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

Reference:	**60053379-554567-R-TR-18o-FCC**
Version:	**A**
Status:	**Approved**
Date:	**28/Feb/2007**

Customer:	**NORTEL NETWORKS** **Parc d'Activités de Magny-Châteaufort** **78928 Yvelines Cedex 09**
Product:	**GSM 18000 Outdoor BTS**

Author:	**Marc CANCOUËT**
Technical Manager:	**Didier PRADON**

05/March/2007

LCIE
Laboratoire Central
des Industries Electriques
Une société de Bureau Veritas

33, av du Général Leclerc
BP 8
92266 Fontenay-aux-Roses cedex
France

Tél : +33 1 40 95 60 60
Fax : +33 1 40 95 86 56
contact@lcie.fr
www.lcie.fr

Société Anonyme
au capital de 15 245 984 €
RCS Nanterre B 408 363 174

PUBLICATION HISTORY

VERSION	DATE	AUTHOR	MODIFICATION
A	28-Feb-07	M.CANCOUËT	Creation of document

CONTENTS

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 Outdoor BTS with modules on GSM 850 MHz band & PCS 1900 MHz band.

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/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/021761 01.01 / EN	GSM850/1900 Outdoor BTS 18000 hardware delivery notice

4. IDENTIFICATION OF EQUIPMENT UNDER TEST

4.1. GSM 18000 OUTDOOR BTS

This document applies to:

Product: GSM 18000 Outdoor BTS

Manufacturer: NORTEL
Frequencies: 850 MHz & 1900 MHz

Configuration:

Option: *ALPRO*

AVLM Recipient: LCIE	Date of delivery: 09/FEB/2007
Product: GSM/UMTS 18000 Outdoor BTS	
Article delivered: GSM 18000 Outdoor BTS R18OB 19 S333 85 S333 H2 E1	Article code: NTT915AF 01
Section transmitting: 8U00	Designer name: CHENET S. / JEULAND P.
Cabinet Serial Number: NNTMC3002GCK / N°446117	
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: - DBP2 - RICAM to replace 1IFM1+2ICM+1ABM - RMPSU CR on 3 RM - Rectifier 1.4KW CR Artesyn - DDM850 with VSWR - 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
CAB: PRECA W BAT/60 S18O ROHS	NTT915AF	01	NNTMC3002GCK	
BARE CABINET & ECU	NTT91550	01	NNTMC3002GCK	
UCPS Rectifier 1.4KW	NTN070BF	04	ATSNZH152588	Rectifier 1.4KW CR ARTESYN
UCPS Rectifier 1.4KW	NTN070BF	04	ATSNZH152589	Rectifier 1.4KW CR ARTESYN
UCPS Rectifier 1.4KW	NTN070BF	04	ATSNZH152586	Rectifier 1.4KW CR ARTESYN
UCPS Rectifier 1.4KW	NTN070BF	04	ATSNZH152587	Rectifier 1.4KW CR ARTESYN
UCPS Rectifier 1.4KW	NTN070BF	04	ATSNZH152432	Rectifier 1.4KW CR ARTESYN
UCPS CCU UMTS/GSM	NTUM44AF	01	ATSNZH106461	
Rectifier Shelf UCPS W DDU	NTN066AA	01	ATSNZH127977	
ADU	NTT970AF	01	ATSNCR222358	
MOD: User ICO V2	NTT970BF	01	NNTMGT0052OI	
Kit Heater option :ECU	NTT991VF	01	NNTMGT0050F2	
Maintenance Plug Europe	NTN091HF	01	NNTMGT004XDK	
DBP2	NTN030AM	N1	18	New DBP without BUS bar
ECU W HEATER OPTION	NNT971CQ	01	NNTM7504YD2Y	
ECU ASSY	NTT971CF	01	NNTMC3002GDV	
RICAM	NTN024AA	D2 MIR2.5	FANTASTIX	ICM0 IP : 136.147.42.151 ICM1 IP : 136.147.42.152 ABM IP : 136.147.42.153
ABM	NTN029AF	01	NNTMGWC5036L	
RM PCS1900	NTN050PM	D3	CDN200639006	00 17 D1 9F 2F 58 IP : 136.147.42.85
RM PCS1900	NTN050PM	D5	CDN200640003	00 0E 62 FD 94 DF IP:136.147.42.88 with new PSU CR NTN058AM 04 / ATSNZH155434
RM PCS1900	NTN050PM	D4	CDN200640005	00 17 D1 9F 30 19 IP : 136.147.42.86
HPRM 850 for Radio Test	NTN050JA	D1	CDN200651003	00 19 69 FE C1 69 IP:136.147.42.128 with new PSU CR NTN058AM 04 / ATSNZH155432
HPRM 850	NTN050JA	D1	CDN200651009	00 19 69 FE C1 67 IP : 136.147.42.127
HPRM 850	NTN050JA	D1	CDN200651001	00 19 69 FE C1 6C IP : 136.147.42.120 with new PSU CR NTN058AM 04 / ATSNZH155429
DDM H2 1900 W/VSWR	NTN063AA	04	FICT03000MPC	
DDM H2 1900 W/VSWR	NTN063AA	04	FICT030016F3	
DDM H2 1900 W/VSWR	NTN063AA	04	FICT03000PEX	
DDM H2 850 W/VSWR	NTN063HA	D2	FICT03002119	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D2	FICT0300212D	FILTRONICS 850 full band
DDM H2 850 W/VSWR	NTN063HA	D1	FICT0200204F	FILTRONICS 850 full band
ALPRO 2	NTT971AF	01	NNTMGT004U9L	
ALPRO 2	NTT971AF	01	NNTMGT004U9N	

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 Outdoor: - 40℃ / + 50 ℃

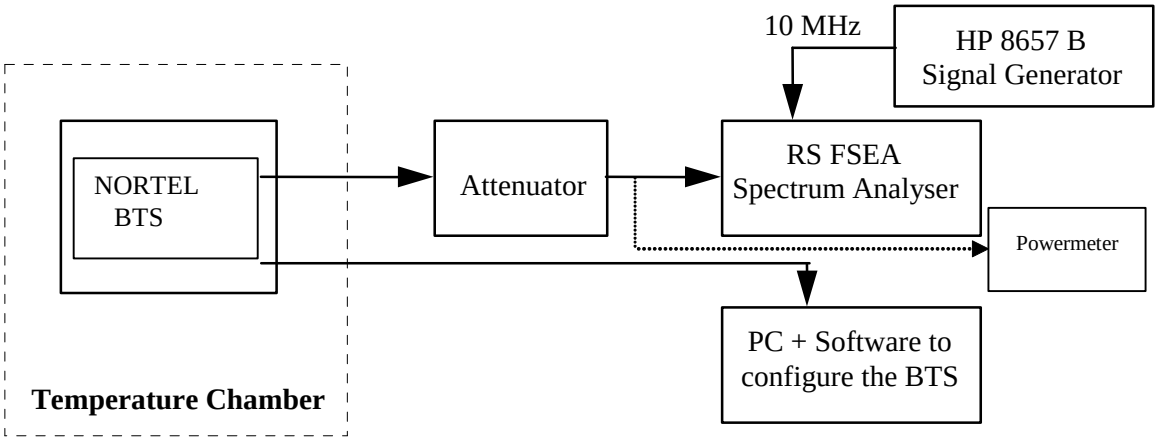
Frequency stability are performed under following extreme conditions:

for Outdoor 18000 BTS
Temperature from – 40℃ to + 50℃ at intervals of 1 0 degrees.
With AC power supply variations: 187 V, 265 V.

Modules GSM HPRM 850MHz run with nominal power regulation at maximum power (60W) 47.8 dBm in GMSK modulation, modules PCS RM1900 run with nominal power regulation at maximum power (30W) 44.8 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



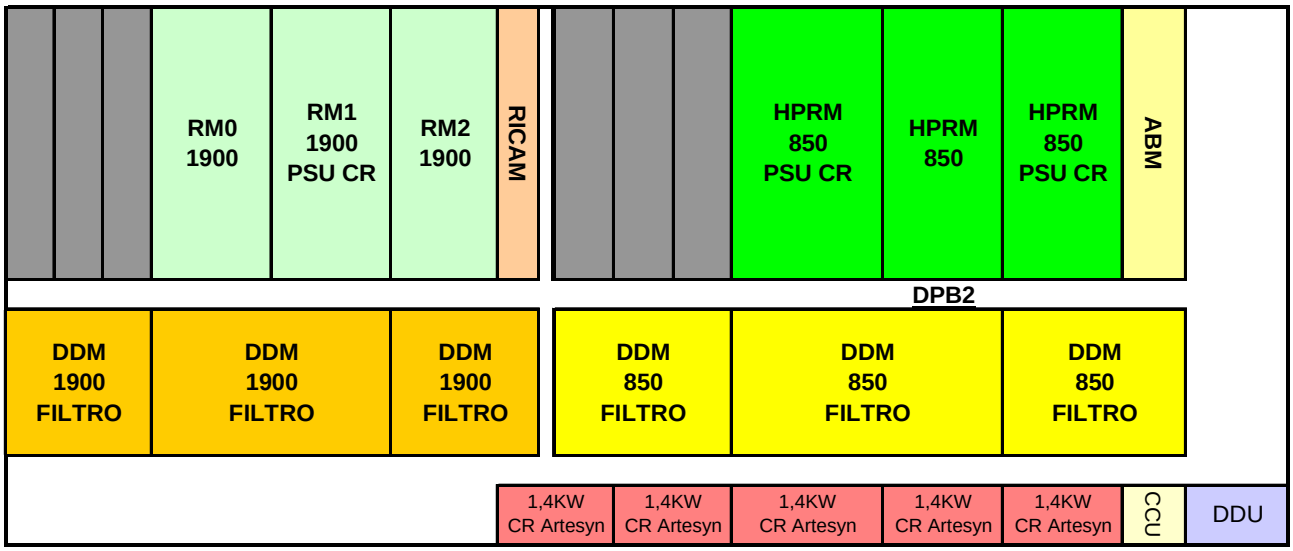
5.2. SOFTWARE CONFIGURATION

BTS type	GSM 18000 Outdoor 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 OUTDOOR BTS

5.3.1 BTS CONFIGURATION

Configuration GSM 18000 Outdoor dualband 850/1900 MHz



Tested modules

	ARTICLE	PEC code	Release	Serial number
RM 1	RM PCS1900	NTN050PM	D5	CDN200640003
DDM 1 1900	DDM H2 1900 W/VSWR	NTN063AA	04	FICT030016F3
HPRM3	HPRM 850	NTN050JA	D1	CDN200651003
DDM3 850	DDM H2 850 W/VSWR	NTN063HA	D2	FICT03002119

5.3.2 TESTS AT TEMPERATURE 50 ℃

5.3.2.1 TX TESTS ON RM 1 (1900 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.2.1.1 MEAN RF POWER @ 187 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,19	**PASS**
TDMA 1	**661**	GMSK	40,53	**PASS**
TDMA 2	**810**	GMSK	41,24	**PASS**

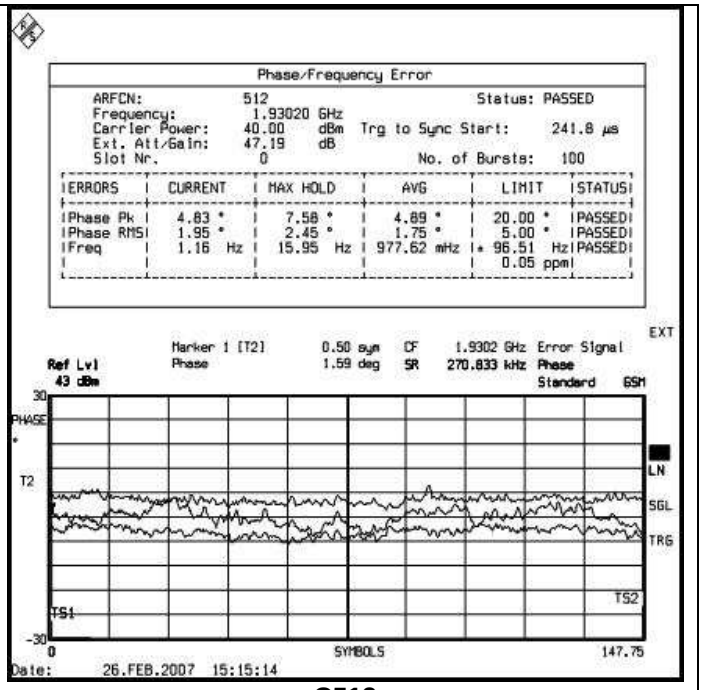
5.3.2.1.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

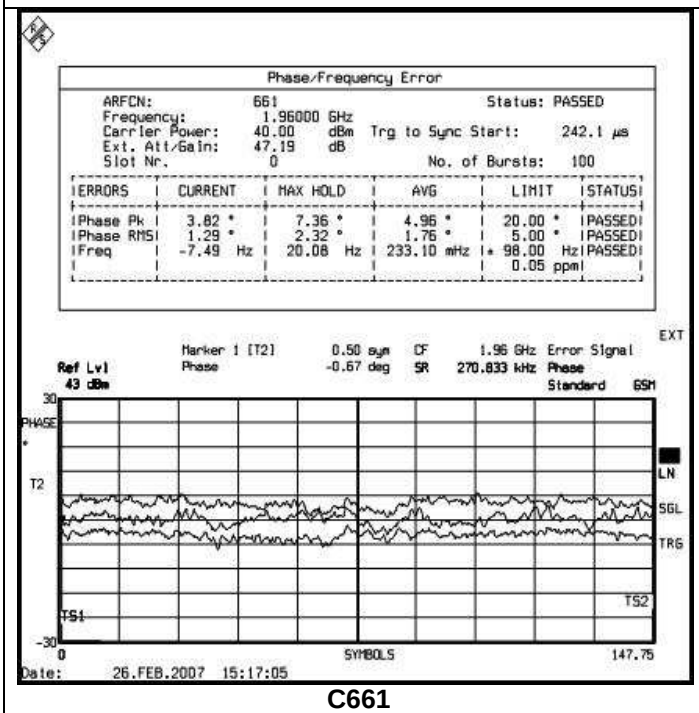
		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,25	**PASS**
TDMA 1	**661**	GMSK	40,59	**PASS**
TDMA 2	**810**	GMSK	41,33	**PASS**

5.3.2.1.3 PHASE AND MEAN FREQUENCY ERROR @ 187 VAC

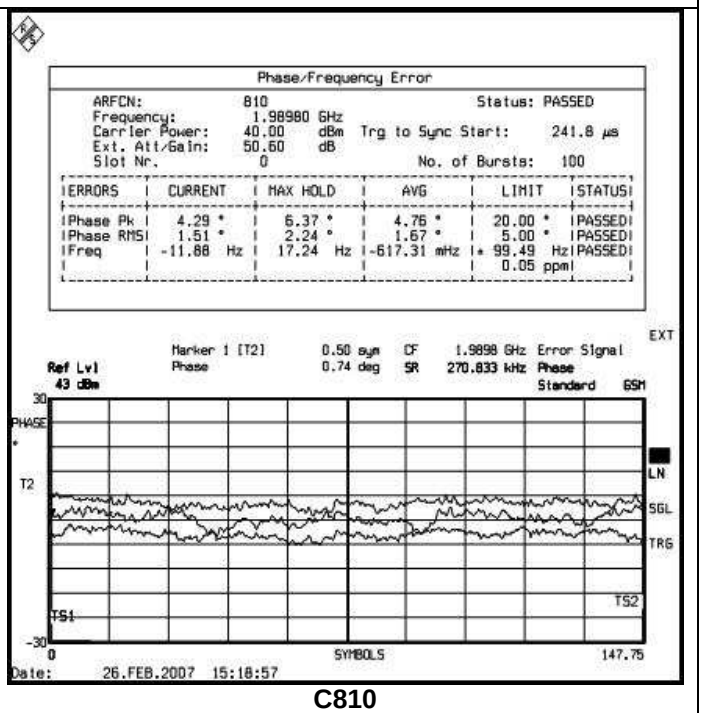
			RM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,58 °	4,89 °	PASS
		Phase RMS	2,45 °	1,75 °	PASS
		Freq	15,95 Hz	0,98 Hz	PASS
TDMA 1	661	Phase Pk	7,36 °	4,96 °	PASS
		Phase RMS	2,32 °	1,76 °	PASS
		Freq	20,08 Hz	0,23 Hz	PASS
TDMA 2	810	Phase Pk	6,37 °	4,76 °	PASS
		Phase RMS	2,24 °	1,67 °	PASS
		Freq	17,24 Hz	-0,62 Hz	PASS



C512



C661

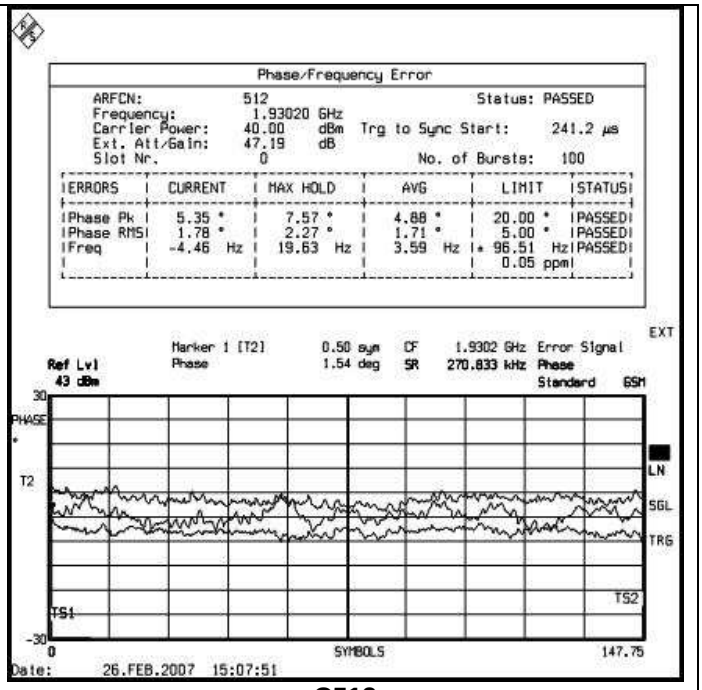


C810

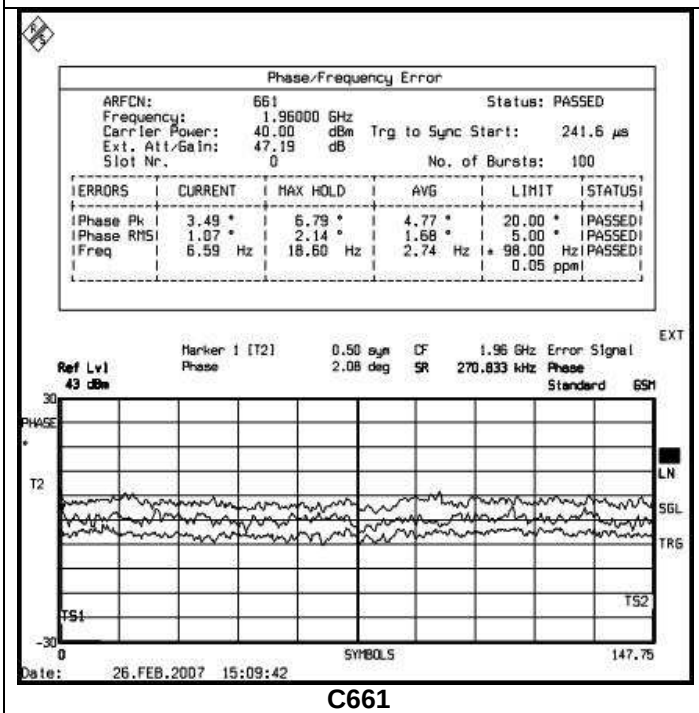
The maximum frequency deviation allowed is 0.05 ppm (+/-95 Hz). The maximum deviation measured (20.08 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.2.1.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VAC

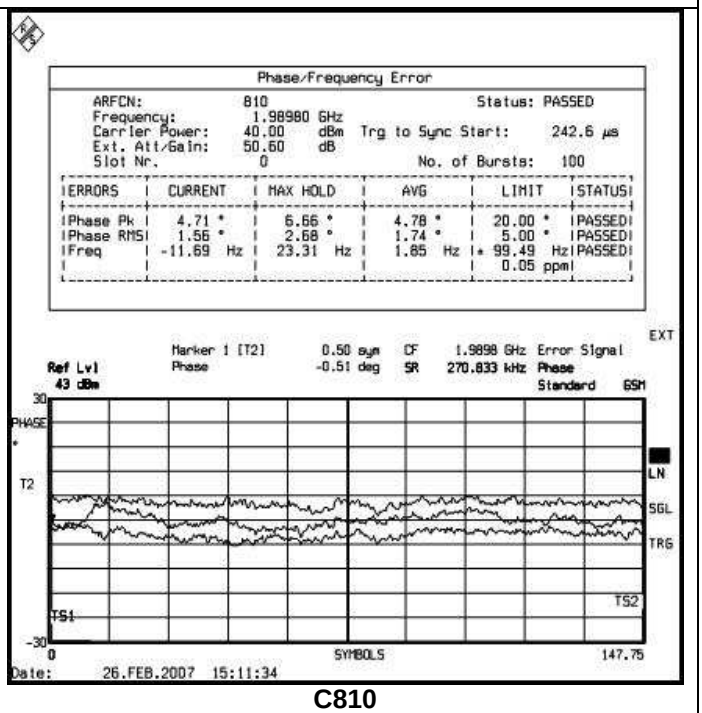
			RM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,57 °	4,88 °	PASS
		Phase RMS	2,27 °	1,71 °	PASS
		Freq	19,63 Hz	3,59 Hz	PASS
TDMA 1	661	Phase Pk	6,79 °	4,77 °	PASS
		Phase RMS	2,14 °	1,68 °	PASS
		Freq	18,60 Hz	2,74 Hz	PASS
TDMA 2	810	Phase Pk	6,66 °	4,78 °	PASS
		Phase RMS	2,68 °	1,74 °	PASS
		Freq	23,31 Hz	1,85 Hz	PASS



C512



C661



C810

The maximum frequency deviation allowed is 0.05 ppm (+/-95 Hz). The maximum deviation measured (23.31 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.2.2 TX TESTS ON HPRM 3 (850 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.2.2.1 MEAN RF POWER @ 187 VAC

Specification for H2 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	43,00	**PASS**
TDMA 1	**190**	GMSK	43,36	**PASS**
TDMA 2	**251**	GMSK	43,69	**PASS**

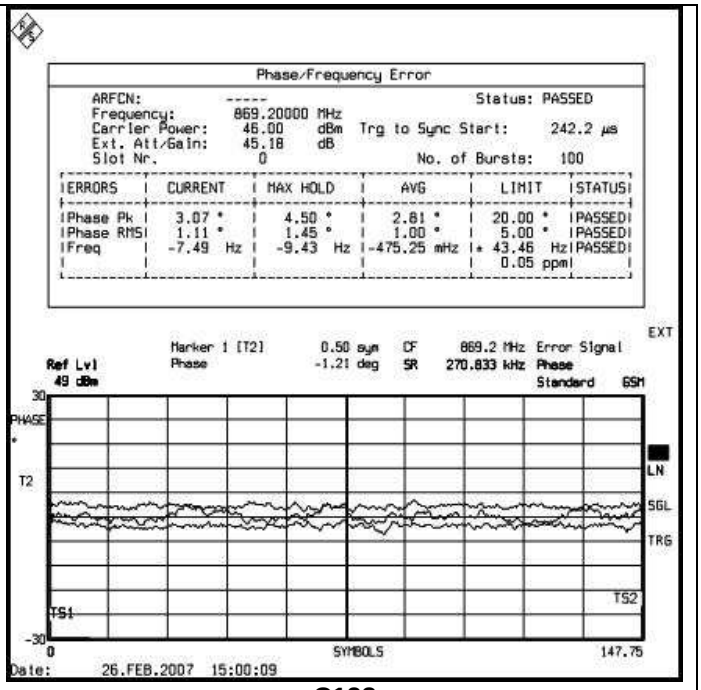
5.3.2.2.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 41 dBm and ≥ 45 dBm.

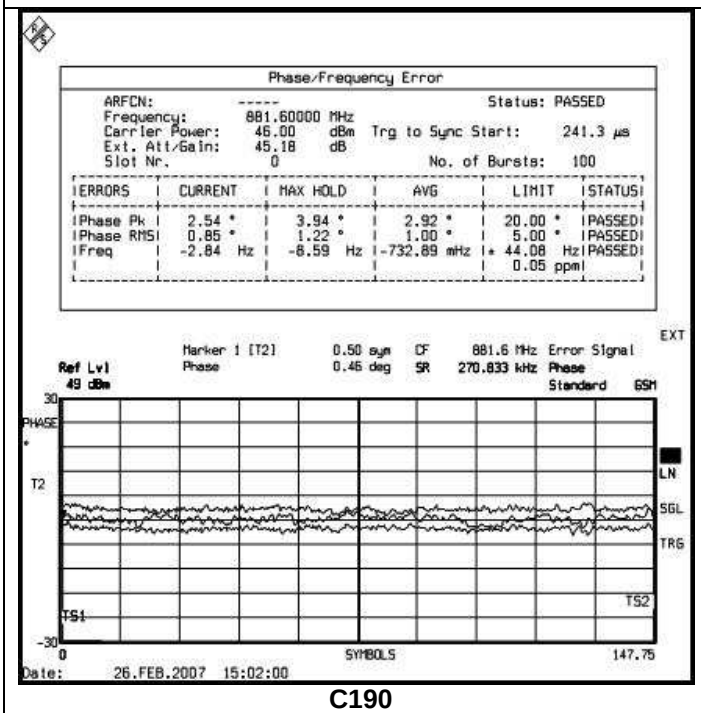
		HPRM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**128**	GMSK	43,01	**PASS**
TDMA 1	**190**	GMSK	43,36	**PASS**
TDMA 2	**251**	GMSK	43,70	**PASS**

5.3.2.2.3 PHASE AND MEAN FREQUENCY ERROR @ 187VAC

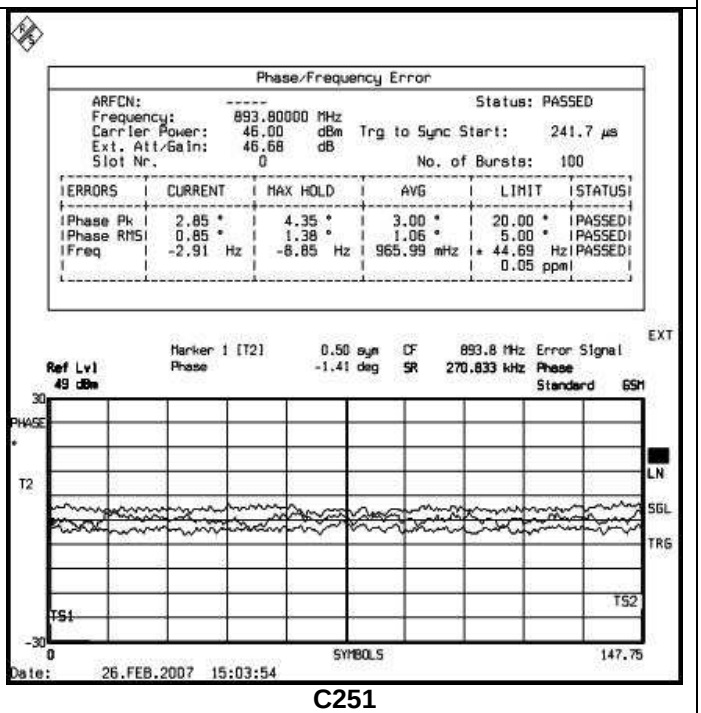
	Canal	Mesure	HPRM tested Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,50 °	2,81 °	PASS
		Phase RMS	1,45 °	1,00 °	PASS
		Freq	-9,43 Hz	-0,48 Hz	PASS
TDMA 1	190	Phase Pk	3,94 °	2,92 °	PASS
		Phase RMS	1,22 °	1,00 °	PASS
		Freq	-8,59 Hz	-0,73 Hz	PASS
TDMA 2	251	Phase Pk	4,35 °	3,00 °	PASS
		Phase RMS	1,38 °	1,06 °	PASS
		Freq	-8,85 Hz	0,97 Hz	PASS



C128



C190

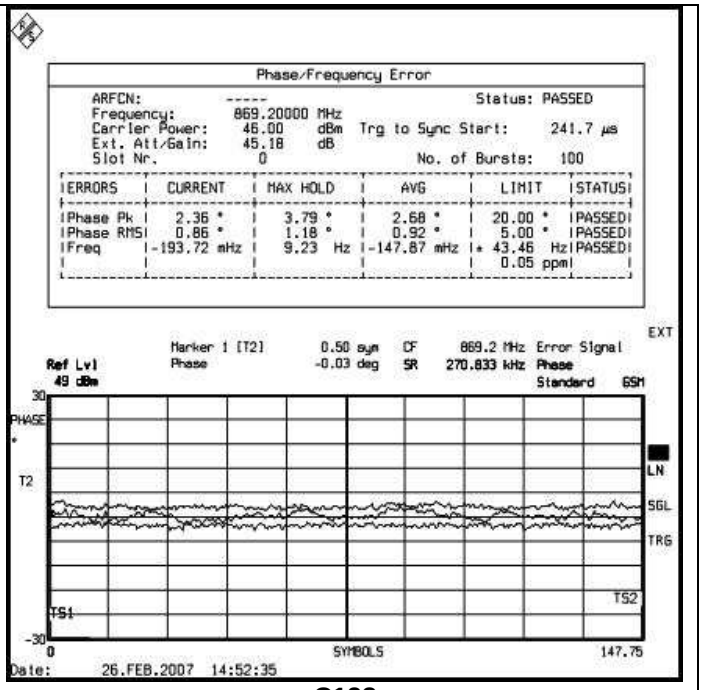


C251

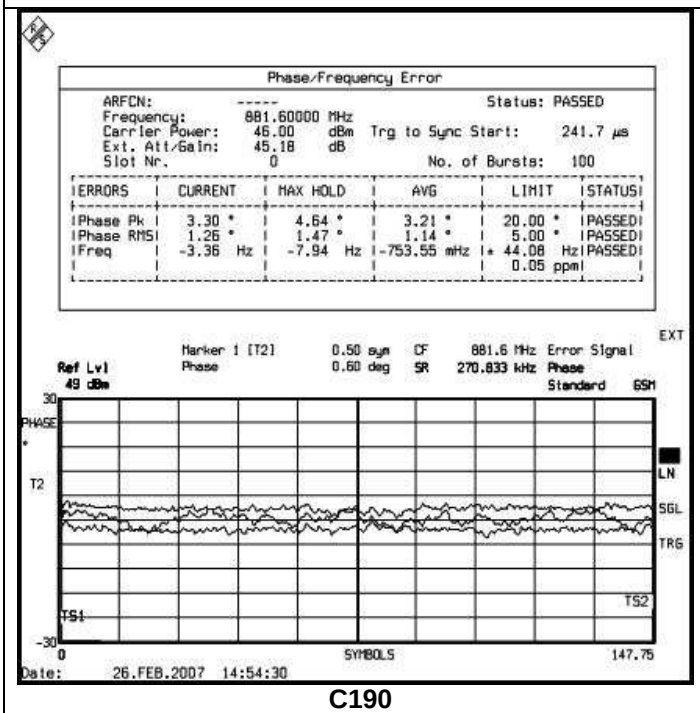
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (-9.43 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.2.2.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VDC

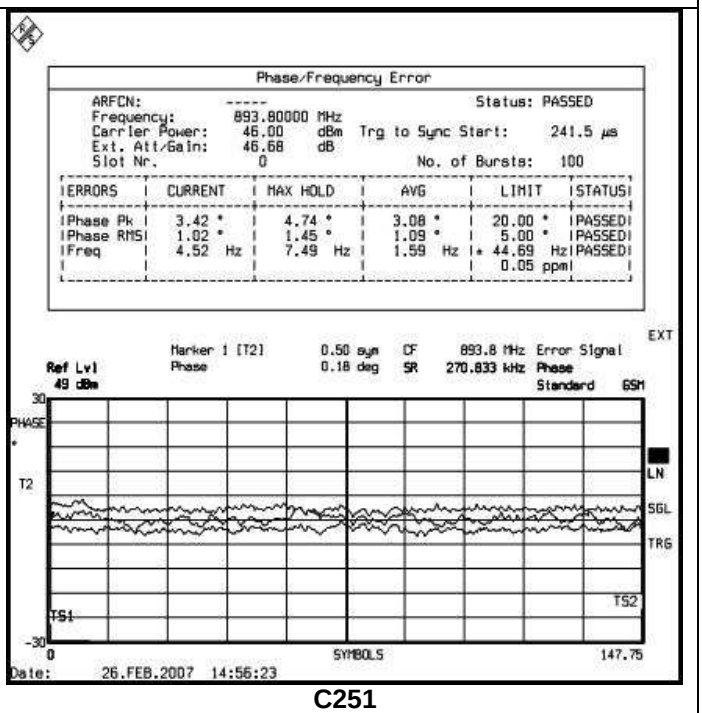
	Canal	Mesure	HPRM tested Max hold	Average	Sanction
TDMA 0	128	Phase Pk	3,79 °	2,68 °	PASS
		Phase RMS	1,18 °	0,92 °	PASS
		Freq	9,23 Hz	-0,15 Hz	PASS
TDMA 1	190	Phase Pk	4,64 °	3,21 °	PASS
		Phase RMS	1,47 °	1,14 °	PASS
		Freq	-7,94 Hz	-0,75 Hz	PASS
TDMA 2	251	Phase Pk	4,74 °	3,08 °	PASS
		Phase RMS	1,45 °	1,09 °	PASS
		Freq	7,49 Hz	1,59 Hz	PASS



C128



C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (9.23 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3 TESTS AT TEMPERATURE 40 ℃

5.3.3.1 TX TESTS ON RM 1 (1900 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.3.1.1 MEAN RF POWER @ 187 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,28	**PASS**
TDMA 1	**661**	GMSK	40,62	**PASS**
TDMA 2	**810**	GMSK	41,29	**PASS**

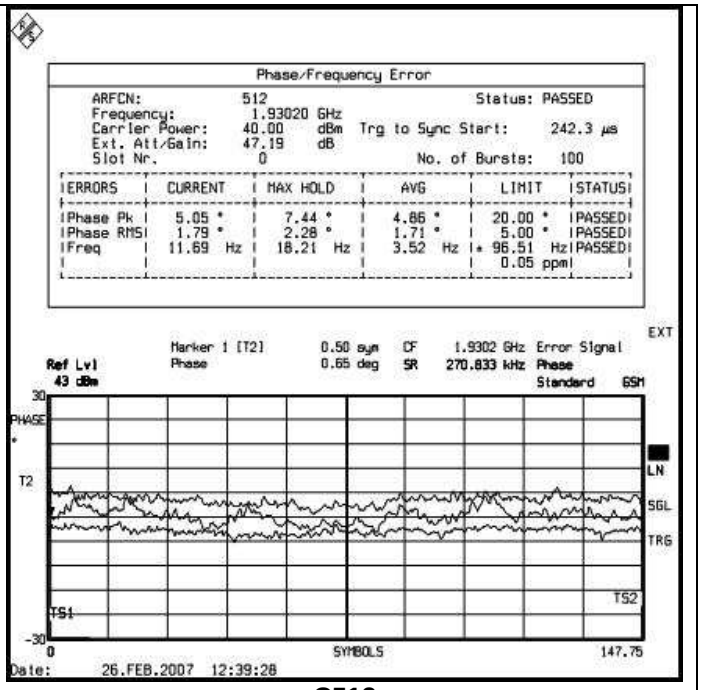
5.3.3.1.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

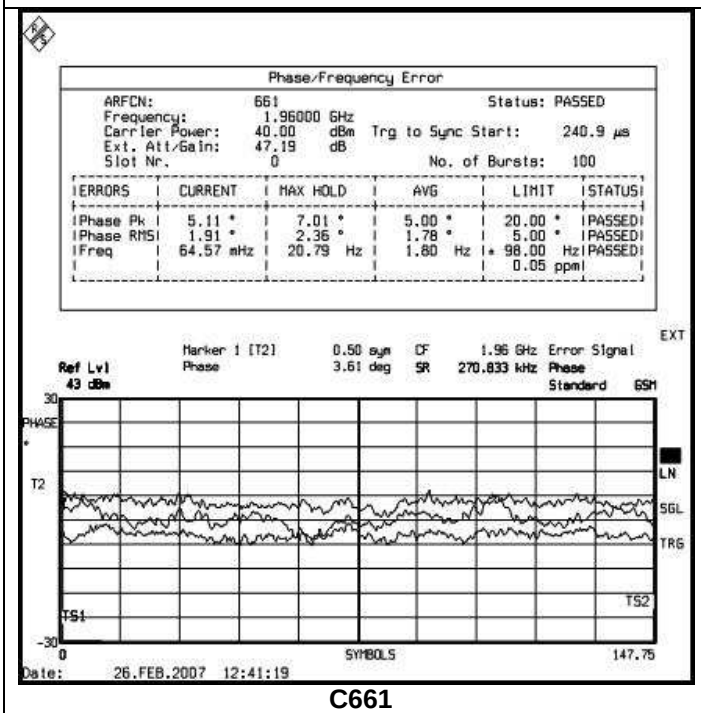
		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,28	**PASS**
TDMA 1	**661**	GMSK	40,62	**PASS**
TDMA 2	**810**	GMSK	41,29	**PASS**

5.3.3.1.3 PHASE AND MEAN FREQUENCY ERROR @ 187 VAC

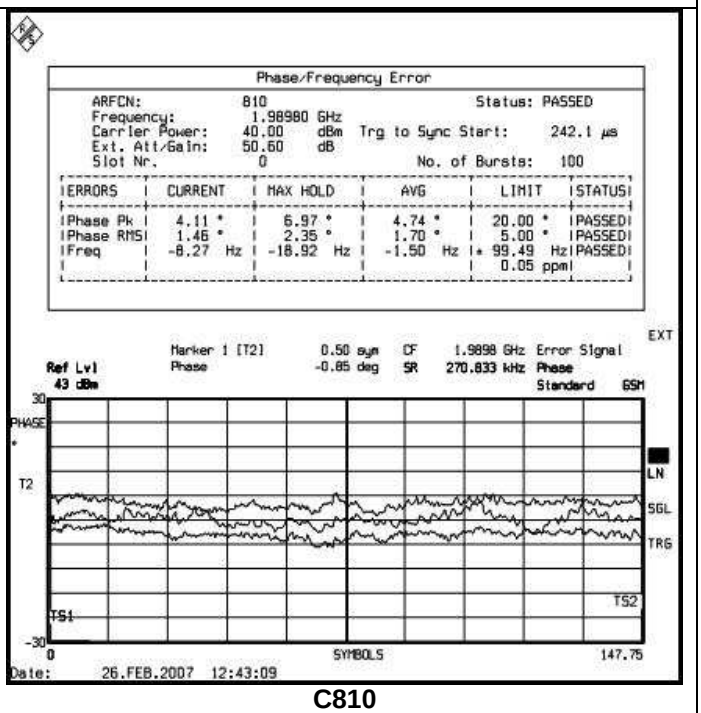
			RM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,44 °	4,86 °	PASS
		Phase RMS	2,28 °	1,71 °	PASS
		Freq	18,21 Hz	3,52 Hz	PASS
TDMA 1	661	Phase Pk	7,01 °	5,00 °	PASS
		Phase RMS	2,36 °	1,78 °	PASS
		Freq	20,79 Hz	1,80 Hz	PASS
TDMA 2	810	Phase Pk	6,97 °	4,74 °	PASS
		Phase RMS	2,35 °	1,70 °	PASS
		Freq	-18,92 Hz	-1,50 Hz	PASS



C512



C661

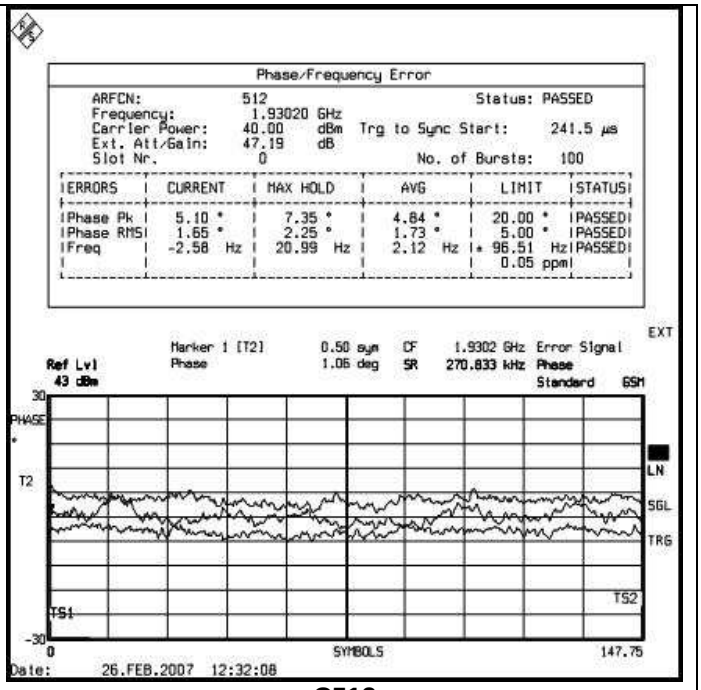


C810

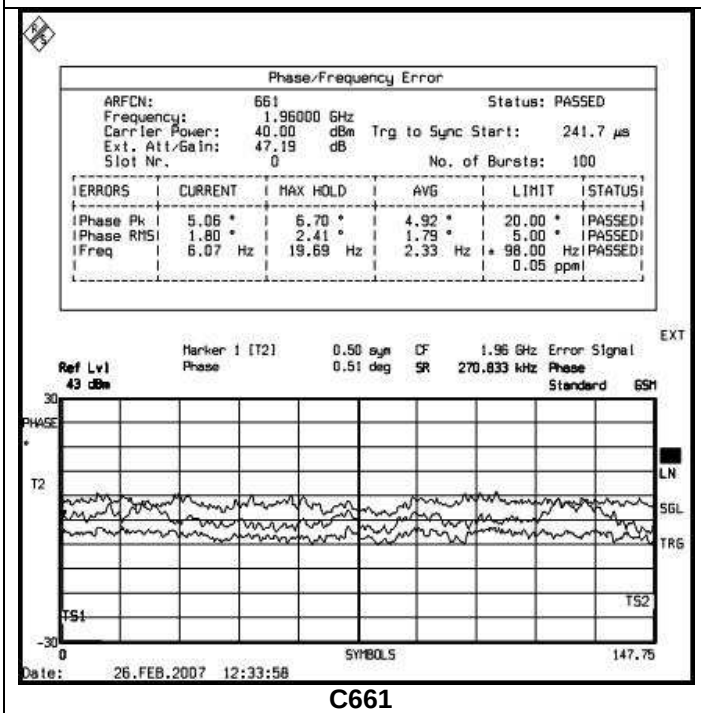
The maximum frequency deviation allowed is 0.05 ppm (+/- 95 Hz). The maximum deviation measured (20.79 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3.1.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VAC

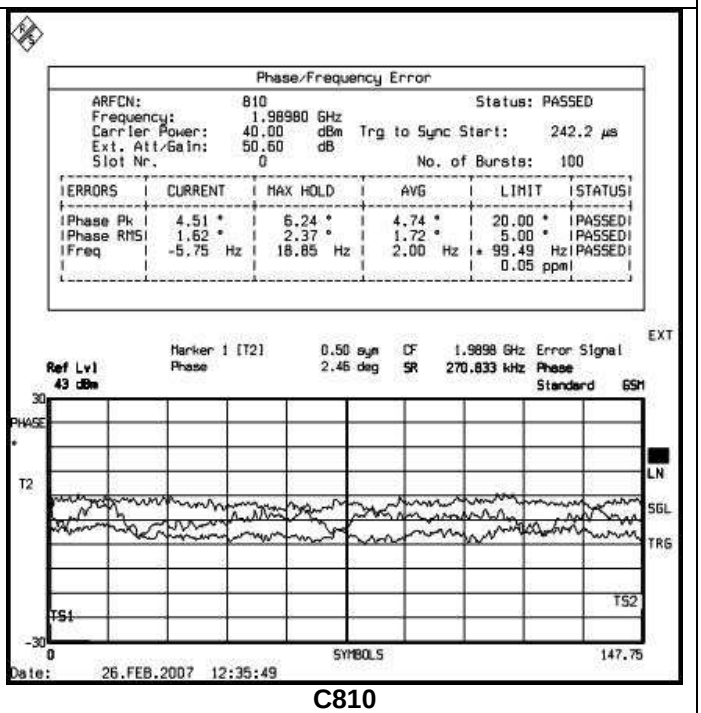
	Canal	Mesure	HPRM tested		
			Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,35 °	4,84 °	PASS
		Phase RMS	2,25 °	1,73 °	PASS
		Freq	20,99 Hz	2,12 Hz	PASS
TDMA 1	661	Phase Pk	6,70 °	4,92 °	PASS
		Phase RMS	2,41 °	1,79 °	PASS
		Freq	19,69 Hz	2,33 Hz	PASS
TDMA 2	810	Phase Pk	6,24 °	4,74 °	PASS
		Phase RMS	2,37 °	1,72 °	PASS
		Freq	18,85 Hz	2,00 Hz	PASS



C512



C661



C810

The maximum frequency deviation allowed is 0.05 ppm (+/- 95 Hz). The maximum deviation measured (20.99 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3.2 TX TESTS ON HPRM 3 (850 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.3.2.1 MEAN RF POWER @ 187 VAC

Specification for H2 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	43,19	**PASS**
TDMA 1	**190**	GMSK	43,53	**PASS**
TDMA 2	**251**	GMSK	43,79	**PASS**

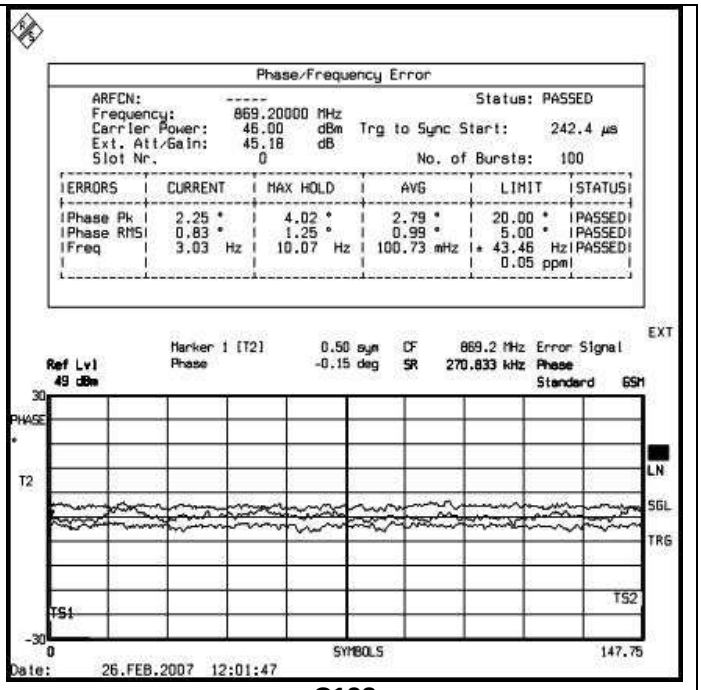
5.3.3.2.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 41 dBm and ≥ 45 dBm.

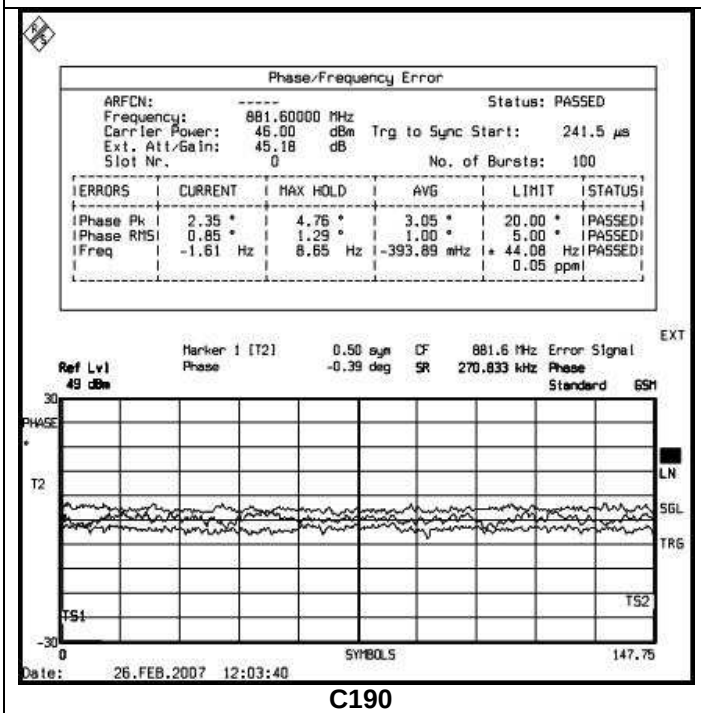
		HPRM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**128**	GMSK	43,16	**PASS**
TDMA 1	**190**	GMSK	43,50	**PASS**
TDMA 2	**251**	GMSK	43,78	**PASS**

5.3.3.2.3 PHASE AND MEAN FREQUENCY ERROR @ 187VAC

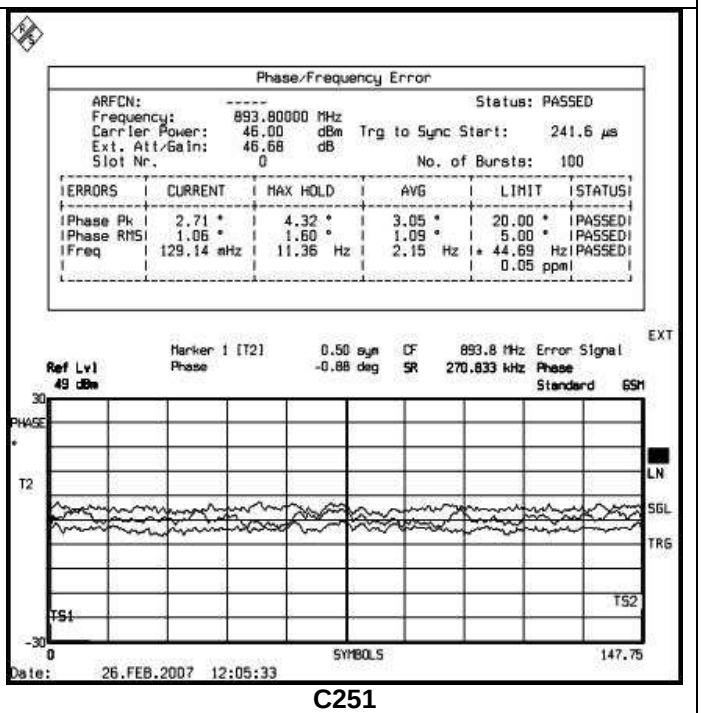
			HPRM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,02 °	2,79 °	PASS
		Phase RMS	1,25 °	0,99 °	PASS
		Freq	10,07 Hz	0,10 Hz	PASS
TDMA 1	190	Phase Pk	4,76 °	3,05 °	PASS
		Phase RMS	1,29 °	1,00 °	PASS
		Freq	8,65 Hz	-0,39 Hz	PASS
TDMA 2	251	Phase Pk	4,32 °	3,05 °	PASS
		Phase RMS	1,60 °	1,09 °	PASS
		Freq	11,36 Hz	2,15 Hz	PASS



C128



C190

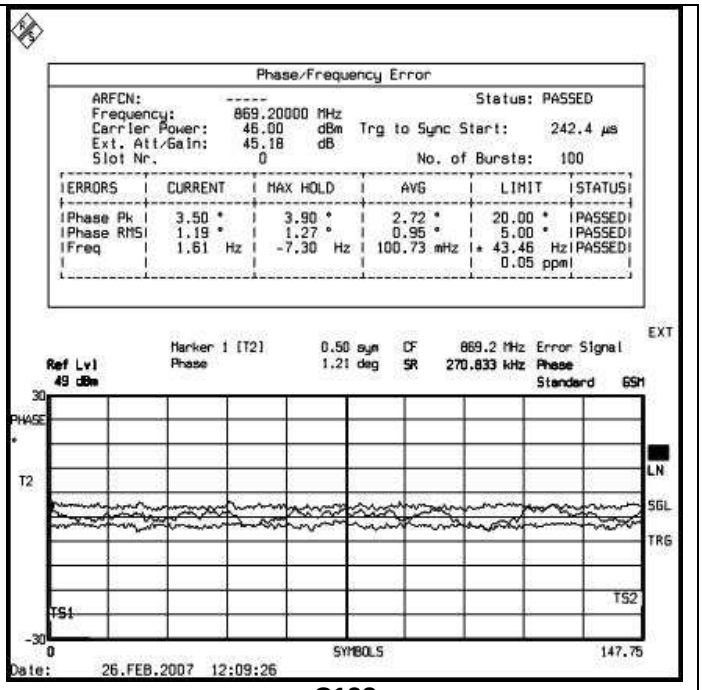


C251

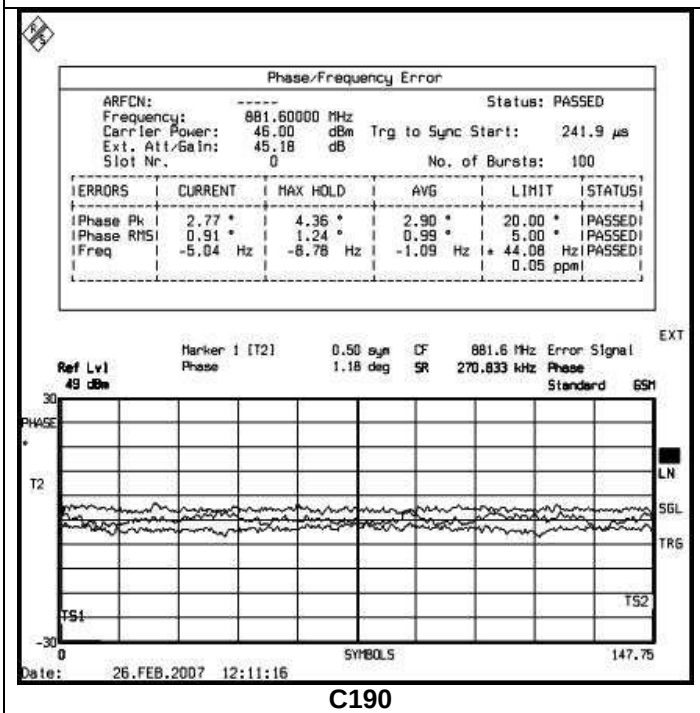
The maximum frequency deviation allowed is 0.05 ppm (+/- 43 Hz). The maximum deviation measured (11.36 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.3.2.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VDC

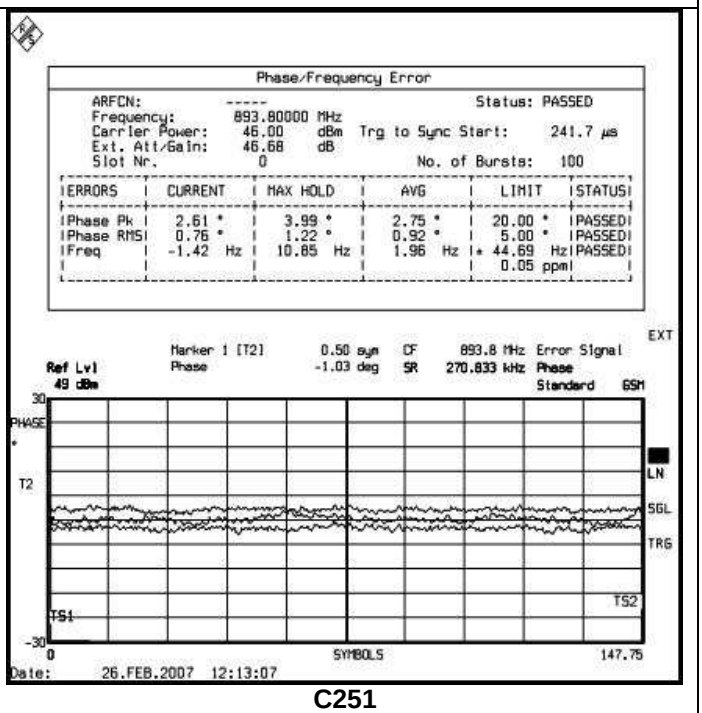
	Canal	Mesure	HPRM tested Max hold	Average	Sanction
TDMA 0	128	Phase Pk	3,90 °	2,72 °	PASS
		Phase RMS	1,27 °	0,95 °	PASS
		Freq	-7,30 Hz	0,10 Hz	PASS
TDMA 1	190	Phase Pk	4,36 °	2,90 °	PASS
		Phase RMS	1,24 °	0,99 °	PASS
		Freq	-8,78 Hz	-1,09 Hz	PASS
TDMA 2	251	Phase Pk	3,99 °	2,75 °	PASS
		Phase RMS	1,22 °	0,92 °	PASS
		Freq	10,85 Hz	1,96 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.

5.3.4 TESTS AT TEMPERATURE 30 ℃

5.3.4.1 TX TESTS ON RM 1 (1900 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.4.1.1 MEAN RF POWER @ 187 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,01	**PASS**
TDMA 1	**661**	GMSK	40,42	**PASS**
TDMA 2	**810**	GMSK	41,03	**PASS**

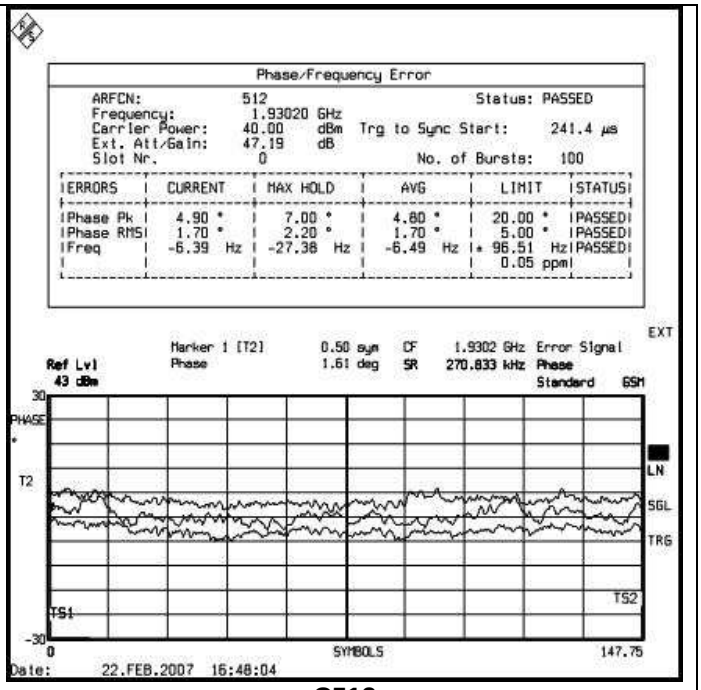
5.3.4.1.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

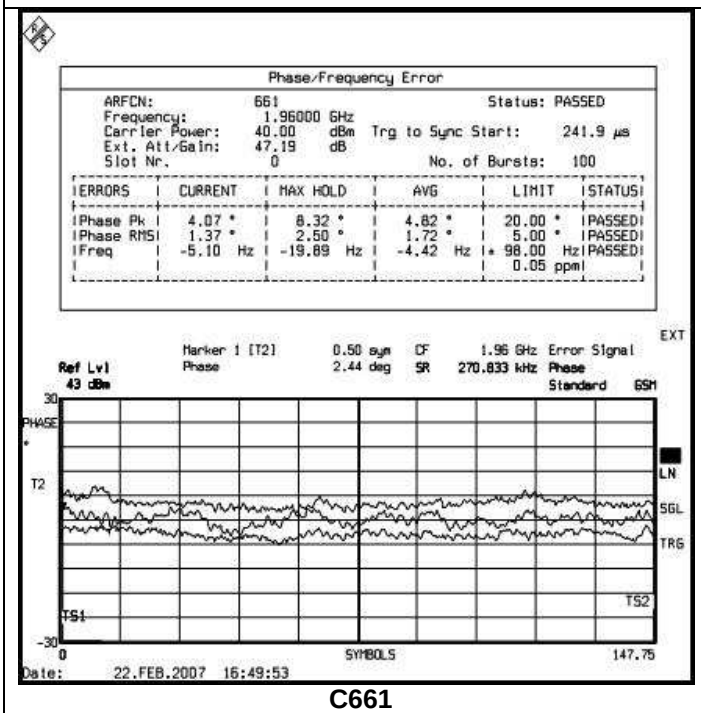
		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,33	**PASS**
TDMA 1	**661**	GMSK	40,70	**PASS**
TDMA 2	**810**	GMSK	41,24	**PASS**

5.3.4.1.3 PHASE AND MEAN FREQUENCY ERROR @ 187 VAC

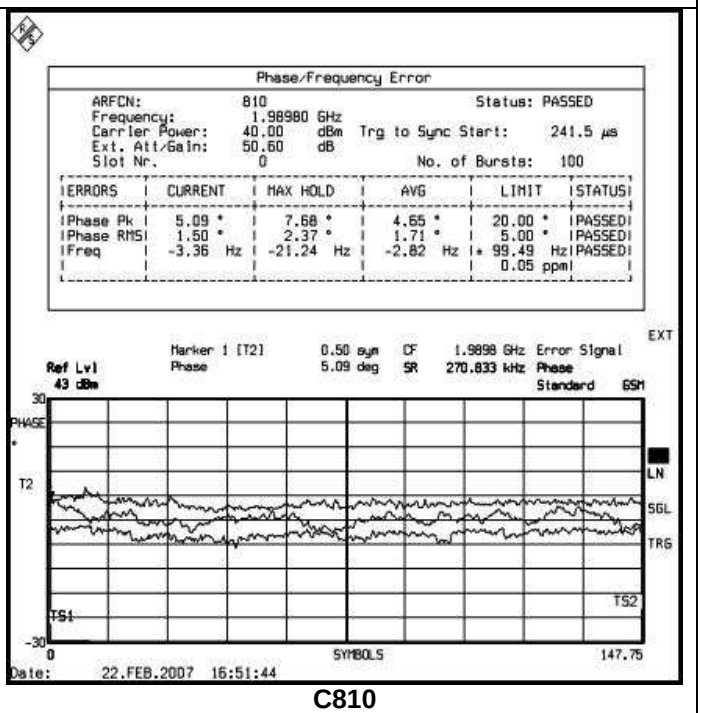
			RM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,00 °	4,80 °	PASS
		Phase RMS	2,20 °	1,70 °	PASS
		Freq	-27,38 Hz	-6,49 Hz	PASS
TDMA 1	661	Phase Pk	8,32 °	4,82 °	PASS
		Phase RMS	2,50 °	1,72 °	PASS
		Freq	-19,89 Hz	-4,42 Hz	PASS
TDMA 2	810	Phase Pk	7,68 °	4,65 °	PASS
		Phase RMS	2,37 °	1,71 °	PASS
		Freq	-21,24 Hz	-2,82 Hz	PASS



C512



C661

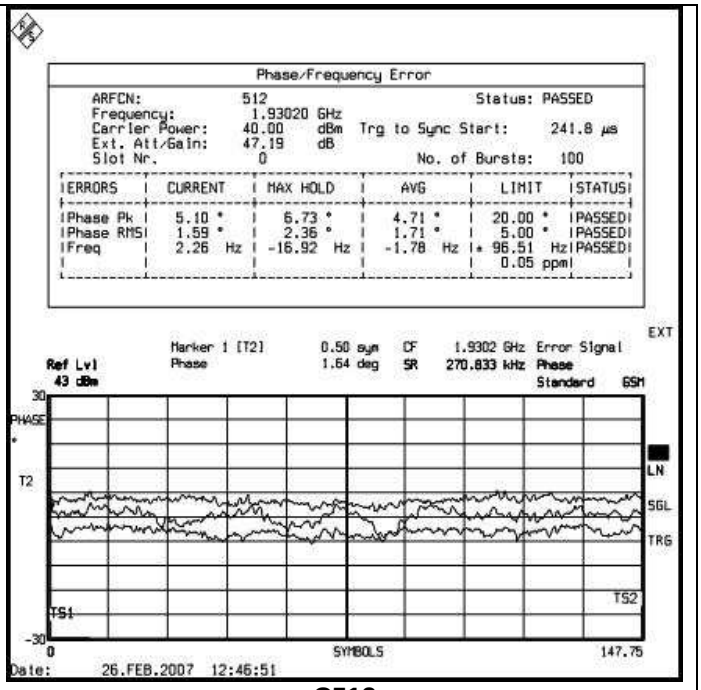


C810

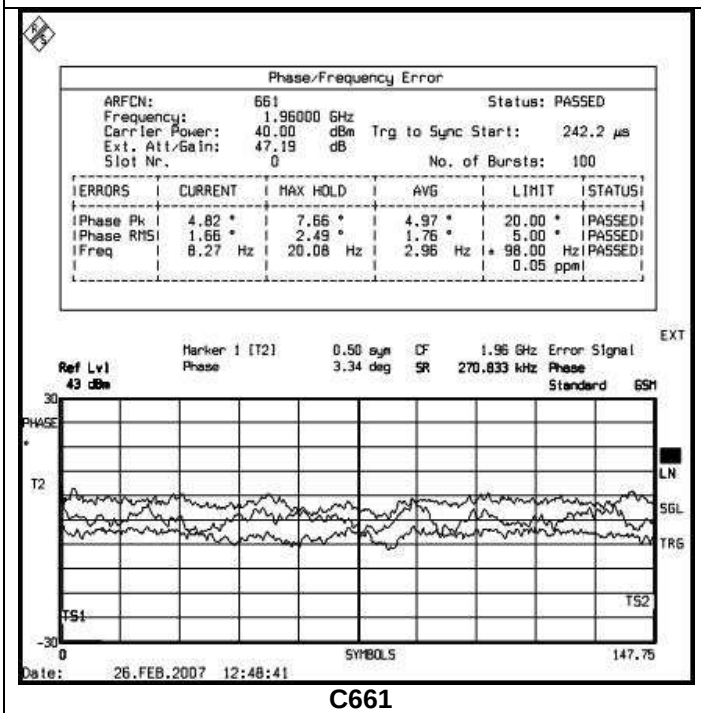
The maximum frequency deviation allowed is 0.05 ppm (+/- 95 Hz). The maximum deviation measured (-27.38 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4.1.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VAC

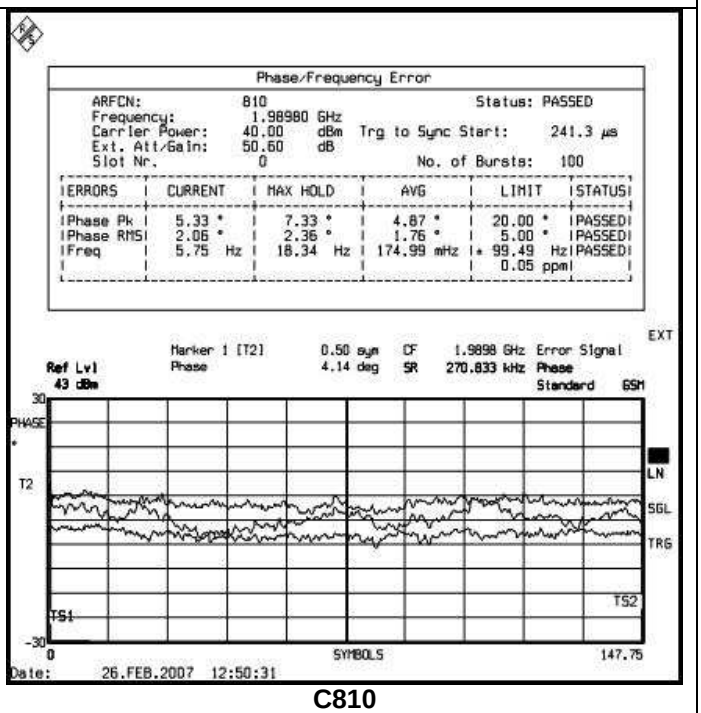
	Canal	Mesure	RM tested		
			Max hold	Average	Sanction
TDMA 0	512	Phase Pk	6,73 °	4,71 °	PASS
		Phase RMS	2,36 °	1,71 °	PASS
		Freq	-16,92 Hz	-1,78 Hz	PASS
TDMA 1	661	Phase Pk	7,66 °	4,97 °	PASS
		Phase RMS	2,49 °	1,76 °	PASS
		Freq	20,08 Hz	2,96 Hz	PASS
TDMA 2	810	Phase Pk	7,33 °	4,87 °	PASS
		Phase RMS	2,36 °	1,76 °	PASS
		Freq	18,34 Hz	0,17 Hz	PASS



C512



C661



C810

The maximum frequency deviation allowed is 0.05 ppm (+/- 95 Hz). The maximum deviation measured (20.08 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4.2 TX TESTS ON HPRM 3 (850 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.4.2.1 MEAN RF POWER @ 187 VAC

Specification for H2 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	43,26	**PASS**
TDMA 1	**190**	GMSK	43,59	**PASS**
TDMA 2	**251**	GMSK	43,81	**PASS**

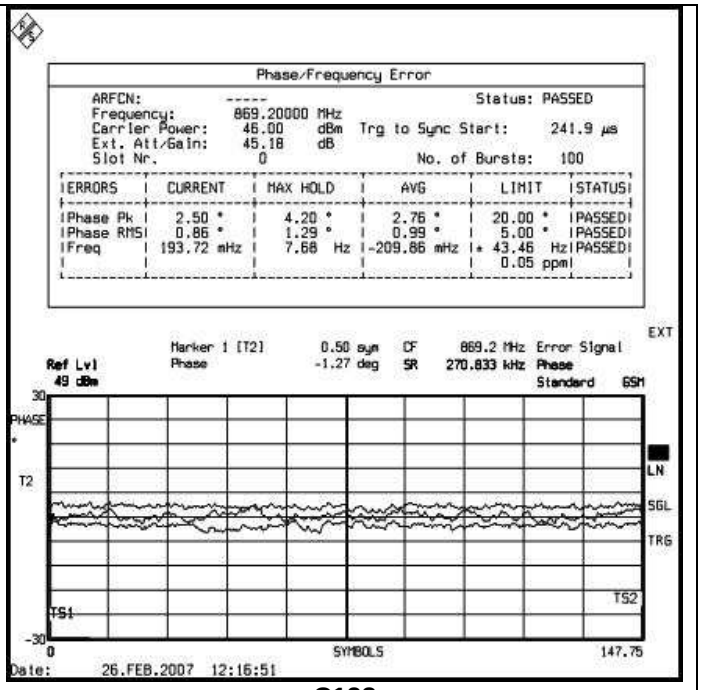
5.3.4.2.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 41 dBm and ≥ 45 dBm.

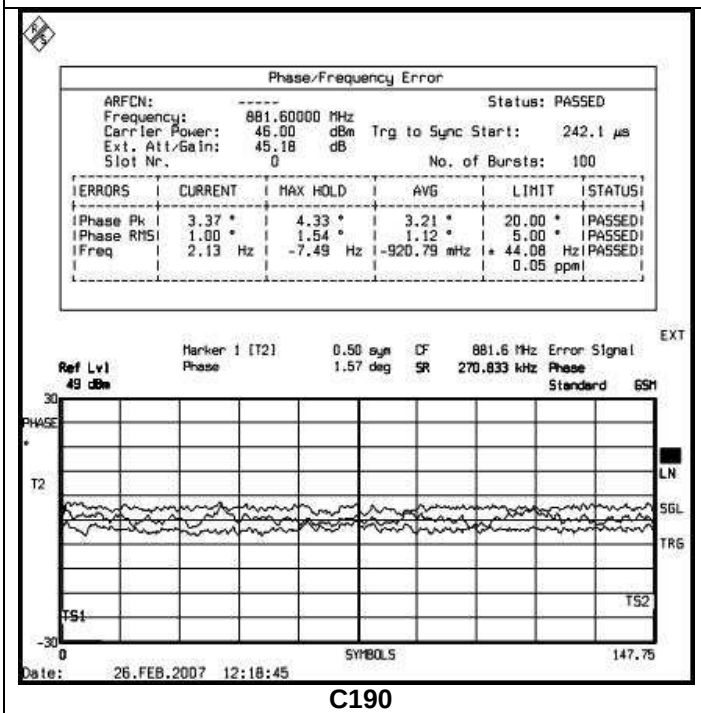
		HPRM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**128**	GMSK	43,27	**PASS**
TDMA 1	**190**	GMSK	43,59	**PASS**
TDMA 2	**251**	GMSK	43,81	**PASS**

5.3.4.2.3 PHASE AND MEAN FREQUENCY ERROR @ 187VAC

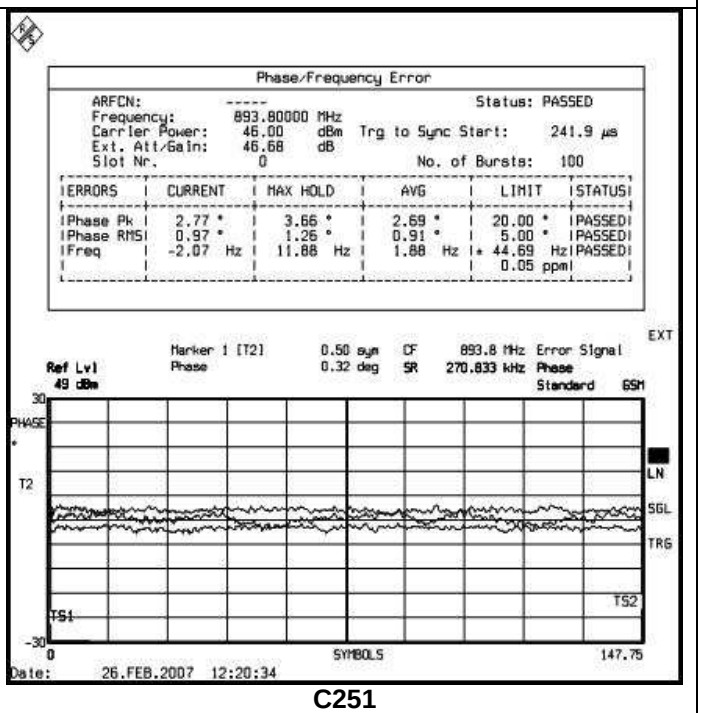
	Canal	Mesure	HPRM tested Max hold	Average	Sanction
TDMA 0	128	Phase Pk	4,20 °	2,76 °	PASS
		Phase RMS	1,29 °	0,99 °	PASS
		Freq	7,68 Hz	-0,21 Hz	PASS
TDMA 1	190	Phase Pk	4,33 °	3,21 °	PASS
		Phase RMS	1,54 °	1,12 °	PASS
		Freq	-7,49 Hz	-0,92 Hz	PASS
TDMA 2	251	Phase Pk	3,66 °	2,69 °	PASS
		Phase RMS	1,26 °	0,91 °	PASS
		Freq	11,88 Hz	1,88 Hz	PASS



C128



C190

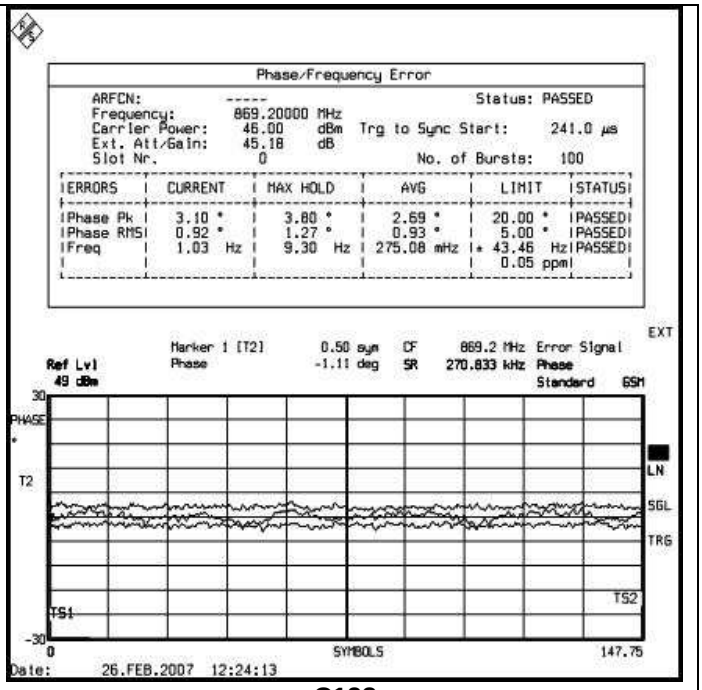


C251

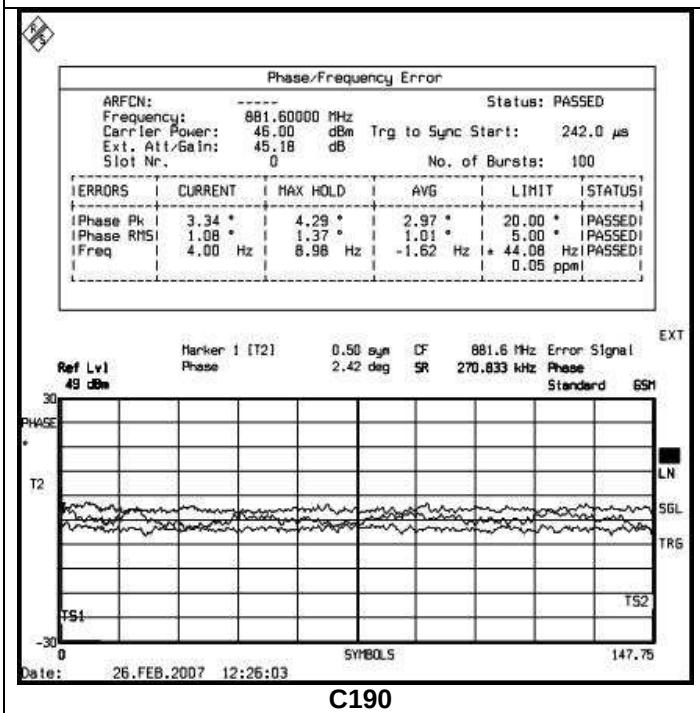
The maximum frequency deviation allowed is 0.05 ppm (+/- 43Hz). The maximum deviation measured (11.88 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4.2.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VDC

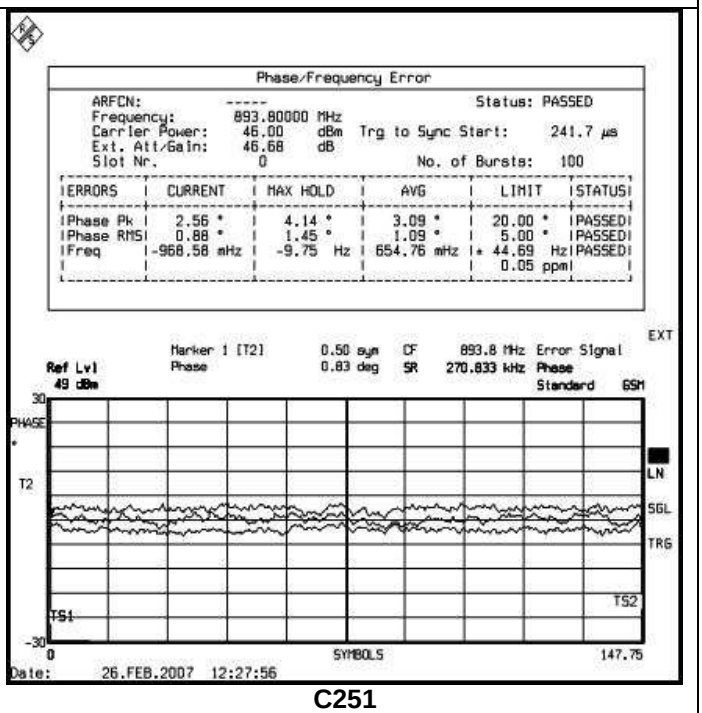
	Canal	Mesure	HPRM tested Max hold	Average	Sanction
TDMA 0	128	Phase Pk	3,80 °	2,69 °	PASS
		Phase RMS	1,27 °	0,93 °	PASS
		Freq	9,30 Hz	0,28 Hz	PASS
TDMA 1	190	Phase Pk	4,29 °	2,97 °	PASS
		Phase RMS	1,37 °	1,01 °	PASS
		Freq	8,98 Hz	-1,62 Hz	PASS
TDMA 2	251	Phase Pk	4,14 °	3,09 °	PASS
		Phase RMS	1,45 °	1,09 °	PASS
		Freq	-9,75 Hz	0,65 Hz	PASS



C128



C190



C251

The maximum frequency deviation allowed is 0.05 ppm (+/- 43Hz). The maximum deviation measured (-9.75 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5 TESTS AT TEMPERATURE 20 ℃

5.3.5.1 TX TESTS ON RM 1 (1900 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.5.1.1 MEAN RF POWER @ 187 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,45	**PASS**
TDMA 1	**661**	GMSK	40,82	**PASS**
TDMA 2	**810**	GMSK	41,28	**PASS**

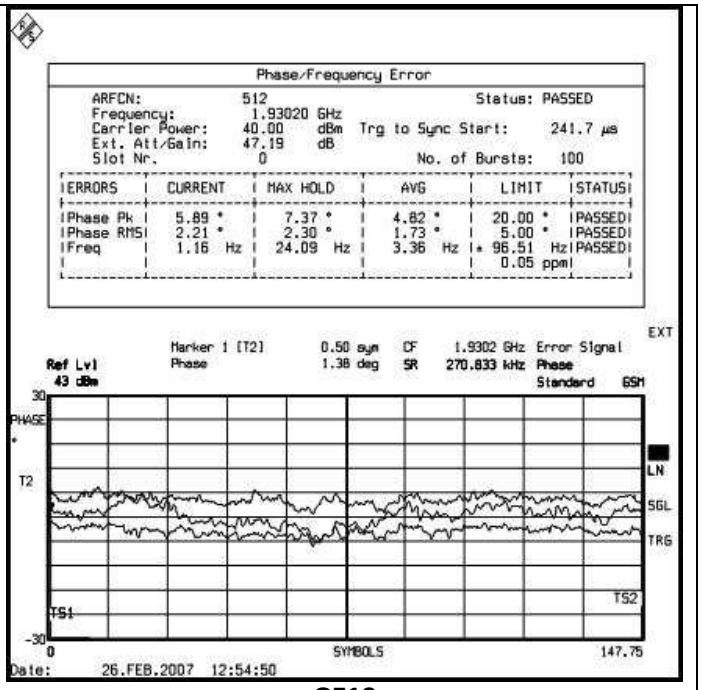
5.3.5.1.2 MEAN RF POWER @ 265 VAC

Specification for H2 Duplexer configuration in GMSK :
The power must be ≥ 38 dBm and ≤ 42 dBm.

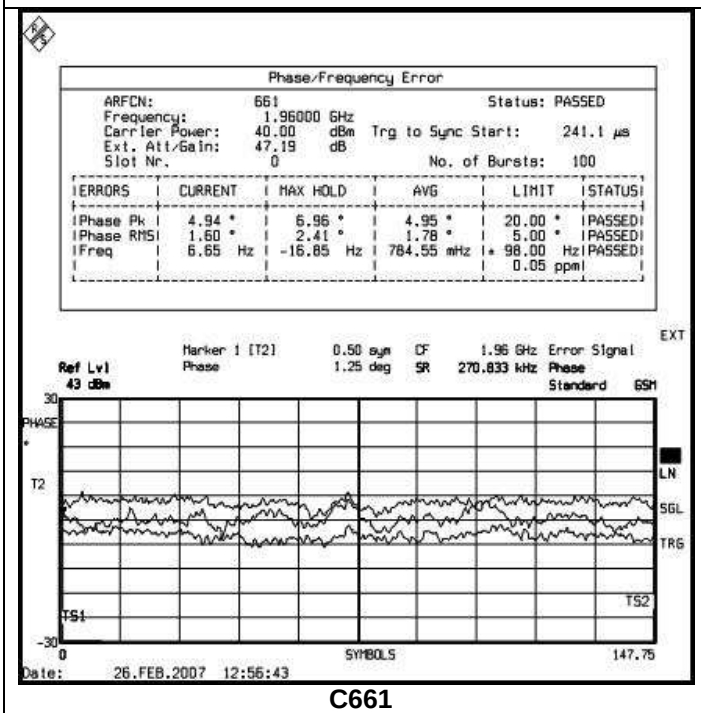
		RM tested		
	Canal	**Modulation Type**	**Mean RF Power**	**Sanction**
TDMA 0	**512**	GMSK	40,47	**PASS**
TDMA 1	**661**	GMSK	40,84	**PASS**
TDMA 2	**810**	GMSK	41,30	**PASS**

5.3.5.1.3 PHASE AND MEAN FREQUENCY ERROR @ 187 VAC

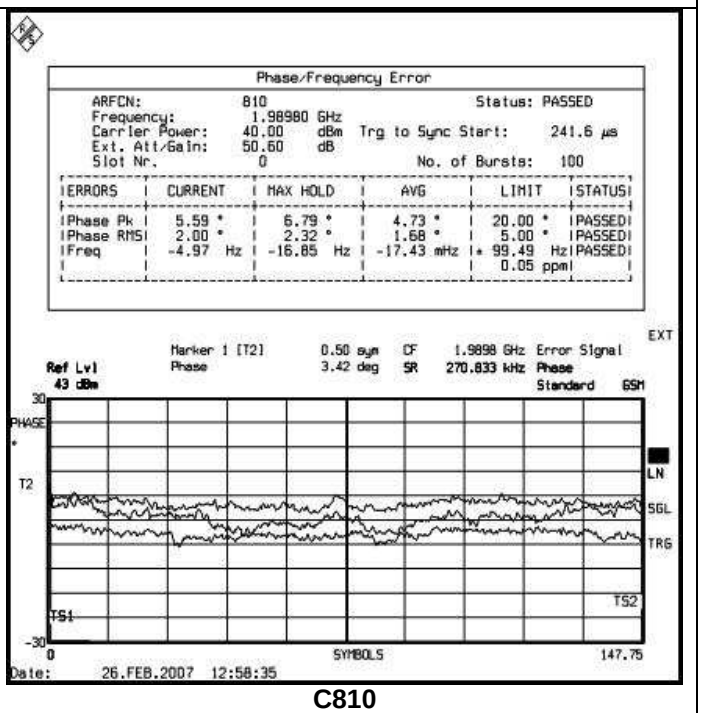
			RM tested		
	Canal	Mesure	Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,37 °	4,82 °	PASS
		Phase RMS	2,30 °	1,73 °	PASS
		Freq	24,09 Hz	3,36 Hz	PASS
TDMA 1	661	Phase Pk	6,96 °	4,95 °	PASS
		Phase RMS	2,41 °	1,78 °	PASS
		Freq	-16,85 Hz	0,78 Hz	PASS
TDMA 2	810	Phase Pk	6,79 °	4,73 °	PASS
		Phase RMS	2,32 °	1,68 °	PASS
		Freq	-16,85 Hz	-0,02 Hz	PASS



C512



C661

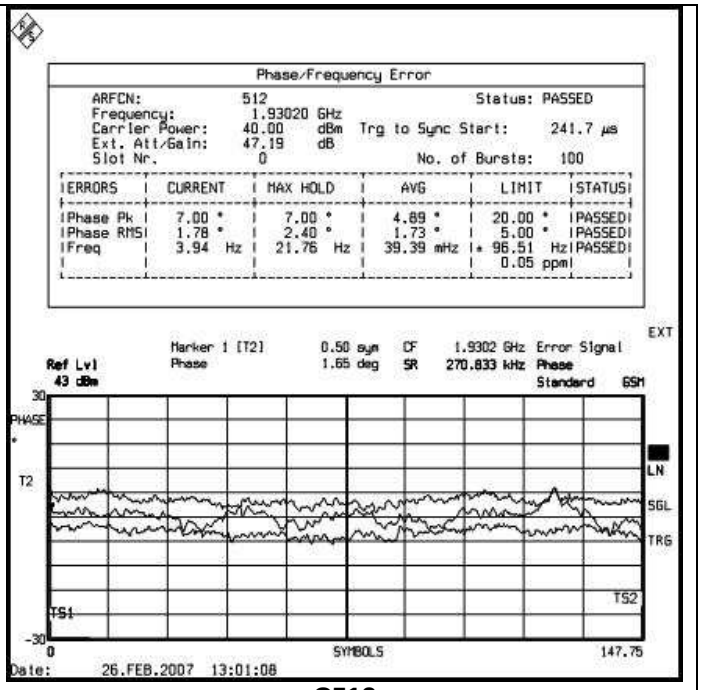


C810

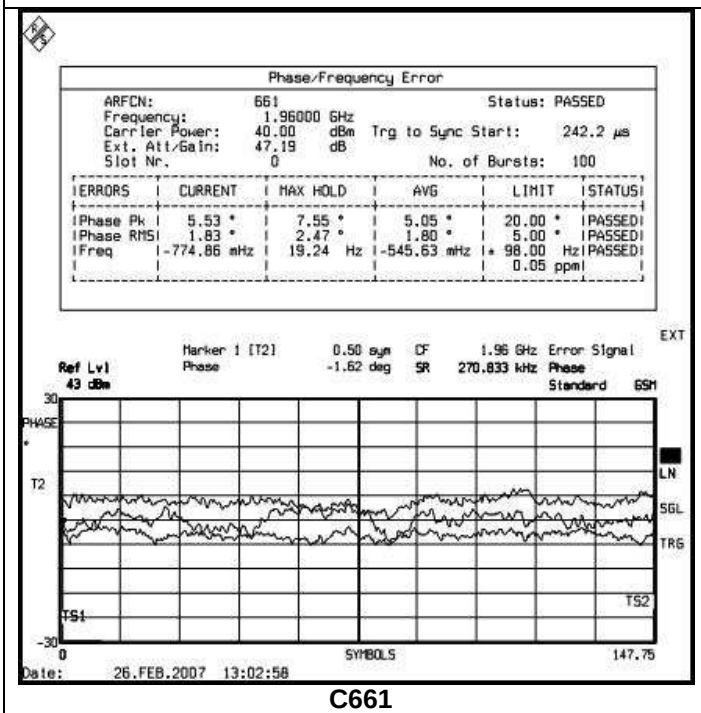
The maximum frequency deviation allowed is 0.05 ppm (+/- 95Hz). The maximum deviation measured (24.09 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5.1.4 PHASE AND MEAN FREQUENCY ERROR @ 265 VAC

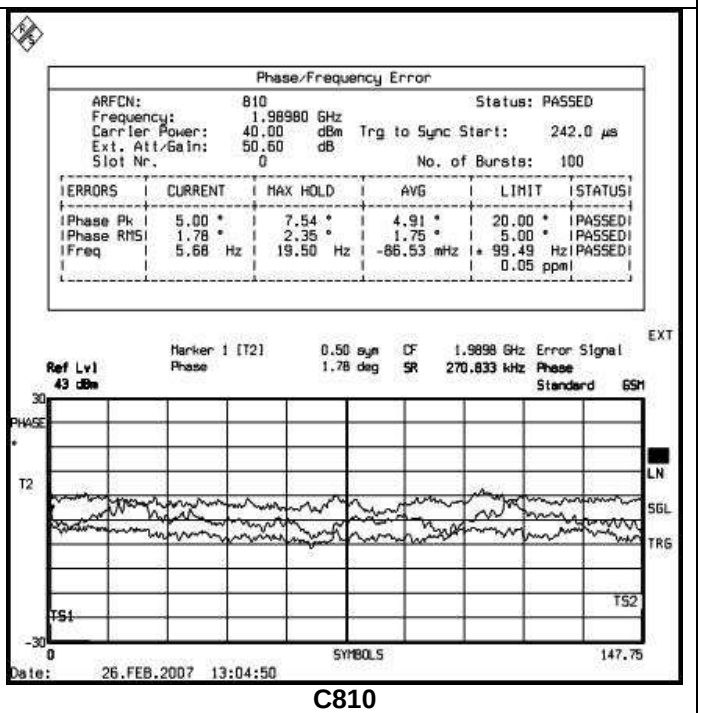
	Canal	Mesure	RM tested Max hold	Average	Sanction
TDMA 0	512	Phase Pk	7,00 °	4,89 °	PASS
		Phase RMS	2,40 °	1,73 °	PASS
		Freq	21,76 Hz	0,04 Hz	PASS
TDMA 1	661	Phase Pk	7,55 °	5,05 °	PASS
		Phase RMS	2,47 °	1,80 °	PASS
		Freq	19,24 Hz	-0,55 Hz	PASS
TDMA 2	810	Phase Pk	7,54 °	4,91 °	PASS
		Phase RMS	2,35 °	1,75 °	PASS
		Freq	19,50 Hz	-0,09 Hz	PASS



C512



C661



C810

The maximum frequency deviation allowed is 0.05 ppm (+/- 95Hz). The maximum deviation measured (21.76 Hz) is more than sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5.2 TX TESTS ON HPRM 3 (850 MHZ) IN GMSK

Measurements are realized at antenna output for H2 Duplexer configuration.

5.3.5.2.1 MEAN RF POWER @ 187 VAC

Specification for H2 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	43,45	**PASS**
TDMA 1	**190**	GMSK	43,78	**PASS**
TDMA 2	**251**	GMSK	43,95	**PASS**

5.3.5.2.2 MEAN RF POWER @ 265 VAC

Specification for H2 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	43,46	**PASS**
TDMA 1	**190**	GMSK	43,77	**PASS**
TDMA 2	**251**	GMSK	43,95	**PASS**