



EMC TEST REPORT

Report No.: SET2014-13151

Product Name: LTE Mobile Phone

FCC ID: CLNSS4445

Model No. : M4 SS4445

Applicant: MFOURTEL MEXICO S.A. DE C.V.

Address: Av. Ejército Nacional 436 Piso 3 Chapultepec Morales Miguel
Hidalgo Distrito Federal 11570.

Received Date: 2014-11-12

Tested Date: 2014-11-14—2014-11-29

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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Model No. : M4 SS4445

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Applicant Address..... : Av. Ejército Nacional 436 Piso 3 Chapultepec Morales
Miguel Hidalgo Distrito Federal 11570.

Manufacturer..... : CK Telecom Limited

Manufacturer Address : Technology Road.High-Tech Development Zone.
Heyuan, Guangdong,P.R.China.

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

Test Result : PASS

Tested by : Xiaolong Zhang 2014.12.02
Xiaolong Zhang, Test Engineer

Reviewed by..... : Shuangwen Zhang 2014.12.02
Shuangwen Zhang, Senior Engineer

Approved by : Wu Li'an 2014.12.02
Wu Li'an, Manager



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Change History		
Issue	Date	Reason for change
1.0	2014.12.02	First edition



1. GENERAL INFORMATION

1.1 EUT Description

EUT Name : LTE Mobile Phone

Serial No..... : SS44456B4000114

IMEI No. : 355616029894916

FCC ID..... : CLNSS4445

Trade Name..... : M4

Brand Name..... : M4

Hardware Version..... : A-V1.0

Software Version : M4_SS4445_S10_Ver200

Power Supply : Battery

Brand Name: M4

Model No.: M2000A

Capacitance: 2000 mAh

Rated Voltage: 3.7V

Charge Limit: 4.2V

Ancillary Equipment 1 : AC Adapter (Charger for Battery)

Brand Name: M4

Model No.: A8-501000

Rated Input: 100-240V, 50/60Hz ,0.15A

Rated Output: 5V=1A

*Note1:*The EUT is a Mobile phone, it supports the following operating frequency band:GSM850/1900, WCDMA850/1900,GPS, 802.11b,802.11g,802.11n/20M,802.11n/40M and bluetooth4.0,LTE 4,17.

*Note2:*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 car charger.

*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 2013	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:

(1) 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.



1.3 Facilities and Accreditations

1.3.1 Facilities

CNAS-Lab Code: L1659

CCIC 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 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, valid time is until October 28, 2017.

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 Peripherals

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Description	Manufacturer	Model	Serial No.	FCCID /DOC
Notebook	ThinkPad	E430C	A131101550	/
Micro SD card	4GB	SanDisk	/	/
earphone	/	/	A131101551	/
Mouse	Microsoft	1068	/	DOC

2.2 Test Mode

- (1) The first test mode

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) The second test mode

The EUT configuration of the emission tests is Internal memory+ EUT + Battery + PC.

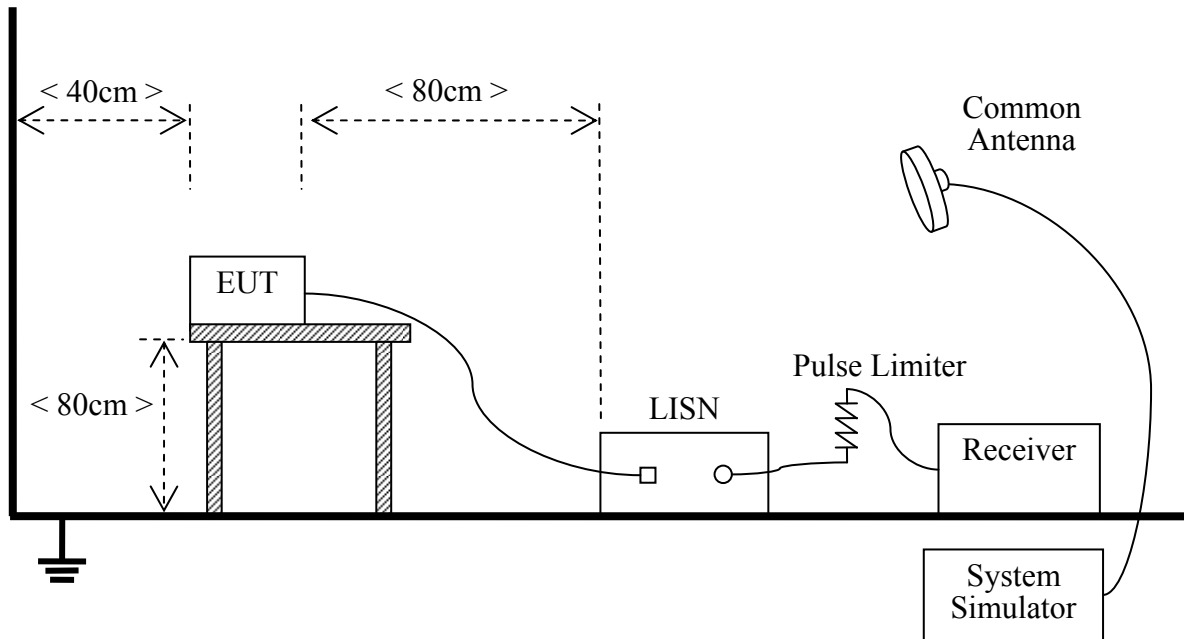
In this test mode, the EUT with a Internal memory is connected with a PC via a USB cable supplied by applicant. During the measurement, the data is transmitting between the PC and the Internal memory of the EUT.

NOTE: All test modes are performed, only the worse case (the first test mode) is recorded in this report.

2.3 Test Setup and Equipments List

2.3.1 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.

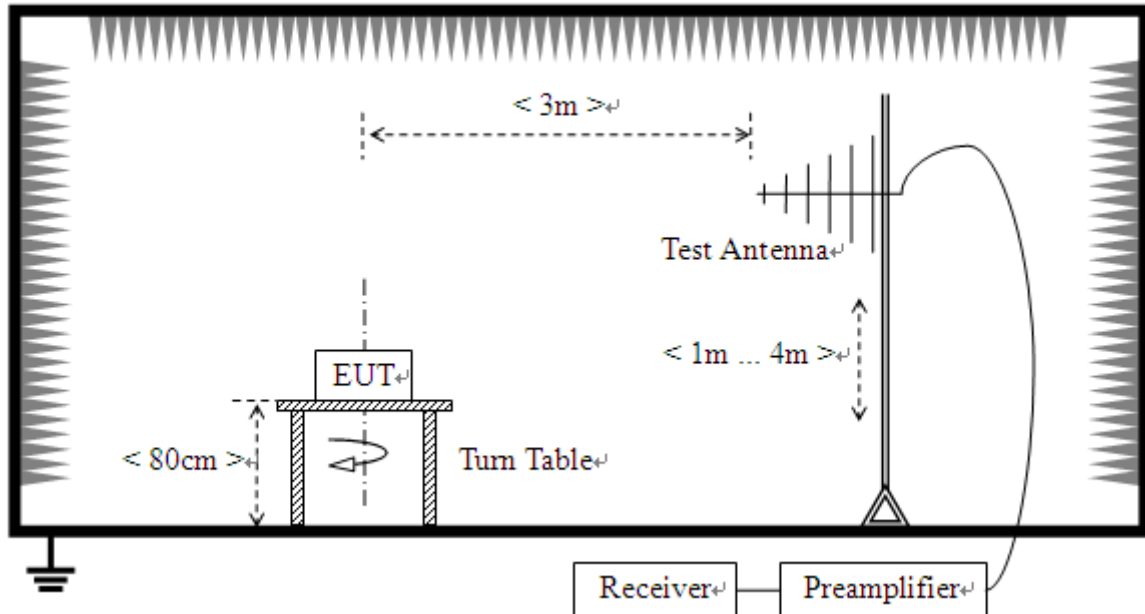
B. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
Test Receiver	ROHDE&SCHWARZ	ESCI	A130901475	2014.09.09	2015.09.08
LISN	ROHDE&SCHWARZ	ENV216	/	2014.04.28	2015.04.27
Cable	MATCHING PAD	W7	/	2014.06.05	2015.06.04

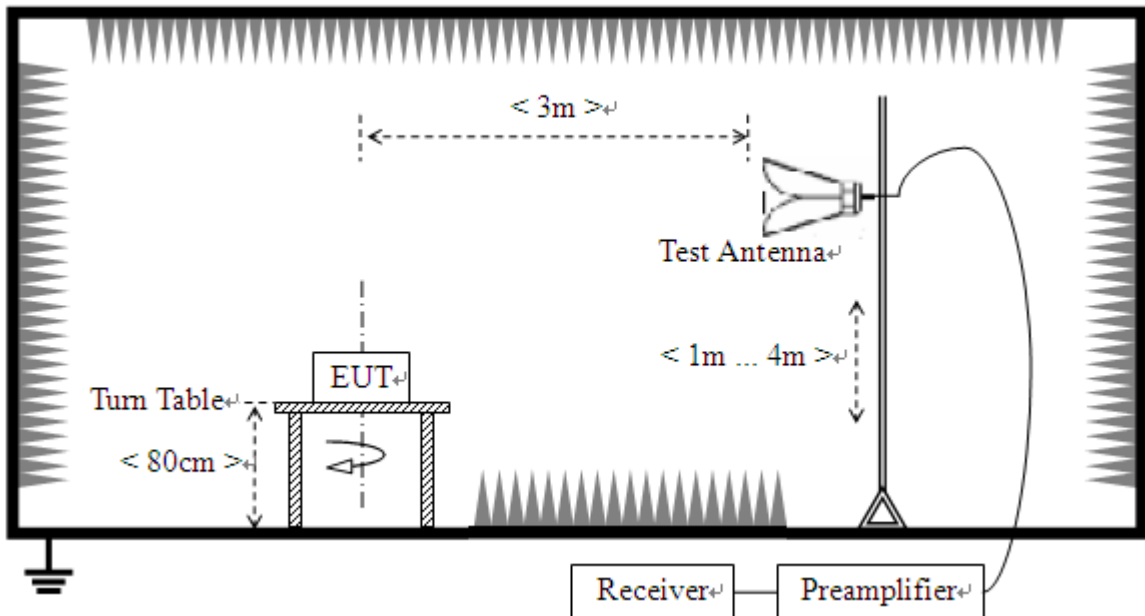
2.3.2 Radiated Emission

A. Test Setup:

- 1) For radiated emissions from 30MHz to 1GHz



- 2) 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 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 Date	Calibration Due. Date
Test Receiver	ROHDE&SCHWARZ	ESIB7	A0501375	2014.06.10	2015.06.09
Test Receiver	ROHDE&SCHWARZ	ESIB26	A0304218	2014.06.10	2015.06.09
Semi-Anechoic Chamber	Albatross	9m*6m*6m	A0412372	2014.03.22	2015.03.21
Test Antenna - Bi-Log	HP	CBL6111A	A9704202	2014.06.10	2015.06.09
Test Antenna – Horn	ROHDE&SCHWARZ	HF906	A0304225	2014.06.10	2015.06.09
Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2014.03.22	2015.03.21
Amplifier 1G~18GHz	ROHDE&SCHWARZ	MITEQ AFS42-001018 00	A0509366	2014.06.10	2015.06.09
Amplifier 20M~3GHz	Compliance Direction System	PAP-0203H	A0509377	2014.06.10	2015.06.09
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.10	2015.06.09
Cable	SUNHNER	SUCOFLEX 104	MY1758/4	2014.06.10	2015.06.09



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.

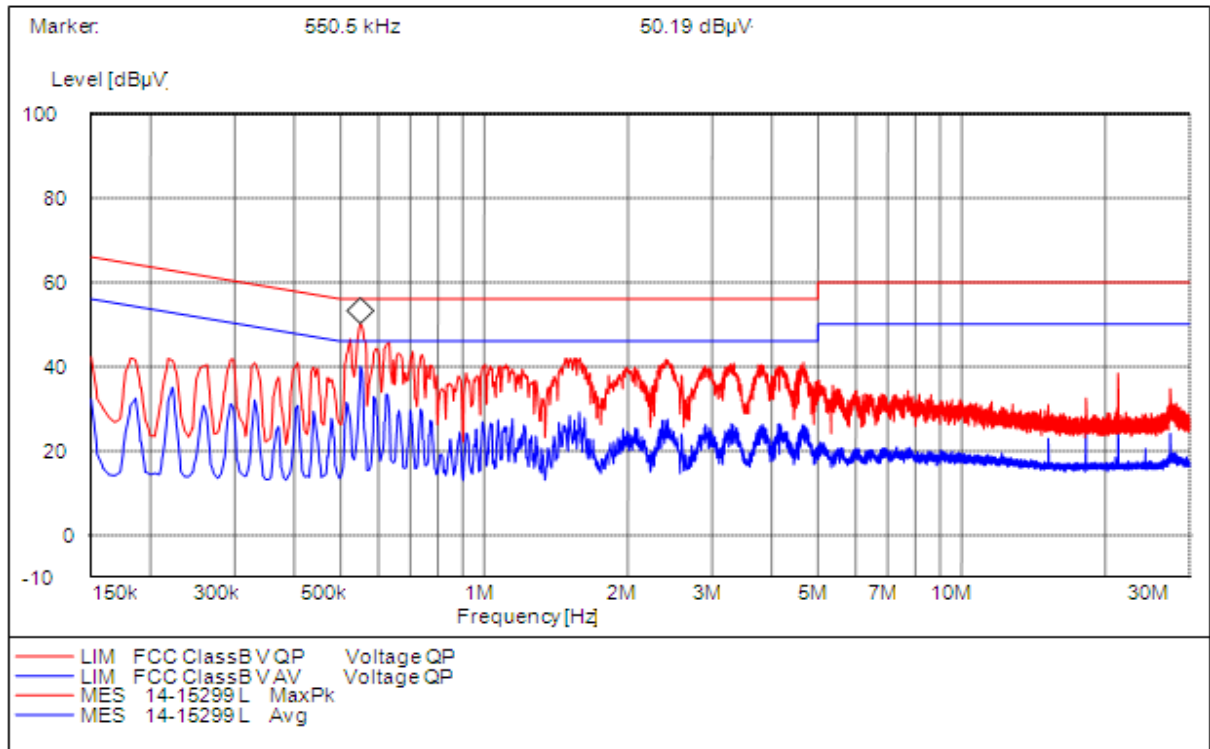
3.1.2 Test Description

See section 2.3.1 of this report.

3.1.3 Test Result

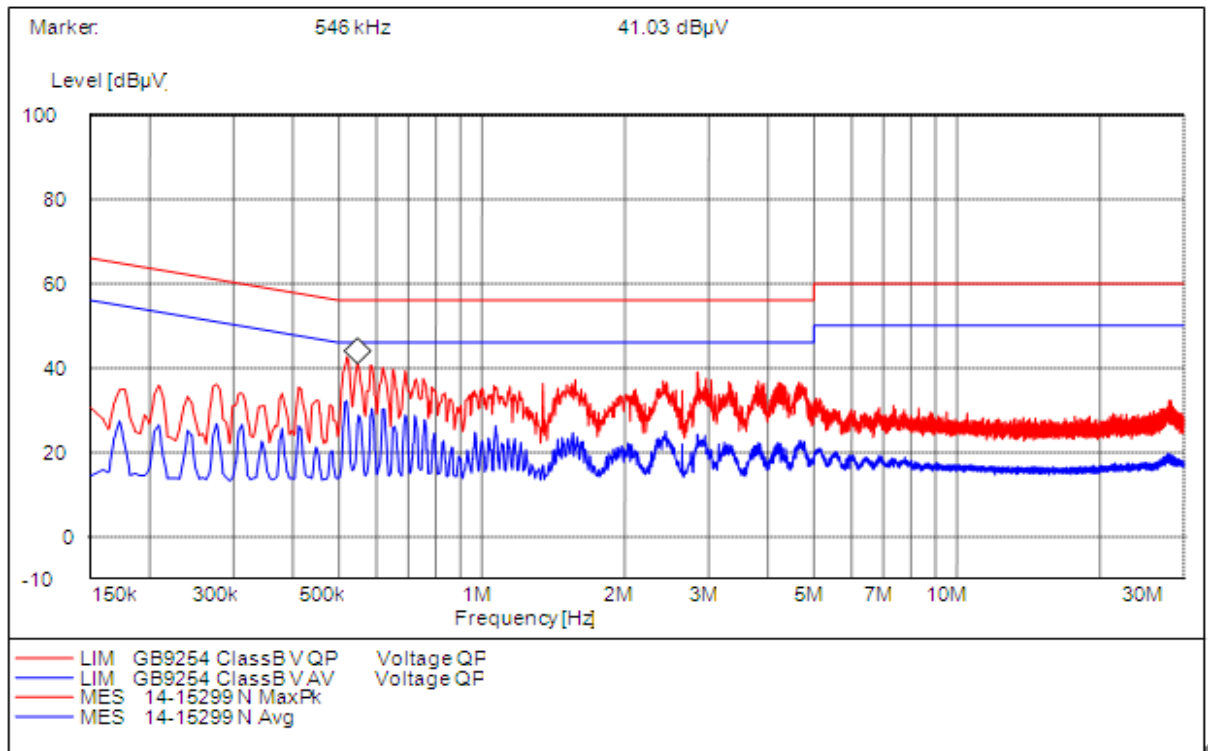
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines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

A. Test Plot and Suspicious Points:



(Plot A: L Phase)

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)
0.2985	60.30	39.70	20.60	0.2985	50.30	29.90	20.40
0.5235	56.00	44.50	11.50	0.5235	46.00	31.50	14.50
0.5505	56.00	47.70	8.30	0.5505	46.00	31.49	14.51
2.3515	56.00	40.23	15.77	2.3515	46.00	26.59	19.41



(Plot B: N Phase)

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)
0.4110	57.60	32.70	24.90	0.4110	47.60	26.30	21.30
0.5190	56.00	40.60	15.40	0.5190	46.00	32.20	13.80
0.5460	56.00	47.74	8.24	0.5460	46.00	28.40	17.60
2.8145	56.00	39.46	16.54	2.8145	46.00	23.16	22.84

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	(uV/m)	(dBuV/m)
0.009 - 0.490	2400/F(kHz)	300m	10000* 2400/F(kHz)	20log 2400/F(kHz) + 80
0.490 - 1.705	2400/F(kHz)	30m	100* 2400/F(kHz)	20log 2400/F(kHz) + 40
1.705 - 30.00	30	30m	100*30	20log 30 + 40
30.0 - 88.0	100	3m	100	20log 100
88.0 - 216.0	150	3m	150	20log 150
216.0 - 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

- a) 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.
- b) 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.
- c) For below 1G :QP detector RBW 120kHz ,VBW 300kHz.
- d) For Above 1G: PK detector RBW 1MHz,VBW 3MHz for PK value ;PK detector RBW 1MHz, VBW 10Hz for AV value.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dBuV/m is calculated by $20\log \text{Emission Level}(\text{uV/m})$.
- 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 30uV/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 2.3.2 of this report.

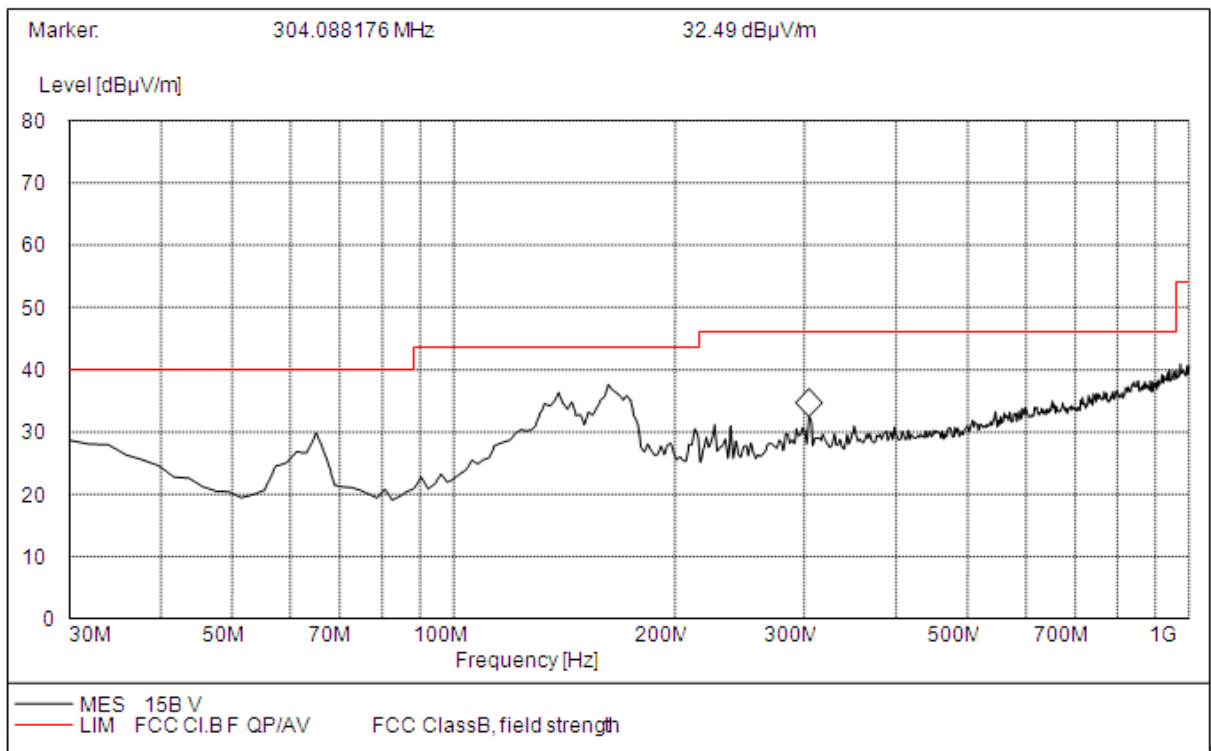
3.2.3 Test Result

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.

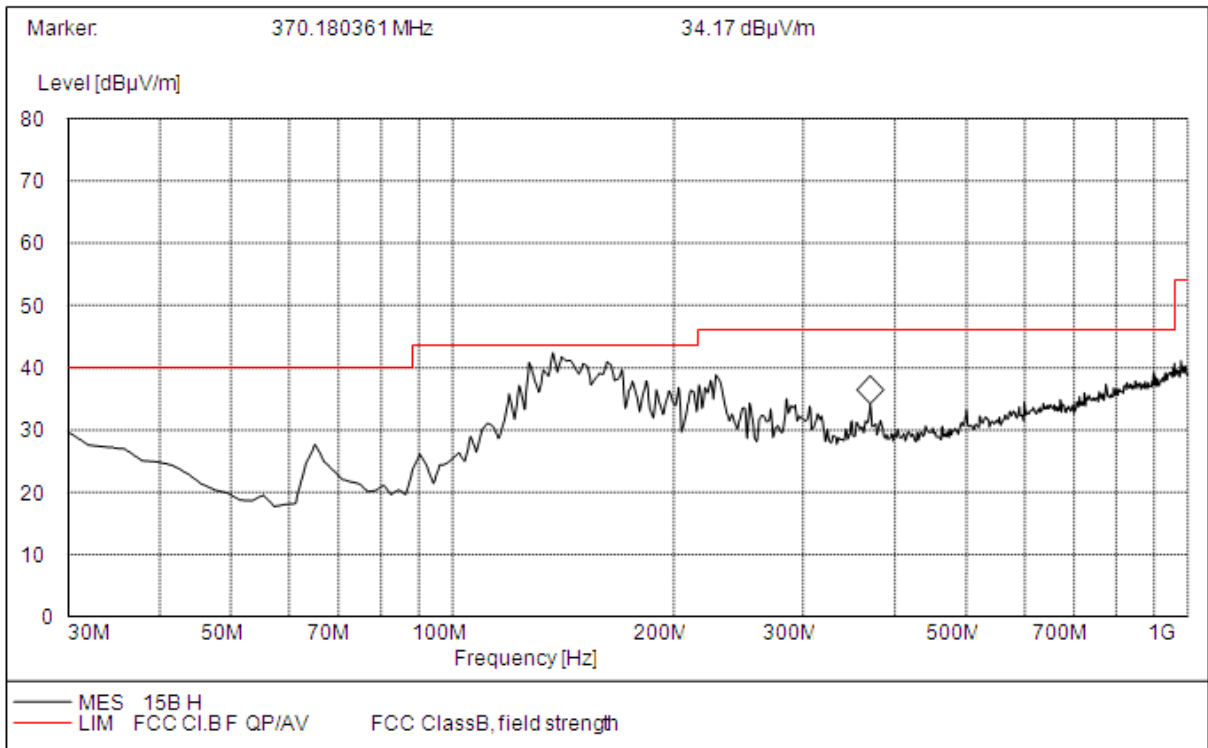
B. Test Plots and Suspicious Points:



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

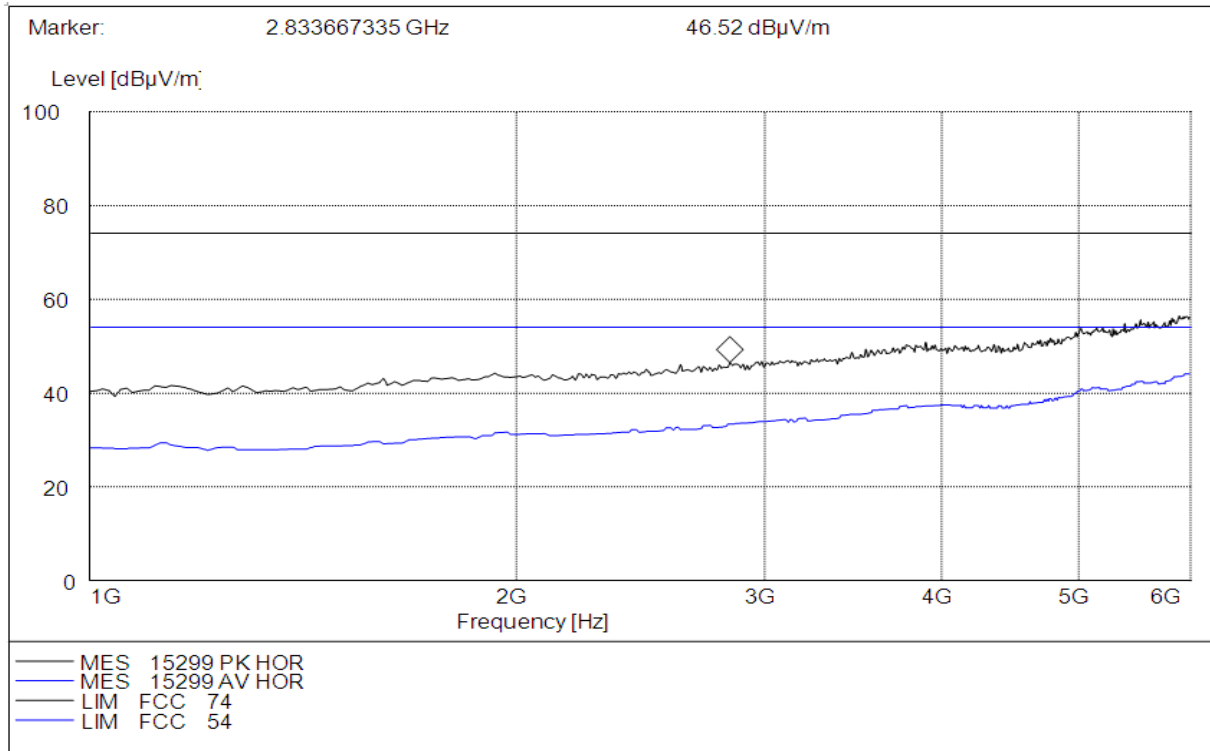


Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
64.25000	28.59	120.000	100.0	40.00	11.41	Vertical	Pass
136.59000	35.59	120.000	100.0	43.50	7.91	Vertical	Pass
161.23000	37.56	120.000	100.0	43.50	5.94	Vertical	Pass
303.26500	31.26	120.000	100.0	46.00	14.74	Vertical	Pass



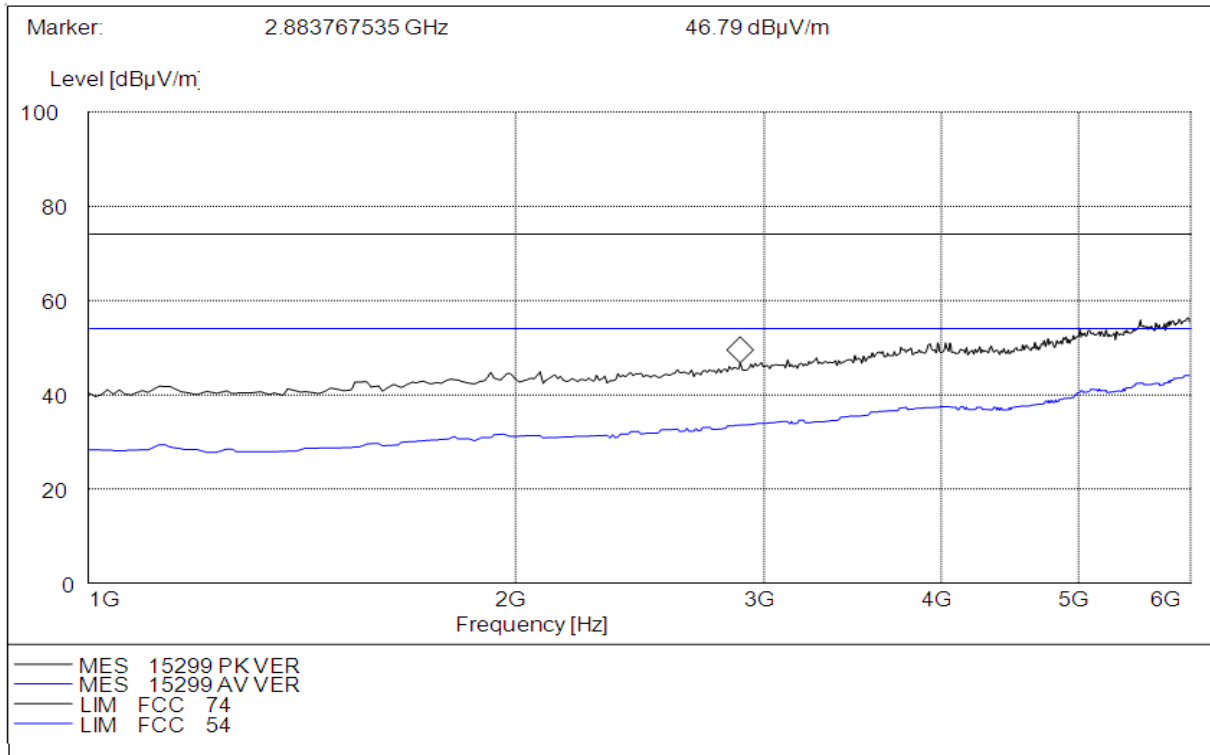
(Plot D: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Verdict
125.16000	38.47	120.000	100.0	43.50	5.03	Horizontal	Pass
135.36000	38.16	120.000	100.0	43.50	5.34	Horizontal	Pass
161.23000	38.59	120.000	100.0	43.50	4.91	Horizontal	Pass
228.15000	38.16	120.000	100.0	46.00	7.84	Horizontal	Pass



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

Frequency (MHz)	PK/AV (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
1080.10090	29.63	1000.000	150.0	54.00	24.37	Horizontal	Pass
1901.76352	32.75	1000.000	150.0	54.00	21.25	Horizontal	Pass
2832.71456	33.75	1000.000	150.0	54.00	20.25	Horizontal	Pass
1080.10090	39.68	1000.000	150.0	74.00	34.32	Horizontal	Pass
1901.76352	43.13	1000.000	150.0	74.00	30.87	Horizontal	Pass
2832.71456	45.56	1000.000	150.0	74.00	28.44	Horizontal	Pass



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

Frequency (MHz)	PK/AV (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
1100.16032	30.13	1000.000	100.0	54.00	23.87	Vertical	Pass
1981.76352	31.90	1000.000	150.0	54.00	22.10	Vertical	Pass
2881.74549	33.85	1000.000	100.0	54.00	20.15	Vertical	Pass
1100.16032	40.26	1000.000	150.0	74.00	33.74	Vertical	Pass
1981.76352	42.58	1000.000	100.0	74.00	31.42	Vertical	Pass
2881.74549	46.20	1000.000	150.0	74.00	27.80	Vertical	Pass

Test Result: PASS

4. PHOTOGRAPHS OF THE EUT



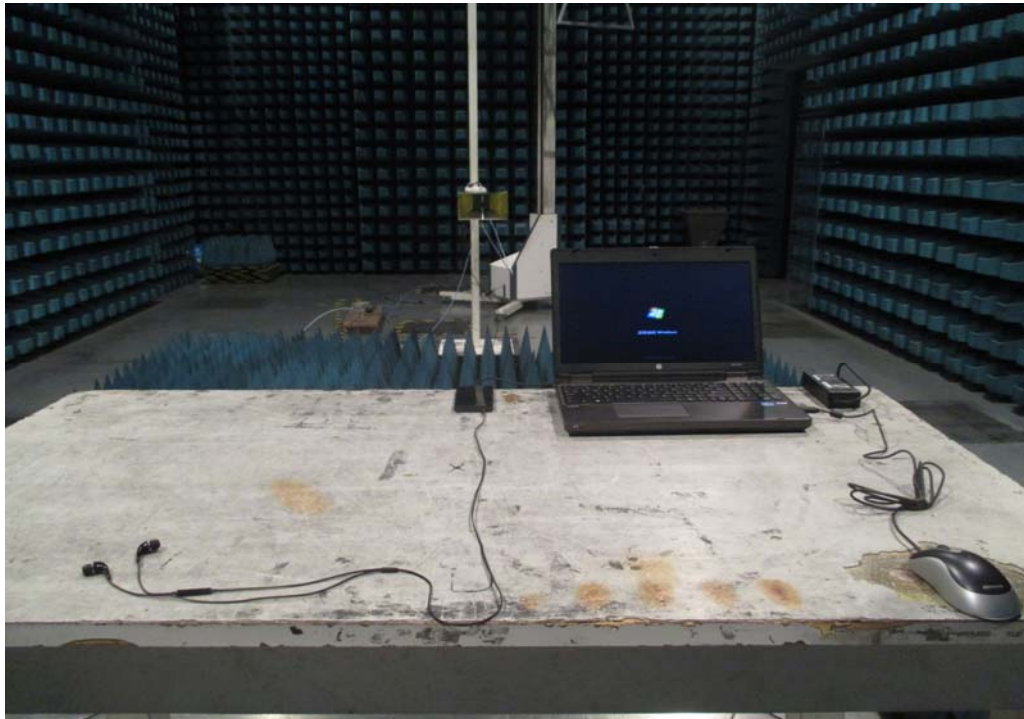
5. PHOTOGRAPHS OF THE TEST SET-UP



Conducted Emission



Radiated Emission of 30M-1G



Radiated Emission of 1-6G

**** END OF REPORT ****