EXHIBIT 2

Test Report

Applicant: Northern Telecom Ltd.

For Type Acceptance/Certification on:

AB6NTL100AA

1 Introduction

This information is submitted in accordance with the FCC rules and regulations, Part 2, Subpart J, §2.1046 through §2.1057 and Industry Canada RSS 128 Radio Standards for Type Acceptance of the Nortel's (Northern Telecom) Dual Mode 800MHz TDMA Enclosure (DM800) Cellsite.
This DM800 is intended for use in the Domestic Public Cellular Radio Telecommunications Service and is designed in accordance with the following standards:

- CFR 47, Part 22, Subpart H, Domestic Public Cellular Radio Telecommunications Service
- CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Type acceptance
- RSS 128, 800MHz Dual Mode TDMA Cellular (Base Station)
- TDMA Cellular/PCS - Radio Interface Minimum Performance Standards for Base Stations, TIA/EIA/IS-138-A, July 1996
- TDMA Cellular/PCS - Radio Interface - Base Station Compatibility Standard, TIA/EIA/IS-136-A, October 1996

1.1 Test Result Summary

Table 1 summarizes the measurement results for the DM800 MHz Enclosure system.

Table 1: Test Results Summary

FCC Measurement Specification	FCC Limit Specification	Description	Result
2.1046	22.913	RF Output Power	Compliant
2.1047	22.915	Modulation Characteristics (Audio Frequency Response)	Compliant
2.1047	22.915	Modulation Characteristics (Audio Filter Characteristics)	Compliant
2.1047	22.915	Modulation Characteristics (Modulation Limiting)	Compliant
2.1049	22.917	Occupied Bandwidth	Compliant
2.1051, 2.1057	22.917	Spurious Emissions at Antenna Terminals	Compliant
2.1053, 2.1057	22.917	Field Strength of Spurious Emissions	Compliant
2.1055		Frequency Stability	Compliant

2 Engineering Declaration

The DM800 MHz Enclosure System has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Parts 2 and 22 and Industry Canada Radio Standard Specification 128, issue 1. To the best of my knowledge, these tests were performed in accordance with good engineering practices using measurement procedures consistent with industry or commission standards and demonstrate that this equipment complies with the appropriate standards. All tests were conducted on a representative sample of the equipment for which type acceptance/certification is sought.

Signed Official copy kept on file by Nortel Networks *November 03, 1999*

Rupinder Randhawa Date
Technical Manager
Wireless Systems Integrity
Nortel Networks
Calgary, Alberta

3 Type Acceptance Application Requirements

3.1 Name of Applicant

The applicant is Northern Telecom (Nortel Networks) Limited.

3.2 Identification of Equipment

The equipment in this application is referred to as the TDMA Dual Mode 800MHz (DM800) Enclosure Cell Site. The FCC ID sought for the DMU product is AB6NTL100AA.

3.3 Quantity Production

The DM800 MHz Enclosure system will be produced in quantity.

3.4 Technical Description

The DM800MHz Cell Site is a 800MHz AMPS/TDMA product designed for both high density, small/medium radius cells in areas where large traffic capacity is required and low density areas with relatively small radius. The DMU uses the existing TRU-II as the transceiver and a Multi-Channel Power Amplifier (MCPA) for its amplification stage. The TRU-II has been approved standalone under FCC ID AB6NTAX98AA and TRU III has been approved standalone under FCC ID AB6NTAW99AA. The MCPA is an OEM component that was filed for standalone approval with FCC under FCC ID E675JS0042. A duplexer is used to provide rejection/filtering outside of the TX and RX passbands. The duplexer provides isolation of >105dB between the TX and RX paths.

The output power of the DM800 MHz Enclosure is designed to deliver of 200W per sector or 47dBm per carrier.

The TDMA 800 MHZ Enclosure system supports maximum 2 MCPA per shelf and one shelf per sector. The maximum radio channels to the system (3 sector) is 72 or 24 radio channels per sector.

3.5 Types of Emissions

The TDMA DM800 MHz Enclosure Assembly is designed to operate in Analog and Digital Mode (Dual Mode).

30K0F3E - Voice transmission
30K0F3E and 30K0F3D - Voice plus supervisory audio tone
30K0F1D- Wideband Data
30K0DXW - TDMA mode.

3.6 Frequency Range

The TDMA DM800MHz Enclosure product will operate in the 824 to 894 MHz band, using 824 - 849 MHz for the transmitter and 869-894 MHz for the receiver. The channel separation is 30 kHz.

3.7 Range of Operating Power

The TDMA DM800 MHz Enclosure system's range of operating RF power is 30.0 dBm (1W) to 47.0dBm (50 W) per carrier.

3.8 Maximum Power Rating

The maximum RF power output per channel is 50W(47dBm). The Total RF Power per sector is 200W, which requires minimum of 4 radio channels or maximum of 24 radio channels.

3.9 Final RF amplifying device power consumption

The worst case current draw of one MCPA (Max. of 2 MCPAs per sector) is 110A at a nominal operating voltage of 27.0 V.

3.10 Function of Each Active Circuit Device

The active circuit devices used in the transceiver TRU-II and TRU III all described in detail in the TRU-II and TRU III standalone filing under FCC ID AB6NTAX98AA and AB6NTAW99AA respectively. The MCPA is an OEM component that was also filed for standalone approval with FCC under FCC ID E675JS0042 and the functionality of the active devices used on the MCPA are described in that filing.

See section 3.24 for a listing of devices incorporated in the TDMA DM800 MHz Enclosure system for FCC filing number AB6NTL100AA.

3.11 Complete Circuit Diagrams

The DM800Mhz Enclosure product comprised of an existing transceiver TRU-II and TRU III, which was approved standalone under FCC ID AB6NTAX98AA and AB6NTAW99AA respectively. The schematic diagrams for the TRU-II and TRU III were included with its filing. The MCPA is an OEM component that was also filed for standalone approval with FCC under FCC ID E675JS0042. This system is a re-packaged with existing component which already been filed with additional high power MCPA. The circuit diagram of other components can be found in Dual Mode Urban cellsite filing; FCC ID AB6NTFC01AD.

3.12 User Document

User and Maintenance Manual

See Exhibit 3.

3.13 Tune-Up Procedure

The tune-up tests will be performed as part of the factory testing on the product. This procedure includes power output levels, spurious emissions, and occupied bandwidth. There are no user adjustments that will have any effect on these settings to the product.

3.14 Circuit Description for Frequency Determining and Stabilizing

All RF frequencies are derived from the master oscillator which is external to the transceiver. The master oscillator employs up to two independent crystal oscillators, each in its own temperature controlled oven. Failure of an active oscillator automatically causes a switch-over to the standby unit with an oscillator alarm indication. The master oscillator has a frequency stability of +/- 0.25ppm. The master oscillator is common to all transceivers in the DM800MHz Enclosure system. Each transceiver contains a 130.56 MHz IF LO and an RF LO which operates at 130.56 MHz lower than transmit frequency. The LOs are generated respectively by an IF synthesizer and a RF synthesizer which are phase locked to the master oscillator. The synthesizers contain a lock detect circuit configured to remove the transceiver from service should the synthesizer lose lock with the master oscillator.

3.15 Circuit Description for Suppression of Spurious Radiation

Spurious radiation is suppressed through filtering in the RF transmit section. Multiple SAW filters are included in the TX chain to suppress out of band spurious emissions. A duplexer is always included in the transmit path.

3.16 Circuit Description for Limiting Modulation

Modulation is limited by a digital device in the TRU which instantaneously clips the voice modulating signal (after compression and pre-emphasis). The clipped voice signal is filtered to remove high frequency components and fed to an FM modulator. The deviation limiting circuit is implemented digitally and has no user adjustments.

3.17 Circuit Description for Limiting Power

The output is regulated by an automatic level control (ALC) within the TRU. The ALC power detector is calibrated during manufacturing. The calibration factors are stored in a micro controller within the TRU and are protected by a checksum. If the calibration factors become corrupted the transceiver is automatically taken out of service.

The MCPAs also have their own built in power control circuit. Once the tuning procedure completed at the field with the proper input levels then the MCPAs will be locked in to that set output power. If the out put power exceed the tolerance level due to any other variance the cell site will be shut down by the MCPAs.

3.18 RF Radiation Effects

An internal Nortel document, "RF Exposure Guidelines for Cellular and PCS Antenna Sites" (Document no: SI-EMR-R01.4), is used for the deployment and installation of Nortel's wireless base station equipment with respect to the control of electromagnetic radiation (EMR) exposure. The objective of this document is to provide guidance on where antennas can be deployed, how to calculate power densities and safe distances, and how to protect users from excessive exposure to electromagnetic radiation.

3.19 Photographs

See Exhibit 6 for system level photograph.

3.20 Regulatory Labels

See Exhibit 1 for system label Identification.

3.21 Standard Test Conditions and Test Equipment

The DM800 MHz Enclosure Cell site was tested under the following standard test conditions unless otherwise noted:

Ambient temperature: 20 to 35 degrees C

Ambient humidity: 20 to 40%

AC supply voltage: 208 VAC (nominal)

3.22 Test Equipment List

The following table shows the identification of the test equipment used in the test cases.

Description	Manufacturer	Model	Serial Number	Cal.Due Date
20 Hz to 26.5 GHz, Spectrum Analyzer	Rohde & Schwarz	ESMI	DE22868	Mar. 10/2000
9 kHz to 26.5 GHz, Spectrum Analyzer	HP	8593E	3710A03172	Aug. 12/2000
9 kHz to 2.9 GHz, RF Filter/Preselector	HP	85420E	3705A00184	Mar. 19/2000
9 kHz to 2.9 GHz, EMI Receiver	HP	8542E	3710A00202	Mar. 19/2000
9 kHz to 40 GHz, Spectrum Analyzer	Rohde & Schwarz	FSEK	DE22471	Oct. 8/2000
RF Power Meter	HP	437B	3038A03661	Nov. 16/2000
RF Power Head	HP	8482B	3318A06105	Nov. 16/2000

Description	Manufacturer	Model	Serial Number	Cal.Due Date
30 dB Attenuator	Wenschel	24-30-34	BF8381	Verified before use
Transient Limiter	HP	119474A	3107A02927	April 16/2000
LISN (B1-Power Feed)	EMCO	38100/1SPEC	9711-2019	Mar. 04/2000
LISN (B2-Power Feed)	EMCO	38100/1SPEC	9711-2014	Mar. 04/2000
LISN (B3-Power Feed)	EMCO	38100/1SPEC	9711-2025	Mar. 04/2000
LISN (B4-Power Feed)	EMCO	38100/1SPEC	9711-2013	Mar. 04/2000
Biconolog Antenna 20 MHz to 2 GHz	EMCO	3141	9611-1008	July 16/2000
Log Periodic Antenna 1 GHz to 26.5 GHz	Rohde & Schwarz	HL025	355618/010	July 31/2000
High Pass Filter	Narda West	NHP-3006	P114	Verified before use
1 – 18 GHz Low Noise Amplifier	Miteq	N/A	513159	Lab Calibrated/ Verified before use

3.23 DM800 MHz Technical Specification

The specifications below are for the DualMode 800 Enclosure and its unique sub-systems. For specifications on the TDMA Macrocell and DualMode Urban modules, refer to these documents: NTP 411-2131-860 *NT800DR (ICP) Cell Site Manual, and* NTP 411-2041-100 *DualMode Urban Functional Description.*
Note: The cell site specifications listed in this document are subject to change without notice.

Channel capacity
Channel capacity Up to 24 RF Channels per sector, 72 channels total

AC power requirements
Voltage Nominal 208/240Vac Split Phase (line 1, line 2, neutral and ground)
120V (line to neutral) Range: 176 to 264 Vrms
Current 150 Amperes circuit feed, Frequency Limits 47 to 63 Hz

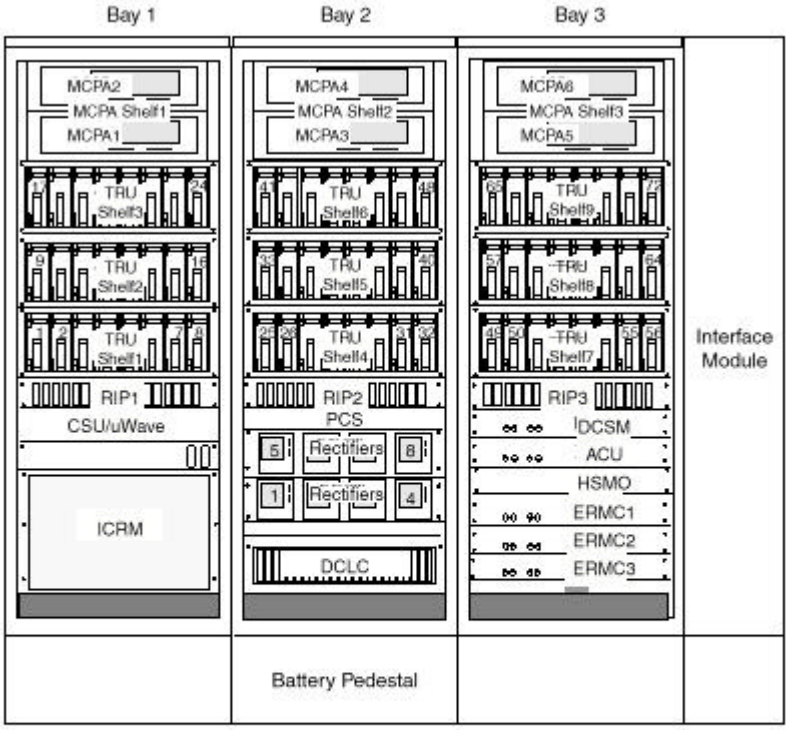
Mechanical Dimensions (W x D x H)
3 Bay with interface module: 244 x 102 x 183 cm (96” x 40” x 72”)
Bay with interface module, 244 x 102 x 221 cm
battery pedestal and solar shield: (96” x 40” x 87”)
Battery pedestal: 244 x 102 x 30.5 cm (96” x 40” x 12”)
Clearance and Access: Front and side aisles: 1 m (3 ft.)
Rear aisle: 1.2 m (4 ft.)

Weight
3 Bay with interface module 1400 Kg (3165 lb.)
3 Bay with interface 900 Kg (1900 lb.) module minus MCPAs,
TRUs, rectifiers and rear doors
3 Bay with interface module 1900 Kg (4065 lb.) and battery pedestal with batteries

Environmental
Operating Temperature: -40°C to +46°C (-40°C to +115°F) continuous.
Maximum temperature is derated by 2°C per 305 m above 1524 m above sea level
(4°F per 1000 feet above 7000 feet above sea level).
Storage Temperature: -55°C to +70°C (-67°F to +158°F)
Relative Humidity: 5 to 95% RH @ 40°C (104°F)
Altitude: -60 m to 3960m (-200 ft. to 13000 ft.) above sea level.
Wind: Operating: 130 kph (80 m.p.h.) Short term: 190 kph (118 m.p.h.)
Water (driving rain): UL-50, 4X rating (enclosure)
31 m/s (70mph), 15 cm/h (6”/h)
0.4 - 4.5 mm droplets (0.16” - 0.18”)
Salt fog: 14 days functional 30 days idle

Earthquake
Bellcore GR-63-CORE, NEBS Section 5.4.1 Earthquake Test Method, Zone 4

3.24 DM800 MHz System Configuration



Legends:

ACU	Alarm Control Unit	HSMO	High Stability Master Oscillator
CSU	Channel Service Unit	MCPA	Multi-Challen Power Amplifier
DCLC	DC Load Center	PCS	Power Control Shelf
DCSM	DualMode Cell Site Monitor	RIP	Rack Interface Panel
ERMC	Enhanced Receive MultiCoupler	TRU	Transmit Receive Unit
ICRM	Integrated Cellsite Remote Module	uWave	MicroWave

3.25 DM800 MHz Equipment List

Description	PEC	Serial #	FCC #	Country Origin
Transmit Receive Unit II	NTAX98AA	NNTM531062MX	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DPYCQ	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531068BT	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530D1E15	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531072DP	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530LT6FB	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DPRRY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XHW1D	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXLKV	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531076P5	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531072N0	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106XPV	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106WX2	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531D9166	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXQDT	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106XW2	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM5310797Q	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106YEL	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DF0JP	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DPVNY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106Y5B	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DF0HN	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DHD8V	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531LEW22	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530D8CX7	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531D7X61	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EY0WK	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM5310F989	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XJ8UK	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531074KY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106GMC	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DH2NY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106YJQ	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530CYVP6	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XT0CC	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531074R5	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531077K2	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106YDK	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM5310E01Q	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106XTY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53103JRP	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530D84XY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530D8KN6	AB6NTAX96BA / 98AA	Canada

Transmit Receive Unit II	NTAX98AA	NNTM531DQAG8	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DP2UA	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM5310632C	AB6NTAX96BA / 98AA	Canada
Description	**PEC**	**Serial #**	**FCC #**	**Country Origin**
Transmit Receive Unit II	NTAX98AA	NNTM531DH2HT	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531D87AF	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531062V5	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XL64V	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531067YD	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXDWY	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EY3F8	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXL5E	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXWWF	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106YKR	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531074ET	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DDQ1V	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531DH29U	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106WW1	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EXLEP	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531078N6	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106XKQ	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53107B6R	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531067M3	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531EY0C2	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XJ8TJ	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM530XHJKL	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM5310FGAJ	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53107ATC	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM531067FW	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit II	NTAX98AA	NNTM53106QJH	AB6NTAX96BA / 98AA	Canada
Transmit Receive Unit III	NTAW99AA	NNTM5324ALHM	AB6NTAW99AA	Canada
DualMode 800 Enclosure base package	NTL100AA	NNTM533BPCPB	n/a	Canada
Equipped with:				
RIP 1	NTL102AA	NNTM533BPCNA	n/a	Canada
RIP 2	NTL102AB	NNTM533BPCQC	n/a	Canada
RIP 3	NTL102AC	NNTM533BPCRD	n/a	Canada
ERMC	NT3P20XC	FITCGBU00088	n/a	Canada
ERMC	NT3P20XC	FITCGBU00098	n/a	Canada
ERMC	NT3P20XC	FITCGBU00201	n/a	Canada
HSMO	NT3P89DA	NNTM533UVLEY	n/a	Canada
ACU	NT3P89CA	NNTM533UUKCU	n/a	Canada
DCSM	NT3P70BC	NNTM533XNMDV	n/a	Canada
ICRM	NTTG86AA	NNTM533KPLX2	n/a	Canada
Power Converter	NT2X70CA	NNTM161S5YF3	n/a	Canada
Power Converter	NT2X70CA	NNTM161S5Y98	n/a	Canada

Remote Module Digital Port Card	NT8X47CA	NNTM533R1HWE	n/a	Canada
Remote Module Digital Port Card	NT8X47CA	NNTM533R1HIJ	n/a	Canada
Remote Module Digital Port Card	NT8X47CA	NNTM533R1HRA	n/a	Canada
Remote Module Digital Port Card	NT8X47CA	NNTM533R1GBU	n/a	Canada
Remote Module Digital Port Card	NT8X47CA	NNTM533R1HM6	n/a	Canada
Description	**PEC**	**Serial #**	**FCC #**	**Country Origin**
Remote Module Digital Port Card	NT8X47CA	NNTM533R1HXF	n/a	Canada
Time Switch Controller	NTAX88CA	NNTM5341HEMV	n/a	Canada
Time Switch Controller	NTAX88CA	NNTM5341HDU1	n/a	Canada
DS1 EFF Card CP	NT6X50AB	NNTM5007LURK	n/a	Canada
DS1 EFF Card CP	NT6X50AB	NNTM5007LURL	n/a	Canada
CSU Minishelf	NTLA7011	n/a	n/a	USA
Shelf Interface Unit	NTLA7013	989D63995720	n/a	USA
T Smart T1 Channel Service Unit (A0383869)	n/a	210829993	F8I4HV-19244-DE-N	USA
T Smart T1 Channel Service Unit (A0383869)	n/a	210905212	F8I4HV-19244-DE-N	USA
T Smart T1 Channel Service Unit (A0383869)	n/a	210829998	F8I4HV-19244-DE-N	USA
DC Load Centre	NTL17010	NNTM60G2J183	n/a	Canada
Rectifier Shelf	NTL106AB	NNTM533BPCTE	n/a	USA
Rectifier Shelf	NTL106AB	NNTM533BPCUF	n/a	USA
Power Control Shelf Assembly	NTTF60AA	NNTM533BPCVG	n/a	Canada
Battery Compensation Module	NTTF60AB	NNTM533BPD3Q	n/a	Canada
Low Voltage Disconnect Card	NTTF60AC	NNTM533P57DN	n/a	Canada
Low Voltage Disconnect Card	NTTF60AC	NNTM533P578H	n/a	Canada
Heat Exchanger	NTL131AA	HX610C-9867142-3		USA
Heat Exchanger	NTL131AA	HX610C-9829783-4		USA
Heat Exchanger	NTL131AA	HX610C-9829781-4		USA
DC power cabling				
Data cabling				
RF cabling				
Provisionable Equipment:				
Full Band Duplexer	NTFC04AD	39	n/a	USA
Full Band Duplexer	NTFC04AD	40	n/a	USA
Full Band Duplexer	NTFC04AD	41	n/a	USA
MCPA Shelf	NTL107AC	NNTM74PR000M	n/a	USA
MCPA Shelf	NTL107AC	NNTM74PR000K	n/a	USA
MCPA Shelf	NTL107AC	NNTM74PR000L	n/a	USA

Multi Channel Power Amplifier	NTL107AA	202583	E675JS0042	USA
Multi Channel Power Amplifier	NTL107AA	202576	E675JS0042	USA
Multi Channel Power Amplifier	NTL107AA	202444	E675JS0042	USA
Multi Channel Power Amplifier	NTL107AA	202546	E675JS0042	USA
Multi Channel Power Amplifier	NTL107AA	202527	E675JS0042	USA
Multi Channel Power Amplifier	NTL107AA	202445	E675JS0042	USA
TRU Shelf	NTFC05AG	NNTM533UTNYG	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTP0J	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTP1K	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTNUC	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTNTB	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTP3N	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTNWE	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTP6Q	n/a	Canada
TRU Shelf	NTFC05AG	NNTM533UTNVD	n/a	Canada
Description	**PEC**	**Serial #**	**FCC #**	**Country Origin**
Rectifier Module	NTL106AA	36969-1	n/a	USA
Rectifier Module	NTL106AA	4	n/a	USA
Rectifier Module	NTL106AA	2	n/a	USA
Rectifier Module	NTL106AA	36969-4	n/a	USA
Rectifier Module	NTL106AA	36969-5	n/a	USA
Rectifier Module	NTL106AA	5	n/a	USA
Rectifier Module	NTL106AA	36969-6	n/a	USA
Rectifier Module	NTL106AA	7	n/a	USA

4 Transmitter Test and Measurement Results

4.1 RF Power Output

4.1.1 RF Power Output Requirements

FCC Part 2.1046 / IC RSS129 Sec. 7.1.1

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.983(d)(5). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

FCC Limit (Part 22.913)

The maximum effective radiated power (ERP) of base transmitters and cellular transmitters must not exceed 500 Watts.

IC Limit (RSS128 Sec. 7.1.1)

The output power shall be capable of being adjusted to within +/-1.0 dB of the manufacturer's rated power.

Test Equipment:

TRU II - s/n 5304YKCA
TRU-III - s/n 5324ALHM

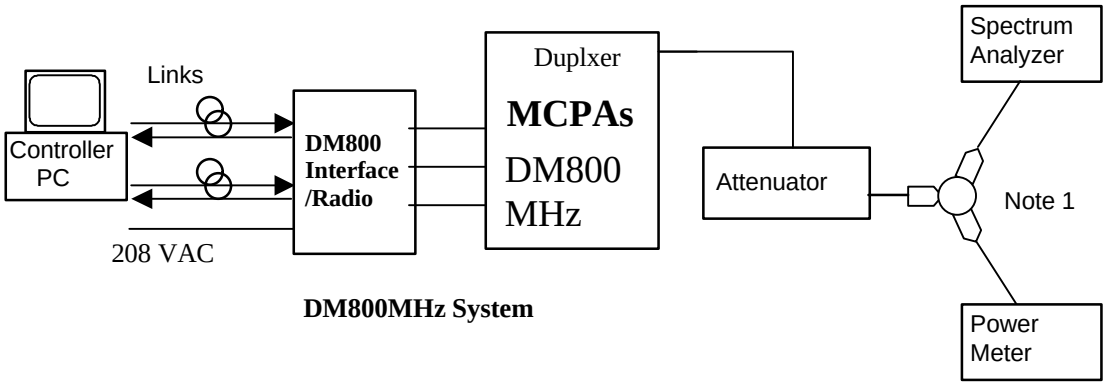
Test Method:

The output of the Dual Mode Urban Cell Site was directly coupled to the RF power meter via the 30dB power attenuator. The insertion loss between the output of the Dual Mode Urban Cell Site and the input of the power meter was measured and taken into account in the measurements. The TRU was keyed on each bands at a channel near the low end of each band. The measured power for the highest power level settings was recorded. The measurements were repeated on a channel near the middle and high end of the band. Both AMPS and TDMA modes were measured.

Test Setup:

The set-up used for the TDMA 800 MHz Enclosure system RF output power test is illustrated in Figure 4.1.1

Figure 4.1.1: Test Setup for RF Power Output Measurement



Note 1: Power Meter or Spectrum Analyzer

Test Result:

The TDMA DM800 MHz Enclosure system complies with the requirement. The maximum measured RF output power from the output of the MCPA was +47.21 dBm. The RF power output measured on different channels is shown in Table 4.1.1 and 4.1.2 as TRU II and TRU III respectively.

Table 4.1.1: RF Output Power of TDMA DM800 MHz Enclosure System

TRU II Radios(Dual Mode Mode Radio)

Channel Number (Band)	Frequency (MHz)	Digital Mode Measured RF Output Power (dBm) @ ant. port	Analog Mode Measured RF Output Power (dBm) @ ant. port	TRU II Maximum Rated Power (dBm)	FCC Limit (dBm)
1	839.34	46.42	46.42	47.0	50
156	874.68	46.60	46.64	47.0	50
312	879.36	46.62	46.66	47.0	50
355	880.65	46.64	46.65	47.0	50
510	885.30	46.59	46.65	47.0	50
666	889.98	46.77	46.78	47.0	50
691	890.73	46.79	**46.82**	47.0	50
716	891.48	**46.76**	46.78	47.0	50
758	892.74	46.77	46.73	47.0	50

Channel Number (Band)	Frequency (MHz)	Digital Mode Measured RF Output Power (dBm) @ ant. port	Analog Mode Measured RF Output Power (dBm) @ ant. port	TRU II Maximum Rated Power (dBm)	FCC Limit (dBm)
799	893.97	46.69	46.71	47.0	50
991	869.04	46.34	46.35	47.0	50
1007	869.52	46.40	46.4	47.0	50
1023	870.0	46.42	46.44	47.0	50

Table 4.1.2: RF Output Power of TDMA DM800 MHz Enclosure System

TRU III Radio (Only Digital Mode)

Channel Number (Band)	Frequency (MHz)	Digital Tx Measured RF Output Power (dBm) @ ant. port	Digital Standalone Measured RF Output Power (dBm) @ ant. port	Maximum Rated Power (dBm)	FCC Limit (dBm)
1	839.34	46.72	46.92	47.0	50
156	874.68	46.98	**47.21**	47.0	50
312	879.36	46.93	47.13	47.0	50
355	880.65	46.93	47.15	47.0	50
510	885.30	46.95	**47.21**	47.0	50
666	889.98	**47.01**	47.19	47.0	50
691	890.73	46.96	47.16	47.0	50
716	891.48	46.97	47.2	47.0	50
758	892.74	46.88	47.12	47.0	50
799	893.97	46.92	47.11	47.0	50
991	869.04	46.65	46.84	47.0	50
1007	869.52	46.69	46.92	47.0	50
1023	870.0	46.80	47.01	47.0	50

4.2 Modulation Characteristics (Audio Frequency Response)

4.2.1 Modulation Characteristics Requirements (FCC Sec. 2.1047)

(a) Voice modulated communication equipment: A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 cps shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

Test Requirements:

From 300 to 3000 Hz the audio frequency response shall not vary more than +1/-3 dB from a true 6 dB/octave pre-emphasis characteristic with the exception of a permissible 6 dB/octave roll off from 2500 to 3000 Hz.

Test Equipment:

TRU s/n 5304YKCA

Test Method:

Disable the compressor and operate the transmitter. Monitor the transmit output with a frequency deviation meter or modulation analyzer (without FM de-emphasis). Apply a 1 kHz audio signal to the PCM codec audio input and adjust its level to produce +/- 2.9 kHz peak deviation. Vary the frequency from 100 Hz to 4 kHz while leaving the level constant and measure the deviation relative to that at 1 kHz.

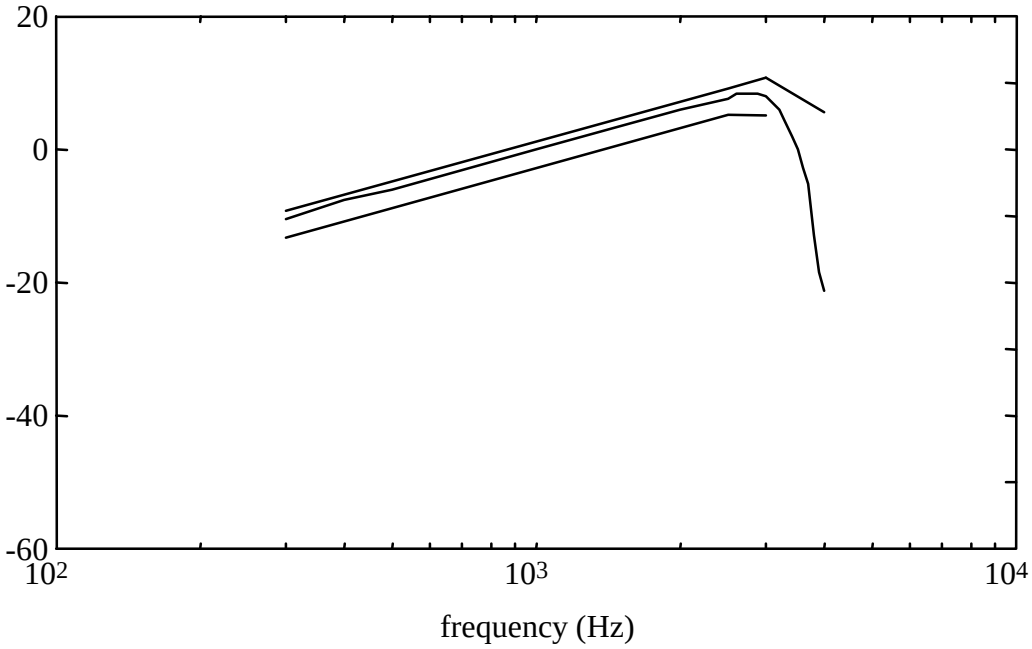
Test Measurements:

Measurements were made using the HP8903B audio analyzer as the audio source and the HP8901B modulation analyzer to measure transmit frequency deviation. The measured transmit audio response is shown in Figure 4.2.1 along with the specification limits. The vertical scale is dB relative to the deviation at 1 kHz.

Test Results:

Conforms. The Audio Frequency Response of the TRU-II was measured as part of the Standalone TRU-II filing under FCC ID AB6NTAX98AA. The test results are shown here for completeness of the DM800 MHz Enclosure cell site filing.

Figure 4.2.1: Transmit Audio Response



4.3 Modulation Characteristics (Audio Filter Characteristics)

4.3.1 Modulation Characteristics Requirements (FCC Sec. 2.1047)

(d) Audio filter characteristics. Except as provided in §22.917, radiotelephony signals applied to the modulator from the modulation limiter must be attenuated as a function of frequency as specified in this paragraph.

(1) For mobile stations, these signals must be attenuated, relative to the level at 1 kHz, as follows:

(i) In the frequency ranges of 3.0 to 5.9 kHz and 6.1 to 15.0 kHz, signals must be attenuated by at least 40 log (f/3) dB, where f is the frequency of the signal in kHz.

(ii) In the frequency range of 5.9 to 6.1 kHz, signals must be attenuated at least 35 dB.

(iii) In the frequency range above 15 kHz, signals must be attenuated at least 28 dB.

(2) For base stations, these signals shall be attenuated, relative to the level at 1 kHz, as follows:

(i) In the frequency range of 3 to 15 kHz, signals must be attenuated by at least 40 log (f/3) dB, where f is the frequency of the signal in kHz.

(ii) In the frequency range above 15 kHz, signals must be attenuated by at least 28 dB.

(3) Filtering is not required for the supervisory audio tones, signaling tones or wideband data signals.

Equipment:

TRU s/n 5304YKCA

Test Method:

The audio filter is implemented with a digital device and its input and output are not accessible as analog signals within the transceiver. The frequency response of the audio filter was determined by simulation of the digital device.

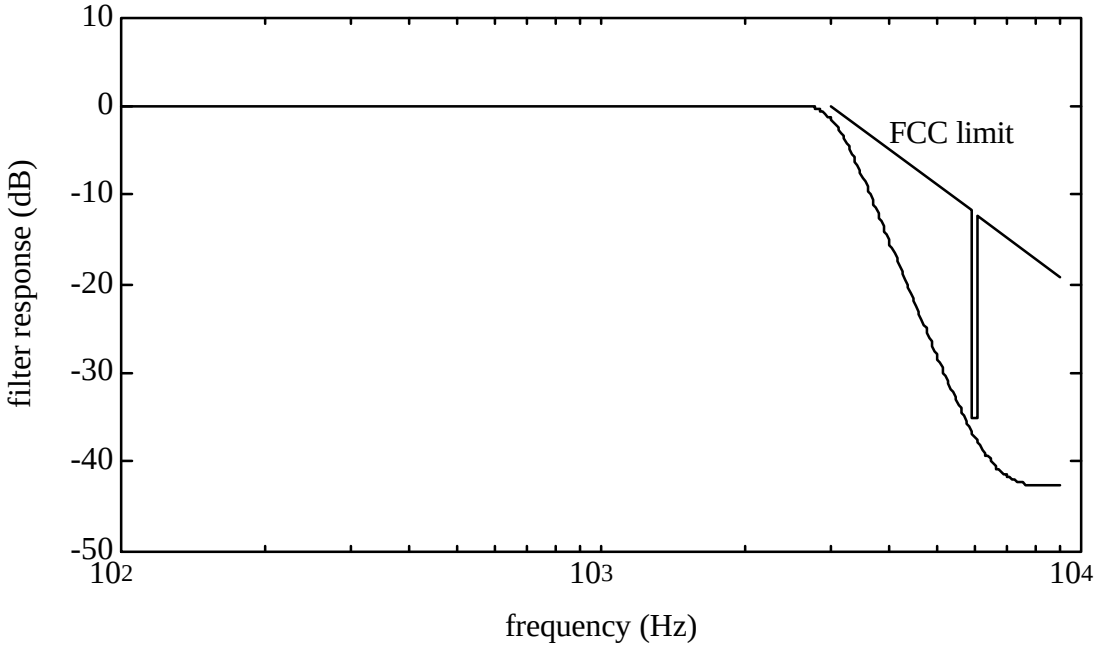
Measurement:

The audio filter response is shown in Figure 4.3.1 along with the FCC Part 22 attenuation limits.

Test Results:

Conforms. The Audio Filter Response of the TRU-II was measured as part of the Standalone TRU-II filing under FCC ID AB6NTAX98AA. The test results are shown here for completeness of the DM 800MHz Enclosure cell site filing.

Figure 4.3.1: Audio Filter Response



4.4 Modulation Characteristics (Modulation Limiting)

4.4.1 Modulation Characteristics Requirements (FCC Sec. 2.1047)

(b) Modulation levels. The levels of the modulating signals must be set to the values specified in this paragraph, and must be maintained within +/-10% of those values.
   (1) The instantaneous frequency deviation resulting from the main modulating signal must be +/-12 kHz.
   (2) The instantaneous frequency deviation resulting from the supervisory audio tones must be +/-2 kHz.
   (3) The instantaneous frequency deviation resulting from the signaling tone must be +/-8 kHz.
   (4) The instantaneous frequency deviation resulting from wideband data signals must be +/-8 kHz.

(c) Deviation limitation circuitry. Cellular transmitters must be equipped with circuitry that automatically prevents modulation levels for voice transmissions from exceeding the limits specified in this section.

Test Requirements:

The FM deviation shall not exceed +/- 12 kHz peak frequency deviation.

Test Equipment:

TRU s/n 5304YKCA

Test Method:

Operate the transmitter with the compressor enabled. Couple the transmit output to a frequency deviation meter or modulation analyzer set to measure peak FM deviation. Apply a 1 kHz audio tone to the PCM codec input and adjust the level to produce 50% of the rated deviation (+/- 6 kHz peak deviation). Increase the level of the audio tone by 20 dB in 1 dB steps, recording the peak FM deviation at each audio level. Set the audio frequency to 300 Hz and 3 kHz and measure the transmitter deviation over the same range of audio levels.

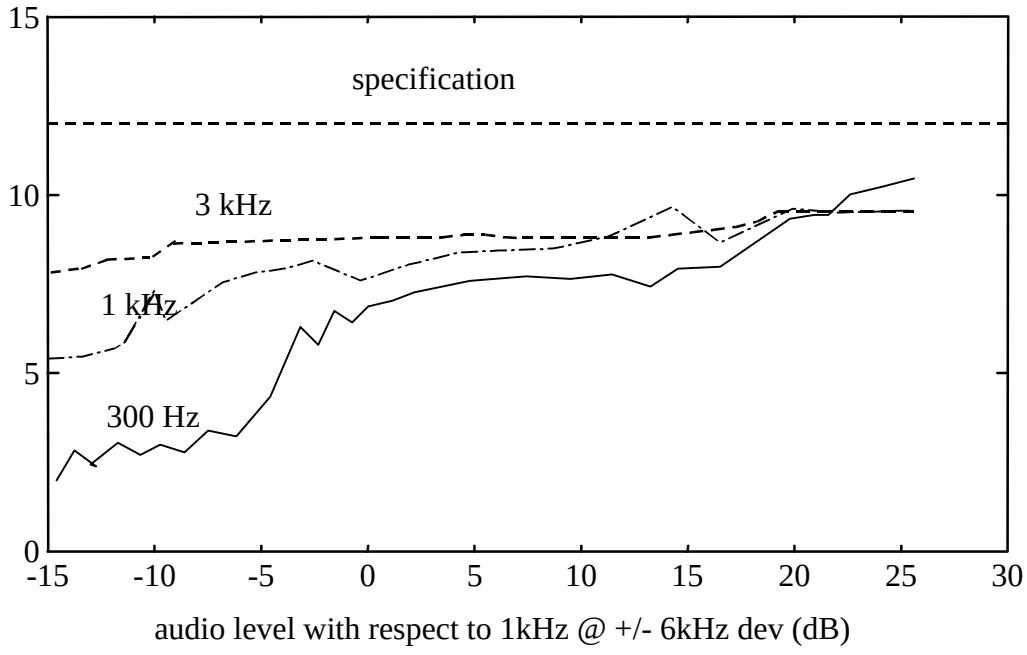
Test Measurements:

Measurements were made using the HP8903B audio analyzer as the audio source and the HP8901B modulation analyzer to measure transmit frequency deviation. The measured deviation limiting characteristics is shown in Figure 4.4.1. The peak hold detector was used on all measurements. The horizontal scale is dB relative to the level needed to produce 50% of the rated deviation at a frequency of 1 kHz.

Test Results:

Conforms. The Audio Frequency Response of the TRU-II was measured as part of the Standalone TRU-II filing under FCC ID AB6NTAX98AA. The test results are shown here for completeness of the DM 800MHz Enclosure cell site filing.

Figure 4.4.1: Deviation Limiting



4.5 Occupied Bandwidth and Emission Masks

4.5.1 Occupied Bandwidth Requirements (FCC Sec. 2.1049 & 22.917)

FCC Part 2, Para.2.1049

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(g) Transmitter in which the modulating baseband comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with section 22.917 of the FCC rules as follows:

For Voice modulation (F3E emissions) and Combined SAT and Voice modulation (F3E and F3D emissions):

(b) F3E and F3D emission mask for use with audio filter. For F3E and F3D emissions, the mean power of emissions must be attenuated below the mean output power of the unmodulated carrier wave (P) as follows:

(1) On any frequency removed from the carrier by more than 20 kHz but no more than 45 kHz: at least 26dB.

(2) On any frequency removed from the carrier by more than 45 kHz, up to the first multiple of the carrier frequency: at least 60 dB or 43 + 10 log P dB, whichever is the lesser attenuation.

For Wideband Data modulation (F1D emissions) and TDMA modulation (DXW emissions):

(d) F1D emission mask. For F1D emissions, the mean power of emissions must be attenuated below the mean output power of the unmodulated carrier wave (P) as follows:

(1) On any frequency removed from the carrier by more than 20 kHz but no more than 45 kHz: at least 26dB.

(2) On any frequency removed from the carrier by more than 45kHz but no more than 90 kHz: at least 45 dB.

(2) On any frequency removed from the carrier by more than 90 kHz, up to the first multiple of the carrier frequency: at least 60 dB or 43 + 10 log P dB, whichever is the lesser attenuation.

Test Equipment:

TDMA Dual Mode (DM) 800 MHz Enclosure Cell Site

TRU II - s/n 5304YKCA
TRU-III - s/n 5324ALHM

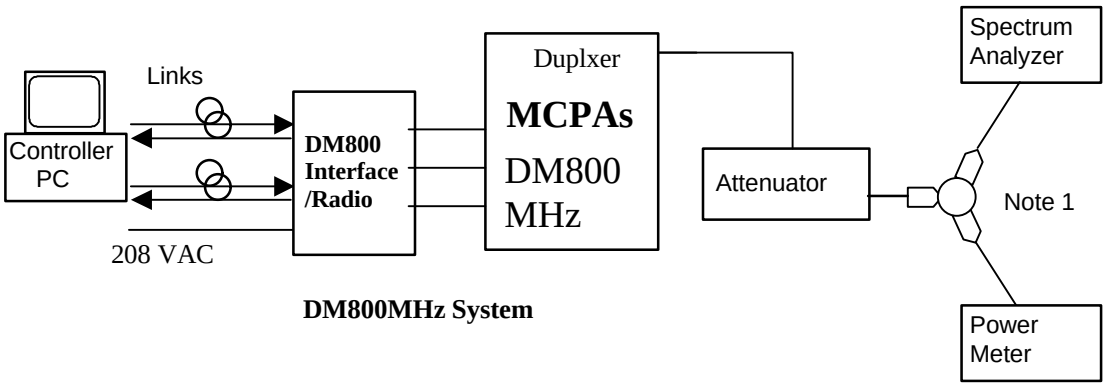
Test Method:

Operate the transmitter under the standard test conditions with the compressor disabled. For voice modulation apply a 2500 Hz tone at a level 16 dB greater than that required to produce 50 percent of the maximum transmitter deviation. For combined voice and SAT modulation apply the same audio level and enable transmission of the +/- 2 kHz peak deviation SAT signal. For data modulation measurements, a pseudo-random binary sequence (PRBS) of length 2 15 was used. The measurements were made at the output of the duplexer port for one RF carrier. Measurements were also made on channels at the bottom, middle and top of the licensed bands. The occupied bandwidth was measured using the 99% channel power feature of the spectrum analyzer.

Test Setup:

The set-up used for DM800 MHz Enclosure Occupied bandwidth test is illustrated in Figure 4.5.1 as digital mode and analog mode. TRU-II was tested for digital and analog modes and TRU III was tested for only digital. The TRU III wasn't designed to support analog mode; it's only a digital mode radio.

Figure 4.5.1: Test Setup for Occupied BW Measurement



Note 1: Power Meter or Spectrum Analyzer

Test Results:

The measured maximum occupied BW from the Base Station was 28.25kHz. The Base Station complies with the requirement. The 99% occupied bandwidth was measured and the results are summarized in the table below. Table 4.5.1 and 4.5.2 shows the measured occupied bandwidth at the different channels and of each mode of operation. The maximum measured occupied bandwidth from the tables was 28.25kHz. Figure 4.5.2 to 4.5.9 shows the plots of the measured occupied bandwidth at some of the TDMA/AMPS channels. The measurement was taken at TRU II and TRU III for TDMA/AMPS modes.

Conforms. The test was performed on these channels met the occupied bandwidth requirement.

Digital Mode
The occupied bandwidth for the DM800MHz Enclosure cell site when operating in TDMA mode for TRU II is shown in Figure 4.5.2(a) and 4.5.3(a) and for TRU III is shown in Figure 4.5.2(b) and Figure 4.5.3(b) as transmit and standalone modes respectively. All plot figures are attached in the test report attachment section of Exhibit 2A.

Analog Mode
The occupied bandwidths for the Dual Mode 800MHz cell site when operating in AMPS mode is shown in Figures 4.5.6 to 4.5.9. Figure 4.5.6 or Voice Modulation, Figure 4.5.7 for SAT Modulation, Figure 4.5.8 for Voice & SAT Modulation and Figure 4.5.9 for Wide band data. All plot figures are attached in the test report attachment section of Exhibit 2A.

Table 4.5.1: Occupied Bandwidth of DM800 MHz Enclosure System

Digital Mode (TDMA)

Channel Number	Mode Of Operation (TRU-II & TRU III)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)	FCC Limited Occupied Bandwidth (kHz)
156	TRU-II-Tx	874.68	24.00	30
156	TRU-II-Standalone Tx	874.68	24.00	30
510	TRU-II-Tx	885.3	24.25	30
510	TRU-II-Standalone Tx	885.3	28.25	30
333	TRU-II-Tx	879.99	24.00	30
333	TRU-II-Standalone Tx	879.99	28.00	30
510	TRU-III-Tx	885.3	25.00	30
510	TRU-III-Standalone Tx	885.3	28.25	30

Table 4.5.2: Occupied Bandwidth of DM800 MHz Enclosure System

Analog Mode (AMPS)

Channel Number	Mode Of Operation TRU-II	Frequency (MHz)	Measured Occupied Bandwidth (kHz)	FCC Limited Occupied Bandwidth (kHz)
156	Voice & SAT	874.68	12.50	30
156	SAT Only	874.68	12.50	30
156	Voice Only	874.68	20.50	30
156	Wide Band Data	874.68	21.50	30
156	Compandor On	874.68	24.75	30
510	Wide Band Data &SAT	885.30	21.50	30
510	Voice & SAT	885.30	12.00	30
333	Wide Band Data	879.99	21.25	30

4.6 Spurious Emissions at Antenna Terminals

4.6.1 Spurious Emissions Requirements

FCC Part 2.1051

Conducted spurious emissions shall be attenuated below the level of emissions of the carrier frequency by at least 43 + 10[log(mean output power in watts)] or must not exceed a level of -13 dBm.

FCC Part 2.1057 - Frequency spectrum to be investigated

The spectrum should be investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and sub harmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value need not be reported.

Conducted Emissions limit:

43 + 10 log(mean output power in watts) = 43 + 10 log (14W) = 54.4 dBc or -13dBm.

Test Equipment:

TDMA DM800MHz Enclosure Cell Site
TRU II - s/n 5304YKCA
TRU-III - s/n 5324ALHM

Test Method:

Operate the transmitter under the standard test conditions in both AMPS and TDMA modes. Measure the harmonic and spurious emissions from 1 MHz to 10 GHz. Use a 30 kHz resolution bandwidth.

The antenna port of the duplexer was directly coupled to the spectrum analyzer through a 30dB attenuator. The TRU was set to transmit at full power on channel 333. The entire range from 1MHz to 10GHz was searched for spurious and harmonic emissions in both AMPS and TDMA modes.

The following spectrum analyzer settings were used for the measurement of the antenna port spurious emissions:

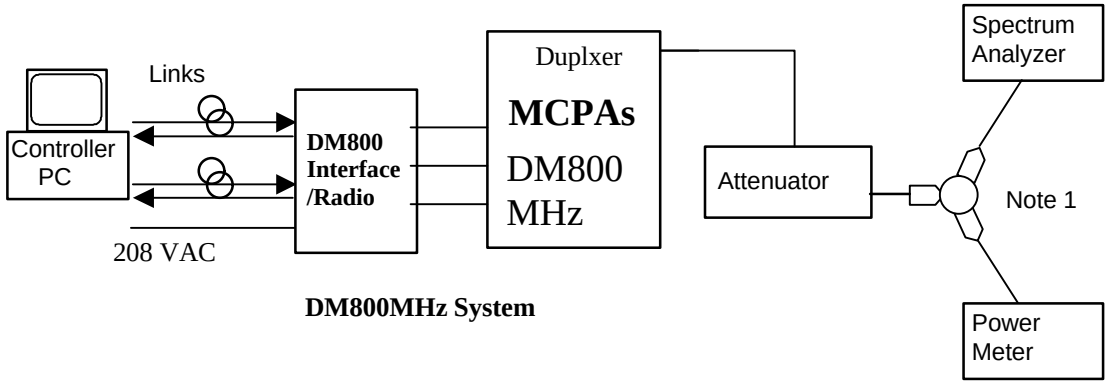
Resolution Bandwidth:	30 kHz
Video Bandwidth:	30 kHz
Attenuation:	30 dB
Ref. Level:	48 dBm
Ref. Level Offset:	31.3 dB
Sweep Time:	Coupled

The emissions were investigated up to 10 GHz (the 10th harmonic of the fundamental emission).

Test Setup:

The set-up used for the DM800 MHz Enclosure system Antenna Port Spurious Emission test is illustrated in Figure 4.6.1.

Figure 4.6.1: Test Setup for Antenna Port Spurious Emission Measurement



Note 1: Power Meter or Spectrum Analyzer

Test Results:

The DM800MHz was searched for spurious emissions at the antenna port when operating in AMPS and TDMA modes. The frequency spectrum from 1 MHz to 10 GHz was scanned for emissions using a 30 kHz resolution bandwidth. The DM800 MHz Enclosure system complies with the limit of –13 dBm. A minimum margin of 10.77 dB was achieved with TRU II and TRU III radio. Table 4.6.1 shows the worst case spurious emissions at the antenna port of the system. Figures 4.6.2 – 4.6.4 show the band edge emissions of the 510 TDMA channel. No other out of band emissions was detected from 1 MHz to 10 GHz. All plot figures are attached in the test report attachment section of Exhibit 2A.

Table 4.6.1: Spurious Emissions at the DM800MHz Enclosure Antenna Port of Ch.510

Frequency (GHz)	Operating Mode	Spurious Emissions Level (dBm)	FCC Limit (dBm)	Margin (dB)
1.7706	TDMA-TX	-31.27	-13.0	18.27
2.6577	TDMA-TX	-24.42	-13.0	11.42
8.860	TDMA-TX	-32.16	-13.0	19.16
1.770	TDMA-Standalone	-26.0	-13.0	13.0
2.0977	TDMA-Standalone	-25.65	-13.0	12.65
6.0866	TDMA-Standalone	-31.45	-13.0	18.45
1.6853	SAT	-26.28	-13.0	13.25
7.0222	SAT	-26.30	-13.0	13.3
1.7679	SAT & Signal Tone	-26.15	-13.0	13.15
4.92	SAT & Signal Tone	-24.92	-13.0	11.92
2.6577	AMPS	-29.80	-13.0	16.8
1.7706	Wide Band Data	-30.74	-13.0	17.74
2.6577	Wide Band Data	-25.36	-13.0	12.36
1.7706	Voice & SAT	-30.46	-13.0	17.46
2.6577	Voice & SAT	-26.27	-13.0	13.27
1.7119	TRU-III-Transmit	-27.85	-13.0	14.85
2.2111	TRU-III-Transmit	-27.08	-13.0	14.08
4.6533	TRU-III-Transmit	-28.84	-13.0	15.84
6.0200	TRU-III-Transmit	-31.07	-13.0	18.07
2.1888	TRU-III-Standalone	-25.14	-13.0	12.14
4.6511	TRU-III-Standalone	-23.77	-13.0	10.77
6.0644	TRU-III-Standalone	-26.57	-13.0	13.57
9.2466	TRU-III-Standalone	-26.29	-13.0	13.29

4.7 Frequency Stability

4.7.1 Frequency Stability Requirements

FCC Part 2.1055

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30^{o} to +50^{o} centigrade for all equipment except that specified in subparagraphs (2) and (3) of this paragraph.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10^{o} centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

FCC Limit (Part 22.913)

The frequency stability shall be better than +/- 2.5 ppm over a temperature range of -30 to +50 degrees C.

Equipment:

TRU s/n 5304YKCA

Requirements:

The frequency stability shall be better than +/- 1.5 ppm over a temperature range of -30 to +60 degrees C.

The frequency stability shall be better than +/- 1.5 ppm over a voltage range of 85 to 115 percent of the nominal voltage.

Measurement Method:

The TRU output was sampled and fed to the HP5565A Frequency Counter. An HP8657B generator with the high stability reference option was used as the counter time base. The high stability reference has stability of +/- 0.01ppm over temperature and line voltage, and an aging of +/- 0.001ppm per day. The measured frequency stability versus temperature is shown in Figure 4.7a. The stability versus battery voltage is shown in Figure 9.

Results:

Conforms. The Frequency Stability of the TRU-II was measured as part of the Standalone TRU-II filing under FCC ID AB6NTAX98AA and TRU III was measured as part of the standalone TRU filing under AB6NTAW99AA. The test results are shown here for completeness of the DM800MHz Cell Site filing.

Figure 4.7a: Frequency Stability versus Temperature

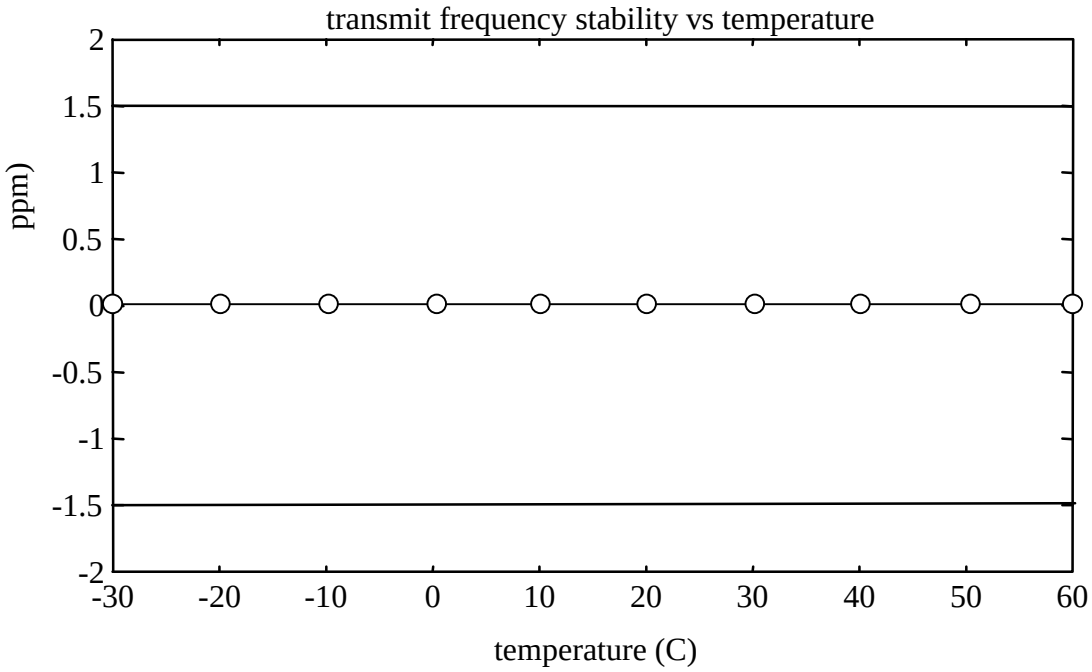
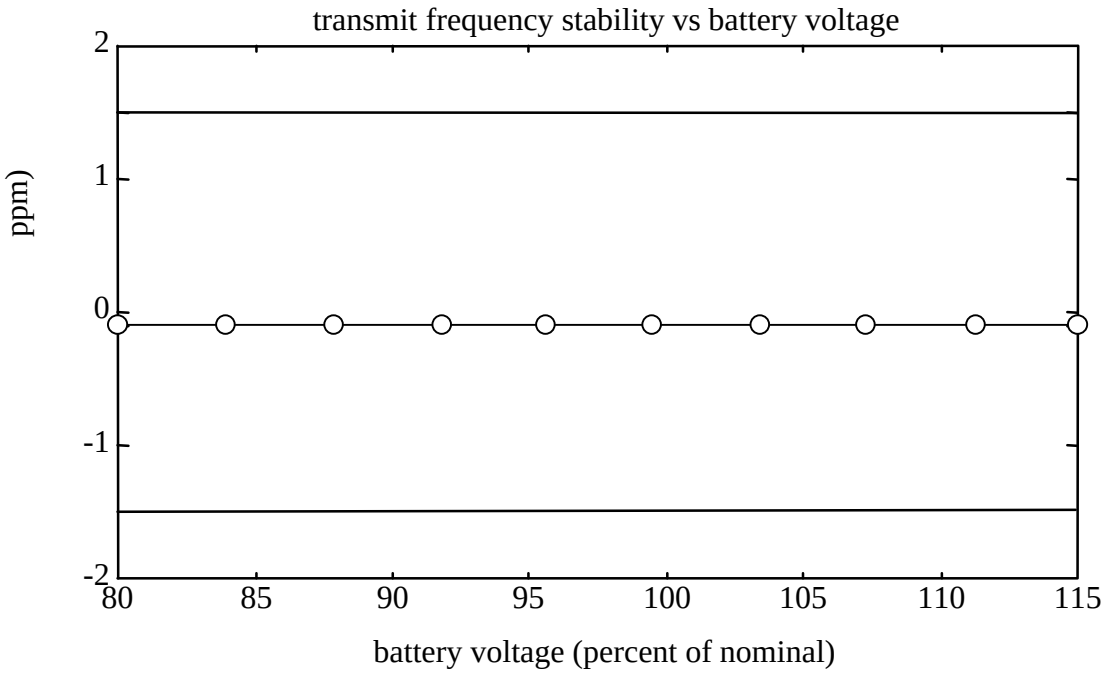


Figure 4.7b: Frequency Stability versus Battery Voltage



4.8 Field Strength of Spurious and Harmonic Radiation

4.8.1 Radiated Emissions Requirements

FCC Part 2.1053

(a) Measurements was made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.989(c) as appropriate. For equipment operating on frequencies below 890 MHz, an Open Field Test is normally required, with the measuring instrument antenna located in the far field at all test frequencies. In event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

FCC Part 2.1057 - Frequency spectrum to be investigated

The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Test Site:

Radiated emissions testing was performed at Nortel's Wireless Systems Integrity Laboratory in the 10 meter Ambient Free Chamber located at 5111 47th Street NE, Calgary, Alberta Canada.

Test Procedure:

Radiated emission measurements were performed according to the procedures outlined in Section 8 of the ANSI C63.4 standard.

The measurement distance between the center of the measurement antenna and the periphery of equipment under test was 10 meters.

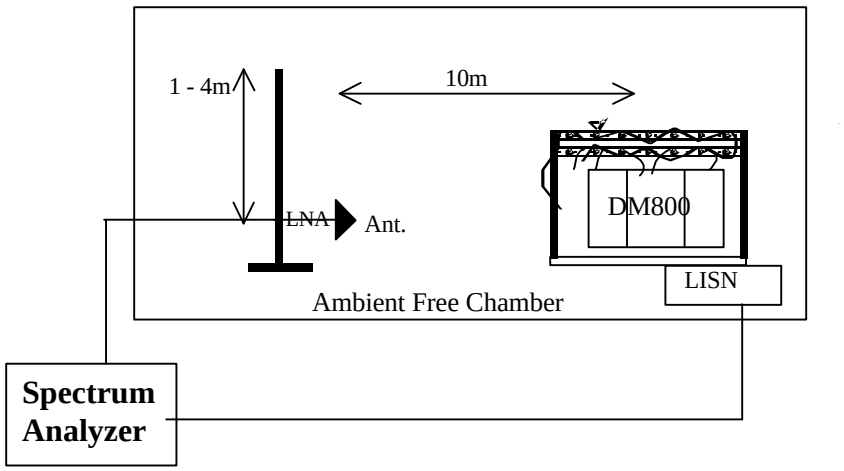
In order to maximize all emission levels from the equipment, the emissions were searched with the receive antenna at varied height levels. The equipment was rotated a full 360 degrees on the turntable with the receive antenna at varying height levels (1 to 4 meters). Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization.

The TDMA DM800 MHz Enclosure system was setup with 72 radios transmitting at maximum power that contain of three RF sectors. The radios were setup in both TDMA and AMPS transmit modes and each radio was set transmit on a different channel to cover the entire cellular band. The interface at the MCPA shelf measures the output power of the base station. The output power of the base station also verified with the calibrated power meter. The each MCPA shelf was configured with 24 carrier per sector. And each shelf transmitting at 200Watts power per sector.

A complete scan of the emissions from 30MHz to 10 GHz was completed. Quasi-peak detector was used for measurements up to 1GHz. For emissions above 1 GHz the peak detector function was used with an RBW of 1 MHz.

The TDMA DM800 MHz Enclosure system was powered by 208 VAC. The conducted emission of the system also measured at each power leads to meet the FCC / IC requirement.

Test Setup:



Test Results:

There were no radiated emissions present within 15 dB of the FCC limit of 73.9 dBµV/m at 10 meters from the TDMA DM800 MHz Enclosure system.