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Certification Test Report

In Accordance With: FCC Part 15 Subpart C, 15.231

Applicant: SMK Manufacturing, Inc
1055 Tierra Del Rey
Chula Vista, CA 91910

Equipment Under Test (EUT): FSK Remote
Model: 186371

FCC ID: QVEFSK4U2

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

Test Report Number: 2011 08182836 FCC
Date: August 12, 2011
Project Number: 10213104
NEX Number: 182836

Total Number of Pages: 26

Section 1. Summary of Test Results

1.1 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 Part 15; Subpart C. 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.

The assessment summary is as follows:

Apparatus Assessed:	FSK Remote
Model:	186371
Specification:	FCC Part 15 Subpart C, 15.231 RSS-210 Issue 8 December 2010
Date Received in Laboratory:	July 7, 2011
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.2 Report Release History

REVISION	DATE	COMMENTS
-	August 12, 2011	Prepared By: Alan Laudani
-	August 12, 2011	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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Alan Laudani, RF/EMC Test Engineer



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Section 2: Equipment Under Test

2.1 Theory of Operation

The 186371 is a FSK Remote to be used in remote controls for TVs and other uses. The 186371 works on four frequencies.

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 Technical Specifications of the EUT

Manufacturer:	SMK Manufacturing, Inc
Operating Frequency:	369.5 to 394.3 MHz, 4 channels: 369.5, 375.3, 388.3 & 394.3 MHz
Measured Field Strength:	76.2 dBuV/m @ 3m 6456.5 microVolts/meter
Modulation:	FSK
Antenna Data:	Folded Wire Antenna soldered to circuit board
Antenna Connector:	NONE
Power Source:	6 V Battery (4 AA cells)





Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.231

Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

RSS-210 Issue 8 December 2010

Annex 1 - Momentarily Operated Devices and Remote Control

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 : 14 – 22 °C
Humidity range : 32--76 %
Pressure range : 102.0 kPa

3.4 Test Equipment

Nemko ID	Device	Mfr.	Model	Serial Number	Cal Date	Cal Due Date
115	Antenna, Bicon	EMCO	3104	3020	9/28/2010	9/28/2011
755	Antenna, LPA	EMCO	3147	1246	7/23/2009	7/23/2011
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/12/2010	7/12/2011
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	8/16/2010	8/16/2012
897	Spectrum Analyzer	Rohde & Schwarz	FSP7	837620/009	10/27/2010	10/27/2011
902	pre amp	Sonoma	310 N	185803	6/8/2010	7/8/2011



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 Tests 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

Test Results. This section contains the following:

FCC Part 15 Subpart C
 RSS-210 Issue 8 December 2010
 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 15	RSS	Test Description	Required	Result
15.207 (a)	RSS-Gen 7.2.4	Power line Conducted Emissions	Battery Powered	NA
15.215 (c)	A1.1.3	Occupied Bandwidth/ 99% Bandwidth	Y	Pass
15.231(c)	A1.1	Permissible Field Strength Limits for Momentarily Operated Devices	Y	Pass
15.205 (a)	Table A			
15.231 (a)	RSS-Gen 7.2.2	Types of Momentary Signals	Y	Pass
15.231 (d)	A1.1.1(a)	Frequency Stability	N	NA
15.107 (a)	A1.1.4	Receiver Spurious Conducted Emissions	Battery Powered	NA
15.109 (a)	RSS-Gen 7.2.4	Receiver Spurious Radiated Emissions	NA	Pass



Appendix A: Test Results

Conducted Emissions

Client	SMK Manufacturing, Inc	Temperature		°C
Pan #	182836	Relative Humidity		%
EUT Name	FSK Remote	Barometric Pressure		kPa
EUT Model	186371	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.207 Class "B" Transmit RSS-Gen 7.2.4	Date of test		
Test Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			
Not applicable as EUT is battery powered.				



Occupied Bandwidth

15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

RSS-Gen 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.

Test Conditions:

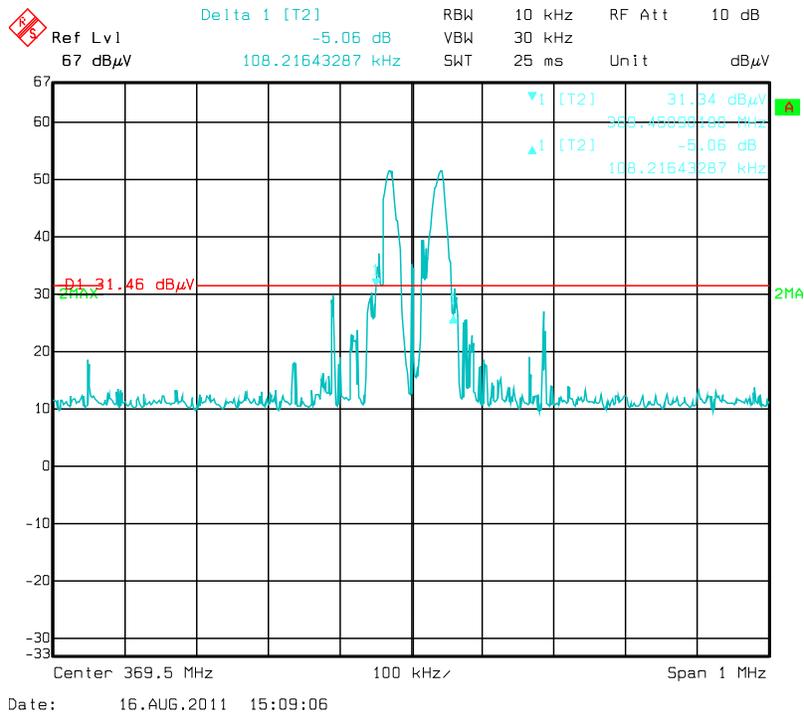
Client	SMK Manufacturing, Inc	Temperature	22	°C
Pan #	182836	Relative Humidity	50	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15C	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.231 Transmit	Date of test	August 16, 2011	

Test Results:

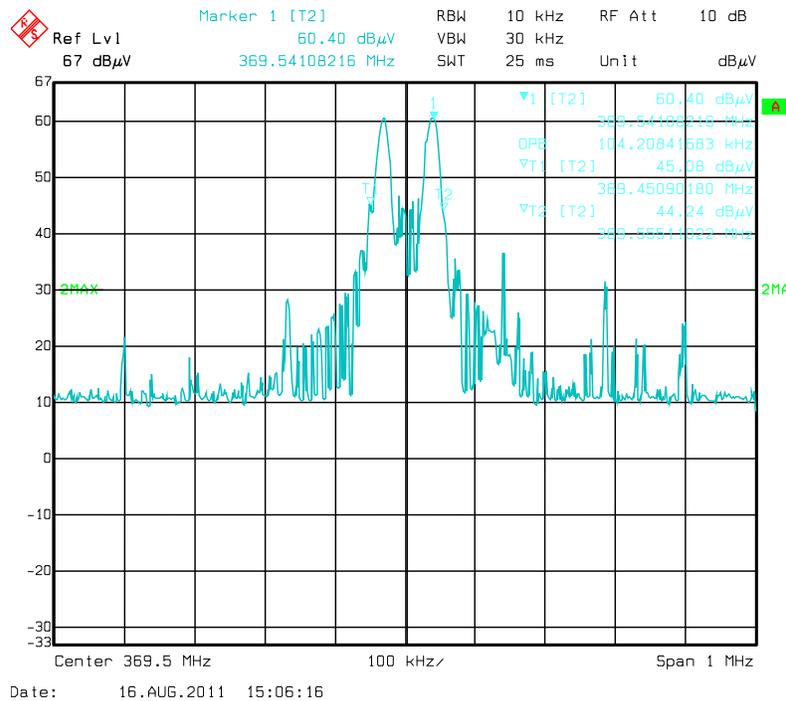
Measured Occupied Bandwidth: 116 kHz
Measured 99% Bandwidth = 108 kHz

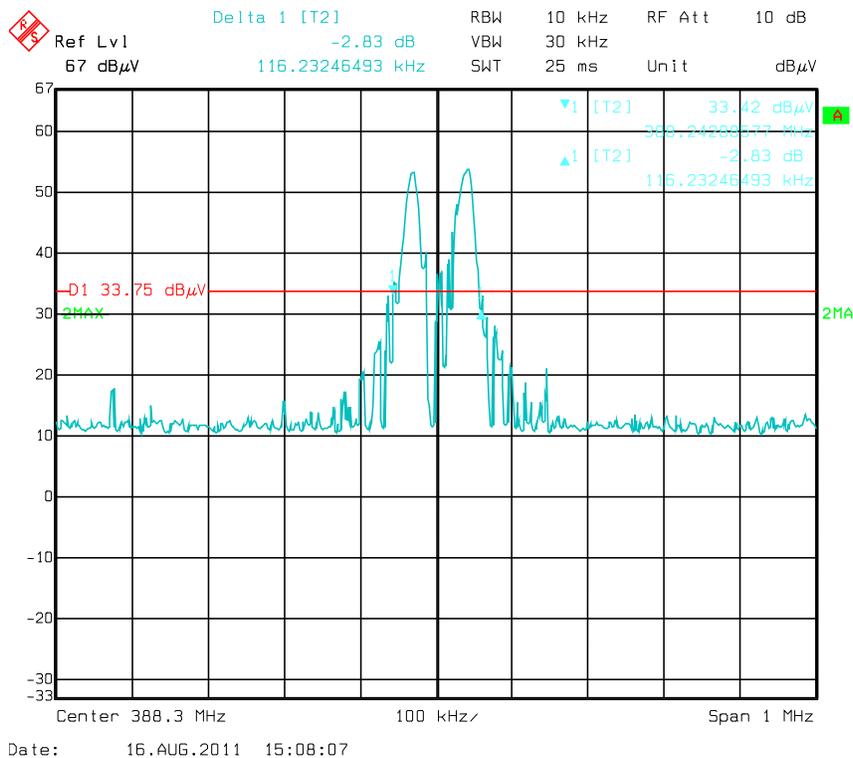
Frequency	20 dB	99 %
369.5	108 kHz	104 kHz
388.3	116 kHz	108 kHz
394.3	114 kHz	106 kHz



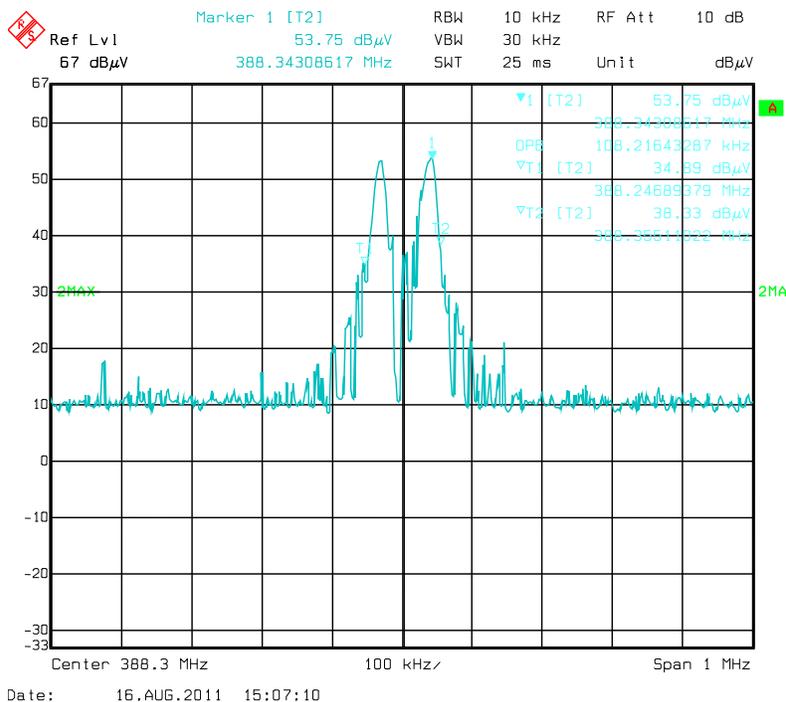


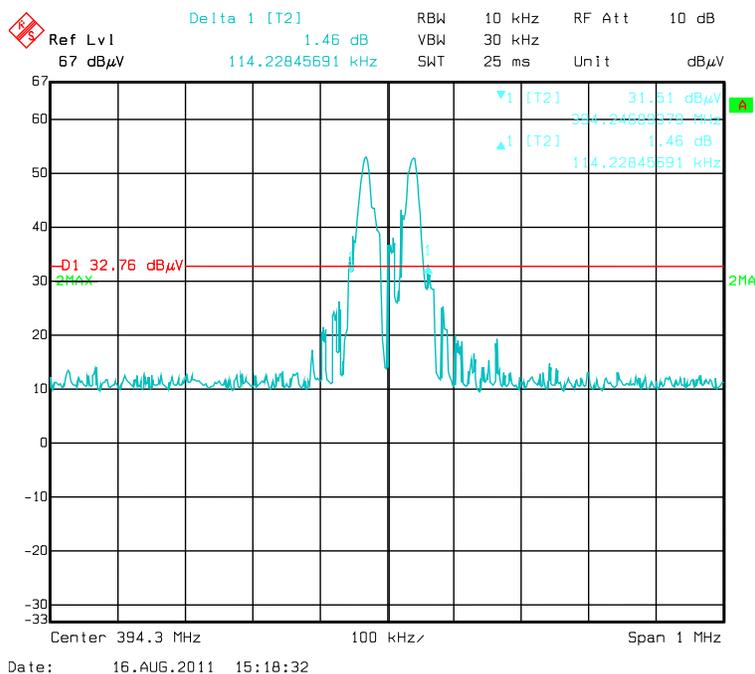
Low Frequency 369.5 MHz 20 dB bandwidth = 108 kHz
 99% bandwidth = 104 kHz



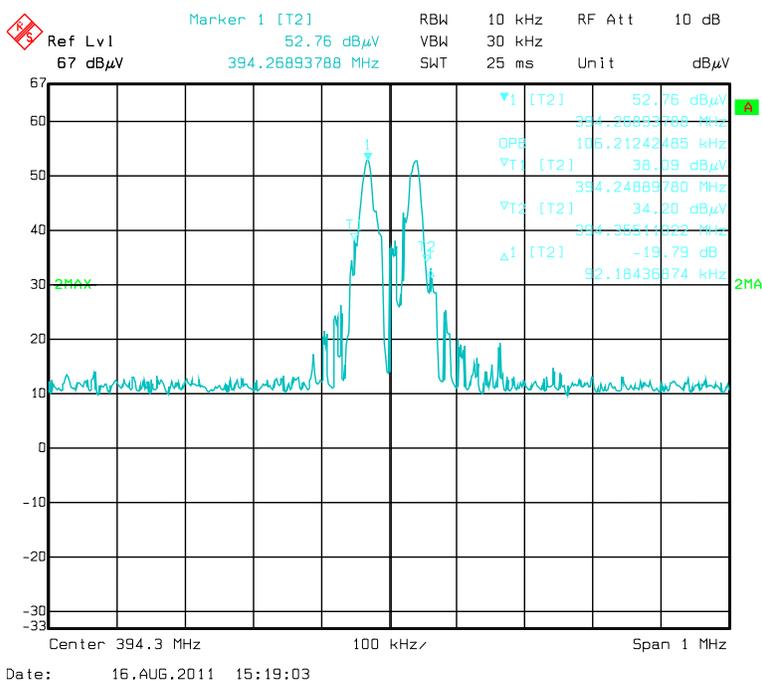


Mid Frequency 388.3 MHz 20 dB bandwidth = 116 kHz
 99% bandwidth = 108 kHz





High Frequency 394.3 MHz 20 dB bandwidth = 114 kHz
 99% bandwidth = 106 kHz





Frequency Stability

15.231(d) For devices operating within the frequency band 40.66–40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be $\pm 0.01\%$. This frequency tolerance shall be maintained for a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltages at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

RSS-210 A1.1.4 Carrier frequency stability of devices momentarily operated in the band 40.66-40.70 MHz shall be maintained to $\pm 0.01\%$ (± 100 ppm).

Test Conditions:

Client	SMK Manufacturing, Inc	Temperature	22	°C
Pan #	182836	Relative Humidity	50	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15C	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.231 Transmit	Date of test	August 16, 2011	

Test Results:

The EUT does not transmit within the 40.66—40.70 MHz band, therefore this test is not applicable.





Types of Momentary Signals

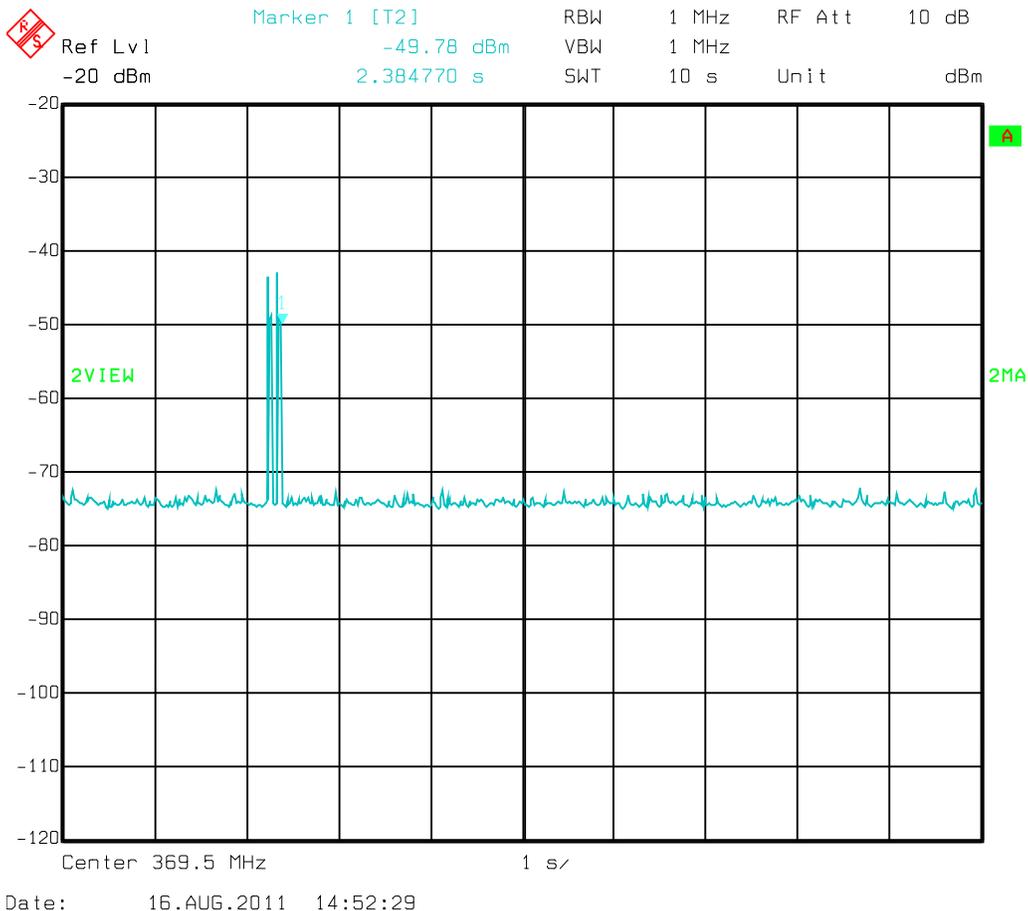
15.231 (a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

RSS210 Annex 1 A1.1.1(a) A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all transmission times. When released, the transmitter shall cease transmission (holdover time of up to 5 seconds is permitted).

Client	SMK Manufacturing, Inc	Temperature	22	°C
Pan #	182836	Relative Humidity	50	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15C	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.231 Transmit	Date of test	August 16, 2011	

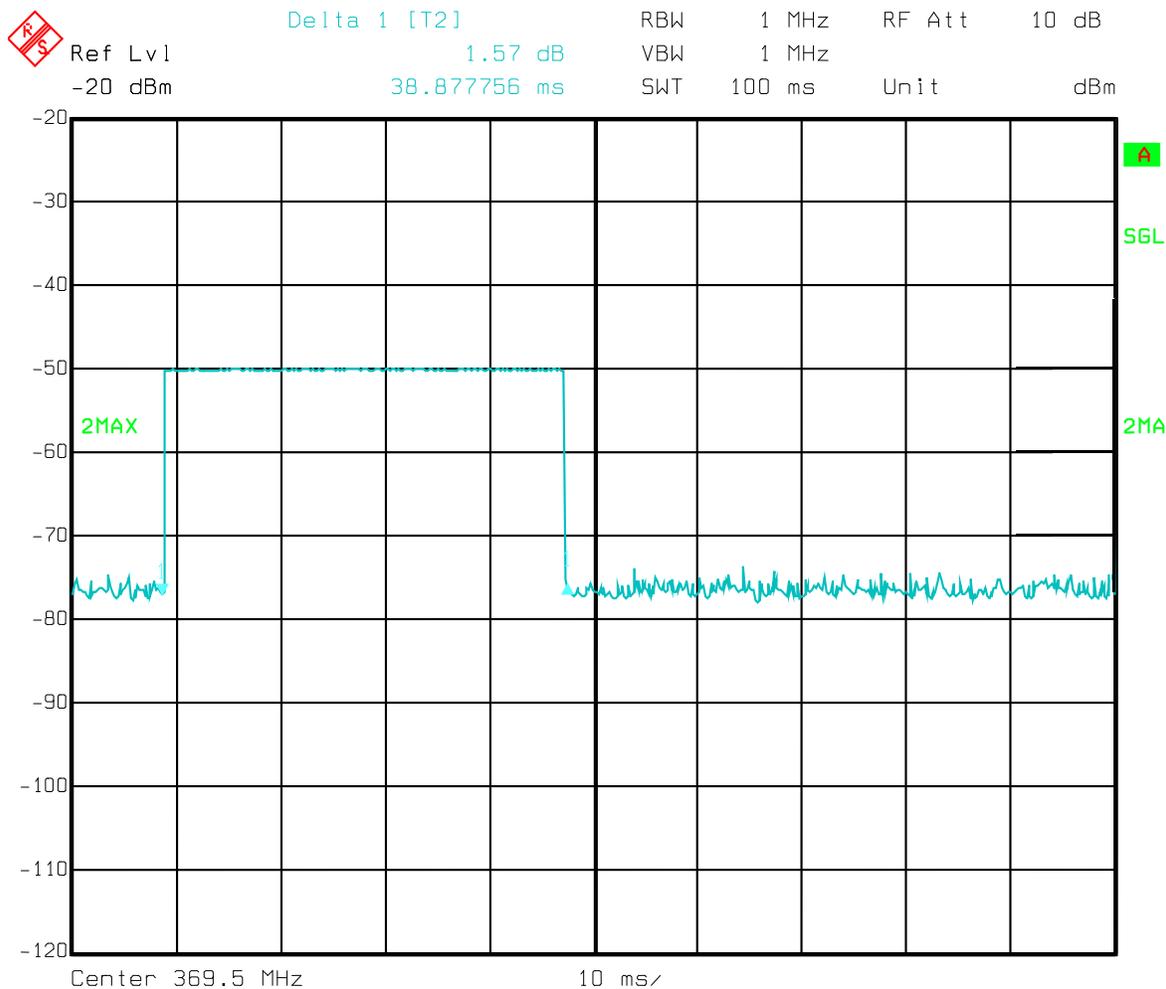
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This plot shows deactivation, the marker indicates when the transmit button was released.



Duty Cycle

This plot shows the on time in 100 ms.
Duty cycle factor = $20 \times \log(\text{on} / 100 \text{ ms}) = 20 \times \log(38.88 \text{ ms}/100\text{ms}) = -8.2 \text{ dB}$



Date: 16.AUG.2011 15:00:19



Permissible Field Strength Limits for Momentarily Operated Devices

15.231 (b) In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66–40.70	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹Linear interpolations.

RSS210 Annex 1: A1.1.

RSS GEN: 7.2.2 Emissions Falling Within Restricted Frequency Bands

Fundamental Frequency (MHz), excluding restricted band frequencies of RSS-Gen	Field Strength of the Fundamental ^(Note 1) (microvolts/m at 3 metres)	Field Strength of Unwanted Emissions ^(Note 1) (microvolts/m at 3 metres)
40.66-40.70	See Section A2.7	
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375
174-260 ^(Note 2)	3,750	375
260-470 ^(Note 2)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250



Client	SMK Manufacturing, Inc	Temperature	19	°C
Pan #	182836	Relative Humidity	40	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15C	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.231 Transmit	Date of test	June 1, 2011	

Test Results:

See Table. EUT complies for fundamental power and spurious emissions.

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic (3950 MHz).

These results apply to emissions that may be found in the restricted bands defined in FCC Part 15 Subpart C, 15.205.

The EUT was investigated with fresh batteries. The emissions were measured with a test mode to repeat the emissions so measurements could be maximized for the rotation of the sample and height and polarity of the measurement antenna.

All Measurements below 1GHz were performed at 3m employing a CISPR quasi-peak detector, except for the radio's fundamental. Peak measurements above 1GHz were done utilizing RBW of 1MHz and VBW of 3MHz.

Measurements made at the 3 meter Outside Area Test Site, all measurements max hold after peaking for EUT rotation and antenna height from 1 to 4 meters.

Fundamental power was measured at 1 MHz RBW, 3 MHz VBW to ensure capture of entire emissions envelope. Max Peak Hold used.

Average reading of Fundamental power therefore was peak + duty cycle factor.

No other emissions found within 20 dB of the limits.

As the module will be used in hand held remotes, field strength was investigated on all three axes and the strongest field strength reported.

At 369.5 MHz, Limit = 8312.5 uV/m or 78.4 dBuV/m Average

$$20 + 78.4 = 98.4 \text{ dBuV/m limit Peak}$$

Note: Corrected Reading Computations

Peak Result = Maximum Meter Reading + Antenna Factor + Path Loss

$$84.4 = 66.7 + 15.0 + 2.7; \text{ EUT passes Peak}$$

Average Measurement = Maximum Peak Meter Reading + Duty Cycle Factor

Average Result = Average Measurement + Antenna Factor + Path Loss

$$\text{Corrected Average Reading} = 66.7 - 8.2 \text{ DCF} = 58.5 \text{ dBuV/m}$$

$$58.5 + 15.0 + 2.7 = 76.2$$

$$10^{(76.2/20)} = 6456.5 \text{ uV/m; EUT passes Average}$$

FCC ID: QVEFSK4U
 IC: 3683B-FSK4U

Report Number: 2011 08182836 FCC
 Specification: FCC Part 15 Subpart C, 15.231
 RSS-210 Issue 8 December 2010
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Radiated Emissions Data

Job # :	10213104	Date :	6/1/2011	Page	1	of	1
NEX #:	182836	Time :	1300				
		Staff :	aal				
Client Name :	SMK Manufacturing Inc.			EUT Voltage :	6 AA bat		
EUT Name :	Remote			EUT Frequency :	dc		
EUT Model # :	186371			Phase:			
EUT Serial # :	NA			NOATS			
EUT Config. :	Repeating TX, FSK modulated			SOATS	X		
				Distance < 1000 MHz:	3 m		
				Distance > 1000 MHz:	3 m		
Specification :	CFR47 Part 15, Subpart B, Class B						
Loop Ant. #:	NA						
Bicon Ant. #:	115	10m	Temp. (°C) :	19			
Log Ant. #:	755	10m	Humidity (%) :	40			
DRG Ant. #	877		Spec An. #:	897			
Cable LF#:	SOATS		Spec An. Display #:	897			
Cable HF#:	SOATS		QP #:	897			
Preamp LF#:	NA		PreSelect#:	NA			
Preamp HF#	NA						

Peak	RBW: 1 MHz
Video Bandwidth 3 MHz	
Average = Peak - DCF	
DCF = 20 x Log(0.388) = -8.2 dB	

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
369.5	58.4	65.1	P	-	1.0	65.1	82.8	98.4	-15.6	Pass	back
369.5	54.5	66.7	P	-	1.0	66.7	84.4	98.4	-14.0	Pass	side
369.5	63.3	54.6	P	-	1.0	63.3	81.0	98.4	-17.4	Pass	upright
369.5	50.2	56.9	A	-	1.0	56.9	74.6	78.4	-3.8	Pass	back
369.5	46.3	58.5	A	-	1.0	58.5	76.2	78.4	-2.2	Pass	side
369.5	55.1	46.4	A	-	1.0	55.1	72.8	78.4	-5.6	Pass	upright
375.3	58.2	64.7	P	-	1.0	64.7	82.5	98.7	-16.2	Pass	back
375.3	60.0	66.5	P	-	1.0	66.5	84.3	98.7	-14.4	Pass	side
375.3	63.7	53.9	P	-	1.0	63.7	81.5	98.7	-17.2	Pass	upright
375.3	50.0	56.5	A	-	1.0	56.5	74.3	78.7	-4.4	Pass	back
375.3	51.8	58.3	A	-	1.0	58.3	76.1	78.7	-2.6	Pass	side
375.3	55.5	45.7	A	-	1.0	55.5	73.3	78.7	-5.4	Pass	upright
388.3	56.5	63.8	P	-	1.0	63.8	81.7	99.2	-17.5	Pass	back
388.3	58.0	65.1	P	-	1.0	65.1	83.0	99.2	-16.2	Pass	side
388.3	64.7	54.6	P	-	1.0	64.7	82.6	99.2	-16.6	Pass	upright
388.3	48.3	55.6	A	-	1.0	55.6	73.5	79.2	-5.7	Pass	back
388.3	49.8	56.9	A	-	1.0	56.9	74.8	79.2	-4.4	Pass	side
388.3	56.5	46.4	A	-	1.0	56.5	74.4	79.2	-4.8	Pass	upright
394.3	54.8	62.1	P	-	1.0	62.1	80.1	99.4	-19.3	Pass	back
394.3	57.3	64.0	P	-	1.0	64	82.0	99.4	-17.4	Pass	side
394.3	63.1	53.8	P	-	1.0	63.1	81.1	99.4	-18.3	Pass	upright
394.3	46.6	53.9	A	-	1.0	53.9	71.9	79.4	-7.5	Pass	back
394.3	49.1	55.8	A	-	1.0	55.8	73.8	79.4	-5.6	Pass	side
394.3	54.9	45.6	A	-	1.0	54.9	72.9	79.4	-6.5	Pass	upright



Conducted Emissions Test Data—Receive Mode

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

7.2.2 The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network. Except when the requirements applicable to a given device state otherwise, for any license-exempt radiocommunication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown below. The tighter limit applies at the frequency range boundaries. The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Client	SMK Manufacturing, Inc	Temperature	15	°C
Pan #	182836	Relative Humidity	38	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107 Class "B"	Date of test	December 17, 2010	
Test Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			

EUT does not have need for AC power as it is battery powered.





Radiated Emissions Test Data—Receive Mode

The following receiver spurious emission limits shall be complied with:

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Table 1 - Spurious Emission Limits for Receivers

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

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Client	SMK Manufacturing, Inc	Temperature	15	°C
Pan #	182836	Relative Humidity	38	%
EUT Name	FSK Remote			
EUT Model	186371	Test Location	SOATS	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107 Class "B"	Date of test	June 1, 2011	

EUT does not have a receive mode.
No emissions evident while in standby mode





APPENDIX B

B. Radiated Emissions Measurement Uncertainties

1. Introduction

ISO/IEC 17025:2005 and ANSI/NC SL Z540.3: 2006 require that all measurements contained in a test report be “traceable”. “Traceability” is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: “the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*”.

The purposes of this Appendix are to “state the *Measurement Uncertainties*” of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor

Radiated Emissions Measurement Detection Systems	Applicable Frequency Range	"U" for a k=2 Coverage Factor
Spectrum Analyzer with QPA & Pre-amplifier	30 MHz - 200 MHz	+3.9 dB, -4.0 dB
Spectrum Analyzer with QPA & Pre-amplifier	200 MHz-1000 MHz	+/- 3.5 dB
Spectrum Analyzer with Pre-amplifier	1 GHz - 18 GHz	+2.5 dB, -2.6 dB
Spectrum Analyzer with Pre-amplifier	18 GHz - 40 GHz	+/- 3.4 dB

NOTES:

1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT



3. Practical Explanation of the Meaning of Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- o *ANSI Z540.2 (2002) Guide to the Expression of Uncertainty in Measurement*
- o *NIS 81:1994, The Treatment of Uncertainty in EMC Measurements (NAMAS, 1994)*
- o *NIST Technical Note 1297(1994), Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results (NIST, 1994)*

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as an "expanded uncertainty", U , with a $k=2$ coverage factor. The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE: Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBuV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

APPENDIX C

C. Nemko USA, Inc. Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540.3: 2006, ISO 10012:2003, ISO/IEC 17025:2005, and ISO-9000: 2000. Nemko USA, Inc.'s calibrations program therefore meets or exceeds the US national commercial and military requirements [N.B. ANSI/NCSL Z540.1-1994 replaced MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Guide 25-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Guide 25-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceability to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(2003) or ANSI C63.5-2004, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Sub clause 16.6 and Annex G.2 of CISPR 16-1 (2003), and, ANSI C63.4-2003 when performing the normalized site attenuation measurements.

APPENDIX D

D. NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP[®]

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200116-0

Nemko USA, Inc. - San Diego EMC Division
San Diego, CA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2011-01-01 through 2011-12-31
Effective dates



Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

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