



**ADDENDUM TO GARMIN INTERNATIONAL, INC.
TEST REPORT FC07-083A**

FOR THE

REMOTE TRANSCEIVER, GRT 10

**FCC PART 15 SUBPART B SECTIONS 15.107, 15.109 CLASS B,
FCC PART 15 SUBPART C SECTIONS 15.207, 15.247 & RSS 210 ISSUE 7**

TESTING

DATE OF ISSUE: FEBRUARY 19, 2008

PREPARED FOR:

Garmin International, Inc.
1200 E. 151st. Street
Olathe, KS 66062

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

P.O. No.: 229767
W.O. No.: 86612

Date of test: September 12, 2007 –
February 15, 2008

Report No.: FC07-083B

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ADMINISTRATIVE INFORMATION

DATE OF TEST: September 12 , 2007 –
February 15, 2008

DATE OF RECEIPT: September 12, 2007

REPRESENTATIVE: Van Ruggles

MANUFACTURER:
Garmin International, Inc.
1200 E. 151st. Street
Olathe, KS 66062

TEST LOCATION:
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

TEST METHOD: ANSI C63.4 (2003), RSS-210 Issue 7 & RSS GEN Issue 2

PURPOSE OF TEST:

Original Report: To perform the testing of the Remote Transceiver, GRT 10 with the requirements for FCC Part 15 Subpart Subpart B Sections 15.107, 15.109, FCC Part 15 Subpart C Sections 15.207, 15.247 and RSS-210 devices.

Addendum A: To replace the radiated spurious emissions, bandedge, RF power and power spectral density data with new testing after a SAW filter was added to the output trace.

Addendum B: To replace the RF power output and peak power spectral density data with new testing.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:



Mike Wilkinson, EMC Engineer/Lab
Manager

TEST PERSONNEL:



Eddie Wong, EMC Engineer



Chuck Kendall, Senior EMC Consultant

FCC TO CANADA STANDARD CORRELATION MATRIX

Canadian Standard	Canadian Section	FCC Standard	FCC Section	Test Description
RSS GEN	7.1.4	47CFR	15.203	Antenna Connector Requirements
RSS GEN	7.2.1	47CFR	15.35(c)	Pulsed Operation
RSS GEN	7.2.2	47CFR	15.207	AC Mains Conducted Emissions Requirement
RSS 210	2.1	47CFR	15.215(c)	Frequency Stability Recommendation
RSS 210	2.2	47CFR	15.205	Restricted Bands of Operation
RSS 210	2.6	47CFR	15.209	General Radiated Emissions Requirement
RSS 210	A8.2(1)	47CFR	15.247(a)(2)	Minimum 6dB Bandwidth
RSS 210	A8.2(2)	47CFR	15.247(e)	Peak Power Spectral Density
RSS 210	A8.4(4)	47CFR	15.247(b)(3)	RF Power Output
RSS 210	A8.4(4)	NA	NA	EIRP Limit
RSS 210	A8.4(5)	47CFR	15.247(c)(1)	Directional Gain Requirements
RSS 210	A8.4(6)	47CFR	15.247(c)(2)	Beam Steering Antennas
RSS 210	A8.5	47CFR	15.247(d)	Spurious Emissions
	3172-A		90473	Site File

Notes: Rule Sections for RSS 210 are taken from RSS 210 Issue 7

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

FCC 15.31(e) Voltage Variations

The supply voltage of the intentional radiator was varied between 85% and 115% of the nominal rated supply voltage. Result: No deviation of output power or the radiated signal level of the fundamental frequency component of the emission was detected.

Various voltage +/- 15% from nominal 14 – 28 V. (11.9 V, 32.2 V)

Test Equipment used:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Programmable Power Source	250 / 245	051507	051509	01695/ 01696

FCC 15.31(m) Number of Channels

This device was tested on three channels.

FCC 15.33(a) Frequency Ranges Tested

15.107 Conducted Emissions: 150 kHz – 30 MHz

15.109 Radiated Emissions: 30 MHz – 25 GHz

15.207 Conducted Emissions: 150 kHz – 30 MHz

15.247(d) Radiated Emissions: 9 kHz – 25 GHz

FCC 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 2403 - 2412 MHz. The EUT is a direct sequencing device operating in the 2400 – 2483.5 MHz band.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit. The EUT is a wireless remote transceiver for XM radio in aircraft. The unit is mounted in the aircraft, using aircraft power and communicates with the XM radio via RS-232.

EQUIPMENT UNDER TEST

Remote Transceiver

Manuf: Garmin International, Inc.
Model: GRT 10
Serial: 14Q000037, 14Q000412 &
14Q000419
FCC ID: IPH-01179 (pending)
IC: 1792A-01179 (pending)

PERIPHERAL DEVICES

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

Remote Transceiver

Manuf: Garmin International, Inc.
Model: GRT 10
Serial: Interrogator & 14Q000419
FCC ID: IPH-01179 (pending)
IC: 1792A-01179 (pending)

DC Power Supply

Manuf: Topward
Model: 6303D
Serial: 988614

Laptop Computer

Manuf: Toshiba
Model: SatelliteA105
Serial: 36322146Q

Laptop Power Supply

Manuf: Toshiba
Model: 3469U-1ACA
Serial: PA3469U

Power Supply

Manuf: Astron
Model: VLS-10M
Serial: 99050008

REPORT OF EMISSIONS MEASUREMENTS

TESTING PARAMETERS

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

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 bandwidth settings that were used in designated frequency bands are listed on the individual data sheets or plots. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

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 were 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.

FCC 15.107 CONDUCTED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin International, Inc.**
 Specification: **FCC 15.107 Class B COND [AVE]**
 Work Order #: **86612** Date: 9/25/2007
 Test Type: **Conducted Emissions** Time: 16:21:02
 Equipment: **Remote Transceiver** Sequence#: 14
 Manufacturer: Garmin International, Inc. Tested By: E. Wong
 Model: GRT 10 110V 60Hz
 S/N: 14Q000037

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN	1104	11/10/2006	11/10/2008	00847
6dB Attenuator	None	11/21/2006	11/21/2008	P05611
150kHz HPF	G7755	01/30/2006	01/30/2008	02610
Conducted Emission Cable	Cable #21	05/09/2006	05/09/2008	P04358
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin International, Inc.	GRT 10	14Q000037

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin International, Inc.	GRT 10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table. The EUT receives RF commands from a remote interrogator and the EUT sets the receiving frequency which it operates on. A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Receiving
 Freq: 2408 (ch 8)

The EUT obtains DC 28V from a support power supply. 23°C and 49% relative humidity.

Transducer Legend:

T1=150kHz HPF Asset 02610	T2=6dB Attenuator P05611
T3=Cable #21 Conducted Site A 050908	T4=(L1) Insertion Loss 00847 EMCO 3816/2NM

Measurement Data:

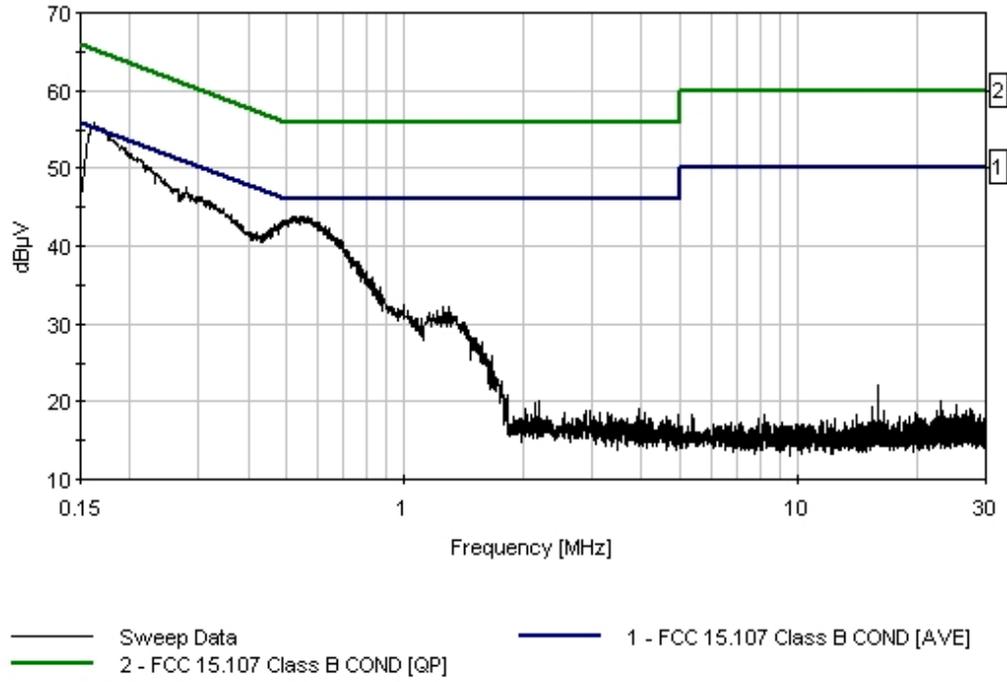
Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	834.301k	28.8	+0.1	+6.1	+0.1	+0.1	+0.0	35.2	46.0	-10.8	Black
2	885.710k	26.9	+0.1	+6.1	+0.0	+0.1	+0.0	33.2	46.0	-12.8	Black
3	1.830M	14.4	+0.1	+6.1	+0.1	+0.1	+0.0	20.8	46.0	-25.2	Black

4	2.187M	13.7	+0.1	+6.1	+0.1	+0.1	+0.0	20.1	46.0	-25.9	Black
5	2.149M	13.5	+0.1	+6.1	+0.1	+0.1	+0.0	19.9	46.0	-26.1	Black
6	3.926M	12.4	+0.1	+6.2	+0.2	+0.2	+0.0	19.1	46.0	-26.9	Black
7	2.030M	12.6	+0.1	+6.1	+0.1	+0.1	+0.0	19.0	46.0	-27.0	Black
8	4.058M	11.9	+0.1	+6.2	+0.2	+0.2	+0.0	18.6	46.0	-27.4	Black
9	4.951M	11.7	+0.1	+6.2	+0.2	+0.2	+0.0	18.4	46.0	-27.6	Black
10	15.995M	14.6	+0.2	+6.1	+0.4	+0.9	+0.0	22.2	50.0	-27.8	Black
11	4.607M	11.3	+0.1	+6.2	+0.2	+0.2	+0.0	18.0	46.0	-28.0	Black
12	4.233M	11.2	+0.1	+6.2	+0.2	+0.2	+0.0	17.9	46.0	-28.1	Black
13	570.325k Ave	6.6	+0.2	+6.1	+0.1	+0.1	+0.0	13.1	46.0	-32.9	Black
14	570.325k Ave	6.5	+0.2	+6.1	+0.1	+0.1	+0.0	13.0	46.0	-33.0	Black
^	570.325k	38.5	+0.2	+6.1	+0.1	+0.1	+0.0	45.0	46.0	-1.0	Black
^	570.325k	37.4	+0.2	+6.1	+0.1	+0.1	+0.0	43.9	46.0	-2.1	Black
17	162.363k Ave	12.7	+0.6	+6.2	+0.1	+0.1	+0.0	19.7	55.3	-35.6	Black
^	162.363k	48.8	+0.6	+6.2	+0.1	+0.1	+0.0	55.8	55.3	+0.5	Black
19	279.443k Ave	8.3	+0.2	+6.1	+0.1	+0.1	+0.0	14.8	50.8	-36.0	Black
^	279.443k	41.0	+0.2	+6.1	+0.1	+0.1	+0.0	47.5	50.8	-3.3	Black

CKC Laboratories, Inc. Date: 9/25/2007 Time: 16:21:02 Garmin AT VWO#: 86612
 FCC 15.107 Class B COND [AVE] Test Lead: Black 110V 60Hz Sequence#: 14



Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin International, Inc.**
 Specification: **FCC 15.107 Class B COND [AVE]**
 Work Order #: **86612**
 Test Type: **Conducted Emissions**
 Equipment: **Remote Transceiver**
 Manufacturer: **Garmin International, Inc.**
 Model: **GRT 10**
 S/N: **14Q000037**

Date: 9/25/2007
 Time: 16:14:28
 Sequence#: 13
 Tested By: E. Wong
 110V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN	1104	11/10/2006	11/10/2008	00847
6dB Attenuator	None	11/21/2006	11/21/2008	P05611
150kHz HPF	G7755	01/30/2006	01/30/2008	02610
Conducted Emission Cable	Cable #21	05/09/2006	05/09/2008	P04358
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin International, Inc.	GRT 10	14Q000037

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin International, Inc.	GRT 10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table. The EUT receives RF commands from a remote interrogator and the EUT sets the receiving frequency which it operates on. A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Receiving
 Freq: 2408 (ch 8)

The EUT obtains DC 28V from a support power supply. 23°C and 49% relative humidity.

Transducer Legend:

T1=150kHz HPF Asset 02610	T2=6dB Attenuator P05611
T3=Cable #21 Conducted Site A 050908	T4=(L2) Insertion Loss 00847 EMCO 3816/2NM

Measurement Data:

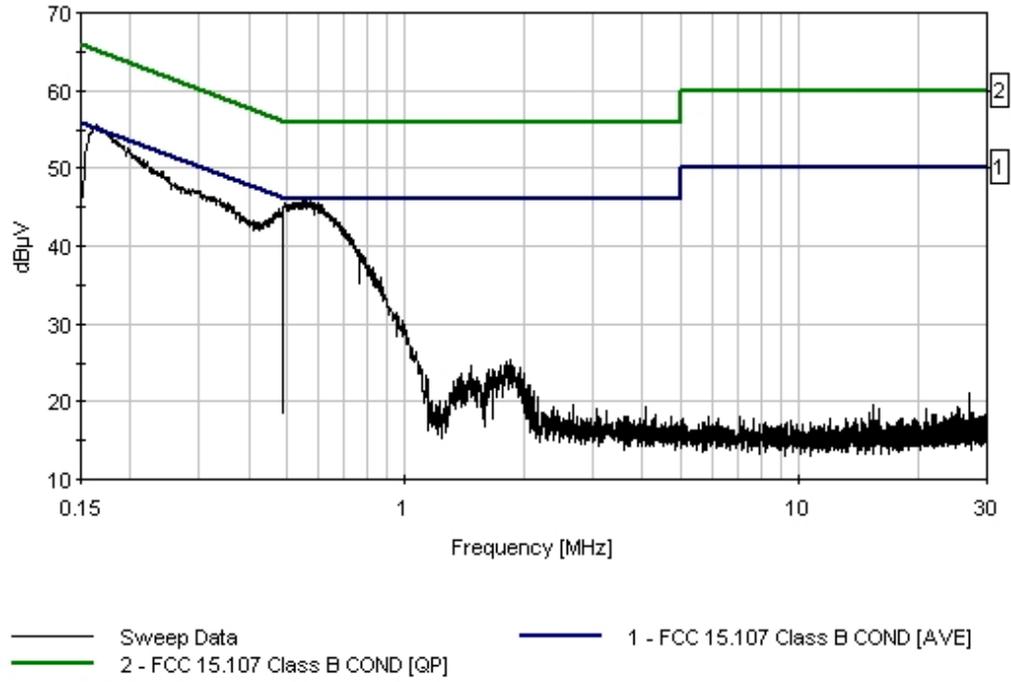
Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	768.124k	32.9	+0.1	+6.1	+0.1	+0.1	+0.0	39.3	46.0	-6.7	White
2	866.297k	29.7	+0.1	+6.1	+0.0	+0.1	+0.0	36.0	46.0	-10.0	White
3	877.205k	28.0	+0.1	+6.1	+0.0	+0.1	+0.0	34.3	46.0	-11.7	White
4	1.838M	19.1	+0.1	+6.1	+0.1	+0.1	+0.0	25.5	46.0	-20.5	White

5	1.468M	18.2	+0.1	+6.1	+0.0	+0.1	+0.0	24.5	46.0	-21.5	White
6	1.626M	17.8	+0.1	+6.1	+0.1	+0.1	+0.0	24.2	46.0	-21.8	White
7	2.042M	15.8	+0.1	+6.1	+0.1	+0.1	+0.0	22.2	46.0	-23.8	White
8	2.064M	15.7	+0.1	+6.1	+0.1	+0.1	+0.0	22.1	46.0	-23.9	White
9	2.128M	15.0	+0.1	+6.1	+0.1	+0.1	+0.0	21.4	46.0	-24.6	White
10	2.093M	14.1	+0.1	+6.1	+0.1	+0.1	+0.0	20.5	46.0	-25.5	White
11	1.162M	13.9	+0.1	+6.1	+0.0	+0.1	+0.0	20.2	46.0	-25.8	White
12	1.268M	13.9	+0.1	+6.1	+0.0	+0.1	+0.0	20.2	46.0	-25.8	White
13	555.053k	6.5	+0.2	+6.1	+0.1	+0.1	+0.0	13.0	46.0	-33.0	White
	Ave										
^	555.053k	39.5	+0.2	+6.1	+0.1	+0.1	+0.0	46.0	46.0	+0.0	White
15	488.150k	6.5	+0.2	+6.2	+0.1	+0.1	+0.0	13.1	46.2	-33.1	White
	Ave										
^	488.150k	38.4	+0.2	+6.2	+0.1	+0.1	+0.0	45.0	46.2	-1.2	White
17	164.543k	12.8	+0.5	+6.2	+0.1	+0.2	+0.0	19.8	55.2	-35.4	White
	Ave										
^	164.543k	48.6	+0.5	+6.2	+0.1	+0.2	+0.0	55.6	55.2	+0.4	White

CKC Laboratories, Inc. Date: 9/25/2007 Time: 16:14:28 Garmin AT VWO#: 86612
 FCC 15.107 Class B COND [AVE] Test Lead: White 110V 60Hz Sequence#: 13

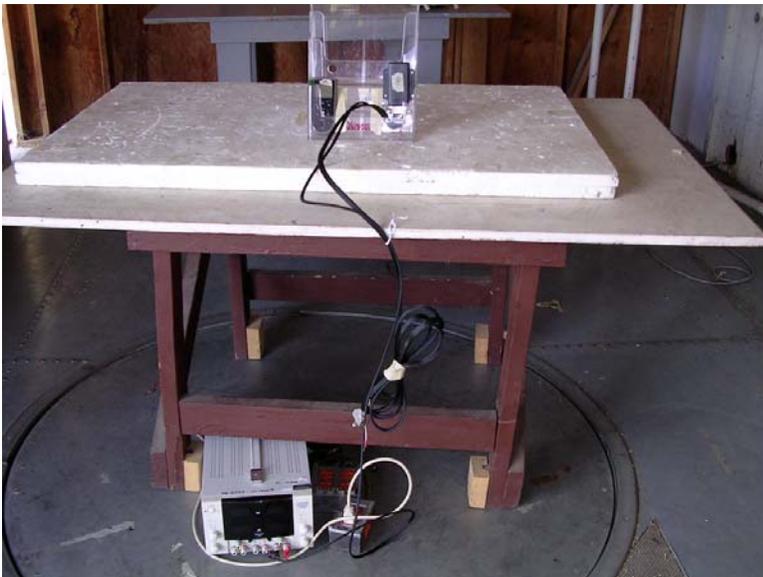


FCC 15.109 RADIATED EMISSIONS

Test Setup Photos



Upright Position



Upright Position



Flat Position



Flat Position

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin International, Inc.**

Specification: **FCC 15.109 Class B**

Work Order #: **86612**

Date: 9/25/2007

Test Type: **Radiated Scan**

Time: 13:32:13

Equipment: **Remote Transceiver**

Sequence#: 5

Manufacturer: Garmin International, Inc.

Tested By: E. Wong

Model: GRT 10 & GRC 10

S/N: 14Q000037 & 14R000050

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2007	01/05/2009	P05198
Pre Amp	1937A02548	06/01/2006	06/01/2008	00309
Horn Antenna	6246	06/29/2006	06/29/2008	00849
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
Heliacx Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
18-26GHz Horn	3643A00027	11/27/2006	11/27/2008	02112
24" SMA Cable	1-26GHz_white	01/11/2007	01/11/2009	P05183

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin International, Inc.	GRT 10	14Q000037
Remote Control	Garmin International, Inc.	GRC 10	14R000050

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin International, Inc.	GRT 10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives RF commands from a remote interrogator and the EUT sets the receiving frequency which it operates on. A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Standby/receive

Modulation: GFSK

Freq: 2408 (ch 8)

Frequency range of measurement = 30MHz - 25 GHz.

Frequency 30 MHz - 1000 MHz, RBW=120 kHz, VBW=120 kHz; 1000 - 25,000 MHz, RBW=1 MHz, VBW=1 MHz.

The emission profile of all three orthogonal orientations was investigated.

GRT 10: worst case is EUT placed upright and laying flat.

GRC 10: worst case is EUT placed upright.

23°C and 49% relative humidity.

Transducer Legend:

T1=Preamp 8447D 060108	T2=Bilog AN01995 020208 Chase
T3=Cable #10 051609	T4=Cable #15, Site A, 010509
T5=Pre amp 1- 26GHz 071908	T6=54' Heliac Cable 091808 P05565
T7=Horn 00849_062908	T8=SMA-cable_W_05183-011109-26GHz

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

#	Freq	Rdng	Reading listed by margin.				Test Distance: 3 Meters					Polar
	MHz	dB μ V	T1 T5 dB	T2 T6 dB	T3 T7 dB	T4 T8 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Ant	
1	2754.000M	47.8	+0.0	+0.0	+0.0	+0.0	+0.0	44.3	54.0	-9.7	Horiz	
	Ave		-38.5	+3.9	+29.6	+1.5			Flat			
^	2754.000M	51.8	+0.0	+0.0	+0.0	+0.0	+0.0	48.3	54.0	-5.7	Horiz	
			-38.5	+3.9	+29.6	+1.5			Flat			
^	2754.000M	49.0	+0.0	+0.0	+0.0	+0.0	+0.0	45.5	54.0	-8.5	Horiz	
			-38.5	+3.9	+29.6	+1.5			Up right			
4	3913.200M	41.3	+0.0	+0.0	+0.0	+0.0	+0.0	42.1	54.0	-11.9	Vert	
			-38.0	+4.7	+32.4	+1.7			Up right			
5	2754.000M	44.5	+0.0	+0.0	+0.0	+0.0	+0.0	41.0	54.0	-13.0	Horiz	
	Ave		-38.5	+3.9	+29.6	+1.5			Up right			
6	2754.000M	43.3	+0.0	+0.0	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Vert	
	Ave		-38.5	+3.9	+29.6	+1.5			Up right			
^	2754.000M	49.2	+0.0	+0.0	+0.0	+0.0	+0.0	45.7	54.0	-8.3	Vert	
			-38.5	+3.9	+29.6	+1.5			Up right			
^	2754.000M	47.8	+0.0	+0.0	+0.0	+0.0	+0.0	44.3	54.0	-9.7	Vert	
			-38.5	+3.9	+29.6	+1.5			Flat			
9	765.600M	24.0	-27.0	+22.1	+0.5	+5.4	+0.0	25.0	46.0	-21.0	Vert	
			+0.0	+0.0	+0.0	+0.0						
10	446.850M	25.7	-27.6	+17.0	+0.4	+4.0	+0.0	19.5	46.0	-26.5	Horiz	
			+0.0	+0.0	+0.0	+0.0						

FCC 15.207 CONDUCTED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin International, Inc.**

Specification: **FCC 15.207 COND [AVE]**

Work Order #: **86612**

Date: 9/25/2007

Test Type: **Conducted Emissions**

Time: 16:03:30

Equipment: **Remote Transceiver**

Sequence#: 11

Manufacturer: Garmin International, Inc.

Tested By: E. Wong

Model: GRT 10

110V 60Hz

S/N: 14Q000037

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN	1104	11/10/2006	11/10/2008	00847
6dB Attenuator	None	11/21/2006	11/21/2008	P05611
150kHz HPF	G7755	01/30/2006	01/30/2008	02610
Conducted Emission Cable	Cable #21	05/09/2006	05/09/2008	P04358
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin International, Inc.	GRT 10	14Q000037

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin International, Inc.	GRT 10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table. The EUT receives RF commands from a remote interrogator and the EUT sets the receiving frequency which it operates on. A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Receiving

Freq: 2408 (ch 8)

The EUT obtains DC 28V from a support power supply. 23°C and 49% relative humidity.

Transducer Legend:

T1=150kHz HPF Asset 02610	T2=6dB Attenuator P05611
T3=Cable #21 Conducted Site A 050908	T4=(L1) Insertion Loss 00847 EMCO 3816/2NM

Measurement Data:

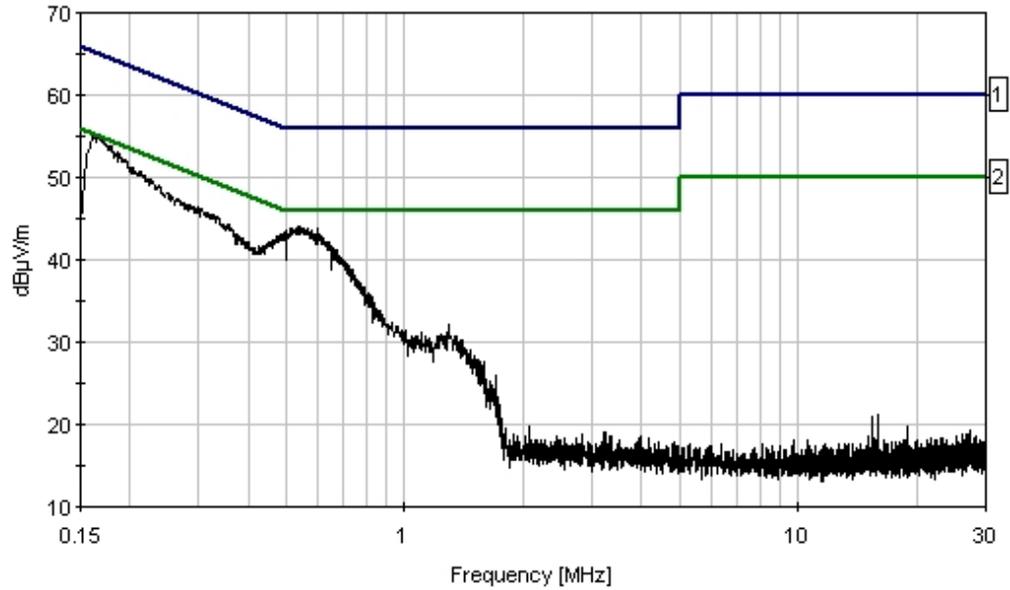
Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	657.590k	34.9	+0.2	+6.1	+0.1	+0.1	+0.0	41.4	46.0	-4.6	Black
2	737.583k	32.5	+0.1	+6.1	+0.1	+0.1	+0.0	38.9	46.0	-7.1	Black
3	877.205k	26.7	+0.1	+6.1	+0.0	+0.1	+0.0	33.0	46.0	-13.0	Black

4	1.698M	19.6	+0.1	+6.1	+0.1	+0.1	+0.0	26.0	46.0	-20.0	Black
5	1.643M	18.9	+0.1	+6.1	+0.1	+0.1	+0.0	25.3	46.0	-20.7	Black
6	1.749M	16.1	+0.1	+6.1	+0.1	+0.1	+0.0	22.5	46.0	-23.5	Black
7	2.076M	13.3	+0.1	+6.1	+0.1	+0.1	+0.0	19.7	46.0	-26.3	Black
8	3.259M	12.5	+0.1	+6.2	+0.1	+0.2	+0.0	19.1	46.0	-26.9	Black
9	3.191M	12.4	+0.1	+6.2	+0.1	+0.2	+0.0	19.0	46.0	-27.0	Black
10	2.816M	12.2	+0.1	+6.2	+0.1	+0.2	+0.0	18.8	46.0	-27.2	Black
11	3.361M	11.8	+0.1	+6.2	+0.2	+0.2	+0.0	18.5	46.0	-27.5	Black
12	3.994M	11.8	+0.1	+6.2	+0.2	+0.2	+0.0	18.5	46.0	-27.5	Black
13	496.150k Ave	5.8	+0.2	+6.2	+0.1	+0.1	+0.0	12.4	46.1	-33.7	Black
^	496.150k	36.7	+0.2	+6.2	+0.1	+0.1	+0.0	43.3	46.1	-2.8	Black
15	537.601k Ave	5.7	+0.2	+6.1	+0.1	+0.1	+0.0	12.2	46.0	-33.8	Black
^	537.601k	37.5	+0.2	+6.1	+0.1	+0.1	+0.0	44.0	46.0	-2.0	Black
17	170.362k Ave	11.8	+0.4	+6.2	+0.1	+0.1	+0.0	18.6	54.9	-36.3	Black
^	170.362k	48.1	+0.4	+6.2	+0.1	+0.1	+0.0	54.9	54.9	+0.0	Black

CKC Laboratories, Inc. Date: 9/25/2007 Time: 16:03:30 Garmin ATWVO#: 86612
 FCC 15.207 COND [AVE] Test Lead: Black 110V 60Hz Sequence#: 11



— Sweep Data — 1 - FCC 15.207 COND [QP] — 2 - FCC 15.207 COND [AVE]

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin International, Inc.**

Specification: **FCC 15.207 COND [AVE]**

Work Order #: **86612**

Date: 9/25/2007

Test Type: **Conducted Emissions**

Time: 16:09:07

Equipment: **Remote Transceiver**

Sequence#: 12

Manufacturer: Garmin International, Inc.

Tested By: E. Wong

Model: GRT 10

110V 60Hz

S/N: 14Q000037

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN	1104	11/10/2006	11/10/2008	00847
6dB Attenuator	None	11/21/2006	11/21/2008	P05611
150kHz HPF	G7755	01/30/2006	01/30/2008	02610
Conducted Emission Cable	Cable #21	05/09/2006	05/09/2008	P04358
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin International, Inc.	GRT 10	14Q000037

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin International, Inc.	GRT 10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table. The EUT receives RF commands from a remote interrogator and the EUT sets the receiving frequency which it operates on. A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Receiving

Freq: 2408 (ch 8)

The EUT obtains DC 28V from a support power supply. 23°C and 49% relative humidity.

Transducer Legend:

T1=150kHz HPF Asset 02610	T2=6dB Attenuator P05611
T3=Cable #21 Conducted Site A 050908	T4=(L2) Insertion Loss 00847 EMCO 3816/2NM

Measurement Data:

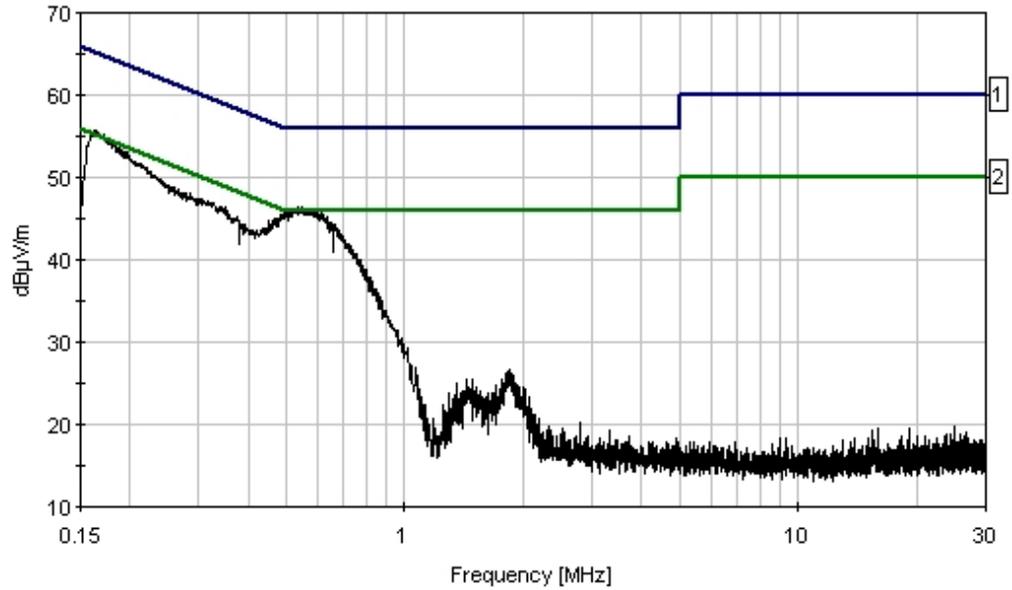
Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	877.205k	27.9	+0.1	+6.1	+0.0	+0.1	+0.0	34.2	46.0	-11.8	White
2	1.855M	20.3	+0.1	+6.1	+0.1	+0.1	+0.0	26.7	46.0	-19.3	White
3	1.443M	19.2	+0.1	+6.1	+0.0	+0.1	+0.0	25.5	46.0	-20.5	White
4	1.494M	19.1	+0.1	+6.1	+0.0	+0.1	+0.0	25.4	46.0	-20.6	White

5	1.358M	18.8	+0.1	+6.1	+0.0	+0.1	+0.0	25.1	46.0	-20.9	White
6	1.290M	17.6	+0.1	+6.1	+0.0	+0.1	+0.0	23.9	46.0	-22.1	White
7	1.120M	16.2	+0.1	+6.1	+0.0	+0.1	+0.0	22.5	46.0	-23.5	White
8	1.256M	16.0	+0.1	+6.1	+0.0	+0.1	+0.0	22.3	46.0	-23.7	White
9	2.102M	15.5	+0.1	+6.1	+0.1	+0.1	+0.0	21.9	46.0	-24.1	White
10	1.302M	15.4	+0.1	+6.1	+0.0	+0.1	+0.0	21.7	46.0	-24.3	White
11	2.149M	14.9	+0.1	+6.1	+0.1	+0.1	+0.0	21.3	46.0	-24.7	White
12	1.277M	14.8	+0.1	+6.1	+0.0	+0.1	+0.0	21.1	46.0	-24.9	White
13	639.930k Ave	12.7	+0.2	+6.1	+0.1	+0.1	+0.0	19.2	46.0	-26.8	White
14	547.054k Ave	6.7	+0.2	+6.1	+0.1	+0.1	+0.0	13.2	46.0	-32.8	White
^	547.054k	40.0	+0.2	+6.1	+0.1	+0.1	+0.0	46.5	46.0	+0.5	White
16	661.953k Ave	5.5	+0.2	+6.1	+0.1	+0.1	+0.0	12.0	46.0	-34.0	White
^	661.953k	37.7	+0.2	+6.1	+0.1	+0.1	+0.0	44.2	46.0	-1.8	White
18	163.090k Ave	12.7	+0.5	+6.2	+0.1	+0.2	+0.0	19.7	55.3	-35.6	White
^	163.090k	48.8	+0.5	+6.2	+0.1	+0.2	+0.0	55.8	55.3	+0.5	White

CKC Laboratories, Inc. Date: 9/25/2007 Time: 16:09:07 Garmin AT VWO#: 86612
 FCC 15.207 COND [AVE] Test Lead: White 110V 60Hz Sequence#: 12



— Sweep Data — 1 - FCC 15.207 COND [QP] — 2 - FCC 15.207 COND [AVE]

FCC 15.247(a)(2) BANDWIDTH PLOT

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
Horn Antenna	00849	EMCO	3115	6246	062906	062908
Microwave Pre-amp	00786	HP	83017A	3123A00281	071906	071908
Heliac Antenna cable	P05565	Andrew	LDF1-50	P5565	091806	091808
24" SMA Cable (White)	P05183	Pasteck	35591-48	1-40GHz_white	011107	011109

Test Conditions

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives a RF commands from a remote interrogator and then the EUT sets the transmitting frequency which it operates on. EUT transmits at max power and executes a test routine.

A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Transmit

Modulation: GFSK

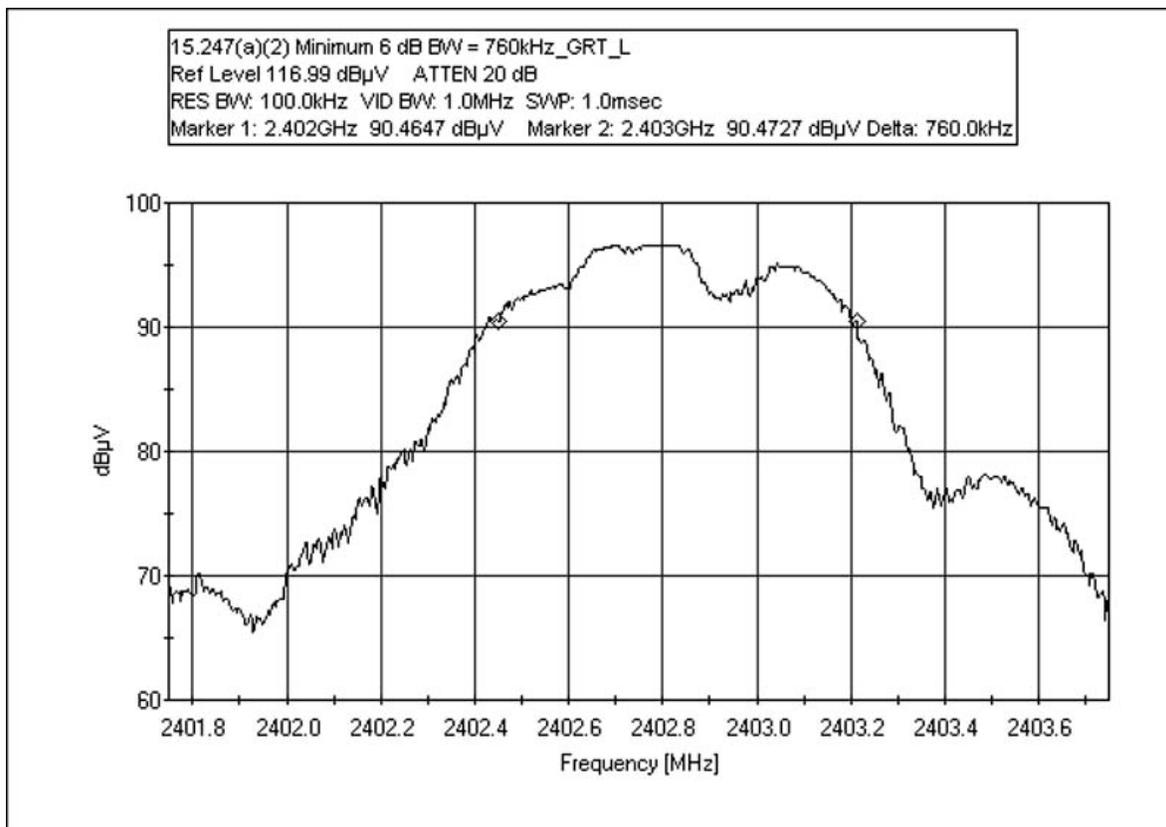
Freq: 2403 MHz (ch 3), 2408 MHz (ch 8) and 2412 MHz (ch 12)

Note: Serial number 14Q000037 tested.

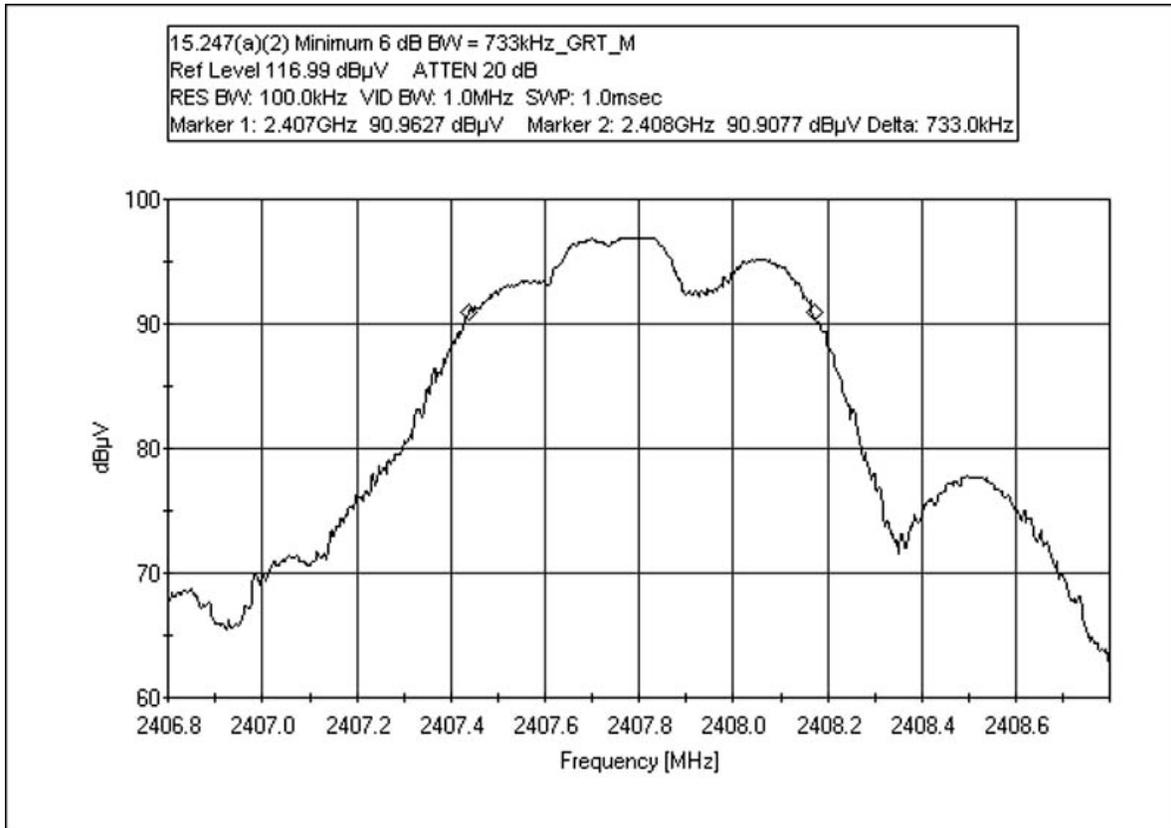
Test Setup Photos



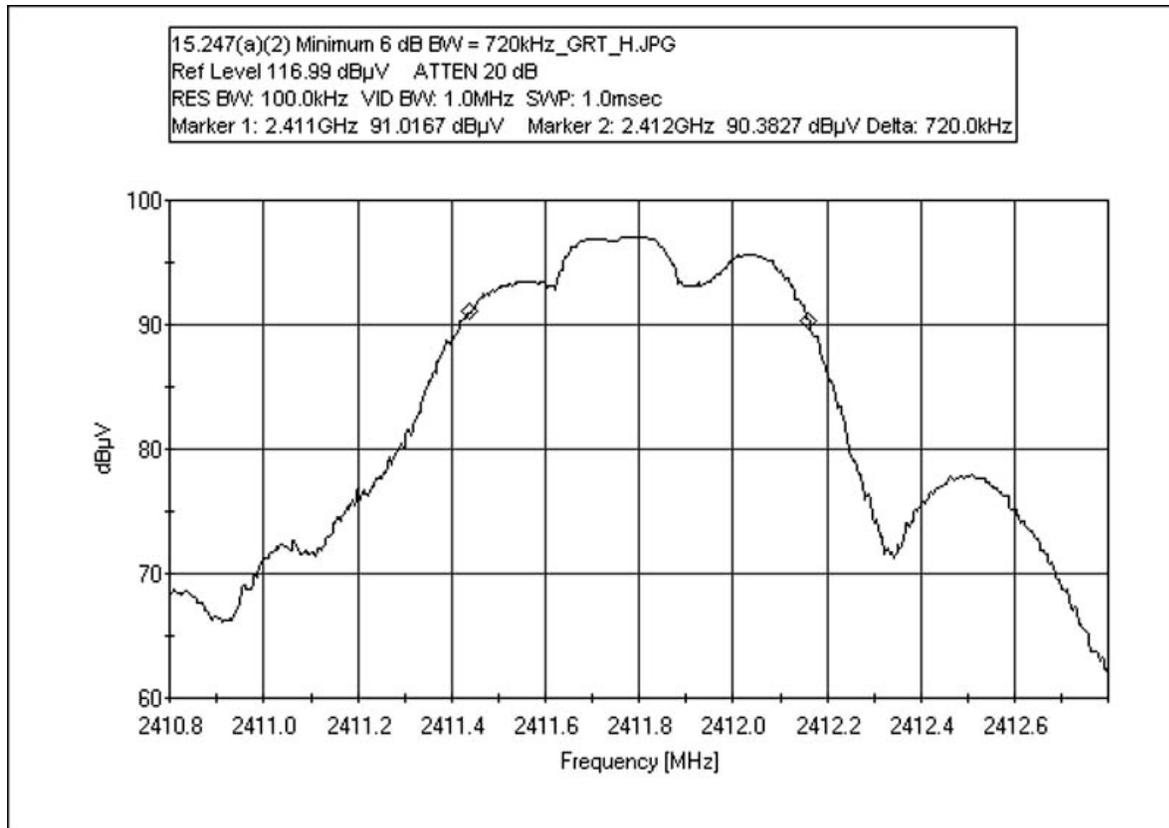
FCC 15.247(a)(2) - Low



FCC 15.247(a)(2) - Medium



FCC 15.247(a)(2) - High



FCC 15.247(b)(3) RF POWER OUTPUT

Test Equipment

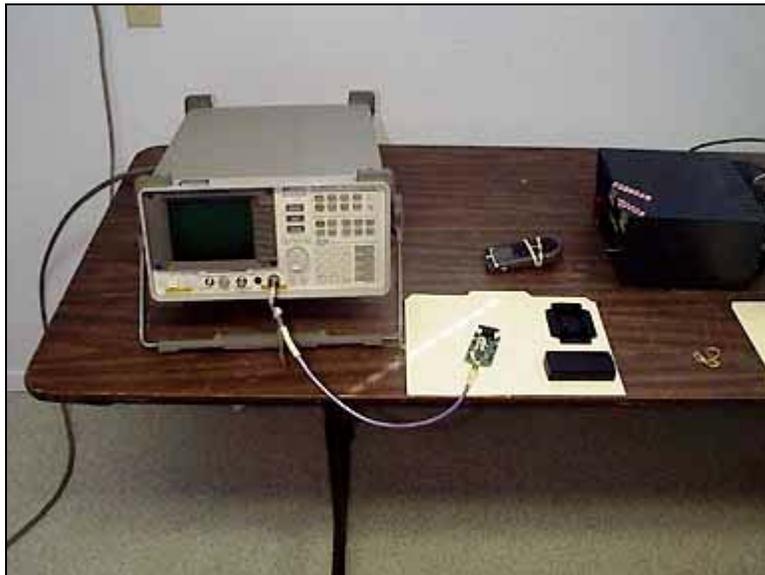
Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02111	HP	8593EM	3624A00159	3/23/07	3/23/09
Coax	P01527	Unknown	12" long	N/A	5/16/07	5/16/09

Test Conditions

Each channel was selected using the laptop computer to select the test mode, frequency/channel, and constant transmit mode of the GRC-10 by programming the interrogator that in-turn sent the commands via RF to the hand held. Resolution BW was set to 1 MHz and the Video BW was set to 3 MHz for these readings. The frequency span was set to capture the entire signal. Frequency range was: 2403 – 2412 MHz. Mode: Transmit. Modulation: GFSK.

Test Setup Photos





§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

(b) The maximum peak output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Handheld Remote: GRT10 P/N: 011-01557-00 S/N:14Q000419

Channel	Frequency (GHz)	Peak Output Reading (dBm)	P01527 Cable Loss (dB)	Corrected Reading (dBm)
3	2.402858	-6.07	0.4	- 6.03
8	2.407860	-5.78	0.4	- 5.74
12	2.412130	-5.66	0.4	- 5.64

Tested by: Chuck Kendall

15.31(e)

Varies voltage +- 15% from nominal 14 – 28 V. (11.9 V, 32.2 V)

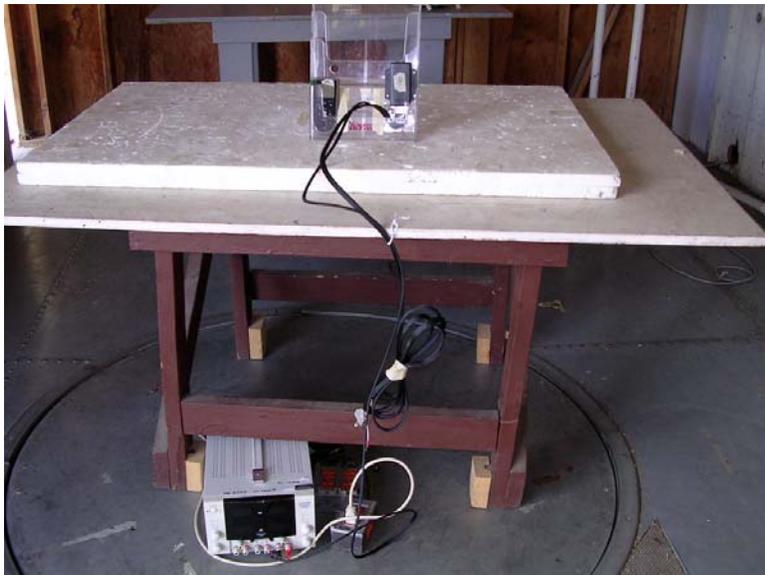
The supply voltage of the intentional radiator was varied between 85% and 115% of the nominal rated supply voltage. Result: No deviation of output power or the radiated signal level of the fundamental frequency component of the emission was detected.

FCC 15.247(d) OATS RADIATED SPURIOUS EMISSIONS

Test Setup Photos



Upright Position



Upright Position



Flat Position



Flat Position

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin AT**
 Specification: **15.247(d) Bandedge Compliance**
 Work Order #: **86612** Date: 1/11/2008
 Test Type: **Radiated Scan** Time: 09:42:11
 Equipment: **Remote Transceiver** Sequence#: 30
 Manufacturer: Garmin AT Tested By: E. Wong
 Model: GRT10
 S/N: 14Q000412

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2007	01/05/2009	P05198
Pre Amp	1937A02548	06/01/2006	06/01/2008	00309
Horn Antenna	6246	06/29/2006	06/29/2008	00849
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
Heliacx Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
18-26GHz Horn	3643A00027	11/27/2006	11/27/2008	02112
Loop Antenna	2014	06/14/2006	06/14/2008	00314
3.0 GHz HPF	1	03/08/2006	03/08/2008	02744
2'-40GHz cable	NA	09/18/2007	09/18/2009	P2948

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin AT	GRT10	14Q000412

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin AT	GRT10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives RF commands from remote interrogator, sets up transmit frequency, transmits at max power and executes test routine. A section of data cable is connected to the RS232 port of the GRT10 with data streaming in loop back manner. Frequency range: 2402.8 - 2412 MHz. Mode: Transmit. Modulation: GFSK. Frequency: 2403 MHz (ch3). Frequency range of measurement = 9 kHz- 25 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz - 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz - 25,000 MHz RBW=1 MHz, VBW=1 MHz. The emission profile of all three orthogonal orientations was investigated. GRT: Worse case data upright and lying flat were presented. 28 Vdc, 23°C, 49% relative humidity. SAW filter installed.

Transducer Legend:

T1=Preamp 8447D 060108	T2=Bilog AN01995 020208 Chase
T3=Cable #10 051609	T4=Cable #15, Site A, 010509
T5=Pre amp 1- 26GHz 071908	T6=54' Heliac Cable 091808 P05565
T7=Horn 00849_062908	T8=Filter 3GHz HPF AN02744
T9=Hi Freq_40GHz_2ft-ANP02948-091809	

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

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
	MHz	dB μ V	T9				Table	dB μ V/m	dB μ V/m	dB	Ant
			dB	dB	dB	dB					
1	68.257M	53.0	-27.7 +0.0 +0.0	+6.0 +0.0	+0.0 +0.0	+1.5 +0.0	+0.0	32.8	40.0	-7.2	Vert
2	80.781M	50.5	-27.8 +0.0 +0.0	+7.7 +0.0	+0.1 +0.0	+1.6 +0.0	+0.0	32.1	40.0	-7.9	Vert
3	69.007M	51.9	-27.7 +0.0 +0.0	+6.0 +0.0	+0.0 +0.0	+1.5 +0.0	+0.0	31.7	40.0	-8.3	Vert
4	4805.650M Ave	43.6	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	45.1	54.0 flat	-8.9	Horiz
^	4805.650M	48.1	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	49.6	54.0 flat	-4.4	Horiz
^	4805.650M	46.1	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	47.6	54.0 upright	-6.4	Horiz
7	2402.870M	100.3	+0.0 -38.6 +0.3	+0.0 +3.6	+0.0 +28.4	+0.0 +0.0	+0.0	94.0	103.0	-9.0	Vert
8	4805.650M Ave	41.0	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	42.5	54.0 flat	-11.5	Vert
^	4805.650M	47.5	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	49.0	54.0 flat	-5.0	Vert
^	4805.650M	46.3	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	47.8	54.0 upright	-6.2	Vert
11	4805.650M Ave	40.8	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	42.3	54.0 upright	-11.7	Horiz
12	4805.650M Ave	39.5	+0.0 -37.7 +0.5	+0.0 +5.3	+0.0 +33.1	+0.0 +0.3	+0.0	41.0	54.0 upright	-13.0	Vert

13	60.811M	46.1	-27.7 +0.0 +0.0	+6.2 +0.0	+0.1 +0.0	+1.3 +0.0	+0.0	26.0	40.0	-14.0	Vert
14	250.000M	38.7	-27.7 +0.0 +0.0	+12.5 +0.0	+0.3 +0.0	+2.9 +0.0	+0.0	26.7	46.0	-19.3	Horiz
15	202.849M	37.9	-27.6 +0.0 +0.0	+9.0 +0.0	+0.2 +0.0	+2.6 +0.0	+0.0	22.1	43.5	-21.4	Vert
16	165.892M	33.3	-27.7 +0.0 +0.0	+9.9 +0.0	+0.3 +0.0	+2.3 +0.0	+0.0	18.1	43.5	-25.4	Horiz
17	7208.392M	46.9	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	52.8	80.0 flat	-27.2	Vert
18	7208.392M	45.0	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	50.9	80.0 upright	-29.1	Horiz
19	7208.392M	43.5	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	49.4	80.0 flat	-30.6	Horiz
20	7208.392M	43.0	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	48.9	80.0 upright	-31.1	Vert

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin AT**
 Specification: **FCC 15.247 (d) (FCC 15.205 restricted band)**
 Work Order #: **86612** Date: 1/10/2008
 Test Type: **Radiated Scan** Time: 16:22:36
 Equipment: **Remote Transceiver** Sequence#: 31
 Manufacturer: **Garmin AT** Tested By: E. Wong
 Model: **GRT10**
 S/N: **14Q000412**

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2007	01/05/2009	P05198
Pre Amp	1937A02548	06/01/2006	06/01/2008	00309
Horn Antenna	6246	06/29/2006	06/29/2008	00849
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
HeliAx Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
18-26GHz Horn	3643A00027	11/27/2006	11/27/2008	02112
Loop Antenna	2014	06/14/2006	06/14/2008	00314
3.0 GHz HPF	1	03/08/2006	03/08/2008	02744
2'-40GHz cable	NA	09/18/2007	09/18/2009	P2948

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin AT	GRT10	14Q000412

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin AT	GRT10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives RF commands from remote interrogator, sets up transmit frequency, transmits at max power and executes test routine. A section of data cable is connected to the RS232 port of the GRT10 with data streaming in loop back manner. Frequency range: 2402.8 - 2412 MHz. Mode: Transmit. Modulation: GFSK. Frequency: 2407.7 MHz (ch8). Frequency range of measurement = 9 kHz - 25 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz - 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz - 25,000 MHz RBW=1 MHz, VBW=1 MHz. The emission profile of all three orthogonal orientations was investigated. GRT: Worse case data upright and lying flat were presented. 28 Vdc, 23°C, 49% relative humidity. SAW filter installed.

Transducer Legend:

T1=Preamp 8447D 060108	T2=Bilog AN01995 020208 Chase
T3=Cable #10 051609	T4=Cable #15, Site A, 010509
T5=Pre amp 1- 26GHz 071908	T6=54' Heliac Cable 091808 P05565
T7=Horn 00849_062908	T8=Filter 3GHz HPF AN02744
T9=Hi Freq_40GHz_2ft-ANP02948-091809	

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

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5	T6	T7	T8	Table	dB μ V/m	dB μ V/m	dB	Ant
			T9								
1	4815.617M	42.4	+0.0	+0.0	+0.0	+0.0	+0.0	43.9	54.0	-10.1	Horiz
	Ave		-37.7	+5.3	+33.1	+0.3			upright		
			+0.5								
2	4815.783M	41.3	+0.0	+0.0	+0.0	+0.0	+0.0	42.8	54.0	-11.2	Vert
	Ave		-37.7	+5.3	+33.1	+0.3			flat		
			+0.5								
^	4815.783M	47.6	+0.0	+0.0	+0.0	+0.0	+0.0	49.1	54.0	-4.9	Vert
			-37.7	+5.3	+33.1	+0.3			flat		
			+0.5								
4	4815.617M	40.6	+0.0	+0.0	+0.0	+0.0	+0.0	42.1	54.0	-11.9	Horiz
	Ave		-37.7	+5.3	+33.1	+0.3			upright		
			+0.5								
^	4815.617M	47.4	+0.0	+0.0	+0.0	+0.0	+0.0	48.9	54.0	-5.1	Horiz
			-37.7	+5.3	+33.1	+0.3			upright		
			+0.5								
^	4815.700M	47.3	+0.0	+0.0	+0.0	+0.0	+0.0	48.8	54.0	-5.2	Horiz
			-37.7	+5.3	+33.1	+0.3			flat		
			+0.5								
^	4815.617M	47.1	+0.0	+0.0	+0.0	+0.0	+0.0	48.6	54.0	-5.4	Horiz
			-37.7	+5.3	+33.1	+0.3			upright		
			+0.5								
8	4815.700M	40.5	+0.0	+0.0	+0.0	+0.0	+0.0	42.0	54.0	-12.0	Horiz
	Ave		-37.7	+5.3	+33.1	+0.3			flat		
			+0.5								
9	249.950M	37.2	-27.7	+12.5	+0.3	+2.9	+0.0	25.2	46.0	-20.8	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
10	386.000M	31.6	-27.7	+15.5	+0.4	+3.6	+0.0	23.4	46.0	-22.6	Vert
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
11	7223.433M	45.5	+0.0	+0.0	+0.0	+0.0	+0.0	51.4	80.0	-28.6	Vert
			-37.2	+6.7	+35.7	+0.1			flat		
			+0.6								

12	7223.400M	45.4	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	51.3	80.0 upright	-28.7	Horiz
13	7223.350M	45.3	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	51.2	80.0 flat	-28.8	Horiz
14	7223.267M	45.1	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.7	+0.0 +0.1	+0.0	51.0	80.0 upright	-29.0	Horiz

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Garmin AT**
 Specification: **FCC 15.247 (d) (FCC 15.205 restricted band)**
 Work Order #: **86612** Date: 1/10/2008
 Test Type: **Radiated Scan** Time: 16:36:01
 Equipment: **Remote Transceiver** Sequence#: 32
 Manufacturer: **Garmin AT** Tested By: E. Wong
 Model: **GRT10**
 S/N: **14Q000412**

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2007	01/05/2009	P05198
Pre Amp	1937A02548	06/01/2006	06/01/2008	00309
Horn Antenna	6246	06/29/2006	06/29/2008	00849
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
HeliAx Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
18-26GHz Horn	3643A00027	11/27/2006	11/27/2008	02112
Loop Antenna	2014	06/14/2006	06/14/2008	00314
3.0 GHz HPF	1	03/08/2006	03/08/2008	02744
2'-40GHz cable	NA	09/18/2007	09/18/2009	P2948

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Transceiver*	Garmin AT	GRT10	14Q000412

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward	6303D	988614
Remote Transceiver	Garmin AT	GRT10	Interrogator

Test Conditions / Notes:

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives RF commands from remote interrogator, sets up transmit frequency, transmits at max power and executes test routine. A section of data cable is connected to the RS232 port of the GRT10 with data streaming in loop back manner. Frequency range: 2402.8 - 2412 MHz. Mode: Transmit. Modulation: GFSK. Frequency: 2411.7 MHz (ch12). Frequency range of measurement = 9 kHz - 25 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz - 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz - 25,000 MHz RBW=1 MHz, VBW=1 MHz. The emission profile of all three orthogonal orientations was investigated. GRT: Worse case data upright and lying flat were presented. 28 Vdc, 23°C, 49% relative humidity. SAW filter installed.

Transducer Legend:

T1=Preamp 8447D 060108	T2=Bilog AN01995 020208 Chase
T3=Cable #10 051609	T4=Cable #15, Site A, 010509
T5=Pre amp 1- 26GHz 071908	T6=54' Heliac Cable 091808 P05565
T7=Horn 00849_062908	T8=Filter 3GHz HPF AN02744
T9=Hi Freq_40GHz_2ft-ANP02948-091809	

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

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
	MHz	dB μ V	T9				Table	dB μ V/m	dB μ V/m	dB	Ant
			dB	dB	dB	dB					
1	4823.667M	42.0	+0.0	+0.0	+0.0	+0.0	+0.0	43.5	54.0	-10.5	Vert
	Ave		-37.7	+5.3	+33.1	+0.3		flat			
			+0.5								
^	4823.667M	47.2	+0.0	+0.0	+0.0	+0.0	+0.0	48.7	54.0	-5.3	Vert
			-37.7	+5.3	+33.1	+0.3		flat			
			+0.5								
^	4823.667M	46.5	+0.0	+0.0	+0.0	+0.0	+0.0	48.0	54.0	-6.0	Vert
			-37.7	+5.3	+33.1	+0.3		upright			
			+0.5								
4	4823.667M	41.7	+0.0	+0.0	+0.0	+0.0	+0.0	43.2	54.0	-10.8	Horiz
	Ave		-37.7	+5.3	+33.1	+0.3		flat			
			+0.5								
^	4823.667M	48.0	+0.0	+0.0	+0.0	+0.0	+0.0	49.5	54.0	-4.5	Horiz
			-37.7	+5.3	+33.1	+0.3		flat			
			+0.5								
^	4823.667M	47.1	+0.0	+0.0	+0.0	+0.0	+0.0	48.6	54.0	-5.4	Horiz
			-37.7	+5.3	+33.1	+0.3		upright			
			+0.5								
7	4823.667M	41.3	+0.0	+0.0	+0.0	+0.0	+0.0	42.8	54.0	-11.2	Horiz
	Ave		-37.7	+5.3	+33.1	+0.3		upright			
			+0.5								
8	4823.667M	40.6	+0.0	+0.0	+0.0	+0.0	+0.0	42.1	54.0	-11.9	Vert
	Ave		-37.7	+5.3	+33.1	+0.3		upright			
			+0.5								
9	952.680M	24.7	-27.1	+24.7	+0.7	+6.1	+0.0	29.1	46.0	-16.9	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
10	270.592M	30.3	-27.7	+12.8	+0.3	+3.0	+0.0	18.7	46.0	-27.3	Vert
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
11	7235.500M	45.9	+0.0	+0.0	+0.0	+0.0	+0.0	51.9	80.0	-28.1	Horiz
			-37.2	+6.7	+35.8	+0.1		flat			
			+0.6								

12	7235.500M	45.4	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.8	+0.0 +0.1	+0.0	51.4	80.0 flat	-28.6	Vert
13	7235.500M	44.1	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.8	+0.0 +0.1	+0.0	50.1	80.0 upright	-29.9	Vert
14	7235.500M	43.5	+0.0 -37.2 +0.6	+0.0 +6.7	+0.0 +35.8	+0.0 +0.1	+0.0	49.5	80.0 upright	-30.5	Horiz

FCC 15.247(e) POWER SPECTRAL DENSITY

Test Equipment

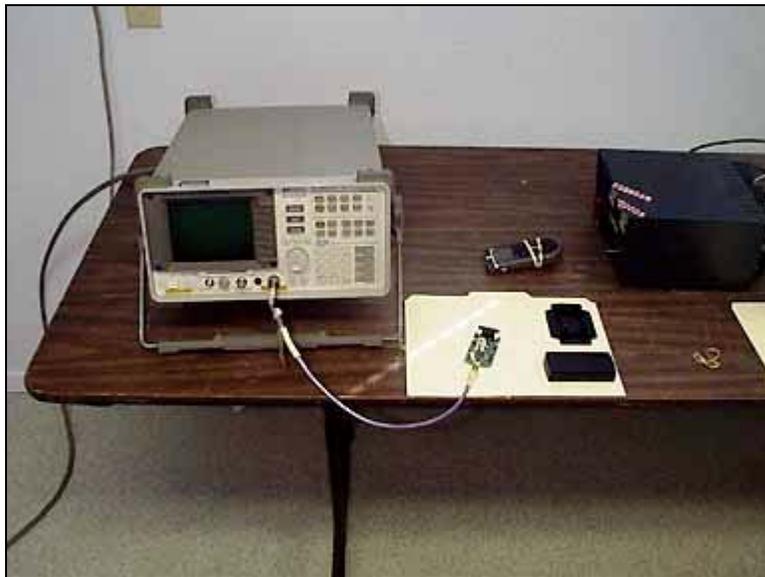
Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02111	HP	8593EM	3624A00159	3/23/07	3/23/09
Coax	P01527	Unknown	12" long	N/A	5/16/07	5/16/09

Test Conditions

Each channel was selected using the laptop computer to select the test mode, frequency/channel, and constant transmit mode of the GRC-10 by programming the interrogator that in-turn sent the commands via RF to the hand held. Resolution BW was set to 3 kHz and the Video BW was set to 10 kHz for these readings. The frequency span was set to capture the entire signal. Frequency range was: 2402.8 – 2412 MHz. Mode: Transmit. Modulation: GFSK.

Test Setup Photos





Test Data

Handheld Remote: GRT10 P/N: 011-01557-00 S/N:14Q000419

Channel	Frequency (GHz)	Peak Power Density Reading (dBm)	P01527 Cable Loss (dB)	Peak Power Density Corrected Reading (dBm)
3	2.402858	-7.94	0.4	- 7.90
8	2.407860	-7.73	0.4	- 7.69
12	2.412130	-7.12	0.4	- 7.08

Tested by: Chuck Kendall

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Measurement method in accordance with KDB558074, option 1, however, since the gain of the trace antenna is undetermined. Antenna substitution was method was used.

With the device on the wooden table, the fundamental emission of the device was measured (dBuV, raw).

The device is then removed and substituted with a horn antenna. A signal generator sends a CW signal to the substitution antenna, the RF level is adjusted to achieve the fundamental emission as measured.

The power level at the feed point of the substitution antenna is then measured with the spectrum analyzer. The Horn antenna gain correction factor is then added to the recorded feed point power, presented as power level.

G = numeric gain of antenna over isotropic radiator
 G(dB) = 20*Log(f MHz) - 29.77 - (transducer factor in dB)
 G (dB) = 20 Log (2408) – 29.77 – 28.5 = 9.4 dB

GRT10

Frequency	PSD (Raw dBuV)	Power at Substitution antenna	Horn Antenna gain	PSD (dBm)
2403 MHz	93.3	-15.4	9.4	-6.0
2408MHz,	91.9	-17.2	9.4	-7.8
2412 MHz	90.8	-18.2	9.4	-8.8

BANDEDGE COMPLIANCE

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
Horn Antenna	00849	EMCO	3115	6246	062906	062908
Microwave Pre-amp	00786	HP	83017A	3123A00281	071906	071908
Heliac Antenna cable	P05565	Andrew	LDF1-50	P5565	091806	091808
24" SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives a RF commands from a remote interrogator and then the EUT sets the transmitting frequency which it operates on. EUT transmits at max power and executes a test routine.

A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Transmit

Modulation: GFSK

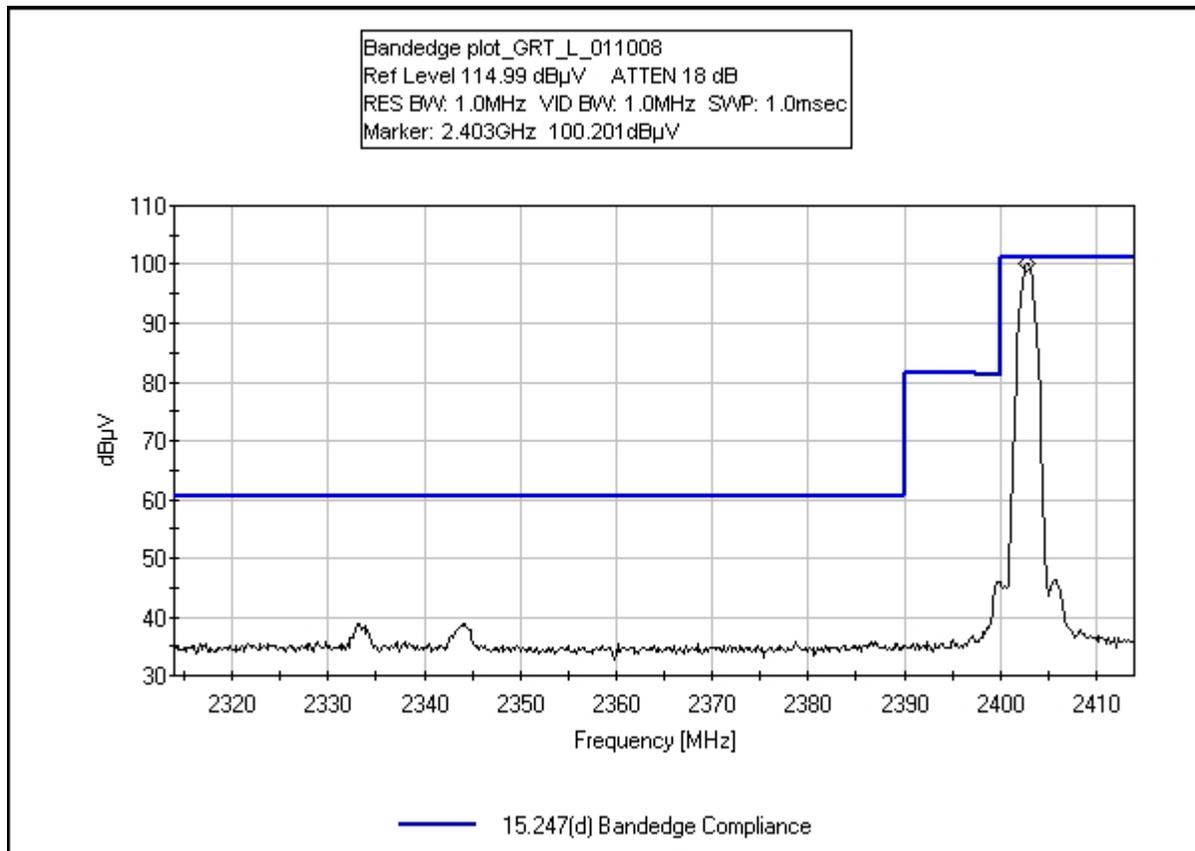
Freq: 2403 MHz (ch 3), 2408 MHz (ch 8) and 2412 MHz (ch 12)

Note: Serial number 14Q000412 tested.

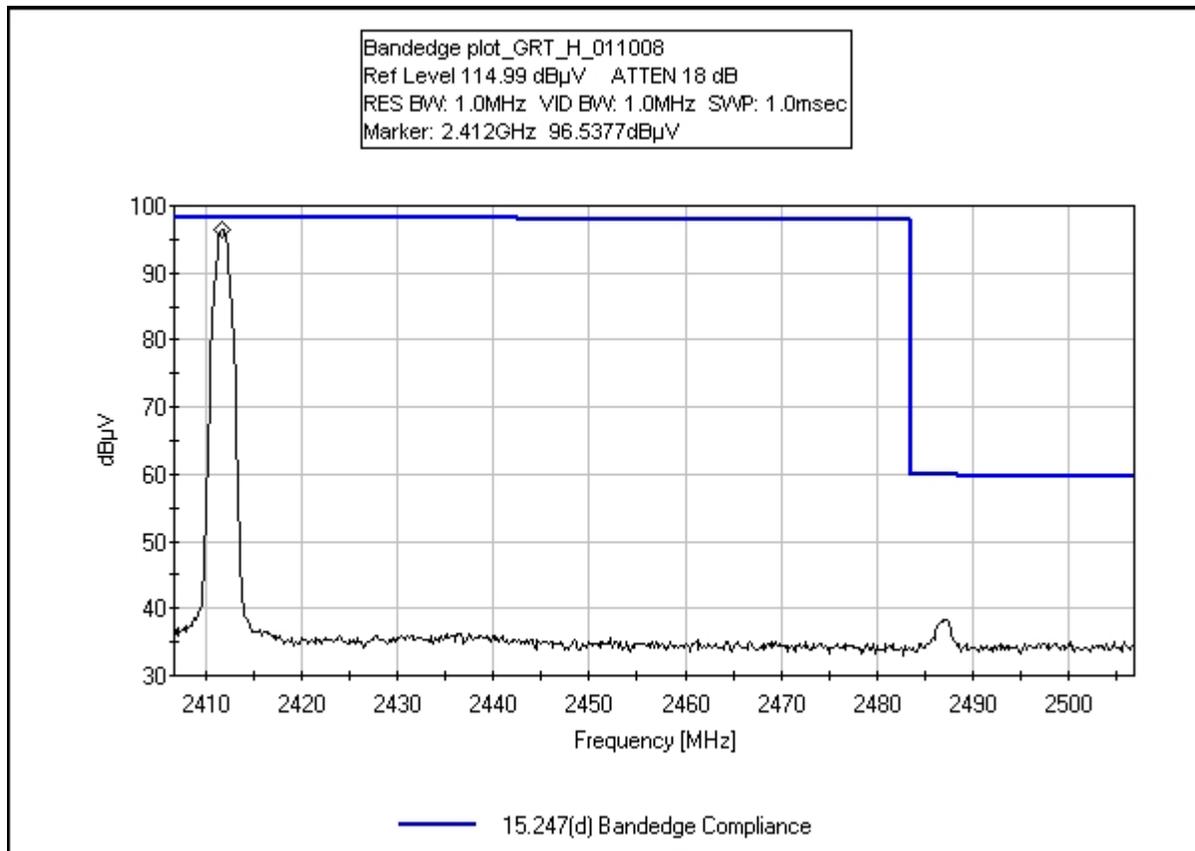
Test Setup Photos



Bandedge Compliance - Low



Bandedge Compliance - High



RSS 210 - 99% BANDWIDTH

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
Horn Antenna	00849	EMCO	3115	6246	062906	062908
Microwave Pre-amp	00786	HP	83017A	3123A00281	071906	071908
Heliac Antenna cable	P05565	Andrew	LDF1-50	P5565	091806	091808
24" SMA Cable (White)	P05183	Pasteck	35591-48	1-40GHz_white	011107	011109

Test Conditions

The EUT is placed on the wooden table with 10 cm of Styrofoam material. The EUT receives a RF commands from a remote interrogator and then the EUT sets the transmitting frequency which it operates on. EUT transmits at max power and executes a test routine.

A section of data cable is connected to the RS232 port of the GRT 10 with data streaming in a loop back manner.

Mode: Transmit

Modulation: GFSK

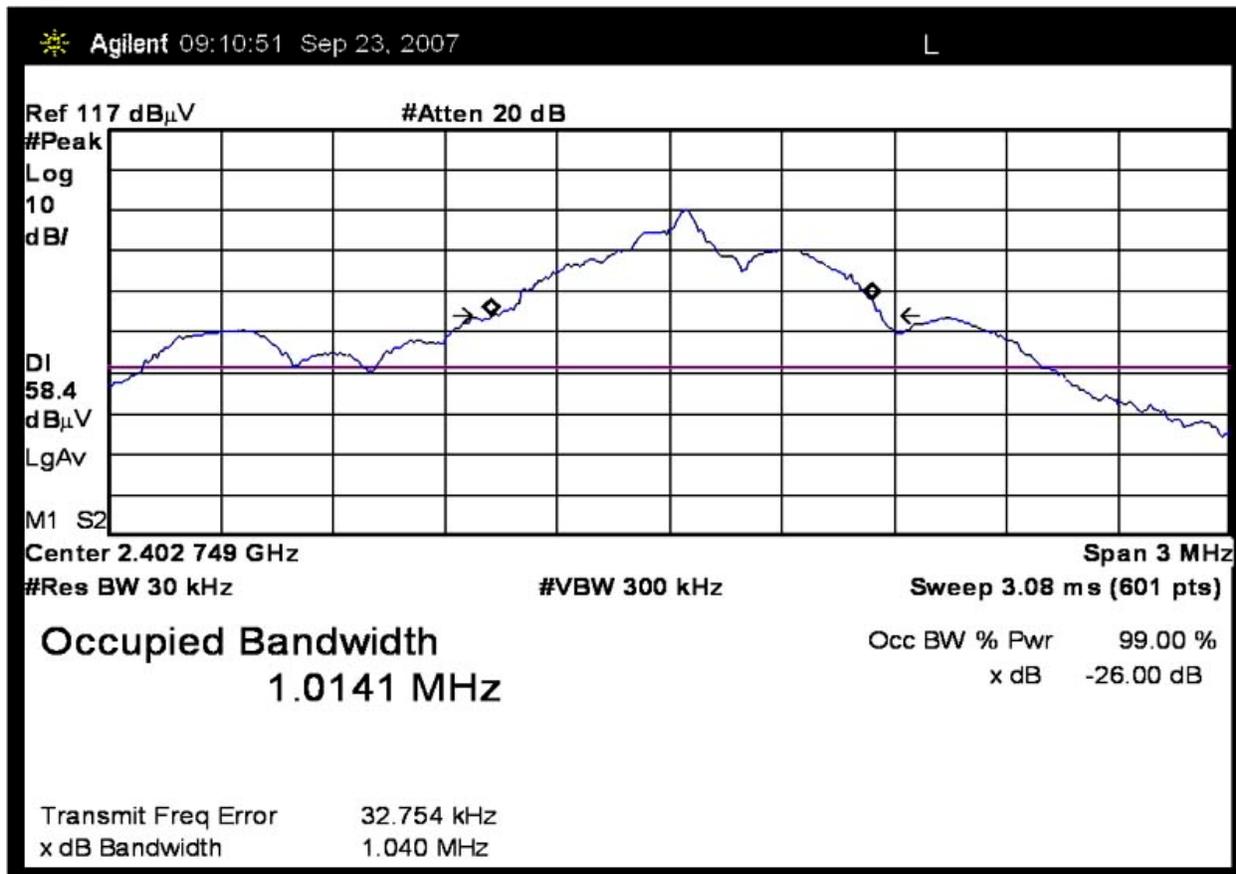
Freq: 2403 MHz (ch 3), 2408 MHz (ch 8) and 2412 MHz (ch 12)

Serial number 14Q000037 tested.

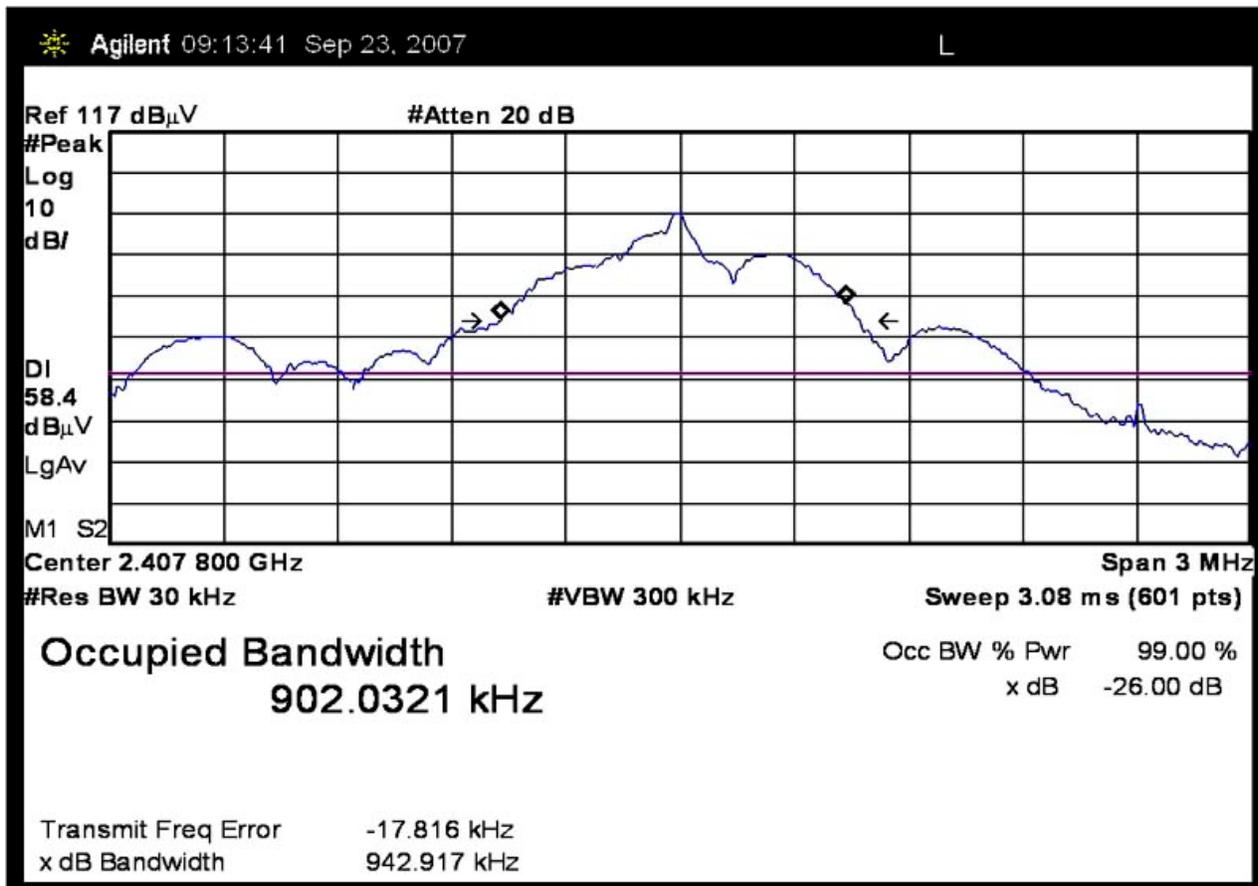
Test Setup Photos



RSS 210 - 99% Bandwidth - Low



RSS 210 - 99% Bandwidth - Medium



RSS 210 - 99% Bandwidth - High

