

# Intentional Radiator Test Report

Test Standards:  
FCC Part 15.225 (Subpart C – Intentional Radiators)  
Industry Canada RSS-210, Issue 8

Prepared For:  
Identiv, Inc.  
1900B Carnegie Ave,  
Santa Ana, CA 92705  
USA

Product Name :  
uTrust TS Scramblepad SC

Model Name :  
8336

Application Purpose : Original

Prepared by:

EMCE Engineering, Inc.  
1726 Ringwood Avenue  
San Jose, CA 95117 USA



ACCREDITED BY THE NATIONAL VOLUNTARY LABORATORY  
ACCREDITATION PROGRAM FOR THE SPECIFIC SCOPE  
OF ACCREDITATION UNDER LAB CODE #: 200092-0

Note:

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## Revision History

Rev.	Issue Date	Description
0	01/31/18	Initial Issue

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## 1.0 GENERAL INFORMATION

Test Laboratory:	EMCE Engineering 1726 Ringwood Avenue San Jose, CA 95131 USA Tel: 510-490-4307, Fax: 510-490-3441 bob@universalcompliance.com
	NVLAP Testing Lab Code: 200092-0
	Test Site : FCC : US5291, IC : 3324A
Applicant Name :	Identiv, Inc. 1900B Carnegie Ave Santa Ana, CA 92705 Tel: 510-933-3300 Contact Person: Calai Bhoopathi
Application Purpose :	Original
EUT Description	RFID SmartCard Reader
Product Name	uTrust TS-Scramblepad SC
Model Name :	8336
Applied Standards :	47 CFR §15.207, 15.209, 15.225: 2010 & Canadian Standards RSS-GEN Issue 4, RSS-210 Issue 8
FCC ID :	FCC ID: MBPTSSPSC-02
IC :	IC: 7485A-TSSPSCR2
RF Operating Frequency (ies)	13.56MHz, 125 kHz
Modulation	ASK
Emission Designator	10K5K1D
Receipt of EUT :	01/05/15
Date of Testing :	01/07/15 – 01/15/18
Date of Report :	01/27/18

The tests listed in this report have been completed to demonstrated compliance to the CFR 47 Section 15.225, as well as Industry Canada Radio Standard RSS-210, Issue 8.

Contents approved:


Name: Bob Cole Title: President

## 2.0 EUT AND ACCESSORY INFORMATION

EUT				
<i>Model name:</i>	8336			
<i>Description:</i>	RFID Smartcard Reader - uTrust TS-Scramblepad SC			
<i>Manufacturer:</i>	Identiv, Inc.			
Support Equipment				
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>	<i>Power Cable Description</i>
<i>Netbook PC</i>	<i>Acer Aspire</i>	<i>NUSH6AA0012410 25337600</i>	<i>Acer</i>	<i>Unshielded / 1.5 Meter</i>
Cable Description				
<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite Loaded (Y/N)</i>
<i>EUT</i>	<i>Netbook</i>	<i>0.5</i>	<i>Y</i>	<i>N</i>

### 3.0 SUMMARY OF TEST RESULTS

Test Standard		Description	Pass / Fail
47 CFR Part 15.225: 2010	RSS 210 Issue 8		
15.203		Antenna Requirement	Pass
15.207(a)	RSS Gen(7.2.2)	Conducted Emissions Voltage	Pass
15.225(a)	RSS210(A2.6)	Limit in the band of 13.553 – 13.567 MHz	Pass
15.225(b)	RSS210(A2.6)	Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	Pass
15.225(c)	RSS210(A2.6)	Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	Pass
15.225(d), 15.209	RSS210(A2.6)	Limit outside the band of 13.110 – 14.010 MHz	Pass
15.225(e)	RSS210(A2.6)	Frequency Stability	Pass
	RSS-210(5.9.1)	Occupied Bandwidth	Pass
ANSI C63.4: 2013/ RSS-Gen Issue 4			
PS: All measurement uncertainties are not taken into consideration for all presented test result.			

**PASS**      The EUT passed that particular test.  
**FAIL**      The EUT failed that particular test.  
**008**        Not Applicable due to product type.

## 4.0 MODIFICATIONS

There were no modifications installed by EMCE Engineering.

Any modifications installed previous to testing by the Manufacturer will be incorporated in each production model sold or leased.

## 5.0 TEST RESULTS

### 5.1 Antenna Requirement

**Requirement(s):** 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
  - b) Antenna must use a unique type of connector to attach to the device.
  - c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.
- 
- 1) The RFID antenna is integral to the main board permanently to the device which meets the requirement (See Internal Photographs submitted as another Exhibit).



## 5.2 Conducted Emissions Voltage

**Requirement(s):** 47 CFR §15.207

Requirement:

Frequency of emission (MHz)	Conducted limit (dBµV)	
	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.

### Procedures:

- All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
- "Ave" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of measurement at a confidence level of approximately 95% (in the case where distributions normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) ±3.5dB.
- Environmental Conditions
 

Temperature	67°F
Relative Humidity	37.4%
Atmospheric Pressure	1010mbar

Test Date : 1/12/2018

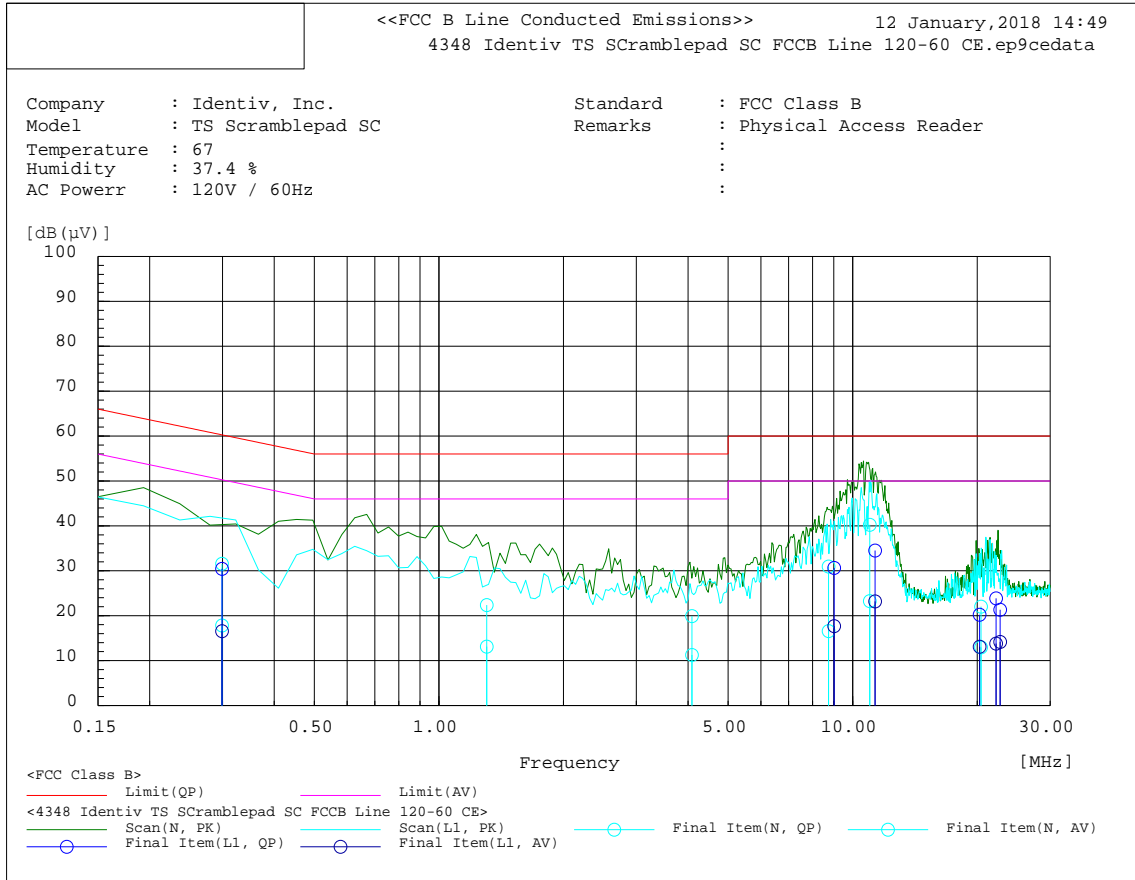
Tested By : Bob Cole

**Results:** Pass

FCC Part 15.207 Line Conducted Emissions  
120V / 60 Hz - Line

150kHz – 30 MHz

Frequency MHz	Line	Reading		Factor dB	Level		Limit		Margin		Pass/Fail
		dB(μV)			dB(μV)		dB(μV)		dB		
		QP	AV		QP	AV	QP	AV	QP	AV	
11.324	L1	23.90	12.60	10.60	34.50	23.20	60.00	50.00	25.50	26.80	Pass
0.299	L1	20.40	6.60	10.00	30.40	16.60	60.30	50.30	29.90	33.70	Pass
9.020	L1	20.10	7.20	10.50	30.60	17.70	60.00	50.00	29.40	32.30	Pass
20.260	L1	9.50	2.40	10.70	20.20	13.10	60.00	50.00	39.80	36.90	Pass
22.711	L1	10.50	3.30	10.80	21.30	14.10	60.00	50.00	38.70	35.90	Pass
22.213	L1	13.10	3.00	10.80	23.90	13.80	60.00	50.00	36.10	36.20	Pass
10.993	N	29.70	12.70	10.50	40.20	23.20	60.00	50.00	19.80	26.80	Pass
0.299	N	21.60	7.80	10.00	31.60	17.80	60.30	50.30	28.70	32.50	Pass
8.740	N	20.40	6.10	10.50	30.90	16.60	60.00	50.00	29.10	33.40	Pass
1.305	N	12.30	3.00	10.10	22.40	13.10	56.00	46.00	33.60	32.90	Pass
20.424	N	11.30	2.30	10.70	22.00	13.00	60.00	50.00	38.00	37.00	Pass
4.088	N	9.60	0.90	10.30	19.90	11.20	56.00	46.00	36.10	34.80	Pass



### 5.3 Radiated Emission < 30MHz (9kHz - 30MHz, H-Field)

**Requirement(s):** 47 CFR §15.225 & RSS-210 (A2.6) & RSS-310 (3.7)

**Procedures:** For < 30MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the centre of the loop. The measuring bandwidth was set to 10 kHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT.)

The limit is converted from microvolt/meter to decibel microvolt/meter.

**Sample Calculation:** Corrected Amplitude = Raw Amplitude (dBµV/m) + ACF (dB) + Cable Loss (dB) – Distance Correction Factor

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, is +/-6dB.
4. Environmental Conditions  
Temperature 24°C  
Relative Humidity 45%  
Atmospheric Pressure 1010mbar

Test Date : 1/8/2015

Tested By : Bob Cole

**Results:** Pass

## FCC Part 15.209 Radiated Emissions 9 kHz – 30 MHz

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 •

Customer:	<b>Identiv</b>	Date:	1/7/2015
Specification:	<b>15.209 9k-30M FCC Limits II</b>	Time:	10:21:45 AM
Work Order #:	<b>4096</b>	Sequence#:	1
Test Type:	<b>Radiated Scan</b>	Tested By:	Bob Cole
Equipment:	uTrust TS Scramblepad SC		
Manufacturer:	Identiv		
Model:	8330		
S/N:	N/A		

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

Function	Manufacturer	Model #	S/N
RFID Smartcard Reader	Identiv	8330	N/A

**Support Devices:**

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E6320	8BZPYN1
Power Over Ethernet	TP-Link	TL-POE150S Ver 3.0	2144545000690

**Test Conditions / Notes:**

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**Transducer Legend:**

T1=8447 Pre-Amp Asset 377	T2=25' LMR #001
T3=LP-105 Loop Antenna	T4=dBuA - dBuV Conversion

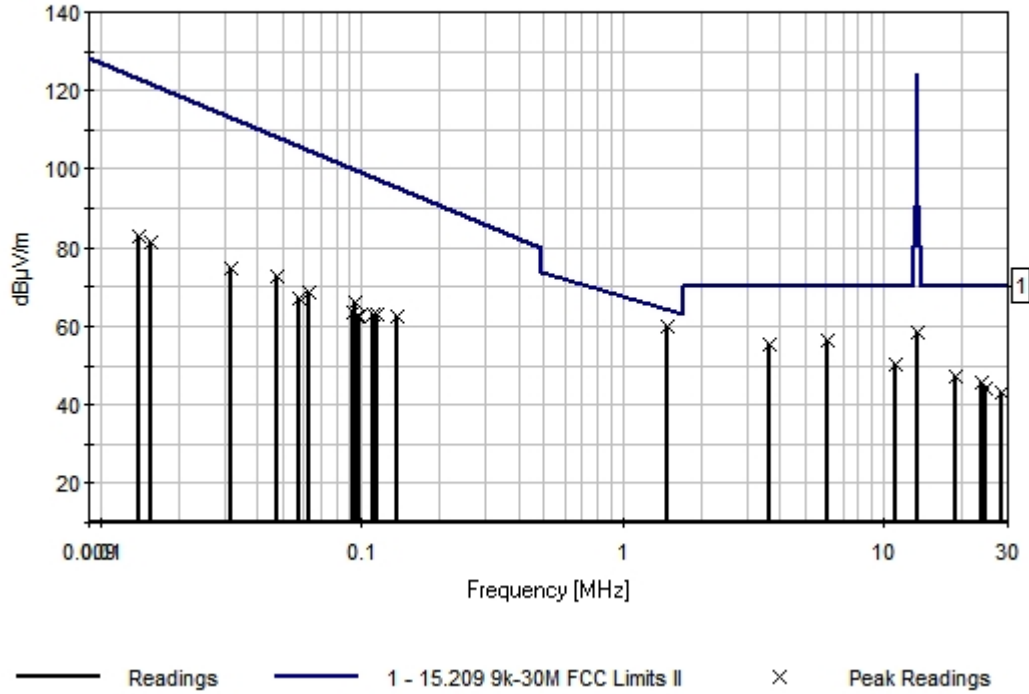
Ext Attn: 0 dB

**Measurement Data:**      Reading listed by frequency.      Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	14.013k	17.8	+28.0	+0.0	+41.7	+51.5	+0.0	83.0	123.1	-40.1	X (ho
2	15.617k	16.1	+27.9	+0.0	+41.7	+51.5	+0.0	81.4	121.8	-40.4	X (ho
3	31.456k	9.5	+27.9	+0.0	+41.4	+51.5	+0.0	74.5	113.3	-38.8	X (ho
4	47.095k	7.9	+27.8	+0.0	+41.2	+51.5	+0.0	72.8	108.4	-35.6	X (ho
5	57.321k	2.4	+27.8	+0.0	+41.1	+51.5	+0.0	67.2	106.0	-38.8	X (ho
6	62.935k	4.0	+27.8	+0.0	+41.0	+51.5	+0.0	68.7	104.9	-36.2	X (ho
7	93.331k	-1.0	+27.8	+0.0	+40.9	+51.5	+0.0	63.6	100.1	-36.5	X (ho
8	94.249k	1.3	+27.8	+0.0	+40.9	+51.5	+0.0	65.9	100.0	-34.1	X (ho

9	96.382k	-2.0	+27.7	+0.0	+40.9	+51.5	+0.0	62.7	99.7	-37.0	X (ho
10	98.569k	-2.4	+27.7	+0.0	+40.9	+51.5	+0.0	62.3	99.5	-37.2	X (ho
11	110.625k	-1.7	+27.7	+0.0	+40.8	+51.5	+0.0	62.9	98.1	-35.2	X (ho
12	115.500k	-1.6	+27.7	+0.0	+40.8	+51.5	+0.0	63.0	97.5	-34.5	X (ho
13	136.875k	-2.1	+27.7	+0.0	+40.7	+51.5	+0.0	62.4	95.5	-33.1	X (ho
14	1.493M	6.8	+27.4	+0.0	+29.3	+51.5	+0.0	60.2	64.1	-3.9	X (ho
15	3.693M	5.5	+27.3	+0.0	+25.8	+51.5	+0.0	55.5	70.0	-14.5	X (ho
16	6.120M	5.5	+27.3	+0.0	+26.5	+51.5	+0.0	56.2	70.0	-13.8	X (ho
17	11.101M	4.8	+27.4	+0.0	+21.4	+51.5	+0.0	50.3	70.0	-19.7	X (ho
18	13.546M	14.7	+27.3	+0.0	+19.7	+51.5	+0.0	58.6	90.5	-31.9	X (ho
19	18.797M	5.8	+27.2	+0.0	+17.0	+51.5	+0.0	47.1	70.0	-22.9	X (ho
20	23.651M	6.6	+27.1	+0.0	+14.8	+51.5	+0.0	45.8	70.0	-24.2	X (ho
21	24.770M	5.2	+27.1	+0.0	+14.4	+51.5	+0.0	44.0	70.0	-26.0	X (ho
22	28.558M	5.6	+27.0	+0.0	+13.2	+51.5	+0.0	43.3	70.0	-26.7	X (ho

EMCE Engineering Date: 1/7/2015 Time: 10:21:45 AM Identiv WO#: 4096  
15.209 9k-30M FCC Limits II Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



## 5.4 Radiated Emissions > 30 MHz (30MHz – 1 GHz, E-Field)

**Requirement(s):** 47 CFR §15.209; 47 CFR §15.225(d) & RSS-210 (A2.6)

**Procedures:** For > 30MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The Log periodic antenna was positioned 1 meter above the ground from the centre of the antenna. The measuring bandwidth was set to 120 kHz. (Note: During testing the receive antenna was raise from 1~4 meters to maximize the emission from the EUT.)

The limit is converted from microvolt/meter to decibel microvolt/meter.

Sample Calculation: Corrected Amplitude = Raw Amplitude (dBµV/m) + ACF (dB) + Cable Loss(dB) – Distance Correction Factor

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A “-ve” margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, is +/-6dB.
4. Environmental Conditions  

Temperature	67°F
Relative Humidity	37.4%
Atmospheric Pressure	1010mbar

Test Date : 1/12/2018

Tested By : Bob Cole

**Results:** Pass



FCC Part 15B Radiated Emissions  
30 MHz – 1 GHz  
POE Mode

Frequency MHz	Polarization	Reading dB(uV)	Factor dB(1/m)	Level dB(uV/m)	Limit dB(uV/m)	Margin dB	Pass/Fail	Height cm	Angle deg
					QP	QP			
31.500	H	28.0	-7.4	20.6	40.0	19.4	Pass	125	0
200.101	V	33.6	-14.1	19.5	43.5	24.0	Pass	140	230
224.000	V	37.3	-15.8	21.5	46.0	24.5	Pass	128	80
249.304	V	35.9	-15.1	20.8	46.0	25.2	Pass	155	250
374.420	V	33.7	-11.7	22.0	46.0	24.0	Pass	207	143
749.768	H	20.3	-4.0	16.3	46.0	29.7	Pass	244	165

FCC Part 15B Radiated Emissions  
30 MHz – 1 GHz  
DC Mode

Frequency MHz	Polarization	Reading dB(uV)	Factor dB(1/m)	Level dB(uV/m)	Limit dB(uV/m)	Margin dB	Pass/Fail	Height cm	Angle deg
					QP	QP			
149.879	V	36.2	-13.7	22.5	43.5	21.0	Pass	122	228
149.434	H	33.7	-13.7	20.0	43.5	23.5	Pass	142	215
40.688	H	30.1	-14.4	15.7	40.0	24.3	Pass	194	117
203.514	V	31.1	-14.7	16.4	43.5	27.1	Pass	129	177
294.760	H	28.4	-13.1	15.3	46.0	30.7	Pass	109	78
374.945	V	21.9	-11.7	10.2	46.0	35.8	Pass	112	95

## 5.5 Frequency Stability

**Requirement(s):** 47 CFR §15.225(e) & RSS-210 (A2.6)

**Procedures:** Frequency Stability was measured according to 47 CFR §2.1055. Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz. A voltmeter was used to monitor when varying the voltage.

Limit:  $\pm 0.01\%$  of 13.5589 MHz = 1355 Hz

Environmental Conditions	Temperature	24°C
	Relative Humidity	45%
	Atmospheric Pressure	1010mbar

Test Date : 1/8/2015

Tested By : Bob Cole

**Results:** Pass

**Frequency Stability versus Temperature:** The Frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of -20°C to +50°C at normal supply voltage.

Reference Frequency: 13.559975 MHz

Temperature (°C)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
50	13.560102	124	<0.01	Pass
40	13.560072	84	<0.01	Pass
30	13.560049	67	<0.01	Pass
20	Reference (13.559982 MHz)			
10	13.559914	68	<0.01	Pass
0	13.559901	81	<0.01	Pass
-10	13.559888	94	<0.01	Pass
-20	13.559868	114	<0.01	Pass

**Frequency Stability versus Input Voltage:** The Frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$ , the frequency of the transmitter was measured at 85% and at 115% of the rated power supply voltage at 20°C environmental temperature.

Carrier Frequency: 13.559975 MHz at 20°C at 5VDC

Measured Voltage $\pm 15\%$ of nominal (DC)	Measured Freq. (MHz)	Freq. Drift (Hz)	Freq. Deviation (Limit: 0.01%)	Pass/Fail
10.20	13.559997	15	<0.01	Pass
13.8	13.559992	10	<0.01	Pass



## Peak Output Power Per CFR 47, Section 15.225 and RSS-210 Issue 8 A2.6

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 •

Customer:	<b>Identiv</b>	Date:	1/12/2015
Specification:	<b>RFID FCC Mask 10 Meter</b>	Time:	9:45:01 PM
Work Order #:	<b>4096</b>	Sequence#:	6
Test Type:	<b>Radiated Scan</b>	Tested By:	Mashood Danmole
Equipment:	uTrust TS Scramblepad		
Manufacturer:	Identiv		
Model:	8330		
S/N:	N/A		

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

Function	Manufacturer	Model #	S/N
RFID Smartcard Reader	Identiv	8330	N/A

**Support Devices:**

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell	Latitude E6320	8BZPYN1
Power Over Ethernet	TP-Link	TL-POE150S Ver 3.0	2144545000690

**Test Conditions / Notes:**

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**Transducer Legend:**

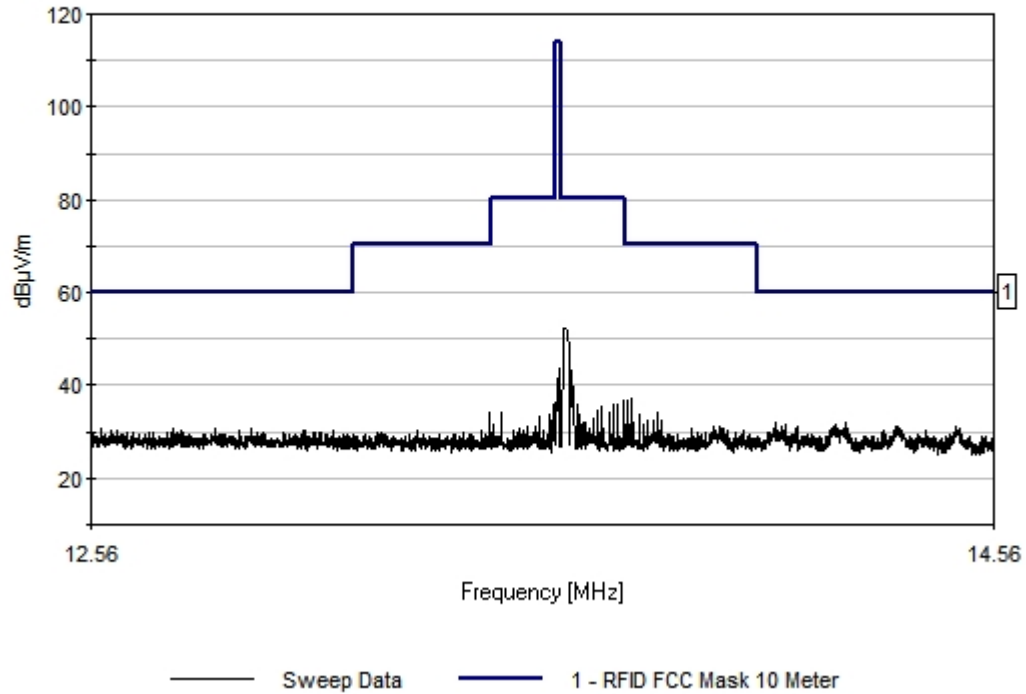
T1=8447 Pre-Amp Asset 377	T2=25' LMR #001
T3=LP-105 Loop Factors	

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	14.051M	20.0	+27.3	+0.0	+39.4		+0.0 186	32.1	60.0	-27.9	X (ho 258
2	14.211M	20.0	+27.3	+0.0	+39.3		+0.0 186	32.0	60.0	-28.0	X (ho 258
3	13.573M	40.0	+27.3	+0.0	+39.7		+0.0 186	52.4	80.5	-28.1	X (ho 258
4	14.070M	19.5	+27.3	+0.0	+39.4		+0.0 186	31.6	60.0	-28.4	X (ho 258
5	14.188M	19.4	+27.3	+0.0	+39.3		+0.0 186	31.4	60.0	-28.6	X (ho 258
6	14.471M	19.4	+27.3	+0.0	+39.1		+0.0 186	31.2	60.0	-28.8	X (ho 258

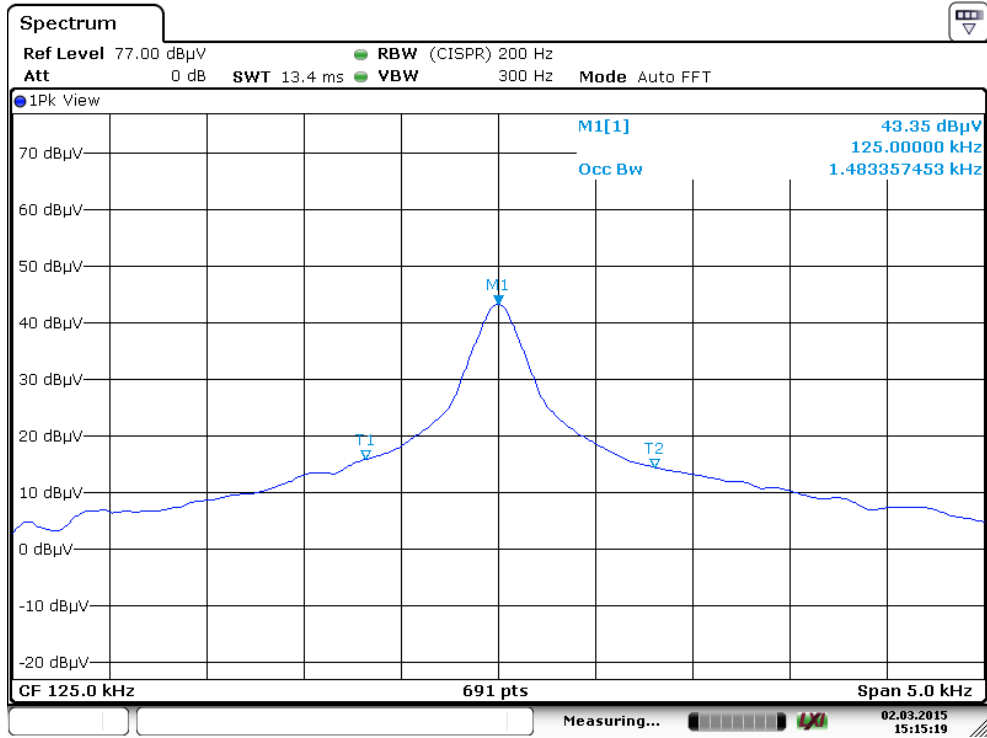
EMCE Engineering Date: 1/12/2015 Time: 9:45:01 PM Identiv WO#: 4096  
RFID FCC Mask 10 Meter Test Distance: 10 Meters Sequence#: 6 Ext ATTN: 0 dB



### 13.56 MHz Peak Power

Frequency (MHz)	Corrected Amplitude Reading (dBuV/m @ 3M)
13.558	52.4

125 kHz Peak Power



125 kHz Peak Power

Frequency (MHz)	Corrected Amplitude Reading (dBuV/m @ 3M)
125.0 kHz	43.35

## 5.7 Occupied Bandwidth

**Requirement(s):** RSS-210 (5.9.1)

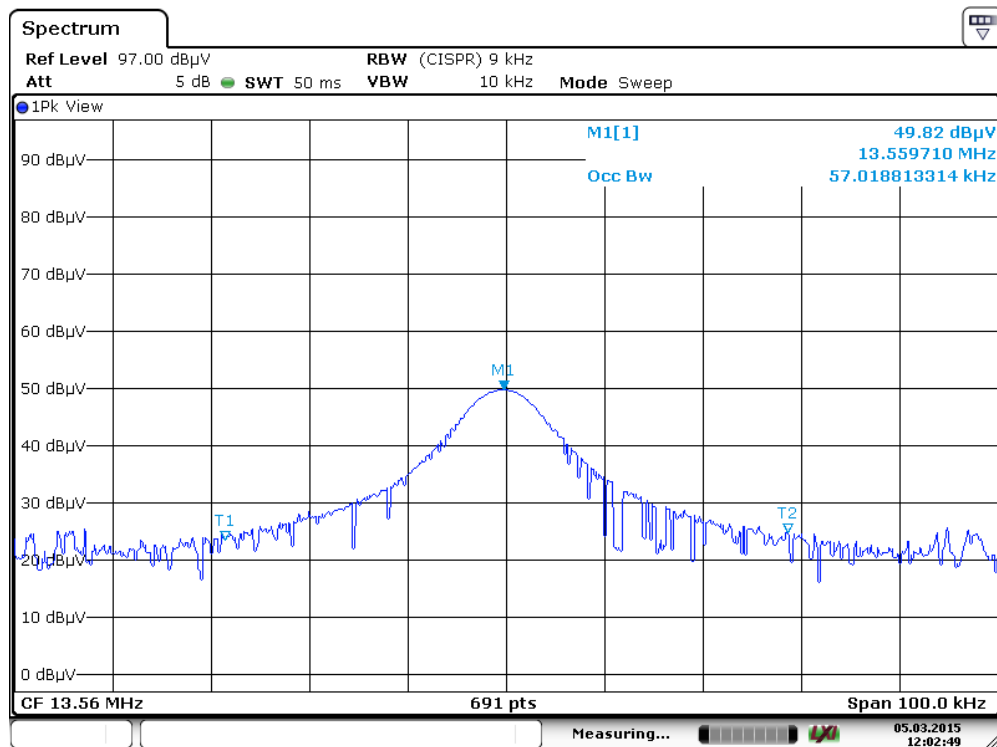
**Procedures:** Occupied Bandwidth was measured according to RSS-210 (5.9.1). Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz.

Environmental Conditions	Temperature	24°C
	Relative Humidity	45%
	Atmospheric Pressure	1010mbar

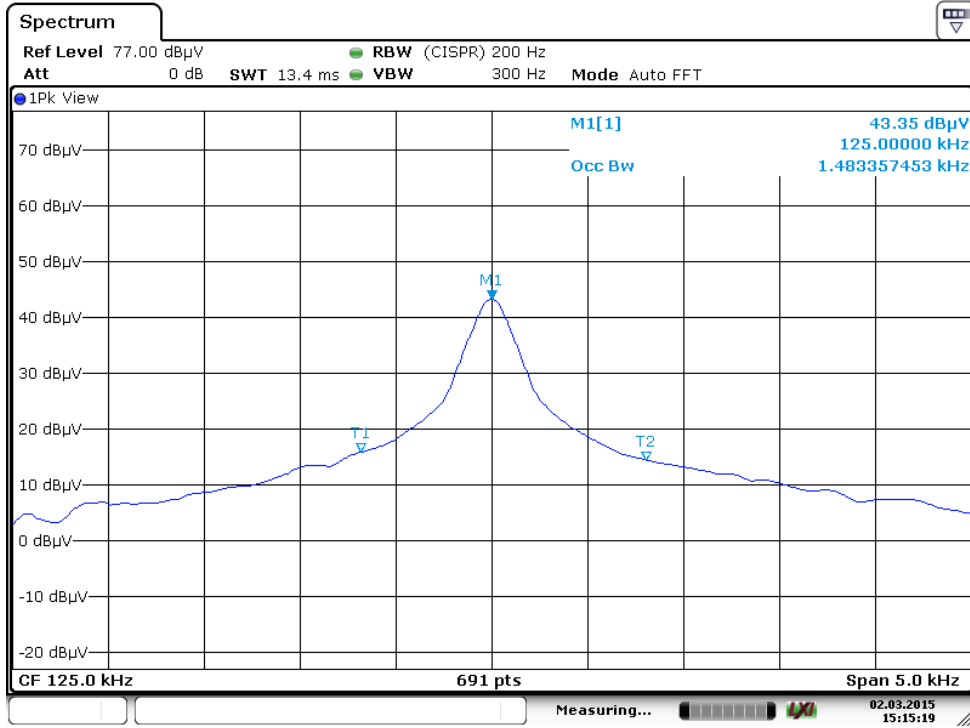
Test Date : 1/12/2015

Tested By : Bob Cole

**Results:** Pass







### Occupied BW

Frequency	Occupied Bandwidth (99%)
13.56 MHz	57.01 kHz
125 kHz	1.4833 kHz

## 6.0 TEST EQUIPMENT

Antenna Conducted Emissions Measurements:

Equipment	Type	Manufacturer	Calibration Date	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	05/02/17	05/02/18
Spectrum Analyzer	8566B	Hewlett-Packard	05/02/17	05/02/18
Spectrum Analyzer	FSV40	Rohde & Schwarz	06/20/17	06/20/18
Pre-Amp	83051A	Hewlett-Packard	05/01/17	05/01/18
Pre-Amp	83017A	Hewlett-Packard	05/01/17	05/01/18
Pre-Amp	8744D	Hewlett-Packard	05/02/17	05/02/18
Cable	0.25 meters	Murata	05/10/17	05/10/18
Temp / Humidity Meter	IBTHXBP	Omega	07/08/17	07/08/18

Radiated Emissions Measurements:

Equipment	Type	Manufacturer	Calibration Date	Calibration Due Date
EMI Analyzer System	84125B	Hewlett-Packard	05/02/17	05/02/18
Spectrum Analyzer	8566B	Hewlett-Packard	05/02/17	05/02/18
Spectrum Analyzer	FSV40	Rohde & Schwarz	06/20/17	06/20/18
Antenna	JB6 BiConiLog	Sunol Sciences	06/15/17	06/15/18
Antenna	AL30-R Loop	Compower	02/22/17	02/22/18
Horn Antenna	SAS 200/571	AH Systems	05/19/17	05/19/18
Cable	N – N (30 Meters)	EMCE	05/02/17	05/02/18