



CERTIFICATION TEST REPORT

Report Number. : 12726919-E1V1

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

Model : SM-A705MN/DS and SM-A705MN

FCC ID : A3LSMA705MN

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

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

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TABLE OF CONTENTS

TABLE OF CONTENTS	3
1. ATTESTATION OF TEST RESULTS	7
2. INTRODUCTION OF TEST DATA REUSE	8
2.1. INTRODUCTION	8
2.2. DIFFERENCES	8
2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY	8
2.4. REFERENCE DETAIL	15
3. TEST METHODOLOGY	16
4. FACILITIES AND ACCREDITATION	16
5. CALIBRATION AND UNCERTAINTY	17
5.1. MEASURING INSTRUMENT CALIBRATION	17
5.2. SAMPLE CALCULATION	17
5.3. MEASUREMENT UNCERTAINTY	17
6. EQUIPMENT UNDER TEST	18
6.1. DESCRIPTION OF EUT	18
6.2. MAXIMUM OUTPUT POWER	18
6.3. SOFTWARE AND FIRMWARE	23
6.4. MAXIMUM ANTENNA GAIN	23
6.5. WORST-CASE CONFIGURATION AND MODE	24
6.6. DESCRIPTION OF TEST SETUP	25
7. TEST AND MEASUREMENT EQUIPMENT	27
8. RF OUTPUT POWER VERIFICATION	29
8.1. GSM	29
8.1.1. GSM850	30
8.1.2. GSM1900	30
8.2. WCDMA	31
8.2.1. WCDMA BAND5	35
8.2.2. WCDMA BAND2	36
8.2.3. WCDMA BAND4	37
8.3. LTE	38
8.3.1. LTE 2	40

8.3.2.	LTE 4	43
8.3.3.	LTE 5	46
8.3.4.	LTE 12	48
8.3.5.	LTE 13	50
8.3.6.	LTE 17	51
8.3.7.	LTE 41	52
8.3.8.	LTE 66	54
9.	CONDUCTED TEST RESULTS	57
9.1.	OCCUPIED BANDWIDTH	57
9.1.1.	GSM	62
9.1.2.	WCDMA	63
9.1.3.	LTE BAND 2	64
9.1.4.	LTE BAND 4	66
9.1.5.	LTE BAND 5	68
9.1.6.	LTE BAND 12	70
9.1.7.	LTE BAND 13	72
9.1.8.	LTE BAND 41	73
9.1.9.	LTE BAND 66	75
9.2.	BAND EDGE AND EMISSION MASK	78
9.2.1.	GSM850	79
9.2.2.	GSM1900	80
9.2.3.	WCDMA BAND5	81
9.2.4.	WCDMA BAND2	82
9.2.5.	WCDMA BAND4	83
9.2.6.	LTE BAND 2 BANDEDGE	84
9.2.7.	LTE BAND 4 BANDEDGE	96
9.2.8.	LTE BAND 5 BANDEDGE	108
9.2.9.	LTE BAND 12 BANDEDGE	116
9.2.10.	LTE BAND 13 ADJACENT CHANNEL POWER	124
9.2.11.	LTE BAND 41 ADJACENT CHANNEL POWER	128
9.2.12.	LTE BAND 66 BANDEDGE	136
9.3.	OUT OF BAND EMISSIONS	148
9.3.1.	GSM GSM850	149
9.3.2.	GSM GSM1900	151
9.3.3.	WCDMA BAND5	153

9.3.4.	WCDMA BAND2	155
9.3.5.	WCDMA BAND4	157
9.3.6.	LTE BAND 2.....	159
9.3.7.	LTE BAND 4.....	165
9.3.8.	LTE BAND 5.....	171
9.3.9.	LTE BAND 12.....	175
9.3.10.	LTE BAND 13	179
9.3.11.	LTE BAND 41	181
9.3.12.	LTE BAND 66	185
9.4.	FREQUENCY STABILITY	192
9.4.1.	GSM.....	193
9.4.2.	WCDMA	194
9.4.3.	LTE BAND 2.....	196
9.4.4.	LTE BAND 4.....	196
9.4.5.	LTE BAND 5.....	197
9.4.6.	LTE BAND 12.....	197
9.4.7.	LTE BAND 13.....	198
9.4.8.	LTE BAND 41.....	198
9.4.9.	LTE BAND 66.....	199
9.5.	PEAK TO AVERAGE RATIO	200
9.5.1.	GSM.....	201
9.5.2.	WCDMA	202
9.5.3.	LTE BAND 2.....	203
9.5.4.	LTE BAND 4.....	205
9.5.5.	LTE BAND 5.....	207
9.5.6.	LTE BAND 12.....	209
9.5.7.	LTE BAND 13.....	211
9.5.8.	LTE BAND 41.....	212
9.5.9.	LTE BAND 66.....	214
10.	RADIATED TEST RESULTS.....	216
10.1.	EFFECTIVE RADIATED POWER ERP/EIRP	216
10.1.1.	GSM	225
10.1.2.	WCDMA.....	226
10.1.3.	LTE Band 2.....	227
10.1.4.	LTE Band 4.....	229

10.1.5.	LTE Band 5.....	231
10.1.6.	LTE Band 12.....	232
10.1.7.	LTE Band 13.....	234
10.1.8.	LTE Band 41.....	235
10.1.9.	LTE Band 66.....	235
10.2.	FIELD STRENGTH OF SPURIOUS RADIATION	238
10.2.1.	GSM	239
10.2.2.	WCDMA.....	243
10.2.3.	LTE BAND 2	249
10.2.4.	LTE BAND 4	251
10.2.5.	LTE BAND 5	253
10.2.6.	LTE BAND 12	255
10.2.7.	LTE BAND 13	257
10.2.8.	LTE BAND 41	259
10.2.9.	LTE BAND 66	261
11.	APPENDIX A: PRE-SCAN DATA FOR 15B RECEIVER MODE	263
11.1.	LTE Band 5	263
11.1.1.	BELOW 1GHz.....	263
11.1.2.	ABOVE 1GHz	269
11.2.	LTE Band 12	275
11.2.1.	BELOW 1GHz.....	275
11.2.2.	ABOVE 1GHz	281
11.1.	LTE Band 13	287
11.1.1.	BELOW 1GHz.....	287
11.1.2.	ABOVE 1GHz	289
12.	SETUP PHOTOS (Original)	291
13.	SETUP PHOTOS (Spot check).....	293

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-A705MN/DS AND SM-A705MN
FCC ID	A3LSMA705MN
EUT Description	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, ANT+ and NFC
Serial Number	R38M106F6BR(CONDUCTED), R38M10CS6GK, R38M10CS2VH(RADIATED)
Date Tested	FEBRUARY 18, 2019 to FEBRUARY 28, 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: 	Reviewed By: 
Dan Corona Operations Leader Consumer Technology Division UL Verification Services Inc.	Kiya Kedida 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: A3LSMA705MN licensed radio is electrically identical. The FCC ID: A3LSMA705FN GSM 850/1900, WCDMA Band 2 & Band 5 and LTE Band 5 test data shall remain representative of FCC ID: A3LSMA705MN.

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

2.2. DIFFERENCES

Difference between A3LSMA705FN and A3LSMA705MN:

Samsung Electronics Co. Ltd. declares that A3LSMA705MN supports the following additional WCDMA and LTE bands: WCDMA Band 4, LTE Band 2, Band 4, Band 12, Band 13, Band 17, Band 41 and Band 66.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMA705MN remains representative of FCC ID: A3LSMA705FN. Test data of FCC ID: A3LSMA705FN being submitted for this application to cover GSM 850/1900, WCDMA Band 2 & Band 5 and LTE Band 5 WWAN features.

2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device A3LSMA705MN 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.

SPOT CHECK DATA

A3LSMA705MN SPOT CHECK RESULTS							
Technology	Mode	Test Item	Channel	Measured	A3LSMA705FN	A3LSMA705MN	Delta (dB)
				Frequency MHz	Peak (dBm)	Peak (dBm)	
GSM	GPRS 850	RSE	824.2 MHz	1648 MHz	-45.48	-65.88	-20.4
	GPRS 1900	RSE	1880 MHz	3760 MHz	-38.69	-56.73	-18.04
	EGPRS 850	RSE	836.6 MHz	1673 MHz	-51.63	-64.56	-12.93
	EGPRS 1900	RSE	1880 MHz	5640 MHz	-42.24	-55.76	-13.52
WCDMA	REL99 B5	RSE	826.4 MHz	3308 MHz	-56.51	-59.57	-3.06
	REL99 B2	RSE	1880 MHz	3763 MHz	-55.05	-56.22	-1.17
	HSDPA B5	RSE	826.4 MHz	2480 MHz	-55.31	-60.13	-4.82
	HSDPA B2	RSE	1907.6 MHz	7634 MHz	-55.91	-54.8	1.11
LTE 5	QPSK @ 10MHz BW	RSE	836.5 MHz	3333 MHz	-56.98	-58.8	-1.82
	16QAM @ 10MHz BW	RSE	844 MHz	2532 MHz	-56.73	-59.1	-2.37

SPOT CHECK DATA
HARMONICS AND SPURIOUS EMISSIONS

GSM

Company:	Samsung
Project #:	12726919
Date:	4/01/19
Test Engineer:	16069
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
824.2 MHz												
1	1.649	-73.48	Pk	28.4	-33.3	12.5	-65.88	-13	-52.88	0-360	148	H
2	1.65	-73.46	Pk	28.4	-33.3	11.4	-66.96	-13	-53.96	0-360	148	V

Company:	Samsung
Project #:	12726919
Date:	4/02/19
Test Engineer:	19480
Configuration:	EUT+ Support Equipment
Mode:	EGPRS 850
Chamber #:	Chamber J

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF PRE0189055 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
836.6 MHz												
1	1.673	-66.36	Pk	25.8	-36.1	12.1	-64.56	-13	-51.56	0-360	148	H
2	1.673	-67.35	Pk	25.8	-36.1	11.8	-65.85	-13	-52.85	0-360	148	V

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
Configuration:	EUT+ Support Equipment
Mode:	GPRS 1900
Chamber #:	Chamber K

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1880 MHz												
1	3.76	-68.44	Pk	33.3	-32.5	10.4	-57.24	-13	-44.24	0-360	150	H
2	3.76	-68.13	Pk	33.3	-32.5	10.6	-56.73	-13	-43.73	0-360	150	V

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
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
1880 MHz												
1	5.64	-67.09	Pk	35	-28.6	11.8	-48.89	-13	-35.89	0-360	148	H
2	5.64	-74.06	Pk	35	-28.6	11.9	-55.76	-13	-42.76	0-360	148	V

WCDMA

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
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
826.4 MHz												
1	3.307	-72.63	Pk	32.7	-30.9	12	-58.83	-13	-45.83	0-360	148	V
2	3.308	-72.97	Pk	32.7	-30.9	11.6	-59.57	-13	-46.57	0-360	148	H

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
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
826.4 MHz												
1	2.482	-71.1	Pk	32.4	-32	11.3	-59.4	-13	-46.4	0-360	148	H
2	2.48	-71.83	Pk	32.4	-32	11.3	-60.13	-13	-47.13	0-360	149	V

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
Configuration:	EUT+ Support Equipment
Mode:	REL99 B2
Chamber #:	Chamber K

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1880 MHz												
1	3.757	-69.12	Pk	33.3	-32.5	10.4	-57.92	-13	-44.92	0-360	150	H
2	3.761	-67.62	Pk	33.3	-32.5	10.6	-56.22	-13	-43.22	0-360	150	V

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
Configuration:	EUT+ Support Equipment
Mode:	HSDPA B2
Chamber #:	Chamber K

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T344 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1907.6 MHz												
1	7.636	-74.2	Pk	35.6	-26.6	10.4	-54.8	-13	-41.8	0-360	150	H
2	7.633	-74.14	Pk	35.6	-26.6	10.6	-54.54	-13	-41.54	0-360	150	V

LTE BAND 5

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
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
836.5 MHz												
1	3.334	-71.47	PK	32.8	-30.8	11.6	-57.87	-13	-44.87	0-360	148	H
2	3.332	-72.7	PK	32.8	-30.8	11.9	-58.8	-13	-45.8	0-360	148	V

Company:	Samsung
Project #:	12726919
Date:	3/26/19
Test Engineer:	19498
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
844 MHz												
1	2.532	-72.5	PK	32.4	-31.7	12.7	-59.1	-13	-46.1	0-360	148	H
2	2.532	-73.08	PK	32.4	-31.7	11.4	-60.98	-13	-47.98	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 Sections except Conducted Power, WCDMA B4, LTE B2/4/12/13/17/41/66 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, and FCC KDB 971168 D01 v03r01.

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/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 Sub-Clause 5.2.7/ TIA-603-E Clause 2.2.17

KDB 971168 D01 Section 5.8

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 radiated 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

WCDMA MODES

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
Part 27 Band 4					
Frequency range (MHz)	Modulation	Radiated EIRP		99% BW (kHz)	Emission Designator
		Average (dBm)	Average (W)		
1712.4-1752.6	REL 99	21.87	0.1538	4120	4M12F9W
	HSDPA	20.90	0.1230	4130	4M13F9W

LTE BAND 2

Part 24							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1850.7	1909.3	23.23	0.2104	1100	1M10G7W
	16QAM			22.12	0.1629	1080	1M08D7W
3.0	QPSK	1851.5	1908.5	23.35	0.2163	2700	2M70G7W
	16QAM			22.17	0.1648	2700	2M70D7W
5.0	QPSK	1852.5	1907.5	23.24	0.2109	4500	4M50G7W
	16QAM			22.20	0.1660	4490	4M49D7W
10.0	QPSK	1855.0	1905.0	23.51	0.2244	8970	8M97G7W
	16QAM			22.31	0.1702	8960	8M96D7W
15.0	QPSK	1857.5	1902.5	22.98	0.1986	13450	13M5G7W
	16QAM			21.90	0.1549	13440	13M4D7W
20.0	QPSK	1860.0	1900.0	23.01	0.2000	17910	17M9G7W
	16QAM			21.95	0.1567	17890	17M9D7W

LTE BAND 4

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1710.7	1754.3	20.79	0.1199	1100	1M10G7W
	16QAM			20.05	0.1012	1080	1M08D7W
3.0	QPSK	1711.5	1753.5	20.81	0.1205	2700	2M70G7W
	16QAM			20.07	0.1016	2700	2M70D7W
5.0	QPSK	1712.5	1752.5	20.92	0.1236	4500	4M50G7W
	16QAM			20.13	0.1030	4500	4M50D7W
10.0	QPSK	1715.0	1750.0	20.88	0.1225	8960	8M96G7W
	16QAM			19.97	0.0993	8940	8M94D7W
15.0	QPSK	1717.5	1747.5	20.72	0.1180	13440	13M4G7W
	16QAM			20.00	0.1000	13430	13M4D7W
20.0	QPSK	1720.0	1745.0	20.81	0.1205	17930	17M9G7W
	16QAM			20.11	0.1026	17910	17M9D7W

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 12

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	699.7	715.3	16.05	0.0403	1080	1M08G7W
	16QAM			15.20	0.0331	1080	1M08D7W
3.0	QPSK	700.5	714.5	16.34	0.0431	2700	2M70G7W
	16QAM			15.54	0.0358	2700	2M70D7W
5.0	QPSK	701.5	713.5	16.18	0.0415	4510	4M51G7W
	16QAM			15.46	0.0352	4490	4M49D7W
10.0	QPSK	704.0	711.0	15.86	0.0385	8980	8M98G7W
	16QAM			15.02	0.0318	8980	8M98D7W

LTE BAND 13

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
5.0	QPSK	779.5	784.5	20.61	0.1151	4500	4M50G7W
	16QAM			19.65	0.0923	4490	4M49D7W
10.0	QPSK	782.0	782.0	20.27	0.1064	8970	8M97G7W
	16QAM			19.28	0.0847	8980	8M98D7W

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	2498.5	2687.5	16.13	0.0410	4510	4M51G7W
	16QAM			15.49	0.0354	4491	4M49D7W
10.0	QPSK	2501.0	2685.0	16.58	0.0455	8970	8M97G7W
	16QAM			15.74	0.0375	8953	8M95D7W
15.0	QPSK	2503.5	2682.5	16.47	0.0444	13400	13M4G7W
	16QAM			15.66	0.0368	13409	13M4D7W
20.0	QPSK	2506.0	2680.0	17.06	0.0508	17871	17M9G7W
	16QAM			16.38	0.0435	17842	17M8D7W

LTE BAND 66

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				Average (dBm)	Average (W)		
1.4	QPSK	1710.7	1779.3	21.33	0.1358	1080	1M08G7W
	16QAM			20.27	0.1064	1090	1M09D7W
3.0	QPSK	1711.5	1778.5	21.18	0.1312	2700	2M70G7W
	16QAM			20.39	0.1094	2700	2M70D7W
5.0	QPSK	1712.5	1777.5	21.73	0.1489	4500	4M50G7W
	16QAM			21.18	0.1312	4490	4M49D7W
10.0	QPSK	1715.0	1775.0	21.44	0.1393	8990	8M99G7W
	16QAM			20.80	0.1202	8980	8M98D7W
15.0	QPSK	1717.5	1772.5	21.60	0.1445	13420	13M4G7W
	16QAM			21.06	0.1276	13410	13M4D7W
20.0	QPSK	1720.0	1770.0	21.89	0.1545	17870	17M9G7W
	16QAM			21.32	0.1355	17880	17M9D7W

6.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was A705MN.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
WCDMA Band 2, 1850-1910 MHz	-6.07
WCDMA Band 4, 1710-1755 MHz	-7.60
WCDMA Band 5, 824-849 MHz	-7.39
LTE BAND 2, 1850-1910 MHz	-6.37
LTE BAND 4, 1710-1755 MHz	-7.60
LTE BAND 5, 824-849 MHz	-7.39
LTE BAND 12, 699-716 MHz	-9.13
LTE BAND 13, 777-787 MHz	-8.39
LTE BAND 17, 704-716 MHz	-9.13
LTE BAND 41, 2496-2690 MHz	-5.80
LTE BAND 66, 1710-1780 MHz	-7.60

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of band 2, band 4, band 5, band 12, band 13, band 17, band 41 and band 66.

LTE Band 17 (704 - 716 MHz, 5/10 MHz bandwidth) is covered by LTE Band 12 because it is a subset of LTE band 12 and they have same output power and channel bandwidth.

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 other 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 X-Axis for 1700MHz, Y-Axis for 1900MHz, X-Axis for 850/700MHz, 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 LTE B5, LTE B12 and LTE B13, 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-TA50EWE	DW3J719AS/A-E	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

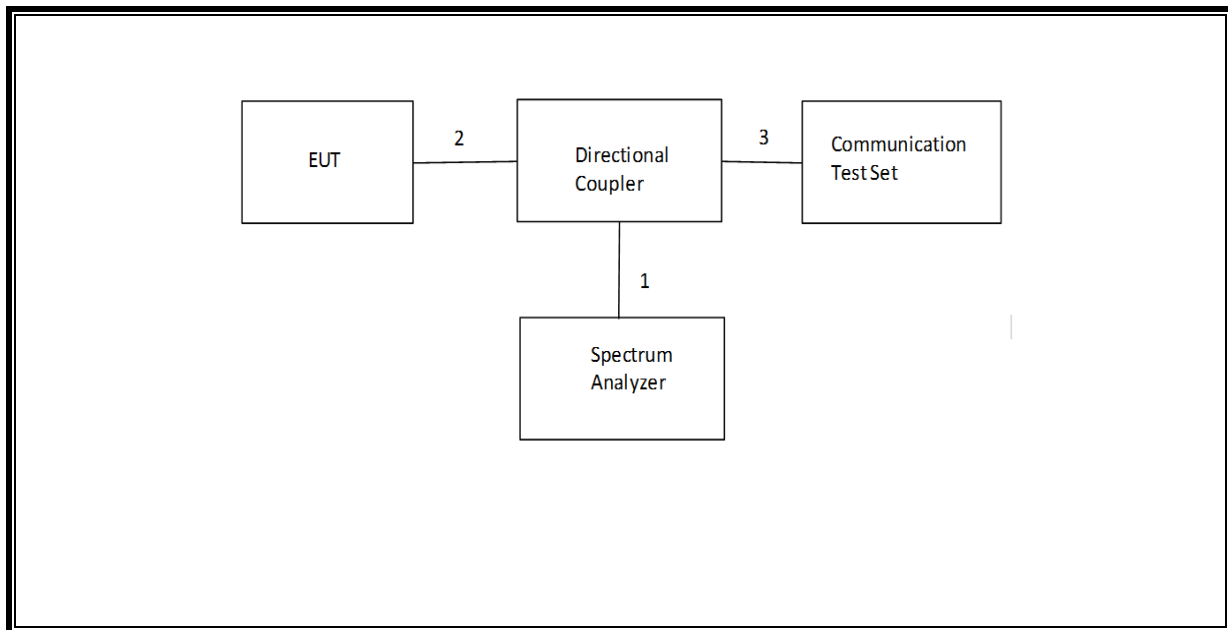
I/O CABLES (RF Radiated Test)

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

