



EMC TEST REPORT

No. 150100700SHA-001

Applicant : Buzz Products PTY LTD
18 Studley Street Abbotsford Victoria Australia 3067

Manufacturer : Ningbo Hicon International Industry Co.,Ltd
No.55,4th Binhai Road, Hangzhou Bay New
Zone, Cixi, Ningbo, Zhejiang Province 315336

Equipment : Bud-e fridge

Type/Model : 010275

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2014): Radio Frequency Devices

ANSI C63.4 (2003): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

RSS-210 Issue 8 (December 2010): Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

RSS-Gen Issue 4 (November 2014): General Requirements for Compliance of Radio Apparatus

Date of issue: Feb 28, 2015

Prepared by:

Jesse Xu (*Project Engineer*)

Reviewed by:

Daniel Zhao (*Reviewer*)



Description of Test Facility

Name: Intertek Testing Services Limited Shanghai
Address: Building No.86, 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

FCC Registration Number: 236597
IC Assigned Code: 2042B-1

Name of contact: Steve Li
Tel: +86 21 64956565 ext. 214
Fax: +86 21 54262335 ext. 214

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1. General Information

1.1 Applicant Information

Applicant:	Buzz Products PTY LTD 18 Studley Street Abbotsford Victoria Australia 3067
Name of contact:	NICK HOWARD
Tel:	+61384129000
Fax:	+61384129001
Manufacturer:	Ningbo Hicon International Industry Co.,Ltd No.55,4 th Binhai Road, Hangzhou Bay New Zone, Cixi, Ningbo, Zhejiang Province 3153366
Sample received date:	Jan 17, 2015
Sample Identification No:	*0140117-38-010*
Date of test:	Jan 20, 2015 ~ Feb 12, 2015

1.2 Identification of the EUT

Equipment:	Bud-e fridge
Type/model:	010275
FCC ID:	2AA7CCONNREFG
IC:	11838A-CONNREFG



1.3 Technical specification

Operation Frequency Band:	433.92MHz
Modulation:	ASK
Antenna Designation:	Integral antenna, non-user removable.
Gain of Antenna:	0dBi
Rating:	Input: 115V~ 60Hz Output:5V Working frequency: 433.92MHz
Description of EUT:	There is one model only. The EUT is a transmitter to control the working condition of the corresponding receiver.
Channel Description:	There is one channel only, namely 433.92MHz.

1.4 Mode of operation during the test / Test peripherals used

Within this test report, EUT was tested with modulation and tested under its rating voltage and frequency.

The EUT is a floor stand device, were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.



2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESIB 26	R&S	EC 3045	2014-10-21	2016-10-20
Semi-anechoic chamber	-	Albatross project	EC 3048	2014-5-21	2015-5-20
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2014-5-16	2016-5-15
Horn antenna	HF 906	R&S	EC 3049	2014-5-13	2016-5-12
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2014-4-12	2015-4-11
Test Receiver	FSV40	R&S	/	2014-10-21	2015-10-20
Loop antenna	9230-1/9229-1	Schwarzbeck	086814/084814	2014-12-16	2015-12-15

2.2 Test Standard

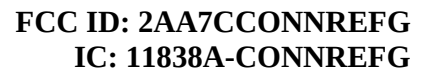
47CFR Part 15 (2014)
ANSI C63.4: 2003
RSS-210 Issue 8 (December 2010)
RSS-Gen Issue 4 (November 2014)



2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERENCE	IC REFERENCE	RESULT
Fundamental & spurious emission	15.231(b)	RSS-210 Issue 8 Annex A1.1.2	Pass
Restrict band radiated emission	15.205	RSS-210 Issue 8 Clause 2.2	Pass
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	Pass
Emission bandwidth	15.231(c)	RSS-210 Issue 8 Annex A1.1.3	Pass
Deactivating time	15.231(a)(1)	RSS-210 Issue 8 Annex A1.1.1	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested



Test result: PASS

3.1.1 The emission shall test through the 10th harmonic or to 40GHz, whichever is lower. It must comply with the limits below:

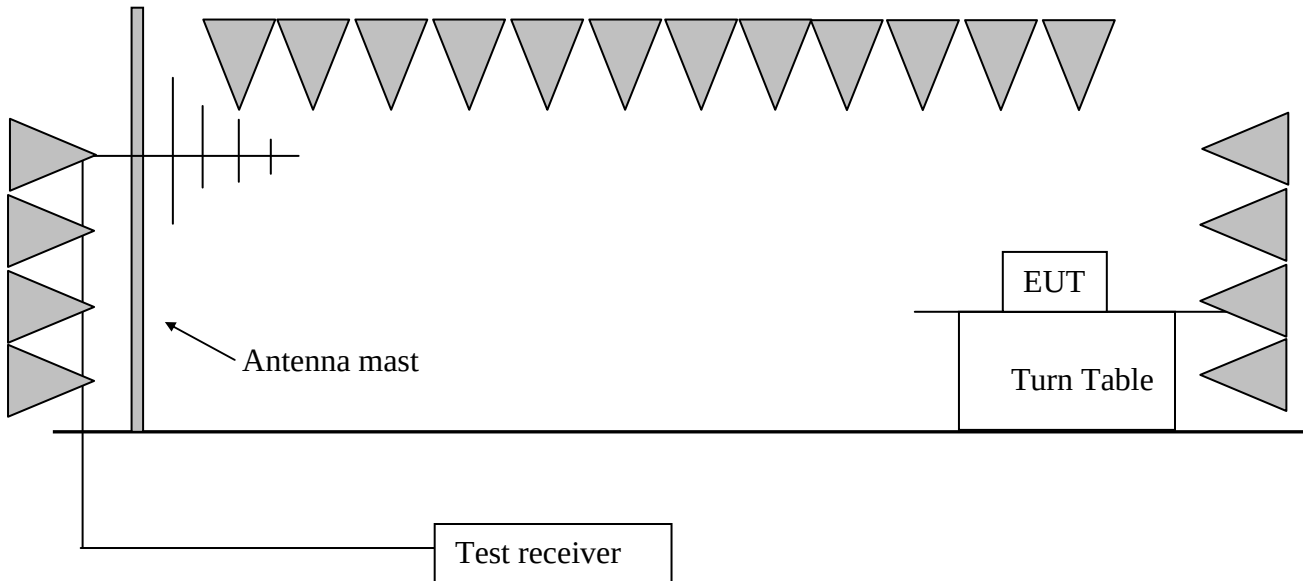
The formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m at 3 meters} = 56.81818(\text{Frequency}) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m at 3 meters} = 41.6667(\text{Frequency}) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Fundamental limit = $41.6667 * 433.92 - 7083.3333 = 10996.68 \text{ uV/m} = 80.80 \text{ dBuV/m}$
 Spurious limit = $81 - 20 = 60.80 \text{ dBuV/m}$

3.1.2 The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

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3.2 Test Configuration



3.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, the pre-amplifier and high pass filter is equipped just at the output terminal of the antenna.

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Both horizontal and vertical polarities of the receiving antenna were assessed and the higher reading was listed in this report.

The radiated emission was measured using the test receiver with the resolutions bandwidth set as:

RBW=300 Hz, VBW=1 kHz (9 kHz~150 kHz);

RBW=10kHz, VBW=30kHz (150kHz~30MHz);

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz)

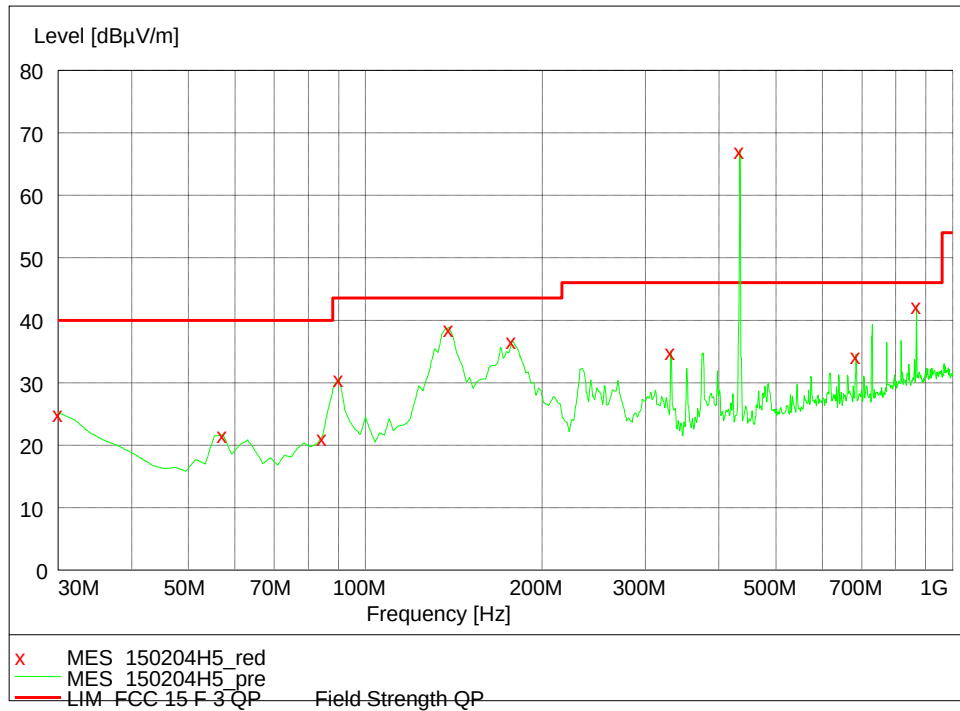
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

3.4 Test protocol

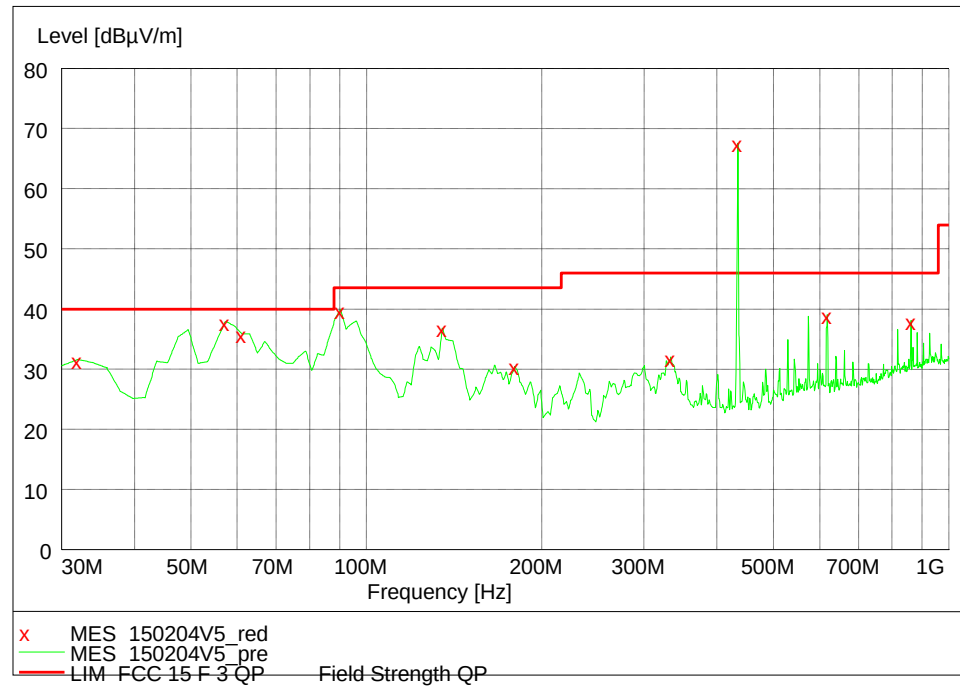
Temperature: 23 °C

Relative humidity: 54%

Polarization: Horizontal



Polarization: Vertical



Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Emission Type	Limit (dBuV/m)	Margin	Detector
H	433.92	18.80	67.20	Fundamental	100.80	33.60	PK
H	867.81	23.60	42.40	Harmonics	80.80	38.40	PK
H	90.26	12.10	30.80	Harmonics	80.80	50.00	PK
H	138.85	15.50	38.80	Harmonics	80.80	42.00	PK
H	177.73	12.60	36.80	Harmonics	80.80	44.00	PK
H	1272.54	-18.40	54.20	Harmonics	80.80	26.60	PK
H	1715.43	-15.60	49.40	Harmonics	80.80	31.40	PK
V	433.92	18.80	67.60	Fundamental	100.80	33.20	PK
V	861.98	24.50	38.10	Harmonics	80.80	42.70	PK
V	57.21	9.30	37.90	Harmonics	80.80	42.90	PK
V	90.26	12.10	40.00	Harmonics	80.80	40.80	PK
V	618.99	22.10	39.00	Harmonics	80.80	41.80	PK
V	1272.54	-18.40	55.70	Harmonics	80.80	25.10	PK
V	1715.43	-15.60	48.10	Harmonics	80.80	32.70	PK
V	3909.81	-2.70	38.40	Restrict	74.00	35.60	PK
H	407.00	17.40	23.40	Restrict	46.00	22.60	PK
H	1720.12	-10.00	33.42	Restrict	74.00	40.58	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)

2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = limit - Corrected Reading

4. If PK reading is less than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,

Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, limit = 40.00dBuV/m.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m; Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.



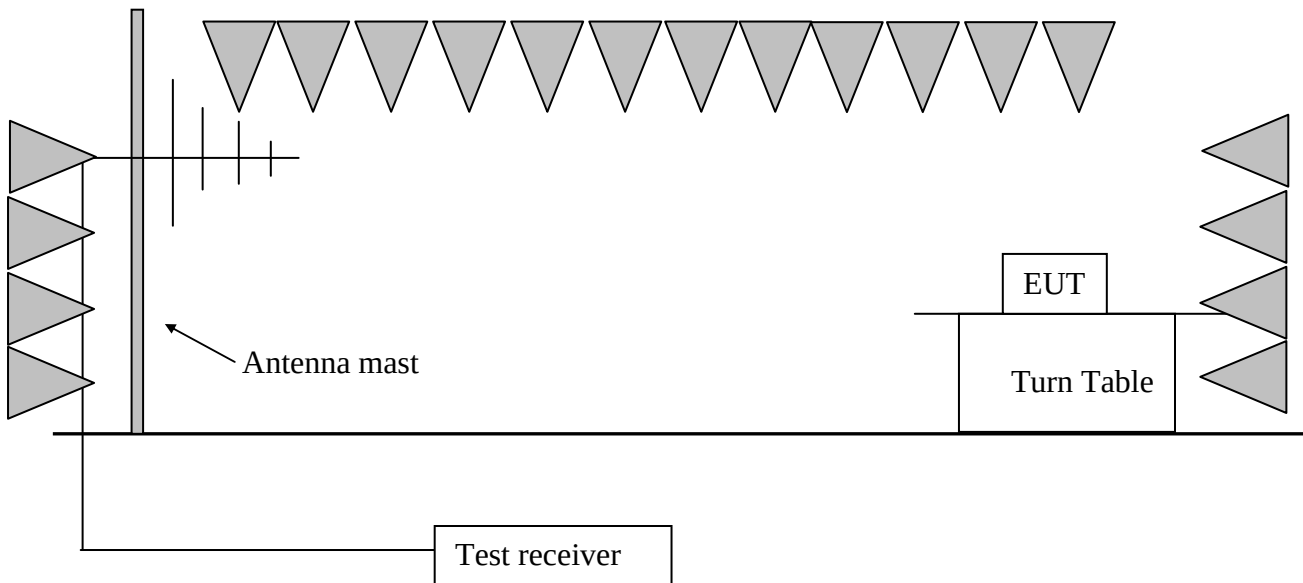
Deactivating time

Test result: PASS

4.1 Test limit

- ☒ (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- ☐ (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- ☐ (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- ☐ (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.
- ☐ (5) Transmission of set-up information for security systems may exceed the transmission duration limits in (1) and (2) above, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

4.2 Test Configuration



4.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber.

The central frequency of test receiver was set as the operating frequency of EUT and the Span was set as 0.

The EUT was switched once. The test receiver recorded the whole time from the triggered moment to the time of stopping radiating. For manual switching, to avoid uncertainty, the operating above would be repeated five times and the worst data is recorded.

4.4 Test protocol

Whole time from the triggered moment to the time of stopping radiating: 0.2s.

As a result, the EUT complies with the limit of 5s' deactivating time.

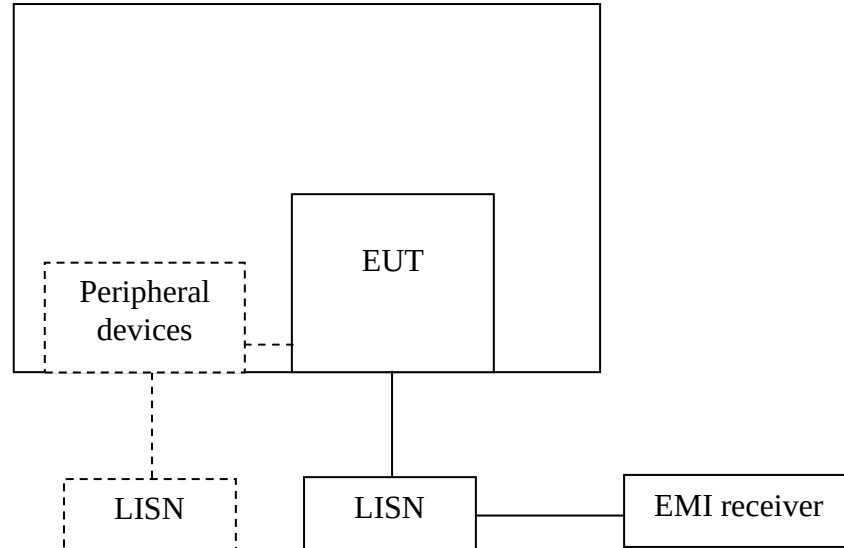
4. Power line conducted emission

Test result: Pass

5.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.		

5.2 Test configuration



- ☐ For table top equipment, wooden support is 0.8m height table
- ☐ For floor standing equipment, wooden support is 0.1m height rack.



5.3 Test procedure and test set up

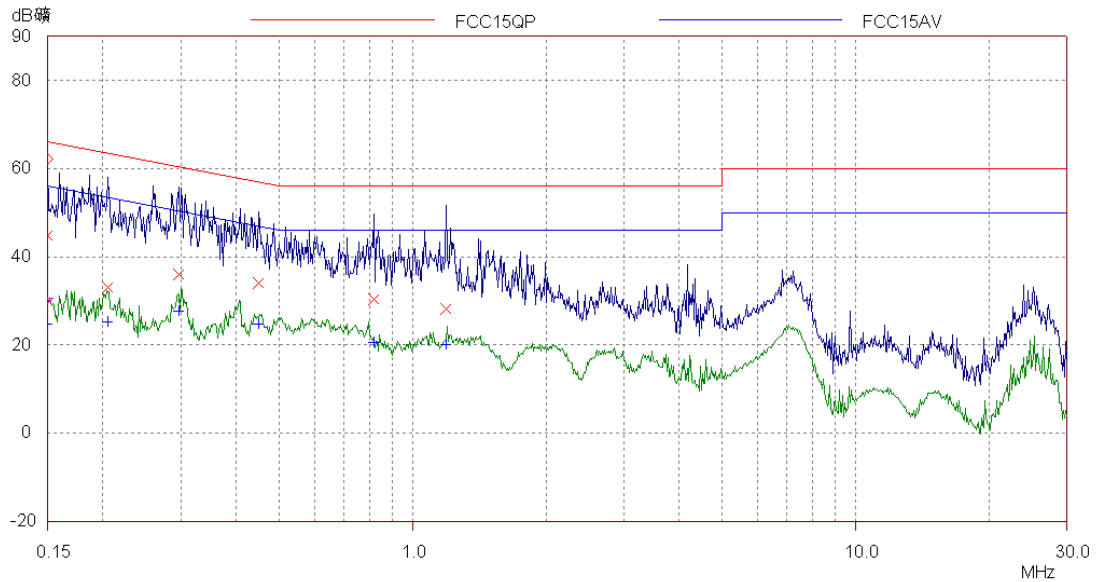
The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a $50\Omega/50\mu\text{H}$ coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a $50\Omega/50\mu\text{H}$ coupling impedance with 50Ω termination.

Both sides (Line and Neutral) of AC 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 on conducted measurement. The bandwidth of the test receiver is set at 9 kHz.

5.4 Test protocol

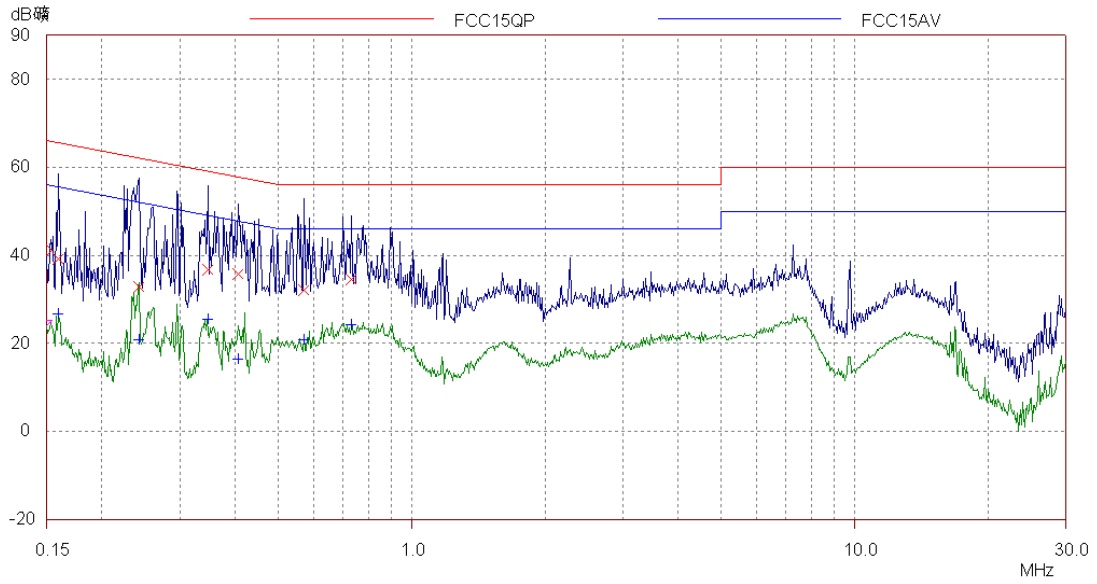
Temperature : 20°C
Relative Humidity : 55 %

L-line



Frequency (MHz)	Quasi-peak		Average	
	Disturbance level dB(uV)	Permitted limit dB(uV)	Disturbance level dB(uV)	Permitted limit dB(uV)
0.15	44.71	66.00	*	*
0.20	33.06	63.41	*	*
0.29	36.04	60.36	*	*
0.44	33.93	56.92	*	*
0.81	30.29	56.00	*	*
1.18	28.24	56.00	*	*
Note: * means the emission level 20dB lower than the relevant limit.				

N-line



Frequency (MHz)	Quasi-peak		Average	
	Disturbance level dB(uV)	Permitted limit dB(uV)	Disturbance level dB(uV)	Permitted limit dB(uV)
0.15	39.05	65.50	*	*
0.24	32.77	62.02	*	*
0.34	36.74	59.04	*	*
0.40	35.78	57.74	*	*
0.56	32.02	56.00	*	*
0.72	34.52	56.00	*	*
Note: * means the emission level 20dB lower than the relevant limit.				

5. Emission Bandwidth

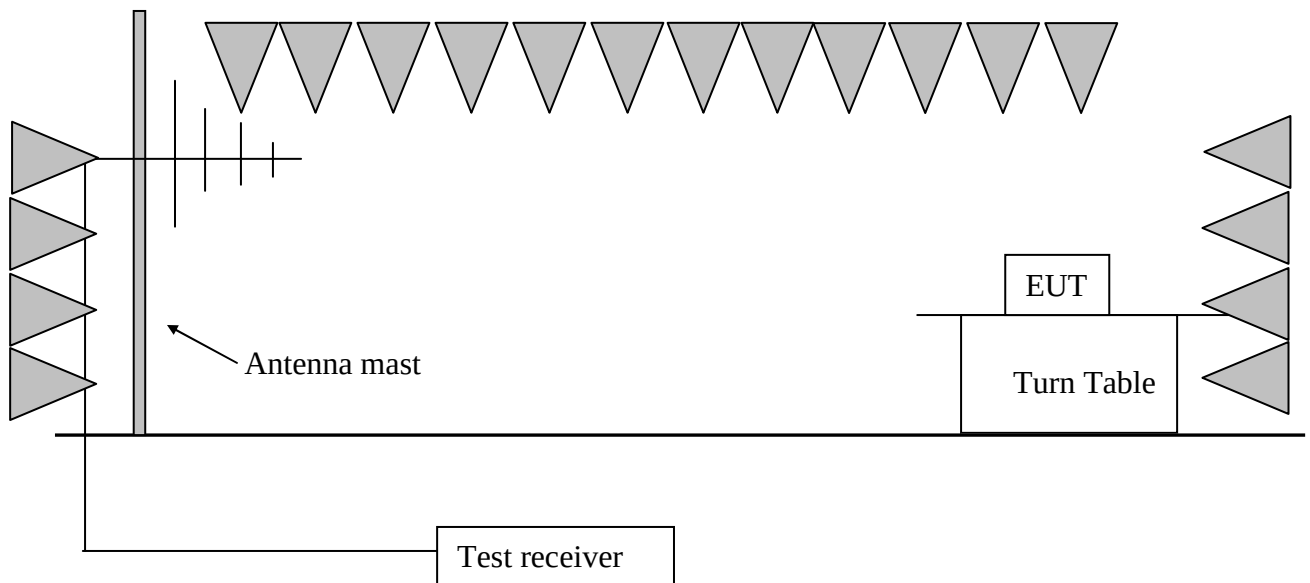
Test Status: Pass

6.1 Test limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

The limit for the EUT = $0.25\% * 433.92\text{MHz} = 1085\text{kHz}$

6.2 Test Configuration



6.3 Test procedure and test setup

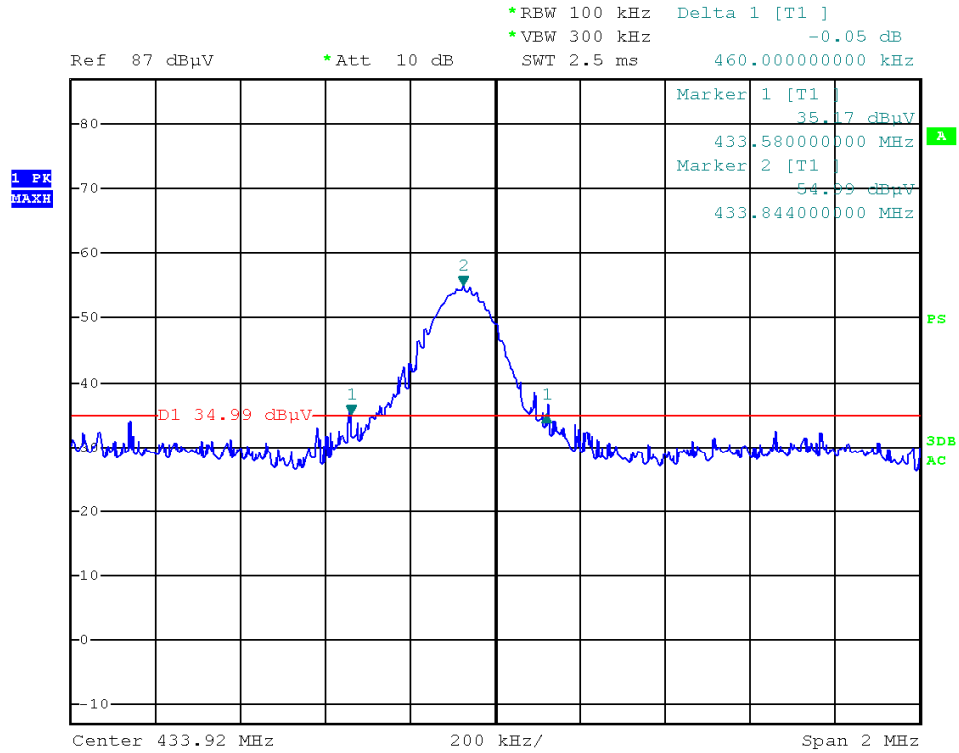
The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The central frequency of test receiver was set near the operating frequency of EUT.

The test was conducted using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz.

6.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %



Date: 9.FEB.2015 14:31:44

Channel	Emission Bandwidth (kHz)	Limit (kHz)
1	460	1085

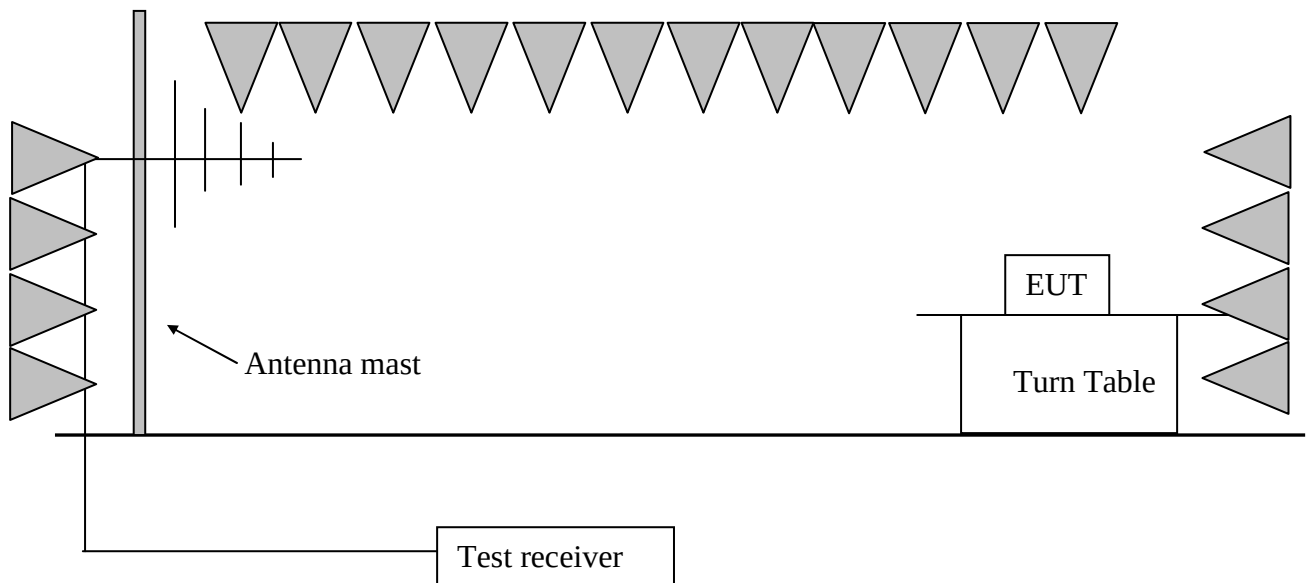
6. Occupied Bandwidth

Test Status: Tested

7.1 Test limit

None

7.2 Test Configuration



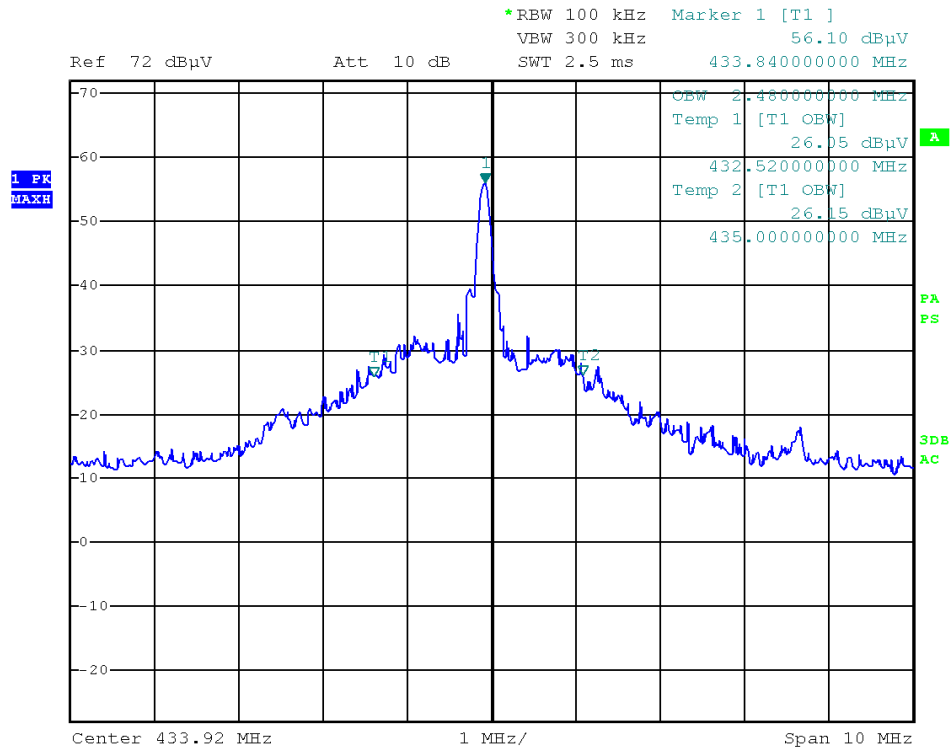
7.3 Test procedure and test setup

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz.



7.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %



Date: 9.FEB.2015 14:37:42

Channel	Occupied Bandwidth (MHz)	Max. Value (MHz)
1	2.480	2.480

Remark: “Max. Value” is the maximum test result of all the measured occupied bandwidth.