



Underwriters Laboratories Inc.
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Job Number:	967379
Project Number:	08CA26008
File Number:	MC15337
Date:	10 July 2008
Model:	6 Inch antenna

Electromagnetic Compatibility Test Report

For

Datamax Corp

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Test Report Details

Underwriters Laboratories Inc.
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Melville, NY 11747

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to public safety and committed to
quality service for over 100 years*

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Job Number: 967379 File Number: MC15337 Page 2 of 40
Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

Tests Performed By: **Underwriters Laboratories Inc.**
1285 Walt Whitman Rd.
Melville, NY 11747

Tests Performed For: **Datamax Corp**
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ORLANDO, FL 32808

Applicant Contact: **Chuck Collins**
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Test Report Date: **10 July 2008**

Product Type: **RFID Tag/Reader**

Product standards **FCC Part 15, Subpart C, 15.209, 15.247, ETSI EN 302-208,**
ETSI EN 300-220-3

Model Number: **6 Inch antenna**

EUT Category: **Low Power Transmitter**

Testing Start Date: **29 May 2008**

Date Testing Complete: **14 June 2008**

Overall Results: Compliant

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, A2LA, or any agency of the US government.

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 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	--	---

1.0 G E N E R A L - Product Description

1.1 Equipment Description

The Datamax RFID Writer/Reader IS INTENDED FOR USE IN Datamax printers. The device uses either the ETSI EN 302-208-2 RFID short-range band (865-858MHz) or the 300 220-3 non-specific short-range band (869.4 –869.65MHz) to write to an RFID tag and then read the tag to ensure proper coding. It is intended for applications into a variety of Datamax printers. Although it is mounted inside the printer, tests were performed outside the printer. The intent is to demonstrate performance to these standards that is independent of the host printer.

1.2 Equipment Marking Plate



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 FCC ID: SEM915MPDMX

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	RFID Module	Datamax Corp	9311	Revised antenna to 6 inch for RFID module
ACC	Printer	Datamax Corp	DMX-H-4310X	Used as host for test
ACC	Laptop	IBM	Think-pad	Used to start transmitting
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	NO	NO	None
2	Printer Cable	I/O	YES	NO	None
3	Ethernet	I/O	YES	NO	None
4	Serial Cable	I/O	YES	YES	None
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

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 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

1.3.3 EUT Internal Operating Frequencies:

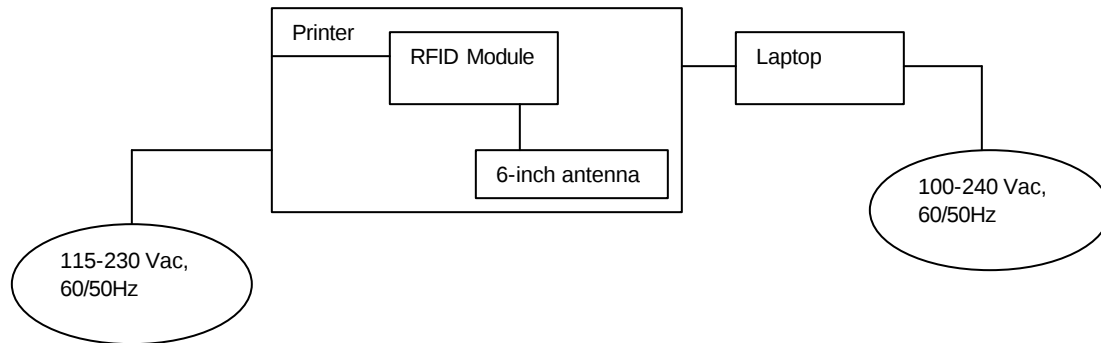
Frequency (MHz)	Description
902	FCC Part 15 Low frequency
917	FCC Part 15 Mid frequency
928	FCC Part 15 High frequency
865.1	Low frequency ETSI 302-208-2
867.9	High frequency ETSI 302-208-2
869.52	ETSI 300-220

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	115-230	3.0-1.5	-	50/60Hz	Single Phase	None
1	120Vac	-	-	60Hz	Single Phase	North America
2	230Vac	-	-	50Hz	Single Phase	European

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



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1.5 EUT Operation Modes

Mode #	Description
1	Operating at maximum power (+ 27dBm) transmitting at low, middle, and high FCC channels.
2	Operating at maximum power (+ 27dBm) hopping between ETSI EN 302 208-2 channels
3	Operating at maximum power (+ 27dBm) hopping between ETSI EN 300 220-3 channel

1.6 EUT Configurations

Mode #	Description
1	RFID module with antenna attached to RFID, but mounted externally to printer. The RFID module and printer were mounted in worst-case orientation.

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

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2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.209 15.247	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007
ETSI EN 302 208-2 V1.1.1 section 4.2.6	Spurious Emissions- Radiated	2004
ETSI EN 302 208-1 V1.1.1 section 8.5.2	Spurious Emissions- Radiated	2004
ETSI EN 300 220-3 V1.1.1 section 4.1.8	Radiated Spurious Emissions	2000

2.4 Results Summary

This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*						
Radiated Emissions Above 1GHz FCC 15.209 and 15.247	Complaint						
Radiated Spurious Emissions Above 1GHz ETSI EN 302 208	Complaint						
Radiated Spurious Emissions Above 1GHz ETSI EN 300 220	Complaint						
Conducted Transmitter Spectrum Mask ETSI EN 302 208	Complaint						
Note: This testing is limited in scope Radiated Spurious Emissions is measured for the RFID module with the new antenna. There was no change to the RFID module. Refer to the original UL test reports as listed below for further compliance results: <table> <tr> <th><u>Report #</u></th><th><u>Description</u></th></tr> <tr> <td>050066</td><td>FCC Part 15.247</td></tr> <tr> <td>050090</td><td>R&TTE Directive</td></tr> </table>		<u>Report #</u>	<u>Description</u>	050066	FCC Part 15.247	050090	R&TTE Directive
<u>Report #</u>	<u>Description</u>						
050066	FCC Part 15.247						
050090	R&TTE Directive						

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Reviewer:



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 Senior Staff Engineer
 International EMC Services
 Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- United States -----

Code of Federal Regulations Title 47	Part 15, Subpart C, Part 15.209 and 15.247 Radio Frequency Devices
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----- International -----

Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999	On radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.
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Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

4.1 Test Conditions and Results – RADIATED EMISSIONS ETSI EN 302-208 & EN300-220

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard	ETSI EN 302-208 and ETSI EN 300-220		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	1GHz –12.75	(3 meter measurement distance)	
Limits			
State	47 MHz to 74 MHz, 87.5 MHz to 118 MHz, 174 MHz to 230 MHz, 470 MHz to 862 MHz	Other Frequencies below 1000 MHz	Frequencies above 1000 MHz
Operating	4 nW (-54 dBm)	250 nW (-36 dBm)	1 µW (-30 dBm)
Standby/Receive	2 nW (-57 dBm)	2 nW (-57 dBm)	20 nW (-47 dBm)
Frequency Range of Measurement			
Maximum Transmit Frequency		Measurement Range	
< 470 MHz		25 MHz to 4 GHz	
> 470 MHz		25 MHz to 12.75 GHz	

Supplementary information: The scope was limited to confirming that the spurious emissions above the fundamental frequency met the requirements therefore, only above 1GHz was tested in operating mode.

An estimation of the field strength that correlates with the Radiated Spurious power Limit is made using the range equation stated below. This line is placed upon the measurements plot for reference. Any emissions close to the line are then subject to the substitution method procedure using the calibrated signal source and calibrated reference antenna.

$$Elim = 20\log(\sqrt{30Plim}/d)+120 \text{ therefore, } 20\log((\sqrt{30P} \text{ } 1\mu W/3) +120 = 65.2 \text{ dB (V)/m}$$

Where

$Elim$ =electric field strength limit, in dB (µV)

$Plim$ = EIRP limit, in watts

d =measurement distance, in meters

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Table 1 Radiated Emissions EUT Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
2	2 & 3	1
Supplementary information:		

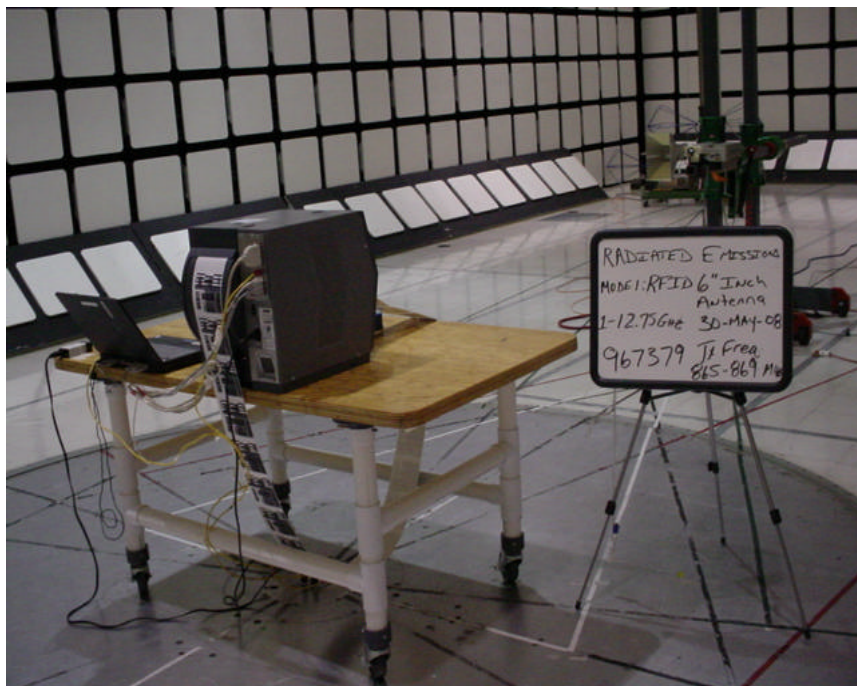
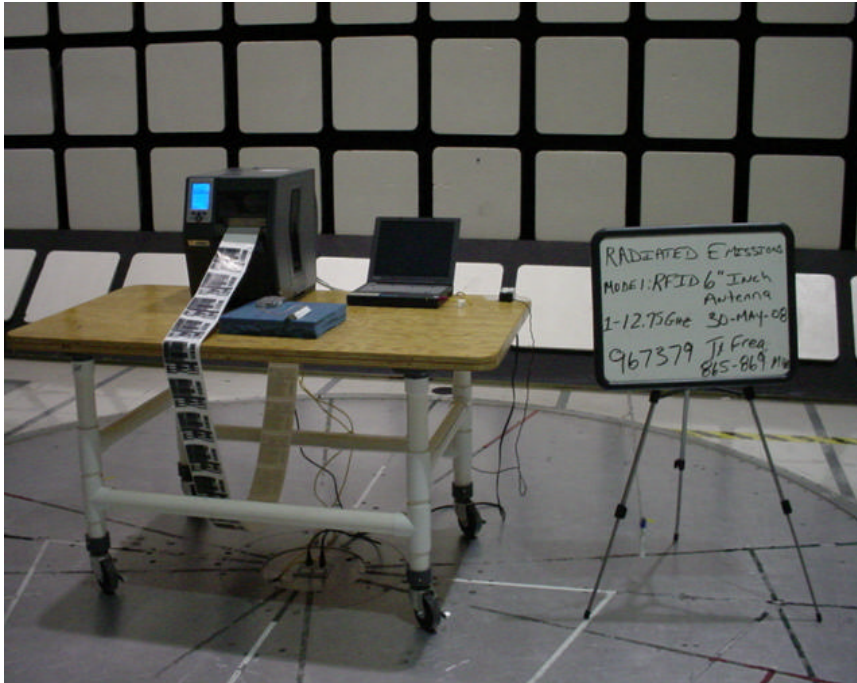
Table 2 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Above 1GHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Horn Antenna	Electro-Metrics	RGA-180	ME5-565
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

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Figure 1 Test setup for Radiated Emissions Test Set Up 1-12.75GHz Front and Rear View



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Table 3 Radiated Emissions Data Points

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 865MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4
Horizontal 1000 - 3000MHz -----								
1	1000	54.21 pk	-32.6	25.2	46.81	-	65.2	-
	Azimuth:138	Height:200	Horz	Margin [dB]	-	-18.39	-	-
20	1000	54.21 pk	-32.6	25.2	46.81	-	65.2	-
	Azimuth:138	Height:200	Horz	Margin [dB]	-	-18.39	-	-
21	1090.09	48.19 pk	-32.2	25.2	41.19	-	65.2	-
	Azimuth:82	Height:100	Horz	Margin [dB]	-	-24.01	-	-
22	1188.188	50.69 pk	-31.8	25.1	43.99	-	65.2	-
	Azimuth:221	Height:100	Horz	Margin [dB]	-	-21.21	-	-
23	1288.288	46.59 pk	-31.7	25.1	39.99	-	65.2	-
	Azimuth:165	Height:100	Horz	Margin [dB]	-	-25.21	-	-
24	1390.39	47.26 pk	-31.3	25	40.96	-	65.2	-
	Azimuth:6	Height:100	Horz	Margin [dB]	-	-24.24	-	-
25	1990.991	42.78 pk	-29.9	27.7	40.58	-	65.2	-
	Azimuth:0	Height:200	Horz	Margin [dB]	-	-24.62	-	-
Vertical 1000 - 3000MHz -----								
2	1062.062	49.78 pk	-32.5	25	42.28	-	65.2	-
	Azimuth:0	Height:100	Vert	Margin [dB]	-	-22.92	-	-
3	1090.09	50.54 pk	-32.2	25	43.34	-	65.2	-
	Azimuth:0	Height:100	Vert	Margin [dB]	-	-21.86	-	-
4	1128.128	51.35 pk	-32.3	25	44.05	-	65.2	-
	Azimuth:6	Height:100	Vert	Margin [dB]	-	-21.15	-	-
5	1190.19	55.66 pk	-31.8	25	48.86	-	65.2	-
	Azimuth:165	Height:100	Vert	Margin [dB]	-	-16.34	-	-
6	1252.252	48.57 pk	-31.8	25.1	41.87	-	65.2	-
	Azimuth:0	Height:100	Vert	Margin [dB]	-	-23.33	-	-
7	1298.298	51.65 pk	-31.6	25.1	45.15	-	65.2	-
	Azimuth:27	Height:100	Vert	Margin [dB]	-	-20.05	-	-
8	1390.39	52.17 pk	-31.3	25.1	45.97	-	65.2	-
	Azimuth:358	Height:200	Vert	Margin [dB]	-	-19.23	-	-
9	1408.408	50.99 pk	-31.2	25.1	44.89	-	65.2	-
	Azimuth:358	Height:200	Vert	Margin [dB]	-	-20.31	-	-

LIMIT 2: ETSI EN302-208 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

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 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 865MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
10	1428.428	51.33 pk	-31.3	25.1	45.13	-	65.2	-	-
	Azimuth:358	Height:200	Vert	Margin [dB]	-	-20.07	-	-	-
11	1460.46	52.34 pk	-31.3	25.1	46.14	-	65.2	-	-
	Azimuth:27	Height:200	Vert	Margin [dB]	-	-19.06	-	-	-
12	1502.503	53.68 pk	-31	25.1	47.78	-	65.2	-	-
	Azimuth:248	Height:200	Vert	Margin [dB]	-	-17.42	-	-	-
13	1650.651	51.43 pk	-30.8	25.9	46.53	-	65.2	-	-
	Azimuth:304	Height:200	Vert	Margin [dB]	-	-18.67	-	-	-
14	1678.679	49.98 pk	-30.6	26.1	45.48	-	65.2	-	-
	Azimuth:358	Height:200	Vert	Margin [dB]	-	-19.72	-	-	-
15	1790.791	47.01 pk	-30.4	26.7	43.31	-	65.2	-	-
	Azimuth:248	Height:100	Vert	Margin [dB]	-	-21.89	-	-	-
16	1812.813	45.76 pk	-30.5	26.8	42.06	-	65.2	-	-
	Azimuth:0	Height:100	Vert	Margin [dB]	-	-23.14	-	-	-
17	1838.839	44.51 pk	-30.3	26.9	41.11	-	65.2	-	-
	Azimuth:358	Height:100	Vert	Margin [dB]	-	-24.09	-	-	-
18	1888.889	45.75 pk	-30	27.2	42.95	-	65.2	-	-
	Azimuth:6	Height:200	Vert	Margin [dB]	-	-22.25	-	-	-
19	1986.987	43.58 pk	-30	27.7	41.28	-	65.2	-	-
	Azimuth:0	Height:200	Vert	Margin [dB]	-	-23.92	-	-	-

LIMIT 2: ETSI EN302-208 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

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 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Table 4 Radiated Emissions Data Points

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 867MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 dB[uVolts/meter]	2	3	4
Horizontal 1000 - 3000MHz -----								
22	1000	53.49 pk	-32.6	25.2	46.09	-	65.2	-
	Azimuth:6	Height:200	Horz	Margin [dB]	-	-19.11	-	-
23	1092.092	49.24 pk	-32.2	25.2	42.24	-	65.2	-
	Azimuth:110	Height:100	Horz	Margin [dB]	-	-22.96	-	-
24	1190.19	48.52 pk	-31.8	25.1	41.82	-	65.2	-
	Azimuth:221	Height:100	Horz	Margin [dB]	-	-23.38	-	-
25	1242.242	47.47 pk	-31.8	25.1	40.77	-	65.2	-
	Azimuth:331	Height:200	Horz	Margin [dB]	-	-24.43	-	-
26	1392.392	48.56 pk	-31.3	25	42.26	-	65.2	-
	Azimuth:0	Height:100	Horz	Margin [dB]	-	-22.94	-	-
27	1592.593	43.59 pk	-30.8	25.5	38.29	-	65.2	-
	Azimuth:276	Height:100	Horz	Margin [dB]	-	-26.91	-	-
28	1734.735	45.88 pk	-30.5	26.3	41.68	-	65.2	-
	Azimuth:221	Height:100	Horz	Margin [dB]	-	-23.52	-	-
29	2603.604	51 pk	-28.9	29.1	51.2	-	65.2	-
	Azimuth:331	Height:100	Horz	Margin [dB]	-	-14	-	-
30	1000	53.49 pk	-32.6	25.2	46.09	-	65.2	-
	Azimuth:6	Height:200	Horz	Margin [dB]	-	-19.11	-	-
31	1000	53.49 pk	-32.6	25.2	46.09	-	65.2	-
	Azimuth:6	Height:200	Horz	Margin [dB]	-	-19.11	-	-
Vertical 1000 - 3000MHz -----								
1	1000	54.28 pk	-32.6	25	46.68	-	65.2	-
	Azimuth:193	Height:100	Vert	Margin [dB]	-	-18.52	-	-
2	1090.09	54.08 pk	-32.2	25	46.88	-	65.2	-
	Azimuth:358	Height:100	Vert	Margin [dB]	-	-18.32	-	-
3	1196.196	54.81 pk	-31.9	25	47.91	-	65.2	-
	Azimuth:276	Height:200	Vert	Margin [dB]	-	-17.29	-	-
4	1294.294	50.3 pk	-31.6	25.1	43.8	-	65.2	-
	Azimuth:55	Height:200	Vert	Margin [dB]	-	-21.4	-	-
5	1360.36	49.64 pk	-31.5	25.1	43.24	-	65.2	-
	Azimuth:358	Height:200	Vert	Margin [dB]	-	-21.96	-	-
6	1390.39	50.33 pk	-31.3	25.1	44.13	-	65.2	-
	Azimuth:331	Height:200	Vert	Margin [dB]	-	-21.07	-	-
7	1408.408	50.28 pk	-31.2	25.1	44.18	-	65.2	-
	Azimuth:165	Height:200	Vert	Margin [dB]	-	-21.02	-	-
8	1432.432	50.5 pk	-31.3	25.1	44.3	-	65.2	-
	Azimuth:304	Height:100	Vert	Margin [dB]	-	-20.9	-	-
9	1454.454	53.62 pk	-31.3	25.1	47.42	-	65.2	-
	Azimuth:55	Height:200	Vert	Margin [dB]	-	-17.78	-	-

LIMIT 2: ETSI EN302-208 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

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 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 867MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
10	1492.492	51.68 pk	-31.1	25.1	45.68	-	65.2	-	-
	Azimuth:276	Height:100	Vert	Margin [dB]		-	-19.52	-	-
11	1512.513	52.45 pk	-30.9	25.2	46.75	-	65.2	-	-
	Azimuth:0	Height:200	Vert	Margin [dB]		-	-18.45	-	-
12	1552.553	51.19 pk	-31	25.4	45.59	-	65.2	-	-
	Azimuth:138	Height:100	Vert	Margin [dB]		-	-19.61	-	-
13	1564.565	52.26 pk	-30.9	25.4	46.76	-	65.2	-	-
	Azimuth:358	Height:200	Vert	Margin [dB]		-	-18.44	-	-
14	1590.591	52.27 pk	-30.8	25.6	47.07	-	65.2	-	-
	Azimuth:193	Height:200	Vert	Margin [dB]		-	-18.13	-	-
15	1626.627	53.12 pk	-30.8	25.8	48.12	-	65.2	-	-
	Azimuth:55	Height:200	Vert	Margin [dB]		-	-17.08	-	-
16	1688.689	48.9 pk	-30.5	26.1	44.5	-	65.2	-	-
	Azimuth:110	Height:100	Vert	Margin [dB]		-	-20.7	-	-
17	1760.761	46.33 pk	-30.4	26.5	42.43	-	65.2	-	-
	Azimuth:55	Height:100	Vert	Margin [dB]		-	-22.77	-	-
18	1806.807	47.55 pk	-30.5	26.8	43.85	-	65.2	-	-
	Azimuth:0	Height:200	Vert	Margin [dB]		-	-21.35	-	-
19	1988.989	44.61 pk	-30	27.7	42.31	-	65.2	-	-
	Azimuth:304	Height:200	Vert	Margin [dB]		-	-22.89	-	-
20	2089.089	42.35 pk	-29.7	27.9	40.55	-	65.2	-	-
	Azimuth:358	Height:200	Vert	Margin [dB]		-	-24.65	-	-
21	2603.604	39.36 pk	-28.9	28.9	39.36	-	65.2	-	-
	Azimuth:0	Height:100	Vert	Margin [dB]		-	-25.84	-	-

LIMIT 2: ETSI EN302-208 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

Job Number: 967379 File Number: MC15337 Page 18 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 869.52MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Horizontal 1000 - 3000MHz -----									
21	1096.096	47.75 pk	-32.2	25.2	40.75	54	65.2	-	-
	Azimuth:57	Height:99	Horz	Margin [dB]		-13.25	-24.45	-	-
22	1192.192	54.46 pk	-31.8	25.1	47.76	54	65.2	-	-
	Azimuth:169	Height:99	Horz	Margin [dB]		-6.24	-17.44	-	-
23	1272.272	46.92 pk	-31.7	25.1	40.32	54	65.2	-	-
	Azimuth:225	Height:200	Horz	Margin [dB]		-13.68	-24.88	-	-
24	1388.388	48.7 pk	-31.3	25	42.4	54	65.2	-	-
	Azimuth:2	Height:99	Horz	Margin [dB]		-11.6	-22.8	-	-
25	1492.492	49.84 pk	-31.1	25	43.74	54	65.2	-	-
	Azimuth:169	Height:99	Horz	Margin [dB]		-10.26	-21.46	-	-
26	1448.448	48.98 pk	-31.3	25	42.68	54	65.2	-	-
	Azimuth:2	Height:99	Horz	Margin [dB]		-11.32	-22.52	-	-
27	1834.835	42.79 pk	-30.3	26.9	39.39	54	65.2	-	-
	Azimuth:337	Height:99	Horz	Margin [dB]		-14.61	-25.81	-	-
Horizontal 3000 - 6000MHz -----									
35	4565.043	33.56 pk	-24.9	32.6	41.26	54	65.2	-	-
	Azimuth:91	Height:200	Horz	Margin [dB]		-12.74	-23.94	-	-
36	5305.537	33.09 pk	-23.7	33.8	43.19	54	65.2	-	-
	Azimuth:107	Height:200	Horz	Margin [dB]		-10.81	-22.01	-	-
37	5971.981	32.72 pk	-22.6	34.5	44.62	54	65.2	-	-
	Azimuth:331	Height:100	Horz	Margin [dB]		-9.38	-20.58	-	-
Horizontal 6000 - 12750MHz -----									
38	11463.482	28.31 pk	-17.6	40.4	51.11	54	65.2	-	-
	Azimuth:135	Height:100	Horz	Margin [dB]		-2.89	-14.09	-	-
39	10339.045	29.09 pk	-17.9	38.3	49.49	54	65.2	-	-
	Azimuth:258	Height:200	Horz	Margin [dB]		-4.51	-15.71	-	-
40	8782.391	30.1 pk	-20.5	37.5	47.1	54	65.2	-	-
	Azimuth:303	Height:100	Horz	Margin [dB]		-6.9	-18.1	-	-
Vertical 1000 - 3000MHz -----									
1	1004.004	46.57 pk	-32.5	25	39.07	54	65.2	-	-
	Azimuth:3	Height:199	Vert	Margin [dB]		-14.93	-26.13	-	-
2	1054.054	47.64 pk	-32.6	25	40.04	54	65.2	-	-
	Azimuth:336	Height:100	Vert	Margin [dB]		-13.96	-25.16	-	-
3	1066.066	48.33 pk	-32.4	25	40.93	54	65.2	-	-
	Azimuth:336	Height:100	Vert	Margin [dB]		-13.07	-24.27	-	-
4	1092.092	52.84 pk	-32.2	25	45.64	54	65.2	-	-
	Azimuth:353	Height:100	Vert	Margin [dB]		-8.36	-19.56	-	-

LIMIT 2: ETSI EN300-220 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Job Number: 967379 File Number: MC15337 Page 19 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 869.52MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
5	1166.166	47.41 pk	-31.9	25	40.51	54	65.2	-	-
	Azimuth:113	Height:100	Vert	Margin [dB]	-13.49	-24.69	-	-	-
6	1176.176	48.94 pk	-31.8	25	42.14	54	65.2	-	-
	Azimuth:336	Height:100	Vert	Margin [dB]	-11.86	-23.06	-	-	-
7	1194.194	52.39 pk	-31.9	25	45.49	54	65.2	-	-
	Azimuth:57	Height:199	Vert	Margin [dB]	-8.51	-19.71	-	-	-
8	1234.234	49.37 pk	-31.9	25	42.47	54	65.2	-	-
	Azimuth:224	Height:100	Vert	Margin [dB]	-11.53	-22.73	-	-	-
9	1262.262	47.58 pk	-31.8	25.1	40.88	54	65.2	-	-
	Azimuth:353	Height:100	Vert	Margin [dB]	-13.12	-24.32	-	-	-
10	1282.282	48.26 pk	-31.6	25.1	41.76	54	65.2	-	-
	Azimuth:224	Height:100	Vert	Margin [dB]	-12.24	-23.44	-	-	-
11	1394.394	51.64 pk	-31.3	25.1	45.44	54	65.2	-	-
	Azimuth:6	Height:100	Vert	Margin [dB]	-8.56	-19.76	-	-	-
12	1452.452	54.41 pk	-31.3	25.1	48.21	54	65.2	-	-
	Azimuth:224	Height:199	Vert	Margin [dB]	-5.79	-16.99	-	-	-
13	1490.49	52.6 pk	-31.1	25.1	46.6	54	65.2	-	-
	Azimuth:1	Height:199	Vert	Margin [dB]	-7.4	-18.6	-	-	-
14	1514.515	50.12 pk	-30.9	25.2	44.42	54	65.2	-	-
	Azimuth:141	Height:199	Vert	Margin [dB]	-9.58	-20.78	-	-	-
15	1540.541	51.43 pk	-30.9	25.3	45.83	54	65.2	-	-
	Azimuth:196	Height:199	Vert	Margin [dB]	-8.17	-19.37	-	-	-
16	1590.591	49.75 pk	-30.8	25.6	44.55	54	65.2	-	-
	Azimuth:308	Height:199	Vert	Margin [dB]	-9.45	-20.65	-	-	-
17	1690.691	47.66 pk	-30.5	26.1	43.26	54	65.2	-	-
	Azimuth:336	Height:100	Vert	Margin [dB]	-10.74	-21.94	-	-	-
18	1786.787	47.01 pk	-30.4	26.6	43.21	54	65.2	-	-
	Azimuth:224	Height:100	Vert	Margin [dB]	-10.79	-21.99	-	-	-
19	1992.993	42.95 pk	-29.9	27.8	40.85	54	65.2	-	-
	Azimuth:281	Height:199	Vert	Margin [dB]	-13.15	-24.35	-	-	-
20	2609.61	41.51 pk	-28.9	29	41.61	54	65.2	-	-
	Azimuth:3	Height:199	Vert	Margin [dB]	-12.39	-23.59	-	-	-

LIMIT 2: ETSI EN300-220 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Job Number: 967379 File Number: MC15337 Page 20 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 869.52MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	
=====										
Vertical 3000 - 6000MHz -----										
28	4198.799	33.76 pk	-25.1	32.4	41.06	54	65.2	-	-	-
	Azimuth:35	Height:199	Vert	Margin [dB]		-12.94	-24.14	-	-	-
29	5465.644	32.56 pk	-23.1	34	43.46	54	65.2	-	-	-
	Azimuth:79	Height:199	Vert	Margin [dB]		-10.54	-21.74	-	-	-
30	5805.871	33.76 pk	-23.3	34.3	44.76	54	65.2	-	-	-
	Azimuth:219	Height:100	Vert	Margin [dB]		-9.24	-20.44	-	-	-
Vertical 6000 - 12750MHz -----										
31	8096.923	30.92 pk	-20.5	37.1	47.52	54	65.2	-	-	-
	Azimuth:6	Height:100	Vert	Margin [dB]		-6.48	-17.68	-	-	-
32	9177.464	30.23 pk	-20.1	37.6	47.73	54	65.2	-	-	-
	Azimuth:6	Height:100	Vert	Margin [dB]		-6.27	-17.47	-	-	-
33	9609.68	30.81 pk	-19.1	37.7	49.41	54	65.2	-	-	-
	Azimuth:91	Height:100	Vert	Margin [dB]		-4.59	-15.79	-	-	-
34	11169.71	28.78 pk	-17.1	40.2	51.88	54	65.2	-	-	-
	Azimuth:303	Height:200	Vert	Margin [dB]		-2.12	-13.32	-	-	-

LIMIT 2: ETSI EN300-220 1GHz -12.75GHz

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

4.2 Test Conditions and Results: TRANSMITTER SPECTRUM MASK

Test Description	Measurements were made in accordance with the requirements and specification and configured as noted in the test set up. The EUT was attached to the input of the measuring receiver a calibrated 50-ohm attenuator is used to reduce the signal strength of the transmit signal. The attenuator loss factor is included on the plot and in the frequency table in the results.	
Basic Standard	ETSI EN 302-208	
UL LPG	--	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	865 MHz	Conducted at the output of the antenna.
Limits The diagram illustrates the transmitter spectrum mask limits. It features a central trapezoidal shape. The top horizontal edge is labeled '0 dBc' and has a width of '200 kHz' indicated by a dimension line. The center frequency is marked as 'fc'. The sloped edges descend to a level of '-30 dBc' at the frequencies 'fc - 200 kHz' and 'fc + 200 kHz'. Outside these frequency ranges, the limit is a constant horizontal line at '-36 dBm'.		
Supplementary information: The scope was limited to confirming that the conducted emissions at the fundamental frequency 865MHz met the requirements.		

Job Number: 967379 File Number: MC15337 Page 22 of 40
Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

Table 5 Radiated Emissions EUT Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
2	2	1
Supplementary information:		

Table 6 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Above 30MHz-1GHz			
Spectrum Analyzer	Agilent	E7402A	ME5B-123
Dipole Antenna	EMCO	3121C	3359
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

Job Number: 967379 File Number: MC15337 Page 23 of 40
Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

Figure 2: Test setup TRANSMITTER SPECTRUM MASK

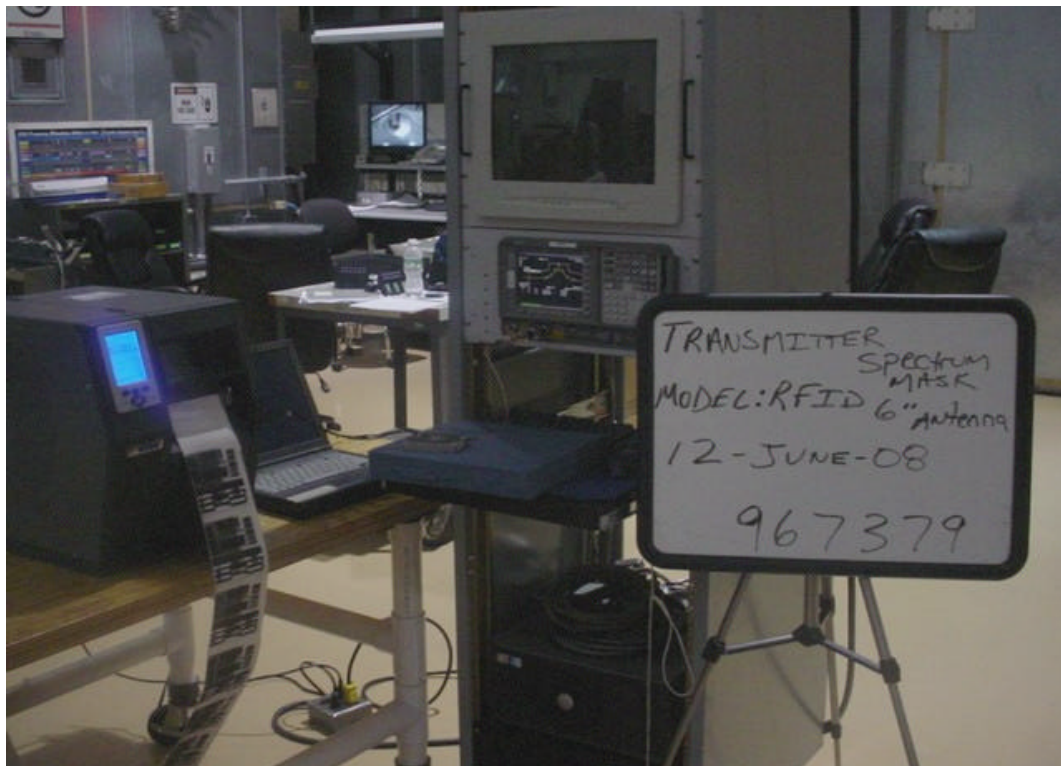
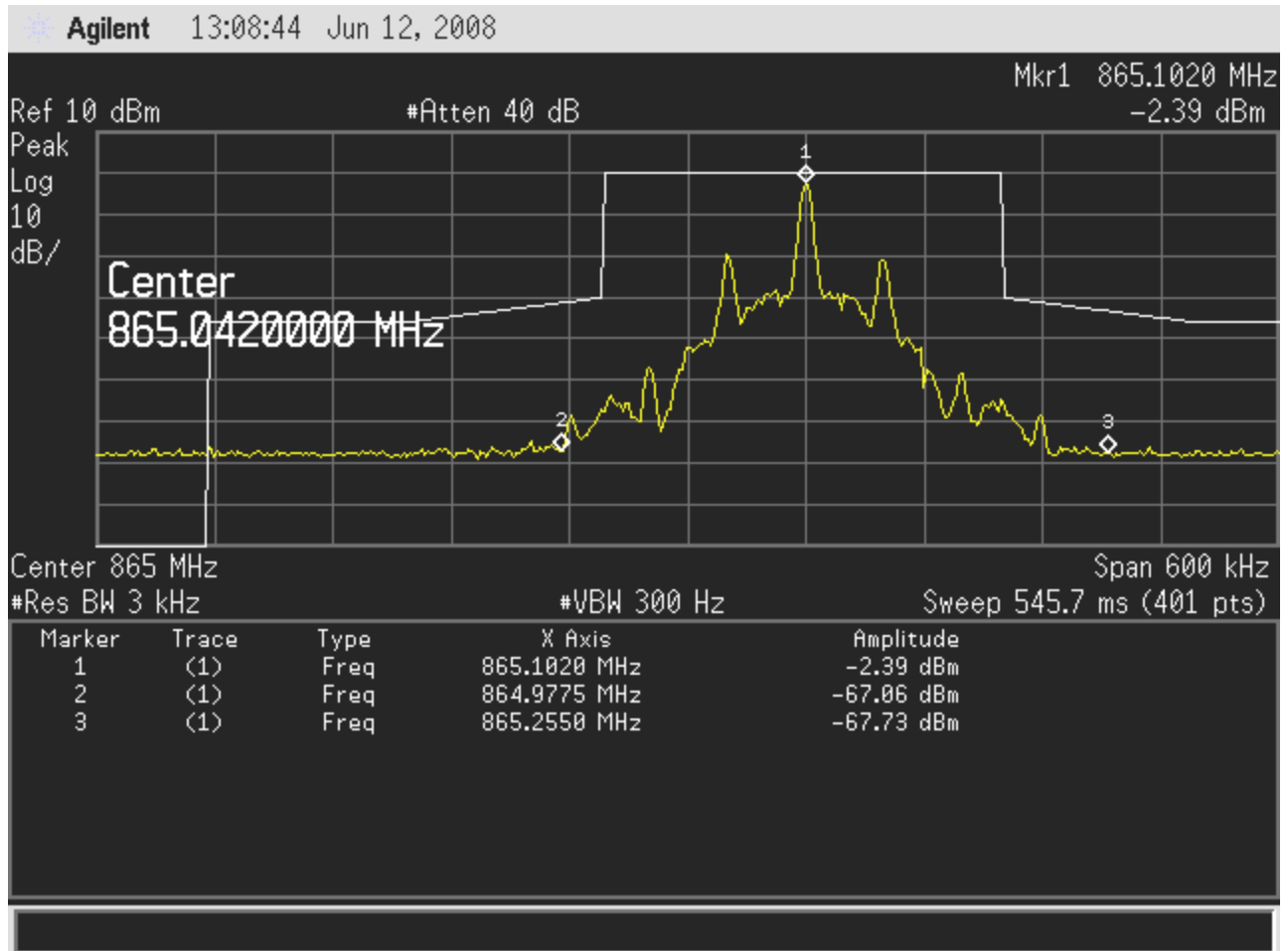


Figure 3: Data TRANSMITTER SPECTRUM MASK



4.3 Test Conditions and Results – RADIATED EMISSIONS FCC PART 15 SUBPART C

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard	FCC Part 15, Subpart C, 15.209 and 15.247	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	1GHz –10GHz	(3 meter measurement distance)
Limits - Class B		
Frequency (MHz)	Limit (dBμV/m)	
	Quasi-Peak	Average
Above 960 (FCC)	NA	54 (at 3-meter)
Supplementary information: None		

Table 7 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: Most Harmonics of the transmit frequency fall wholly or partially within the restricted band, so for simplicity the general limits of 15.209 are displayed. Spurious emissions measurements from spurious emissions were measured up to the 10 th harmonic.		

Job Number: 967379 File Number: MC15337 Page 26 of 40
Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

Table 8 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Above 1GHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Horn Antenna	Electro-Metrics	RGA-180	ME5-565
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

Job Number: 967379 File Number: MC15337 Page 27 of 40
Model Number: 6 Inch antenna
Client Name: Datamax Corp
FCC ID: SEM915MPDMX

Figure 4 Test setup for Radiated Emissions 1-10GHz Front and Rear View

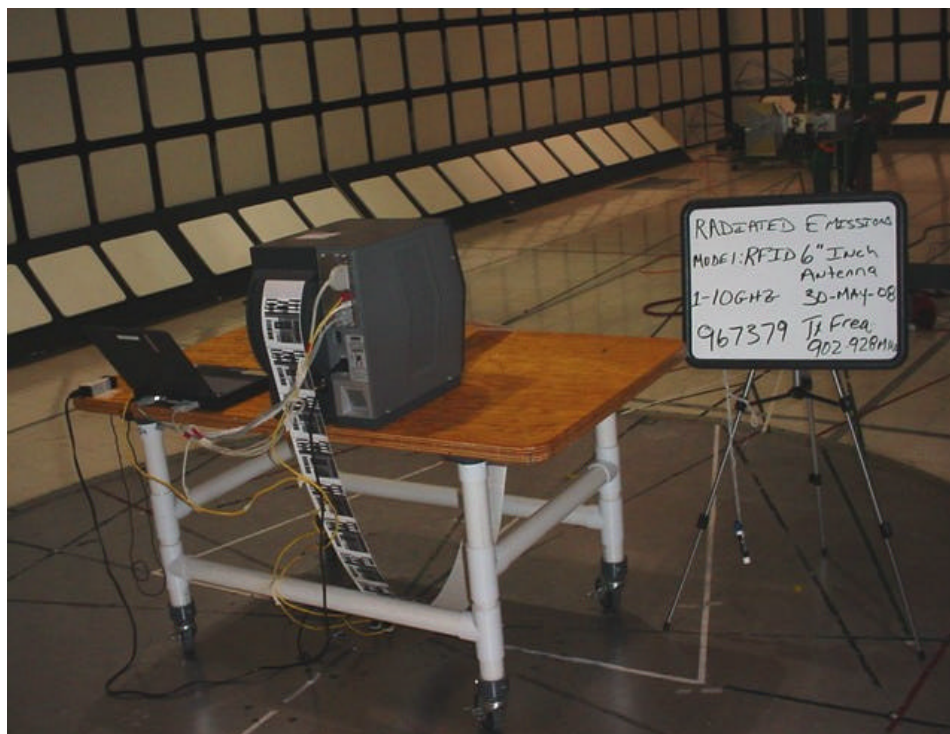
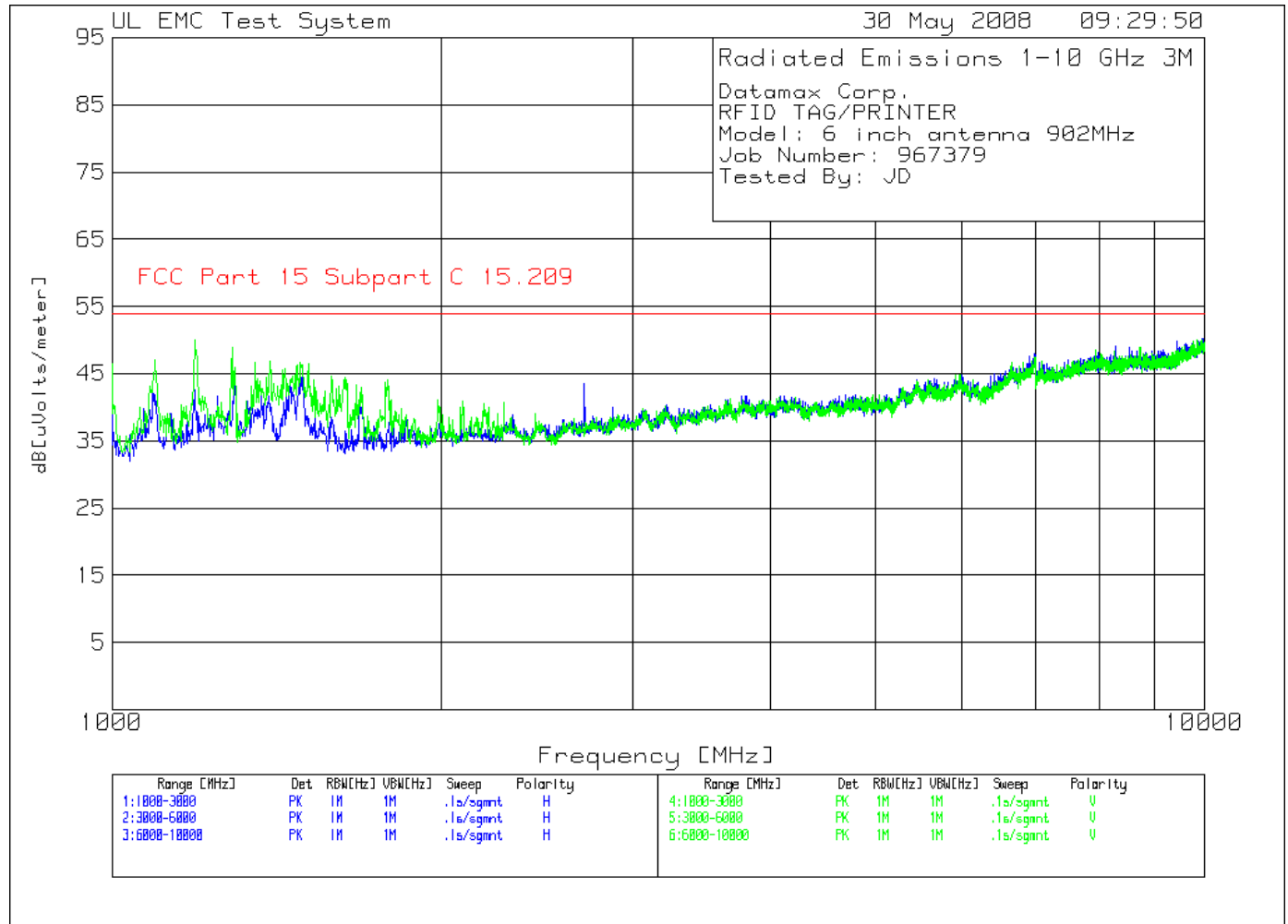


Figure 5 Radiated Emissions Graph



Job Number: 967379 File Number: MC15337 Page 29 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Table 9 Radiated Emissions Data Points

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 902MHz
 Job Number: 967379
 Tested By: JD

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Horizontal 1000 - 3000MHz -----									
1	1000	52.74 pk	-32.6	25.2	45.34	54	-	-	-
	Azimuth:167	Height:200	Horz	Margin [dB]		-8.66	-	-	-
Vertical 1000 - 3000MHz -----									
2	1096.096	54.17 pk	-32.2	25	46.97	54	-	-	-
	Azimuth:2	Height:100	Vert	Margin [dB]		-7.03	-	-	-
3	1190.19	56.79 pk	-31.8	25	49.99	54	-	-	-
	Azimuth:0	Height:100	Vert	Margin [dB]		-4.01	-	-	-
4	1288.288	55.45 pk	-31.7	25.1	48.85	54	-	-	-
	Azimuth:222	Height:100	Vert	Margin [dB]		-5.15	-	-	-
5	1352.352	53.01 pk	-31.5	25.1	46.61	54	-	-	-
	Azimuth:0	Height:200	Vert	Margin [dB]		-7.39	-	-	-
6	1394.394	53.07 pk	-31.3	25.1	46.87	54	-	-	-
	Azimuth:167	Height:200	Vert	Margin [dB]		-7.13	-	-	-
7	1440.44	51.86 pk	-31.3	25.1	45.66	54	-	-	-
	Azimuth:29	Height:200	Vert	Margin [dB]		-8.34	-	-	-
8	1488.488	52.78 pk	-31.2	25.1	46.68	54	-	-	-
	Azimuth:112	Height:100	Vert	Margin [dB]		-7.32	-	-	-
9	1588.589	49.74 pk	-30.8	25.6	44.54	54	-	-	-
	Azimuth:195	Height:200	Vert	Margin [dB]		-9.46	-	-	-
10	1636.637	49.46 pk	-30.8	25.8	44.46	54	-	-	-
	Azimuth:2	Height:200	Vert	Margin [dB]		-9.54	-	-	-
11	1692.693	47.18 pk	-30.4	26.1	42.88	54	-	-	-
	Azimuth:0	Height:100	Vert	Margin [dB]		-11.12	-	-	-
12	1788.789	47.78 pk	-30.4	26.7	44.08	54	-	-	-
	Azimuth:0	Height:100	Vert	Margin [dB]		-9.92	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

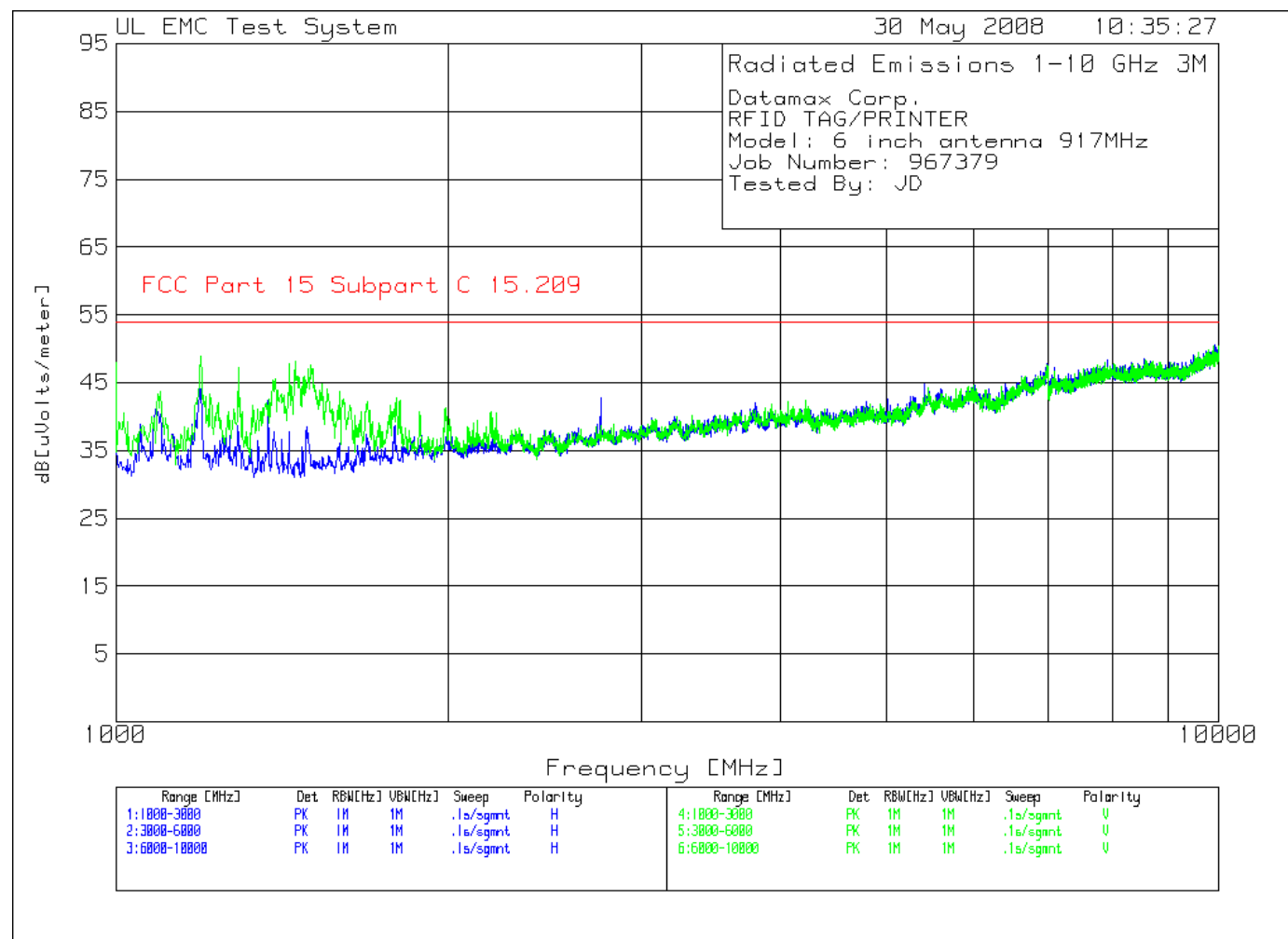
Job Number: 967379 File Number: MC15337 Page 30 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 902MHz
 Job Number: 967379
 Tested By: JD

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
=====								
Vertical 1000 - 3000MHz								
1192.3898	35.78 ave	-31.8	25	28.98	54	-	-	-
Azimuth: 57	Height:100	Vert	Margin	[dB]: -25.02		-	-	-
1191.6483	34.87 ave	-31.8	25	28.07	54	-	-	-
Azimuth: 45	Height:100	Vert	Margin	[dB]: -25.93		-	-	-
1288	32.14 ave	-31.7	25.1	25.54	54	-	-	-
Azimuth: 80	Height:100	Vert	Margin	[dB]: -28.46		-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector



Job Number: 967379 File Number: MC15337 Page 32 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Table 10 Radiated Emissions Data Points

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 917MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Horizontal 1000 - 3000MHz -----									
15	2751.752	41.67 pk	-28.5	29.6	42.77	54	-	-	-
	Azimuth:111	Height:100	Horz	Margin [dB]		-11.23	-	-	-
Vertical 1000 - 3000MHz -----									
1	1000	55.5 pk	-32.6	25	47.9	54	-	-	-
	Azimuth:6	Height:100	Vert	Margin [dB]		-6.1	-	-	-
2	1098.098	50.91 pk	-32.2	25	43.71	54	-	-	-
	Azimuth:29	Height:100	Vert	Margin [dB]		-10.29	-	-	-
3	1194.194	55.75 pk	-31.9	25	48.85	54	-	-	-
	Azimuth:6	Height:100	Vert	Margin [dB]		-5.15	-	-	-
4	1292.292	53.85 pk	-31.7	25.1	47.25	54	-	-	-
	Azimuth:84	Height:100	Vert	Margin [dB]		-6.75	-	-	-
5	1394.394	51.72 pk	-31.3	25.1	45.52	54	-	-	-
	Azimuth:277	Height:200	Vert	Margin [dB]		-8.48	-	-	-
6	1438.438	54.06 pk	-31.3	25.1	47.86	54	-	-	-
	Azimuth:84	Height:100	Vert	Margin [dB]		-6.14	-	-	-
7	1454.454	54.37 pk	-31.3	25.1	48.17	54	-	-	-
	Azimuth:139	Height:200	Vert	Margin [dB]		-5.83	-	-	-
8	1500.501	53.41 pk	-31	25.1	47.51	54	-	-	-
	Azimuth:1	Height:100	Vert	Margin [dB]		-6.49	-	-	-
9	1596.597	48.86 pk	-30.8	25.6	43.66	54	-	-	-
	Azimuth:139	Height:200	Vert	Margin [dB]		-10.34	-	-	-
10	1690.691	46.62 pk	-30.5	26.1	42.22	54	-	-	-
	Azimuth:1	Height:100	Vert	Margin [dB]		-11.78	-	-	-
11	1798.799	46.44 pk	-30.4	26.7	42.74	54	-	-	-
	Azimuth:56	Height:100	Vert	Margin [dB]		-11.26	-	-	-
12	1886.887	43.55 pk	-30	27.2	40.75	54	-	-	-
	Azimuth:332	Height:100	Vert	Margin [dB]		-13.25	-	-	-
13	1990.991	43.38 pk	-29.9	27.8	41.28	54	-	-	-
	Azimuth:221	Height:100	Vert	Margin [dB]		-12.72	-	-	-
14	2189.189	41.98 pk	-29.4	28.1	40.68	54	-	-	-
	Azimuth:1	Height:200	Vert	Margin [dB]		-13.32	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

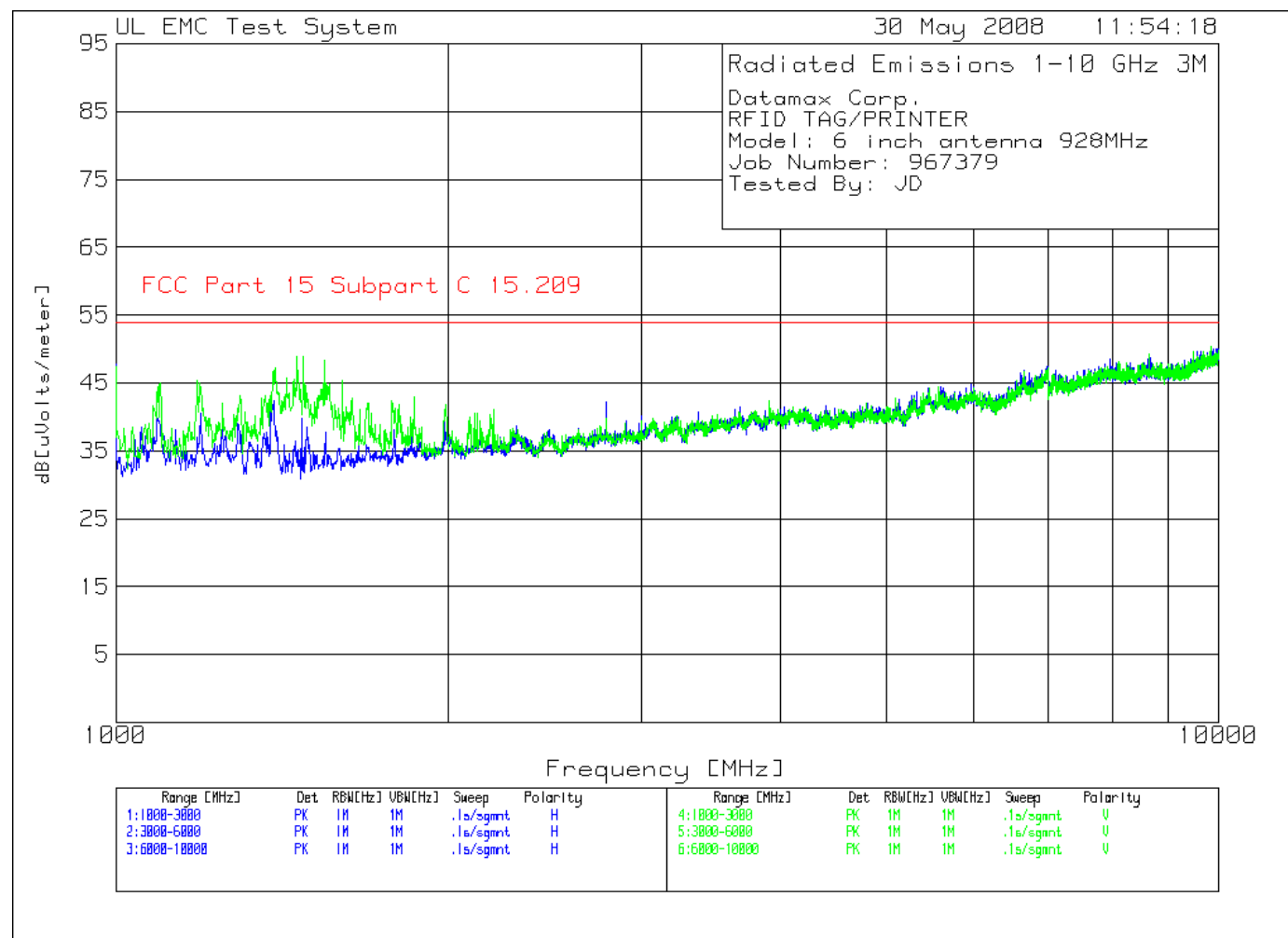
Job Number: 967379 File Number: MC15337 Page 33 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 917MHz
 Job Number: 967379
 Tested By: JD

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
=====								
Vertical 1000 - 3000MHz								
1000	47.05 ave	-32.6	25	39.45	54	-	-	-
Azimuth: 153	Height:100	Vert	Margin	[dB]: -14.55		-	-	-
1195.1698	35.02 ave	-31.9	25	28.12	54	-	-	-
Azimuth: 58	Height:100	Vert	Margin	[dB]: -25.88		-	-	-
1194.1	34.69 ave	-31.9	25	27.79	54	-	-	-
Azimuth: 58	Height:100	Vert	Margin	[dB]: -26.21		-	-	-
1435.6503	32.75 ave	-31.3	25.1	26.55	54	-	-	-
Azimuth: 45	Height:100	Vert	Margin	[dB]: -27.45		-	-	-
1438	32.81 ave	-31.3	25.1	26.61	54	-	-	-
Azimuth: 45	Height:100	Vert	Margin	[dB]: -27.39		-	-	-
1456.3798	34.37 ave	-31.3	25.1	28.17	54	-	-	-
Azimuth: 168	Height:100	Vert	Margin	[dB]: -25.83		-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector



Job Number: 967379 File Number: MC15337 Page 35 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Table 11 Radiated Emissions Graph

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 928MHz
 Job Number: 967379
 Tested By: JD

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Horizontal 1000 - 3000MHz -----									
15	1000	55.23 pk	-32.6	25.2	47.83	54	-	-	-
	Azimuth:249	Height:200	Horz	Margin [dB]		-6.17	-	-	-
16	2783.784	40.75 pk	-28.3	29.7	42.15	54	-	-	-
	Azimuth:110	Height:100	Horz	Margin [dB]		-11.85	-	-	-
17	1390.39	48.67 pk	-31.3	25	42.37	54	-	-	-
	Azimuth:138	Height:100	Horz	Margin [dB]		-11.63	-	-	-
Vertical 1000 - 3000MHz -----									
1	1000	55 pk	-32.6	25	47.4	54	-	-	-
	Azimuth:138	Height:100	Vert	Margin [dB]		-6.6	-	-	-
2	1098.098	52.23 pk	-32.2	25	45.03	54	-	-	-
	Azimuth:358	Height:100	Vert	Margin [dB]		-8.97	-	-	-
3	1186.186	52.17 pk	-31.8	25	45.37	54	-	-	-
	Azimuth:7	Height:100	Vert	Margin [dB]		-8.63	-	-	-
4	1396.396	53.36 pk	-31.3	25.1	47.16	54	-	-	-
	Azimuth:83	Height:200	Vert	Margin [dB]		-6.84	-	-	-
5	1460.46	55.15 pk	-31.3	25.1	48.95	54	-	-	-
	Azimuth:0	Height:200	Vert	Margin [dB]		-5.05	-	-	-
6	1480.48	54.93 pk	-31.2	25.1	48.83	54	-	-	-
	Azimuth:276	Height:100	Vert	Margin [dB]		-5.17	-	-	-
7	1546.547	53.96 pk	-31	25.4	48.36	54	-	-	-
	Azimuth:193	Height:100	Vert	Margin [dB]		-5.64	-	-	-
8	1606.607	50.46 pk	-30.8	25.7	45.36	54	-	-	-
	Azimuth:55	Height:200	Vert	Margin [dB]		-8.64	-	-	-
9	1692.693	46.4 pk	-30.4	26.1	42.1	54	-	-	-
	Azimuth:193	Height:100	Vert	Margin [dB]		-11.9	-	-	-
10	1778.779	46.19 pk	-30.3	26.6	42.49	54	-	-	-
	Azimuth:55	Height:100	Vert	Margin [dB]		-11.51	-	-	-
11	1862.863	46.01 pk	-30.2	27.1	42.91	54	-	-	-
	Azimuth:27	Height:200	Vert	Margin [dB]		-11.09	-	-	-
12	1990.991	43.9 pk	-29.9	27.8	41.8	54	-	-	-
	Azimuth:138	Height:100	Vert	Margin [dB]		-12.2	-	-	-
13	2125.125	42.02 pk	-29.4	28	40.62	54	-	-	-
	Azimuth:110	Height:200	Vert	Margin [dB]		-13.38	-	-	-
14	2201.201	42.18 pk	-29.2	28.1	41.08	54	-	-	-
	Azimuth:358	Height:200	Vert	Margin [dB]		-12.92	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

Job Number: 967379 File Number: MC15337 Page 36 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

Datamax Corp.
 RFID TAG/PRINTER
 Model: 6 inch antenna 928MHz
 Job Number: 967379
 Tested By: JD

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
=====								
Horizontal 1000 - 3000MHz								
1000	50.48 ave	-32.6	25.2	43.08	54	-	-	-
Azimuth: 216	Height:100	Horz	Margin [dB]:	-10.92	-	-	-	-
Vertical 1000 - 3000MHz								
1460	33.61 ave	-31.3	25.1	27.41	54	-	-	-
Azimuth: 48	Height:100	Vert	Margin [dB]:	-26.59	-	-	-	-
1480	31.22 ave	-31.2	25.1	25.12	54	-	-	-
Azimuth: 164	Height:100	Vert	Margin [dB]:	-28.88	-	-	-	-
1546.57	32.29 ave	-31	25.4	26.69	54	-	-	-
Azimuth: 84	Height:100	Vert	Margin [dB]:	-27.31	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

4.3.1 Maximum Permissible Exposure

Maximum Permissible Exposure limits are as follows:

FCC Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3 - 1.34	614	1.63	(100)*	30
1.34 - 30	824/f	2.19/f	(180/f ²)*	30
30 - 300	27.5	0.073	0.2	30
300 – 1500	-	-	f/1500	30
1500 – 100,000	-	-	1.0	30

*Plane-wave equivalent power density

Test Details: This device is considered to possibly be located in either environment. See calculation for assumptions.

Background: Per the following guidance from OET Bulletin 65 Supplement C required minimum spacing are provided to the professional installer.

<u>Transmitter or Device Type</u> ¹⁸	<u>Output</u> ¹⁹	<u>Applicable Methods to Ensure Compliance</u> ²⁰
Transmitters using indoor antennas that operate at 20 cm or more from nearby persons	>2.5 W at 915 MHz	If the MPE distance is greater than that required for normal operation of the device, operating instructions, warning instructions and/or warning labels may be used to ensure compliance by indicating the minimal separation distance to comply with MPE limits. If the antennas are professional installed to ensure compliance, warning instructions and warning labels are not necessary.
	=< 2.5 W at 915 MHz or =< 4 W at 2450 MHz	Transmitters operating at 2.5W EIRP (1.5 ERP) or less at 915 MHz, or at 4 W EIRP (2.4 W ERP) or less at 2450 MHz, generally are not expected to exceed MPE limits when nearby persons are 20 cm or more from most antennas. Therefore, special instructions and warnings are normally not necessary to ensure compliance.

Job Number: 967379 File Number: MC15337 Page 38 of 40
 Model Number: 6 Inch antenna
 Client Name: Datamax Corp
 FCC ID: SEM915MPDMX

MPE Calculation with highest EIRP:

Assuming the highest gain antenna intended for use (-5 dBi gain) and the 6-Inch antenna is outputting at highest measured power continuously and no cable loss to the antenna, then MPE requirements in an uncontrolled environment are met at a distance of 20cm.

Maximum Permissible Exposure		
Power Density = $EIRP / (4 * \pi * R^2)$,		
Where EIRP = Output Power * Antenna Gain		

Uncontrolled/Occupational Exposure					
Operating Frequency	915	MHz			
Output Power (Peak)	0.07	Watts			
Antenna Gain	2.5	dB	or (linear)	1.778279	(unitless)
Separation Distance	0.2	m	-or-	7.874	inches
Peak Power Density	0.248	W/m ²	- or -	0.0248	mW/cm ²
Exposure % (over 6 min timespan for uncontrolled)	100%				
Transmit Duty Cycle (Peak-to-Average Ratio)	100%				
Average Power Density	0.24764	W/m ²	- or -	0.0248	mW/cm ²
Limit for Uncontrolled Exposure at Operating Frequency	6.1	W/m ²	- Or -	0.61	mW/cm ²

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100255-0

NVLAP: Recognized under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC EN17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91040).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2181



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: (Radiated Emissions) R-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-267



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6