DECLARATION OF COMPLIANCE - RF MEASUREMENT REPORT (FCC/IC)

Test Lab Information	**Name**	**CELLTECH LABS INC.**
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada
Test Lab Registration No.(s)	**FCC**	714830
	IC	3874A-1
Applicant Information	**Name**	**KINETEKS CORPORATION.**
	Address	#126-1020 Mainland St., British Columbia, Canada, V6B2T4
Standard(s) & Procedure(s)	**FCC**	**47 CFR Part 15.249**
	IC	**RSS-210 Issue 8; RSS-Gen Issue 3**
	ANSI	C63.4-2003
Device Classification(s)	**FCC**	Low Power Communication Device (DXX)
	IC	Low-power License-exempt Radiocommunication Device
Application Type(s)	**FCC/IC**	TCB/CB Certification
Device Identifier(s)	**FCC ID:**	ZP2-TSEN001
	IC:	9751A-TSEN001
Device Model(s) Tested	Tractivity Sensor	
Test Sample Serial No.	#1	
Transmit Frequency Band	2400 – 2483.5 MHz	
Transmit Frequency Range	2400.5 MHz	
Max. RF Output Power (measured)	91.96dBuV/m@3m	
Modulation	MSK	
Antenna Type(s) Tested	Integral, 2dBi	
Power Source(s) Tested	3VDC Cell (CR2032)	

This wireless device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Part 15.249; Industry Canada RSS-210 Issue 8 and RSS-Gen Issue 3; and ANSI C63.4-2003.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results and statements contained in this report pertain only to the device(s) evaluated.

This report shall not be reproduced partially or in full without the prior written approval of Celltech Labs Inc.

Test Report Approved By		**Glen Westwell**	**Laboratory Manager**	**Celltech Labs Inc.**

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FIGURES

TEST SUMMARY

Referenced Standard(s):		FCC CFR Title 47 Part 15 Subpart C				
Appendix	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
A	Field Strength of Intentional Radiators & Restricted Band Emissions	ANSI C63.4-2003	15.249(a)(d)	Jan 8	Jan 8	Pass
B	Radiated Spurious Emissions	ANSI C63.4-2003	15.205,15.209	Jan 10	Jan 10	Pass
C	Radiated Spurious Emissions – Band Edge	ANSI C63.4-2003	15.249(d),15.209	Jan 10	Jan 10	Pass
D	Antenna Requirements	n/a	15.203	n/a	n/a	Pass
Referenced Standard(s):		**Industry Canada RSS-210 Issue 8**				
Appendix	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
A	Field Strength of Intentional Radiators & Restricted Band Emissions	ANSI C63.4-2003	RSS-210 A8.2(a)	Jan 8	Jan 8	Pass
B	Radiated Spurious Emissions	ANSI C63.4-2003	RSS-210 A8.2(a)	Jan 10	Jan 10	Pass
C	Radiated Spurious Emissions – Band Edge	ANSI C63.4-2003	RSS-210 A8.2(a)	Jan 10	Jan 10	Pass
D	Antenna Requirements	n/a	15.203	n/a	n/a	Pass

REVISION LOG

Revision	Description	Implemented By	Issue Date
1.0 1.1 1.2 1.3	Initial Release Corrected test dates, pg.3. Added emission search range pg. 10. Replaced photo on pg. 18. Added loop ant. and Horn ant. Data to appendix B3,4&7. Added Loop ant. Set up photo pg.20.	Glen Westwell	4/17/2013 4/17/2013 6/17/2013 6/17/2013

SIGNATORIES

Prepared By	Glen Westwell	**Reviewed By**	Mike Meaker	**Date**
	Lab Manager		Engineering Technologist	6/17/2013

1.0 SCOPE

This report outlines the measurements made and results collected during electromagnetic emissions testing of Kinetics Tractivity Sensor. The measurement results were applied against the applicable FCC requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication's Commission Code of Federal Regulations Title 47 Part 15 Subpart C and Industry Canada Radio Standards Specification RSS-210 Issue 8 and RSS-Gen Issue 3.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4-2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CFR Title 47 Part 15C	Code of Federal Regulations Title 47: Telecommunication Part 15C: Intentional Radiators
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification RSS-210 Issue 8 - Low-Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment RSS-Gen Issue 3 - General Requirements and Information for the Certification of Radiocommunication Equipment

3.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. The DUT is considered to have passed the requirements if the data collected during the described measurement procedure is no greater than the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

4.0 FACILITIES AND ACCREDITATIONS

The facilities used in collecting the test results outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Test Firm Registration Number 714830 and Industry Canada under Test Site File Number IC 3874A-1.

5.0 GENERAL INFORMATION

5.1 Applicant Information

Company Name	**KINETEKS CORPORATION.**
Address	#126-1020 Mainland St.
	Vancouver, British Columbia
	Canada, V6B2T4

5.2 DUT Description

Device (DUT)	2.4GHz Tractivity Sensor	
Device Model(s) Tested	Tractivity Sensor	
Test Sample Serial No.(s)		
Device Identifier(s)	**FCC ID:**	ZP2-TSEN001
	IC:	9751A-TSEN001
Power Source(s) Tested	3VDC Cell (CR2032)	
Antenna Type(s) Tested	Integral	

5.3 Mode(s) of Operation Tested

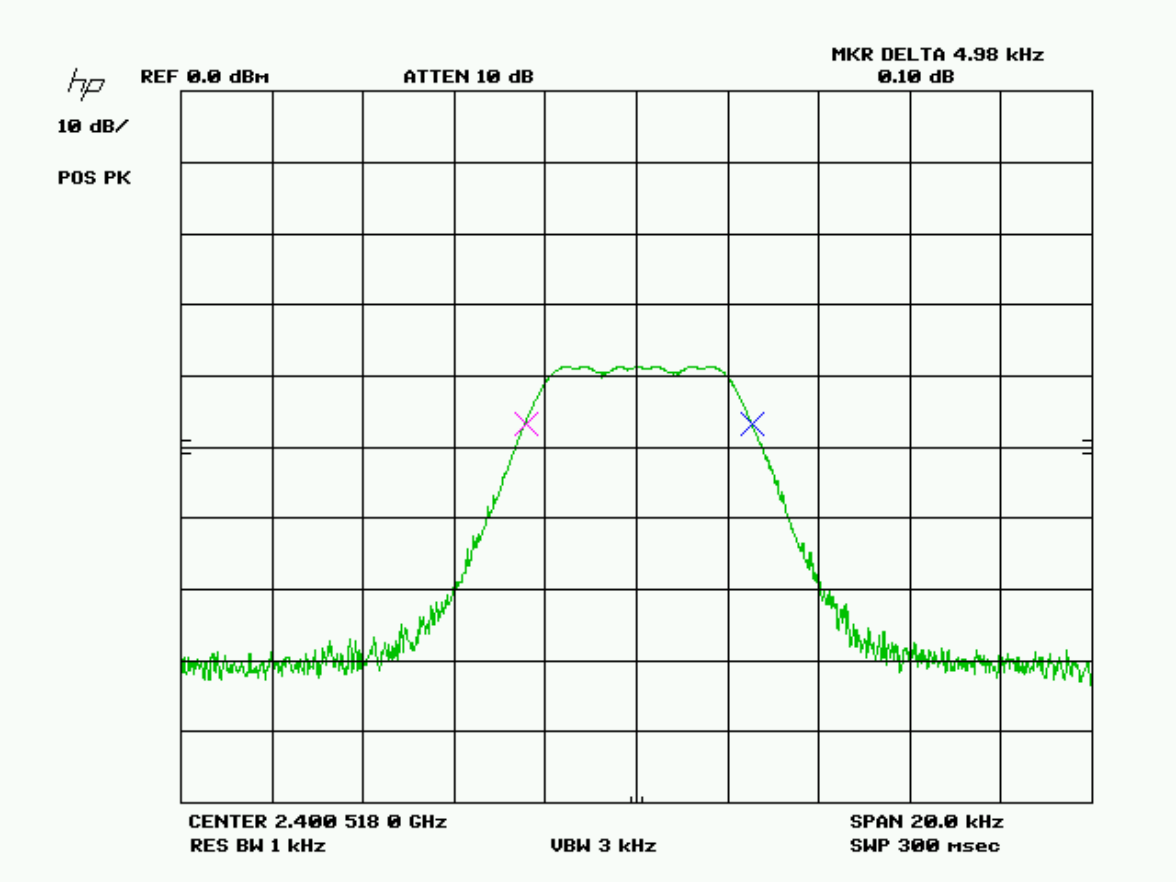
Transmit Frequency Range	2400.5 MHz
Transmitter Test Frequency(s)	2400.5 MHz
Transmitter Test Mode(s)	Continuous.
Modulation Type(s)	2-FSK/GFSK

5.4 Modification(s)

The EUT was configured for continuous transmit (worst case).

99% Occupied Bandwidth = 4.98kHz

Tractivity Sensor



Appendix A Field Strength of Intentional Radiator and Restricted Band Emissions

A.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §15.249; RSS-210
Procedure Reference	ANSI C63.4:2003

A.2 ENVIRONMENTAL CONDITIONS

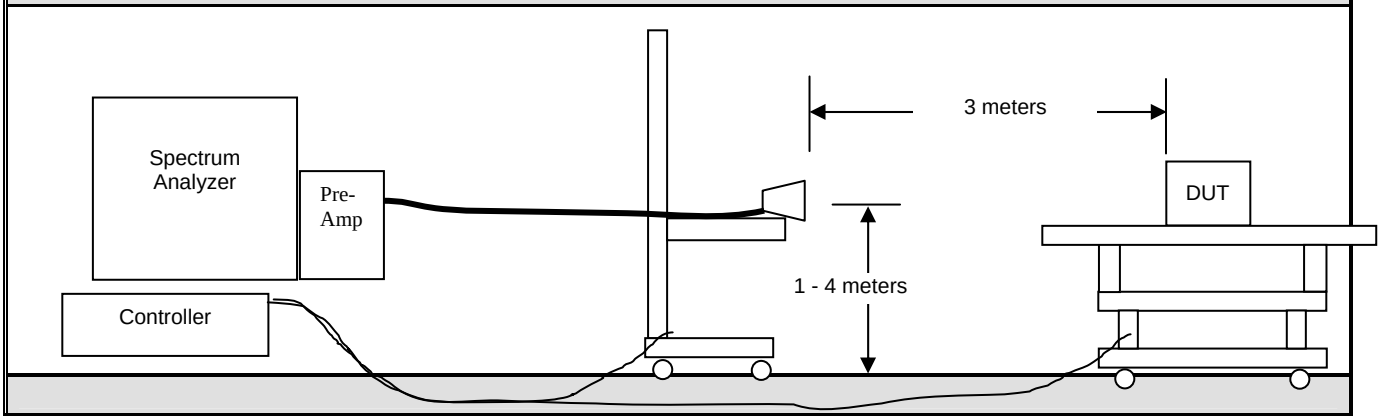
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

A.3 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	09 May14
00049	HP	85650A	Quasi-peak Adapter	10 May14
00047	HP	85685A	RF Preselector	09 May14
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00030	HP	83017A	Microwave system amplifier	n/a
00050	Chase	CBL-6111A	Bilog Antenna	03 May14
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 14

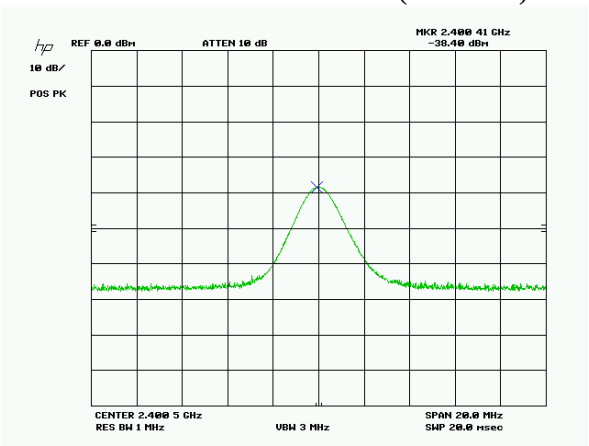
A.4 SETUP DRAWING

Figure E.6-1 - Setup Drawing – Radiated TX Spurious Emissions (> 1 GHz)

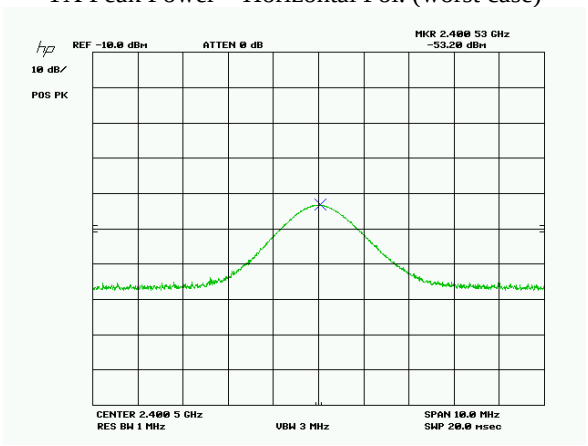


15.249(a) Field Strength of Fundamental – Peak Detector Tractivity Sensor Low Power Transmitter								
Frequency (MHz)	Antenna Pol.	Emission Level (dBuV/m) @1m	Antenna Factor (dB)	Cable Loss	Distance Correction	Emission Level (dBuV/m@3m)	Limit (dBuV/m@3m)	Margin
2400.5	V	68.6	28.4	4.5	-9.54	91.96	94.0	-2.04
2400.5	H	53.8	28.4	4.5	-9.54	77.16	94.0	-16.84
15.205 Restricted Band Emissions (worst Case)								
2390.0	V	24.5	28.4	4.5	-9.54	47.86	54.0	-6.14
2483.5	V	24.1	28.4	4.5	-9.54	47.46	54.0	-6.54
Data presented using a Pk detector results compared to average limits. Therefore satisfying the requirements of 15.249(e). Device characterization was performed on 3 orthogonal axis to determine worst case orientation. The device was tested using new batteries throughout all testing.								

TX Peak Power – Vertical Pol. (worst case)

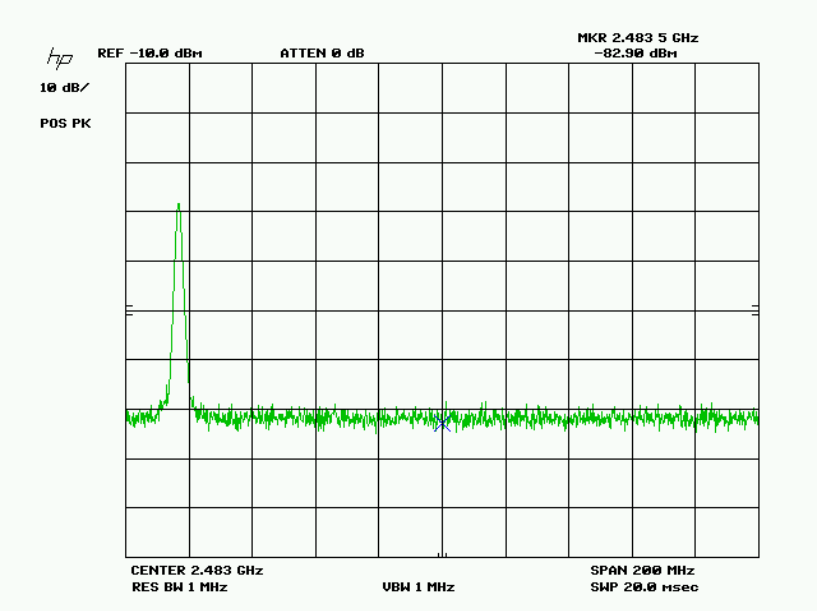


TX Peak Power – Horizontal Pol. (worst case)



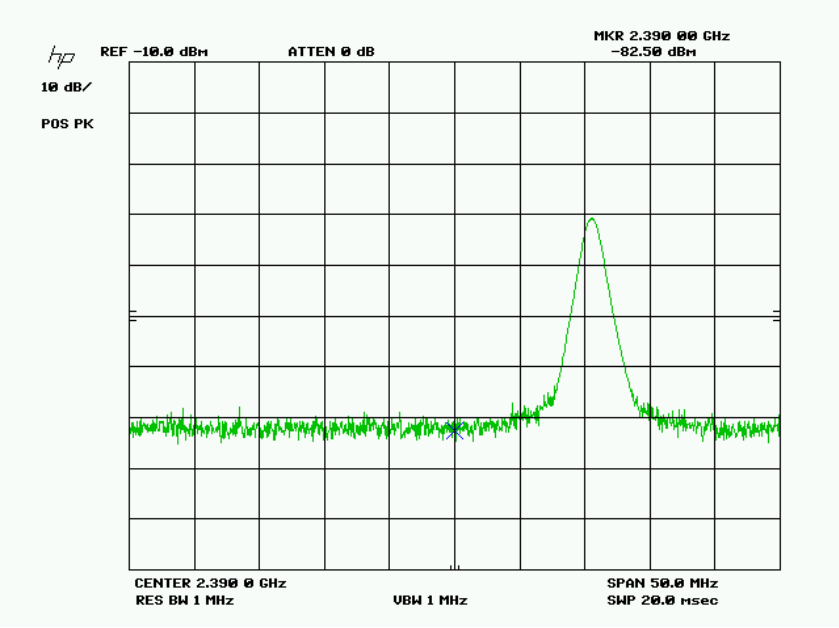
Restricted Band

Peak emission = 24.1dBuV @ 1m



Restricted Band

Peak emission = 24.5dBuV @ 1m



Appendix B Radiated Spurious Emissions

B.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §15.205; §15.209: §15.249, RSS-210, IECS-003
Procedure Reference	ANSI C63.4:2003

B.2 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

B.3 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	09 May14
00049	HP	85650A	Quasi-peak Adapter	10 May14
00047	HP	85685A	RF Preselector	09 May14
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00030	HP	83017A	Microwave system amplifier	n/a
00050	Chase	CBL-6111A	Bilog Antenna	03 May14
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 14
00085	EMCO	6502	Active Loop Antenna	03 June 14
00162	Waveline	899	Horn Antenna	n/a

B.4 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements, the measurement equipment was connected as shown in B.5-7. Various antenna types may be required to cover the applicable frequency range tested. The ranges in which each antenna was used are shown below.

Frequency Range	RX Antenna	TX Antenna
9kHz – 30Mhz	Active Loop	N/a
30 MHz - 1GHz	Bilog	N/a
1 GHz - 18 GHz	ETS 3115 Horn	N/a
18-26.5 GHz	Waveline Horn	N/a

MEASUREMENT EQUIPMENT SETTINGS

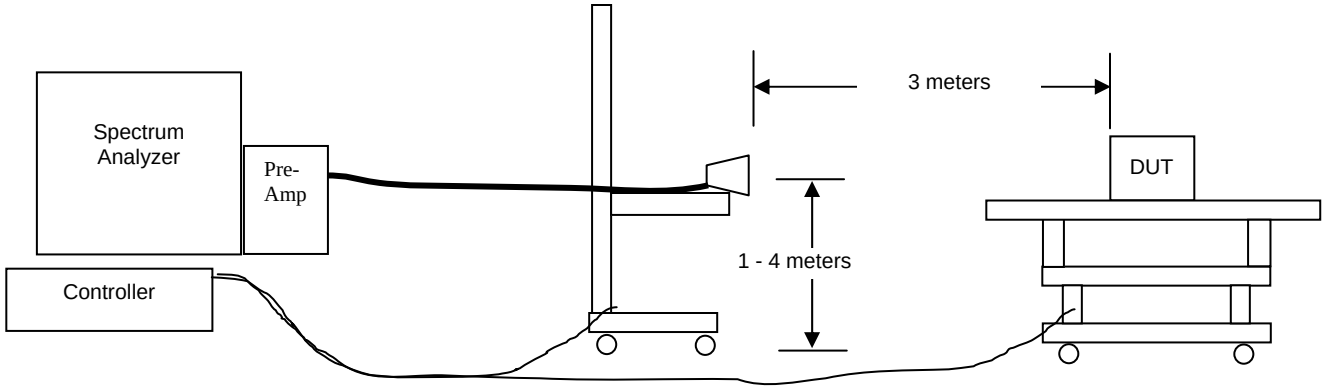
For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:

Measurement	RBW	VBW	Detector
	kHz	kHz	
< 1 GHz	100	300	Peak*
> 1 GHz	1000	3000	Peak*

- The spectrum was searched from the lowest frequency generated by the EUT to the 10th harmonic of the fundamental.
- All detected emissions are reported.
- No emissions below 1GHz were detected.
- The highest frequency emission detected was at 9.602 GHz.

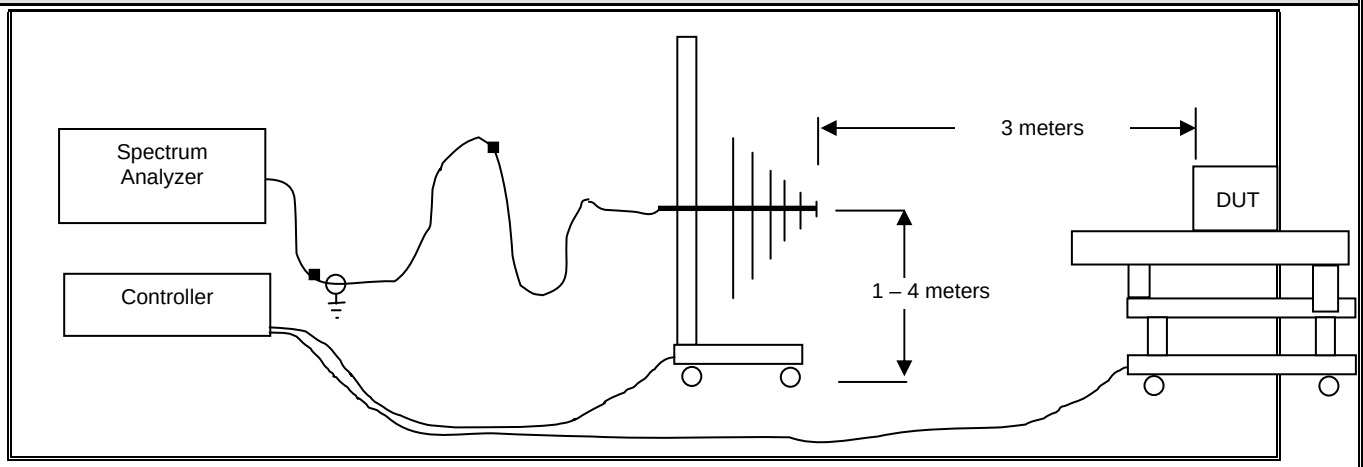
B.5 SETUP DRAWING

Figure E.6-1 - Setup Drawing – Radiated TX Spurious Emissions (> 1 GHz)



B.6 SETUP DRAWING

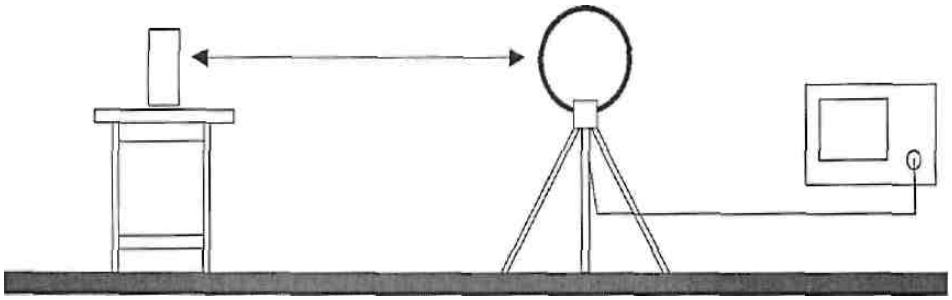
Figure E.7-1 - Setup Drawing – Radiated TX Spurious Emissions (< 1 GHz)



B.7 SETUP DRAWING

Figure E.6-1 - Setup Drawing – Radiated TX Spurious Emissions (< 30MHz)

Active Loop Ant.

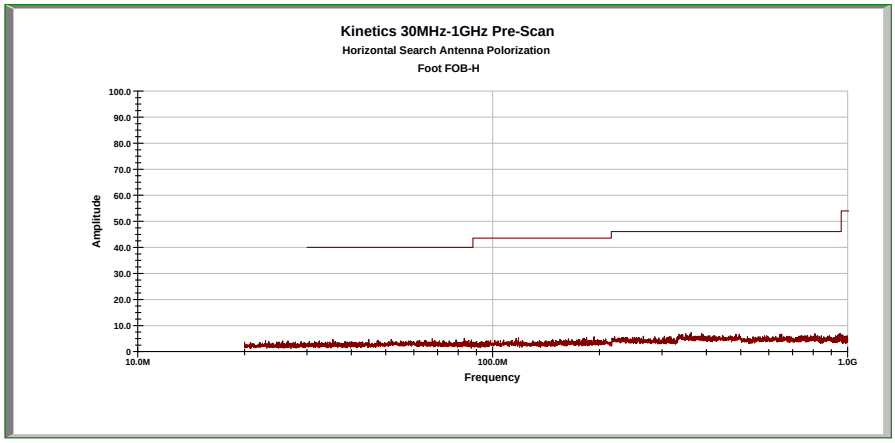


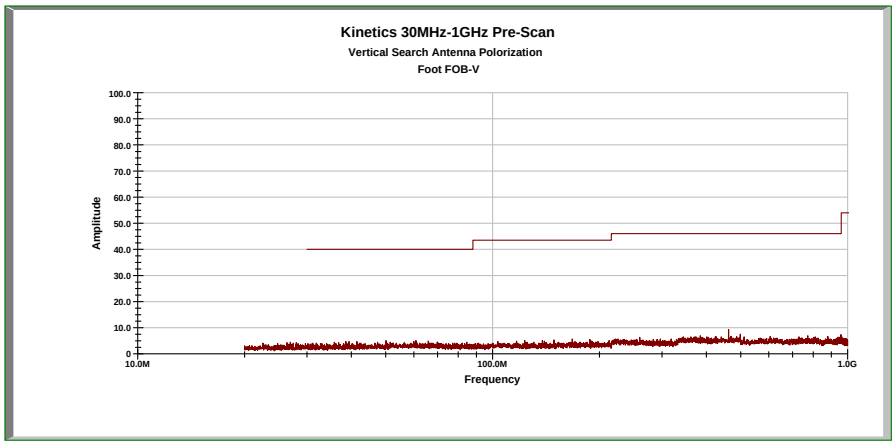
15.249(a)(d) Emissions Field Strength– Peak Detector
Tractivity Sensor Low Power Transmitter

Frequency (MHz)	Antenna Pol.	Emission Level (dBuV/m) @1m	Antenna Factor (dB)	Cable Loss/Amp Gain Corr.	Distance Correction	Emission Level (dBuV/m@3m)	Limit (avg) (dBuV/m@3m)	Margin
4801.0	V	48.1	32.9	-26.0	-9.54	45.46	54.0	-8.54
	H	44.6	32.9	-26.0	-9.54	41.96	54.0	-12.04
7201.5	V	47.2	35.9	-21.8	-9.54	51.76	54.0	-2.24
	H	42.7	35.9	-21.8	-9.54	47.26	54.0	-6.74
9602.0	V	39.0	37.8	-18.3	-9.54	48.96	54.0	-5.04
	H	37.8	37.7	-18.3	-9.54	50.56	54.0	-3.44

Notes:
ND = Not Detected.
Data presented using a Pk detector compared to average limits. Therefore satisfying the requirements of 15.249(e).
Device characterization was performed on 3 orthogonal axis to determine worst case orientation.
The device was tested using new batteries throughout all testing.
Worst case performance has been presented.
The Device was searched to the 10th harmonic of the fundamental. The highest detectable emission was 9.602 GHz.

15.209 Radiated Emissions





Appendix C — Radiated Spurious Emissions – Band Edge

C.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §15.205; §15.209: §15.249, RSS-210
Procedure Reference	ANSI C63.4:2003

C.2 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

C.3 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	09 May14
00049	HP	85650A	Quasi-peak Adapter	10 May14
00047	HP	85685A	RF Preselector	09 May14
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00030	HP	83017A	Microwave system amplifier	n/a
00050	Chase	CBL-6111A	Bilog Antenna	03 May14
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 14

C.4 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements, the measurement equipment was connected as shown in E.4. Various antenna types may be required to cover the applicable frequency range tested. The ranges in which each antenna was used are shown below.

Frequency Range	RX Antenna	TX Antenna
30 MHz - 1GHz	Bilog	N/a
1 GHz - 18 GHz	ETS 3115 Horn	N/a

MEASUREMENT EQUIPMENT SETTINGS

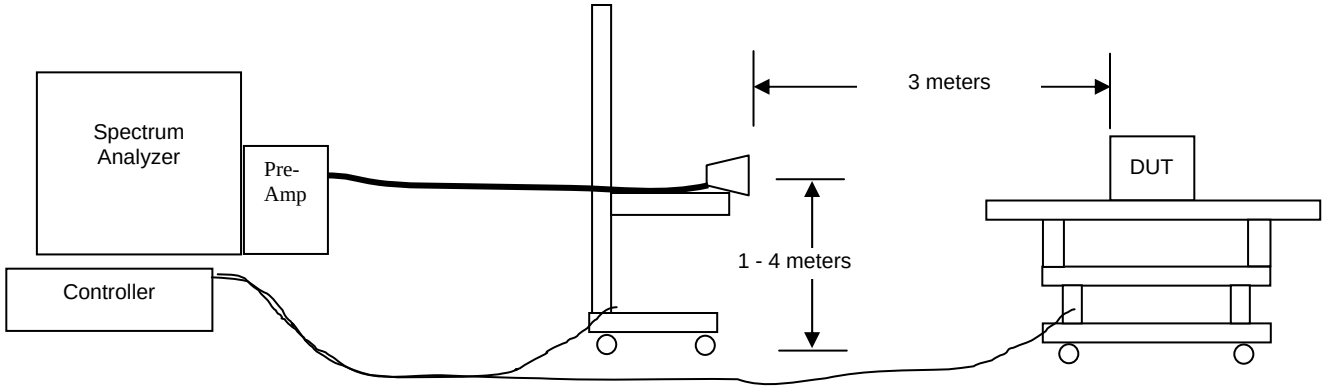
For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:

Measurement	RBW	VBW	Detector
	kHz	kHz	
< 1 GHz	100	300	Peak*
> 1 GHz	1000	3000	Peak*

* As a worst-case measurement, the QP limit was applied to measurements made with a peak detector.

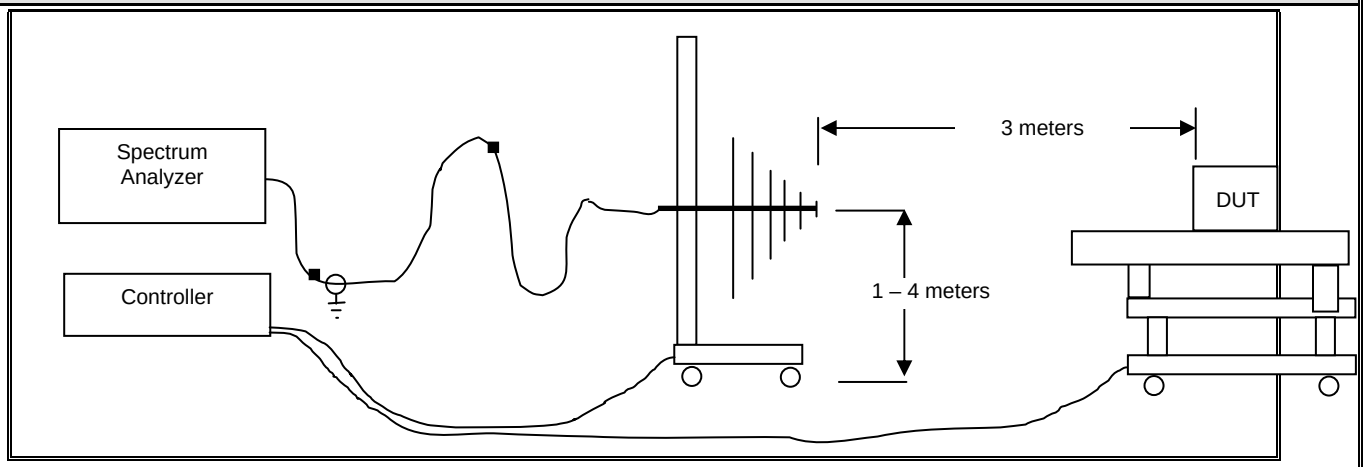
C.5 SETUP DRAWING

Figure E.6-1 - Setup Drawing – Radiated TX Spurious Emissions (> 1 GHz)



C.6 SETUP DRAWING

Figure E.7-1 - Setup Drawing – Radiated TX Spurious Emissions (< 1 GHz)



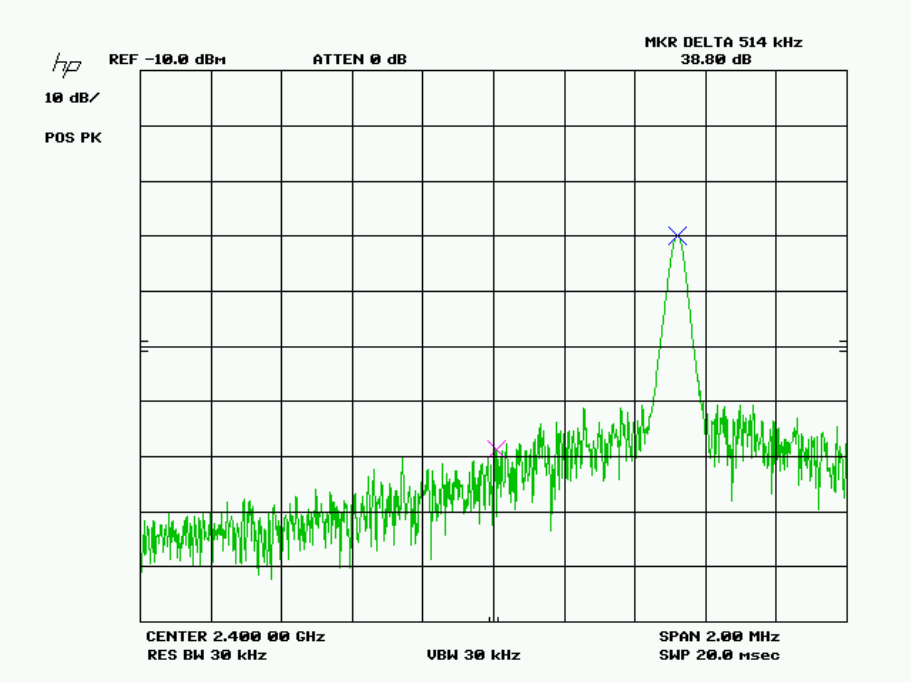
Band Edge Emissions- Marker Delta Method (Radio Service Rule Publication # 913591)

(worst case, vertical polarization.)

15.249(d) Field Strength of Unwanted Emissions – Peak Detector AP Low Power Transmitter								
Frequency (MHz)	Antenna Pol.	Emission Level (dBuV/m) @3m	Antenna Factor (dB)	Cable Loss	MDCF	Emission Level (dBuV/m@3m)	Limit (Avg) (dBuV/m@3m)	Margin
2400.0	V	54.7	28.4	4.5	-38.8	48.8	54.0	-5.2
Data presented using a Pk detector compared to average limits. Therefore satisfying the requirements of 15.249(e). Device characterization was performed on 3 orthogonal axis to determine worst case orientation. The device was tested using new batteries throughout all testing.								

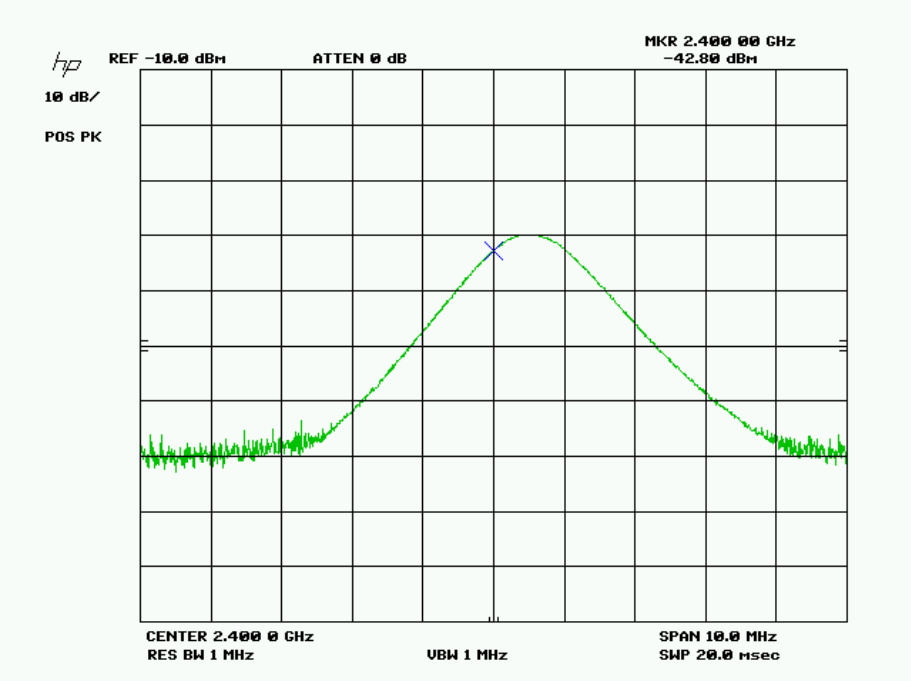
Note: This is a fixed single carrier device with the TX channel located beside the lower band edge at 2400.5MHz.

Marker Delta Correction Factor (MDCF) = -38.8dB



Band Edge Peak Emission Level (worst case, vertical polarization, peak detector)

Peak emission = 64.2dBuV @ 1m
Peak emission =54.7dBuV/m @ 3m (1m to 3m correction factor of -9.54 dB)



Appendix D - Antenna Requirement §15.203

§ 15.203 Antenna Requirement

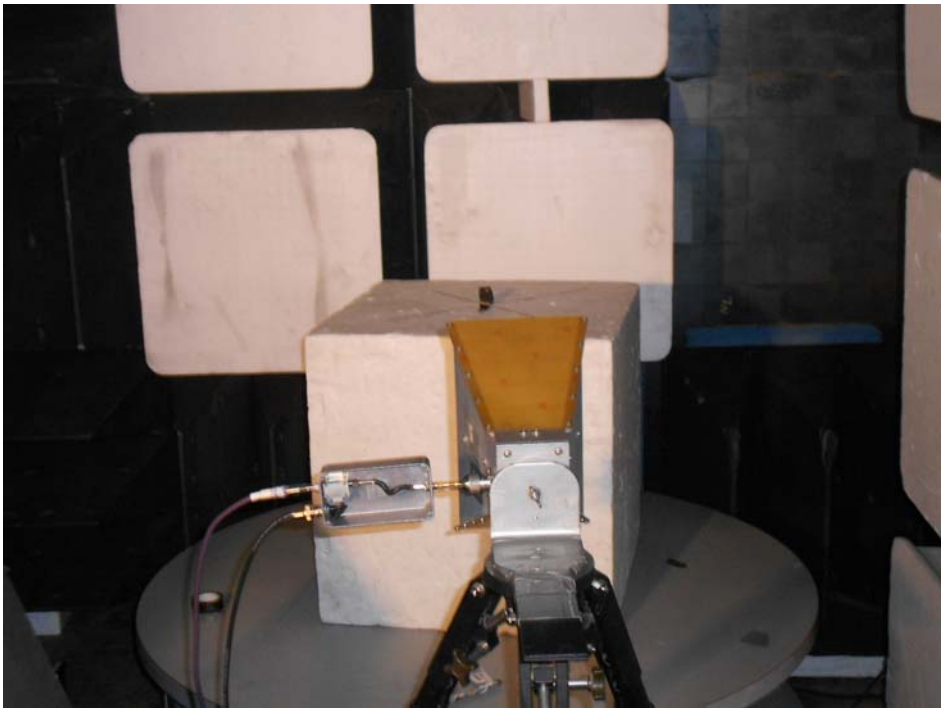
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

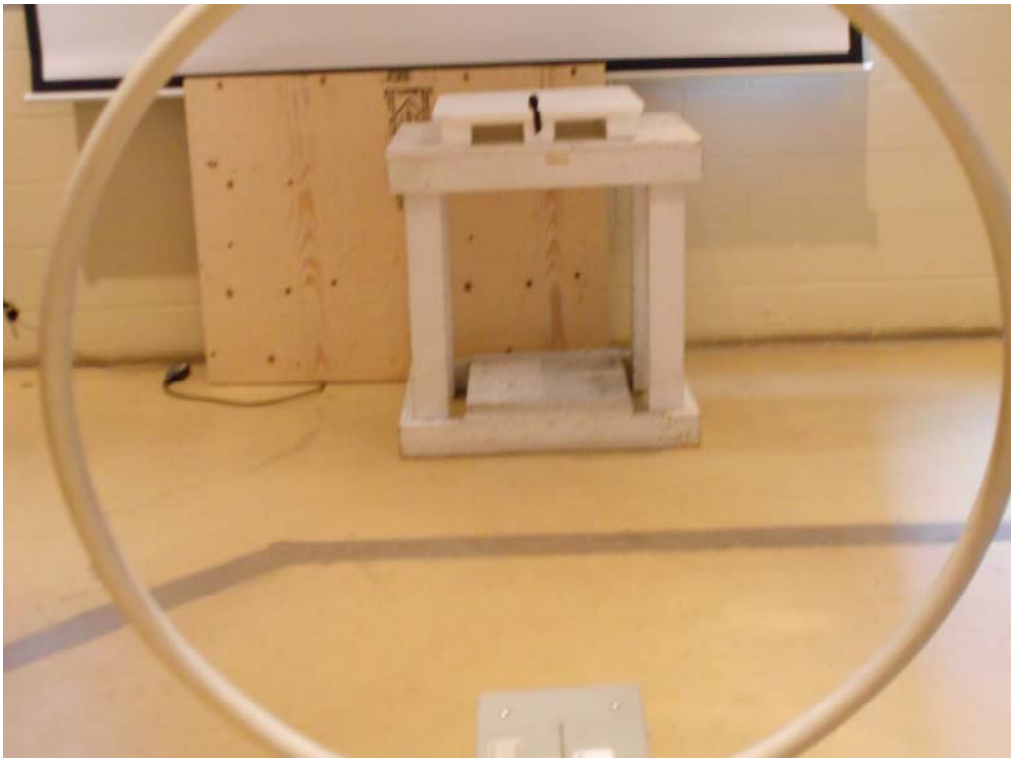
The DUT complies with the antenna requirements of 15.203 as follows:

Integral antenna is used.

Appendix E

Test Set Up Photo's





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