



America

**Choose certainty.
Add value.**

Report On

Radio Testing of the
IPS Group, Inc.
795-880 IPS RFID Module

FCC Part 15 Subpart C §15.225
IC RSS-210 Issue 9 August 2016

Report No. SD72118901-0716A

September 2016



REPORT ON Radio Testing of the
IPS Group, Inc.
795-880 IPS RFID Module

TEST REPORT NUMBER SD72118901-0716A

TEST REPORT DATE September 2016

PREPARED FOR 7737 Kenamar Court
San Diego, CA 92121
USA

PREPARED FOR Gary Thomas
Sr. RF Design Engineer and Code Compliance Engineer
(858) 768-2401
gary.thomas@ipsgroupinc.com

PREPARED BY _____
Name
Authorized Signatory
Title: EMC/Wireless Test Engineer

APPROVED BY _____
Name
Authorized Signatory
Title: EMC SL Manager Western Region

DATED September 22, 2016



Revision History

SD72118901-0716A IPS Group, Inc. 795-880 IPS RFID Module					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
09/22/2016	Initial Release				Juan M. Gonzalez

CONTENTS

Section	Page No
1 REPORT SUMMARY	5
1.1 Introduction.....	6
1.2 Brief Summary Of Results	7
1.3 Product Information	8
1.4 EUT Test Configuration	10
1.5 Deviations From The Standard.....	12
1.6 Modification Record	12
1.7 Test Methodology	12
1.8 Test Facility Location	12
1.9 Test Facility Registration.....	12
2 TEST DETAILS.....	14
2.1 Frequency Stability	15
2.2 20 dB Bandwidth	17
2.3 99% Emission Bandwidth.....	19
2.4 Emission Mask	21
2.5 Spurious Radiated Emissions	24
3 TEST EQUIPMENT USED	28
3.1 Test Equipment Used.....	29
3.2 Measurement Uncertainty	30
4 DIAGRAM OF TEST SETUP	31
4.1 Test Setup Diagram	32
5 ACCREDITATION, DISCLAIMERS AND COPYRIGHT	34
5.1 Accreditation, Disclaimers And Copyright	35

FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



SECTION 1

REPORT SUMMARY

Radio Testing of the
IPS Group, Inc.
795-880 IPS RFID Module

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the IPS Group, Inc. 795-880 IPS RFID Module to the requirements of FCC Part 15 Subpart C §15.225 and IC RSS-210 Issue 9 August 2016.

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)	795-880
FCC ID Number	SGWIPS2016RFID
IC Number	11583A-IPS2016RFID
Serial Number(s)	N/A
Number of Samples Tested	1
Test Specification/Issue/Date	<ul style="list-style-type: none">• FCC Part 15 Subpart C §15.225 (October 1, 2015).• RSS-210 (Issue 9, August 2016) - Licence-exempt Radio Apparatus: Category I Equipment.• RSS-Gen (Issue 4, November 2014) - General Requirements for Compliance of Radio Apparatus.
Start of Test	August 30, 2016
Finish of Test	September 02, 2016
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 §15.225 with cross-reference to the corresponding IC RSS standard is shown below.

Section	FCC Part 15	§15.225 Spec Clause	RSS	Test Description	Result	Comments/Base Standard
	§15.31(e)			Voltage Requirement	Compliant	§15.225(e)
	§15.203 and 204		RSS-Gen 8.3	Antenna Requirements	Compliant	*)
2.1		§15.225(e)	RSS-210 B.6 RSS-Gen 6.11 RSS-Gen 8.11	Frequency Tolerance	Compliant	
2.2	§15.215(c)			20dB Bandwidth	Compliant	
2.3			RSS-Gen 6.6	99% Emission Bandwidth	Compliant	
2.4		§15.225(a)(b)(c)	RSS-210 B.6(a)(b)(c)	Emission Mask	Compliant	
2.5	§15.209	§15.225(d)	RSS-210 B.6(d)	Spurious Radiated Emissions	Compliant	
2.5.12			RSS-Gen 7.1	Receiver Spurious Emissions	Compliant	
2.6		§15.207(a)	RSS-Gen 8.8	Conducted Emissions	N/A **)	

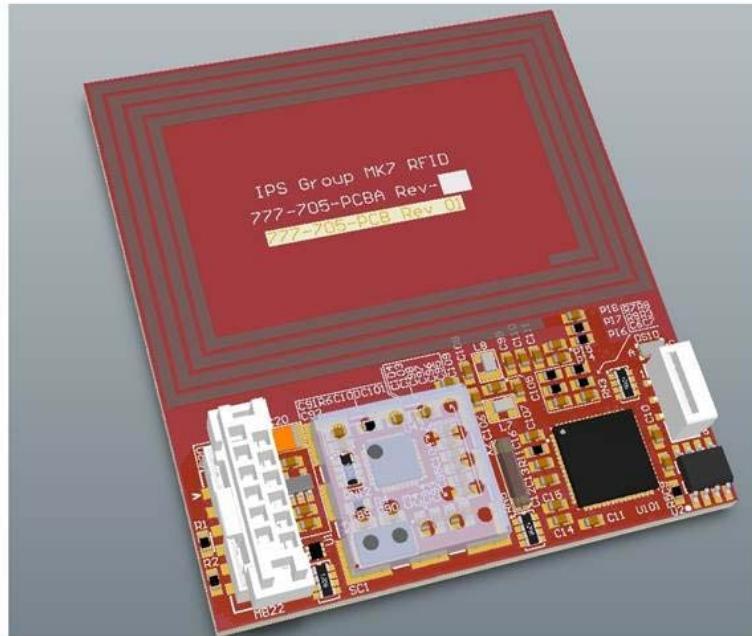
*) This requirement does not apply to intentional radiators that are professionally installed.

**) EUT is a battery powered device, test is not required.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was an IPS Group, Inc. RFID Module as shown in the photograph below. The RFID Module is a fully integrated 13.56 MHz RFID analog front end and data framing reader system.





1.3.2 EUT General Description

EUT Description	RFID Module
Model Number(s)	795-880
Rated Voltage	3.7VDC (nominal)
RFID Module Output Power	200 mW (typical)
EUT RFID Field Strength	51.7 dB μ V/m @ 3 meters
Frequency Range	13.56 MHz in the 13.110 to 14.0101 MHz band
Number of Operating Frequencies	1
Antenna Type	PCBA
Antenna Q Factor	6.78 (Q = $F_0 / BW = 13.56 \text{ MHz} / 2 \text{ MHz} = 6.78$)
RFID Antenna Connector	SMA
Modulation Used	ASK
Antenna Dimension	55mm x 40mm

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Conducted port: RFID module transmitting max power, measurement through the conducted antenna port.
B	Radiated: RFID module transmitting max power, measurement with antenna port terminated with 50ohm.

1.4.2 EUT Exercise Software

None. Module was loaded with software version 8.00.1 and used during evaluation.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
—	—	—

1.4.4 Simplified Test Configuration Diagrams

RF Conducted Port Measurement



Not To Scale – Illustration Purpose Only
Objects may not represent actual image of
original equipment/s or set-up

RF Radiated Measurement



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

All deviations made during testing from the applicable test standards or test plan are detailed under Section 1.2 of this test report.

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 C63.10-2013, American 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 C63.4-2014. 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)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 678 1466 Fax: 858 546 0364

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Registration No.: US1146

TÜV SÜD 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.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TUV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 VCCI – Registration No. A-0230

TUV SUD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



SECTION 2

TEST DETAILS

Radio Testing of the
IPS Group, Inc.
795-880 IPS RFID Module

2.1 FREQUENCY STABILITY

2.1.1 Specification Reference

Part 15 Subpart C §15.225(e)

2.1.2 Standard Applicable

(e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

2.1.3 Equipment Under Test and Modification State

Serial No: N/A / Test Configuration A

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

August 30, 2016 / 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	25.6 °C
Relative Humidity	52.5 %
ATM Pressure	98.7 kPa

2.1.7 Additional Observations

- This is a conducted test. In order for the RFID system to be verified.
- Measurement was done using the spectrum analyzer's frequency counter function to measure the frequency variation of the EUT's RFID system.
- The RBW was set to 3 kHz for better resolution.
- The temperature was varied from -20°C to $+50^{\circ}\text{C}$ in 10 degree increments.
- At 20°C , voltage variation verification was performed. Manufacturer declared voltage range is from 2.7VDC to 4.1VDC where 3.7VDC is the nominal voltage.



2.1.8 Test Results

RFID @ 13.56MHz					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Frequency Deviation	Deviation (%)
100	3.7	-20	13.5599929	0.0000071	0.000052
100		-10	13.5600510	0.000051	0.00038
100		0	13.5599428	0.0000572	0.00042
100		+10	13.5598260	0.000174	0.0013
100		+20	13.5600338	-0.0000338	-0.00025
100		+30	13.5601096	-0.000110	-0.00081
100		+40	13.5600458	-0.0000458	-0.00034
100		+50	13.5598907	0.0001093	0.00081
Manufacturer declared voltage range	2.7	+20	13.5598903	0.0001097	0.00081
	4.1	+20	13.5599983	0.0000017	0.000013

Maximum Deviation = 0.0013%
 = 0.0013% < 0.01% Limit (**Complies**)

2.2 20 dB BANDWIDTH

2.2.1 Specification Reference

Part 15 Subpart C §15.215(c)

2.2.2 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.

2.2.3 Equipment Under Test and Modification State

Serial No: N/A / Test Configuration A

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

August 30, 2016 / 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	25.6 °C
Relative Humidity	52.5 %
ATM Pressure	98.7 kPa

2.2.7 Additional Observations

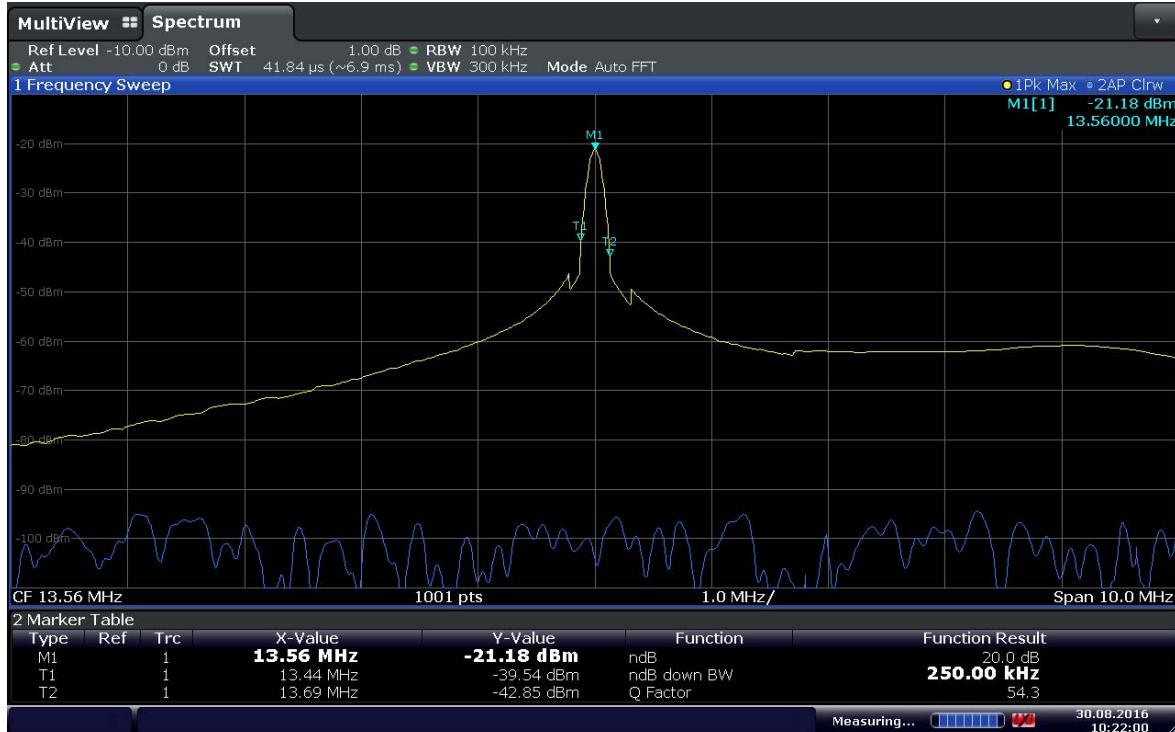
- This is a conducted test.
- A offset 1dB was added to compensate for the external cable used.
- Span is wide enough to capture the channel transmission.
- RBW is set to 100 kHz.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is peak.



- The “n” dB down marker function of the spectrum analyzer was used for this test.

2.2.8 Test Results

Frequency	20dB bandwidth
13.56 MHz	250.0 kHz



Date: 30 AUG 2016 10:22:00

Measured 20dB Bandwidth: 250.0 kHz
 Frequency Band: 13.110 to 14.010 MHz

13.56 MHz – (20dB BW/2) = 13.44 MHz (within the frequency band - **Compliant**)
 13.56 MHz + (20dB BW/2) = 13.69 MHz (within the frequency band - **Compliant**)

2.3 99% EMISSION BANDWIDTH

2.3.1 Specification Reference

RSS-Gen Clause 4.6.1

2.3.2 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.

2.3.3 Equipment Under Test and Modification State

Serial No: N/A / Test Configuration A

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

August 30, 2016 / 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	25.6 °C
Relative Humidity	52.5 %
ATM Pressure	98.7 kPa

2.3.7 Additional Observations

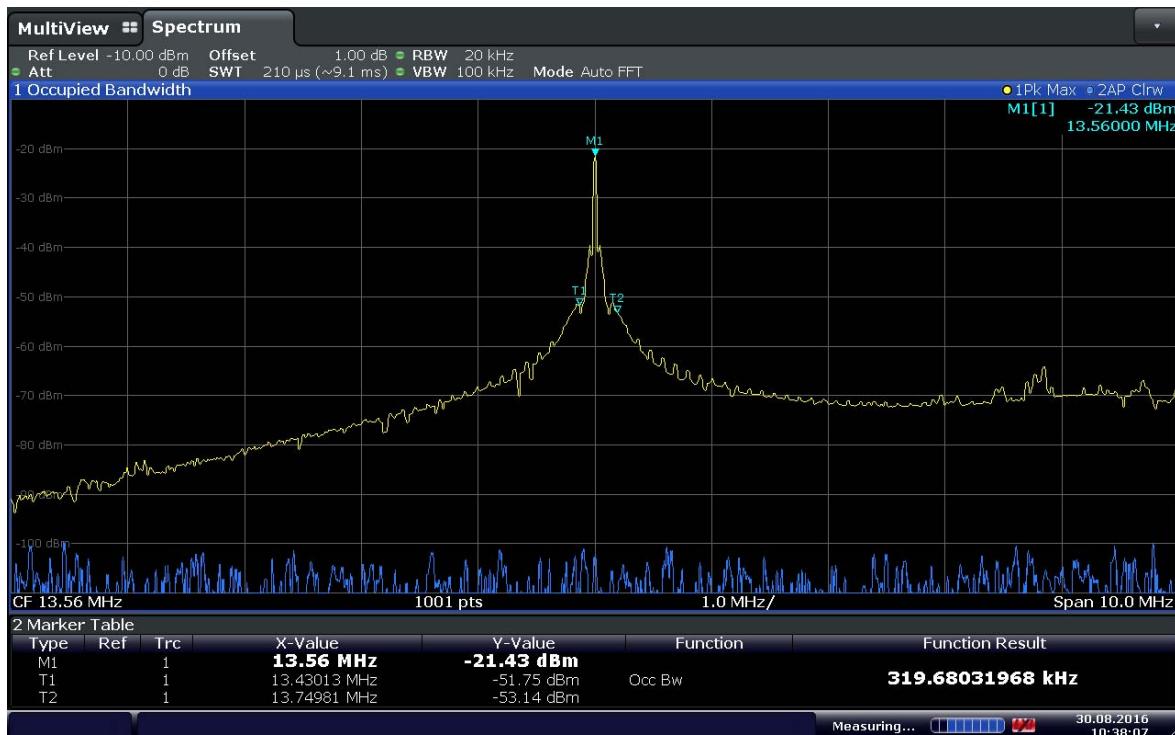
- This is a conducted test.
- A offset 1dB was added to compensate for the external cable used.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the span.
- VBW is 3X RBW.
- Sweep is auto.



- 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.

2.3.8 Test Results

Frequency	99% Emission bandwidth
13.56 MHz	319.68 kHz



2.4 EMISSION MASK

2.4.1 Specification Reference

Part 15 Subpart C §15.225(a)(b)(c)

2.4.2 Standard Applicable

- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

2.4.3 Equipment Under Test and Modification State

Serial No: N/A / Test Configuration B

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

August 30, 2016 / 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	25.6 °C
Relative Humidity	52.5 %
ATM Pressure	98.7 kPa

2.4.7 Additional Observations

- This is a radiated test. The spectrum was searched from 9kHz to 30MHz. Only 13.110 MHz to 14.010 MHz presented. There are no significant emissions observed other than the fundamental frequency (13.56 MHz) measured at 3 meters.
- Limits were converted from 30 meters to 3 meters using worst case 20 dB/decade extrapolation rules. Measurement was focused on the RFID system and not the host.
- Measurement was done using EMC32 V8.53 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) @ 13.56MHz			15.0
Correction Factor (dB)	Asset# 1026 (cable)	0.6	21.5
	Asset# 1057 3m (cable)	0.7	
	Asset# 6628 (antenna)	19.9	
	Asset# 1187(cable)	0.3	
Reported Quasi Peak Final Measurement (dB μ V/m) @ 30MHz			36.5

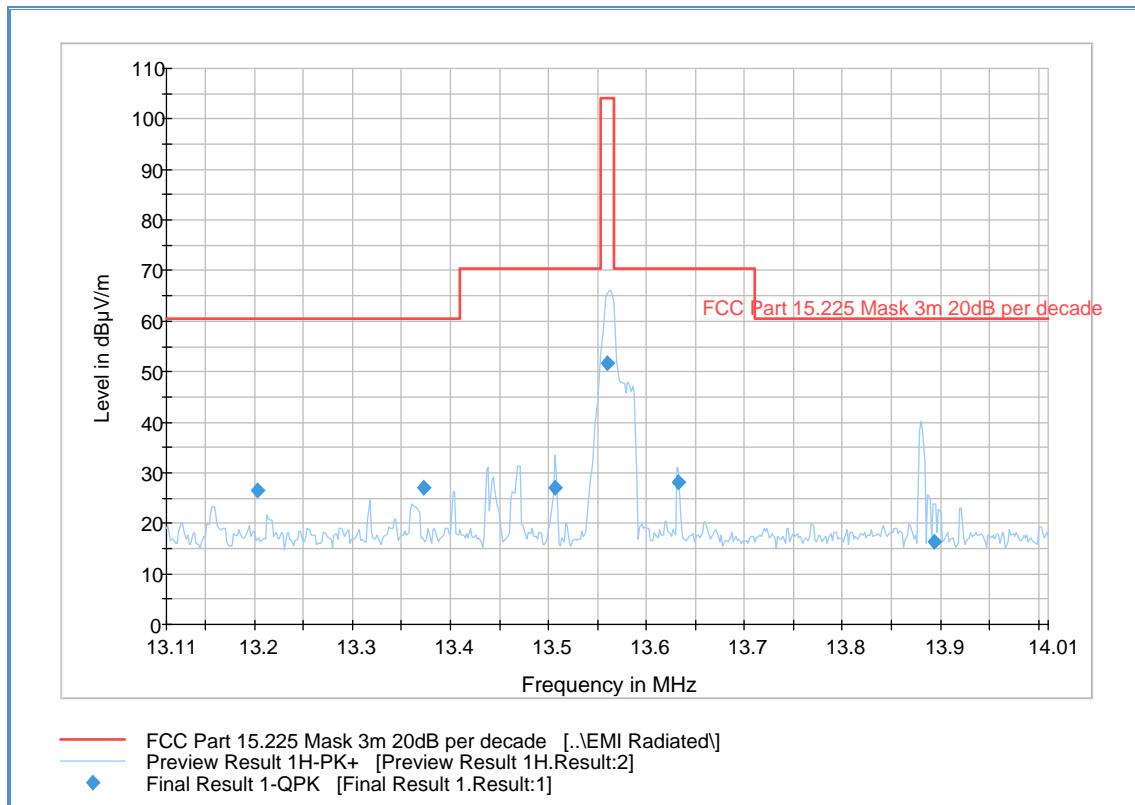
2.4.9 Sample Computation (Limits)

Limit @ 13.553–13.567 MHz:	= 15,848 μ V/m @30 meters
	= 20 log(15,848 μ V/m)
	= 84 dB μ V/m @30 meters
Using 20dB/decade extrapolation rule:	= 20 log (30m/3m)
Measuring distance correction factor:	= 20 dB
Calculated limit @ 3 meters:	= 84 dB μ V/m + 20 dB
	= 104 dB μ V/m

2.4.10 Test Results

See attached plots.

2.4.11 Test Results



Quasi Peak Data (§15.225 Limits)

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)
13.203500	26.6	1500.0	9.000	100.0	H	16.0	20.9	33.9	60.5
13.372257	27.0	1500.0	9.000	100.0	H	-14.0	20.9	33.5	60.5
13.559722	51.7	1500.0	9.000	100.0	H	16.0	20.9	52.3	104.0
13.633000	28.0	1500.0	9.000	100.0	H	16.0	20.9	42.5	70.5
13.894140	16.3	1500.0	9.000	100.0	H	16.0	21.0	44.2	60.5
13.506000	27.0	1500.0	9.000	100.0	H	16.0	20.9	43.5	70.5

2.5 SPURIOUS RADIATED EMISSIONS

2.5.1 Specification Reference

Part 15 Subpart C §15.225(d)

2.5.2 Standard Applicable

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

2.5.3 Equipment Under Test and Modification State

Serial No: N/A / Test Configuration B

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

Augus 30, 2016 / 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	25.6 °C
Relative Humidity	52.5 %
ATM Pressure	98.7 kPa

2.5.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to 1GHz.
- Plot presented for both TX and RX modes show compliance to §15.109 limits, the EUT being a Class B device.
- There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205 that originates from the RFID system.
- Measurement was done using EMC32 V8.53 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 2.5.8 for sample computation.

2.5.8 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 Quasi Peak Final Measurement (dB μ V/m) @ 30MHz		11.8

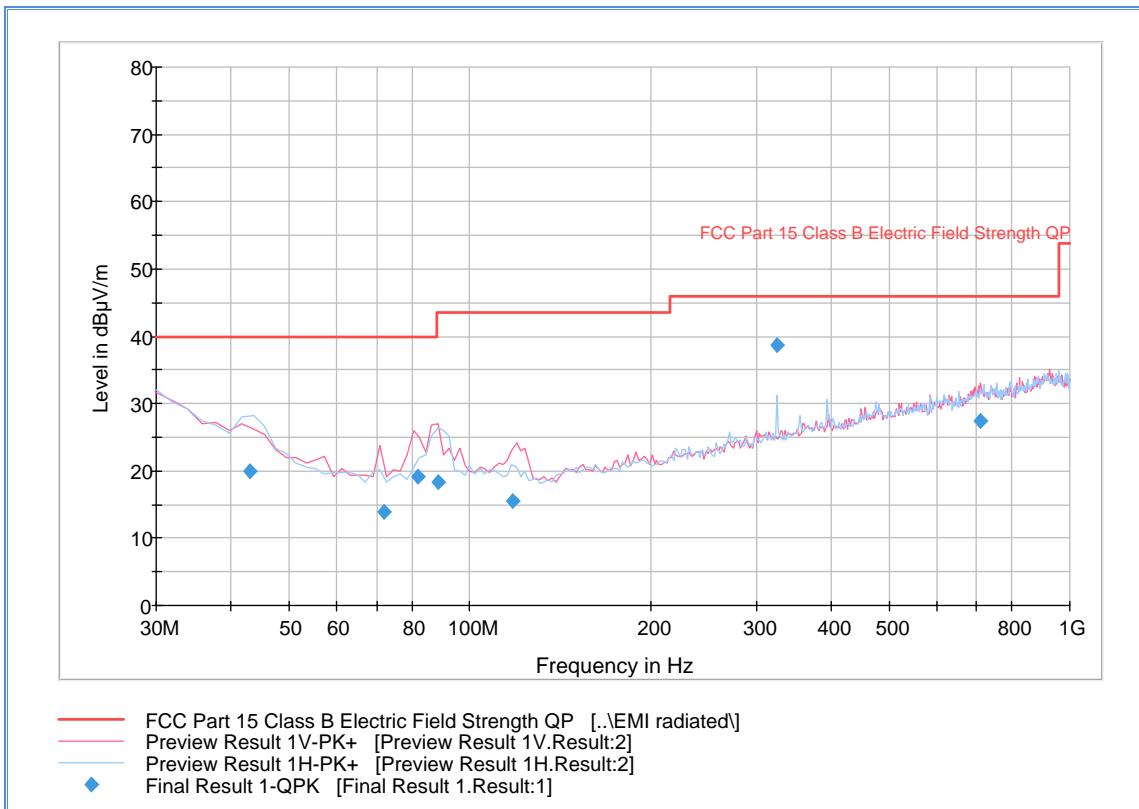
FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



2.5.9 Test Results

See attached plots.

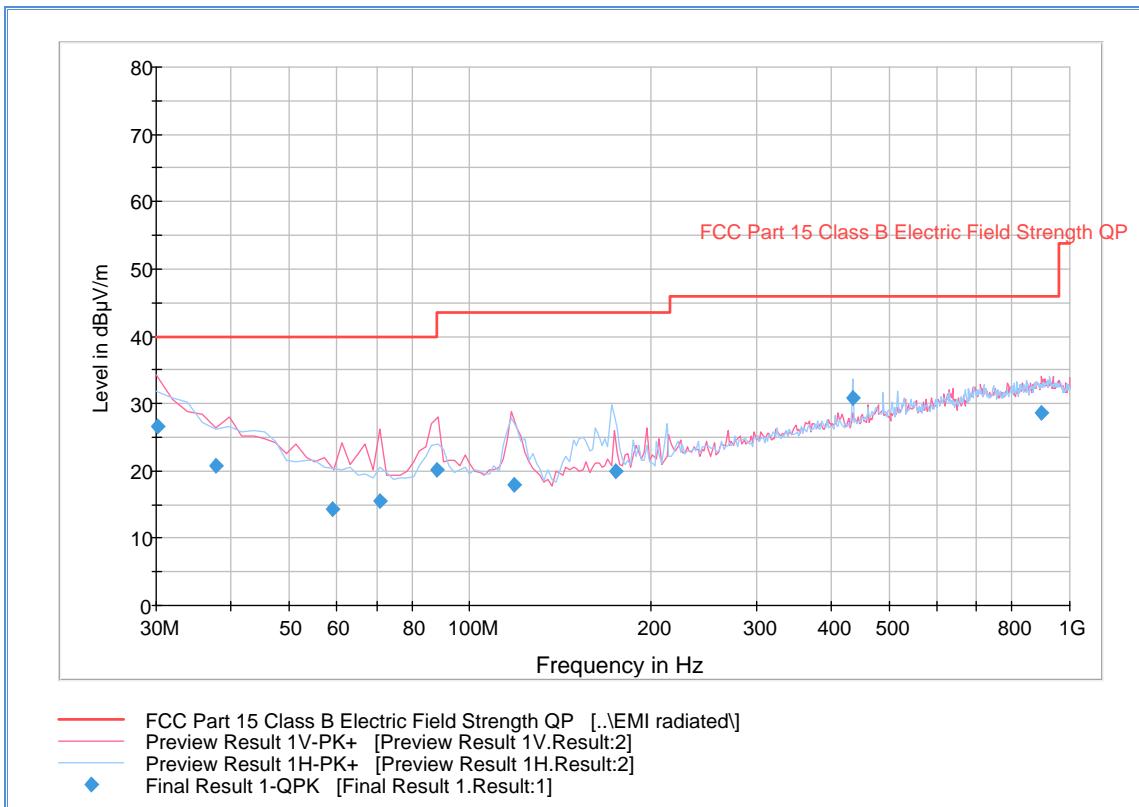
2.5.10 Test Results Below 1GHz



Quasi Peak Data (§15.109 Limits)

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)
43.007214	19.9	1000.0	120.000	350.0	H	-15.0	-12.2	20.1	40.0
72.061643	13.9	1000.0	120.000	100.0	V	19.0	-16.8	26.1	40.0
81.781082	19.0	1000.0	120.000	225.0	V	6.0	-16.4	21.0	40.0
88.436633	18.3	1000.0	120.000	200.0	V	342.0	-15.6	25.2	43.5
117.738838	15.6	1000.0	120.000	100.0	V	19.0	-15.1	27.9	43.5
325.470942	38.6	1000.0	120.000	100.0	H	214.0	-6.3	7.4	46.0
710.360721	27.4	1000.0	120.000	150.0	V	225.0	3.2	18.6	46.0

2.5.11 Receive Mode Below 1GHz



Quasi Peak Data (§15.109 Limits)

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.120000	26.6	1000.0	120.000	100.0	V	-15.0	-5.8	13.4	40.0
37.719439	20.8	1000.0	120.000	250.0	V	15.0	-9.9	19.2	40.0
58.902204	14.3	1000.0	120.000	128.0	V	15.0	-16.0	25.7	40.0
70.701643	15.5	1000.0	120.000	105.0	V	194.0	-16.8	24.5	40.0
88.156633	20.1	1000.0	120.000	200.0	V	1.0	-15.7	23.4	43.5
118.674950	18.0	1000.0	120.000	100.0	V	165.0	-15.2	25.5	43.5
174.663808	20.0	1000.0	120.000	135.0	H	86.0	-12.7	23.5	43.5
433.968657	30.9	1000.0	120.000	179.0	H	-8.0	-3.5	15.1	46.0
895.773948	28.6	1000.0	120.000	384.0	V	108.0	5.7	17.4	46.0

FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



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
<i>Radiated Emissions</i>						
1033	Bilog Antenna	3142C	00044556	EMCO	09/25/14	09/25/16
6628	Loop Antenna	HFH 2-ZZ	880 458/25	Rhode & Schwarz	10/28/15	10/28/16
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	09/29/15	09/29/16
1016	Pre-amplifier	PAM-0202	187	PAM	12/15/15	12/15/16
<i>Antenna Conducted Port Measurements</i>						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	10/05/15	10/05/16
7579	Temperature Chamber	115	151617	TestQuity	08/25/16	08/25/17
<i>Miscellaneous</i>						
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/29/16	08/29/17
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	10/19/15	10/19/16
	DC Power Supply	35010M	D102007S	Protek	Verified by 6792	
	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 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 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	0.30	0.17	0.03
3	EUT Setup	Rectangular	0.50	0.29	0.08
				Combined Uncertainty (u_c):	0.39
				Coverage Factor (k):	1.96
				Expanded Uncertainty:	0.76

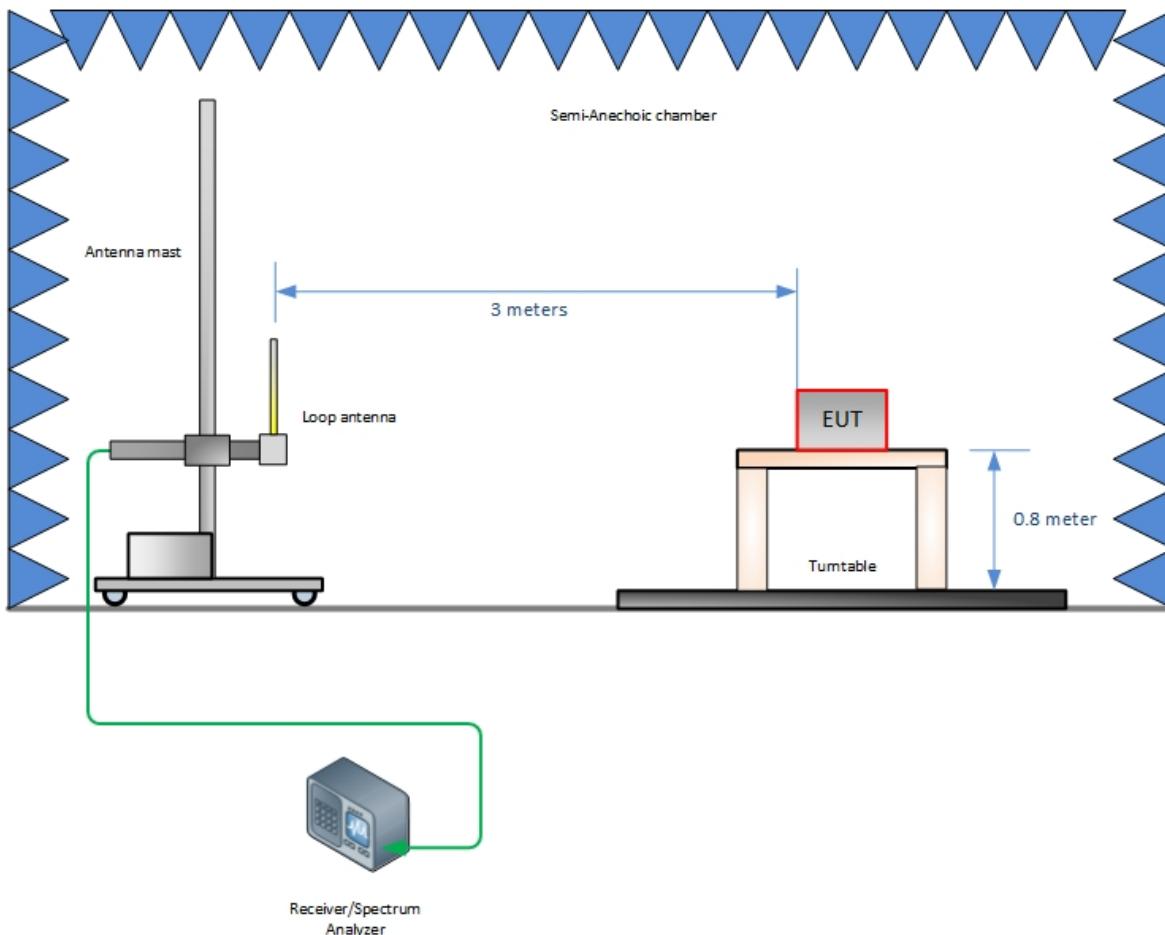
FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



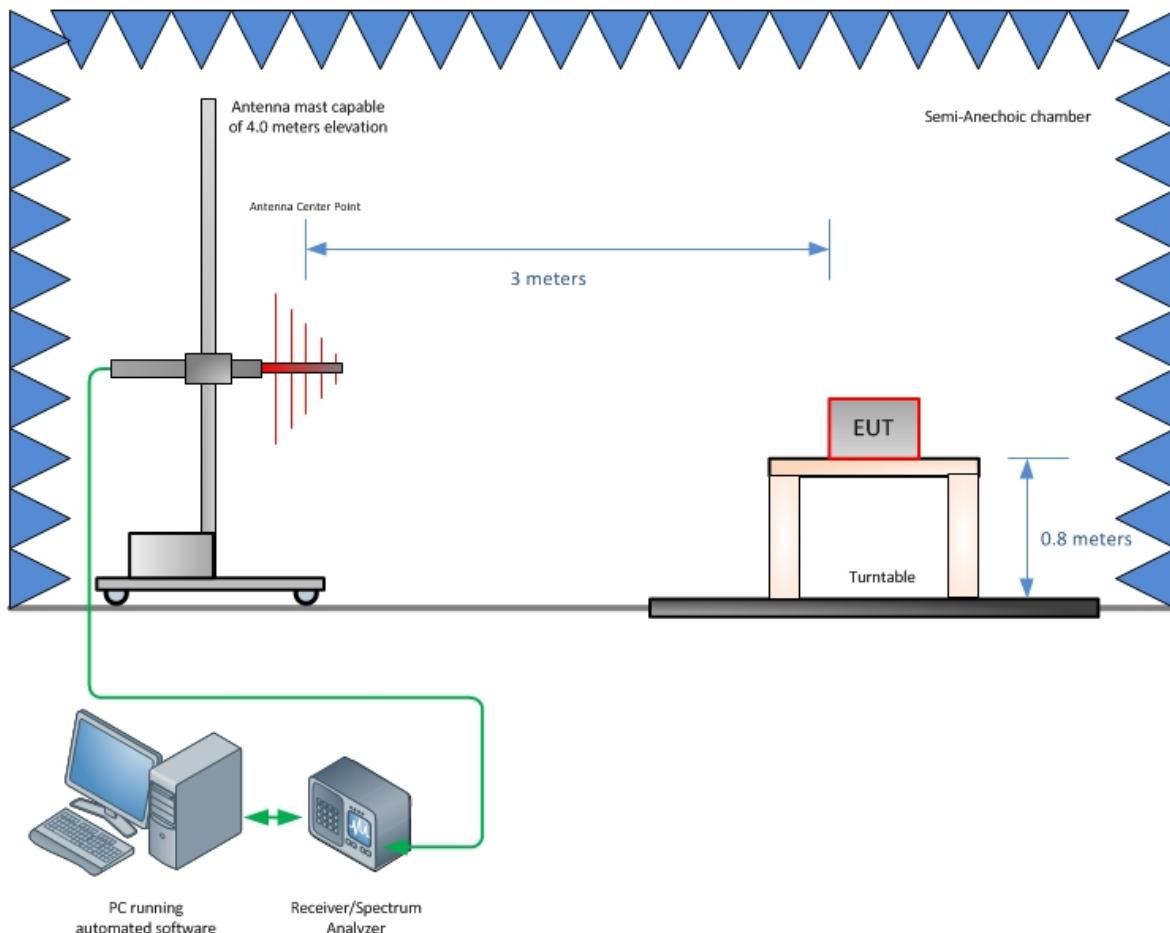
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Emission Mask



Radiated Emission Test Setup (Below 1GHz)

FCC ID: SGWIPS2016RFID
IC: 11583A-IPS2016RFID
Report No. SD72118901-0716A



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

TÜV SÜD America, Inc. and its professional staff hold government and professional organization certifications for AAMI, ACIL, AEA, ANSI, IEEE, A2LA, NIST and VCCI.



A2LA Cert. No. 2955.13

