Produkte
Products

TÜVRheinland®

Prüfbericht - Nr.: *Test Report No.:*	10038606 001	**Seite 1 von 25** *Page 1 of 25*
Auftraggeber: *Client:*	CyberTAN Technology Inc. No. 99, Park Ave. III, Science-based Industrial Park, Hsinchu 308, Taiwan, R.O.C.	
Gegenstand der Prüfung: *Test Item:*	Miracast™ Video Receiver	
Bezeichnung: *Identification:*	RF-WFD301 (Rocketfish)	**Serien-Nr.:** *Serial No.:* N/A
Wareneingangs-Nr.: *Receipt No.:*	113161703	**Eingangsdatum:** *Date of Receipt:* 02 Oct. 2012
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Intact prototype samples	
Prüfort: *Testing Location:*	TÜV Rheinland Taiwan Ltd. 11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C.	
Prüfgrundlage: *Test Specification:*	FCC 47 CFR Part 15, Subpart B: 2011 ICES-003:Issue5:2012	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland Taiwan Ltd. (Taipei)	

geprüft/ *tested by:*			**kontrolliert/** *reviewed by:*		
18 Jan. 2013	Neil J. N. Tsai / Project Engineer (TÜV Rheinland Taiwan)		18 Jan. 2013	Spring C. Y. Wang / Project Engineer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges/ Other Aspects:

FCC Test Report.
FCC ID: N89-RFWFD301

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

TEST SUMMARY

5.1 CONDUCTED EMISSION PER SECTION 15.107, FCC 47 CFR PART 15 SUBPART B
RESULT: Pass

5.2 RADIATED EMISSION PER SECTION 15.109, FCC 47 CFR PART 15 SUBPART B
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland Taiwan Ltd.
11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facilities and has found these test sites to be in compliance with the requirements under 47 CFR section 2.948. The registration number: 365730.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facilities and has found these test sites to be in compliance with the Canadian requirements. The filing number: 9465A.

The test facility is accredited by TAF (member of ILAC), under number 0759 according to ISO/IEC 17025:2005.

TÜV Rheinland Taiwan Ltd. is accredited by the Federal Communications Commission as a Conformity Assessment Body under Designation Number TW1065 and Test Firm Registration#: 799772.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

☒ **For Conducted Emission**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101094	2013/09/11
2	LISN (1 phase)	R&S	ENV216	101243	2013/09/08
3	LISN	Rolf Heine	NNB-2/16Z	99080	2013/09/27
4	Telecom ISN 2 Line	FCC	FCC-TLISN-T2-02-09	101169	2013/09/08
5	Telecom ISN 8 Line	FCC	FCC-TLISN-T8-02-09	101167	2013/09/08
6	4 balance telecom pair ISN	FCC	F-070306-1057-1	101166	2013/09/08

☒ **For Radiated Emission**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Receiver	R&S	ESCI7	100797	2013/12/16
2	Spectrum Analyzer	R&S	FSV-40	1000921	2013/12/15
3	Pre-Amplifier	HP	8447F	2805A03335	2013/09/14
4	Pre-Amplifier	Com-Power	PAM-840	461257	2013/09/17
5	Pre-Amplifier	EM Electronics	EM30180	060558	2013/11/12
6	Bilog Antenna	TESEQ	CBL6111D	29802	2014/06/29
7	Horn Antenna	Com-Power	AH-118	0701251	2013/09/28
8	Horn Antenna	Com-Power	AH-840	101029	2013/09/19
9	Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2013/09/28

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing.

2.3 Calibration

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

2.4 Abbreviations

PASS	means 'complied with requirement'	**N/A**	means 'not applicable'
FAIL	means 'not complied'	**N.C.R.**	means 'no calibration required'

2.5 Measurement Uncertainty

Table 2: Measurement Uncertainty

Testing Item	Frequency Range	Uncertainty
Conducted Emission (Shield Room)	150kHz - 30MHz	2.47 dB
Radiated Emission (966 Chamber: 3m)	30MHz - 1000MHz	2.80 dB

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

3 General Product Information

3.1 Product Function and Intended Use

The tested sample is a **"Miracast™ Video Receiver"**, which is intended for use with compatible devices such as phone or tablet to deliver signals to LCD TV, projector or other audio/video devices. The tested sample must insert the micro USB port on LCD TV, which is intended for charge.

3.2 Rating and Physical Characteristics

Type Designation: RF-WFD301
Input Voltage: 120Vac, 60Hz (LCD TV), 5Vdc (Via USB port)
Protection Class: III
For details, refer to rating labels and user manual.

3.3 System Details

Table 3: Interfaces present on the EUT

Interface	Cable length for Testing, Shielding
HDMI port	Shielded, 0.15m
Micro USB port	Shielded, 1m

3.4 Noise Generating or Sources of Interference

1) IC circuits
2) U4: DDR SDRAM operation frequency 400MHz
3) BCM2835: 600MHz Crystal
4) HDMI operation frequency: 148.5MHz
5) Y1: 19.2MHz Crystal
6) Y3: 20MHz Crystal

Please refer to attachment photo document for detail

3.5 Noise Suppressing Parts

Please refer to Attachment Photo Documentation for details.

3.6 Submitted Documents

1) Circuit diagram
2) Block diagram
3) BOM List
4) Rating Label
5) User manual

4 Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirement of 47 CFR PART 15, section 15.31, 15.33, 15.35, 15.107 and 15.109, and of ICES-003.

The test methods, which have been used, are based on ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Independent and Test Operation Modes

The EUT was connected to a LCD TV, and charging via USB port of LCD TV.
The Smart phone was linked with AP router via wireless, then the smart phone play the video.
The AP router was transferred the signal to EUT, then LCD TV was display the video.

The basic operation mode is:
A. Normal operation without HDMI cable
B. Normal operation with HDMI cable
C. Normal operation with HDMI cable & converter

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C 63.4 and in CAN/CSA-CEI/IEC CISPR22.

Refer to Test setup in chapter 4.5.

4.3 Special Accessories and Auxiliary Equipment

The EUT was tested as an independent unit with the following equipment:

Description	Manufacturer	Model No.	Remark	Certification
LCD TV	INSIGNIA	NS-19E320A13	326LE19MF79AH026842	DoC
AP router	CISCO	E2500	10A10C11L00033	DoC
Smart phone	LG	LG-E960	211KPTM082185	DoC

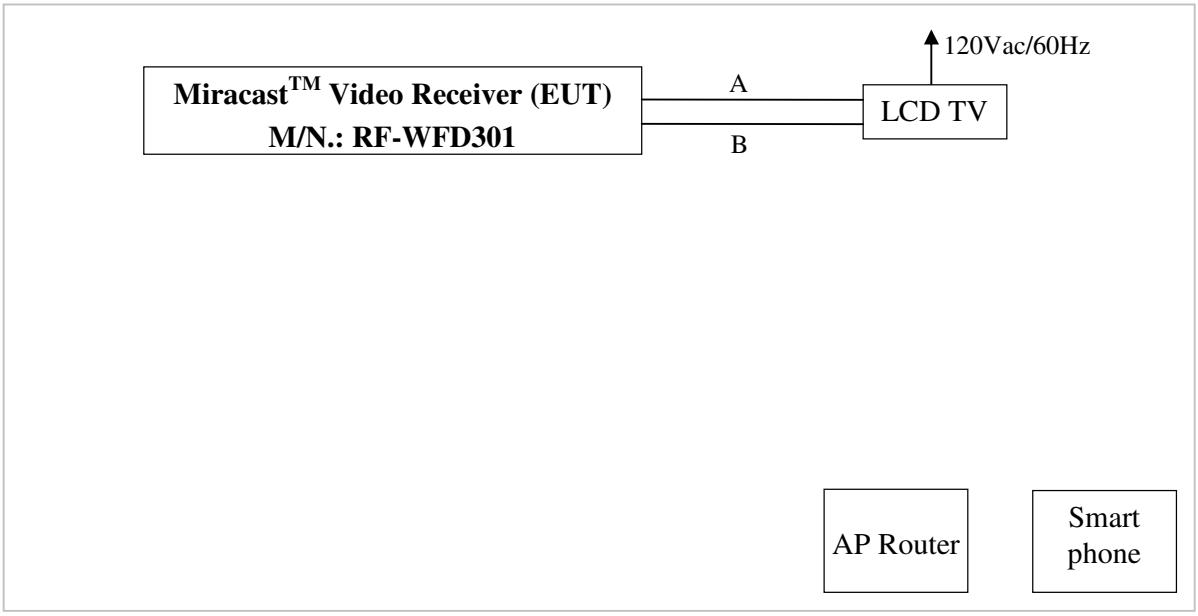
4.4 Countermeasures to achieve EMC compliance

The test sample which has been tested contained the noise suppression parts as described in the constructional data form or technical construction file or refer to the attachment photo document of test report. No additional measures were employed to achieve compliance.

4.5 Test Setup

The test setup was realized on a table of 80cm height during all the tests.

The test arrangement is configured and set according to manufacturer's installations.



Signal Cable Type		Signal Cable Description
A	HDMI cable	Shielded, 0.15m
B	Micro USB cable	Shielded, 1m

5 Test Results EMISSION

5.1 Conducted Emission per section 15.107, 47 CFR part 15 subpart B

RESULT:	**PASS**

Port:		AC Mains
Test Procedure	:	ANSI C63.4 (2009) Clause 7.3
Deviations from standard test procedure	:	None
Frequency Range	:	0.15 – 30MHz
Limits	:	FCC Part 15 Subpart B Section 15.107 (a) class B, CAN/CSA-CEI/IEC CISPR 22 class B
Kind of Test Site	:	Conducted Room (Shield)

Test Setup

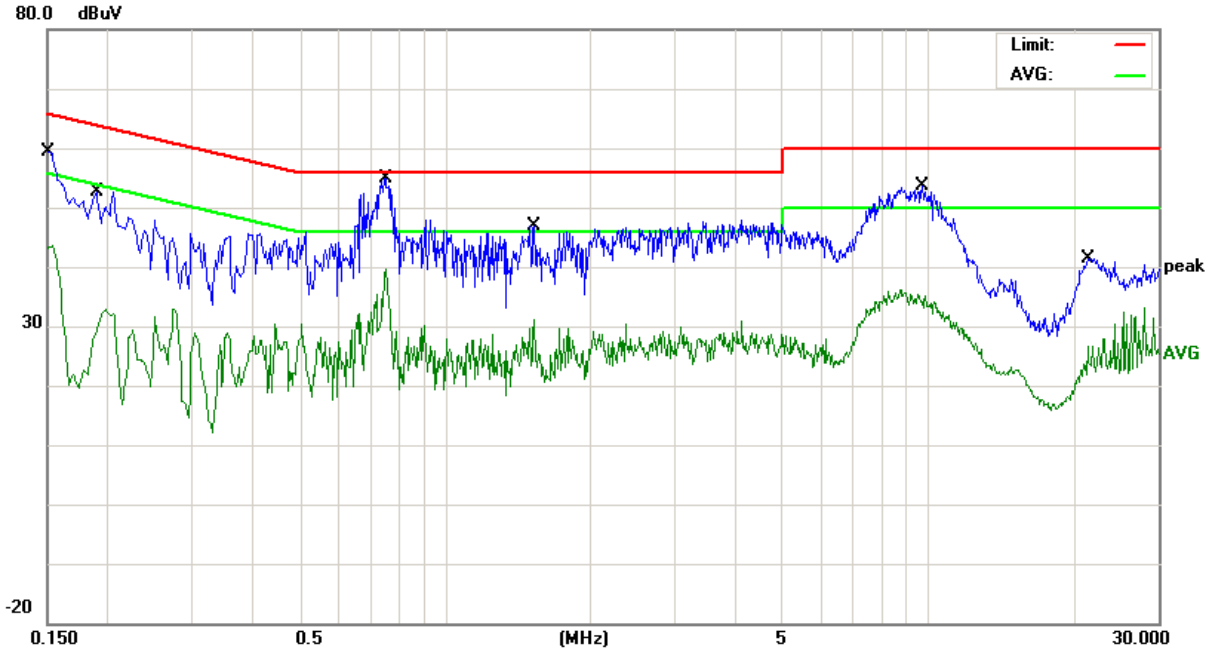
The following setup caused the highest disturbance:

Date of Testing	:	27 Dec. 2012
Input Voltage	:	120Vac, 60Hz (LCD TV), 5Vdc (Via USB port)
Operational Mode	:	See 4.2
Temperature		23 ℃
Relative Humidity		60 %

The worst mode was listed in this test report.

Figure 1: Conducted Emission at Mains Ports; 0.15 - 30 MHz (Mode B)

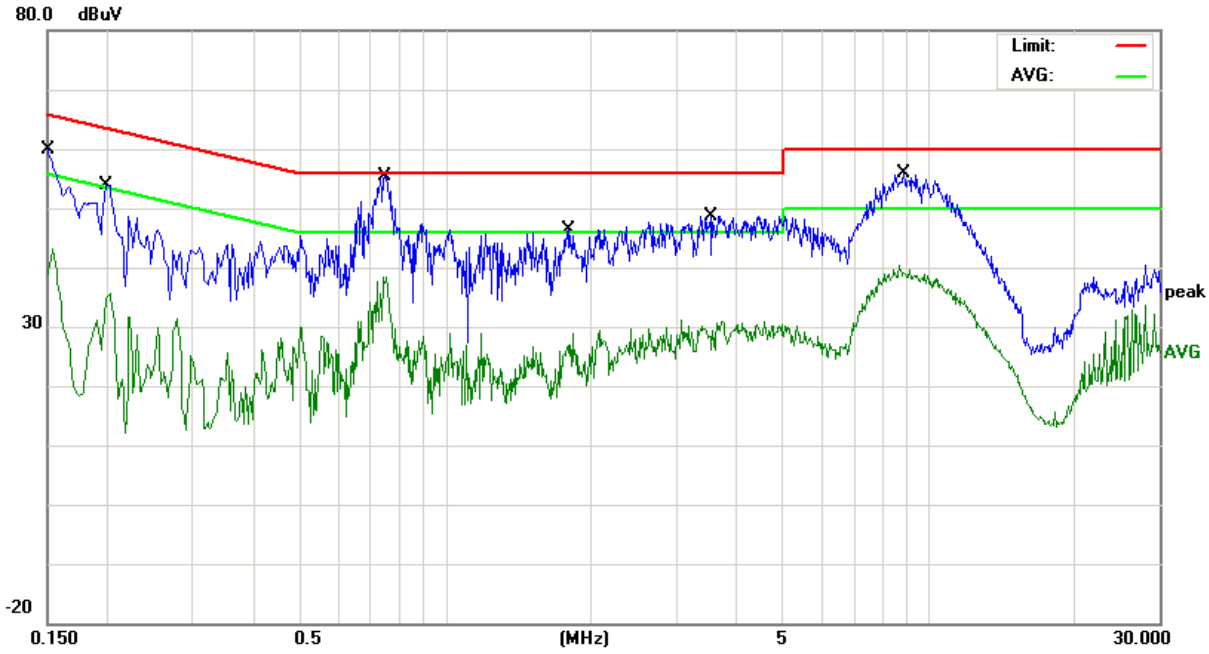
Phase L1



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	9.55	48.03	57.58	65.99	-8.41	QP	P	
2	0.1500	9.55	31.25	40.80	55.99	-15.19	AVG	P	
3	0.1900	9.64	38.57	48.21	64.03	-15.82	QP	P	
4	0.1900	9.64	20.19	29.83	54.03	-24.20	AVG	P	
5	0.7539	9.60	42.57	52.17	56.00	-3.83	QP	P	
6	0.7539	9.60	25.95	35.55	46.00	-10.45	AVG	P	
7	1.5300	9.61	30.73	40.34	56.00	-15.66	QP	P	
8	1.5300	9.61	15.07	24.68	46.00	-21.32	AVG	P	
9	9.7340	9.74	35.68	45.42	60.00	-14.58	QP	P	
10	9.7340	9.74	21.95	31.69	50.00	-18.31	AVG	P	
11	21.5300	9.84	25.19	35.03	60.00	-24.97	QP	P	
12	21.5300	9.84	11.22	21.06	50.00	-28.94	AVG	P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

Phase L2



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	9.65	47.98	57.63	65.99	-8.36	QP	P	
2	0.1500	9.65	30.18	39.83	55.99	-16.16	AVG	P	
3	0.1980	9.68	40.62	50.30	63.69	-13.39	QP	P	
4	0.1980	9.68	20.48	30.16	53.69	-23.53	AVG	P	
5	0.7500	9.64	43.03	52.67	56.00	-3.33	QP	P	
6	0.7500	9.64	26.40	36.04	46.00	-9.96	AVG	P	
7	1.8060	9.62	31.04	40.66	56.00	-15.34	QP	P	
8	1.8060	9.62	15.10	24.72	46.00	-21.28	AVG	P	
9	3.5300	9.65	30.71	40.36	56.00	-15.64	QP	P	
10	3.5300	9.65	16.46	26.11	46.00	-19.89	AVG	P	
11	8.9140	9.74	38.08	47.82	60.00	-12.18	QP	P	
12	8.9140	9.74	27.51	37.25	50.00	-12.75	AVG	P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

5.2 Radiated Emission per section 15.109, 47 CFR part 15 subpart B

RESULT:	**PASS**

Port:		Enclosure
Test Procedure	:	ANSI C63.4 (2009) Clause 8.3
Deviations from standard test procedure	:	None
Frequency Range	:	30 – 1000MHz
Limits	:	FCC Part 15 Subpart B Section 15.109 (a) class B, CAN/CSA-CEI/IEC CISPR 22 class B at 3m
Kind of Test Site	:	966 Semi-anechoic chamber (3m distance)

Test Setup

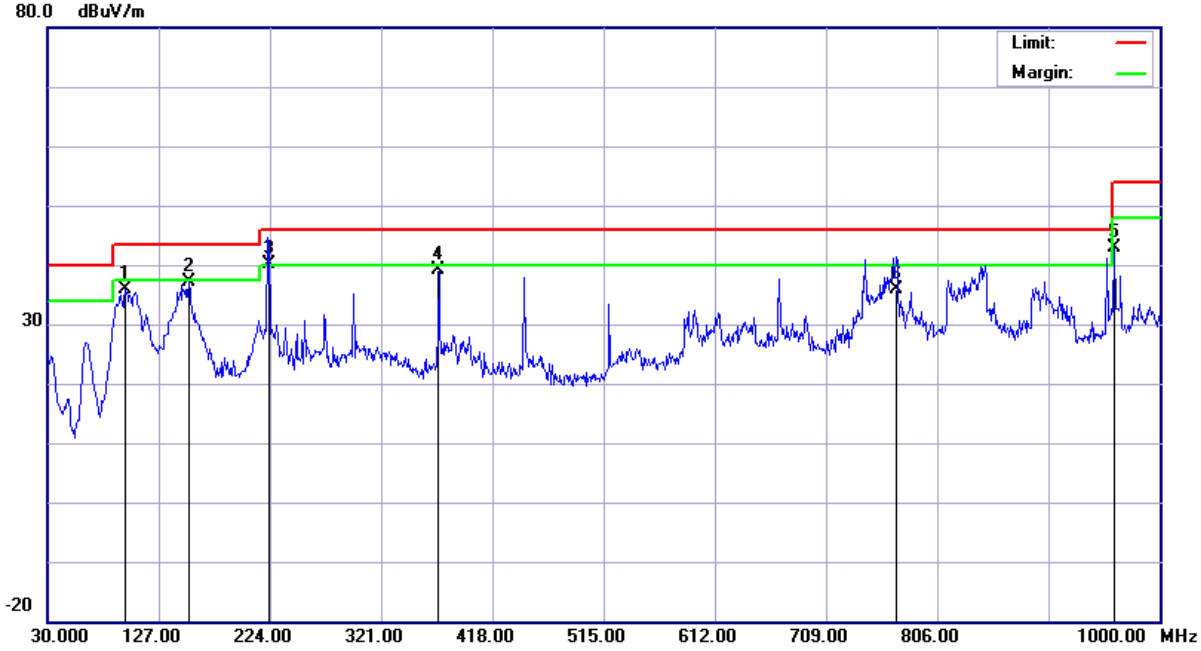
The following setup caused the highest disturbance:

Date of Testing	:	27 Dec. 2012
Input Voltage	:	120Vac, 60Hz (LCD TV), 5Vdc (Via USB port)
Operational Mode	:	See 4.2
Temperature		21 ℃
Relative Humidity		56 %

The highest frequency generated or used in the device or on which the operates or tunes of the EUT:
☐ below 1.705M, measuring up to 30MHz
☐ 1.705-108M, measuring up to 1000MHz
☐ 108-500MHz, measuring up to 2000MHz
☐ 500-1000MHz, measuring up to 5000MHz
☒ above 1000MHz, measuring up to 5th harmonic of the hightest frequency or 40GHz, whichever is lower

Figure 2: Radiated Emission; 30 – 1000 MHz (Mode B)

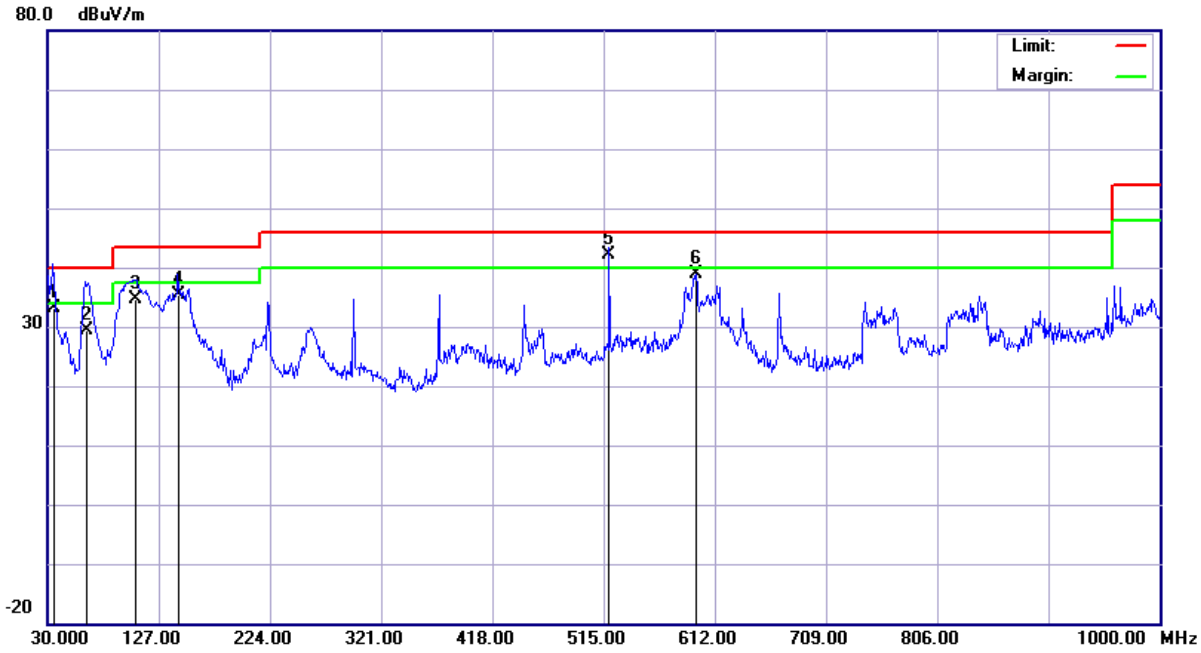
Horizontal



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (◦)	P/F	Remark
1	97.9000	-16.12	51.96	35.84	43.50	-7.66	QP	300	11	P	
2	153.1899	-14.30	51.46	37.16	43.50	-6.34	QP	200	143	P	
3	222.7200	-15.30	55.32	40.02	46.00	-5.98	QP	100	181	P	
4	371.4399	-9.64	48.82	39.18	46.00	-6.82	QP	100	45	P	
5	960.2300	0.06	42.93	42.99	54.00	-11.01	QP	100	124	P	
6	770.3000	-3.25	39.16	35.91	46.00	-10.09	QP	100	221	P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

Vertical



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (◦)	P/F	Remark
1	35.4500	-10.67	43.81	33.14	40.00	-6.86	QP	100	233	P	
2	63.6900	-20.72	50.12	29.40	40.00	-10.60	QP	100	210	P	
3	106.3600	-15.24	49.99	34.75	43.50	-8.75	QP	100	249	P	
4	143.9850	-13.77	49.04	35.27	43.50	-8.23	QP	100	166	P	
5	519.7550	-6.92	48.96	42.04	46.00	-3.96	QP	100	183	P	
6	595.5100	-5.87	44.81	38.94	46.00	-7.06	QP	100	156	P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

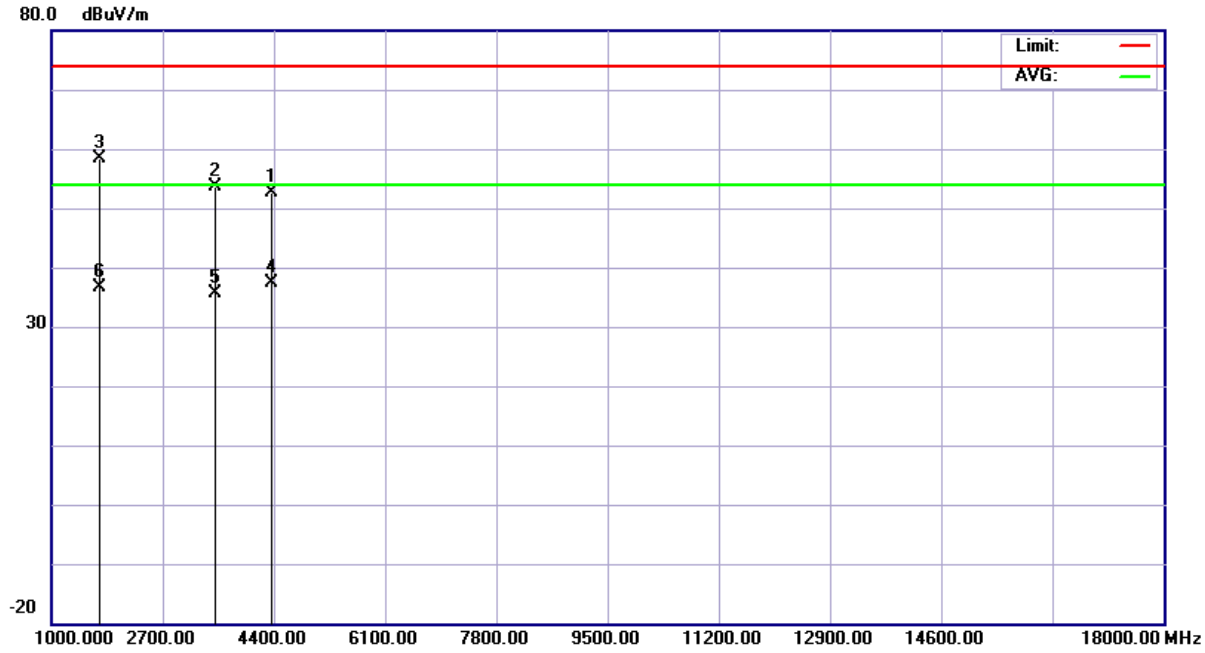
Figure 3: Radiated Emission; 1000 – 18000 MHz (Mode B)

Horizontal

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (◦)	P/F	Remark
1	4332.000	-4.67	61.47	56.80	74.00	-17.20	peak	100	360	P	
2	3570.000	-6.81	59.07	52.26	74.00	-21.74	peak	100	360	P	
3	1830.000	-10.62	61.60	50.98	74.00	-23.02	peak	100	360	P	
4	4332.000	-4.67	45.80	41.13	54.00	-12.87	AVG			P	
5	3570.000	-6.81	43.24	36.43	54.00	-17.57	AVG			P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

Vertical

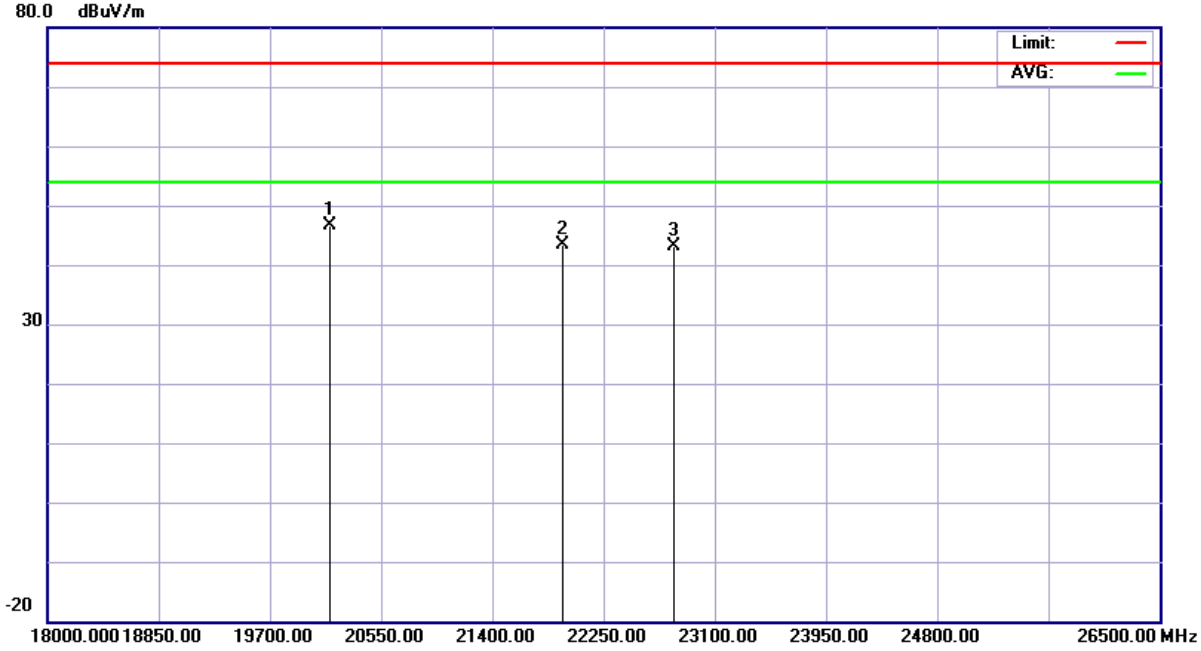


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (◦)	P/F	Remark
1	4356.000	-4.57	57.30	52.73	74.00	-21.27	peak	100	360	P	
2	3513.000	-6.92	60.63	53.71	74.00	-20.29	peak	100	360	P	
3	1745.000	-10.99	69.40	58.41	74.00	-15.59	peak	100	360	P	
4	4356.000	-4.57	42.04	37.47	54.00	-16.53	AVG			P	
5	3513.000	-6.92	42.53	35.61	54.00	-18.39	AVG			P	
6	1745.000	-10.99	47.54	36.55	54.00	-17.45	AVG			P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

Figure 4: Radiated Emission; 18000 – 26500 MHz (Mode B)

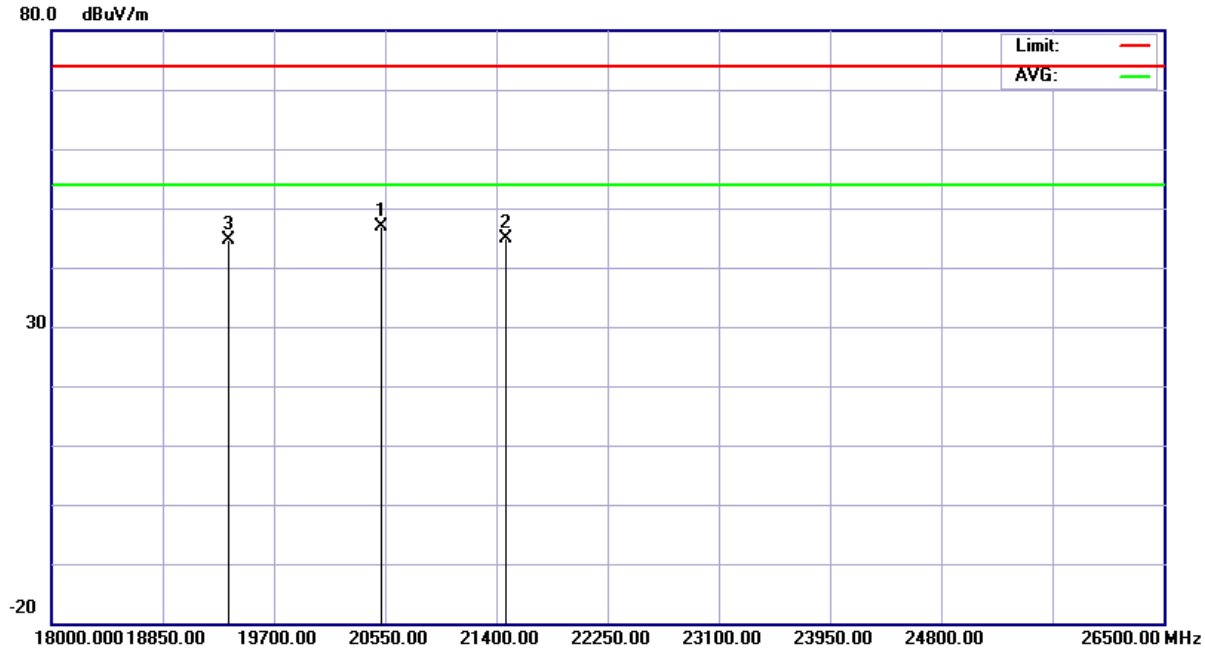
Horizontal



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F	Remark
1	20156.000	26.40	20.29	46.69	74.00	-27.31	peak	100	0	P	
2	21937.000	24.35	19.04	43.39	74.00	-30.61	peak	100	0	P	
3	22794.000	24.91	18.29	43.20	74.00	-30.80	peak	100	0	P	

Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

Vertical



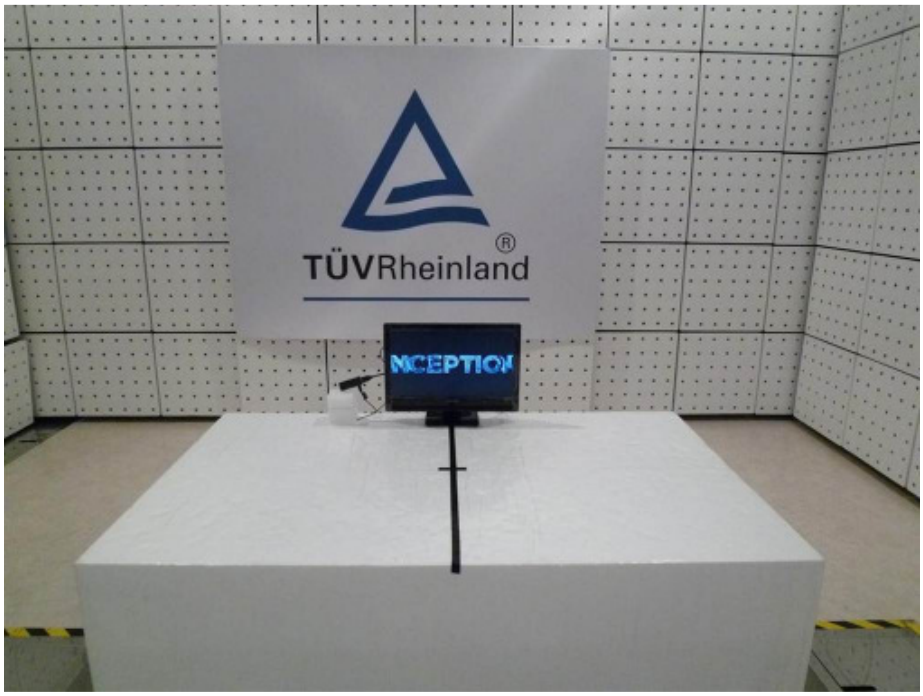
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (◦)	P/F	Remark
1	20523.000	26.59	20.25	46.84	74.00	-27.16	peak	100	360	P	
2	21475.000	25.53	19.37	44.90	74.00	-29.10	peak	100	360	P	
3	19353.000	25.53	19.20	44.73	74.00	-29.27	peak	100	360	P	

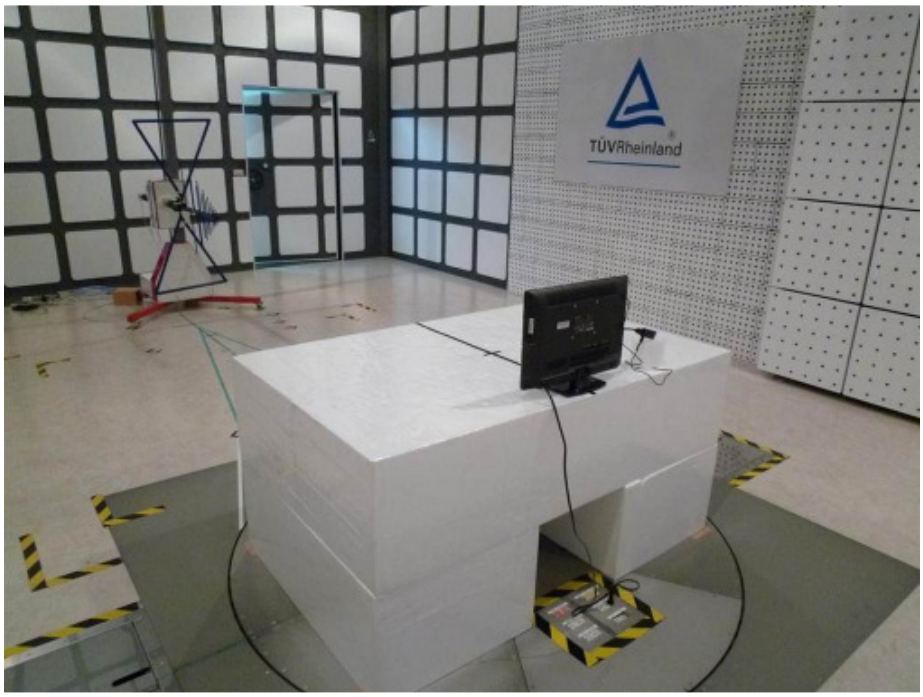
Note 1: Level = Reading + Factor
Note 2: Margin = Level - Limit

6 Photographs of Test Setup

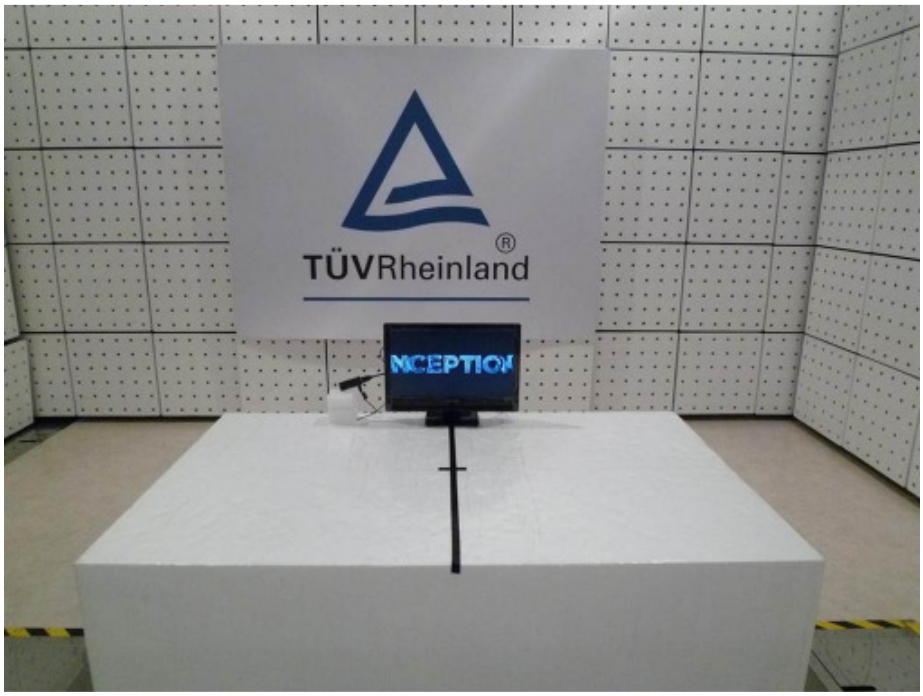
Picture 1: Conducted Emission at Mains Ports; 0.150 - 30 MHz

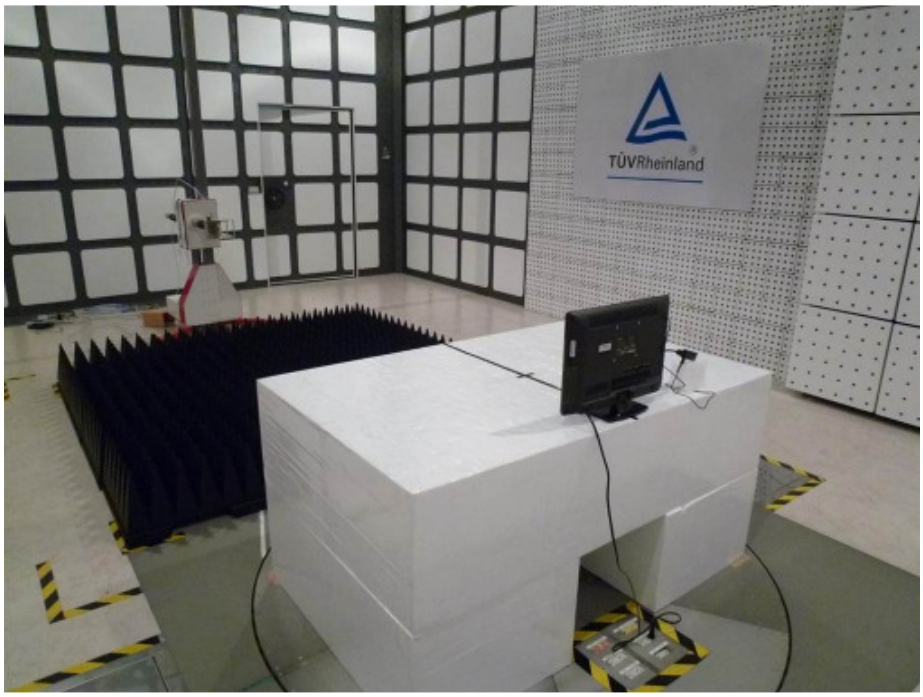
Picture 2: Radiated Emission, 30 - 1000 MHz



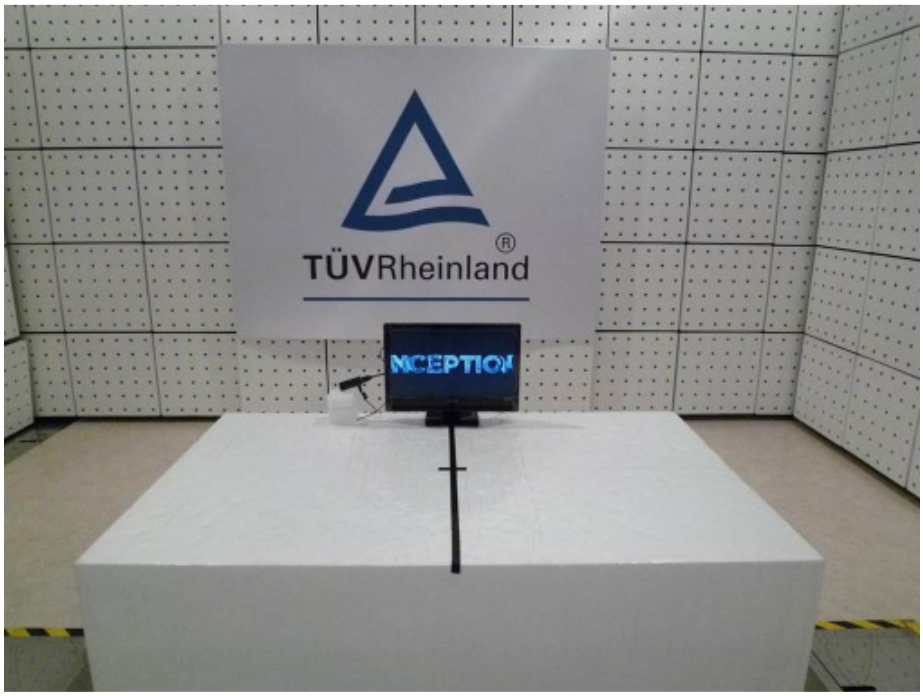


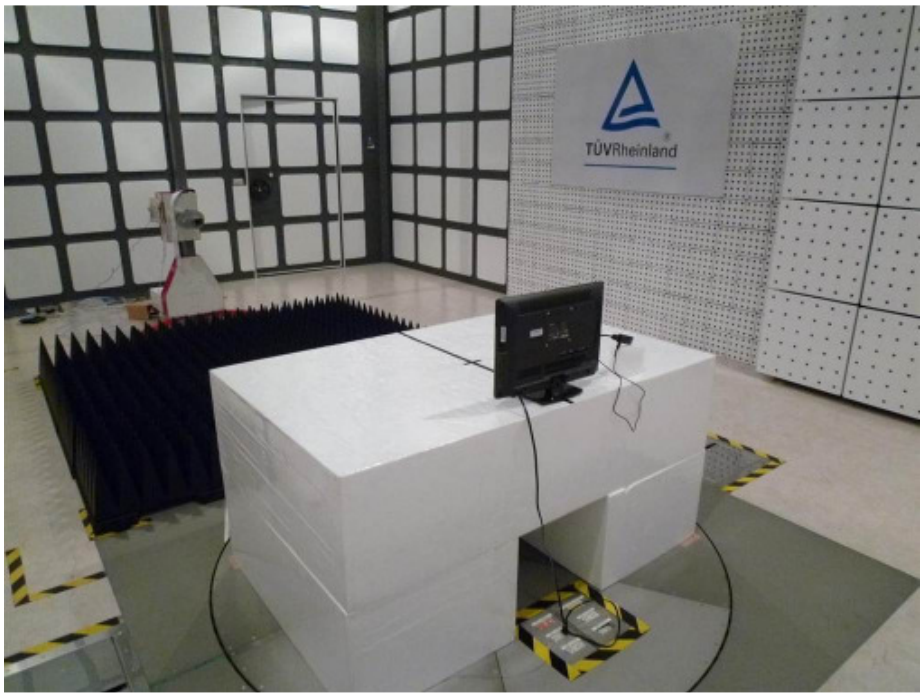
Picture 3: Radiated Emission, 1000 - 18000 MHz





Picture 4: Radiated Emission, 18000 - 26500 MHz





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