Report No.: GTSE14110206401

FCC REPORT

Applicant:	Braeburn Systems LLC
Address of Applicant:	2215 Cornell Avenue Montgomery, Illinois 60538 United States

Equipment Under Test (EUT)

Product Name:	Humidity sensor
Model No.:	7330
FCC ID:	2ADX6-7330
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249:2013
Date of sample receipt:	November 26, 2014
Date of Test:	February 02-06, 2015
Date of report issued:	February 06, 2015
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*February 06, 2015*	*Original*

Prepared By: Edward.Pan ***Date:*** *February 06, 2015*

Project Engineer

Check By: Hank.yan ***Date:*** *February 06, 2015*

Reviewer

3 Contents

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Braeburn Systems LLC
Address of Applicant:	2215 Cornell Avenue Montgomery, Illinois 60538 United States
Manufacturer:	Computime Limited
Address of Manufacturer:	17/F, Great Eagle Centre, 23 Harbour Road, Wanchai Hong Kong
Factory:	Computime Electronics (shenzhen) Company Limited
Address of Factory:	YueKenguanyu Industrial Park, Kangqiao Road 88#, Danzhutou Community, Nanwan Street Office Longgang District, Shenzhen, China

5.2 General Description of EUT

Product Name:	Humiditysensor
Model No.:	7330
Operation Frequency:	915MHz
Modulation type:	GFSK
Antenna Type:	Integral antenna
Antenna gain:	0dBi
Power supply:	AC 24V

5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	91.28	92.30	90.84

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup":

Y axis (see the test setup photo)

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC approval
ET	AC/AC Linear Transformer	ETE40310F	N/A	Verification

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China
Tel: 0755-27798480
Fax: 0755-27798960

5.7 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2014	Mar. 27 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	July 01 2014	June 30 2015
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	July 01 2014	June 30 2015
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	July 01 2014	June 30 2015
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 28 2014	Mar. 27 2015
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 29 2014	Mar. 28 2015
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 29 2014	Mar. 28 2015
11	Coaxial cable	GTS	N/A	GTS210	Mar. 29 2014	Mar. 28 2015
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 29 2014	Mar. 28 2015
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	July 01 2014	June 30 2015
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	July 01 2014	June 30 2015
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
16	Band filter	Amindeon	82346	GTS219	Mar. 29 2014	Mar. 28 2015

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	July 01 2014	June 30 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	July 01 2014	June 30 2015
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	July 01 2014	June 30 2015
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July 01 2014	June 30 2015
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	July 01 2014	June 30 2015
6	Coaxial Cable	GTS	N/A	GTS227	July 01 2014	June 30 2015
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	July 08 2014	July 07 2015

7 Test results and Measurement Data

7.1 Antenna requirement:

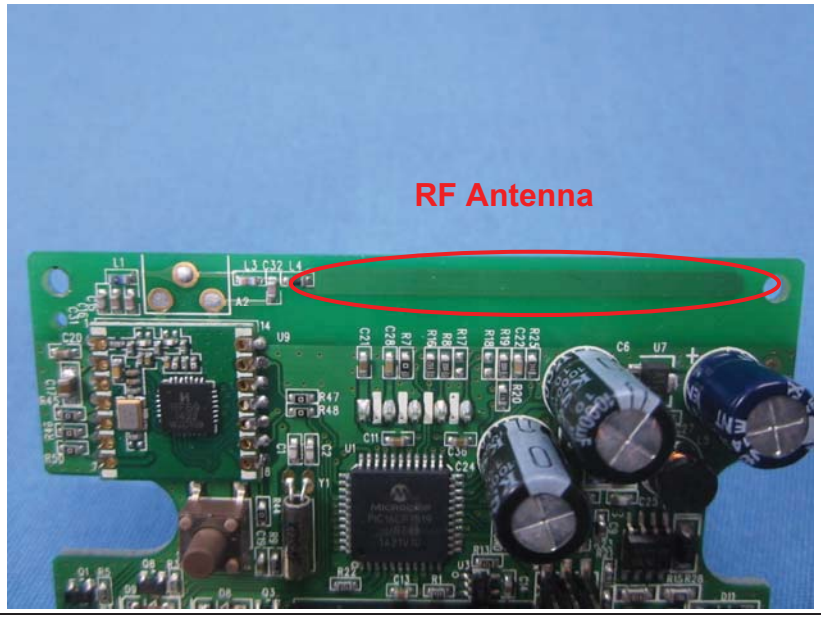
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

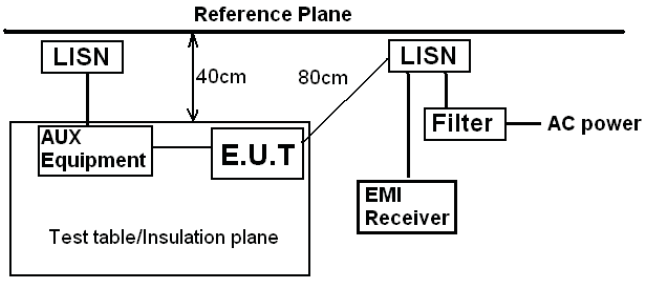
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:

The antenna is Internal Integral antenna, the best case gain of the antenna is 0dBi

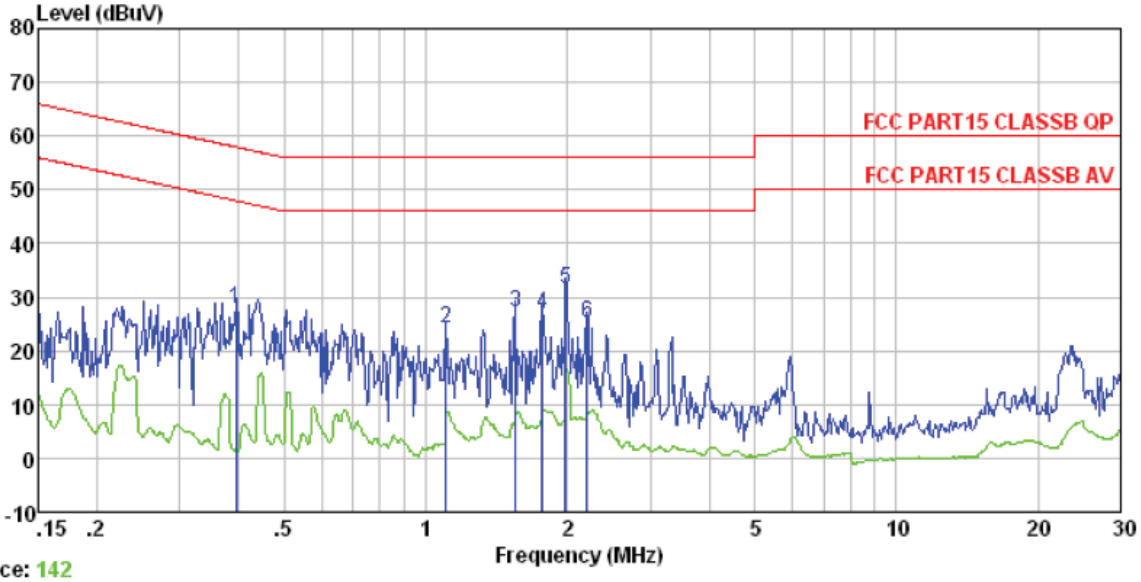


7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4:2009
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement data

Line:

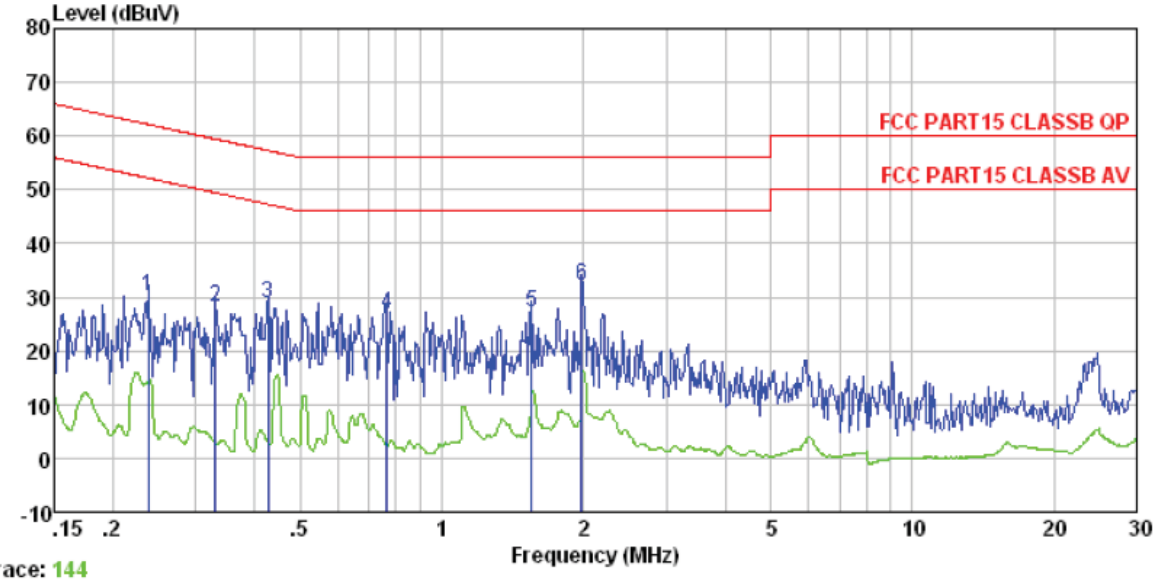


Trace: 142

Site : Shielded room
Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 2064RF
Test mode : Transmitting mode
Test Engineer: Mike

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.396	27.63	0.11	27.85	57.95	-30.10	QP
2	1.106	24.05	0.13	24.31	56.00	-31.69	QP
3	1.552	26.81	0.14	27.07	56.00	-28.93	QP
4	1.772	26.67	0.14	26.93	56.00	-29.07	QP
5	1.980	31.37	0.14	31.63	56.00	-24.37	QP
6	2.201	25.02	0.15	25.29	56.00	-30.71	QP

Neutral:



Trace: 144

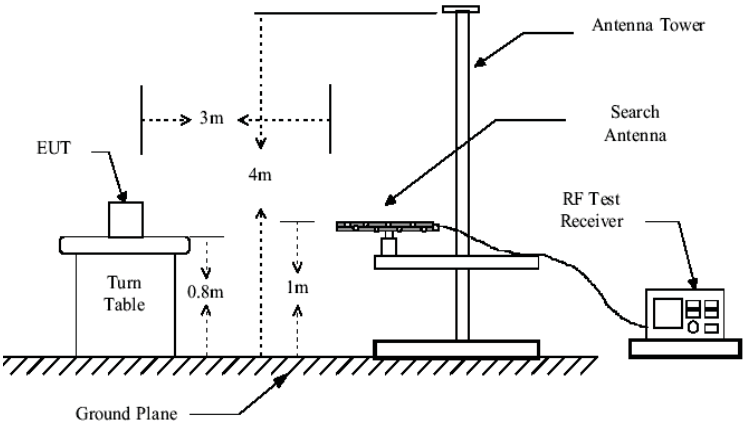
Site : Shielded room
Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
Job No. : 2064RF
Test mode : Transmitting mode
Test Engineer: Mike

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.238	29.85	0.12	30.03	62.17	-32.14	QP
2	0.330	28.10	0.10	28.26	59.44	-31.18	QP
3	0.428	28.75	0.11	28.92	57.29	-28.37	QP
4	0.763	26.51	0.13	26.71	56.00	-29.29	QP
5	1.552	26.93	0.14	27.16	56.00	-28.84	QP
6	1.980	31.83	0.14	32.06	56.00	-23.94	QP

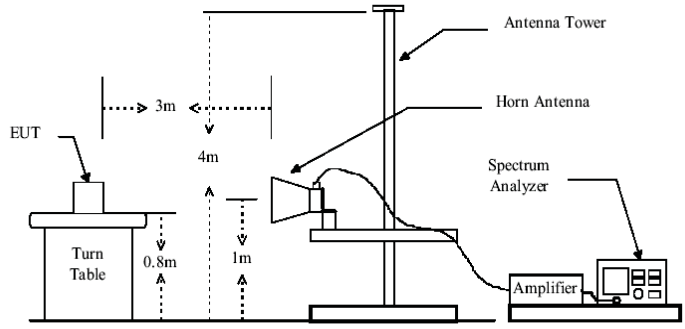
Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4:2009</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 10GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>902MHz~928MHz</td><td>94.00</td><td>Quasi-peak</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(band edge)</td><td>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 Section 15.209, whichever is the lesser attenuation.</td></tr>
<tr><td>Test setup:</td><td>Below 1GHz
 

Above 1GHz</td></tr>
</table>

	
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Quasi-peak Value：

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
915.00	87.41	23.18	4.91	29.10	86.40	94.00	-7.60	Vertical
915.00	93.31	23.18	4.91	29.10	92.30	94.00	-1.70	Horizontal

7.3.2 Spurious emissions

■ Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
41.42	39.31	15.57	0.68	30.04	25.52	40.00	-14.48	Vertical
61.13	39.83	14.29	0.87	29.91	25.08	40.00	-14.92	Vertical
196.51	40.55	12.57	1.82	29.21	25.73	43.50	-17.77	Vertical
340.78	39.56	16.15	2.57	29.77	28.51	46.00	-17.49	Vertical
599.32	40.41	20.45	3.72	29.30	35.28	46.00	-10.72	Vertical
696.86	40.25	20.80	4.08	29.20	35.93	46.00	-10.07	Vertical
40.99	39.69	15.57	0.67	30.04	25.89	40.00	-14.11	Horizontal
61.35	40.18	14.16	0.87	29.91	25.30	40.00	-14.70	Horizontal
86.50	40.39	12.89	1.08	29.76	24.60	40.00	-15.40	Horizontal
230.10	39.72	13.62	2.02	29.48	25.88	46.00	-20.12	Horizontal
318.82	39.98	15.33	2.46	29.89	27.88	46.00	-18.12	Horizontal
629.48	41.04	20.57	3.83	29.27	36.17	46.00	-9.83	Horizontal

■ Above 1GHz

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1830.00	41.15	25.42	4.87	34.17	37.27	74.00	-36.73	Vertical
2745.00	43.31	28.24	5.71	33.61	43.65	74.00	-30.35	Vertical
3660.00	40.83	29.20	7.27	32.56	44.74	74.00	-29.26	Vertical
4575.00	46.26	31.47	8.40	31.97	54.16	74.00	-19.84	Vertical
5490.00	40.68	31.98	9.49	32.42	49.73	74.00	-24.27	Vertical
6405.00	33.63	33.49	10.78	32.11	45.79	74.00	-28.21	Vertical
7320.00	31.01	36.37	11.72	31.89	47.21	74.00	-26.79	Vertical
8235.00	32.38	36.76	12.47	31.73	49.88	74.00	-24.12	Vertical
9150.00	29.76	37.31	13.78	32.13	48.72	74.00	-25.28	Vertical
1830.00	45.17	25.42	4.87	34.17	41.29	74.00	-32.71	Horizontal
2745.00	39.64	28.24	5.71	33.61	39.98	74.00	-34.02	Horizontal
3660.00	38.57	29.20	7.27	32.56	42.48	74.00	-31.52	Horizontal
4575.00	35.18	31.47	8.40	31.97	43.08	74.00	-30.92	Horizontal
5490.00	32.25	31.98	9.49	32.42	41.30	74.00	-32.70	Horizontal
6405.00	31.15	33.49	10.78	32.11	43.31	74.00	-30.69	Horizontal
7320.00	30.26	36.37	11.72	31.89	46.46	74.00	-27.54	Horizontal
8235.00	29.53	36.76	12.47	31.73	47.03	74.00	-26.97	Horizontal
9150.00	30.34	37.31	13.78	32.13	49.30	74.00	-24.70	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1830.00	*							Vertical
2745.00	*							Vertical
3660.00	*							Vertical
4575.00	29.19	31.47	8.40	31.97	37.09	54.00	-16.91	Vertical
5490.00	*							Vertical
6405.00	*							Vertical
7320.00	*							Vertical
8235.00	*							Vertical
9150.00	*							Vertical
1830.00	*							Horizontal
2745.00	*							Horizontal
3660.00	*							Horizontal
4575.00	*							Horizontal
5490.00	*							Horizontal
6405.00	*							Horizontal
7320.00	*							Horizontal
8235.00	*							Horizontal
9150.00	*							Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *(*)The test result on peak is lower than average limit, then average measurement needn't be performed.*

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

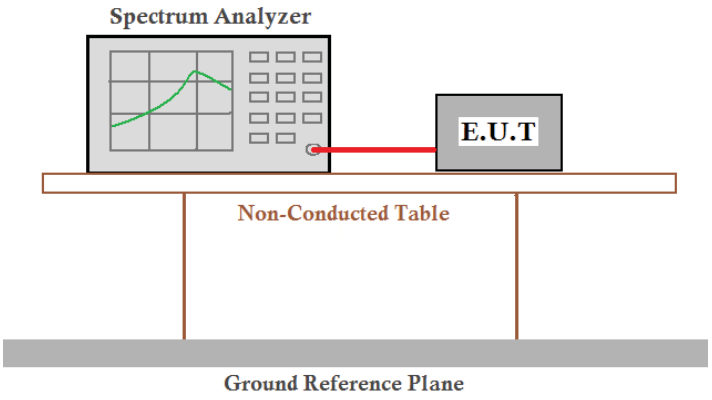
Quasi-peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
902.00	28.36	23.12	4.87	29.10	27.25	46.00	-18.75	Horizontal
928.00	27.90	23.28	4.96	29.10	27.04	46.00	-18.96	Horizontal
902.00	27.73	23.12	4.87	29.10	26.62	46.00	-19.38	Vertical
928.00	29.27	23.28	4.96	29.10	28.41	46.00	-17.59	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

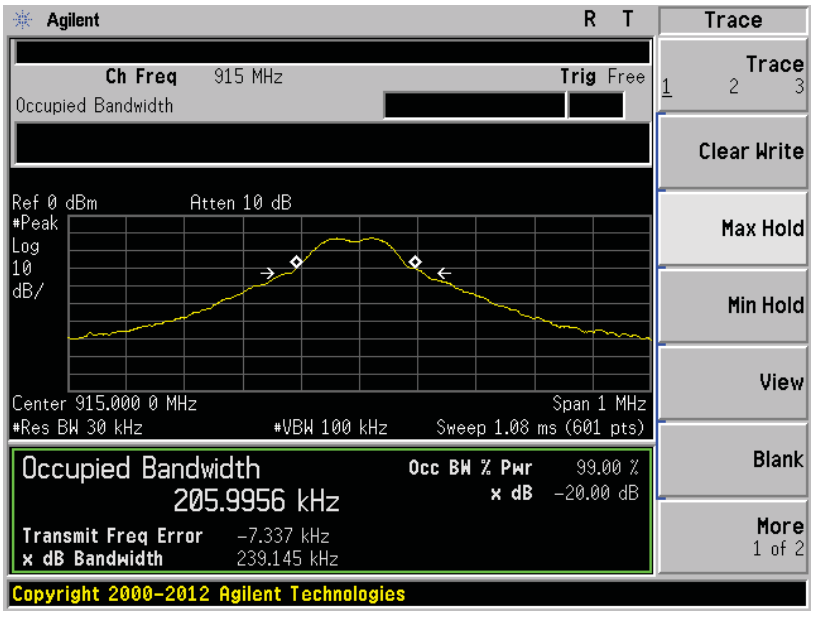
7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.4:2009
Limit:	Operation Frequency range 902MHz ~ 928MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

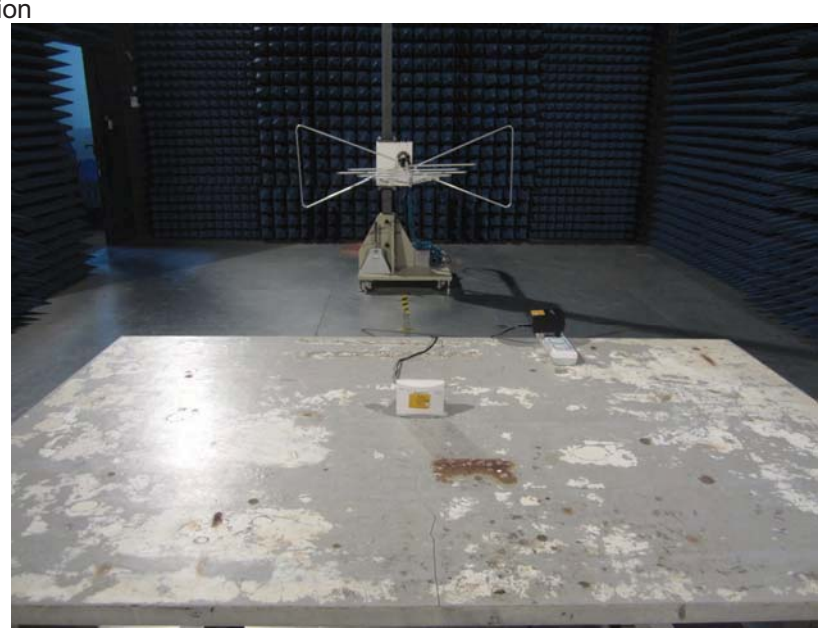
Operation Frequency	20dB bandwidth(MHz)	Result
915MHz	0.239	Pass

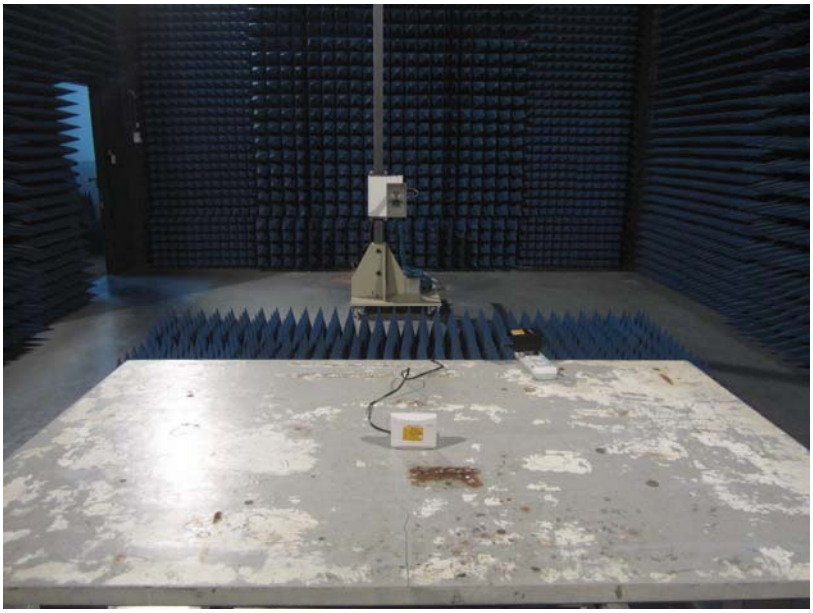
Test plot as follows:



8 Test Setup Photo

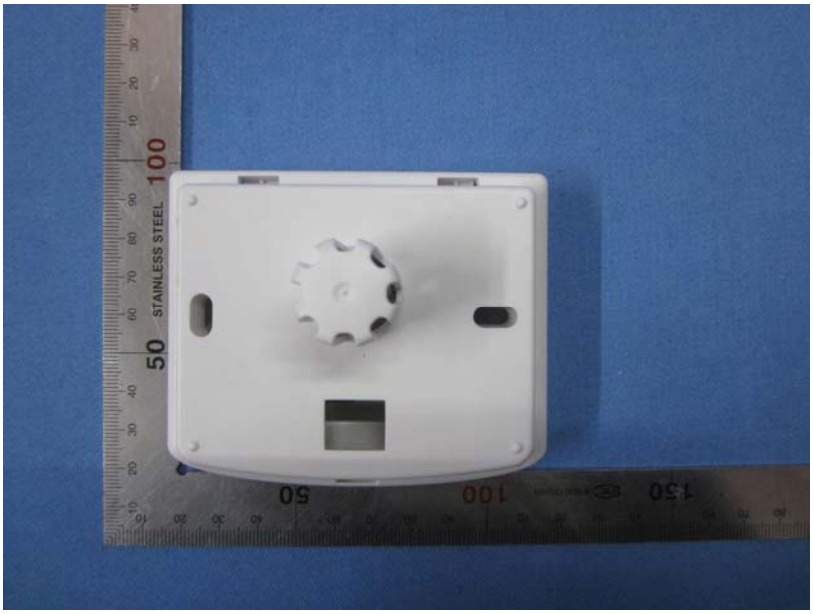
Radiated Emission

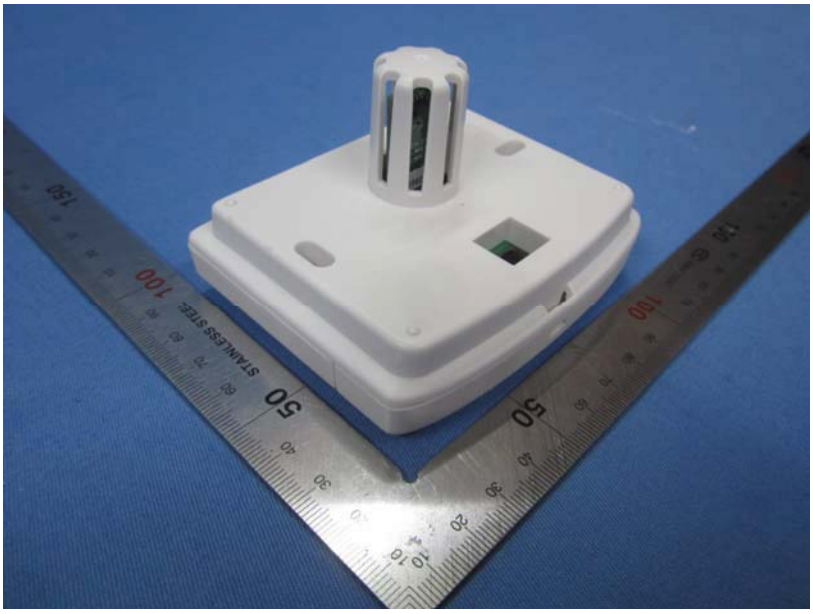


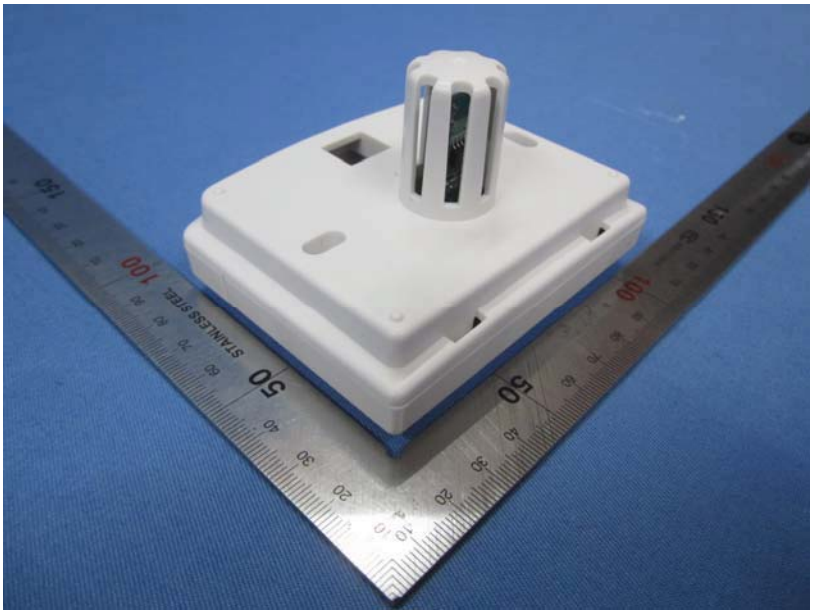


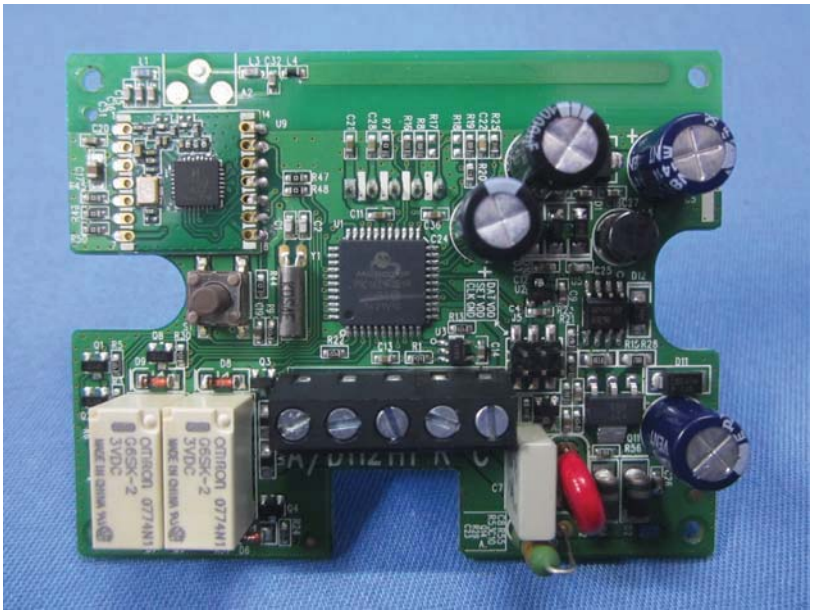
Conducted Emission

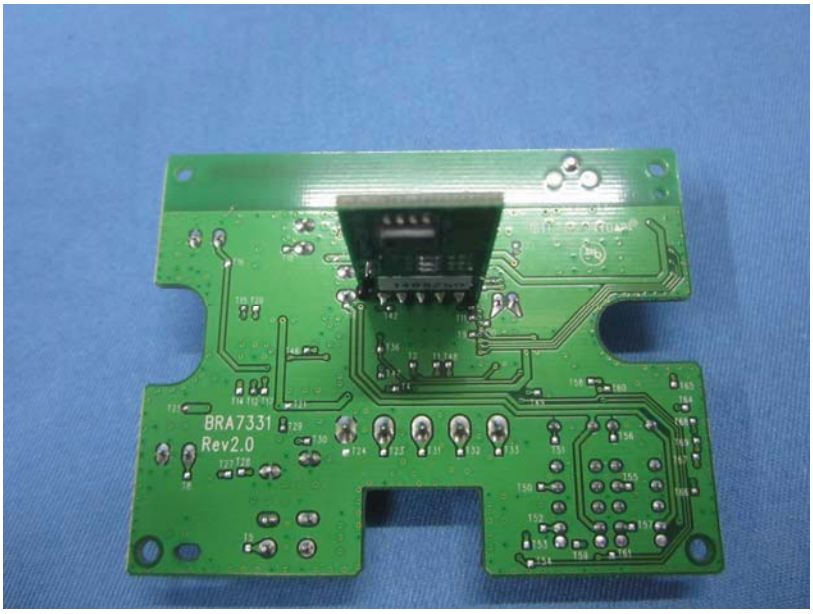
9 EUT Constructional Details

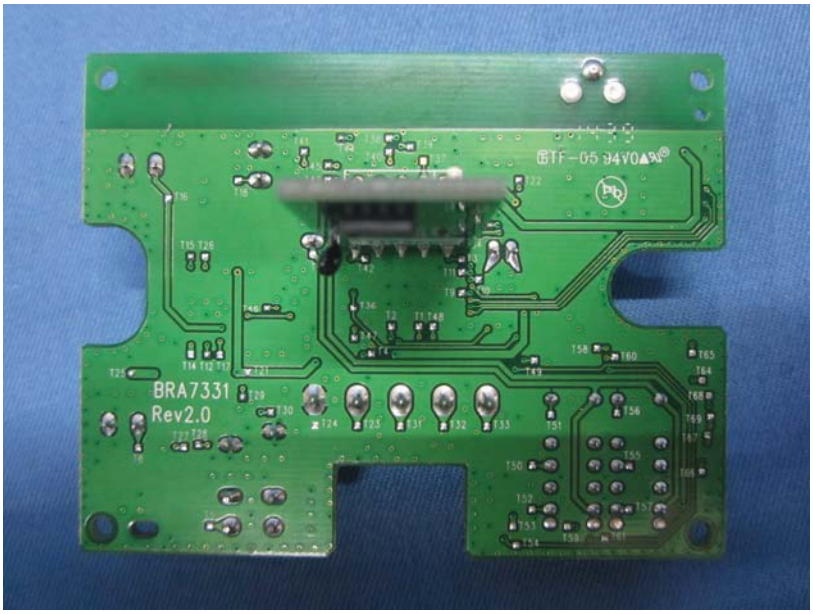









BRA7331
Rev2.0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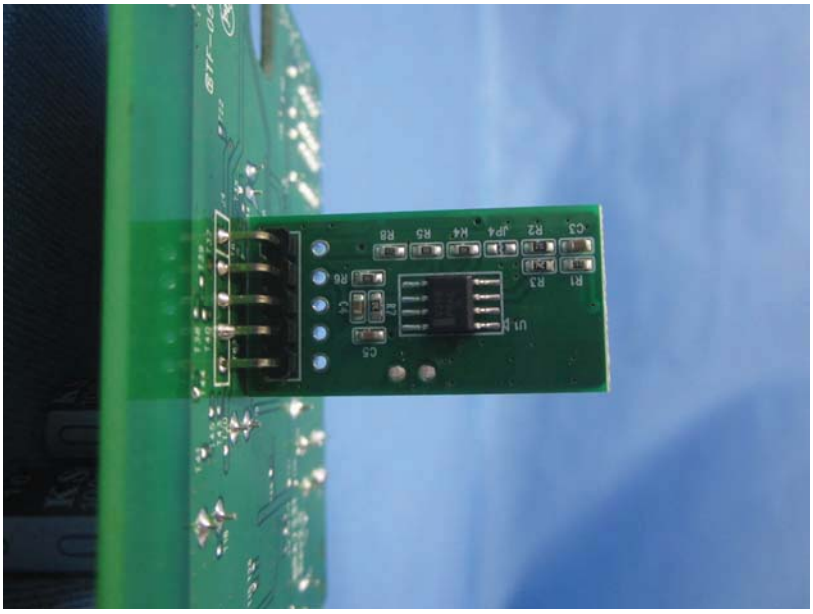

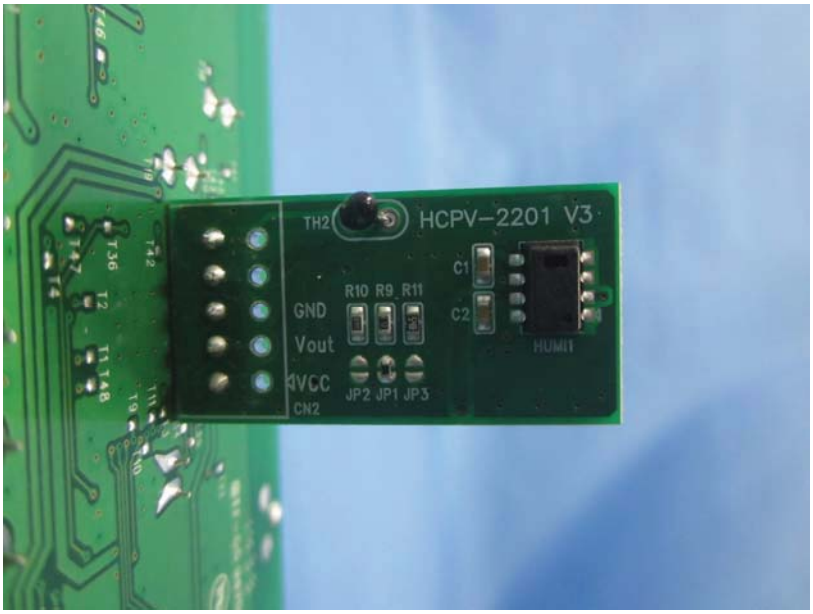
TH2
HCPV-2201 V3
C1
C2
R10 R9 R11
GND
Vout
VCC
JP2 JP1 JP3
CN2
HUMIT

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