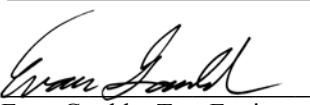




# Test Report

Report No	EC0749-1
Client	Maximum Inc. 30 Samuel Barnet Blvd. New Bedford, MA 02745
Phone	(508) 995-2200
Fax	(508) 998-5359
FRN	0005833959
Model	EA314
FCC ID	KLN314
Equipment Type	Low Power Communication Device Transmitter
Equipment Code	DXX
Results	As detailed within this report
Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	<u>10/4/02</u>
Conditions of issue	This Test Report is issued subject to the conditions stated in 'terms and conditions' section of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



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## ***Summary***

This report is an application for Certification of a transmitter operating pursuant to Part 15.249 of the FCC Rules, Code of Federal Regulations 47. This report is designed to demonstrate the compliance of the EA314 Wireless Rain Transmitter with the requirements outlined in Part 15 (using the methods outlined in Part 2) of 47 CFR.

## ***Test Methodology***

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). The testing was performed at distance of 3 meters below 1GHz, and 3 or 1 meter(s) above 1GHz. The actual test distance used is noted in the test data sheets. The device's performance was investigated in the range 30MHz to 9166MHz (tenth harmonic). The EUT was powered by two AA batteries. Fresh batteries were used for all testing. Since the device is installed in only one orientation, the emissions were maximized around the vertical axis and the maximum reading was recorded. The integrated antenna cannot be maximized separately.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report.

***Statement of Conformity***

The Maximum Inc. Wireless Rain Transmitter has been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
2.925	15.19	The label is shown in the label exhibit.
	15.21	Information to the user is shown in the instruction manual exhibit.
	15.27	No special accessories are required for compliance.
	15.203	The antenna is soldered to the transmitter board, and there is no external antenna connection.
	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is battery powered without the capability of being recharged or operated from the AC mains.
	15.249	The unit complies with the field strength limits of 15.249

***Test Equipment Used***

<b>SPECTRUM ANALYZERS</b>					
x	Analyzer	Model No.	Company	Serial No.	Calibration Due
X	YELLOW 9kHz-2.9GHz	8594E	HP	3523A01958	03-JUL-2003
X	ORANGE 9kHz-26.5GHz	E4407B	HP	US39440975	07-JUN-2003

<b>OPEN AREA TEST SITE (OATS)</b>					
x	Site	FCC Code	IC Code	VCCI Code	Calibration Due
X	“T” Texas	93448	IC 2762-T	R-905/ C-480	04-FEB-2004

<b>ANTENNAS</b>					
x	Antenna	Model No.	Company	Serial No.	Calibration Due
X	BLUE Bilog: 30MHz-1GHz	3143	EMCO	1271	11-JUL-2004
X	YELLOW Horn: 1-18GHz	3115	EMCO	9608-4898	08-MAY-2003

<b>PREAMPLIFIERS</b>					
x	Preamplifier	Model No.	Company	Serial No.	Calibration Due
X	BLACK 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	22-MAR-2003
X	ORANGE-BLACK 1-20GHz	SMC-12A	MITEQ	690639	27-AUG-2003

<b>RMS VOLTMETER</b>					
x	Meter	Model No.	Company	Serial No.	Calibration Due
X	TRUE-RMS VOLTMETER	79III	Fluke	71700298	03-OCT-2002

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

## Fundamental Frequency Measurement

### LIMIT

Quasi-Peak: 50mV/m = 93.9dB $\mu$ V/m @ 3m [15.249(a), (b), and (d)]

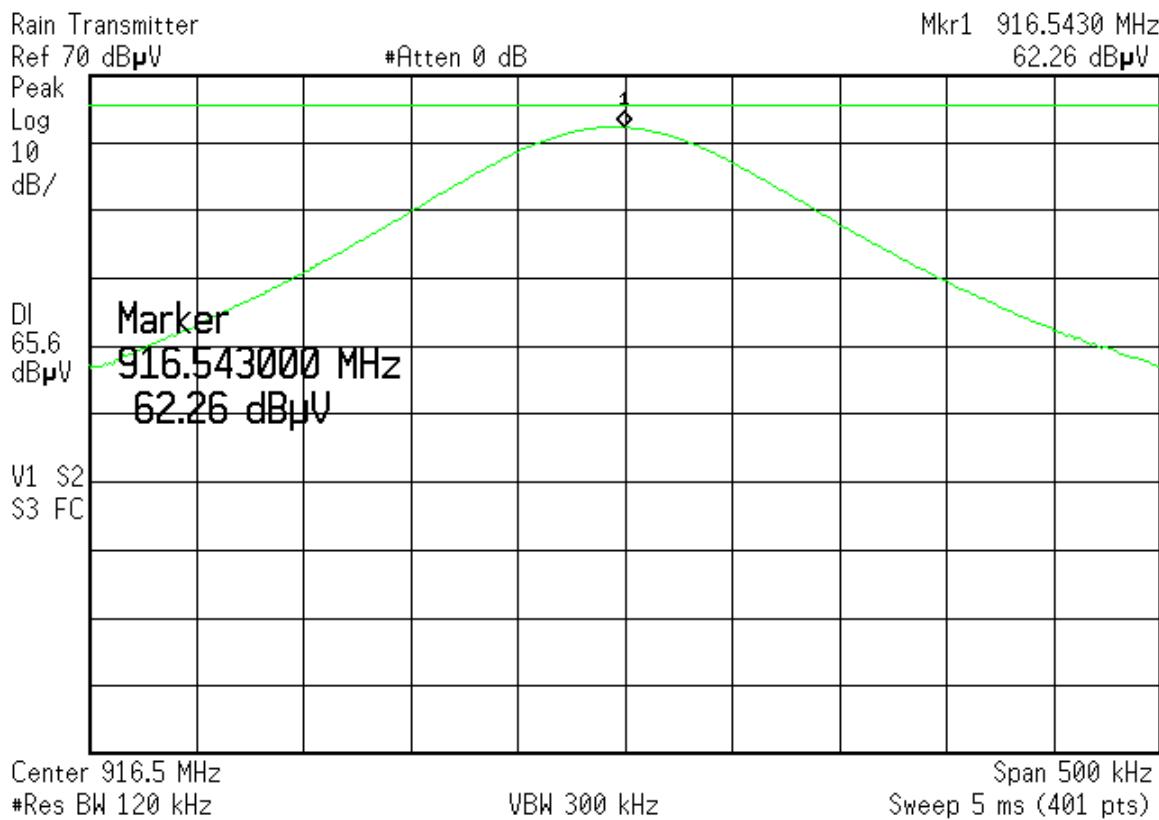
Note: If Peak measurements meet Quasi-Peak limits, then Quasi-Peak measurements are not required.

### MEASUREMENT

Fundamental Frequency										Curtis-Straus LLC					
Date: 25-Sep-02			Engineer: Evan Gould						Work Order: C0749						
Company: Maximum Inc.			EUT: Wireless Rain Transmitter						Fundamental Frequency: 916.5MHz						
Test Site: "T"			Cable: 65 ft RG8A/U						Pre-amp: N/A						
Antenna: Blue			Filter/Attenuator: N/A						Analyzer: Orange						
Measurement Distance: 3 meters						Resolution BW: 120kHz									
Detector Type: Peak						Video BW: 300kHz									
Notes:															
										47 CFR 15.249					
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB $\mu$ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Distance Factor (dB)	Adjusted Reading (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)	Margin (dB)	Result (Pass/Fail)			
V	916.5	62.3	0.0	24.2	4.1	0.0	0.0	90.6	93.9	-3.3	Pass				

### ANALYZER PLOT

\* Agilent 10:10:31 Sep 25, 2002



## Band Edge Measurements

### LIMITS

Quasi-Peak: 50dB below level of Fundamental *OR*

General radiated emission limits of 15.209

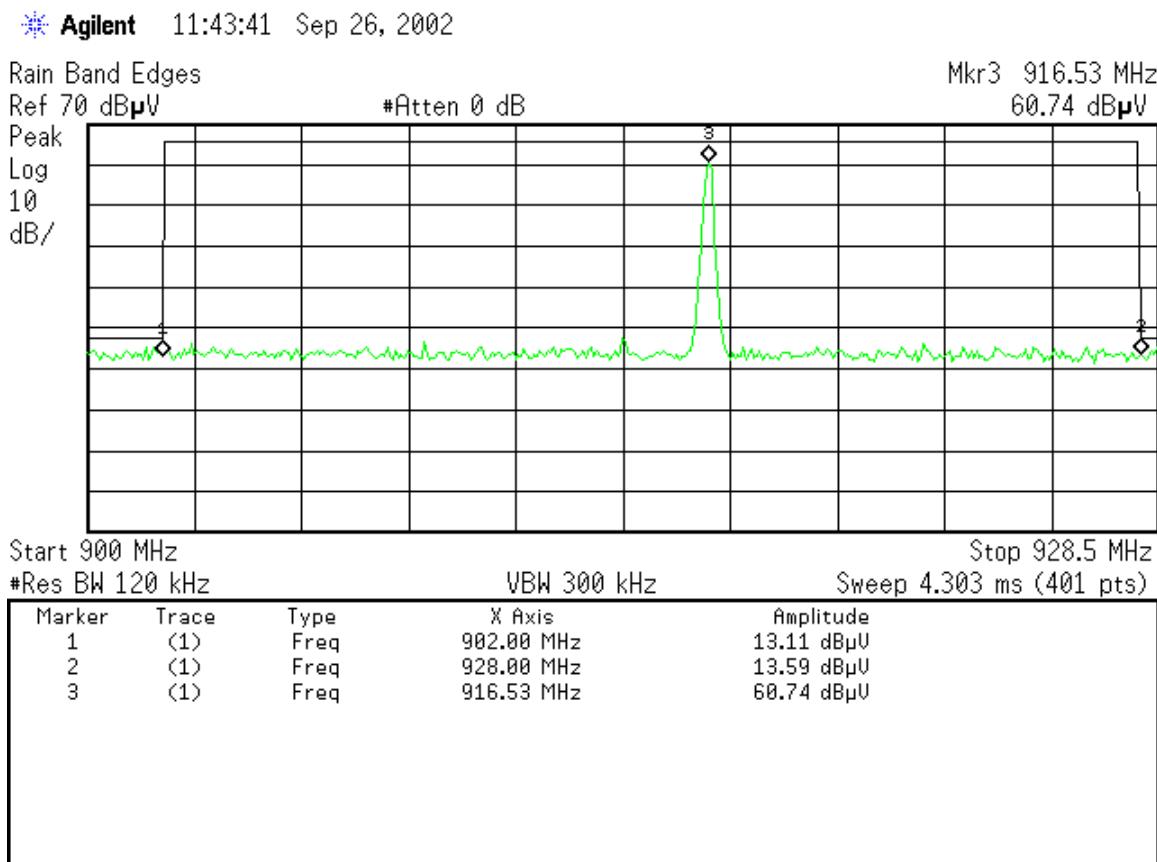
*"...whichever is the lesser attenuation."* [15.249(c)]

**Note:** If Peak measurements meet Quasi-Peak limits, then Quasi-Peak measurements are not required.

## MEASUREMENTS

Band Edges										Curtis-Straus LLC																	
Date: 26-Sep-02	Engineer: Evan Gould						Work Order: C0749																				
Company: Maximum Inc.	EUT: Wireless Rain Transmitter						Fundamental Frequency Band: 902-928MHz																				
Test Site: "T"	Cable: 65 ft RG8A/U						Pre-amp: N/A																				
Antenna: Blue	Filter/Attenuator: N/A						Analyzer: Orange																				
Measurement Distance: 3 meters	Resolution BW: 120kHz						Video BW: 300kHz																				
Detector Type: Peak																											
Notes:																											
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB $\mu$ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Distance Factor (dB)	Adjusted Reading (dB $\mu$ V/m)	47 CFR 15.249																		
V	902.0	13.1	0.0	24.3	4.1	0.0	0.0	41.5	Limit (dB $\mu$ V/m)	46.0	-4.5	Pass															
V	928.0	13.6	0.0	24.2	4.2	0.0	0.0	42.3	Margin (dB)	46.0	-3.7	Pass															

## ANALYZER PLOT



## Harmonic Frequency Measurements

### LIMITS

Average:  $500\mu\text{V}/\text{m} = 54\text{dB}\mu\text{V}/\text{m}$  @ 3m [15.249(a), (b), and (d)]

Peak:  $53.9\text{dB}\mu\text{V}/\text{m} + 20\text{dB} = 73.9\text{dB}\mu\text{V}$  @ 3m [15.249(d)]

**Note:** If peak measurements meet the Average limit, then Average measurements are not required.

## MEASUREMENTS

Harmonics											Curtis-Straus LLC					
Date: 25-Sep-02			Engineer: Evan Gould						Work Order: C0749							
Company: Maximum Inc.											Fundamental Frequency: 916.5MHz					
Test Site: "T"			Cable: 65 ft RG8A/U						Pre-amp: N/A							
Antenna: Yellow Horn			Filter/Attenuator: N/A						Analyzer: Orange							
Measurement Distance: 3 meters						Resolution BW: 1MHz										
Detector Type: Peak						Video BW: 1MHz										
Notes:																
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB $\mu$ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Duty Cycle Factor (dB)	Distance Factor (dB)	Adjusted Reading (dB $\mu$ V/m)	47 CFR 15.249						
V	1833.1	38.9	24.1	28.2	1.2	0.0	0.0	0.0	44.2	54.0	-9.8	Pass				
V	2749.7	34.1	23.9	31.1	1.5	0.0	0.0	0.0	42.8	54.0	-11.2	Pass				
V	3666.2	29.5	23.6	33.4	2.0	0.0	0.0	0.0	41.3	54.0	-12.7	Pass				
V	4582.8	29.3	23.3	34.1	2.2	0.0	0.0	0.0	42.3	54.0	-11.7	Pass				
V	5499.3	29.4	22.4	36.2	2.3	0.0	0.0	0.0	45.5	54.0	-8.5	Pass				

Harmonics											Curtis-Straus LLC					
Date: 25-Sep-02			Engineer: Evan Gould						Work Order: C0749							
Company: Maximum Inc.											Fundamental Frequency: 916.5MHz					
Test Site: "T"			Cable: 65 ft RG8A/U						Pre-amp: N/A							
Antenna: Yellow Horn			Filter/Attenuator: N/A						Analyzer: Orange							
Measurement Distance: 1 meter						Resolution BW: 1MHz										
Detector Type: Peak						Video BW: 1MHz										
Notes:																
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB $\mu$ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Duty Cycle Factor (dB)	Distance Factor (dB)	Adjusted Reading (dB $\mu$ V/m)	47 CFR 15.249						
V	6415.9	29.2	21.5	36.5	2.5	0.0	0.0	9.5	37.2	54.0	-16.8	Pass				
V	7332.4	31.2	21.3	37.7	2.8	0.0	0.0	9.5	40.9	54.0	-13.1	Pass				
V	8249.0	29.6	20.9	38.4	3.2	0.0	0.0	9.5	40.8	54.0	-13.2	Pass				
V	9165.5	28.5	20.2	40.2	3.3	0.0	0.0	9.5	42.3	54.0	-11.7	Pass				

## ***Terms and Conditions***

**Paragraph 1. SERVICES.** LABORATORY will:

- 1.1 Use the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.
- 1.2 Perform all technical services in substantial accordance with the generally accepted laboratory principles and practices.
- 1.3 Retain all pertinent records relating to the services performed for a period of three (3) years following submission of the report describing such services, during which period the records will be made available to CLIENT upon reasonable request.

**Paragraph 2. CLIENT'S RESPONSIBILITIES.** CLIENT or his authorized representative will:

- 2.1 Provide LABORATORY with all plans, schematics, specifications, addenda, change orders, drawings and other information for the proper performance of technical services.
- 2.2 Designate a person to act as CLIENT's representative with respect to LABORATORY's services to be performed on behalf of the CLIENT; such person or firm to have complete authority to transmit instructions, receive information and data, interpret and define CLIENT's policies and decisions with respect to the LABORATORY's work on behalf of the CLIENT and to order, at CLIENT's expense, such technical services as may be required.
- 2.3 Designate a person who is authorized to receive copies of LABORATORY's reports.
- 2.4 Undertake the following:
  - (a) Secure and deliver to LABORATORY, without cost to LABORATORY, preliminary representative samples of the equipment proposed to require technical services, together with any relevant data.
  - (b) Furnish such labor and equipment needed by LABORATORY to handle samples at the LABORATORY and to facilitate the specified technical services.

**Paragraph 3. GENERAL CONDITIONS:**

- 3.1 LABORATORY, by the performance of services covered hereunder, does not in any way assume any of those duties or responsibilities customarily vested in the CLIENT, its employees, or any other party, agency or authority.
- 3.2 LABORATORY shall not be responsible for acts of omissions of any other party or parties involved in the design, manufacture or maintenance of the equipment or the failure of any employee, contractor or subcontractor to undertake any aspect of equipment's design, manufacture or maintenance.
- 3.3 LABORATORY is not authorized to revoke, alter, release, enlarge or release any requirement of the equipment's design, manufacture or maintenance unless specifically authorized by CLIENT or his authorized representative.
- 3.4 THE ONLY WARRANTY MADE BY LABORATORY IN CONNECTION WITH ITS SERVICE PERFORMED HEREUNDER IS THAT IT WILL USE THAT DEGREE OF CARE AND SKILL AS SET FORTH IN PARAGRAPH 1 ABOVE. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED FOR SERVICES PROVIDED HEREUNDER.
- 3.5 Where the LABORATORY indicates that additional testing is advisable to obtain more valid or useful data, and where such testing has not been authorized, CLIENT agrees to view such test reports as inconclusive and preliminary.
- 3.6 The LABORATORY will supply technical service and prepare a report based solely on the sample submitted to the LABORATORY by the CLIENT. The CLIENT understands that application of the data to other devices is highly speculative and should be applied with extreme caution.
- 3.7 The LABORATORY agrees to exercise ordinary care in receiving, preserving and shipping (F.O.B. Littleton, MA) any sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise from loss, damage or destruction of the samples due to the act of examination, modification or testing, or technical services or circumstances beyond LABORATORY's control.
- 3.8 The LABORATORY will hold samples for thirty (30) days after tests are completed, or until the CLIENT's outstanding debts to the LABORATORY are satisfied, whichever is later.
- 3.9 The CLIENT recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.
- 3.10 It is agreed between LABORATORY and CLIENT that no distribution of any tests, reports or analysis shall be made to any third party without the prior written consent of both parties unless such distribution is mandated by operation of law. No reference to reports or technical services of the LABORATORY shall be made in any advertising or promotional literature without the express written permission of the LABORATORY.
- 3.11 The CLIENT acknowledges that all employees of LABORATORY operate under employment contracts with the LABORATORY and CLIENT agrees not to solicit employment of such employees or to solicit information related to other clients from said employees.

**Paragraph 4. INSURANCE:**

- 4.1 LABORATORY shall secure and maintain throughout the full period of the services provided to the CLIENT adequate insurance to protect it from claims under applicable Workmen's Compensation Acts and also shall maintain one million dollars of general liability coverage to cover claims for bodily injury, death or property damage as may arise from the performance of its services.
- 4.2 The CLIENT hereby warrants that it has sufficient insurance to protect its employees adequately under applicable Workmen's Compensation Acts and for bodily injury, death, or property damage.
- 4.3 No insurance of whatever kind or type, which may be carried by either party is to be considered as in any way limiting any other party's responsibility for damages resulting from their operations or for furnishing work and materials.

**Paragraph 5. PAYMENT:**

- 5.1 CLIENT shall pay to LABORATORY such fees for services as previously agreed, orally or in writing, within 30 days of presentment of a bill for such services performed. In the event CLIENT ordered, orally or in writing, services but such services were not assigned a rate for billing, such services shall be billed at the LABORATORY's reasonable and customary rate.
- 5.2 CLIENT shall be responsible for all shipping, customs and other expenses related to services provided by LABORATORY to the CLIENT, and shall fully insure any test sample or other equipment provided to LABORATORY by the CLIENT.
- 5.3 Amounts overdue from CLIENT to LABORATORY shall be charged interest at a rate of 1½% per month.

**Paragraph 6. ISO Guide 25 ADDITIONS:**

- 6.1 CLIENT agrees that this test report will not be reproduced except in full, without written approval from the LABORATORY.
- 6.2 CLIENT agrees that this test report shall not be used to claim product endorsement by A2LA or ANSI or any agency of the U.S. Government.
- 6.3 CLIENT agrees that test results presented herein relate only to the sample tested by the LABORATORY.