



TEST REPORT

No. I15Z42677-EMC01

for

Huawei Technologies Co., Ltd.

HSDPA Module

Model Name: MU509-65

FCC ID: QISMU509-65

IC number: 6369A-MU50965

with

Hardware Version: MD2MU509 Ver. A

Software Version: 11.815.01.03.00

Issued Date: 2015-11-05

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

FCC 2.948 Listed: No. 525429

IC O.A.T.S listed: No.12389A-1

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z42677-EMC01	Rev.0	1st edition	2015-11-05



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1. Test Laboratory

1.1. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35°C

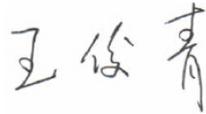
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2015-10-30

Testing End Date: 2015-11-04

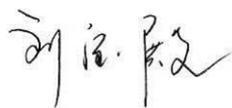
1.4. Signature



Wang Junqing
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



Liu Baodian
Deputy Director of the laboratory
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Huawei Technologies Co., Ltd.
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Postal Code: 518129
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2.2. Manufacturer Information

Company Name: Huawei Technologies Co., Ltd.
Address /Post: Administration Building, Headquarters of Huawei Technologies Co.,
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City: Shenzhen
Postal Code: 518129
Country: China
Telephone: 029-89282965
Fax: /



3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	HSDPA Module
Model Name	MU509-65
FCC ID	QISMU509-65
IC number	6369A-MU50965
Extreme vol. Limits	3.3VDC to 4.2VDC (nominal: 3.8VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	868542020002376	MD2MU509 Ver. A	11.815.01.03.00
EUT2	868542020002285	MD2MU509 Ver. A	11.815.01.03.00

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	USB cable	/	/
AE2	USB cable	/	/
AE3	Antenna	/	1542677AE001

AE1, AE2

Model	/
Manufacturer	/
Length of cable	98cm

AE3

Model	/
Manufacturer	/
Length of cable	/

*AE ID: is used to identify the test sample in the lab internally.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 +AE1 +AE2 +AE3	By USB Power

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	10-1-13 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
ICES-003	Information Technology Equipment (ITE) – Limits and methods of measurement	Issue 5

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω



6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

Clause	List	Clause in FCC rules	Verdict	Location
1	Radiated Emission	15.109(a)	P	1
2	Conducted Emission	15.107(a)	P	1



7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCI	100344	R&S	2016-03-03	1 year
2	Test Receiver	ESCI 7	100948	R&S	2016-07-07	1 year
3	Universal Radio Communication Tester	CMU200	109914	R&S	2016-03-26	1 year
4	Test Receiver	FSV	101047	R&S	2016-07-02	1 year
5	LISN	ESH2-Z5	829991/012	R&S	2016-04-12	1 year
6	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-16	3 years
7	EMI Antenna	3115	9906-5827	ETS-Lindgren	2016-11-19	3 years
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Monitor	E178FPc	CN-OWR979-64180-7AJ-D2MS	DELL	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
11	Keyboard	L100	CN0RH659658907 ATOI40	DELL	N/A	N/A
12	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator at distances of 10 meters (for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.1.2 EUT Operating Mode:

The HSDPA Module is operating in the USB power mode. During the test HSDPA Module is connected to a PC via USB cables. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit ($\mu\text{V}/\text{m}$)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

A.1.4 Test Condition

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	15	Peak, Average

A.1.5 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + G_A + G_{\text{PL}}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 4.3 \text{ dB}$, $k=2$.

Measurement results for Set.1:

USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17975.000	44.5	-17.7	45.6	16.600	V
17960.500	44.3	-17.7	45.6	16.400	V
17969.000	44.3	-17.7	45.6	16.400	V
17965.000	44.2	-17.7	45.6	16.300	H
17973.000	44.2	-17.7	45.6	16.300	V
17965.500	44.2	-17.7	45.6	16.300	H

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17977.500	55.8	-17.7	45.6	27.900	V
17967.500	55.7	-17.7	45.6	27.800	H
17960.500	55.5	-17.7	45.6	27.600	V
17950.000	55.3	-17.7	45.6	27.400	H
17984.500	55.2	-17.7	45.6	27.300	V
17998.500	55.2	-17.7	45.6	27.300	V

USB Mode, Set.1

Normal RE_30M-1GHz_10m

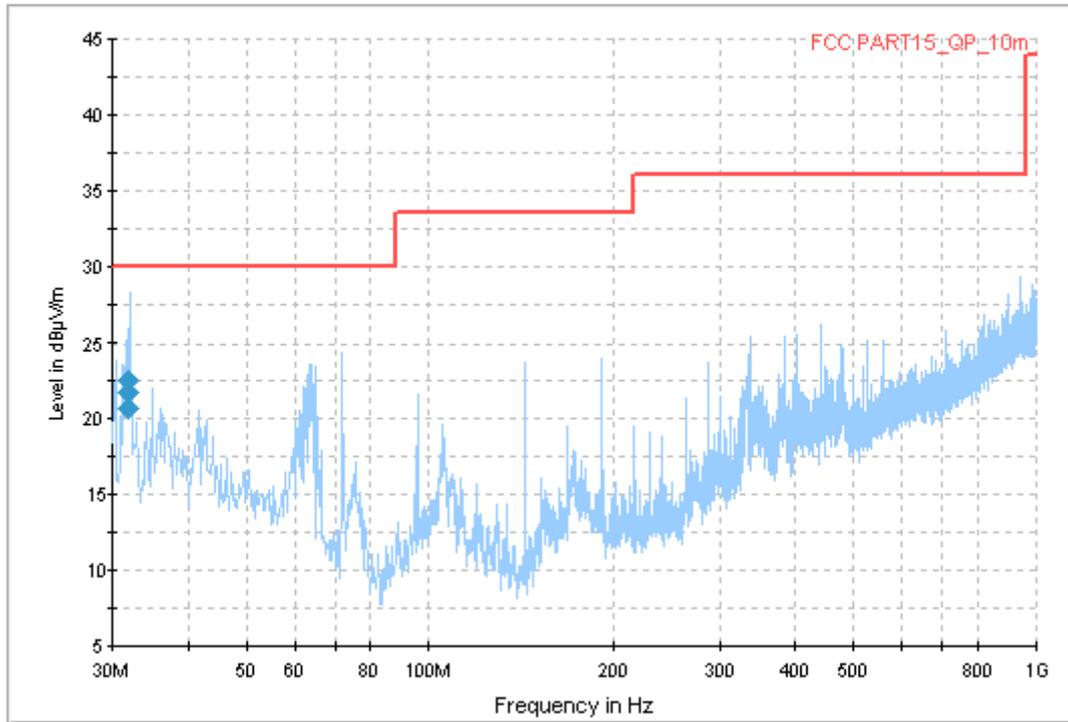


Fig.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
31.792000	22.6	325.0	V	3.0	-13.8	7.4	30.0
31.811000	20.7	175.0	V	151.0	-13.8	9.3	30.0
31.820000	21.8	309.0	V	241.0	-13.8	8.2	30.0

Normal RE_1G-18GHz_directly

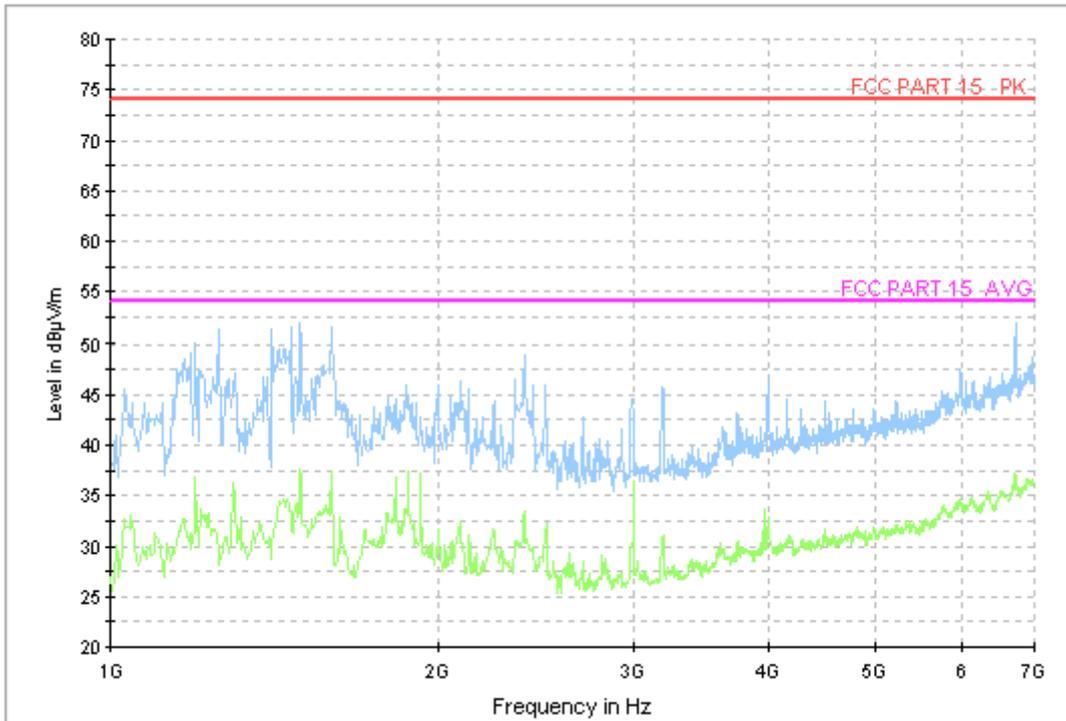


Fig.2 Radiated Emission from 1GHz to 7GHz

Normal RE_3G-18GHz

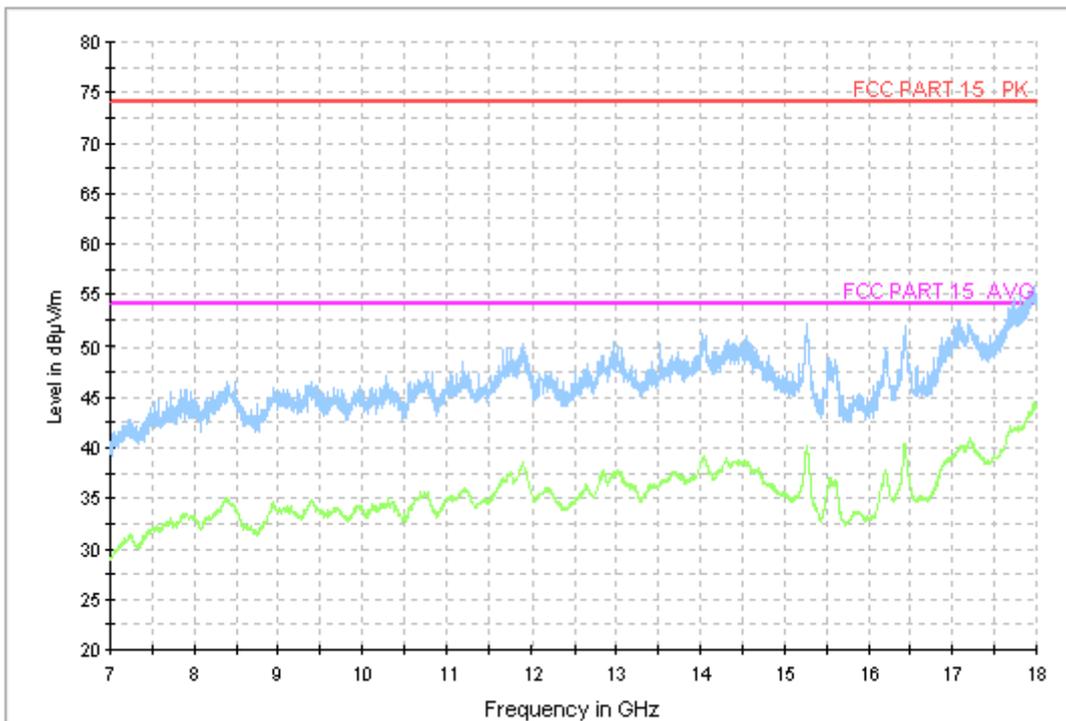


Fig.3 Radiated Emission from 7GHz to 18GHz

A.2 Conducted Emission (§15.107(a))

A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 7.2.

A.2.2 EUT Operating Mode

The HSDPA Module is operating in the USB power mode. During the test HSDPA Module is connected to a PC via USB cables. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

Measurement uncertainty: $U= 2.9$ dB, $k=2$.

USB Mode, Set.1

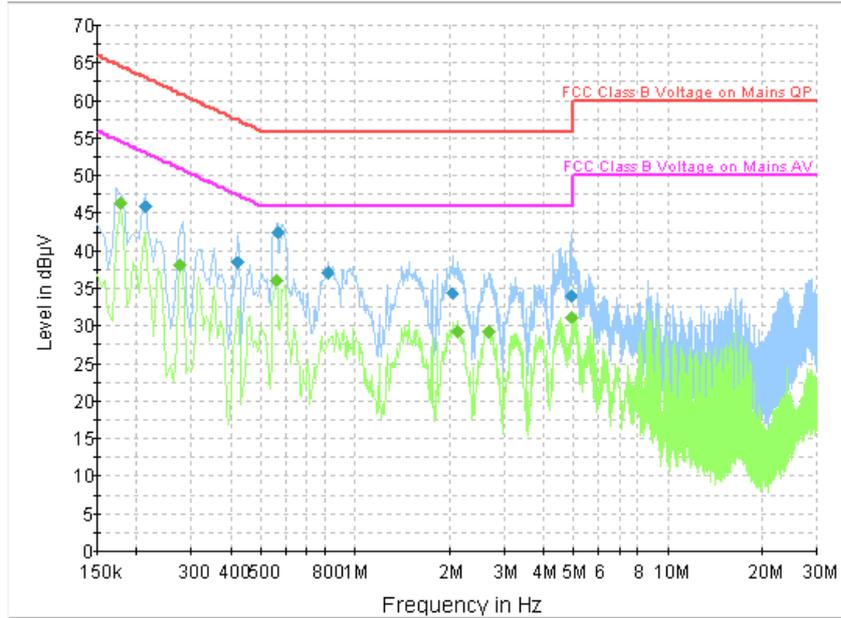


Fig.4 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.213000	45.9	GND	N	19.8	17.2	63.1
0.420000	38.4	GND	L1	19.9	19.1	57.4
0.564000	42.4	GND	L1	19.9	13.6	56.0
0.811500	37.2	GND	N	19.8	18.8	56.0
2.040000	34.3	GND	N	19.7	21.7	56.0
4.906500	34.0	GND	N	19.6	22.0	56.0

Final Result 2

Frequency (MHz)	CAverage (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.177000	46.4	GND	N	19.8	8.2	54.6
0.276000	38.2	GND	N	19.8	12.8	50.9
0.559500	36.2	GND	N	19.9	9.8	46.0
2.112000	29.2	GND	N	19.6	16.8	46.0
2.674500	29.2	GND	L1	19.4	16.8	46.0
4.965000	31.1	GND	N	19.6	14.9	46.0

END OF REPORT