FCC SAR Test Report

APPLICANT	:	SIERRA WIRELESS
EQUIPMENT	:	PCIe wireless WAN card
BRAND NAME	:	SIERRA WIRELESS
MODEL NAME	:	EM7455
FCC ID	:	N7NEM7455
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

The product was installed into Portable Computer (Brand Name DELL, Model Name: P28S) during test.

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA681204-05	Rev. 01	Initial issue of report	Dec. 09, 2016

1. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
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Applicant	
Company Name	SIERRA WIRELESS
Address	13811 Wireless Way Richmond, BC Canada V6V 3A4

Manufacturer	
Company Name	SIERRA WIRELESS
Address	13811 Wireless Way Richmond, BC Canada V6V 3A4

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	PCIe wireless WAN card
Brand Name	SIERRA WIRELESS
Model Name	EM7455
FCC ID	N7NEM7455
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Mode	· RMC 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · LTE: QPSK, 16QAM
EUT Stage	Production Unit

Host Information	
Equipment Name	Portable Computer
Brand Name	DELL
Model Name	P28S
Wireless Technology	· 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 · NFC:ASK

Remark :

1. This device has two kinds of Housing material, two kinds of panel, three kinds of antenna vendors and two kinds of batteries, the detail information as following table.
2. This device has two kinds of NFC antenna vendors and respectively integrated into the device for this model.
3. The Qualcomm QCNFA344A WLAN / Bluetooth module is also integrated into this host, for WLAN / Bluetooth power which can refer to Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories SAR Test Report, FCC ID: PPD-QCNFA344AH, Report No: SA150107E06B.

Sample List			
Sample	Housing material	Panel	Antenna Vendor
1	MG	NTS	Hong-Bo
2	MG	TS	Hong-Bo
3	CF	TS	Hong-Bo
4	MG	NTS	Speed
5	MG	TS	Speed
6	CF	TS	Speed
7	MG	NTS	WNC

Batteries Option				
Battery 1	Brand Name	DELL	Model Name	DJ1J0
	Power Rating	11.4Vdc, 42Wh	Type	Li-ion
Battery 2	Brand Name	DELL	Model Name	F3YGT
	Power Rating	7.6Vdc, 60Wh	Type	Li-ion

WWAN Antenna Information						
Sample 1	Manufacturer	Hong-Bo	Panel	NTS	Peak gain (dBi)	698-821MHz: 0 824-960MHz: -1.21 1425-1515MHz: -0.01 1710-2170MHz: 2.99 2300-2690MHz: 2.71
	P/N	260-24134			Type	PIFA
Sample 2 Sample 3	Manufacturer	Hong-Bo	Panel	TS	Peak gain (dBi)	698-821MHz: 0.36 824-960MHz: -0.32 1425-1515MHz: -0.05 1710-2170MHz: 2.75 2300-2690MHz: 2.49
	P/N	260-24130			Type	PIFA
Sample 4	Manufacturer	Speed	Panel	NTS	Peak gain (dBi)	698-821MHz: -0.64 824-960MHz: -0.15 1425-1515MHz: -0.64 1710-2170MHz: 1.52 2300-2690MHz: 1.58
	P/N	F.0G.FH-6018-003-00			Type	PIFA
Sample 5 Sample 6	Manufacturer	Speed	Panel	TS	Peak gain (dBi)	698-821MHz: -0.03 824-960MHz: -1.83 1425-1515MHz: -1.47 1710-2170MHz: 2.13 2300-2690MHz: 2.64
	P/N	F.0G.FH-6017-003-00			Type	PIFA
Sample 7	Manufacturer	Wistron Neweb Corporation	Panel	NTS	Peak gain (dBi)	704-821MHz: 0.73 824-960MHz: 0.18 1710-2170MHz: 2.95 2300-2690MHz: 2.71
	P/N	81ELAN15.G08			Type	PIFA

WLAN Antenna Information											
Sample 1	Main	Ant. Type	PIFA	connector	IPEX	Aus	Ant. Type	PIFA	connector	IPEX
		Model No.	DC33001WF2L (260-24134)	Manufacturer	Hong-Bo		Model No.	DC33001WF2L (260-24134)	Manufacturer	Hong-Bo
		Peak Gain (dBi)					Peak Gain (dBi)			
		2400~2483.5MHz	-1.89	5470~5725MHz	-1.03		2400~2483.5MHz	-4.77	5470~5725MHz	-0.48
		5150~5250MHz	0.2	5725~5850MHz	-3.35		5150~5250MHz	-1.55	5725~5850MHz	-0.47
		5250~5350MHz	0.2				5250~5350MHz	-1.55		
Sample 2 Sample 3	Main	Ant. Type	PIFA	connector	IPEX	Aus	Ant. Type	PIFA	connector	IPEX
		Model No.	DC33001WF3L (260-24130)	Manufacturer	Hong-Bo		Model No.	DC33001WF3L (260-24130)	Manufacturer	Hong-Bo
		Peak Gain (dBi)					Peak Gain (dBi)			
		2400~2483.5MHz	2.25	5470~5725MHz	1.65		2400~2483.5MHz	2.51	5470~5725MHz	-2.88
		5150~5250MHz	1.55	5725~5850MHz	0.62		5150~5250MHz	-1.48	5725~5850MHz	-2.88
		5250~5350MHz	1.55				5250~5350MHz	-1.48		
Sample4	Main	Ant. Type	PIFA	connector	IPEX 20565	Aus	Ant. Type	PIFA	connector	IPEX 20565
		Model No.	DC33001WK2L (F.0G.FH-6018-003-00)	Manufacturer	Speed		Model No.	DC33001WK2L (F.0G.FH-6018-003-00)	Manufacturer	Speed
		Peak Gain (dBi)					Peak Gain (dBi)			
		2400~2483.5MHz	0.41	5470~5725MHz	-1.69		2400~2483.5MHz	-0.1	5470~5725MHz	-0.66
		5150~5250MHz	-0.92	5725~5850MHz	-1.35		5150~5250MHz	1.96	5725~5850MHz	-2.87
		5250~5350MHz	-0.92				5250~5350MHz	1.96		
Sample 5 Sample 6	Main	Ant. Type	PIFA	connector	IPEX 20565	Aus	Ant. Type	PIFA	connector	IPEX 20565
		Model No.	DC33001WK3L (F.0G.FH-6017-003-00)	Manufacturer	Speed		Model No.	DC33001WK3L (F.0G.FH-6017-003-00)	Manufacturer	Speed
		Peak Gain (dBi)					Peak Gain (dBi)			
		2400~2483.5MHz	-2.4	5470~5725MHz	1.04		2400~2483.5MHz	-2.57	5470~5725MHz	-0.97
		5150~5250MHz	2.64	5725~5850MHz	-1.72		5150~5250MHz	-2.16	5725~5850MHz	-0.97
		5250~5350MHz	2.64				5250~5350MHz	-2.16		
Sample7	Main	Ant. Type	PIFA	connector	IPEX	Aus	Ant. Type	PIFA	connector	IPEX
		Model No.	DC33001WG2L (81ELAN15.G08)	Manufacturer	Wistron Neweb Corporation		Model No.	DC33001WG2L (81ELAN15.G08)	Manufacturer	Wistron Neweb Corporation
		Peak Gain (dBi)					Peak Gain (dBi)			
		2400~2483.5MHz	0.85	5470~5725MHz	1.31		2400~2483.5MHz	-1.52	5470~5725MHz	1.05
		5150~5250MHz	2.96	5725~5850MHz	2.84		5150~5250MHz	0.69	5725~5850MHz	1.05
		5250~5350MHz	2.96				5250~5350MHz	0.69		

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	N7NEM7455
Equipment Name	PCIe wireless WAN card
Operating Frequency Range of each LTE transmission band	LTE Band 02: 1850 MHz ~ 1910 MHz LTE Band 04: 1710 MHz ~ 1755 MHz LTE Band 05: 824 MHz ~ 849 MHz LTE Band 07: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK, and 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations as page10/11.
LTE Carrier Aggregation Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink only. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 2

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745

LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

Inter-Band Combination																				
PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC
LTE B2	+	LTE B5	LTE B5	+	LTE B2	LTE B2	+	LTE 12	LTE B12	+	LTE B2	LTE B2	+	LTE B13	LTE B13	+	LTE B2	LTE B2	+	LTE B29
BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)
20	+	10	10	+	20	20	+	10	10	+	20	20	+	10	10	+	20	20	+	10
20	+	5	10	+	15	20	+	5	10	+	15	20	+	5	10	+	15	20	+	5
15	+	10	10	+	10	20	+	3	10	+	10	15	+	10	10	+	10	20	+	3
15	+	5	10	+	5	15	+	10	10	+	5	15	+	5	10	+	5	15	+	10
10	+	10	5	+	20	15	+	5	5	+	20	10	+	10	5	+	20	15	+	5
10	+	5	5	+	15	15	+	3	5	+	15	10	+	5	5	+	15	15	+	3
5	+	10	5	+	10	10	+	10	5	+	10	5	+	10	5	+	10	10	+	10
5	+	5	5	+	5	10	+	5	5	+	5	5	+	5	5	+	5	10	+	5
						10	+	3	3	+	20							10	+	3
						5	+	10	3	+	15							5	+	10
						5	+	5	3	+	10							5	+	5
						5	+	3	3	+	5							5	+	3

Inter-Band Combination																				
PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC
LTE B4	+	LTE B5	LTE B5	+	LTE B4	LTE B4	+	LTE B12	LTE B12	+	LTE B4	LTE B4	+	LTE B13	LTE B13	+	LTE B4	LTE B4	+	LTE B29
BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)
20	+	10	10	+	20	20	+	10	10	+	20	20	+	10	10	+	20	20	+	10
20	+	5	10	+	15	20	+	5	10	+	15	15	+	10	10	+	15	20	+	5
15	+	10	10	+	10	20	+	3	10	+	10	10	+	10	10	+	10	20	+	3
15	+	5	10	+	5	15	+	10	10	+	5	5	+	10	10	+	5	15	+	10
10	+	10	5	+	20	15	+	5	10	+	3							15	+	5
10	+	5	5	+	15	15	+	3	10	+	1.4							15	+	3
5	+	10	5	+	10	10	+	10	5	+	20							10	+	10
5	+	5	5	+	5	10	+	5	5	+	15							10	+	5
						10	+	3	5	+	10							10	+	3
						5	+	10	5	+	5							5	+	10
						5	+	5	5	+	3							5	+	5
						5	+	3	5	+	1.4							5	+	3
						3	+	10	3	+	20									
						3	+	5	3	+	15									
						3	+	3	3	+	10									
						1.4	+	10	3	+	5									
						1.4	+	5	3	+	3									
						1.4	+	3	3	+	1.4									

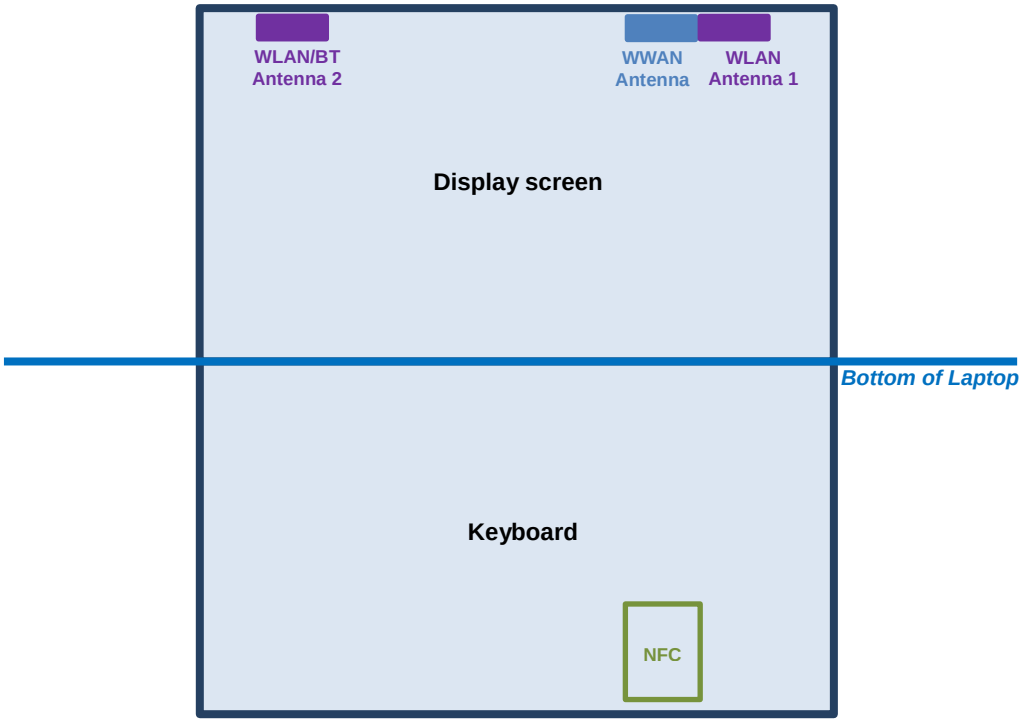
Intra-Band Combination											
Contiguous						Non-Contiguous					
PCC		SCC	PCC		SCC	PCC		SCC	PCC		SCC
LTE B2	+	LTE B2	LTE B7	+	LTE B7	LTE B2	+	LTE B2	LTE B7	+	LTE B7
BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)	BW (MHz)	+	BW (MHz)
20	+	20	20	+	20	20	+	20	20	+	20
20	+	15	20	+	15	20	+	15	15	+	20
20	+	10	20	+	10	20	+	10	15	+	15
20	+	5	15	+	20	20	+	5	10	+	15
15	+	20	15	+	15	15	+	20	10	+	10
15	+	15	10	+	20	15	+	15	5	+	15
15	+	10				15	+	10	20	+	15
10	+	20				15	+	5	15	+	10
10	+	15				10	+	20	15	+	5
5	+	20				10	+	15			
						10	+	10			
						10	+	5			
						5	+	20			
						5	+	15			
						5	+	10			
						5	+	5			

4. Maximum Tune-up Limit (Unit: dBm)

Band	Maximum Average Power (dBm)
WCDMA Band II	24
WCDMA Band IV	24
WCDMA Band V	24
LTE Band 2	24
LTE Band 4	24
LTE Band 5	24
LTE Band 7	23
LTE Band 12	24
LTE Band 13	24
LTE Band 25	24
LTE Band 26	24
LTE Band 41	24

Band	Maximum Average Power (dBm)	
	Antenna 1	Antenna 2
Bluetooth		13
2.4G WLAN	20.5	20.5
5G WLAN	15	15

5. Antenna Location



The separation distance for antenna to edge:

Antenna	To Bottom of Laptop (mm)
WWAN Antenna	197.02
WLAN Antenna 1	197.02
WLAN/BT Antenna 2	197.02

6. SAR test exclusion table

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 13	LTE Band 5 / 26	LTE Band 4	LTE Band 2 / 25	LTE Band 7	LTE Band 41	2.4GHz BT ANT 2	2.4GHz WLAN ANT 1	2.4GHz WLAN ANT 2	5GHz WLAN ANT 1	5GHz WLAN ANT 2
Exposure Position	Maximum power (dBm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.0	23.0	13.0	20.5	20.5	15.0	15.0
	Maximum rated power(mW)	251.0	251.0	251.0	251.0	251.0	251.0	251.0	251.0	200.0	200.0	20.0	112.0	112.0	32.0	32.0
Bottom of Laptop	Separation distance(mm)	197.02														
	exclusion threshold	992.0	1583.0	1579.0	878.0	938.0	994.0	1583.0	1578.0	1564.0	1561.0	1566.0	1566.0	1566.0	1532.0	1532.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Conclusion: According to table above, standalone SAR is not require in this report.

7. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + WLAN + Bluetooth	Yes

General Note:

1. WLAN and Bluetooth share the same antenna 2, and cannot transmit simultaneously.
2. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
3. Per KDB 447498 D01v06 SAR test exclusion in section6, the standalone SAR testing is not required for this device, 0.4 W/kg is used for simultaneous transmission analysis when the test separation distance is > 50mm.

Exposure Position	1	2	3	1+2+3 Summed 1g SAR (W/kg)
	WWAN	WLAN Ant 1	WLAN/BT Ant 2	
	Estimated 1g SAR (W/kg)			
Body	0.4	0.4	0.4	1.2

Conclusion:

In the table above, the summed SAR is compliant with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

8. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] 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”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[6] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[7] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[8] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.