FCC 47 CFR PART 15 SUBPART C
Radiated Emissions Only

CERTIFICATION TEST REPORT

FOR

Lyric

MODEL NUMBER: AIO

FCC ID: CFS8DLAIO
IC: 573F-AIO

REPORT NUMBER: 10895509A

ISSUE DATE: October 1, 2015

Prepared for
Honeywell Security
PO Box 9040 2 Corporate Center Dr., Suite 100
Melville
NY 11747

Prepared by

UL LLC
333 Pfingsten Rd.
Northbrook, IL 60062
TEL: (847) 272-8800

NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/01/15	Initial Issue	M.Ferrer

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Honeywell Security
PO Box 9040 2 Corporate Center Dr., Suite 100
Melville, NY 11747

EUT DESCRIPTION: Smart Home Interface

MODEL: AIO

SERIAL NUMBER: N/A

DATE TESTED: August 5, 2015 – September 23, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL LLC By:

Bob Delisi
EMC Engineer
UL LLC

Tested By:

Michael Ferrer
EMC Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with

ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15

Testing Deviation – EUT was tested 1.5m height for above 1GHz Radiated Emissions in accordance with TCB Conference Call Dec 2014.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:
Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.30dB
Radiated Emissions	30-130MHz	Bicon 3m Vert	4.84dB
Radiated Emissions	130-200MHz	Bicon 3m Vert	4.94dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	3.46dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	4.98dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Smart Home Interface containing a 345MHz transmitter.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two internal fixed metal rod antennas.

5.3. WORST-CASE CONFIGURATION AND MODE

The EUT was setup in the upright position as it would be for installation. The EUT was programmed the for highest output power and can transmit on two different antenna individually at one frequency 345MHz

5.4. MODIFICATIONS

No modifications were made during testing.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Power Supply	Honeywell	300-04705V1	-	DoC

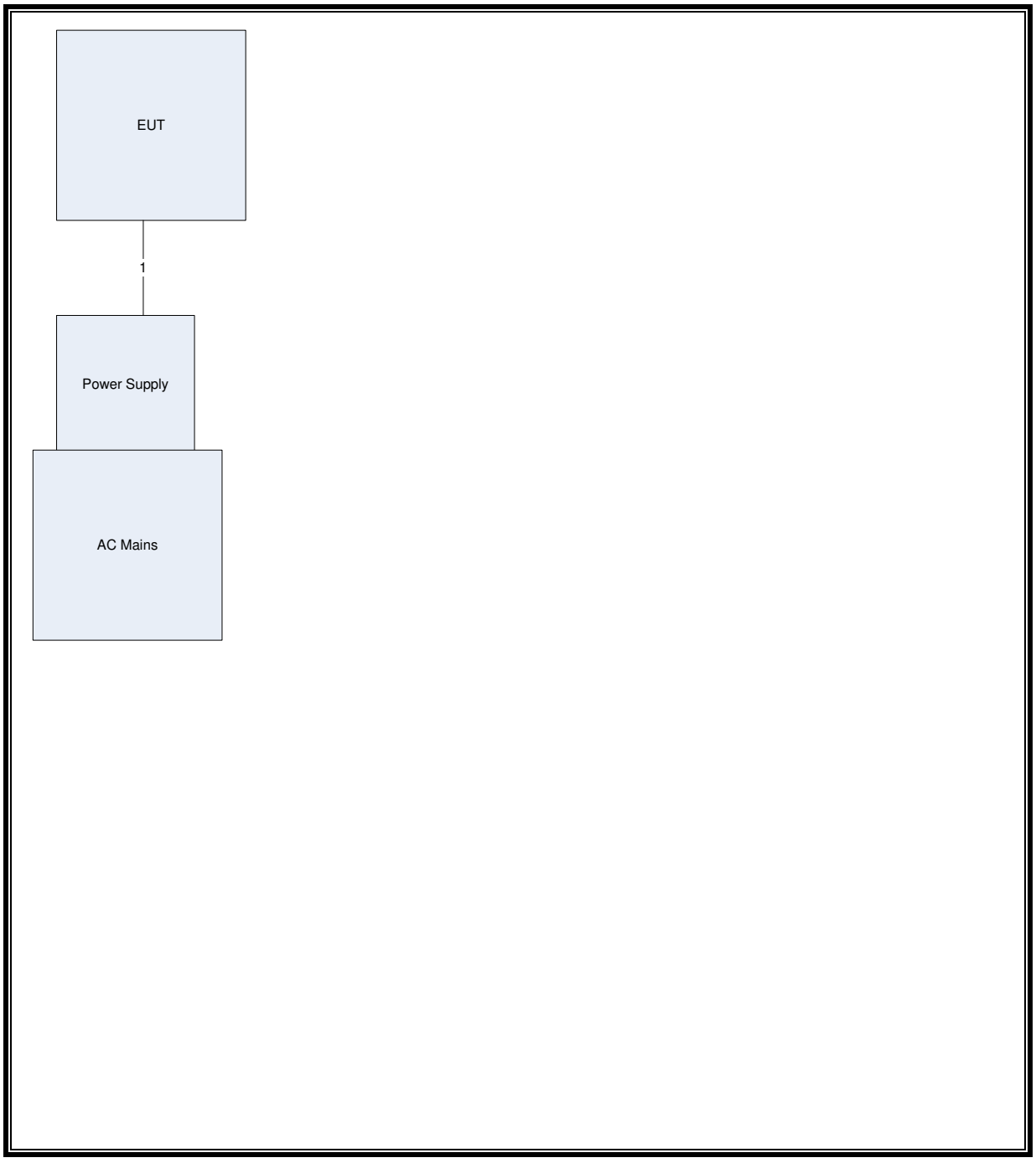
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC	1	DC	Wire	1	None

TEST SETUP

The EUT is a stand alone unit. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List					
Description	Manufacturer	Model	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014		
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012		
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20141830	20151231
Bicon Antenna	Electro-Metrics	EM6912A	EMC4070	20141014	20151031
Log-P Antenna	Chase	UPA6109	EMC4313	24141119	20151130
Spectrum Analyzer	Rohde & Schwarz	ESU	EMC4323	20141216	20151231
Antenna Array	UL	BOMS	EMC4276	20141201	20151231

6.1. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

RESULTS

The Manufacturer has declared a Duty cycle correction factor of -20dB

7. RADIATED EMISSION TEST RESULTS

7.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (b)
In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750[1]	125 to 375[1]
174 - 260	3,750	375
260 - 470	3,750 to 12,500[1]	375 to 1,250[1]
Above 470	12,500	1,250

1 Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 – 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

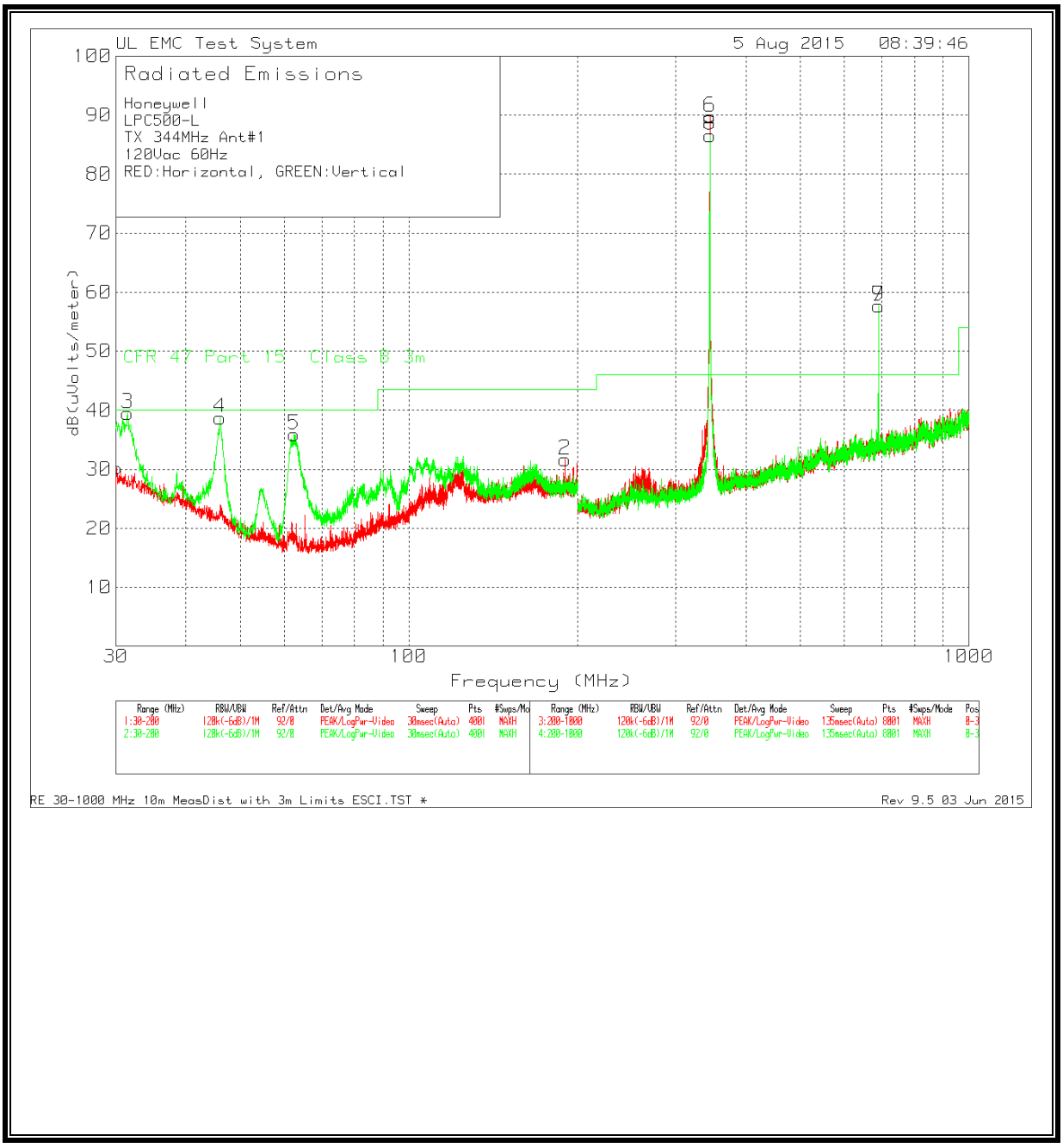
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 88	100 **	3
88 216	150 **	3
216 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

RESULTS

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)



Honeywell
LPC500-L
TX 344MHz Ant#1
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

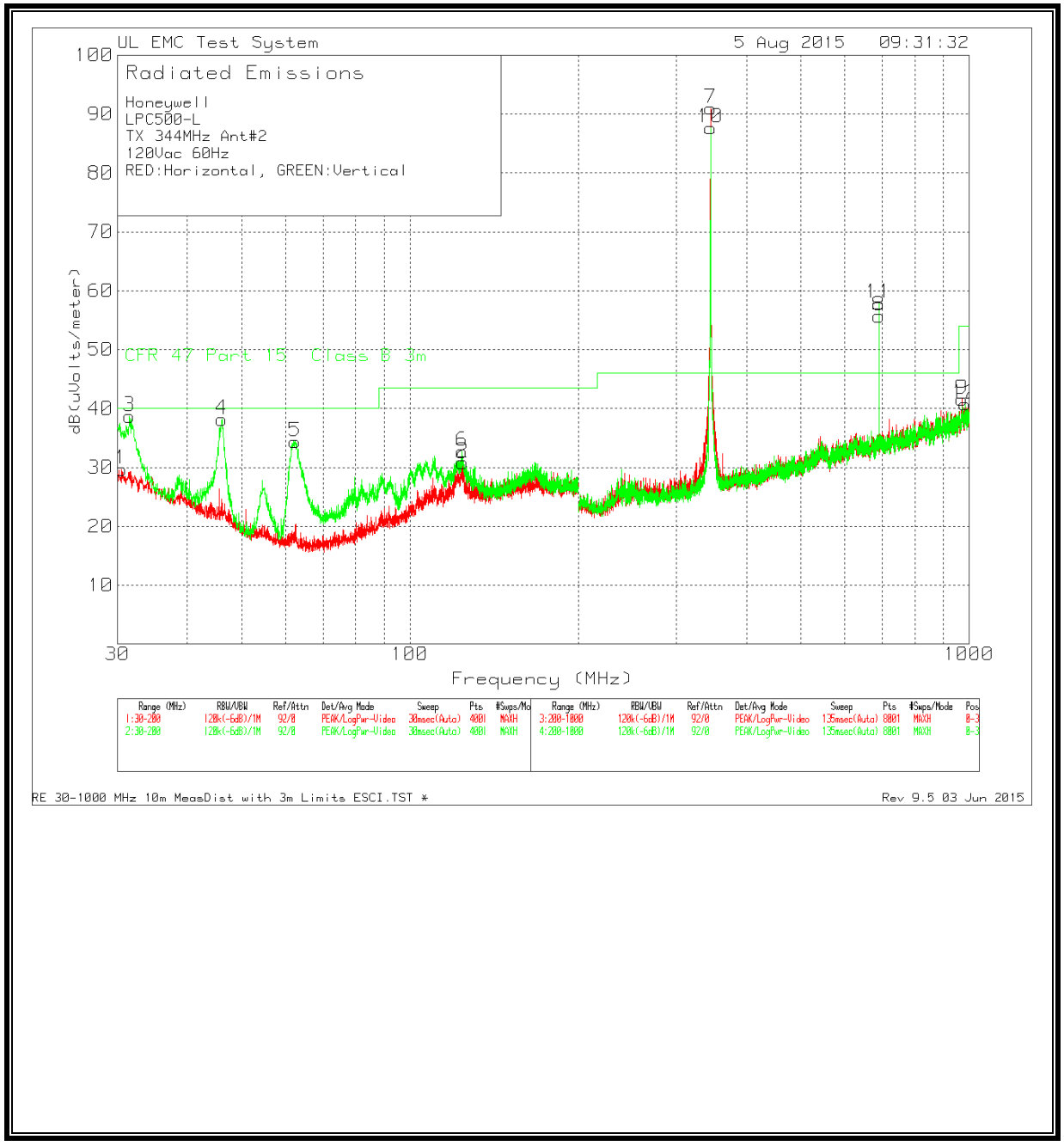
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor	Corrected Reading dB(uVolts /meter)	Pk Limit dBuV/m	Margin (dB)	Duty Cycle Factor dB	Corrected Reading dB(uVolts /meter)	AV Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
344.9296	62.92	PK	15.5	8.2	86.62	97.2	-10.58	-20	66.62	77.2	-10.58	241	102	H
344.9296	62.75	PK	15.5	8.2	86.45	97.2	-10.75	-20	66.45	77.2	-10.75	314	166	V
689.86	25.86	PK	21.2	9.5	56.56	77	-20.44	-20	36.56	57	-20.44	183	161	V
689.86	27.46	PK	21.2	9.5	58.16	77	-18.84	-20	38.16	57	-18.84	226	212	H

Honeywell
LPC500-L
TX 344MHz Ant#1
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	10M to 3M Factor dB	Corrected Reading dB(uVolts /meter)	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
30.085	31.77	Pk	18.2	-30.2	10.5	30.27	40	-9.73	0-360	400	H
190.0125	34.23	Pk	16	-29.1	10.5	31.63	43.52	-11.89	0-360	100	H
31.445	41.56	Pk	17.6	-30.2	10.5	39.46	40	-0.54	0-360	99	V
45.98	47.09	Pk	11.2	-30.1	10.5	38.69	40	-1.31	0-360	99	V
62.385	49.49	Pk	6	-30.1	10.5	35.89	40	-4.11	0-360	248	V
31.401	36.44	Qp	17.6	-30.2	10.5	34.34	40	-5.66	227	100	V
46.0375	43.45	Qp	11.2	-30.1	10.5	35.05	40	-4.95	33	100	V
61.77	45.22	Qp	6	-30	10.5	31.72	40	-8.28	191	258	V

Qp - Quasi-Peak detector

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)



Honeywell
LPC500-L
TX 344MHz Ant#2
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

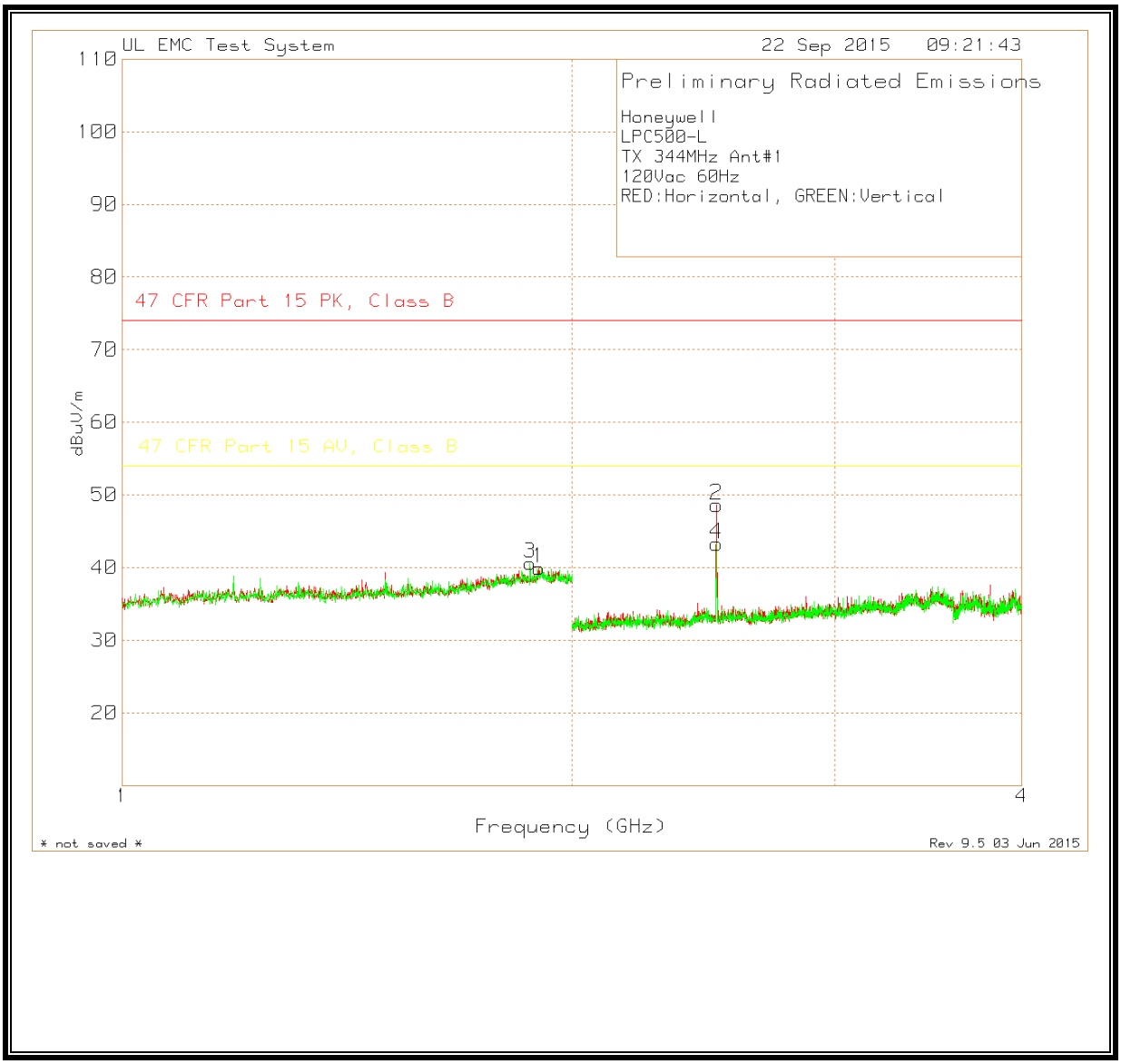
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor	Corrected Reading dB(uVolts /meter)	Pk Limit dBuV/m	Margin (dB)	Duty Cycle Factor dB	Corrected Reading dB(uVolts /meter)	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
344.925	66.36	PK	15.5	8.2	90.06	97.2	-7.14	-20	70.06	77.2	-7.14	224	102	H
344.925	62.65	PK	15.5	8.2	86.35	97.2	-10.85	-20	66.35	77.2	-10.85	293	168	V
689.868	25.64	PK	21.2	9.5	56.34	77	-20.66	-20	36.34	57	-20.66	130	149	V
689.868	23.95	PK	21.2	9.5	54.65	77	-22.35	-20	34.65	57	-22.35	231	119	H

Honeywell
LPC500-L
TX 344MHz Ant#2
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	10M to 3M Factor dB	Corrected Reading dB(uVolts /meter)	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
30.4675	31.39	Pk	18	-30.2	10.5	29.69	40	-10.31	0-360	99	H
124.1375	35.93	Pk	14.2	-29.8	10.5	30.83	43.52	-12.69	0-360	400	H
31.4875	40.76	Pk	17.6	-30.2	10.5	38.66	40	-1.34	0-360	100	V
46.1075	46.55	Pk	11.2	-30.1	10.5	38.15	40	-1.85	0-360	100	V
62.3	47.97	Pk	6	-30.1	10.5	34.37	40	-5.63	0-360	400	V
124.01	37.81	Pk	14.2	-29.8	10.5	32.71	43.52	-10.81	0-360	100	V
971.9	32.17	Pk	24	-25.1	10.5	41.57	53.97	-12.4	0-360	400	H
984.4	31.36	Pk	23.8	-24.9	10.5	40.76	53.97	-13.21	0-360	400	V
31.7205	35.61	Qp	17.6	-30.2	10.5	33.51	40	-6.49	181	103	V
46.1075	43.46	Qp	11.2	-30.1	10.5	35.06	40	-4.94	36	101	V
61.76875	44.43	Qp	6	-30	10.5	30.93	40	-9.07	191	263	V

Qp - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz

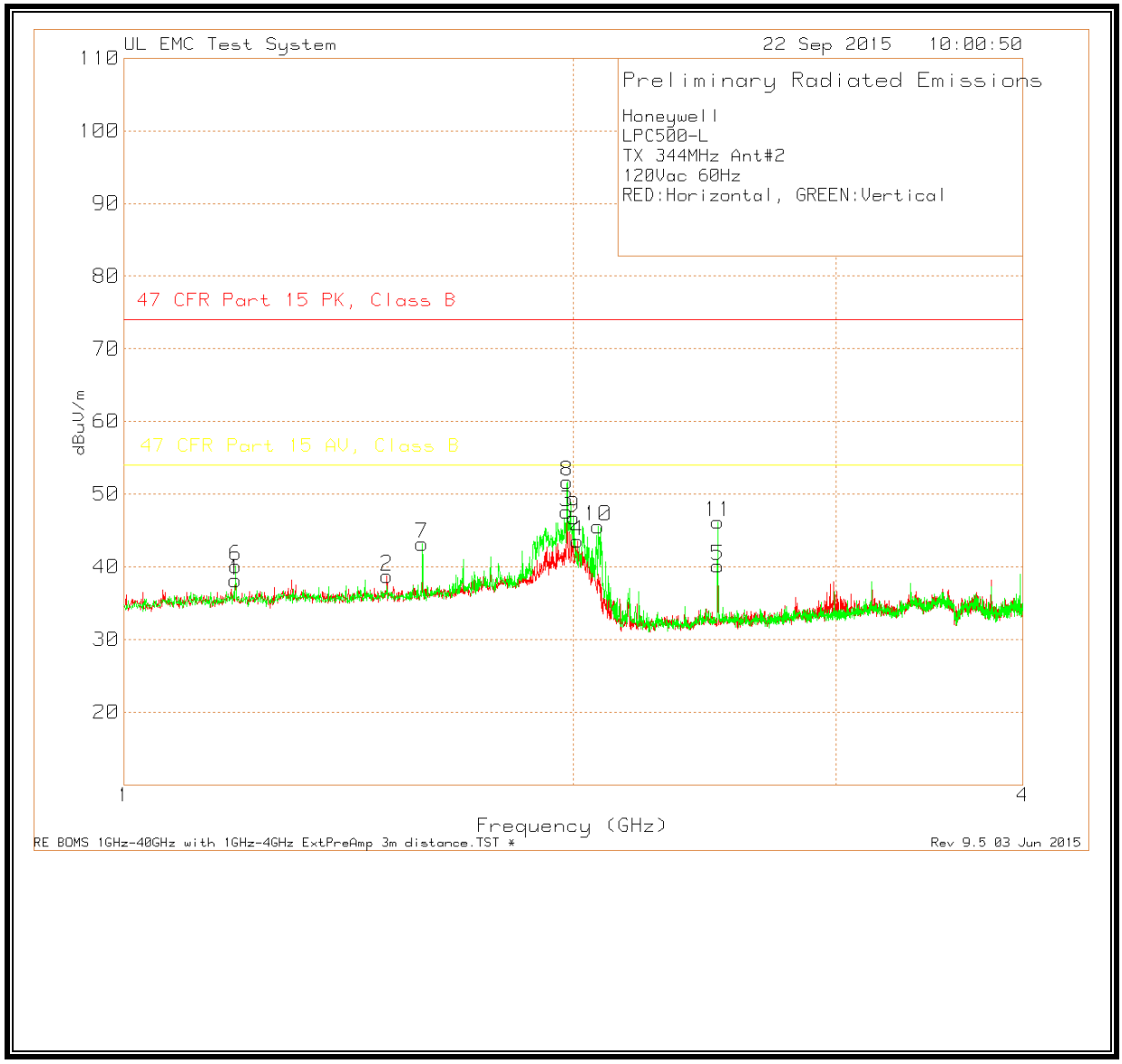


Honeywell
LPC500-L
TX 344MHz Ant#1
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK, Class B	Margin (dB)	47 CFR Part 15 AV, Class B	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.5	67.45	PK	25.3	-53.49	39.26	74	-34.74	54	-14.74	0-360	150	H
2.5	78.47	PK	22.1	-51.96	48.61	74	-25.39	54	-5.39	0-360	100	H
1.187	67.21	PK	25.1	-53.49	38.82	74	-35.18	54	-15.18	0-360	150	V
1.237	66.75	PK	25.2	-53.49	38.46	74	-35.54	54	-15.54	0-360	100	V
1.875	66.78	PK	27.3	-53.49	40.59	74	-33.41	54	-13.41	0-360	100	V
2.5	73.13	PK	22.1	-51.96	43.27	74	-30.73	54	-10.73	0-360	150	V
2.4999	78.46	Pk	22.1	-51.96	48.6	74	-25.4	-	-	300	100	H
2.4999	77.07	Av	22.1	-51.96	47.21	-	-	54	-6.79	300	100	H

Pk - Peak detector
Av - Average detection

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Honeywell
LPC500-L
TX 344MHz Ant#2
120Vac 60Hz
RED:Horizontal, GREEN:Vertical

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK, Class B	Margin (dB)	47 CFR Part 15 AV, Class B	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.187	69.43	Pk	25.1	-56.39	38.14	74	-35.86	54	-15.86	0-360	100	H
1.5	68.52	Pk	25.3	-55.12	38.7	74	-35.3	54	-15.3	0-360	150	H
1.98	73.72	Pk	27.4	-53.53	47.59	74	-26.41	54	-6.41	0-360	100	H
2.013	75.5	Pk	21.2	-53.14	43.56	74	-30.44	54	-10.44	0-360	100	H
2.5	69.99	Pk	22.1	-51.96	40.13	74	-33.87	54	-13.87	0-360	100	H
1.188	71.36	Pk	25.1	-56.36	40.1	74	-33.9	54	-13.9	0-360	100	V
1.584	72.4	Pk	25.4	-54.63	43.17	74	-30.83	54	-10.83	0-360	100	V
1.981	77.82	Pk	27.4	-53.52	51.7	74	-22.3	54	-2.3	0-360	150	V
2.001	78.91	Pk	21.2	-53.34	46.77	74	-27.23	54	-7.23	0-360	150	V
2.078	77.2	Pk	21.4	-53.05	45.55	74	-28.45	54	-8.45	0-360	150	V
2.5	76.04	Pk	22.1	-51.96	46.18	74	-27.82	54	-7.82	0-360	150	V
1.9799	88.39	Pk	27.4	-53.53	62.26	74	-11.74	-	-	283	113	V
1.98	74	Av	27.4	-53.53	47.87	-	-	54	-6.13	283	113	V

Pk - Peak detector
Av - Average detection