



EXHIBIT 2B

S8000 EMC Report

Applicant: Northern Telecom Ltd.

For Certification on:

AB6OUD850S8000



SANMINA-SCI

S8000 850 MHz : EMC Test Report

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Product Name: S8000 Indoor & Outdoor BTS

Frequency: 850 / 1900 MHz

Discipline: EMC

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1. INTRODUCTION

The objective of this document is to present the tests report of the EMC testing on the S8000 850 MHz Indoor and Outdoor BTS. The qualification phase on the BTS has been done according to the FCC Part 15; 22 & 24 as defined by Nortel Networks.

This document applies to :

- Product : S8000 Indoor & Outdoor BTS
- Manufacturer : Nortel Networks
- Frequencies : 850 / 1900 MHz
- Configuration : S4_4 (for Indoor BTS) and S44 (for Outdoor BTS)
- Ancillary : No
- Options : No

2. RELATED DOCUMENTS

2.1. APPLICABLES DOCUMENTS

[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 15	Code of Federal Regulations - Part 15 - Radio Frequency Devices.
[A3]	CFR 47 Part 22	Code of Federal Regulations - Part 22 – Public Mobile Services
[A4]	CFR 47 Part 24	Code of Federal Regulations - Part 24 - Personal Communications Services. Date : June 1996.

2.2. REFERENCE DOCUMENTS

[R1]	Nortel-STP-00282 V01-en	S8000 850 MHz : EMC Test Plan
[R2]	PE/BTS/DJD/2592 V03.01	Avis de livraison matériel d'une BTS S8000 850 GSM (Indoor BTS)
[R3]	PE/BTS/DJD/2592 V05.01	Avis de livraison matériel d'une BTS S8000 850 GSM (Outdoor BTS)
[R4]	149 014 DK	External report from GYL Technologies laboratory
[R5]	149 015 DK	External report from GYL Technologies laboratory

3. TESTS RESULTS

3.1. TEST CONFIGURATION

Standard Coverage : FCC Part 15.109; FCC Part 22.917 & FCC Part 24.238

Intend :

- (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonics and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of 2.989, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open filed measurements (e.g., a broadcast transmitter installed in a building) measurements will be acceptable of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.
- (b) The measurements specified in paragraph (a) of this section shall be made for the following equipment :
 - (1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
 - (2) All equipment operating on frequencies higher than 25 MHz.
 - (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
 - (4) Other types of equipment as required, when deemed necessary by the Commission.

Test Procedure :

Radiated emission measurement procedures shall be performed as outlined in Section 8 of the ANSI C63.4 measurement standard. The BTS will be tested to the applicable limits of the FCC rules. For radiated emission measurements the measurement distance between the center of the measurement antenna and the equipment under test shall be 3 meters (or less for frequencies above 1 GHz). In order to maximize all emission levels from the equipment, the emissions will be searched with the receive antenna at varied height levels. The equipment shall also be rotated a full 360 degrees on the turntable with the receive antenna at varying height levels (1 to 4 meters). Tests shall be made with the antenna positioned in both the horizontal and vertical planes of polarization. The BTS shall be placed on the turntable as per ANSI C63.4 measurement procedures. Please see the Part 15 test plan as Part 22 & 24 radiated requirements will be tested in conjunction with the Part 15 testing. The spectrum shall be searched to identify emissions. A complete scan of the applicable spectrum shall be completed (up to 10th harmonic of fundamental). The transmitter shall then be turned off, with the rest of the equipment powered on. A complete scan of the spectrum shall be done and referred to as "ambient" without the transmitter keyed on. Emissions emanating from the transmitter shall be identified from comparing these two scans. The identified emissions (from the transmitter) shall be measured and the levels recorded with the transmitter keyed on at full rated power output.

Important remark :

Substitution measurements must be made on all detected emissions given that the limits for the FCC are given in power measurements. If no emissions are detected, measurements should be made at the noise floor levels for each of the transmitter harmonics frequencies and a statements should be placed in the test report indicating that no emissions were detected.

The equipment was configured as shown in the next figure.

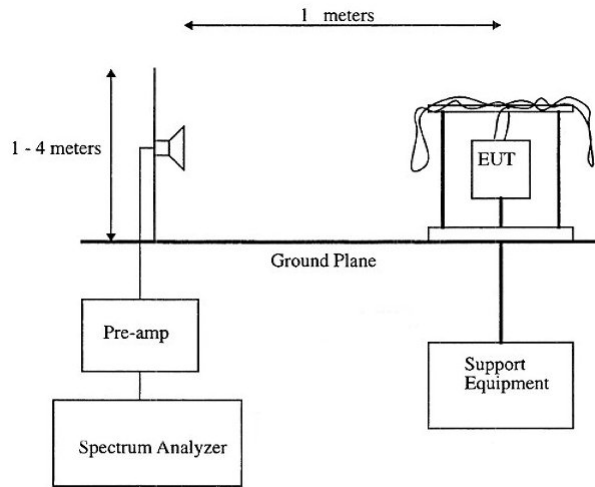


Figure 7 : Test configuration for Radiated Spurious emissions

The BTS was configured to transmit at maximum power (static level 0). 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 (30 Watts),
- G = Gain of ideal Dipole (linear)

Therefore :

$$E(V / m) = \sqrt{30 * 30 * 1.64}$$

E = 38.42 V/m = 151.69 dB_μV/m

The spurious emissions must be attenuated by at least 43 + 10*Log(30) = 57.7 dB.

Therefore the field strength limit at 1 meters is :

E = 151.69 dB_μV/m – 57.7 dB = 93.9 dB_μV/m

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Spectrum Analyzer setting during measurements shall be as following :

Receiver Setting	Pre-Scan (to identify spurious emissions from EUT)	Final Measurements
Detector Type	Peak	Quasi-Peak (CISPR)
Mode	Max Hold	Not Applicable
Bandwidth	100 kHz or 1 MHz (for > 1GHz)	120 kHz*
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 1m for 1GHz - 20GHz

Pass / Fail criteria :

- For 30 MHz to 1 GHz :
Measurement distance : **10 m**
Limit : [30 MHz-88 MHz] **30 dB μ V/m**
 [88 MHz-216 MHz] **33.5 dB μ V/m**
 [216 MHz-960 MHz] **36 dB μ V/m**
 Above 960 MHz **43.5 dB μ V/m**
- For 1 GHz to 20 GHz :
Measurement distance : 1 m
Limit : **93.9 dB μ V/m**

S/W Configuration – Traffic data flow :

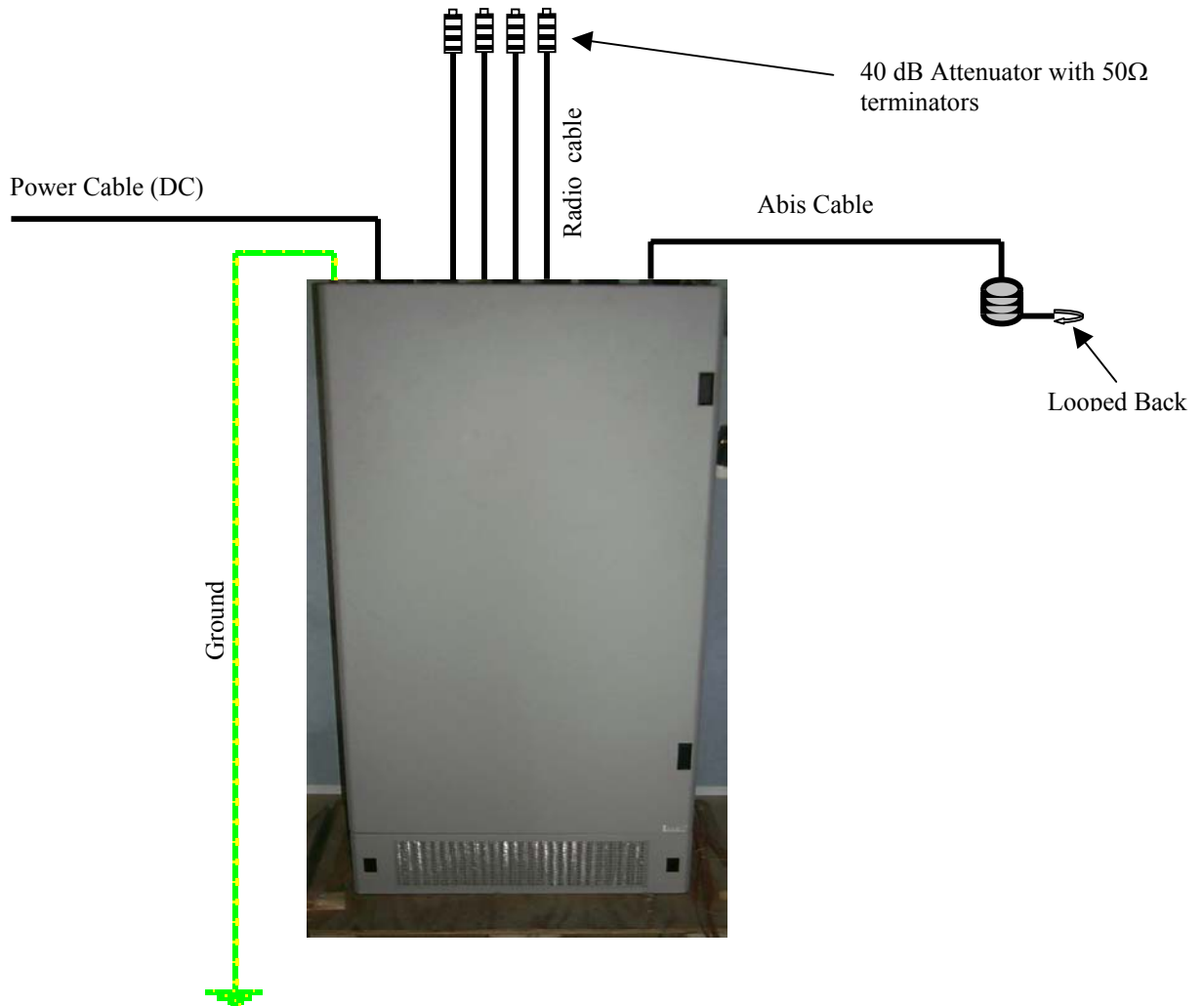
All transmitters in the EUT should be transmitting at full power.

The transmitters' operating frequencies should be selected by setting the Absolute Radio Frequency Channel Numbers (ARFCN) equally distributed over the BSS operating band, subject to any restrictions of the configuration of the EUT.

Transmit Power : All TX at 30 W

3.2. INSTALLATION DIAGRAM

The drawing gives a representation of functional test bench.



See Annex 1 for the Hardware Technical Status.

The following table presents the list of cable :

S8000 Indoor				
Cables	Description	Length		Quantity
Radio cables	RG214	10 m	Shielded	4
Abis cable	NTQA1717	5.5 m	Shielded	1
Power cable (0v/-48v)	Type H07 RN-F	/	Not Shielded	1
Ground cable	Type H07 VK	/	/	1
Equipotentiality braid	/	0.5 m	/	1

S8000 Outdoor				
Cables	Description	Length		Quantity
Radio cables	RG214	10 m	Shielded	8
Abis cable	NTQA1717	5.5 m	Shielded	1
Power cable	Type H07 RN-F	/	Not Shielded	1
Equipotentiality braid	/	0.5 m	/	1

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3.3. MATRIX RESULTS

Configuration of the EUT	Test	Reference Method	Compliance	Comments
S8000 Indoor 850 / 1900 MHz S4_4	Radiated Emissions FCC Part 15 Class B (30 MHz to 10 GHz)	Section 15.109	PASS	Pass with 12 dB margin minimum in worst case.
	Radiated Emissions FCC Part 22 Class B (1 GHz to 9 GHz)	Section 22.917	PASS	No frequencies between 1 and 9 GHz (except the 4 transmit frequencies).
	Radiated Emissions FCC Part 24 (1GHz to 20 GHz)	Section 24.238	PASS	No frequencies between 1 and 20 GHz (except the 4 transmit frequencies).
S8000 Outdoor 850 MHz S44	Conducted Emissions FCC Part 15 Class B (450 kHz to 30 MHz)	Section 15.107	PASS	Pass with 26 dB margin minimum in worst case.
	Radiated Emissions FCC Part 15 Class B (30 MHz to 5 GHz)	Section 15.109	PASS	Pass with 18 dB margin minimum in worst case.

No radiated spurious emissions were detected during testing and thus substitution measurements were not preformed.

The results of the EMC tests are also presented in the external report from GYL Technologies COFRAC laboratory [R4] for Indoor BTS & [R5] for Outdoor BTS.

4. CONCLUSION

The S8000 Outdoor & Indoor BTS equipped with 850 MHz modules comply with the EMC applicable requirements for US market, that is to say FCC part 15; 22 & 24.

By the way, this qualification allows us to declare compliant from an EMC point of view with FCC requirements :

- The 850 MHz frequency band in S8000 Outdoor or Indoor system,
- The dual band 850 / 1900 in S8000 Outdoor or Indoor system.

5. ABBREVIATIONS AND DEFINITIONS

5.1. ABBREVIATIONS

BTS	Base Transceiver Station
DC	Direct Current
DCS	Digital Cellular System
DRX	Driver Receiver unit
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
N/A	Not Applicable
RF	Radio Frequency
RXQUAL	Receive Quality
TRX	Transmitter / Receiver

5.2. DEFINITIONS

FCC Part 2 – This part contains the table of frequency allocations and special requirements in international regulations, recommendations, agreements, and treaties. This part also contains standards and procedures concerning the marking and importation of radio frequency devices, and for obtaining equipment authorization.

FCC Part 15 – This part contains rules setting out the regulations under which an international, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 Devices.

FCC Part 22 – The purpose of these rule is to establish the requirements and conditions under which domestic common carrier radio stations may be licensed and used in the Public Mobile Services.

FCC Part 24 – This part states the conditions under which portions of the radio spectrum are made available and licensed for PCS.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

Equivalent Isotropically Radiated Power (e.i.r.p.) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Mean power (of a radio transmitter) – The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

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6. ANNEX 1 : HARDWARE TECHNICAL STATUS

6.1. S8000 INDOOR BTS

Références matérielles :

CMCF	NTQA66 CB 05	NNTMES00ACUA	IP = 47.162.61.233
CPCMI	NTQA66 AA 05	NNTMES001P8S	
RECAL	NTQA66 DA 02	NNTMES00CUH0	

- Références eDRX 850GSM

DRX0	NTQA88HA D2	CDN200208004	IP = 47.162.61.225
DRX1	NTQA88HA D2	CDN200208011	IP = 47.162.61.226
DRX2	NTQA88HA D2	CDN200208007	IP = 47.162.61.227
DRX3	NTQA88HA D2	CDN200208006	IP = 47.162.61.228

- Références eDRX PCS

DRX4	NTQA88PA 01	NNTM7503BQMM	IP = 47.162.61.229
DRX5	NTQA88PA 01	NNTM7503BQN7	IP = 47.162.61.230
DRX6	NTQA88PA 01	NNTM7503BQMN	IP = 47.162.61.231
DRX7	NTQA88PA 01	NNTM7503BQN9	IP = 47.162.61.232

- Références escPA 850GSM

PA0	NTQA37AA D1	PWWT01D3KCEC
PA1	NTQA37AA D1	PWWT01D35TCC
PA2	NTQA37AA D1	PWWT01D35T8C
PA3	NTQA37AA D1	PWWT01D35RYC

- Références escPA PCS

PA4	NTQA50GA 01	PWWT03D2VCLP
PA5	NTQA50GA 01	PWWT01D2XFMP
PA6	NTQA50GA 01	PWWT01D2V9GP
PA7	NTQA50GA 01	PWWT01D2FVJP

- Références H2D 850GSM

H2D0	NTQA38BA D1	FORM01269369
H2D1	NTQA38BA D1	FORM01269370

- Références H2D PCS

H2D2	NTQA51AA 07	PALD01002BK9
H2D3	NTQA51AA 07	PALD01002BGE

- Références Splitter 850GSM

Splitter0	NTQA85XA P1	NNTMES00CQZH
Splitter1	NTQA85XA P1	NNTMES00CQZR

- Références Splitter PCS

Splitter2	NTQA10AA 03	NNTMES001ORD
Splitter3	NTQA10AA 03	NNTMES001SLI

6.2. S8000 OUTDOOR BTS

Références matérielles :

CMCF	NTQA66 CB 05	NNTMES00DITI	IP = 47.162.62.22
CPCMI	NTQA66 AA 05	NNTMES001KQG	
RECAL	NTQA66 DA 02	NNTMES00D3U5	

- Références eDRX 850GSM

DRX0	NTQA88HA D2	CDN200208009	IP = 47.162.62.14
DRX1	NTQA88HA D2	CDN200208010	IP = 47.162.62.15
DRX2	NTQA88HA D2	CDN200211003	IP = 47.162.62.16
DRX3	NTQA88HA D2	CDN200211001	IP = 47.162.62.17
DRX4	NTQA88HA D2	CDN200211009	IP = 47.162.62.18
DRX5	NTQA88HA D2	CDN200211010	IP = 47.162.62.19
DRX6	NTQA88HA D2	CDN200211008	IP = 47.162.62.20
DRX7	NTQA88HA D2	CDN2002110011	IP = 47.162.62.21

- Références escPA 850GSM

PA0	NTQA37AA D1	PWWT01D3KD4C
PA1	NTQA37AA D1	PWWT01D3KCWC
PA2	NTQA37AA D1	PWWT01D3KCHC
PA3	NTQA37AA D1	PWWT01D35T2C
PA4	NTQA37AA D1	PWWT01D3KC9C
PA5	NTQA37AA D1	PWWT01D3KCFC
PA6	NTQA37AA D1	PWWT01D3KCPC
PA7	NTQA37AA D1	PWWT01D3KCFC

- Références DUPLEXER 850

DP0	NTQA38CA D1	FORM01285399
DP1	NTQA38CA D1	FORM01285408
DP2	NTQA38CA D1	FORM01285411
DP3	NTQA38CA D1	FORM01285409

- Références TX FILTER 850

TX0	NTQA39AA P1	FORM01100002
TX1	NTQA39AA P1	FORM01100008
TX2	NTQA39AA P1	FORM0110000H
TX3	NTQA39AA P1	FORM01100001

- Références Splitter 850GSM

Splitter0	NTQA88XA P1	NNTMES00CQZL
Splitter1	NTQA88XA P1	NNTMES00CQZP
Splitter2	NTQA88XA P1	NNTMES00CQZN
Splitter3	NTQA88XA P1	NNTMES00CQZS

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