



FCC TEST REPORT

MEASUREMENT AND TEST REPORT

For

INS SERVICES

11 NAPIER CERSCENT, NTH RYDE, NSW 2113

Model: BAR-1, BSR-1 PAC

FCC ID: ZFZBAR-1

April 5, 2011

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Mifare proximity reader
Test Engineer:	<u>Take Wang</u>
Report Number:	<u>POCE1104018RF</u>
Test Date:	<u>April.01 –April.03, 2011</u>
Reviewed By:	<u>Ada Li</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen POCE Technology Co., Ltd.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.225)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	Note(1)
15.203	Antenna Requirement	Pass	
15.35 / 15.205 / 15.209 / 15.225	Radiated Spurious Emission	Pass	
15.225(e)	Frequency Stability	Pass	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report.

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd.

Add. : 3/F,Block B, Hua feng Technology & Business Building, Xin'an 6 Road, Bao an Center District, Shenzhen, China.

FCC Registered No.: 791972 IC Registered No.:9270A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)
C01	ANSI C63.4-2003	150 KHz ~ 30MHz	1.94

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)
OS-01	ANSI C63.4-2003	30MHz ~ 200MHz	V	2.93
		30MHz ~ 200MHz	H	2.86
		200MHz ~ 1,000MHz	V	3.86
		200MHz ~ 1,000MHz	H	3.94

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

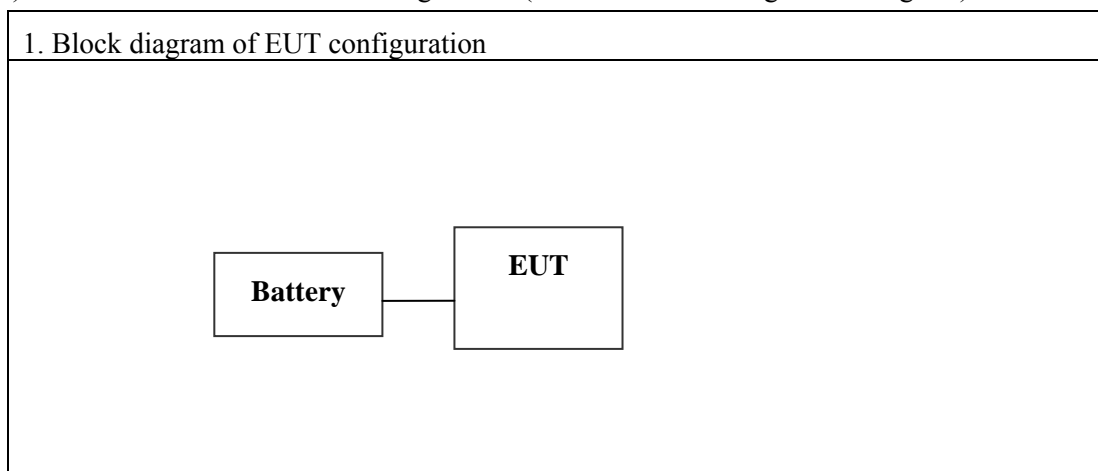
EUT	:	Mifare proximity reader
Model	:	BAR-1, BSR-1 PAC All the model are identical except the model name.
Operation frequency:	:	13.56MHz
Power Supply	:	DC 12V
Modulation Technology:	:	ASK
Applicant	:	INS SERVICES
Address	:	11 NAPIER CERSCENT, NTH RYDE, NSW 2113
Manufacturer	:	JAT ENTERPRISE CO., LTD
Address	:	Room 1705, 17F, XiangXieFengJin Building, LongZhu Road, NanShan, Shen Zhen , China
Date of receiver	:	April 1, 2011
Date of Test	:	April.01 –April.03, 2011

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 DESCRIPTION OF TEST CONDITIONS

(1) EUT was tested in normal configuration (Please See following Block diagram)



(2) E.U.T. test conditions:

15.31(e) :For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

(4) Frequency range of radiated measurements:

According to the 15.33, The test range will be upto the tenth harmonic of the highest fundamental frequency.

2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
01	Battery	N/A	Nr-12	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A	N/A	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.4 EQUIPMENTS LIST FOR ALL TEST ITEMS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Due Date
1	Spectrum Analyzer	Agilent	E4446A	MY43360458	2011.04.16
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2011.04.07
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2012.03.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2011.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2011.07.14
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2011.07.14
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2012.03.07
8	EMI Test Receiver	R&S	ESCI	100124	2011.12.27
9	LISN	Kyoritsu	KNW-242	8-837-4	2011.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2011.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2012.03.07
12	Loop Antenna	ARA	PLA-1030/B	1029	2011.07.14
13	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	2011.08.21
14	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2011.08.21

3. TEST RESULT

3.1 ANTENNA REQUIREMENT

3.1.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

3.1.2 EUT ANTENNA

The EUT antenna is integral Antenna. It comply with the standard requirement.

3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

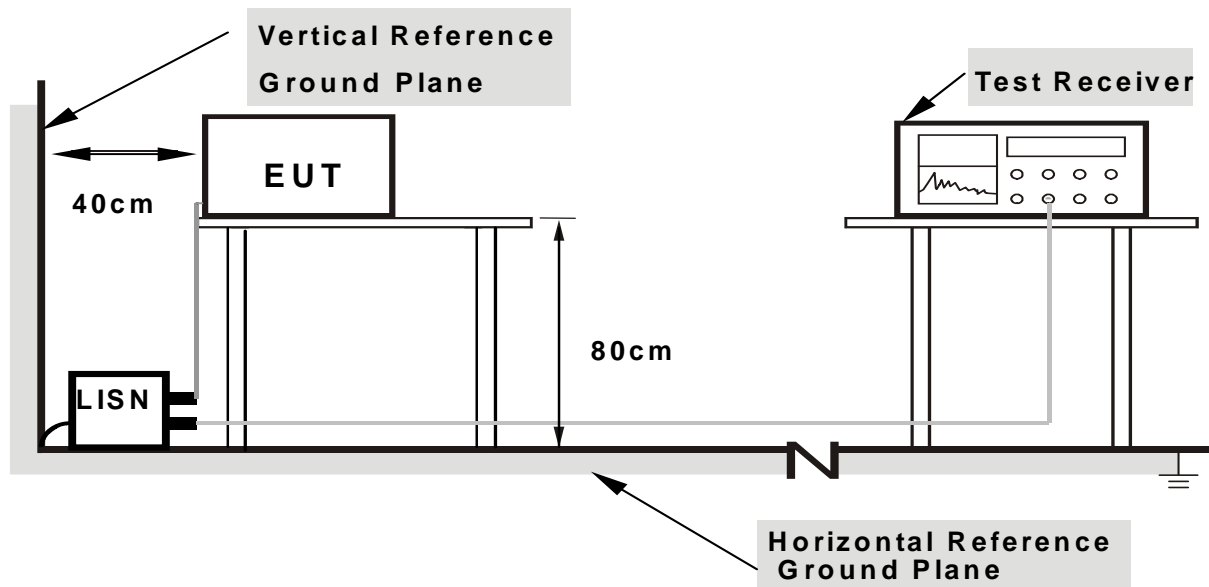
3.2.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 DEVIATION FROM TEST STANDARD

No deviation

3.2.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80
from other units and other metal planes**

3.2.5 TEST RESULTS

EUT :	Mifare proximity reader	Model Name :	BAR-1
Temperature :	26 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Power :	DC 12V
Test Mode :	N/A - denotes test is not applicable in this test report		

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of 『Note 』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) N/A - denotes test is not applicable in this test report

3.3 RADIATED EMISSION MEASUREMENT

3.3.1 RADIATED EMISSION LIMITS

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500
FCC Part 15.225(a)/(b)/(c)				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
13.553 – 13.567	15,848	30 m	15,848*100	124
13.567 – 13.710	334	30 m	334*100	90.5
13.110 – 13.410 13.710 – 14.010	106	30 m	106*100	80.5

Note:

- (1) The tighter limit shall apply at the boundary between two frequency range.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).
- (3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$. Example:
F.S Limit at 30m distance is 30uV/m , then F.S Limitation at 3m distance is adjusted as $L_{d1} = L_1 = 30uV/m * (10)^2 = 100 * 30 uV/m$

3.3.2 TEST PROCEDURE

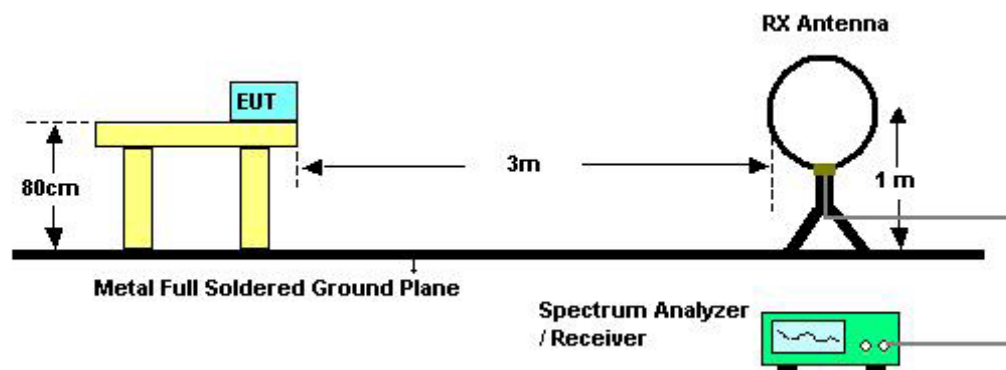
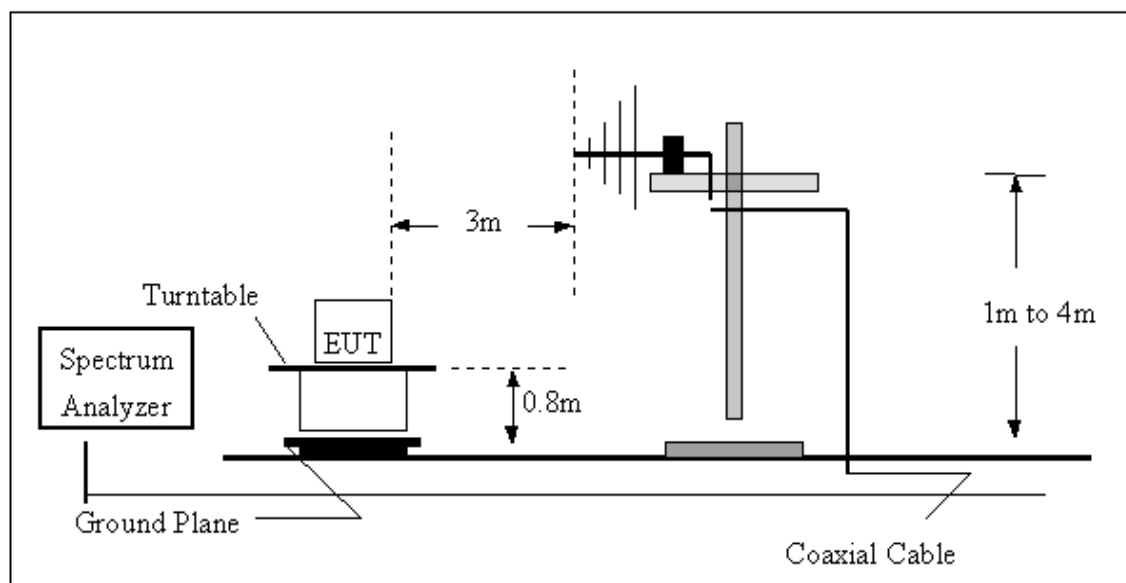
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement. performed pretest to three orthogonal axis.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



3.3.5 TEST RESULTS (-FCC PART 15.209)

EUT :	Mifare proximity reader	Model Name :	BAR-1
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2011-4-1
Test Mode :	13.56MHz	Polarization :	Vertical
Test Power :	DC 12V		

Freq. (MHz)	Ant.Pol . H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit-3m (dBuV/m)	Safe Margins (dBuV/m)	Note
85.78	V	Peak	54.30	-22.18	32.12	40.00	-7.88	
194.90	V	Peak	47.44	-18.07	29.37	43.50	-14.13	
243.40	V	Peak	42.63	-17.40	25.23	46.00	-20.77	
255.54	V	Peak	45.60	-17.12	28.48	46.00	-17.52	
341.32	V	Peak	44.66	-14.54	30.12	46.00	-15.88	
410.43	V	Peak	46.02	-12.15	33.87	46.00	-12.13	

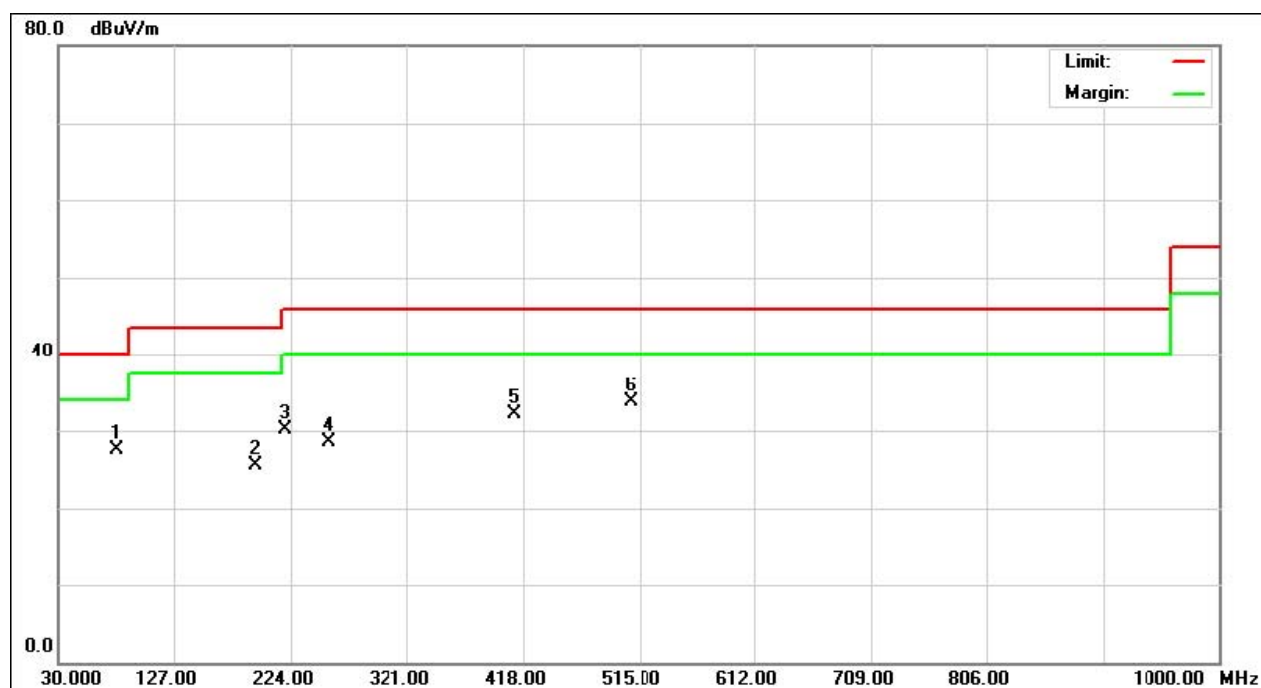


Remark :

- (1) '*' means the worst case
Measurement Level = Reading Level + Factor
Ant Factor + Cable Loss-Amp
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (3) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

EUT :	Mifare proximity reader	Model Name :	BAR-1
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2011-4-1
Test Mode :	13.56MHz	Polarization :	Horizontal
Test Power :	DC 12V		

Freq. (MHz)	Ant.Pol . H/V	DetectorMod e (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit-3m (dBuV/m)	Safe Margins (dBuV/m)	Note
78.50	H	Peak	49.28	-21.84	27.44	40.00	-12.56	
194.90	H	Peak	43.50	-18.07	25.43	43.50	-18.07	
219.15	H	Peak	47.20	-17.08	30.12	46.00	-15.88	
255.52	H	Peak	45.54	-17.12	28.42	46.00	-17.58	
410.73	H	Peak	44.25	-12.15	32.10	46.00	-13.90	
507.55	H	Peak	43.90	-10.25	33.65	46.00	-12.35	



Remark :

- (1) '*' means the worst case
 Measurement Level = Reading Level + Factor
 Factor = Ant Factor + Cable Loss-Amp
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (3) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3.3.6 TEST RESULTS (-FCC PART 15.225)

EUT :	Mifare proximity reader	Model Name :	BAR-1
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2011-4-1
Test Mode :	13.56MHz		
Test Power :	DC 12V		

Freq. (MHz)	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit-3m (dBuV/m)	Safe Margins (dBuV/m)	Note
0.047	Peak	32.18	22.59	54.77	114.16	-59.39	
0.06	Peak	25.43	22.30	47.73	112.80	-65.07	
0.27	Peak	19.76	20.35	40.11	98.99	-58.88	
0.87	Peak	22.43	20.14	42.57	68.85	-26.28	
1.76	Peak	19.89	19.52	39.41	68.85	-29.44	
13.56	Peak	43.13	17.65	60.78	124.00	-63.22	F
26.34	Peak	22.12	16.74	38.86	69.54	-30.68	



Remark :

- (1) Spectrum Setting: 9 KHz – 150 KHz, RBW= 1 KHz, VBW=1 KHz, Sweep time = 200 ms. 150 KHz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms. 30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) The Log-Bicon Antenna will use to test frequency range from 30MHz to 1000MHz and the Loop Antenna will use to test frequency below 30MHz.
- (4) Emission level (dBuV/m) = 20 log Emission level (uV/m). Distance extrapolation factor = 40 log

- (specific distance / test distance) (dB);
- (5) If the peak scan value lower limit more than 20dB, then this signal data does not show in table °
- (6) Measuring frequency range from 9KHz to the 10th harmonic of highest fundamental frequency ° “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.

4. FREQUENCY STABILITY MEASUREMENT

4.1 LIMIT

the frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over 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 voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.2 TEST PROCEDURE

The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

At room temperature ($25 \pm 5^\circ\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

4.3 TEST SETUP



4.4 TEST RESULTS

EUT :	Mifare proximity reader	Model Name :	BAR-1
Temperature :	26 °C	Relative Humidity :	53%
Pressure :	1020 hPa	Test Power :	DC 12V
Test Mode :	TX		

Frequency Stability Versus Environmental Temperature						
	Temperature (°C)	Voltage (Vac)	Frequency (MHz)	Freq Error (KHz)	Limit (KHz)	Results
	20	12V	13.56160			
0 min	50	12V	13.56168	0.080	+/- 1.356	PASS
	-20	12V	13.56150	-0.100	+/- 1.356	PASS
2 min	50	12V	13.56250	0.900	+/- 1.356	PASS
	-20	12V	13.56070	-0.900	+/- 1.356	PASS
5 min	50	12V	13.56170	0.100	+/- 1.356	PASS
	-20	12V	13.56144	-0.160	+/- 1.356	PASS
10 min	50	12V	13.56165	0.050	+/- 1.356	PASS
	-20	12V	13.56141	-0.190	+/- 1.356	PASS
Frequency Stability Versus Input Voltage						
Temperature (°C)	Voltage (Vac)		Frequency (MHz)	Freq Error(KHz)	Limit (KHz)	Results
20	V-nom	12V	13.56160			
20	V-min	10.2V	13.5616	0.003	+/- 1.356	PASS
20	V-max	13.8V	13.5616	0.003	+/- 1.356	PASS