

DATE: 01 September 2010

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report


for

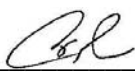
Visonic Ltd.

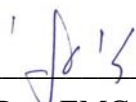
Equipment under test:

**Wireless Repeater for Power Code
Communications**

MCX-610 (PCI) (315 MHz)

Written by: 
D. Shidlow, Documentation

Approved by: 
A. Sharabi, Test Engineer

Approved by: 
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

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1. General Information

1.1 Administrative Information

Manufacturer:	Visonic Ltd.
Manufacturer's Address:	24 Habarzel ST. Tel Aviv 69710 Israel Tel: +936-03-645-6789 Fax: +936-03-645-6788
Manufacturer's Representative:	Arik Elshtein
Equipment Under Test (E.U.T):	Wireless Repeater for Power Code Communications
Equipment Model No.:	MCX-610 (PCI) (315 MHz)
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	01.07.10
Start of Test:	02.07.10
End of Test:	08.07.10
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Subpart C

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 **Product Description**

The MCX-610 is a range extender designed to relay digital data between wireless devices and a control panel. Repeater links are required when the control panel is beyond the range of at least some of the devices and is therefore incapable of receiving transmissions directly

Devices whose message transmissions need to be repeated by the repeater must be enrolled to the repeater and to the control panel.

Features

Supports 1way and 2way keyfob and detector devices

Mains powered

36 hours backup battery (rechargeable)

Front and back tamper protected

Enrolment and test buttons

Diagnostic of installation performance

Power fail indication (green LED)

Activity (RF) indication (blue LED)

Compatible with PowerMaxExpress PowerMaxComplete PowerMaxPro,

PowerMax+ and PowerMax1 versions

Indoor environment

AC Power Supply: AC to AC adaptor.

120 VAC, 60 Hz / 9 VAC, 0.35 A min. (in the U.S.A.)

230 VAC, 50 Hz / 9 VAC, 0.35 A min.

Backup Battery: 4.8-Volt 1300 mAh NiMH rechargeable.

1.4 **Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 **Test Facility**

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 3, 2009).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission

The uncertainty for this test is ± 2 dB.

Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. System Test Configuration

2.1 *Justification*

The E.U.T. is a wall mounted device and was tested in the vertical position.

2.2 *EUT Exercise Software*

Manufacturing software was used for the tests.

2.3 *Special Accessories*

No special accessories were needed.

2.4 *Equipment Modifications*

No modifications were needed in order to achieve compliance

2.5 *Configuration of Tested System*

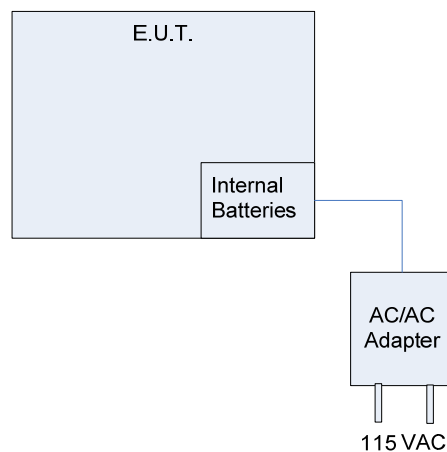


Figure 1. Configuration of Tested System

3. Conducted and Radiated Measurement Test Set-up Photo



Figure 2. Conducted Emission Test



Figure 3. Radiated Emission Test

Conducted Emission

E.U.T Description Wireless Repeater for Power
Code Communications
Type MCX-610 (PCI) (315 MHz)
Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C
Lead: Phase
Detectors: Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.192597	5.0	-5.6	-69.5	-13.0	-66.9	0.0
2	0.601482	-1.5	-8.0	-64.0	-15.1	-61.1	0.0
3	0.663879	-3.7	-8.4	-64.4	-15.2	-61.2	0.0
4	4.001093	2.7	-0.2	-56.2	-2.2	-48.2	0.0
5	15.489818	9.0	7.5	-52.5	6.5	-43.5	0.0
6	17.805921	10.6	7.6	-52.4	3.8	-46.2	0.0

Figure 4. Detectors: Peak, Quasi-peak, AVERAGE .

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description Wireless Repeater for Power
Code Communications
Type MCX-610 (PCI) (315 MHz)
Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C
Lead: Phase
Detectors: Peak, Quasi-peak, Average



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 540 kHz
14.79 dB μ V

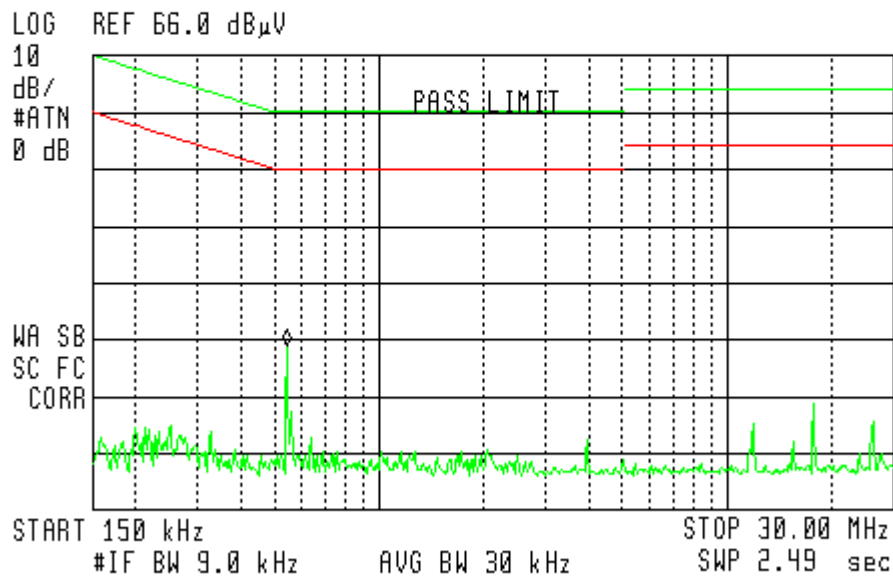


Figure 5. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description Wireless Repeater for Power
Code Communications
Type MCX-610 (PCI) (315 MHz)
Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C
Lead: Neutral
Detectors: Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.221642	5.4	0.2	-62.7	-6.5	-59.3	0.0
2	0.310443	2.5	-2.6	-62.5	-9.1	-59.1	0.0
3	0.554625	3.0	-2.6	-58.6	-8.9	-54.9	0.0
4	4.000131	10.8	8.2	-47.8	6.0	-40.0	0.0
5	11.824655	0.8	-3.5	-63.5	-9.9	-59.9	0.0
6	15.490121	7.3	3.9	-56.1	1.1	-48.9	0.0

Figure 6. Detectors: Peak, Quasi-peak, AVERAGE

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

4.4 Test Instrumentation Used, Conducted Measurement

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	Fischer	FCC-LISN-2A	127	March 3, 2010	1 Year
LISN	Fischer	FCC-LISN-2A	128	March 3, 2010	1 Year
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 Year
RF Filter Section	HP	85420E	3705A00248	November 10, 2009	1 Year
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

5. Average Factor Calculation

$$1. \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \right] = 66\% \text{ (worst case, customer declaration)}$$

$$2. \text{Burst duration} = 41.5 + 41.5 + 7 = 90 \text{ msec}$$

$$3. \text{Time between bursts} = 5 + 5 = 10 \text{ msec}$$

$$4. \text{Average Factor} = 20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100 \text{ msec}} \right]$$

$$\text{Average Factor} = 20 \log \left[\frac{2}{3} \times \frac{90}{100} \right] = -4.44 \text{ dB}$$

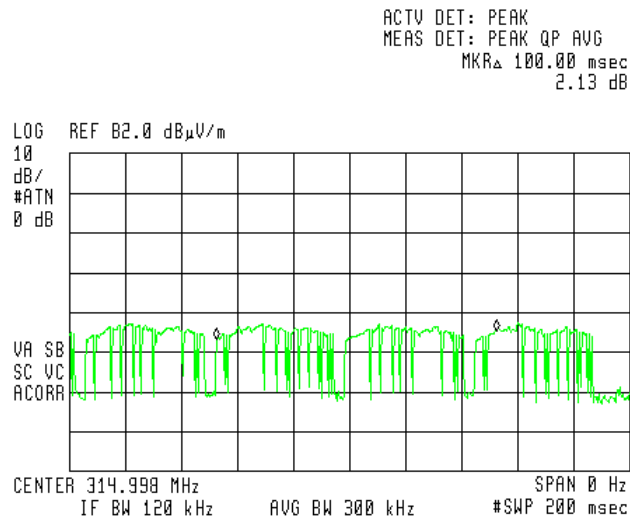


Figure 8. Transmission within 100 msec. window



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 41.500 msec
1.40 dB

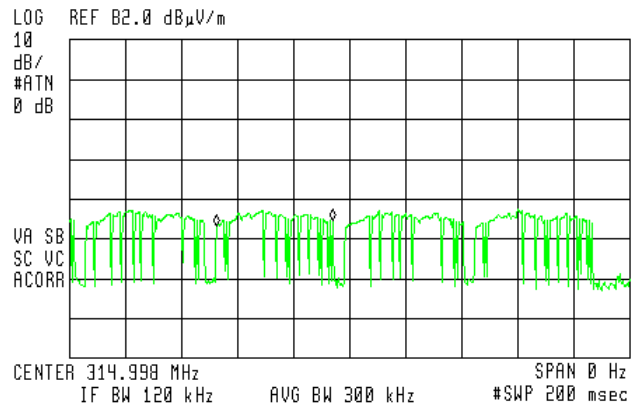


Figure 9. First Burst Duration = 41.5 msec.



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 41.500 msec
.98 dB

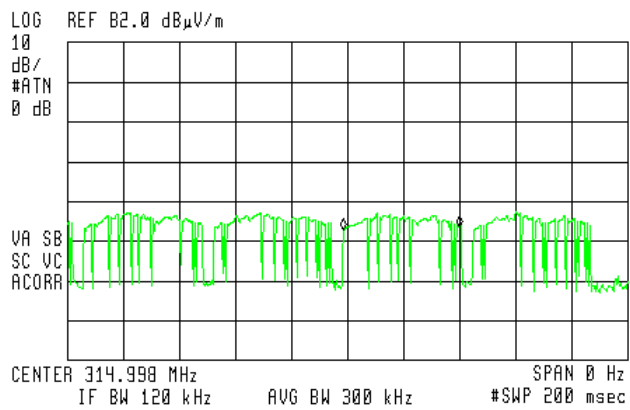


Figure 10. Second Burst Duration = 41.5 msec.



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 7.0000 msec
2.31 dB

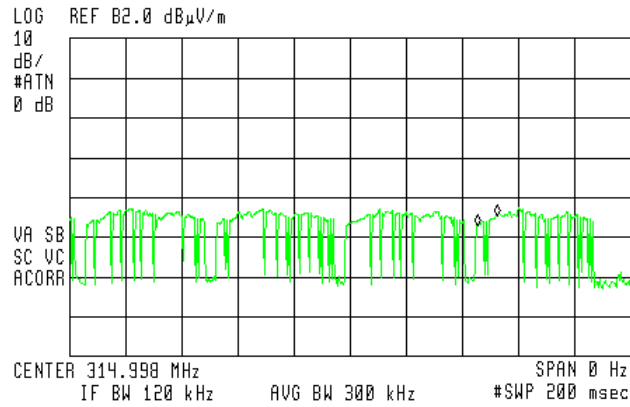


Figure 11. Remain Burst duration (Within 100msec window) = 7 msec



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 5.0000 msec
-1.61 dB

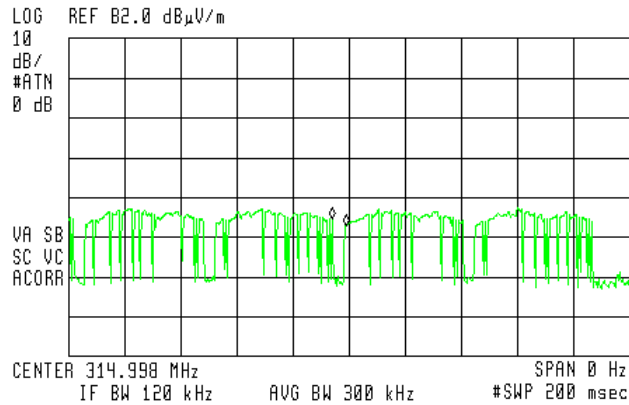


Figure 12. First Time between bursts = 5msec



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 5.0000 msec
-1.44 dB

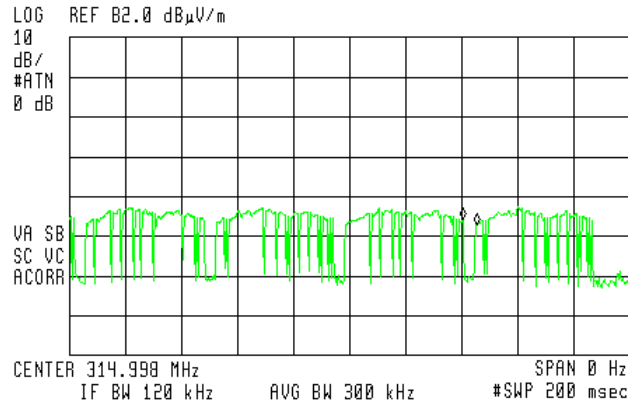


Figure 13. Second Time between bursts = 5msec

5.1 Test Instrumentation Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 Year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 Year
Antenna Bioconical	ARA	BCD 235/B	1041	August 3, 2009	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 29, 2009	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

6. Periodic Operation

6.1 Specification

F.C.C., Part 15, Subpart C, Section 15.231(a)

6.2 Requirements


Requirement	Rationale	Verdict
Continuous transmissions are not permitted.	N/A	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	N/A	Complies
An automatically operated transmitter shall cease operation within 5 seconds after activation.	See plots in Figure 14 to Figure 15	Complies
Periodic transmissions at regular predetermined intervals are not permitted.	N/A	Complies
Polling or supervised transmissions to determine system integrity of transmitter used in security or safety applications shall not exceed more than 2 seconds per hour.	See plots in Figure 14 to Figure 15	Complies

6.3 Results

JUDGEMENT: Passed

The EUT met the FCC Part 15, Subpart C, Section 15.231(a) specification requirements.

TEST PERSONNEL:

Tester Signature:  Date: 30.08.10

Typed/Printed Name: A. Sharabi

Periodic Operation

E.U.T Description Wireless Repeater for Power Code Communications
 Type MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

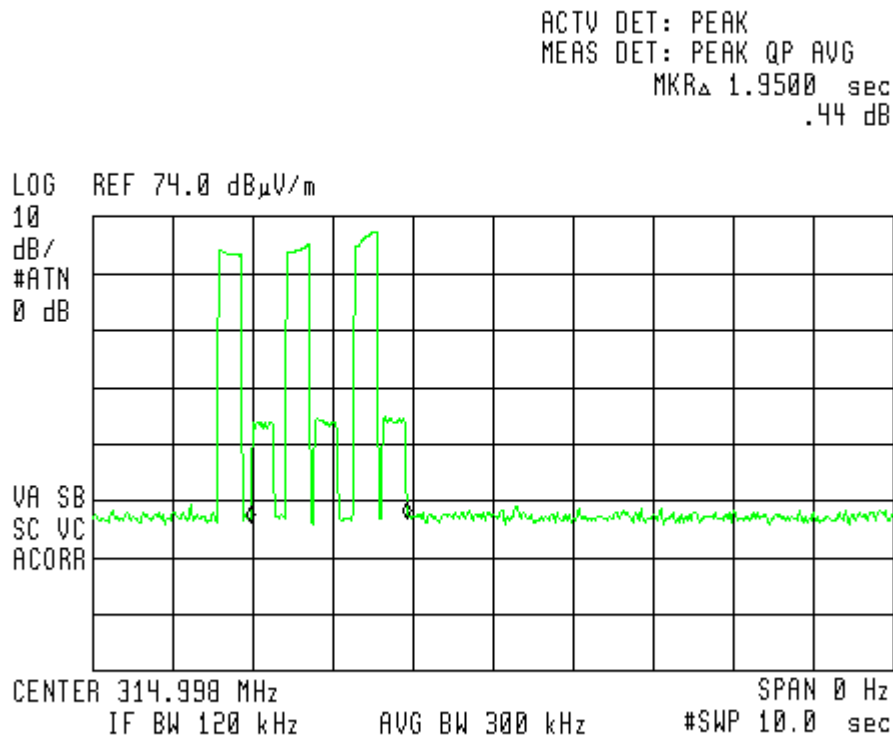


Figure 14. Automatically operated transmission (1.95sec)

Note: The bursts above with the high level received from the magnet sensor and the low bursts level received from the repeater. It is showing below that the repeater transmits exactly the same burst it received.

Periodic Operation

E.U.T Description Wireless Repeater for Power Code Communications
 Type MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 325.00 msec
 .21 dB

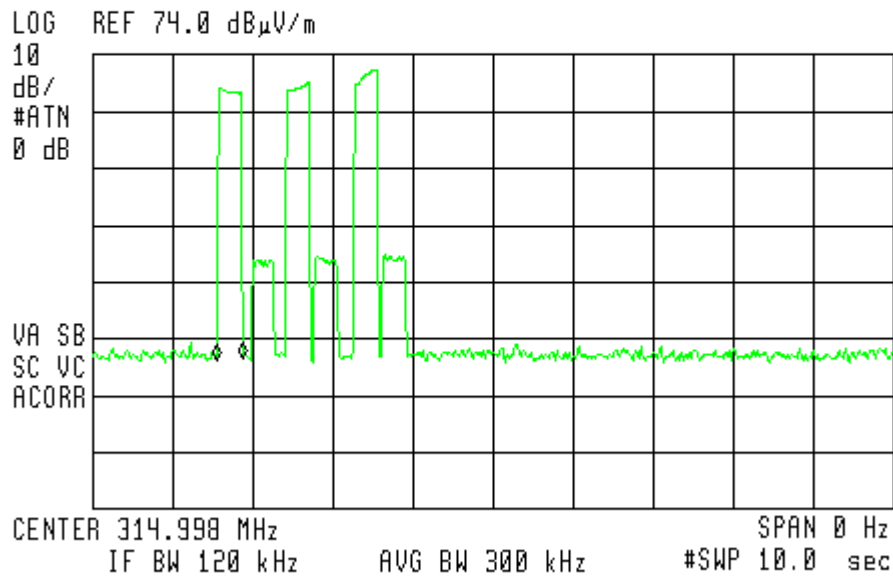


Figure 15. Source Burst Duration

Periodic Operation

E.U.T Description Wireless Repeater for Power Code Communications
 Type MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

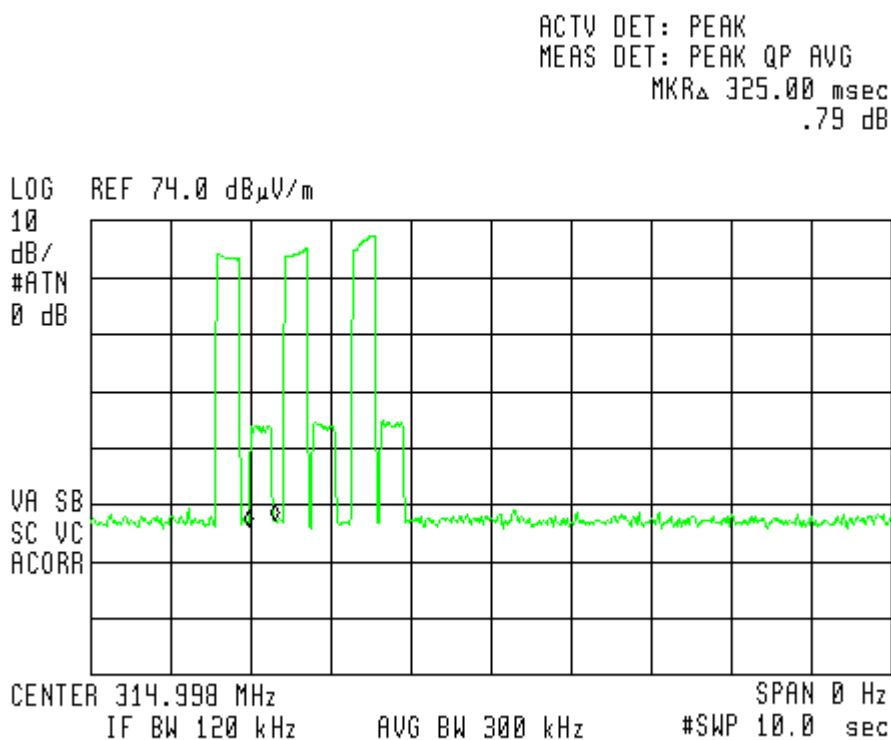


Figure 16. Repeater Respective Burst Duration

Field Strength of Fundamental

E.U.T Description Wireless Repeater for Power Code
Communications
Type MCX-610 (PCI) (315 MHz)
Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detector: Peak

Freq.	Pol.	Peak Reading	Average Factor	Average Result	Average Specification	Margin
(MHz)	V/H	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
315.00	H	78.78	-4.44	74.34	75.6	-1.26
315.00	V	74.62	-4.44	70.18	75.6	-5.42

Figure 17. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak

Notes:

1. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.
2. "Peak Reading." (dB μ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dB μ V/m)=Peak Reading (dB μ V/m)+ Average Factor (dB)

Field Strength of Fundamental

E.U.T Description Wireless Repeater for Power Code Communications
 Type MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detectors: Peak, Quasi-peak, Average

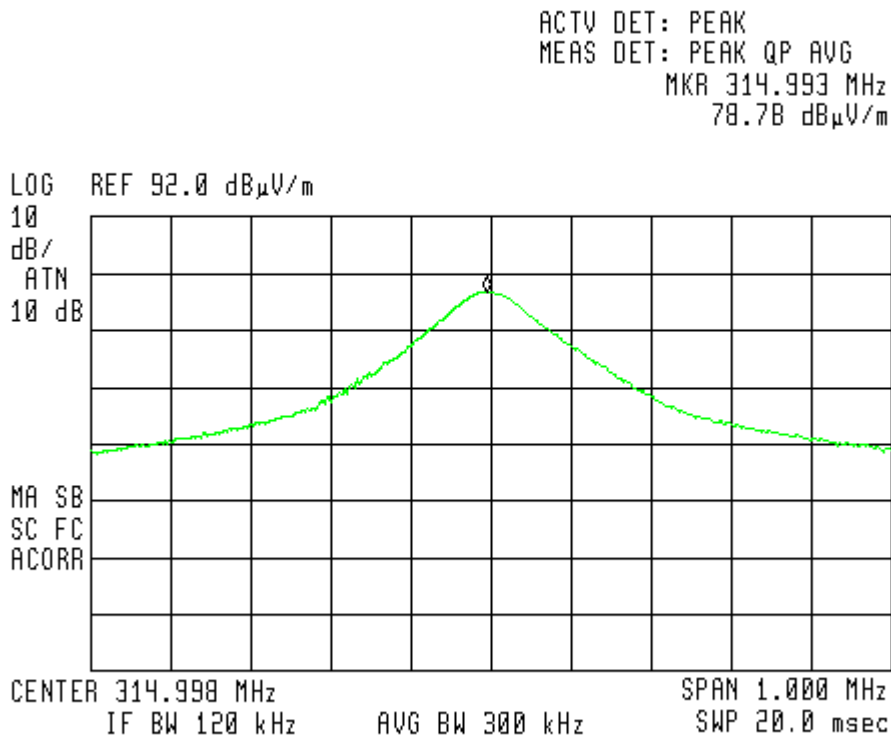


Figure 18. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.
 Detectors: Peak, Quasi-peak, Average

7.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

8. Spurious Radiated Emission, 9 kHz – 30 MHz

8.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

8.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 10 meters.


The E.U.T. was operated at the frequency of kHz. This frequency was measured using a peak detector.

8.3 Measured Data

JUDGEMENT: Passed

No signals were found in the frequency range of 9 kHz to 30 MHz.

TEST PERSONNEL:

Tester Signature: 

Date: 30.08.10

Typed/Printed Name: A. Sharabi

8.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2009	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

8.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB μ v/m]

RA: Receiver Amplitude [dB μ v]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

Example: FS = 30.7 dB μ V (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μ V

No external pre-amplifiers are used.

9. Spurious Radiated Emission, 30 MHz – 3500 MHz

9.1 Test Specification

30 - 3500 MHz, F.C.C., Part 15, Subpart C

9.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3. See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1. The signals from the list of the highest emissions were verified and the list was updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9 – 3.5 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.

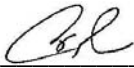
9.3 **Test Data**

JUDGEMENT: Passed by 16.7 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The margin between the emission level and the specification limit was 16.7 dB in the worst case at the frequency of 945.00 MHz, vertical polarization.

TEST PERSONNEL:

Tester Signature: _____ 

Date: 30.08.10

Typed/Printed Name: A. Sharabi

Radiated Emission

E.U.T Description Wireless Repeater for Power Code Communications
 Type MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 30 MHz to 3500 MHz
 Antenna: 3 meters distance Detectors: Peak

Frequency (MHz)	Antenna Polarity (H/V)	Peak Reading (dB μ V/m)	Average Factor (dB μ V/m)	Average Result dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
630.00	V	22.93	-4.44	18.49	55.62	-37.13
630.00	H	24.31	-4.44	19.87	55.62	-35.75
945.00	V	43.36	-4.44	38.92	55.62	-16.70
945.00	H	38.14	-4.44	33.70	55.62	-21.92
1260.00	V	34.28	-4.44	29.84	55.62	-25.78
1260.00	H	33.63	-4.44	29.19	55.62	-24.63
1575.00	V	41.60	-4.44	37.16	55.62	-18.46
1575.00	H	40.40	-4.44	35.96	55.62	-19.66

**Figure 20. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak**

Notes:

1. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.
2. "Peak Reading." (dB μ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dB μ V/m)=Peak Reading (dB μ V/m)+ Average Factor (dB)

9.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	013	January 13, 2010	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	March 14, 2010	1 Year
Antenna Bioconical	ARA	BCD 235/B	1041	August 3, 2009	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 29, 2009	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

10. Bandwidth

10.1 Test procedure

The transmitter unit operated with normal modulation. The spectrum analyzer was set to 30 kHz resolution BW and center frequency of the transmitter fundamental. The spectrum bandwidth of the transmitter unit was measured and recorded. The BW was measured at 20 dBc points.

The EUT was set up as shown in Figure 1, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on the modulation envelope.

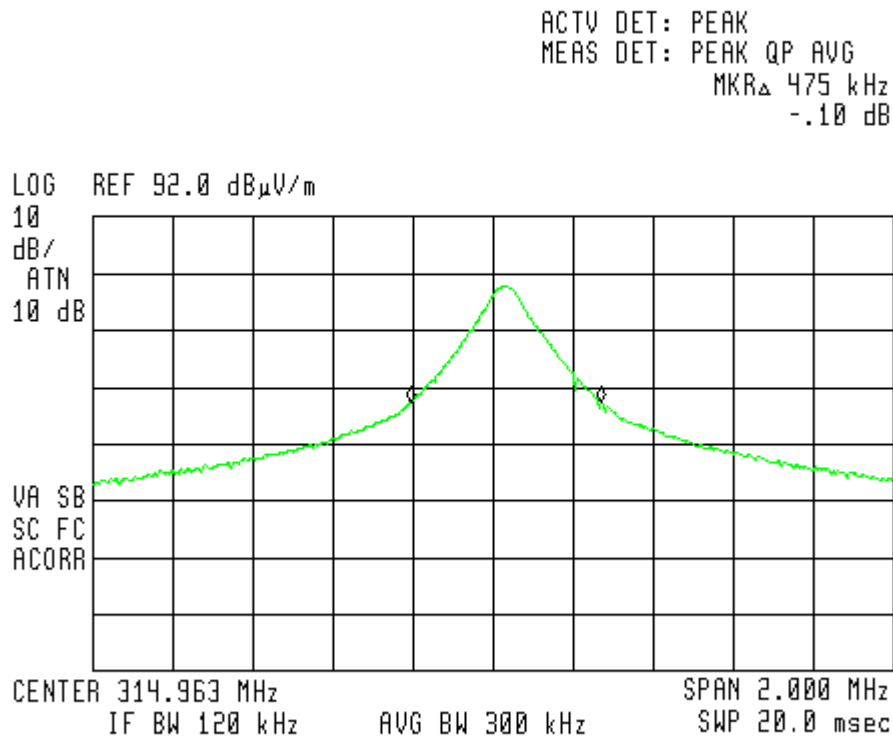


Figure 21 Center Frequency

10.2 Results table

E.U.T Description: Wireless Repeater for Power Code Communications
 Model: MCX-610 (PCI) (315 MHz)
 Serial Number: Not Designated
 Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (1) (kHz)	Margin (kHz)
475	787.5	-312.5

Figure 22 Bandwidth

JUDGEMENT: Passed by 312.5 kHz

TEST PERSONNEL:

Tester Signature: _____ Date: 30.08.10

Typed/Printed Name: A. Sharabi

(1) 0.25% of the E.U.T. fundamental frequency, Section 15.231(c).

10.3 Test Equipment Used.

Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

Figure 23 Test Equipment Used

11. 11. APPENDIX A - CORRECTION FACTORS

11.1 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
90.0	1.6		
100.0	1.7		
150.0	2.0		
200.0	2.3		
250.0	2.7		
300.0	3.1		
350.0	3.4		
400.0	3.7		
450.0	4.0		
500.0	4.3		
600.0	4.7		
700.0	5.3		
800.0	5.9		
900.0	6.3		
1000.0	6.7		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

11.2 Correction factors for CABLE
from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

- 1. The cable type is RG-8.*
- 2. The overall length of the cable is 10 meters.*

11.3 Correction factors for CABLE
from spectrum analyzer
to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.
2. The cable is used for measurements above 2.9 GHz.
3. The overall length of the cable is 10 meters.

12.6 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M30.ANT for a 3 meter range,
and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission
Test EMI Receiver".

11.4 Correction factors for

LOG PERIODIC ANTENNA

**Type SAS-200/511
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.
2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.
3. The files mentioned above are located on the disk marked "Antenna Factors".

**11.5 Correction factors for BICONICAL ANTENNA
Type BCD-235/B,
at 3 meter range**

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

11.6 Correction factors for ACTIVE LOOP ANTENNA

Model 6502

S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2

12. Comparison requirements FCC with Industry Canada

FCC Specification	According FCC Standard	IC Standard
Periodic Operation	FCC Part 15.231 (a)(1-5)	RSS- 210 Section 2.6 Annex 1, A1.1.1
Field Strength at Fundamental	FCC Part 15.231 (b)	RSS- 210 Annex 1 A1.1.2, Section 2.6
Spurious Emissions and Intermodulation	FCC Part 15.231 (b)	RSS- 210 Section 2.6 Annex 1 A1.1.2
Bandwidth	FCC Part 15.231 (c)	RSS- 210 Section 2.6 Annex 1 A1.1.3