CERTIFICATION TEST REPORT

Report Number. : 13073027A

Applicant	:	Honeywell International Inc. Commercial Fire & Security Div 12 Clintonville Rd. Northford, CT 06472
Model	:	MPIKTSMF
FCC ID	:	PV3MPIKTSMF
IC	:	12252A-MPIKTSMF
EUT Description	:	Keypad Access Panel
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS-210

Date Of Issue:
2020-07-22

Prepared by:
UL LLC.
333 Pfingsten Road
Northbrook, IL 60062 U.S.A.
TEL: (847) 272-8800

Revision History

Rev.	Issue Date	Revisions	Revised By
	--		

UL LLC
333 Pfingsten Road, Northbrook, IL 60062; USA TEL:(847) 272-8800

This report shall not be reproduced except in full, without the written approval of UL LLC

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 4
2. TEST METHODOLOGY 5
3. FACILITIES AND ACCREDITATION 5
4. CALIBRATION AND UNCERTAINTY 6
4.1. METROLOGICAL TRACEABILITY 6
4.2. DECISION RULES 6
4.3. MEASUREMENT UNCERTAINTY 6
4.4. SAMPLE CALCULATION 6
5. EQUIPMENT UNDER TEST 7
5.1. DESCRIPTION OF EUT 7
5.2. MAXIMUM OUTPUT POWER 7
5.3. SOFTWARE AND FIRMWARE 7
5.4. WORST-CASE CONFIGURATION AND MODE 7
5.5. DESCRIPTION OF TEST SETUP 8
6. TEST AND MEASUREMENT EQUIPMENT 9
7. OCCUPIED BANDWIDTH 10
7.1. Badwidth Data 11
8. RADIATED EMISSION TEST RESULTS 13
8.1. LIMITS AND PROCEDURE 13
8.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 - 30 MHz) 15
8.2.1. Plot Data with Card 15
8.2.2. Tabular Data with Card 17
8.2.3. Plot Data no Card 18
8.2.4. Tabular Data no Card 20
8.3. TX SPURIOUS EMISSION 30 TO 1000 MHz 21
8.3.1. Plot Data with Card 21
8.3.2. Tabular Data with Card 22
8.3.3. Plot Data no Card 23
8.3.4. Tabular Data no Card 24
9. FREQUENCY STABILITY 25
9.1. Frequency Stability Data 26
10. AC MAINS LINE CONDUCTED EMISSIONS 27
10.1. With Normal Antenna with Card 28
10.1.1. Plot Data 28
10.1.2. Tabular Data 29
10.2. With Normal Antenna no Card 30
10.2.1. Plot Data 30
10.2.2. Tabular Data 31
10.3. With non-radiating Antenna 32
10.3.1. Plot Data 32
10.3.2. Tabular Data 33
11. SETUP PHOTOS 34

This report shall not be reproduced except in full, without the written approval of UL LLC

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Honeywell Internationl Inc.
Commercial Fire & Security Div 12 Clintonville Rd.
Northford, CT 06472

EUT DESCRIPTION: Keypad Access Panel

MODEL: MPIKTSMF

SERIAL NUMBER: 00030EEE

DATE TESTED: 2020-03-12 thru 2020-06-17

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Complies
ISED RSS-210 Issue 10, Annex B	Complies
ISED RSS-GEN Issue 5	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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 Verification Services Inc. 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, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Thu Chan
Operations Leader
Consumer Technology Division
UL Verification Services

Prepared By:

Bart Mucha
Test Engineer
Consumer Technology Division
UL LLC

This report shall not be reproduced except in full, without the written approval of UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 15, RSS-GEN Issue 5, and RSS-210 Issue 10.

3. FACILITIES AND ACCREDITATION

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

333 Pfingsten Road
☒ Chamber 10m

This report shall not be reproduced except in full, without the written approval of UL LLC

4. CALIBRATION AND UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

For all tests, the Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

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
AC Conducted Disturbance	0.15 to 30MHz	LISN	3.65dB
Radiated Emissions	0.009 to 30MHz	H-Filed Loop	2.52dB

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

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS
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

MAINS CONDUCTED EMISSIONS
Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

This report shall not be reproduced except in full, without the written approval of UL LLC

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, Model MPIKTSMF is a Dual Frequency Access Keypad. This report only covers the 13.56MHz. See UL Report 13073027B for data on 125kHz device.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak radiated electric field strength as follows:

Frequency Range (MHz)	E Field at 30m distance (dBuV/m)	Notes
13.56	14.36	with Card
	23.27	no Card

5.3. SOFTWARE AND FIRMWARE

AE Equipment – Control Panel
FW version: 7.91
BSP version: 7.1r3

EUT – Keypad
AMS: 0.9.54

5.4. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was in normal installation orientation.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788

This report shall not be reproduced except in full, without the written approval of UL LLC

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Control Panel	Honeywell	Eagle Control Panel	non-serilaized	

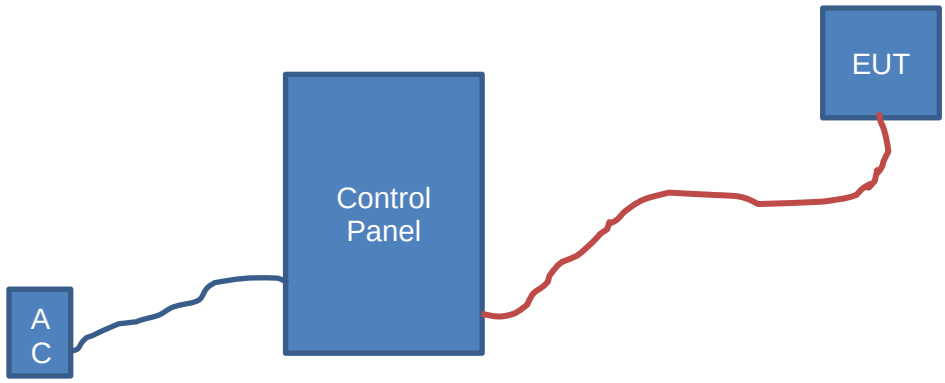
I/O CABLES

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	IEC C13	3 wire	1m	connected to EUT input
2	Power and Data	1	wired in	4 wire, 24 AWG	1m	shielded cable with unterminated shield

TEST SETUP

The EUT is a stand alone keypad connected via 4 wire power and data back to control panel. EUT was tested as stand alone.

SETUP DIAGRAM



This report shall not be reproduced except in full, without the written approval of UL LLC

6. TEST AND MEASUREMENT EQUIPMENT

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

UL SOFTWARE			
AC Line Conducted Software and Radiated Emissions Software	UL	UL EMC	Ver 9.5, April 3, 2015

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	2019-12-28	2020-12-31
Bicon Antenna	Electro-Metrics	EM6912A	EMC4070	2019-12-31	2020-12-31
Log-P Antenna	Chase	UPA6109	EMC4258	2019-12-31	2020-12-31
Loop Antenna	EMCO	6502/1	EMC4026	2020-01-28	2021-01-31
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	2019-12-30	2020-12-31
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
High-Pass Filter	Solar Electronics	2803-150	EMC4327	N/A	N/A
Attenuator	HP	8494B	2831A00838	N/A	N/A
LISN - L1	Solar Electronics	8602-50-TS-50-N	EMC4066	2019-12-16	2020-12-31
LISN - L2	Solar Electronics	8602-50-TS-50-N	EMC4064	2019-12-16	2020-12-31
Environmental Chamber	Espec	BTX-475	EMC4378	2019-04-15	2020-04-30
Signal Analyzer	Aglient	N9030A PXA	EMC4360	2019-12-22	2020-12-31

This report shall not be reproduced except in full, without the written approval of UL LLC

7. OCCUPIED BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 10kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Since the transmitter signal is CW-like it is impractical to use an RBW setting of 1 - 5% of the emission bandwidth since the emission bandwidth will be proportional to the RBW.

RESULTS

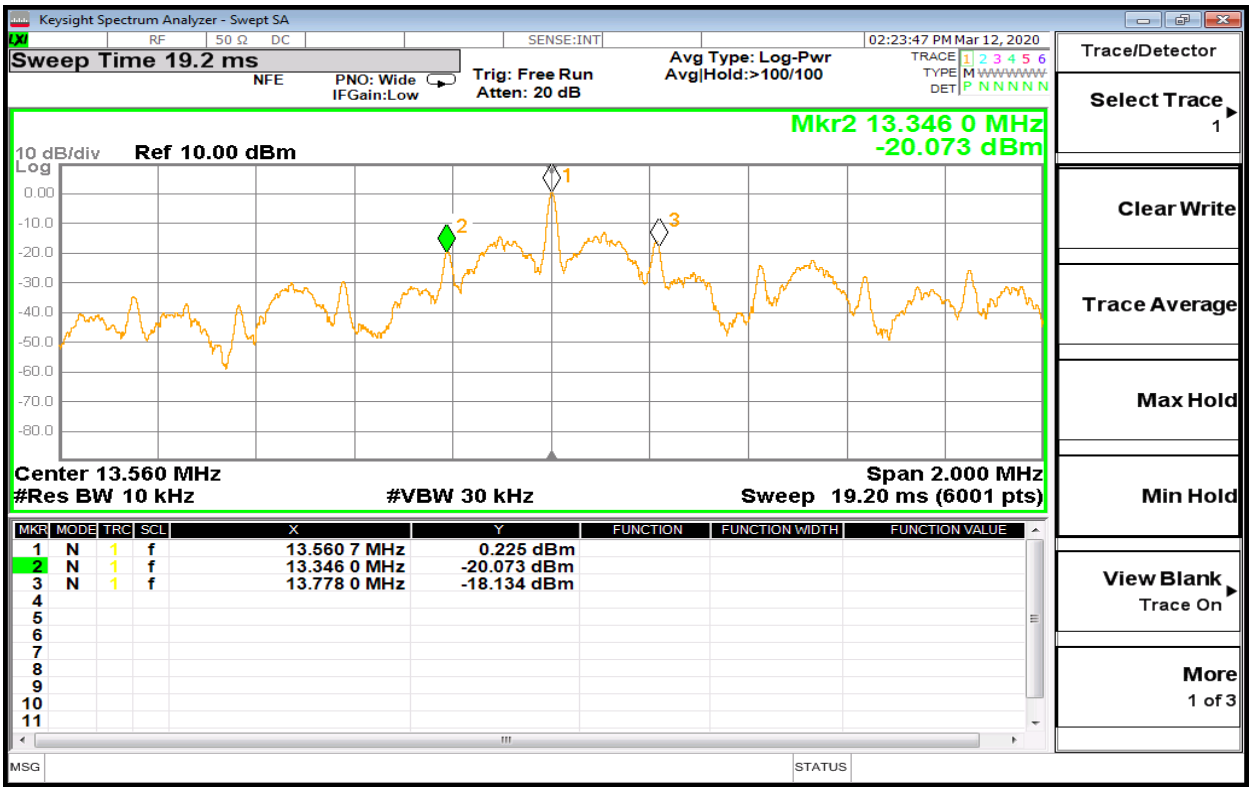
99% and 20dB BW

Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
13.56 with card	998.2	432
13.56 no card	849.62	299

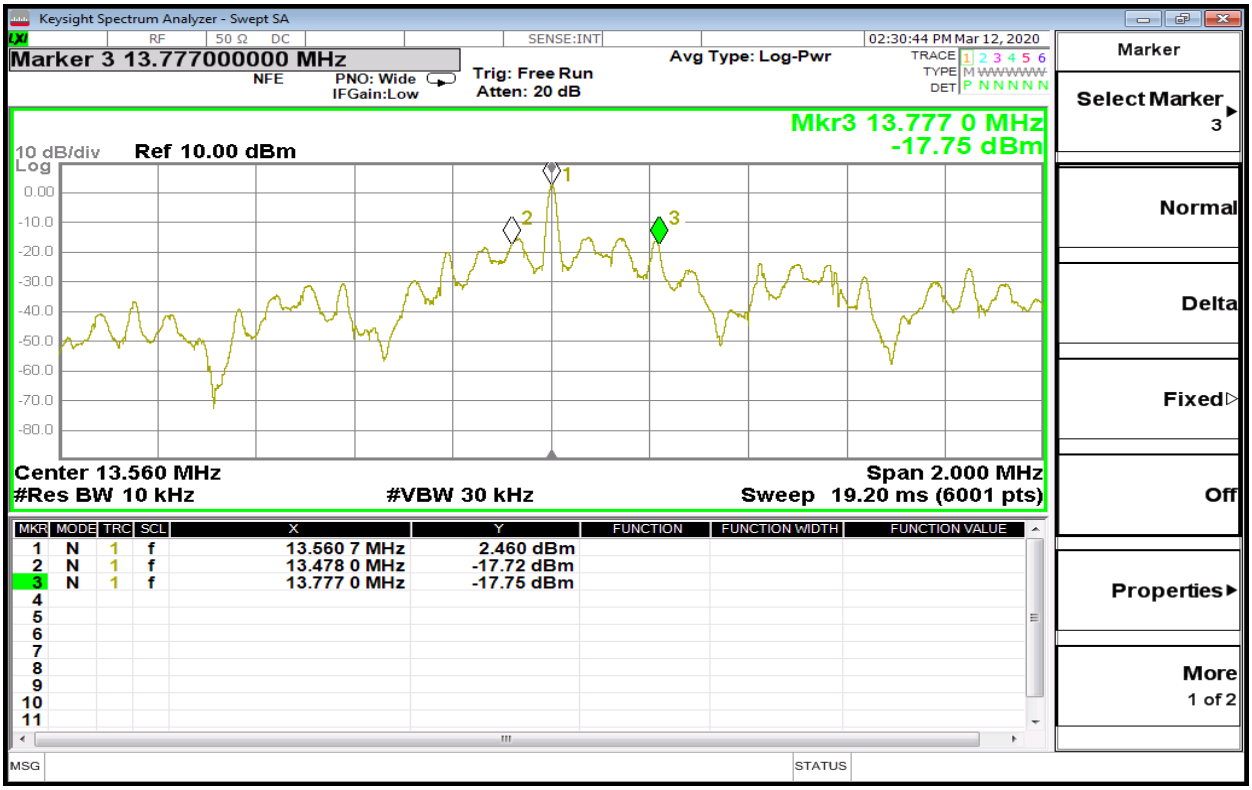
This report shall not be reproduced except in full, without the written approval of UL LLC

7.1. Badwidth Data

20dB Data with Card

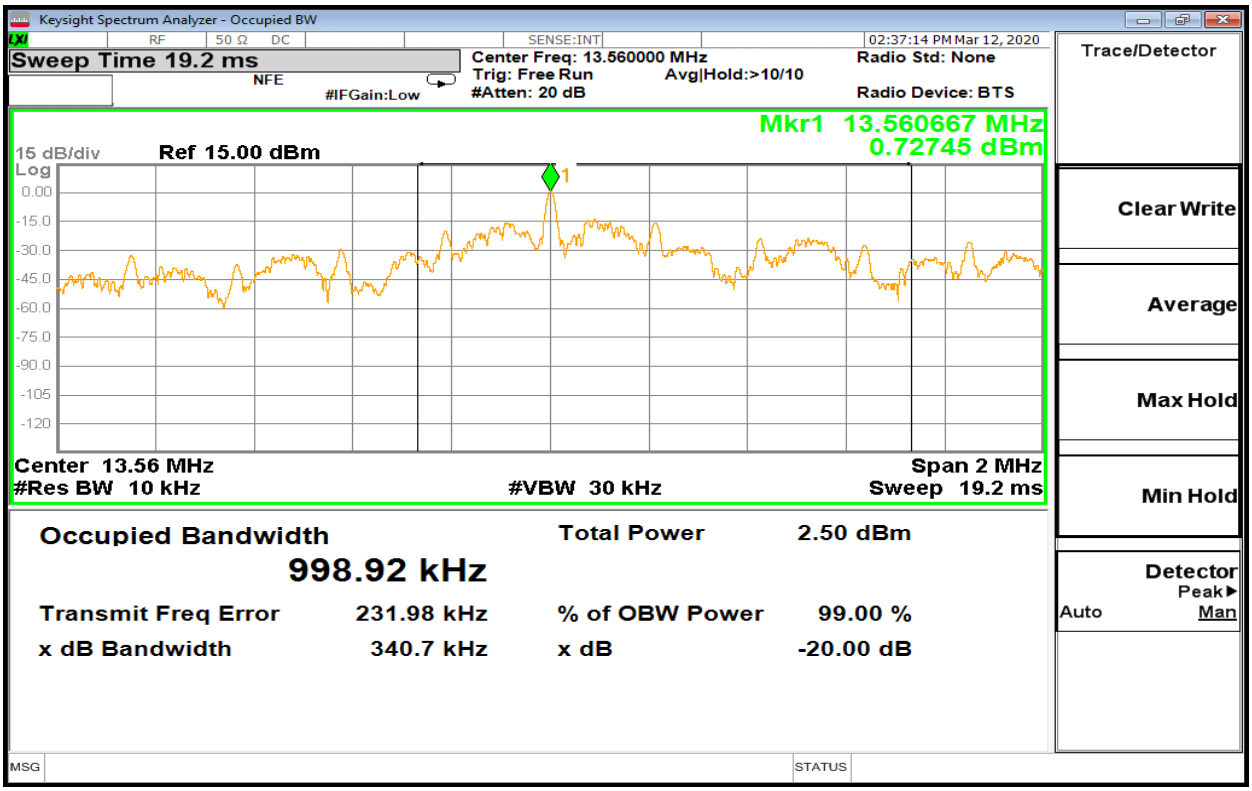


20dB Data no Card

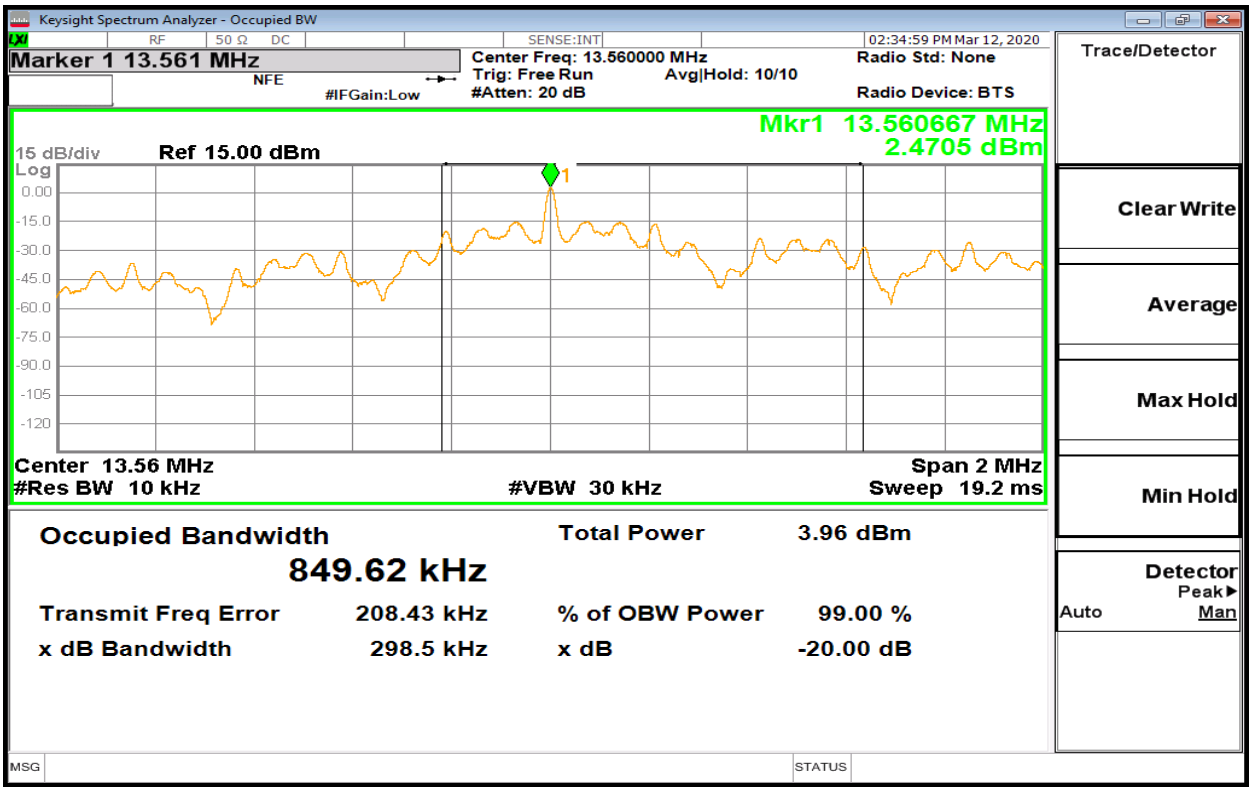


This report shall not be reproduced except in full, without the written approval of UL LLC

99% Data with Card



99% Data no Card



This report shall not be reproduced except in full, without the written approval of UL LLC

8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

§15.225
IC RSS-210, Annex B.6
IC RSS-GEN, Section 8.9 (Transmitter)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:
§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:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
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.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

Note: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as report in the table) using free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

This report shall not be reproduced except in full, without the written approval of UL LLC

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10, 2013

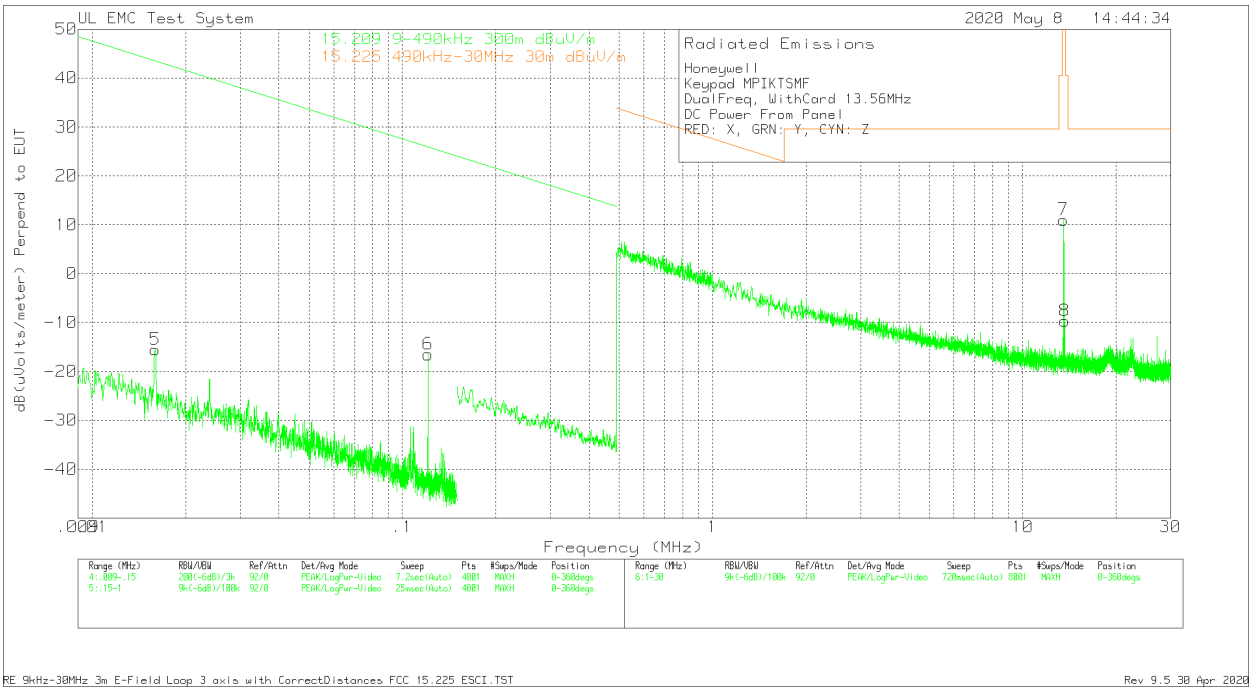
The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

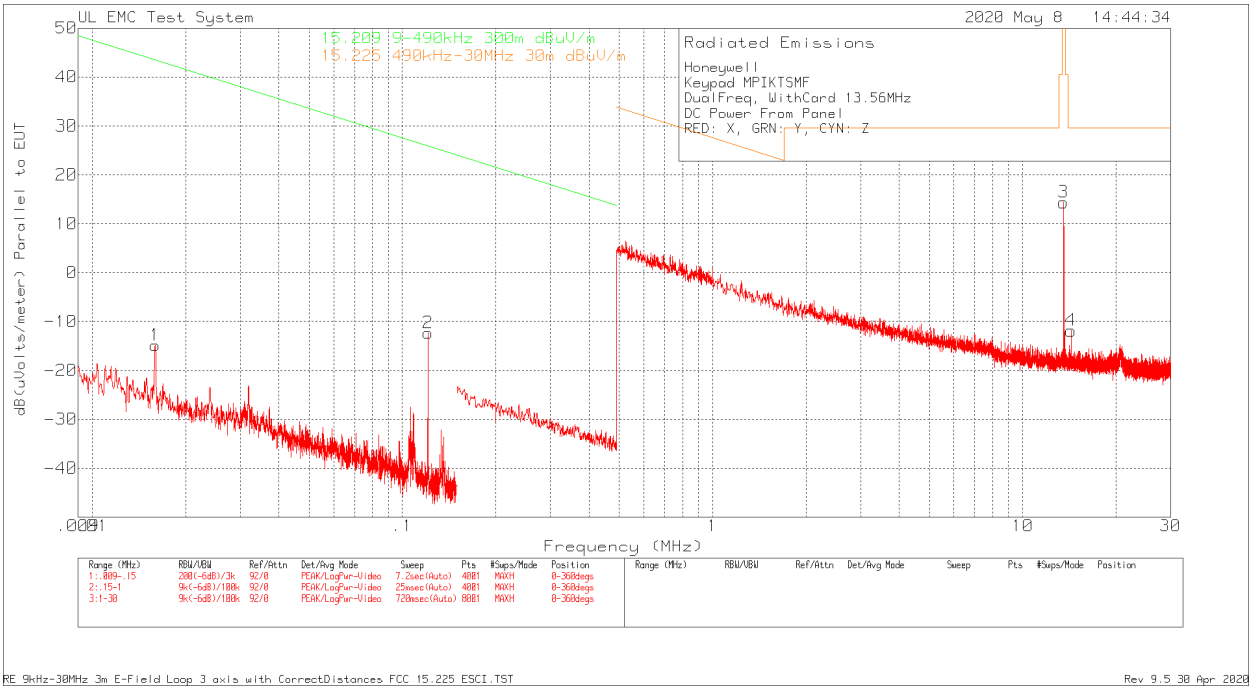
RESULTS

This report shall not be reproduced except in full, without the written approval of UL LLC

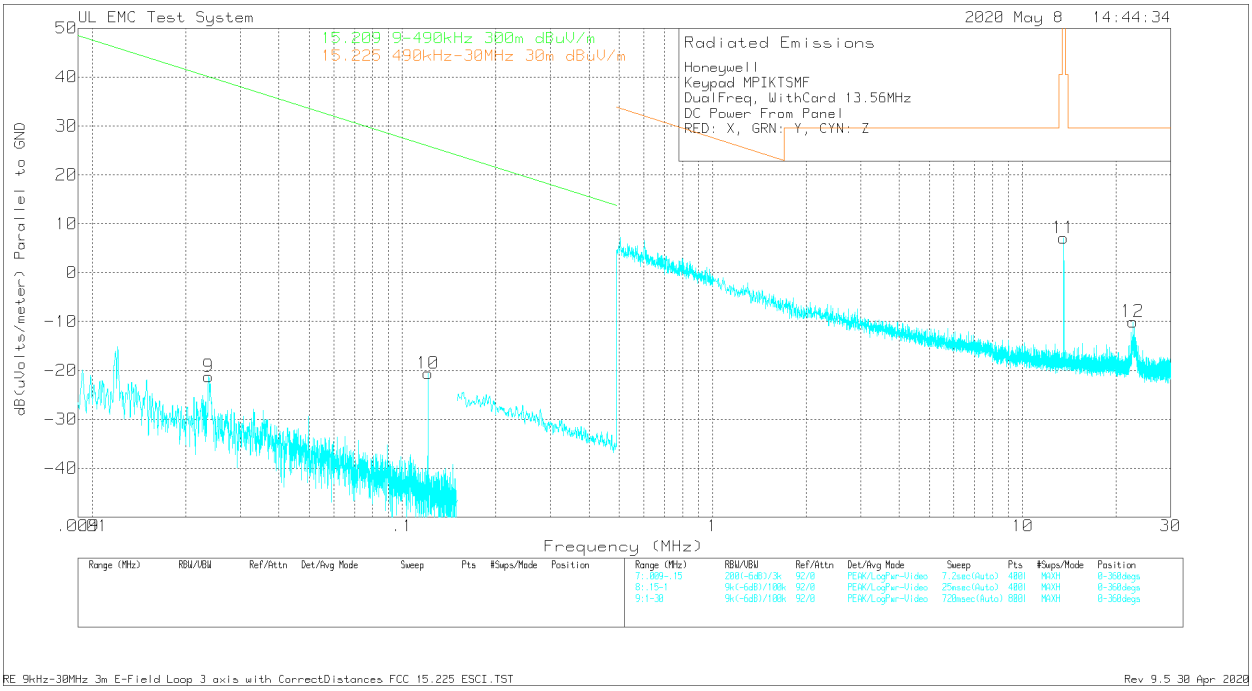
8.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 - 30 MHz)

8.2.1. Plot Data with Card





This report shall not be reproduced except in full, without the written approval of UL LLC



This report shall not be reproduced except in full, without the written approval of UL LLC

8.2.2. Tabular Data with Card

Honeywell
Keypad MPIKTSMF
DualFreq, WithCard 13.56MHz
DC Power From Panel
RED: X, GRN: Y, CYN: Z
Trace MArkers

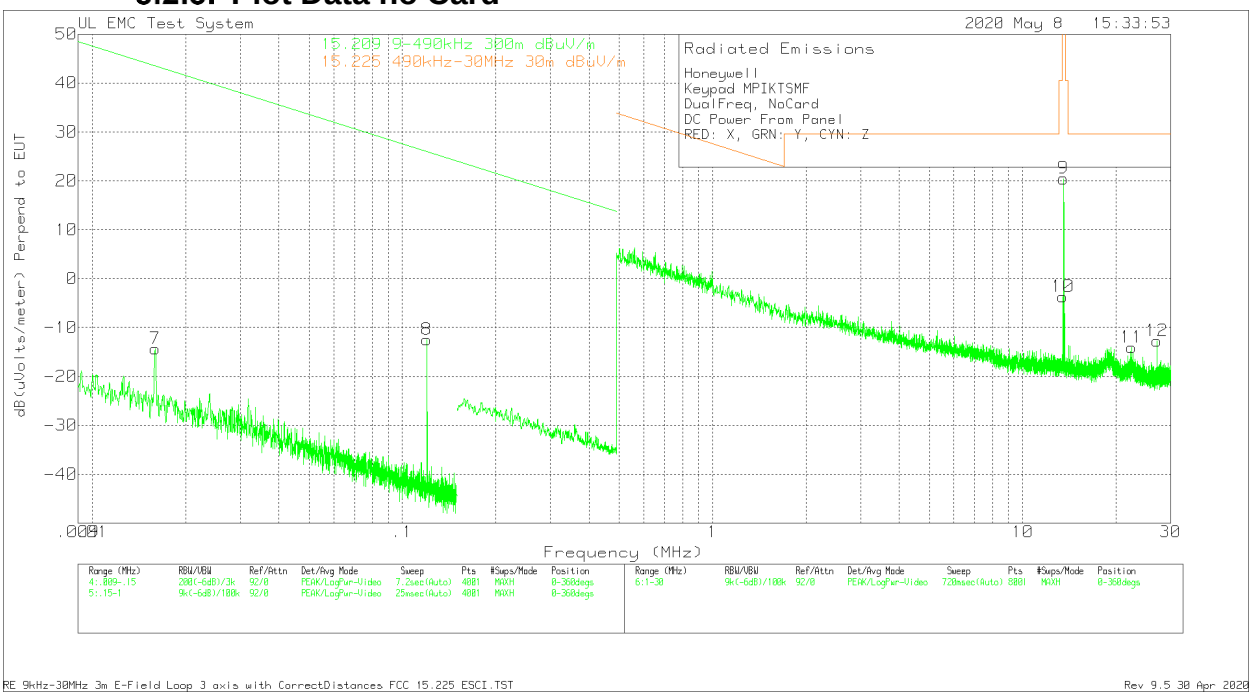
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Distance Factor 300mTo3m & 30mTo3m dB	Level dBuV/m	Limit 15.209 9-490kHz 300m dBuV/m	Margin (dB)	Limit 15.225 490kHz-30MHz 30m dBuV/m	Margin (dB)	Azimuth [Degs]
1*	0.01593	44.09	Pk	20.9	0.1	-80	-14.91	43.55	-58.46	-	-	0-360
2**	0.120895	55.35	Pk	12.2	0.1	-80	-12.35	25.95	-38.3	-	-	0-360
3	13.56063	42.66	Pk	11.3	0.4	-40	14.36	-	-	84	-69.64	0-360
4	14.311	16.43	Pk	11.3	0.4	-40	-11.87	-	-	29.54	-41.41	0-360
5*	0.01593	43.42	Pk	20.9	0.1	-80	-15.58	43.55	-59.13	-	-	0-360
6**	0.120895	51.18	Pk	12.2	0.1	-80	-16.52	25.95	-42.47	-	-	0-360
7	13.56063	39.29	Pk	11.3	0.4	-40	10.99	-	-	84	-73.01	0-360
8	13.66575	18.59	Pk	11.3	0.4	-40	-9.71	-	-	50.47	-60.18	0-360
9*	0.02372	40.27	Pk	18.4	0.1	-80	-21.23	40.09	-61.32	-	-	0-360
10**	0.120895	47.06	Pk	12.2	0.1	-80	-20.64	25.95	-46.59	-	-	0-360
11	13.56063	35.4	Pk	11.3	0.4	-40	7.1	-	-	84	-76.9	0-360
12	22.634	19.36	Pk	10.1	0.5	-40	-10.04	-	-	29.54	-39.58	0-360

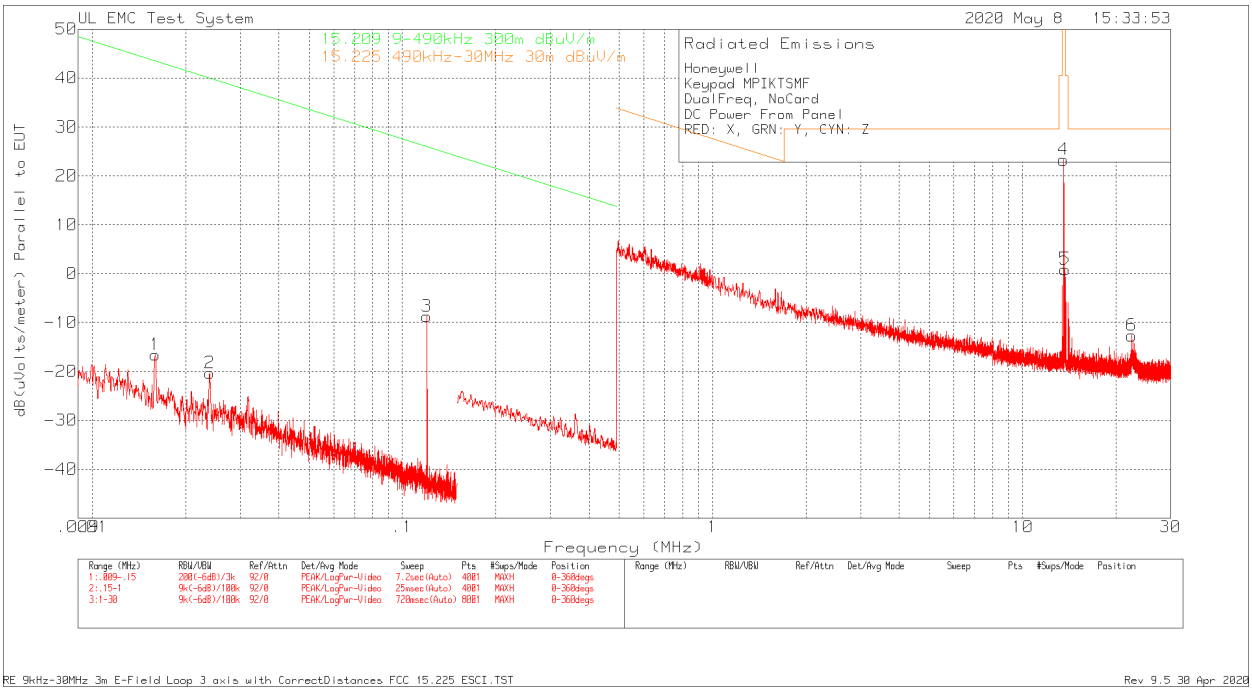
Pk - Peak detector

* ambient not subject to measurement
** The 125kHz transmitter is collocated with the 13.56MHz transmitter. See report report # 13073027B for data on 125kHz transmitter.

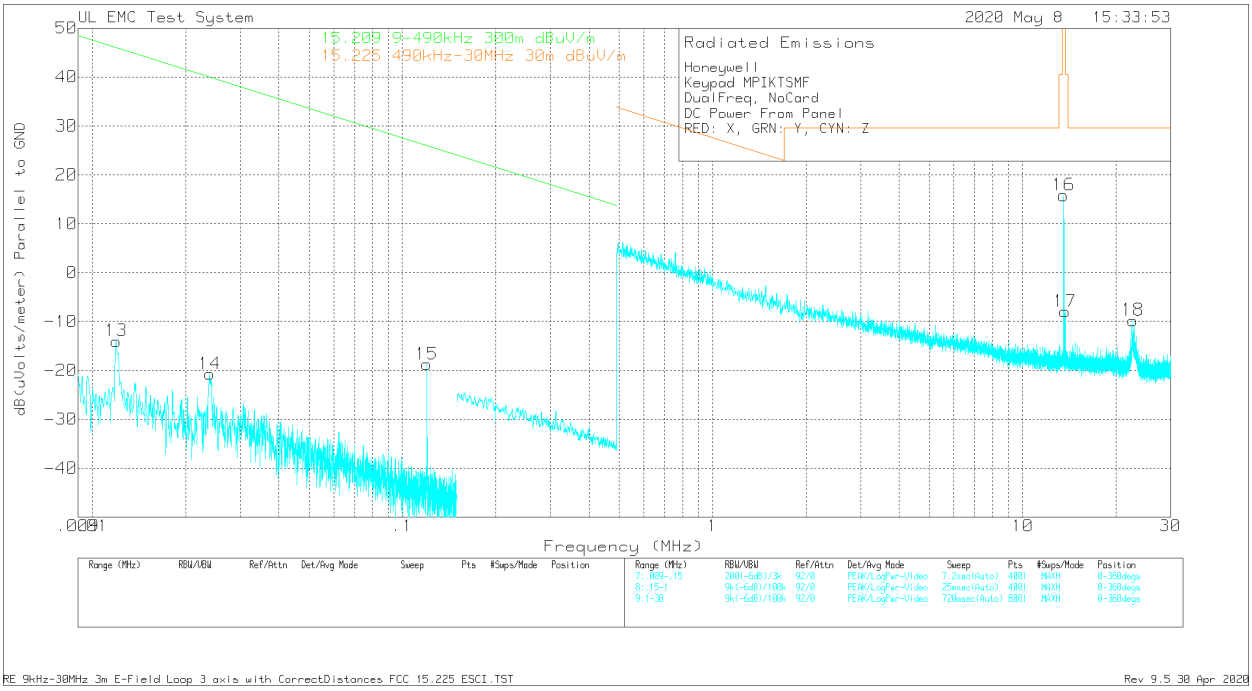
This report shall not be reproduced except in full, without the written approval of UL LLC

8.2.3. Plot Data no Card





This report shall not be reproduced except in full, without the written approval of UL LLC



UL LLC
FORM NO: CCSUP4701I
333 Pfingsten Road, Northbrook, IL 60062; USA TEL:(847) 272-8800
This report shall not be reproduced except in full, without the written approval of UL LLC

8.2.4. Tabular Data no Card

Honeywell
Keypad MPIKTSMF
DualFreq, NoCard
DC Power From Panel
RED: X, GRN: Y, CYN: Z
Trace MArkers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Distance Factor 300mTo3m & 30mTo3m dB	Level dBuV/m	Limit 15.209 9-490kHz 300m dBuV/m	Margin (dB)	Limit 15.225 490kHz-30MHz 30m dBuV/m	Margin (dB)	Azimuth [Degs]
1*	0.01593	42.36	Pk	20.9	0.1	-80	-16.64	43.55	-60.19	-	-	0-360
2*	0.02391	41.25	Pk	18.3	0.1	-80	-20.35	40.03	-60.38	-	-	0-360
3**	0.11997	58.93	Pk	12.2	0.1	-80	-8.77	26.02	-34.79	-	-	0-360
4	13.56063	51.57	Pk	11.3	0.4	-40	23.27	-	-	84	-60.73	0-360
5	13.69838	29.19	Pk	11.3	0.4	-40	0.89	-	-	50.47	-49.58	0-360
6	22.46	16.73	Pk	10.1	0.5	-40	-12.67	-	-	29.54	-42.21	0-360
7*	0.01593	44.68	Pk	20.9	0.1	-80	-14.32	43.55	-57.87	-	-	0-360
8**	0.119985	55.2	Pk	12.2	0.1	-80	-12.5	26.02	-38.52	-	-	0-360
9	13.56063	48.77	Pk	11.3	0.4	-40	20.47	-	-	84	-63.53	0-360
10	13.49175	24.52	Pk	11.4	0.4	-40	-3.68	-	-	50.47	-54.15	0-360
11	22.46	15.28	Pk	10.1	0.5	-40	-14.12	-	-	29.54	-43.66	0-360
12	27.12538	17.26	Pk	9.4	0.6	-40	-12.74	-	-	29.54	-42.28	0-360
13*	0.01194	42.89	Pk	23	0.1	-80	-14.01	46.06	-60.07	-	-	0-360
14*	0.02391	40.86	Pk	18.3	0.1	-80	-20.74	40.03	-60.77	-	-	0-360
15**	0.11997	48.96	Pk	12.2	0.1	-80	-18.74	26.02	-44.76	-	-	0-360
16	13.56063	44.11	Pk	11.3	0.4	-40	15.81	-	-	84	-68.19	0-360
17	13.702	20.34	Pk	11.3	0.4	-40	-7.96	-	-	50.47	-58.43	0-360
18	22.69925	19.63	Pk	10.1	0.5	-40	-9.77	-	-	29.54	-39.31	0-360

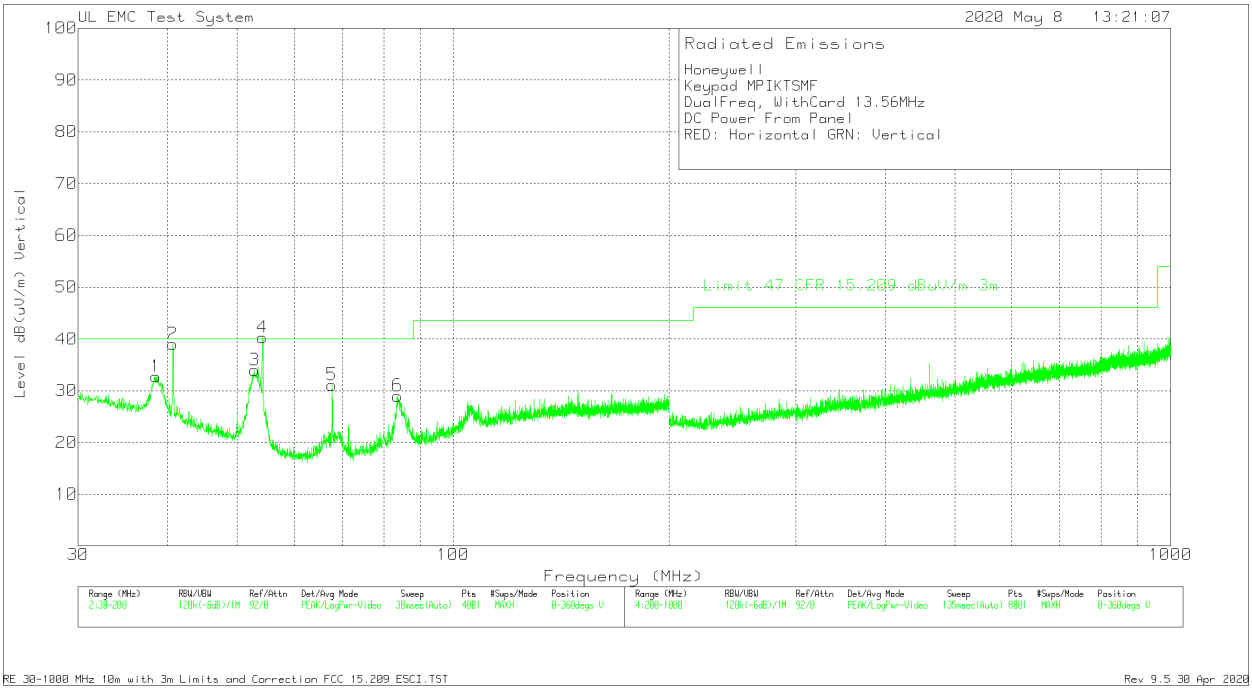
Pk - Peak detector

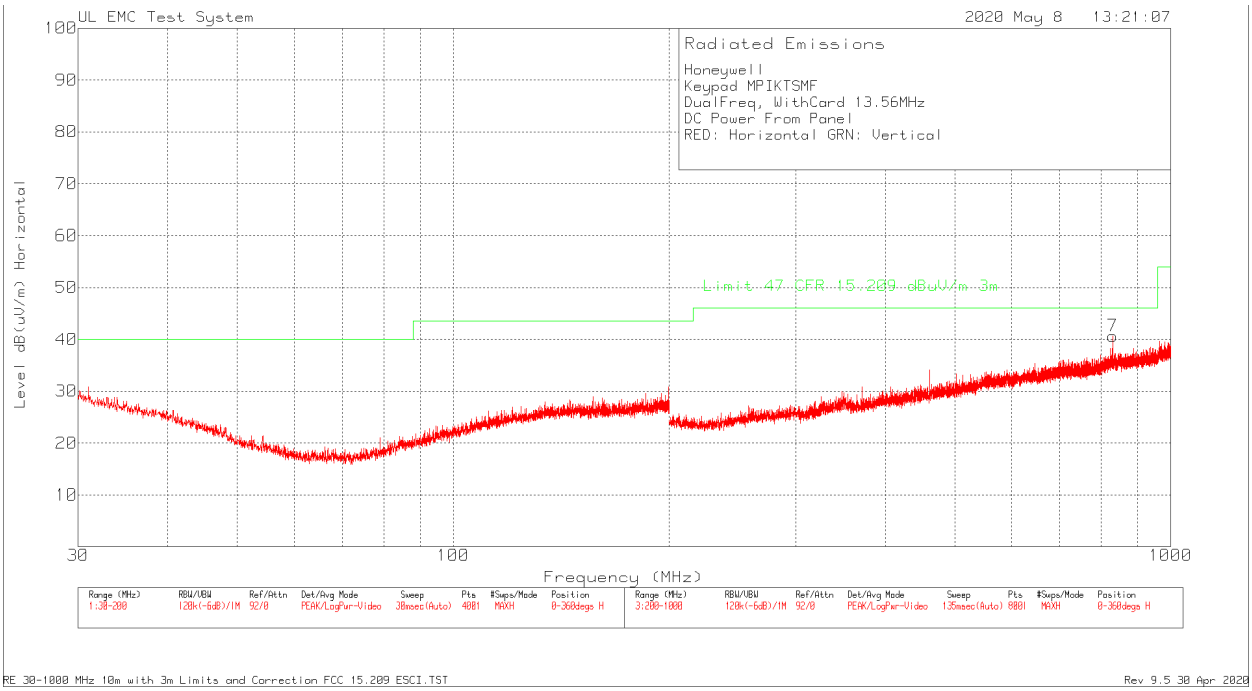
* ambient not subject to measurement
** The 125kHz transmitter is collocated with the 13.56MHz transmitter. See report report # 13073027B for data on 125kHz transmitter.

This report shall not be reproduced except in full, without the written approval of UL LLC

8.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

8.3.1. Plot Data with Card





UL LLC
333 Pfingsten Road, Northbrook, IL 60062; USA TEL:(847) 272-8800

FORM NO: CCSUP4701I
This report shall not be reproduced except in full, without the written approval of UL LLC

8.3.2. Tabular Data with Card

Honeywell
Keypad MPIKTSMF
DualFreq, WithCard 13.56MHz
DC Power From Panel
RED: Horizontal GRN: Vertical
Trace MArkers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	EMC4070 Bicon dB/m	Path Factor dB	10m to 3m Factor dB	Corrected Reading Level dB(uV/m)	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	38.5	37.7	Pk	14.6	-30.1	10.5	32.7	40	-7.3	0-360	101	V
2	40.6675	45.03	Pk	13.6	-30.1	10.5	39.03	40	-0.97	0-360	101	V
3	52.865	45.1	Pk	8.4	-30	10.5	34	40	-6	0-360	101	V
4	54.225	52.05	Pk	7.8	-30.1	10.5	40.25	40	0.25	0-360	249	V
5	67.7825	44.42	Pk	6.2	-30	10.5	31.12	40	-8.88	0-360	401	V
6	83.635	39.9	Pk	8.5	-29.9	10.5	29	40	-11	0-360	101	V
7	830.15	34.6	Pk	23	-27.5	10.5	40.6	46.02	-5.42	0-360	99	H

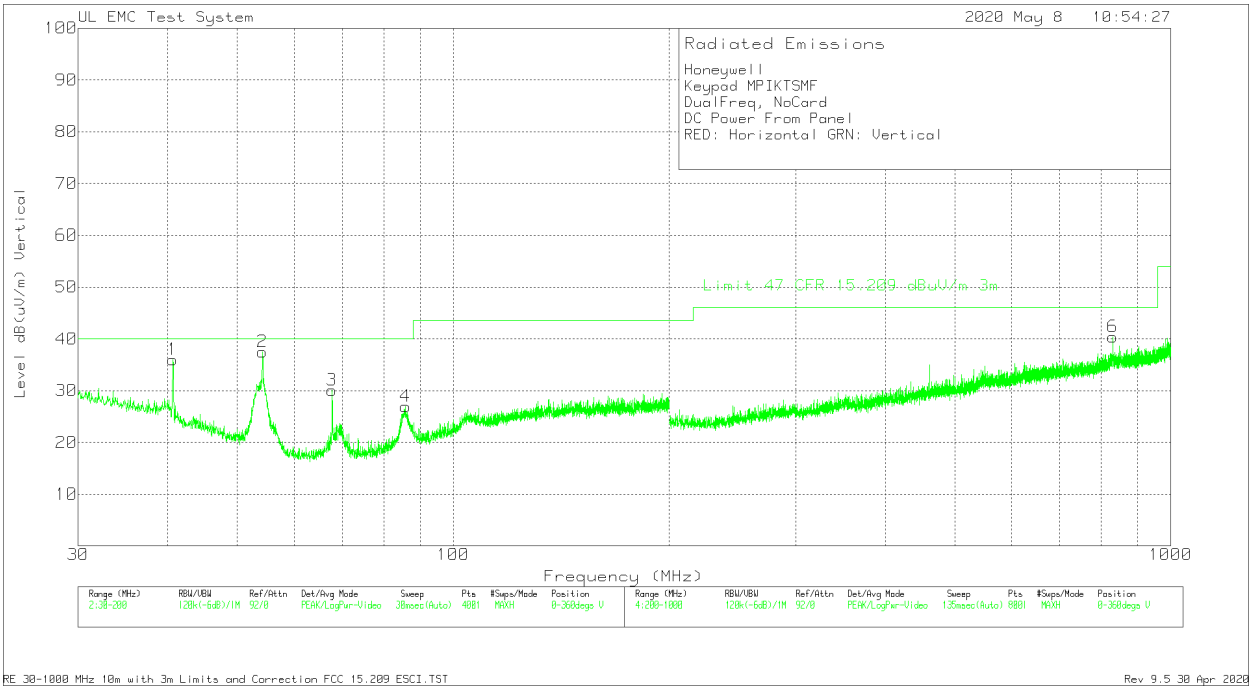
Radiated Emission Data

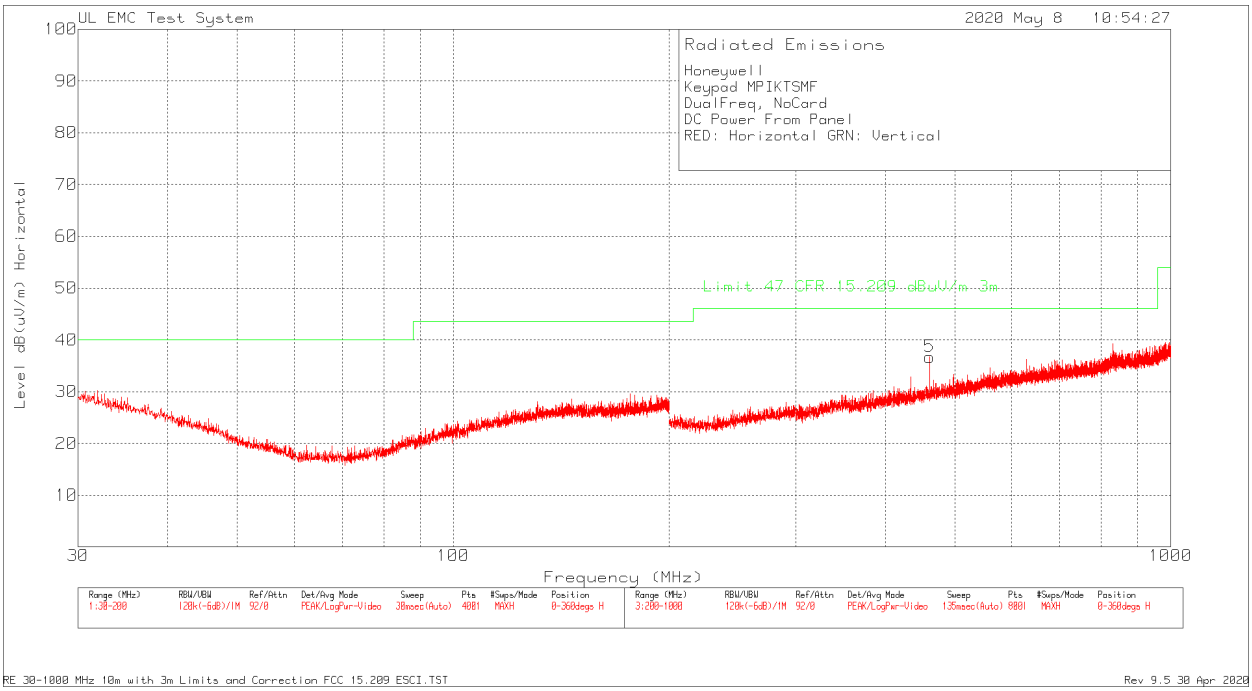
	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	EMC4070 Bicon dB/m	Path Factor dB	10m to 3m Factor dB	Corrected Reading Level dB(uV/m)	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	54.2394	51.01	Qp	7.8	-30.1	10.5	39.21	40	-0.79	55	290	V
	40.6819	44.01	Qp	13.6	-30.1	10.5	38.01	40	-1.99	0	101	V

Pk - Peak detector
Qp - Quasi-Peak detector

This report shall not be reproduced except in full, without the written approval of UL LLC

8.3.3. Plot Data no Card





This report shall not be reproduced except in full, without the written approval of UL LLC

8.3.4. Tabular Data no Card

Honeywell
Keypad MPIKTSMF
DualFreq, NoCard
DC Power From Panel
RED: Horizontal GRN: Vertical
Trace MArkers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	EMC4070 Bicon dB/m	Path Factor dB	10m to 3m Factor dB	Corrected Reading Level dB(uV/m)	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	40.6675	41.95	Pk	13.6	-30.1	10.5	35.95	40	-4.05	0-360	101	V
2	54.225	49.32	Pk	7.8	-30.1	10.5	37.52	40	-2.48	0-360	101	V
3	67.7825	43.35	Pk	6.2	-30	10.5	30.05	40	-9.95	0-360	248	V
4	85.845	37.34	Pk	9	-29.9	10.5	26.94	40	-13.06	0-360	401	V
5	461	36.49	Pk	17.6	-27.9	10.5	36.69	46.02	-9.33	0-360	199	H
6	830.1	34.36	Pk	23	-27.5	10.5	40.36	46.02	-5.66	0-360	198	V

Radiated Emission Data

	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	EMC4070 Bicon dB/m	Path Factor dB	10m to 3m Factor dB	Corrected Reading Level dB(uV/m)	Limit 47 CFR 15.209 dBuV/m 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	54.2454	48.3	Qp	7.8	-30.1	10.5	36.5	40	-3.5	256	266	V
	40.67854	40.91	Qp	13.6	-30.1	10.5	34.91	40	-5.09	0	101	V
	830.03625	32.93	Qp	23	-27.5	10.5	38.93	46.02	-7.09	90	185	V

Pk - Peak detector
Qp - Quasi-Peak detector

This report shall not be reproduced except in full, without the written approval of UL LLC

9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

IC RSS-210, Annex B.6
Carrier frequency stability shall be maintained to ±0.01% (±100 ppm).

TEST PROCEDURE

ANSI C63.10-2013 Clause 6.8

RESULTS

No non-compliance noted.

This report shall not be reproduced except in full, without the written approval of UL LLC

9.1. Frequency Stability Data

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(Vdc)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
13.50	50	13.5604100	4.181	13.5604050	4.550	13.5604067	4.425	13.5604100	4.181	± 100
13.50	40	13.5604267	2.950	13.5604133	3.938	13.5604133	3.938	13.5604100	4.181	± 100
13.50	30	13.5604567	0.737	13.5604383	2.094	13.5604317	2.581	13.5604250	3.075	± 100
13.50	***20***	***13.5604667***	***0.000***	***13.5604600***	***0.494***	***13.5604567***	***0.737***	***13.5604583***	***0.619***	***± 100***
13.50	10	13.5605050	-2.824	13.5604950	-2.087	13.5604883	-1.593	13.5604783	-0.855	± 100
13.50	0	13.5605133	-3.437	13.5605118	-3.324	13.5605083	-3.068	13.5605033	-2.699	± 100
13.50	-10	13.5605033	-2.699	13.5605117	-3.319	13.5605150	-3.562	13.5605150	-3.562	± 100
13.50	-20	13.5604600	0.494	13.5604883	-1.593	13.5604983	-2.330	13.5605050	-2.824	± 100
11.48	20	13.5604600	0.494	13.5604567	0.737	13.5604567	0.737	13.5604567	0.737	± 100
15.53	20	13.5604717	-0.369	13.5604633	0.251	13.5604550	0.863	13.5604550	0.863	± 100

This report shall not be reproduced except in full, without the written approval of UL LLC

10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 8.8

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.10:2013

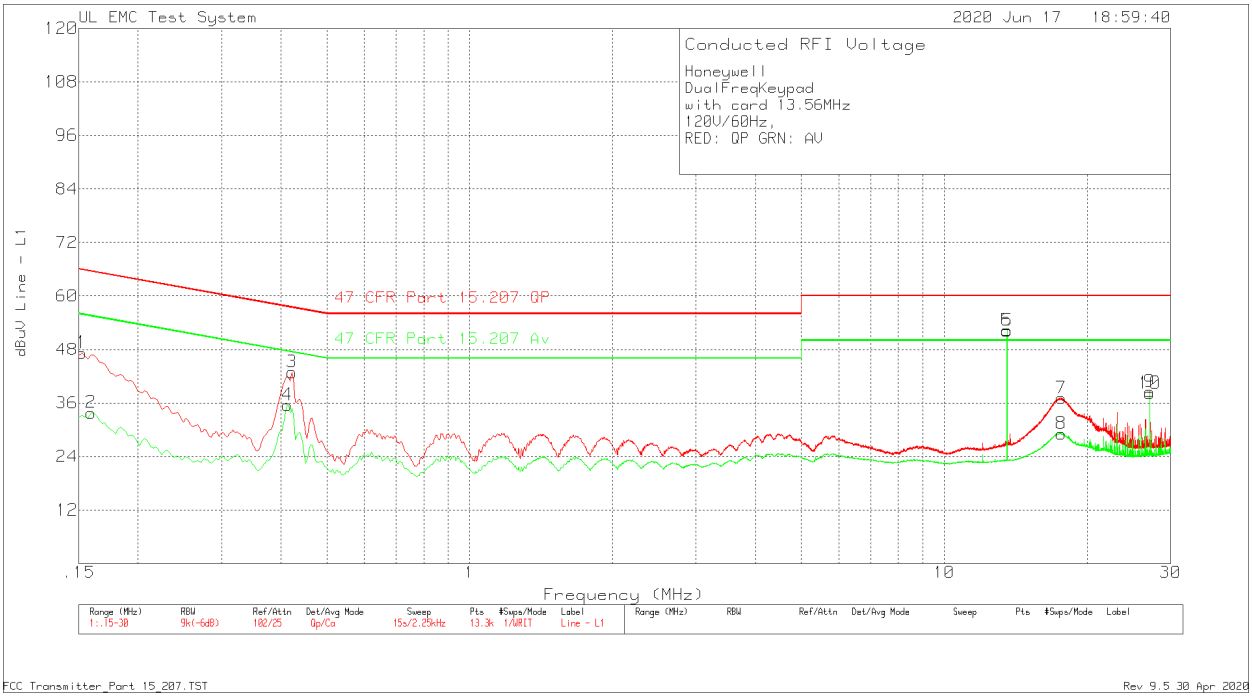
RESULTS

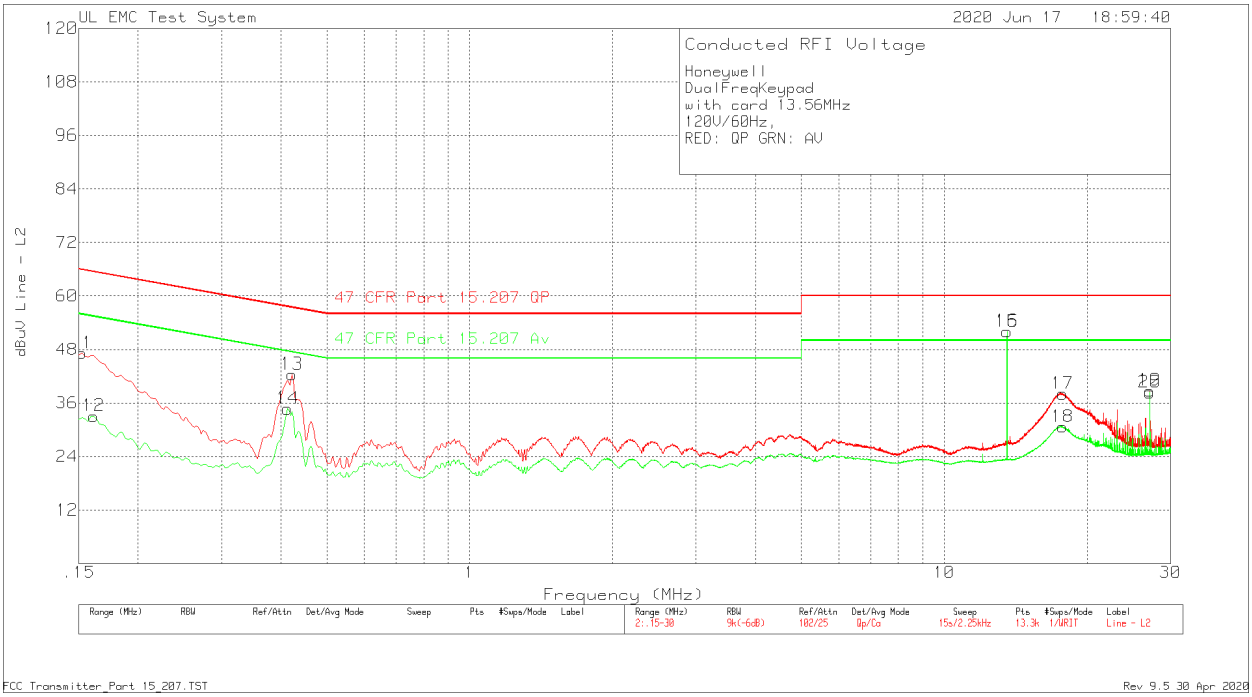
No non-compliance noted:

This report shall not be reproduced except in full, without the written approval of UL LLC

10.1. With Normal Antenna with Card

10.1.1. Plot Data





UL LLC
FORM NO: CCSUP4701I
333 Pfingsten Road, Northbrook, IL 60062; USA TEL:(847) 272-8800
This report shall not be reproduced except in full, without the written approval of UL LLC

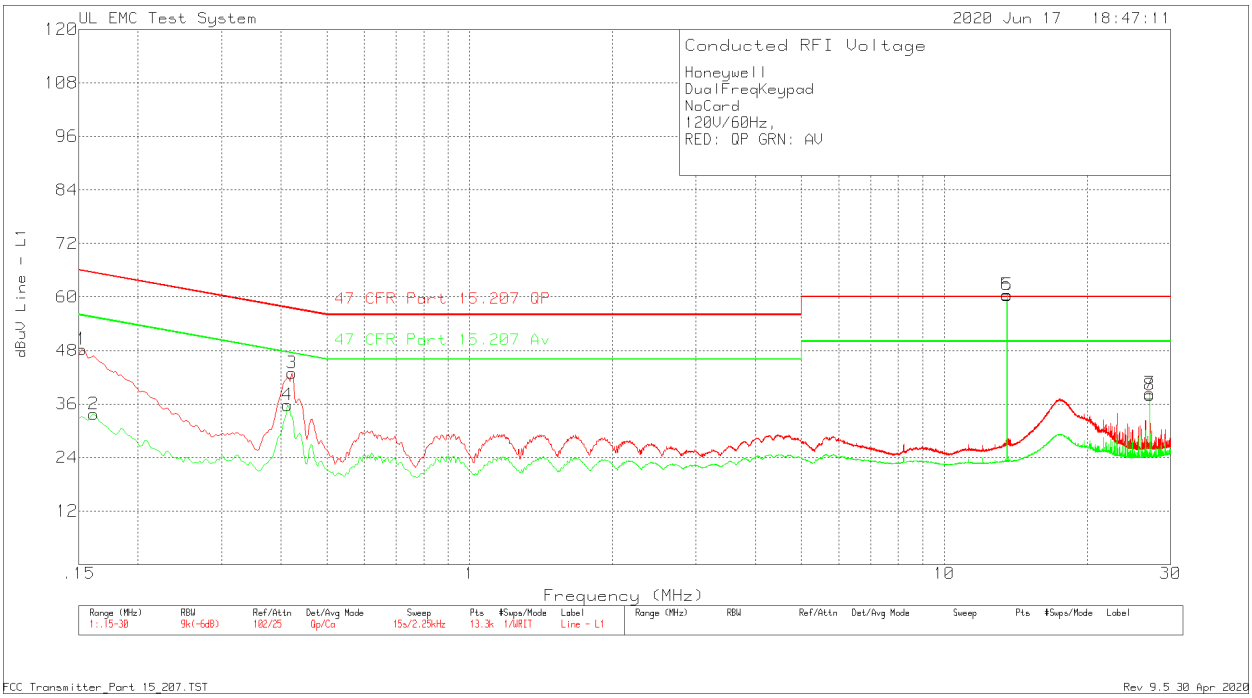
10.1.2. Tabular Data

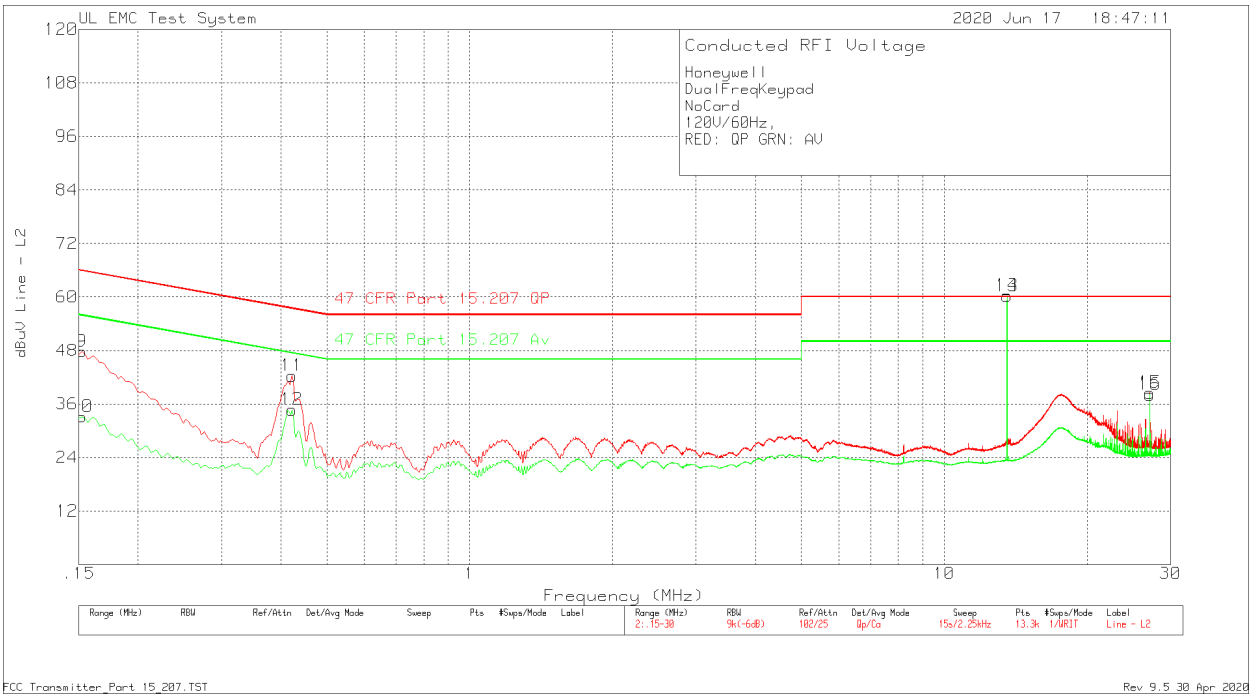
Honeywell										
DualFreqKeypad										
with card 13.56MHz										
120V/60Hz,										
RED: QP GRN: AV										
Trace MArkers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor	Corrected Reading dBuV	Limit 47 CFR Part 15.207 QP	Margin (dB)	Limit 47 CFR Part 15.207 Av	Margin (dB)
Line 1										
1	0.15225	32.51	Qp	0	14.7	47.21	65.88	-18.67	55.88	-8.67
2	0.159	20.12	Ca	0	13.7	33.82	65.52	-31.7	55.52	-21.7
3	0.42225	32.19	Qp	0	10.7	42.89	57.4	-14.51	47.4	-4.51
4	0.41325	24.83	Ca	0	10.7	35.53	57.58	-22.05	47.58	-12.05
5	13.56	41.03	Qp	0	11.2	52.23	60	-7.77	50	2.23
6	13.56	41.1	Ca	0	11.2	52.3	60	-7.7	50	2.3
7	17.6325	25.79	Qp	0	11.3	37.09	60	-22.91	50	-12.91
8	17.6415	17.82	Ca	0	11.3	29.12	60	-30.88	50	-20.88
9	27.12075	26.94	Qp	-0.1	11.7	38.54	60	-21.46	50	-11.46
10	27.12075	26.54	Ca	-0.1	11.7	38.14	60	-21.86	50	-11.86
Line 2										
11	0.15225	32.36	Qp	0.1	14.7	47.16	65.88	-18.72	55.88	-8.72
12	0.16125	19.79	Ca	0	13.3	33.09	65.4	-32.31	55.4	-22.31
13	0.42225	31.7	Qp	0	10.7	42.4	57.4	-15	47.4	-5
14	0.41325	24.01	Ca	0	10.7	34.71	57.58	-22.87	47.58	-12.87
15	13.56	40.9	Qp	0	11.1	52	60	-8	50	2
16	13.56	40.97	Ca	0	11.1	52.07	60	-7.93	50	2.07
17	17.74725	26.68	Qp	0	11.4	38.08	60	-21.92	50	-11.92
18	17.76975	19.26	Ca	0	11.4	30.66	60	-29.34	50	-19.34
19	27.12075	27.19	Qp	-0.1	11.7	38.79	60	-21.21	50	-11.21
20	27.12075	26.76	Ca	-0.1	11.7	38.36	60	-21.64	50	-11.64
Qp - Quasi-Peak detector										
Ca - CISPR Average detection										

UL LLC
FORM NO: CCSUP4701I
333 Pfingsten Road, Northbrook, IL 60062; USA
TEL:(847) 272-8800
This report shall not be reproduced except in full, without the written approval of UL LLC

10.2. With Normal Antenna no Card

10.2.1. Plot Data





This report shall not be reproduced except in full, without the written approval of UL LLC

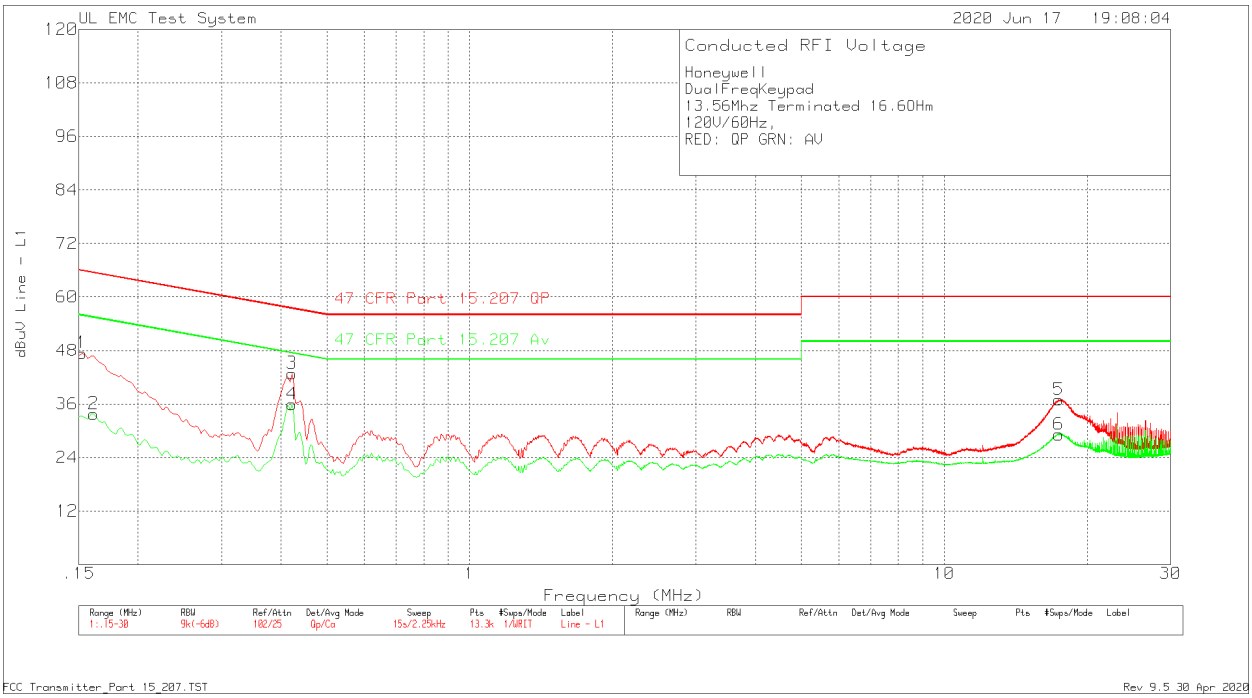
10.2.2. Tabular Data

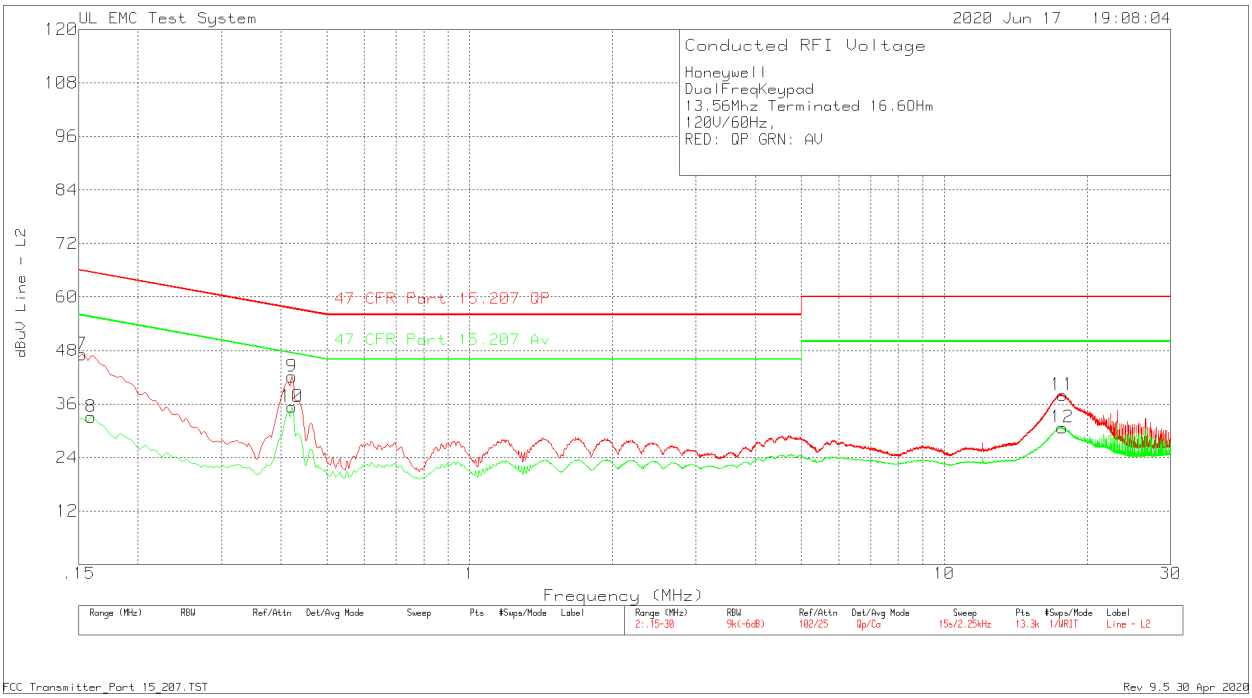
Honeywell										
DualFreqKeypad										
NoCard										
120V/60Hz,										
RED: QP GRN: AV										
Trace MArkers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor	Corrected Reading dBuV	Limit 47 CFR Part 15.207 QP	Margin (dB)	Limit 47 CFR Part 15.207 Av	Margin (dB)
Line 1										
1	0.15225	33.52	Qp	0	14.7	48.22	65.88	-17.66	55.88	-7.66
2	0.16125	20.44	Ca	0	13.3	33.74	65.4	-31.66	55.4	-21.66
3	0.42225	32.22	Qp	0	10.7	42.92	57.4	-14.48	47.4	-4.48
4	0.41325	25.05	Ca	0	10.7	35.75	57.58	-21.83	47.58	-11.83
5	13.56	49.21	Qp	0	11.2	60.41	60	0.41	50	10.41
6	13.56	49.28	Ca	0	11.2	60.48	60	0.48	50	10.48
7	27.12075	26.77	Qp	-0.1	11.7	38.37	60	-21.63	50	-11.63
8	27.12075	26.38	Ca	-0.1	11.7	37.98	60	-22.02	50	-12.02
Line 2										
9	0.15225	32.98	Qp	0.1	14.7	47.78	65.88	-18.1	55.88	-8.1
10	0.15225	18.33	Ca	0.1	14.7	33.13	65.88	-32.75	55.88	-22.75
11	0.42225	31.61	Qp	0	10.7	42.31	57.4	-15.09	47.4	-5.09
12	0.42225	24	Ca	0	10.7	34.7	57.4	-22.7	47.4	-12.7
13	13.56	49.13	Qp	0	11.1	60.23	60	0.23	50	10.23
14	13.56	49.18	Ca	0	11.1	60.28	60	0.28	50	10.28
15	27.12075	26.91	Qp	-0.1	11.7	38.51	60	-21.49	50	-11.49
16	27.12075	26.48	Ca	-0.1	11.7	38.08	60	-21.92	50	-11.92
Qp - Quasi-Peak detector										
Ca - CISPR Average detection										

This report shall not be reproduced except in full, without the written approval of UL LLC

10.3. With non-radiating Antenna

10.3.1. Plot Data





This report shall not be reproduced except in full, without the written approval of UL LLC

10.3.2. Tabular Data

Honeywell										
DualFreqKeypad										
13.56Mhz Terminated 16.6OHm										
120V/60Hz,										
RED: QP GRN: AV										
Trace MArkers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor	Corrected Reading dBuV	Limit 47 CFR Part 15.207 QP	Margin (dB)	Limit 47 CFR Part 15.207 Av	Margin (dB)
Line 1										
1	0.15225	32.7	Qp	0	14.7	47.4	65.88	-18.48	55.88	-8.48
2	0.16125	20.48	Ca	0	13.3	33.78	65.4	-31.62	55.4	-21.62
3	0.42225	32.15	Qp	0	10.7	42.85	57.4	-14.55	47.4	-4.55
4	0.42225	25.21	Ca	0	10.7	35.91	57.4	-21.49	47.4	-11.49
5	17.421	25.64	Qp	0	11.3	36.94	60	-23.06	50	-13.06
6	17.44125	17.86	Ca	0	11.3	29.16	60	-30.84	50	-20.84
Line 2										
7	0.15225	32.35	Qp	0.1	14.7	47.15	65.88	-18.73	55.88	-8.73
8	0.159	19.3	Ca	0.1	13.7	33.1	65.52	-32.42	55.52	-22.42
9	0.42225	31.47	Qp	0	10.7	42.17	57.4	-15.23	47.4	-5.23
10	0.42225	24.69	Ca	0	10.7	35.39	57.4	-22.01	47.4	-12.01
11	17.74275	26.64	Qp	0	11.4	38.04	60	-21.96	50	-11.96
12	17.73825	19.35	Ca	0	11.4	30.75	60	-29.25	50	-19.25
Qp - Quasi-Peak detector										
Ca - CISPR Average detection										

UL LLC
FORM NO: CCSUP4701I
333 Pfingsten Road, Northbrook, IL 60062; USA TEL:(847) 272-8800
This report shall not be reproduced except in full, without the written approval of UL LLC