



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

MANUFACTURER'S TEST REPORT

FOR

WIRELESS ALARM CONSOLE

MODEL NUMBER: TSSC-VE

**FCC ID: CFS8DLTSSCBASE1
IC: 573F-TSSCBASE1**

REPORT NUMBER: R11070857-E2

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

Prepared by
**UL LLC
12 LABORATORY DR.
RESEARCH TRIANGLE PARK, NC 27709 USA
TEL: (919) 549-1400**



NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2016-01-20	Initial Issue	Mark Nolting
2	2016-01-21	Revised EUT description in Section 5.1.	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 ALARM CONSOLE

MODEL: TSSC-VE

SERIAL NUMBER: Non-serialized samples: SRID 1506; SRID 9553 (FCC#3)

DATE TESTED: 12/03/2015, 12/28-12/31/2015, 01/03/2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C (Fundamental and radiated spurious emissions only.)	PASS
INDUSTRY CANADA RSS-210 Issue 8 Annex 2 (Fundamental and radiated spurious emissions only.)	PASS
INDUSTRY CANADA RSS-GEN Issue 4 (Fundamental and radiated 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:



Jeff Moser
EMC Program Manager
UL – Consumer Technology Division

Prepared By:



Mark Nolting
EMC Engineer
UL – Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8. This report is a manufacturer's specification report that contains only fundamental and radiated spurious data.

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 and 2800 Suite B Perimeter Park Dr., Morrisville, NC 27560.

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

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560	
☒	Chamber NORTH
☐	Chamber SOUTH

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>.

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radiated Disturbance 0.009 to 30 MHz	+/- 3.15
Radiated Disturbance, 30 to 1000 MHz	+/- 5.36
Radiated Emissions, 1-18 GHz	+/- 4.32

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless alarm console that contains a 344.94 MHz radio, 802.11 b/g/n (HT20) radio and Z-Wave (908.4 MHz) radio. This report covers the Z-Wave radio.

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)
908.4	Z-Wave	92.61

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a monopole antenna, with a maximum gain of 2 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was standard production panel firmware, rev. 2.0.

5.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in two orientations as follows: Table-top and Wall-mount. The table-top orientation produced the highest emission and, therefore, was deemed the worst-case orientation. Hence, all final radiated testing was performed with the EUT in a table-top orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
EUT AC adapter	Honeywell	300-05763V1	15060548099	N/A

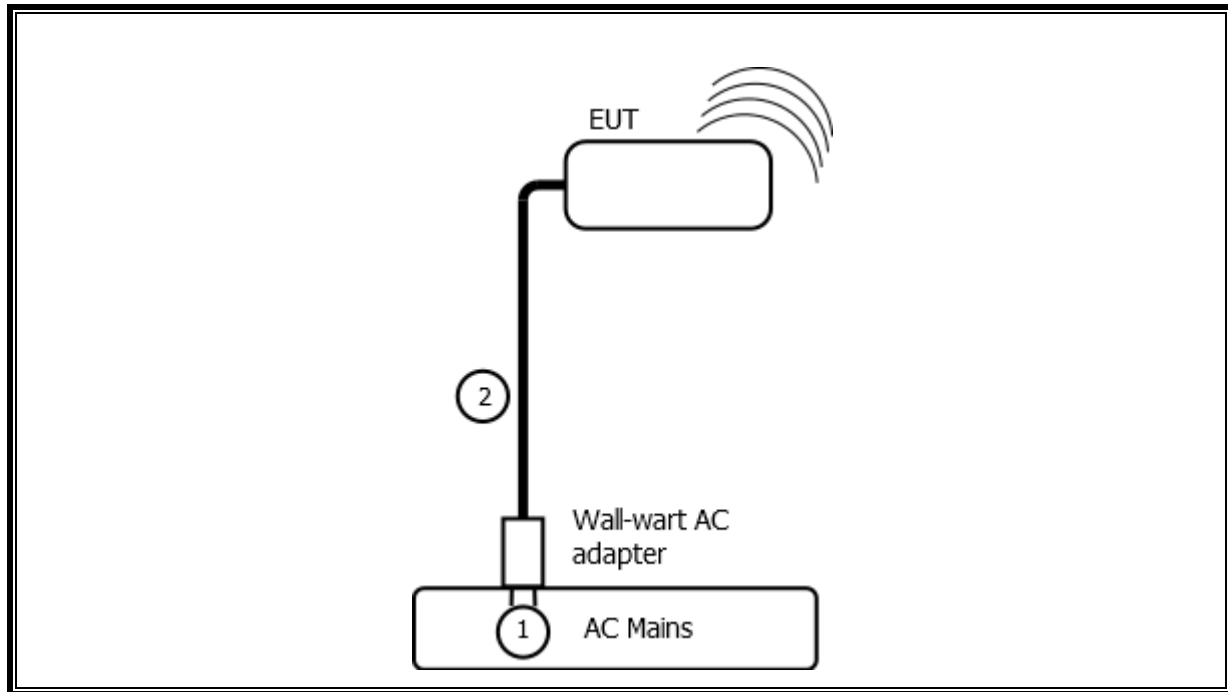
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2C AC	N/A	0	Wall-wart AC adapter's AC input.
2	DC (9V)	1	2C DC	Unshielded	2.4	Wall-wart AC adapter DC output to EUT. Non-detachable.

TEST SETUP

The EUT was configured as a table-top device. Test software internal to the device exercised its 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 Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0059	Active Shielded Loop Antenna	EMCO	6502	2015-03-17	2016-03-31
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2015-02-17	2016-02-29
AT0073	Hybrid Broadband Antenna, 30-1000MHz	Sunol Sciences Corp.	JB3	2015-06-10	2016-06-30
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2015-10-07	2016-10-31
N-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2015-06-04	2016-06-30
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2015-09-29	2016-09-30
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2015-08-26	2016-08-31
SA0026	Spectrum Analyzer	Agilent	N9030A	2015-03-27	2016-03-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
HI0079	Temp/Humid/Pressure Meter	Springfield Precision	PreciseTemp	2015-07-01	2016-07-31

7. TEST RESULTS

7.1. RADIATED EMISSIONS

LIMIT

IC RSS-210, A2.9
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

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.

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 peak measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz. For average measurements, the resolution and video bandwidths are set as described in ANSI 63.10:2013 for the applicable average measurement.

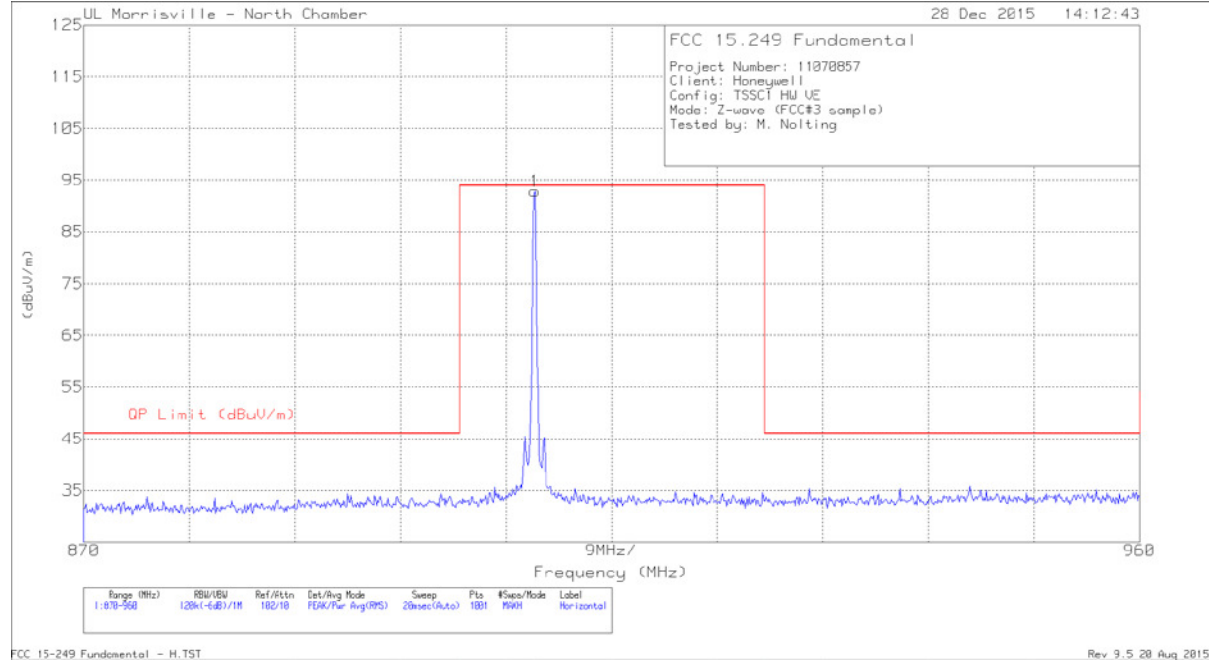
The spectrum from 9 kHz to 10 GHz is investigated with the transmitter on.

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

7.1.1. FUNDAMENTAL FREQUENCY RADIATED EMISSIONS

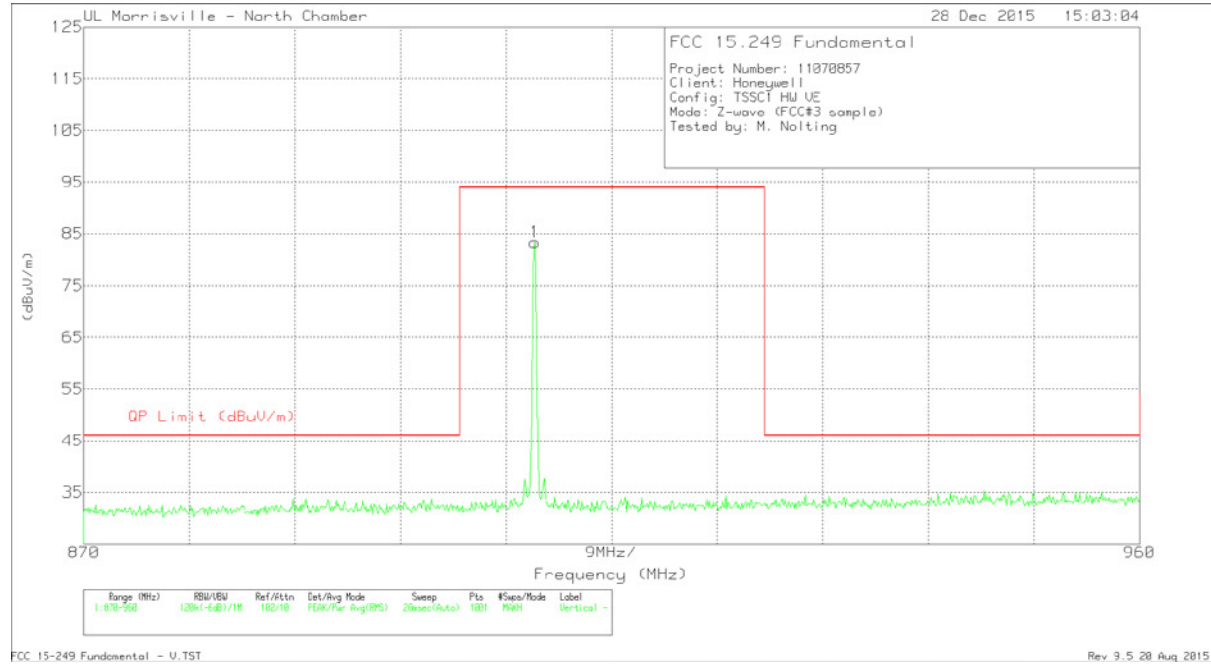
HORIZONTAL



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	908.4008	92.31	Qp	26.8	-26.5	92.61	93.98	-1.37	101	155	H

Qp - Quasi-Peak detector

VERTICAL



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	908.4007	82.89	Qp	26.8	-26.5	83.19	93.98	-10.79	329	163	V

Qp - Quasi-Peak detector

7.1.2. TRANSMITTER AUTHORIZED BAND EDGES

AUTHORIZED BANDEDGE

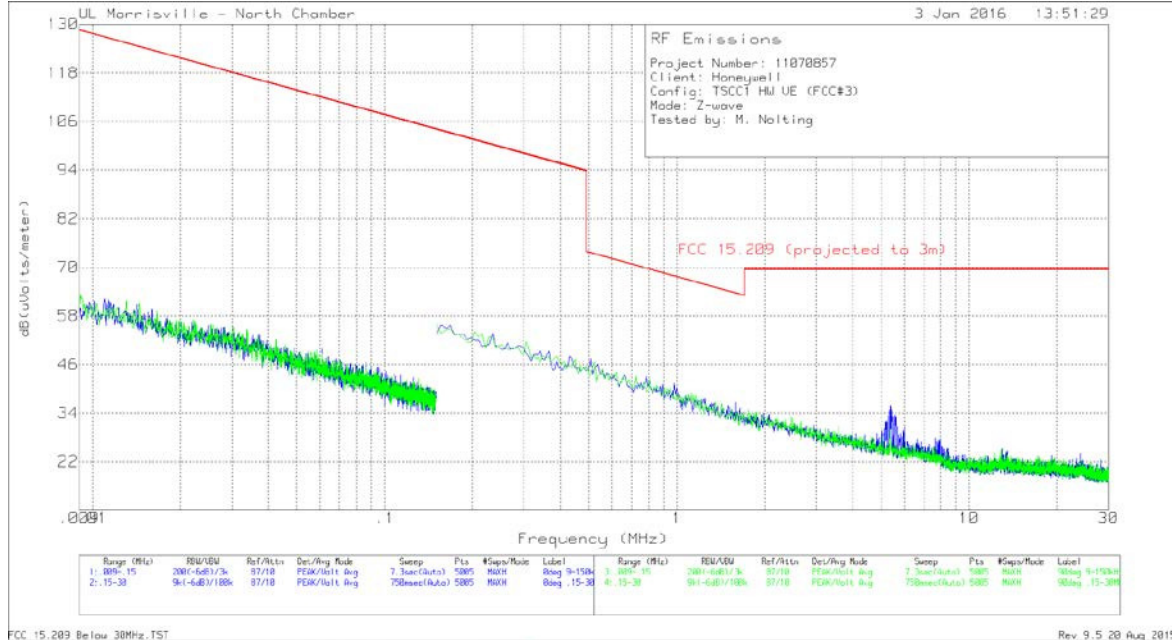
See the previous section for emissions at the edges of the 902-928 MHz band.

7.1.3. SPURIOUS EMISSIONS BELOW 1 GHz

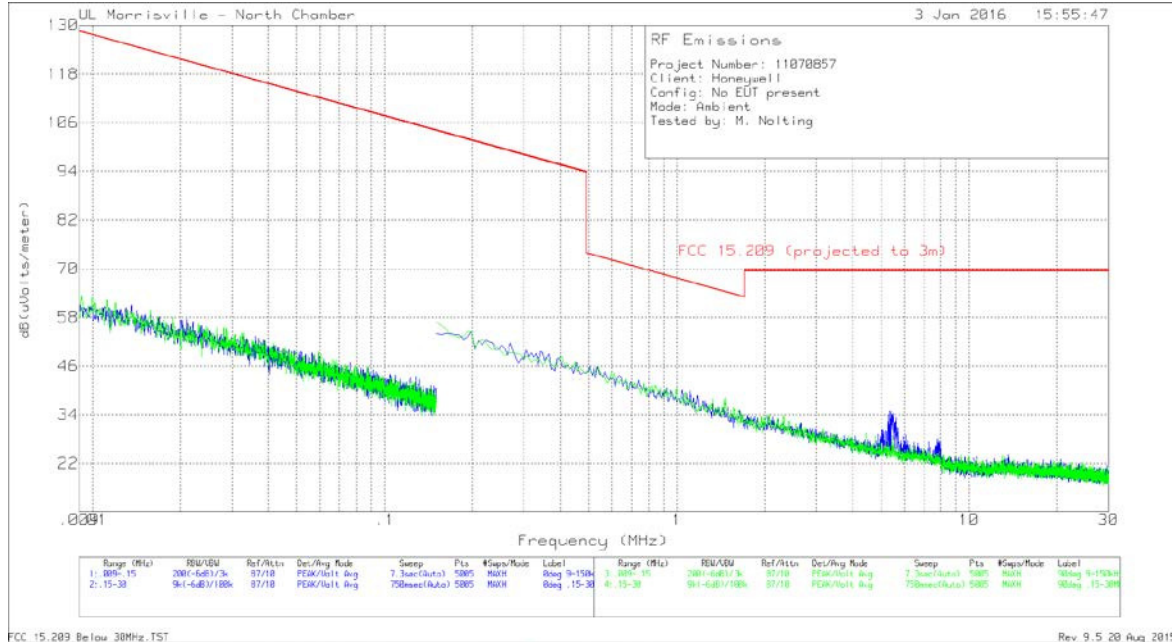
SPURIOUS EMISSIONS 0.009-30MHz

Note: All measurements were made at a test distance of 3 m. The limits in the plots and tabular data are the FCC/IC limits extrapolated from the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to the measurement distance to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log$ (specification distance / test distance) per FCC 15.31 (f) (2).

EUT PLOT

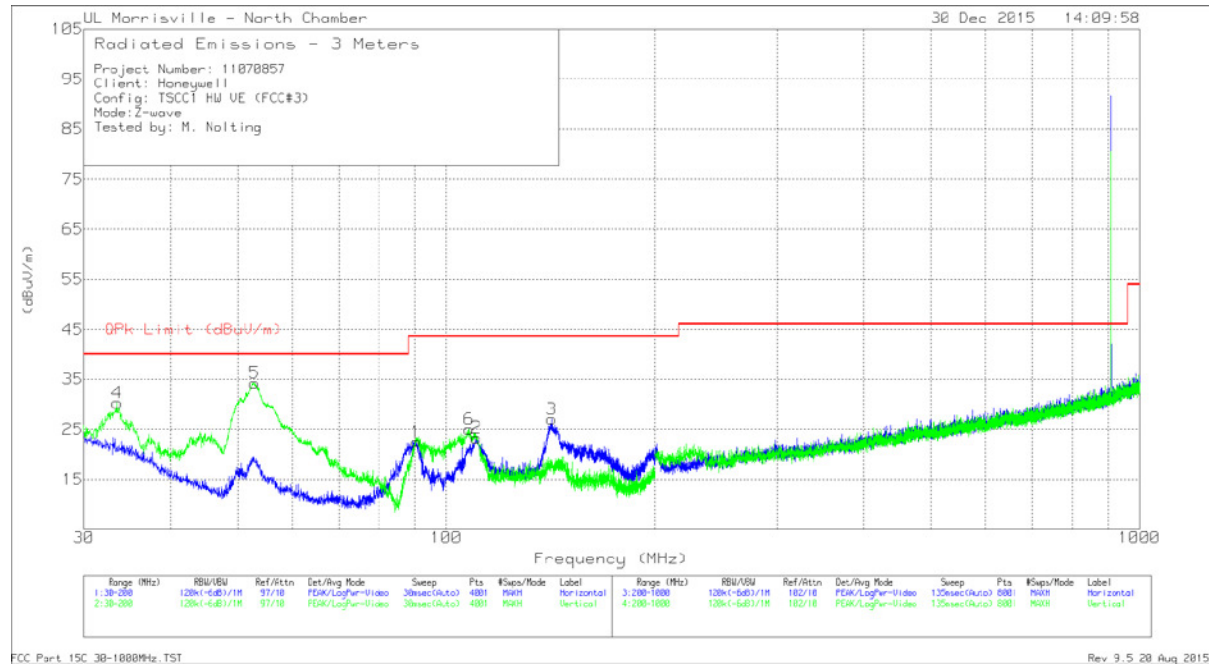


NOISE-FLOOR PLOT



The above plots demonstrate there were no EUT-related emissions of interest relative to the FCC 15.209 limit below 30MHz.

SPURIOUS EMISSIONS 30 TO 1000 MHz



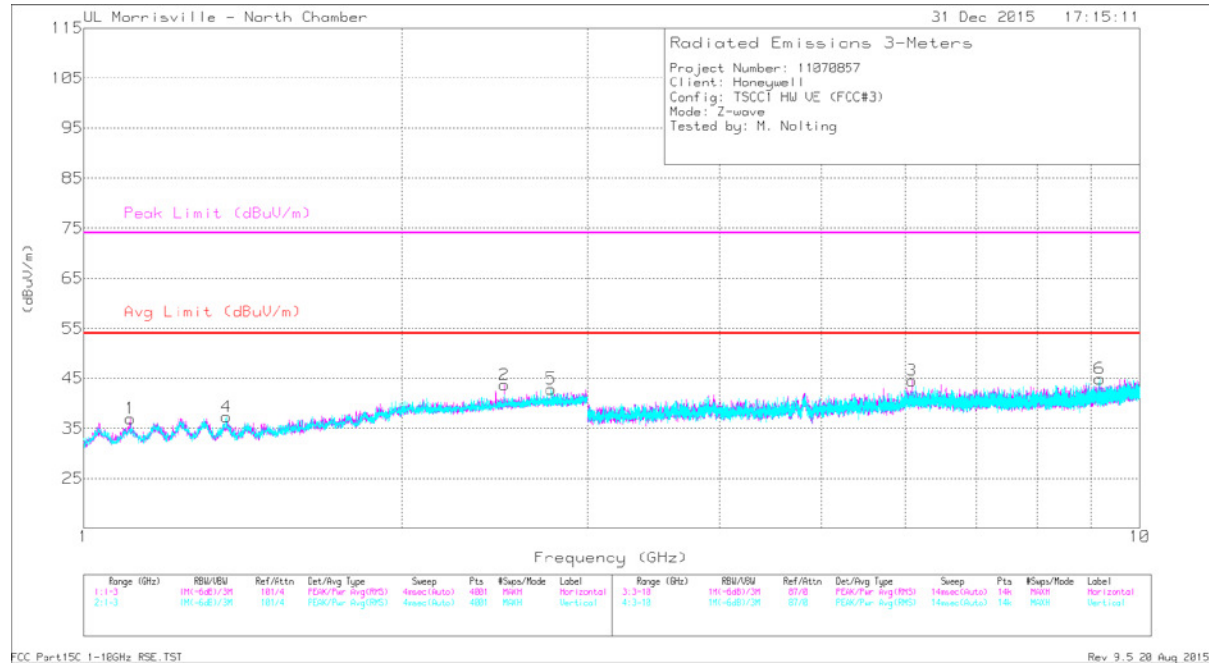
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 110.41	37.11	Pk	16.9	-30.7	23.31	43.52	-20.21	0-360	299	H
4	33.5275	38.53	Pk	23.4	-31.6	30.33	40	-9.67	0-360	103	V
5	52.77	51.46	Qp	12	-31.4	32.06	40	-7.94	299	100	V
1	90.3925	41.51	Pk	11.8	-30.8	22.51	43.52	-21.01	0-360	199	H
6	107.8175	39.29	Pk	16.5	-30.8	24.99	43.52	-18.53	0-360	103	V
3	141.945	40.15	Pk	17.3	-30.4	27.05	43.52	-16.47	0-360	199	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

7.1.4. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.106	35.67	Pk	28.3	-27	36.97	54	-17.03	74	-37.03	0-360	101	H
4	* 1.365	34.46	Pk	28.5	-25.7	37.26	54	-16.74	74	-36.74	0-360	101	V
5	* 2.773	34.67	Pk	32.4	-24.2	42.87	54	-11.13	74	-31.13	0-360	101	V
6	* 9.166	37.19	Pk	36.4	-28.7	44.89	54	-9.11	74	-29.11	0-360	101	V
2	* 2.5	39.19	Pk	32.1	-24.7	46.59	-	-	74	-27.41	114	107	H
	* 2.5	32.77	Av	32.1	-24.7	40.17	54	-13.83	-	-	114	107	H
3	6.089	40.33	Pk	35.2	-31	44.53	54	-9.47	74	-29.47	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Av - Average detection

END OF REPORT