

# RF Exposure Evaluation

## in co-locating with other transmitters

The applying WLAN modular transmitter device (FCC ID: **PPD-AR5BXB72-L**) was already approved for the Lenovo laptop PCs, ThinkPad T60, R60, X60, and Z61 Series on July/18/2006 with grant condition of simultaneous transmission with the Bluetooth transmitter shown in the Table-1.

**Table-1:** Joint Bluetooth device

Option type	FCC ID	Grantee Name	Product Name	Granted Date	Conducted Tx power
Modular Approval Transmitter	MCLJ07H081	HON HAI Precision Ind. Co., Ltd.	ThinkPad Bluetooth with Enhanced Data Rate	June/ 23 / 2005	0.003W

And the following two WWAN modular transmitters are newly to be added for co-location with the applying WLAN transmitter, and are being in certification process separately with each respective FCC ID shown in the Table-2.

**Table-2:** Joint WWAN devices

Granted PC models	ThinkPad Z61p/Z61m	ThinkPad Z61t	ThinkPad T60	ThinkPad R60	ThinkPad X60
<b>FCC ID: N7NMC8755</b>  <b>22H</b>	08/11/2006  0.031W/Kg@G PRS/Ch 128/824.2 MHz (ABS)	08/11/2006  0.099W/Kg@GP RS/CH 128/824.2 MHz (Hyb CFRP)	04/27/2006  0.0793W/Kg@1 4 inches/CH 251/848.8 MHz	06/09/2006  0.130W/Kg@14 inches/CH 128/824.2 MHz  0.065W/Kg@15 inches/CH 128/824.2 MHz	04/27/2006  0.0041W/Kg@CH 192/848.2 MHz
<b>24E</b>	0.090W/Kg@G PRS/CH 661/1880 MHz (Alum ABS)	0.105W/Kg@GP RS/CH 810/1909.8 MHz (Alum CFRP)	0.133W/Kg@14 inches/CH 661/1880 MHz	0.218W/Kg@14 inches/CH 512/1850.2 MHz  0.08W/Kg@15 inches/CH 512/1850.2 MHz	0.020W/Kg@CH 661/1880 MHz

<b>FCC ID: N7N-MC5720</b>  <b>22H</b>	05/24/2006  0.057W/Kg@E VDO/Ch384/83 6.52 MHz (Alum ABS)	05/24/2006  0.108W/Kg@EV DO/CH 384/836.52 MHz (Hyb CFRP)	01/17/2006  0.103W/Kg@14 inches/CH 384/836.52 MHz	05/03/2006  0.071W/Kg@14 inches/CH 1013/824.7 MHz  0.042W/Kg@15 inches/CH 384/836.52 MHz	02/24/2006  0.101W/Kg@C H1013/836.52 MHz
<b>24E</b>	0.105W/Kg@E VDO/CH 600/1880 MHz (Alum ABS)	0.167W/Kg@EV DO/CH 25/1851.25 MHz (Alum CFRP)	0.115W/Kg@14 inches/CH 1175/1908.75 MHz	0.187W/Kg@14 inches/CH 25/1851.25 MHz  0.112W/Kg@15 inches/CH 25/1851.25 MHz	0.152W/Kg@CH 25/1851.25 MHz

## 1. RF Exposure evaluation for multiple transmission with WWAN device

As for the RF exposure evaluation in co-locating with the WWAN transmitters in the Table-2, the WWAN devices (FCC ID: N7N-MC5720, N7NMC8755) are to be certified through separate Class II permissive change applications for the subjected Lenovo laptop PCs.

Each WWAN device was examined the SAR compliance as a **dominant transmitter** with the applying modular transmitter device (FCC ID: PPD-AR5BXB72-L) and Bluetooth module in Table-1, and has found to comply with the SAR limits according to FCC CFR 47 section 2.1093, Portable devices.

## 2. RF Exposure evaluation for multiple transmission with Bluetooth device

As shown by the Figure-1 thru Figure-5, the Bluetooth antennas integrated in the subjected ThinkPad Series are assembled apart from the WWAN and WLAN antennas with 20 cm or more.

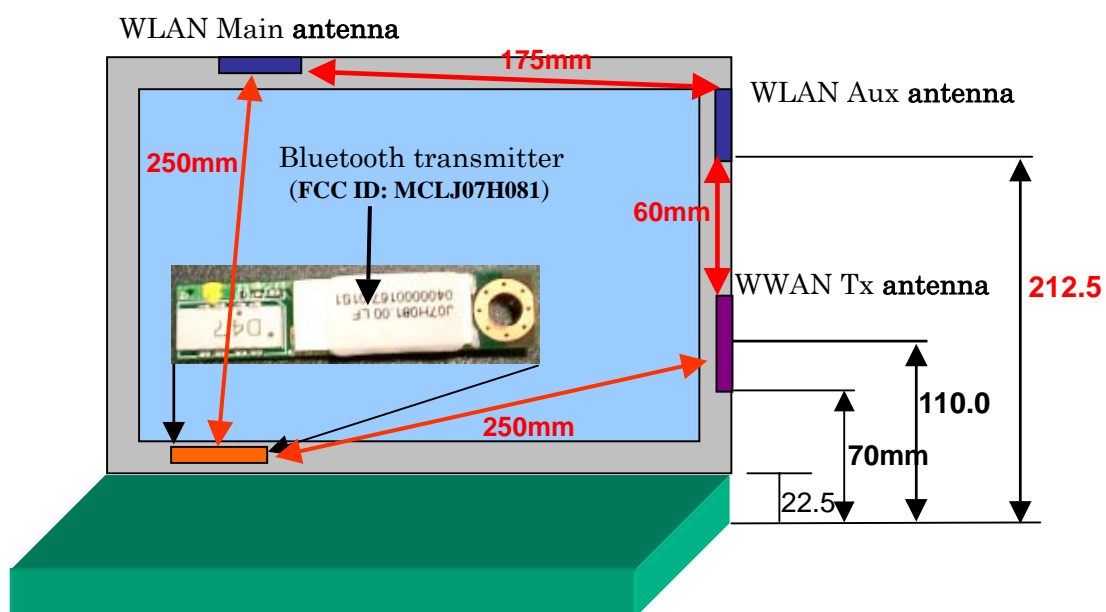
Therefore, the Bluetooth transmitter is not considered as a co-located device, and is allowed to evaluate the RF exposure compliance independently of the applying WWAN modular transmitter or other co-located WLAN ones. In other word, the SAR testing for the applying WWAN device in simultaneous transmitting with the Bluetooth device is not required, when the Bluetooth device satisfies the RF exposure requirement with its own transmission power.

When a customer operates the Lenovo laptop PC on one's lap, the sufficient separation distance (minimum 20cm) between the above Bluetooth antenna and the person's body (lap) can not be maintained. However the footnote14 of the Section 3 in Supplement C to OET Bulletin 65 states:

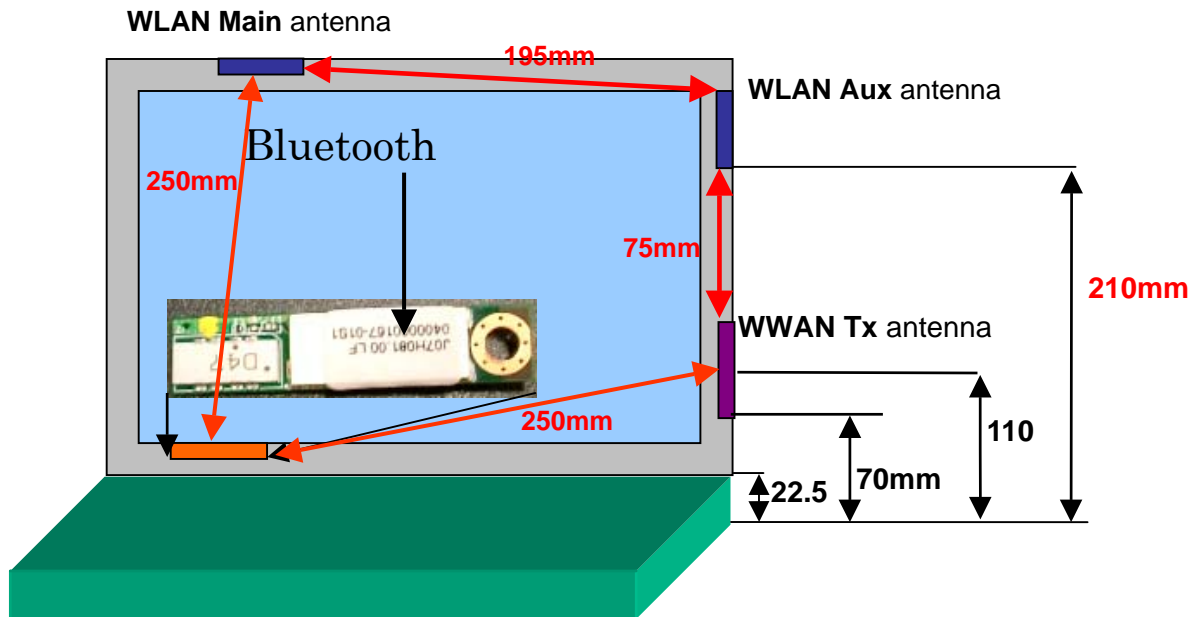
“<sup>14</sup> If a device, its antenna or other radiating structures are operating at closer than 2.5 cm from a person's body or in contact with the body, SAR evaluation may be necessary when the output is more than 50 – 100 mW, depending on the device operating configurations and exposure conditions.”

The output power of the Bluetooth device is 3mW (far below 50mW). Therefore the BT transmitter satisfies the RF exposure requirement regarding CFR 47 Part 15.247(b)(4) without a SAR compliance test report, and can operate with the applying WLAN transmitter simultaneously.

**Figure-1 Antenna assembly of T60 series**



**Figure-2 Antenna assembly of ThinkPad R60 series**



**Figure-3 Antenna assembly of ThinkPad X60 series**

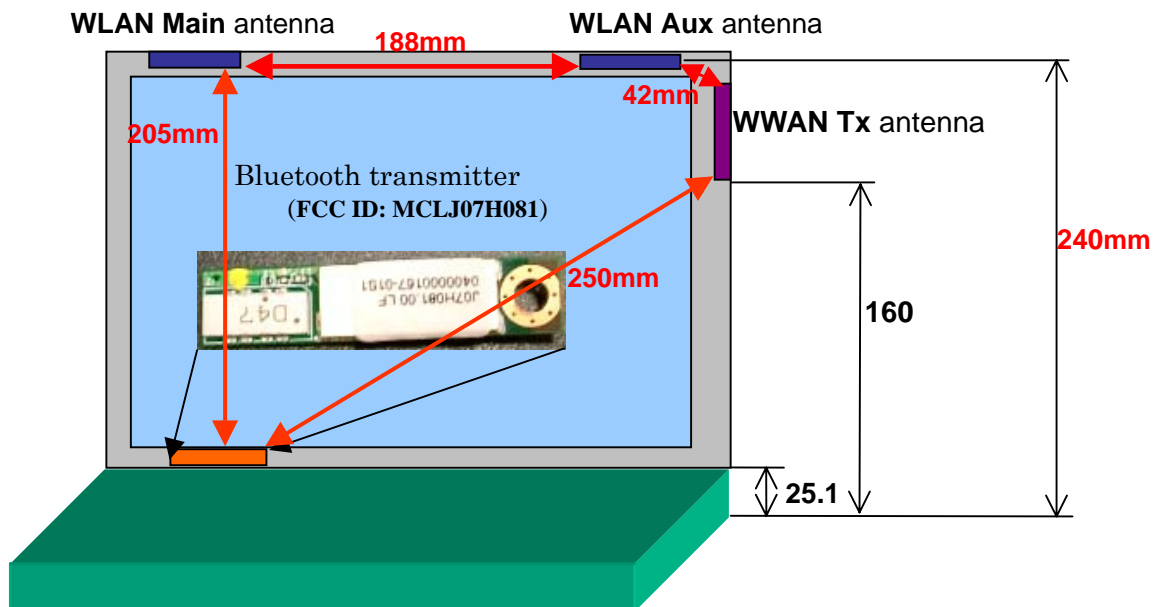


Figure-4 Antenna assembly of ThinkPad Z61m/Z61p Series

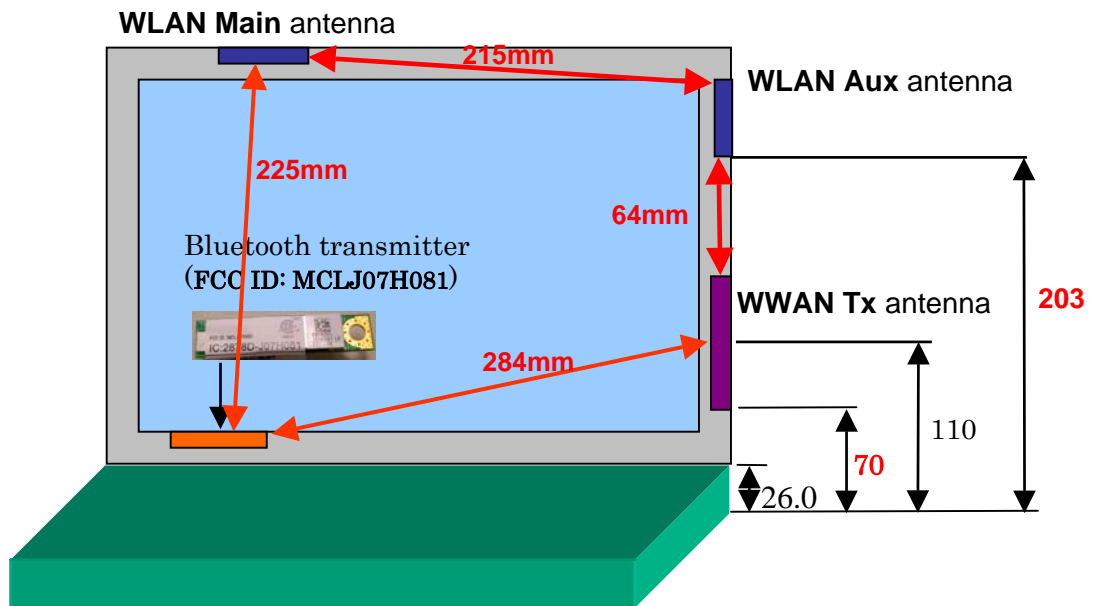


Figure-5 Antenna assembly of ThinkPad Z61t Series

