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Report On

Radio Testing of the
SMK Electronics Corp
Platinum Remote Control Kit IR/RF Remote Control

FCC Subpart C Part 15.249
IC RSS-210 Issue 8 December 2010

Report No. SC1203313

March 2012

REPORT ON Radio Testing of the
SMK Electronics Corp
IR/RF Remote Control

TEST REPORT NUMBER SC1203313

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DATED April 10, 2012

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FCC ID UXURC4U2
IC: 7316A-RC4U2
Report No. SC1203313



SECTION 1

REPORT SUMMARY

Radio Testing of the
SMK Electronics Corp
IR/RF Remote Control

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the SMK Electronics Corp IR/RF Remote Control to the requirements of FCC Subpart C Part 15.249 and IC RSS-210 Issue 8 December 2010.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	SMK Electronics Corp
Model Number(s)	1010510210 and 1001000869
FCC ID Number	UXURC4U2
IC Number	7316A-RC4U2
Serial Number(s)	N/A
Number of Samples Tested	1
Test Specification/Issue/Date	<ul style="list-style-type: none">• FCC Subpart C Part 15.249 (October 1, 2011).• RSS-210 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment (Issue 8, December 2010).• RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).
Start of Test	March 22, 2012
Finish of Test	March 23, 2012
Name of Engineer(s)	Ferdinand S. Custodio
Related Document(s)	None. Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Subpart C Part 15.249 with cross-reference to the corresponding IC RSS standard is shown below.

Section	Spec Clause	RSS	Test Description	Result	Comments/Base Standard
-	§15.207(a)	RSS-Gen 7.2.4	Conducted Emissions	N/A*	
2.1	§15.215(c)	RSS-Gen 4.6.3	20 dB Bandwidth	Compliant	
2.2		RSS-Gen 4.6.1	99% Emission Bandwidth	Compliant	
2.3	§15.249(a)	RSS-210 A2.9(a)	Field Strength Limits for Fundamental and Harmonics	Compliant	
2.4	§15.249(d)	RSS-210 A2.9(b)	Spurious Radiated Emissions	Compliant	
-		RSS-Gen 4.10	Receiver Spurious Emissions	N/A**	

* Not applicable. EUT is battery powered.

** Not applicable. EUT does not have a separate receive mode.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a SMK Electronics Corp IR/RF Remote Control as shown in the photograph below. Two models are represented in this test report (1010510210 and 1001000869), the difference between the two model numbers are housing colour. The EUT is a remote control for shutters and windows.



Equipment Under Test

1.3.2 EUT General Description

EUT Description	IR/RF Remote Control
Model Name	Platinum Remote Control Kit
Model Number(s)	1010510210 and 1001000869
Rated Voltage	3.0VDC from 2 (two) AAA alkaline batteries
Output Power	86.8dB μ V/m @ 3 meters (143.6 μ W EIRP)
Frequency Range	2433 MHz to 2471 MHz in the 2400 MHz to 2483.5 MHz Band
Number of Operating Frequencies	3
Channels Verified	Low Channel 2433 MHz Mid Channel 2452MHz High Channel 2471MHz
Antenna Type (used during evaluation)	Integral (Complies with Part 15.203 requirements)
Modulation Used	GFSK

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	EUT transmitting max power alternating between the three channels verified (Section 1.3.2)

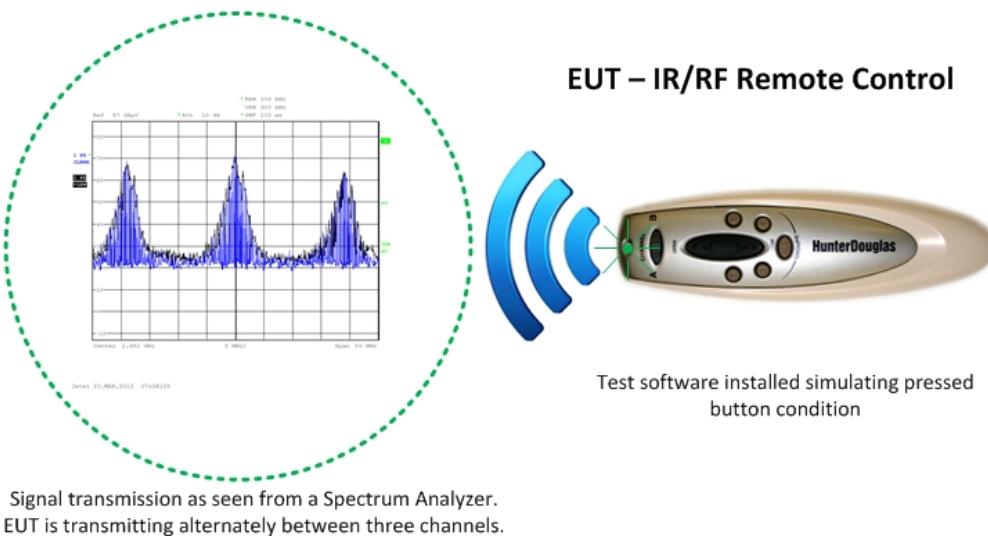
1.4.2 EUT Exercise Software

FCC Test Software Rev. 1. The software sets the EUT in the continuous packet transmission mode simulating pressed button condition.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
N/A	N/A	N/A

1.4.4 Simplified Test Configuration Diagram



1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number N/A		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY

1.8.1 FCC – Registration No.: US5281

TUV SUD America Inc. (San Diego), a §2.498 listed test firm operates the EMC Laboratory registered under Sony Electronics Inc. Product Quality Division EMC. This laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is US5281.

1.8.2 Industry Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.

FCC ID UXURC4U2
IC: 7316A-RC4U2
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SECTION 2

TEST DETAILS

Radio Testing of the
SMK Electronics Corp
IR/RF Remote Control

2.1 20 dB BANDWIDTH

2.1.1 Specification Reference

Part 15 Subpart C §15.215(c)

2.1.2 Standard Applicable

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

2.1.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

2.1.4 Date of Test/Initial of test personnel who performed the test

March 23, 2012/FSC

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Ambient Temperature	22.2°C
Relative Humidity	43.2%
ATM Pressure	99.2 kPa

2.1.7 Additional Observations

- This is a radiated test.
- A peak output reading was taken. A display line was drawn 20dB below the peak level.
- 20dB bandwidth verified using delta-marker measurements from the line drawn.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the span.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is peak.



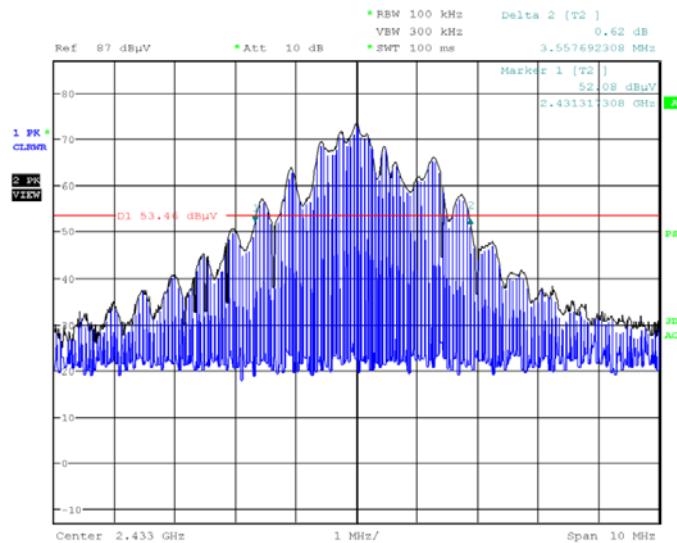
- Trace is max hold.

2.1.8 Test Results

Low Channel (2433 MHz)	Mid Channel (2452MHz)	High Channel (2471MHz)
3.56 MHz	3.73 MHz	4.20 MHz

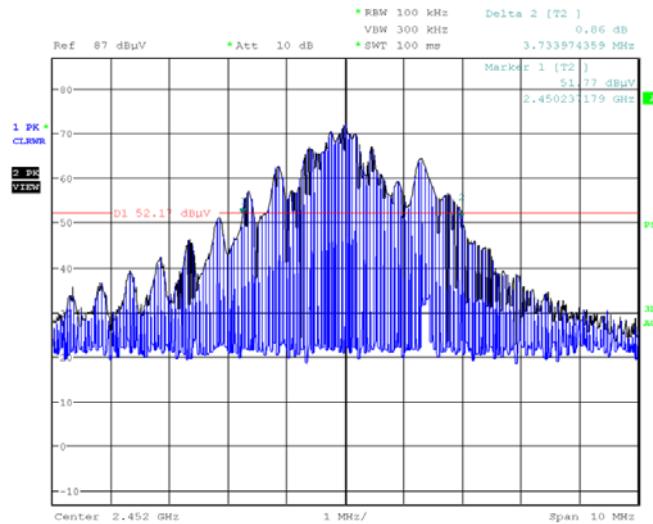
2433.00 MHz – (20dB BW/2) = 2431.22MHz (within the frequency band - **Compliant**)

2471.00MHz + (20dB BW/2) = 2473.10 MHz (within the frequency band - **Compliant**)



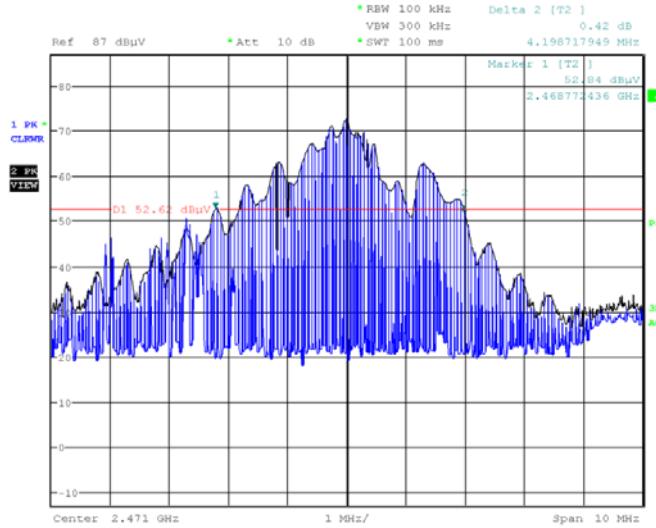
Date: 23.MAR.2012 10:52:07

Low Channel



Date: 23.MAR.2012 10:54:19

Mid Channel



Date: 23.MAR.2012 10:59:10

High Channel

2.2 99% EMISSION BANDWIDTH

2.2.1 Specification Reference

RSS-Gen Clause 4.6.1

2.2.2 Standard Applicable

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

2.2.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

2.2.4 Date of Test/Initial of test personnel who performed the test

March 23, 2012/FSC

2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

Ambient Temperature	22.2°C
Relative Humidity	43.2%
ATM Pressure	99.2 kPa

2.2.7 Additional Observations

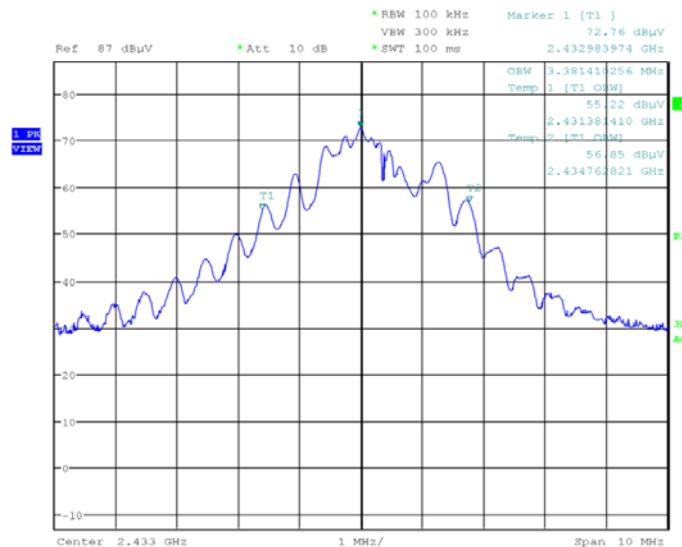
- This is a radiated test.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the span.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is peak.



- The % Power Bandwidth setting in the spectrum analyzer was set to 99% (default).
- The Channel Bandwidth measurement function of the spectrum analyzer was used for this test.

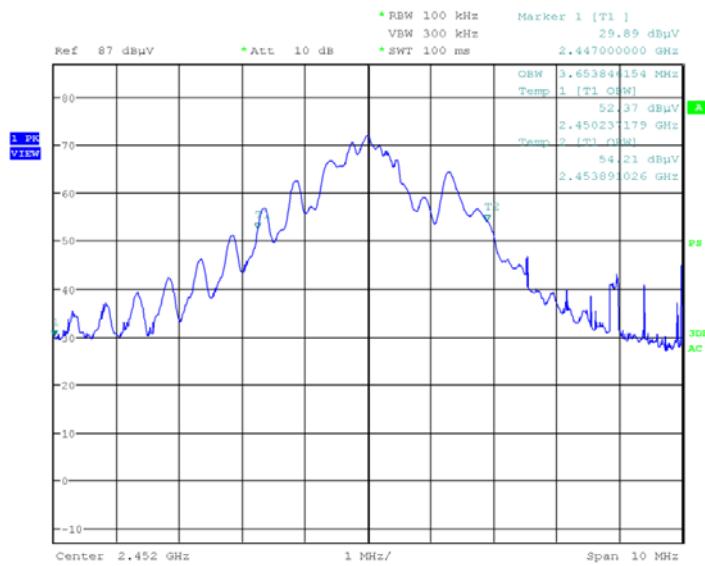
2.2.8 Test Results

Low Channel (2433 MHz)	Mid Channel (2452MHz)	High Channel (2471MHz)
3.38 MHz	3.65 MHz	4.08 MHz



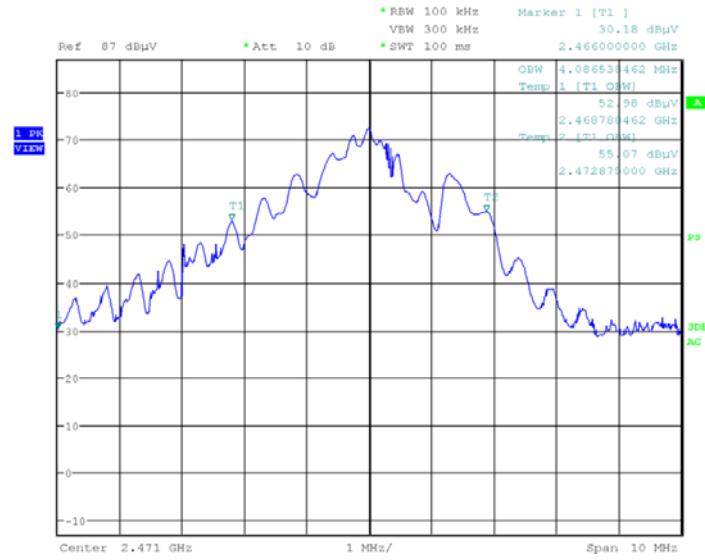
Date: 23.MAR.2012 11:11:19

Low Channel



Date: 23.MAR.2012 11:12:28

Mid Channel



Date: 23.MAR.2012 11:13:55

High Channel

2.3 FIELD STRENGTH LIMITS FOR FUNDAMENTAL AND HARMONICS

2.3.1 Specification Reference

Part 15 Subpart C §15.249(a)

2.3.2 Standard Applicable

(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

2.3.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

2.3.4 Date of Test/Initial of test personnel who performed the test

March 22, 2012/FSC

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions

Ambient Temperature	23.1°C
Relative Humidity	43.5%
ATM Pressure	99.0 kPa

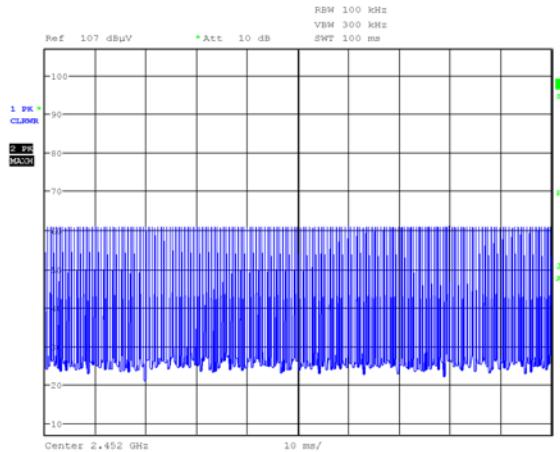
2.3.7 Additional Observations

- This is a radiated test. The spectrum was searched from 1GHz to the 10th harmonic (25GHz).
- Fundamental measurements were performed without a preamp.
- Harmonics measurements were performed with a preamp and a notch filter attenuating the fundamental frequencies.
- Measurement was done using EMC32 V8.52 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.3.8 for sample computation.

2.3.8 Sample Computation (Radiated Emission)

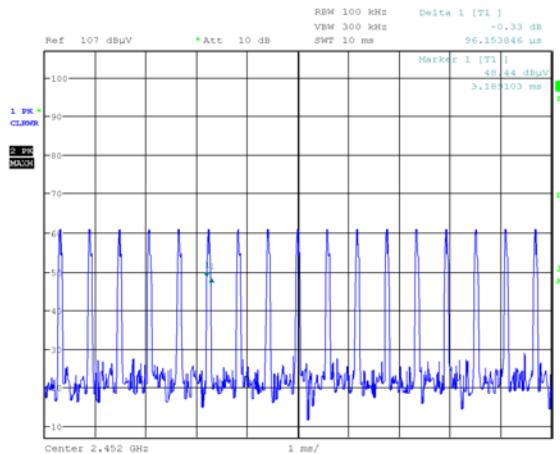
Measuring equipment raw measurement (db μ V) @ 2400 MHz			58.4
Correction Factor (dB)	Asset# 1153 (cable)	3.3	-4.8
	Asset# 8628 (preamplifier)	-36.4	
	Asset# 6669 (antenna)	28.3	
Reported Peak Final Measurement (db μ V/m) @ 2400 MHz			53.6

2.3.9 Duty Cycle Correction Factor Calculation



Date: 22.MAR.2012 14:47:38

100ms sweep (representative channel)



Date: 22.MAR.2012 14:46:45

10ms sweep (representative channel)

Duty Cycle Calculation:

$$\begin{aligned}
 &= 0.096153 \text{ ms "On" time per 10 ms sweep} \\
 &= 0.096153 \text{ ms} \times 17 \times 10 \\
 &= 16.34601 \text{ ms "On" time per 100 ms sweep}
 \end{aligned}$$

Duty Cycle Correction Factor

$$\begin{aligned}
 &= 20 \log (0.1634601) \\
 &= \mathbf{-15.731 \text{ dB}}
 \end{aligned}$$

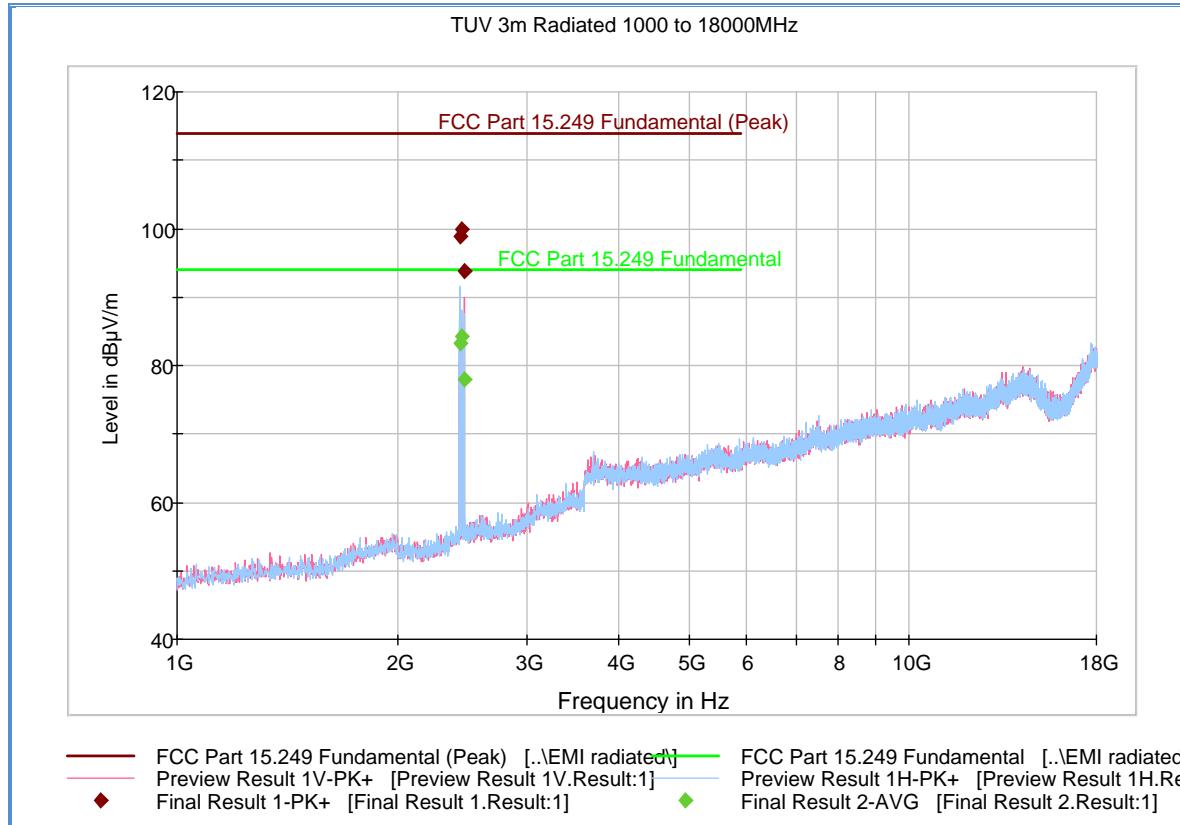
2.3.10 Test Results

See attached plots.



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2.3.11 Test Results Fundamental ("X" axis configuration)



Peak Data

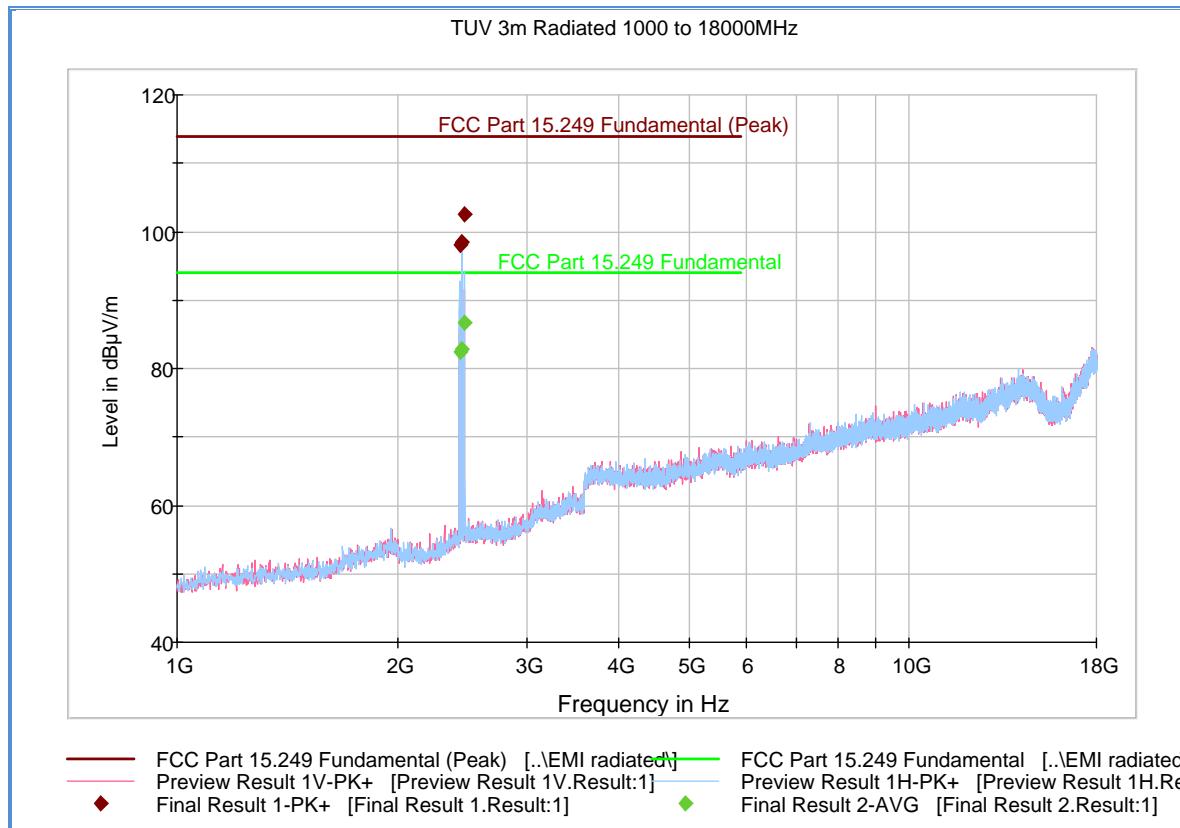
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2433.00000	98.9	1000.0	1000.000	100.0	H	40.0	31.6	15.0	114.0
2451.98000	99.9	1000.0	1000.000	100.0	H	43.0	31.6	14.1	114.0
2471.00000	93.8	1000.0	1000.000	100.0	V	326.0	31.6	20.2	114.0

Average Data

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2433.00000	83.2							10.8	94.0
2451.98000	84.2							9.8	94.0
2471.00000	78.1							15.9	94.0

Test Notes: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:
 2433.0 MHz (Low Channel) = 98.9 dB μ V/m (Peak)
 = 98.9 dB μ V/m + (-15.731 dB DCCF)
 = 83.2 dB μ V/m (Average)

2.3.12 Test Results Fundamental ("Y" axis configuration)



Peak Data

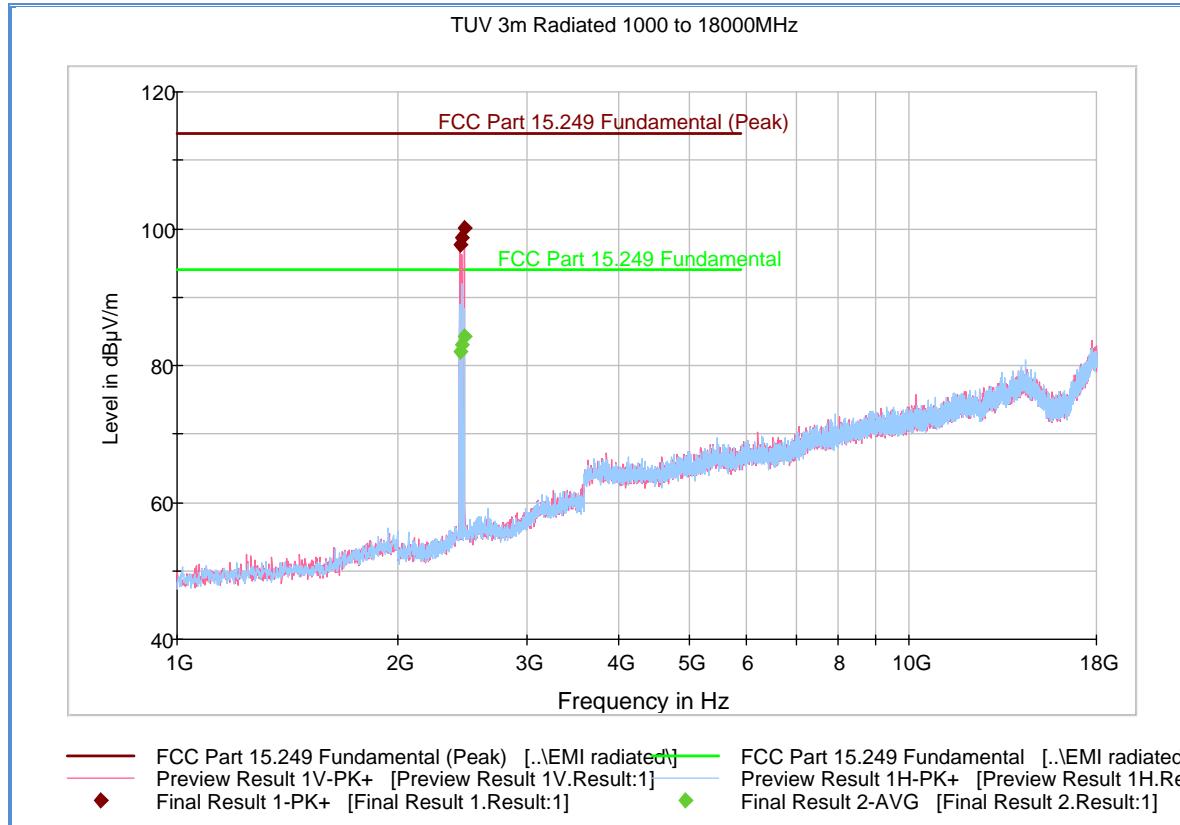
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2433.00000	98.1	1000.0	1000.000	100.0	H	43.0	31.6	15.8	114.0
2451.98000	98.5	1000.0	1000.000	100.0	H	45.0	31.6	15.5	114.0
2471.00000	102.5	1000.0	1000.000	100.0	H	272.0	31.6	11.4	114.0

Average Data

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2433.00000	82.4							11.6	94.0
2451.98000	82.8							11.2	94.0
2471.00000	86.8							7.2	94.0

Test Notes: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:
 2433.0 MHz (Low Channel) = 98.9 dB μ V/m (Peak)
 = 98.9 dB μ V/m + (-15.731 dB DCCF)
 = 83.2 dB μ V/m (Average)

2.3.13 Test Results Fundamental ("Z" axis configuration)



Peak Data

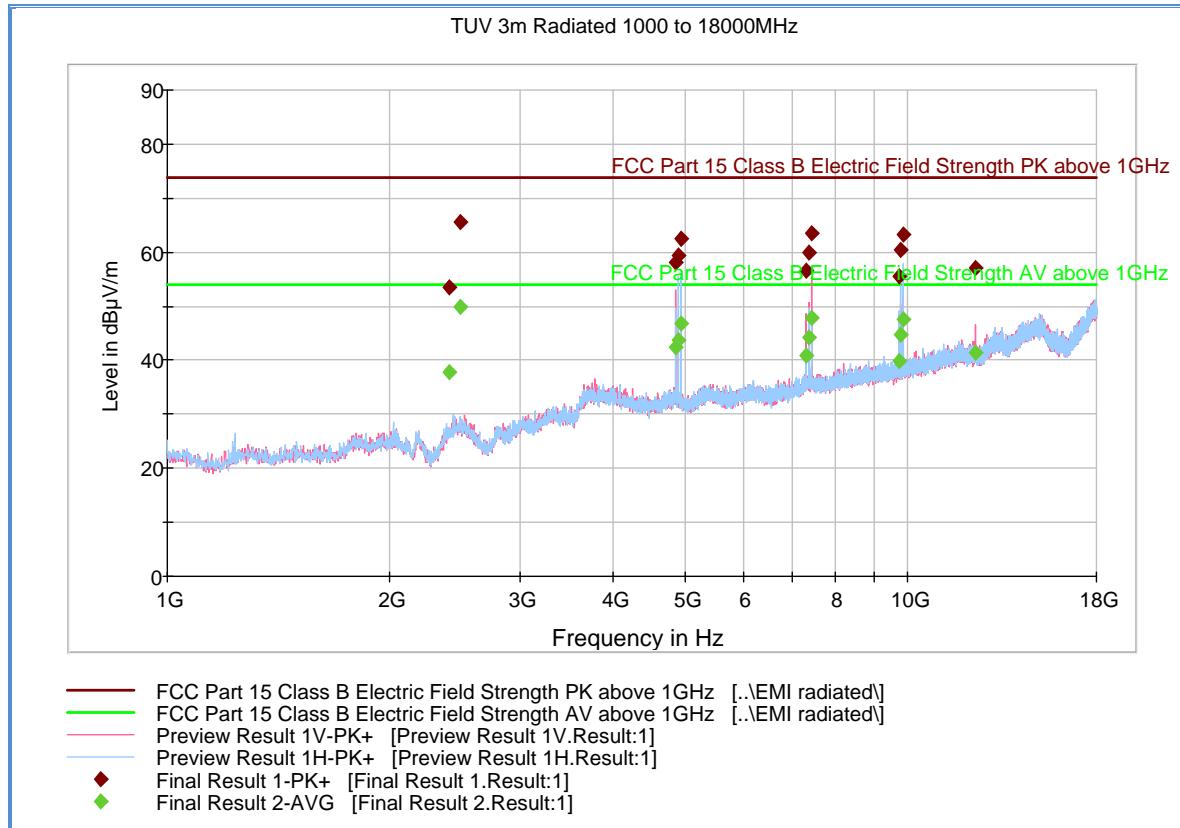
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2433.00000	97.7	1000.0	1000.000	100.0	V	353.0	31.6	16.3	114.0
2451.98000	98.8	1000.0	1000.000	100.0	V	19.0	31.6	15.2	114.0
2471.00000	100.0	1000.0	1000.000	100.0	V	348.0	31.6	13.9	114.0

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2433.00000	82.0							12.0	94.0
2451.98000	83.1							10.9	94.0
2471.00000	84.3							9.7	94.0

Test Notes: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:
 2433.0 MHz (Low Channel) = 98.9 dBµV/m (Peak)
 = 98.9 dBµV/m + (-15.731 dB DCCF)
 = 83.2 dBµV/m (Average)

2.3.14 Test Results Harmonics ("X" axis configuration)



Peak Data

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2483.560000	65.6	1000.0	1000.000	100.0	H	41.0	-4.6	8.3	73.9
2400.060000	53.6	1000.0	1000.000	100.0	H	44.0	-4.8	20.3	73.9
4865.980000	58.1	1000.0	1000.000	104.0	V	195.0	2.2	15.8	73.9
4903.340000	59.4	1000.0	1000.000	100.0	H	0.0	2.2	14.5	73.9
4942.000000	62.6	1000.0	1000.000	123.0	H	31.0	2.3	11.3	73.9
7298.960000	56.6	1000.0	1000.000	183.0	V	83.0	7.0	17.3	73.9
7356.000000	60.0	1000.0	1000.000	181.0	V	84.0	7.2	13.9	73.9
7412.980000	63.6	1000.0	1000.000	115.0	V	67.0	7.2	10.3	73.9
9735.380000	55.7	1000.0	1000.000	104.0	H	198.0	9.5	18.2	73.9
9807.960000	60.5	1000.0	1000.000	105.0	H	193.0	9.7	13.4	73.9
9882.760000	63.2	1000.0	1000.000	105.0	H	204.0	9.9	10.7	73.9
12356.860000	57.2	1000.0	1000.000	136.0	V	133.0	12.2	16.7	73.9



Average Data

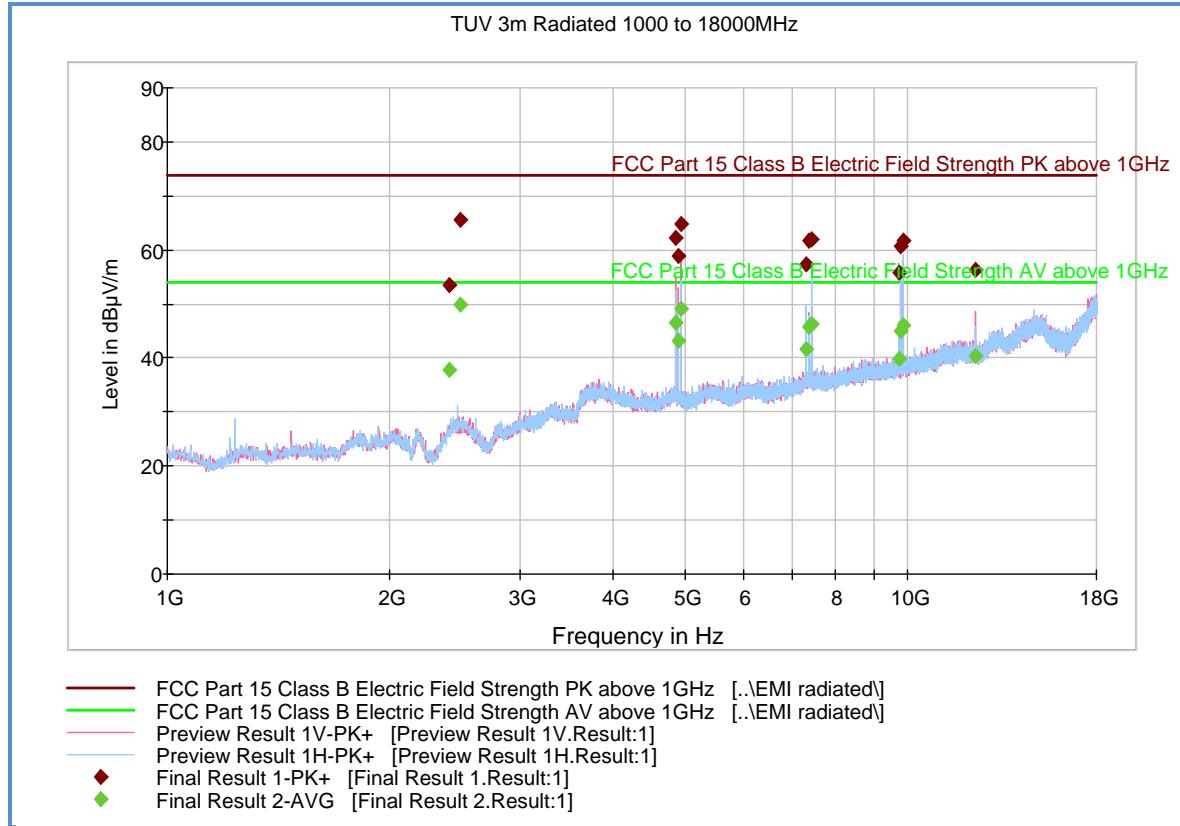
Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2400.060000	37.8							16.1	53.9
2483.560000	49.9							4.0	53.9
4865.980000	42.3							11.6	53.9
4903.340000	43.6							10.3	53.9
4942.000000	46.9							7.0	53.9
7298.960000	40.9							13.0	53.9
7356.000000	44.3							9.6	53.9
7412.980000	47.8							6.1	53.9
9735.380000	39.9							14.0	53.9
9807.960000	44.7							9.2	53.9
9882.760000	47.5							6.4	53.9
12356.860000	41.5							12.4	53.9

Test Notes 1: Measurement was performed with a 2.4GHz notch filter. Band edge measurements were performed with the notch filter removed. Worst band edge measurements presented.

Test Notes 2: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:

$$\begin{aligned}
 4865.98 \text{ MHz} &= 58.1 \text{ dB}\mu\text{V/m (Peak)} \\
 &= 58.1 \text{ dB}\mu\text{V/m} + (-15.731 \text{ dB DCCF}) \\
 &= 42.3 \text{ dB}\mu\text{V/m (Average)}
 \end{aligned}$$

2.3.15 Test Results Harmonics ("Y" axis configuration)



Peak Data

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2400.060000	53.6	1000.0	1000.000	100.0	H	44.0	-4.8	20.3	73.9
2483.560000	65.6	1000.0	1000.000	100.0	H	41.0	-4.6	8.3	73.9
4865.980000	62.2	1000.0	1000.000	150.0	V	9.0	2.2	11.7	73.9
4903.340000	59.0	1000.0	1000.000	157.0	V	154.0	2.2	14.9	73.9
4941.340000	64.8	1000.0	1000.000	100.0	V	356.0	2.3	9.1	73.9
7299.000000	57.4	1000.0	1000.000	168.0	H	204.0	7.0	16.5	73.9
7355.060000	61.6	1000.0	1000.000	179.0	V	190.0	7.2	12.3	73.9
7412.980000	62.0	1000.0	1000.000	162.0	H	180.0	7.2	11.9	73.9
9733.200000	55.7	1000.0	1000.000	161.0	H	308.0	9.5	18.2	73.9
9809.300000	60.8	1000.0	1000.000	112.0	H	198.0	9.7	13.1	73.9
9883.980000	61.7	1000.0	1000.000	112.0	H	192.0	9.9	12.2	73.9
12354.920000	56.2	1000.0	1000.000	123.0	V	66.0	12.2	17.7	73.9



Average Data

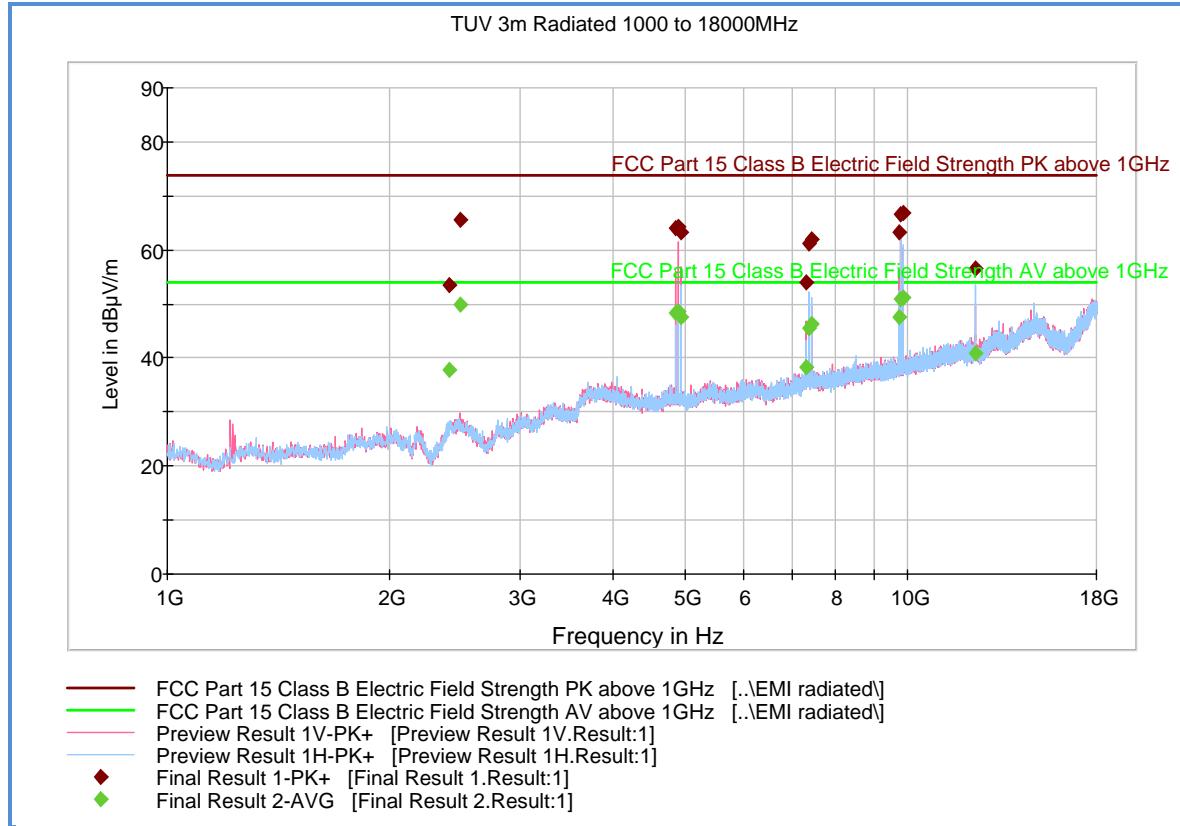
Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2400.060000	37.8						16.1	53.9	
2483.560000	49.9						4.0	53.9	
4865.980000	46.4						7.5	53.9	
4903.340000	43.2						10.7	53.9	
4941.340000	49.1						4.8	53.9	
7299.000000	41.7						12.2	53.9	
7355.060000	45.9						8.0	53.9	
7412.980000	46.3						7.6	53.9	
9733.200000	40.0						13.9	53.9	
9809.300000	45.0						8.9	53.9	
9883.980000	46.0						7.9	53.9	
12354.920000	40.5						13.4	53.9	

Test Notes 1: Measurement was performed with a 2.4GHz notch filter. Band edge measurements were performed with the notch filter removed. Worst band edge measurements presented.

Test Notes 2: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:

$$\begin{aligned} 4865.98 \text{ MHz} &= 58.1 \text{ dB}\mu\text{V/m (Peak)} \\ &= 58.1 \text{ dB}\mu\text{V/m} + (-15.731 \text{ dB DCCF}) \\ &= 42.3 \text{ dB}\mu\text{V/m (Average)} \end{aligned}$$

2.3.16 Test Results Harmonics ("Z" axis configuration)



Peak Data

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2400.060000	53.6	1000.0	1000.000	100.0	H	44.0	-4.8	20.3	73.9
2483.560000	65.6	1000.0	1000.000	100.0	H	41.0	-4.6	8.3	73.9
4865.980000	64.0	1000.0	1000.000	136.0	V	203.0	2.2	9.9	73.9
4903.340000	64.4	1000.0	1000.000	136.0	V	198.0	2.2	9.5	73.9
4942.000000	63.4	1000.0	1000.000	142.0	V	80.0	2.3	10.5	73.9
7299.980000	54.0	1000.0	1000.000	168.0	V	281.0	7.0	19.9	73.9
7355.060000	61.2	1000.0	1000.000	154.0	H	128.0	7.2	12.7	73.9
7412.980000	62.1	1000.0	1000.000	131.0	H	64.0	7.2	11.8	73.9
9733.160000	63.2	1000.0	1000.000	154.0	V	180.0	9.5	10.7	73.9
9807.960000	66.6	1000.0	1000.000	152.0	V	211.0	9.7	7.3	73.9
9882.800000	66.8	1000.0	1000.000	159.0	H	255.0	9.9	7.1	73.9
12356.780000	56.6	1000.0	1000.000	100.0	H	238.0	12.2	17.3	73.9



Average Data

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
2400.060000	37.8							16.1	53.9
2483.560000	49.9							4.0	53.9
4865.980000	48.3							5.6	53.9
4903.340000	48.6							5.3	53.9
4942.000000	47.6							6.3	53.9
7299.980000	38.2							15.7	53.9
7355.060000	45.5							8.4	53.9
7412.980000	46.3							7.6	53.9
9733.160000	47.5							6.4	53.9
9807.960000	50.8							3.1	53.9
9882.800000	51.1							2.8	53.9
12356.780000	40.9							13.0	53.9

Test Notes 1: Measurement was performed with a 2.4GHz notch filter. Band edge measurements were performed with the notch filter removed. Worst band edge measurements presented.

Test Notes 2: Average data are from Peak data with Duty Cycle correction factor applied. Sample computation:
 4865.98 MHz = 58.1 dB μ V/m (Peak)
 = 58.1 dB μ V/m + (-15.731 dB DCCF)
 = 42.3 dB μ V/m (Average)

2.4 SPURIOUS RADIATED EMISSIONS

2.4.1 Specification Reference

Part 15 Subpart C §15.249(d)

2.4.2 Standard Applicable

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

2.4.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

2.4.4 Date of Test/Initial of test personnel who performed the test

March 22, 2012/FSC

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions

Ambient Temperature	23.1°C
Relative Humidity	43.5%
ATM Pressure	99.0 kPa

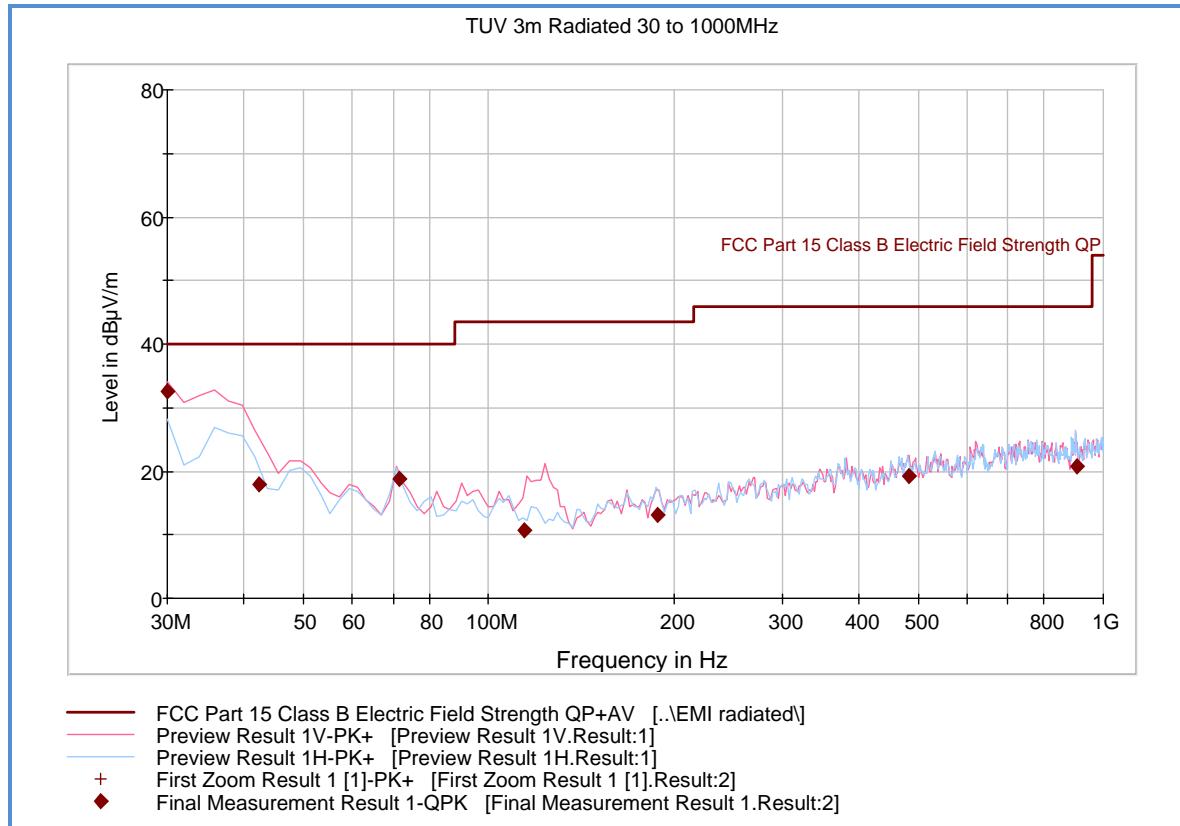
2.4.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic (25GHz). There are no emissions observed beyond 18GHz.
- No significant emission observed below 1GHz. Data presented is from worst configuration based from fundamental/harmonics verification ("Y" axis configuration).
- Above 1GHz measurement results are identical to test results presented under Section 2.3.14 up to Section 2.3.16 of this test report. No other spurious emissions observed other than harmonics of the fundamental frequency.
- Measurement was done using EMC32 V8.52 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.4.8 for sample computation.

2.4.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db μ V) @ 2400 MHz			58.4
Correction Factor (dB)	Asset# 1153 (cable)	3.3	-4.8
	Asset# 8628 (preamplifier)	-36.4	
	Asset# 6669 (antenna)	28.3	
Reported Peak Final Measurement (db μ V/m) @ 2400 MHz			53.6

2.4.9 Test Results Below 1GHz ("Y" Configuration)



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
30.040000	32.5	1000.0	120.000	209.0	V	155.0	-12.3	7.5	40.0
42.367214	17.9	1000.0	120.000	173.0	V	67.0	-18.3	22.1	40.0
71.581643	18.9	1000.0	120.000	190.0	V	101.0	-22.2	21.1	40.0
114.251062	10.7	1000.0	120.000	107.0	V	87.0	-20.7	32.8	43.5
187.934910	13.0	1000.0	120.000	260.0	H	92.0	-16.7	30.5	43.5
481.461964	19.2	1000.0	120.000	225.0	H	212.0	-6.6	26.8	46.0
904.245611	20.8	1000.0	120.000	130.0	H	109.0	-0.5	25.2	46.0

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SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
1033	Bilog Antenna	3142C	00044556	EMCO	08/01/11	08/01/12
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/10/11	08/10/12
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/15/11	06/15/12
6815	2.4GHz Band Notch Filter	BRM50702	008	Micro-Tronics	Verified by 1040	
1051	Double-ridged waveguide horn antenna	3115	9412-4364	EMCO	11/07/11	11/07/12
1016	Pre-amplifier	PAM-0202	187	PAM	08/17/11	08/17/12
1003	Signal Generator	SMR-40	1104.0002.40	Rhode & Schwarz	10/13/11	10/13/12
1150	Horn antenna	RA42-K-F-4B-C	012054-004	CMT	Verified by 1003 and 1049	
1151	Pre-amplifier	TS-PR26	100026	Rhode & Schwarz	Verified by 1003 and 1049	
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	08/17/11	08/17/12
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	08/17/11	08/17/12
7514	Multimeter	34410A	MY45002624	Agilent	08/01/11	08/01/12
	Test Software	EMC32	V8.52	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Emission Measurements

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	2				
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.41	0.24	0.06
5	Site	Rectangular	2.00	1.15	1.33
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					1.38
Coverage Factor (k):					2
Expanded Uncertainty:					2.79

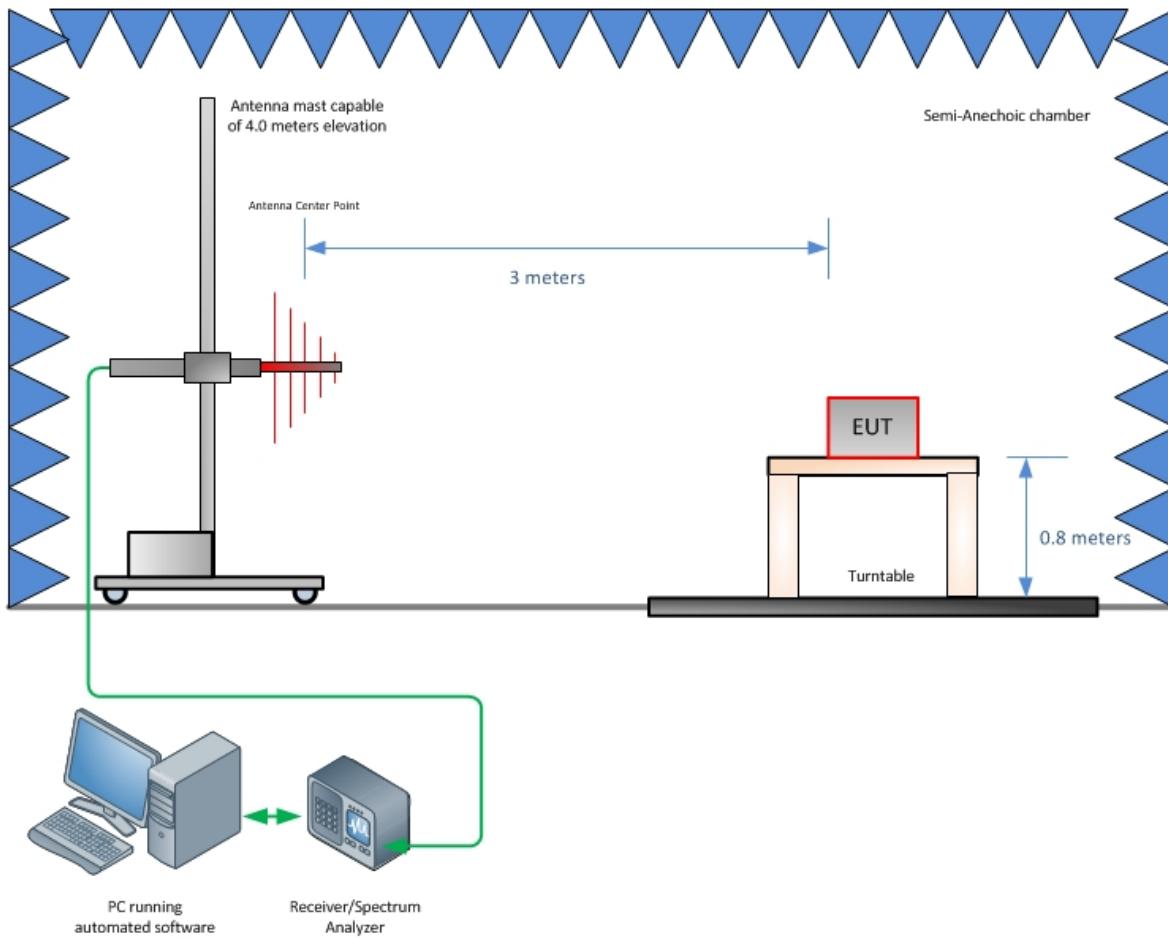
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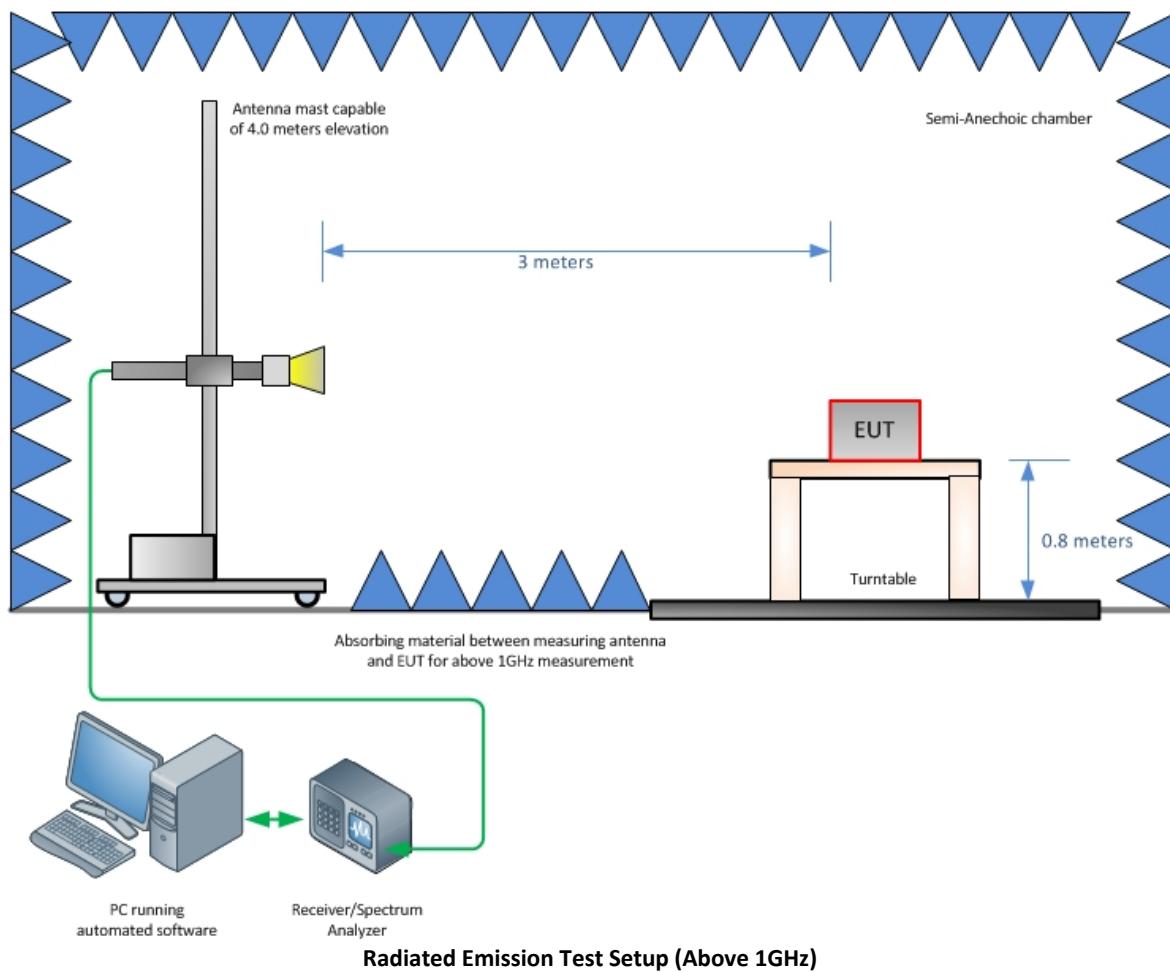


SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM





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SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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