



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. +1.410.290.6652 / Fax +1.410.290.6654

<http://www.pctestlab.com>



SAR EVALUATION REPORT

Applicant Name:

Samsung Electronics, Co. Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:

07/10/2017

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

1M1707060212-01.A3L

FCC ID:

A3LSMG892A

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD

DUT Type:

Portable Handset

Application Type:

Class II Permissive Change

FCC Rule Part(s):

CFR §2.1093

Model:

SM-G892A

Test Device Serial No.:

Pre-Production Sample [S/N: 2A808]

Permissive Change(s):

Adding LAA Downlink Only Operations

Date of Original Certification:

06/30/2017

Note: The following test data was evaluated for the current test report. Please refer to RF Exposure Technical Report S/N 1M1704170147-01-R2.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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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
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 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 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE B38	Voice/Data	2572.5 - 2617.5 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 conditions and under some conditions when the device is being used in close proximity to the user's hand. Detailed descriptions of the power reduction mechanism are included in the operational description.

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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 1M1704170147-01-R2.A3L for complete maximum and nominal output power specifications.

1.3.1 Maximum Power

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

1.3.2 Reduced Power – Hotspot Mode Active

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	21.5
	Nominal	21.0
LTE Band 4 (AWS)	Maximum	21.0
	Nominal	20.5
LTE Band 2 (PCS)	Maximum	20.5
	Nominal	20.0

1.3.3 Reduced Power – Grip Sensor Active

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	21.5
	Nominal	21.0
LTE Band 4 (AWS)	Maximum	21.5
	Nominal	21.0
LTE Band 2 (PCS)	Maximum	22.0
	Nominal	21.5

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1.4 SAR Test Exclusion

The report only evaluates the additional capabilities according to the change of description document. The output power with downlink only carrier aggregation active was not > 0.25 dB higher than with carrier aggregation not active. Therefore, additional SAR measurements were not required per FCC KDB Publication 941225 D05Av01r02. See RF Exposure Technical Report S/N 1M1704170147-01-R2.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)

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LTE INFORMATION

LTE Information					
FCC ID	A3LSMG892A				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 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 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 7 (2502.5 - 2567.5 MHz)				
	LTE Band 38 (2572.5 - 2617.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
Channel Bandwidths	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 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 38: 5 MHz, 10 MHz, 15 MHz, 20 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 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)	1733.6 (132208)	N/A	1756.4 (132436)	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 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 7: 5 MHz	2502.5 (20775)		2535 (21100)	2567.5 (21425)	
LTE Band 7: 10 MHz	2505 (20800)		2535 (21100)	2565 (21400)	
LTE Band 7: 15 MHz	2507.5 (20825)		2535 (21100)	2562.5 (21375)	
LTE Band 7: 20 MHz	2510 (20850)		2535 (21100)	2560 (21350)	
LTE Band 38: 5 MHz	2572.5 (37775)		2595 (38000)	2617.5 (38224)	
LTE Band 38: 10 MHz	2575 (37800)		2595 (38000)	2615 (38199)	
LTE Band 38: 15 MHz	2577.5 (37825)		2595 (38000)	2612.5 (38174)	
LTE Band 38: 20 MHz	2580 (37850)		2595 (38000)	2610 (38150)	
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	Uplink: 5; Downlink: 11/15				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
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. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 14 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WiFi Offloading via LWA & LTE-U, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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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.

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4 RF CONDUCTED POWERS

4.1 LTE 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 B66 standalone powers were used to select measurement configurations for LTE B4. See RF Exposure Technical Report S/N 1M1704170147-01-R2.A3L for complete SAR compliance evaluation and RF conducted output power measurements.

4.1.1 LTE 2x2 MIMO Downlink Carrier Aggregation LAA Conducted Powers

Table 4-1
LTE Two Component Carrier Max Conducted Powers

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	18900	1880	QPSK	1	0	900	1960	LTE B46 _A	20	47290	5200	24.23	24.19
CA_2A-46 _B A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _B	20	48290	5300	24.19	24.19
CA_2A-46 _C A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _C	20	51290	5600	24.20	24.19
CA_2A-46 _D A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _D	20	53140	5785	24.15	24.19
CA_4A-46 _A A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _A	20	47290	5200	24.14	24.18
CA_4A-46 _B A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _B	20	48290	5300	24.19	24.18
CA_4A-46 _C A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _C	20	51290	5600	24.12	24.18
CA_4A-46 _D A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _D	20	53140	5785	24.15	24.18
CA_46 _A A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _A	20	47290	5200	24.23	24.18
CA_46 _B A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _B	20	48290	5300	24.25	24.18
CA_46 _C A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _C	20	51290	5600	24.23	24.18
CA_46 _D A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _D	20	53140	5785	24.19	24.18

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Table 4-2
LTE Four Component Carrier Max Conducted Powers

Combination	PCC Band	PCC BW [MHz]	PCC					SCC 1				SCC 2			SCC 3			Power					
			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-4G-D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	CA_2A.23	24.19
CA_2A-4G-D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _u	20	48290	5300	LTE B46 _u	20	48488	5319.8	LTE B46 _u	20	48092	5280.2	CA_2A.23	24.19
CA_2A-4G-D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	24.21	24.19
CA_2A-4G-D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	24.17	24.19
CA_4A-4G-D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	24.18	24.18
CA_4A-4G-D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _u	20	48290	5300	LTE B46 _u	20	48488	5319.8	LTE B46 _u	20	48092	5280.2	24.15	24.18
CA_4A-4G-D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	24.17	24.18
CA_4A-4G-D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	24.14	24.18
CA_4G-D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	24.22	24.18
CA_4G-D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _c	20	48290	5300	LTE B46 _c	20	48488	5319.8	LTE B46 _c	20	48092	5280.2	24.25	24.18
CA_4G-D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	24.18	24.18
CA_4G-D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	24.21	24.18

Table 4-3
LTE Two Component Carrier Reduced Conducted Powers – Hotspot Mode Active

	PCC									SCC				Power	
Combination	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 _u A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _u	20	47290	5200	20.47	20.42
CA_2A-46 _u A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _u	20	48290	5300	20.49	20.42
CA_2A-46 _c A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _c	20	51290	5600	20.50	20.42
CA_2A-246 _c A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _c	20	53140	5785	20.45	20.42
CA_4A-46 _u A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _u	20	47290	5200	20.96	21.00
CA_4A-46 _u A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _u	20	48290	5300	20.95	21.00
CA_4A-46 _c A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _c	20	51290	5600	20.99	21.00
CA_4A-46 _c A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _c	20	53140	5785	21.00	21.00
CA_46 _u A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _u	20	47290	5200	21.43	21.37
CA_46 _u A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _u	20	48290	5300	21.44	21.37
CA_46 _c A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _c	20	51290	5600	21.43	21.37
CA_46 _c A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _c	20	53140	5785	21.44	21.37

Table 4-4
LTE Four Component Carrier Reduced Conducted Powers – Hotspot Mode Active

Combination	PCC Band	PCC							SCC 1				SCC 2			SCC 3				Power			
		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-4G-D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	20.34	20.42
CA_2A-4G-D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _u	20	48290	5300	LTE B46 _u	20	48488	5319.8	LTE B46 _u	20	48092	5280.2	20.29	20.42
CA_2A-4G-D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	20.38	20.42
CA_2A-4G-D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	20.34	20.42
CA_4A-4G-D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	20.88	21.00
CA_4A-4G-D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _u	20	48290	5300	LTE B46 _u	20	48488	5319.8	LTE B46 _u	20	48092	5280.2	20.87	21.00
CA_4A-4G-D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	20.91	21.00
CA_4A-4G-D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	20.92	21.00
CA_4G-D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _u	20	47290	5200	LTE B46 _u	20	47488	5219.8	LTE B46 _u	20	47092	5180.2	21.39	21.37
CA_4G-D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _c	20	48290	5300	LTE B46 _c	20	48488	5319.8	LTE B46 _c	20	48092	5280.2	21.40	21.37
CA_4G-D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _c	20	51290	5600	LTE B46 _c	20	51488	5619.8	LTE B46 _c	20	51092	5580.2	21.39	21.37
CA_4G-D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _c	20	53140	5785	LTE B46 _c	20	53338	5804.8	LTE B46 _c	20	52942	5765.2	21.37	21.37

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Table 4-5
LTE Two Component Carrier Reduced Conducted Powers – Grip Sensor Active

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	18700	1860	16QAM	1	0	700	1940	LTE B46 _A	20	47290	5200	21.80	21.69
CA_2A-46 _B A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _B	20	48290	5300	21.90	21.69
CA_2A-46 _C A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _C	20	51290	5600	21.89	21.69
CA_2A-46 _D A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _D	20	53140	5785	21.88	21.69
CA_4A-46 _A A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _A	20	47290	5200	21.44	21.37
CA_4A-46 _B A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _B	20	48290	5300	21.48	21.37
CA_4A-46 _C A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _C	20	51290	5600	21.50	21.37
CA_4A-46 _D A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _D	20	53140	5785	21.46	21.37
CA_46 _A A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _A	20	47290	5200	21.43	21.37
CA_46 _B A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _B	20	48290	5300	21.44	21.37
CA_46 _C A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _C	20	51290	5600	21.43	21.37
CA_46 _D A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _D	20	53140	5785	21.44	21.37

Table 4-6
LTE Four Component Carrier Reduced Conducted Powers – Grip Sensor Active

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 _A D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _A	20	47290	5200	LTE B46 _A	20	47488	5219.8	LTE B46 _A	20	47092	5180.2	21.63	21.69
CA_2A-46 _B D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _B	20	48290	5300	LTE B46 _B	20	48488	5319.8	LTE B46 _B	20	48092	5280.2	21.64	21.69
CA_2A-46 _C D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _C	20	51290	5600	LTE B46 _C	20	51488	5619.8	LTE B46 _C	20	51092	5580.2	21.65	21.69
CA_2A-46 _D D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _D	20	53140	5785	LTE B46 _D	20	53338	5804.8	LTE B46 _D	20	52942	5765.2	21.64	21.69
CA_4A-46 _A D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _A	20	47290	5200	LTE B46 _A	20	47488	5219.8	LTE B46 _A	20	47092	5180.2	21.29	21.37
CA_4A-46 _B D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _B	20	48290	5300	LTE B46 _B	20	48488	5319.8	LTE B46 _B	20	48092	5280.2	21.28	21.37
CA_4A-46 _C D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _C	20	51290	5600	LTE B46 _C	20	51488	5619.8	LTE B46 _C	20	51092	5580.2	21.29	21.37
CA_4A-46 _D D	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	LTE B46 _D	20	53140	5785	LTE B46 _D	20	53338	5804.8	LTE B46 _D	20	52942	5765.2	21.27	21.37
CA_46 _A D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _A	20	47290	5200	LTE B46 _A	20	47488	5219.8	LTE B46 _A	20	47092	5180.2	21.39	21.37
CA_46 _B D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _B	20	48290	5300	LTE B46 _B	20	48488	5319.8	LTE B46 _B	20	48092	5280.2	21.40	21.37
CA_46 _C D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _C	20	51290	5600	LTE B46 _C	20	51488	5619.8	LTE B46 _C	20	51092	5580.2	21.39	21.37
CA_46 _D D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _D	20	53140	5785	LTE B46 _D	20	53338	5804.8	LTE B46 _D	20	52942	5765.2	21.37	21.37

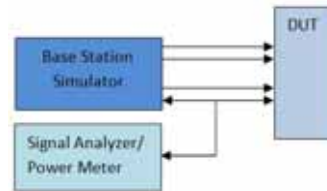


Figure 4-1
Power Measurement Setup

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4.1.2 4x4 Downlink MIMO LAA Conducted Powers

Table 4-7
Two Component Carriers with 4x4 Downlink MIMO Maximum Output Powers

Combination	PCC Band	PCC							DL Antenna Configuration	SCC					Power	
		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]	DL Antenna Configuration	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _A	20	47290	5200	2x2 MIMO	24.16	24.19
CA_2A-46A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _B	20	48290	5300	2x2 MIMO	24.10	24.19
CA_2A-46A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _C	20	51290	5600	2x2 MIMO	24.12	24.19
CA_2A-46A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B46 _D	20	53140	5785	2x2 MIMO	24.14	24.19
CA_4A-46A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _A	20	47290	5200	2x2 MIMO	24.08	24.18
CA_4A-46A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _B	20	48290	5300	2x2 MIMO	24.06	24.18
CA_4A-46A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _C	20	51290	5600	2x2 MIMO	24.07	24.18
CA_4A-46A	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	LTE B46 _D	20	53140	5785	2x2 MIMO	24.03	24.18
CA_46A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _A	20	47290	5200	2x2 MIMO	24.13	24.18
CA_46A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _B	20	48290	5300	2x2 MIMO	24.11	24.18
CA_46A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _C	20	51290	5600	2x2 MIMO	24.10	24.18
CA_46A-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	LTE B46 _D	20	53140	5785	2x2 MIMO	24.15	24.18

Table 4-8
Four Component Carriers with 4x4 Downlink MIMO Maximum Output Powers

Combination	PCC Band	PCC										SCC 1					SCC 2					SCC 3					Power	
		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 DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)	
CA_2A-46D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	24.16	24.19	
CA_2A-46D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	24.10	24.19	
CA_2A-46D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	LTE B46 _C	20	51092	5580.2	2x2 MIMO	24.12	24.19	
CA_2A-46D	LTE B2	20	18900	1880	QPSK	1	0	900	1960	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	24.10	24.19	
CA_4A-46D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	24.08	24.18	
CA_4A-46D	LTE B4	20	20300	1745	QPSK	1	0	2300	2145	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	24.05	24.18	
CA_4A-46D	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	LTE B46 _C	20	51092	5580.2	2x2 MIMO	24.06	24.18	
CA_4A-46D	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	24.06	24.18	
CA_46D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	24.16	24.18	
CA_46D-66A	LTE B66	20	132322	1745	QPSK	1	0	66786	2145	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	24.18	24.18	
CA_46D-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	LTE B46 _C	20	51092	5580.2	2x2 MIMO	24.17	24.18	
CA_46D-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	24.16	24.18	

Table 4-9
Two Component Carriers with 4x4 Downlink MIMO Reduced Output Powers – Hotspot Mode Active

Combination	PCC Band	PCC							DL Antenna Configuration	SCC					Power	
		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]	DL Antenna Configuration	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _A	20	47290	5200	2x2 MIMO	20.20	20.42
CA_2A-46A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _B	20	48290	5300	2x2 MIMO	20.30	20.42
CA_2A-46A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _C	20	51290	5600	2x2 MIMO	20.23	20.42
CA_2A-46A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	LTE B46 _D	20	53140	5785	2x2 MIMO	20.29	20.42
CA_4A-46A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _A	20	47290	5200	2x2 MIMO	20.77	21.00
CA_4A-46A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _B	20	48290	5300	2x2 MIMO	20.74	21.00
CA_4A-46A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _C	20	51290	5600	2x2 MIMO	20.77	21.00
CA_4A-46A	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	LTE B46 _D	20	53140	5785	2x2 MIMO	20.76	21.00
CA_46A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _A	20	47290	5200	2x2 MIMO	21.16	21.37
CA_46A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _B	20	48290	5300	2x2 MIMO	21.16	21.37
CA_46A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _C	20	51290	5600	2x2 MIMO	21.15	21.37
CA_46A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	LTE B46 _D	20	53140	5785	2x2 MIMO	21.26	21.37

Table 4-10
Four Component Carriers with 4x4 Downlink MIMO Reduced Output Powers – Hotspot Mode Active

Combination	PCC Band	PCC										SCC 1				SCC 2				SCC 3				Power			
		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 DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	20.20	20.42
CA_2A-46D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	20.21	20.42
CA_2A-46D	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	LTE B46 _C	20	51092	5580.2	2x2 MIMO	20.23	20.42
CA_2A-46D	LTE B2	20	18700	1860	16QAM	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	20.26	20.42
CA_4A-46D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	20.76	21.00
CA_4A-46D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	20.74	21.00
CA_4A-46D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	LTE B46 _C	20	51092	5580.2	2x2 MIMO	20.71	21.00
CA_4A-46D	LTE B4	5	20175	1732.5	16QAM	1	0	2175	2132.5	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	20.75	21.00
CA_46D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	LTE B46 _A	20	47488	5219.8	2x2 MIMO	LTE B46 _A	20	47092	5180.2	2x2 MIMO	21.27	21.37
CA_46D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	LTE B46 _B	20	48488	5319.8	2x2 MIMO	LTE B46 _B	20	48092	5280.2	2x2 MIMO	21.28	21.37
CA_46D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	LTE B46 _C	20	51488	5619.8	2x2 MIMO	LTE B46 _C	20	51092	5580.2	2x2 MIMO	21.23	21.37
CA_46D-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	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	21.25	21.37

Table 4-11
Two Component Carriers with 4x4 Downlink MIMO Reduced Output Powers – Grip Sensor Active

Combination	PCC Band	PCC									SCC					Power	
		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 A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	21.62	21.69
CA_2A-46 _B A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	21.63	21.69
CA_2A-46 _C A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	21.62	21.69
CA_2A-46 _D A	LTE B2	20	18700	1860	16QAM	1	0	700	1940	4x4 MIMO	LTE B46 _D	20	53140	5785	2x2 MIMO	21.65	21.69
CA_4A-46 _A A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	21.27	21.37
CA_4A-46 _B A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	21.26	21.37
CA_4A-46 _C A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	21.27	21.37
CA_4A-46 _D A	LTE B4	20	20300	1745	64QAM	1	0	2300	2145	4x4 MIMO	LTE B46 _D	20	53140	5785	2x2 MIMO	21.23	21.37
CA_46 _A A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _A	20	47290	5200	2x2 MIMO	21.16	21.37
CA_46 _B A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _B	20	48290	5300	2x2 MIMO	21.16	21.37
CA_46 _C A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _C	20	51290	5600	2x2 MIMO	21.15	21.37
CA_46 _D A-66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	4x4 MIMO	LTE B46 _D	20	53140	5785	2x2 MIMO	21.26	21.37

Table 4-12
Four Component Carriers with 4x4 Downlink MIMO Reduced Output Powers – Grip Sensor Active

PCC											SCC 1				SCC 2				SCC 3				Power				
Combination	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 DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-46 _D	LTE B2	20	18700	1860	16QAM	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	21.55	21.69
CA_2A-46 _D	LTE B2	20	18700	1860	16QAM	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	21.54	21.69
CA_2A-46 _D	LTE B2	20	18700	1860	16QAM	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	21.54	21.69
CA_2A-46 _D	LTE B2	20	18700	1860	16QAM	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	21.52	21.69
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	21.23	21.37
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	21.26	21.37
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	21.22	21.37
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	21.25	21.37
CA_46 _D -66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	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	21.27	21.37
CA_46 _D -66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	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	21.18	21.37
CA_46 _D -66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	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	21.21	21.37
CA_46 _D -66A	LTE B66	20	132572	1770	64QAM	1	0	67036	2170	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	21.19	21.37

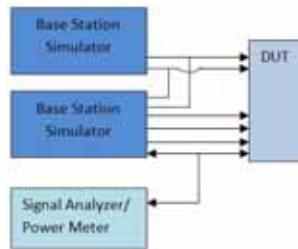


Figure 4-2
Power Measurement Setup for LAA with 4x4 Downlink MIMO

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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-1+~~	Power Splitter	N/A	CBT	N/A	~~N/A~~

Note: 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.

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6 CONCLUSION

6.1 Measurement Conclusion

The SAR evaluation 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]

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