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Report On

C2PC Application for Grant of Equipment Authorization of the ViaSat Inc.
L-Band Satellite Mobile Terminal MT2220
L-Band Satellite Aviation Terminal AT2220

FCC Part 15 Subpart C §15.247
IC RSS-247 Issue 1 May 2015
IC RSS-Gen Issue 4 November 2014

Report No. SD72116127-0416A May 2016

REPORT ON	C2PC Radio Testing of the ViaSat Inc. L-Band Satellite Mobile Terminal MT2220 L-Band Satellite Aviation Terminal AT2220
TEST REPORT NUMBER	SD72116127-0416A
PEPORT DATE	May 2016
PREPARED FOR	ViaSat Inc. 6155 El Camino Real Carlsbad, CA 92009 USA
CONTACT PERSON	Waiman Wong Compliance Engineer (760) 893-3704 Waiman.Wong@viasat.com
PREPARED BY	Alex Chang **Name** Authorized Signatory Title: EMC/Wireless Test Engineer
APPROVED BY	Juan Manuel Gonzalez **Name** Authorized Signatory Title: Commercial/Wireless EMC Lab Manager
DATED	May 25, 2016

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

Revision History

SD72116127-0416A ViaSat Inc. L-Band Satellite Mobile Terminal MT2220 L-Band Satellite Aviation Terminal AT2220					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
05/25/2016	Initial Release				Juan M. Gonzalez

CONTENTS

SECTION 1

REPORT SUMMARY

C2PC Radio Testing of the
ViaSat Inc.
L-Band Satellite Mobile Terminal MT2220
L-Band Satellite Aviation Terminal AT2220

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the ViaSat Inc. L-Band Satellite Mobile Terminal, model MT2220 and L-Band Satellite Aviation Terminal, model AT2220 to the requirements of FCC Part 15 Subpart C §15.247 and IC RSS-247 Issue 1 May 2015.

Objective	To perform C2PC Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	ViaSat Inc.
Model Number(s)	MT2220 and AT2220
Model Name(s)	Aviation Terminal 2220 Mobile Terminal 2220
FCC ID Number	2ABLPAT2220
IC Number	20546-AT2220
Serial Number(s)	E70016120011 (MT2220) C20015440005 (AT2220)
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC Part 15 Subpart C §15.247 (October 1, 2015). • RSS-247 – Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices (Issue 1, May 2015). • RSS-Gen - General Requirements for Compliance of Radio Apparatus (Issue 4, November 2014). • 558074 D01 DTS Meas Guidance v03r05, (April 08, 2016) Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247. •
Start of Test	April 25, 2016
Finish of Test	May 04, 2016
Name of Engineer(s)	Alex Chang
Related Document(s)	• None. Supporting documents for EUT certification are separate exhibits. • Conducted port measurement leveraged from previously evaluated under TÜV SÜD test report ref. No. SD72111016-1015A WLAN test report.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart C §15.247 with cross-reference to the corresponding IC RSS standard is shown below.

Section	§15.247 Spec Clause	RSS	Test Description	Result	Comments/ Base Standard
2.1	§15.247(b)(3)	RSS-247 5.4(4)	Peak Output Power	N/P	See notes
—	§15.207(a)	RSS-Gen 7.2.4	Conducted Emissions	N/A	
2.2		RSS-Gen 4.6.1	99% Emission Bandwidth	N/P	See notes
2.3	§15.247(a)(2)	RSS-247 5.2(1)	Minimum 6 dB RF Bandwidth	N/P	See notes
2.4	§15.247(d)	RSS-247 5.5	Out-of-Band Emissions - Conducted	N/P	See notes
2.5	§15.247(d)	RSS-247 5.5	Band-edge Compliance of RF Conducted Emissions	N/P	See notes
2.6	§15.247(d)	RSS-247 5.5	Spurious Radiated Emissions	Compliant	
2.6		RSS-Gen 4.10	Receiver Spurious Emissions	Compliant	
2.7	§15.247(d)	RSS-247 5.5	Radiated Band Edge Measurements	Compliant	
2.8	§15.247(e)	RSS-247 5.2(2)	Power Spectral Density for Digitally Modulated Device	N/P	See notes

N/A EUT is a DC voltage operated device.
N/P WLAN conducted port test results were leveraged from previous WLAN module which was previously evaluated under TÜV SÜD test report ref. No. SD72111016-1015A. No further evaluation considered necessary.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a ViaSat Inc. Aviation Terminal 2220 (L-Band Satellite Mobile Terminal) model no. AT2220. The ViaSat AT2220 Terminal enables reliable and instant IP-based communications via satellite for rotor and fixed-wing aircraft. Powered by ViaSat L-band Managed Service (VMS), this satcom terminal's two-way networking capability enables both real-time monitoring of position location information using built in GPS receiver, and data and voice communications. AES-256 encrypted data link layer encryption is employed to ensure the integrity of user data is protected. The terminal features easy-to-use interfaces and provides flexibility to configure to nearly any sensor system or IP data application. Examples of operational scenarios that the AT2220 Terminal supports range from fleet management, emergency first responders, homeland security forces, disaster aid workers, corresponders, mobile workforce management and tracking of high-valued assets. This is all within an integrated single assembly package that is optimized for airborne data transmission. A single cable provides DC power and Ethernet for wired connections to an IP device, eliminating the need of RF cable typically required for connection between modem and antenna. The transceiver also supports Wi-Fi and Bluetooth for wireless connections to multiple tablets or smart-phones. The AT2220 Terminal is powered by ViaSat advanced waveform that allows for a low latency and highest capacity of users to operate on a single L-band channel.

The Equipment Under Test (EUT) was a ViaSat Inc. Mobile Terminal 2220 (L-Band Satellite Mobile Terminal) model no. MT2220. The ViaSat MT2220 Terminal enables reliable and instant IP-based communications via satellite for mobile vehicular environments. Powered by ViaSat L-band Managed Service (VMS), this satcom terminal's two-way networking capability enables both real-time monitoring of position location information using built in GPS receiver, and data and voice communications. AES-256 data link layer encryption is employed to ensure the integrity of user data is protected. The terminal features easy-to-use interfaces and provides IP data and voice connectivity, including Push-To-Talk and GPS tracking. Examples of operational scenarios that the MT2220 Terminal supports range from fleet management, emergency first responders, homeland security forces, disaster aid workers, and mobile workforce management. This is all within an integrated single assembly package that is optimized for mobile data transmission. A single cable provides DC power and Ethernet for wired connections to an IP device, eliminating the need of RF cable typically required for connection between modem and antenna. The transceiver also supports Wi-Fi and Bluetooth for wireless connections to multiple tablets or smart-phones. The MT2220 Terminal is powered by ViaSat advanced waveform that allows for a low latency and highest capacity of users to operate on a single L-band channel.

The WiFi/BT antenna gain was increased from previous evaluated model AT2220; the model MT2220 was provided for spurious emission evaluation. Test results applied to both models AT2220 and MT2220 which were conducted into this test report.

1.3.2 EUT General Description

EUT Description	L-Band Satellite Mobile Terminal L-Band Satellite Aviation Terminal
Model Name	Mobile Terminal 2220 and Aviation Terminal 2220
Model Number(s)	MT2220 and AT2220
Rated Voltage	10 – 32VDC
Mode Verified	802.11 b/g
Capability	802.11 b/g WLAN (DTS) 2.4GHz band 20MHz BW, Bluetooth EDR and Mobile satellite service at 1.6 GHz
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
Antenna Type	Integral PCB trace type (multilayer chip antenna)
Manufacturer	ViaSat
Antenna Gain (measured declared by manufacturer)	-2.98 dBi (2412 MHz) -2.76 dBi (2437 MHz) -2.84 dBi (2472 MHz)

1.3.3 Maximum Conducted Output Power

Mode	Frequency Range (MHz)	Average Output Power (dBm)	Average Output Power (mW)
802.11b	2412 – 2462	19.38	86.70
802.11g	2412 – 2462	15.32	34.04

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Antenna conducted port test configuration. A conducted test sample was provided for this setup. The integral antenna was removed to gain accessible to the coaxial connector. EUT configuration was set to WiFi mode via Ethernet connection using Tera Term application. Manufacturer provided the instructions that able to configure the EUT to change modes, channels, data rates and power level (Power parameter was set to "20 for b mode and 15 for g mode" which corresponds to the maximum power setting).
B	Radiated emissions test configuration. EUT was set on continuous transmission at 100% duty cycle modulated in low, mid or high channel for evaluation.

1.4.2 EUT Exercise Software

EUT is configured via TCP/IP (Ethernet). EUT IP address is set to 192.168.100.1. This address is used to connect to the EUT via Tera Term client application. Once connected, corresponding programming commands were issue in order to set the EUT in WiFi test mode.

1.4.3 Support Equipment and I/O cables

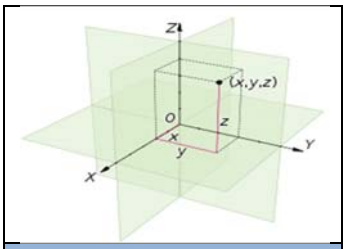
Manufacturer	Equipment/Cable	Description
Sony	Support Laptop	Model PCG-31311L
Sony	Support AC-DC Power Adapter	Model: ACDP-120E03
—	Ethernet EUT to Support Laptop	2.1 meters, shielded CAT5e cable with RJ45 connector

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report as per maximum conducted output power measurements:

Mode	Channel	Data Rate
802.11b	11 (High Channel)	5.5Mbps
802.11g	1 (Low Channel)	6Mbps

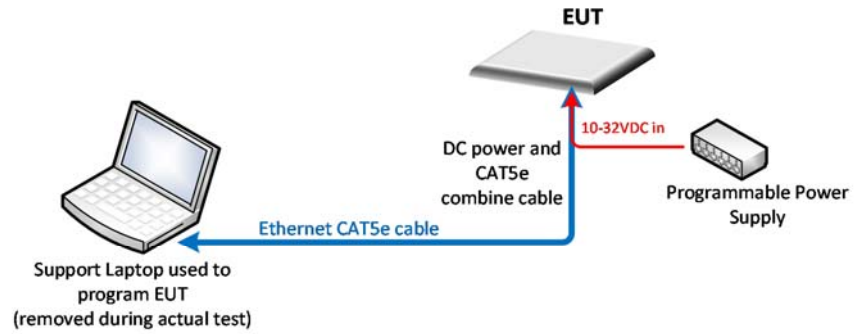
For radiated measurements X, Y and Z orientations were verified. Worst case position is “Y”.



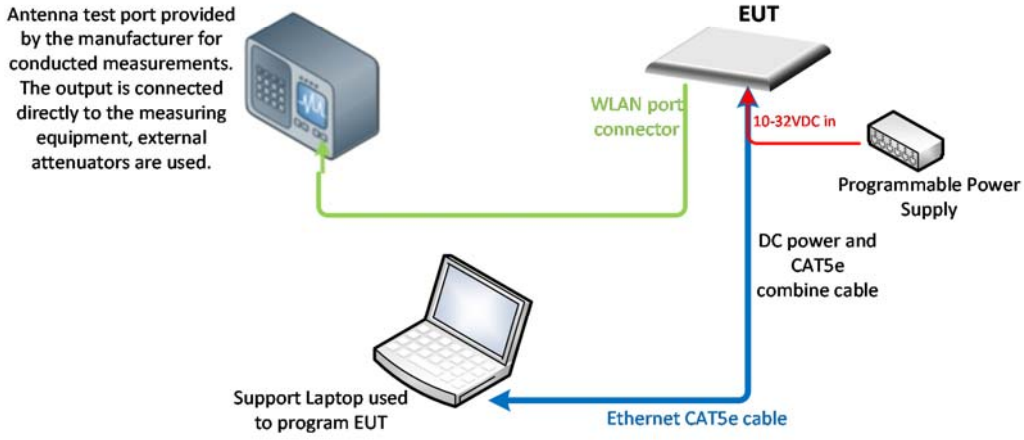
“X,Y,Z” Configuration

1.4.5 Simplified Test Configuration Diagram

Radiated Emission Test Setup



Conducted Port Measurement Test Setup



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: E70016120011 and C20015440005		
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 C63.10-2013, America National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
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 C63.10-20013. 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)

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 §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

1.9.2 Innovation, Science and Economic Development Canada (ISED) Registration No.: 3067A

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

SECTION 2

TEST DETAILS

C2PC Radio Testing of the
ViaSat Inc.
L-Band Satellite Mobile Terminal MT2220
L-Band Satellite Aviation Terminal AT2220

2.1 PEAK OUTPUT POWER

2.1.1 Specification Reference

Part 15 Subpart C §15.247(b)(3)

2.1.2 Standard Applicable

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

2.1.3 Equipment Under Test and Modification State

Serial No: C10015220004 / Test Configuration A

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

July 31, 2015 / AC

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.1 °C
Relative Humidity	52.6 %
ATM Pressure	99.3 kPa

2.1.7 Additional Observations

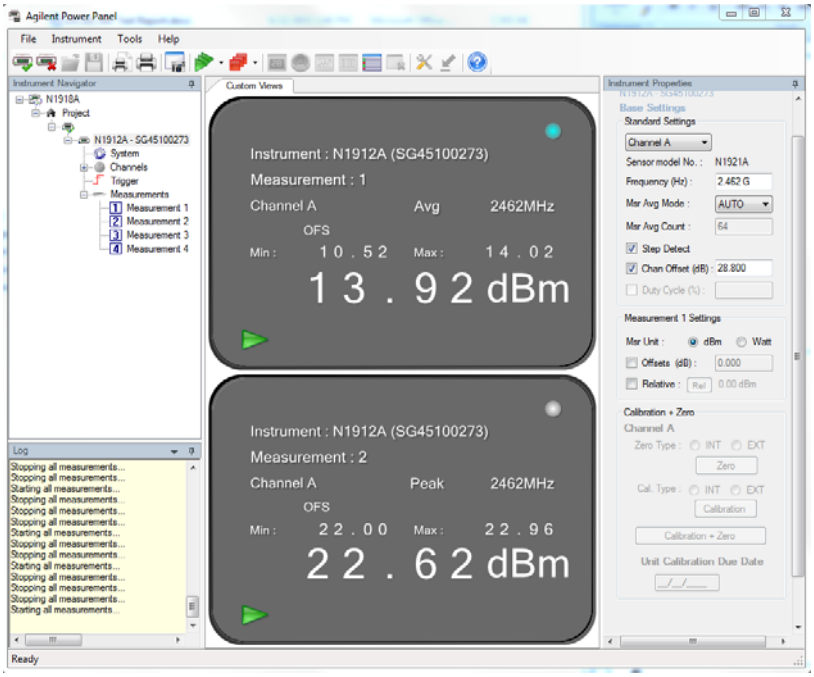
- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- This is a conducted test (Maximum conducted [average] output power) using direct connection to a power meter.
- An offset of 28.8dB was added to compensate for the external attenuator and cable used from the antenna port to the power sensor and spectrum analyzer.
- Test methodology is per Clause 9.2.3.1 of KDB 558074 D01 DTS Meas Guidance v03r01 (April 09, 2013). All conditions under this Clause are satisfied.
- Both Peak and Average measurements were recorded.

2.1.8 Test Results

WLAN Mode	Channel	Data Rates (Mbps)	Measured Average Power (dBm)	Measured Peak Power (dBm)
802.11b	1 (2412 MHz)	1	18.52	21.30
		2	18.67	21.36
		5.5	18.89	21.40
		11	18.62	21.48
	6 (2437 MHz)	1	18.26	21.08
		2	18.36	21.14
		5.5	18.59	21.09
		11	18.48	21.21
	11 (2462 MHz)	1	18.83	21.59
		2	18.90	21.66
		5.5	**19.38**	**21.69**
		11	18.94	21.59

WLAN Mode	Channel	Data Rates (Mbps)	Measured Average Power (dBm)	Measured Peak Power (dBm)
802.11g	1 (2412 MHz)	6	15.32	22.90
		9	15.25	22.92
		12	15.16	22.88
		18	15.05	22.95
		24	14.95	23.01
		36	14.64	22.89
		48	14.57	22.87
		54	14.38	22.91
	6 (2437 MHz)	6	14.87	22.52
		9	14.84	22.50
		12	14.78	22.56
		18	14.62	22.56
		24	14.73	22.72
		36	14.57	22.58
		48	14.09	22.49
		54	14.13	22.50
	11 (2462 MHz)	6	14.91	22.94
		9	14.80	22.93
		12	14.74	22.92
		18	14.65	22.81
		24	14.54	22.91
		36	14.37	22.83
		48	14.09	22.93
		54	14.02	22.96

2.1.9 Sample Test Display



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: C10015220004 / Test Configuration A

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

July 31, 2015 / AC

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.1 °C
Relative Humidity	52.6 %
ATM Pressure	99.3 kPa

2.2.7 Additional Observations

- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- This is a conducted test.
- An offset of 22.0dB was added to compensate for the external attenuator and cable used from the antenna port to the spectrum analyzer.
- 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

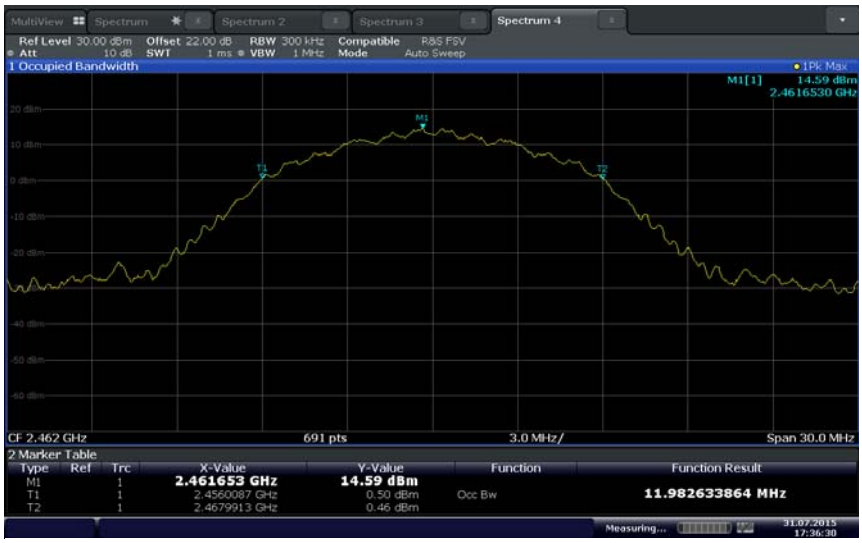
Mode	Channel	Measured 99% Bandwidth (MHz)
802.11b	1 (2412 MHz)	11.983
	6 (2437 MHz)	12.026
	11 (2462 MHz)	11.983
802.11g	1 (2412 MHz)	16.758
	6 (2437 MHz)	16.758
	11 (2462 MHz)	16.671

2.2.9 Test Results Plots

802.11b Low Channel (2412 MHz)

Date: 31.JUL.2015 17:34:52

802.11b Mid Channel (2437 MHz)

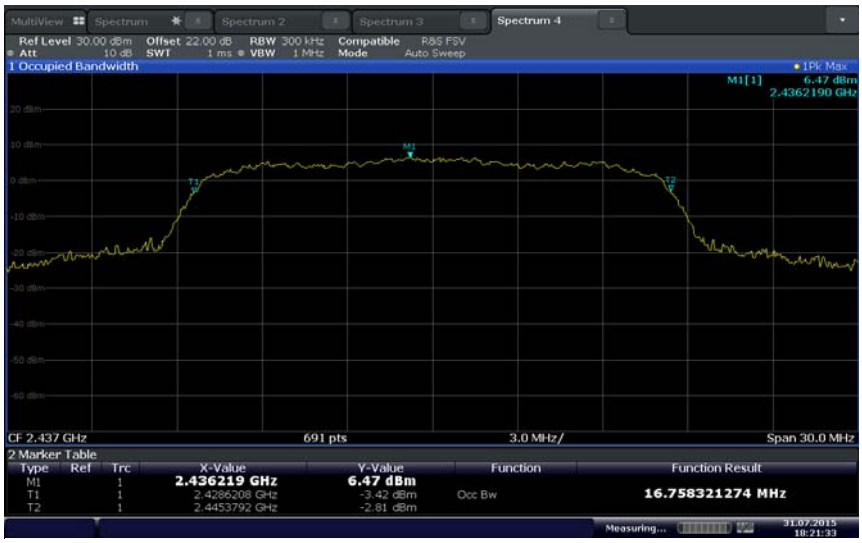


Date: 31.JUL.2015 17:36:30

802.11b High Channel (2462 MHz)

Date: 31.JUL.2015 18:19:25

802.11g Low Channel (2412 MHz)



Date: 31.JUL.2015 18:21:33

802.11g Mid Channel (2437 MHz)

Date: 31.JUL.2015 18:23:37

802.11g High Channel (2462 MHz)

2.3 MINIMUM 6 dB RF BANDWIDTH

2.3.1 Specification Reference

Part 15 Subpart C §15.247(a)(2)

2.3.2 Standard Applicable

(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.3 Equipment Under Test and Modification State

Serial No: C10015220004 / Test Configuration A

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

July 31, 2015 / 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	24.1 °C
Relative Humidity	52.6 %
ATM Pressure	99.3 kPa

2.3.7 Additional Observations

- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- This is a conducted test.
- An offset of 22.0dB was added to compensate for the external attenuator and cable used from the antenna port to the spectrum analyzer.
- Span is wide enough to capture the channel transmission.
- RBW is set to 100 kHz.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is peak.
- The “n” dB down marker function of the spectrum analyzer was used for this test.
- For signal modulation where “n” dB down marker function is not practical a peak measurement is performed while the trace is in max hold.
- A horizontal line is drawn 6dB below the peak measurement.
- 6dB bandwidth is where the lower and upper edge of the signal intersects the drawn line using delta marker type measurement.

2.3.8 Test Results

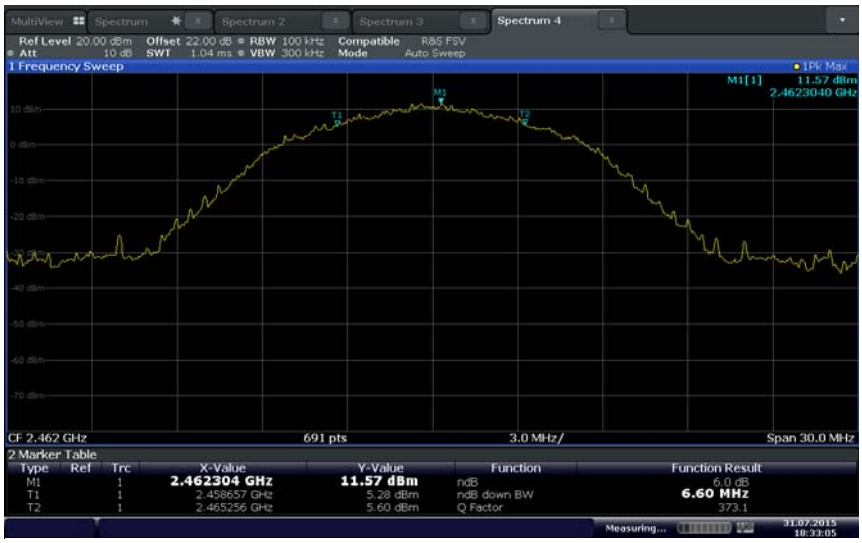
Mode	Channel	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Compliance
802.11b	1 (2412 MHz)	6.51	0.500	Complies
	6 (2437 MHz)	6.56	0.500	Complies
	11 (2462 MHz)	6.60	0.500	Complies
802.11g	1 (2412 MHz)	13.46	0.500	Complies
	6 (2437 MHz)	13.46	0.500	Complies
	11 (2462 MHz)	13.55	0.500	Complies

2.3.9 Test Results Plots

802.11b Low Channel (2412 MHz)

Date: 31.JUL.2015 18:30:39

802.11b Mid Channel (2437 MHz)



Date: 31.JUL.2015 18:33:06

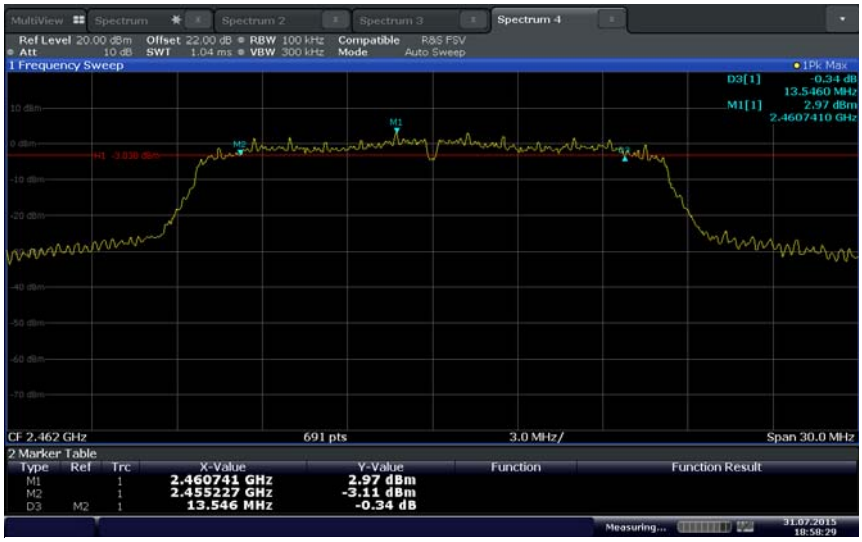
802.11b High Channel (2462 MHz)

Date: 31.JUL.2015 18:45:05

802.11g Low Channel (2412 MHz)

Date: 31.JUL.2015 18:50:07

802.11g Mid Channel (2437 MHz)



Date: 31.JUL.2015 18:58:29

802.11g High Channel (2462 MHz)

2.4 OUT-OF-BAND EMISSIONS - CONDUCTED

2.4.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.4.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.4.3 Equipment Under Test and Modification State

Serial No: C10015220004 / Test Configuration A

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

August 01, 2015 / 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	24.5 °C
Relative Humidity	56.0 %
ATM Pressure	99.6 kPa

2.4.7 Additional Observations

- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- This is a conducted test.
- An offset of 22.0dB was added to compensate for the external attenuator and cable used from the antenna port to the spectrum analyzer.
- RBW is 100kHz.VBW is 3X RBW.
- Sweep is auto. Detector is RMS. Trace is max hold.
- Initial scan was performed to determine the highest level of the desired power within the band. Limit (display line) was drawn 30dB below this level.

- Spectrum was searched from 9 kHz up to 26.5GHz.

2.4.8 Test Results Plots

Date: 1 AUG .2015 10:25:05

802.11b Low Channel (2412 MHz)

Date: 1 AUG .2015 10:34:59

802.11b Mid Channel (2437 MHz)

Date: 1 AUG 2015 10:37:03

802.11b High Channel (2462 MHz)

Date: 1 AUG 2015 10:21:10

802.11g Low Channel (2412 MHz)

Date: 1 AUG 2015 10:18:51

802.11g Mid Channel (2437 MHz)

Date: 1 AUG 2015 10:13:31

802.11g High Channel (2462 MHz)

2.5 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

2.5.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.5.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.5.3 Equipment Under Test and Modification State

Serial No: C10015220004 / Test Configuration A

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

August 01, 2015 / 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	24.5 °C
Relative Humidity	56.0 %
ATM Pressure	99.6 kPa

2.5.7 Additional Observations

- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- Setup is identical to “Out-of-Band Emissions – Conducted“ test (previous test).
- 2.4GHz band-edges (2400MHz and 2483.5MHz) were verified in this test.
- Test methodology is per Clause 13.2 Marker-delta method of KDB 558074 D01 DTS Meas Guidance v03r01 (April 09, 2013).
- An offset of 22.0dB was added to compensate for the external attenuator and cable used from the antenna port to the spectrum analyzer.

2.5.8 Test Results

Complies. See attached plots.

Date: 1 AUG 2015 11:31:00

802.11b Low Channel (2412 MHz)

Date: 1 AUG 2015 11:39:08

802.11b High Channel (2462 MHz)

Date: 1 AUG 2015 11:26:41

802.11g Low Channel (2412 MHz)

Date: 1 AUG 2015 11:28:41

802.11g High Channel (2462 MHz)

2.6 SPURIOUS RADIATED EMISSIONS

2.6.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.6.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.6.3 Equipment Under Test and Modification State

Serial No: E70016120011 / Test Configuration B

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

April 25, 2016 / AC

2.6.5 Test Equipment Used

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

2.6.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	27.2 °C
Relative Humidity	33.2 %
ATM Pressure	99.0 kPa

2.6.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic.
- There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Only the considered worst case WLAN configuration (802.11b, High Channel, 5.5Mbps) presented for radiated emissions below and above 1GHz for verification.

- Only noise floor measurements observed above 18GHz.
- 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 2.6.8 for sample computation.

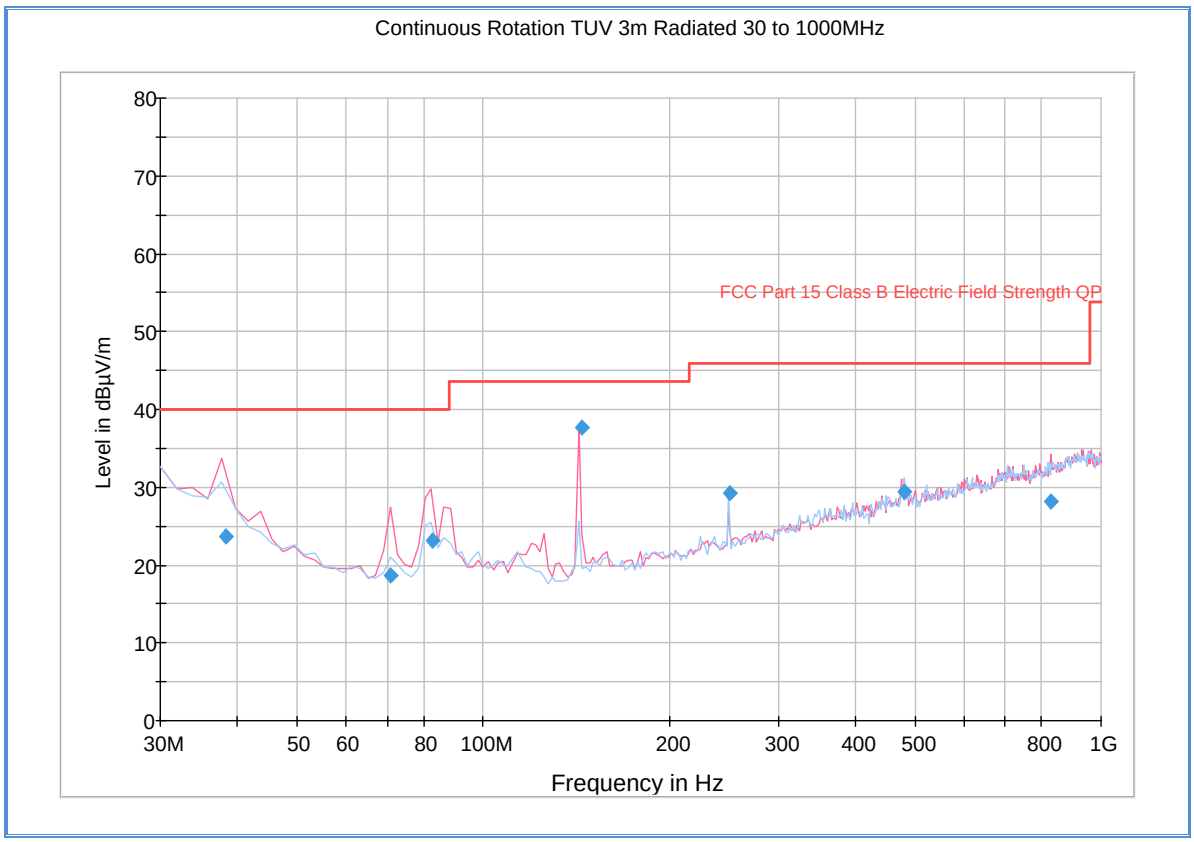
2.6.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dBµV) @ 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 Quasi Peak Final Measurement (dBµV/m) @ 30MHz			**11.8**

2.6.9 Test Results

See attached plots.

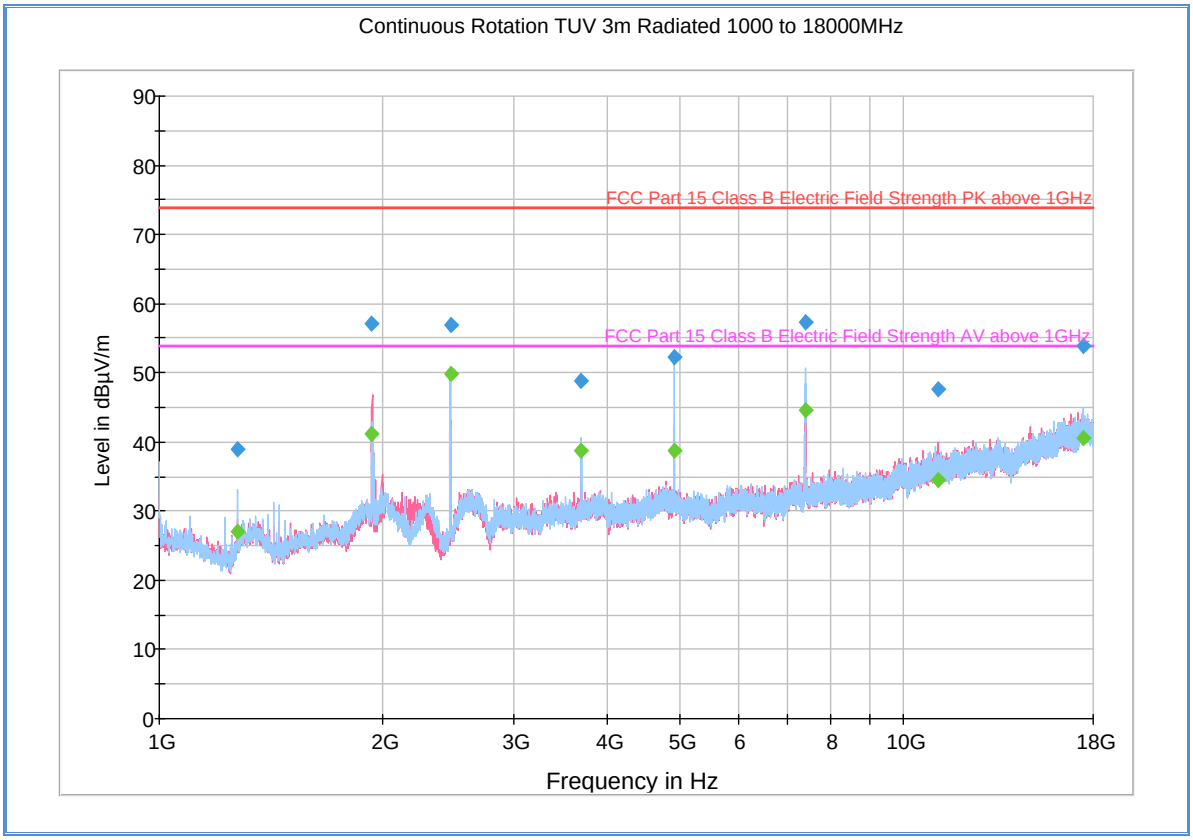
2.6.10 Test Results Below 1GHz (wifi worst case b mode at high channel Tx mode)



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
38.255551	23.7	1000.0	120.000	100.0	V	118.0	-10.2	16.3	40.0
70.821643	18.7	1000.0	120.000	109.0	V	216.0	-16.8	21.3	40.0
82.684970	23.1	1000.0	120.000	105.0	V	-12.0	-16.3	16.9	40.0
144.025491	37.7	1000.0	120.000	100.0	V	73.0	-14.0	5.8	43.5
250.019319	29.2	1000.0	120.000	100.0	H	182.0	-9.2	16.8	46.0
480.061964	29.4	1000.0	120.000	150.0	H	23.0	-1.6	16.6	46.0
830.161764	28.2	1000.0	120.000	150.0	V	81.0	4.8	17.8	46.0

2.6.11 Test Results Above 1GHz (wifi worst case b mode at high channel Tx mode)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1274.633333	38.9	1000.0	1000.000	125.7	H	227.0	-5.2	35.0	73.9
1932.533333	57.1	1000.0	1000.000	99.7	V	100.0	-1.1	16.8	73.9
2462.533333	56.9	1000.0	1000.000	163.6	H	-10.0	-0.8	*)	
3693.000000	48.8	1000.0	1000.000	133.7	H	310.0	1.1	25.1	73.9
4924.200000	52.2	1000.0	1000.000	131.7	H	-3.0	3.6	21.7	73.9
7385.000000	57.3	1000.0	1000.000	208.5	H	56.0	7.4	16.6	73.9
11163.00000	47.6	1000.0	1000.000	103.7	V	-20.0	13.0	26.3	73.9
17463.60000	53.9	1000.0	1000.000	133.7	H	210.0	20.1	20.0	73.9

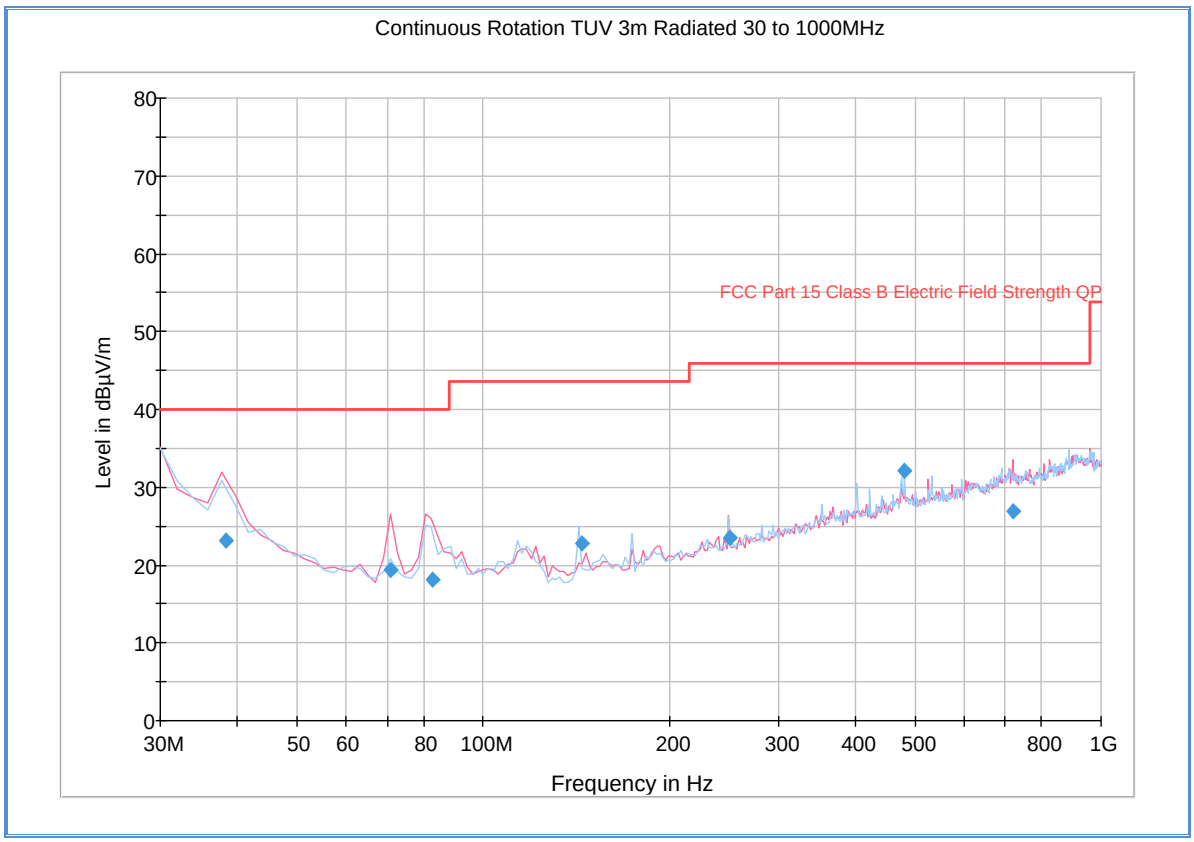
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1274.633333	27.0	1000.0	1000.000	125.7	H	227.0	-5.2	26.9	53.9
1932.533333	41.2	1000.0	1000.000	99.7	V	100.0	-1.1	12.7	53.9
2462.533333	49.9	1000.0	1000.000	163.6	H	-10.0	-0.8	*)	
3693.000000	38.7	1000.0	1000.000	133.7	H	310.0	1.1	15.2	53.9
4924.200000	38.8	1000.0	1000.000	131.7	H	-3.0	3.6	15.1	53.9
7385.000000	44.6	1000.0	1000.000	208.5	H	56.0	7.4	9.3	53.9
11163.00000	34.4	1000.0	1000.000	103.7	V	-20.0	13.0	19.5	53.9
17463.60000	40.6	1000.0	1000.000	133.7	H	210.0	20.1	13.3	53.9

***)** This is fundamental frequency, not part of spurious emission evaluation. Data provided for information purpose only.

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 8GHz. Measurements above 8GHz are noise floor figures.

2.6.12 Test Results Below 1GHz (Received / Standby mode)

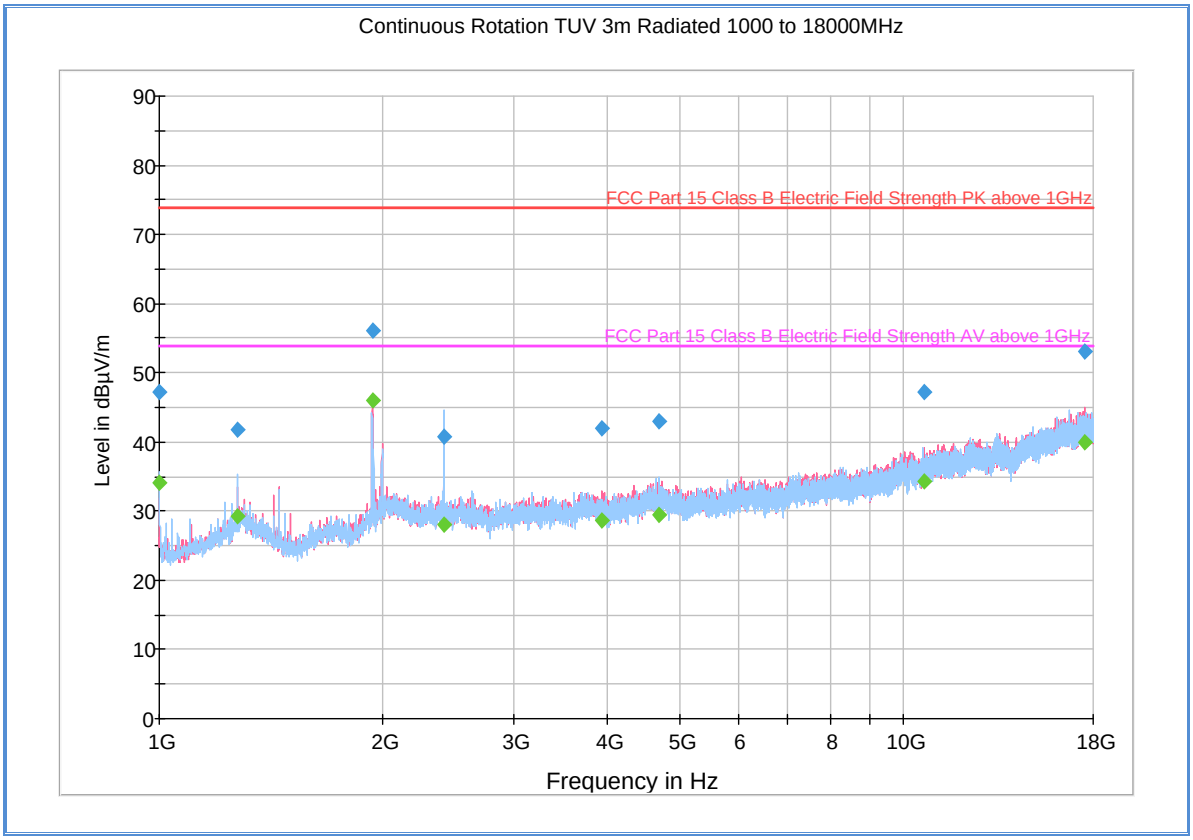


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
38.375551	23.2	1000.0	120.000	127.0	V	18.0	-10.3	16.8	40.0
70.861643	19.3	1000.0	120.000	100.0	V	-12.0	-16.8	20.7	40.0
82.741082	18.2	1000.0	120.000	165.0	V	344.0	-16.3	21.8	40.0
144.025491	22.7	1000.0	120.000	178.0	H	268.0	-14.0	20.8	43.5
249.979319	23.6	1000.0	120.000	100.0	V	230.0	-9.2	22.4	46.0
480.021964	32.1	1000.0	120.000	171.0	H	298.0	-1.6	13.9	46.0
718.760160	26.9	1000.0	120.000	150.0	V	39.0	3.1	19.1	46.0

Test Notes: Only worst case channel presented for spurious emissions below 1GHz.

2.6.13 Test Results Above 1GHz (Received / Standby mode)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	47.3	1000.0	1000.000	269.3	H	20.0	-7.8	26.6	73.9
1275.633333	41.7	1000.0	1000.000	132.7	H	95.0	-5.2	32.2	73.9
1932.933333	56.2	1000.0	1000.000	301.2	V	-3.0	-1.1	17.7	73.9
2413.833333	40.7	1000.0	1000.000	362.1	H	135.0	-1.1	33.2	73.9
3940.966667	41.9	1000.0	1000.000	228.4	V	272.0	2.3	32.0	73.9
4688.666667	43.0	1000.0	1000.000	202.5	H	28.0	3.0	30.9	73.9
10655.466667	47.2	1000.0	1000.000	125.7	V	64.0	12.2	26.7	73.9
17556.833333	53.1	1000.0	1000.000	165.6	V	235.0	20.0	20.8	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)
1000.000000	34.0	1000.0	1000.000	269.3	H	20.0	-7.8	19.9	53.9
1275.633333	29.3	1000.0	1000.000	132.7	H	95.0	-5.2	24.6	53.9
1932.933333	46.0	1000.0	1000.000	301.2	V	-3.0	-1.1	7.9	53.9
2413.833333	28.0	1000.0	1000.000	362.1	H	135.0	-1.1	26.0	53.9
3940.966667	28.8	1000.0	1000.000	228.4	V	272.0	2.3	25.1	53.9
4688.666667	29.5	1000.0	1000.000	202.5	H	28.0	3.0	24.4	53.9
10655.466667	34.4	1000.0	1000.000	125.7	V	64.0	12.2	19.5	53.9
17556.833333	39.9	1000.0	1000.000	165.6	V	235.0	20.0	14.0	53.9

2.7 RADIATED BAND EDGE MEASUREMENTS AND IMMEDIATE RESTRICTED BANDS

2.7.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.7.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.7.3 Equipment Under Test and Modification State

Serial No: E70016120011 / Test Configuration B

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

May 03 and 04, 2016 / AC

2.7.5 Test Equipment Used

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

2.7.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.5 – 24.4 °C
Relative Humidity	34.8 – 43.3 %
ATM Pressure	98.7 – 99.7 kPa

2.7.7 Additional Observations

- This is a radiated test. The spectrum was searched from 2310MHz to 2390MHz for lower immediate restricted band and 2483.5MHz to 2500MHz for the upper immediate restricted band.
- The EUT WiFi conducted antenna port was terminated with 50ohm to be evaluated per KDB 558074 D01 DTS Meas Guidance v03r05 Section 12.1.
- There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.
- Verification were done with b and g mode in Low and High channels.

- 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 2.7.8 for sample computation.

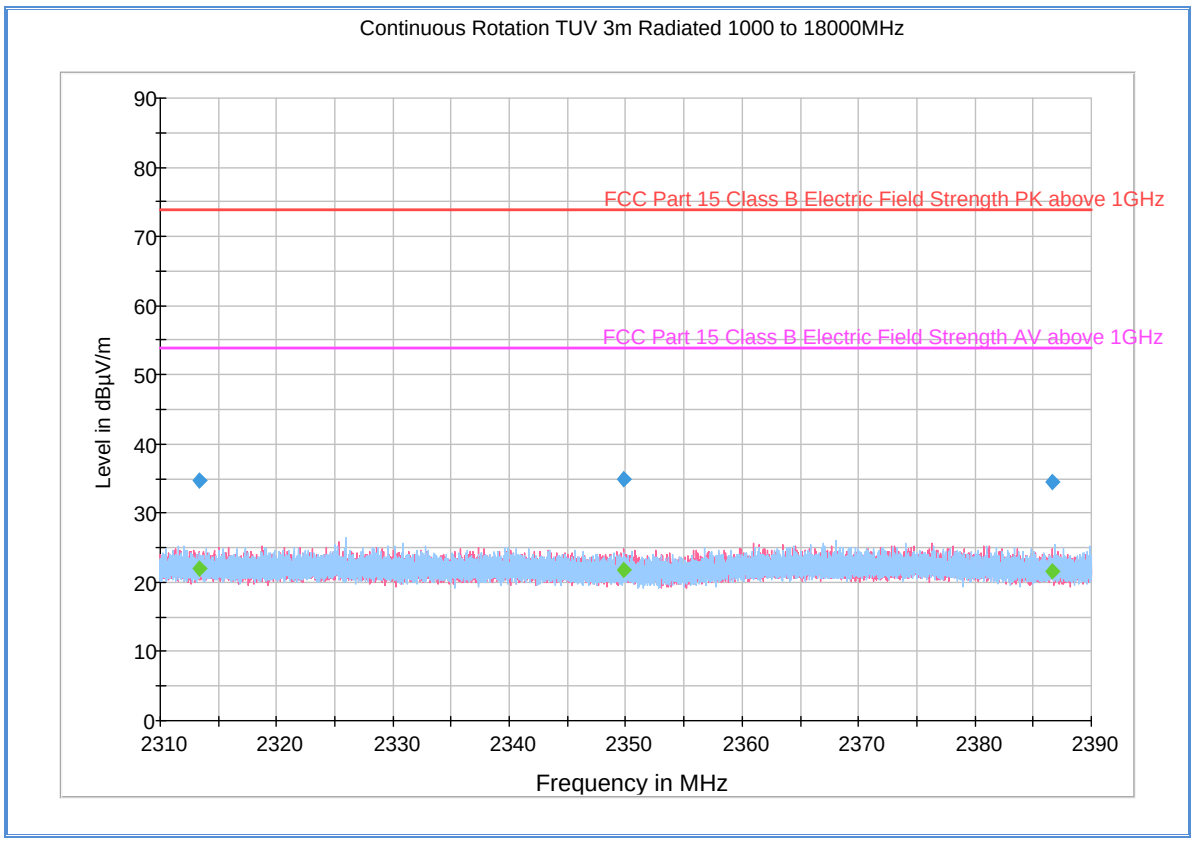
2.7.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dBµV) @ 2400 MHz			53.9
Correction Factor (dB)	Asset# 1153 (cable)	3.4	-0.4
	Asset# 8628(preamplifier)	-36.5	
	Asset#7575 (antenna)	32.7	
Reported Max Peak Final Measurement (dBµV/m) @ 2400 MHz			**53.5**

2.7.9 Test Results

Compliant. See attached plots.

2.7.10 Test Results Restricted Band 2310MHz to 2390MHz (802.11b Low Channel)



Peak Data

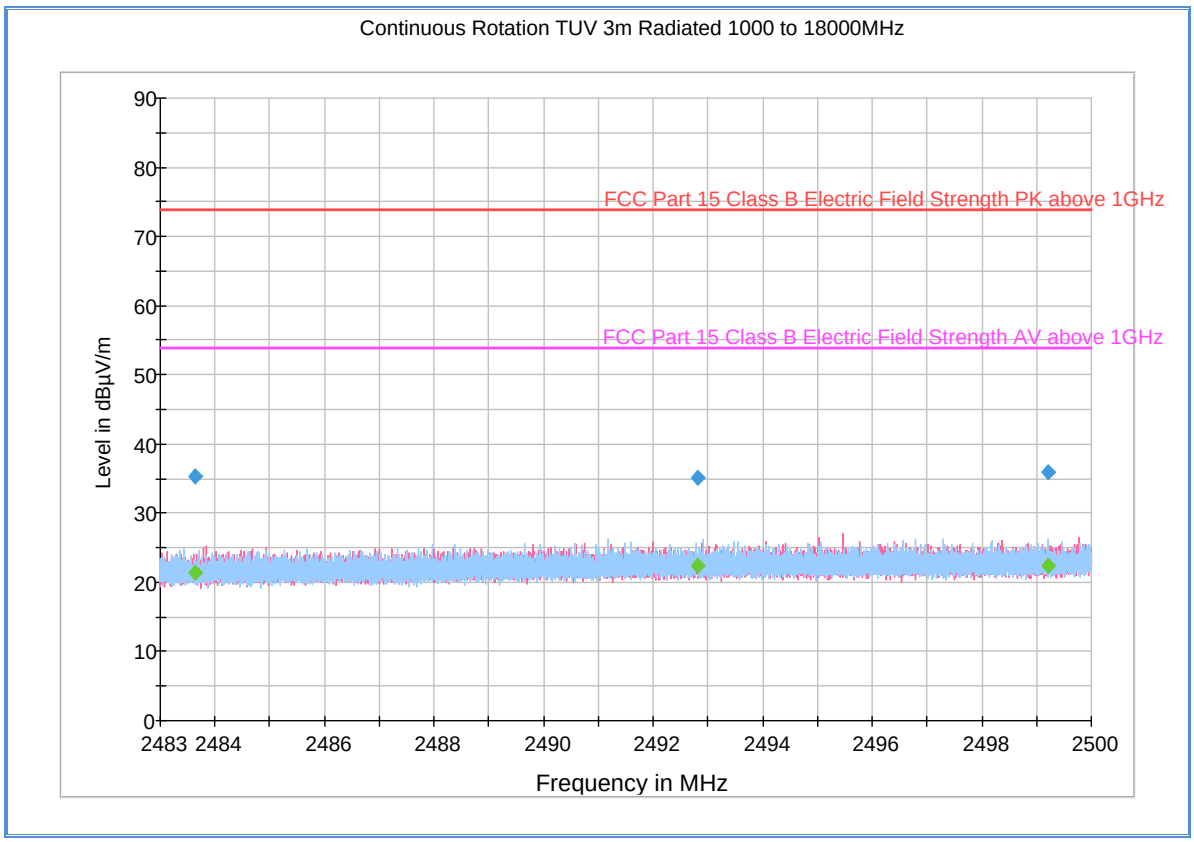
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2313.416000	34.8	1000.0	1000.000	386.0	V	213.0	-7.5	39.1	73.9
2349.832000	34.9	1000.0	1000.000	219.4	V	311.0	-7.4	39.0	73.9
2386.698667	34.4	1000.0	1000.000	291.2	H	173.0	-7.4	39.5	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)
2313.416000	22.0	1000.0	1000.000	386.0	V	213.0	-7.5	31.9	53.9
2349.832000	21.7	1000.0	1000.000	219.4	V	311.0	-7.4	32.2	53.9
2386.698667	21.6	1000.0	1000.000	291.2	H	173.0	-7.4	32.3	53.9

Test Notes: 2.4GHz notch filter removed for this test.

2.7.11 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11b High Channel)



Peak Data

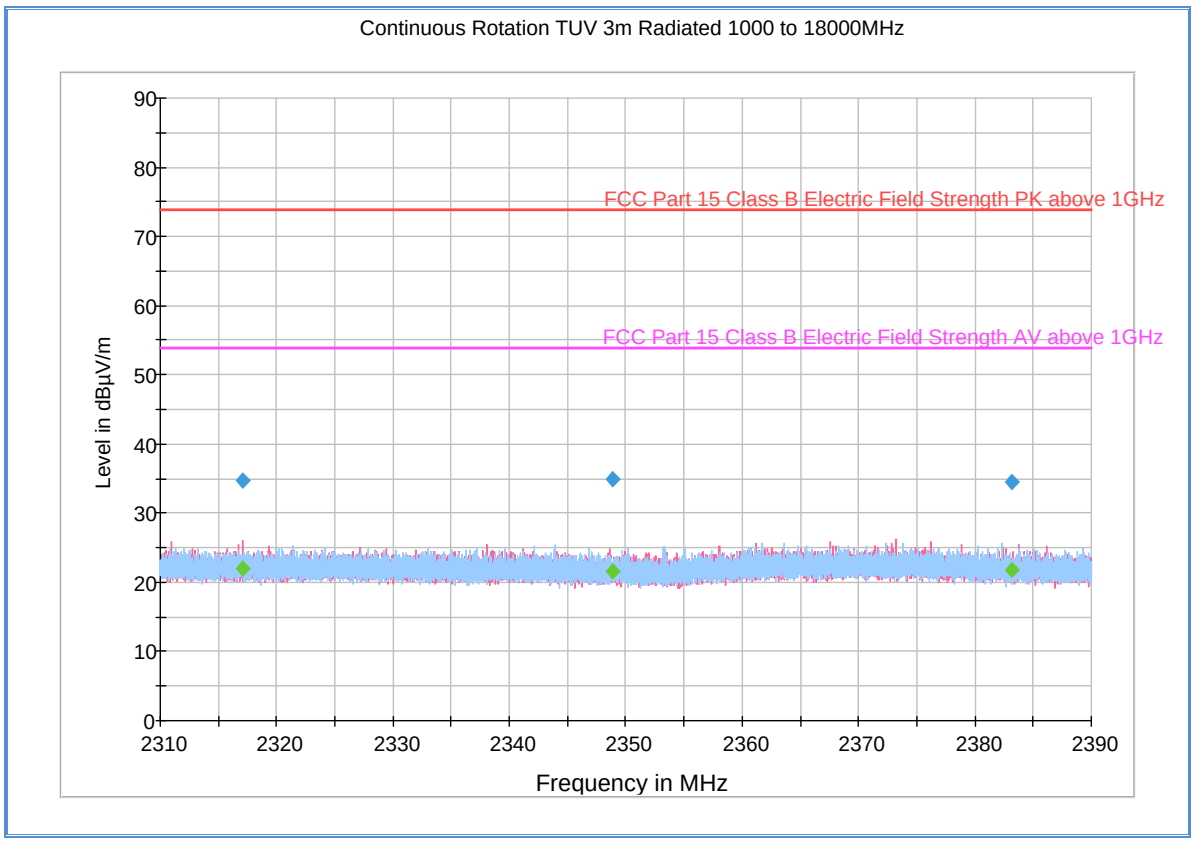
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.639233	35.3	1000.0	1000.000	220.4	V	7.0	-6.5	38.6	73.9
2492.801500	35.2	1000.0	1000.000	172.6	V	48.0	-6.4	38.7	73.9
2499.219700	35.8	1000.0	1000.000	397.5	H	206.0	-6.4	38.1	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)
2483.639233	21.4	1000.0	1000.000	220.4	V	7.0	-6.5	32.5	53.9
2492.801500	22.4	1000.0	1000.000	172.6	V	48.0	-6.4	31.5	53.9
2499.219700	22.5	1000.0	1000.000	397.5	H	206.0	-6.4	31.4	53.9

Test Notes: 2.4GHz notch filter removed for this test.

2.7.12 Test Results Restricted Band 2310MHz to 2390MHz (802.11g Low Channel)



Peak Data

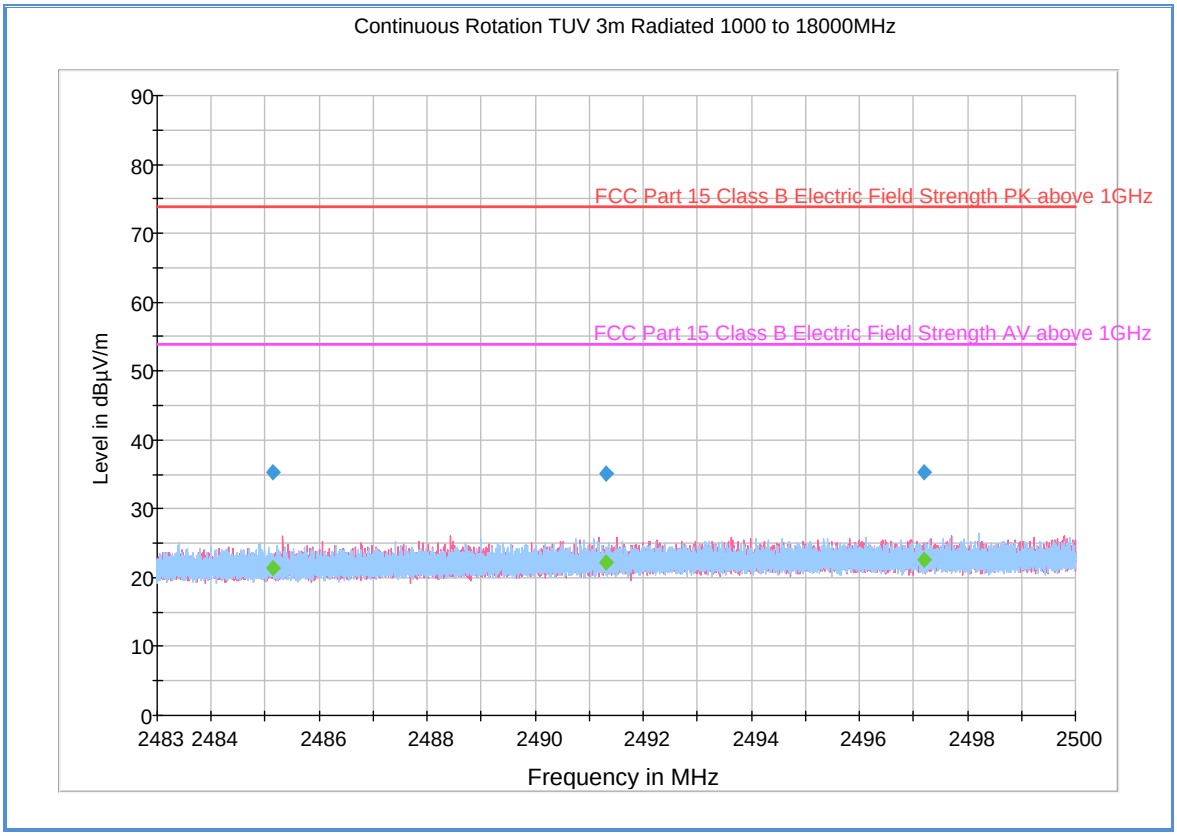
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2317.026667	34.7	1000.0	1000.000	148.7	V	355.0	-7.5	39.3	73.9
2348.866667	34.9	1000.0	1000.000	174.6	V	251.0	-7.4	39.0	73.9
2383.176000	34.4	1000.0	1000.000	173.6	H	185.0	-7.4	39.5	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)
2317.026667	21.9	1000.0	1000.000	148.7	V	355.0	-7.5	32.0	53.9
2348.866667	21.5	1000.0	1000.000	174.6	V	251.0	-7.4	32.4	53.9
2383.176000	21.8	1000.0	1000.000	173.6	H	185.0	-7.4	32.1	53.9

Test Notes: 2.4GHz notch filter removed for this test.

2.7.13 Test Results Restricted Band 2483.5MHz to 2500MHz (802.11g High Channel)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2485.131267	35.3	1000.0	1000.000	328.2	V	263.0	-6.5	38.6	73.9
2491.308500	35.0	1000.0	1000.000	238.4	V	217.0	-6.4	38.9	73.9
2497.203667	35.4	1000.0	1000.000	279.3	H	66.0	-6.4	38.5	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)
2485.131267	21.4	1000.0	1000.000	328.2	V	263.0	-6.5	32.5	53.9
2491.308500	22.1	1000.0	1000.000	238.4	V	217.0	-6.4	31.8	53.9
2497.203667	22.5	1000.0	1000.000	279.3	H	66.0	-6.4	31.4	53.9

Test Notes: 2.4GHz notch filter removed for this test.

2.8 POWER SPECTRAL DENSITY

2.8.1 Specification Reference

Part 15 Subpart C §15.247(e)

2.8.2 Standard Applicable

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

2.8.3 Equipment Under Test and Modification State

Serial No: C10015220004 / Test Configuration A

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

August 01, 2015 / AC

2.8.5 Test Equipment Used

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

2.8.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.5 °C
Relative Humidity	56.0.%
ATM Pressure	99.6 kPa

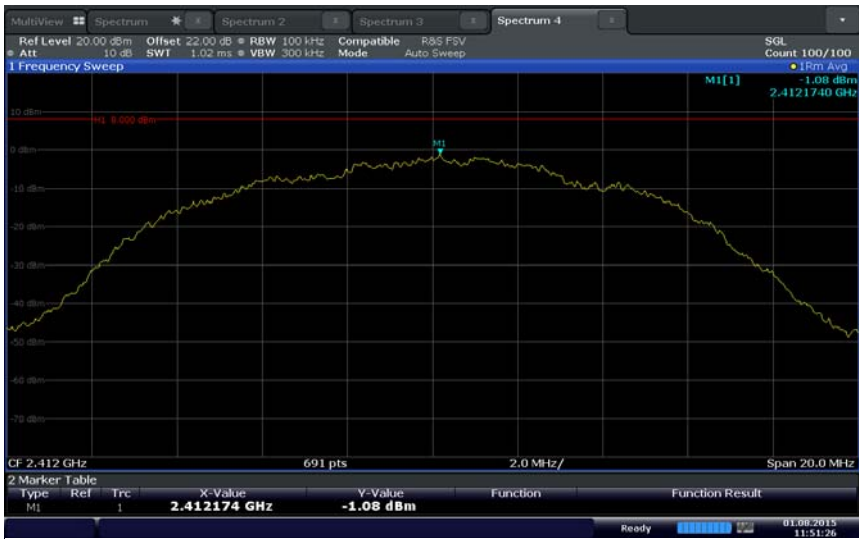
2.8.7 Additional Observations

- This Section of test data was leveraged from previous test report under TÜV SÜD test report ref. No. SD72111016-1015A.
- This is a conducted test.
- Test procedure is per Section 10.3 of KDB 558074 D01 DTS Meas Guidance v03r01 (April 09, 2013).
- An offset of 22.0dB was added to compensate for the external attenuator and cable used from the antenna port to the spectrum analyzer.
- Detector is RMS power averaging.
- Trace averaging mode over 100 traces.
- Sweep time is Auto Couple.
- EUT complies with 100 kHz RBW.

2.8.8 Test Results Summary

Mode	Channel	Marker Reading using 100 kHz RBW (dBm)	PSD Limit (dBm)	Margin (dB)	Compliance
802.11b	1 (2412 MHz)	-1.08	8	9.08	Complies
	6 (2437 MHz)	-2.10	8	10.10	Complies
	11 (2462 MHz)	-1.57	8	9.57	Complies
802.11g	1 (2412 MHz)	-7.08	8	15.08	Complies
	6 (2437 MHz)	-7.70	8	15.70	Complies
	11 (2462 MHz)	-8.60	8	16.60	Complies

2.8.9 Test Results Plots



Date: 1.AUG.2015 11:51:25

802.11b Low Channel (2412 MHz)

Date: 1 AUG .2015 11:53:04

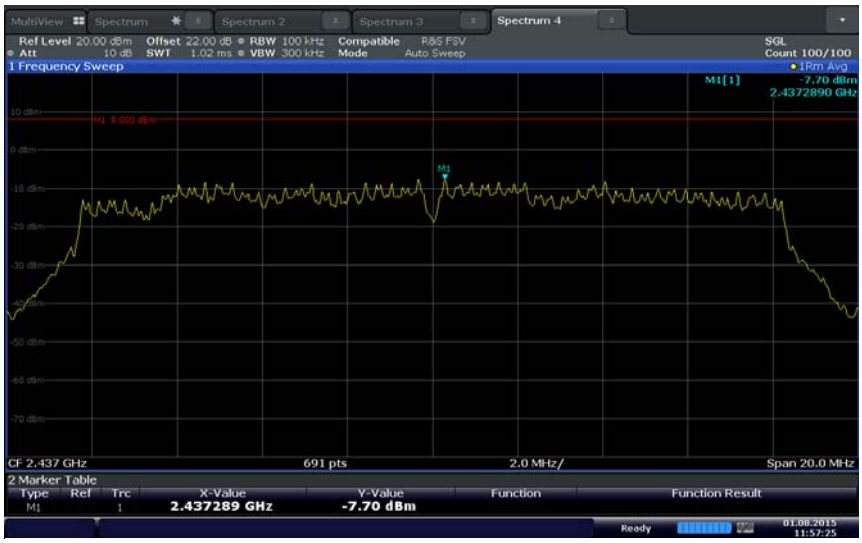
802.11b Mid Channel (2437 MHz)

Date: 1 AUG .2015 11:54:47

802.11b High Channel (2462 MHz)

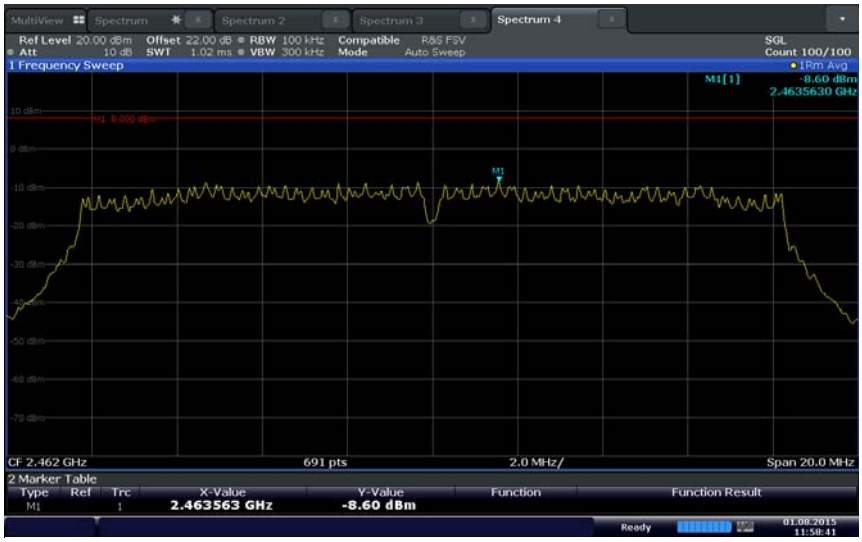
Date: 1 AUG 2015 11:56:27

802.11g Low Channel (2412 MHz)



Date: 1 AUG 2015 11:57:24

802.11g Mid Channel (2437 MHz)



802.11g High Channel (2462 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
Antenna Conducted Port Setup						
7604	P-Series Power Meter	N1912A	SG45100273	Agilent	05/27/15	05/27/16
7605	50MHz-18GHz Wideband Power Sensor	N1921A	MY51100054	Agilent	04/10/15	04/10/16
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/22/14	12/22/15
1189	Signal Generator	8648C	3623A03059	Hewlett Packard	10/14/14	10/14/15
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	07/29/15	07/29/16
8825	20dB Attenuator	46-20-34	BK5773	Weinschel Corp.	Verified by 7582 and 7608	
Radiated Test Setup						
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	09/29/15	09/29/16
1033	Bilog Antenna	3142C	00044556	EMCO	09/25/14	09/25/16
1016	Pre-amplifier	PAM-0202	187	PAM	12/15/15	12/15/16
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/17/16	03/17/17
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	01/11/16	01/11/17
1051	Double-ridged waveguide horn antenna	3115	9408-4329	EMCO	03/21/16	03/21/17
Miscellaneous						
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/14/15	08/14/16
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	10/19/15	10/19/16
1123	DC Power Supply	E3631A	N/A	Hewlett Packard	Verified by 6792	
	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	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.78
				Coverage Factor (k):	2
				Expanded Uncertainty:	3.57

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	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.78
				Coverage Factor (k):	2
				Expanded Uncertainty:	3.56

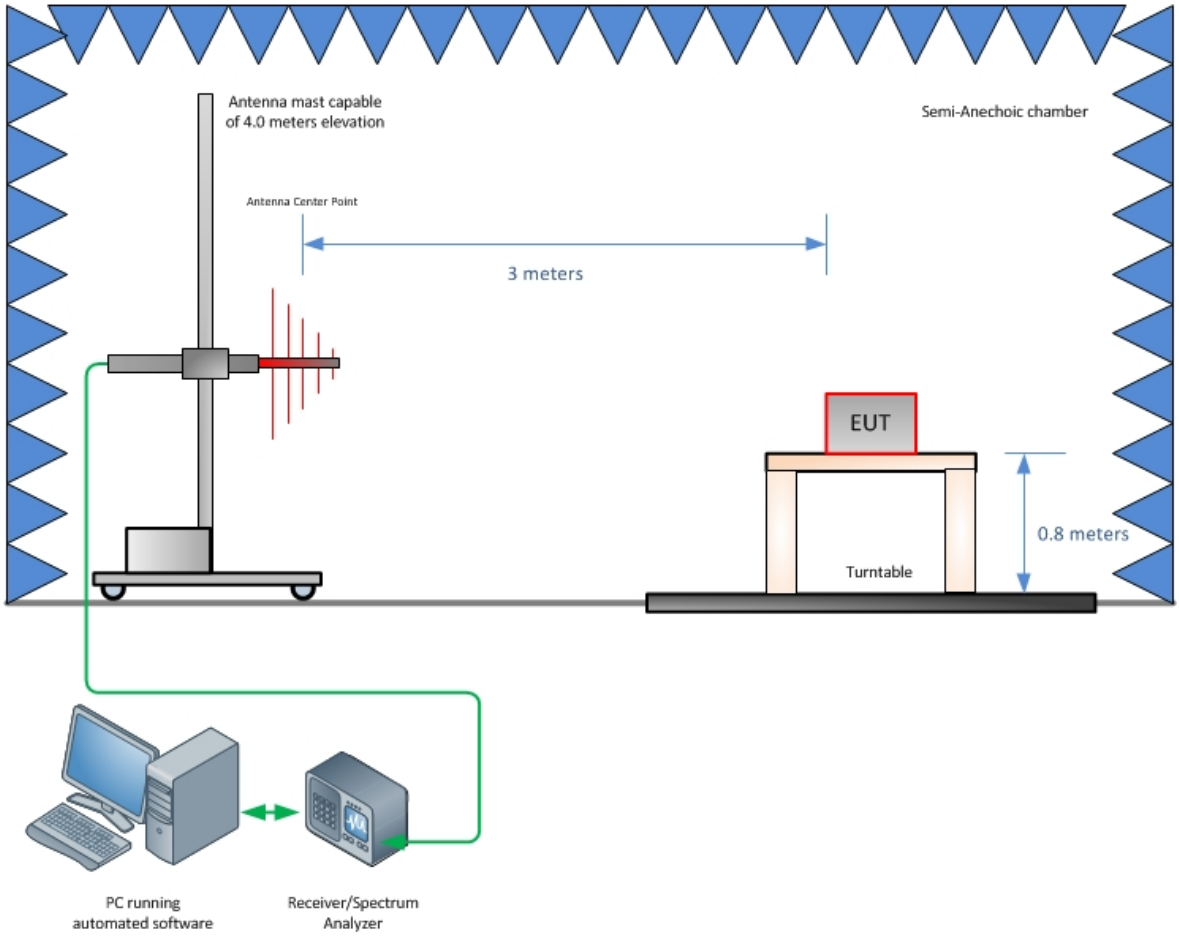
3.2.3 Conducted Antenna Port Measurement

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.34	0.20	0.04
2	Cables	Rectangular	1.00	0.58	0.33
3	EUT Setup	Rectangular	0.50	0.29	0.08
				Combined Uncertainty (u_c):	0.67
				Coverage Factor (k):	1.96
				Expanded Uncertainty:	1.32

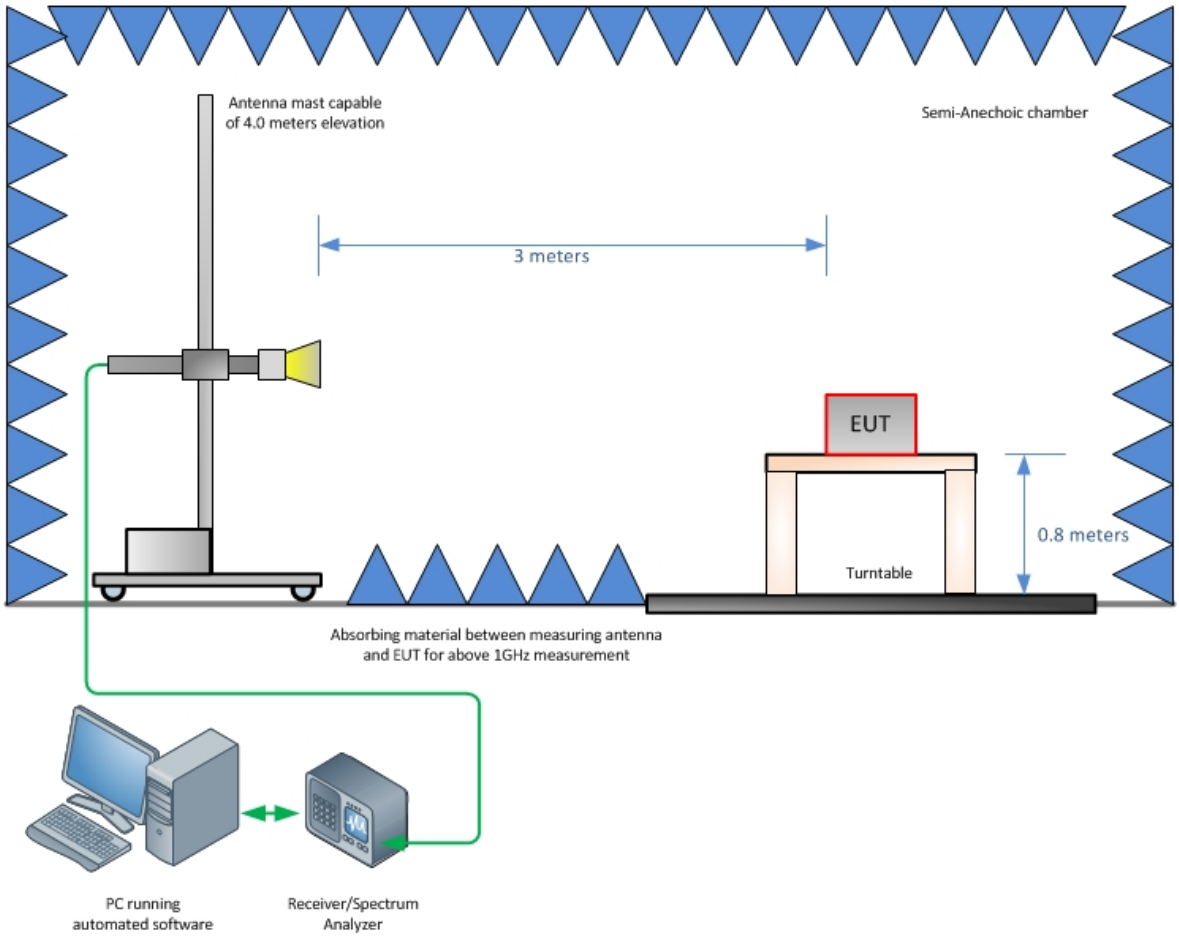
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)

SECTION 5

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5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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