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Nokia UltraSite EDGE BTS, Rel. CX5, Product Documentation, v.1

UltraSite EDGE BTS Technical Data

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Contents

1 Summary of changes in UltraSite EDGE BTS Technical Data

The following changes have taken place in the document:

- The following sections have been updated to CX5 level and relocated in *Software Compatibility of UltraSite EDGE BTS* document:
  - *Compatibility between HW and SW*
  - *Compatibility between BTS, BSC, NetAct, SiteWizard and LMU SW*
  - *Compatibility between new features of BTS SW CX5 and other network elements*
- RF properties of the 800 MHz, 1800 MHz, and 1900 MHz BTS have been updated.
- Section *BTS interfaces* has been removed from the document; the information can be found in the *Installing and Cabling the UltraSite EDGE BTS Cabinet* document.

2 BTS specifications

2.1 Cabinet dimensions and weights

Table 1. Cabinet dimensions and weights

Parameter	Outdoor	Midi Outdoor	Indoor	Midi Indoor	Mini Outdoor
Height	1940 mm (76.4 in.)	1320 mm (52.0 in.)	1800 mm (70.9 in.)	1180 mm (46.5 in.)	1130 mm (44.5 in.)
Depth	750 mm (29.5 in.)	750 mm (29.5 in.)	620 mm[1] (24.4 in.)	620 mm [1] (24.4 in.)	537 mm (21.1 in.)
Width	770 mm (30.0 in.)	770 mm (30.0 in.)	600 mm (23.6 in.)	600 mm (23.6 in.)	411 mm (16.2 in.)
Maximum cabinet weight (with units)	342 kg (755 lb)	233 kg (513.7 lb)	281 kg (629 lb)		110 kg (243 lb)
Maximum cabinet weight (without units)	152 kg (335 lb)	125.1 kg (275.7 lb)	95 kg (210 lb)	62.4 kg (137.5 lb)	38 kg (84 lb)

[1] Includes 52 mm (2.05 in.) behind the cabinet for the spacer part, which is required for cabinet cooling.

2.2 RF properties of 800 MHz BTS

Table 2. RF properties

Property	Value
TX frequency range	869 - 894 MHz

Table 2. RF properties (cont.)

Property	Value
RX frequency range	824 - 849 MHz
Channel spacing	200 kHz
Available radio channels	174
Minimum Frequency Spacing in combiners: WBC	600 kHz
Dynamic power control	
GMSK	30 dB (15 steps in 2 dB increments
8PSK (EGPRS)	18 dB (9 steps in 2 dB increments)

Table 3. BTS transmitter output performance for GSM 800

BTS Output Power GSM 800	Nominal Output Power dBm	Guaranteed Output Power dBm	Maximum number of carriers / antenna element	Frequency hopping
TRX output	47.0	46.5	n/a	n/a
IDD	50	n/a	1	RF & BB
Combiner by-pass	45.7	44.7	1	RF & BB
WBC 2:1	42.5	41.2	2	RF & BB
WBC 4:1	39.0	37.7	4	RF & BB

Note

Output power with 8-PSK modulation is 2dB less than with GMSK modulation.

Table 4. BTS receiver sensitivity for GSM 800

BTS Receiver Sensitivity GSM 900	**Nominal with MHA dBm**	**Guaranteed without MHA dBm**
Single-branch sensitivity (all profiles)	-112.5	-111.5
2-way diversity (all profiles)	-115.5	-113.5
4-way diversity (all profiles)	-118.0	-116.5

Note

The MHA sensitivity improvement is 0.5 dB.

2.3 RF properties of 900 MHz BTS

Table 5. RF properties

Property	**Value**
TX frequency range	A: 925.0 to 960.0 MHz H: 942.5 to 960.0 MHz J: 935.0 to 960.0 MHz
RX frequency range	A: 880.0 to 915.0 MHz H: 897.5 to 915.0 MHz J: 890.0 to 915.0 MHz
Channel spacing	200 kHz
Available radio channels	A: 174 H: 87 J: 124
Minimum Frequency Spacing in combiners:	
WBC	600 kHz
RTC	600 kHz
Dynamic power control	

Table 5. RF properties (cont.)

Property	Value
GMSK	30 dB (15 steps in 2 dB increments)
8PSK (EGPRS)	18 dB (9 steps in 2 dB increments)

Table 6. BTS transmitter output performance for GSM 900

BTS Output Power GSM 900	Nominal Output Power dBm	Guaranteed Output Power dBm	Maximum number of carriers / antenna element	Frequency hopping
TRX output	47.0	46.5	n/a	n/a
IDD	50	n/a	1	RF & BB
Combiner by-pass	45.7	44.7	1	RF & BB
RTC	44.0	42.2	6	BB
WBC 2:1	42.5	41.2	2	RF & BB
WBC 4:1	39.0	37.7	4	RF & BB

Note

Output power with 8-PSK modulation is 2dB less than with GMSK modulation.

Table 7. BTS receiver sensitivity for GSM 900

BTS Receiver Sensitivity GSM 900	Nominal with MHA dBm	Guaranteed without MHA dBm
Single-branch sensitivity (all profiles)	-112.5	-111.5
2-way diversity (all profiles)	-115.5	-113.5

Table 7. BTS receiver sensitivity for GSM 900 (cont.)

BTS Receiver Sensitivity GSM 900	**Nominal with MHA dBm**	**Guaranteed without MHA dBm**
4-way diversity (all profiles)	-118.0	-116.5

Note

The MHA sensitivity improvement is 0.5 dB.

2.4 RF properties of 1800 MHz BTS

Table 8. RF properties

Property	**Value**
TX frequency range	A: 1805-1850 MHz B: 1835-1880 MHz C: 1805-1880 MHz (Full-band)
RX frequency range	A: 1710-1755 MHz B: 1740-1785 MHz C: 1710-1785 MHz (Full-band)
Channel spacing	200 kHz
Available radio channels	A: 224 B: 224 C: 374
Minimum Frequency Spacing in combiners:	
WBC	600 kHz
RTC	600 kHz
Dynamic power control	
GMSK	30 dB (15 steps in 2 dB increments)
8PSK (EGPRS)	18 dB (9 steps in 2 dB increments)

Table 9. BTS transmitter output performance for GSM 1800

BTS Output Power GSM 1800	Nominal Sub-banded dBm	Guaranteed Full-banded dBm	Guaranteed Sub-banded dBm	Maximum number of carriers / antenna element	Frequency hopping
TRX output	47.0	n/a	n/a	n/a	n/a
IDD	50	n/a	n/a	1	RF & BB
Combiner by-pass	46.0	44.5	45.0	1	RF & BB
RTC	44.0	41.8	42.5	6	BB
WBC 2:1	42.8	40.8	41.5	2	RF & BB
WBC 4:1	39.3	37.1	38.0	4	RF & BB

Note

Output power with 8-PSK modulation is 2dB less than with GMSK modulation.

Table 10. BTS Receiver Sensitivity for GSM 1800

BTS Receiver Sensitivity GSM 1800	Nominal With MHA Sub- banded units dBm	Guaranteed Without MHA Full- banded units dBm	Guaranteed Without MHA Sub-banded units dBm
Single-branch sensitivity (all profiles)	-113.0	-111.5	-112.0
2-way diversity (all profiles)	-116.0	-114.5	-115.0
4-way diversity (all profiles)	-118.5	-117.5	-118.0

Note

The MHA sensitivity improvement is 0.5 dB.

2.5 RF properties of 1900 MHz BTS

Table 11. RF properties

Property	Value
TX frequency range	1930-1990 MHz
RX frequency range	1850-1910 MHz
Channel spacing	200 kHz
Available radio channels	281
Blocked channels (5)	586, 611, 686, 711, 736
Reduced power channels (12)	512, 585, 587, 610, 612, 685, 687, 710, 712, 735, 737, 810
Minimum Frequency Spacing in combiners:	
WBC	600 kHz
RTC	800 kHz
Dynamic power control	
GMSK	30 dB (15 steps in 2 dB increments)
8PSK	(EGPRS) 18 dB (9 steps in 2 dB increments)

Table 12. BTS transmitter output performance for GSM 1900

BTS Output Power GSM 1900	Nominal Ouput Power dBm	Guaranteed Output Power dBm	Maximum number of carriers / antenna element	Frequency hopping
TRX output	47.0	46.5	n/a	n/a
IDD	50	n/a	1	RF & BB
Combiner by-pass	45.7	44.6	1	RF & BB

Table 12. BTS transmitter output performance for GSM 1900 (cont.)

BTS Output Power GSM 1900	Nominal Ouput Power dBm	Guaranteed Output Power dBm	Maximum number of carriers / antenna element	Frequency hopping
RTC	44.0	42.1	6	BB
WBC 2:1	42.5	41.1	2	RF & BB
WBC 4:1	39.0	37.5	4	RF & BB

Note

Output power with 8-PSK modulation is 2dB less than with GMSK modulation.

Table 13. BTS receiver sensitivity for GSM 1900

BTS Receiver Sensitivity GSM 1900	Nominal With MHA dBm	Guaranteed Without MHA dBm
Single-branch sensitivity (all profiles)	-112.5	-111.5
2-way diversity (all profiles)	-115.5	-114.0
4-way diversity (all profiles)	-118.0	-117.0

Note

The MHA sensitivity improvement is 0.5 dB.

2.6 Static performance properties of BTS receivers

Table 14. Receiver performance for 10% BLER

Channel type	Static level
MCS-1 GMSK	-112.0 dBm
MCS-2 GMSK	-110.9 dBm
MCS-3 GMSK	-109.0 dBm
MCS-4 GMSK	-106.6 dBm
MCS-5 8PSK	-105.8 dBm
MCS-6 8PSK	-103.8 dBm
MCS-7 8PSK	-100.7 dBm
MCS-8 8PSK	-97.7 dBm
MCS-9 8PSK	-95.7 dBm

3 GSM/EDGE unit specifications

3.1 Base Operations and Interfaces (BOIx) unit

3.1.1 Dimensions and weight of Base Operations and Interfaces

Table 15. Dimensions and weight

Property	Value (metric)	Value (imperial)
Height	280.8 mm	11.1 in
Width	30 mm	1.2 in
Depth	259 mm	10.2 in
Weight	1.64 kg	3.6 lb

3.1.2 Electrical properties for Base Operations and Interfaces

Table 16. Electrical properties

Output number	V3	V5P	V9P	V9N
Nominal voltage	+3.4 V	+5.1 V	9.1 V	-9.1 V
Maximum supply voltage from backplane	+3.47 V	+5.2 V	+9.28 V	-9.28 V
Minimum supply voltage from backplane	+3.16 V	+4.74 V	+8.46 V	-8.46 V
Typical current	1.0 A	0.5 A	0.10 A	0.005 A
Maximum current	1.4 A	1.0 A	0.4 A	0.04 A

3.2 Bias Tee (BPxx) unit

3.2.1 Bias Tee (BPxx) unit alternatives

Unit	Frequency band
WBNB	GSM EDGE 800, 900, 1800, 1900
WBVC	GSM EDGE 800, 900 with VSWR
WBVB	GSM EDGE 1800, 1900 with VSWR
WBSB	GSM EDGE 1800, 1900 with VSWR, Sniffer

3.2.2 Electrical specifications for Bias Tee (BPxx) unit

Table 17. RF Interface Details

Parameter	Details	
	without VSWR	with VSWR
Frequency range	824 MHz to 960 MHz and 1710 MHz to 1990 MHz	824 MHz to 960 MHz and 1710 MHz to 1990 MHz
Return loss	18 dB minimum	20 dB minimum
Insertion loss	0.3 dB maximum	0.3 dB maximum
Rated operating power	RMS 240W (1440W peak)	RMS 240W (1440W peak)
Inter-modulation	GSM 05.05; GSM 11.21	GSM 05.05; GSM 11.21
Spurious emission	GSM 05.05; GSM 11.21	GSM 05.05; GSM 11.21
VSWR alarm indication	N/A	1. Return loss < 7 +/-2 dB and RF power level > +27.5 dBm 2. RF power level < -35 dBm (indicating missing RF power)

Table 18. DC Interface Details

Parameter	Details	
	without VSWR	**with VSWR**
Supply voltage DC	+7.5 V to +14.4 V	+7.5 V to +14.4 V
DC current	1000 mA maximum	1000 mA maximum
DC voltage drop	1 V maximum at 900 mA load	1 V maximum at 900 mA load

Table 19. Lightning Protection Details

Parameter	Details	
	without VSWR	**with VSWR**
Meeting standard	IEC 801-5 and IEC 1312	IEC 801-5 and IEC 1312
Over current pulse between centre conductor and shield of ANT port	3 kA, 10/350 us pulse	3 kA, 10/350 us pulse
Over current pulse between shield of BTS port and shield of MHA port	20 kA, 10/350 us pulse	20 kA, 10/350 us pulse

3.2.3 Mechanical specifications for Bias Tee (BPxx) unit

Table 20. Mechanical details

Parameter	Details	
	without VSWR	**with VSWR**
Size: W x L x D (mm)	48 mm x 54 mm x 48 mm	95 mm x 80 mm x 52 mm
Weight, including connectors	0.4 kg	0.4 kg
BTS connector	Type 7-16 male	Type 7-16 male
Antenna connector	Type 7-16 female	Type 7-16 female
DC supply connector	m8 4-pole connector	m8 4-pole connector
Alarm connector	Not available	m8 4-pole connector

3.2.4 Environmental specifications for Bias Tee (BPxx) unit

Table 21. Environmental specifications

Temperature range; operation	-40° C to +65° C
Temperature range; storage and transportation	-40° C to +70° C
Meeting standard; operation	ETS 300 019-1-3, class 4.1E
Meeting standard; transportation	ETS 300 019-1-2, class 2.3
Meeting standard storage	ETS 300 019-1-1, class 1.3E
Enclosure Protection	IP65

3.2.5 Mean Time Between Failure (MTBF) specifications for Bias Tee (BPxx) unit

Table 22. MTBF Details

Bias Tee	>1 000 000 hours at +30° C
Bias Tee with VSWR	>1 000 000 hours at +30° C

3.2.6 Electromagnetic Compatibility (EMC) of Bias Tee (BPxx) unit

The Bias Tee meets the requirements stated in ETSI 300 342-2. The equipment complies with the European EMC directives 89/336/EEC for both spurious emissions and immunity.

3.3 Dual Band Diplex Filter (DU2A) unit

3.3.1 Dimensions and weight of Dual Band Diplex Filter (DU2A) unit

Table 23. Dimensions and weight

Property	Value (metric)	Value (imperial)
Height	150 mm	5.91 in.
Width	55 mm	2.17 in.

Table 23. Dimensions and weight (cont.)

Property	Value (metric)	Value (imperial)
Depth	75 mm	2.95 in.
Weight	2.0 kg	4.42 lb

3.3.2 Insertion and return loss of Dual Band Diplex Filter (DU2A) unit

Table 24. Unit insertion and return loss

Frequency band	Frequency range	Insertion loss	Return loss
GSM/EDGE 800/900	824 MHz to 960 MHz	0.4 dB (maximum)	20 dB (minimum)
GSM/EDGE 1800/ 1900	1710 MHz to 1990 MHz	0.4 dB (maximum)	20 dB (minimum)

3.3.3 Power requirements for Dual Band Diplex Filter (DU2A) unit

Table 25. Maximum RF input power

Property	Value
CW power/carrier	46 dBm (40 W)
Peak	61.6 dBm (1440 W)
Duration of peak	20 µs
Period between peaks	550 µs

3.4 Dual Variable Gain Duplex Filter (DVxx) unit

3.4.1 Dual Variable Gain Duplex Filter (DVxx) unit alternatives

Note

The GSM 800 DVTC has been removed from the product portfolio. Take this into consideration when carrying out maintenance activities, and supplying replacement units.

Table 26. Unit alternatives

Unit	Frequency Band
DVTB	full band for GSM EDGE 800
DVTD	full band for co-siting GSM EDGE 800 and SMR[a]
DVGA	full band for GSM EDGE 900
DVHA	customer specific for GSM EDGE 900[a]
DVJA	customer specific for GSM EDGE 900[a]
DVDA	A band for GSM EDGE 1800
DVDB	B band for GSM EDGE 1800
DVDC	full band for GSM EDGE 1800
DVPA	full band for GSM EDGE 1900

[a]To distinguish between DVHA and DVJA, see *Technical data for the Dual Variable Gain Duplex Filter unit.*

3.4.2 Dimensions and weight of Dual Variable Gain Duplex Filter (DVxx) unit

Note

GSM 800 DVTC has been removed from the product portfolio. Take this into consideration when carrying out maintenance activities, and supplying replacement units.

Table 27. Maximum dimensions and weight

Property	Value (metric)	Value (imperial)
Height	160 mm	6.3 in.
Width	188 mm	7.4 in.
Depth	337 mm	13.3 in.
Weight	13 kg	28.7 lb

3.4.3 Power requirements for Dual Variable Gain Duplex Filter (DVxx) unit

Table 28. Maximum input power

Input power	+9V	-9V	+5V
Voltage tolerance	±3%	±3%	±3%
Current draw	2400 mA	200 mA	400 mA
Ripple 0 to 150 kHz (maximum)	50 mVpp	50 mVpp	50 mVpp
Ripple 150 kHz (maximum)	100 mVpp	100 mVpp	100 mVpp

3.4.4 RF properties for Dual Variable Gain Duplex Filter (DVxx) unit

Table 29. Operating frequency ranges

Version	TX band	RX band	Duplex separation	Duplex filter bandwidth
DVTD (full band co-sited)	869 to 894 MHz	824 to 849 MHz	45 MHz	25 MHz
DVTB	869 to 894 MHz	824 to 849 MHz	45 MHz	25 MHz
DVGA	925-960 MHz	880 to 915 MHz	45 MHz	35 MHz
DVHA	942.5 to 960 MHz	897.5 to 915 MHz	45 MHz	17.5 MHz
DVJA	935 to 960 MHz	890 to 915 MHz	45 MHz	25 MHz
DVDA	1805 to 1850 MHz	1710 to 1755 MHz	95 MHz	45 MHz

Table 29. Operating frequency ranges (cont.)

Version	TX band	RX band	Duplex separation	Duplex filter bandwidth
DVDB	1835 to 1880 MHz	1740 to 1785 MHz	95 MHz	45 MHz
DVDC	1805 to 1880 MHz	1710 to 1785 MHz	95 MHz	75 MHz
DVPA	1930 to 1990 MHz	1850 to 1910 MHz	80 MHz	60 MHz

Table 30. TX insertion loss

Version	TX to antenna	Maximum
DVTB	869 to 894 MHz	1.1 dB
DVTD (full band co-sited) DVTD provides >20dB rejection at SMR 900 RX frequency 896 to 901 MHz to reduce TX spurious	869 to 871.5 MHz 871.5 to 891.5 891.5 to 894	1.65dB 1.1 dB 1.65 dB
DVGA	925 to 960 MHz	1.2 dB
DVHA	942.5 to 960 MHz	1.2 dB
DVJA	935 to 960 MHz	1.2 dB
DVDA	1805 to 1850 MHz	0.8 dB
DVDB	1835 to 1880 MHz	0.8 dB
DVDC	1805 to 1880 MHz	1.2 dB
DVPA	1930 to 1990 MHz	1.1 dB

Table 31. RX High-gain values

Version	Temperature	Value
DVTD (full band co-sited) DVTD provides >40dB rejection at SMR 800 TX frequency 851 to 869 MHz to protect LNA	20° C to 30° C -10° C to 65° C	(824 to 847) 28.4 dB ±1.1 dB/28.4 dB ±1.6 dB (847 to 849) 28.4 dB +1.1 to - 3.3 dB/28.4 dB +1.6 to -3.8 dB

Table 31. RX High-gain values (cont.)

Version	Temperature	Value
DVGA DVHA DVJA DVTB	20° C to 30° C -10° C to 65° C	28.4 dB ±1.1 dB 28.4 dB ±1.6 dB
DVDA DVDB DVPA	20° C to 30° C -10° C to 65° C	29.4 dB ±1.1 dB 29.4 dB ±1.6 dB
DVDC	20° C to 30° C -10° C to 65° C	28.4 dB ±1.6 dB 28.4 dB ±2.1 dB

Note

20° C to 30° C is equal to 68° F to 86° F. -10° C to 65° C is equal to 14° F to 149° F.

Table 32. RX Low-gain values

Version	Temperature	Maximum	Minimum
DVTD (full band co-sited)	20° C to 30° C -10° C to 65° C	(824 to 847) 3.4 dB ±1.4 dB/3.4 dB ± 1.9 (847 to 849) 3.4 dB + 1.4 to -3.6 dB/3.4 dB + 1.9 to -4.1 dB	(824 to 847) -3.6 dB + 1.4 dB/ -3.6 dB ± 1.9 dB (847 to 849) -3.6 dB + 1.4 dB to -3.6 dB/-3.6 dB + 1.9 dB to -4.1 dB
DVTB DVGA DVHA DVJA	20° C to 30° C -10° C to 65° C	3.4 dB ±1.4 dB 3.4 dB ±1.9 dB	-3.6 dB ±1.4 dB -3.6 dB ±1.9 dB
DVDA DVDB	20° C to 30° C -10° C to 65° C	6.4 dB ± 1.4 dB 6.4 dB ± 1.9 dB	-3.6 dB ± 1.4 dB -3.6 dB ± 1.9 dB
DVDC	20° C to 30° C -10° C to 65° C	6.4 dB ±1.9 dB 6.4 dB ± 2.4 dB	-3.6 dB ± 1.9 dB -3.6 dB ± 2.4 dB

Table 32. RX Low-gain values (cont.)

Version	Temperature	Maximum	Minimum
DVPA	20° C to 30° C	6.4 dB ±1.4 dB	-3.6 dB ±1.4 dB
	-10° C to 65° C	6.4 dB ± 1.9 dB	-3.6 dB ±1.9 dB

Note

The step size for adjustment is 0.5 dB ±0.8 dB.

Table 33. Isolation parameters (high-gain state)

Version	Band	Minimum
DVTB	824 to 849 MHz	60 dB
DVTD (full band co-sited)	869 to 894 MHz	89 dB
DVGA	880 to 915 MHz	60 dB
	915 to 925 MHz	31 dB
	925 to 960 MHz	88 dB
DVHA	897.5 to 915 MHz	60 dB
	915 to 942.5 MHz	31 dB
	942.5 to 960 MHz	88 dB
DVJA	890 to 915 MHz	60 dB
	915 to 935 MHz	31 dB
	935 to 960 MHz	88 dB
DVDA	1710 to 1755 MHz	47 dB
	1755 to 1805 MHz	35 dB
	1805 to 1850 MHz	85 dB
DVDB	1740 to 1785 MHz	47 dB
	1785 to 1835 MHz	35 dB
	1835 to 1880 MHz	85 dB
DVDC	1710 to 1785 MHz	47 dB
	1785 to 1805 MHz	35 dB
	1805 to 1880 MHz	85 dB

Table 33. Isolation parameters (high-gain state) (cont.)

Version	Band	Minimum
DVPA	1850 to 1910 MHz	47 dB
	1910 to 1930 MHz	27 dB
	1930 to 1990 MHz	85 dB

Table 34. Isolation parameters (low-gain state)

Version	Band	Minimum
DVTB	824 to 849 MHz	85 dB
DVTD (full band co-sited)	869 to 894 MHz	102 dB
DVGA	880 to 915 MHz	85 dB
	915 to 925 MHz	56 dB
	925 to 960 MHz	100 dB
DVHA	897.5 to 915 MHz	85 dB
	915 to 942.5 MHz	56 dB
	942.5 to 960 MHz	100 dB
DVJA	890 to 915 MHz	85 dB
	915 to 935 MHz	56 dB
	935 to 960 MHz	100 dB
DVDA	1710 to 1755 MHz	70 dB
	1755 to 1805 MHz	58 dB
	1805 to 1850 MHz	95 dB
DVDB	1740 to 1785 MHz	70 dB
	1785 to 1835 MHz	58 dB
	1835 to 1880 MHz	95 dB
DVDC	1710 to 1785 MHz	70 dB
	1785 to 1805 MHz	45 dB
	1805 to 1880 MHz	95 dB
DVPA	1850 to 1910 MHz	70 dB
	1910 to 1930 MHz	50 dB
	1930 to 1990 MHz	95 dB

Table 35. Return loss

Port/band	Minimum
TX 1 / TX 2	18 dB (1.29:1)
RX port / RX band (high-gain and low-gain)	16 dB (1.38:1)
ANT port/TX band	18 db (1:29:1)
ANT port / RX band (high-gain)	16 dB (1.38:1)
ANT port / RX band (low-gain)	13 dB (1.58:1)

Table 36. Maximum RF input power

Property	Value
rms	51 dBm (125 W)
Peak (20 ms peak, 550 ms between peaks)	55 dBm (316.2 W)
Peak voltage	130 V

Table 37. Maximum RX band input power

Property	Value
RX (high gain)	16 dBm minimum
RX (low gain with maximum gain)	23 dBm minimum

3.5 Power Supply (PWSx) units

3.5.1 Power Supply (PWSx) unit alternatives

Note

Full redundancy assumes the maximum number of PWSx units are installed.

Table 38. Unit alternatives

PWSx unit	TSxx units ≤ 6	TSxx units > 6
PWSA	Fully redundant[1]	Not redundant
PWSB	Fully redundant[1]	Fully redundant[1]
PWSC	Fully redundant[1]	Not redundant

[1]Dependent on TSxx slot population configuration.

3.5.2 Dimensions and weight of Power Supply (PWSx) units

Table 39. Dimensions and weight

Property	PWSA	PWSB	PWSC
Height	300 mm 11.8 in.	300 mm 11.8 in.	300 mm 11.8 in.
Width	99 mm 3.9 in.	63 mm 2.5 in.	99 mm 3.9 in.
Depth	350 mm 13.8 in.	350 mm 13.8 in.	350 mm 13.8 in.
Weight	11 kg 24 lb	7 kg 15.4 lb	11 kg 24 lb

3.5.3 Power requirements for Power Supply (PWSx) units

Table 40. Input voltage

Unit	Value	Notes
PWSA	230 VAC (184 to 276 VAC)	The unit accepts both 50Hz and 60 Hz input.
The unit accepts both 50 Hz and 60 Hz input.	-48 VDC (-36 to -60 VDC)	The unit has reverse polarity protection. If input voltage reverse polarity occurs, the internal fuse opens.

Table 40. Input voltage (cont.)

Unit	Value	Notes
PWSC	+24 VDC (+20 to +32 VDC)	The unit has reverse polarity protection. If input voltage reverse polarity occurs, the internal fuse opens.

Table 41. Maximum continuous output power rating

Unit	Value
PWSA	2250 W
PWSB	600 W
PWSC	2500 W

3.6 Receiver Multicoupler (M2xA or M6xA) unit

3.6.1 Receiver Multicoupler (M2xA or M6xA) unit alternatives

Note

The M2xA and M6xA units split Received (RX) and Diversity-Received (DRX) signals and distribute them to the Transceiver (TSxx) units. Two versions are available for different frequency bands.

Table 42. Unit alternatives

GSM/EDGE 800 and 900 bands.	GSM/EDGE 1800 and 1900 bands.
M2LA	M2HA
M6LA	M6HA

3.6.2 Dimensions and weight of Receiver Multicoupler (M2xA or M6xA) unit

Table 43. Dimensions and weight

Property	M2xA	M6xA
Height	160 mm 6.3 in.	490 mm 19.3 in.
Width	50 mm 2 in.	50 mm 2 in.
Depth	21.5 mm 0.85 in.	21.2 mm 0.83 in.
Weight	0.14 kg 0.3 lb	0.48 kg 1.05 lb

3.6.3 Insertion and return loss of Receiver Multicoupler (M2xA or M6xA) unit

Table 44. Insertion loss and return loss

Frequency band	Frequency range	Insertion loss	Return loss
GSM/EDGE 800/900	824MHz to 915 MHz	8.7 ± 0.8 dB	14.6 dB minimum
GSM/EDGE 1800/1900	1710 MHz to 1910 MHz	8.3 ± 0.8 dB	14.6 dB minimum

3.7 Remote Tune Combiner (RTxx) unit

3.7.1 Remote Tune Combiner (RTxx) unit alternatives

Table 45. Unit alternatives

Unit	Frequency Band
RTGA	full band for GSM/EDGE 900
RTHA	H sub-band for GSM/EDGE 900

Table 45. Unit alternatives (cont.)

Unit	Frequency Band
RTJA	J sub-band for GSM/EDGE 900
RTDA	A band for GSM/EDGE 1800
RTDB	B band for GSM/EDGE 1800
RTDC	full band for GSM/EDGE 1800
RTPA	full band for GSM/EDGE 1900

3.7.2 Dimensions and weight of Remote Tune Combiner (RTxx) unit

Table 46. Dimensions and weight

Property	Value (metric)	Value (imperial)
Height	490 mm	19.29 in.
Width	195 mm	7.68 in.
Depth	432 mm	17.01 in.
Weight	20 kg maximum	44.09 lb maximum

3.7.3 Electrical properties for Remote Tune Combiner (RTxx) unit

Table 47. Electrical properties

Nominal supply voltage	Nominal current consumption
+3.3 V	650 mA
+5.0 V	500 mA
+9.0 V	2800 mA
-9.0 V	450 mA
+26.0 V	1000 mA

3.7.4 RF properties for Remote Tune Combiner (RTxx) unit

Table 48. GSM/EDGE 900

	GSM/EDGE 900	GSM/EDGE 900H	GSM/EDGE 900J
TX frequency range	925 - 960 MHz	942.5 - 960 MHz	935 - 960 MHz
RX frequency range	880 - 915 MHz	897.5 - 915 MHz	890 - 915 MHz
Carrier frequency spacing	600 kHz minimum	600 kHz minimum	600 kHz minimum
Insertion loss (TX)	4.0 dB maximum	4.0 dB maximum	4.0 dB maximum
TX power in the input	55.0 W maximum	55.0 W maximum	55.0 W maximum
Number of TX carriers combined into one antenna	1 - 6 TX	1 - 6 TX	1 - 6 TX
Return loss at TX input port	15.6 dB minimum	15.6 dB minimum	15.6 dB minimum
Return loss at Ant port/TX band	8.0 dB	8.0 dB	8.0 dB
Gain (RX)	+28.4 dB / high gain +3.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain	+28.4 dB / high gain +3.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain	+28.4 dB / high gain +3.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain
Return loss at DAnt port on RX band, high gain	16 dB minimum	16 dB minimum	16 dB minimum
Return loss at DAnt port on RX band, low gain	13 dB minimum	13 dB minimum	13 dB minimum
Return loss at RX output ports	16 dB minimum	16 dB minimum	16 dB minimum
Tuning time	62 s	62 s	62 s

Table 49. GSM/EDGE 1800

	GSM/EDGE 1800A	GSM/EDGE 1800B	GSM/EDGE 1800C
TX frequency range	1805 - 1850 MHz	1835 - 1880 MHz	1805 - 1880 MHz
RX frequency range	1710 - 1755 MHz	1740 - 1785 MHz	1710 - 1785 MHz
Carrier frequency spacing	800 kHz minimum	800 kHz minimum	800 kHz minimum
Insertion loss (TX)	3.6 dB maximum	3.6 dB maximum	4.0 dB maximum
TX power in the input	55.0 W maximum	55.0 W maximum	55.0 W maximum
Number of TX carriers combined into one antenna	1 - 6 TX	1 - 6 TX	1 - 6 TX

Table 49. GSM/EDGE 1800 (cont.)

	GSM/EDGE 1800A	GSM/EDGE 1800B	GSM/EDGE 1800C
Return loss at TX input port	15.6 dB minimum	15.6 dB minimum	15.6 dB minimum
Return loss at Ant port/TX band	9.0 dB	9.0 dB	7.0 dB
Gain (RX)	+29.4 dB / high gain +6.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain	+29.4 dB / high gain +6.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain	+28.4 dB / high gain +6.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain
Return loss at DAnt port on RX band, high gain	16 dB minimum	16 dB minimum	16 dB minimum
Return loss at DAnt port on RX band, low gain	13 dB minimum	13 dB minimum	13 dB minimum
Return loss at RX output ports	16 dB minimum	16 dB minimum	16 dB minimum
Tuning time	62 s	62 s	62 s

Table 50. GSM/EDGE 1900

	GSM/EDGE 1900
TX frequency range	1930 - 1990 MHz
RX frequency range	1850 - 1910 MHz
Carrier frequency spacing	800 kHz minimum
Insertion loss (TX)	3.9 dB maximum
TX power in the input	55.0 W maximum
Number of TX carriers combined into one antenna	1-6 TX
Return loss at TX input port	15.6 dB minimum
Return loss at Ant port/TX band	7.0 dB
Gain (RX)	+29.4 dB / high gain +6.4 dB / low gain, maximum gain -3.6 dB / low gain, minimum gain
Return loss at DAnt port on RX band, high gain	16 dB minimum
Return loss at DAnt port on RX band, low gain	13 dB minimum
Return loss at RX output ports	16 dB minimum

Table 50. GSM/EDGE 1900 (cont.)

	GSM/EDGE 1900
Tuning time	62 s

3.7.5 Insertion loss (TX) of Remote Tune Combiner (RTxx) unit

Table 51. Insertion loss for GSM/EDGE 900 RTGA, RTHA, and RTJA

Number of cavities	**Minimum spacing (600 kHz)**	**Extended spacing (600 kHz + 400 kHz)**
1	1.76	1.76
2	2.04	1.81
3	2.21	1.88
4	2.26	1.89
5	2.34	1.93
6	2.36	1.93

Table 52. Insertion loss for GSM/EDGE 1800 RTDA

Number of cavities	**Minimum spacing (800 kHz)**	**Extended spacing (800 kHz + 400 kHz)**
1	1.91	1.91
2	2.11	2.01
3	2.26	2.07
4	2.31	2.07
5	2.38	2.11
6	2.41	2.12

Table 53. Insertion loss for GSM/EDGE 1800 RTDB

Number of cavities	Minimum spacing (800 kHz)	Extended spacing (800 kHz + 400 kHz)
1	1.98	1.98
2	2.16	2.04
3	2.31	2.12
4	2.36	2.14
5	2.43	2.16
6	2.45	2.18

Table 54. Insertion loss for GSM/EDGE 1800 RTDC

Number of cavities	Minimum spacing (800 kHz)	Extended spacing (800 kHz + 400 kHz)
1	2.12	2.12
2	2.39	2.22
3	2.55	2.30
4	2.62	2.32
5	2.68	2.39
6	2.72	2.40

Table 55. Insertion loss for GSM/EDGE 1900 RTPA

Number of cavities	Minimum spacing (800 kHz)	Extended spacing (800 kHz + 400 kHz)
1	2.22	2.22
2	2.43	2.31
3	2.58	2.39
4	2.63	2.40
5	2.68	2.43
6	2.72	2.45

3.8 Temperature Control System (TCS)

3.8.1 Dimensions and weight of Temperature Control System (TCS)

Table 56. Dimensions and weight of unit cooling fans

Property	Value (metric)	Value (imperial)
Height[1]	119 mm or 127 mm	4.7 in. or 5.0 in.
Width[1]	119 mm or 127 mm	4.7 in. or 5.0 in.
Depth	38 mm	1.5 in.
Weight[1]	0.36 kg or 0.38 kg	0.79 lb or 0.84 lb

[1]Differing values represent different manufacturers.

Table 57. Dimensions and weight of cabinet cooling fan

Property	Value (metric)	Value (imperial)
Height	280 mm	10.92 in.
Width	280 mm	10.92 in.
Depth	125 mm	4.88 in.
Weight	2.6 kg	5.75 lb

Table 58. Dimensions and weight of cabinet heater (HETA)

Property	Value (metric)	Value (imperial)
Height	365 mm	14.37 in.
Width	340 mm	13.39 in.
Depth	88.5 mm	3.48 in.
Weight	3.0 kg	6.6 lb

3.8.2 Electrical properties for Temperature Control System (TCS)

Table 59. Electrical properties for unit cooling fans

Property	Value
Input voltage	36 to 60 VDC[1]
Nominal voltage	54 VDC
Nominal running current	< 0.25 A
Maximum peak current	≤ 0.75 A[2]

[1]Fans are not damaged if the voltage level is from 0 to 36 VDC.

[2]Duration is no more than three seconds.

Table 60. Electrical properties for cabinet cooling fan

Property	Value
Input voltage	36 to 60 VDC[1]
Nominal voltage	54 VDC
Nominal running current	< 3.0 A
Maximum peak current	≤ 4.5 A[2]

[1]The fan is not damaged if the voltage level is from 0 to 36 VDC.

[2]Duration is no more than three seconds.

Table 61. Electrical properties for cabinet heater (HETA)

Property	Value
Input voltage	166 to 276 VAC
Nominal voltage	208 to 230 VAC
Power rating	1500 W ±5% (230 VAC)
Noise	50 dB maximum
Protection	IP 54 - One T16A fuse, located after the power filter module, protects against over-current

Note

The power for the HETA comes from the AC mains through the ACFU power filter module. An AC/DC converter inside the HETA supplies power for the cold-start control logic and for the fans.

3.9 Transceiver Baseband (BB2x) unit

3.9.1 Transceiver Baseband (BB2x) unit alternatives

Table 62. Unit alternatives

Unit	Coding scheme
BB2A	GMSK only
BB2E	GMSK/EDGE
BB2F	GMSK/EDGE

3.9.2 Dimensions and weight of Transceiver Baseband (BB2x) unit

Table 63. Dimensions and weight

Property	Value (metric)	Value (imperial)
Height	280.8 mm	11.1 in.
Width	25 mm	1 in.
Depth	266 mm	10.5 in.
Weight	1.5 kg	3.3 lb
BB2F weight	0.85 kg	1.87 lb

3.9.3 Power requirements for Transceiver Baseband (BB2x) unit

Table 64. Power requirements

Power requirement	V3P	V5P	Noise
Nominal voltage	+3.4 V	+5.1 V	<100 mVpp
Maximum supply voltage from backplane	+3.47 V	+5.2 V	<100 mVpp
Minimum supply voltage from backplane	+3.16 V	+4.74 V	<100 mVpp
Average current:			
BB2A	2.4 A	2 mA	NA
BB2E	3.5 A	30 mA	NA
BB2F	3.2 A	30 mA	NA
Maximum Current:			
BB2A	3.8 A	0.1 A	NA
BB2E	5 A	0.1 A	NA
BB2F	5 A	0.1 A	NA

3.10 Transceiver (TSxx) unit

3.10.1 Transceiver (TSxx) unit alternatives

Note

GSM 1900 TRX (TSPA) has been removed from the product portfolio. Take this into consideration when carrying out maintenance activites, and replacing units.

Table 65. Frequency band alternatives in the TSxx unit

Frequency band	TSxA	TSxB
GSM 900	TSGA	N/A
GSM 1800	TSDA	N/A

Table 65. Frequency band alternatives in the TSxx unit (cont.)

Frequency band	TSxA	TSxB
GSM/EDGE 800	N/A	TSTB
GSM/EDGE 900	N/A	TSGB
GSM/EDGE 1800	N/A	TSDB
GSM/EDGE 1900	N/A	TSPB

3.10.2 Dimensions and weight for Transceiver (TSxx) unit

Table 66. Nominal dimensions and weight

Property	Value (metric)	Value (imperial)
Height	80 mm	3.2 in.
Width	300 mm	11.9 in.
Depth	400 mm	15.9 in.
Weight	6.2 kg	13.6 lb

3.10.3 Electrical properties for Transceiver (TSxx) unit

Table 67. Input voltage supply requirements

Voltage	-48 V	+9 V	+5 V	+3.3 V	-9 V
Tolerance	± 12 V	± 3%	± 3%	± 3%	± 3%
Maximum ripple < 150 kHz	In accordance with ETS 300-132-2 and ETS 300-342-2.	30 mVpp	30 mVpp	30 mVpp	30 mVpp
Maximum ripple > 150 kHz	In accordance with ETS 300-132-2 and ETS 300-342-2.	100 mVpp	100 mVpp	100 mVpp	100 mVpp

Table 68. Current consumption

Voltage	-48 V	+9 V	+5 V	_3.3 V	-9 V
TSDA	4.5 to 7.6 A	2100 mA	710 mA	670 mA	260 mA
TSGA	2.2 to 3.7 A	1510 mA	630 mA	650 mA	295 mA
TSxB	4.4 to 7.4 A (265W)	2100 mA	710 mA	710 mA	420 mA

The DC/DC power supply module converts the -48 VDC input voltage to the output voltage required by the PA module.

Table 69. Output voltage requirements

Requirement	Value
Output voltage	26.2 VDC
Output maximum current	8.7 A
Efficiency at maximum current	> 85%
Tolerance	± 1.5%
Maximum ripple at < 150 kHz	20 mVpp
Maximum ripple at > 150 kHz	80 mVpp

3.10.4 RF properties for Transceiver (TSxx) unit

Table 70. TX output power

Property	GMSK (TSxx)		8PSK (TSxB)	
Nominal output power (maximum power level)	TSTx (800)	47 dBm	TSTx (800)	45 dBm
	TSGx (900)	47 dBm	TSGx (900)	45 dBm
	TSDx (1800)	47 dBm	TSDx (1800)	45 dBm
	TSPx (1900)	47 dBm	TSPx (1900)	45 dBm
Output power variation (maximum power level)	± 0.5 dB (normal conditions)			

Table 70. TX output power (cont.)

Property	GMSK (TSxx)	8PSK (TSxB)
Output power variation (power levels 1 through 15)	± 3.0 dB (normal conditions)	

Table 71. RX sensitivity

Version	GMSK (TSxx)	8PSK (TSxB)
TSTx (800)	< -99.0 dBm	< -94.3 dBm
TSGx (900)	< -99.0 dBm	< -94.3 dBm
TSDx (1800)	< -97.8 dBm	< -92.6 dBm
TSPx (1900)	< -97.8 dBm	< -92.6 dBm

3.11 Wideband Combiner (WCxA) unit

3.11.1 Wideband Combiner (WCxA) unit alternatives

Table 72. Unit alternatives

Unit	Frequency band
WCGA	GSM/EDGE 800, 900
WCDA	GSM/EDGE 1800
WCPA	GSM/EDGE 1900

3.11.2 Dimensions and weight of Wideband Combiner (WCxA) unit

Table 73. Maximum dimensions and weight

Property	Value (metric)	Value (imperial)
Height	75 mm	3.0 in.
Width	188 mm	7.4 in.

Table 73. Maximum dimensions and weight (cont.)

Property	Value (metric)	Value (imperial)
Depth	295 mm	11.6 in.
Weight	3.5 kg	7.7 lb

3.11.3 RF properties for Wideband Combiner (WCxA) unit

Table 74. Operating frequency range

Version	Frequency range
WCGA (GSM/EDGE 800/900)	869 to 960 MHz
WCDA (GSM/EDGE 1800)	1805 to 1880 MHz
WCPA (GSM/EDGE 1900)	1930 to 1990 MHz

Table 75. Maximum insertion loss

Property	Insertion loss	Return loss (input/ output)
TX 1 to TX OUT	-3.5 dB maximum	-20 dB maximum
TX 2 to TX OUT	-3.5 dB maximum	-20 dB maximum

Table 76. Maximum RF input power

Property	Value
rms	48 dBm (63 W)
Peak (20 µsec peak, 550 µsec between peaks)	52 dBm (158.5 W)
Peak voltage	90 V

Impedance

The nominal input and output impedance of the WCxA unit is 50 Ω.

3.12 Triple Wideband Combiner (WCxT) unit

3.12.1 Triple Wideband Combiner (WCxT) unit alternatives

Table 77. Unit alternatives

Unit	Frequency band
WCGT	GSM/EDGE 800/900
WCDT	GSM/EDGE 1800
WCPT	GSM/EDGE 1900

3.12.2 Dimensions and weight of Triple Wideband Combiner (WCxT) unit

Table 78. Maximum dimensions and weight

Property	Value (metric)	Value (imperial)
Height	77 mm	3.0 in.
Width	188 mm	7.4 in.
Depth	393 mm	15.5 in.
Weight	3.5 kg	7.7 lb

3.12.3 RF properties for Triple Wideband Combiner (WCxT) unit

Table 79. Operating frequency range

Version	Frequency range
WCGT (GSM/EDGE 800/900)	869 to 960 MHz
WCDT (GSM/EDGE 1800)	1805 to 1880 MHz
WCPT (GSM/EDGE 1900)	1930 to 1990 MHz

Table 80. Maximum insertion loss

Property	Insertion loss	Return loss (input/ output)
TX 1 to TX OUT	-3.5 dB maximum	-20 dB maximum
TX 2 to TX OUT	-3.5 dB maximum	-20 dB maximum

Table 81. Maximum RF input power

Property	Value
rms	48 dBm (63 W)
Peak (20 µsec peak, 550 µsec between peaks)	52 dBm (158.5 W)
Peak voltage	90 V

Impedance

The nominal input and output impedance of the WCxT unit is 50 Ω.

3.13 Transmission (VXxx) unit

3.13.1 Transmission (VXxx) unit alternatives

Table 82. Alternatives

Unit	Interface	Usage
FXC RRI	Two Flexbus interfaces	Radio-link to FlexiHopper Microwave Radio or Metro Hopper Radio
FXC STM-1/FXC Bridge	Two STM-1 interfaces	STM-1 optical fibre
FXC E1	Four Abis line interfaces	Wireline for E1 use
FXC E1/T1	Four Abis line interfaces	Wireline for E1 or T1 use
FC E1/T1	One Abis line interface	Wireline for E1 or T1 (co-siting with Talk-family)

3.13.2 BTS transmission capacity signal types

Table 83. Signal types

Signal Type	Description
EDAP	Edge Dynamic Abis Pool (EDAP) buses can be used to optimise the creation of cross-connections in a loop network by automatically allocating D-buses and creating the required cross-connections. Traffic Manager's EDAP support includes: • adding new EDAPs • adding a TRX to or removing a TRX from an existing EDAP • modifying the size of the existing EDAPs • removing EDAPs
OMUSIG	The BTS can have one OMUSIG which allocates 2, 4 or 8 bits in one time slot, depending on the link speed used (16, 32 or 64 kbit/s).
TCH	The BTS must be allocated at least as many TCHs as there are TRXs installed in it (1 to 12). Each TCH allocates 2 contiguous time slots (16 bits) for a single TRX. Each time slot is marked with the TRX number. The TCHs are numbered from 1 to 12 in the order in which they are defined.
TRXSIG	The BTS must be allocated at least as many TRXSIGs as there are TRXs installed in it (1 - 12). Each TRXSIG can allocate 2, 4 or 8 bits in one time slot depending on the link speed used (16, 32 or 64 kbit/s). The TRXSIGs are numbered from 1 to 12 in order of which they are entered.
TRXSIG on TCHs	The TRXSIG can be reserved on a traffic channel (TCH) but then up to 4 radio time slots (8 bits) are lost. The signal type must always start from the first bit of the channel.

3.14 FC E1/T1

3.14.1 Dimensions and weight of FC E1/T1 Transmission (VXxx) units

Table 84. Dimensions and weight of FC E1/T1 transmission unit

Property	Value (metric)	Value (imperial)
Height	254 mm	10 in.
Width	30 mm	1.18 in.
Depth	220 mm	8.7 in.
Weight	1.35 kg	3 lb.

3.14.2 International standards; FC E1/T1 transmission (VXxx) units

Table 85. International standards for FC E1/T1 transmission unit

Standard	Note
2048 kbit/s E1 interface:	
ITU-T G.703 (1991)	Physical/electrical characteristics of hierarchical digital interfaces
ITU-T G.704 (10/94)	Synchronous frame structures used at primary and secondary hierarchical levels.
ITU-T G.706 (1991)	Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704.
ITU-T G.823 (03/93)	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy.
ITU-T G.826 (08/96)	Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate.
1544 kbit/s T1 interface:	
ITU-T G.824 (03/93)	The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy

Table 85. International standards for FC E1/T1 transmission unit (cont.)

Standard	Note
ANSI T1.403 (1995) and T1.102 (1993)	Digital interface characteristics Functional Interface Characteristics PCM Coding Law Primary PCM Multiplexer Performance parameters
BELCORE GR-1089	Electromagnetic compatibility and electrical safety - generic criteria for network telecommunications equipment
FCC Part 68.308	Signal power limitations

Table 86. International standards for FXC STM-1 and FXC Bridge transmission units

Standard	Note
ITU-T G.828 (March 2000)	Error performance parameters and objectives for international, constant bit rate synchronous digital paths.
ITU-T G.829 (December 2002)	Digital networks - Quality and availability targets - Error performance events for SDH multiplex and regenerator sections.
ITU-T G.957	Digital sections and digital line systems - Optical interfaces of equipments and systems relating to the synchronous digital hierarchy.
ETS 300147 (September 2001)	ETSI Transmission and Multiplexing; Synchronous Digital Hierarchy - Multiplexing Structure.
EN 300417-1-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 1: Generic processes and performance.
EN 300417-2-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 2: SDH and PDH physical layer functions.
EN 300417-3-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 3: STM-N MS and RS section layer functions.

Table 86. International standards for FXC STM-1 and FXC Bridge transmission units (cont.)

Standard	Note
EN 300417-4-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 4: SDH path layer functions.
EN 300417-5-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 5: PDH layer functions.
EN 300417-6-1 (May 1999)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 6: Synchronisation layer functions.
EN 300417-7-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 7: Equipment Management and Auxiliary Layer Functions.
EN 300462-1 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 1: Definition and terminology for synchronisation networks.
EN 300462-2 (June 2002)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 2: Synchronisation Network Architecture.
EN 300462-3 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 3: The control of jitter and wander within synchronisation networks.
EN 300462-4 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 4: Timing characteristic of slave clocks suitable for synchronisation supply to SDH and PDH equipment.
EN 300462-5 (June 1998)	ETSI Transmission and Multiplexing Generic requirements for synchronisation networks; Part 5: Timing characteristics of slave clocks suitable for operation in SDH equipment.
EN 300462-6 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 6: Timing characteristics of primary clocks.

Table 86. International standards for FXC STM-1 and FXC Bridge transmission units (cont.)

Standard	Note
TS 101009 (V1.1.1. (November 1997))	ETSI Transmission and Multiplexing; SDH Network protection schemes types and characteristics.
TS 101010 (V1.1.1. (November 1997))	ETSI Transmission and Multiplexing; SDH Network protection schemes.

3.14.3 Electrical properties for FC E1/T1 Transmission (VXxx) units

Table 87. Electrical data for FC E1/T1 transmission unit

Property	Value
DC supply voltage	Powered by BTS
Power consumption	< 6 W

3.15 FXC E1 and FXC E1/T1

3.15.1 Dimensions and weight of FXC E1 and E1/T1 transmission units

Table 88. FXC E1 and FXC E1/T1 dimensions and weight

Height	254 mm (10 in.)
Width	30 mm (1.18 in.)
Depth	220 mm (8.7 in.)
Weight	1.35 kg (3 lb.)

3.15.2 Power requirements for FXC E1 and FXC E1/T1 transmission units

Table 89. Power supply and power consumption

DC supply voltage	Powered by Nokia MetroHub or BTS
Power consumption	< 6 W

3.15.3 International standards; FXC E1 and FXC E1/T1 transmission units

Table 90. International recommendations

2048 kbit/s E1 interface	
ITU-T G.703 (1991)	Physical/electrical characteristics of hierarchical digital interfaces
ITU-T G.704 (10/94)	Synchronous frame structures used at primary and secondary hierarchical levels
ITU-T G.706 (1991)	Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704
ITU-T G.823 (03/93)	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy
ITU-T G.826 (08/96)	Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate
1544 kbit/s T1 interface	
ITU-T G.824 (03/93)	The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy
ANSI T1.403 (1995) and T1.102 (1993)	Digital interface characteristics Functional Interface Characteristics PCM Coding Law Primary PCM Multiplexer Performance parameters
BELCORE GR-1089	Electromagnetic compatibility and electrical safety - generic criteria for network telecommunications equipment.
FCC Part 68.308	Signal power limitations

3.16 FXC RRI

3.16.1 Dimensions and weight of the FXC RRI transmission unit

Table 91. FXC RRI dimensions and weight

Height	254 mm (10 in.)
Width	30 mm (1.18 in.)
Depth	220 mm (8.7 in.)
Weight	1.35 kg (3 lb.)

3.16.2 Power requirements for the FXC RRI transmission unit

Table 92. Power supply and power consumption

DC supply voltage	Powered by Nokia MetroHub or BTS
Power consumption	< 8 W (For OU power consumption, see the radio documentation)

3.16.3 International standards; FXC RRI transmission units

Table 93. International recommendations

Flexbus interface	
ITU-T G.704 (10/94)	Synchronous frame structures used at primary and secondary hierarchical levels.
ITU-T G.706 (1991)	Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704
ITU-T G.823 (03/93)	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy.

Table 93. International recommendations (cont.)

Flexbus interface	
ITU-T G.826 (08/96)	Error performance parameters and objectives for international, constant bit rate digital paths at or above primary rate.
ITU-T G.921	Digital sections based on the 2048 kbit/s hierarchy

3.16.4 Flexbus cable requirements for the FXC RRI transmission unit

Table 94. Flexbus cable requirements

Cable type	Coaxial cable, double shielded or semi-rigid
Recommended cable types	RG-223, max. length 140 m RG-214, max. length 300 m
Characteristic impedance	50 ± 2 Ω
DC resistance	< 4.6 Ω (sum of inner and outer conductor)
Data attenuation	< 9.0 dB at 19 MHz
Flexbus signals	- DC power supply - Bidirectional data (37 Mbit/s, NRZ code, 1.4V pulse amplitude)

Note

Over-voltage protection and cable equalizer are integral parts of the Flexbus interface. Primary over-voltage protection is a 90 V gas-arrester. External gas-arresters can be used as well.

Table 95. Recommended cable type

RG-223	Maximum length 140 m (459 ft.)
RG-214	Maximum length 300 m (984 ft.)

3.17 FXC STM-1 and FXC Bridge

3.17.1 Dimensions and weight of FXC STM-1 and FXC Bridge transmission units

Table 96. FXC STM-1 and FXC Bridge dimensions and weight

Height	254 mm (10 in.)
Width	28 mm (1.1 in.)
Depth	187 mm (7.4 in.)
Weight	1.35 kg (3 lb.)

3.17.2 Power requirements for FXC STM-1 and FXC Bridge transmission units

Table 97. Power supply and power consumption

DC supply voltage	Powered by Nokia MetroHub or BTS
Power consumption	< 11 W

3.17.3 International standards; FXC STM-1 and FXC Bridge transmission units

ITU-T G.828 (March 2000)	Error performance parameters and objectives for international, constant bit rate synchronous digital paths.
ITU-T G.829 (December 2002)	Digital networks - Quality and availability targets - Error performance events for SDH multiplex and regenerator sections.
ITU-T G.957	Digital sections and digital line systems - Optical interfaces of equipments and systems relating to the synchronous digital hierarchy.
ETS 300147 (September 2001)	ETSI Transmission and Multiplexing; Synchronous Digital Hierarchy - Multiplexing Structure.

EN 300417-1-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 1: Generic processes and performance.
EN 300417-2-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 2: SDH and PDH physical layer functions.
EN 300417-3-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 3: STM-N MS and RS section layer functions.
EN 300417-4-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 4: SDH path layer functions.
EN 300417-5-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 5: PDH layer functions.
EN 300417-6-1 (May 1999)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 6: Synchronisation layer functions.
EN 300417-7-1 (October 2001)	ETSI Transmission and Multiplexing; Generic functional requirements for SDH equipment; Part 7: Equipment Management and Auxiliary Layer Functions.
EN 300462-1 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 1: Definition and terminology for synchronisation networks.
EN 300462-2 (June 2002)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 2: Synchronisation Network Architecture.
EN 300462-3 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 3: The control of jitter and wander within synchronisation networks.
EN 300462-4 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 4: Timing characteristic of slave clocks suitable for synchronisation supply to SDH and PDH equipment.

EN 300462-5 (June 1998)	ETSI Transmission and Multiplexing Generic requirements for synchronisation networks; Part 5: Timing characteristics of slave clocks suitable for operation in SDH equipment.
EN 300462-6 (June 1998)	ETSI Transmission and Multiplexing; Generic requirements for synchronisation networks; Part 6: Timing characteristics of primary clocks.
TS 101009 (V1.1.1. (November 1997))	ETSI Transmission and Multiplexing; SDH Network protection schemes types and characteristics.
TS 101010 (V1.1.1. (November 1997))	ETSI Transmission and Multiplexing; SDH Network protection schemes.

3.18 Electrical properties for -48 VDC filter module

The optional -48 VDC Filter module is required when installing -48 VDC power. The DC filter is used for attenuating conducted and radiated emission between the BTS and the external 48 DC power supply network. The DC filter is designed to ensure adequate protection against user contact with any part at hazardous voltage or energy levels.

Note

The -48 VDC filter module is pre-installed in the cabinet.

The operating temperature of the DC filter module is between -33 and +65 ^{o}C. The following electrical specifications apply across the entire operating temperature range:

- Rated voltage:

  60 VDC

  Operating voltage V48N (-) and V48RTN (+).

- Rated current:

  140 ADC

  The current flow is bi-directional. The current can flow from the input threaded studs to the output threaded studs, and from the output threaded studs to the input threaded studs.

- Leakage current:

  Less than 1mA

- DC resistance:

  5 mΩ/line maximum

- Insulation resistance:

  500 MΩ minimum (100VDC. +/- to chassis/PE)

- Dielectric Strength:

  The electric strength tests have been performed on every single filter.

Between + and -	707VDC	2s.
+,- to chassis	707VDC	2s.

3.19 Electrical properties for Mini outdoor AC/DC filter module

The Mini outdoor cabinet AC/DC filter module is preinstalled in the cabinet.

The operating temperature of the AC/DC filter module is between -40 and +85 ^{o}C. The following electrical specifications apply across the entire operating temperature range:

- Rated voltage:

  max. DC 60 V/ AC 230

- Leakage current:

  Less than 8.107mA

- DC resistance:

  DC 2 x 5 mΩ/line maximum

  AC 2 x 15 mΩ/line maximum

4 Unit cable specifications

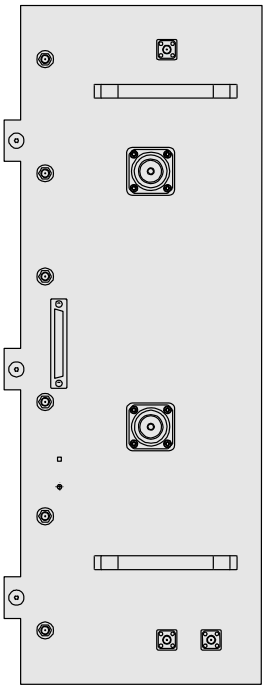
4.1 Technical data for unit cable kits

Table 98. Unit cable kits

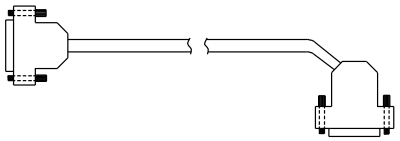
Category	Property	Cable quantity	From unit	To unit
066643x	994081x (M2xA)	2 each	DVxx or RTxx	M2xA
066644x	993856x (M6xA)	2 each	DVxx or RTxx	M6xA
066647x	993747x (WCxA)	1 each	WCxA	WCxA or DVxx
069314x	993935x (Bias Tee)	2 each (Indoor cabinet) 4 each (Outdoor cabinet) 1 - Adaptor plate	Bias Tee Interface Module	BPxx
066646x	993997x (RTxx)	1 each	RTxx	RFU backplane
	993997x (DVxx)	1 each	DVxx	RFU backplane
069313x	993744x (or 994751) (Antenna: 2.0 m (6.6 ft))	2 each	DVxx or RTxx	Antenna box
	993936x (or 994750) (Antenna: 1.4 m (4.6 ft))	2 each	DVxx or RTxx	Antenna box
	993937x (or 994752) (Antenna: 1.7 m (5.6 ft))	2 each	DVxx or RTxx	Antenna box

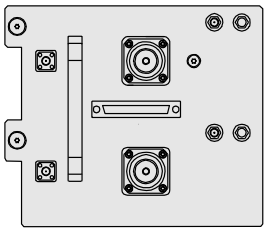
Table 98. Unit cable kits (cont.)

Category	Property	Cable quantity	From unit	To unit
083529x	995060x (WCxT)	3 each	TSxx	WCxT (Block A, B, or C)
			WCxT (Block A, B, or C)	WCxT (Block A, B, or C)
			WCxT (Block A, B, or C)	DVxx
066641x	993857xx (TSxx)	2 each	TSxx	M2xA or M6xA
				DVxx or RTxx or WCxA
				WCxT (Block A, B, or C)
			WCxT (Block A, B, or C)	WCxT (Block A, B, or C)
			WCxT (Block A, B, or C)	DVxx

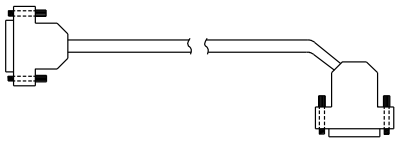


RTxx to RFU Backplane
Kit # 066646x.xxx / Part #993997x, quantity one





DVxx to RFU Backplane
Kit # 066646x.xxx / Part #993997x, quantity one



Antenna cable kit

Kit #069313x.xxx
Part:
#994751x, 2.0m long, quantity two
#994752x, 1.7m long, quantity two
#994750x, 1.4m long, quantity two

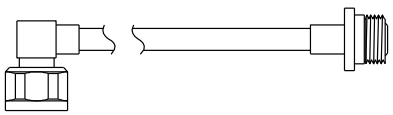


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Figure 1. Plug-in units with cable kits

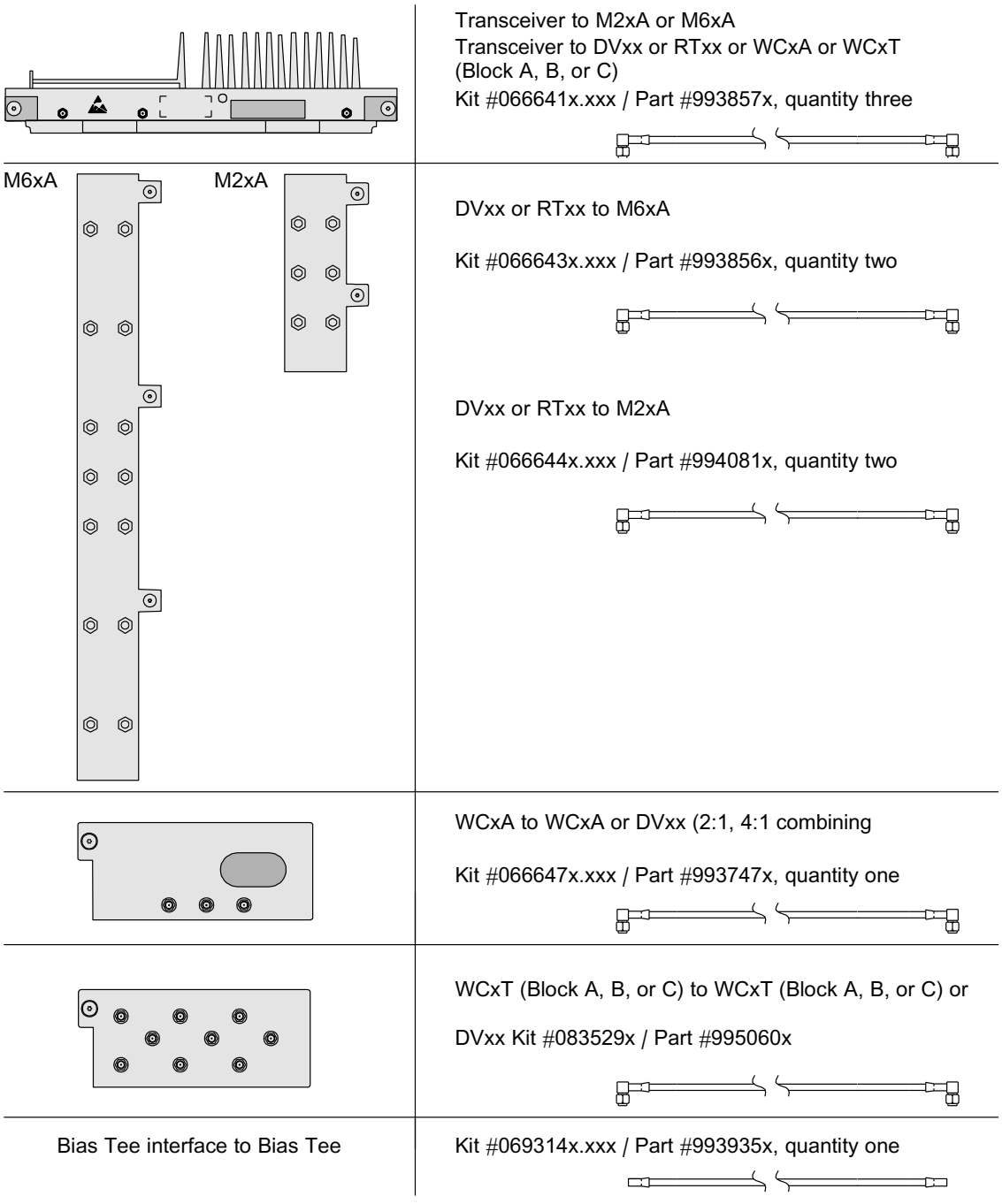

Figure 2. Plug-in units with cable kits

4.2 Technical data for the LMP cable

The LMP cable provides a connection between the laptop computer and the LMP port on the CCUA.

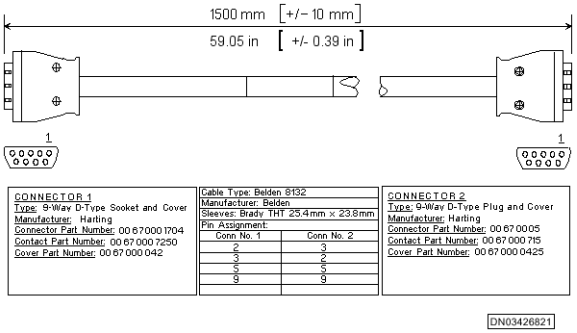

Figure 3. LMP cable specification

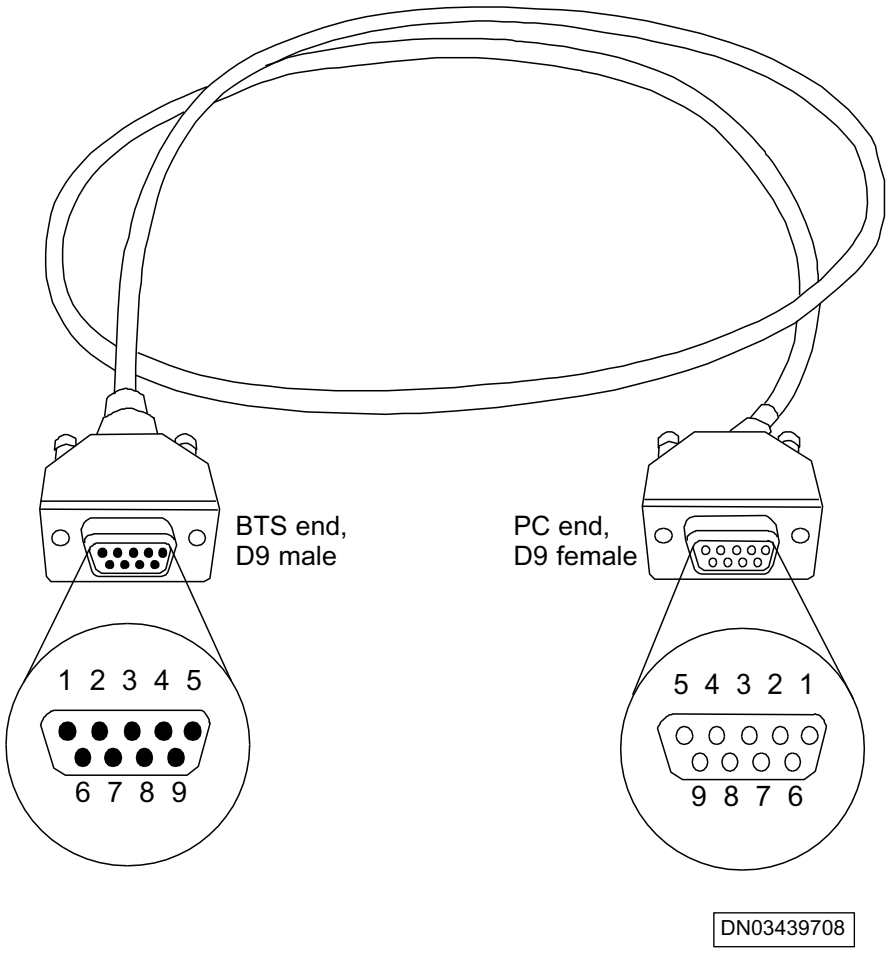

Figure 4. LMP cable

Table 99. Connector pin order

BTS end, D9 male, pin number	PC end, D9 female, pin number	PC end, D25 female, pin number
2, LMP in	3, transmitted data	2, transmitted data
3, LMP out	2, received data	3, received data
5, ground	5, ground	7, ground