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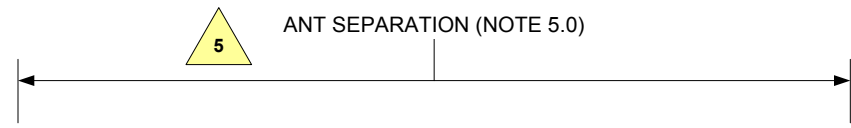
### Low Profile Option 2 w/ Concurrent Support for Both 3G and 4G data protocols



### 3G/4G Solution for Kiosk Digital Messaging Systems

Section 1: Low-Profile Option 2 with Dual 3G Cellular and 4G WiMax Support  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr)	SIZE	LIC NO	DWG NO	REV
APPROVED BY:		AZ ROC # 253407	BW-403911010-001	2A
FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax	SCALE	NO SCALE	FRN: 0018086041	SHEET 1 OF 6

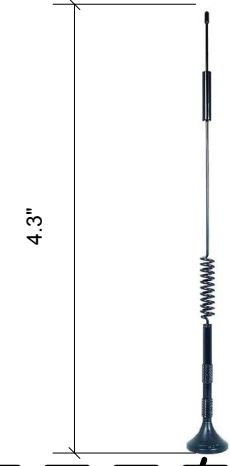
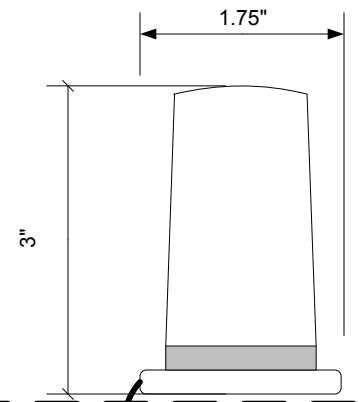


**Cellular/WiMax MIMO Primary Antenna [ANT#1]** 18

694-894 MHz/ 1.7 – 2.7 GHz Cellular/PCS/WiMax antenna w/ 10ft SMA-M Cable, 3dBi

**WiMax MIMO Secondary Antenna [ANT#2]** 16

2300-2700 MHz 4G WiMax Antenna w/ 6.25ft SMA-M Cable, 3dBi



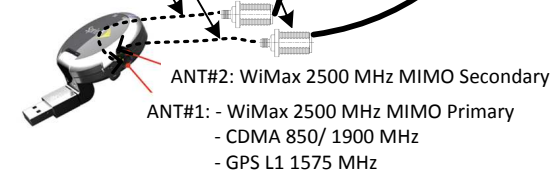
Mounting Plane or Exterior Enclosure

10ft cable w/ SMA-Male connector included with antenna #18.

6.25ft cable w/ SMA-Male connector included with antenna #16.

FME-Female/SMA-Female Adapter 17

Dual Pigtail w/ TS9-Male to FME-Male Ends 5



ANT#2: WiMax 2500 MHz MIMO Secondary

ANT#1: - WiMax 2500 MHz MIMO Primary  
- CDMA 850/ 1900 MHz  
- GPS L1 1575 MHz

NOTE 2.0

Bill of Materials			
ITEM	QTY.	RFWEL SKU	DESCRIPTION
5	1	PIG_CLR250U_2	Sierra 250U Dual Pigtail (TS9_Male/FME-Male)
16	1	RFWAT2P5MMSM	2.3-2.7GHz low profile WiMax Magnet Mount Antenna, SMA-M
17	2	ADPSMAFFMEF	SMA-Female (Jack) / FME-Female (Jack) Adapter
18	1	MGRM-WLF-1C10	Cellular/PCS/WiMax/ AWS Wideband Magnet Mount, SMA-M

NOTES:  
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2.0 Note modem primary antenna port labeled "ANT1" is the port connected to PCS/WiMax diplexer. For applications using only one external antenna, plug into the "ANT1" port. Due to potentially significant RF-shielding from kiosk structure recommend use of two antennas if using 4G WiMax. If using setup for 3G only DON'T need to have secondary antenna connected. Refer to [www.rfwel.com/forums](http://www.rfwel.com/forums) for additional discussion on when MIMO dual antennas are most effective.

5.0 Provide maximum separation distance between WiMax 4G antennas for best performance but no less than 0.5' separation.

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**SYSTEM INTEGRATION WITH AMPLIFIED CELLULAR 3G**

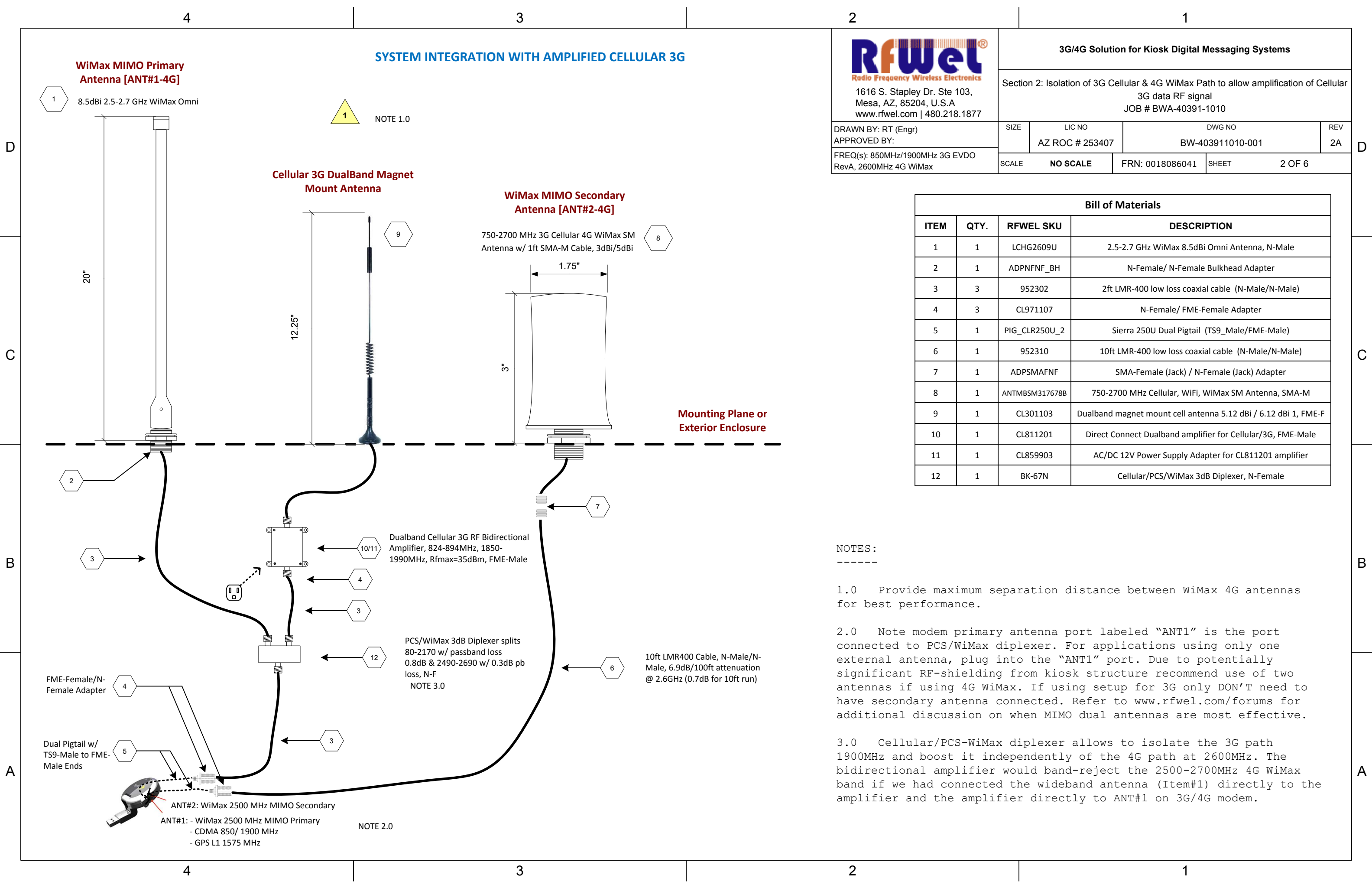
**Rfwel**  
Radio Frequency Wireless Electronics  
1616 S. Stapley Dr. Ste 103,  
Mesa, AZ, 85204, U.S.A  
www.rfwel.com | 480.218.1877

**3G/4G Solution for Kiosk Digital Messaging Systems**

Section 2: Isolation of 3G Cellular & 4G WiMax Path to allow amplification of Cellular 3G data RF signal  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr)	SIZE	LIC NO	DWG NO	REV
APPROVED BY:		AZ ROC # 253407	BW-403911010-001	2A
FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax	SCALE	NO SCALE	FRN: 0018086041	SHEET 2 OF 6

Bill of Materials			
ITEM	QTY.	RFWEL SKU	DESCRIPTION
1	1	LCHG2609U	2.5-2.7 GHz WiMax 8.5dBi Omni Antenna, N-Male
2	1	ADPNFNF_BH	N-Female/ N-Female Bulkhead Adapter
3	3	952302	2ft LMR-400 low loss coaxial cable (N-Male/N-Male)
4	3	CL971107	N-Female/ FME-Female Adapter
5	1	PIG_CLR250U_2	Sierra 250U Dual Pigtail (TS9_Male/FME-Male)
6	1	952310	10ft LMR-400 low loss coaxial cable (N-Male/N-Male)
7	1	ADPSMAFNF	SMA-Female (Jack) / N-Female (Jack) Adapter
8	1	ANTMBSM317678B	750-2700 MHz Cellular, WiFi, WiMax SM Antenna, SMA-M
9	1	CL301103	Dualband magnet mount cell antenna 5.12 dBi / 6.12 dBi 1, FME-F
10	1	CL811201	Direct Connect Dualband amplifier for Cellular/3G, FME-Male
11	1	CL859903	AC/DC 12V Power Supply Adapter for CL811201 amplifier
12	1	BK-67N	Cellular/PCS/WiMax 3dB Diplexer, N-Female



**NOTES:**

- 1.0 Provide maximum separation distance between WiMax 4G antennas for best performance.
- 2.0 Note modem primary antenna port labeled "ANT1" is the port connected to PCS/WiMax diplexer. For applications using only one external antenna, plug into the "ANT1" port. Due to potentially significant RF-shielding from kiosk structure recommend use of two antennas if using 4G WiMax. If using setup for 3G only DON'T need to have secondary antenna connected. Refer to [www.rfwel.com/forums](http://www.rfwel.com/forums) for additional discussion on when MIMO dual antennas are most effective.
- 3.0 Cellular/PCS-WiMax diplexer allows to isolate the 3G path 1900MHz and boost it independently of the 4G path at 2600MHz. The bidirectional amplifier would band-reject the 2500-2700MHz 4G WiMax band if we had connected the wideband antenna (Item#1) directly to the amplifier and the amplifier directly to ANT#1 on 3G/4G modem.

### High Gain 4G Antenna Options (No 3G Support)

**4G WiMax MIMO  
Primary Antenna**

**4G WiMax MIMO  
Secondary  
Diversity Antenna**

NOTE 4.0

13 2.3-2.7GHz, 12dBi Omni antenna, N-Female, L=45"

14 2.5-2.7GHz, 16.3dBi Panel antenna, N-Female, 10.4"x10.4"x0.49", 30dB F2B

6 LMR400 Cable, N-Male/N-Male, 6.9dB/100ft attenuation @ 2.6GHz (0.7dB for 10ft run)

4 FME-Female/N-Female Adapter

5 Dual Pigtail w/ TS9-Male to FME-Male Ends

ANT#2: WiMax 2500 MHz MIMO Secondary  
ANT#1: - WiMax 2500 MHz MIMO Primary  
- CDMA 850/ 1900 MHz  
- GPS L1 1575 MHz

NOTE 2.0



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Mesa, AZ, 85204, U.S.A  
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### 3G/4G Solution for Kiosk Digital Messaging Systems

Section 3: High Gain 4G Option - Integration with 12dBi Omni & 16dBi Panel Antenna for 4G WiMax (NO 3G)  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr)  
APPROVED BY:

SIZE

LIC NO

DWG NO

REV

AZ ROC # 253407

BW-403911010-001

2A

FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax

SCALE

NO SCALE

FRN: 0018086041

SHEET

3 OF 6

#### Bill of Materials

ITEM	QTY.	RFWEL SKU	DESCRIPTION
4	2	CL971107	N-Female/ FME-Female Adapter
5	1	PIG_CLR250U_2	Sierra 250U Dual Pigtail (TS9_Male/FME-Male)
6	2	952310	10ft LMR-400 low loss coaxial cable (N-Male/N-Male)
13	1	ARC-PA2516B01	2.5-2.7GHz Wimax panel antenna, 16dBi, N-Female Jack
14	1	RFWAT2P5OMNNF	2.3-2.7GHz Wimax Omnidirectional antenna, 12dBi, N-Female Jack

#### NOTES:

2.0 Note modem primary antenna port labeled "ANT1" is the port connected to PCS/WiMax diplexer. For applications using only one external antenna, plug into the "ANT1" port. Due to potentially significant RF-shielding from kiosk structure recommend use of two antennas if using 4G WiMax. If using setup for 3G only DON'T need to have secondary antenna connected. Refer to [www.rfwel.com/forums](http://www.rfwel.com/forums) for additional discussion on when MIMO dual antennas are most effective.

4.0 Provide maximum separation distance between WiMax 4G antennas for best performance. To provide maximum performance gain orient directional panel antenna away from omnidirectional antenna. This allows for MIMO paths to be maximally uncorrelated which improves MIMO diversity gain.

Low Profile Option 1 w/ Concurrent Support for Both 3G and 4G data protocols



3G/4G Solution for Kiosk Digital Messaging Systems

Section 4: Low-Profile Option 1 with Dual 3G Cellular and 4G WiMax Support  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr)	SIZE	LIC NO	DWG NO	REV
APPROVED BY:		AZ ROC # 253407	BW-403911010-001	2A
FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax	SCALE	NO SCALE	FRN: 0018086041	SHEET 4 OF 6

Bill of Materials			
ITEM	QTY.	RFWEL SKU	DESCRIPTION
5	1	PIG_CLR250U_2	Sierra 250U Dual Pigtail (TS9_Male/FME-Male)
15	1	ANTMBSM317678B	750-2700 MHz Cellular, WiFi, WiMax SM Antenna, SMA-M
16	1	RFWAT2P5MMSM	2.3-2.7GHz low profile WiMax Magnet Mount Antenna, SMA-M
17	2	ADPSMAFFMEF	SMA-Female (Jack) / FME-Female (Jack) Adapter

D

C

B

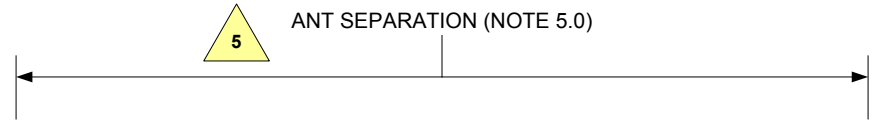
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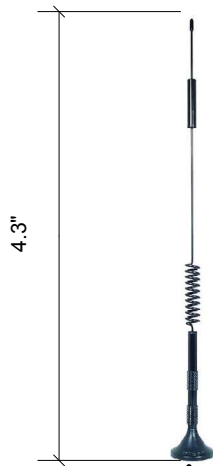
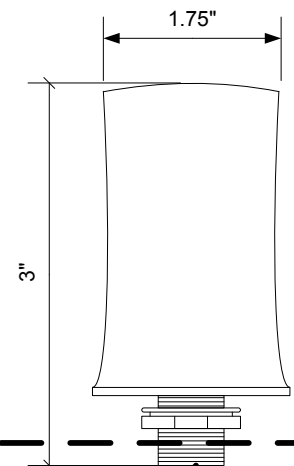
B

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**Cellular/WiMax MIMO Primary Antenna [ANT#1]**  
750-2700 MHz 3G Cellular 4G WiMax Surface Mnt Antenna w/ 1ft SMA-M Cable, 3dBi/5dBi

**WiMax MIMO Secondary Antenna [ANT#2]**  
2300-2700 MHz 4G WiMax Antenna w/ 6.25ft SMA-M Cable, 3dBi



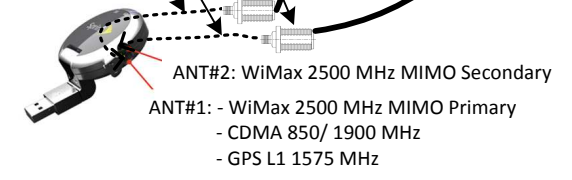
Mounting Plane or Exterior Enclosure

1ft cable w/ SMA-Male connector included with antenna #15.

6.25ft cable w/ SMA-Male connector included with antenna #16.

FME-Female/SMA-Female Adapter

Dual Pigtail w/ TS9-Male to FME-Male Ends



NOTE 2.0

NOTES:

2.0 Note modem primary antenna port labeled "ANT1" is the port connected to PCS/WiMax diplexer. For applications using only one external antenna, plug into the "ANT1" port. Due to potentially significant RF-shielding from kiosk structure recommend use of two antennas if using 4G WiMax. If using setup for 3G only DON'T need to have secondary antenna connected. Refer to [www.rfwel.com/forums](http://www.rfwel.com/forums) for additional discussion on when MIMO dual antennas are most effective.

5.0 Provide maximum separation distance between WiMax 4G antennas for best performance but no less than 0.5' separation.

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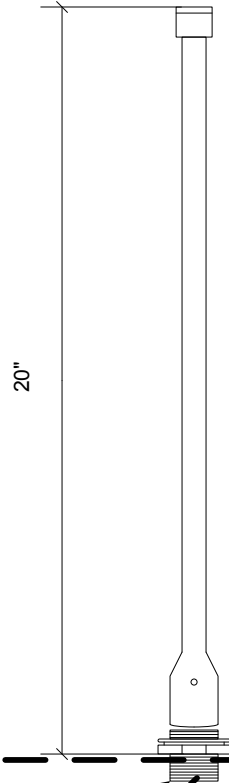
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**WiMax MIMO Primary Antenna  
[ANT#1-4G]**

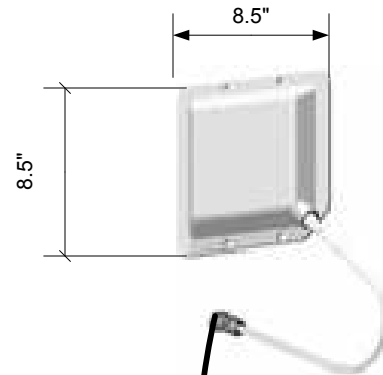
1 8.5dBi 2.5-2.7 GHz WiMax Omni



**4G WiMax Boost ONLY.**

**WiMax MIMO Secondary Antenna  
[ANT#2 - 4G]**

17 14dBi 2.5-2.7 GHz WiMax Patch Antenna, Mount on flat surface (alternate mounting options available)



NOTE 4.0

Mounting Plane or Exterior Enclosure



**3G/4G Solution for Kiosk Digital Messaging Systems**

Section 5: 4G Only – 14dBi Directional on Primary & 8.5dBi Omni On Secondary  
Antenna Port  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr)	SIZE	LIC NO	DWG NO	REV
APPROVED BY:		AZ ROC # 253407	BW-403911010-001	2A
FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax	SCALE	NO SCALE	FRN: 0018086041	SHEET 5 OF 6

Bill of Materials			
ITEM	QTY.	RFWEL SKU	DESCRIPTION
1	1	LCHG2609U	2.5-2.7 GHz WiMax 8.5dBi Omni Antenna, N-Male
2	1	ADPNFNF_BH	N-Female/ N-Female Bulkhead Adapter
4	2	CL971107	N-Female/ FME-Female Adapter
5	1	PIG_CLR250U_2	Sierra 250U Dual Pigtail (TS9_Male/FME-Male)
6	2	952310	10ft LMR-400 low loss coaxial cable (N-Male/N-Male)
17	1	LCHG2614P-NF	2.5-2.7GHz 14dBi Flat Patch Antenna, N-Female

NOTES:

2.0 Note modem primary antenna port labeled "ANT1" is the port connected to PCS/WiMax diplexer. For applications using only one external antenna, plug into the "ANT1" port. Due to potentially significant RF-shielding from kiosk structure recommend use of two antennas if using 4G WiMax. If using setup for 3G only DON'T need to have secondary antenna connected. Refer to www.rfwel.com/forums for additional discussion on when MIMO dual antennas are most effective.

4.0 Provide maximum separation distance between WiMax 4G antennas for best performance. To provide maximum performance gain orient directional panel antenna away from omnidirectional antenna. This allows for MIMO paths to be maximally uncorrelated which improves MIMO diversity gain.

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ANT#2: WiMax 2500 MHz MIMO Secondary  
 - CDMA 850/ 1900 MHz  
 - GPS L1 1575 MHz

ANT#1: - WiMax 2500 MHz MIMO Primary  
 - CDMA 850/ 1900 MHz  
 - GPS L1 1575 MHz

FME-Female/N-Female Adapter

Dual Pigtail w/ TS9-Male to FME-Male Ends

10ft LMR400 Cable, N-Male/N-Male, 6.9dB/100ft attenuation @ 2.6GHz (0.7dB for 10ft run)

NOTES:

- To replace antennas look carefully at the antenna port then visit [http://www.rfwel.com/signal\\_improvement/coaxial\\_termination\\_adapters.php](http://www.rfwel.com/signal_improvement/coaxial_termination_adapters.php) to order adapter to allow antenna to mate with your cable type
- Notice that the lower the profile (the smaller the size) the lower the antenna gain.



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3G/4G Solution for Kiosk Digital Messaging Systems

Section 6: Cellular/ WiMax Comparison Chart  
JOB # BWA-40391-1010

DRAWN BY: RT (Engr) APPROVED BY:	SIZE	LIC NO AZ ROC # 253407	DWG NO BW-403911010-001	REV 2A
FREQ(s): 850MHz/1900MHz 3G EVDO RevA, 2600MHz 4G WiMax	SCALE	NO SCALE	FRN: 0018086041	SHEET 6 OF 6

WiMax Antenna Options												
Product features	2.5-2.7 GHz Spring Mount Antenna Price: \$189.95	2.5 - 2.7 GHz WiMax 8.5 dBi Omni Antenna Price: \$79.99	2.3 - 2.7 GHz WiMax 12 dBi Omni Antenna Price: \$89.95	WiMax Low-Profile Magnet Mount Antenna Price: \$38.95	750-2700 MHz Cellular, WiFi, WiMax Surface Mount Antenna Price: \$69.95	Cellular/ PCS/ WiMax/ AWS Wideband Magnet Mount Antenna Price: \$98.89	WiFi/ WiMax Indoor 8dBi Panel Asntenna Price: \$69.95	2.5 - 2.7 GHz 14 dBi Flat Patch Antenna Price: \$74.99	2.5 - 2.7 GHz 16 dBi Yagi Antenna Price: \$54.95	2.5-2.7GHz WiMax 16dBi Flat Panel Antenna Price: \$54.95	2.5-2.7GHz 19dBi Antenna Price: \$99.95	WiMax Wideband Outdoor Directional Antenna Price: \$99.95
Rfwel Part Number	<a href="#">ECOS6-2600</a>	<a href="#">LCG2609U</a>	<a href="#">RFWAT2P5OMN-NF</a>	<a href="#">RFWAT2P5MMS-M</a>	<a href="#">RMM-UMB-1C</a>	<a href="#">MGRM-WLF-1C10</a>	<a href="#">RFWAT2P5INPANNF</a>	<a href="#">HG2614P-NF</a>	<a href="#">VA25-16-NF</a>	<a href="#">ARC-PA2516B01</a>	<a href="#">ARC-IA2519B01</a>	<a href="#">RFWAT2P5LPDANF</a>
Frequency Band	2.5 - 2.7 GHz	2.5 - 2.7 GHz	2.3 - 2.7 GHz	2.3 - 2.7 GHz	750-1250 MHz, 1650-2700 MHz	694-894 MHz / 1.7 - 2.7 GHz	2.3 - 2.7 GHz	2.5 - 2.7 GHz	2.5 - 2.7 GHz	2.5 - 2.7 GHz	2.5 - 2.7 GHz	824-960, 1710-2190, 2500-2690 MHz
Antenna Style	Omnidirectional	Omnidirectional	Omnidirectional	Magnet mount	Low Profile Surface Mount	Low Profile Magnet Mount	Panel	Panel	Yagi	Directional Panel	Directional Panel	LPDA
Isotropic Gain (dBi)	6 dBi	8.5 dBi	12 dBi	3 dBi	3 dBi	3 dBi	8 dBi	14 dBi	16 dBi	16.3 dBi	19.2 dBi	8 dBi
Front-to-Back Ratio (dB)	n/a	n/a	n/a	n/a	n/a	n/a	> 16 dB	>16 dB	>19 dB	>30 dB	>30 dB	>15 dB
Vertical Beamwidth (degrees)		15°	9°				51°	30°	25°	27°	18°	50°
Horizontal Beamwidth (degrees)	360°	360°	360°	360°	360°	360°	86°	30°	30°	23°	17°	70°
Polarization	Vertical Polarization	Vertical Polarization	Vertical Polarization	Vertical Polarization	Vertical Polarization	Vertical Polarization	Vertical Polarization	Vertical or Horizontal Polarization	Vertical or Horizontal Polarization	Vertical or Horizontal Polarization	Vertical or Horizontal Polarization	Vertical or Horizontal Polarization
VSWR	<2:1	<2:1	<1.5:1	<2:1	<2:1	<2:1	<1.5:1	<1.5:1	<1.5:1	<1.5:1	<1.5:1	<1.5:1
Operating Temperature		-40°F to +185°F						-40°F to +185°F	-49°F to +158°F	-49°F to +149°F	-49°F to +149°F	
Cable/ Connector	SMA-Female (no cable)	N-Male (no cable)	N-Female (no cable)	SMA-Male (6.25ft cable)	SMA-Male (1ft cable)	N-Male (10ft Cable)	N-Female (1ft cable)	N-Female (1ft cable)	N-Female (2.5ft cable)	N-Female (no cable)	Right Angle SMA-Female Jack (no cable)	N-Female (no cable)
Included Mounting Kit	1" through-hole mount	None	Pole Mounting (0.75in to 3.0in diameter pole)	Magnet mount	Mount on any surface 1/4" thick or less via 5/8" through-hole	Magnet mount		Four 1/4 in Holes	QuikClamp Bracket for 1.0" to 1.5" Pole Diameter	Pole Mounting (0.75in to 3.0in diameter pole)	Pole Mounting (0.75in to 3.0in diameter pole)	Pole Mounting Brackets included
Contruction	Fiberglass	UV-stabilized fiberglass radome	ABS Plastic		ABS Plastic	ABS Plastic		UV-inhibited Polymer	Die Cast Aluminum Alloy with anticorrosion alodine finish	UV Stabilized ABS Plastic w/ Aluminium backplane	UV stabilized ABS plastic	
Dimensions	ø0.5" x 16.3" Height	ø1.27" x 20" Height	ø1.4" x 45" Height	ø1.0 x 4.3" Height	ø1.75" x 3" Height	ø1.75" x 3" Height	4.5" x 4.5" x 1.5"	8.5"x8.5"x1"	22" x 3" x 4"	10.4in x 10.4in x 0.49in	15.4in x 15.4in x 1.7in	11.6" x 8.27" x 2.52"