

Variant FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola, Lenovo
MODEL NAME : 9850
FCC ID : IHDT56VF4
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

This is variant report which is only valid together with the original test report. The product was received on Dec. 13, 2016 and testing was completed on Dec. 18, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-D-2010 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.



Prepared by: James Huang / Manager



SPORTON LAB.

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1. Applicant.....	5
1.2. Manufacturer	5
1.3. Product Feature of Equipment Under Test	5
1.4. Product Specification of Equipment Under Test	6
1.5. Modification of EUT	6
1.6. Maximum ERP Power	7
1.7. Specification of Accessory	7
1.8. Testing Location	8
1.9. Applicable Standards	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Test Mode.....	9
2.2 Connection Diagram of Test System	10
2.3 Support Unit used in test configuration	10
3 CONDUCTED TEST RESULT	11
3.1 Measuring Instruments.....	11
3.2 Test Setup	11
3.3 Test Result of Conducted Test.....	11
3.4 Conducted Output Power and ERP	12
4 RADIATED TEST ITEMS	13
4.1 Measuring Instruments.....	13
4.2 Test Setup	13
4.3 Test Result of Radiated Test.....	13
4.4 Field Strength of Spurious Radiation Measurement	14
5 LIST OF MEASURING EQUIPMENT	15
6 UNCERTAINTY OF EVALUATION	16
APPENDIX A. TEST RESULTS OF CONDUCTED TEST	
APPENDIX B. TEST RESULTS OF RADIATED TEST	
APPENDIX C. TEST SETUP PHOTOGRAPHS	
APPENDIX D. PRODUCT EQUALITY DECLARATION	
APPENDIX E. ORIGINAL REPORT	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG6D1302A	Rev. 01	This is a variant report for 9850, the product equality declaration could be referred to Appendix D. Based on the similarity between current and previous, only the worse cases of Conducted Power, ERP and Radiated Spurious Emission from original test report (Sporton Report Number FG693004-03A) were verified for the differences.	Jan. 18, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 5.18 dB at 2508.000 MHz



1 General Description

1.1. Applicant

Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

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	Motorola, Lenovo
Model Name	9850
FCC ID	IHDT56VF4
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/ WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.2 LE
S/N Code	Radiation: N/A
HW Version	DVT2(V5.0)
SW Version	cedric-userdebug 7.0 NPP25.127 859 intcfg,test-keys
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM/GPRS/EDGE: 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM/GPRS/EDGE: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz WCDMA: Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	GSM 850: 32.72 dBm
Antenna Type	PIFA Antenna
Antenna Gain	Cellular Band: 0.73 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (uplink is not supported) DC-HSDPA : 64QAM

1.5. Modification of EUT

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

1.6. Maximum ERP Power

FCC Rule	System	Type of Modulation	Maximum ERP (W)
Part 22H	GSM850 GSM	GMSK	1.3490

1.7. Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola (Acbel)	Model Name	C-P37
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 2	Brand Name	Motorola (Salom)	Model Name	SSW-2919UK C-P37 SPN5940A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 3	Brand Name	Motorola (Salom)	Model Name	SSW-2919EU C-P36 SPN5944A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 4	Brand Name	Motorola (Acbel)	Model Name	C-P35
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 5	Brand Name	Motorola (Salom)	Model Name	SSW-2919UMTJ C-P35 SPN5945A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 6	Brand Name	Motorola (Acbel)	Model Name	C-P48
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 7	Brand Name	Motorola (Salom)	Model Name	SSW-2919AU C-P48 SPN5953A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
Battery 1	Brand Name	Motorola (ATL)	Model Name	GK40
	Power Rating	3.8Vdc, 2685/2800mAh (Min/Typ)	Type	Li-ion
Battery 2	Brand Name	Motorola (Sunwoda)	Model Name	GK40
	Power Rating	3.8Vdc, 2685/2800mAh (Min/Typ)	Type	Li-ion
Earphone	Brand Name	Motorola	Model Name	SJYN1181B
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core		
USB Cable 1	Brand Name	Motorola (Liqi)	Model Name	L25W-051000100AL
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
USB Cable 2	Brand Name	Motorola (Fukangyuan)	Model Name	F25W-051000100A
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		

1.8. Testing Location

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

1.9. Applicable Standards

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

- 47 CFR Part 2, 22(H), 24(E), 27(L)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850.

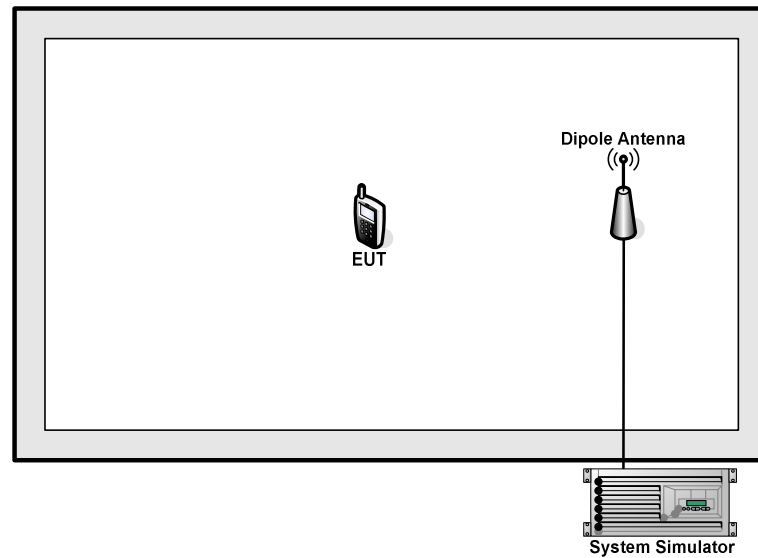
All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	ERP TCs
GSM 850	■ GSM Link	■ GSM Link

2.2 Connection Diagram of Test System

For 22H



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m

3 Conducted Test Result

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP

3.4.1 Description of the Conducted Output Power and ERP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

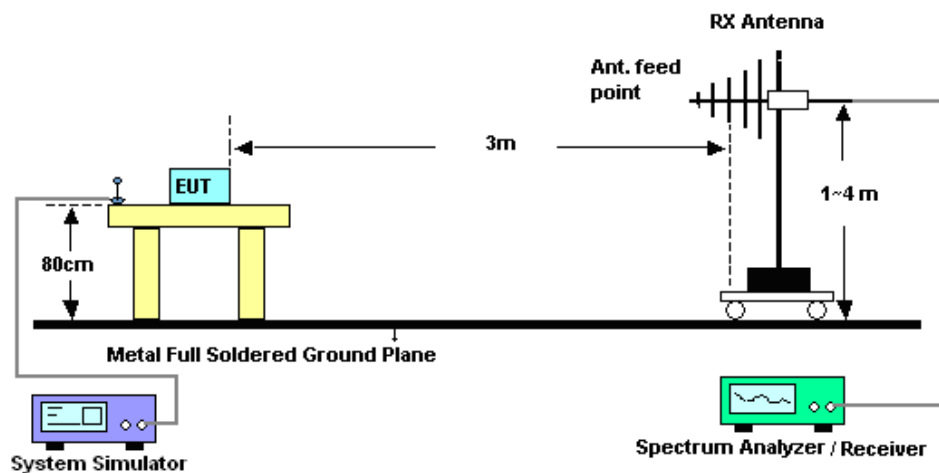
4 Radiated Test Items

4.1 Measuring Instruments

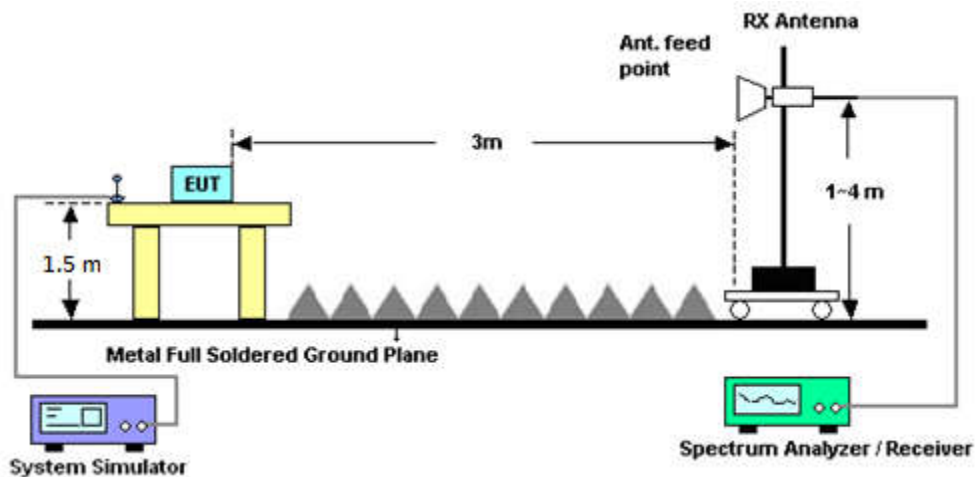
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Dec. 18, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Dec. 18, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Dec. 18, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Dec. 18, 2016	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Dec. 18, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Dec. 18, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Dec. 18, 2016	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 18, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 18, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 18, 2016	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.8 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.3dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power (Average power)

Conducted Power (*Unit: dBm)			
Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	32.72	32.58	32.55
GPRS class 8	32.71	32.57	32.54
GPRS class 10	30.41	30.34	30.33
GPRS class 11	28.35	28.30	28.44
GPRS class 12	26.86	26.85	27.04
EGPRS class 8	26.08	25.98	26.18
EGPRS class 10	23.92	23.90	24.05
EGPRS class 11	22.12	22.10	22.16
EGPRS class 12	21.10	21.00	21.20

**ERP**

GSM850 (GT – LC: 0.73)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency	824.2	836.4	848.8
(MHz)			
Conducted Power (dBm)	32.72	32.58	32.55
Conducted Power (Watts)	1.8707	1.8113	1.7989
ERP(dBm)	31.30	31.16	31.13
ERP(Watts)	1.3490	1.3062	1.2972



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

GSM850 (GSM)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-47.54	-13	-34.54	-48.25	-49.40	1.19	5.20	H
	2508	-24.67	-13	-11.67	-31.15	-26.89	1.53	5.90	H
	3345	-67.26	-13	-54.26	-71.21	-70.05	1.76	6.70	H
	4182	-64.22	-13	-51.22	-68.85	-67.37	1.90	7.20	H
	5019	-63.58	-13	-50.58	-69.81	-68.16	2.17	8.90	H
	5853	-46.73	-13	-33.73	-59.39	-51.97	2.41	9.80	H
	6690	-57.07	-13	-44.07	-74.72	-62.90	2.57	10.55	H
	7527.6	-54.75	-13	-41.75	-75.03	-61.65	2.76	11.81	H
	1672	-46.87	-13	-33.87	-46.89	-48.73	1.19	5.20	V
	2508	-18.18	-13	-5.18	-24.32	-20.40	1.53	5.90	V
	3345	-66.58	-13	-53.58	-69.9	-69.37	1.76	6.70	V
	4182	-41.32	-13	-28.32	-50.25	-44.47	1.90	7.20	V
	5019	-65.10	-13	-52.10	-73.65	-69.68	2.17	8.90	V
	5856	-35.30	-13	-22.30	-50.55	-40.54	2.41	9.80	V
	6690	-57.18	-13	-44.18	-74.55	-63.01	2.57	10.55	V
	7527	-32.60	-12	-20.60	-53.39	-39.49	2.76	11.81	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



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: January 13, 2017

Product Equality Declaration

We, Lenovo Mobile Communication Technology Ltd., declare on our sole responsibility for the product of **Dante-EMEA-APAC SKU** as below:

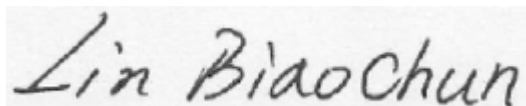
The differences between **Dante-EMEA-APAC SKU** and previous as below:

Object	1 st Source spec		2 nd Source spec	
	Specifications	Supplier	Specifications	Supplier
Battery	GK40	Amperex	GK40	SUNW ODA
Sim Card	Dual Sims and Single Sim	N\A	Only Single Sim	N\A
Band7 Duplexer	B39272B8674P810	EPCOS	SAYEY2G53BA0F0AR05	Murata
Band28A Duplexer	B8538	EPCOS	SAYEY718MBC0F0A	Murata
Band28B Duplexer	B8539	EPCOS	SAYEY733MBC0F0A	Murata
USB Cable	L25W-051000100AL	Liqi	F25W-051000100A	Fukang yuan
Charger	C-P36 (EU) C-P35 (US)	Acbel	SSW-2919EU C-P36 SPN5944A (EU) SSW-2919UMTJ C-P35 SPN5945A (US)	Salom

Except above, the others are all the same.

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

Sincerely yours,



Contact Person: Lin Biaochun

COMPANY: Motorola Mobility LLC.

Tel:86- 18150396560

E-Mail: Linbc@lenovo.com



Appendix E. Original Report

Please refer to Sporton report number FG693004-03A which is issued separately.