FCC SAR Test Report

APPLICANT	:	**Motorola Mobility, LLC**
EQUIPMENT	:	**Mobile Cellular Phone**
BRAND NAME	:	**Motorola**
MODEL NAME	:	**7050**
FCC ID	:	**IHDT56VA1**
STANDARD	:	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2013**

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA620325-02	Rev. 01	Initial issue of report	Apr. 12, 2016
FA620325-02	Rev. 02	1. Update Appendix A 2. Add description for data reuse in section4.2. 3. Revised Bluetooth "column" in section 6.3.	Apr. 29, 2016
FA620325-02	Rev. 03	1. Update Appendix A 2. Updated Highest SAR Summary.	May. 09, 2016

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Mobility, LLC, Mobile Cellular Phone, 7050** are as follows.

Equipment Class	Frequency Band	Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	Product specific (Separation 0mm)	
		1g SAR (W/kg)			10g SAR (W/kg)	
Licensed	GSM850	0.45	0.89	0.75		1.51
	GSM1900	0.38	0.68	0.68		
	WCDMA V	0.40	0.80	0.89		
	LTE Band 5	0.39	0.72	0.74		
DTS	2.4GHz WLAN	1.12	0.18	0.18		1.51
NII	5GHz WLAN	0.63	0.37	0.37	0.67	1.25
DSS	Bluetooth		0.05			0.93

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body, 4.0 W/kg for Product specific) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
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Applicant	
Company Name	Motorola Mobility, LLC
Address	222 W. Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility, LLC
Address	222 W. Merchandise Mart Plaza, Chicago IL 60654 USA

3. Guidance Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	7050
FCC ID	IHDT56VA1
IMEI Code	Sample for WWAN SAR testing: 354117070006055 Sample for WLAN SAR testing: 354117070006194
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 5: 824 MHz ~ 849 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	· GSM/GPRS/EGPRS · RMC/AMR 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · LTE: QPSK, 16QAM · 802.11a/b/g/n HT20/HT40 · Bluetooth v3.0+EDR，Bluetooth v4.0-LE
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark: 1. This device 2.4GHz / 5.2GHz / 5.8GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner), and 5.3GHz / 5.5GHz WLAN supports WiFi Direct (Group Client).	

4.2 Re-use of Measured Data

1. This application re-uses data collected on a similar device. The subject device of this application (Model 7050, FCC ID IHDT56VA1) is electrically identical to the reference device (Model 8028, FCC ID IHDT56VA2) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.
2. For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Operational Description.
3. The re-used SAR data includes the following bands provided in Appendix A (Sporton SAR Report No. FA620325 for the reference device Model 8028, FCC ID IHDT56VA2): GSM850/1900, WCDMA B5, LTE B5, 2.4GHz/5GHz WLAN and Bluetooth.
4. The following bands from the reference device report in Appendix A are not applicable to the Model 7050 (FCC ID IHDT56VA1) subject device of this application: WCDMA B2 and LTE B7.
5. In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the individual cases within each frequency band and test condition (head, body-worn, hotspot and extremity) having maximum reported SAR, for those frequency bands and test conditions where such maximum SAR exceeded half of the FCC allowed value. The spot check test cases and qualifying criteria to confirm equivalence was as follows table.
6. Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.
7. Spot Check Results within one expanded STD uncertainty of reference device.
8. The device from which these reference data are taken is currently in the process of FCC certification, and may not yet be visible on the FCC web system. However , these data representative of the reference device, and are valid for this purpose.

<Spot Check Exposure Condition>

<Head Exposure Condition>

Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)
WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	1	2412

<Hotspot Exposure Condition>

Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)
WCDMA V	RMC 12.2Kbps	Left Side	10mm	4182	836.4

<Body-Worn Exposure Condition>

Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)
GSM850	GPRS (4 Tx slots)	Back	10mm	189	836.4

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	IHDT56VA1
Equipment Name	Mobile Cellular Phone
Operating Frequency Range of each LTE transmission band	LTE Band 05: 824 MHz ~ 849 MHz
Channel Bandwidth	LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz
uplink modulations used	QPSK, and 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset				Note
		Head	Body-worn	Hotspot	Product specific	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		Yes	
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth		Yes		Yes	
6.	GPRS/EDGE + Bluetooth		Yes		Yes	WWAN VoIP
7.	WCDMA+ Bluetooth		Yes		Yes	WWAN VoIP
8.	LTE + Bluetooth		Yes		Yes	WWAN VoIP
9.	GSM Voice + WLAN5GHz	Yes	Yes		Yes	
10.	GPRS/EDGE + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP
11.	WCDMA + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP
12.	LTE + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP

General Note:

1. This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. This device 2.4GHz / 5.2GHz / 5.8GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner), and 5.3GHz / 5.5GHz WLAN supports WiFi Direct (Group Client).
4. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
5. The Scaled SAR summation is calculated based on the same configuration and test position.
6. The worst WWAN and WLAN reported SAR for each configuration was used for SAR summation, Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WWAN and WLAN.
7. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
8. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.

Bluetooth Max Power	Exposure Position	Product specific
12.5 dBm	Estimated SAR (W/kg)	0.302 W/kg

6.1 Head Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
GSM	GSM850	Right Cheek	0.332	1.118	0.633	**1.45**	**0.97**
		Right Tilted	0.244	0.560	0.443	**0.80**	**0.69**
		Left Cheek	0.454	0.531	0.482	**0.99**	**0.94**
		Left Tilted	0.240	0.526	0.537	**0.77**	**0.78**
	GSM1900	Right Cheek	0.375	1.118	0.633	**1.49**	**1.01**
		Right Tilted	0.245	0.560	0.443	**0.81**	**0.69**
		Left Cheek	0.336	0.531	0.482	**0.87**	**0.82**
		Left Tilted	0.252	0.526	0.537	**0.78**	**0.79**
WCDMA	WCDMA V	Right Cheek	0.396	1.118	0.633	**1.51**	**1.03**
		Right Tilted	0.262	0.560	0.443	**0.82**	**0.71**
		Left Cheek	0.352	0.531	0.482	**0.88**	**0.83**
		Left Tilted	0.218	0.526	0.537	**0.74**	**0.76**
LTE	LTE Band 5	Right Cheek	0.370	1.118	0.633	**1.49**	**1.00**
		Right Tilted	0.272	0.560	0.443	**0.83**	**0.72**
		Left Cheek	0.393	0.531	0.482	**0.92**	**0.88**
		Left Tilted	0.272	0.526	0.537	**0.80**	**0.81**

6.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
GSM	GSM850	Front	0.525	0.145	0.067	**0.67**	**0.59**
		Back	0.724	0.184	0.366	**0.91**	**1.09**
		Left side	0.746	0.093	0.260	**0.84**	**1.01**
		Right side	0.596			**0.60**	**0.60**
		Top side		0.125	0.128	**0.13**	**0.13**
		Bottom side	0.056			**0.06**	**0.06**
	GSM1900	Front	0.558	0.145	0.067	**0.70**	**0.63**
		Back	0.680	0.184	0.366	**0.86**	**1.05**
		Left side	0.237	0.093	0.260	**0.33**	**0.50**
		Right side	0.198			**0.20**	**0.20**
		Top side		0.125	0.128	**0.13**	**0.13**
		Bottom side	0.336			**0.34**	**0.34**
WCDMA	WCDMA V	Front	0.537	0.145	0.067	**0.68**	**0.60**
		Back	0.626	0.184	0.366	**0.81**	**0.99**
		Left side	0.889	0.093	0.260	**0.98**	**1.15**
		Right side	0.520			**0.52**	**0.52**
		Top side		0.125	0.128	**0.13**	**0.13**
		Bottom side	0.087			**0.09**	**0.09**
LTE	LTE Band 5	Front	0.631	0.145	0.067	**0.78**	**0.70**
		Back	0.718	0.184	0.366	**0.90**	**1.08**
		Left side	0.736	0.093	0.260	**0.83**	**1.00**
		Right side	0.554			**0.55**	**0.55**
		Top side		0.125	0.128	**0.13**	**0.13**
		Bottom side	0.101			**0.10**	**0.10**

6.3 Product specific Exposure Conditions

1	2	3	4	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)	1+4 Summed 10g SAR (W/kg)
WWAN	2.4GHz WLAN	5GHz WLAN	2.4GHz Bluetooth			
10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	Estimated 10g SAR (W/kg)			
-	-	0.670	0.302	**-**	**0.67**	**0.30**

Remark:

1. According to KDB 648474 D04v01r03, for WWAN / 2.4GHz WLAN / Bluetooth hand SAR ("-") was excluded, due to SAR was < 1.2W/kg.

6.4 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 2.4GHz Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
GSM	GSM850	Front	0.525	0.145	0.067	0.048	**0.67**	**0.59**	**0.57**
		Back	0.885	0.184	0.366	0.046	**1.07**	**1.25**	**0.93**
	GSM1900	Front	0.558	0.145	0.067	0.048	**0.70**	**0.63**	**0.61**
		Back	0.680	0.184	0.366	0.046	**0.86**	**1.05**	**0.73**
WCDMA	WCDMA V	Front	0.537	0.145	0.067	0.048	**0.68**	**0.60**	**0.59**
		Back	0.802	0.184	0.366	0.046	**0.99**	**1.17**	**0.85**
LTE	LTE Band 5	Front	0.631	0.145	0.067	0.048	**0.78**	**0.70**	**0.68**
		Back	0.718	0.184	0.366	0.046	**0.90**	**1.08**	**0.76**

Test Engineer： Poa Pan, Kurt Liu, Nick Yu, Bevis Chang, Lawrence Chen, Thomas Wang, Iran Wang and Steven Chang

7. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[8] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[9] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[12] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.