FCC Test Report

Product Name	Smart Energy In wall Switch Module
Model No.	PAN03-2
FCC ID.	RHHPAN03

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

Date of Receipt	Aug. 19, 2014
Issued Date	Sep. 30, 2014
Report No.	1480437R-RFUSP15V00
Report Version	V1.0

Testing Laboratory
0914

Test Report

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Product Name	Smart Energy In wall Switch Module
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.	PAN03-2
FCC ID.	RHHPAN03
EUT Rated Voltage	AC 100-120V/ 60Hz
EUT Test Voltage	AC 100V/ 60Hz
Trade Name	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2013 ANSI C63.10: 2009
Test Result	Complied

Documented By : Genie Chang

(Senior Adm. Specialist / Genie Chang)

Tested By : Nova chu

(Engineer / Nova Chu)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Smart Energy In wall Switch Module
Trade Name	
FCC ID.	RHHPAN03
Model No.	PAN03-2
Frequency Range	908.4MHz & 916MHz
Type of Modulation	FSK
Number of Channels	2
Channel Control	Auto
Antenna Type	Monopole Antenna

Center Frequency of Each Channel:

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

Note:

1. The EUT is a Smart Energy In wall Switch Module with a built-in 908.4MHz & 916MHz Z-Wave transceiver.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. 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

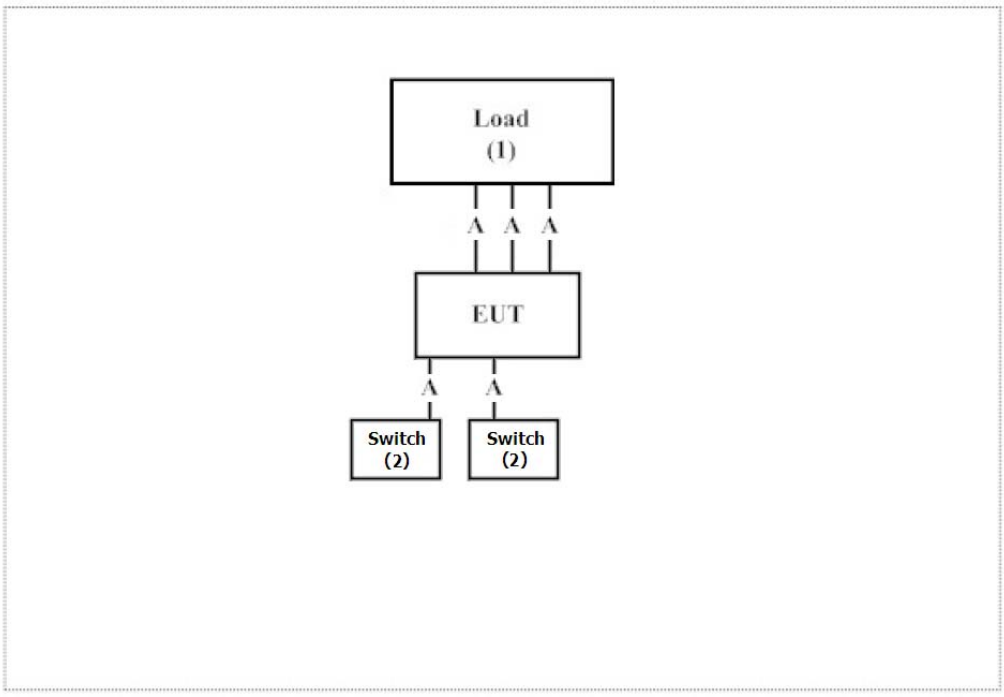
1.3. Tested System Details

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 (1400W)	Pioneer	N/A	N/A	N/A
2	Switch (two PCS)		N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	Power Line Cable	Non-Shielded, 0.2m, five PCS.

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4.
(2) Provide the AC Power Source.
(3) Start transmits continually.
(4) 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 QuieTek Corporation's Web Site : http://tw.quietek.com/modules/myalbum/
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
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 : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

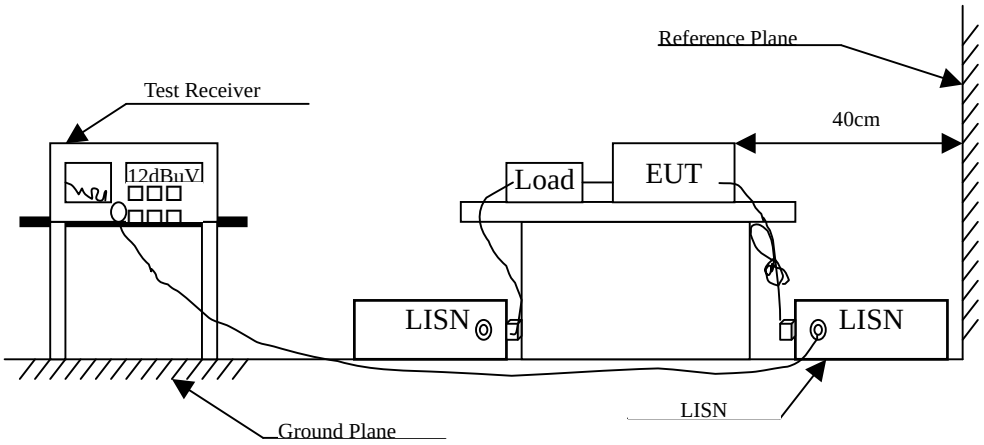
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2014	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2014	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	No.8 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) 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.

2.4. 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 C63.10: 2009 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Smart Energy In wall Switch Module
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.197	9.650	49.580	59.230	-5.427	64.657
0.259	9.654	46.710	56.364	-6.522	62.886
0.318	9.657	44.160	53.817	-7.383	61.200
0.338	9.658	43.450	53.108	-7.521	60.629
0.482	9.666	36.340	46.006	-10.508	56.514
0.920	9.690	30.540	40.230	-15.770	56.000
Average					
0.197	9.650	33.680	43.330	-11.327	54.657
0.259	9.654	30.900	40.554	-12.332	52.886
0.318	9.657	28.900	38.557	-12.643	51.200
0.338	9.658	28.030	37.688	-12.941	50.629
0.482	9.666	21.650	31.316	-15.198	46.514
0.920	9.690	17.320	27.010	-18.990	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 Energy In wall Switch Module
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.181	9.659	49.490	59.149	-5.965	65.114
0.244	9.663	46.940	56.603	-6.711	63.314
0.302	9.658	44.640	54.298	-7.359	61.657
0.404	9.662	39.900	49.562	-9.181	58.743
0.599	9.672	31.790	41.462	-14.538	56.000
0.888	9.698	30.400	40.098	-15.902	56.000
Average					
0.181	9.659	33.510	43.169	-11.945	55.114
0.244	9.663	30.910	40.573	-12.741	53.314
0.302	9.658	28.860	38.518	-13.139	51.657
0.404	9.662	23.990	33.652	-15.091	48.743
0.599	9.672	14.290	23.962	-22.038	46.000
0.888	9.698	12.730	22.428	-23.572	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 Equipment

The following test equipment are used during the radiated emission test:

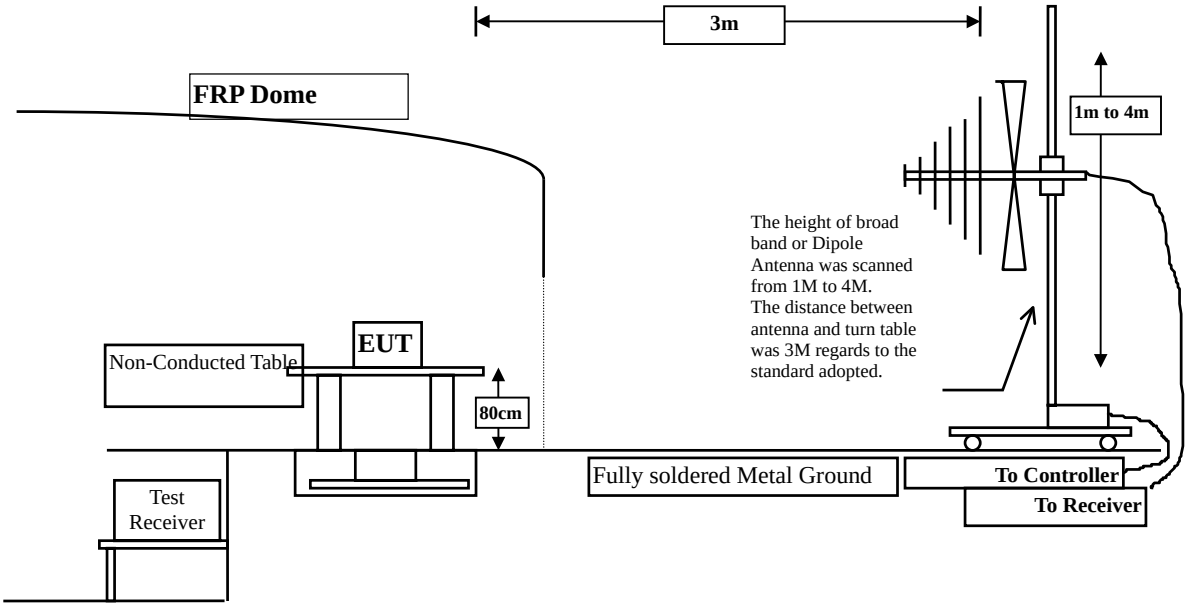
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2014
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2014
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2014
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2014
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2014
	X	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2014
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2014
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2014
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

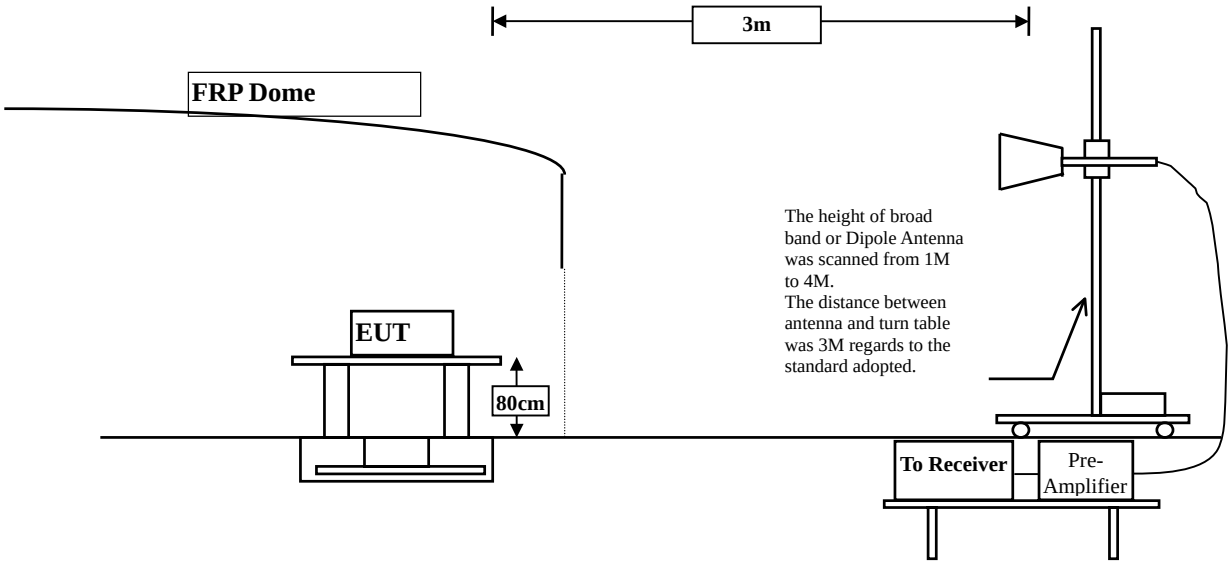
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Below 1GHz



Above 1GHz



3.3. 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)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/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 (dBuV/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 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 : 1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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: 2009 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.

3.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : Smart Energy In wall Switch Module
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit (X-asix)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
908.400	6.291	85.310	91.601	-2.399	94.000
916.000	6.434	85.370	91.804	-2.196	94.000
Vertical					
908.400	0.747	83.220	83.967	-10.033	94.000
916.000	-0.901	83.660	82.759	-11.241	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 – PreAMP.

Product : Smart Energy In wall Switch Module
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit (Y-asix)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
908.400	6.291	84.444	90.735	-3.265	94.000
916.000	6.434	83.810	90.244	-3.756	94.000
Vertical					
908.400	0.747	81.600	82.347	-11.653	94.000
916.000	-0.901	88.360	87.459	-6.541	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 – PreAMP.

Product : Smart Energy In wall Switch Module
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit (Z-asix)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
908.400	6.291	85.830	92.121	-1.879	94.000
916.000	6.434	85.800	92.234	-1.766	94.000
Vertical					
908.400	0.747	82.450	83.197	-10.803	94.000
916.000	-0.901	82.310	81.409	-12.591	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 – PreAMP.

Product : Smart Energy In wall Switch Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
1816.800	-0.546	42.520	41.975	-32.025	74.000
2725.200	-2.972	51.130	48.158	-25.842	74.000
3633.600	-1.186	42.640	41.454	-32.546	74.000
4542.000	2.357	40.770	43.126	-30.874	74.000
5450.400	3.829	40.440	44.269	-29.731	74.000
6358.800	5.583	40.470	46.053	-27.947	74.000
7267.200	9.789	39.280	49.069	-24.931	74.000
8175.600	11.090	37.820	48.910	-25.090	74.000
9084.000	11.885	37.620	49.505	-24.495	74.000

Average Detector:

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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 Energy In wall Switch Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
1816.800	0.256	42.390	42.647	-31.353	74.000
2725.200	-2.972	47.450	44.478	-29.522	74.000
3633.600	-1.186	43.170	41.984	-32.016	74.000
4542.000	2.357	45.230	47.586	-26.414	74.000
5450.400	3.829	40.050	43.879	-30.121	74.000
6358.800	5.583	40.050	45.633	-28.367	74.000
7267.200	9.789	38.220	48.009	-25.991	74.000
8175.600	11.090	38.210	49.300	-24.700	74.000
9084.000	11.885	37.770	49.655	-24.345	74.000

Average Detector:

--

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 Energy In wall Switch Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
1832.000	-1.292	41.750	40.458	-33.542	74.000
2748.000	-1.900	51.760	49.860	-24.140	74.000
3664.000	-1.420	43.140	41.719	-32.281	74.000
4580.000	2.285	40.420	42.705	-31.295	74.000
5496.000	4.419	40.320	44.739	-29.261	74.000
6412.000	6.060	39.790	45.850	-28.150	74.000
7328.000	10.732	38.200	48.932	-25.068	74.000
8244.000	11.499	39.310	50.809	-23.191	74.000
9160.000	11.539	38.600	50.139	-23.861	74.000

Average Detector:

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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 Energy In wall Switch Module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
1832.000	-0.666	41.900	41.234	-32.766	74.000
2748.000	-2.777	48.500	45.723	-28.277	74.000
3664.000	-1.420	42.490	41.069	-32.931	74.000
4580.000	2.285	41.920	44.205	-29.795	74.000
5496.000	4.419	40.530	44.949	-29.051	74.000
6412.000	6.060	39.530	45.590	-28.410	74.000
7328.000	10.732	38.920	49.652	-24.348	74.000
8244.000	11.499	38.690	50.189	-23.811	74.000
9160.000	11.539	39.140	50.679	-23.321	74.000

Average Detector:

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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 Energy In wall Switch Module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (908.4MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
128.940	-7.390	24.281	16.891	-26.609	43.500
255.040	-5.409	34.986	29.577	-16.423	46.000
288.020	-5.557	31.905	26.348	-19.652	46.000
452.920	1.290	25.257	26.547	-19.453	46.000
606.180	4.196	23.830	28.026	-17.974	46.000
813.760	6.296	27.746	34.042	-11.958	46.000
Vertical					
45.520	-10.625	38.127	27.502	-12.498	40.000
255.040	-5.089	28.537	23.448	-22.552	46.000
381.140	0.816	23.032	23.848	-22.152	46.000
619.760	0.474	26.049	26.523	-19.477	46.000
780.780	2.769	29.738	32.507	-13.493	46.000
877.780	0.847	29.362	30.209	-15.791	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 Energy In wall Switch Module
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (916MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
117.300	-7.350	24.633	17.283	-26.217	43.500
255.040	-5.409	34.717	29.308	-16.692	46.000
460.680	4.030	22.928	26.958	-19.042	46.000
596.480	3.587	27.334	30.921	-15.079	46.000
788.540	6.144	28.318	34.462	-11.538	46.000
852.560	7.106	27.428	34.534	-11.466	46.000
Vertical					
45.520	-10.625	39.349	28.724	-11.276	40.000
255.040	-5.089	28.953	23.864	-22.136	46.000
381.140	0.816	24.537	25.353	-20.647	46.000
524.700	1.130	24.591	25.721	-20.279	46.000
685.720	2.254	23.043	25.297	-20.703	46.000
792.420	2.681	23.494	26.175	-19.825	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.

4. Band Edge

4.1. Test Equipment

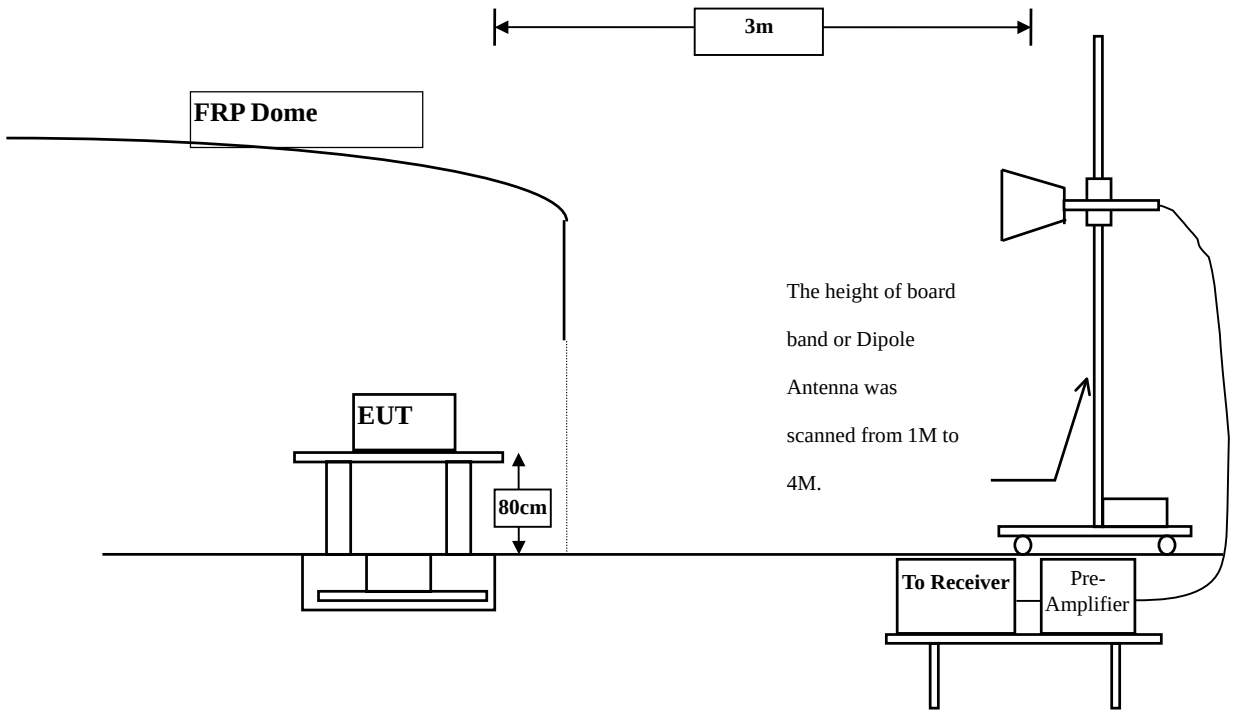
The following test equipments are used during the band edge tests:

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2014
		Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2014
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2014
		Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2014
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2014
		Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2014
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2014
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated every one year.

2. The test equipments marked by “X” are used to measure the final test results.

4.2. Test Setup



4.3. Limit

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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 C63.10:2009 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

4.5. Uncertainty

Radiated is ± 3.9 dB.

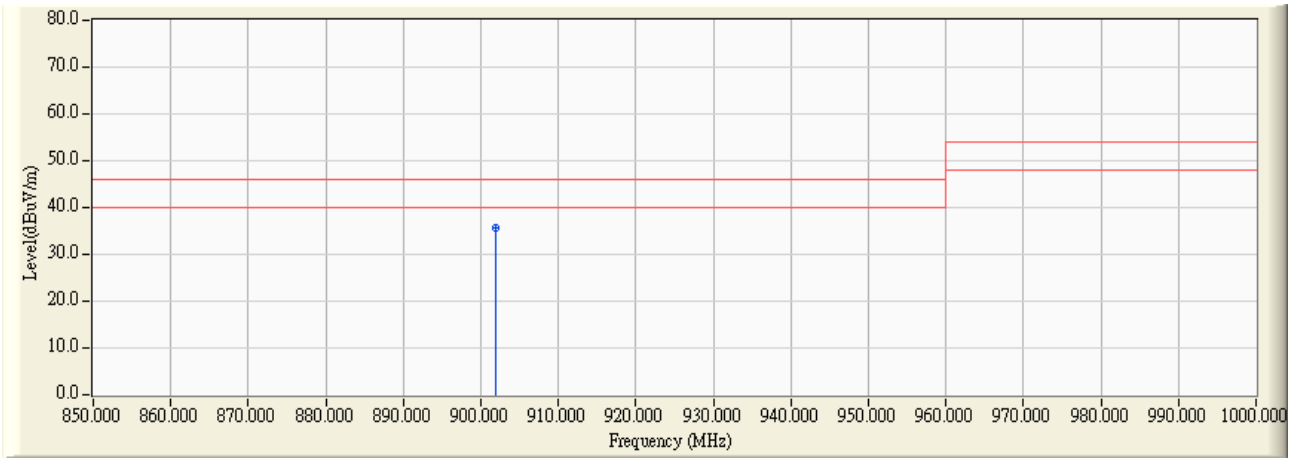
4.6. Test Result of Band Edge

Product : Smart Energy In wall Switch Module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (908.4MHz)

RF Radiated Measurement (Horizontal):

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	5.907	29.765	35.672	46.000	Pass

Figure Channel 01: Horizontal (Quasi-Peak)



Note:

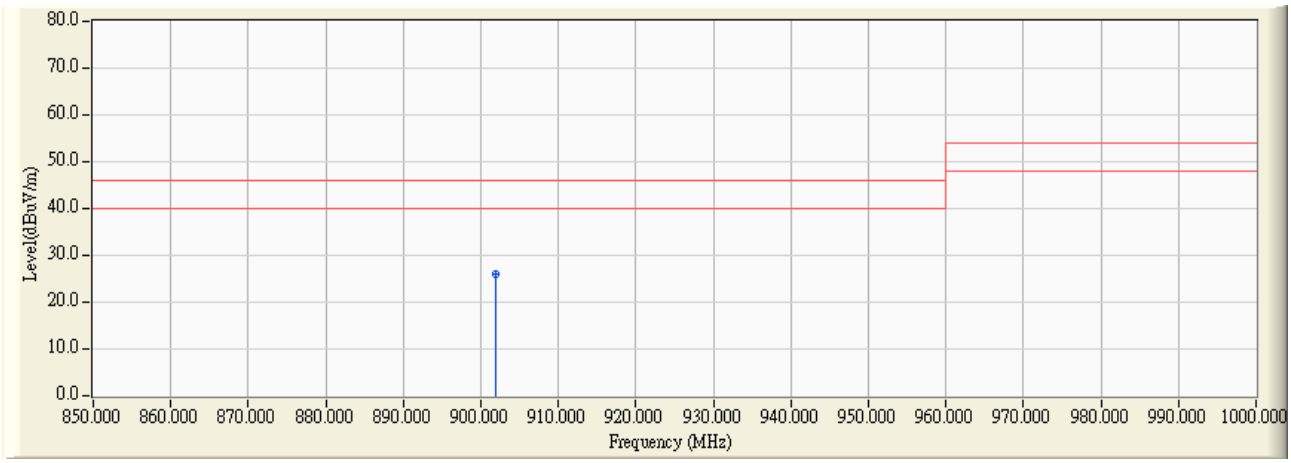
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Smart Energy In wall Switch Module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (908.4MHz)

RF Radiated Measurement (Vertical):

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	1.645	24.334	25.979	46.000	Pass

Figure Channel 01: Vertical (Quasi-Peak)



Note:

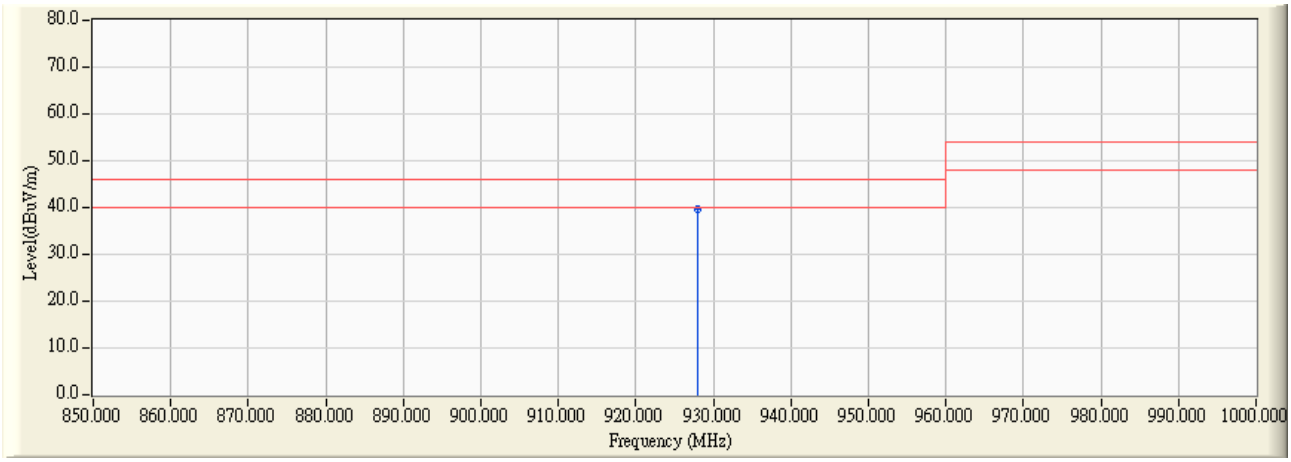
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Smart Energy In wall Switch Module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (916MHz)

RF Radiated Measurement (Horizontal):

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
02(Quasi-Peak)	928.000	7.185	32.483	39.668	46.000	Pass

Figure Channel 01: Horizontal (Quasi-Peak)



Note:

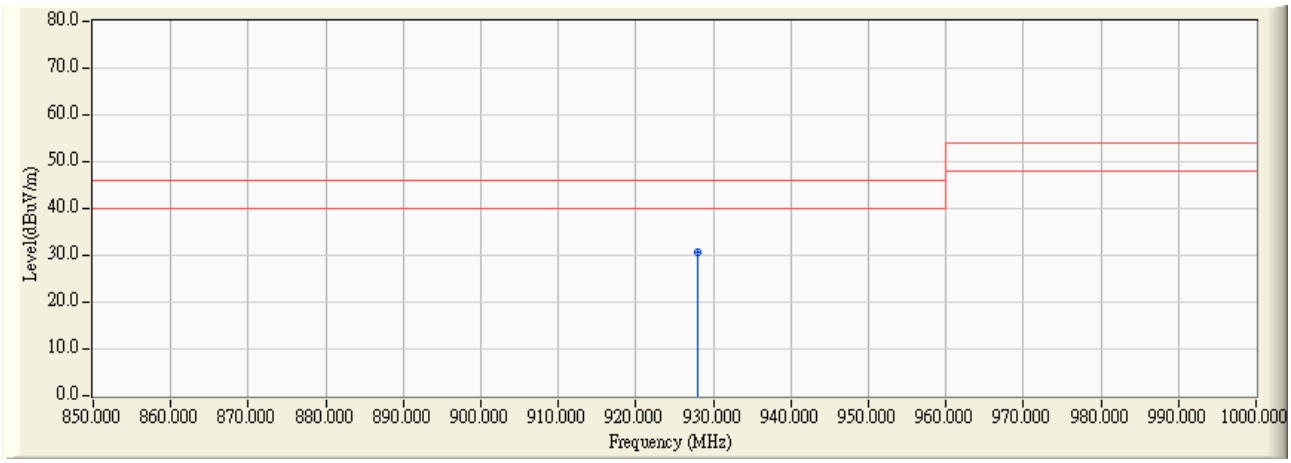
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Smart Energy In wall Switch Module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (916MHz)

RF Radiated Measurement (Vertical):

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
02(Quasi-Peak)	928.000	3.606	27.007	30.613	46.000	Pass

Figure Channel 01: Vertical (Quasi-Peak)



Note:

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.