



Test Report B

Applicant: Ericsson (China)

For Original Filing:

FCC: X3V1900RRUC

IC: 287AJ-1900RRUC



Spurious Emissions Test Report for the RRUC 1900

FCC Part 24 and Industry Canada RSS-133

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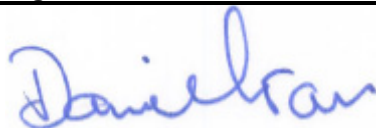
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Revision History

Stream/Issue	Revision Date	Status	Changes	Author/Editor
00/01	February 5, 2010	Draft	Initial test report	Ramon Lao
00/01	March 26, 2010	Approved		Daniel Tan

Approval by

Name	Function	Date	Signature
Daniel Tan	PI Manager	March 26, 2010	

Applicable Standard

- [A1] ANSI C63.4-2003 for FCC CFR 47 American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, 15 September 2009.
- [A2] ANSI C63.2-1996, American National Standard for Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz – Specifications, 01 January 1996.
- [A3] FCC CFR 47 Part 15, “FCC Rules for Radio Frequency devices, title 47 of the code of federal regulations – radio frequency devices”
- [A4] TIA-603-C, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, August 2004.
- [A5] CISPR 22 (1997 / A2 2002), Title: Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
- [A6] EN 55022, “Information technology equipment – Radio disturbance characteristics – limits and methods of measurement (1998)”
- [A7] ICES-003, Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard, Issue 4, February 2004
- [A8] 2GHz Personal Communications Services, Industry Canada, RSS-133, Issue 2, Revision 1, November 6, 1999.
- [A9] Industry Canada, RSS 212, Test Facilities and Test Methods for Radio Equipment, Issue 1 (Provisional), February 27, 1999.

Reference Document

- [R1] "CDMA Metro Cell Remote Radio Head Provisioning Guidelines and Cell Site Requirements", Approved, Stream 00, Issue 01, September 27, 2009.
- [R2] "Recommended Minimum Performance Standards for Spread Spectrum Base Stations" Release C (TIA-97-F), C.S0010-C, Version 1.0, Jan 14, 2005.
- [R3] E1001WT8888-0115, Lab report provided by CEPREI in Guangzhou, China.
- [R4] "Remote Radio Unit CDMA Duplexer 1900 MHz A/D, B/E, C/F Band Duplexer OEM General Specification", Approved, Stream: 00, Issue: 01.2, January 07, 2010
- [R5] "1900MHz Remote Radio Head (RRH) Systems Design Specification", Approved, Stream: 01, Issue: 00, August 25, 2009.
- [R6] "CDMA 1900MHz Remote Radio Head (RRH) Product Integrity/System Integrity/Product Verification General Test Plan", Draft, Stream: 00, Issue:01, December 22, 2009.

Acronyms and Abbreviations

<u>Abbreviation</u>	<u>Explanation</u>
ASIC	Application Specific Integrated Circuit
BBW	Breathing, Blossoming and Wilting
BPF	Bandpass Filter
BTS	Base Station Transceiver Subsystem
BW	Bandwidth
CDMA	Code Division Multiple Access
dBFS	dB relative to Full Scale
dB	Decibel
dBm	decibel relative to 1 mW
DPM	Duplexer Preselector Module
EMI	Electro-Magnetic Interference
EMU	Equipment Under Test
EMC	Electromagnetic Compatibility
EC	Engineering Change
ERLCE	Excess Reverse Link Capacity Estimate
HSSPC	High-Speed Serial Protocol Controller
HW	Hardware
IF	Intermediate Frequency
ITE	International Electro technical Commission
IS	Interim Standard
IEC	International Electro technical Commission
LO	Local Oscillator
LPF	Low pass Filter
MCPA	Multi-Carrier Power Amplifier
MFRM	Multi-carrier Flexible Radio Module
MHz	Megahertz
N/A	Not Applicable
NA	not Available
OCNS	Orthogonal Channel Noise Source
OH	Over Head
PA	Power Amplifier
PC	Personal Computer
PI	Product Integrity
RE	Radiated Emissions
PSA	Product Specification Agreement
RBW	Resolution Band Width
RF	Radio Frequency
Rx	Receive
SA	Spectrum Analyzer
SFRW	Single Carrier Flexible Radio Module
SW	Software
TBD	To Be Determined
TM	Triplexer Module
TPTL	Transmit Power Tracking Loop
TRM	Transmitter Receiver Module
Tx	Transmit
uP	Microprocessor
XCVR	Transceiver

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1.0 Introduction

1.1 Purpose

The purpose of this document is to describe the test results of FCC Part 24 and Industry Canada RSS-133 radiated emissions tests applied by China CEPREI Laboratory on RRUC 1900 .

1.2 Product Overview

The Remote Radio Head is a three carrier single sector radio operating at -48V DC. It is intended primarily for outdoor installations remote from the CDMA BTS. To reduce size the Remote Radio Head uses convection cooling with no fan or heater. It is optimized for size and will not support any user equipment space or customer alarms.

The Remote Radio Head is a 1900 MHz frequency radio supporting bands A, B, C, D, E, F and G with both 1xRTT and 1xEV-DO air interfaces. The maximum carrier configuration is six carriers per sector, with one, two or three sector deployment supported.

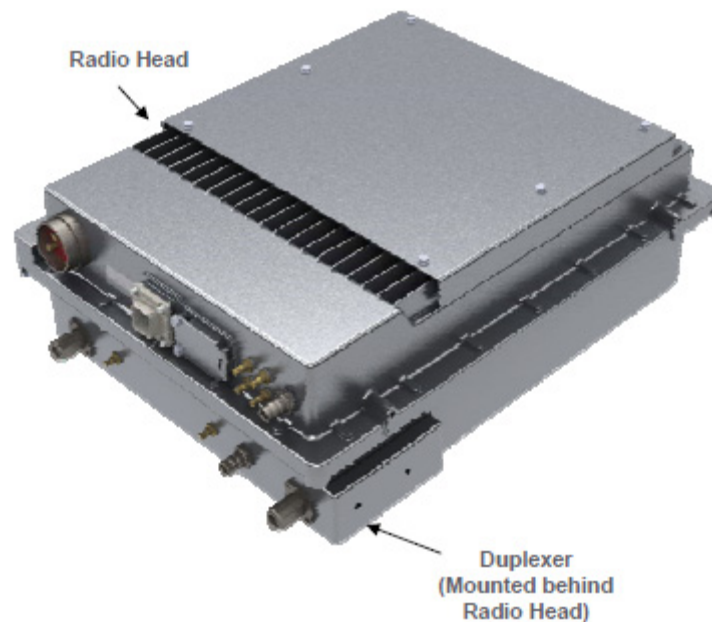


Figure 1. RRH Product External View

2.0 EUT Configuration

2.1 BTS Configuration Under Test

The following figure shows test configuration during test.

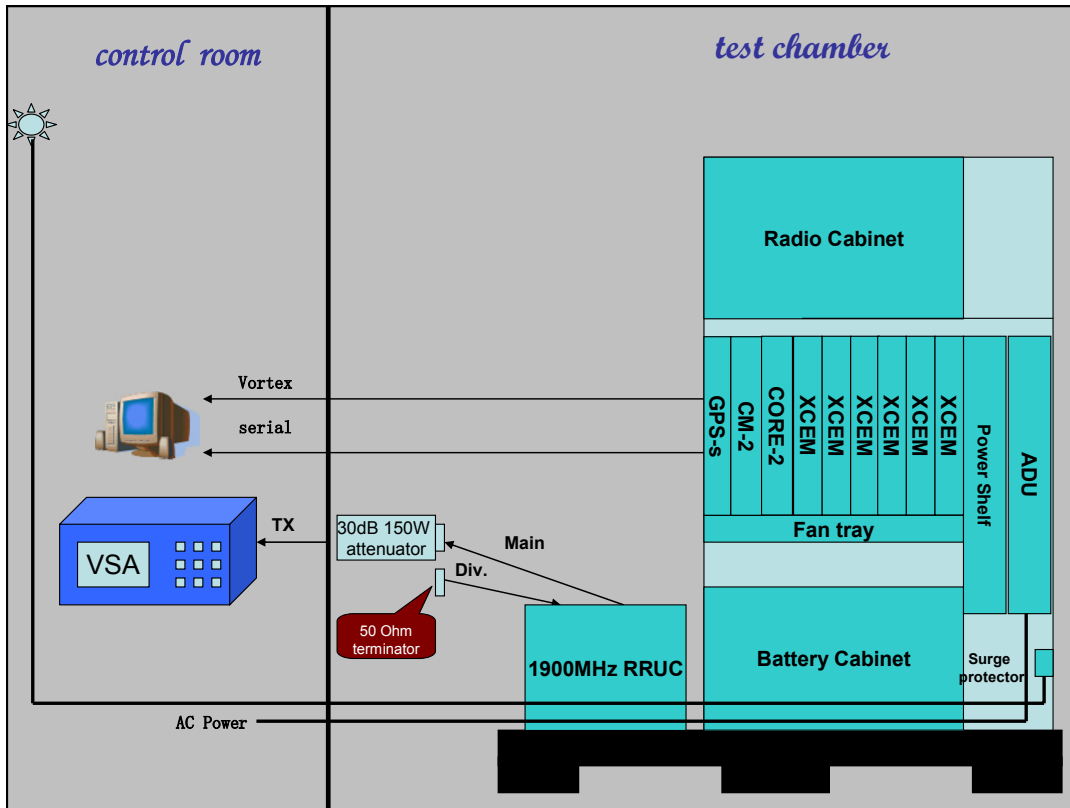


Figure 2. Chamber Environment Setup

2.2 BTS Configuration Description

Item	Description	Test cases
Configuration 1	A CDMA BTS6131 have been configured for testing with 1 GPS-s, 1 eDCG, 3 XCEM192, 1 RRUC 1900, 1 DPM	Radiated Emission Spurious



Figure 3. EUT Setup

2.3 EUT Identification List

CDMA AC BTS6131			
Item	component	PEC code	SN
1	xCEM192	NTRZ80BA	NNTMPX000GXN
2	xCEM192	NTRZ80BA	NNTMPX000M2T
3	xCEM192	NTRZ80BA	NNTM7860EUFV
4	GPS-s	NTBW50AA	TMSLL2007394
5	CM-2	NTBW40BAE5	NNTMDV01HFCK
6	CORE-2S	NTBW30DAE5	NNTMDV04TK7P
7	FRAME TRAY COOLING	NTDV13AA	NNTM7860FXP6
8	-	NTDV00FA	NNTM7860FXNJ
9	-	NTDV01AA	NNTM7860FXP0
10	-	NTDV00AA	NNTM7860FXNM
11	-	NTQ202ABE5	09KZ45015486
12	-	NTLK25BAE5	ADPL16044K2F
13	COOLING	NTDV05AA	NNTM7860FXP9
14	ICM	NTLK60CAE5	NNTMLA09P22S
15	Rectifier	NTDV62CA	-
16	Rectifier	NTDV62CA	-
17	RRUC	NTTT20BAE5	NNTMEER01006
18	RRUC-DPM	NTTT27BA	WFETMT2RYY01

3.0 Vortex configuration

Software	Version
Vortex	17.02_10WK01
Lip files	
CM-2(eDCG)	Cmedcg1702eh.lip
CM config file	Cmcfg1702eh.lip
XCEM-192	Xchcap1702eh.lip
XCEM	Xcemap1702eh.lip
SFRM	Rfmap1702eh.lip
MFRM	Mfrmmap1702eh.lip
MFRM2	Mfrmtwoap1702eh.lip
RRH	cbrmap1702eh.lip
MFRM3	Mfrmthree1702eh.lip

4.0 Test Procedure

Verifications of the test equipment and 10-meter Ambient Free Chamber were performed prior to the installation of the EUT in accordance with the quality assurance procedures documented in the EMC Test Procedures document. The test was performed as per the relevant test procedures in ANSI C63.4 and TIA-603-C :

- The EUT was placed on a turntable inside the 10-meter Ambient Free Chamber (configured as in normal operation). The system and its cables were separated from the ground plane. The system was grounded in accordance with its installation specifications. No additional grounding connections were connected.
- For tests between 30 MHz and 10 GHz the receive antenna was placed at a 10 m distance from the EUT. An initial scan was performed to find emissions (frequencies) requiring detail measurement. The pre-scan was performed by rotating the system 360 degrees while recording all emissions (frequency and amplitude). This procedure was repeated for antenna heights of 1 to 4 meters, and for horizontal and vertical polarizations of the receiving antenna.
- For all the above frequency ranges optimization was performed based on the pre-scan data. For each identified frequency, the EUT was rotated in azimuth over 360 degrees and the direction of maximum emission was noted. Antenna height was then varied from 1 to 4 meters at this azimuth to obtain maximum emissions. The procedure was repeated for both horizontal and vertical polarizations (where applicable) of the search antenna. The maximum level measured was recorded.
- The highest emissions were re-evaluated using the substitution method. This is accomplished by replacing the EUT by a calibrated antenna, cable and signal generator.

5.0 Test Equipment

Item	Quantity	Description
Current Clamp Meter	1	Model:318 Cal. 2009-9-1 to 2010-9-1
Multi-Meter	1	Model:117 Cal. 2009-9-1 to 2010-9-1
VSA	1	Model:E4406A . VSA series transmitter tester (7MHZ-4.0GHZ). Cal. 2009-9-1 to 2010-9-1
PC	1	Window XP
Attenuator	12	30dB @ 150W
Attenuator	12	12dB @ 5W
Terminal	12	Huber + Suhner Load @ 50 Ohm
BNC Cable	12	2ea for 10, 5ea for 3m.
Ethernet Cable	2	About 10m, shielded
Note: EMC test equipments in lab are listed in lab report , E1001WT8888-0115		

6.0 Test Result Summary

Electromagnetic Emissions		
Test Item	Clause Standard	Result
Radiated Emissions Spurious	FCC PART 24 § 24.238 and RSS-133	PASS

7.0 EMC Lab Test Report Reference

Refer to report E1001WT8888-0115 [R3].

8.0 Conclusion

Since all measured emissions indicate positive margins, it can be declared that the EUT has passed the radiated Spureious Emission tests with respect to **FCC part 24 and Industry Canada RSS-133** requirements..

☞ **END OF DOCUMENT** ☞

APPENDIX EMC TEST REPORT of CEPREI CHINA

No.	E1001WT8888-0115
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TEST REPORT

(No part of the report can be duplicated without permission)

Product Name : RRUC 1900MHz

Type and Specification : CDMA 6131 BTS DCR connect with RRUC

Test Category : Entrusted Test

Manufacturer : Guangdong Nortel Telecommunications Equipment Co.,Ltd

Applicant: Guangdong Nortel Telecommunications Equipment Co.,Ltd



**China Electronic Product Reliability And
Environmental Testing Research Institute**

China CEPREI Laboratory

Items For Attention

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3. It would be invalid test report without all the signatures of compilation, reviewer and approver.
4. It would be invalid test report, if there is any scrawl in the test report without official authorization.
5. Any disputes about the report must be submitted for test institute within 15 days from the day when the report is received, otherwise that would be invalid out of expiry.
6. Generally, the responsible is only for the samples in entrusted test.

Remark: Possible test case verdicts:

Test item does meet the requirement.....P (Pass)

Test item does not meet the requirement.....F (Fail)

Test case does not apply to the test object.....N (N/A)

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TEST REPORT

Product	RRUC 1900MHz	Model / Type	CDMA 6131 BTS DCR connect with RRUC
Factory	Guangdong Nortel Telecommunications Equipment Co.,Ltd	Trade/Mark	Nortel
Address of Factory	Rongli Industrial Park ,Liheng Road ,Ronggui Shunde Foshan Guangdong 528306 P.R.China.		
Manufacturer	Guangdong Nortel Telecommunications Equipment Co.,Ltd		
Address of manufacturer	Rongli Industrial Park ,Liheng Road ,Ronggui Shunde Foshan Guangdong 528306 P.R.China.		
Applicant	Guangdong Nortel Telecommunications Equipment Co.,Ltd		
Address of Applicant	Rongli Industrial Park ,Liheng Road ,Ronggui Shunde Foshan Guangdong 528306 P.R.China.		
Sampling Method	Sampling by the factory		Production Date /
Number of Specimen	1	Testing Duration 2010.01.15	Ambient Condition 15~35 , 45~75%RH, 86~106kPa
Test Standards: FCC PART 24 § 24.238 and RSS-133			
Test Instruments and Equipments: See Equipments List of This Report.			
Conclusion: EUT complied with the requirements of the test standards.			
Testing Technician: <u>刘鑫</u> (Liu xin)			
Responsible Engineer: <u>陈辉</u> (Chen Hui)			
Approver: <u>陈辉</u>		Date: _____	
Remark:			



EMC Standards Compliance List / Test Summary:

The following standards have been applied to ensure the product conforms to Radiated Emissions Spurious requirements of the Reference: RRUC 1900MHz General Test Plan.

EMC Test plan for RRUC 1900MHz Introduction:

Electromagnetic Emissions		
Test Item	Clause Standard	Result
Radiated emissions spurious	FCC PART 24 § 24.238 and RSS-133	PASS

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Section 1 General Information

1.1 Introduction

This report documents the Radiated Emissions Spurious test results for the RRUC 1900MHz.

1.2 EUT General and Technical Descriptions

EUT Name:	RRUC 1900MHz
EUT Model:	CDMA 6131 BTS DCR connect with RRUC
EUT Trademark:	Nortel
Input Voltage:	AC 220V
Function(s) Description:	CDMA base station.

1.3 EUT Photographs



Section 2 Electromagnetic Emissions

2.1 Radiated Emission spurious (30MHz-18GHz)

2.1.1 Radiated Emission Test Information

Temperature:	23°C	Humidity:	61% RH
ATM Pressure:	101 k Pa	Grounding:	Grounding
Test Voltage:	AC 220V	Tested Range:	30MHz to 10GHz
Tested by:	Liu Xin	Date of test:	2010-01-15
Test Reference:	FCC PART 24 § 24.238 and RSS-133	Test method:	ANSI/TIA/EIA-603-B:2004
Results:	PASS		

2.1.2 Measurement Equipments Used for Radiated emission

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	2009-06-08	2010-06-08
Horn Antenna	R & S	HF906	100095	2009-06-08	2010-06-08
0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	2009-06-08	2010-06-08
1-26.5GHz Pre-Amplifier	Agilent	8449B	3008A01649	2009-06-08	2010-06-08
10m Semi- Anechoic Chamber	ETS	N/A	N/A	2009-06-08	2010-06-08

2.1.3 Limits for radiated emissions.

Frequency range	Minimum requirement(e.r.p.)/ Reference Bandwidth
30MHz≤f≤18GHz	The spurious emission must be attenuated by at least 43+10log(P) P=Transmitter rated Power in watts

Measurements were made according to the procedures outline in ANSI/TIA-603-C-2004

The emissions were investigated up to the tenth harmonic of the fundamental emission(18GHz).

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:

$$ERP = \text{Signal generator Level} - \text{Cable losses} + \text{Antenna gain} - \text{Half wave dipole gain}$$

$$\text{Margin} = \text{Limit} - \text{ERP}$$

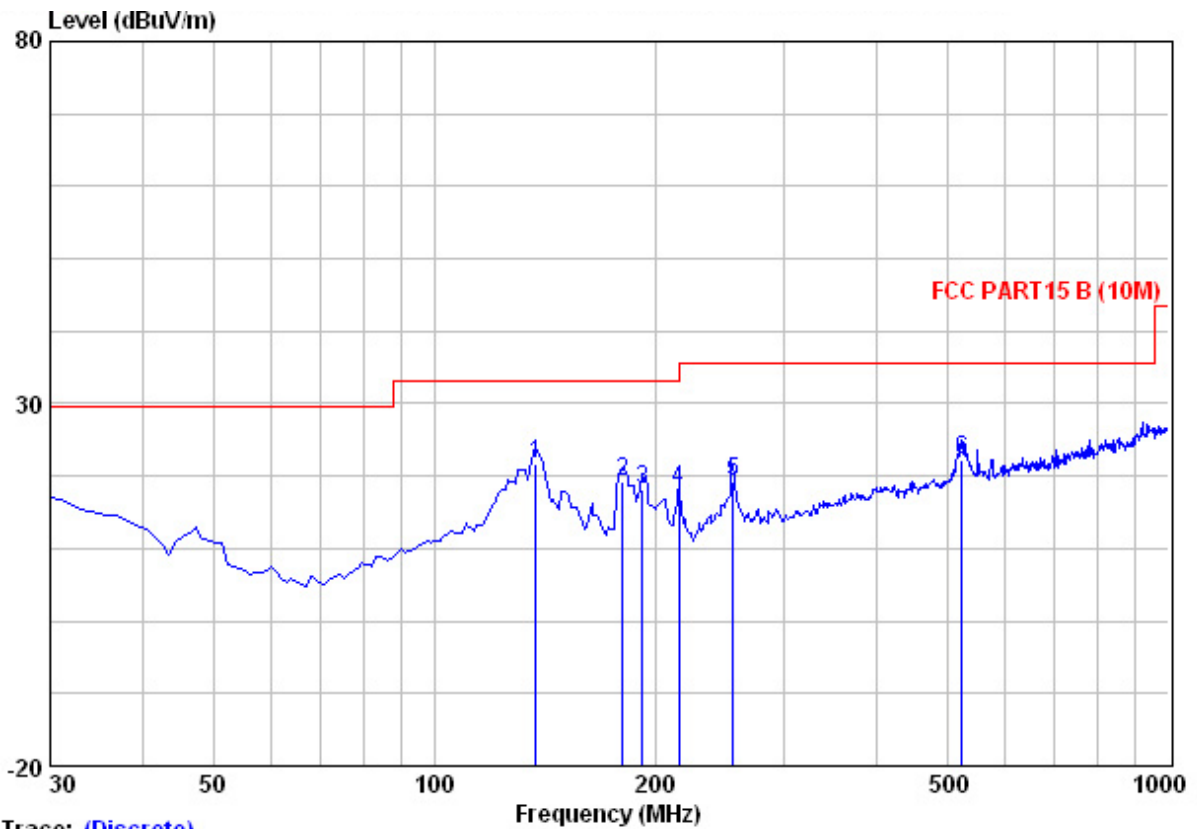
2.1.4 Test Data

Horizontal										
No.	Frequency	E-Field Emission Level	Substituted Measured Rx level	Signal Generator	Tx Antenna Gain	Theoretical Dipol gain	Tx Cable loss	E.R.P	Limit	Margin (dB)
	MHz	dB μ V/m	dB μ V	dBm	dBi	dB	dB	dBm	dBm	dB
1	1932.5	65.10	69.20	-23.95	9.30	2.15	4.35	-21.15	-13.00	8.15
2	2478.0	34.23	37.51	-53.19	8.80	2.15	4.66	-51.20	-13.00	38.20
3	3805.0	30.34	33.98	-53.90	8.65	2.15	6.90	-54.30	-13.00	41.30
4	8123.0	21.61	35.56	-45.13	7.38	2.15	12.80	-52.70	-13.00	39.70
Vertical										
No.	Frequency (MHz)	E-Field Emission Level	Substituted Measured Rx level	Signal Generator	Tx Antenna Gain	Theoretical Dipol gain	Tx Cable loss	E.R.P	Limit	Margin (dB)
	MHz	dB μ V/m	dB μ V	dBm	dBi	dB	dB	dBm	dBm	dB
1	1932.5	67.10	71.20	-22.56	9.30	2.15	4.35	-19.76	-13.00	6.76
2	2478.0	35.34	37.52	-54.45	8.80	2.15	4.90	-52.70	-13.00	39.70
3	3805.0	31.24	34.69	-53.25	8.65	2.15	6.70	-53.45	-13.00	40.45
4	8123.0	21.69	35.63	-48.89	7.38	2.15	8.65	-52.31	-13.00	39.31

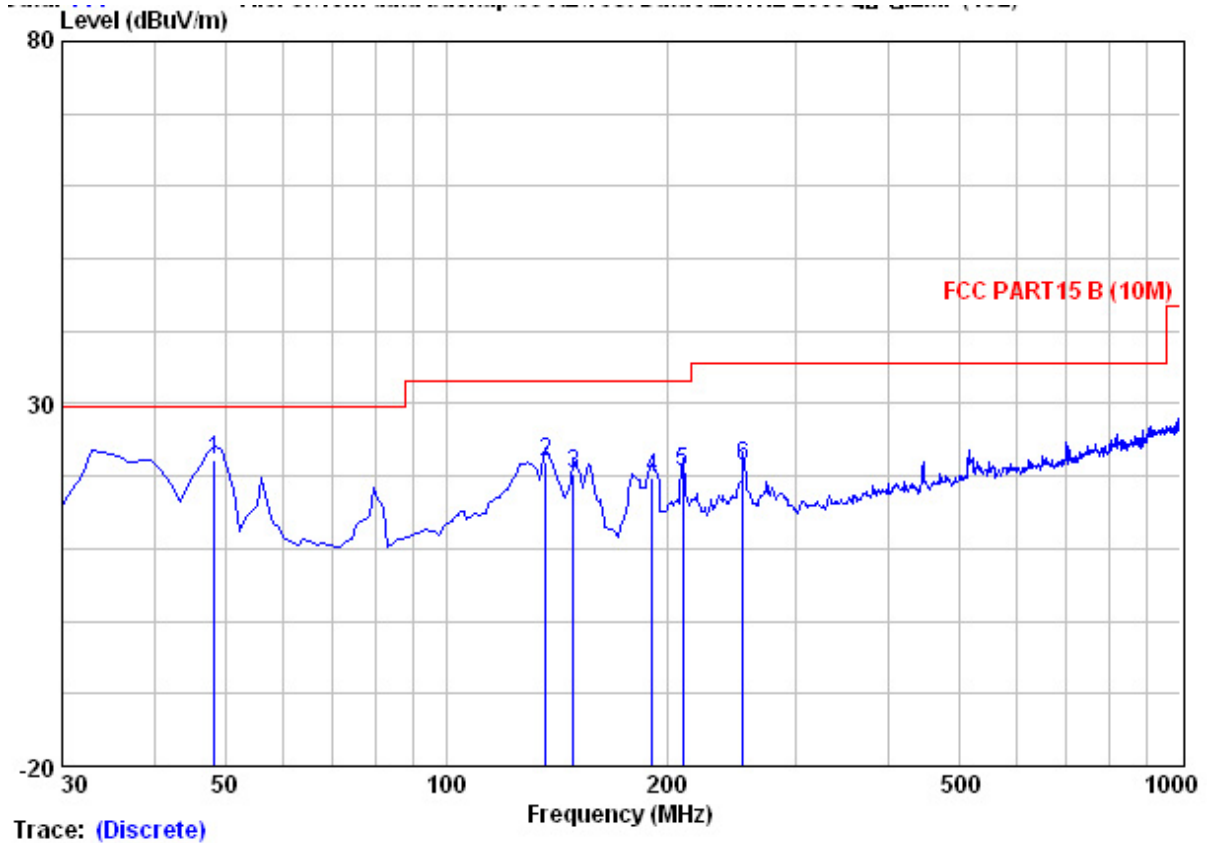
Note: The Corrected QP Level included The Cable attenuation and The Antenna Factor.

Test was performed at 10m semi-anechoic chamber.

2.1.4 Test Curves

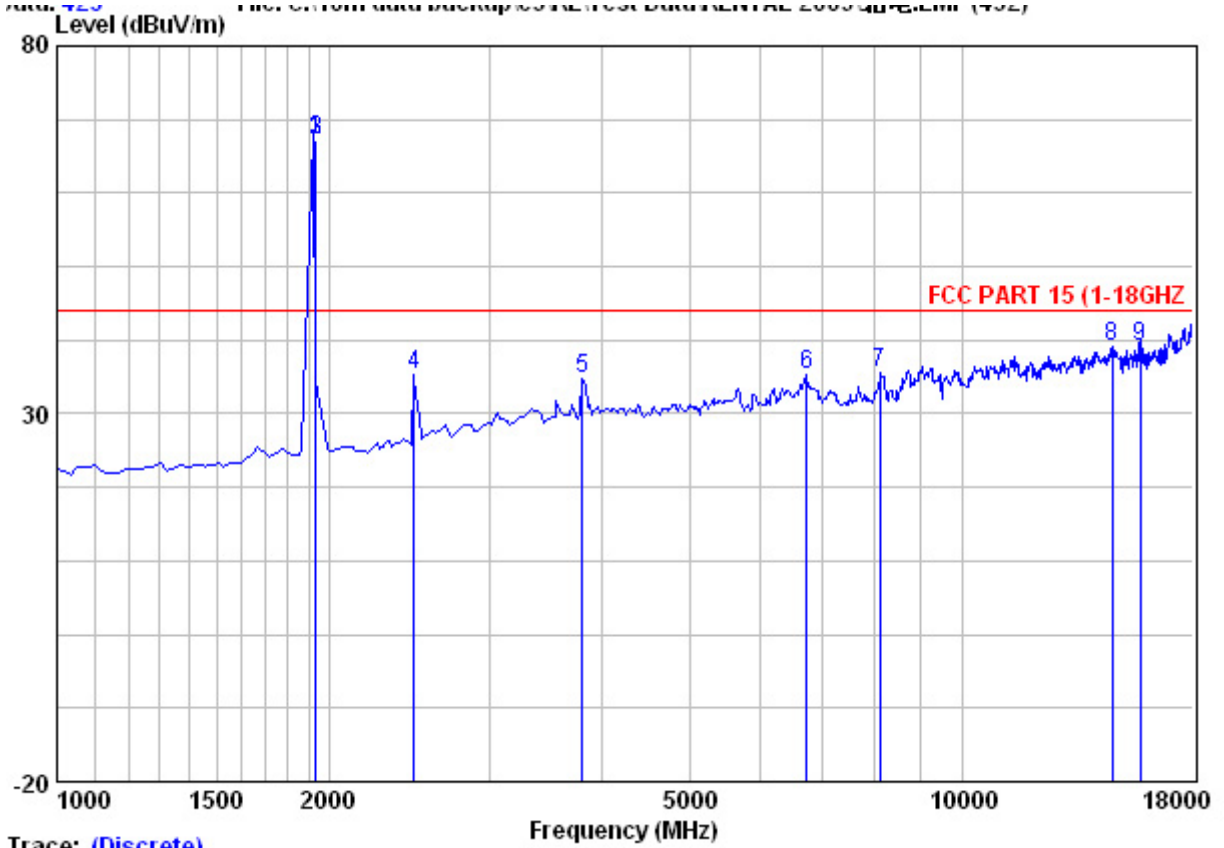
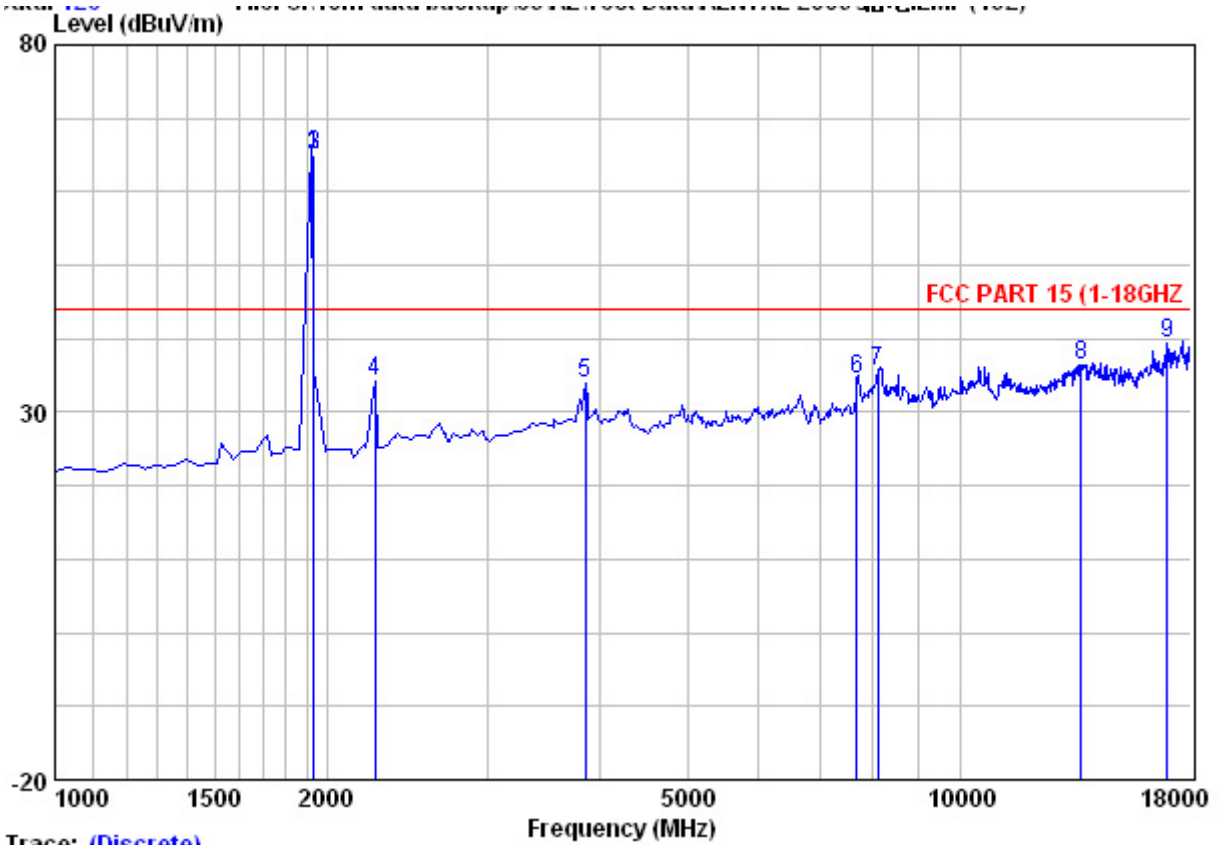


Horizontal Radiated Emission Plot (Peak, Max Hold Mode) 30-1000MHz



Vertical Radiated Emission Plot (Peak, Max Hold Mode) 30-1000MHz

Note: The Curves included The Cable attenuation and The Antenna Factor.
CDMA frequencies were included.

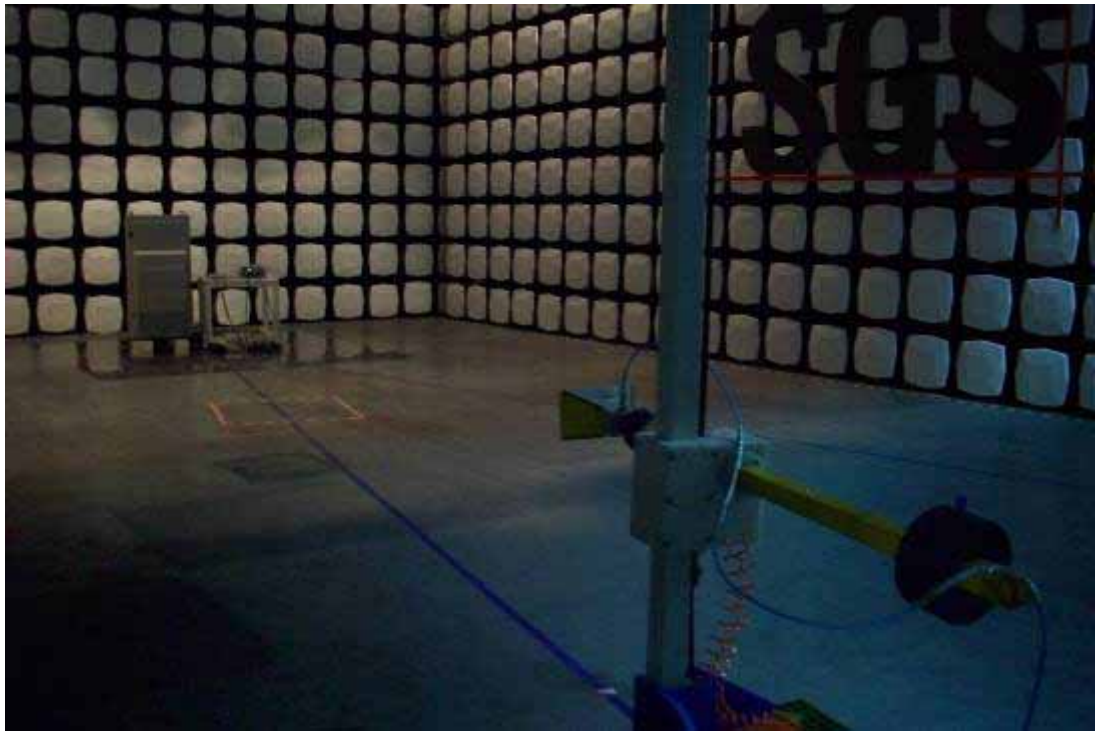


Note: The Curves included The Cable attenuation and The Antenna Factor.
CDMA frequencies were included.

2.1.5 Test Setup



Radiated Emission Test Set-Up 30-1000MHz



Radiated Emission Test Set-Up 1-18GHz

END OF THE TEST REPORT