



## **TEST REPORT**

**CFR 47 Part 15  
and CFR 47 Part 24**

**UMTS 1900 Mono iBTS**

**N°149027DK**

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**APPENDIXES A1 TO A16**



## 1 GENERAL INFORMATION

### 1.1 APPLICANT:

**SANMINA SCI**  
**46 Rue Pierre Curie**  
**78376 PLAISIR - FRANCE**

### 1.2 MANUFACTURER:

**NORTEL NETWORKS**  
**38, rue Paul Cézanne**  
**78928 Guyancourt Yvelines – France**

### 1.3 APPLICANT REPRESENTATIVE:

Marc CANCOUËT

### 1.4 TEST DATE:

September 9 and 10, 2003

### 1.5 TEST SITE:

GYL Technologies  
Parc d'activités de Lanserre  
49610 Juigné sur Loire – France  
FCC registration Number: 90469



## 2 INTRODUCTION

The following test report for a Base Station Transmitter is written in accordance with Part 15 and 24 of the Federal Communications Commissions. The Equipment Under Test (EUT) was the UMTS 1900 Mono iBTS. The test results reported in this document relate only to the item that was tested.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions of 2001. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. These are explained in this report. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier and cables.

All radiated and conducted emissions measurements were performed manually at GYL TECHNOLOGIES. The radiated emissions measurements required by the rules were performed on the three to ten meters, open field, test site maintained by GYL Technologies Parc d'activités de Lanserre, 49610 Juigné sur Loire , France. Complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission.

The power line conducted emission measurements were performed in a shielded enclosure also located at the Parc d'activités de Lanserre, 49610 Juigné sur Loire, France facility

## 3 MEASUREMENT EQUIPMENT LIST

PART TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	CALIBRATION DATE
<b>RECEIVERS</b>				
Receiver	Rohde & Schwarz	ESI 7	M02020	Mar-03
Spectrum analyzer	Rohde & Schwarz	FSEM 30	M02021	Dec-02
<b>ARTIFICIAL MAINS NETWORKS</b>				
LISN (50 $\mu$ H / 5/50 $\Omega$ )	Rohde & Schwarz	ESH2-Z5	M02034	Oct-02
<b>ANTENNAS</b>				
Bilog (30-2000MHz)	CHASE	CBL-6112	M02031	Nov-02
Horn (1 to 18GHz)	EMCO	3161-01	M01138	



## 4 TESTED SYSTEM DETAILS

The equipment tested is a Base Transceiver Station single channel for Universal Mobile Telecommunications System also considered as an Information Technology Equipment. The equipment provides Personal Communications Services in the 1930 – 1990 MHz frequency band.

## 5 EQUIPMENT DESCRIPTION

### 5.1 PRODUCT TYPE:

UMTS 1900 Mono iBTS :

#### 5.1.1 Equipment Release Status:

iTRM 1900 :	D1
iCCM :	D2
iCEM :	D2
cGPSAM :	02
MCPA 1900 :	D2
cDDM 1900 :	D1
Cooling Unit :	D1
Control board :	D1
MCA :	D1
INTERCO :	D1
Digital backplane :	D1
Rectifier :	D1
DC box :	D2
LPPCM :	D1
External alarm module :	D1

### 5.2 AUXILIARY EQUIPMENT:

Attenuators and 50 ohms load

### 5.3 PRODUCT PICTURES:

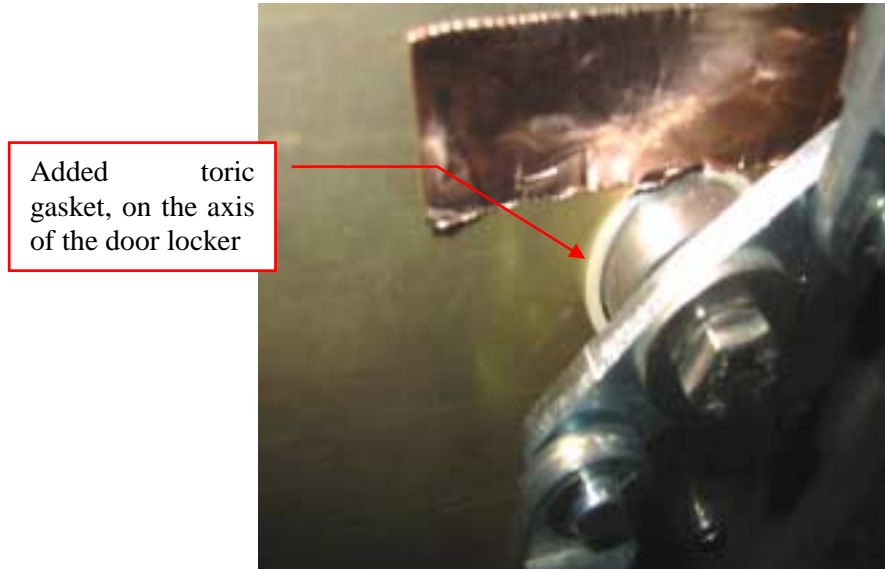
Front view



Rear view

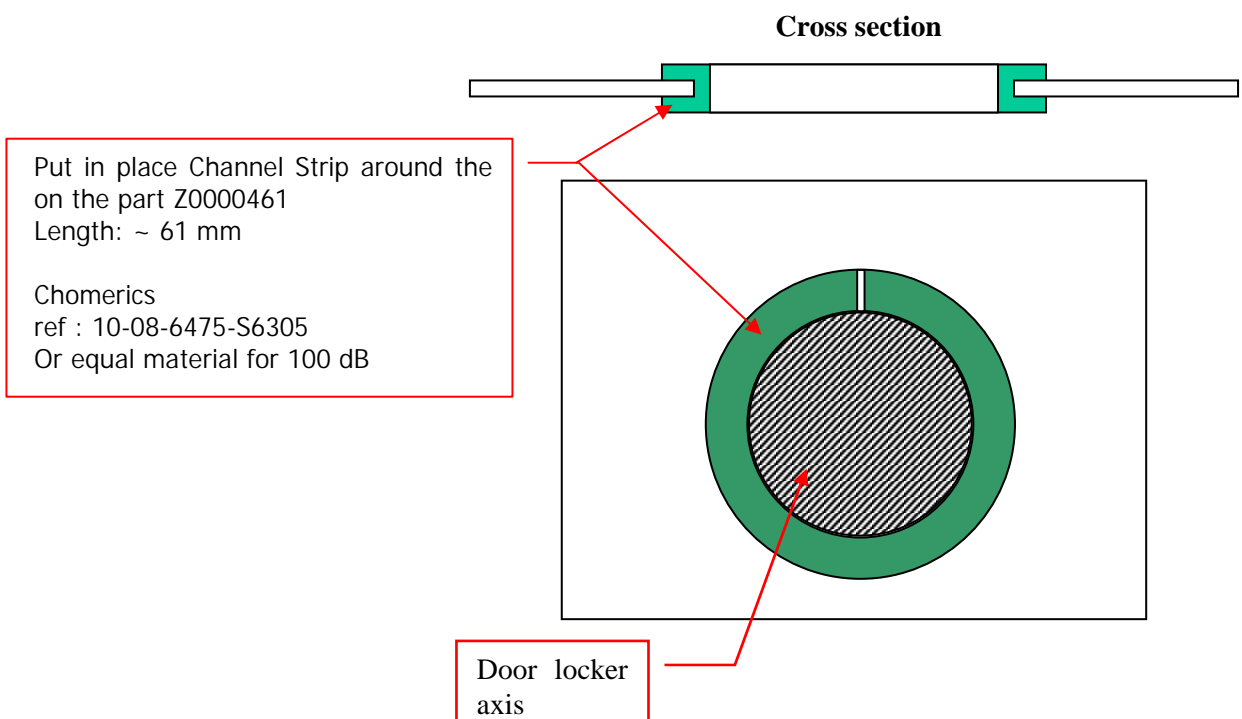


### Applied modifications during testing



### Final solution for manufacturing

This solution being in compliance with the modification done during testing solves the door leakage problem by implementing a signal attenuation greater than 60 dB. So it is not necessary to redo testing





## EMC TEST REPORT

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FCC registration # 90469

Written by : O. ROY

September 11, 2003

Identification : 149027DK

**5.4 PRODUCT COMPOSITION**

The table given here under gives the features details of the equipment under test

ARTICLE	PEC code	Release	Serial number	Comments
iTRM 1900	NTUM17BA	D1 DER AC 03 06 046	CDN200326004	136.147. 33.147
ICCM Board	NTUM25BA	D2	SLR200247010	136.147. 32.162
ICCM shelf	NTUM26AA	D1	CDN200247010	
iCEM 128	NTUM00DA	D2	CDN200316012	136.147. 33.109
cGPSAM	NTA520AA	02	NNTM7503OECE	
MCPA 1900	NTUM30PA	D2	PWWT03DC11NY	Firmware 1.16
cDDM 1900	NTU719AA	D1	FORM01437242	
Cooling Unit	NTU752AA	D1	SNMN7500AV7Q	
MCA	NTU750AA	D1	SNMN7500AW3T	
INTERCO PANEL	NTU727AA	D1	SNMN7500AVY9	
DIGITAL SHELF	NTU753DA	D1	SNMN7500AW3U	
DC Box	NTU754AA	D2	SNMN7500C9YY	
LPPCM	NTU733AA	D1	SNMN7500BTTR	
MCA	NTUM7200	D1	SNMN7500B0CS	
Control board	NTU751AA	D1	SNMN7500AV7L	
Rectifier	NTU753HA	D1	PITS01W00606	
External alarm module	NTU735BA	D1	SNMN7500B4UP	

**6 EXERCISING TEST CONDITIONS**

Measurements are done in transmitter mode (the transmitter is set at maximum power 30 watts).  
Installation diagram and cables list on appendix A6 and A9

**6.1 CHANNELS TEST CONFIGURATION:**

TRM	CHANNEL #	Definition
3	M	TRM 1 output on PA 1 transmitting at 1960 MHz and 44.8 dBm

**6.2 EUT EXERCISING SOFTWARE**

The EUT was provided with the software to continuously transmit during testing. The carrier was also checked to verify that the information was being transmitted.

- Modules software version : V03E3.0E01.4
- PI bench : v03d0402
- Visual TRM: v03d0402 with a modification: the file for channelizers' configuration "TX\_umts.chz" delivered with Visual TRM as modified by the file "TX\_umts.chz" delivered with PI Bench v03d0402.
- Visual BBS for iCEM : V03D3.2\_E04





## 7 CONFORMANCE STATEMENT

### 7.1 STANDARDS REFERENCED FOR THIS REPORT

PART 2: 1999	Frequency allocations and Radio Treaty Matters General Rules and Regulations
PART 15: 2002	Radio frequency devices
ANSI C63.4-2001	Standard format measurements/technical report personal computer and peripherals
PART 24 Subpart E"-2000	Broadband Personal communications services

### 7.2 JUSTIFICATION

As mentioned in paragraph 5 of this report, the equipment is an information technology equipment providing public mobiles services and Personal Communication Services and as it may be installed in residential commercial or light industry areas the following sub clause of the standard mentioned above are

- Part 15.107 and 15.109 (subpart B) for respectively conducted and radiated emission.
- Part 24.238 (subpart E) for broadband PCS emission limits

## 8 Interpretation and remarks:

**This equipment complies with the rules of the FCC.**

### 8.1 IMPORTANT REMARK:

**Even if spurious emissions were observed during part 15 testing, substitution method was not performed on UMTS 1900 Mono iBTS due to the measured margin greater than 20dB**

**The EUT Plot on page 26 shows measured noise floor levels detected while testing the UMTS 1900 Mono iBTS**

## 9 TEST ACCORDING TO CFR 47 Part 15 Class B

Tests performed by Daniel RAUD at GYL Technologies laboratories, on September 9 and 10, 2003

### 9.1 REFERENCE DOCUMENTATION:

FCC part 15 (Sub part B) §15.107 and 15.109 of 2002

### 9.2 CONDUCTED EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a semi anechoic chamber manufactured by SIDT. The EUT was assembled on a non conductive 10 centimeters high wooden pallet. Power was fed to the EUT through a 50 ohm / 50 micro-Henry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Rohde and Schwartz 150 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 150 kHz. Conducted emission levels were measured on each current-carrying line with the receiver operating in the CISPR quasi-peak mode (or average mode if applicable)





**9.3 RESULTS: (§ 15.107 class B)**

The following table lists worst-case conducted emission data. Specifically: Emission Frequency, Test Detector, Analyzer Reading, Site Correction Factor, corrected Emission Level, Quasi Peak Limit and Margin, and the Average Limit and Margin.

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and LIVE SIDE, herein referred to as Neutral, Live1 and Live2 respectively.

ESI 7 EMI TEST RECEIVER IN RECEIVER MODE	
Peak measurement time	5 ms
step size	4KHz
Preamplifier	OFF
Preselector	ON
Resolution, Band With	9 kHz
Final Quasi Peak measurement time	1 s minimum
Final average measurement time	1 sec minimum

All readings are quasi-peak unless stated otherwise.



EMC TEST REPORT

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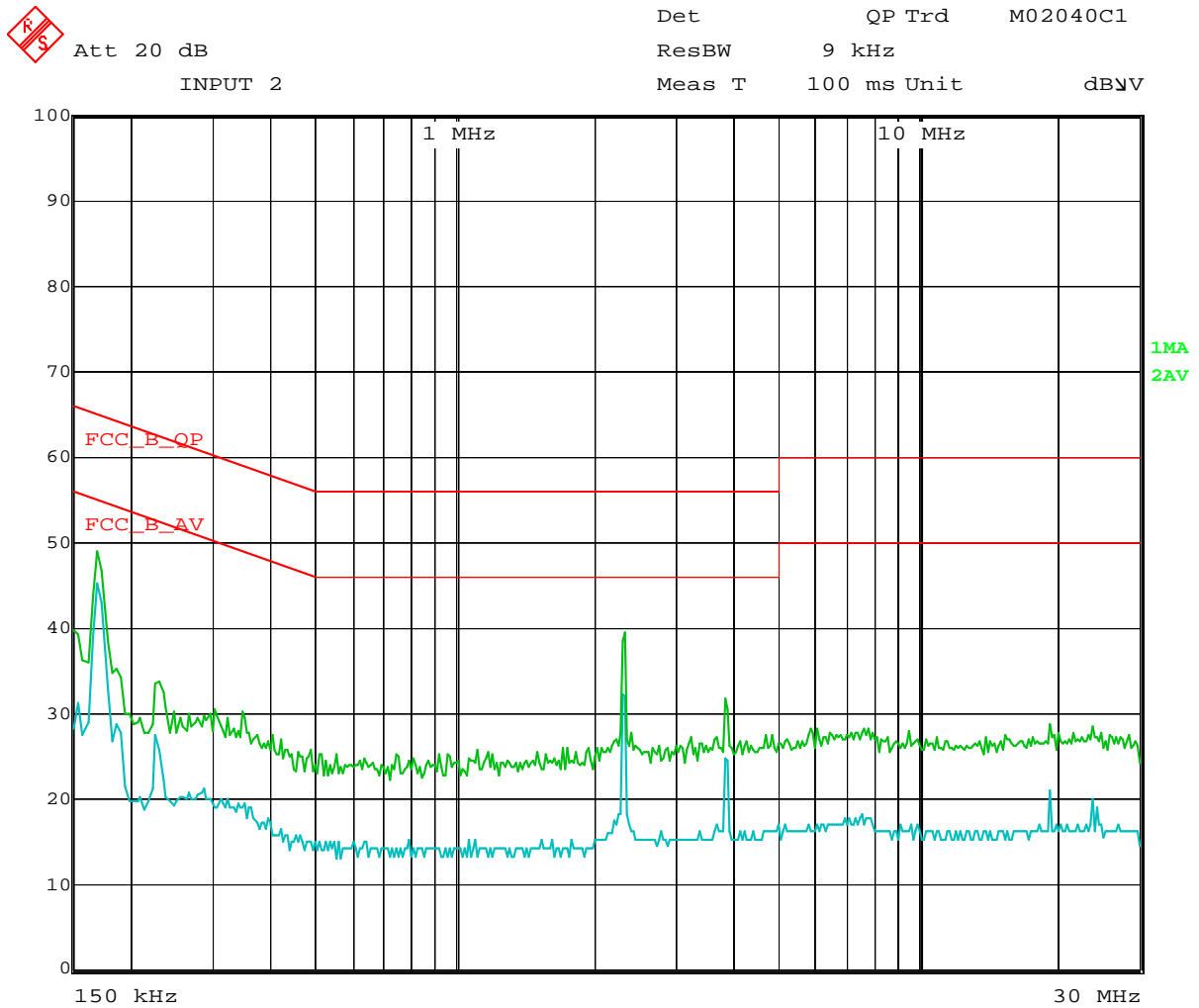
September 11, 2003

Identification : 149027DK

9.3.1 LIVE 1 (EUT is AC powered)

Frequency (MHz)	Quasi-peak (dBµV/m)	QP margin (dBµV/m)	Frequency (MHz)	Average (dBµV/m)	Average margin (dBµV/m)
0.170	47.978	-16.982	0.170	44.574	-10.386
2.318	37.178	-18.822	0.226	26.280	-26.316
3.858	27.247	-28.753	2.314	31.862	-14.138
			3.858	24.006	-21.994

Legend: Blue curve represents average values  
Green curve represents the peak values

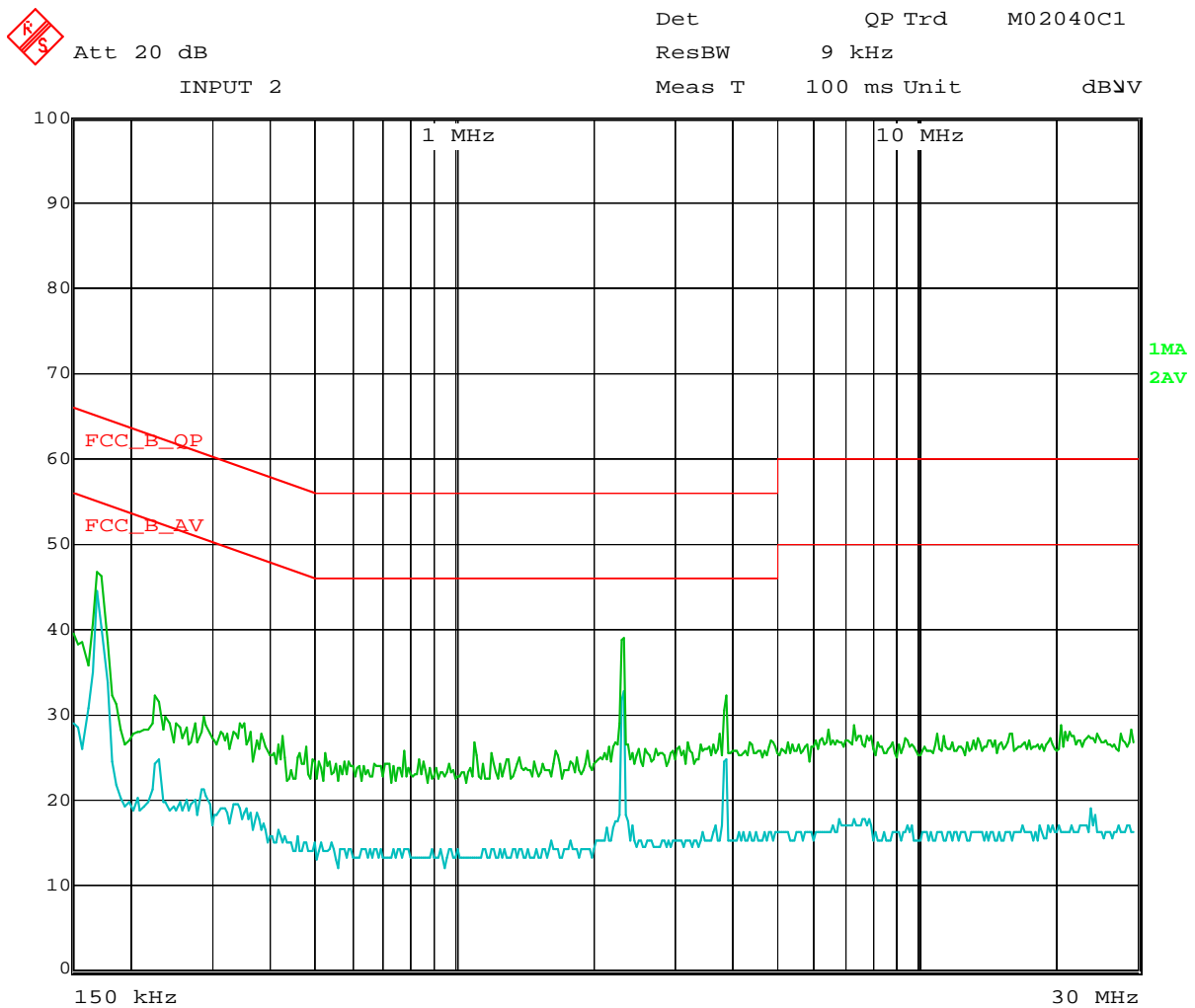


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9.3.2 LIVE 2 (EUT is AC powered)

Frequency (MHz)	Quasi-peak (dBµV/m)	QP margin (dBµV/m)	Frequency (MHz)	Average (dBµV/m)	Average margin (dBµV/m)
0.170	47.19	-17.77	0.170	43.61	-11.35
2.318	37.25	-18.75	2.318	32.26	-13.74
3.862	27.88	-28.12	3.862	24.58	-21.42



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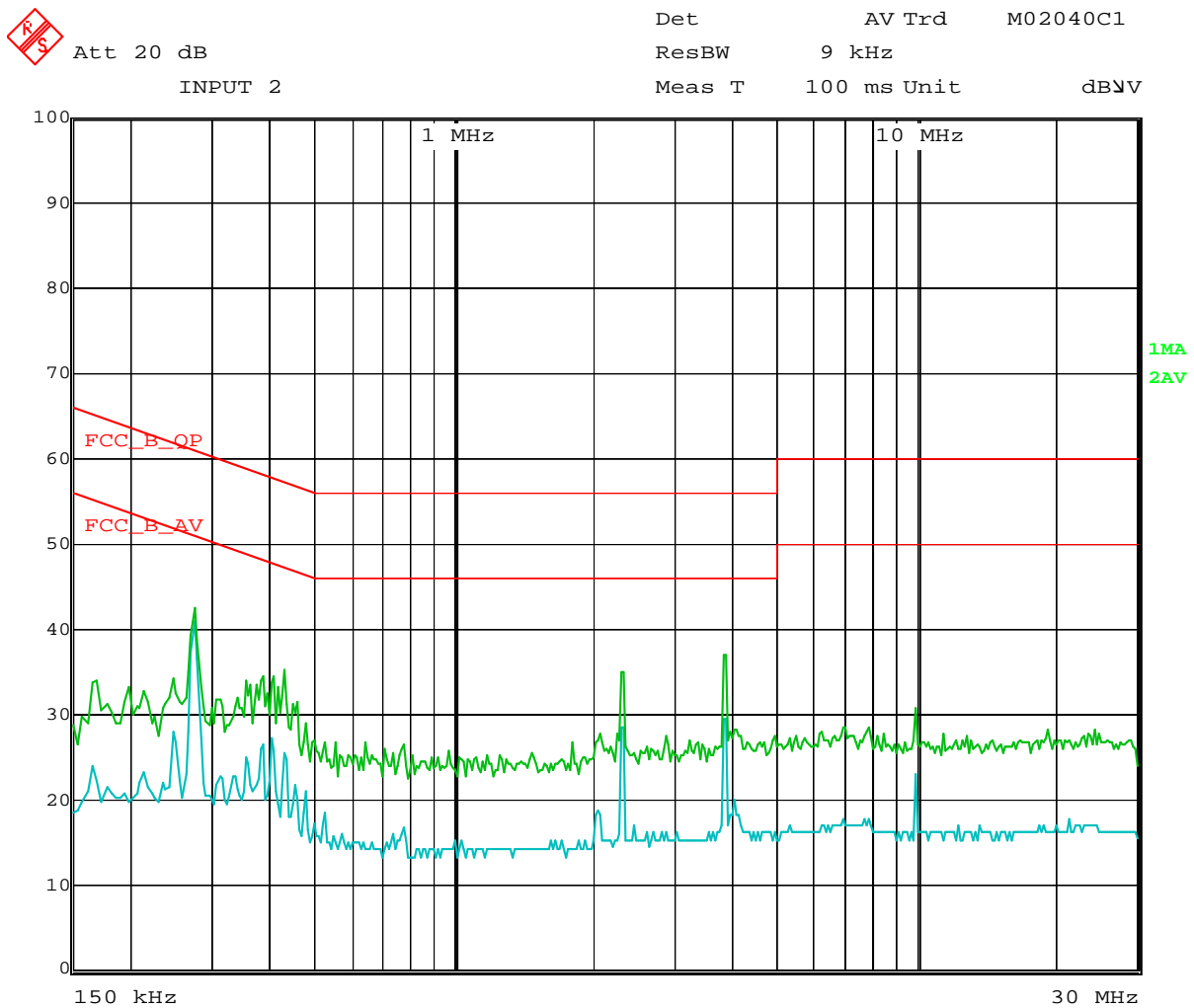
Identification : 149027DK

9.3.3 LIVE 1 (HEATING is AC powered while EUT is DC powered)

Measurement are done on the heating power

Frequency (MHz)	Quasi-peak (dBµV/m)	QP margin (dBµV/m)	Frequency (MHz)	Average (dBµV/m)	Average margin (dBµV/m)
0.274	41.72	-19.27	0.274	41.06	-9.94
0.426	30.55	-26.78	2.314	28.06	-17.94
2.318	32.90	-23.10	2.318	28.41	-17.59
3.858	36.03	-19.97	3.858	29.43	-16.57
3.862	35.63	-20.37	3.862	29.25	-16.75

Legend: Blue curve represents average values  
Green curve represents the peak values



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9.3.4 LIVE 2 (HEATING is AC powered while EUT is DC powered)

Frequency (MHz)	Quasi-peak (dBµV/m)	QP margin (dBµV/m)	Frequency (MHz)	Average (dBµV/m)	Average margin (dBµV/m)
0.274	41.64	-19.35	0.274	40.99	-10.01
2.318	33.12	-22.88	0.426	25.26	-22.07
3.858	35.79	-20.21	2.318	28.30	-17.70
3.862	35.55	-20.45	3.862	29.13	-16.87



Att 20 dB

INPUT 2

Det

AV Trd

M02040C1

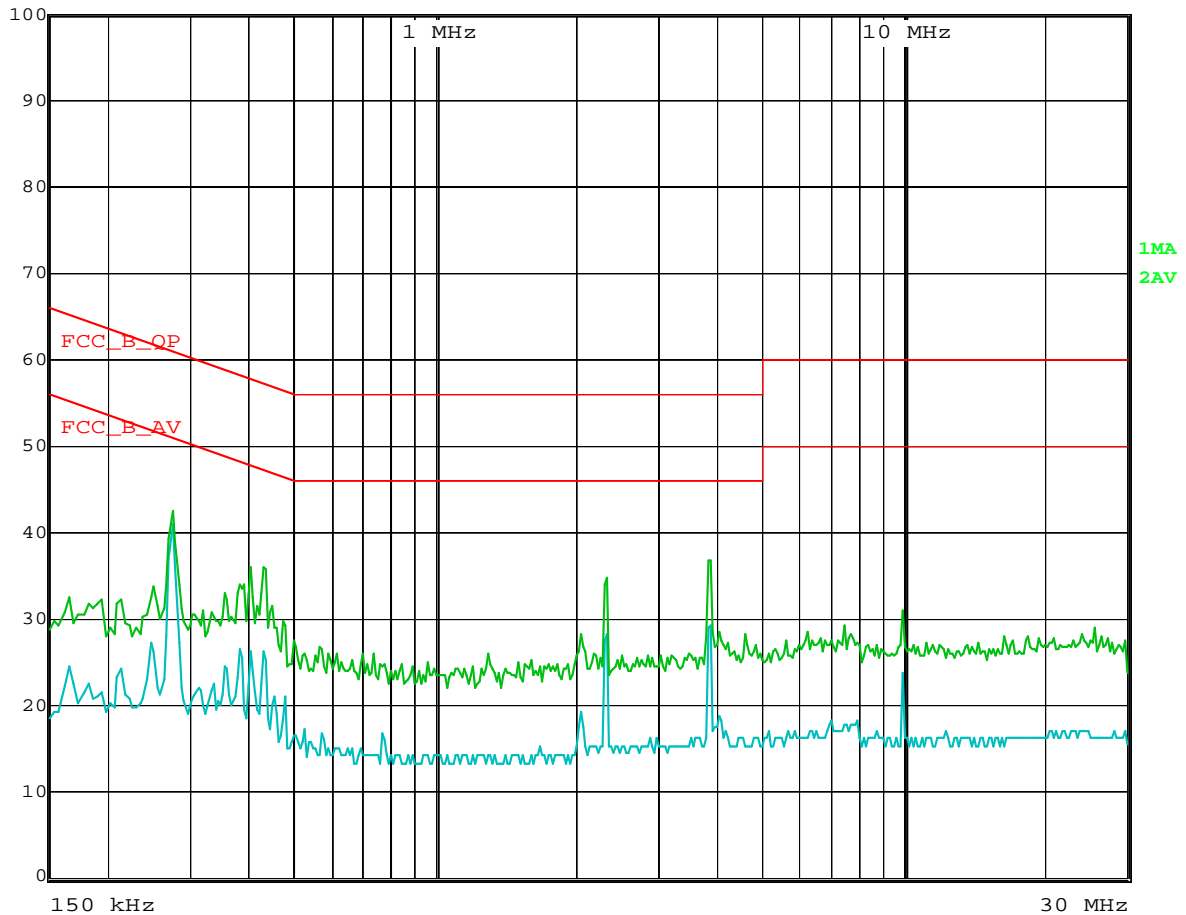
ResBW

9 kHz

Meas T

100 ms Unit

dBµV



Date: 10.SEP.2003 15:31:27

9.4 INTERPRETATION AND REMARKS:

The equipment complies with the §15.107 requirements



## 9.5 RADIATED EMISSIONS MEASUREMENTS

Before final measurements of radiated emissions were made on the open-field three/ten meter range; the EUT was pre-scanned in the semi anechoic at one meter distance. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to insure that maximum emission amplitudes were attained. As Part 24 radiated requirements was tested in conjunction with the Part 15 testing. The spectrum was searched to identify emissions. A complete scan of the applicable spectrum was completed (up to 10<sup>th</sup> harmonic of fundamental). The transmitters were then turned off, with the rest of the equipment powered on. A complete scan of the spectrum was done and referred to as "ambient" without the transmitter keyed on. Emissions emanating from the transmitter were identified from comparing these two scans. The identified emissions (from the transmitter) were measured and the levels recorded with the transmitter keyed on at full rated power output.

Final radiated emissions measurements were made, as outlined in Section 8 of the ANSI C63.4 measurement standard, on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.1 meter above the ground plane. The iBTS was tested to the applicable limits of the FCC rules. The measurement distance between the center of the measurement antenna and the equipment under test is 10 meters (or less for frequencies above 1 GHz). At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. The range of the frequency spectrum to be investigated is specified in FCC Part 15. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

**Since the EUT has a DC and AC versions, pre-scan measurements were performed in both modes to determine which on was the worst case conditions. For this reasons measurements were performed only on 208V ac version ( see pages 20 and 22 for pre-scan data)**

### Summary of settings

ESI 7 EMI TEST RECEIVER IN RECEIVER MODE	
Peak measurement time	5 ms
step size	40 KHz
Preamplifier	ON
Preselector	ON
Resolution, Band With	120 kHz
Final Quasi Peak measurement time	1 s minimum
Final average measurement time	1 second

All readings are quasi-peak unless stated otherwise.



### 9.5.1 Test Set up





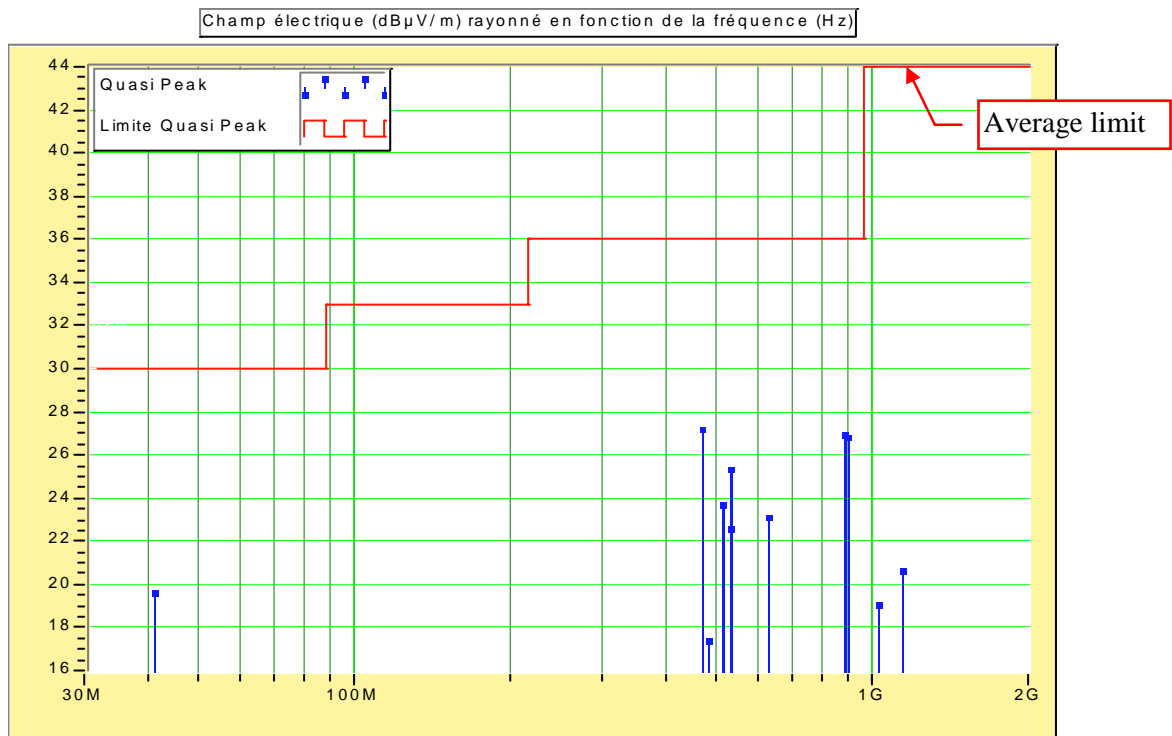
**9.6 RESULTS (§ 15.109 class B):**

The following data table lists the most significant emission frequencies, measured level, correction factor (includes cable and antenna corrections), corrected reading and the limit. The highest peaks are measured in quasi-peak detection mode at 10 meters distance, except for emissions radiated above 1 GHz where an average detector with 1 MHz resolution bandwidth was used.

**Results**

F (MHz)	PK (dBµV/m)	QP (dBµV/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact (dB)	RBW (kHz)	Comments
40,918	28,22	19,65	-10,35	V	104	64	13,56	120	
468,018	30,62	27,22	-9,78	V	239	323	20,49		
483,379	22,32	17,38	-19,62	V	104	352	20,78		
511,183	27,05	23,70	-13,30	V	250	329	21,27		
530,833	28,13	25,33	-11,67	V	103	353	21,57		
533,332	26,28	22,55	-14,45	V	249	345	21,61		
629,148	26,45	23,11	-13,89	V	104	6	22,78		
884,744	30,61	26,92	-10,08	V	232	7	24,69		
894,585	29,66	26,83	-9,17	V	241	356	24,69		

F (MHz)	PK (dBµV/m)	Average (dBµV/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact (dB)	RBW (kHz)	Comments
1022,371	30,74	19,06	-25,74	V	224	328	26,79	1 MHz	Average
1142,407	32,70	20,61	-27,22	V	208	353	27,67		





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For indicative level

F (MHz)	PK	QP	Pol	H (cm)	A (degrees)	Corr. fact (dB)	RBW (kHz)	Comments
	(dB $\mu$ V/m)							
1960.000	61	59	V	103	221	32.66	1000	transmitter

**Only two spurious signals were found at 1022,371 and 1142,407 MHz with an attenuation greater than – 25dB. No other spurious signal found between 1.2 GHZ and 20 GHZ**

**9.7 INTERPRETATION AND REMARKS:**

The equipment complies with the §15.109 requirements
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Identification : 149027DK

### 9.8 PRE-SCAN MEASUREMENT TO IDENTIFY SPURIOUS EMISSIONS FROM EUT at D = 1m WHEN EUT IS – 48V dc powered:

F (MHz)	PK (dB $\mu$ V/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact. (dB)	Comments
30,05	10,11	-29,89	H	100	90	16,77	
30,75	10,99	-29,01	H	100	0	16,5	
36,297	15,38	-24,62	V	100	90	14,34	
40,894	12,51	-27,49	V	100	90	12,56	
42,493	10,65	-29,35	V	100	90	11,94	
127,848	17,59	-25,41	H	100	0	13,46	
157,282	21,29	-21,71	V	100	0	12,58	
200,059	15,48	-27,52	V	100	0	11,09	
235,94	18,29	-27,71	V	100	0	13,44	
400,003	19,72	-26,28	H	100	90	19,2	
404,301	16,52	-29,48	H	100	90	19,26	
438,232	16,15	-29,85	H	100	90	19,71	
450,526	16,31	-29,69	V	100	0	19,88	
476,562	16,66	-29,34	H	100	90	20,23	
502,298	17,01	-28,99	V	100	90	20,57	
502,548	17,84	-28,16	H	100	90	20,57	
502,898	17,84	-28,16	V	100	0	20,58	
511,194	26,07	-19,93	H	100	0	20,69	
577,758	18,04	-27,96	H	100	90	21,61	
600,896	19,19	-26,81	H	100	0	21,94	
618,436	18,85	-27,15	V	100	0	22,51	
626,682	19,12	-26,88	H	100	90	22,78	
628,231	19,17	-26,83	V	100	90	22,83	
629,081	20,78	-25,22	V	100	0	22,86	
647,621	21,47	-24,53	V	100	0	23,47	
652,968	20,1	-25,90	V	100	90	23,64	
670,708	20,79	-25,21	H	100	90	24,22	
675,356	20,96	-25,04	V	100	0	24,37	
690,098	22,25	-23,75	V	100	90	24,86	
692,097	21,47	-24,53	H	100	90	24,92	
701,492	21,63	-24,37	V	100	90	25,17	
702,991	21,64	-24,36	V	100	0	25,16	
705,09	22,48	-23,52	V	100	90	25,15	
707,839	23,24	-22,76	H	100	0	25,13	
712,486	21,65	-24,35	V	100	0	25,1	
732,276	22,31	-23,69	V	100	0	24,97	
736,374	22,27	-23,73	V	100	90	24,95	
766,807	27,99	-18,01	V	100	90	24,75	
786,847	22,6	-23,40	H	100	90	24,62	
808,235	22,54	-23,46	H	100	90	24,56	
854,61	21,75	-24,25	H	100	90	24,69	
876,299	21,82	-24,18	H	100	90	24,75	
894,589	27,18	-18,82	V	100	0	24,8	
923,724	23,47	-22,53	V	100	90	25,59	
952,958	24,6	-21,40	V	100	0	26,56	
1002,382	24,58	-29,42	V	100	90	28,12	
1027,868	28,24	-25,76	H	100	90	28,2	
1047,358	27,62	-26,38	H	100	90	28,26	
1063,749	28,78	-25,22	H	100	90	28,31	



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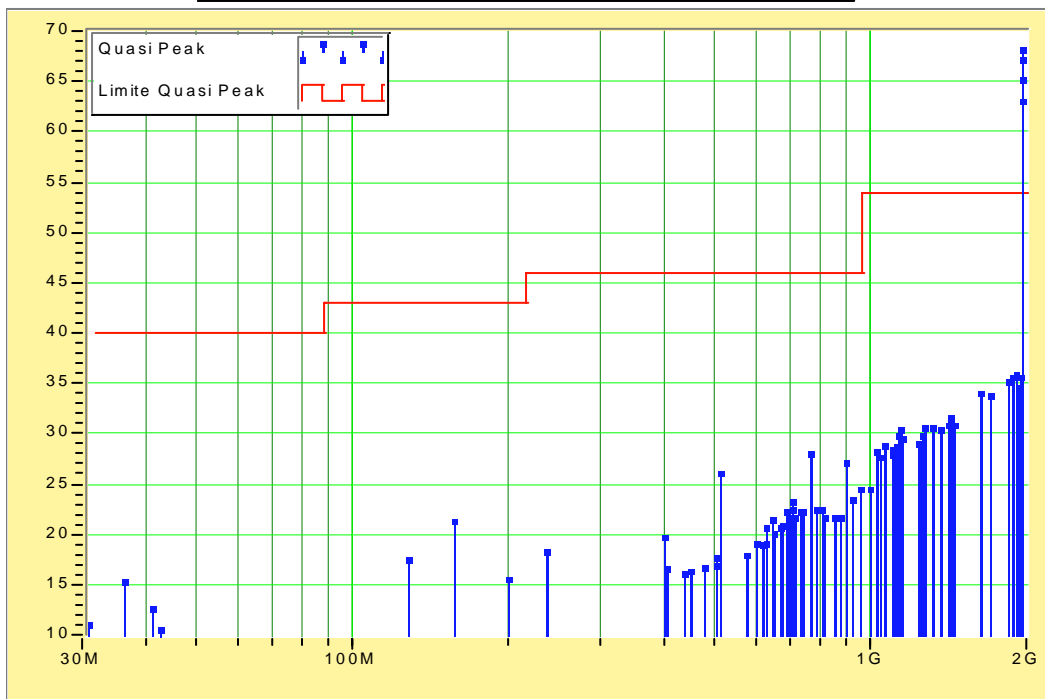
Written by : O. ROY

September 11, 2003

Identification : 149027DK

F (MHz)	PK (dBµV/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact. (dB)	Comments
1101,079	28,39	-25,61	V	100	0	28,44	
1101,679	27,8	-26,20	H	100	0	28,45	
1111,574	28,53	-25,47	H	100	90	28,58	
1117,42	28,61	-25,39	V	100	0	28,65	
1131,813	29,88	-24,12	H	100	90	28,84	
1139,459	30,48	-23,52	V	100	90	28,94	
1147,354	29,56	-24,44	H	100	90	29,05	
1242,254	29,02	-24,98	H	100	90	30,29	
1249,95	29,12	-24,88	H	100	90	30,39	
1254,697	29,82	-24,18	H	100	90	30,46	
1266,341	30,58	-23,42	H	100	90	30,61	
1321,362	30,66	-23,34	V	100	0	31,29	
1360,541	30,46	-23,54	H	100	90	31,73	
1411,963	30,95	-23,05	V	100	90	32,2	
1421,708	31,61	-22,39	V	100	90	32,21	
1431,153	30,97	-23,03	V	100	0	32,22	
1444,346	30,96	-23,04	V	100	90	32,24	
1447,295	30,95	-23,05	V	100	0	32,24	
1622,701	34,13	-19,87	V	100	90	33,57	
1708,955	33,81	-20,19	H	100	90	33,83	
1839,686	35,27	-18,73	V	100	90	35,29	
1873,967	35,64	-18,36	H	100	90	35,65	
1905,55	35,91	-18,09	H	100	0	35,88	
1926,839	34,61	-19,39	V	100	90	35,68	
1947,078	35,72	-18,28	V	100	90	35,49	
1958,422	68,26	14,26	V	100	90	35,39	
1958,672	62,98	8,98	H	100	0	35,39	
1959,522	65,3	11,30	H	100	90	35,38	
1961,57	67,22	13,22	V	100	0	35,36	
854,61	21,75	-24,25	H	100	90	24,69	Transmitter
876,299	21,82	-24,18	H	100	90	24,75	

Ciramp électrique (dBµV/m) rayonné en fonction de la fréquence (Hz)





## EMC TEST REPORT

The 26 pages of this report are not sharable

FCC registration # 90469

Written by : O. ROY

September 11, 2003

Identification : 149027DK

**9.9 PRE-SCAN MEASUREMENT TO IDENTIFY SPURIOUS EMISSIONS FROM EUT  
at D = 1m WHEN EUT IS 208Vac powered:**

F (MHz)	PK (dB $\mu$ V/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact. (dB)	Comments
31,644	21.18	V	100	90	17.88	31,644	
35,249	11.77	V	100	90	16.25	35,249	
40,132	19.29	V	100	90	13.91	40,132	
48,901	10.28	V	100	90	10.34	48,901	
61,756	10.49	V	100	90	6.97	61,756	
127,848	17.89	V	100	90	13.49	127,848	
432,585	16.30	V	100	90	19.83	432,585	
440,081	16.45	V	100	90	19.97	440,081	
442,080	16.48	H	100	90	20.01	442,080	
459,021	16.80	H	100	90	20.32	459,021	
465,518	16.92	H	100	90	20.45	465,518	
468,067	18.55	H	100	90	20.49	468,067	
470,965	17.01	H	100	90	20.55	470,965	
471,765	17.03	V	100	90	20.56	471,765	
471,914	18.61	H	100	90	20.56	471,914	
473,264	17.06	H	100	90	20.59	473,264	
473,614	17.06	H	100	90	20.60	473,614	
475,762	16.18	V	100	90	20.64	475,762	
476,312	16.19	V	100	90	20.65	476,312	
478,861	16.24	H	100	90	20.69	478,861	
479,560	16.25	V	100	90	20.71	479,560	
480,810	16.27	V	100	90	20.73	480,810	
483,408	18.06	H	100	90	20.78	483,408	
484,258	16.33	V	100	90	20.80	484,258	
491,454	16.46	H	100	90	20.93	491,454	
495,302	17.44	V	100	90	21.00	495,302	
497,151	18.30	H	100	90	21.04	497,151	
500,249	17.53	V	100	90	21.09	500,249	
501,399	19.13	H	100	90	21.11	501,399	
511,194	34.86	H	100	90	21.27	511,194	
571,361	18.66	V	100	90	22.21	571,361	
578,957	18.78	V	100	90	22.33	578,957	
581,306	18.82	V	100	90	22.37	581,306	
600,046	19.92	V	100	90	22.66	600,046	
621,735	19.24	H	100	90	22.75	621,735	
624,133	19.25	V	100	90	22.76	624,133	
650,769	19.30	V	100	90	22.87	650,769	
651,019	19.30	H	100	90	22.87	651,019	
653,668	19.31	V	100	90	22.89	653,668	
662,563	19.32	V	100	90	22.92	662,563	
673,657	20.18	H	100	90	22.97	673,657	
677,105	19.36	V	100	90	22.98	677,105	
691,797	19.44	H	100	90	23.05	691,797	
694,496	22.39	V	100	90	23.06	694,496	
697,044	19.49	V	100	90	23.07	697,044	
698,094	19.50	V	100	90	23.07	698,094	
699,293	19.51	V	100	90	23.08	699,293	
702,342	19.54	H	100	90	23.12	702,342	
702,891	18.63	V	100	90	23.13	702,891	



EMC TEST REPORT

The 26 pages of this report are not sharable

FCC registration # 90469

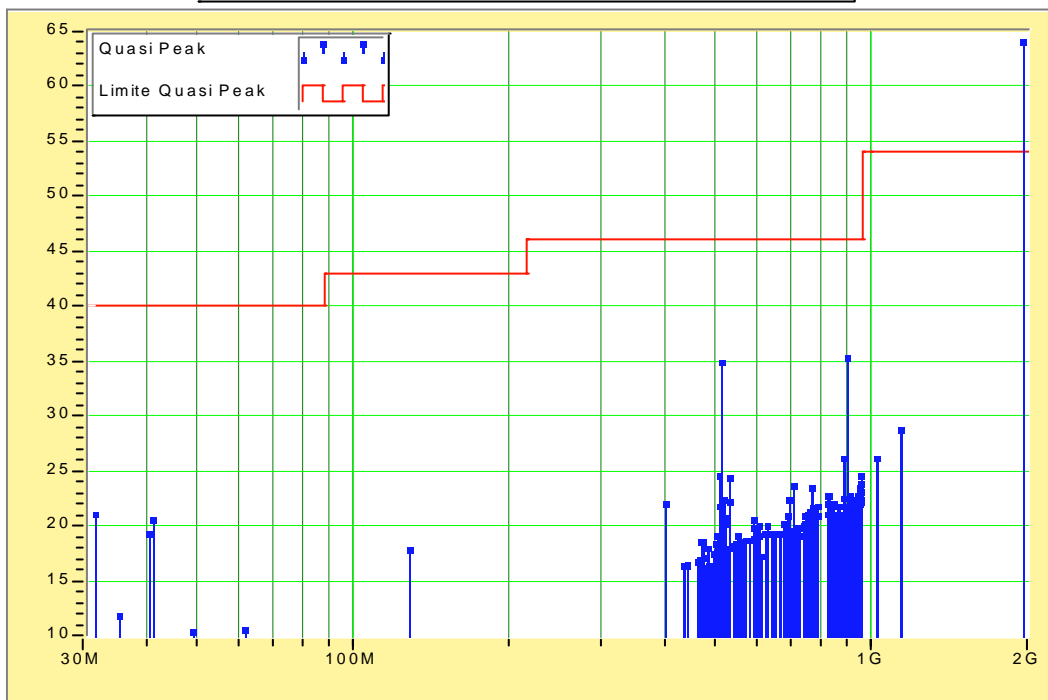
Written by : O. ROY

September 11, 2003

Identification : 149027DK

F (MHz)	PK (dBµV/m)	Margin (dB)	Pol	H (cm)	Angle (degrees)	Corr. Fact. (dB)	Comments
705,040	19,57	V		9	23,16	705,040	
705,790	19,58	V		9	23,17	705,790	
707,789	23,68	V		9	23,20	707,789	
735,974	19,13	H		9	23,65	735,974	
766,807	23,54	V		9	24,14	766,807	
785,397	21,76	V		9	24,43	785,397	
820,579	22,01	H		9	24,67	820,579	
852,412	21,10	V		9	24,68	852,412	
877,498	21,03	V		9	24,68	877,498	
894,589	35,40	V		9	24,69	894,589	
921,425	22,29	H		9	25,12	921,425	
924,223	22,35	V		9	25,17	924,223	
924,473	22,35	H		9	25,18	924,473	
925,173	21,54	V		9	25,19	925,173	
928,971	21,62	H		9	25,27	928,971	
931,519	21,68	H		9	25,32	931,519	
935,517	21,77	V		9	25,40	935,517	
936,917	22,63	H		9	25,42	936,917	
942,414	22,76	V		9	25,53	942,414	
943,763	23,55	H		9	25,56	943,763	
944,662	22,82	V		9	25,58	944,662	
947,711	22,89	H		9	25,64	947,711	
948,510	22,08	H		9	25,66	948,510	
951,959	22,17	V		9	25,72	951,959	
955,906	23,84	V		9	25,80	955,906	
958,005	22,31	V		9	25,84	958,005	
958,855	24,61	H		9	25,86	958,855	
1022,371	26,21	H		9	26,79	1022,371	
1142,407	28,73	H		9	27,67	1142,407	
1959,522	64,08	H		9	34,15	1959,522	Transmitter

Champ électrique (dBµV/m) rayonné en fonction de la fréquence (Hz)



## 10 TEST ACCORDING TO CFR 47 Part 24 subpart E

Tests performed by Daniel RAUD at GYL Technologies laboratories on September 9 and 10, 2003.

### 10.1 REFERENCE DOCUMENTATION:

CFR 47 part 24 subpart E (§ 24.238) of 2000

### 10.2 RADIATED DISTURBANCE:

#### 10.2.1 General measurement conditions.

Conforms to Section 8 of the ANSI C63.4 measurement standard.

Diagram in 0° position, angles are positives in the reverse clock wise.

#### Equipment under test set up:



#### 10.2.2 Method of measurement.

Measurements are done at 10m in an open area test site and maximum at all frequencies is analyzed by moving the product orientation and antenna polarization. The height of the antenna can vary from 1 m to 4 m Since no emission were detected above 1 GHZ a less than 30 cm scan was performed

Measurements are done in transmitter mode (the transmitter is at 30Watts maximum power)



**10.2.3 RESULTS (§24.238):**

Measurement at transmitters' frequencies **for indicative level**  
Transmitters output connected to resistive 50 ohms loads

FREQUENCY (MHz)	Measure (dBµV)	AF A	Loss cable B	Correc. Factor A+B	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1 960.0	37.1	27.9	2	29.9	67	93.9	-26.9

**10.2.4 Spurious emissions measurement (peak values) at D=1m**

The measurement instrumentation has a resolution bandwidth of 10 kHz up to 10 MHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100 kHz was used. Outside this bandwidth, all emissions shall be attenuated at least 26 dB below the transmitter power.

Only two spurious emissions in horizontal polarization found which level upper to noise level in 1 MHz bandwidth (harmonics transmitters' frequencies under noise level)

FREQUENCY (MHz)	Measure (dBµV)	AF A	Loss cable B	Correc. Factor A+B	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1022,371	noisefloor	27.9	2	29.9	noisefloor	93.9	> -60dB
1142,407	noisefloor	27.9	2	29.9	noisefloor	93.9	

**10.3 INTERPRETATION AND REMARKS:**

The equipment complies with the §24.238 requirements
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Spectrum of noise level from 1GHz to 20GHz including cables loss and antenna factors

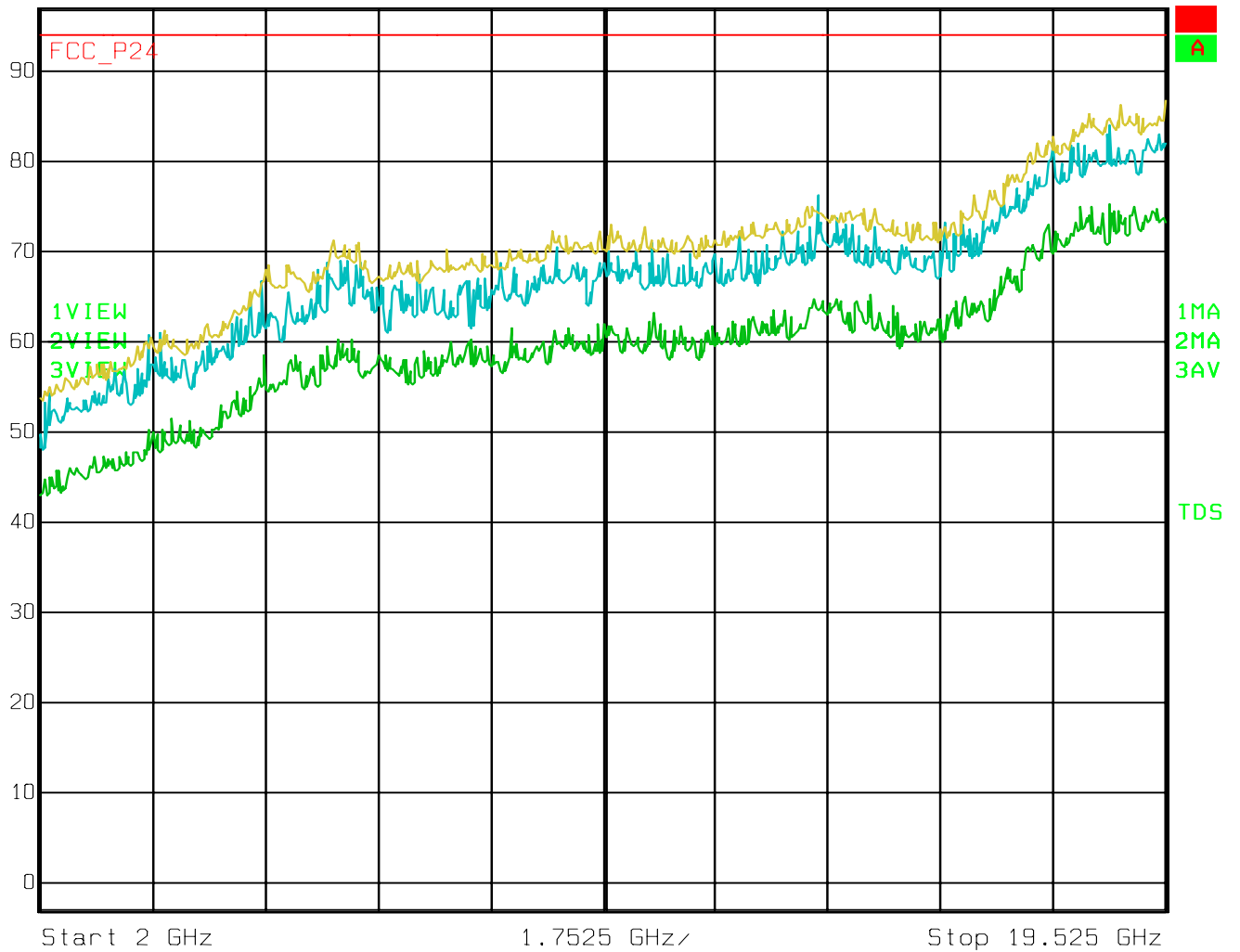
**Legend:**

Yellow curve represents the peak measurement in max hold mode

Blue curve represents the peak measurement in sweeping mode

Green curve represents the average measurements

	RBW	1 MHz	RF Att	0 dB
Ref Lvl	VBW	1 MHz		
97 dB $\mu$ V	SWT	100 ms	Unit	dB $\mu$ V





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## **UMTS 1900 Mono iBTS: EMC test plan**

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**Reference:** PLN-T-030459-6G1

**Version:** A

**Status:** Approved

**Date:** 09/07/2003

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**Product Name:** UMTS 1900 Mono iBTS

**Frequency:** UMTS-1900

**Discipline:** EMC

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**Author:** Marc CANCOUËT

**Verified by:** Patrick GALOPIN

**Approved by:** Christian CHANSARD

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UMTS 1900 Mono iBTS: EMC test plan

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## PUBLICATION HISTORY

VERSION	DATE	AUTHOR	MODIFICATION
A	06/08/2003	M. CANCOUËT	Creation of the document

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UMTS 1900 Mono iBTS: EMC test plan

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**UMTS 1900 Mono iBTS: EMC test plan**

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# 1. INTRODUCTION

The purpose of this document is to present the plan for the EMC qualification of the UMTS 1900 Mono iBTS used for the US Market. The conformity with the test program presented below will be used to demonstrate the compliance of the UMTS 1900 Mono iBTS with the Electromagnetic Compatibility applicable standard.

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

This document applies to:

<i>Product:</i>	UMTS 1900 Mono iBTS
<i>Manufacturer:</i>	NORTEL NETWORKS
<i>Frequencies:</i>	1930 – 1990 MHz
<i>Configuration:</i>	OTOR1
<i>Option:</i>	PCM lightening protection kit External alarm module DC box

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**UMTS 1900 Mono iBTS: EMC test plan**


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**2. RELATED DOCUMENTS****2.1. APPLICABLES DOCUMENTS**

[A1]	47CFR Part 2	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations - Frequency allocations and radio treaty matters; general rules and regulations - dated 10/1/01
[A2]	47 CFR Part 15	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations - Radio frequency devices - dated 10/1/01
[A3]	47 CFR Part 24	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations - Personal communications services - dated 10/1/01
[A4]	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

**2.2. REFERENCE DOCUMENTS**

[R1]	UMT/BTS/DD/0017	E-Mobility iBTS Platform / UMTS Product Specification
[R2]	UMT/COM/DD/001	UMTS Product Overview
[R3]	UMT/DCL/DD/002	iBTS Reference Manual
[R4]	UMT/BTS/DD/453	Requirements specification for a Mono cabled cabinet
[R5]	UMT/BTS/DD/552	Mono iBTS Modular Structure
[R6]	UMT/BTS/DD/453	Requirements specification for a Mono cabled cabinet

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**UMTS 1900 Mono iBTS: EMC test plan**

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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 Networks during the commissioning & acceptance phase form for UMTS 1900 Mono iBTS.

#### **3.2. LIST OF KITS & CABLES**

##### **3.2.1 LIST OF KITS**

In fact, protections modules are optional but can be used to protect the PCM links & the Alarms links. These modules are made only with passive components and then are not critical modules for the system.

Kits are the following :

- Kits: PCM lightning protection (NTUM98BA)
- EAM lightning protection (NTUM98AA)

The TMA Kit (NTUM35AA) as ancillary equipments already comply with FCC standard, and is under the responsibility of the OEM supplier.

##### **3.2.2 LIST OF CABLES**

The following ports of the UMTS 1900 Mono iBTS were available and connected:

- lub port (telecom port): cable referenced NTQG41HA 25 meters 100Ω. This cable has been looped in order to transmit TX signals on RX ones.
- Alarms externs ports: cable referenced NTUM41JA 25 meters. 1 cable has been looped and the other cable has been in open circuit.
- Radio port (signal port) : 6 RF cables RADIALL SHF9TD – DC-2GHz – Insertion loss < 5.5 dB at 2 GHz (15 meters). Attenuators and loads have also been used on RF links.
- DC port : Lab cable (about 10 meters).

#### **3.3. SOFTWARE NEEDS FOR IBTS UMTS 1900 MONO IBTS**

As the objective is to perform the FCC marking on the UMTS 1900 Mono iBTS OTOR1, we need to use performance criteria as defined in the EMC applicable standard for UMTS project.

Consequently, for emissions, we have to configure the equipment with the power amplifiers set at their maximum rated level, and looped back the lub link in order to generate activity inside this cable.

If one of the above functionality is not available for the testing phase, we will not be able to perform the FCC marking based on the tests realized.



UMTS 1900 Mono iBTS: EMC test plan

## 4. TEST PLAN SUMMARY

### 4.1. TESTS MATRIX FOR QUALIFICATION

The following table lists the tests to be done, the severity level to apply, the configuration to test and comment when necessary.

	Test case	Application	Standard	Test requirement	Performance criteria	Comment
	Emission tests					
1	Radiated emissions	Enclosure of iBTS Indoor	FCC Part 15 § 15.109	30MHz – 18 GHz	Class B	<b>This EMC test is realized with the DC box configuration.</b>
2	Radiated emissions	Enclosure of iBTS Indoor	FCC Part 24 § 24.238	30 MHz – 20GHz	The spurious emissions must be attenuated by at least $43 + 10 \text{Log}(P)$ P = Transmitter rated Power in Watts	<b>This EMC test is realized with the DC box configuration.</b>
3	Conducted emissions	AC Power	FCC Part 15	150 kHz – 30 MHz	Class B	<b>This EMC test is realized in AC Power, in two configuration: with &amp; without DC box option</b>

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**UMTS 1900 Mono iBTS: EMC test plan**

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**4.2. TEST DESCRIPTION OF THE RADIATED EMISSION**

**Standard Coverage :** FCC Part 15.109, 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 iBTS 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 iBTS shall be placed on the turntable as per ANSI C63.4 measurement procedures. Please see the Part 15 test plan as Part 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 10<sup>th</sup> 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 et the noise floor levels for each of the transmitter harmonic frequencies and a statement should be placed in the test report indicating that no emissions were detected.

UMTS 1900 Mono iBTS: EMC test plan

The equipment was configured as shown in the next figure.

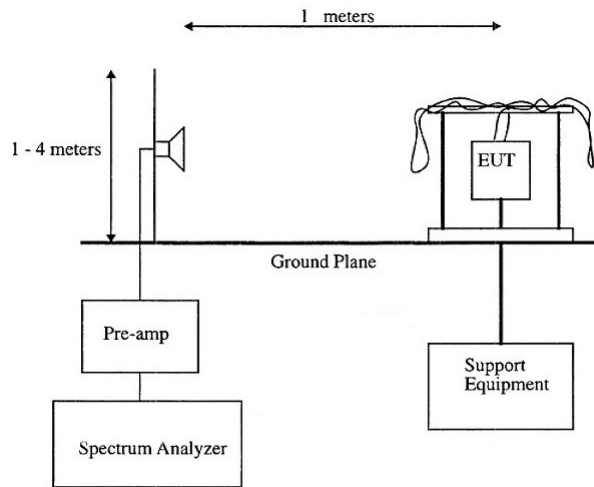


Figure 7 : Test configuration for Radiated Spurious emissions

Limits for radiated emissions from FCC Part 24.

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

Limits for radiated emissions (FCC Part 15 class B)

Frequency range MHz	Distance m	Electric fields	
		μV/m	dBμV/m
30-88	3	100	40
88-216	3	150	43.5
216-960	3	200	46
>960	3	500	54

**UMTS 1900 Mono iBTS: EMC test plan**

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<sub>t</sub> = 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 dBμV/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 dBμV/m – 57.7 dB = 93.9 dBμV/m

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

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**UMTS 1900 Mono iBTS: EMC test plan**

**Pass / Fail criteria :**

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

**Limits for radiated emissions from FCC Part 24.**

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

Limits for radiated emissions (FCC Part 15 class B)

Frequency range MHz	Distance m	Electric fields	
		$\mu$ V/m	dB $\mu$ V/m
30-88	3	100	40
88-216	3	150	43.5
216-960	3	200	46
>960	3	500	54

**4.2.1.1 CONDUCTED EMISSIONS**

Limits for conducted emissions (FCC Part 15 class B)

Frequency range	Quasi-peak	Average
> 0,15-0,5 MHz	66 - 56 dB $\mu$ V	56 - 46 dB $\mu$ V
> 0.5- 5 MHz	56 dB $\mu$ V	46 dB $\mu$ V
> 5-30 MHz	60 dB $\mu$ V	50 dB $\mu$ V
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

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**4.3. IBTS EMISSION TESTS CONFIGURATIONS**

In agreement with the Nortel requirements specification [R1 ], EMC tests will be carried out for North America according to the standard FCC part 15 Class B.

The iBTS UMTS will be configured with the maximum hardware activation in order to simulate the worst case. The hardware configuration will then be equivalent to a O1.

We will have the following number of modules:

- 1 CEM
- 1 TRM
- 1 CCM
- 1 GPSAM
- 1 MCPA
- 1 cDDM

For a functional point of view, the test configuration shall be as close to the normal intended use and the base station shall transmit with the maximum power declared by Nortel with all the transmitters active. So the MCPA have to transmit a UMTS radio signal at the maximum power (30W). The iBTS UMTS Mono will be configured to transmit a radio signal corresponding to test model 1 (according to the 3 GPP standard) on the MCPA.

Following the software, we can activate the RF link as follow:

- TRM output on PA transmitting at 1960 MHz and 44.7dBm

In the same time, some data are looped back on the lub link (external cable with TX and RX looped back together).

The ancillary equipment, as TMA, will be tested separately and have to comply with the TS 25.113 requirements. The iBTS UMTS Mono will not be tested with these ancillary.

All the input/output ports will be connected to representative cables and load. The nominal external cables shall be supplied to Sanmina EMC team before the tests.

Internal protection module is optional but can be used to protect the Alarm links. This module is made only with passive components and then is not critical modules for the system.

This optional module will be used in the system for the tests.

Another internal protection module is optional but can be used to protect the PCM links. This module is made only with passive components and then is not critical modules for the system.

This optional module will not be used in the system for the emission tests.

The power of the Mono iBTS is carried out in 2 ways, either one in 230 V ac only, or the other in 230 V ac and -48 V dc.

**5. CONCLUSION**

The tests presented in this document, if compliant with the EMC standard, will allow determining the compliance of the UMTS 1900 Mono iBTS with the FCC standards.

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## 6. ABBREVIATIONS AND DEFINITIONS

### 6.1. ABBREVIATIONS

The following abbreviations are relevant to this document.

Abbreviation	Explanation
3GPP	Third Generation Partnership Project
3- $\phi$	Three Phase
A	Ampere
AC	Alternating Current
AMN	Artificial Mains Network
ATM	Asynchronous Transfer Mode
BIP	Breaker Interface Panel
BLER	Block Error Ratio
BS	Base Station
BTS	Base station Transceiver System
CB	Circuit Breaker
CCM	Core Control Module
CE	Compliance Europe
CEM	Channel Element Module
CPICH	Common Pilot Channel
CPC	Common Product Code
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
dB	Decibel
dBm	Power unit (in Decibels) referenced to 1 mW
dB $\mu$ V	Voltage unit (in Decibels) referenced to 1 $\mu$ V
dB $\mu$ V/m	Field Strength unit (in Decibels) referenced to 1 $\mu$ V/m.
DC	Direct Current
DDM	Dual Duplexer Module
DPCH	Dedicated Physical Channel
EFT	Electrical Fast Transients
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EN	European Norms
ESD	Electrostatic Discharge
EUT	Equipment Under Test
f	Frequency
fc	Chip frequency in IS-95 standard. fc = 1.2288MHz
FCC	Federal Communications Commission
FDD	Frequency Division Duplexing
GHz	Gigahertz
GPS	Global Positioning System
GPSAM	Global Positioning System Alarm Module
HSSL	High Speed Serial Links
HW	Hardware (also H/W)
Hz	Hertz
iaw	In Accordance With
iBTS	Internet Base station Transceiver System
IEC	International Electrotechnical Commission

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I/O	Input/Output
ITU	International Telecommunications Union
kHz	Kilohertz
kV	Kilovolt
LISN	Line Impedance Stabilization Network
m	Meter
MCPA	Multichannel Power Amplifier (also PA).
MHz	Megahertz
mm	Millimeter
mW	Milliwatt
N/A	Not Applicable
OEM	Original Equipment Manufacturer
PA	Power Amplifier
PCB	Printed Circuit Board
PCCPCH	Primary Common Control Physical Channel
PEC	Procurement Engineering Code
PFM	Power Filter Module
PI	Product Integrity
PICH	Page Indication Channel
PP and G	Power Protection and Ground
RF	Radio Frequency
R&TTE	Radio and Telecommunications Equipment
SF	Spreading Factor
STSR3D	Sector Transmit Sector Receive
TBT	Test Bench Tools
TDD	Time Division Duplexing
TMA	Tower Masthead Antenna
TRM	Transmit Receive Module
ULC	Unlimited Liability Corporation
UMTS	Universal Mobile Telecommunications System
$\mu$ V	Microvolts
V	Volts
VAC	Volts AC
VDC	Volts DC
W	Watt



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**6.2. DEFINITIONS**

The following are definitions of terms used throughout this test plan.

*Ancillary Equipment* - Equipment (apparatus), used in connection with a receiver, transmitter or transceiver is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a receiver, transmitter or transceiver to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a receiver, transmitter or transceiver; and
- the receiver, transmitter or transceiver to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

*Base Station Equipment* - Radio and/or ancillary equipment intended for operation at a fixed location and powered directly or indirectly (e.g. via an AC/DC converter or power supply) by AC mains network, or an extended local DC mains network.

*BLER* - BLER is block error ratio. The BLER calculation shall be based on evaluating the CRC on each transport block.

*Continuous phenomena (continuous disturbance)* - Electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects (IEC 60050-161).

*Radio communications equipment* - Telecommunications equipment, which includes one or more transmitters and/or receivers and/or parts thereof for use in a fixed, mobile or portable application. It can be operated with ancillary equipment but if so, is not dependent on it for basic functionality.

*Port* - A particular interface, of the specified equipment (apparatus), with the electromagnetic environment. For example, any connection point on equipment intended for connection of cables to or from that equipment is considered as a port (see Figure 2-1).

*Signal and control* - Port which carries information or control signals, excluding antenna ports.

*Spurious Emission* – Emissions on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of band emissions.

*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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*Telecommunication port* - Ports, which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks), local area networks (e.g. Ethernet, Token Ring) and similar networks.

*Transient phenomena* - Pertaining to or designating a phenomena or a quantity, which varies between two consecutive steady states during a time interval short, compared with the time-scale of interest (IEC 60050-161).

fc -Chip frequency in IS-95 standard.  $f_c = 1.2288\text{MHz}$

NodeB - A logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment.

Iub - Interface between a Node B and an RNC.

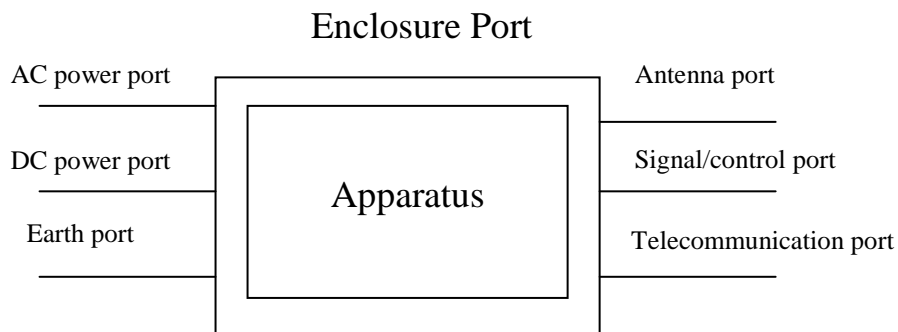


Figure 1: Examples of Ports.

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