



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

TEST REPORT

For

Data Collection Computer

Model: CV31A

Trade Name: Honeywell

Issued to

**Honeywell International Inc
9680 Old Bailes Road
Fort Mill, SC 29707 USA**

Issued by

**Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
<http://www.ccsrf.com>
service@ccsrf.com
Issued Date: May 28, 2014**



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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		May 28, 2014		Initial Issue	ALL	Kelly Cheng



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1. TEST RESULT CERTIFICATION

Applicant: Honeywell International Inc
9680 Old Bailes Road
Fort Mill, SC 29707 USA

Equipment Under Test: Data Collection Computer

Trade Name: Honeywell

Model: CV31A

Date of Test: May 7 ~ 27, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C & Industry Canada RSS-210 Issue 8 December, 2010	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.225.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Reviewed by:

Miller Lee
Section Manager
Compliance Certification Services Inc.

Angel Cheng
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Data Collection Computer
Trade Name	Honeywell
Model Number	CV31A
Model Difference	N/A
Received Date	April 30, 2014
Power Supply	VDC from Power Adapter Intermec / 9006AE01 I/P: 100-240V, 50-60Hz, 1.5A O/P: 12V, 8.3A 100W
Frequency Range	13.56MHz
Modulation Technique	ASK
Number of Channels	1 Channel
Antenna Designation	PCB Antenna



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209 and 15.225.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, IC RSS-212, and ANSI C63.4.

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-210.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2009.



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (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

- (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.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: CV31A) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode was programmed.

After verification, all tests carried out were with the worst-case test modes as shown below except radiated spurious emission worst case was in normal link mode.

RF ID: Channel 13.56MHz was chosen for full testing.



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	02/27/2015
Power Meter	Agilent	E4416A	GB41291611	06/24/2014
Power Sensor	Agilent	E9327A	US40441097	06/24/2014

Wugu 966 Chamber A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	10/30/2015
EMI Test Receiver	R&S	ESCI	100064	02/14/2015
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/10/2015
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/16/2014
Bilog Antenna	Sunol Sciences	JB3	A030105	10/03/2014
Horn Antenna	EMCO	3117	00055165	01/09/2015
Horn Antenna	EMCO	3116	00026370	10/15/2014
Loop Antenna	EMCO	6502	8905/2356	06/09/2014
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/23/2014
Test S/W	EZ-EMC (CCS-3A1RE)			

Conducted Emission room # B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	101203	09/12/2014
LISN	R&S	ESH3-Z5	848773/014	12/09/2014
ISN	FCC	FCC-TLISN-T4-02	20395	05/29/2015
ISN	FCC	FCC-TLISN-T8-02-09	101131	09/04/2014
Coaxial Cable	Commate	CFD300-NL	NA	12/05/2014
Test S/W	CCS-3A1-CE			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2575
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

Remark: The powerline conducted emissions test items was tested at Compliance Certification Services Inc. (Hsintien Lab.) The test equipments were listed in page 9 and the test data, please refer page 28-29.

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841,
TAIWAN, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.




Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Mouse	DELL	OXN867	J0206CRS	R41108	Shielded, 1.8m	N/A
2	Earphone	Lenovo	GS-4021M	57Y4488	N/A	Unshielded, 1.8m	N/A
3	HDD	WD	My Passport	WX31A41D9040	D33015	N/A	N/A

Remark:

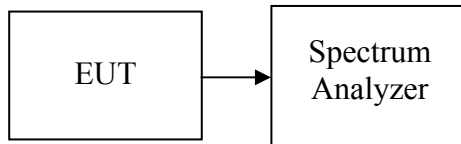
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



7. FCC PART 15.225 REQUIREMENTS

7.1 99%BANDWIDTH

Test Configuration



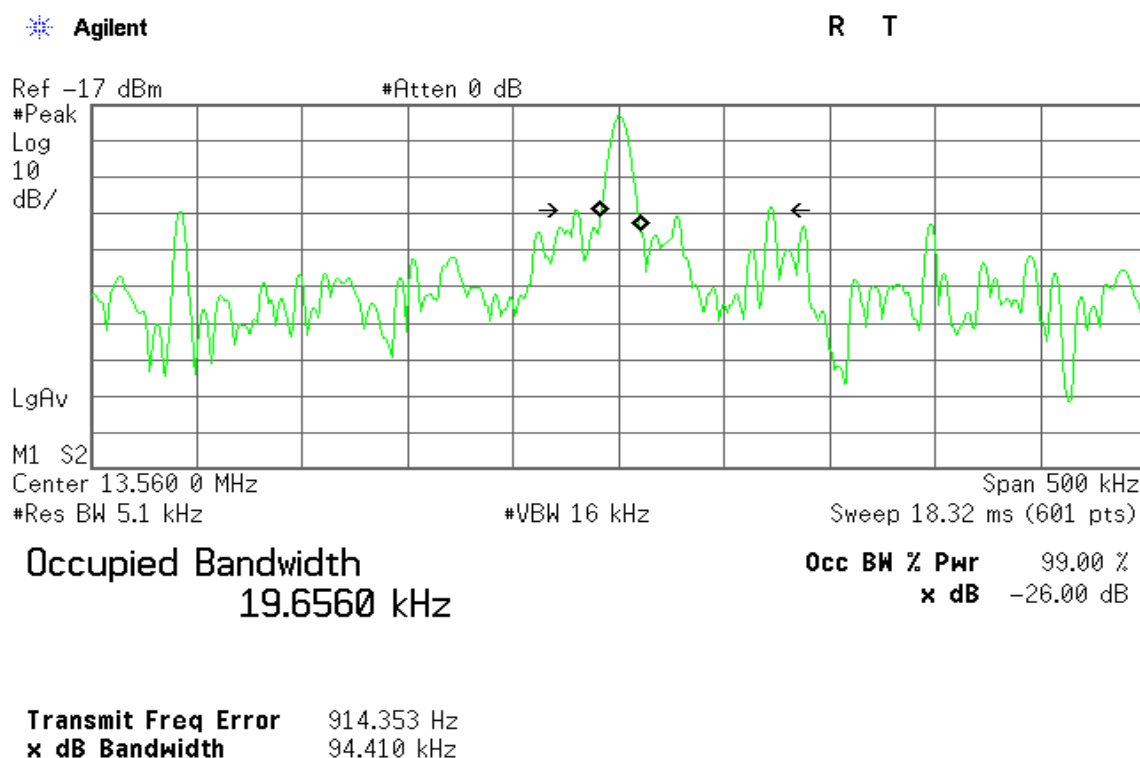
TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold.

TEST RESULTS

No non-compliance noted.

Test Plot



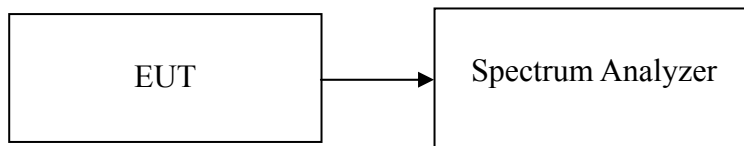


7.2 20 DB BANDWIDTH

LIMIT

None; for reporting purposes only.

Test Configuration



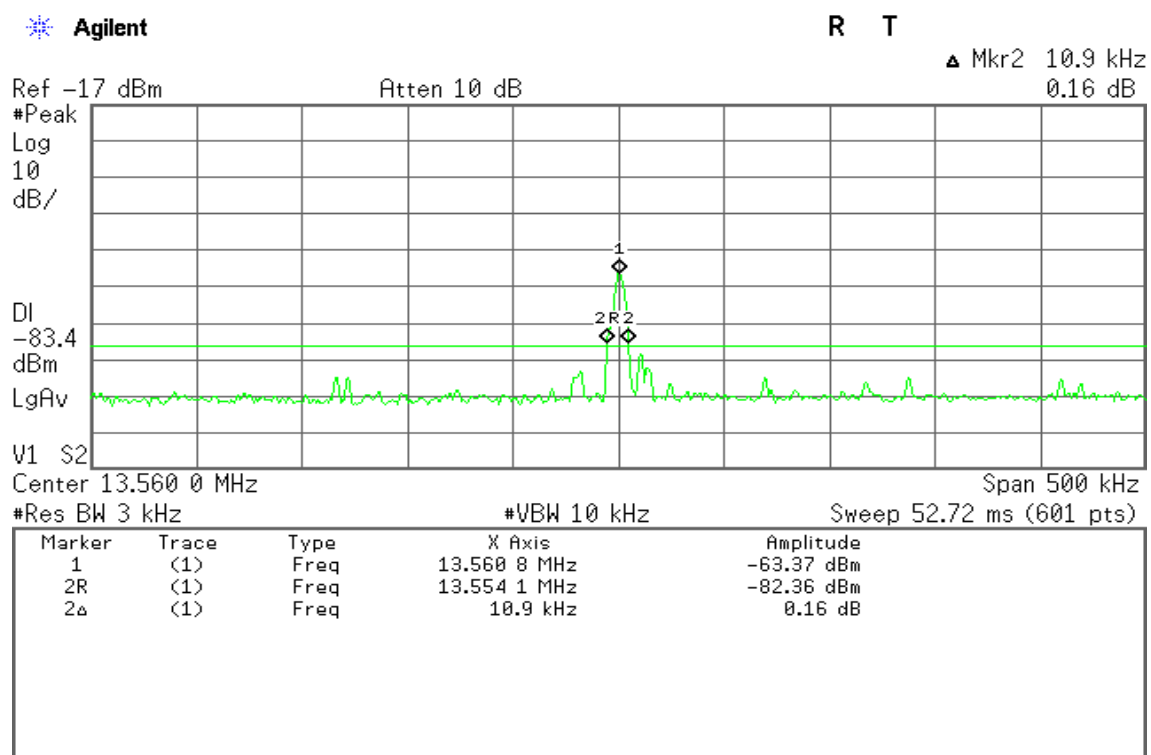
TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW= 5.1kHz, VBW = 16kHz, Span = 500kHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted.

Test Plot





7.3 RADIATED EMISSIONS

LIMIT

According to §15.225,

- (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.

According to §15.225(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 (μ V/m at meter)	Measurement Distance (meter)
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., Sections 15.231 and 15.241.*



According to RSS-210 §A2.6, the field strength of any emission shall not exceed the following limits:

- 15,848 millivolts/m (84 dB μ V/m) at 30 m, within the 13.553-13.567 MHz band.
- 334 microvolts/m (50.5 dB μ V/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.
- 106 microvolts/m (40.5 dB μ V/m) at 30 m, within the bands 13.110-13.410 MHz and 13.71-14.010 MHz.
- 30 microvolts/m (29.5 dB μ V/m) at 30 m, outside the 13.110-14.010 MHz band.

RSS-210 Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz ^(Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

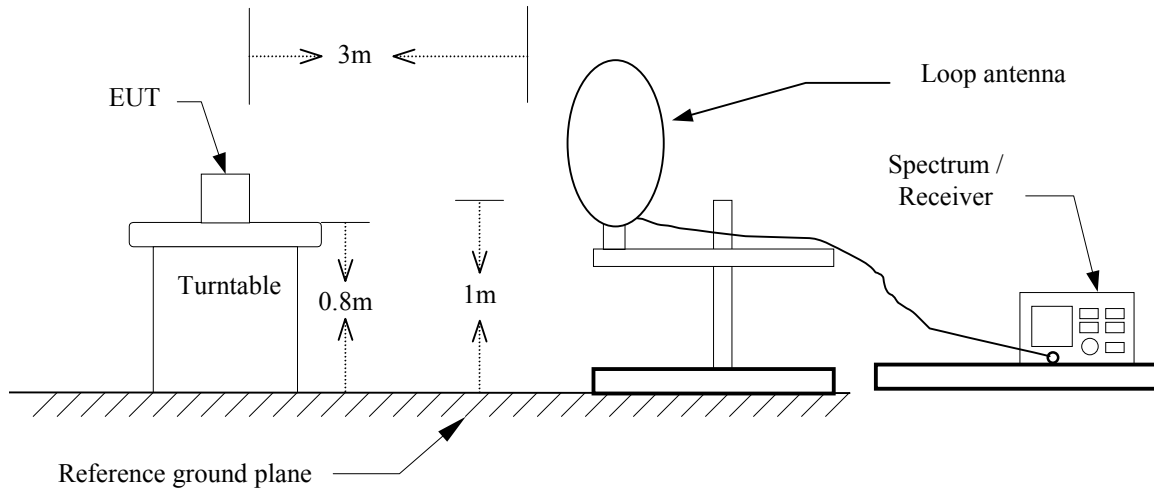
RSS-210 Table 3: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency (fundamental or spurious)	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in Hz)	300
490-1.705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

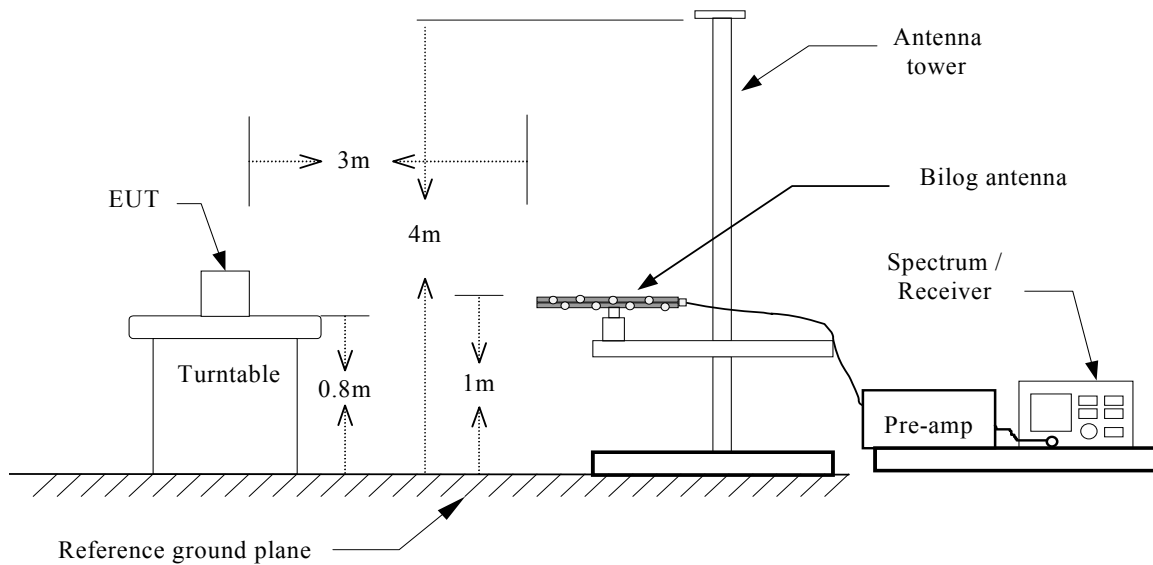


Test Configuration

9kHz ~ 30MHz



30MHz ~ 1GHz





TEST PROCEDURE

For 9kHz ~ 30MHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, The center of the loop shall be 1 m above the ground then to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by rotated of receiving antenna axis
6. Set the spectrum analyzer in the following setting as:
RBW=10kHz / VBW=30kHz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

For 30MHz ~ 1GHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**TEST RESULTS**

No non-compliance noted

TEST DATA

Operation Mode: TX mode **Test Date:** May 7, 2014
Temperature: 27°C **Tested by:** David Shu
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Detector Mode (PK/QP/AVG)
13.5607	29.67	14.66	44.33	124.00	-79.67	PK

Remark:

- 1. Measuring frequencies from 9kHz to the 1GHz.*
- 2. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.*
- 3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
- 4. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

**9kHz ~ 30MHz****Operation Mode:** TX mode**Test Date:** May 7, 2014**Temperature:** 27°C**Tested by:** David Shu**Humidity:** 53 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Ant.Pol. (H/V)	Detector Mode (PK/QP/AVG)
0.1880	28.20	13.96	42.16	115.59	-73.43	V	peak
0.2452	24.68	13.90	38.58	111.47	-72.89	V	peak
0.3034	20.60	13.89	34.49	107.27	-72.78	V	peak
0.3422	18.96	13.88	32.84	104.47	-71.63	V	peak
0.3744	19.34	13.88	33.22	102.14	-68.92	V	peak
0.4032	16.89	13.87	30.76	100.06	-69.30	V	peak
2.6737	25.44	13.70	39.14	69.50	-30.36	V	peak
4.6510	18.18	14.33	32.51	69.50	-36.99	V	peak
6.6576	18.25	14.53	32.78	69.50	-36.72	V	peak
16.1302	12.49	14.55	27.04	69.50	-42.46	V	peak
18.4616	12.22	14.46	26.68	69.50	-42.82	V	peak
22.6520	13.03	14.13	27.16	69.50	-42.34	V	peak

Remark:

1. Measuring frequencies from 9kHz to the 1GHz.
2. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limit (dBuV/m)}$.

**30MHz ~ 1GHz****Operation Mode:** TX mode**Test Date:** May 7, 2014**Temperature:** 27°C**Tested by:** David Shu**Humidity:** 53 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Ant.Pol. (H/V)	Detector Mode (PK/QP/AVG)
64.9200	50.64	-23.26	27.38	40.00	-12.62	V	peak
242.4300	42.12	-18.56	23.56	46.00	-22.44	V	peak
391.8100	32.36	-14.21	18.15	46.00	-27.85	V	peak
480.0800	47.57	-12.16	35.41	46.00	-10.59	V	peak
605.2100	43.10	-10.38	32.72	46.00	-13.28	V	peak
779.8100	37.80	-7.58	30.22	46.00	-15.78	V	peak
239.5200	47.41	-18.62	28.79	46.00	-17.21	H	Peak
419.9400	52.33	-13.48	38.85	46.00	-7.15	H	Peak
605.2100	45.53	-10.38	35.15	46.00	-10.85	H	Peak
630.4300	46.94	-9.78	37.16	46.00	-8.84	H	Peak
660.5000	37.78	-9.20	28.58	46.00	-17.42	H	Peak
760.4100	46.11	-7.78	38.33	46.00	-7.67	H	Peak
809.8800	42.87	-7.26	35.61	46.00	-10.39	H	Peak

Remark:

1. Measuring frequencies from 9kHz to the 1GHz.
2. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limit (dBuV/m)}$.



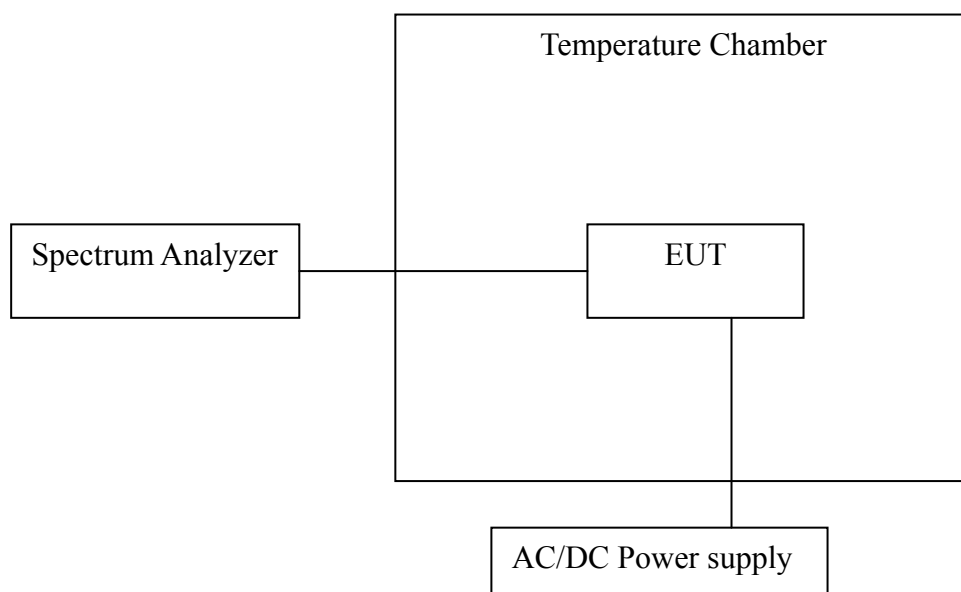
7.4 FREQUENCY STABILITY

LIMIT

According to §15.225(e), the frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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.

Test Configuration

Temperature and Voltage Measurement (under normal and extreme test conditions)



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the environment into appropriate environment.
4. Set the spectrum analyzer as RBW=1kHz, VBW = RBW, Span = 200kHz, Sweep = auto.
5. Mark the peak frequency and measure the frequency tolerance using frequency counter function.
6. Repeat until all the results are investigated.



TEST RESULTS

No non-compliance noted.

Temperature Variations

Temp. (°C)	Voltage (V)	Measured Frequency (MHz)	Delta Frequency (Hz)	Tolerance (%)	Limit (±%)	Margin (%)	Result (Pass/Fail)
-20	120	13.56111	1110	0.00819	0.01	-0.00181	Pass
-10		13.56018	180	0.00133	0.01	-0.00867	Pass
0		13.56003	30	0.00022	0.01	-0.00978	Pass
10		13.56012	120	0.00088	0.01	-0.00912	Pass
20		13.56020	200	0.00147	0.01	-0.00853	Pass
30		13.56007	70	0.00052	0.01	-0.00948	Pass
40		13.56004	40	0.00029	0.01	-0.00971	Pass
50		13.56009	90	0.00066	0.01	-0.00934	Pass

Voltage Variations

Temp. (°C)	Voltage (V)	Measured Frequency (MHz)	Delta Frequency (Hz)	Tolerance (%)	Limit (±%)	Margin (%)	Result (Pass/Fail)
20	102	13.56012	120	0.00088	0.01	-0.00912	Pass
	120	13.56013	130	0.00096	0.01	-0.00904	Pass
	138	13.56012	120	0.00088	0.01	-0.00912	Pass



7.5 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(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 50 μ H/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 boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

**TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode: Normal Link **Test Date:** May 27, 2014
Temperature: 24°C **Tested by:** Moore Cheng
Humidity: 50% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1539	34.97	24.26	9.58	44.55	33.84	65.78	55.79	-21.23	-21.95	L1
0.1780	25.85	19.57	9.58	35.43	29.15	64.57	54.58	-29.14	-25.43	L1
0.2180	22.25	16.75	9.58	31.83	26.33	62.89	52.89	-31.06	-26.56	L1
0.2660	17.13	11.24	9.58	26.71	20.82	61.24	51.24	-34.53	-30.42	L1
5.2380	23.82	21.41	9.62	33.44	31.03	60.00	50.00	-26.56	-18.97	L1
5.9100	23.73	21.22	9.63	33.36	30.85	60.00	50.00	-26.64	-19.15	L1
0.1620	28.13	16.38	9.63	37.76	26.01	65.36	55.36	-27.60	-29.35	L2
0.2100	22.60	12.26	9.63	32.23	21.89	63.20	53.21	-30.97	-31.32	L2
2.1140	18.23	11.86	9.65	27.88	21.51	56.00	46.00	-28.12	-24.49	L2
5.2380	25.27	22.77	9.67	34.94	32.44	60.00	50.00	-25.06	-17.56	L2
9.3900	23.72	20.49	9.71	33.43	30.20	60.00	50.00	-26.57	-19.80	L2
23.1299	22.91	21.60	9.79	32.70	31.39	60.00	50.00	-27.30	-18.61	L2

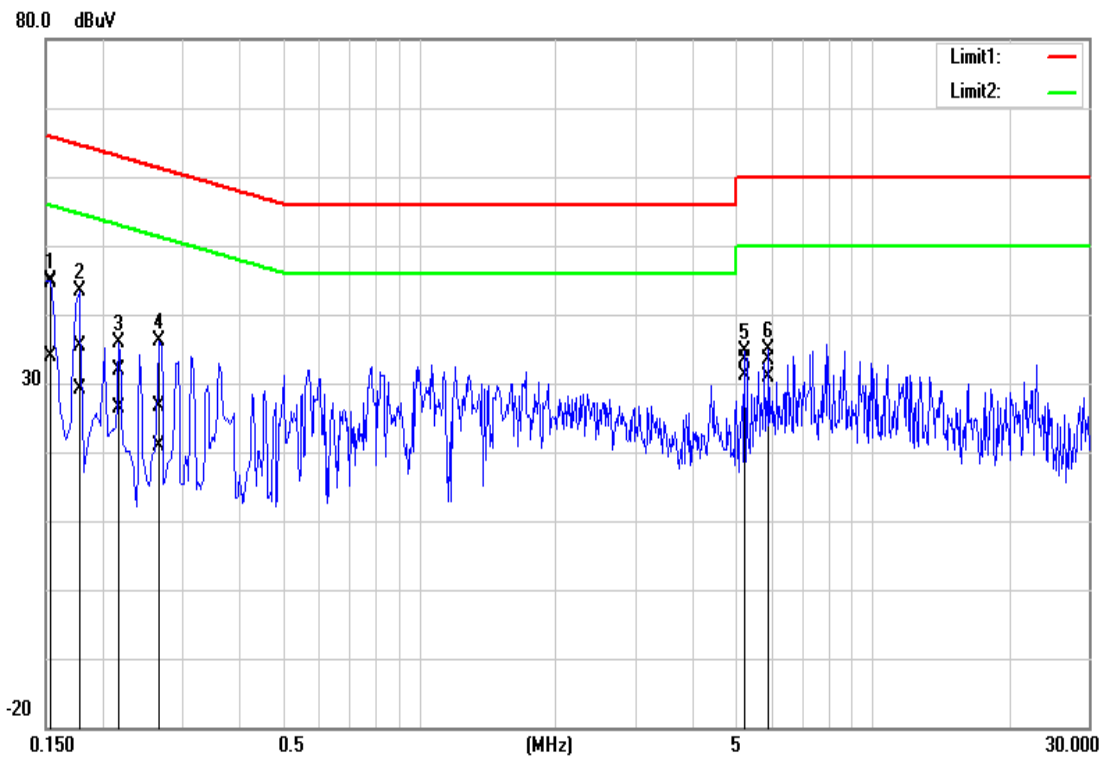
Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

