FCC CFR47 PART 15 SUBPART C

MANUFACTURER'S TEST REPORT

FOR

WIRELESS KEY TRANSMITTER

MODEL NUMBER: 582

FCC ID: CFS8DL582

REPORT NUMBER: R10784314-E1A

ISSUE DATE: 2015-10-28

Prepared for
HONEYWELL SECURITY
2 CORPORATE CENTER DR
SUITE 100 PO BOX 9040
MELVILLE
NY, 11747, USA

Prepared by
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NVLAP Lab code: 200246-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2015-06-25	Initial Issue	Jeff Moser
1	2015-08-20	For marketing purposes, revised the model name from 5834-4 to 582. Due to this change, the FCC ID was changed from CFS8DL58242 to CFS8DL582. There are no differences in the '5834-4' unit and the '582' unit other than the model change.	Jeff Moser
2	2015-10-01	Revised the Duty Cycle from 10% to 14.3%.	Jeff Moser
3	2015-10-28	Revised test dates on page 4 of 18.	Jeff Moser

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HONEYWELL SECURITY
2 CORPORATE CENTER DR
SUITE 100 PO BOX 9040
MELVILLE, NY, 11747, USA

EUT DESCRIPTION: WIRELESS KEY TRANSMITTER

MODEL: 582

SERIAL NUMBER: Non-serialized sample (Sample #1)

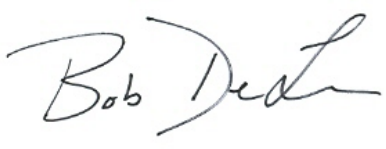
DATE TESTED: June 03-25, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C (Duty Cycle, Fundamental and Spurious Emissions, only).	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
Certification Engineer
UL – Consumer Technology Division

Prepared By:

Jeff Moser
EMC Program Manager
UL – Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2 and FCC CFR 47 Part 15. This report is a manufacturer's specification report that included duty cycle, fundamental and radiated spurious, only.

Note – Radiated testing above 1GHz was performed on a 1.5m table height, per ANSI C63.10: 2013. All other testing was performed per ANSI C63.10: 2009.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☒ Chamber C

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2002460.htm.

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

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

Test	Uncertainty
Radiated Emissions (0.01-30 MHz)	+/- 2.14 dB
Radiated Emissions (30-1000 MHz)	+/- 6.04 dB (3m)
Radiated Emissions (1-6 GHz)	+/- 5.96 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless key transmitter intended for security purposes. The transmitter operates at 344.94 MHz.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a printed PCB antenna.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 500-02201, rev. A

The test utility software used during testing was 500-02201, rev. A.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z. It was determined that the X orientation was the worst-case orientation. Therefore, all final radiated testing was performed with the EUT in X orientation.

5.5. MODIFICATIONS

No modifications were made during testing.

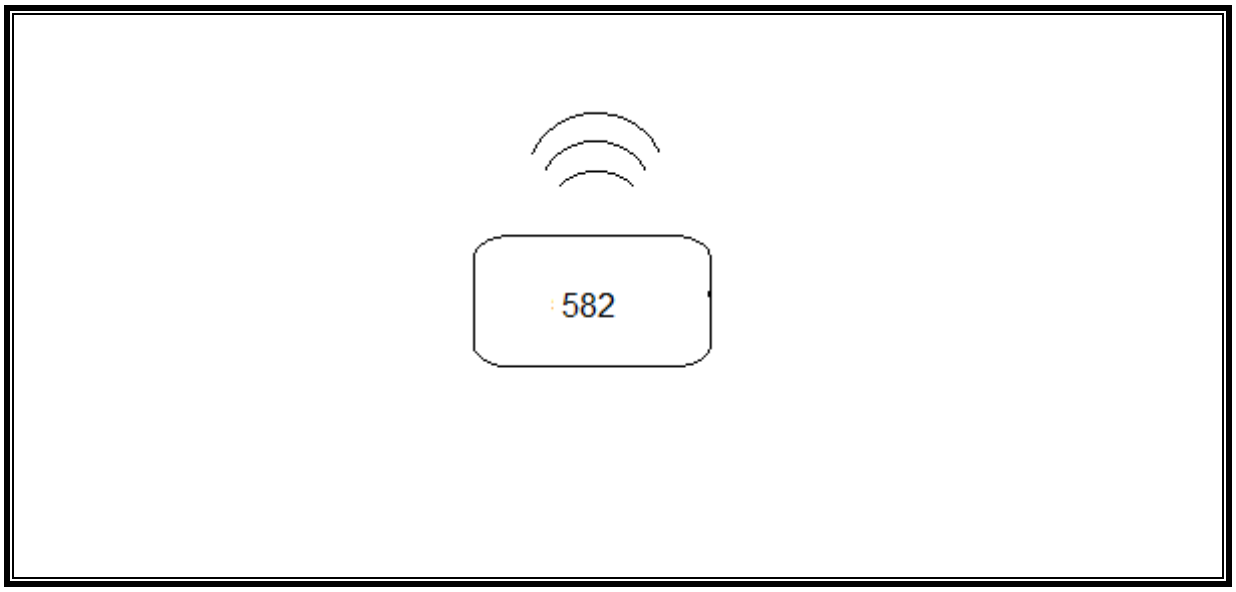
5.6. DESCRIPTION OF TEST SETUP

I/O CABLES - None

TEST SETUP

The EUT is installed as a table top device. 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:

Radiated Emission Measurement Equipment

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0059	Active Loop Antenna	EMCO	6502	2015-03-17	2016-03-31
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2014-07-10	2015-07-31
AT0062	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2014-07-22	2015-07-31
SAC_G (Hybrid)	Gain-Loss string for Hyrbid antenna at 3m	Various	Various	2015-02-01	2016-02-29
SAC_G (3117)	Gain-Loss string for 3117 antenna at 3m	Various	Various	2015-02-01	2016-02-29
SA0018	Spectrum Analyzer	Agilent	N9030A	2014-06-26	2015-06-30
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
HI0069	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2014-06-27	2015-06-27

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.

CALCULATION

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

The manufacturer declared the worst-case duty cycle to be 14.3%, which translates into a duty cycle correction factor of -16.9 dB.

7. RADIATED EMISSION TEST RESULTS

7.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (e)

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 (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500[1]	50 to 150[1]
174-260	1,500	150
260-470	1,500 to 5,000[1]	150 to 500[1]
Above 470	5,000	500

1 Linear interpolation

Note – This is a manufacturer's specification report. Verification of restrictions noted in 15.231 (a)(3) were not conducted. Duty cycle measurements were performed also not conducted. Therefore, the fundamental was compared to the worst-case limits found in 15.231e.

§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)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
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., §§15.231 and 15.241.

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

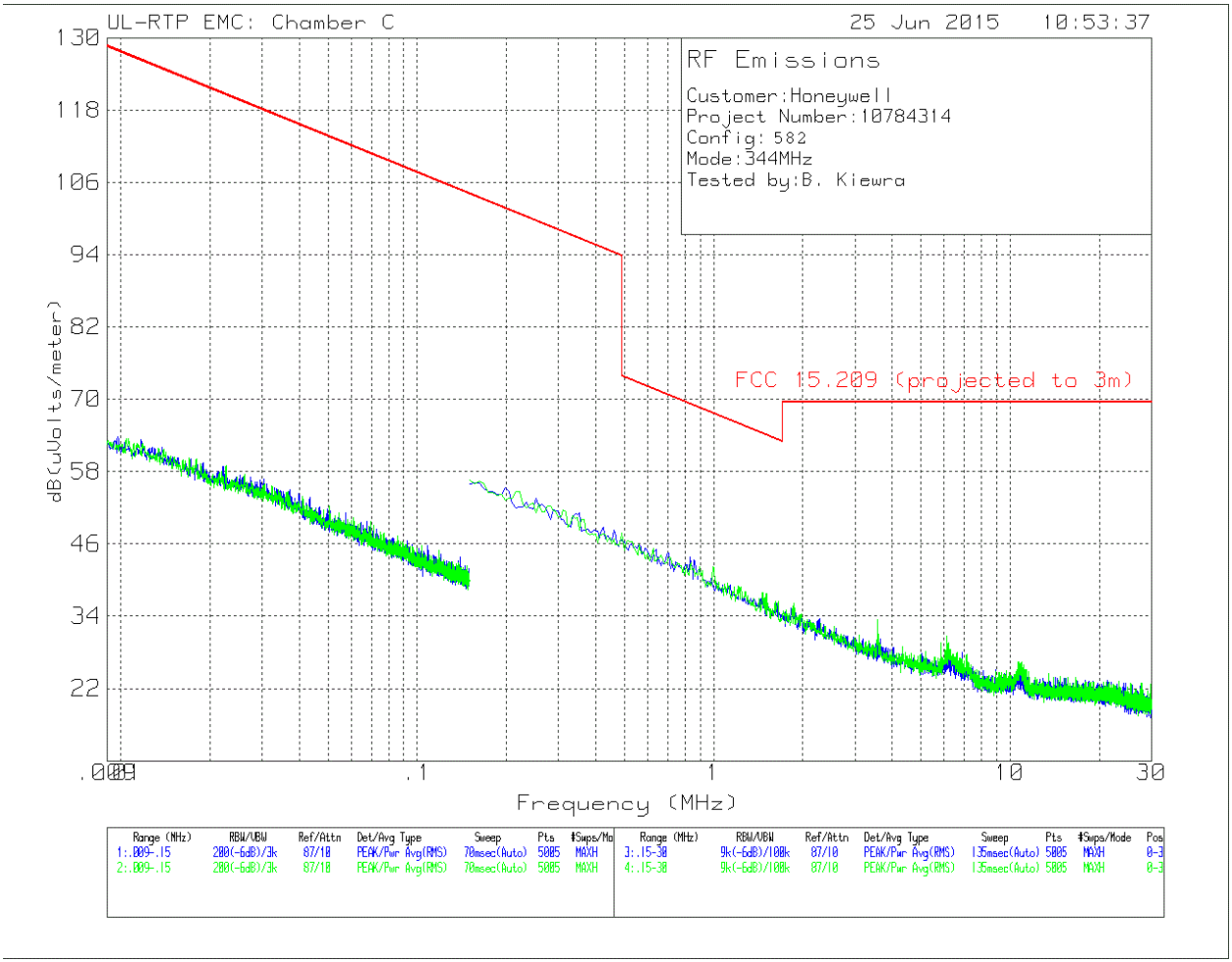
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

The spectrum from 10 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

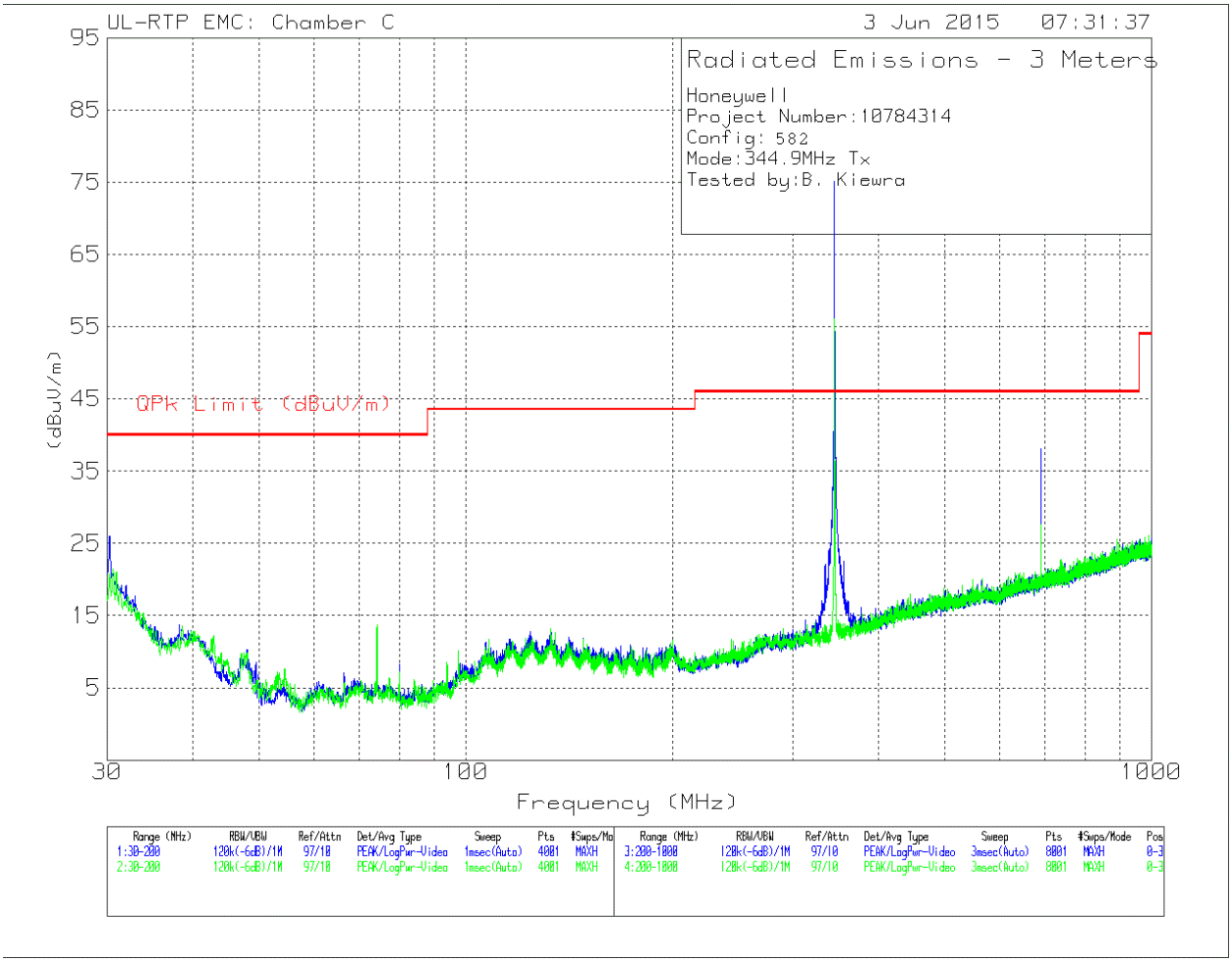
HARMONICS AND TX SPURIOUS EMISSION (10kHz – 30MHz)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	ATA216 Cable (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 (projected to 3m)	Margin (dB)	Azimuth (Degs)
1	3.57988	21.8	Pk	10.6	.2	.2	32.8	69.54	-36.74	0-360
2	6.22237	17.26	Pk	10.7	.3	.3	28.56	69.54	-40.98	0-360
3	10.79156	13.58	Pk	10.7	.4	.3	24.98	69.54	-44.56	0-360
4	3.57988	22.4	Pk	10.6	.2	.2	33.4	69.54	-36.14	0-360
5	6.10009	19.41	Pk	10.7	.3	.3	30.71	69.54	-38.83	0-360
6	10.94069	14.99	Pk	10.7	.4	.3	26.39	69.54	-43.15	0-360

Pk - Peak detector

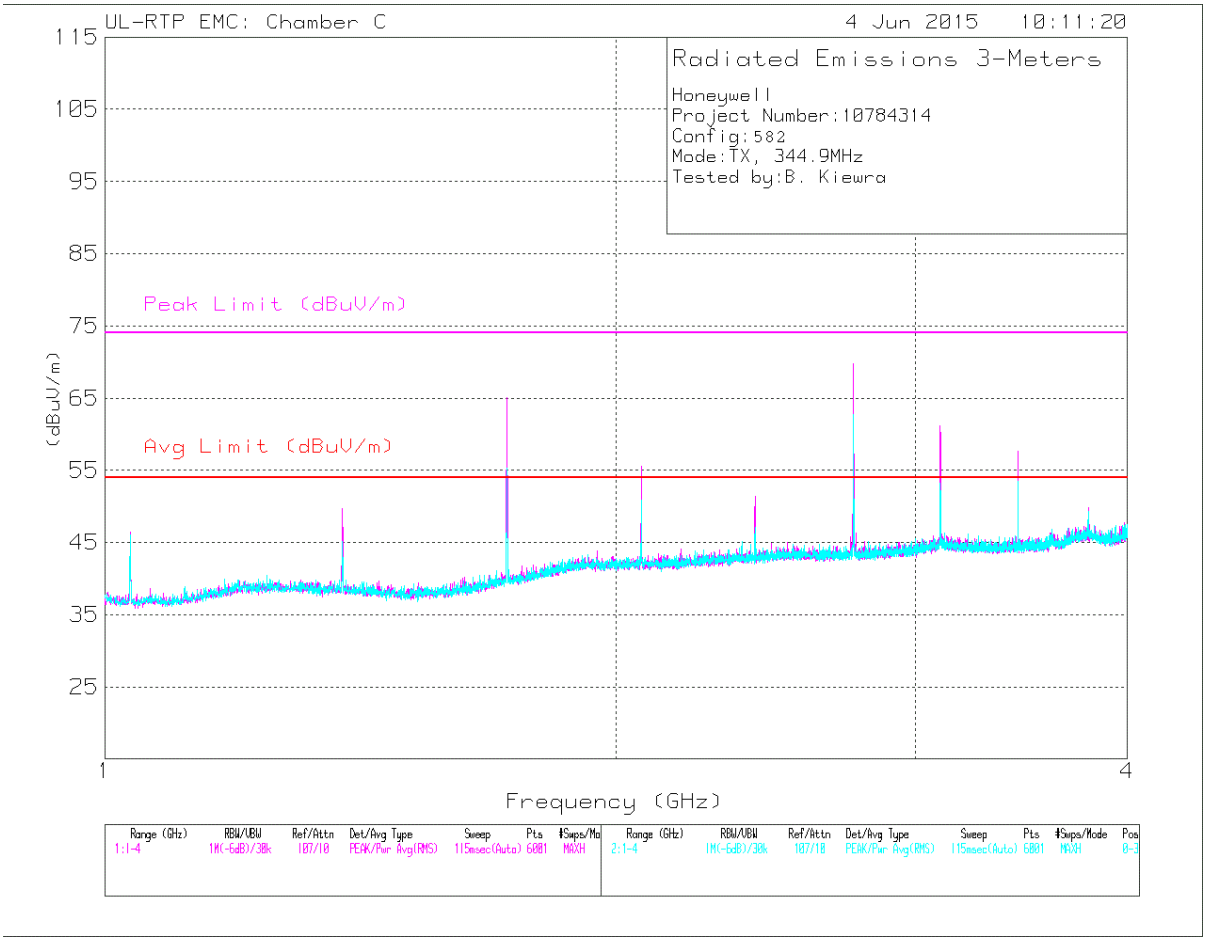
FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)



Customer: Honeywell
Project Number: 10784314
Config: 582
Mode: 344.9MHz Tx
Tested by: B. Kiewra

Freq (MHz)	Meter Reading [dBuV]	Detector*	Antenna Factor [dB/m]	Gain/Loss [dB]	Peak Field Strength [dBuV/m]	FCC 15.231 Peak Limit [dBuV/m]	Margin [dB]	DCF (dB)	Average Field Strength [dBuV/m]	FCC 15.231 Average Limit [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Antenna Polarity	In Restricted Band?
344.94	91.13	Pk	14.10	-29.60	75.6	89.3	-13.7	-16.9	58.7	69.3	-10.6	109	100	H	N
689.88	45.81	Pk	20.00	-28.60	37.2	69.3	-32.1	-16.9	20.3	49.3	-29.0	327	231	H	N
344.94	73.14	Pk	14.10	-29.60	57.6	89.3	-31.7	-16.9	40.8	69.3	-28.5	5	337	V	N
689.89	40.49	Pk	20.00	-28.60	31.9	69.3	-37.4	-16.9	15.0	49.3	-34.3	173	122	V	N
*PK = Peak, QP = Quasi-Peak															
Average Field Strength computed as follows for the above fundamental and harmonics: PK + DCF, where DCF is a duty-cycle correction factor based on the manufacturer's declared worst-case duty cycle of 14.3%.															

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Customer: Honeywell
Project Number: 10784314
Config: 582
Mode: 344.9MHz Tx
Tested by: B. Kiewra

Freq (GHz)	Meter Reading [dBuV]	Detector*	Antenna Factor [dB/m]	Gain/Loss [dB]	Peak Field Strength [dBuV/m]	FCC 15.231 Peak Limit [dBuV/m]	Margin [dB]	DCF (dB)	Average Field Strength [dBuV/m]	FCC 15.231 Average Limit [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Antenna Polarity	In Restricted Band?
1.035	49.52	Pk	27.10	-30.20	46.4	74.0	-27.6	-16.9	29.5	54.0	-24.5	61	108	H	Y
1.380	50.51	Pk	28.40	-29.20	49.7	74.0	-24.3	-16.9	32.8	54.0	-21.2	324	183	H	Y
1.725	63.89	Pk	29.50	-28.30	65.1	69.3	-4.2	-16.9	48.2	49.3	-1.1	281	117	H	N
2.070	51.57	Pk	31.50	-27.50	55.6	69.3	-13.7	-16.9	38.7	49.3	-10.6	275	110	H	N
2.415	45.95	Pk	32.10	-26.60	51.5	69.3	-17.8	-16.9	34.6	49.3	-14.7	153	165	H	N
2.760	63.72	Pk	32.30	-26.20	69.8	74.0	-4.2	-16.9	52.9	54.0	-1.1	160	133	H	Y
3.105	53.60	Pk	33.30	-25.70	61.2	69.3	-8.1	-16.9	44.3	49.3	-5.0	183	121	H	N
3.450	49.76	Pk	32.80	-24.90	57.7	69.3	-11.6	-16.9	40.8	49.3	-8.5	161	123	H	N
3.795	41.39	Pk	33.40	-24.90	49.9	74.0	-24.1	-16.9	33.0	54.0	-21.0	161	250	H	Y
1.035	49.15	Pk	27.10	-30.20	46.1	74.0	-28.0	-16.9	29.2	54.0	-24.8	161	250	V	Y
1.380	45.91	Pk	28.40	-29.20	45.1	74.0	-28.9	-16.9	28.2	54.0	-25.8	75	334	V	Y
1.725	54.05	Pk	29.50	-28.30	55.3	69.3	-14.0	-16.9	38.4	49.3	-10.9	50	378	V	N
2.070	46.91	Pk	31.50	-27.50	50.9	69.3	-18.4	-16.9	34.0	49.3	-15.3	219	267	V	N
2.415	41.64	Pk	32.10	-26.60	47.1	69.3	-22.2	-16.9	30.3	49.3	-19.0	209	315	V	N
2.760	56.63	Pk	32.30	-26.20	62.7	74.0	-11.3	-16.9	45.8	54.0	-8.2	273	394	V	Y
3.105	45.62	Pk	33.30	-25.70	53.2	69.3	-16.1	-16.9	36.3	49.3	-13.0	304	371	V	N
3.450	45.64	Pk	32.80	-24.90	53.5	69.3	-15.8	-16.9	36.7	49.3	-12.6	201	283	V	N
3.795	40.85	Pk	33.40	-24.90	49.4	74.0	-24.7	-16.9	32.5	54.0	-21.5	257	296	V	Y

*PK = Peak, Av = Average

Average Field Strength computed as follows for the above fundamental and harmonics: PK + DCF, where DCF is a duty-cycle correction factor based on the manufacturer's declared worst-case duty cycle of 14.3%.

END OF REPORT