



**Nemko**

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## CERTIFICATION TEST REPORT

**Report Number:** 2010 10158450 FCC

**Project Number:** 61447-1

**Nex Number:** 158450

**Applicant:** DISCUS DENTAL INC.  
8550 HIGUERA ST.  
Culver City, CA 90232

**Equipment Under Test (EUT):** WIRELESS FOOT PEDAL

**Model:** NV

**FCC ID:** VIK-OH002

**IC:** 7260A-OH002

**In Accordance With:** FCC Part 15 Subpart C, 15.249  
IC RSS-210 Issue 8 December 2010  
IC RSS-Gen Issue 3 December 2010

**Tested By:** Nemko USA Inc.  
11696 Sorrento Valley Road, Suite F  
San Diego, CA 92121

**Authorized By:** Alan Laudani, EMC/RF Test Engineer

**Date:** October 11, 2010

**Total Number of Pages:** 25



## Section1: Summary of Test Results

### General

#### All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C and IC RSS-210. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

**Apparatus Assessed:** Wireless Foot Pedal

**Model:** NV

**Specification:** FCC Part 15 Subpart C, 15.249  
IC RSS-210 Issue 8 December 2010

**Date Received in Laboratory:** October 1, 2010

**Compliance Status:** Complies

**Exclusions:** None

**Non-compliances:** None



## 1.1 Report Release History

REVISION	DATE	COMMENTS	
-	October 11, 2010	Prepared By:	Ferdinand Custodio
-	October 11, 2010	Initial Release:	Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:

  
Ferdinand Custodio, EMC Test Engineer

Date: October 11, 2010



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## Section 2: Equipment Under Test

### 2.1 Product Identification

The Equipment Under Test was identified as follows:

*Discus Dental Inc. NV Wireless Foot Pedal*



### 2.2 Samples Submitted for Assessment

The following sample of the apparatus has been submitted for type assessment:

Sample No.	Description	Serial No.
158450-1	NV WIRELESS FOOT PEDAL	N/A



## 2.3 Theory of Operation

The NV Wireless Foot Pedal is part of the NV Microlaser™/NV Ortho™ dental diode laser system used on many different soft tissue procedures. The system is intended to be used for oral soft tissue surgery, including: sulcular debridement of diseased fibrous tissue, i.e., excision and biopsy; gingivectomy; gingivoplasty; lesion (tumor) removal; fibroma removal; tissue retraction (troughing); aphthous ulcers; gingival hyperplasia (excision and recontour); crown lengthening; operculectomy; frenectomy; photocoagulation and for periodontal procedures, including: laser soft tissue curettage; laser removal of diseased, infected, inflamed, or necrosed soft tissue within the periodontal pocket; removal of highly inflamed edematous tissue affected by bacteria penetration of the pocket lining; and junctional epithelium.

The EUT is a (UL-approved) commercial foot-switch that provides hands-free ON/OFF capabilities. This switch controls initiation/termination of laser power wirelessly using 2.4GHz frequency.

## 2.4 Technical Specifications of the EUT

<b>Manufacturer:</b>	Discus Dental Inc.
<b>Operating Frequency:</b>	2402.0 MHz to 2470.0 MHz in the 2400-2483.5 MHz Band
<b>Number of Operating Frequencies:</b>	15
<b>Rated Power:</b>	72.8dB $\mu$ V/m @ 3 meters
<b>Modulation:</b>	GFSK
<b>Reference Designator:</b>	1M88F1D
<b>Antenna Type:</b>	Trace on PCB, 0dBi gain (typ)
<b>Antenna Connector:</b>	None
<b>Power Source:</b>	1.5VDC from standard AA LR6 AM3 alkaline battery (2X wired in parallel)



## Section 3: Test Conditions

### 3.1 Specifications

The apparatus was assessed against the following specifications:

***FCC Part 15 Subpart C, 15.249***

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

***IC RSS-210 Issue 8 December 2010***

Low-power Licence-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment. Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

***IC RSS-Gen Issue 3 December 2010***

General Requirements and Information for the Certification of Radio-communication Equipment

### 3.2 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

### 3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	20-23 °C
Humidity range	43-60%
Pressure range	102.0 – 102.3 kPa

### 3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
E1018	9kHz to 7GHz Spectrum Analyzer	Rohde & Schwarz	FSP7	835363/0003	1/22/2010	1/22/2011
752	Antenna, DRWG	EMCO	3115	4943	11/12/2008	11/12/2010
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/12/2010	7/12/2011
317	Preamplifier	HP	8449A	2749A00167	5/7/2010	5/7/2011
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	8/16/2010	8/16/2011
114	Antenna, Bicon	EMCO	3104	2997	3/5/2010	3/5/2012
110	Antenna, LPA	Electrometrics	LPA-25	1217	1/10/2009	2/10/2011
898	EMI Receiver & filter set	HP	8546A	3625A00348	6/22/2010	6/22/2011
899	Filter Section	HP	85460A	3448A00288	6/22/2010	6/22/2011

Registration of the OATS are on file with the Federal Communications Commission, under Registration Number 90579, the VCCI under registration number R-3027, and are also registered with Industry Canada under Site Numbers 2040B-1 and 2040B-2.



## Section 4: Observations

### 4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

### 4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

### 4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

### 4.4 Test Deleted

No Tests were deleted from this assessment.

### 4.5 Additional Observations

There were no additional observations made during this assessment.



## Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: §15.249  
IC RSS-210 Issue 8 December 2010 Annex A2.9  
IC RSS-Gen Issue 3 December 2010

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant

Y Yes: Mandatory i.e. the apparatus shall conform to these tests.

N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

### 5.1 Test Results

Part 15C	Industry Canada	Test Description	Required	Result
15.207 (a)	RSS-Gen 7.2.4	Conducted Emission Limit	N*	
15.215(c)	RSS-Gen 4.6.3	20 dB Bandwidth	Y	Pass
15.249 (a)	RSS-Gen 4.8 & RSS-210 A2.9	Field Strength of Emissions	Y	Pass
15.249 (d) & 15.209 (a)	RSS-Gen 4.9 & RSS-210 A2.9	Spurious Emissions Outside of the band	Y	Pass
15.249 (b)		Fixed Point-to-Point Operation	N	
15.109 (a)	RSS-Gen 4.10 & RSS-Gen 6.1	Receiver Spurious Emissions	N/T*	

N\* = *EUT only employ battery power for operation and doesn't operate from the AC power lines or contain provisions for operation while connected to the AC power lines.*

N/T\* = *EUT does not have a separate receive mode. Configured to transmit only.*

## Appendix A: Test Results

### Section 15.215(c) – Occupied Bandwidth

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### RSS-Gen Section 4.6.1 – Occupied Bandwidth

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

#### Test Conditions:

Sample Number:	NV	Temperature:	23°C
Date:	October 7, 2010	Humidity:	43 %
Modification State:	Low ,Mid and High Channel	Tester:	FSCustodio

#### Test Results:

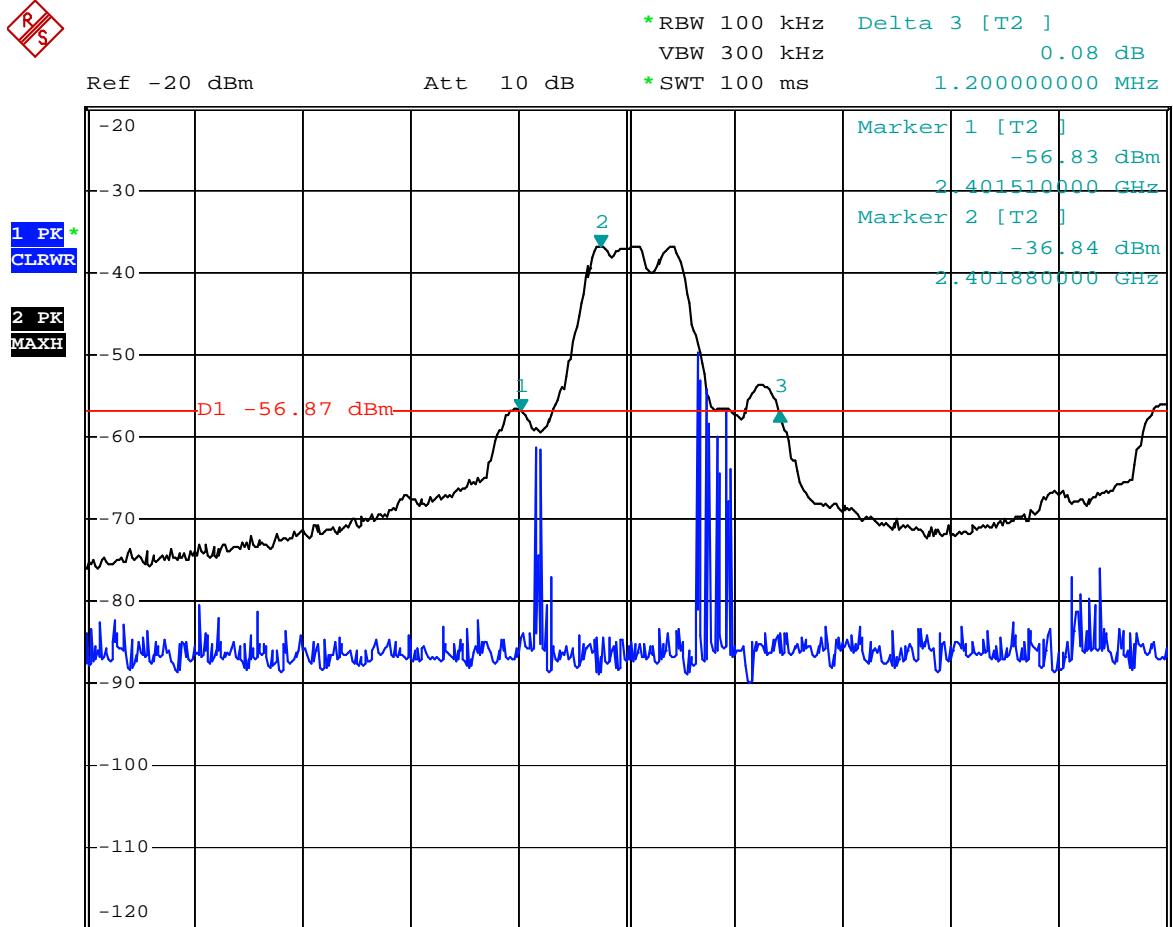
See attached plots

#### Additional Observations:

- Span is wide enough to capture the channel transmission
- RBW is 1% of the span or worst case (i.e. 5MHz span, SA RBW limited to 30kHz and 100kHz only, 100kHz RBW used)

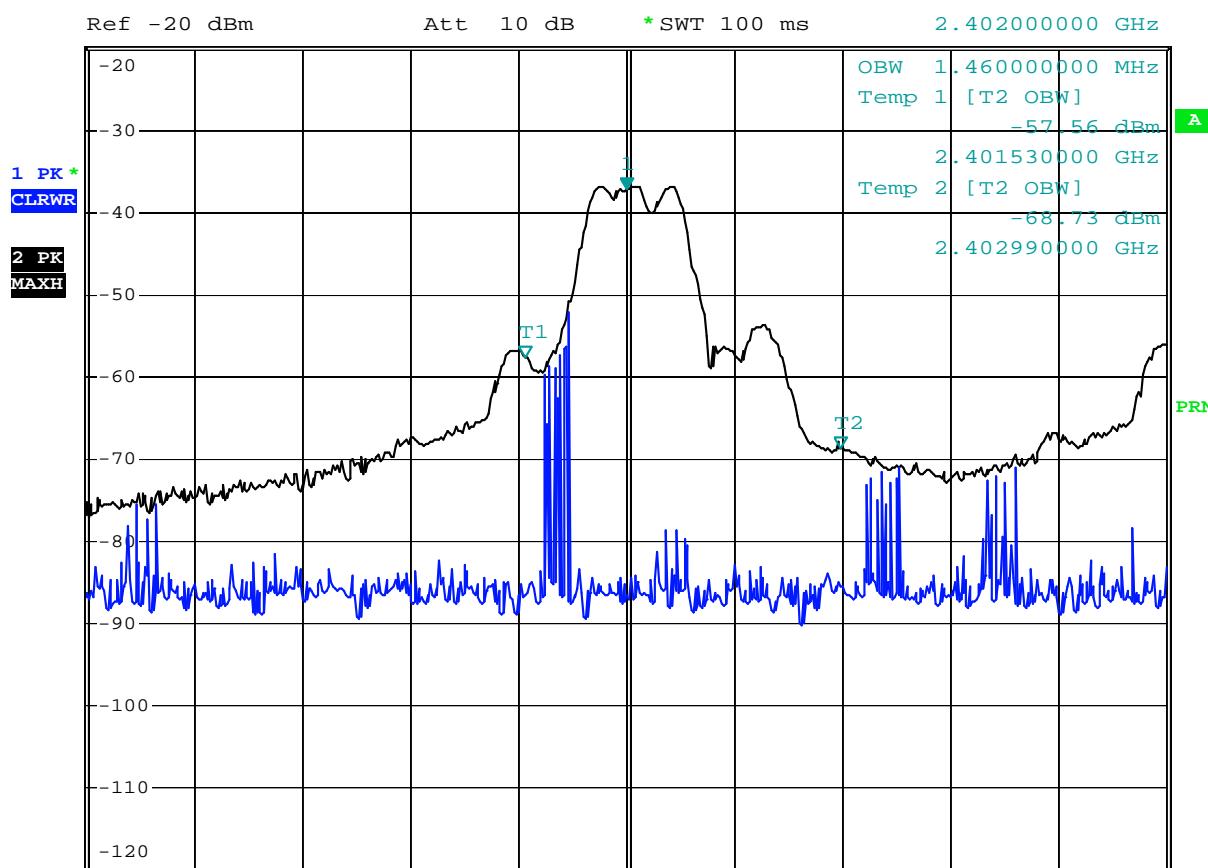
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- A peak output max hold reading was taken; a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.
- Per Industry Canada requirement, another measurement was made using the built-in OBW measuring feature of the spectrum analyzer with power BW of 99%.
- Observed maximum occupied BW is 1.88 MHz (20dB BW High Channel).
- $2402 \text{ MHz} - 0.94 \text{ MHz} = 2401.06 \text{ MHz}$  (within the frequency band)
- $2470 \text{ MHz} + 0.94 \text{ MHz} = 2470.94 \text{ MHz}$  (within the frequency band)





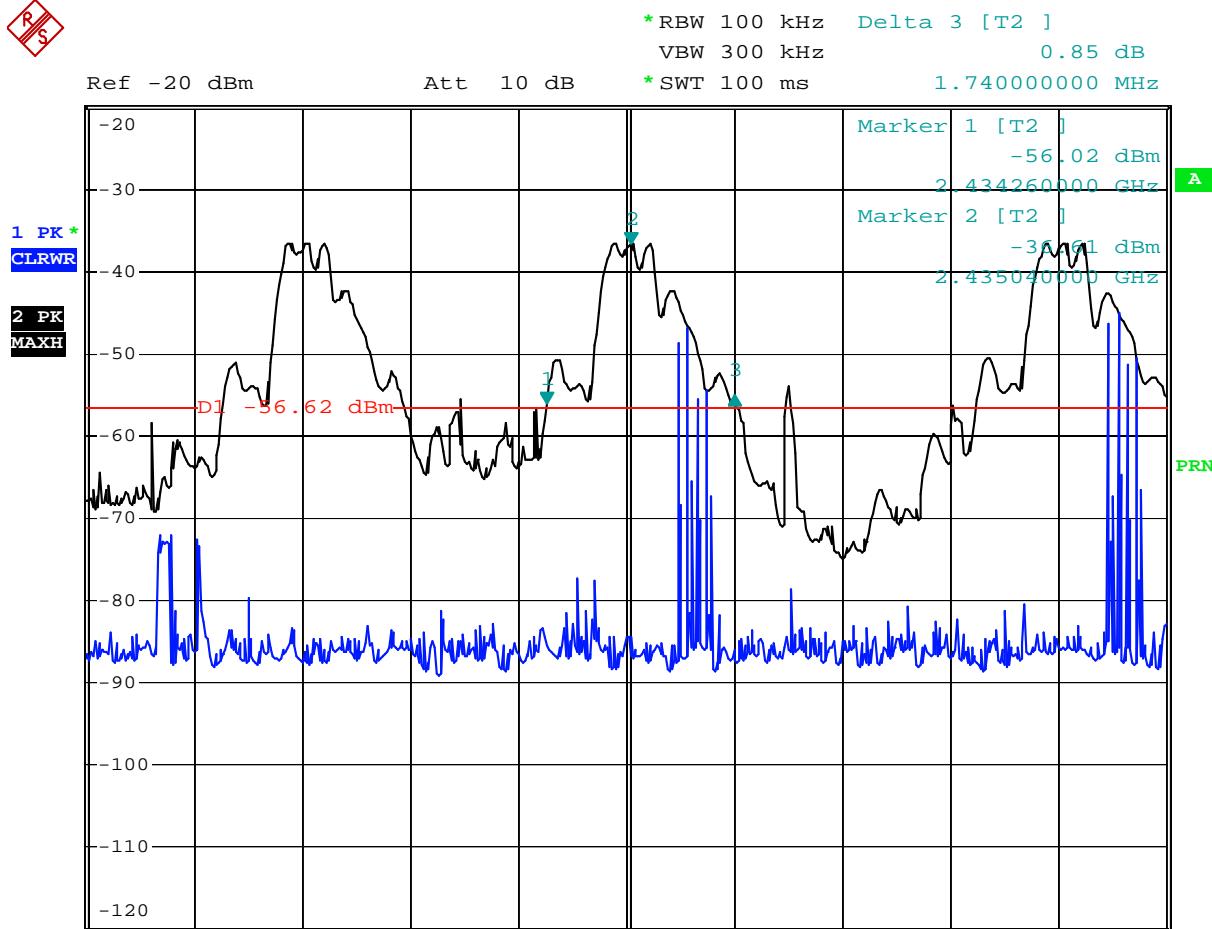
Date: 7.OCT.2010 10:07:38

**Low Channel (2402MHz) 20dB Occupied Bandwidth is 1.2MHz**



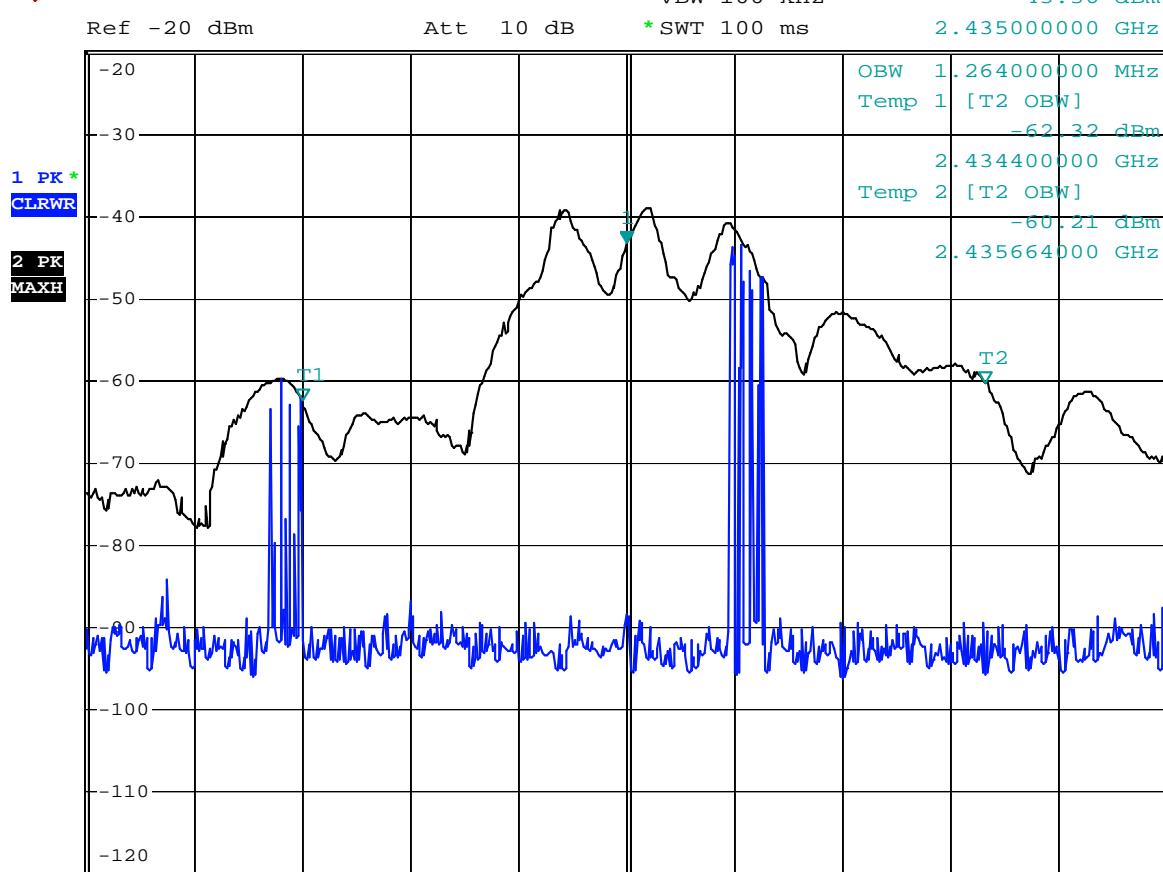
Date: 7.OCT.2010 10:14:27

**Low Channel (2402MHz) 99% Occupied Bandwidth is 1.46MHz**



Date: 7.OCT.2010 10:40:57

**Mid Channel (2435MHz) 20dB Occupied Bandwidth is 1.74MHz**



Date: 7.OCT.2010 10:18:28

### Mid Channel (2435MHz) 99% Occupied Bandwidth is 1.264MHz

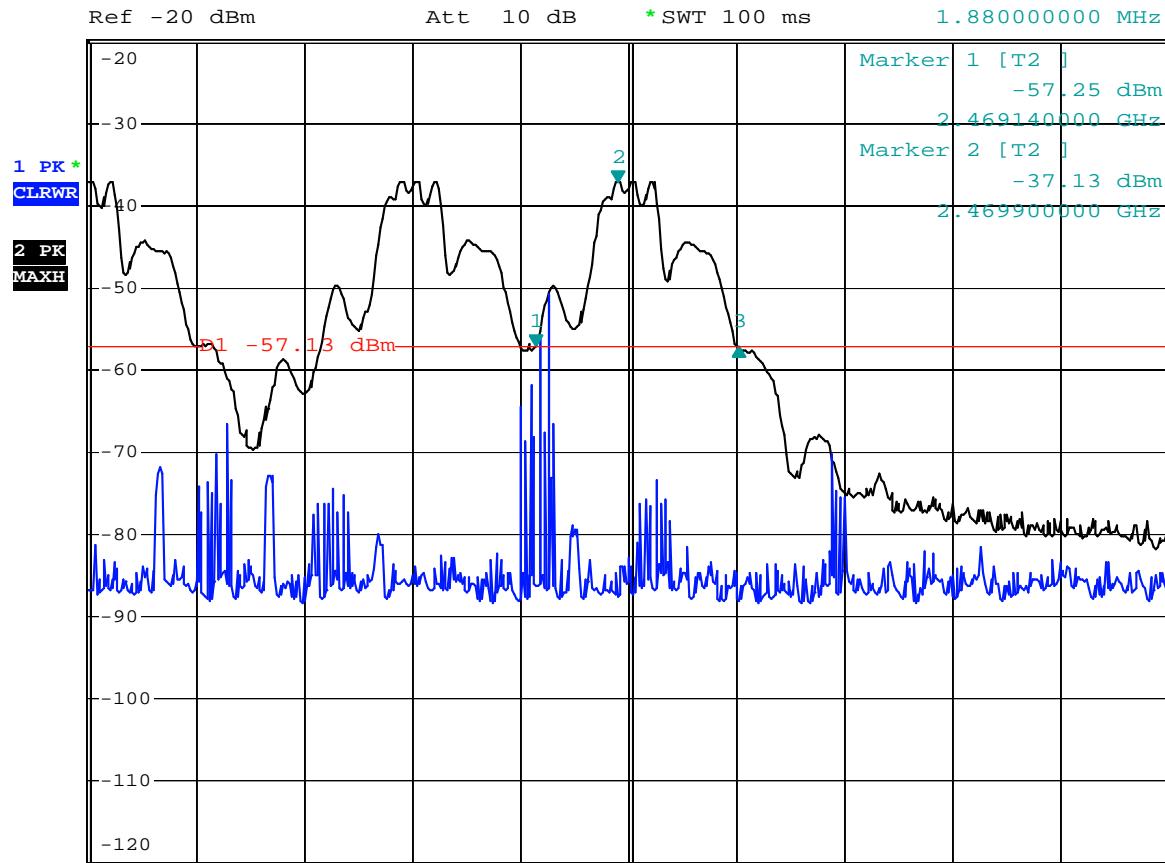
*Test Notes: Span and RBW were adjusted to prevent spectrum analyzer built in OBW measuring feature from incorporating signals from adjacent channels.*

FCC ID: VIK-OH002  
IC: 7260A-OH002

Report Number: 2010 10158450 FCC  
Specification: FCC Part 15 Subpart C, 15.249

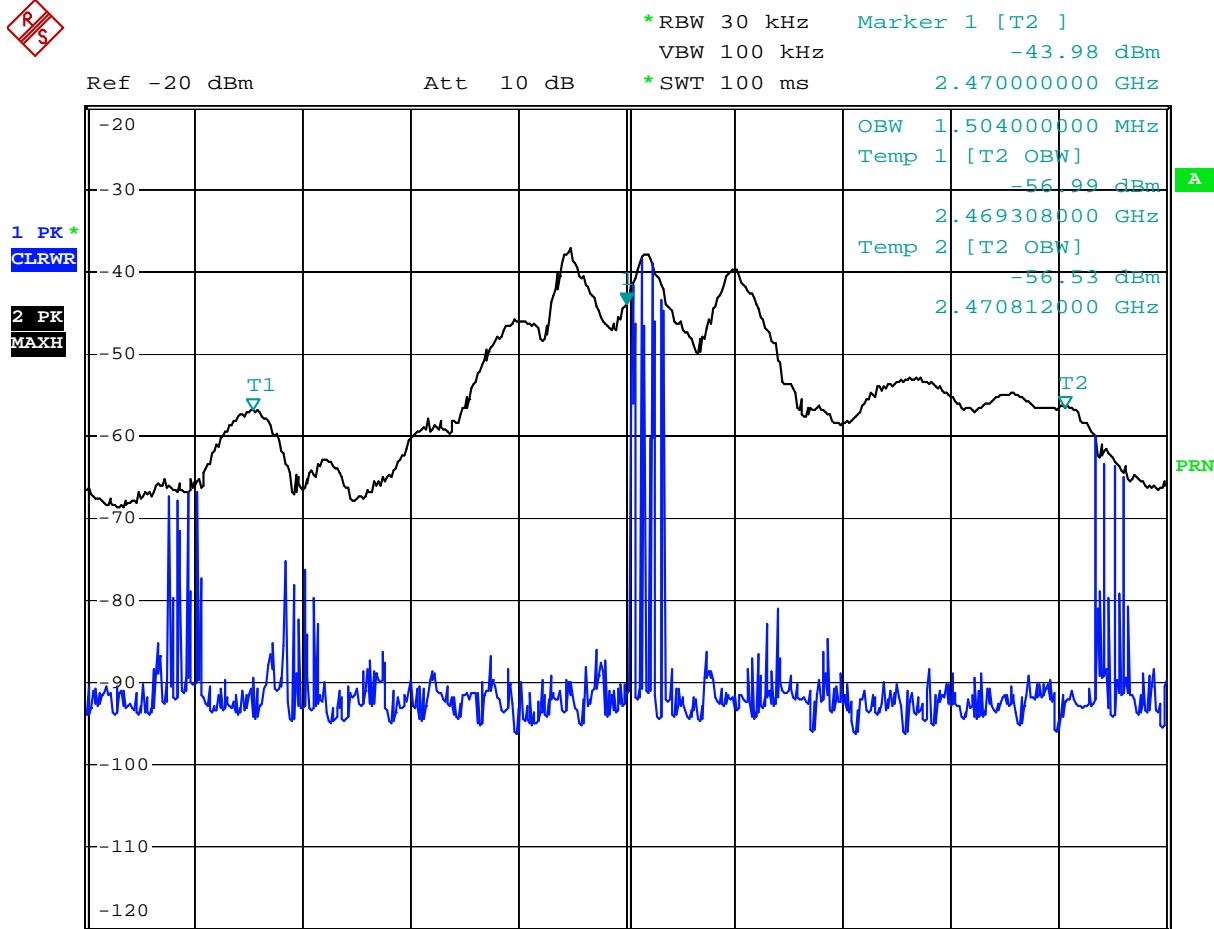


\* RBW 100 kHz Delta 3 [T2] 0.15 dB  
VBW 300 kHz  
\* SWT 100 ms 1.880000000 MHz



Date: 7.OCT.2010 10:42:43

**High Channel (2470MHz) 20dB Occupied Bandwidth is 1.88MHz**



Date: 7.OCT.2010 10:44:32

**High Channel (2470MHz) 99% Occupied Bandwidth is 1.504MHz**

*Test Notes: Span and RBW were adjusted to prevent spectrum analyzer built in OBW measuring feature from incorporating signals from adjacent channel.*



### Section 15.249(a) – Field Strength of Emissions

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

WIRELESS  
TECHNOLOGY

### RSS-210 A2.9 – Field Strength of Emissions

This section provides standards for low-power devices that can be used for any application provided the following conditions are met:

(a) The field strengths measured at 3 metres shall not exceed the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902–928 MHz	50 <sup>(Note 1)</sup>	0.5
2400–2483.5 MHz	50 <sup>(Note 1)</sup>	0.5
5725–5875 MHz	50 <sup>(Note 1)</sup>	0.5

Note 1: Equivalent to 0.75 mW e.i.r.p.

(b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to Table 2 limits, whichever is the less stringent.

Section 4.4 of RSS-Gen (Pulsed Operation) does not apply to CISPR measurement for the band 902-928 MHz.

### Test Conditions:

Sample Number:	NV	Temperature:	20°C
Date:	October 6, 2010	Humidity:	60 %
Modification State:	Hopping	Tester:	FSCustodio
			Laboratory:
			SOATS

### Test Results:

See attached plots.

### Additional Observations:

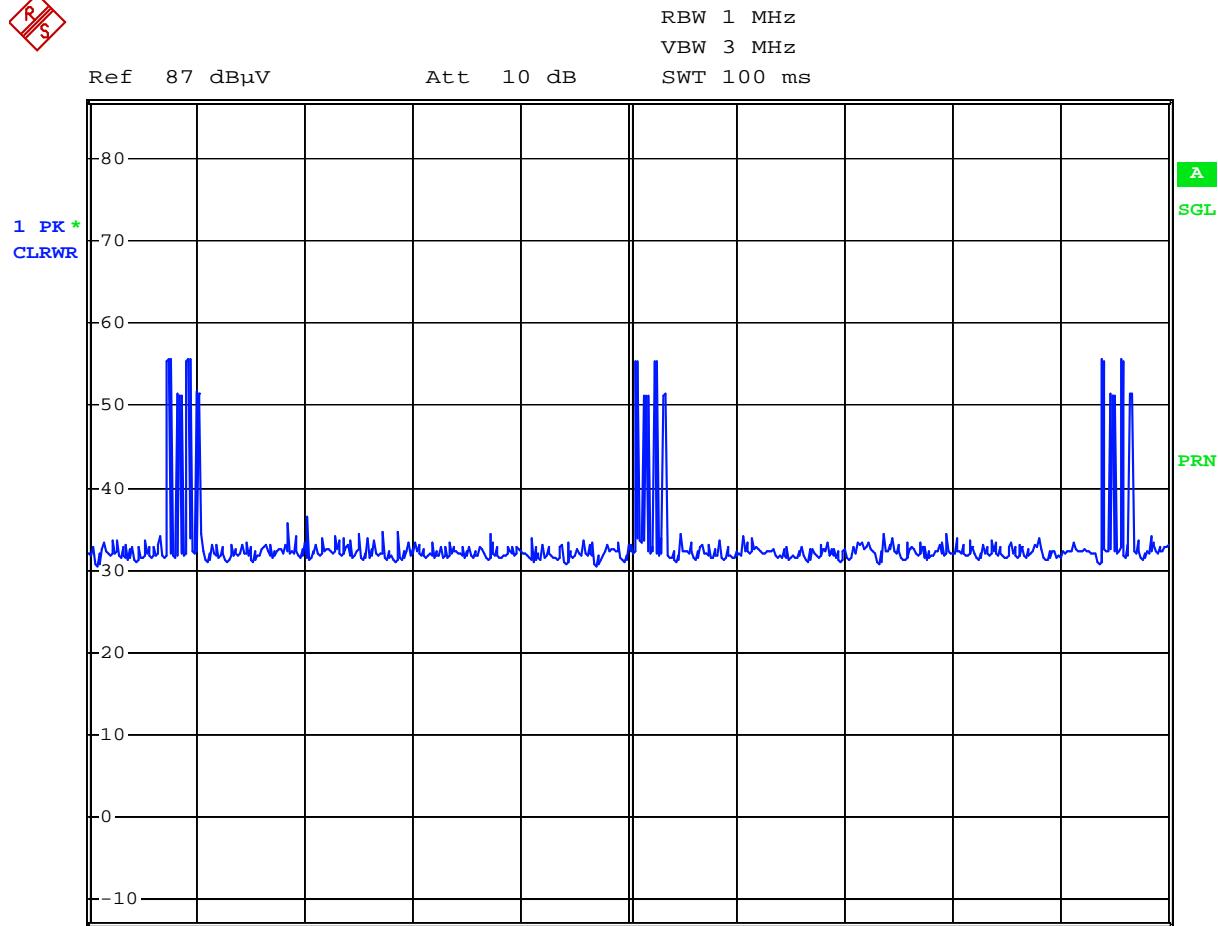
- Fresh batteries was used during assessment.

- All measurements were performed using a peak detector.
- RBW is 1MHz while VBW is 3MHz.
- Spectrum was investigated up to 24.70GHz
- There are no emissions found after the second harmonic
- Average data are calculated from Peak measurements plus Duty Cycle Correction Factor (DCCF).

**Sample Computation (Radiated Emissions Data Sheet):**

Correction factor @ 2402MHz	= 36.88 dB $\mu$ V/m
	= Antenna factor + Cable loss – Preamp gain
	= 29.18 + 7.7 – 0
Corrected reading	= Max. reading + Correction factor
	= 35.9 + 36.88
	= 72.78 dB $\mu$ V/m

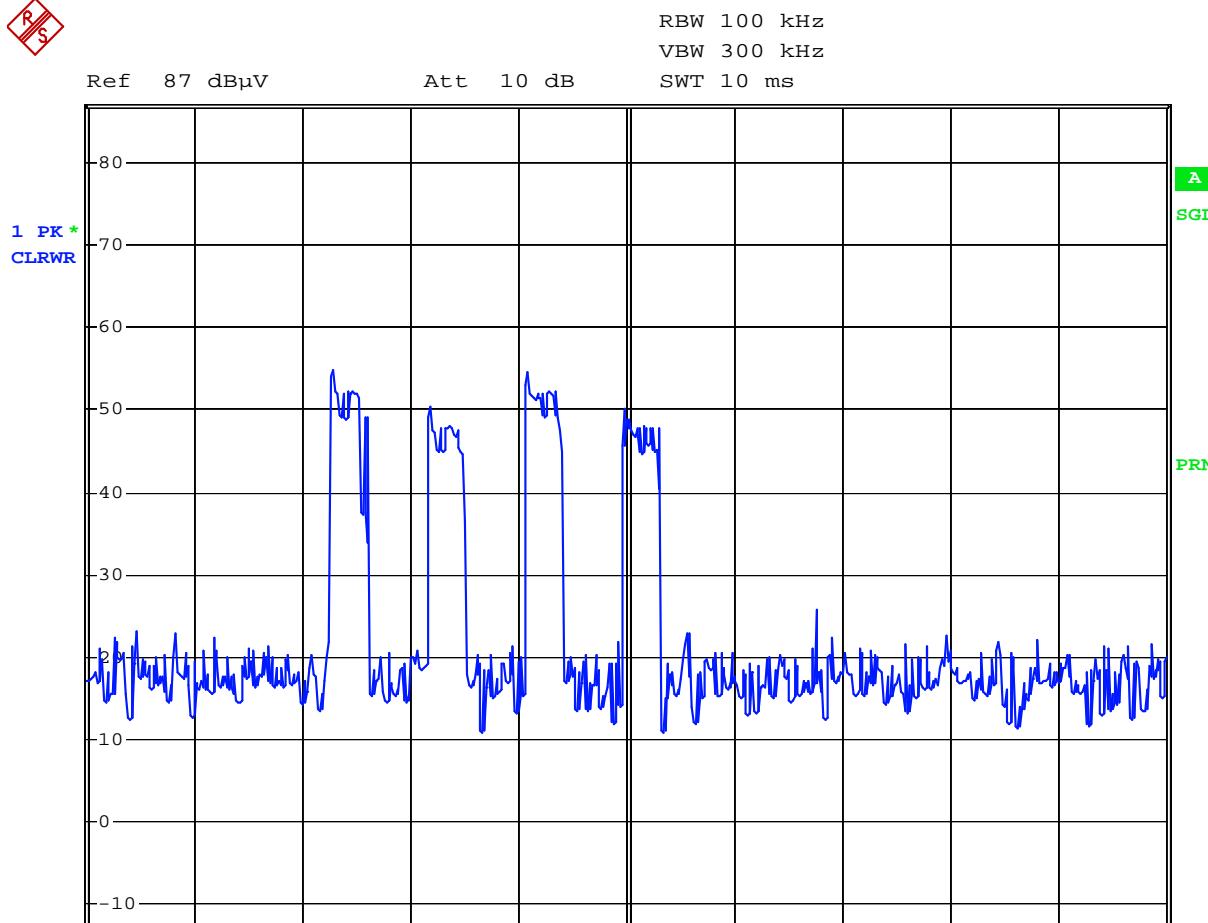


**Duty Cycle Correction Factor Calculations**

Date: 6.OCT.2010 12:55:08

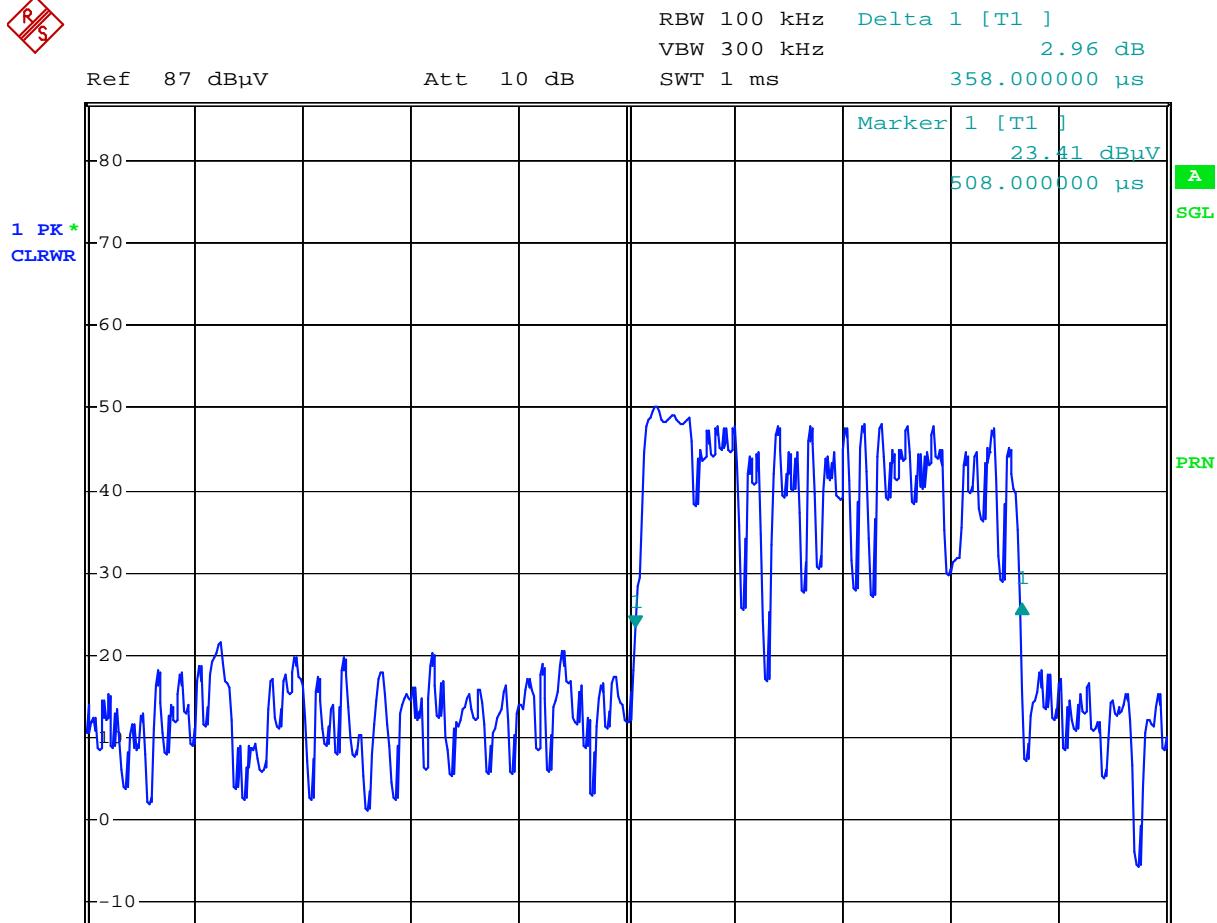
**Three (3) set of data packets in 100ms sweep**

RS



Date: 6.OCT.2010 12:57:24

**Four (4) transmissions in one data packet**



Date: 6.OCT.2010 12:59:08

**Each data packet is 358 $\mu$ s long**

**Duty Cycle** = 0.358ms x 12  
= 4.296 ms/100 ms  
= 0.043

**DCCF** = 20 log (0.04296)  
= -27.34; limited to -20 dB

FCC ID: VIK-OH002  
 IC: 7260A-OH002

 Report Number: 2010 10158450 FCC  
 Specification: FCC Part 15 Subpart C, 15.249

 Fundamental: RBW = 3MHz, VBW = 10 MHz  
 Harmonics of the fundamental: RBW = 1MHz, VBW = 3 MHz

Radiated Emissions Data																					
Job #:	61447-1		Date :	10/6/2010		Page	1	of	1												
NEX #:	158450		Time :	12:30PM																	
Staff :	FSC																				
Client Name :	Discus Dental Inc.		EUT Voltage :	Battery																	
EUT Name :	Wireless Foot Pedal		EUT Frequency :																		
EUT Model #:	NV		Phase:																		
EUT Serial #:	N/A		NOATS																		
EUT Config. :	Continuous transmit		SOATS	X																	
Specification :	CFR47 Part 15, Subpart B, Class B		Distance < 1000 MHz:	3 m																	
Loop Ant. #:	NA		Distance > 1000 MHz:	3 m																	
Bicon Ant.#:	NA		Temp. (°C) :	20																	
Log Ant.#:	NA		Humidity (%) :	60																	
DRG Ant. #	877		Spec Analyzer #:	E1018/835																	
Cable LF#:	NA		Analyzer Display #:																		
Cable HF#:	40ft_blue		Quasi-Peak Detector #:	E1018/835																	
Preamp LF#:	NA		Preselector #:	NA																	
Preamp HF#	317		DCCF :	20																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">Quasi-Peak</td> <td>RBW: 120 kHz</td> </tr> <tr> <td>Video Bandwidth</td> <td>300 kHz</td> </tr> <tr> <td>Peak</td> <td>RBW: 1 MHz</td> </tr> <tr> <td>Video Bandwidth</td> <td>3 MHz</td> </tr> <tr> <td>Average</td> <td>= Peak -DCCF</td> </tr> </table>												Quasi-Peak	RBW: 120 kHz	Video Bandwidth	300 kHz	Peak	RBW: 1 MHz	Video Bandwidth	3 MHz	Average	= Peak -DCCF
Quasi-Peak	RBW: 120 kHz																				
Video Bandwidth	300 kHz																				
Peak	RBW: 1 MHz																				
Video Bandwidth	3 MHz																				
Average	= Peak -DCCF																				
Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dB $\mu$ V)	Corrected Reading (dB $\mu$ V/m)	Spec. limit (dB $\mu$ V/m)	CR/SL Diff. (dB)	Pass Fail	Comment										
2402.0	52.9	55.9	P	BL	1.6	55.9	92.8	114.0	-21.2	Pass											
2402.0	32.9	35.9	A	BL	1.6	35.9	72.8	94.0	-21.2	Pass											
2435.0	50.6	54.1	P	BL	1.6	54.1	91.0	114.0	-23.0	Pass											
2435.0	30.6	34.1	A	BL	1.6	34.1	71.0	94.0	-23.0	Pass											
2470.0	52.6	54.9	P	BL	1.6	54.9	91.8	114.0	-22.2	Pass											
2470.0	32.6	34.9	A	BL	1.6	34.9	71.8	94.0	-22.2	Pass											
2400.0	47.9	50.9	P	BR	2.0	50.9	54.6	74.0	-19.4	Pass	Delta Marker Method										
2400.0	27.9	30.9	A	BR	2.0	30.9	34.6	54.0	-19.4	Pass											
2483.5	48.5	56.1	P	BL	1.6	56.1	59.7	74.0	-14.3	Pass											
2483.5	28.5	36.1	A	BL	1.6	36.1	39.7	54.0	-14.3	Pass											
4804.0	46.7	49.2	P	BL	1.6	49.2	61.4	74.0	-12.6	Pass											
4804.0	26.7	29.2	A	BL	1.6	29.2	41.4	54.0	-12.6	Pass											
7206.0	43.5	43.4	P	BL	1.6	43.5	63.0	74.0	-11.0	Pass	Noise floor										
4870.0	45.0	45.5	P	BL	1.6	45.5	57.7	74.0	-16.3	Pass	Noise floor										
7305.0	43.1	42.9	P	BL	1.6	43.1	62.9	74.0	-11.1	Pass	Noise floor										
4940.0	44.5	45.8	P	BL	1.6	45.8	58.1	74.0	-15.9	Pass	Noise floor										
7410.0	42.5	44.1	P	BL	1.6	44.1	63.5	74.0	-10.5	Pass	Noise floor										



**Section 15.249 (d) – Spurious Emissions Outside of the band**

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**RSS-210 A2.9 – Spurious Emissions Outside of the band**

(b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to Table 2 limits, whichever is the less stringent.

Section 4.4 of RSS-Gen (Pulsed Operation) does not apply to CISPR measurement for the band 902-928 MHz.

**Test Conditions:**

<b>Sample Number:</b>	NV	<b>Temperature:</b>	20°C
<b>Date:</b>	October 6, 2010	<b>Humidity:</b>	60 %
<b>Modification State:</b>	Hopping	<b>Tester:</b>	FSCustodio

**Laboratory:** SOATS**Test Results:**

No emissions found.

**Additional Observations:**

- Fresh batteries were used during assessment.
- All measurements below 1 GHz were performed at 3m employing a CISPR quasi-peak detector.
- Peak measurements above 1 GHz utilize a RBW of 1 MHz and a VBW of 3 MHz
- The Spectrum was searched from 30MHz to 24.7 GHz.
- There were no emissions found other than the fundamental and the second harmonic (Section 15.249(a)).