REGULATORY Compliance REPORT

TITLE: Test Report for Title 47 Part 15.249 and RSS-210 for 100WC C2PC ext., ant.
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REV	CCO	DESCRIPTION OF CHANGE	DATE	APPROVALS	
001		INITIAL RELEASE		Engineering	
				Regulatory	

REVISION HISTORY

a		initial upload	24dec11	Engineering	
				Regulatory	
b		answering questions on test setup	10jan12	Engineering	
				Regulatory	
				Engineering	
				Regulatory	

FCC Part 15.249 / IC RSS-210 Sec. 6.2.2(m2);
Field strength of Low Power Transmitters,
100WC 908 MHz
FCC ID: EWQ100WC
IC ID: 864D-100WC
IC Device Models: 100WC
OATS Registration Number: FCC 90716, IC 5615

Rule	Description	Spec Limit	Max. Reading	Pass/Fail
15.31(e)	Variation of Supply Voltage	n/a	N/A (battery)	N/A
15.207/RSS-GEN 7.2.2	Power line conducted emissions	n/a	N/A (battery)	N/A
15.249(d)/RSS-210 sec. 6.6.2(m2)(3)	Out of band non-harmonic radiated emissions	table	No Emissions	Pass
15.249(a)/RSS-210 Sec. 6.2.2 (m2)(1)	Radiated emissions of transmitter fundamental and harmonics	50,000/500 uV/m – 94dBuV/m	79.76dBuV/m @908 MHz average 33.51dBuV/m @ 2724MHz	Pass

Rule versions: FCC Part 1; FCC Part 2; FCC Part 15, RSS-102 Issue 4 (03-2010); RSS-210 Issue 8 (12-2010); RSS-Gen Issue 3 (12-2010).
Reference docs: ANSI C63.4-2003; DA 00-705 (03-30-2000); OET65 (08-1997); OET65C (06-2001); IEEE C95.3-2002.

Cognizant Personnel			
Roger Mulcahy	Name	Test Technician	Title
Jason Woodruff	Name	Project Engineer	Title
Jay Holcomb	Name	Regulatory	Title

CONDITIONS DURING TESTING

No Modifications to the EUT were necessary during the testing.

FCC 15.31(m) – IC _n/a_; Number of Channel
This device operates and was tested on one channel.

ANSI C63.4 - Temperature and Humidity during Testing
The temperature during testing was within +10º C and +40º C.
The Relative humidity was between 10% and 90%.
RSS-Gen 4.3: Tests shall be performed at ambient temperature

EQUIPMENT UNDER TEST (EUT) DESCRIPTION
Itron declares that the EUT tested was representative of a production unit.

EQUIPMENT UNDER TEST

EUT Module

Manuf:	Itron, Inc.
Itron Model:	Itron 100W and 100WP Endpoint
FCC ID:EWQ100WC	
IC:864D-100WC IC Device Models (for IC): 100WC	
Serial Number(s)	**Endpoint** 46552402 are listed below
Power source	Fresh Batteries were used

Plot Information
In the zero span measurements, the line in the display is the trigger level.

Test Conditions Setup
The external antenna EUT was mounted in a metal water meter pit lid above the endpoint device, on the test site turntable.

15.31(e)

Variation of Supply Voltage

Vary the supply voltage from 85% to 115% of the nominal voltage. If the power level of the fundamental signal varies with supply voltage, record the voltage level at which the fundamental signal is at its highest and use that voltage level for all further testing.

DEVICE IS BATTERY OPERATED NOT CONNECTED TO THE POWER LINE. BATTERY IS NOT RECHARGABLE. THERFORE THIS TEST IS N/A.

15.207 / RSS-GEN 7.2.2

Power line Conducted Emissions

Measure the AC power line conducted emissions from 150kHz to 30 MHz using a 50□H/50□ line impedance stabilization network (LISN) according to the procedure specified in ANSI C63.4. Verify that no emissions exceed the following limits:

Frequency (MHz)	Quasi-Peak (dB□V)	Average (dB□V)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of frequency

DEVICE IS BATTERY OPERATED NOT CONNECTED TO THE POWER LINE. BATTERY IS NOT RECHARGABLE. THERFORE THIS TEST IS N/A.

15.209 / RSS-210 sec. 6.2(m2)(3)

Out of band non-harmonic emissions

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (microvolts/meter)	in dBuV/m	Measurement Distance (meters)*
0.009-0.490	2440F (kHz)		300
0.490-1.705	2400F (kHz)		30
1.705-30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

FS (dBuV/) = 20 * log (FS(uV/m))

* Adjust when measuring at different distances than specified; 40dB/decade <30MHz and 20dB/decade >=30MHz. (At 30MHz depends on the antenna used)

note: 15.249(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Measure the field strength of all spurious emissions that are not harmonics according to the procedure in Appendix A.

For emissions measurements below 30MHz, rotate the loop antenna about its horizontal and vertical positions to maximize emissions.

DUT is endpoint 46552402, battery was new

Equipment Used	Serial Number	Cal Date	Cal Due
Agilent E7405A Spectrum Analyzer	MY45113415	8/8/2011	8/8/2012
Huber&Suhner 40 foot cable	220297 001	12/3/2010	12/3/2011
AH systems preamplifer model number PAM 0126	146	12/22/2010	12/22/2011
Hewlett Packard 8593E Spectrum Analyzer	3543A02032	12/3/2010	12/3/2011
Emco 6502 Loop (9kHz to 30Mhz)	9509-2970	10/7/2010	10/7/2012
Emco 3110B Biconical (30MHz-to 300MHz)	9807-3129	7/20/2011	7/20/2013
Emco 3146 Log Periodic (200Mhz to 1GHz)	9203-3358	7/20/2011	7/20/2013
Emco 3115 waveguide (1Ghz - 18GHz)	9508-4550	3/22/2010	3/22/2012
1.3Ghz high pass filter	405735	6/3/2011	6/3/2013
Huber&Suhner sucotest cable	2	4/26/2011	4/26/2013

Date	Temp/Humidity °F / %	Tested by
11/28/2011	68 F / 23%	Roger Mulcahy

Frequency range investigated was 9 kHz to 9.28GHz. (part 15.33 (a))

No Emissions found

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5.249(a)/RSS-210 sec. 6.2(m2)(1)

Transmitter Fundamental and Harmonics

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following: (table below)

(c) Field strength limits are specified at a distance of 3 meters.

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Measure the field strength of the transmitter fundamental and harmonic emissions at three meters according to the procedure in Appendix A. Record emissions levels with the transmitter near its lowest, middle, and highest frequencies. The maximum field strength of emissions may not exceed:

Fundamental (□V/m)	in (dBuV/m)	Harmonics (□V/m)	in (dBuV/m)
50,000	94	500	54

FS (dBuV/m) = 20 * log (FS(uV/m))

Equipment Used	Serial Number	Cal Date	Cal Due
Agilent E7405A Spectrum Analyzer	MY45113415	8/8/2011	8/8/2012
Huber&Suhner 40 foot cable	220297 001	12/3/2010	12/3/2011
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Emco 3115 waveguide (1Ghz - 18GHz)	9508-4550	3/22/2010	3/22/2012
1.3Ghz high pass filter	405735	6/3/2011	6/3/2013

Date	Temp/Humidity ºF / %	Tested by
11/28/2011	68 F / 23%	Roger Mulcahy

Frequency (Mhz)	Polarity	Peak Level (dBuV/m)	Average level with Duty Cycle Correction factor -5.64db* (dBuV/m)	Antenna correction Factor	Coaxial cable and High pass filter loss (db)	Amplifier Gain (db)
908	Vertical	79.76		22.18	2.59	0
908	Horizontal	73.77		22.18	2.59	0
2724	Vertical	39.16	33.51	28.9	5.51	-33.72
1816	Vertical	38.21	32.56	26.9	4.71	-33.68
1816	Horizontal	36.67	31.02	26.9	4.71	-33.68

*For harmonics, adjust for the proper duty cycle correction in accordance with the results from pulsed operation section above.
Rest are below the noise floor.

Appendix A

Field Strength Measurement Procedure

This test measures the field strength of radiated emissions using a spectrum analyzer and a receiving antenna in accordance with ANSI C63.4-2003. During the test, the EUT is to be placed on a non-conducting support at 80 cm above the horizontal ground plane of the OATS. The horizontal distance between the antenna and the EUT is to be exactly 3 meters. The bandwidths used shall be per ANSI C63.4-2003; 200 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz, 100 kHz from 30 MHz to 1000 MHz, and 1 MHz from 1 GHz to 40 GHz, with the detector set to peak hold or quasi peak.

1) The antenna correction factor, preamplifier gain (if the preamplifier is installed), and cable loss are stored in tables in the EMC analyzer and the level at the analyzer is the corrected level in dBuV/m.
2) Monitor the frequency range of interest at a fixed antenna height and EUT azimuth.
3) If appropriate, manipulate the system cables to produce the highest amplitude signal relative to the limit. Note the amplitude and frequency of the suspect signal.
4) Rotate the EUT 360° to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, go back to the azimuth and repeat step 3). Otherwise, orient the EUT azimuth to repeat the highest amplitude observation and proceed.
5) Move the antenna over its fully allowed range of travel to maximize the suspected highest amplitude signal. If the signal or another at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, return to step 3) with the antenna fixed at this height. Otherwise, move the antenna to the height that repeats the highest amplitude observation and proceed.
6) Change the polarity of the antenna and repeat step 3), step 4), and step 5). Compare the resulting suspected highest amplitude signal with that found for the other polarity. Select and note the higher of the two signals.
7) The final maximized level displayed on the EMC analyzer is the field strength.