



FCC 47 CFR PART 15 SUBPART C TEST REPORT

for

RF ID Reader

MODEL: RDR-HF-BTDISP1

Brand: INFOCHIP

Test Report Number:

SZ111215B01-RP

Issued for

INFOCHIP SYSTEMS INC.

#203, 1122 3rd Ave S Lethbridge, Alberta,
Canada T1J0J6

Issued by:

Compliance Certification Services (Shenzhen) Inc.

No.10-1, Mingkeda Logistics Park, NO.18, Huanguan South Rd.,
Guan Lan Town, Baoan District, Shenzhen, China

TEL: 86-755-28055000

FAX: 86-755-28055221

Issued Date: December 28, 2011



TESTING CERT #2861.01

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Revision History

Rev.	Issue Report	Revisions	Effect Page	Revised By
00	SZ111215B01-RP	Initial Issue	ALL	Sunny Wang



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1 TEST CERTIFICATION

Product:	RF ID Reader
Model:	RDR-HF-BTDISP1
Brand:	INFOCHIP
Tested:	December 15~28, 2011
Applicant:	INFOCHIP SYSTEMS INC. #203, 1122 3rd Ave S Lethbridge, Alberta, Canada T1J0J6

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted
DEVIATION FROM APPLICABLE STANDARD	
None	

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 C63.4:2003 and the energy emitted by the sample EUT 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 EUT identified in this report.

Approved by:

Reviewed by:

Tom Gan
Supervisor of EMC Dept.
Compliance Certification Service Inc.

Aven Zhou
Supervisor of Report Dept.
Compliance Certification Service Inc.



2 EUT DESCRIPTION

Product	RF ID Reader
Model Number	RDR-HF-BTDISP1
Brand	INFOCHIP
Model Discrepancy	N/A
Identify Number	SZ111215B01-RP
EUT Power Rating	DC3.7V supplied by the batteries or DC 5V Supplied by the PC
Frequency Range	13.56 MHz
Transmit Power	37.50dBuV/m(measured at 3m)
Modulation Technique	AM
Number of Channels	1Channel

Note: 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

2. This submittal(s) (test report) is intended for **FCC ID: A40-EBTR01** filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.



3 TEST METHODOLOGY

3.1. DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link (powered by the adapter) mode only, and powerline conducted emission below 30MHz, which worst case was in normal link mode with charging only.

Channel 1 (13.56MHz) was chosen for the final testing.



4 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4:2003 and FCC CFR 47 15.207, 15.209 and 15.225.

4.1. 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.

4.2. EUT EXERCISE

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

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209, 15.225 under the FCC Rules Part 15 Subpart C.

4.3. 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: 2003. 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: 2003.



4.4. 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.



5 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.

6 SETUP OF EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook	Studio 1435	5315448686549	N/A	DELL	N/A	N/A

Note:

- 1) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.2. CONFIGURATION OF SYSTEM UNDER TEST

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



7 FACILITIES AND ACCREDITATIONS

7.1. FACILITIES

All measurement facilities used to collect the measurement data are located at
 No10-1, Mingkeda Logistics Park, No.18 Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	A2LA
China	CNAS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Norway	Nemko
Japan	VCCI (C-3478, R-3135, T-652)
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

7.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	+/- 3.18dB
Radiated emissions	30MHz ~ 200MHz	+/- 3.79dB
	200MHz ~1000MHz	+/- 3.62dB
	Above 1000MHz	+/- 5.04dB

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

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.



8 FCC PART 15.225 REQUIREMENTS

8.1. 20 DB BANDWIDTH MEASUREMENT

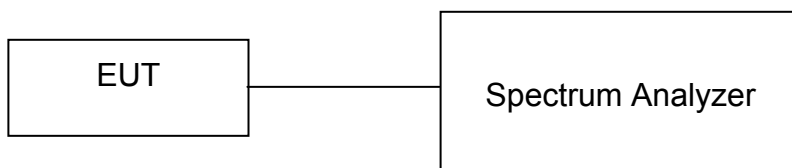
LIMIT

None; for reporting purposes only.

MEASUREMENT EQUIPMENT USED

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVE.ESCI	ROHDE&SCHWARZ	ESCI	100088	03/19/2011	03/19/2012
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2011	03/19/2012
Amplifier	MITEQ	AM-1604-3000	1411843	03/18/2011	03/18/2012
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Bilog Antenna	SCHAFFNER	CBL6143	5082	06/03/2011	06/03/2012
Loop Antenna	A, R, A	PLA-1030/B	1029	03/19/2011	03/19/2012
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/31/2011	03/31/2012
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

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= 10kHz, VBW = 30kHz, Span = 1MHz, 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.



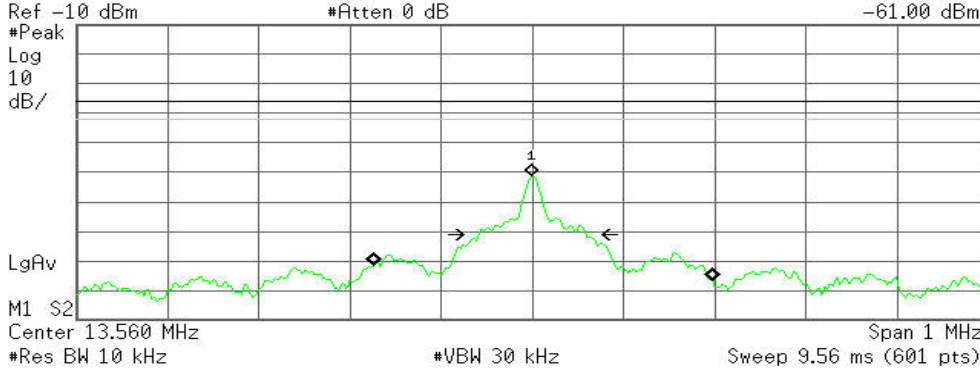
Test Data

Bandwidth (TX / CH 13.56.0MHz)

Agilent 17:19:08 Dec 11, 2011

R T

Mkr1 13.560 MHz
-61.00 dBm



Occupied Bandwidth
374.6784 kHz

Occ BW % Pwr 99.00 %
x dB -20.00 dB

Transmit Freq Error 12.057 kHz
x dB Bandwidth 119.895 kHz



8.2. POWER LINE CONDUCTED EMISSIONS MEASUREMENT

8.2.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

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

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

TEST INSTRUMENTS

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVE.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/19/2011	03/19/2012
LISN	SCHAFFNER	NNB42	2001/001	05/26/2011	05/26/2012
LISN	EMCO	3825/2	8901-1459	03/19/2011	03/19/2012
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/31/2011	03/31/2012
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

- NOTE:**
- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 - 2. N.C.R = No Calibration Request.

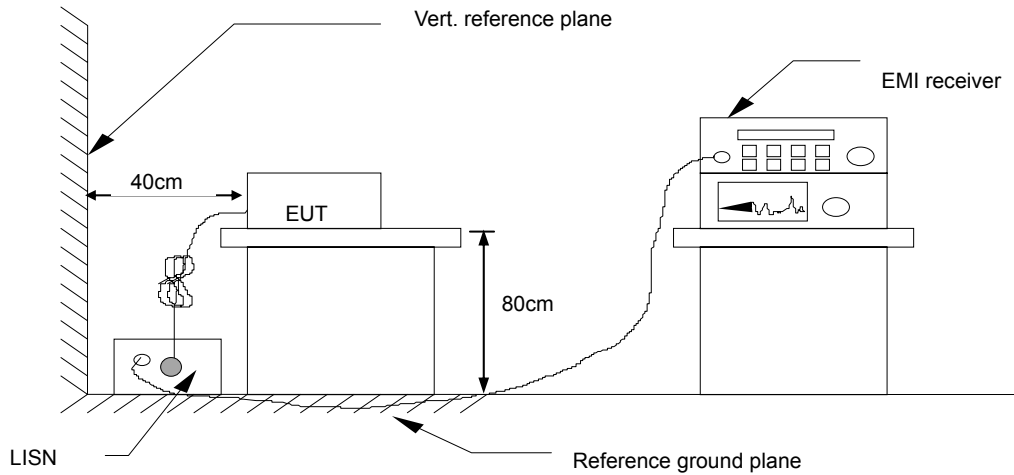


8.2.2. TEST PROCEDURES (please refer to measurement standard)

- The EUT and Support equipment, if needed, was placed on a non-conducted table, which is 0.8m above the ground plane and 0.4m away from the conducted wall.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane. All support equipment power received from a second LISN. The two LISNS provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The frequency range from 150 kHz to 30 MHz was searched. The test data of the worst-case condition(s) was recorded. Emission levels under limit 20dB were not recorded.



8.2.3. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.2.4. DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Line (L1/L2)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	L1

Factor = Insertion loss of LISN + Cable Loss
 Result = Quasi-peak Reading/ Average Reading + Factor
 Limit = Limit stated in standard
 Margin = Result (dBuV) – Limit (dBuV)
 L1 = Hot side
 L2 = Neutral side



8.2.5. TEST RESULTS

Test Mode	Mode 1	RBW,VBW	9 kHz
Environmental Conditions	22°C, 45% RH	Tested by	Paul Pan

(The chart below shows the highest readings taken from the final data.)

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Line (L1/L2)
0.1900	25.14	23.90	11.52	36.66	35.42	64.03	54.04	-27.37	-18.62	L1
0.2660	21.10	18.63	11.53	32.63	30.16	61.24	51.24	-28.61	-21.08	L1
1.1300	15.76	10.13	11.52	27.28	21.65	56.00	46.00	-28.72	-24.35	L1
1.6980	14.70	8.61	11.54	26.24	20.15	56.00	46.00	-29.76	-25.85	L1
4.8180	15.68	9.20	11.66	27.34	20.86	56.00	46.00	-28.66	-25.14	L1
14.3980	28.26	22.38	12.25	40.51	34.63	60.00	50.00	-19.49	-15.37	L1
0.1900	25.81	22.38	11.52	37.33	33.90	64.03	54.04	-26.70	-20.14	L2
0.2660	17.86	15.41	11.53	29.39	26.94	61.24	51.24	-31.85	-24.30	L2
0.7539	16.64	13.07	11.52	28.16	24.59	56.00	46.00	-27.84	-21.41	L2
1.7020	15.83	7.95	11.55	27.38	19.50	56.00	46.00	-28.62	-26.50	L2
7.1660	16.97	10.13	11.80	28.77	21.93	60.00	50.00	-31.23	-28.07	L2
14.3940	28.37	22.04	12.25	40.62	34.29	60.00	50.00	-19.38	-15.71	L2

NOTE: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

2. Those frequencies only show peak emission level because that was below the Average limit, so no need to check average anymore.



8.3. SPURIOUS EMISSIONS MEASUREMENT

8.3.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT

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.
1. 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 (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

Remark: 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.



8.3.2. TEST INSTRUMENTS

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVE.ESCI	ROHDE&SCHWARZ	ESCI	100088	03/19/2011	03/19/2012
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2011	03/19/2012
Amplifier	MITEQ	AM-1604-3000	1411843	03/18/2011	03/18/2012
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Bilog Antenna	SCHAFFNER	CBL6143	5082	06/03/2011	06/03/2012
Loop Antenna	A、R、A	PLA-1030/B	1029	03/19/2011	03/19/2012
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/31/2011	03/31/2012
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. N.C.R = No Calibration Required.

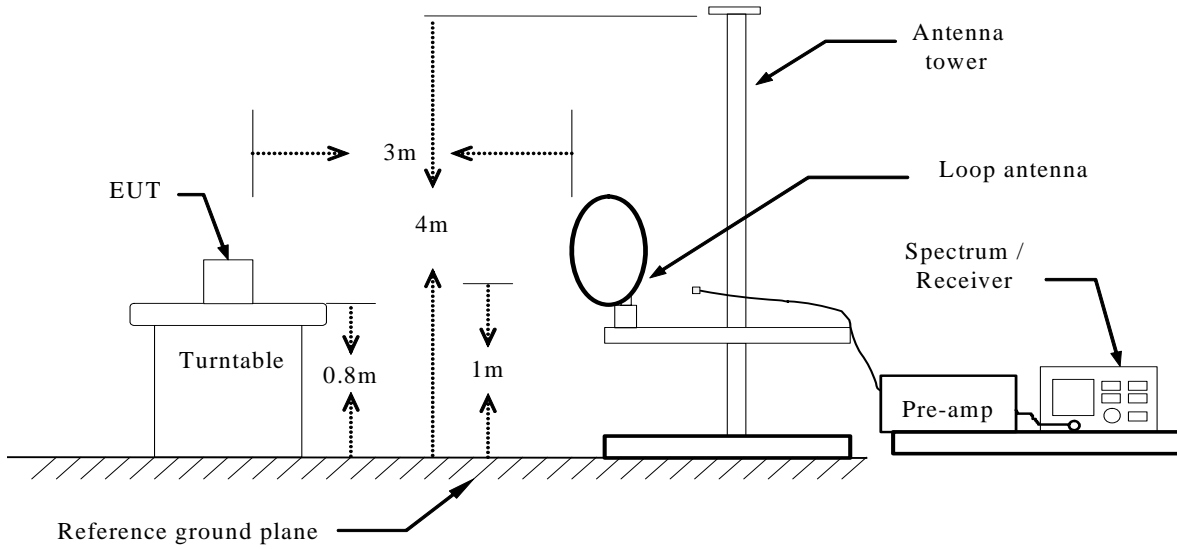
8.3.3 TEST PROCEDURE (please refer to measurement standard)

- The EUT is placed on a turntable, which is 0.8m above ground plane.
- The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Set the spectrum analyzer in the following setting as:
 Below 1GHz:
 RBW=100kHz / VBW=300kHz / Sweep=AUTO
 Above 1GHz:
 (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
- Repeat above procedures until the measurements for all frequencies are complete.

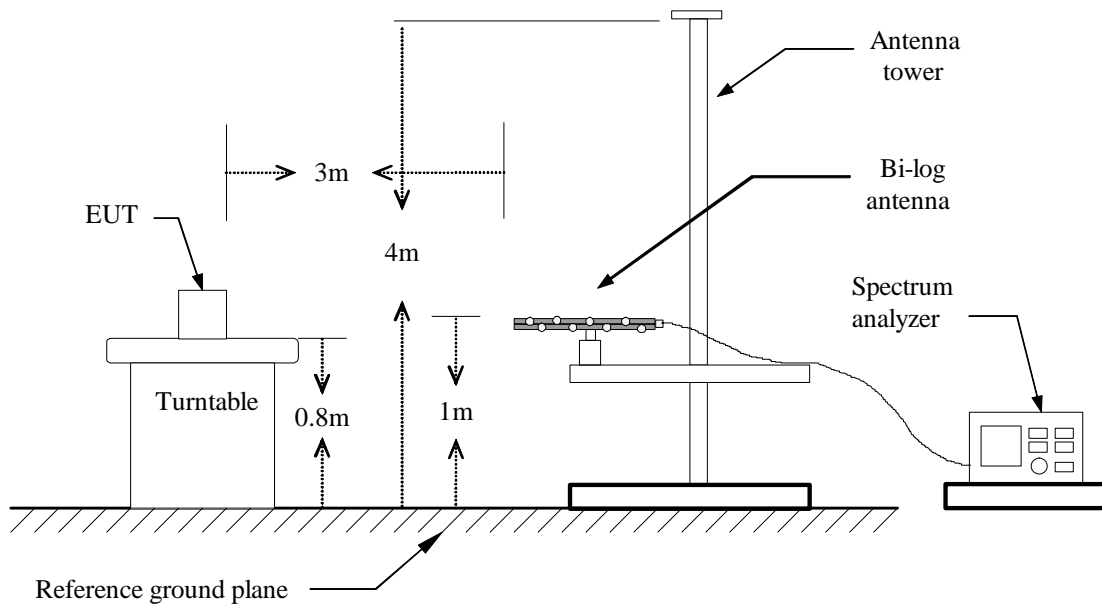


8.3.2.1. TEST SETUP

Below 30MHz

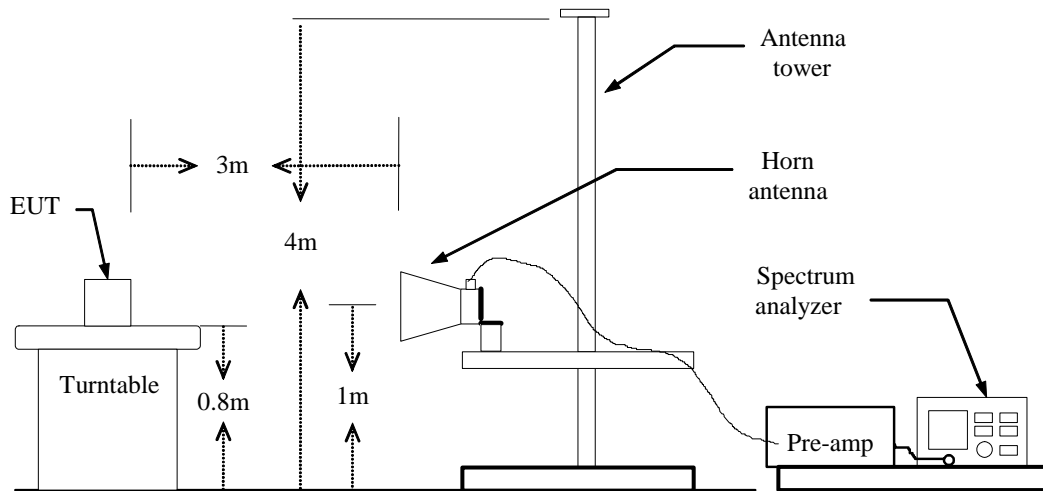


Below 1 GHz





Above 1 GHz



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.3.2.2. DATA SAMPLE

Below 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXX.XXXX	37.47	-16.41	21.06	40.00	-18.94	V	Peak

Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXXX.XXXX	55.54	4.56	60.10	74.00	-13.90	V	Peak
XXXX.XXXX	29.66	4.56	34.22	54.00	-19.78	V	AVG

- Frequency (MHz) = Emission frequency in MHz
- Reading (dBuV) = Uncorrected Analyzer / Receiver reading
- Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
- Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
- Q.P. = Quasi-peak Reading
- Peak = Peak Reading
- AVG = Average Reading



8.3.2.3. TEST RESULTS

Blow 1GHz

Operation Mode: TX / CH 1 (13.56)

Test Date: December 22, 2011

Temperature: 24°C

Tested by: Sunday Hu

Humidity: 52 % RH

Polarity: Ver. / Hor.

Fundamental

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
13.5600	56.03	-18.53	37.50	124.00	-86.50	AVG

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
67.8300	51.37	-20.03	31.34	40.00	-8.66	V	Peak
267.6500	50.99	-13.14	37.85	46.00	-8.15	V	Peak
596.4800	36.84	-6.47	30.37	46.00	-15.63	V	Peak
690.5700	37.72	-4.56	33.16	46.00	-12.84	V	Peak
898.1500	41.30	-2.33	38.97	46.00	-7.03	V	Peak
988.3600	38.62	-1.15	37.47	54.00	-16.53	V	Peak
67.8300	53.86	-20.03	33.83	40.00	-6.17	H	Peak
94.9900	44.13	-17.87	26.26	43.50	-17.24	H	Peak
202.6600	45.30	-15.82	29.48	43.50	-14.02	H	Peak
264.7400	52.71	-13.20	39.51	46.00	-6.49	H	Peak
338.4600	44.30	-10.50	33.80	46.00	-12.20	H	Peak
596.4800	37.97	-6.47	31.50	46.00	-14.50	H	Peak

**Note: The emission found is too lower to record between lowest internal used/generated frequency to 30 MHz.

REMARKS:

1. Radiated emissions measured in frequency range from 9kHz to 1GHz were made with an instrument using peak/quasi-peak detector mode.
2. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
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) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m)



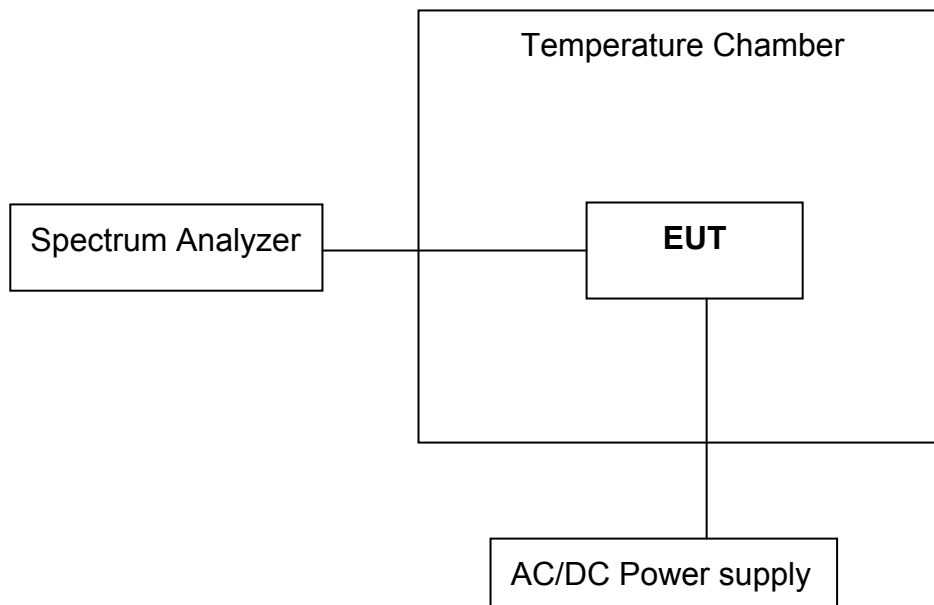
8.4. FREQUENCY STABILITY

LIMIT

According to §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.

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. (oC)	Voltage (VAC)	Measured Frequency (MHz)	Delta Frequency (Hz)	Tolerance (%)	Limit (±%)	Margin (%)	Result (Pass/Fail)
-20	3.7	13.56008	10	0.00007	0.01	-0.00993	Pass
-10		13.56003	30	0.00022	0.01	-0.00978	Pass
0		13.56001	10	0.00007	0.01	-0.00993	Pass
10		13.56017	170	0.00125	0.01	-0.00875	Pass
20		13.56001	10	0.00007	0.01	-0.00993	Pass
30		13.56008	80	0.00059	0.01	-0.00941	Pass
40		13.55998	-20	-0.00015	0.01	-0.01015	Pass
50		13.56010	100	0.00074	0.01	-0.00926	Pass

Voltage Variations

Temp. (oC)	Voltage (VAC)	Measured Frequency (MHz)	Delta Frequency (Hz)	Tolerance (%)	Limit (±%)	Margin (%)	Result (Pass/Fail)
20	3.33	13.56015	150	0.00111	1.01	-1.00889	Pass
	3.7	13.56001	10	0.00007	2.01	-2.00993	Pass
	4.03	13.56004	40	0.00029	3.01	-3.00971	Pass