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Report On

Application for Grant of Equipment Authorization of the
IPS Group Inc.
VDS (Vehicle Detection Sensor)

FCC Part 15 Subpart C §15.231

Report No. SC1402474A

April 2014



REPORT ON Radio Testing of the
IPS Group Inc.
VDS (Vehicle Detection Sensor)

TEST REPORT NUMBER SC1402474A

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DATED April 07, 2014



Revision History

SC1402474A IPS Group Inc. VDS (Vehicle Detection Sensor)					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
04/07/2014	Initial Release				Ferdinand Custodio

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SECTION 1

REPORT SUMMARY

Radio Testing of the
IPS Group Inc.
Vehicle Detection Sensor



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the IPS Group Inc. VDS (Vehicle Detection Sensor) to the requirements of FCC Part 15 Subpart C §15.231

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	IPS Group Inc.
Model Number(s)	VDS
FCC ID Number	SGWIPS2007VS
Serial Number(s)	N/A
Number of Samples Tested	3
Test Specification/Issue/Date	FCC Part 15 Subpart C §15.231 (October 1, 2013)
Start of Test	March 24, 2014
Finish of Test	March 24, 2014
Name of Engineer(s)	Alex Chang
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 Part 15 Subpart C §15.231 standard is shown below.

Section	§15.231 Spec Clause	Test Description	Result	Comments/Base Standard
2.1	§15.207 (a)	Conducted Emissions	N/A *	
2.2	§15.231(a)(2)	Transmission Verification For Transmitter Activated Automatically	N/A **	
2.3	§15.231(a)(3)	Polling Or Supervision Transmissions, Including Data, To Determine System Integrity Of Transmitters Used In Security Or Safety Applications	Compliant	
2.4	§15.231(b)	Field Strength Of Emissions	Compliant	
2.5	§15.231(c)	Bandwidth Requirement	Compliant	
—	—	Receiver Spurious Emissions	N/A	Applies to IC RSS Specification Only

* Not applicable. EUT is battery operated device.

** EUT is a transmitter that activates automatically, however provisions of §15.231(a)(3) applies.

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was an IPS Group Inc. VDS (Vehicle Detection Sensor) as shown in the photograph below. The EUT provides a reliable and secure detection system which detects the presence and absence of a vehicle in a public or garage parking space. The sensor uniquely directs all sensing information via the IPS single or multispace parking meter cellular communications backbone.

The parking locations whether they are located on a city street or parking structure will detect whatever is parked over it. This built-in added measure of security not only does it detect when a vehicle is located at a parking location it will also detect when it is vacant so if a vehicle is abandoned, stolen or has been left on the street somewhere it can be immediately located and it will time/date stamp the actual event. It will also tell the city workers that have shut down specific parking locations due to either road work or an event if someone has inadvertently left their vehicle on the street in a restricted area.

The sensor because it is mounted in either an asphalt or concrete street has a battery life of 3 -5 years depending on detection activity. To maximize and conserve battery life the sensor remains dormant until it actually senses a vehicle at which time it will wake up to detect whatever is covered up by it and relays the information or data to the meter and then returns to dormant state until the next event which is when the vehicle leaves. The sensor uses multiple sensing technologies combining RF as well as IR to detect large metal objects. Its unique design provides the most accurate data on the sensor market and allows for quick installation and servicing.



Equipment Under Test



1.3.2 EUT General Description

EUT Description Vehicle Detection Sensor

Model Number(s) VDS

Rated Voltage Internal (two) lithium ion 3.6VDC cells

Mode Verified 400 MHz Transmit Mode

Capability

Item	Description
ISM/SRD Band Transceiver	400 MHz

Primary Unit (EUT)

☐ Production

☒ Pre-Production

☐ Engineering

Antenna Detail Specification

Manufacturer	IPS Group
Model	VDS 400MHz Antenna
Type	Dipole
Frequency	415 MHz
Gain	0dBi
Length	181.61mm
Wire Specification	18 gauge (AA59551-S18S1B)
Wire Manufacturer	Wesbell electronics, Inc.

1.3.3 Maximum Radiated Output Power

Transmitter Frequency (MHz)	Field Strength (dBμV/m @ 3 meters)	Part 15.231(e) limits in dBμV/m
	FSK modulation	
410	65.43 (Quasi Peak)	79.53
420	65.38 (Quasi Peak)	79.94
430	66.97 (Quasi Peak)	80.36

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	Radiated emission test configuration. Measurement was performed while EUT configured in continuously transmission mode.

1.4.2 EUT Exercise Software

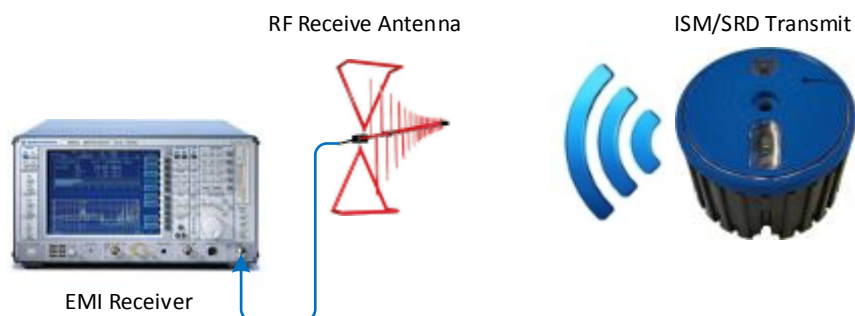
None. No special software was used to exercise the EUT. Software revision at the time of investigation is 1.04.6.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
—	—	—

1.4.4 Simplified Test Configuration Diagram

Radiated Emission Test Configuration



Not To Scale – Illustration Purpose Only

Objects may not represent actual image of original equipment/s or set-up.



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 LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 Fax: 858 546 0364.

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

Sony Electronics Inc., Building #8, 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Registration No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.498 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.



SECTION 2

TEST DETAILS

Radio Testing of the
IPS Group Inc.
Vehicle Detection Sensor

2.1 CONDUCTED EMISSIONS

2.1.1 Specification Reference

Part 15 Subpart C §15.207(a)

2.1.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

**Decreases with the logarithm of the frequency.*

2.1.3 Equipment Under Test and Modification State

Not applicable. EUT is a battery operated device.



2.2 TRANSMISSION VERIFICATION FOR TRANSMITTER ACTIVATED AUTOMATICALLY

2.2.1 Specification Reference

Part 15 Subpart C §15.231(a)(2)

2.2.2 Standard Applicable

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

2.2.3 Equipment Under Test and Modification State

- Test not applicable. When activated, the EUT transmits short burst ($<521.7\mu\text{S}$) every two seconds until the EUT information/data are relayed then returns to dormant state until the next EUT (sensor) event.
- The manufacturer declares that the EUT based from its intended application falls under the Security or Safety Application category. Therefore Part 15 Subpart C § 15.231(a) (3) applies. Please refer to Section 2.3 of this test report for details.



2.3 POLLING OR SUPERVISION TRANSMISSIONS, INCLUDING DATA, TO DETERMINE SYSTEM INTEGRITY OF TRANSMITTERS USED IN SECURITY OR SAFETY APPLICATIONS

2.3.1 Specification Reference

Part 15 Subpart C §15.231(a)(3)

2.3.2 Standard Applicable

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

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 24, 2014/AC

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/Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

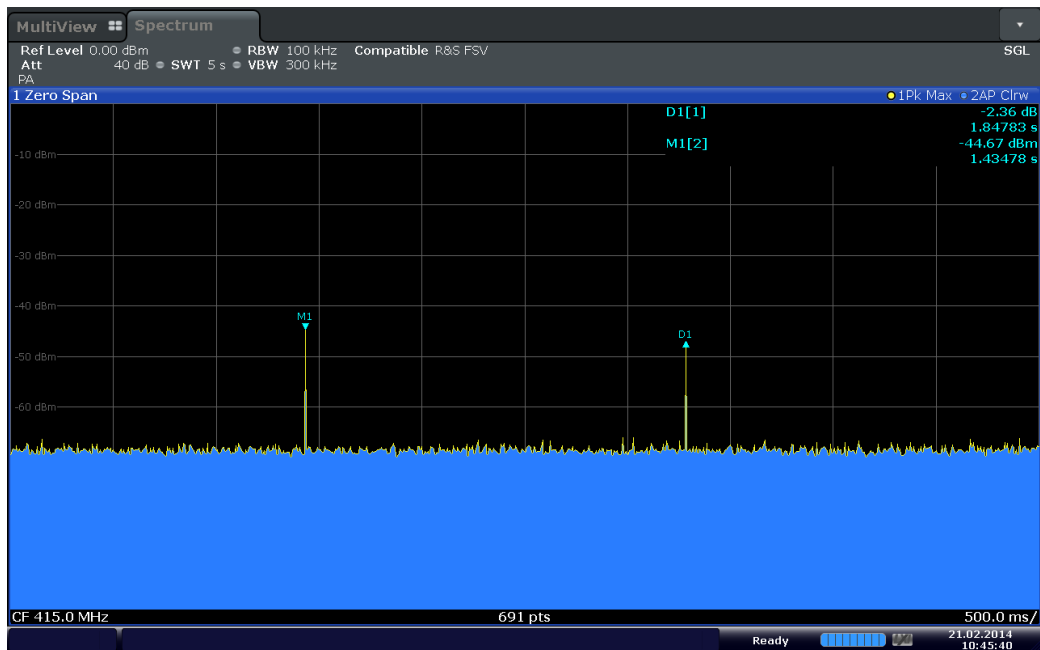
Ambient Temperature	25.0°C
Relative Humidity	32.4%
ATM Pressure	98.8 kPa

2.3.7 Calculations

EUT transmits short burst (<521.7µS) every two seconds when activated. Calculation presented is based from continuous transmission for one hour. EUT in normal operation does not transmit continuously for an hour:

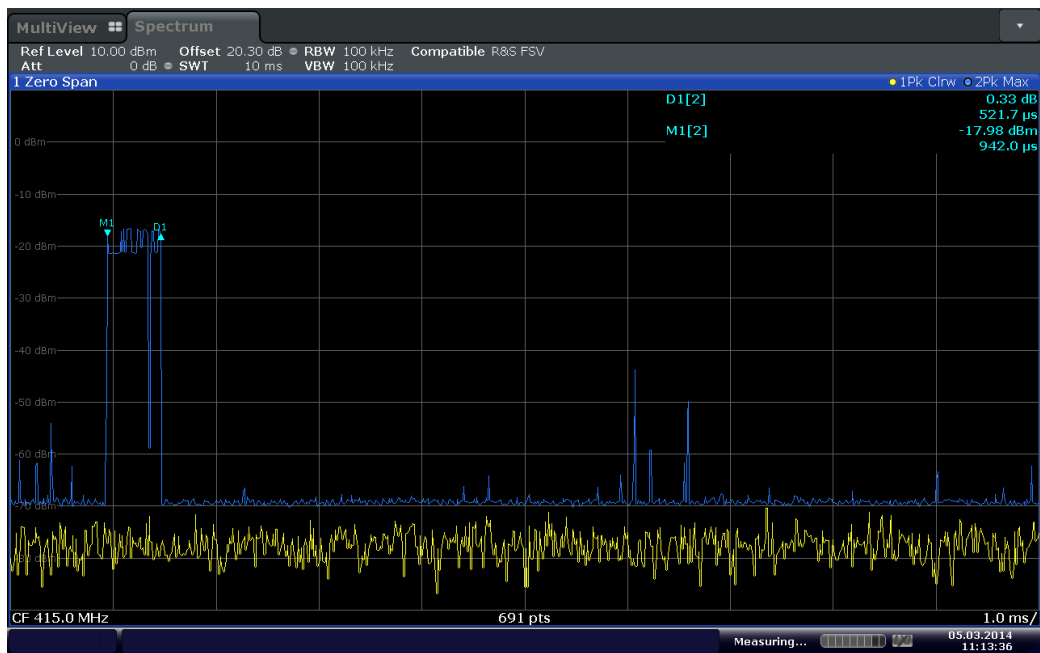
Total transmission in 1 hour	:	521.7 µS x 1800 (EUT transmissions/hour)
	:	939.06 mS
	:	939.06 mS < 2 seconds (EUT complies)

2.3.8 Test Result Plot



Date: 21 FEB 2014 10:45:41

Normal operation of the EUT showing two (2) short burst (0.0005217ms) and two seconds apart.



Date: 5 MAR 2014 11:13:36

Single transmission burst

2.4 FIELD STRENGTH OF EMISSIONS

2.4.1 Specification Reference

Part 15 Subpart C §15.231(b)

2.4.2 Standard Applicable

(b) In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹Linear Interpolations

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 24, 2014/AC

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/Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.0°C
Relative Humidity	32.4%
ATM Pressure	98.8 kPa

2.4.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic (5GHz), up to 18GHz presented.



- There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.
- Measurement was done using EMC32 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.

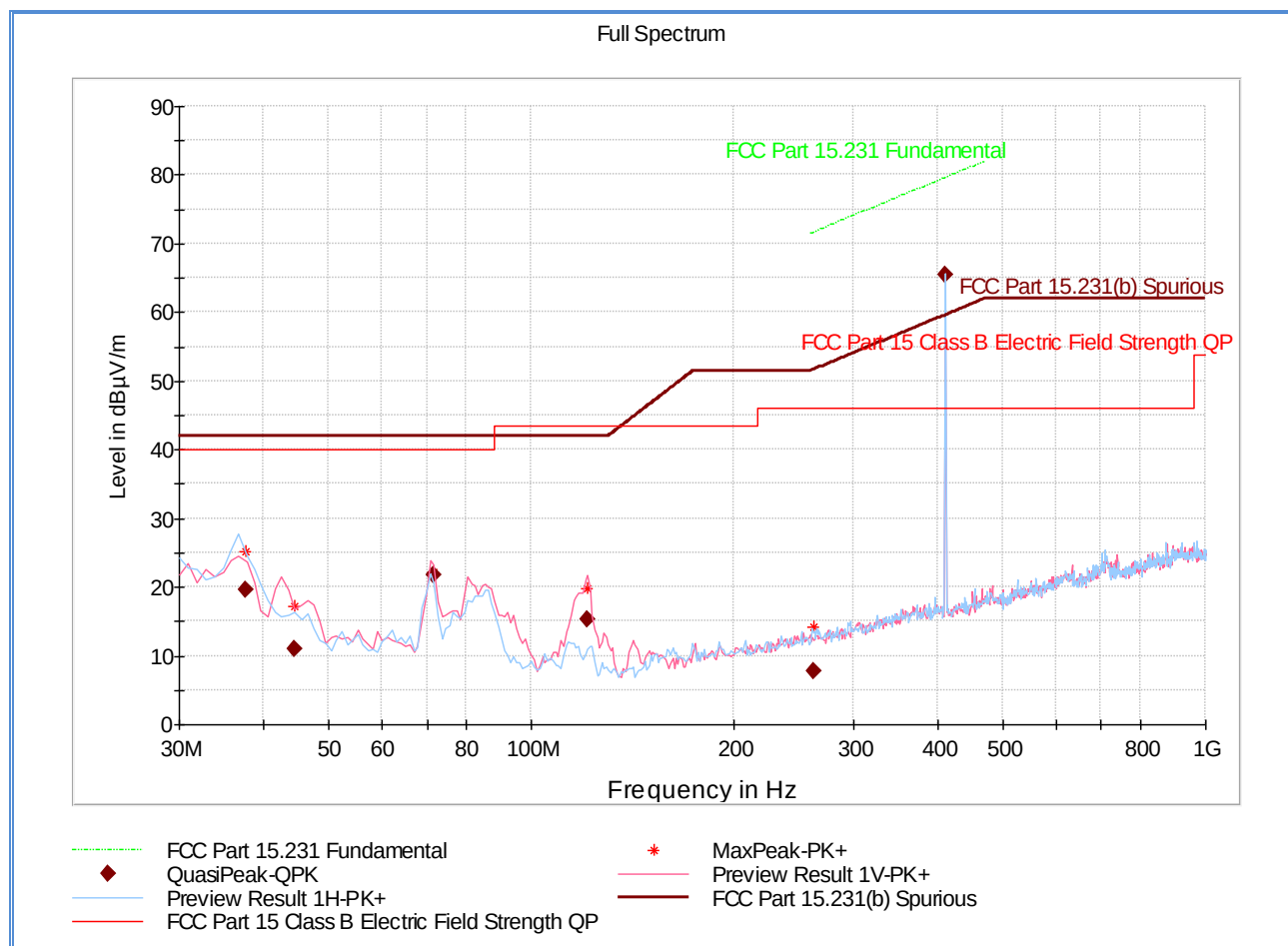
2.4.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db μ V) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (db μ V/m) @ 30MHz			11.8

2.4.9 Test Results

See attached plots.

2.4.10 Test Results Below 1GHz (Low Channel 410 MHz)

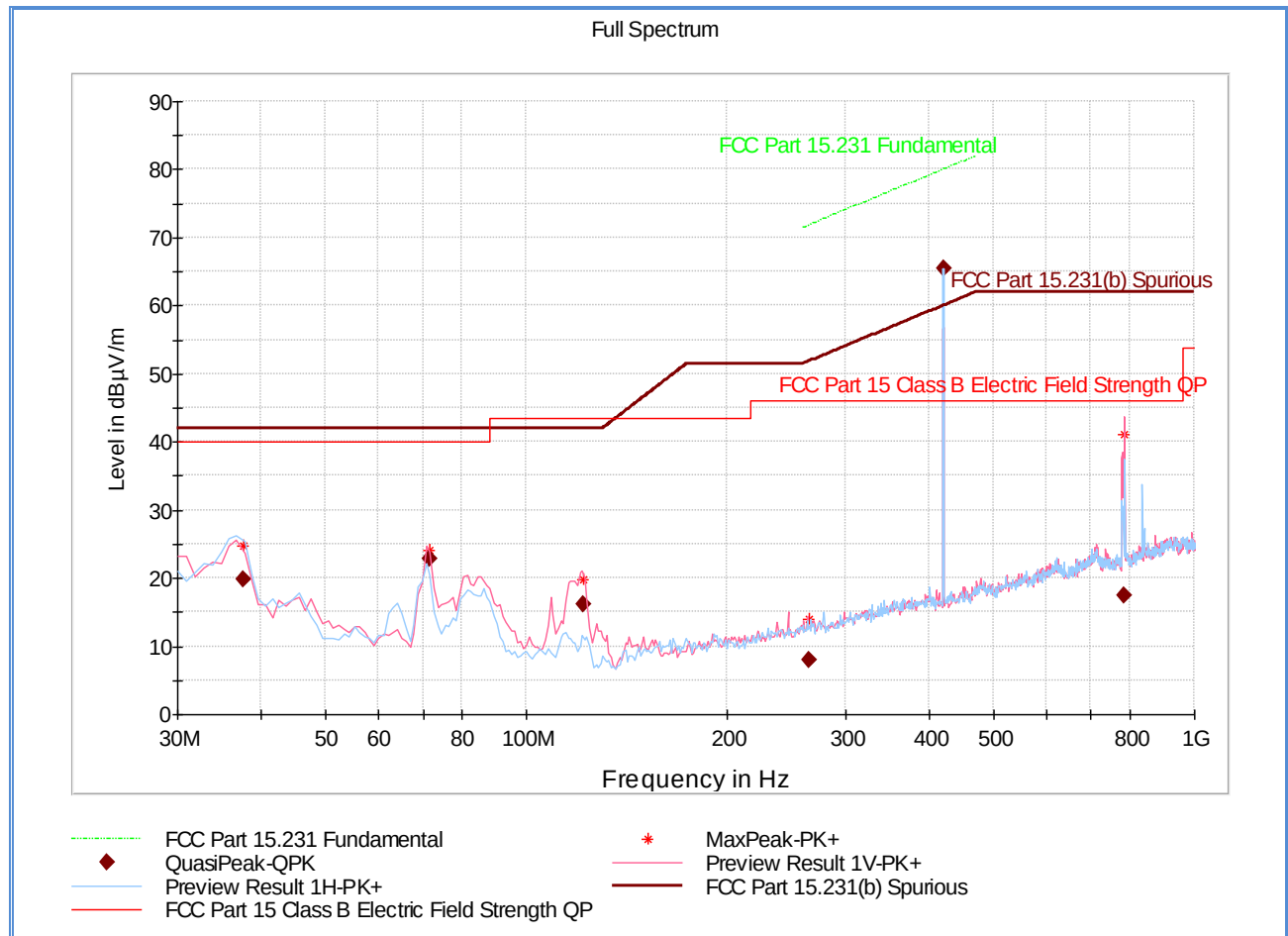


Quasi Peak Data

Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.600000	19.69	1000.0	120.000	400.0	H	96.0	-15.0	20.31	40.0
44.500000	11.08	1000.0	120.000	112.0	V	291.0	-18.0	28.92	40.0
71.370000	21.83	1000.0	120.000	181.1	V	217.0	-22.1	18.17	40.0
120.700000	15.19	1000.0	120.000	126.8	V	171.0	-20.2	28.31	43.5
261.970000	7.68	1000.0	120.000	400.0	H	117.0	-13.3	38.32	46.0
410.670000	65.43	1000.0	120.000	198.6	H	221.0	-8.5	14.10	79.53

Test Notes: There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.

2.4.11 Test Results Below 1GHz (Mid Channel 420 MHz)

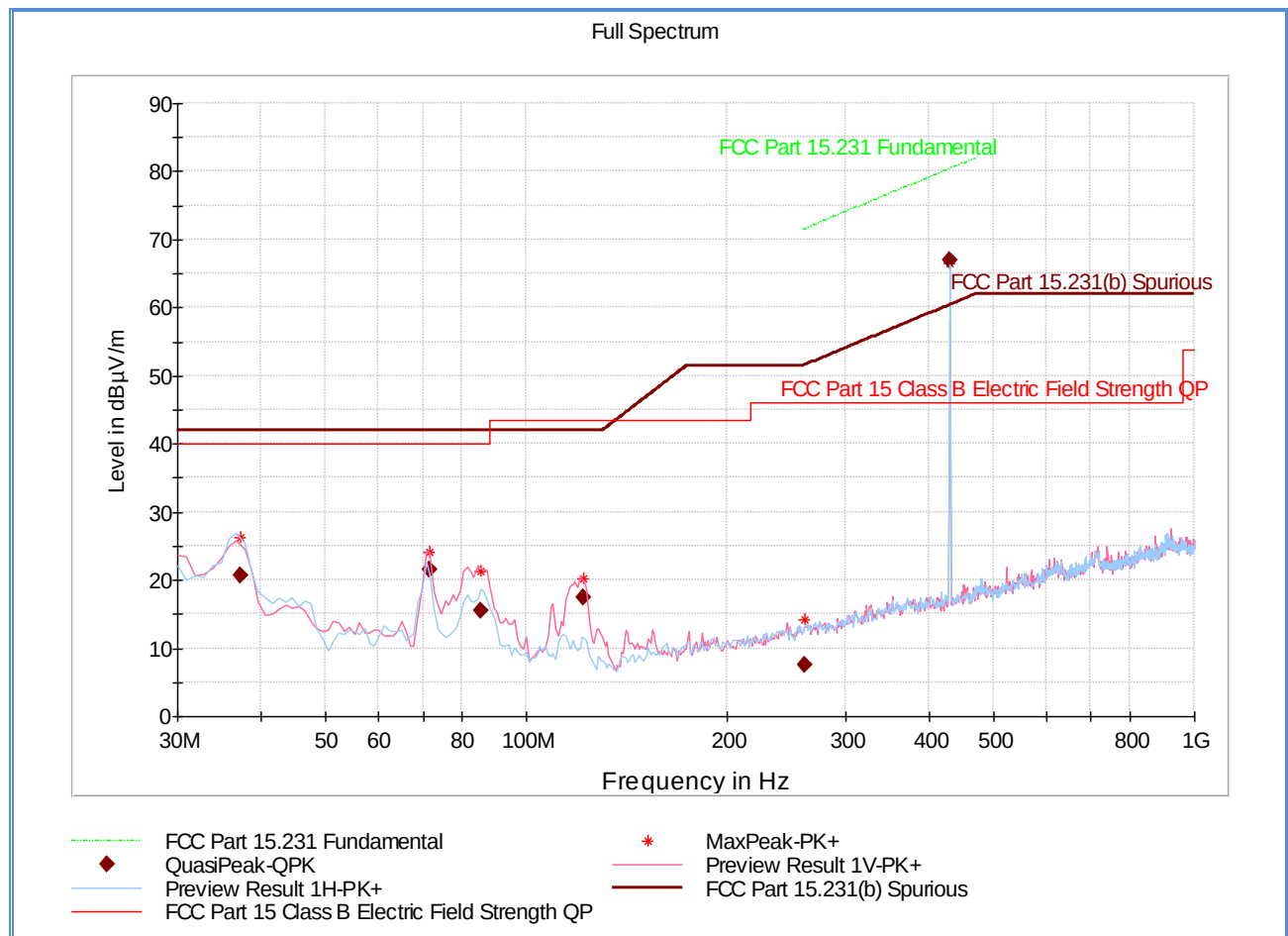


Quasi Peak Data

Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.570000	19.83	1000.0	120.000	103.1	V	42.0	-15.0	20.17	40.0
71.380000	22.81	1000.0	120.000	204.8	V	216.0	-22.1	17.19	40.0
121.720000	16.19	1000.0	120.000	100.0	V	84.0	-20.3	27.31	43.5
264.750000	8.07	1000.0	120.000	250.0	V	24.0	-13.1	37.93	46.0
420.460000	65.38	1000.0	120.000	190.1	H	223.0	-8.4	14.56	79.94
785.300000	17.38	1000.0	120.000	250.0	V	274.0	-0.4	28.62	46.0

Test Notes: There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.

2.4.12 Test Results Below 1GHz (High Channel 430 MHz)

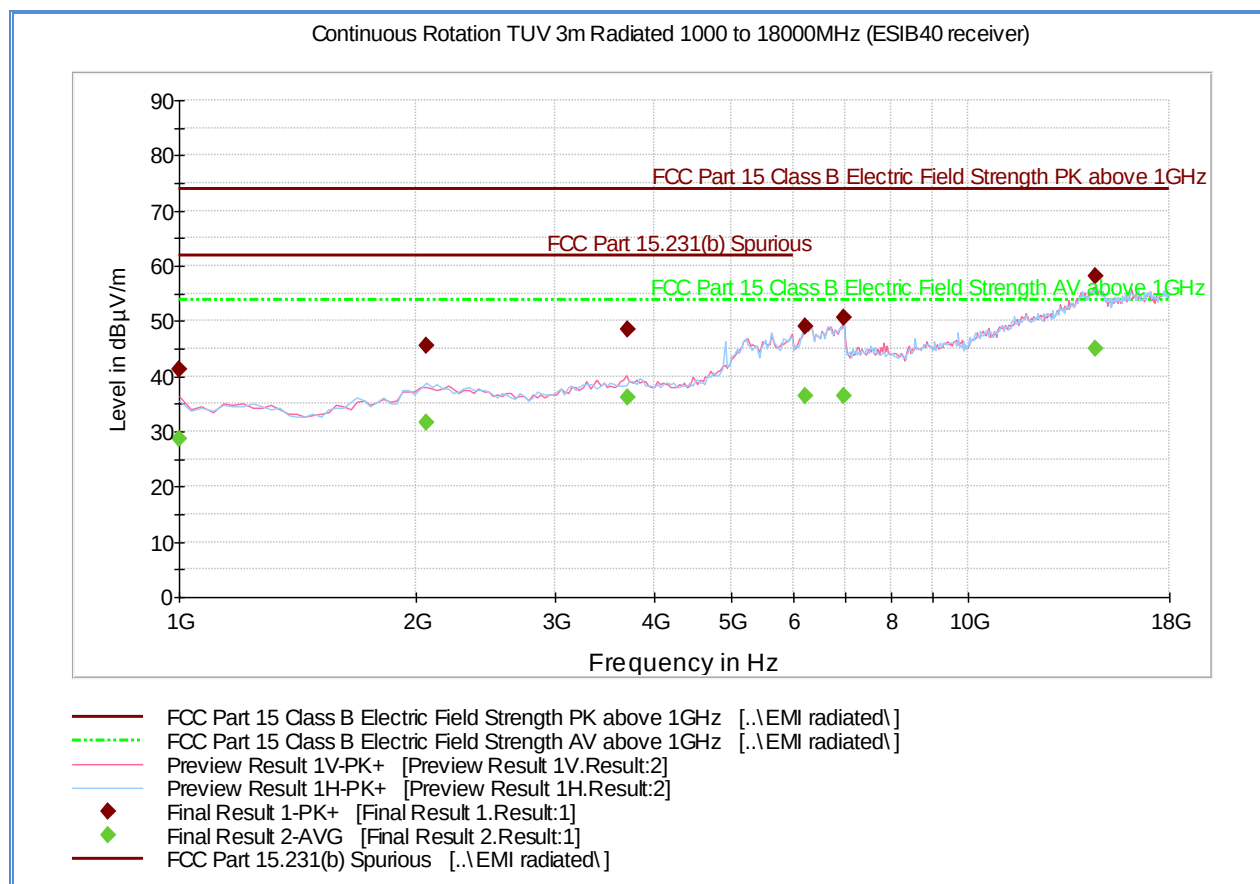


Quasi Peak Data

Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.210000	20.74	1000.0	120.000	400.0	H	330.0	-14.7	19.26	40.0
71.440000	21.56	1000.0	120.000	182.3	V	223.0	-22.1	18.44	40.0
85.240000	15.59	1000.0	120.000	180.9	V	218.0	-21.2	24.41	40.0
121.800000	17.36	1000.0	120.000	103.1	V	351.0	-20.3	26.14	43.5
260.670000	7.64	1000.0	120.000	300.2	H	169.0	-13.3	38.36	46.0
430.520000	66.97	1000.0	120.000	185.4	H	217.0	-8.0	13.39	80.36

Test Notes: There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.

2.4.13 Test Results Above 1GHz (Low Channel)



Peak Data

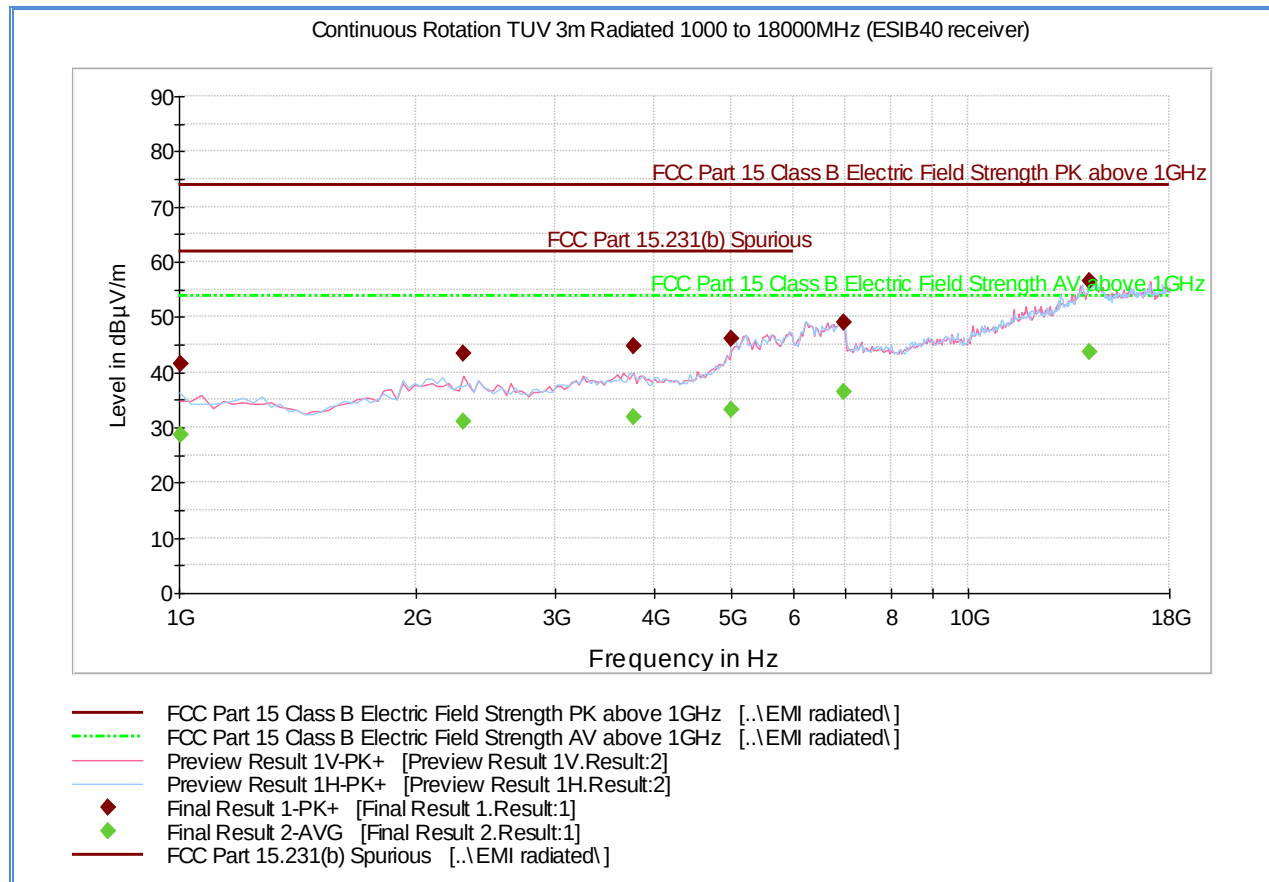
Frequency (MHz)	Max Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1001.200000	41.3	1000.0	1000.000	352.1	V	250.0	-1.1	32.6	73.9
2058.212224	45.5	1000.0	1000.000	167.5	H	275.0	2.1	28.4	73.9
3695.882766	48.5	1000.0	1000.000	151.5	V	321.0	5.8	25.4	73.9
6217.724850	48.9	1000.0	1000.000	224.3	H	20.0	10.3	25.0	73.9
6966.023848	50.7	1000.0	1000.000	132.6	V	62.0	10.4	23.2	73.9
14489.081964	58.1	1000.0	1000.000	406.7	V	41.0	23.0	15.8	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1001.200000	28.6	1000.0	1000.000	352.1	V	250.0	-1.1	25.3	53.9
2058.212224	31.6	1000.0	1000.000	167.5	H	275.0	2.1	22.3	53.9
3695.882766	36.2	1000.0	1000.000	151.5	V	321.0	5.8	17.7	53.9
6217.724850	36.3	1000.0	1000.000	224.3	H	20.0	10.3	17.6	53.9
6966.023848	36.4	1000.0	1000.000	132.6	V	62.0	10.4	17.5	53.9
14489.081964	45.1	1000.0	1000.000	406.7	V	41.0	23.0	8.8	53.9

Test Notes: No significant emissions observed above 1GHz. Measurement are noise floor figures.

2.4.14 Test Results Above 1GHz (Mid Channel)



Peak Data

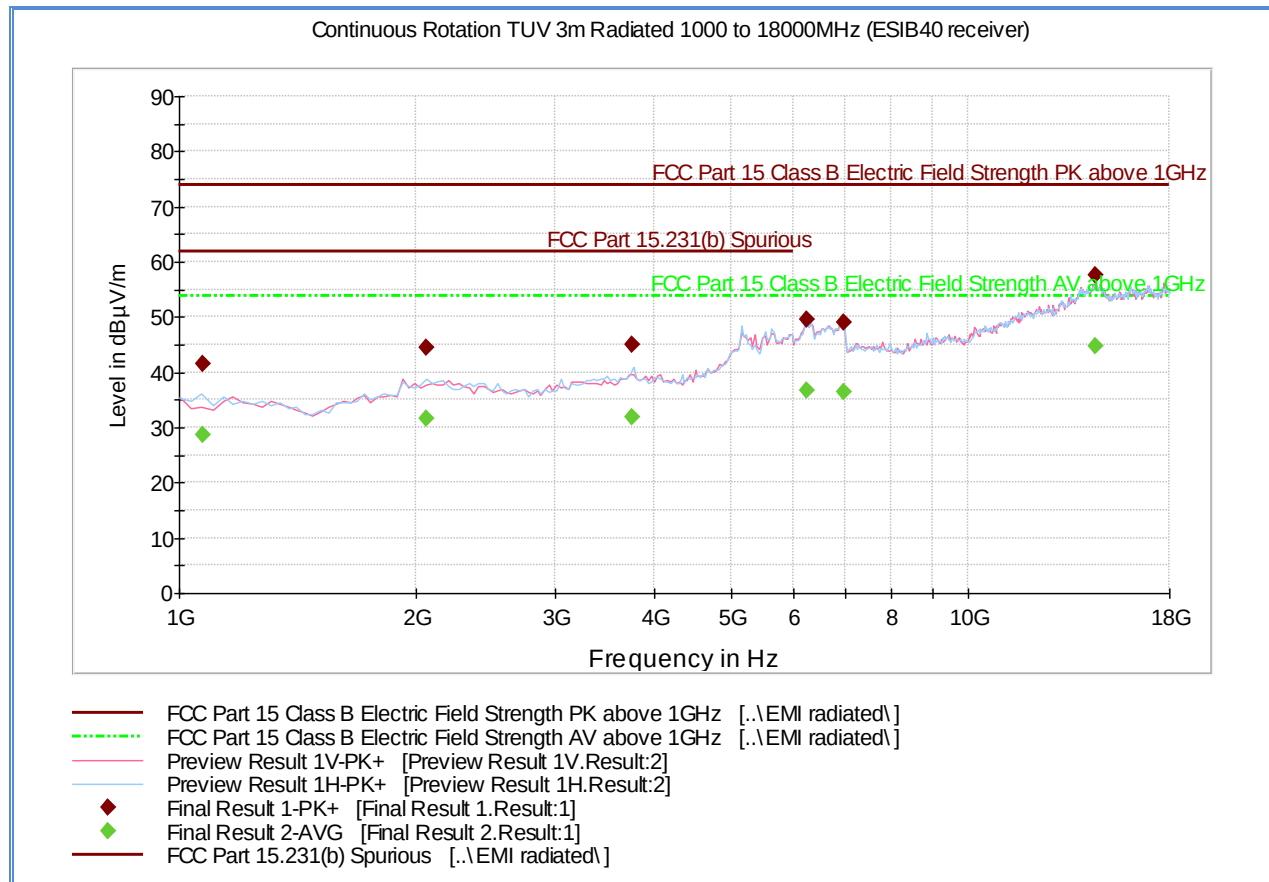
Frequency (MHz)	Max Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1005.500000	41.7	1000.0	1000.000	312.2	H	281.0	-1.1	32.3	73.9
2296.289178	43.5	1000.0	1000.000	303.2	V	11.0	2.2	30.4	73.9
3764.419038	44.8	1000.0	1000.000	352.6	V	23.0	5.9	29.1	73.9
5018.540080	46.2	1000.0	1000.000	151.5	H	303.0	7.9	27.7	73.9
6958.023848	49.1	1000.0	1000.000	167.5	V	93.0	10.4	24.8	73.9
14223.736874	56.4	1000.0	1000.000	149.5	V	20.0	22.2	17.5	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1005.500000	28.7	1000.0	1000.000	312.2	H	281.0	-1.1	25.2	53.9
2296.289178	31.1	1000.0	1000.000	303.2	V	11.0	2.2	22.8	53.9
3764.419038	31.9	1000.0	1000.000	352.6	V	23.0	5.9	22.0	53.9
5018.540080	33.2	1000.0	1000.000	151.5	H	303.0	7.9	20.7	53.9
6958.023848	36.4	1000.0	1000.000	167.5	V	93.0	10.4	17.5	53.9
14223.736874	43.8	1000.0	1000.000	149.5	V	20.0	22.2	10.1	53.9

Test Notes: No significant emissions observed above 1GHz. Measurement are noise floor figures.

2.4.15 Test Results Above 1GHz (High Channel)



Peak Data

Frequency (MHz)	Max Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1072.636273	41.5	1000.0	1000.000	140.5	H	199.0	-1.5	32.4	73.9
2058.212224	44.4	1000.0	1000.000	352.1	H	275.0	2.1	29.5	73.9
3757.219038	45.1	1000.0	1000.000	410.7	H	199.0	5.9	28.8	73.9
6243.392986	49.6	1000.0	1000.000	115.6	V	-16.0	10.3	24.3	73.9
6966.823848	49.0	1000.0	1000.000	99.6	H	338.0	10.4	24.9	73.9
14525.150100	57.7	1000.0	1000.000	246.3	V	-3.0	22.9	16.2	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1072.636273	28.8	1000.0	1000.000	140.5	H	199.0	-1.5	25.2	53.9
2058.212224	31.6	1000.0	1000.000	352.1	H	275.0	2.1	22.3	53.9
3757.219038	31.9	1000.0	1000.000	410.7	H	199.0	5.9	22.0	53.9
6243.392986	36.7	1000.0	1000.000	115.6	V	-16.0	10.3	17.2	53.9
6966.823848	36.4	1000.0	1000.000	99.6	H	338.0	10.4	17.5	53.9
14525.150100	44.8	1000.0	1000.000	246.3	V	-3.0	22.9	9.1	53.9

Test Notes: No significant emissions observed above 1GHz. Measurement are noise floor figures.



2.5 BANDWIDTH REQUIREMENT

2.5.1 Specification Reference

Part 15 Subpart C §15.231(c)

2.5.2 Standard Applicable

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

2.5.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

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

March 24, 2014/AC

2.5.5 Test Equipment Used

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

2.5.6 Environmental Conditions/Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.0°C
Relative Humidity	32.4%
ATM Pressure	98.8 kPa

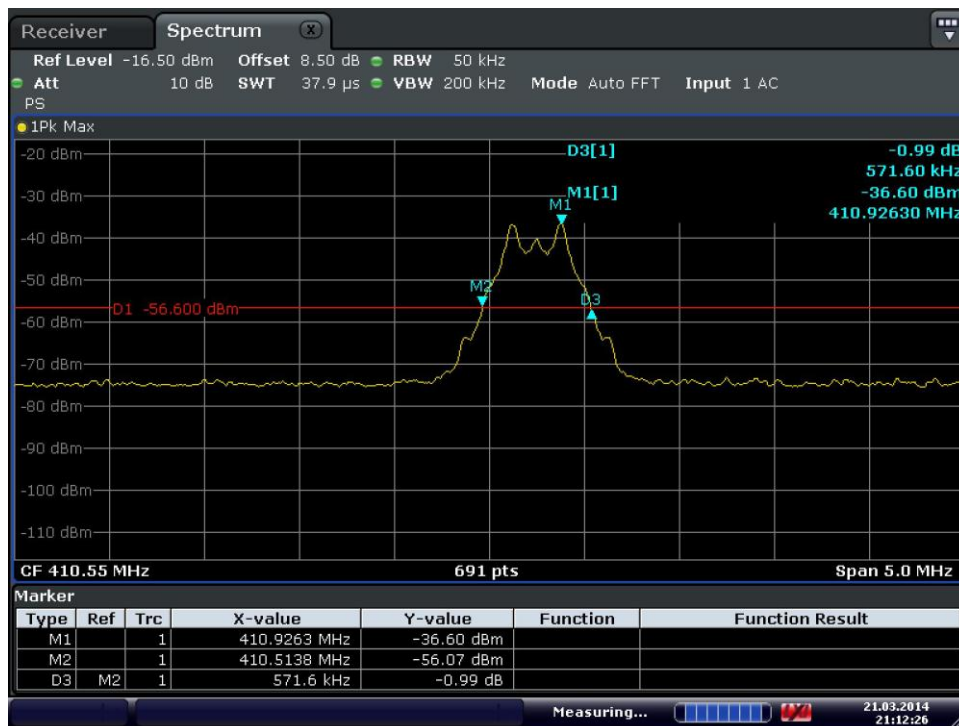
2.5.7 Additional Observations

- This is a radiated test.
- Offset were added to compensate for the antenna factor, preamp, and cable used from the antenna to spectrum analyzer.
- Span is set to encompass the whole emission
- RBW is 1% of the span while VBW is greater than 3X RBW.
- Sweep is auto.
- Detector is peak.
- Max hold function activated.

2.5.8 Test Results

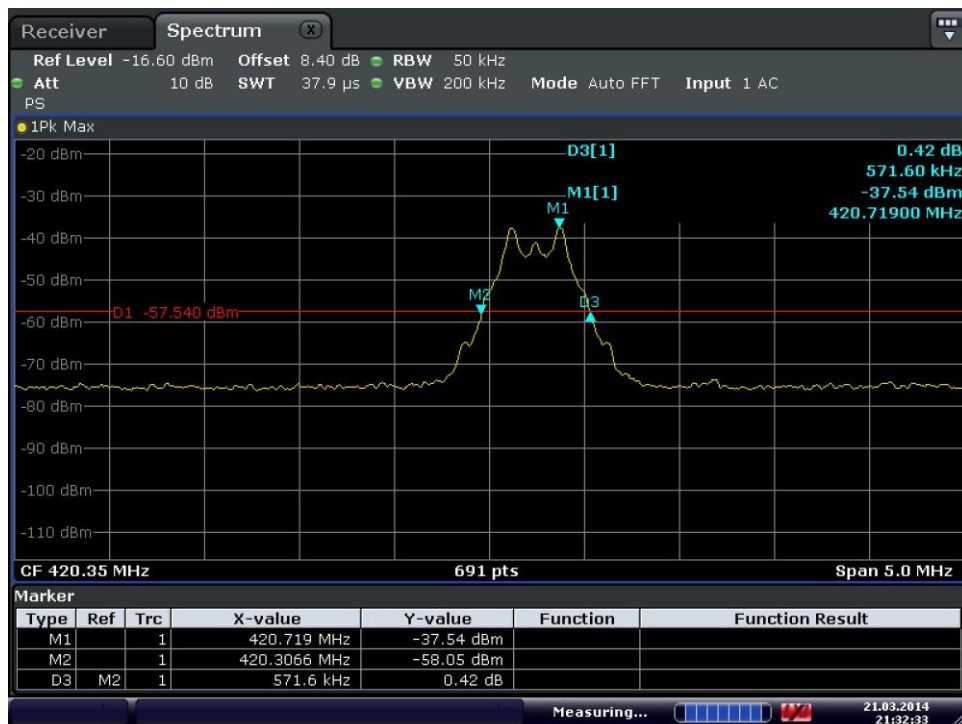
Transmitter Frequency (MHz)	Modulation	0.25% of the center frequency requirement	Measured 20dB Bandwidth (MHz)
410	FSK	<1.026 MHz	571.6 kHz
420	FSK	<1.051 MHz	571.6 kHz
430	FSK	<1.075 MHz	571.6 kHz

2.5.9 Test Results Plots



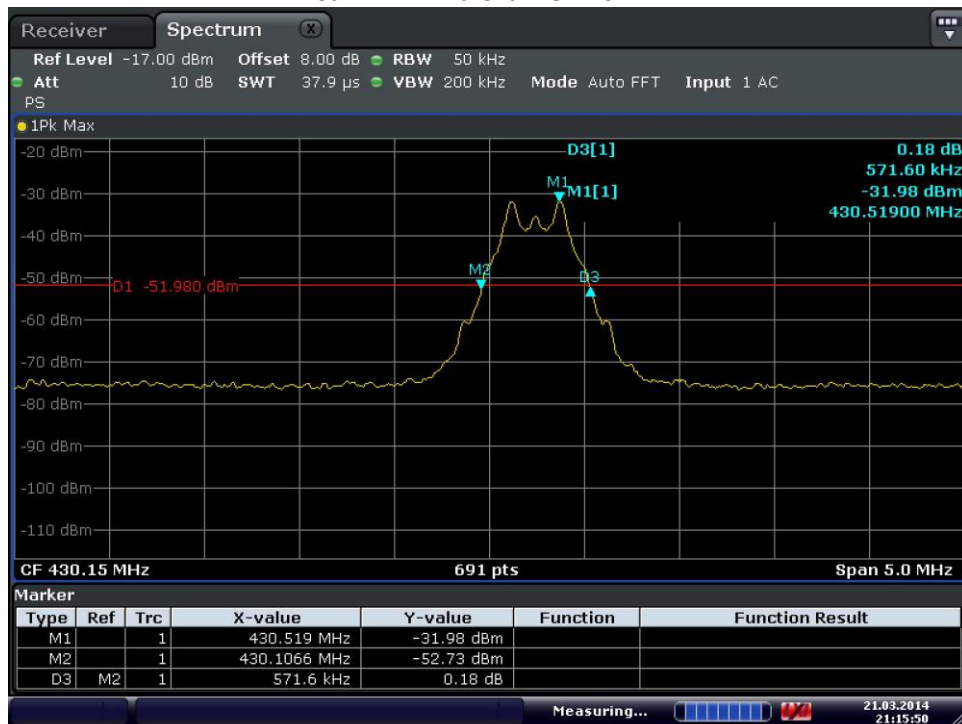
Date: 21.MAR.2014 21:12:26

20dB BW – Low Channel 410 MHz



Date: 21.MAR.2014 21:32:32

20dB BW – Mid Channel 420 MHz



Date: 21.MAR.2014 21:15:50

20dB BW – High Channel 430 MHz



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
Radiated Test Setup						
1033	Bilog Antenna	3142C	00044556	EMCO	06/25/13	06/25/14
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	03/25/13	03/25/14
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	07/31/13	07/31/14
Rental	EMI Test Receiver	ESR7	5000- 309019782	Rhode & Schwarz	11/21/13	11/21/14
1016	Pre-amplifier	PAM-0202	187	PAM	10/08/13	10/08/14
Miscellaneous						
6452	Multimeter	3478A	2911A52177	Hewlett Packard	08/02/13	08/02/14
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	01/30/14	01/30/15
	Test Software	EMC32	V8.53	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 (Below 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamplifier	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.41
Coverage Factor (k):					2
Expanded Uncertainty:					4.82

3.2.2 Radiated Emission Measurements (Above 1GHz)

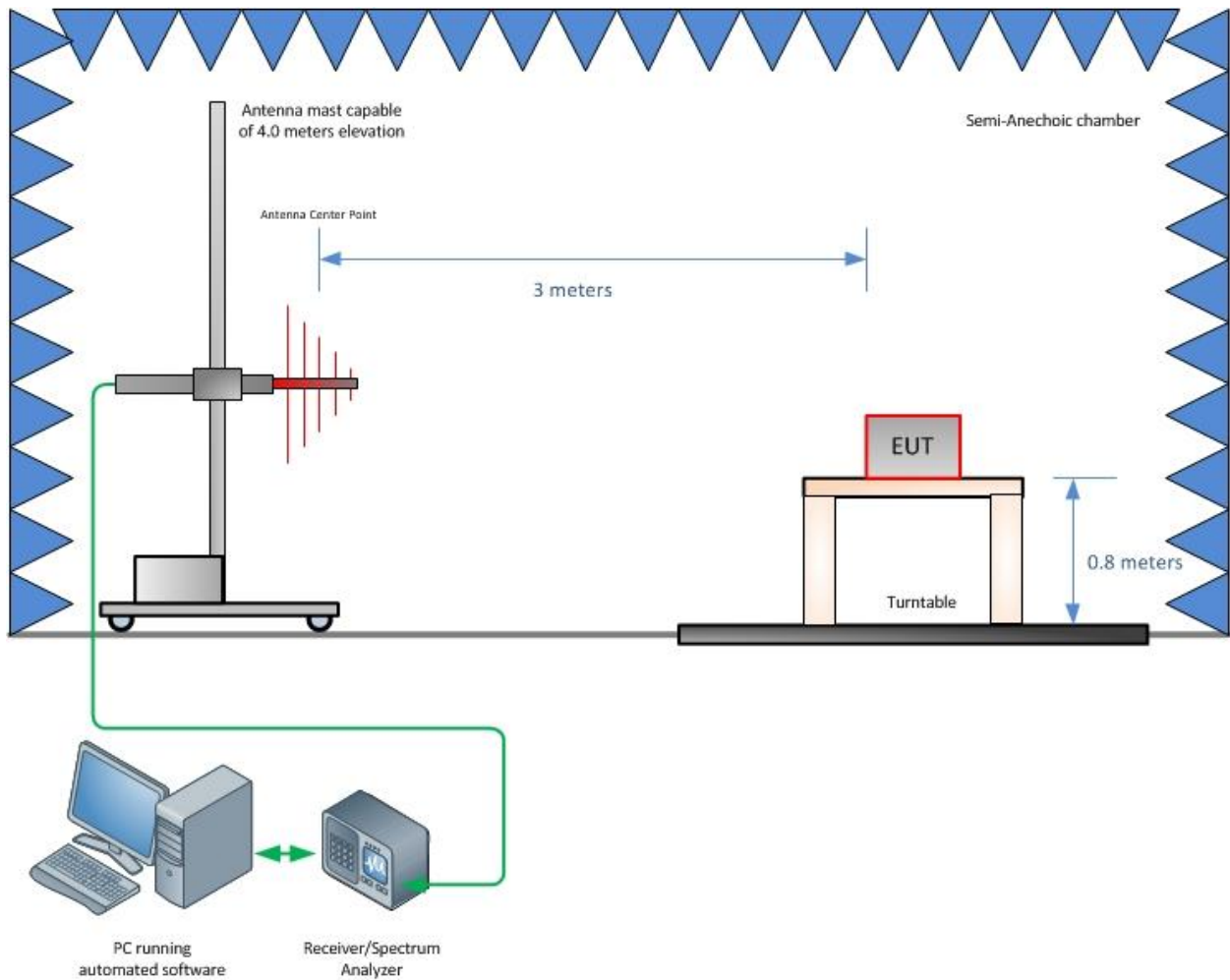
Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamplifier	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.40
Coverage Factor (k):					2
Expanded Uncertainty:					4.81



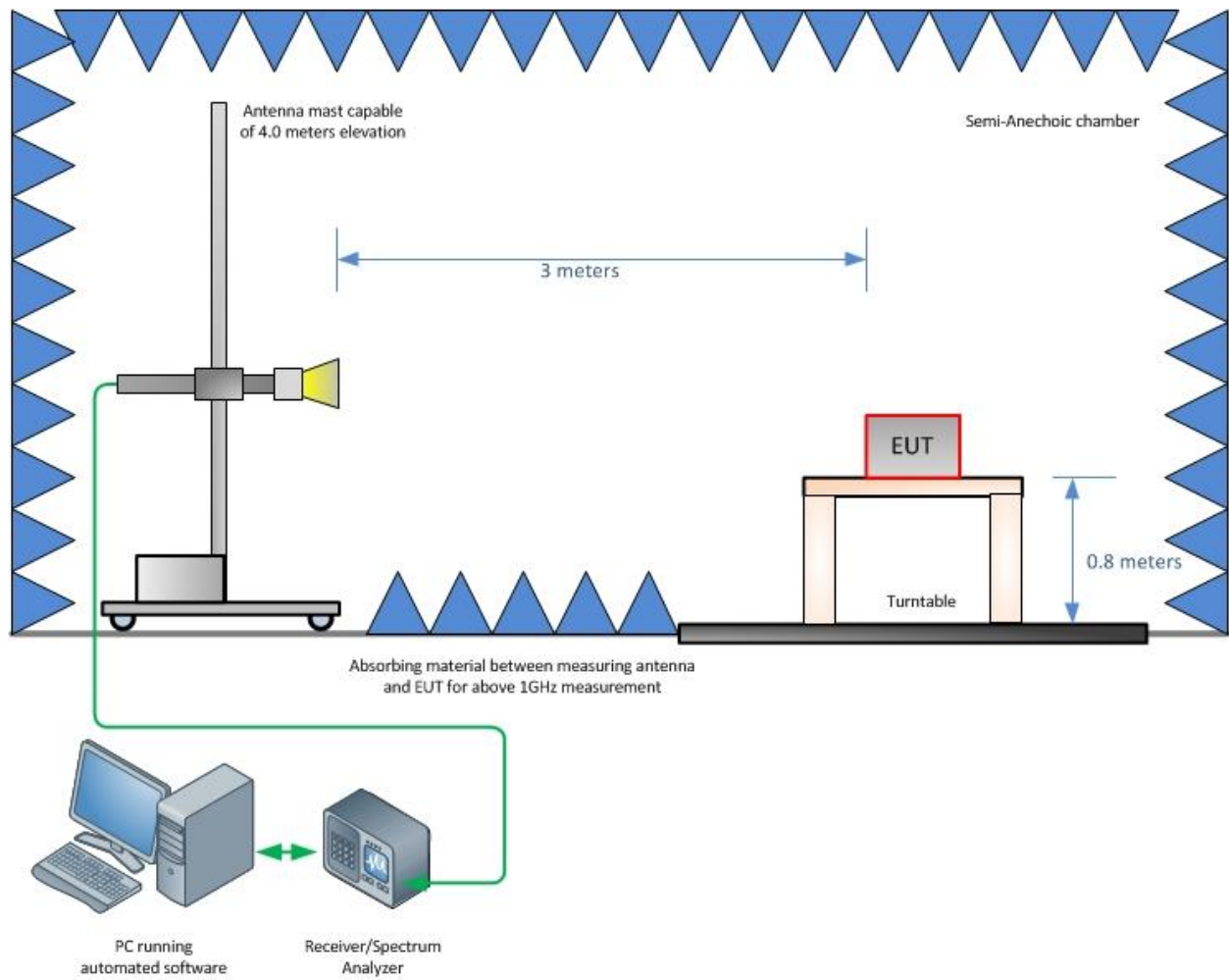
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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