

# Variant FCC RF Test Report

APPLICANT : Lenovo Mobile Communication Technology Ltd.  
EQUIPMENT : Mobile Cellular Phone  
BRAND NAME : Lenovo  
MODEL NAME : Lenovo K53b36, Lenovo K53b37  
FCC ID : YCNK53B3  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on Sep. 14, 2016 and testing was completed on Oct. 14, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

James Huang

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SPORTON LAB.

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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION                                                                                                                                                                                                                                                                                                                                    | ISSUED DATE   |
|------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| FR691407C  | Rev. 01 | This is a variant report for Lenovo K53b36, Lenovo K53b37. The product equality declaration could be referred to Appendix D. Based on the similarity between two models, only the conducted power and worst cases of Radiated Spurious Emission from original test report (Sporton Report Number FR662005C) were verified for the differences. | Oct. 31, 2016 |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |
|            |         |                                                                                                                                                                                                                                                                                                                                                |               |



## SUMMARY OF TEST RESULT

| Report Section | FCC Rule  | Description                                        | Limit                 | Result | Remark                             |
|----------------|-----------|----------------------------------------------------|-----------------------|--------|------------------------------------|
| 3.1            | 15.247(b) | Power Output Measurement                           | $\leq 30\text{dBm}$   | Pass   | -                                  |
| 3.2            | 15.247(d) | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass   | Under limit 5.87 dB at 2389.95 MHz |



# 1 General Description

## 1.1 Applicant

**Lenovo Mobile Communication Technology Ltd.**

No. 999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech Industry Development Zone, Xiamen, P. R. China

## 1.2 Manufacturer

**Motorola Mobility LLC**

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | Mobile Cellular Phone                                                                                                                                                          |
| Brand Name                      | Lenovo                                                                                                                                                                         |
| Model Name                      | Lenovo K53b36, Lenovo K53b37                                                                                                                                                   |
| FCC ID                          | YCNK53B3                                                                                                                                                                       |
| EUT supports Radios application | GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/<br>HSPA+(16QAM uplink is not supported)/LTE/<br>WLAN2.4GHz 802.11b/g/n HT20/<br>Bluetooth v3.0+EDR/Bluetooth v4.0 LE/<br>Bluetooth v4.2 LE |
| IMEI Code                       | Radiation:<br>Sample 1: 861901030036633/861901030036641                                                                                                                        |
| HW Version                      | 82939_1_13                                                                                                                                                                     |
| SW Version                      | K53_S016_160729_ROW                                                                                                                                                            |
| EUT Stage                       | Identical Prototype                                                                                                                                                            |

### Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two different types of EUT. They are single SIM card mobile (Model Name: Lenovo K53b37) and dual SIM card mobile (Model Name: Lenovo K53b36). The others are the same including circuit design, PCB board, structure and all components.

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification       |                                                                                                         |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Tx/Rx Channel Frequency Range</b>          | 2412 MHz ~ 2462 MHz                                                                                     |
| <b>Maximum (Peak) Output Power to antenna</b> | 802.11b : 15.45 dBm (0.0351 W)<br>802.11g : 21.34 dBm (0.1361 W)<br>802.11n HT20 : 20.62 dBm (0.1153 W) |
| <b>Antenna Type / Gain</b>                    | LDS Antenna with gain -4.93 dBi                                                                         |
| <b>Type of Modulation</b>                     | 802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)                  |

## 1.5 Specification of Accessory

| Specification of Accessory |                         |                                                     |                   |                                                                    |
|----------------------------|-------------------------|-----------------------------------------------------|-------------------|--------------------------------------------------------------------|
| AC Adapter 1               | <b>Brand Name</b>       | Lenovo (Acbel)                                      | <b>Model Name</b> | C-P35                                                              |
|                            | <b>Power Rating</b>     | I/P: 100-240Vac, 300mA, O/P: 5.2Vdc, 2000mA         |                   |                                                                    |
| AC Adapter 2               | <b>Brand Name</b>       | Lenovo (Huntkey)                                    | <b>Model Name</b> | C-P35                                                              |
|                            | <b>Power Rating</b>     | I/P: 100-240Vac, 500mA, O/P: 5.2Vdc, 2000mA         |                   |                                                                    |
| Battery                    | <b>Brand Name</b>       | Lenovo (SCUD)                                       | <b>Model Name</b> | BL270                                                              |
|                            | <b>Power Rating</b>     | 3.85Vdc, 4000mAh                                    |                   |                                                                    |
| Earphone                   | <b>Brand Name</b>       | Lenovo (Cosonic)                                    | <b>Model Name</b> | LS-118M                                                            |
|                            | <b>Signal Line Type</b> | 1.1 meter, non-shielded cable, without ferrite core |                   |                                                                    |
| USB Cable 1                | <b>Brand Name</b>       | Lenovo (Starw)                                      | <b>Model Name</b> | XJ-007070                                                          |
|                            | <b>Signal Line Type</b> | 1.0 meter, non-shielded cable, without ferrite core |                   |                                                                    |
| USB Cable 2                | <b>Brand Name</b>       | Lenovo (Saibao)                                     | <b>Model Name</b> | SWT-A053A                                                          |
|                            | <b>Signal Line Type</b> | 1.0 meter, non-shielded cable, without ferrite core |                   |                                                                    |
| LCD Panel                  | <b>Brand Name</b>       | O-FILM                                              | <b>Model Name</b> | MTF-055-2594-03TMA                                                 |
| Camera _ Front             | <b>Brand Name</b>       | Q-Tech                                              | <b>Model Name</b> | FX219BQS                                                           |
| Camera _ Rear              | <b>Brand Name</b>       | Sunny                                               | <b>Model Name</b> | A16S05J-200                                                        |
| CTP Module                 | <b>Brand Name</b>       | O-FILM                                              | <b>Model Name</b> | Black: MCF-055-2594<br>White: MCF-055-2594<br>Golden: MCF-055-2594 |

## 1.6 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.7 Testing Location

|                    |                                                                                                                       |           |                      |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| Test Site          | SPORTON INTERNATIONAL (KUNSHAN) INC.                                                                                  |           |                      |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China<br>TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958 |           |                      |
| Test Site No.      | Sporton Site No.                                                                                                      |           | FCC Registration No. |
|                    | TH01-KS                                                                                                               | 03CH03-KS | 306251               |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

## 1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
- ♦ ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

### 2.1 Carrier Frequency and Channel

| Frequency Band  | Channel | Freq.<br>(MHz) | Channel | Freq.<br>(MHz) |
|-----------------|---------|----------------|---------|----------------|
| 2400-2483.5 MHz | 1       | 2412           | 7       | 2442           |
|                 | 2       | 2417           | 8       | 2447           |
|                 | 3       | 2422           | 9       | 2452           |
|                 | 4       | 2427           | 10      | 2457           |
|                 | 5       | 2432           | 11      | 2462           |
|                 | 6       | 2437           | -       | -              |

## 2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

| 802.11b mode Peak Power (dBm) |           |                 |        |          |         |
|-------------------------------|-----------|-----------------|--------|----------|---------|
| Channel                       | Frequency | Data Rate (MHz) |        |          |         |
|                               |           | 1M bps          | 2M bps | 5.5M bps | 11M bps |
| CH 01                         | 2412 MHz  | 15.45           | 15.42  | 15.40    | 15.43   |
| CH 06                         | 2437 MHz  | 14.87           | 14.85  | 14.75    | 14.82   |
| CH 11                         | 2462 MHz  | 14.63           | 14.62  | 14.54    | 14.61   |

| 802.11g mode Peak Power (dBm) |           |                 |        |         |         |         |         |         |         |
|-------------------------------|-----------|-----------------|--------|---------|---------|---------|---------|---------|---------|
| Channel                       | Frequency | Data Rate (MHz) |        |         |         |         |         |         |         |
|                               |           | 6M bps          | 9M bps | 12M bps | 18M bps | 24M bps | 36M bps | 48M bps | 54M bps |
| CH 01                         | 2412 MHz  | 21.34           | 21.28  | 21.30   | 21.33   | 21.29   | 21.25   | 21.14   | 21.16   |
| CH 06                         | 2437 MHz  | 20.43           | 20.31  | 20.37   | 20.39   | 20.42   | 20.30   | 20.29   | 20.23   |
| CH 11                         | 2462 MHz  | 19.82           | 19.75  | 19.76   | 19.74   | 19.69   | 19.72   | 19.55   | 19.68   |

| 802.11n HT20 mode Peak Power (dBm) |           |                 |       |       |       |       |       |       |       |
|------------------------------------|-----------|-----------------|-------|-------|-------|-------|-------|-------|-------|
| Channel                            | Frequency | Data Rate (MHz) |       |       |       |       |       |       |       |
|                                    |           | MCS0            | MCS1  | MCS2  | MCS3  | MCS4  | MCS5  | MCS6  | MCS7  |
| CH 01                              | 2412 MHz  | 20.62           | 20.53 | 20.60 | 20.58 | 20.51 | 20.57 | 20.59 | 20.61 |
| CH 06                              | 2437 MHz  | 19.65           | 19.60 | 19.55 | 19.62 | 19.63 | 19.59 | 19.48 | 19.58 |
| CH 11                              | 2462 MHz  | 19.15           | 19.10 | 19.04 | 19.08 | 19.00 | 19.03 | 18.94 | 19.09 |



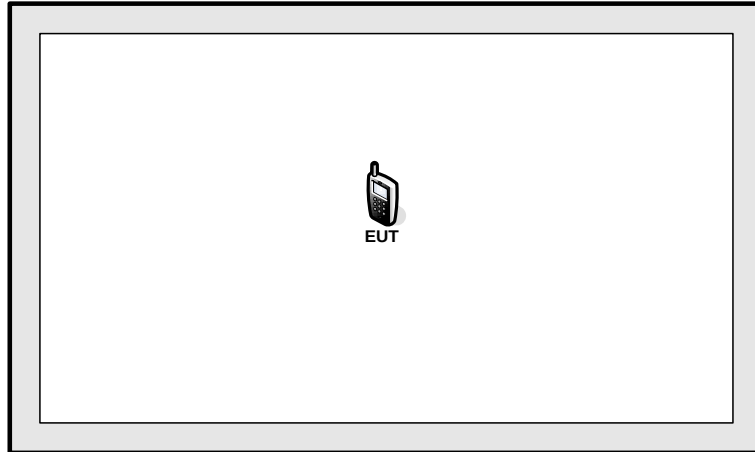
## 2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

| Modulation   | Data Rate |
|--------------|-----------|
| 802.11b      | 1 Mbps    |
| 802.11g      | 6 Mbps    |
| 802.11n HT20 | MCS0      |

## 2.4 Connection Diagram of Test System

<WLAN Tx Mode>



## 2.5 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

### 3 Test Result

#### 3.1 Output Power Measurement

##### 3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

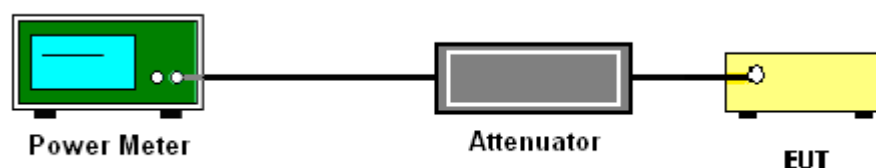
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r05 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

##### 3.1.4 Test Setup



## 3.2 Radiated Band Edges and Spurious Emission Measurement

### 3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 0.009 – 0.490      | 2400/F(kHz)                          | 300                              |
| 0.490 – 1.705      | 24000/F(kHz)                         | 30                               |
| 1.705 – 30.0       | 30                                   | 30                               |
| 30 – 88            | 100                                  | 3                                |
| 88 – 216           | 150                                  | 3                                |
| 216 - 960          | 200                                  | 3                                |
| Above 960          | 500                                  | 3                                |

### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

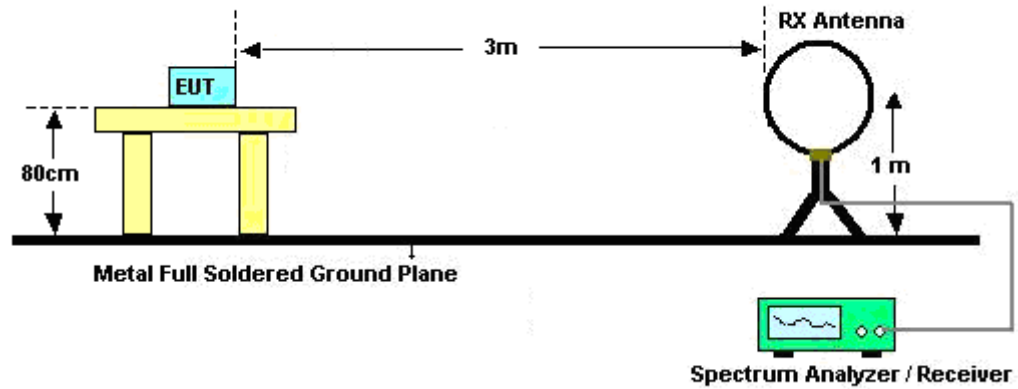
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.

For average measurement:

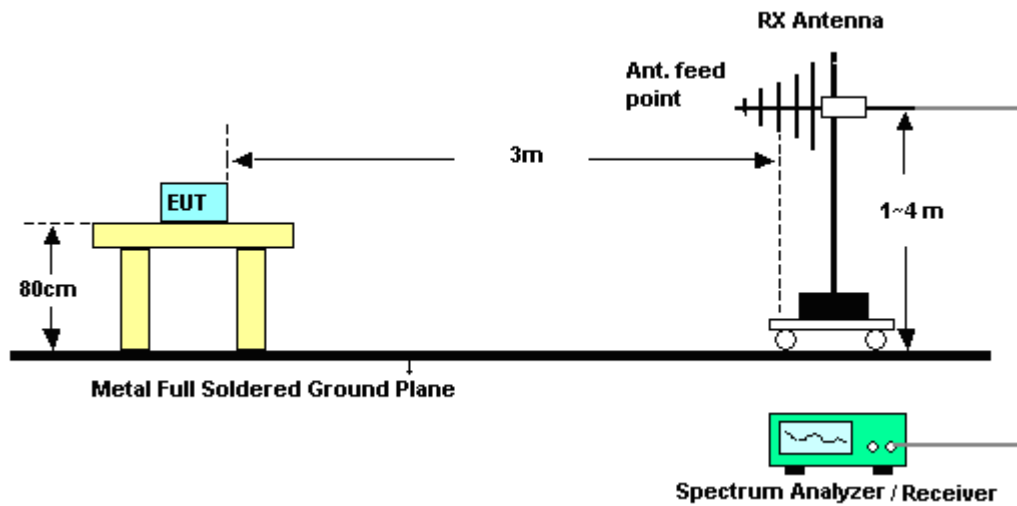
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.2.4 Test Setup

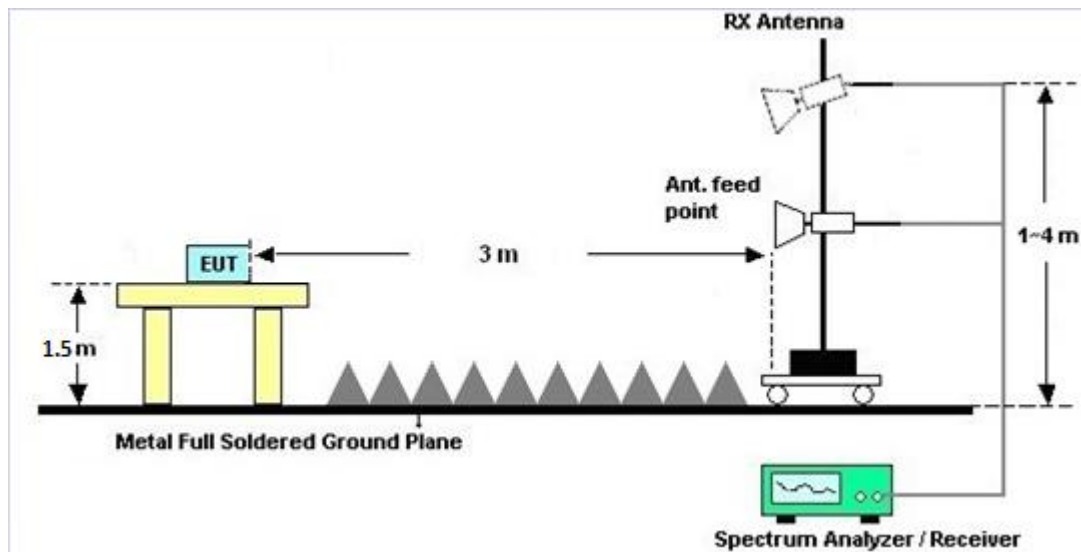
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.2.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

### 3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

### 3.2.7 Duty Cycle

Please refer to Appendix B.

### 3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix A.



## 4 List of Measuring Equipment

| Instrument            | Manufacturer | Model No.     | Serial No. | Characteristics | Calibration Date | Test Date     | Due Date      | Remark                |
|-----------------------|--------------|---------------|------------|-----------------|------------------|---------------|---------------|-----------------------|
| Spectrum Analyzer     | R&S          | FSV40         | 101040     | 10Hz~40GHz      | Aug. 09, 2016    | Oct. 14, 2016 | Aug. 08, 2017 | Conducted (TH01-KS)   |
| Pulse Power Sensor    | Anritsu      | MA2411B       | 0917070    | 300MHz~40GHz    | Jan. 20, 2016    | Oct. 14, 2016 | Jan. 19, 2017 | Conducted (TH01-KS)   |
| Power Meter           | Anritsu      | ML2495A       | 1005002    | 50MHz Bandwidth | Jan. 20, 2016    | Oct. 14, 2016 | Jan. 19, 2017 | Conducted (TH01-KS)   |
| EMI Test Receiver     | R&S          | ESCI          | 100534     | 9kHz~3GHz       | Oct. 24, 2015    | Sep. 24, 2016 | Oct. 23, 2016 | Radiation (03CH03-KS) |
| EXA Spectrum Analyzer | Keysight     | N9010A        | MY55150244 | 10Hz~44GHz      | Apr. 22, 2016    | Sep. 24, 2016 | Apr. 21, 2017 | Radiation (03CH03-KS) |
| Loop Antenna          | R&S          | HFH2-Z2       | 100321     | 9kHz~30MHz      | Nov. 07, 2015    | Sep. 24, 2016 | Nov. 06, 2016 | Radiation (03CH03-KS) |
| Bilog Antenna         | TeseQ        | CBL6112D      | 35406      | 25MHz~2GHz      | Apr. 16, 2016    | Sep. 24, 2016 | Apr. 15, 2017 | Radiation (03CH03-KS) |
| Horn Antenna          | Schwarzbeck  | BBHA9120D     | 9120D-1356 | 1GHz~18GHz      | Apr. 16, 2016    | Sep. 24, 2016 | Apr. 15, 2017 | Radiation (03CH03-KS) |
| SHF-EHF Horn          | com-power    | AH-840        | 101070     | 18GHz~40GHz     | Oct. 10, 2015    | Sep. 24, 2016 | Oct. 09, 2016 | Radiation (03CH03-KS) |
| Amplifier             | SONOMA       | 310N          | 187289     | 9kHz~1GHz       | Aug. 09, 2016    | Sep. 24, 2016 | Aug. 08, 2017 | Radiation (03CH03-KS) |
| Amplifier             | MITEQ        | TTA1840-35-HG | 1887435    | 18GHz~40GHz     | Jan. 20, 2016    | Sep. 24, 2016 | Jan. 19, 2017 | Radiation (03CH03-KS) |
| Amplifier             | Agilent      | 8449B         | 3008A02370 | 1GHz~26.5GHz    | Oct. 24, 2015    | Sep. 24, 2016 | Oct. 23, 2016 | Radiation (03CH03-KS) |
| AC Power Source       | Chroma       | 61601         | F104090004 | N/A             | NCR              | Sep. 24, 2016 | NCR           | Radiation (03CH03-KS) |
| Turn Table            | ChamPro      | EM 1000-T     | 060762-T   | 0~360 degree    | NCR              | Sep. 24, 2016 | NCR           | Radiation (03CH03-KS) |
| Antenna Mast          | ChamPro      | EM 1000-A     | 060762-A   | 1 m~4 m         | NCR              | Sep. 24, 2016 | NCR           | Radiation (03CH03-KS) |

NCR: No Calibration Required

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.5dB |
|----------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.5dB |
|----------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.6dB |
|----------------------------------------------------------------------------|-------|



## Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

| WIFI Ant.                   | Note                                                                                        | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamplifier Factor | Ant Pos | Table Pos | Peak Avg. | Pol.    |
|-----------------------------|---------------------------------------------------------------------------------------------|-----------|------------|------------|------------|------------|----------------|------------|---------------------|---------|-----------|-----------|---------|
| 1                           |                                                                                             | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )     | ( dB )              | ( cm )  | ( deg )   | ( P/A )   | ( H/V ) |
| 802.11g<br>CH 01<br>2412MHz |                                                                                             | 2389.95   | 61.08      | -12.92     | 74         | 65.63      | 27             | 5.47       | 37.02               | 203     | 147       | P         | H       |
|                             | !                                                                                           | 2389.82   | 47.97      | -6.03      | 54         | 52.52      | 27             | 5.47       | 37.02               | 203     | 147       | A         | H       |
|                             | *                                                                                           | 2418      | 105.05     | -          | -          | 109.45     | 27.13          | 5.47       | 37                  | 203     | 147       | P         | H       |
|                             | *                                                                                           | 2418      | 96.62      | -          | -          | 101.02     | 27.13          | 5.47       | 37                  | 203     | 147       | A         | H       |
|                             |                                                                                             | 2389.95   | 61.09      | -12.91     | 74         | 65.64      | 27             | 5.47       | 37.02               | 100     | 62        | P         | V       |
|                             | !                                                                                           | 2389.95   | 48.13      | -5.87      | 54         | 52.68      | 27             | 5.47       | 37.02               | 100     | 62        | A         | V       |
|                             | *                                                                                           | 2420      | 103.69     | -          | -          | 107.94     | 27.26          | 5.48       | 36.99               | 100     | 62        | P         | V       |
|                             | *                                                                                           | 2418      | 95.98      | -          | -          | 100.38     | 27.13          | 5.47       | 37                  | 100     | 62        | A         | V       |
| Remark                      | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |            |            |            |                |            |                     |         |           |           |         |

**2.4GHz 2400~2483.5MHz****WIFI 802.11g (Harmonic @ 3m)**

| WIFI<br>Ant.<br>1 | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|-------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|-------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 802.11g           |                                                                                             | 4824                 | 41.75               | -32.25                  | 74                          | 39.2                      | 31.51                         | 7.72                    | 36.68                      | 100                  | 360                     | P                       | H               |
| CH 01<br>2412MHz  |                                                                                             | 4824                 | 41.95               | -32.05                  | 74                          | 39.4                      | 31.51                         | 7.72                    | 36.68                      | 100                  | 360                     | P                       | V               |
| Remark            | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                         |                             |                           |                               |                         |                            |                      |                         |                         |                 |



## 2.4GHz 2400~2483.5MHz

## Emission below 1GHz

## 2.4GHz WIFI 802.11g (LF)

| WIFI Ant.               | Note                                                                       | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol.    |
|-------------------------|----------------------------------------------------------------------------|-----------|------------|------------|------------|------------|----------------|------------|---------------|---------|-----------|-----------|---------|
| 1                       |                                                                            | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )     | ( dB )        | ( cm )  | ( deg )   | ( P/A )   | ( H/V ) |
| 2.4GHz<br>802.11g<br>LF |                                                                            | 31.94     | 18.88      | -21.12     | 40         | 32.43      | 18.32          | 0.68       | 32.55         | 105     | 197       | P         | H       |
|                         |                                                                            | 45.52     | 16.69      | -23.31     | 40         | 36.24      | 12.22          | 0.83       | 32.6          | -       | -         | P         | H       |
|                         |                                                                            | 111.48    | 18.02      | -25.48     | 43.5       | 35.8       | 13.26          | 1.28       | 32.32         | -       | -         | P         | H       |
|                         |                                                                            | 216.24    | 16.75      | -29.25     | 46         | 35.84      | 11.52          | 1.73       | 32.34         | -       | -         | P         | H       |
|                         |                                                                            | 463.59    | 19.06      | -26.94     | 46         | 30.91      | 17.64          | 2.68       | 32.17         | -       | -         | P         | H       |
|                         |                                                                            | 764.29    | 23.64      | -22.36     | 46         | 30.86      | 21.06          | 3.5        | 31.78         | -       | -         | P         | H       |
|                         |                                                                            | 32.91     | 28.78      | -11.22     | 40         | 42.43      | 18.18          | 0.69       | 32.52         | 199     | 47        | P         | V       |
|                         |                                                                            | 45.52     | 25.81      | -14.19     | 40         | 45.36      | 12.22          | 0.83       | 32.6          | -       | -         | P         | V       |
|                         |                                                                            | 110.51    | 19.56      | -23.94     | 43.5       | 37.35      | 13.25          | 1.27       | 32.31         | -       | -         | P         | V       |
|                         |                                                                            | 168.71    | 20.39      | -23.11     | 43.5       | 38.62      | 12.65          | 1.57       | 32.45         | -       | -         | P         | V       |
|                         |                                                                            | 288.02    | 19.19      | -26.81     | 46         | 34.85      | 14.5           | 2.04       | 32.2          | -       | -         | P         | V       |
|                         |                                                                            | 323.91    | 21.26      | -24.74     | 46         | 35.96      | 15.33          | 2.21       | 32.24         | -       | -         | P         | V       |
| Remark                  | 1. No other spurious found.<br>2. All results are PASS against limit line. |           |            |            |            |            |                |            |               |         |           |           |         |



**Note symbol**

|     |                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| *   | <b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| !   | Test result is <b>over limit</b> line.                                                                                                                   |
| P/A | <b>P</b> eak or <b>A</b> verage                                                                                                                          |
| H/V | <b>H</b> orizontal or <b>V</b> ertical                                                                                                                   |



A calculation example for radiated spurious emission is shown as below:

| WIFI    | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.    |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1       |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11b |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
| CH 01   |      |           |            |        |            |          |          |        |        |        |         |         |         |
| 2412MHz |      | 2390      | 43.54      | -10.46 | 54         | 42.6     | 32.22    | 4.58   | 35.86  | 103    | 308     | A       | H       |

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

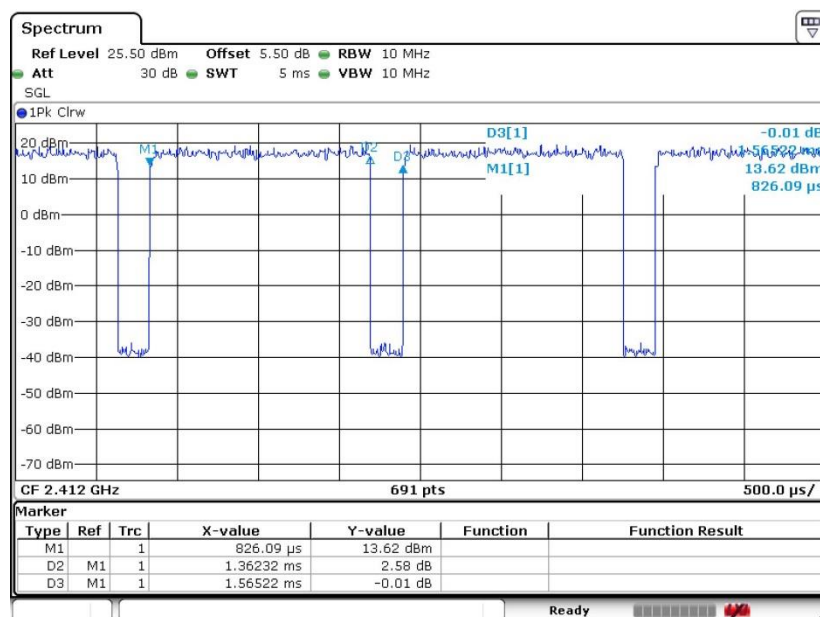
= -10.46(dB)

**Both peak and average measured complies with the limit line, so test result is “PASS”.**

## Appendix B. Duty Cycle Plots

| Band    | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|---------|---------------|-------|----------|-------------|
| 802.11g | 87.04         | 1.36  | 0.73     | 1kHz        |

802.11g





## **Appendix D. Product Equality Declaration**

**Lenovo Mobile Communication Technology Ltd.**

**No.999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech**

**Industry Development Zone, Xiamen, P.R.China**

**Tel: 86-10-58866181; Fax: 86-10-56720293**

**Date: October 26, 2016**

**Product Equality Declaration**

We, Lenovo Mobile Communication Technology Ltd., declare on our sole responsibility for the product of **Lenovo K53b36 (Dual Sim) & Lenovo K53b37(Single Sim)** as below:

The differences between Lenovo K53b36 (Dual Sim) & Lenovo K53b37(Single Sim) and previous as below:

| Object |                                            | 1 <sup>st</sup> Source spec (G5. 5)                                                               | 2 <sup>nd</sup> Source spec (G6. 0)                                                                   |
|--------|--------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| LCD    | The BLU code is not consistent             | Item number code for TL055VDXP64-00                                                               | Item number code for TL055VDMP02-00                                                                   |
|        | BLU protective film color                  | wathet                                                                                            | carmine                                                                                               |
|        | FPC shape difference                       | Bonding pad in FPC LCM appearance shape distance is 1 . 72 , welding positioning hole is circular | Bonding pad in FPC LCM appearance shape distance is 2 . 52 , the welding location hole for semicircle |
|        | FPC jet printing on Mark is not consistent | sprinkle<br>TL055VDXP64-00-FPC1                                                                   | sprinkle<br>TL055VDMP02-00-FPC1                                                                       |
|        | Glass border is not the same               | 1.0border                                                                                         | 0.8border                                                                                             |
|        | IC difference                              | Hx8399c                                                                                           | NT35596                                                                                               |

And also **the variant test (2<sup>nd</sup> Source) reduces WCDMA Band II power level comparing with the original test (2<sup>nd</sup> Source) .**

Except listings above, the others are all the same.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,

*Weiting Sun*

Contact Person: Sun weiting

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