



Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) - FCC Marking

Document number: PE/BTS/DJD/023592
Document issue: V01.01 / EN
Document status: Standard
Date: 29/04/2008

External Document

Copyright© 2008 Nortel Networks, All Rights Reserved

Printed in France

NORTEL NETWORKS CONFIDENTIAL:

The information contained in this document is the property of Nortel Networks. Except as specifically authorized in writing by Nortel Networks, the holder of this document shall keep the information contained herein confidential and shall protect same in whole or in part from disclosure and dissemination to third parties and use same for evaluation, operation and maintenance purposes only.

The content of this document is provided for information purposes only and is subject to modification. It does not constitute any representation or warranty from Nortel Networks as to the content or accuracy of the information contained herein, including but not limited to the suitability and performances of the product or its intended application.

The following are trademarks of Nortel Networks: *NORTEL NETWORKS, the NORTEL NETWORKS corporate logo, the NORTEL Globemark, UNIFIED NETWORKS. The information in this document is subject to change without notice. Nortel Networks assumes no responsibility for errors that might appear in this document.

All other brand and product names are trademarks or registered trademarks of their respective holders.

PUBLICATION HISTORY

29/04/2008 Issue 01.01 / EN Status: standard – Creation	
Author: Stephane Chenet BTS HW GSM PI Team	Verified / Approved by Alain CAILLE - BTS HW GSM PI & Regulatory manager 

CONTENTS

1.	INTRODUCTION	4
2.	RELATED DOCUMENTS.....	4
3.	RELATED DOCUMENTS.....	4
3.1.	APPLICABLE STANDARDS	4
3.2.	REFERENCE DOCUMENTS	5
4.	IDENTIFICATION OF EQUIPMENT UNDER TEST	6
5.	TESTS PRESENTATION.....	10
5.1.	TEST PROCEDURE	10
5.2.	SOFTWARE CONFIGURATION	11
5.3.	SPECIFICATION RELATED FOR TX TESTS	11
5.3.1	Mean RF output power	11
5.3.2	Phase and mean frequency error	12
5.4.	TEST RESULTS ON NG GSM18000 OUTDOOR BTS.....	13
5.4.1	BTS CONFIGURATION FOR TESTS	13
5.4.2	MOLDULE USED DURING RF TESTS	14
6.	RF TEST RESULTS	15
6.1.	TESTS AT -40°C	15
6.1.1	TX TESTS ON RM SLOT 0 (GSM 850MHz) IN GMSK MODULATION.....	15
6.1.2	TX TESTS ON RM SLOT 3 (GSM 1900MHz) IN GMSK MODULATION.....	16
6.2.	TESTS AT -30°C	17
6.3.	TESTS AT -20°C	19
6.4.	TESTS AT -10°C	21
6.5.	TESTS AT 0°C	23
6.6.	TESTS AT +10°C	25
6.7.	TESTS AT +20°C	27
6.8.	TESTS AT +30°C	29
6.9.	TESTS AT +40°C	29
6.10.	TESTS AT +50°C	30
6.11.	EXAMPLE OF PHASE / FREQUENCY ERROR CURVE	32
7.	CONCLUSION.....	35
8.	MEASUREMENT EQUIPMENT LIST	35
9.	ABBREVIATIONS AND DEFINITIONS	36
9.3.	DEFINITIONS	38

1. INTRODUCTION

The objective of this document is to present the Radio tests which have been performed in extreme temperature on the NG 18000 Outdoor BTS (ETR version) for FCC Mark.

For North America, applicable standard for Radio of GSM 850 MHz Base stations are the FCC Part 22 / RS132 & standard for Radio of PCS 1900 MHz Base stations are the FCC Part 24 / RS133 .

This document is addressed to Nortel Product Integrity team.

2. RELATED DOCUMENTS

3. RELATED DOCUMENTS

3.1. APPLICABLE STANDARDS

[A1]	CFR 47 Part 2	Code of Federal Regulations - Part 2 - Frequency Allocations and Radio Treaty Matters. General Rules and Regulations. Date : June 1996.
[A2]	CFR 47 Part 22	Code of Federal Regulations - Part 22 - Public Mobiles Services.
[A3]	RSS 132	Industry Canada - 800 MHz Cellular Telephones Employing New Technologies.
[A4]	CFR 47 Part 24	Code of Federal Regulations - Part 24 - Personal Communications Services.
[A5]	RSS 133	Industry Canada – 2 GHz Personal Communications Services.

3.2. REFERENCE DOCUMENTS

- | | | |
|------|-------------------|---|
| [R1] | PE/BTS/DPL/022692 | GSM BTS 18000 Project Qualification Plan for Outdoor NG
BTS introduction (v01.07/EN) |
| [R2] | PE/BTS/DPL/023486 | FCC Radio Test Plan for GSM850/PCS1900 NG Outdoor
18000 BTS (FCCID AB6BTS18OUT) |
| [R3] | PE/BTS/DJD/023017 | Outdoor NG BTS18000 hardware delivery notice
03.06 / EN |

4. IDENTIFICATION OF EQUIPMENT UNDER TEST

This document applies to:

Product: NG 18000 Outdoor BTS
Manufacturer: NORTEL
Frequencies: GSM 850 MHz & GSM 1900 MHz

AVLM Recipient: LCIE	Date of delivery: 28/APR/2008
Product: GSM NG BTS 18000 Outdoor	
Article delivered: GSM NG BTS 18000 Outdoor	Article code: NTT915BS P1
Section transmitting: 8Z60	Designer name: P.JEULAND / S.CHENET
Cabinet Serial Number: Serial Number : N°5	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications:	
<ul style="list-style-type: none"> - PE/BTS/DD/ 5282 V04.01/EN BTS 18000 system design specification 	
Issues fixed on the cabinet:	
<ul style="list-style-type: none"> - None Label on the Cabinet, no pec code, no serial number - New ECS board - New ETR board added / damper alarm updated - Acoustic kit: Gore screen, New rear panel with Acoustic foam and without chicane - ECS and ETR Fan tray: with Fan support move up for to optimize the air flow and Front damper solenoid link change - EMI gasket modify - New Heater version: 2 STEGO Heater (Heater and Fan in same module) / New position in the cabinet - Perforated Gore plate - Firmware updated in version 1.14 	
Missing Equipment:	
<ul style="list-style-type: none"> - None 	

**Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) -
FCC Marking**

Software compatibility:

Modules software version :

- ICM/ABM : CDI120795
- RM : CDI121233

PI software tools :

- WINTMI: v03d306
- TIL COAM: V16a402
- TIL Alarm: V16a401
- WINTOOL: V05a2e19

**Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) -
FCC Marking**

The delivery includes :

ARTICLE	PEC code	Release	Serial number	Comment
BARE CABINET S333 & ECS/ETR	NTT915BS	P1	5	
S666 EXPANSION KIT ETR	NTT998ED	P1	5	
ECS MAIN Rohs VERSION	NTT965AA	01	NNTMJR000LCT	FW 01.14
ETR board Rohs version	NTT965AM	02	NNTMJR000RE2	
KIT BATTERY NARADA	NTT988AA	P1	N/A	
RICAM	NTN024AA	D2	ERRATIX	ICM 0: 47.164.182.175 ICM 1: 47.164.182.176 ABM : 47.164.182.177
ABM	NTN029AF	D1	NNTMGR00MCVF	47.164.182.189
CIBP	NTN027AM	01	NNTMDV03EP8L	
CIBP	NTN027AM	01	NNTMDV03EP8V	
DBP2	NTN020EF	01	NNTMJR000023	
DBP2	NTN020EF	01	NNTMJR000026	
ADU	NTT966CA	P1	ATSNZH230293	
RICO	NTN020CF	01	NNTMJR000022	No label on the front
DDM 850 W/VSWR W/HYBRIDS	NTN063HA	D2	FICT03002119	
DDM 850 W/VSWR W/HYBRIDS	NTN063HA	D2	FICT0300213H	
DDM 850 W/VSWR W/HYBRIDS	NTN063HA	D2	FICT0300204F	
DDM 1900 W/VSWR W/HYBRIDS	NTN063AA	04	FICT03000MPC	
DDM 1900 W/VSWR W/HYBRIDS	NTN063AA	03	FICT03000N7C	
DDM 1900 W/VSWR W/HYBRIDS	NTN063AA	04	FICT030016F3	
HPRM 850 60/45	NTN050JA	D1	CDN200651003	47.164.182.178
HPRM 850 60/45	NTN050JA	D1	CDN200651004	47.164.182.184
HPRM 850 60/45	NTN050JA	D1	CDN200651008	47.164.182.185
RM 1900 30/30	NTN050PM	D5	CDN200640003	47.164.182.211
RM 1900 30/30	NTN050PM	D3	CDN200639007	47.164.182.230
RM 1900 30/30	NTN050PM	D4	CDN200640006	47.164.182.229
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224293	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224291	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224294	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224286	
ngUCPS GSM CCU	NTT966DA	P1	ATSNZH229049	
ngUCPS BTS18K SHELF&DDU	NTT966AA	P1	ATSNZH236039	
ngUSER-ICO	NTT988DA	P1	N°2	
ALPRO 2	NTT971AF	D1	NNTMGT003U5C	
ALPRO 2	NTT971AF	D1	NNTMGT003U5A	
UCPS Rectifier Plastic Filler	NTQ66651	D1		

**Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) -
FCC Marking**

Additional delivery:

ARTICLE	PEC code	Release	Serial number	Comment
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224300	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224296	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224298	
ngUCPS 1600W RECTIFIER	NTT966EA	P1	ATSNZH224288	

Tests performed:

The following features have been tested:

- MIC on IFM
- Link D0/D1
- IFM/ ICM / ABM / RM Inventory test
- DDM Alarms & Inventory interface
- Dale & Dali
- TX @ Pmax on each Radio Module

Functional limits :

- **Hardware Limitations :**
-
- **Software Limitations :**
-

Documents related to the Hardware Test Specifications

Reference of the test specifications documents:

- PE/BTS/DJD/010557 V01/EN Hardware integration test specification for BTS 18000 Outdoor

Documents related to the Hardware Test Report

Reference of the test reports documents:

- PE/BTS/DJD/023076 V02/EN Hardware integration tests report for ng BTS 18000 GSM Outdoor

Remark: The exact configuration used during tests is described in § 5.4.2

5. TESTS PRESENTATION

5.1. TEST PROCEDURE

BTS are able to operate under the following external extreme temperatures and voltages:

- NG 18000 Outdoor BTS (ETR version) : -40°C until + 50 °C by steps of 10°C; 187 Vac and 264 Vac for each temperature steps

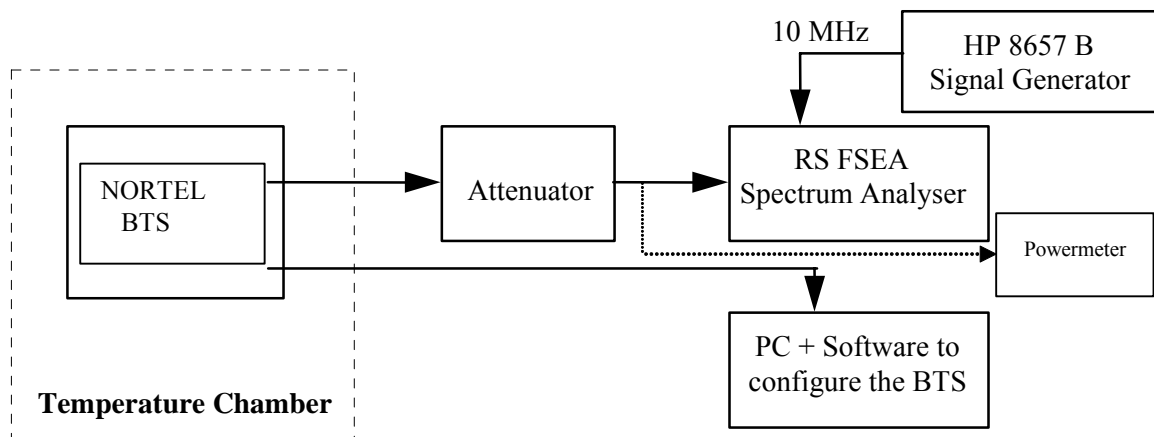
Modules RM GSM 850MHz are configured with nominal power regulation at maximum power (60W) 47.8 dBm in GMSK modulation,

Modules RM GSM 1900MHz run with nominal power regulation at maximum power (30W) 44.8 dBm in GMSK modulation.

All RM were configured to transmit at maximum power (Static level 0).

A period of at least two hours was performed prior to start radio measurement to ensure that all the components of the oscillator circuit was stabilized for each steps of temperature.

The equipment was configured as shown in Schematic below.



5.2. SOFTWARE CONFIGURATION

Software compatibility:

Modules software version :
Load BTS S18000 v16b1e11 CDI121234

- ICM/ABM : CDI120795
- RM : CDI121233

PI software tools :

- WINTMI: v03d306
- TIL COAM: V16a402
- TIL Alarm: V16a401
- WINTOOL: V05a2e19

5.3. SPECIFICATION RELATED FOR TX TESTS

5.3.1 MEAN RF OUTPUT POWER

➤ RM (60W/45W) GSM850

RM Radio module output:

RM2 Output (GMSK 60W)	47,8 dBm ± 0.5 dB
RM2 Output (8PSK 45W)	46,5 dBm ± 0.5 dB

RF Power at antenna connector - DDM H2 configuration:

GMSK	41 dBm ≤ RF power ≤ 45 dBm
8PSK	40 dBm ≤ RF power ≤ 44 dBm

➤ RM 30W/30W GSM1900

RM Radio module output:

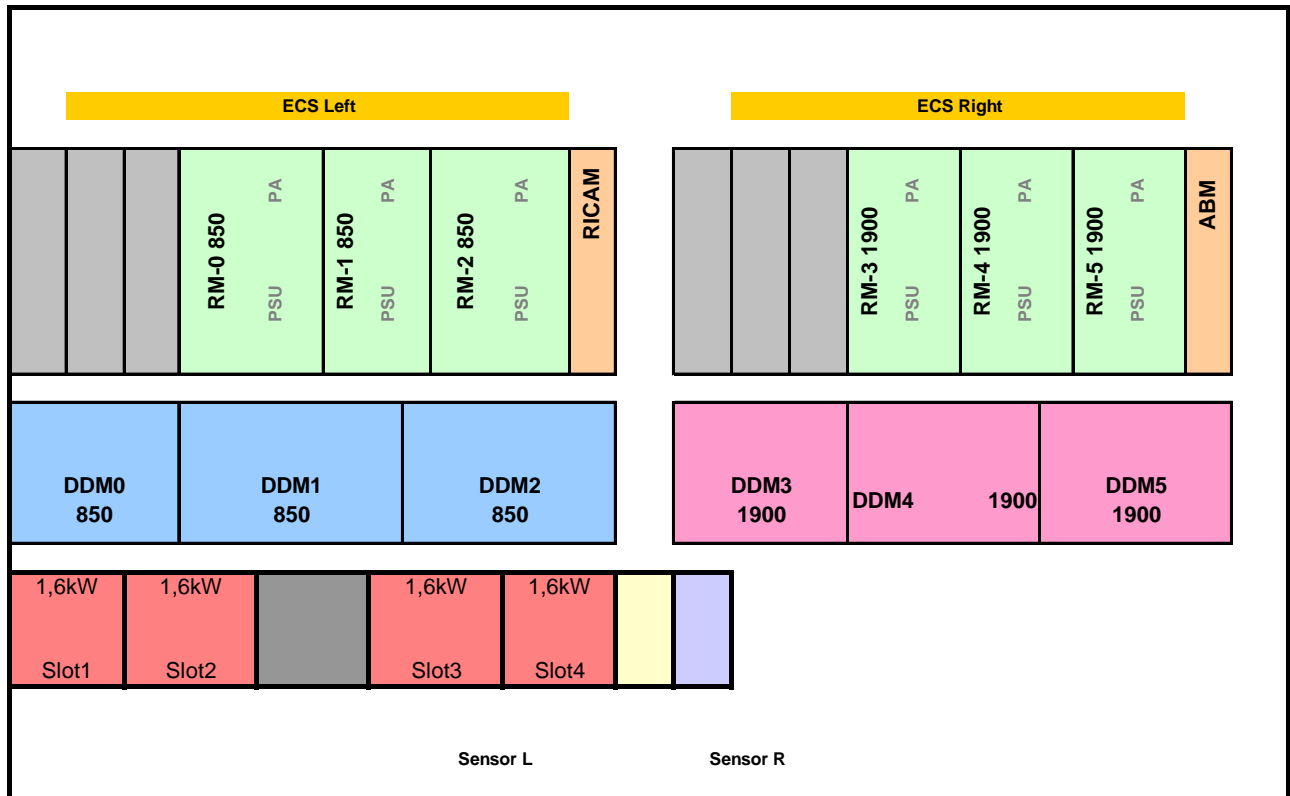
RM2 Output (GMSK 30W)	44,8 dBm ± 0.5 dB
RM2 Output (8PSK 30W)	44,8 dBm ± 0.5 dB

RF Power at antenna connector - DDM H2 configuration:

GMSK	38 dBm ≤ RF power ≤ 42 dBm
8PSK	38 dBm ≤ RF power ≤ 42 dBm

5.4. TEST RESULTS ON NG GSM18000 OUTDOOR BTS

5.4.1 BTS CONFIGURATION FOR TESTS



Maximum radio configuration:
 3 x 60W on each RM GSM850 module
 3 x 30W on each RM GSM1900 module

The curve of the cooling system (ECS / ETR) applied are described below:

T(°C)	From -50°C to 0°C	10	20	30	40	50	60
Speed (RPM)	1308	1598	1901	2301	2452	2573	3100
Speed parameter ECS Board	432	528	628	760	810	850	1024

Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) - FCC Marking

```

ECS - HyperTerminal
Fichier Edition Affichage Appel Transfert ?
[Icons]

SANMINA-SCI          ECS/ETR    HW:BETA    FW:1.14    Apr 01, 2008
CONFIG: 6   ETR:Y
TEMP_L: 49C  TEMP_R: 49C

CEATS=H (H=ok)
C1 (High_up) = +75C+
C2 (High_dn) = +60C+
C3 (Low_dn)  = -10C+/-
C4 (Low_up)  = -03C+/-

FAN CURVE POINTS {0...1024=max}
P100 = 1024 (minimum 300)
P090 = 1024
P080 = 1024
P070 = 1024
P060 = 1024
P050 = 0850
P040 = 0810
P030 = 0760
P020 = 0628
P010 = 0528
P000 = 0432
P-10 = 0432
P-20 = 0432
P-30 = 0432
P-40 = 0432
P-50 = 0432

HEATER 1 [L_up:H0 = +10C+  H_dn:H1 = +05C+ ] OFF
HEATER 2 [L_up:H2 = +05C+  H_dn:H3 = +00C+ ] OFF
HEATER 3 [L_up:H4 = +00C+  H_dn:H5 = -10C+/-] OFF

DAMPER MAIN [H_up:D0 = 10C+  L_dn:D1 = 05C+] ON
DAMPER AUX  [L_up:D2 = 20C+  H_dn:D3 = 12C+] OFF

Blower Speed:          I2C  1000010000000000
BL_0L = 0849          Alarms 1 ... 10 ... 0
BL_1L = 0844          7    07    0
BL_0R = 0850
BL_1R = 0845

Filter: FL=ok FR=ok

HELP: -----
enter=refresh | Pxxx=yyyy | Hx=yyy | Dx=yy | Cx=yyy | RESET | ToFlash *

18:09:31 connecté  ANSI  19200 8-N-1  DÉFIL  [Maj] Num  Capturer  Écho
  
```

5.4.2 MOLDULE USED DURING RF TESTS

Note: the RM 850MHz used for RF tests was placed in slot 0 inside the BTS and RM 1900MHZ in slot 3.

Tested modules

Location	Article	PEC code	Release	Serial number
RM in slot 0	RM 850MHz 60/45W	NTN050JA	D1	CDN200651003
DDM in slot 0	DDM 850MHz	NTN063HA	D2	FICT03002119
RM in slot 3	RM 1900MHz 30/30W	NTN050PM	D5	CDN200640003
DDM in slot 3	DDM 1900MHz	NTN063AA	04	FICT03000MPC

Note: For each RM
 TDMA 0 connected on DDM slot 0 (Main channel)
 TDMA 1 connected on DDM slot 0 (Main channel)
 TDMA 2 connected on DDM slot 0 (Diversity channel)

6. RF TEST RESULTS

6.1. TESTS AT -40°C

6.1.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +10°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.80	PASS
TDMA 1	190	GMSK	45.06	PASS
TDMA 2	251	GMSK	44.49	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.82	PASS
TDMA 1	190	GMSK	45.02	PASS
TDMA 2	251	GMSK	44.45	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.50 °	2.73 °	PASS	TDMA 0	128	Phase Pk	4.70 °	2.77 °	PASS
		Phase RMS	1.30 °	0.93 °	PASS			Phase RMS	1.29 °	0.94 °	PASS
		Freq	11.43 Hz	2.43 Hz	PASS			Freq	10.01 Hz	2.71 Hz	PASS
TDMA 1	190	Phase Pk	5.23 °	3.23 °	PASS	TDMA 1	190	Phase Pk	4.58 °	3.05 °	PASS
		Phase RMS	1.52 °	1.07 °	PASS			Phase RMS	1.45 °	1.03 °	PASS
		Freq	-13.75 Hz	-2.16 Hz	PASS			Freq	13.11 Hz	1.11 Hz	PASS
TDMA 2	251	Phase Pk	3.91 °	2.64 °	PASS	TDMA 2	251	Phase Pk	5.02 °	2.71 °	PASS
		Phase RMS	1.31 °	0.92 °	PASS			Phase RMS	1.43 °	0.93 °	PASS
		Freq	10.14 Hz	0.66 Hz	PASS			Freq	-12.20 Hz	-0.49 Hz	PASS

Maximum deviation : 13.75 Hz

6.1.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +18°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	41.02	PASS
TDMA 1	661	GMSK	41.43	PASS
TDMA 2	810	GMSK	41.23	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.96	PASS
TDMA 1	661	GMSK	41.40	PASS
TDMA 2	810	GMSK	41.27	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6.58 °	4.64 °	PASS	TDMA 0	512	Phase Pk	6.76 °	4.66 °	PASS
		Phase RMS	2.20 °	1.70 °	PASS			Phase RMS	2.28 °	1.70 °	PASS
		Freq	22.15 Hz	-1.12 Hz	PASS			Freq	-18.21 Hz	-1.25 Hz	PASS
TDMA 1	661	Phase Pk	7.08 °	4.65 °	PASS	TDMA 1	661	Phase Pk	7.58 °	4.72 °	PASS
		Phase RMS	2.19 °	1.64 °	PASS			Phase RMS	2.43 °	1.64 °	PASS
		Freq	-19.95 Hz	-0.69 Hz	PASS			Freq	-21.11 Hz	0.63 Hz	PASS
TDMA 2	810	Phase Pk	7.48 °	4.36 °	PASS	TDMA 2	810	Phase Pk	6.76 °	4.37 °	PASS
		Phase RMS	2.37 °	1.63 °	PASS			Phase RMS	2.39 °	1.60 °	PASS
		Freq	-24.80 Hz	-1.92 Hz	PASS			Freq	-19.69 Hz	0.66 Hz	PASS

Maximum deviation : 24.8 Hz

6.2. TESTS AT -30°C

6.2.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +10.5°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK:
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.77	PASS
TDMA 1	190	GMSK	44.97	PASS
TDMA 2	251	GMSK	44.42	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.74	PASS
TDMA 1	190	GMSK	45.08	PASS
TDMA 2	251	GMSK	44.47	PASS

PHASE AND MEAN FREQUENCY ERROR

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	5.07 °	2.98 °	PASS
		Phase RMS	1.38 °	1.05 °	PASS
		Freq	8.20 Hz	-0.41 Hz	PASS
TDMA 1	190	Phase Pk	4.71 °	3.14 °	PASS
		Phase RMS	1.58 °	1.06 °	PASS
		Freq	-9.69 Hz	-0.99 Hz	PASS
TDMA 2	251	Phase Pk	4.20 °	2.68 °	PASS
		Phase RMS	1.33 °	0.93 °	PASS
		Freq	-10.27 Hz	-1.19 Hz	PASS

For an input voltage of 187VAC:

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.16 °	2.73 °	PASS
		Phase RMS	1.30 °	0.93 °	PASS
		Freq	-9.56 Hz	-0.44 Hz	PASS
TDMA 1	190	Phase Pk	4.78 °	3.18 °	PASS
		Phase RMS	1.39 °	1.06 °	PASS
		Freq	-9.75 Hz	-0.26 Hz	PASS
TDMA 2	251	Phase Pk	3.86 °	2.72 °	PASS
		Phase RMS	1.24 °	0.93 °	PASS
		Freq	14.01 Hz	0.91 Hz	PASS

For an input voltage of 264VAC

Maximum deviation : 14.01 Hz

6.2.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +18.8°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.93	PASS
TDMA 1	661	GMSK	41.37	PASS
TDMA 2	810	GMSK	41.20	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	41.00	PASS
TDMA 1	661	GMSK	41.29	PASS
TDMA 2	810	GMSK	41.13	PASS

PHASE AND MEAN FREQUENCY ERROR

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6.97 °	4.68 °	PASS
		Phase RMS	2.42 °	1.64 °	PASS
		Freq	-22.02 Hz	-2.20 Hz	PASS
TDMA 1	661	Phase Pk	6.66 °	4.64 °	PASS
		Phase RMS	2.40 °	1.68 °	PASS
		Freq	22.73 Hz	3.44 Hz	PASS
TDMA 2	810	Phase Pk	6.07 °	4.36 °	PASS
		Phase RMS	2.39 °	1.63 °	PASS
		Freq	22.86 Hz	1.40 Hz	PASS

For an input voltage of 187VAC:

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	8.01 °	4.71 °	PASS
		Phase RMS	2.22 °	1.66 °	PASS
		Freq	19.18 Hz	-0.85 Hz	PASS
TDMA 1	661	Phase Pk	7.07 °	4.69 °	PASS
		Phase RMS	2.35 °	1.72 °	PASS
		Freq	-19.31 Hz	0.71 Hz	PASS
TDMA 2	810	Phase Pk	8.18 °	4.42 °	PASS
		Phase RMS	2.39 °	1.63 °	PASS
		Freq	21.31 Hz	0.56 Hz	PASS

For an input voltage of 264VAC

Maximum deviation : 22.86 Hz

6.3. TESTS AT -20°C

6.3.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +11.1°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.74	PASS
TDMA 1	190	GMSK	44.85	PASS
TDMA 2	251	GMSK	44.54	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.76	PASS
TDMA 1	190	GMSK	44.90	PASS
TDMA 2	251	GMSK	44.57	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.33 °	2.71 °	PASS	TDMA 0	128	Phase Pk	4.46 °	2.76 °	PASS
		Phase RMS	1.27 °	0.93 °	PASS			Phase RMS	1.33 °	0.93 °	PASS
		Freq	10.27 Hz	-0.23 Hz	PASS			Freq	8.39 Hz	0.48 Hz	PASS
TDMA 1	190	Phase Pk	4.30 °	2.96 °	PASS	TDMA 1	190	Phase Pk	4.34 °	3.02 °	PASS
		Phase RMS	1.31 °	1.00 °	PASS			Phase RMS	1.30 °	1.02 °	PASS
		Freq	10.40 Hz	0.04 Hz	PASS			Freq	-11.88 Hz	-0.89 Hz	PASS
TDMA 2	251	Phase Pk	4.30 °	2.66 °	PASS	TDMA 2	251	Phase Pk	4.28 °	2.71 °	PASS
		Phase RMS	1.43 °	0.91 °	PASS			Phase RMS	1.29 °	0.92 °	PASS
		Freq	-12.59 Hz	-0.60 Hz	PASS			Freq	-9.94 Hz	-1.44 Hz	PASS

Maximum deviation : 12.59 Hz

6.3.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +20.5°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.90	PASS
TDMA 1	661	GMSK	41.18	PASS
TDMA 2	810	GMSK	41.11	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.90	PASS
TDMA 1	661	GMSK	41.24	PASS
TDMA 2	810	GMSK	41.09	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:					For an input voltage of 264VAC						
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7.20 °	4.65 °	PASS	TDMA 0	512	Phase Pk	7.55 °	4.71 °	PASS
		Phase RMS	2.23 °	1.63 °	PASS			Phase RMS	2.22 °	1.71 °	PASS
		Freq	18.08 Hz	-2.92 Hz	PASS			Freq	17.11 Hz	0.37 Hz	PASS
TDMA 1	661	Phase Pk	7.25 °	4.75 °	PASS	TDMA 1	661	Phase Pk	6.78 °	4.74 °	PASS
		Phase RMS	2.50 °	1.73 °	PASS			Phase RMS	2.29 °	1.67 °	PASS
		Freq	-24.09 Hz	-2.46 Hz	PASS			Freq	20.08 Hz	-0.70 Hz	PASS
TDMA 2	810	Phase Pk	6.71 °	4.28 °	PASS	TDMA 2	810	Phase Pk	6.96 °	4.24 °	PASS
		Phase RMS	2.44 °	1.59 °	PASS			Phase RMS	2.07 °	1.53 °	PASS
		Freq	-19.05 Hz	-1.54 Hz	PASS			Freq	-17.18 Hz	-1.39 Hz	PASS

Maximum deviation : 24.09 Hz

6.4. TESTS AT -10°C

6.4.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +11.9°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK:
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.75	PASS
TDMA 1	190	GMSK	44.87	PASS
TDMA 2	251	GMSK	44.56	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.77	PASS
TDMA 1	190	GMSK	44.81	PASS
TDMA 2	251	GMSK	44.54	PASS

PHASE AND MEAN FREQUENCY ERROR

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.87 °	2.72 °	PASS
		Phase RMS	1.34 °	0.93 °	PASS
		Freq	-8.98 Hz	2.15 Hz	PASS
TDMA 1	190	Phase Pk	4.64 °	3.08 °	PASS
		Phase RMS	1.46 °	1.04 °	PASS
		Freq	-10.65 Hz	-1.29 Hz	PASS
TDMA 2	251	Phase Pk	4.45 °	2.72 °	PASS
		Phase RMS	1.24 °	0.92 °	PASS
		Freq	-11.17 Hz	0.09 Hz	PASS

For an input voltage of 187VAC:

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.72 °	2.71 °	PASS
		Phase RMS	1.34 °	0.93 °	PASS
		Freq	-9.75 Hz	-0.09 Hz	PASS
TDMA 1	190	Phase Pk	4.12 °	2.98 °	PASS
		Phase RMS	1.39 °	1.01 °	PASS
		Freq	-9.62 Hz	0.19 Hz	PASS
TDMA 2	251	Phase Pk	4.37 °	2.78 °	PASS
		Phase RMS	1.40 °	0.94 °	PASS
		Freq	-10.65 Hz	0.68 Hz	PASS

For an input voltage of 264VAC

Maximum deviation : 11.17 Hz

6.4.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +21.4°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK:
 $38 \text{ dBm} \leq \text{RF power} \leq 42 \text{ dBm}$

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.76	PASS
TDMA 1	661	GMSK	41.21	PASS
TDMA 2	810	GMSK	41.08	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.87	PASS
TDMA 1	661	GMSK	41.18	PASS
TDMA 2	810	GMSK	41.10	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6.71 °	4.58 °	PASS	TDMA 0	512	Phase Pk	6.94 °	4.66 °	PASS
		Phase RMS	2.19 °	1.61 °	PASS			Phase RMS	2.26 °	1.68 °	PASS
		Freq	21.57 Hz	0.66 Hz	PASS			Freq	19.76 Hz	0.68 Hz	PASS
TDMA 1	661	Phase Pk	6.73 °	4.55 °	PASS	TDMA 1	661	Phase Pk	7.29 °	4.73 °	PASS
		Phase RMS	2.39 °	1.62 °	PASS			Phase RMS	2.65 °	1.72 °	PASS
		Freq	19.76 Hz	1.10 Hz	PASS			Freq	22.02 Hz	0.27 Hz	PASS
TDMA 2	810	Phase Pk	6.65 °	4.40 °	PASS	TDMA 2	810	Phase Pk	8.39 °	4.36 °	PASS
		Phase RMS	2.22 °	1.59 °	PASS			Phase RMS	2.45 °	1.59 °	PASS
		Freq	-19.89 Hz	-1.97 Hz	PASS			Freq	-20.34 Hz	-3.51 Hz	PASS

Maximum deviation : 22.02 Hz

6.5. TESTS AT 0°C

6.5.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +12°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.68	PASS
TDMA 1	190	GMSK	44.82	PASS
TDMA 2	251	GMSK	44.56	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.80	PASS
TDMA 1	190	GMSK	44.78	PASS
TDMA 2	251	GMSK	44.51	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.37 °	2.85 °	PASS	TDMA 0	128	Phase Pk	4.38 °	2.84 °	PASS
		Phase RMS	1.35 °	1.00 °	PASS			Phase RMS	1.37 °	1.01 °	PASS
		Freq	-10.91 Hz	-0.30 Hz	PASS			Freq	9.81 Hz	-0.35 Hz	PASS
TDMA 1	190	Phase Pk	4.22 °	3.05 °	PASS	TDMA 1	190	Phase Pk	4.28 °	3.05 °	PASS
		Phase RMS	1.39 °	1.03 °	PASS			Phase RMS	1.40 °	1.05 °	PASS
		Freq	-10.20 Hz	-1.39 Hz	PASS			Freq	-11.82 Hz	-1.87 Hz	PASS
TDMA 2	251	Phase Pk	4.05 °	2.70 °	PASS	TDMA 2	251	Phase Pk	3.91 °	2.67 °	PASS
		Phase RMS	1.35 °	0.91 °	PASS			Phase RMS	1.26 °	0.92 °	PASS
		Freq	10.20 Hz	-0.50 Hz	PASS			Freq	-7.10 Hz	-0.54 Hz	PASS

Maximum deviation : 11.82 Hz

6.5.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +21°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK:
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.71	PASS
TDMA 1	661	GMSK	41.13	PASS
TDMA 2	810	GMSK	41.07	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.68	PASS
TDMA 1	661	GMSK	41.12	PASS
TDMA 2	810	GMSK	41.07	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6.52 °	4.49 °	PASS	TDMA 0	512	Phase Pk	8.39 °	4.52 °	PASS
		Phase RMS	2.15 °	1.60 °	PASS			Phase RMS	2.24 °	1.59 °	PASS
		Freq	-18.47 Hz	-1.01 Hz	PASS			Freq	-22.21 Hz	0.74 Hz	PASS
TDMA 1	661	Phase Pk	6.39 °	4.49 °	PASS	TDMA 1	661	Phase Pk	7.10 °	4.56 °	PASS
		Phase RMS	2.19 °	1.57 °	PASS			Phase RMS	2.16 °	1.63 °	PASS
		Freq	-20.92 Hz	-1.33 Hz	PASS			Freq	19.24 Hz	2.00 Hz	PASS
TDMA 2	810	Phase Pk	6.33 °	4.29 °	PASS	TDMA 2	810	Phase Pk	7.19 °	4.30 °	PASS
		Phase RMS	2.35 °	1.59 °	PASS			Phase RMS	2.37 °	1.53 °	PASS
		Freq	21.63 Hz	-1.75 Hz	PASS			Freq	-25.51 Hz	-0.65 Hz	PASS

Maximum deviation : 25.51 Hz

6.6. TESTS AT +10°C

TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +10°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :

41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.90	PASS
TDMA 1	190	GMSK	44.94	PASS
TDMA 2	251	GMSK	44.67	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.86	PASS
TDMA 1	190	GMSK	44.89	PASS
TDMA 2	251	GMSK	44.55	PASS

PHASE AND MEAN FREQUENCY ERROR

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.82 °	2.90 °	PASS
		Phase RMS	1.55 °	1.03 °	PASS
		Freq	10.20 Hz	0.97 Hz	PASS
TDMA 1	190	Phase Pk	4.27 °	3.02 °	PASS
		Phase RMS	1.30 °	1.00 °	PASS
		Freq	-11.36 Hz	-1.29 Hz	PASS
TDMA 2	251	Phase Pk	4.42 °	2.65 °	PASS
		Phase RMS	1.26 °	0.89 °	PASS
		Freq	-10.27 Hz	0.67 Hz	PASS

For an input voltage of 187VAC:

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.54 °	2.82 °	PASS
		Phase RMS	1.40 °	0.99 °	PASS
		Freq	10.07 Hz	1.03 Hz	PASS
TDMA 1	190	Phase Pk	4.57 °	3.05 °	PASS
		Phase RMS	1.35 °	1.02 °	PASS
		Freq	-11.17 Hz	-0.63 Hz	PASS
TDMA 2	251	Phase Pk	4.61 °	2.94 °	PASS
		Phase RMS	1.51 °	1.04 °	PASS
		Freq	10.72 Hz	1.95 Hz	PASS

For an input voltage of 264VAC

Maximum deviation : 11.36 Hz

6.6.1 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +10°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.67	PASS
TDMA 1	661	GMSK	41.02	PASS
TDMA 2	810	GMSK	41.07	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.59	PASS
TDMA 1	661	GMSK	41.04	PASS
TDMA 2	810	GMSK	40.97	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7.28 °	4.62 °	PASS	TDMA 0	512	Phase Pk	7.65 °	4.49 °	PASS
		Phase RMS	2.40 °	1.61 °	PASS			Phase RMS	2.18 °	1.60 °	PASS
		Freq	18.47 Hz	0.05 Hz	PASS			Freq	-17.95 Hz	-0.72 Hz	PASS
TDMA 1	661	Phase Pk	6.54 °	4.57 °	PASS	TDMA 1	661	Phase Pk	7.81 °	4.58 °	PASS
		Phase RMS	2.30 °	1.64 °	PASS			Phase RMS	2.29 °	1.67 °	PASS
		Freq	19.05 Hz	0.26 Hz	PASS			Freq	19.82 Hz	2.70 Hz	PASS
TDMA 2	810	Phase Pk	6.80 °	4.30 °	PASS	TDMA 2	810	Phase Pk	6.60 °	4.29 °	PASS
		Phase RMS	2.15 °	1.57 °	PASS			Phase RMS	2.22 °	1.58 °	PASS
		Freq	-22.34 Hz	0.39 Hz	PASS			Freq	21.63 Hz	1.40 Hz	PASS

Maximum deviation : 22.34 Hz

6.7. TESTS AT +20°C

6.7.1 TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +20.6°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.79	PASS
TDMA 1	190	GMSK	44.77	PASS
TDMA 2	251	GMSK	44.60	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.81	PASS
TDMA 1	190	GMSK	44.73	PASS
TDMA 2	251	GMSK	44.57	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:					For an input voltage of 264VAC						
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4.49 °	2.66 °	PASS	TDMA 0	128	Phase Pk	4.11 °	2.74 °	PASS
		Phase RMS	1.32 °	0.92 °	PASS			Phase RMS	1.31 °	0.97 °	PASS
		Freq	12.20 Hz	3.31 Hz	PASS			Freq	9.81 Hz	1.30 Hz	PASS
TDMA 1	190	Phase Pk	4.39 °	3.06 °	PASS	TDMA 1	190	Phase Pk	4.72 °	2.93 °	PASS
		Phase RMS	1.33 °	1.01 °	PASS			Phase RMS	1.37 °	1.00 °	PASS
		Freq	11.43 Hz	-1.28 Hz	PASS			Freq	-12.66 Hz	-2.07 Hz	PASS
TDMA 2	251	Phase Pk	3.67 °	2.59 °	PASS	TDMA 2	251	Phase Pk	3.77 °	2.58 °	PASS
		Phase RMS	1.24 °	0.89 °	PASS			Phase RMS	1.25 °	0.90 °	PASS
		Freq	-9.62 Hz	-0.26 Hz	PASS			Freq	10.53 Hz	1.06 Hz	PASS

Maximum deviation : 12.66 Hz

6.7.2 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +19.6°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.58	PASS
TDMA 1	661	GMSK	40.99	PASS
TDMA 2	810	GMSK	40.93	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.54	PASS
TDMA 1	661	GMSK	41.01	PASS
TDMA 2	810	GMSK	41.04	PASS

PHASE AND MEAN FREQUENCY ERROR

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6.84 °	4.61 °	PASS
		Phase RMS	2.19 °	1.62 °	PASS
		Freq	-18.08 Hz	-0.52 Hz	PASS
TDMA 1	661	Phase Pk	6.55 °	4.66 °	PASS
		Phase RMS	2.28 °	1.69 °	PASS
		Freq	18.79 Hz	1.33 Hz	PASS
TDMA 2	810	Phase Pk	6.42 °	4.36 °	PASS
		Phase RMS	2.20 °	1.58 °	PASS
		Freq	21.70 Hz	1.18 Hz	PASS

For an input voltage of 187VAC:

	Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7.80 °	4.64 °	PASS
		Phase RMS	2.50 °	1.67 °	PASS
		Freq	-19.44 Hz	-0.50 Hz	PASS
TDMA 1	661	Phase Pk	7.72 °	4.63 °	PASS
		Phase RMS	2.35 °	1.64 °	PASS
		Freq	-26.67 Hz	-1.11 Hz	PASS
TDMA 2	810	Phase Pk	6.31 °	4.39 °	PASS
		Phase RMS	2.43 °	1.61 °	PASS
		Freq	-27.12 Hz	-1.49 Hz	PASS

For an input voltage of 264VAC

Maximum deviation : 27.12 Hz

6.8. TESTS AT +30°C

Not tested because the ETR BTS thermal behaviour is the same as Standard version in the range [+10°C-+50°C].

6.9. TESTS AT +40°C

Not tested because the ETR BTS thermal behaviour is the same as Standard version in the range [+10°C-+50°C].

6.10. TESTS AT +50°C

TX TESTS ON RM SLOT 0 (GSM 850MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the left side GSM850 modules inside the BTS is: +50.4°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
41 dBm ≤ RF power ≤ 45 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.52	PASS
TDMA 1	190	GMSK	44.48	PASS
TDMA 2	251	GMSK	44.31	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43.52	PASS
TDMA 1	190	GMSK	44.55	PASS
TDMA 2	251	GMSK	44.42	PASS

PHASE AND MEAN FREQUENCY ERROR

For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	5.05 °	2.70 °	PASS	TDMA 0	128	Phase Pk	3.87 °	2.68 °	PASS
		Phase RMS	1.36 °	0.93 °	PASS			Phase RMS	1.26 °	0.92 °	PASS
		Freq	-10.14 Hz	0.43 Hz	PASS			Freq	8.72 Hz	-0.18 Hz	PASS
TDMA 1	190	Phase Pk	4.80 °	3.36 °	PASS	TDMA 1	190	Phase Pk	4.26 °	3.00 °	PASS
		Phase RMS	1.57 °	1.19 °	PASS			Phase RMS	1.37 °	1.00 °	PASS
		Freq	-10.46 Hz	-1.64 Hz	PASS			Freq	-10.27 Hz	-0.09 Hz	PASS
TDMA 2	251	Phase Pk	3.81 °	2.70 °	PASS	TDMA 2	251	Phase Pk	4.50 °	3.15 °	PASS
		Phase RMS	1.31 °	0.92 °	PASS			Phase RMS	1.48 °	1.10 °	PASS
		Freq	-11.69 Hz	-1.99 Hz	PASS			Freq	-9.17 Hz	0.36 Hz	PASS

Maximum deviation : 11.69 Hz

6.10.1 TX TESTS ON RM SLOT 3 (GSM 1900MHZ) IN GMSK MODULATION

Measurements are realized at antenna output with DDM H2 configuration.

Temperature measured on the right side GSM1900 modules inside the BTS is: +49.5°C

MEAN RF POWER

Specification for DDM H2 configuration in GMSK :
38 dBm ≤ RF power ≤ 42 dBm

For an input voltage of 187VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.21	PASS
TDMA 1	661	GMSK	40.83	PASS
TDMA 2	810	GMSK	41.01	PASS

For an input voltage of 264VAC:

	Channel	Modulation Type	Mean RF Power	Sanction
TDMA 0	512	GMSK	40.24	PASS
TDMA 1	661	GMSK	40.85	PASS
TDMA 2	810	GMSK	41.04	PASS

PHASE AND MEAN FREQUENCY ERROR

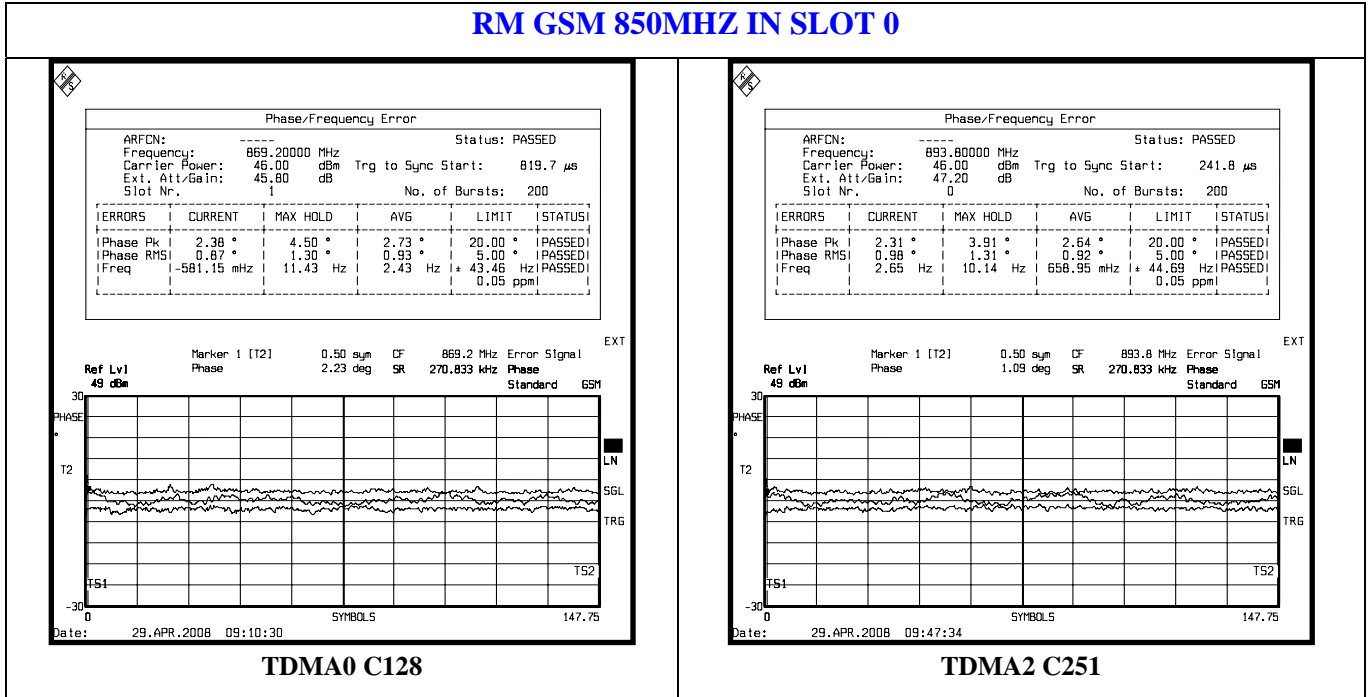
For an input voltage of 187VAC:						For an input voltage of 264VAC					
	Channel	Measure	Max hold	Average	Sanction		Channel	Measure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	9.32 °	4.74 °	PASS	TDMA 0	512	Phase Pk	7.15 °	4.76 °	PASS
		Phase RMS	2.31 °	1.67 °	PASS			Phase RMS	2.32 °	1.74 °	PASS
		Freq	-23.96 Hz	-0.58 Hz	PASS			Freq	19.18 Hz	-1.43 Hz	PASS
TDMA 1	661	Phase Pk	7.49 °	4.67 °	PASS	TDMA 1	661	Phase Pk	7.33 °	4.79 °	PASS
		Phase RMS	2.25 °	1.68 °	PASS			Phase RMS	2.52 °	1.74 °	PASS
		Freq	-18.08 Hz	-0.52 Hz	PASS			Freq	18.79 Hz	1.02 Hz	PASS
TDMA 2	810	Phase Pk	6.84 °	4.54 °	PASS	TDMA 2	810	Phase Pk	7.01 °	4.53 °	PASS
		Phase RMS	2.32 °	1.61 °	PASS			Phase RMS	2.39 °	1.60 °	PASS
		Freq	-19.63 Hz	0.53 Hz	PASS			Freq	-20.02 Hz	-0.37 Hz	PASS

Maximum deviation : 23.96 Hz

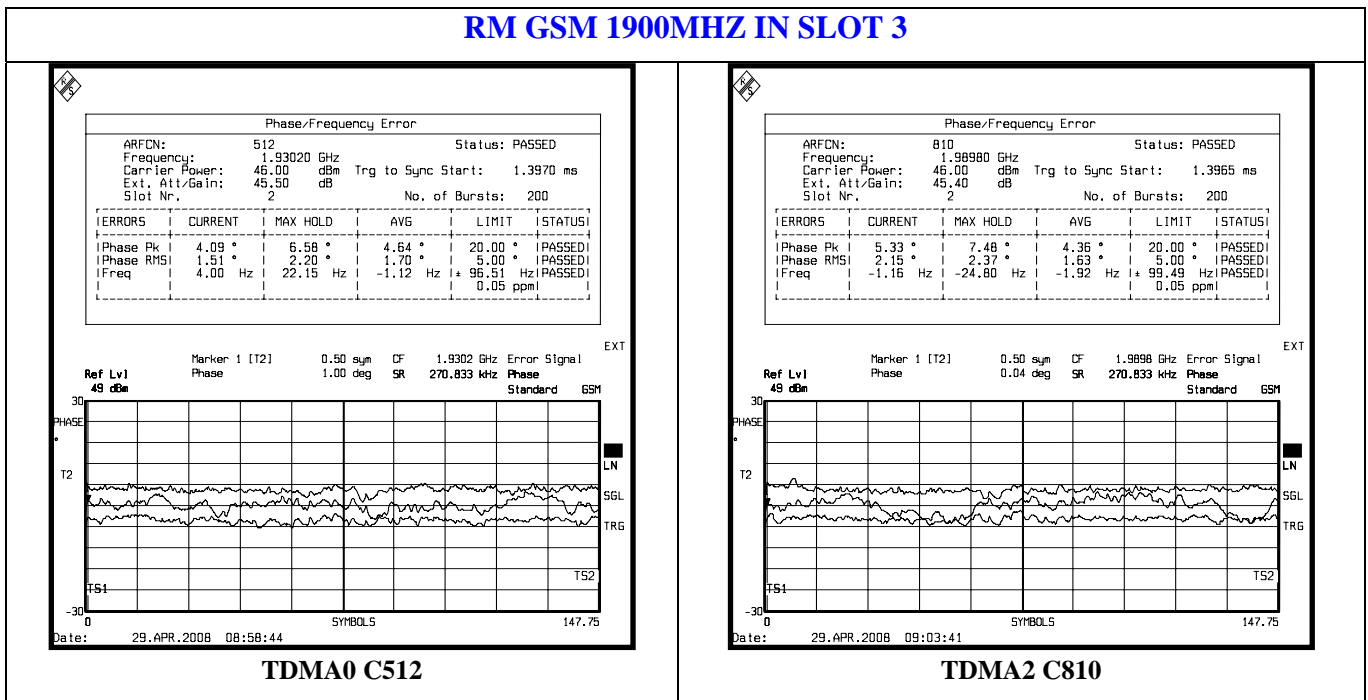
6.11. EXAMPLE OF PHASE / FREQUENCY ERROR CURVE

6.11.1 TESTS AT -40°C

RM GSM 850MHZ IN SLOT 0



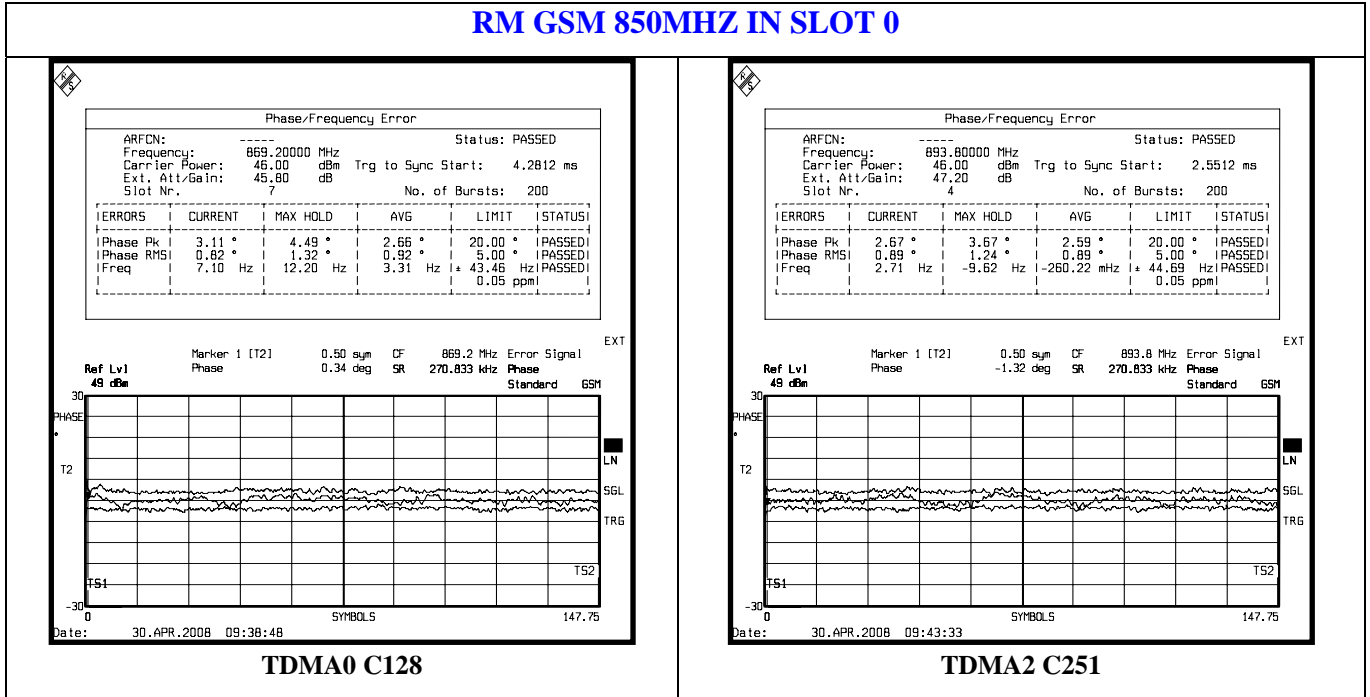
RM GSM 1900MHZ IN SLOT 3



Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) - FCC Marking

6.11.2 TESTS AT +20°C

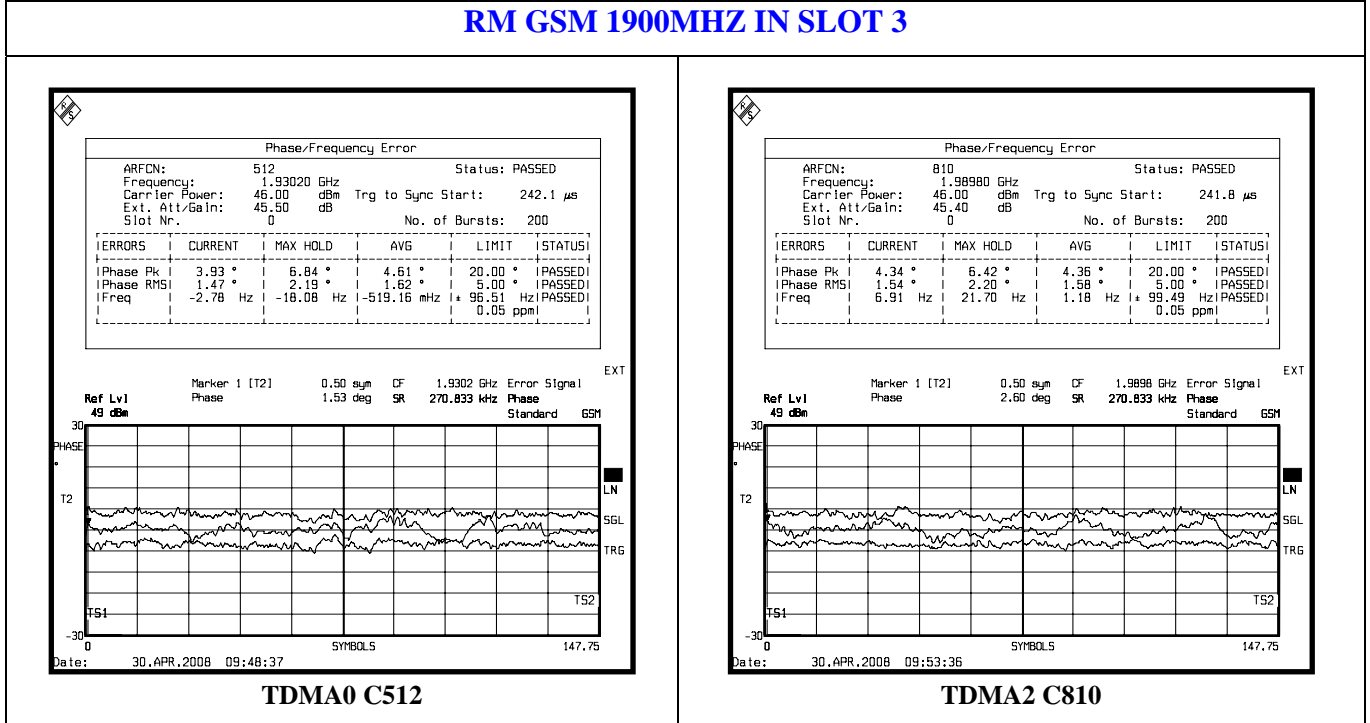
RM GSM 850MHZ IN SLOT 0



TDMA0 C128

TDMA2 C251

RM GSM 1900MHZ IN SLOT 3



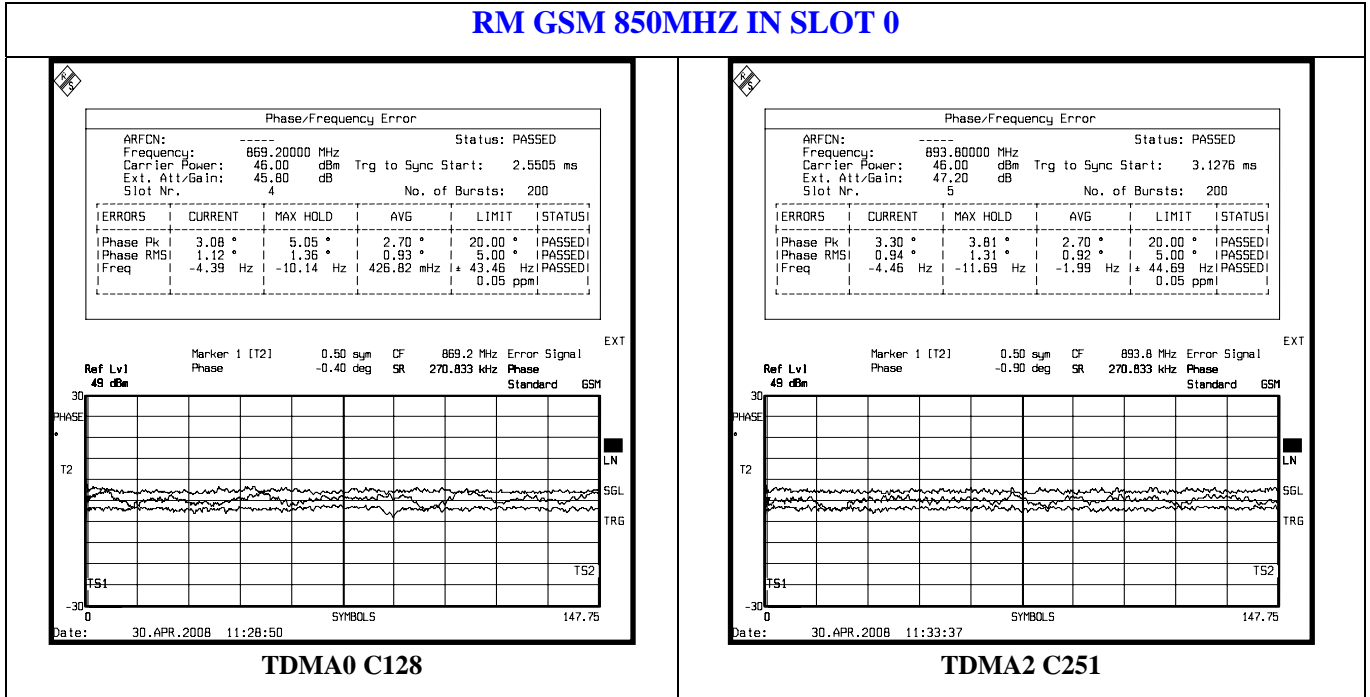
TDMA0 C512

TDMA2 C810

**Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) -
FCC Marking**

6.11.3 TESTS AT +50°C

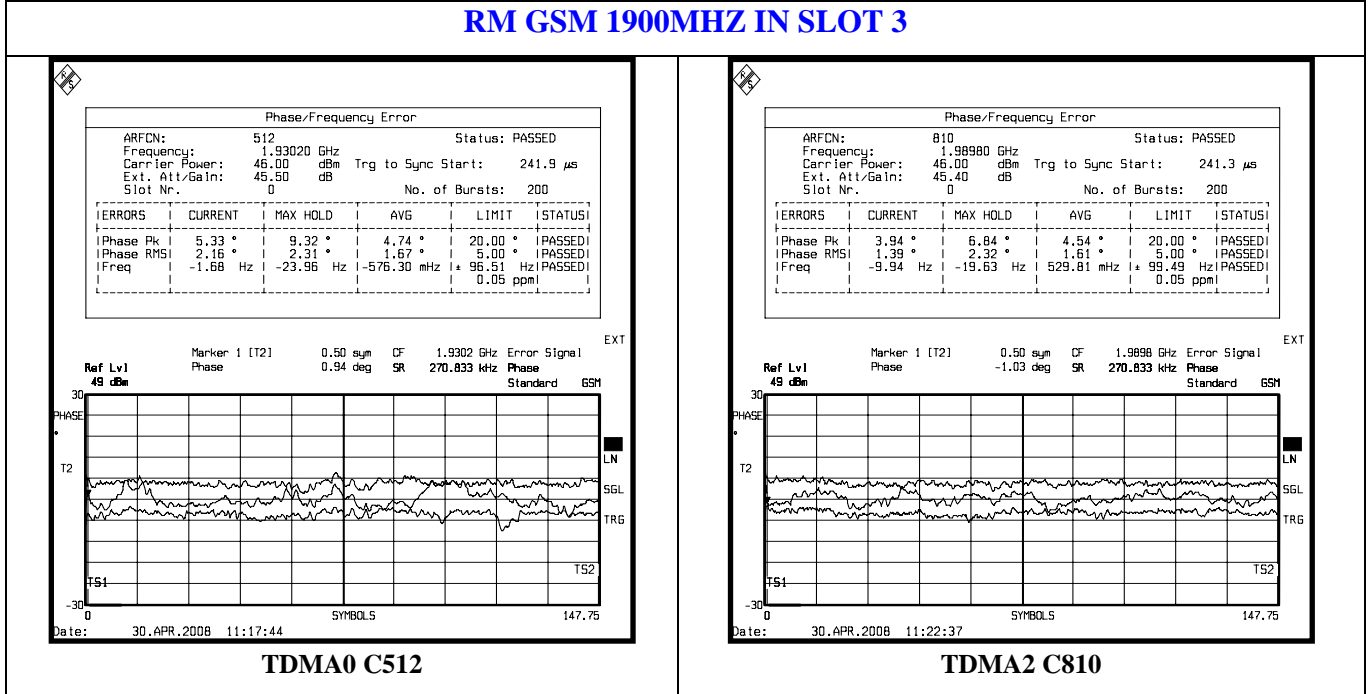
RM GSM 850MHZ IN SLOT 0



TDMA0 C128

TDMA2 C251

RM GSM 1900MHZ IN SLOT 3



TDMA0 C512

TDMA2 C810

7. CONCLUSION

The NG 18000 Outdoor BTS (ETR Version) in Dual Band is equipped with modules RM GSM 850MHz and RM GSM 1900 MHz and as described in this document complies with the FCC & IC radio requirements in extreme temperature.

8. MEASUREMENT EQUIPMENT LIST

Equipment description	Manufacturer	Model	Serial No.	LCIE No.
Spectrum analyser	R&S	FSEA	842655/0027	A4060024
MIC analyseur	W&G	ANT20	AC-0084	A4040008
Signal generator	HP	8657B	3520U06264	A5442024
Power Meter	Giga-tronics	8542C	1831019	A1503008
RF Probe	Giga-tronics	80401A	1829439	A1509026
40 dB 60 W attenuator	Diconex	16-6568	04/006	-
Temperature chambre	CLIMAT SAPRATIN			D1025026

9. ABBREVIATIONS AND DEFINITIONS

9.1. GENERAL ABBREVIATIONS

°C	Degree Centigrade
3GPP	3 rd Generation Partnership Project
A	Ampere
AC	Alternative Current (Power Source)
ADU	AC Distribution Unit
ALPRO	Alarm Protection
ANSI	American National Standards Institute
BTS	Base Station Transceiver Subsystem or Base Transceiver Station
CFR	Code of Federal Regulations
CSA	Canadian Standards Association
dB	Decibel
dB(A)	Decibel Audio
DC	Direct Current (Power Source)
E1	European Standard For PCM Link Interface (2.048mbit/S)
ECU	Environmental Control Unit
EDGE	Enhanced Data rates for GSM Evolution
EGPRS	Enhanced General Packet Radio Service (cf. EDGE)
EMC	Electro-Magnetic Compatibility
ETS	European Telecommunication Standard
ETSI	European Telecommunication Standard Institute
EVM	Error Vector Magnitude
FCC	Federal Communications Commission
GHz	Giga Hertz
GND	This Ground Represents Earth-Grounding Connection From Equipment
HW	Hardware
Hz	Hertz
IEC	International Electro-Technical Commission
ISO	International Standards Organization
IUT	International Telecommunication Union
kbits/s	Kilo Bits Per Second
LVD	Low Voltage Directive
MCPA	Multi-Carrier Power Amplifier
MHz	Mega-Hertz
N.A.	Not Applicable
NEMA	National Electrical Manufacturers Association (USA)
PA	Power Amplifier
PCM	Pulse Code Modulation
PCS	Personal Communication Service
PI	Product Integrity
R&D	Research and Development
RF	Radio Frequency

**Radio Test Report in extreme conditions for the qualification of NG 18000 Outdoor BTS (ETR version) -
FCC Marking**

RSS	Radio Standard Specification
RTTE	Radio And Telecommunication Terminal Equipment
RX	Receiver
SELV	Safety Extra Low Voltage
T°	Temperature
T1	US Standard For PCM Interface (1.544mbps)
T1 PCM	Pulse Code Modulation at 1.544 MHz
TBC	To Be Confirmed
TBD	To Be Defined
TIA/EIA/IS	Telecommunication Industry Association / Electronic Industries Alliance / Interim
TNV	Telecommunication Network Voltage Circuit
TX	Transmitter
UL	Underwriters Laboratories Inc.
V	Volt (Vdc with DC) or (Vac with AC)
VSWR	Voltage Standing Wave Ratio
W	Watt

9.2. GSM ABBREVIATIONS

ABM	Alarm And Bridge Module
AC	Alternative Current (Power Source)
ADU	AC Distribution Unit
ALPRO	Alarm Protection
CSU	Channel Service Unit
DBP	Digital Back Panel
DCS	Digital Cellular System
DDM	Dual Duplexer Module
ECU	Environmental Control Unit
EDGE	Enhanced Data rates for GSM Evolution
GSM	Global System For Mobile Communication
H2D	Hybrid Duplexer Two Paths
H3	Coupling Module Handling Up To 3 TX TDMA
H3D	Hybrid Duplexer Three Paths
H4M	PCM Clock At 4.096 MHz
IBP	Interface Back Panel
ICM	Interface Control Module
IFM	Interface Module Dedicated To PCM Link within a BTS 18000
LAPD	Link Access Protocol On The D Channel
PCS	Personal Communication Service
PRIPRO	Primary Protection
RICO	Radio Inter-Connection For Cabinet And Coupling Modules
RM	Radio Module
RMPSU	Radio Module Power Supply Unit
RXLEV	Reception Level
RXQUAL	Reception quality
S8000/S12000	This Represents The Previous GSM BTS Family (S8000 And S12000)

SICS	Snew Integrated Cooling System
SPM	Spare Module
SPU	Signal Processing Unit
TXF	Transmitter filter
UCPS	Univity Compact Power System
User ICO	User Interconnection

9.3. DEFINITIONS

Interconnect

Discipline which ensures telecom interface

Interface T1 PCM

Pulse Code Modulation interface at 1.544 MHz

Interface E1 PCM

European Standard for Pulse Code Modulation interface at 2.048Mbit/s

PCM Interface:

PCM port at the bulkhead of the BTS

Sxxx:

BTS radio configuration where “S” means sectorized cell and each “x” represents the number of TDMA per sector.

Ox

BTS radio configuration where “O” means Omni directional cell and the “x” represents the number of TDMA.

∞ END OF DOCUMENT ∞