# **Band Edge Compliance**

Revision 10/1/03

## Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:	
Low	
High	

#### **Operating Modes Investigated:**

No hop

#### **Data Rates Investigated:**

Maximum

## **Output Power Setting(s) Investigated:**

Maximum

## **Power Input Settings Investigated:**

Software\Firmware Applied During Test						
Exercise software	MLOG Firmware	Version	1.0			
Description						
The system was tested using standard production firmware developed to test all functions of the device						
during the test.						

EUT and Peripherals					
Description	Manufacturer	Model/Part Number	Serial Number		
EUT	FlowMetrix	MLOG	N/A		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo
Near Field Probe	EMCO	7405	IPD	NCR	NA



# **Band Edge Compliance**

Revision 10/1/03

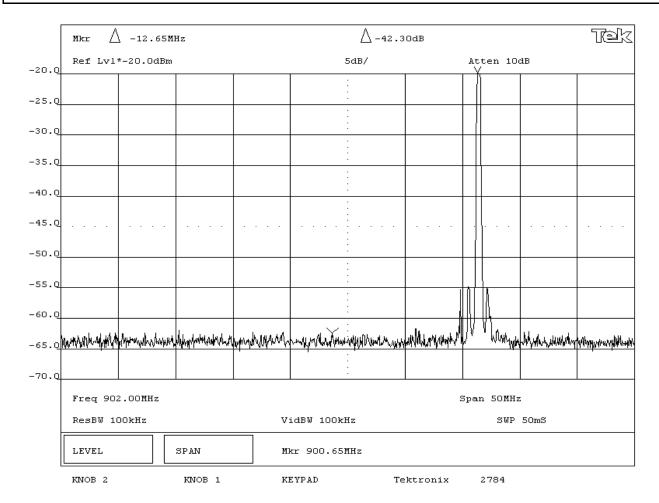
#### **Test Description**

**Requirement**: Per 47 CFR 15.247(d), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

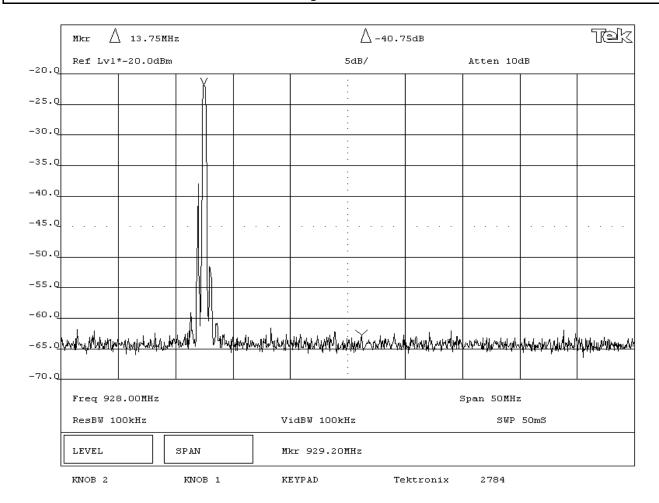
**Configuration**: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a spectrum analyzer and near field probe. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from at least 5 MHz below the band edge to at least 5 MHz above the band edge.

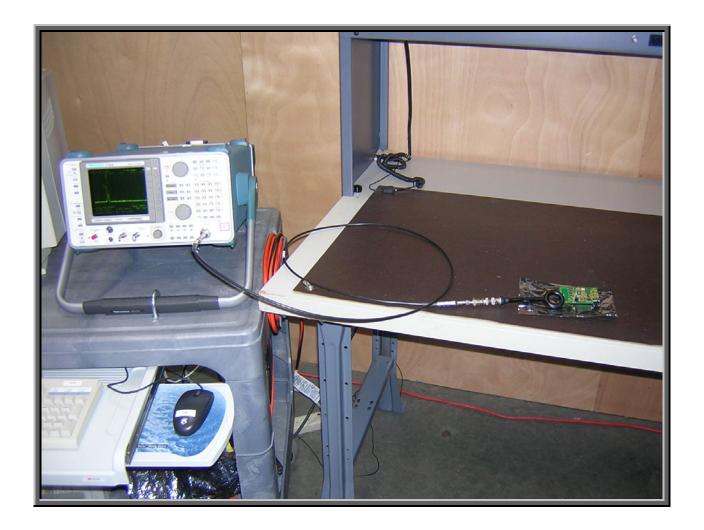
Rochy la Relenge

NORTHWEST	<b>EMISSIONS</b>	DATA SHEET		Transmitters
EMC	Band Edge	Compliance		Rev df11/15/02
	MLOG	•	Work Order:	
Serial Number:	N/A		Date:	04/30/04
Customer:	Flow Metrix, Inc.		Temperature:	23° C
Attendees:	None		Humidity:	34%
Customer Ref. No.:	N/A		Bar. Pressure:	30.15
Tested by:	Rod Peloquin	Power: Battery	Job Site:	EV06
TEST SPECIFICATION	s			
Specification:	CFR 47 Part 15.247(d) Year: 2004	Method: DA 00-705, ANSI C63.4	Year:	2003
SAMPLE CALCULATION	DNS			
COMMENTS				
None				
EUT OPERATING MOD	DES			
No hop mode				
<b>DEVIATIONS FROM TE</b>	EST STANDARD			
REQUIREMENTS				
RESULTS		AMPLITUDE		
Pass		-42.3db		
SIGNATURE		-TE-OUD		
Tested By:	Rochy la Felegy			
		hannel		
	LOW C	riailioi		



NORTHWEST	<b>EMISSIONS</b>	DATA SHEET		Transmitters
EMC	Band Edge	Compliance		Rev df11/15/02
	MLOG	•	Work Order:	
Serial Number:	N/A		Date:	04/30/04
Customer:	Flow Metrix, Inc.		Temperature:	23° C
Attendees:	None		Humidity:	34%
Customer Ref. No.:	N/A		Bar. Pressure:	30.15
Tested by:	Rod Peloquin	Power: Battery	Job Site:	EV06
TEST SPECIFICATION	S			
Specification:	CFR 47 Part 15.247(d) Year: 2004	Method: DA 00-705, ANSI C63.4	Year:	2003
SAMPLE CALCULATION	DNS			
COMMENTS				
None				
EUT OPERATING MOD	DES			
No hop mode				
<b>DEVIATIONS FROM TE</b>	EST STANDARD			
REQUIREMENTS				
RESULTS		AMPLITUDE		
Pass		-40.75dB		
SIGNATURE				
rested by:	Porly la Felegy			
DESCRIPTION OF TES				
	High C	Channel		





# **Receive Mode Emissions**

Revision 10/1/03

#### **Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in S	Specified Band Investigated:
Low	
High	

## **Operating Modes Investigated:**

Receive Mode

## **Data Rates Investigated:**

Maximum

#### **Output Power Setting(s) Investigated:**

Maximum

## **Power Input Settings Investigated:**

Frequency Range Investigated					
Start Frequency	30 MHz	Stop Frequency	5 GHz		

Software\Firmware Applied During Test						
Exercise software MLOG Firmware Version 1.0						
Description						
The system was tested using standard production firmware developed to test all functions of the device						
during the test.						

EUT and Peripherals					
Description	Manufacturer	Model/Part Number	Serial Number		
EUT	Flow Metrix, Inc.	MLOG	N/A		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A



## **Receive Mode Emissions**

Revision 10/1/03

Measurement Equipment									
Description	Manufacturer	Model	Identifier	Last Cal	Interval				
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo				
Pre-Amplifier	Miteq	AMF-4D-005180-24- 10P	APJ	01/05/2004	13 mo				
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo				
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo				
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo				
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo				

#### **Test Description**

**Requirement**: Per 47 CFR 15.109(f), the receiver portion of the transceiver is tested with the integral antenna connected. The radiated emissions limits of 15.109(a) apply.

**Configuration**: The EUT was configured for low and high receive frequencies. For each configuration, the spectrum was scanned throughout the specified range. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003). A preamp was used for this test in order to provide sufficient measurement sensitivity.

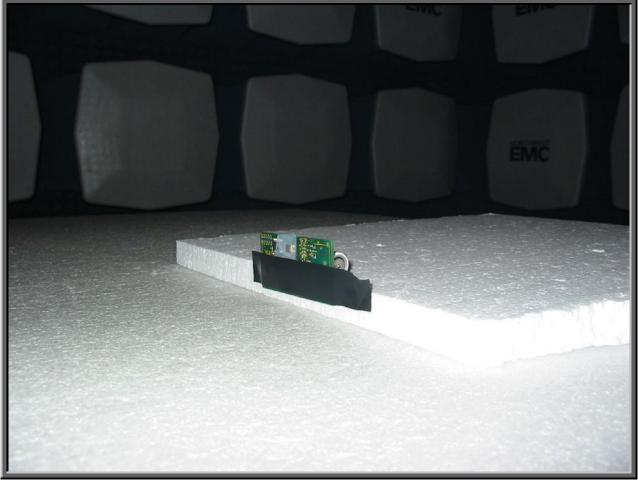
Completed by:

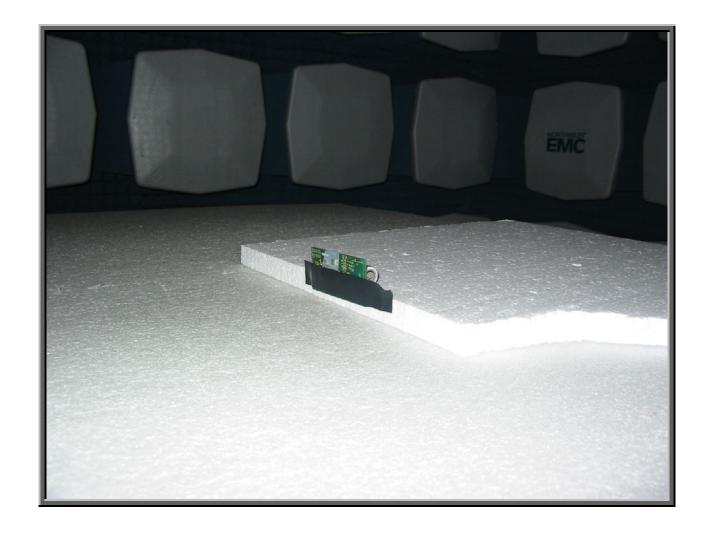
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EUT: MLOG Work Order: FLWM0001 Number: IDONE	NORTHWE						R.A	ΛC		١T	ΕI	ו כ	ΞN	IIS	SIC	ON	IS D	AT	Δ 5	SHI	ET				RE\ df4.1:
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Mathod   MSI CE3.4	SPEC	IFIC	ATIC	NS											Po	wer: I	battery				JOD SITE	9:  EV	UI		
ALFOLDATIONS Treatment Patron Services Antienced Level + Transchoor Factor + Cales Factor - Angeline Gain + Distances Adjustment Factor + Echemal Alternation  Services Adjusted Level + Measured Level + Transchoor Factor + Cales Alternation Factor + Echemal Alternation  Services Adjusted Level + Measured Level + Transchoor Factor + Cales Alternation  Treatment  SI FROM YEST STANDARD  Tested By:  Test							ass B	3																	
ATTING MODES   Testing Calument   Testing Calumen	E CA	ALCI	ULA <sup>-</sup>	rions	}																	r:  20	US		
SERRON TEST STANDARD		Emissi			-														tor + Ex	ternal At	enuation				
Application   Park																									
Tested By:   Tes	ION ions.		ROM	TEST	STA	ANDA	ARD																		
Tested By:   Tes																						Ru	ın#	_	
Tested By:   Tes	on																							•	
Tested By:   Tes																					0	,			
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0																		61	0					_	
Amplitude   Factor   Assimuth   Beside   Beside   College   Coll																				res	lea By:				
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Q	20.0	0 +	+		+				+			+	+												
Q	10.0	ا ا																							
Amplitude   Factor (dB)   Azimuth (dB)   Height (dB)   Distance (meters)   Adjustment (dB)   Distance (meters)   Dis																									
Polarity	30		000		400	00.00	00		500	00.00	00		600	0.000		700	0.000	800	0.00	)	9000.00	0	1	0000	0.000
Agricultude   Factor   Azimuth   Height   (degrees)															MHz	:									
255.700	Freq (MHz														Attenua	ation	Polarity	Detecto		djustmen				nit	Spec.
1219.700   25.6   13.8   186.0   2.9   3.0   0.0   H-Horn   AV   0.0   39.4   54.0   -14.6	82	255.7			26.0	, ,,	13.9	9	6	3.0	,	1.3	(ATT	3.0	(00)	0.0				0.	39.	9	54	.0	-14.1
1219.700   25.6   13.8   87.0   1.2   3.0   0.0   V-Horn   AV   0.0   39.4   54.0   -14.6   306.400   26.5   10.6   48.0   1.3   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   306.400   26.5   10.6   154.0   1.2   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   308.400   26.5   10.6   53.0   1.3   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   10.6   53.0   1.3   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   10.6   47.0   3.8   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   356.500   26.0   26.0   18.0   1.3   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   356.500   25.9   2.6   286.0   1.2   3.0   0.0   V-Horn   AV   0.0   28.5   54.0   -25.5   356.500   25.6   2.7   324.0   3.3   3.0   0.0   V-Horn   AV   0.0   28.3   54.0   -25.7   3586.500   25.6   2.7   324.0   3.3   3.0   0.0   V-Horn   AV   0.0   28.3   54.0   -25.7   3586.500   26.7   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   28.3   54.0   -25.7   3653.200   26.7   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.6   54.0   -26.4   3653.200   26.7   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.6   54.0   -26.4   3669.200   26.3   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.2   54.0   -26.8   369.200   26.3   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.2   54.0   -26.8   3255.700   39.8   33.9   291.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.1   54.0   -26.8   3255.700   39.2   31.8   87.0   1.2   3.0   0.0   V-Horn   AV   0.0   53.7   74.0   -20.3   3219.700   39.2   31.8   87.0   1.2   3.0   0.0   W-Horn   PK   0.0   53.7   74.0   -20.3   3219.700   39.9   10.6   53.0   1.3   3.0   0.0   W-Horn   PK   0.0   50.5   74.0   -23.3   338.400   39.9   10.6   53.0   1.3   3.0   0.0   W-Horn   PK   0.0   50.5   74.0   -23.3   338.400   39.9   10.6   53.0   1.3   3.0   0.0   W-Horn   PK   0.0   50.5   74.0   -23.5   338.400   39.9   10.6   53.0   1.3   3.0   0.0   W-Horn   PK   0.0   50.5   74.0   -23.5   338.400   39.9   10.6   53.0																									
306.400   26.5   10.6   154.0   1.2   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   10.6   53.0   1.3   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   10.6   47.0   3.8   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   10.6   47.0   3.8   3.0   0.0   V-Horn   AV   0.0   37.1   54.0   -16.9   338.400   26.5   26.0   26.0   26.1   18.0   1.3   3.0   0.0   V-Horn   AV   0.0   28.6   54.0   -25.5   566.500   25.9   2.6   268.0   1.2   3.0   0.0   V-Horn   AV   0.0   28.5   54.0   -25.5   566.500   25.6   2.7   229.0   1.3   3.0   0.0   V-Horn   AV   0.0   28.3   54.0   -25.5   566.500   25.6   2.7   229.0   1.3   3.0   0.0   V-Horn   AV   0.0   28.3   54.0   -25.7   568.500   25.6   2.7   324.0   3.3   3.0   0.0   V-Horn   AV   0.0   27.6   54.0   -25.4   663.200   26.7   0.9   317.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.6   54.0   -26.4   663.200   26.7   0.9   317.0   1.2   3.0   0.0   V-Horn   AV   0.0   27.6   54.0   -26.4   669.200   26.3   0.9   317.0   1.2   3.0   0.0   V-Horn   AV   0.0   27.2   54.0   -26.8   669.124   26.2   0.9   307.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.1   54.0   -26.8   669.124   26.2   0.9   307.0   1.3   3.0   0.0   V-Horn   AV   0.0   27.1   54.0   -26.8   62.5   26.5	82	219.7	700		25.6		13.8	8	8	7.0		1.2		3.0		0.0	V-Horn	AV		0.	39.	4	54	.0	-14.6
338.400																									
1566.500         26.0         26.0         118.0         1.3         3.0         0.0         H-Horn         AV         0.0         28.6         54.0         -25.6           1566.500         25.9         2.6         286.0         1.2         3.0         0.0         H-Horn         AV         0.0         28.5         54.0         -25.5           1586.500         25.6         2.7         229.0         1.3         3.0         0.0         H-Horn         AV         0.0         28.3         54.0         -25.7           1586.500         25.6         2.7         324.0         3.3         3.0         0.0         H-Horn         AV         0.0         28.3         54.0         -25.7           1653.200         26.7         0.9         317.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.6         54.0         -26.4           1663.200         26.3         0.9         317.0         1.2         3.0         0.0         V-Horn         AV         0.0         27.1         54.0         -26.8           1669.120         26.3         0.9         317.0         1.3         3.0         0.0         H-Horn         AV									5	3.0							H-Horn			0.	37.		54	.0	-16.9
1566,500         25.9         2.6         286.0         1.2         3.0         0.0         V-Horn         AV         0.0         28.5         54.0         -25.5         5586.500         25.6         2.7         229.0         1.3         3.0         0.0         H-Horn         AV         0.0         28.3         54.0         -25.7         5586.500         25.6         2.7         229.0         1.3         3.0         0.0         V-Horn         AV         0.0         28.3         54.0         -25.7         5685.200         26.7         0.9         317.0         1.3         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.4         6683.200         26.7         0.9         232.0         2.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.4         6683.200         26.7         0.9         337.0         1.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.4         6689.200         26.3         3.9         317.0         1.2         3.0         0.0         H-Horn         AV         0.0         27.1         54.0         -26.8         1669.200																									
1586.500         25.6         2.7         229.0         1.3         3.0         0.0         H-Horn         AV         0.0         28.3         54.0         -25.7           1586.500         25.6         2.7         324.0         3.3         3.0         0.0         H-Horn         AV         0.0         28.3         54.0         -25.7           1653.200         26.7         0.9         232.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.6         54.0         -26.4           1653.200         26.7         0.9         232.0         2.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.8           1669.124         26.2         0.9         307.0         1.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.8           1669.124         26.2         0.9         307.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.1         54.0         -26.8           1255.700         39.8         13.9         63.0         1.3         3.0         0.0         H-Horn         PK																									
1863,200         26,7         0.9         317.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.6         54.0         -26.4         1663,200         26,7         0.9         232.0         2.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.4         1663,200         26.7         0.9         232.0         2.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.8         1669,200         26.2         0.9         307.0         1.2         3.0         0.0         V-Horn         AV         0.0         27.1         54.0         -26.8         1669,124         26.2         0.9         307.0         1.3         3.0         0.0         V-Horn         AV         0.0         27.1         54.0         -26.9         26.9         3.0         0.0         V-Horn         PK         0.0         53.2         74.0         -20.8         26.9         3.0         0.0         V-Horn         PK         0.0         53.7         74.0         -20.8         221.9         30.0         0.0         V-Horn         PK         0.0         53.0         74.0         -21.5 <t< td=""><td>45</td><td>586.5</td><td>500</td><td></td><td>25.6</td><td></td><td>2.7</td><td>7</td><td>22</td><td>9.0</td><td></td><td>1.3</td><td></td><td>3.0</td><td></td><td>0.0</td><td>H-Horn</td><td>AV</td><td></td><td>0.</td><td>28.</td><td>3</td><td>54</td><td>.0</td><td>-25.7</td></t<>	45	586.5	500		25.6		2.7	7	22	9.0		1.3		3.0		0.0	H-Horn	AV		0.	28.	3	54	.0	-25.7
1853.200         26,7         0.9         232.0         2.2         3.0         0.0         V-Horn         AV         0.0         27.6         54.0         -26.4         669.200         26.3         0.9         317.0         1.2         3.0         0.0         V-Horn         AV         0.0         27.2         54.0         -26.8         669.124         26.2         0.9         307.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.1         54.0         -26.8         669.124         26.2         0.9         307.0         1.3         3.0         0.0         H-Horn         AV         0.0         27.1         54.0         -26.8         669.124         26.2         0.9         307.0         1.3         3.0         0.0         H-Horn         AV         0.0         54.2         74.0         -19.8         19.8         19.8         63.0         1.3         3.0         0.0         H-Horn         PK         0.0         53.7         74.0         -21.8         19.8         1219.700         38.7         13.8         186.0         2.9         3.0         0.0         H-Horn         PK         0.0         52.5         74.0         -21.5         306.400																									
1686,124         26,2         0.9         307.0         1,3         3.0         0.0         H-Horn         AV         0.0         27.1         54,0         -26,9           1255,700         40.3         13.9         291.0         1,3         3.0         0.0         H-Horn         PK         0.0         54.2         74.0         -20.3           1255,700         39.8         13.9         63.0         1.3         3.0         0.0         H-Horn         PK         0.0         53.7         74.0         -20.3           1219,700         38.7         13.8         87.0         1.2         3.0         0.0         H-Horn         PK         0.0         53.0         74.0         -21.0           306,400         39.9         10.6         154.0         1.2         3.0         0.0         H-Horn         PK         0.0         50.5         74.0         -23.5           338,400         39.9         10.6         55.0         1.3         3.0         0.0         H-Horn         PK         0.0         50.5         74.0         -23.5           338,400         39.9         10.6         53.0         1.3         3.0         0.0         H-Horn         PK	36	653.2	200		26.7		0.9	9	23	2.0		2.2		3.0		0.0	V-Horn	AV		0.	27.	6	54	.0	-26.4
1255.700       40.3       13.9       291.0       1.3       3.0       0.0       V-Horn       PK       0.0       54.2       74.0       -19.8         1255.700       39.8       13.9       63.0       1.3       3.0       0.0       V-Horn       PK       0.0       53.7       74.0       -20.3         1219.700       39.2       13.8       87.0       1.2       3.0       0.0       V-Horn       PK       0.0       53.0       74.0       -21.5         306.400       38.7       13.8       186.0       2.9       3.0       0.0       H-Horn       PK       0.0       52.5       74.0       -21.5         306.400       39.9       10.6       154.0       1.2       3.0       0.0       H-Horn       PK       0.0       50.5       74.0       -23.3         338.400       39.9       10.6       55.0       1.3       3.0       0.0       H-Horn       PK       0.0       50.5       74.0       -23.5         338.400       39.7       10.6       47.0       3.8       3.0       0.0       V-Horn       PK       0.0       50.5       74.0       -23.5         586.500       39.2       2.6																									
1295.700 39.8 13.9 63.0 1.3 3.0 0.0 H-Horn PK 0.0 53.7 74.0 -20.3 (219.700 39.2 13.8 87.0 1.2 3.0 0.0 V-Horn PK 0.0 53.0 74.0 -21.0 (219.700 39.2 13.8 186.0 2.9 3.0 0.0 H-Horn PK 0.0 55.5 74.0 -21.5 (306.400 40.1 10.6 48.0 1.3 3.0 0.0 H-Horn PK 0.0 50.7 74.0 -23.5 (306.400 39.9 10.6 154.0 1.2 3.0 0.0 H-Horn PK 0.0 50.5 74.0 -23.5 (338.400 39.9 10.6 53.0 1.3 3.0 0.0 H-Horn PK 0.0 50.5 74.0 -23.5 (338.400 39.9 10.6 53.0 1.3 3.0 0.0 H-Horn PK 0.0 50.5 74.0 -23.5 (338.400 39.7 10.6 47.0 3.8 3.0 0.0 V-Horn PK 0.0 50.3 74.0 -23.5 (338.400 39.2 2.7 324.0 3.3 3.0 0.0 V-Horn PK 0.0 50.3 74.0 -23.5 (566.500 39.2 2.6 118.0 1.3 3.0 0.0 H-Horn PK 0.0 41.9 74.0 -32.1 (566.500 39.2 2.6 26 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.2 (566.500 39.0 2.6 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.4 (586.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.4 (586.500 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 41.6 74.0 -32.4 (565.200 40.1 0.9 232.0 2.2 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.4 (565.200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 (665.200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2 (665.200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2 (665.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2																							74	.0	
1219.700 38.7 13.8 186.0 2.9 3.0 0.0 H-Horn PK 0.0 52.5 74.0 -21.5 306.400 40.1 10.6 48.0 1.3 3.0 0.0 H-Horn PK 0.0 50.7 74.0 -23.5 306.400 39.9 10.6 154.0 1.2 3.0 0.0 V-Horn PK 0.0 50.5 74.0 -23.5 338.400 39.9 10.6 53.0 1.3 3.0 0.0 V-Horn PK 0.0 50.5 74.0 -23.5 338.400 39.9 10.6 47.0 3.8 3.0 0.0 V-Horn PK 0.0 50.5 74.0 -23.5 1586.500 39.2 2.7 324.0 3.3 3.0 0.0 V-Horn PK 0.0 50.3 74.0 -23.5 1586.500 39.2 2.6 118.0 1.3 3.0 0.0 V-Horn PK 0.0 41.9 74.0 -32.5 1586.500 39.2 2.6 18.0 1.3 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.5 1586.500 39.2 2.6 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.5 1586.500 39.0 2.6 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.5 1586.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.5 1586.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.5 1586.500 39.9 0.9 317.0 1.3 3.0 0.0 V-Horn PK 0.0 41.0 74.0 -32.6 1653.200 40.1 0.9 232.0 2.2 3.0 0.0 V-Horn PK 0.0 41.0 74.0 -33.6 1653.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.20	82	255.7	700		39.8		13.9	9	6	3.0		1.3		3.0		0.0	H-Horn	PK		0.	53.	7	74	.0	-20.3
338.400   40.1   10.6   48.0   1.3   3.0   0.0   H-Horn   PK   0.0   50.7   74.0   -23.5																									
338.400 39.9 10.6 53.0 1.3 3.0 0.0 H-Horn PK 0.0 50.5 74.0 -23.5 138.400 39.7 10.6 47.0 3.8 3.0 0.0 V-Horn PK 0.0 50.3 74.0 -23.5 1586.500 39.2 2.7 324.0 3.3 3.0 0.0 V-Horn PK 0.0 41.9 74.0 -32.5 1586.500 39.2 2.6 118.0 1.3 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.5 1586.500 39.0 2.6 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.5 1586.500 38.9 2.7 229.0 1.3 3.0 0.0 H-Horn PK 0.0 41.6 74.0 -32.5 1586.500 38.9 2.7 229.0 1.3 3.0 0.0 H-Horn PK 0.0 41.6 74.0 -32.5 1586.500 40.1 0.9 232.0 2.2 3.0 0.0 H-Horn PK 0.0 41.0 74.0 -33.5 1653.200 40.1 0.9 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.5 1659.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.0 40.0 40.8 74.0 33.0 40.0 40.8 74.0 33.0 40.0 40.8 74.0 33.0 40.0 40.8	73	306.4	400		40.1		10.6	6	4	8.0		1.3		3.0		0.0	H-Horn	PK		0.	50.	7	74	.0	-23.3
338.400 39.7 10.6 47.0 3.8 3.0 0.0 V-Horn PK 0.0 50.3 74.0 -23.7 586.500 39.2 2.7 324.0 3.3 3.0 0.0 V-Horn PK 0.0 41.9 74.0 -32.5 566.500 39.2 2.6 118.0 1.3 3.0 0.0 V-Horn PK 0.0 41.8 74.0 -32.5 566.500 39.0 2.6 286.0 1.2 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.5 566.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.6 566.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.6 566.500 38.9 2.7 229.0 1.3 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.6 565.200 40.1 0.9 232.0 2.2 3.0 0.0 V-Horn PK 0.0 41.6 74.0 -32.6 565.200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 565.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 33.6 569.200 39.9 0.9 307.0 1.3 30.0 0.0 H-Horn PK 0.0 40.8 74.0 30.0 40.8 74.0 30.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8 74.0 40.8																									
1586.500     39.2     2.7     324.0     3.3     3.0     0.0     V-Horn     PK     0.0     41.9     74.0     -32.1       1566.500     39.2     2.6     118.0     1.3     3.0     0.0     H-Horn     PK     0.0     41.8     74.0     -32.2       1566.500     39.0     2.6     286.0     1.2     3.0     0.0     V-Horn     PK     0.0     41.6     74.0     -32.4       1586.500     38.9     2.7     229.0     1.3     3.0     0.0     H-Horn     PK     0.0     41.6     74.0     -32.4       1653.200     40.1     0.9     232.0     2.2     3.0     0.0     V-Horn     PK     0.0     41.6     74.0     -33.2       1653.200     39.9     0.9     317.0     1.3     3.0     0.0     H-Horn     PK     0.0     40.8     74.0     -33.2       1669.200     39.9     0.9     307.0     1.3     3.0     0.0     H-Horn     PK     0.0     40.8     74.0     -33.2																									
1566.500     39.0     2.6     286.0     1.2     3.0     0.0     V-Horn     PK     0.0     41.6     74.0     -32.4       586.500     38.9     2.7     229.0     1.3     3.0     0.0     H-Horn     PK     0.0     41.6     74.0     -32.4       6653.200     40.1     0.9     232.0     2.2     3.0     0.0     V-Horn     PK     0.0     41.0     74.0     -33.6       6653.200     39.9     0.9     317.0     1.3     3.0     0.0     H-Horn     PK     0.0     40.8     74.0     -33.2       6669.200     39.9     0.9     307.0     1.3     3.0     0.0     H-Horn     PK     0.0     40.8     74.0     -33.2	45	586.5	500		39.2		2.7	7	32	4.0		3.3		3.0		0.0	V-Horn	PK		0.	41.	9	74	.0	-32.1
1586,500 38.9 2.7 229.0 1.3 3.0 0.0 H-Horn PK 0.0 41.6 74.0 -32.4 (653,200 40.1 0.9 232.0 2.2 3.0 0.0 V-Horn PK 0.0 41.0 74.0 -33.6 (653,200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.6 (669,200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2																									
1653.200 39.9 0.9 317.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2 (1669.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2		586.5	500		38.9		2.7	7	22	9.0		1.3		3.0		0.0	H-Horn	PK		0.	41.	6	74	.0	-32.4
1669.200 39.9 0.9 307.0 1.3 3.0 0.0 H-Horn PK 0.0 40.8 74.0 -33.2		653.2																							
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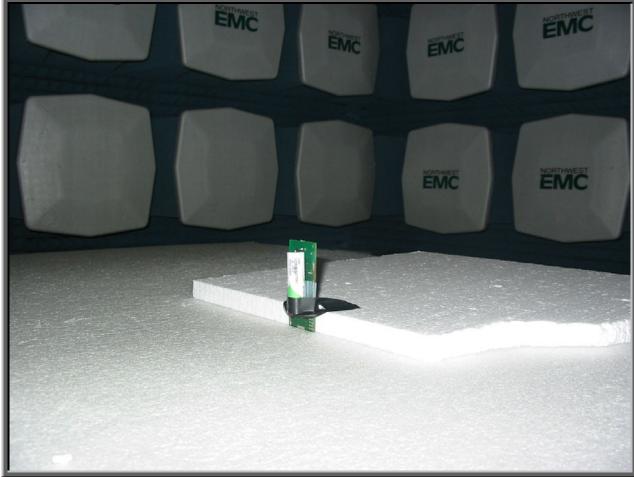
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	Year: 2004 Year: 2003
MPLE CALCULATIONS	Tear. 2003
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation	1
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator	
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30.0 20.0 10.0	2790.000 2800.000
30.0 20.0 10.0 0.0 2700.000 2710.000 2720.000 2730.000 2740.000 2750.000 2760.000 2770.000 2780.000	2790.000 2800.000
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30.0 20.0 10.0 2700.000 2710.000 2720.000 2730.000 2740.000 2750.000 2760.000 2770.000 2780.000  MHz  Freq (MHz) (dBuV) (dB) (degrees) (meters) (meters) (meters) (dB) (dB) (degrees) (meters) (dB) (dB) (dB) (dB) (dB) (dB) (dB) (dB	usted Spec. Limit Spec. vV/m dBuV/m (dB)
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30.0	usted Spec. Limit Spec. (dB)
30.0 20.0 10.0 2700.000 2710.000 2720.000 2730.000 2740.000 2750.000 2760.000 2770.000 2780.000  MHz  Freq (MHz) (dBuV) (dB) (degrees) (meters) (meters) (meters) (dB) (dB) (dB) (dB) (dB) (dB) (dB) (dB	Usted John Spec. Limit Spec. Limit (dB) (dB) (26.6 54.0 -27. 26.4 54.0 -27.
20.0   2700.000 2710.000 2720.000 2730.000 2740.000 2750.000 2760.000 2770.000 2780.000   MHz	usted dBuV/m (dB) -27. 26.6 54.0 -27. 26.4 54.0 -27. 26.4 54.0 -27. 26.4 54.0 -27.
20.0   2700.000   2710.000   2720.000   2730.000   2740.000   2750.000   2760.000   2770.000   2780.000   2700.000   2770.000   2780.000   2770.000   2780.000   2780.000   MHz	Lusted MBU/m dBu/m dBu/m 26.6 54.0 -27. 26.6 54.0 -27. 26.4 54.0 -27. 26.4 54.0 -27. 40.3 74.0 -33.
20.0   2700.000   2710.000   2720.000   2730.000   2740.000   2750.000   2760.000   2770.000   2780.000   2780.000   2700.000   27	Usted John Spec. Limit Spec. (dB) (dB) (26.6 54.0 -27. 26.4 54.0 -27. 40.3 74.0 -33.
20.0   2700.000   2710.000   2720.000   2730.000   2740.000   2750.000   2760.000   2770.000   2780.000   2700.000   2770.000   2780.000   2770.000   2780.000   2780.000   MHz	Lusted MBU/m dBu/m dBu/m 26.6 54.0 -27. 26.6 54.0 -27. 26.4 54.0 -27. 26.4 54.0 -27. 40.3 74.0 -33.











# **Output Power - EIRP**

Revision 10/1/03

#### **Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

# Channels in Specified Band Investigated: Low

LUW

High

#### **Operating Modes Investigated:**

No Hop

#### **Data Rates Investigated:**

Maximum

#### **Output Power Setting(s) Investigated:**

Maximum

#### **Power Input Settings Investigated:**

**Battery** 

Software\Firmware Appli	ed During Test		
Exercise software	MLOG Firmware	Version	1.0
Description			
T			

The system was tested using standard production firmware developed to test all functions of the device during the test.

EUT and Periphera	ls		
Description	Manufacturer	Model/Part Number	Serial Number
EUT	Flow Metrix, Inc.	MLOG	N/A

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

Measurement Equipment									
Description	Manufacturer	Model	Identifier	Last Cal	Interval				
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo				
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo				
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo				



# **Output Power - EIRP**

Revision 10/1/03

#### **Test Description**

Requirement: Per 47 CFR 15.247(b)(3), the maximum peak output power must not exceed 1 Watt.

<u>Configuration</u>: The peak output power was measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at its maximum output power and data rate.

The measurement was made using the alternative test procedure described in FCC 97-114. The maximum field strength of the fundamental was measured at a 3 meter distance. The field strength was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003).

The peak EIRP was calculated using the equation:

$$EIRP = (Ed)^{2} / 30$$

Where: E is the measured maximum field strength in V/m

d is the distance in meters from which the field strength was measured

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

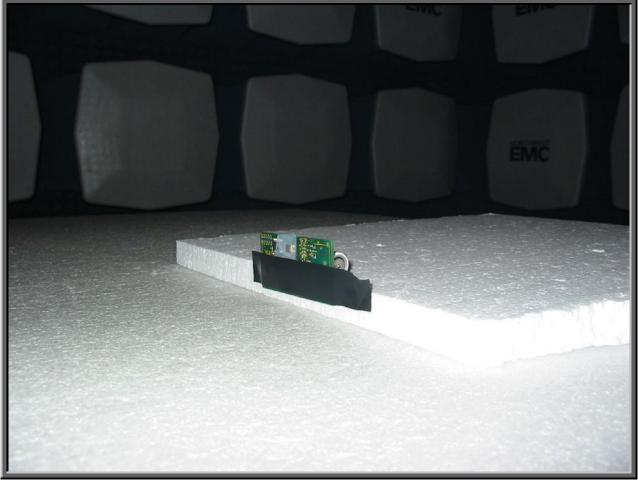
Completed by:

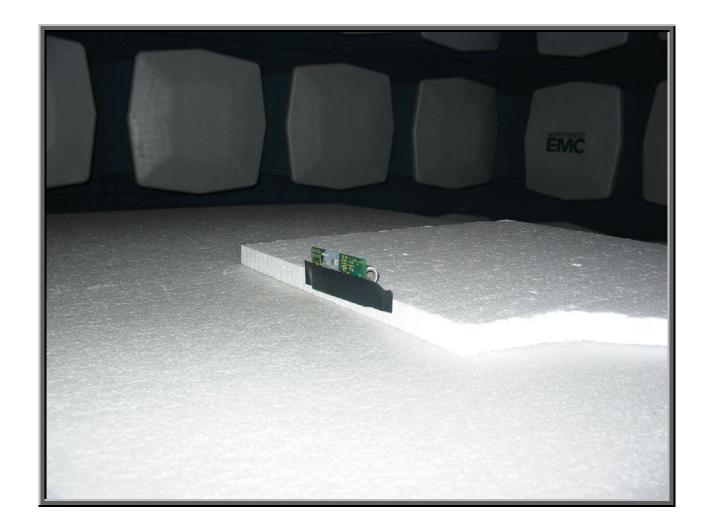
Holy Arling

	RTHWEST MC			Out	put	Pow	er - E	IRP				REV df4.4 10/22/2004
		: MLOG							W		FLWM0003	
Se	rial Number										10/26/04	
		: Flow Metrix, Inc.							Ter	nperature:		
C	Attendees ust. Ref. No								Barometrio	Humidity: Pressure		
		: Greg Kiemel				Power	: Battery		Daronieur	Job Site:		
TEST S	PECIFICA						Í					
S		: FCC 15.247(b) Outp	ut Power							Year:		
CAMDI	Method E CALCUL	ATIONS								Year:	2003	
		: Field Strength = Measured	Level + Antenna	Factor + Cal	ole Factor - A	mnlifier Gain -	- Distance Adiu	stment Factor +	External Atten	uation		
		: Adjusted Level = Measured				-	-		External / ttori	441011		
COMME		MODES										
	PERATING nigh channel,											
DEVIAT No deviat		M TEST STANDARD										
RESUL <sup>*</sup>	TS										Run#	
Pass											10	
Other							<u> </u>					
Other								A	Bu.K	-		
									Tested	d By:		
	30.0											
	20.0											
	10.0						•					
dBm	0.0											
	-10.0											
	-20.0											
	-30.0											
	902.00	907.0	000	912	2.000	MHz	917.000		922.000		927.00	00
	Freq		Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
(	MHz) 917.34 917.34		18.0 146.0	1.0 1.2	<u> </u>		H-Bilog V-Bilog	PK PK	0.0212 0.0036	13.3 5.6	30.0 30.0	-16.7 -24.4

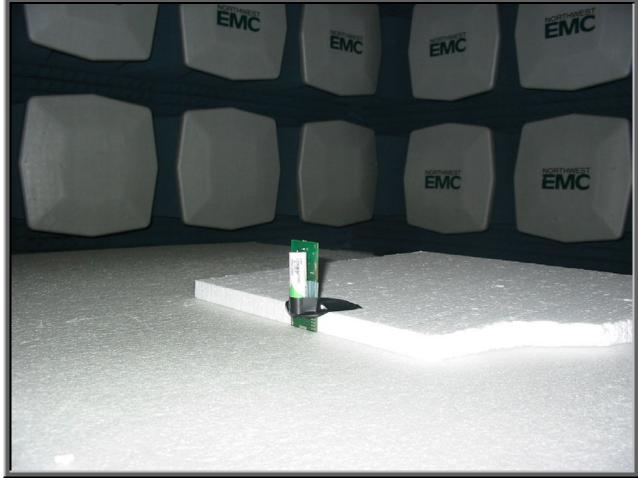
NORTHWEST						O	ut	pu	t	Ow	er	- E	IRP						F c 10/22/2
	: MLOG														V	Vork Order	r: FLWI	M0003	
Serial Number																	: 11/05		
	: Flow Me	trix, In	ıc.												Te	mperature			
Attendees																Humidity			
Cust. Ref. No										_				Bar	ometri	ic Pressur			
	Rod Pel	oquin								Powe	r: Ba	ttery				Job Site	: EV01		
T SPECIFICAT Specification	_	247(b)	Outp	ıt Dow	٠,											Voor	: 2004		
Method	: ANSI C6	247 (D)	Outpi	ut FOW	<del> </del>												: 2003		
PLE CALCUL		0.4														i cai	. 2000		
adiated Emissions		gth = Me	easured	Level + A	ntenna	a Factor	+ Cab	le Facto	or - An	plifier Gain	+ Dista	nce Adju	stment Factor	+ Extern	al Atter	nuation			
nducted Emissions																			
OPERATING op, low channel, s	)13.294 kHz	TAND	ABB																
IATIONS FRO viations. ULTS	M TEST S	TAND	ARD														Run	#	
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902.00	0		907.0	000			912	.000			917	.000		922	2.000		(	927.00	00
										MHz									
							1												Compare
Freq				Azim	uth	Heigh	nt				F	Polarity	Detector	EIF	RP	EIRP		Limit	Spec.
Freq (MHz) 913.33		1		Azim (degre		Heigh (meter						-Bilog	Detector	EIF (Wa		EIRP (dBm)	Spec. (dE		Spec. (dB)











# Spurious Radiated Emissions in the Resticted Bands

Revision 10/1/03

#### **Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

<b>Channels in Specified Band</b>	Investigated:
Low	
High	

## **Operating Modes Investigated:**

Typical

#### **Data Rates Investigated:**

Maximum

#### **Output Power Setting(s) Investigated:**

Maximum

#### **Power Input Settings Investigated:**

Frequency Range Invest	gated		
Start Frequency	30 MHz	Stop Frequency	10 GHz

Software\Firmware Applied During Test											
Exercise software	MLOG Firmware	Version	1.0								
Description	Description										
The system was tested us	The system was tested using standard production firmware developed to test all functions of the device										
during the test.											

<b>EUT and Periphera</b>	EUT and Peripherals									
Description	Manufacturer	Model/Part Number	Serial Number							
EUT	Flow Metrix, Inc.	MLOG	N/A							

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

# Spurious Radiated Emissions in the Resticted Bands

Revision 10/1/03

Measurement Equipmen	nt				
Description	Manufacturer	Model	Identifier	Last Cal	Interval
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
High Pass Filter	Hewlett-Packard	84300-80037	HFE	02/04/2004	13 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24- 10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/23/2003	13 mo

#### **Test Description**

**Requirement:** The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

<u>Configuration</u>: The single integral antenna to be used with the EUT was tested. The EUT was configured for low and high band transmit frequencies in receive and transmit mode. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Bandwidths Used for Mea	asurements		
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were m	ade using the bandwidths	and detectors specified. No	video filter was used.

Completed by:

Holy Arling

E	MC	•	<del>opunc</del>	rus INA	anatet		SIUIIS	THE CITE	- Kesi	ricted I	Danus	,	d 10/22/2
		MLOG								V		FLWM0003	
Ser	ial Number:									_		10/26/04	
		Flow Metri	x, Inc.							Те	mperature:		
Cur	Attendees: st. Ref. No.:	none								Barometr	Humidity: ic Pressure		
Ou.		Greg Kiem	el				Power:	Battery		Darometi	Job Site:		
T SP	ECIFICATI							,					
Sp	ecification:			us Radiate	d Emissior	ıs						2004	
ADL E	Method:	ANSI C63.4									Year:	2003	
			= Measured I	evel + Antenna	Eactor + Cah	le Eactor - Am	nlifier Gain + F	Dietance Adius	tment Eactor	+ External Atter	nuation		
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dBuV/m <sup>™</sup>													
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3	30.0												
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	0.0 +							· · ·		<u> </u>		400	⊣ ^^ ^^
	1000.000						MHz					100	00.000
							1411 12						
F	req	Amplitude	Factor	Azimuth	Height	Distance	Duty Cycle Correction	Polarity	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compare
	req 1Hz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)	1 Granty	Detector	(dB)	dBuV/m	dBuV/m	(dB)
٠.,	2751.900	62.1	-1.0	197.0	1.9	3.0	8.0	H-Horn	AV	0.0	53.1	54.0	
			4.0	075.0		0.0	0.0				=0.4		
	2751.900 2751.900	59.0 62.8	-1.0 -1.0	275.0 197.0	1.2 1.9	3.0 3.0	8.0 0.0	V-Horn H-Horn	AV PK	0.0 0.0	50.1 61.8	54.0 74.0	

#### **Spurious Radiated Emissions in the Restricted Bands EMC** EUT: MLOG Work Order: FLWM0003 Date: 10/28/04 Serial Number: none Customer: Flow Metrix, Inc. Temperature: 66 Attendees: none Humidity: 45% Cust. Ref. No.: Barometric Pressure 29.93 Tested by: Rod Peloquin Power: Battery Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 15.247(d) Spurious Radiated Emissions Method: ANSI C63.4 Year: 2004 Year: 2003 SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

#### COMMENTS

The average data can be reduced by a factor (dB) = 20 \* log (worst case transmit time on a single channel / 100ms). The worst case transmit time of 40 ms on a single channel in any 100 ms window = 7.95 dB duty cycle correction factor.

#### EUT OPERATING MODES

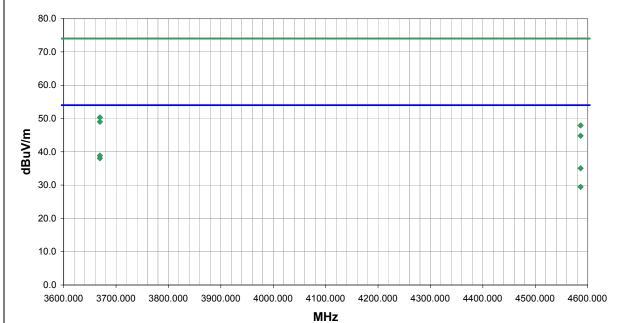
No hop, High channel 917.3 MHz

#### DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS Run # 12

Other



	_						Duty Cycle			Distance			Compared to	
	Freq	Amplitude	Factor	Azimuth	Height	Distance	Correction	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.	
	(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)	
_	3669.194	45.8	1.0	203.0	1.0	3.0	8.0	V-Horn	AV	0.0	38.8	54.0	-15.2	
	3669.194	45.0	1.0	267.0	1.1	3.0	8.0	H-Horn	AV	0.0	38.0	54.0	-16.0	
	4586.493	40.1	2.9	4.0	1.0	3.0	8.0	V-Horn	AV	0.0	35.0	54.0	-19.0	
	4586.493	34.5	2.9	165.0	1.3	3.0	8.0	H-Horn	AV	0.0	29.5	54.0	-24.5	
	3669.194	49.3	1.0	203.0	1.0	3.0	0.0	V-Horn	PK	0.0	50.3	74.0	-23.7	
	3669.194	48.0	1.0	267.0	1.1	3.0	0.0	H-Horn	PK	0.0	49.0	74.0	-25.0	
	4586.493	45.0	2.9	4.0	1.0	3.0	0.0	V-Horn	PK	0.0	47.9	74.0	-26.1	
	4586.493	41.9	2.9	165.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.8	74.0	-29.2	

#### **Spurious Radiated Emissions in the Restricted Bands EMC** EUT: MLOG Work Order: FLWM0003 Date: 10/28/04 Serial Number: none Customer: Flow Metrix, Inc. Temperature: 66 Attendees: none Humidity: 45% Cust. Ref. No.: Barometric Pressure 29.93 Tested by: Rod Peloquin Power: Battery Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 15.247(d) Spurious Radiated Emissions Method: ANSI C63.4 Year: 2004 Year: 2003 SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

#### COMMENTS

The average data can be reduced by a factor (dB) = 20 \* log (worst case transmit time on a single channel / 100ms). The worst case transmit time of 40 ms on a single channel in any 100 ms window = 7.95 dB duty cycle correction factor.

#### EUT OPERATING MODES

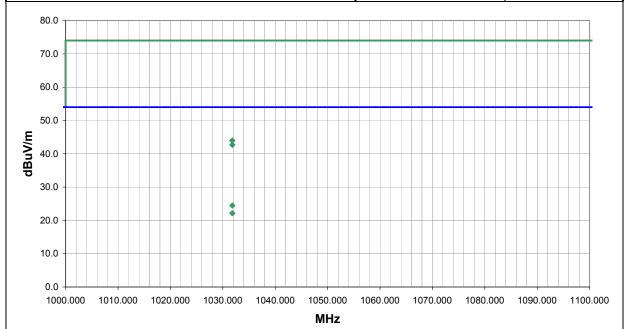
No hop, High channel 917.3 MHz

#### DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS Run#
Pass 13

Other



						External			Duty Cycle			Compared to	
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Correction	Adjusted	Spec. Limit	Spec.	
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)	
1031.813	31.5	-9.1	77.0	1.3	3.0	10.0	H-Horn	AV	8.0	24.5	54.0	-29.5	-
1031.813	29.2	-9.1	335.0	2.6	3.0	10.0	V-Horn	AV	8.0	22.2	54.0	-31.8	
1031.813	43.1	-9.1	77.0	1.3	3.0	10.0	H-Horn	PK	0.0	44.0	74.0	-30.0	
1031.813	41.8	-9.1	335.0	2.6	3.0	10.0	V-Horn	PK	0.0	42.7	74.0	-31.3	

#### **Spurious Radiated Emissions in the Restricted Bands EMC** EUT: MLOG Work Order: FLWM0003 Date: 11/05/04 Serial Number: none Customer: Flow Metrix, Inc. Temperature: 72 Attendees: none Humidity: 32% Cust. Ref. No.: Barometric Pressure 30.4 Tested by: Rod Peloquin Power: Battery Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 15.247(d) Spurious Radiated Emissions Method: ANSI C63.4 Year: 2004 Year: 2003 SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

#### COMMENTS

The average data can be reduced by a factor (dB) = 20 \* log (worst case transmit time on a single channel / 100ms). The worst case transmit time of 40 ms on a single channel in any 100 ms window = 7.95 dB duty cycle correction factor.

#### EUT OPERATING MODES

No hop, Low channel 913.294 kHz

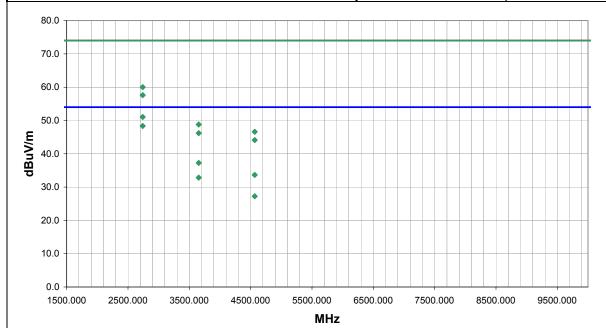
#### DEVIATIONS FROM TEST STANDARD

No deviations.

 RESULTS
 Run #

 Pass
 15

Other



						External			Duty Cycle			Compared to
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Correction	Adjusted	Spec. Limit	Spec.
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)
2739.896	60.0	-1.0	179.0	1.1	3.0	0.0	V-Horn	AV	8.0	51.1	54.0	-2.9
2739.896	57.3	-1.0	96.0	1.1	3.0	0.0	H-Horn	AV	8.0	48.3	54.0	-5.7
3653.176	44.2	1.0	69.0	1.2	3.0	0.0	H-Horn	AV	8.0	37.3	54.0	-16.7
4566.514	38.8	2.8	199.0	1.5	3.0	0.0	H-Horn	AV	8.0	33.7	54.0	-20.3
3653.176	39.8	1.0	37.0	1.2	3.0	0.0	V-Horn	AV	8.0	32.8	54.0	-21.2
4566.514	32.4	2.8	164.0	1.2	3.0	0.0	V-Horn	AV	8.0	27.3	54.0	-26.7
2739.896	61.0	-1.0	179.0	1.1	3.0	0.0	V-Horn	PK	0.0	60.0	74.0	-14.0
2739.896	58.6	-1.0	96.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.6	74.0	-16.4
3653.176	47.8	1.0	69.0	1.2	3.0	0.0	H-Horn	PK	0.0	48.8	74.0	-25.2
4566.514	43.8	2.8	199.0	1.5	3.0	0.0	H-Horn	PK	0.0	46.6	74.0	-27.4
3653.176	45.2	1.0	37.0	1.2	3.0	0.0	V-Horn	PK	0.0	46.2	74.0	-27.8
4566.514	41.3	2.8	164.0	1.2	3.0	0.0	V-Horn	PK	0.0	44.1	74.0	-29.9

#### **Spurious Radiated Emissions in the Restricted Bands EMC** Work Order: FLWM0003 Date: 11/05/04 EUT: MLOG Serial Number: none Customer: Flow Metrix, Inc. Temperature: 72 Attendees: none Humidity: 32% Cust. Ref. No.: Barometric Pressure 30.4 Tested by: Rod Peloquin Power: Battery Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 15.247(d) Spurious Radiated Emissions Method: ANSI C63.4 Year: 2004 Year: 2003 SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

#### COMMENTS

The average data can be reduced by a factor (dB) = 20 \* log (worst case transmit time on a single channel / 100ms). The worst case transmit time of 40 ms on a single channel in any 100 ms window = 7.95 dB duty cycle correction factor.

#### EUT OPERATING MODES

No hop, Low channel 913.294 kHz

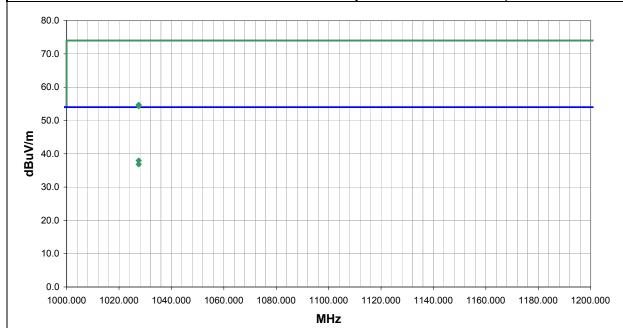
#### DEVIATIONS FROM TEST STANDARD

No deviations.

 RESULTS
 Run #

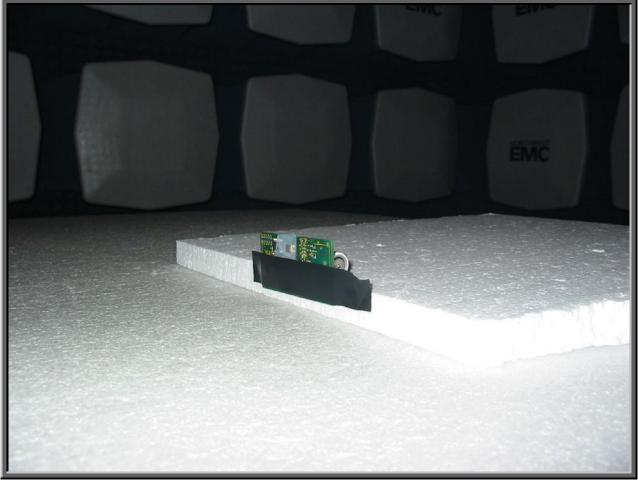
 Pass
 16

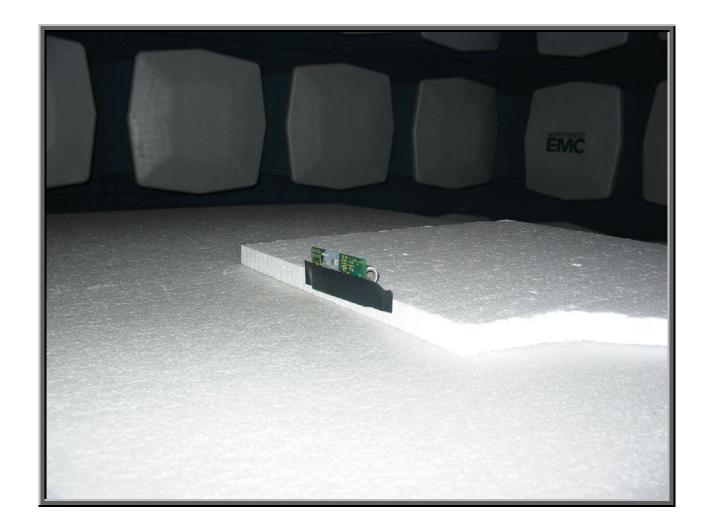
Other



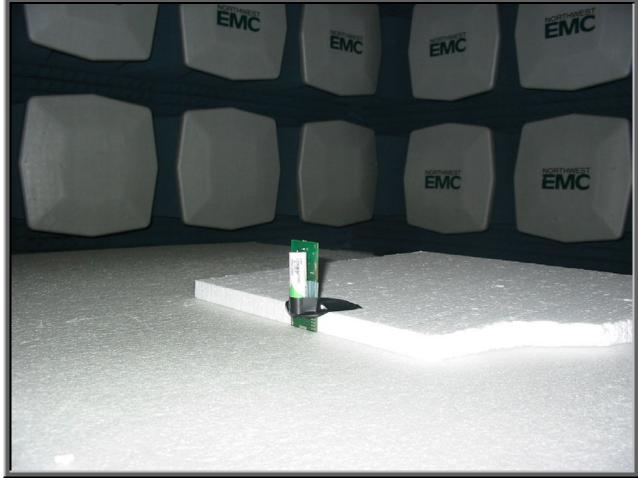
						External			Duty Cycle		in .	Compared to	1
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Correction	Adjusted	Spec. Limit	Spec.	
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)	
1027.503	35.0	-9.1	228.0	1.1	3.0	20.0	H-Horn	AV	8.0	38.0	54.0	-16.0	•
1027.503	33.9	-9.1	174.0	1.2	3.0	20.0	V-Horn	AV	8.0	36.9	54.0	-17.1	
1027.503	43.8	-9.1	228.0	1.1	3.0	20.0	H-Horn	PK	0.0	54.7	74.0	-19.3	
1027.503	43.4	-9.1	174.0	1.2	3.0	20.0	V-Horn	PK	0.0	54.3	74.0	-19.7	











Revision 10/1/03

#### **Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

#### **Channels in Specified Band Investigated:**

Mid

#### **Operating Modes Investigated:**

Hopping

#### **Data Rates Investigated:**

Maximum

#### **Output Power Setting(s) Investigated:**

Maximum

#### **Power Input Settings Investigated:**

Software\Firmware Applied During Test										
Exercise softwareMLOG FirmwareVersion1.0										
Description										
The system was tested us	The system was tested using special firmware developed to test all functions of the device during the test.									

<b>EUT and Peripheral</b>	EUT and Peripherals									
Description	Manufacturer	Model/Part Number	Serial Number							
EUT	FlowMetrix	MLOG	N/A							

Measurement Equipment										
Description Manufacturer Model Identifier Last Cal Interval										
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo					
Near Field Probe	EMCO	7405	IPD	NCR	NA					

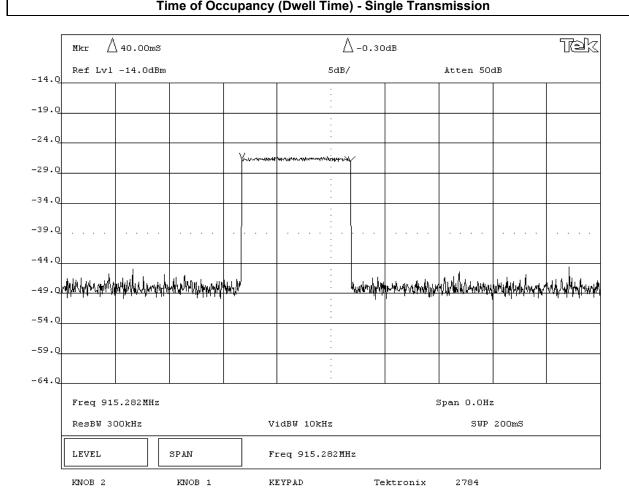
#### **Test Description**

**Requirement**: Per 47 CFR 15.247(f)), the frequency hopping operation of the hybrid system shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The measurement is made with the spectrum analyzer's span set to zero. The measurement is made in two steps. First, the sweep speed is adjusted to capture the pulse width or dwell time of a single transmission. Then, the sweep speed is set to 2 seconds (5 hopping channels x 0.4 seconds) to count the number of transmissions during that period. The dwell time of a single transmission multiplied by the number of transmissions during a 2 second period equals the average time of occupancy during a 2 second period.

**Configuration**: The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a near field probe and spectrum analyzer to measure the RF output of the EUT. The hopping function of the EUT was enabled.

Completed by:

EMC		<b>EMISSIONS</b> I	DATA SH	EET		Rev BET 01/30/01				
EUT:	MLOG				Work Order	FLWM0003				
Serial Number:	N/A	Date:	11/09/04							
Customer:	FlowMetrix	Temperature:	23 °C							
Attendees:	None	Humidity	34%							
Customer Ref. No.:	N/A	Bar. Pressure:	30.10							
Tested by:	Greg Kiemel	reg Kiemel Power: Battery				EV06				
Specification:	47 CFR 15.247(f)	Year: 2004	Method:	DA 00-705, ANSI C63.4	Year	2003				
SAMPLE CALCULATION	ONS									
Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 2 second period)										
COMMENTS										
EUT OPERATING MOI	DES									
Modulated by PRBS a	t maximum data rate. Hopping ca	rrier.								
<b>DEVIATIONS FROM T</b>	EST STANDARD									
None										
REQUIREMENTS										
The average time of o multiplied by 0.4.	ccupancy on any frequency shall	not be greater than 0.4 seconds w	ithin a period in second	ds equal to the number	of hopping channels	employed				
	DWELL TIME DURING A SINGLE TRANSMISSION									
	40mS									
SIGNATURE										
Tested By:	ADU.K.P									
DESCRIPTION OF TES	-	Occupancy (Dwell:	T: \ 0: I							



NORTHWEST EMC		<b>EMISSIONS</b> I	DATA SHEET		BETA 01/30/				
EUT:	MLOG			Work Order:	FLWM0003				
Serial Number:	N/A			Date:	11/09/04				
Customer:	FlowMetrix	Temperature:	23 °C						
Attendees:	None	Humidity:	34%						
Customer Ref. No.:	N/A	Bar. Pressure:	30.10						
Tested by:	Greg Kiemel	Job Site:	EV06						
Specification:	47 CFR 15.247(f)	Year: 2004	Method: DA 00-705, ANSI C63.4	Year:	2003				
SAMPLE CALCULATION	ONS								
Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 2 second period)									
COMMENTS									
5 hopping channels									
EUT OPERATING MO									
	t maximum data rate. Hopping ca	arrier.							
DEVIATIONS FROM T	EST STANDARD								
None									
REQUIREMENTS									
The average time of o multiplied by 0.4.	ccupancy on any frequency shall	not be greater than 0.4 seconds w	ithin a period in seconds equal to the number	of hopping channels	mployed				
RESULTS	TOTAL DWELL TIME	IN 2 SECOND PERIOD	NUMBER OF TRANSMISSIONS DURING A 2 S	SECOND PERIOD					
Pass	400mS		10						
SIGNATURE									
Tested By:	ADU.K.P								
DESCRIPTION OF TES	ST								
Time	of Occupancy (Dw	ell Time) - Number	of transmissions during a	2 second no	riod				

