

Prüfbericht - Nr.: 16800338 002 <i>Test Report No.:</i>			Seite 1 von 20 <i>Page 1 of 20</i>		
Auftraggeber: <i>Client:</i>			Technicolor USA, Inc. 101 West 103 rd Street, Indianapolis, IN 46290, United States		
Gegenstand der Prüfung: Set Top Box <i>Test item:</i>					
Bezeichnung: <i>Identification:</i>		DCI401COM2		Serien-Nr.: <i>Serial No.:</i>	
Wareneingangs-Nr.: <i>Receipt No.:</i>		1143005145		Eingangsdatum: <i>Date of receipt:</i>	
Prüfort: <i>Testing location:</i>		Refer to section 1.1			
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15 Subpart B Section 15.107 FCC Part 15 Subpart B Section 15.109 FCC Part 15 Subpart B Section 15.115			
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test items passed the test specification(s).</i>			
Prüflaboratorium: <i>Testing Laboratory:</i>		Refer to section 1.1			
geprüft/ tested by: kontrolliert/ reviewed by:					
2011-06-27 Yang, Kai/PE				2011-07-01 Sun, Lixun/Reviewer	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges/ Other Aspects:					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(fail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet Abbreviations: P(ass) = passed F(fail) = failed N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>					

TEST SUMMARY

4.1.1 RADIATED EMISSIONS

RESULT: Passed

4.1.2 OUTPUT AND SPURIOUS CONDUCTED LEVEL

RESULT: Passed

4.2.1 CONDUCTED EMISSIONS

RESULT: Passed

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1. Test Sites

1.1 Test Facilities

**Laboratory: The State Radio Monitoring Center Testing (SRTC) (FCC
Registration No.: 910917)**

Address: No.98 BeiLishi Road, Xicheng District, Beijing 100037

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Output and spurious conducted level				
Spectrum Analyzer	Rohde & Schwarz	FSV	100930	2012-03-15
Conducted Emissions				
EMI Receiver	SCHAFFNER	SMR4503	29	2011-12-24
LISN	SCHAFFNER	NNB42	04/10158	2011-12-22
Radiated Emissions				
EMI Test Receiver	Rohde & Schwarz	ESI40	100015	2011-08-20
Bi-log Antenna	Rohde & Schwarz	HL562	100016	2011-08-20

1.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology P.R. China) or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

1.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

1.5 Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO/IEC 17025 are:

Table 2: Measurement Uncertainty

Items		Extended Uncertainty
CE	Disturbance Voltage (dBuV)	$U=\pm 2.56\text{dB}$, $k=2$, $\sigma=95\%$
RE (30-1000MHz)	Field strength (dBuV/m)	$U=\pm 4.94\text{dB}$, $k=2$, $\sigma=95\%$

2. General Product Information

2.1 Product Function and Intended Use

The EUT(equipment under test) is a set top box with 2.4G wireless technology. For the further information refer to the User Manual and Circuit Diagram.

This report covers the circuitry of the device subject to FCC part 15, subpart B, the transceiver is to be tested to FCC part 15, subpart C and covered in the report 16800338 001.

2.2 Ratings and System Details

Table 3: Rating of EUT

Kind of Equipment:	Set Top Box
Type Designation:	DCI401COM2
FCC ID	G95DCI401COM2
Rated Input Voltage	DC 5V (via power supply unit)
Rated input Current	1.5A
Kind of Equipment:	Power Supply Unit
Type Designation:	WAA020
Rated Input Voltage	AC 100-120V; 60Hz
Rated input Current	0.2A
Output voltage and current	DC 5V;1.5A
PN	3682860A
Manufacturer	AcBel ELECTRONIC (DONGGUAN) Co., Ltd.

Table 4: Interface port of EUT

Name of Ports	No. of Ports	Cable descriptions/Max Length
RF In	1	Shielding cable/1.524m
RF Out	1	Shielding cable/1.524m
HDMI	1	Shielding cable/1.829m
DC In	1	Unshielding cable/2m

2.3 Independent Operation Modes

The basic operation modes are:

- A. On,
- B. Off.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

2.5 Submitted Documents

- | | |
|--------------------|----------------------|
| - Bill of Material | - Circuit Diagram |
| - PCB Layout | - Instruction Manual |
| - Photo Document | - Rating Label |

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use. And prior to the measurements, the test object operated about 5 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

3.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.4: 2003.

3.3 Special Accessories and Auxiliary Equipment

Table 5: Test Auxiliary Equipments

Description	Manufacturer	FCC ID	Model	Specification
Remote control	Philips	RCSRC2 843001	RC2843001	2 AA batteries, 3V
Television	TOSHIBA	DoC	19AV615D	220-240V 50/60Hz 50W

3.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

3.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

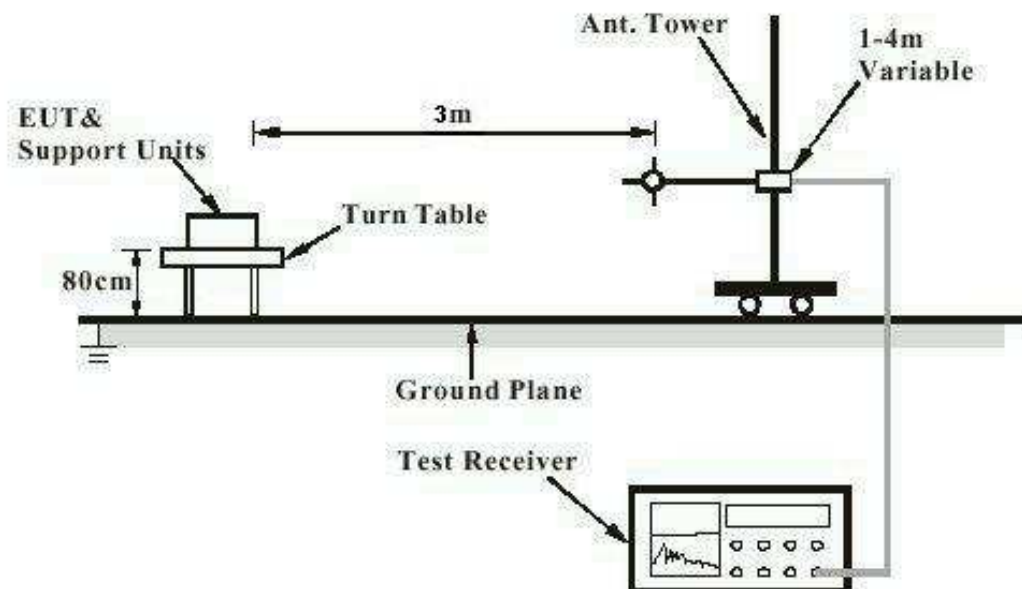


Diagram of Measurement Equipment Configuration for Conduction Measurement

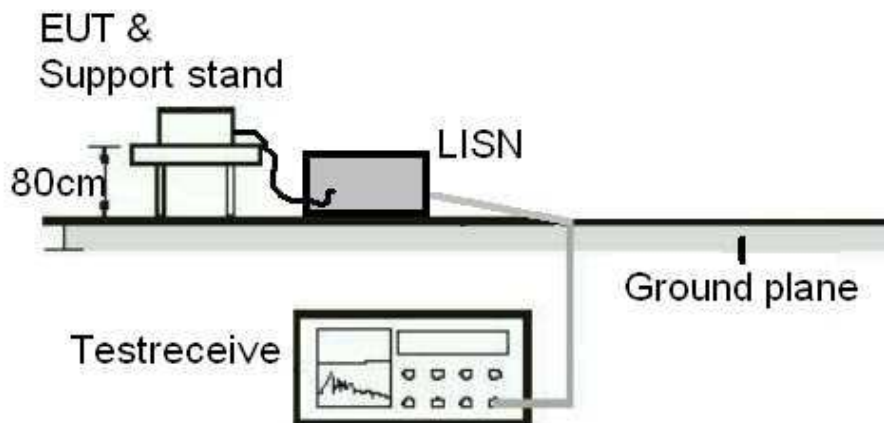
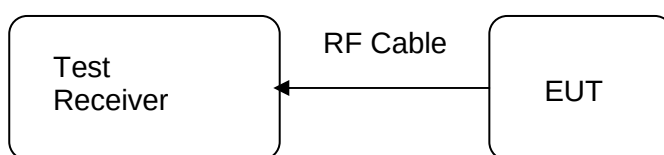


Diagram of Measurement Equipment Configuration for Transmitter Measurement



4. Test Results

4.1 Emission in the Frequency Range above 30 MHz

4.1.1 Radiated emissions

RESULT:**Passed**

Date of testing	:	2011-06-14
Test standard	:	FCC Part 15.109
Basic standard	:	ANSI C63.4: 2003
Frequency range	:	30 – 1000MHz
Limits	:	FCC Part 15.109(a)
Kind of test site	:	3m Semi-Anechoic Chamber

Test Setup

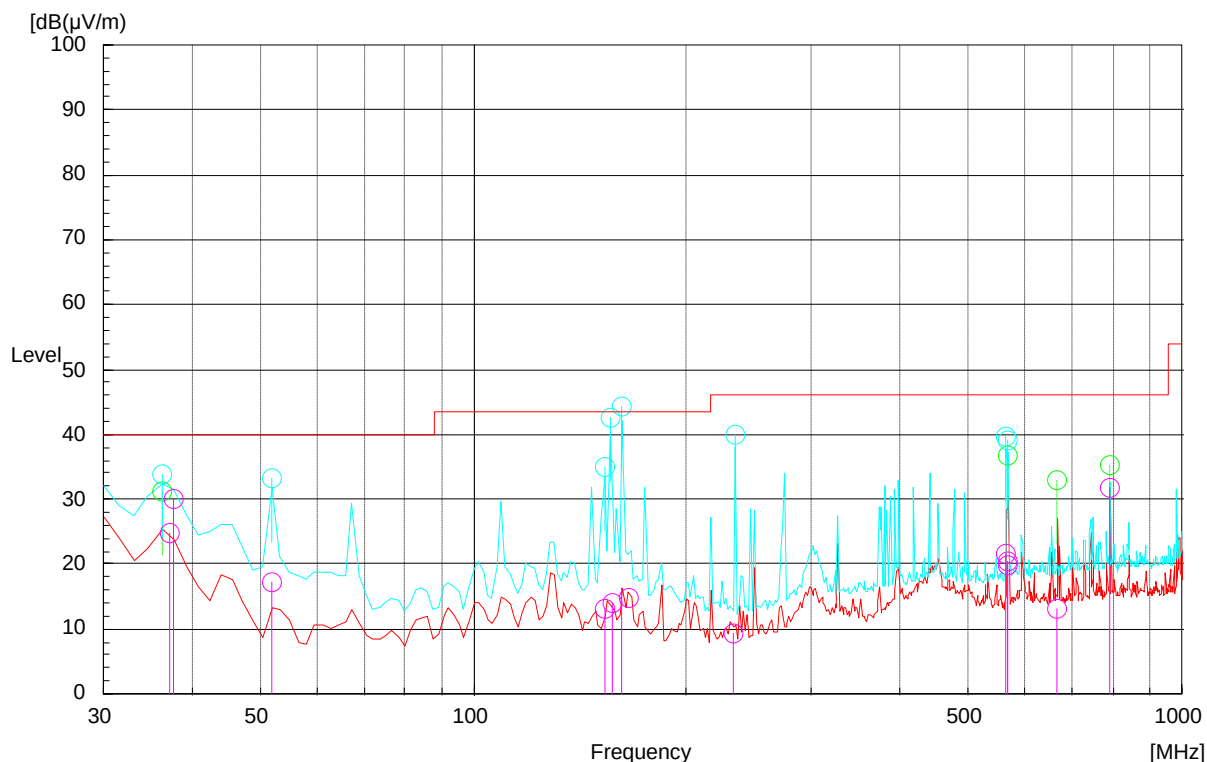
Input Voltage	:	DC 5V (via power supply unit)
Operation Mode	:	A
Earthing	:	Not Connected
Ambient temperature	:	23°C
Relative humidity	:	51%
Atmospheric pressure	:	100 kPa

The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid.

During the test, the wooden table was rotated 360° around and the antenna was varied from 1m to 4m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

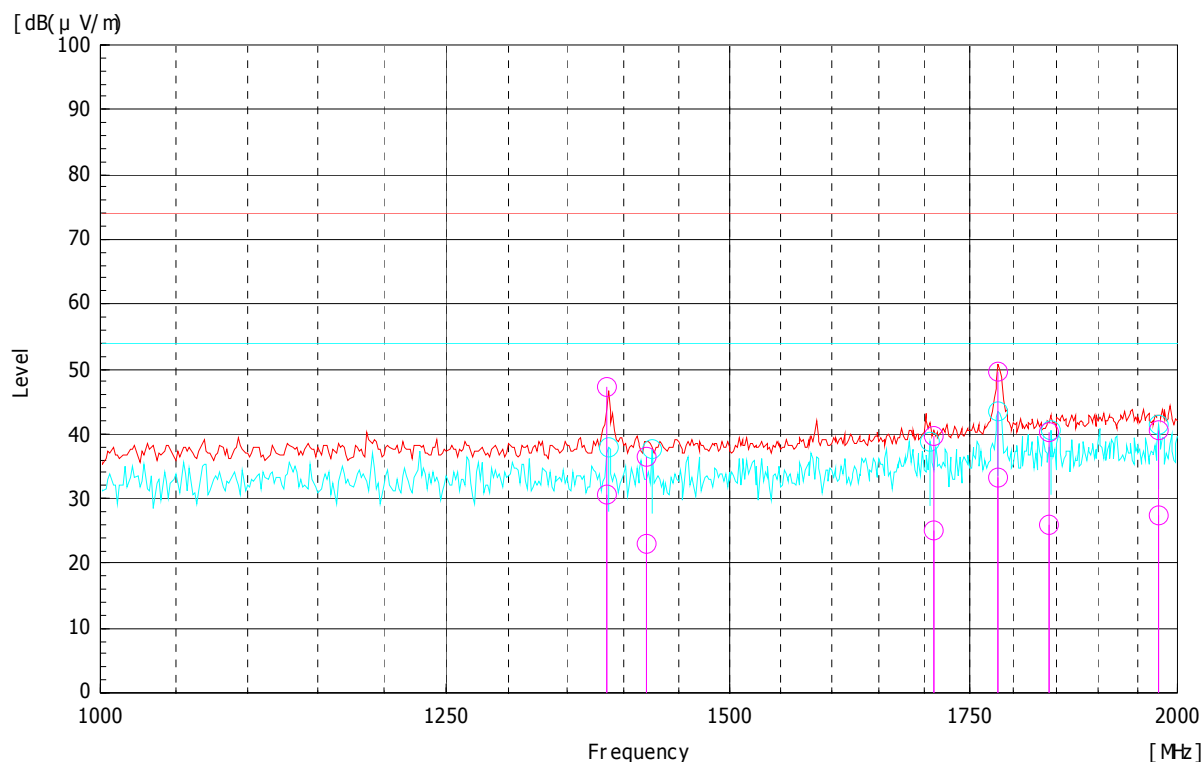
The highest frequency of the internal sources of the sample is between 108 MHz and 500 MHz, therefore the measurement shall be made up to 2 GHz.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following figures, the vertical results are marked with red, and the horizontal ones are marked with blue.

Figure 1: Radiated emission measurement results, 30-1000MHz, vertical and horizontal polarization


Final quasi-peak measurement result:

Frequency(MHz)	polarization (horizontal H/ vertical V)	Height(m) (cm)	Angle (°)	Limit (dBuV/m)	Level (dBuV/m)	Margin (QP) dB(μ V/m)
37.098	H	100.0	71.9	40.0	24.9	15.1
568.700	H	400.0	226.8	46.0	20.5	25.5
668.325	H	300.0	328.2	46.0	13.2	32.8
791.998	H	100.0	314.7	46.0	31.7	14.3
37.708	V	100.0	132.1	40.0	30.0	10.0
51.840	V	100.0	307.9	40.0	17.2	22.8
153.603	V	100.0	179.3	43.5	13.1	30.4
156.697	V	100.0	179.3	43.5	14.0	29.5
161.987	V	100.0	179.3	43.5	16.4	27.1
232.845	V	100.0	213.0	46.0	9.4	36.6
564.772	V	200.0	166.2	46.0	21.7	24.3
568.907	V	200.0	166.2	46.0	20.0	26.0

Figure 2: Radiated emission measurement results, 1000-2000MHz, vertical and horizontal polarization


Final quasi-peak measurement result:

Frequency(MHz)	polarization (horizontal H/ vertical V)	Height(m) (cm)	Angle (°)	Limit (dBuV/m)	Level (dBuV/m)	Margin (QP) dB(μ V/m)
1385.994	H	100.0	139.5	54.0	47.3	26.7
1421.586	H	100.0	10.9	54.0	36.4	37.6
1708.766	H	100.0	10.9	54.0	39.6	34.4
1781.843	H	100.0	342.4	54.0	49.7	24.3
1841.650	V	100.0	10.9	54.0	40.1	33.9
1976.924	V	100.0	10.9	54.0	40.6	33.4

4.1.2 Output and spurious conducted level

RESULT:
Passed

Date of testing : 2011-06-03
 Test standard : FCC Part 15.115(b)
 Basic standard : ANSI C63.4: 2003
 Frequency range : 30-1000MHz
 Limits : FCC Part 15.115(b)
 Kind of test site : Shield room

According to FCC Part 15.115(b) (1), For a cable system terminal device or a TV interface device used with a master antenna, at any RF output terminal, the maximum measured RMS voltage, in microvolts, corresponding to the peak envelope power of the modulated signal during maximum amplitude peaks across a resistance (R in ohms) matching the rated output impedance of the TV interface device, shall not exceed the 692.8 times the square root of (R) for the video signal and 155 times the square root of (R) for the audio signal.

And for any emission appearing on frequencies removed by more than 4.6 MHz below or 7.4 MHz above the video carrier frequency on which the TV interface device is operated shall not exceed the 692.8 times the square root of (R).

As R=75ohms, the limits are listed below:

Vedio carrier	75.56dBμV
Audio carrier	59.54 dBμV
Spurious	75.56dBμV

Measurement result:

Channel	Carrier frequency(MHz)		Level(dBμV)	Limit(dBμV)	Margin(dB)
3	Video	61.25	70.42	75.56	5.14
	Audio	65.75	55.03	59.54	4.51
	Spurious	183.4	36.54	75.56	39.02
	Spurious	305.8	21.22	75.56	54.34
	Spurious	979.6	28.79	75.56	46.77
4	Video	67.25	70.93	75.56	4.63
	Audio	71.75	56.22	59.54	3.32
	Spurious	201.6	34.61	75.56	40.95
	Spurious	325.8	21.15	75.56	54.41
	Spurious	676.3	32.33	75.56	43.23

4.2 Emission in the Frequency Range up to 30 MHz

4.2.1 Conducted emissions

RESULT:**Passed**

Date of testing	:	2011-06-14
Test standard	:	FCC Part 15.107
Basic standard	:	ANSI C63.4: 2003
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.107
Kind of test site	:	Shield room

Test setup

Input Voltage	:	DC 5V (via power supply unit)
Operation Mode	:	A
Earthing	:	Not Connected
Ambient temperature	:	23°C
Relative humidity	:	51%
Atmospheric pressure	:	100 kPa

The measurement setup was made in a shielded room.

The measurement equipment like test receivers, quasi-peak detector, average detector and LISN are in compliance with CISPR 16-1 series standards and ANSI C63.4-2003. The tested object was operated under its rated voltage and its rated frequency. Prior to the measurements the test object operated about 5 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

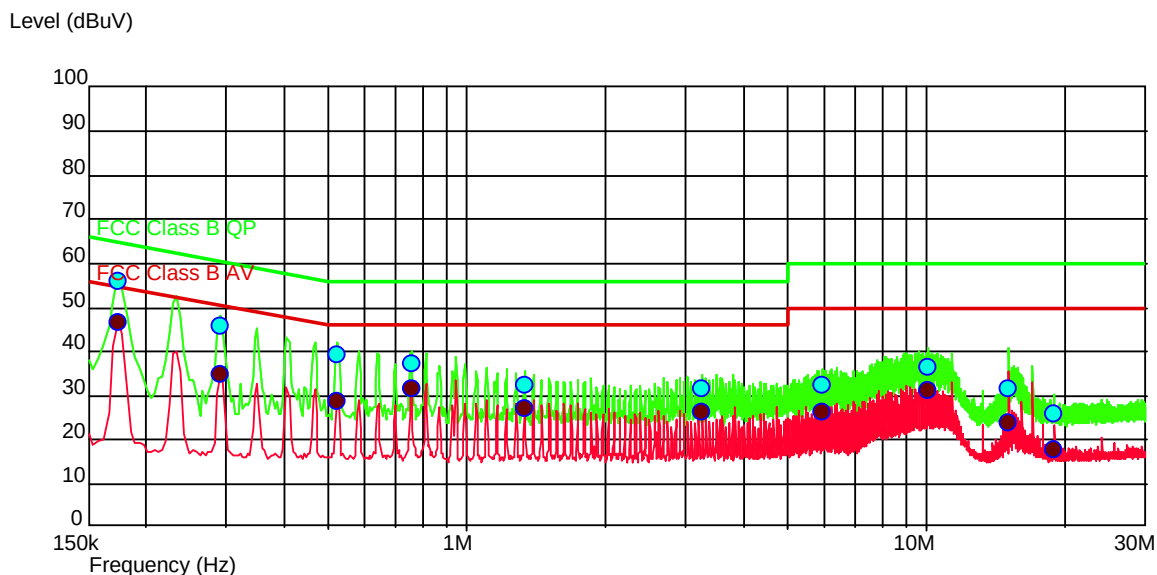
Furthermore an internal calibration with the test receiver was conducted prior to each measurement.

The EUT was set 0.8m away from the LISN. The cord longer than necessary to be connected to the LISN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

The interference voltage was determined while measuring the line conductor by turns.

The test was carried out from 100V to 120V for the max. measurement results.

The following figures and tables were those measured by an automatic measuring system. A preview test was first made with peak detector. Final test with quasi-peak detector and average detector was only performed at these critical frequencies found via preview test.

Figure 3: Conducted emission measurement results, Line L


Final quasi-peak measurement results:

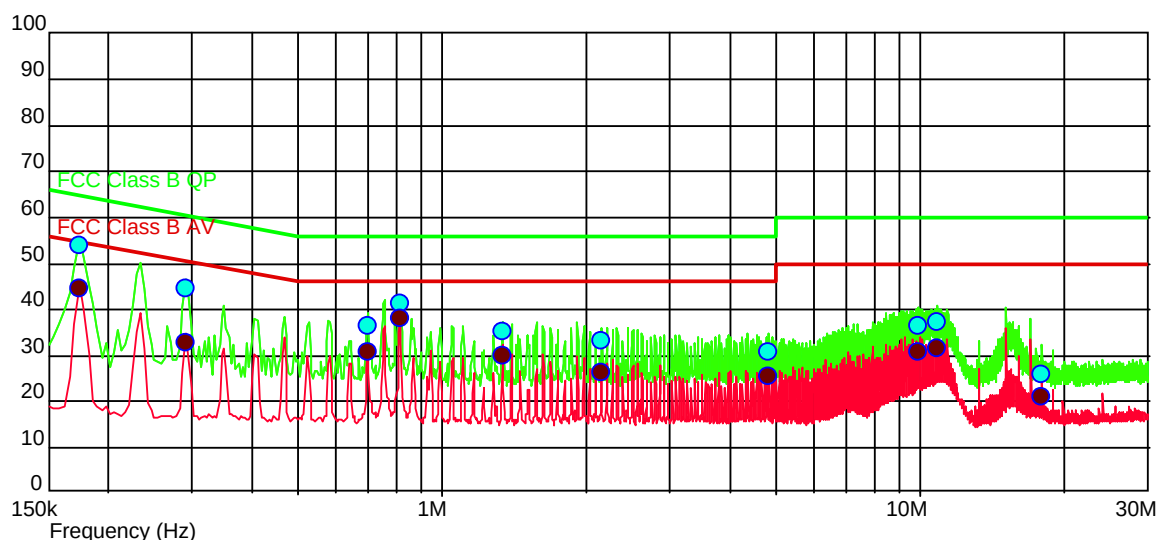
Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)	Detector	RBW(Hz)
174.0 k	55.73	64.77	9.04	QP	9.0 k
290.0 k	45.79	60.52	14.73	QP	9.0 k
522.0 k	39.12	56.00	16.88	QP	9.0 k
758.0 k	37.32	56.00	18.68	QP	9.0 k
1.338 M	32.44	56.00	23.56	QP	9.0 k
3.254 M	31.48	56.00	24.52	QP	9.0 k
5.926 M	32.14	60.00	27.86	QP	9.0 k
10.11 M	36.52	60.00	23.48	QP	9.0 k
15.11 M	31.36	60.00	28.64	QP	9.0 k
18.882 M	25.84	60.00	34.16	QP	9.0 k

Final average measurement results:

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)	Detector	RBW(Hz)
174.0 k	46.43	54.77	8.34	AVERAGE	9.0 k
290.0 k	34.79	50.52	15.74	AVERAGE	9.0 k
522.0 k	28.85	46.00	17.15	AVERAGE	9.0 k
758.0 k	31.57	46.00	14.43	AVERAGE	9.0 k
1.338 M	27.20	46.00	18.80	AVERAGE	9.0 k
3.254 M	26.14	46.00	19.86	AVERAGE	9.0 k
5.926 M	26.40	50.00	23.60	AVERAGE	9.0 k
10.11 M	31.13	50.00	18.87	AVERAGE	9.0 k
15.11 M	23.60	50.00	26.40	AVERAGE	9.0 k
18.882 M	17.85	50.00	32.15	AVERAGE	9.0 k

Figure 4: Conducted emission measurement results, Line N

Level (dBuV)



Final quasi-peak measurement results:

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)	Detector	RBW(Hz)
174.0 k	53.73	64.77	11.03	QP	9.0 k
290.0 k	44.50	60.52	16.02	QP	9.0 k
698.0 k	36.22	56.00	19.78	QP	9.0 k
814.0 k	41.23	56.00	14.77	QP	9.0 k
1.338 M	35.35	56.00	20.65	QP	9.0 k
2.15 M	33.13	56.00	22.87	QP	9.0 k
4.826 M	30.81	56.00	25.19	QP	9.0 k
9.878 M	36.19	60.00	23.81	QP	9.0 k
10.87 M	37.14	60.00	22.86	QP	9.0 k
17.918 M	25.87	60.00	34.13	QP	9.0 k

Final average measurement results:

Frequency(Hz)	Level(dBuV)	Limit(dBuV)	Margin(dBuV)	Detector	RBW(Hz)
174.0 k	44.38	54.77	10.39	AVERAGE	9.0 k
290.0 k	32.84	50.52	17.69	AVERAGE	9.0 k
698.0 k	30.49	46.00	15.51	AVERAGE	9.0 k
814.0 k	38.09	46.00	7.91	AVERAGE	9.0 k
1.338 M	30.06	46.00	15.94	AVERAGE	9.0 k
2.15 M	26.09	46.00	19.91	AVERAGE	9.0 k
4.826 M	25.33	46.00	20.67	AVERAGE	9.0 k
9.878 M	30.87	50.00	19.13	AVERAGE	9.0 k
10.87 M	31.69	50.00	18.31	AVERAGE	9.0 k
17.918 M	20.87	50.00	29.13	AVERAGE	9.0 k

5. Photographs of the Test Set-Up

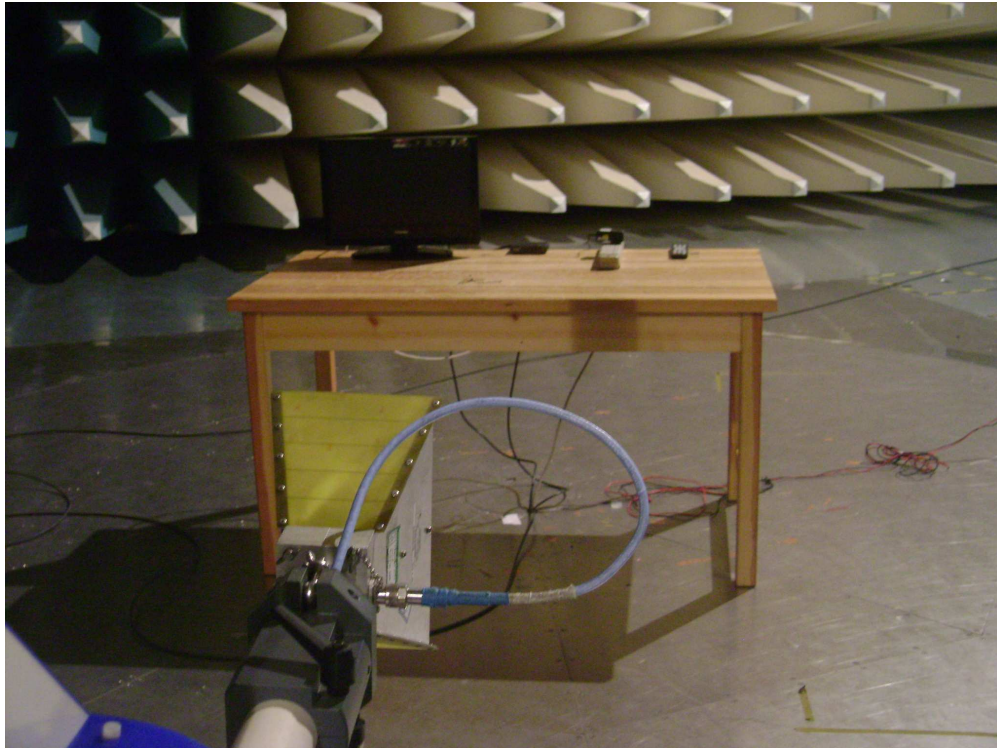
Photograph 1: Set-up for Conducted Emissions



Photograph 2: Set-up for Radiated Emissions, 30MHz-1GHz



Photograph 3: Set-up for Radiated Emissions 1GHz – 2GHz



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