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Report On

Limited RF Evaluation of
Mobilogix, Inc.
ATD300S Asset Tracking Device

FCC CFR 47 Part 2 and 27
IC RSS-130 issue 1: 2013

Report No. JT72138801-0418B

June 2018



America

TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121
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REPORT ON	Limited RF Evaluation of the Mobilogix, Inc. ATD300S Asset Tracking Device
TEST REPORT NUMBER	JT72138801-0418B
TEST REPORT DATE	June 2018
PREPARED FOR	Mobilogix, Inc. 5500 Trabuco Road, Suite 150 Irvine, CA 92620 USA
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DATED	June 20, 2018



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Revision History

JT72138801-0418B Mobilogix, Inc. ATD300S Asset Tracking Device					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/20/2018	—	Initial Release			Ferdinand Custodio

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SECTION 1

REPORT SUMMARY

Limited RF Evaluation of the
Mobilogix, Inc.
ATD300S Asset Tracking Device



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Mobilogix, Inc. ATD300S Model ATD300S to the requirements of the following:

- FCC CFR 47 Part 2 and 27
- RSS-130

Objective	To perform RF Evaluation to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Mobilogix, Inc.
EUT	Asset Tracking Device
Model Name	ATD300S
Model Number(s)	ATD300S
FCC ID Number	2AH4HATD300S
IC Number	21385-ATD300S
Serial Number(s)	861108037056305 (IMEI)
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC CFR 47 Part 2 and 27 (October 1, 2017) • RSS-130 – Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz (Issue 1, October 2013).
Start of Test	June 13, 2018
Finish of Test	June 13, 2018
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	None

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and 27 is with cross-reference to corresponding IC RSS-130 standard is shown below.

Section	Spec Clause			Test Description	Result
	FCC Part 2	FCC Part 27	RSS-130		
2.1	2.1051	27.53(c)(2)(4)(5)&(f)	4.6	Conducted Spurious Emissions	Compliant

Note: Only Conducted Spurious Emissions tested as per client's test plan.



1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Mobilogix, Inc. ATD300S Asset Tracking Device. The ATD300S is a multi-purpose LTE CAT1 tracking and monitoring device with GPS, accelerometer, battery monitoring, buzzer/tone generation, throttle control, brake control, and headlamp control.



1.3.2 EUT General Description

EUT Description	Asset Tracking Device
Model Name	ATD300S
Model Number(s)	ATD300S
Rated Voltage	3.7VDC via internal Lithium battery
Mode Verified	LTE Band 13
Frequency Range	LTE Band 13: 777 MHz – 787 MHz
Capability	LTE Band 4 and 13 and BT LE
Primary Unit (EUT)	☒ Production ☐ Pre-Production ☐ Engineering



1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	Conducted antenna port measurement. EUT Transmits at max power and is powered by the internal battery.

1.4.2 EUT Exercise Software

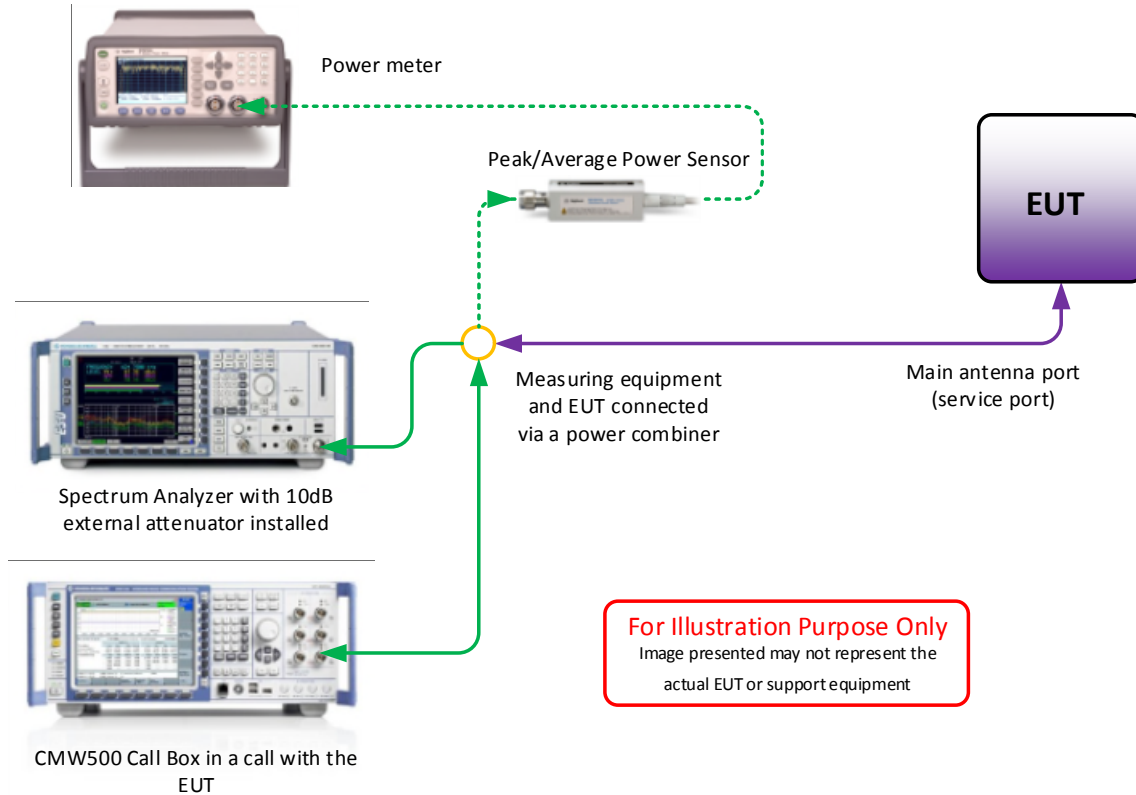
EUT is controlled by a CMW 500 Wideband Radio Communication Tester. There are no other test software used during verification.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Rhode & Schwarz	CMW 500 Wideband Radio Communication Tester	S/N: 116815

1.4.4 Simplified Test Configuration Diagram

Conducted (Antenna Port) Test Configuration





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: 861108037056305 (IMEI)		
None	—	—

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 C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. 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) 678-1400 Fax: (858) 546-0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Designation 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 Designation is US1146.



1.9.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

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 NCC (National Communications Commission - US0102)

TUV SUD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0280 and A-0281

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.

1.9.6 RRA – Identification No. US0102

TUV SUD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

1.9.7 OFCA – U.S. Identification No. US0102

TUV SUD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.



SECTION 2

TEST DETAILS

Limited RF Evaluation of the
Mobilogix, Inc.
ATD300S Asset Tracking Device



2.1 CONDUCTED SPURIOUS EMISSIONS

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(c)(2)(4)(5)(f)
RSS-130, Clause 4.6

2.1.2 Standard Applicable

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(f) For operations in the 746-758 MHz and 775-788 MHz and 805-806 MHz bands, emissions in the band 1559-1610 MHz be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

2.1.3 Equipment Under Test and Modification State

Serial No: 861108037056305 (IMEI) / Default Test Configuration

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

June 13, 2018/XYZ

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

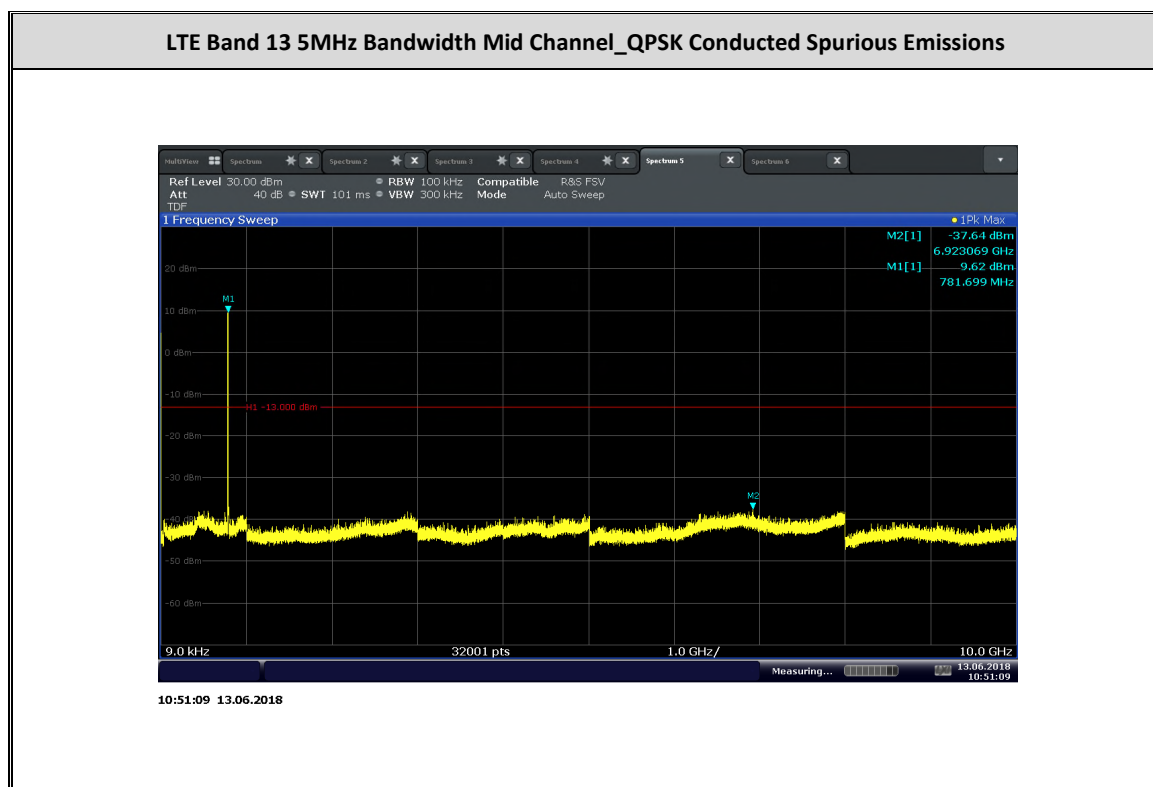
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

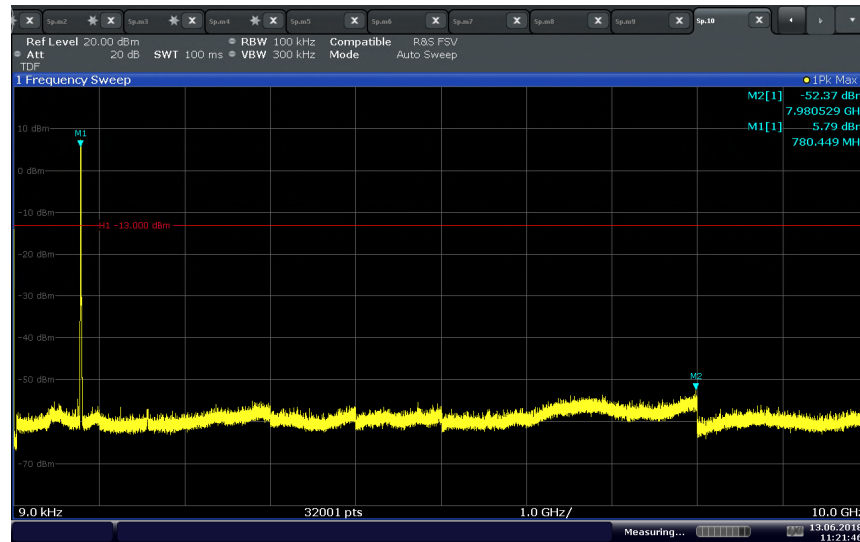
Ambient Temperature	24.9°C
Relative Humidity	54.2%
ATM Pressure	98.5kPa

2.1.7 Additional Observations

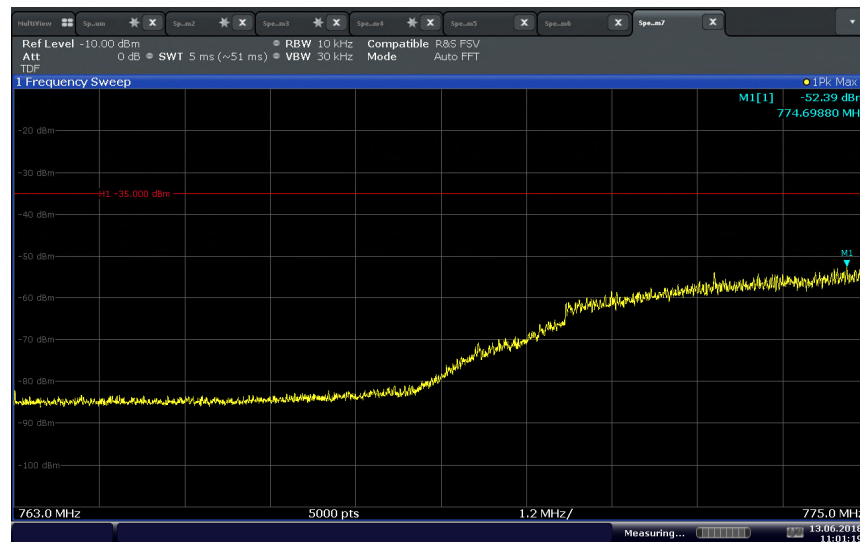
- This is a conducted test.
- The transducer factor (TDF) used is from the external attenuators and cables used.
- The spectrum was searched from 9 kHz to 10 GHz (requirement is up to the 10th harmonic ($\leq 8\text{GHz}$)).
- For 763-775 MHz and 793-806 MHz verification, the next available RBW was used (6.25 kHz required, 10kHz RBW utilized).
- All low, middle and high channels for different bandwidths and modulations were verified. There are no much difference between different channels and modulations. Only test plots for middle channel for QPSK presented in this test report as the representative configuration.

2.1.8 Test Results

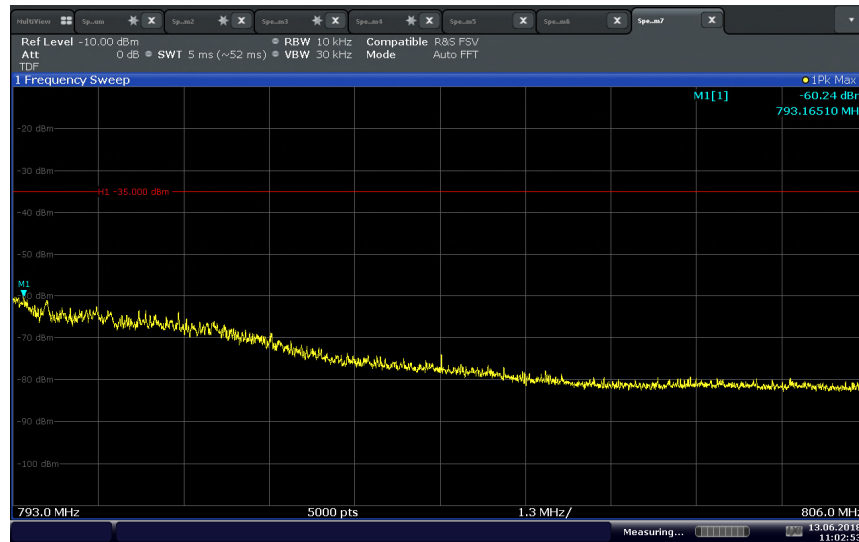


LTE Band 13 10MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions

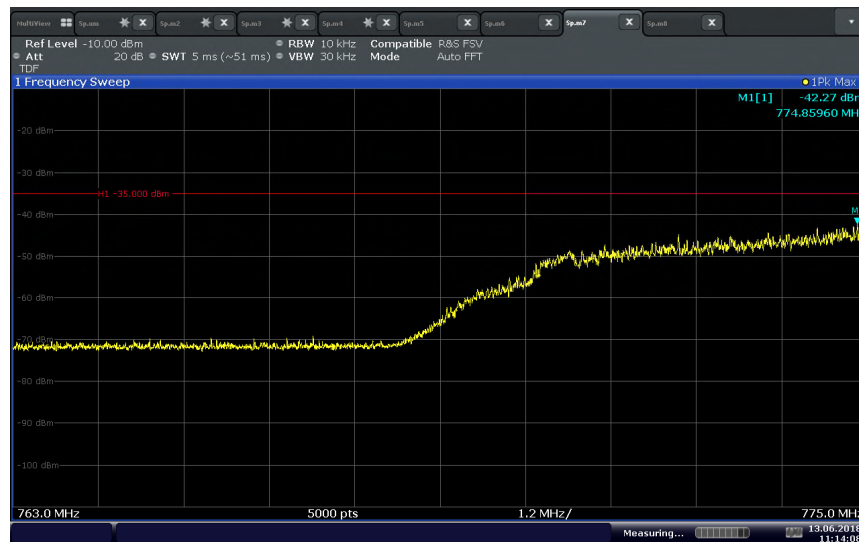
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LTE Band 13 5MHz Bandwidth Mid Channel Conducted_QPSK Spurious Emissions (763-775 MHz)

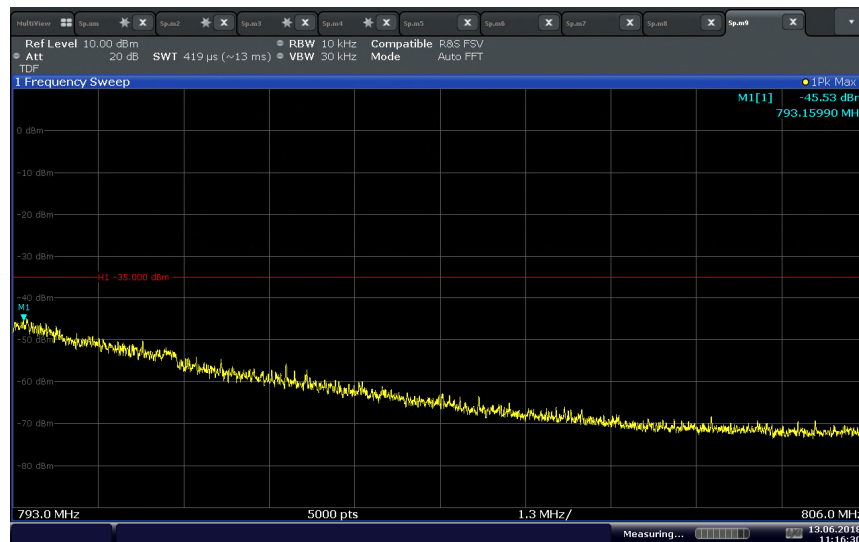
11:01:20 13.06.2018

LTE Band 13 5MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions (793-806 MHz)

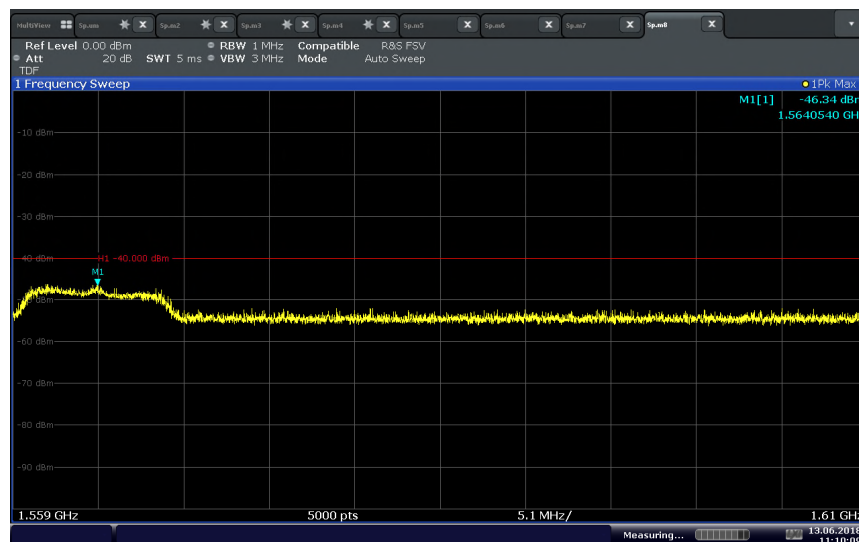
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LTE Band 13 10MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions (763-775 MHz)

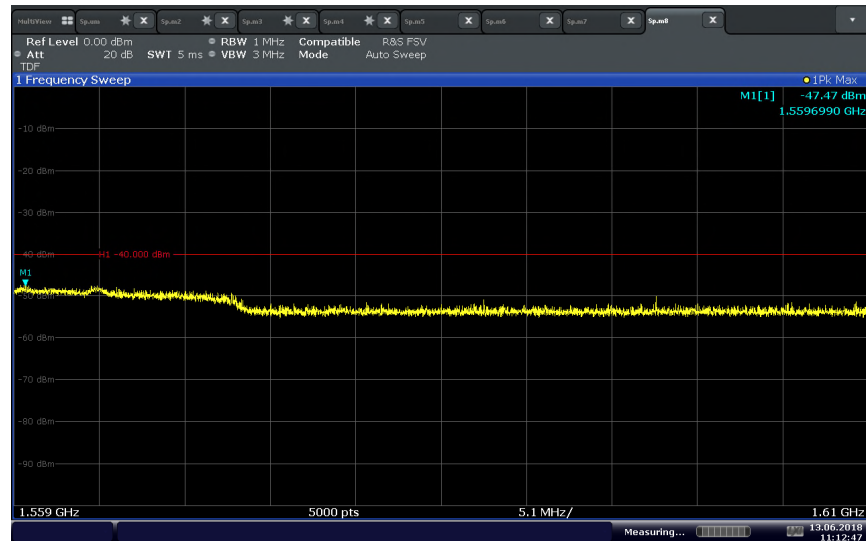
11:14:09 13.06.2018

LTE Band 13 10MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions (793-806 MHz)

11:16:30 13.06.2018

LTE Band 13 5MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions (1559-1610 MHz)

11:10:09 13.06.2018

**LTE Band 13 10MHz Bandwidth Mid Channel_QPSK Conducted Spurious Emissions
(1559-1610 MHz)**

11:12:47 13.06.2018



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
Conducted Port Setup						
7611	Signal/Spectrum Analyzer	FSW26	102017	Rhode & Schwarz	05/09/18	05/09/19
-	10dB Attenuator	VAT-10W2+2W	N/A	MCL	Verified by 7611 and 7608	
8800	Broadband Resistive Power Divider	1506A	RR002	Weinschel Corp.	Verified by 7611 and 7608	
7562	Wideband Radio Communication Tester	CMW 500	1201.0002k50 /103829	Rhode & Schwarz	08/10/17	08/10/18
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	09/19/17	09/19/19
Miscellaneous						
11312	Mini Environmental Quality Meter	850027	CF099-56010-340	Sper Scientific	02/26/18	02/26/19

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	3.52	1.44	2.07
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					1.68
Coverage Factor (k):					2
Expanded Uncertainty:					3.36

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	3.00	1.22	1.50
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					1.49
Coverage Factor (k):					2
Expanded Uncertainty:					2.99

3.2.3 Conducted Antenna Port Measurement

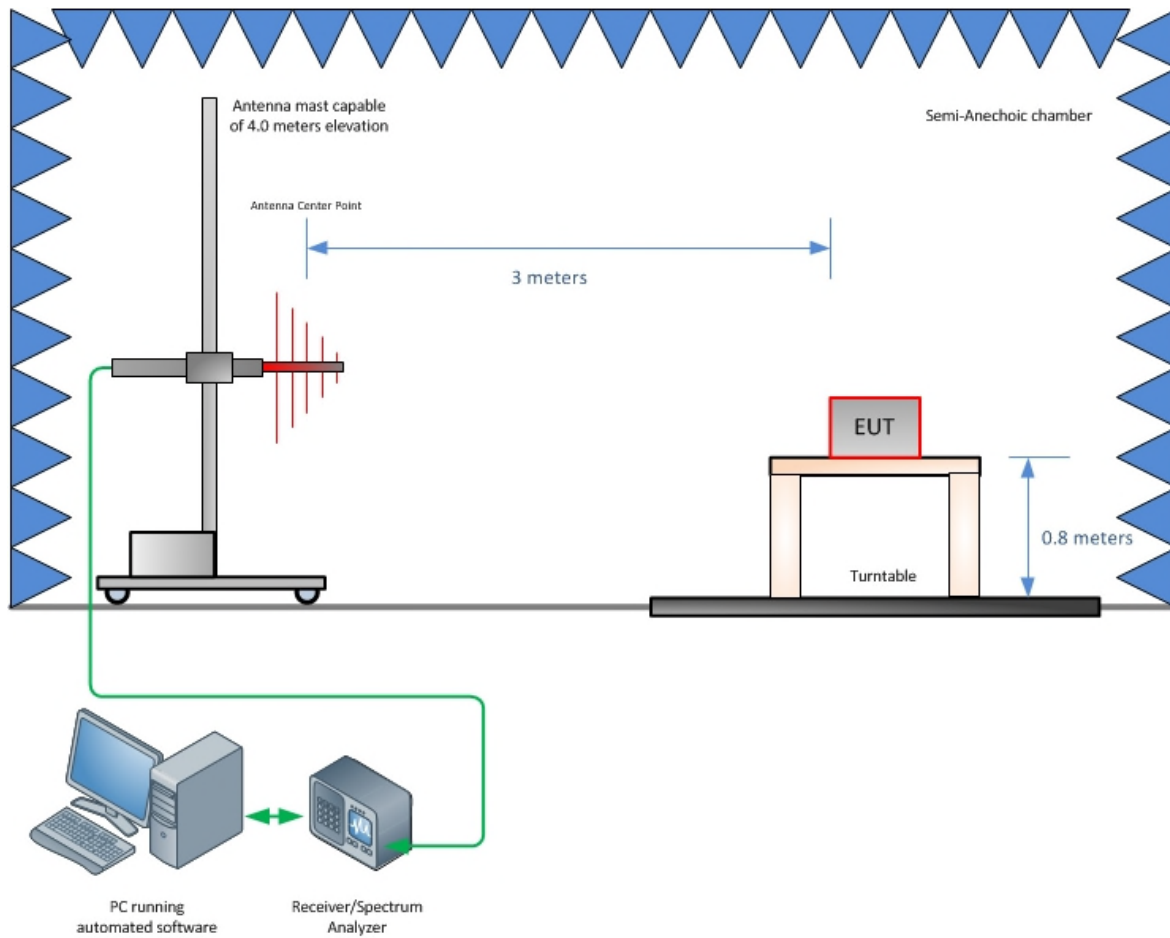
Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.34	0.20	0.04
2	Cables	Rectangular	0.30	0.17	0.03
3	EUT Setup	Rectangular	0.50	0.29	0.08
Combined Uncertainty (u_c):					0.39
Coverage Factor (k):					1.96
Expanded Uncertainty:					0.76



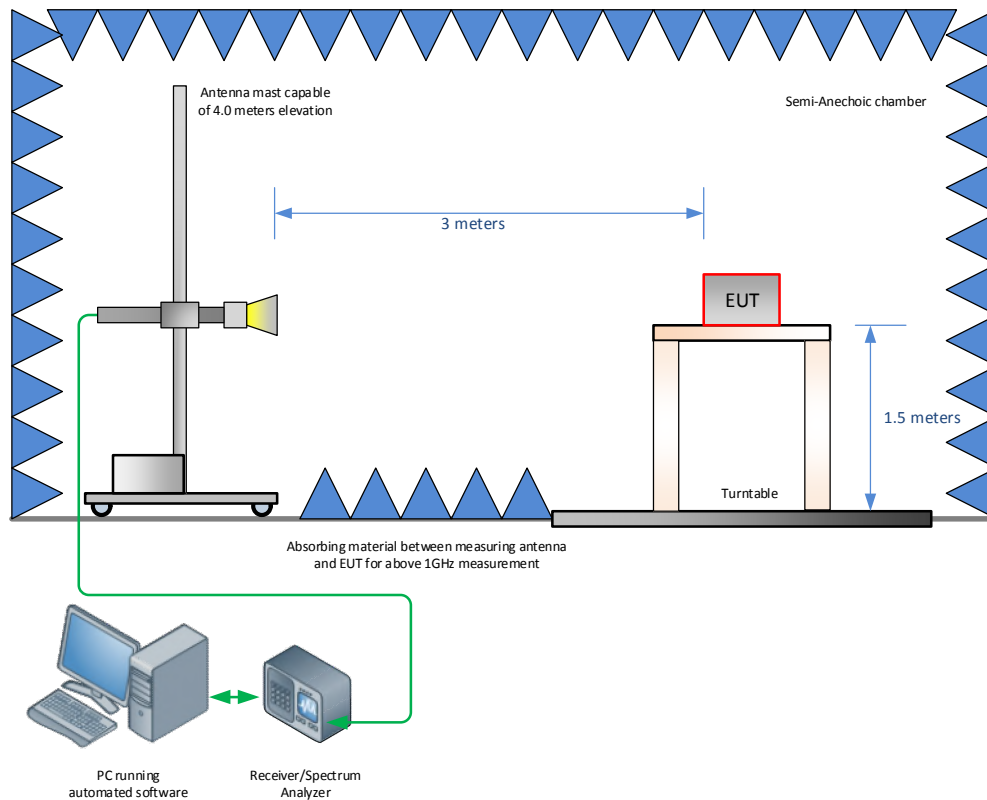
SECTION 4

DIAGRAM OF TEST SETUP

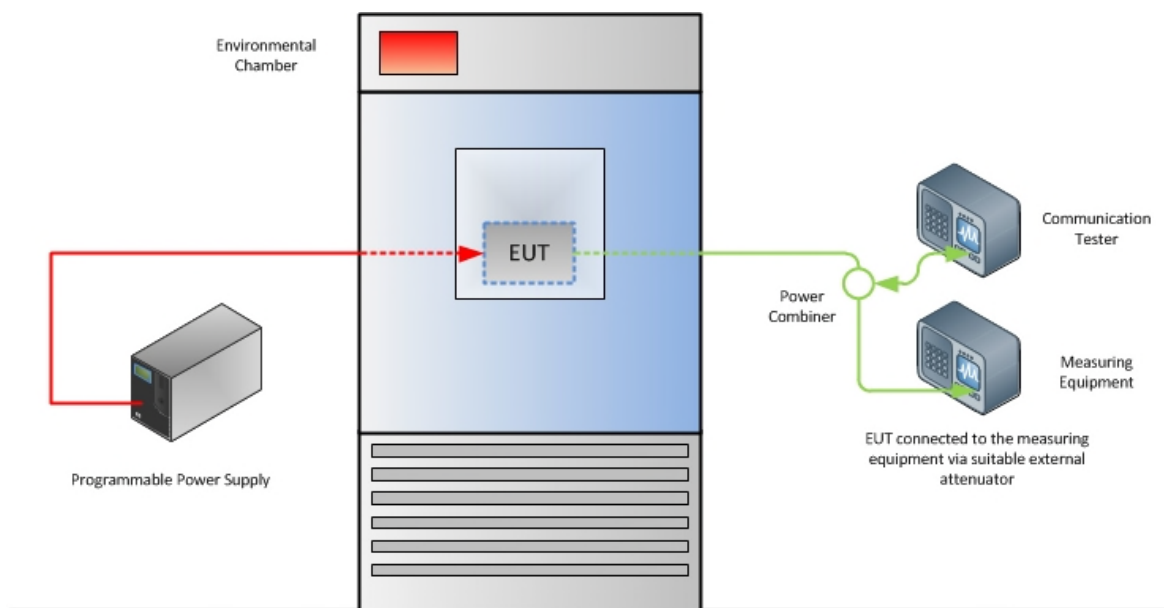
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Frequency Stability Test Configuration



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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