

Mb02 Antenna Sample Approval Report

Description: 802.11a+b Antenna & Bluetooth Antenna
FIC P/N: 21-92148-01/21-92149-01
WistronNeWeb P/N: 91.CAN15.001/002/003
Vendor Code: H222

啓碁科技股份有限公司

新竹市科學園區力行一路 10-1 號

Wistron NeWeb Corporation

**No. 10-1,Li-hsin Road I,
Science-base Industrial Park,
Hsinchu 300,Taiwan, R.O.C.**

Tel: 886-3-6667799#6545

Fax: 886-3-6667711

Provided by Wistron NeWeb Corp.	Reviewed by Wistron NeWeb Corp.	Approved by First International Computer Inc.
Justin Chang	Weili Cheng	

I. Antenna Spec.

I-1. Antenna Spec. For WLAN(LCD site)

1. 802.11b Spec.

- 1.1. Frequency range : 2.4 ~ 2.5GHz (Nominal)
- 1.2. Impedance : 50Ω
- 1.3. LCD Panel : Open (100°)
- 1.4. System Plane : XY plane
- 1.5. VSWR : ≤ 2 (Main & Aux. Antenna)
- 1.6. Band Width : ≥ 130MHz (2450MHz±65MHz at least).
- 1.7. Any 30° angle range can't has null depth.
- 1.8. Average gain & Peak gain

Antenna	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
	2.4GHz	2.45GHz	2.5GHz	2.4GHz	2.45GHz	2.5GHz
Main	≤ 3	≤ 3	≤ 3	≥ -5	≥ -5	≥ -5
Auxiliary				≥ -5	≥ -5	≥ -5

- 1.9. Diversity Sum : ≥ -2.5dBi

2. 802.11a Spec.

- 2.1. Frequency range : 5.15 ~ 5.35GHz (Nominal)
- 2.2. Impedance : 50Ω
- 2.3. LCD Panel : Open (100°)
- 2.4. System Plane : XY plane
- 2.5. VSWR : ≤ 2.5 (Main & Aux. Antenna)
- 2.6. Band Width : ≥ 250MHz (5250MHz±125MHz at least).
- 2.7. Any 30° angle range can't has null depth.
- 2.8. Average gain & Peak gain

Antenna	Peak Gain (dBi)			Average Gain (dBi)		
	Frequency			Frequency		
	5.15GHz	5.25GHz	5.35GHz	5.15GHz	5.25GHz	5.35GHz
Main	≤ 6	≤ 6	≤ 6	≥ -5	≥ -5	≥ -5

Auxiliary				≥ -5	≥ -5	≥ -5
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2.9. Diversity Sum : $\geq -4\text{dBi}$

I.2 Antenna description

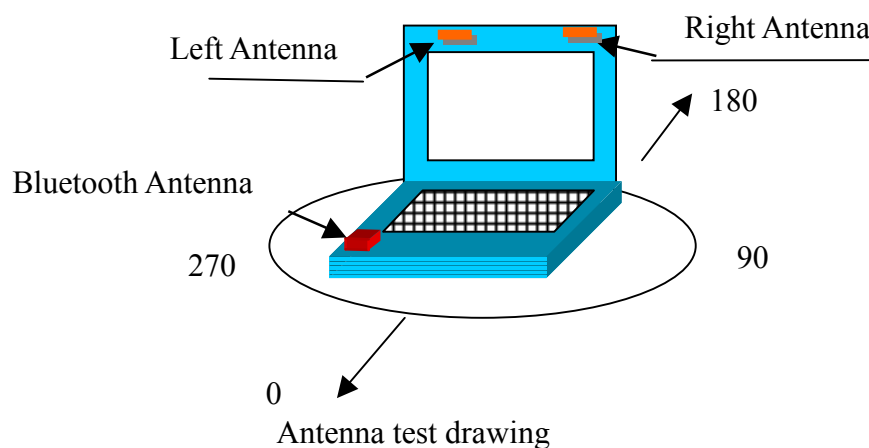
Antenna type	Wireless antenna :PIFA Bluetooth antenna:IFA
Antenna material	Metal sheet
Cable length	Left-side antenna: 730mm Φ 1.13mm Right-side antenna: 590mm Φ 1.13mm Bluetooth antenna: 105mm Φ 1.13mm (From the center of connector to the metal edge of antenna)
Connector type	HRS U.FL-LP-066

II. Mechanical spec.

Mechanical drawing: (Attached the file below)

III. Antenna test report

a. Average gain and peak gain test result



Antenna Gain		2G4 ISM (2.400 GHz - 2.4835 GHz)			U-NII (5.150 GHz - 5.350 GHz)			HyperLAN (5.470 GHz - 5.725 GHz)		
		2.40 GHz	2.45 GHz	2.50GHz z	5.15 GHz	5.25 GHz	5.35 GHz	5.47 GHz	5.5975 GHz	5.825 GHz
Left Ant.	Peak dBi	2.45	1.99	2.24	0.4	0.5	0.7	2.51	1.5	2.61
	Avg dBi	-1.83	-1.74	-1.42	-4.06	-3.77	-3.22	-3.38	-3.05	-2.86
Right Ant.	Peak dBi	1.66	2.57	2.41	1.98	1.28	2.03	2.65	1.87	2.45
	Avg dBi	-1.41	-1.31	-1.87	-3.88	-4.02	-3.18	-3.17	-2.85	-2.36
Bluetooth Ant.	Peak dBi	1.55	0.96	1.47						
	Avg dBi	-4.05	-4.36	-4.54						

Diversity Sum

Antenna Gain		2G4 ISM (2.400 GHz - 2.4835 GHz)			U-NII (5.150 GHz - 5.350 GHz)			HyperLAN (5.470 GHz - 5.725 GHz)		
		2.40 GHz	2.45 GHz	2.50GHz z	5.15 GHz	5.25 GHz	5.35 GHz	5.47 GHz	5.5975 GHz	5.825 GHz
Diversity Sum		-1.13	-0.84	-1.24	-3.42	-3.25	-2.82	-2.85	-2.52	-2.04

b .VSWR

Frequency	2.40 GHz	2.45 GHz	2.50 GHz	5.15 GHz	5.25 GHz	5.35 GHz	5.47 GHz	5.5975 GHz	5.825 GHz
Left A Antenna	1.56	1.23	1.65	1.56	1.43	1.75	1.52	1.45	1.75
Right Antenna	1.62	1.32	1.45	1.45	1.35	1.42	1.67	1.52	1.44
Bluetooth Antenna	1.65	1.34	1.57						

c. Cable & Connector Loss

1.13mm (dia.) Nissei RF cable with double end HRS connector										
S21 (dBm)										
length (mm)	2.4G	2.45G	2.5G	5.15G	5.25G	5.35G	5.47G	5.5975G	5.725G	5.825G
198	-1.104	-1.091	-1.104	-1.540	-1.644	-1.799	-1.819	-1.666	-1.656	-1.854
362	-1.700	-1.699	-1.689	-2.391	-2.519	-2.606	-2.450	-2.750	-2.539	-2.694
750	-2.980	-3.020	-3.033	-4.620	-4.710	-4.800	-4.810	-4.737	-4.833	-4.877
1000	-3.539	-3.584	-3.619	-5.217	-5.269	-5.312	-5.364	-5.444	-5.499	-5.537

d. Antenna pattern

Right-side Antenna

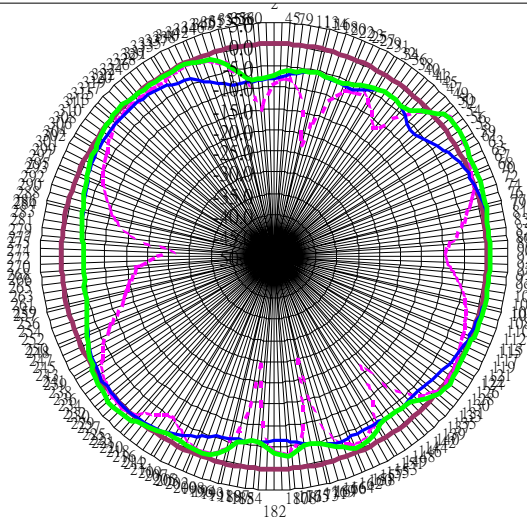
Freq. : 2.45/5.25/5.6475GHz

Polarization : V pol. And H pol.

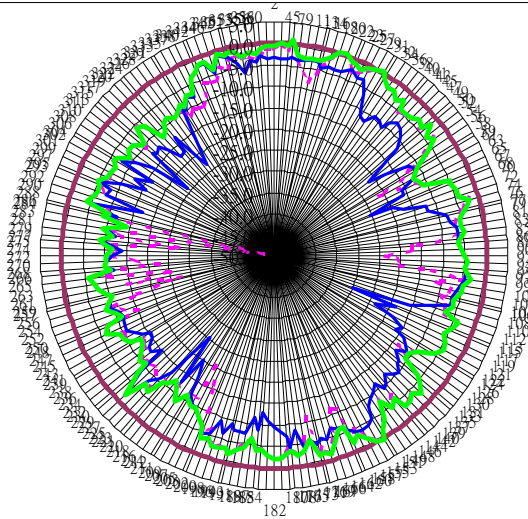
LCD angle: 110°

Elevation angle: 0°

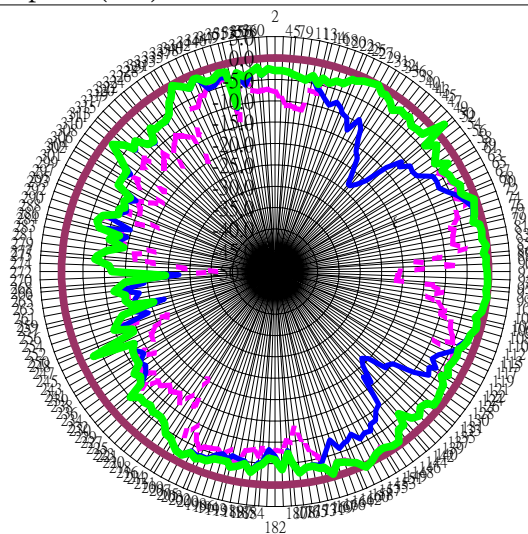
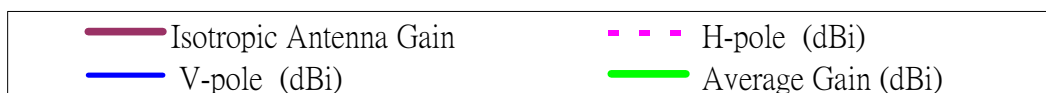
Antenna Radiation pattern -@2.45GHz



Antenna Radiation pattern -@5.25GHz



Antenna Radiation pattern -@5.6475GHz



Left-side Antenna

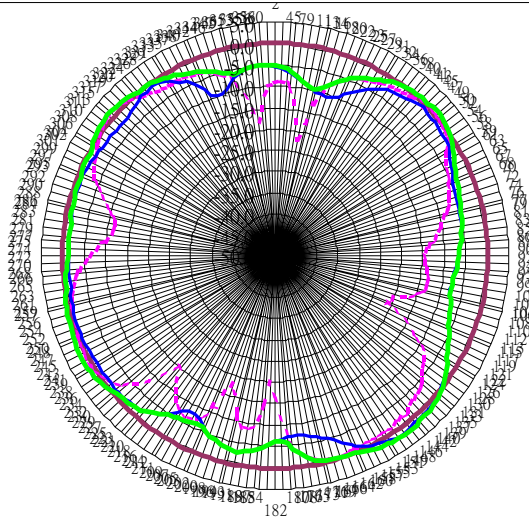
Freq. : 2.45/5.25/5.6475GHz

Polarization : V pol. And H pol.

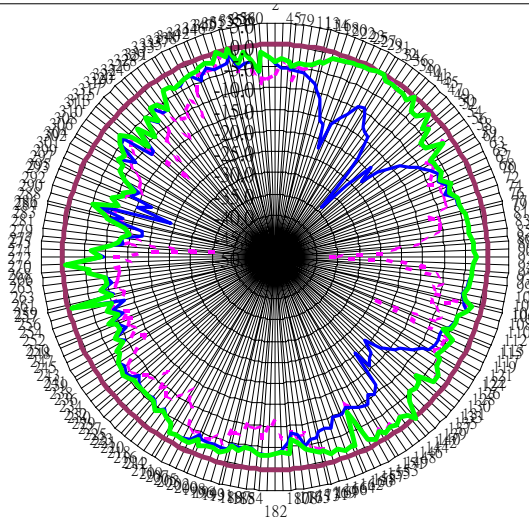
LCD angle: 110°

Elevation angle: 0°

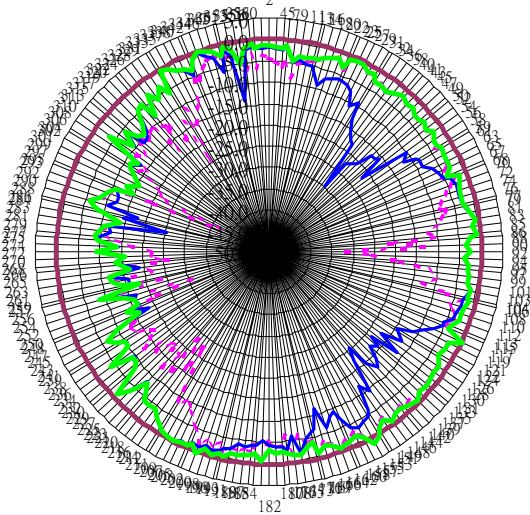
Antenna Radiation pattern -@2.45GHz



Antenna Radiation pattern -@5.25GHz

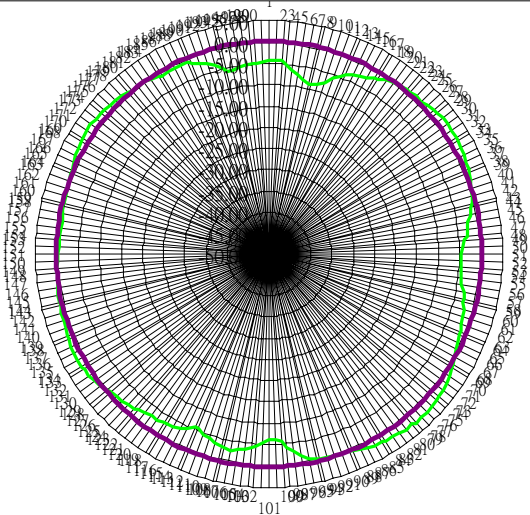


Antenna Radiation pattern -@5.6475GHz



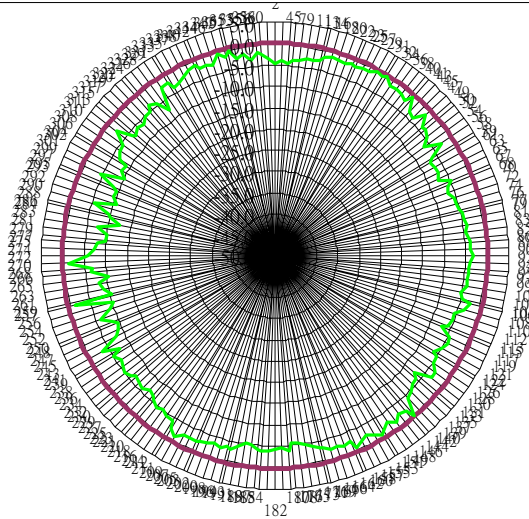
Wireless LAN Antenna Diversity Sum

Antenna Radiation pattern -@2.45GHz



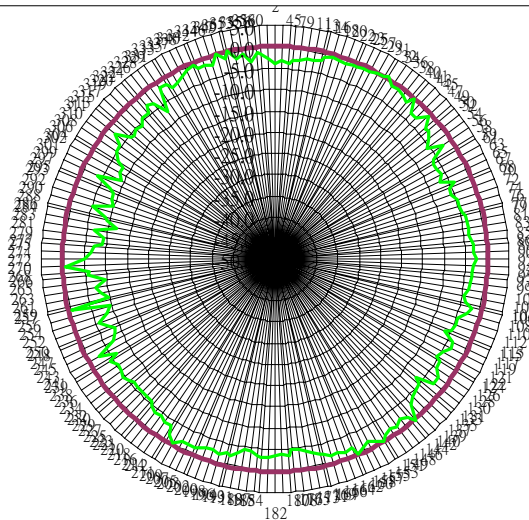
Antenna Radiation pattern -@5.25GHz

— Isotropic Antenna Gain — Diversity Sum Gain (dBi)



Antenna Radiation pattern -@5.6475GHz

— Isotropic Antenna Gain — Diversity Sum Gain (dBi)



Bluetooth Antenna

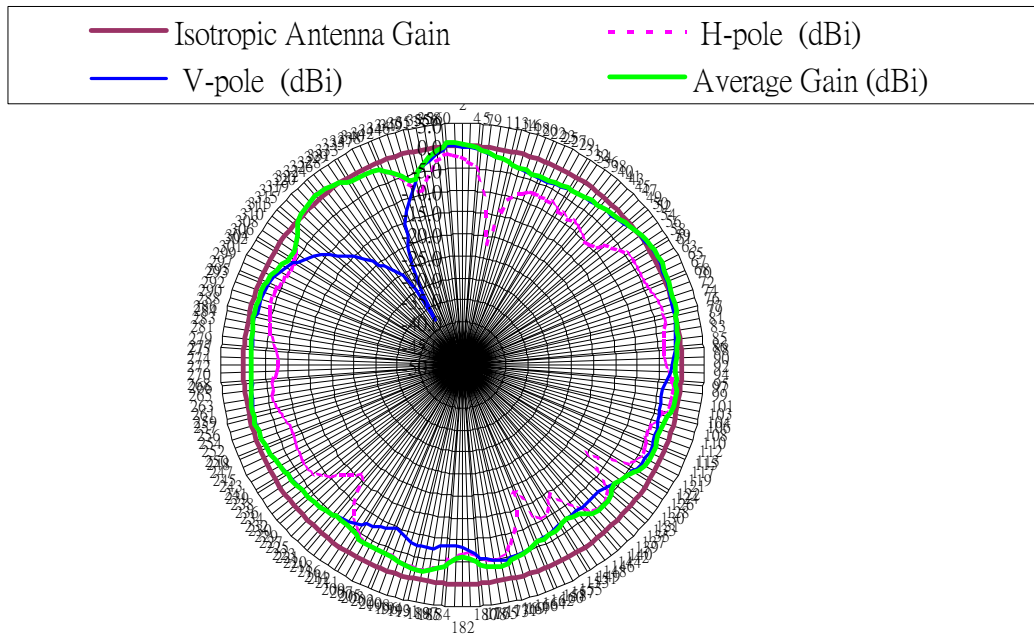
Freq. : 2.45GHz

Polarization : V pol. And H pol.

LCD angle: 110°

Elevation angle: 0°

Antenna Radiation pattern -@2.45GHz



IV. Cable spec.

U. FL-LP-5016B-A-37(590)

U. FL-LP-5016-A-39(730)

U. FL-LP-5016-A-67(105)

Approval sheet is as the attached document.

2003/2/13

REF: RF-A20020518

TO Wistron Neweb Corporation.

DRAWING FOR APPROVAL

U. FL-LP-5016-A-67-(105)

U. FL-LP-5016-A-39-(730)

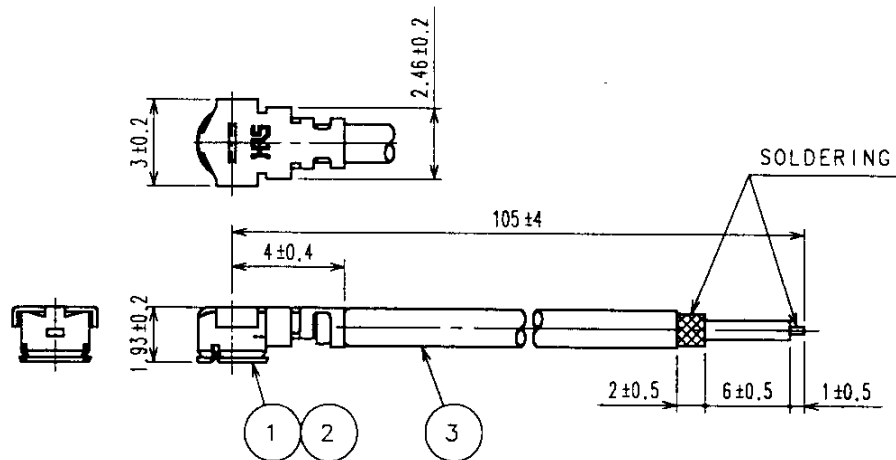
U. FL-LP-5016B-A-37-(590)

HIROSE ELECTRIC CO.,LTD.

FORM No. 23-1

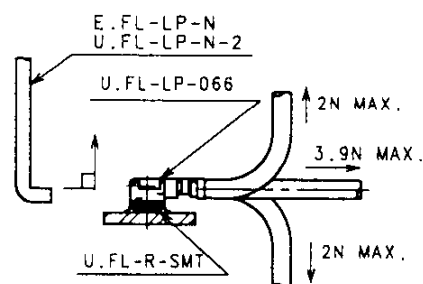
TO
RF

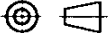
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△										△									
△										△									
△										△									



1 PRECAUTIONS FOR HANDLING

- ◆ Connector insertion and extraction
 - a. Connector shall be extracted vertically by specialised extraction JIG.
Part No.: E.FL-LP-N (CL Code: CL331-0441-9)
U.FL-LP-N-2 (CL Code: CL331-0494-5)
Never hold the cable when extracting the cable because it damages the connector.
 - b. Insert the connector as perpendicularly to the mating surface as possible by aligning the mating axes of both connectors. Do not excessively slant the connectors when inserting.
- ◆ Allowable loads on the cable after the connectors are mated.
The figures below show the maximum allowable loads on the cable. Do not apply loads exceeding these values to the cable.



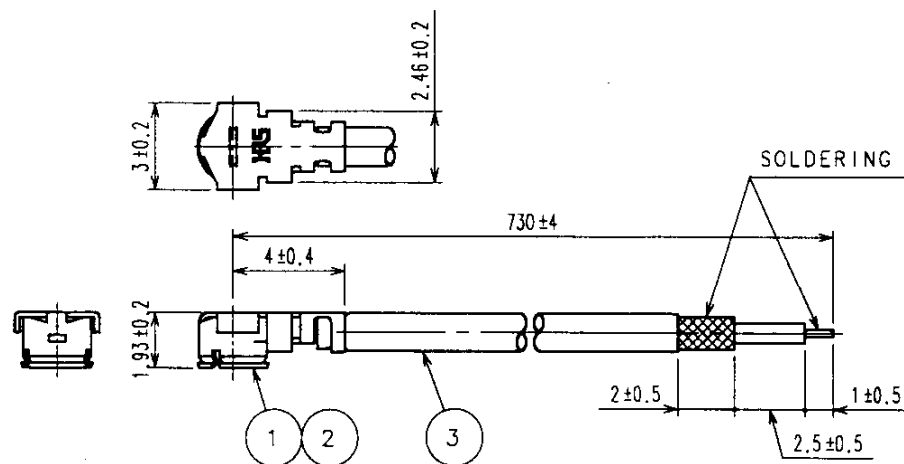
2	U.FL-CONTACT	CL331-0461-6					
1	U.FL-LP-066	CL331-0452-5	3	RF-MF5016	NISSEI ELECTRIC CO.,LTD		
NO.	PART NO.	CODE NO.	NO.	PART NO.	MANUFACTURER		
CODE NO.(OLD) CL		DRAWN		DESIGNED	CHECKED	APPROVED	RELEASED
For Wistron NeWeb Corporation.		S.SATO 03.02.12		S.SATO 03.02.12	M. Yamane 03.02.13	F. Kobayashi 03.02.13	ENG DEPT
		DRAWING NO.		PART NO.			
SCALE FREE		EDC4-302837		U.FL-LP-5016-A-67-(105)			
UNITS mm		HRS HIROSE ELECTRIC CO.,LTD.		CODE NO.			1/1
				CL396-9396-0			

TO
RF

FORM No. 231-1

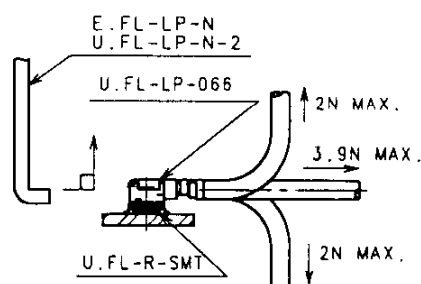
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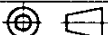
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△					△					△	
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[PRECAUTIONS FOR HANDLING]

- ◆Connector insertion and extraction
 - a. Connector shall be extracted vertically by specialised extraction JIG.
Part No.: E.FL-LP-N (CL Code: CL331-0441-9)
U.FL-LP-N-2 (CL Code: CL331-0494-5)
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2	U.FL-CONTACT	CL331-0461-6							
1	U.FL-LP-066	CL331-0452-5	3	RF-MF5016	NISSEI ELECTRIC CO., LTD				
NO.	PART NO.	CODE NO.	NO.	PART NO.	MANUFACTURER				
CODE NO. (OLD) CL			DRAWN	DESIGNED	CHECKED	APPROVED	RELEASED		
For Wistron NeWeb Corporation.			S.SATO 03.02.12	S.SATO 03.02.12	M. Yamane 03.02.13	F. Kobayashi 03.02.13	ENG DEPT.		
			DRAWING NO. EDC4-302838		PART NO. U.FL-LP-5016-A-39-(730)				
SCALE FREE			 HIROSE ELECTRIC CO., LTD.		CODE NO. CL396-9397-3			1/1	
UNITS mm									

TO
RF

F

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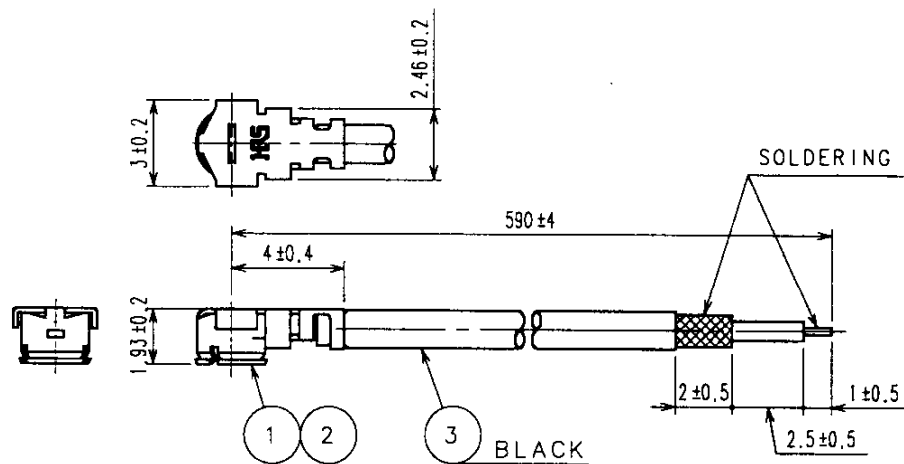
FORM NO. 228

07

FORM No 23

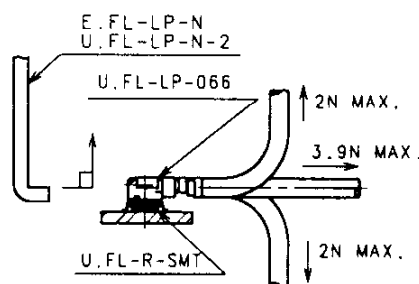
P.F.

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COUNT	DESCRIPTION OF REVISIONS				BY	CHKD	DATE			COUNT	DESCRIPTION OF REVISIONS				BY	CHKD	DATE		
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[PRECAUTIONS FOR HANDLING]

- Connector insertion and extraction
 - a.Connector shall be extracted vertically by specialised extraction JIG.
Part No.:E.FL-LP-N(CL Code:CL331-0441-9)
U.FL-LP-N-2(CL Code:CL331-0494-5)
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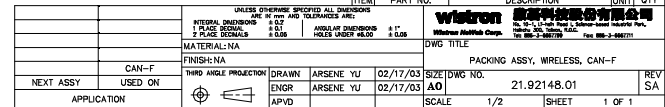
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NO.	PART NO.	CODE NO.	NO.	PART NO.	MANUFACTURER

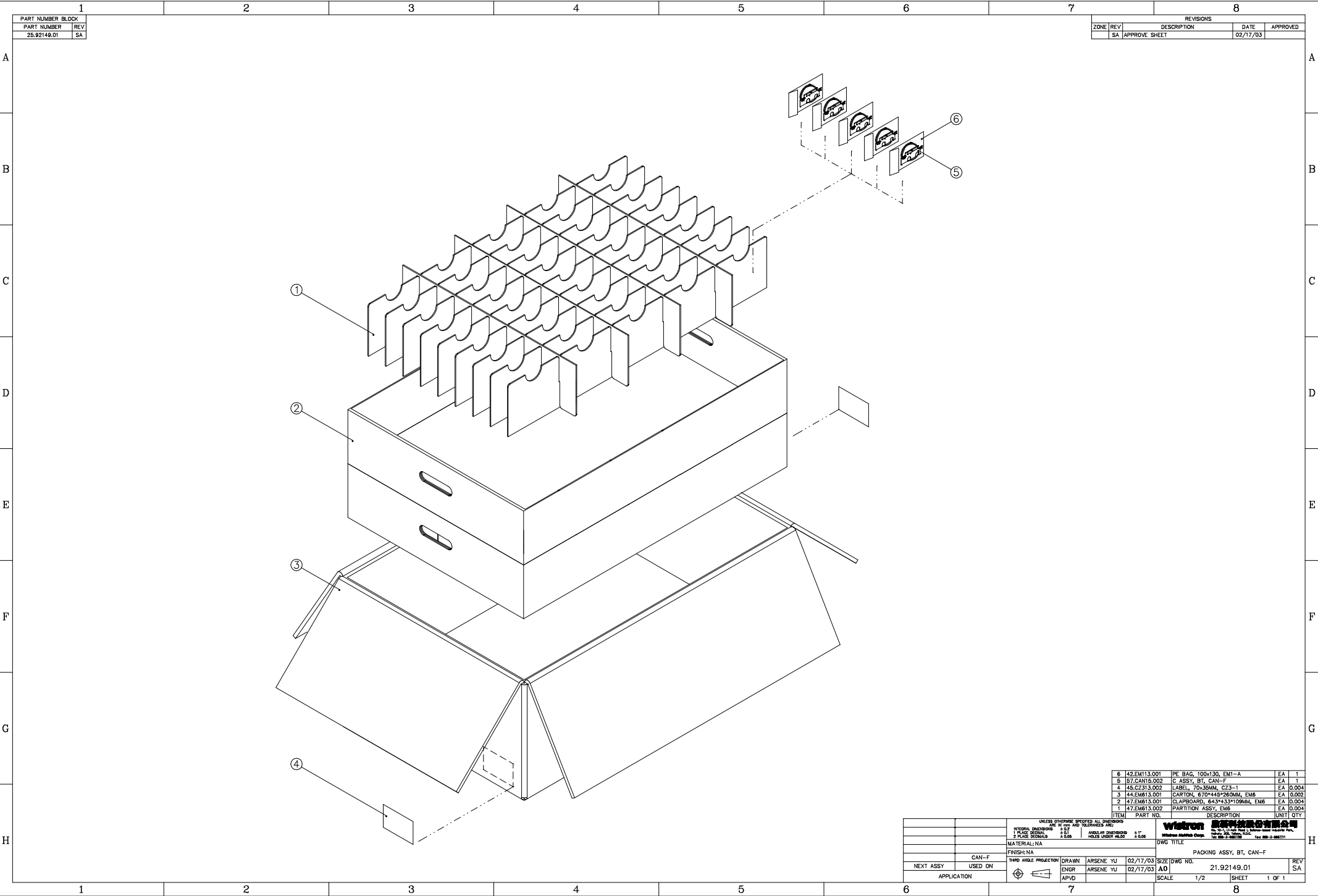
CODE NO.(OLD) CL		DRAWN	DESIGNED	CHECKED	APPROVED	RELEASED
For Wistron NeWeb Corporation.		SSATO 03.02.12	SSATO 03.02.12	Sh. Yamane 03.02.13	Z. Kobayashi 03.02.13	ENG T DEF
DRAWING NO. EDC4-302839		PART NO. U.FL-LP-5016B-A-37-(590)				
SCALE FREE		CODE NO. CL396-9398-6				
UNITS mm		1/1				

TO
RF

V. Package

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	SA	APPROVE SHEET	02/17/03	





PART NUMBER BLOCK	
PART NUMBER	REV
25.92149.01	SA

REVISIONS			
ZONE	REV	DESCRIPTION	DATE
SA	APPROVE	SHEET	02/17/03

ITEM	PART NO.	DESCRIPTION	UNIT	QTY
6	42.EM13.001	PE BAG, 100x130, EM1-A	EA	1
5	37.CAN16.002	C ASSY, BT, CAN-F	EA	1
4	45.CZ313.002	LABEL, 70x38MM, CZ3-1	EA	0.004
3	44.EM613.001	CARTON, 670*445*260MM, EM6	EA	0.002
2	47.EM613.001	C APPROX, 643*433*109MM, EM6	EA	0.004
1	47.EM613.002	PARTITION ASSY, EM6	EA	0.004

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES AND TOLERANCES ARE: 1 PLACE DECIMALS ±.02 2 PLACE DECIMALS ±.01		ALL OTHER DIMENSIONS HOLD UNDER .0005 HOLD UNDER .0005		8" ±.005	
MATERIAL: NA		FINISH: NA		TWO ANGLE PROJECTION	
CAN-F		DRAWN		ARSENIE YU 02/17/03	
NEXT ASSY		USED ON		ENGR ARSENIE YU 02/17/03	
APPLICATION		APVD		DWG NO. 21.92149.01	
				SCALE 1/2	
				SHEET 1 OF 1	

Watson **PACKAGING**
Watson Airtech Corp. 10000 S. 1st Ave. Suite 100
Tulsa, OK 74116-1000
Tel: 918-252-0000 Fax: 918-252-0001

DWG TITLE: PACKING ASSY, BT, CAN-F

REV SA

VI. Antenna Outline Drawing

1

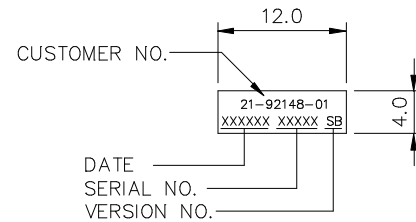
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PART NUMBER BLOCK

PART NUMBER	REV
57.CAN15.001	SA

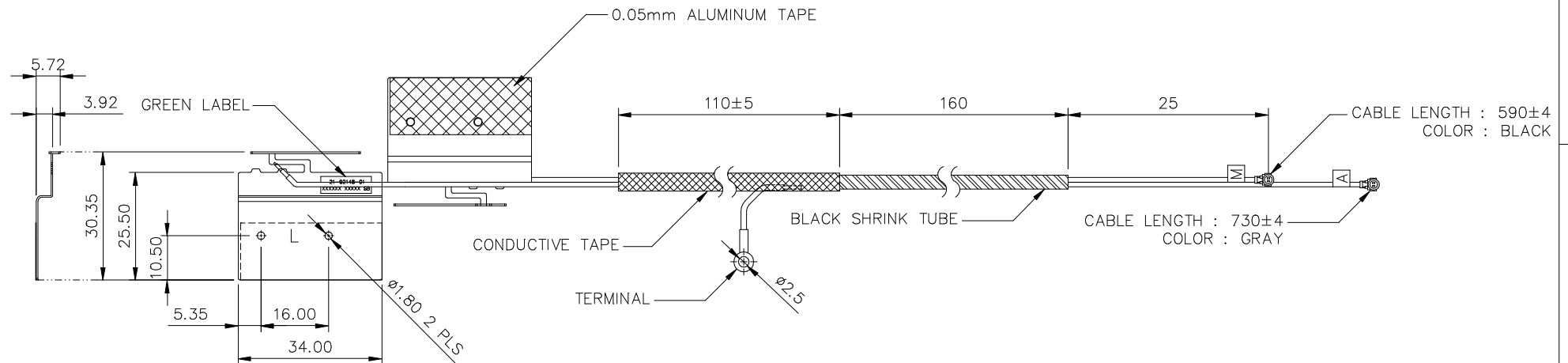
REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	SA	APPROVE SHEET	01/16/03	
	SB	APPROVE SHEET	02/19/03	



DETAIL OF LABEL

SCALE : 2/1



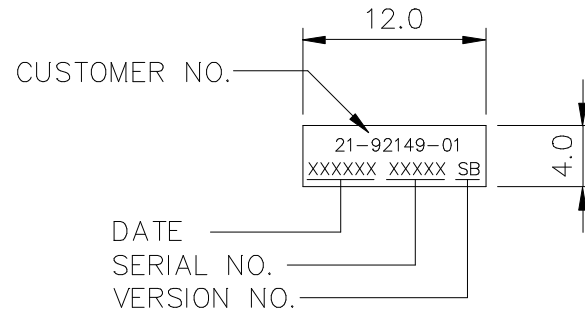
	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN mm AND TOLERANCES ARE:					wistron 啟碁科技股份有限公司 Wistron NeWeb Corp. No. 10-1, Li-hsin Road I, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C. Tel: 886-3-6667799 Fax: 886-3-6667711		
	INTEGRAL DIMENSIONS ± 4		ANGULAR DIMENSIONS ± 1°					
	1 PLACE DECIMAL ± 0.1		HOLES UNDER Ø5.00 ± 0.05					
	MATERIAL:					DWG TITLE OUTLINE, CAN-F		
	FINISH:							
	THIRD ANGLE PROJECTION	DRAWN	ARSENE YU	02/19/03	SIZE	DWG NO.	REV	
NEXT ASSY	USED ON		ENGR	ARSENE YU	02/19/03	A3	57.CAN15.001	SB
APPLICATION		APVD			SCALE	1/1	SHEET	1 OF 1

1

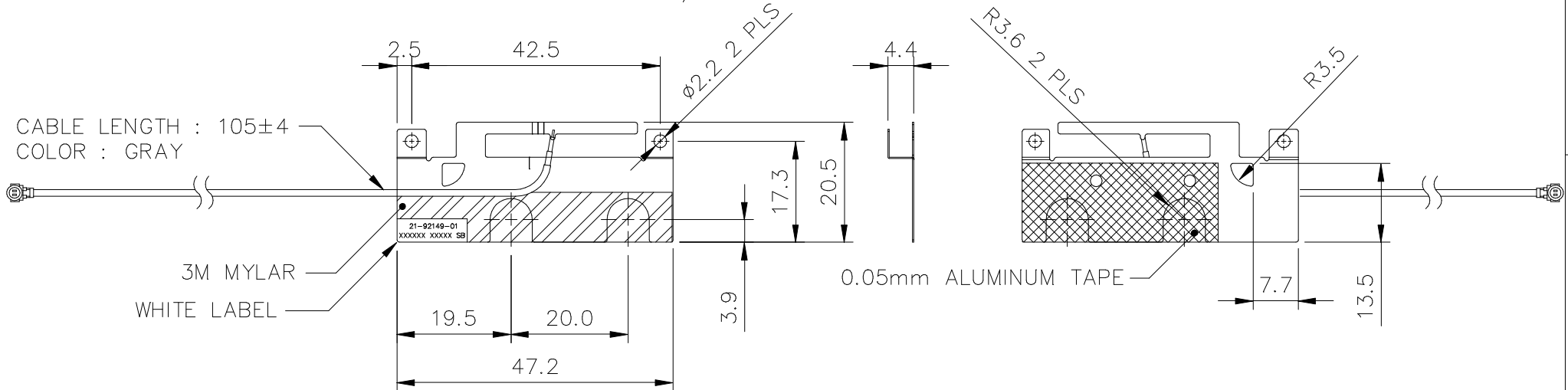
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PART NUMBER BLOCK	
PART NUMBER	REV
57.CAN15.002	SB

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
SA	APPROVE SHEET	01/16/03	
SB	APPROVE SHEET	02/19/03	



DETAIL OF LABEL
SCALE : 2/1



		UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN mm AND TOLERANCES ARE:					Wistron Wistron NeWeb Corp. 啟碁科技股份有限公司 No. 10-1, Li-hsin Road I, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C. Tel: 886-3-6667799 Fax: 886-3-6667711		
		INTEGRAL DIMENSIONS ± 4 1 PLACE DECIMAL ± 0.1 ANGULAR DIMENSIONS ± 1° 2 PLACE DECIMALS ± HOLES UNDER Ø5.00 ± 0.05					DWG TITLE OUTLINE, BT, CAN-F		
		MATERIAL:							
		FINISH:							
	CAN-F	THIRD ANGLE PROJECTION	DRAWN	ARSENE YU	02/19/03	SIZE	DWG NO.		REV
NEXT ASSY	USED ON		ENGR	ARSENE YU	02/19/03	A4	57.CAN15.002		SB
APPLICATION			APVD			SCALE 1/1		SHEET 1 OF 1	