RF Exposure Evaluation in co-locating with other transmitters

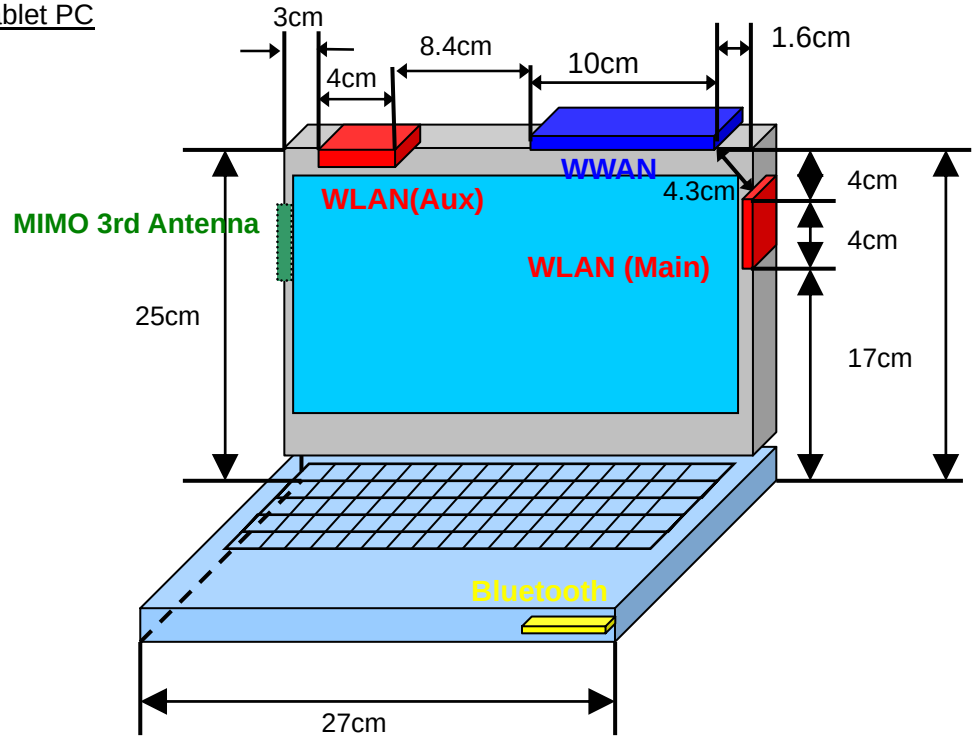
1. Configuration

The host PC device (ThinkPad X60/X61 Tablet Series) consists of the following wireless communication features, and accommodates two transmission antennas for the applying WLAN modular transmitter device (FCC ID: PPD-AR5BXB72-L).

The frequency bands shading in blue were already certified on 10/31/2006. The separate SAR and emission test reports include the measurement results for the new additional U-NII band (5.470-5.725GHz).

Host PC model	Antenna Manufacturer	Antenna type		Antenna P/N	Cable length	Frequency band (GHz)			
						2.4 - 2.5	5.15 - 5.35	5.47 - 5.725	5.725-5.85
ThinkPad X60T & X61T	Wistron NeWeb	PIFA	Main	25.90354.001	600mm	0.90	1.84	1.86	1.92
			Aux	25.90355.001	700mm	1.52	2.78	2.72	2.13

Figure-1: Tablet PC



2. RF Exposure evaluation with co-located WWAN transmitter

The WLAN antenna and WWAN Tx/Rx antenna co-locate with 43mm of separation distance. However both transmitter modules do not establish the network link connections simultaneously, but switch the operation each other within 11 seconds of hand over time when one is in active. (See Section 4 in this exhibit.)

So the SAR testing for the applying WLAN transmitter does not require any evaluation of co-location with WWAN devices.

3. RF Exposure evaluation with co-located Bluetooth transmitter

In addition, the host PC device incorporates the following Bluetooth transmitter.

Co-located Bluetooth device

Model Name	FCC ID, IC Cert. Number	Grantee Name	Granted Date	Conducted Tx power	Antenna gain	EIRP
J07H081	FCC ID: MCLJ07H081	HON HAI Precision Ind. Co., Ltd.	June/ 23 / 2005	3 mW	2 dBi (Peak)	4.8 mW
	IC: 2878D-J07H081		Sep. / 02/ 2005			

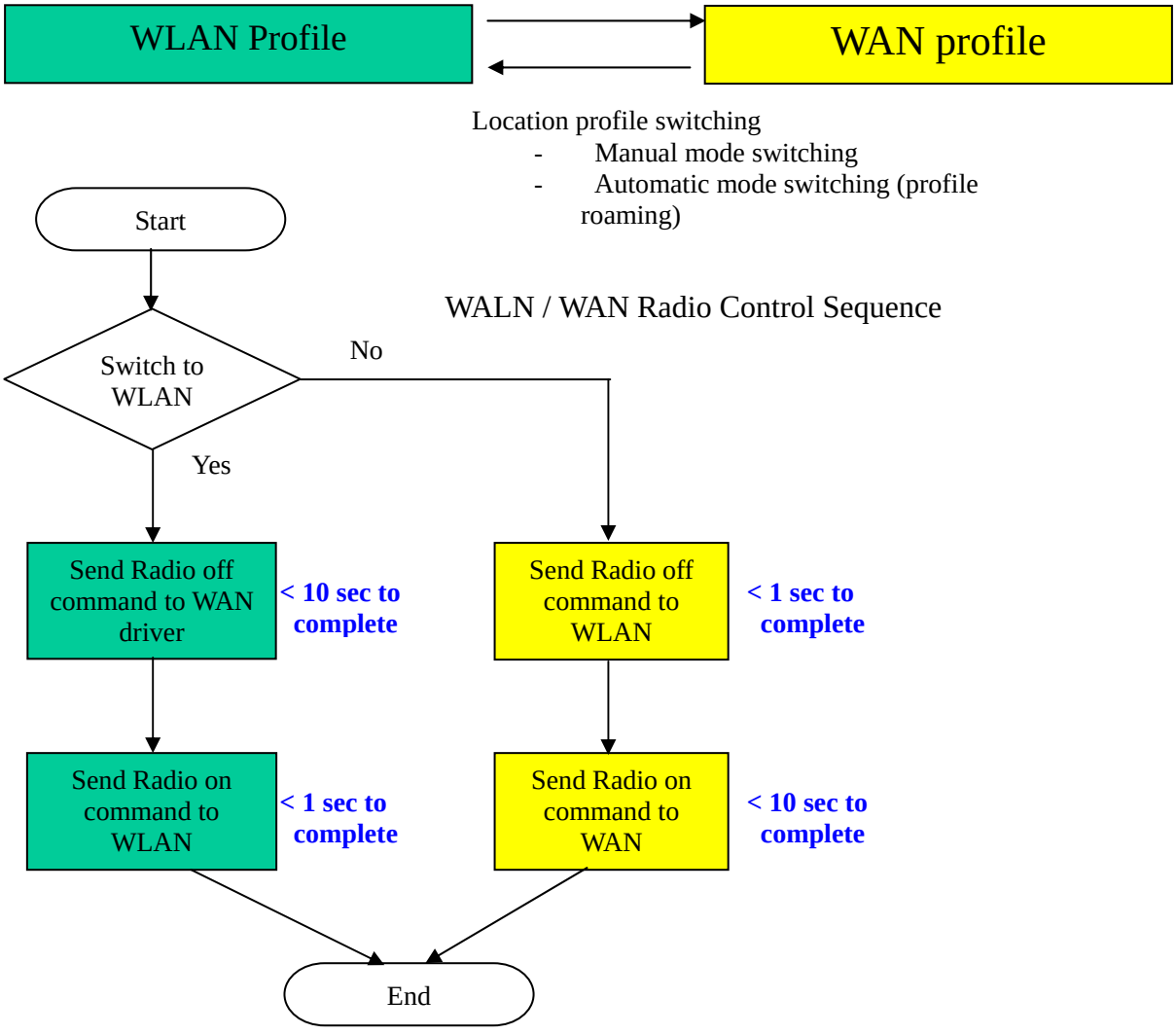
The separation distance between WLAN Tx/Rx antenna and Bluetooth antenna is 15mm (See Figure-2 in page 6), and both transmitters operate simultaneously. Therefore those transmitters are regarded as co-located devices, then the SAR testing is required to be performed with the both WLAN and Bluetooth devices in active.

The separate SAR report indicates the measurement results performed with the applying transmitter (**FCC ID: PPD-AR5BXB72-L**) and the co-located Bluetooth transmitter (FCC ID: MCLJ07H081) in active and transmitting simultaneously.

4. Handover scheme within 11 seconds between wireless LAN /WAN

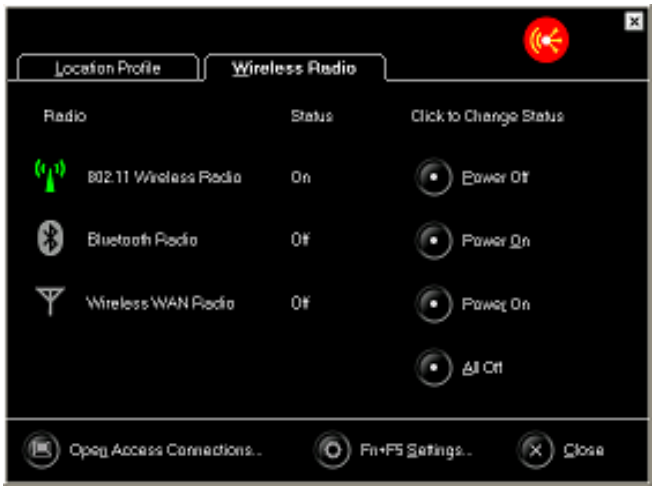
Location profile switching scenario

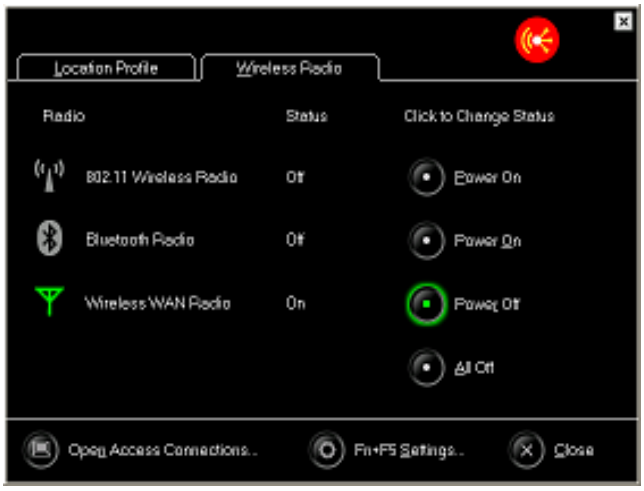
- Exclusive control for WLAN and WAN when WLAN and WAN location profile is applied by user (manual mode switching)
- Exclusive control when automatic location switching is performed by Access Connections (automatic profile roaming)

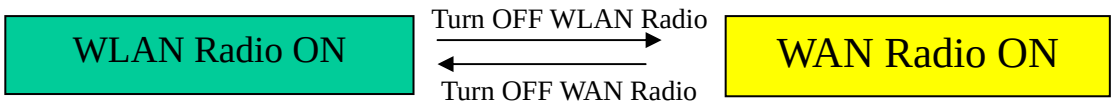


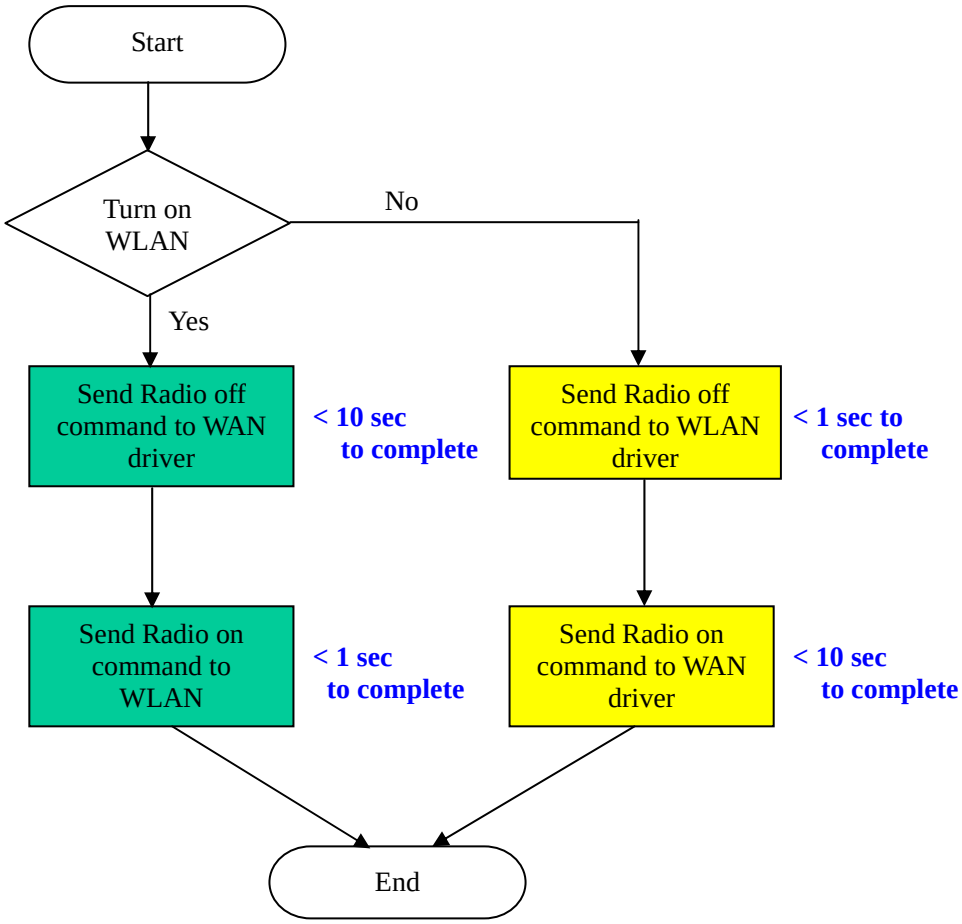
Radio control by software menu (Fn+F5 hot key)

Exclusive control when WLAN or WAN Radio ON is selected by hot key



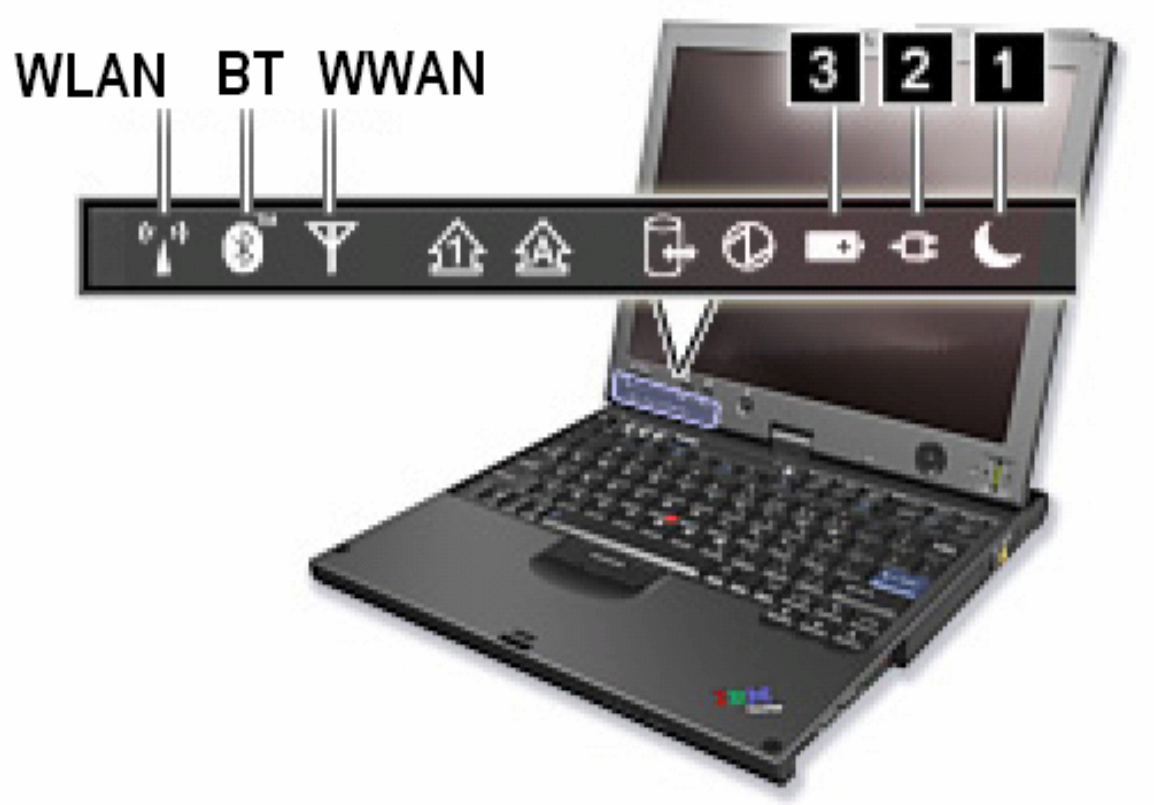






Wireless WAN/LAN status indication

The sifting status from WAN(LAN) to LAN(WAN) is also indicated with the following LED. The switching time is actually shorter than 11 seconds of logical control limit time.



5. Justification for SAR testing

The subjected host device is a tablet type PC, and the transmission antennas are very close to the human body. Therefore the applying LMA transmitter and the antenna system is categorized as a Potable device pursuant to FCC CFR 47 Section 2.1093.

The WLAN and WWAN modules do not establish the network link connections simultaneously, but switch to the other within 11 seconds of handover time when one is in active. So each independent SAR testing for WLAN or WWAN module is available for RF exposure evaluation.

The separate SAR test report was measured for the applying modular transmitter (**FCC ID: PPD-AR5BXB72-L**). Then the applying device has found to comply with the SAR limits.

The SAR testing was performed with the co-located Bluetooth (FCC ID: MCLJ07H081) in active and transmitting simultaneously.

The SAR test was performed with the following configuration. The same terms of each configuration are referred in the SAR test report.

Figure-2: Laptop (Lap Held) mode

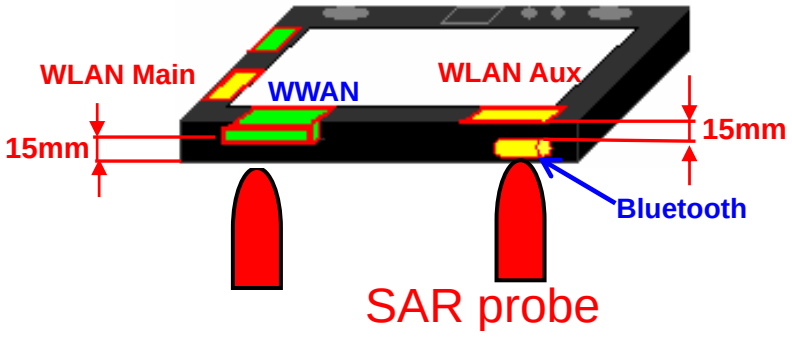


Figure-3: Tablet PL (Primary Landscape)

Figure-4: Tablet PP (Primary Portrait)

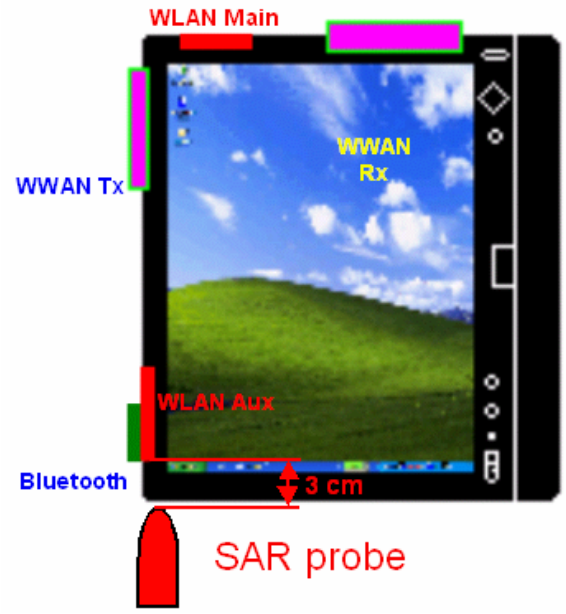


Figure-5: Tablet SL (Secondary Landscape)

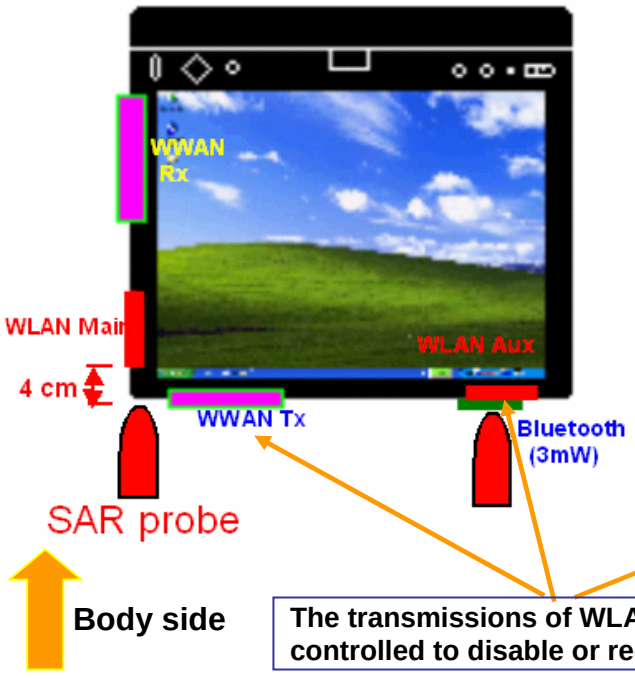
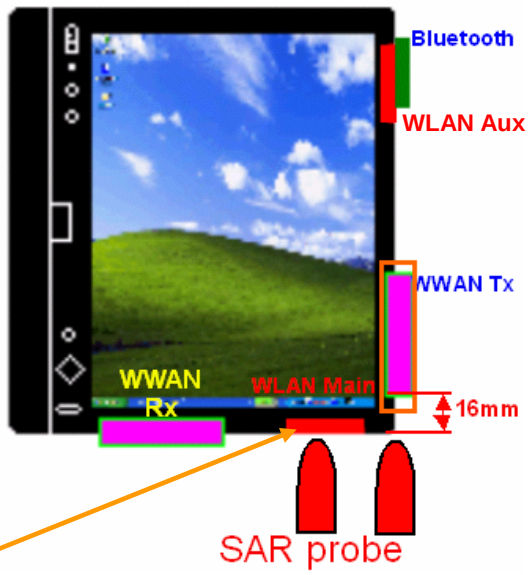


Figure-6: Tablet SP (Secondary Portrait)



The transmissions of WLAN or WWAN at these angles are controlled to disable or reduce the power. (See next page.)

[Transmission control in "Tablet" operation mode]

- The system recognizes mechanically that it is transformed from **"Notebook mode"** to **"Tablet mode".**

- The screen angle of **Tablet mode** is to be selected by the screen rotation switch shown below, then the system recognizes which screen mode in **PL, PP, SL** or **SP** is chosen.

- When the **SL** screen mode was selected, the system performs transmitting control according to the kind of each wireless card. When the applying card (FCC ID: PPD-AR5BXB72-L) was used, the system reduces the transmission power of the Aux antenna to 1mW compulsorily.

  Information only: If WWAN module was active, the system does not function as **SL** mode and returns to **PL** mode automatically so that operator won't use the device with **SL** mode.

- When the **SP** screen mode was selected, the system also performs transmitting control according to the kind of each wireless card. When the applying card (FCC ID: PPD-AR5BXB72-L) was used, the system reduces the transmission power of the main antenna to 1mW compulsorily.