



LCIE

TEST REPORT

N° 60039646-539502B

FCC REGISTRATION NUMBER 93402
INDUSTRY CANADA NUMBER IC6231

ISSUED TO : NORTEL NETWORKS
PARC D ACTIVITE DE MAGNY- CHATEAUFORT
78928 YVELINES CEDEX 09
FRANCE

SUBJECT : ELECTROMAGNETIC COMPATIBILITY TESTS ACCORDING TO THE
PUBLICATIONS 47 CFR PART 22 of 47 CFR, PART 24 of 2004, RSS132 of 2005,
and RSS133 of 2005

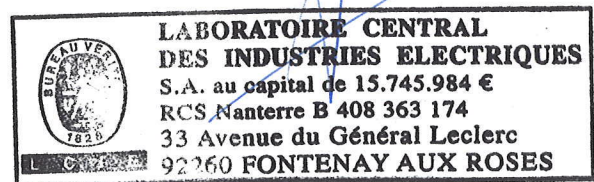
Apparatus under test :

- Product : BASE STATION
- Trade mark : NORTEL
- manufacturer : NORTEL NETWORKS
- type : S12000 OUTDOOR BTS (DUAL BAND GSM850/PCS1900)
- Serial number : -

Test date : December 2005
Composition of document : 10 pages + 2 related documents

Fontenay-aux-Roses, December 27th, 2005

The technical manager
Sébastien AOUT



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1 – GENERAL

1.1 - Manufacturer identification

Manufacturer : NORTEL NETWORKS
Address : PARC D'ACTIVITE DE MAGNY- CHATEAUFORT
78928 YVELINES CEDEX 09

2 - TESTING PROGRAM

The documents presents the tests which have performed to validate of the integration of the GSM 850MHz HEPA From ANDREWS modules on S12000 OUTDOOR BTS (TX FCC ID: AB6S12000BTS ;IC: 332AD-S12KBTS).

These modules were integrated too on the following base station :

- S12000 Indoor BTS (TX FCC ID: AB6S12000BTS ; IC: 332AD-S12KBTS)
- S8000 Outdoor BTS (TX FCC ID: AB6S8000BTS ; IC: 332AD-S8KBTS)
- S8000 Indoor BTS (TX FCCID : AB6S8000BTS ; IC: 332AD-S8KBTS)

Test have been carried out according to the publication 47CFR Part. 22 subpart H (§ 22.917), 47CFR Part. 24 subpart E (§24.238), RSS132 (§4.5), and RSS133 (§6.5) and have been stated on the following point :

- Measurement of radiated disturbances in the frequency range 30 MHz to 20 GHz

3 - EQUIPMENT CHARACTERISTICS

3.1 - Label identification

No number plate statement.
(see hardware and software descriptions of the related document provided by NORTEL, reference UMT/BTS/DJD/017192)

3.2 - Equipment configuration

The configuration of the equipment under test is described on the related documents reference LCIE-60039646-539500-C-TP-FCC and NORTEL - UMT/BTS/DJD/017192.

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

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

The emissions frequencies were 869.2 MHz ; 873.60MHz ; 893.8MHz for GSM850 and 1930.20 MHz ; 1962.2MHz ; 1989.6MHz for PCS1900 , and all transmitters were at maximum power 60Watts (in BCCH mode without frequency hopping).

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 2 x 108-60Hz (split phase).

Climatic conditions: ambient temperature : 23 °C
relative humidity : 42%
atmospheric pressure : -

5. – Radiated disturbances measurement

5.1-Test procedure

Radiated emission measurement procedures shall be performed as outlined in Section 8 of the ANSI C63.4 measurement standard .

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

5.1.1- 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.

5.1.2 -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 Limits for radiated emissions from FCC Part 22 , Part 24, RSS132 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 C63.4
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 :

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

Where,

E = Field Strength in Volts/meter,
R = Measurement distance in meters,
P_t = Transmitter Rated Power in Watts (60 Watts),
G = Gain of ideal Dipole (linear)

Therefore :

$$E(V/m) = \frac{1}{10} * \sqrt{30 * 60 * 1.64}$$

E = 5,43V/m = 134.69 dBμV/m
The spurious emissions must be attenuated by at least 43 + 10*Log(60) = 60.78 dB.
Therefore the field strength limit at 10 meters is :
E = 134.69dBμV/m – 60.78 dB = 73.91 dBμV/m

Limit Level = 73.91 dBμV/m

5.3 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

**5.4- 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)	☒	☐	☐	[1]
	- Horn (1 GHz to 18 GHz)	☒	☐	☐	[1]
	- Horn (18 GHz to 20 GHz)	☒	☐	☐	[1]
	Diagram No 1+ table n° 1				

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

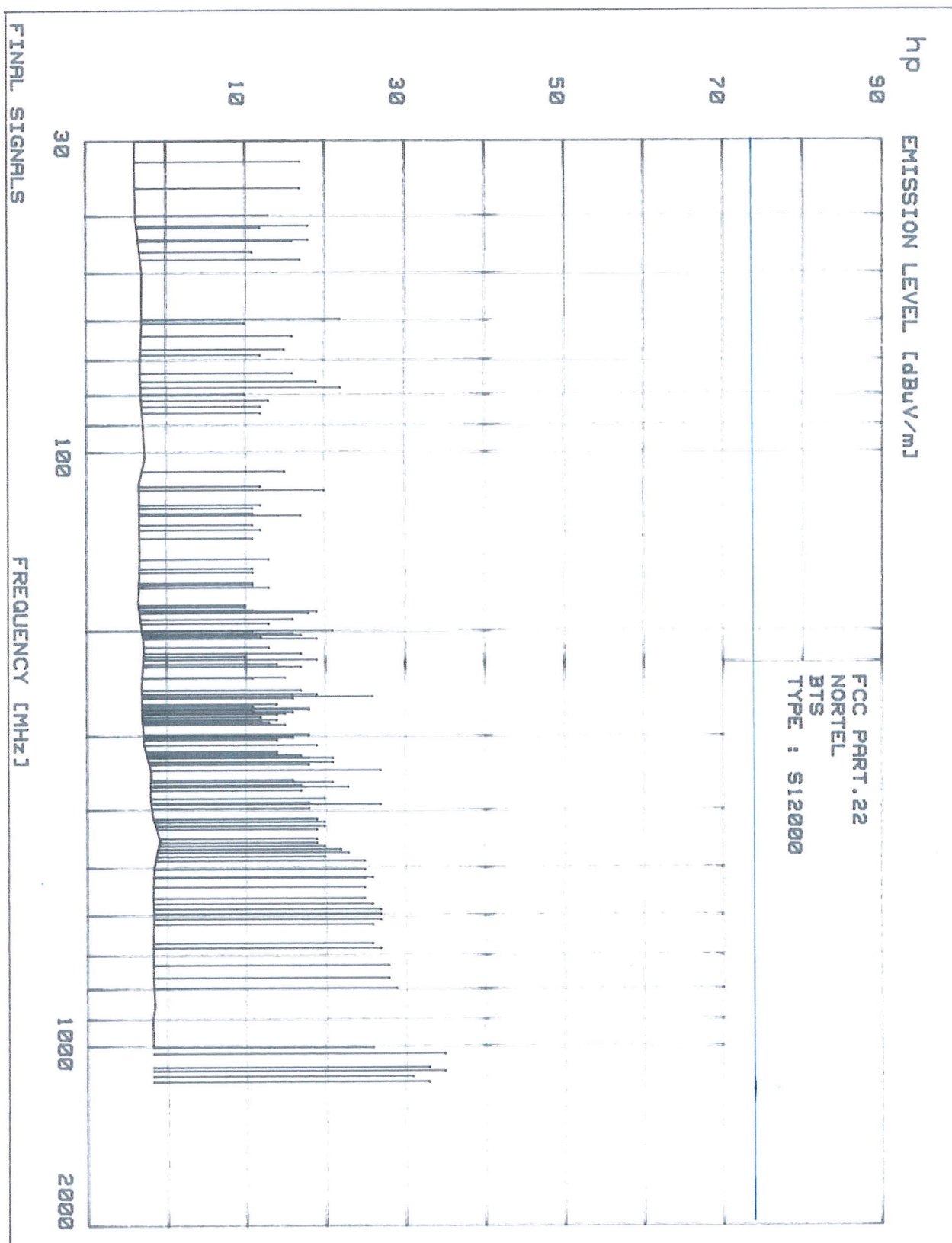
Remark N° 1 : During the Pre-Scan at 1 meter , no spurious frequencies has been detected in the frequency range 2GHz to 20 GHz.
Same result for 47CFR Part. 24 subpart E (§ 24.238) OF 2004, RSS132 (§ 4.5) of 2005 , and RSS133 (§ 6.5) of 2005

6 - CONCLUSION

The apparatus of manufacturer NORTEL and model S12000 OUTDOOR BTS (DUAL BAND GSM850/PCS1900) is in compliance with the requirements of the publications Part. 22 subpart H (§ 22.917) of 2004, 47CFR Part. 24 subpart E (§ 24.238) OF 2004, RSS132 (§ 4.5) of 2005 , and RSS133 (§ 6.5) of 2005



Diagram n°1





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Table N°1

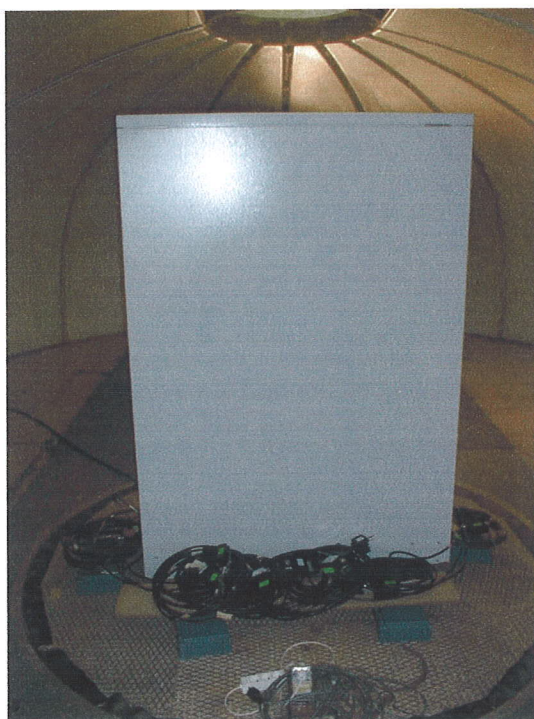
Measurement at transmitters frequencies for indicative level

Frequency (MHz)	Channel	Level (dBμV/m)
869.20	Bottom	66
873.60	Middle	68
893.8	Top	65
1930.2	Bottom	70
1962.2	Middle	70
1989.6	Top	69

Photo N° 1



Photo N° 2



LISTE DU MATERIEL / EQUIPMENT LIST

Test	Appareil / Apparatus	Marque / Trade Mark	Type / Type	Immatriculation / Registration number
<i>Essais en espace libre / Open area test site</i>				
X	Analyseur de spectre/ Spectrum analyseur	HEWLETT PACKARD	8566B	A4060004
X	Présélecteur / Preselector	HEWLETT PACKARD	85685A	A4069001
X	Adaptateur quasi-crête / Quas-Peak adaptator	HEWLETT PACKARD	85650A	B2163019
X	Préamplificateur / Preamplifier	HEWLETT PACKARD	8449B	A4069002
	Générateur / Signal Generator	HEWLETT PACKARD	8657A	A5442003
	Générateur / Signal Generator	HEWLETT PACKARD	E4433B	A5488014
	Générateur / Signal Generator	ROHDE & SCHWARZ	SMP02	B2163019
	Mire	PHILIPS	PM 5518-TX	A5240009
	RLTE	SECRET	ENS 1039	C2324001
	Coupleur / Coupler	NARDA	3020A	C5364002
	Coupleur / Coupler	SALIES	3060-20	C5364001
	Réseau V / V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001
	Réseau V / V ISLN	ROHDE & SCHWARZ	ESH3-Z6	C2322020
X	Antenne bilog / Bilog antenna	CHASE	CBL 6112A	C2040040
	Antenne bilog / Bilog antenna	AH SYSTEM	SAS-2001251	C2040025
	Dipole large bande /	ROHDE & SCHWARZ	HUF-Z1	C2040011
	Antenne logpériodique / Logperiodic antenna	ROHDE & SCHWARZ	HL 023 A2	C2040001
	Antenne logpériodique / Logperiodic antenna	E/D	AN112	C2040029
X	Antenne cornet / Horn antenna	AH SYSTEMS	SAS-572	
X	Antenne cornet / Horn antenna	EMCO	3115	C2042016

TABLE DES INCERTITUDES / UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) $\pm x$ (dB)	Incertitude limite du CISPR / CISPR uncertainty limit $\pm y$ (dB)
Mesure des perturbations conduites en tension sur le réseau d'énergie « alternatif » sur le site de Fontenay-aux-Roses / Measurement of conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site.	3.56	3.6
Mesure des perturbations conduites en tension sur le réseau d'énergie « alternatif » sur le site en espace libre d'Ecuelles / Measurement of conducted disturbances in voltage on the AC power port on the Ecuelles site.	3.50	3.6
Mesure des perturbations conduites en tension sur le réseau d'énergie « continu » sur le site de Fontenay-aux-Roses / Measurement of conducted disturbances in voltage on the DC power port on the Fontenay-aux-Roses site.	3.56	3.6
Mesure des perturbations conduites en tension sur le réseau d'énergie « continu » sur le site en espace libre d'Ecuelles / Measurement of conducted disturbances in voltage on the DC power port on the Ecuelles site.	3.56	3.6
Mesure des perturbations conduites en tension sur le réseau de télécommunication / Measurement of conducted disturbances in voltage on the telecommunication port.	3.28	A l'étude / Under consideration
Mesure des perturbations conduites en courant / Measurement of conducted disturbances in current	2.90	A l'étude / Under consideration
Mesure du champ électrique rayonné de 30 à 200MHz en polarisation horizontale sur le site de Fontenay-Aux-Roses / Measurement of radiated electric field from 30 to 200MHz in horizontal position on the Fontenay-aux-Roses site	4.58	5.2
Mesure du champ électrique rayonné de 30 à 200MHz en polarisation verticale sur le site de Fontenay-Aux-Roses / Measurement of radiated electric field from 30 to 200MHz in vertical position on the Fontenay-aux-Roses site	4.82	5.2
Mesure du champ électrique rayonné de 200 à 1000MHz sur le site de Fontenay-Aux-Roses / Measurement of radiated electric field from 200 to 1000MHz on the Fontenay-aux-Roses site	4.92	5.2
Mesure du champ électrique rayonné de 1 à 18GHz sur le site de Fontenay-Aux-Roses / Measurement of radiated electric field from 1 to 18GHz on the Fontenay-aux-Roses site	6.54	A l'étude / Under consideration
Mesure du champ électrique rayonné de 30 à 1000MHz sur le site en espace libre d'Ecuelles / Measurement of radiated electric field from 30 to 1000MHz on the Ecuelles site	4.72	5.2
Mesure du champ électrique rayonné de 1 à 6GHz sur le site en espace libre d'Ecuelles / Measurement of radiated electric field from 1 to 6GHz on the Ecuelles site	5.60	A l'étude / Under consideration
Mesure du champ électrique rayonné de 6 à 18GHz sur le site en espace libre d'Ecuelles / Measurement of radiated electric field from 6 to 18GHz on the Ecuelles site	5.83	A l'étude / Under consideration
Mesure de la puissance perturbatrice / Measurement of disturbance power	3.37	4.5
Immunité aux perturbations conduites, induites par les champs radioélectriques / Immunity to conducted disturbances, induced by radio electric field	2.36	/
Immunité aux perturbations conduites, induites par les champs radioélectriques, méthode de la pince d'injection / Immunity to conducted disturbances, induced by radio electric field, method on the injection clamp	2.76	/
Immunité aux champs radioélectriques rayonnés de 80MHz à 2.6GHz / Immunity to radiated radio electric field from 80MHz to 2.6GHz	2.64	/

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / 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.



LABORATOIRE CENTRAL
DES INDUSTRIES ELECTRIQUES
RELATED DOCUMENT *N° 1*
to test report N° *60039646-S39S02B*
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EMC Test plan for the introduction of HePA 850 on GSM S8000/S12000 (FCC)

Reference: 60039646-539500-C-TP-FCC

Revision: B

Status: Approved

Date: 16/Dec/2005

Customer: NORTEL

Product: GSM S8000/S12000

Author: M. CANCOUËT

Verified by: D. PRADON

16/12/2005



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VERSION	DATE	AUTHOR	MODIFICATION
A	04 Nov. 2005	M. CANCOUËT	Creation of document
B	16 Dec. 2005	M. CANCOUËT	Update of document



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1. INTRODUCTION

This document presents the EMC tests plan for the FCC EMC qualification, for introduction of the GSM 850MHz HEPA from Andrew on GSM S8000/S12000 products.

For North America, applicable standard for EMC Base stations are the FCC part 15/ICES 003 Class B, the FCC Part 22 /RS132 and the FCC Part 24/RS133.

The following table gives some information of the EUT :

Product Name	GSM S8000/S12000
Manufacturer	NORTEL
Serial Number	-
Alimentation of the EUT	-

The following configurations will be covered:

➤ **S8000 GSM BTS Indoor & Outdoor with the following configuration:**

- Single 850 MHz bandwidth with full HePA and ePA & HEPA mixity
- Dual band 850/1900 MHz including ePA and HePA for both 850 and 1900 specified bands
- With DRX models: eDRX850
- For all existing types of Tx coupling: D, H2D, H4D and TxF
- For outdoor cabinet GIPS & non GIPS variants.

➤ **S12000 GSM BTS Indoor & Outdoor with the following configuration:**

- Single 850 MHz bandwidth with full HePA and ePA & HEPA mixity
- Dual band 850/1900 MHz including ePA and HePA for both 850 and 1900 specified bands
- With DRX models: eDRX850
- For all existing types of Tx coupling: D, H2D, H4D and TxF
- For outdoor cabinet GIPS & non GIPS variants.

The EMC tests will be realized on a GSM S12000 Outdoor, the worse case configuration for FCC tests.

This document is addressed to Nortel and LCIE people in charge with GSM S8000/S12000 products qualification.



2. RELATED DOCUMENTS

2.1. 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]	47 CFR Part 15 08/20/02	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations – Radio frequency devices – dated 08/20/02
[A3]	CFR 47 Part 22	Code of Federal Regulations - Part 22 - Public Mobiles Services.
[A4]	CFR 47 Part 24	Code of Federal Regulations - Part 24 - Personal Communications Services.
[A5]	IC ES 003 (NMB 003)	Industry Canada - Digital apparatus
[A6]	RSS 132	Industry Canada - 800 MHz Cellular Telephones Employing New Technologies.
[A7]	RSS 133	Industry Canada – 2 GHz Personal Communications Services.

2.2. REFERENCE DOCUMENTS

[R1]	PE/BTS/DPL/016573	GSM S8000/S12000 Project Qualification Plan for the introduction of HEPA 850
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3. REQUIREMENTS BEFORE EMC ASSESSMENT

3.1. HARDWARE TECHNICAL STATUS

Details on the technical status of the system will be available in the document, supplied by Nortel during the commissioning & acceptance phase form for GSM S12000 Outdoor BTS.

3.2. LIST OF CABLES

The following ports of the GSM S12000 Outdoor BTS are available and will be connected :

- Abis port (telecom port) : cable 5.5 meters. This cable will be looped in order to transmit TX signals on RX ones.
- Radio port (signal port) : 6 RF cables RADIALL SHF9TD – DC-2GHz – Insertion loss < 5.5 dB at 2 GHz (15 meters). Attenuators and loads will also be used on RF links.
- AC ports : Lab cables (about 10 meters).



4. TEST PLAN SUMMARY

4.1. TEST PLAN SUMMARY FOR EMISSIONS TESTING

The following table presents the test plan summary for the FCC & IC qualification for introduction of GSM 850MHz HEPA from Andrew on the GSM S8000/S12000 products:

	Test case	Application	Test requirement	Performance criteria	Comment
Emission tests					
1	Conducted Emissions FCC Part 15 § 15.107 & ICES 003	AC port	150 kHz to 30 MHz	Class B	Realized on S12000 Outdoor (worse case configuration for FCC & IC testing)
2	Radiated emissions FCC part 15 § 15.109 & ICES 003	E- field enclosure	30 MHz to 18 GHz	Class B	Realized on S12000 Outdoor (worse case configuration for FCC & IC testing)
3	Radiated emissions spurious FCC part 22 § 22.917 & RS132	E- field enclosure	30 MHz to 20 GHz	The spurious emissions must be attenuated by at least 43 + 10 Log(P) P = Transmitter rated Power in Watts	Realized on S12000 Outdoor (worse case configuration for FCC & IC testing)
4	Radiated emissions spurious FCC part 24 § 24.238 & RS133	E- field enclosure	30 MHz to 20 GHz	The spurious emissions must be attenuated by at least 43 + 10 Log(P) P = Transmitter rated Power in Watts	Realized on S12000 Outdoor (worse case configuration for FCC & IC testing)



5. TEST CONFIGURATION

5.1. TEST CONFIGURATION FOR EMISSIONS TESTING

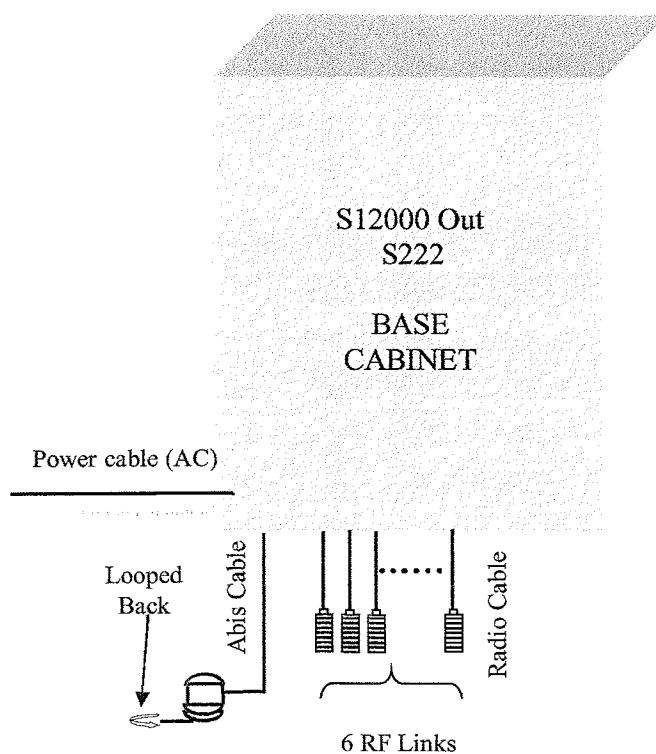
The S12000 Outdoor BTS will be configured as close to normal intended use. The BTS will be configured to transmit on all RF channels at Pmax on all the frequency band.

The Abis cable of the BTS is looped back at the end and a PCM signal is transmitted on this cable.

The following ports of the GSM S12000 Outdoor BTS are available and will be connected :

- Abis port (telecom port) : cable 5.5 meters. This cable will be looped in order to transmit TX signals on RX ones.
- Radio port (signal port) : 6 RF cables RADIALL SHF9TD – DC-2GHz – Insertion loss < 5.5 dB at 2 GHz (15 meters). Attenuators and loads will also be used on RF links.
- AC ports : Lab cables (about 10 meters).

Figure N°1: Emissions testing configuration





Abbreviations and definitions

5.2. ABBREVIATIONS

5.2.1 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
IC	Industry Canada
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



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 /
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

5.2.2 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
HPRM	High Power Radio Module
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



5.3. DEFINITIONS

Air discharge method : a method of testing, in which the charged electrode of the test generator is brought close to the EUT, and the discharge actuated by a spark to the EUT.

Amplitude modulation : process by which the amplitude of a carrier wave is varied following a specified law.

Anechoic chamber : shielded enclosure which is lined with radio-frequency absorbers to reduce reflections from the internal surfaces.

Antenna : transducer which either emits radio-frequency power into space from a signal source or intercepts an arriving electromagnetic field, converting it into an electrical signal.

Antistatic material : material exhibiting properties which minimize charge generation when rubbed against or separated from the same or other similar materials.

Artificial hand : an electrical network simulating the impedance of the human body under average operational conditions between a hand-held electrical appliance and earth

Auxiliary equipment : equipment necessary to provide the EUT with the signals required for normal operation and equipment to verify the performance of the equipment under test.

Balanced lines : a pair of symmetrically driven conductors with a conversion loss from differential to common mode of less than 20 dB.

Balun : device for transforming an unbalanced voltage to a balanced voltage or vice versa.

Burst : a sequence of a limited number of distinct pulses or an oscillation of limited duration.

Contact discharge method : a method of testing, in which the electrode of the test generator is held in contact with the EUT, and the discharge actuated by the discharge switch within the generator.

Clamp injection : clamp injection is obtained by means of a clamp-on "current" injecting device on the cable.

Continuous waves : electromagnetic waves, the successive oscillations of which are identical under steady-state conditions, which can be interrupted or modulated to convey information.

Coupling clamp : device of defined dimensions and characteristics for common mode coupling of the disturbance signal to the circuit under test without any galvanic connection to it.

Coupling network : electrical circuit for the purpose of preventing EFT voltage applied to the EUT from affecting other devices, equipment or systems which are not under test.

Coupling plane : a metal sheet or plate, to which discharges are applied to simulate electrostatic discharge to objects adjacent to the EUT.

Current clamp : a transformer, the secondary winding of which consists of the cable into which the injection is made.

Current surge : the front time T_f of a surge voltage is a virtual parameter defined as 1.25 times the interval T between the instants when the impulse is 10% and 90% of the peak value.

Decoupling network : electrical circuit for the purpose of preventing surges applied to the EUT from affecting other devices, equipment or systems which are not under test.



Degradation of performance : an undesired departure in the operational performance of any device, equipment or system from its intended performance.

Direct application : application of the discharge directly to the EUT.

Duration : the absolute value of the interval during which a specified waveform or feature exists or continues.

Electrical installation : an assembly of associated electrical equipment to fulfil a specific purpose or purposes and having coordinated characteristics.

Electromagnetic clamp : (EM-clamp) injection devices with combined capacitive and inductive coupling.

Electromagnetic compatibility : the ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

Electromagnetic wave : radiant energy produced by the oscillation of an electric charge characterized by oscillation of the electric and magnetic field.

Electrostatic discharge : a transfer of electric charge between bodies of different electrostatic potential in proximity or through direct contact.

Energy storage capacitor : the capacitor of the ESD generator representing the capacity of a human body charged to the test voltage value. This may be provided as a discrete component, or a distributed capacitance.

Far field : region where the power flux density from an antenna approximately obeys an inverse square law of the distance.

Field strength : the term "field strength" is applied only to measurements made in the far field. The measurement may be of either the electric or the magnetic component of the field and may be expressed as V/m, A/m or W/m²; any one of these may be converted into the others.

Frequency band : continuous of frequencies extending between two limits.

Fully anechoic chamber : shielded enclosure whose internal surfaces are totally lined with anechoic material.

Ground reference plane : a flat conductive surface whose potential is used as a common reference

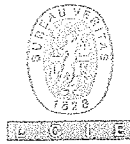
Holding time : interval of time within the decrease of the test voltage due to leakage, prior to the discharge, is not greater than 10%.

Human body-mounted equipment : equipment which is intended for use when attached to the human body. This definition included hand-held devices which are carried by people while in operation (e.g. pocket devices) as well as electronics aid devices and implants.

Immunity to a disturbance : the ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance.

Indirect application : application of the discharge to a coupling plane in the vicinity of the EUT, and simulation of personnel discharge to objects which are adjacent to the EUT.

Induction field : predominant electric and/or magnetic field existing at a distance $d < \lambda/2\pi$, where λ is the wavelength and the physical dimensions of the source are much smaller than distance d .



Isotropic : having properties of equal values in all directions

Malfunction : the termination of the ability of an equipment to carry out intended functions or the execution of unintended functions by the equipment.

Maximum RMS value : the highest short-term RMS value of a modulated RF signal during an observation time of one modulation period. The short-term RMS is evaluated over a single carrier cycle.

Modified semi-anechoic chamber : semi-anechoic chamber which has additional absorbers installed on the ground plane.

Non-constant envelope modulation : RF modulation schemes where the amplitude of the carrier wave varies slowly in time compared with the period of the carrier itself. Examples include conventional modulation and TDMA.

Polarization : orientation of the electric field vector of a radiated field.

Port : particular interface of the EUT with the external electromagnetic environment

Primary protection : the means by which the majority of stressful energy is prevented from propagating beyond the designated interface.

Rise time : the interval of time between the instants at which the instantaneous value of a pulse first reaches 10% value and then the 90% values.

Secondary protection : the means by which the let-through energy from primary protection is suppressed. It may be a special device or an inherent characteristic of the EUT.

Semi-anechoic chamber : shielded enclosure where all internal surfaces are covered with anechoic material with the exception of the floor, which shall be reflective (ground plane).

Shielded enclosure : screened or solid metal housing designed expressly for the purpose of isolating the internal from the external electromagnetic environment. The purpose is to prevent outside ambient electromagnetic fields from causing performance degradation and to prevent emission from causing interference to outside activities.

Short interruption : the disappearance of the supply voltage for a period of time typically not exceeding 1 min. Short interruptions can be considered as voltage dips with 100% amplitude.

Spurious radiation : any undesired electromagnetic emission from an electrical device.

Stripline : terminated transmission line consisting of two parallel plates between which a wave is propagated in the transverse electromagnetic mode to produce a specified field for testing purposes.

Surge : a transient wave of electrical current, voltage, or power propagating along a line or a circuit and characterized by a rapid increase followed by a slower decrease.

Surge voltage : the front time T_f of a surge voltage is a virtual parameter defined as 1.67 times the interval T between the instants when the impulse is 30% and 90% of the peak value.

Sweep : continuous or incremental traverse over a range of frequencies

System : set of interdependent elements constituted to achieve a given objective by performing a specified function.



Time to half-value T_2 : the time to half value T_2 of a surge is a virtual parameter defined as the time interval between the virtual origin O_1 and the instant when the voltage current has decreased to half the peak value.

Transceiver : Combination of radio transmitting and receiving equipment in a common housing.

Transient : pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval which is short compared with the time-scale of interest.

Voltage dips : a sudden reduction of the voltage at a point in the electrical system, followed recovery after a short period of time, from half a cycle to a few second.

Voltage variation : a gradual change of the supply voltage to a higher or lower value than the rated voltage. The duration of the change can be short or long with regard to the period.

❧END OF DOCUMENT❧

Dual Band GSM850/PCS1900 Outdoor BTS S12000 hardware delivery notice

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External document

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PUBLICATION HISTORY

02/DEC/2005

Issue 01.01 / EN, Standard

Delivery of the GSM850/PCS1900 Outdoor BTS S12000 / BTS N° 400190

Dual Band GSM850/PCS1900 Outdoor BTS S12000 hardware delivery notice

AVLM Recipient: LCIE	Date of delivery: 02/DEC/2005
Product: Dual Band GSM850/PCS1900 BTS S12000 Outdoor	
Article delivered: S120/B 8519 33_33H H2D T1	Article code: SA000208 204
Section transmitting: 8Z60	Designer name: CHENET Stéphane
Cabinet Serial Number: NNTMGY000UC0 / 400190	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications: PE/BTS/DD/4456 V02.01/EN Product Specification for the S12000 Outdoor GSM BTS	
Issues fixed on the cabinet: – None	
Missing Equipment: – None	
Software compatibility: Modules software version : – Load BTS : v15c3e03 ➤ iBCBF_v15c302 / CDI111128 / 2005-11-22 ➤ eDRX_v15c305 / CDI111127 / 2005-11-22 PI software tools : – WINTMI: v03d305 – TIL COAM: v15e102 – TIL Alarm: v01d110 – WINTOOL: v01b2e31	

Dual Band GSM850/PCS1900 Outdoor BTS S12000 hardware delivery notice

The delivery includes :

ARTICLE	PEC code	Release	Serial number	Comment
BARE CABINET S12000 OUT	SA000209	204	NNTMGY000UC0	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB6973	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB6975	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB6984	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB6996	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB7002	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB7014	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB7029	
MOD: RECTIFIER 680W	NTQA91HA	03	PITS01LB6973	
CPCMI T1 PCBA	NTQA66AA	06	NNTMGW05C4C7	
CPCMI T1 PCBA	NTQA66AA	06	NNTMGW05C4DM	
CPCMI T1 PCBA	NTQA66AA	06	NNTMGW05C4G1	
H2D HEPA HANDLING W/O VSWR 19	NTQA38KA	01	FORM01708496	
H2D HEPA HANDLING W/O VSWR 19	NTQA38KA	01	FORM01708527	
H2D HEPA HANDLING W/O VSWR 19	NTQA38KA	01	FORM01708528	
H2D HEPA HANDLING W/O VSWR 19	NTQA38KA	01	FORM01708539	
H2D 850 SMR W/O VSWR	NTQA38BA	01	FORM01707220	Channel 128 to 239
H2D 850 SMR W/O VSWR	NTQA38BA	01	FORM01707224	Channel 128 to 239
H2D 850 SMR W/O VSWR	NTQA38BA	01	FORM01707225	Channel 128 to 239
H2D 850 W/VSWR	NTQA38HA	01	NNTM7504NT7A	Channel 128 to 251
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714016	
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714018	
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714022	
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714030	
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714838	
HEPA: 60W GMSK/45W EDGE 1900	NTQA50RA	05	FORM01714017	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800024	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800010	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800027	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800002	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800025	
HEPA: 60W GMSK/45W EDGE 850	NTQA50UA	D1	ANDWCS800005	
TYPE F PSU	NTQA57AA	04	ADPL16032B4C	
TYPE F PSU	NTQA57AA	04	ADPL160329YW	
PA ICO-12 ASSY	NTU475EA	02	FCIN2500010J	
MOD: DACS S12000 OUT	NTU440AA	07	HIRSA51CPENY	
E - DRX GSM1900	NTQA88PA	08	NNTM7504NWQI	
E - DRX GSM1900	NTQA88PA	08	NNTM7504O159	
E - DRX GSM1900	NTQA88PA	08	NNTM7504O15Y	
E - DRX GSM1900	NTQA88PA	08	NNTM7504O162	
E - DRX GSM1900	NTQA88PA	08	NNTM7504O16S	
E - DRX GSM1900	NTQA88PA	08	NNTM7504O16W	
E - DRX GSM850	NTQA88HA	07	NNTM7504O20O	
E - DRX GSM850	NTQA88HA	07	NNTM7504O29Z	

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The delivery includes :

ARTICLE	PEC code	Release	Serial number	Comment
USER INTERCONNECT PLUGGABLE	NTQA3131	01	NNTMGT002797	
E - DRX GSM850	NTQA88HA	07	NNTM7504O2AB	
E - DRX GSM850	NTQA88HA	07	NNTM7504O2T9	
E - DRX GSM850	NTQA88HA	07	NNTM7504O2UJ	
E - DRX GSM850	NTQA88HA	07	NNTM7504O2UL	
CMCF PCBA PHASE 2	NTQA66CB	07	NNTMGW01HERX	
CMCF PCBA PHASE 2	NTQA66CB	07	NNTMGW01HEW3	
SPLITTER GSM1900 1X4	NTQA10AA	04	NNTMGW0225D6	
SPLITTER GSM1900 1X4	NTQA10AA	04	NNTMGW0225EV	
SPLITTER GSM1900 1X4	NTQA10AA	04	NNTMGW0225J8	
SPLITTER GSM1900 1X4	NTQA10AA	04	NNTMGW0225KX	
RECAL PCBA	NTQA66DA	02	NNTMGW073M9W	
RX SPLITTER GSM850 1X4	NTQA88XA	01	NNTMGW0933P3	
RX SPLITTER GSM850 1X4	NTQA88XA	01	NNTMGW0933P5	
RX SPLITTER GSM850 1X4	NTQA88XA	01	NNTMGW0933RM	
RX SPLITTER GSM850 1X4	NTQA88XA	01	NNTMGW0933V3	
CBCF SHELF	NTQA66GA	01	NNTMGX00F6EV	
DC PANEL S12000 OUT	NTU486AA	01	NNTMGY000U86	
AC BOX/GIPS (W/O MAINT PLUG)	NTQA18AA	03	NNTMGY000U8G	
MOD: COMICO-12 OUT ASSY	NTU464AA	01	NNTMGY166F80	
MOD: DRX ICO-6 A ASSY	NTU461AA	02	NNTMGY16FC25	
MOD: DRX ICO-6 B ASSY	NTU462AA	02	NNTMGY183C63	
RECTIF SHELF S120 GIPS W/O ADU	NTU47003	03	PITS01M12976	
MOD: ADU FOR S120 (GIPS)	NTU419AA	01	PITS01P08741	

Additional delivery:

ARTICLE	PEC code	Release	Serial number	Comment
DUPLEXER 850 SMR W/VSWR	NTQA38DA	01	NNTM7503KYZE	For radio Base/Base loopback
CROSS PATH II CSU	NTQA45JA	00	0211869869	

Dual Band GSM850/PCS1900 Outdoor BTS S12000 hardware delivery notice

Tests performed:

The following features have been tested:

- Global test
 - Nominal Load flashing on each CMCF and each eDRX
 - Alarms scanning
 - Inrush current measuring for each HePA 850
- RX characterization for each eDRX 850 having a HePA 850
 - Alarms scanning,
 - BER on the Abis link,
 - Base_base loop back in PDCH (Edge) @-101dBm, and also in TCH (GMSK) @-104dBm for 2 minutes on each HePA 850
 - Long term Base_base loop back in PDCH (Edge) @-101dBm for one HePA 850.
- TX characterization for each eDRX 850 having a HePA 850
 - Output Power in GMSK and 8PSK at Pmin(34dBm) and Pmax (47dBm) for each HePA 850
 - Power versus Time in 8PSK modulation and EVM for each HePA 850

Functional limits:

- Hardware Limitations :

None

- Software Limitations :

None

Documents related to the Hardware Test Specifications

Reference of the test specifications documents:

- PE/BTS/DJD/02560 V03/EN Hardware Integration Test Specification for S12000 BTS

Documents related to the Hardware Test Report

Reference of the test reports documents:

- PE/BTS/DJD/017196 V01/FR Dossier des tests d'intégration de la BTS S12000 Outdoor Bi-Bande GSM850/PCS1900

∞ END OF DOCUMENT ∞