



CERTIFICATION TEST REPORT

Report Number. : 12530276-E1V5

Applicant : Samsung Electronics Co., Ltd.
129 Samsung-Ro, Yeongtong-Gu,
Suwon-Si, Gyeonggi-Do, Korea 16677

Model : SM-T927A

FCC ID : A3LSMT927A

EUT Description : WCDMA/LTE Tablet with BT, DTS/UNII a/b/g/n/ac

Test Standard(s) : FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 and PART 90R

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NVLAP Lab code: 200065-0

Revision History

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V3	1/17/2019	Updated Section 5.4, 6 & Added Section 10	K.Kedida
V4	1/22/2019	Updated Section 5.2, 5.4 & 10	K.Kedida
V5	1/28/2019	Updated Section 5.2 and added statement on Section 9.1	K.Kedida

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 16677, Korea
Model	SM-T927A
FCC ID	Kedida, Kiya
EUT Description	WCDMA/LTE Tablet with BT, DTS/UNII a/b/g/n/ac
Date Tested	AUGUST 13, 2018 to JANUARY 15, 2019
Applicable Standards	FCC CFR 47 PART 22H, 24E, 27, and 90R
Test Results	COMPLIES

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By: 	Reviewed By: 
Dan Corona Operations Leader UL Verification Services Inc.	Kiya Kedida Senior Project Engineer UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26:2015, TIA-603-E, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, and Part 90R, FCC KDB 971168 D01 v3r1 and ANSI C63.4:2014.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)	<input type="checkbox"/> Chamber I (IC: 2324A-5)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)	<input type="checkbox"/> Chamber J (IC: 2324A-6)
<input checked="" type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)	<input type="checkbox"/> Chamber K (IC: 2324A-1)
	<input type="checkbox"/> Chamber G (IC:22541-4)	<input checked="" type="checkbox"/> Chamber L (IC: 2324A-3)
	<input type="checkbox"/> Chamber H (IC:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \\ &\text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WCDMA/LTE Tablet with BT, DTS/UNII a/b/g/n/ac.

5.2. MAXIMUM OUTPUT POWER

ERP/EIRP LIMIT

FCC: §2.1046, §22.913, §24.232, §27.50 and §90.541

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015/ TIA-603-E Clause 2.2.17

KDB 971168 D01 Section 5.6

KDB 412172 D01

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

WCDMA MODE

Part 22 Band 5								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
826.4-846.6	REL 99	23.9	0.49	7.0	22.24	0.167	4126	4M13F9W
	HSDPA	23.3			21.64	0.146	4147	4M15F9W

Part 24 Band 2								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1852.4-1907.6	REL 99	23.4	3.83	2.0	27.23	0.528	4147	4M15F9W
	HSDPA	23.2			27.03	0.505	4151	4M15F9W

LTE BAND 2

Part 24								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		3.83						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1850.7	1909.3	23.5	27.33	0.541	1090	1M09G7W
	16QAM			22.5	26.33	0.430	1090	1M09D7W
	64QAM			21.5	25.33	0.341		
3.0	QPSK	1851.5	1908.5	23.4	27.23	0.528	2700	2M70G7W
	16QAM			22.3	26.13	0.410	2700	2M70D7W
	64QAM			21.5	25.33	0.341		
5.0	QPSK	1852.5	1907.5	23.4	27.23	0.528	4510	4M51G7W
	16QAM			22.3	26.13	0.410	4510	4M51D7W
	64QAM			21.5	25.33	0.341		
10.0	QPSK	1855.0	1905.0	23.4	27.23	0.528	8980	8M98G7W
	16QAM			22.2	26.03	0.401	8960	8M96D7W
	64QAM			21.3	25.13	0.326		
15.0	QPSK	1857.5	1902.5	23.3	27.13	0.516	13440	13M4G7W
	16QAM			22.3	23.30	0.214	13460	13M5D7W
	64QAM			21.5	25.33	0.371		
20.0	QPSK	1860.0	1900.0	23.4	27.23	0.528	17880	17M9G7W
	16QAM			22.4	26.23	0.420	17900	17M9D7W
	64QAM			21.5	25.33	0.341		

LTE BAND 5

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		0.49						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	824.7	848.3	22.7	21.04	0.127	1090	1M09G7W
	16QAM			21.6	19.94	0.099	1090	1M09D7W
	64QAM			20.6	18.94	0.078		
3.0	QPSK	825.5	847.5	22.6	20.94	0.124	2710	2M71G7W
	16QAM			21.7	20.04	0.101	2700	2M70D7W
	64QAM			20.6	18.94	0.078		
5.0	QPSK	826.5	846.5	22.6	20.94	0.124	4510	4M51G7W
	16QAM			21.4	19.74	0.094	4550	4M55D7W
	64QAM			20.5	18.84	0.077		
10.0	QPSK	829.0	844.0	22.7	21.04	0.127	8950	8M95G7W
	16QAM			21.7	20.04	0.101	8960	8M96D7W
	64QAM			20.6	18.94	0.078		

LTE BAND 12

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-1.11						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	699.7	715.3	23.8	20.54	0.113	1100	1M10G7W
	16QAM			22.6	19.34	0.086	1090	1M09D7W
	64QAM			21.8	18.54	0.071		
3.0	QPSK	700.5	714.5	23.8	20.54	0.113	2700	2M70G7W
	16QAM			22.7	19.44	0.088	2700	2M70D7W
	64QAM			21.6	18.34	0.068		
5.0	QPSK	701.5	713.5	23.6	20.34	0.108	4500	4M50G7W
	16QAM			22.5	19.24	0.084	4500	4M50D7W
	64QAM			21.9	18.64	0.073		
10.0	QPSK	704.0	711.0	23.5	20.24	0.106	8950	8M95G7W
	16QAM			22.3	19.04	0.080	8960	8M96D7W
	64QAM			21.5	18.24	0.067		

LTE BAND 14

Part 90R								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-0.88						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	790.5	795.5	23.6	20.57	0.114	4520	4M52G7W
	16QAM			22.6	19.57	0.091	4520	4M52D7W
	64QAM			21.7	18.67	0.074		
10.0	QPSK	793.0	793.0	23.7	20.67	0.117	8950	8M95G7W
	16QAM			22.5	19.47	0.089	8960	8M96D7W
	64QAM			21.6	18.57	0.072		

LTE BAND 66

Part 27								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		2.74						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1710.7	1779.3	24.0	26.74	0.472	1080	1M08G7W
	16QAM			23.0	25.74	0.375	1090	1M09D7W
	64QAM			22.0	24.74	0.298		
3.0	QPSK	1711.5	1778.5	24.0	26.74	0.472	2700	2M70G7W
	16QAM			23.0	25.74	0.375	2700	2M70D7W
	64QAM			22.0	24.74	0.298		
5.0	QPSK	1712.5	1777.5	23.9	26.64	0.461	4500	4M50G7W
	16QAM			22.8	25.54	0.358	4510	4M51D7W
	64QAM			21.9	24.64	0.291		
10.0	QPSK	1715.0	1775.0	24.0	26.74	0.472	8970	8M97G7W
	16QAM			23.0	25.74	0.375	8970	8M97D7W
	64QAM			21.7	24.44	0.278		
15.0	QPSK	1717.5	1772.5	23.9	26.64	0.461	13454	13M5G7W
	16QAM			23.0	25.74	0.375	13405	13M4D7W
	64QAM			21.7	24.44	0.278		
20.0	QPSK	1720.0	1770.0	23.9	26.64	0.461	17873	17M9G7W
	16QAM			23.0	25.74	0.375	17870	17M9D7W
	64QAM			21.7	24.44	0.278		

5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was T927A.001

5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
WCDMA Band 2, 1850-1910 MHz	3.83
WCDMA Band 5, 824-849 MHz	0.49
LTE BAND 2, 1850 - 1910 MHz	3.83
LTE BAND 4, 1710 – 1755 MHz	2.74
LTE BAND 5, 824 - 849 MHz	0.49
LTE BAND 12, 699 - 716 MHz	-1.11
LTE BAND 14, 788 - 798 MHz	-0.88
LTE BAND 30, 2305 – 2315 MHz	0.98
LTE BAND 66, 1710 - 1780 MHz	2.74

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:

Band 2, Band 4, Band 5, Band 12, Band 14, Band 30 and Band 66.

LTE Band 4 (1710-1755MHz, 1.4/3/5/10/15/20MHz bandwidth) is covered by LTE Band 66 because it is a subset of LTE band 66 and they have same output power and channel bandwidth.

The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM and 64QAM modulations. It was found that QPSK, and 16QAM results were worst case. All testing was performed using QPSK and 16QAM modulations to represent the worst case.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, & Z, and it was determined that X-Axis with AC/DC Adapter and headset was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis with AC/DC Adapter and headset orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	EP-TA300	R37K5PK1GA3SE3	N/A
Earphone	Samsung	N/A	N/A	N/A

I/O CABLES (RF Conducted Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

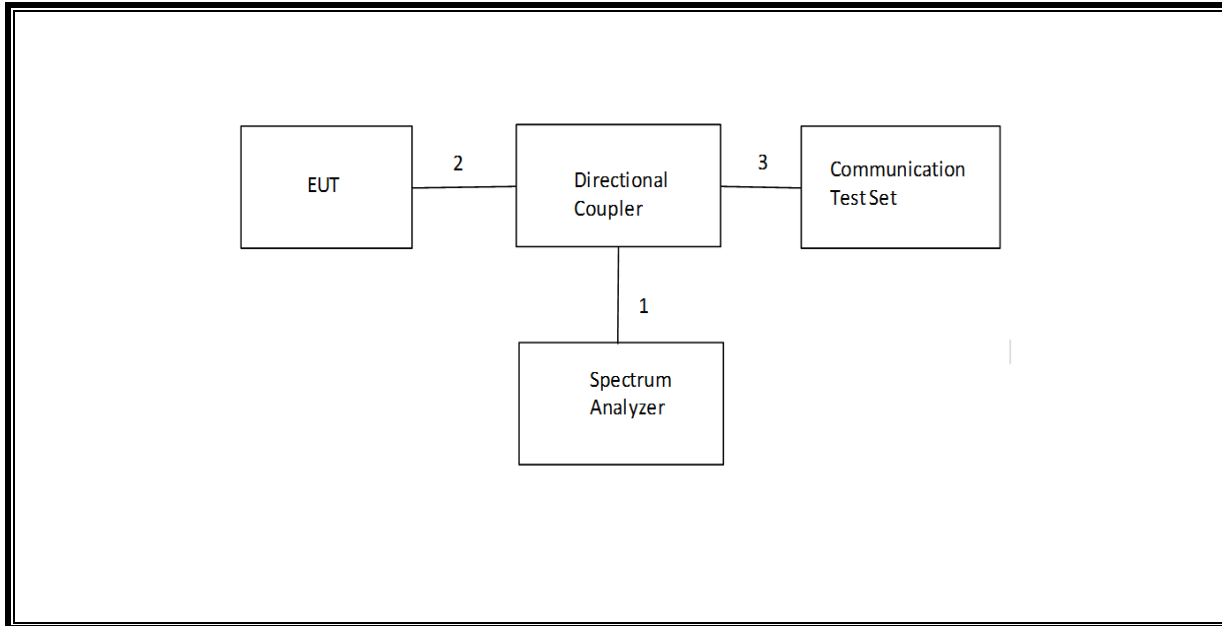
I/O CABLES (RF Radiated Test)

I/O Cable List						
Cable No	Port	# of identic	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Earphone	1	USB	Un-shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	No

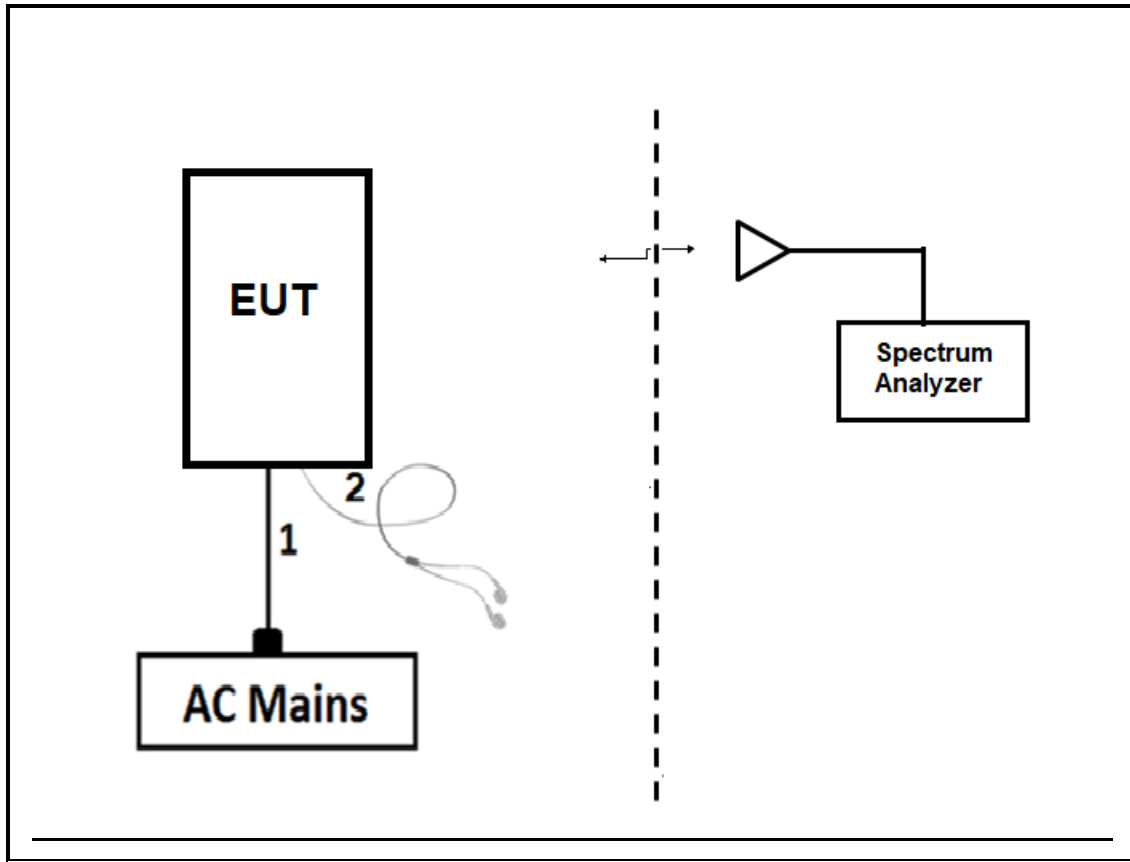
TEST SETUP

The EUT is continuously communicated to the call box during the tests

CONDUCTED TEST SETUP DIAGRAM



RADIATED TEST SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Highpass Filter, 2.7 GHz	Micro-Circuits	H2G518G6	T772	07/05/19	07/05/18
Highpass Filter, 1 GHz	Micro-Tronics	HPM18129	T889	02/21/19	02/21/18
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM50114	T1852	07/16/19	07/16/18
Highpass Filter, 4GHz	Micro-Tronics	HPM13351	T1241	07/19/19	07/19/18
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T4942	04/30/19	04/30/18
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	04/30/19	04/30/18
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences Corp.	JB1	PRE0184052	04/19/19	04/19/18
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	11/02/18	11/02/17
Antenna, Horn, 18-26 GHz	Seavey Division	MWH-1826/B	T447	6/16/2019	6/16/2018
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	3/9/2019	3/9/2018
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T1568	06/21/19	06/21/18
RF Amplifier	AMPLICAL	AMP1G18-35	T5969	06/03/19	06/03/18
Directional Coupler	Mini-Circuits	ZUDC10-183+	T1136	06/18/19	06/18/18
Wideband Communication Test Set, Call Box	R&S	CMW500	T972	05/29/19	05/29/18
Wideband Communication Test Set, Call Box	R&S	CMW500	T1872	02/15/19	02/15/18
Wideband Communication Test Set, Call Box	R&S	CMW500	T949	02/21/19	02/21/18
Chamber, Environmental	Thermotron	SE-600-10-10	T80	02/22/19	02/22/18
Spectrum Analyzer	Agilent (Keysight) Technologies	E4446A	T146	07/18/19	07/18/18
Spectrum Analyzer	Agilent	CCS01178-1C	T200	10/18/19	10/18/18
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1450	02/05/19	02/05/18
EMI TEST RECEIVER	R&S	ESW44	PRE0179522	05/11/19	05/11/18
EMI TEST RECEIVER	R&S	ESW44	PRE0179377	05/03/19	05/03/18
DC power supply, 8 V @ 3 A or 15 V @ 2 A	Agilent / HP	E3610A	None	CNR	CNR
DC power supply 15V	Spresen	XT15-4	T463	CNR	CNR

UL AUTOMATION SOFTWARE			
CLT Software	UL	UL RF	Ver 7.6, November 11, 2017
Power Measurement Software	UL	UL RF	Ver 2.2, June 2017

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.