

FCC SAR TEST REPORT

FCC ID : QYLEM9190B
Equipment : Wireless Module
Brand Name : Getac
Model Name : EM9190
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1, Nangang
Rd.,Nangang Dist., Taipei City 11568,
Taiwan, R.O.C.
Standard : FCC 47 CFR Part 2 (2.1093)

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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



Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA0D2108-01A	01	Initial issue of report	Oct. 30, 2023



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Getac Technology Corporation., Wireless Module, EM9190, are as follows.

Table with 4 columns: Equipment Class, Frequency Band, Highest SAR Summary, Highest Simultaneous Transmission. Row 1: Licensed, FR1, FR1 n41, 1.16, 1.16.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.(FCC) This device is in compliance 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, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- 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
FCC KDB 941225 D05 SAR for LTE Devices v02r05



3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Wireless Module
Brand Name	Getac
Model Name	EM9190
FCC ID	QYLEM9190B
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 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 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM
Remark:	<ol style="list-style-type: none"> Based on the original Report No.: FA0D2108, added 5G NR n48/n77 plimit and maximum power, since the n48 transmit antenna is away 200mm from human body, therefore, additional evaluation MPE calculation to show compliance. According to Qualcomm smart transmit procedure to additional n48/n77 plimit and pmax was not required part2 verification, therefore, the part2 validation was refer to original report No.: FA02D108B. The Intel AX200NGW WLAN/Bluetooth module is also integrated into this host, the WLAN/Bluetooth estimated SAR is used perform simultaneous transmission analysis which refer to FCC ID: PD9AX200NG, Sporton report no.: FA9N1220-02. The Intel AX211NGW WLAN/BT module is also integrated into this host. The WLAN 2.4GHz/5GHz SAR result is referenced from Intel SAR report, report No.:200611-01.TR10 (FCC ID: PD9AX211NG), WLAN 6GHz SAR result refers to report No.: 200611-01.TR40 (FCC ID: PD9AX211NG) and these SAR results are also used to perform simultaneous transmission analysis. The n41 SAR results were according to original report No.: FA0D2108A and used perform Sim-Tx analysis in section 7



Host Information	
Equipment Name	Notebook
Brand Name	Getac
Model Name	B360, B360 Pro, B360 G2, B360 Pro G2
Integrated WLAN Module 1	Brand Name: Intel Model Name: AX200NGW
Integrated WLAN Module 1	Brand Name: Intel Model Name: AX211NGW
Integrated RFID Module	Brand Name: Getac Model Name: K120 PN7462 NFC
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20 / HT40 / VHT20 / VHT40 / VHT80 / VHT160 / HE20 / HE40 / HE80 / HE160 Bluetooth BR/EDR/LE NFC:ASK
EUT Stage	Production Unit
Remark:	
1. The WLAN/Bluetooth module is also integrated into this host, the WLAN/Bluetooth estimated SAR is used perform simultaneous transmission analysis which refer to FCC ID: PD9AX200NG, Sporton report no.: FA9N1220-02.	

SKU List				
B360	SKUA	SKUB	SKUC	SKUD
CPU	i7-10610U	i7-10710U	ADL-P i5-1250P vPro	ADL-P i7-1280P vPro
Memory(DDR4)	8G	8G	Kingston 16GB*2,	Kingston 32GB, 3200MHZ, DDR4 x2 (E-Die)
Storage(OPAL SSD)	Main:256GB	Main:256GB	Main:1TB	Main:256GB
	Second:256GB	Second:256GB	Second:1TB	Second:256GB
WLAN	AX200NGW	AX200NGW	AX211NGW	AX211NGW
WWAN	EM9190	EM9190	EM9190	EM9190
Camera FN20FF-679H (RGB)	N/A	v	N/A	v
Camera FN23FF-678H (RGB+IR)	v	N/A	v	N/A
FINGERPRINT	v	v	v	N/A
VGA	v	N/A	N/A	v
HDMI	v	v	v	v
RS232	v	v	v	v
LAN	v	v	v	v
USB	v	v	v	v
USB3.1 Type C	N/A	v	v	v
Smart Card	v	v	v	v
SD Card Reader	N/A	N/A	v	v
MXM	v	v	v	N/A
ODD(Expansion)	v	N/A	N/A	N/A
RS232(Expansion)	N/A	v	N/A	N/A
Touch Screen	v	v	v	v
PCMCIA	v	v	N/A	N/A
GPS	v	v	v	v



4. Smart Transmit feature for RF Exposure compliance

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter to ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency ≤ 6GHz). To control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement.

This report describes the procedures for the SAR char generation, and the parameters obtained from SAR characterization (referred to as SAR char, respectively) will be used as input for Smart Transmit. SAR char will be entered via the Embedded File System (EFS) to enable the Smart Transmit Feature.

<Terminologies in this report>

P _{limit}	The time-averaged RF power which corresponds to SAR _{design_target} .
P _{max}	Maximum target power level
SAR _{design_target} :	The design target for SAR compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
SAR char	P _{limit} for all the technologies/bands for all applicable DSI

<SAR Characterization>

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz.

<SAR design target and uncertainty>

Exposure conditions	SAR design target	W/kg
Bottom of Laptop	1g SAR design target	0.95

Item	Uncertainty dB (k=2)
Total uncertainty	1.0

To account for total uncertainty, SAR_{design_target} should be determined as:

$$SAR_{design_target} < SAR_{regulatory_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit, for each characterized technology and band.

Smart Transmit allows the device to transmit at higher power instantaneously, as high as P_{max}, when needed, but enforces power limiting to maintain time-averaged transmit power to P_{limit}. Below table shows P_{limit} EFS settings and maximum tune up output power P_{max} configured for this EUT for various transmit conditions (Device State Index DSI).

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

Wireless technology	Band	Antenna	P _{limit} (dBm)	Duty cycle (%)	P _{max} * (dBm)
WCDMA	WCDMA Band 2	Main	27.7	100.00%	23
	WCDMA Band 4	Main	27.3	100.00%	23
	WCDMA Band 5	Main	26.4	100.00%	23
LTE	LTE Band 2	Main	27.7	100.00%	23
	LTE Band 4	Main	27.3	100.00%	23
	LTE Band 5	Main	26.4	100.00%	23
	LTE Band 7	Main	27.6	100.00%	23
	LTE Band 12	Main	25.2	100.00%	23
	LTE Band 13	Main	25.7	100.00%	23
	LTE Band 14	Main	26.3	100.00%	23
	LTE Band 17	Main	25.3	100.00%	23
	LTE Band 25	Main	27.7	100.00%	23
	LTE Band 26	Main	26.5	100.00%	23
	LTE Band 66	Main	26.7	100.00%	23
	LTE Band 71	Main	25.2	100.00%	23
	LTE Band 38**	Main	27.5	63.30%	23
	LTE Band 41**	Main	27.0	63.30%	23
LTE Band 48**	Main	31.4	63.30%	22	
5G FR1	NR Band2	Main	27.7	100.00%	23
	NR Band5	Main	26.4	100.00%	23
	NR Band48	Main	31.4	100.00%	22
	NR Band77	Main	29.9	100.00%	23.5
	NR Band66	Main	27.3	100.00%	23
	NR Band71	Main	25.2	100.00%	23
	NR Band41	MIMO	15.00	100.00%	23

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to P_{max} + 1dB uncertainty.

**All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The max allowed output power is the P_{limit} + 1dB device uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.



5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

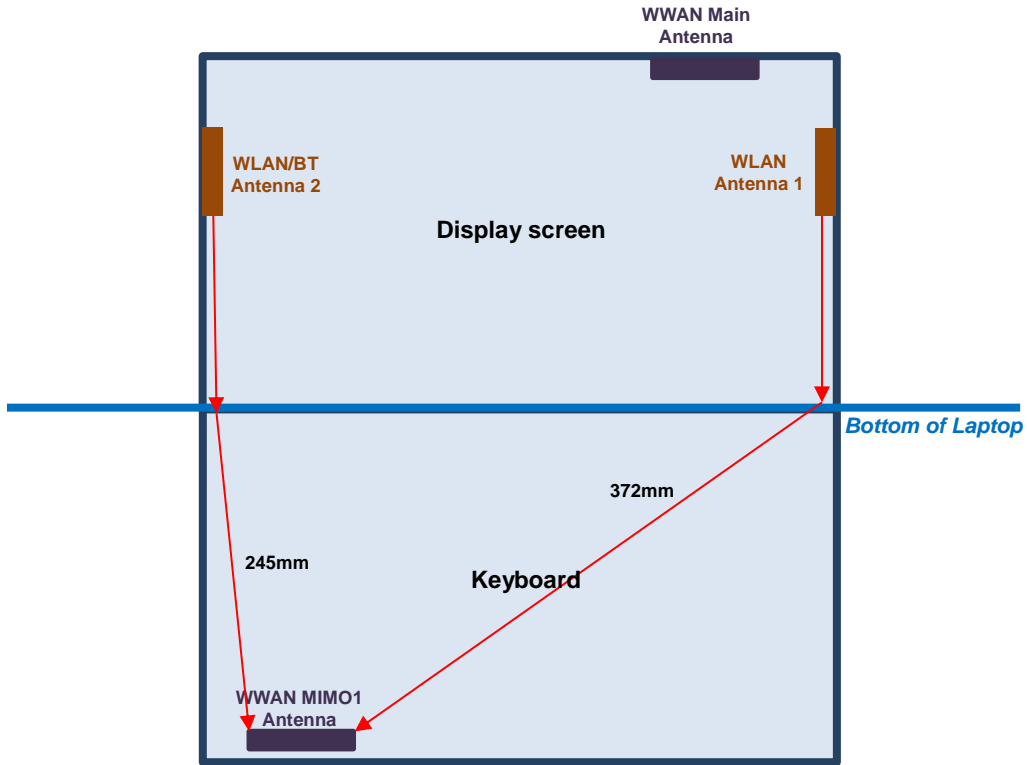
Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Antenna Location



The separation distance for antenna to edge:

Antenna	To Bottom of Laptop (mm)
WWAN Main	>200
WWAN MIMO	<5
WLAN Antenna 1	140
WLAN/BT Antenna 2	140



<WWAN Main MPE Calculation>

General Note:

1. For WWAN main antenna to bottom of laptop distance is higher than 200mm, therefore, power density calculation is perform to show RF exposure compliance. And the ratio is using perform Sim-Tx analysis.

Wireless technology	Band	Antenna	Frequency (MHz)	Maximum Power (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm ²)	limit (mW/cm ²)	Power Density / Limit Ratio
WCDMA	WCDMA Band 2	Main	1850	24	2.28	0.085	1.000	0.085
	WCDMA Band 4	Main	1710	24	2.64	0.092	1.000	0.092
	WCDMA Band 5	Main	824	24	0.95	0.062	0.549	0.113
LTE	LTE Band 2	Main	1850	24	2.28	0.085	1.000	0.085
	LTE Band 4	Main	1710	24	2.64	0.092	1.000	0.092
	LTE Band 5	Main	824	24	0.95	0.062	0.549	0.113
	LTE Band 7	Main	2500	24	2.37	0.086	1.000	0.086
	LTE Band 12	Main	699	24	1.45	0.070	0.466	0.150
	LTE Band 13	Main	777	24	1.39	0.069	0.518	0.133
	LTE Band 14	Main	788	24	0.91	0.062	0.525	0.117
	LTE Band 17	Main	704	24	1.45	0.070	0.469	0.149
	LTE Band 25	Main	1850	24	2.28	0.085	1.000	0.085
	LTE Band 26	Main	814	24	0.98	0.063	0.543	0.115
	LTE Band 66	Main	1710	24	3.28	0.106	1.000	0.106
	LTE Band 71	Main	663	24	1.28	0.067	0.442	0.152
	LTE Band 38	Main	2570	24	2.48	0.089	1.000	0.089
	LTE Band 41	Main	2496	24	2.96	0.099	1.000	0.099
	LTE Band 48	Main	3550	23	-1.43	0.029	1.000	0.029
5G FR1	NR Band2	Main	1850	24	2.28	0.085	1.000	0.085
	NR Band5	Main	824	24	0.95	0.062	0.549	0.113
	NR Band48	Main	3550	22	-1.43	0.023	1.000	0.023
	NR Band66	Main	1710	24	2.64	0.092	1.000	0.092
	NR Band71	Main	663	24	1.28	0.067	0.442	0.152
	NR Band77	Main	3450	24.5	0.12	0.058	1.000	0.058

7. Simultaneous Transmission Analysis

	NO.	Simultaneous Transmission Configurations	Body
AX200NGW	1.	WWAN Main Ant + FR1 MIMO 1 Ant + 2.4GHz WLAN Ant 1 + 2.4GHz WLAN Ant 2	Yes
	2.	WWAN Main Ant + FR1 MIMO 1 Ant + 2.4GHz WLAN Ant 2 + Bluetooth Ant 1	Yes
	3.	WWAN Main Ant + FR1 MIMO 1 Ant + 5GHz WLAN Ant 1 + 5GHz WLAN Ant 2+ Bluetooth Ant 1	Yes

	NO.	Simultaneous Transmission Configurations	Body
AX211NGW	4.	WWAN Main Ant + FR1 MIMO 1 Ant + 2.4GHz WLAN Ant 1 + 2.4GHz WLAN Ant 2	Yes
	5.	WWAN Main Ant + FR1 MIMO 1 Ant + 2.4GHz WLAN Ant 2 + Bluetooth Ant 1	Yes
	6.	WWAN Main Ant + FR1 MIMO 1 Ant + 5/6GHz WLAN Ant 1 + 5/6GHz WLAN Ant 2+ Bluetooth Ant 1	Yes

General Note:

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. According to KDB 447498 D01v06, an estimated 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm is used for Sim-Tx analysis.
3. For MPE evaluation for WLAN/Bluetooth the ratio = estimated 0.4W/kg / SAR limit 1.6W/kg = 0.25 is used for each WLAN/Bluetooth transmitter.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
 - v) The SPLSR calculated results please refer to section 7.3.

7.1 5G NR + LTE + WLAN + BT Sim-Tx analysis

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \leq 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and $A \leq 1.0$; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for 5G FR2 or SAR exposure for 5G FR1), and $B \leq 1.0$.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \leq 1.0 \quad (1)$$

$$x\% * A + (100-x)\% * B \leq x\% * \max(A, B) + (100-x)\% * \max(A, B) \leq \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \leq \max(A, B) + C \leq 1.0 \quad (2)$$

if $A + C \leq 1.0$ and $B + C \leq 1.0$ can be proven, then “ $x\% * A + (100-x)\% * B + C \leq 1.0$ ”. Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1

Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

7.2 Body Exposure Conditions

Summation of SAR

<AX200NGW>

Exposure Position	2	3	4	5	6	7	2+3+4 Summed 1g SAR (W/kg)	2+4+7 Summed 1g SAR (W/kg)	2+5+6+7 Summed 1g SAR (W/kg)	SPLSR	Case No
	FR1 MIMO 1 Ant	2.4GHz WLAN Ant 1	2.4GHz WLAN Ant 2	5GHz WLAN Ant 1	5GHz WLAN Ant 2	Bluetooth Ant 1					
	1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Estimated 1g SAR (W/kg)					
Bottom of Laptop at 0mm	1.163	0.400	0.400	0.400	0.400	0.400	1.963	1.963	2.363	0.01	Case 1

<AX211NGW>

Exposure Position	2	3	4	5	6	7	2+3+4 Summed 1g SAR (W/kg)	2+4+7 Summed 1g SAR (W/kg)	2+5+6+7 Summed 1g SAR (W/kg)	SPLSR	Case No
	FR1	WLAN2.4GHz Ant 1	WLAN2.4GHz Ant 2	WLAN5/6GHz Ant 1	WLAN5/6GHz Ant 2	Bluetooth Ant 1					
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)					
Bottom of Laptop at 0mm	1.163	0.440	0.400	0.510	0.490	0.160	2.003	1.723	2.323	0.020	Case 1

Summation of MPE Ratio

<AX200NGW>

Exposure Position	1	3	4	5	6	7	1+3+4 Summed Ratio	1+4+7 Summed Ratio	1+5+6+7 Summed Ratio
	Main Antenna PD Ratio	2.4GHz WLAN Ant 1 SAR Ratio	2.4GHz WLAN Ant 2 SAR Ratio	5GHz WLAN Ant 1 SAR Ratio	5GHz WLAN Ant 2 SAR Ratio	Bluetooth Ant 1 SAR Ratio			
Bottom of Laptop at 0mm	0.152	0.250	0.250	0.250	0.250	0.250	0.652	0.652	0.902

<AX211NGW>

Exposure Position	1	3	4	5	6	7	1+3+4 Summed Ratio	1+4+7 Summed Ratio	1+5+6+7 Summed Ratio
	Main Antenna PD Ratio	WLAN2.4GHz Ant 1 Ratio	WLAN2.4GHz Ant 2 Ratio	WLAN5/6GHz Ant 1 Ratio	WLAN5/6GHz Ant 2 Ratio	Bluetooth Ant 1 Ratio			
Bottom of Laptop at 0mm	0.152	0.275	0.250	0.319	0.306	0.100	0.677	0.502	0.877

7.3 SPLSR Evaluation and Analysis

General Note:

1. $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary
2. According to antenna location the minimum distance between each transmit antenna is used for SPLSR analysis.

<AX200NGW>

	Band	Position	SAR (W/kg)	Gap	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)				
Case 1	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	245.0	1.56	0.01	Not required
	2.4GHz WLAN Ant 1		0.4	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	372.0	1.56	0.01	Not required
	2.4GHz WLAN Ant 2		0.4	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	245.0	1.96	0.01	Not required
	5GHz WLAN Ant 1 + BT Ant 1		0.8	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	372.0	1.56	0.01	Not required
	5GHz WLAN Ant 2		0.4	0mm				
	2.4GHz WLAN Ant 1	Bottom of Laptop	0.4	0mm	300.0	0.80	0.00	Not required
	2.4GHz WLAN Ant 2		0.4	0mm				
	2.4GHz WLAN Ant 2	Bottom of Laptop	0.4	0mm	300.0	0.80	0.00	Not required
	BT Ant 1		0.4	0mm				
	5GHz WLAN Ant 1 + BT Ant 1	Bottom of Laptop	0.8	0mm	300.0	1.20	0.00	Not required
	5GHz WLAN Ant 2		0.4	0mm				

<AX211NGW>

	Band	Position	SAR (W/kg)	Gap	Minimum distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)				
Case 1	WWAN Main Ant	Bottom of Laptop	0.4	0mm	275.0	1.56	0.01	Not required
	FR1 MIMO 1 Ant		1.163	0mm				
	WWAN Main Ant	Bottom of Laptop	0.4	0mm	194.0	0.84	0.00	Not required
	2.4GHz WLAN Ant 1		0.44	0mm				
	WWAN Main Ant	Bottom of Laptop	0.4	0mm	44.0	0.80	0.02	Not required
	2.4GHz WLAN Ant 2		0.4	0mm				
	WWAN Main Ant	Bottom of Laptop	0.4	0mm	194.0	1.07	0.01	Not required
	5GHz WLAN Ant 1 + BT Ant 1		0.67	0mm				
	WWAN Main Ant	Bottom of Laptop	0.4	0mm	44.0	0.89	0.02	Not required
	5GHz WLAN Ant 2		0.49	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	245.0	1.60	0.01	Not required
	2.4GHz WLAN Ant 1		0.44	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	372.0	1.56	0.01	Not required
	2.4GHz WLAN Ant 2		0.4	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	245.0	1.83	0.01	Not required
	5GHz WLAN Ant 1 + BT Ant 1		0.67	0mm				
	FR1 MIMO 1 Ant	Bottom of Laptop	1.163	0mm	372.0	1.65	0.01	Not required
	5GHz WLAN Ant 2		0.49	0mm				
	2.4GHz WLAN Ant 1	Bottom of Laptop	0.44	0mm	300.0	0.84	0.00	Not required
	2.4GHz WLAN Ant 2		0.4	0mm				
	2.4GHz WLAN Ant 2	Bottom of Laptop	0.4	0mm	300.0	0.56	0.00	Not required
	BT Ant 1		0.16	0mm				
	5GHz WLAN Ant 1 + BT Ant 1	Bottom of Laptop	0.67	0mm	300.0	1.16	0.00	Not required
	5GHz WLAN Ant 2		0.49	0mm				

Test Engineer : Sing Lim



8. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.

Declaration of Conformity:

The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

9. 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 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [7] FCC KDB 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", Oct 2015
- [8] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [9] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.