

EMC TEST REPORT

No. SH09041141-001

Applicant : Hansong(Nanjing) Technology Ltd.
8th Kangping Road, Jiangning Economy and Technology
Development Zone, Nanjing, China, 211100

Manufacturer : Hansong(Nanjing) Technology Ltd.
8th Kangping Road, Jiangning Economy and Technology
Development Zone, Nanjing, China, 211100

Equipment : Media Furniture

Type/Model : Media Chair 8001

SUMMARY

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

47CFR Part 15 (2008): Radio Frequency Devices

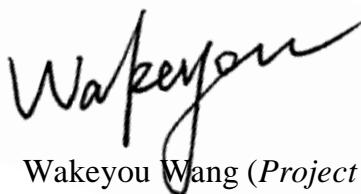
ANSIC63.4 (2003): American National Standard for Methods of Measurement
of Radio-Noise Emissions from Low-Voltage Electrical and Electronic
Equipment in the Range of 9 kHz to 40 GHz

RSS-210 Issue 7 (June 2007): Low-power Licence-exempt Radiocommunication
Devices (All Frequency Bands): Category I Equipment

RSS-Gen Issue 2 (June 2007): General Requirements and Information for the Certification
of Radiocommunication Equipment

Date of issue: July 6, 2009

Prepared by:



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FCC ID: XCO-HIQ8001
IC: 7756A-HIQ8001

Description of Test Facility

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FCC ID: XCO-HIQ8001
IC: 7756A-HIQ8001

1. General Information

1.1 Applicant Information

Applicant: Hansong(Nanjing) Technology Ltd.
8th Kangping Road, Jiangning Economy and
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211100

Name of contact: Una Chi

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Manufacturer: Hansong(Nanjing) Technology Ltd.
8th Kangping Road, Jiangning Economy and
Technology Development Zone, Nanjing, China,
211100

Sample received date : April 24, 2009

Date of test : April 24, 2009 ~ July 1, 2009

1.2 Identification of the EUT

Equipment: Media Furniture

Type/model: Media Chair 8001

FCC ID: XCO-HIQ8001

IC: 7756A-HIQ8001



1.3 Technical specification

| | |
|---------------------------|---|
| Operation Frequency Band: | 2412 - 2464 MHz |
| Modulation: | QPSK |
| Antenna Designation: | External replaceable omnidirectional antenna, reverse SMA-K connector to be connected to the EUT. |
| Gain of Antenna: | 1.80dBi max. |
| Rating: | DC 12V by Adapter: AC 100-240V, 50/60Hz, 0.5A |
| Description of EUT: | <p>Here is one model only.</p> <p>The EUT is the transmitter part of a media chair system. The wireless transmitter allows the user to connect virtually any audio (receivers, CD players, and MP3 players) or video source with audio outputs (DVD player, VCR) and transmit the sound wirelessly to the receiver part of the media chair to 30 feet away. The EUT contains of two antennas that cannot be set to work simultaneously.</p> |
| Power Cable: | Unshielded, detachable, 2.0m |
| I/O port: | Audio input |
| Channel Description: | |

| Channel Identifier | Frequency (MHz) |
|--------------------|-----------------|
| low | 2412 |
| middle | 2438 |
| high | 2464 |

1.4 Mode of operation during the test / Test peripherals used

Within this test report, EUT was tested under 120V/60Hz. Although the EUT is the transmitter part of a media chair system, it also receives the answer signal from the receiver part while setting up connection. As a result, both transmitting as well as receiving conditions were observed.

While testing transmitter mode of EUT, an iPod generating 1 kHz audio signal was used as a test peripheral.

While testing receiver mode of EUT (Media Chair 8001), the receiver part of the media chair system (Media Chair 8003) was employed to generate continuous answer signal.

2. Test Specification

2.1 Instrument list

| Equipment | Type | Manu. | Internal no. | Cal. Date | Due date |
|-------------------------|----------------------|-------------------|--------------|-----------|-----------|
| Test Receiver | ESIB 26 | R&S | EC 3045 | 2009-6-1 | 2010-5-31 |
| Semi-anechoic chamber | - | Albatross project | EC 3048 | 2009-6-1 | 2010-5-31 |
| A.M.N. | ESH2-Z5 | R&S | EC 3119 | 2009-1-23 | 2010-1-22 |
| Test Receiver | ESCS 30 | R&S | EC 2107 | 2009-1-23 | 2010-1-22 |
| Ultra-broadband antenna | CBL 6112D | TESEQ | EC 4206 | 2009-5-30 | 2010-6-1 |
| Horn antenna | HF 906 | R&S | EC 3049 | 2009-6-30 | 2010-6-29 |
| Pre-amplifier | Pre-amp 18 | R&S | EC 3222 | 2009-6-30 | 2010-6-29 |
| Pre-amplifier | Pre-amp 40 | Beijing Radio 2 | - | 2009-3-4 | 2010-3-3 |
| Horn antenna | K638A | Beijing Radio 2 | - | 2009-3-4 | 2010-3-3 |
| Power meter | PM2002 | AR | EC3043-7 | 2009-1-23 | 2010-1-22 |
| Power sensor | PH2000 | AR | EC3043-8 | 2009-1-23 | 2010-1-22 |
| Signal generator | SMR 20 | R&S | EC 3044-1 | 2008-8-21 | 2009-8-20 |
| Spectrum Analyzer | E7402A | Agilent | EC2254 | 2008-9-17 | 2009-9-16 |
| High-Pass Filter | WHKX2.8/1 8G-12SS | Wainwright | SN1 | 2009-3-3 | 2010-3-3 |
| High-Pass Filter | WHKX7.0/1 8G-8SS | Wainwright | SN16 | 2009-3-3 | 2010-3-3 |
| Lowpass Filter | WLKS4500- 9SS | Wainwright | SN2 | 2009-3-3 | 2010-3-3 |

2.2 Test Standard

47CFR Part 15 (2007)
ANSI C63.4: 2003
RSS-210 Issue 7 (June 2007)
RSS-Gen Issue 2 (June 2007)

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 |
|---|-------------------|---------------------------------|--------|
| Minimum 6dB Bandwidth | 15.247(a)(2) | RSS-210 Issue 7 Annex 8 | Pass |
| Maximum peak output power | 15.247(b)(1) | RSS-210 Issue 7 Annex 8 | Pass |
| Power spectrum density | 15.247(e) | RSS-210 Issue 7 Annex 8 | Pass |
| Radiated emission | 15.205 & 15.209 | RSS-210 Issue 7 Clause 2 | Pass |
| Emission outside the frequency band | 15.247(d) | RSS-210 Issue 7 Annex 8 | Pass |
| Power line conducted emission | 15.207 | RSS-Gen Issue 2 Clause 7.2.2 | Pass |
| Channel number of hopping system | 15.247(a)(1)(iii) | RSS-210 Issue 7 Annex 8 | NA |
| Average time of occupancy in any channel | 15.247(a)(1)(iii) | RSS-210 Issue 7 Annex 8 | NA |
| Occupied bandwidth | - | RSS-Gen Issue 2 Clause 4.6.1 | Tested |
| Spurious emission for receiver | - | RSS-210 Issue 7 Clause 2.3 | Pass |

2.4 Data rate VS power

The data rate of EUT is fixed and cannot be adjusted.

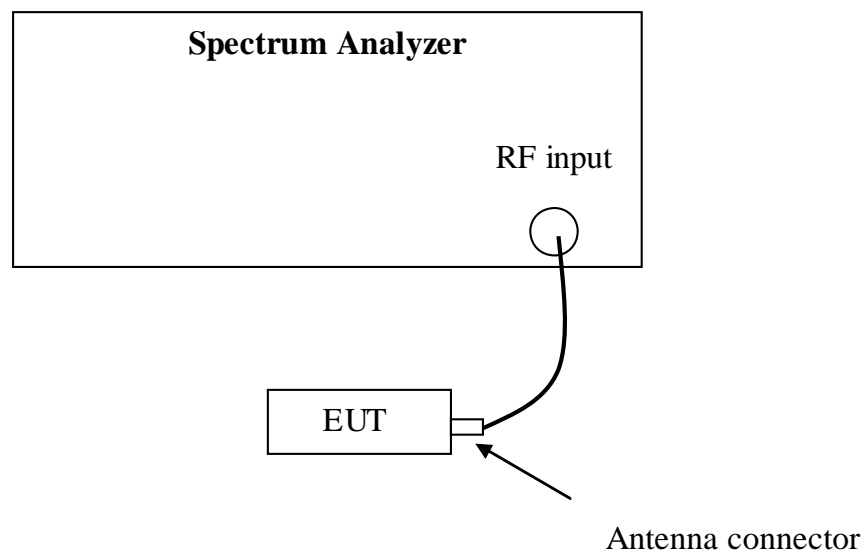
3. Minimum 6dB Bandwidth

Test result: PASS

3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Test Configuration



3.3 Test Procedure and test setup

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel).

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.4 Test Protocol

Temperature : 22°C
Relative Humidity : 43%

| Mode | CH | Antenna 1 (MHz) | Antenna 2 (MHz) | Limit (MHz) |
|------|----|--------------------|--------------------|----------------|
| - | L | 9.78 | 9.78 | ≥ 0.5 |
| | M | 9.78 | 9.78 | ≥ 0.5 |
| | H | 9.74 | 9.78 | ≥ 0.5 |

3.5 Measurement uncertainty

The measurement uncertainty is $\pm 100\text{Hz}$.

4. Maximum peak output power

Test result: Pass

4.1 Test limit

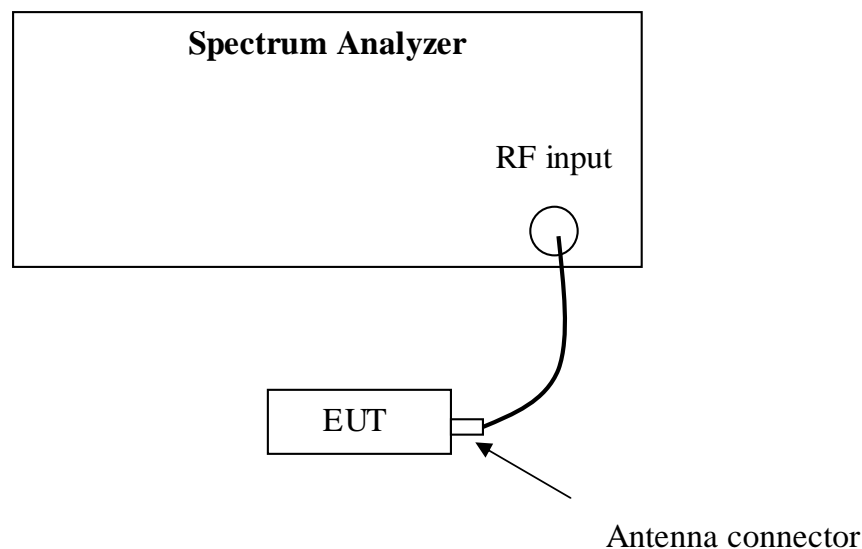
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

4.2 Test Configuration



4.3 Test procedure and test setup

The power output per FCC § 15.247(b)(1) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth set at 3MHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

4.4 Test protocol

Temperature : 22 °C
 Relative Humidity : 43 %

| Mode | CH | Antenna 1 (dBm) | Antenna 2 (dBm) | Limit (dBm) |
|------|----|--------------------|--------------------|----------------|
| - | L | 21.84 | 22.90 | ≤30 |
| | M | 21.48 | 22.44 | ≤30 |
| | H | 21.00 | 22.08 | ≤30 |

For the gain of antenna = 1.8dBi, the maximum e.i.r.p = 22.90dBm + 1.80dBi = 24.70dBm = 0.30W (lower than the e.i.r.p limit of 4W showed in RSS-210.).

4.5 Measurement uncertainty

The measurement uncertainty is ±1dB.

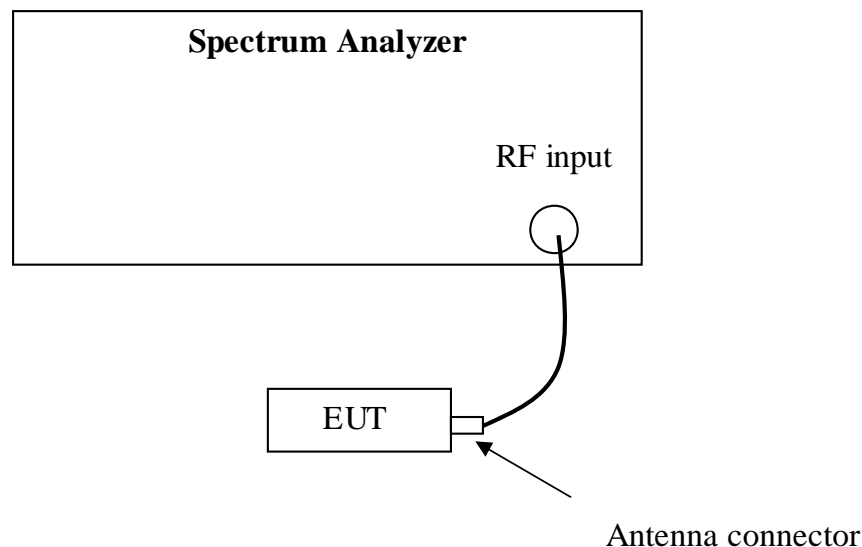
5. Power spectrum density

Test result: Pass

5.1 Test limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Configuration



5.3 Test procedure and test setup

The power output per FCC §15.247(e) was measured using the Spectrum Analyzer with the resolutions bandwidth set at 3kHz, the video bandwidth set at 10kHz. The test was performed at 3 channels (lowest, middle and highest channel).

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

5.4 Test Protocol

Temperature : 22 °C
Relative Humidity : 43 %

| Mode | CH | Antenna 1 (dBm/3kHz) | Antenna 2 (dBm/3kHz) | Limit (dBm/3kHz) |
|------|----|-------------------------|-------------------------|---------------------|
| - | L | 2.80 | 3.26 | ≤8 |
| | M | 2.41 | 3.04 | ≤8 |
| | H | 2.03 | 2.31 | ≤8 |

5.5 Measurement uncertainty

The measurement uncertainty is $\pm 1\text{dB}/3\text{kHz}$.

6. Radiated emission

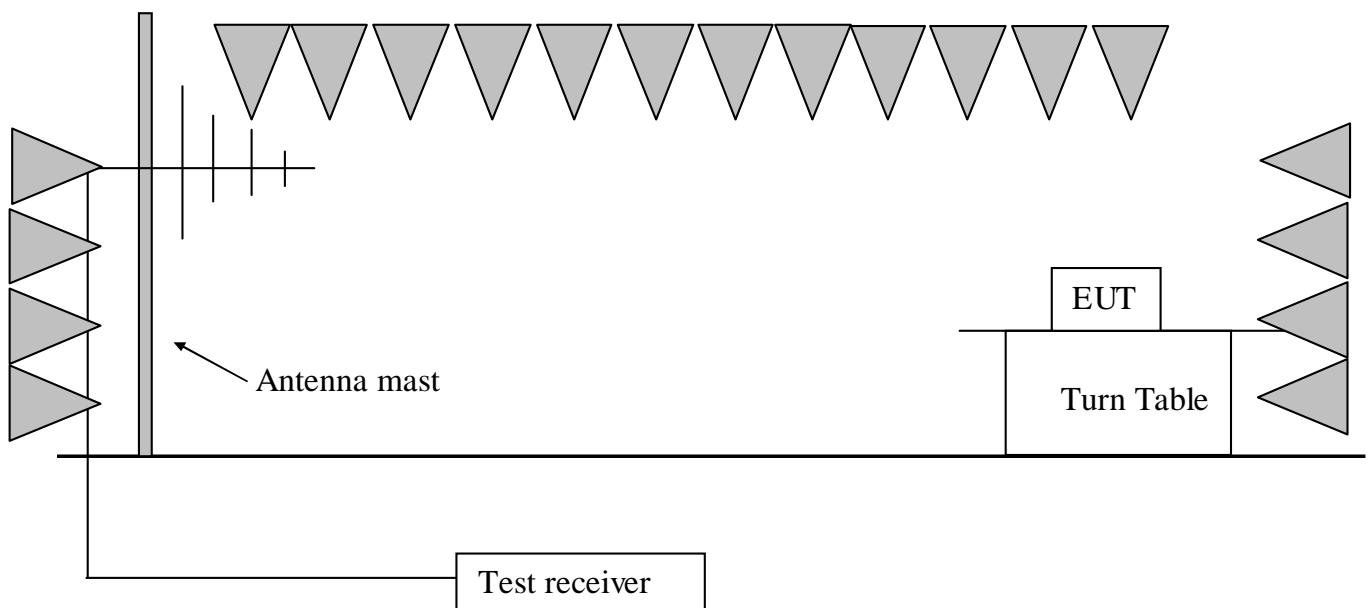
Test result: PASS

6.1 Test limit

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:

| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (m) |
|--------------------|----------------------------|-----------------------------|
| 30 - 88 | 40.0 | 3 |
| 88 - 216 | 43.5 | 3 |
| 216 - 960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

6.2 Test Configuration



6.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be 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.

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

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

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

RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

6.4 Test protocol

Antenna 1

| CH | Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L | V | 2412.35 | 30.70 | 114.10 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4824.97 | -0.90 | 51.20 | Spurious | / | PK |
| | V | 2390.00 | 30.70 | 69.50 | 74.00 | 4.50 | PK |
| | V | 2390.00 | 30.70 | 47.60 | 54.00 | 6.40 | AV |
| | V | 2483.50 | 30.70 | 60.20 | 74.00 | 13.80 | PK |
| | V | 2483.50 | 30.70 | 39.20 | 54.00 | 14.80 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |
| M | V | 2439.18 | 30.70 | 113.60 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4878.12 | -0.90 | 50.80 | Spurious | / | PK |
| | V | 2390.00 | 30.70 | 60.10 | 74.00 | 13.90 | PK |
| | V | 2390.00 | 30.70 | 41.30 | 54.00 | 12.70 | AV |
| | V | 2483.50 | 30.70 | 59.80 | 74.00 | 14.20 | PK |
| | V | 2483.50 | 30.70 | 38.70 | 54.00 | 15.30 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |
| H | V | 2463.08 | 30.70 | 113.10 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4927.32 | -0.90 | 51.90 | Spurious | / | PK |
| | V | 2390.00 | 30.70 | 60.50 | 74.00 | 13.50 | PK |
| | V | 2390.00 | 30.70 | 40.20 | 54.00 | 13.80 | AV |
| | V | 2483.50 | 30.70 | 61.20 | 74.00 | 12.80 | PK |
| | V | 2483.50 | 30.70 | 40.80 | 54.00 | 13.20 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |

Antenna 2

| CH | Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L | V | 2412.62 | 30.70 | 114.90 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4824.08 | -0.90 | 52.70 | Harmonics | / | PK |
| | V | 2390.00 | 30.70 | 70.80 | 74.00 | 3.20 | PK |
| | V | 2390.00 | 30.70 | 48.90 | 54.00 | 5.10 | AV |
| | V | 2483.50 | 30.70 | 60.80 | 74.00 | 13.20 | PK |
| | V | 2483.50 | 30.70 | 39.10 | 54.00 | 14.90 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |
| M | V | 2438.07 | 30.70 | 114.10 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4877.96 | -0.90 | 51.30 | Harmonics | / | PK |
| | V | 2390.00 | 30.70 | 60.20 | 74.00 | 13.80 | PK |
| | V | 2390.00 | 30.70 | 40.80 | 54.00 | 13.20 | AV |
| | V | 2483.50 | 30.70 | 60.60 | 74.00 | 13.40 | PK |
| | V | 2483.50 | 30.70 | 39.20 | 54.00 | 14.80 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |
| H | V | 2464.52 | 30.70 | 114.50 | Fundamental | / | PK |
| | H | 836.71 | 25.20 | 41.30 | Spurious | / | PK |
| | H | 861.98 | 25.80 | 41.70 | Spurious | / | PK |
| | V | 4929.43 | -0.90 | 51.50 | Harmonics | / | PK |
| | V | 2390.00 | 30.70 | 60.20 | 74.00 | 13.80 | PK |
| | V | 2390.00 | 30.70 | 40.00 | 54.00 | 14.00 | AV |
| | V | 2483.50 | 30.70 | 61.90 | 74.00 | 12.10 | PK |
| | V | 2483.50 | 30.70 | 41.00 | 54.00 | 13.00 | AV |
| | V | 4000.00 | 1.80 | 50.60 | 54.00 | 3.40 | PK |

Remark: 1. For fundamental & restrict emission at 2300-2390MHz and 2483.5-2500MHz test, no amplifier is employed.

2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)

3. Corrected Reading = Original Receiver Reading + Correct Factor

4. Margin = limit – Corrected Reading

5. If the PK reading is lower 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 = 10dBuV.

Then Correct Factor = $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$; Corrected Reading = $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$

Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = $54 - 10.20 = 43.80\text{dBuV/m}$

6.5 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of radiated emission is: $\pm 5.31\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

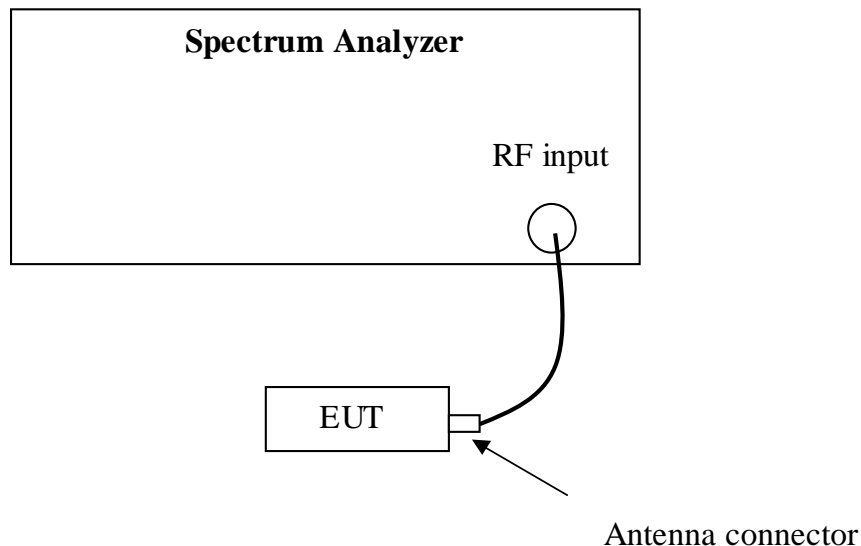
7. Emission outside the frequency Band

Test result: PASS

7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

7.2 Test Configuration



7.3 Test procedure and test setup

The Emission outside the frequency Band per FCC §15.247(d) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.



7.4 Test protocol

Please refer to the test data. All the emission outside the frequency band is at least 20 dB below that in the 100 kHz bandwidth within the band.

7.5 Measurement uncertainty

The measurement uncertainty is ± 1 dB.

8. Power line conducted emission

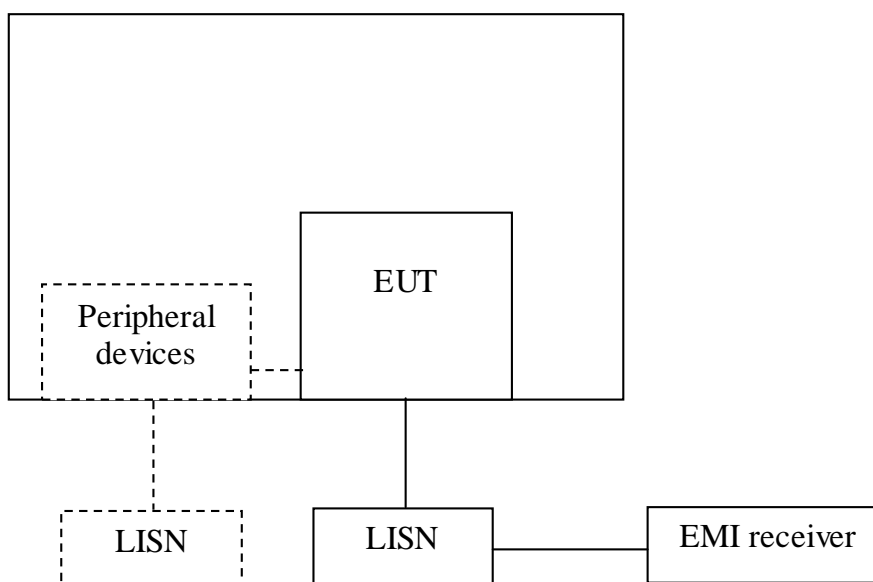
Test result: **Pass**

8.1 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.

8.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.



8.3 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.

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

8.4 Test protocol

Power line: L

| Frequency | Correct Factor (dB) | Corrected Reading (dBuV) | | Limit (dBuV) | | Margin (dB) | |
|--|------------------------|-----------------------------|-------|-----------------|-------|----------------|-------|
| | | QP | AV | QP | AV | QP | AV |
| 0.15 | 3.00 | 36.35 | 11.22 | 66.00 | 56.00 | 29.65 | 44.78 |
| 0.17 | 3.00 | 48.06 | 32.47 | 64.94 | 54.94 | 16.88 | 22.47 |
| 0.22 | 3.00 | 41.61 | 29.23 | 62.75 | 52.75 | 21.14 | 23.52 |
| 0.44 | 3.00 | 33.88 | 21.46 | 57.11 | 47.11 | 23.23 | 25.65 |
| 0.50 | 3.00 | 35.55 | 22.83 | 56.00 | 46.00 | 20.45 | 23.17 |
| 2.24 | 3.00 | 25.93 | 14.24 | 56.00 | 46.00 | 30.07 | 31.76 |
| Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading. | | | | | | | |

Power line: N

| Frequency | Correct Factor (dB) | Corrected Reading (dBuV) | | Limit (dBuV) | | Margin (dB) | |
|--|------------------------|-----------------------------|-------|-----------------|-------|----------------|-------|
| | | QP | AV | QP | AV | QP | AV |
| 0.15 | 3.00 | 32.78 | 10.37 | 66.00 | 56.00 | 33.22 | 45.62 |
| 0.17 | 3.00 | 47.03 | 29.99 | 64.94 | 54.94 | 17.91 | 24.95 |
| 0.22 | 3.00 | 40.45 | 27.79 | 62.75 | 52.75 | 22.30 | 24.96 |
| 0.44 | 3.00 | 32.91 | 19.85 | 57.11 | 47.11 | 24.20 | 27.26 |
| 0.50 | 3.00 | 35.01 | 21.65 | 56.00 | 46.00 | 20.99 | 24.35 |
| 2.24 | 3.00 | 23.52 | 8.75 | 56.00 | 46.00 | 32.48 | 37.25 |
| Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading. | | | | | | | |

8.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty at mains terminal: $\pm 1.99\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

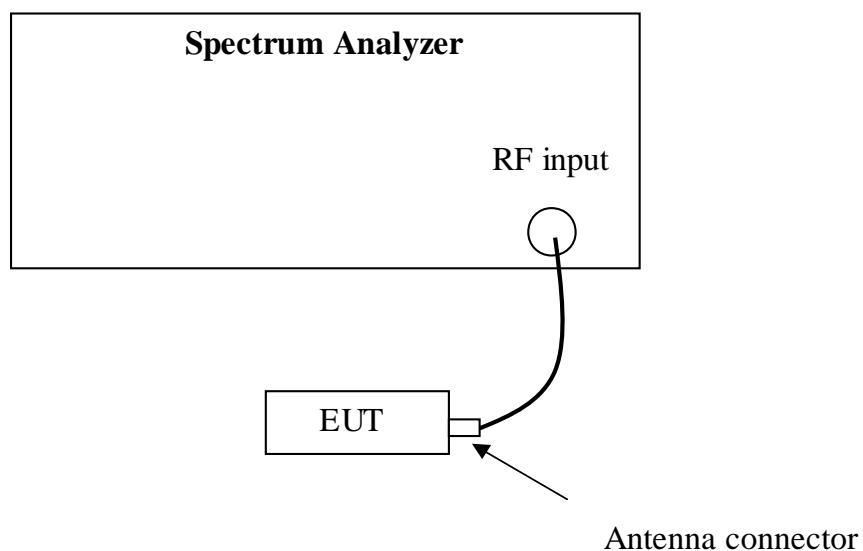
9. Channel Number of hopping system

Test result: NA

9.1 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

9.2 Test Configuration



9.3 Test procedure and test setup

The channel number per FCC §15.247(a)(1)(iii) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.

The RF passband of the EUT was divided into 3 appropriate bands to test.

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.



9.4 Test protocol

| Channel Number | Limit |
|----------------|-----------|
| - | ≥ 15 |

9.5 Measurement uncertainty

The measurement uncertainty is ± 1 dB.

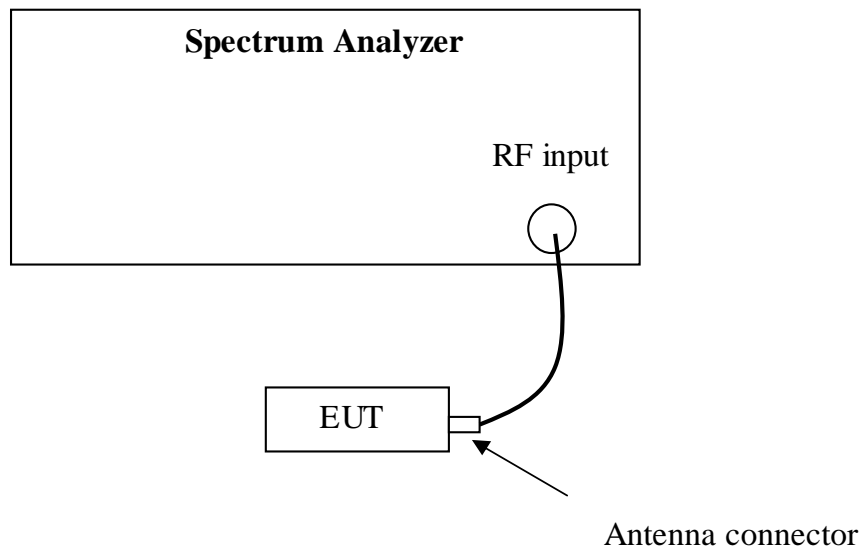
10. Average time of occupancy in any channel

Test result: NA

10.1 Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

10.2 Test Configuration



10.3 Test procedure and test setup

Average time of occupancy in any channel per FCC § 15.247(a)(1)(iii)

is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN set to be 0Hz to test in time domain. The test is performed at the middle channel.

10.4 Test protocol

| Packet | Observed period (s) P | Time of occupancy for single hopping (ms) O | Hops among the interval of 3.6 s I | Average time of occupancy (s) T | Limit (s) |
|----------------|---------------------------------|---|--|---|-----------|
| Packet Type 4 | - | - | - | - | ≤0.4 |
| Packet Type 11 | - | - | - | - | ≤0.4 |
| Packet Type 15 | - | - | - | - | ≤0.4 |

Remark: 1. There are 79 channels in all. So the observed period $P = 0.4 * 79 = 31.6$ s.

2. Average time of occupancy $T = O * I * P / 3.6$

10.5 Measurement uncertainty

The measurement uncertainty is $\pm 10\mu\text{s}$.

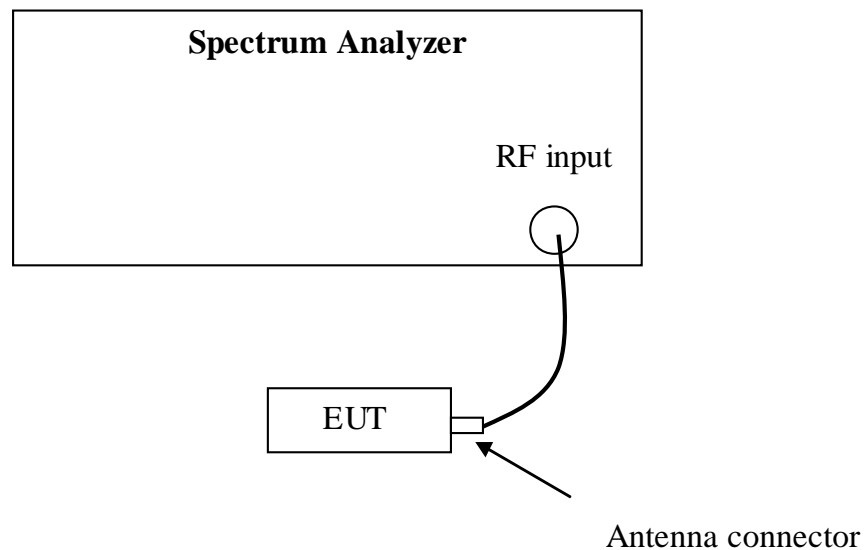
11. Occupied Bandwidth

Test Status: Tested

11.1 Test limit

None

11.2 Test Configuration



11.3 Test procedure and test setup

The occupied bandwidth per RSS-Gen Issue 2 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth set at 3MHz.

11.4 Test protocol

Temperature : 22 °C
Relative Humidity : 43 %

| Mode | Antenna | Occupied Bandwidth (MHz) | Max. Value (MHz) |
|------|---------|--------------------------|------------------|
| - | 1 | 16.41 | 16.41 |
| | 2 | 16.27 | |

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

11.5 Measurement uncertainty

The measurement uncertainty is $\pm 100\text{Hz}$.

12. Spurious emission for receiver

Test result: **PASS**

12.1 Test limit

The spurious emission shall test through 3 times tuneable or local oscillator frequency whichever is the higher, without exceeding 40 GHz.

1) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2nW per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5nW above 1 GHz.

2) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table below:

| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (m) |
|--------------------|----------------------------|-----------------------------|
| 30 - 88 | 40.0 | 3 |
| 88 - 216 | 43.5 | 3 |
| 216 - 960 | 46.0 | 3 |
| Above 960 | 54.0 | 3 |

12.2 Test Configuration

Please refer to clause 6.2

12.3 Test procedure and test setup

Please refer to clause 6.3.

12.4 Test protocol

Antenna 1

| Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| H | 210.78 | 10.60 | 34.90 | 43.50 | 8.60 | PK |
| H | 762.85 | 24.10 | 37.90 | 46.00 | 8.10 | PK |
| H | 836.71 | 25.20 | 40.00 | 46.00 | 6.00 | PK |
| H | 861.98 | 25.80 | 40.80 | 46.00 | 5.20 | PK |
| H | 885.31 | 26.20 | 39.50 | 46.00 | 6.50 | PK |
| V | 107.76 | 11.10 | 35.30 | 43.50 | 8.20 | PK |

Antenna 2

| Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| H | 210.78 | 10.60 | 35.50 | 43.50 | 8.00 | PK |
| H | 762.85 | 24.10 | 37.50 | 46.00 | 8.50 | PK |
| H | 836.71 | 25.20 | 41.10 | 46.00 | 4.90 | PK |
| H | 861.98 | 25.80 | 40.90 | 46.00 | 5.10 | PK |
| H | 885.31 | 26.20 | 40.10 | 46.00 | 5.90 | PK |
| V | 187.45 | 9.70 | 33.20 | 43.50 | 10.30 | PK |

12.5 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of radiated emission is: $\pm 5.31\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.