FCC Test Report

Product Name	Smart Touch In-Wall Switch
Model No.	PAN26
FCC ID	RHHPAN26

Applicant	Philio Technology Corporation
Address	8F.,No.653-2,Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24257,Taiwan(R.O.C)

Date of Receipt	May 16, 2018
Issued Date	Jun. 25, 2018
Report No.	1850203R-RFUSP26V00
Report Version	V1.0

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.

Test Report

Issued Date: Jun. 25, 2018
Report No.: 1850203R-RFUSP26V00

Product Name	Smart Touch In-Wall Switch
Applicant	Philio Technology Corporation
Address	8F.,No.653-2,Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24257,Taiwan(R.O.C)
Manufacturer	Philio Technology Corporation
Model No.	PAN26
EUT Rated Voltage	AC100-240V 50/60Hz 10A
EUT Test Voltage	AC120V 60Hz
Trade Name	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Elephant Chen

(Adm. Assistant / Elephant Chen)

Tested By : Anson Lu

(Engineer / Anson Lu)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Smart Touch In-Wall Switch
Trade Name	
Model No.	PAN26
FCC ID	RHHPAN26
Frequency Range	908.4MHz, 916MHz
Channel Control	Auto
Type of Modulation	FSK
Antenna Type	Monopole Antenna
Dongle	MFR: Philio, M/N: ME001, ME002 Relay Dongle/Curtain Dongle: 5A(model: ME001) Dimmer Dongle: 0.7A(model: ME002)

Center Frequency of Each Channel

Channel	Frequency	Channel	Frequency
Channel 1:	908.4 MHz	Channel 2:	916 MHz

Note:

1. The EUT is a Smart Touch In-Wall Switch with a built-in Z-Wave transceiver.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit

1.2. Operational Description

The EUT is a Smart Touch In-Wall Switch with a built-in Z-Wave transceiver. The EUT operation frequency is 908.4MHz and 916MHz. The signals modulated by FSK are transmitted from the Monopole Antenna of the EUT.

Together with the patented Z-Wave Protocol the Z-Wave transceiver delivers a complete highly reliable RF communication solution.

1.3. Tested System Datails

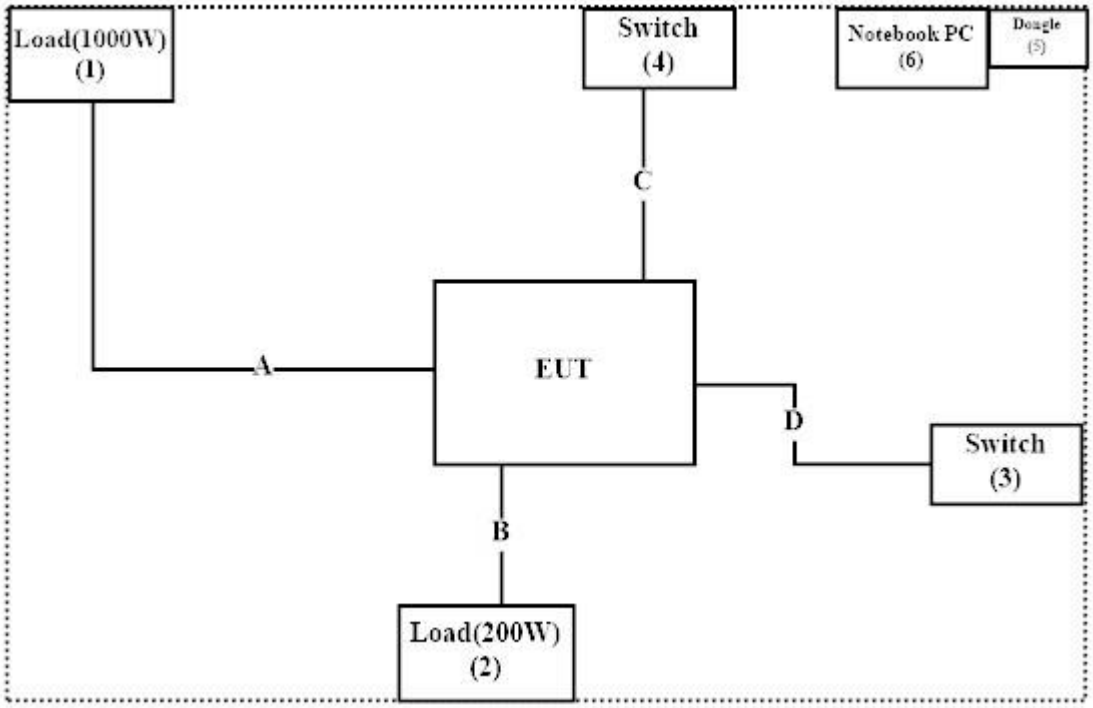
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Load(1000W)	TOA	N/A	N/A	N/A
2	Load(200W)	TOA	N/A	N/A	N/A
3	Switch	Philio	PAN27	N/A	N/A
4	Switch	Philio	PAN26	N/A	N/A
5	Dongle	Philio	N/A	N/A	N/A
6	Notebook PC	DELL	Latitude E5440	74BTK32	Non-Shielded, 0.8m

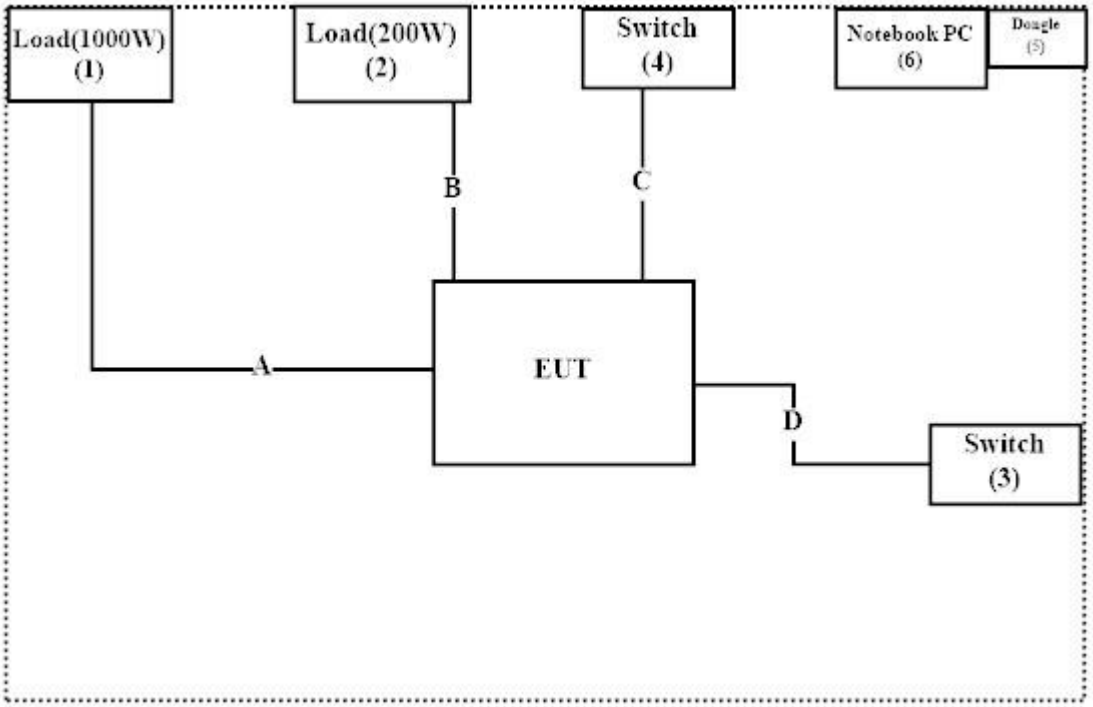
Signal Cable Type		Signal cable Description
A	Power Cable	Non-Shielded, 0.6m
B	Power Cable	Non-Shielded, 0.6m
C	Signal Cable	Non-Shielded, 0.7m
D	Signal Cable	Non-Shielded, 0.7m

1.4. Configuration of Test System

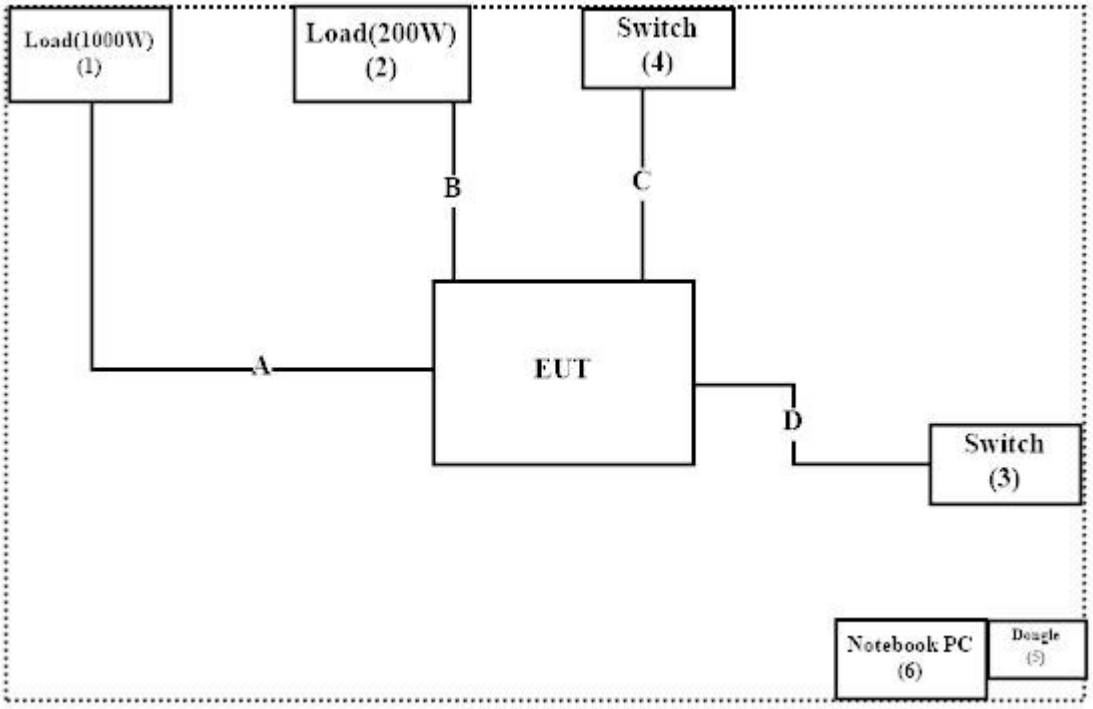
Conducted Emission



Radiated Emission for RE



Radiated Emission for RF



1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4.
(2) Execute “Cmd v1.0” program on the Notebook.
(3) Configure the test mode and the test channel
(4) Start the continuous Transmit.
(5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en.aspx

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd
Site Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023

1.7. List of Test Equipment

For Conducted measurements /SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2018/2/12	2019/2/11
	Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/10/13	2018/10/12
	Peak Power Analyzer	Keysight	8990B	MY51000410	2017/7/19	2018/7/18
	Wideband Power Sensor	Keysight	N1923A	MY56080003	2017/7/6	2018/7/5
	Wideband Power Sensor	Keysight	N1923A	MY56080004	2017/7/6	2018/7/5
X	EMI Test Receiver	R&S	ESCS 30	100369	2017/11/7	2018/11/6
X	LISN	R&S	ESH3-Z5	836679/017	2018/2/9	2019/2/8
X	LISN	R&S	ENV216	100097	2018/2/9	2019/2/8
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2018/6/22	2019/6/21

For Radiated measurements /Site3/CB8

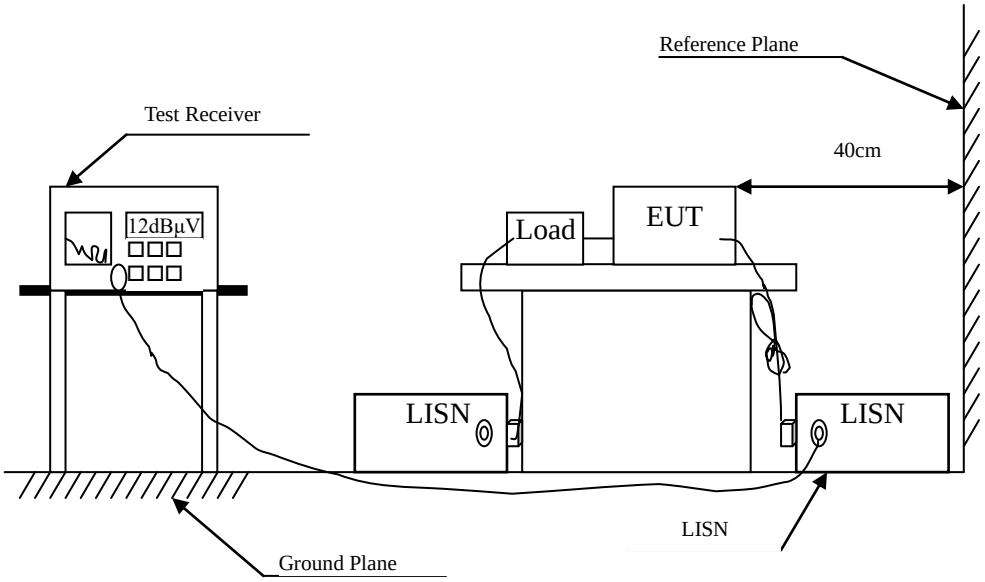
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2018/3/12	2019/3/11
	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2018/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2017/6/25	2018/6/24
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2017/6/15	2018/6/14
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330010	2017/7/19	2018/7/18
X	Horn Antenna	ETS-Lindgren	3117	00135205	2018/5/3	2019/5/2
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2018/4/10	2019/4/9
X	Coaxial Cable	QuieTek	SF-106	LC035/37/41-SF	2018/6/21	2019/6/20
X	Amplifier + Cable	EMCI	EMC184045SE	980370	2018/3/21	2019/3/20
X	Horn Antenna	Com-Power	AH-840	101043	2018/1/9	2019/1/8
	Filter	MicroTRON	BRM50701	019	2017/11/21	2018/11/20
	Filter	Microwave Circuits	N0257881	36681	2018/1/22	2019/1/21

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version :QuieTek EMI 2.0 V2.1.113.

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product	:	Smart Touch In-Wall Switch
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Date	:	2018/06/09
Test Mode	:	Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.193	9.672	36.360	46.032	-18.739	64.771
0.439	9.687	42.360	52.047	-5.696	57.743
0.838	9.723	37.860	47.583	-8.417	56.000
1.365	9.756	37.140	46.896	-9.104	56.000
1.607	9.772	37.400	47.172	-8.828	56.000
2.701	9.831	34.320	44.151	-11.849	56.000
Average					
0.193	9.672	28.890	38.562	-16.209	54.771
0.439	9.687	35.210	44.897	-2.846	47.743
0.838	9.723	30.560	40.283	-5.717	46.000
1.365	9.756	30.560	40.316	-5.684	46.000
1.607	9.772	28.580	38.352	-7.648	46.000
2.701	9.831	23.600	33.431	-12.569	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Smart Touch In-Wall Switch
Test Item : Conducted Emission Test
Power Line : Line 2
Test Date : 2018/06/09
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.162	9.670	34.800	44.470	-21.187	65.657
0.357	9.672	40.180	49.852	-10.234	60.086
0.443	9.678	44.300	53.978	-3.651	57.629
0.963	9.721	38.240	47.961	-8.039	56.000
1.560	9.769	38.500	48.269	-7.731	56.000
3.099	9.840	34.580	44.420	-11.580	56.000
Average					
0.162	9.670	28.850	38.520	-17.137	55.657
0.357	9.672	33.970	43.642	-6.444	50.086
0.443	9.678	35.980	45.658	-1.971	47.629
0.963	9.721	31.370	41.091	-4.909	46.000
1.560	9.769	31.670	41.439	-4.561	46.000
3.099	9.840	24.650	34.490	-11.510	46.000

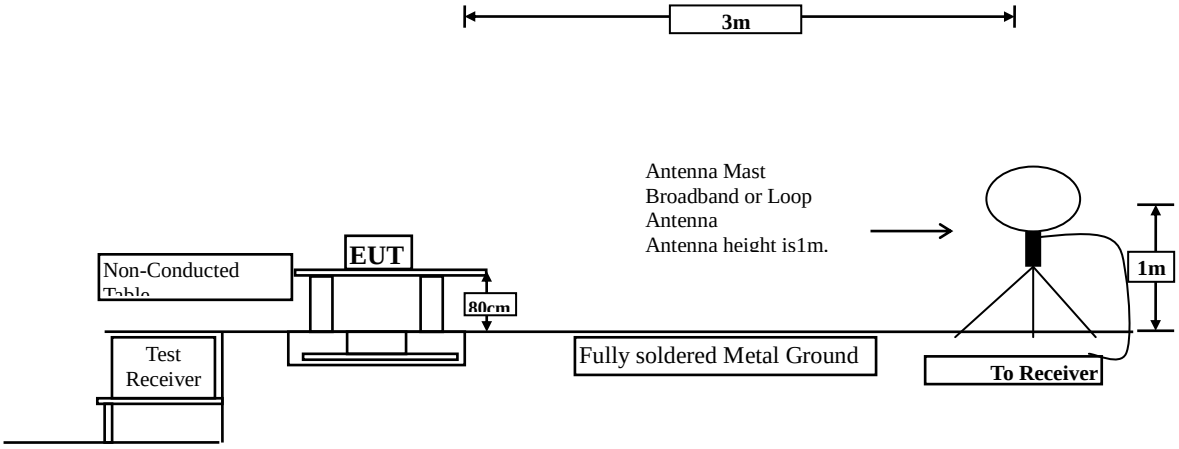
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

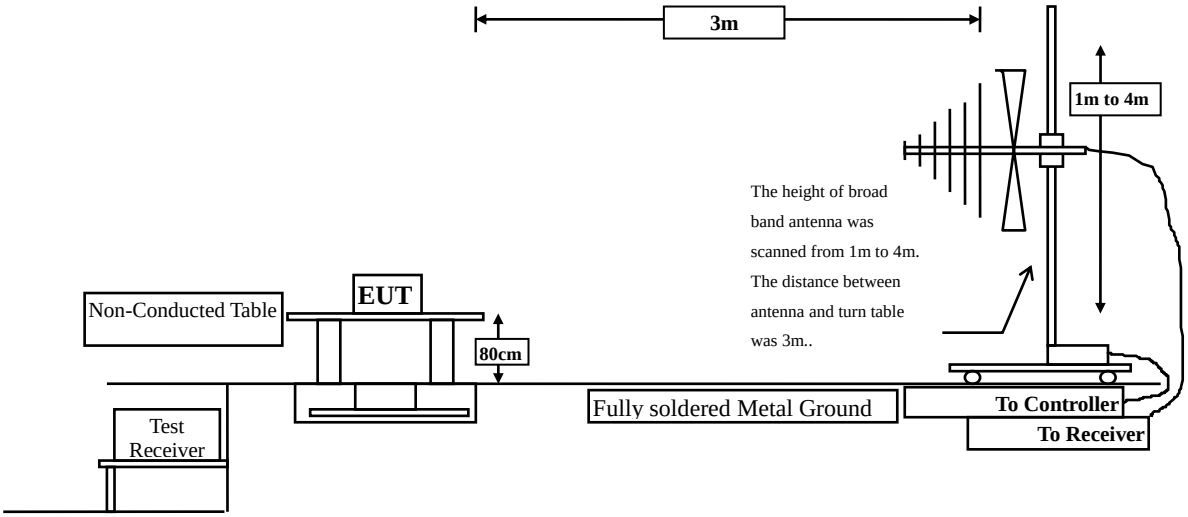
3. Radiated Emission

3.1. Test Setup

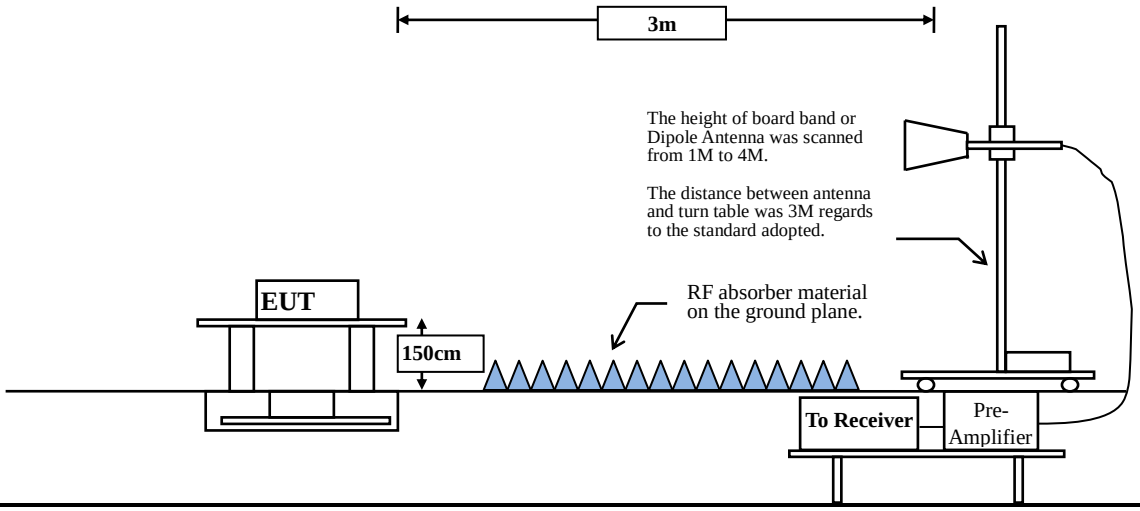
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➢ **Fundamental and Harmonics Emission Limits**

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBμV /m) = 20 log RF Voltage (uV/m)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ **General Radiated Emission Limits**

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

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
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

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.
The turn table is rotated 360 degrees to determine the position of the maximum emission level.
The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.
This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.
The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.
Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.
The measurement is divided into the Preliminary Measurement and the Final Measurement.
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.
The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.
The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Uncertainty

± 4.08 dB above 1GHz
± 4.22 dB below 1GHz

3.5. Test Result of Radiated Emission

Product : Smart Touch In-Wall Switch
Test Item : Fundamental Radiated Emission
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit

X-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV /m	dB	dBµV /m
Horizontal					
Quasi-Peak					
908.400	26.895	53.040	79.935	-14.065	94.000
916.000	26.970	53.520	80.490	-13.510	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product	:	Smart Touch In-Wall Switch
Test Item	:	Fundamental Radiated Emission
Test Date	:	2018/05/30
Test Mode	:	Mode 1: Transmit

X-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Vertical					
Quasi-Peak					
908.400	28.005	55.950	83.955	-10.045	94.000
916.000	28.026	55.850	83.876	-10.124	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product	:	Smart Touch In-Wall Switch
Test Item	:	Fundamental Radiated Emission
Test Date	:	2018/05/30
Test Mode	:	Mode 1: Transmit

Y-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV /m	dB	dBµV /m
Horizontal					
Quasi-Peak					
908.400	26.895	57.140	84.035	-9.965	94.000
916.000	26.970	57.520	84.490	-9.510	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product	:	Smart Touch In-Wall Switch
Test Item	:	Fundamental Radiated Emission
Test Date	:	2018/05/30
Test Mode	:	Mode 1: Transmit

Y-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV /m	dB	dBµV /m
Vertical					
Quasi-Peak					
908.400	28.005	54.910	82.915	-11.085	94.000
916.000	28.026	54.870	82.896	-11.104	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product	:	Smart Touch In-Wall Switch
Test Item	:	Fundamental Radiated Emission
Test Date	:	2018/05/30
Test Mode	:	Mode 1: Transmit

Z-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
Quasi-Peak					
908.400	26.895	56.160	83.055	-10.945	94.000
916.000	26.970	56.340	83.310	-10.690	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product	:	Smart Touch In-Wall Switch
Test Item	:	Fundamental Radiated Emission
Test Date	:	2018/05/30
Test Mode	:	Mode 1: Transmit

Z-Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Vertical					
Quasi-Peak					
908.400	28.005	54.740	82.745	-11.255	94.000
916.000	28.026	54.910	82.936	-11.064	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Smart Touch In-Wall Switch
Test Item : Harmonic Radiated Emission Data
Test Date : 2018/05/31
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
Peak Detector:					
1816.800	-11.227	47.700	36.473	-37.527	74.000
2725.200	-7.234	47.070	39.836	-34.164	74.000
3633.600	-5.555	46.330	40.775	-33.225	74.000
4542.000	-3.066	45.060	41.995	-32.005	74.000
5450.400	-2.176	43.580	41.404	-32.596	74.000
6358.800	-0.543	48.100	47.558	-26.442	74.000
7267.200	0.150	42.610	42.760	-31.240	74.000
8175.600	0.946	45.420	46.366	-27.634	74.000
9084.000	1.335	43.260	44.595	-29.405	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Smart Touch In-Wall Switch
Test Item : Harmonic Radiated Emission Data
Test Date : 2018/05/31
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Vertical					
Peak Detector:					
1816.800	-11.227	47.970	36.743	-37.257	74.000
2725.200	-7.234	47.640	40.406	-33.594	74.000
3633.600	-5.555	46.490	40.935	-33.065	74.000
4542.000	-3.066	45.040	41.975	-32.025	74.000
5450.400	-2.176	43.000	40.824	-33.176	74.000
6358.800	-0.543	46.750	46.208	-27.792	74.000
7267.200	0.150	43.060	43.210	-30.790	74.000
8175.600	0.946	45.320	46.266	-27.734	74.000
9084.000	1.335	44.480	45.815	-28.185	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Smart Touch In-Wall Switch
Test Item : Harmonic Radiated Emission Data
Test Date : 2018/05/31
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV /m	dB	dBµV /m
Horizontal					
Peak Detector:					
1832.000	-11.111	48.360	37.249	-36.751	74.000
2748.000	-7.186	47.430	40.244	-33.756	74.000
3664.000	-5.546	51.030	45.484	-28.516	74.000
4580.000	-3.050	44.320	41.270	-32.730	74.000
5496.000	-2.107	43.540	41.433	-32.567	74.000
6412.000	-0.409	45.130	44.721	-29.279	74.000
7328.000	0.103	44.270	44.373	-29.627	74.000
8244.000	0.892	45.840	46.732	-27.268	74.000
9160.000	1.430	41.440	42.871	-31.129	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Smart Touch In-Wall Switch
Test Item : Harmonic Radiated Emission Data
Test Date : 2018/05/31
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV /m	dB	dBµV /m
Vertical					
Peak Detector:					
1832.000	-11.111	47.380	36.269	-37.731	74.000
2748.000	-7.186	49.750	42.564	-31.436	74.000
3664.000	-5.546	44.880	39.334	-34.666	74.000
4580.000	-3.050	44.380	41.330	-32.670	74.000
5496.000	-2.107	44.060	41.953	-32.047	74.000
6412.000	-0.409	44.040	43.631	-30.369	74.000
7328.000	0.103	44.250	44.353	-29.647	74.000
8244.000	0.892	45.640	46.532	-27.468	74.000
9160.000	1.430	41.870	43.301	-30.699	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Smart Touch In-Wall Switch
Test Item : General Radiated Emission Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
120.160	11.334	15.474	26.808	-16.692	43.500
333.125	17.292	3.240	20.532	-25.468	46.000
530.545	23.735	2.320	26.055	-19.945	46.000
608.269	26.846	2.853	29.699	-16.301	46.000
752.837	26.366	2.420	28.786	-17.214	46.000
981.346	27.645	8.156	35.801	-18.199	54.000
Vertical					
99.952	17.914	16.607	34.521	-8.979	43.500
199.439	20.632	3.174	23.806	-19.694	43.500
460.593	21.017	2.217	23.234	-22.766	46.000
528.990	21.799	3.224	25.023	-20.977	46.000
752.837	24.568	2.801	27.369	-18.631	46.000
836.779	26.219	3.028	29.247	-16.753	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Smart Touch In-Wall Switch
Test Item : General Radiated Emission Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
131.042	10.438	17.354	27.792	-15.708	43.500
239.856	14.271	19.125	33.397	-12.603	46.000
263.173	15.069	20.355	35.424	-10.576	46.000
494.792	22.292	9.867	32.159	-13.841	46.000
600.497	26.942	4.769	31.711	-14.289	46.000
768.381	26.588	8.249	34.837	-11.163	46.000
Vertical					
68.862	9.878	22.864	32.742	-7.258	40.000
92.179	15.183	22.853	38.036	-5.464	43.500
297.372	14.166	14.547	28.713	-17.287	46.000
387.532	20.001	8.252	28.253	-17.747	46.000
567.853	22.797	19.534	42.331	-3.669	46.000
749.728	24.531	10.207	34.738	-11.262	46.000

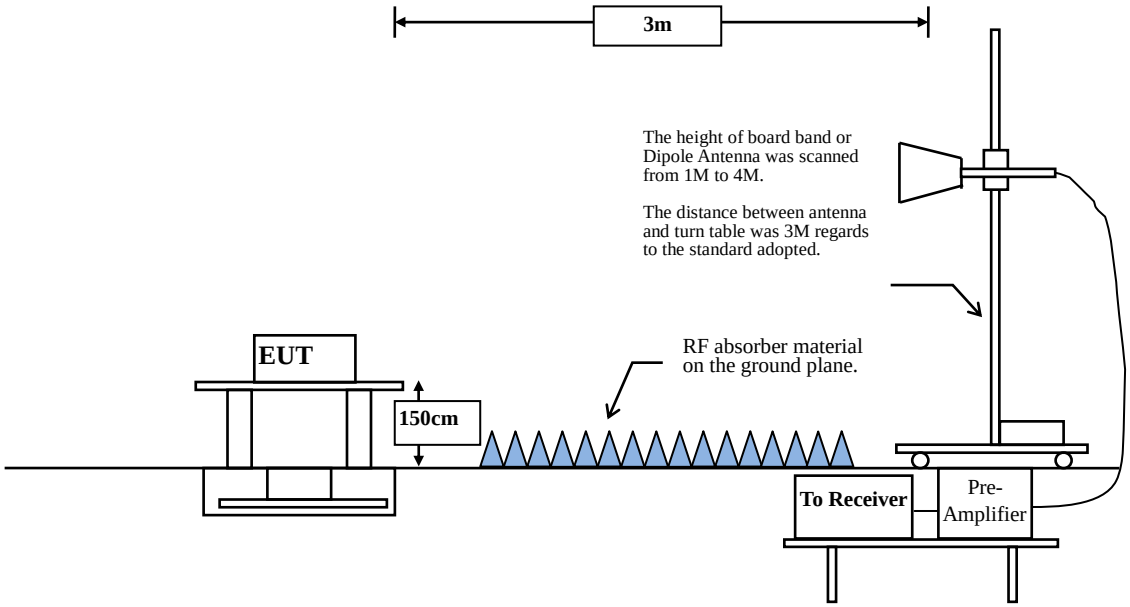
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
9. The emission levels of other frequencies are very lower than the limit and not show in test report.
10. No emission found between lowest internal used/generated frequency to 30MHz.

4. Band Edge

4.1. Test Setup

RF Radiated Measurement:



4.2. Limits

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

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
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

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Uncertainty

± 4.08 dB above 1GHz
± 4.22 dB below 1GHz

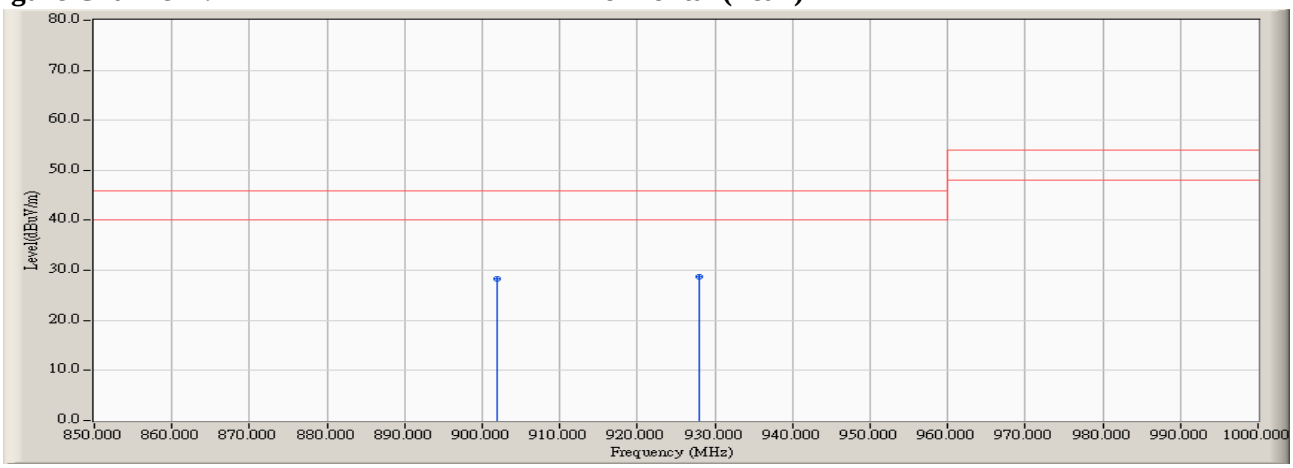
4.5. Test Result of Band Edge

Product : Smart Touch In-Wall Switch
Test Item : Band Edge Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (908.4MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Quasi-Peak Limit (dBuV/m)	Result
1 (Quasi-Peak)	902.000	7.731	20.643	28.374	46.020	Pass
1 (Quasi-Peak)	928.000	8.009	20.804	28.813	46.020	Pass

Figure Channel 1: Horizontal (Peak)



Note:

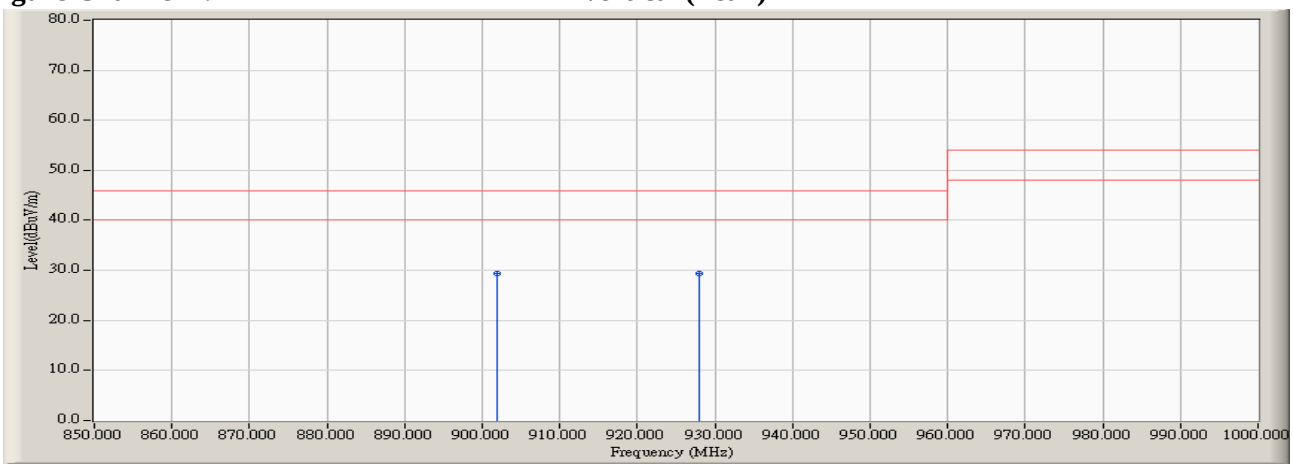
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Smart Touch In-Wall Switch
Test Item : Band Edge Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (908.4MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Quasi-Peak Limit (dBuV/m)	Result
1 (Quasi-Peak)	902.000	8.881	20.538	29.419	46.020	Pass
1 (Quasi-Peak)	928.000	8.989	20.316	29.305	46.020	Pass

Figure Channel 1: Vertical (Peak)



Note:

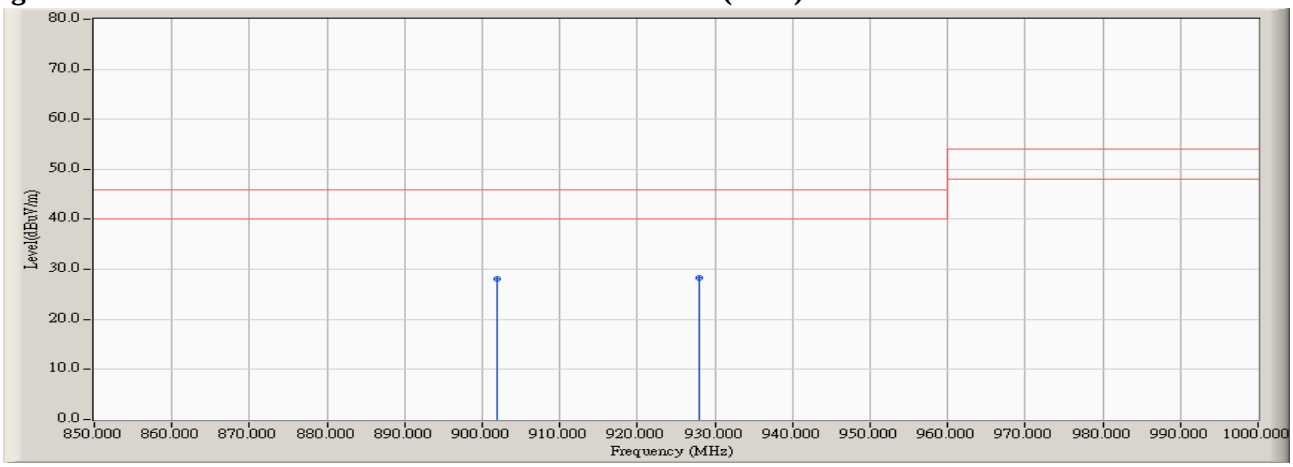
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Smart Touch In-Wall Switch
Test Item : Band Edge Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (916MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Emission Level (dBµV /m)	Quasi-Peak Limit (dBuV/m)	Result
2 (Quasi-Peak)	902.000	7.731	20.277	28.008	46.020	Pass
2 (Quasi-Peak)	928.000	8.009	20.298	28.307	46.020	Pass

Figure Channel 2: Horizontal (Peak)



Note:

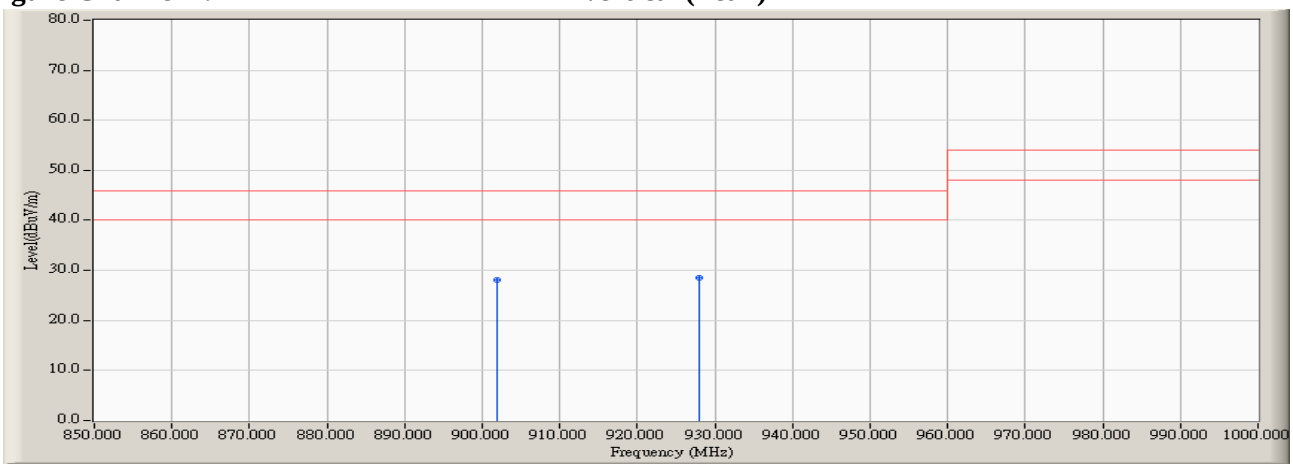
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Smart Touch In-Wall Switch
Test Item : Band Edge Data
Test Date : 2018/05/30
Test Mode : Mode 1: Transmit (916MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Quasi-Peak Limit (dBuV/m)	Result
2 (Quasi-Peak)	902.000	8.881	19.254	28.135	46.020	Pass
2 (Quasi-Peak)	928.000	8.989	19.469	28.458	46.020	Pass

Figure Channel 2: Vertical (Peak)



Note:

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.