



CERTIFICATION TEST REPORT

Report Number. : 12737383-E1V3

Applicant : Samsung Electronics Co., Ltd.
129 Samsung-Ro, Yeongtong-Gu,
Suwon-Si, Gyeonggi-Do, 16677, Korea

Model : SM-A7050

FCC ID : A3LSMA7050

EUT : GSM/CDMA/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and
Description NFC

Test : FCC CFR47 PART 22 SUBPART H
Standard(s) FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART M
FCC CFR47 PART 15 SUBPART B

Date Of Issue:

APRIL 03, 2019

Prepared by:

UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888



NVLAP Lab code: 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	3/27/2019	Initial Review	--
V2	3/29/2019	Updated Sections 1, 6.2, 6.5, and 8	Steven Tran
V3	4/3/2019	Updated Sections 2.1 and 2.2	Dan Corona

TABLE OF CONTENTS

TABLE OF CONTENTS	3
1. ATTESTATION OF TEST RESULTS	6
2. INTRODUCTION OF TEST DATA REUSE	7
2.1. INTRODUCTION	7
2.2. DIFFERENCE	7
2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY	7
2.4. REFERENCE DETAIL	14
3. TEST METHODOLOGY	15
4. FACILITIES AND ACCREDITATION	15
5. CALIBRATION AND UNCERTAINTY	16
5.1. MEASURING INSTRUMENT CALIBRATION	16
5.2. SAMPLE CALCULATION	16
5.3. MEASUREMENT UNCERTAINTY	16
6. EQUIPMENT UNDER TEST	17
6.1. DESCRIPTION OF EUT	17
6.2. MAXIMUM OUTPUT POWER	17
6.3. SOFTWARE AND FIRMWARE	20
6.4. MAXIMUM ANTENNA GAIN	20
6.5. WORST-CASE CONFIGURATION AND MODE	21
6.6. DESCRIPTION OF TEST SETUP	22
7. TEST AND MEASUREMENT EQUIPMENT	25
8. RF OUTPUT POWER VERIFICATION	27
8.1. GSM	27
8.1.1. GSM850	28
8.1.2. GSM1900	28
8.2. CDMA	29
8.2.1. CDMA BC0	31
8.3. WCDMA	32
8.3.1. WCDMA BAND5	36
8.3.2. WCDMA BAND2	37
8.4. LTE	38

8.4.1.	LTE 5	40
8.4.2.	LTE 41 (FCC).....	42
9.	CONDUCTED TEST RESULTS	44
9.1.	OCCUPIED BANDWIDTH.....	44
9.1.1.	GSM.....	47
9.1.2.	CDMA BC0.....	48
9.1.3.	WCDMA	49
9.1.4.	LTE BAND 5.....	50
9.1.5.	LTE BAND 41.....	52
9.2.	BAND EDGE AND EMISSION MASK.....	54
9.2.1.	GSM850	55
9.2.2.	GSM1900	56
9.2.3.	CDMA BC0.....	57
9.2.4.	WCDMA BAND5	58
9.2.5.	WCDMA BAND2	59
9.2.6.	LTE BAND 5 BANDEDGE.....	60
9.2.7.	LTE BAND 41 ADJACENT CHANNEL POWER	68
9.3.	OUT OF BAND EMISSIONS	76
9.3.1.	GSM GSM850	77
9.3.2.	GSM GSM1900	79
9.3.3.	CDMA BC0.....	81
9.3.4.	WCDMA BAND5	82
9.3.5.	WCDMA BAND2	84
9.3.6.	LTE BAND 5.....	86
9.3.7.	LTE BAND 41.....	90
9.4.	FREQUENCY STABILITY	94
9.4.1.	GSM.....	95
9.4.2.	CDMA	97
9.4.3.	WCDMA	98
9.4.4.	LTE BAND 5.....	100
9.4.5.	LTE BAND 41.....	101
9.5.	PEAK TO AVERAGE RATIO	102
9.5.1.	GSM.....	103
9.5.2.	CDMA	104
9.5.3.	WCDMA	105

9.5.4.	LTE BAND 5.....	106
9.5.5.	LTE BAND 41.....	108
10.	RADIATED TEST RESULTS.....	110
10.1.2.	CDMA.....	116
11.	APPENDIX A: PRE-SCAN DATA FOR 15B RECEIVER MODE	135
11.1.	GSM 850.....	135
11.1.1.	BELOW 1GHz.....	135
11.1.2.	ABOVE 1GHz	141
12.	SETUP PHOTOS.....	147
12.1.	A3LSMA705FN (Original)	147
12.1.	A3LSMA7050 (Spot Check).....	149
13.	RADIATED MEASUREMENT SETUP AND XYZ	149

1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA		
Model	SM-A7050		
FCC ID	A3LSMA7050		
EUT Description	GSM/CDMA/WCDMA/LTE PHONE WITH BT, DTS/UNII a/b/g/n/ac, ANT+ AND NFC		
Serial Number	R38M20759DP(CONDUCTED), R38M2074Q7T, R38M207598Z(RADIATED)		
Date Tested	FEBRUARY 26, 2019 to MARCH 11, 2019		
Applicable Standards	FCC CFR 47 PART 22H, 24E, and 27M		
Test Results	Complies		
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.			
Approved & Released For UL Verification Services Inc. By:  DAN CORONIA		Reviewed By:  STEVEN TRAN	
Operations Leader Consumer Technology Division UL Verification Services Inc.		Project Engineer Consumer Technology Division UL Verification Services Inc.	

2. INTRODUCTION OF TEST DATA REUSE

2.1. INTRODUCTION

According to the manufacturer, FCC ID: A3LSMA705FN and FCC ID: A3LSMA7050 licensed radios are electrically identical. The FCC ID: A3LSMA705FN test data shall remain representative of FCC ID: A3LSMA7050.

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

2.2. DIFFERENCE

Difference between A3LSMA705FN and A3LSMA7050:

Samsung Electronics Co. Ltd. declares that A3LSMA7050 SAW Filter is added and updated. Please refer to Product Equality Declaration for more details.

The FCC ID: A3LSMA705FN, shares the same enclosure and circuit board as FCC ID: A3LSMA7050. The licensed antennas and surrounding circuitry and layout are identical between two models.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMG705FN remains representative of FCC ID: A3LSMA7050. The test data of FCC ID: A3LSMG705FN being submitted for this application to cover licensed bands.

2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device A3LSMA7050 for radiated harmonic spurious. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary below.

Comparison of two models, upper deviation is within 3dB range and all tests are under FCC Technical Limits. The PRx SAW Filter is added and DRx SAW filter is changed

SPOT CHECK DATA

A3LSMA7050 SPOT CHECK RESULTS							
Technology	Mode	Test Item	Channel	Measured	A3LSMA705FN	A3LSMA7050	Delta (dB)
				Frequency GHz	Peak (dBm)	Peak (dBm)	
GSM	GPRS 850	RSE	824.2 MHz	1648 MHz	-45.48	-48.74	-3.26
	GPRS 1900	RSE	1880 MHz	3760 MHz	-38.69	-42.34	-3.65
	EGPRS 850	RSE	836.6 MHz	1673 MHz	-51.63	-54.52	-2.89
	EGPRS 1900	RSE	1880 MHz	5640 MHz	-42.24	-48.37	-6.13
WCDMA	REL99 B5	RSE	826.4 MHz	3308 MHz	-56.51	-57.76	-1.25
	REL99 B2	RSE	1880 MHz	3763 MHz	-55.05	-53.93	1.12
	HSDPA B5	RSE	826.4 MHz	2480 MHz	-55.31	-59.68	-4.37
	HSDPA B2	RSE	1907.6 MHz	7634 MHz	-55.91	-55.71	0.2

A3LSMA7050 SPOT CHECK RESULTS							
Technology	Mode	Test Item	Channel	Measured	A3LSMA705FN	A3LSMA7050	Delta (dB)
				Frequency GHz	Peak (dBm)	Peak (dBm)	
LTE 5	QPSK @ 10MHz BW	RSE	836.5 MHz	3333 MHz	-56.98	-58.57	-1.59
	16QAM @ 10MHz BW	RSE	844 MHz	2532 MHz	-56.73	-59.35	-2.62

SPOT CHECK DATA
HARMONICS AND SPURIOUS EMISSIONS

GSM

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	GPRS 850
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
824.2MHz												
1	1.648	-56.24	Pk	28.3	-33.3	12.5	-48.74	-13	-35.74	0-360	149	H
2	1.648	-63.22	Pk	28.3	-33.3	11.4	-56.82	-13	-43.82	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	EGPRS 850
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
836.6MHz												
1	1.673	-62.12	Pk	29	-33	11.6	-54.52	-13	-41.52	0-360	149	H
2	1.673	-65.37	Pk	29.1	-33	10.9	-58.37	-13	-45.37	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	GPRS 1900
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1880MHz												
1	3.76	-57.63	Pk	33	-30	11.8	-42.83	-13	-29.83	0-360	149	H
2	3.76	-57.14	Pk	33	-30	11.8	-42.34	-13	-29.34	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	EGPRS 1900
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1880MHz												
1	5.64	-66.57	Pk	35	-28.6	11.8	-48.37	-13	-35.37	0-360	148	H
2	5.64	-67	Pk	35	-28.6	11.9	-48.7	-13	-35.7	0-360	149	V

WCDMA

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	REL99 B5
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
826.4MHz												
1	3.308	-73.3	Pk	32.7	-30.9	11.6	-59.9	-13	-46.9	0-360	149	H
2	3.31	-71.46	Pk	32.7	-30.9	11.9	-57.76	-13	-44.76	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	HSDPA B5
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
826.4MHz												
1	2.481	-71.38	Pk	32.4	-32	11.3	-59.68	-13	-46.68	0-360	149	H
2	2.483	-71.72	Pk	32.4	-32	11.4	-59.92	-13	-46.92	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	REL99 B2
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1880MHz												
1	3.759	-71.78	Pk	33	-30	11.8	-56.98	-13	-43.98	0-360	148	H
2	3.758	-68.83	Pk	33	-29.9	11.8	-53.93	-13	-40.93	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	HSDPA B2
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1907.6MHz												
1	7.633	-78.3	Pk	35.6	-25.8	11.9	-56.6	-13	-43.6	0-360	149	H
2	7.635	-77.51	Pk	35.6	-25.8	12	-55.71	-13	-42.71	0-360	149	V

LTE BAND 5

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	LTE 5 QPSK 10MHz
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
836.5MHz												
1	3.332	-72.28	PK	32.7	-30.8	11.6	-58.78	-13	-45.78	0-360	149	H
2	3.334	-72.57	PK	32.8	-30.8	12	-58.57	-13	-45.57	0-360	149	V

Company:	Samsung
Project #:	12737383
Date:	2/26/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	LTE 5 16QAM 10MHz
Chamber #:	Chamber I

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
844MHz												
1	2.53	-73.03	PK	32.4	-31.6	12.7	-59.53	-13	-46.53	0-360	148	H
2	2.531	-71.55	PK	32.4	-31.7	11.5	-59.35	-13	-46.35	0-360	149	V

2.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/ Permissive Change	Reference Application	Folder Test/RF Exposure	Report Title/Section
PCE	A3LSMA705FN	Grant	12726900-E1	Test	FCC Report WWAN all except CDMA and LTE41 test data, and Appendix A

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.26:2015, ANSI C63.4:2014, TIA-603-E, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, Part 15, FCC KDB 971168 D01 v03r01, and KDB 484596 D01 Referencing Test Data v01.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
☒ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☒ Chamber I (ISED:2324A-5)
☐ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☒ Chamber J (ISED:2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☒ Chamber K (ISED:2324A-1)
	☐ Chamber G (ISED:22541-4)	☐ Chamber L (ISED:2324A-3)
	☐ Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a GSM/CDMA/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and NFC.

6.2. MAXIMUM OUTPUT POWER

ERP/EIRP LIMIT

FCC: §2.1046, §22.913, §24.232, and §27.50

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015/ TIA-603-E Clause 2.2.17
KDB 971168 D01Section 5.6
KDB 412172 D01

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

GSM MODES

Part 22 850MHz					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
824.2-848.8	GPRS	26.17	0.4140	241.05	241KGXW
	EGPRS	22.27	0.1687	229.05	229KG7W
Part 24 1900MHz					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1850.2-1909.8	GPRS	24.31	0.2698	245.13	245KGXW
	EGPRS	21.78	0.1507	244.77	245KG7W

CDMA MODES

Part 22 BC0					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
824.7-848.31	1xRTT	19.94	0.0986	1280.00	1M28F9W
	1xEVDO REV A	20.04	0.1009	1290.00	1M29F9W

WCDMA MODE

Part 22 Band 5					
Frequency range (MHz)	Modulation	Radiated ERP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
826.4-846.6	REL 99	18.33	0.0681	4120	4M12F9W
	HSDPA	17.65	0.0582	4150	4M15F9W
Part 24 Band 2					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1852.4-1907.6	REL 99	19.73	0.0940	4130	4M13F9W
	HSDPA	18.82	0.0762	4130	4M13F9W

LTE BAND 5

Part 22H							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	824.7	848.3	15.96	0.0394	1100	1M10G7W
	16QAM			15.15	0.0327	1080	1M08D7W
3.0	QPSK	825.5	847.5	16.01	0.0399	2700	2M70G7W
	16QAM			15.25	0.0335	2700	2M70D7W
5.0	QPSK	826.5	846.5	16.53	0.0450	4500	4M50G7W
	16QAM			15.86	0.0385	4500	4M50D7W
10.0	QPSK	829.0	844.0	17.07	0.0509	8960	8M96G7W
	16QAM			16.35	0.0432	8960	8M96D7W

LTE BAND 41

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
5.0	QPSK	2557.5	2652.5	18.48	0.0705	4500	4M50G7W
	16QAM			17.84	0.0608	4490	4M49D7W
10.0	QPSK	2560.0	2650.0	19.16	0.0824	8950	8M95G7W
	16QAM			18.46	0.0701	8990	8M99D7W
15.0	QPSK	2562.5	2647.5	19.26	0.0843	13430	13M4G7W
	16QAM			18.51	0.0710	13420	13M4D7W
20.0	QPSK	2565.0	2645.0	19.26	0.0843	17880	17M9G7W
	16QAM			18.59	0.0723	17900	17M9D7W

6.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was A7050.001

6.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
GSM850, 824-849MHz	-7.39
GSM1900, 1850-1910MHz	-6.07
CDMA 2000, 824-849MHz	-7.39
WCDMA Band 2, 1850-1910 MHz	-6.07
WCDMA Band 5, 824-849 MHz	-7.39
LTE BAND 5, 824 - 849 MHz	-7.39
LTE BAND 41 (FCC), 2555 - 2655 MHz	-5.80

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports GSM850/1900, CDMA, BC0, WCDMA Band 2/5 and LTE Band 5/41.

The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, and 64QAM modulations. All testing was performed using QPSK, and 16QAM modulations to represent the worst case.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, & Z, and it was determined that Y-Axis for 1900MHz, X-Axis for 850MHz, and X-Axis for 2500MHz with AC/DC Adapter and headset was worst-case orientation.

All radios that can be transmitted simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

For check the Part15B receiver mode (Appendix A):

For GSM850, the spurious emissions was investigated in three orthogonal orientations X, Y and Z. It was determined that X orientation was worst-case orientation.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	EP-TA800 (China)	R37M2100011SE3	N/A
AC Adapter	Samsung	EP-TA800 (Hong Kong)	R37M3JA00F1DK3	N/A
Earphone	Samsung	N/A	N/A	N/A

I/O CABLES (RF Conducted Test)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

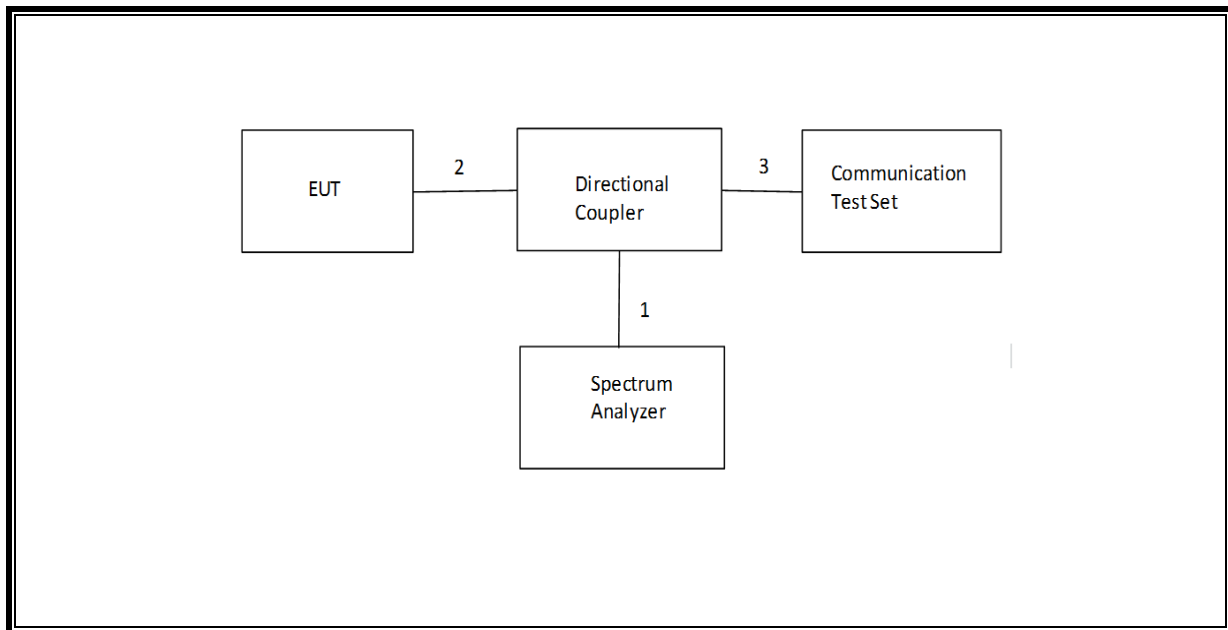
I/O CABLES (RF Radiated Test)

I/O Cable List						
Cable No	Port	# of identic	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Earphone	1	USB	Un-shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	No

TEST SETUP

The EUT is continuously communicated to the call box during the tests

CONDUCTED TEST SETUP DIAGRAM



RADIATED TEST SETUP DIAGRAM

