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TEST REPORT

N° 81818-571636A

FCC REGISTRASTION NUMBER 888863
INDUSTRY CANADA NUMBER 6231A

ISSUED TO : NORTEL NETWORKS
Parc d'activités de Magny-Châteaufort
78928 YVELINES Cedex 09

SUBJECT : **ELECTROMAGNETIC COMPATIBILITY TESTS ACCORDING TO THE PUBLICATIONS 47 CFR PART 15 CLASS B of 2006 , ICES003 CLASS B of 2004, , 47 CFR PART 24 of 2004 and RSS133 of 2005**

Apparatus under test :

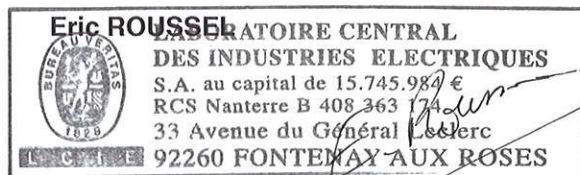
- Product : BASE STATION
- Trade mark : NORTEL
- manufacturer : NORTEL NETWORKS
- type : NG 18000 OUTDOOR BTS
- configuration : Equipped with 3 RM2 PCS1900 50/30 and 3 HPRM GSM850 60/45
- Serial number : -

Test date : June 2008

Composition of document : 12 pages + 2 related documents

Fontenay-aux-Roses, July 7th, 2008

The technical manager,



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1 - GENERAL

1.1 - Manufacturer identification

Manufacturer : NORTEL NETWORKS
Address : Parc d'activités de Magny-Châteaufort
78928 YVELINES Cedex 09

2 - TESTING PROGRAM

Tests have been carried out according to the following specifications:

- Measurement of continuous conducted disturbances in the frequency range 0.15 MHz to 30 MHz - publication 47CFR Part. 15 subpart B (§ 107) class B of 2000 and standard CISPR 22 (§9) class B of 2003
- Measurement of radiated disturbances in the frequency range 30 MHz to 18 GHz - publication 47CFR Part. 15 subpart B (§ 109) ,class B of 2006
- Measurement of radiated disturbances in the frequency range 30 MHz to 1 GHz - standard CISPR 22 (§10) class B of 2003
- Measurement of radiated disturbances in the frequency range 30 MHz to 20 GHz – 47CFR Part. 24 subpart E (§ 24.238) and RSS133 (§ 6.5)

The ICES003 standard use CISPR 22 standard method and limit

3 - EQUIPMENT CHARACTERISTICS

3.1 - Label identification

No number plate statement.
(see hardware and software descriptions of the related document provided by NORTEL , reference : PE/BTS/DJD/023739 issue 01.01/EN).

3.2 - Equipment configuration

The configuration of the equipment under test is described on the related documents reference LCIE 81818-571635-TP-18-FCC and NORTEL - PE/BTS/DJD/023739 issue 01.01/EN.

The position of apparatus under test is given in the photograph in annex.

During the measurements, the apparatus was operating in transmitter mode and the output transmitters were connected to 50 Ohms loads.

All transmitters were at maximum power with the following configuration:

HPRM 850 (60 W) and RM2 1900 (50W)

	Channel 1	Channel 2	Channel 3
RM0	512(1930.2 MHz)	661(1961.6 MHz)	810(1989.8 MHz)
RM1	512(1930.2 MHz)	661(1961.6 MHz)	810(1989.8 MHz)
RM2	512(1930.2 MHz)	661(1961.6 MHz)	810(1989.8 MHz)
HPRM3	128(869.2 MHz)	190(881.6 MHz)	251(893.8 MHz)
HPRM4	128(869.2 MHz)	190(881.6 MHz)	251(893.8 MHz)
HPRM5	128(869.2 MHz)	190(881.6 MHz)	251(893.8 MHz)

The frame of the BTS was grounded.



4 - OPERATING CONDITIONS

The apparatus was placed in an open field site located rue Théo Bonhomme at ECUELLES (Seine-et-Marne) was powered with a A.C. source delivering 120/240VAC, Split phase US, 60Hz or 230v-60Hz three phases

. Climatic conditions: ambient temperature : 21 °C
 relative humidity : 57 %
 atmospheric pressure : - hPa

5 - TESTING RESULTS

5.1 DISTURBANCES MEASUREMENT- CISPR22 , 47CFR Part. 15

Apparatus class : B

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
<u>Limits for conducted disturbances at mains ports</u>	Frequency range : 0.15MHz to 30 MHz Diagram No 1	[X]	[]	[]	[]
<u>Limits for radiated disturbances</u>	Frequency range : 30 MHz to 18000 MHz Antennas : - bilog (30 MHz to 1000 MHz) - Horn (1 GHz to 18 GHz) Diagram No 2	[X] [X]	[] []	[] []	[] [1]

P : pass - F : Fail - NA : not applicable - Rem : remark

Remark N° 1 : Between 2 GHz to 18 GHz , the measured levels are below the limit level (15dB margin)



5.2 DISTURBANCES MEASUREMENT - 47CFR Part. 24 subpart E (§ 24.238) and RSS133 (§ 6.5)

5.2.1-Test procedure

Radiated emission measurement procedures shall be performed as outlined in ANSI/TIA-603-C-2004 measurement standard.

The measurements have been carried out in two steps : the identification of the frequencies and the measurement of the radiated field.

5.2.2- The identification of the frequencies (pre scan)

The apparatus was placed inside a shielded room.
The measurement antenna is placed near the apparatus and connected to a spectrum analyzer.
The observation of the radioelectric spectrum is allowed to identify the spurious frequencies to the equipment under test.

5.2.3 -Measurement of the radiated field.

Measurements have been carried out in an open field site with the following antennas :

- Bilog antenna : 30MHz to 1000MHz
- Horn type : EMCO 3115 : 1GHz to 18GHz
- Horn type : AH SYSTEMS SAS-572 : 18GHz to 20GHz

Antennas were placed at 10 m from the equipment under test and connected successively to a spectrum analyzer equipped with a radiofrequency preselector, a preamplifier and a quasi peak-adaptor.

Antennas height was adjusted between 1m and 4 m in order to obtain the maximal electric field value

Antennas under test was placed on a turntable in order to present the side giving the highest level disturbance.

5.2.4 Limits for radiated emissions from FCC Part 24 and RSS133.

Frequency range	Minimum requirement (e.r.p.)/Reference Bandwidth
30 MHz ≤ f < 20 GHz	The spurious emissions must be attenuated by at least 43 + 10 Log(P) P = Transmitter rated Power in Watts

Measurements were made according to the procedures outline in ANSI/TIA-603-C-2004
The emissions were investigated up to the tenth harmonic of the fundamental emission (20 GHz).
The measured level of the emissions was recorded and compared to the limit.
The reference level for spurious radiation was taken with reference to an ideal dipole antenna excited by the rated output power according to the following relationship :

$$E(V / m) = \frac{1}{R(m)} * \sqrt{30 * Pt}$$

Where,

- E = Field Strength in Volts/meter,
- R = Measurement distance in meters,
- P_t = Transmitter Rated Power in Watts (50 Watts),

Therefore :

$$E(V/m) = \frac{1}{10} * \sqrt{30 * 50}$$

$$E = 3.87 \text{ V/m} = 131.76 \text{ dB}\mu\text{V/m}$$

The power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 * \text{Log}(P)$

Therefore, the spurious emissions must be attenuated by at least $43 + 10 * \text{Log}(50) = 59.99 \text{ dB}$.

Consequently, the field strength limit at 10 meters must be lower than

$$E = 131.76 \text{ dB}\mu\text{V/m} - 60.78 \text{ dB} = 71.77 \text{ dB}\mu\text{V/m}$$

Limit Level = 71.77dB μ V/m

5.2.5 Spectrum Analyzer setting:

Receiver Setting	Pre-Scan (to identify spurious emissions from EUT)	Final Measurements
Detector Type	Peak	Quasi-Peak (CISPR) for 30 MHz - 1GHz Peak for 1GHz - 20GHz
Mode	Max Hold	Not Applicable
Bandwidth	100 kHz or 1 MHz (for > 1GHz)	120 kHz Quasi-Peak 100 kHz or 1 MHz (for > 1GHz)
Amplitude Range	60 dB	20 dB
Measurement Time	Not Applicable	> 1s
Observation Time	Not Applicable	> 15s
Step size	Continuous sweep	Not Applicable
Sweep Time	Coupled	Not Applicable
Measuring Distance	3m for 30 MHz - 1GHz 1m for 1GHz - 20GHz	10m for 30 MHz - 1GHz 10m for 1GHz - 20GHz

5.2.6- Testing results

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
<u>Limits for radiated disturbances</u>	Frequency range : 30 MHz to 20000 MHz				
	Antenna :				
	- bilog (30 MHz to 1000 MHz)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	[1]
	- Horn (1 GHz to 18 GHz)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	[1]
	- Horn (18 GHz to 20 GHz)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	[1]
	Diagram No 3				

P : pass - F : Fail - NA : not applicable - Rem : remark

Remark N° 1 : During the Pre-Scan at 1 meter, no spurious frequencies has been detected in the frequency range 2 GHz to 20 GHz. The measured levels are below the limit level (30 dB margin)
Same result for 47CFR Part. 24 subpart E (§24.238) of 2004 and RSS133 (§ 6.5) of 2005.

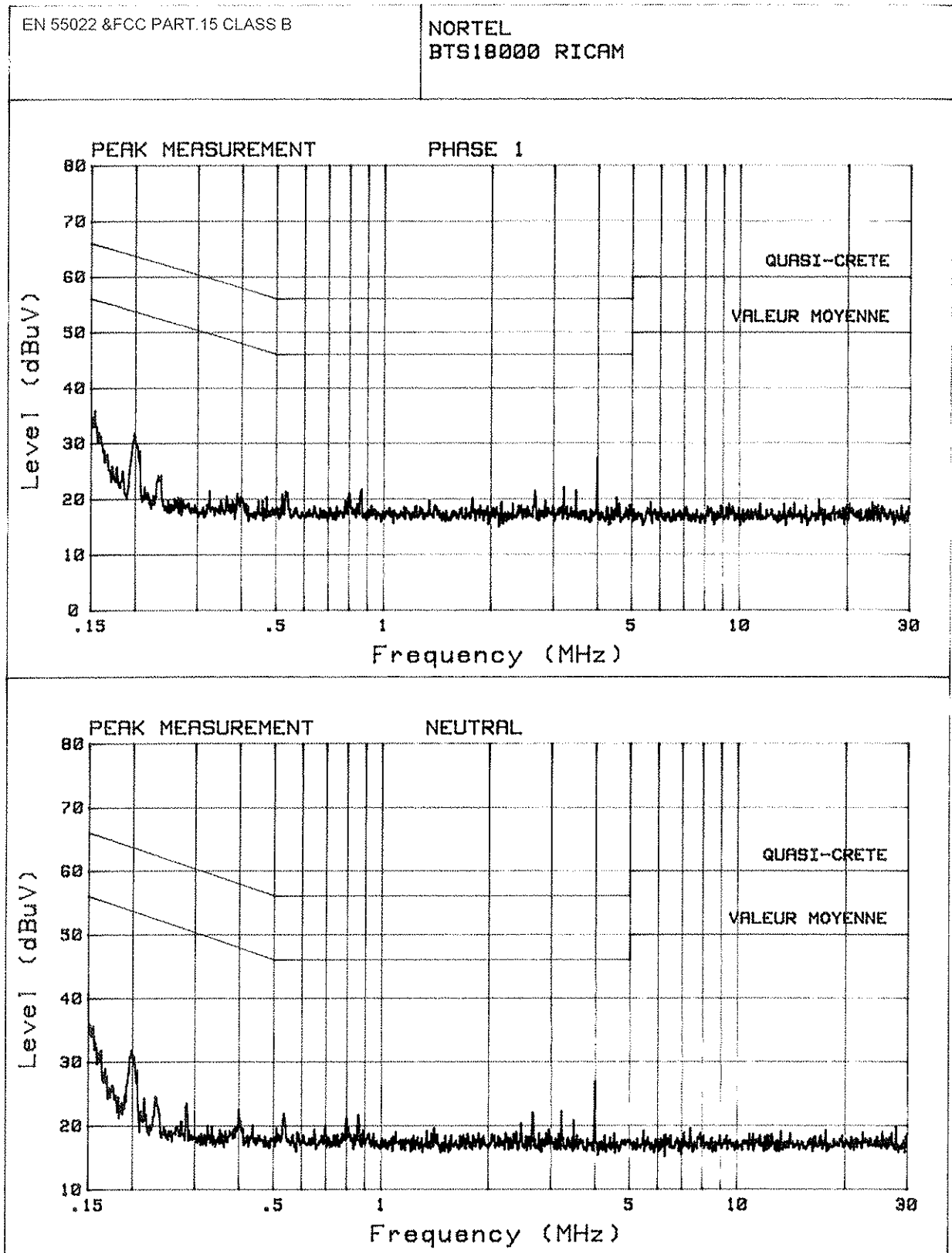
6 - CONCLUSION

The apparatus of manufacturer NORTEL and model NG 18000 Outdoor BTS (equipped with 3 RM2 PCS1900 50/30 and 3 HPRM GSM850 60/45) is in compliance with the requirements of the publications 47 CFR PART 15 Subpart B (§107 and § 109 in the frequency range 30 MHz to 18 GHz) class B of 2006, ICES003 class B , 47CFR Part. 24 subpart E § 24.238 (in the frequency range 30 MHz to 20 GHz) of 2004 and RSS133 (§ 6.5) of 2005.



L C I E

Diagram n° 1



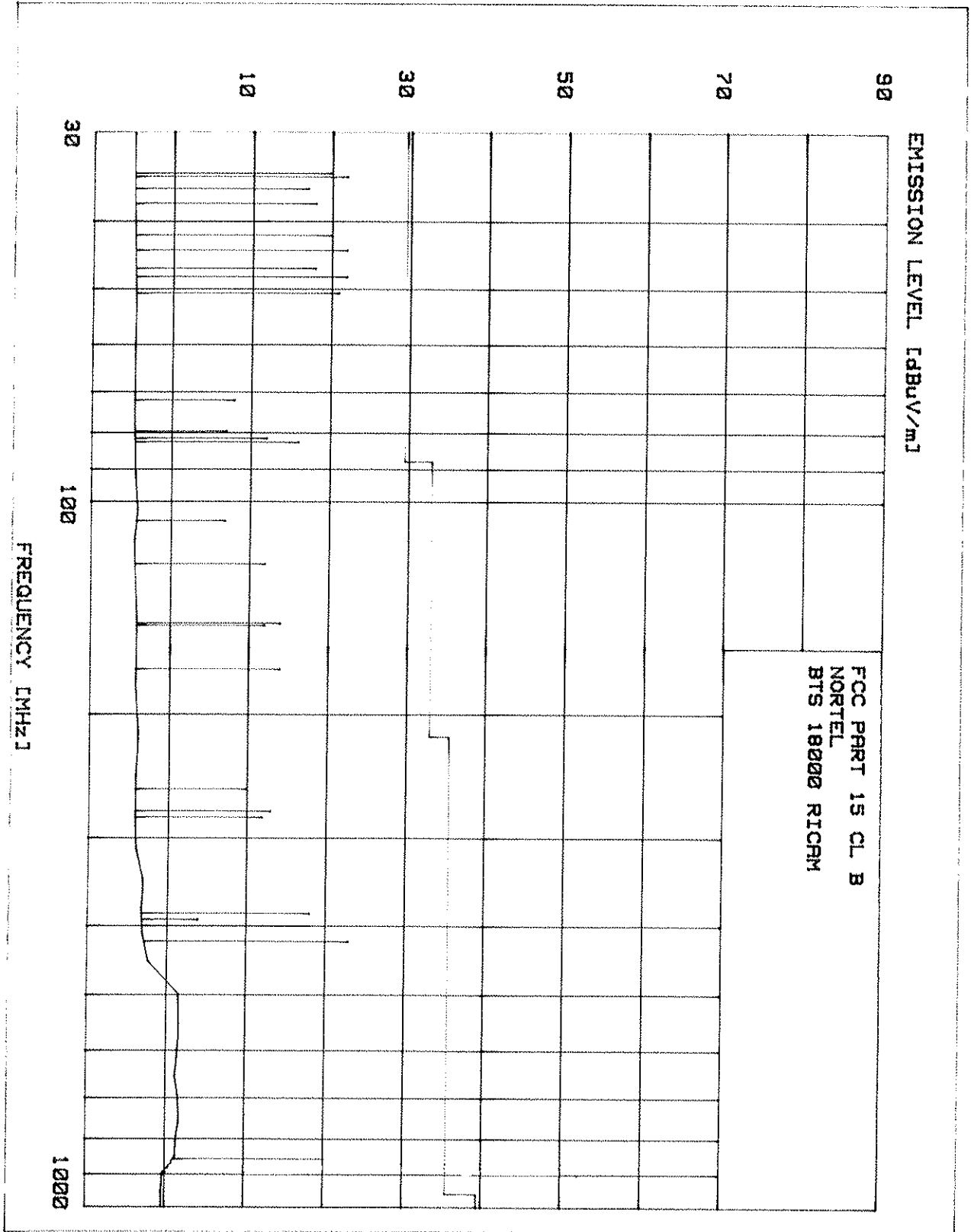


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Diagram n° 2





L C I E

Diagram n° 3

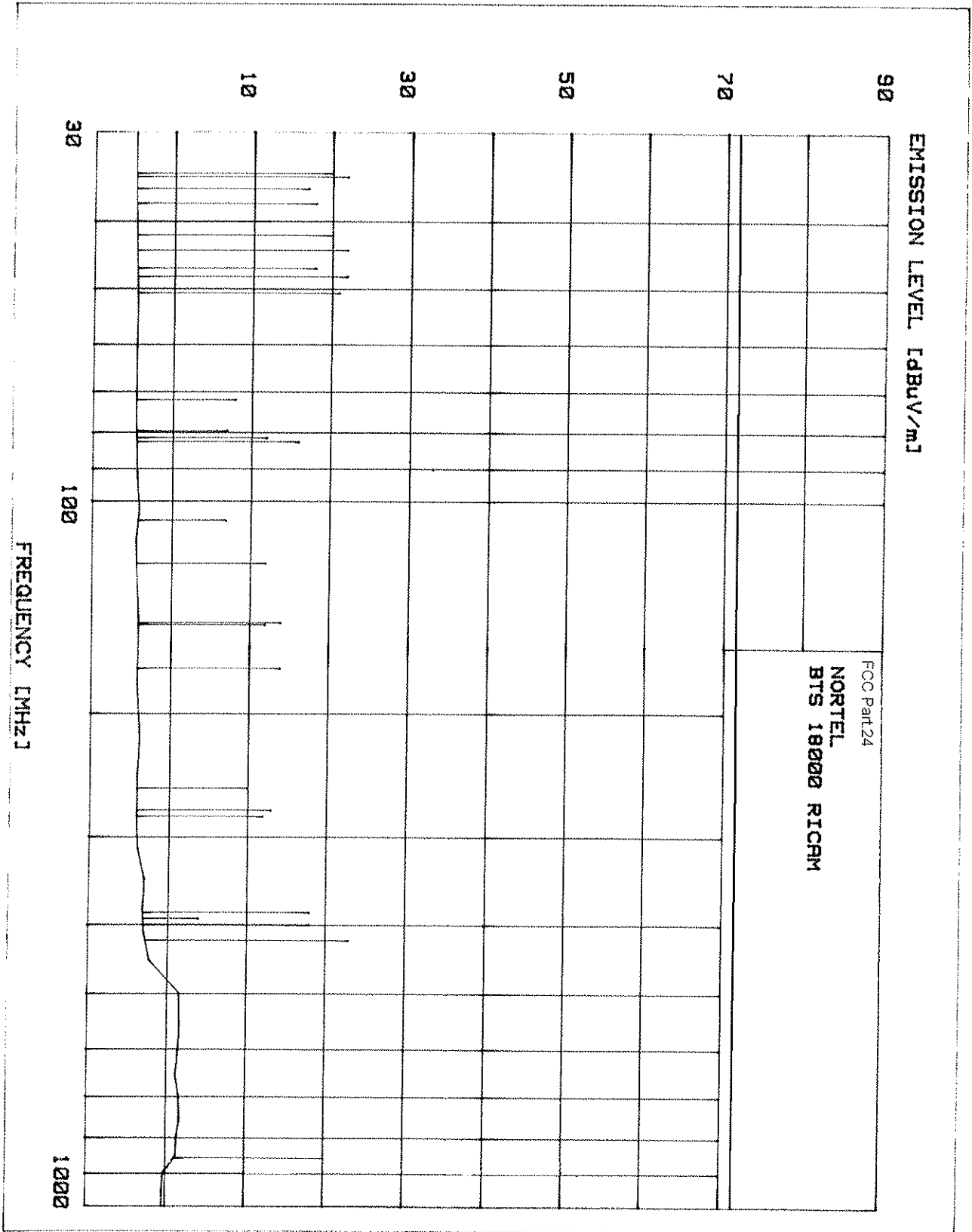
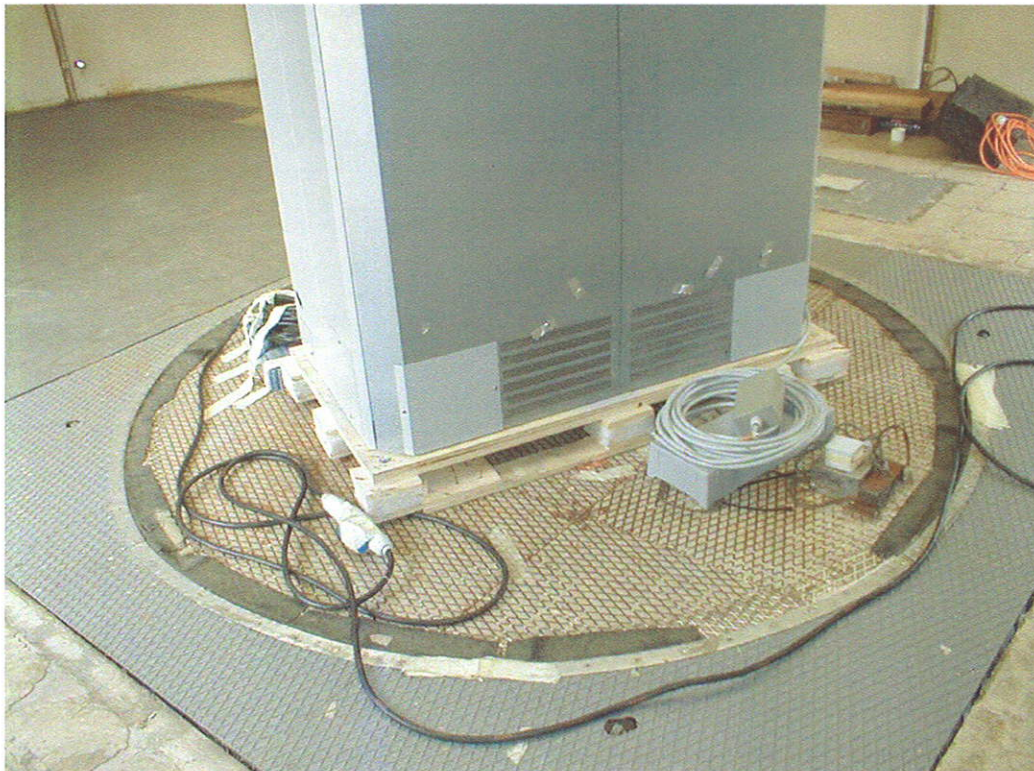


Photo N° 1



Photo N° 2





EQUIPMENT LIST

Test	Apparatus	Trade Mark	Type	Registration number
<i>Open area test site</i>				
X	Spectrum analyseur	HEWLETT PACKARD	8566B	A4060004
X	Preselector	HEWLETT PACKARD	85685A	A4069001
X	Quas-Peak adaptator	HEWLETT PACKARD	85650A	B2163019
X	Preamplifier	HEWLETT PACKARD	8449B	A4069002
	Signal Generator	HEWLETT PACKARD	8657A	A5442003
	Signal Generator	HEWLETT PACKARD	E4433B	A5488014
	Générateur / Signal Generator	ROHDE & SCHWARZ	SMP02	B2163019
	Mire	PHILIPS	PM 5518-TX	A5240009
	RLTE	SECRET	ENS 1039	C2324001
	Coupler	NARDA	3020A	C5364002
	Coupler	SALIES	3060-20	C5364001
X	V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001
	V ISLN	ROHDE & SCHWARZ	ESH3-Z6	C2322020
X	Bilog antenna	CHASE	CBL 6112A	C2040040
	Bilog antenna	AH SYSTEM	SAS-2001251	C2040025
	Dipôle large bande /	ROHDE & SCHWARZ	HUF-Z1	C2040011
	Logperiodic antenna	ROHDE & SCHWARZ	HL 023 A2	C2040001
	Logperiodic antenna	EVD	AN112	C2040029
x	Horn antenna	AH SYSTEMS	SAS-572	
X	Horn antenna	EMCO	.3115	C2042016

UNCERTAINTIES CHART

<i>Kind of measurement</i>	<i>Wide uncertainty laboratory (k=2) ±x(dB)</i>	<i>CISPR uncertainty limit ±y(dB)</i>
<i>Measurement of conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site.</i>	3.56	3.6
<i>Measurement of conducted disturbances in voltage on the AC power port on the Ecuelles site.</i>	3.50	3.6
<i>Measurement of conducted disturbances in voltage on the DC power port on the Fontenay-aux-Roses site.</i>	3.56	3.6
<i>Measurement of conducted disturbances in voltage on the DC power port on the Ecuelles site.</i>	3.56	3.6
<i>Measurement of conducted disturbances in voltage on the telecommunication port.</i>	3.28	<i>Under consideration</i>
<i>Measurement of conducted disturbances in current</i>	2.90	<i>Under consideration</i>
<i>Measurement of radiated electric field from 30 to 200 MHz in horizontal position on the Fontenay-aux-Roses site</i>	4.58	5.2
<i>Measurement of radiated electric field from 30 to 200 MHz in vertical position on the Fontenay-aux-Roses site</i>	4.82	5.2
<i>Measurement of radiated electric field from 200 to 1000 MHz on the Fontenay-aux-Roses site</i>	4.92	5.2
<i>Measurement of radiated electric field from 1 to 18 GHz on the Fontenay-aux-Roses site</i>	6.54	<i>Under consideration</i>
<i>Measurement of radiated electric field from 30 to 1000 MHz on the Ecuelles site</i>	4.72	5.2
<i>Measurement of radiated electric field from 1 to 6 GHz on the Ecuelles site</i>	5.60	<i>Under consideration</i>
<i>Measurement of radiated electric field from 6 to 18 GHz on the Ecuelles site</i>	5.83	<i>Under consideration</i>
<i>Measurement of disturbance power</i>	3.37	4.5
<i>Immunity to conducted disturbances, induced by radio electric field</i>	2.36	/
<i>Immunity to conducted disturbances, induced by radio electric field, method oh the injection clamp</i>	2.76	/
<i>Immunity to radiated radio electric field from 80 MHz to 2.6 GHz</i>	2.64	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values.



Outdoor NG BTS18000 RM2 1900 Mhz hardware delivery notice

Document number: PE/BTS/DJD/023739
Document issue: V01.01 / EN
Document status: Standard
Date: 13/JUN/2008

External document

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DES INDUSTRIES ELECTRIQUES
RELATED DOCUMENT No 1
to test report N° 818717-57/1636 A
5 pages

PUBLICATION HISTORY

13/JUN/2008

Issue 01.01 / EN, Status

Delivery of the Outdoor NG BTS 18000 for RM2 1900Mhz introduction

Outdoor NG BTS18000 RM2 1900 Mhz hardware delivery notice

AVLM	Date of delivery:
Recipient: LCIE	13/JUN/2008
Product: GSM NG BTS 18000 Outdoor	
Article delivered: GSM NG BTS 18000 Outdoor	Article code: NTT915BS P1
Section transmitting: 8Z60	Designer name: S.CHENET
Cabinet Serial Number: Serial Number : N°5	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications:	
-- PE/BTS/DD/ 5282 V04.01/EN BTS 18000 system design specification	
Issues fixed on the cabinet:	
-- New ETR board added / new Transfo, new PCB for safety requirement	
-- New EMI gasket.(LAIRD)	
-- Firmware uploaded in version 1.15	
Missing Equipment:	
-- None	
Software compatibility:	
Modules software version :	
-- ICM/ABM : CDI120795	
-- RM : CDI121233	
PI software tools :	
-- WINTMI:	v03d306
-- TIL COAM:	V16a402
-- TIL Alarm:	V16a401
-- WINTOOL:	V05a2e19

Outdoor NG BTS18000 RM2 1900 Mhz hardware delivery notice

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 01.15
ETR board Rohs version	NTT965AM	03	NNTMJR0038L4	
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
RM2 1900 50/30	NTN050PP	D1	NNTM7880Y9R1	47.164.182.240 For radio test
RM2 1900 50/30	NTN050PP	D1	NNTM7880Y9QZ	47.164.182.241
RM2 1900 50/30	NTN050PP	D1	NNTM7880Y9R0	47.164.182.242
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		

Outdoor NG BTS18000 RM2 1900 Mhz hardware delivery notice

Additional delivery:

ARTICLE	PEC code	Release	Serial number	Comment
PRIPRO2	NTT993QF	02	NNTMGT004V97	
1 Abis external cable				
1 Diplexer 1900Mhz				For RX Base/Base loopback mesurement

Tests performed:

The following features have been tested:

- MIC BER in T1
- Inventory test.
- DDM Alarms & Inventory interface.
- Dale & Dati.
- TX sequence with factory test bench on each RM2 1900 MHz
- RX sequence with factory test bench on each RM2 1900 MHz

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/023736 V01.01/EN Hardware integration tests report for GSM1900 RM2 introduction

œ END OF DOCUMENT œ

Nortel Networks confidential



EMC Test plan for the introduction of GSM RM2 1900MHz (FCC)

Reference: 81818-571635-TP-18-FCC

Revision: A

Status: Approved

Date: 06/May/2008

Customer: NORTEL

Product: GSM 18000 & 6000 & 9000 BTS

Author: V. GODET

P.O.

J. PALARD

Verified by: D. PRADON

07/05/2008

LABORATOIRE CENTRAL
DES INDUSTRIES ELECTRIQUES
RELATED DOCUMENT No 2
to test report N° 81818-571635A
2 pages



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A	06-May-08	V. GODET	Creation of document



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1. INTRODUCTION

This document presents the FCC EMC tests plan for the introduction of RM2 1900MHz as described in the document referenced [R1] on GSM BTS products.

For North America, applicable standard for EMC Base stations are the FCC part 15/ICES 003 Class B, and the FCC Part 24/RS133.

The following table gives some information of the EUT:

Product Name	GSM 18000 & 6000 & 9000 BTS
Manufacturer	NORTEL
Serial Number	-
Alimentation of the EUT	AC & DC

BTS 18000 Covered configurations:

Indoor and Outdoor: Full 1900MHz S111 to S666.

Indoor and Outdoor: Dual band S111_S111 to S333_S333

Standard single band RF configurations:

- Up to S666 configuration with a single cabinet configuration
- Support of extension cabinets (up to 3 cabinets with 3 S666/666/666) for IFM + ICM config.
- Support of extension cabinets (up to 2 cabinets with 2 S666/333) for RICAM config.

Standard dual band RF configurations:

- Up to S333_333 configuration with a single cabinet configuration
- Support of extension cabinets (up to 3 cabinets with 3 S333_333/333_333/333_333) for IFM + ICM config
- Support of extension cabinets (up to 2 cabinets with 2 S333_333/333) for RICAM config

➤ Synchronization options:

- GPS synchronization
- Synchronization from S8000/S12000

➤ Modules covered:

- 1900 MHz RM and RM2 30w GMSK/ 30w EGPRS
- 1900 MHz RM2 50w GMSK/ 30w EGPRS
- 850 MHz HPRM 60w GMSK/ 45w EGPRS
- All GSM850 and PCS1900 coupling devices configurations with mixed source including:
 - DDM_H2, DDM_D and mixed configuration with and without VSWR
 - TX filter_H2, TX filter and mixed configuration with and without VSWR
- Simplex ICM and duplex ICM configurations
- ABM
- RICAM configuration
- T1 (100 Ohms) PCM interface with and without secondary protection
- E1 (75/120 Ohm modes) PCM interface with and without secondary protection
- Rectifiers: 1,4KW, including mixed configurations between all rectifiers.
- Rectifiers: 1,6KW (for BTS 18000 Outdoor NG only)
- UCPS UMTS/GSM CCU
- NgUCPS GSM CCU (for BTS 18000 Outdoor NG only)

EMC Test plan for the introduction of GSM RM2 1900MHz (FCC)