Nemko USA, Inc.
11696 Sorrento Valley Rd., Suite F
San Diego, CA 92121-1024
Phone (858) 755-5525 Fax (858) 452-1810

CERTIFICATION TEST REPORT

TITLE 47 CFR 15 SUBPART C, 15.247
IC RSS-210, ISSUE 8, DECEMBER 2010

For The Wireless Remote Control
Model: 184057

FCC ID: QVE4DELTA
IC: 3683B-4DELTA

PREPARED FOR:

SMK Manufacturing
12264 El Camino Real, Ste. 203
San Diego, CA 92130

Prepared on: March 21, 2011

Report Number: 2011 031025216 FCC

Project Number: 1025216

NEx Number: 168271

Total Pages: 39

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	March 21, 2011	Prepared By: Jim Owen
-	March 21, 2011	Initial Release: Alan Laudani

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on March 14, 2011.
- Testing was performed on the unit described in this report on March 11, 2011.
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

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CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4–2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.

Jim Owen, NCE
Sr. EMC Engineer

1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT:	SMK Manufacturing 12264 El Camino Real, Ste. 203 San Diego, CA 92130
CONTACT: E-Mail:	Leon Gateno lgateno@smkusa.com
DATE (S) OF TEST:	March 11, 2011
EQUIPMENT UNDER TEST (EUT):	Wireless Remote Control
MODEL: SERIAL NUMBER: CONDITION UPON RECEIPT:	184057 NA Suitable for Test
TEST SPECIFICATION:	FCC, Title 47 CFR Part 15, Subpart C, 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands and RSS 210 (Issue 8, June 2010) Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

1.2. Test Summary

Specification	*Frequency Range*	*Compliance Status*
FCC, CFR 47, Section 15.207	0.15 MHz - 30.00 MHz	NA[1]
FCC, CFR 47, Section 15.109	30 MHz – 5th Harmonic	PASS
FCC, CFR 47, Section 15.209	30 MHz – 10th Harmonic	PASS
FCC CFR 47, §15.247 Plus Band edge	2425 – 2475 MHz	PASS
RSS-210 - Low Power License Exempt Radio-communication Devices (All Frequency Bands)	2425 – 2475 MHz	PASS

[1] The EUT is powered by 4 AAA batteries.
Testing was started at 30 MHz as there are no RF signals generated below this frequency.

Refer to the test results section for further details.

Jim Owen, NCE
Sr. EMC Engineer

2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The 184057 are Wireless Remote Controls commonly known as Echostar 184057. The purpose for the unit is to control a set up box. This set up box is similar to a cable box.. The unit can operate in IR (infra red) mode or in RF mode. The remote controls the volume, channel, record, fast forwards, etc. When operating in IR mode, the unit performs a sub set of the functions provided by the remote. There are a total of 49 keys and a scroll keys. Every time the key is pressed or the scroll is used the data is sent via the RF channel. When a key is not pressed, a heartbeat is sent to keep the remote and the rcvr in sync. The information sent during the heart beet is similar to that of a key pressed. The only type of data sent is control data. The unit does not send audio or video signals. The remote communicates with a unit inside of the set up box. This unit is separate of the remote. The communication is done in one and only one frequency. If the unit sees an interferer both set up box and transmitter will switch channel. Never are two frequencies transmitted at the same time. The antenna used is a meandering antenna with a gain of -2dBi.. The antenna is located in front of the remote. It interfaces with the RFIC via a Balun/Matching network. The only intentional source of RF is via this port. This unit is operated from 4 AAA batteries. The IC's have an internal regulator. There is an external regulator that supplies 3.3 Volts to all the circuits.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Set-Top Box Remote	SMK Manufacturing 184057 SN: NA	None

2.3. Device Interconnection and I/O Cables

Connection	I/O Cable
None	

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

2.5. Technical Specifications of the EUT

Manufacturer:	SMK Manufacturing
Operating Frequencies:	2425, 2450, & 2475 MHz in the 2400-2483.5 MHz Band
Measured Maximum Output Power (Alternate Method):	0.00144 W (1.436mW)
Modulation:	QPSK
Antenna Connector:	Internal, integral.
Power Source:	6 Vdc (4) AAA batteries

3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 19 ^{o}C
Humidity range	:	54 - 75%
Pressure range	:	87 - 105 kPa

4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4–2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

4.3. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBuV/m
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dB/m

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dB/m (antenna factor @ frequency)
36.9 dBuV/m Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

5. Test Results

5.1. Radiated Emissions

Clause 15.247(d) Radiated Emissions Not in Restricted Bands

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Additional Observations:

- Emissions were searched over a range of 30 MHz to 25000 MHz while in transmit mode on each of the three channels. No other emissions found within 20 dB of the limit.
- Emissions were searched over a range of 30 MHz to 25000 MHz while in receive mode on each of the three channels. No emissions found within 20 dB of the limit.
- Investigations were made at 3 meters. Each channel investigated was maximized in the OATS.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies, example below.
- Measurements were made after fresh batteries were installed.

Correction Factor for measurement at 2425 MHz = 4.88

(29.18 dB/m Antenna factor + 8.9 dB Cable loss – 33.2 dB PreAmp)

Corrected Reading = Max Reading + Correction Factor

= 90.0dBµV + 4.88 db

= 94.8 dBµV/m

RXT9000-0701E as a model number has been revised to 184057.

NEMKO USA, Inc.

San Diego Headquarters:
11696 Sorrento Valley Rd.
San Diego, CA 92121
Tel: (858) 755-5525
Fax: (858) 452-1810

Radiated Emissions Data

Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX #:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting Low Channel - 2425 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	10 MHz
Average = Peak + Duty Cycle Factor		
DCF = 20 x log(duty cyle)		

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2425.0	88.2	81.4	P		1.0	88.2	93.0	125.2	-32.2	Pass	Intentional - X orientation
2425.0	90.0	78.1	P		1.0	90.0	94.8	125.2	-30.4	Pass	Y and Z orientation
4850.0	40.0	37.2	P		1.0	40.0	54.7	74.0	-19.3	Pass	Y orientation
4850.0	40.0	37.2	A		1.0	40.0	44.4	54.0	-9.6	Pass	Y orientation
7275.0	34.5	34.7	P		1.0	34.7	57.3	74.0	-16.7	Pass	ambient
12125.0	27.5	27.7	P		1.0	27.7	69.5	74.0	-4.5	Pass	ambient

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Radiated Emissions Data

Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX #:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting Mid Channel - 2450 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

Quasi-Peak	RBW: 120 kHz
	Video Bandw idth 300 kHz
Peak	RBW: 1 MHz
	Video Bandw idth 10 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cyle)	

Measurements below 1 GHz are Quasi-Peak values, unless otherw ise stated.
Measurements above 1 GHz are Average values, unless otherw ise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2450.0	87.6	84.4	P		1.0	87.6	92.4	125.2	-32.8	Pass	Intentional - X orientation
2450.0	87.2	81.4	P		1.0	87.2	92.0	125.2	-33.2	Pass	Y and Z orientation
4900.0	40.0	37.2	P		1.0	40.0	54.5	74.0	-19.5	Pass	ambient
7350.0	34.6	34.6	P		1.0	34.6	57.3	74.0	-16.7	Pass	ambient

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Radiated Emissions Data

Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX #:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting High Channel - 2450 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

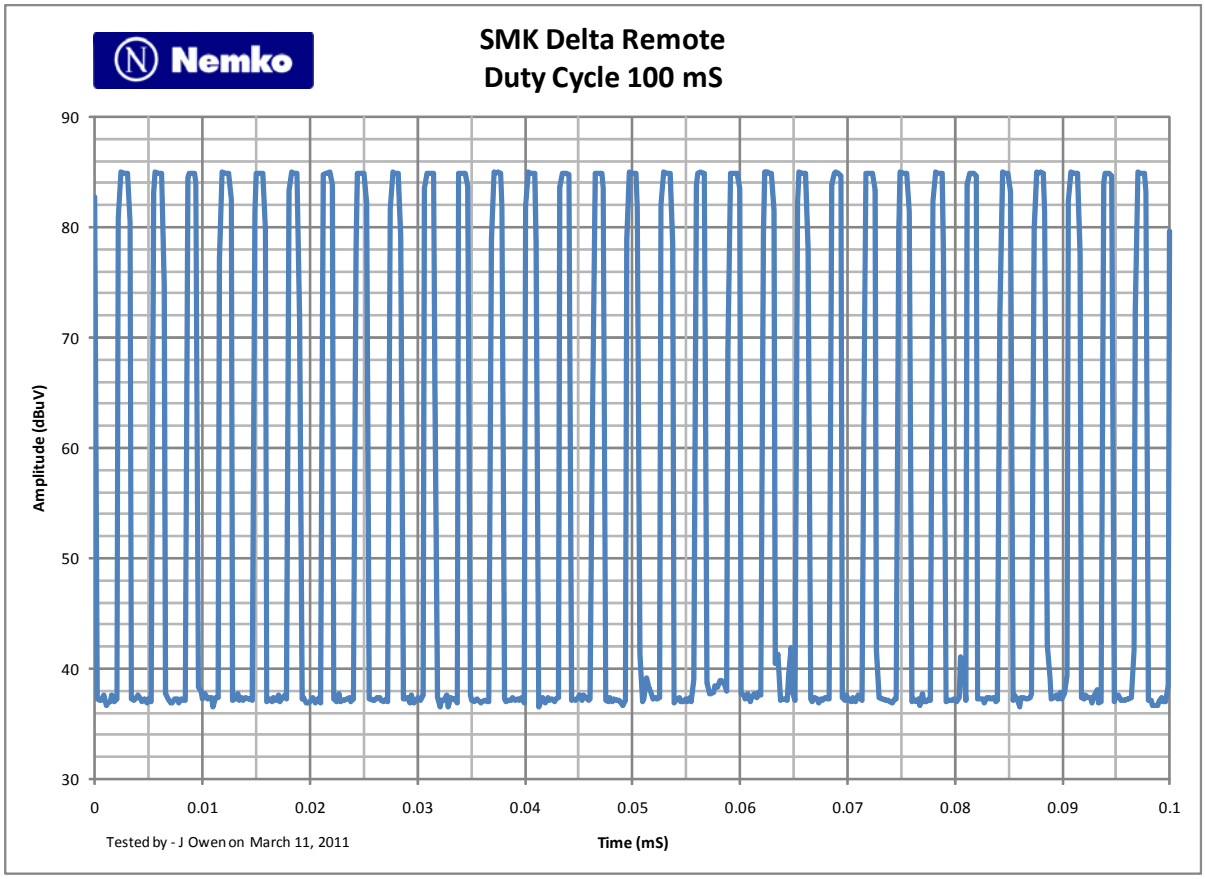
Quasi-Peak RBW:	120 kHz
Video Bandw idth	300 kHz
Peak RBW:	1 MHz
Video Bandw idth	10 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cyle)	

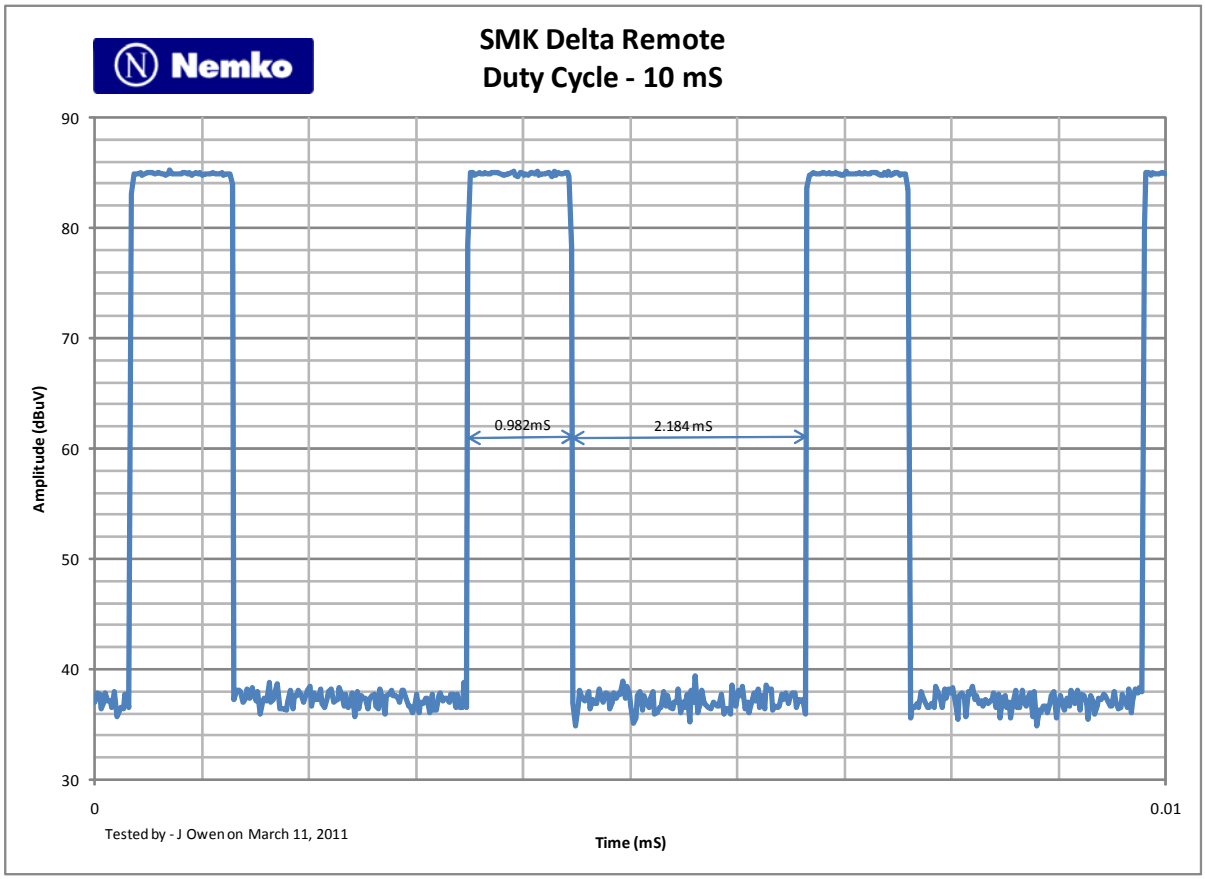
Measurements below 1 GHz are Quasi-Peak values, unless otherw ise stated.
Measurements above 1 GHz are Average values, unless otherw ise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2475.0	86.4	86.4	P		1.4	86.4	91.2	125.2	-34.0	Pass	Intentional - X orientation
2475.0	86.5	85.1	P		1.0	86.5	91.3	125.2	-33.9	Pass	Y and Z orientation
4950.0	38.6	36.4	P		1.0	38.6	53.1	74.0	-20.9	Pass	ambient
7425.0	33.2	33.2	P		1.0	33.2	56.3	74.0	-17.6	Pass	ambient

5.2. Duty Cycle Factor

31 Pulses in 100 ms





31 x 0.982 uS = 30.44 ms

30.44 ms in 100ms = 30.44%

DCF = 20 x log (.3044) = -10.33 dB

5.3. Bandwidth

RSS-Gen 4.6.1

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.

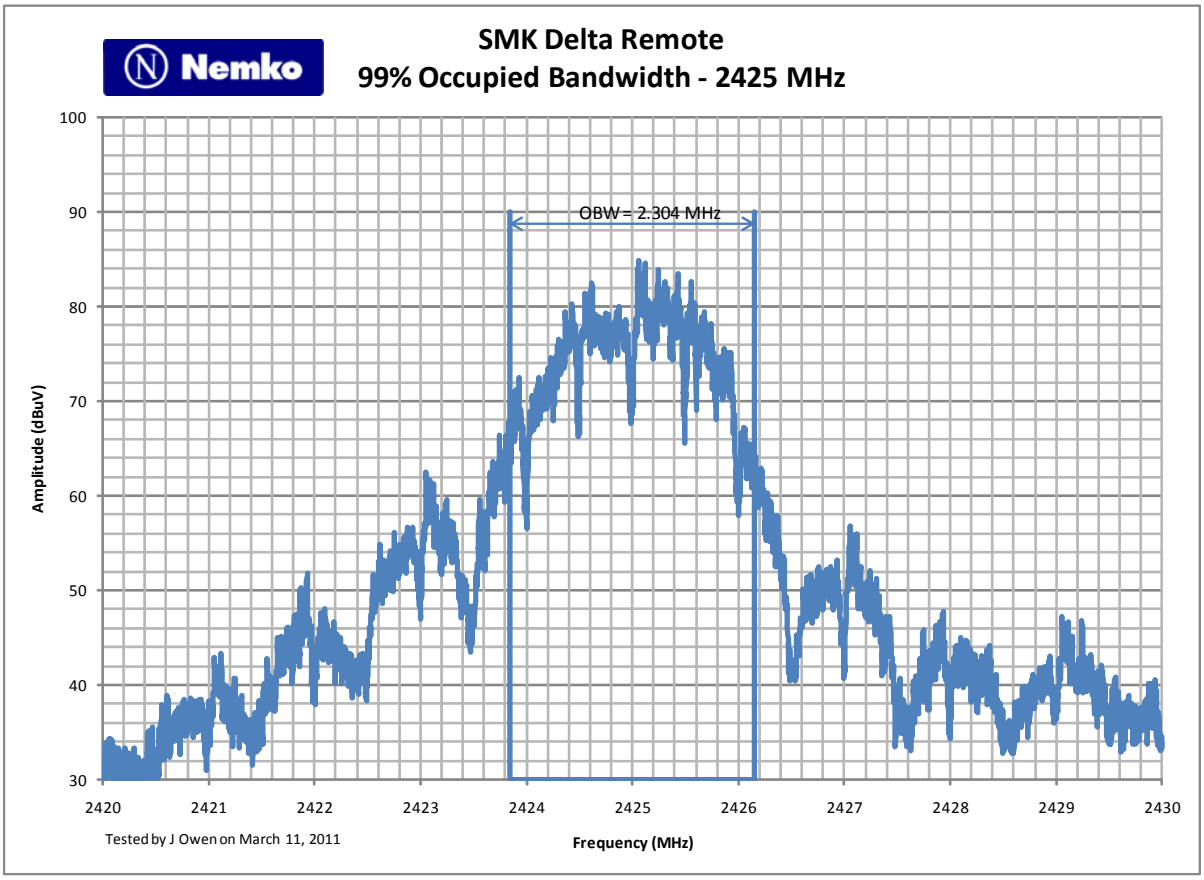
Sample Number:	184057	Temperature:	16 °C
Date:	3-11-2011	Humidity:	72%
Modification State:	Lo/Mid/High Channels	Tester:	Jim Owen
		Laboratory:	SOATS

15.247(a)(1)

Measurements were made at 1 meter.
Analyzer RES BW was set to 100 kHz.
For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier.
A program in the Spectrum Analyzer determined 99% Occupied Bandwidth.

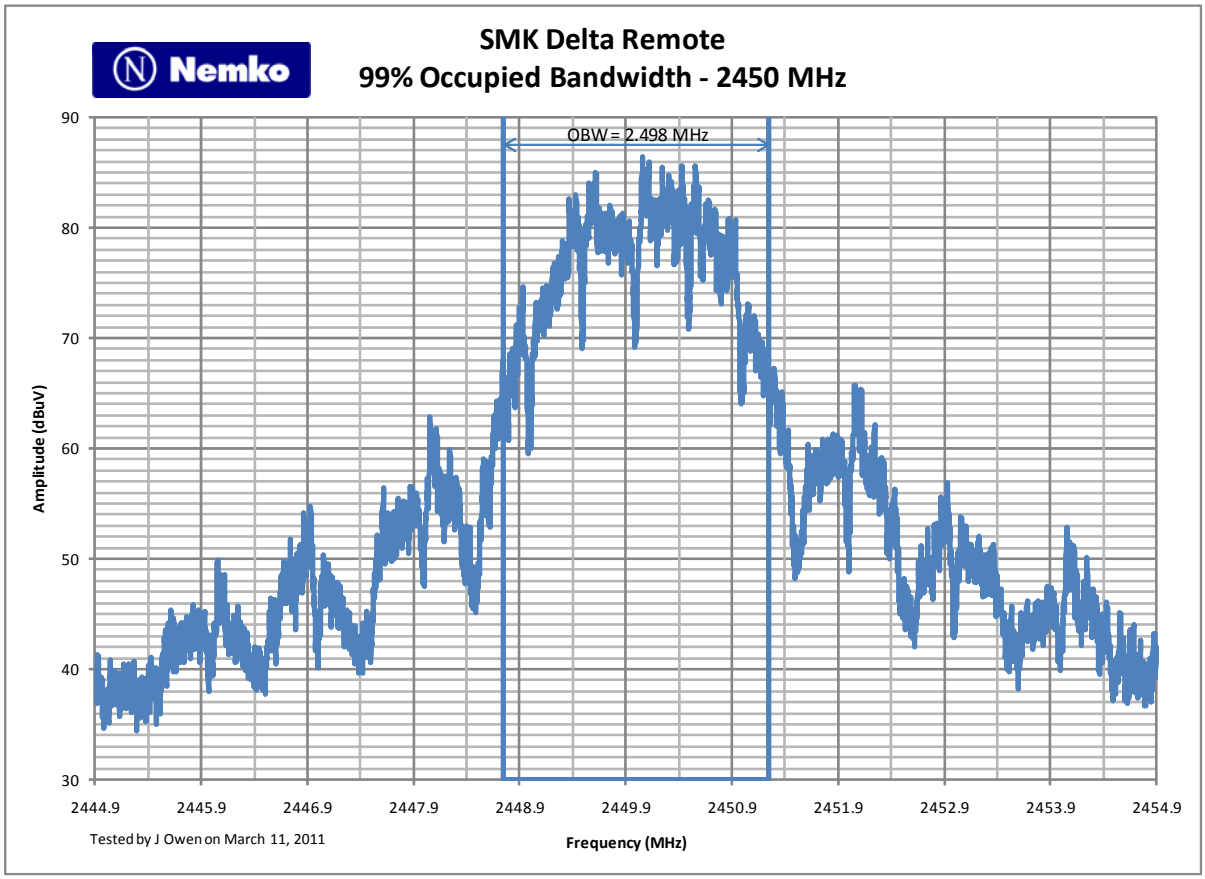
Test Results:

	99% Occupied Bandwidth Results		
	Low Channel	Mid Channel	High Channel
Original Data	2.304 MHz	2.498 MHz	2.3125 MHz



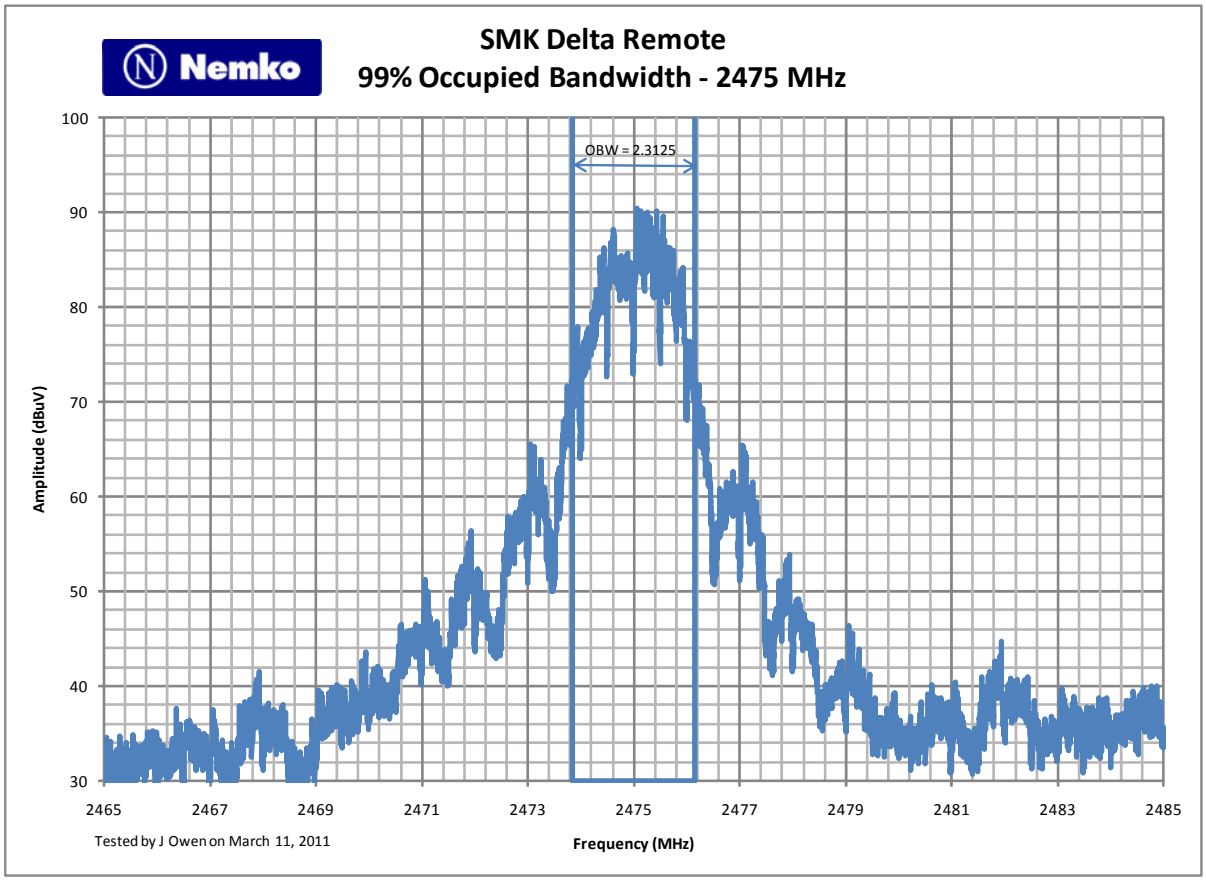
Low Channel

OBW = 2.304 MHz



Mid Channel

OBW = 2.498 MHz



High Channel

OBW = 2.3125 MHz

5.4. Out-of-band Emissions / Radiated Emissions within Restricted Bands

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/meter)	Measurement Distance (meter)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

A8.5 Out-of-band Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Sample Number:	184057	Temperature:	16°C
Date:	3/11/2011	Humidity:	72 %
Modification State:	Lo/Mid/High Channels	Tester:	Jim Owen
		Laboratory:	SOATS

Test Results:

See Table.

Additional Observations:

- The Spectrum was searched from 30MHz to the 10th Harmonic, 25000 MHz.
  There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).

- The EUT was measured on three orthogonal axes.

- Radiated Measurements below 1GHz were performed at 3m with a Quasi-Peak detector (RBW 120kHz/VBW 300kHz) while Radiated Peak (RBW 1MHz/3MHz or greater VBW) measurements conducted above 1GHz.

- Average = Peak – Pulse Desensitization (Duty Cycle) Factor

- The device has an integral antenna with no conducted emissions measurement capability.

- RXT9000-0701E as a model number has been revised to 184057.

- Measurements were made after fresh batteries were installed.

NEMKO USA, Inc.

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Radiated Emissions Data

Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX #:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting Low Channel - 2425 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

Quasi-Peak	RBW: 120 kHz
	Video Bandw idth 300 kHz
Peak	RBW: 1 MHz
	Video Bandw idth 10 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cyle)	

Measurements below 1 GHz are Quasi-Peak values, unless otherw ise stated.
Measurements above 1 GHz are Average values, unless otherw ise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2425.0	88.2	81.4	P		1.0	88.2	93.0	125.2	-32.2	Pass	Intentional - X orientation
2425.0	90.0	78.1	P		1.0	90.0	94.8	125.2	-30.4	Pass	Y and Z orientation
4850.0	40.0	37.2	P		1.0	40.0	54.7	74.0	-19.3	Pass	Y orientation
4850.0	40.0	37.2	A		1.0	40.0	44.4	54.0	-9.6	Pass	Y orientation
7275.0	34.5	34.7	P		1.0	34.7	57.3	74.0	-16.7	Pass	ambient
12125.0	27.5	27.7	P		1.0	27.7	69.5	74.0	-4.5	Pass	ambient

NEMKO USA, Inc.

San Diego Headquarters:
11696 Sorrento Valley Rd.
San Diego, CA 92121
Tel: (858) 755-5525
Fax: (858) 452-1810

Radiated Emissions Data

Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX#:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting Mid Channel - 2450 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

Quasi-Peak	RBW: 120 kHz
	Video Bandw idth 300 kHz
Peak	RBW: 1 MHz
	Video Bandw idth 10 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cyle)	

Measurements below 1 GHz are Quasi-Peak values, unless otherw ise stated.
Measurements above 1 GHz are Average values, unless otherw ise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2450.0	87.6	84.4	P		1.0	87.6	92.4	125.2	-32.8	Pass	Intentional - X orientation
2450.0	87.2	81.4	P		1.0	87.2	92.0	125.2	-33.2	Pass	Y and Z orientation
4900.0	40.0	37.2	P		1.0	40.0	54.5	74.0	-19.5	Pass	ambient
7350.0	34.6	34.6	P		1.0	34.6	57.3	74.0	-16.7	Pass	ambient

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Radiated Emissions Data

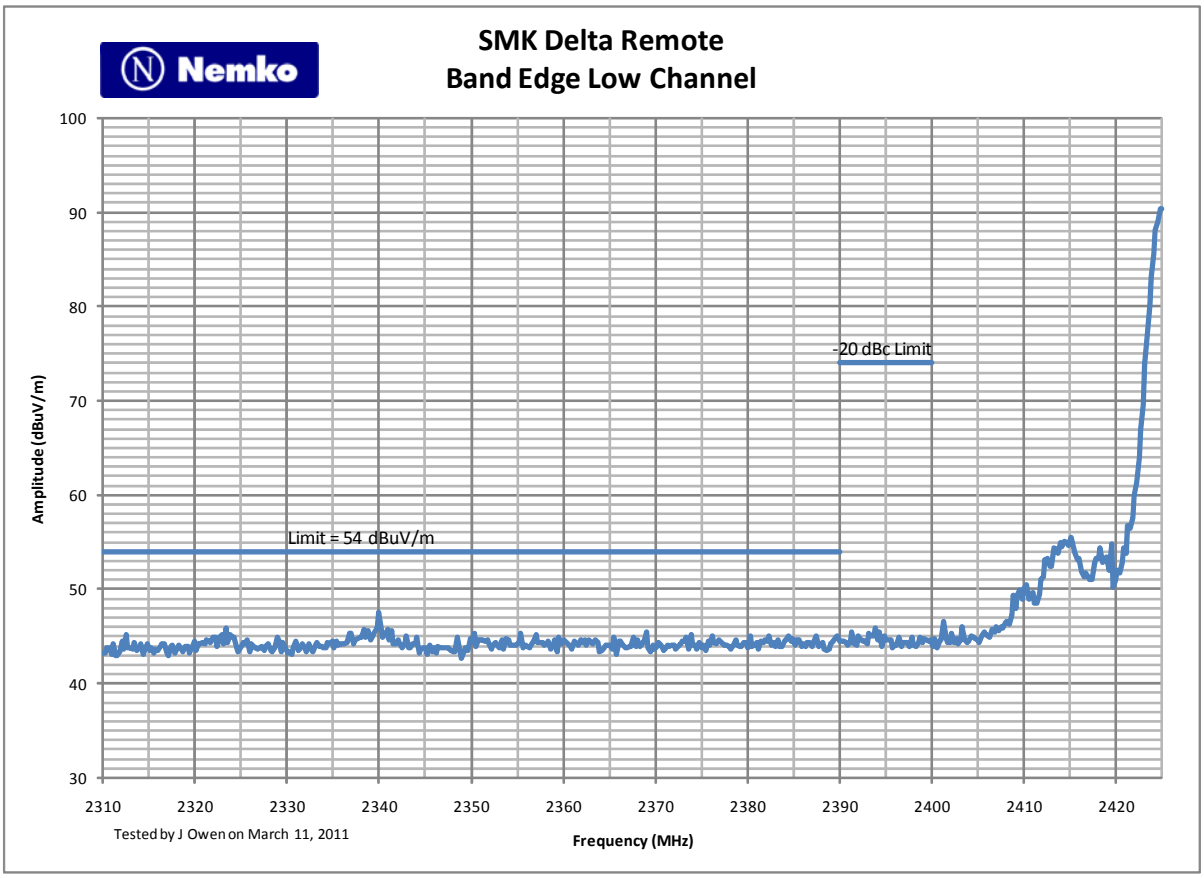
Job # :	1025216	Date :	3/14/2011	Page	1 of 1
NEX#:	168273	Time :	1015		
		Staff :	JO		
Client Name :	SKM Electronics Corp.			EUT Voltage :	battery
EUT Name :	Delta Remote			EUT Frequency :	
EUT Model # :	RXT9000-230XE			Phase:	
EUT Serial # :	N/A			NOATS	
EUT Config. :	Transmitting High Channel - 2450 MHz			SOATS	X
	No other emissions detected from 30 MHz to 25 GHz			Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart C, Restricted Bands				
Loop Ant. #:	NA				
Bicon Ant.#:	NA	Temp. (°C) :	16		
Log Ant.#:	NA	Humidity (%) :	72		
DRG Ant. #	877	Spec Analyzer #:	835		
Cable LF#:	SOATS	Analyzer Display #:	835		
Cable HF#:	60FT	Quasi-Peak Detector #:	835		
Preamp LF#:	NA	Duty Cycle (%):	30		
Preamp HF#	317				

Quasi-Peak	RBW: 120 kHz
	Video Bandw idth 300 kHz
Peak	RBW: 1 MHz
	Video Bandw idth 10 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cyle)	

Measurements below 1 GHz are Quasi-Peak values, unless otherw ise stated.
Measurements above 1 GHz are Average values, unless otherw ise stated.

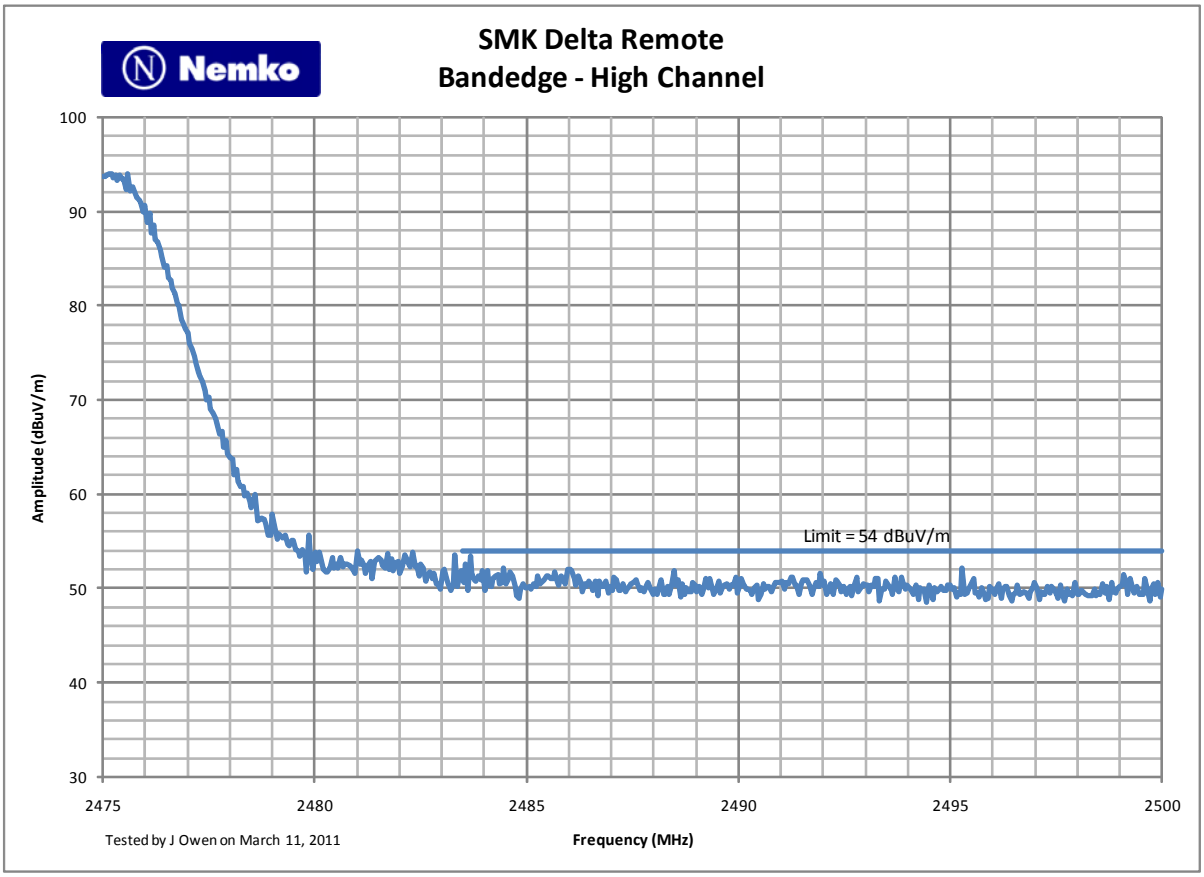
Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2475.0	86.4	86.4	P		1.4	86.4	91.2	125.2	-34.0	Pass	Intentional - X orientation
2475.0	86.5	85.1	P		1.0	86.5	91.3	125.2	-33.9	Pass	Y and Z orientation
4950.0	38.6	36.4	P		1.0	38.6	53.1	74.0	-20.9	Pass	ambient
7425.0	33.2	33.2	P		1.0	33.2	56.3	74.0	-17.6	Pass	ambient

5.5. Band Edge Measurements



Low Channel 2425 MHz (Peak Measurement Corrected)

Peak meets average limit requirements



High Channel 2475 MHz (Peak Measurement corrected)

Peak meets average limit requirements

5.6. Minimum 6dB RF Bandwidth

(a)(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

A8.2 (a) The minimum 6 dB bandwidth shall be at least 500 kHz.

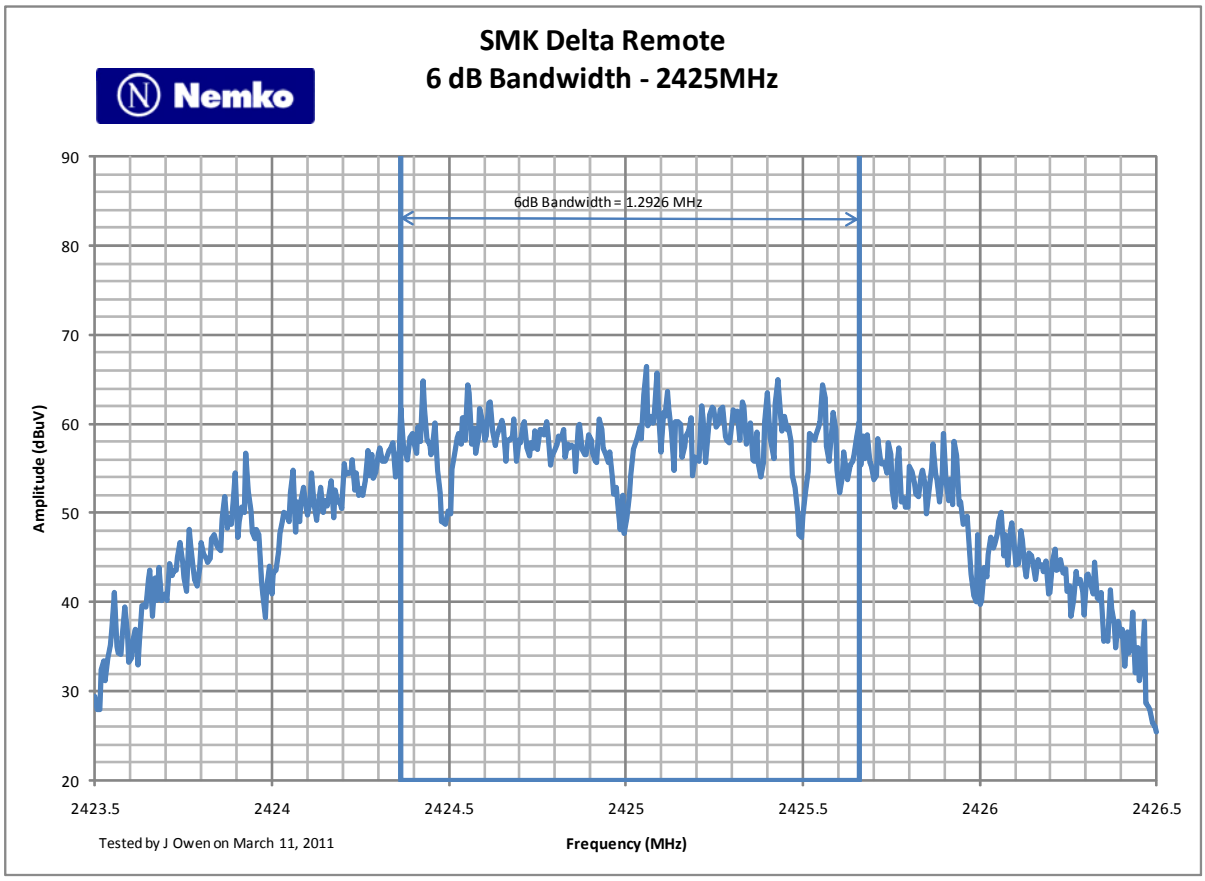
Sample Number:	184057	Temperature:	16°C
Date:	3-11-2011	Humidity:	72 %
Modification State:	Lo/Mid/High Channels	Tester:	Jim Owen
		Laboratory:	SOATS

Test Results:

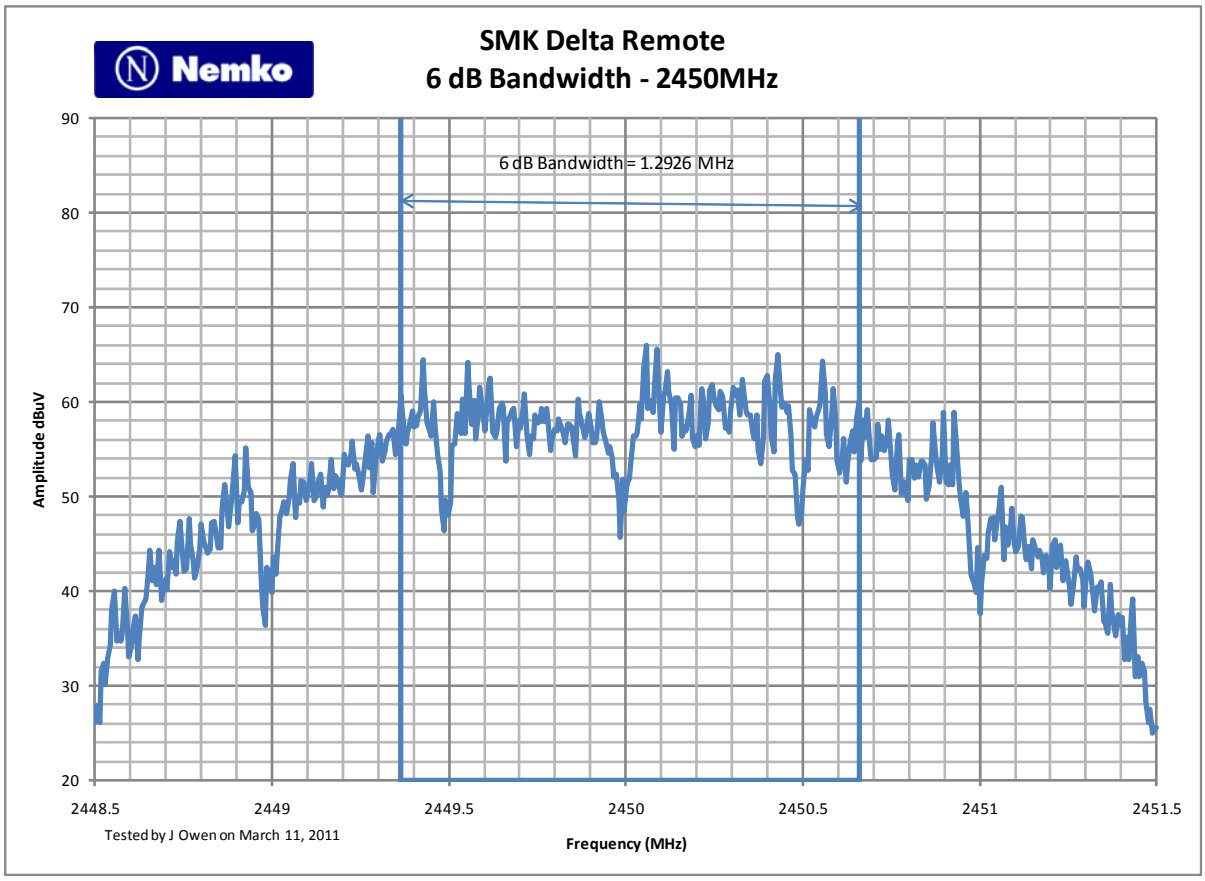
6dB Bandwidth:

Measurements were made at 3 meters. Each channel investigated was maximized in the OATS before any reading was made. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was plotted, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

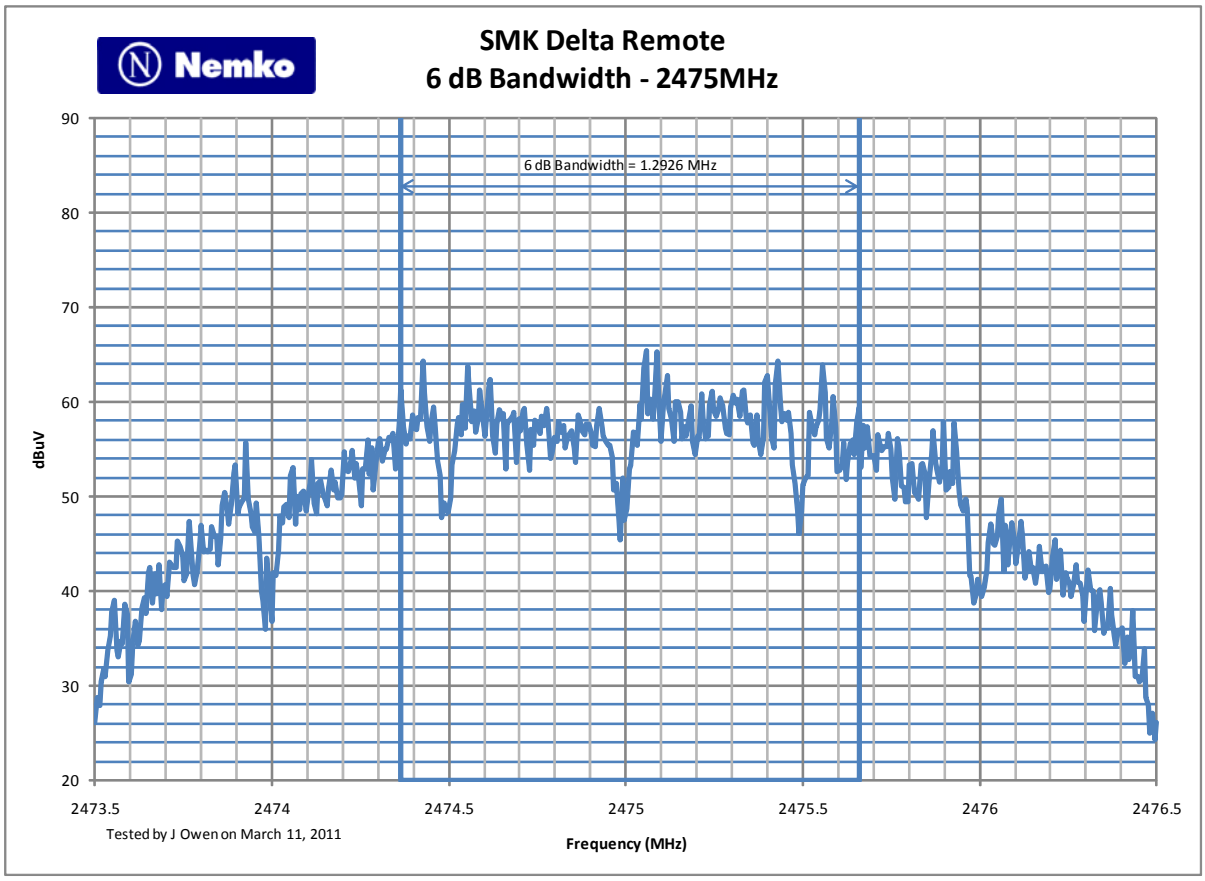
Channel Range	6 dB Bandwidth
Low (2425 MHz)	1.2926 MHz
Mid (2450 MHz)	1.2926 MHz
High (2475 MHz)	1.2926 MHz



LOW Channel (2425 MHz)



MID Channel (2450 MHz)



HIGH Channel (2475 MHz)

5.7. Maximum Peak Output Power

(b) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

A8.5
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

Sample Number:	184057	Temperature:	16°C
Date:	3-11-2011	Humidity:	72 %
Modification State:	Lo/Mid/High Channels	Tester:	Jim Owen
		Laboratory:	SOATS

Test Results: Using values from table Radiated Emissions, page 14.

Channel	Frequency (MHz)	Measured Output Power (dBµV/m)	Measured Output Power (mW)	Measured Output Power (dBm)	Calculated Output Power (-2 dBi gain) EIRP (W)
Low	2425	94.8	1.436 mW	1.57	0.00144
Mid	2450	92.4	0.826 mW	-0.829	0.00083
High	2475	91.3	0.641 mW	-1.93	0.00064

Additional Observations:

- Investigations were made at 3 meters. Each channel investigated was maximized in the OATS. Analyzer RES BW was set to 3 MHz and VBW to 3 MHz for fundamental power level measurements.
- A correction factor of 33.2 dB was added to compensate for antenna factor and cable loss at the fundamental frequencies.
- Measurements were made after fresh batteries were installed.
- Manufacturer's antenna gain: -2 dBi gain
- The peak level measured was converted to mW using the formula:

$P = (E \times d)^2 / (30 \times G)$

$E = 10^{((dB\mu V/m-120/20)}$
$0.0549= 10^{((94.8-120)/20)}$
$G = 10(-2dBi/10) = 0.63$
$(0.0549 \times 3)^2 / (30 \times 0.63) = 0.001436$ or 0.0014W

Where: P = Power in watts
E = measured maximum field strength in V/m
d =distance in meters during measurement
G = numeric gain of the transmitting antenna over an isotropic radiator (assume 1.)

Correction Factor for all measurements = 4.88 (29.18 Antenna factor + 8.9 Cable loss – 33.2 dB PreAmp)
Corrected Reading = Max Reading + Correction Factor
= 90.0 + 4.88
= 94.8 dBuV/m

5.8. Power Spectral Density

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
A8.2(b) The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration. This power spectral density shall be determined in accordance with the provisions of Section A8.4(4); (i.e. the power spectral density shall be determined using the same method for determining the conducted output power).

Sample Number:	184057	Temperature:	16
Date:	3-11-2011	Humidity:	72
Modification State:	Lo/Mid/High Channels	Tester:	Jim Owen
		Laboratory:	SOATS

Test Results:

Measurements were made at 3 meters. Each channel investigated was maximized in the OATS before any reading was made. Analyzer RES BW was set to3 kHz and the Span was set to 1.5 MHz. Sweep was 600 seconds For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Measurements were made after fresh batteries were installed.

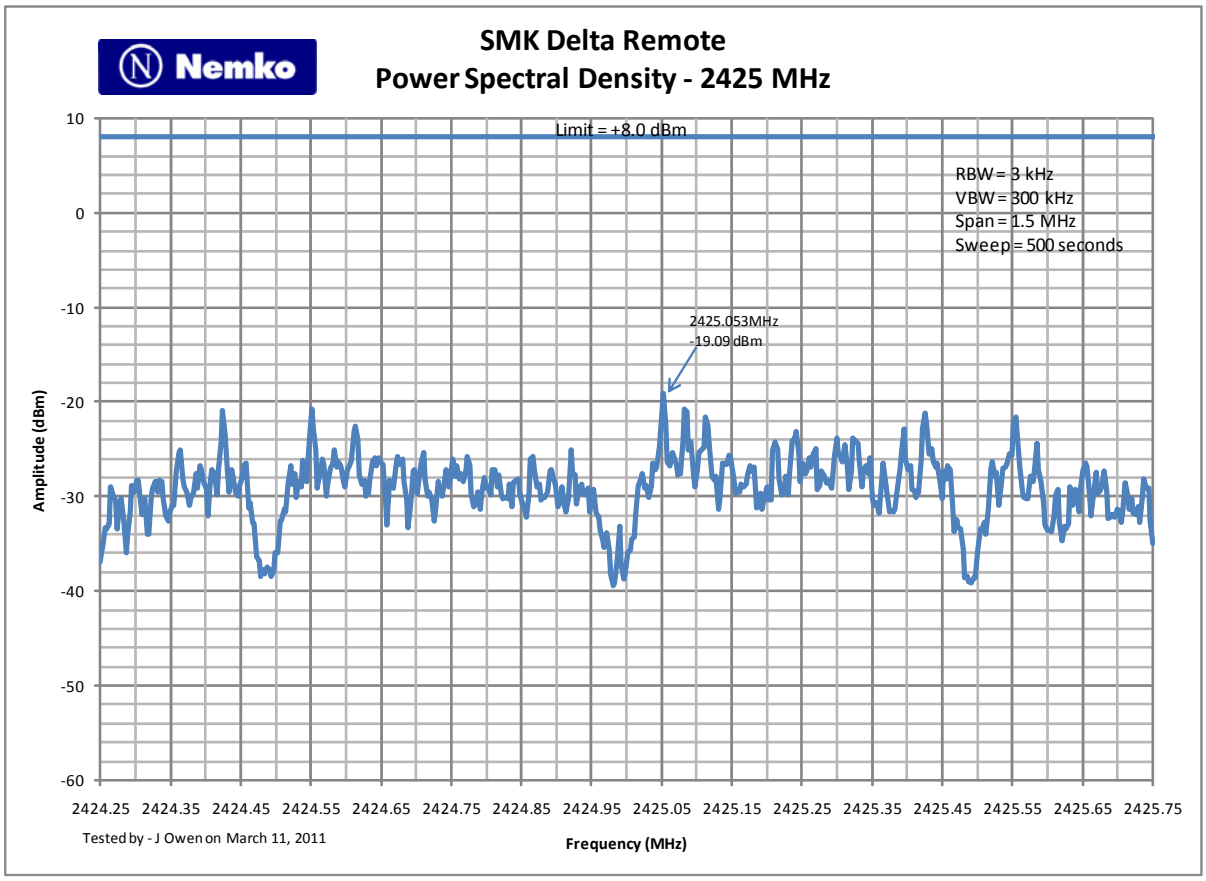
Channel Frequency (MHz)	RF Field Strength (dBuV/m)	Calculated Output Power (-2 dBi gain) (dBm)	Maximum Limit (dBm)	PASS/ FAIL
2425.053	74.1	-19.09	8	Pass
2450.053	68.1	-29.13	8	Pass
2475.053	67.0	-26.29	8	Pass

Using formulae: $V = 10^{\wedge((dB\mu V/m-120)/20)}$ and $P = (E \times d)^2 / (30 \times G)$

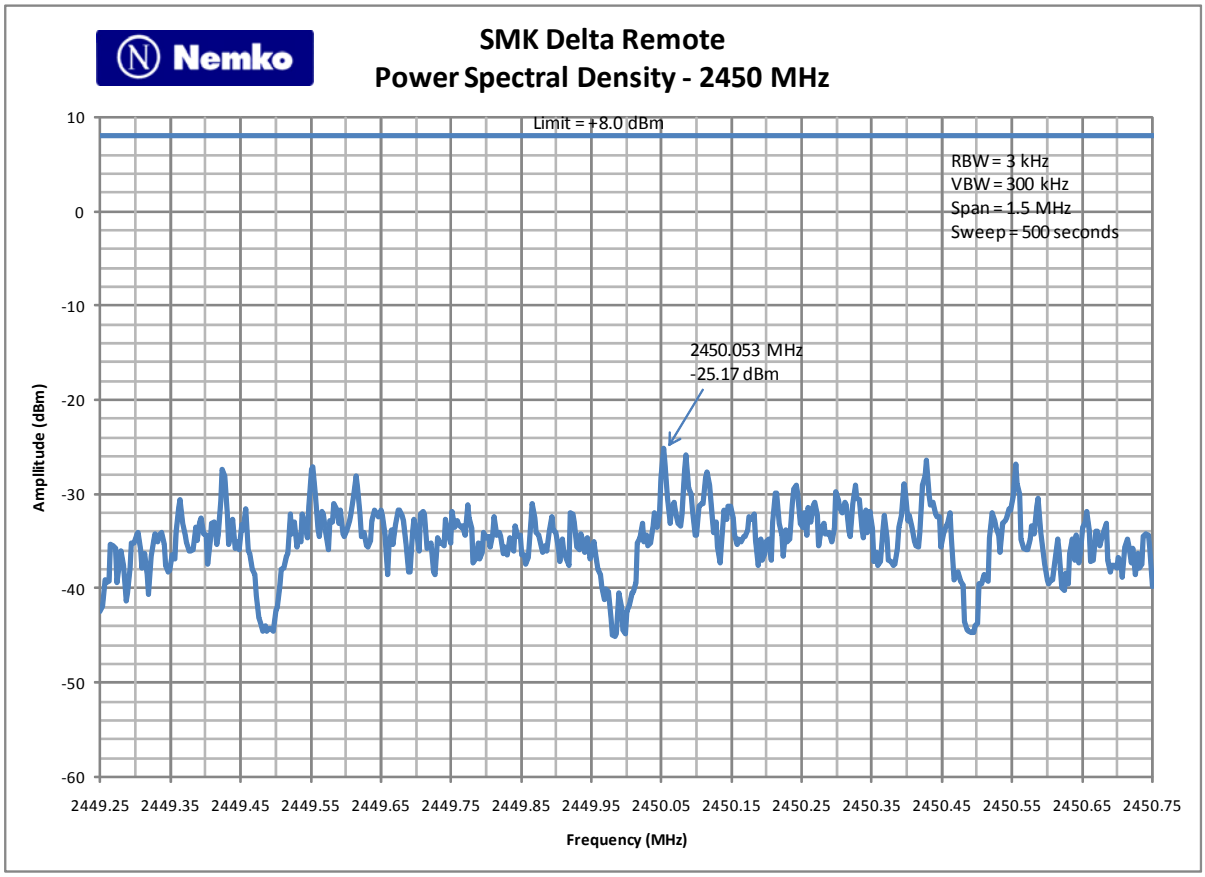
$V = 10^{\wedge((74.1\ dB\mu V/m-120)/20)}$

$= (0.005 \times 3)^2 / (30 \times 0.63)$

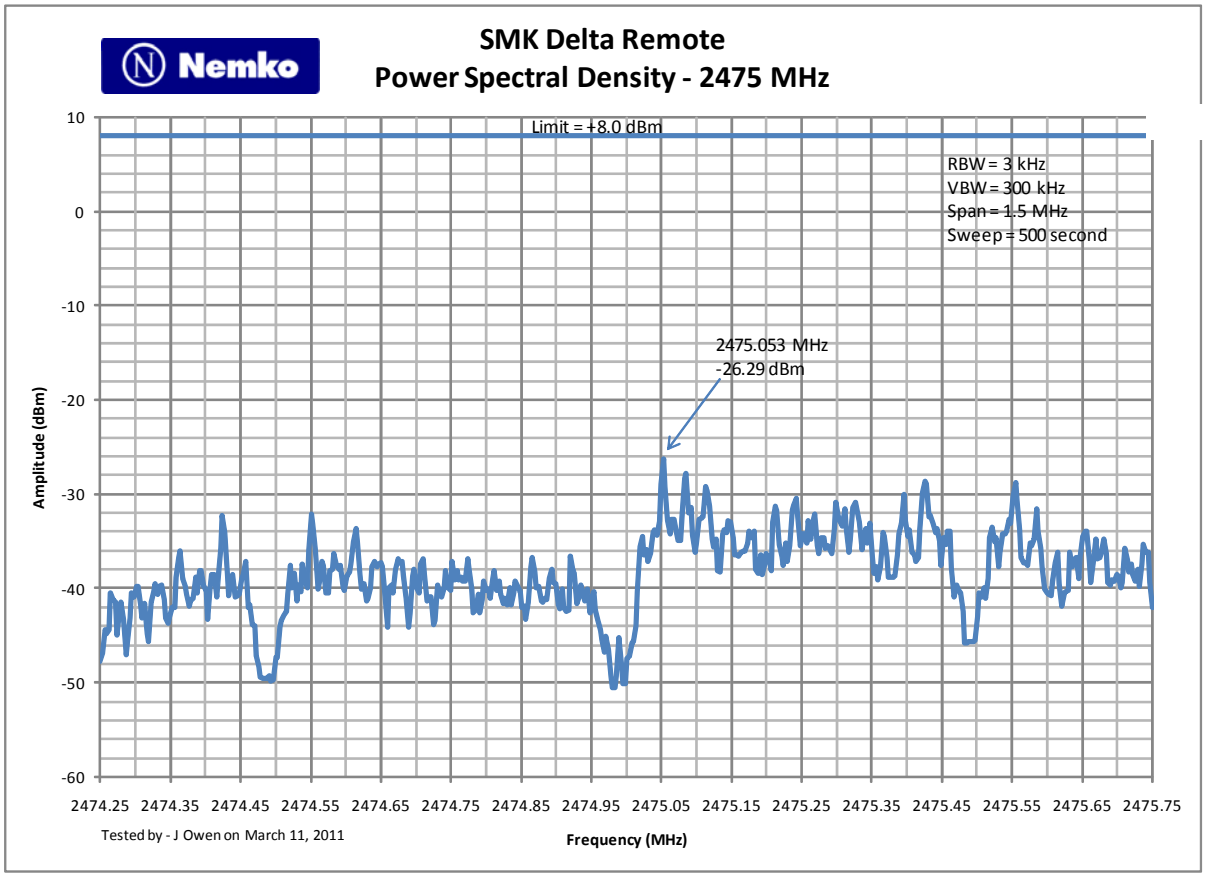
$= -19.09$ dBm



Low Channel 2425 MHz



Mid Channel 2450 MHz



High Channel 2475 MHz

5.9. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
114	Antenna, Bicon	EMCO	3104	2997	3/5/2010	3/5/2012
111	Antenna, LPA	EMCO	3146	1382	11/29/2010	11/29/2012
317	Preamplifier	HP	8449A	2749A00167	5/7/2010	5/7/2011
625	Antenna, Dbl Ridge Horn	EMCO	3116	2325	2/1/2010	2/1/2012
877	Antenna, DRWG	EMCO	3115	4943	8/16/2010	8/16/2012
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/12/2010	7/12/2011
813	Multimeter	Fluke	111	78130066	9/16/2009	9/16/2011