Test Report Serial Number:	**16121-R1.1**
Test Report Date:	**4 March 2016**

EMC Test Report

Applicant:

Bosspac Engineering and Technology, Inc
Bay 8, 1450 - 28 St. NE
Calgary, AB, T2A 7W6
Canada

FCC ID:	IC Registration Number
ZI8EA190	**9648A-EA190**

Product Model Number / HVIN	Product Name / PMN
EA000190	**WASP-P**

In Accordance With:

FCC 47 CFR Part 15 Subpart C, §15.249
Low Power Communication Device (DXX)

RSS-GEN, RSS-210 Issue 8
Low Power License-Exempt Radiocommunication Device

Approved By:

Ben Hewson, President
Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada

Test Lab Certificate: 2470.01 **IC Registration 3874A-1** **FCC Registration: 714830**

TABLE OF CONTENTS

1.0 REVISION LOG

Prepared By:	**Art Voss**
Reviewed By:	**Art Voss**

Issue Number	Description	By	Issue Date
1.0	Initial Release	Art Voss	19 February 2016
1.1	Corrections per TCB	Art Voss	4 March 2016

2.0 TEST RESULT SUMMARY

TEST SUMMARY					
Referenced Standard(s):		**FCC CFR Title 47 Part 15C, §15.249, RSS-GEN, RSS-210**			
Section	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Date**	**Result**
8	Occupied Bandwidth / Peak to Average Ratio	ANSI C63.4:2014	§15.249(a)(d) RSS-210-A8.2(a)	5 June 2015	Pass
9	Duty Cycle Correction	ANSI C63.4:2014	§15.249(a)(d) RSS-210-A8.2(a)	5 June 2015	Pass
10	Field Strength of Intentional Radiators, Band Edge & Restricted Band Emissions	ANSI C63.4:2014	§15.249(a)(d) RSS-210-A8.2(a)	5 June 2015	Pass
11	Radiated Spurious Emissions	ANSI C63.4:2014	§15.205, §15.209 RSS-210-A8.2(a)	5 June 2015	Pass
12	Frequency Stability	n/a	§15.249 RSS-236	8 June 2015	Pass
13	Antenna Requirements	n/a	§15.203 RSS-236	n/a	Pass

3.0 PASS/FAIL CRITERIA

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 measurement and test results obtained 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.

I attest to the accuracy of the data reported herein and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client and were not modified in any manner by Celltech Labs Inc. This test report has been completed in accordance with ISO/IEC 17025.

Art Voss, P.Eng.
Technical Manager
Celltech Labs Inc.

15 February 2016
Date

4.0 SCOPE

Scope
This report presents the measurement and test results obtained during electromagnetic emissions evaluation of the: **BossPac Engineering and Technology's Inc., WASP-P EA000190 Low Power Transmitter** The measurement results were applied against the applicable FCC and Industry Canada requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication's Commission Code of Federal Regulations and Industry Canada Radio Standards Specification cited in the Normative References below.

5.0 REFERENCES

Normative References	
ANSI / ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4:2014	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 15:	Radio Frequency Devices
Subpart C:	Intentional Radiators
Industry Canada Spectrum Management & Telecommunications Policy	
RSS-Gen Issue 3:	General Requirements and Information for the Certification of Radiocommunication Equipment
RSS-210 Issue 8:	Low-Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

6.0 FACILITIES AND ACCREDITATIONS

Facility and Accreditation
The facilities used to evaluate this device 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.

7.0 GENERAL INFORMATION

Client Information	
Applicant Name	BossPac Engineering and Technology, Inc.
Applicant Address	Bay 8, 1450 - 28 St NE
	Calgary, AB, T2A 7W6
	Canada
DUT Information	
Device Identifier(s):	**FCC ID:** ZI8EA190
	IC: 9648A-EA190
Device Type:	Low Power Communication Device (DXX)
	Low Power License-Exempt Radiocommunication Device
Type of Equipment:	Low Power ISM Transmitter
Device Model(s) / HVIN:	EA000190
Device Marketing Name / PMN:	WASP-P
Firmware Version ID Number / FVIN:	n/a
Host Marketing Name / HMN:	n/a
Test Sample Serial No.:	T/A Sample - Identical Prototype
Transmit Frequency Range:	2405-2480 MHz
Number of Channels:	n/a
Manuf. Max. Rated Output Power:	5dBm (3.2mW)
Manuf. Max. Rated BW/Data Rate:	350kHz, 250kbps
Antenna Gain:	Internal Folded F, 2dBi Max
Modulation:	GFSK
Mode:	Periodic Burst
Duty Cycle:	10% Max, 5ms Maximum Duration
Emission Designator:	3M30F1D Measured
DUT Power Source:	3.6VDC Primary Lithium non-Rechargeable Battery
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

8.0 OCCUPIED BANDWIDTH / PEAK TO AVERAGE RATIO

Test Conditions	
Normative Reference	FCC 47 CFR §15.249, RSS-210
Procedure Reference	ANSI C63.4

Limits	
FCC §15.249(e) RSS-210	As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

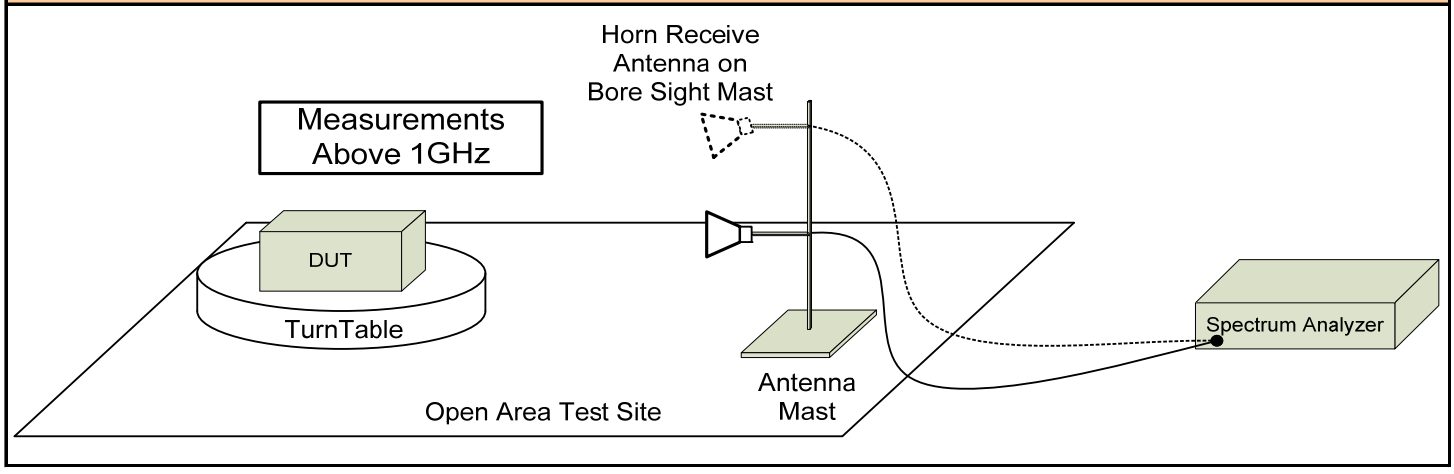
Environmental Conditions (Typical)	
Temperature	25°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List

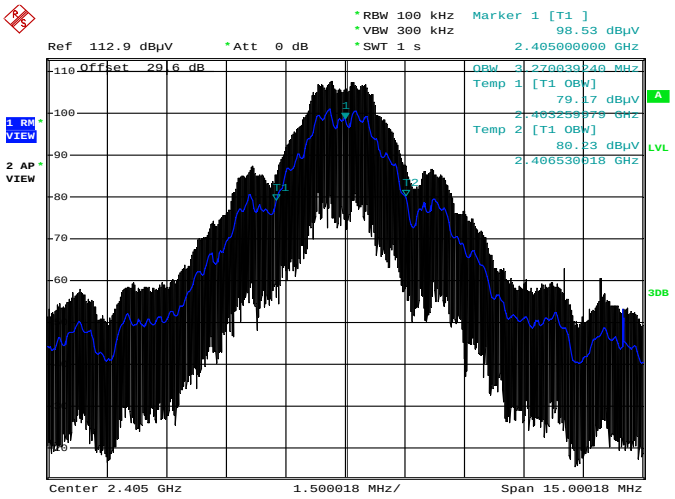
Asset Number	Manufacturer	Model Number	Description	Last Calibrated	Calibration Interval	Calibration Due
00072	EMCO	2075	Mini-mast	n/a	n/a	n/a
00073	EMCO	2080	Turn Table	n/a	n/a	n/a
00071	EMCO	2090	Multi-Device Controller	n/a	n/a	n/a
00265	Miteq	JS32-00104000-58-5P	Microwave L/N Amplifier	COU	n/a	COU
00241	R&S	FSP40	Spectrum Analyzer	23 Apr 2015	Biennial	23 Apr 2017
00275	Coaxis	LMR400	25m Cable	COU	n/a	COU
00276	Coaxis	LMR400	4m Cable	COU	n/a	COU
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 2012	Triennial	06 Dec 2015

CNR: Calibration Not Required
COU: Calibrate On Use

Set-Up Drawing - DUT Measurement



Occupied Bandwidth / Peak to Average Ratio



Date: 5.JUN.2015 18:15:31

Occupied Bandwidth47 CFR §2.1049
47 CFR §2.1049

Frequency (MHz)	Antenna Polarization	OBW (MHz)
2405	V	3.27
2405	H	3.27
2440	V	3.24
2440	H	3.27
2480	V	3.15
2480	H	3.27

Occupied bandwidth measured for both horizontal and vertical polarity at F = LO/MID/HI
Signal maximized prior to measurement
Measurement performed using Resolution bandwidth (RBW) = 1% of emissison bandwidth (EBW)

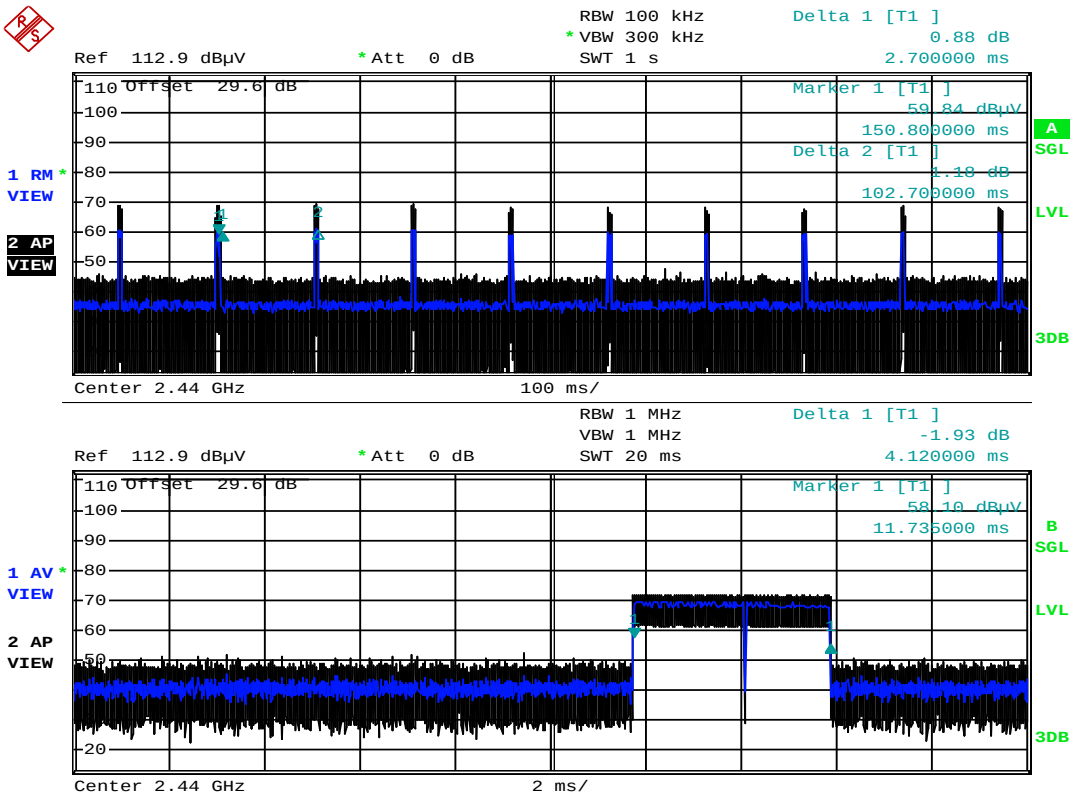
Peak to Average Ratio (PAR)
47 CFR §15.249(e)

Frequency (MHz)	Antenna Polarization	Peak dBuV/m @1m	Average dBuV @1m	Pk to Avg Ratio (dB)	Limit (dB)	Margin (dB)
2405	V	98.53	106.2	7.67	20	13.2

Channel Frequency:	2405.000
Measured Occupied Bandwidth:	3.27MHz
Peak to Average Ration:	7.67dB
Limit (§15.249(e)):	20dB
Result:	**Complies**

9.0 DUTY CYCLE CORRECTION

Duty Cycle Correction



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Date: 5.JUN.2015 18:58:23

Duty Cycle = 4.12ms/100ms, Correction = 20Log(.0412) = -28dB:	-28dB
Manufacturer's Maximum Rated Duty Cycle = 5ms (-26dB):	-26dB
Maximum Permissible:	-20dB

10.0 FIELD STRENGTH OF RADIATOR, BAND EDGE AND RESTRICTED BAND EMISSIONS

Test Conditions	
Normative Reference	FCC 47 CFR §15.249, RSS-210
Procedure Reference	ANSI C63.4

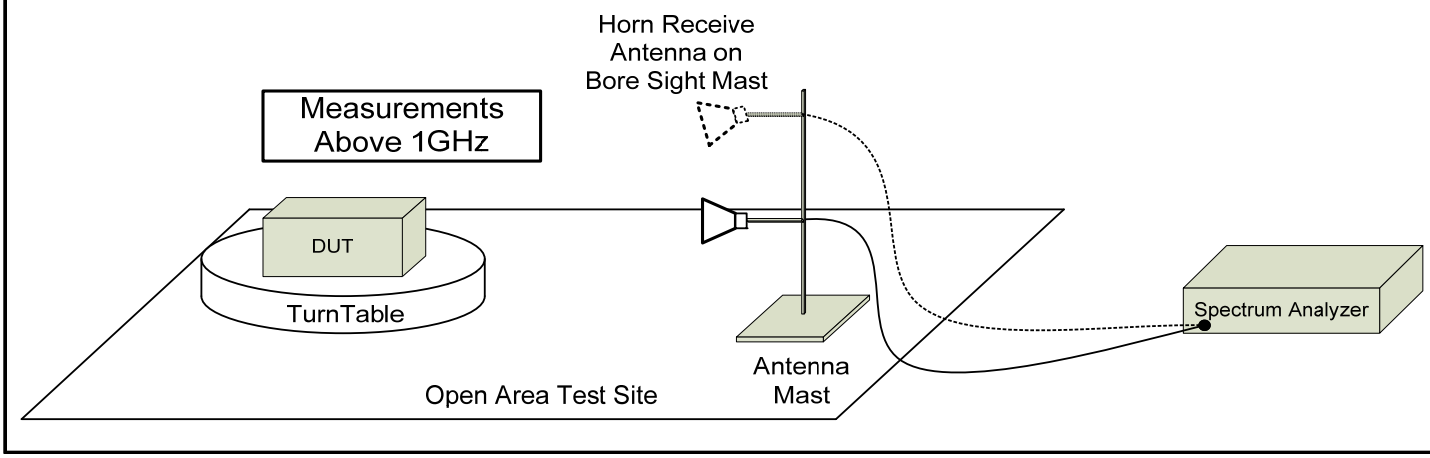
Environmental Conditions (Typical)	
Temperature	25°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List

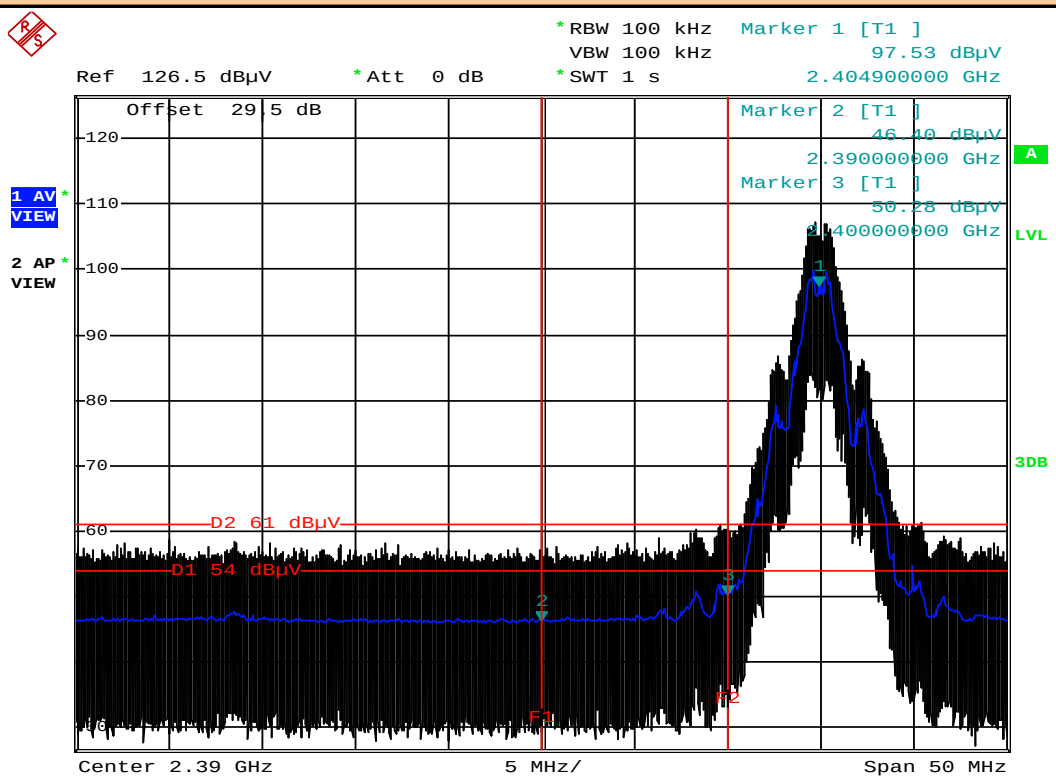
Asset Number	Manufacturer	Model Number	Description	Last Calibrated	Calibration Interval	Calibration Due
00072	EMCO	2075	Mini-mast	n/a	n/a	n/a
00073	EMCO	2080	Turn Table	n/a	n/a	n/a
00071	EMCO	2090	Multi-Device Controller	n/a	n/a	n/a
00265	Miteq	JS32-00104000-58-5P	Microwave L/N Amplifier	COU	n/a	COU
00241	R&S	FSP40	Spectrum Analyzer	23 Apr 2015	Biennial	23 Apr 2017
00275	Coaxis	LMR400	25m Cable	COU	n/a	COU
00276	Coaxis	LMR400	4m Cable	COU	n/a	COU
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 2012	Triennial	06 Dec 2015

CNR: Calibration Not Required
COU: Calibrate On Use

Set-Up Drawing - DUT Measurement Above 1GHz



Band Edge / Adjacent Restricted Band Plots



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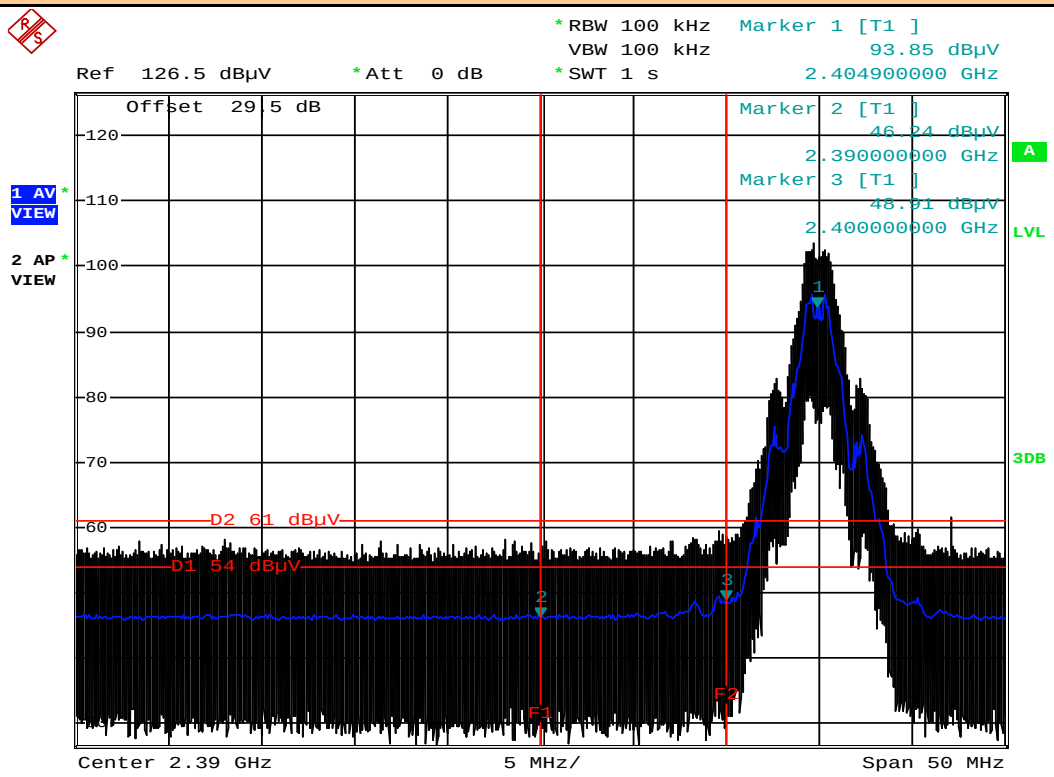
Band Edge / Adjacent Restriced Band 2390MHz (Low Channel) - Vertical

Center Frequency 2390MHz Result:	Complies

Band Edge / Adjacent Restricted Band Plots



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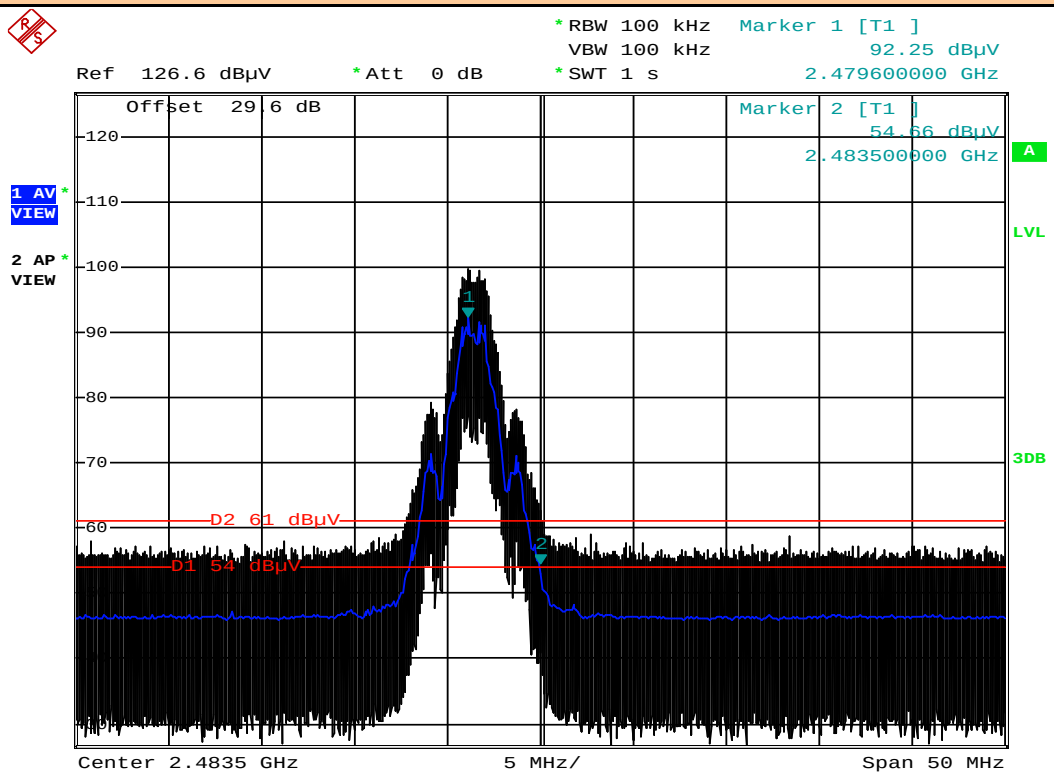
Band Edge / Adjacent Restriced Band 2390MHz (Low Channel) - Horizontal

Center Frequency 2390MHz Result:	Complies

Band Edge / Adjacent Restricted Band Plots

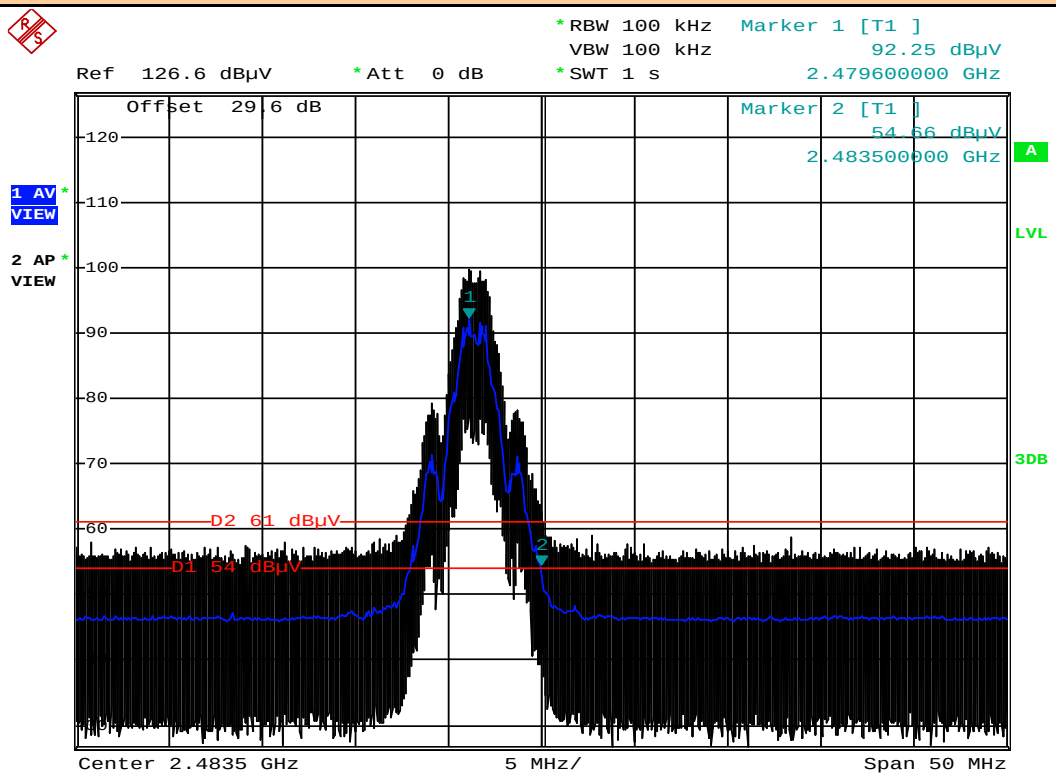


Date: 5.JUN.2015 14:36:40

Band Edge / Adjacent Restriced Band 2483.5MHz (High Channel) - Vertical

Center Frequency 2483.5MHz Result:	Complies

Band Edge / Adjacent Restricted Band Plots



Date: 5.JUN.2015 14:36:40

Band Edge / Adjacent Restriced Band 2483.5MHz (High Channel) - Horizontal

Center Frequency 2483.5MHz Result:	Complies

15.249(a) Field Strength of Fundamental – Peak Detector

Freq (MHz)	Ant Pol	Emission @3m [E_{Meas}] (dBuV/m)	Antenna Factor [AF] (dB)	Cable Loss [L_{Cable}] (dB)	BW Corr [C_{BW}] (dB)	Dist Corr [C_{Dist}] (dB)	Duty Cycle Corr [C_{DC}] (dB)	Corr Meas @3m [E_{Corr}] (dBuV/m)	Limit @3m [E_{Lim}] (dBuV/m)	Margin (dB)
2405	V	70.8	28.4	0.6	0	0	20.0	79.80	94	14.20
2405	H	67.2	28.4	0.6	0	0	20.0	76.20	94	17.80
2440	V	69.7	28.4	0.6	0	0	20.0	78.70	94	15.30
2440	H	63.5	28.4	0.6	0	0	20.0	72.50	94	21.50
2480	V	71.7	28.4	0.6	0	0	20.0	80.70	94	13.30
2480	H	66.1	28.4	0.6	0	0	20.0	75.10	94	18.90

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$

Margin = $E_{Lim} - E_{Corr}$

Band Edge -15.249(d) 100k/1M

2400	V	10.1	28.3	0.6	10	0	20.0	29.00	54	25.00
2400	H	11.5	28.3	0.6	10	0	20.0	30.40	54	23.60
2483.5	V	13.3	28.4	0.6	10	0	20.0	32.30	54	21.70
2483.5	H	21.5	28.4	0.6	10	0	20.0	40.50	54	13.50

Worst-case emission shown

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$

Margin = $E_{Lim} - E_{Corr}$

15.205 Restricted Band Emissions 100k/1M

2390	V	7.3	28.3	0.6	10	0	20.0	26.2	54	27.80
2390	H	7.4	28.3	0.6	10	0	20.0	26.3	54	27.70
2483.5	V	13.1	28.4	0.6	10	0	20.0	32.1	54	21.90
2483.5	H	21.4	28.4	0.6	10	0	20.0	40.4	54	13.60

Full (restricted) band emissions examined, worst-case emissions shown

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$

Margin = $E_{Lim} - E_{Corr}$

Notes:

Data for fundamental and bandedge presented using a peak detector compared to average limits

Device characterization was performed on all axis to determine worst case orientation

The device was tested using a new DC battery throughout all testing

11.0 RADIATED SPURIOUS EMISSIONS

Test Conditions	
Normative Reference	FCC 47 CFR §15.205, §15.209, §15.249, ICES-203, RSS-210
Procedure Reference	ANSI C63.4

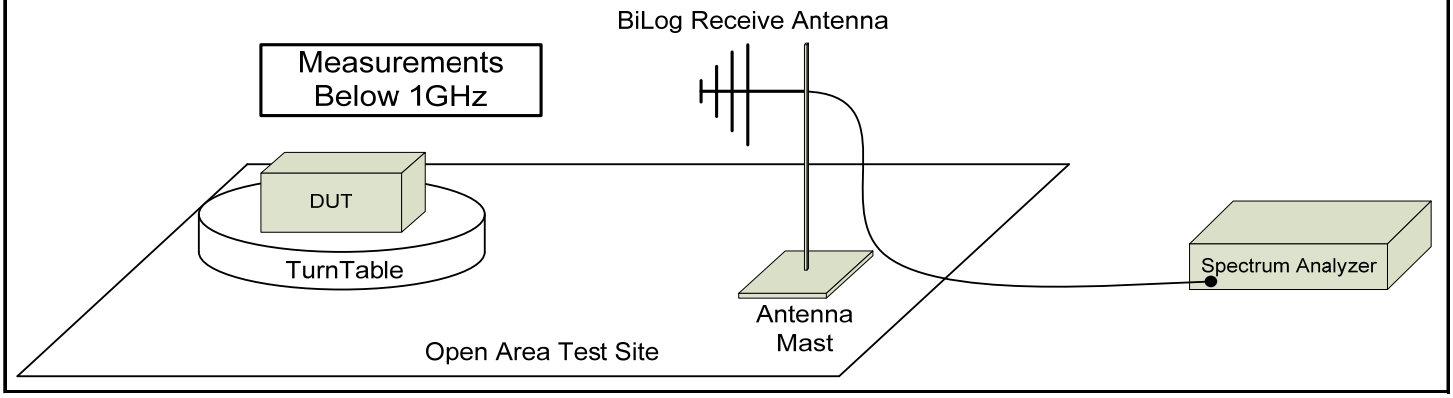
Environmental Conditions (Typical)	
Temperature	25°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List

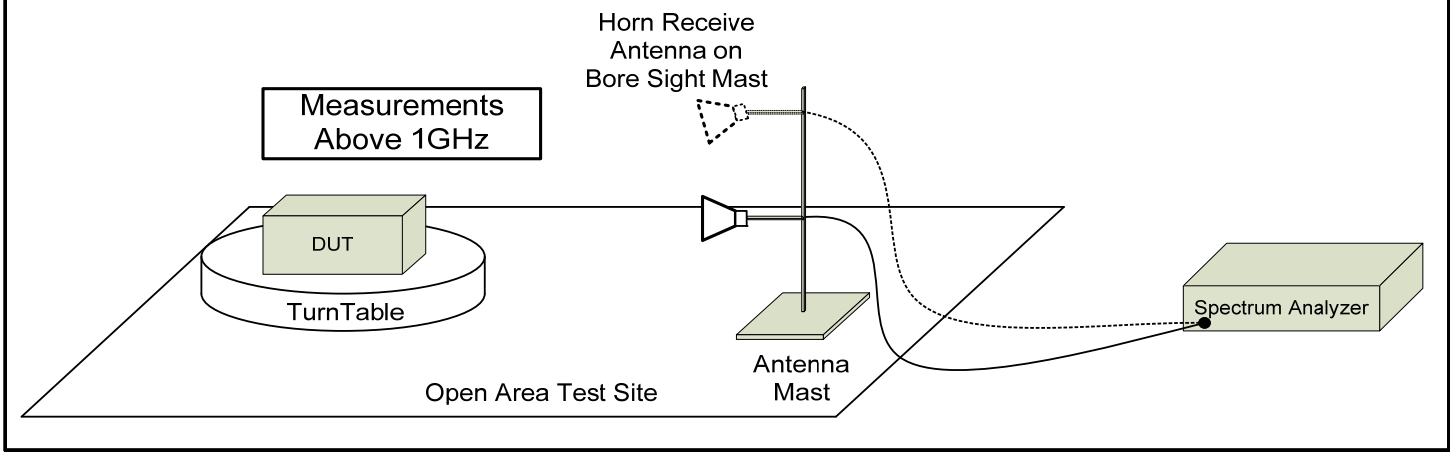
Asset Number	Manufacturer	Model Number	Description	Last Calibrated	Calibration Interval	Calibration Due
00051	HP	8566B	Spectrum Analyzer	30 Apr 2014	Biennial	30 Apr 2016
00049	HP	85650A	Quasi-peak Adapter	30 Apr 2014	Biennial	30 Apr 2016
00047	HP	85685A	RF Preselector	30 Apr 2014	Biennial	30 Apr 2016
00072	EMCO	2075	Mini-mast	n/a	n/a	n/a
00073	EMCO	2080	Turn Table	n/a	n/a	n/a
00071	EMCO	2090	Multi-Device Controller	n/a	n/a	n/a
00265	Miteq	JS32-00104000-58-5P	Microwave L/N Amplifier	COU	n/a	COU
00241	R&S	FSU40	Spectrum Analyzer	23 Apr 2015	Biennial	23 Apr 2017
00050	Chase	CBL-6111A	Bilog Antenna	25 Apr 2014	Biennial	25 Apr 2016
00275	Coaxis	LMR400	25m Cable	COU	n/a	COU
00276	Coaxis	LMR400	4m Cable	COU	n/a	COU
00278	TILE	34G3	TILE Test Software	NCR	n/a	NCR
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 2012	Triennial	06 Dec 2015

CNR: Calibration Not Required
COU: Calibrate On Use

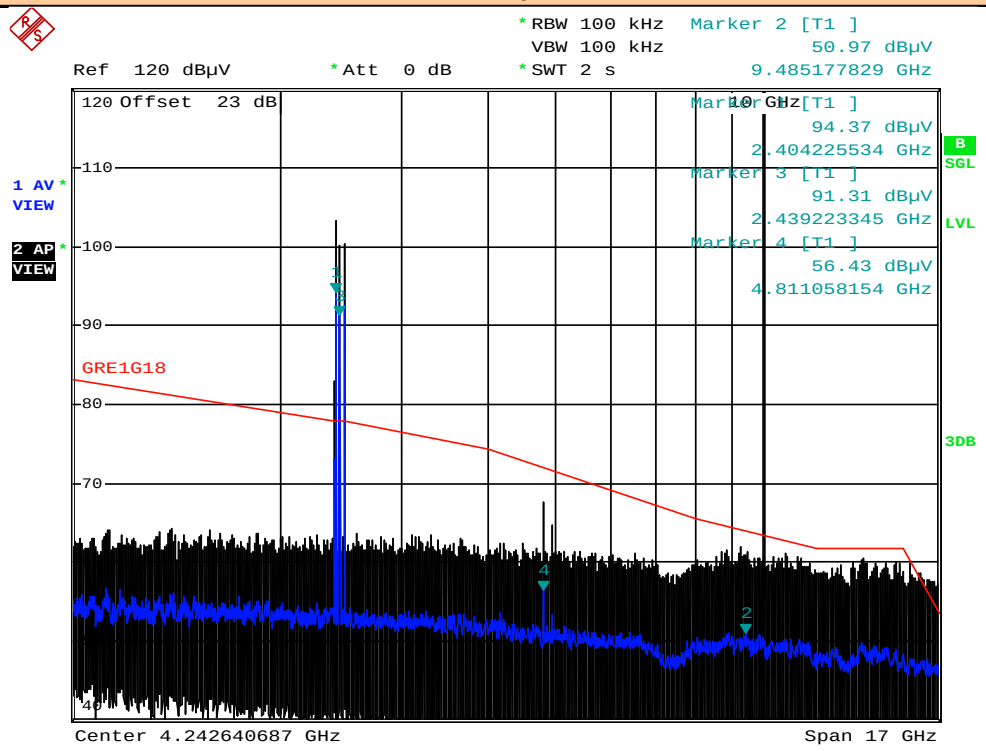
Set-Up Drawing - DUT Measurement Below 1GHz



Set-Up Drawing - DUT Measurement Above 1GHz



Radiated Spurious Emissions



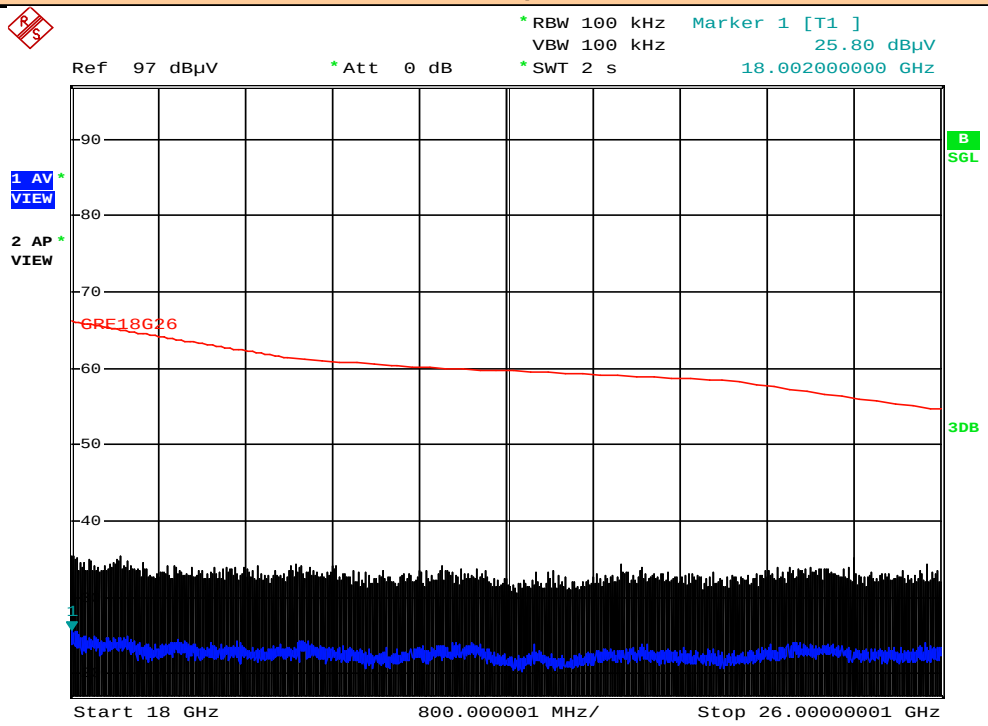
Date: 5.JUN.2015 21:45:52

Plot for Reference Only

Radiated Spurious Emissions - 1GHz - 18GHz - Vertical
Limit line (as opposed to measurement data) has been corrected
RBW= 100K has been used to reduce noise floor for examination

Result:	**Complies**

Radiated Spurious Emissions



Date: 5.JUN.2015 22:02:17

Plot for Reference Only

Radiated Spurious Emissions - 18GHz - 26GHz - Horizontal
Limit line (as opposed to measurement data) has been corrected
RBW= 100K has been used to reduce noise floor for examination

Result:	Complies

Harmonics

Freq (MHz)	Ant Pol	@1m [E_{Meas}] (dBuV/m)	Antenna Factor [AF] (dB)	Cable Loss/ Gain [L_{Cable}] (dB)	BW Corr [C_{BW}] (dB)	Dist Corr [C_{Dist}] (dB)	Duty Cycle Corr [C_{DC}] (dB)	Corr Meas @3m [E_{Corr}] (dBuV/m)	Limit @3m [E_{Lim}] (dBuV/m)	Margin (dB)
4810	V	20.5	33.3	0.8	0	-9.54	20.0	25.06	54	28.94
4810	H	25.6	33.1	0.8	0	-9.54	20.0	29.96	54	24.04
4880	V	19.3	33.3	0.8	0	-9.54	20.0	23.86	54	30.14
4880	H	24.2	33.2	0.8	0	-9.54	20.0	28.66	54	25.34
4960	V	19.1	33.4	0.8	0	-9.54	20.0	23.76	54	30.24
4960	H	25.4	33.3	0.8	0	-9.54	20.0	29.96	54	24.04
7215	V	17.8	36.4	1.4	0	-9.54	20.0	26.06	54	27.94
7215	H	18.2	36.6	1.4	0	-9.54	20.0	26.66	54	27.34
7320	V	17.5	36.5	1.4	0	-9.54	20.0	25.86	54	28.14
7320	H	17.5	36.6	1.4	0	-9.54	20.0	25.96	54	28.04
7440	V	17.7	36.5	1.4	0	-9.54	20.0	26.06	54	27.94
7440	H	17.8	36.6	1.4	0	-9.54	20.0	26.26	54	27.74

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} - C_{DC}$
$Margin = E_{Lim} - E_{Corr}$

Duty cycle correction has been included
No other harmonics detected above noise floor to 10th harmonic

Spurious Emissions 30MHz - 1000MHz

30.346	V	11.1	19.7	0.26	0	0	0.0	31.06	40	8.94
340.867	V	9.5	14.8	0.96	0	0	0.0	25.26	46	20.74
525.461	H	11.6	18.6	1.25	0	0	0.0	31.45	46	14.55
959.328	H	10.2	24.7	1.78	0	0	0.0	36.68	46	9.32

No Emission Found. Noise Floor Measurement

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$
$Margin = E_{Lim} - E_{Corr}$

Spurious Emissions 1.0GHz - 18GHz 100k/1M

4810	V	56.4	33.1	-50.9	10	0	0	48.6	54	5.37

Duty cycle correction has been included
No Emissions Found Above Noise Floor

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$
$Margin = E_{Lim} - E_{Corr}$

Spurious Emissions 18.0GHz - 26GHz 100k/1M

18.02	H	26.1	37.2	-49.2	10	0	0	24.1	54	29.90

No Emission Found. Noise Floor Measurement

$E_{Corr} = E_{Meas} + AF + L_{Cable} + C_{BW} + C_{Dist} + C_{DC}$
$Margin = E_{Lim} - E_{Corr}$

Notes:
Worst-case emissions shown
Device characterization was performed on all axis to determine worst case orientation
Device was tested using new batteries throughout testing
The device was searched to the 10th harmonic of the fundamental (25 GHz)
Data presented may use a peak detector and compared to average limit
All detected emissions have been reported

12.0 FREQUENCY STABILITY

Test Conditions	
Normative Reference	FCC 47 CFR §15.249, RSS-210

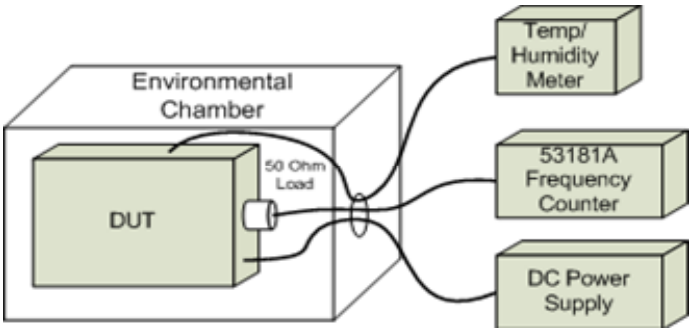
Limits	
FCC §15.249	The channel center must be maintained within a frequency tolerance of +/- 0.001%.

Test Conditions	
Temperature	-30°C to +50°C at 10°C Increments
Humidity	<100% Non Condensating
Voltage (VDC)	Primary Lithium

Equipment List

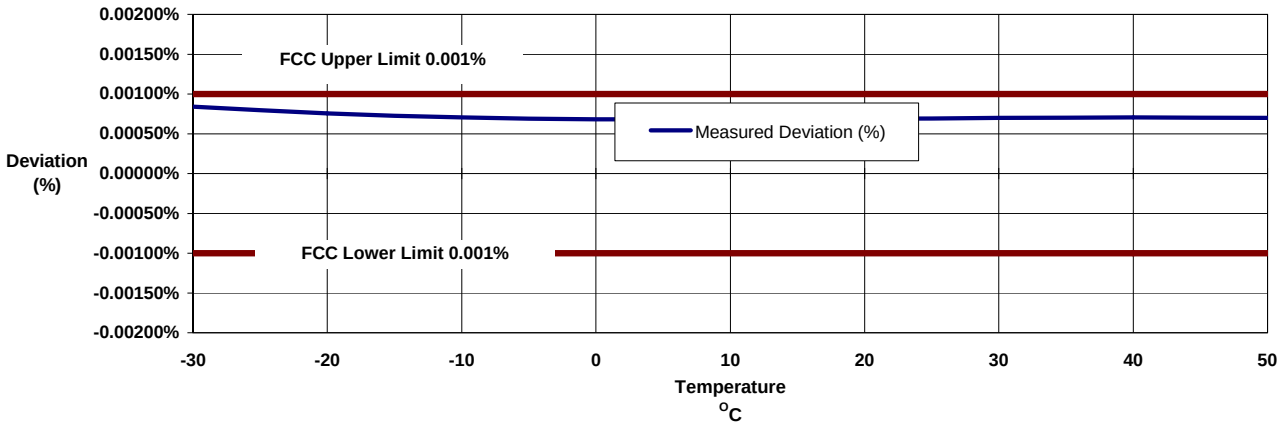
Asset Number	Manufacturer	Model Number	Description	Last Calibrated	Calibration Interval	Calibration Due
n/a	ESPEC	ECT-2	Environmental Chamber	CNR	n/a	CNR
00003	HP	53181A	Frequency Counter	28 Apr 2014	Biennial	28 Apr 2016
n/a	HP	E3611A	Power Supply	COU	n/a	COU
00234	VWR	61161-378	Temp/Humidity Meter	New	Annual	08 May 2016

Set-Up Drawing



Frequency Stability

Nomimal Frequency (MHz):	2.405GHz
New Primary Lithium Used:	-



Frequency Stability Measurements (Temperature)

Temp (°C)	Assigned Frequency (GHz)	Measured Frequency (GHz)	Deviation (kHz)	Deviation (%)
-30	2.405000	2.404980	20	0.00084%
-20	2.405000	2.404982	18	0.00076%
-10	2.405000	2.404983	17	0.00071%
0	2.405000	2.404984	16	0.00068%
10	2.405000	2.404983	17	0.00069%
20	2.405000	2.404983	17	0.00069%
30	2.405000	2.404983	17	0.00070%
40	2.405000	2.404983	17	0.00071%
50	2.405000	2.404983	17	0.00070%
			Maximum Deviation:	0.00084%
			Maximum Limit:	+/-0.00100%
			Result:	Complies

13.0 ANTENNA REQUIREMENTS

§ 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

END OF DOCUMENT

