Eyecom Antenna Product
Introduction
Company Introduction

History:
► 1996 - Eyecom New Zealand Ltd. was founded by Deltec New Zealand and its ex-employees
► 1999 - Set up the Eyecom Telecom Ltd. in Guangzhou, China to lower manufacturing costs
► 2003 - China factory expended, plays an important role in business development

What we do:

Design and Manufacturing of:
► Tower Top RF products:
  Base station antenna, RET and MDT, single to Multi-bands
  TMA, Lightning arrestors, RF feeder cables
► IRDN (DAS) products for PMR, Tetra and Cellular:
  Antennas, POI/Filters, RF/Optical Repeaters, power dividers
► Signaling and Control Products:
  Complete range of signaling and Safety products for Railway/Metro Tunnel and Confined area safety/ control/monitoring; RFID/GPS target global positioning
Sale and Service Offices
Technology Milestones

1996: World’s first 11 cellular systems POI (POI for HK CEC, Sino-UK handover ceremony Hall)
1997: Eyecom – introduces MB-DAS to APAC
1999: PMR/GSM Optical Repeater
2001: Cellular FSR
2001: Dual band dual pol EDT antenna
2002: Ultra high linearity Amplifier
2003: Ultra high dynamic range repeater
2003: Tetra Repeater
2005: Pilot Beacon generator for CDMA
2006: Remote RF Unit for CDMA and GSM
2007: High EDT (27 degree) BTS antenna
2008: Tetra FSR repeater/RFID
2008: Digital Optical repeater
2009: ICS repeater/Atex BDAs
2010: Optical multiband MCPA DAS Repeaters
2011: Digital Base station Hotel Solutions – cellular & DMR
2012: MIMO active DAS and MIMO Indoor Antenna & MIMO POI
2013: Broadband multi-system intelligent digital optical DAS system – dioDAS
2014: Improve version of DioDAS FPGA Engine for cellular and DMR
2015: Low PIM Smart Intelligence POI. Advanced Digital GSM-R OBDA
2016: Digital Full band all platform MRRU
2017: 4x4 MIMO MRRU, 8 bands MRRUs
> 25 years of innovations continues to deliver superior products.

Constantly challenged by customers to meet demanding requirements

Eyecom’s strengths:
- Complete flexibility and custom design approach
- Imagination, creativity and the care for the smallest detail
- Meet and better the customers requirements to future proof our designs

Our strengths have led us to being the customers “First Choice Supplier”

Patent invention certificates from Eyecom in BTS RET antenna dipole and phase shifter design.
“Customer Satisfaction” our foremost concern!

- We will not compromise on quality or reliability
- Production savings reinvested into improving quality and reliability
- New RF and radiating cable production facility provides full turnkey solution for our customers
- ISO 9001 Accreditation

Our quality and reliability will lead to us being the customers “First Choice Supplier”
Antenna Range

Model:

- 698-960MHz, 14, 16, 18dBi RET
- 1710-2690MHz 14, 16, 18dBi RET
- 698-960/1710-2690MHz, 14dBi/15dBi, 18dBi/18dBi RET
  Available in combination of
  HH, LH, LHH, LLHH, LHHHH 4 Ports, 6 ports, 8 Ports, 10 Ports
- 1710-2690/1710-2690MHz, 18dBi/18dBi RET
- 824-960MHz/1710-2170MHz 12dBi/14dBi, 14-29º RET for congested Urban high sites
Major Customers
**Eyecom Antenna Product**

**Performance:**

- Designed and manufactured in accordance to ISO9001 accreditation
- Robust single radome enclosure design
- 20 years experience in IMP control from antenna design to production
- Wide band design, Quad-band antenna in one single radome
- Excellent front-to-back and side lobe performance
- Patented technology, best Cross-Polar Ratio performance in the industry
Eyecom Antenna Product

Product Range

- Mechanical downtilt antenna
- Remote control and variable electrical downtilt antenna
- Single polarization and dual polarization antenna
- Omni antenna
- Large RET range antenna (14-27° RET range)
Eyecom Antenna Product

Frequency Range

Omni and sector single/dual-band antenna
- TETRA/iDEN, CDMA/GSM900, GSM1800, 3G, LTE, WiFi/WiMax

Tri-band antenna
- CDMA/GSM900 + 3G, + LTE
- GSM1800 + 3G+ LTE
- CDMA/GSM900 + DCS1800+ LTE

Quad-band antenna
- CDMA/GSM900 + DCS1800 + 3G+ LTE

WiFi/Wi-Max low profile antenna
- 2400-2700/5150-5875MHz
EyeCom Antenna Key Technical Strength

- Patented Dipole: excellent signal concentration, very low side coupling: superior performance in 4x4 to 6x6 MIMO antenna configuration
- Excellent Squint and wide band performance, good CPR figure@+/- 60°
- PCB dipole structure: stable isolation and VSWR in mass production, low PIM,
- Patented phase shifter: good 1st -3rd upper side lobe suppression in all EDT range
- EZ141 cable used: stable performance across all climate condition
Other Make Antenna Internal Structure

- **Phase cable Technology:** Air strip line – easily upset by Humidity/temp.
- **Consistency problem:** Moisture caused dielectric constant changed, pattern distorted
Improvement to RMS Delay Spread

- 10 degree EDT: $A_2 > A_1$
- 10 degree MDT: $A_2 = A_1$
Eyecom EDT Antenna Applications

- DT adjusted in minutes
- Control cable or AISG
Eyecom EDT Antenna Applications

- Antenna Wall mount
- Tower mount, no service platform needed
Real Time SO DT Adjustment

- Antenna EDT adjusted in road test vehicle—S.O. result can be verified in minutes, RF coverage problem fixed in one single trip
Eyecom EDT Antenna

Super performance: Pattern, matching and F/B

- Patented Phase Shifter Technology:

  All common model First Upper side lobe <17dBc, Adjacent sector antennas installed very close (10 cm) while still maintaining >30 dB isolation

30 cm Dia. Pole

10 cm, ISO=30-40dB

- Eyecom Antennas
  (Top View)
Beam Shaping Of Eyecom Antenna

- Eyecom BPA960-65-15D pattern
Beam Shaping Of Eyecom Antenna

- **Side Lobe consistency**: common problem of R/C EDT
- Special PS technology, enables side lobe suppression greater than 17 dB in every EDT

![Graphs showing beam shaping with BPA890-65S-16DRE pattern for 1 degree EDT, +45 and -45 degrees.](image)
Beam Shaping Of Eyecom Antenna

- BPA890-65S-16DRE pattern
  - 5.5 degree EDT, +45 degree

- BPA890-65S-16DRE pattern
  - 5.5 degree EDT, -45 degree
Beam Shaping Of Eyecom Antenna

BPA890-65S-16DRE pattern
10 degree EDT, +45 degree

BPA890-65S-16DRE pattern
10 degree EDT, -45 degree
Beam Shaping Of Eyecom Antenna

- **H-BW consistency**
- **Patented Dipole Design**: Wide band: 1710-2170MHz H-BW consistent

- BPA890-65S-16DRE pattern
  - 1 degree EDT

- BPA890-65S-16DRE pattern
  - 5.5 degree EDT
Beam Shaping Of Eyecom Antenna

- **Isolation and Cross Polar ratio**
- **Patented Dipole Design:**
  - Isolation >33 dB,
  - Cross Polar Ratio consistent: >25 dB in main +/- 30 degree
    >13 dB in main +/- 60 degree

- BPA890-65S-16DRE pattern
  - Cross Polar, 1 degree EDT

- BPA890-65S-16DRE pattern
  - Cross Polar, 10 degree EDT
Beam Shaping Of Eyecom Antenna

► **Super VSWR**: In every EDT, R/L>16 dB

► **Super Isolation**: Patented Dipole, Isolation>32 dB

- BPA890-65S-16DRE pattern
  R/L>20 dB, 1 degree EDT

- BPA890-65S-16DRE pattern
  ISO>45dB, 1 degree EDT
Eyecom Antenna Advantage

► UV stable:
  ➢ Fiber Glass Radom enclosure
  ➢ Eliminates water leakage problem

► Special design antenna brackets:
  ➢ Avoid problems of rust and broken which are common problems of most antennas

► Manufactured strictly according to NZ design:
  ➢ QC and Parts Sourcing : NZ team
  ➢ LOW IMD material are selected :
    ➢ Connector:
    ➢ PCB:
    ➢ Cable:
**Large Electrical Downtilt Range Antenna**

- **EDT range:** 14-27 degree;
- **Tri-band:** 824-960MHz/1710-2170MHz
- **Small in dimension:** 800mm length
- **Applications:** CBD/Urban high antenna sites (>50 meter)

### BAP890-1900-65S-12DRE-B

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td><strong>Frequency Range:</strong></td>
<td>806-960MHz/1710-2170MHz</td>
</tr>
<tr>
<td><strong>H-V beam width:</strong></td>
<td>H-65°; V-29°/18°</td>
</tr>
<tr>
<td><strong>Gain:</strong></td>
<td>12dBi/14dBi</td>
</tr>
<tr>
<td><strong>RET Range:</strong></td>
<td>14-27°</td>
</tr>
<tr>
<td><strong>Length:</strong></td>
<td>810mm</td>
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</tbody>
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### BAP1900-2500-65S-14DRE-B

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<tr>
<td><strong>Frequency Range:</strong></td>
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Large Electrical Downtilt Range Antenna

- **Better RF foot-print:**
  Antenna radiation pattern remains low distortion in high antenna BTS sites (50-100 meters)

- **Quad-Band:**
  CDMA800/GSM900+GSM1800+3G+LTE in one single radome

- **Small Size:** 810 mm in length

27° EDT in 50 meter height

10° EDT+17° MDT in 50 meter height
Eyecom TMA Products

- **Robust Structure:**
  - Solid metal structure, LNA housed inside filter reduce NF and Insertion Loss
  - DL Bypass Loss: <0.6 dB

- **Ultra Low NF Figure:**
  - The best in the class Patent Pending low noise amplifier circuitry assures the top NF performance in the class: NF<1.5 dB (typ.1.3 dB)

- **Variable Gain from 7-12 dB**
  - The only version in this class, gain can be remotely adjusted from shelter, RSSI is easily reduced within range
  - TMA Gain Adjustment: a must to system optimization