

AquaCheck (Pty) LTD

TEST REPORT FOR

SOLO Remote Transmission Unit, ACSOLO_EXT-O
&
Classic SDI-12/MODBUS Probe, AC-CLASSIC-MOD & AC-CLASSIC-SDI

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.249

and

RSS-210 Version 7

Report No.: 90751-13

Date of issue: June 18, 2010



TESTING
CERT #803.01, 803.02,
803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

AquaCheck (Pty) LTD
Office 1, First Floor, 44 Oxford
Dubanville 7550, South Africa

Representative: Emile Jordaan

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 90751

DATE OF EQUIPMENT RECEIPT:

June 5, 2010

DATE(S) OF TESTING:

June 5 - 14, 2010

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink, reading "Steve Behm", is positioned above a horizontal line.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
1120 Fulton Place
Fremont, CA 94539

Site Registration & Accreditation Information

Location	Japan	Canada	FCC
Fremont	R-2160, C2332 & T-228	3082B-1	958979

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Description	Test Procedure/Method	Results
Occupied Bandwidth	FCC Part 15 Subpart C Section 15.215	Pass
Carrier Field Strength	FCC Part 15 Subpart C Section 15.249	Pass
Spurious Emissions	FCC Part 15 Subpart C Section 15.249	Pass
99% Bandwidth	RSS-210 Version 7	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
Installed the latest firmware that would lower the fundamental Tx power for compliance. Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex

EQUIPMENT UNDER TEST (EUT)

EUT DESCRIPTION

The EUT is a wireless logging soil moisture probe, Wireless LOGGER for soil moisture probe and fixed mount Wireless LOGGER For soil moisture probe.

EQUIPMENT UNDER TEST

Classic SDI-12/MODBUS Probe

Manuf: AquaCheck
Model: AC-CLASSIC-MOD & AC-CLASSIC-SDI
Serial: 6878

SOLO Remote Transmission Unit

Manuf: AquaCheck
Model: ACSOLO_EXT-O
Serial: 7069

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Basic II Wireless logger

Manuf: AquaCheck
Model: ACBIIWLOGGER
Serial: 60390

Power Adapter

Manuf: PENERGY
Model: Type: ACH-4E Falcon 771070
Serial: 01039337

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

Temperature And Humidity During Testing

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

15.31(e) Voltage Variations

Not applicable to this device because it is battery powered.

15.31(m) Number Of Channels

This device operates on a single channel.

15.33(a) Frequency Ranges Tested

15.249 Radiated Emissions: 9 kHz - 10GHz

15.203 Antenna Requirements

The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

EUT Operating Frequency

The EUT was operating at 917.923330MHz.

15.215 Occupied Bandwidth

Test Conditions

EUT transmits at 917.9581MHz.

The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.

Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.

Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex

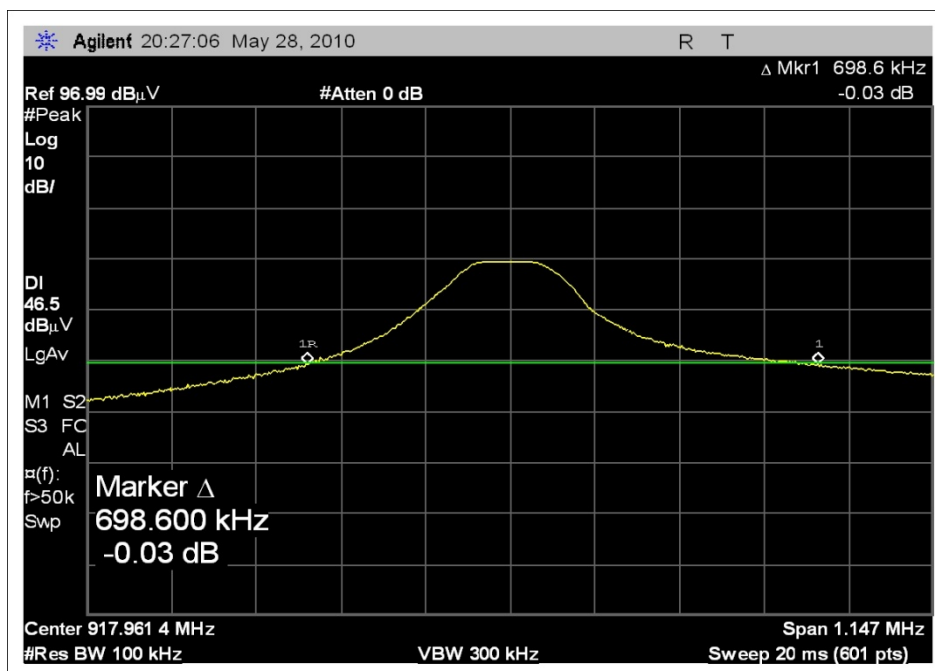
The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Engineer Name: A. Brar

Test Equipment

Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	US44300408	3/9/2009	3/9/2011	AN02668
Horn Antenna	1064	1/19/2009	1/19/2011	AN02061
Cable	HOL-HF-025-06	3/19/2010	3/19/2012	ANP05138
Cable	26	3/2/2010	3/2/2012	ANP04241

Test Plot



Test Setup Photo



15.249 Carrier Field Strength

Test Data Sheets

Test Location: CKC Laboratories • 5046 Sierra Pines Dr • Mariposa, CA 95338 • (209) 966-5240

Customer: **AquaCheck (Pty) LTD**
 Specification: **15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter)**
 Work Order #: **90751** Date: 6/10/2010
 Test Type: **Radiated Scan** Time: 17:47:46
 Equipment: **SOLO Remote Transmission Unit** Sequence#: 9
 Manufacturer: AquaCheck Tested By: A. Brar
 Model: ACSOLO_EXT-O
 S/N: 7069

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP05300	Cable	RG214/U	3/6/2009	3/6/2011
T2	ANP05440	Cable		1/18/2010	1/18/2012
T3	AN00852	Biconilog Antenna	CBL 6111C	12/22/2008	12/22/2010

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Classic SDI-12/MODBUS Probe*	AquaCheck	AC-CLASSIC-MOD & AC-CLASSIC-SDI	6878
SOLO Remote Transmission Unit*	AquaCheck	ACSOLO_EXT-O	7069

Support Devices:

Function	Manufacturer	Model #	S/N
Basic II Wireless logger	AquaCheck	ACBIIWLOGGER	60390
Power Adapter	PENERGY	Type: ACH-4E Falcon 771070	01039337

Test Conditions / Notes:

Fundamental Readings.
 EUT transmits at 917.9581MHz.
 The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.
 Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.
 Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex
 The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Ext Attn: 0 dB

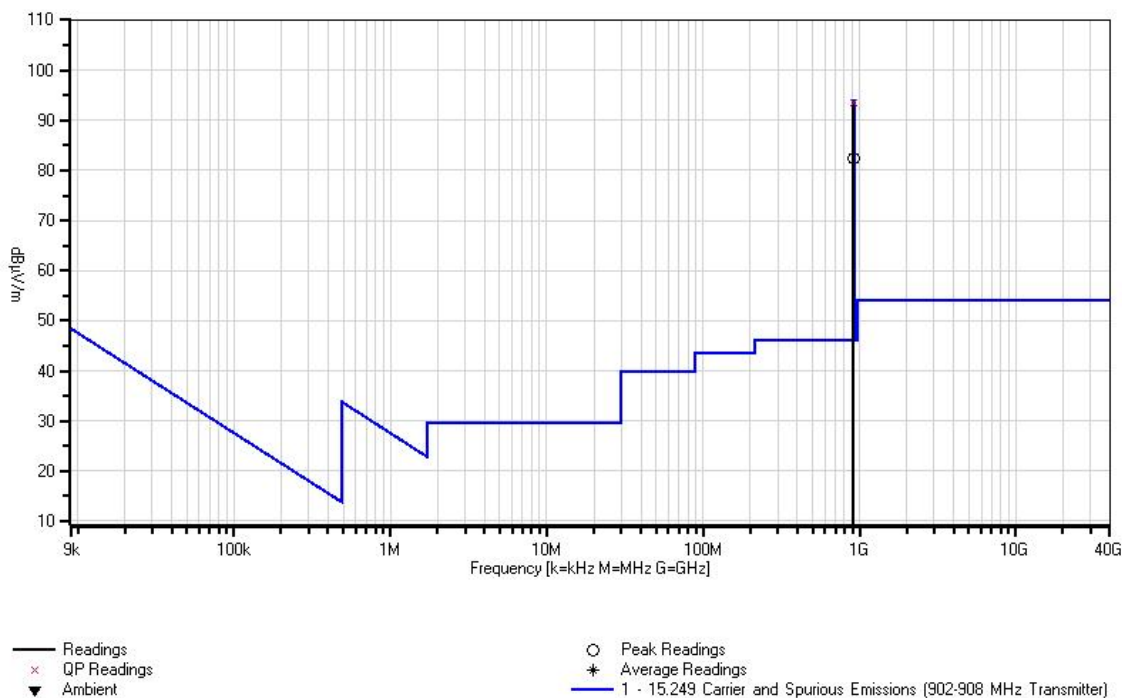
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	917.943M QP	67.4	+1.2	+2.0	+22.8		+0.0 82	93.4	94.0 EUT is standing up vertically as actual installation.	-0.6	Vert 137
^	917.940M	67.8	+1.2	+2.0	+22.8		+0.0 82	93.8	94.0 EUT is standing up vertically as actual installation.	-0.2	Vert 137
3	917.943M	56.5	+1.2	+2.0	+22.8		+0.0 29	82.5	94.0 EUT is standing up vertically as actual installation.	-11.5	Horiz 136

CKC Laboratories Date: 6/10/2010 Time: 17:47:46 AquaCheck (Pty) LTD WO#: 90751
15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter) Test Distance: 3 Meters Sequence#: 9 Ext
ATTN: 0 dB



Test Setup Photo



15.249 Radiated Emissions

Bandedge Test Conditions

EUT transmits at 917.9581MHz.

The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.

Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.

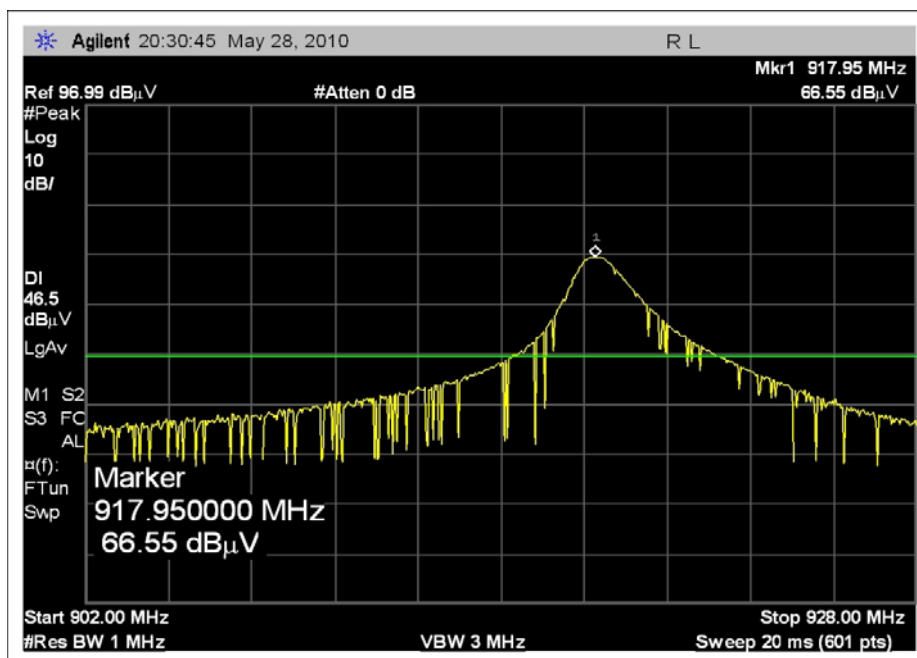
Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex

The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Engineer Name: A. Brar

Test Equipment				
Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	US44300408	3/9/2009	3/9/2011	AN02668
Horn Antenna	1064	1/19/2009	1/19/2011	AN02061
Cable	HOL-HF-025-06	3/19/2010	3/19/2012	ANP05138
Cable	26	3/2/2010	3/2/2012	ANP04241

Plot



Test Data Sheets

Test Location: CKC Laboratories • 5046 Sierra Pines Dr • Mariposa, CA 95338 • (209) 966-5240

Customer: **AquaCheck (Pty) LTD**
 Specification: **15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter)**
 Work Order #: **90751** Date: 6/11/2010
 Test Type: **Maximized Emissions** Time: 3:15:44 PM
 Equipment: **SOLO Remote Transmission Unit** Sequence#: 23
 Manufacturer: AquaCheck Tested By: A. Brar
 Model: ACSOLO_EXT-O
 S/N: 7069

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP05300	Cable	RG214/U	3/6/2009	3/6/2011
T2	ANP05440	Cable		1/18/2010	1/18/2012
T3	AN00432	Loop Antenna	6502	5/18/2009	5/18/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SOLO Remote Transmission Unit*	AquaCheck	ACSOLO_EXT-O	7069
Classic SDI-12/MODBUS Probe	AquaCheck	AC-CLASSIC-MOD & AC-CLASSIC-SDI	6878

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Spurious Emissions.
 .09-30MHz.
 EUT transmits at 917.9581MHz.
 The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.
 Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.
 Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex
 The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Ext Attn: 0 dB

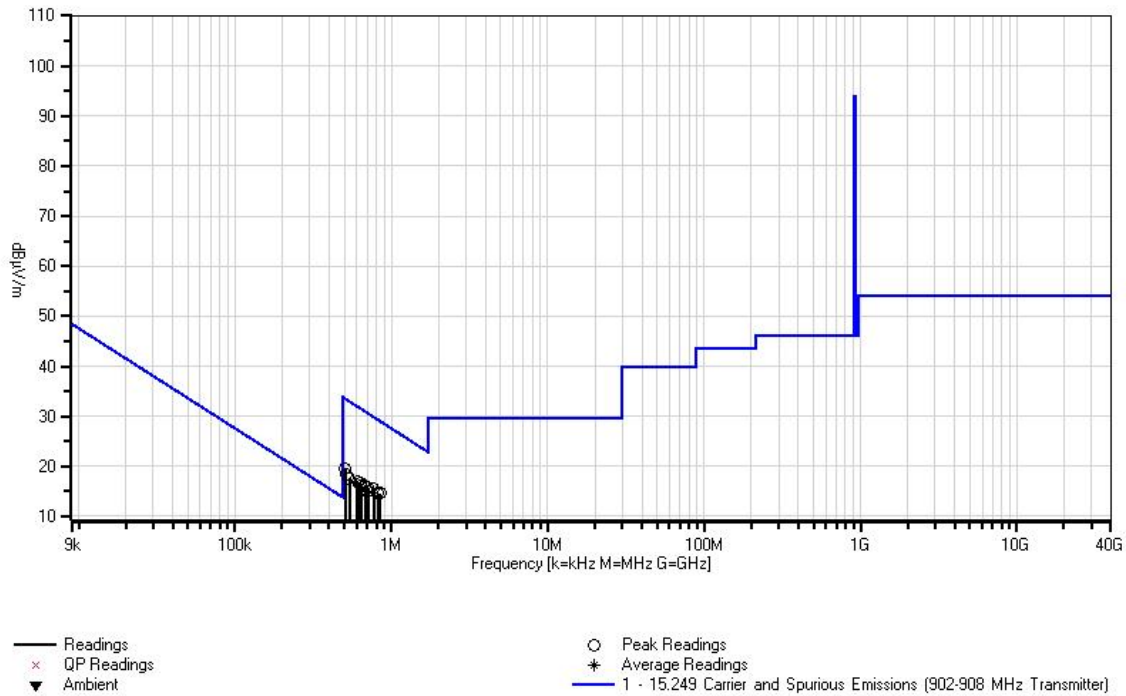
Measurement Data:

Reading listed by margin.

Test Distance: 5 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	505.419k	40.2	+0.2	+0.1	+9.9		-31.0 -5	19.4	33.5	-14.1	Paral 100
2	773.029k	36.0	+0.1	+0.1	+10.3		-31.0 314	15.5	29.8	-14.3	Perpe 100
3	844.113k	35.1	+0.1	+0.1	+10.3		-31.0 -5	14.6	29.0	-14.4	Paral 100
4	816.934k	35.1	+0.1	+0.1	+10.3		-31.0 -5	14.6	29.3	-14.7	Paral 100
5	699.855k	36.5	+0.1	+0.0	+10.3		-31.0 -5	15.9	30.7	-14.8	Paral 100
6	607.864k	38.1	+0.1	+0.0	+9.9		-31.0 -5	17.1	31.9	-14.8	Paral 100
7	630.861k	37.6	+0.2	+0.0	+10.0		-31.0 314	16.8	31.6	-14.8	Perpe 100
8	681.038k	36.7	+0.1	+0.0	+10.2		-31.0 -5	16.0	30.9	-14.9	Paral 100
9	513.782k	39.2	+0.2	+0.1	+9.9		-31.0 314	18.4	33.4	-15.0	Perpe 100
10	639.224k	36.8	+0.3	+0.0	+10.1		-31.0 314	16.2	31.5	-15.3	Perpe 100
11	540.961k	38.4	+0.2	+0.0	+9.9		-31.0 314	17.5	32.9	-15.4	Perpe 100
12	708.217k	35.6	+0.2	+0.0	+10.3		-31.0 314	15.1	30.6	-15.5	Perpe 100

CKC Laboratories Date: 6/11/2010 Time: 3:15:44 PM AquaCheck (Pty) LTD WO#: 90751
 15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter) Test Distance: 5 Meters Sequence#: 23 Ext
 ATTN: 0 dB



Test Location: CKC Laboratories • 5046 Sierra Pines Dr • Mariposa, CA 95338 • (209) 966-5240

Customer: **AquaCheck (Pty) LTD**
 Specification: **15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter)**
 Work Order #: **90751** Date: 6/11/2010
 Test Type: **Maximized Emissions** Time: 11:10:54
 Equipment: **SOLO Remote Transmission Unit** Sequence#: 13
 Manufacturer: AquaCheck Tested By: A. Brar
 Model: ACSOLO_EXT-O
 S/N: 7069

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP05300	Cable	RG214/U	3/6/2009	3/6/2011
T2	ANP05440	Cable		1/18/2010	1/18/2012
T3	AN00852	Biconilog Antenna	CBL 6111C	12/22/2008	12/22/2010
T4	AN00730	Preamp	8447D	2/9/2009	2/9/2011
T5	ANP05299	Cable	RG214	3/6/2009	3/6/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SOLO Remote Transmission Unit*	AquaCheck	ACSOLO_EXT-O	7069
Classic SDI-12/MODBUS Probe	AquaCheck	AC-CLASSIC-MOD & AC-CLASSIC-SDI	6878

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Spurious Emissions.
 30-1000MHz.
 EUT transmits at 917.9581MHz.
 The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.
 Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.
 Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex
 The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Ext Attn: 0 dB

Measurement Data:

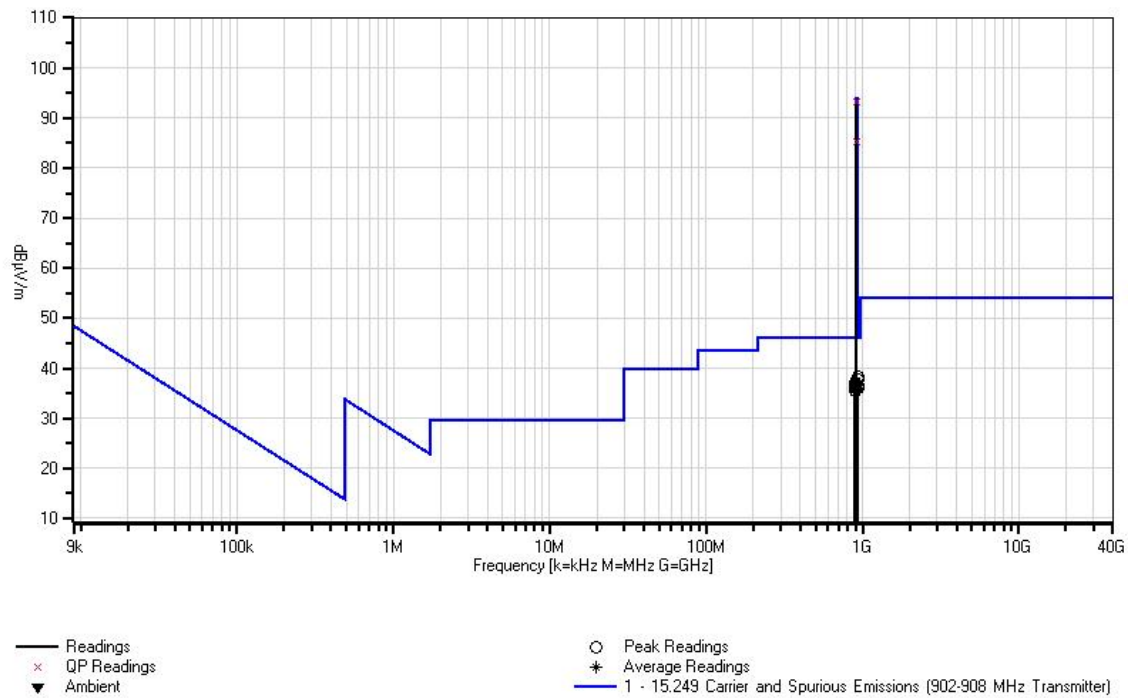
Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	917.942M QP	94.3	+1.2 +0.4	+2.0	+22.8	-27.5	+0.0 102	93.2	94.0	-0.8	Vert 141
									Reading taken after re-measuring the distance from EUT to Antenna.		
^	917.942M	94.6	+1.2 +0.4	+2.0	+22.8	-27.5	+0.0 102	93.5	94.0	-0.5	Vert 141
									Reading taken after re-measuring the distance from EUT to Antenna.		

3	928.981M	39.2	+1.2 +0.4	+2.0	+23.0	-27.5	+0.0 277	38.3	46.0	-7.7	Vert 270
4	931.623M	38.5	+1.1 +0.4	+2.1	+23.0	-27.5	+0.0 277	37.6	46.0	-8.4	Vert 270
5	917.942M QP	86.4	+1.2 +0.4	+2.0	+22.8	-27.5	+0.0 34	85.3	94.0	-8.7	Horiz 138
^	917.942M	86.4	+1.2 +0.4	+2.0	+22.8	-27.5	+0.0 34	85.3	94.0	-8.7	Horiz 138
7	896.068M	38.7	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	37.3	46.0	-8.7	Vert 270
8	901.833M	38.6	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	37.2	46.0	-8.8	Vert 270
9	898.710M	38.3	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.9	46.0	-9.1	Vert 270
10	900.272M	38.2	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.8	46.0	-9.2	Vert 270
11	929.941M	37.6	+1.2 +0.4	+2.0	+23.0	-27.5	+0.0 277	36.7	46.0	-9.3	Vert 270
12	899.791M	38.1	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.7	46.0	-9.3	Vert 270
13	931.263M	37.5	+1.1 +0.4	+2.1	+23.0	-27.5	+0.0 277	36.6	46.0	-9.4	Vert 270
14	897.990M	37.8	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.4	46.0	-9.6	Vert 270
15	899.551M	37.6	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.2	46.0	-9.8	Vert 270
16	935.707M	36.9	+1.1 +0.4	+2.1	+23.1	-27.5	+0.0 277	36.1	46.0	-9.9	Vert 270
17	897.749M	37.5	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	36.1	46.0	-9.9	Vert 270
18	893.785M	37.0	+1.3 +0.3	+1.9	+22.5	-27.4	+0.0 277	35.6	46.0	-10.4	Vert 270

CKC Laboratories Date: 6/11/2010 Time: 11:10:54 AquaCheck (Pty) LTD WO#: 90751
 15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter) Test Distance: 3 Meters Sequence#: 13 Ext
 ATTN: 0 dB



Test Location: CKC Laboratories • 5046 Sierra Pines Dr • Mariposa, CA 95338 • (209) 966-5240

Customer: **AquaCheck (Pty) LTD**
 Specification: **15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter)**
 Work Order #: **90751** Date: 6/14/2010
 Test Type: **Maximized Emissions** Time: 12:22:39
 Equipment: **SOLO Remote Transmission Unit** Sequence#: 30
 Manufacturer: AquaCheck Tested By: A. Brar
 Model: ACSOLO_EXT-O
 S/N: 7069

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	AN02812	Preamplifier	83017-69004	3/8/2009	3/8/2011
T2	AN02061	Horn Antenna	DRG-118A	1/19/2009	1/19/2011
T3	AN03015	Cable	32022-2-29094K-24TC	2/4/2010	2/4/2012
T4	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T5	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Classic SDI-12/MODBUS Probe	AquaCheck	AC-CLASSIC-MOD & AC-CLASSIC-SDI	6878
SOLO Remote Transmission Unit*	AquaCheck	ACSOLO_EXT-O	7069

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Spurious Emissions.
 1-10GHz.
 EUT transmits at 917.9581MHz.
 The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.
 Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.
 Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex
 The Classic SDI-12/MODBUS Probe is being treated as floor standing.

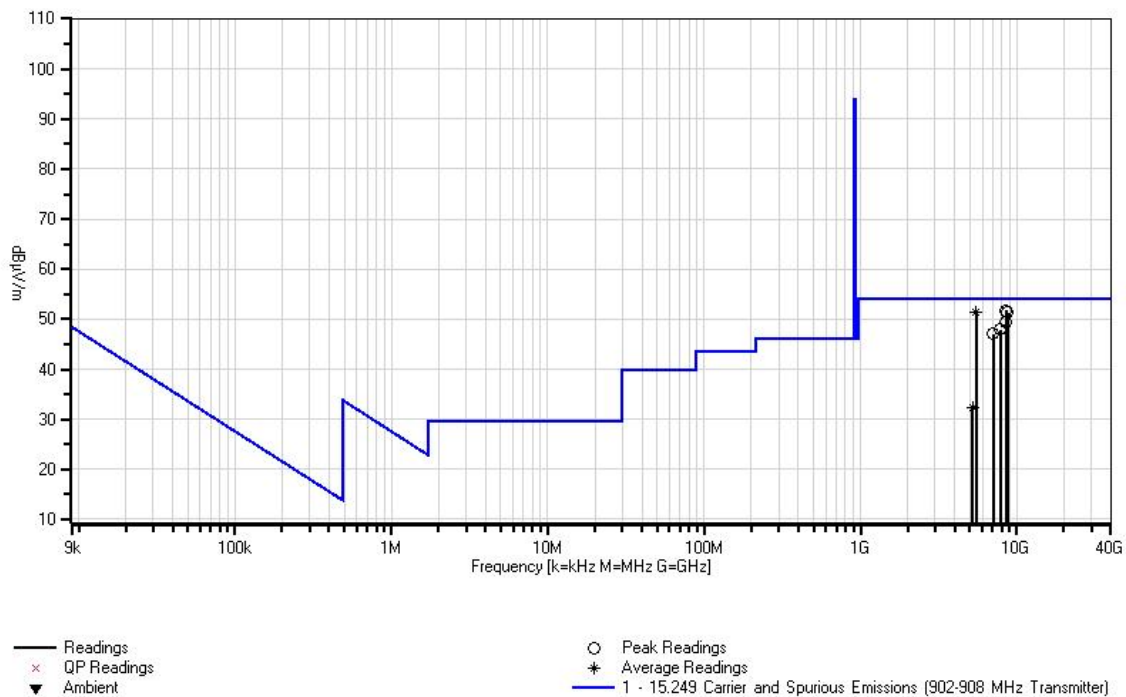
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

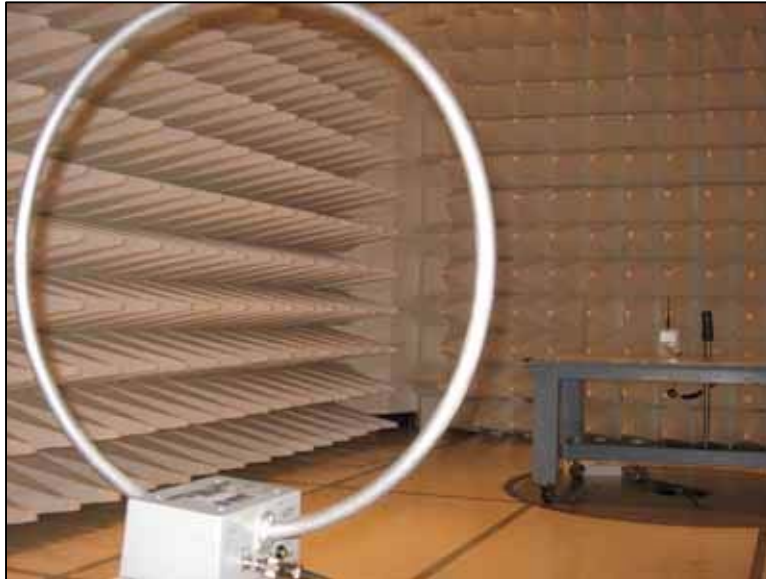
#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	8480.945M	41.6	-34.9 +4.8	+38.3	+0.8	+1.2	+0.0 365	51.8	54.0	-2.2	Horiz 147
2	5507.816M Ave	44.3	-32.7 +3.8	+34.4	+0.6	+0.9	+0.0 281	51.3	54.0	-2.7	Vert 147
^	5507.816M	50.2	-32.7 +3.8	+34.4	+0.6	+0.9	+0.0 281	57.2	54.0	+3.2	Vert 147
4	8704.384M	41.2	-34.8 +4.9	+38.0	+0.8	+1.2	+0.0 365	51.3	54.0	-2.7	Vert 147
5	8482.976M	39.3	-34.9 +4.8	+38.3	+0.8	+1.2	+0.0 365	49.5	54.0	-4.5	Vert 147

6	7815.309M	38.0	-34.8 +4.7	+38.2	+0.7	+1.1	+0.0 201	47.9	54.0	-6.1	Horiz 147
7	7035.530M	37.8	-34.3 +4.5	+37.4	+0.7	+1.0	+0.0 201	47.1	54.0	-6.9	Horiz 147
8	5229.731M Ave	26.3	-32.7 +3.6	+33.8	+0.6	+0.8	+0.0 201	32.4	54.0	-21.6	Horiz 147
^	5229.731M	52.0	-32.7 +3.6	+33.8	+0.6	+0.8	+0.0 201	58.1	54.0	+4.1	Horiz 147

CKC Laboratories Date: 6/14/2010 Time: 12:22:39 AquaCheck (Pty) LTD WO#: 90751
15.249 Carrier and Spurious Emissions (902-908 MHz Transmitter) Test Distance: 3 Meters Sequence#: 30 Ext
ATTN: 0 dB



Test Setup Photos



.009-30MHz



30-1000MHz



1-10GHz

RSS-210 99% Bandwidth

Test Conditions

EUT transmits at 917.9581MHz.

The Classic SDI-12/MODBUS Probe is connected to SOLO Remote Transmission Unit via Cable. The Handheld RF Logger was used to initialize the EUT, but it is no longer linked with the EUT during the testing. The EUT's firmware is set so once the EUT is initialized it continuously transmits without having to communicate with the Handheld RF Logger.

Note: Installed the latest firmware that would lower the fundamental Tx power for compliance.

Firmware File Name: CP7_28 SOLO FCC918 -6dB (39).Dex

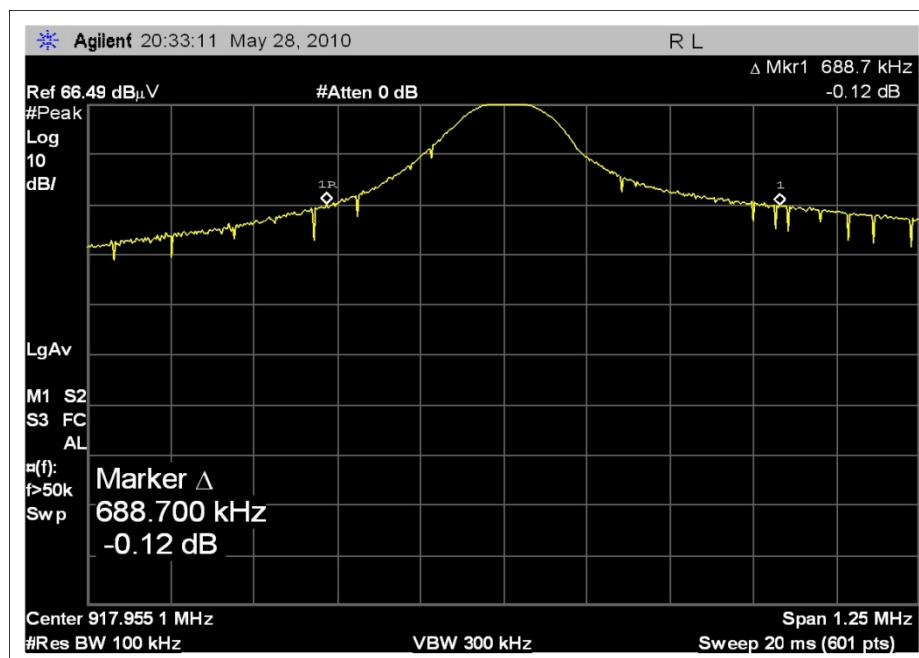
The Classic SDI-12/MODBUS Probe is being treated as floor standing.

Engineer Name: A. Brar

Test Equipment

Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	US44300408	3/9/2009	3/9/2011	AN02668
Horn Antenna	1064	1/19/2009	1/19/2011	AN02061
Cable	HOL-HF-025-06	3/19/2010	3/19/2012	ANP05138
Cable	26	3/2/2010	3/2/2012	ANP04241

Test Plot



Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9kHz	150kHz	200Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.