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FCC TEST REPORT

For Sola Technology Inc.

Three Position Touch Switch Model No.: SLLTS-350F

Test Report Number: ESTSZ131201227F



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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Sola Technology Inc.

Address of applicant: 4900 California Ave, Tower B-210, Bakersfield, California 93309,

USA

Manufacturer: Sola Technology Inc.

Address of manufacturer: 4900 California Ave, Tower B-210, Bakersfield, California 93309,

USA

General Description of E.U.T

EUT Description: Three Position Touch Switch

Trade Name: N/A

Model No.: SLLTS-350F
Rating: AC 120V/60Hz
Test Power Supply: AC 120V/60Hz

Frequency: 908.42 MHz (1 Channel)

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with FCC Rules and Regulations Part 15 Subpart C 15.249: 2012

The objective of the manufacturer is to demonstrate compliance with the described above standards. Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen Exact Standard Testing Technology Co., Ltd..

Date of Test:	Oct.10~27, 2014
Prepared by:	(Engineer: David He)
Reviewer:	(Project Manager: Charles Liu)
Approved & Authorized Signer:	Ari hi
	(Manager: Ronnie Liu)

1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart C for Emissions.

Table 1: Tests Carried Out Under FCC Part 15 Subpart C

FCC Part 15 Subpart C	Test Items	Status
Section 15.207	Conduction Emission	$\sqrt{}$
Section 15.249(a), 15.249(d), 15.35(b), 15.209	Radiation Emission	$\sqrt{}$
Section 15.215	20dB bandwidth	√
Section 15.203	Antenna requirement	√

- $\sqrt{}$ Indicates that the test is applicable
- × Indicates that the test is not applicable

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 15 Subpart C limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

Global United Technology Service Co., Ltd at 2nd Floor, Block No. 2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

1.5 Test Facility

All measurement required was performed at laboratory of Global United Technology Service Co., Ltd at 2nd Floor, Block No. 2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

The test facility is recognized, certified, or accredited by the following organizations:

FCC - Registration No.: 600491

Global United Technology Service Co., Ltd, Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

1.6 Test Equipment List and Details

	ment List and Det				T 5 5 /
Equipment	Manufacturer	Model#	Serial #	Data of Cal.	Due Data
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2014	Mar. 30 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESÚ26	GTS203	Dec. 06, 2013	Dec. 05, 2014
EMI Test Software	AUDIX	E3	N/A	Mar. 30 2014	Mar. 30 2015
Coaxial Cable	GTS	N/A	GTS400	N/A	N/A
Coaxial Cable	GTS	N/A	GTS401	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS402	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS407	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS408	Apr. 01 2014	Apr. 01 2015
BiConiLog Antenna (26- 3000MHz)	SCHWARZBECK MESS- ELEKTRONIK	VULB9163	GTS204	Apr. 01 2014	Apr. 01 2015
Pre- amplifier(0.1- 3000MHz)	HP	8347A	GTS210	Feb. 26 2014	Feb. 26 2015
Double-ridged horn (1-18GHz)	SCHWARZBECK MESS- ELEKTRONIK	9120D-829	GTS205	Aug. 03 2014	Aug. 03 2015
Pre-amplifier(1- 18GHz)	Rohde & Schwarz	8349B	GTS224	Feb. 26 2014	Feb. 26 2015
Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	GTS250	Mar. 30 2014	Mar. 30 2015
Barometer	ChangChun	DYM3	GTS251	Oct. 28 2013	Oct. 28 2014
Shielding Room	ZhongYu Electron	7.0(L)*3.0(W)*3.0(H)	GTS206	Feb. 26 2014	Feb. 26 2015
EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Apr. 10 2014	Apr. 10 2015
10dB Pulse Limiter	Rohde & Schwarz	N/A	GTS209	Sept. 14 2014	Sept. 14 2015
LISN	SCHWARZBECK MESS- ELEKTRONIK	NSLK 8127	GTS207	Sept. 14 2014	Sept. 14 2015
Coaxial Cable	GTS	N/A	GTS406	Apr. 14 2014	Apr. 14 2015
Loop Antenna	ETS-Lindgren	6502	00082431	Apr. 01 2014	Apr. 01 2015
Double-ridged horn (15- 26.5GHz)	SCHWARZBECK MESS- ELEKTRONIK	BBHA-9170	GTS211	Apr. 14 2014	Apr. 14 2015

2 - TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **Sola Technology Inc.** and its respective support equipment manufacturers.

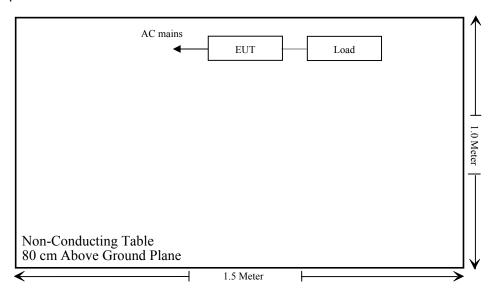
2.4 Equipment Modifications

The EUT tested was not modified by EST.

2.5 Basic Test Setup Block Diagram

Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
Three Position Touch Switch	N/A	SLLTS-350F	2ABOB-350F	N/A	EUT
Lamp	Huaqiang	PZ120V	N/A	N/A	Load (3 PCS)

2.5.1 Setup on the table



3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.4 dB.

3.2 Requirements (15.207):

Frequency Range (MHz)	Limits (dBuV)			
Trequency italige (Miliz)	Quasi-Peak	Average		
0.150~0.500	66~56	56~46		
0.500~5.000	56	46		
5.000~30.00	60	50		

Note: (1)The tighter limit shall apply at the edge between two frequency bands.

3.3 EUT Setup

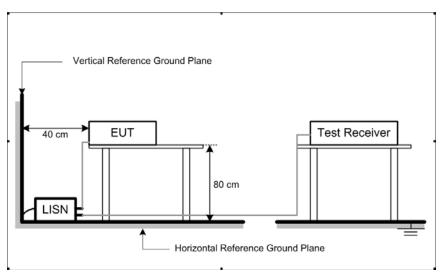
The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart C limits.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.



3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range......150 KHz to 30 MHz

Detector.....Peak & Quasi-Peak & Average

Sweep Speed.....Auto
IF Band Width......9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB $_{\mu}$ V of specification limits). Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with a "**AV**".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT <u>complied with the FCC Part 15 Subpart C Conducted</u> margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

Temperature (°C)	26
Humidity (%RH)	58
Barometric Pressure (mbar)	1001.1
EUT	Three Position Touch Switch
M/N	SLLTS-350F
Operating Mode	On Mode (TX + Operation)

Test data see following pages.

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.

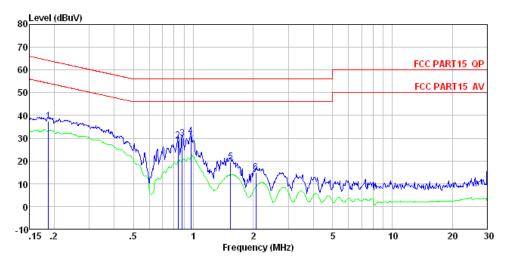
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

3.8 Test Results

PASS.

Please refer the following pages.

Conducted Emission Test Data

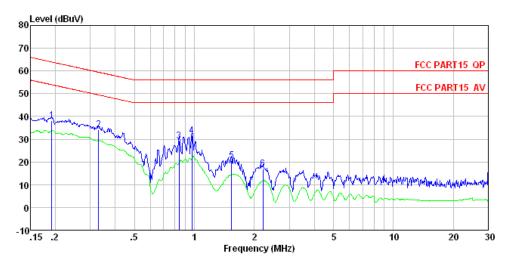


Condition : FCC PART15 QP LISN-2013 NEUTRAL : Three Position Touch Switch : SLLTS-350F EUT

Model Test Mode : ON mode Power Rating : AC 120V/60Hz Test Engineer: David

.031	Freq	Read	LISN Factor			Limit Line	Over Limit	Remark	
	MHz	dBuV	dB	₫B	dBuV	dBuV	dB		
1 2 3 4 5 6	0.880 0.974 1.535	37. 19 28. 64 29. 57 30. 51 19. 35 14. 55	0. 07 0. 07 0. 09	0.13 0.13 0.13	28. 84 29. 77 30. 71 19. 58	56.00 56.00 56.00 56.00	-26. 23 -25. 29	QP QP QP QP	

Conducted Emission Test Data



: FCC PART15 QP LISN-2013 LINE : Three Position Touch Switch : SLLTS-350F Condition EUT

Model Test Mode : ON mode
Power Rating : AC 120V/60Hz
Test Engineer: David

	Freq		LISN Factor			Limit Line	Over Limit	Remark
	MHz	dBuV	dB	d₿	dBuV	dBuV	dB	
1 2 3 4 5 6	0.330 0.839 0.974 1.535	28. 96 31. 24 20. 31		0.10 0.13 0.13 0.14	29. 23 31. 51 20. 57	59. 44 56. 00 56. 00 56. 00	-25.37 -26.77 -24.49 -35.43	QP QP QP QP

4 - Radiation Interference

4.1 Requirements (15.249, 15.209 & 15.35(b), 15.33(a)):

According to 15.249(a) the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

For this equipment

Fundamental Frequency	Field Strength of fundamental		Field Strength of Harmonic	
requency	μV/m	dBμV/m	μV/m	dBμV/m
2400 - 2483.5 MHz	50000	94	500	54

According to 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

15.209(a) –Radiated emission limits, general requirements.

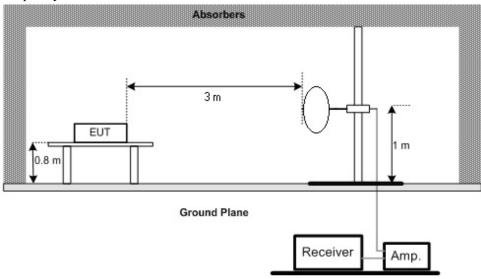
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

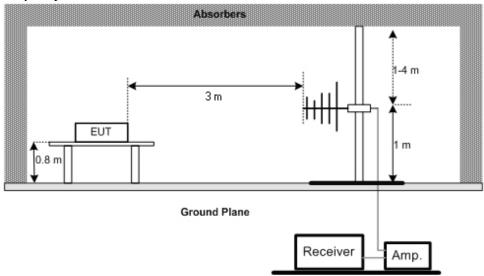
4.2 Test Setup

FCC ID: 2ABOB-350F

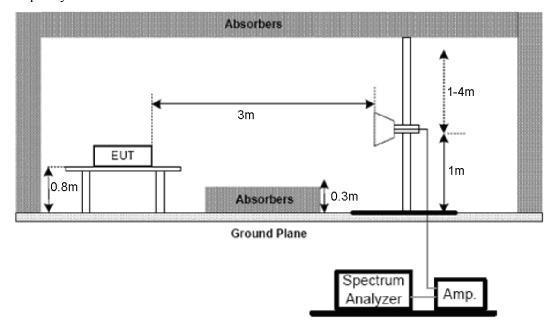
Frequency below 30MHz



Frequency from 30 to 1000MHz



Frequency above 1 GHz



The EUT is located in a 3m Semi-Anechoic Chamber, the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

Covering an area of 2.4 m by 2.4 m (for a 3 m test distance) between the antenna and the EUT using RF absorbing material with a minimum-rated attenuation of 20 dB (for normal incidence) up to 18 GHz.

For the Test Antenna: In the frequency range below 30MHz, Loop Antenna is used; from 30-1000MHz, Bi-log Antenna is used, and above 1GHz, Horn Antenna is used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength, the azimuth range of turntable was 0° to 360°, the receive antenna has two polarizations horizontal and vertical. When doing measurements above 1GHz, the EUT was placed within the 3dB beam width range of the horn antenna, and the EUT was tested in orthogonal positions as recommended in ANSI C63.4 for Radiated Emissions and the worst-case data was presented.

4.3 Test Results

PASS.

Please refer the following pages.

4.4 Test Data

Temperature (°C)	26			
Humidity (%RH)	58			
Barometric Pressure (mbar)	1001.1			
EUT	Three Position Touch Switch			
M/N	SLLTS-350F			
Operating Mode	TX mode			

Test frequency 9KHz-10GHz

Note: Emissions attenuated more than 20 dB below the permissible value are not reported. X, Y, Z in three orthogonal panels to determine the final configuration (X plane as worst plane) from all possible combinations.

4.4.1 Field Strength of fundamental

Mode: TX

Frequency	Read Peak	Read OP	Total	Total Level (dBuV/m) Factor		Limit(dBuV/m)		Direction	Result
(MHz)	(dBuV)	(dBuV)	(dB)	Peak	QP	Peak	QP	(H/V)	Resuit
908.42	-	92.03	-3.65	-	88.38	-	94	Н	pass
908.42	-	93.75	-3.65	-	90.10	-	94	V	pass
					·				

Note: Level=Peak or AV+ Total Factor

Total Factor=Antenna Factor + Cable Loss-Preamp Factor

4.4.2 Field Strength of Harmonic Mode: TX

Frequency	Read Peak	Read AV			Level (aba v/III)		Limit(dBuV/m)		Result
(MHz)	(dBuV)	(dBuV)	(dB)	Peak	AV	Peak	AV	(H/V)	Resuit
1816.85	43.86	42.25	5.76	49.62	48.01	74	54	Н	pass
2725.28	45.11	43.49	5.95	51.06	49.44	74	54	Н	pass
1816.88	45.28	43.52	5.76	51.04	49.28	74	54	V	pass
2725.31	45.99	43.78	5.95	51.94	49.73	74	54	V	pass

4.4.3 Spurious Radiated Emissions

Mode: TX

From 9KHz ~ 30MHz:

Frequency (MHz)	Read Level (dBuV)	Total Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark	Direction (H/V)	Result
-	•	ı	-	-	-	-	ı	pass

Note:

Below 30MHz, the measurements were more than 20dB below the limit and not reported.

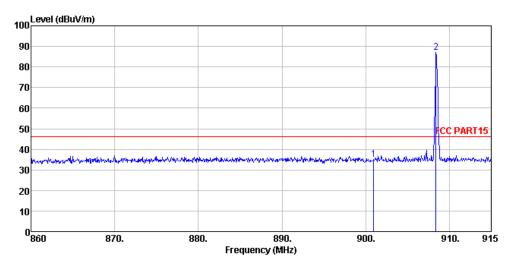
Mode: TX

From 30MHz ~ 1000MHz:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark	Direction (H/V)
154.82	48.76	10.45	1.60	32.00	28.81	43.50	-14.69	QP	Н
162.04	51.04	10.72	1.64	32.02	31.38	43.50	-12.12	QP	Н
194.45	49.76	12.56	1.81	32.12	32.01	43.50	-11.49	QP	Н
150.54	56.76	10.29	1.57	31.98	36.64	43.50	-6.86	QP	V
197.89	48.66	12.57	1.83	32.13	30.93	43.50	-12.57	QP	V
827.49	39.98	22.37	4.57	31.28	35.64	46.00	-10.36	QP	V

Result: Pass.

4.4.4 Band Edge - Radiated Emissions **Horizontal: PASS**



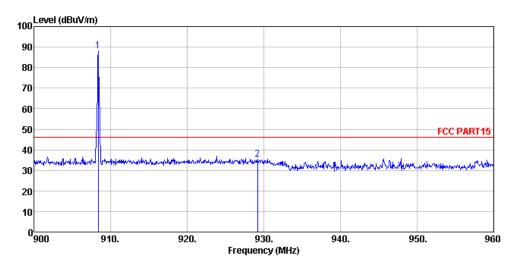
: 3m chamber : FCC PART15 3m VULB9163-2013M HORIZONTAL : Three Position Touch Switch : SLLTS-350F Condition EUT

Model Test mode : On Power Rating : AC 120V/60Hz

Test Engineer: David

ReadAntenna Cable Preamp Limit Over Freq Level Factor Loss Factor Level Line Limit Remark MHz dBu∀ dB/m ₫B dB dBuV/m dBuV/m

38.11 23.09 90.21 23.15 4.85 31.18 4.88 31.19 34.87 46.00 -11.13 QP 87.05 46.00 41.05 QP 900.975



dB dBuV/m dBuV/m

Site Condition : 3m chamber : FCC PART15 3m VULB9163-2013M HORIZONTAL

EUT Three Position Touch Switch

dBu∀ dB/m

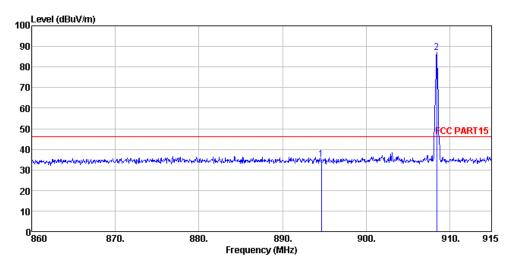
Model SLLTS-350F Test mode : On Power Rating : AC 120V/60Hz

MHz

Test Engineer: David ReadAntenna Cable Preamp Limit Freq Level Factor Loss Factor Level Line Limit Remark

₫B 908.400 91.49 23.15 929.160 38.29 23.28 4.88 31.19 4.96 31.20 88.33 46.00 42.33 QP 35.33 46.00 -10.67 QP

Vertical: PASS



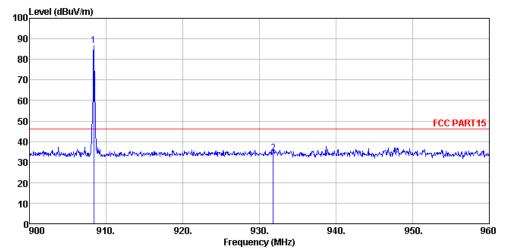
Site

: 3m chamber : FCC PART15 3m VULB9163-2013M VERTICAL : Three Position Touch Switch : SLLTS-350F Condition EUT

Model

Test mode : On Power Rating : AC 120V/60Hz Test Engineer: David

ReadAntenna Cable Preamp Limit Over Freq Level Factor Loss Factor Level Line Limit Remark MHz dBuV dB/m ďΒ dB dBuV/m dBuV/m 894.650 908.455 38.19 23.05 90.26 23.15 4.83 31.19 34.88 46.00 -11.12 QP 4.88 31.19 87.10 46.00 41.10 QP



Site

: 3m chamber : FCC PART15 3m VULB9163-2013M VERTICAL : Three Position Touch Switch : SLLTS-350F Condition EUT

Model Test mode : On Power Rating : AC 120V/60Hz

Test Engineer: David

ReadAntenna Cable Preamp Limit Over Freq Level Factor Loss Factor Level Line Limit Remark MHz dBuV dB/m ďΒ dB dBuV/m dBuV/m

89.86 23.15 37.30 23.31 86.70 46.00 40.70 QP 34.39 46.00 -11.61 QP 908.400 4.88 31.19 4.98 31.20

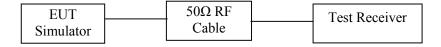
5 - 20 dB Bandwidth

5.1 Requirements

According to 15.215(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,

5.2 Test Setup



5.3 Test Procedure

- a. Place the EUT on the table and set it in the transmitting mode.
- b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- c. Set the spectrum analyzer as RBW = 300 kHz, VBW = 300kHz, Span = 3 MHz, Sweep = auto. Detector function = peak, Trace = max hold
- d. Mark the peak frequency and -20dB (upper and lower) frequency.
- e. Repeat until all the rest channels are investigated.

5.4 Limit

The 20dB Bandwidth Frequency shall be lie on 902-928MHz.

5.5 Test Results

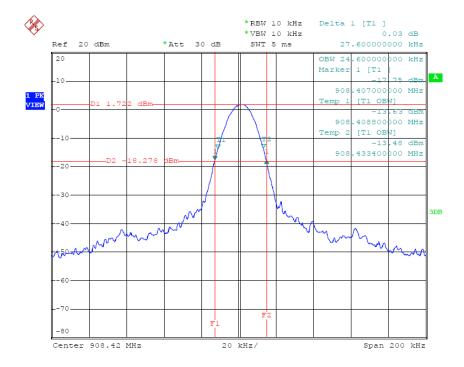
Pass.

5.6 Test Data

Temperature (°C)	26
Humidity (%RH)	58
Barometric Pressure (mbar)	1001.1
EUT	Three Position Touch Switch
M/N	SLLTS-350F
Operating Mode	TX

Test data as follows

Channel	Frequency(MHz)	20dB Down BW(kHz)
CH01	908.42	27.6



And, the 20dB Bandwidth Frequency lies on 902-928MHz.

6 - Antenna

6.1 Antenna requirement

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited

6.2 Antenna Type

Antenna is on the PCB.

Table2: The antenna gain

	Antenna gain(dBi)
Antenna	0

6.3 Result

Pass.

The antenna complies with the relevant FCC rules.