



# FCC RF Test Report

**APPLICANT** : Motorola Mobility LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : XT2005-5, XT2005-1PP, XT2005-1  
**FCC ID** : IHDT56YA1  
**STANDARD** : 47 CFR Part 2, and 90(S)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

This is a data re-used report which is only valid together with the original test report. The product was received on Feb. 21, 2019 and completely tested on Mar. 08, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown 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.



Approved by: James Huang / Manager

**Sporton International (Kunshan) Inc.**  
**No. 1098, Pengxi North Road, Kunshan Economic Development Zone,**  
**Jiangsu Province 215335, China**



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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW922110-02B	Rev. 01	Initial issue of report	May 09, 2019



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	§2.1046	Conducted Output Power	Reporting only	Not Required	1
-	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	Not Required	1
-	§2.1051 §90.691	Emission masks – In-band emissions	$< 50+10\log_{10}(P[\text{Watts}])$	Not Required	1
-	§2.1051 §90.691	Emission masks – Out of band emissions	$< 43+10\log_{10}(P[\text{Watts}])$	Not Required	1
3.1	§2.1053 §90.691	Field Strength of Spurious Radiation	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 51.90 dB at 2444.000 MHz
-	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	$< 2.5 \text{ ppm}$	Not Required	1

**Remark 1:** Test items are performed on original report which can be referred to Sporton report number FW922110B.



# 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 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2005-5, XT2005-1PP, XT2005-1
FCC ID	IHDT56YA1
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth BR / EDR / LE FM Receiver/GNSS
MEID Code	Radiation: 352178100007283
HW Version	88941-1-12
SW Version	fastboot_surfna_oem_userdebug_9_PPB29.12_2fc78_intcf g-test-keys_oem
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

Product Specification subjective to this standard	
Tx Frequency	814.7 ~ 823.3 MHz
Rx Frequency	859.7 ~ 868.3 MHz
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz
Antenna Type	Coupling type (LDS) antenna
Type of Modulation	QPSK / 16QAM / 64QAM



### 1.5 Modification of EUT

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

### 1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola(Acbel)	Model Name	SC-61
	Power Rating	I/P: 100-240 Vac, 130mA ; O/P: 5Vdc,1000mA		
AC Adapter 2	Brand Name	Motorola (Chenyang)	Model Name	SC-61
	Power Rating	I/P: 100-240 Vac, 130mA ; O/P: 5Vdc,1000mA		
Battery 1	Brand Name	Motorola(ATL)	Model Name	KE40
	Power Rating	3.8Vdc, 2820/3000mAh (Rated/typ)	Type	Li-ion
Battery 2	Brand Name	Motorola(Sunwoda)	Model Name	KE40
	Power Rating	3.8Vdc, 2820/3000mAh (Rated/typ)	Type	Li-ion
USB Cable	Brand Name	Motorola (SaiBao)	Model Name	711310002241
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		



## 1.7 Re-use of Measured Data

### 1.7.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2005-5, XT2005-1PP, XT2005-1, FCC ID: IHDT56YA1) is electrically identical to the reference device (Model: XT2005-3, FCC ID: IHDT56YA3) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

### 1.7.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix C (Sporton RF Report No. FW922110B for the reference device Model: XT2005-3, FCC ID: IHDT56YA3).

### 1.7.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
PCE (CDMA BC10)	IHDT56YA3	Part90S(FW922110A)	All sections applicable except RSE
PCE (LTE Band 26)	IHDT56YA3	Part90S(FW922110B)	All sections applicable except RSE

### 1.7.4 Spot Check Verification Data Section

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 for Conducted Power, the test result were consistent with FCC ID: IHDT56YA3.

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.

Test Item	Mode	IHDT56YA3 Worst Result	IHDT56YA1 Worst Result	Difference (dB)
Average Conducted Power (dBm)	CDMA BC10	24.60	24.33	0.27
	LTE Band 26	23.27	23.03	0.24



### 1.8 Testing Site

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0).

<b>Test Site</b>	Sporton International (Kunshan) Inc.		
<b>Test Site Location</b>	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH06-KS	CN5013	630927

### 1.9 Applied Standards

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

- ♦ 47 CFR Part 2, 90(S)
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

**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

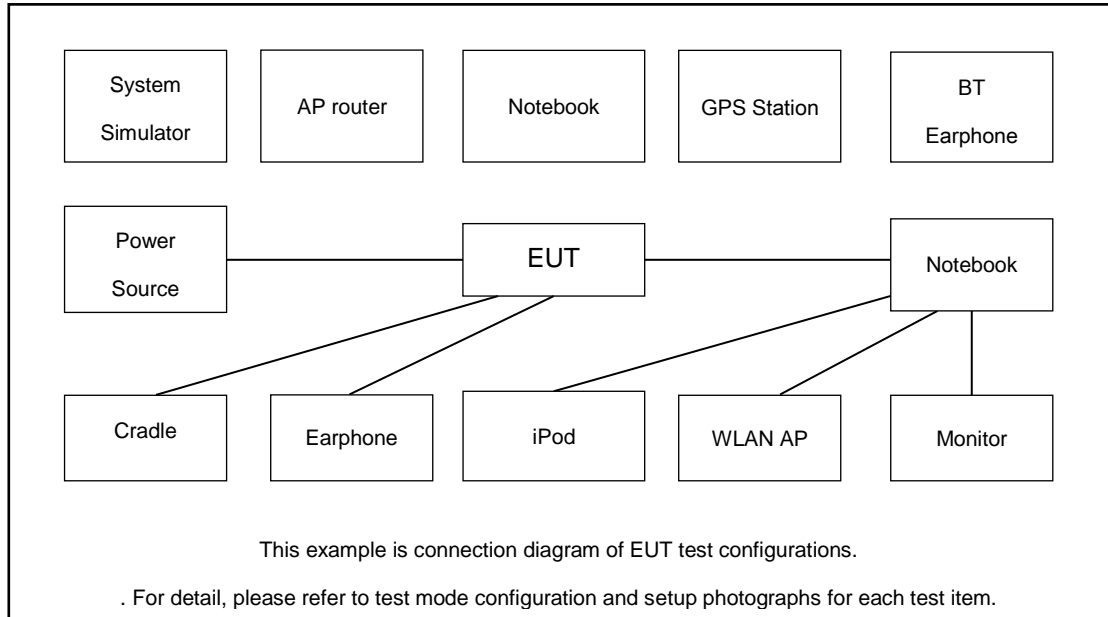
### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is 30 MHz to 10th harmonic

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	26			v				v			v			v	v	v
					v			v			v				v	
Note	<ol style="list-style-type: none"> <li>The mark "v " means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.</li> </ol>															

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8m

## 2.4 Frequency List of Low/Middle/High Channels

LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26765	-	-
	Frequency	821.5	-	-
10	Channel	-	26740	-
	Frequency	-	819	-
5	Channel	26715	26740	26765
	Frequency	816.5	819	821.5
3	Channel	26705	26740	26775
	Frequency	815.5	819	822.5
1.4	Channel	26697	26740	26783
	Frequency	814.7	819	823.3



### 3 Test Result

#### 3.1 Field Strength of Spurious Radiation Measurement

##### 3.1.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

##### 3.1.2 Measuring Instruments

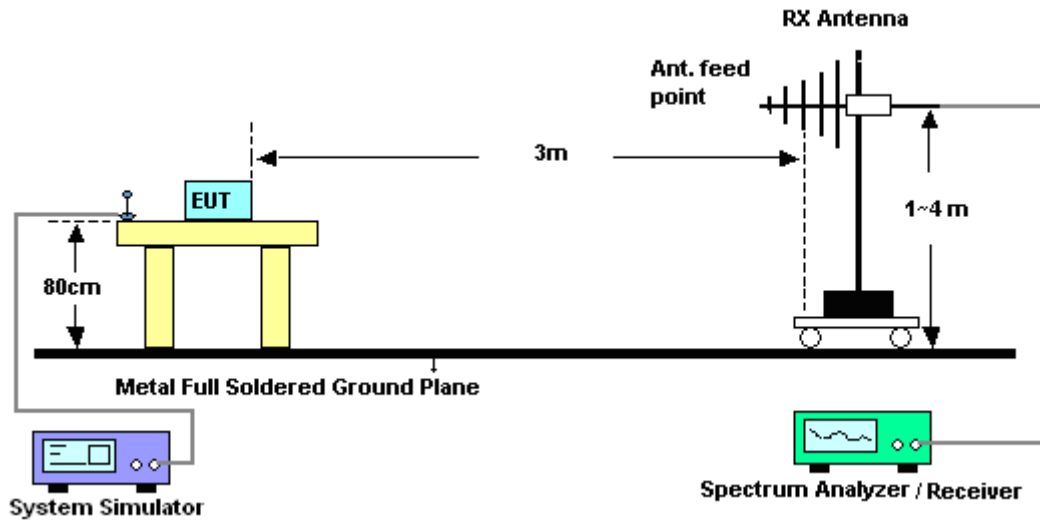
The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

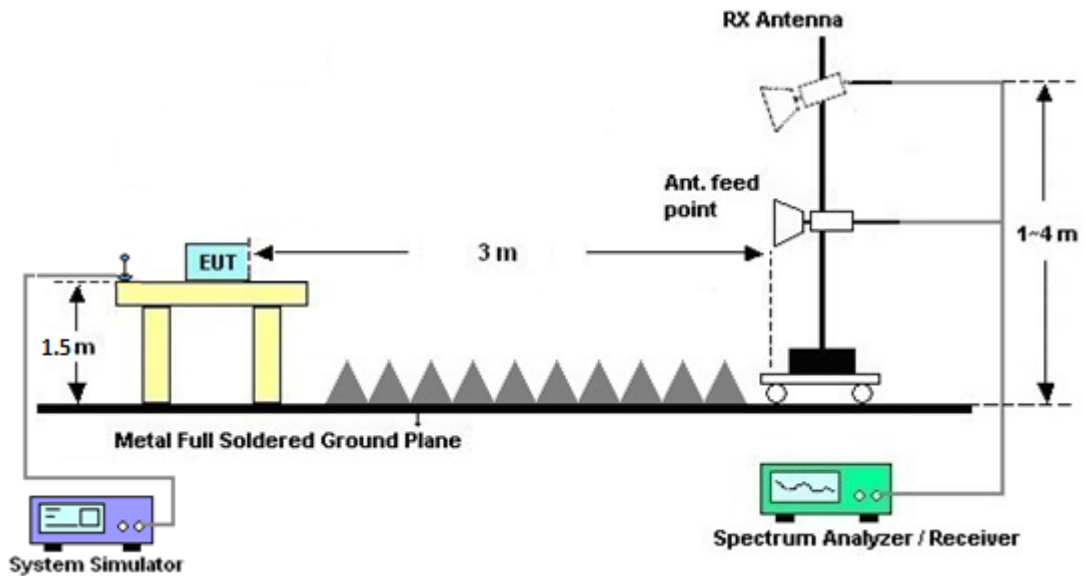
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10.  $EIRP (dBm) = S.G. Power - Tx Cable Loss + Tx Antenna Gain$
11.  $ERP (dBm) = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

### 3.1.4 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



### 3.1.5 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix A.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010B	MY5747108 4	10Hz-44GHz	Oct. 09, 2018	Mar. 08, 2019	Oct. 08, 2019	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Mar. 08, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 20, 2018	Mar. 08, 2019	Oct. 19, 2019	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Mar. 08, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2018	Mar. 08, 2019	Aug. 05, 2019	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30- 10P	2025788	1Ghz-18Ghz	Apr. 17, 2018	Mar. 08, 2019	Apr. 16, 2019	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY5327020 3	500MHz~26.5G Hz	Apr. 18, 2018	Mar. 08, 2019	Apr. 17, 2019	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35 -HG	2014749	18~40GHz	Jan. 14, 2019	Mar. 08, 2019	Jan. 13, 2020	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 08, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 08, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 08, 2019	NCR	Radiation (03CH06-KS)

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.5dB
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.0dB
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### Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.0dB
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## Appendix A. Test Results of Radiated Test

### Radiated Spurious Emission

LTE Band 26 / 5MHz / QPSK / RB Size 1 Offset 0								
Channel	Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi)	Polarization (H/V)
Lowest	1628	-68.97	-13	-55.97	-70.18	2.32	5.68	H
	2444	-65.80	-13	-52.80	-66.43	3.02	5.80	H
	3258	-65.78	-13	-52.78	-68.24	3.27	7.88	H
	1628	-69.00	-13	-56.00	-70.21	2.32	5.68	V
	2444	-66.09	-13	-53.09	-66.72	3.02	5.80	V
	3258	-65.83	-13	-52.83	-68.29	3.27	7.88	V
Middle	1634	-68.99	-13	-55.99	-70.20	2.32	5.68	H
	2450	-66.06	-13	-53.06	-66.69	3.02	5.80	H
	3270	-65.43	-13	-52.43	-67.89	3.27	7.88	H
	1634	-68.91	-13	-55.91	-70.12	2.32	5.68	V
	2450	-66.43	-13	-53.43	-67.06	3.02	5.80	V
	3270	-65.39	-13	-52.39	-67.85	3.27	7.88	V
Highest	1638	-68.49	-13	-55.49	-69.70	2.32	5.68	H
	2458	-65.92	-13	-52.92	-66.55	3.02	5.80	H
	3276	-65.93	-13	-52.93	-68.39	3.27	7.88	H
	1638	-68.58	-13	-55.58	-69.79	2.32	5.68	V
	2458	-65.99	-13	-52.99	-66.62	3.02	5.80	V
	3276	-65.51	-13	-52.51	-67.97	3.27	7.88	V

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

LTE Band 26 / 10MHz / QPSK / RB Size 1 Offset 0								
Channel	Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi)	Polarization (H/V)
Middle	1630	-67.60	-13	-54.60	-68.81	2.32	5.68	H
	2444	-64.90	-13	-51.90	-65.53	3.02	5.80	H
	3258	-65.55	-13	-52.55	-68.01	3.27	7.88	H
	1630	-67.90	-13	-54.90	-69.11	2.32	5.68	V
	2444	-65.07	-13	-52.07	-65.70	3.02	5.80	V
	3258	-65.55	-13	-52.55	-68.01	3.27	7.88	V

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



## **Appendix C. Reference Report**

Please refer to Sporton report number FW922110B which is issued separately.