
Electromagnetic Emission

FCC MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE

FCC Part 15 Certification Measurement

PRODUCT : Digital Set-top Box

MODEL/TYPE NO : PANSAT 250SM

FCC ID : SVM-PANSAT250SM

APPLICANT / ADDRESS : Global Technologies Inc.
340-9, Yangpyeong-ri, Moga-myeon, Icheon-si, Gyeonggi-do
467-873 South Korea
Attn : Heo, Jin-Sik / Manager

MANUFACTURER 1 : Global Technologies Inc.
340-9, Yangpyeong-ri, Moga-myeon, Icheon-si, Gyeonggi-do
467-873 South Korea

MANUFACTURER 2 : Hyundai Digital Technology(Shenzhen) Co., Ltd.
HDTCN, Ind. Park, Potouxia Village Kukeng, Guanlan Town,
Bao'an District, Shenzhen City, China, PRC

FCC CLASSIFICATION : HID : TV interface device

FCC RULE PART(S) : FCC Part 15 Subpart B

FCC PROCEDURE : Certification

TRADE NAME : GLOBALTEQ, PANSAT

TEST REPORT No. : ETLE061227.596

DATES OF TEST : December 27, 2006 to January 17, 2007


REPORT ISSUE DATE : January 19, 2007

TEST LABORATORY : ETL Inc. (FCC Registration Number : 95422)

This Digital Set-top Box, Model PANSAT 250SM has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 at the ETL EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart B: TV interface device.

I attest to the accuracy of data. All measurement here in was performed by me or was made under my supervision and is correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results of testing in this report apply to the product/system, which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.



Chon Sik, Kim / Chief Engineer

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Table of Contents

FCC Measurement Report

- 1. Introduction**
- 2. Product Information**
- 3. Description of Tests**
- 4. Test Condition**
- 5. Test Results**
 - 5.1 Summary of Test Results**
 - 5.2 Conducted Emission Test**
 - 5.3 Radiated Emission Test**
 - 5.4 Antenna Power Conduction Measurement**
 - 5.5 Output Signal Level Measurement**
 - 5.6 Output Terminal Conducted Spurious Emission Measurement**
 - 5.7 Transfer Switch Measurement**
- 6. Sample Calculation**
- 7. List of test Equipment used for Measurements**

Appendix A. FCC ID Label and Location

Appendix B. Test Setup Photographs

Appendix C. External Photographs

Appendix D. Internal Photographs

Appendix E. Block Diagram

Appendix F. Manual

FCC MEASUREMENT REPORT

Scope – Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)

General Information

| |
|---|
| Applicant Name : Global Technologies Inc. |
| Address : 340-9, Yangpyeong-ri, Moga-myeon, Icheon-si Gyeonggi-do, 467-873 Korea. |
| Attention : Heo, Jin-Sik / Manager |

- **EUT Type** : Digital Set-top Box
- **Model Number** : PANSAT 250SM
- **FCC Identifier** : SVM-PANSAT250SM
- **S/N** : N/A
- **FCC Rule Part(s)** : Part 15 Subpart B
- **Test Procedure** : ANSI C63.4-2003
- **FCC Classification** : TV Interface Device
- **RF Channels** : Ch. 3 / Ch. 4
- **Dates of Tests** : December 27, 2006 to January 17, 2007
- **Place of Tests** : ETL Inc. Testing Lab. (FCC Registration Number : 95422)

Radiated Emission test;
#584, Sangwhal-ri, Ganam-myeon, Yaju-gun,
Gyeonggi-do, 469-885, Korea

Conducted Emission test;
ETL Inc. Testing Lab. (FCC Registration Number : 95422)
371-51, Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea
- **Test Report No.** : ETLE061227.596

1. INTRODUCTION

The measurement test for radiated and conducted emission test were conducted at the ETL Inc. The site is constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The ETL has site descriptions on file with the FCC for 3 m and 10 m site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (Registration Number : 95422).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions from the Global Technologies Inc.
/ Digital Set-top Box / Model : PANSAT 250SM

2. PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test(EUT) is the Global Technologies Inc./ Digital Set-top Box /
Model : PANSAT 250SM

2.2 General Specification

Embedded Smart Card Slot **1 Smart Card Reader**
USB 2.0 with On-The-Go **1 Host**

Front-End

| | |
|-----------------------|-------------------------------|
| 1 Input Connector | F-type, IEC 169-24 |
| IF Input Frequency | 950 MHz to 2 150 MHz |
| IF Loop Throughout | 950 MHz to 2 150 MHz |
| IF Frequency | Zero-IF |
| Input Level | -65 dBm ~ -25 dBm |
| LNB Power | 13 / 18 Vdc / 500 mA Max. |
| DiSEQqC Control | Diseqc 1,2 & USALS Compatible |
| Band Switch | 22 kHz Tone |
| Demodulation | QPSK |
| Symbol Rate | 1~45 Msps(SCPC, MCPC) |
| Viterbi Decoding Rate | 1/2, 2/3, 3/4, 5/6 and 7/8 |
| Reed Solomon Decoding | FEC: 204, 188. t=8 |

MPEG transport Stream A/V Decoding

| | |
|--------------------------|--|
| Demultiplex | According to ISO/IEC 13818-1 |
| Input syream | Max. 90 Mbit/s |
| Aspect Ratio | 4:3, 16:9 |
| Video Resolution | 720 x 576 (PAL), 720 X 480 (NTSC) |
| Audio Decoding | MPEG Layer I & II |
| Audio Mode | Single Channel /Dual Channel, Stereo, Joint Stereo |
| Audio Sampling Frequency | 16/22, 05/24/32/41, 1/48 KHz |

Microprocessor & Memories

| | |
|----------------|----------|
| Main Processor | VIRGO SE |
| CPU Clock | 150 MHz |
| Flash Memory | 8 Mbyte |
| SDRAM | 32 Mbyte |
| EEPROM | 32 kbit |

Data port

| | |
|-----------|--------------------|
| Connector | 9 Pin D-Sub Type |
| Protocol | RS232 Asynchronous |
| Data Rate | Max. 19,2 kbps |

RF Modulator

| | |
|----------------|----------------------------------|
| Connector | IEC 169-24, Male/ Female |
| Frequency | CH3 (61,25 MHz), CH4 (67,25 MHz) |
| Output Channel | CH 3-4 |
| TV Standard | NTSC |
| Preset Channel | Ch3-4, Changeable by Menu Screen |

Front Panel

| | |
|---------------------------------------|--|
| 4 Digits LED | Channel Number Display |
| 8 keys | Volume Up/Down, Channel Down/Up, OK, Power, Menu, Exit |
| Smart Card Interface | 1 Slot |
| USB Memory Card Slot (Max. 500 mA) | 1 Host |

Rear Panel

| | |
|----------------------|--------------------------------|
| IF Input | F-type Connector |
| IF Loophrough output | F-type Connector |
| 6 Phone (Cinch) | Video, Audio L, Audio R, YPbPr |
| S/PDIF Optical | |
| S-VHS | |
| UHF | |
| Modulator | |
| RS232 Serial port | 9 Pin D-Sub Type |

Remote Control

| | |
|---------|------------------|
| Type | IR Remote |
| Battery | 2x1,5 V AAA type |

Electrical and Mechanical

| | |
|-------------------|----------------------|
| Input Voltage | AC 90 V-240 V, 60 Hz |
| Power Consumption | Max. 25 Watts |
| Standby Power | Less than 11 Watts |
| Size(WxHxD) | (290x200x55) mm |
| Weight | 2,1 kg |

3. DESCRIPTION OF TESTS

3.1 AC Powerline Conducted Emissions Test

Conducted emissions measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2003. The measurements were performed over the frequency range of 0,15 MHz to 30 MHz using a 50 Ω / 50uH LISN as the input transducer to a Spectrum Analyzer or a Test Receiver. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 9 kHz or for "quasi-peak" within a bandwidth of 9 kHz.

The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1 m x 1,5 m x 0,8 m wooden table which is placed 40 cm away from the vertical wall and 1,5 m away from the side wall of the chamber room. Two LISN are bonded to the shielded room. The EUT is powered from the LISN and the support equipment is powered from the another LISN. Power to the LISNs is filtered by a noise cut power line filters. All electrical Satellite Receivers are shielded by braided tinned steel tubing with inner ϕ 1,2 cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the LISN. All interconnecting Satellite Receivers more than 1m were shortened by non-inductive bundling (serpentine fashion) to a 1 m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the Spectrum Analyzer and Test Receiver to determine the frequency producing the max. emission from the EUT. The frequency producing the max. level was reexamined using the detector function set to the CISPR Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0,15 MHz to 30 MHz. The bandwidth of the Test Receiver was set to 9 kHz. The EUT, support equipment, and interconnecting Satellite Receivers were arranged and manipulated to maximize each emission. Each emission was maximized by switching power lines, varying the mode of operation or resolution, clock or data exchange speed, if applicable Satellite Receiver, whichever determined the worst-case emission. Each emission reported was calibrated using self-calibrating mode.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup in Appendix B.

3. DESCRIPTION OF TESTS

3.2 Radiated Emissions Test

Preliminary measurements were made at indoors 3 m semi EMC Compact Chamber using broadband antennas, broadband amplifier and spectrum analyzer to determine the emission frequencies producing the maximum EME.

Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 MHz to 1 000 MHz using biconilog antenna and above 1 000 MHz, linearly polarized double ridge horn antennas were used. Above 1 GHz, linearly polarized double ridge horn antennas were used. The measurements were performed with three frequencies which were selected as bottom, middle and top frequency in the operating band. Emission level from the EUT with various configurations were examined on the spectrum analyzer connected with the RF amplifier and plotted graphically.

Final measurements were made outdoors open site at 3 m test range using biconilog antenna. The output from the antenna was connected, via a preselector or a preamplifier, to the input of the EMI Measuring Receiver or Spectrum analyzer(for above 1 GHz). The detector function was set to the quasi-peak or peak mode as appropriate. The measurement bandwidth on the Field strength receiver was set to at least 120 kHz (1 MHz for measurement above 1 GHz), with all post-detector filtering no less than 10 times the measurement bandwidth. Sufficient time for the EUT, support equipment and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during preliminary measurement was examined and investigated as the same set up and configuration which produced the maximum emission The EUT, support equipment and interconnecting Satellite Receivers were configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0,8 m high non-metallic 1 m x 1,5 m table. The turntable containing the system was rotated and the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.

Each emission was maximized by varying the mode of operating frequencies of the EUT. The worst case emissions are recorded in the data tables. If necessary, the radiated emission measurement could be performed at a closer distance to ensure higher accuracy and the results were extrapolated to the specified distance using an inverse linear distance extrapolation factor(20 dB/decade) as per section 15.31(f).

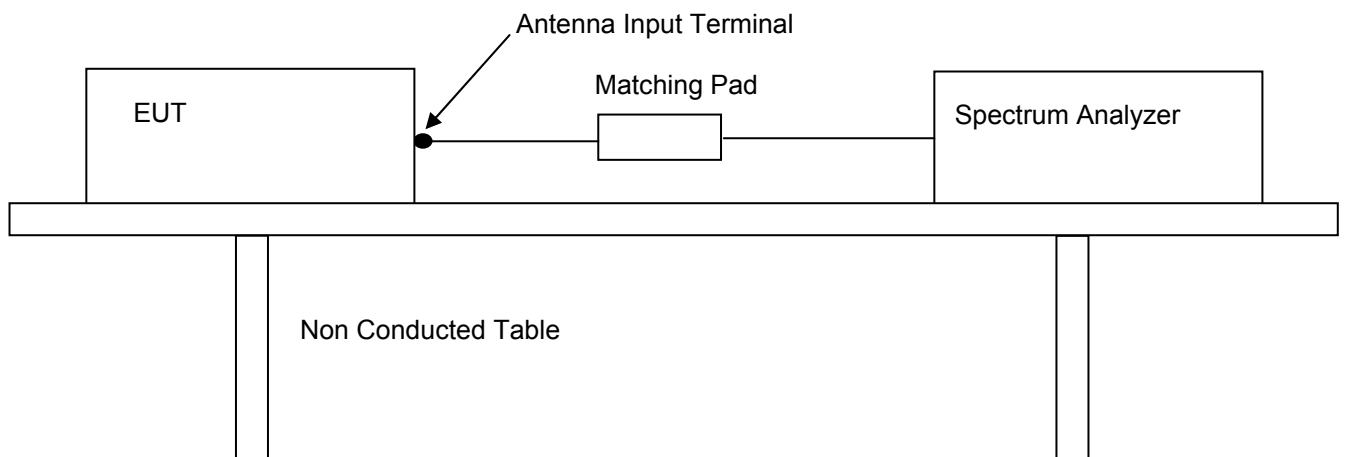
Photographs of the worst-case emission test setup can be seen in Appendix B.

3. DESCRIPTION OF TESTS

3.3 Antenna-Conducted Power Measurements

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna-conducted power measurements is performed with the EUT antenna terminals connected directly to a spectrum analyzer, if the antenna impedance matches the impedance of the measuring instrument. Otherwise, use an impedance-matching network to connect the measuring instrument to the antenna terminals of the EUT. Losses in decibels in any impedance-matching network used is added to the measured value in dB μ V.

With the EUT tuned to one of the frequency over which device operates , measure both the frequency and voltage present at the antenna input terminals over the frequency range specified in the individual equipment requirements. Repeat this measurement with the receiver tuned to another frequency until the number of frequencies specified have been successively measured. Power on the receive antenna terminals is the ratio of V^2/R , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.



3. DESCRIPTION OF TESTS

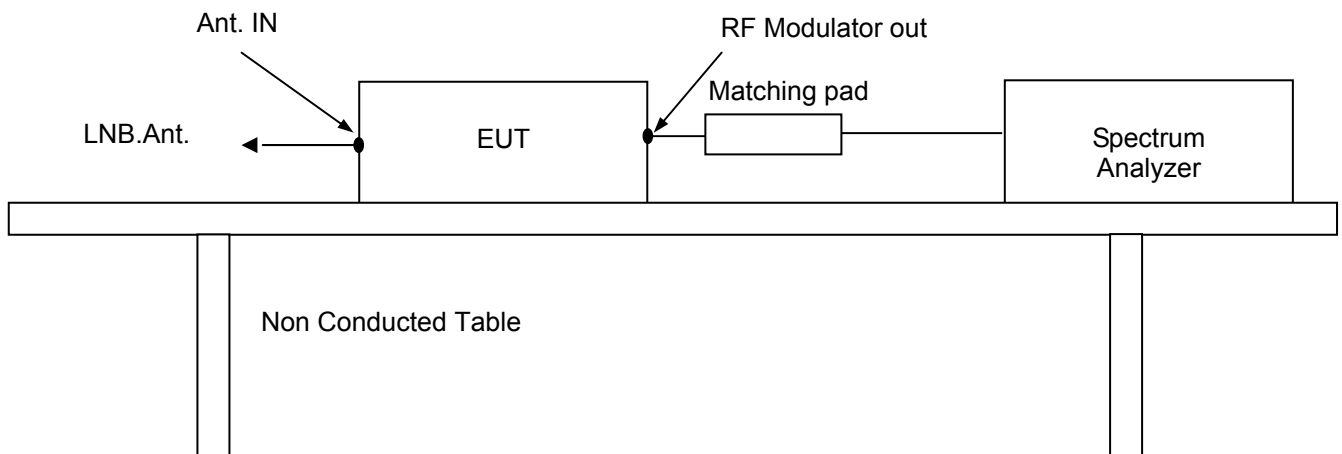
3.4 Output Signal Conducted Level Measurement

The output signal level is the maximum voltage level present at the output terminals of the EUT on a particular frequency during normal use of the device.

The signal level was measured by direct connection to the spectrum analyzer with 50 Ω/75 Ω matching transformer between the spectrum analyzer and the TV interface device. The RF output signal level measured was the highest RF level present at the output terminals during normal use of the device. Measurements were made of the levels of both the visual (61,25 MHz) and audio (65,75 MHz) carrier for each TV channel (3 and 4) on which the device operates. The Satellite Receiver was supported between the EUT and the measuring instrument in a straight horizontal line so it had at least 75cm clearance from any conducting surface.

The EUT is provided with a typical signal consistent with normal operation. For each channel on which the EUT operates and in each mode in which the device operates, the video and audio carrier level is measured and recorded.

The voltage corresponding to the peak envelope power of the video modulated signal during maximum amplitude peaks across a resistance ($R \Omega$) matching the rated output impedance of the device, must not exceed $692,8 R^{1/2} \mu V$ for all other TV interface device. The voltage corresponding to peak envelope power of the audio modulated signal, if provided by the TV interface device, must not exceed $155 R^{1/2} \mu V$ for Satellite Receiver system terminal device of TV interface device used with a master antenna, and $77,5 R^{1/2} \mu V$ for all other TV interface device. Losses in decibels in any impedance-matching network used is added to the measured value in dBμV. The EUT was configured in accordance with ANSI C63.4-2003 Section 12.2 as below configuration block diagram.

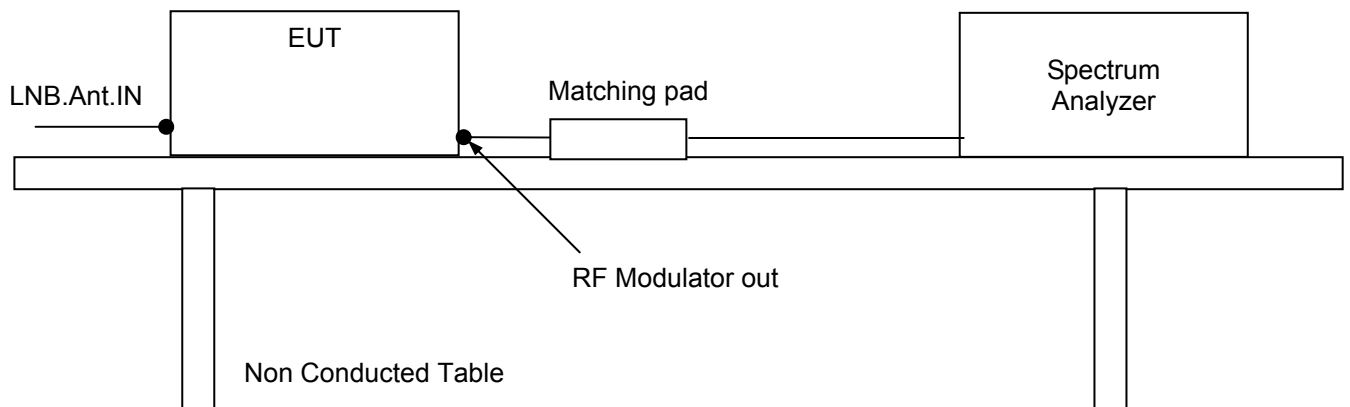


3. DESCRIPTION OF TESTS

3.5 Output Terminal Conducted Spurious Emission Measurement

The RF output signal was fed to the TV receiver via coaxial Satellite Receiver. Measurements were made by direct connection to the spectrum analyzer and TV interface device with 50 Ω /75 Ω matching transformer. The frequency range 30 MHz to 1 000 MHz was investigated for significant emission.

The maximum RMS voltage of any emission appearing on frequencies removed by more than 4,6 MHz below and 7,4 MHz above the video carrier frequency on which the TV interface device is operated must not exceed 692,8 R^{1/2} μ V for Satellite Receiver system terminal device or TV interface device used with a master antenna and 10,95 R^{1/2} μ V for all other TV interface device when terminated with a resistance (R Ω) matching the rated output impedance of the TV interface device. The EUT was configured in accordance with ANSI C63.4-2003 Section 12.2 as below configuration block diagram.



3. DESCRIPTION OF TESTS

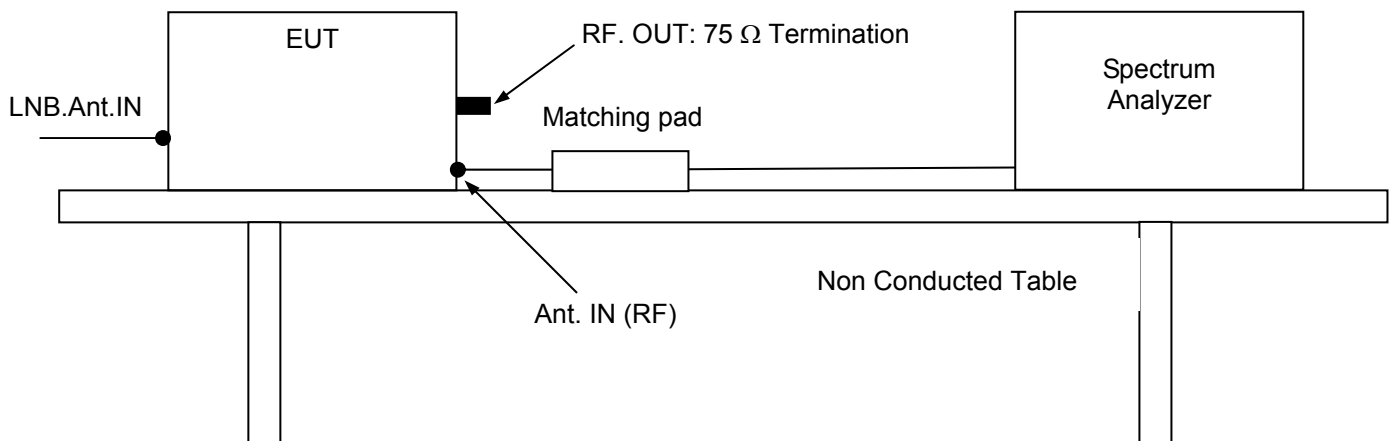
3.6 Antenna Transfer Switch Measurement

Isolation was measured for all positions of an antenna transfer switch on all output channels of the EUT. TV interface device transfer switch isolation is the difference the levels of a signal going into one antenna input port of the switch and that of the same signal coming out of another antenna terminal of transfer switch. The isolation of an antenna transfer switch equipped with coaxial connectors is performed by measuring the maximum voltage of the visual carrier. Measurements were made of the maximum RMS voltage at the antenna input terminals of the switch for all positions of the transfer switch. The maximum voltage corresponds to the peak envelope power of the video signal during maximum amplitude peaks. In either position of the receiver transfer switch, the maximum voltage at the receiving antenna input terminals of the switch when terminated with a resistance ($R \Omega$) matching the rated impedance of the antenna input of the switch, must not exceed $0,346 R^{1/2} \mu V$.

The maximum voltage corresponds to the peak envelope power of the video modulated signal during maximum amplitude.

The EUT was configured in accordance with ANSI C63.4-2003 Section 12.2 as below configuration block diagram. and the EUT configuration can also be seen in Appendix B. Photographs of the test setup.

The unused RF input/output terminals are terminated in a proper impedance. The antenna input terminal is connected to the the input of preamplifier through the matching transformer coaxial Satellite Receiver. And the output of preamplifier is connected to the spectrum analyzer. Then, the signal level on the antenna input terminal is measured under the EUT condition produced the maximum signal level.



4. TEST CONDITION

4.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner which tends to maximize its emission level in a typical application.

4.2 EUT operation

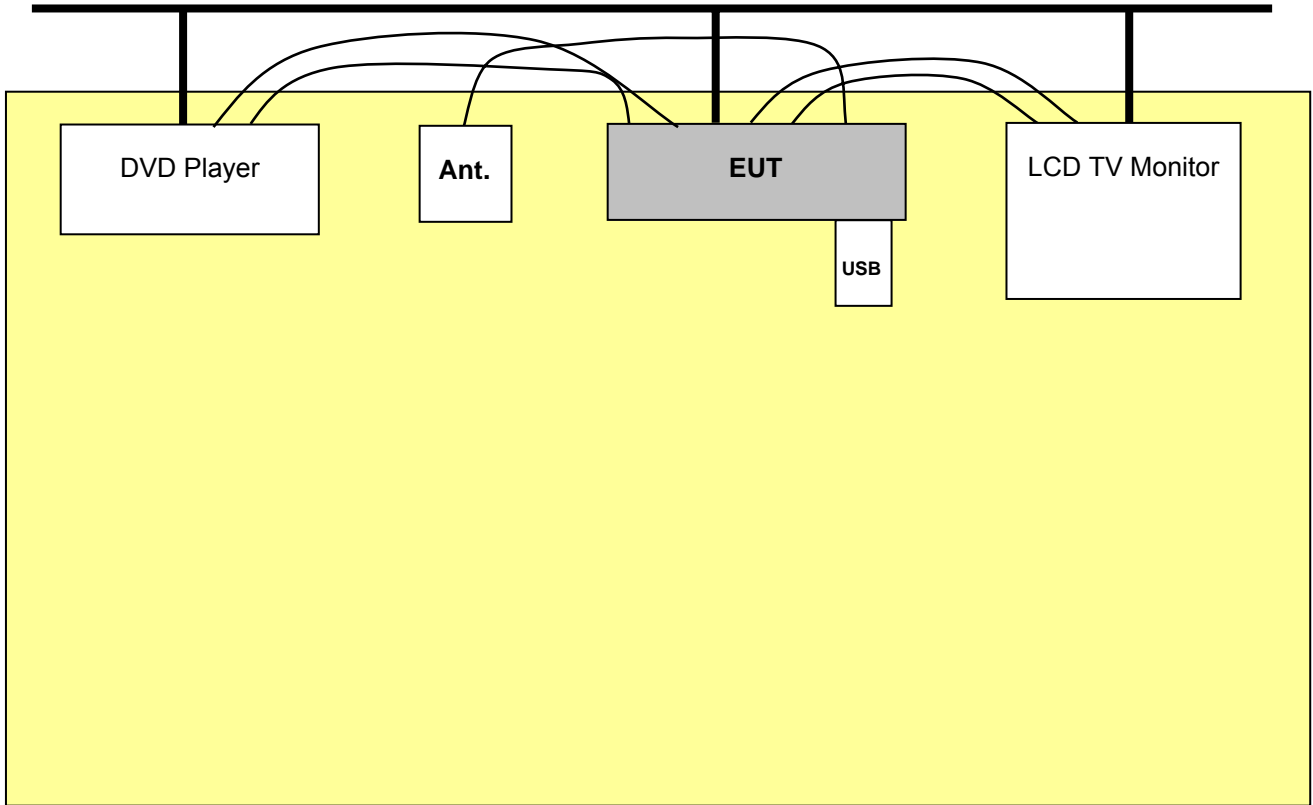
The EUT was set to the normal receiving mode in a TV mode during all the testing in a manner similar to a typical use. For the EUT operation, the satellite live signal was fed to the EUT through the LNB input. During the preliminary testing, the worst case condition of the operating mode was ch.3

4.3 Support Equipment Used

Following peripheral devices and interface Satellite Receivers were connected during the measurement:

| Description | Model Name | Serial No. | Manufacturer | FCC ID |
|-------------|------------|------------|----------------|--------|
| LCD TV | LT23DW000 | 23D060255 | Hyundai IT | - |
| DVD Player | DVR-530S | NONE | Ellion Digital | - |
| | | | | - |
| | | | | - |
| | | | | - |

4.4 The setup drawing(s)



———— : Data Line ———— : Power Line

4.5 Type of Cables Used

| Device from | Device to | Type of Cable | Length(m) | Type of shield |
|----------------|----------------|---------------|-----------|----------------|
| EUT | LCD TV Monitor | R.C.A | 1,5 | Shielded |
| EUT | LCD TV Monitor | Coaxial Cable | 1,0 | Shielded |
| EUT | DVD Player | Component | 1,5 | Shielded |
| EUT | USB Memory | - | - | - |
| EUT | Ant. | Coaxial Cable | 1,0 | Shielded |
| EUT | Power Socket | INLET | 1,5 | Unshielded |
| LCD TV Monitor | Power socket | INLET | 1,5 | Unshielded |

5. TEST RESULTS

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

| FCC Rule Parts | Measurement Required | Result |
|------------------|---|-------------------|
| 15.107 | Conducted Emission | Passed by 7,7 dB |
| 15.109 | Radiated Emission | Passed by 3,5 dB |
| 15.111 | Antenna Power Conduction Measurement | Passed by 4,8 dB |
| 15.115(b)(1)(ii) | Output Signal Level Measurement | Passed by 4,0 dB |
| 15.115(b)(2)(ii) | Output Terminal Conducted Spurious Emission Measurement | Passed by 16,0 dB |
| 15.115(c)(1)(ii) | Transfer Switch Measurement | Passed * |

* During this test, no signal detected

The data collected shows that the **Global Technologies Inc / Digital Set-top Box / PANSAT 250SM** complies with Part 15 Subpart B Unintentional radiators and the TV Interface Device section(15.115) of the FCC Rules.

The equipment is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified during testing.

5.2 Conducted Emission Test

| | |
|---------------------|---|
| EUT | Digital Set-top Box / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part 15 Subpart B Section 15.107 |
| Test Date | January 03, 2007 |
| Operating Condition | TV Mode (Channel 4) |
| Result | Passed by 7,7 dB |

Conducted Emission Test Data

The following table shows the highest levels of conducted emissions on both polarizations of hot and neutral line.

Detector mode : CISPR Quasi-Peak mode (6 dB Bandwidth : 9 kHz)

| Frequency [MHz] | Result [dB μ V] | | Phase (*L/**N) | Limit [dB μ V] | | Margin [dB] | |
|-----------------|---------------------|---------|----------------|--------------------|---------|-------------|---------|
| | Quasi-peak | Average | | Quasi-peak | Average | Q.Peak | Average |
| 0,178 | 48,6 | 39,4 | H | 64,5 | 54,5 | 15,9 | 15,1 |
| 0,356 | 39,2 | 33,2 | N | 58,8 | 48,8 | 19,6 | 15,6 |
| 0,774 | 43,9 | 38,3 | N | 56,0 | 46,0 | 12,1 | 7,7 |
| 1,311 | 44,1 | 36,6 | H | 56,0 | 46,0 | 11,9 | 9,4 |
| 1,853 | 44,5 | 36,4 | H | 56,0 | 46,0 | 11,5 | 9,6 |
| 2,333 | 44,2 | 34,4 | H | 56,0 | 46,0 | 11,8 | 11,6 |
| 2,858 | 43,1 | 33,3 | N | 56,0 | 46,0 | 12,9 | 12,7 |
| 1,539 | 46,2 | 34,3 | H | 56,0 | 46,0 | 9,8 | 11,7 |
| 5,857 | 49,9 | 36,0 | H | 60,0 | 50,0 | 10,1 | 14,0 |
| 21,459 | 46,9 | 32,9 | N | 60,0 | 50,0 | 13,1 | 17,1 |

NOTES :

- * H : Live Line , **N :Neutral Line
- Margin value = Result - Limit.
- Channel 4 was the worst case operation mode



Kug Kyoung Yoon
Test Engineer

5.3 Radiated Emission Test

| | |
|---------------------|---|
| EUT | Digital Set-top Box / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part 15 Subpart B Section 15.109 |
| Test Date | December 26, 2006 |
| Operating Condition | TV Mode (Channel 3) |
| Result | Passed by 3,5 dB |

Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Detector mode : CISPR Quasi-Peak mode (6 dB Bandwidth : 120 kHz)

Measurement Distance : 3 meters

| Frequency [MHz] | Reading [dB μ V] | Polarization (*H/**V) | Ant. Factor [dB/m] | Cable Loss [dB] | Result [dB μ V/m] | Limit [dB μ V/m] | Margin [dB] |
|-----------------|----------------------|-----------------------|--------------------|-----------------|-----------------------|----------------------|-------------|
| 60,67 | 18,72 | V | 11,08 | 2,11 | 31,90 | 40,0 | 8,10 |
| 132,94 | 22,74 | V | 12,07 | 3,29 | 38,10 | 43,5 | 5,40 |
| 265,99 | 26,02 | H | 11,39 | 5,09 | 42,50 | 46,0 | 3,50 |
| 589,87 | 9,92 | V | 18,38 | 8,80 | 37,10 | 46,0 | 8,90 |
| 688,86 | 7,95 | H | 19,72 | 9,53 | 37,20 | 46,0 | 8,80 |

NOTES :

1. * H : Horizontal polarization , ** V : Vertical polarization
2. Result = Reading + Antenna factor + Cable loss
3. Margin value = Limit - Result
4. Channel 4 was the worst case operation mode.



Kug Kyoung Yoon
Test Engineer

5.4 Antenna Power Conduction Measurement

| | |
|---------------------|---|
| EUT | Digital Set-top Box / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part 15 Subpart B Section 15.111 |
| Test Date | January 17, 2007 |
| Operating Condition | LNB Tuner |
| Result | Passed by 4,8 dB |

Antenna Power Conduction Test Data

| Tuned Frequency [MHz] | Meter Reading [dB μ V] | Correction Factor [dB] | Result [dB μ V] | Limit [dB μ V] | Margin [dB] |
|-----------------------|----------------------------|------------------------|---------------------|--------------------|-------------|
| 59,70 | 19,4 | 7,5 | 26,9 | 50 | 23,1 |
| 231,82 | 20,8 | 7,6 | 28,4 | 50 | 21,6 |
| 217,65 | 18,8 | 7,6 | 26,4 | 50 | 23,6 |
| 492,50 | 20,3 | 7,8 | 28,1 | 50 | 21,9 |
| 510,00 | 18,9 | 7,8 | 26,7 | 50 | 23,3 |
| 2 519,75 | 29,7 | 9,1 | 38,8 | 50 | 11,2 |
| 3 875,00 | 34,5 | 9,2 | 43,7 | 50 | 6,3 |
| 4 600,00 | 35,4 | 9,8 | 45,2 | 50 | 4,8 |

NOTES :

1. Result = Meter Reading + Correction Factor(Matching Loss + Cable loss)
Margin value = Limit – Result
2. Measurements using the CISPR Quasi-peak mode in the the frequency range 30 to 1 000 MHz and measurements using the CISPR peak mode in the the frequency range above 1 GHz.
3. The limits is 2.0 nanowatts in the frequency range section 15.33(b)(1) of FCC Part 15.



Kug Kyoung Yoon
Test Engineer

5.5 Output Signal Level Measurement

| | |
|---------------------|---|
| EUT | Digital Set-top Box / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part15 Subpart B Section 15.115(b)(1) |
| Test Date | January 08, 2007 |
| Operating Condition | TV Mode (Channel3, 4) |
| Result | Passed by 4,0 dB |

Output Signal Test Data

| Test Channel | Emission Frequency [MHz] | Meter Reading [dB μ V] | Correction Factor [dB] | Signal Level [dB μ V] | Limit [dB μ V] | Margin [dB] |
|--------------|--------------------------|----------------------------|------------------------|---------------------------|--------------------|-------------|
| 3 | 61,25 | 58,0 | 7,5 | 65,5 | 69,5 | 4,0 |
| | 65,75 | 42,0 | 7,5 | 49,5 | 69,5 | 20,0 |
| 4 | 67,25 | 58,0 | 7,5 | 65,5 | 69,5 | 4,0 |
| | 71,75 | 42,3 | 7,5 | 49,8 | 69,5 | 19,7 |

NOTES :

1. The correction factor consist of the insertion loss of the impedance matching transformer and the coaxial Satellite Receiver used for the test.
2. The spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.
3. $Signal\ Level = Meter\ Reading + Correction\ Factor(Matching\ Loss + Cable\ loss)$
 $Margin\ value = Limit - Signal\ Level$



Kug Kyoung Yoon
Test Engineer

5.6 Output Terminal Conducted Spurious Emission Measurement

| | |
|---------------------|--|
| EUT | Digital Set-top Box Receiver / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part15 Subpart B Section 15.115(b)(2) |
| Test Date | Januany 10, 2007 |
| Operating Condition | TV Mode (Channel 3, 4) |
| Result | Passed by 16,0 dB |

Output Terminal Conducted Spurious Test Data

| Test Channel | Emission Frequency [MHz] | Meter Reading [dB μ V] | Correction Factor [dB] | Result [dB μ V] | Limit [dB μ V] | Margin [dB] |
|--------------|--------------------------|----------------------------|------------------------|---------------------|--------------------|-------------|
| 3 | 185,20 | 13,9 | 7,6 | 21,5 | 39,5 | 18,0 |
| | 306,45 | 10,5 | 7,6 | 18,1 | 39,5 | 21,4 |
| | 796,30 | 10,7 | 7,9 | 18,6 | 39,5 | 20,9 |
| 4 | 201,45 | 15,9 | 7,6 | 23,5 | 39,5 | 16,0 |
| | 336,75 | 8,2 | 7,6 | 15,8 | 39,5 | 23,7 |
| | 741,00 | 10,2 | 7,8 | 18,0 | 39,5 | 21,5 |

NOTES :

1. The correction factor consist of the insertion loss of the impedance matching transformer, the coaxial Satellite Receiver used for the test.
2. The spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.
3. Result = Meter Reading + Correction (Matching Loss+ Cable loss)
Margin value = Limit - Signal Level



Kug Kyoung Yoon
Test Engineer

5.7 Antenna Transfer Switch Measurement

| | |
|---------------------|---|
| EUT | Digital Set-top Box / PANSAT 250SM (SN:N/A) |
| Limit apply to | FCC Part15 Subpart B Section 15.115(c)(1) |
| Test Date | January 10, 2007 |
| Operating Condition | TV Mode (Channel 3, 4) |
| Result | Passed |

Antenna Transfer Switch Test Data

| Test Channel | Emission Frequency [MHz] | Meter Reading [dB μ V] | Correction Factor [dB] | Result [dB μ V] | Limit [dB μ V] | Margin [dB] |
|--------------|--------------------------|--------------------------------------|------------------------|---------------------|--------------------|-------------|
| 3 | 61,25 | During this test, no signal detected | | | 9,5 | - |
| 4 | 67,25 | | | | 9,5 | - |

NOTES :

- No emission was observed during the test. The spectrum was checked in each test mode and operation mode. Transfer switch isolation measurements were made on the Channel 3 or 4 video output frequency of 61.25 or 67.25MHz and both positions of the transfer switch were checked for compliance.
- To clarify the emissions emanated from ANT. input terminal on the EUT, RF pre-amplifier was used. The gain of pre-amplifier at each frequency measured from the EUT was obtained after sufficient warm-up for stabilization of gain. The correction factor consist of the insertion loss of the impedance matching transformer, the coaxial Satellite Receiver used for the test and the gain of pre-amplifier.
- Result = Meter Reading + Correction Factor(Matching Loss + Cable loss)
Margin value = Limit - Result
- Spectrum analyzer setting : Frequency Span 1MHz, Resolution bandwidth 100 kHz, Video bandwidth 300 kHz, Detector function Peak mode.



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Test Engineer

6. SAMPLE CALCULATION

Sample Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Satellite Receiver Factor.
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Loss

$$dB(\mu V/m) = 20 \log_{10} (\mu V / m) : \text{Equation 1}$$

$$dB\mu V = dBm + 107 : \text{Equation 2}$$

Example : @265,99 MHz

| | | |
|-----------------------------|---|----------------------|
| Class B Limit | = | 46,00 dBuV/m |
| Reading | = | 26,02 dBuV |
| Antenna Factor + Cable Loss | = | 16,48 dB/m |
| Total | = | 42,50 dBuV/m |
| Margin | = | 46,00 – 42,50 = 3,50 |
| | = | 3,50 dB below Limit |

7. List of Test Equipments used for Measurements

| | Test Equipment | Model | Mfg. | Serial No. | Cal. Due Date |
|-------------------------------------|--------------------|-------------|-------------|------------|---------------|
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESPI3 | R&S | 100478 | 07-10-17 |
| <input checked="" type="checkbox"/> | LOGBICON ANTENNA | VULB9160 | Schwarzbeck | 3082 | 07-08-11 |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESVS 10 | R&S | 835165/001 | 07-04-25 |
| <input checked="" type="checkbox"/> | LISN | 3825/2 | EMCO | 9006-1669 | 07-04-06 |
| <input checked="" type="checkbox"/> | LISN | 3816-2 | EMCO | 1001 | 07-10-17 |
| <input checked="" type="checkbox"/> | SPECTRUM ANALYZER | E7405A | H.P | US41160290 | 07-10-17 |
| <input checked="" type="checkbox"/> | MATCHING PAD (RAM) | 358.5414.02 | R&S | 836964/009 | 07-10-17 |
| <input checked="" type="checkbox"/> | Turn-Table | DETT-03 | Daeil EMC | - | N/A |
| <input checked="" type="checkbox"/> | Antenna Master | DEAM-03 | Daeil EMC | - | N/A |
| <input checked="" type="checkbox"/> | Chamber | DTEC01 | DAETONG | - | N/A |

End of test Report