



Variant FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : 9839
FCC ID : IHDT56VE3
STANDARD : 47 CFR Part 2, 22(H), 27(M)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

This is a variant report which is only valid together with the original test report. The product was received on Dec. 10, 2016 and completely tested on Dec. 24, 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 the testing has shown the tested sample to be 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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG6O1212-12B	Rev. 01	This is a variant report for 9839. 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, EIRP and Radiated Spurious Emission from original test report (Sporton Report Number FG6O1212-05B) were verified for the differences. The Conducted item of LTE band7 re-use data collected on Model: 9370, 9842, FCC ID: IHDT56VE2(Sporton Report Number FG6O1212-11B)	Jan. 13, 2017

**SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7)	EIRP < 2Watt	PASS	-
4.4	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	$< 55 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 31.54 dB at 10125.000 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
Model Name	9839
FCC ID	IHDT56VE3
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/NFC/ WLAN2.4GHz 802.11b/g/n HT20/ WLAN5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0+EDR/Bluetooth v4.0 LE/ Bluetooth v4.2 LE
IMEI Code	Conducted: 351856080011174 Radiation: 351862080041773/351862080041781
HW Version	DVT2
SW Version	potter_oem_userdebug_7.0_NPN25.124_1787_intcfg-test-keys_oem
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz
Rx Frequency	LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz
Bandwidth	LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power	LTE Band 7 : 23.34 dBm
Antenna Gain	LTE Band 7 : 2.51 dBi
Type of Modulation	QPSK / 16QAM

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	Brand Name	Motorola(Salom)	Model Name	SSW-2680BR
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5 Vdc,1600mA or 9Vdc,1600mA or 12Vdc,1200mA		
Battery	Brand Name	motorola(SUNWODA)	Model Name	HG40
	Power Rating	3.8Vdc,2810/3000mAh (Min/Typ)	Type	Li-ion
USB Cable	Brand Name	Motorola	Model Name	SKN6461A
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
Earphone	Brand Name	Motorola (Jiangxi Lianchuang)	Model Name	MEMD1532B080008
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core		
DTV Dongle	Signal Line Type	0.16 meter, non-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: 9839, FCC ID: IHDT56VE3) is electrically identical to the reference device (9370, 9842, FCC ID: IHDT56VE2) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

1.7.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., some difference of population/depopulation to enable support of different cellular bands, please refer to the Operational Description.

1.7.3 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 Conducted of LTE band7, the test result were consistent with FCC ID: IHDT56VE2.

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.

1.7.4 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test/RF Exposure	Report Title/Section
PCE (LTE Band7)	IHDT56VE2	Part27M (FG6O1212-11B)	Conducted



1.8 Maximum EIRP Power

LTE Band 7		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
15	2507.5 ~ 2562.5	0.3846	0.2799

1.9 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.
	TH01-KS	03CH03-KS	306251

1.10 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), 27(M)
- ♦ 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

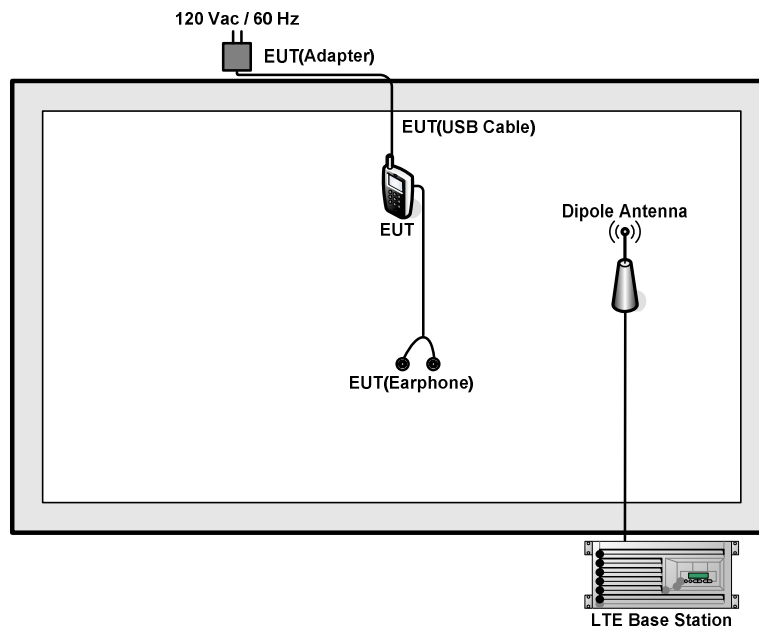
2.1 Test Mode

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

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

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	7	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E.R.P./ E.I.R.P.	7	-	-			✓		✓	✓	✓			✓	✓	✓
Radiated Spurious Emission	7	-	-			✓		✓		✓				✓	
Note	- The mark "✓" means that this configuration is chosen for testing - The mark "-" means that this bandwidth is not supported. - The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m



2.4 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
15	Channel	20825	21100	21375
	Frequency	2507.5	2535	2562.5
10	Channel	20800	21100	21400
	Frequency	2505	2535	2565
5	Channel	20775	21100	21425
	Frequency	2502.5	2535	2567.5

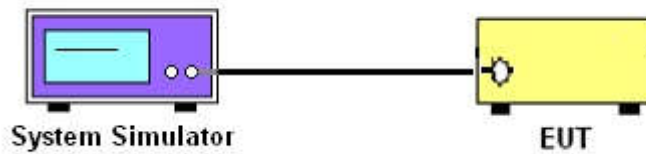
3 Conducted Test Items

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 EIRP

3.4.1 Description of the Conducted Output Power Measurement and EIRP Measurement

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

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 7.

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 the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

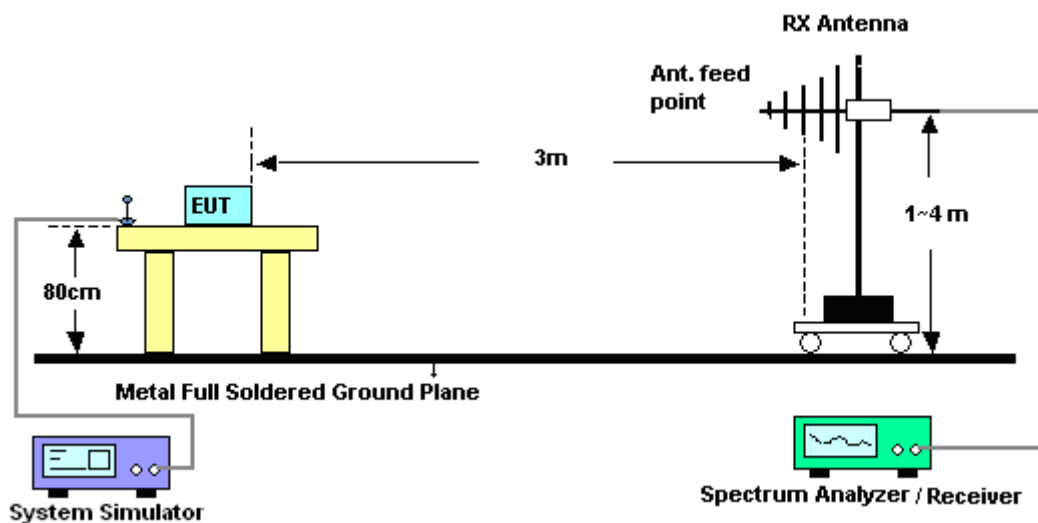
4 Radiated Test Items

4.1 Measuring Instruments

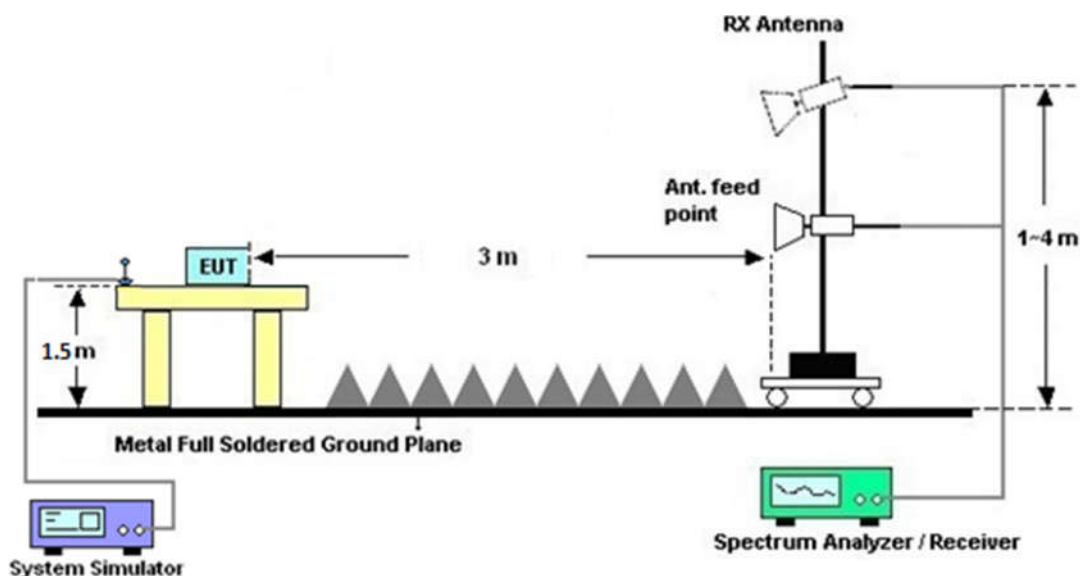
See list of measuring instruments of this test report.

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 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-D-2010. 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.

For Band 7

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 $55 + 10 \log (P)$ 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 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
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, 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. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.

11. For Band 7, 38, 41:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $EIRP$ (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
 ERP (dBm) = $EIRP - 2.15$



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. 24, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Dec. 24, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Dec. 24, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Dec. 24, 2016	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Dec. 24, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Dec. 24, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Dec. 24, 2016	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 24, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 24, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 24, 2016	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (25 MHz ~ 1000 MHz)

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

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)

LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.98	22.93	22.78
20	1	49		23.28	23.32	23.33
20	1	99		22.86	22.90	22.93
20	50	0		22.31	22.21	22.32
20	50	24		22.23	22.14	22.25
20	50	50		22.18	22.17	22.30
20	100	0		22.16	22.15	22.25
20	1	0	16-QAM	21.78	21.68	21.62
20	1	49		21.84	21.40	21.86
20	1	99		21.83	21.49	21.77
20	50	0		21.34	21.15	21.36
20	50	24		21.28	21.17	21.34
20	50	50		21.22	21.14	21.40
20	100	0		21.20	21.17	21.22
15	1	0	QPSK	23.16	23.11	23.13
15	1	37		23.27	23.30	23.34
15	1	74		23.19	23.10	23.14
15	36	0		22.34	22.24	22.26
15	36	20		22.29	22.10	22.41
15	36	39		22.36	22.16	22.36
15	75	0		22.31	22.19	22.31
15	1	0	16-QAM	21.82	21.81	21.88
15	1	37		21.93	21.90	21.96
15	1	74		21.77	21.81	21.95
15	36	0		21.32	21.19	21.22
15	36	20		21.26	21.16	21.38
15	36	39		21.32	21.12	21.45
15	75	0		21.36	21.34	21.26



LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.72	22.82	22.98
10	1	25		23.27	23.30	23.31
10	1	49		22.91	22.71	23.02
10	25	0		22.25	22.19	22.36
10	25	12		22.29	22.08	22.45
10	25	25		22.29	22.12	22.35
10	50	0		22.28	22.14	22.39
10	1	0	16-QAM	21.81	21.91	21.90
10	1	25		21.94	21.78	21.95
10	1	49		21.89	21.71	21.93
10	25	0		21.34	21.29	21.55
10	25	12		21.30	21.16	21.56
10	25	25		21.57	21.22	21.64
10	50	0		21.34	21.12	21.50
5	1	0	QPSK	22.58	22.63	22.70
5	1	12		23.23	23.14	23.19
5	1	24		22.75	22.59	22.81
5	12	0		22.14	22.01	22.31
5	12	7		22.31	22.08	22.35
5	12	13		22.26	22.04	22.26
5	25	0		22.22	22.10	22.35
5	1	0	16-QAM	21.96	21.94	21.95
5	1	12		21.89	21.76	21.95
5	1	24		21.80	21.67	21.86
5	12	0		21.13	21.04	21.32
5	12	7		21.39	21.20	21.38
5	12	13		21.43	21.24	21.31
5	25	0		21.37	21.26	21.42

**ERP/EIRP**

LTE Band 7 ($G_T - L_C = 2.51$ dB) QPSK			
Bandwidth	15M		
Channel	20825	21100	21375
	(Low)	(Mid)	(High)
Frequency	2507.5	2535	2562.5
(MHz)			
Conducted Power (dBm)	23.27	23.30	23.34
Conducted Power (Watts)	0.2123	0.2138	0.2158
EIRP(dBm)	25.78	25.81	25.85
EIRP(Watts)	0.3784	0.3811	0.3846

LTE Band 7 ($G_T - L_C = 2.51$ dB) 16QAM			
Bandwidth	15M		
Channel	20825	21100	21375
	(Low)	(Mid)	(High)
Frequency	2507.5	2535	2562.5
(MHz)			
Conducted Power (dBm)	21.93	21.90	21.96
Conducted Power (Watts)	0.1560	0.1549	0.1570
EIRP(dBm)	24.44	24.41	24.47
EIRP(Watts)	0.2780	0.2761	0.2799



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 7 / 10MHz / QPSK / RB Size 1 Offset 0									
Channel	Frequency (MHz)	EIRP (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	5061.18	-64.16	-25	-39.16	-73.38	-70.72	2.41	8.97	H
	7592	-60.84	-25	-35.84	-74.54	-69.84	2.86	11.86	H
	10125	-57.76	-25	-32.76	-76.11	-66.66	3.21	12.11	H
	5061.18	-64.51	-25	-39.51	-73.22	-71.07	2.41	8.97	V
	7592	-59.58	-25	-34.58	-74.21	-68.58	2.86	11.86	V
	10125	-56.54	-25	-31.54	-75.94	-65.44	3.21	12.11	V

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



Appendix D. Product Equality Declaration



Appendix E. Reference Report

Please refer to Sporton report number FG6O1212-05B which is issued separately.

Please refer to Sporton report number FG6O1212-11B.