RF Exposure Justification
in co-locating with other transmitters

1. Outline

As shown by the Figure-1 through Figure-6 in this exhibit, the applying host PC device (Lenovo ThinkPad X200 Tablet Series) incorporates the four kinds of transmitters listed below.

WWAN:		FCC ID: **VV7-MBMF3507G-L**	IC: **287AG-MBMF3507G**
Bluetooth:		FCC ID: QDS-BRCM1033	IC: 4324A-BRCM1033
UWB:		FCC ID: TZQWQ110HMC	N/A
WLAN/WiMAX:		FCC ID: PD9533ANMU	IC: 1000M-533ANMU
		FCC ID: PD9533ANXMU	N/A
		FCC ID: PD9LEN512ANMU	IC: 1000M-L512ANMU
		FCC ID: PPD-AR5BHB63-L	IC: 4104A-ARBHB63L
	*1	FCC ID: TX2-RTL8191SE-L	IC: 6317A-RTL8191SE

*1: New co-located WLAN transmitter device to be added in this application.
The applying WWAN transmitter module has been tested for the host PC device (ThinkPad X200 Tablet) and was already certified on March 20, 2009 by the Commission and February 06, 2009 by IC for the co-location with WLAN / WiMAX devices except FCC ID: TX2-RTL8191SE-L.

This document is made to clarify the RF exposure compliance for co-location of the applying WWAN modular device (FCC ID: **VV7-MBMF3507G-L**, IC: **287AG-MBMF3507G)** and the above WLAN / WiMAX devices.

as of May/2009

	SAR / SAR config.
Co-located WLAN/WiMAX modules	ThinkPad X200 Tablet
FCC ID: PD9533ANMU IC: 1000M-533ANMU	granted FCC: 03/20/2009 IC: 02/06/2009
FCC ID: PD9LEN512ANMU IC: 1000M-L512ANMU	
FCC ID: PPD-AR5BHB63-L IC: 4104A-ARBHB63L	
FCC ID: PD9533ANXMU IC: N/A	granted FCC: 03/20/2009
FCC ID: TX2-RTL8191SE-L IC: 6317A-RTL8191SE	*2

*2 : additional combination of co-location with the new WLAN transmitter device

See **Annex-1** in more details for the grant history.

The minimum separation distance between human body and the WWAN Tx antenna of the host PC device is **13mm** (in Figure-6). Therefore the applying WWAN transmitter module (Model: **F3507G**) and the antenna system is subjected to SAR evaluation pursuant to FCC CFR 47 Section 2.1093, and “SAR Evaluation” category pursuant to IC RSS-102e clause 2.5.1.

With the evaluation hereafter, the applying modular transmitter (FCC ID: **VV7-MBMF3507G-L**, IC: **287AG-MBMF3507G**) has found to comply with the SAR limit pursuant to FCC CFR 47 section 2.1093 for general Population/Uncontrolled exposure and KDB 447498 and IC RSS-102e clause 4.1, even if the co-located WLAN (or WiMAX) devices transmit radio frequencies simultaneously.

Summary of RF Exposure evaluation

Operation mode	Antenna combination	Clause number	Category	Result	note
Notebook, Primary Landscape	WWAN Main and WLAN/WiMAX Aux	5.1.1	MPE / MPE	Pass	Sum of MPE: 0.160 mW/cm^2
	WWAN Main and WLAN/WiMAX Main & 3rd	5.1.2	MPE / SAR	Consultation with FCC is required.	
Primary Portrait	WWAN Main and WLAN/WiMAX Main & 3rd	5.2.1	MPE / MPE	Pass	Sum of MPE: below 0.160
	WWAN Main and WLAN/WiMAX Aux	5.2.2	MPE / SAR	Consultation with FCC is required.	
Lap Held	WWAN and WLAN/WiMAX Main	5.3.1	SAR / SAR	Pass	SAR to peak location separation ratio 0.125 (< 0.3)
	WWAN and WLAN/WiMAX Aux	5.3.2	SAR / SAR	Pass	Sum of SAR: 22H: 0.217 W/Kg 24E: 0.457 W/Kg
Secondary Landscape	WWAN Main and WLAN/WiMAX Main & 3rd	5.4	N/A / SAR	Pass	Max. SAR: 0.222 W/Kg
Secondary Portrait	WWAN Main and WLAN/WiMAX Aux	5.5	SAR / SAR	Pass	Sum of SAR: 22H: 0.407 W/Kg 24E: 1.344 W/Kg

2. Configuration of EUT/ 12.1 Inches diagonal screen size

Figure-1: Notebook mode

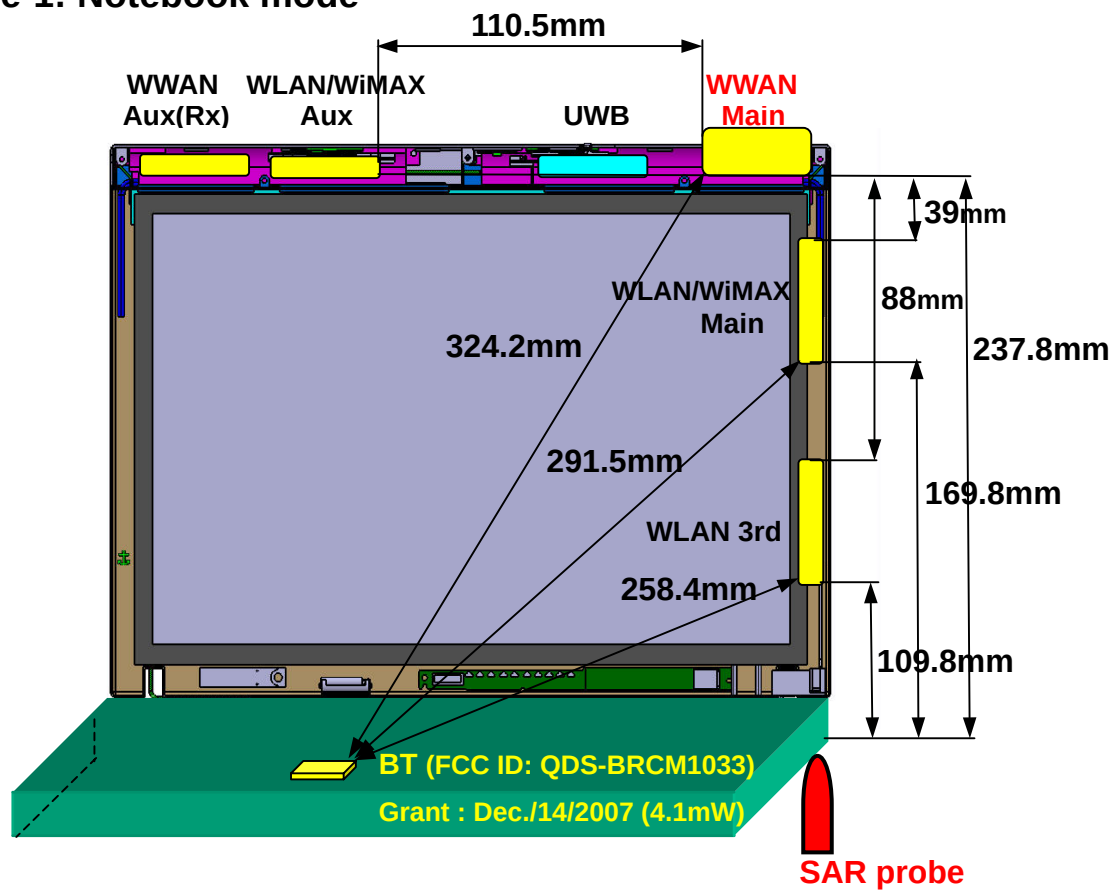


Figure-2: Lap Held

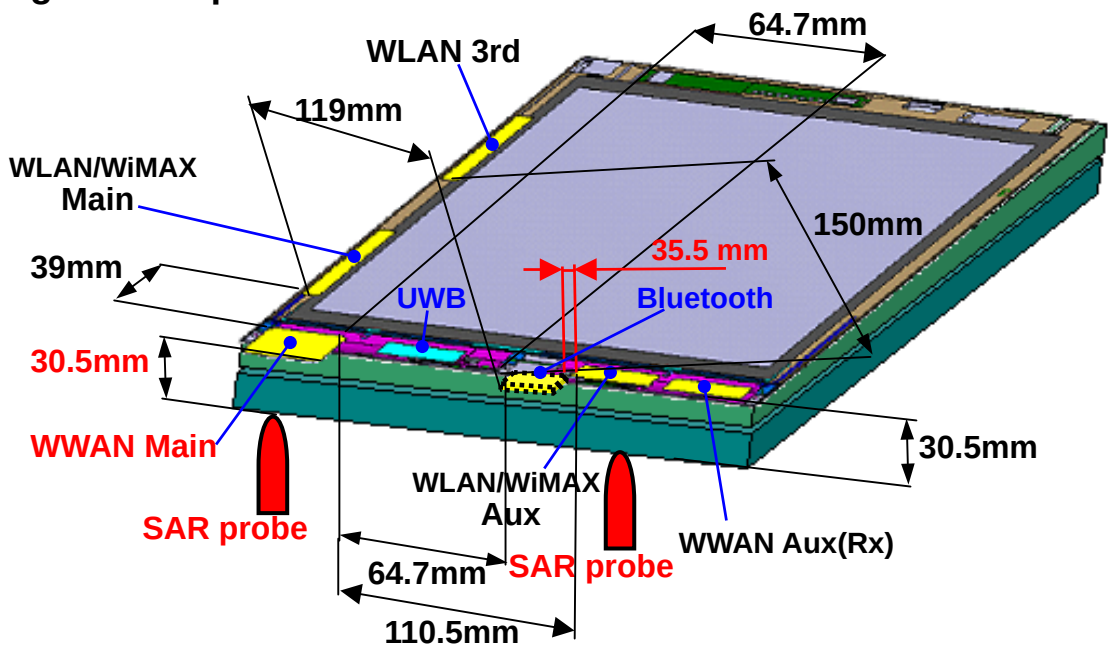


Figure-3:
Tablet PL (Primary Landscape)

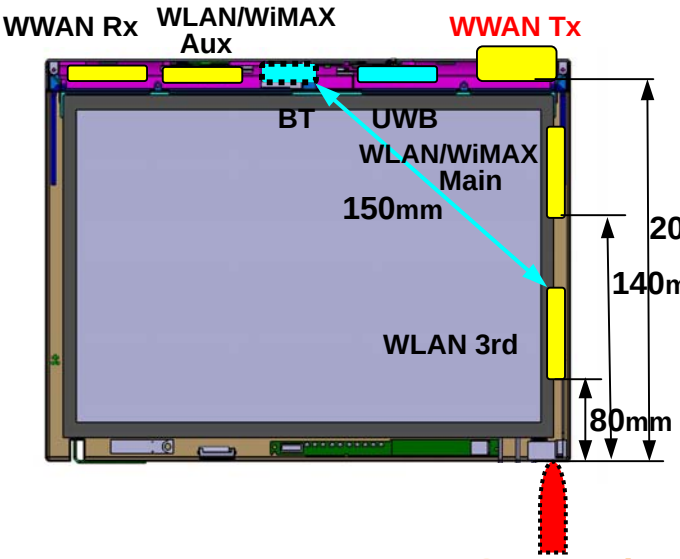


Figure-4:
Tablet PP (Primary Portrait)

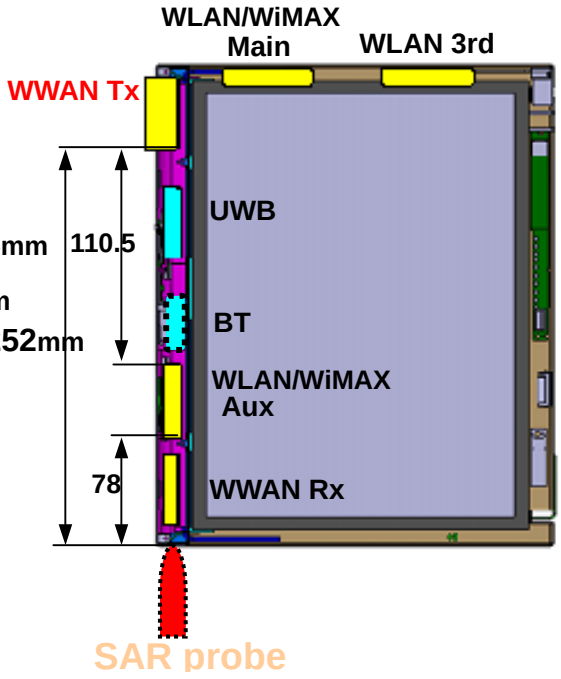


Figure-5:
Tablet SL (Secondary Landscape)

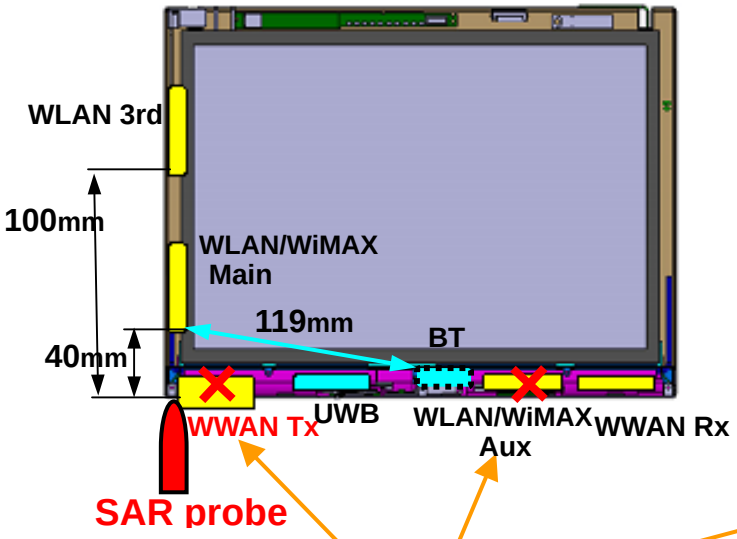
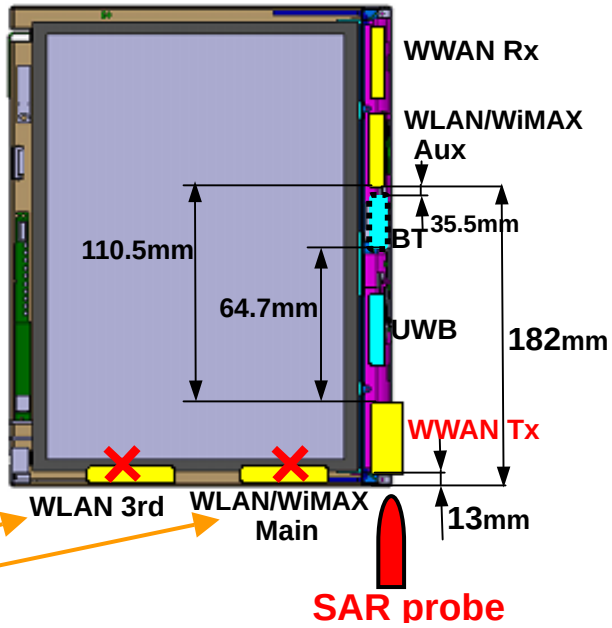


Figure-6:
Tablet SP (Secondary Portrait)



✕ **Tx antennas in these rotary screen positions do not transmit RF.**

See separate exhibit “Tablet Tx control logic” in more details.

3. RF Exposure justification regarding Bluetooth co-location

WWAN - Bluetooth

The co-location evaluation between the applying WWAN (Model: **F3507G**) and Bluetooth device is not required because of the sufficient antenna separation distance (64.7mm or more) and the low power (4.1mW) of Bluetooth device.

WLAN – Bluetooth

The Bluetooth antenna separation distance from human body in Figure-2 is 30.5mm. And the antenna to antenna separation distance between the WLAN/WiMAX **Aux** and Bluetooth is 35.5mm. Therefore, the WLAN/WiMAX **Aux** antenna in Figure-2 requires a RF Exposure evaluation for co-location with Bluetooth device (FCC ID: QDS-BRCM1033, IC: 4324A-BRCM1033).

The all specified WLAN/WiMAX devices listed in page 1 were already certified with co-location with the Bluetooth device at each Grant of Equipment Authorization.

4. RF Exposure justification regarding UWB co-location (US only)

UWB transmitter is not mentioned in FCC CFR 47 Section 2.1091 and 2.1093, so it does not subject to RF exposure requirement. Therefore, no additional SAR testing or RF Exposure evaluation is required for any combination with UWB transmitter.

5. RF Exposure evaluation regarding WWAN & WLAN co-location

5.1 Notebook mode (Fig-1) & Primary Landscape Tablet Edge mode (Fig-3)

The Notebook and Primary Landscape modes are similar test configurations with or without the thickness of keyboard section, and Landscape mode represents for evaluation as the worse case.

5.1.1 WWAN Main and WLAN/WiMAX Aux antennas

These antennas fall in Mobile category and co-locate with 110.5 mm of antenna to antenna separation distance. Therefore, the summation of the highest MPE of WWAN and WLAN (or WiMAX) devices is required. The MPE summation is calculated as below.

1) Part 22H (Cellular) & Part 15C/E or Part 27:
Per OET Bulletin 65, Section 3 for frequency bands with different limits, the MPEs are calculated separately for each band, then divided by the limit for the band and the results are summed. The summation must be less than 1.
i.e. 0.104 / 0.533 (Table-1) + 0.117 / 1.0 (Table-2) = 0.312 < 1.0 …… Pass

2) Part 24E (PCM) & Part 15C/E or Part 27:
0.043 (Table-1) + 0.117 (Table-2) = 0.160 mW/cm^2 (Limit=1.0) …… Pass

Table-1: WWAN (Model: F3507g) MPE info.

Previous Grant date	Host PC model	FCC CFR IC RSS	Max. Conducted power (**Px**)	Max. Host PC antenna gain (**G**)	Distance (**D**)	**MPE *1** (mW/cm^2)	limit (mW/cm^2)
FCC: 03/20/2009 IC: 02/06/2009	ThinkPad X200 Tablet	Part 22H RSS-132	498.82 (Table-1a)	0.54 dBi	20.8 cm (Fig-3)	**0.104**	0.533 (=800/1500)
		Part 24E RSS-133	212.78 (Table-1b)	0.38 dBi	20.8 cm (Fig-3)	**0.043**	1.0

***1**: MPE= (1000 x **Px**)x(10 $^{G/10}$) / (4 x π x **D**^{2})

Table-1a: WWAN Maximum Power consideration at 850MHz frequency band

Mode	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty cycle	Equivalent conducted output power (Maximum conducted output power x duty cycle) (mW)
GPRS	33,00	***a** 1995,26	25%	498,82
EDGE	31,00	1258,93	25%	314,73
WCDMA	23,62	230,14	100%	230,14
HSDPA	23,49	223,36	100%	223,36
HSUPA	23,08	203,24	100%	203,24

***a: 2W is the peak output power listed in the original grant (VV7-MBMF3507G). However, based upon the original test report, 1.955W of the peak output power is used here.**

Table-1b: WWAN Maximum Power consideration at 1900MHz frequency band

Mode	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty cycle	Equivalent conducted output power (Maximum conducted output power x duty cycle) (mW)
GPRS	29,30	***b** 851,14	25%	212,78
EDGE	28,70	741,31	25%	185,33
WCDMA	22,80	190,55	100%	190,55
HSDPA	23,00	199,53	100%	199,53
HSUPA	22,80	190,55	100%	190,55

***b:** **871 mW is the peak output power listed in the original test report (VV7-MBMF3507G). However, 851 mW of the burst-averaged output power in the original test report is used here.**

Table-2: WLAN&WiMAX MPE info.

		Max. Conducted power (See **Table-3**.) (**Py**)	Max. Host PC antenna gain (**G**)	**MPE *2** (mW/cm^2)	limit (mW/cm^2)
Part 15C	2.4GHz band	0.470 W	1.32 dBi	**0.117**	1.0
Part 15E	5.18– 5.32GHz	0.110 W	1.45 dBi	0.028	
Part 15E	5.50 – 5.70GHz	0.110 W	1.47 dBi	0.028	
Part 15C	5.745 – 5.825GHz	0.436 W	1.13 dBi	0.104	
Part 27	2.496 – 2.690GHz	0.211 W	0.16 dBi	0.040	

***2** MPE= (1000x**Py**)x($10^{G/10}$) / (4 x π x 20.8^2)

Table-3: Conducted peak power of WLAN&WiMAX modules

Grant date ***3**	FCC ID	WLAN				WiMAX
		Part 15C 2.4GHz band	Part 15E 5.18 – 5.32GHz	Part 15E 5.50 – 5.70GHz	Part 15C 5.745 – 5.825GHz	Part 27 2.496 – 2.690GHz
09/03/2008	PPD-AR5BHB63-L	0.1977W	N/A	N/A	N/A	N/A
09/17/2008	PD9LEN512ANMU	0.091 W	0.028 W	0.054 W	0.021 W	N/A
09/22/2008	PD9533ANMU	0.130 W	0.110 W	0.110 W	0.068 W	N/A
02/10/2009	PD9533ANXMU	0.470 W	0.048 W	0.048 W	0.436 W	0.211 W
04/07/2009	TX2-RTL8191SE-L	0.0667W	N/A	N/A	N/A	N/A

***3**: Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.

New co-located WLAN transmitter device to be added in this Class II application

5.1.2 WWAN Main and WLAN/WiMAX Main & 3rd antennas

The WWAN Main antenna falls in Mobile category. On the other hand, the WLAN/WiMAX Main and 3rd antennas are Portable category.

The antenna-to-antenna separation distance between WWAN and WLAN/WiMAX regarding KDB 616217 is calculated as below.

Table-4: Antenna to Antenna separation distance of WWAN & WLAN/WiMAX modules

$1/2\ n_x = 1/2\ [$ **Px** $/(60/f)-1]$ (cm) **Px**: Conducted power of F3507g			$1/2\ n_y = 1/2\ [$ **Py** $/(60/f)-1]$ (cm) **Py**: See Table-2.			5cm + 1/2 n_x + 1/2 n_y **Px** Duty 100%	25%	WLAN to WWAN (cm)	Simul Eval?
WWAN: Cellular	Duty=100% (Table-1a) 1/2[**1995**/(60/0.836)-1]	14	WLAN 2400MHz	1/2[**470**/(60/2.45)-1]	9	28	17	3.9 or 8.8	Yes
			WLAN 5250MHz	1/2[**110**/(60/5.25)-1]	5	24	13		Yes
			WLAN 5600MHz	1/2[**110**/(60/5.60)-1]	5	24	13		Yes
	Duty=25% (Table-1a) 1/2[**499**/(60/0.836)-1]	3	WLAN 5785MHz	1/2[**436**/(60/5.785)-1]	21	40	29		Yes
			WIMAX 2590MHz	1/2[**211**/(60/2.59)-1]	4	24	12		Yes
WWAN: PCS	Duty=100% (Table-1b) 1/2[**851**/(60/1.880)-1]	13	WLAN 2400MHz	1/2[**470**/(60/2.45)-1]	9	27	17		Yes
			WLAN 5250MHz	1/2[**110**/(60/5.25)-1]	5	23	13		Yes
			WLAN 5600MHz	1/2[**110**/(60/5.60)-1]	5	23	13		Yes
	Duty=25% (Table-1b) 1/2[**213**/(60/1.880)-1]	3	WLAN 5785MHz	1/2[**436**/(60/5.785)-1]	21	39	29		Yes
			WIMAX 2590MHz	1/2[**211**/(60/2.59)-1]	4	23	12		Yes

Conclusion: ….. **Consultation with FCC is required.**
The configuration of clause 5.1.2 requires the FCC evaluation for simultaneous transmission. See Table-1 for WWAN MPE and Table-5 WLAN/WiMAX SAR.

Table-5: WLAN/WiMAX SAR test results at Primary Landscape mode

Grant date ***3**	FCC ID	Device type	FCC CFR	Conducted Max. power	**Stand alone SAR** (W/Kg) **Main**	**3rd**
02/10/2009	PD9533ANXMU	WLAN / WiMAX	Part 15C (2.4G)	0.470 W	***5**	**0.064 *4**
			Part 15C (5.8G)	0.436 W	***5**	**0.084 *4**
			Part 15E	0.048 W	***5**	**0.126 *4**
			Part 27	0.211 W	**0.026 *9 0.069*10**	Not used
09/22/2008	PD9533ANMU	WLAN	Part 15C (2.4G)	0.130 W	***5**	**0.025 *4**
			Part 15C (5.8G)	0.068 W	***5**	**0.098 *4**
			Part 15E	0.110 W	***5**	**0.095 *4**
09/17/2008	PD9LEN512ANMU	WLAN	Part 15C (2.4G)	0.091 W	**0.015**	Not used
			Part 15C (5.8G)	0.021 W	**0.005**	Not used
			Part 15E	0.054 W	**0.005**	Not used
09/03/2008	PPD-AR5BHB63-L	WLAN	Part 15C (2.4G)	0.1977 W	**0.080**	Not used
04/07/2009	TX2-RTL8191SE-L	WLAN	Part 15C (2.4G)	0.0667 W	Not used ***11**	Not used ***11**

*3: Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.
*4: (Main + 3rd) or (Main + Aux + 3rd) 802.11n MIMO simultaneous
*5: Measurement was omitted because the result of *4 is surely worse than *5.
*9: Notebook mode
*10: Primary Landscape mode
*11: The Main and 3rd antennas are not used for transmission for FCC ID: TX2-RTL8191SE-L.
New co-located WLAN transmitter device to be added in this Class II application

5.2 Primary Portrait Tablet Edge mode (Fig-4)

5.2.1 WWAN Main and WLAN/WiMAX Main & 3rd antennas

These antennas fall in Mobile category, and co-locate with 39 mm of antenna to antenna separation distance. Therefore, the summation of the highest MPE of WWAN and WLAN (or WiMAX) devices is applied.
The results of MPE summation are lower than Primary Landscape mode (Clause 5.1.1) thanks to the longer anterra separation distance from human body.

Therefore, conclusion of the RF Exposure evaluation is: …… Pass

5.2.2 WWAN Main and WLAN/WiMAX Aux antennas

The WWAN Main antenna falls in Mobile category. On the other hand, the WLAN/WiMAX Aux antenna is Portable category.

The antenna-to-antenna separation distance between WWAN and WLAN/WiMAX regarding KDB 616217 is shown by Table-4 (i.e. Min. 12cm), and the distance between the both antennas is 11.05 cm.

Conclusion: ….. **Consultation with FCC is required.**
The configuration of clause 5.2.2 requires the FCC evaluation for simultaneous transmission. See Table-1 for WWAN MPE and Table-6 WLAN/WiMAX SAR.

Table-6: WLAN/WiMAX SAR test results at Primary Portrait mode

Grant date *3	FCC ID	Device type	FCC CFR	Conducted Max. power	Stand alone SAR (W/Kg) Aux
02/10/2009	PD9533ANXMU	WLAN / WiMAX	Part 15C (2.4G)	0.470 W	**0.017**
			Part 15C (5.8G)	0.436 W	**0.026**
			Part 15E	0.048 W	**0.136**
			Part 27	0.211 W	Not used
09/22/2008	PD9533ANMU	WLAN	Part 15C (2.4G)	0.130 W	**0.014**
			Part 15C (5.8G)	0.068 W	**0.037**
			Part 15E	0.110 W	**0.110**
09/17/2008	PD9LEN512ANMU	WLAN	Part 15C (2.4G)	0.091 W	***6**
			Part 15C (5.8G)	0.021 W	***6**
			Part 15E	0.054 W	***6**
09/03/2008	PPD-AR5BHB63-L	WLAN	Part 15C (2.4G)	0.1977 W	**0.068**
04/07/2009	TX2-RTL8191SE-L	WLAN	Part 15C (2.4G)	0.0667 W	**0.254**

***3:** Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.
***6:** Measurement was omitted because of the lower power than others.
New co-located WLAN transmitter device to be added in this Class II application

5.3 Lap held mode (Fig-2)

The SAR results of the all WWAN and WLAN/WiMAX devices at Lap held mode are shown as below.

Table-7: SAR test results at Lap held mode

Grant date *3	FCC ID	Device type	FCC CFR IC RSS	Conducted Max. power	Stand alone SAR (W/Kg)
07/29/2008	VV7-MBMF3507G-L	WWAN	Part 22H RSS-132	498.82 (Table-1a)	**0.168**
			Part 24E RSS-133	212.78 (Table-1b)	**0.408**

Grant date *3	FCC ID	Device type	FCC CFR	Conducted Max. power	Stand alone SAR (W/Kg)	
					Main	**Aux *7**
02/10/2009	PD9533ANXMU	WLAN / WiMAX	Part 15C (2.4G)	0.470 W	**0.023 *4**	**0.023**
			Part 15C (5.8G)	0.436 W	**0.023 *4**	**0.029**
			Part 15E	0.048 W	**0.053 *4**	**0.028**
			Part 27	0.211 W	**0.022 *4**	Rx only
09/22/2008	PD9533ANMU	WLAN	Part 15C (2.4G)	0.130 W	**0.021 *4**	**0.019**
			Part 15C (5.8G)	0.068 W	**0.037 *4**	**0.034**
			Part 15E	0.110 W	**0.051 *4**	**0.038**
09/17/2008	PD9LEN512ANMU	WLAN	Part 15C (2.4G)	0.091 W	**0.015**	Rx only
			Part 15C (5.8G)	0.021 W	**0.005**	Rx only
			Part 15E	0.054 W	**0.005**	Rx only
09/03/2008	PPD-AR5BHB63-L	WLAN	Part 15C (2.4G)	0.1977 W	**0.081**	**0.049**
04/07/2009	TX2-RTL8191SE-L	WLAN	Part 15C (2.4G)	0.0667 W	Rx only	**0.013**

***3:** Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.
***4:** (Main + 3rd) or (Main + Aux + 3rd) 802.11n MIMO simultaneous
***7:** Bluetooth co-location evaluation was taken into account for Aux antenna. Refer to Clause 3.
New co-located WLAN transmitter device to be added in this Class II application

5.3.1 WWAN Main and WLAN/WiMAX Main antennas

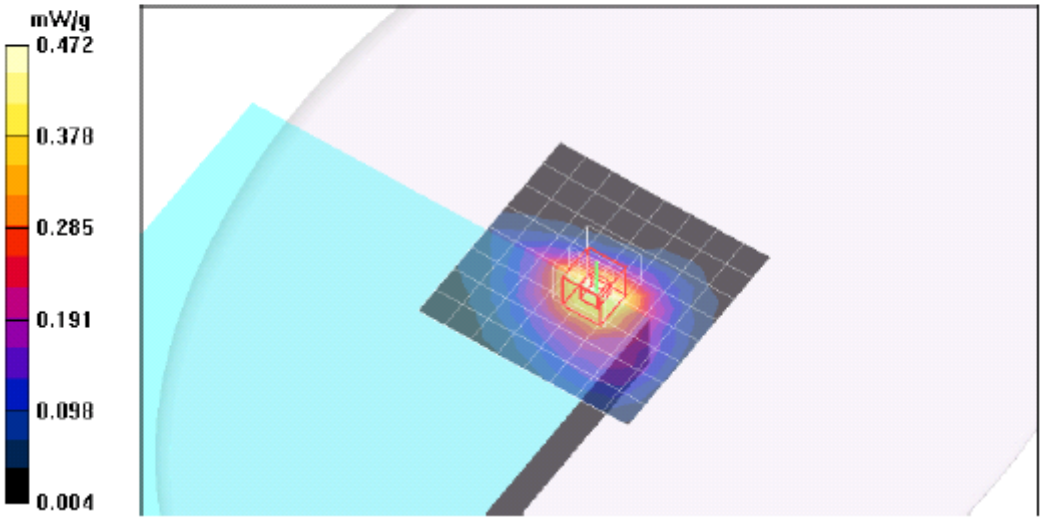
Pursuant to FCC KDB 447498, 3) b) ii) (1), this configuration is required the "**SAR to peak location separation ratio**" evaluation due to the following conditions.
- the antennas are located < 5 cm from persons,
- the antenna separation distance between WWAN **Main** and WLAN/WiMAX **Main** is 39mm (<5cm),
- the output powers of the specific simultaneous transmitting antennas in Table-7 are > 60/f (GHz) mW and were certified with each stand-alone SAR evaluation.
- Since the WWAN Main and WLAN/WiMAX Main separation distance is less than 5cm, sum of 1-g SAR is not allowed. In order to determine the simultaneous SAR evaluation requirement, SAR-to-peak location ratio shall be used.

The SAR to peak location separation ratio is calculated by using the highest SAR results of each WWAN and WLAN/WiMAX devices as follows.

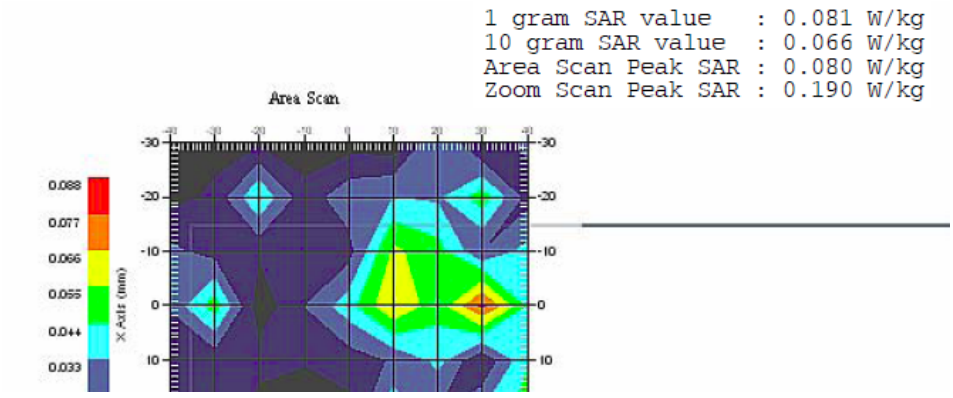
(0.408 + 0.081)/ 3.9 = 0.125 (< 0.3) …….. Pass

WWAN SAR Peak Location at Main antenna / Lap held mode

Wistron - Lap held - GPRS 2 slots - M ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.8 V/m; Power Drift = 0.167 dB
Peak SAR (extrapolated) = 0.663 W/kg
SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.249 mW/g
Maximum value of SAR (measured) = 0.492 mW/g



WLAN SAR Peak Location at Main antenna / Lap held mode



Due to WWAN SAR and WLAN SAR were measured with two difference SAR system, the SAR-to peak location separation distance can only be estimated. As indicated from the above two peak SAR distribution, the SAR to peak location separation distance will be greater than the antenna-to-antenna separation distance of 39 mm.

(0.408 + 0.081)/ 3.9 = 0.125 (< 0.3) …….. Pass
Simultaneously SAR evaluation is not required per KDB 447498.

5.3.2 WWAN Main and WLAN/WiMAX Aux antennas

Pursuant to FCC KDB 447498, 3) b) ii) (1), this configuration is required a summation of SAR evaluation due to the following conditions.
- the antennas are located < 5 cm from persons,
- the antenna separation distance between WWAN **Main** and WLAN/WiMAX **Aux** is 110.5mm (>5cm),
- the output powers of the specific simultaneous transmitting antennas in Table-7 are > 60/f (GHz) mW and were certified with each stand-alone SAR evaluation.

The summation of SAR is calculated as:

Sum of SAR = 0.168 + 0.049 = 0.217 (< 1.6) …… Pass (Cellular band)
= 0.408 + 0.049 = 0.457 (< 1.6) …… Pass (PCS band)

Thus, any simultaneous transmission SAR evaluation is not required.

5.4 Secondary Landscape Tablet Edge mode (Fig-5)

The applying WWAN transmitter does not function at Secondary Landscape mode, so the co-location evaluation for WWAN and WLAN/WiMAX devices is not necessary.

The all subjected WLAN/WiMAX transmitters have found to comply with the SAR limit as below.

…... … Pass

Table-8: SAR test results at Secondary Landscape mode

Grant date ***3**	FCC ID	Device type	FCC CFR / IC RSS	Conducted Max. power	**Stand alone SAR** (W/Kg)
07/29/2008	VV7-MBMF3507G-L	WWAN	Part 22H RSS-132	N/A	not used
			Part 24E RSS-133	N/A	not used

Grant date ***3**	FCC ID	Device type	FCC CFR	Conducted Max. power	**Stand alone SAR** (W/Kg)	
					Main	**Aux**
02/10/2009	PD9533ANXMU	WLAN / WiMAX	Part 15C (2.4G)	0.470 W	**0.179 *4**	Rx only
			Part 15C (5.8G)	0.436 W	**0.091 *4**	Rx only
			Part 15E	0.048 W	**0.177 *4**	Rx only
			Part 27	0.211 W	**0.222**	Rx only
09/22/2008	PD9533ANMU	WLAN	Part 15C (2.4G)	0.130 W	**0.133 *4**	Rx only
			Part 15C (5.8G)	0.068 W	**0.036**	Rx only
			Part 15E	0.110 W	**0.043**	Rx only
09/17/2008	PD9LEN512ANMU	WLAN	Part 15C (2.4G)	0.091 W	**0.040**	Rx only
			Part 15C (5.8G)	0.021 W	**0.039**	Rx only
			Part 15E	0.054 W	**0.091**	Rx only
09/03/2008	PPD-AR5BHB63-L	WLAN	Part 15C (2.4G)	0.1977 W	**0.089**	Rx only
04/07/2009	TX2-RTL8191SE-L	WLAN	Part 15C (2.4G)	0.0667 W	Rx only	**0.199**

***3**: Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.

***4**: Main + 3rd antenna 802.11n 40MHz simultaneous

New co-located WLAN transmitter device to be added in this Class II application

5.5 Secondary Portrait Tablet Edge mode (Fig-6)

Pursuant to FCC KDB 447498, 3) b) ii) (1), this configuration is required a summation of SAR evaluation due to the following conditions.
- the antennas are located < 5 cm from persons,
- the antenna separation distance between WWAN **Main** and WLAN/WiMAX **Aux** is 110.5mm (>5cm),
- the output powers of the specific simultaneous transmitting antennas in Table-9 are > 60/f (GHz) mW and were certified with each stand-alone SAR evaluation.

The summation of SAR is calculated as:

Sum of SAR = 0.243 + 0.164 = 0.407 (< 1.6) …… Pass (Cellular band)
= 1.180 + 0.164 = 1.344 (< 1.6) …… Pass (PCS band)

Thus, any simultaneous transmission SAR evaluation is not required.

Table-9: SAR test results at Secondary Portrait mode

Grant date *3	FCC ID	Device type	FCC CFR IC RSS	Conducted Max. power	**Stand alone SAR** (W/Kg)
07/29/2008	VV7-MBMF3507G-L	WWAN	Part 22H RSS-132	498.82 (Table-1a)	**0.243**
			Part 24E RSS-133	212.78 (Table-1b)	**1.180**

Grant date *3	FCC ID	Device type	FCC CFR	Conducted Max. Power	**Stand alone SAR** (W/Kg)	
					Main	**Aux**
02/10/2009	PD9533ANXMU	WLAN / WiMAX	Part 15C (2.4G)	0.470 W	Rx only	**0.083**
			Part 15C (5.8G)	0.436 W	Rx only	**0.062**
			Part 15E	0.048 W	Rx only	**0.155**
			Part 27	0.211 W	not used ***8**	not used ***8**
09/22/2008	PD9533ANMU	WLAN	Part 15C (2.4G)	0.130 W	Rx only	**0.086**
			Part 15C (5.8G)	0.068 W	Rx only	**0.088**
			Part 15E	0.110 W	Rx only	**0.164**
09/17/2008	PD9LEN512ANMU	WLAN	Part 15C (2.4G)	0.091 W	not used ***8**	not used ***8**
			Part 15C (5.8G)	0.021 W		
			Part 15E	0.054 W		
09/03/2008	PPD-AR5BHB63-L	WLAN	Part 15C (2.4G)	0.1977 W	Rx only	**0.027**
04/07/2009	TX2-RTL8191SE-L	WLAN	Part 15C (2.4G)	0.0667 W	Rx only	**0.085**

***3**: Grant dates for ThinkPad X200 Tablet Series. The configuration of host device remains the same.
***8**: WiMAX and PD9LEN512ANMU do not function at Secondary Portrait mode.
New co-located WLAN transmitter device to be added in this Class II application

Annex-1: FCC ID:VV7-MBMF3507G-L, FCC Regulatory Compliance History

1. Section 2.933 Change in Identification filing based upon VV7-MBMF3507G

   a. Change in identification grant date:04/30/2008

   b. Output power : Based upon VV7-MBMF3507G (original device)

FCC Rule Parts	Frequency Range (MHZ)	Output Watts/Peak –Grant entries	Actual Peak Output power based upon the test report	Actual Bust-Averaged Power based upon the test report	Modulation
24E	**1850.2 - 1909.8**	**0.871**	0.871	**0.851**	**GPRS/10**
24E	**1850.2 - 1909.8**	**0.742**	0.742	**0.617**	**EDGE/10**
24E	**1852.4 - 1907.6**	**0.387**	0.524	0.191(RMS)	HSUPA
22H	**824.2 - 848.8**	**2.0**	1.995	**1.908**	**GPRS/10**
22H	**824.2 - 848.8**	**1.259**	1.259	**0.617**	**EDGE/10**
22H	**826.4 - 846.6**	**0.435**	0.499	**0.203(RMS)**	**HSUPA**

MPE Calculation as documented in VV7-MBMF3507G

850 MHz frequency band

Maximum output power considerations:

Mode	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty cycle	Equivalent conducted output power (Maximum conducted output power x duty cycle) (mW)
GPRS	33,00	1995,26	25%	498,82
EDGE	31,00	1258,93	25%	314,73
WCDMA	23,62	230,14	100%	230,14
HSDPA	23,49	223,36	100%	223,36
HSUPA	23,08	203,24	100%	203,24

1900 MHz frequency band

Maximum output power considerations:

Mode	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty cycle	Equivalent conducted output power (Maximum conducted output power x duty cycle) (mW)
GPRS	29,30	851,14	25%	212,78
EDGE	28,70	741,31	25%	185,33
WCDMA	22,80	190,55	100%	190,55
HSDPA	23,00	199,53	100%	199,53
HSUPA	22,80	190,55	100%	190,55

2. Class II permissive change, Grant date :05/09/2008

a. Implementing Two-Way bios lock logic and qualified for portable hosts / (ThinkPad T400/R400 and ThinkPad T500/W500 Laptop Computers).

b. Highest SAR values: Part 22, 0.173W/kg.; Part 24, 0.112W/kg.

3. Class II permissive change, Grant date: 05/16/2008

   a. Adding alternate WWAN antenna and co-located with Bluetooth (FCC ID:MCLJ07H081) and WLAN (FCC ID: QDS-BRCM1033) in Mobile Hosts (MP1, KD1, KD2, and BX3)

4. Class II permissive change, Grant date: 07/18/2008

   a. Enabling WWAN and WLAN to transmit simultaneously

   b. Co-located with WLAN modules (FCC ID:PPD-AR5BHB63-L; PD9LEN512ANMU; and PD9533ANMU) in Mobile Hosts (ThinkPad X200/X200s; ThinkPad X300/X301, ThinkPad SL310/400 and SL500).

5. Class II permissive change, Grant date:07/29/2008

   a. Installed WWAN module in Portable Tablet Computer (ThinkPad X200 Tablet) and co-located with Bluetooth (FCC ID: QDS-BRCM1033)

   b. Highest SAR values: Part 22, 0.173W/kg.; Part 24, 0.112W/kg.

6. Class II permissive change, Grant date: 08/05/2008

   a. Enable Simultaneously WLAN and WWAN simultaneously transmission in hosts (ThinkPad T400/R400 and ThinkPad T500/W500 Laptop Computers).

   b. and co-located with Bluetooth (FCC ID: QDS-BRCM1033) and WLAN (FCC ID: PD9LEN512ANMU or FCC ID: PPD-AR5BHB63-L)

7. Class II permissive change, Grant date: 09/17/2008

   a. Add new co-located WLAN/WiMAX module (FCC ID: PD9533ANXMU) in the mobile Hosts ((ThinkPad X200/X200s; ThinkPad X300/X301, ThinkPad SL310/400 and SL500).

8. Class II permissive change, Grant date: 10/16/2008

   a. Add new co-located WLAN/WiMAX module (FCC ID:PD9533ANXMU) in the portable host (ThinkPad T400/R400 and ThinkPad T500/W500 Laptop Computers).

9. Class II permissive change, Grant date: 03/20/2009

   a. Enable simultaneously WLAN/WiMAX/WWAN transmission in Tablet Computer (ThinkPad X200 Tablet) and co-located with WLAN/WiMAX module (FCC

ID:PD9533ANXMU), WLAN modules (FCC ID:PD9LEN512ANMU, FCC ID: PD9533ANMU or FCC ID: PPD-AR5BHB63-L) and Bluetooth Module (FCC ID:MCLJ07H081).

10. Class II permissive change, Grant date: 04/27/2009

    a. Enable simultaneously WLAN/WiMAX/WWAN transmission in Mobile Host (ThinkPad T400s) and In portable Host (ThinkPad T400/R400/T500/W500).

    b. Co-located with FCC ID: PD9533ANHU IC: 1000M-533ANHU,FCC ID: PD9512ANHU, FCC ID: PD9512ANXMU, FCC ID: PD9533ANHMU, FCC ID: TX2-RTL8191SE

11. Class II permissive change, application (May/2009)

    a. Add new co-located WLAN module (FCC ID: TX2-RTL8191SE-L) in Tablet Computer (ThinkPad X200 Tablet).