

Celadon Inc.

TEST REPORT FOR

Tessonics RF Remote, FGSK18-TES-01

Tested To The Following Standards:

**FCC Part 15 Subpart C Sections 15.249
and
RSS-210 Version 7**

Report No.: 90470-21

Date of issue: June 23, 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:

Celadon Inc.
50 Mitchell Blvd.
San Rafael, CA 94903

Representative: Michael Griswold
Customer Reference Number: 4435

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

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

Project Number: 90470

May 24, 2010

May 24 -June 7, 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 that reads "Steve Behm".

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
Carrier Output	FCC Part 15 Subpart C Section 15.249(a)	Pass
Occupied Bandwidth-20dBc	FCC Part 15 Subpart C	Pass
Bandedge	FCC Part 15 Subpart C	Pass
Field Strength of Spurious & Harmonics Emissions	FCC Part 15 Subpart C Section 15.249(a)(d)	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
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Tessonics RF Remote

Manuf: Celadon Inc.
Model: FGSK18-TES-01
Serial: None

Tessonics RF Transceiver

Manuf: Celadon Inc.
Model: FG-RCV3000-TES-01
Serial: None

PERIPHERAL DEVICES

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

AC Adaptor

Manuf: IP
Model: SNY-3800R
Serial: None

Relay Timer

Manuf: NCC
Model: CKK-10-461
Serial: 0715

Laptop

Manuf: Dell
Model: Latitude D620
Serial: PN PF329 A03

AC Adaptor

Manuf: Dell
Model: LA90PS0-00
Serial: CN-0DF266-71615-735-B6DB

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.

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 – 25GHz

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 2.44234125GHz.

15.249(a) Carrier Output

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Celadon Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **90470** Date: 6/4/2010
 Test Type: **Radiated Scan** Time: 13:44:59
 Equipment: **Tessonics RF Remote** Sequence#: 5
 Manufacturer: Celadon Inc. Tested By: A. Brar
 Model: FGSK18-TES-01
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	AN02061	Horn Antenna	DRG-118A	1/19/2009	1/19/2011
T2	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012
T3	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T4	ANdBm	Unit Conversion		4/12/2010	4/12/2012
T5	ANWO#90470	Duty Cycle		4/12/2010	4/12/2012
	Duty Cycle	Correction Factor			
	Correction Factor				

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Tessonics RF Remote*	Celadon Inc.	FGSK18-TES-01	None

Support Devices:

Function	Manufacturer	Model #	S/N
AC Adaptor	IP	SNY-3800R	None
Relay Timer	NCC	CKK-10-461	0715

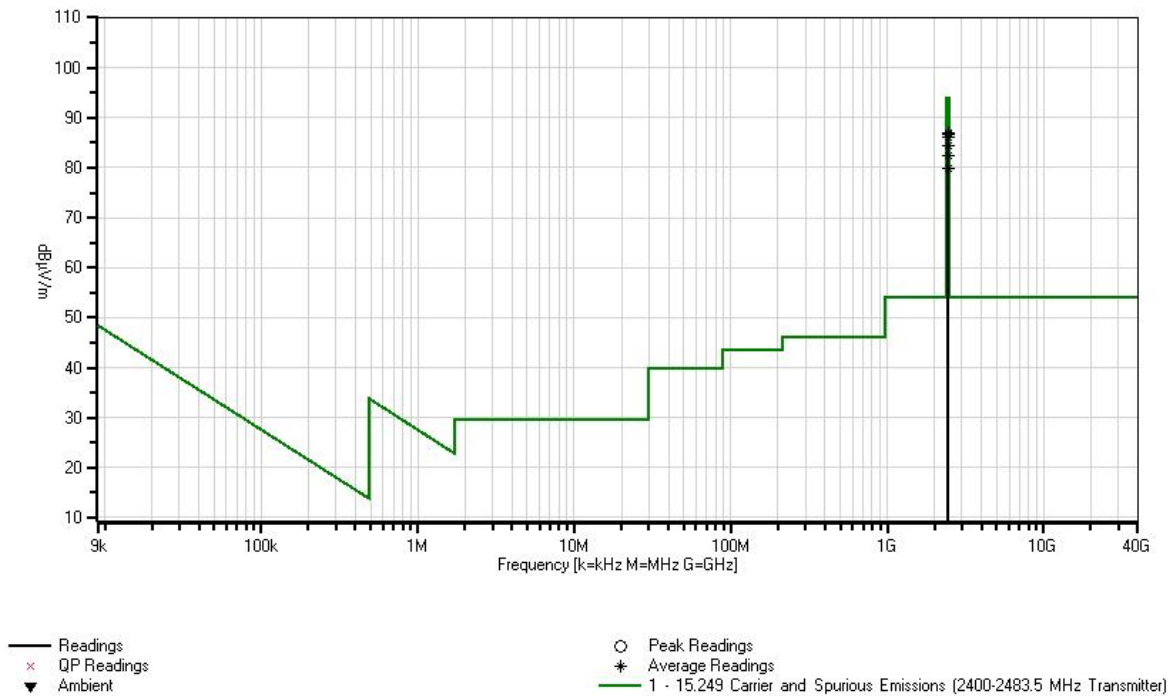
Test Conditions / Notes:

RBW 1MHz
 VBW 3MHz
 Fundamental Peak Readings.
 EUT runs on single channel at 2.44234125GHz.
 FCC 15.31(e) covered under this data sheet by using a new battery for testing.
 Temperature: 21°C
 Relative Humidity: 42%
 Atmospheric Pressure: 101.3kPa
 The average readings are based on the following correction factor:
 On Time: 145us
 Off Time: 470us
 On Time per 100ms: (100ms/470us)*(0.145ms) = 30.85ms
 20*Log(30.85/100) = -10.21dB

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	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	2442.130M Ave	-41.4	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	86.9	94.0	-7.1	Horiz
^	2442.130M	-41.4	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 134	97.1	94.0 EUT lying flat, X Axis.	+3.1	Horiz 112
3	2442.308M Ave	-41.7	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	86.6	94.0	-7.4	Vert
^	2442.308M	-41.7	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 62	96.8	94.0 EUT lying on side, Z Axis.	+2.8	Vert 106
5	2442.138M Ave	-42.3	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	86.0	94.0	-8.0	Vert
^	2442.138M	-42.3	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 57	96.2	94.0 EUT lying on side, Y Axis.	+2.2	Vert 105
7	2442.390M Ave	-44.0	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	84.3	94.0	-9.7	Horiz
^	2442.390M	-44.0	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 40	94.5	94.0 EUT lying on side, Y Axis.	+0.5	Horiz 140
9	2442.850M Ave	-46.0	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	82.3	94.0	-11.7	Horiz
^	2442.850M	-46.0	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 323	92.5	94.0 EUT lying on side, Z Axis.	-1.5	Horiz 140
11	2442.799M Ave	-48.4	+28.7 -10.2	+2.3	+0.5	+107.0	+0.0	79.9	94.0	-14.1	Vert
^	2442.799M	-48.4	+28.7 +0.0	+2.3	+0.5	+107.0	+0.0 61	90.1	94.0 EUT lying flat, X Axis.	-3.9	Vert 109

CKC Laboratories, Inc. Date: 6/4/2010 Time: 13:44:59 Celadon Inc. WO#: 90470
 15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Sequence#: 5
 Vert



Test Setup Photo



Occupied Bandwidth -20dBc

Test Conditions

EUT runs on single channel at 2.44234125GHz. 100kHz RBW & 300kHz VBW

Temperature: 21°C

Relative Humidity: 42%

Atmospheric Pressure: 101.3kPa

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



Bandedge

Test Conditions

EUT runs on single channel at 2.44234125GHz. 1MHz RBW and 3MHz VBW

Temperature: 21°C

Relative Humidity: 42%

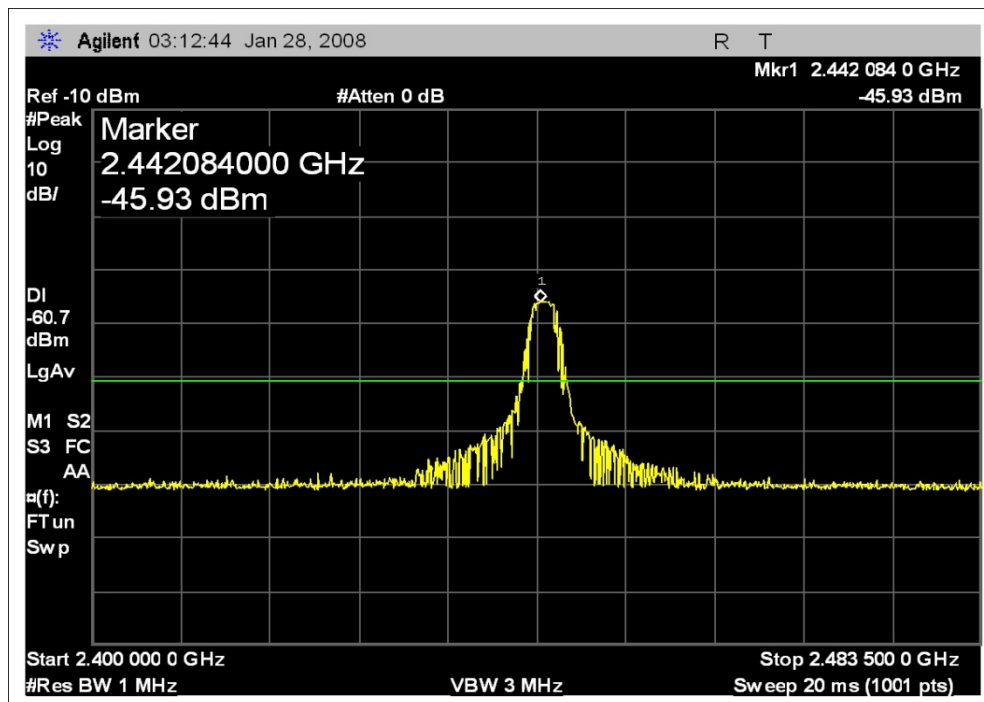
Atmospheric Pressure: 101.3kPa

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



The above plot screen date should read May 24, 2010 and not the default date of Jan. 28, 2008.

The plot screen capture was taken at the time of testing and cannot be changed.

Test Setup Photos



15.249(a)(d) Field Strength of Spurious and Harmonics Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Celadon Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **90470** Date: 5/25/2010
 Test Type: **Radiated Scan** Time: 15:51:45
 Equipment: **Tessonics RF Remote** Sequence#: 34
 Manufacturer: Celadon Inc. Tested By: A. Brar
 Model: FGSK18-TES-01
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP05299	Cable	RG214	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
Tessonics RF Remote*	Celadon Inc.	FGSK18-TES-01	None
Tessonics RF Transceiver	Celadon Inc.	FG-RCV3000-TES-01	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude D620	PN PF329 A03
AC Adaptor	Dell	LA90PS0-00	CN-0DF266-71615-735-B6DB

Test Conditions / Notes:

FCC 15.249
 0.09-30MHz
 Both EUTs are transmitting and receiving.
 FCC 15.209(c) covered by this data sheet because the 15.249 and 15.209 spurious emissions limits are equivalent.
 EUT runs on single channel at 2.44234125GHz.
 Temperature: 21°C
 Relative Humidity: 42%
 Atmospheric Pressure: 101.3kPa

Ext Attn: 0 dB

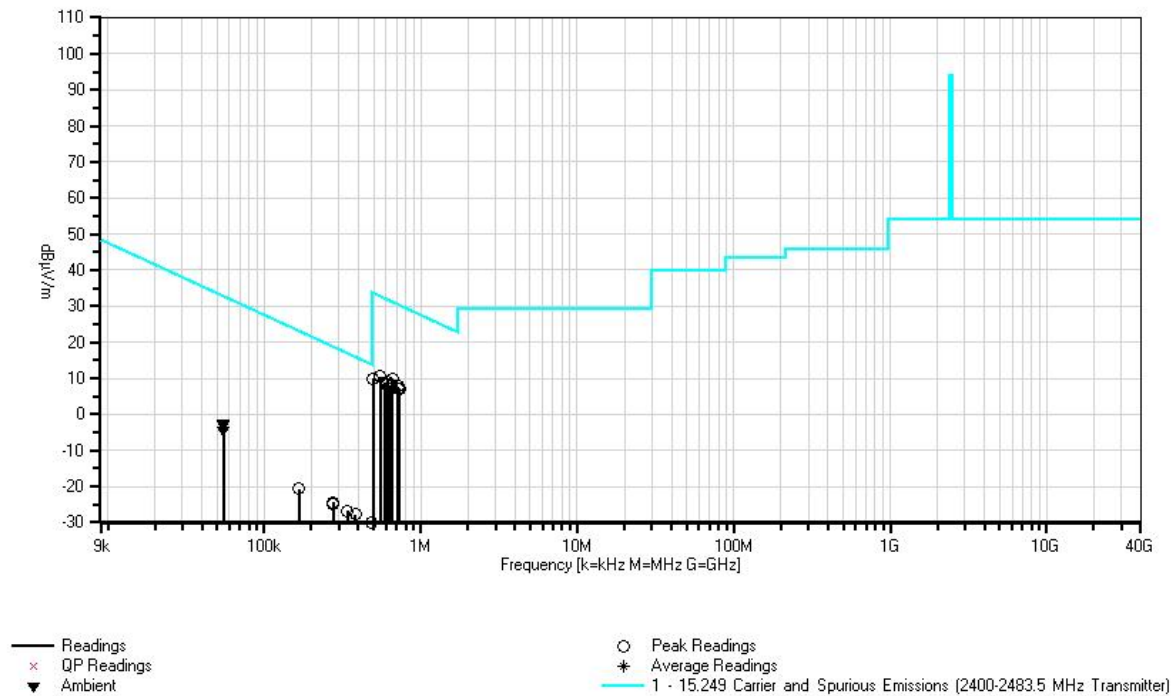
Measurement Data:

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	657.370k	39.8	+0.1	+0.0	+10.1			-40.0 -5	10.0	31.2	-21.2	Paral 250
2	548.648k	40.6	+0.1	+0.0	+9.9			-40.0 -5	10.6	32.8	-22.2	Perpe 250
3	613.076k	39.1	+0.0	+0.0	+10.0			-40.0 -5	9.1	31.8	-22.7	Paral 250
4	717.771k	37.4	+0.0	+0.0	+10.3			-40.0 -5	7.7	30.5	-22.8	Perpe 250
5	655.357k	37.9	+0.1	+0.0	+10.1			-40.0 -5	8.1	31.3	-23.2	Perpe 250
6	729.852k	36.8	+0.0	+0.0	+10.3			-40.0 -5	7.1	30.3	-23.2	Perpe 250
7	594.956k	38.8	+0.0	+0.0	+9.9			-40.0 -5	8.7	32.1	-23.4	Perpe 250
8	611.063k	38.5	+0.0	+0.0	+9.9			-40.0 -5	8.4	31.9	-23.5	Perpe 250
9	713.745k	36.6	+0.0	+0.0	+10.3			-40.0 -5	6.9	30.5	-23.6	Paral 250
10	647.303k	37.6	+0.1	+0.0	+10.1			-40.0 -5	7.8	31.4	-23.6	Perpe 250
11	498.314k	39.9	+0.1	+0.1	+9.9			-40.0 -5	10.0	33.7	-23.7	Paral 250
12	54.780k Ambient	67.1	+0.0	+0.1	+10.5			-80.0 129	-2.3	32.8 From Support Equipment Only.	-35.1	Paral 250
13	54.780k Ambient	66.8	+0.0	+0.1	+10.5			-80.0 129	-2.6	32.8 From Support Equipment Only.	-35.4	Paral 250
14	54.831k Ambient	64.9	+0.0	+0.1	+10.5			-80.0 -5	-4.5	32.8 From Support Equipment Only.	-37.3	Perpe 250
15	274.829k	45.8	+0.1	+0.1	+9.7			-80.0 -5	-24.3	18.8	-43.1	Paral 250
16	274.829k	45.4	+0.1	+0.1	+9.7			-80.0 -5	-24.7	18.8	-43.5	Perpe 250
17	339.257k	43.3	+0.1	+0.1	+9.8			-80.0 -5	-26.7	17.0	-43.7	Perpe 250
18	383.551k	42.1	+0.1	+0.1	+9.9			-80.0 -5	-27.8	15.9	-43.7	Paral 250
19	166.107k	49.4	+0.1	+0.1	+9.8			-80.0 -5	-20.6	23.2	-43.8	Perpe 250
20	166.107k	49.4	+0.1	+0.1	+9.8			-80.0 -5	-20.6	23.2	-43.8	Paral 250
21	486.233k	40.2	+0.0	+0.0	+9.9			-80.0 -5	-29.9	13.9	-43.8	Paral 250
22	482.207k	40.1	+0.0	+0.0	+9.9			-80.0 -5	-30.0	13.9	-43.9	Perpe 250

CKC Laboratories, Inc. Date: 5/25/2010 Time: 15:51:45 Celadon Inc. WO#: 90470
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Sequence#: 34
Parallel



Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Celadon Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **90470** Date: 5/25/2010
 Test Type: **Maximized Emissions** Time: 11:36:17
 Equipment: **Tessonics RF Remote** Sequence#: 15
 Manufacturer: Celadon Inc. Tested By: A. Brar
 Model: FGSK18-TES-01
 S/N: None

Test Equipment:

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

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Tessonics RF Remote*	Celadon Inc.	FGSK18-TES-01	None
Tessonics RF Transceiver	Celadon Inc.	FG-RCV3000-TES-01	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude D620	PN PF329 A03
AC Adaptor	Dell	LA90PS0-00	CN-0DF266-71615-735-B6DB

Test Conditions / Notes:

Spurious Emissions.
 30-1000MHz.
 The remote is transmitting and the transceiver is receiving and sending acknowledgements.
 FCC 15.209(c) covered by this data sheet because the 15.249 and 15.209 spurious emissions limits are equivalent.
 EUT runs on single channel at 2.44234125GHz.
 Temperature: 21°C
 Relative Humidity: 42%
 Atmospheric Pressure: 101.3kPa

Ext Attn: 0 dB

Measurement Data:

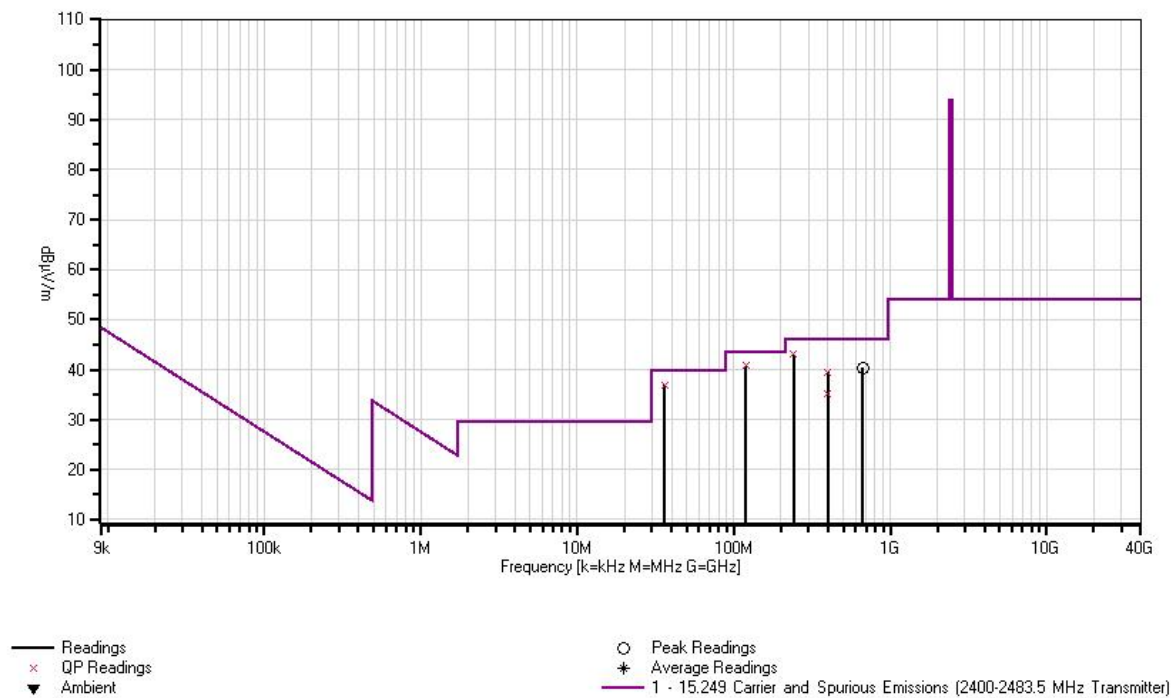
Reading listed by margin.

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	120.017M	55.5	-27.3	+11.5	+0.1	+0.5	+0.0	40.8	43.5	-2.7	Vert
	QP		+0.5				105				100
^	120.017M	56.7	-27.3	+11.5	+0.1	+0.5	+0.0	42.0	43.5	-1.5	Vert
			+0.5				105				100
3	240.030M	56.8	-27.2	+11.8	+0.2	+0.6	+0.0	43.0	46.0	-3.0	Vert
	QP		+0.8				151				111
^	240.030M	59.1	-27.2	+11.8	+0.2	+0.6	+0.0	45.3	46.0	-0.7	Vert
			+0.8				151				111
5	36.006M	47.4	-27.4	+16.2	+0.1	+0.3	+0.0	36.9	40.0	-3.1	Vert
	QP		+0.3				130				101

^	36.006M	50.0	-27.4 +0.3	+16.2	+0.1	+0.3	+0.0 130	39.5	40.0	-0.5	Vert 101
7	665.904M	44.6	-27.0 +1.6	+20.0	+0.2	+0.9	+0.0 64	40.3	46.0	-5.7	Horiz 143
8	399.183M QP	49.0	-27.3 +1.1	+16.0	+0.1	+0.6	+0.0 138	39.5	46.0	-6.5	Vert 100
^	399.183M	59.1	-27.3 +1.1	+16.0	+0.1	+0.6	+0.0 138	49.6	46.0	+3.6	Vert 100
10	398.786M QP	44.7	-27.3 +1.1	+16.0	+0.1	+0.6	+0.0 64	35.2	46.0	-10.8	Horiz 143
^	398.786M	53.0	-27.3 +1.1	+16.0	+0.1	+0.6	+0.0 64	43.5	46.0	-2.5	Horiz 143

CKC Laboratories, Inc. Date: 5/25/2010 Time: 11:36:17 Celadon Inc. WO#: 90470
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Sequence#: 15
Horiz



Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **Celadon Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **90470** Date: 6/7/2010
 Test Type: **Maximized Emissions** Time: 10:57:41
 Equipment: **Tessonics RF Remote** Sequence#: 36
 Manufacturer: Celadon Inc. Tested By: A. Brar
 Model: FGSK18-TES-01
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	AN02061	Horn Antenna	DRG-118A	1/19/2009	1/19/2011
T2	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012
T3	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T4	AN03015	Cable	32022-2-29094K-24TC	2/4/2010	2/4/2012
T5	AN02812	Preamp	83017-69004	3/8/2009	3/8/2011
T6	AN03143	Cable	32022-29094K-144TC	9/10/2009	9/10/2011
T7	AN02694	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/13/2008	11/13/2010

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Tessonics RF Remote*	Celadon Inc.	FGSK18-TES-01	None
Tessonics RF Transceiver	Celadon Inc.	FG-RCV3000-TES-01	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude D620	PN PF329 A03
AC Adaptor	Dell	LA90PS0-00	CN-0DF266-71615-735-B6DB

Test Conditions / Notes:

Spurious Emissions.
 1-25GHz.
 The remote is transmitting continuously and the transceiver is receiving and sending acknowledgements.
 FCC 15.209(c) covered by this data sheet because the 15.249 and 15.209 spurious emissions limits are equivalent.
 EUT runs on single channel at 2.44234125GHz.
 Temperature: 21°C
 Relative Humidity: 42%
 Atmospheric Pressure: 101.3kPa

Ext Attn: 0 dB

Measurement Data:

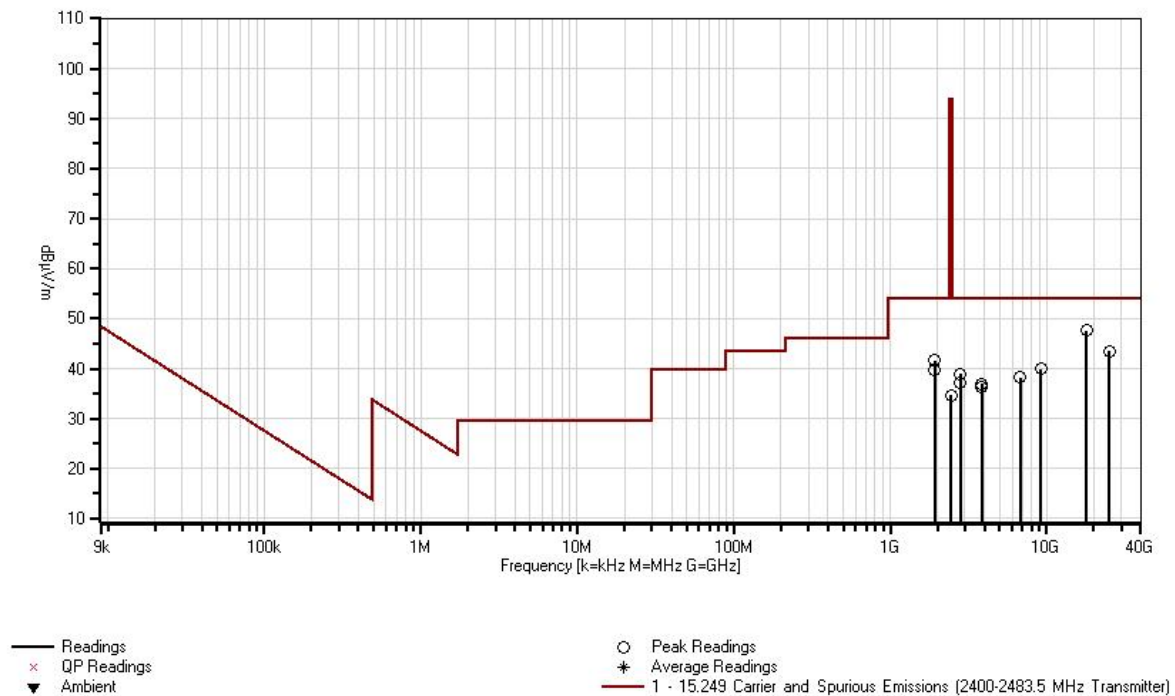
Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5	T6	T7						
			dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	18000.000	28.2	+43.9	+7.2	+1.9	+1.2	+0.0	47.6	54.0	-6.4	Vert
	M		-34.8	+0.0	+0.0		100				150
2	24999.000	50.1	+0.0	+0.0	+0.0	+1.6	+0.0	43.5	54.0	-10.5	Vert
	M		+0.0	+7.2	-15.4		108				150
3	1920.000M	45.4	+27.4	+2.0	+0.5	+0.4	+0.0	41.7	54.0	-12.3	Vert
			-34.0	+0.0	+0.0						150

4	9209.000M	30.0	+38.1 -35.2	+5.1 +0.0	+1.2 +0.0	+0.8 94	+0.0	40.0	54.0	-14.0	Vert 150
5	1919.900M	43.5	+27.4 -34.0	+2.0 +0.0	+0.5 +0.0	+0.4 -5	+0.0	39.8	54.0	-14.2	Horiz 150
6	2794.000M	38.8	+29.9 -33.3	+2.5 +0.0	+0.6 +0.0	+0.4 322	+0.0	38.9	54.0	-15.1	Horiz 150
7	6756.000M	30.0	+36.4 -34.1	+4.3 +0.0	+1.0 +0.0	+0.7 336	+0.0	38.3	54.0	-15.7	Horiz 150
8	2794.000M	37.0	+29.9 -33.3	+2.5 +0.0	+0.6 +0.0	+0.4 -4	+0.0	37.1	54.0	-16.9	Vert 150
9	3840.000M	34.1	+31.7 -33.0	+3.0 +0.0	+0.7 +0.0	+0.5 29	+0.0	37.0	54.0	-17.0	Horiz 150
10	3840.000M	33.5	+31.7 -33.0	+3.0 +0.0	+0.7 +0.0	+0.5 +0.0	+0.0	36.4	54.0	-17.6	Vert 150
11	2459.000M	36.3	+28.7 -33.5	+2.3 +0.0	+0.5 +0.0	+0.4 +0.0	+0.0	34.7	94.0	-59.3	Horiz 150

CKC Laboratories, Inc. Date: 6/7/2010 Time: 10:57:41 Celadon Inc. WO#: 90470
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Sequence#: 36
Vert



Test Setup Photos



RSS 210 99% Bandwidth

Test Conditions

EUT runs on single channel at 2.44234125GHz. RBW & VBW 100kHz

Temperature: 21°C

Relative Humidity: 42%

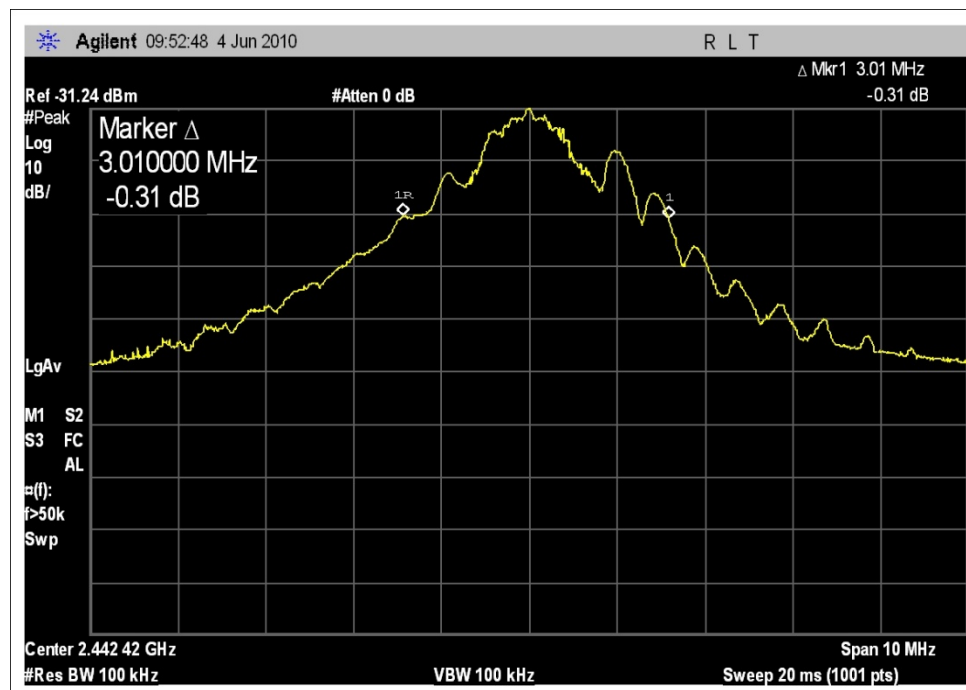
Atmospheric Pressure: 101.3kPa

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.