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TEST REPORT

FCC NFC Test for SL600

APPLICANT
PASSTECH CO., LTD

REPORT NO.
HCT-RF-2108-FC041

DATE OF ISSUE
August 25, 2021

Tested by
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Additional model
SL600E, SL600TWR, SL600ERW

Applicant	**PASSTECH CO., LTD** B-402. 215 Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Rep. of Korea (Zip 13217)
Eut Type Model Name	SLIM LOCK SL600
FCC ID	W6YSL600
RF Output Field Strength	-1.06 dBμV/m @30 m
Frequency of Operation	13.56 MHz
Modulation type	ASK
FCC Classification	Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s)	FCC Part 15.225 Subpart C

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	August 25, 2021	Initial Release

Engineering Statement:
The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance. measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

CONTENTS

1. EUT DESCRIPTION

Model	SL600
Additional model	SL600E, SL600TWR, SL600ERW
EUT Type	SLIM LOCK
Manufacturer Name **Address**	PASSTECH CO., LTD B-402. 215 Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Rep. of Korea (Zip 13217)
Factory Name **Address**	PASSTECH CO., LTD B-402. 215 Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Rep. of Korea (Zip 13217)
Power Supply	6 V
Frequency Range	13.56 MHz
Transmit Power	-1.06 dBμV/m @30 m
Modulation Type	ASK
Antenna type	Antenna type: PCB Pattern Antenna
Date(s) of Tests	August 10, 2021~ August 24, 2021

2. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.225 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013).

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of § 15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (Confidence level about 95 %, k=2)

7. DESCRIPTION OF TESTS

7.1. Radiated Test

Limit (Operation within the band 13.110 MHz – 14.010 MHz)

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
13.553 – 13.567	15,848	30
13.410 ≤ f ≤ 13.553 13.567 ≤ f ≤ 13.710	334	30
13.110 ≤ f ≤ 13.410 13.710 ≤ f ≤ 14.010	106	30

Note:

1. 15,848 μV/m = 84.0 dBμV/m
2. 334 μV/m = 50.47 dBμV/m
3. 106 μV/m = 40.51 dBμV/m

Limit (Radiated Spurious Emissions)

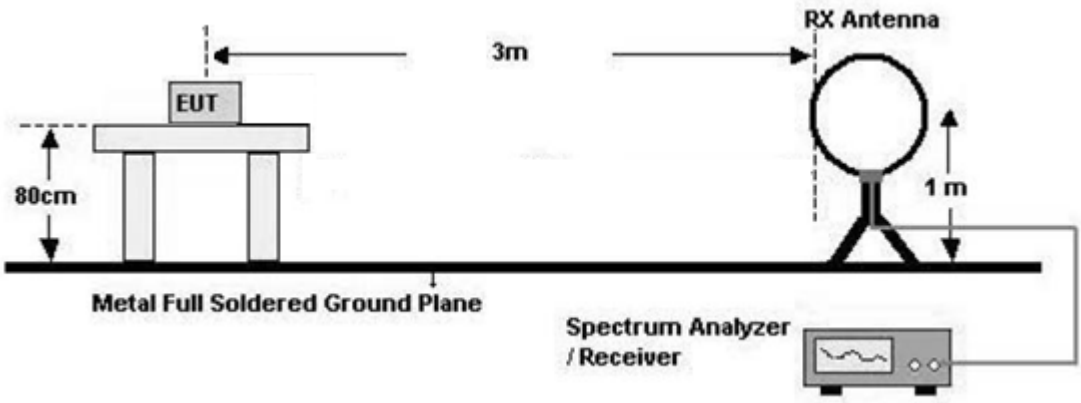
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	※100	3
88-216	※150	3
216-960	※200	3
Above 960	500	3

※:

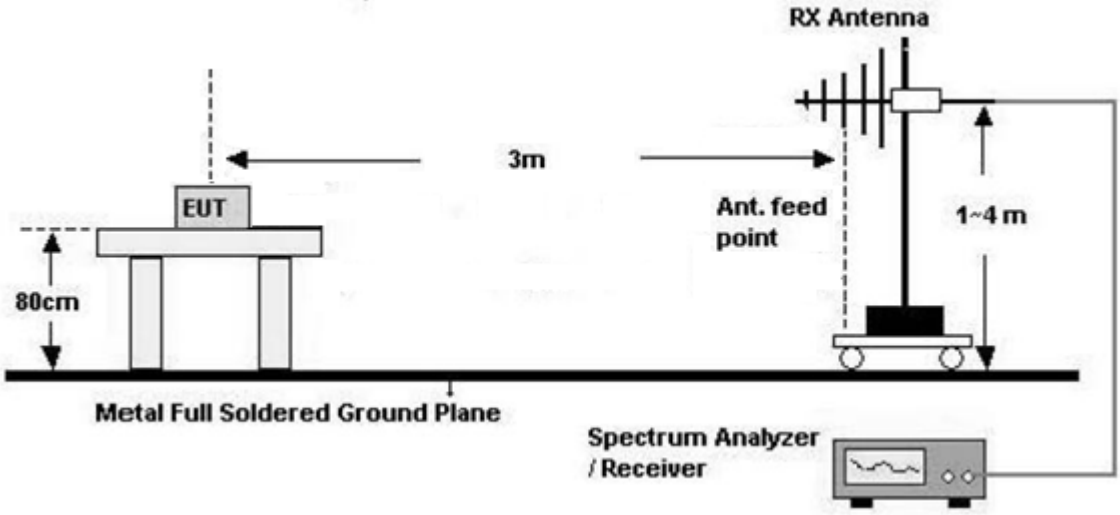
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Test Procedure of inband

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground

plane in detecting antenna.

5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m (Below 30 MHz)
7. Spectrum Setting
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
8. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

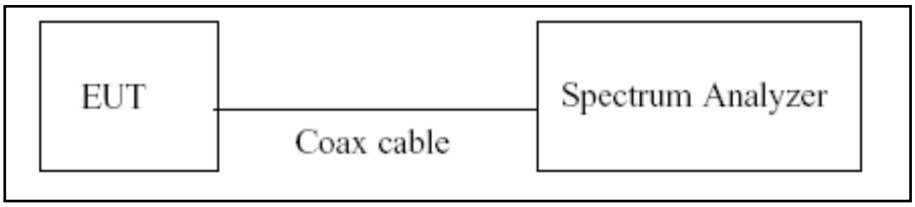
Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Above 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   - Frequency Range = 30 MHz ~ 1 GHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 100 kHz
   - VBW ≥ 3 x RBW
7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

7.2. 20 dB Bandwidth

Test Configuration



Test Procedure

The 20 dB bandwidth was measured by using a spectrum analyzer.

(Procedure 6.9.2 in ANSI 63.10-2013)

1) RBW = 1 %~5 % of the OBW
2) VBW = approximately three times RBW
3) Span =between two times and five times the OBW
4) Detector = Peak
5) Trace mode = Max hold
6) Allow the trace to stabilize

Note :

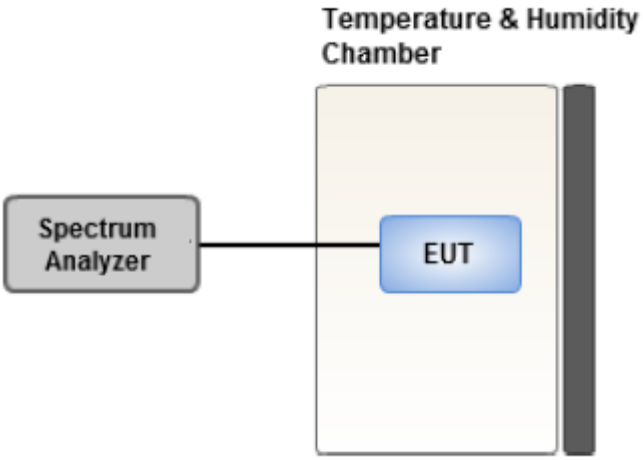
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01 % of the operating frequency.

Test Configuration



Test Procedure.

For battery operated equipment, the equipment tests shall be performed using a new battery.

1) Turn the EUT OFF and place it inside the environmental temperature chamber.
   For devices that have oscillator heaters, energize only the heater circuit.
2) Set the temperature control on the chamber to the highest specified in the regulatory requirements
   for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
3) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
4) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01 % of the operating frequency.

Note:

1) Temperature:
   The temperature is varied from -20 °C to + 50 °C using an environmental chamber.
2) Primary Supply Voltage :
   The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-

carried battery and AC powered equipment.
For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

7.4. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone
   - Worstcase : Stand alone
2. EUT Axis : X
3. All type and bitrate were investigated and the worst case results are reported.
   - Worst case : Type A, 106 kbps
4. All mode of without tag and with tag were investigated and the worst case configuration results are reported.
   - Worstcase : Without Tag
5. All position of loop antenna were investigated and the worst case configuration results are reported.
   - Position : Horizontal, Vertical, Parallel to the ground plane
   - Worstcase : Horizontal
6. SL600, SL600E were tested and the worst case results are reported.
   - Worst case : SL600

AC Power line Conducted Emissions

1. We don't perform powerline conducted emission test. Because this EUT is used DC.

20 dB Bandwidth & Frequency Stability

1. All type and bitrate were investigated and the worst case results are reported.
   - Worst case : Type A, 106 kbps
2. SL600, SL600E were tested and the worst case results are reported.
   - Worst case : SL600

8. TEST SUMMARY

Regulation	Requirement	Result
Part 15.225 (a)	Radiated Electric Field Emissions (13.553 MHz to 13.567 MHz)	Pass
Part 15.225 (b)	Radiated Electric Field Emissions (13.410 ≤ f ≤ 13.553, 13.567 ≤ f ≤ 13.710)	Pass
Part 15.225 (c)	Radiated Electric Field Emissions (13.110 ≤ f ≤ 13.410, 13.710 ≤ f ≤ 14.010)	Pass
Part 15.209	Radiated Electric Field Emissions (9 kHz to 30 MHz)	Pass
Part 15.209	Radiated Electric Field Emissions (30 MHz to 1 GHz)	Pass
Part 15.225 (e)	Frequency Stability	Pass
Part 15.207	AC power conducted emissions (150 kHz to 30 MHz)	Pass
Part 15.215 (c)	20 dB Bandwidth	Pass

9. TEST RESULT

9.1. Operation within the band 13.110 MHz – 14.010 MHz

- SL600

Measured Frequency Range :
13.553 MHz-13.567 MHz

Frequency (MHz)	Read Level (dBμV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBμV/m) @30 m	Limit (dBμV/m) @30 m	Margin (dB)
13.5587	17.66	18.17	-40.00	H	-4.17	84.00	88.17
13.5598	16.52	18.17	-40.00	V	-5.31	84.00	89.31

Measured Frequency Range :
13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz

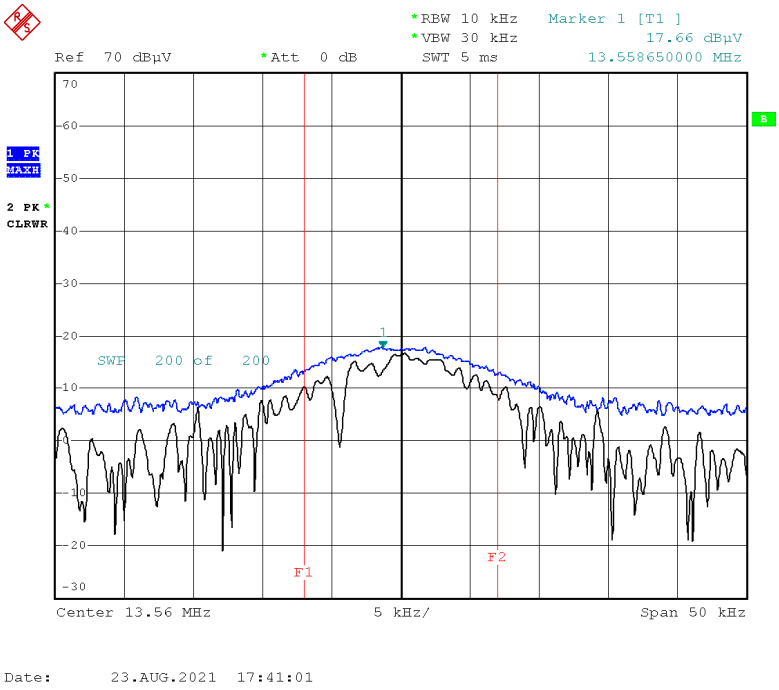
Frequency (MHz)	Read Level (dBμV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBμV/m) @30 m	Limit (dBμV/m) @30 m	Margin (dB)
13.5530	13.16	18.17	-40.00	H	-8.67	50.47	59.14
13.5674	12.20	18.17	-40.00	H	-9.63	50.47	60.10

Measured Frequency Range :
13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz

Frequency (MHz)	Read Level (dBμV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBμV/m) @30 m	Limit (dBμV/m) @30 m	Margin (dB)
13.7998	7.03	18.17	-40.00	H	-14.80	40.51	55.31
13.2878	8.25	18.17	-40.00	H	-13.58	40.51	54.09

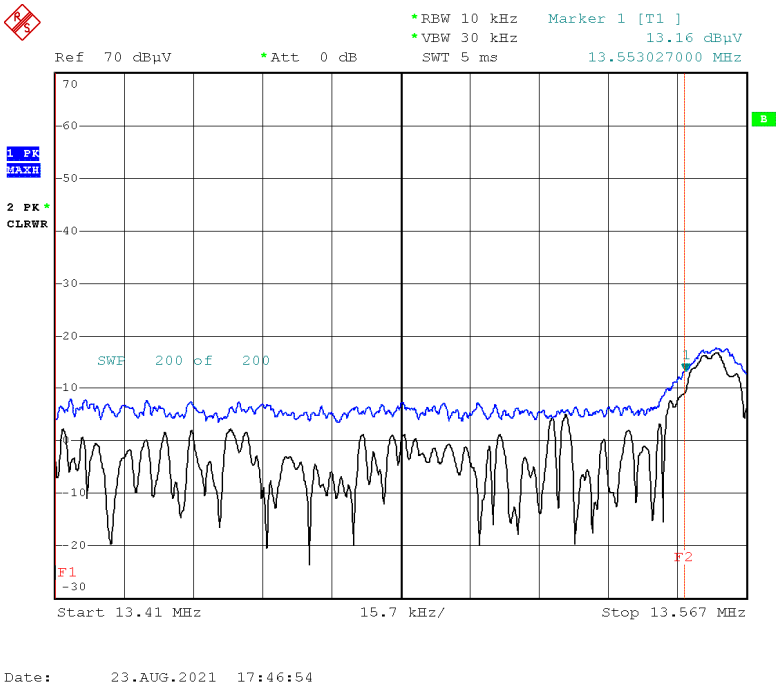
▣ Test Plot

13.553 MHz ~ 13.567 MHz_SL600



Date: 23.AUG.2021 17:41:01

13.410 MHz-13.553 MHz _SL600



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Note:

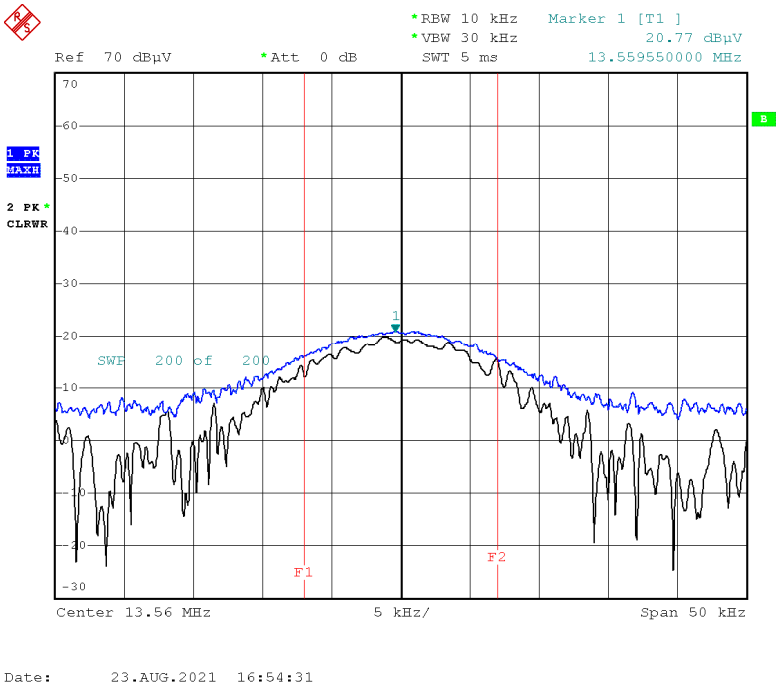
Plot of worst case are only reported.

- **SL600E**

Measured Frequency Range : 13.553 MHz-13.567 MHz							
Frequency (MHz)	Read Level (dBµV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBµV/m) @30 m	Limit (dBµV/m) @30 m	Margin (dB)
13.559 6	20.77	18.17	-40.00	H	-1.06	84.00	85.06

▣ Test Plot

13.553 MHz ~ 13.567 MHz_ SL600E



Note:

Plot of worst case are only reported.

9.2. Radiated Emission 9 kHz – 30 MHz

- **SL600**

Measured Frequency Range :
9 kHz - 30 MHz

Frequency (MHz)	Read Level (dBμV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBμV/m) @30 m	Limit (dBμV/m) @30 m	Margin (dB)
1.3680	21.43	18.17	-40.00	H	-0.40	29.54	29.94
5.4298	9.15	17.89	-40.00	V	-12.96	29.54	42.50
27.1189	7.98	17.89	-40.00	H	-14.13	29.54	43.67
28.2250	8.86	17.89	-40.00	H	-13.25	29.54	42.79

9.3. Radiated Emission 30 MHz – 1000 MHz

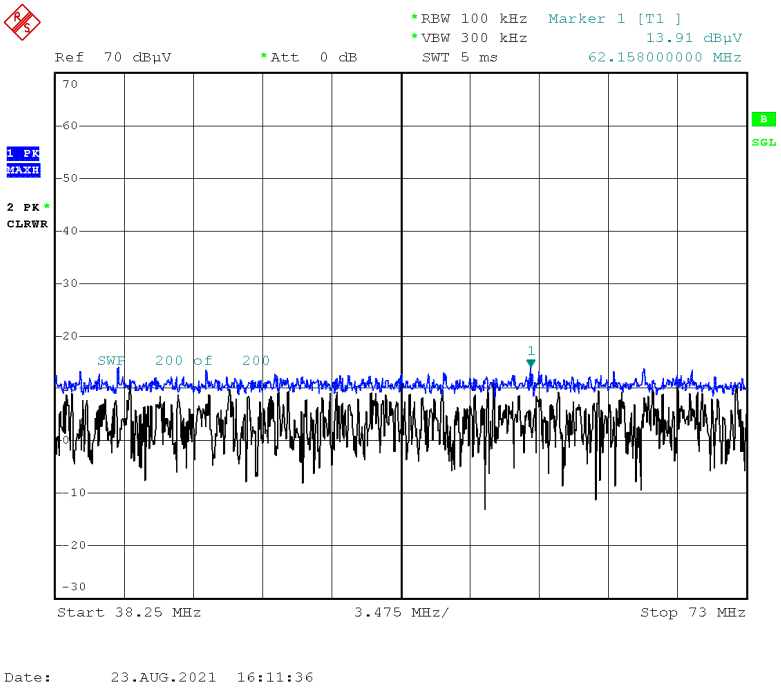
- **SL600**

Measured Frequency Range : 30 MHz - 1000 MHz							
Frequency (MHz)	Read Level (dBµV/m) @3 m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.3300	13.29	18.40	0.47	V	32.16	40.00	7.84
62.1580	13.91	18.80	0.70	H	33.41	40.00	6.59
#74.4896	14.31	16.90	0.75	H	31.96	40.00	8.04
79.6650	13.06	0.81	14.10	V	27.97	40.00	12.03
#132.2250	13.47	17.90	1.04	H	32.41	43.50	11.09
#165.0027	13.52	18.00	1.19	H	32.71	43.50	10.79

Note:

1. '#' is the result for restricted band.

▣ **Test Plot**



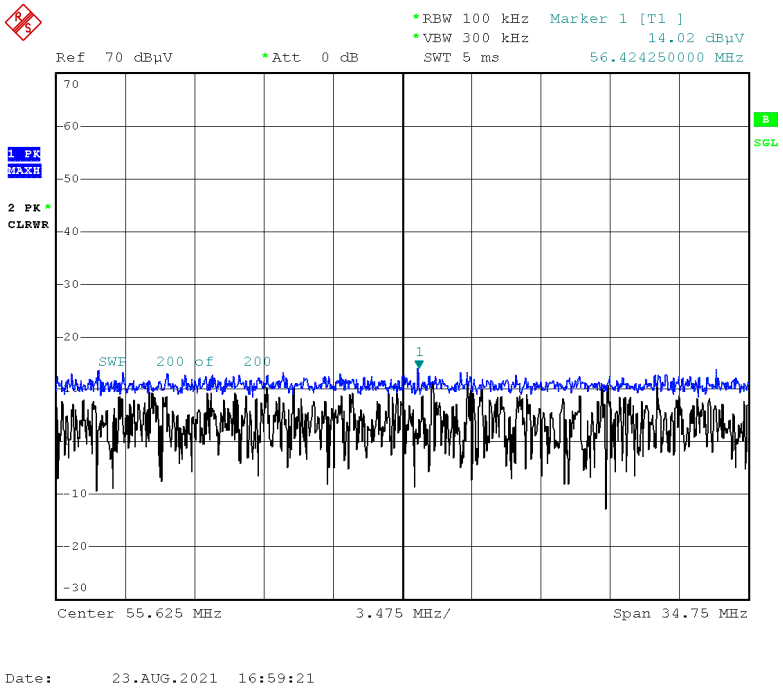
Note:

Plot of worst case are only reported

- **SL600E**

Measured Frequency Range : 30 MHz - 1000 MHz							
Frequency (MHz)	Read Level (dBµV/m) @3 m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBµV/m)	Limit (dBµV/m)	Margin (dB)
56.4243	14.02	18.80	0.70	H	33.52	40.00	6.48

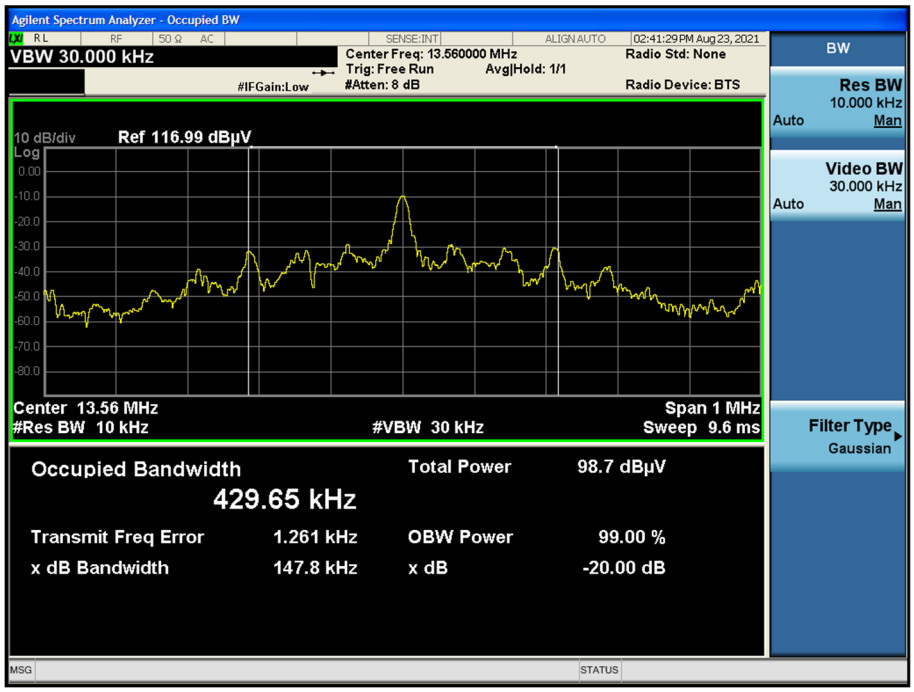
▣ **Test Plot**



Note:

Plot of worst case are only reported

9.4. 20 dB Bandwidth



9.5. Frequency Stability

- **SL600**

Startup

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 6.00 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage	Power	Temp.	Frequency	Frequency Dev.	Frequency
(%)	(VDC)	(°C)	(MHz)	(Hz)	Dev (%)
100%	6	-20	13.560 057	57	0.000 419 9
100%		-10	13.560 023	23	0.000 170 0
100%		0	13.560 086	86	0.000 631 9
100%		+10	13.560 092	92	0.000 680 6
100%		+20(Ref.)	13.560 024	24	0.000 175 2
100%		+30	13.560 083	83	0.000 608 6
100%		+40	13.560 012	12	0.000 091 1
100%		+50	13.560 096	96	0.000 707 7
LOW	5.1	+20	13.560 071	71	0.000 520 8
HIGH	6.9	+20	13.560 035	35	0.000 260 3

2 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 6.00 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage	Power	Temp.	Frequency	Frequency Dev.	Frequency
(%)	(VDC)	(°C)	(MHz)	(Hz)	Dev (%)
100%	6	-20	13.560 065	65	0.000 477 9
100%		-10	13.560 097	97	0.000 716 2
100%		0	13.560 086	86	0.000 633 4
100%		+10	13.560 072	72	0.000 527 7
100%		+20(Ref.)	13.560 027	27	0.000 196 0
100%		+30	13.560 078	78	0.000 572 7
100%		+40	13.560 027	27	0.000 200 3
100%		+50	13.560 021	21	0.000 156 7
LOW	5.1	+20	13.560 036	36	0.000 268 4
HIGH	6.9	+20	13.560 087	87	0.000 641 1

5 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 6.00 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage	Power	Temp.	Frequency	Frequency Dev.	Frequency
(%)	(VDC)	(°C)	(MHz)	(Hz)	Dev (%)
100%	6	-20	13.560 056	56	0.000 416 2
100%		-10	13.560 012	12	0.000 087 9
100%		0	13.560 056	56	0.000 415 2
100%		+10	13.560 030	30	0.000 218 1
100%		+20(Ref.)	13.560 015	15	0.000 107 7
100%		+30	13.560 093	93	0.000 685 3
100%		+40	13.560 043	43	0.000 313 6
100%		+50	13.560 042	42	0.000 311 1
LOW	5.1	+20	13.560 021	21	0.000 157 7
HIGH	6.9	+20	13.560 004	4	0.000 031 0

10 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 6.00 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage	Power	Temp.	Frequency	Frequency Dev.	Frequency
(%)	(VDC)	(°C)	(MHz)	(Hz)	Dev (%)
100%	6	-20	13.560 009	9	0.000 069 9
100%		-10	13.560 055	55	0.000 404 1
100%		0	13.560 013	13	0.000 096 3
100%		+10	13.560 044	44	0.000 321 5
100%		+20(Ref.)	13.560 062	62	0.000 460 5
100%		+30	13.560 051	51	0.000 374 6
100%		+40	13.560 018	18	0.000 130 7
100%		+50	13.560 066	66	0.000 4873
LOW	5.1	+20	13.560 096	96	0.000 707 1
HIGH	6.9	+20	13.560 068	68	0.000 500 1

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	09/04/2021	Annual
Test Receiver	ESCI	Rohde & Schwarz	100033	06/15/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/15/2022	Annual
Signal Analyzer	N9020A	Agilent	MY47380318	01/28/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	04/08/2022	Annual
Power Sensor	N1921A	Agilent	MY57820067	04/08/2022	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/10/2021	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/20/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75303960	06/10/2022	Annual
Attenuator (10 dB)	5910-N-50-010	H+S	00801	10/28/2021	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	FCC WLAN&BT&BLE Conducted Test Software v3.0	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100422	05/04/2022	Annual

Note:

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.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller (Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	Loop Antenna	Rohde & Schwarz	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2021	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170541	11/29/2021	Biennial
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/14/2021	Annual
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	101068-SZ	09/22/2021	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2022	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/08/2022	Annual
Attenuator (10 dB) 56-10	CBLU1183540B-01 56-10	CERNEX WEINSCHEL	N/A	12/23/2021	Annual
Broadband Low Noise Amplifier Attenuator (3 dB)	CBL06185030 18B-03	CERNEX Api tech.	N/A	12/23/2021	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/23/2021	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/23/2021	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/23/2021	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/04/2021	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/23/2022	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000276	03/09/2022	Annual

Note:

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.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2108-FC041-P