



Electromagnetic Compatibility Test Report

Tests Performed on a Macmillan New Ventures'

iClicker+, Model ICL24-SR

Radiometrics Document RP-7739B



Product Detail:

FCC ID: T24-ICL24

IC: 6495C-ICL24

Equipment type: Low power 2.4 GHz transceiver

Test Standards:

US CFR Title 47, Chapter I, FCC Part 15 Subpart C

FCC Part 15 CFR Title 47: 2012

Industry Canada RSS-210, Issue 8: 2010 as required for Category I Equipment

This report concerns: Original Grant for Certification

FCC Part 15.249

Tests Performed For:

Holtzbrinck Publishers, LLC

c/o Macmillan New Ventures

33 Irving Place, 9th Floor

New York, NY 10003

Test Facility:

Radiometrics Midwest Corporation

12 East Devonwood

Romeoville, IL 60446

Test Date(s): (Month-Day-Year)

December 5, 2013 to February 5, 2014

Document RP-7739 Revisions:

Rev.	Issue Date	Affected sections	Revised By
0	May 1, 2014		
1	May 27, 2014	10.1	Joseph Strzelecki
2	May 29, 2014	10.1	Joseph Strzelecki

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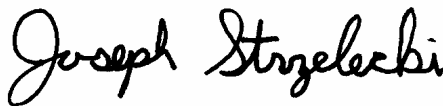
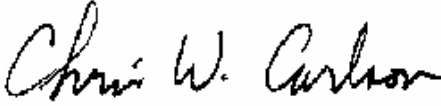
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RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Macmillan New Ventures, Model ICL24-SR, iClicker+ Transmitter

1 ADMINISTRATIVE DATA

<i>Equipment Under Test:</i> A Macmillan New Ventures, iClicker+ Transmitter Model: ICL24-SR, Serial Number: none This will be referred to as the EUT in this Report	
<i>Date EUT Received at Radiometrics: (Month-Day-Year)</i> February 3, 2012	<i>Test Date(s): (Month-Day-Year)</i> February 3 thru March 12, 2012
<i>Test Report Written By:</i> Joseph Strzelecki Senior EMC Engineer	<i>Test Witnessed By:</i> The tests were not witnessed by Macmillan New Ventures
<i>Radiometrics' Personnel Responsible for Test:</i>  Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE	<i>Test Report Approved By</i>  Chris W. Carlson Director of Engineering NARTE EMC-000921-NE

2 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is an iClicker+ Transmitter, Model ICL24-SR, manufactured by Macmillan New Ventures. The detailed test results are presented in a separate section. The following is a summary of the test results.

Emissions Tests Results

Environmental Phenomena	Frequency Range	Basic Standard	Test Result
RF Radiated Emissions	30-25,000 MHz	RSS-210 & FCC Part 15	Pass
Conducted Emissions, AC Mains	0.15 - 30 MHz	RSS-210 & FCC Part 15	Pass
Occupied Bandwidth Test	Fundamental Freq.	RSS-210 & FCC Part 15	Pass

Note: The RSS-210 specification is not currently covered in Radiometrics' Scope of Accreditation. This is technically very similar to FCC, CFR 47 Part 15 which is on Radiometrics scope.

2.1 RF Exposure Compliance Requirements

Since the power output is 2 mW, the EUT meets the FCC requirement for RF exposure. There are no power level adjustments and the antenna is permanently attached. The detailed calculations for RF Exposure are presented in a separate document.

3 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is an iClicker+ Transmitter wireless handheld classroom response device, Model ICL24-SR, manufactured by Macmillan New Ventures Division of Holtzbrinck. The EUT was in good working condition during the tests, with no known defects.

The EUT is a part of a 2400 MHz audience response system. It is used to collect votes from an audience, such as in educational settings. It operates in accordance with a proprietary RF protocol. It operates in the 2401 to 2482 MHz range.

3.2 Product Family

The following is the product family list of the transmitters that use the same electronics and PCB as the one tested in this report:

Model Number	Model Number
ICL24-SR	ICL24-IR

The ICL24-SR is the student remote. The ICL24-IR is the instructor remote. The two are identical, except that the plastic case is a different color, and the software allows it to send votes even when the base unit is in a closed state. Both have the same PCB and components, the same TX power, channels, and duty cycle.

3.2.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The 900 MHz antenna is permanently attached to the PCB via a trace on the circuit board. The antenna is internal to the EUT and it is not readily available to be modified by the end user. Therefore, it meets the 15.203 Requirement

3.3 Related Submittals

The associated receiver is operated under 15.249. It is subject to the FCC requirements pursuant to the Certification equipment authorization under Part 15 Subpart C, and is being submitted as FCC ID: T24-ICL24B & IC: 6495C-ICL24B.

The associated receiver is subject to the IC requirements pursuant to the Certification equipment authorization under RSS-210. The associated receiver is subject to the IC requirements pursuant to the Certification equipment authorization under RSS-210.

4 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

The EUT was tested as a stand-alone device. Power was supplied with new batteries.

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Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	iClicker Transmitter	E	Macmillan New Ventures	ICL24-SR	None
2	iClicker Transmitter	E	Macmillan New Ventures	ICL24-IR	None

* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

4.2 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.3 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5 TEST SPECIFICATIONS AND RELATED DOCUMENTS

Document	Date	Title
FCC CFR Title 47	2012	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices
ANSI C63.4-2009	2009	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2009	2009	American National Standard for Testing Unlicensed Wireless Devices
IC RSS-210 Issue 8	2010	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment
IC RSS-Gen Issue 3	2010	General Requirements and Information for the Certification of Radiocommunication Equipment (RSS-Gen)
FCC 558074	2005	Measurement of Digital Transmission Systems Operating under Section 15.247

The test procedures used are in accordance with the Industry Canada RSS-GEN and ANSI document C63.10. Radiated testing was performed at an antenna to EUT distance of 3 meters.

6 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 2005 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during the tests:

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

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Test Station F: Is an area that measures 10' D X 12' W X 10' H. The floor and back wall are metal shielded. This area is used for conducted emissions measurements.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as site number IC8727A-1.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

9 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12GHz	12 Mo.	06/25/13
AMP-20	Avantek	Pre-amplifier	SF8-0652	15221	8-18GHz	12 Mo.	01/17/14
AMP-22	Anritsu	Pre-amplifier	MH648A	M23969	0.1-1200MHz	12 Mo.	01/15/14
AMP-29	HP / Agilent	Amplifier	11975A	2304A00158	2-8 GHz	12 Mo.	12/20/13
ANT-03	Tensor	Biconical Antenna	4104	2231	20-250MHz	24 Mo.	11/26/13
ANT-04	Tensor	Biconical Antenna	4104	2246	20-250MHz	24 Mo.	05/02/12
ANT-06	EMCO	Log-Periodic Ant.	3146	1248	200-1000MHz	24 Mo.	11/26/13
ANT-08	RMC	Log-Periodic Ant.	LP1000	1002	200-1000MHz	24 Mo.	08/10/12
ANT-13	EMCO	Horn Antenna	3115	2502	1.0-18GHz	24 Mo.	12/05/12
ANT-44	ARA	Super Log Antenna	SL-20M2G	1002	20-2000MHz	24 Mo.	12/10/13
ANT-48	RMC	Std Gain Horn	HW2020	1001	18-26 GHz	12 Mo.	08/08/13
MXR-02	HP / Agilent	Harmonic Mixer	11970K	2332A00489	18-26.5GHz	12 Mo.	12/20/13
REC-03	Anritsu	Spectrum Analyzer	MS2601B	MT94589	0.01-2200MHz	12 Mo.	04/08/13
REC-07	Anritsu	Spectrum Analyzer	MS2601A	MT53067	0.01-2200MHz	12 Mo.	05/21/13
REC-08	HP / Agilent	Spectrum Analyzer	8566B	2648A13481 2209A01436	30Hz-22GHz	24 Mo.	11/21/13
REC-10	HP / Agilent	EMI Receiver	8546A	3842A00521 3704A00484	30Hz-6GHz	24 Mo.	01/13/14
REC-11	HP / Agilent	Spectrum Analyzer	E7405A	US39110103	9Hz-26.5GHz	12 Mo.	06/13/13
RNT-07	Agilent	Signal Analyzer	N9030A	MY51360006	3Hz-44 GHz	12 Mo.	10/01/13
THM-02	Fluke	Temp/Humid Meter	971	93490471	N/A	24 Mo.	06/27/13

Note: All calibrated equipment is subject to periodic checks.

NCR – No Calibration Required. Device monitored by calibrated equipment. N/A: Not Applicable.

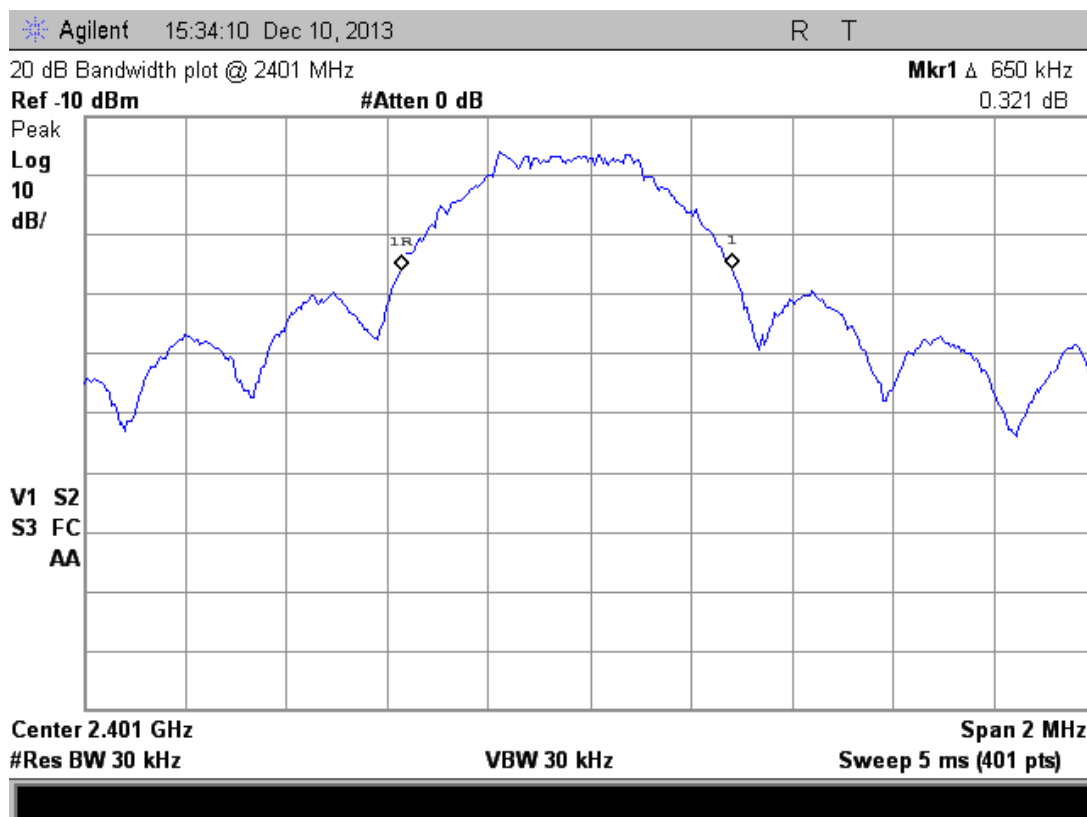
10 TEST SECTIONS

10.1 Occupied Bandwidth

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The EUT was transmitting at its maximum data rate. The trace was allowed to stabilize.

The marker-to-peak function was set to the peak of the emission. Then the marker-delta function was used to measure 20 dB down one side of the emission. The marker-delta function was reset and then moved to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

Channel MHz	20 dB EBW kHz
2401	650
2440	660
2482	650



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Agilent 17:10:50 Dec 6, 2013

R T

20 dB Bandwidth Plot @ 2440 MHz.

Mkr1 Δ 660 kHz

Ref -10 dBm

#Atten 0 dB

-0.361 dB

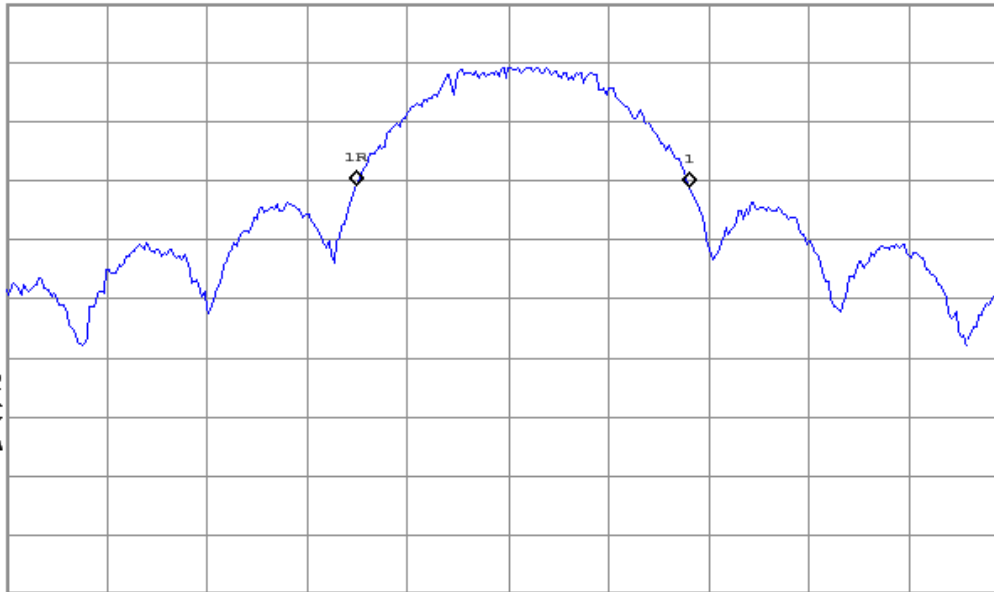
Peak

Log

10

dB/

V1 S2
S3 FC
AA



Center 2.44 GHz

Span 2 MHz

#Res BW 30 kHz

VBW 30 kHz

Sweep 5 ms (401 pts)

Agilent 17:11:15 Apr 22, 2014

R T

20 dB Bandwidth @ 2482 MHz; Remote

Mkr1 Δ 650 kHz

Ref -5 dBm

#Atten 5 dB

-0.24 dB

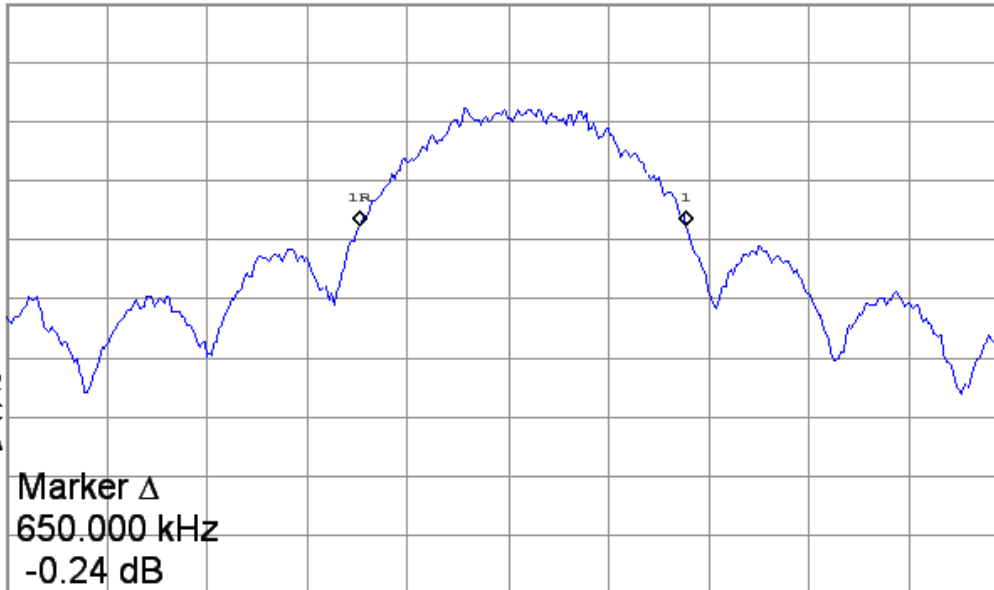
Peak

Log

10

dB/

V1 S2
S3 FC
AA



Center 2.482 GHz

Span 2 MHz

#Res BW 30 kHz

VBW 30 kHz

Sweep 5 ms (401 pts)

10.2 Radiated Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 150 kHz to 30 MHz is 9 or 10 kHz and the bandwidth from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists.

From 30 to 1000 MHz, an Anritsu spectrum analyzer was used. For tests from 1 to 25 GHz, an HP 8566 spectrum analyzer was used. For tests from 1 to 10 GHz, a high pass filter was used to reduce the fundamental emission. A harmonic mixer was used from 18 to 25 GHz. Figure 4 herein lists the details of the test equipment used during radiated emissions tests. In addition, a high pass filter was used to reduce the fundamental emission. The test device was rotated through three orthogonal axes as per 13.1.4.1 of ANSI C63.4 during the prescans and during final radiated tests.

Final radiated emissions measurements were performed inside of an anechoic chamber at a test distance of 3 meters. The anechoic chamber is designated as Chamber E. This Chamber meets the Site Attenuation requirements of ANSI C63.4 and CISPR 16-1. Chamber E is located at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 to 25000 MHz was slowly scanned with particular attention paid to those frequency ranges which appeared high. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded. All measurements may be performed using either the peak, average or quasi-peak detector functions. If the peak detector data exceeds or is marginally close to the limits, the measurements are repeated using a quasi-peak detector or average function as required by the specification for final determination of compliance.

The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground.

10.2.1 Radiated Emissions Field Strength Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

$$FS = RA + AF + CF - AG + HPF + PKA$$

Where: FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

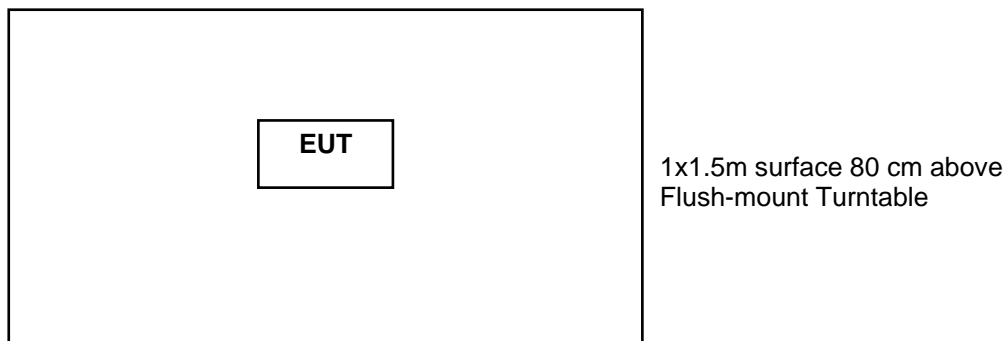
CF = Cable Attenuation Factor

AG = Amplifier Gain

PKA = Peak to Average Factor (This is zero for non-average measurements)

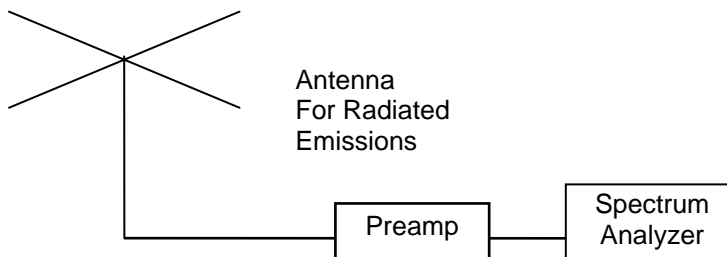
The Peak to average factor is used when average measurements are required. It is calculated by the highest duty cycle in percent over any 100mS transmission. The factor in dB is $20 * \text{Log}(\text{Duty cycle}/100)$.

Figure 1. Drawing of Radiated Emissions Setup



Notes:

- AC outlet with low-pass filter at the base of the turntable
- Antenna height varied from 1 to 4 meters
- Distance from antenna to tested system is 3 meters
- Not to Scale



Frequency Range	Receive Antenna	Pre-Amplifier	Spectrum Analyzer
30 to 1000 MHz	ANT-44	AMP-22	REC-11
1 to 10 GHz	ANT-13	AMP-05	REC-11
10 to 18 GHz	ANT-13	AMP-20	REC-11
18 to 25 GHz	ANT-48	AMP-29	REC-08; MXR-01

10.2.2 Radiated Emissions Test Results

The following spectrum analyzer settings were used.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

A Video Bandwidth of 10 Hz was used for Average measurements above 1 GHz.

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10.2.2.1 Transmit and Receive Emissions Below 1 GHz

Test Date	February 5, 2014
Test Distance	3 Meters
Specification	FCC Part 15 Subpart C & RSS-210
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP
Configuration	Receive and Transmit mode

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/am p Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
39.3	30.9	P	H	16.3	-18.4	0.0	28.8	40.0	11.2
107.6	34.6	P	H	11.2	-17.9	0.0	27.8	43.5	15.7
160.4	36.7	P	H	10.7	-17.7	0.0	29.7	43.5	13.8
197.2	38.6	P	H	9.8	-17.5	0.0	30.9	43.5	12.6
246.1	36.1	P	H	12.5	-17.5	0.0	31.1	46.0	14.9
256.9	32.4	P	H	12.9	-17.6	0.0	27.7	46.0	18.3
396.3	36.5	P	H	15.8	-17.4	0.0	34.9	46.0	11.1
477.5	30.8	P	H	17.4	-17.1	0.0	31.0	46.0	15.0
518.8	30.0	P	H	19.0	-16.9	0.0	32.1	46.0	13.9
983.8	29.8	P	H	22.1	-14.8	0.0	37.1	54.0	16.9
33.3	30.4	P	V	16.7	-18.5	0.0	28.7	40.0	11.3
100.4	37.8	P	V	9.3	-18.0	0.0	29.1	43.5	14.4
115.8	33.5	P	V	13.5	-17.9	0.0	29.1	43.5	14.4
162.6	34.5	P	V	10.5	-17.7	0.0	27.3	43.5	16.2
237.9	31.0	P	V	12.1	-17.5	0.0	25.6	46.0	20.4
258.1	29.8	P	V	12.9	-17.6	0.0	25.1	46.0	20.9
306.3	37.7	P	V	13.8	-17.4	0.0	34.1	46.0	11.9
311.3	35.6	P	V	14.0	-17.4	0.0	32.2	46.0	13.8
434.4	34.2	P	V	16.9	-17.3	0.0	33.8	46.0	12.2
493.1	30.8	P	V	17.6	-17.0	0.0	31.4	46.0	14.6
518.8	30.0	P	V	19.0	-16.9	0.0	32.1	46.0	13.9
562.5	31.5	P	V	19.4	-16.8	0.0	34.1	46.0	11.9
937.5	30.4	P	V	22.1	-15.1	0.0	37.4	46.0	8.6
982.5	30.4	P	V	22.0	-14.8	0.0	37.6	54.0	16.4

Judgment: Pass by 8.6 dB

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10.2.2.2 Transmit Emissions; Fundamental Band Edge and Harmonics 2-25 GHz

		Spectrum Analyzer Readings									EUT	Peak	Ave	Peak	Ave	Margin
hrm	Tx	Peak				Ave				Corr.	Emission	Tot. FS		Limit		Under
#	Freq	Vertical Polarization				Horizontal Polarization				Fact.	MHz	dBuV/m		dBuV/m		Limit
		X	Y	Z	Max	X	Y	Z	Max							
1	2401	83.8	96.6	100.1	80.1	96.5	95.1	92.9	76.5	1.2	2401.0	101.3	81.3	114	94	12.7
BE	2401	47.7	60.5	64.0	44.0	60.4	59.0	56.8	40.4	1.2	2400.0	65.2	45.2	74	54	8.8
2	2401	44.2	49.4	53.0	33.0	47.7	47.8	43.4	27.8	7.2	4802.0	60.2	40.2	74	54	13.8
3	2401	46.6	46.9	48.6	28.6	48.1	48.0	45.9	28.1	7.9	7203.0	56.5	36.5	74	54	17.5
1	2440	82.6	94.1	95.5	75.5	95.1	93.7	89.4	75.1	1.2	2440.0	96.7	76.7	114	94	17.3
2	2440	44.1	44.9	48.3	28.3	46.4	48.3	46.8	28.3	6.7	4880.0	55.0	35.0	74	54	19.0
3	2440	45.9	47.6	47.9	27.9	51.8	49.3	47.7	31.8	8.2	7320.0	60.0	40.0	74	54	14.0
1	2482	80.6	94.0	96.3	76.3	93.8	94.1	88.7	74.1	1.4	2482.0	97.7	77.7	114	94	16.3
BE	2482	45.6	59.0	61.3	41.3	58.8	59.1	53.7	39.1	1.4	2483.5	62.7	42.7	74	54	11.3
2	2482	46.1	47.0	47.2	27.2	45.7	48.9	45.0	28.9	6.9	4964.0	55.8	35.8	74	54	18.2
3	2482	44.7	44.0	45.9	25.9	46.2	44.2	42.6	26.2	8.6	7446.0	54.8	34.8	74	54	19.2
Column numbers (see below for explanations)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Column #1. hrm = Harmonic; BE = Band Edge emissions

Column #2. Frequency of Transmitter.

Column #3. Uncorrected readings from the spectrum analyzer with First Axis Rotation.

Column #4. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.

Column #5. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.

Column #6. Average Reading based on peak reading reduced by the Duty cycle correction

Column #7. Uncorrected readings from the spectrum analyzer with First Axis Rotation.

Column #8. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.

Column #9. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.

Column #10. Average Reading based on peak reading reduced by the Duty cycle correction

Column #11. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor

Column #12. Frequency of Tested Emission

Column #13. Highest peak field strength at listed frequency.

Column #14. Highest Average field strength at listed frequency.

Column #15. Peak Limit. In the non restricted band the limit was set to 20 dB below the level of the Fundamental.

Column #16. Average Limit. In the non restricted band the limit was set to 20 dB below the level of the Fundamental.

Column #17. The margin (last column) is the worst case margin under the peak or average limits for that row.

Judgment: Pass by 8.8 dB; There were no other emissions detected from 1 to 25 GHz within 10 dB of the limits

10.2.2.3 Transmitter Spurious Emissions (Non-Harmonics); Above 1 GHz

Manufacturer	Macmillan New Ventures	Specification	FCC Part 15.247 & RSS-210
Model	ICL24-SR, ICL24-IR	Test Date	February 5, 2014
Serial Number	none	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Cbl/amp = Cable Loss – Preamp Gain		

RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Macmillan New Ventures, Model ICL24-SR, iClicker+ Transmitter

Transmitting at 2401 MHz

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
1075.0	37.5	P	H	24.8	-28.3	0.0	34.0	54.0	20.0
1915.0	37.7	P	H	27.4	-28.1	0.0	37.0	54.0	17.0
2352.5	38.9	P	H	28.0	-27.4	0.0	39.5	54.0	14.5
2370.0	43.9	P	H	28.1	-27.3	0.0	44.7	54.0	9.3
2432.5	43.4	P	H	28.5	-27.3	0.0	44.7	54.0	9.3
2975.0	37.1	P	H	29.8	-26.3	0.0	40.6	54.0	13.4
3372.5	36.2	P	H	31.2	-25.6	0.0	41.8	54.0	12.2
4125.0	35.2	P	H	32.5	-26.4	0.0	41.3	54.0	12.7
4902.5	36.4	P	H	33.3	-26.5	0.0	43.2	54.0	10.8
5347.5	36.9	P	H	34.2	-27.3	0.0	43.9	54.0	10.1
6347.5	35.6	P	H	34.7	-29.3	0.0	40.9	54.0	13.1
7830.0	39.1	P	H	36.7	-26.6	0.0	49.2	54.0	4.8
7972.5	37.8	P	H	36.9	-27.0	0.0	47.8	54.0	6.2
1012.5	40.8	P	V	24.2	-28.5	0.0	36.5	54.0	17.5
1100.0	41.4	P	V	24.9	-28.2	0.0	38.1	54.0	15.9
1915.0	38.6	P	V	27.4	-28.1	0.0	37.9	54.0	16.1
2370.0	45.8	P	V	28.1	-27.3	0.0	46.6	54.0	7.4
2432.5	45.6	P	V	28.5	-27.3	0.0	46.9	54.0	7.1
2825.0	38.5	P	V	29.0	-26.6	0.0	40.9	54.0	13.1
3825.0	36.3	P	V	32.6	-25.4	0.0	43.5	54.0	10.5
4425.0	36.9	P	V	33.0	-25.5	0.0	44.4	54.0	9.6
4922.5	35.2	P	V	33.3	-26.5	0.0	42.0	54.0	12.0
5290.0	36.9	P	V	34.1	-26.8	0.0	44.2	54.0	9.8
5892.5	35.3	P	V	34.3	-27.5	0.0	42.2	54.0	11.8
6465.0	36.1	P	V	34.5	-29.1	0.0	41.4	54.0	12.6
7082.5	36.4	P	V	35.6	-28.2	0.0	43.8	54.0	10.2
7967.5	37.7	P	V	36.9	-27.0	0.0	47.7	54.0	6.3

Transmitting at 2440 MHz

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
1062.5	38.6	P	H	24.7	-28.4	0.0	35.0	54.0	19.0
1875.0	36.6	P	H	27.3	-27.9	0.0	36.0	54.0	18.0
2407.5	44.7	P	H	28.4	-27.2	0.0	45.8	54.0	8.2
2472.5	43.6	P	H	28.6	-27.3	0.0	44.9	54.0	9.1
2830.0	38.8	P	H	29.0	-26.6	0.0	41.2	54.0	12.8
3107.5	36.8	P	H	30.6	-26.2	0.0	41.2	54.0	12.8
3867.5	38.0	P	H	32.7	-25.4	0.0	45.4	54.0	8.6
4417.5	36.5	P	H	33.0	-25.4	0.0	44.1	54.0	9.9
5107.5	35.7	P	H	33.6	-27.0	0.0	42.3	54.0	11.7
5862.5	35.0	P	H	34.2	-27.6	0.0	41.6	54.0	12.4
6210.0	37.7	P	H	34.8	-28.7	0.0	43.9	54.0	10.1
6800.0	36.2	P	H	35.2	-28.5	0.0	42.8	54.0	11.2
7115.0	36.0	P	H	35.7	-28.1	0.0	43.5	54.0	10.5
7952.5	37.7	P	H	36.9	-26.9	0.0	47.7	54.0	6.3
1200.0	45.9	P	V	25.4	-28.1	0.0	43.2	54.0	10.8
1245.0	42.9	P	V	25.3	-28.0	0.0	40.2	54.0	13.8

RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Macmillan New Ventures, Model ICL24-SR, iClicker+ Transmitter

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
1922.5	40.4	P	V	27.4	-28.2	0.0	39.6	54.0	14.4
2407.5	45.9	P	V	28.4	-27.2	0.0	47.1	54.0	6.9
2472.5	45.7	P	V	28.6	-27.3	0.0	47.0	54.0	7.0
3080.0	39.6	P	V	30.4	-26.3	0.0	43.7	54.0	10.3
3857.5	38.0	P	V	32.7	-25.3	0.0	45.3	54.0	8.7
4200.0	35.0	P	V	32.5	-26.1	0.0	41.4	54.0	12.6
4880.0	42.0	P	V	33.3	-26.6	0.0	48.7	54.0	5.3
5047.5	35.5	P	V	33.5	-26.8	0.0	42.2	54.0	11.8
5945.0	37.2	P	V	34.3	-27.2	0.0	44.3	54.0	9.7
6395.0	39.5	P	V	34.6	-29.2	0.0	44.9	54.0	9.1
6960.0	36.5	P	V	35.2	-28.5	0.0	43.1	54.0	10.9
7912.5	37.2	P	V	36.8	-26.8	0.0	47.3	54.0	6.7

Transmitting at 2482 MHz.

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
1012.5	38.1	P	H	24.2	-28.5	0.0	33.8	54.0	20.2
1912.5	39.9	P	H	27.4	-28.1	0.0	39.2	54.0	14.8
2450.0	42.0	P	H	28.5	-27.3	0.0	43.2	54.0	10.8
2955.0	38.6	P	H	29.6	-26.3	0.0	41.9	54.0	12.1
3770.0	38.9	P	H	32.5	-25.4	0.0	46.0	54.0	8.0
4430.0	37.8	P	H	33.1	-25.5	0.0	45.4	54.0	8.6
4982.5	35.5	P	H	33.3	-26.4	0.0	42.4	54.0	11.6
5450.0	35.3	P	H	34.4	-27.4	0.0	42.3	54.0	11.7
6450.0	37.1	P	H	34.5	-29.1	0.0	42.5	54.0	11.5
7450.0	37.2	P	H	36.6	-28.0	0.0	45.7	54.0	8.3
7967.5	37.8	P	H	36.9	-27.0	0.0	47.7	54.0	6.3
1032.5	40.4	P	V	24.4	-28.4	0.0	36.4	54.0	17.6
1247.5	42.9	P	V	25.3	-28.0	0.0	40.2	54.0	13.8
1962.5	38.7	P	V	27.4	-27.8	0.0	38.3	54.0	15.7
2450.0	44.9	P	V	28.5	-27.3	0.0	46.1	54.0	7.9
2515.0	40.2	P	V	28.8	-27.2	0.0	41.7	54.0	12.3
2962.5	37.9	P	V	29.7	-26.3	0.0	41.3	54.0	12.7
3475.0	36.9	P	V	31.3	-25.2	0.0	43.0	54.0	11.0
4180.0	37.5	P	V	32.5	-26.3	0.0	43.8	54.0	10.2
5000.0	35.8	P	V	33.4	-26.5	0.0	42.7	54.0	11.3
5565.0	35.5	P	V	34.3	-27.4	0.0	42.5	54.0	11.5
6517.5	37.3	P	V	34.5	-29.2	0.0	42.6	54.0	11.4
7447.5	41.1	P	V	36.6	-28.0	0.0	49.6	54.0	4.4
7987.5	37.3	P	V	36.9	-27.0	0.0	47.2	54.0	6.8

Judgment: Pass by 4.4 dB

The Peak Readings met the average limits. The Average limit is 20 dB lower than the Peak limits

RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Macmillan New Ventures, Model ICL24-SR, iClicker+ Transmitter

10.2.2.4 Receiver Spurious Emissions above 1 GHz

Manufacturer	Macmillan New Ventures	Specification	FCC Part 15.247 & RSS-210
Model	ICL24-SR	Test Date	February 5, 2014
Serial Number	none	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Cbl/amp = Cable Loss – Preamp Gain		
Configuration	Receive mode		

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB
1065.0	36.4	P	H	24.7	-27.1	0.0	34.0	54.0	20.0
1940.0	35.5	P	H	27.4	-26.2	0.0	36.7	54.0	17.3
2510.0	35.9	P	H	28.7	-25.2	0.0	39.4	54.0	14.6
2975.0	37.6	P	H	29.8	-24.0	0.0	43.4	54.0	10.6
3067.5	36.6	P	H	30.3	-24.0	0.0	42.9	54.0	11.1
3640.0	36.3	P	H	31.6	-22.6	0.0	45.3	54.0	8.7
3975.0	34.7	P	H	32.7	-23.0	0.0	44.4	54.0	9.6
4032.5	35.0	P	H	32.7	-23.4	0.0	44.3	54.0	9.7
4540.0	34.0	P	H	33.4	-23.2	0.0	44.2	54.0	9.8
4787.5	33.6	P	H	33.3	-22.7	0.0	44.2	54.0	9.8
4985.0	33.9	P	H	33.3	-22.8	0.0	44.4	54.0	9.6
5057.5	34.5	P	H	33.5	-23.2	0.0	44.8	54.0	9.2
5527.5	34.8	P	H	34.4	-22.3	0.0	46.9	54.0	7.1
6242.5	34.9	P	H	34.8	-24.3	0.0	45.4	54.0	8.6
7220.0	35.8	P	H	36.1	-24.2	0.0	47.7	54.0	6.3
8837.5	34.4	P	H	37.8	-22.9	0.0	49.3	54.0	4.7
9097.5	34.3	P	H	37.9	-23.4	0.0	48.8	54.0	5.2
1127.5	36.5	P	V	25.1	-26.9	0.0	34.7	54.0	19.3
1510.0	36.1	P	V	25.5	-26.7	0.0	34.9	54.0	19.1
1947.5	35.9	P	V	27.4	-26.1	0.0	37.2	54.0	16.8
2065.0	34.9	P	V	27.6	-25.9	0.0	36.6	54.0	17.4
2640.0	35.2	P	V	28.9	-24.9	0.0	39.2	54.0	14.8
2975.0	37.3	P	V	29.8	-24.0	0.0	43.1	54.0	10.9
3155.0	36.9	P	V	30.7	-23.6	0.0	44.0	54.0	10.0
3885.0	36.8	P	V	32.7	-22.7	0.0	46.8	54.0	7.2
4057.5	33.9	P	V	32.6	-23.5	0.0	43.0	54.0	11.0
4800.0	35.0	P	V	33.3	-22.8	0.0	45.5	54.0	8.5
4975.0	35.1	P	V	33.3	-22.8	0.0	45.6	54.0	8.4
5207.5	34.3	P	V	33.9	-22.7	0.0	45.5	54.0	8.5
5857.5	33.2	P	V	34.2	-22.1	0.0	45.3	54.0	8.7
6267.5	34.8	P	V	34.8	-24.6	0.0	45.0	54.0	9.0
6787.5	34.3	P	V	35.2	-24.5	0.0	45.0	54.0	9.0
7175.0	35.2	P	V	35.9	-24.2	0.0	46.9	54.0	7.1
8912.5	33.8	P	V	37.9	-22.7	0.0	49.0	54.0	5.0
9170.0	33.6	P	V	37.9	-24.2	0.0	47.3	54.0	6.7

Judgment: Pass by 4.7 dB

The Peak Readings met the average limits. The Average limit is 20 dB lower than the Peak limits