
BreezeMAX 2300/2500/3500 TDD Technical Specification

Technical Specifications for:

BreezeMAX 2300

BreezeMAX 2500

BreezeMAX 3500

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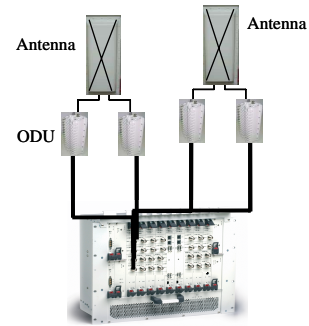
Scope

This document details the system specifications for the BreezeMAX 2300, BreezeMAX 2500 and the BreezeMAX 3500 TDD products, under release 1.0 (software version 4.02) – beta version.

Please note that all specifications are subject to changes.

Architecture

Parameter	Value
Base Station	<p><u>Macro BST:</u></p> <ul style="list-style-type: none"> • Up to 7 AU-IDUs • 4 I/F ports per AU-IDU <p>Outdoor radio (ODU):</p> <ul style="list-style-type: none"> • 2nd or 4th order radio diversity • 1, 2 or 4 ODUs per AU-IDU <p>Antenna Options:</p> <ul style="list-style-type: none"> • Dual polarization antenna • Single polarization antenna <p>Note:</p> <ul style="list-style-type: none"> • Two Dual Polarization antenna are used by 4 radio units to provide 4th order diversity • Two Single Polarization antenna are used by 2 radio units to provide 2nd order diversity
	<p><u>Opetaion mode:</u></p> <p>Downlink</p> <ul style="list-style-type: none"> • 2 branch STC (Space Time Coding) • 2 branch polarization diversity • 3dB power gain • 12dB diversity gain in 4th order diversity (9dB in 2nd order) <p>Uplink</p> <ul style="list-style-type: none"> • 4 Channels MRC (Maximum Ratio Combining) diversity • 3dB power gain



Parameter	Value
Other Base Station Shelf components	<p><u>Network Processing Unit:</u> NPU: 1 per shelf *</p> <p><u>Power:</u> PIU: 1 + 1, for redundancy PSU: 1 to 4, according to load, with n+1 redundancy</p> <p>* Shelf is designed to host 2 NPUs for future implementation of 1+ 1 redundancy.</p>
GPS	<p><u>Global Positioning System:</u> 1 per base station for intercell and intracell synchronization</p>
CPE	<p><u>Outdoor Unit:</u></p> <ul style="list-style-type: none"> • Compact ODU with integrated antenna. • Optional external antenna <p><u>Indoor units:</u> (Operating in conjunction with an Indoor Unit)</p> <ul style="list-style-type: none"> • Data • Residential GW • Networking GW <p><u>Self Install Unit</u></p> <ul style="list-style-type: none"> • Stand alone device with 6 integrated antennas • Optional external window antenna <p><u>Operation mode:</u></p> <ul style="list-style-type: none"> • 6 Elements steering Antenna with Rapid Antenna Selection • 4dB Fade Margin gain • Uplink OFDMA sub channelization <ul style="list-style-type: none"> ○ Up to 16 sub channels (12dB gain)



Radio & Modem

General Parameters (2.x & 3.5GHz)

Parameter	Value
Frequency (2.x)	<u>Base Station & CPE:</u> 2.3GHz WCS: 2305-2317,2348-2360MHz (A&B pairs). 2.3GHz ROW: 2300-2360MHz 2.5 Band A: 2496-2602MHz 2.5 Band B: 2590-2690MHz
Frequency (3.5)	<u>Base Station & CPE:</u> 3.4A: 3399.5 - 3455MHz 3.4B: 3445 - 3500MHz 3.5A: 3500 - 3555MHz 3.5B: 3545 - 3600MHz
Radio Access Method	TDD
Standard Compliance	Radio – FCC Part 27 Safety – IEC 60 950 US/C
Channel bandwidth	3.5MHz; 5MHz – software selectable
Duplexing Technologies	TDD
Central frequency resolution	125KHz
Antenna (2.x)	BMAX PRO-S CPE: Integrated (2.3GHz) – 13dbi , Integrated (2.5GHz) – 14dbi. Si CPE: integrated 7dbi , Window – 11.5dbi. BST (V&DS) : 60-16.5 dbi, 90-15.5 dbi, 120-14dbi.
Antenna (3.5)	BMAX PRO-S CPE : Integrated (3.5GHz) – 17dbi , Si CPE: integrated 9dbi , Window – 11dbi. BST (V &DS) : 60-16.5 dbi, 90-15.5 dbi, 120-14dbi.
CPE Antenna Port	N-type, 50 ohm
No. FFT points	256 DL - 208 sub-carriers for 3.5MHz / 5Mhz channels UL - 200 sub-carriers for 3.5MHz / 5MHz channels
FEC	Convolutional encoder, Viterbi decoder, coding rates: 3/4, 2/3, 1/2
Maximum Output power –2x (At antenna port)	AU: 36dBm SU: 19dBm SU SI 2.3 : 23dBm SU SI 2.5 : 24dBm
Maximum Output power –3.5 (At antenna port)	AU: 24- 34dBm SU: 19dBm SU SI 3.5 : 22dBm

ATPC Dynamic Range	DL: Manually SNMP based UL: automatic Power control range: SU: 45 dB; AU: 6dB	
Multi bit Rate	<u>5MHz:</u> BFSK 1/2: 1.9152Mbps QPSK 1/2: 3.8304Mbps QPSK 3/4: 5.7456Mbps QAM16 1/2: 7.6608Mbps QAM16 3/4: 11.4912Mbps QAM64 2/3: 15.3216Mbps QAM64 3/4: 17.2368 Mbps	<u>3.5MHz:</u> BFSK 1/2: 1.4016Mbps QPSK 1/2: 2.8032Mbps QPSK 3/4: 4.2048Mbps QAM16 1/2: 5.6064Mbps QAM16 3/4: 8.4096Mbps QAM64 2/3: 11.2128Mbps QAM64 3/4: 12.6144 Mbps

Networking

Services	Macro BST
Max number of service pipes per BST	4095
Min number of data connections per Service Pipe	2 (1 uplink, 1 downlink)
Max number of data connections per Service Pipe	8 (4 uplink, 4 downlink)
Max number of data connections per SU	126
Max number of data connections per AU	3999
Max number of SUs per AU	510
Max number of Sus per BST	2000
Max number of Aus per BST	7
Max number of MAC addresses in bridging table	NPU: 6000 (configurable aging time, default 10 minutes) SU: 512 (aging time 3 minutes)
Max number of VLANs per Service Pipe	16
Max number of VLANs per BST	1024
Max number of concurrent calls per voice service	10
Max number of MAC Addresses forwarded by SU	512

Data Communications

Data	IEEE 802.3 CSMA/CD
Maximum Packet Size (including 4 CRC bytes)	1550 Bytes
VLAN support	IEEE 802.1Q
Traffic Classification	Layer 2 IEEE 802.1p, IP DiffServ Code Points DCSP
Traffic Prioritization	IEEE 802.16a QoS air interface

Indoor to Outdoor Communications

Subscriber unit

Cable Type	Category 5E, Outdoor Data Cable, Double Jacket, 4x2x24# FTP
Maximum Length	100 meter

Base station

IF Frequency	Tx- 240MHz, Rx - 140MHz
Ref Synchronization Frequency	64MHz
Bi-Directional Control Frequency	14MHz
IF cable Impedance	50 ohm
Maximum IF cable Attenuation (Include MUX loss)	10dB @ 240MHz 7.5dB @ 140MHz 8dB @ 64MHz
Maximum IF cable DC Resistance	1.5 ohm
Recommended IF cable	Double Shielded (Shielding effectiveness 90dB)

Interfaces

Interface	Indoor Unit	Outdoor Unit
IF	TNC jack, lightning protected	TNC jack, lightning protected
External ANT	SMA(F)	N-Type jack, lightning protected
Data, Voice, Management	<u>NPU:</u> Data: 100/1000Base-T (RJ-45) <u>CPE:</u> Data: 10/100Base-T (RJ-45) Voice: POTS (RJ11)	<u>CPE:</u> 10/100Base-T (RJ-45)
Management (out of band)	<u>NPU</u> : 10/100Base-T (RJ-45)	
GPS	<u>NPU:</u> 15-pin mini DIN	
Time Base Synchronization	<u>NPU:</u> 15-pin mini DIN	
External Alarm Input	<u>NPU</u> 9-pin mini DIN	
Alarm Output	<u>NPU</u> : 9-pin mini DIN	
Power	<u>BS-PS:</u> D-Type 3 Power pin male <u>CPE all types:</u> AC standard 3 pin cable	48 VDC from indoor unit: BST via the IF cable CPE via CAT5 cable

Electrical

Subscriber Unit

Unit	Details
Power Consumption –2.xGHz (IDU+ODU)	BMAX PRO-S CPE: 25W , Self Install CPE: 12.5 W
Power Consumption –3.5GHz (IDU+ODU)	BMAX PRO-S CPE: 22W , Self Install CPE: 12.5 W
CPE-IDU Power Input	100-240 VAC, 47-63 Hz
CPE-ODU Power Input	54 VDC from the IDU over the indoor-outdoor Ethernet cable

Modular (Macro) Base Station Equipment

Unit	Details
Power Source	-40.5 to -60 VDC
PIU	16W maximum
PSU	200W maximum output power Efficiency: 75% minimum, 80% typical
NPU	65W maximum, 44W typical
GPS + GPS Adaption box	7.2W maximum (1.2w on Adaption box)
AU-IDU	46W maximum, 29W typical
AU-ODU-2x	82W maximum, 75W typical
AU-ODU-3.5	50W maximum, 43W typical
AVU	40W maximum, 23W typical
Outdoor CPE-2x	22W maximum
Outdoor CPE-3.5	22W maximum
Indoor CPE-2.x\3.5GHz	12.5W maximum

Mechanical

Product	Dimensions (cm)	Weight (kg)
Macro base station shelf	8U x 43.19 x 24	6.9 (excluding AVU)
Air Ventilation Unit (fan tray)	2U x 84HP x 16	1.7
Power interface module	3U x 5HP x 16	0.35
Power supply module	3U x 8HP x 16	0.7
Network processing module	6U x 7HP x 16	0.7
Access Unit indoor module	6U x 7HP x 16.	0.6
AU ODU – All types	32.9 x 15.7 x 20.9	8.6
Broadband data bridge indoor module	16 x 3.2 x 6	0.3
Networking gateway CPE indoor module	11.1 x 2.6 x 19	0.6
Voice Gateway	17.6 x 11 x 2.8	0.23
Si CPE	15x15x5	1.0
CPE PRO outdoor radio unit with integrated antenna	21x21x5.4	1.4

* 1U=44.45 mm (1.75")

** 1HP=5.08 mm (0.2")

Environmental

	Indoor Unit	Outdoor Unit
Operating Temperature	0 ^o C to 40 ^o C	-40 ^o C to 55 ^o C
Operating Humidity	5%-95% non condensing	5%-95% non condensing, weather protected

Standard Compliance (RoHS comply)

Type	Standard
EMC	ETSI EN 301 489-1
Safety	EN60950 (CE), CB IEC 60950 US/C (TUV)
Lightning protection (Antenna and IF connections)	EN 61000-4-5, Class 3 (2kV)
Environmental	ETS 300 019 Part 2-1 T 1.2 & part 2-2 T 2.3 for indoor & outdoor Part 2-3 T 3.2 for indoor Part 2-4 T 4.1E for outdoor
Radio	FCC part 27
MTBF	Bellcore SR332 Issue 1

MTBF

Product	Part Number	Description	MTBF
Base Station			
BMAX-BST-SH	735201	Base Station Shelf. Includes air ventilation unit (AVU)	756,600 (MTBCF)
BMAX-BST-PSU	735203	Base Station Power Supply Unit	704,733
BMAX-BST-NPU	735204	Network Processor Unit	212,213
BMAX-BST-PIU	735205	Base Station Power Interface Unit	1,579,428
BMAX-BST-AVU	735202	Base Station Air Ventilation Unit	756,600 (MTBCF)
BMAX-BST-AU-ODU-HP-2.3	723200	BreezeMAX Base Station High Power Outdoor Radio Unit - for 2.3GHz band.	157133
BMAX-BST-AU-ODU-2.3-WCS	723201	BreezeMAX Base Station High Power Outdoor Radio Unit, for 2.3Ghz band - with a special (WCS) internal filter.	157133
BMAX-BST-AU-ODU-3.4\3.5-HP Band A/B	735510\11\12\13	Base Station Outdoor Radio Unit HP	157,133
BMAX-BST-PWR-FEED	735216	Single Power Feeder. Includes one DC power cable and four IF cables length 0.5m	1,017,000
BMAX-GPS-IGA	723203	Indoor GPS Adaptor unit. Interfaces between the outdoor GPS and an NPU	937,133
BMAX-BST-AU-IDU-2.X-4CH	723202	BreezeMAX 2.X Base Station Access Unit interface module for (4channels)	117,755
CPE			
BMAX-CPE-Si-E-2.3	723100-xx	BreezeMAX Si indoor CPE for use in the band: 2,300 - 2,360 MHz. With one 10/100 Base-T Port.	400,593
BMAX-CPE-SI	735150	Subscriber SI CPE Indoor Radio Unit	400,593
BMAX-CPE-IDU-NG-4D1W	735106	Networking Gateway Indoor module with four 10/100 Base-T Ports + 802.11g wireless interface	
ALVR-VG-1D1V	735401/ 735403	Voice Gateway Indoor module with one 10/100 Base-T Data Port + one RJ11 POTS Port (H.323 or SIP P/N).	> 300,000
ALVR-VG-1D2V	735402/ 735404	Voice Gateway (H.323) Indoor module with one 10/100 Base-T Data Port + two RJ11 POTS Port (H.323 or SIP P/N).	> 300,000
BMAX-CPE-ODU-PRO-SA-2.3	723104	BreezeMAX CPE Pro Outdoor Radio Unit - 2,300 - 2,360 MHz, with Integrated Antenna.	282,611
BMAX-CPE-ODU-PRO-S	735120/1	Subscriber PRO S CPE Outdoor Radio Unit	299,454

Networking Gateway CPE

General Features	
Routing	Static Route, Dynamic Route (RIP1/2)
Firewall	NAT Firewall with SPI mode
NAT Functionality	NAT, Virtual Server, Special Application DMZ Host
VPN	IPSec, PPTP & LT2P Pass-Through
DHCP	DHCP server for LAN and WLAN clients. DHCP client for WAN
Wireless Features	
Standard	IEEE 802.11b / 802.11g
Data Rates	6/12/18/24/36/48/54Mbps in 802.11g mode 1/2/5.5/11Mbps in 802.11b mode
Operating Frequency	2.4GHz
Range Coverage	Indoors - approx. 35-100 meters
Number of Channels	America/ FCC: 2.412~2.462GHz (11 Channels) Japan/ TELEC: 2.412~2.484GHz (14 Channels) Europe/ ETSI: 2.412~2.472GHz (13 Channels)
Security	WEP encryption – 64 Bit, 128 Bit

Voice Gateway CPE

Interfaces	
Ethernet LAN	1 10/100 Base-TX RJ45 connectors
Telephony	1 or 2 RJ11 connectors for analog telephones
Ethernet WAN (copper)	10/100 Base-TX RJ45 connector
Security	
VLAN	Separates data, management and telephone traffic
PPPoE	
Authentication per call	H235
Telephony and fax services	
VoIP Protocol	H.323, SIP
Internal Class 5 services	Call Waiting, 3-party call, call alteration, differentiated ringing tones
External Class 5 services	Activation of class 5 services supported by the IP-telephony system
G3 Fax	T.38
Calling number identification	FSK, DTMF
3rd party initiated pause and rerouting	External rerouting of media stream during speech, e.g. for pre-paid calling card and record announcement
DTMF	In-band and out-band using H245 and H225 bi-directional
QoS for real-time services	
Speech Codecs	G711, G729ab
DiffServ	Level 3 (IP) mechanism for handling QoS
Class of Service	Level 2 (Ethernet) mechanism for handling QoS
General	Adaptive Jitter buffer, echo cancellation, speech sampling 10-60 ms, silence suppression with comfort noise.
Flexibility & Service differentiation	
Daisy chaining	Up to 3 DRG units can be connected in series by daisy chain
Number of telephones	Up to 5 analog telephones can be connected in series to each telephone port
Regional Settings Properties	Telephony signals, tones and cadences
Router	
NAT	
Protocols and Standards	
Complies with the following standards	IPv4, TCP, UDP, RTP, DHCP, RTCP, SNMP, IEEE 802.1D, IEEE 802.1Q, IEEE 802.1P, IEEE 802.2, IEEE 802.3, ICMP, HTTP, TFTP, NTP, H323v2/4, SIP (RFC3261), G.711, G.729ab, G.723.1, G.165, G.167, G.168, G3, FSK, DTMF