MobileAccess2000 TSX and QSX

A Corning MobileAccess Solutions Product

features and benefits |

Multi-operator optimized platform	Designed to accommodate multiple operator requirements separately, yet cost-effectively across one common infrastructure. Preassembled modular service packs improve neutral host ROI for the first carrier in, as well as the second and third.
Multiservice platform	Accommodates virtually any mix of wireless services, eliminating the need for separate cabled networks for each. Services include: GSM, CELL, PCS, iDEN, LMR, SMR, Public Safety, AWS, 700 MHz LTE, Paging, UMTS, DCS, WMTS and more.
Modular design	The MobileAccess2000 platform enables seamless service upgrades with the addition of a conditioning card in the headend and self-contained service packs in IDF/Telco/IT closets at remote ends.
Scalable media and MIMO upgrades	Additional services leverage the existing coaxial cabling and antenna grid without disrupting work spaces or existing services. Fiber links extend a single capacity source across multiple buildings in campus environments. Multi-MIMO upgrades are simple with modular elements.
Operator-grade management	Built-in signal grooming and an element management system (EMS) offer end-to-end visibility and proactive alarming, ideal for large-scale, multi-operator environments.

The MobileAccess2000 (MA2000) platform provides operator-grade indoor coverage for a wide range of 2G, 3G and 4G mobile voice and data services, over a single broadband architecture.

The MobileAccess2000 platform is the leading multi-operator, multiservice platform, which delivers multiple radio frequency (RF) services over one common and cost-effective cabling and antenna infrastructure for a complete solution.

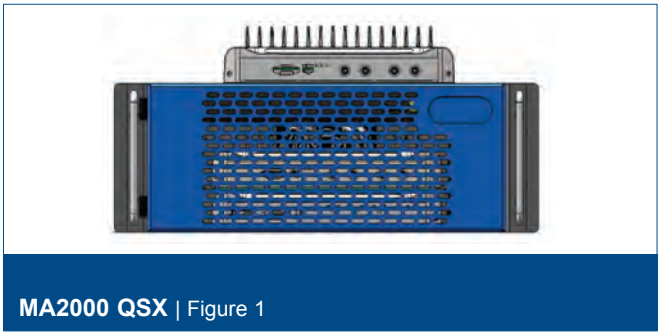
Operator RF services are bi-directionally transmitted (uplink/downlink) between an operator's capacity source (BTS/BDA) at the infrastructure headend and then distributed to/from remote locations and multiple buildings, using low-loss fiber and coaxial cabling media.

Other converged options include WMTS, and the MobileAccess2000 platform offers MIMO (multi-input/multi-output) capabilities.

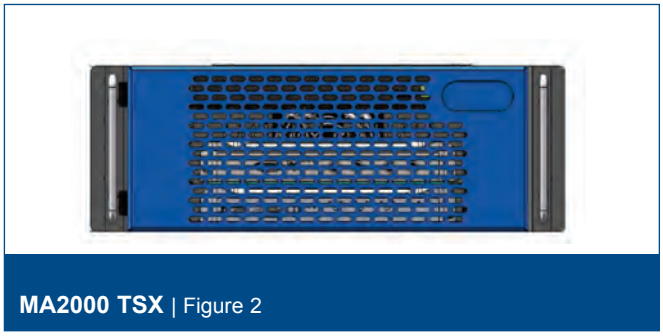
Deployment Options

- **MA2000 TSX**: Supports three RF services over a common fiber/coax antenna infrastructure
- **MA2000 QSX**: Supports four RF services over a common fiber/coax antenna infrastructure

Multiple MA2000 TSX/QSX units can be combined to provide a full multiservice solution over a common fiber/coax antenna infrastructure.



MA2000 QSX | Figure 1



MA2000 TSX | Figure 2

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MobileAccess2000 System Architecture

The MobileAccess2000 solution is comprised of the following elements. Third-party equipment is sold separately (i.e. cabling, antennas).

Headend Equipment

Radio Interface Unit (RIU): The RIU conditions the RF downlink (DL) signals from an operator's signal source base transceiver stations (BTS) or bi-directional amplifiers (BDA) located inside the building. The RIU then custom tunes incoming signals in order to ensure a constant level of RF before signals are passed to/from the base unit. RF uplink (UL) signals from subscribers' phones are received from the base unit and transported back to the operator's signal source (BTS or BDA) and to the operator's macro network outdoors.

Base Unit (BU): The BU converts RF downlink (DL) signals received from the RIU into an optical signal. This optical signal is then transported over single-mode or multimode fiber optic cabling (SMF/MMF) to/from the MobileAccess2000 TSX units, which are housed within IDF/Telco/IT closets at the remote-end locations, for distribution throughout the facility. UL signals from subscribers' phones are received from the antennas and sent back to the TSX units through the fiber connection to the headend, where they are converted back from RF optical to RF electrical before being passed on to the RIU.

System Controller (SC-450): The system controller enables centralized remote management and control of all MobileAccess2000 elements.

Remote-End Equipment

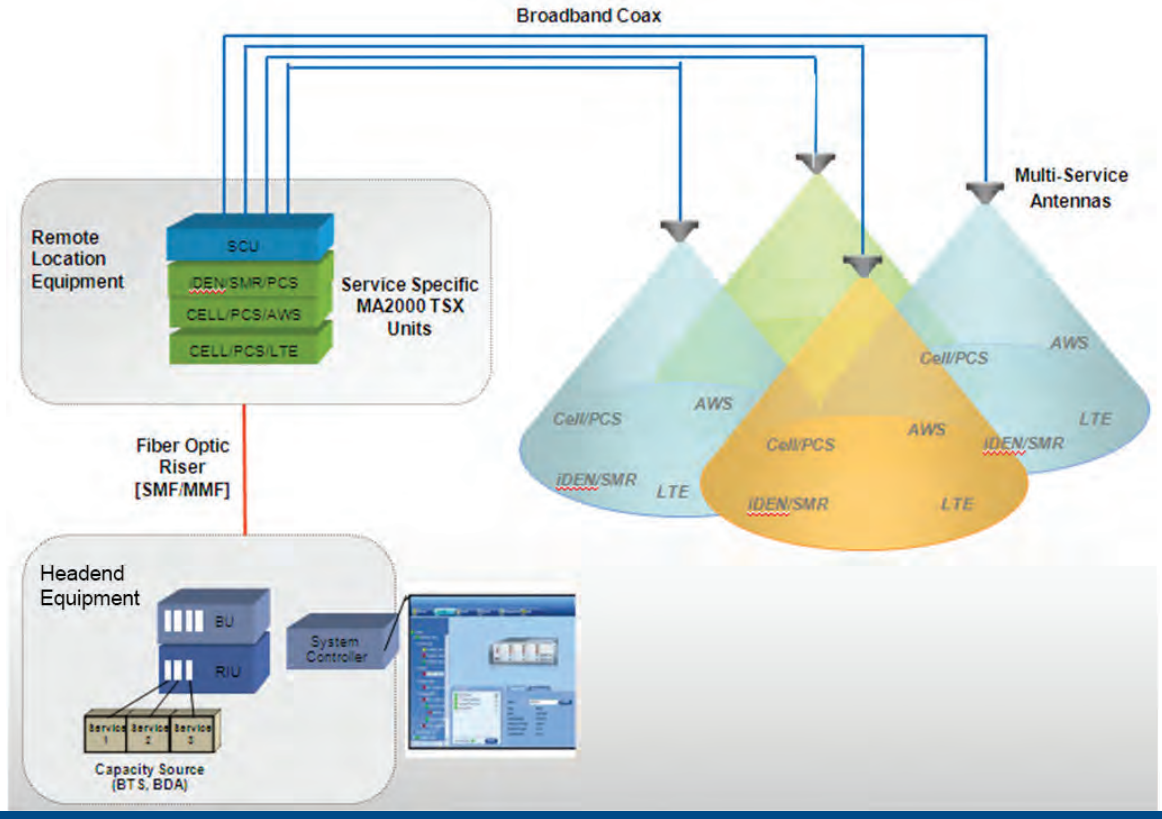
Service Combiner Unit (SCU): The Service Combiner Unit is a passive module that combines and distributes the UL and DL signals from all of the MA2000 TSX and/or QSX systems to the broadband antenna.

MobileAccess2000 TSX: The MA2000 TSX delivers coverage for three RF services over a common fiber/coax antenna infrastructure. The output of multiple TSX units can be combined to provide a full multiservice solution over a common fiber/coax antenna infrastructure. The TSX comes prepackaged with applicable filters and other required accessories to simplify the ability to order, service and install this solution. The sub-components of the TSX are as follows:

- **Remote Hub Unit (RHU):** The RHU is a services-specific module that performs RF-optical-to-RF-electrical conversion on signals received from the BU. Signals are automatically filtered and amplified for transport over broadband coax cable to a passive antenna. UL signals from the antennas are then converted to optical signals before being transmitted back to the BU. Each pre-configured RHU supports up to two services.
- **Add-On Module (AO):** The AO is a single-service module coupled with an RHU to deliver an additional, third service at a lower incremental cost. The AO receives RF signal from the RHU and amplifies it for transport across the broadband coax.

MobileAccess2000 QSX: The MA2000 QSX delivers coverage for four RF services (CELL, PCS, 700 LTE and AWS) over a common fiber/coax antenna infrastructure. The output of multiple QSX and TSX units can be combined to provide a full multiservice solution over a common fiber/coax antenna infrastructure. The QSX comes prepackaged with applicable filters and other required accessories to simplify the ability to order, service and install this solution. The sub-components of the QSX are equivalent to that of the TSX with an additional AO.

specifications |



Example MA2000 TSX System Architecture | Figure 3

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

700/800 Public Safety		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	763-775 851-869	793-805 806-824
Max Output Power Per Antenna Port 1 (Composite)	14	
2 Carriers	11	
4 Carriers	8	
8 Carriers	5	
12 Carriers	2	
Mean Gain (dB)[1]	14	7
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-6
Input IP3 (dBm) AGC ON Min		6
SFDR[2] (dB)		
Max Intermodulation Distortion (dBm)		
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

CELL TDMA/CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	869-894	824-849
Max Output Power Per Antenna Port 1 (Composite)	16	
2 Carriers	13	
4 Carriers	10	
8 Carriers	7	
12 Carriers	5	
Mean Gain (dB)[1]	16	7
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-5
Input IP3 (dBm) AGC ON Min		5
SFDR[2] (dB)		71
Max Intermodulation Distortion (dBm)	-13*	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

SCU-8

700/800 Public Safety		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	763-775 851-869	793-805 806-824
Max Output Power Per Antenna Port 1 (Composite)	10	
2 Carriers	7	
4 Carriers	4	
8 Carriers	1	
12 Carriers	-1	
Mean Gain (dB)[1]	10	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-2
Input IP3 (dBm) AGC ON Min		10
SFDR[2] (dB)		
Max Intermodulation Distortion (dBm)		
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

CELL TDMA/CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	869-894	824-849
Max Output Power Per Antenna Port 1 (Composite)	12	
2 Carriers	9	
4 Carriers	6	
8 Carriers	3	
12 Carriers	1	
Mean Gain (dB)[1]	12	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-1
Input IP3 (dBm) AGC ON Min		9
SFDR[2] (dB)		71
Max Intermodulation Distortion (dBm)	-13*	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

* WCDMA complies with 3GPP TS 25.106 V5.0.0 (2002-03) table 9.4 spectrum emission mask.
[1]Factory set mean gain BU-SCU without RIU. BU is in "Passive/Other RF source" mode. Gain may be field adjusted using controller system. Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain flatness/ripple is specified for the non-duplexed port of the system. Overall system typical values.

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

SMR 800[6]		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	851-869	806-824
Max Output Power Per Antenna Port 1 (Composite)	14	
2 Carriers	11	
4 Carriers	8	
8 Carriers	5	
12 Carriers	3	
Mean Gain (dB)[1]	14	7
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-5
Input IP3 (dBm) AGC ON Min		5
SFDR[2] (dB)		72
Max Intermodulation Distortion (dBm)	-13	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-1.0	

GSM/E-GSM		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	935-960 925-960	890-915 880-915
Max Output Power Per Antenna Port 1 (Composite)	12	
2 Carriers	9	
4 Carriers	6	
8 Carriers	3	
12 Carriers	1	
Mean Gain (dB)[1]	12	7
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-5
Input IP3 (dBm) AGC ON Min		5
SFDR[2] (dB)		64
Max Intermodulation Distortion (dBm)	-36	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

SCU-8

SMR 800[6]		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	851-869	806-824
Max Output Power Per Antenna Port 1 (Composite)	10	
2 Carriers	7	
4 Carriers	4	
8 Carriers	1	
12 Carriers	-1	
Mean Gain (dB)[1]	10	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-1
Input IP3 (dBm) AGC ON Min		9
SFDR[2] (dB)		72
Max Intermodulation Distortion (dBm)	-13	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-1.0	

GSM/E-GSM		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	935-960 925-960	890-915 880-915
Max Output Power Per Antenna Port 1 (Composite)	8	
2 Carriers	3	
4 Carriers	0	
8 Carriers	-3	
12 Carriers	-5	
Mean Gain (dB)[1]	8	
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-1
Input IP3 (dBm) AGC ON Min		9
SFDR[2] (dB)		64
Max Intermodulation Distortion (dBm)	-36	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

[1]Factory set mean gain BU-SCU without RIU. BU is in "Passive/Other RF source" mode. Gain may be field adjusted using controller system. Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain flatness/ripple is specified for the non-duplexed port of the system. Overall system typical values. The typical ripples in iDEN/SMR are +/-1 dB.
[6]The SMR 800/900 for Sprint are to be designed, per Sprint guidelines, with composite power levels per antenna port and mean gain values 3 dB less than stated.

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

SMR 900[6]		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	929-941	896-902
Max Output Power Per Antenna Port 1 (Composite)	14	
2 Carriers	11	
4 Carriers	8	
8 Carriers	5	
12 Carriers	3	
Mean Gain (dB)[1]	14	7
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-5
Input IP3 (dBm) AGC ON Min		5
SFDR[2] (dB)		71
Max Intermodulation Distortion (dBm)	-13	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-1.0	

DCS		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1805-1880	1710-1785
Max Output Power Per Antenna Port 1 (Composite)	14	
2 Carriers	11	
4 Carriers	8	
8 Carriers	5	
12 Carriers	3	
Mean Gain (dB)[1]	14	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-6
Input IP3 (dBm) AGC ON Min		3
SFDR[2] (dB)		64
Max Intermod Distortion (dBm)	-30	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

SCU-8

SMR 900[6]		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	929-941	896-902
Max Output Power Per Antenna Port 1 (Composite)	10	
2 Carriers	7	
4 Carriers	4	
8 Carriers	1	
12 Carriers	-1	
Mean Gain (dB)[1]	10	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-1
Input IP3 (dBm) AGC ON Min		9
SFDR[2] (dB)		71
Max Intermodulation Distortion (dBm)	-13	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-1.0	

DCS		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1805-1880	1710-1785
Max Output Power Per Antenna Port 1 (Composite)	10	
2 Carriers	7	
4 Carriers	4	
8 Carriers	1	
12 Carriers	-1	
Mean Gain (dB)[1]	10	-1
Pin (dBm)[1]		0
Input IP3 (dBm) AGC OFF Min		-1
Input IP3 (dBm) AGC ON Min		9
SFDR[2] (dB)		64
Max Intermod Distortion (dBm)	-30	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

[1]Factory set mean gain BU-SCU without RIU. BU is in "Passive/Other RF source" mode. Gain may be field adjusted using controller system. Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain flatness/ripple is specified for the non-duplexed port of the system. Overall system typical values. The typical ripples in iDEN/SMR are +/-1 dB.
[6]The SMR 800/900 for Sprint are to be designed, per Sprint guidelines, with composite power levels per antenna port and mean gain values 3 dB less than stated.

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

PCS[4] GSM/TDMA/CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	20	
2 Carriers	17	
4 Carriers	14	
8 Carriers	11	
12 Carriers	9	
Mean Gain (dB)[1]	20	3
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-6
Input IP3 (dBm) AGC ON Min		3
SFDR[2] (dB)		64
Max Intermodulation Distortion (dBm)	-13*	
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

700 MHz LTE		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	728-757	698-716 777-787
Max Output Power Per Antenna Port 1 (Composite)	21	
2 Carriers	18	
4 Carriers	15	
8 Carriers		
12 Carriers		
Mean Gain (dB)[1]	21	4
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	**	
Input IP3 (dBm)		-10
SFDR (dBm)[2]		55
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-1.0	

SCU-8

PCS[4] GSM/TDMA/CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	16	
2 Carriers	13	
4 Carriers	10	
8 Carriers	7	
12 Carriers	5	
Mean Gain (dB)[1]	16	-1
Pin (dBm)[1]	0	
Input IP3 (dBm) AGC OFF Min		-2
Input IP3 (dBm) AGC ON Min		7
SFDR[2] (dB)		64
Max Intermodulation Distortion (dBm)	-13*	
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

700 MHz LTE		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	728-757	698-716 777-787
Max Output Power Per Antenna Port 1 (Composite)	17	
2 Carriers	14	
4 Carriers	11	
8 Carriers		
12 Carriers		
Mean Gain (dB)[1]	17	0
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	**	
Input IP3 (dBm)		-6
SFDR (dBm)[2]		55
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-1.0	

* WCDMA complies with 3GPP TS 25.106 V5.0.0 (2002-03) table 9.4 spectrum emission mask.
** Out of band and spurious emissions compliant to FCC.
[1]Factory set mean gain BU-SCU without RIU. BU is in 'Passive/Other RF source' mode. Gain may be field adjusted using controller system.Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain Flatness/Ripple is specified for the non-duplexed port of the system. Overall system typical values.
[4]The PCS service RF specifications outlined is relevant only for the MA2000 CELL/PCS TSX, MA2000 CELL/PCS/700 LTE TSX, MA2000 CELL/PCS/AWS TSX and MA2000 CELL/PCS/700 LTE/AWS QSX

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

PCS[5] CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	20	
2 Carriers	17	
4 Carriers	14	
8 Carriers	11	
12 Carriers	9	
Mean Gain (dB)[1]	20	3
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	-13*	
Input IP3 (dBm)		-7
SFDR (dBm)[2]		66
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]	+/-2.0	

PCS[5] GSM/TDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	21	
2 Carriers	18	
4 Carriers	15	
8 Carriers	12	
12 Carriers	10	
Mean Gain (dB)[1]	20	3
Pin (dBm)[1]	1	
Max Intermodulation Distortion (dBm)	-13	
Input IP3 (dBm)		-7
SFDR (dBm)[2]		64
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]		

SCU-8

PCS[5] CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	16	
2 Carriers	13	
4 Carriers	10	
8 Carriers	7	
12 Carriers		
Mean Gain (dB)[1]	16	-1
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	-13*	
Input IP3 (dBm)		-3
SFDR (dBm)[2]		66
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

PCS[5] GSM/TDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	1930-1995	1850-1915
Max Output Power Per Antenna Port 1 (Composite)	17	
2 Carriers	14	
4 Carriers	11	
8 Carriers	8	
12 Carriers	6	
Mean Gain (dB)[1]	17	-1
Pin (dBm)[1]	1	
Max Intermodulation Distortion (dBm)	-13	
Input IP3 (dBm)		-3
SFDR (dBm)[2]		64
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

* WCDMA complies with 3GPP TS 25.106 V5.0.0 (2002-03) table 9.4 spectrum emission mask.
[1]Factory set mean gain BU-SCU without RIU. BU is in "Passive/Other RF source" mode. Gain may be field adjusted using controller system. Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain Flatness/Ripple is specified for the non-duplexed port of the system. Overall system typical values.

specifications | (continued)

RF Parameters per Service at Antenna Port of 4-Port and 8-Port Service Combiner Unit

The RF Parameters listed in the tables in this section reflect the specifications with respect to the antenna ports of the SCU-4 and SCU-8 of the MobileAccess2000 TSX/QSX. *Note: Max = Maximum; Min = Minimum.*

SCU-4

UMTS 2100 & AWS CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	2110-2170	1920-1980
Max Output Power Per Antenna Port		
1 (Composite)	21	
2 Carriers	18	
4 Carriers	15	
8 Carriers	12	
12 Carriers	10	
Mean Gain (dB)[1]	21	3
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	*	
Input IP3 (dBm)		-7
SFDR (dBm)[2]		66
Max NF (dB)		20
Gain Flatness/Ripple (dB)[3]		

SCU-8

UMTS 2100 & AWS CDMA/WCDMA		
RF Parameter	**DL**	**UL**
Frequency Range (MHz)	2110-2170	1920-1980
Max Output Power Per Antenna Port		
1 (Composite)	17	
2 Carriers	14	
4 Carriers	11	
8 Carriers	8	
12 Carriers		
Mean Gain (dB)[1]	17	-1
Pin (dBm)[1]	0	
Max Intermodulation Distortion (dBm)	*	
Input IP3 (dBm)		-3
SFDR (dBm)[2]		66
Max NF (dB)		24
Gain Flatness/Ripple (dB)[3]	+/-2.0	

* WCDMA complies with 3GPP TS 25.106 V5.0.0 (2002-03) table 9.4 spectrum emission mask.
[1]Factory set mean gain BU-SCU without RIU. BU is in "Passive/Other RF source" mode. Gain may be field adjusted using controller system. Pin fed into BU.
[2]SFDR for CDMA services is calculated in 100 KB/sec.
[3]Gain Flatness/Ripple is specified for the non-duplexed port of the system. Overall system typical values.

Absolute Maximum Rating

Total Input RF Power to BU	10 dBm
Total Input RF Power to RHU	20 dBm out-of-band; -10 dBm in-band
Power Supply	60 VDC

Optical

Optical Output Power	< 3.0 mW
Maximum Optical Budget	2 dB for fiber + 1 dB for connectors (assumed) = 3 dB total. 300 m multimode

specifications | (continued)

Optical

Optical Loss per Mated-pair Connectors	0.5 dB (maximum)
Fiber Type	• Single-mode: 9/125 µm • Multimode: 50/125 µm or 62.5/125 µm (Minimum qualifications with ANSI/TIA/EIA-568-B series, EN50173-1 or ISO/IEC 11801)
Wavelength	1310 ± 10nm
Maximum Distance Between Base Unit and Remote Cabinet	2 km

Temperature

Operating	0° to +50°C (32° to 122°F)
Storage	-20° to 85°C (-4° to 185°F)

specifications | (continued)

Standards and Approvals

Laser Safety	• CDRH 21 CFR 1040.10, 1040.11 (Except for deviations per notice No.50, July 26, 2001) • IEC 60825-1, Amendment 2 (January 2001) • EN 60825-1
CE	
Radio Equipment and Systems	• EN 301 502 – for GSM / EGSM Frequency Bands • EN 300 609 – for DCS Frequency Band • EN 301 908 – for UMTS Frequency Band • EN 300 328 – for WLAN 802.11b/g 2.4 GHz Frequency Band • EN 301 893 – for WLAN 802.11a 5 GHz Frequency Band
EMC	• EN 301 489
FCC	
Radio Equipment and Systems	FCC 47 CFR Part 2, 15, 22, 24, 27, 90
EMC	FCC 47 CFR Part 15 Subpart B
Safety	• EN 60950UL 60950 • CAN/CSA-C22.2 No.60950 • UL 2043

component specifications |

Tri-Service Package (TSX)

The TSX comes fully assembled with the RF service modules, applicable filters and accessories.

Supported Services	Three services per TSX (1 RHU + 1 AO). Refer to the TSX model for specific services support.
Ports	To Service Combiner Unit: 50Ω QMA cables
Power	• Local Power: 100-240 VAC (Integrated AC/DC converter) • Remote Power: 25 to 48 VDC • Maximum Power Consumption: 85 W
Physical Characteristics	• Mounting: 19-in Rack-mount brackets preconnected; wall-mount brackets can be ordered separately • Dimensions (H x W x D): mm (in) 177 x 434 x 369 (6.7 x 17.1 x 14.5) • Weight: kg (lbs) 19 (42)

Tri-Service Package (TSX) | Figure 4

Quad-Service Package (QSX)

The QSX comes fully assembled with the RF service modules, applicable filters and accessories, as reflected in the following specifications:

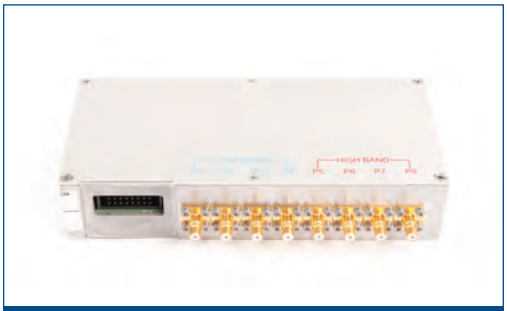
Supported Services	• CELL • PCS • 700 LTE • AWS (1 RHU + 2AO)
Ports	To Service Combiner Unit: 50Ω QMA cables
Power	• Local Power: 100-240 VAC (Integrated AC/DC converter) • Remote Power: 25 to 48 VDC • Maximum Power Consumption: 135 W
Physical Characteristics	• Mounting: 19-in rack-mount brackets preconnected; wall-mount brackets can be ordered separately • Dimensions (H x W x D): mm (in) 266 x 434 x 369 (10.5 x 17.1 x 14.5) • Weight: kg (lbs) 22 (49)

Quad-Service Package (QSX) | Figure 5

component specifications | (continued)

4-Port Service Combiner Unit (SCU-4)

Supported Services	High-band (1710 MHz - 2170 MHz) and low-band (698 MHz – 960 MHz) RF services
Ports	• To MA2000 TSX: 8 QMA 50Ω connectors (terminate if unused; 6 QMA 50Ω terminations provided) • To Antennas: 4 N-Type 50Ω connectors (terminate if unused)
Physical Characteristics	• Dimensions (H x W x D): mm (in) 35 x 166 x 80 (1.38 x 6.5 x 3.15) • Mounting: Comes with bracket that allows it to be mounted directly on top of an MA2000 TSX; Optionally, can be mounted on to a TSX AMU bracket. **If being mounted to QSX, an additional bracket must be ordered.*



4-Port Service Combiner Unit (SCU-4) | Figure 6

8-Port Service Combiner Unit (SCU-8)

Supported Services	High-band (1710 MHz - 2170 MHz) and low-band (698 MHz – 960 MHz) RF services. Required supporting element of the EC560 Solution
Ports	• To MA2000 TSX: 16 QMA 50Ω connectors (terminate if unused; 14 QMA 50Ω terminations provided) • To Antennas: 8 N-Type 50Ω connectors (terminate if unused) • To EHU: 8 QMA 50Ω connectors (terminations not required)
Physical Characteristics	• Dimensions (H x W x D): mm (in) 44 x 433 x 270 (1.7 x 17 x 10.6) • Weight: kg (lbs) 3 (6.6) • Mounting: Comes with brackets that allow it to be mounted on 19-in rack, as well as on the wall

8-Port Service Combiner Unit (SCU-8) | Figure 7

component specifications | (continued)

Antenna Monitoring Unit (AMU)

Supported Services	Monitors the status of antennas connected to the SCU-4. Works in conjunction with SCU-4
Physical Characteristics	• Dimensions (H x W x D): mm (in) 160 x 260 x 127 (6.3 x 10.2 x 5) • Weight: kg (lbs) 0.3 (0.7) • Mounting: Comes with mounting holes; separate brackets need be ordered to mount on MA2000 TSX/QSX

Antenna Monitoring Unit (AMU)
| Figure 8

Note 1: The DC resistance of the antenna together with the cable connected to the SCU-4 should be less than or equal to 1 kilo ohm for the AMU to sense the antennas successfully.
Note 2: AMU may not sense antenna if splitters are used between the connected antenna and the SCU-4.
Note 3: AMU is not designed to work with SCU-8.

ordering information |

MA2000 QSX

Service Supported	Part Number	Description
CELL/PCS/700 LTE/AWS	2000-C85P19L70A17-A-TC	MA2000 QSX Quad-service CELL/PCS, 700 MHz LTE and AWS - Additional filter (P/N 700LTE-PS-FILTER) ordered separately. Required if 700/800 MHz Public Safety coexists across same infrastructure.
	2000-C85P19L70A17-A-TCF	MA2000 QSX Quad-service CELL/PCS, 700 MHz LTE and AWS with filter to support 700/800 MHz Public Safety coexistence
	2000M-C85P19L70A17-A-TC	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence with MMF - Additional filter (P/N 700LTE-PS-FILTER) ordered separately. Required if 700/800 MHz Public Safety coexists across same infrastructure.
	2000M-C85P19L70A17-ATCF	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence and MMF

ordering information | (continued)

MA2000 TSX

Service Supported	Part Number	Description
700/800 MHz Public Safety	2000-P71S80-A-TC	MA2000 TSX Dual-service 700/800 MHz Public Safety
	2000M-P71S80-A-TC	MA2000 TSX Dual-service 700/800 MHz Public Safety with MMF
700/800 MHz Public Safety/AWS	1000-C85P19L70-A	MA2000 TSX Tri-service 700/800 MHz Public Safety and AWS
	1000M-C85P19L70-A	MA2000 TSX Tri-service 700/800 MHz Public Safety and AWS with MMF
CELL/PCS/700 LTE	2000-C85P19L70-A-TC	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE - Additional filter ordered separately (P/N 700LTE-PS-FILTER). Required if 700/800 MHz Public Safety coexists across same infrastructure.
	2000-C85P19L70-A-TC-F	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence
	2000-C85P19L70-B-TC	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE pre-installed with AWS upgrade kit. - Additional filter ordered separately (P/N 700LTE-PS-FILTER). Required if 700/800 MHz Public Safety coexists across same infrastructure.
	2000-C85P19L70-B-TC-F	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence. Comes pre-installed with AWS upgrade kit.
	2000M-C85P19L70-A-TC	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence with MMF - Additional filter ordered separately (P/N 700LTE-PS-FILTER). Required if 700/800 MHz Public Safety coexists across same infrastructure.
	2000M-C85P19L70-A-TC-F	MA2000 TSX Tri-service CELL/PCS and 700 MHz LTE with filter to support 700/800 MHz Public Safety coexistence and MMF
CELL/PCS/AWS	2000-C85P19A17-A-TC	MA2000 TSX Tri-service CELL/PCS and AWS
	2000M-C85P19A17-A-TC	MA2000 TSX Tri-service CELL/PCS and AWS with MMF

ordering information | (continued)

MA2000 TSX

Service Supported	Part Number	Description
iDEN/SMR/PCS	2000-S80S90P19-A-TC	MA2000 TSX Tri-service 800/900 MHz SMR and PCS, supports 700 MHz LTE and 700/800 MHz Public Safety coexistence
	2000M-S80S90P19-A-TC	MA2000 TSX Tri-service 800/900 MHz SMR and PCS with MMF, supports 700 MHz LTE and 700/800 MHz Public Safety coexistence
iDEN/SMR/AWS	2000-S80S90A17-A-TC	MA2000 TSX Tri-service 800/900 MHz SMR and AWS. Supports 700 MHz LTE and 700/800 MHz Public Safety coexistence.
	2000M-S80S90A17-A-TC	MA2000 TSX Tri-service 800/900 MHz SMR and PCS with MMF. Supports 700 MHz LTE and 700/800 MHz Public Safety coexistence.
GSM/DCS/UMTS 2100	2000-G92D18U21-A-TC	MA2000 TSX Tri-service GSM/DCS and UMTS 2100
E-GSM/DCS/UMTS 2100	2000-G90D18U21-A-TC	MA2000 TSX Tri-service E-GSM/DCS and UMTS 2100

MA2000 TSX International

Service Supported	Part Number	Description
GSM/DCS/UMTS 2100	2000-G92D18U21-A-TC	MA2000 TSX Tri-service GSM/DCS and UMTS 2100
E-GSM/DCS/UMTS 2100	2000-G90D18U21-A-TC	MA2000 TSX Tri-service E-GSM/DCS and UMTS 2100

Service Combiner Unit

Part Number	Description
SCU-4	Service Combiner Unit supporting four antenna output ports, four low-band services input ports and four high-band services input ports. To be used with the MA2000 TSX solution.
SCU-8	Service Combiner Unit supporting eight antenna output ports, eight low-band services input ports and eight high-band services input ports. To be used with the MA2000 TSX solution.

ordering information | (continued)

Antenna Monitoring Unit

Part Number	Description
2000-AMU-A	Antenna Monitoring Unit (AMU), includes communication cables to the SCU-4, communications cable to the RHU and internal power supply access cable (external power supply cable to be ordered separately).

Accessories

Part Number	Description
Brackets	
AK-TC-ENC-WMT	Accessory Kit containing contents to mount the MA2000 TSX and QSX onto the wall
BRKT-QSX-AO-STK-A	Additional Bracket for stacking an SCU-4 on top of an Add-On
AK- 2000-AMU-TSXBRKT-A	Antenna Monitoring Unit Mounting Kit for the MA2000 TSX. Includes mounting bracket, screws and communication cables to the 4-Port Service Combiner Unit (SCU-4).
AK-2000-AMU-QSXBRKT-A	Antenna Monitoring Unit Mounting Kit for the MA2000 QSX. Includes mounting bracket, screws and communication cables to the 4-Port Service Combiner Unit (SCU-4).
Cables	
AK-2000-AMU-CBL	Antenna Monitoring Unit monitoring cable to daisy-chain more than one MA2000 TSX or MA2000 QSX unit to the AMU. Maximum distance between MA2000 TSX/QSX units cannot exceed 6U.
Filters	
700LTE-PS-FILTER	Cavity Filter for the 700 LTE add-on when 700 LTE service coexists with 700/800 Public Safety service across the same set of coax. This filter is already included with the MA2000 TSX CELL/PCS/700LTE part numbers with a “-F” suffix.

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