

# TEST REPORT

For Electromagnetic Interference of

**FCC ID: 2AAKQ-SDW-424W1-M6L**

Report Reference No. ....: 13FAB06001 11

Date of issue .....: 2013-06-28

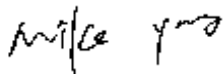
Testing Laboratory .....: ATT Product Service Co., Ltd.  
Address .....: No. 3, ChangLianShan Industrial Park, ChangAn Town,  
DongGuan City, GuangDong, China.

Applicant's name .....: BAANTO INTERNATIONAL LTD  
Address .....: 6470 VISCOUNT RD MISSISSAUGA, ON L4V 1H3 CANADA  
Manufacturer .....: BAANTO INTERNATIONAL LTD

**Test specification:**

Test item description.....: Touch Screen  
Trade Mark .....: --  
Model/Type reference .....: SDW-424W1-M6L-I50-S0-PRD  
Ratings .....: Input: 12V/1A

Responsible Engineer



(Mike Yang/ Engineer)

Approved by



(Tomy Wu /EMC Manager)

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## 1. CERTIFICATION

Testing Laboratory .....: ATT Product Service Co., Ltd.  
 Address.....: No. 3, ChangLianShan Industrial Park, ChangAn Town,  
 DongGuan City, GuangDong, China.

Applicant's name .....: BAANTO INTERNATIONAL LTD  
 Address.....: 6470 VISCOUNT RD MISSISSAUGA, ON L4V 1H3 CANADA  
 Manufacturer .....: Same as applicant  
 Address.....: Same as applicant  
 Factory.....: Same as applicant  
 Address.....: Same as applicant

**Test specification:**  
 Test item description.....: Touch Screen  
 Trade Mark .....: --  
 Model/Type reference .....: SDW-424W1-M6L-I50-S0-PRD  
 Test Sample: SDW-424W1-M6L-I50-S0-PRD  
 Ratings.....: Input: 12V/1A

Tested Power: AC 120V 60Hz  
 Standards .....: 47 CFR FCC Part 15 Subpart B: 2012

The device described above was tested by ATT Product Service Co., Ltd to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and ATT Product Service Co., Ltd assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the Part 15 Subpart B, ANSI C63.4 and CISPR 22 official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of ATT Product Service Co., Ltd.

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMC Emission			
Standard	Test Item	Judgment	Remark
FCC Part 15 B	Conducted Emission	PASS	
	Radiated Emission	PASS	

NOTE: The highest frequency of the internal sources of this EUT is less than 108 MHz, the radiated emission measurement shall only be made up to 1 GHz.

### 2.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

#### A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	1.94	

#### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
OS02	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	WORKING
For Conducted Test	
Final Test Mode	Description
Mode 1	WORKING
For Radiated Test	
Final Test Mode	Description
Mode 1	WORKING

The system has to be powered by 12V AC-DC adapter and operated with Windows system computer powered on and USB connected. 12V-power and USB cable connect to Top Sensor Bar of the system on the top right corner with special 8-wire cable. In the Top Sensor bar of the system, there is a Control board that provides all powers to other sensor boards, Slave MCU board and three Light Bars (Left, Bottom and Right), and control signals for sensor boards and light bars, as well as communicating with Slave MCU. The main MCU on the Control Board is running at 72MHz with a 25MHz resonator. The slave MCUs on the Control Board as well as on the Slave MCU Board are running at 72MHz with an 8MHz resonator.

During the normal operation, the main MCU fires IR LEDs one by one at about 10us pulse for each IR LED, starts from the Left Light Bar and ends at the Right Light Bar. At same time, all 6 sensors are monitoring all IR LEDs, Each slave MCU (on-board and on the Slave MCU board) converts 3 analog signals from Sensor boards to digital and compute with same firmware. After all IR LEDs fired, the main MCU collects data from two slave MCUs via SPI interface while slave MCUs are ready, and send final result to PC through USB.

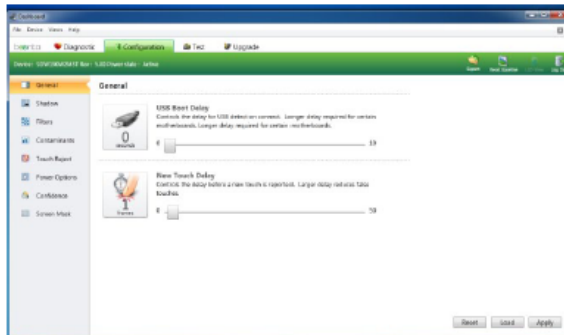
During the test, use the test software "Baanto V1.0.0.0" to control EUT working. The details configure of the software as follow:

## Configuration Dashboard Overview

Enhance your control of touch screen performance and behavior with the Baanto Configuration Dashboard. Critical firmware parameters are easily adjustable through an intuitive dashboard interface, allowing developers to configure the touchscreen characteristics to meet the unique challenges faced by your systems. Easily implement and control functions such as:

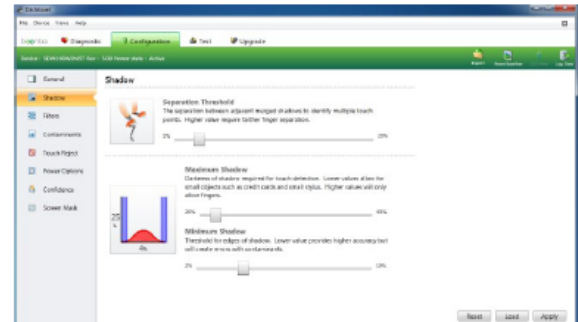
- Touch duration control
- Palm rejection
- Rain / Fluid rejection
- Power modes: Full, Standby, Sleep
- Touch pressure emulation
- Hover distance

### General



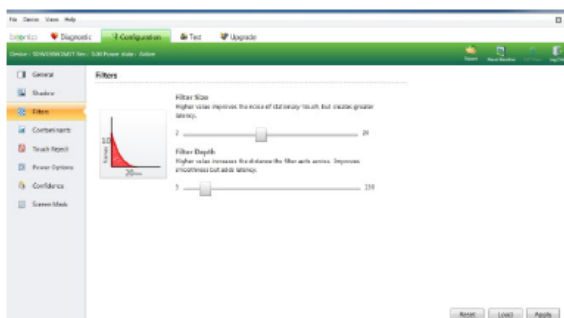
- **USB Boot Delay**
  - Supports system boot-up and sequencing requirements for test and operational modes
- **New Touch Delay**
  - Controls the delay from touch detection to touch reporting

### Shadow Factors



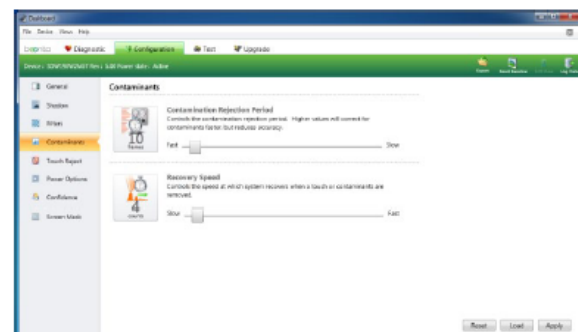
- **Shadow Characteristics**
  - **Separation Threshold**
    - Controls the minimum distance between two touch points
  - **Maximum Shadow / Minimum Shadow**
    - Adjusts the sensitivity of touch detection based upon the measured shadow density
- Controls hover distance and Rain / Fluid rejection

### Filters



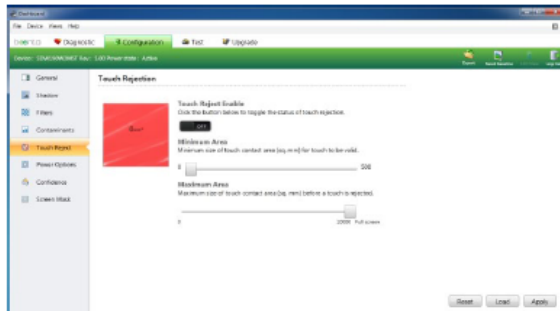
- **Filter Size**
  - Improves the stability of "right click" functionality
- **Filter Depth**
  - Smoothing function for the reported touch point tracks

### Contaminants



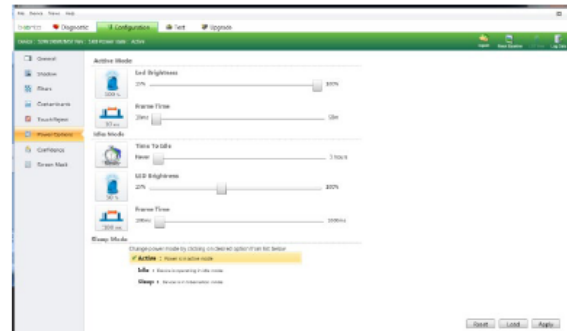
- **Contamination Rejection Period**
  - Controls the period for static object detection and rejection
- **Recovery Speed**
  - Controls the rate at which a touchscreen will recognize a static object or contaminant has been removed from the touchscreen

## Touch Rejection / Touch Gate



- **Touch Rejection**
  - Controls touch reporting based on touch object area
    - Minimum Area sets the smallest object reported as a touch
    - Maximum Area establishes the largest object reported as a touch
  - Used for palm and spurious object rejection

## Power Options



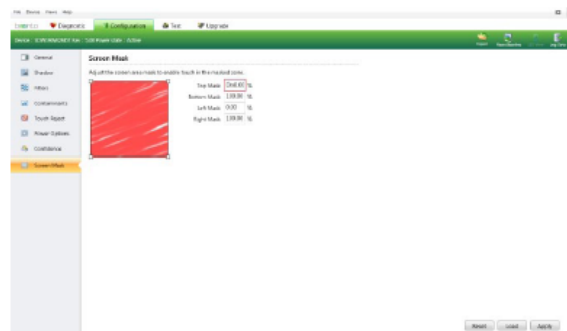
- **Power Options**
  - Adjust power consumption in Active, Idle, and Sleep modes
- Supports "Wake on Touch" and advanced power control across multiple modes

## Confidence



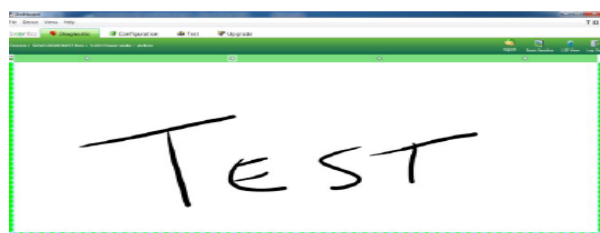
- **Touch Confidence**
  - Correlates new touch points to existing touch points and touch tracks and establishes the likelihood that a new touch is valid as opposed to a spurious or false touch point

## Screen Mask



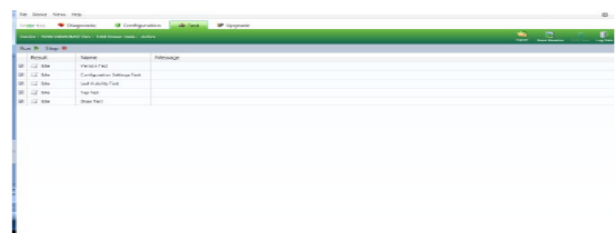
- **Screen Mask**
  - Allows the touchscreen to be used over a smaller display
  - Maps physical touch points from the touchscreen to the display coordinate system

## Diagnostic



- **Touchscreen Diagnostic Screen**
  - Sensor / LED Health
    - Displays LED power level and visibility to each sensor for the entire LED array
    - Determine if an LED or sensor has failed or out of calibrated power levels
  - Touch point tracking
    - Renders touch points and touch tracks

## Test



- **Touchscreen test programs**
  - Sequences through automated and manual touchscreen health, accuracy, and calibration routines

## Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Other
Adapter	JET	EMSA120250	Input :AC100-240V,50/60Hz,1.0A Output:12V/2.5A
Baanto USB Cable	N/A	N/A	Shielding, without ferrite
Baanto CB-1 Power cable	N/A	N/A	without ferrite

## Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
Notebook	Lenovo	SL400 2743	S/N:00158-710-942-828
Mouse	Lenovo	MOEUUO	S/N:44F0301
Keyboard	Lenovo	LXH-JME2209U	S/N:01203897



### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

##### 3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/27/2013
2	EMI Test Receiver	R&S	ESCI	101308	12/27/2013
3	LISN	AFJ	LS16	16011103219	12/27/2013

Remark: " N/A" denotes No Model No. , Serial No. or No Calibration specified.

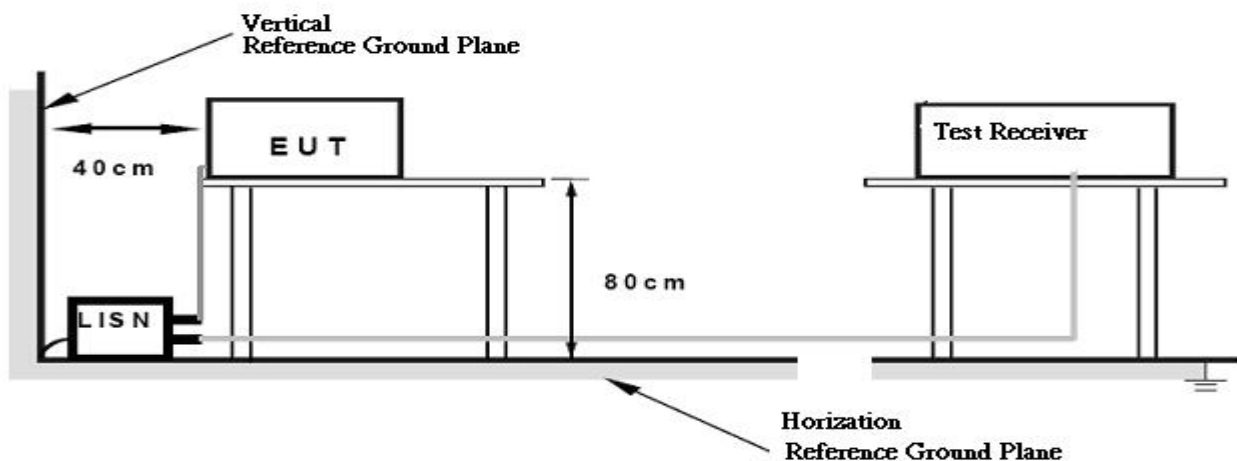
### 3.1.3 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal reference ground plane and 0.4meters from vertical reference ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.5 TEST SETUP



### 3.1.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

**3.1.7 TEST RESULTS**

<b>EUT :</b>	Touch Screen	<b>Model No. :</b>	SDW-424W1-M6L-I50-S0-PRD
<b>Temperature :</b>	26°C	<b>Relative Humidity :</b>	48 %
<b>Pressure :</b>	1008 hPa	<b>Test Power :</b>	AC 120V/60Hz
<b>Test Mode :</b>	Working		

**Remark**

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a " \* " marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz.



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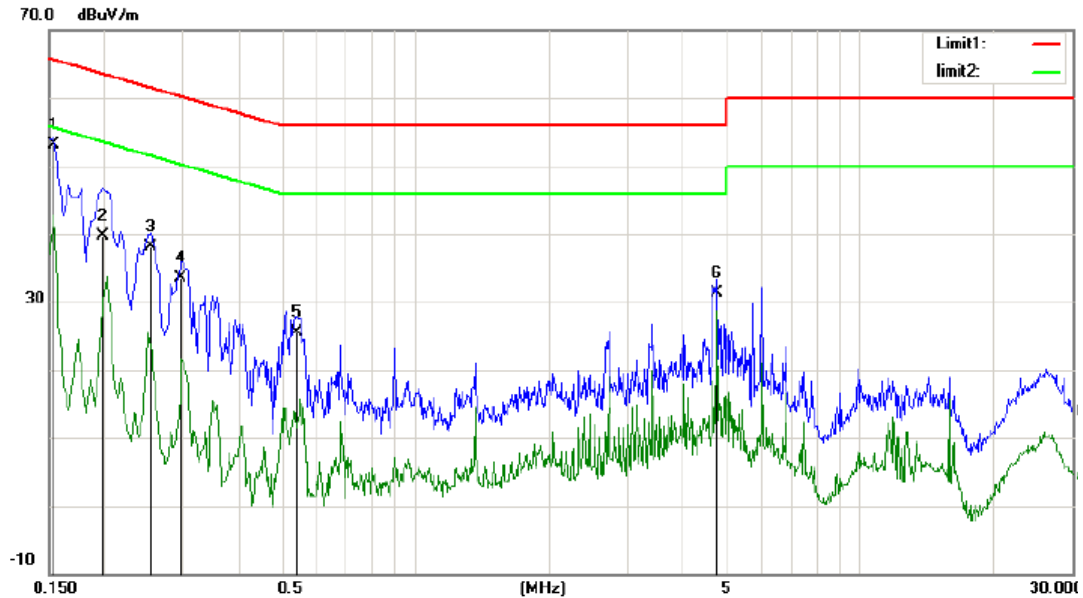
### Conducted Emission Measurement

File: BI1306001-3

Data: #13

Date: 2013-6-20

Time: 10:27:57



Site: ATT Conducted Emission Test Site (1)

Phase: N

Temperature: 24

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

Humidity: 55 %

EUT: Touch Screen

M/N: SDW-424W1-M6L-I50-S0-PRD

Mode: Working

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure- ment dBuV/m	Limit dB	Over dB	Detector	Comment
1	*	0.1539	51.73	1.44	53.17	65.78	-12.61	QP	
2		0.1980	38.52	1.14	39.66	63.69	-24.03	QP	
3		0.2540	37.43	0.75	38.18	61.62	-23.44	QP	
4		0.2980	33.13	0.45	33.58	60.30	-26.72	QP	
5		0.5420	25.31	0.17	25.48	56.00	-30.52	QP	
6		4.7738	31.14	0.11	31.25	56.00	-24.75	QP	

\*:Maximum data x:Over limit !:over margin



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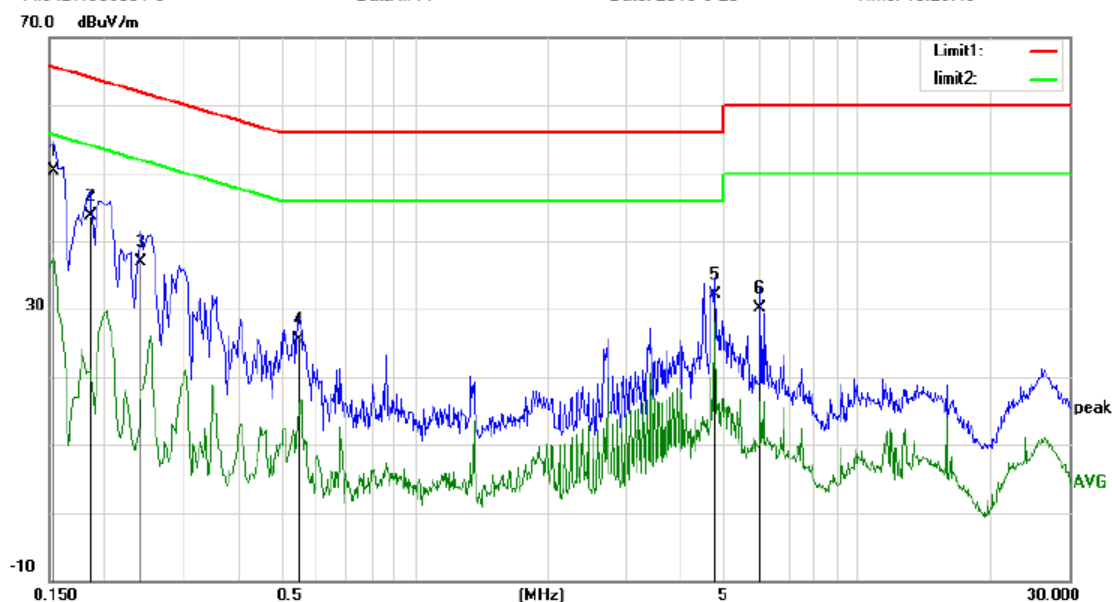
### Conducted Emission Measurement

File :BI1306001-3

Data :#14

Date: 2013-6-20

Time: 10:29:49



Site :ATT Conducted Emission Test Site (1)

Phase: **L1**

Temperature: 24

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

Humidity: 55 %

EUT: Touch Screen

M/N: SDW-424W1-M6L-I50-S0-PRD

Mode: Working

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure- ment dBuV/m	Limit dB	Over dB	Detector	Comment
1	*	0.1539	48.81	1.44	50.25	65.78	-15.53	QP	
2		0.1860	42.55	1.22	43.77	64.21	-20.44	QP	
3		0.2420	36.14	0.84	36.98	62.02	-25.04	QP	
4		0.5500	25.28	0.16	25.44	56.00	-30.56	QP	
5		4.7699	31.90	0.11	32.01	56.00	-23.99	QP	
6		6.0499	29.92	0.11	30.03	60.00	-29.97	QP	

\*:Maximum data    x:Over limit    !:over margin

## 3.2 RADIATED EMISSION MEASUREMENT

### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY RANGE OF RADIATED MEASUREMENT (For FCC)

☒ FCC Class B Limit at 3m

Frequency	Distance	Field Strength	
MHz	Meter	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 to 88	10	90	39.0
88 to 216	10	150	43.5
216 to 960	10	210	46.4
Above 960	10	300	49.5

### 3.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	SCHWARZBECK	VULB9168	VULB9168-192	01/03/2014
2	Pre-Amplifier	HP	8447F	3113A05680	12/27/2013
3	EMI Test Receiver	R&S	ESCI	101307	12/27/2013
4	Spectrum Analyzer	Agilent	E4407B	US40240708	07/30/2013
5	HORN Antenna	SCHWARZBECK	BBHA 9120D	BBHA 9120D 1065	12/27/2013
6	PRE-Amplifier	CY	EMC011830	980136	12/27/2013
7	Turn Table	UC	UC3000	N/A	N.C.R.
8	Antenna Mast	UC	UC3000	N/A	N.C.R.

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

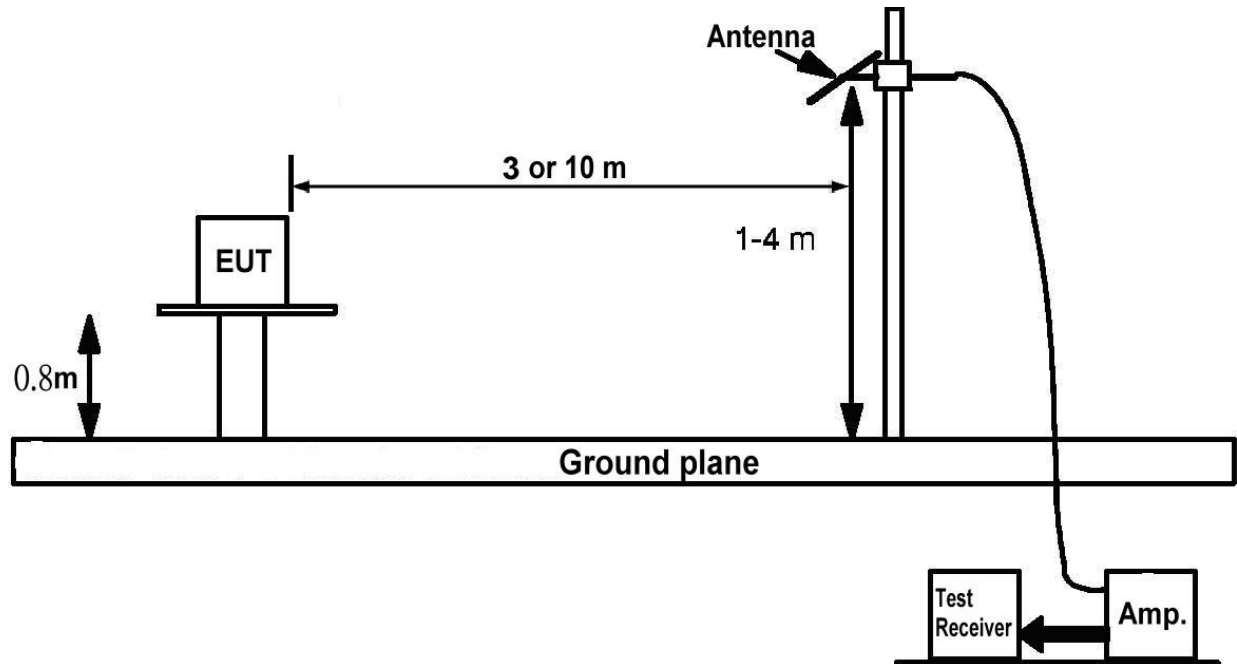
### 3.2.3 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation

### 3.2.5 TEST SETUP



### 3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.



**3.2.7 TEST RESULTS**

<b>EUT :</b>	Touch Screen	<b>Model No. :</b>	SDW-424W1-M6L-I50-S0-PRD
<b>Temperature :</b>	26 °C	<b>Relative Humidity :</b>	48 %
<b>Pressure :</b>	1009 hPa	<b>Test Power :</b>	AC 120V/60Hz
<b>Test Mode :</b>	Working		

**Remark :**

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note 』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measure-ment didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.



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### Radiated Emission Measurement

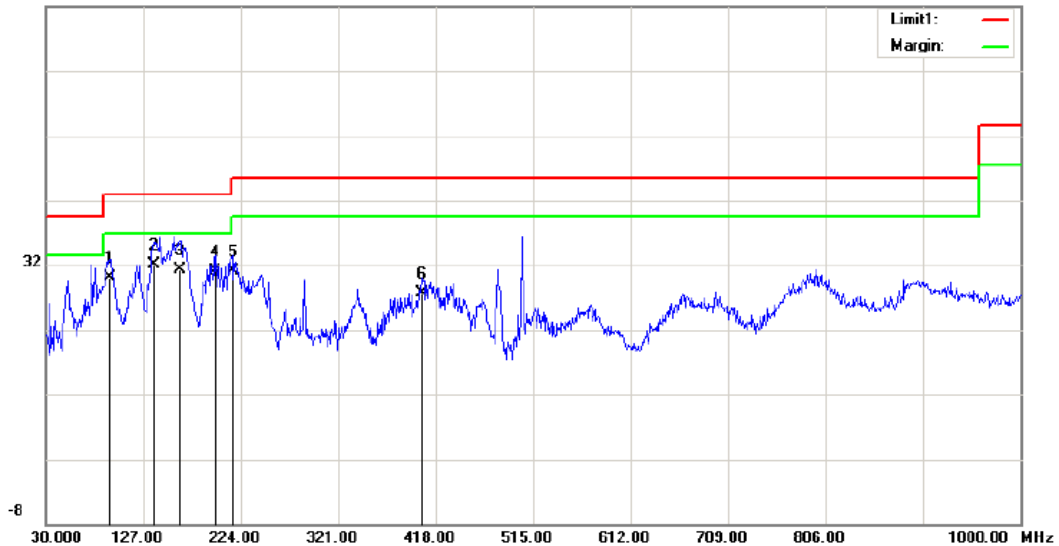
File :SI1306001-3

Data :#9

Date: 2013-6-19

Time: 下午 08:31:22

72.0 dBuV/m



Site :ATT Radiated Emission Test Site 3#

Polarization: **Horizontal**

Temperature: 26

Limit: (RE)FCC PART 15 class B 3m

Power: AC 120V/60Hz

Humidity: 60 %

EUT: Touch Screen

Distance: 3m

M/N: SDW-424W1-M6L-I50-S0-PRD

Mode: Working

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		94.0199	48.05	-18.04	30.01	43.00	-12.99	QP		
2	*	137.6699	45.19	-13.05	32.14	43.00	-10.86	QP		
3		163.8600	44.85	-13.49	31.36	43.00	-11.64	QP		
4		198.7800	46.05	-14.94	31.11	43.00	-11.89	QP		
5		216.2400	45.37	-14.25	31.12	45.50	-14.38	QP		
6		404.4200	35.08	-7.45	27.63	45.50	-17.87	QP		

\*:Maximum data x:Over limit !:over margin



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### Radiated Emission Measurement

File :SI1306001-3

Data :#10

Date: 2013-6-19

Time: 下午 08:34:31

72.0 dBuV/m



Site :ATT Radiated Emission Test Site 3#

Polarization: **Vertical**

Temperature: 26

Limit: (RE)FCC PART 15 class B 3m

Power: AC 120V/60Hz

Humidity: 60 %

EUT: Touch Screen

Distance: 3m

M/N: SDW-424W1-M6L-I50-S0-PRD

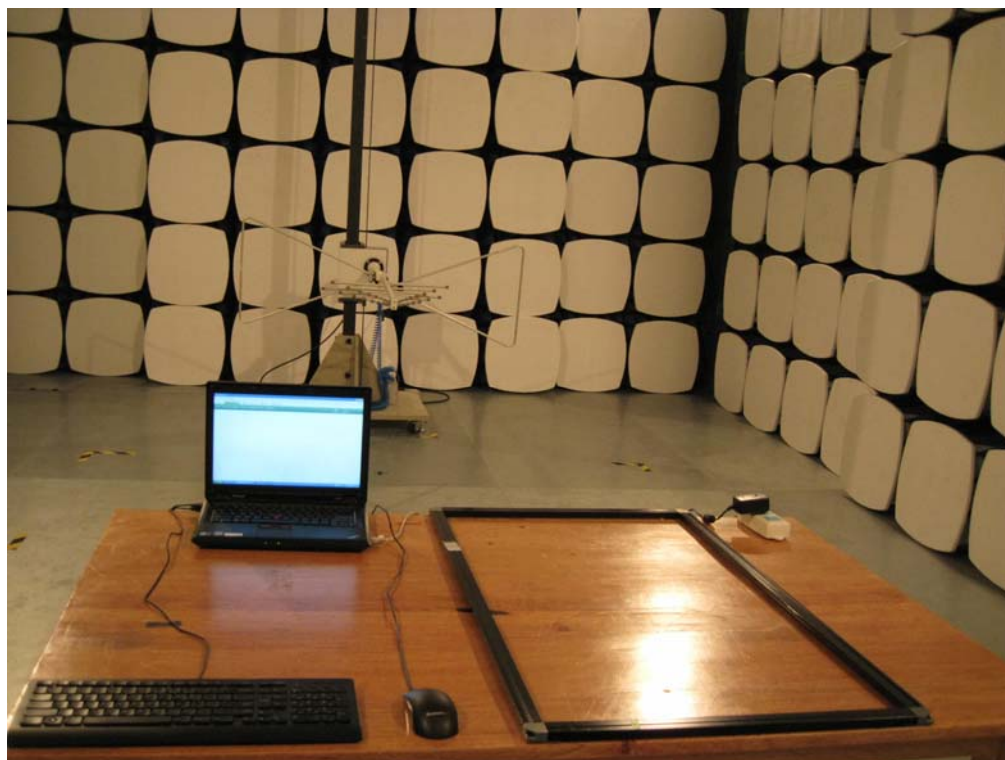
Mode: Working

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	39.7000	48.40	-14.82	33.58	39.50	-5.92	QP		
2		52.3100	44.10	-13.93	30.17	39.50	-9.33	QP		
3		75.5899	43.92	-15.39	28.53	39.50	-10.97	QP		
4		92.0799	43.65	-15.79	27.86	43.00	-15.14	QP		
5		148.3400	40.89	-15.56	25.33	43.00	-17.67	QP		
6		460.6800	31.19	-8.60	22.59	45.50	-22.91	QP		

\*:Maximum data x:Over limit !:over margin

**4. EUT TEST PHOTO****Conducted Measurement Photos**

**Radiated Measurement Photos**



**EUT Photo**







