



**HID CORPORATION ADDENDUM  
TEST REPORT TO FC05-020**

**FOR THE**

**6055C MIFARE READER/WRITER**

**FCC PART 15 SUBPART C SECTIONS 15.207, 15.209, 15.225  
AND RSS-210**

**COMPLIANCE**

**DATE OF ISSUE: JULY 7, 2005**

**DRAFT**

**PREPARED FOR:**

HID Corporation  
9292 Jeronimo Road  
Irvine, CA 92718

P.O. No.: 10002832  
W.O. No.: 82742

**PREPARED BY:**

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CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Date of test: September 24, 2004 –  
April 15, 2005

**Report No.: FC05-020A**

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**ADMINISTRATIVE INFORMATION**

**DATE OF TEST:** September 24, 2004 – April 15, 2005

**DATE OF RECEIPT:** September 24, 2004

**MANUFACTURER:** HID Corporation  
9292 Jeronimo Road  
Irvine, CA 92718

**REPRESENTATIVE:** Frank de Vall

**TEST LOCATION:** CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

**TEST METHOD:** ANSI C63.4 (2001) and RSS-212

**PURPOSE OF TEST:** To demonstrate the compliance of the 6055C MiFare Reader/Writer with the requirements for FCC Part 15 Subpart C Sections 15.207, 15.209, 15.225 and RSS-210 devices.  
**Addendum A** is to corrected the frequency range in the conducted test conditions and to change the description of the test table used to match that in the test setup photos.

**FCC TO CANADA STANDARD CORRELATION MATRIX**

Canadian Standard	Canadian Section	FCC Standard	FCC Section	Test Description
RSS 210	5.5	47CFR	15.203	Antenna Connector Requirements
RSS 210	6.2.1	47CFR	15.209	General Radiated Emissions Requirement
RSS 210	6.2.2(e)	47CFR	15.225(a)*	Fundamental Requirements
RSS 210	6.3	47CFR	15.205	Restricted Bands of Operation
RSS 210	6.4	47CFR	15.215(c)	Frequency Stability Recommendation
RSS 210	6.6	47CFR	15.207	AC Mains Conducted Emissions Requirement
	IC 3082-D		784962	Site Filing No.

\* Indicates that FCC Requirements are more stringent than the Canadian Equivalent.

**CONDITIONS FOR COMPLIANCE**

No modifications to the EUT were necessary to comply.

**DRAFT**  
**APPROVALS**

Steve Behm, Director of Engineering Services

**QUALITY ASSURANCE:**

**TEST PERSONNEL:**



Joyce Walker, Quality Assurance Administrative Manager



Randy Clark, EMC Engineer



Mike Wilkinson, Lab Manager

**FCC 15.33(a) Frequency Ranges Tested**

15.207 Conducted Emissions: 150 kHz – 30 MHz

15.209 Radiated Emissions: 9 kHz – 1000 MHz

<b>FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE</b>			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

**FCC 15.203 Antenna Requirements**

The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

**FCC 15.205 Restricted Bands**

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

**Eut Operating Frequency**

The EUT was operating at 13.56 MHz.

**Temperature And Humidity During Testing**

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

### **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

### **EQUIPMENT UNDER TEST**

#### **MiFare Reader/Writer**

Manuf: HID  
Model: 6055C  
Serial: unit#7  
FCC ID: JQ66055BC

### **PERIPHERAL DEVICES**

The EUT was tested with the following peripheral device(s):

#### **DC Power Supply**

Manuf: Topward Electric Instruments Co., Ltd.  
Model: TPS-2000  
Serial: 920035  
FCC ID: NA

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## REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

**Table 1: FCC 15.207 Six Highest Conducted Emission Levels**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V	SPEC LIMIT dB $\mu$ V	MARGIN dB	NOTES
		Lisn dB	HPF dB	Cable dB					
0.156545	31.6	0.3	2.1	0.1		34.1	55.6	-21.5	B
0.204540	34.4	0.4	0.0	0.1		34.9	53.4	-18.5	W
0.215449	34.0	0.4	0.1	0.1		34.6	53.0	-18.4	W
0.270716	29.2	0.3	0.2	0.1		29.8	51.1	-21.3	W
13.558350	37.3	0.5	0.1	0.4		38.3	50.0	-11.7	W
13.561370	38.3	0.4	0.1	0.4		39.2	50.0	-10.8	B

Test Method: ANSI C63.4 (2001)  
Spec Limit: FCC Part 15 Subpart C Section 15.207

NOTES:

B = Black Lead  
W = White Lead

COMMENTS: EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: 150 kHz - 300 MHz. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Table 2: FCC 15.209 Six Highest Radiated Emission Levels: 30-1000 MHz**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN DB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
40.667	38.3	12.0	-27.3	1.4	10.0	34.4	40.0	-5.6	V
298.346	36.9	12.8	-26.5	4.1	10.0	37.3	46.0	-8.7	V
298.350	35.4	12.8	-26.5	4.1	10.0	35.8	46.0	-10.2	H
325.464	36.8	13.5	-26.7	4.3	10.0	37.9	46.0	-8.1	V
352.586	34.5	14.3	-26.8	4.5	10.0	36.5	46.0	-9.5	V
379.731	32.7	14.9	-27.0	4.9	10.0	35.5	46.0	-10.5	V

Test Method: ANSI C63.4 (2001)  
 Spec Limit: FCC Part 15 Subpart C Section 15.209  
 Test Distance: 10 Meters

NOTES:

H = Horizontal Polarization  
 V = Vertical Polarization

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COMMENTS: EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Test distance correction factor used in accordance with 15.31 of 20 dB per decade to correct test data for comparison to the limit at 3 meters. Frequency Range Investigated: 30 - 1000 MHz. Temperature: 16°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.



**Table 3: FCC 15.225 Fundamental Emission Levels**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN DB	NOTES
		Ant dB	Corr dB	Cable dB					
13.562	44.8	8.4	-20.0	0.8		34.0	84.0	-50.0	H
13.562	42.2	8.4	-20.0	0.8		31.4	84.0	-52.6	V

Test Method: ANSI C63.4 (2001)  
 Spec Limit: FCC Part 15 Subpart C Section 15.225  
 Test Distance: 10 Meters

NOTES: H = Horizontal Polarization  
 V = Vertical Polarization

COMMENTS: EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: Fundamental 13.56 MHz. Test distance correction factor used, 40dB per decade to correct test data for comparison to the applicable limit. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Table 4: FCC 15.225 Six Highest Radiated Emission Levels: 9 kHz - 30 MHz**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN DB	NOTES
		Ant dB	Corr dB	Cable dB					
13.553	10.7	8.4	-20.0	0.8		-0.1	50.5	-50.6	H
13.553	7.0	8.4	-20.0	0.8		-3.8	50.5	-54.3	V
13.568	6.9	8.4	-20.0	0.8		-3.9	50.5	-54.4	V
13.572	8.4	8.4	-20.0	0.8		-2.4	50.5	-52.9	H
27.123	14.1	4.9	-20.0	1.1		0.1	29.5	-29.4	H
27.125	6.2	4.9	-20.0	1.1		-7.8	29.5	-37.3	V

Test Method: ANSI C63.4 (2001)

Spec Limit: FCC Part 15 Subpart C Sections 15.225

Test Distance: 10 Meters

NOTES:

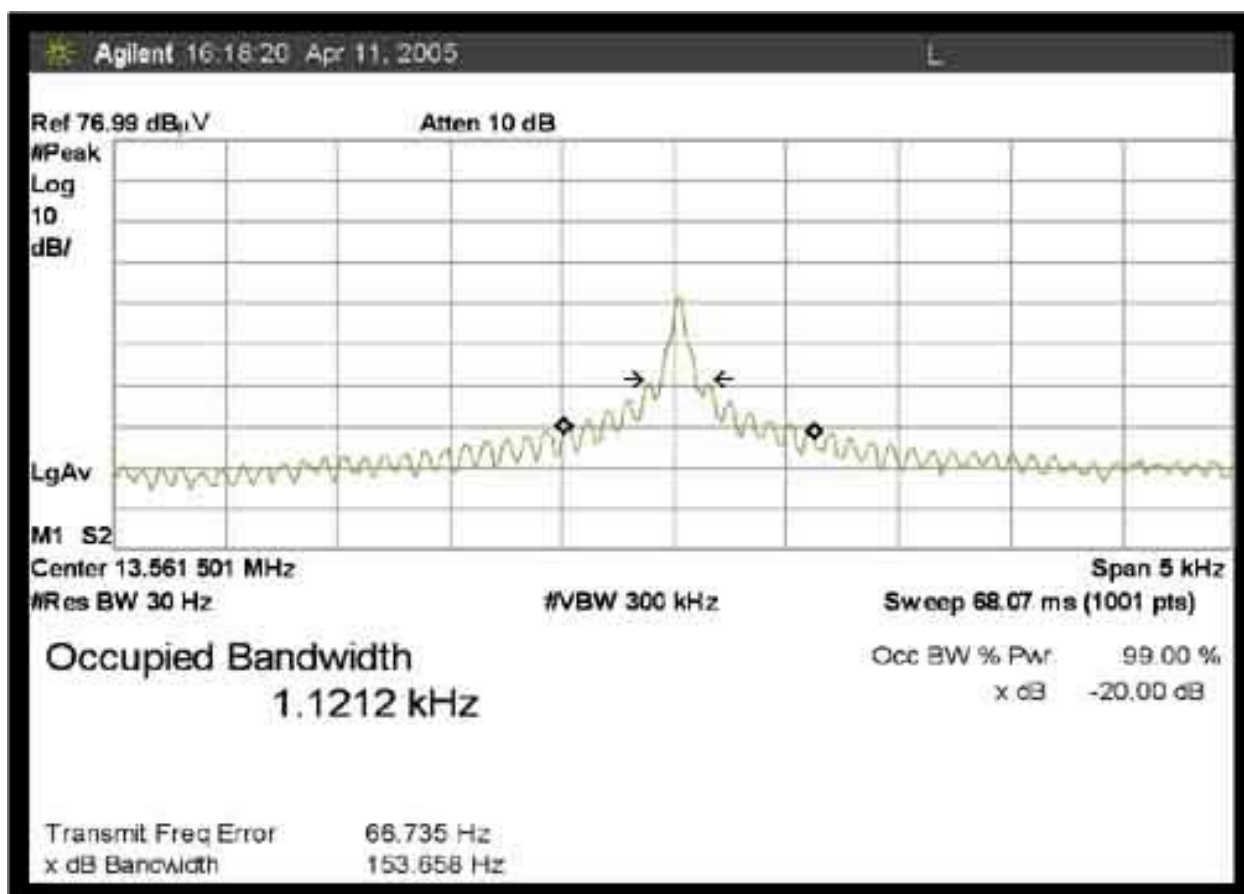
H = Horizontal Polarization

V = Vertical Polarization

COMMENTS: EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Test distance correction factor used in accordance with 15.31, 40dB per decade to correct test data for comparison to the applicable limit. Frequency Range Investigated: Fundamental 9 kHz to 30 MHz. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

### FCC 15.225/RSS-210 OCCUPIED BANDWIDTH PLOT

**Test Conditions:** EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: Fundamental 13.56 MHz. Unit Serial Number: 7, PCB Version: 5.



### FCC 15.225 FREQUENCY STABILITY

**Test Conditions:** EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12V DC power is supplied via support power supply. RF Tag is present in the field for testing. EUT and Loop Antenna were placed inside a Temp chamber during all testing. The DC Power Supply was remote.

**Customer:** HID  
**WO#:** 83742  
**Test Engineer:** Mike Wilkinson

**Device Model #:** 6055C  
**Operating Voltage:** 12 VDC  
**Frequency Limit:** 0.01 %

#### Temperature Variations

		Channel 1 (MHz, Dev. (MHz))	
Channel Frequency:		13.56156	
Temp (C)	Voltage		
-30	12		
-20	12	13.56164	0.00008
-10	12	13.56165	0.00009
0	12	13.56164	0.00008
10	12	13.56162	0.00006
20	12	13.56156	0.00000
30	12	13.56155	0.00001
40	12	13.56137	0.00019
50	12	13.56149	0.00008

#### Voltage Variations ( $\pm 15\%$ )

20	10.2	13.56154	0.00002
20	12	13.56156	0.00000
20	13.8	13.56154	0.00002

<b>Max Deviation (MHz)</b>	<b>0.00019</b>
<b>Max Deviation (%)</b>	<b>0.00140</b>
<b>PASS</b>	

## EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated and conducted emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

## CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB $\mu$ V/m, the spectrum analyzer reading in dB $\mu$ V was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dB $\mu$ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB $\mu$ V/m)

## TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. For frequencies from 30 to 1000 MHz, the biconilog antenna was used. The horn antenna was used for frequencies above 1000 MHz. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB $\mu$ V, and a vertical scale of 10 dB per division.

## SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

### Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

### Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

### Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

## **EUT TESTING**

### **Mains Conducted Emissions**

During conducted emissions testing, the EUT was located on a nonconductive table measuring approximately 80 cm high, 46cm deep, and 60 cm in length. One wall of the room where the EUT was located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50  $\mu$ H/+50 ohms. Above 150 kHz, a 0.15  $\mu$ F series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

### **Radiated Emissions**

The EUT was mounted on a nonconductive, rotating table approximately 80 cm high, 46cm deep, and 60 cm in length

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable and raising and lowering the antenna from one to four meters as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

**APPENDIX A**  
**TEST SETUP PHOTOGRAPHS**

**DRAFT**



**PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS**



Mains Conducted Emissions - Front View

**PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS**



Mains Conducted Emissions - Side View

**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Radiated Emissions - Front View

**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Radiated Emissions - Back View

**PHOTOGRAPH SHOWING TEMPERATURE TESTING**



## APPENDIX B

### TEST EQUIPMENT LIST

#### 15.207

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN's set-AF Solar 8028-50-TS-24-BNC 814493	474	06/29/2003	06/29/2005	02056
Filter, High Pass-AF HE9615-150K-50-720B	G7753	04/20/2004	04/20/2006	02609
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660

#### 15.209

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8447D Preamp	1937A02604	03/11/2005	03/11/2007	00099
Chase CBL6111C Bilog	2456	06/26/2003	06/26/2005	01991
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660

#### 15.225 and Occupied Bandwidth

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660
EMCO Loop Antenna	1074	05/21/2003	05/21/2005	00226

#### Frequency Stability

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer HP 4446A	US44300407	01/12/2005	01/12/2007	2660
Antenna, Loop EMCO 6502	1074	05/21/2003	05/20/2005	226
Temp Chamber Thermotron S-1.2 MiniMax	11899	01/24/2005	01/24/2007	1879
Thermometer Omega HH-26K	T-202884	08/15/2003	08/14/2005	2242

**APPENDIX C:  
MEASUREMENT DATA SHEETS**

**DRAFT**

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **HID**  
 Specification: **FCC 15.207 - AVE**  
 Work Order #: **82742**  
 Test Type: **Conducted Emissions**  
 Equipment: **MiFare Reader/Writer**  
 Manufacturer: **HID**  
 Model: **6055C**  
 S/N: **unit#7**

Date: 04/11/2005  
 Time: 12:44:57  
 Sequence#: 53  
 Tested By: Mike Wilkinson  
 120V 60Hz

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
MiFare Reader/Writer*	HID	6055C	unit#7

**Support Devices:**

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments Co., Ltd.	TPS-2000	920035

**Test Conditions / Notes:**

EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: 150 kHz - 300 MHz. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Transducer Legend:**

T1=Cable - Internal + cab	T2=LISN Insertion Loss s/n280
T3=HP Filter AN02608	

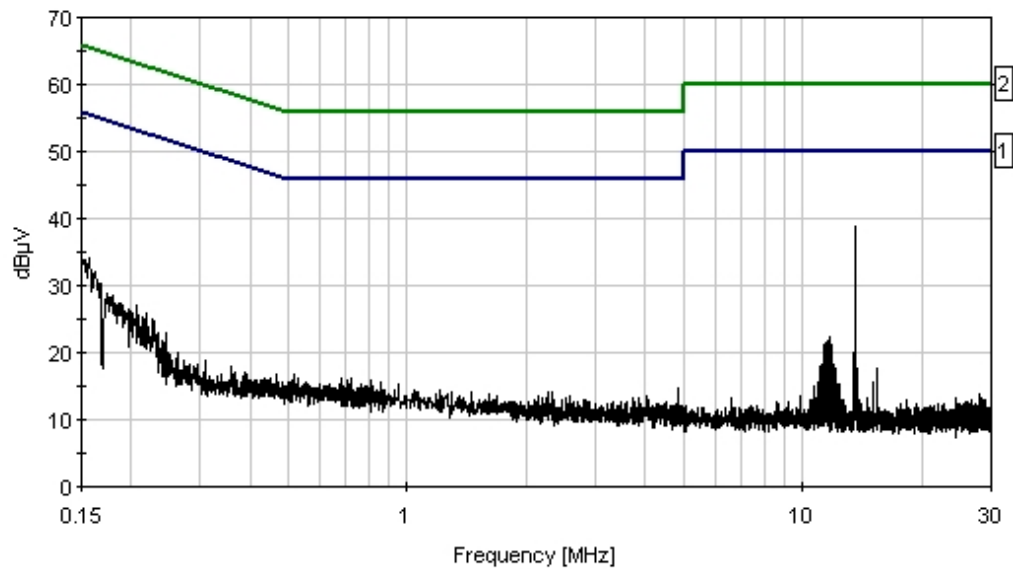
**Measurement Data:** Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	Dist dB	Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	13.561M	38.3	+0.4	+0.4	+0.1	+0.0		39.2	50.0	-10.8	Black
2	156.545k	31.6	+0.1	+0.3	+2.1	+0.0		34.1	55.6	-21.5	Black
3	162.363k	30.1	+0.1	+0.3	+1.6	+0.0		32.1	55.3	-23.2	Black
4	174.725k	28.0	+0.1	+0.3	+0.5	+0.0		28.9	54.7	-25.8	Black
5	207.449k	26.6	+0.1	+0.3	+0.1	+0.0		27.1	53.3	-26.2	Black
6	218.357k	25.5	+0.1	+0.3	+0.1	+0.0		26.0	52.9	-26.9	Black
7	226.357k	24.5	+0.1	+0.3	+0.2	+0.0		25.1	52.6	-27.5	Black
8	229.993k	24.2	+0.1	+0.3	+0.2	+0.0		24.8	52.4	-27.6	Black
9	11.717M	21.5	+0.4	+0.4	+0.1	+0.0		22.4	50.0	-27.6	Black
10	213.994k	24.7	+0.1	+0.3	+0.1	+0.0		25.2	53.0	-27.8	Black



11	11.636M	20.9	+0.3	+0.4	+0.1	+0.0	21.7	50.0	-28.3	Black
12	11.466M	20.7	+0.3	+0.4	+0.1	+0.0	21.5	50.0	-28.5	Black
13	11.807M	20.4	+0.4	+0.4	+0.1	+0.0	21.3	50.0	-28.7	Black
14	11.346M	20.4	+0.3	+0.4	+0.1	+0.0	21.2	50.0	-28.8	Black
15	11.516M	20.4	+0.3	+0.4	+0.1	+0.0	21.2	50.0	-28.8	Black

CKC Laboratories Date: 04/11/2005 Time: 12:44:57 HID WO#: 82742  
 FCC 15.207 - AVE Test Lead: Black 120V 60Hz Sequence#: 53  
 HID MN 6055C



— Sweep Data      — 1 - FCC 15.207 - AVE      — 2 - FCC 15.207 - QP

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **HID**  
 Specification: **FCC 15.207 - AVE**  
 Work Order #: **82742**  
 Test Type: **Conducted Emissions**  
 Equipment: **MiFare Reader/Writer**  
 Manufacturer: **HID**  
 Model: **6055C**  
 S/N: **unit#7**

Date: 04/11/2005  
 Time: 2:08:51 PM  
 Sequence#: 54  
 Tested By: Mike Wilkinson  
 120V 60Hz

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
MiFare Reader/Writer*	HID	6055C	unit#7

**Support Devices:**

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments Co., Ltd.	TPS-2000	920035

**Test Conditions / Notes:**

EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: 150 kHz - 300 MHz. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Transducer Legend:**

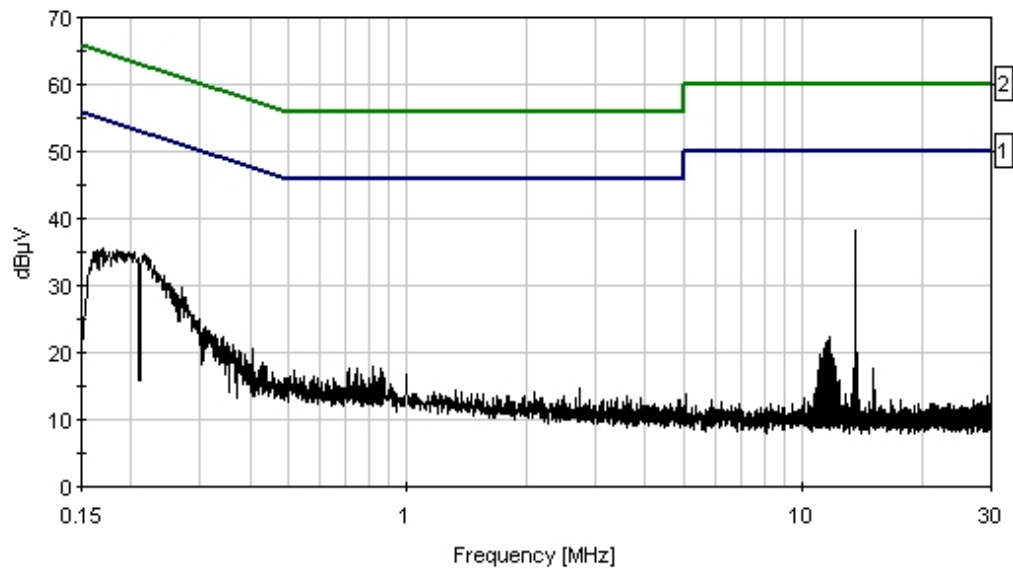
T1=Cable - Internal + cab	T2=LISN Insertion Loss s/n276
T3=HP Filter AN02608	

**Measurement Data:** Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	Dist Table dB	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	13.558M	37.3	+0.4	+0.5	+0.1	+0.0	38.3	50.0	-11.7	White
2	215.449k	34.0	+0.1	+0.4	+0.1	+0.0	34.6	53.0	-18.4	White
3	204.541k	34.4	+0.1	+0.4	+0.0	+0.0	34.9	53.4	-18.5	White
4	270.716k	29.2	+0.1	+0.3	+0.2	+0.0	29.8	51.1	-21.3	White
5	307.804k	23.2	+0.1	+0.3	+0.2	+0.0	23.8	50.0	-26.2	White
6	304.168k	23.0	+0.1	+0.3	+0.2	+0.0	23.6	50.1	-26.5	White
7	341.982k	21.8	+0.1	+0.3	+0.1	+0.0	22.3	49.2	-26.9	White
8	404.522k	20.0	+0.1	+0.4	+0.1	+0.0	20.6	47.8	-27.2	White
9	350.709k	20.9	+0.1	+0.4	+0.1	+0.0	21.5	48.9	-27.4	White
10	360.890k	20.6	+0.1	+0.4	+0.1	+0.0	21.2	48.7	-27.5	White

11	11.717M	21.4	+0.4	+0.5	+0.1	+0.0	22.4	50.0	-27.6	White
12	819.757k	17.4	+0.1	+0.2	+0.3	+0.0	18.0	46.0	-28.0	White
13	376.888k	19.6	+0.1	+0.4	+0.1	+0.0	20.2	48.3	-28.1	White
14	11.516M	21.0	+0.3	+0.5	+0.1	+0.0	21.9	50.0	-28.1	White
15	346.346k	20.3	+0.1	+0.3	+0.1	+0.0	20.8	49.0	-28.2	White

CKC Laboratories Date: 04/11/2005 Time: 2:08:51 PM HID WVO#: 82742  
 FCC 15.207 - AVE Test Lead: White 120V 60Hz Sequence#: 54  
 HID M/N 6055C



— Sweep Data      — 1 - FCC 15.207 - AVE      — 2 - FCC 15.207 - QP

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **HID**  
 Specification: **FCC 15.209**  
 Work Order #: **82742** Date: 04/11/2005  
 Test Type: **Maximized Emissions** Time: 12:07:25  
 Equipment: **MiFare Reader/Writer** Sequence#: 52  
 Manufacturer: **HID** Tested By: Mike Wilkinson  
 Model: 6055C  
 S/N: unit#7

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
MiFare Reader/Writer*	HID	6055C	unit#7

**Support Devices:**

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments Co., Ltd.	TPS-2000	920035

**Test Conditions / Notes:**

EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Test distance correction factor used in accordance with 15.31 of 20 dB per decade to correct test data for comparison to the limit at 3 meters. Frequency Range Investigated: 30 - 1000 MHz. Temperature: 16°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Transducer Legend:**

T1=Amp - S/N 604	T2=Bilog Site B
T3=Cable - 10 Meter	

**Measurement Data:**

Reading listed by margin.

Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	Dist dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	40.667M	38.3	-27.3	+12.0	+1.4	+10.0	34.4	40.0	-5.6	Verti 100
2	325.464M	36.8	-26.7	+13.5	+4.3	+10.0 150	37.9	46.0	-8.1	Verti 99
3	298.346M	36.9	-26.5	+12.8	+4.1	+10.0 141	37.3	46.0	-8.7	Verti 106
4	352.586M	34.5	-26.8	+14.3	+4.5	+10.0 141	36.5	46.0	-9.5	Verti 99
5	298.350M	35.4	-26.5	+12.8	+4.1	+10.0 180	35.8	46.0	-10.2	Horiz 279
6	379.731M	32.7	-27.0	+14.9	+4.9	+10.0 141	35.5	46.0	-10.5	Verti 99
7	244.106M	35.9	-26.5	+11.6	+3.6	+10.0 59	34.6	46.0	-11.4	Verti 99
8	406.826M	30.9	-27.2	+15.6	+5.1	+10.0 150	34.4	46.0	-11.6	Verti 99
9	325.476M	33.1	-26.7	+13.5	+4.3	+10.0 180	34.2	46.0	-11.8	Horiz 279

10	108.499M	35.7	-27.2	+10.1	+2.4	+10.0	31.0	43.5	-12.5	Verti
						89				99
11	81.381M	35.7	-27.2	+6.9	+2.0	+10.0	27.4	40.0	-12.6	Verti
						131				100
12	244.112M	34.7	-26.5	+11.6	+3.6	+10.0	33.4	46.0	-12.6	Horiz
						188				401
13	352.607M	30.5	-26.8	+14.3	+4.5	+10.0	32.5	46.0	-13.5	Horiz
						180				279
14	54.227M	34.1	-27.3	+7.3	+1.6	+10.0	25.7	40.0	-14.3	Verti
						98				100
15	271.221M	31.7	-26.5	+12.4	+3.8	+10.0	31.4	46.0	-14.6	Verti
						206				100
16	216.992M	34.9	-26.6	+9.7	+3.4	+10.0	31.4	46.0	-14.6	Horiz
						188				350
17	284.776M	31.2	-26.5	+12.6	+3.9	+10.0	31.2	46.0	-14.8	Verti
						205				100
18	257.670M	31.3	-26.5	+12.1	+3.7	+10.0	30.6	46.0	-15.4	Horiz
						188				401
19	271.230M	30.4	-26.5	+12.4	+3.8	+10.0	30.1	46.0	-15.9	Horiz
						188				401
20	162.736M	27.6	-26.9	+9.8	+2.9	+10.0	23.4	43.5	-20.1	Verti
						205				100
21	216.981M	28.4	-26.6	+9.7	+3.4	+10.0	24.9	46.0	-21.1	Verti
						241				100

**DRAFT**

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **HID**  
 Specification: **FCC 15.225(a)**  
 Work Order #: **82742**  
 Test Type: **Maximized Emissions**  
 Equipment: **MiFare Reader/Writer**  
 Manufacturer: **HID**  
 Model: **6055C**  
 S/N: **unit#7**

Date: 04/11/2005  
 Time: 15:57:09  
 Sequence#: 57  
 Tested By: Mike Wilkinson

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
MiFare Reader/Writer*	HID	6055C	unit#7

**Support Devices:**

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments Co., Ltd.	TPS-2000	920035

**Test Conditions / Notes:**

EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Frequency Range Investigated: Fundamental 13.56 MHz. Test distance correction factor used, 40dB per decade to correct test data for comparison to the applicable limit. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.

**Transducer Legend:**

T1=15.31 10m 40dB/Dec Correction	T2=Mag Loop - Site B - AN 00226 - 9kHz-30M
T3=Cable - 10 Meter	

**Measurement Data:** Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	13.562M	44.8	-20.0	+8.4	+0.8	+0.0	34.0	84.0	-50.0	Horiz
2	13.562M	42.2	-20.0	+8.4	+0.8	+0.0	31.4	84.0	-52.6	Vert

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **HID**  
 Specification: **FCC 15.225(a)**  
 Work Order #: **82742**  
 Test Type: **Maximized Emissions**  
 Equipment: **MiFare Reader/Writer**  
 Manufacturer: **HID**  
 Model: **6055C**  
 S/N: **unit#7**

Date: 04/12/2005  
 Time: 10:26:27  
 Sequence#: 58  
 Tested By: Mike Wilkinson

**Equipment Under Test (\* = EUT):**

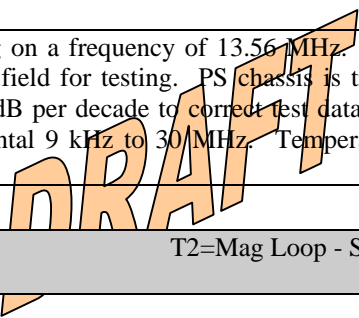
Function	Manufacturer	Model #	S/N
MiFare Reader/Writer*	HID	6055C	unit#7

**Support Devices:**

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments Co., Ltd.	TPS-2000	920035

**Test Conditions / Notes:**

EUT is a Mifare Reader/Writer operating on a frequency of 13.56 MHz. 12VDC power is supplied via support power supply. RF Tag is present in the field for testing. PS chassis is tied to ground. Test distance correction factor used in accordance with 15.31, 40dB per decade to correct test data for comparison to the applicable limit Frequency Range Investigated: Fundamental 9 kHz to 30 MHz. Temperature: 20°C, Relative Humidity: 41%. Unit Serial Number: 7, PCB Version: 5.



**Transducer Legend:**

T1=15.31 10m 40dB/Dec Correction	T2=Mag Loop - Site B - AN 00226 - 9kHz-30M
T3=Cable - 10 Meter	

**Measurement Data:** Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	Dist Table dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	27.123M	14.1	-20.0	+4.9	+1.1	+0.0	0.1	29.5	-29.4	Horiz
2	27.125M	6.2	-20.0	+4.9	+1.1	+0.0	-7.8	29.5	-37.3	Vert
3	13.553M	10.7	-20.0	+8.4	+0.8	+0.0	-0.1	50.5	-50.6	Horiz
4	13.572M	8.4	-20.0	+8.4	+0.8	+0.0	-2.4	50.5	-52.9	Horiz
5	13.553M	7.0	-20.0	+8.4	+0.8	+0.0	-3.8	50.5	-54.3	Vert
6	13.568M	6.9	-20.0	+8.4	+0.8	+0.0	-3.9	50.5	-54.4	Vert