



EMC TEST REPORT

Report No.: SET2013-05673

Product Name: GALAPAD9

FCC ID: Y3GGALAPAD9G3

Model No. : GALAPAD9

Applicant: Galaxy Microsystems Ltd.

Address: Room 1101-1103, 11/F, Enterprise Square Two, 3 Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

Received Date: 2013-08-22

Tested Date: 2013-08-23—2013-09-10

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

Lab Location: Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China

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Test Report

Product Name.....: GALAPAD9

Model No.: GALAPAD9

Applicant.....: Galaxy Microsystems Ltd.

Applicant Address: Room 1101-1103, 11/F, Enterprise Square Two, 3
Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

Manufacturer: XiangDe electronic technology (Shen Zhen)Co.,LTD

Manufacturer Address: Room 1101-1103, 11/F, Enterprise Square Two, 3
Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

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

Test Result.....: PASS

Tested by: Xiaolong Zhang Sep. 29. 2013
Xiaolong Zhang, Test Engineer

Reviewed by: Shuangwen Zhang Sep, 29 2013
Shuangwen Zhang, Senior Engineer

Approved by: Wu Li'an Sep, 29 2013
Wu Li'an, Manager

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Change History		
Issue	Date	Reason for change
1.0	Sep16,2013	First edition



1.1 EUT Description

Note 1: The EUT is a GALAPAD9, it supports WIFI (802.11b,802.11g,802.11n/20M, 11n/40M) .

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.

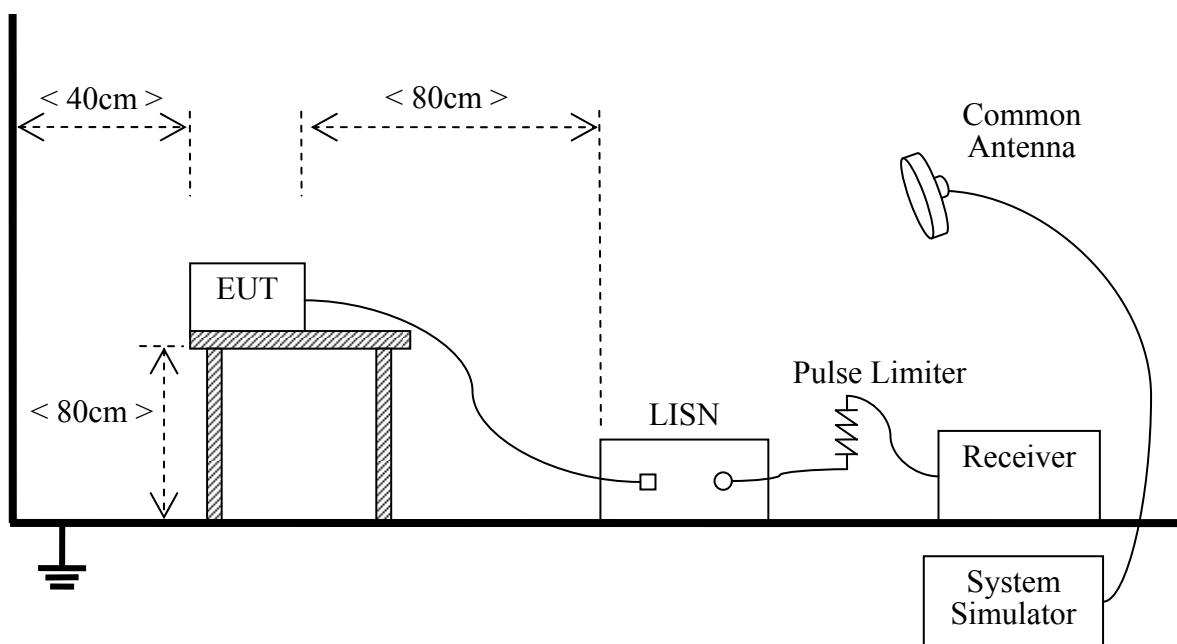
In this test mode, the EUT with a TransFlash Card embedded is connected with a PC via a USB cable supplied by applicant. During the measurement, the data is transmitting between the PC and the TransFlash Card of the EUT.

NOTE: All test modes are performed, only the worst cases are recorded in this report.

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 $50\Omega/50\mu\text{H}$ 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:

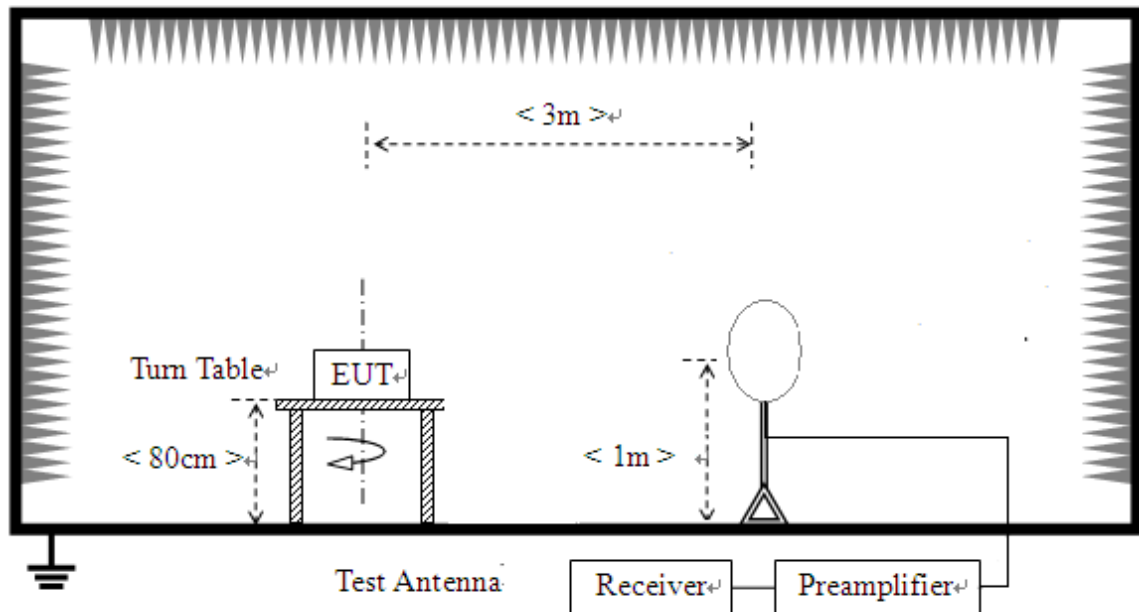
Description	Manufacturer	Model	Serial No.	Cal. Date
Test Receiver	Schwarzbeck	FCKL1528	A0304230	2014.06.10
LISN	Schwarzbeck	NSLK8127	A0304233	2014.06.10

The Cal. Interval was one year.

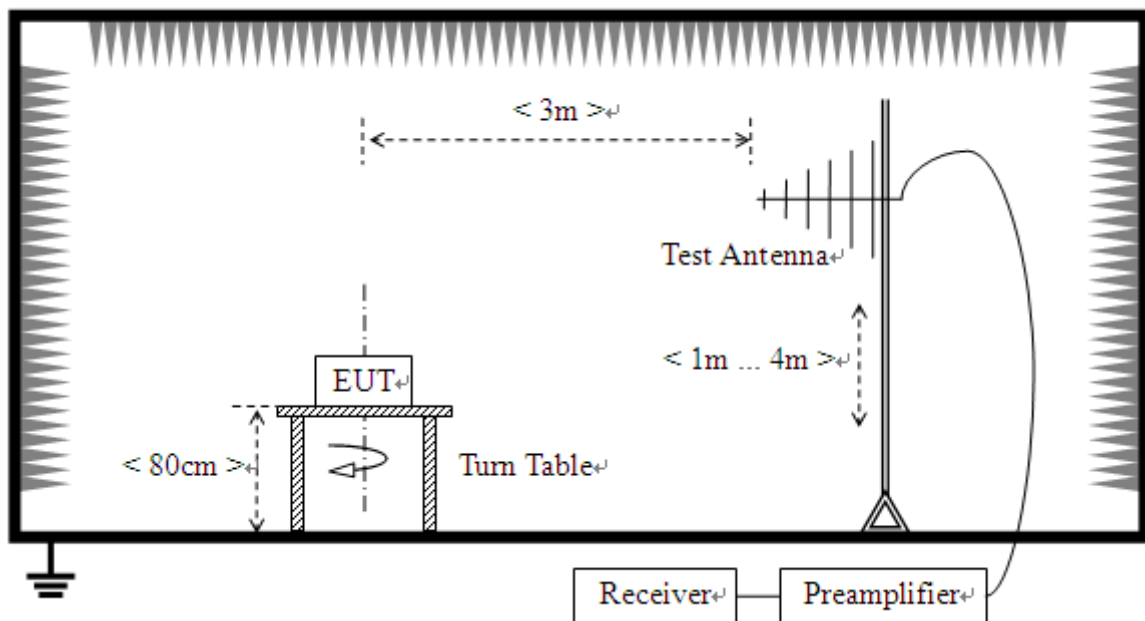
2.2.2 Radiated Emission

A. Test Setup:

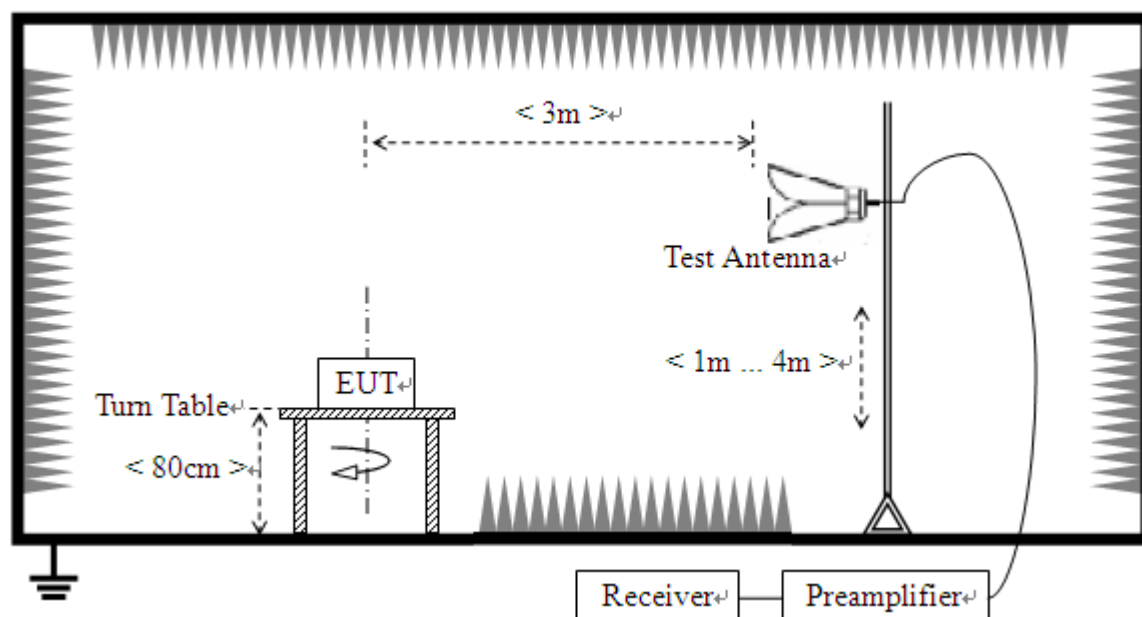
- 1) For radiated emissions from 9kHz to 30MHz



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.	Cal. Date
Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2013.06.10
Test Receiver	ROHDE&SCHWARZ	ESIB26	A0304218	2013.06.10
Semi-Anechoic Chamber	Albatross Projects GmbH	9m*6m*6m	A0412372	2013.01.04



Description	Manufacturer	Model	Serial No.	Cal. Date
Test Antenna - Bi-Log	HP	CBL6111A	A9704202	2013.06.10
Test Antenna - Horn	ROHDE&SCHWARZ	HF906	A0304225	2013.06.10
Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4 m	A0304210	2013.03.09
Amplifier 1G~18GHz	ROHDE&SCHWARZ	MITEQ AFS42-0010 1800	25-S-42	2013.06.10
Amplifier 20M~3GHz	Compliance Direction System	PAP-0203H	22018	2013.06.10

The Cal. Interval was one year.

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 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ 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.

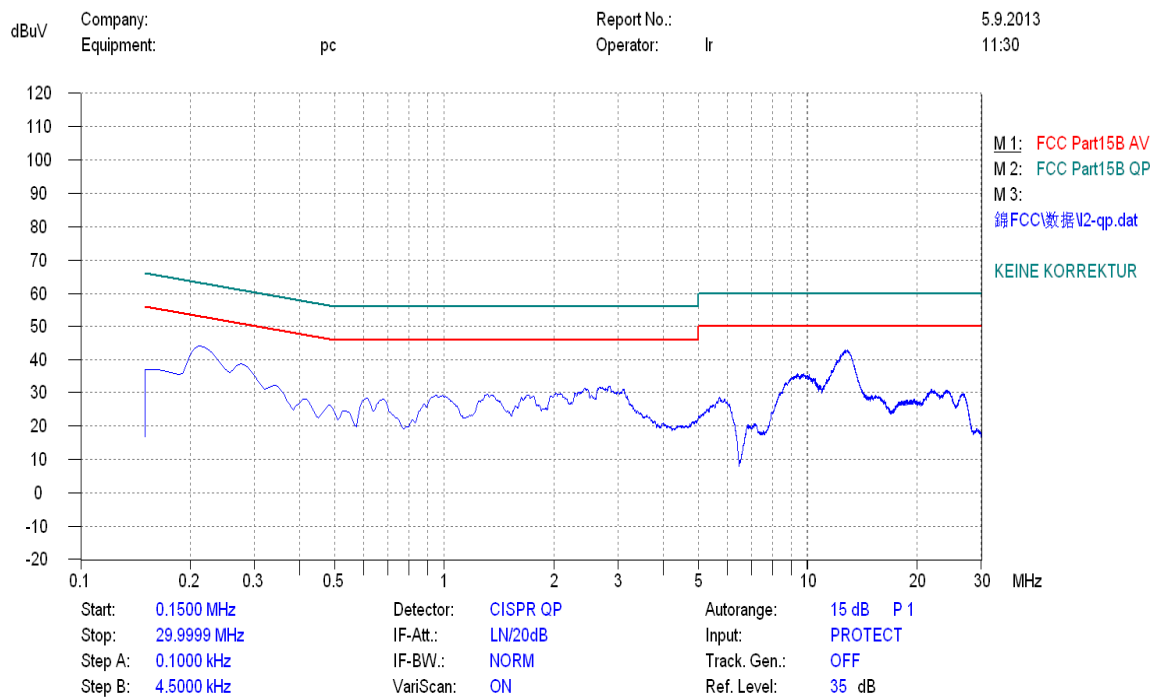
3.1.3 Test Result

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

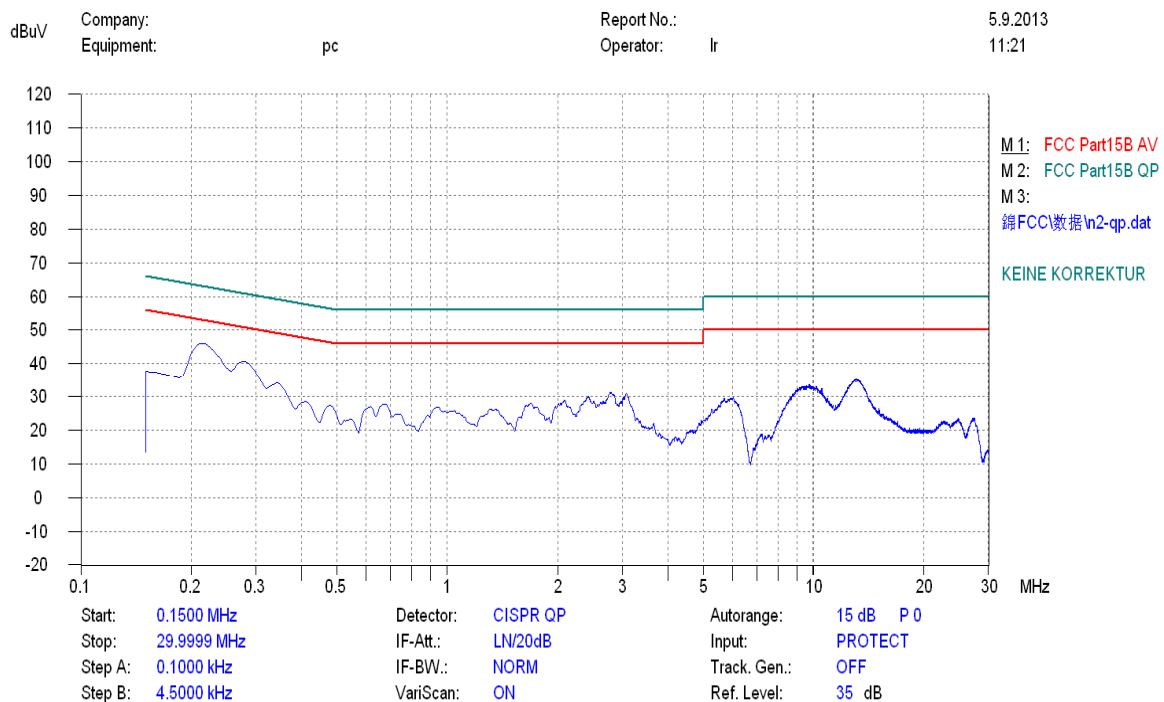


A. Test Plot and Suspicious Points:



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)
0.2190	62.9	44.80	18.10	0.4290	52.9	--	--
2.8172	56	30.52	25.48	2.8172	46	--	--
13.9170	60	42.90	17.10	13.9170	50	--	--
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)
0.2190	62.9	44.60	18.30	0.2190	52.9	--	--
2.8172	56	30.42	25.58	2.8172	46	--	--
13.9170	60	34.52	25.48	13.9170	50	--	--
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	($\mu\text{V/m}$)	(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.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dBuV/m is calculated by $20\log \text{Emission Level}(\mu\text{V/m})$.
- 3) 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 $30\mu\text{V/m}$, then F.S Limitation at 3m distance is adjusted as

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

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

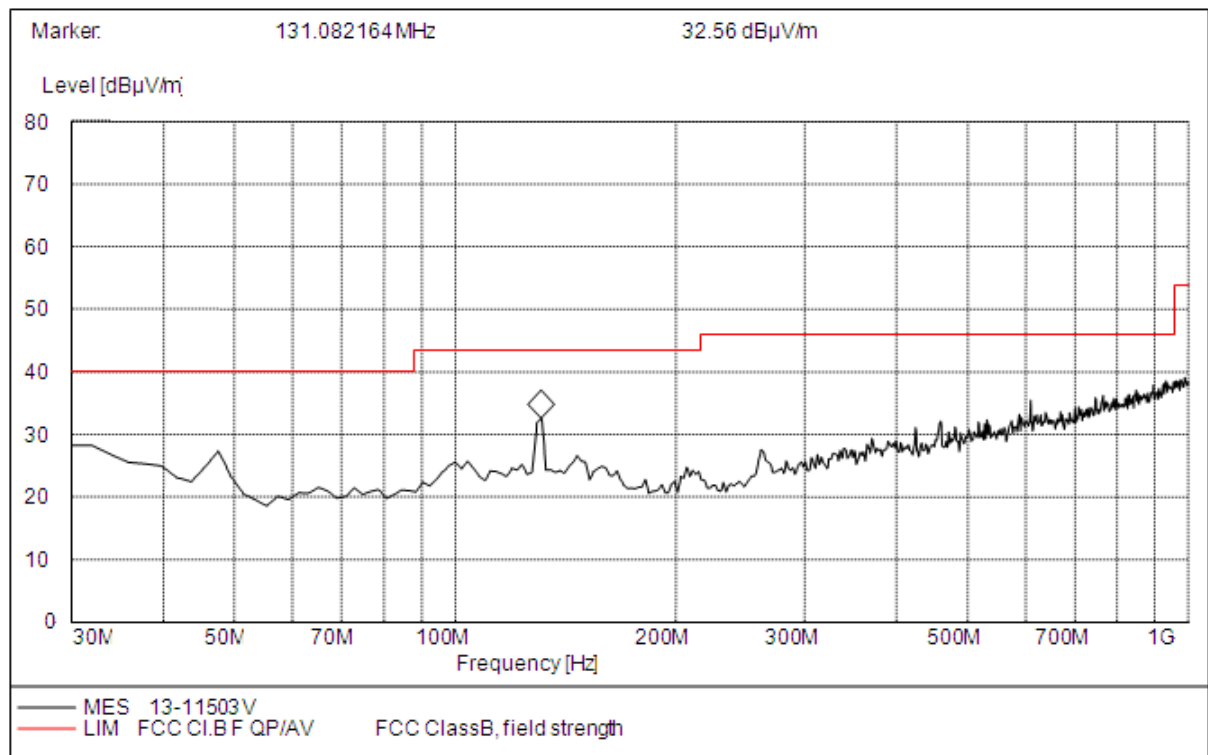
QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

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.

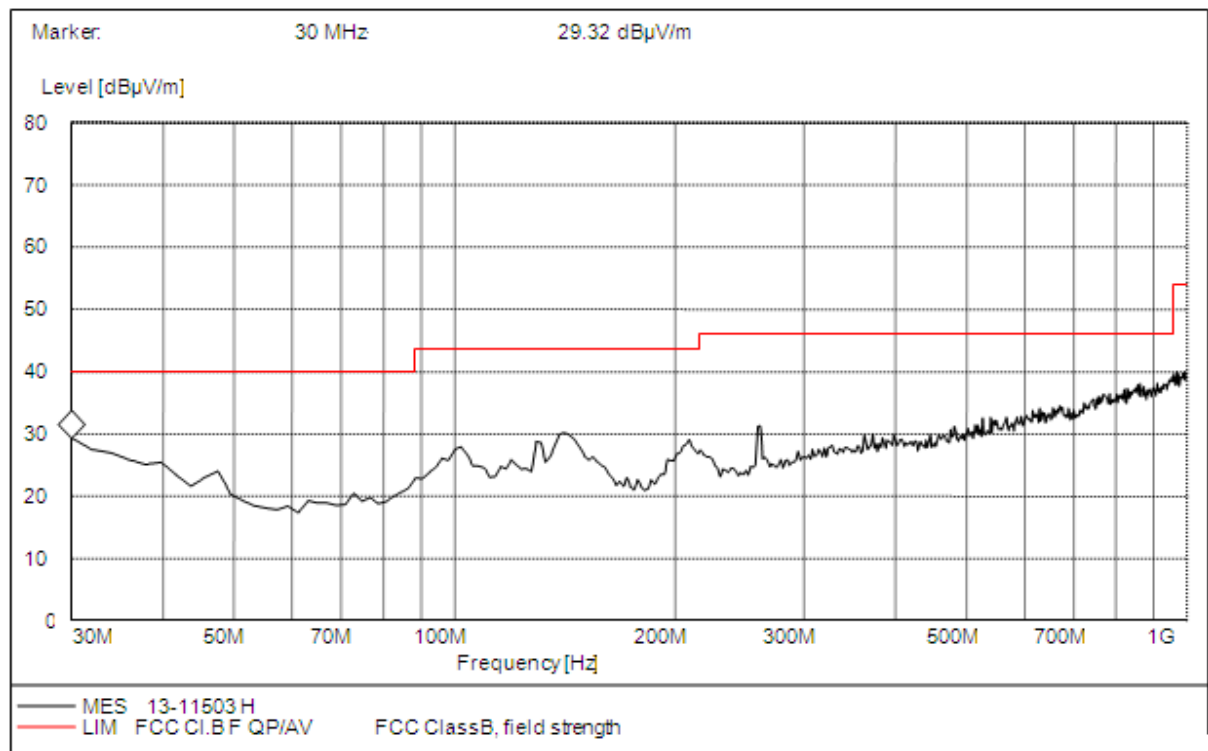
A. Test Plots and Suspicious Points:

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.



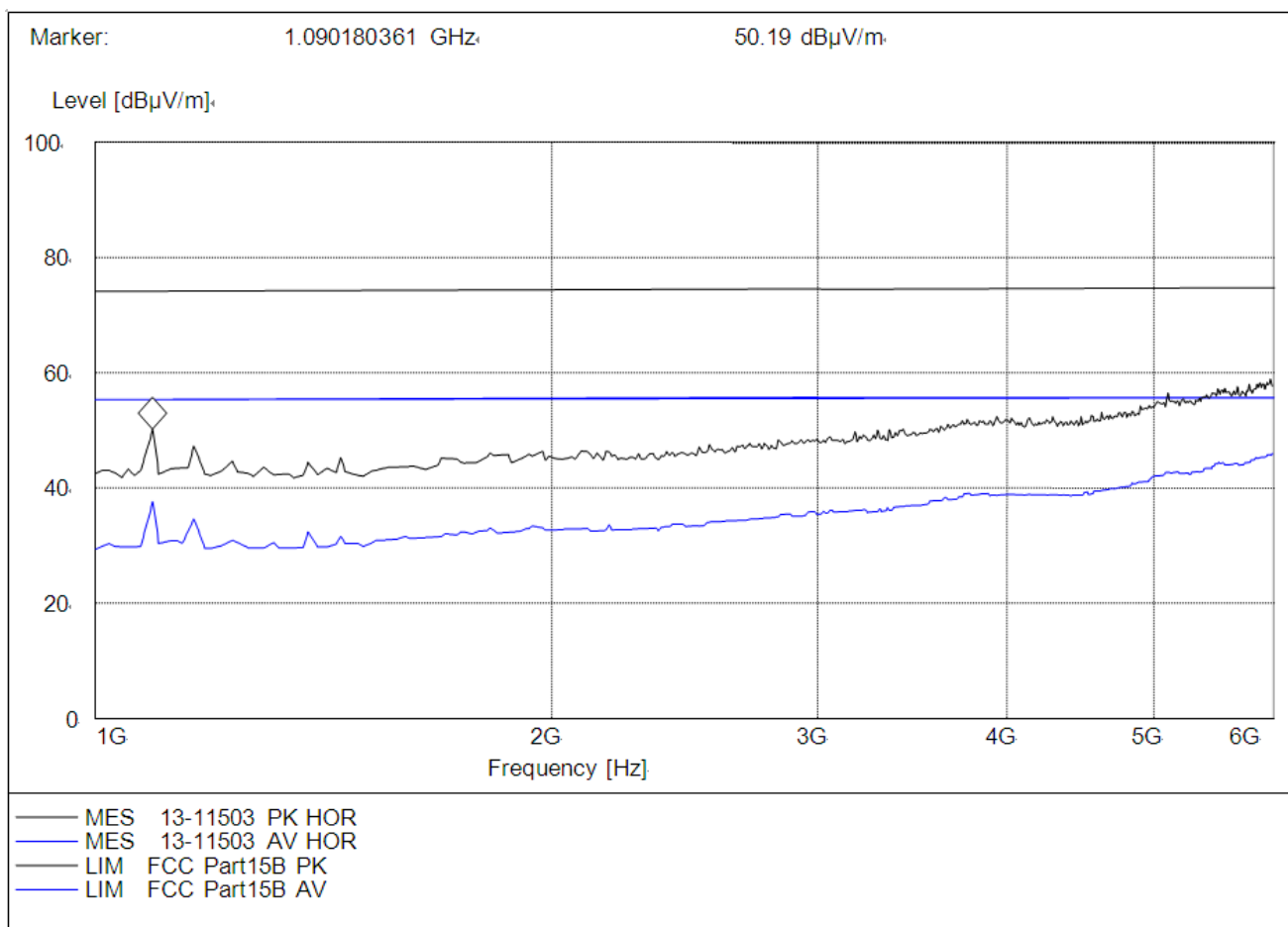
(Plot A: Test Antenna Vertical 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
30.109419	28.01	120.000	100.0	40.00	11.99	Vertical	Pass
131.082164	29.28	120.000	100.0	43.50	14.22	Vertical	Pass
611.042623	34.78	120.000	100.0	46.00	11.22	Vertical	Pass



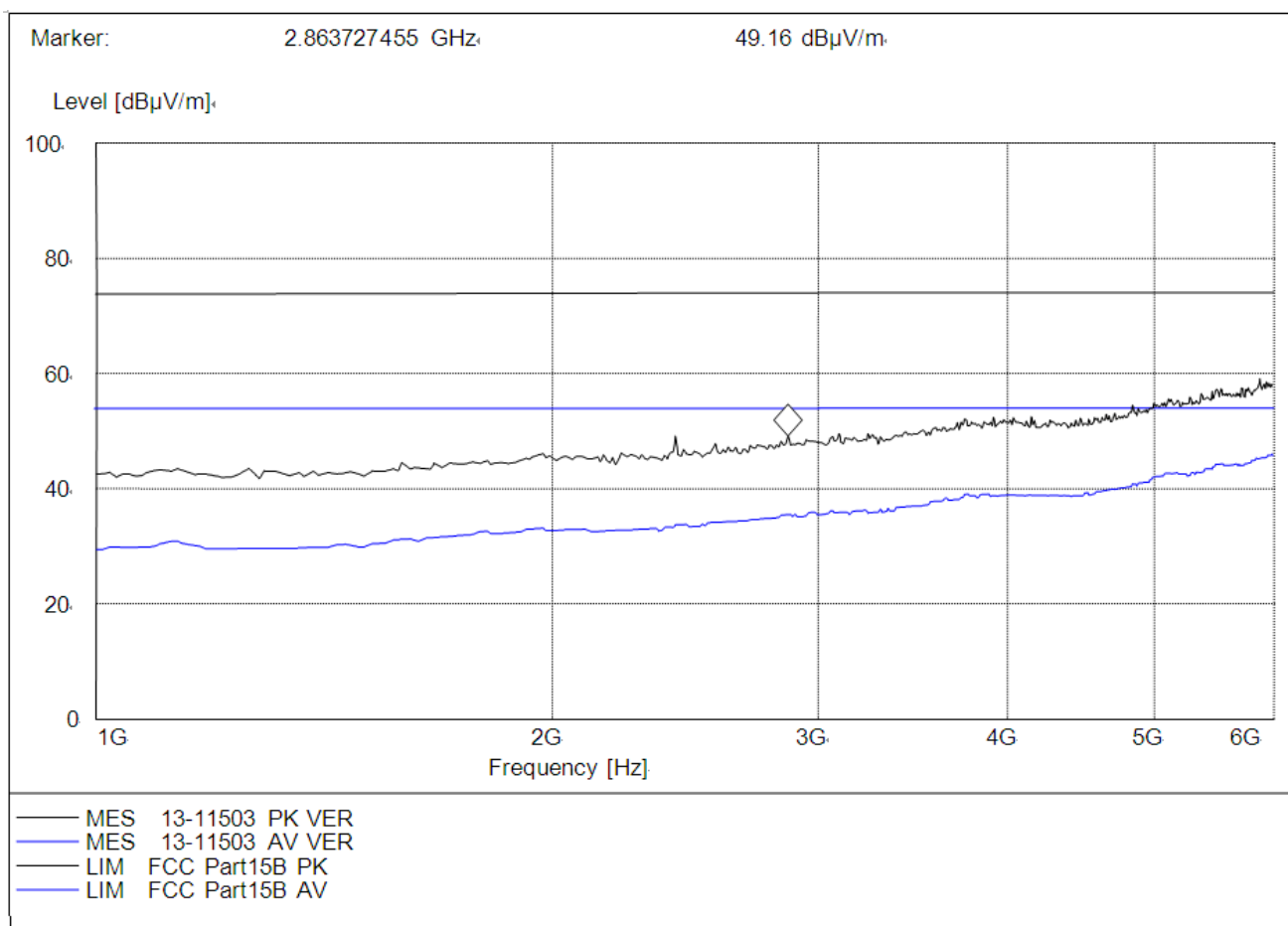
(Plot B: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
30.000000	29.32	120.000	100.0	40.00	10.68	Horizontal	Pass
156.352705	29.12	120.000	100.0	43.50	14.38	Horizontal	Pass
259.93967	31.47	120.000	100.0	46.00	14.53	Horizontal	Pass



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

Frequency (MHz)	AV (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
1090.18036	37.90	1000.000	100.0	54.00	16.10	Horizontal	Pass
1592.50000	31.56	1000.000	150.0	54.00	22.44	Horizontal	Pass
1864.60000	33.88	1000.000	150.0	54.00	20.12	Horizontal	Pass
2410.12450	34.32	1000.000	100.0	54.00	19.68	Horizontal	Pass
5045.51540	41.31	1000.000	150.0	54.00	12.69	Horizontal	Pass
5970.93788	43.48	1000.000	100.0	54.00	10.52	Horizontal	Pass



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

Frequency (MHz)	AV (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
1062.00000	30.68	1000.000	150.0	54.00	23.32	Vertical	Pass
1780.00000	33.28	1000.000	150.0	54.00	20.72	Vertical	Pass
2410.00000	34.22	1000.000	150.0	54.00	19.78	Vertical	Pass
2863.72745	36.12	1000.000	148.0	54.00	17.88	Vertical	Pass
3390.00000	37.56	1000.000	150.0	54.00	16.44	Vertical	Pass
5920.82363	43.44	1000.000	100.0	54.00	10.56	Vertical	Pass

Test Result: PASS

**** END OF REPORT ****