



SAR EVALUATION REPORT

Applicant Name:

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Date of Testing:

07/14/2017

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

1M1706210205-01.A3L

FCC ID:

A3LSMG950U

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD.

DUT Type:

Portable Handset

Application Type:

Class II Permissive Change

FCC Rule Part(s):

CFR §2.1093

Model:

SM-G950U

Additional Model(s):

SM-G950U1

Test Device Serial No.:

Pre-production Sample [S/N: 1EEEE]

Permissive Change(s):

Adding LAA Downlink Only Operations and additional 4x4 MIMO DL CA combinations.

Original Grant Date:

03/08/2017

Note: The following test data was evaluated for the current test report. Please refer to RF Exposure Technical Report S/N 1M1701030004-01.A3L for original compliance evaluation.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.5 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.



Randy Ortanez
President



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FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 1 of 16

T A B L E O F C O N T E N T S

1	DEVICE UNDER TEST	3
2	LTE INFORMATION	5
3	FCC MEASUREMENT PROCEDURES.....	6
4	RF CONDUCTED POWERS.....	7
5	EQUIPMENT LIST.....	13
6	CONCLUSION.....	14
7	REFERENCES	15

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 2 of 16

1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
CDMA/EVDO BC10 (§90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (§22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 - 2480 MHz
MST	Data	555 Hz - 8.33 kHz

1.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot. Detailed descriptions of the power reduction mechanism are included in the operational description.

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 3 of 16

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications for the capabilities evaluated in this test report. See RF Exposure Technical Report S/N 1M1701030004-01.A3L for complete maximum and nominal output power specifications.

1.3.1 Maximum PCE Power

Mode / Band		Modulated Average (dBm)
LTE Band 13	Maximum	25.0
	Nominal	24.5
LTE Band 66 (AWS)	Maximum	25.0
	Nominal	24.5
LTE Band 4 (AWS)	Maximum	25.0
	Nominal	24.5
LTE Band 25 (PCS)	Maximum	24.0
	Nominal	23.5
LTE Band 2 (PCS)	Maximum	24.0
	Nominal	23.5

1.3.2 Reduced PCE Power

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	20.5
	Nominal	20.0
LTE Band 4 (AWS)	Maximum	20.5
	Nominal	20.0
LTE Band 25 (PCS)	Maximum	20.5
	Nominal	20.0
LTE Band 2 (PCS)	Maximum	20.5
	Nominal	20.0

1.4 SAR Test Exclusion

The report only evaluates the additional capabilities according to the change of description document. Per FCC KDB Publication 941225 D05Av01r02 and FCC guidance, additional SAR measurements were not required since the maximum average output power in downlink only LTE CA mode were not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive. See RF Exposure Technical Report S/N 1M1701030004-01.A3L for SAR compliance evaluation and complete RF conducted output power measurements.

1.5 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D05v02r04, D05Av01r02 (4G)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)

FCC ID: A3LSMG950U	 SAR EVALUATION REPORT 		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 4 of 16

LTE Information					
FCC ID	A3LSMG950U				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
Channel Bandwidths	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)		715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)		714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)		713.5 (23155)
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)		711 (23130)
LTE Band 17: 5 MHz	706.5 (23755)		710 (23790)		713.5 (23825)
LTE Band 17: 10 MHz	709 (23780)		710 (23790)		711 (23800)
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)		784.5 (23255)
LTE Band 13: 10 MHz	N/A		782 (23230)		N/A
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)		848.3 (27033)
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)		847.5 (27025)
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)		846.5 (27015)
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)		844 (26990)
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)		841.5 (26965)
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)		848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)		847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)		846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)		844 (20600)
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)		1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)		1778.5 (132657)
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)		1777.5 (132647)
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)		1775 (132622)
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)		1772.5 (132597)
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)		1770 (132572)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)		1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)		1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)		1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)		1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)		1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)		1745 (20300)
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)		1914.3 (26683)
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)		1913.5 (26675)
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)		1912.5 (26665)
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)		1910 (26640)
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)		1907.5 (26615)
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)		1905 (26590)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)		1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)		1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)		1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)		1905 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)		1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)		1900 (19100)
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)		2312.5 (27735)
LTE Band 30: 10 MHz	N/A		2310 (27710)		N/A
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	6				
DL UE Category	16				
UL UE Category	5				
Modulations Supported in UL	QPSK, 16QAM, 64 QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Release 14 Additional Information	This device does not support full CA features on 3GPP Release 14. It supports carrier aggregation and downlink MIMO features. All other uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC unless otherwise specified. The following LTE Release 14 Features are not supported: Relay, HetNet, Enhanced eICIC, WiFi Offloading via LWA, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA				

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 5 of 16	

3 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator and a signal analyzer under digital average power.

3.1 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

For 3CC downlink carrier aggregation combinations, PCC uplink channel was selected based on section C)3)b)ii) of KDB 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

FCC ID: A3LSMG950U	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 6 of 16

4 RF CONDUCTED POWERS

4.1 4x4 MIMO DL Carrier Aggregation

This device supports downlink 4x4 MIMO operations for LTE Bands 2, 4, 25 and 66 only. Uplink transmission is limited to a single output stream. Power measurements were performed with downlink 4x4 MIMO active for the configuration with highest measured maximum conducted power with 4x4 downlink MIMO inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC Guidance and KDB Publication 941225 D05A v01r02, for every supported combination, power measurements were performed with the downlink carrier aggregation and 4x4 DL MIMO active for the configuration with highest measured maximum conducted power with downlink carrier aggregation and 4x4 DL MIMO inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC Guidance and KDB Publication 941225 D05A v01r02, SAR for downlink 4x4 MIMO single carrier and downlink 4x4 MIMO carrier aggregation were not needed since the maximum average output power with downlink 4x4 MIMO single carrier active and the maximum average output power with downlink 4x4 MIMO carrier aggregation active were not more than 0.25 dB higher than the maximum output power with downlink 4x4 MIMO and downlink only Carrier Aggregation inactive.

Per FCC guidance, LTE Band 66 standalone SISO powers were used to select measurement configurations for LTE Band 4 and LTE B25 standalone SISO powers were used to select measurement configurations for LTE Band 2.

See RF Exposure Technical Report S/N 1M1701030004-01.A3L for complete SAR compliance evaluation and RF conducted output power measurements.

Table 4-1
Additional 4x4 MIMO DL CA Maximum Output Powers – 2 Component Carriers

Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC				DL Antenna Configuration	SCC				DL Antenna Configuration	Power	
						PCC UL# RB	PCC UL# RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]		SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]		LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA 2A-13A	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	23.92	23.93
CA 4A-13A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	24.97	24.97
CA 13A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	24.95	24.97
CA 25A-25A (1)	LTE B25	20	26140	1860	QPSK	1	0	8140	1940	4x4 MIMO	LTE B25	5	8665	1992.5	2x2 MIMO	23.92	23.93
CA 25A-25A (1)	LTE B25	20	26140	1860	QPSK	1	0	8140	1940	4x4 MIMO	LTE B25	5	8665	1992.5	2x2 MIMO	23.91	23.93
CA 2A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	2x2 MIMO	LTE B2	20	900	1960	4x4 MIMO	24.51	24.48
CA 4A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	2x2 MIMO	LTE B4	20	2175	2132.5	4x4 MIMO	24.55	24.48
CA 13A-66A	LTE B13	10	23230	782	QPSK	1	25	5230	751	2x2 MIMO	LTE B66	20	66786	2145	4x4 MIMO	24.52	24.48

Table 4-2
Additional 4x4 MIMO DL CA Reduced Output Powers – 2 Component Carriers

Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC				DL Antenna Configuration	SCC				DL Antenna Configuration	Power	
						PCC UL# RB	PCC UL# RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]		SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]		LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA 2A-13A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	20.18	20.16
CA 4A-13A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	20.36	20.48
CA 13A-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B13	10	5230	751	2x2 MIMO	20.25	20.48
CA 25A-25A	LTE B25	20	26365	1882.5	QPSK	1	0	8365	1962.5	4x4 MIMO	LTE B25	5	8065	1932.5	2x2 MIMO	20.11	20.16
CA 25A-25A	LTE B25	20	26365	1882.5	QPSK	1	0	8365	1962.5	2x2 MIMO	LTE B25	5	8065	1932.5	4x4 MIMO	20.13	20.16

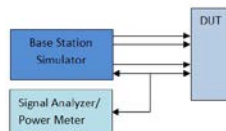


Figure 4-1
Power Measurement Setup

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 7 of 16

4.2 LAA Conducted Powers

This device supports LAA with downlink carrier aggregation only for B46. All uplink communications and acknowledgements on the PCC remain identical to specifications when downlink carrier aggregation is inactive.

Per FCC Guidance and KDB Publication 941225 D05A v01r02, for every supported combination, additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

The PCC uplink channel was selected based on section C)3)b)ii) of KDB 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation per 3GPP requirements. The SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band carriers, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For LAA operations, each Band 46 sub-band was evaluated independently due to the wide downlink bandwidth. Subscripts A,B,C, and D represent 4 sub-bands for Band 46.

Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

Per FCC guidance, LTE Band 66 standalone SISO powers were used to select measurement configurations for LTE Band 4 and LTE B25 standalone SISO powers were used to select measurement configurations for LTE Band 2.

See RF Exposure Technical Report S/N 1M1701030004-01.A3L for complete SAR compliance evaluation and RF conducted output power measurements.

4.2.1 Downlink 2x2 MIMO LAA Additional Conducted Powers

Table 4-3
Additional Maximum Output Powers – 2 Component Carriers

Combination	PCC									SCC				Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _A	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 _A	20	47290	5200	23.92	23.93
CA_2A-46 _B	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 _B	20	48290	5300	23.95	23.93
CA_2A-46 _C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 _C	20	51290	5600	23.96	23.93
CA_2A-46 _D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 _D	20	53140	5785	23.95	23.93
CA_4A-46 _A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _A	20	47290	5200	24.99	24.97
CA_4A-46 _B	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _B	20	48290	5300	24.98	24.97
CA_4A-46 _C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _C	20	51290	5600	24.97	24.97
CA_4A-46 _D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _D	20	53140	5785	24.99	24.97
CA_46 _A -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _A	20	47290	5200	24.92	24.97
CA_46 _B -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _B	20	48290	5300	24.92	24.97
CA_46 _C -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _C	20	51290	5600	24.89	24.97
CA_46 _D -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _D	20	53140	5785	24.87	24.97

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 8 of 16

Table 4-4
Additional Maximum Output Powers – 3 Component Carriers

Combination	PCC								SCC 1				SCC 2				Power		
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 ₀ C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	23.95	23.93
CA_2A-46 ₀ C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	23.96	23.93
CA_2A-46 ₀ C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	23.93	23.93
CA_2A-46 ₀ C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	23.97	23.93
CA_4A-46 ₀ C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	25.00	24.97
CA_4A-46 ₀ C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	24.99	24.97
CA_4A-46 ₀ C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	24.98	24.97
CA_4A-46 ₀ C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	24.99	24.97
CA_46 ₀ C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	24.91	24.97
CA_46 ₀ C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	24.90	24.97
CA_46 ₀ C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	24.91	24.97
CA_46 ₀ C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	24.92	24.97

Table 4-5
Additional Maximum Output Powers – 4 Component Carriers

Combination	PCC								SCC 1				SCC 2				SCC 3				Power		
	PCC Band	PCC BW [MHz]	PCC (UL) Channel	PCC (UL) Freq. [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dbm)
CA_2A-46 ₀ D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	LTE B46 ₀	20	47092	5180.2	23.92	23.93
CA_2A-46 ₀ D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	LTE B46 ₀	20	48092	5280.2	23.95	23.93
CA_2A-46 ₀ D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	LTE B46 ₀	20	51092	5580.2	23.93	23.93
CA_2A-46 ₀ D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	LTE B46 ₀	20	52942	5765.2	23.88	23.93
CA_4A-46 ₀ D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	LTE B46 ₀	20	47092	5180.2	24.98	24.97
CA_4A-46 ₀ D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	LTE B46 ₀	20	48092	5280.2	24.97	24.97
CA_4A-46 ₀ D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	LTE B46 ₀	20	51092	5580.2	24.97	24.97
CA_4A-46 ₀ D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	LTE B46 ₀	20	52942	5765.2	24.98	24.97
CA_46 ₀ D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	47290	5200	LTE B46 ₀	20	47488	5219.8	LTE B46 ₀	20	47092	5180.2	24.88	24.97
CA_46 ₀ D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	48290	5300	LTE B46 ₀	20	48488	5319.8	LTE B46 ₀	20	48092	5280.2	24.89	24.97
CA_46 ₀ D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	51290	5600	LTE B46 ₀	20	51488	5619.8	LTE B46 ₀	20	51092	5580.2	24.84	24.97
CA_46 ₀ D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 ₀	20	53140	5785	LTE B46 ₀	20	53338	5804.8	LTE B46 ₀	20	52942	5765.2	24.87	24.97

Table 4-6
Additional Reduced Output Powers – 2 Component Carriers

Combination	PCC									SCC				Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _A A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 _A	20	47290	5200	20.05	20.16
CA_2A-46 _B A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 _B	20	48290	5300	20.09	20.16
CA_2A-46 _C A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 _C	20	51290	5600	20.05	20.16
CA_2A-46 _D A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 _D	20	53140	5785	20.07	20.16
CA_4A-46 _A A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _A	20	47290	5200	20.44	20.48
CA_4A-46 _B A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _B	20	48290	5300	20.37	20.48
CA_4A-46 _C A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _C	20	51290	5600	20.41	20.48
CA_4A-46 _D A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _D	20	53140	5785	20.43	20.48
CA_46 _A A-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 _A	20	47290	5200	20.38	20.48
CA_46 _B A-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 _B	20	48290	5300	20.34	20.48
CA_46 _C A-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 _C	20	51290	5600	20.33	20.48
CA_46 _D A-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 _D	20	53140	5785	20.39	20.48

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 9 of 16	

Table 4-7
Additional Reduced Output Powers – 3 Component Carriers

Combination	PCC									SCC 1				SCC 2				Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 ₃ C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	20.06	20.16
CA_2A-46 ₃ C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	20.07	20.16
CA_2A-46 ₃ A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	20.06	20.16
CA_2A-46 ₃ C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	20.08	20.16
CA_4A-46 ₃ C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	20.18	20.48
CA_4A-46 ₃ C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	20.19	20.48
CA_4A-46 ₃ C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	20.18	20.48
CA_4A-46 ₃ C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	20.22	20.48
CA_46 ₃ C-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	20.16	20.48
CA_46 ₃ C-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	20.11	20.48
CA_46 ₃ C-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	20.13	20.48
CA_46 ₃ C-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	20.14	20.48

Table 4-8
Additional Reduced Output Powers – 4 Component Carriers

Combination	PCC									SCC 1				SCC 2				SCC 3				Power	
	PCC Band	PCC BW [MHz]	PCC (UL) Channel	PCC (UL) Freq. [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 ₃ D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	LTE B46 ₃	20	47092	5180.2	20.07	20.16
CA_2A-46 ₃ D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	LTE B46 ₃	20	48092	5280.2	20.05	20.16
CA_2A-46 ₃ D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	LTE B46 ₃	20	51092	5580.2	20.03	20.16
CA_2A-46 ₃ D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	LTE B46 ₃	20	52942	5765.2	20.06	20.16
CA_4A-46 ₃ D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	LTE B46 ₃	20	47092	5180.2	20.25	20.48
CA_4A-46 ₃ D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	LTE B46 ₃	20	48092	5280.2	20.18	20.48
CA_4A-46 ₃ D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	LTE B46 ₃	20	51092	5580.2	20.19	20.48
CA_4A-46 ₃ D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	LTE B46 ₃	20	52942	5765.2	20.19	20.48
CA_46 ₃ D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	47290	5200	LTE B46 ₃	20	47488	5219.8	LTE B46 ₃	20	47092	5180.2	20.19	20.48
CA_46 ₃ D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	48290	5300	LTE B46 ₃	20	48488	5319.8	LTE B46 ₃	20	48092	5280.2	20.14	20.48
CA_46 ₃ D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	51290	5600	LTE B46 ₃	20	51488	5619.8	LTE B46 ₃	20	51092	5580.2	20.16	20.48
CA_46 ₃ D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	LTE B46 ₃	20	53140	5785	LTE B46 ₃	20	53338	5804.8	LTE B46 ₃	20	52942	5765.2	20.18	20.48

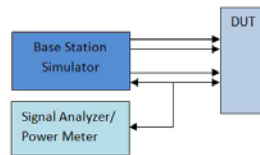


Figure 4-2
Power Measurement Setup

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 10 of 16

4.2.2 Downlink 4x4 MIMO LAA Additional Conducted Powers

Table 4-9
Additional Maximum Output Powers – 2 Component Carriers

Combination	PCC										SCC					Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	DL Antenna Configuration	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _A	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	23.89	23.93
CA_2A-46 _A	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46 _A	20	48290	5300	2x2 MIMO	23.91	23.93
CA_2A-46 _C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	23.93	23.93
CA_2A-46 _C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	23.90	23.93
CA_4A-46 _A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	25.00	24.97
CA_4A-46 _A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _A	20	48290	5300	2x2 MIMO	24.99	24.97
CA_4A-46 _C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	24.95	24.97
CA_4A-46 _C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	24.98	24.97
CA_46 _A -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	24.97	24.97
CA_46 _A -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _A	20	48290	5300	2x2 MIMO	25.00	24.97
CA_46 _C -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	25.00	24.97
CA_46 _C -66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	24.95	24.97

Table 4-10
Additional Maximum Output Powers – 3 Component Carriers

Combination	PCC										SCC 1				SCC 2				Power			
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	DL Antenna Configuration	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46_C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_C	20	47290	5200	2x2 MIMO	LTE B46_C	20	47488	5219.8	2x2 MIMO	23.89	23.93
CA_2A-46_C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_C	20	48290	5300	2x2 MIMO	LTE B46_C	20	48488	5319.8	2x2 MIMO	23.91	23.93
CA_2A-46_C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_C	20	51290	5600	2x2 MIMO	LTE B46_C	20	51488	5619.8	2x2 MIMO	23.92	23.93
CA_2A-46_C	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_C	20	53140	5785	2x2 MIMO	LTE B46_C	20	53338	5804.8	2x2 MIMO	23.94	23.93
CA_4A-46_C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_C	20	47290	5200	2x2 MIMO	LTE B46_C	20	47488	5219.8	2x2 MIMO	24.98	24.97
CA_4A-46_C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_C	20	48290	5300	2x2 MIMO	LTE B46_C	20	48488	5319.8	2x2 MIMO	24.98	24.97
CA_4A-46_C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_C	20	51290	5600	2x2 MIMO	LTE B46_C	20	51488	5619.8	2x2 MIMO	25.00	24.97
CA_4A-46_C	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_C	20	53140	5785	2x2 MIMO	LTE B46_C	20	53338	5804.8	2x2 MIMO	24.99	24.97
CA_46_C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_C	20	47290	5200	2x2 MIMO	LTE B46_C	20	47488	5219.8	2x2 MIMO	24.98	24.97
CA_46_C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_C	20	48290	5300	2x2 MIMO	LTE B46_C	20	48488	5319.8	2x2 MIMO	24.96	24.97
CA_46_C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_C	20	51290	5600	2x2 MIMO	LTE B46_C	20	51488	5619.8	2x2 MIMO	25.00	24.97
CA_46_C-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_C	20	53140	5785	2x2 MIMO	LTE B46_C	20	53338	5804.8	2x2 MIMO	24.99	24.97

Table 4-11
Additional Maximum Output Powers – 4 Component Carriers

Combination	PCC										SCC 1				SCC 2				SCC 3				Power				
	PCC Band	PCC BW [MHz]	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)		
CA_2A-46_D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_D	20	47290	5200	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	23.91	23.93
CA_2A-46_D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	23.93	23.93
CA_2A-46_D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	23.91	23.93
CA_2A-46_D	LTE B2	20	18700	1860	QPSK	1	0	700	1940	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	23.87	23.93
CA_4A-46_D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	47290	5200	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	24.99	24.97
CA_4A-46_D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	24.95	24.97
CA_4A-46_D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	25.00	24.97
CA_4A-46_D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	24.96	24.97
CA_46_D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	47290	5200	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	25.00	24.97
CA_46_D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	24.99	24.97
CA_46_D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	25.00	24.97
CA_46_D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	25.00	24.97

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 11 of 16

Table 4-12
Additional Reduced Output Powers – 2 Component Carriers

Combination	PCC									SCC				DL Antenna Configuration	Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _A	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _A	20	47290	5200	20.14	20.16
CA_2A-46 _B	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _B	20	48290	5300	20.05	20.16
CA_2A-46 _C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _C	20	51290	5600	20.10	20.16
CA_2A-46 _D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _D	20	53140	5785	20.04	20.16
CA_4A-46 _A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	20.10	20.48
CA_4A-46 _B	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _B	20	48290	5300	20.06	20.48
CA_4A-46 _C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	20.14	20.48
CA_4A-46 _D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _D	20	53140	5785	20.09	20.48
CA_46 _A -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	20.16	20.48
CA_46 _B -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _B	20	48290	5300	20.19	20.48
CA_46 _C -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	20.13	20.48
CA_46 _D -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _D	20	53140	5785	20.18	20.48

Table 4-13
Additional Reduced Output Powers – 3 Component Carriers

Combination	PCC										SCC 1					SCC 2					Power	
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	DL Antenna Configuration	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	DL Antenna Configuration	LTE Tx Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _C	20	47290	5200	2x2 MIMO	LTE B46 _C	20	47488	5219.8	2x2 MIMO	20.07	20.16
CA_2A-46 _C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _C	20	48290	5300	2x2 MIMO	LTE B46 _C	20	48488	5319.8	2x2 MIMO	20.04	20.16
CA_2A-46 _C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	20.04	20.16
CA_2A-46 _C	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	LTE B46 _C	20	53338	5804.8	2x2 MIMO	20.07	20.16
CA_4A-46 _C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	47290	5200	2x2 MIMO	LTE B46 _C	20	47488	5219.8	2x2 MIMO	20.11	20.48
CA_4A-46 _C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	48290	5300	2x2 MIMO	LTE B46 _C	20	48488	5319.8	2x2 MIMO	20.05	20.48
CA_4A-46 _C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	20.08	20.48
CA_4A-46 _C	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	LTE B46 _C	20	53338	5804.8	2x2 MIMO	20.10	20.48
CA_46 _C -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	47290	5200	2x2 MIMO	LTE B46 _C	20	47488	5219.8	2x2 MIMO	20.15	20.48
CA_46 _C -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	48290	5300	2x2 MIMO	LTE B46 _C	20	48488	5319.8	2x2 MIMO	20.17	20.48
CA_46 _C -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	20.10	20.48
CA_46 _C -66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46 _C	20	53140	5785	2x2 MIMO	LTE B46 _C	20	53338	5804.8	2x2 MIMO	20.13	20.48

Table 4-14
Additional Reduced Output Powers – 4 Component Carriers

Combination	PCC									SCC 1				SCC 2				SCC 3				Power					
	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx Power with CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46_D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46_D	20	47290	5300	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	20.09	20.16
CA_2A-46_D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	20.12	20.16
CA_2A-46_D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	20.07	20.16
CA_2A-46_D	LTE B2	20	18925	1882.5	QPSK	1	0	925	1962.5	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	20.15	20.16
CA_4A-46_D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	47290	5200	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	20.09	20.48
CA_4A-46_D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	20.06	20.48
CA_4A-46_D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	20.05	20.48
CA_4A-46_D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	20.06	20.48
CA_46_D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	47290	5200	2x2 MIMO	LTE B46_D	20	47488	5219.8	2x2 MIMO	LTE B46_D	20	47092	5180.2	2x2 MIMO	20.16	20.48
CA_46_D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	48290	5300	2x2 MIMO	LTE B46_D	20	48488	5319.8	2x2 MIMO	LTE B46_D	20	48092	5280.2	2x2 MIMO	20.09	20.48
CA_46_D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	51290	5600	2x2 MIMO	LTE B46_D	20	51488	5619.8	2x2 MIMO	LTE B46_D	20	51092	5580.2	2x2 MIMO	20.11	20.48
CA_46_D-66A	LTE B66	20	132322	1745	64QAM	1	0	66786	2145	4x4 MIMO	LTE B46_D	20	53140	5785	2x2 MIMO	LTE B46_D	20	53338	5804.8	2x2 MIMO	LTE B46_D	20	52942	5765.2	2x2 MIMO	20.14	20.48

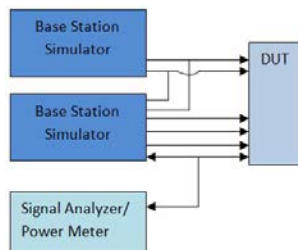


Figure 4-3
Power Measurement Setup

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset		Page 12 of 16

5 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4432B	ESG-D Series Signal Generator	3/24/2017	Annual	3/24/2018	US40053896
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	8/18/2016	Annual	8/18/2017	1126066
Anritsu	MT8821C	Radio Communication Analyzer	N/A	N/A	N/A	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	N/A	N/A	N/A	6201664756
MCL	BW-N6W5+	6dB Attenuator	N/A	CBT	N/A	1139
MiniCircuits	ZN2PD2-63-S+	Power Splitter	N/A	CBT	N/A	N/A
MiniCircuits	VN4PD1-63W-S+	Power Splitter	N/A	CBT	N/A	N/A

CBT (Calibrated Before Testing): Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

FCC ID: A3LSMG950U	 SAR EVALUATION REPORT 			Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 13 of 16	

6 CONCLUSION

6.1 Measurement Conclusion

Additional SAR measurements are not required for the current report per FCC Guidance and FCC KDB Publication 941225 D05Av01r02. The RF Exposure Technical Report S/N 1M1701030004-01.A3L indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

FCC ID: A3LSMG950U		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 14 of 16	

7 REFERENCES

- [1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.
- [2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.
- [3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.
- [4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.
- [5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – 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.
- [6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.
- [7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.
- [8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 1 -124.
- [9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.
- [10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.
- [11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.
- [12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.
- [13] G. Hartsgrrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.
- [14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.
- [15] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.
- [16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.
- [17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

FCC ID: A3LSMG950U	 SAR EVALUATION REPORT 		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 15 of 16

- [18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.
- [19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hochschule Zürich, Dosimetric Evaluation of the Cellular Phone.
- [20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), Feb. 2005.
- [21] Innovation, Science, Economic Development Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 5, March 2015.
- [22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2015
- [23] FCC SAR Test Procedures for 2G-3G Devices, Mobile Hotspot and UMPC Devices KDB Publications 941225, D01-D07
- [24] SAR Measurement Guidance for IEEE 802.11 Transmitters, KDB Publication 248227 D01
- [25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474 D03-D04
- [26] FCC SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers, FCC KDB Publication 616217 D04
- [27] FCC SAR Measurement and Reporting Requirements for 100MHz – 6 GHz, KDB Publications 865664 D01-D02
- [28] FCC General RF Exposure Guidance and SAR Procedures for Dongles, KDB Publication 447498, D01-D02
- [29] Anexo à Resolução No. 533, de 10 de Setembro de 2009.
- [30] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), Mar. 2010.

FCC ID: A3LSMG950U	 SAR EVALUATION REPORT 		Approved by: Quality Manager
Document S/N: 1M1706210205-01.A3L	Test Dates: 07/14/2017	DUT Type: Portable Handset	Page 16 of 16