



Product Integrity Laboratory

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Emissions Test Report
Project Code CG-444
(Report CG-444-EM-1-2)

1900MHz VBTS 3031
With GNB Battery

FCC Part 24.238 Emissions Report

Revision: 2

November 22, 2006

Prepared for: Nortel
Author: Glen Moore
EMC Manager

Approved by: Nick Kobrosly
Director of Operations

Emissions Test Report

Report Summary**Test Facility****NTS Canada**

Product Integrity Laboratory
5151-47th Street, N.E. Calgary Alberta T3J 3R2

Accreditation Numbers:

FCC 101386
IC 46405-3978 File # IC3978-2
Standards Council of Canada Accredited Laboratory No. 440

Performed For:

Nortel .
5050-40th Street, N.E.
Calgary Alberta T3J 4P8
Phone (403) 769-4103

Customer Representative: Daryl Therens

EUT Description

	Name	Model	Revision	Serial Number
EUT	1900 MHz VBTS 3031 with GNB Battery	See equipment list in Section 2.1.1		

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Emissions Test Report

Test Summary

Standards		Test description & Range	Deviations* from:			Pass / Fail	Criteria
Base	Test Basis		Base Standard	Test Basis	NTS Procedure		
Configuration : 03 1900MHz VBTS 3031 with GNB Battery							
FCC CFR 47 Part 24	ANSI C63.4	Radiated E-Field Emissions 30 MHz – 19 GHz	No	No	No	PASS	Subpart E

*Deviation details are outlined in the applicable appendix of this report

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Emissions Test Report

Test Log and Signatures

Test Case	Start	End	Tester / Date
Configuration: 03 : 1900MHz VBTS 3031 with GNB Battery			
Radiated Emissions 30 MHz – 19 GHz FCC CFR 47 Part 24	October 03, 2006	October 03, 2006	Alex Matthews Compliance Specialist Glen Moore, EMC Manager

The test outlined may not be inclusive of all testing required by the Base Standards or fulfill the applicable regulatory requirements in their entirety.

Test Result: The product presented for testing complied with test requirements as shown above.

Prepared By: _____
Glen Moore
EMC Manager

Reviewed By: _____
Alex Matthews
Compliance Specialist

Checked By: _____
Janet Johanntges
Quality Representative

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Register of Revisions

Revision	Date	Description of Revisions
0	Nov 1, 2006	Draft release for review
1	Nov 9, 2006	Final Release
2	Nov 22, 2006	Corrected Version

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Emissions Test Report

1.0 INTRODUCTION**1.1 PURPOSE**

The purpose of this document is to describe the tests applied by NTS Canada to demonstrate compliance of Nortel Network's 1900MHz VBTS 3031 with GNB Battery to the applicable Electromagnetic Compatibility (EMC) standards as outlined in section 1.3. The test outlined may not be inclusive of all testing required by the Base Standards or fulfill the applicable regulatory requirements in their entirety.

The client directed the operation and configuration of the system under test and was responsible for its monitoring and proper operation during the testing,

1.2 ABBREVIATIONS AND DEFINITIONS

The following are the abbreviations and definitions that may be relevant to this document.

<u>Abbreviation</u>	<u>Explanation</u>
A	Amps
AC	Alternating Current
AE	Ancillary Equipment
AF	Antenna Factor
ANSI	American National Standards Institute
AWG	American Wire Gauge
BTS	Base Transceiver Station
C	Celsius
CAM	Customer Alarm Module
CDMA	Code Division Multiple Access
CEM	Channel Element Module
CF	Correction Factor
CFR	Code of Federal Regulations
CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques (The International Special Committee on Radio Interference)
CL	Cable Loss
cm	centimetre
CM	Control Module
dB	Decibel
dBm	Decibel relative to 1 milliwatt
dBµV	Decibel relative to 1 uV
DC	Direct Current
DM	Digital Module
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EN	European Norms
EUT	Equipment Under Test
FCC	Federal Communications Commission
FRU	Flexible Radio Unit
GHz	Gigahertz
GPS	Global Positioning System
GPSTM	Global Positioning System Timing Module
GR	Generic Requirements

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Hpol	Horizontal Polarization
HSSL	High Speed Serial Link
Hz	Hertz
IC	Industry Canada
kHz	kilohertz
LO	Local Oscillator
LNA	Low Noise Amplifier
m	Metre
MHz	Megahertz
ms	Milli Second
NTS	National Technical Systems
NA	Not Available
N/A	Not Applicable
PA	Power Amplifier
PI	Product Integrity
PK	Peak
PLL	Phase Lock Loop
P/N	Part Number
PS	Power Supply
PSU	Power Supply Unit
QP	Quasi-Peak
Qty	Quantity
RE	Radiated Emissions
RF	Radio Frequency
RM	Radio Module
Rx	Receive
TDMA	Time Division Multiple Access
TT	Turn Table
Tx	Transmit
V	Volts
VDC	Volts Direct Current
Vpol	Vertical Polarization
W	Watt
XCEM	X Channel Element Module
Zt	Transfer Impedance

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Definitions:

Equipment Under Test (EUT): A representative ITE or functionally interactive group of ITE (that is a system), which includes one or more host units and is used for evaluation purposes.

Electromagnetic compatibility (EMC): The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

1.3 REFERENCES

- ANSI C63.4: 2001 American National Standards for Methods of Measurements of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipments in the range of 9 kHz to 40 GHz, June 6, 2001
- TIA/EIA-603-1: 1998 Land Mobile FM or PM Communication Equipment Measurement and Performance Standards

US Code of Federal Regulations

- 47 CFR Part 24 Federal Communications Commission, Part 24

NTS Documentation

- NTS Radiated Emissions 1GHz – 18GHz Manual Test Method E006R4

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Emissions Test Report

2.0 EUT

2.1 DESCRIPTION OF EUT

	Name	Model	Revision	Serial Number
EUT	See equipment list in Section 2.1.1			
Classification	Floor Standing			
Size	Hardware		Width (inches)	Height (inches)
	BTS 3031		22.44	36.7
Weight	Hardware			Weight (pounds)
	BTS 3031 fully loaded			210
	Battery enclosure with heater (houses 4 GNB batteries)			65
	GNB lead acid battery			119
Power	200 to 240 Vrms / 15A, 50 to 60 Hz (a 30A BTS input circuit breaker is recommended). Use 10 meter, 3-wire (hot, return, ACEG), #10 AWG power cable Tested at 208 VAC			
Functional Description	<p>The Village BTS 3031 is a physically small BTS for outdoor deployment with a RF capacity of 1 to 3 carriers on each of 3 sectors. It supports up to 2 standard xCEM192, DOM-0 or DOM-A, typical 20W per carrier, and 6 customer alarms.</p> <p>BTS 3031</p> <p>vCAM</p> <p>The vCAM is based on the Compact BTS Customer Alarm Module with added features and functionality. The vCAM provides the alarm and monitoring functions for the BTS. It monitors PA temperature and sets the fan speed based upon the temperature. The vCAM supports an auxiliary DC output with a separate 10A breaker, EIA 232 interface to monitor battery performance, and 6 customer alarms. The vCAM also provides secondary surge protection for up to 4 T1/E1 lines, or 4 paired circuits.</p> <p>DM</p> <p>The DM is based on the Compact BTS CM-2, xCEM192, and GPSTM. The CM-2 and xCEM192 are combined on the same digital board, and the GPSTM has a separate board. The DM provides the call processing capability, overall data flow control, 4 T1/E1 backhaul interfaces to the BSC via the vCAM, 128 channel elements, 2 HSSLs to interface with 2 external xCEM/DOM positions, and 3 HSSLs to interface with the 3 sector radio board (in the RM). The GPSTM board interfaces directly with the digital board and provides the timing reference for the BTS.</p> <p>The DM also provides the CDMA toolbox interface (DMI and Vortex).</p>			

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Mini-backplane (Expansion Shelf)

The mini-backplane and expansion shelf can accommodate all CEM modules (up to 2) compatible with Compact CEM slots (xCEM64 PnP, xCEM192, DOM, DOM-A), and will have mechanical features to prevent non-PnP xCEM64 modules from being used. The HSSL interconnect cable is twisted pair and shielded. The DC power interconnect cable is not shielded but EMI filter components are on the mini-backplane.

CEM

There are 4 different CEM digital module variants (xCEM64 PnP, xCEM192, DOM-0, DOM-A) that can be used in the BTS 3031 in any permutation (up to 2). The CEM provides the cell site modem function, converting the encoded voice and data between the network and the air interface. The xCEM64 PnP and xCEM192 provide 1xRTT voice and data capability. The DOM-0 and DOM-A are OEM units that provide 1xEV-DO capability, and also provide their own backhaul interface via T1/E1 or ethernet.

RM

The RM is based on the Compact BTS Radio Module, and is available in -48 and +24 Vdc power options. The 3031 RM has incorporated the 3c-3s Radio Board, Monitoring and Alarm Card, 3 800 MHz 75 W Power Amplifier pallets, and the Power Supply Unit. The RM provides the radio channel compensation and RF conversion. Once the radio is configured it becomes a data processing pipe with little activity that is not OAM related.

DPM

The 800 MHz BTS 3031 supports 2 variants of passive, 3 sector duplexers that are designed to support specific bands. They are:

- A" and A Cellular Band (BTS Rx band 824 to 835 MHz, BTS Tx band 869 to 880 MHz)
- B, A' and B' Cellular Band (BTS Rx band 835 to 849 MHz, BTS Tx band 880 to 894 MHz)

Cooling Unit

The BTS 3031 requires 3 fan modules. The speed of the fan module connected to the vCAM is controlled with a PWM signal set by the vCAM depending upon the maximum PA pallet temperature reported by all 3 PA pallets. A "Y" jumper cable connects 2 heat exchanger fan modules into the ACIM.

Heater

The BTS 3031 requires a heater to ensure the inside temperature does not drop below -5°C.

Heat Exchanger

The BTS 3031 uses an air to air heat exchanger to maintain environmental sealing and heat control.

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TCCM

The TCCM routes T1/E1 lines in an outdoor cabinet. It is installed in series between the primary T1/E1 surge protection and the vCAM. It can cross connect up to 12 T1/E1 circuits.

AC Rectifier

The BTS 3031 utilizes AC power (1800 W rectifier) which includes the option of battery back-up support. Among the important features provided are battery voltage and current control, battery temperature monitoring, battery fault detection, battery recharge current control, and power system alarms.

ACIM

The ACIM interfaces with the AC and DC power, rectifier, battery string, vCAM, AC outlet, humidity sensor, door alarm, and temperature sensor. It also provides some alarming and monitoring capabilities, and is applicable to both North American and International markets.

Digital Module Air Baffle and EMI Shield

Each unpopulated digital module slot in the expansion shelf requires the air baffle/EMI shield installed for proper air flow and EMI shielding.

Battery Enclosure with Heater

The battery enclosure with heater will support one string of 4 GNB M12V155FTX batteries.

Battery Enclosure with Avestor Batteries

The battery enclosure with Avestor batteries does not require any heating or cooling, and will support 2 Avestor batteries (both batteries must always be present).

Surge Protection

The BTS 3031 provides primary surge protection for all cabling that enters the enclosure, including protectors for AC power, T1/E1, customer alarms, GPS RF antenna, and Tx/Rx RF antennas.

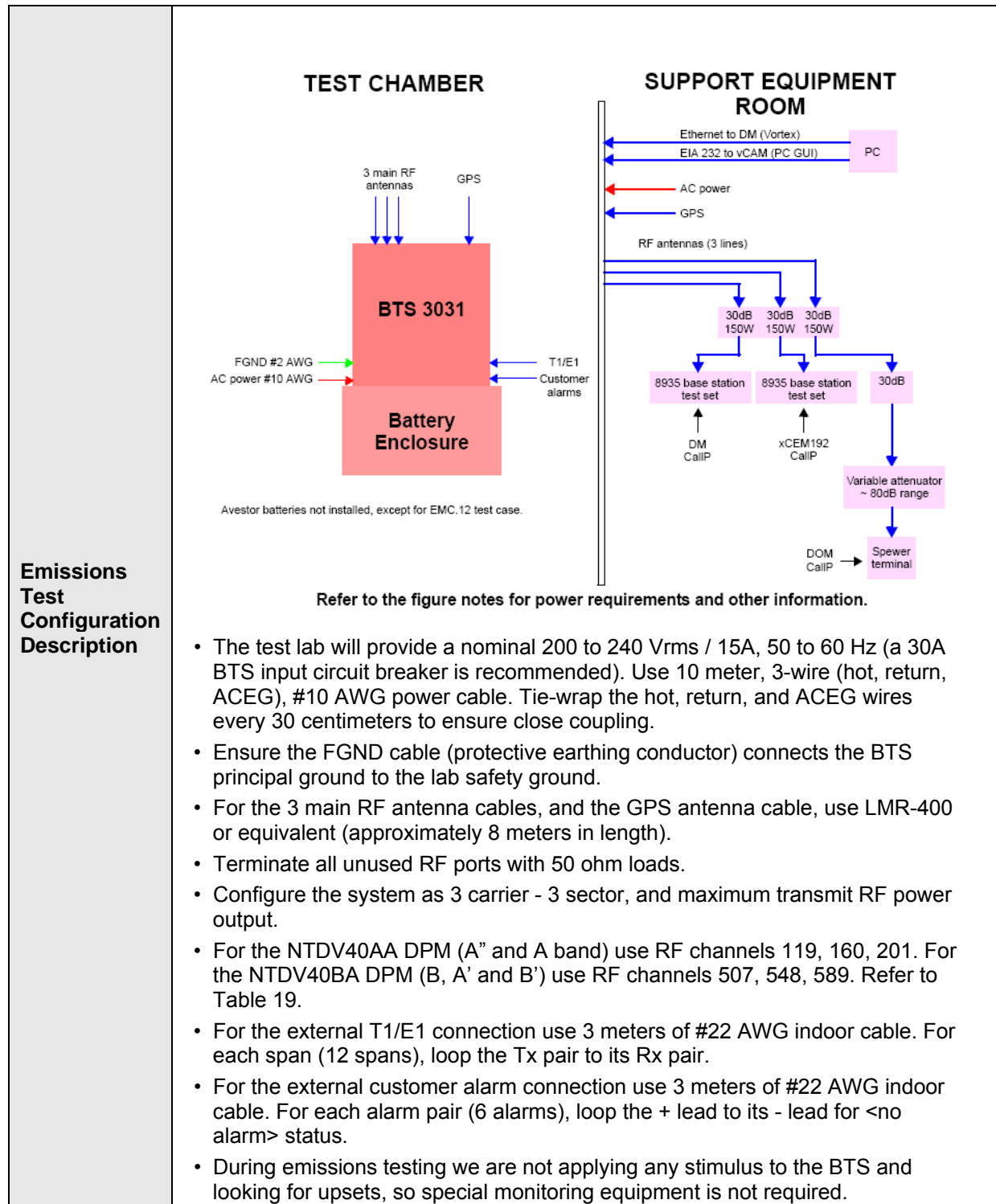
Software Support

BTS 3031 is supported in Vortex 13.0 or greater

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2.1.1 EUT DESCRIPTION LIST

The following module information was provided by the client and was not verified by NTS. Configuration differences are indicated in the Notes section.

PEC	REL	SN	Description
NTDV60BA	P3		System NA (North America)
			4 - GNB Batteries
NTDV65AA	P1		GNB Battery Box
N0087643	P1		GNB Battery Box EBM Fan
NTDV22BA	P5		Fan Back
NTDV22BA	P5	NNTM7860CSDM	Fan Door top
NTDV22BA	P5		Fan Outer Front
NTDV6102	01		Heat Exchanger
NTDV21CA	P3d	NNTM74XL65T3	VCAM (<i>Diodes Replaced / FW: 6.60</i>)
NTDV25BA	P3	NNTM7860CQ73	Digital Module
NTDV26CA	P7	NNTMEENP015A	Digital Card
NTDV27AA	01	TMSLL2100068	GPS Card (<i>updated 100C</i>)
NTDV30DA	R8	NNTMEEBP1033	Radio Module (<i>specifics below</i>)
NTDV31DA	R1		Radio Card
NTDV32BAE6	R1		PSU
NTDV36CA	P6		VMAC
NTDV38EA	Q5		PA Card (1)
NTDV38EA	Q5		PA Card (2)
NTDV38EA	Q5		PA Card (3)
NTDV41CA	P1	CLWVWW103JH4	Duplexer (C/F Band)
NTDV24AA	P3	NNTM536G49T0	ACIM
NTDV62CA	P1	NNTM536G4DV6	Rectifier (<i>1:0K 06LD50000315</i>)
NTGS4993	P1	NNTM74XL5FCY	TCCM
NTDV2401			120 VAC Outlet Box NA
NTDV3187			Alarm Lightning Protector 1
NTDV3188			T1 Lightning Protector 2
NTDV3188			T1 Lightning Protector 3
NTDV6104			Heater
NTBW89DA	8	NNTM74X1LMFN	DOM-A
NTBW89DA	8	NNTM74X1LMF5	DOM-A

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2.1.2 POWER

Voltage	200-240Vrms (tested at 208 VAC)
Number of Feeds	3-wire (hot, return, ACEG)
Gauge of cable	#10 AWG
Current Draw	15A
Special Requirements	50 to 60 Hz (a 30A BTS input circuit breaker is recommended).

2.2 TEST PLAN CONFIGURATION DEVIATIONS

None.

2.3 CABLES

The following cables were not verified by NTS.

EUT Cable list

Quantity	Model	Routing		Shielded / Unshielded	Description	Cable Length (m)
		From	To			
1	NA	Hubble B	Power Input	Unshielded	#10 AWG AC Power Cables	
3	LMR400	RM	Chamber Bulkhead	Shielded	N Male – N Male Cable	
1	LMR400	Chamber Bulkhead	GPS Distribution Block	Shielded	N Male – N Male Cable	
1	8 pair 24 AWG	VCAM	Looped back	Shielded	T1 / E1 Cable	
1	8 pair 24 AWG	DOM-A	Looped back	Shielded	T1 / E1 Cable	
1	8 pair 24 AWG	VCAM	Looped back	Unshielded	Alarm Cable	

2.3.1 TEST PLAN CABLE LIST DEVIATIONS

None indicated by the customer.

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2.4 EUT CLOCK FREQUENCIES OF KEY INTEREST (SUPPLIED BY CUSTOMER)

Module	Frequency (MHz)	Description
vCAM	0.030	Fan power supply
	0.050	Main power supply
	0.100	I ² C interfaces
	32	Microprocessor Clock
vDM	.008	T1/E1 and PLD reference, time switch, BCN packet switch
	0.100	I ² C interfaces
	1.2288	Chip rate (fc)
	1.544	T1
	2.048	E1, T1/E1 and PLD reference, FALCS
	4.096	T1/E1 and PLD reference
	5.0	T1/E1 and PLD reference, I/O slave processor
	8.192	T1/E1 reference, FALCS, TDM clock time switch, BCN
	9.8304	8fc, LVDS signal
	10	Reference signal for test
	19.6608	16fc
	25	T1/E1 and PLD reference, ethernet reference
	33	xCEM bus clock
	33.25	xCEM PCI clock
	39.3216	32fc, T1/E1 and PLD reference
	63.8976	52fc
	66.666	Bus clock, 755, I/O slave processor, BCN packet switch
	133	CM-2+ L2 cache, xCEM processor clock
vRM	638.976	520fc
	0.100	I ² C interfaces
	0.330	Power supply switching (-48V and +24V power supplies)
	1.2288	Chip rate (fc)
	9.8304	8fc
	19.6608	16fc
	39.3216	32fc
	63.8976	52fc
	78.6432	64fc
	638.976	520fc
	Rx frequency - 177	Image frequency
	Rx frequency - 88.5	Local oscillator frequency
Rx frequency - 44.25	Half IF frequency	
Tx frequency + 57.6	BBPD RF local oscillator frequency	
AC Rectifier	0.330	Power supply switching
xCEM 192	0.100	I ² C interfaces
	1.2288	Chip rate (fc)

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Module	Frequency (MHz)	Description
	2.5	Ethernet reference (10Base-T)
	9.8304	8fc
	19.6608	16fc
	25	Ethernet reference (100Base-T)
	33	PCI, CSM5000
	33.25	BIR FPGA, PCI
	39.3216	32fc
	63.8976	52fc
	133	System clock, SDRAM
	638.976	520fc
	997.5	Processor core frequency
DOM A	0.100	I ² C interfaces
	1.2288	Chip rate (fc)
	1.544	T1
	2.048	E1
	9.8304	8fc
	19.6608	16fc
	25	Ethernet reference (100Base-T)
	33	PCI
	33.25	FPGA
	39.3216	32fc
	63.8976	52fc
	133	System clock, SDRAM
	638.976	520fc

2.5 EUT SOFTWARE

Software Name	Software Release Number	Software Configuration
SW: Vortex 13.0 Wk24	Lip files: vCAM F/W 6.68	3 carriers/3 Sectors

2.6 MODE OF OPERATION

As defined by Nortel Networks, the EUT was operated in a typical manner. During testing, the customer monitored the system operation. See Section 2.5 for software mode of operation information. All radios were transmitting at full power

2.6.1 TEST PLAN MODE OF OPERATION DEVIATION

None.

2.7 PASS / FAIL CRITERIA

The pass/fail criteria are defined by the emission limits outlined in each reference base standard. The specific limits are described in each test appendices of this report.

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3.0 SUPPORT EQUIPMENT

The following equipments were available for PI testing.

- PC with Windows 2000, ethernet, Vortex 12.1
- Agilent Spectrum Analyzer, 8596E
- Agilent Vector Signal Analyzer, E4406A
- Agilent CDMA Base Station test Set, 8935
- Agilent Power Meter, E4419B, with E9300A Power Sensor
- Vortex Cable (rolled ethernet)
- RF attenuator, 30dB, 150 W
- GPS antenna and cable (may be required at some test labs)
- Miscellaneous RF interconnect cables
- Digital multi meter

3.1 CONFIGURATION

All support equipment information was supplied by the client and was not verified by NTS.

3.2 CABLES**Support Cable List**

None provided by the customer.

3.3 FREQUENCIES**Support Frequency List**

Assembly	Signal	Frequency (MHz)
NA		

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APPENDICES

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Emissions Test Report

APPENDIX A: RADIATED E-FIELD EMISSIONS – 30 MHZ – 19 GHZ

A.1. Base Standard & Test Basis

Base Standard	<input type="checkbox"/>	CFR Title 47 – Telecommunications, Chapter I - FCC Part 22 – Public Mobile Services – Subpart H – Cellular Radiotelephone Service
	<input checked="" type="checkbox"/>	CFR Title 47 – Telecommunications, Chapter I - FCC Part 24 – Personal Communication Services – Subpart E – Broadband PCS
Test Basis		TIA/EIA-603-1: Land Mobile FM or PM Communication Equipment Measurement and Performance Standards
Test Method		NTS Radiated Emissions Test Method E006R4 NTS Radiated Emissions Signal Substitution Method 30MHz - 20GHz. EMC Test Method 11.0, Revision 01

A.2. Specifications

Frequency	<input type="checkbox"/>	47 CFR FCC Part 22	
	<input checked="" type="checkbox"/>	47 CFR FCC Part 24	
		Theoretical Peak @ 3m¹	ERP²
MHz		dBμV/m	dBm
1000 - 10000		84.3	-13

Note 1: Calculated using: $P_d - (43 + 10 \log(P_w))$

where P_d is the EUT power in dBm and P_w is the EUT power in watts

Note 2: Calculated using: $120 + 20 \log(\text{SQRT}(49.2 * P_w) / 3)$

where P_w is the EUT power in watts

A.3. Measurement Uncertainty

Frequency Range	Measurement Uncertainty (dB)	Expanded Uncertainty (K=2) (dB)
30 MHz – 1 GHz	+2.32/-2.36	+4.65/-4.72
1 GHz – 19 GHz	+3.48/-3.51	+6.96/-7.02

A.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

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Emissions Test Report

A.5. Radiated Emissions Measurement Equipment

A.5.1. Radiated Emissions 30 MHz – 1 GHz Measurement Equipment

Descriptions	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Bilog Antenna	<input type="checkbox"/> Chase	CBL 6111B	260398	24AUG07	24AUG06
	<input checked="" type="checkbox"/> Chase	CBL 6112B	260301		
RF Cable	Suhner Sucoflex	Ferrite bead loaded cable	260388	07JAN07	07JAN04
CONTROL ROOM					
Test Receiver	<input checked="" type="checkbox"/> Rohde & Schwarz	ESMI	260424 / 260423	05FEB07	13MAY05
	<input type="checkbox"/> Rohde & Schwarz	ESAI	260110 / 260111		
Mast Controller	EMCO	2090	260166	N/A	N/A
Multi Device Controller TT1 (Turntable)	EMCO	2090	260165	N/A	N/A
RF 10m East site Link					
- Cable 1	Suhner Sucoflex	NA	263191	13APR09	13APR06
- Cable 2	Suhner Sucoflex	NA	263135	13APR09	13APR06
- Cable 3	Suhner Sucoflex	NA	263161	13APR09	13APR06
- Cable 4	Suhner Sucoflex	NA	263162	13APR09	13APR06
- Switch Matrix Controller	TDL	SMC-002	260162	13APR09	13APR06
- Amplifier	Hewlett Packard	8447F	260164	13APR09	13APR06

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Emissions Test Report

A.5.2. Radiated Emissions 1 GHz – 18 GHz Measurement Equipment

Descriptions	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Horn Antenna (Rx) 1 GHz – 18 GHz	<input checked="" type="checkbox"/> EMCO	3115	260092	30AUG07	30AUG06
Standard Gain Horn (Rx) 5.95 GHz – 8.2GHz	<input type="checkbox"/> EMCO	3160-06	260090	N/A	27NOV01
Standard Gain Horn (Rx) 8.2 GHz – 12.5 GHz	<input type="checkbox"/> EMCO	3160-07	260089	N/A	27NOV01
Standard Gain Horn (Rx) 12.5 GHz – 18 GHz	<input type="checkbox"/> EMCO	3160-08	260074	N/A	27NOV01
Standard Gain Horn (Rx) 18 GHz – 26.5 GHz	<input type="checkbox"/> EMCO	3160-09	260044	N/A	27NOV01
High frequency Link					
High pass filter	Micro Tronics	HPM14576	CG963	10AUG07	10AUG06
LNA	Miteq	JSD000121	CG031	10AUG07	10AUG06
Cable from SA to LNA	Sucoflex 100	2422774A	263187	10AUG07	10AUG06
Cable from LNA to Antenna	Sucoflex 100	115757-4	N/A	10AUG07	10AUG06
Spectrum Analyzer 9k-40GHz	Rohde & Schwarz	FSEK-20	260104	09MAY07	09MAY06
LNA DC Power Supply	Xantrex	LXO 30-2	260483	NA	NA
CONTROL ROOM					
PC with FSEK Manual ctrl S/W	N/A	N/A	N/A	N/A	N/A
HPIB Extender	HP	37204	260168	N/A	N/A
Mast Controller	EMCO	2090	260166	N/A	N/A
Multi Device Controller TT1	EMCO	2090	260165	N/A	N/A
VERIFICATION EQUIPMENT					
Horn Antenna (Tx)	<input checked="" type="checkbox"/> EMCO	3115	260088	08NOV06	08NOV04
Signal Generator	<input checked="" type="checkbox"/> Rohde & Schwarz	SMP-04	260425	29MAR07	29MAR06
	<input type="checkbox"/> Rohde & Schwarz	SMIQ		N/A	N/A
	<input type="checkbox"/> Wiltron	68369B	Serial 691006	N/A	N/A
Cable TX antenna to Signal Generator	Sucoflex	115745-4	263136	18APR07	18APR06

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Emissions Test Report

A.5.3. Substitution Measurement Equipment

Descriptions	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
SUBSTITUTION EQUIPMENT					
Horn Antenna (Tx)	<input checked="" type="checkbox"/> EMCO	3115	260092	08NOV06	08NOV04
Signal Generator	<input checked="" type="checkbox"/> Rohde & Schwarz	SMP-04	260425	29MAR07	29MAR06
	<input type="checkbox"/> Rohde & Schwarz	SMIQ		N/A	N/A
	<input type="checkbox"/> Wiltron	68369B	Serial 691006	N/A	N/A
Cable TX antenna to Signal Generator	Sucoflex	115745-4	263136	18APR07	18APR06

A.6. Test Results

 Product Integrity Laboratory V2.5	Project Number: CG-444 Model: vBTS3031 1900 MHz P4 Comments: ConfID3: Aruba sys w/ GNB bat-bkr on, AC bkr ON 1900 3C/3S, full pwr, ext.12 T1's and Alm cable inst,Ferr.on HSSL.1 Braid gnd MBP to Cabinet, 1xDOM A, 1 XCEM-192 dr closed, re-crimped braid cable	Tester: A. Mathews Test ID: RE03-10m-444										
	Standard: FCC Part 24	Measurement Distance: <table border="0"> <tr> <td><1GHz</td> <td>10</td> <td>meters</td> </tr> <tr> <td>>1GHz</td> <td>3</td> <td>meters</td> </tr> </table>	<1GHz	10	meters	>1GHz	3	meters				
<1GHz	10	meters										
>1GHz	3	meters										
Antenna Polarization	Frequency (MHz)	Measured Level (dBμV)	Measurement Detector	Correction Factors (dB/m)	Emission Level (dBμV/m)	Signal Generator Level (dBm)	Tx Cable Loss (dB)	Tx Antenna Gain (dBi)	Dipole Gain (dBi)	ERP (dBm)	ERP Limit (dBm)	EUT Mode
Horizontal	3885.00	64.92	Peak	3.4	68.32	-36.2	2.07	9.33	2.15	-31.09	-13.0	Tx Operating
Vertical	3881.00	60.68	Peak	3.34	64.02	-40.8	2.07	9.65	2.15	-35.37	-13.0	Tx Operating
Horizontal	5809.50	39.72	Peak	6.91	46.63	-60	2.34	11.23	2.15	-53.26	-13.0	Tx Operating
Vertical	5820.13	47.03	Peak	6.92	53.95	-53.7	2.34	11.51	2.15	-46.68	-13.0	Tx Operating

The EUT is in compliance with the limits as specified above. The worst case emission level was -31.09 dbm ERP at 3885 MHz in horizontal polarization. This is 18.09 dB below the limit.

Note: There was no Part 24 related frequencies found between 30 MHz and 1 GHz, so data within this frequency span is not included in the report.

A.7. Observations

None

A.8. Deviations from Normal Operating Mode During Test

None

A.9. Sample Calculation

3m Limit = 10m Limit – 20 * log (3/10)

Emission Level = Measured Level + Correction Factors

Margin = Limit – Emission Level

ERP Limit (dBm) = Pd-(43 + 10 log(Pw))

where Pd is the EUT power in dBm and Pw is the EUT power in watts

Theoretical ERP Limit (dBuV/m) 120+20log(SQRT(49.2*Pw)/3)

where Pw is the EUT power in watts

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Emissions Test Report

A.10. Test Data & Photographs

The test data and photographs collected during this test appear following this page. Note: In some bands, a lower rbw detector was used to identify and detect emissions with better measurement system sensitivity.

Tested By

This testing was conducted in accordance with the ISO 17025:1999 scope of accreditation table 1; Quality Manual.

Name:	Alex Matthews	Glen Moore
Function:	Compliance Specialist	EMC Manager

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Emissions Test Report

Figure 1 RE 1 GHz - 20 GHz EUT Configuration



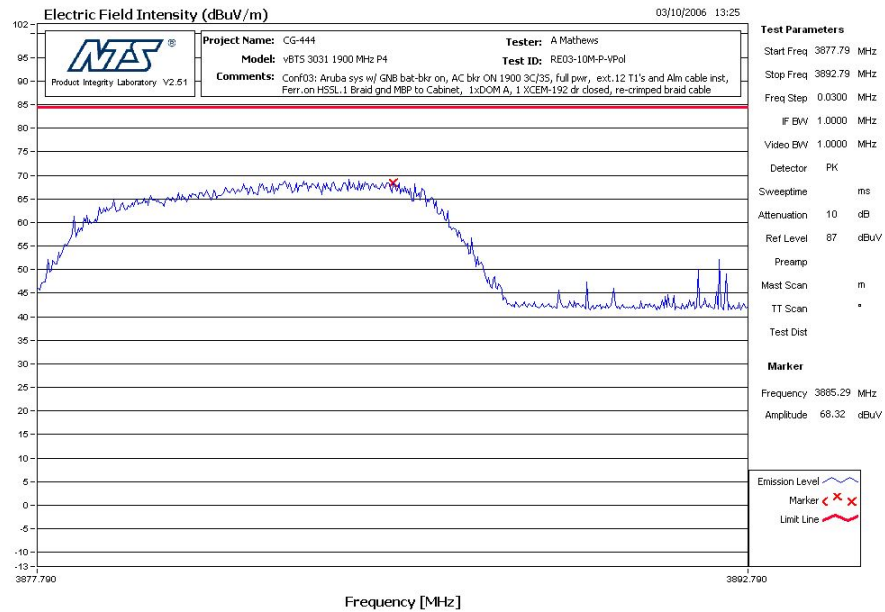
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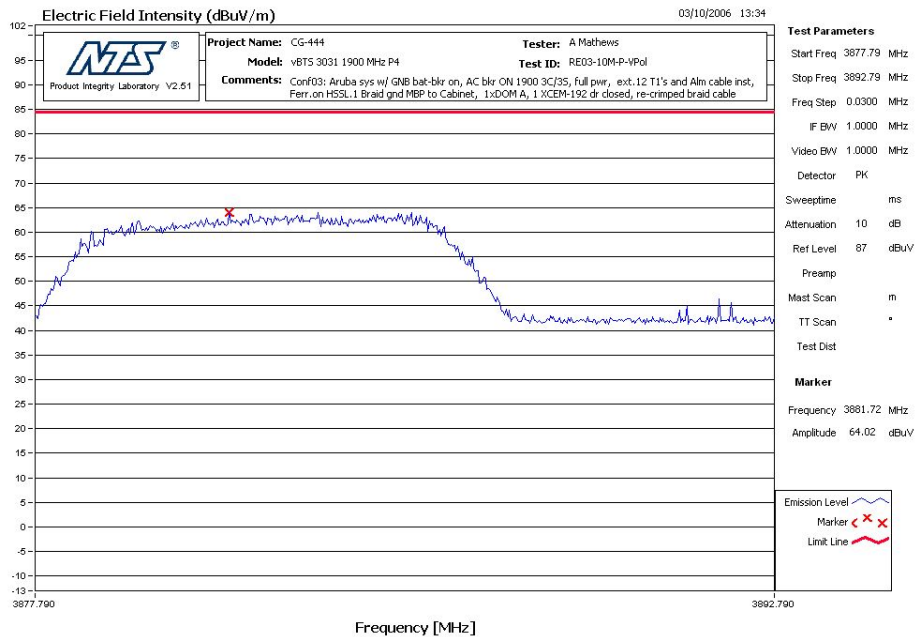


Emissions Test Report

Horizontal Compliance Scan @ 3885.29 MHz



Vertical Compliance Scan @ 3881.72 MHz



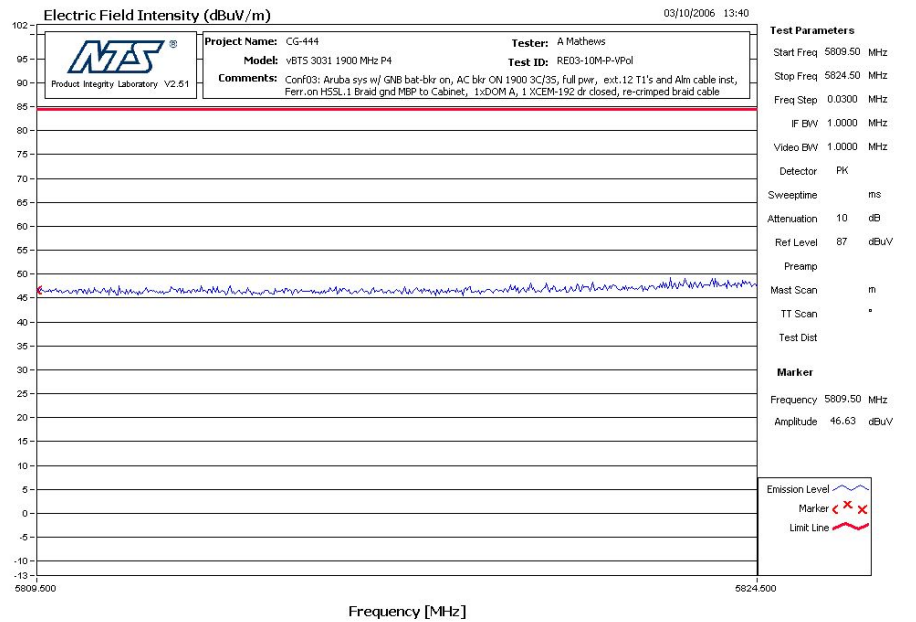
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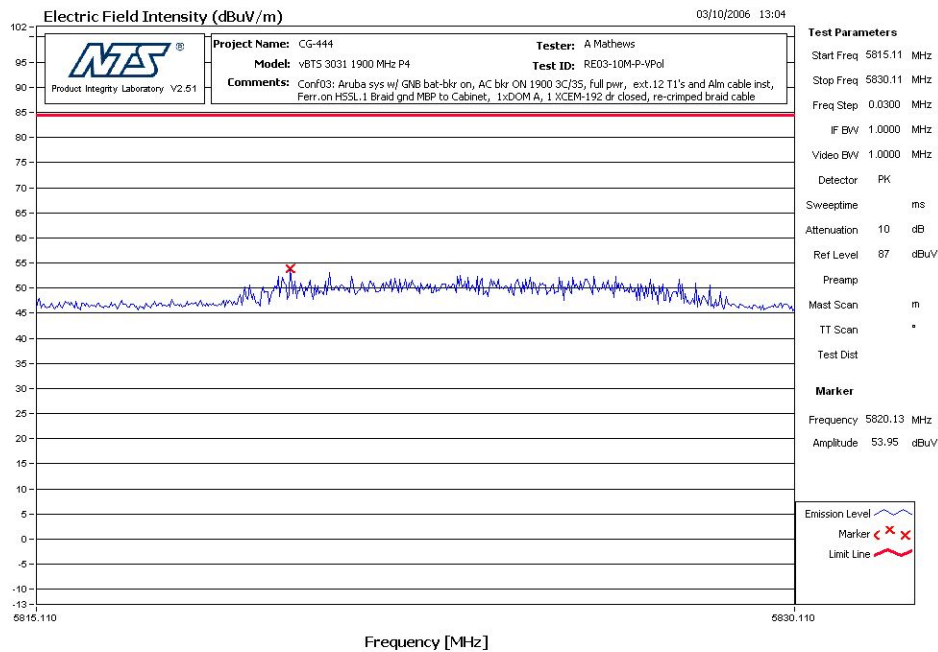


Emissions Test Report

Horizontal Compliance Scan @ 5809.5 MHz-5820 MHz (no emission detected)



Vertical Compliance Scan @5820.13 MHz



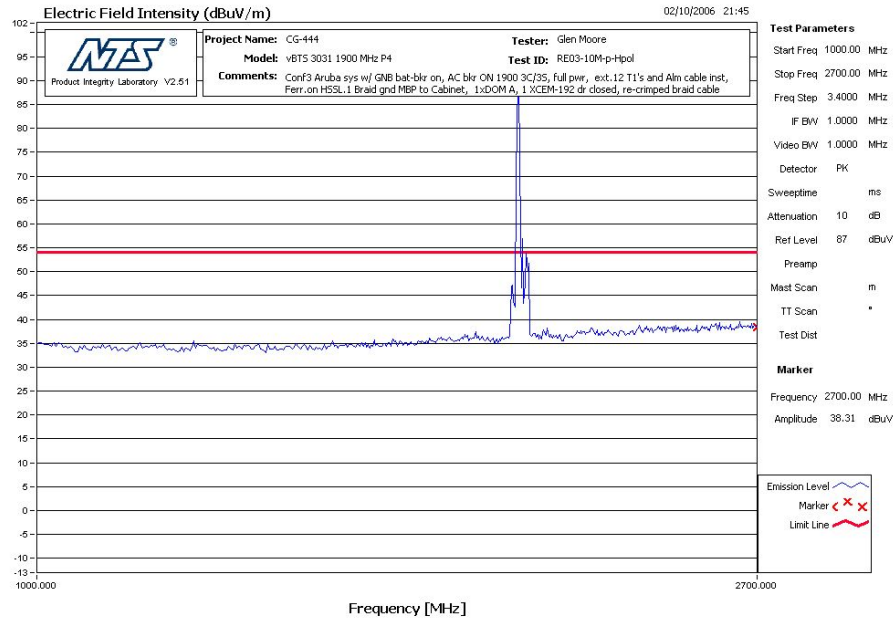
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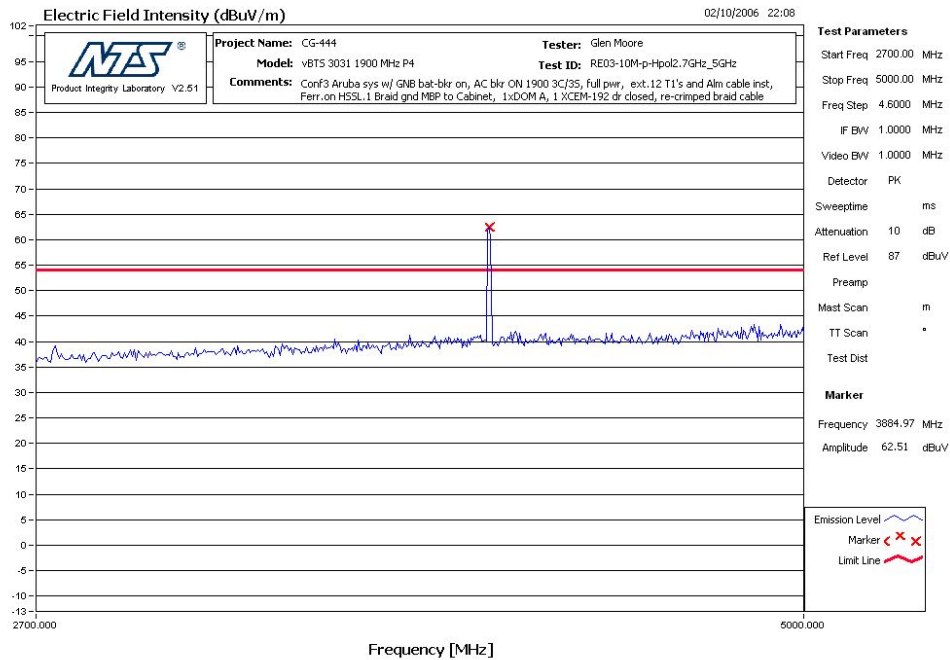


Emissions Test Report

1-2.7 GHz Horizontal Polarization



2.7-5 GHz Horizontal Polarization



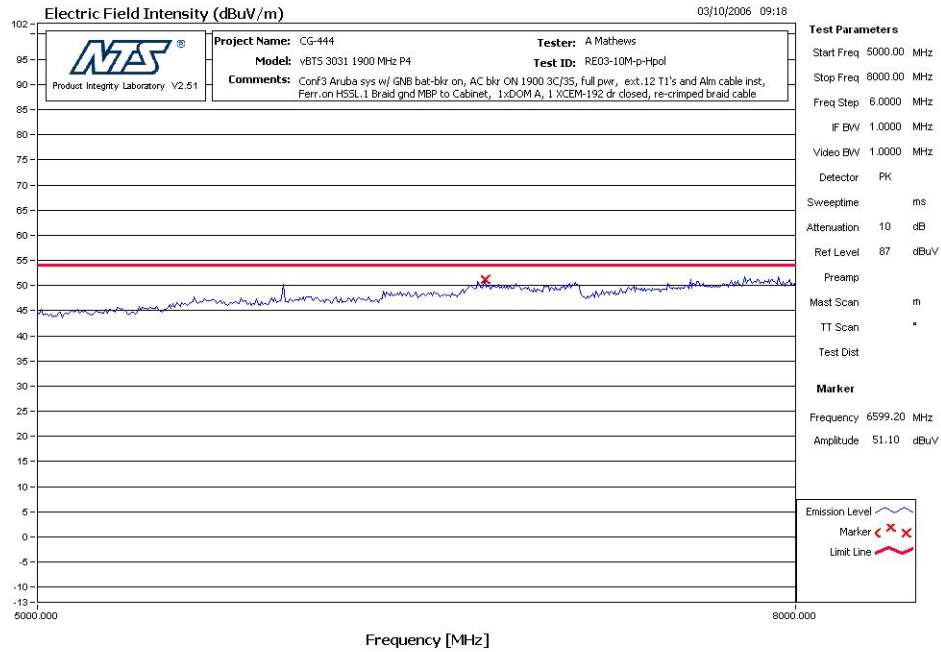
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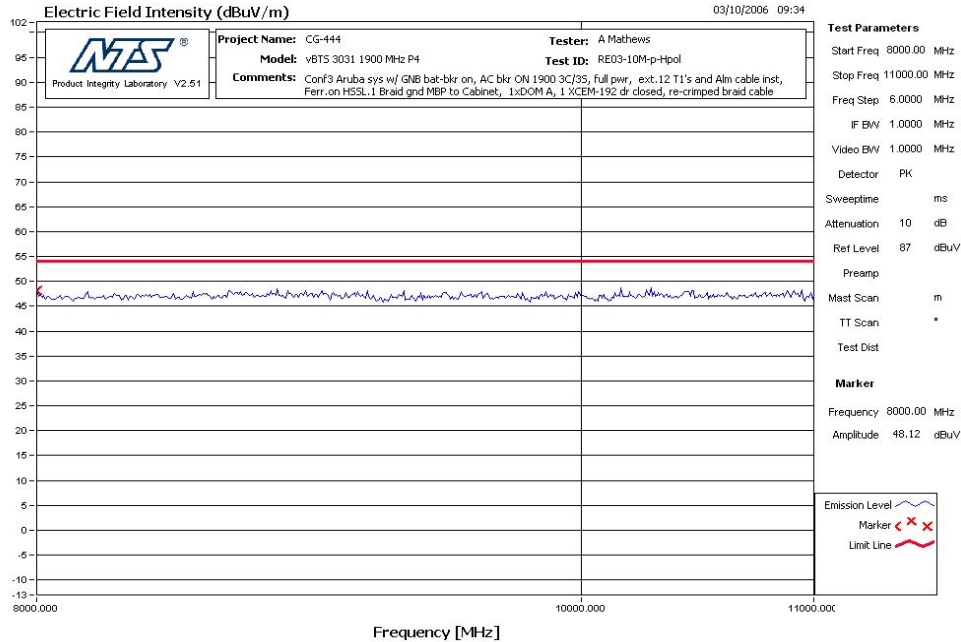


Emissions Test Report

5-8 GHz Horizontal Polarization



8-11 GHz Horizontal Polarization



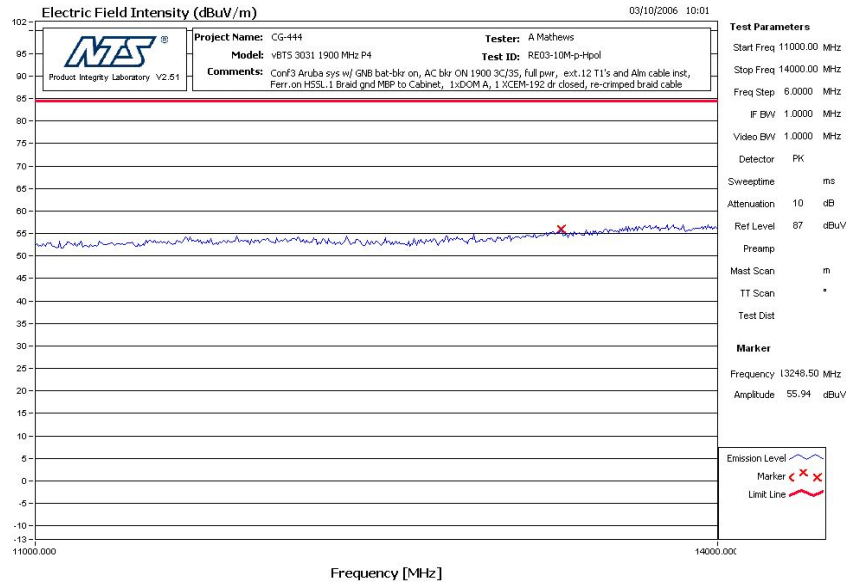
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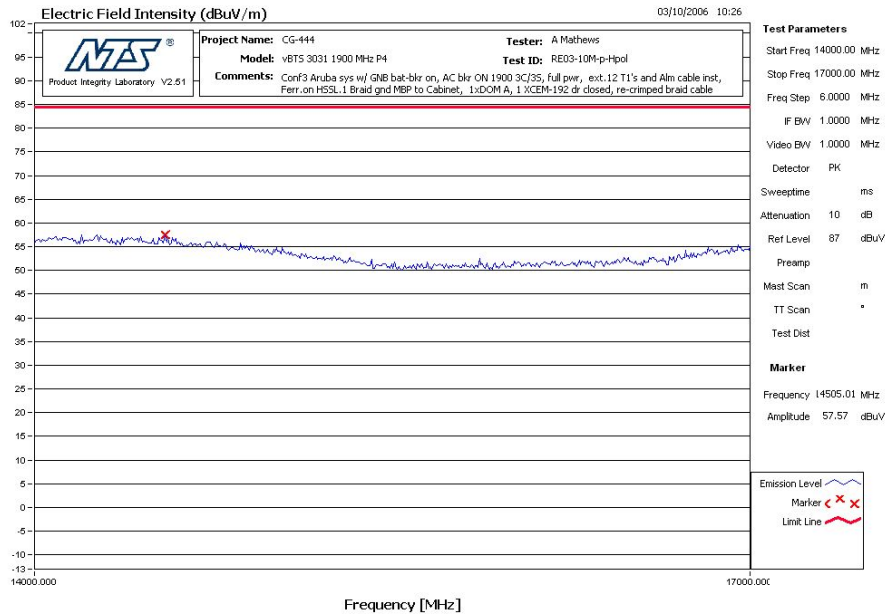


Emissions Test Report

11-14 GHz Horizontal Polarization



14-17 GHz Horizontal Polarization



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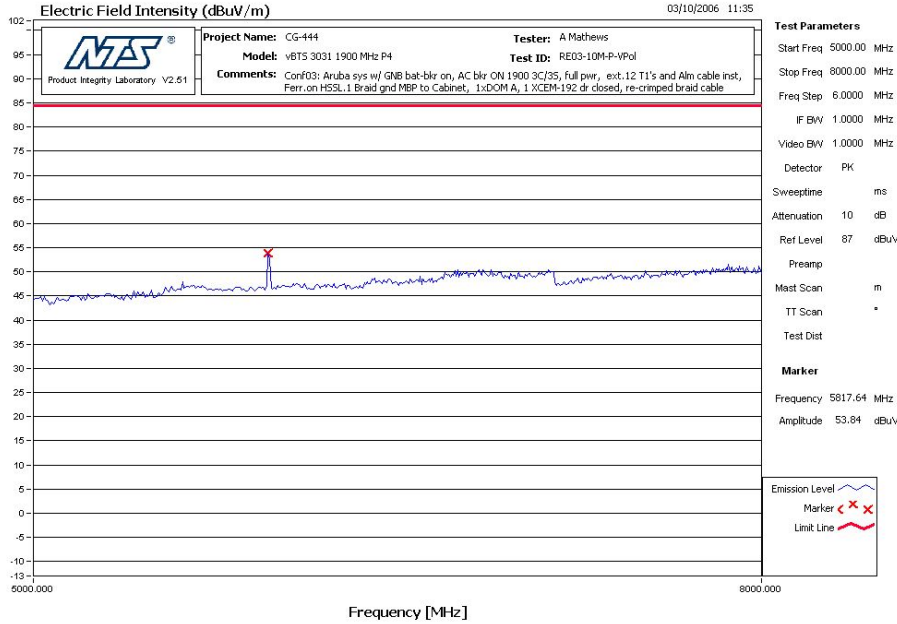
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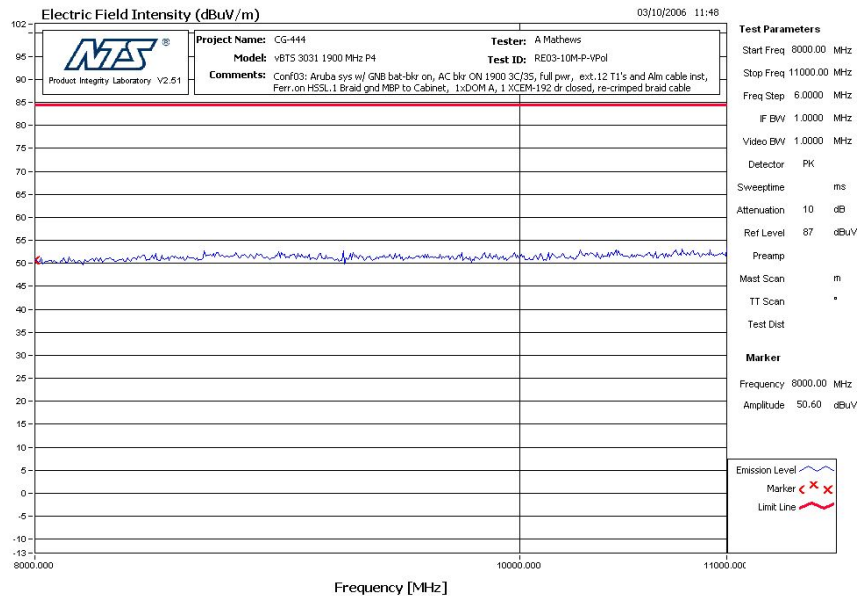
Emissions Test Report

17-19 GHz Horizontal Polarization This plot was not printed in graphic form
 1-5 GHz Vertical Plots – These plots were not printed in Graphic form

5-8 GHz Vertical Polarization



8-11 GHz Vertical Polarization



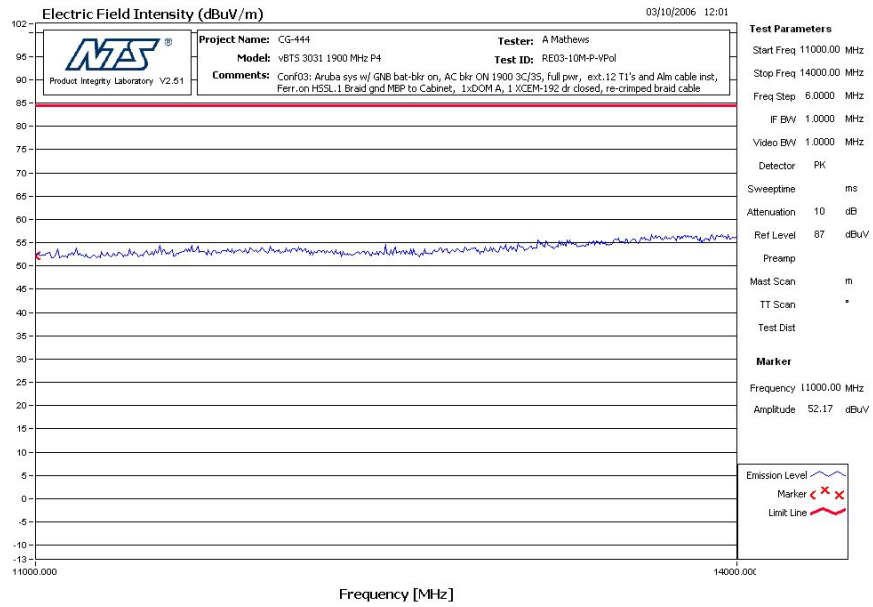
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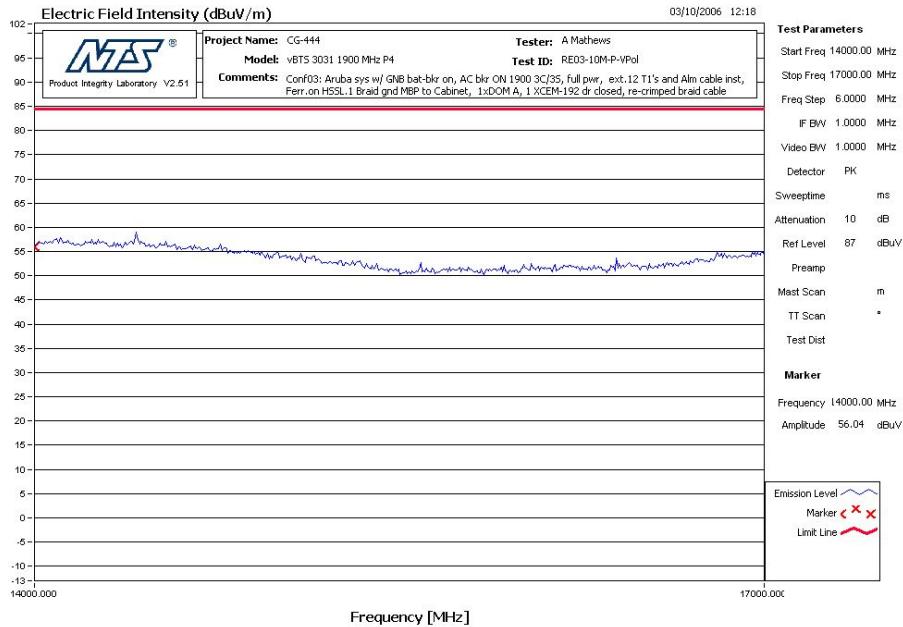


Emissions Test Report

11-14 GHz Vertical Polarization



14-17 GHz Vertical Polarization



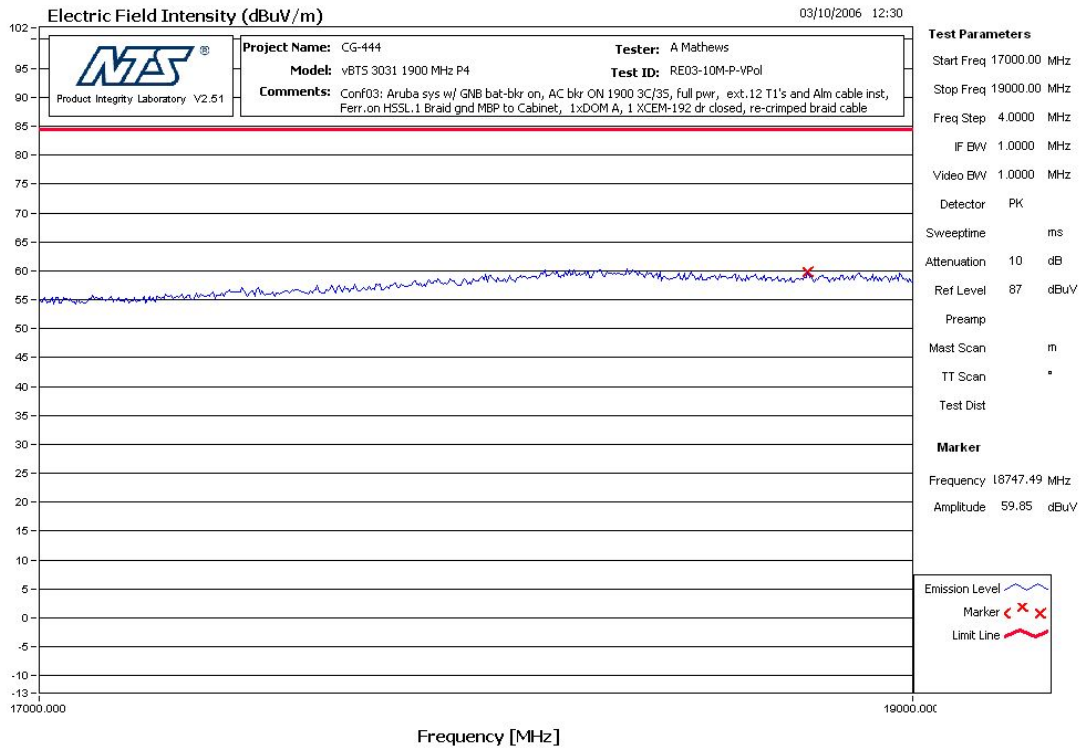
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Emissions Test Report

17-19 GHz Vertical Polarization



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END OF DOCUMENT

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