





TEST REPORT

CFR 47 Part 15
CFR 47 Part 24
and
ICES 003, RSS 133

GSM 18000 Outdoor BTS (Base & Extension cabinet)

N°151013DK

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EMC TEST REPORT
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Written by : F.NOURRY

11 October 2004

Identification : 151013DK

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Applicant:

S.A. GROLLEAU FLEXTRONICS
49310 MONTILLIERS
FRANCE

Product description**GSM 18000 Outdoor BTS (Base & Extension cabinet)****Manufacturer :**

NORTEL NETWORKS
38, rue Paul Cézanne
78928 Guyancourt - Yvelines

Responsible of the equipment:

Patrick GALOPIN

Product type:

GSM 18000 Outdoor BTS in S666_666 configuration configured in 1900MHz
(base and extension cabinet)

Reference.:

Item definition	Designation	Comments
Base :	NTT915AAP1	S/N: NNTMGT00124C
Extension :	NTT915AAP1	S/N: NNTMGT0012x0/303435
Manual:	none	
Power supply:	208V/60Hz,	tested at 208 V 60 Hz. biphasé
FCC ID :	AB6BTS18000	
FCC Emission designator:	300KGXW	
Operating Frequency Range:	1930.2 to 1989.8 MHz	

PRODUCT PICTURE:

Base cabinet
Front view



Rear view base cabinet



Mechanical cabinet is the same for Extension part.



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PRODUCT COMPOSITION:

For base cabinet :

See Nortel document referenced PE/BTS/DJD/011043 Issue 06.01/EN of 09 August 2004.

For Extension cabinet :

See Nortel document referenced PE/BTS/DJD/011043 Issue 07.01/EN of 09 August 2004

UTILISATION:

Base Transceiver Station

General test conditions**AUXILIARY EQUIPMENT:**

Attenuators and 50 ohms load

WORKING MODE FOR EMISSION TEST

Measurements are done in transmitter mode (all Radio modules at maximum power, 44 dBm output amplifier of Radiomodule, in BCCH mode without frequency hopping), and in receiver mode

Channels configuration for the test:

RM#	Base cabinet			Extension cabinet		
	TDMA#	CHANNEL#	FREQUENCY (MHz)	TDMA#	CHANNEL #	FREQUENCY (MHz)
0	0	512	1930.2	0	525	1932.8
	1	512	1930.2	1	525	1932.8
	2	512	1930.2	2	525	1932.8
1	0	610	1949.8	0	550	1937.8
	1	610	1949.8	1	550	1937.8
	2	610	1949.8	2	550	1937.8
2	0	660	1959.8	0	630	1953.8
	1	660	1959.8	1	630	1953.8
	2	660	1959.8	2	630	1953.8
3	0	720	1971.8	0	750	1977.8
	1	720	1971.8	1	750	1977.8
	2	720	1971.8	2	750	1977.8
4	0	770	1981.8	0	765	1980.8
	1	770	1981.8	1	765	1980.8
	2	770	1981.8	2	765	1980.8
5	0	810	1989.8	0	795	1986.8
	1	810	1989.8	1	795	1986.8
	2	810	1989.8	2	795	1986.8



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Reference standards choice

The product is information technology equipment.

For North America deployment the applicable product standard for the EMC and Radio aspects are the CFR 47 part 15 subpart C for EMC conducted and radiated emissions and the CFR 47 part 24 subpart E for radio spurious emissions.

For CANADA deployment the applicable product standard for EMC are the ICES 003 and RSS 133 for conducted and radiated emissions.

Note : CFR47 part 15 and part 24 are in agreement with ICES 003 and RSS 133 for conducted and radiated emission.

Interpretation and remarks:

This equipment conforms to limits standards for EMC measurements.

IMPORTANT REMARK :

Substitution method was not performed as there was nor spurious emission did neither emission within the limits detect in prescan as shown by page 17

The EUT Plot on pages 22 show measured noise floor levels detected while testing the GSM 18000 outdoor BTS.



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Test according to CFR 47 Part 15 Class B

Tests performed by Daniel RAUD at GYL Technologies laboratories, in August 16 of 2004.

REFERENCE DOCUMENTATION:

FCC CFR 47 part 15, (2004)
ANSI C63.4 (2001).

CONDUCTED DISTURBANCE AT INPUT POWER ACCESS :

General measurement conditions.

Conforms to ANSI C63.4.

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)

Limit :

Class B of FCC standard regulation CFR 47 part 15 subpart B for conducted emission limit (§15.107 class B device).

Method of measurement.

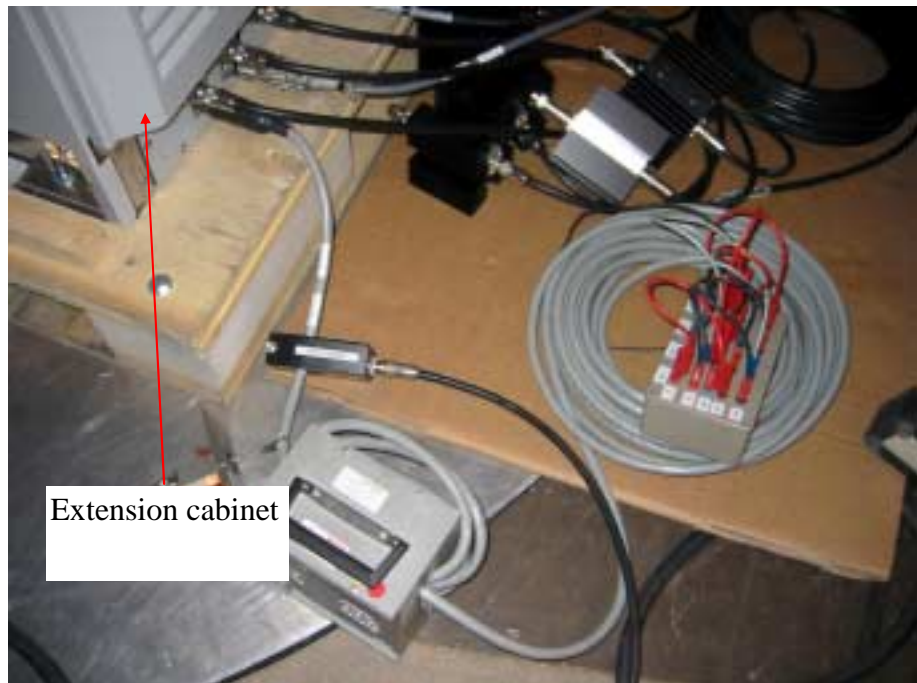
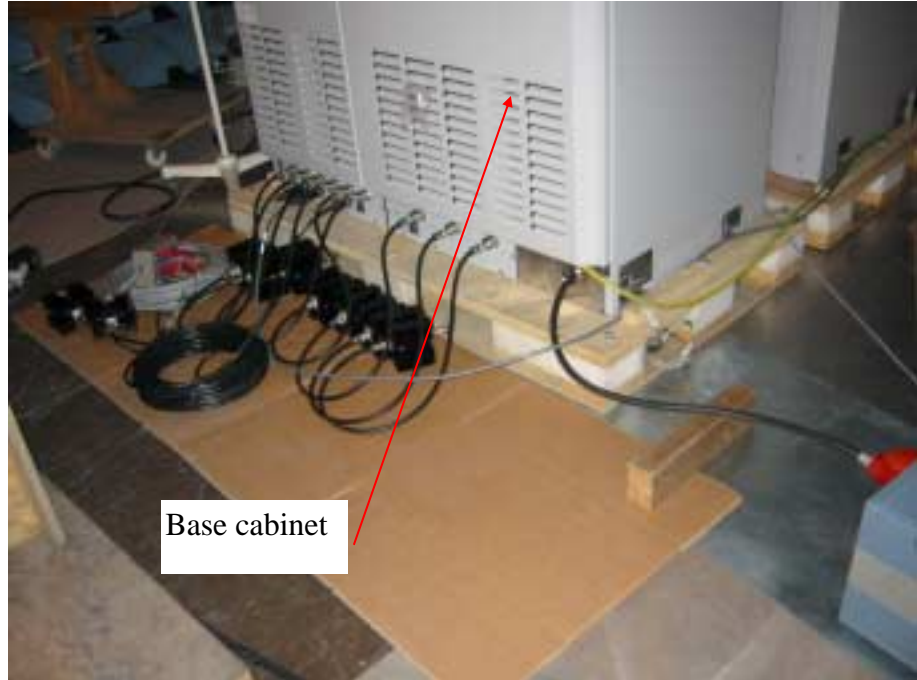
Method of measurement and test installation according to Section 7 of the ANSI C63.4 measurement standard.

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Test equipment used :

APPARATUS	MANUFACTURER	REFERENCE	SERIAL NUMBER	Date of verification
EMI test receiver	Rohde & Schwarz	ESI 7	M02020	Aug-04
LISN (50 μ H / 5/50ohms)	Rohde & Schwarz	ESH2-Z5	871777/031	Nov-03
LISN (50 μ H / 5/50ohms)	Rohde & Schwarz	ESH2-Z5	872094/037	Nov-03

Results for base cabinet:

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, and Live 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 s minimum

Split phase 208V 60Hz

For some measurements, since no peak emissions were detected above average or quasi-peak limits data collection measurement were not performed on the EUT.

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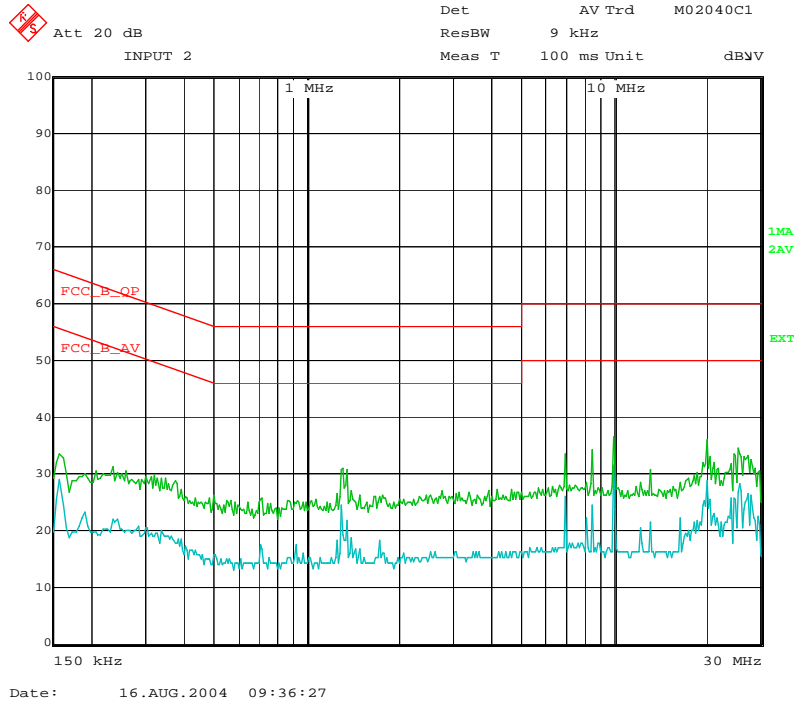
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Legend: Blue curve represents average values
 Green curve represents the peak values

Neutral



Live 1

Frequency (MHz)	Quasi-peak (dBµV)	QP margin (dB)
6,95	41,959885	-18,040115
8,494	40,341759	-19,658241
10,038	40,95137	-19,04863

Frequency (MHz)	Average (dBµV)	Average margin (dB)
1,098	26,228867	-19,771133
1,134	29,354065	-16,645935
6,946	34,558571	-15,441429
8,494	34,362366	-15,637634
10,038	38,453072	-11,546928
19,742	18,631424	-31,368576

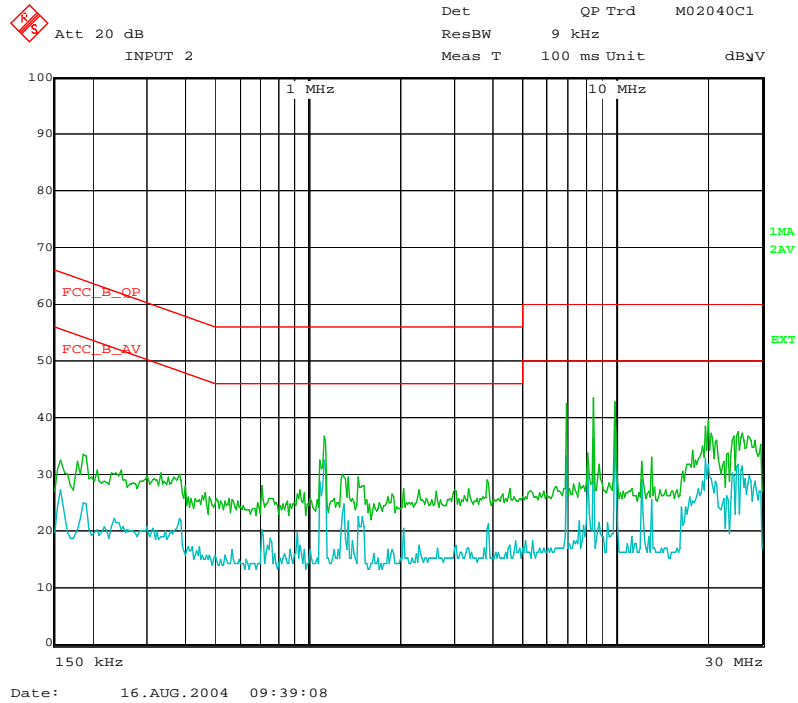


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Live 2

Frequency (MHz)	Quasi-peak (dBµV)	QP margin (dB)
6,95	40,23909	-19,76091
8,494	42,241257	-17,758743
10,038	39,849205	-20,150795

Frequency (MHz)	Average (dBµV)	Average margin (dB)
1,094	28,550201	-17,449799
1,138	30,664528	-15,335472
6,946	34,374771	-15,625229
8,494	35,146194	-14,853806
10,038	37,16716	-12,83284



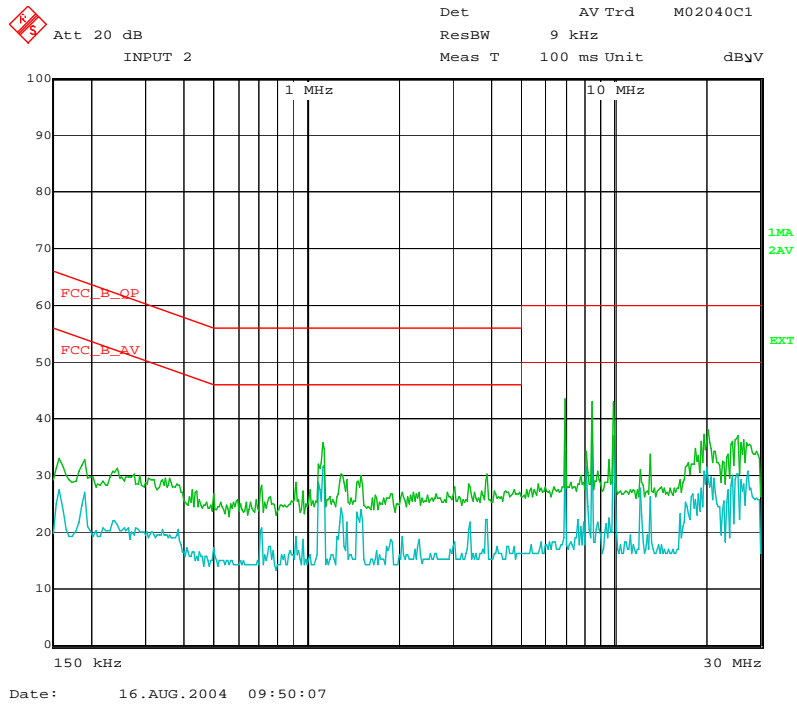
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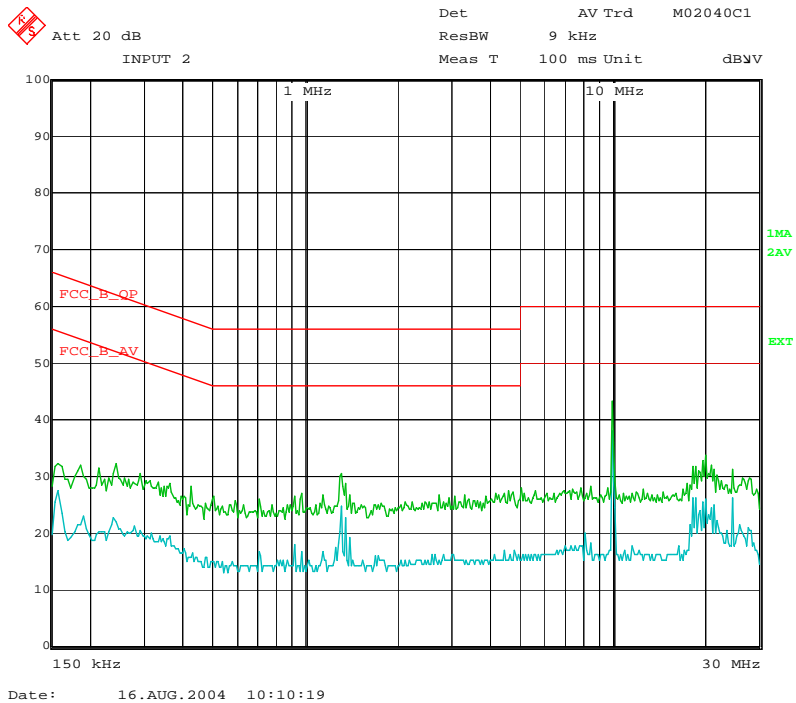
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Results for extension cabinet:

Neutral





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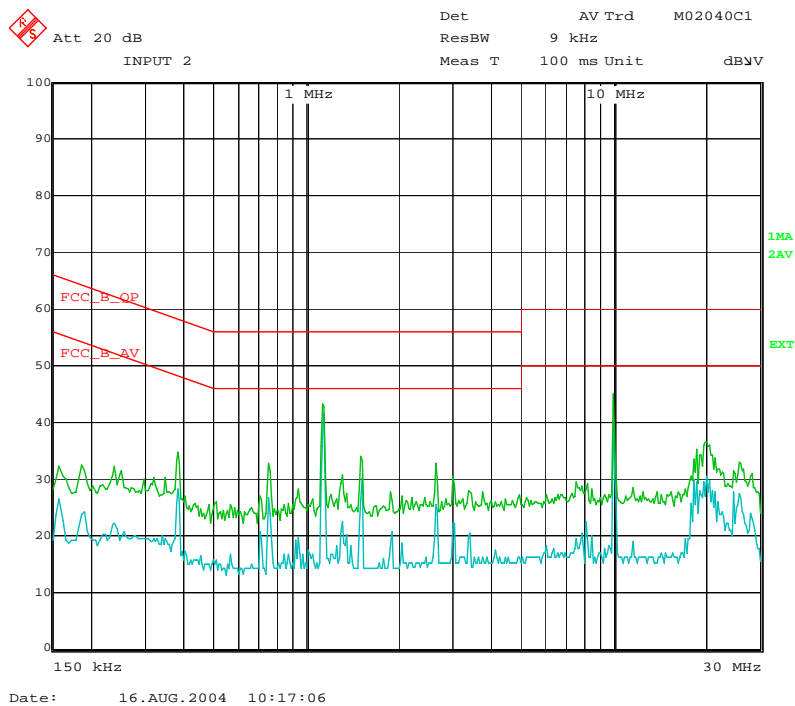
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Live 1

Frequency (MHz)	Quasi-peak (dBμV)	QP margin (dB)
1,13	41,318085	-14,681915
10,038	43,371025	-16,628975

Frequency (MHz)	Average (dBμV)	Average margin (dB)
1,142	41,180916	-4,819084
1,522	29,731476	-16,268524
10,038	39,292923	-10,707077



Live 2

Frequency (MHz)	Quasi-peak (dBμV)	QP margin (dB)
1,13	37,880585	-18,119415
10,038	47,367851	-12,632149

Frequency (MHz)	Average (dBμV)	Average margin (dB)
1,142	37,538483	-8,461517
10,034	42,469704	-7,530296



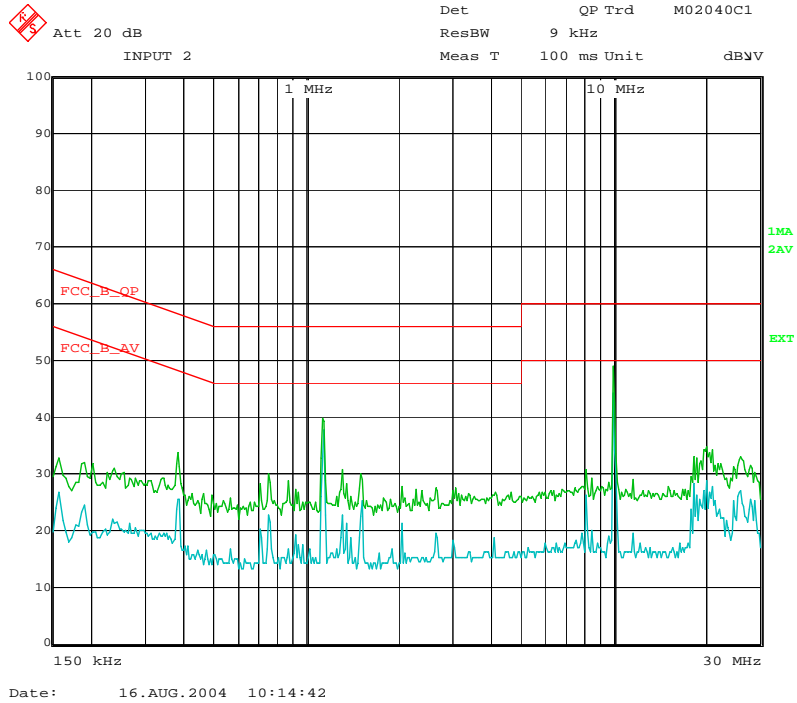
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INTERPRETATION AND REMARKS:

Conform

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RADIATED DISTURBANCE :

Limit :

Class B of FCC standard regulation CFR 47 part 15 subpart B for radiated emission limit (§15.109 class B device) for unintentional radiator and subpart C (§15.209 class B device) for intentional radiator

General measurement conditions.

Conforms to ANSI C63.4.

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

Equipment under test.



Method of measurement.

Method of measurement and test installation according to Section 8 of the ANSI C63.4 measurement standard.

Measurement are done at 10m in a free area.

We try to obtain a maximum at all frequencies by moving the product orientation and antenna polarisation. The height of the antenna can vary from 1 m to 4 m.



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Test equipment used :

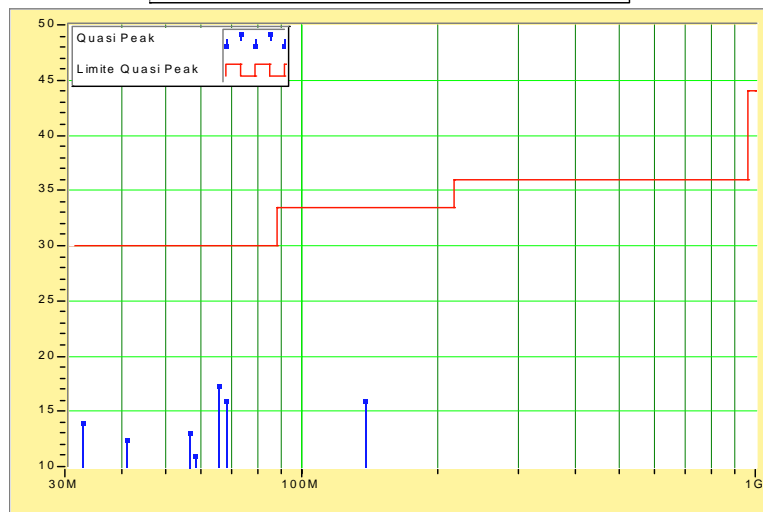
APPARATUS	MANUFACTURER	REFERENCE	SERIAL NUMBER	Date of verification
EMI test receiver	Rohde & Schwarz	ESI 7	M02020	March-04
10 m open area test site			M02093	AUG-04
semi-anechoic 11mx7mx5m	SIDT	SIDT	M02098	JUL-04
10 m measurement Cables kit			M02068	AUG-04
Horn Antenna 1 to 18 GHZ	EMCO	3115	M02045	JUL-04
Antenna Positioning Masts	EMCO	1050	M01101	without
Antenne Bilog	CHASE	6112A CBL	M02032	AUG-04
Turn table controler, Open area	EMCO	1085	M01100	without
Turn table controler	EMCO	1085	M01102	without

Results :

Highest lines table (spurious signals):

Frequency (MHz)	Quasi-peak (dB μ V/m)	Std limit (dB μ V/m)	Margin (dB)	Angle (Deg.)	Site (cm)	Polarisation	Corr Fact.	Comment
32,767	18,99	13,91	-16,09	V	106	27	17,37	
40,964	19,51	12,41	-17,59	V	137	274	13,54	
56,359	22,89	13,06	-16,94	V	100	225	9,24	
57,898	17,09	10,98	-19,02	V	103	197	9,03	
65,626	21,53	17,35	-12,65	V	236	361	7,06	
67,938	18,24	15,96	-14,04	V	221	4	7,12	
137,493	19,59	15,92	-17,58	V	100	47	13,51	

Champ électrique (dB μ V/m) rayonné en fonction de la fréquence (Hz)



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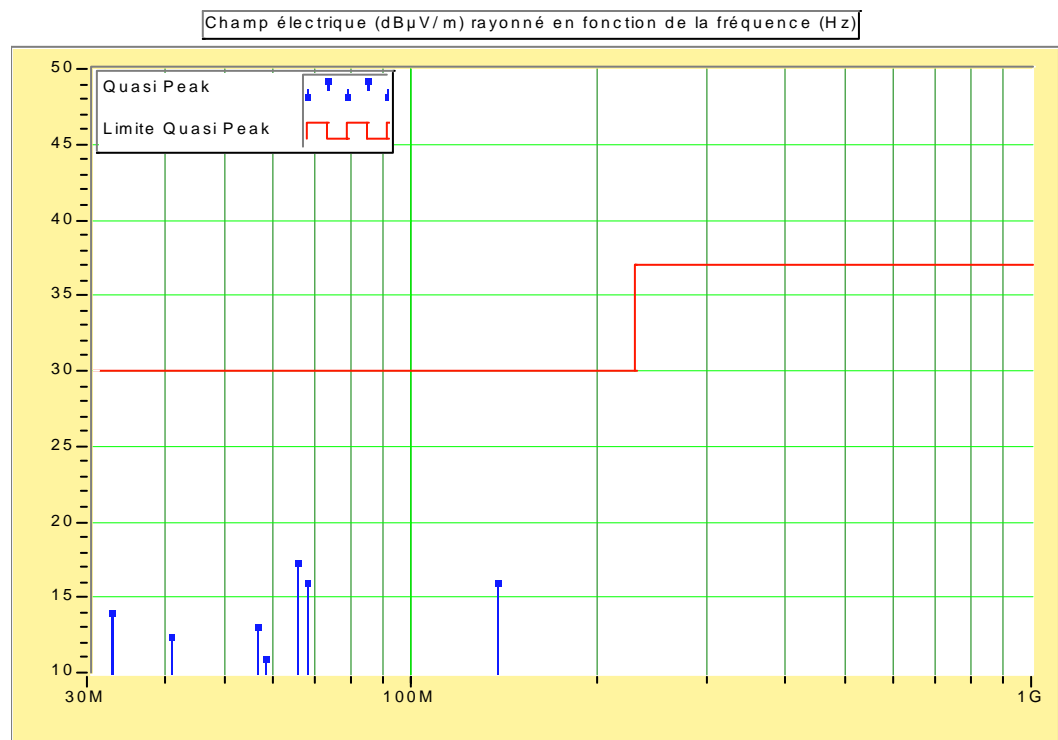
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ACCORDING TO Canada STANDARDS CISPR 22 CLASS B

Results for emissions measurements from 30MHz to 1GHz:

Frequency (MHz)	Peak (dB μ V/m)	Quasi peak (dB μ V/m)	Margin (dB)	Polar.	Height (cm)	Angle (°)	Facteur Corr. (dB)	Comments
32,767	18,99	13,91	-16,09	V	106	27	17,37	
40,964	19,51	12,41	-17,59	V	137	274	13,54	
56,359	22,89	13,06	-16,94	V	100	225	9,24	
57,898	17,09	10,98	-19,02	V	103	197	9,03	
65,626	21,53	17,35	-12,65	V	236	361	7,06	
67,938	18,24	15,96	-14,04	V	221	4	7,12	
137,493	19,59	15,92	-14,08	V	100	47	13,51	



INTERPRETATION AND REMARKS:

Conform



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Pre-Scan measurement in anechoic chamber to identify spurious emissions from EUT at D=3m:

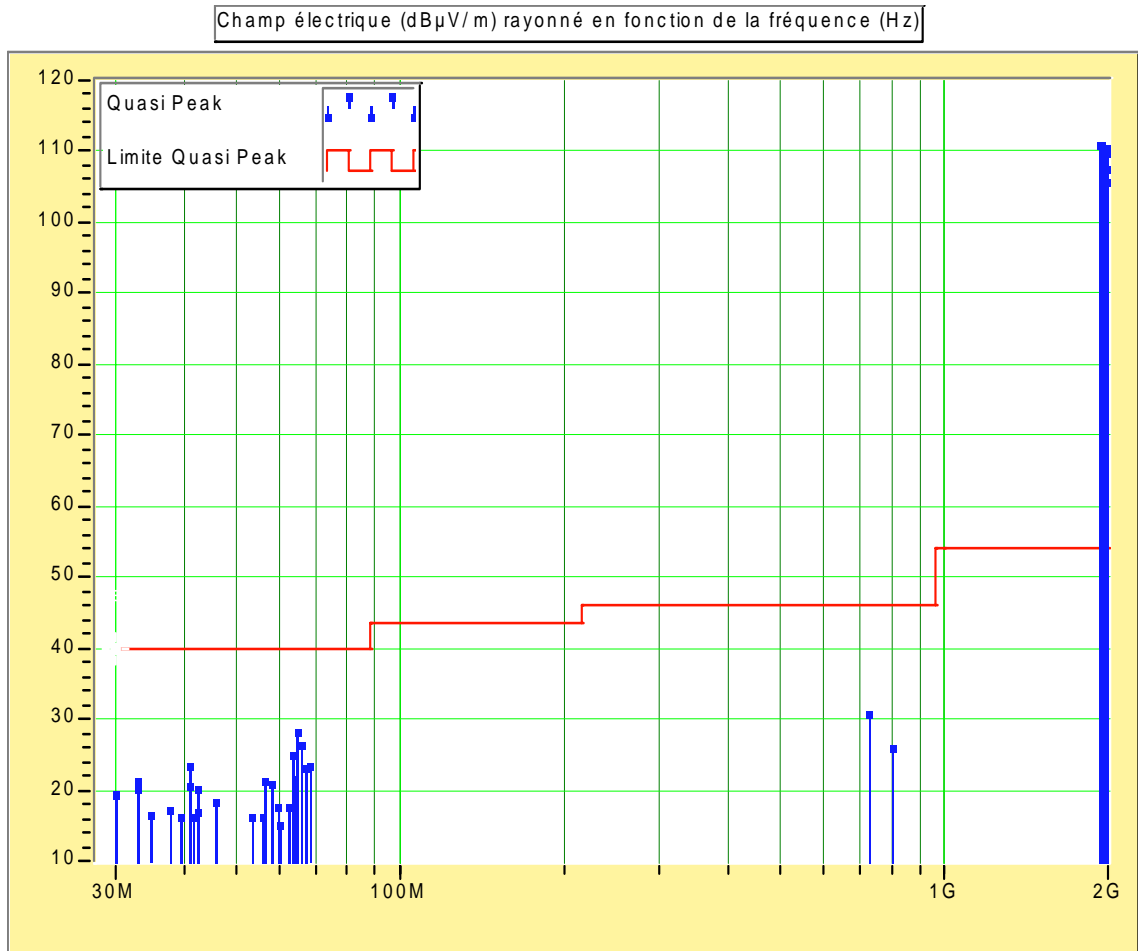
Fréquence (MHz)	Peak (dBµV/m)	Ecart (dB)	Polar.	Hauteur (cm)	Angle (Degré)	Facteur Corr. (dB)	Comments
30,1	19,49	-20,51	V	98	0	17,49	
32,975	20,32	-19,68	V	98	180	16,02	
33,004	21,45	-18,55	V	98	180	16,01	
34,747	16,64	-23,36	V	98	0	15,12	
37,817	17,26	-22,74	V	98	180	13,98	
39,345	16,31	-23,69	V	98	0	13,43	
40,921	23,48	-16,52	V	98	0	12,83	
40,944	20,39	-19,61	V	98	0	12,82	
41,618	16,24	-23,76	V	98	180	12,56	
42,464	16,96	-23,04	V	98	180	12,23	
42,485	20,25	-19,75	V	98	180	12,23	
45,55	18,4	-21,6	V	98	0	11,12	
53,297	16,09	-23,91	V	98	180	9,66	
55,586	16,04	-23,96	V	98	0	9,34	
56,359	21,16	-18,84	V	98	0	9,24	
57,898	20,85	-19,15	V	98	180	9,03	
59,438	17,71	-22,29	V	98	180	8,82	
60,234	15,27	-24,73	V	98	0	8,73	
60,983	16,69	-23,31	V	98	0	8,69	
61,783	16,62	-23,38	V	98	0	8,64	
62,533	17,83	-22,17	V	98	0	8,6	
63,311	25,04	-14,96	V	98	0	8,56	
64,082	21,48	-18,52	V	98	0	8,52	
64,854	28,1	-11,9	V	98	0	8,47	
65,626	26,53	-13,47	V	98	0	8,43	
67,18	23,03	-16,97	V	98	0	8,35	
67,93	23,51	-16,49	V	98	0	8,3	
728,005	30,72	-15,28	V	98	0	25,92	
799,99	26,02	-19,98	V	98	180	25,5	
1930,187	110,74	56,74	H	98	0	37,84	transmitter
1930,287	110,74	56,74	V	98	0	37,84	transmitter
1932,886	110,74	56,74	H	98	180	37,83	transmitter
1937,883	110,72	56,72	H	98	180	37,8	transmitter
1949,777	110,67	56,67	V	98	0	37,74	transmitter
1953,775	110,65	56,65	H	98	180	37,72	transmitter
1953,875	107,69	53,69	V	98	180	37,72	transmitter
1959,771	110,62	56,62	V	98	0	37,69	transmitter
1971,815	110,53	56,53	H	98	0	37,63	transmitter
1971,915	110,53	56,53	V	98	0	37,63	transmitter
1977,862	109,89	55,89	V	98	180	37,6	transmitter
1980,86	110	56	V	98	180	37,59	transmitter
1981,91	105,73	51,73	V	98	0	37,58	transmitter
1986,857	110,4	56,4	H	98	180	37,56	transmitter
1989,905	107,68	53,68	V	98	0	37,54	transmitter

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Test according to CFR 47 Part 24

Tests performed by Daniel RAUD at GYL Technologies laboratories, in August 19 of 2004.

REFERENCE DOCUMENTATION:

CFR 47 part 24, (2003)
ANSI C63.4 (2001).

RADIATED DISTURBANCE :

General measurement conditions.

Conforms to Section 8 of the ANSI C63.4 measurement standard.
Equipment under test:



Method of measurement.

Method of measurement and test installation according ANSI C63.4.

Measurement are done at 1m in a free area.

We try to obtain a maximum at all frequencies by moving the product orientation and antenna polarisation. The height of the antenna can vary from 1 m to 4 m.

Measurements done in transmitter mode (all transmitters at maximum power 30 W, in BCCH mode without frequency hopping) and in receiver mode.

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Test equipment used :

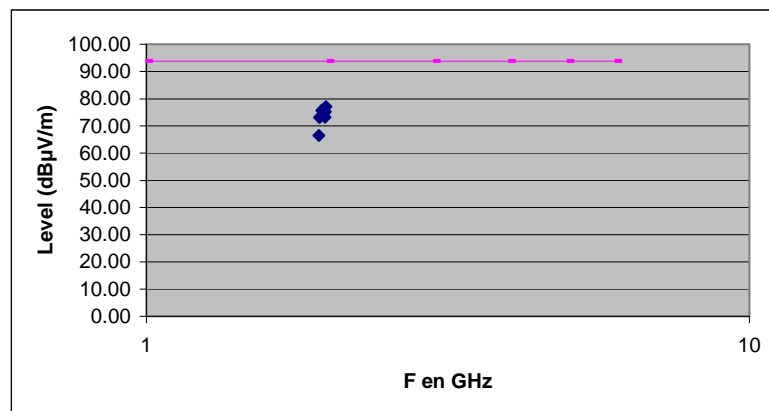
APPARATUS	MANUFACTURER	REFERENCE	SERIAL NUMBER	Date of verification
EMI test receiver	Rohde & Schwarz	ESI 7	M02020	March-04
10 m open area test site			M02093	AUG-04
semi-anechoic 11mx7mx5m	SIDT	SIDT	M02098	AUG-04
10 m measurement Cables kit			M02068	AUG-04
Horn Antenna 1 to 18 GHz	EMCO	3115	M02045	JUL-04
Antenna Positioning Masts	EMCO	1050	M01101	Without
Bilog antenna	CHASE	6112A CBL	M02032	AUG-04
Turn table controller, Open area	EMCO	1085	M01100	Without
Turn table controller	EMCO	1085	M01102	

Results :

1 - Measurement at transmitters frequencies for indicative level
transmitters output connected to resistive 50 ohms loads.

Base

FREQUENCY (GHz)	Canal	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.9328	525	66.5	93.9	27.4
1.9378	550	73.12	93.9	20.7
1.9538	630	75.7	93.9	18.2
1.9778	750	73.24	93.9	20.6
1.9808	765	75.23	93.9	18.7
1.9868	795	77.12	93.9	16.7





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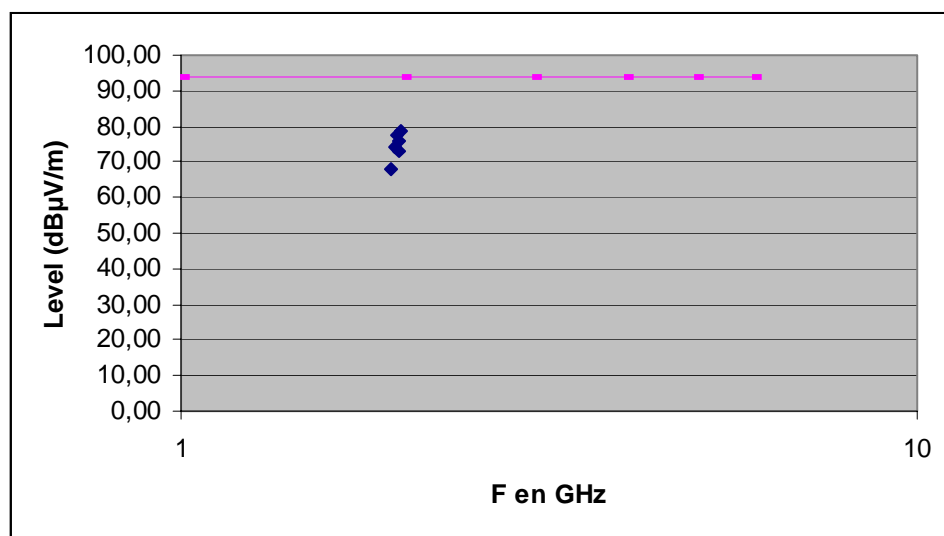
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Extension :

FREQUENCY (GHz)	Canal	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1.9302	512	68.2	93.9	25.7
1.9498	610	74.4	93.9	19.5
1.9598	660	77.5	93.9	16.4
1.9717	720	73.18	93.9	20.7
1.9818	770	75.63	93.9	18.3
1.9898	810	78.5	93.9	15.4



2 - Spurious emissions measurement.

No spurious emission found which level upper to noise level in 100KHz bandwidth (harmonics from transmitters frequencies are under noise level).

INTERPRETATION AND REMARKS:

Conform



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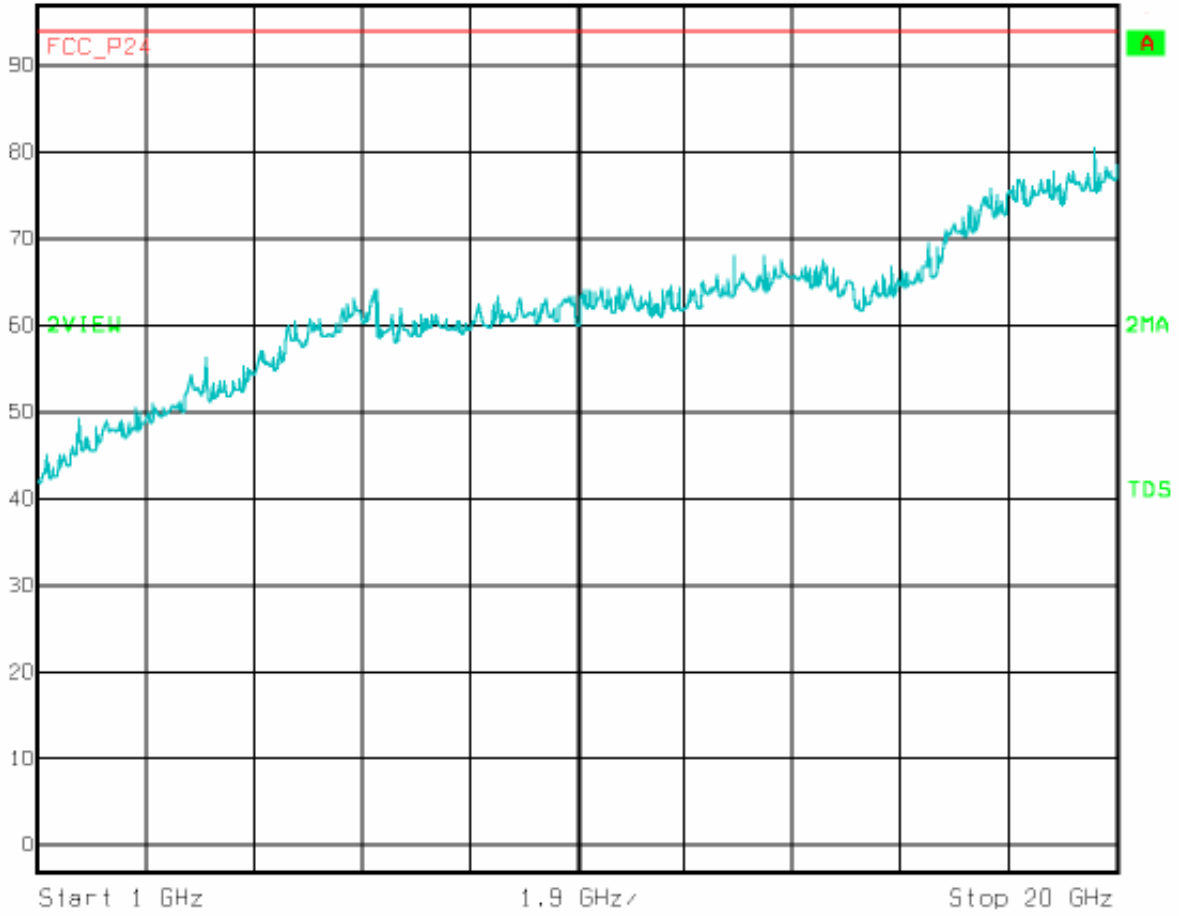
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Spectrum of noise level from 1GHz to 20GHz including loss cable and antenna factors



Ref Lvl
97 dB μ V

RBW 100 kHz RF Att 0 dB
VBW 300 kHz
SWT 200 ms Unit dB μ V



PCS1900 Outdoor BTS18000 hardware delivery notice

AVLM	
Recipient: FLEXTRONICS	Date of delivery : 09/AUG/2004
Product : GSM/UMTS BTS 18000 Outdoor	
Article delivered : GSM PCS BTS 18000 Outdoor (use as an base cabinet)	Article code : NTT915AA P1
Section transmitting : 8Z60	Designer name : P.JEULAND
Cabinet Serial Number : Serial Number : N°NNTMGT00124C	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications :	
PE/BTS/DD/ 5282 V04.01/EN BTS 18000 system design specification	
Software compatibility :	
Modules software version :	
<ul style="list-style-type: none"> - ICM/ABM : CDI103126 - RM : CDI103162 	
PI software tools version:	
<ul style="list-style-type: none"> - TIL coam : Til coam v03b108 - TIL alarm : Til alarm v01d102 - Win Spu + Win Perf : WinTool Bench V01B02 E8.0 - Win Tmi : WIN TMI V03D302 	

PCS1900 Outdoor BTS18000 hardware delivery notice

ARTICLE	PEC code	Release	Serial number	Comment
BARE CABINET & ECU	NTT91500	D1	NNTMGT001KIG	
IFM	NTN025AA	D1	NNTMGR0009H5J	
IFM	NTN025AA	D1	NNTMGR0009H5R	
ICM	NTN023AA	D1	NNTMGR008WHV	Etat MIR 03-1 IP: 136.147.44.106 MAC: 00 60 38 b9 40 bb
ICM	NTN023AA	D1	NNTMGR008WJD	Etat MIR 03-1 IP: 136.147.44.55 MAC: 00 60 38 b9 40 eb
ABM	NTN029AA	D2	NNTMGR0090L5	IP: 136.147.44.90 MAC: 00 60 38 b9 40 b9
ABM	NTN029AA	D2	NNTMGR0090K4	IP: 136.147.44.109 MAC: 00 60 38 b9 60 73
IBP	NTN027AA	D1	NNTMGR009971	
IBP	NTN027AA	D1	NNTMGR00996K	
DBP	NTN030AA	D1	NNTMGR008H71	DER AC 04.03.045
DBP	NTN030AA	D1	NNTMGR008H6P	DER AC 04.03.045
ECU	NTT971CM	D2	NNTMGT001KJG	As part of NTT91500
RICO	NTN020CA	D1	NNTMGR001GZV	
DDM H2 1900 w/vswr	NTN063AA	01	FICT020000DT	DDM D1 not tested in EMC in stand alone Warning: wrong release number instead of D1
DDM H2 1900 w/vswr	NTN063AA	01	FICT020000K0	DDM D1 not tested in EMC in stand alone Warning: wrong release number instead of D1
DDM H2 1900 w/vswr	NTN063AA	01	FICT020000K1	DDM D1 not tested in EMC in stand alone Warning: wrong release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000GD	Warning: none release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000G9	Warning: none release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000G3	Warning: none release number instead of D1
Radio Module 1900	NTN050PM	D1	CDN200428014	IP: 136.147.47.206 MAC: 00 60 38 14 2a e3
Radio Module 1900	NTN050PM	D1	CDN200428013	IP: 136.147.47.132 MAC: 00 60 38 14 2c 43
Radio Module 1900	NTN050PM	D1	CDN200428007	IP: 136.147.47.133 MAC: 00 60 38 14 30 a2
Radio Module 1900	NTN050PM	D1	CDN200428018	IP: 136.147.47.134 MAC: 00 60 38 14 30 04
Radio Module 1900	NTN050PM	D1	CDN200428012	IP: 136.147.44.131 MAC: 00 60 38 14 2c 61
Radio Module 1900	NTN050PM	D1	CDN200428016	IP: 136.147.47.207 MAC: 00 60 38 14 30 a3

PCS1900 Outdoor BTS18000 hardware delivery notice

ARTICLE	PEC code	Release	Serial number	Comment
UCPS rack	GSW703AA	N2	ATSNZH000000	release number N2 complies with Calgary standard number
UCPS UMTS/GSM DDU	NTN070DA	P2	ATSNZH000000	
UCPS CDMA/GSM CCU	NTW703CC	N3	ATSNZH000003	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000022	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000014	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000036	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000030	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000030	release number N3 complies with Calgary standard number + DER AC 04.06.044

Additional delivery :

ARTICLE	PEC code	Release	Serial number	Comment
1 ABIS cable	NTT995ER			With connecting box
1 D-link external cable	NTT995EA			
1 combiner 1900	NTQA51DA	03	FORM01319220	For Base-Base test
1 combiner 1900	RNMHR4344	BA	NMNC954705195	For Base-Base test
1 external alarm cable	NTU795AA			GSM cable is not available ref : NTT997GA

Documents related to the Hardware Test Specifications

Reference of the test specifications documents :

PE/BTS/DJD/010557 V01/EN Hardware integration test specification for BTS 18000 Outdoor

Documents related to the Hardware Test Report

PE/BTS/DJD/011045 V06/FE Dossier des tests d'intégration de la BTS 18000 PCS1900 Outdoor

END OF DOCUMENT

PCS1900 Outdoor BTS18000 hardware delivery notice

AVLM Recipient: Flextronics	Date of delivery : 09/AUG/2004
Product : GSM/UMTS BTS 18000 Outdoor	
Article delivered : GSM PCS BTS 18000 Outdoor (use as an extension cabinet)	Article code : NTT915AA D1
Section transmitting : 8Z60	Designer name : P.JEULAND
Cabinet Serial Number : Serial Number : N°NNTMGT0012XO / 303435	
Documents related to the Hardware Design Specifications	
Documents dealing with specifications : PE/BTS/DD/ 5282 V04.01/EN BTS 18000 system design specification	
Software compatibility :	
Modules software version :	
- ICM/ABM : CDI103126	
- RM : CDI103162	
PI software tools version:	
- TIL coam : Til coam v03b108	
- TIL alarm : Til alarm v01d102	
- Win Spu + Win Perf : WinTool Bench V01B02 E8.0	
- Win Tmi : WIN TMI V03D302	

PCS1900 Outdoor BTS18000 hardware delivery notice

Modules delivered in the cabinet :

ARTICLE	PEC code	Release	Serial number	Comment
BARE CABINET & ECU	NTT91500	D1	NNTMGT001KIF	
IFM	NTN025AA	D1	NNTMGR009H5H	
IFM	NTN025AA	D1	NNTMGR009H6H	
ICM	NTN023AA	D1	NNTMGR008WJ5	Etat MIR 03 IP: 136.147.44.36 MAC: 00 60 38 b9 40 bd
ICM	NTN023AA	D1	NNTMGR008WHP	Etat MIR 03 IP: 136.147.44.54 MAC: 00 60 38 14 29 ef
ABM	NTN029AA	D2	NNTMGR0090L3	IP: 136.147.44.23 MAC: 00 60 38 14 29 ed
ABM	NTN029AA	D2	NNTMGR0090K9	IP: 136.147.44.24 MAC: 00 60 38 b9 60 6f
IBP	NTN027AA	D1	NNTMGR009972	
IBP	NTN027AA	D1	NNTMGR009966	
DBP	NTN030AA	D1	NNTMGR008H84	DER AC 04.03.045
DBP	NTN030AA	D1	NNTMGR008H6K	DER AC 04.03.045
ECU	NTT971CM	D2	NNTMGT001KJH	As part of NTT91500
RICO	NTN020CA	D1	NNTMGR0013C1	
DDM H2 1900 w/vswr	NTN063AA	D3	FICT020000K6	
DDM H2 1900 w/vswr	NTN063AA	01	FICT020000H9	DDM D1 not tested in EMC in stand alone Warning: wrong release number instead of D1
DDM H2 1900 w/vswr	NTN063AA	01	FICT020000J1	DDM D1 not tested in EMC in stand alone Warning: wrong release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000GQ	Warning: none release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000H2	Warning: none release number instead of D1
Tx filter H2 1900 w/vswr	NTN063AA		FICT020000GX	Warning: none release number instead of D1
Radio Module 1900	NTN050PM	D1	CDN200428022	IP: 136.147.44.40 MAC: 00 60 38 14 2d 1b
Radio Module 1900	NTN050PM	D1	CDN200428025	IP: 136.147.44.41 MAC: 00 60 38 b9 40 9d
Radio Module 1900	NTN050PM	D1	CDN200427022	IP: 136.147.44.34 MAC: 00 60 38 14 2b 63
Radio Module 1900	NTN050PM	D1	CDN200423003	IP: 136.147.44.33 MAC: 00 60 38 b9 40 7d
Radio Module 1900	NTN050PM	D1	NNTM75047EXA	IP: 136.147.44.6 MAC: 00 60 38 14 31 a7
Radio Module 1900	NTN050PM	D1	CDN2004282009	IP: 136.147.44.9 MAC: 00 60 38 b9 40 97

PCS1900 Outdoor BTS18000 hardware delivery notice

ARTICLE	PEC code	Release	Serial number	Comment
UCPS rack	GSW703AA	N2	ATSNZH000003	release number N2 complies with Calgary standard number
UCPS UMTS/GSM DDU	NTN070DA	P2	ATSNZH000002	
UCPS CDMA/GSM CCU	NTW703CC	N3	ATSNZH000015	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000027	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000026	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000020	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000017	release number N3 complies with Calgary standard number + DER AC 04.06.044
UCPS Rectifier 1000w	NTW703BB	N3	ATSNZH000016	release number N3 complies with Calgary standard number + DER AC 04.06.044

Additional delivery :

ARTICLE	PEC code	Release	Serial number	Comment
1 external alarm cable	NTU795AA			GSM cable is not available ref : NTT997GA

Documents related to the Hardware Test Specifications

Reference of the test specifications documents :

PE/BTS/DJD/010557 V01/EN Hardware integration test specification for BTS 18000 Outdoor

Documents related to the Hardware Test Report

PE/BTS/DJD/011045 V07/FE Dossier des tests d'intégration de la BTS 18000 PCS1900 Outdoor

❧ END OF DOCUMENT ❧

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

**EMC TEST PLAN FOR INTRODUCTION OF GSM 1900 BTS
18000 OUTDOOR (US & Canada Market)****Référence : NORTEL/18K/OUT/1900/EMC/TP/01****Version : 3****Date de création : 27 July 2004****Page Number : 17**

Ed	Date	Comments	Author	Verified by
1	28 May 2004	Creation	Arnaud Lucy	Christophe Cordier
2	02 June 2004	Update	Tests and qualification	
3	27 July 2004	Update	Engineer	

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

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GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

1. INTRODUCTION

This objective of this document is to present the test plan for EMC testing on the system GSM 1900 BTS 18000 Outdoor configured in 1900 MHz.

The conformity with the test program presented below will be used to demonstrate the compliance of the GSM 1900 BTS 18000 Outdoor with the Electromagnetic Compatibility applicable standard.

For North America deployment the applicable standard for the EMC and Radio aspects are the CFR 47 part 15 subpart B for EMC conducted and radiated emissions and the CFR 47 part 24 subpart E for radio spurious emissions.

For CANADA deployment the applicable standard for EMC are the ICES 003 and RSS 133 for conducted and radiated emissions.

This document applied to :

- Product : GSM 1900 BTS 18000 Outdoor
- Manufacturer : Nortel Networks
- Frequencies : 1900 MHz
- Configuration : applies to : up to S666_666 (Base & Extension cabinet)
- Power Supply :
 - 120/240VAC, Split phase US, Three wires (Phase 1, Phase 2, Neutral) plus protective earth (208/240VAC -10%/+6%).
 - 120/240VAC, Split phase Europe, Three wires (Phase 1, Phase 2, Neutral) plus protective earth (208/240VAC -10%/+6%)
- Options : Alarm Protection module (ALPRO box) and AC plugs.

*GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market***2. APPLICABLES DOCUMENTS**

[A1]	47CFR Part 2 10/01/03	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations - Frequency allocations and radio treaty matters; general rules and regulations.
[A2]	47 CFR Part 24 10/01/03	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations - Personal communications services.
[A3]	47 CFR Part 15 April 2004	FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations – Radio frequency devices.
[A4]	ICES-003 Issue 4 February 2004	Industry CANADA Digital Apparatus
[A5]	RSS 133 Issue 2 November 1999	2 GHz Personal Communications services

3. REFERENCES DOCUMENTS

[R1]	PE/BTS/DPL/9848	GSM 1900 BTS 18000 Outdoor Project Qualification Plan
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GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

4. TEST PLAN SUMMARY

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

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

	Test case	Application	Standard	Test requirement	Performance criteria	Comment	
US & CANADA MARKET	1	Radiated emissions	Enclosure of system (base and extension)	FCC Part 15 § 15.109	30MHz – 20 GHz	Class B	All transmitters in the EUT should be transmitting at full power.
	2	Radiated emissions	Enclosure of system (base and extension)	FCC Part 24 § 24.238 and RSS 133	30 MHz – 20GHz	See § 5	All transmitters in the EUT should be transmitting at full power.
	3	Conducted emissions	AC Power	FCC Part 15 § 15.107 and/or CISPR 22 for IECS-003	150 kHz – 30 MHz	Class B	This EMC test is realized in Split phase AC Power 60 Hz. This test is realized on base cabinet and extension cabinet.
	4	Radiated emissions for IECS-003	Enclosure of system (base and extension)	CISPR 22	30MHz – 1 GHz	Class B	All transmitters in the EUT should be transmitting at full power.

5. 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 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 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.

*GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market***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 harmonic frequencies and a statement should be placed in the test report indicating that no emissions were detected.

The equipment was configured as shown in the next figure.

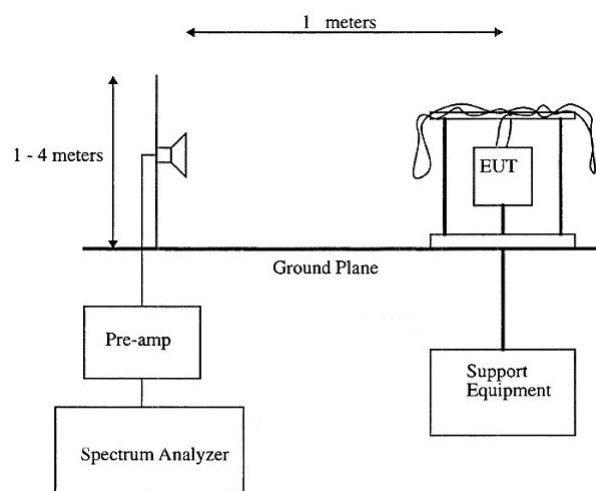


Figure 1 : Test configuration for Radiated Spurious emissions

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

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 (30.19 Watts), (44.8 dBm)

G = Gain of ideal Dipole (linear)

Therefore :

$$E(V/m) = \sqrt{30 * 30.19 * 1.64}$$

E = 38.54 V/m = 151.69 dBμV/m

The spurious emissions must be attenuated by at least :
 43 + 10*Log(30.19) = 57.79 dB.

Therefore the field strength limit at 1 meters is :

E = 151.69 dBμV/m – 57.79 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

*GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market***Pass / Fail criteria :**

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

- For 1 GHz to 20 GHz :
Measurement distance : 1 m
Limit : 93.9 $\text{dB}\mu\text{V/m}$

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

6. TEST DESCRIPTION OF THE CONDUCTED EMISSION.

Test case name : Conducted emissions on AC port (60Hz)

Standard Coverage : FCC Part 15.107 or/and CISPR 22 (0.15 MHz – 30 MHz)

Intend :

Measurement shall be made in the operational mode producing the largest emission in the frequency band being investigated consistent with normal applications.

Test procedure :

A measuring receiver shall be connected to each RSIL measurement port in turn and the conducted emission levels recorded. The RSIL measurement ports not being used for measurement shall be terminated with a 50 Ω (50 μ H) load.

Pass / Fail Criteria :

Limits for conducted emissions AC mode FCC Part 15 Subpart B or/and CISPR 22 (0.15 MHz – 30 MHz)

Limits for conducted emissions (FCC Part 15 class B or/and CISPR 22)

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

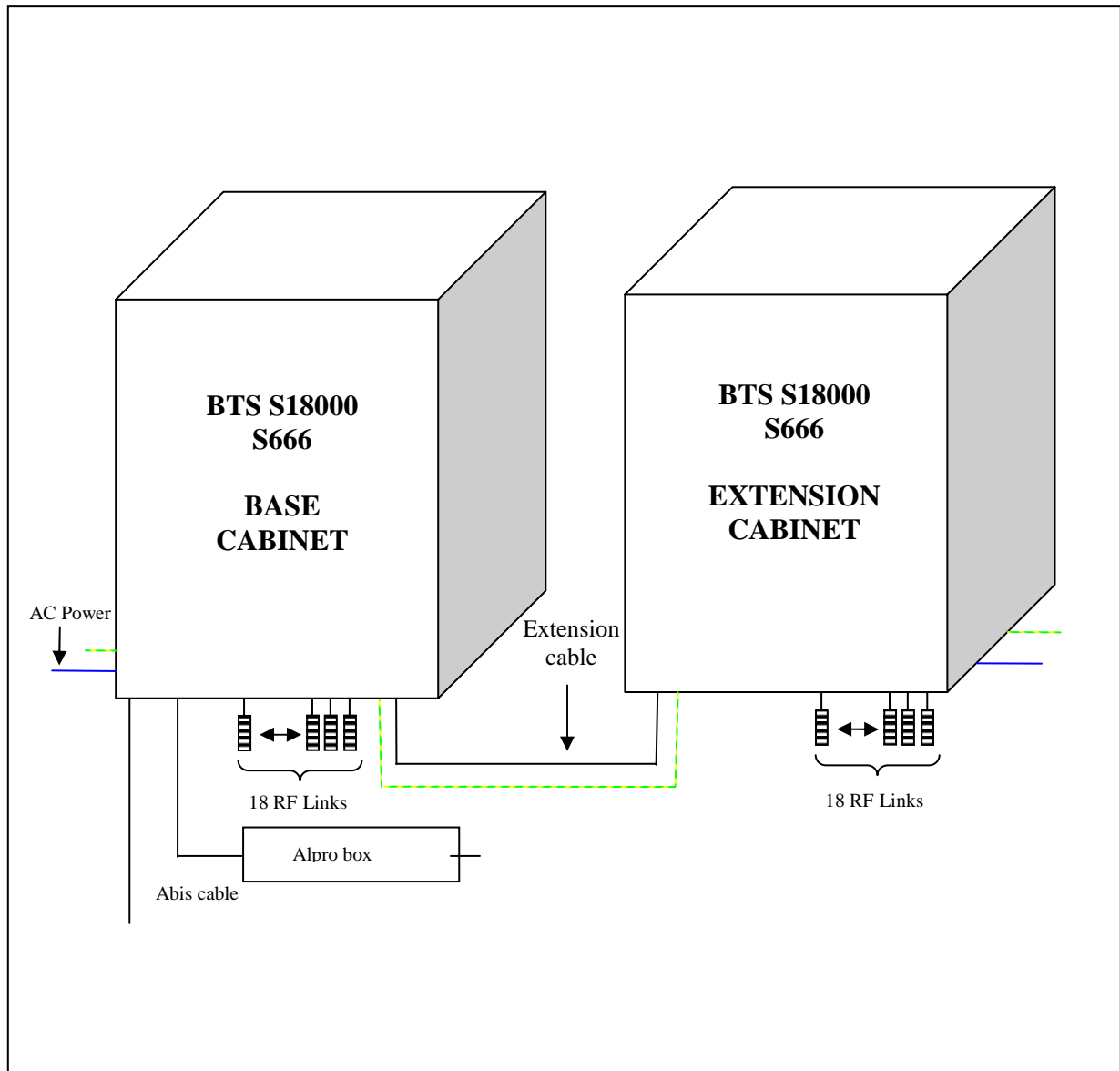
Configuration :

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.

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

7. INSTALLATION DIAGRAM

The drawing gives a representation of functional test bench.



GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

The following table presents the list of cable :

BTS18000 Base Cabinet configured in S666				
Cables	Description	Length		Quantity
Radio cables	RG214	1 m	Shielded	18
Abis cable			Shielded	1
Power cable AC		/	Not Shielded	1
Ground cable		/	/	1
External Alarm cables			Shielded	1
Equipotentiality braid			/	1
Extension cable			Shielded	1

BTS 18000 Extension Cabinet configured in S666				
Cables	Description	Length		Quantity
Radio cables	RG214	1 m	Shielded	18
Power cable AC		/	Not Shielded	1
Ground cable		/	/	1
Equipotentiality braid	/		/	1

8. DOCUMENTATION DELIVERABLES

The report needs to contain the minimum following information ordered in such manner:

- all the information contained in this document, in order to identify precisely the configuration under test,
- any deviation from the test methods defined in the relevant standards,
- for radiated and conducted tests, a table giving the maximum emission levels in absolute and with respect to the limit (margin).
- description of any modifications made to the EUT during testing which are required to acquire compliance,
- instrumentation and antennas calibration dates,
- photographs of the equipment under test (as many as different tests, showing open field test site...)

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

9. FREQUENCY PLAN

SLOT	BASE CABINET
1	Channel : 512 TX : 1930.2 MHz
2	Channel : 530 TX : 1933.8 MHz
3	Channel : 560 TX : 1939.8 MHz
4	Channel : 590 TX : 1945.8 MHz
5	Channel : 610 TX : 1949.8 MHz
6	Channel : 620 TX : 1951.8 MHz
7	Channel : 640 TX : 1955.8 MHz
8	Channel : 660 TX : 1959.8 MHz
9	Channel : 680 TX : 1963.8 MHz
10	Channel : 700 TX : 1967.8 MHz
11	Channel : 720 TX : 1971.8 MHz
12	Channel : 740 TX : 1975.8 MHz
13	Channel : 760 TX : 1979.8 MHz
14	Channel : 770 TX : 1981.8 MHz
15	Channel : 780 TX : 1983.8 MHz
16	Channel : 790 TX : 1985.8 MHz
17	Channel : 800 TX : 1987.8 MHz
18	Channel : 810 TX : 1989.8 MHz
SLOT	EXTENSION CABINET
1	Channel : 514 TX : 1930.6 MHz
2	Channel : 525 TX : 1932.8 MHz
3	Channel : 540 TX : 1935.8 MHz
4	Channel : 550 TX : 1937.8 MHz
5	Channel : 570 TX : 1941.8 MHz
6	Channel : 600 TX : 1947.8 MHz
7	Channel : 630 TX : 1953.8 MHz
8	Channel : 650 TX : 1957.8 MHz
9	Channel : 670 TX : 1961.8 MHz
10	Channel : 690 TX : 1965.8 MHz
11	Channel : 730 TX : 1973.8 MHz
12	Channel : 750 TX : 1977.8 MHz
13	Channel : 765 TX : 1980.8 MHz
14	Channel : 775 TX : 1982.8 MHz
15	Channel : 785 TX : 1984.8 MHz
16	Channel : 795 TX : 1986.8 MHz
17	Channel : 805 TX : 1988.8 MHz
18	Channel : 808 TX : 1989.4 MHz

10. ABBREVIATIONS

AC:	Alternative Current
BTS:	Base Transceiver Station
EMC:	Electromagnetic Compatibility
EN:	European Norm
ETS:	ETSI Standard
EUT:	Equipment Under Test
GSM:	Global System Mobile
N/A:	Not Applicable
RF:	Radio Frequency
RSIL:	Line stabilization networks Impedance

GSM 1900 BTS 18000 Outdoor : EMC Test Plan for US& Canada market

“END OF DOCUMENT”