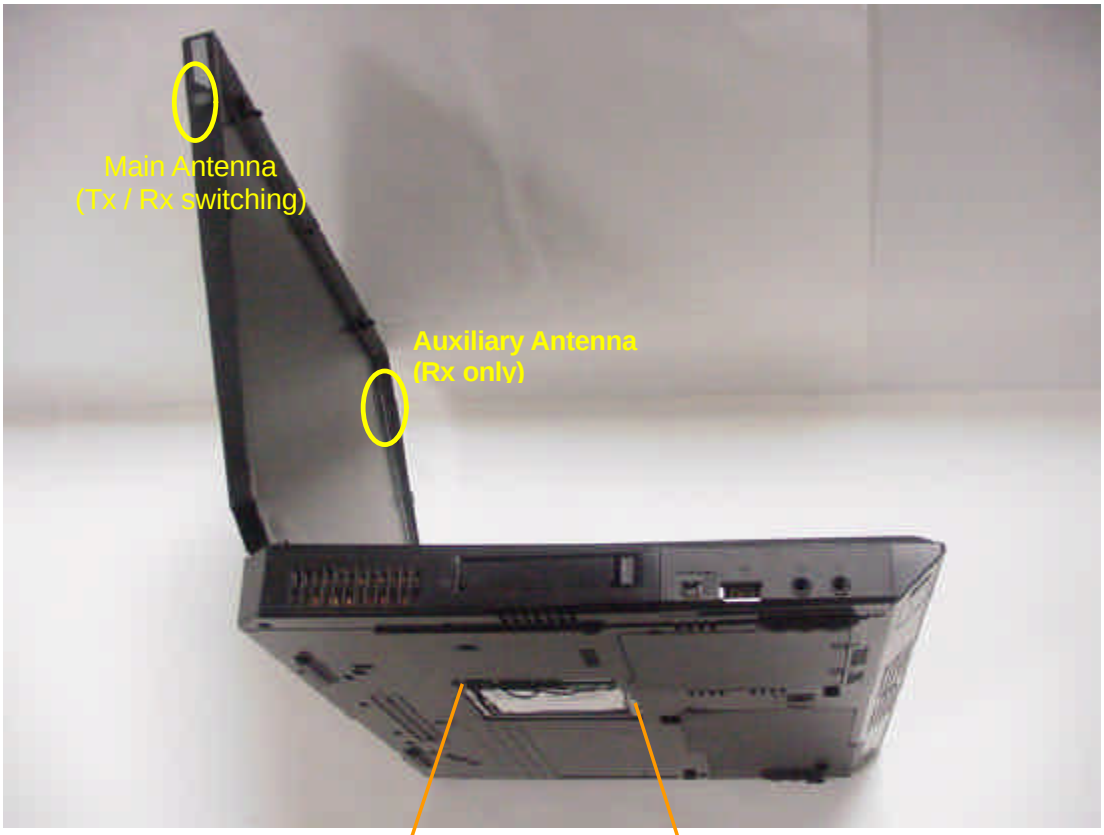
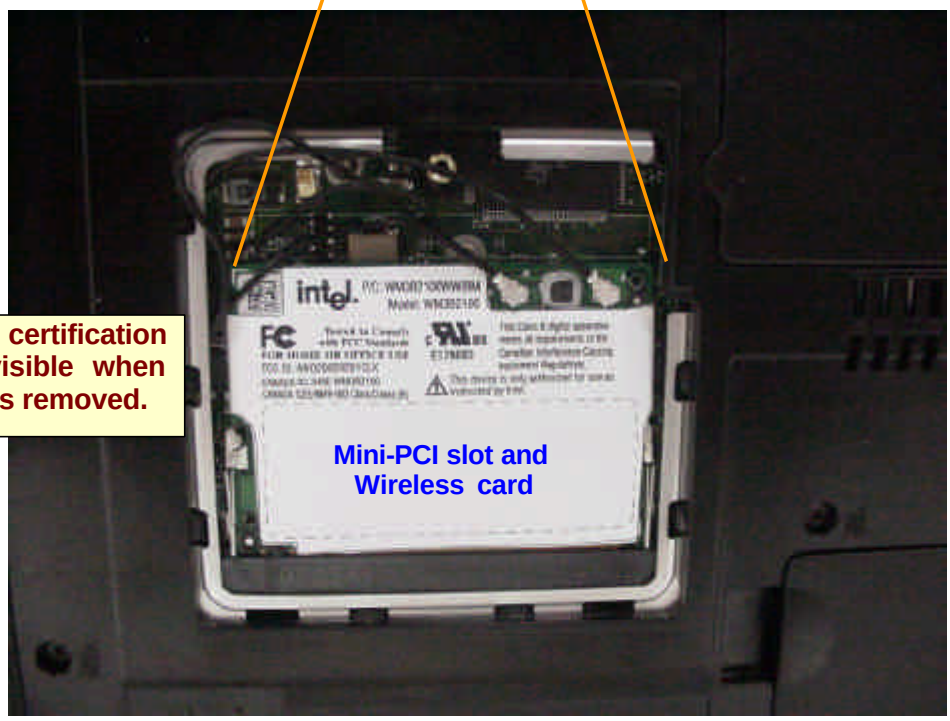
Host Unit Antenna Information
for
ThinkPad R40 Series
ThinkPad T40 Series
ThinkPad X30 Series

1. Host PC Information

1.1 IBM ThinkPad R40 Series

The main antenna in left side of LCD is used for both RF transmission and receiving with half duplex switching mode. The auxiliary antenna in right side of LCD is used for RF receiving only. The RF receiving antenna is selected automatically to have a good quality of radiocommunication





FCC ID and IC certification number are visible when the slot cover is removed.

IBM ThinkPad R40 Series supports threes size of LCD.

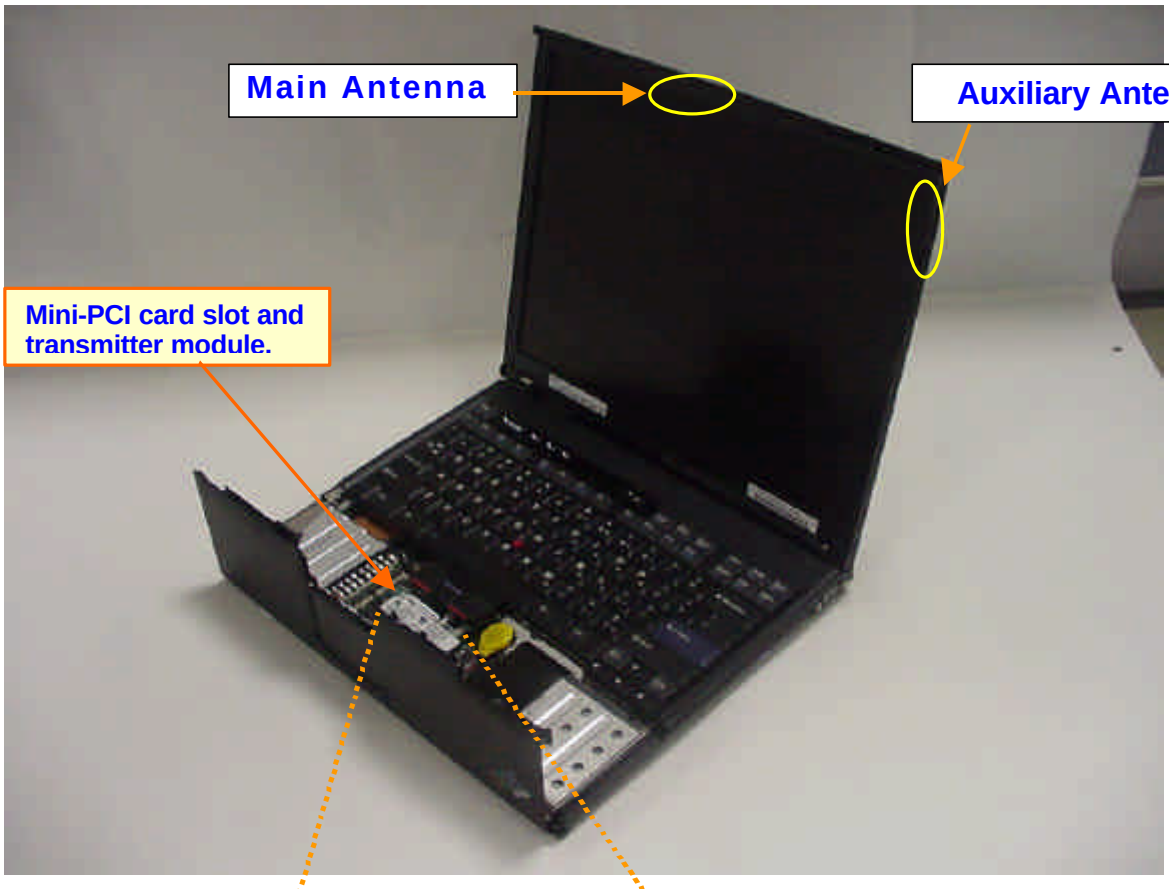
LCD 15 inch Model

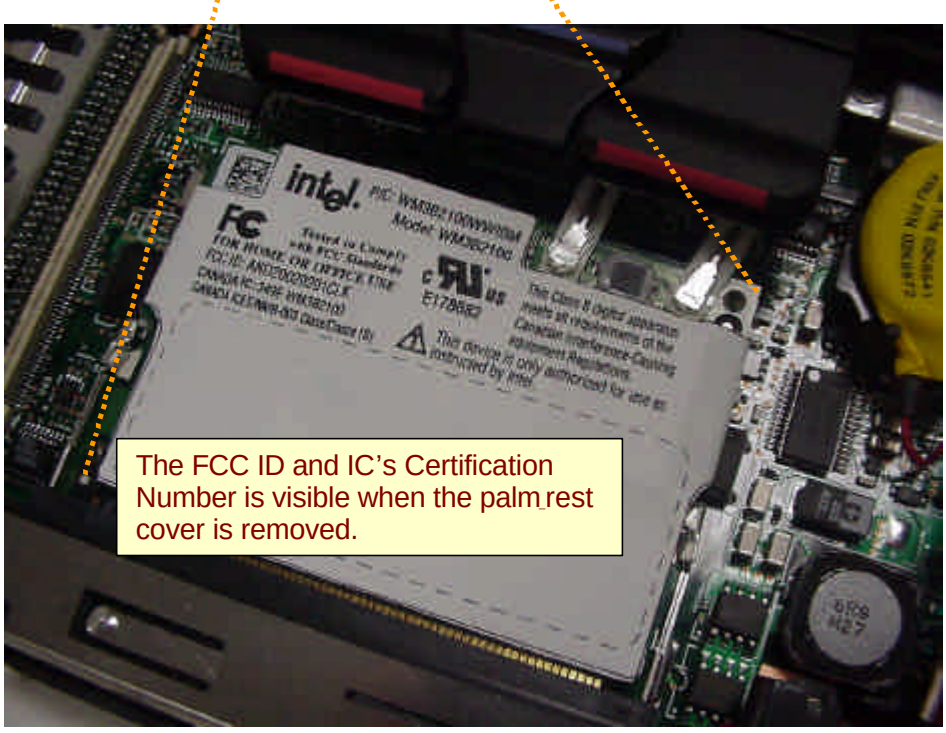
LCD 14 inch Model

LCD 13 inch Model

1.2 IBM ThinkPad T40 Series

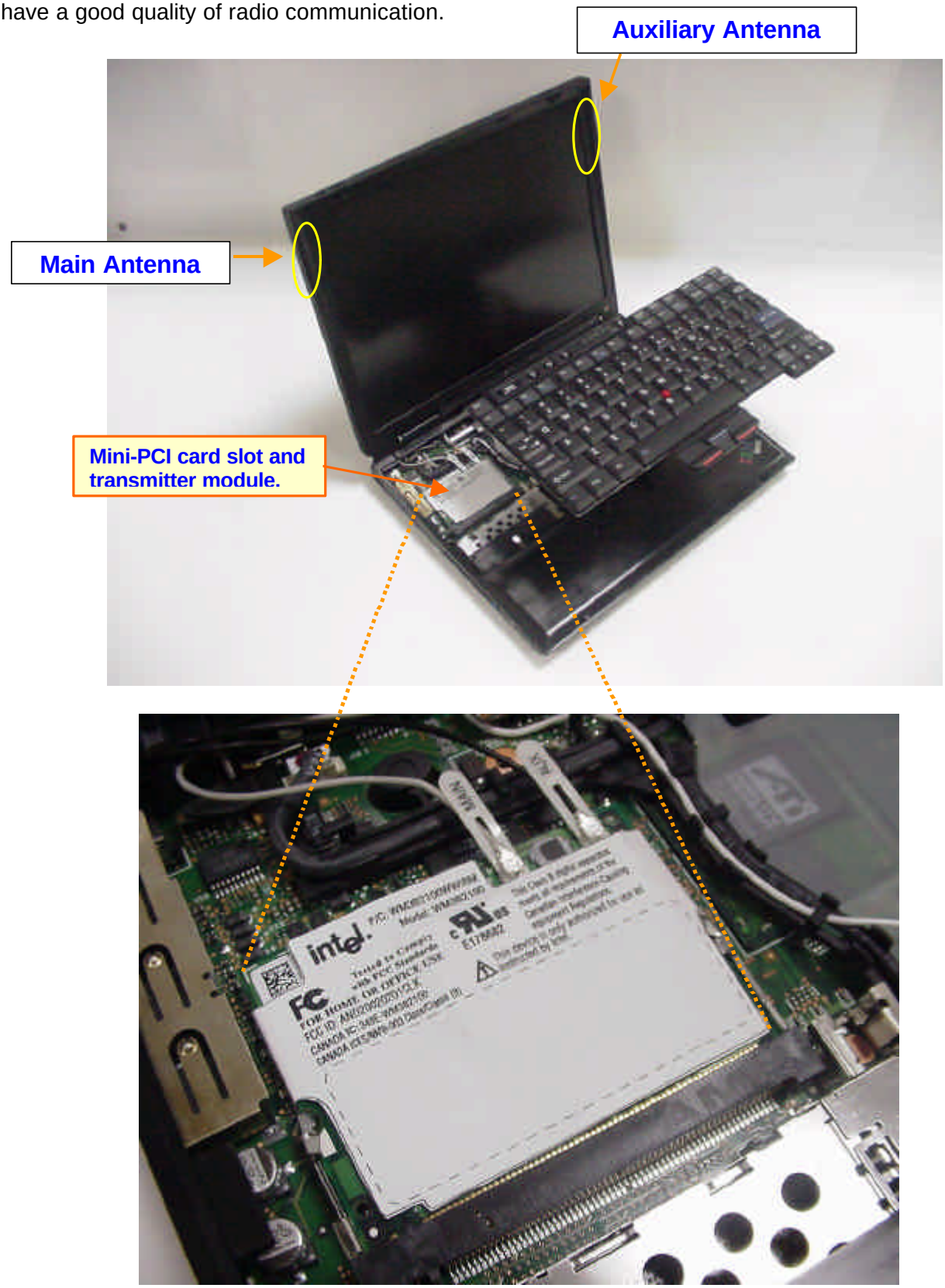
The main antenna is used for both RF transmission and receiving with half duplex switching mode.
The auxiliary antenna is used for RF receiver only.
When the Wireless LAN card is in RF receiving state, one of the antennas is selected automatically to have a good quality of radio communication.





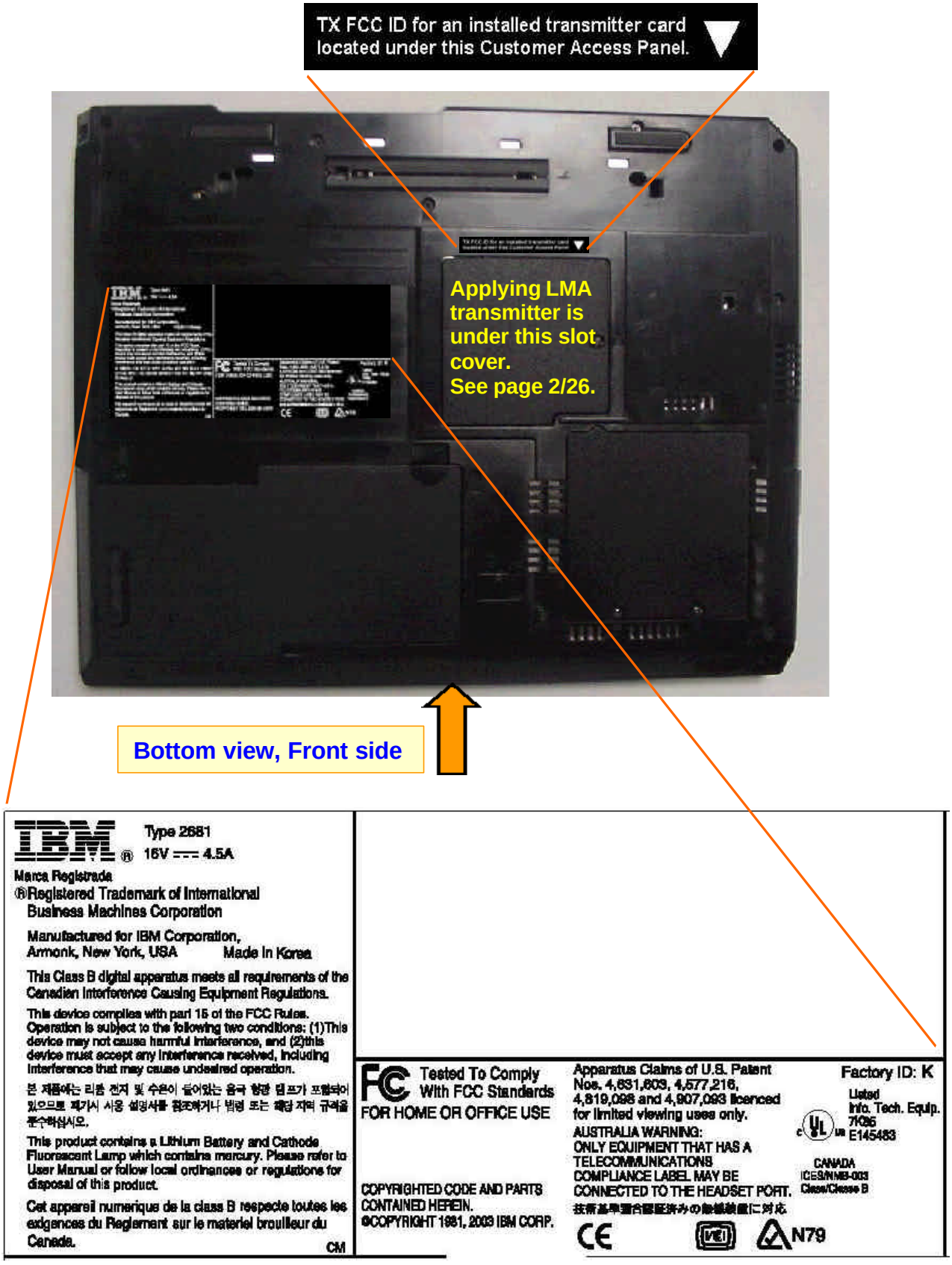
1.3 IBM ThinkPad X30 Series

The left antenna in LCD is used for both RF transmission and receiving with half duplex switching mode. The right antenna is used for RF receiver only.
When the Wireless LAN card is in RF receiving state, one of the antennas is selected automatically to have a good quality of radio communication.



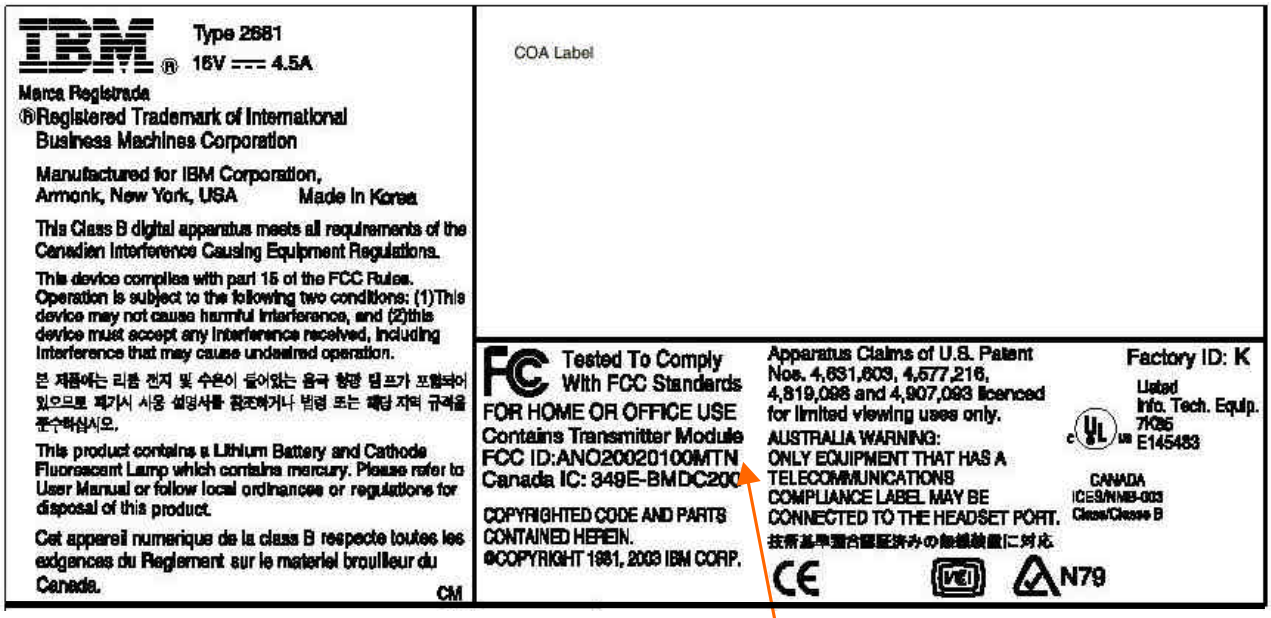
2. Host PC Labeling

2.1 Labeling of R40 Series



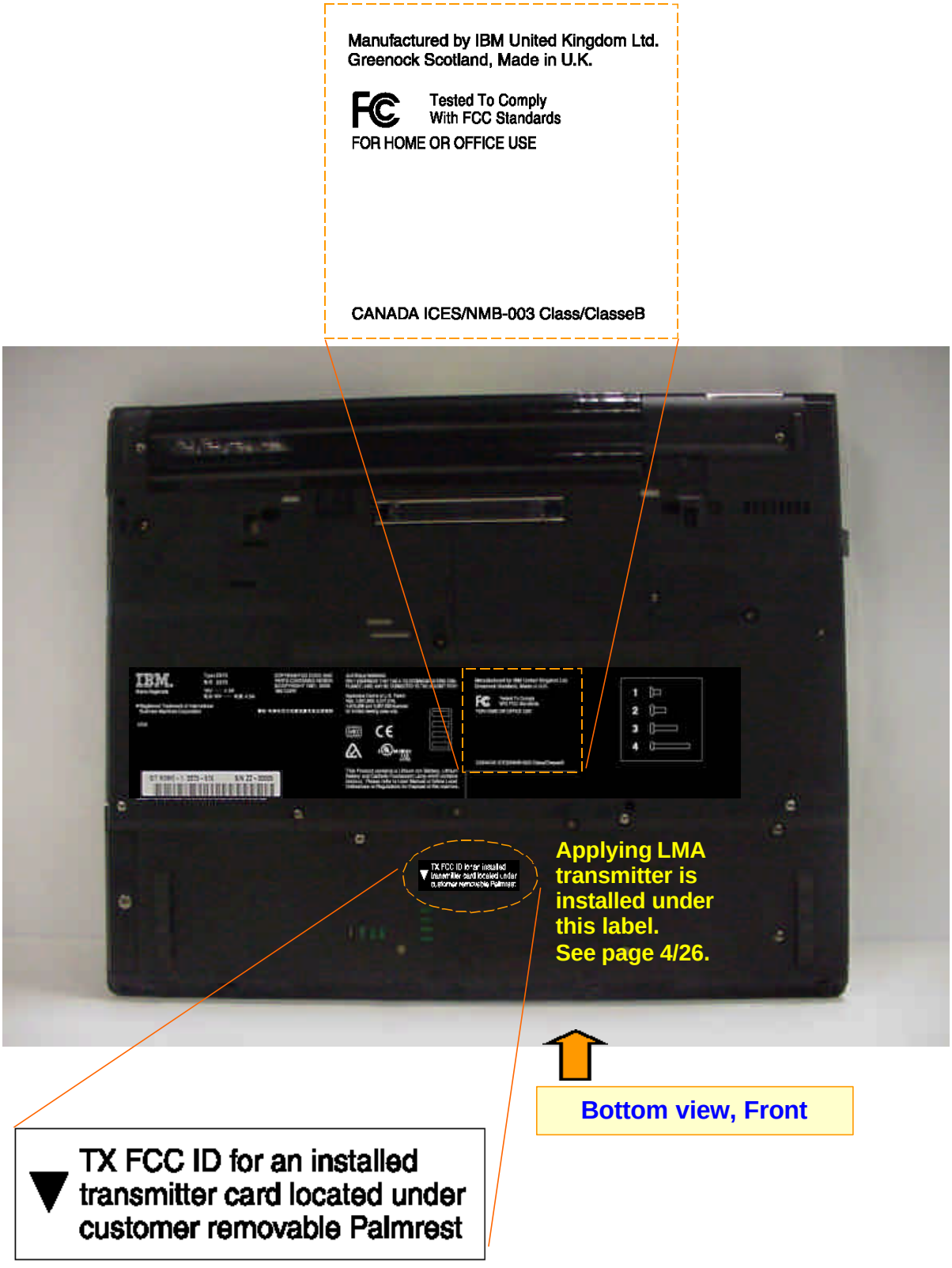
Label for a different model of the applying equipment (ThinkPad R40 Series)

The host device (ThinkPad R40 Series) supports the applying transmitter and a built-in type Bluetooth LMA which is to be certified separately with FCC ID: ANO20020100MTN.



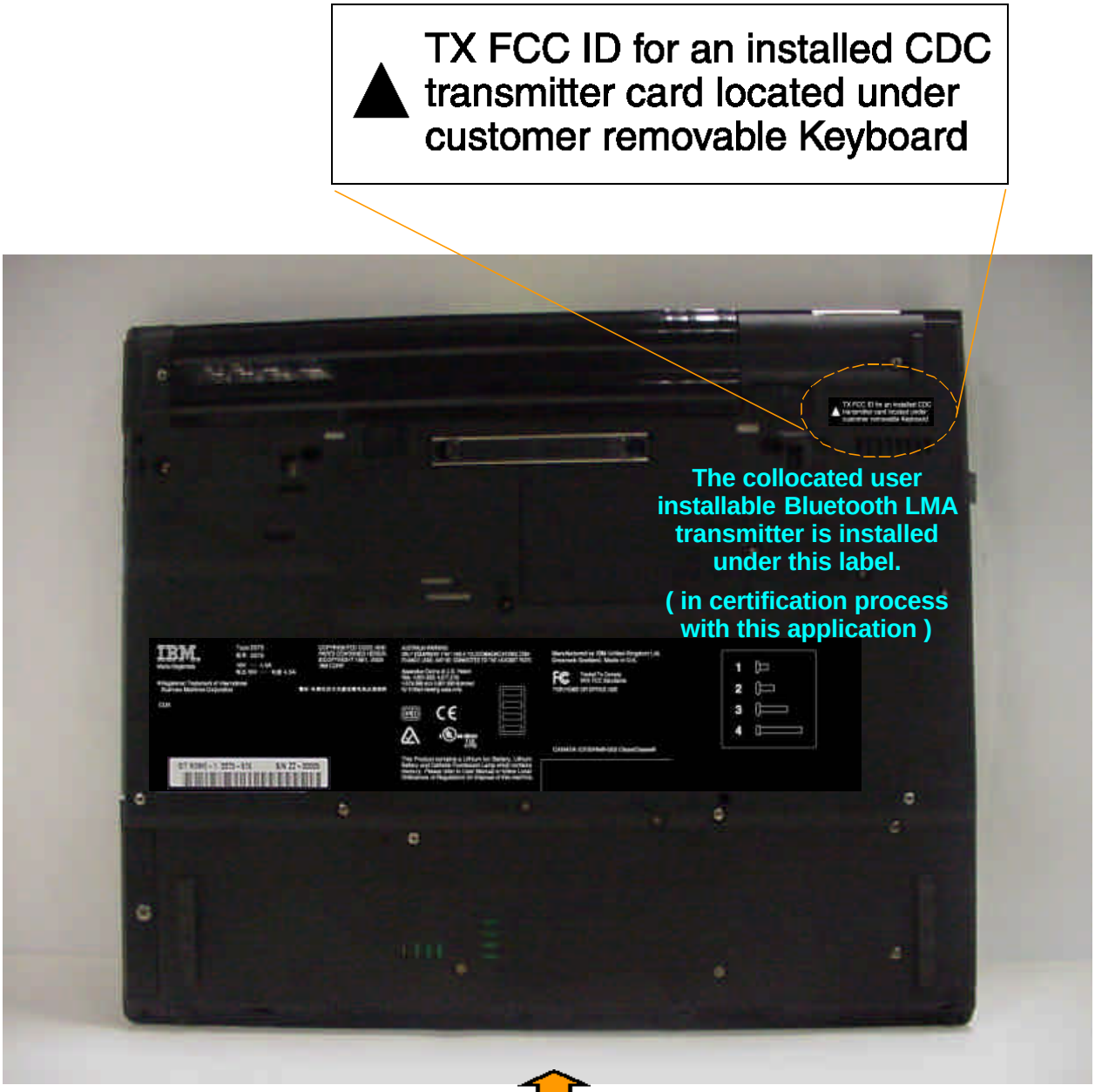
FCC ID of a separate application granted on Jan/21/2003 (Not user installable)

2.2 Labeling of T40 Series



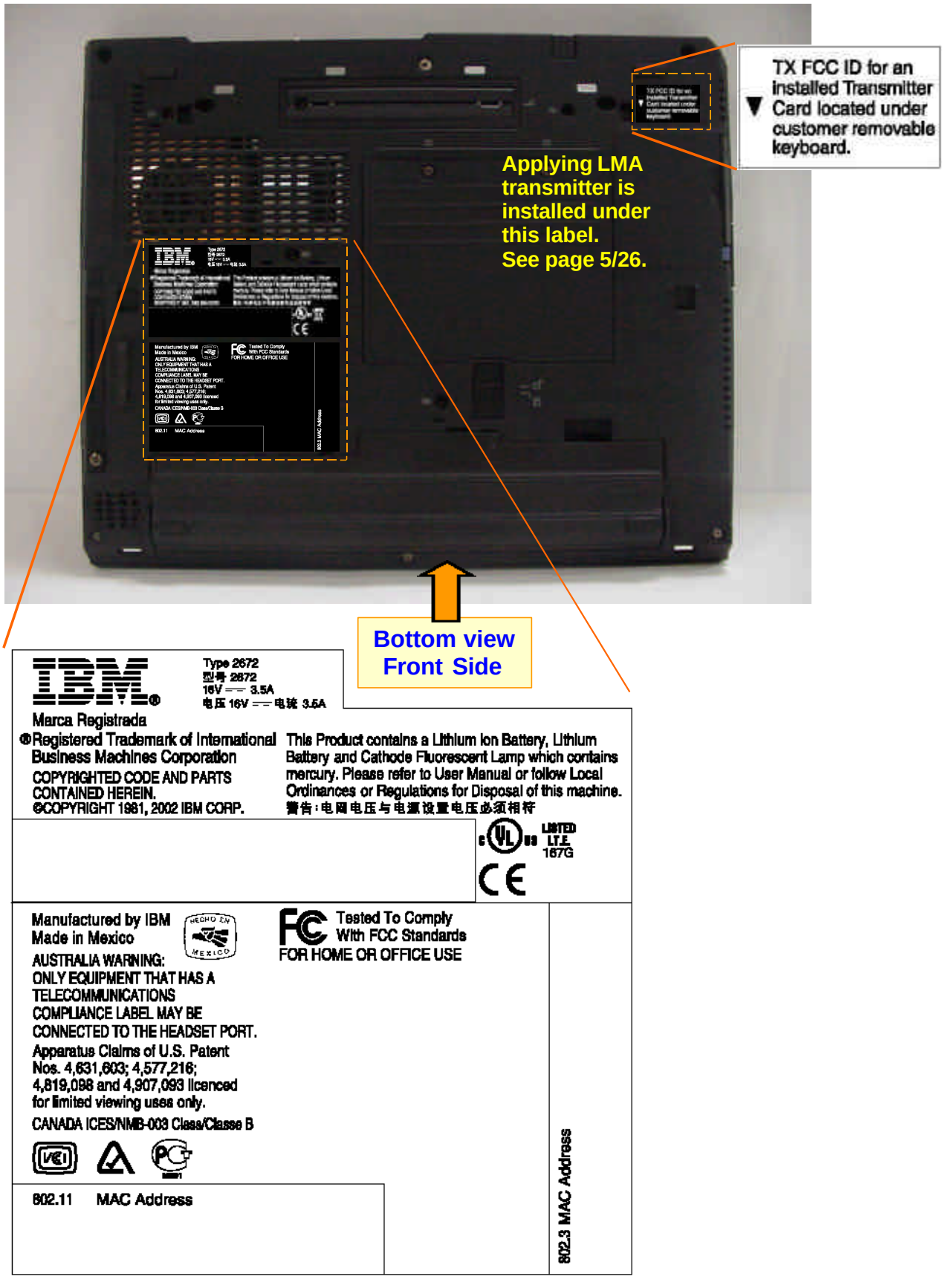
Label for a different model of the host PC (ThinkPad T40 Series)

The model (T40) supports the applying transmitter and a built-in type Bluetooth LMA which is to be certified separately as the FCC ID: ANO20020100MTN.



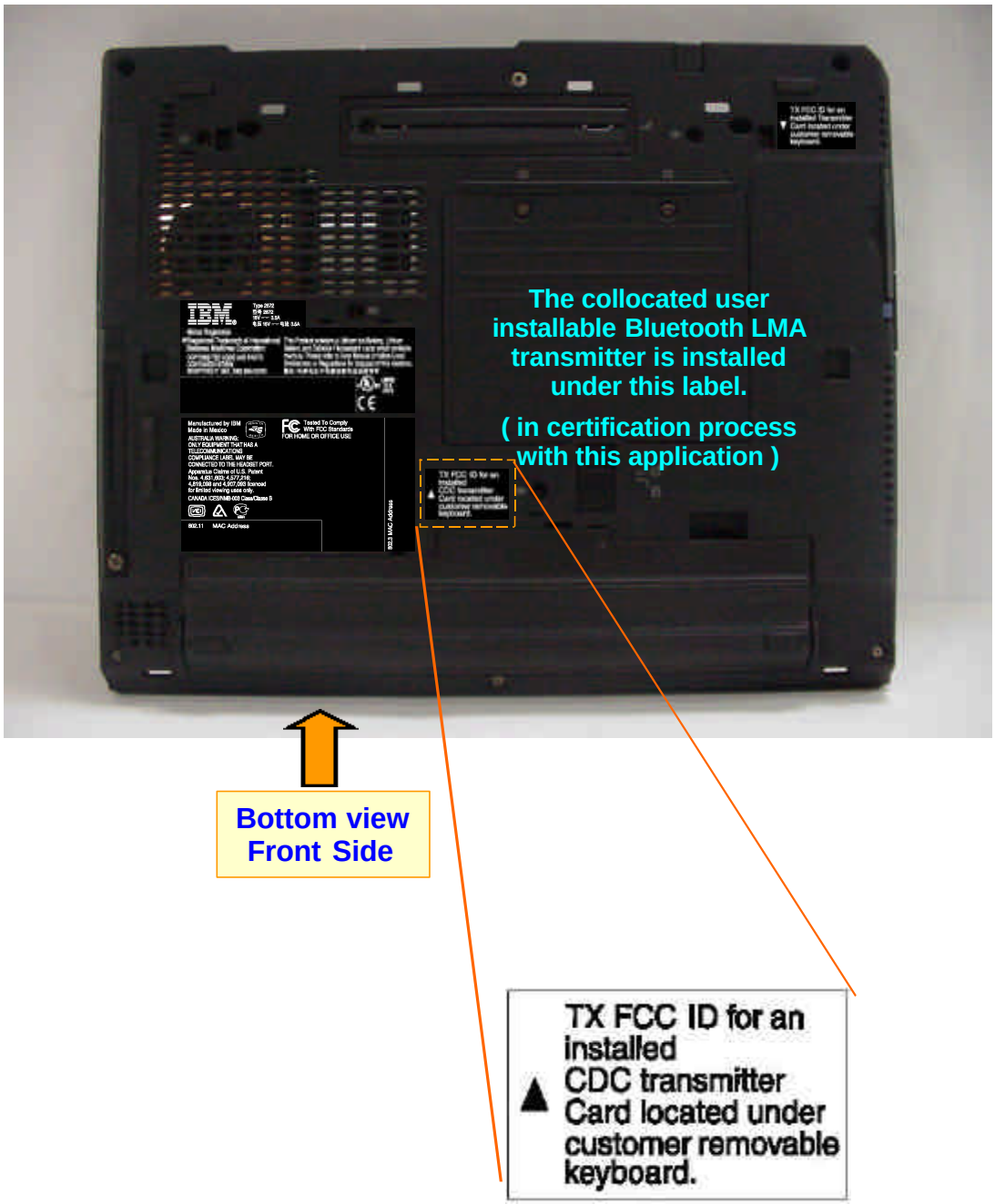
Bottom view, Front side

2.3 Labeling of X30 Series



Label for a different model of the host PC (ThinkPad X30 Series)

The model (X30) supports the applying transmitter and a built-in type Bluetooth LMA module which is to be certified separately as the FCC ID: ANO20020100MTN.



3. Antenna Specifications

3.1 Transmission Antenna assembly overview

IBM ThinkPad R40 Series

Designator	Manufacture	Antenna type	Cable type and length	Gain (dBi) Note 1)
3301BZ9078A 15 inch LCD model Main antenna	Hitachi Cable Ltd. (Japan)	Inverted F type Dual Band Antenna	coax 530mm	0.46 dBi (peak)
3301BZ9079A 15 inch LCD model Auxiliary antenna			coax 640mm	-1.06 dBi (peak)
3301BZ9076A 13/14 inch LCD model Main antenna			coax 530mm	-0.37 dBi (peak)
3301BZ9077A 13/14 inch LCD model Auxiliary antenna			coax 640mm	0.83 dBi (peak)

IBM ThinkPad T40 Series

Designator	Manufacture	Antenna type	Cable type and length	Gain (dBi) Note 1)
62P4204 Main antenna	Foxconn Electronics Inc. (R.O.C.)	Dual Band Inverted F type Antenna	coax 745mm	0.99 dBi (peak)
62P4203 Auxiliary antenna	Foxconn Electronics Inc. (R.O.C.)	Dual-Band Coupled Floating Element Antenna	coax 845mm	-0.48 dBi (peak)

IBM ThinkPad X30 Series

Designator	Manufacture	Antenna type	Cable type and length	Gain (dBi) Note 1)
08K4083 Main antenna	Nissei Electric Ltd. (Japan)	Dual Band Inverted F type Antenna	Coax 394mm	0.62 dBi (peak)
08K4084 Auxiliary antenna	Nissei Electric Ltd. (Japan)	Dual Band Inverted F type Antenna	coax 534mm	1.28 dBi (peak)

Notes:

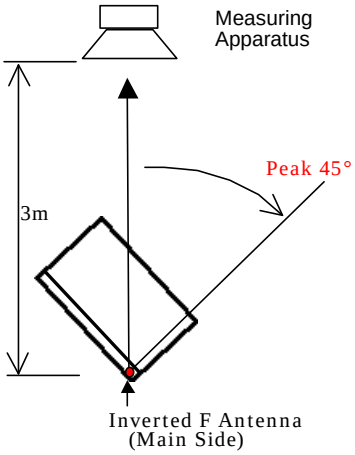
1a. Includes all cable losses.

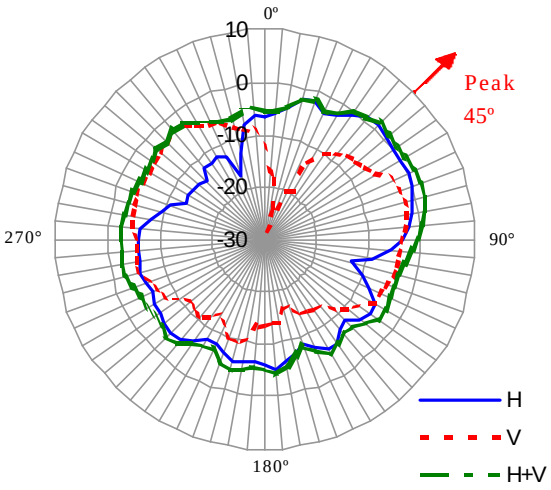
1b. Antenna type should be Omni Directional and have gain of 2.0 dBi or less for IEEE802.11b (2.4GHz band), regarding the IBM internal specification.

3.2 Radiation characteristics of antennas

3.2.1 R40 Series, LCD 15 inch model

Main antenna

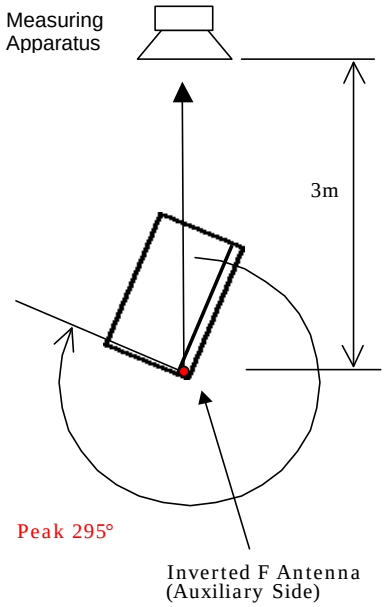


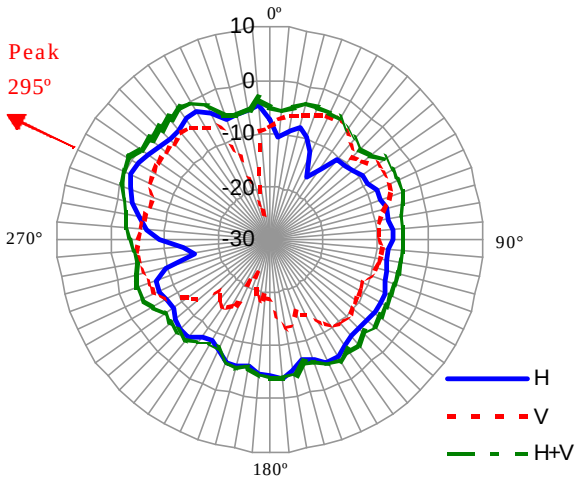


Hori (dBi) ave.	-4.99
Vert (dBi) ave.	-6.83
H+V (dBi) ave.	-2.80
Peak(dBi) **(H)**	0.46
Center Frequency:	2400MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **45 degree** angle from measuring apparatus in **horizontal** polarization at the middle frequency (2400MHz).

Auxiliary antenna



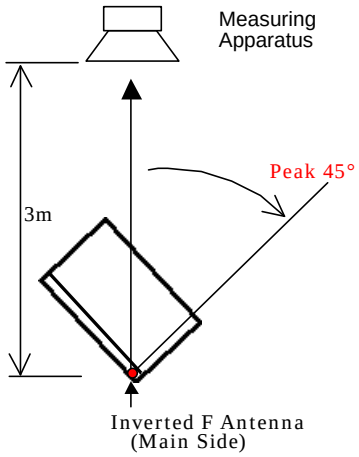


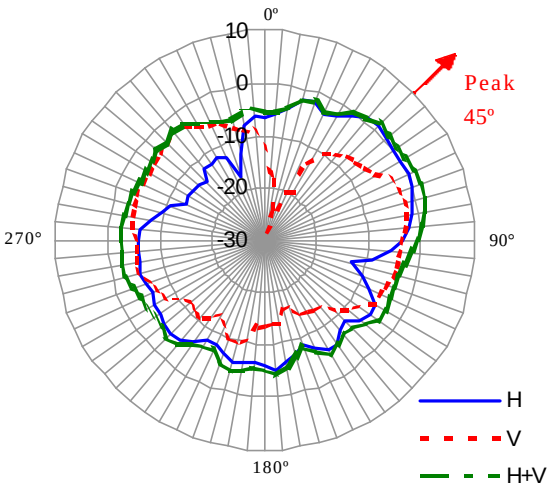
Hori (dBi) ave.	-5.84
Vert (dBi) ave.	-7.66
H+V (dBi) ave.	-3.64
Peak(dBi) **(H)**	-1.06
Center Frequency:	2500MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **295 degree** angle from measuring apparatus in **horizontal** polarization at the middle frequency (2500MHz).

3.2.2 R40 Series, LCD 13/14 inch models

Main antenna

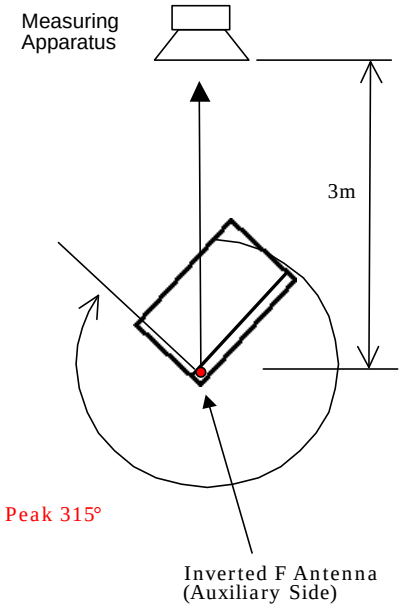


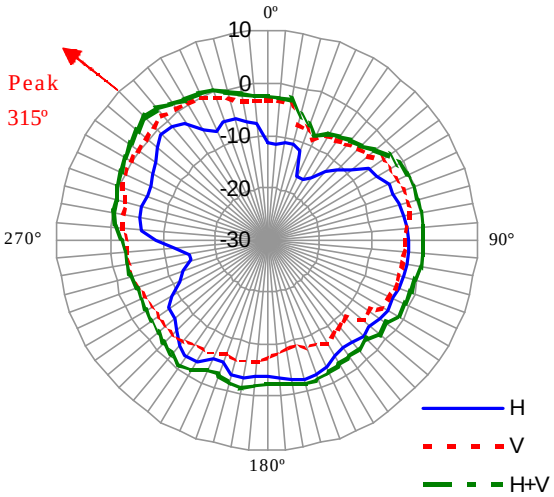


Hori (dBi) ave.	-5.09
Vert (dBi) ave.	-6.36
H+V (dBi) ave.	-2.67
Peak(dBi) (H)	-0.37
Center Frequency:	2500MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **45 degree** angle from measuring apparatus in **horizontal** polarization at the middle frequency (2500MHz).

Auxiliary antenna



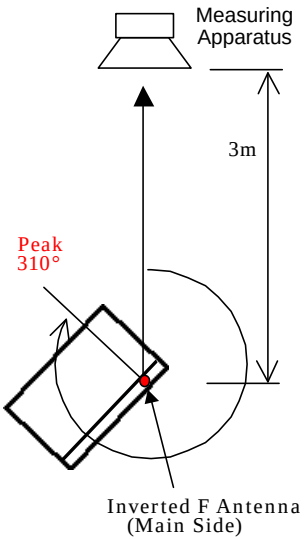


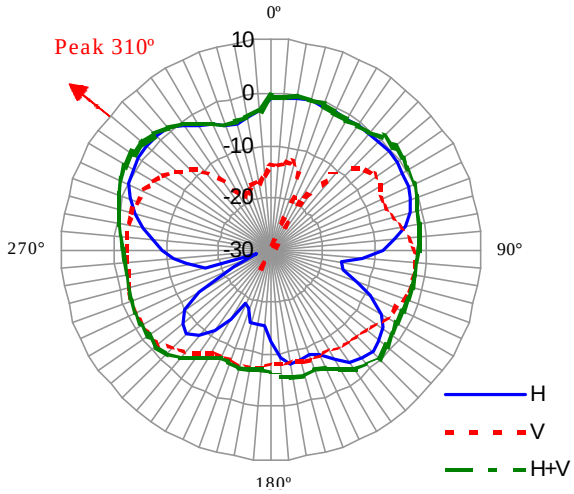
Hori (dBi) ave.	-5.18
Vert (dBi) ave.	-3.55
H+V (dBi) ave.	-1.28
Peak(dBi) (V)	0.83
Center Frequency:	2450MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **315 degree** angle from measuring apparatus in **vertical** polarization at the middle frequency (2450MHz).

3.2.3 T40 Series

Main antenna

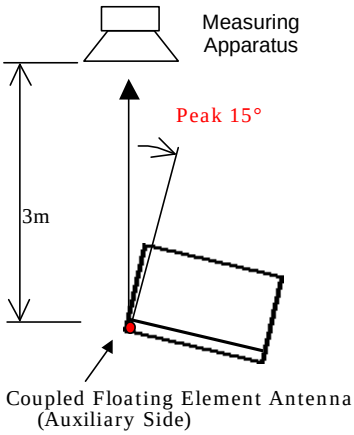


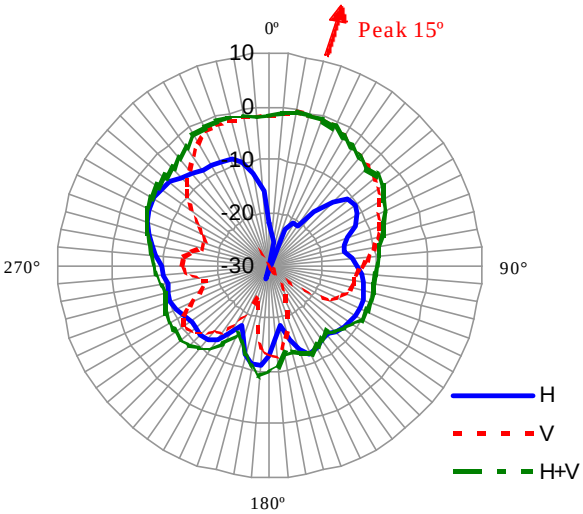


Hori (dBi) ave.	-3.79
Vert (dBi) ave.	-5.55
H+V (dBi) ave.	-1.57
Peak(dBi) **(H)**	0.99
Center Frequency:	2400MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **310 degree** angle from measuring apparatus in **horizontal** polarization at the low frequency (2400MHz).

Auxiliary antenna



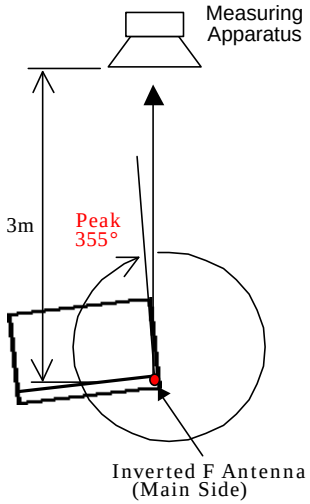


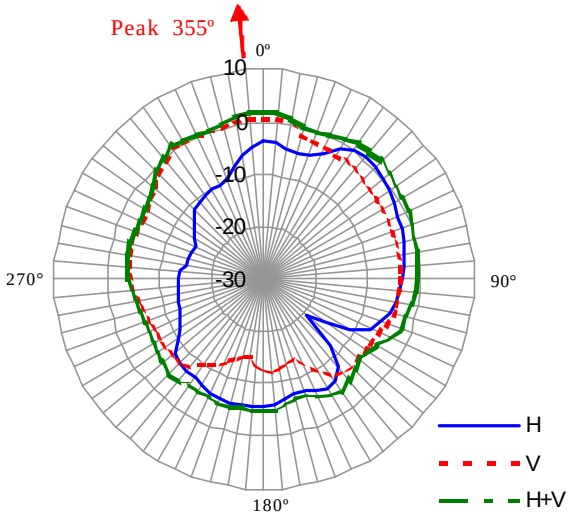
Hori (dBi) ave.	-10.74
Vert (dBi) ave.	-7.02
H+V (dBi) ave.	-5.48
Peak(dBi) **(V)**	-0.48
Center Frequency:	2500MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **15 degree** angle from measuring apparatus in **vertical** polarization at the high frequency (2500MHz).

3.2.4 X30 Series

Main antenna

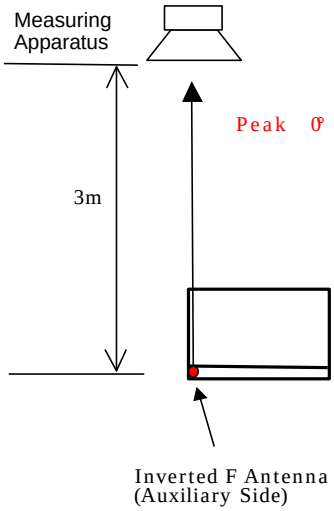


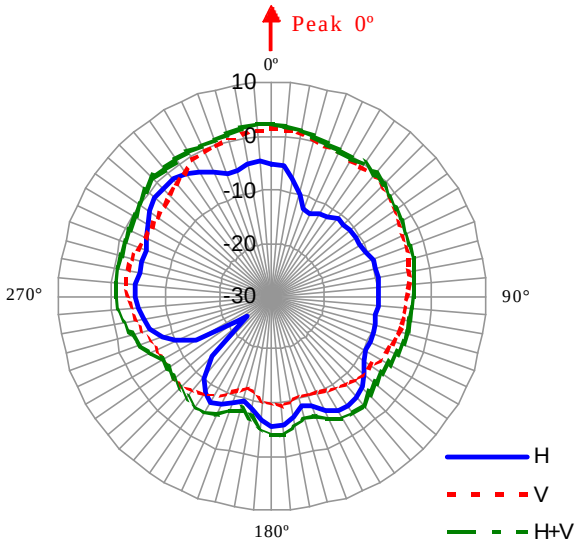


Hori (dBi) ave.	-5.66
Vert (dBi) ave.	-4.00
H+V (dBi) ave.	-1.74
Peak(dBi) **(V)**	0.62
Center Frequency:	2500MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **355 degree** angle from measuring apparatus in **vertical** polarization at the high frequency (2500MHz).

Auxiliary antenna





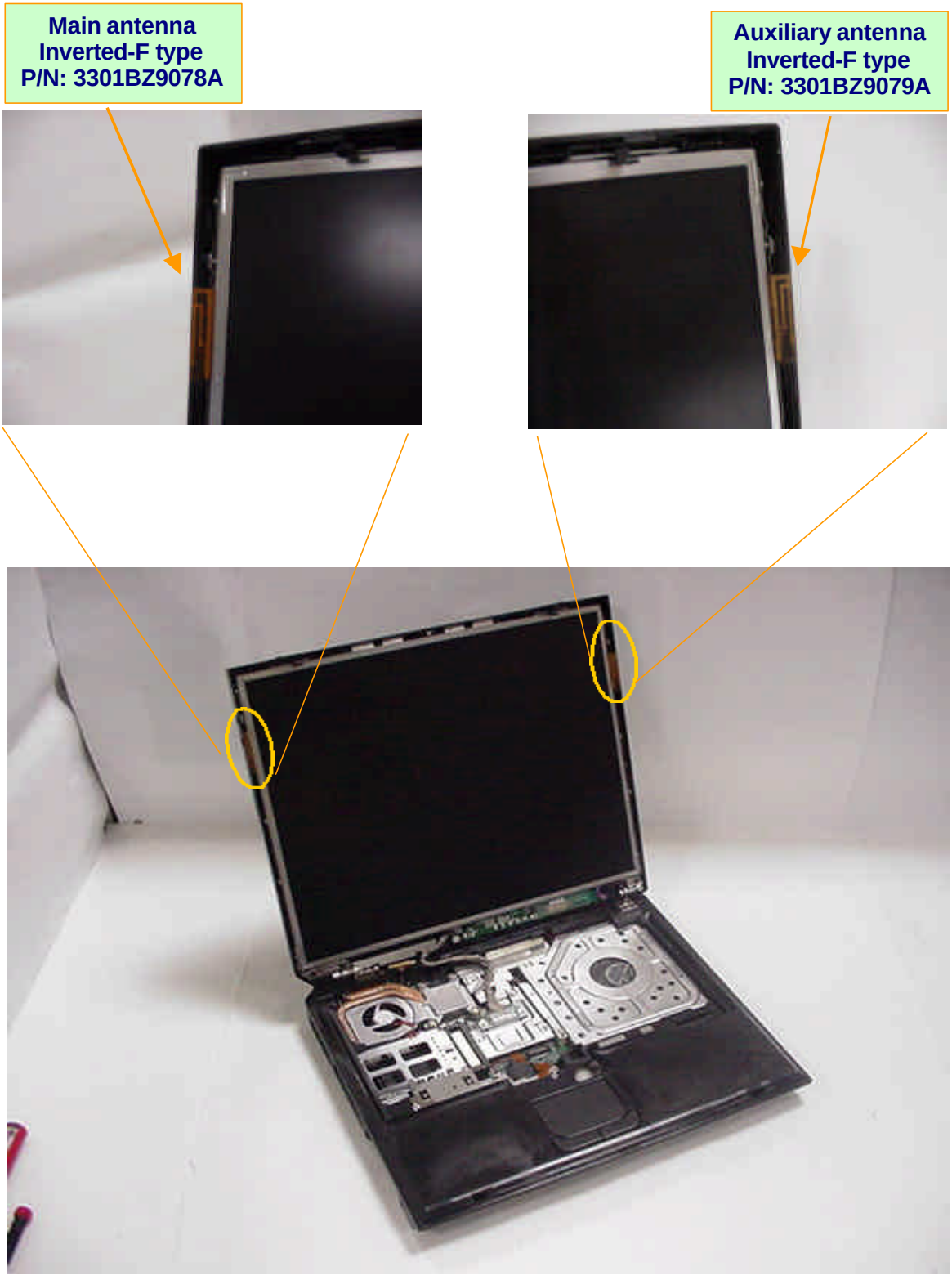
Hori (dBi) ave.	-6.61
Vert (dBi) ave.	-3.32
H+V (dBi) ave.	-1.65
Peak(dBi) **(V)**	1.28
Center Frequency:	2500MHz

Note1) The measurement was performed at 3 frequencies (2400, 2450, 2500MHz).
Note2) The maximum antenna gain was found around **0 degree** angle from measuring apparatus in **vertical** polarization at the high frequency (2500MHz).

3.3 Antenna Photos

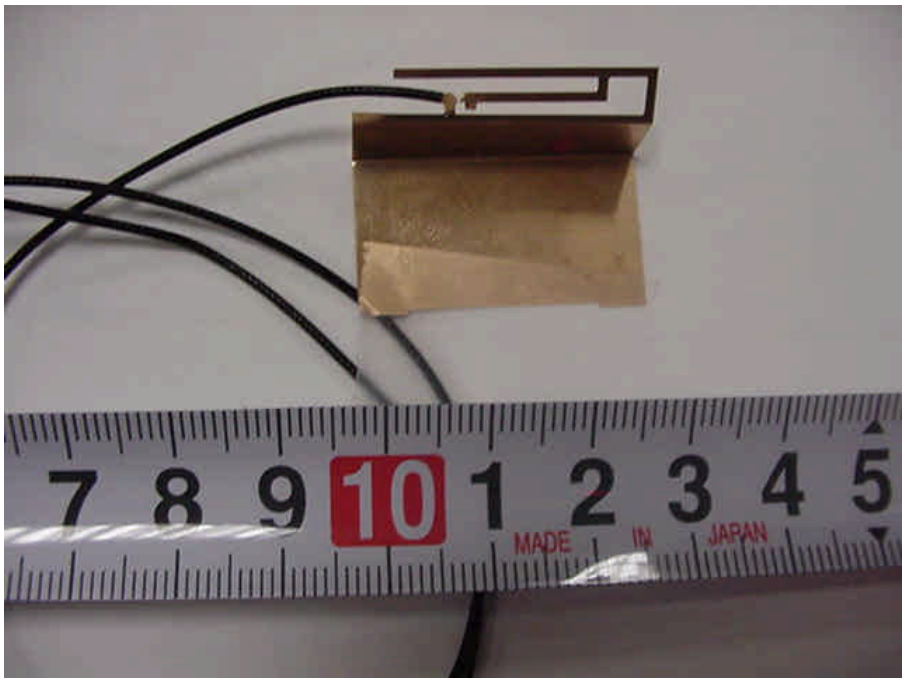
3.3.1 R40 Series, Antenna Photos

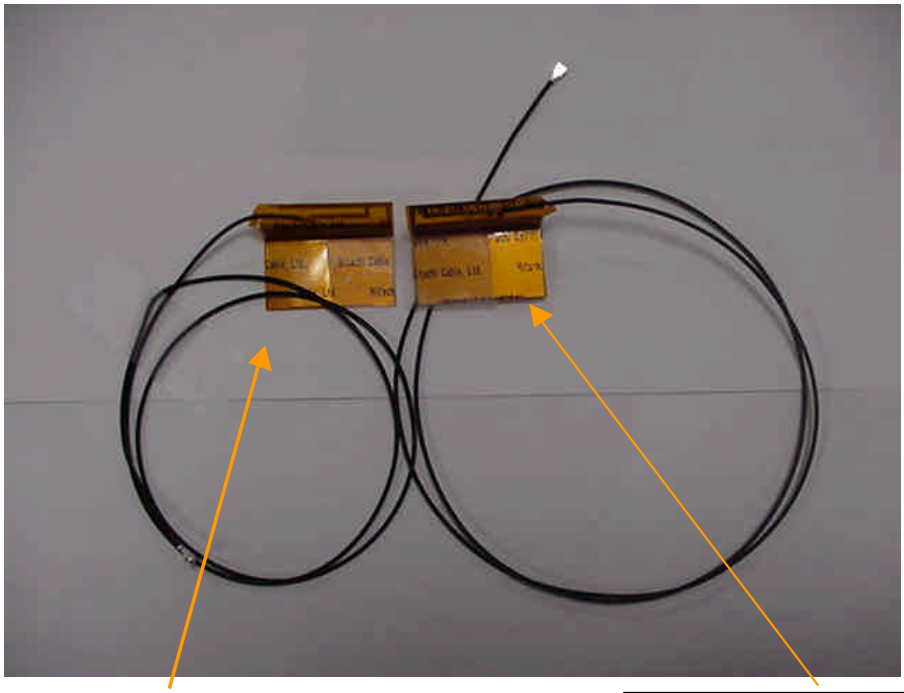
R40: LCD 15 inch Model, Antenna locations



R40: LCD 13/14 inch Model, Antenna locations

R40: LCD 13/14 inch Model, Antenna Exterior Photos

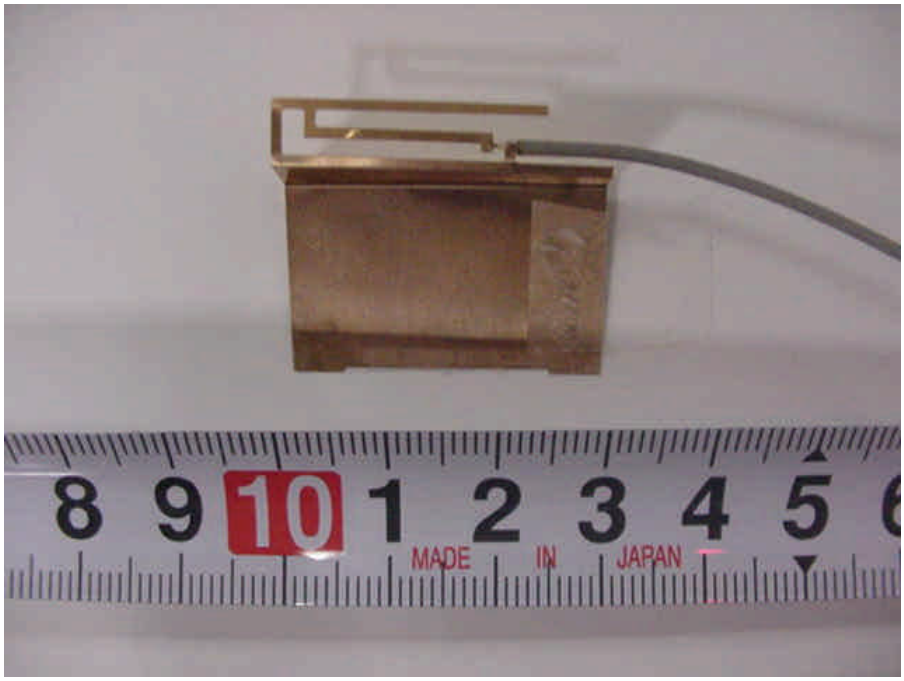


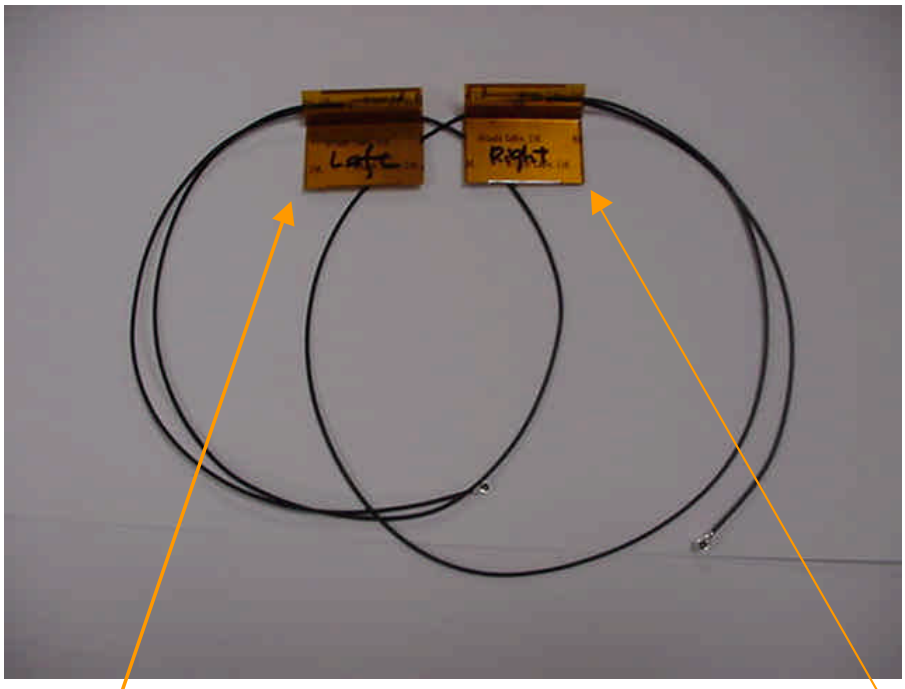


Main Antenna (Left)
Manufacturer: Hitachi Cable Ltd.
Parts number: 3301BZ9076A
Inverted-F type antenna
Cable : coax 530 mm

Auxiliary Antenna (Right)
Manufacturer: Hitachi Cable Ltd.
Parts number: 3301BZ9077A
Inverted-F type antenna
Cable : coax 640 mm

R40: LCD 13/14 inch Model, Antenna Exterior Photos



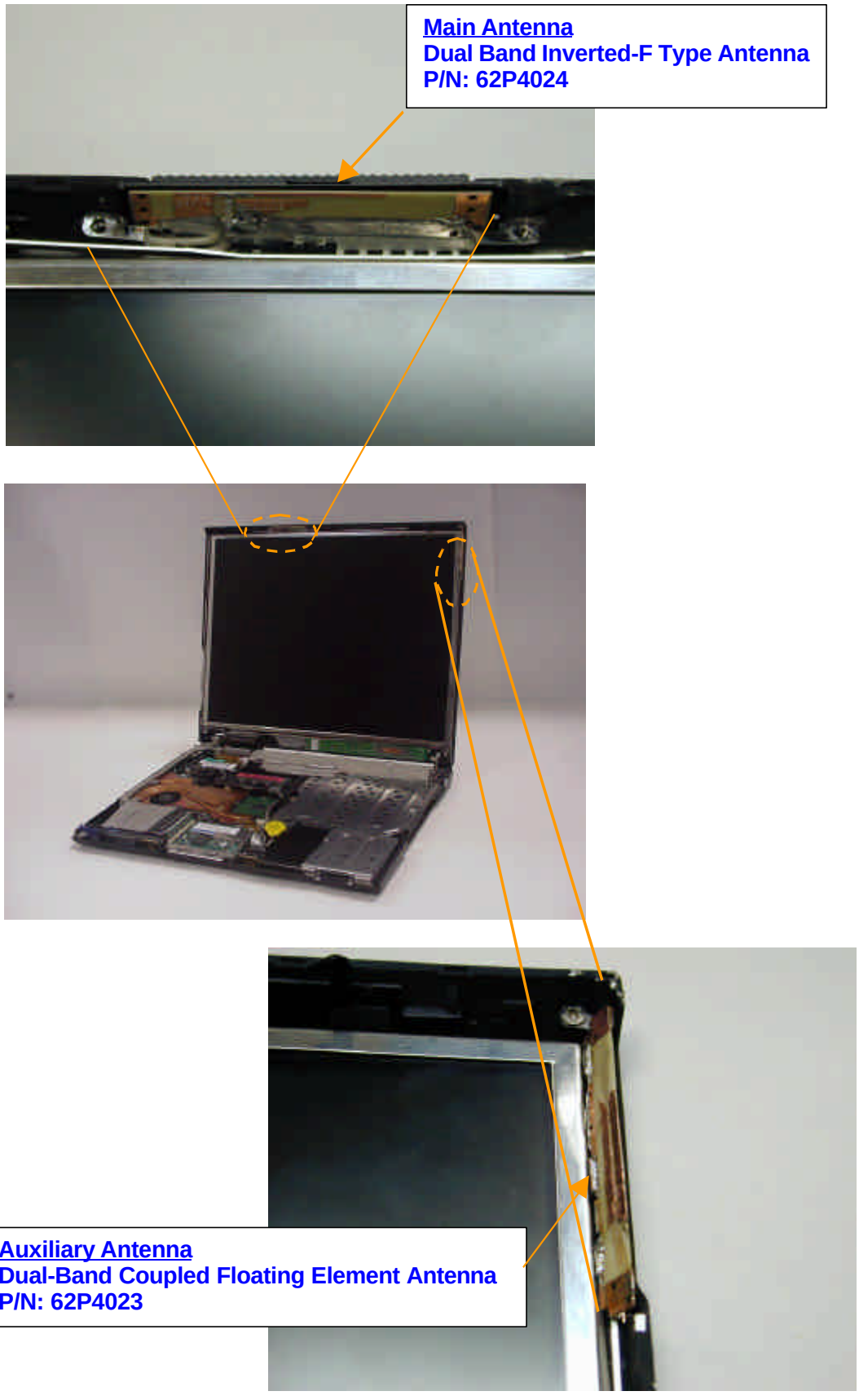


Main Antenna (Left)
Manufacturer: Hitachi Cable Ltd.
Parts number: 3301BZ9078A
Inverted-F type antenna
Cable : coax 530 mm

Auxiliary Antenna (Right)
Manufacturer: Hitachi Cable Ltd.
Parts number: 3301BZ9079A
Inverted-F type antenna
Cable : coax 640 mm

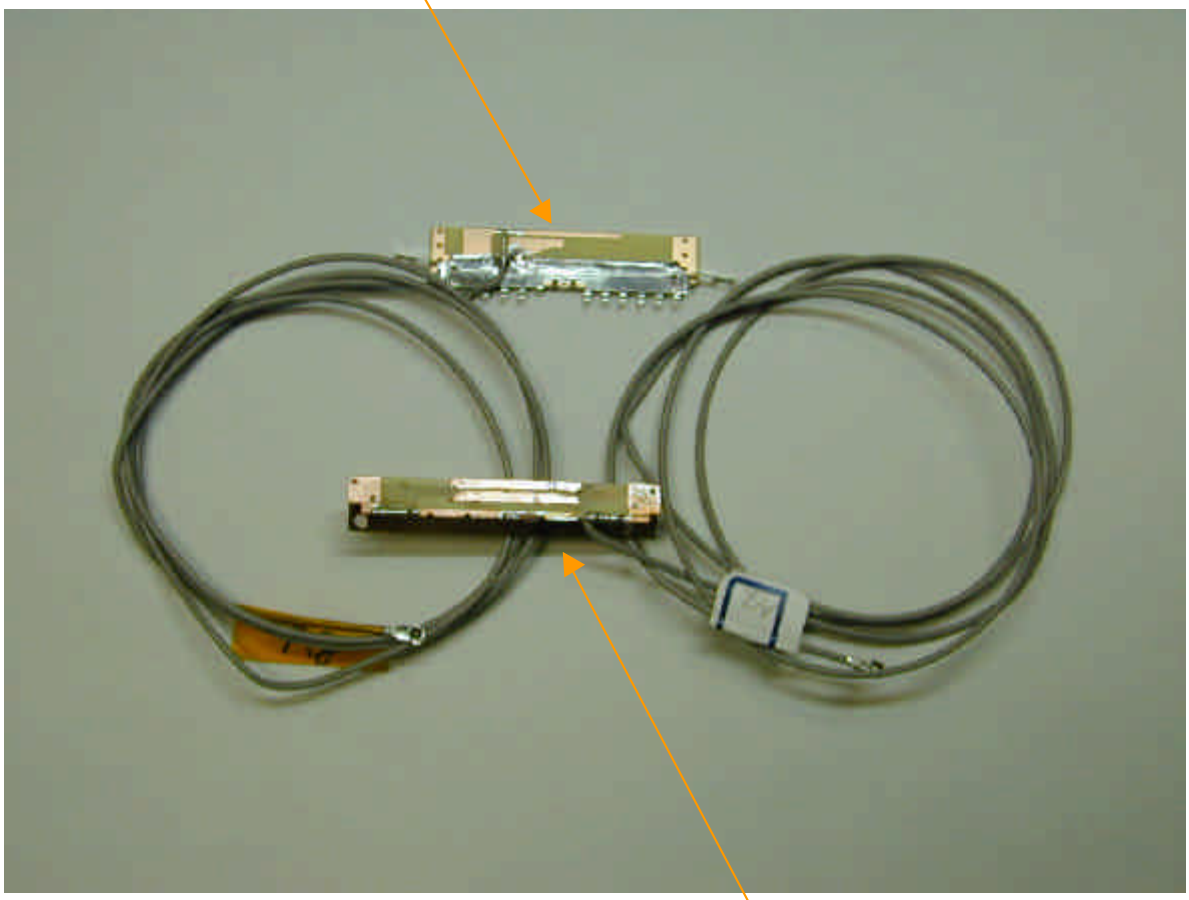
3.3.2 T40 Series, Antenna Photos

T40: Antenna locations



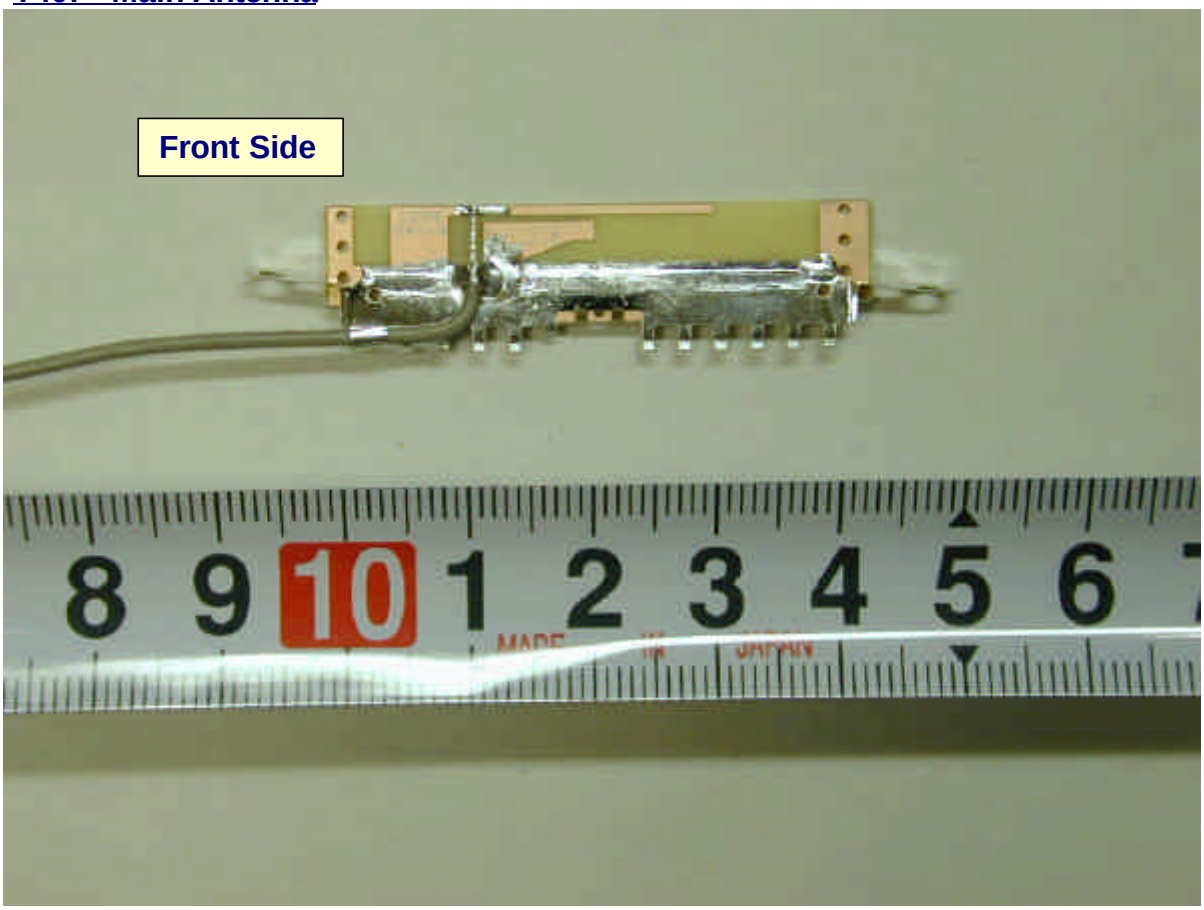
T40: Antenna Exterior Photos

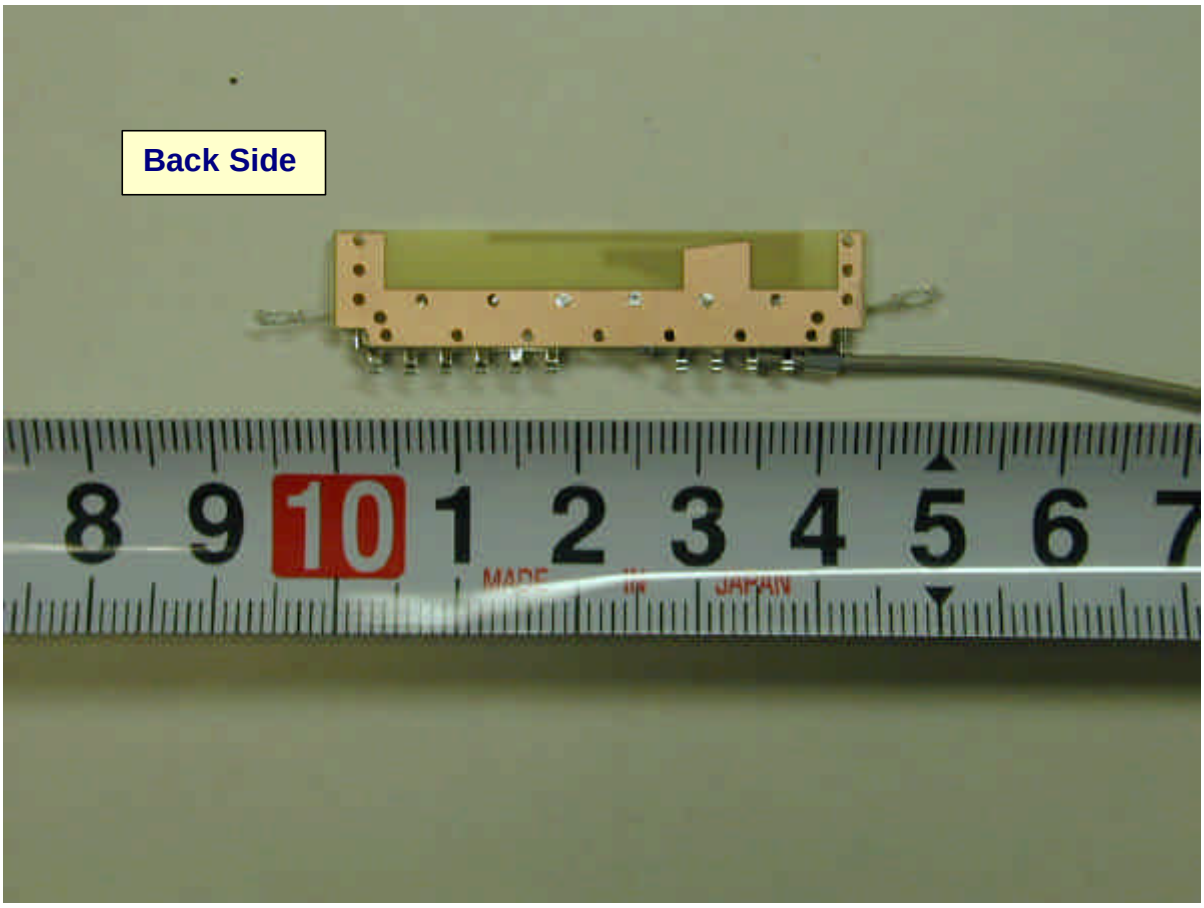
Main Antenna
Manufacturer: Foxconn Electronics Inc.
Parts Number: 62P4204
Dual Band Inverted-F type antenna
Cable: coax 740mm



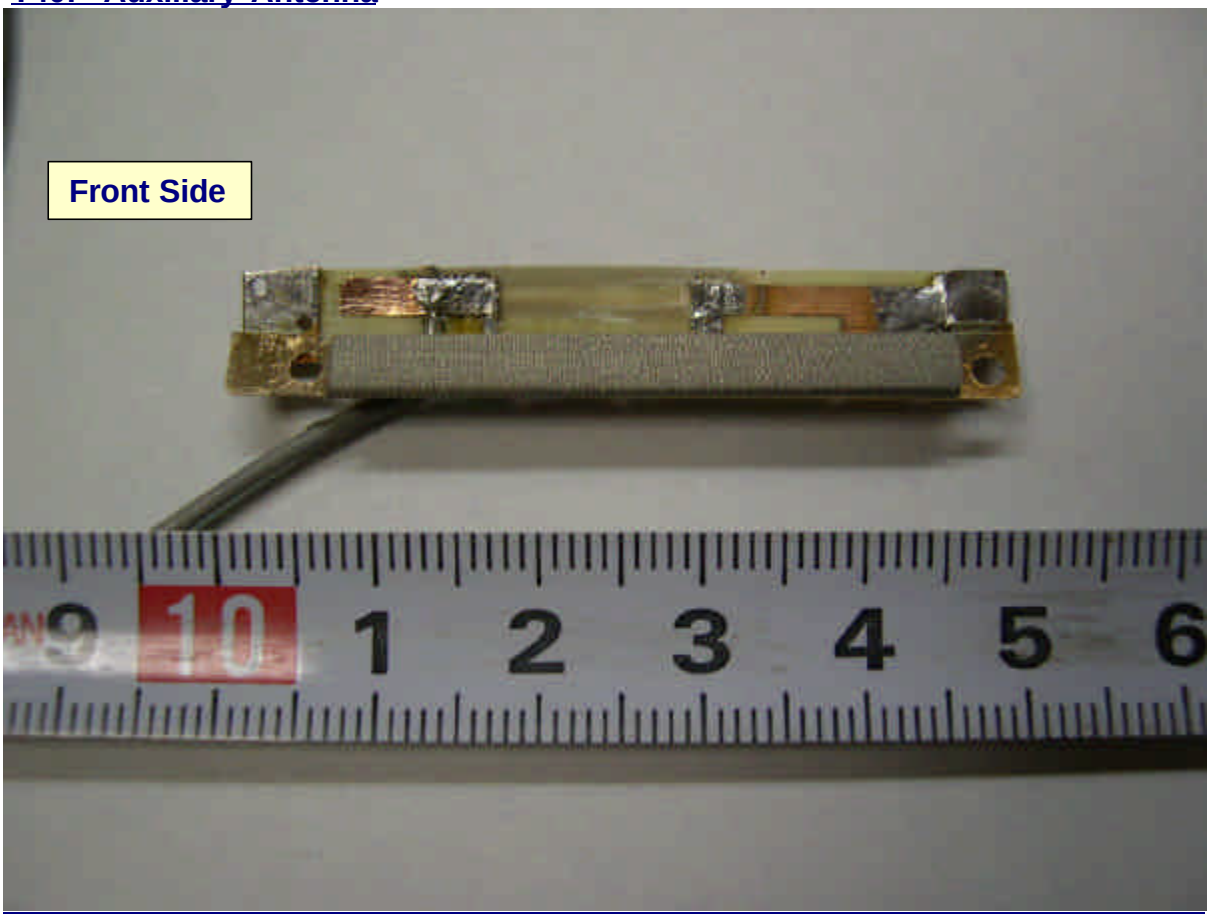
Auxiliary Antenna
Manufacturer: Foxconn Electronics Inc.
Parts Number: 62P4203
Dual-Band Coupled Floating Element Antenna
Cable : coax 845mm

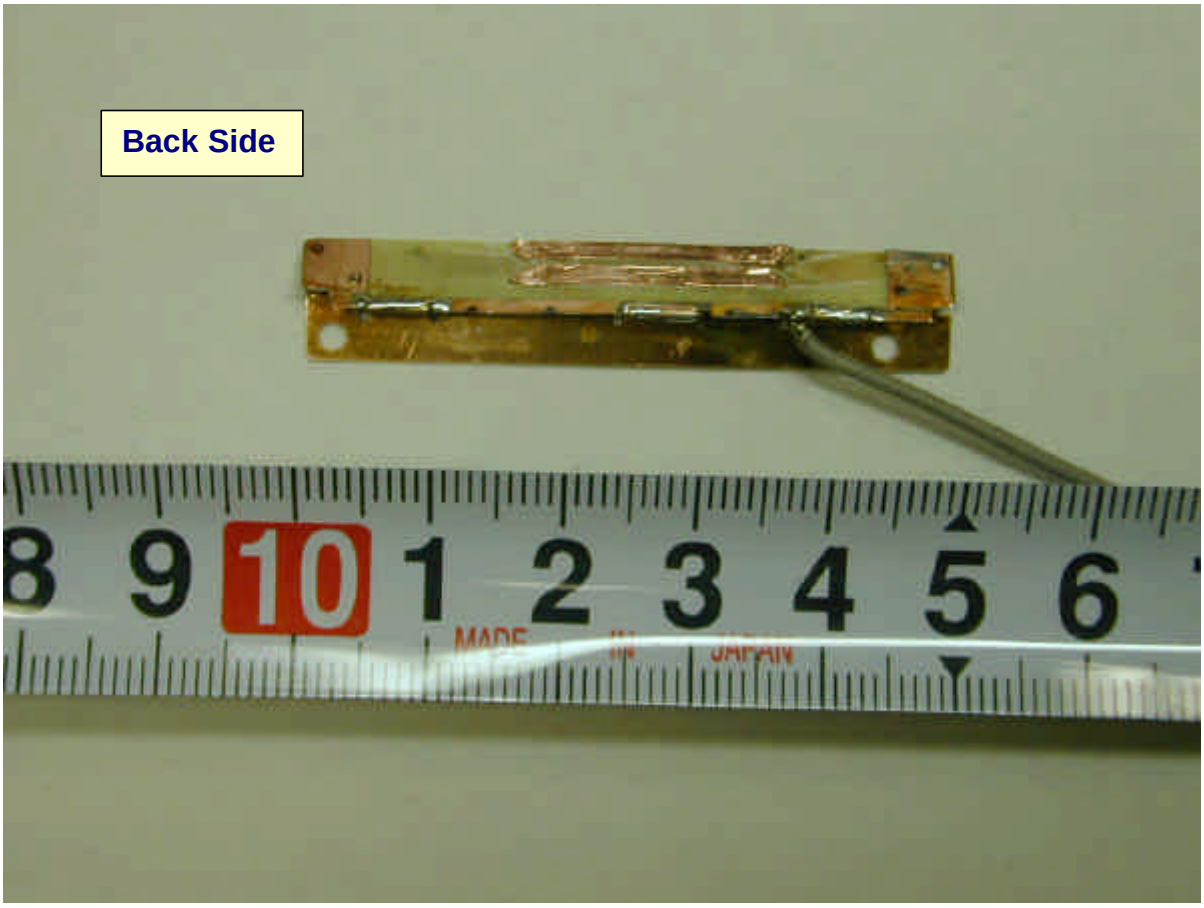
T40: Main Antenna





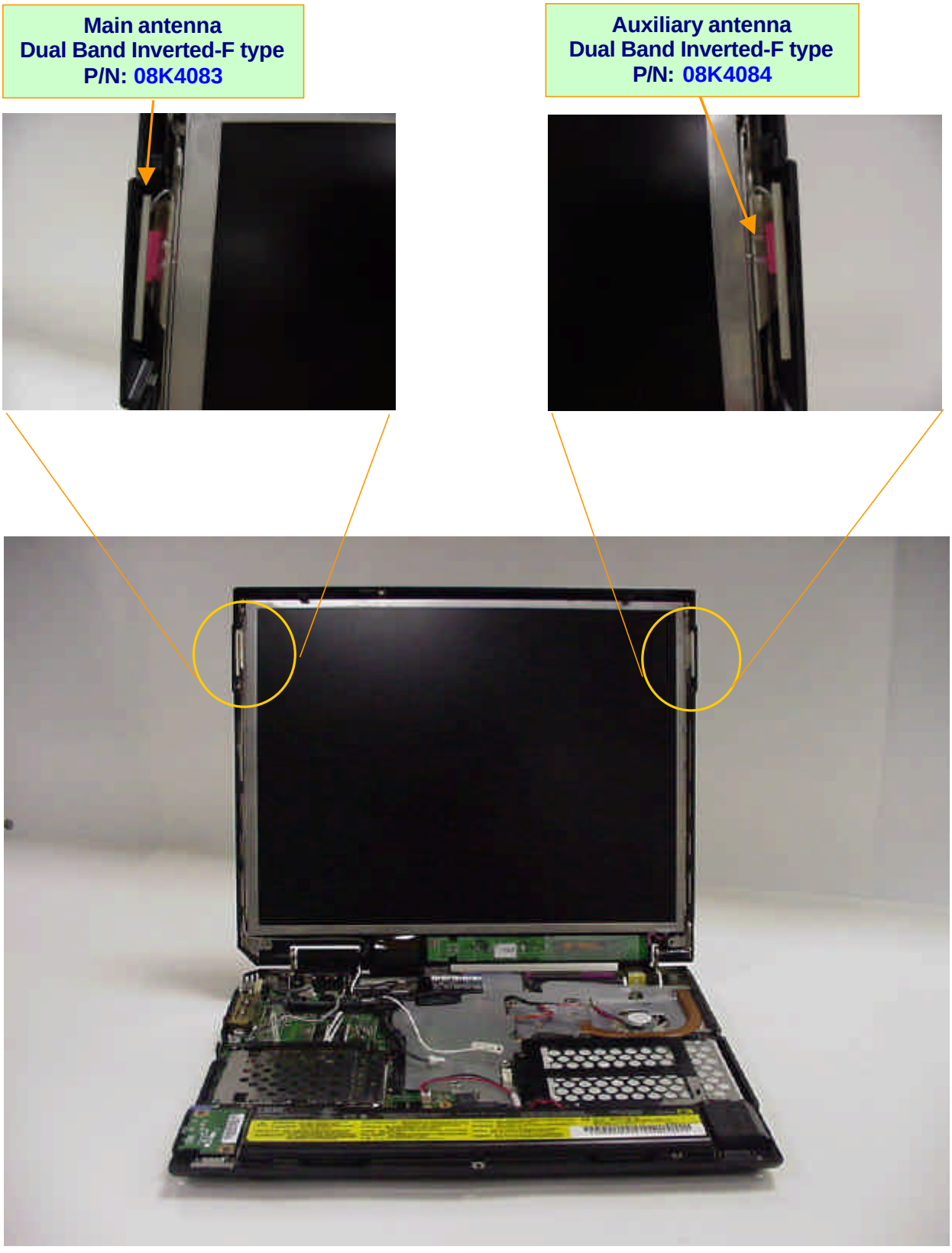
T40: Auxiliary Antenna



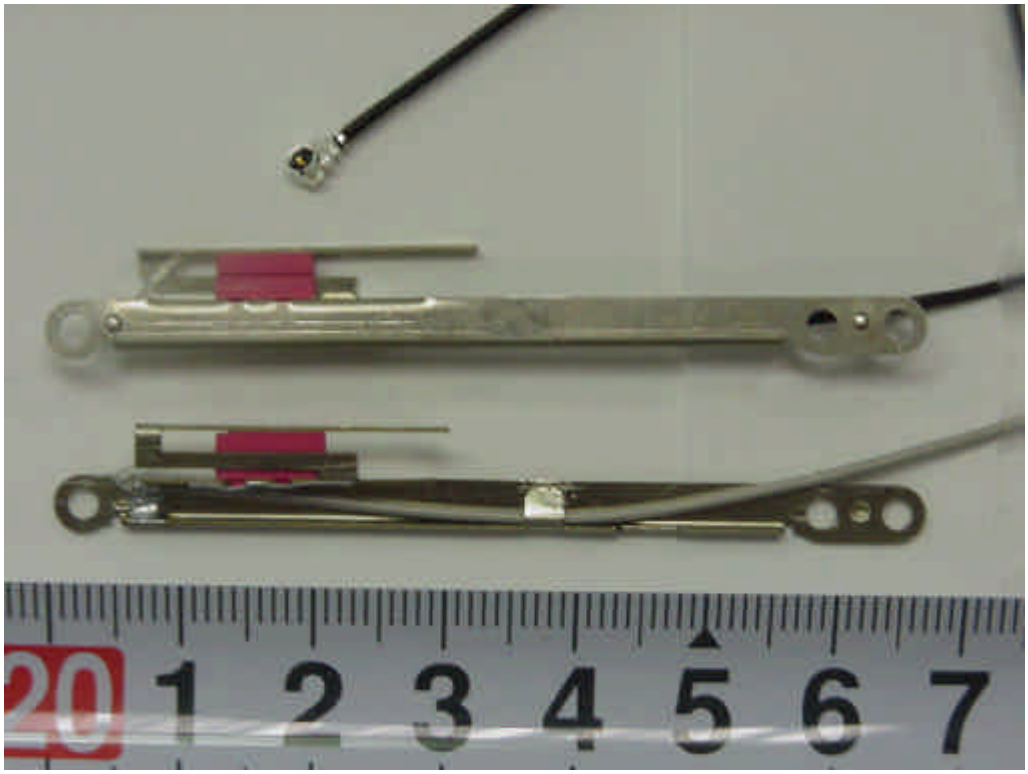


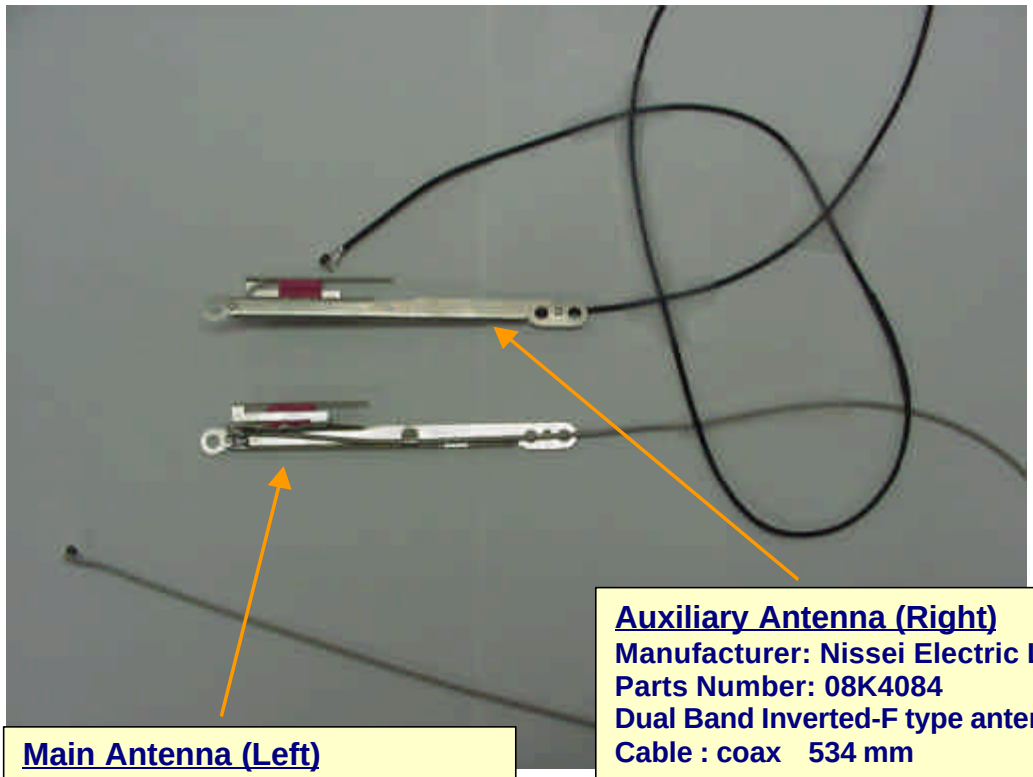
3.3.3 X30 Series, Antenna Photos

X30: Antenna location



X30: Antenna Exterior Photos





Auxiliary Antenna (Right)
Manufacturer: Nissei Electric Ltd.
Parts Number: 08K4084
Dual Band Inverted-F type antenna
Cable : coax 534 mm

Main Antenna (Left)
Manufacturer: Nissei Electric Ltd.
Parts Number: 08K4083
Dual Band Inverted-F type antenna
Cable : coax 394 mm