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Limited Report On

Application for Grant of Equipment Authorization of the
Telit Communication S.p.A.
CE910-DUAL DUAL Band CDMA Module

FCC CFR 47 Part 2, Part 22 and 24
IC RSS-Gen and RSS-132 and RSS-133

Report No. SD72113667-0216C **April 2016**

REPORT ON	Limited Radio Testing of the Telit Communication S.p.A. DUAL Band CDMA Module
TEST REPORT NUMBER	SD72113667-0216C
PREPARED FOR	Telit Communication S.p.A. Viale Stazione di Prosecco 5/B, 34010 Sgonico, Trieste, Italy
CONTACT PERSON	Brian Tucker +919 439 7977
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	April 15, 2016

Revision History

SD72113667-0216C Telit Communication S.p.A. Telit DUAL Band CDMA Module					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
04/15/2016	Initial Release				Juan M. Gonzalez

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SECTION 1

REPORT SUMMARY

Limited Radio Testing of the
Telit Communication S.p.A.
DUAL Band CDMA Module

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Telit Communication S.p.A. DUAL Band CDMA Module to the requirements of the following:

- FCC CFR 47 Part 2, Part 22 and 24
- IC RSS-Gen and RSS-132 and RSS-133.

Objective	To perform limited Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Telit Communication S.p.A.
Model Number(s)	Telit
FCC ID Number	RI7CE910-DUAL
IC Number	5131A-CE910DUAL
Serial Number(s)	N/A
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC CFR 47 Part 2, Part 22 and 24 (October 1, 2015). • RSS-132 - Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz (Issue 3, January 2013). • RSS-133 – 2 GHz Personal Communications Services (Issue 6, January 2013). • RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 4, November 2014).
Start of Test	April 11, 2016
Finish of Test	April 11, 2016
Name of Engineer(s)	Alex Chang
Related Document(s)	• None. • Telit Communication S.p.A. test report with FCC Part 2 22, 24 and RSS-132 and 133, issued by Nemko Korea July 27, 2012. Test report number NK-12-R-098.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2, Part 22 and 24 with cross-reference to the corresponding IC RSS standard is shown below.

Section	FCC Part Sections(s)	RSS Section(s)	Test Description	Result
—	2.1046	RSS-132(5.4),RSS-133(6.4)	Transmitter Conducted Output Power	N/P *
—	22.913(a)(2), 2.1046	RSS-132(5.4),SRSP-503(5.1.3)	Effective Radiated Power	N/P *
—	24.232(c),2.1046	RSS-133(6.4),SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	N/P *
—	2.1049,22.917(b), 24.238(b)	RSS-Gen 6.6	Occupied Bandwidth	N/P *
—	24.232(d)	RRSS-133(6.4)	Peak-Average Ratio	N/P *
—	2.1051,22.917(a), 24.238(a)	RSS-132(5.5),RSS-133(6.5)	Band Edge/Conducted Spurious Emissions	N/P *
2.1	2.1053,22.917(a), 24.238(a)	RSS-132(5.5),RSS-133(6.5)	Field Strength Of Spurious Radiation	Compliant
—	2.1055,22.355,24.235	RSS-132(5.3),RSS-133(6.3)	Frequency Stability	N/P *
—		RSS-132(5.6),RSS-133(6.6)	Receiver Spurious Emissions	N/P *
—		RSS-Gen 8.8	Power Line Conducted Emission	N/A

N/P * Test results were reviewed from CDMA module test report issued by Nemko Korea, test report number NK-12-R-098. Report was reviewed and found to be complies with the latest standard requirement.

N/A Test no applicable. EUT is a battery operated device.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Telit Communication S.p.A. CE910-DUAL Telit DUAL Band CDMA Module. The module installed into IPS Group Smart Cash Collection Card host for final evaluation. CDMA Cellular and PCS band spurious emissions were additional evaluated for compliance.
This module is go into the end product host of IPS Group model name “Smart Mobile Cash Collection Cart” and the end product capability contained CDMA (Cell and PCS bands), Bluetooth and RFID technologies.

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1.3.2 EUT General Description

EUT Description	DUAL Band CDMA Module
Model Name	Telit
Model Number(s)	CE910-DUAL
Mode Verified	CDMA Cellular and PCS band

Host Device Capability

Item	Description
2G Bands	CDMA (Cell 800/900MHz and PCS 1800/1900 bands)
RFID	13.56 MHz
BLE	2.4 GHz

Primary Unit (EUT)

☐ Production

☒ Pre-Production

Antenna Type	Magnet Mount Antennas
Antenna Gain	5.12 dBi for Cellular 6.12 dBi for PCS

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	Radiated test setup. CDMA module installed to IPS Smart Cash Collection Cart host for final evaluation. Tx mode in worst case channel presented of Cellular and PCS each band.

1.4.2 EUT Exercise Software

EUT is controlled by a CMW 500 Wideband Radio Communication Tester.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
—	—	—

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 C63.4-2014, 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 (if applicable) 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

1.8.1 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.

1.8.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A

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

1.9 SAMPLE CALCULATIONS

1.9.1 CDMA Emission Designator

Emission Designator = 1M30F9W
F = Frequency Modulation
9= Composite Digital Info
W = Combination (Audio/Data)

1.9.2 Spurious Radiated Emission (below 1GHz)

Measuring equipment raw measurement (dBµV/m) @ 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 (dBµV/m) @ 30MHz			**11.8**

1.9.3 Spurious Radiated Emission – Substitution Method

Example = 84dBµV/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dBµV/m @ 1413 MHz (2nd Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dBµV/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

P_{EIRP} = -18 dBm + 7.8 dBi – 1dB
= 11.2 dBm
P_{ERP} = P_{EIRP} – 2.15 dB
= 11.2 dBm – 2.15 dB
= 9.05 dBm

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SECTION 2

TEST DETAILS

Radio Testing of the
Telit Communication S.p.A.
DUAL Band CDMA Module

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2.1 FIELD STRENGTH OF SPURIOUS RADIATION

2.1.1 Specification Reference

Part 22 Subpart H §22.917(a) and Part 24 Subpart E §24.238(a)

2.1.2 Standard Applicable

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

2.1.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

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

April 11, 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 performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	24.2 °C
Relative Humidity	47.2 %
ATM Pressure	99.4 kPa

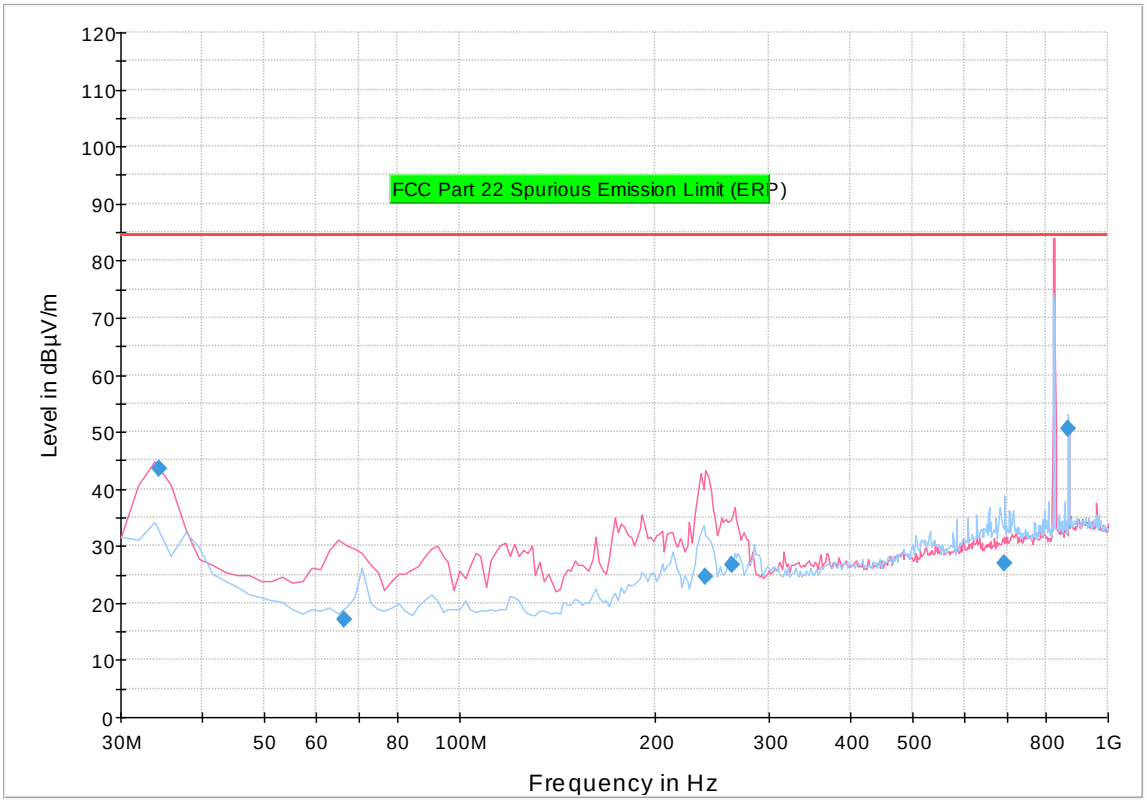
2.1.7 Additional Observations

- Only the worst case configuration presented in this test report on Cellular and PCS bands.
- 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.

2.1.8 Test Results

See attached plots.

2.1.9 Test Results Below 1GHz (Cellular band Worst Case Configuration, Low Channel 1013)

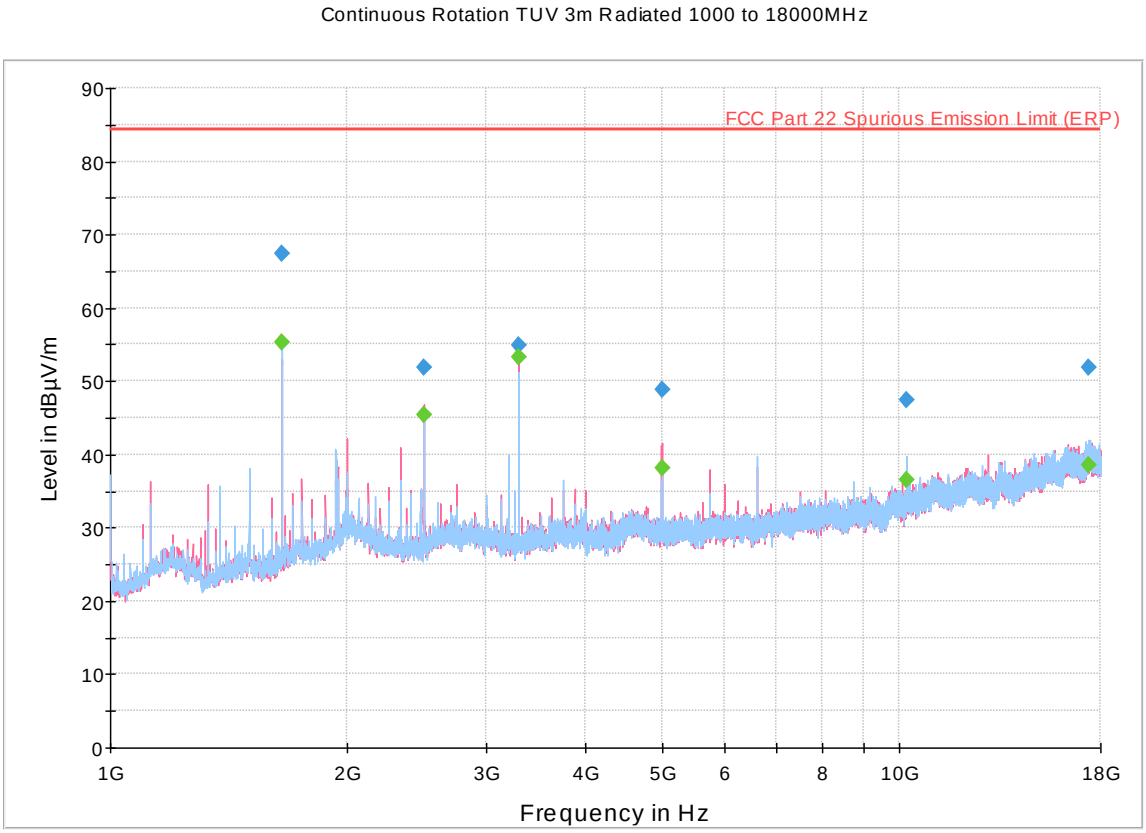


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.407776	43.4	1000.0	120.000	100.0	V	212.0	-8.1	40.9	84.4
66.429980	17.0	1000.0	120.000	106.0	V	181.0	-16.5	67.4	84.4
239.539880	24.5	1000.0	120.000	127.0	V	70.0	-9.3	59.9	84.4
263.050421	26.6	1000.0	120.000	100.0	V	72.0	-8.5	57.7	84.4
693.825731	27.0	1000.0	120.000	144.0	H	297.0	3.0	57.4	84.4
869.679519	50.5	1000.0	120.000	184.0	H	234.0	5.2	33.9	84.4

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

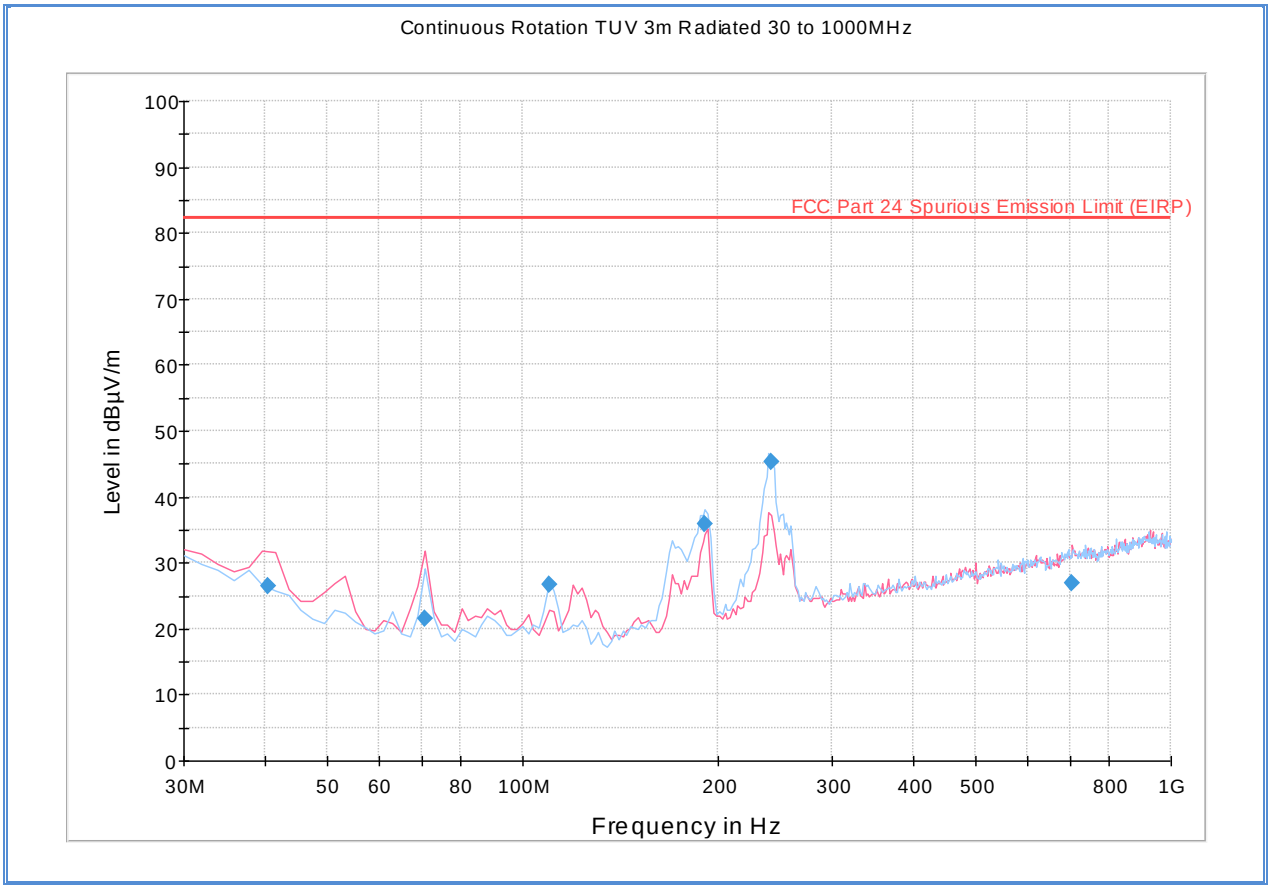
2.1.10 Test Results Above 1GHz (Cellular band Worst Case Configuration, Low Channel 1013)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1648.800000	67.3	1000.0	1000.000	140.7	H	120.0	-5.5	17.1	84.4
2500.166667	51.8	1000.0	1000.000	116.7	V	0.0	-0.8	32.6	84.4
3298.600000	54.9	1000.0	1000.000	301.2	V	152.0	0.4	29.5	84.4
5000.500000	48.9	1000.0	1000.000	269.3	V	49.0	2.8	35.5	84.4
10199.833333	47.4	1000.0	1000.000	116.7	H	223.0	9.9	36.9	84.4
17353.966667	51.8	1000.0	1000.000	404.0	H	20.0	17.9	32.6	84.4

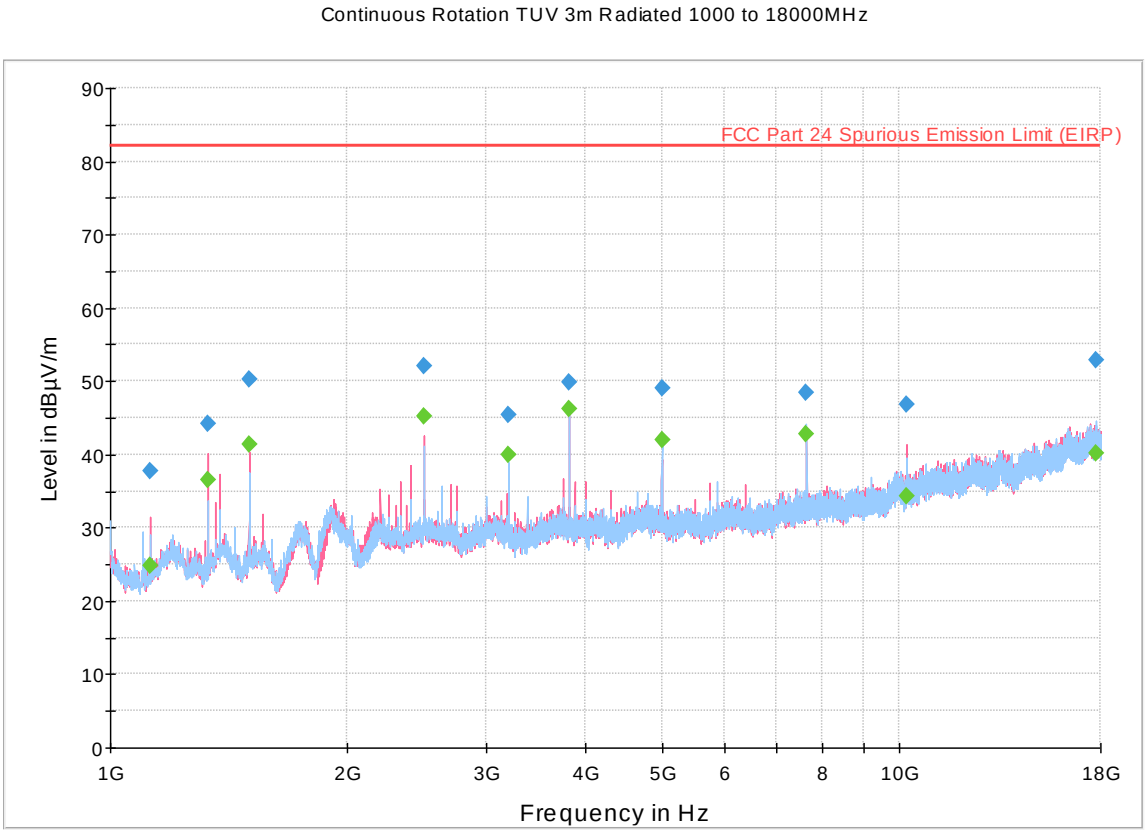
2.1.11 Test Results Below 1GHz (PCS band Worst Case Configuration, High Channel 1175)



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)
40.559439	26.5	1000.0	120.000	115.0	V	15.0	-11.4	55.7	82.2
70.861643	21.5	1000.0	120.000	400.0	V	342.0	-16.8	60.7	82.2
109.979399	26.6	1000.0	120.000	191.0	H	84.0	-14.5	55.6	82.2
191.262685	35.9	1000.0	120.000	139.0	H	266.0	-11.0	46.3	82.2
241.699880	45.4	1000.0	120.000	109.0	H	283.0	-9.3	36.9	82.2
702.929058	26.9	1000.0	120.000	150.0	V	128.0	2.9	55.3	82.2

2.1.12 Test Results Above 1GHz (PCS band Worst Case Configuration, High Channel 1175)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1124.866667	37.7	1000.0	1000.000	157.6	V	154.0	-7.6	44.6	82.2
1332.100000	44.3	1000.0	1000.000	183.5	V	155.0	-5.2	38.0	82.2
1500.000000	50.2	1000.0	1000.000	258.3	V	33.0	-6.2	32.0	82.2
2499.766667	52.2	1000.0	1000.000	103.7	V	6.0	-0.6	30.1	82.2
3200.000000	45.5	1000.0	1000.000	132.7	H	-9.0	0.8	36.7	82.2
3817.666667	49.9	1000.0	1000.000	259.3	V	28.0	1.8	32.3	82.2
4999.900000	49.1	1000.0	1000.000	103.7	H	310.0	3.3	33.2	82.2
7634.900000	48.5	1000.0	1000.000	217.4	H	144.0	7.6	33.7	82.2
10199.233333	46.8	1000.0	1000.000	300.6	V	173.0	11.1	35.5	82.2
17758.166667	52.8	1000.0	1000.000	398.4	H	28.0	20.3	29.4	82.2

SECTION 3

TEST EQUIPMENT USED

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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 Emissions						
1033	Bilog Antenna	3142C	00044556	EMCO	09/25/14	09/25/16
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
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	04/27/15	04/27/16
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	01/11/16	01/11/17
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/17/16	03/17/17
TUV783	2.0GHz High Pass Filter	FF6549-2	008	Sage	Verified by 1049	
Miscellaneous						
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	10/19/15	10/19/16
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

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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

SECTION 4

DIAGRAM OF TEST SETUP

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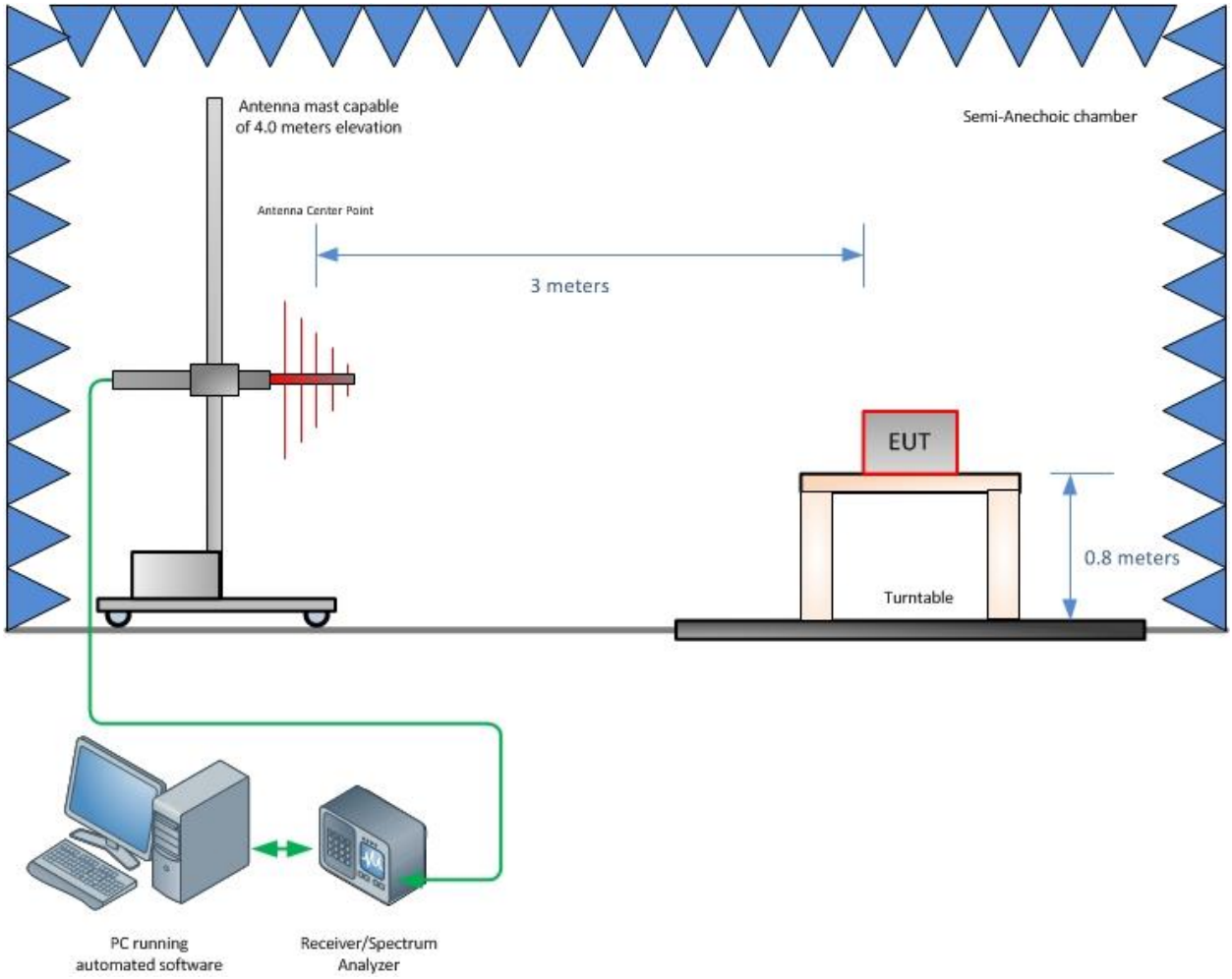
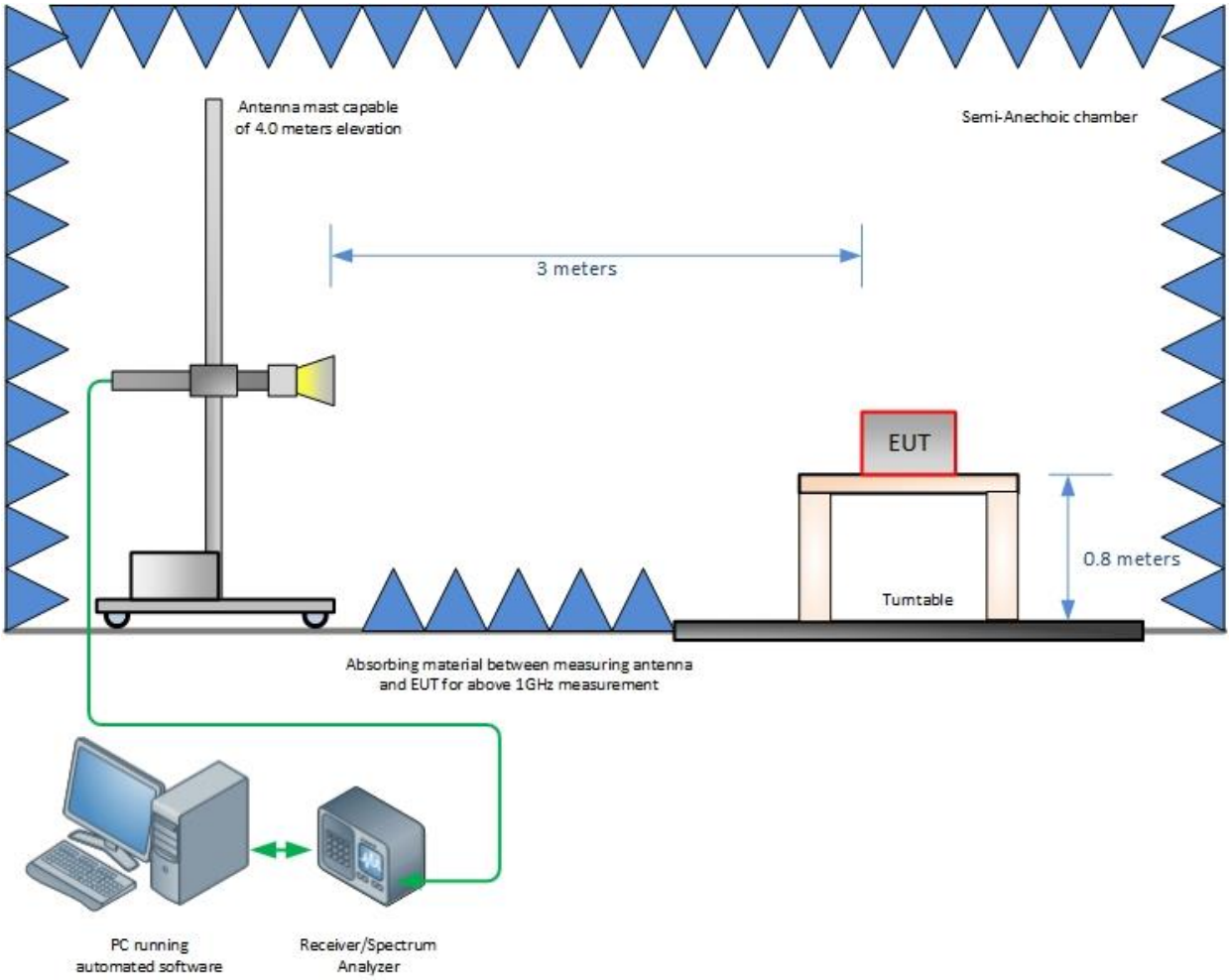
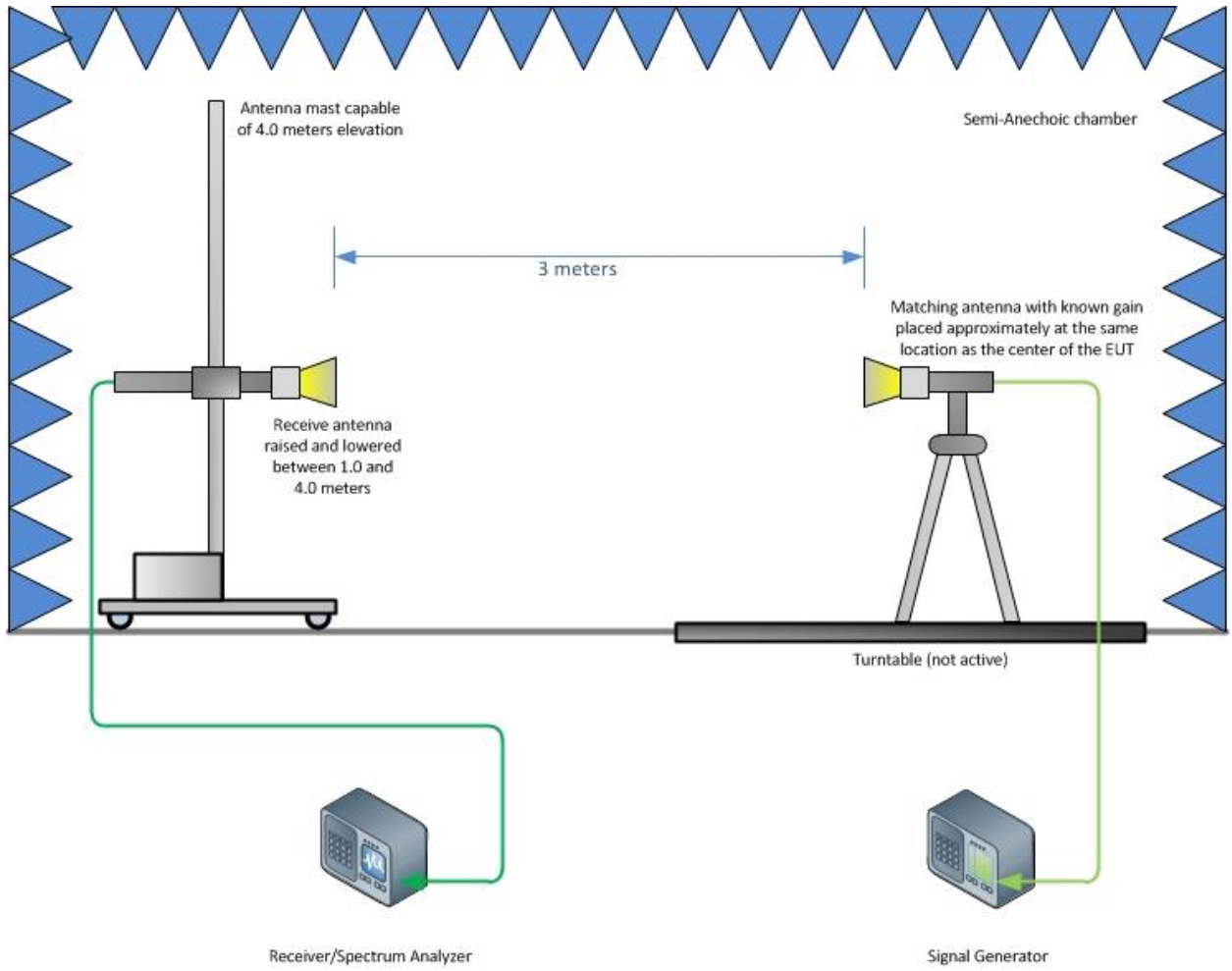
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz, if applicable)

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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