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Radio Test Report in extreme conditions for the introduction of 850 MHz in GSM 18000 Indoor BTS (FCC)

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Product: GSM 18000 Indoor BTS

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05/March/2007

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This document contains results related only to the items tested. It does not imply the conformity of the whole production to the items tested.*

PUBLICATION HISTORY

VERSION	DATE	AUTHOR	MODIFICATION
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1. INTRODUCTION

The objective of this document is to present the tests report of the FCC Radio qualification in extreme temperature on the GSM 18000 Indoor BTS with modules on GSM 850 MHz band.

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

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. |

3.2. REFERENCE DOCUMENTS

- | | | |
|------|---------------------------------|---|
| [R1] | PE/BTS/DPL/020739 | GSM 18000 BTS Project Qualification Plan for GSM850 MHz introduction |
| [R2] | PE/BTS/DPL/021593 | Radio Test Plan for the introduction of GSM850 BTS18000 (FCC & 3GPP) |
| [R3] | PE/BTS/DJD/021778
01.01 / EN | GSM850/1900 Indoor BTS 18000 hardware delivery notice |

4. IDENTIFICATION OF EQUIPMENT UNDER TEST

4.1. GSM 18000 INDOOR BTS

This document applies to:

Product: GSM 18000 Indoor BTS

Manufacturer: NORTEL

Frequencies: 850 MHz

Configuration:

Option: ALPRO

AVLM Recipient: LCIE	Date of delivery: 14/FEB/2007
Product: GSM/UMTS BTS 18000 indoor	
Article delivered: GSM 850/1900 BTS 18000 indoor	Article code: NTN016AF N1
Section transmitting: 8U00	Designer name: JEULAND P. / CHENET S.
Cabinet Serial Number: S18K00010	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications: – PE/BTS/DD/5282 V05.01/EN BTS 18000 system design specification.	
Issues fixed on the cabinet: Introduction new modules: <ul style="list-style-type: none">- BTS 18K Indoor DCR cabinet with DC Filter NTN071CF- SICS DCR- DBP2- RICAM to replace 1IFM1+2ICM+1ABM- PSU CR on RM- DDM850- HPRM850 60/45W	
Missing Equipment: – None	

Software compatibility:

Modules software version :

- Load BTS : v15f1e01 / CDI117235
 - ICM/ABM/RICAM : v15f101 / CDI117166
 - RM : v15e403 / CDI117006

PI software tools :

- WINTMI: v03d306
- TIL COAM: v15e402
- TIL Alarm: v15e401
- WINTOOL: v04b4e10

The delivery includes :

ARTICLE	PEC code	Release	Serial number	Comment
Precab IND 48V ROHS	NTN016AF	N1	S18K00010	
RICAM	NTN024AA	0D2 MIR4	QUANTUMECHANIX P7570012	IP : 136.147.42.154 for ICM0 part IP : 136.147.42.157 for ICM1 part IP : 136.147.42.158 for ABM0 part
ABM	NTN029AF	D1	NNTMGR00MCVJ	
DBP2	NTN030AM	V1	15	
DBP2	NTN030AM	N1	8	
RICO	NTN020CA	02	NNTMGT004GDR	
SICS control board	NTN071GM	N1-01	NNTMLA06Z379	
Fan tray	NTN971NA	N1	FANTR00010	
DDM H2 850 W/VSWR	NTN063HA	D2	FICT0300213H	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D2	FICT0300212F	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D2	FICT0300212G	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D1	FICT02002067	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D2	FICT030020XT	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D2	FICT0300213J	FILTRONICS 850 full band
HPRM 850	NTN050JA	D1	CDN200651006	IP : 136.147.42.126 with new PSU CR NTN058AM 04 / ATSNZH155431
HPRM 850	NTN050JA	D1	CDN200651005	IP : 136.147.42.124 with new PSU CR NTN058AM 04 / ATSNZH155428 For Thermal test
HPRM 850	NTN050JA	D1	CDN200651004	IP : 136.147.42.122 with new PSU CR NTN058AM 04 / ATSNZH155427 For Radio test
HPRM 850	NTN050JA	D1	CDN200651010	IP : 136.147.42.126 with new PSU CR NTN058AM 04 / ATSNZH155424
HPRM 850	NTN050JA	D1	CDN200651008	IP : 136.147.42.126 with new PSU CR NTN058AM 04 / ATSNZH155430
HPRM 850	NTN050JA	D1	CDN200702004	IP : 136.147.42.126 with new PSU CR NTN058AM 04 / ATSNZH155425
Alpro module	NTQ811CA	D1	CDN200608020	
Alpro module	NTQ811CA	D1	CDN200608019	
CABLE: DDM-RICO PWR 300MM ROHS VERSION	NTN095WF	N/A	N/A	Qty : 2 ; new supplier : Foxconn
CABLE: ABM1/RICO L=1250MM ROHS VERSION	NTN097AS	N/A	N/A	Qty : 1 ; new supplier : Foxconn
CABLE: DDM/TF- RICO DATA L=300MM ROHS VERSION	NTN095UF	N/A	N/A	Qty : 2 ; new supplier : Foxconn

Additional delivery:

ARTICLE	PEC code	Release	Serial number	Comment
External E1 cable	NTQA72RA	N/A	N/A	With Connection
Cool Unit Cable	N/A	N/A	N/A	RS232 adaptation
GSM850 Radio Combiner	NTQA38DA	01	NNTM7503KYZB	
TXF H2 850 W/VSWR	NTN064HA	D2	FICT0300214L	For SAFETY
Y debug cable	N/A	N/A	N/A	For HyperTerminal connection

Remark: The exact configuration used during tests is described in § 5.3

5. TESTS RESULTS

5.1. TEST PROCEDURE

The BTS must operate under the following external extreme temperatures:

- BTS 18000 Indoor: - 5°C / + 45 °C

Frequency stability are performed under following extreme conditions:

for Indoor 18000 BTS

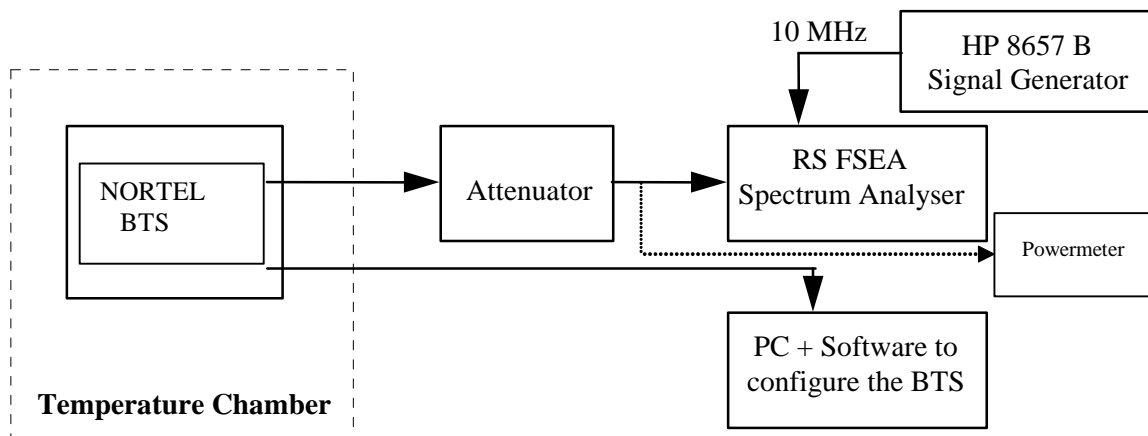
Temperature from -5°C to +45°C at intervals of 10 degrees.

With DC power supply variations: -40V, -57V.

Modules GSM HPRM 850MHz run with nominal power regulation at maximum power (60W) 47.8 dBm in GMSK modulation. The RM were configured to transmit at maximum power (Static level 0). A period of at least one hour was allowed prior to measurement to ensure that all the components of the oscillator circuit was stabilized at each temperature.

The equipment was configured as shown in Schematic below.

Test configuration for Frequency Stability & Power



5.2. SOFTWARE CONFIGURATION

BTS type	GSM 18000 Indoor BTS
BTS	v15f1e01 / CDI117235
ICM/ABM/RICAM	v15f101 / CDI117166
RM	v15e403 / CDI117006
WinTMI	v03d306
Til COAM	v15e402
Til Alarm	v15e401
Win TOOL	v04b4e10

5.3. TEST RESULTS GSM 18000 INDOOR BTS

5.3.1 BTS CONFIGURATION

Configuration GSM 18000 Indoor 850 MHz

DDM FILTRO 850			DDM FILTRO 850 "full"			DDM FILTRO 850		
DDM FILTRO 850			DDM FILTRO 850 "full"			DDM FILTRO 850		
			HPRM 850 PSU CR	HPRM 850 PSU CR	HPRM 850 PSU CR	RICAM		
			HPRM 850 PSU CR	HPRM 850 PSU CR	HPRM 850 PSU CR	ABM		

Tested modules

	ARTICLE	PEC code	Release	Serial number
RM 1	HPRM 850	NTN050JA	D1	CDN200651004
DDM 1 850	DDM H2 850 W/FSWR	NTN063HA	D2	FICT0300212F

5.3.2 TESTS AT TEMPERATURE 45 °C

5.3.2.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.2.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,25	PASS
TDMA 1	190	GMSK	43,34	PASS
TDMA 2	251	GMSK	43,53	PASS

5.3.2.1.2 MEAN RF POWER @ -57 VDC

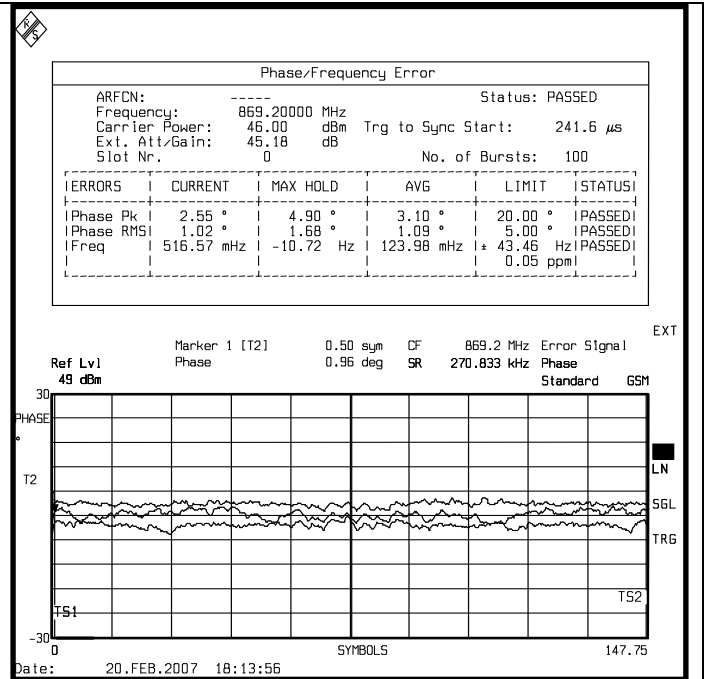
Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

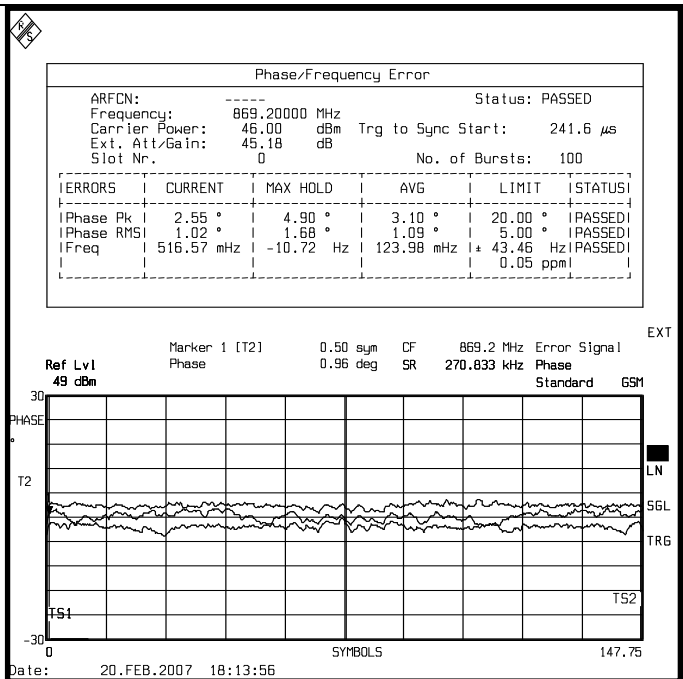
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,23	PASS
TDMA 1	190	GMSK	43,33	PASS
TDMA 2	251	GMSK	43,51	PASS

5.3.2.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

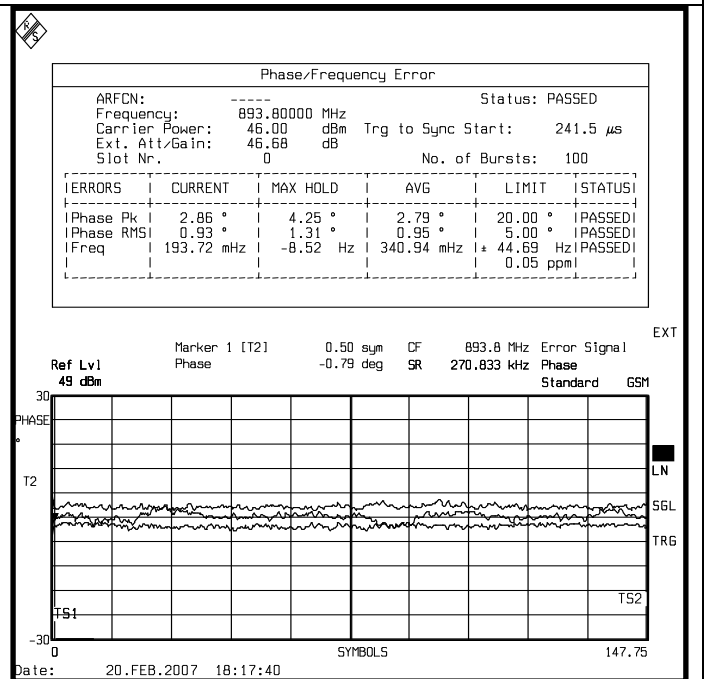
	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	4,90 °	3,10 °	PASS
		Phase RMS	1,68 °	1,09 °	PASS
		Freq	-10,72 Hz	0,12 Hz	PASS
TDMA 1	190	Phase Pk	4,29 °	3,03 °	PASS
		Phase RMS	1,38 °	1,03 °	PASS
		Freq	-11,04 Hz	-1,54 Hz	PASS
TDMA 2	251	Phase Pk	4,25 °	2,79 °	PASS
		Phase RMS	1,31 °	0,95 °	PASS
		Freq	-8,52 Hz	0,34 Hz	PASS



C128



C190

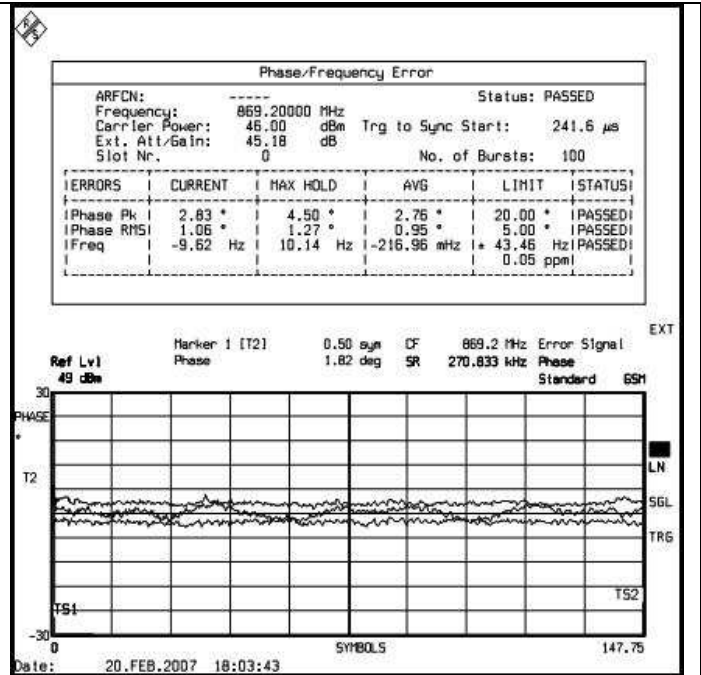


C251

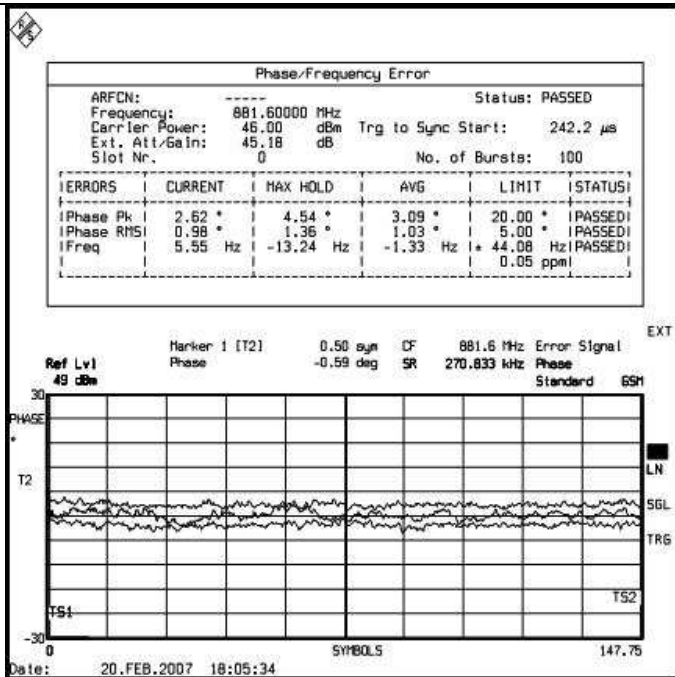
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (-11.04 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.2.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

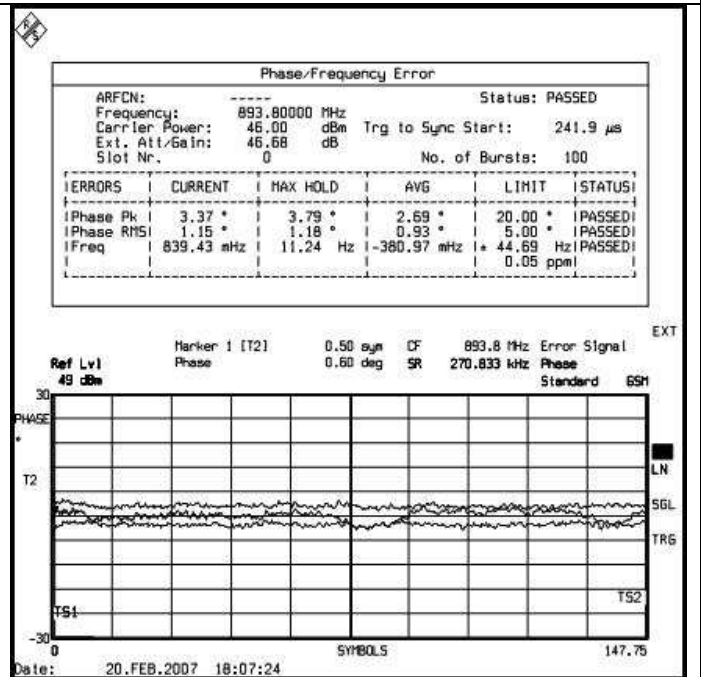
	Canal	Mesure	HPRM tested		
			Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,50 °	2,76 °	PASS
		Phase RMS	1,27 °	0,95 °	PASS
		Freq	10,14 Hz	-0,22 Hz	PASS
TDMA 1	190	Phase Pk	4,54 °	3,09 °	PASS
		Phase RMS	1,36 °	1,03 °	PASS
		Freq	-13,24 Hz	-1,33 Hz	PASS
TDMA 2	251	Phase Pk	3,79 °	2,69 °	PASS
		Phase RMS	1,18 °	0,93 °	PASS
		Freq	11,24 Hz	-0,38 Hz	PASS



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C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (-13.24 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3 TESTS AT TEMPERATURE 35 °C

5.3.3.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.3.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,31	PASS
TDMA 1	190	GMSK	43,39	PASS
TDMA 2	251	GMSK	43,52	PASS

5.3.3.1.2 MEAN RF POWER @ -57 VDC

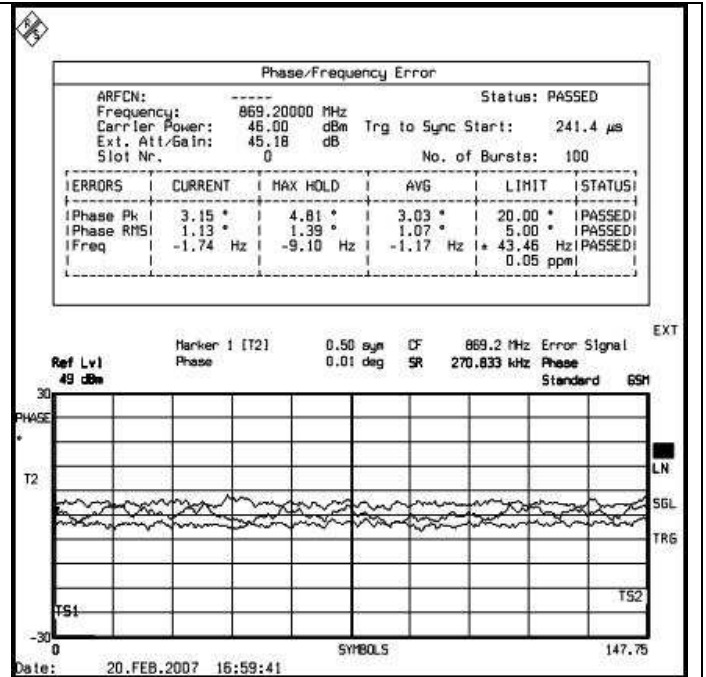
Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

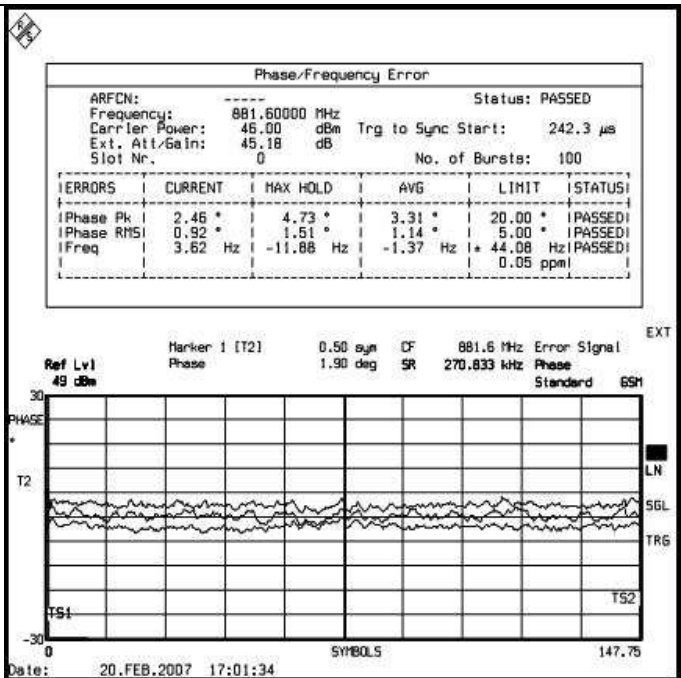
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,36	PASS
TDMA 1	190	GMSK	43,45	PASS
TDMA 2	251	GMSK	43,55	PASS

5.3.3.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

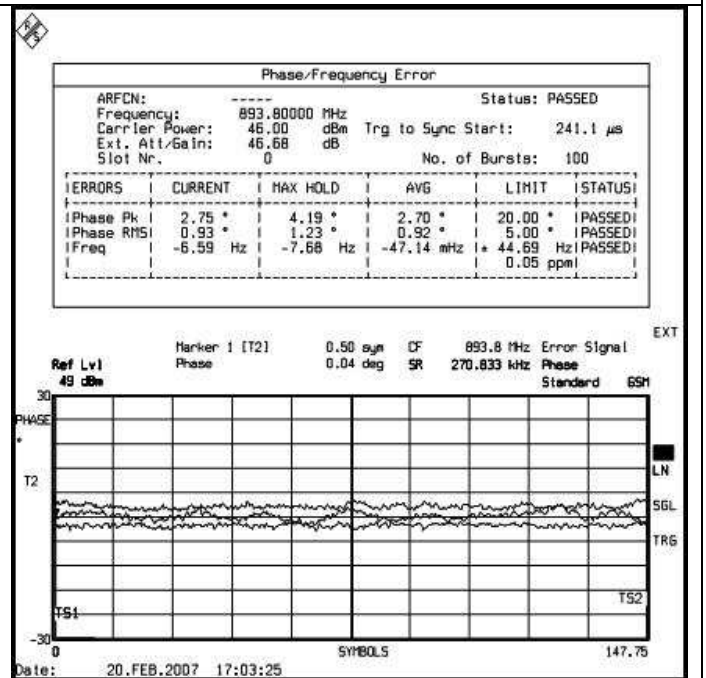
	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	4,81 °	3,03 °	PASS
		Phase RMS	1,39 °	1,07 °	PASS
		Freq	-9,10 Hz	-1,17 Hz	PASS
TDMA 1	190	Phase Pk	4,73 °	3,31 °	PASS
		Phase RMS	1,51 °	1,14 °	PASS
		Freq	-11,88 Hz	-1,37 Hz	PASS
TDMA 2	251	Phase Pk	4,19 °	2,70 °	PASS
		Phase RMS	1,23 °	0,92 °	PASS
		Freq	-7,68 Hz	-0,05 Hz	PASS



C128



C190

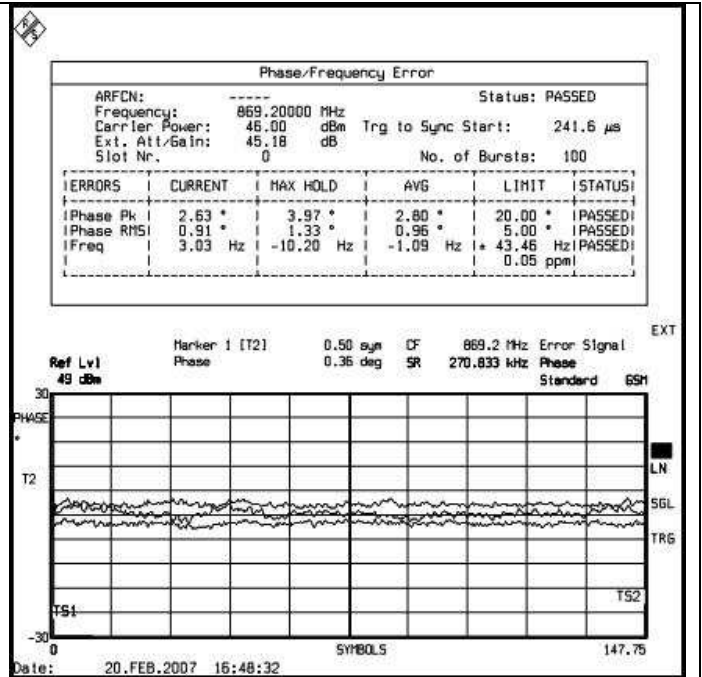


C251

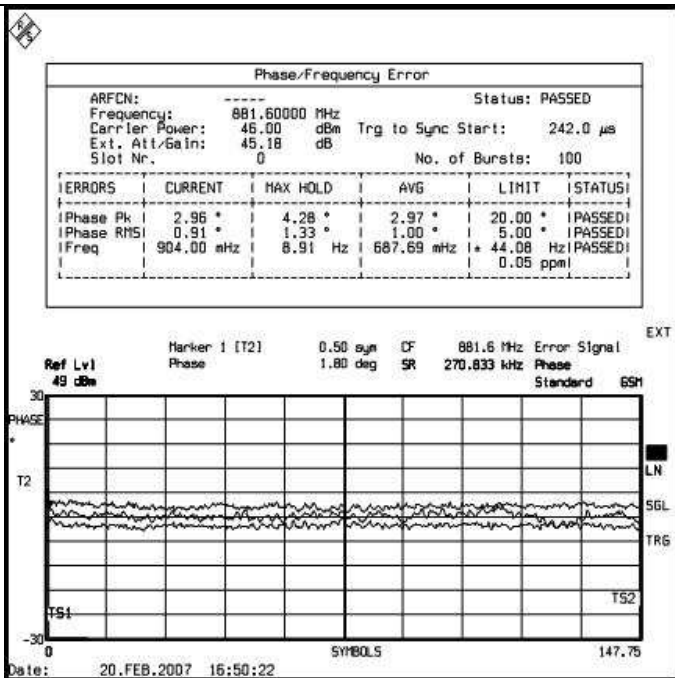
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (-11.88 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

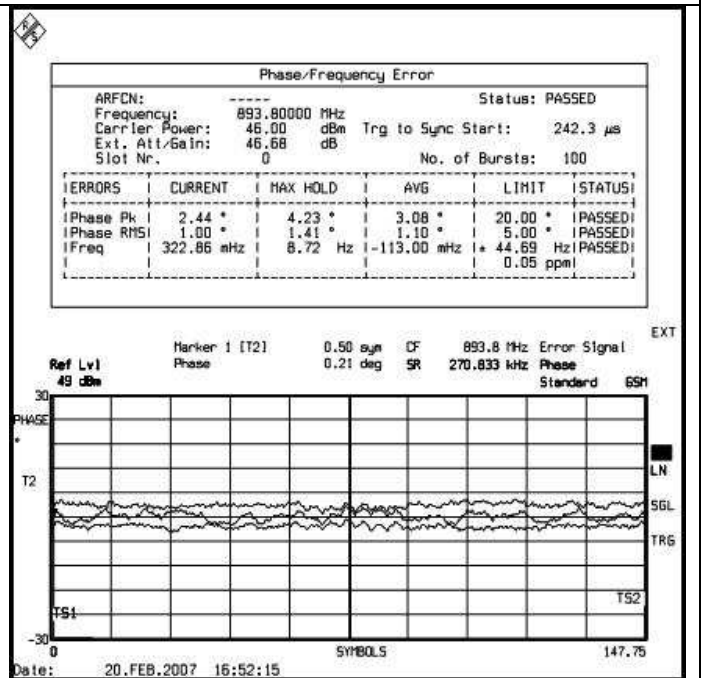
TDMA	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	3,97 °	2,80 °	PASS
		Phase RMS	1,33 °	0,96 °	PASS
		Freq	-10,20 Hz	-1,09 Hz	PASS
TDMA 1	190	Phase Pk	4,28 °	2,97 °	PASS
		Phase RMS	1,33 °	1,00 °	PASS
		Freq	8,91 Hz	0,69 Hz	PASS
TDMA 2	251	Phase Pk	4,23 °	3,08 °	PASS
		Phase RMS	1,41 °	1,10 °	PASS
		Freq	8,72 Hz	-0,11 Hz	PASS



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C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (-10.20 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4 TESTS AT TEMPERATURE 25 °C

5.3.4.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.4.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,38	PASS
TDMA 1	190	GMSK	43,46	PASS
TDMA 2	251	GMSK	44,88	PASS

5.3.4.1.2 MEAN RF POWER @ -57 VDC

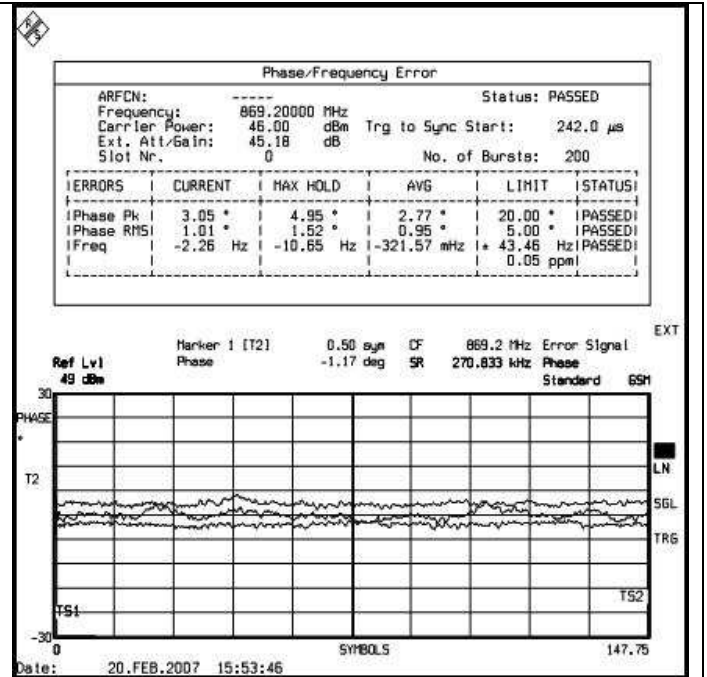
Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

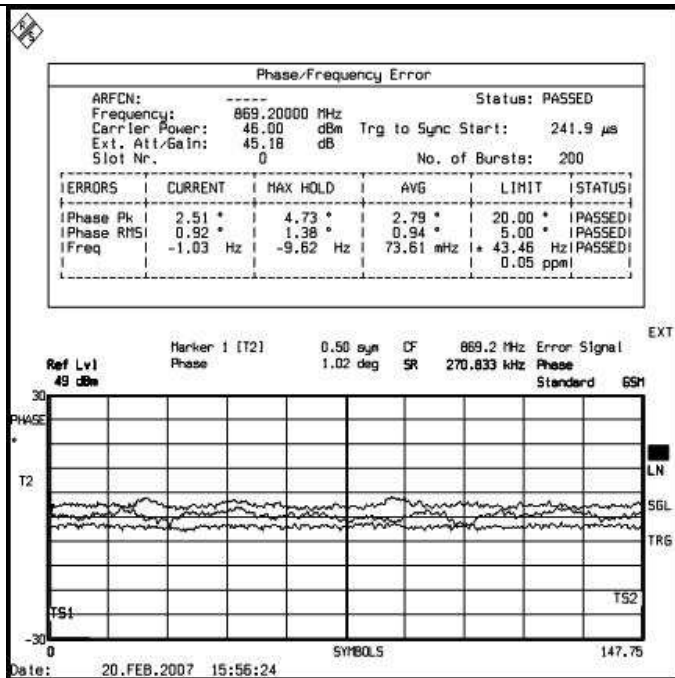
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,47	PASS
TDMA 1	190	GMSK	43,56	PASS
TDMA 2	251	GMSK	43,62	PASS

5.3.4.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

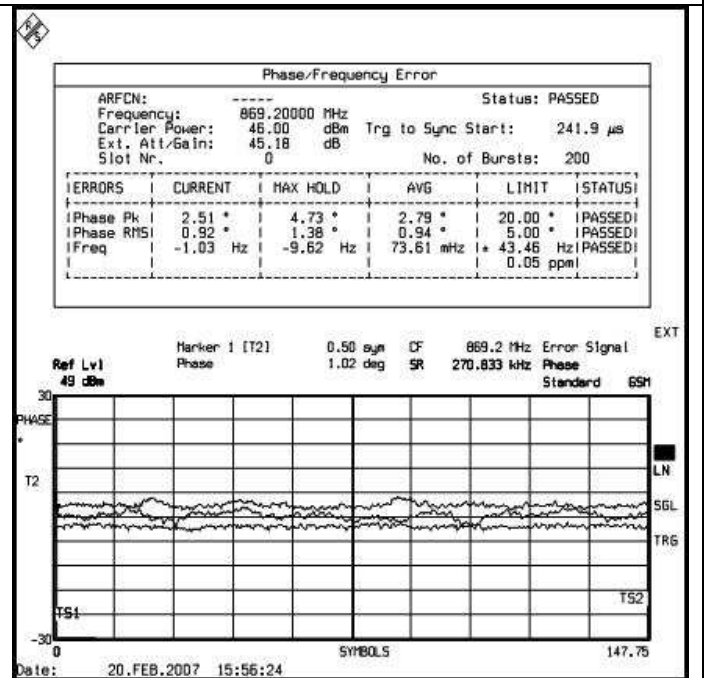
	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	4,95 °	2,77 °	PASS
		Phase RMS	1,52 °	0,95 °	PASS
		Freq	-10,65 Hz	-0,32 Hz	PASS
TDMA 1	190	Phase Pk	4,73 °	2,79 °	PASS
		Phase RMS	1,38 °	0,94 °	PASS
		Freq	-9,62 Hz	0,07 Hz	PASS
TDMA 2	251	Phase Pk	4,47 °	2,83 °	PASS
		Phase RMS	1,35 °	0,97 °	PASS
		Freq	9,94 Hz	0,82 Hz	PASS



C128



C190

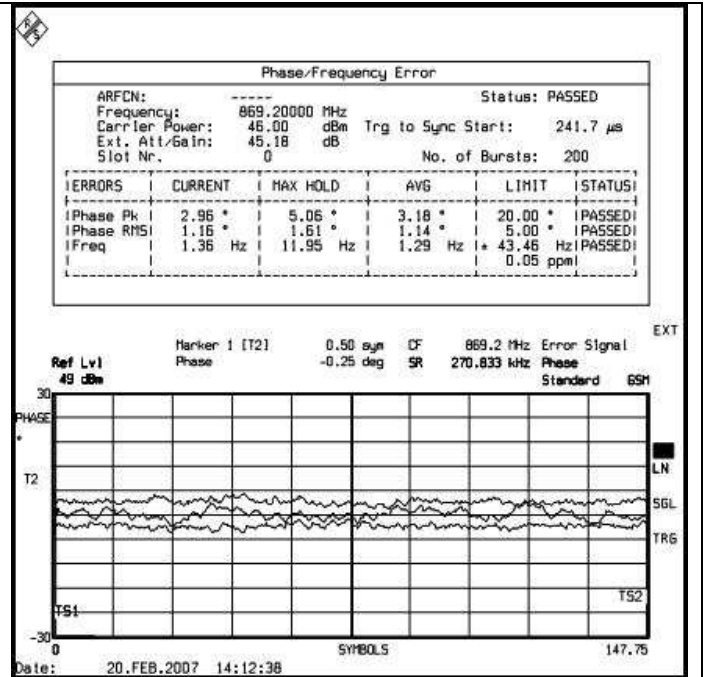


C251

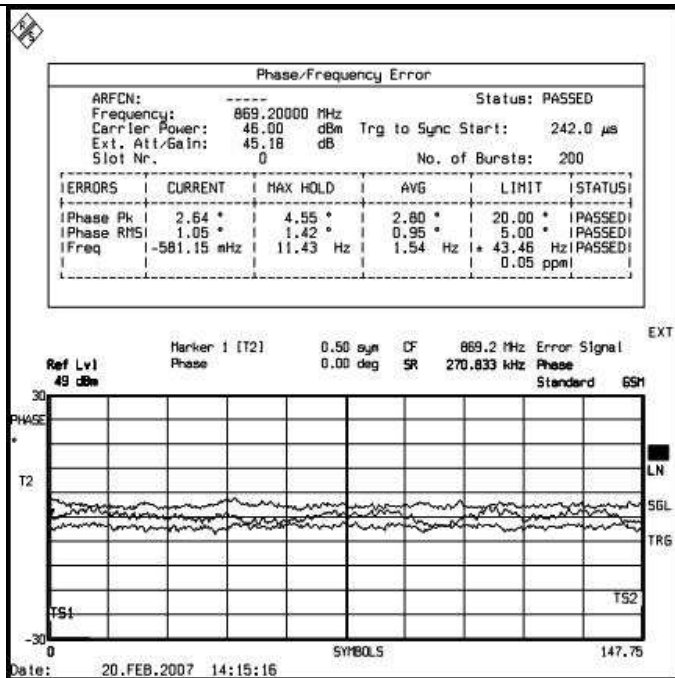
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (10.65 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

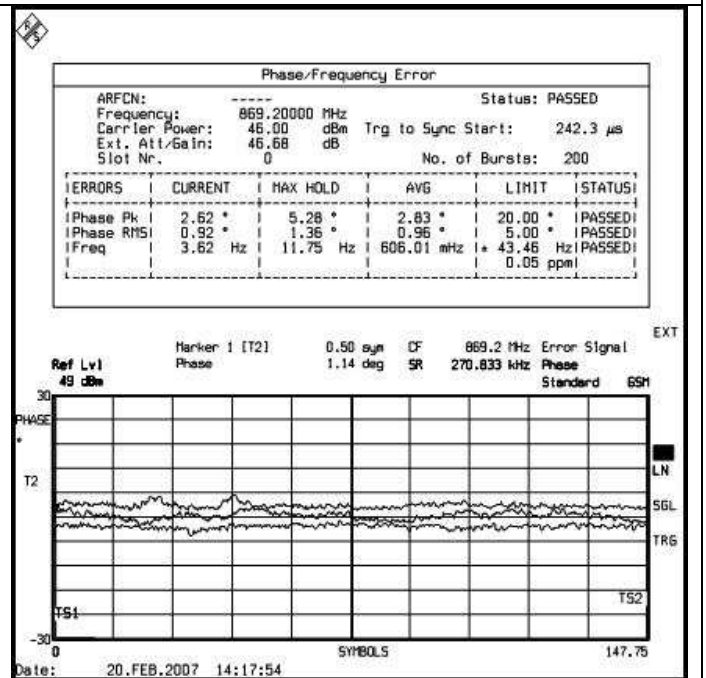
	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	5,06 °	3,18 °	PASS
		Phase RMS	1,61 °	1,14 °	PASS
		Freq	11,95 Hz	1,29 Hz	PASS
TDMA 1	190	Phase Pk	4,55 °	2,80 °	PASS
		Phase RMS	1,42 °	0,95 °	PASS
		Freq	11,43 Hz	1,54 Hz	PASS
TDMA 2	251	Phase Pk	5,28 °	2,83 °	PASS
		Phase RMS	1,36 °	0,96 °	PASS
		Freq	11,75 Hz	0,61 Hz	PASS



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C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (11.95 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5 TESTS AT TEMPERATURE 15 °C

5.3.5.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.5.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,64	PASS
TDMA 1	190	GMSK	43,80	PASS
TDMA 2	251	GMSK	43,78	PASS

5.3.5.1.2 MEAN RF POWER @ -57 VDC

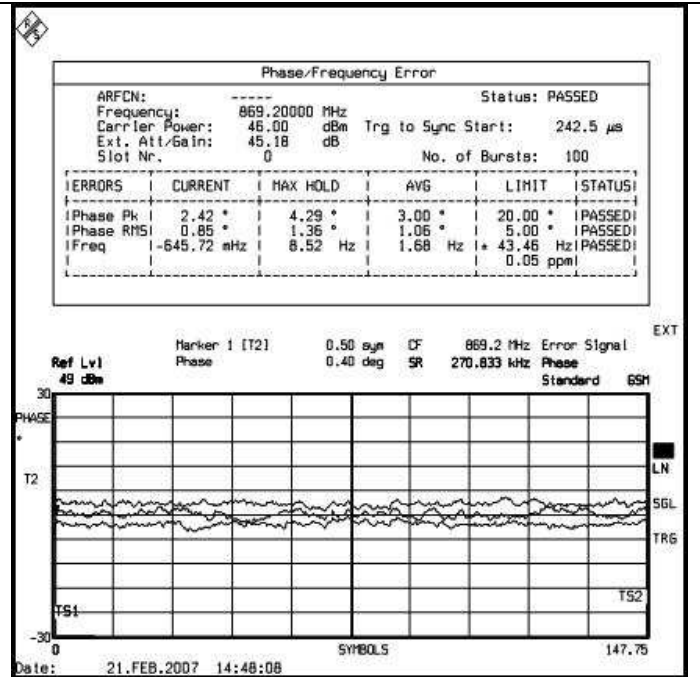
Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

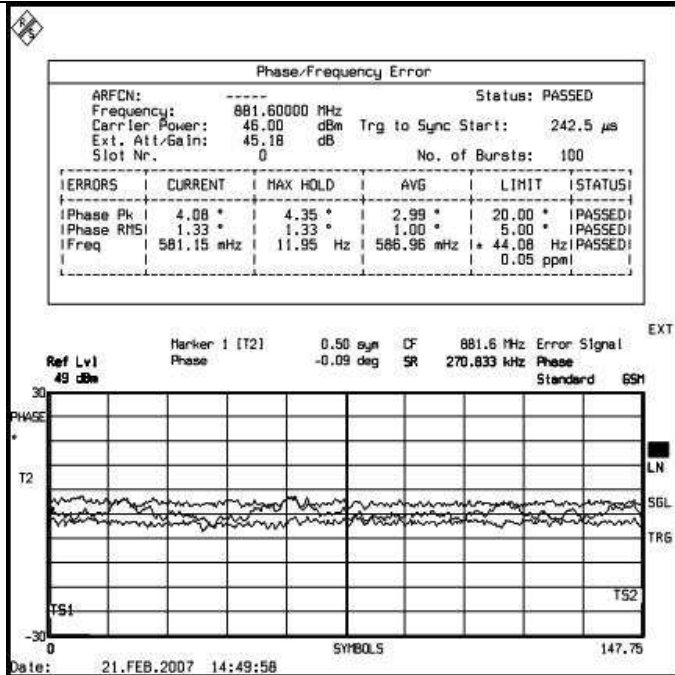
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,65	PASS
TDMA 1	190	GMSK	43,81	PASS
TDMA 2	251	GMSK	43,80	PASS

5.3.5.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

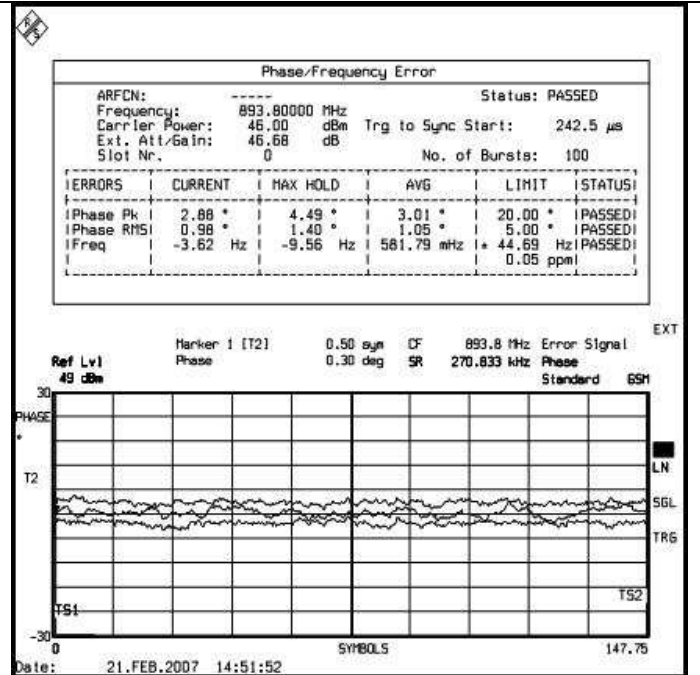
Canal	Mesure	HPRM tested			
		Max hold	Average	Sanction	
TDMA 0	128	Phase Pk	4,29 °	3,00 °	PASS
		Phase RMS	1,36 °	1,06 °	PASS
		Freq	8,52 Hz	1,68 Hz	PASS
TDMA 1	190	Phase Pk	4,35 °	2,99 °	PASS
		Phase RMS	1,33 °	1,00 °	PASS
		Freq	11,95 Hz	0,59 Hz	PASS
TDMA 2	251	Phase Pk	4,49 °	3,01 °	PASS
		Phase RMS	1,40 °	1,05 °	PASS
		Freq	-9,56 Hz	0,58 Hz	PASS



C128



C190

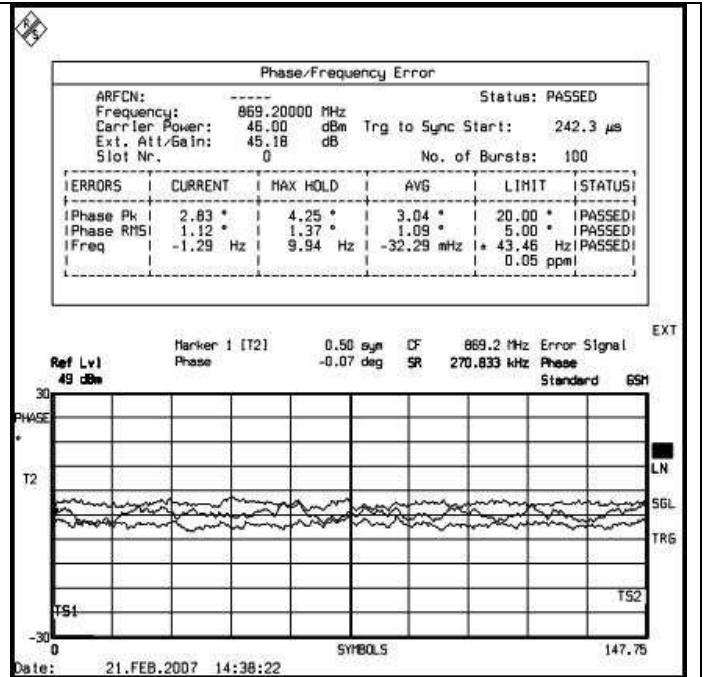


C251

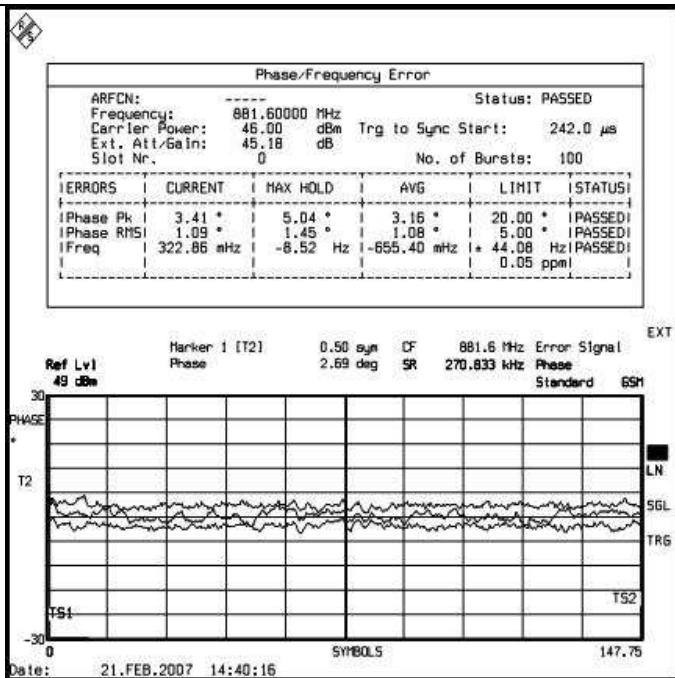
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (11.95 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

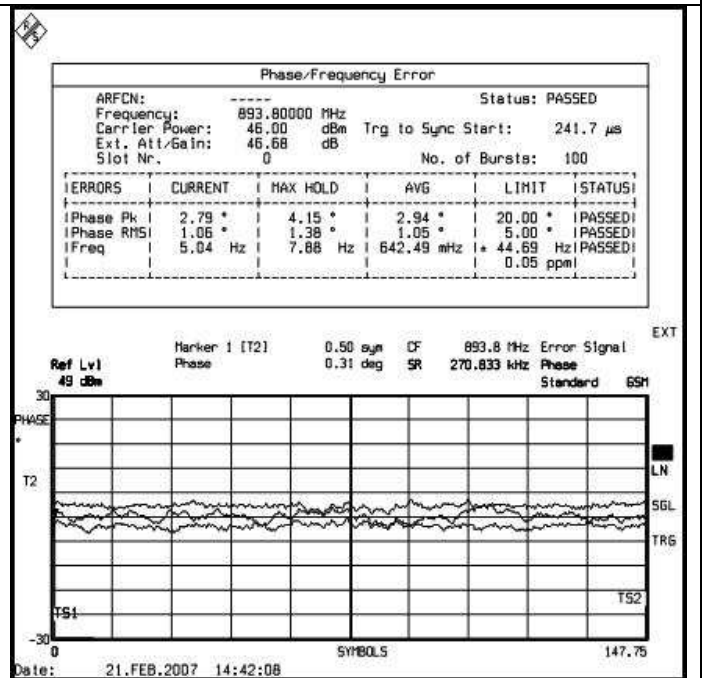
TDMA	Canal	Mesure	HPRM tested		
			Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,25 °	3,04 °	PASS
		Phase RMS	1,37 °	1,09 °	PASS
		Freq	9,94 Hz	-0,03 Hz	PASS
TDMA 1	190	Phase Pk	5,04 °	3,16 °	PASS
		Phase RMS	1,45 °	1,08 °	PASS
		Freq	-8,52 Hz	-0,66 Hz	PASS
TDMA 2	251	Phase Pk	4,15 °	2,94 °	PASS
		Phase RMS	1,38 °	1,05 °	PASS
		Freq	7,88 Hz	0,64 Hz	PASS



C128



C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (9.94 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.6 TESTS AT TEMPERATURE 5 °C

5.3.6.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.6.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,76	PASS
TDMA 1	190	GMSK	43,92	PASS
TDMA 2	251	GMSK	43,88	PASS

5.3.6.1.2 MEAN RF POWER @ -57 VDC

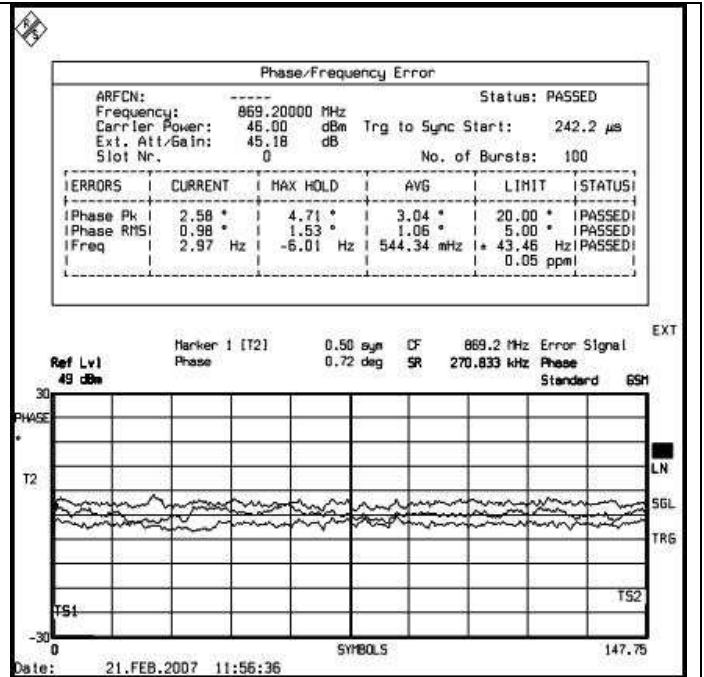
Specification for Duplexer configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

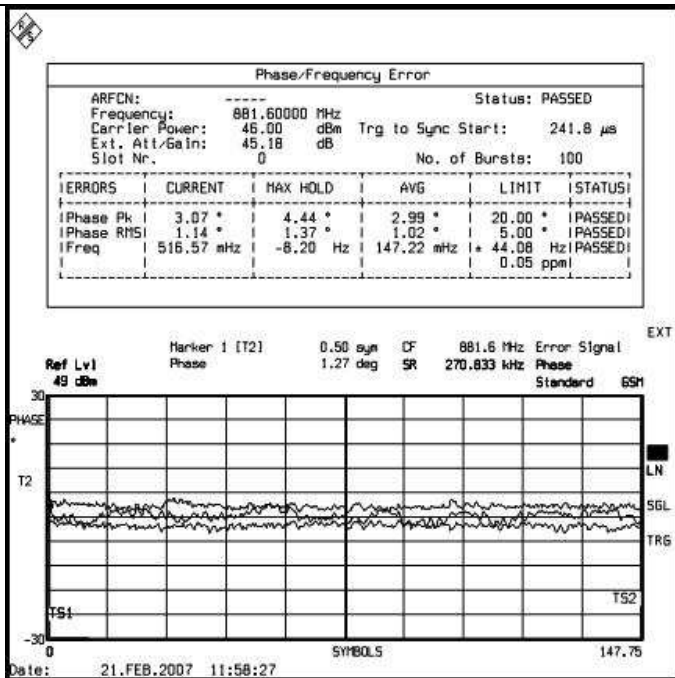
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,83	PASS
TDMA 1	190	GMSK	43,98	PASS
TDMA 2	251	GMSK	43,93	PASS

5.3.6.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

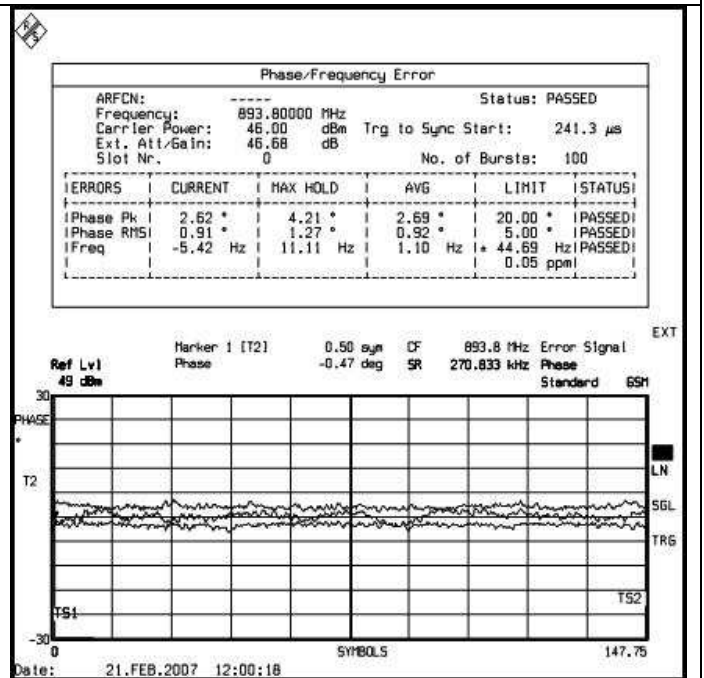
TDMA	Canal	Mesure	HPRM tested		
			Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,71 °	3,04 °	PASS
		Phase RMS	1,53 °	1,06 °	PASS
		Freq	-6,01 Hz	0,54 Hz	PASS
TDMA 1	190	Phase Pk	4,44 °	2,99 °	PASS
		Phase RMS	1,37 °	1,02 °	PASS
		Freq	-8,20 Hz	0,15 Hz	PASS
TDMA 2	251	Phase Pk	4,21 °	2,69 °	PASS
		Phase RMS	1,27 °	0,92 °	PASS
		Freq	11,11 Hz	1,10 Hz	PASS



C128



C190

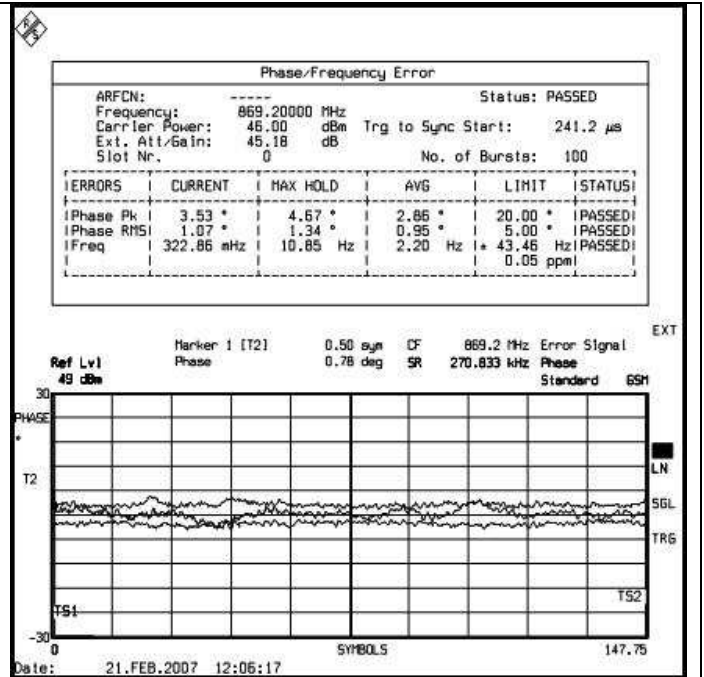


C251

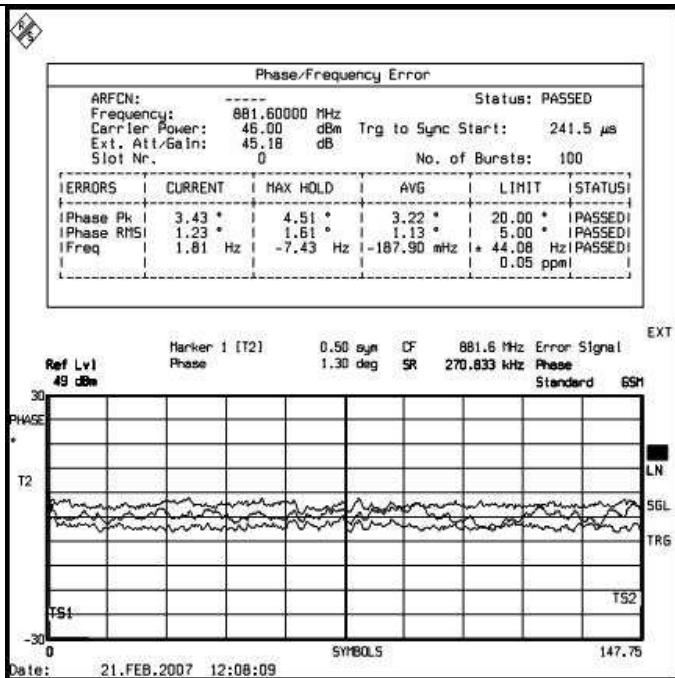
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (11.11 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.6.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

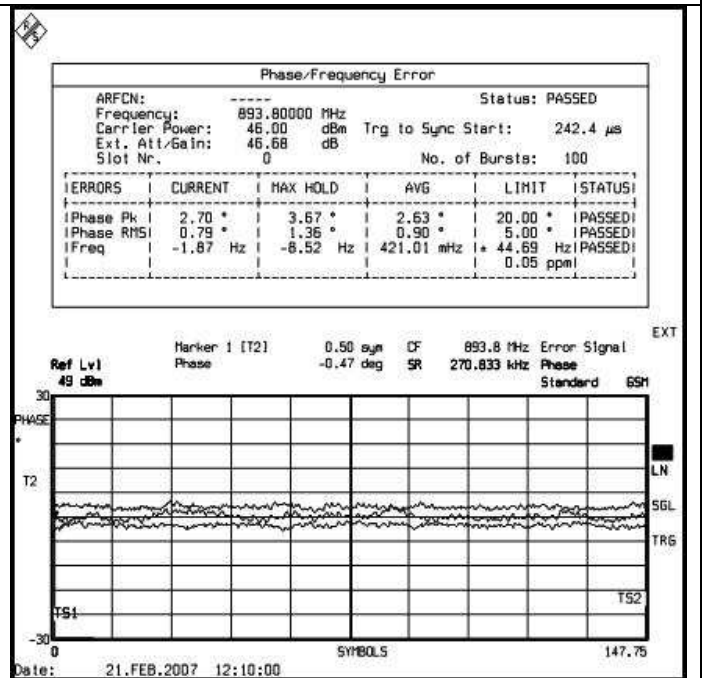
TDMA	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	4,67 °	2,86 °	PASS
		Phase RMS	1,34 °	0,95 °	PASS
		Freq	10,85 Hz	2,20 Hz	PASS
TDMA 1	190	Phase Pk	4,51 °	3,22 °	PASS
		Phase RMS	1,61 °	1,13 °	PASS
		Freq	-7,43 Hz	-0,19 Hz	PASS
TDMA 2	251	Phase Pk	3,67 °	2,63 °	PASS
		Phase RMS	1,36 °	0,90 °	PASS
		Freq	-8,52 Hz	0,42 Hz	PASS



C128



C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (10.85 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.7 TESTS AT TEMPERATURE -5 °C

5.3.7.1 TX TESTS ON HPRM 0 (850 MHZ) IN GMSK

Measurements are realized at antenna output for DDM H2configuration.

5.3.7.1.1 MEAN RF POWER @ -40 VDC

Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,90	PASS
TDMA 1	190	GMSK	44,04	PASS
TDMA 2	251	GMSK	43,97	PASS

5.3.7.1.2 MEAN RF POWER @ -57 VDC

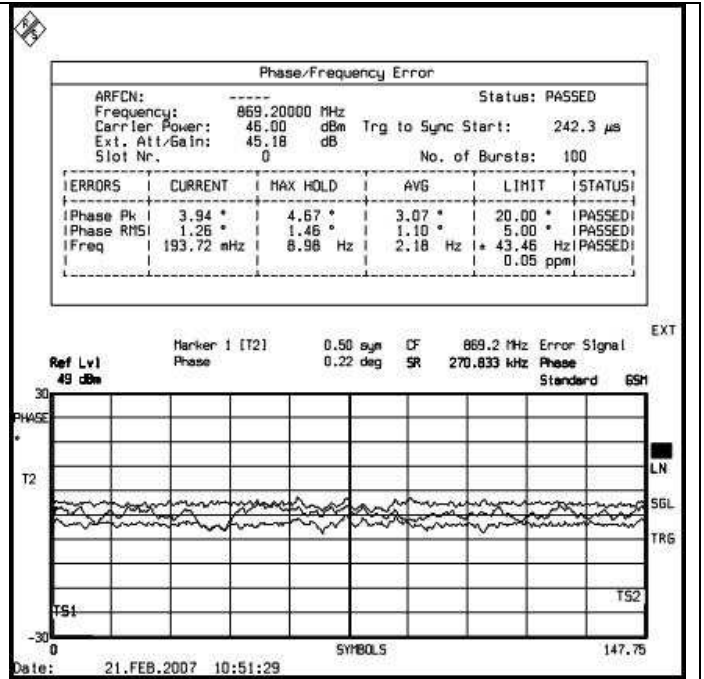
Specification for DDM H2configuration in GMSK :

The power must be ≥ 41 dBm and ≥ 45 dBm.

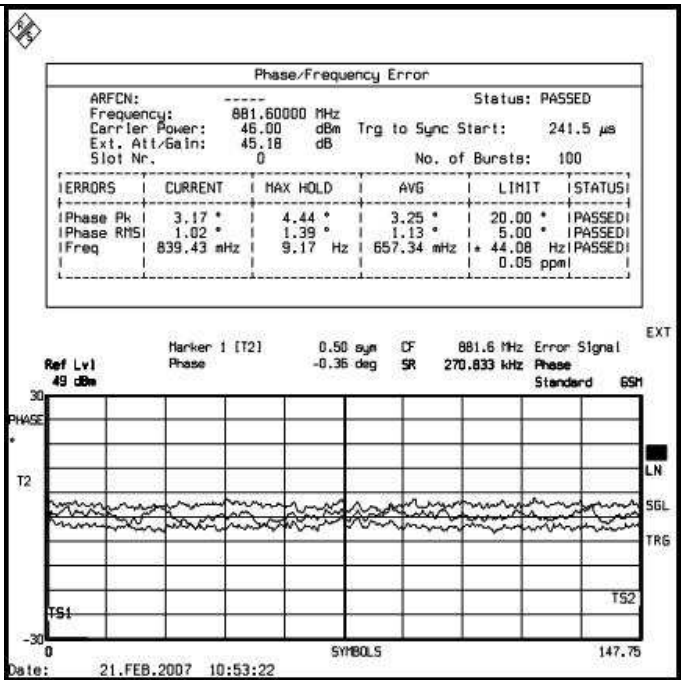
		HPRM tested		
	Canal	Modulation Type	Mean RF Power	Sanction
TDMA 0	128	GMSK	43,96	PASS
TDMA 1	190	GMSK	44,09	PASS
TDMA 2	251	GMSK	44,03	PASS

5.3.7.1.3 PHASE AND MEAN FREQUENCY ERROR @ -40 VDC

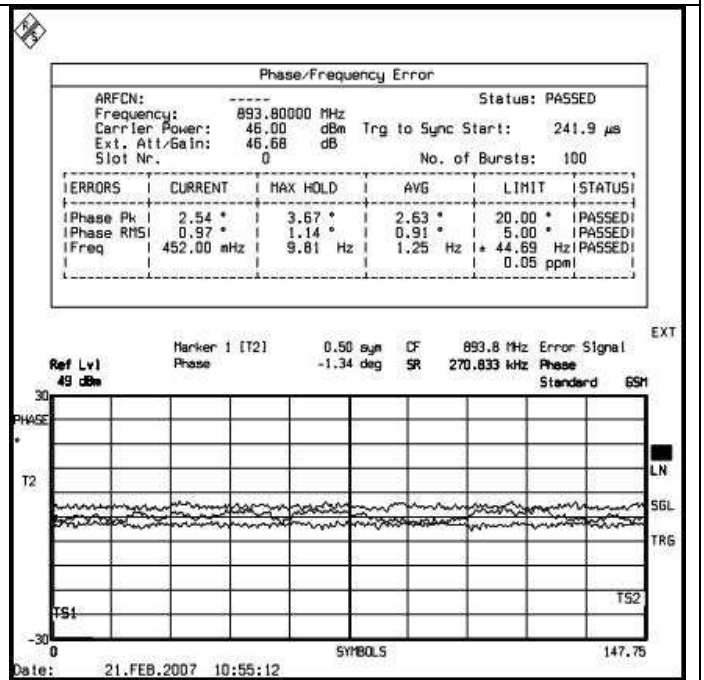
	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	4,67 °	3,07 °	PASS
		Phase RMS	1,46 °	1,10 °	PASS
		Freq	8,98 Hz	2,18 Hz	PASS
TDMA 1	190	Phase Pk	4,44 °	3,25 °	PASS
		Phase RMS	1,39 °	1,13 °	PASS
		Freq	9,17 Hz	0,66 Hz	PASS
TDMA 2	251	Phase Pk	3,67 °	2,63 °	PASS
		Phase RMS	1,14 °	0,91 °	PASS
		Freq	9,81 Hz	1,25 Hz	PASS



C128



C190

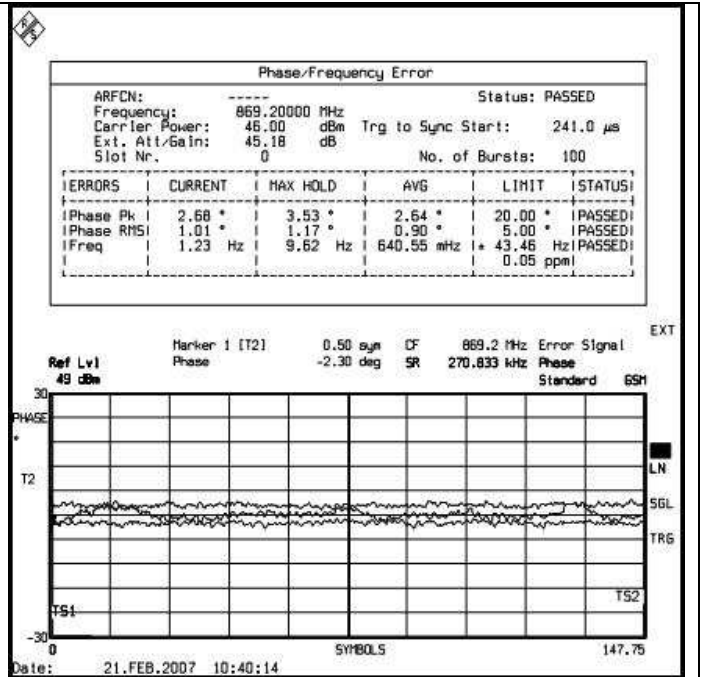


C251

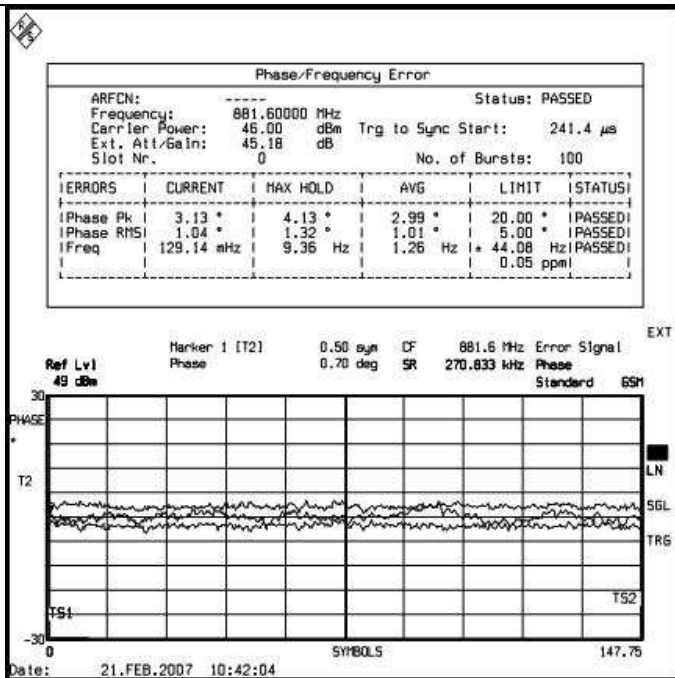
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (9.81 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.7.1.4 PHASE AND MEAN FREQUENCY ERROR @ -57 VDC

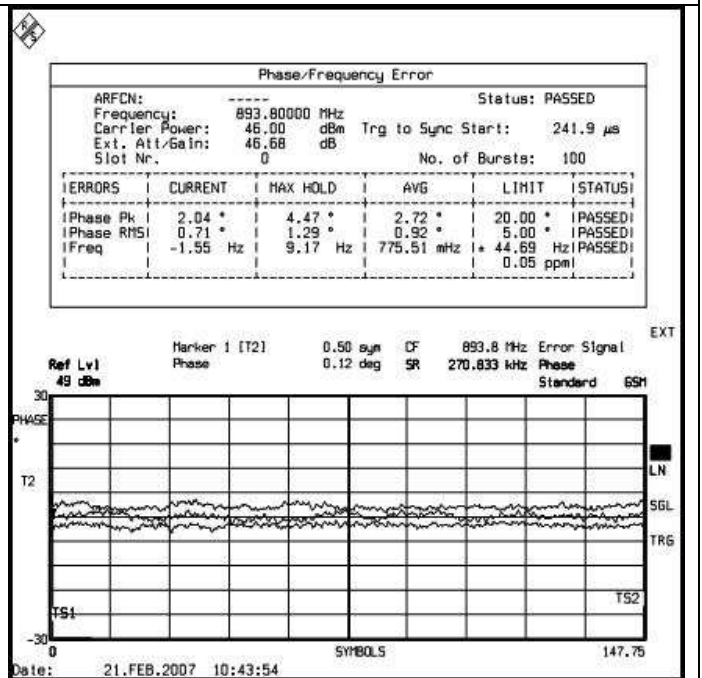
TDMA	Canal	Mesure	HPRM tested		Sanction
			Max hold	Average	
TDMA 0	128	Phase Pk	3,53 °	2,64 °	PASS
		Phase RMS	1,17 °	0,90 °	PASS
		Freq	9,62 Hz	0,64 Hz	PASS
TDMA 1	190	Phase Pk	4,13 °	2,99 °	PASS
		Phase RMS	1,32 °	1,01 °	PASS
		Freq	9,36 Hz	1,26 Hz	PASS
TDMA 2	251	Phase Pk	4,47 °	2,72 °	PASS
		Phase RMS	1,29 °	0,92 °	PASS
		Freq	9,17 Hz	0,78 Hz	PASS



C128



C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (9.62 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

6. CONCLUSION

The GSM 18000 Indoor BTS (GSM 850) equipped with modules HPRRM on 850 MHz band as described in this document complies with the FCC & IC radio requirements in extreme temperature.

7. MEASUREMENT EQUIPMENT LIST

Equipment description	Manufacturer	Model	Serial No.	LCIE No.
Spectrum analyser	R&S	FSEA	842655/02	A4060015
Spectrum analyser	Agilent	VSA	Nortel N° 571313	-
MIC analyseur	W&G	PA20	Y0075	A4040009
Signal generator	HP	8657B	3520U06355	A5442020
Signal generator	HP	8648A	3430V00370	-
Power Meter	Giga-tronics	8542C	1832488	A1503009
RF Probe	Giga-tronics	80401A	18330224	A1509027
40 dB 60 W attenuator	Diconex		02077	-
Temperature chambre	CLIMAT SAPRATIN	PV305C80F60H R	SV025470S	D1025026
Temperature chambre	CLIMAT SAPRATIN	PV140C80F60H R	SV025496S	D1025025

8. ABBREVIATIONS AND DEFINITIONS

8.1. ABBREVIATIONS

ARFCN	Absolute Radio Frequency Channel Number
BCCH	Broadcast Control Channel
BER	Bit Error Rate
BTS	Base Transceiver Station
C	Celsius
CPC	Common Product Code
DB	Decibel
dBc	Decibel referenced to the carrier level
dBm	Decibel ref 1milliwatt
DOA	Dead On Arrival
DRX	Driver Receiver Board
DTX	Discontinuous Transmitter
EDGE	Enhanced Data for GSM Evolution
EFT	Electrical Fast Transient
EMC	Electro-Magnetic-Compatibility
EMI	Electro-Magnetic-Interference
ESD	Electrical Static Discharge
ESS	Environmental Screaming Test
FH Bus	Transmission bus between FP and TX
FMECA	Failures Mode Effect Critically Analysis
FP	Frame Processor
GMSK	Gaussian Minimum Shift Keying
GSM	Global System for Mobile Communications
HALT	Highly Accelerated Life Test
IF	Intermediate Frequency
LISN	Line Impedance Stabilization Networks
LNA	Low Noise Amplifier
MTBF	Mean Time Between Failure
N.A.	Not Applicable
NER	Nominal Error Rate
NFF	No Fault Found
NFH	No Frequency Hopping
NN	Nortel Networks
OEM	Original Equipment Manufacturer
PA	Power Amplifier
PAR	Peak to Average Ratio
PEC	Product Engineering Code
PMR	Peak to Minimum Ratio
PSU	Power Supply Unit
RBER	Residual Bit Error Rate
RF	Radio Frequency
RMS	Root Mean Square

RX	Receiver
SFH	Slow Frequency Hopping
SPQL	Shipped Product Quality Level
SPR	Serial PEC Release
TBC	To Be Confirmed
TBD	To Be Defined
TCH	Traffic Channel
TDMA	Time Domain Multiple Access
TRX	Transmitter – Receiver
TS	Time slot
TX	Transmitter
UNL	Unit nominal Level
URG	Unit Reference Gain
UUT	Unit Under Test
VAD	Voice Activity Detection
VSWR	Voltage Standing Wave Ratio
VVA	Variable Voltage Attenuator

8.2. DEFINITIONS

None

❧ END OF DOCUMENT ❧