



MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

33439 WESTERN AVENUE ! UNION CITY, CALIFORNIA 94587 ! PHONE (510) 489-6300 ! FAX (510) 489-6372

August 22, 2007

NEC Infrontia, Inc
6535 North State Highway 161
Irving, TX 75039

Dear Patricia Von Preysing,

Enclosed is the EMC test report for compliance testing of the NEC Infrontia, Inc, ZT III: SN8158 CSEV as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B for a Class A Digital Device & ICES-003, Issue 4 February 2004 and Subpart D & RSS-213, Issue 2 December 2005 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Sanchez
Documentation Department

Reference: (\NEC Infrontia, Inc\80273-FCC15D Rev. 1)

Certificates and reports shall not be reproduced except in full, without the written permission of MET Laboratories, Inc. While use of the National Voluntary Laboratory Accreditation Program (NVLAP) letters or the NVLAP Logo, the Standards Council of Canada Logo, or the Nationally Recognized Testing Laboratory (NRTL) Letters in this report reflects MET Accreditation under these programs, these letters, logo, or statements do not claim product endorsement by NVLAP or any Agency of the U.S. Government. This letter of transmittal is not a part of the attached report.



Union City Certificate
0591-02

The Nation's First Licensed Nationally Recognized Testing Laboratory

NVLAP
UNION CITY
LAB CODE
200445-0



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Cover Page
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

Electromagnetic Compatibility Criteria Test Report

for the

**NEC Infrontia, Inc
Model ZT III: SN8158 CSEV**

Tested under
the FCC & Industry Canada Certification Rules
contained in
Title 47 of the CFR, Part 15. Subpart B & ICES-003, Issue 4 February 2004
for Unintentional Radiators
Title 47 of the CFR, Part 15. Subpart D & RSS-213, Issue 2 December 2005
for Intentional Radiators

MET Report: EMCS80273-FCC15D Rev. 1

July 3, 2007

Prepared For:

**NEC Infrontia, Inc
6535 North State Highway 161
Irving, TX 75039**

Prepared By:
MET Laboratories, Inc.
4855 Patrick Henry Dr.
Santa Clara, CA 95054



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Cover Page
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

Electromagnetic Compatibility Criteria Test Report

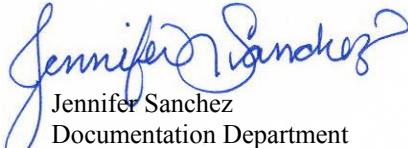
for the

**NEC Infrontia, Inc
Model ZT III: SN8158 CSEV**

Tested Under

the FCC Certification Rules
contained in
Title 47 of the CFR, Part 15. Subpart B & ICES-003, Issue 4 February 2004
for Unintentional Radiators
Title 47 of the CFR, Part 15. Subpart D & RSS-213, Issue 2 December 2005
for Intentional Radiators


Shawn McMillen, Project Engineer
Electromagnetic Compatibility Lab


Jennifer Sanchez
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15 Subparts B & D, of the FCC Rules under normal use and maintenance.


Tony Permsombut, Manager

Electromagnetic Compatibility Lab



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Report Status
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	July 3, 2007	Initial Issue.
1	August 22, 2007	Corrected grantee code.



Table of Contents

I.	Executive Summary	1
	A. Purpose of Test	2
	B. Executive Summary	2
II.	Equipment Configuration	3
	A. Overview.....	4
	B. References.....	5
	C. Test Site	6
	D. Description of Test Sample.....	6
	E. Equipment Configuration.....	8
	F. Support Equipment	8
	G. Ports and Cabling Information.....	8
	H. Mode of Operation.....	9
	I. Method of Monitoring EUT Operation.....	9
	J. Modifications	9
	a) Modifications to EUT.....	9
	b) Modifications to Test Standard.....	9
	K. Disposition of EUT	9
III.	Electromagnetic Compatibility Criteria for Unintentional Radiators	10
	§ 15.107(a) Conducted Emissions Limits.....	11
	§ 15.109(a) Radiated Emission Limits	15
	§ 15.09(a) Radiated Emissions Limits.....	15
IV.	Electromagnetic Compatibility Criteria for Intentional Radiators.....	20
	§ 15.207(a) Conducted Emissions Limits.....	21
	§ 15.209(a) Radiated Emissions Limits.....	22
	§ 15.247(d) Spurious Emissions Requirements – Radiated.....	22
	§ 15.303(c) Emission Bandwidth	22
	§ 15.203 Antenna Requirement.....	22
	§ 15.319 Use of Digital Modulation.....	22
	§ 15.319(c) Peak Transmit Output	22
	§ 15.319(d) Power Spectral Density.....	22
	§ 15.319(e) Power Adjustment for Antenna Gain	22
	§ 15.319(f) Automatically Discontinue Transmission.....	22
	§ 15.319(i) RF Exposure	22
	§ 15.323(d)(1) Spurious Emissions	22
	§ 15.323(c)(1) Monitoring Time	22
	§ 15.323(c)(2) Monitoring Threshold.....	22
	§ 15.323(c)(3) Maximum Transmit Time.....	22
	§ 15.323(c)(4) System Acknowledgment	22
	§ 15.323(c)(5) Least Interfered Channel	22
	§ 15.323(c)(5) Channel Confirmation	22
	§ 15.323(c)(5) Power Measurement Resolution	22
	§ 15.323(c)(5) Segment Occupancy	22
	§ 15.323(c)(6) Random Waiting	22
	§ 15.323(c)(7) Monitoring Bandwidth	22
	§ 15.323(c)(7) Monitoring Reaction Time	22
	§ 15.323(c)(8) Monitoring Antenna	22
	§ 15.323(c)(9) Monitoring Threshold Relaxation.....	22
	§ 15.323(c)(10) Duplex System LBT	22
	§ 15.323(c)(11) Alternate Monitoring Channel	22



§ 15.323(c)(12) Fair Access	22
§ 15.323(e) Frame Period	22
§ 15.323(f) Frequency Stability	22
V. Test Equipment	22
VI. Certification & User's Manual Information	22
A. Certification Information	22
B. Label and User's Manual Information	22
VII. ICES-003 Procedural & Labeling Requirements	22

List of Tables

Table 1 Executive Summary of EMC Part 15 Subpart D Compliance Testing	2
Table 2. Summary of EUT Specifications	4
Table 3. Equipment Configuration	8
Table 4. Support Equipment	8
Table 5. Ports and Cabling Information	8
Table 6. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)	11
Table 7. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)	12
Table 8. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)	12
Table 9. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)	15
Table 10. Radiated Emissions Limits Test Results, 30 MHz – 1 GHz	16
Table 11. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)	21
Table 12. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)	22
Table 13. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)	22
Table 14. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)	22
Table 15. Restricted Bands of Operation	22

List of Figures

Figure 1. Block Diagram of Test Configuration (Radiated Emissions)	7
Figure 2. Block Diagram of Monitoring Reaction Time Setup	22



List of Plots

Plot 1. Maximum Radiated Emissions 30M - 1GHz for Vertical Polarity (RX antenna height 1 and 2 meter)	17
Plot 2. Maximum Radiated Emissions 30M - 1GHz for Horizontal Polarity (RX antenna height 1 and 2 meter)	18
Plot 3. Low Ch Occupied Band Width	22
Plot 4. Mid Ch Occupied Band Width	22
Plot 5. High Ch Occupied Band Width	22
Plot 6. RF Output Power Low Channel	22
Plot 7. RF Output Power Mid Channel	22
Plot 8. RF Output Power High Channel	22
Plot 9. Peak Power Spectral Density Low Channel	22
Plot 10. Peak Power Spectral Density Mid Channel	22
Plot 11. Peak Power Spectral Density High Channel	22
Plot 12. In Band Emissions Low Channel	22
Plot 13. In Band Emissions Mid Channel	22
Plot 14. In Band Emissions High Channel	22
Plot 15. Out of Band Emissions	22
Plot 16. System Acknowledgement	22
Plot 17. Timing Diagram of Pulsed Interference	22
Plot 18. Pulse Interference	22
Plot 19. Voice Carrier Channel with Pulse interference	22

List of Photographs

Photograph 1. NEC Infrontia, Inc ZT III: SN8158 CSEV	6
Photograph 2. Conducted Emissions Test Setup	14
Photograph 3. Radiated Emission Test Setup 30 MHz - 1 GHz	19
Photograph 4. Radiated Emission Test Setup	22



List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dBμA	Decibels above one microamp
dBμV	Decibels above one microvolt
dBμA/m	Decibels above one microamp per meter
dBμV/m	Decibels above one microvolt per meter
DC	Direct Current μ
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GR-1089-CORE	(GR) General Requirement(s) imposed by the NEBS standard, (CORE) Central Office Recovery Express (AT&T), (I089) specifies various parts of the General Requirements under Bellcore Technical Standard, Requirements for Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μH	microhenry
μ	microfarad
μs	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Equipment Configuration
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

I. Executive Summary



A. Purpose of Test

An EMC evaluation was performed to determine compliance of the NEC Infrontia, Inc ZT III: SN8158 CSEV, with the requirements of Part 15 Subpart B and Subpart D. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the ZT III: SN8158 CSEV. NEC Infrontia, Inc should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the ZT III: SN8158 CSEV, has been **permanently** discontinued

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart B and Subpart D, in accordance with NEC Infrontia, Inc, purchase order number 117410. All tests were conducted using measurement procedure ANSI C63.4-2003.

Requirement	FCC Part / IC Part	Test Procedure (Section numbers refer to ANSI C63.17 unless otherwise noted)	Result
Emission Bandwidth	15.303(c) & 15.323 (a) / RSS-213 Clause 6.3	6.1.3	Compliant
Labeling Requirements	15.311 & 15.19(a)(3) / RSS-213 Clause 5.1		Compliant
Conducted Emissions	15.315 & 15.207 / RSS-213 Clause 10.0	ANSI C63.4	Compliant
Antenna Requirements	15.317 & 15.203 / RSS-213 Clause 5.5	Declaration	Compliant
Use digital modulation	15.319 (b) / RSS-213 Clause 5.4	6.1.4	Compliant
Peak transmit power	15.303(f) & 15.319 (c) / RSS-213 Clause 7.1	6.1.2	Compliant
Power spectral density	15.319 (d) & 15.107 / RSS-213 Clause 7.2	6.1.5	Compliant
Power adjustment for antenna gain	15.319 (e)	4	Compliant
Automatically discontinue transmission	15.319 (f) / RSS-213 Clause 7.4.a		Compliant
RF Exposure	15.319 (i) & 1.1307(b), 2.1091 and 2.1093	ANSI/IEEE C95.1	Compliant
Spurious emissions conducted	15.323(12)(g) / RSS-213 Clause 7.3	6.1.6	Compliant
Monitoring time	15.323 (c)(1) / RSS-213 Clause 8.4	7.3.4	Compliant
Monitoring threshold	15.323 (c)(2) / RSS-213 Clause 8.4	7.3.1	Compliant
Maximum transmit time	15.323 (c)(3) / RSS-213 Clause 8.4	8.2.2	Compliant
System acknowledgement	15.323 (c)(4) / RSS-213 Clause 8.4(c)(4)	8.1.1 & 8.1.2	Compliant
Least Interfered	15.323 (c)(5.1)	7.3.2 & 7.3.3	Compliant
Channel confirmation	15.323 (c)(5.2)	7.3.3 & 7.3.4	Compliant
Power measurement resolution	15.323 (c)(5.3) / RSS-213 Clause 8.4(c)(5)	7.3.3	Compliant
Segment occupancy	15.323 (c)(5.4)	Declaration	Compliant
Random waiting	15.323 (c)(6) / RSS-213 Clause 8.4	8.1.3	Not Applicable
Monitoring bandwidth	15.323 (c)(7.1) / RSS-213 Clause 8.4(c)(7)	7.4	Compliant
Monitoring reaction time	15.323 (c)(7.2) / RSS-213 Clause 8.4(c)(7)	7.5	Compliant
Monitoring antenna	15.323 (c)(8) / RSS-213 Clause 8.4(c)(8)	4	Compliant
Monitoring threshold relaxation	15.323 (c)(9) / RSS-213 Clause 8.4(c)(9)	4	Not Applicable
Duplex system LBT	15.323 (c)(10) / RSS-213 Clause 8.4(c)(10)	8.3	Compliant
Alternate monitoring interval	15.323 (c)(11) / RSS-213 Clause 8.4(c)(11)	8.4	Not Applicable
Fair access	15.323 (c)(12) / RSS-213 Clause 8.4(c)(12)	Declaration	Not Applicable
Frame period	15.323 (e) / RSS-213 Clause 8.4(d)	6.2.2 & 6.2.3	Compliant
Frequency stability	15.323 (f) / RSS-213 Clause 8.4(d)	6.2.1	Compliant
Radiated Out of Band Emissions	15.309 (b) & 15.209 / RSS-213 Clause 6.2		Compliant

Table 1 Executive Summary of EMC Part 15 Subpart D Compliance Testing



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Equipment Configuration
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

II. Equipment Configuration



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Equipment Configuration
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

A. Overview

MET Laboratories, Inc. was contracted by NEC Infrontia, Inc to perform testing on the ZT III: SN8158 CSEV, under NEC Infrontia, Inc's purchase order number 117410.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the NEC Infrontia, Inc, ZT III: SN8158 CSEV.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	ZT III: SN8158 CSEV
Model(s) Covered:	ZT III: SN8158 CSEV
EUT Specifications:	Primary Power: 24-27VDC 170mA, -48VDC, 80mA
	FCC ID: UI3SN8158CSEV
	IC: 140L-SN8158CS.
	Operating Mode TDMA
	Type of Modulations: $\pi/4$ QPSK
	Emission Designators: 297KG7W
	Equipment Code: PUB
	Peak RF Output Power: 16.58dBm (0.0454W)
	EUT Frequency Ranges: 1920.35-1929.65MHz
	Frame Period 5ms
Analysis:	Time Slot Length 625 μ s
	Slots per Frame 8
	Number of Channels 20
	The results obtained relate only to the item(s) tested.
Environmental Test Conditions:	Temperature: 15-35° C
	Relative Humidity: 30-60%
	Barometric Pressure: 860-1060 mbar
Evaluated by:	Shawn McMillen
Date(s):	July 3, 2007

Table 2. Summary of EUT Specifications



B. References

CFR 47, Part 15, Subpart D	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories

C. Test Site

All testing was performed at MET Laboratories, Inc., 4855 Patrick Henry Dr., Building 6, Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories. In accordance with §2.948(d), MET Laboratories has been accredited by A2LA (Certificate Number 591.02).

D. Description of Test Sample

The NEC Infrontia, Inc ZT III: SN8158 CSEV, is a 1.9GHz unlicensed band wireless base station for NEC voice communication system. It has a two-wire U-interface for connecting with the NEC PBX system and a wireless interface that conforms to FCC Part subpart D. The EUT is designed to handle up to 3 simultaneous wireless voice calls used with the NEC PS wireless handsets.



Photograph 1. NEC Infrontia, Inc ZT III: SN8158 CSEV

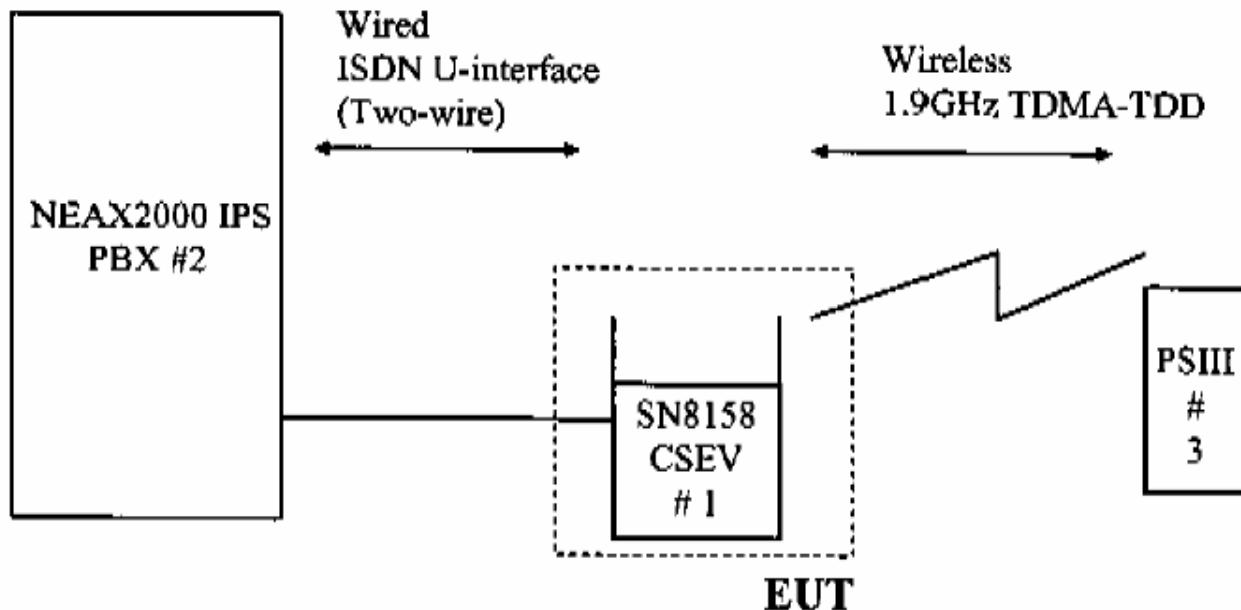


Figure 1. Block Diagram of Test Configuration (Radiated Emissions)



E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Serial Number
1	Zone Transceiver III	SN8158 CSEV	-

Table 3. Equipment Configuration

F. Support Equipment

NEC Infrontia, Inc supplied support equipment necessary for the operation and testing of the ZT III: SN8158 CSEV. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number
2	NEAX2000 IPS PBX System	NEC	-
3	DTTERM PSIII wireless handset	NEC	-

Table 4. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded (Yes/No)	Termination Box ID & Port ID
1	ISDN U interface	RJ45	1	23	No	NEAX2000 IPS PBX System, Ref. ID 2

Table 5. Ports and Cabling Information



H. Mode of Operation

EUT will be connected via a wired interface to NEC PBX system, enabling a normal operation on the wireless interface.

I. Method of Monitoring EUT Operation

EUT has LED indicators listed below:

1. POWER LED (green) should be ON indicating proper DC voltage supply exist
2. STATUS LED (green and red) should show steady or flashing Green LED ON only.
3. MAINTENANCE LED (two green) should be turned OFF.

J. Modifications

a) Modifications to EUT

No modifications were made.

b) Modifications to Test Standard

No modifications were made.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to NEC Infrontia, Inc upon completion of testing.



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Unintentional Radiators
CFR Title 47, Part 15, Subpart B; ICES-003

III. Electromagnetic Compatibility Criteria for Unintentional Radiators



Electromagnetic Compatibility Criteria for Unintentional Radiators

§ 15.107 Conducted Emissions Limits

Test Requirement(s): **15.107 (a)** “Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 6. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.”

15.107 (b) “For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 6. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.”

Frequency range (MHz)	15.107(b), Class A Limits (dB μ V)		15.107(a), Class B Limits (dB μ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15- 0.5	79	66	66 - 56	56 - 46
0.5 – 5.0	73	60	56	46
5.0 - 30	73	60	60	50

Note 1 — The lower limit shall apply at the transition frequencies.

Table 6. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)

Test Procedures:

The EUT was placed on a 0.8m-high wooden table inside a semi-anechoic chamber. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50 Ω /50 μ H LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were measured using a quasi-peak and/or average detector as appropriate.

Test Results:

The EUT was found compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s):

Tony Permsombut

Test Date(s):

June 30, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Unintentional Radiators
CFR Title 47, Part 15, Subpart B; ICES-003

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.158	53.97	79	PASS	-25.03	47.72	66	PASS	-18.28
0.318	47.26	79	PASS	-31.74	46.28	66	PASS	-19.72
0.478	50.31	79	PASS	-28.69	49.45	66	PASS	-16.55
5.7	42.36	73	PASS	-30.64	28.59	60	PASS	-31.41

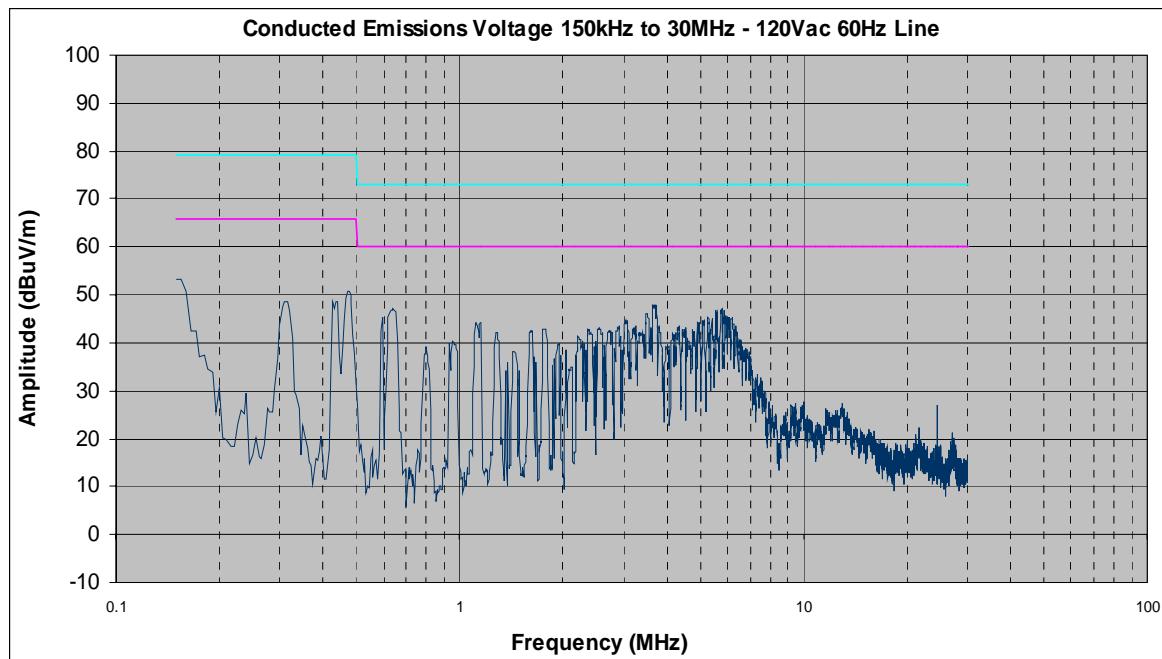
Table 7. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

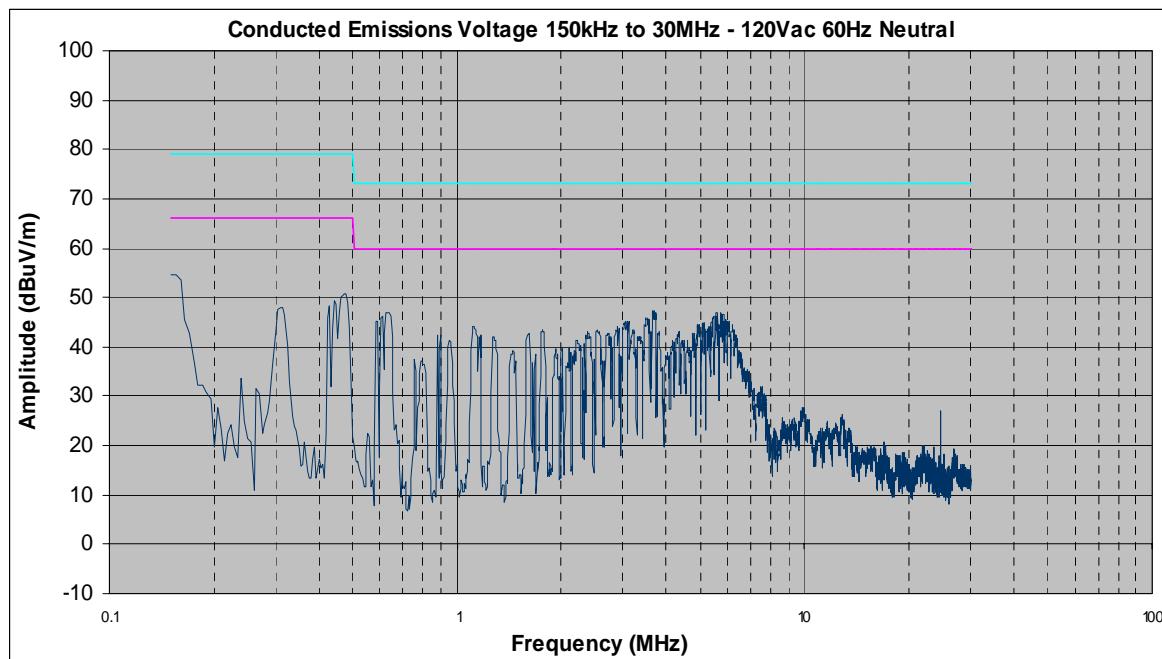
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.159	53.14	79	PASS	-25.86	45.28	66	PASS	-20.72
0.319	47.48	79	PASS	-31.52	46.26	66	PASS	-19.74
0.479	50.26	79	PASS	-28.74	49.43	66	PASS	-16.57
5.7	43.16	73	PASS	-29.84	28.77	60	PASS	-31.23

Table 8. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, (120 VAC, 60 Hz)



Conducted Emission, Phase Line Plots



Conducted Emission, Neutral Line Plots

Conducted Emission Limits Test Setup



Photograph 2. Conducted Emissions Test Setup



Radiated Emission Limits

§ 15.109 Radiated Emissions Limits

Test Requirement(s): **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 9.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 9.

Frequency (MHz)	Field Strength (dB μ V/m)	
	§15.109 (b), Class A Limit (dB μ V) @ 10m	§15.109 (a), Class B Limit (dB μ V) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 9. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures:

The EUT was placed on a 0.8m-high wooden table inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 10 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Test Results:

The EUT was found Compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits

Test Engineer(s):

Tony Permsombut

Test Date(s):

July 2, 2007



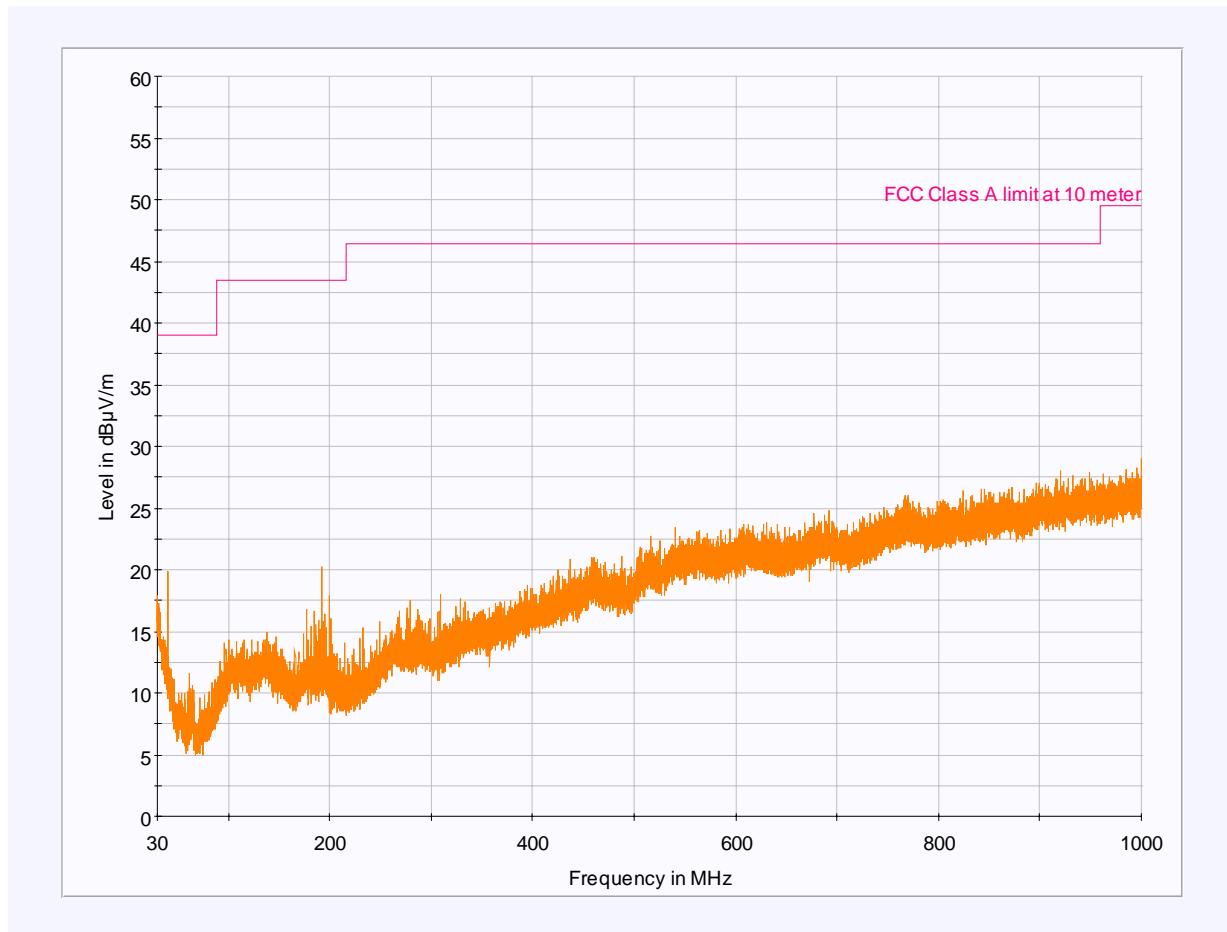
NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Unintentional Radiators
CFR Title 47, Part 15, Subpart B; ICES-003

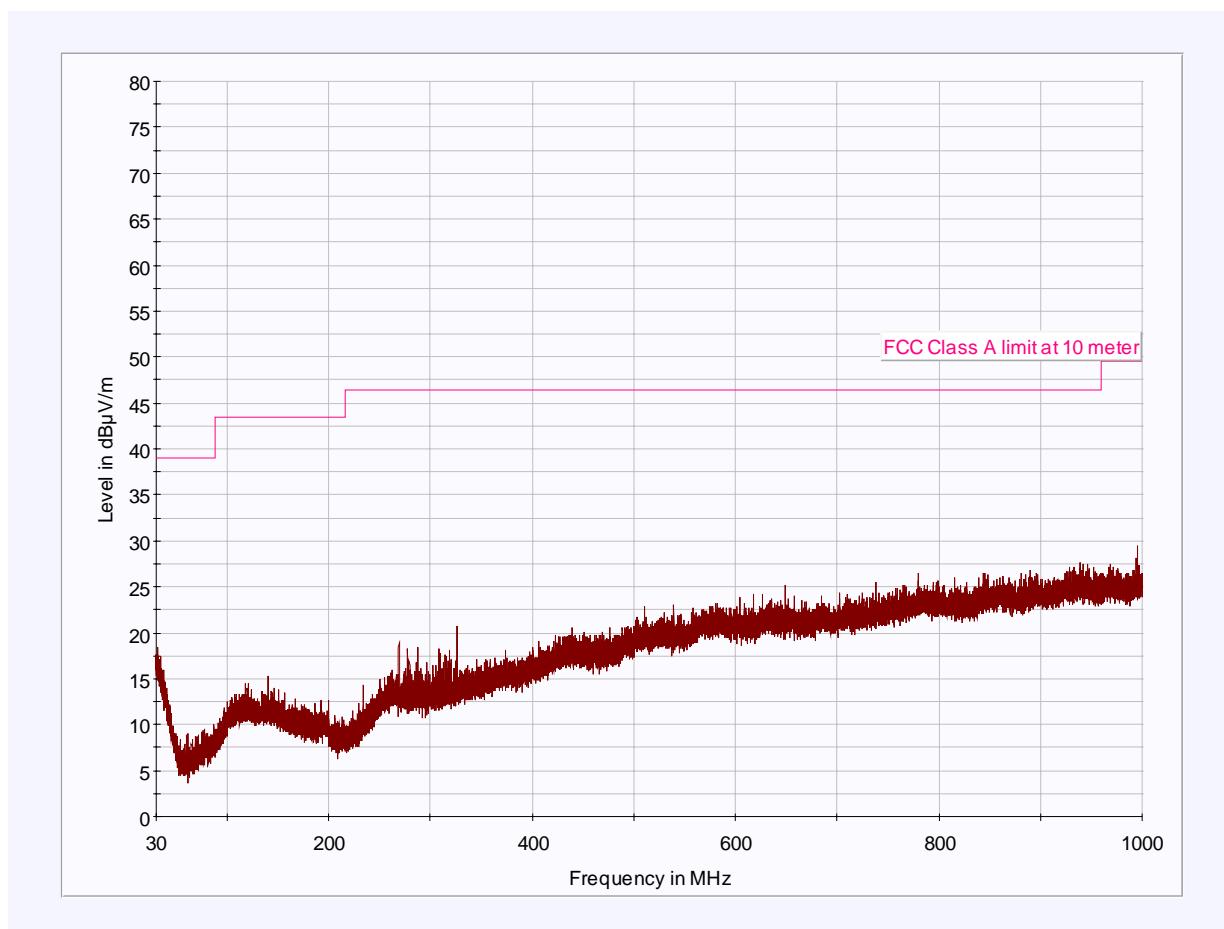
Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected Amplitude (dBuv)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Corrected Amplitude (dBuv)	Limit (dBuv)	Margin (dB)
40.96	V	174	1	8.84	11.62	1.03	21.49	39.00	-17.51
40.96	H	188	1.91	0.85	12.82	1.03	14.70	39.00	-24.30
192	V	0	1	9.07	9.46	2.48	21.01	43.50	-22.49
268.84	H	83	2.5	-0.36	13.34	2.72	15.70	46.40	-30.70
308.72	V	195	1	-1.54	13.17	2.98	14.61	46.40	-31.79
311.64	H	76	2.59	1.03	13.23	2.99	17.26	46.40	-29.14

Table 10. Radiated Emissions Limits Test Results, 30 MHz – 1 GHz



Plot 1. Maximum Radiated Emissions 30M - 1GHz for Vertical Polarity (RX antenna height 1 and 2 meter)



Plot 2. Maximum Radiated Emissions 30M - 1GHz for Horizontal Polarity (RX antenna height 1 and 2 meter)

Radiated Emission Limits Test Setup



Photograph 3. Radiated Emission Test Setup 30 MHz - 1 GHz



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

IV. Electromagnetic Compatibility Criteria for Intentional Radiators



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207 Conducted Emissions Limits

Test Requirement(s):

§ 15.207 (a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB μ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 11. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure:

The EUT was placed on a 0.8 m-high wooden table inside a semi-anechoic chamber. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω /50 μ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-1992 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω /50 μ H LISN as the input transducer to an EMC/field intensity meter. The tests were conducted in a RF-shielded enclosure.

Test Results:

The EUT was found compliant with the requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s):

Tony Permsombut

Test Date(s):

July 2, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.163	53.54	65.31	PASS	-11.77	43.23	55.31	PASS	-12.08
0.327	41.49	59.53	PASS	-18.04	39.47	49.53	PASS	-10.06
0.491	42.69	56.15	PASS	-13.46	40.34	46.15	PASS	-5.81

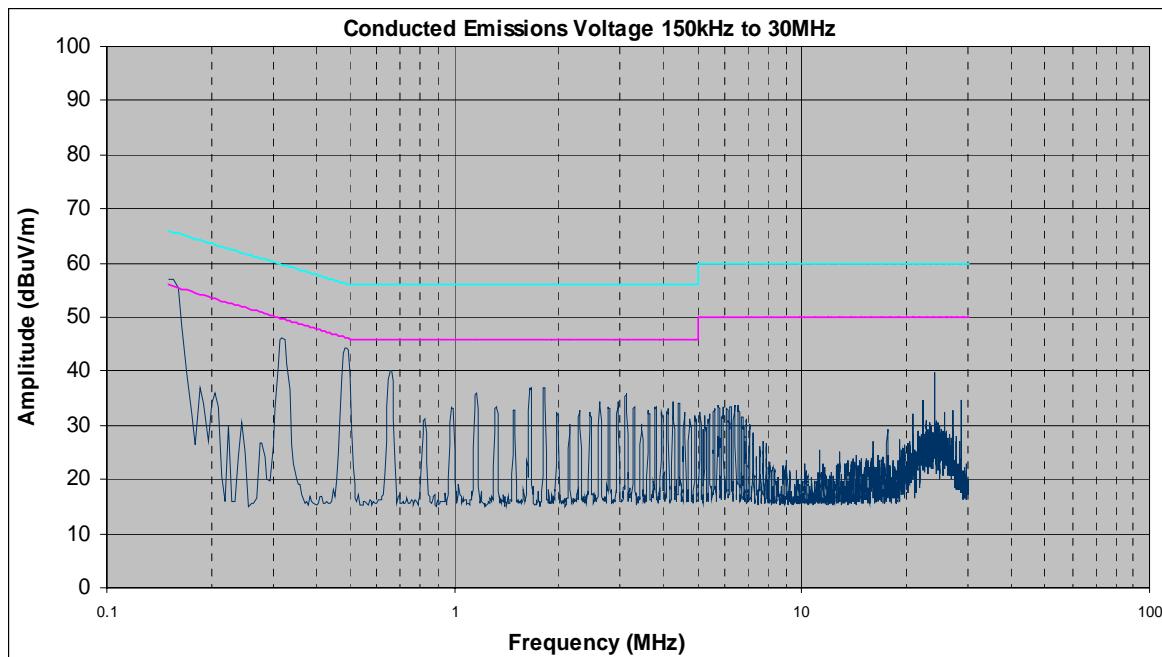
Table 12. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

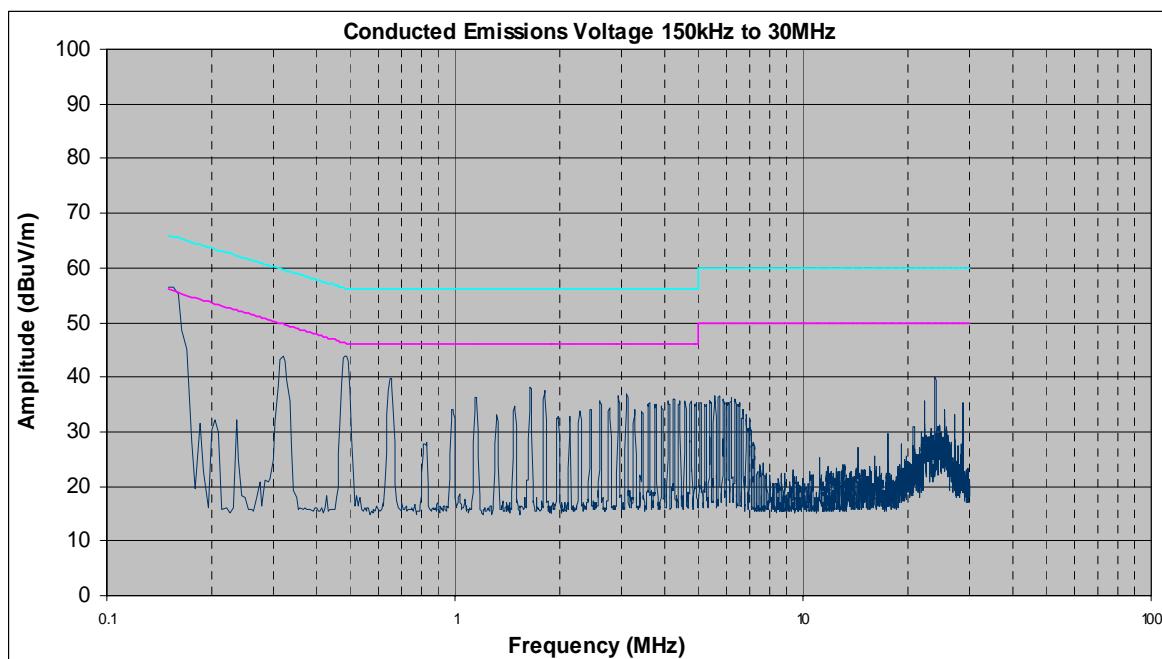
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.163	53.87	65.31	PASS	-11.44	43.35	55.31	PASS	-11.96
0.327	41.6	59.53	PASS	-17.93	39.51	49.53	PASS	-10.02
0.491	42.64	56.15	PASS	-13.51	40.31	46.15	PASS	-5.84

Table 13. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, (120 VAC, 60 Hz)



Conducted Emission, Phase Line Plots



Conducted Emission, Neutral Line Plots



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.209 Radiated Emissions Limits

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 14.

Frequency (MHz)	§ 15.209(a), Radiated Emission Limits (dB μ V) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 14. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedure: The transmitter was set to the mid channel at the highest output power and placed on a 0.8 m high wooden table inside in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast with 1 m to 4 m height to determine worst case orientation for maximum emissions. Measurement were repeated the measurement at the low and highest channels.

For frequencies from 30 MHz to 1 GHz, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

In accordance with §15.35(b) the limit on the radio frequency emissions as measured using instrumentation with a peak detector function shall be 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

EUT Field Strength Final Amplitude = Raw Amplitude – Preamp gain + Antenna Factor + Cable Loss – Distance Correction Factor (1 meter)

Test Results: The EUT was found compliant with the Radiated Emission limits of **§15.209(a)** for Intentional Radiators. See following pages for detailed test results.

Test Engineer(s): Shawn McMillen

Test Date(s): June 25, 2007



§ 15.247(d) Harmonic Emissions – Radiated

Test Requirements: § 15.247(d); § 15.209 (a); § 15.205: Emissions outside the frequency band.

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§ 15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110-----	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505-----	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905-----	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128-----	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775-----	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775-----	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218-----	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825-----	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225-----	123–138	2200–2300	14.47–14.5
8.291–8.294-----	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366-----	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675-----	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475-----	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293-----	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025-----	240–285	3345.8–3358.36.	43–36.5
12.57675–12.57725-----	322–335.4	3600–4400	(²)

Table 15. Restricted Bands of Operation

¹ Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.

² Above 38.6



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Harmonic Emissions Requirements – Radiated

Frequency (GHz)	Receive Antenna Polarity (H/V)	Uncorrected Field strength (dB μ V)@ 3m	Preamp (dB)	Antenna Factor (dB)	Cable Loss (dB)	Distance Correction Factor (dB)	Corrected Field Strength @ 3m (dB μ V)	Limit @ 3m (dB μ V)	Margin (dB)	Measurement Type
3840.70	V	43.2	34.0	33.0	2.5	0	44.7	74	29.3	pk
3840.70	V	38.1	34.0	33.0	2.5	0	39.6	54	14.4	avg
5761.05	V	44.6	34.3	35.1	2.9	0	48.4	74	25.7	pk
7681.40	V	41.6	34.7	37.0	3.5	0	47.4	74	26.6	pk
7681.40	V	37.2	34.7	37.0	3.5	0	43.0	54	11.0	avg
9601.75	V	43.2	35.9	38.4	4.2	0	49.9	74	24.1	pk
11522.10	V	46.1	36.5	39.7	4.6	0	53.9	74	20.1	pk
11522.10	V	32.6	36.5	36.7	4.6	0	37.4	54	16.6	avg
13442.45	V	44.8	34.6	40.2	5.6	0	56.0	74	18.0	pk

Low Channel 1920.35

Frequency (GHz)	Receive Antenna Polarity (H/V)	Uncorrected Field strength (dB μ V)@ 3m	Preamp (dB)	Antenna Factor (dB)	Cable Loss (dB)	Distance Correction Factor (dB)	Corrected Field Strength (dB μ V)	Limit @ 3m (dB μ V)	Margin (dB)	Measurement Type
3849.10	V	42.9	34.0	33.0	2.5	0	44.4	74	29.6	pk
3849.10	V	36.2	34.0	33.0	2.5	0	37.7	54	16.3	avg
5773.65	V	43.5	34.3	35.1	2.9	0	47.3	74	26.8	pk
7698.20	V	40.6	34.7	37.0	3.5	0	46.4	74	27.6	pk
7698.20	V	38.2	34.7	37.0	3.5	0	44.0	54	10.0	avg
9622.75	V	45.5	35.9	38.4	4.2	0	52.2	74	21.8	pk
11547.30	V	47.1	36.5	39.7	4.6	0	54.9	74	19.1	pk
11547.30	V	33.2	36.5	36.7	4.6	0	38.0	54	16.0	avg
13471.85	V	47.0	34.6	40.2	5.6	0	58.2	74	15.8	pk

Mid Channel 1924.55

Frequency (GHz)	Receive Antenna Polarity (H/V)	Uncorrected Field strength (dB μ V)@ 3m	Preamp (dB)	Antenna Factor (dB)	Cable Loss (dB)	Distance Correction Factor (dB)	Corrected Field Strength (dB μ V)	Limit @ 3m (dB μ V)	Margin (dB)	Measurement Type
3859.30	V	41.9	34.0	33.0	2.5	0	43.4	74	30.6	pk
3859.30	V	37.3	34.0	33.0	2.5	0	38.8	54	15.2	avg
5788.95	V	44.4	34.3	35.1	2.9	0	48.2	74	25.9	pk
7718.60	V	40.9	34.7	37.0	3.5	0	46.7	74	27.3	pk
7718.60	V	36.5	34.7	37.0	3.5	0	42.3	54	11.7	avg
9648.25	V	46.2	35.9	38.4	4.2	0	52.9	74	21.1	pk
11577.90	V	44.4	36.5	39.7	4.6	0	52.2	74	21.8	pk
11577.90	V	35.2	36.5	36.7	4.6	0	40.0	54	14.0	avg
13507.55	V	48.9	34.6	40.2	5.6	0	60.1	74	13.9	pk

High Channel 1929.65

Note: All other emissions were measured at the noise floor of the spectrum analyzer

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.209 Radiated Emissions Limits



Photograph 4. Radiated Emission Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.303 (c) Emission Bandwidth

Test Criteria: **§ 15.303(c):** For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

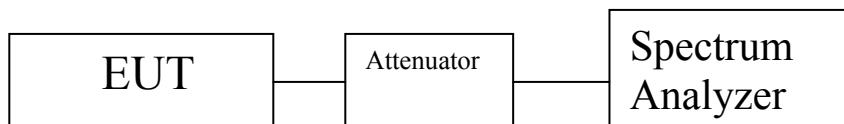
Test Procedure: Operation shall be contained within the 1920-1930 MHz band. The emission bandwidth shall be less than 2.5 MHz. The power level shall be as specified in §15.319(c), but in no event shall the emission bandwidth be less than 50 kHz

Test Results

QPSK		
Carrier Channel	Frequency (MHz)	Measured 26 dB Bandwidth (kHz)
Low	1920.35	297.5
Mid	1924.55	297.5
High	1929.65	295.0

Test Engineer(s): Shawn McMillen

Test Date(s): June 25, 2007



Block Diagram 1. Occupied Bandwidth Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 3. Low Ch Occupied Band Width



Plot 4. Mid Ch Occupied Band Width

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 5. High Ch Occupied Band Width



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

- a.) Antenna must be permanently attached to the unit.
- b.) Antenna must use a unique type of connector to attach to the EUT.
- c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested meets the criteria of this rule by virtue of having permanently installed antenna.

Model/Gain	Manufacturer
NG-070752 CS/1.9dBi	ANTEN Corporation

Test Engineer(s): Shawn McMillen



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319 Use of Digital Modulation

Test Criteria: § 15.319(b): All transmissions must use only digital modulation techniques. criteria:

Test Procedure: Attestation of manufacturer supported by reference to relevant DECT specifications.

Attestation: This device is compliant with the DECT standards described in European Standards EN 300 175-2 and EN 300 175-3. DECT transmissions are MC/TDMA/TDD (Multi carrier / Time Division Multiple Access / Time Division Duplex) using Digital QPSK modulation. For further details see operational description or relevant portions of the DECT standards.

Test Engineer(s): Shawn McMillen

Test Date(s): June 28, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319(c) Peak Transmit Power

Test Criteria: **§15.319(c):** The peak RF output power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in hertz. Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an RMS equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 6.1.2, which provides the test methodology for this provision. The EUT is controlled from a personal computer and set into continuous transmission mode.

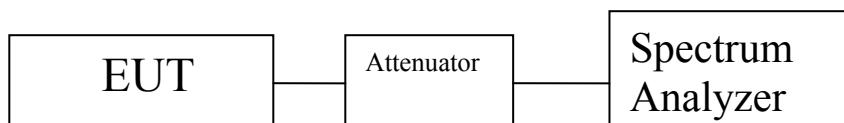
$$\begin{aligned}\text{Peak Transmit Power Limit} &= 5\log B - 10 \text{ dBm} \\ &= 5\log (0.2975 \exp 6) - 10 \text{ dBm} \\ &= 17.36 \text{ dBm}\end{aligned}$$

Test Results: Equipment complies with the Peak Transmit Output limits of § 15.319(c).

RF Transmit Power		
Carrier Channel	Frequency (MHz)	Measured Peak Output Power (dBm)
Low	1920.35	16.58
Mid	1924.55	16.49
High	1929.65	15.97

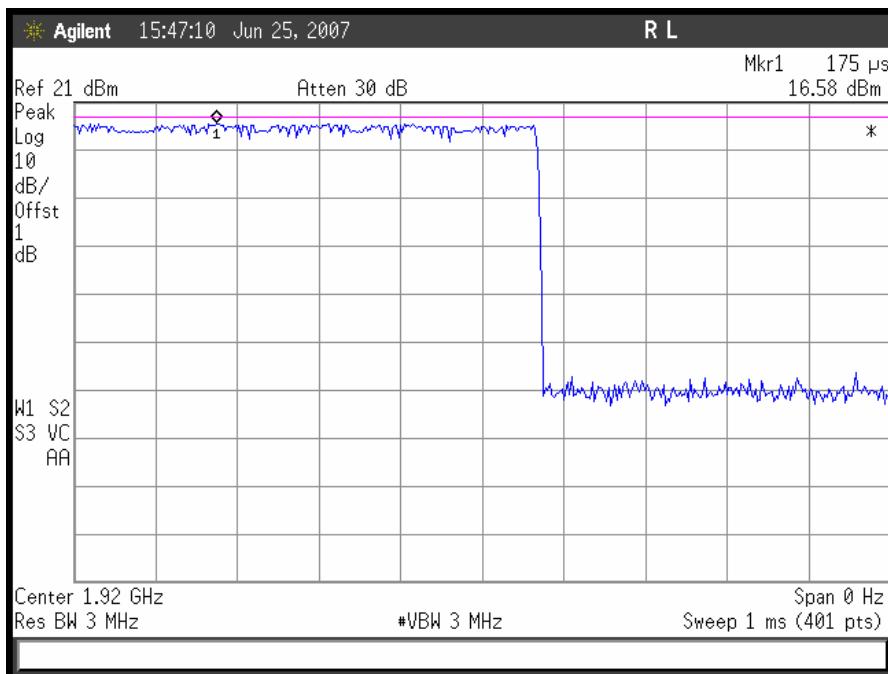
Test Engineer(s): Shawn McMillen

Test Date(s): June 25, 2007

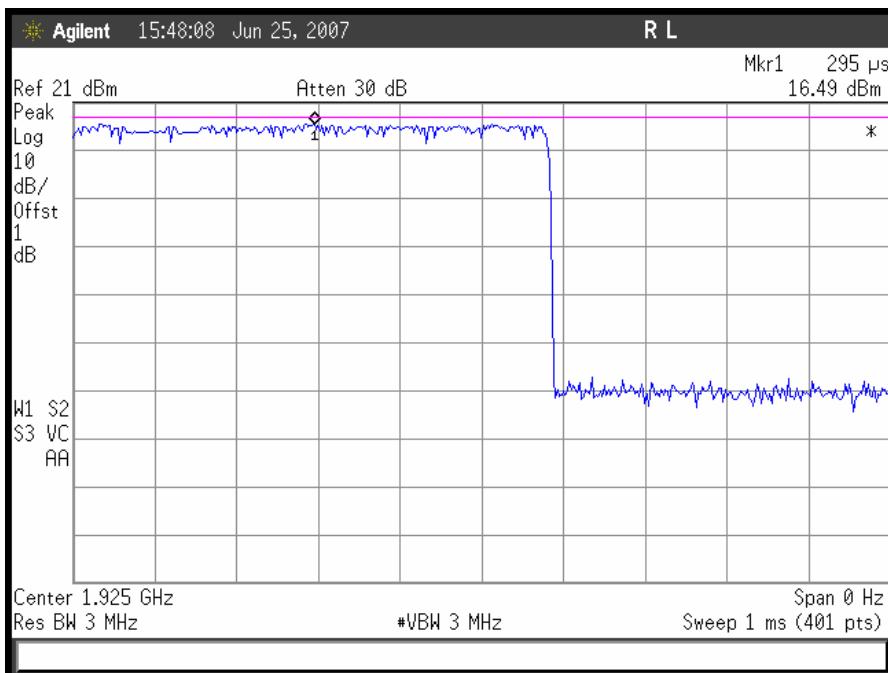


Block Diagram 2. Peak Power Output Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 6. RF Output Power Low Channel



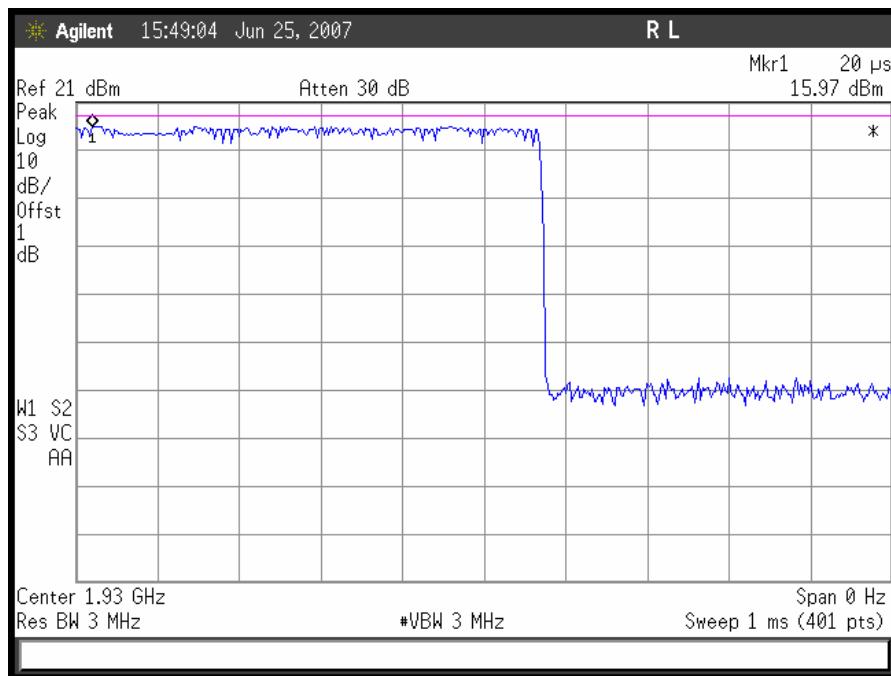
Plot 7. RF Output Power Mid Channel



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 8. RF Output Power High Channel



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319(d) Power Spectral Density

Test Criteria: **§15.319(d):** Power spectral density shall not exceed 3 mW in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

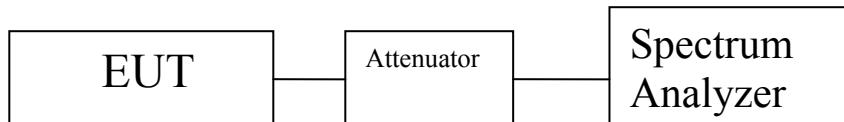
Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 6.1.5, which provides the test methodology for this provision.

Test Results: Equipment complies with the Power Spectral Density limits of **§ 15.319(c)**.

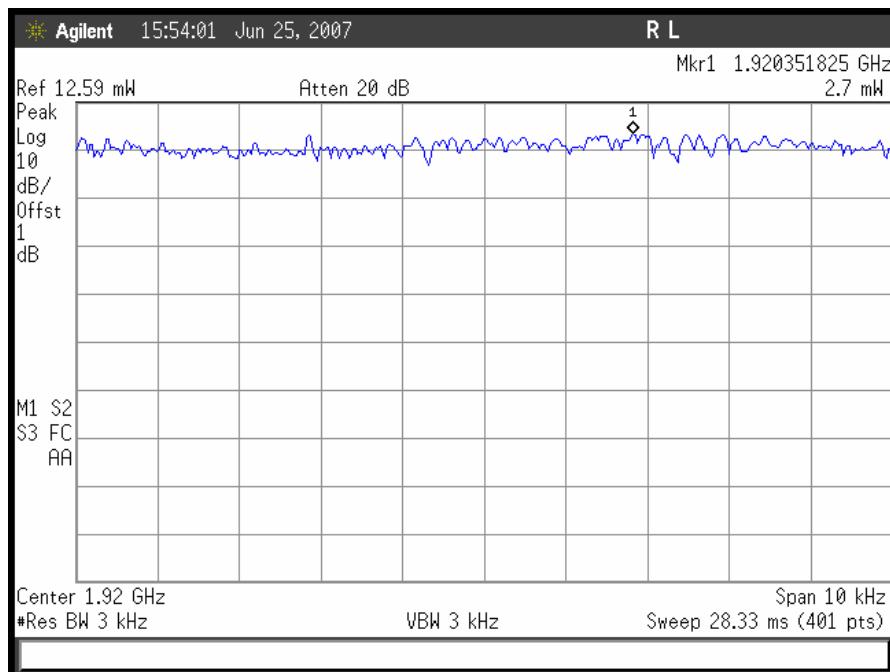
Power Spectral Density		
Carrier Channel	Frequency (MHz)	Measured Peak Power Spectral Density (mW)
Low	1920.35	2.700
Mid	1924.55	2.642
High	1929.65	2.786

Test Engineer(s): Shawn McMillen

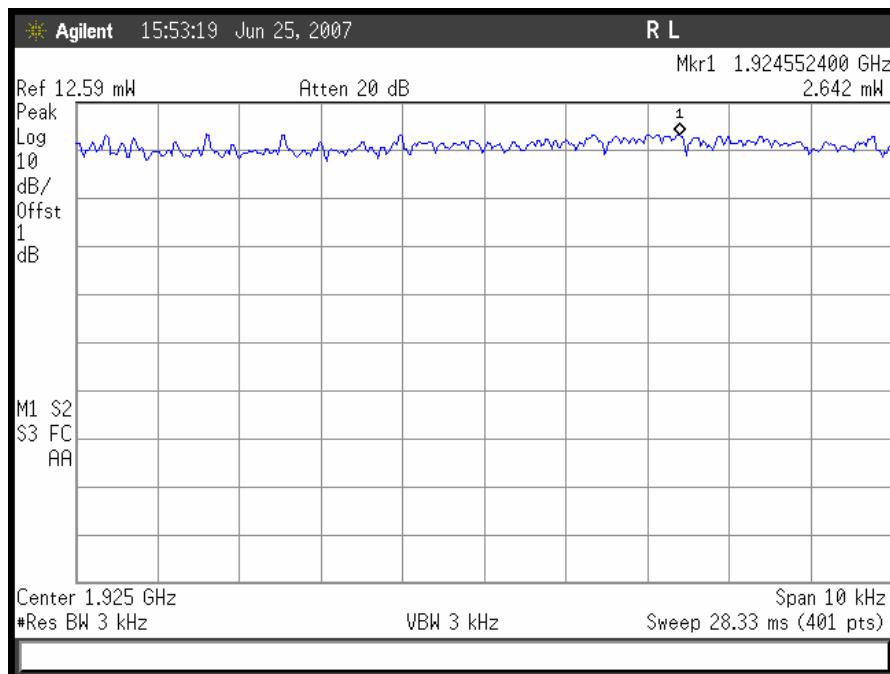
Test Date(s): June 25, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

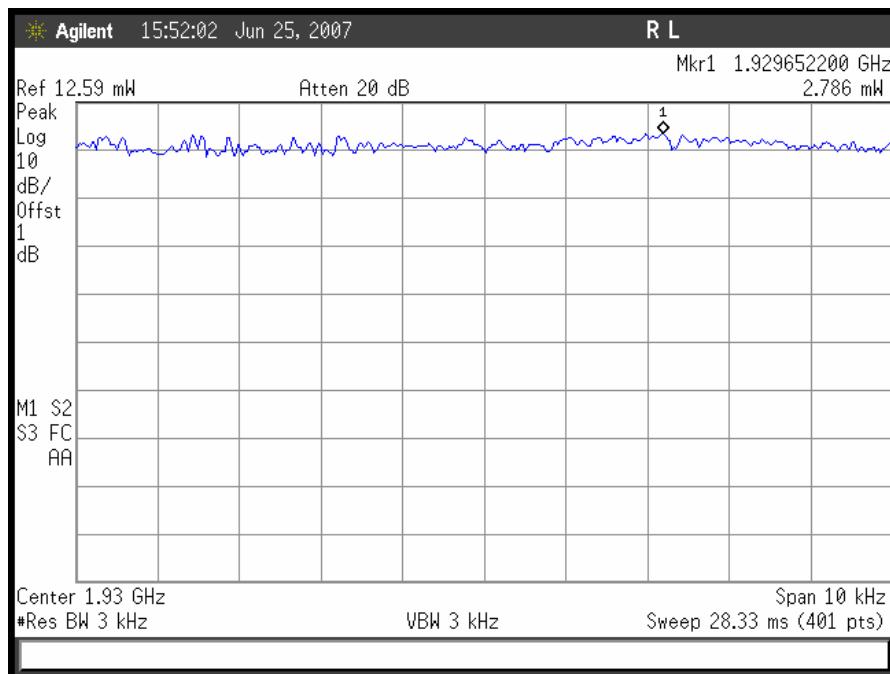


Plot 9. Peak Power Spectral Density Low Channel



Plot 10. Peak Power Spectral Density Mid Channel

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 11. Peak Power Spectral Density High Channel



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319(e) Power Adjustment for Antenna Gain

Test Criteria: **§15.319(e):** The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 6.1.5, which provides the test methodology for this provision.

Test Results: The antenna gain is 1.3dBi and therefore complies with the Power Adjustment for Antenna Gain requirements of **§15.319(e)**

Test Engineer(s): Shawn McMillen

Test Date(s): June 25, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319(f) Automatically Discontinue Transmission

Test Criteria: **§15.319(f):** The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

Test Procedure: Attestation of manufacturer supported by test results. The statement shall include a description of how the EUT operates when there is no data to transmit. This may be met by reference to relevant portions of the DECT standards.

Test Results: Equipment complies with the Automatic Discontinuance of transmission in accordance with **§ 15.319(f).**

Test Results: Equipment complies with the requirements for Automatic Discontinuance of Transmission of **§ 15.319(f).**

	Test	Reaction of EUT	Result
1	Remove Power from Companion Device	A	Pass
2	Switch off the companion device	A	Pass
3	Terminate call at the companion device	A	Pass
4	Switch off the EUT	A	Pass
5	Terminate call at the EUT	A	Pass

A - Connection was terminated and transmission ceased.

B - Connection was terminated but the EUT transmits control or signaling information.

C - Connection was terminated but the companion device transmits control or signaling information.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.319(i) RF Exposure

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit Calculation: EUT's operating frequencies @ 1920-1930 MHz; highest conducted power = 16.58dBm (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²**

EUT maximum antenna gain = 1.3 dBi.

Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (1 mW/cm²)
P = Power Input to antenna (45.5mW)
G = Antenna Gain (1.35 numeric)

$$S = (45.5 * 1.35 / 4 * 3.14 * 20^2) = (61.4 / 5024) = 0.01 \text{ mW/cm}^2$$

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(d)(1) Spurious Emissions

Test Criteria: **§15.323(d)(1): Out of Band Emissions**

Emissions shall be attenuated below a reference power of 112 mW as follows: 30 dB between the band edge and 1.25 MHz above or below the band; 50 dB between 1.25 and 2.5 MHz above or below the band; and 60 dB at 2.5 MHz or greater above or below the band.

§15.323(d)(2): In-Band Emissions

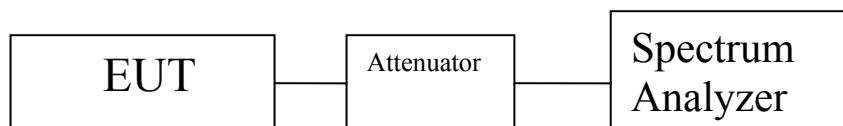
Emissions inside the band must comply with the following emission mask: In the bands between 1B and 2B measured from the center of the emission bandwidth, the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device; in the bands between 2B and 3B measured from the center of the emission bandwidth, the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator; in the bands between 3B and the band edge, the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator. "B" is defined as the emission bandwidth of the device in hertz. Compliance with the emission limits is based on the use of measurement instrumentation employing peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Procedure: For both in and out of band emissions the EUT was connected directly to a spectrum analyzer. The RBW of the spectrum analyzer was set to a minimum 1% of the emission band width.

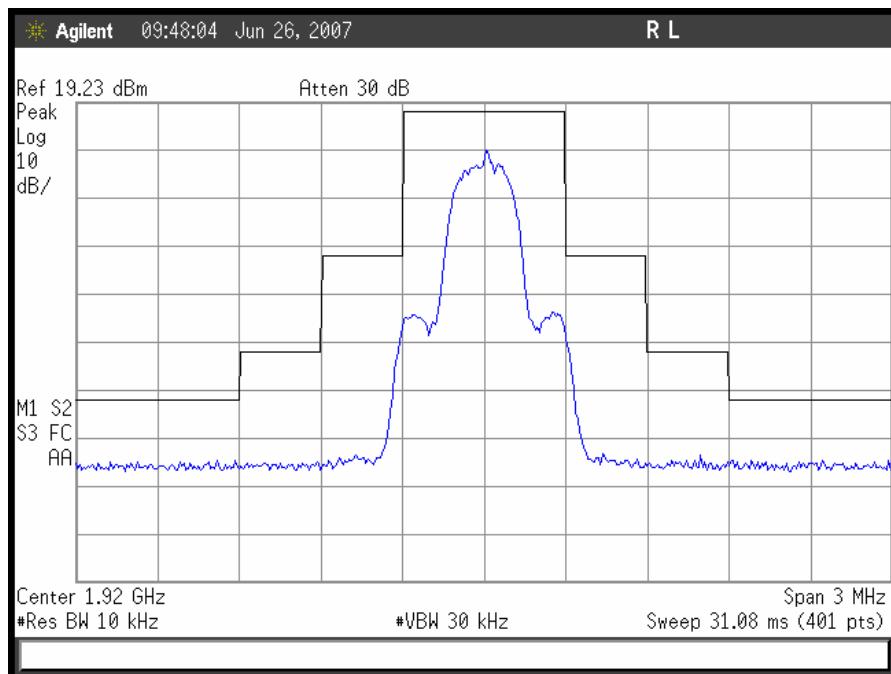
Test Results: Equipment complies with the Spurious Emission limits of **§ 15.323(d)(1)** and **§15.323(d)(2)**.

Test Engineer(s): Shawn McMillen

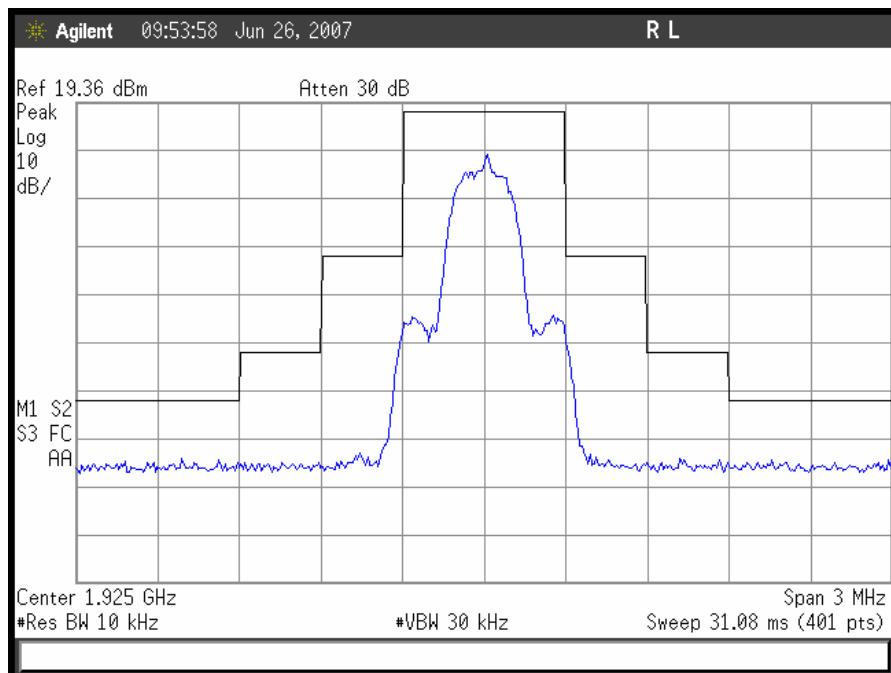
Test Date(s): June 26, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

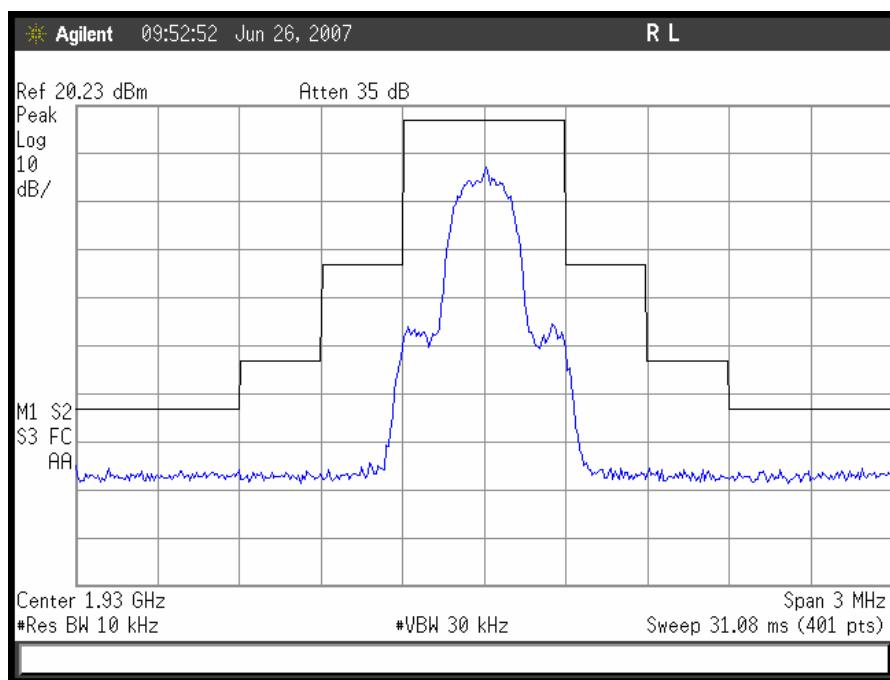


Plot 12. In Band Emissions Low Channel

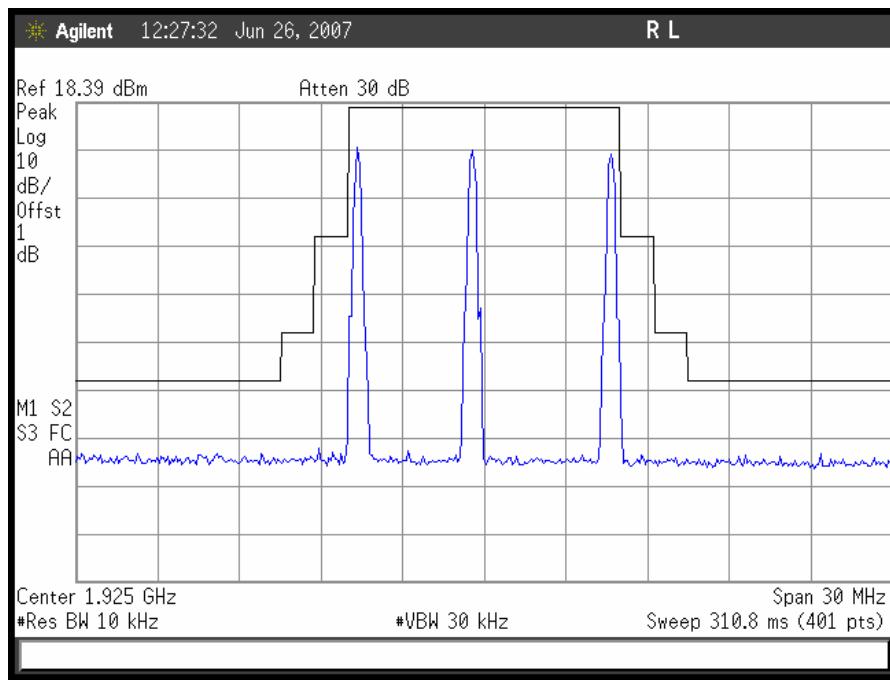


Plot 13. In Band Emissions Mid Channel

Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 14. In Band Emissions High Channel



Plot 15. Out of Band Emissions



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(1) Monitoring Time

Test Criteria: **§15.323 (c)(1)** Immediately prior to initiating transmission, devices must monitor the combined time and spectrum windows in which they intend to transmit for a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.3.4, which provides the test methodology for this provision.

Test Results: This requirement is covered by results of Least Interfered Channel (LIC) test according to FCC 15.323(c)(5).

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(2) Monitoring Threshold

Test Criteria: **§15.323 (c)(2).** The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.3.1, which provides the test methodology for this provision. The Clause states that the lower threshold is for devices that do not use the LIC procedure. The equation for the lower monitoring threshold is given in ANSI C63.17 Clause 4.3.4.

Test Results: $T_L < (15\log B - 184 + M_L - P_{EUT}) \text{ dBm}$

$$B = 0.2975 \text{ MHz}$$

$$M_L = 30 \text{ dB}$$

$$P_{EUT} = 16.58 \text{ dB}$$

$$T_L = -88.47 \text{ dBm}$$



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(3) Maximum Transmit Time

Test Criteria: **§15.323 (c)(3)** If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 4, which provides the test methodology for this provision. A communication link is established between BS and MS in a conducted mode and in a room without other US DECT devices to prevent influence from other transmissions. According to FCC Part 15.323(c)(3), the access criteria have to be verified at least every 8 hours. The following test is performed:

Attestation: The BS incorporates a software program that does not allow transmission of more than 8 hours.

Test Results: The EUT was monitored for 8 hours and the call was terminated at approximately 7 hours and 55 minutes.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(4) System Acknowledgement

Test Criteria: **§15.323 (c)(4)** Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgment, at which time the access criteria must be repeated.

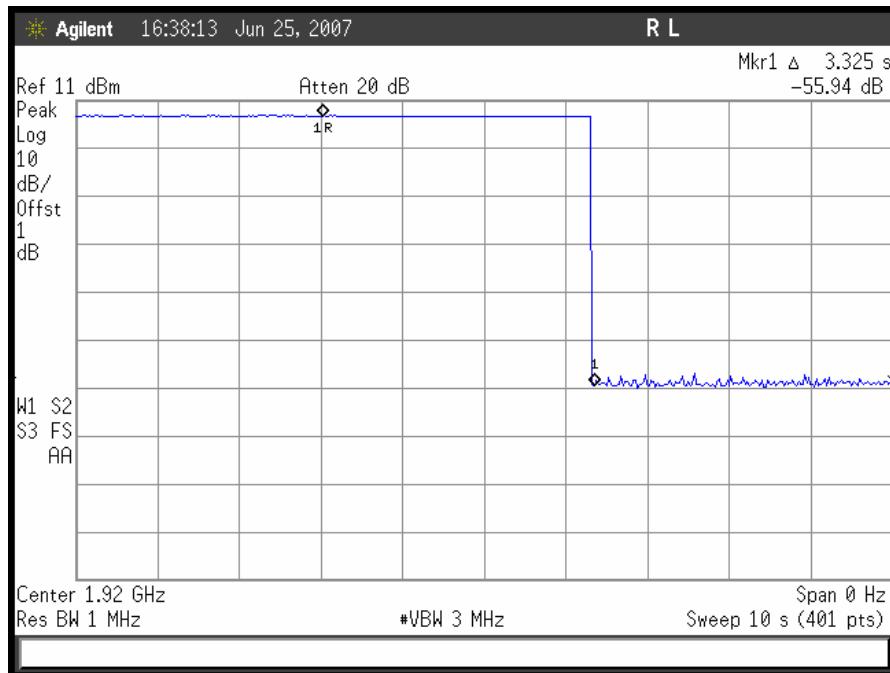
Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 8.2.1., which provides the test methodology for this provision.

Test Results:

Test Condition	Result
Frequency Channel is restricted to Channel #1	Pass
Communication link is setup	Pass
Base Station is turned off to verify transmission terminates within 30s	Pass

Test Engineer(s): Shawn McMillen

Test Date(s): June 25, 2007



Plot 16. System Acknowledgement

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(5) Least Interfered Channel

Test Criteria: **§15.323 (c)(5)** If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.3.2. & 7.3.3 which provides the test methodology for this provision. Apply CW interference a specified frequency and at level of -58.47dBm ($T_U + 10\text{dB}$). A communication link is initiated, forcing the units to communicate on the specified frequency. Lower the interference level until the communication link can be set up on the specified frequency. Verify the communication link on spectrum analyzer.

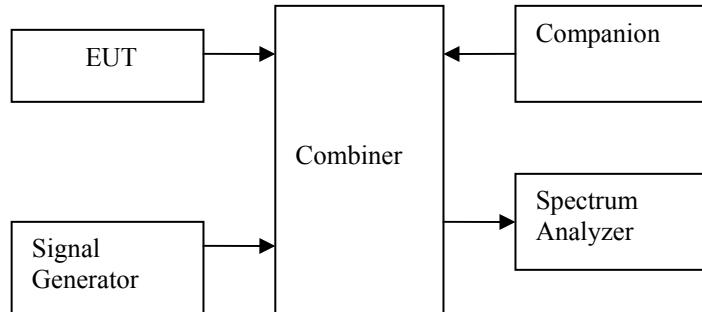
$$T_U < (15\log B - 184 + M_U - P_{EUT}) \text{ dBm}$$

$$B = 0.2975 \text{ MHz}$$

$$M_U = 50 \text{ dB}$$

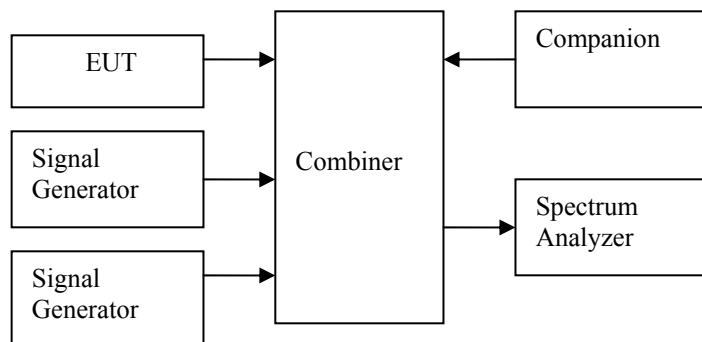
$$P_{EUT} = 16.58 \text{ dB}$$

$$T_U = -68.47 \text{ dBm}$$



ANSI C63.17	Test Requirement
Clause 7.3.2(a)	EUT restricted to transmit on one channel only
Clause 7.3.3(b)	Apply interference on the specified channel at a level of -58.47dBm. Increase interference level until link is established Apply interference on Ch 14 at -88dBm Setup link 5 times and verify transmission

Test Results: EUT established link at a level > 69.2 dBm.



ANSI C63.17	Test Requirement
Clause 7.3.3(a)	EUT restricted to transmit on channels 10 and 14
Clause 7.3.3(b)	Apply interference on Ch 10 at -81dBm Apply interference on Ch 14 at -88dBm Setup link 5 times and verify transmission
Clause 7.3.3(c)	Apply interference on Ch 10 at -88dBm Apply interference on Ch 14 at -81dBm Setup link 5 times and verify transmission
Clause 7.3.3(d)	Apply interference on Ch 10 at -87dBm Apply interference on Ch 14 at -94dBm Setup link 5 times and verify transmission
Clause 7.3.3(e)	Apply interference on Ch 10 at -94dBm Apply interference on Ch 14 at -87dBm Setup link 5 times and verify transmission

Test Results:

ANSI C63.17	Description	Result
Clause 7.3.3(a)	The EUT is restricted to CH 10 and 14.	Nil
Clause 7.3.3(b)	5 x transmission of control signals	Pass
Clause 7.3.3(c)	5 x transmission of control signals	Pass
Clause 7.3.3(d)	5 x transmission of control signals	Pass
Clause 7.3.3(e)	5 x transmission of control signals	Pass

Test Engineer(s): Shawn McMillen

Test Date(s): June 29, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(5) Channel Confirmation

Test Criteria: **§15.323 (c)(5)** A device utilizing the provisions of this paragraph must have monitored all access channels defined for its system within the last 10 seconds and must verify, within the 20 milliseconds (40 milliseconds for devices designed to use a 20 milliseconds frame period) immediately preceding actual channel access that the detected power of the selected time and spectrum windows is no higher than the previously detected value.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.3.3 & 7.3.4, which provides the test methodology for this provision.

Test Results: This test was performed in monitoring time and least interfered channel tests.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(5) Power Measurement Resolution

Test Criteria: **§15.323 (c)(5)** The power measurement resolution for this comparison must be accurate to within 6 dB..

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.3.3, which provides the test methodology for this provision.

Test Results: The accuracy of the upper threshold is 1.6 dB

Test Engineer(s): Shawn McMillen

Test Date(s): 06/30/07



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(5) Segment Occupancy

Test Criteria: **§15.323 (c)(5)** No device or group of cooperating devices located within 1 meter of each other shall occupy more than three 1.25 MHz channels during any frame period

Test Procedure: Attestation of manufacturer supported by reference to relevant DECT specifications.

Attestation: This device is compliant with the DECT standards described in European Standards EN 300 175-2 and EN 300 175-3. DECT transmissions are MC/TDMA/TDD (Multi carrier / Time Division Multiple Access / Time Division Duplex) using Digital GFSK modulation. During any frame period cooperating devices will not occupy more than one channel bandwidth. For further details see operational description or relevant portions of the DECT standards.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(6) Random Waiting

Test Criteria: **§15.323 (c)(6)** If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 8.1.3, which provides the test methodology for this provision.

Attestation: The option 15.323(c) (6) is not implemented by this product.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007

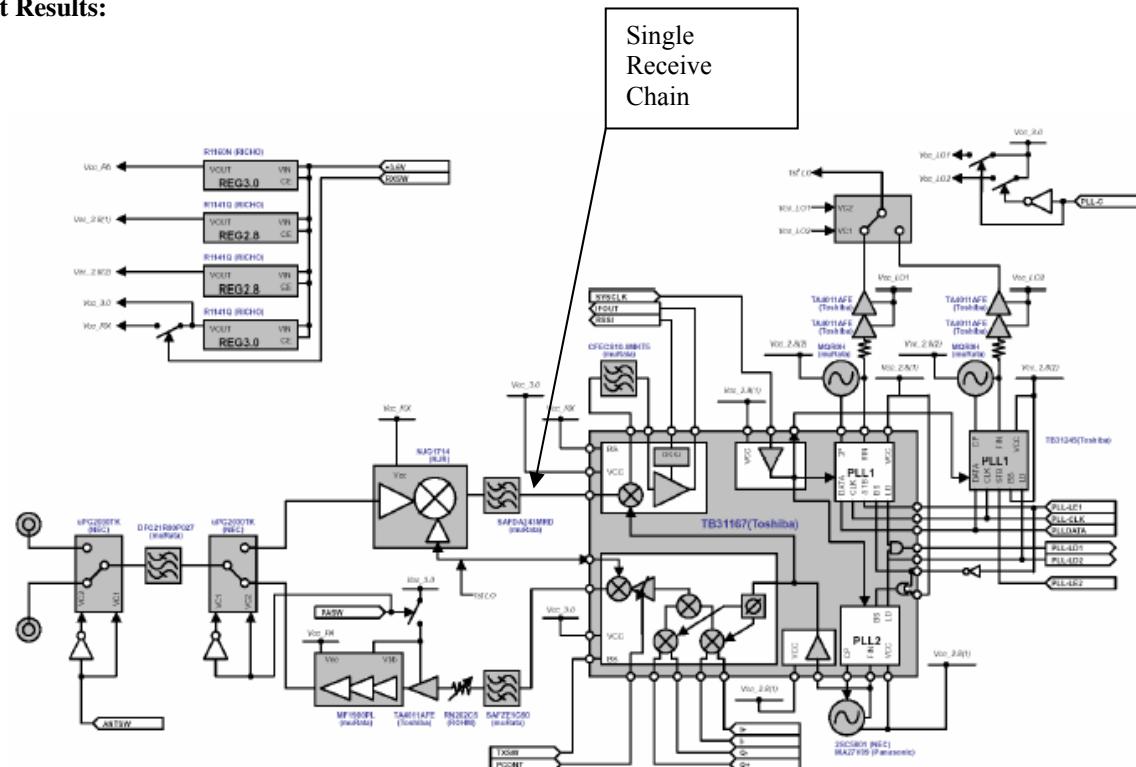
Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(7) Monitoring Bandwidth

Test Criteria: **§15.323 (c)(7)** The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}(1.25 / \text{emission bandwidth in MHz})$ microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.4, which provides the test methodology for this provision.

Test Results:



The Monitoring feature is realized by the actual receiver and therefore the receiver bandwidth equals the monitoring bandwidth.

Test Engineer(s): Shawn McMillen

Test Date(s): 06/30/07

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(7) Monitoring Reaction Time

Test Criteria: **§15.323 (c)(7)** If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds but shall not be required to be less than 35 microseconds.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 7.5, which provides the test methodology for this provision.

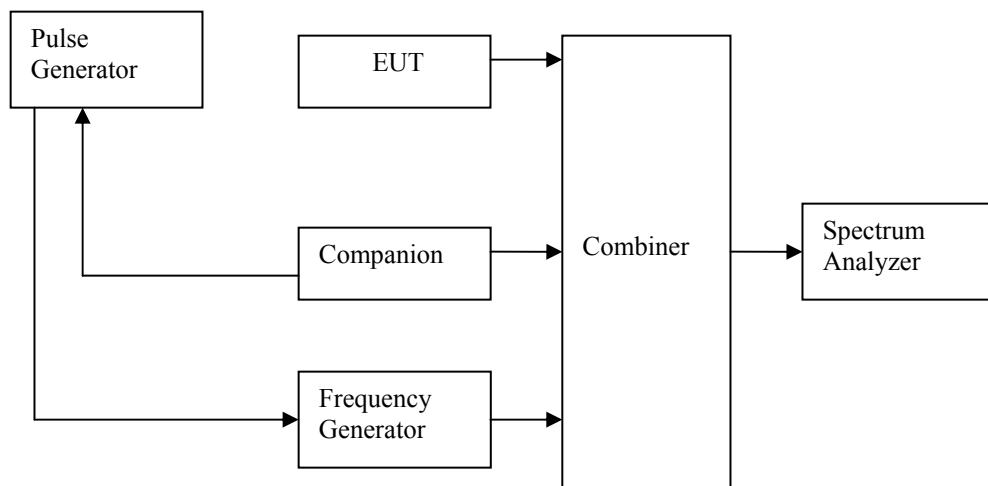


Figure 2. Block Diagram of Monitoring Reaction Time Setup

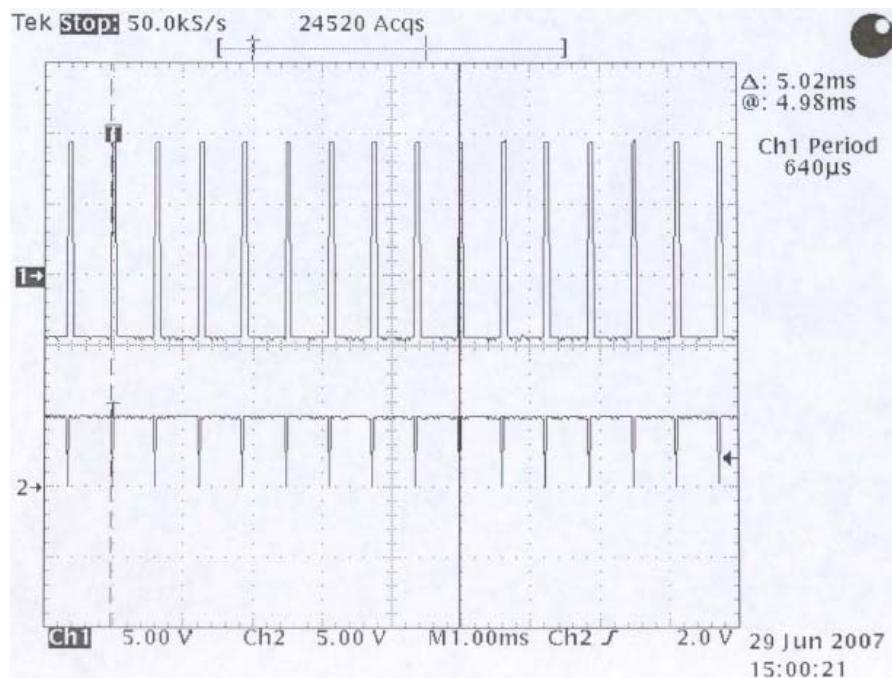
Test Results: This requirement is covered by results of Least Interfered Channel (LIC) test according to FCC 15.323(c)(5).

ANSI C63.17	Test Requirement	Result
Clause 7.5 (a)	Communication restricted to one channel	N/A
Clause 7.5 (b)	Applied Pulse interference	Pass
Clause 7.5 (c)	50µs not required	N/A
Clause 7.5 (d)	No communication link	Pass

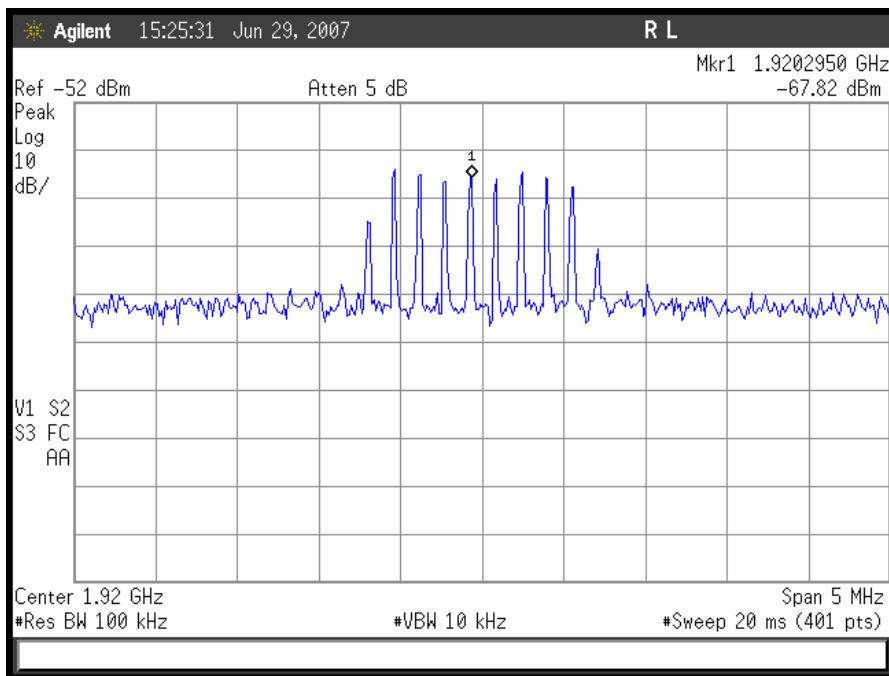
Test Engineer(s): Shawn McMillen

Test Date(s): June 29, 2007

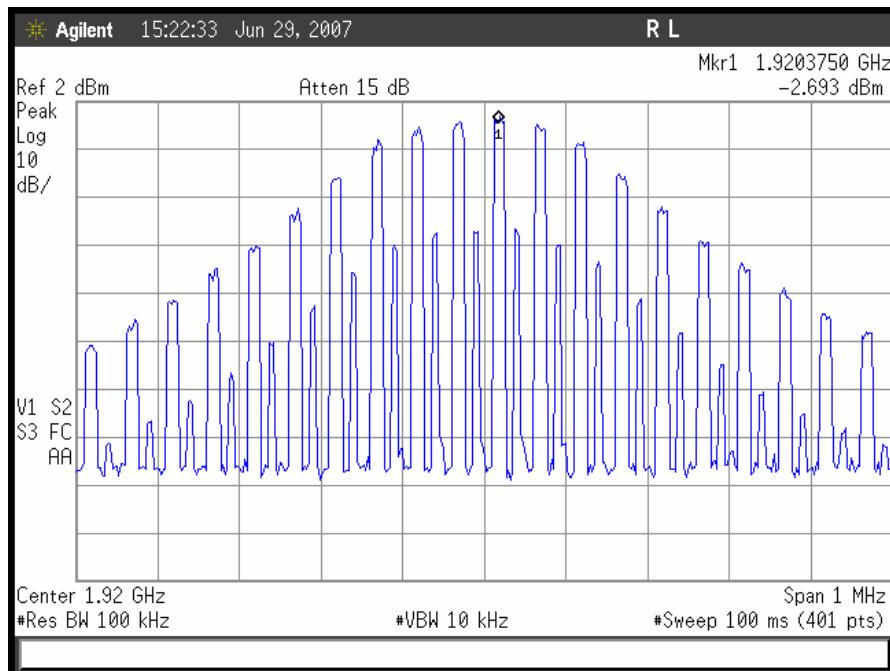
Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 17. Timing Diagram of Pulsed Interference



Plot 18. Pulse Interference



Plot 19. Voice Carrier Channel with Pulse interference



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(8) Monitoring Antenna

Test Criteria: **§15.323 (c)(8)** The monitoring system shall use the same antenna for transmission., or an antenna that yields equivalent reception at that location.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 4, which provides the test methodology for this provision.

Attestation: The BS uses a single permanently attached antenna for transmission and monitoring. A TDMA system is realized according to the DECT standard. Channel monitoring and transmission is done through the same antenna.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(9) Monitoring Threshold Relaxation

Test Criteria: **§15.323 (c)(9)** Devices that have a power output lower than the maximum permitted under this subpart may increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 4, which provides the test methodology for this provision

Test Results: Not Applicable

Test Engineer(s): Shawn McMillen

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(10) Duplex System LBT

Test Criteria:

§15.323 (c)(10) An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device

Test Procedure:

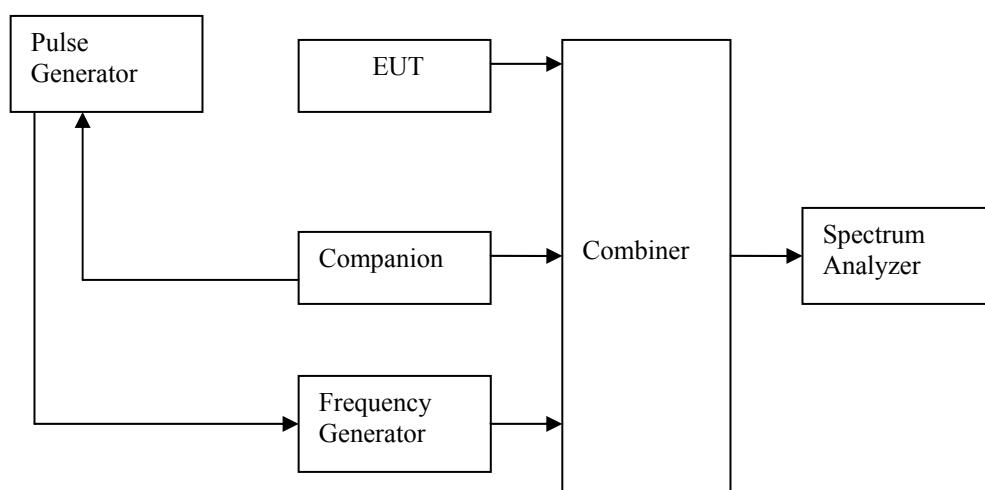
Testing to ANSI C63.17 draft ballot 3.0 Clause 8.3.2, which provides the test methodology for this provision. The MS is the initiating device and the BS is the companion device

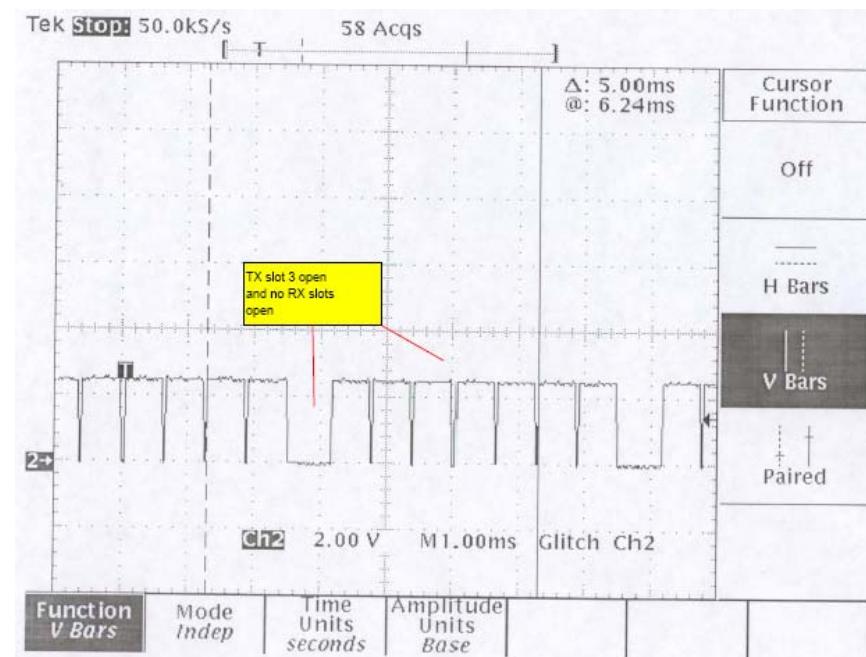
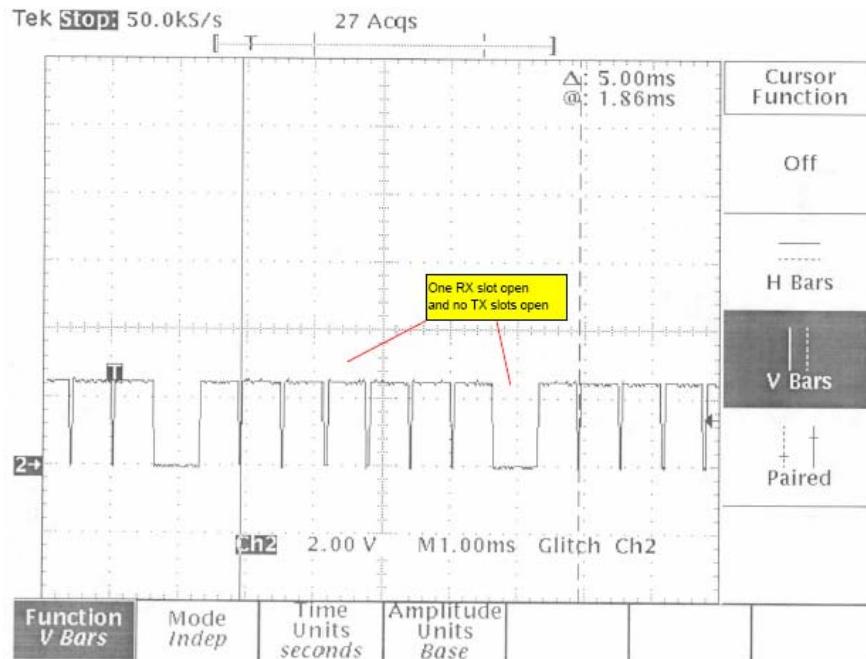
Test Results:

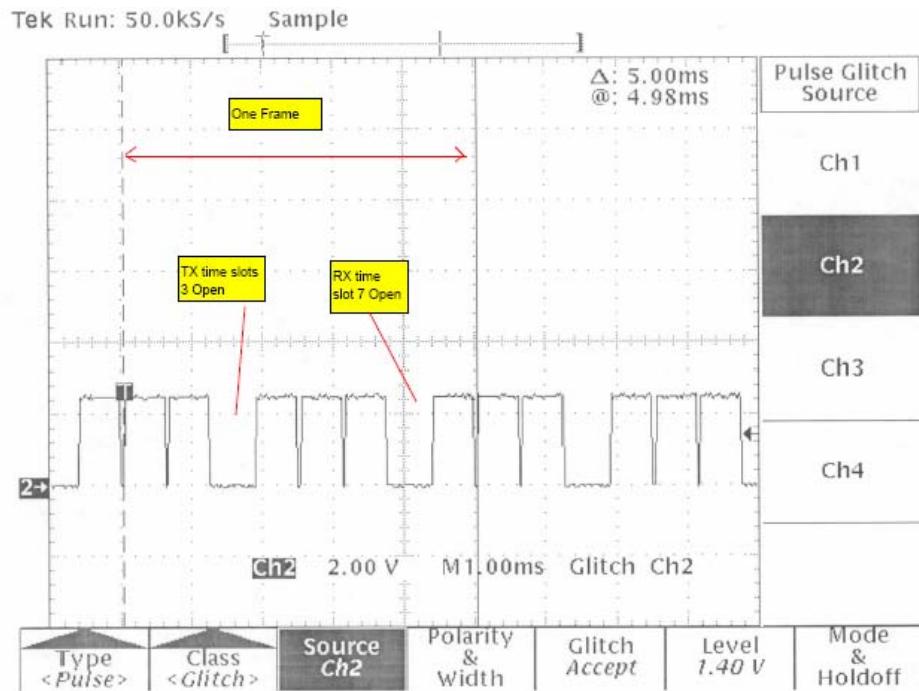
ANSI C63.17	Test Requirement	Result
Step 1	No interference	Connection Established
Step 2	Interference on all slots except one RX slot	No Connection Established
Step 3	Interference on all slots except one TX slot	No Connection Established
Step 4	Interference on slot 3 TX and slot 2 RX	No Connection Established
Step 5	Interference on slot 2 TX and slot 3 RX	No Connection Established
Step 6	Interference on slot 2 TX and slot 2 RX	Connection established on another channel

Test Engineer(s): Shawn McMillen

Test Date(s): 06/30/07









NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(11) Alternate Monitoring Channel

Test Criteria: **§15.323 (c)(11)** An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device

Test Procedure: Testing to ANSI C63.17 draft ballot 3.0 Clause 8.4, which provides the test methodology for this provision. The MS is initiating device and the BS is the companion device

Test Results: The Manufacturer declares that this provision is not utilized by the EUT.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Intentional Radiators
CFR Title 47, Part 15, Subpart D & RSS-213

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(c)(12) Fair Access

Test Criteria: **§15.323 (c)(12)** The provisions of (c)(10) or (c)(11) of this section shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices

Test Procedure: The manufacturer supplies an attestation.

Attestation: This device does not use any mechanisms as provided by Part 15.323(c)(10) or (c)(11) to deny fair access to spectrum to other devices.

Test Engineer(s): Shawn McMillen

Test Date(s): July 2, 2007



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(e) Frame Period

Test Criteria:

§15.323 (e) The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these sub-bands shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm.

Timing Jitter

§15.323 (e) Specific requirements for isochronous devices operating in the 1920–1930 MHz sub-band. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

Test Procedure:

The manufacturer supplies an attestation.

Attestation:

This device does not use any mechanisms as provided by Part 15.323(c)(10) or (c)(11) to deny fair access to spectrum to other devices.

Test Results:

Mean Frame Repetition (Hz)	Standard Deviation (Hz)	Frame Repetition Stability (ppm)	Result
199.99998856	0.000209012	3.13	Pass

Sample Calculation

$$\text{Frame Repetition Stability} = (3 \times \text{Standard Deviation}) / \text{Frame Rate} * 10^6$$

$$\text{Frame Rate} = 1 / 5\text{ms} = 200 \text{ Hz}$$

The following timing jitter was recorded

Mean Period (ms)	Standard Deviation (μsec)	Timing Jitter (μsec)	Results
5.0000003012	0.098953156	0.296	Pass

$$\text{Jitter } \mu\text{sec} = 3 * \text{Standard Deviation}$$



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.323(f) Frequency Stability

Test Criteria:

§15.323 (f) The frequency stability of the carrier frequency of the intentional radiator shall be maintained within ± 10 ppm over 1hour or the interval between channel access monitoring, which ever is shorter. The frequency stability shall be maintained over a temperature variation of -20^0 to $+50^0$ C at normal supply voltage and over a variation in the primary supply voltage of 85% to 115% of the rated supply voltage at a temperature of 20^0 C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

Test Procedure:

The EUT was placed in the Environmental Chamber and support equipments are outside the chamber on a table. A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The frequency drift was investigated for every 10^0 C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -20^0 to $+50^0$ C.

Voltage supplied to EUT is 120 VAC reference temperature was done at 20^0 C. The voltage was varied by ± 15 % of nominal

Test Results:

Carrier Frequency (MHz)	Temp (C)	Supply Voltage (VAC)	Max Deviation (ppm)
1920.35	20	120	Reference
1920.35	20	102	0.2
1920.35	20	138	-0.2
1920.35	-20	120	-2.0
1920.35	50	120	2.0

Sample Calculation:

$$\text{Deviation ppm} = \frac{\text{Reference} - \text{Measured}}{\text{Reference}} \times 10^6$$



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Test Equipment
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

IV. Test Equipment



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Test Equipment
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2421	EMI RECEIVER	ROHDE&SCHWARZ	ESIB 7	03/27/2007	03/27/2008
1S2184	BILOG ANTENNA	CHASE	CBL6112A	01/03/2007	01/03/2008
1S2121	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	11/28/2006	11/28/2007
1S2198	ANTENNA, HORN	EMCO	3115	08/17/2006	08/17/2007
1S2202	ANTENNA, HORN, 1 METER	EMCO	3116	04/10/2007	04/10/2010
N/A	HIGH PASS FILTER	MICRO-TRONICS	HPM13146	SEE NOTE	
1S2263	CHAMBER, 10 METER	RANTEC	N2-14	08/15/2007	08/15/2007
1S2460	Analyzer, Spectrum 9 kHz-40GHz	Agilent	E4407B	07/06/2005	07/06/2008
N/A	2-Way Power Splitter	Mini-Circuits	ZB3PD-2400W-S	SEE NOTE	
N/A	3-way Power Splitter	Mini-Circuits	ZN2PD2-50-S+	SEE NOTE	
1S2034	COUPLER, DIRECTIONAL 1-20 GHz	KRYTAR	101020020	SEE NOTE	
N/A	Modulation Domain Analyzer	HEWLETT PACKARD	53310A	05/22/2007	05/22/2008
1S2243	Pulse/Function Generator 20MHz	HEWLETT PACKARD	8111A	SEE NOTE	
4S3595	Frequency Counter	HEWLETT PACKARD	5385A	SEE NOTE	

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Certification & User's Manual Information
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

V. Certification & User's Manual Information



Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
 - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
 - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

- (i) *Compliance testing;*
- (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
- (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
- (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
- (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
Certification & User's Manual Information
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.¹ *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

¹ In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.



Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



Certification & User's Manual Information

Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



ICES-003 Procedural & Labeling Requirements

From the Industry Canada Electromagnetic Compatibility Advisory Bulletin entitled, "Implementation and Interpretation of the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003" (EMCAB-3, Issue 2, July 1995):

"At present, CISPR 22: 2002 and ICES technical requirements are essentially equivalent. Therefore, if you have CISPR 22: 2002 approval by meeting CISPR Publication 22, the only additional requirements are: to attach a note to the report of the test results for compliance, indicating that these results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations; to maintain these records on file for the requisite five year period; and to provide the device with a notice of compliance in accordance with ICES-003."

Procedural Requirements:

According to Industry Canada's Interference Causing Equipment Standard for Digital Apparatus ICES-003 Issue 4, February 2004:

Section 6.1: A record of the measurements and results, showing the date that the measurements were completed, shall be retained by the manufacturer or importer for a period of at least five years from the date shown in the record and made available for examination on the request of the Minister.

Section 6.2: A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other constraints it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement in the user's manual.

Labeling Requirements:

The suggested text for the notice, in English and in French, is provided below, from the Annex of ICES-003:

This Class [²] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [¹] est conforme à la norme NMB-003 du Canada.

² Insert either A or B but not both as appropriate for the equipment requirements.



NEC Infrontia, Inc
ZT III: SN8158 CSEV

Electromagnetic Compatibility
End of Report
CFR Title 47, Part 15, Subpart B & D; ICES-003 & RSS-213

End of Report

|