Report On

FCC Testing of the
Access Interfacing Solutions BGR135C
In accordance with FCC CFR 47 Part 15C

COMMERCIAL-IN-CONFIDENCE

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REPORT ON

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July 2014

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DATED 04 July 2014

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler M Russell

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Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
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1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Access Interfacing Solutions BGR135C to the requirements of FCC CFR 47 Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Access Interfacing Solutions
Model Number(s)	BGR135C
Serial Number(s)	Golden Sample #2
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2013)
Incoming Release Date	Declaration of Build Status 24 June 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	AKP33425 12 June 2014
Start of Test	24 June 2014
Finish of Test	29 June 2014
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.10: 2009

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
RFiD/NFC				
2.1	15.225 (a)(b)(c)(d)	Field Strength of any Emission	Pass	
2.2	15.225, 15.215 (c)	Occupied Bandwidth	Pass	
2.3	15.225 (e)	Frequency Stability Under Temperature Variations	Pass	

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1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	BGR135C
MANUFACTURER	Access IS
TYPE	Boarding Gate Reader
PART NUMBER	BGR135C
SERIAL NUMBER	BGR135C – Sample #1 BGR135C – Sample #2
HARDWARE VERSION	PCBP3685 B PCBM3707 01 PCBM2999 04 PCBM1641 07
SOFTWARE VERSION	RFID FW version – 0.08 BASE Board FW – 3090 Head Board FW - 2090
TRANSMITTER OPERATING RANGE	Near Field ~5cm
RECEIVER OPERATING RANGE	Near Field ~5cm
INTERMEDIATE FREQUENCIES	NA
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	A2D 8K47
MODULATION TYPES: (i.e. GMSK, QPSK)	AM
HIGHEST INTERNALLY GENERATED FREQUENCY	96MHz
HIGHEST INTERNALLY GENERATED FREQUENCY IN RECEIVE IDLE MODE	96MHz
OUTPUT POWER (W or dBm)	300mW
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	This unit is a boarding gate reader to be used at primarily at airport check-in desks and at point of boarding
If unit is SRD being tested to ETS 301 489-3 please state Class of Equipment as defined in Section 6.1	

BATTERY/POWER SUPPLY		
MANUFACTURING DESCRIPTION		
MANUFACTURER		
TYPE		
PART NUMBER		
VOLTAGE		
SERIAL NUMBER		

ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			

Signature Mohamed Ismail Bari

Date 24 June 2014

D of B S Serial No _____

4.1 PRODUCT INFORMATION

4.1.1 Technical Description

The Equipment Under Test (EUT) was a Access Interfacing Solutions BGR135C. A full technical description can be found in the manufacturer's documentation.

4.2 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 12.0 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

4.3 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard

4.4 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
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Product Service

5.1 FIELD STRENGTH OF ANY EMISSION

5.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.225 (a)(b)(c)(d)

5.1.2 Equipment Under Test and Modification State

BGR135C S/N: Golden Sample #2 - Modification State 0

5.1.3 Date of Test

29 June 2014

5.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

5.1.5 Test Procedure

The EUT was placed on a remotely controlled turntable within a semi-anechoic chamber. Measurements of the Fundamental Frequency and any Spurious Radiated Emissions were measured as described below.

A preliminary profile of the Spurious Radiated Emissions was obtained over the range 9 kHz to 1 GHz.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measurement later. The distance from the measuring antenna to the boundary of the EUT is 3m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. All emissions over the range 9 kHz to 1 GHz were measured with a CISPR Quasi - Peak detector function.
The measurement bandwidths were as follows: for emissions in the range 9 kHz to 150 kHz a 200 Hz Resolution Bandwidth was used. For emissions in the range 150 kHz to 30 MHz a 9 kHz Resolution Bandwidth was used. For emissions in the range 30 MHz to 1GHz a 120 kHz Resolution Bandwidth was used.

To determine compliance with the specification, the level of the measured spurious emissions was compared to the limits in FCC 15.209. The level of the fundamental was compared to the limits in FCC 15.225.

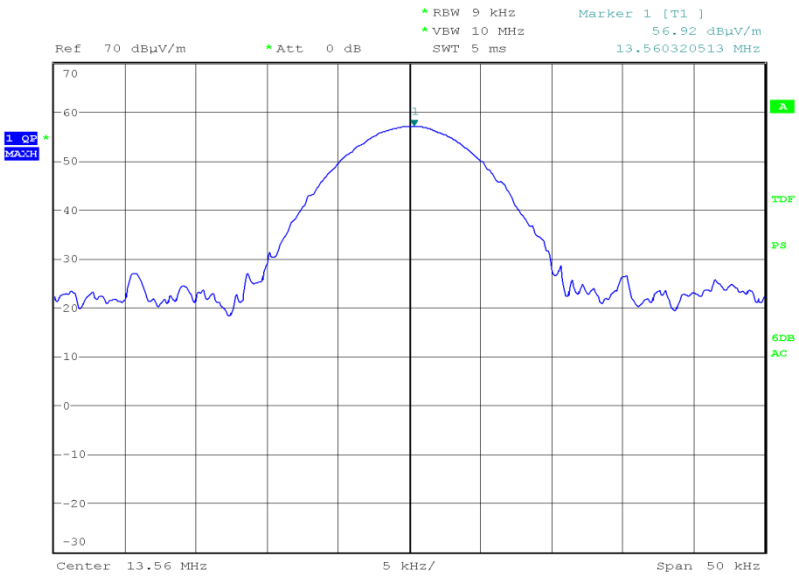
5.1.6 Environmental Conditions

Ambient Temperature	20.6°C
Relative Humidity	51.0%

5.1.7 Test Results

12.0 V DC Supply

Carrier



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Frequency (MHz)	QP Level (dBµV/m) at 3m	QP Level (µV/m) at 3m	QP Limit (dBµV/m) at 3m	QP Limit (µV/m) at 30m	Angle (deg)	Height (m)	Polarity
13.560	56.92	701.46	124	15848.00	212	1.5	Face On
0.833	49.45	296.83	69.19	2880.71	23	1.5	Face On
1.389	50.17	322.48	64.75	1727.83	32	1.5	Face On
1.667	43.41	148.08	63.17	1440.46	32	1.5	Face On
1.944	44.23	162.74	69.54	2999.16	28	1.5	Face On

Product Service

9 kHz to 150 kHz

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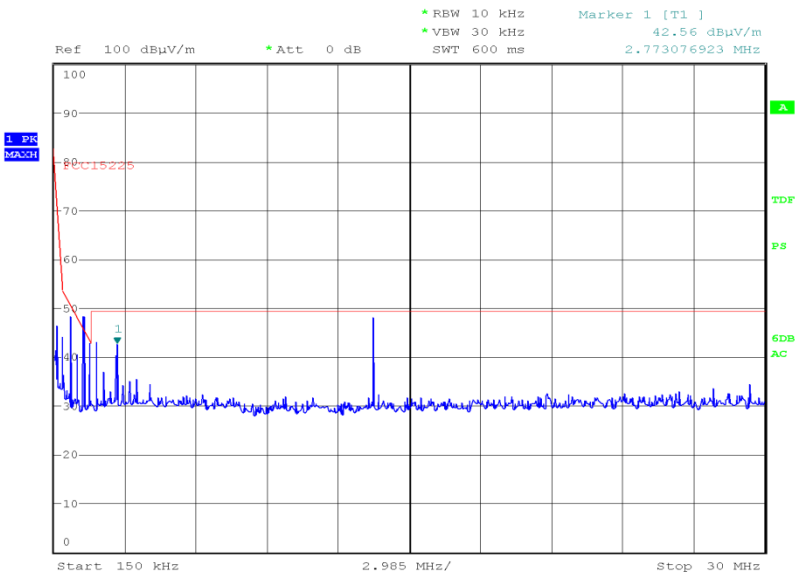
150 kHz to 30 MHz



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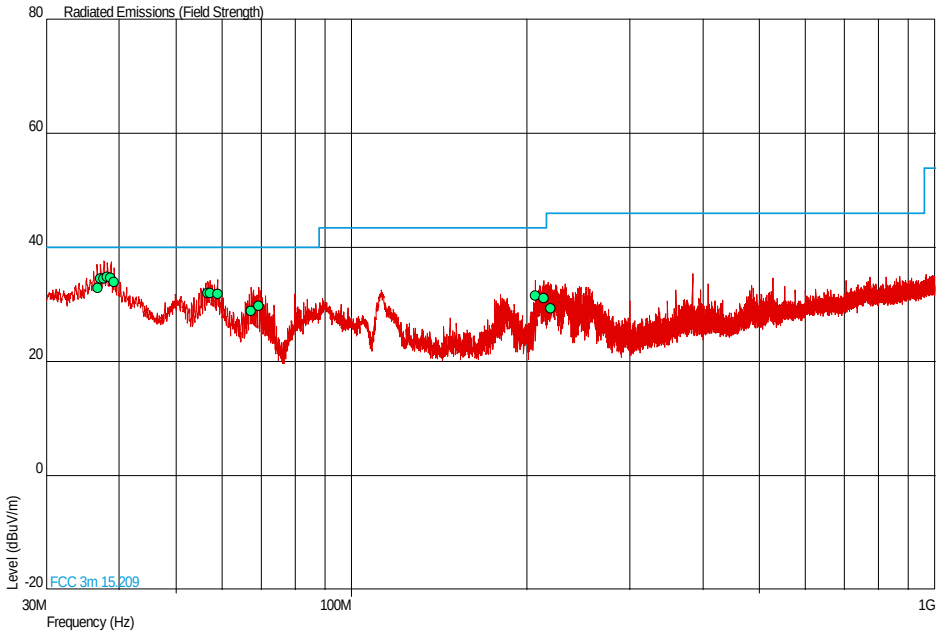
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
36.723	33.0	44.7	40.0	100	-7.0	-55.3	165	1.00	Vertical
37.178	34.6	53.7	40.0	100	-5.4	-46.3	360	1.06	Vertical
37.664	34.6	53.7	40.0	100	-5.4	-46.3	243	1.00	Vertical
38.179	34.9	55.6	40.0	100	-5.1	-44.4	0	1.00	Vertical
38.684	34.6	53.7	40.0	100	-5.4	-46.3	168	1.00	Vertical
39.195	33.9	49.5	40.0	100	-6.1	-50.5	360	1.15	Vertical
56.782	32.0	39.8	40.0	100	-8.0	-60.2	2	1.00	Vertical
57.267	32.1	40.3	40.0	100	-7.9	-59.7	25	1.00	Vertical
58.981	31.8	38.9	40.0	100	-8.2	-61.1	290	1.00	Vertical
67.400	28.9	27.9	40.0	100	-11.1	-72.1	222	1.64	Vertical
69.299	29.8	30.9	40.0	100	-10.2	-69.1	311	1.06	Vertical
206.476	31.5	37.6	43.5	150	-12.0	-112.4	38	1.00	Horizontal
213.398	31.1	35.9	43.5	150	-12.4	-114.1	216	1.36	Horizontal
219.274	29.3	29.2	46.0	200	-16.7	-170.8	63	1.00	Horizontal

For any emissions measured below 30 MHz, the following correction factor was applied to extrapolate the limit from 30 metres to 3 metres. 40 Log (30/3) = 40 dB.

5.2 OCCUPIED BANDWIDTH

5.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.225, 15.215 (c)

5.2.2 Equipment Under Test and Modification State

BGR135C S/N: Golden Sample #2 - Modification State 0

5.2.3 Date of Test

24 June 2014

5.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

5.2.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.215 (c).

The EUT was connected to a spectrum analyser via a test jig. The EUT was transmitting at maximum power polling between type A and type B modulation. The resultant trace was displayed on screen and the peak point of the trace was measured with the analyser configured to max hold, peak detector. The markers were positioned to give the -20 dBc points of the displayed spectrum and the delta value between these two points was recorded as the 20 dB bandwidth as shown by the plot below.

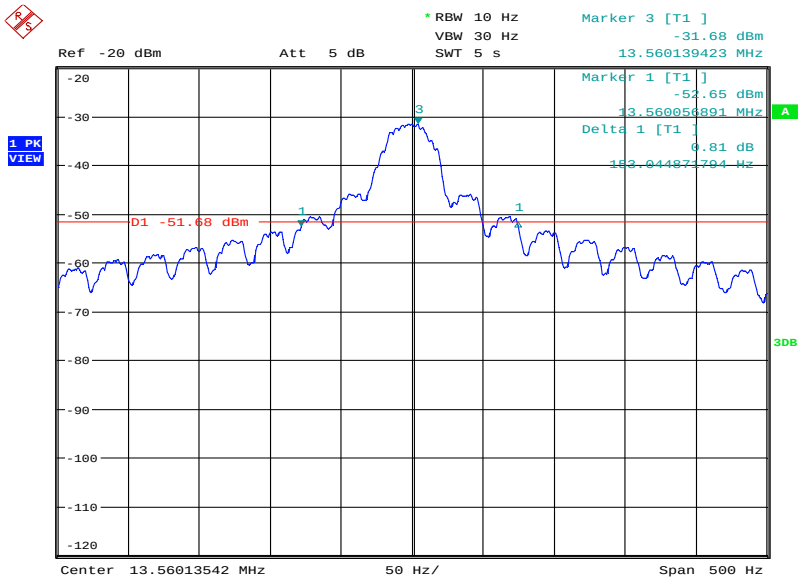
5.2.6 Environmental Conditions

Ambient Temperature	24.8°C
Relative Humidity	47.4%

5.2.7 Test Results

12.0 V DC Supply

Frequency (MHz)	20 dB Bandwidth (Hz)
13.56	153.04



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5.3 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

5.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.225 (e)

5.3.2 Equipment Under Test and Modification State

BGR135C S/N: Golden Sample #2 - Modification State 0

5.3.3 Date of Test

25 June 2014

5.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

5.3.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.225(e).

The EUT was connected to a spectrum analyser via a test jig. The EUT was transmitting at maximum power polling between type A and type B modulation. The spectrum analyser was configured with a 10 Hz RBW and video bandwidth of 30 Hz with max hold and peak detector and the peak value was recorded as the frequency error. The measurement was repeated with the temperature adjusted between -20°C and +50°C in 10° steps as per 15.225 (e) and additionally at 20°C for 85% to 115% of the rated supply voltage.

5.3.6 Environmental Conditions

Ambient Temperature	25.1°C
Relative Humidity	37.9%

5.3.7 Test Results

RFiD

Temperature Interval (°C)	Voltage	Test Frequency (MHz)	Deviation (%)
-20	12.0 V DC	13.56.0175	0.00129
-10	12.0 V DC	13.560169	0.00125
0	12.0 V DC	13.560147	0.00109
+10	12.0 V DC	13.560130	0.00096
+20	13.8 V DC	13.560108	0.00080
+20	12.0 V DC	13.560107	0.00079
+20	10.2 V DC	13.560107	0.00079
+30	12.0 V DC	13.560091	0.00067
+40	12.0 V DC	13.560093	0.00069
+50	12.0 V DC	13.560099	0.00073

Limit Clause

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

6.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 - Field Strength of any Emission					
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	30-Oct-2014
Antenna (Dish/Tripod/Adaptor, 1GHz-18GHz)	Rohde & Schwarz	AC-008	334	-	TU
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.2 - Occupied Bandwidth					
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.3 - Frequency Stability Under Temperature Variations					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Digital Temperature Indicator + T/C	Fluke	51	412	12	12-Feb-2015
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Power Supply	Farnell	LT30-2	2903	-	TU
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

6.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Frequency Stability Under Temperature Variations	± 3.54 Hz
Field Strength of any Emission	9 kHz to 1 GHz: ± 5.1 dB
Occupied Bandwidth	± 16.74 kHz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

7.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).