



## TEST REPORT nr. R12177301\_rev20

### Federal Communication Commission (FCC)

**This test report cancel and replace document nr. R12177301 date 27.11.12**

#### Test item

Description.....: Mifare / NFC Reader  
Trademark.....: GLOBAL DISPLAY SOLUTIONS  
Model/Type.....: BRD01288

#### Test Specification

Standard .....: FCC Rules & Regulations, Title 47 (2012)  
Part 15 paragraph(s) : 203, 204, 209 and 225

**Client's name**.....: GLOBAL DISPLAY SOLUTIONS S.p.A.  
Address .....: Via Tezze, 20/A – 36073 Cornedo Vicentino (VI) - Italy

**Manufacturer's name**.: Same as client  
Address .....: --

#### Report

Tested by .....: G. Gandini - *Technician*

Approved by.....: R. Beghetto - *Laboratory Manager*

Date of issue.....: 27.02.12

Contents .....: 22 pages

This test report shall not be reproduced except in full without the written approval of CMC.  
The test results presented in this report relate only to the item tested.



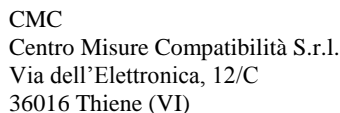
## Index

<b>1. SUMMARY .....</b>	<b>3</b>
<b>2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) .....</b>	<b>4</b>
2.1 TEST SITE.....	4
<b>3. TESTING AND SAMPLING .....</b>	<b>4</b>
<b>4. OPERATIVE CONDITIONS.....</b>	<b>4</b>
<b>5. PHOTOGRAPH(S) OF EUT .....</b>	<b>5</b>
<b>6. EQUIPMENT LIST .....</b>	<b>7</b>
<b>7. MEASUREMENT UNCERTAINTY .....</b>	<b>8</b>
<b>8. EREFERENCE DOCUMENTS .....</b>	<b>9</b>
<b>9. DEVIATION FROM TEST SPECIFICATION .....</b>	<b>10</b>
<b>10. TEST CASE VERDICTS.....</b>	<b>10</b>
<b>11. RESULTS.....</b>	<b>10</b>
11.1 RADIATED EMISSION .....	11
11.2 FIELD STRENGTH WITHIN THE ASSIGNED BAND .....	13
11.3 FREQUENCY TOLERANCE.....	14
<b>12. GRAPHS AND TABLES.....</b>	<b>15</b>



1. Summary			
Emission: FCC Rules & Regulations, Title 47 (2011)			
Test specifications	Environmental Phenomena	Tests sequence	Result
Part 15.203 and 15.204	Antenna Requirement	4	Complies (The antenna is embedded)
Part 15.209	Radiated Emission	1	Complies
Part 15.225	Field strength within the assigned band	2	Complies
Part 15.225 (e)	Frequency tolerance	3	Complies

*The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification.*



Power supply..... : 3,3Vdc from battery

Serial number..... : Sample Pre-D

Type of equipment ..... : ☒ Transmitter Unit    ☒ Receiver Unit  
                               : ☐ Fixed station    ☐ Portable station    ☒ Mobile station

Working Frequency ..... : 13,56 MHz

Information on antenna..... : Embedded

Auxiliary equipment ..... : Monitor 7” by Global Display Solution Spa

Filtering and construction devices..... : None

Company .....: CMC Centro Misure Compatibilità S.r.l.  
Address .....: Via dell'Elettronica, 12/C – 36016 Thiene (VI) – ITALY

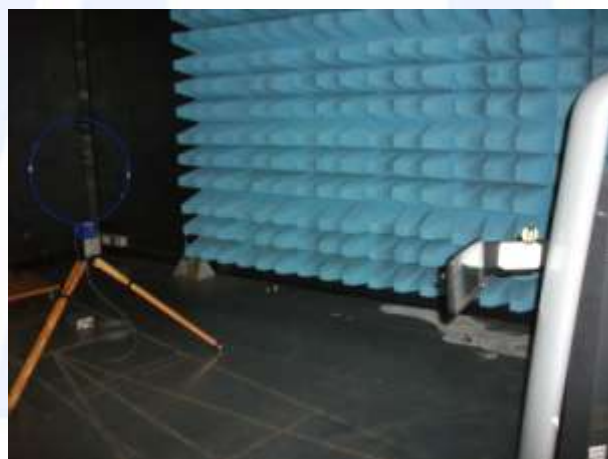
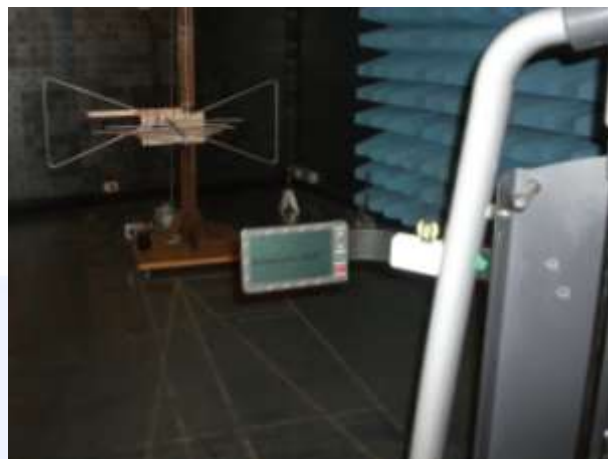
Date of receipt of test item .....	: 15.10.12
Testing start date.....	: 15.11.12
Testing end date.....	: 22.02.13
Samples tested nr. ....	: 1
Sampling procedure.....	: Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion
Internal identification.....	: Adhesive label with the product number P121073

—



## 5. Photograph(s) of EUT







## 6. Equipment list

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>	<i>Last calibration</i>	<i>Due date calibration</i>
CMC S127	SCHAFFNER	HLA6120	Loop Antenna	1191	January '13	January '16
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '10	May '13
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '13	January '14
CMC B069	Angelantoni	CH 600C	Climatic chamber	41973	June '12	June '13
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver	100781	January '13	January '14





## 7. Measurement uncertainty

Test	Expanded Uncertainty	note
<b>Conducted Emission</b>		
(50Ω/50μH AMN) - (9 kHz – 150 kHz)	±3.8 dB	1
(50Ω/50μH AMN) - (150 kHz – 30 MHz)	±3.4 dB	1
(Voltage probe) - (150 kHz – 30 MHz)	±3.0 dB	1
(50Ω/5μH AMN) - (150 kHz – 108 MHz)	±3.2 dB	1
<b>Discontinuous Conducted Emission</b>		
Conducted Emission (50Ω/50μH AMN) - (9 kHz – 150 kHz)	±3.8 dB	1
Conducted Emission (50Ω/50μH AMN) - (150 kHz – 30 MHz)	±3.4 dB	1
<b>Disturbance Power (30 MHz – 300 MHz)</b>		
	±3.2 dB	1
<b>Radiated Emission</b>		
(0,150 MHz – 30 MHz)	±4.5 dB	1
(30 MHz – 1000 MHz)	±4.8 dB	1
(1 GHz – 6 GHz)	±4.4 dB	1
<b>Electromagnetic field EMF</b>		
	±18.8 dB	1
<b>Harmonic current emissions test</b>		
	±2.4 %	1
<b>Voltage fluctuation and flicker test</b>		
	±6.0 %	1
<b>Insertion loss test</b>		
	±2.6 %	1
<b>Radiated electromagnetic disturbance test (loop antenna)</b>		
	±2.5 %	1
<b>Radiated electromagnetic field immunity test</b>		
	0.9 V/m at 3V/m	1
<b>Pulse modulated radiated electromagnetic field immunity test</b>		
	0.9 V/m at 3V/m	1
<b>Injected currents immunity test</b>		
	0.6 V at 3V	1
<b>Bulk current</b>		
	9 mA at 60 mA	1
<b>Power frequency magnetic field immunity test</b>		
	0.3 A/m at 3 A/m	1
<b>Electrostatic discharge immunity test</b>		
		2
<b>Electrical fast transients / burst immunity test</b>		
		2
<b>Surge immunity test</b>		
		2
<b>Short interruption immunity test</b>		
		2
<b>Voltage transient emission test</b>		
	±5 %	1
<b>Transient immunity test</b>		
		2

### Notes

#### Note 1:

The expanded uncertainty reported according to EN55016-4-2(2004-10) is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of  $p = 95\%$

#### Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor  $k = 2$ .





## 8. eference documents

Reference no.	Description
FCC Rules and Regulation Title 47 part 15	--
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz – 40GHz
Internal Procedure PM001 rev. 2.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 8.1 (Quality Manual)	Measurement uncertainty calculation



## 9. Deviation from test specification

In agreement with the client, emission tests were performed with peak detector .  
At the frequencies where the measures exceed the limit or within 6dB from it, the test was repeated with quasi-peak detector and/or average detector.

## 10. Test case verdicts

Test case does not apply to the test object..... : N / N.A.

Test item does meet the requirement..... : P / Pass / Complies

Test item does not meet the requirement..... : F / Fail / Does not comply

Test not performed ..... : NE / Not Executed

## 11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC\_M rev. 8.1.



## 11.1 Radiated Emission

### Test configuration and test method

Test site Semi-Anechoic Chamber  
Auxiliary equipment See clause 4 of this test report

### Environmental conditions

Temperature 20 °C Atmospheric pressure 97 kPa Relative humidity 48 %

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209
- Internal Procedure PM001
- See clause 4 of this test report

### Test specification

Port: Enclosure - Antenna distance: 3m – Frequency range: 30-1000 MHz

### EUT exercising

See clause 4 of this test report

### Acceptance limits

Limits	
Frequency range (MHz)	$dB(\mu V/m)$ Quasi-peak
0,009 to 0,490	128,51 to 93,79
0,490 to 1,705	73,79 to 62,96
1,705 to 30	69,5
30 to 88	40
88 to 216	43,5
216 to 960	46
Above 960	54

### Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
Vertical	30 to 1000	G13031301	--	Complies
Horizontal	30 to 1000	G13031302	--	Complies
Loop	0,009 to 30	G13031303	--	Complies

#### Graphs Legend

PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a X

AV: Average; AV [1s] (average at 1 second) values are marked with a +



### Remarks

EUT was tested in 3 orthogonal planes. In results table are reported the worst case.

### Reference documents

See clause 8 of this test report

### Test equipment used (Id number – see clause 6 of this test report)

CMC S127, CMC S136, CMC S164

Measurement uncertainty: See clause 7 of this test report

### Result

The requirements are met





## 11.2 Field strength within the assigned band

### Test configuration and test method

Test site Semi-anechoic chamber  
Auxiliary equipment See clause 4 of this test report

### Environmental conditions

Temperature 20 °C Atmospheric pressure 98 kPa Relative humidity 50 %

### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.225
- Internal Procedure PM001
- See clause 4 of this test report

### Test specification

Test distance: 3m – Frequency Range: 13,553 to 13,567MHz – if bandwidth: 1kHz

### EUT exercising

See clause 4 of this test report

### Acceptance limits

Limits (with antenna distance 3m)	
Frequency range (MHz)	dB(μV/m) Quasi-peak
13,553 to 13,567	124
13,410 to 13,553 and 13,567 to 13,710	90,5
13,110 to 13,410 and 13,710 to 14,010	80,5

### Result

Graphs	Transmitter field strength		BW (kHz)	Result
	Frequency (MHz)	Level (dBμV/m)		
G13031306	13,560	67,01	9	Complies
G13031307	13,561	66,23	0,2	Complies
G13031308	13,561	66,21	0,2	Complies

Frequency Range (MHz)	Graphs	BW (kHz)	Result
13 to 14,1	G13031304	0,2	Complies
13 to 14,1	G13031305	9	Complies

### Remarks

EUT was tested in 3 orthogonal planes. In results table are reported the worst case.

**Reference documents** See clause 8 of this test report

### Test equipment used (Id number – see clause 6 of this test report)

CMC S127, CMC S164

**Result** The requirements are met



### 11.3 Frequency tolerance

#### Test configuration and test method

Test site

Climatic chamber

Auxiliary equipment

See clause 4 of this test report

#### Environmental conditions

Temperature 20 °C

Atmospheric pressure 98 kPa

Relative humidity 50 %

#### Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.225 (e)
- Internal Procedure PM001
- See clause 4 of this test report

#### Test specification

Frequency range: 13,553 to 13,567MHz

#### EUT exercising

See clause 4 of this test report

#### Acceptance limits

Limits for radiated disturbances  $\pm 0,01\%$

#### Result

Test conditions		Measured frequency (MHz)
Power supply (V)	Temperature	
3,3 (Un)	20°C	13,561054
3,3 (Un)	0°C	13,56109
3,3 (Un)	-10°C	13,56180
3,3 (Un)	-20°C	13,56140
3,3 (Un)	10°C	13,56107
3,3 (Un)	30°C	13,56107
3,3 (Un)	40°C	13,56105
3,3 (Un)	50°C	13,56103
2,80 (3,3V x 0,85)	20°C	13,56105
3,80 (3V x 1,15)	20°C	13,56105

Remarks //

#### Reference documents

See clause 8 of this test report

#### Test equipment used (Id number – see clause 6 of this test report)

CMC B069, CMC S164

#### Result

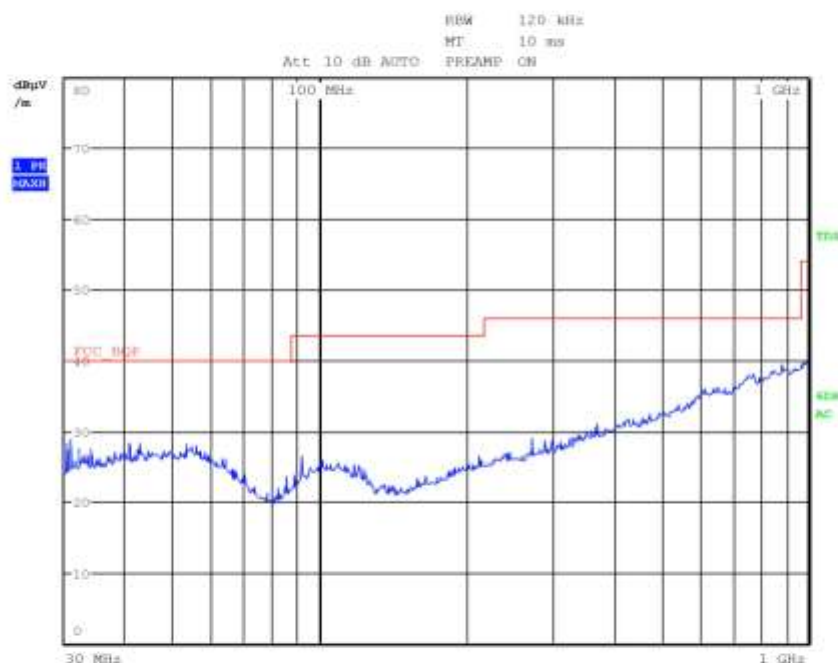
The requirements are met



## 12. Graphs and Tables

G13031301

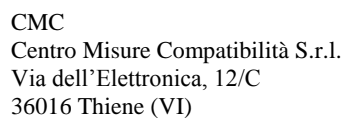
Meas Type Emission 30-1000MHz  
Equipment under Test  
Manufacturer  
OP Condition Lettura/scrittura chiave Mifare  
Operator Segalla 13031301  
Test Spec  
Vert



### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Subranges: 0





BW 120 kHz  
 T 10 ms  
 PREAMP ON

1 GHz  
 TDR  
 40W AC  
 1 GHz

dBmV /m

Att 10 dB AUTO BW 120 kHz MT 10 ms PREAMP ON

100 MHz

1 GHz

1.00 MHz

40.00 dBm

50.00 dBm

55.00 dBm

30 MHz

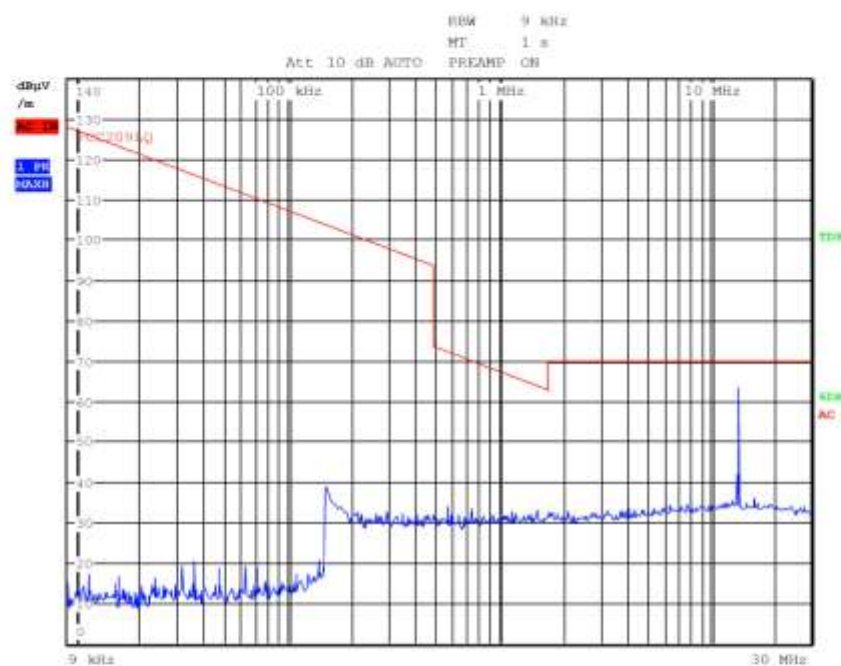
1 GHz

Meas Time: 1 s  
Margin: 6 dB  
Subranges: 0



G13031303

**Meas Type** Emission 0.009-30MHz  
**Equipment under Test**  
**Manufacturer**  
**OP Condition** Lettura/scrittura chiave Mifare  
**Operator** Segalla 13031303  
**Test Spec**  
**Loop**



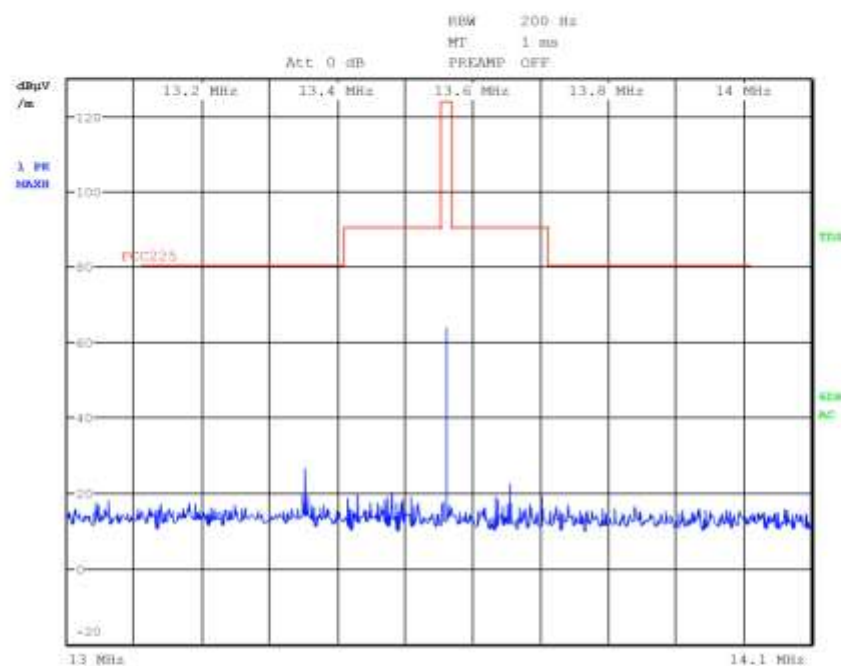
#### **Final Measurement**

Meas Time: 1 s  
Margin: 6 dB  
Subranges: 0



G13031304

**Meas Type** Emission  
**Equipment under Test**  
**Manufacturer**  
**OP Condition** Lettura/scrittura chiave Mifare  
**Operator** Segalla 13031304  
**Test Spec**  
**Loop**



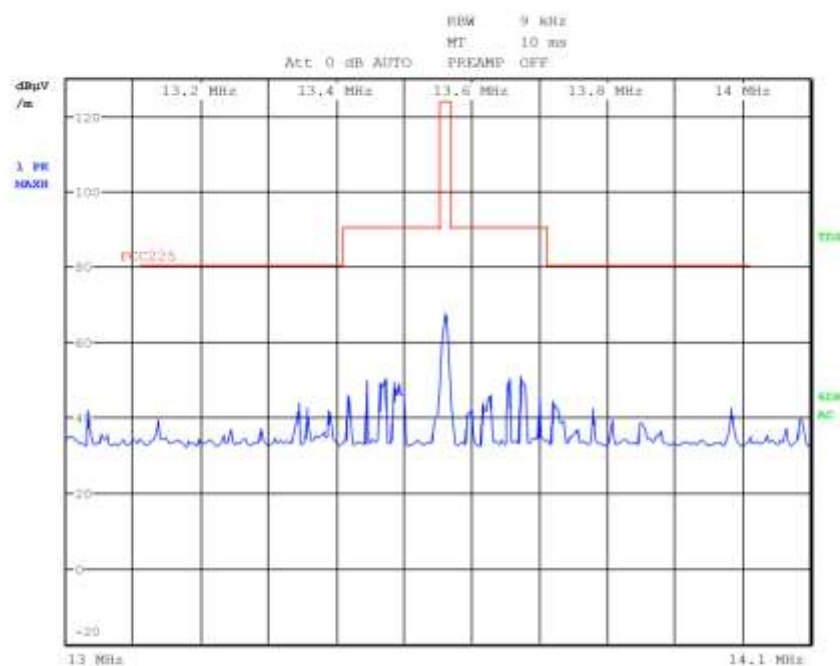
### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Peaks: 0



G13031305

**Meas Type** Emission  
**Equipment under Test**  
**Manufacturer**  
**OP Condition** Lettura/scrittura chiave Mifare  
**Operator** Segalla 13031305  
**Test Spec**  
**Loop**



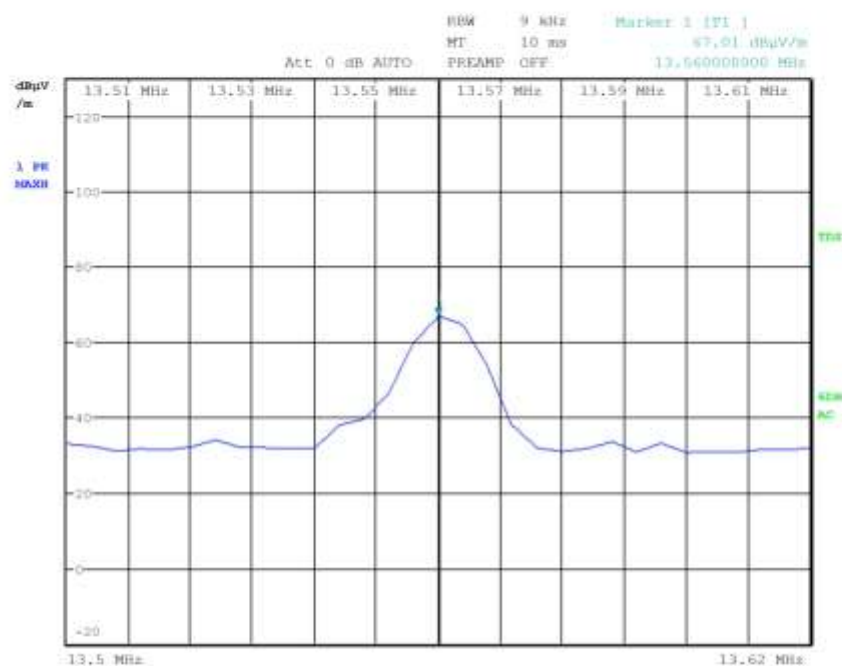
#### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Peaks: 0



G13031306

Meas Type Emission  
Equipment under Test  
Manufacturer  
OP Condition Lettura/scrittura chiave Mifare  
Operator Segalla 13031306  
Test Spec  
Loop



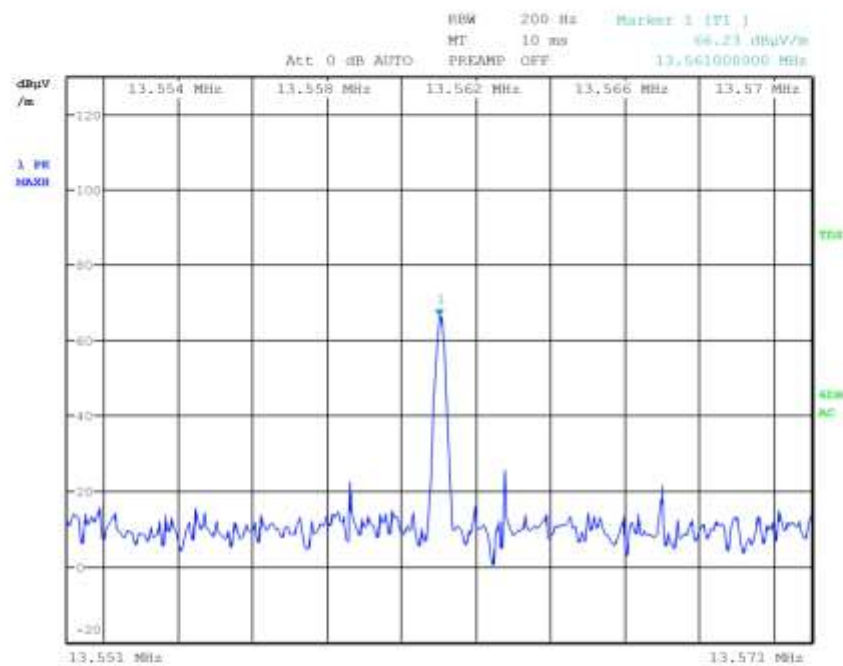
### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Peaks: 0



G13031307

**Meas Type** Emission  
**Equipment under Test**  
**Manufacturer**  
**OP Condition** Lettura/scrittura chiave Mifare  
**Operator** Segalla 13031307  
**Test Spec**  
**Loop**



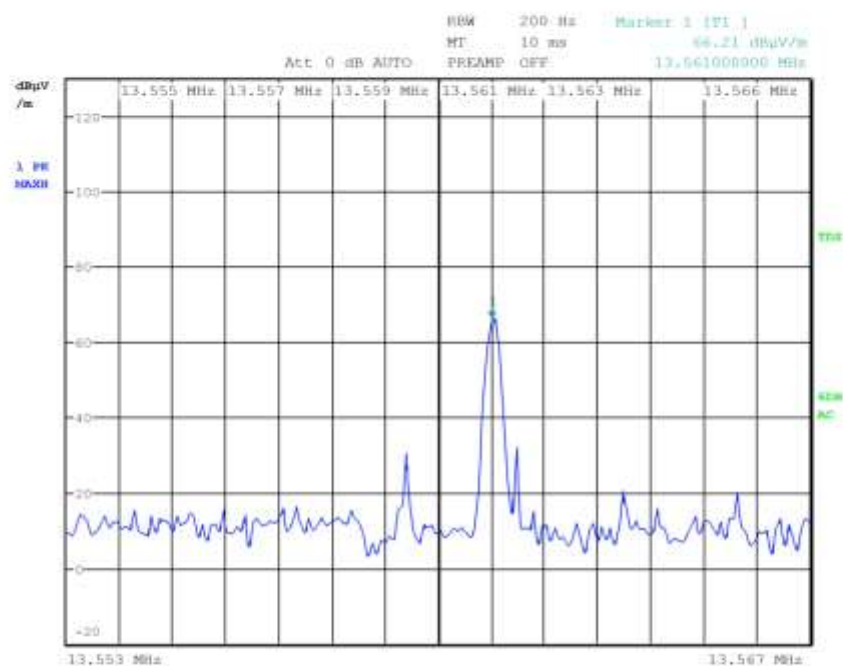
### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Peaks: 0



G13031308

**Meas Type** Emission  
**Equipment under Test**  
**Manufacturer**  
**OP Condition** Lettura/scrittura chiave Mifare  
**Operator** Segalla 13031308  
**Test Spec**  
**Loop**



### Final Measurement

Meas Time: 1 s  
Margin: 6 dB  
Peaks: 0