



# EMC TEST REPORT

**Report No.:** SET2014-00080

**Product Name:** MID

**FCC ID:** 2AANFI8

**Model No. :** i8

**Applicant:** ShenZhen Ramos Digital Technology Co.,Ltd

**Address:** Room 1801-1805 & 1820, Block A XiNian Center, West of No. 9  
Tairan Road, ShenNan Road, Shenzhen, P.R. China 518040

**Received Date:** 2013-12-30

**Tested Date:** 2013-12-30—2014-1-5

**Issued by:** CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

**Lab Location:** Electronic Testing Building, Shahe Road, Xili, Nanshan District,  
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## Test Report

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China 518040


**Manufacturer**..... : ShenZhen Ramos Digital Technology Co.,Ltd


**Manufacturer Address** ..... : Room 1801-1805 & 1820, Block A XiNian Center, West of  
No. 9 Tairan Road, ShenNan Road, Shenzhen, P.R.  
China 518040

**Test Standards** ..... : 47 CFR Part 15 Subpart B: Radio Frequency Devices

**Test Result** ..... : PASS

**Tested by** ..... :   
2014.1.6  
Xiaolong Zhang, Test Engineer

**Reviewed by**..... :   
2014.1.6  
Shuangwen Zhang, Senior Engineer

**Approved by** ..... :   
2014.1.6  
Wu Li'an, Manager

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Change History		
Issue	Date	Reason for change
1.0	Jan 6,2014	First edition



## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Type ..... : MID  
Serial No..... : (n.a, marked #1 by test site)  
FCC ID ..... : 2AANFI8  
Hardware Version..... : ANZHEN\_MB\_V2P0  
Software Version ..... : 18700  
Power Supply ..... : Battery  
Brand Name: LSA  
Model No.: IP3069152  
Serial No.: (n.a. marked #1 by test site)  
Capacitance: 4200mA,  
Rated Voltage: 3.7V  
Charge Limit: 4.22V  
Ancillary Equipment 1 ..... : AC Adapter (Charger for Battery)  
Brand Name: SOY  
Model Name: SUN-0500200  
Serial No.: (n.a. marked #1 by test site)  
Rated Input: 100-240V, 60/50Hz,0.3A  
Rated Output: 5V=2000mA  
Ancillary Equipment 2..... : PC  
Brand Name:ThinkPad  
Model Name:E420  
Serial No.:1141AH6

*Note 1:* The EUT is a MID, it supports WIFI (802.11b,802.11g,802.11n/20M) ,1.5GHzGPS and Bluetooth3.0+EDR.

*Note 2:* The EUT is equipped with a T-Flash card slot; equipped with a USB port which can be connected to the ancillary equipments supplied by the manufacturer e.g. the AC Adapter and the USB Cable.

*Note 3:* For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

## 1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B 2012	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.107	Conducted Emission	PASS
2	15.109	Radiated Emission	PASS

NOTE: The EUT has been tested according to 47 CFR Part 15 Subpart B, Class B. The test procedure is according to ANSI C63.4:2009 and CISPR 22:2008. The test results are as following:



### 1.3 Facilities and Accreditations

#### 1.3.1 Facilities

**CNAS-Lab Code: L1659**

CCIC-SET Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8\*6.8\*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

**FCC-Registration No.: 406086**

CCIC-SET Southern Electronic Product Testing (Shenzhen) Co., Ltd. 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. Registration 406086, Renewal date Nov. 19, 2011, valid time is until Nov. 18, 2014.

#### 1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C - 35°C
Relative Humidity (%):	30% - 60%
Atmospheric Pressure (kPa):	86KPa-106KPa

#### 1.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	Uc = 3.6 dB (k=2)
Uncertainty of Radiated Emission:	Uc = 4.5 dB (k=2)

## **2. TEST CONDITIONS SETTING**

### **2.1 Test Mode**

- (1) The first test mode (USB)

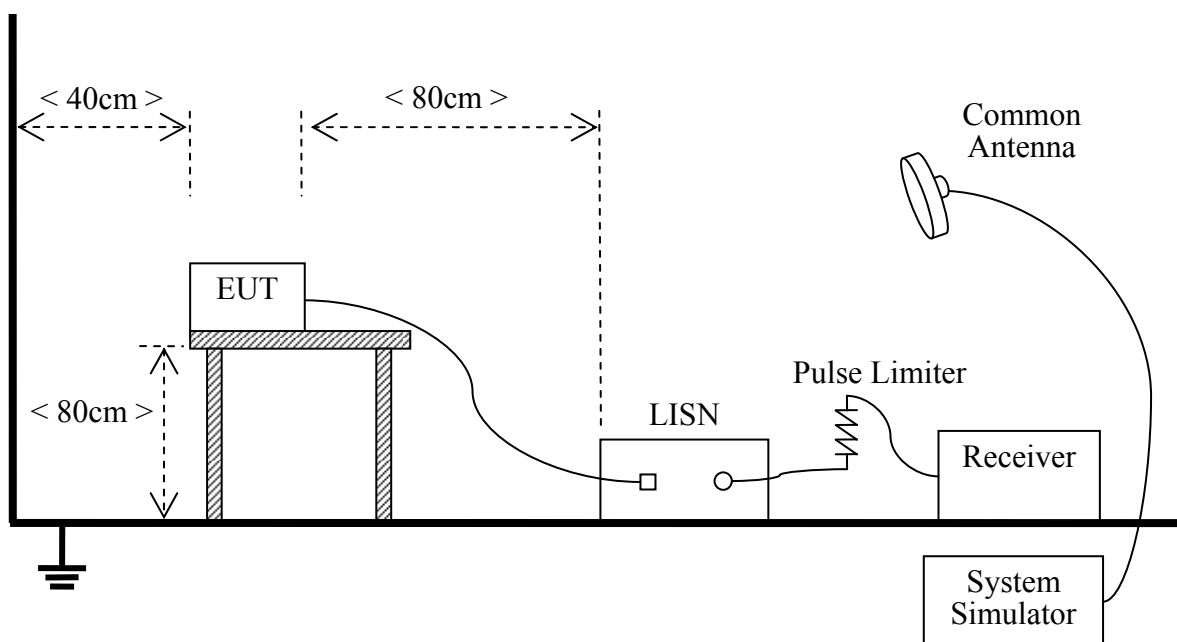
The EUT configuration of the emission tests is TransFlash Card + EUT + Battery + PC.

In this test mode, the EUT with a TransFlash Card embedded is connected with a PC via a USB cable supplied by applicant. During the measurement, the data is transmitting between the PC and the TransFlash Card of the EUT.

## 2.2 Test Setup and Equipments List

### 2.2.1 Conducted Emission

#### A. Test Setup:



The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. The Common Antenna is used for the call between the EUT and the System Simulator (SS). A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

#### B. Equipments List:

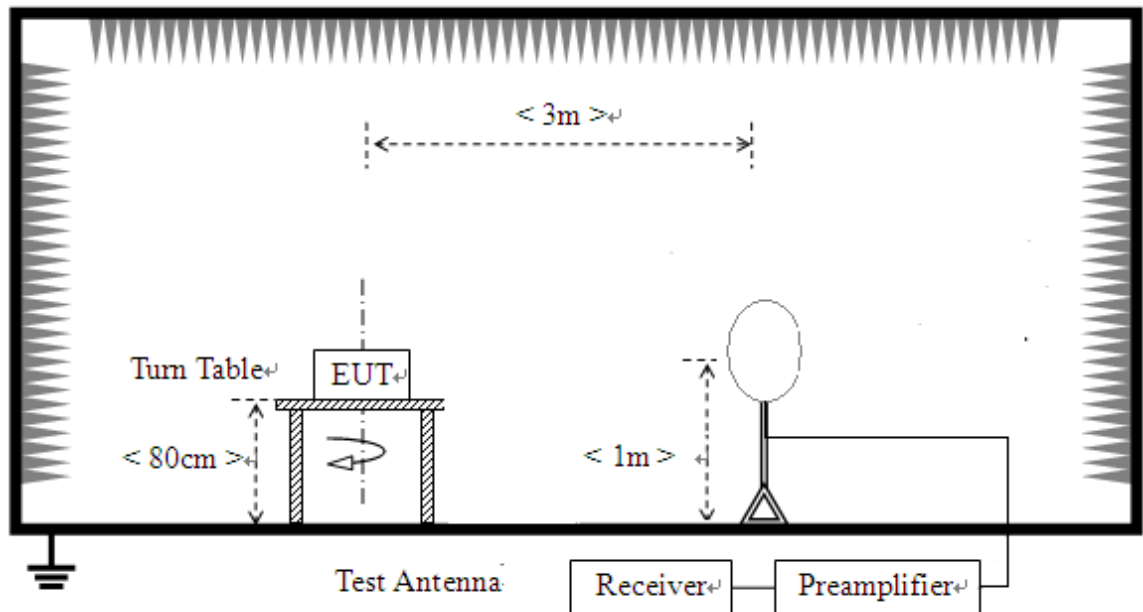
Description	Manufacturer	Model	Serial No.	Calibration Due. Date
Test Receiver	Schwarzbeck	FCKL1528	A0304230	2014.06.10
LISN	Schwarzbeck	NSLK8127	A0304233	2014.06.10

### 2.2.2 Radiated Emission

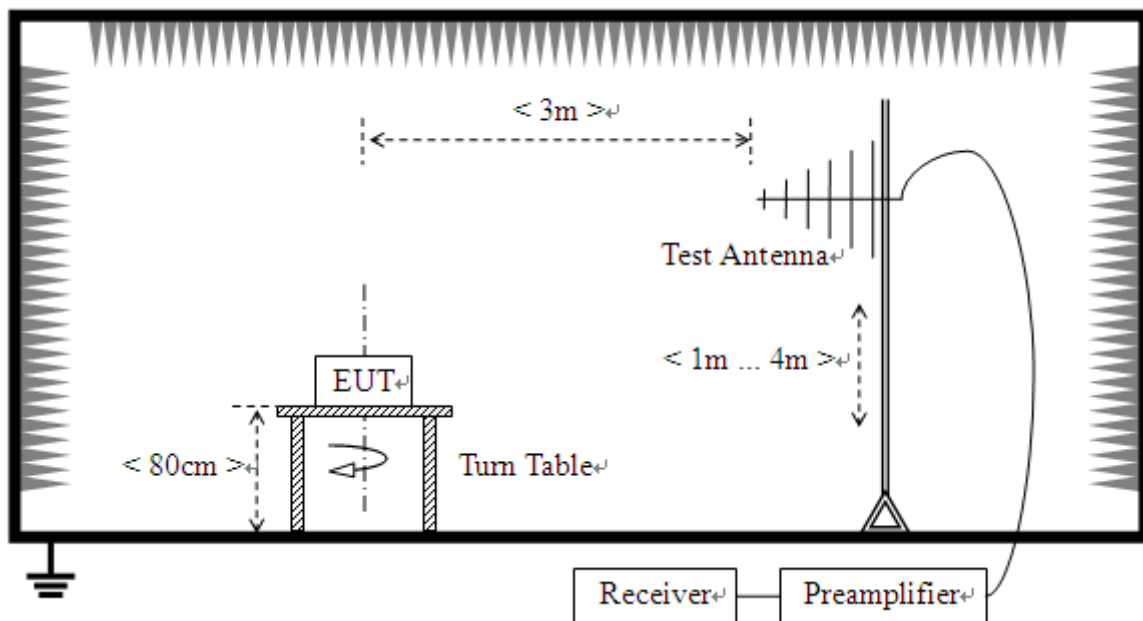
#### A. Test Setup:

- 1) For radiated emissions from 9kHz to 30MHz

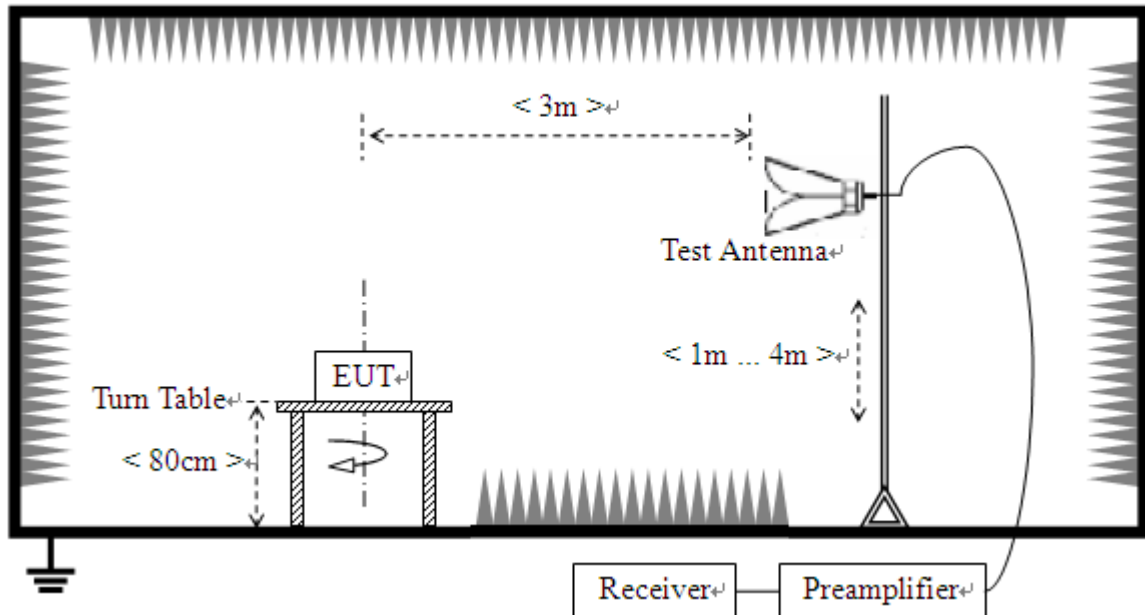




2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



## B. Test Procedure

The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

- 1) In the frequency range of 9KHz to 30MHz, magnetic field is measured with Loop Test Antenna.

The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

- 2) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are 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 emission levels at both horizontal and vertical polarizations should be tested.

## C. Equipments List:



Description	Manufacturer	Model	Serial No.	Calibration Due. Date
Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2014.06.10
Test Receiver	ROHDE&SCHWARZ	ESIB26	A0304218	2014.06.10
Semi-Anechoic Chamber	Albatross Projects GmbH	9m*6m*6m	A0412372	2015.01.04
Test Antenna - Bi-Log	HP	CBL6111A	A9704202	2014.06.10
Test Antenna - Horn	ROHDE&SCHWARZ	HF906	A0304225	2014.06.10
Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4 m	A0304210	2014.03.09
Amplifier 1G~18GHz	ROHDE&SCHWARZ	MITEQ AFS42-0010 1800	A0509366	2014.06.10
Amplifier 20M~3GHz	Compliance Direction System	PAP-0203H	A0509377	2014.06.10

### 3. 47 CFR PART 15B REQUIREMENTS

#### 3.1 Conducted Emission

##### 3.1.1 Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50- 5	56	46
5 - 30	60	50

NOTE:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

##### 3.1.2 Test Description

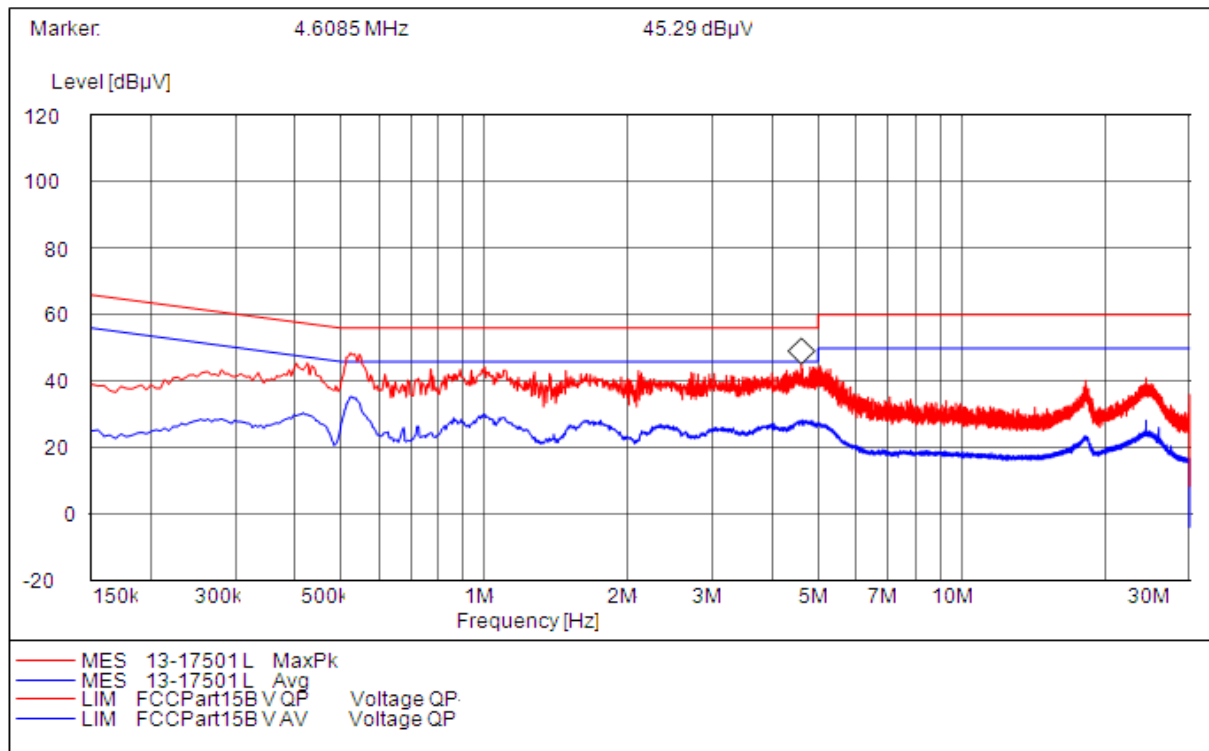
See section 2.2.1 of this report.

##### 3.1.3 Test Result

The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

##### 3.1.3.1 Test Mode

### A. Test Plot and Suspicious Points:



### Conducted Disturbance at Mains Terminals

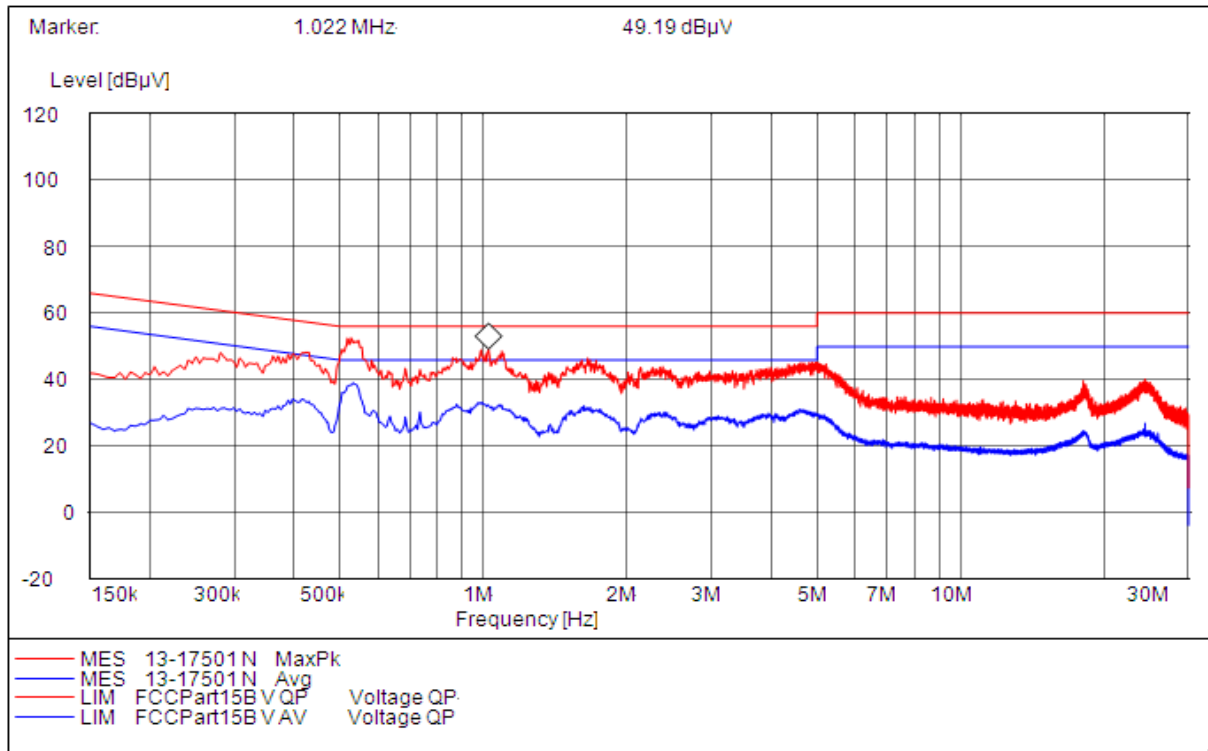
#### L Test Data

QP				AV			
Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Margin (dB)	Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Margin (dB)
0.4148	57.60	40.20	17.40	0.4148	47.60	30.05	17.55
0.5203	56	43.53	12.47	0.5203	46	34.39	11.61
4.6067	56	36.43	19.57	4.6067	46	27.57	18.43

#### L Test Curve

(Plot A: L Phase)

## B. Test Plot and Suspicious Points:



Conducted Disturbance at Mains Terminals							
N Test Data							
QP				AV			
Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Margin (dB)	Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Margin (dB)
0.4170	57.50	43.40	14.10	0.4170	47.50	33.71	13.79
0.5160	56	47.66	8.34	0.5160	46	37.88	8.12
1.0209	56	42.75	13.25	1.0209	46	31.88	14.12
N Test Curve							

(Plot B: N Phase)

**Test Result: PASS**

## 3.2 Radiated Emission

### 3.2.1 Requirement

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength		Field Strength Limitation at 3m Measurement Dist	
	$\mu\text{V/m}$	Dist	( $\text{uV/m}$ )	( $\text{dBuV/m}$ )
0.009 - 0.490	$2400/F(\text{KHz})$	300m	$10000 * 2400/F(\text{KHz})$	$20\log 2400/F(\text{KHz}) + 80$
0.490 - 1.705	$2400/F(\text{KHz})$	30m	$100 * 2400/F(\text{KHz})$	$20\log 2400/F(\text{KHz}) + 40$
1.705 - 30.00	30	30m	$100 * 30$	$20\log 30 + 40$
30.0 - 88.0	100	3m	100	$20\log 100$
88.0 - 216.0	150	3m	150	$20\log 150$
216.0 - 960.0	200	3m	200	$20\log 200$
Above 960.0	500	3m	500	$20\log 500$

- As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.
- 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.
- For below 1G :QP detector RBW 120KHz ,VBW 300KHz.
- For Above 1G: PK detector RBW 1MHz,VBW 3MHz for PK value ;PK detector RBW 1MHz, VBW 10Hz for AV value.

Note:

- The tighter limit shall apply at the boundary between two frequency range.
- Limitation expressed in  $\text{dBuV/m}$  is calculated by  $20\log \text{Emission Level}(\text{uV/m})$ .
- If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of  $Ld1 = Ld2 * (d2/d1)^2$ .

Example:

F.S Limit at 30m distance is  $30\text{uV/m}$ , then F.S Limitation at 3m distance is adjusted as

$$Ld1 = L1 = 30\text{uV/m} * (10)^2 = 100 * 30\text{uV/m}.$$

### 3.2.2 Test Description

See section 2.2.2 of this report.

### 3.2.3 Test Result

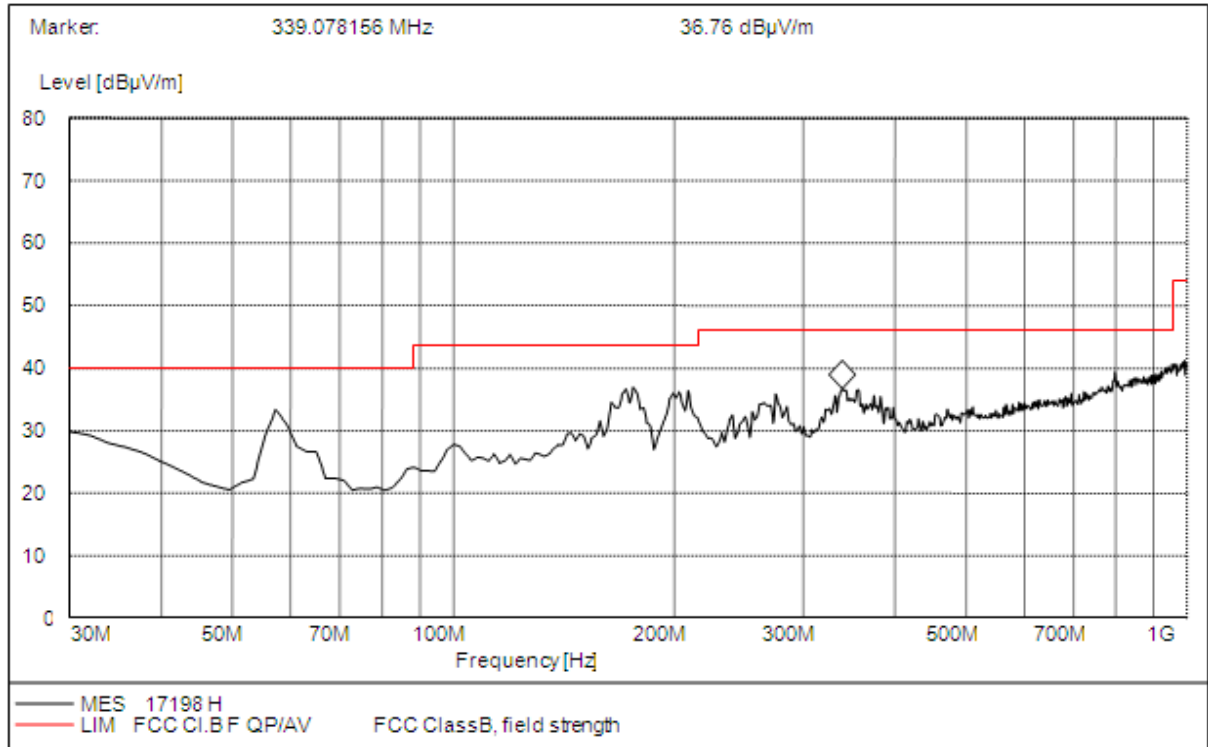
The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

#### A. Test Plots and Suspicious Points:

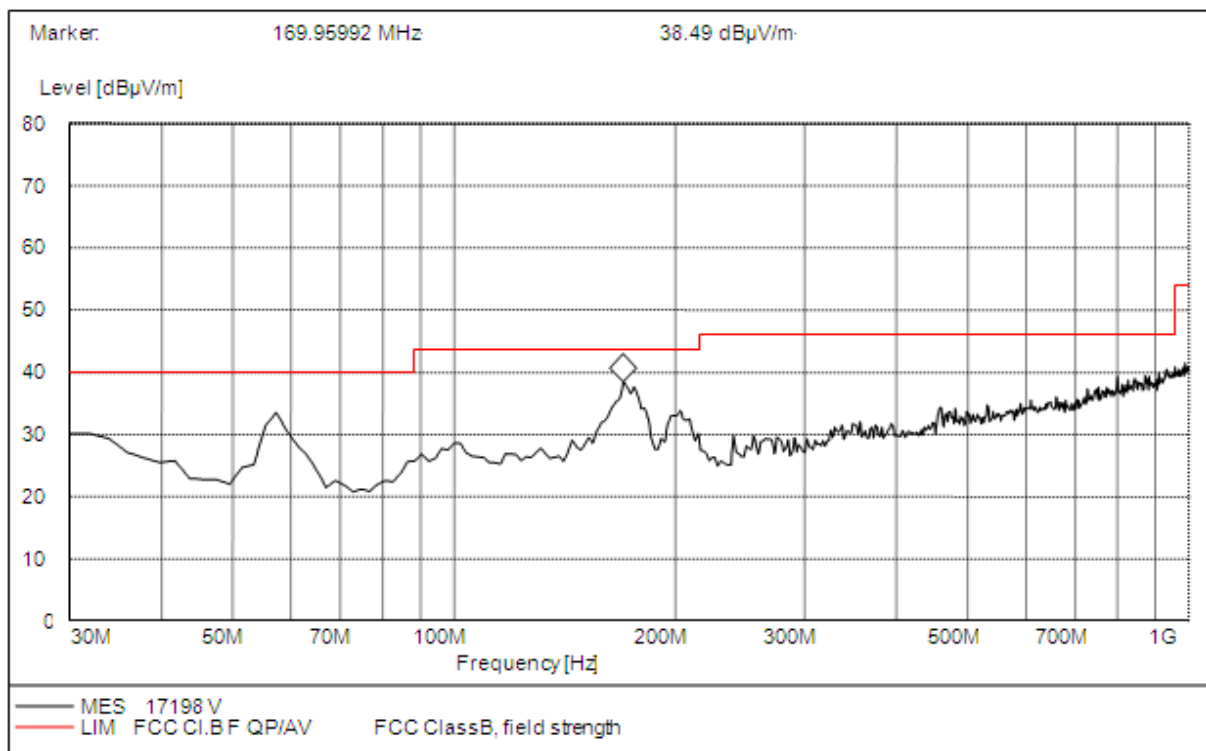
NOTE: The emissions are too small to be measured and are at least 6 dB below the limit, So all the data of marked are pass.





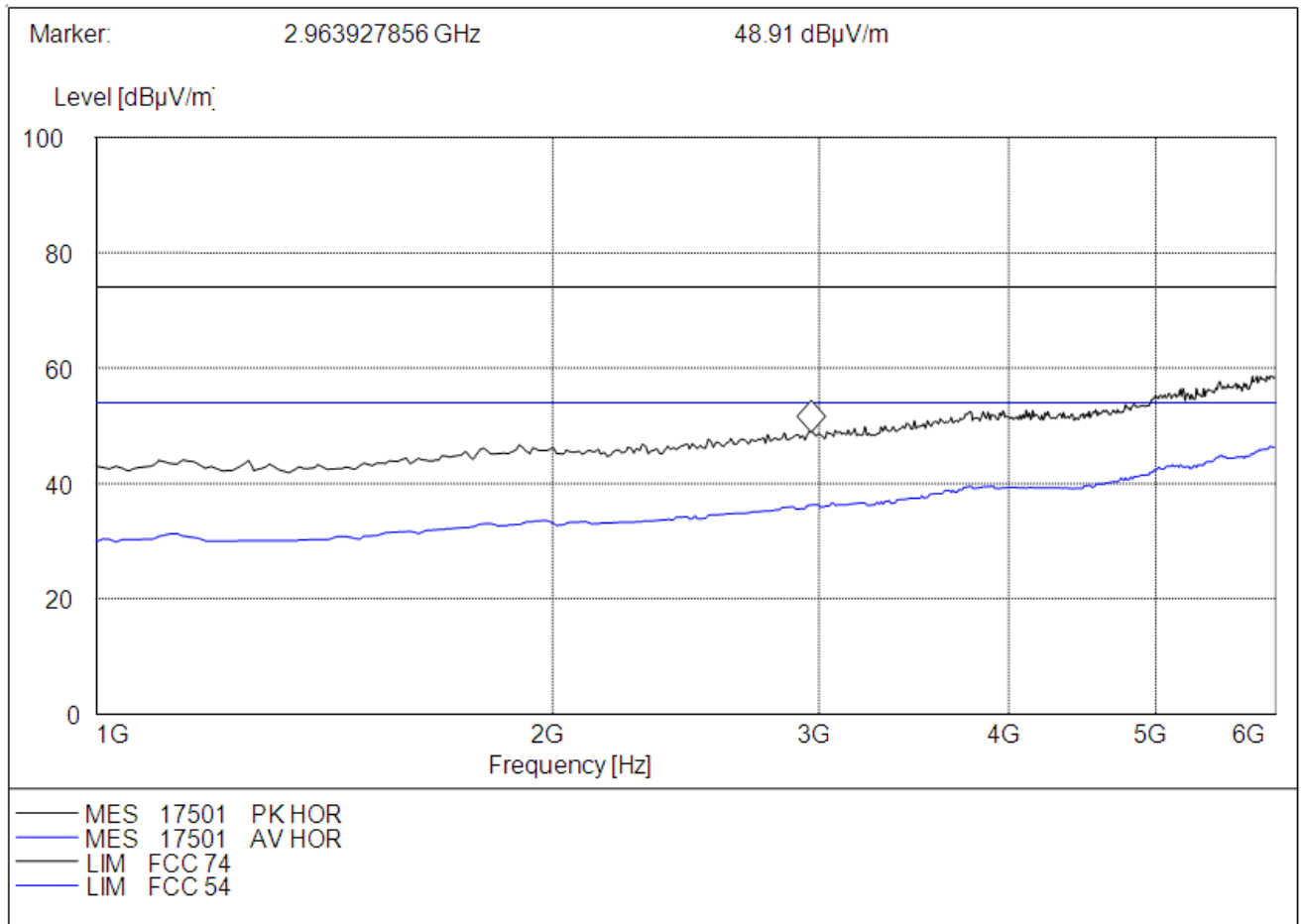
(Plot A: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
57.214400	33.36	120.000	100.0	40.00	6.64	Vertical	Pass
175.791580	36.94	120.000	100.0	43.50	6.56	Vertical	Pass
339.078000	36.76	120.000	100.0	46.00	9.24	Vertical	Pass



(Plot B: Test Antenna Vertical 30M - 1G)

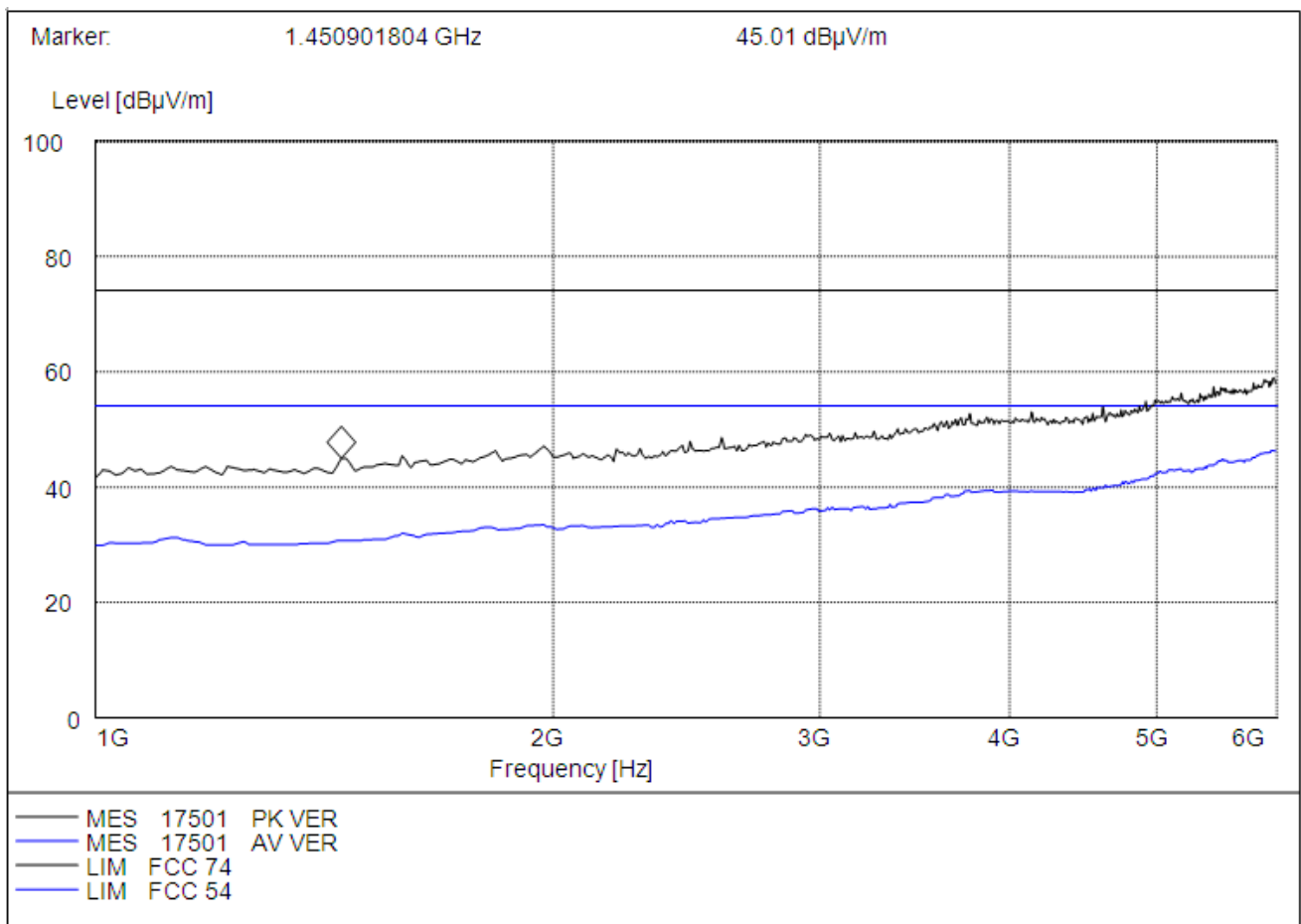
Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
57.214400	33.55	120.000	100.0	40.00	6.45	Horizontal	Pass
169.959900	38.49	120.000	100.0	43.50	5.01	Horizontal	Pass
459.599100	34.40	120.000	100.0	46.00	11.60	Horizontal	Pass



(Plot C: Test Antenna Horizontal 1G – 6G)

Frequency (MHz)	AV (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
1180.18236	30.23	1000.000	100.0	54.00	23.77	Horizontal	Pass
1592.51200	30.61	1000.000	150.0	54.00	23.39	Horizontal	Pass
1864.62200	33.81	1000.000	150.0	54.00	20.19	Horizontal	Pass
2443.88577	37.71	1000.000	100.0	54.00	16.29	Horizontal	Pass
5045.62440	41.68	1000.000	150.0	54.00	12.32	Horizontal	Pass
5970.93882	43.68	1000.000	100.0	54.00	10.32	Horizontal	Pass

Frequency (MHz)	PK (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
1180.18236	42.20	1000.000	100.0	74.00	31.70	Horizontal	Pass
1592.51200	42.98	1000.000	150.0	74.00	31.02	Horizontal	Pass
1864.62200	44.56	1000.000	150.0	74.00	29.43	Horizontal	Pass
2443.88577	47.98	1000.000	100.0	74.00	26.02	Horizontal	Pass
5045.62440	50.28	1000.000	150.0	74.00	23.72	Horizontal	Pass
5970.93882	57.53	1000.000	100.0	74.00	16.47	Horizontal	Pass



(Plot D: Test Antenna Vertical 1G – 6G)



Frequency (MHz)	AV (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
1062.12300	30.58	1000.000	150.0	54.00	23.42	Vertical	Pass
1780.34100	33.43	1000.000	150.0	54.00	20.52	Vertical	Pass
2411.14200	34.19	1000.000	150.0	54.00	19.81	Vertical	Pass
2874.74549	36.49	1000.000	180.0	54.00	17.51	Vertical	Pass
3390.11256	37.51	1000.000	150.0	54.00	16.49	Vertical	Pass
5921.82347	43.65	1000.000	100.0	54.00	10.35	Vertical	Pass

Frequency (MHz)	PK (dB $\mu$ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna	Verdict
1062.12300	42.60	1000.000	100.0	74.00	31.40	Horizontal	Pass
1780.34100	45.68	1000.000	150.0	74.00	28.32	Horizontal	Pass
2411.14200	46.27	1000.000	150.0	74.00	30.73	Horizontal	Pass
2874.74549	48.61	1000.000	100.0	74.00	25.39	Horizontal	Pass
3390.11256	50.89	1000.000	150.0	74.00	23.11	Horizontal	Pass
5921.82347	57.46	1000.000	100.0	74.00	16.54	Horizontal	Pass

#### 4. TEST RESULT: PASS PHOTOGRAPHS OF THE EUT





## 5. PHOTOGRAPHS OF THE TEST SET-UP



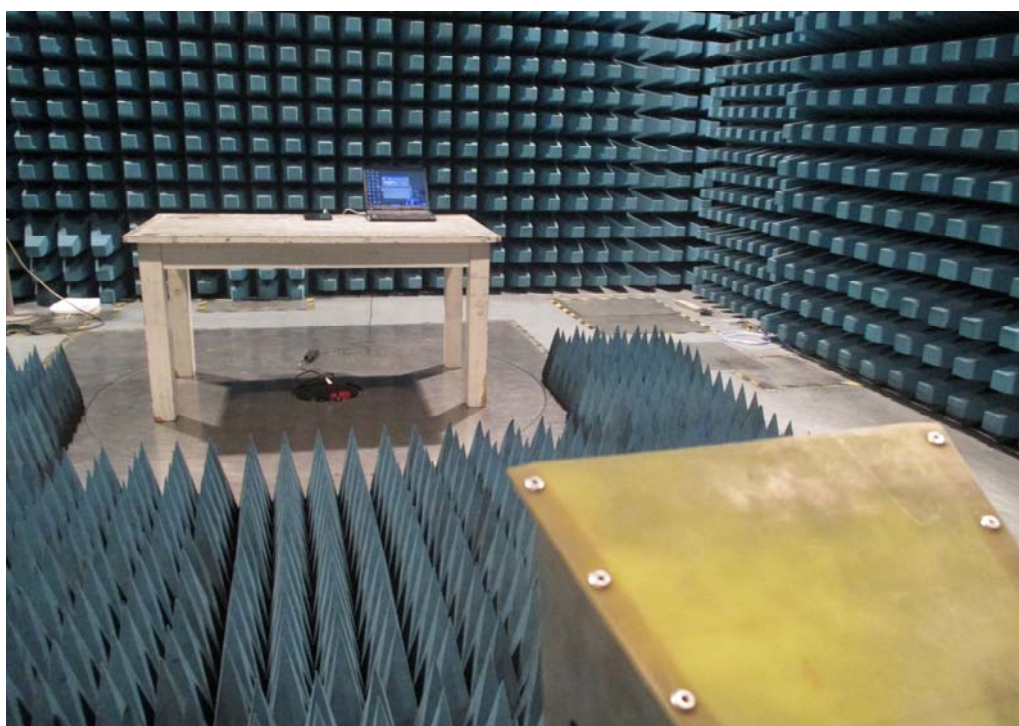
Conducted Emission



Radiated Emission of 9k-30M



Radiated Emission of 30M-1G



Radiated Emission of 1-6G

**\*\* END OF REPORT \*\***