Prüfbericht - Nr.: *Test Report No.:*	**21126237_001**	**Seite 1 von 40** *Page 1 of 40*

Auftraggeber: *Client:*	**F. H. Papenmeier GmbH & Co. KG** Talweg 2 58239 Schwerte, Allemagne Tel. +49 2304 946-124 Fax +49 2304 946-246 Email h.villis@t-online.de
Gegenstand der Prüfung: *Test item:*	**Braille-Terminal**
Bezeichnung: *Identification:*	**BRAILLEX TRIO** **Serien-Nr.:** *Serial No.:* ---
Wareneingangs-Nr.: *Receipt No.:*	--- **Eingangsdatum:** *Date of receipt:* 2006-07-13
Prüfort: *Testing location:*	TÜV Rheinland Product Safety GmbH, Köln, Germany
Prüfgrundlage: *Test specification:*	**FCC 47 CFR Ch.1 Part 15 2006-08-14 Emission** Section 15.107 (a), limits same as IEC/CISPR 22:1997 (EN 55022:1998) Class B Section 15.207 (a) (Intentional radiator) Section 15.109 (a) Class B and/or (alternatively for „digital devices" (radiated el. noise)) Section 15.109 (g), i.e. IEC/CISPR 22:1997 (EN 55022:1998) Class B Section 15.209 (Intentional radiator) Section 15.247 (Intentional radiator)
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannten Prüfgrundlagen** *The test item passed the test specification(s)*
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland Product Safety GmbH, Köln, Germany FCC Registration No. 91096, 2004-07-27

geprüft / *tested by:*			**kontrolliert** / *reviewed by:*		
2007-04-27	J. Klassen, SV		2007-04-27	K. W. Friedrich, LL	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects*:

Anhang / *Annex:*

1. **Messdiagramme** / *Measurement Diagrams*
2. **Fotodokumentation** / *Photo Documentation*
3. **Bluetooth module type approval documentation (FCC ID ED9LMX9820ASM)**

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*

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Verwendete Messgeräte [used testequipment]

Verwendete Messgeräte sind in der linken Spalte mit einem Kreuz **x** markiert
[used instruments are marked with an **x** in the left column]

	Störaussendung [emission] Test / Gerät [test / device]	Type	Hersteller [manufacturer]	Inv. – Nr. /Ser. - Nr.	kal. bis [cal. till]
	Funkstörspannung / –strom [conducted disturbance]				
x	EMI Receiver 9kHz-30MHz	FMLK 1518 D	Schwarzbeck	14200382	2007-06
	EMI Receiver < 2,75GHz	ESCS 30	Rohde & Schwarz	14201360	2007-09
	EMI Receiver < 26,5GHz	ESU 26	Rohde & Schwarz	30401912	2007-12
	EMI Receiver < 26,5GHz	ESMI	Rohde & Schwarz	14200550	2007-07
	Netznachbildung [AMN]	NNLK 8121	Schwarzbeck	14200509	2006-10
	Netznachbildung [AMN]	NSLK 8126 rcps	Schwarzbeck	14200421	2008-05
x	Netznachbildung [AMN]	ESH 3-Z5	Rohde & Schwarz	14200683	2008-04
	HF-Stromwandler [curr. probe]	ESH2-Z1	Rohde & Schwarz	14200616	2008-10
	HF-Stromwandler [curr. probe]	EZ-17 02	Rohde & Schwarz	14200693	2006-10
x	Schirmkabine [shielded room]	B 83102 S1-X10	Siemens		
	Magnetische Feldstärke [magnetic fields]				
	EMI Receiver 9kHz-30MHz	FMLK 1518 D	Schwarzbeck	14200382	2007-06
	EMI Receiver < 2,75GHz	ESCS 30	Rohde & Schwarz	14201360	2007-09
	EMI Receiver < 26,5GHz	ESU 26	Rohde & Schwarz	30401912	2007-12
	Feldstärke Messzusatz	FMZB 1516	Schwarzbeck	14200464	2007-09
	Dreifachrahmenantenne	HM 020	Rohde & Schwarz	14200465	2007-07
	H/E-Field-Meter	ESM-100	Maschek	30401613	2007-08
	Schirmkabine [shielded room]	B 83102 S1-X10	Siemens		
	Semi Anechoic Chamber SAC		ETS	14201372	2007-05
	Elektr. Funkstörfeldstärke 1 [radiated disturbance OATS]				
	EMI Receiver 25-1000MHz	VUMA 1521 A	Schwarzbeck	14200621	2006-10
	EMI Receiver 25-1000MHz	VUMA 1524	Schwarzbeck	14200418	2007-01
	EMI Receiver < 2,75GHz	ESCS 30	Rohde & Schwarz	14201360	2007-09
	EMI Receiver < 26,5GHz	ESU 26	Rohde & Schwarz	30401912	2007-12
	EMI Receiver < 26,5GHz	ESMI	Rohde & Schwarz	14200550	2007-07
	Bikon. Ant 30-300MHz	BBA 9106 + 9103	Schwarzbeck	14200590	2008-03
	Log.-per. Ant 0,3-1GHz	UHALP 9108	Schwarzbeck	14200591	2008-03
	Log.-per. Ant 0,3-2GHz	UHALP 9108-A	Schwarzbeck	30401645	2007-03
	Freifeld-Messplatz [OATS]		TRPS GmbH	14200575	2007-06
	Elektr. Funkstörfeldstärke 2 [radiated disturbance SAC]				
	EMI Receiver 25-1000MHz	VUMA 1524	Schwarzbeck	14200418	2007-01
x	EMI Receiver < 2,75GHz	ESCS 30	Rohde & Schwarz	14201360	2007-09
	EMI Receiver < 26,5GHz	ESU 26	Rohde & Schwarz	30401912	2007-12
x	EMI Receiver < 26,5GHz	ESMI	Rohde & Schwarz	14200550	2007-07
x	BiConiLog-Ant 26-3000MHz	3142B	EMCO	14201363	2007-06
x	Horn-Ant 1-10GHz	BBHA 9120B 202	Schwarzbeck	14200694	2006-11
x	Horn-Ant 1-10GHz	BBHA 9120B 204	Schwarzbeck	14200695	2009-10

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	Horn-Ant	2-18GHz	BBHA 9120C 376	Schwarzbeck	30401857	2009-07
x	Horn-Ant	2-18GHz	BBHA 9120C 377	Schwarzbeck	30401858	2008-03
	Horn-Ant	15-26,5GHz	BBHA 9170 311	Schwarzbeck	30401855	2009-03
x	Horn-Ant	15-26,5GHz	BBHA 9170 312	Schwarzbeck	30401856	2009-03
x	Semi Anechoic Chamber SAC			ETS	14201372	2007-05

Netz-Oberschwingungen, Spannungsschwankungen und 60Hz Generator
[mains harmonic currents, voltage fluctuations and flicker and 60Hz generator]

x	Analyser-Reference-System	ARS 16/3	Spitzenb. + Spies	14200698	2006-12

	Weitere Messgeräte [other testequipment]	Type	Hersteller [manufacturer]	Inv. – Nr. /Ser. - Nr.	kal. bis [cal. till]
x	Digital-Multimeter	Metra Hit 16	ABB	14200346	2008-05
	Digital-Multimeter	Metra Hit 23S	Gossen	14200699	2007-08
	Netzteil 70V / 5A	NGPX 70/5	Rohde & Schwarz	Inv 107720	---
x	Oszilloskop [oscilloscope]	TDS 3052B	Tektronix	30401734	2007-12
	Oszilloskop [oscilloscope]	DSO 468	Tektronix	14200449	2007-11
x	Temperature / Humidity	615	testo	30401660	2007-05
x	Synth. Signal Generator	8673D	Hewlett Packard	14200696	2006-09

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Kalibrierung [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.

All measurement equipment calibrations are traceable to DKD or where calibration is performed outside Germany, to equivalent nationally recognized standards organizations.

Messunsicherheit [measurement uncertainty]

Where relevant, following measurement uncertainty levels have been estimated for tests performed on the apparatus.

	Expanded Uncertainty	
	U_{Lab}	U_{CISPR}
Conducted Emission 0,15 to 30 MHz, Power Line	2,70 dB	3,6 dB
Radiated Emission 9kHz to 30MHz, Magnetic Field 3m	4,16 dB	5,2 dB
Radiated Emission 30 to 300MHz, OATS 3m or 10m	5,11 dB	5,2 dB
Radiated Emission 300 to 1000MHz, OATS 3m	4,71 dB	5,2 dB
Radiated Emission 30 to 1000MHz, Semi Anechoic Chamber 3m	4,91 dB	5,2 dB
Radiated Emission 1000 to 2750MHz, Semi Anechoic Chamber 3m	4,89 dB	under consid.
Disturbance Power 30 MHz to 300 MHz, Power Ports	4,05 dB	4,5 dB

Calculated in accordance with UKAS LAB 34 2002-Aug
Uncertainty figures are valid to a confidence level of 95%

USA/FCC Registration

The measurement facilities for conducted and for radiated disturbances of TRPS GmbH in Cologne, Am Grauen Stein, has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. Measurement data will be accepted in conjunction with applications for Certification under Parts 15 and 18 of the Commission´s Rules.

Registration-Number: 91096 Date of Listing: 2004-July-27

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1. Vereinbarungen [requirements and agreements]

Auftragsgemäß wurde an dem vorgestellten Prüfling eine EMV-Prüfung durchgeführt. Die Prüfung erfolgte nach den folgenden Grundlagen.
[The tested device got investigated by the following requirements and standards]

Störaussendung [Emission]
FCC 47 CFR Ch.1 Part 15

Section 15.107 (a) limits same as IEC/CISPR 22:1997 Class B EN 55022:1998 Kl. B	Störspannung, AC-Eingang [conducted noise, AC power input] (Unintentional Radiator)
Section 15.207 (a) limits same as IEC/CISPR 22:1997 Class B EN 55022:1998 Kl. B	Störspannung, AC-Eingang [conducted noise, AC power input] (Intentional Radiator)
Section 15.109 (a) Class B	El. Störfeldstärke [radiated el. noise] (Unintentional Radiator)
and / or Section 15.109 (g), i.e. IEC/CISPR 22:1997 Class B EN 55022:1998 Kl. B	alternatively for „digital devices“ (radiated el. noise) El. Störfeldstärke [radiated el. noise] (Unintentional Radiator)
Section 15.209 Section 15.247 (b) (1)	El. Störfeldstärke [radiated el. noise] (Intentional Radiator)
ANSI C63.4:2003	Test Procedures

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Übersicht EMV-Prüfungen [Overview of EMC tests]

EUT Name	BRAILLEX TRIO
Testreport	TRPS GmbH EMC_21126235_001
Zielland [destination]	Europe CE, AUS
EUT Name	**BRAILLEX TRIO**
Testreport	**TRPS GmbH EMC_21126237_001**
Zielland [destination]	**USA FCC**

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1.1. Übersicht der Prüfergebnisse [Summary of test results]

Elektromagnetische Aussendung [Emission tests]	Ergebnis [result]
Funkstörspannung am Netzanschluss [Mains terminal disturbance voltage]	**PASS**
Funkstörspannung, Knackstörungen [Disturbance voltage, clicks]	N/A
Funkstörspannung/-strom [conducted cont. disturbance]	N/A
Funkstörleistung [Disturbance power]	N/A
Funkstörfeldstärke [Radiated disturbance] „Unintentional“	**PASS**
Funkstörfeldstärke [Radiated disturbance] „Intentional“	**PASS**
Elektromagn. Felder [electromagn. fields] EMF (EN50366)	N/A
Oberschwingungsströme [Harmonic current emissions]	N/A
Spannungsschwankungen [Voltage fluctuations]	N/A

Elektromagnetische Beeinflussbarkeit [Immunity tests]	Ergebnis [result]
Leitungsgeführte Störgrößen, induziert durch HF-Felder [Conducted disturbances, induced by radio frequency fields]	N/A
Hochfrequente elektromagnetische Felder [Radiated, radio-frequency electromagnetic fields]	N/A
Schnelle transiente elektrische Störgrößen/Burst [Electrical fast transient/burst]	N/A
Spannungseinbrüche, Kurzzeitunterbrechungen und Spannungsschwankungen [Voltage dips, short interruptions and voltage variations]	N/A
Stoßspannungen [Surge]	N/A
Entladung statischer Elektrizität [Electrostatic discharge]	N/A
Magnetfelder mit energietechn. Freq. [Power frequent magnetic fields]	N/A
EN 60335-1 A1:2004 19.11.4 Off/Standby Mode	N/A

Abkürzungen [abbreviations]:

Pass	Anforderungen erfüllt	[requirements fulfilled or test passed]
Fail	Anforderungen nicht erfüllt	[requirements not fulfilled or test failed]
N/A	Nicht anwendbar/gefordert	[not applicable/requested]
A/nT	Anwendbar, nicht getestet	[applicable, not tested]

Begründung für anwendbare, jedoch nicht durchgeführte Prüfungen
[Reason for applicable but not executed tests]

Nr. [No.]	Begründung [Reason]
---	---

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1.2. Einteilung des Prüflings [classification of EUT]

Der Prüfling wird klassifiziert in Kategorie
[The EUT is classified into category]

FCC 47CFR Part 15 Subpart B Section 15.101 Unintentional Radiator Other Class B digital devices and peripherals (EUT in USB Mode)	Verification
FCC 47CFR Part 15 Subpart C Section 15.201 Intentional Radiator (EUT in BlueTooth Mode)	Certification
FCC 47CFR Part 15 Subpart C Section 15.247 Operation within the bands … 2400-2483,5MHz … Equipment Class DSS	

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2. Informationen zum Prüfling [information about EUT]

Geräteart [kind of device]:	Siehe Seite 1 dieses Berichtes [refer to page 1 of this report]
Type:	Siehe Seite 1 dieses Berichtes [refer to page 1 of this report]
Ser. Nr.:	Siehe Seite 1 dieses Berichtes [refer to page 1 of this report]
FCC ID:	UI9-1860-TRIO
Gerätevarianten [EUT variants]:	Keine (identische Hardware für die Ländervarianten) [none (identical hardware for country versions)]
Nennspannung [rated voltage]:	EUT: DC 5,0V; per USB oder per interner Batterie/Akku [per USB or per internal battery/accu] SMPSU 1: AC 100 - 240V / DC 5,0V (in BT Mode) Auxiliary Equipment AE (PC): 100 – 240V
Netzfrequenz [frequency]:	EUT: DC SMPSU 1: 50 – 60Hz Auxiliary Equipment AE (PC): 50 – 60Hz
Nennstrom [rated current]:	Keine spezif. Daten vorhanden [no specific data available]
Nennleistung [rated power]:	< 10VA
Schutzklasse [protection class]:	SMPSU 1: I
Konstruktion/Aufbau: [constructional details]	Siehe Foto- bzw. System-Dokumentation [refer to photo and system documentation]
Abmessungen [dimensions]	
Gewicht [weight]:	NN
Schnittstellen [interfaces, ports]	
Eingang [input]:	DC_In per AC/DC-Adapter SMPSU 1 + USB connector
Intern [internal]:	---
Ausgang [output]:	---
Ein/Ausgang [bidir. I/O]	USB (cable) oder [or] BlueTooth

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EUT Information

EMV relevante Daten

Systemfreq. [system freq.]:	32,768kHz Quarz 3,0MHz Quarz 25,0MHz PLL 2,45GHz BlueTooth
Modulation	BlueTooth Specification
Antenna	Integral
Type of RF Equipment	Class 1
BlueTooth Transceiver	National Semiconductor LMX9820A
Filter [filter]:	SMPSU 1 mit EMI-Filter nach Med.-geräte-Spezifikation [SMPSU 1 with EMI filter by medical devices specification]
Erdung [grounding]:	Keine, bzw. per USB-Leitung und PC [none, respectively by USB cable and PC]
Schirmung [shielding]:	Kunstst.-Gehäuse mit innerer Schirmung und Metallboden [plastics enclosure with internal shielding and metal bottom]
Besondere EMV-Massnahmen [special EMC measures]:	---
Sonstiges [other aspects]:	Terminal mit a) Braille-Zeile 40-stellig b) Braille-Tastatur c) Maus-Funktionen

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Betriebsart während der Prüfungen [EUT mode]:

1 Standby

2 System in Funktion und interaktive Funktionstests
[system operating and interactively functional tests]
USB Interface
EUT DC-Versorgung per USB Interface
[DC supply per USB interface]
AE PC AC versorgt [AC supplied] (SMPSU 2)

Im USB Modus wird der BT Modul abgeschaltet
[In USB Mode BT module is switched off]

3 System in Funktion und interaktive Funktionstests
[system operating and interactively functional tests]
USB Interface
EUT DC-Versorgung per USB Interface
[DC supply per USB interface]
AE PC in Batteriebetrieb [battery operated]

Im USB Modus wird der BT Modul abgeschaltet
[In USB Mode BT module is switched off]

4 System in Funktion und interaktive Funktionstests
[system operating and interactively functional tests]
Bluetooth Interface
DC-Versorgung per interner Batterie
[DC supply per internal battery]

5 System in Funktion und interaktive Funktionstests
[system operating and interactively functional tests]
Bluetooth Interface
DC-Versorgung per interner Batterie mit angeschlossenem Ladegerät
[DC supply per internal battery and connected battery charger]

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3. Prüfaufbau [EUT configuration]

Der Prüfaufbau erfolgte entsprechend den Angaben der genannten EMV-Normen.
Die Messungen und Tests wurden unter "worst case"-Bedingungen durchgeführt, d.h., es wurden typische Anordnungen und Betriebszustände gewählt bzw. angenommen und für maximale Störaussendung optimiert (sogenannte "Ungünstigste Konfiguration").
Die maximalen Störaussendungswerte wurden dokumentiert.
Einzelheiten sind (auch) der Fotodokumentation zu entnehmen, in der die Konfigurationen maximaler Störaussendung dargestellt sind.
Soweit nicht anders angegeben, gelten diese Angaben für alle nachfolgenden Messungen.

[The test setup was made in accordance with mentioned EMC standards.
Measurements and tests were executed under "worst case" conditions. Typical EUT arrangements or operating modes were chosen or assumed and for maximum emission optimized (a so called "unfavourable configuration").
Maximum emissions are reported.
Details of test setup or adjustments are (also) shown inside the photo documentation, in which configurations of maximum emission are displayed.
As far as not mentioned otherwise these statements are valid for all following tests.]

Testkonfiguration [tested configuration]

Prüfling EUT: [Equipment Under Test]	Braille-Terminal BRAILLEX TRIO	
	Schaltnetzteil [switch mode power supply SMPSU 1]	
Verwendete Zusatzgeräte (AE): [auxiliary equipment]	Notebook PC Acer 722 Tx	
	Schaltnetzteil [switch mode power supply SMPSU 2]	
	USB-Kabel	
	oder [or]	
	Bluetooth/USB-Adapter (Belkin) at PC	
Versorgung [supply]:	Wie in Kap. 2 [same as in chapter 2]	
	AUS : U_{NOM} AC 240V 50Hz	(additionally)
	CE, NZ : U_{NOM} AC 230V 50Hz	(additionally)
	USA FCC : U_{NOM} AC 120V 60Hz	(mandatory)
Testsoftware [testsoftware]:	F. H. Papenmeier GmbH & Co. KG	
Überwachung während Prüfung: [supervision during test]	Braille-Elemente	
	PC-Monitor	

Abkürzungen [abbreviations]	NN	Nicht bekannt [not named]
	NC	Nicht bestückt / kontaktiert [not connected]
	N/A	Nicht anwendbar [not applicable]
	N/T	Nicht getestet [not tested]

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4. Prüfungen [EMC tests]

4.1. Funkstörspannung an Netzanschlüssen 0,15 – 30 MHz
[conducted cont. disturbance at mains terminals]

Prüfgrundlage [test bases]: FCC Part 15 Class B Section 15.107 (a)
IEC/CISPR 22 Class B
EN 55022 Klasse B

Grenzwerte [limits] Funkstörspannung [cond. noise]		Quasi-Peak QP 9kHz	Mittelwert Av 9kHz
FCC Part 15.107 (a) Class B **FCC Part 15.207** IEC/CISPR 22 Class B EN 55022 Klasse B	0,15 - 0,5 MHz 0,5 - 5 MHz 5 - 30 MHz	66 - 56 dBµV 56 dBµV 60 dBµV	56 - 46 dBµV 46 dBµV 50 dBµV

FCC Part 15.107 (b) Class A IEC/CISPR 22 Class A EN 55022 Klasse A	0,15 - 0,5 MHz 0,5 - 5 MHz 5 - 30 MHz	79 dBµV 73 dBµV 73 dBµV	66 dBµV 60 dBµV 60 dBµV

Messung auf [tested port]: AC_In SMPSU 1 Battery Charger
AC_In SMPSU 2 Notebook PC

Länge der Versorg.-leitung [length]: ca. 2m

Betriebsart [EUT mode]: siehe Kap. 2 [refer to chapter 2]
Prüfaufbau [test setup]: siehe Kap. 3 [refer to chapter 3]

Messergebnis [test data]: siehe Anhang 1 [refer to appendix 1]

Anmerkungen [comments]:

Prüfergebnis [test result]:

X Anforderungen erfüllt [Req. fulfilled, Passed]
--- Anforderungen nicht erfüllt [Req. not fulfilled, Failed]
--- Informativ getestet [Informatively tested]
--- Nicht anwendbar/gefordert [Not Applicable/Requested]
--- Nicht getestet [Not tested]

Datum [date]: siehe Messwertediagramme [refer to test result diagrams]

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4.2. Funkstörspannung/-strom 0,01/0,15 - 30 MHz [conducted cont. disturbance]

Prüfgrundlage [test bases]: FCC Part 15 Class B Section 15.109 (g) (4)
IEC/CISPR 22 Class B
EN 55022 Klasse B

Grenzwerte [limits]

Funkstörspannung [cond. noise]		Quasi-Peak QP 9kHz	Mittelwert Av 9kHz
EN 55022 Klasse B Tab. 4	0,15 - 0,5 MHz 0,5 - 30 MHz	84 – 74 dBµV 74 dBµV	74 – 64 dBµV 64 dBµV
EN 55022 Klasse A Tab. 3	0,15 - 0,5 MHz 0,5 - 30 MHz	97 – 87 dBµV 87 dBµV	84 – 74 dBµV 74 dBµV

Funkstörstrom [RF current]		Quasi-Peak QP	Mittelwert Av
EN 55022 Klasse B Tab. 4	0,15 - 0,5 MHz 0,5 - 30 MHz	40 – 30 dBµA 30 dBµA	30 – 20 dBµA 20 dBµA
EN 55022 Klasse A Tab. 3	0,15 - 0,5 MHz 0,5 - 30 MHz	53 – 43 dBµA 43 dBµA	40 – 30 dBµA 30 dBµA

Messung auf [tested port]:

EN 55022: keine Messung gefordert [no measurement request.]
RS232, LPT, **USB**, FireWire

Länge der Leitung [length]: ---

Betriebsart [EUT mode]: ---
Prüfaufbau [test setup]: ---

Messergebnis [test data]: ---

Anmerkungen [comments]: Test ist aktuell von FCC nicht gefordert
[Test is actually not requested by FCC]

Prüfergebnis [test result]:

--- Anforderungen erfüllt [Req. fulfilled, Passed]
--- Anforderungen nicht erfüllt [Req. not fulfilled, Failed]
--- Informativ getestet [Informatively tested]
X Nicht anwendbar/gefordert [Not Applicable/Requested]
X Nicht getestet [Not tested]

Datum [date]: 2006-07-13

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4.3. El. Funkstörfeldstärke > 30 MHz, unerwünschte Nebenaussendungen
[radiated disturbance, unintentional radiator]

Prüfgrundlage [test bases]: FCC Part 15 Class B Section 15.109 (g), i.e. CISPR 22
IEC/CISPR 22 Class B
EN 55022 Klasse B

Grenzwerte [limits]		L1	L2
FCC Part 15.109 (g) Class B IEC/CISPR 22 Class B EN 55022 Klasse B	30 - 230 MHz 230 – 1000 MHz > 1000 MHz	30 dBµV/m 37 dBµV/m 44 dBµV/m	40 dBµV/m 47 dBµV/m 54 dBµV/m
FCC Part 15.109 (a) Class B **(FCC Part 15.209)**	30 - 88 MHz 88 – 216 MHz 216 – 960 MHz > 960 MHz	29,5 dBµV/m = 30 µV/m 33 dBµV/m = 50 µV/m 35,5 dBµV/m = 60 µV/m 43,5 dBµV/m = 150 µV/m	40 dBµV/m = 100 µV/m 43,5 dBµV/m = 150 µV/m 46 dBµV/m = 200 µV/m 54 dBµV/m = 500 µV/m
FCC Part 15.109 (g) Class A IEC/CISPR 22 Class A EN 55022 Klasse A	30 - 230 MHz 230 – 1000 MHz > 1000 MHz	40 dBµV/m 47 dBµV/m 50 dBµV/m	50 dBµV/m 57 dBµV/m 60 dBµV/m
FCC Part 15.109 (b) Class A	30 - 88 MHz 88 – 216 MHz 216 – 960 MHz > 960 MHz	39 dBµV/m = 90 µV/m 43,5 dBµV/m = 150 µV/m 46,5 dBµV/m = 210 µV/m 50 dBµV/m = 300 µV/m	49,5 dBµV/m = 300 µV/m 54 dBµV/m = 500 µV/m 57 dBµV/m = 700 µV/m 60,5 dBµV/m = 1000 µV/m
Obere Messfrequenz [upper freq. of measurement] FCC Part 15 Section 15.33 (b)	from 30MHz to 26,5 GHz		
Detektor, Bandbreite [detector, bandwidth] FCC Part 15 Section 15.35	< 1000 MHz > 1000 MHz ---	QP, 120 kHz Av, 1 MHz ---	
Messentfernung [distance]: Entf.-Formel [distance formula] by FCC Part 15.31 (f) (1) by EN 55022 10.6	 L2 = L1 + 20dB/dec. L2 = L1 * (d1/d2)	d1 = 10m = L1 + 20 * lg d1/d2	d2 = 3m = L1 + 10,46dB

Messort [location]: Absorberkammer [semi anechoic chamber]

Prüftisch [turn table]
Dimension 1,5m, Höhe [height] 0,8m
Material Holz, nichtleitend [wood, non-conductive]
Messentfernung [distance]: 3m
Ant.-Polarisation: horizontal / vertikal
Antennenhöhe [antenna height]: 1 ... 4m

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OATS / SAC

Field Strength Calculations:	The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows: Where: Field Strength = Measured Level + Antenna Factor + Cable Attenuation Factor – Amplifier Gain Example: FS = 30,0 + 7,4 + 1,1 - 0 = 38,5dBuV/m Level in uV/m = Common Antilogarithm [(38,5dBuV/m)/20] = 84,1uV/m
Betriebsart [EUT mode]:	siehe Kap. 2 und Anhang 1 [refer to chapter 2 and appendix 1] 2 (USB Mode)
Prüfaufbau [test setup]:	siehe Kap. 3 und Fotos [refer to chapter 3 and photographs]
Messergebnis [test data]:	siehe Anhang 1 [refer to appendix 1] Freq. < 30MHz and 11 – 26,5GHz : Es wurden keine weiteren Aussendungen beobachtet [no further emissions were observed]
Anmerkungen [comments]:	Zwecks Ausschluss von Fremdstörungen wurden die Messungen in der Absorberkammer ausgeführt [With respect to environmental noise measurements were taken in a semi anechoic chamber]
Prüfergebnis [test result]:	**X** Anforderungen erfüllt [Req. fulfilled, Passed] --- Anforderungen nicht erfüllt [Req. not fulfilled, Failed] --- Informativ getestet [Informatively tested] --- Nicht anwendbar/gefordert [Not Applicable/Requested] --- Nicht getestet [Not tested]
Datum [date]:	siehe Messwertediagramme [refer to test result diagrams]

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4.4. El. Funkstörfeldstärke,
[radiated disturbance, intentional radiator]

Prüfgrundlage [test bases]: FCC Part 15.209
FCC Part 15.247 (b) (1)
FCC Part 15.205

Grenzwerte [limits]		L2	L3
FCC Part 15.209	0.009 – 0.490 MHz		2400/F(kHz) 300m !
	0.490 – 1.705 MHz		2400/F(kHz)
	1.705 - 30 MHz	71,6 dBµV/m = 300 µV/m	31,6 dBµV/m = 30 µV/m
Detektor [detector]		QP, 120 kHz	QP, 120 kHz
Messentfernung [distance]:		d2 = 3m	d3 = 30m
Entf.-Formel [distance formula] by FCC Part 15.31 (f) (2)		L2 = L3 + 40 dB/dec.	

Grenzwerte [limits]		L2	L1
FCC Part 15.209	30 - 88 MHz	40 dBµV/m = 100 µV/m	29,5 dBµV/m
	88 – 216 MHz	43,5 dBµV/m = 150 µV/m	33 dBµV/m
	216 – 960 MHz	46 dBµV/m = 200 µV/m	35,5 dBµV/m
	> 960 MHz	54 dBµV/m = 500 µV/m	43,5 dBµV/m
Detektor [detector]	< 1000 MHz	QP, 120 kHz	
	> 1000 MHz	Av, 1 MHz	
Messentfernung [distance]:		d2 = 3m	d1 = 10m
Entf.-Formel [distance formula] by FCC Part 15.31 (f) (1) by EN 55022 10.6	L2 = L1 + 20 dB/dec. L2 = L1 * (d1/d2)	= L1 + 20 * lg d1/d2	= L1 + 10,46 dB

Grenzwerte [limits]

FCC Part 15.247	902 – 928 MHz	N/A
(b) (1)	**2400 - 2483,5 MHz**	**1 W = 30 dBm ERP**
	5725 – 5875 MHz	N/A
	outside these bands	Limits as FCC Part 15.209
Detektor [detector]		Pk
Messentfernung [distance]:		d2 = 3m

Obere Messfrequenz [upper freq. of measurement] FCC Part 15 Section 15.33 (a)	from 30MHz to 26,5GHz

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Messort [location]:	Absorberkammer [semi anechoic chamber]
Prüftisch [turn table]	
Dimension	1,5m, Höhe [height] 0,8m
Material	Holz, nichtleitend [wood, non-conductive]
Messentfernung [distance]:	3 m
Messmethode [method]	Substitution
Betriebsart [EUT mode]:	siehe Kap. 2 und Anhang 1 [refer to chapter 2 and appendix 1] EUT Modes 4 + 5 (BlueTooth = BT) EUT DC-Versorgung per int. Batterie, SMPSU 1 ist nur Ladegerät [EUT DC supply per internal battery, SMPSU 1 is charger only]
Prüfaufbau [test setup]:	siehe Kap. 3 [refer to chapter 3]
Messergebnis [test data]:	siehe Anhang 1 [refer to appendix 1] Observed EUT frequencies: 2,4015 … 2,4806GHz FCC Part 15.205 (2,4835 … 2,50GHz) is kept. Substitution: Effective Radiated Power ERP = Transmit Level - Antenna Gain + Cable Attenuation e. g. 3dBm - 9,85dBd + (-4,5)dB Freq. = 2,40 – 2,50GHz Transmit level ver = max 3dBm = max -11dBm ERP for Receive level = max –52dBm (ESMI Diagramm) Transmit level hor = max 15dBm = max 1dBm ERP for Receive level = max –60dBm (ESMI Diagramm) Limit USA FCC = max 30dBm ERP Freq. < 30MHz and 11 – 26,5GHz : Es wurden keine weiteren Aussendungen beobachtet [no further emissions were observed]
Messunsicherheit [measurement uncertainty]	Erweiterte Messunsicherheit [expanded uncertainty) = 3,22 dB (EN 300328-2: max +/- 6dB)
Anmerkungen [comments]:	107dBuV = 0dBm
Prüfergebnis [test result]:	**X** Anforderungen erfüllt [Req. fulfilled, Passed] **---** Anforderungen nicht erfüllt [Req. not fulfilled, Failed] **---** Informativ getestet [Informatively tested] **---** Nicht anwendbar/gefordert [Not Applicable/Requested] **---** Nicht getestet [Not tested]
Datum [date]:	siehe Messwertediagramme [refer to test result diagrams]

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4.5. Bluetooth Modul Dokumentation [Bluetooth module documentation]

Vorstehend beschriebene Messungen nach FCC Part 15.247 (b) (1) wurden am Gesamt-Gerät Braillex TRIO vorgenommen.
Der verwendete Bluetooth-Modul weist bereits eine eigene FCC Zertifizierung und ID Nummer auf.

[Previously described measurements by FCC Part 15.247 (b) (1) were executed on complete device Braillex TRIO.
Used Bluetooth module is already FCC certified and it is showing an own FCC ID number.]

Geräteart [kind of device]:	Bluetooth transceiver
Type:	LMX9820A
Ser. Nr.:	---
FCC ID:	ED9LMX9820ASM

Documentation	Official correspondence (FCC) and NS Application Note (BTm_Part1.pdf)
	InterLab FCC Measurement/Technical Report on Bluetooth transceiver LMX9820A 4_Natsc_IRV_0104_BTT_FCCa 2004-July-12 (BTm_Part2.pdf)
	Supplement I to Test Report: 4_Natsc_IRV_0104_BTT_FCCa 2005-Sep-06 Band edge compliance (BTm_Part2-1.pdf and BTm_Part2-2.pdf)
	Annex Additional declaration part according FCC 15.247 for Bluetooth™ Devices 2002-Jun-01 (BTm_Part3.pdf)
	National Semiconductor LMX9820A Bluetooth™ Serial Port Module (BTm_Part4.pdf)

Above mentioned BT module documentation is added to this TRPS Testreport of Braillex TRIO.
Therein you can find certain tests, as follows:

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Bluetooth Modul Dokumentation [Bluetooth module documentation]

FCC Part	Requirement / Measurement	Where to find	
15.247 (a) (1)	Carrier frequency separation	BTm_Part2.pdf	4.7
15.247 (a) (1) (iii)	Number of hopping frequencies		4.8
15.247 (a) (1) (iii)	Time of occupancy (dwell time)		4.6
15.247 (a) (1) (ii)	Spectrum bandwidth of a FHHS system / 20 dB BW		4.1
15.247 (b) (1)	Peak output power		4.2
15.247 (c)	Band-edge compliance of RF emission		4.5
15.247 (d)	Band-edge compliance of RF cond. emission (Tx)		4.5
15.205	Band-edge compliance of RF emission, restricted bands	BTm_Part2.pdf and TRPS Testreport	4.5.2 and 4.4
15.247 (c)	Spurious emissions radiated	BTm_Part2.pdf	4.4
15.247 (d)	Spurious emissions radiated (Tx)		4.4
15.247 (d)	Spurious emissions conducted (Tx)		4.3
	Equivalent radiated power		4.2
15.107 15.207 (a)	Power line conducted emission a) In USB Mode there is no direct connection from EUT Braillex TRIO to AC mains (only per PC) b) In BT Mode the EUT Braillex TRIO is battery driven. The only possible connection to AC mains can be done by the power supply unit for battery charging.	BTm_Part2.pdf and TRPS Testreport	4.3 and 4.1
15.109 15.209	Radiated emission from Digital Part and Receiver L.O.	TRPS Testreport	4.3 4.4
15.203	Antenna connector requirement Small BT antenna is fixed on the PCB (ceramic chip antenna left of IC), there is no connection to external.	BTm_Part1.pdf	NS App. Note

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4.6. Maximum Permissible Exposure MPE and Specific Absorption Rate SAR

Prüfgrundlage [test bases]:

FCC Part 1.1307 … 1.1311
FCC Part 2.1091, 2.1093
FCC Part 15.247 (b) (4)
FCC Part 15.247 (i)
Industry Canada RSS-102
Health Canada Safety Code 6

Max Permissible Exposure MPE

EIRP = P * G
P = Peak outp. power (mW)
G = Antenna Gain (num.)

1 dBm = 1,26mW (measured, Testreport Chapter 4.4)

2,12 dBm = 1,629mW (worst case, BTm_Part1.pdf page 2)

Frequency: 2,45GHz (> 1,5GHz)

Max allowable Power Density W_{Limit}: 1,0 mW / cm^2 (General Population, Uncontrolled Exposure)

Minimum/Safe Distance r_{min} = $[EIRP / (4 * Pi * W_{Limit})]^{0,5}$

= 0,32cm (measured)
= 0,36cm (worst case)

Specific Absorption Rate SAR

The tested terminal Braille TRIO is a so called mobile device, distance between this device and any human body is > 20cm. Evaluation therefore is not requested for distances > 20cm.

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Anhang 1
[Appendix 1]

Messdiagramme
[Test Data]

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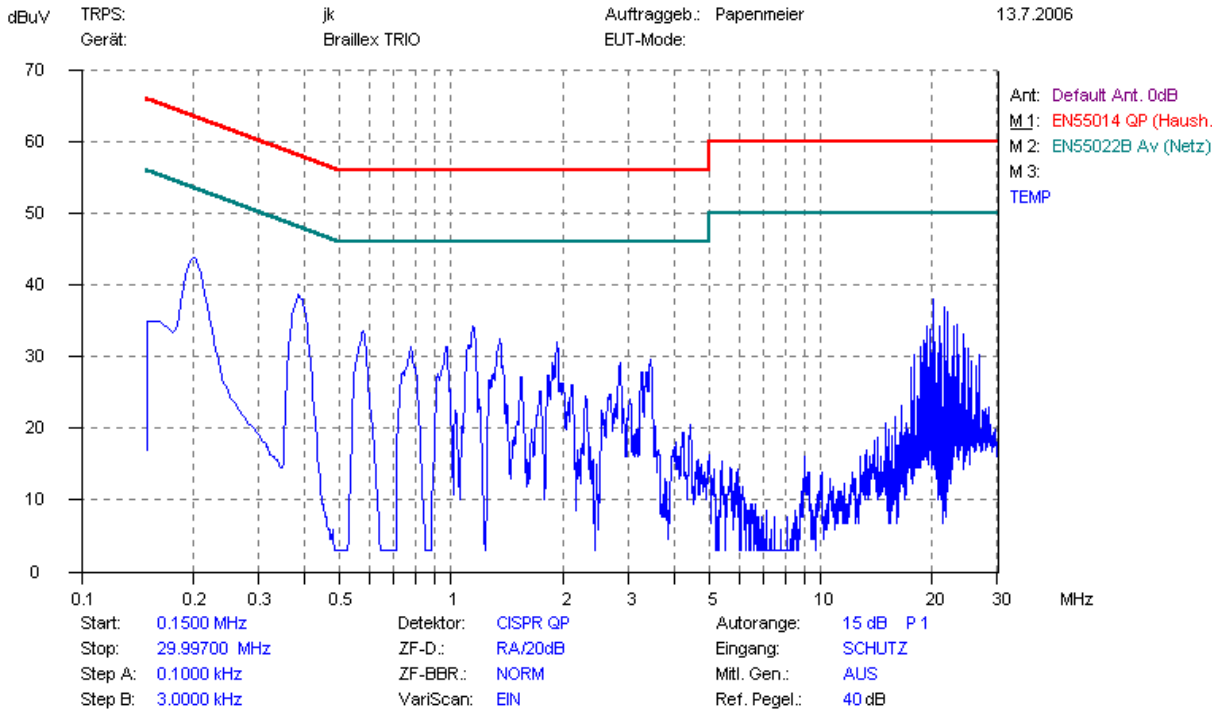
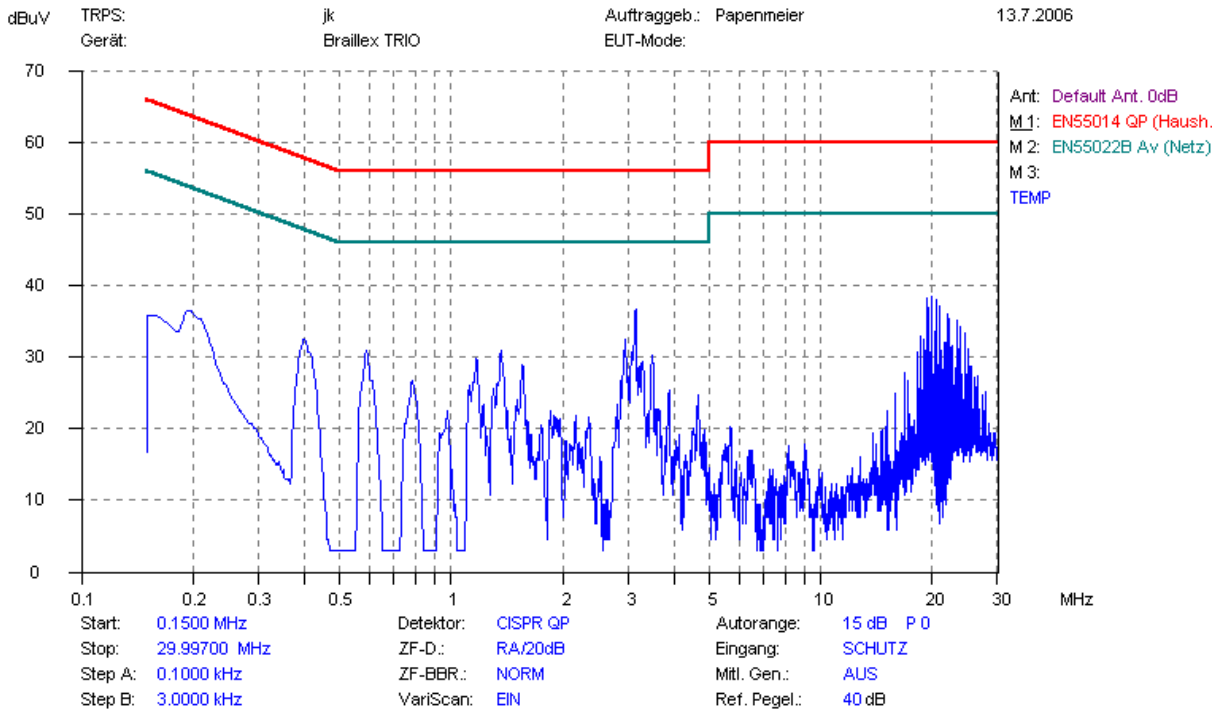
Funkstörspannung [cond. noise]
AC 120V / 60Hz charge NiMH accu BT active (EUT SMPSU 1)



AC 132V / 60Hz charge NiMH accu BT active (EUT SMPSU 1)



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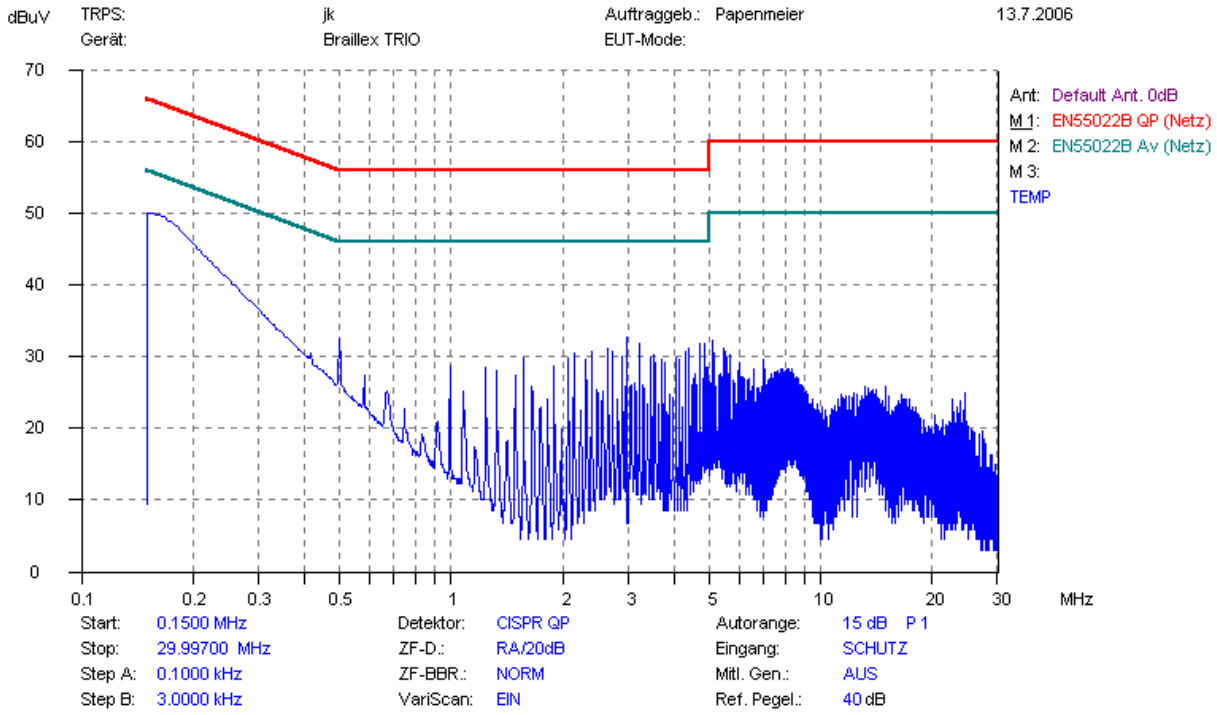
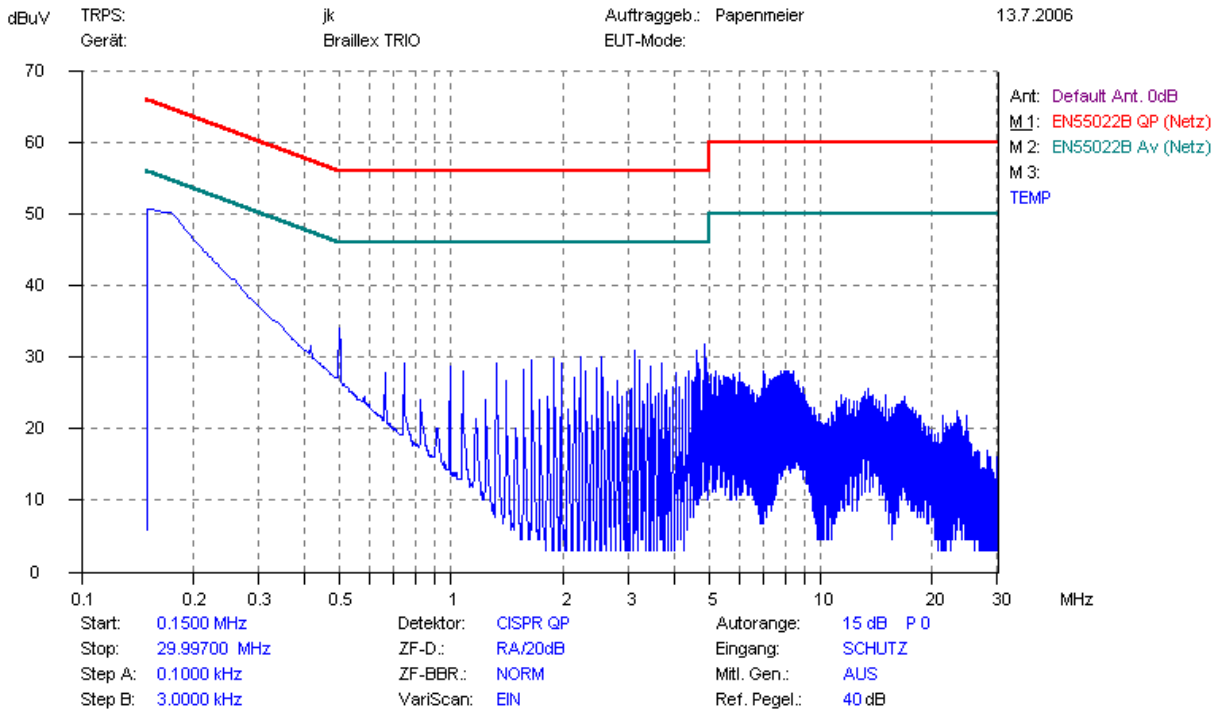
Funkstörspannung [cond. noise]
AC 120V / 60Hz USB Mode (PC SMPSU 2)



AC 132V / 60Hz USB Mode (PC SMPSU 2)



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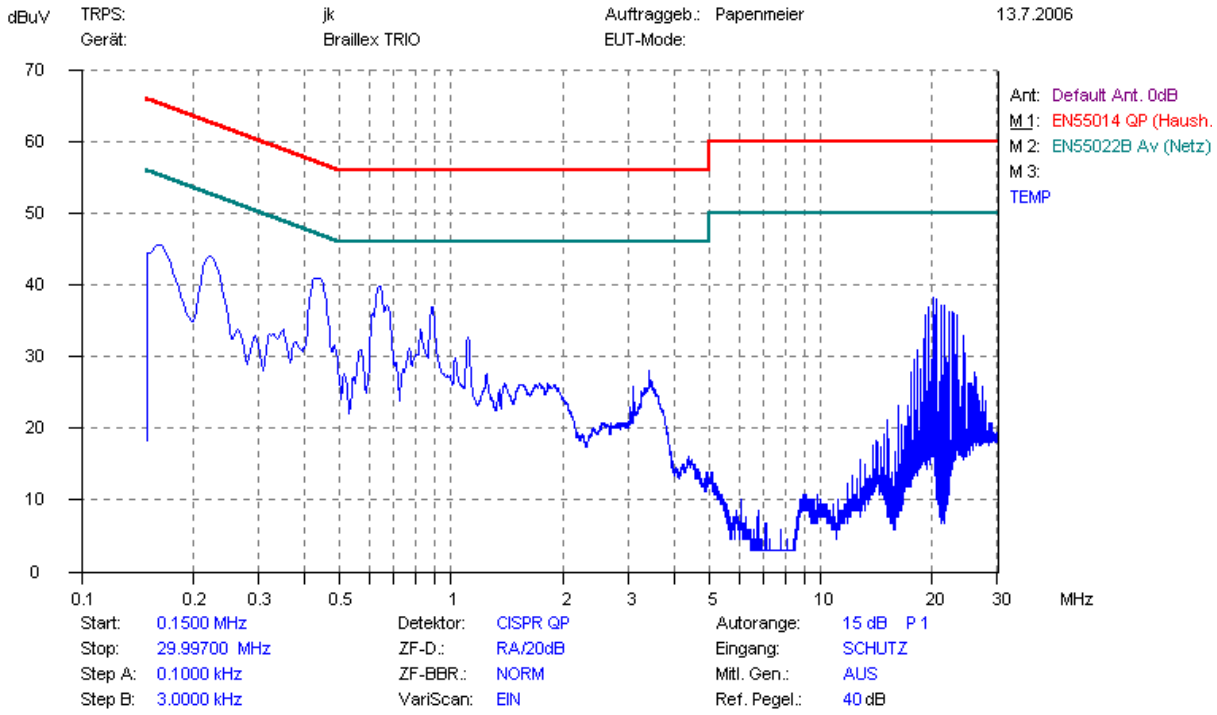
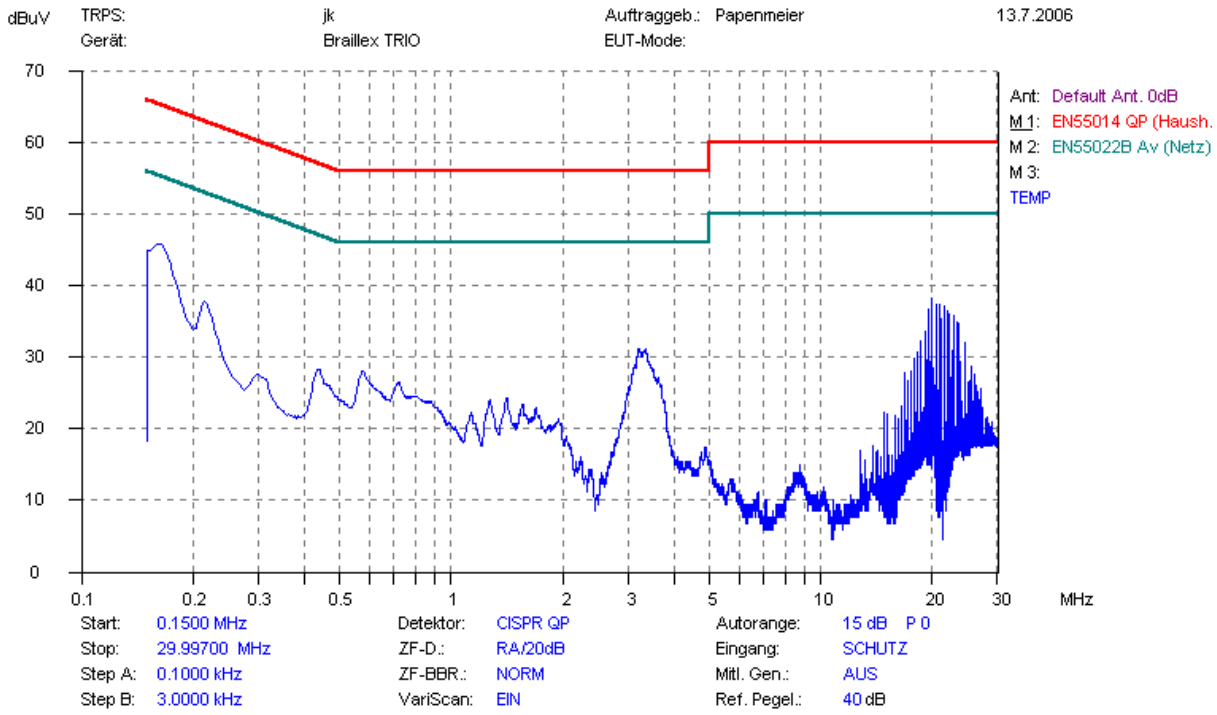
Funkstörspannung [cond. noise]
AC 230V / 50Hz charge NiMH accu BT active (EUT SMPSU 1)



AC 240V / 50Hz charge NiMH accu BT active (EUT SMPSU 1)



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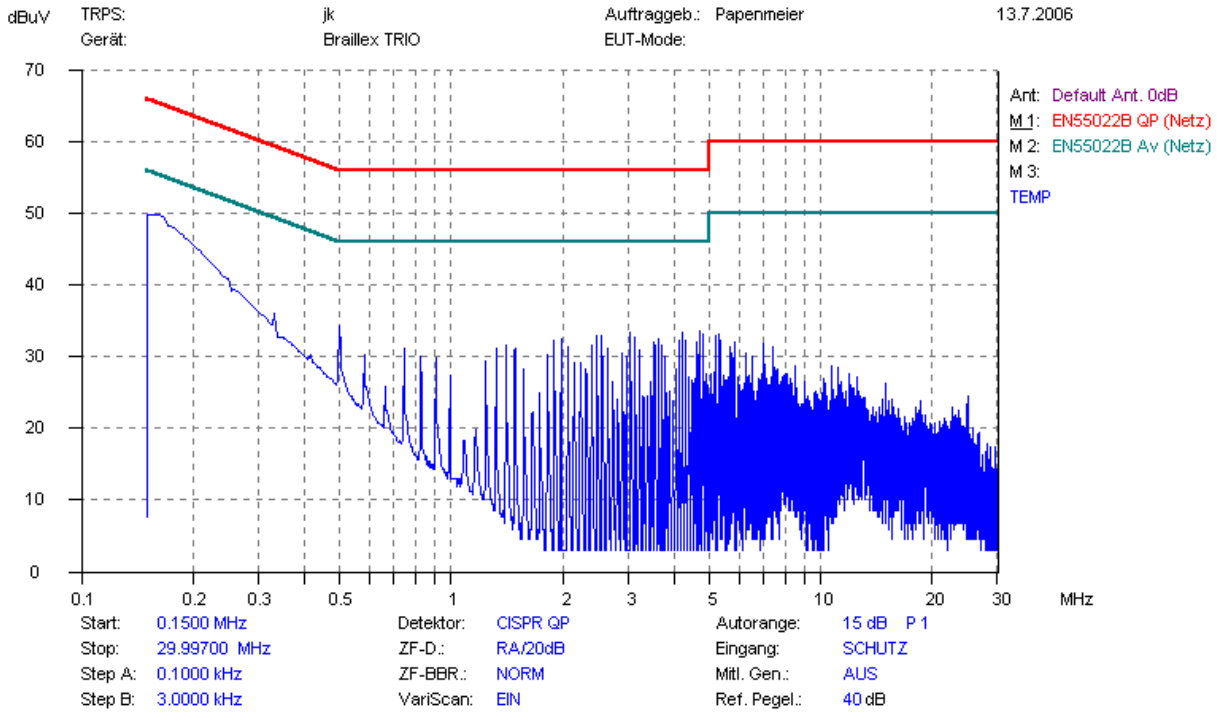
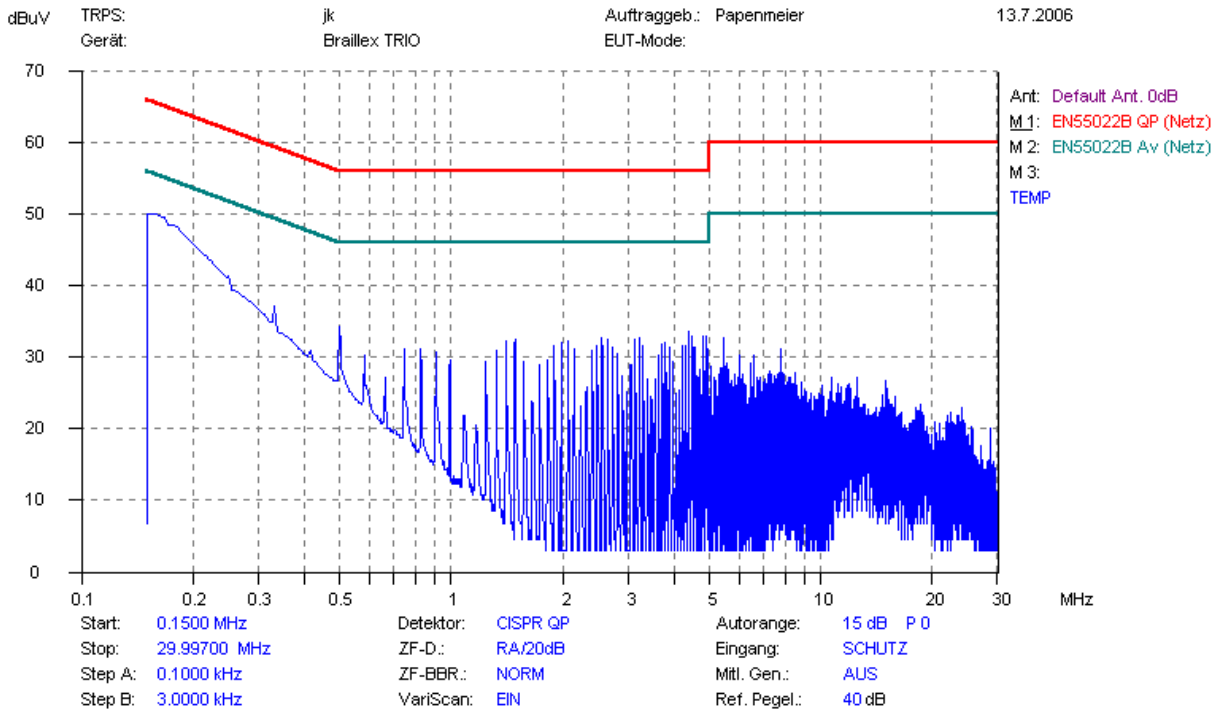
Funkstörspannung [cond. noise]
AC 230V / 50Hz USB Mode (PC SMPSU 2)



AC 240V / 50Hz USB Mode (PC SMPSU 2)



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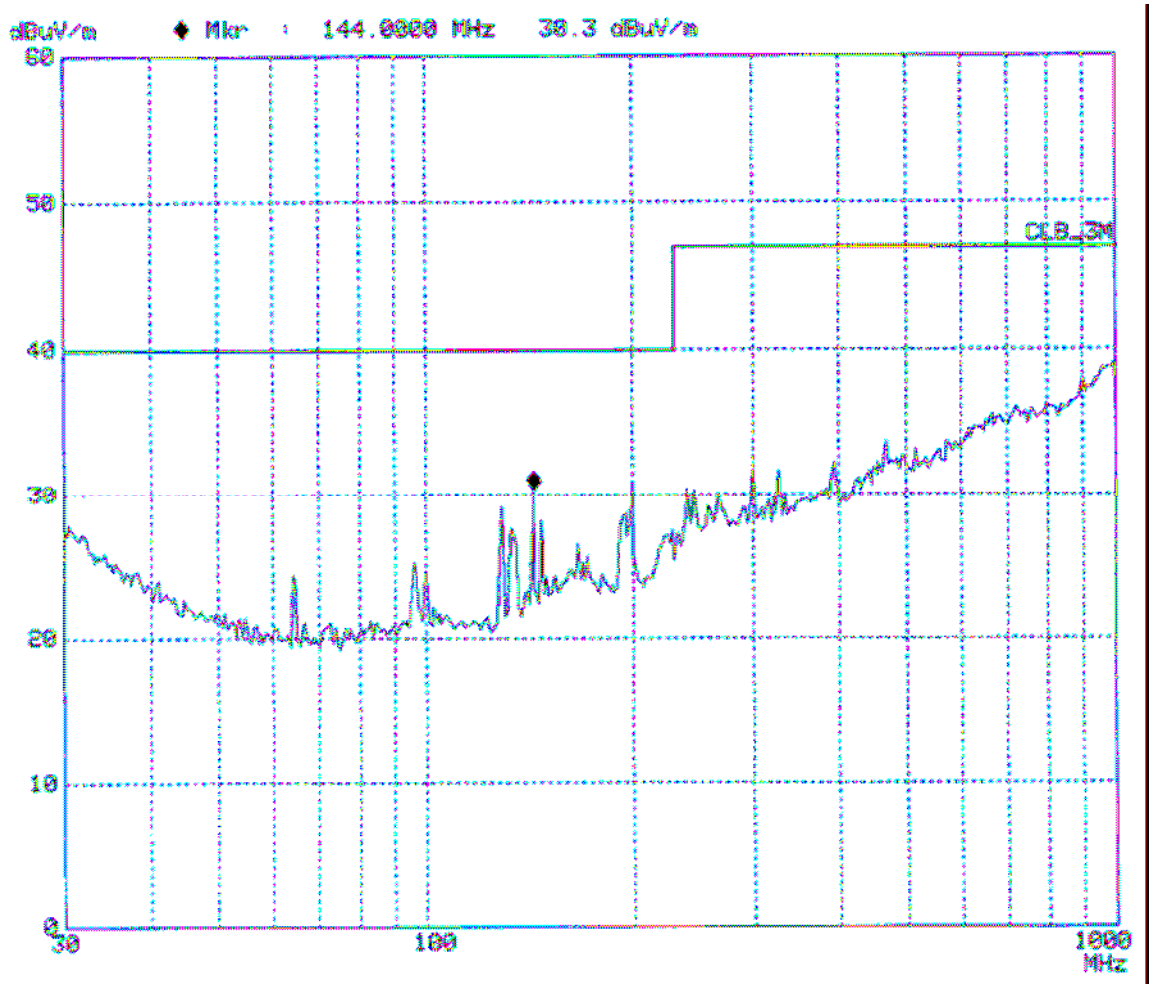
Funkstörfeldstärke [radiated el. noise] SAC

PreScan vertical, EUT Mode = 2 (USB)



v1

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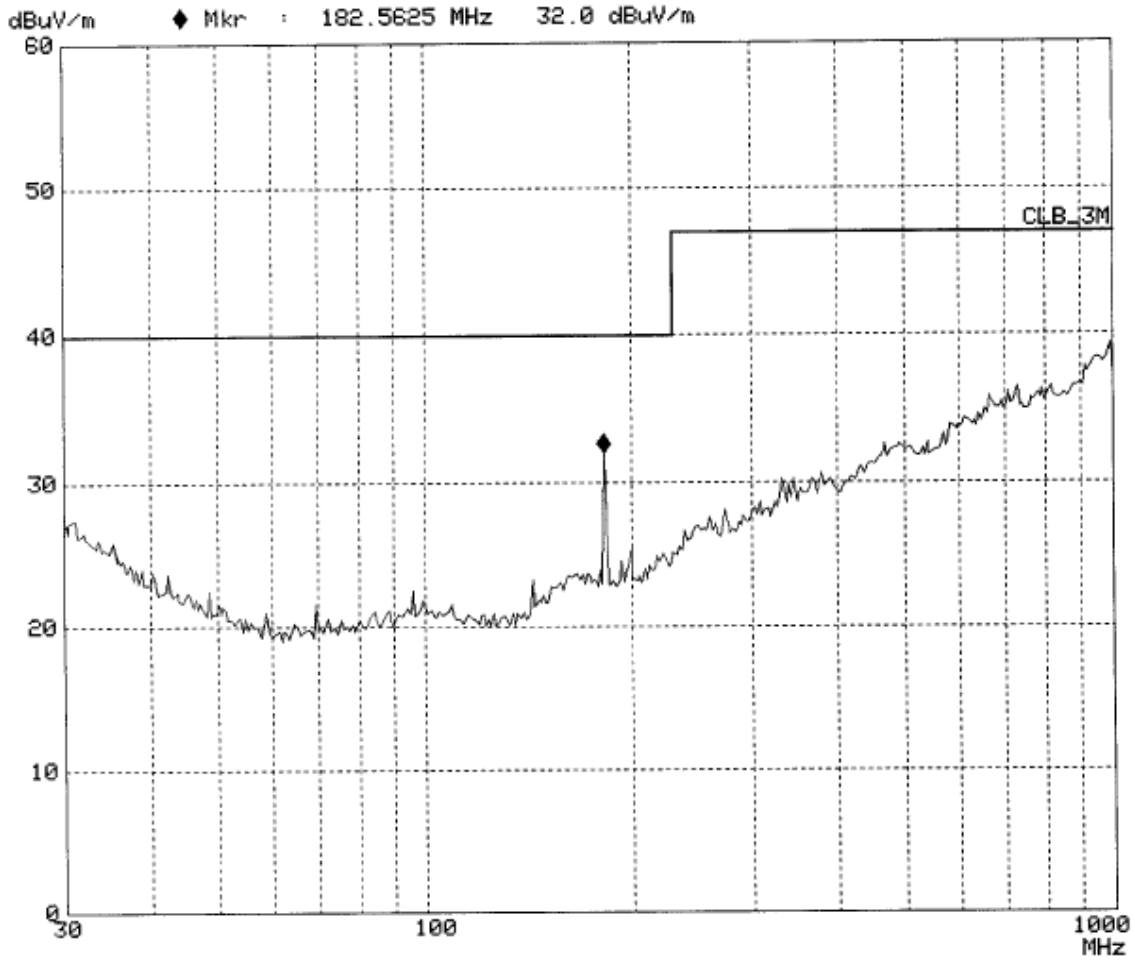
Funkstörfeldstärke [radiated el. noise] SAC

PreScan horizontal, EUT Mode = 2 (USB)



h1

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Funkstörfeldstärke [radiated el. noise] SAC

Testbasis: EN 55022 / CISPR 22 Cl.B (3m)
Client: Papenmeier
Test item: Braille Terminal
Identification: TRIO
tested by: jk
Date: 2006-07-13
Remark: PASSED
EUT-Mode: 2 (USB)
Filename: PAP39_U.EMA

USB Mode

Radiated Disturbance 30 - 1000 MHz

Frequenc y	Measured value		Correction		Level		Limit	Deviation
	horizontal	vertical	horizontal	vertical	horizontal	vertical		
[MHz]	dBµV	dBµV	dB1/m	dB1/m	dBµV/m	dBµV/m	dBµV/m	dBµV/m
64,19	-	19,0	0,0	0,0	0,0	19,0	40,0	-21,0
96,00	-	25,0	0,0	0,0	0,0	25,0	40,0	-15,0
129,25	-	26,0	0,0	0,0	0,0	26,0	40,0	-14,0
144,00	-	30,0	0,0	0,0	0,0	30,0	40,0	-10,0
182,56	16,0	-	0,0	0,0	16,0	0,0	40,0	-24,0
199,94	-	30,0	0,0	0,0	0,0	30,0	40,0	-10,0
299,94	-	23,0	0,0	0,0	0,0	23,0	47,0	-24,0
326,13	-	30,0	0,0	0,0	0,0	30,0	47,0	-17,0
466,50	-	28,0	0,0	0,0	0,0	28,0	47,0	-19,0

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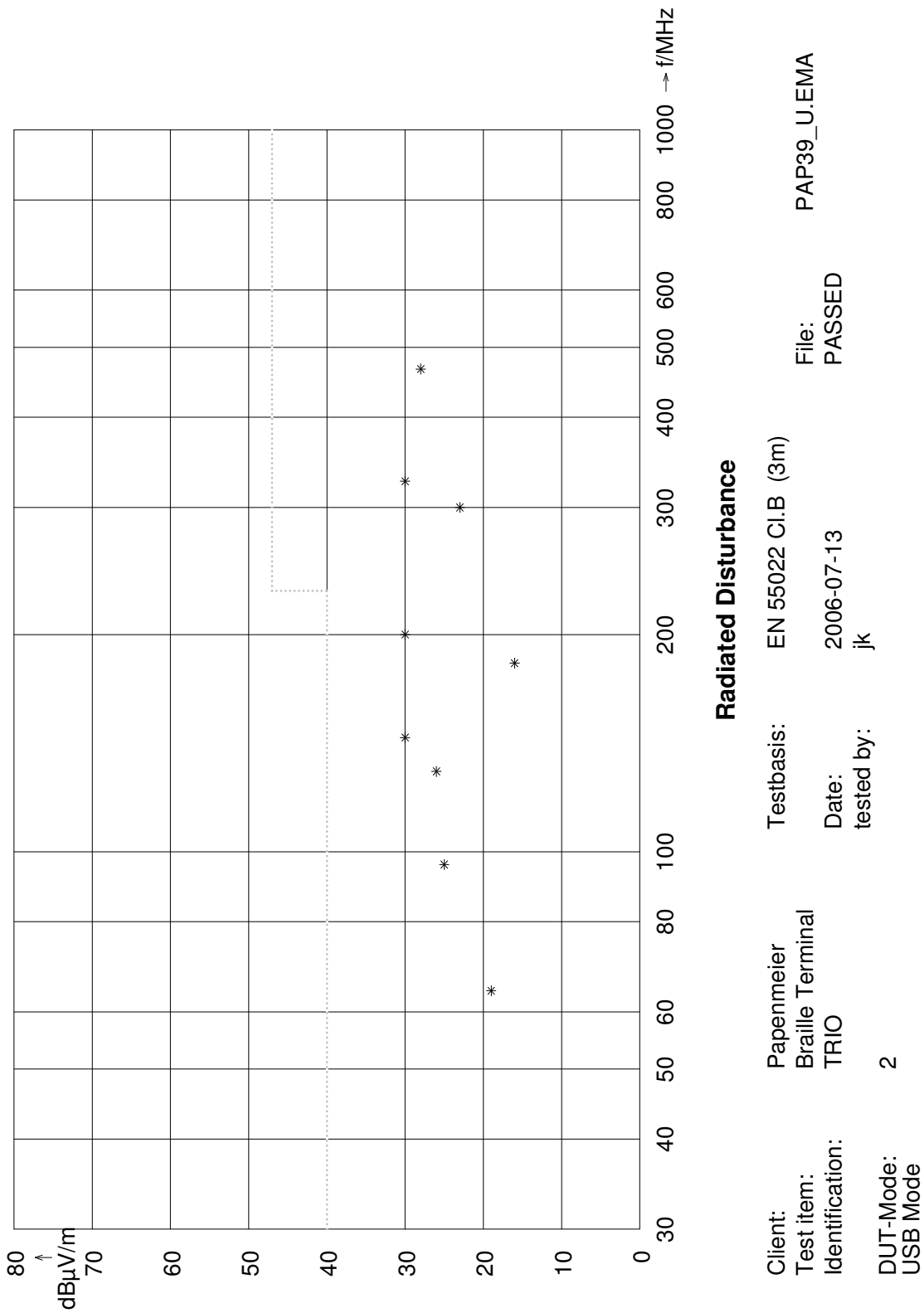
Funkstörfeldstärke [radiated el. noise] SAC



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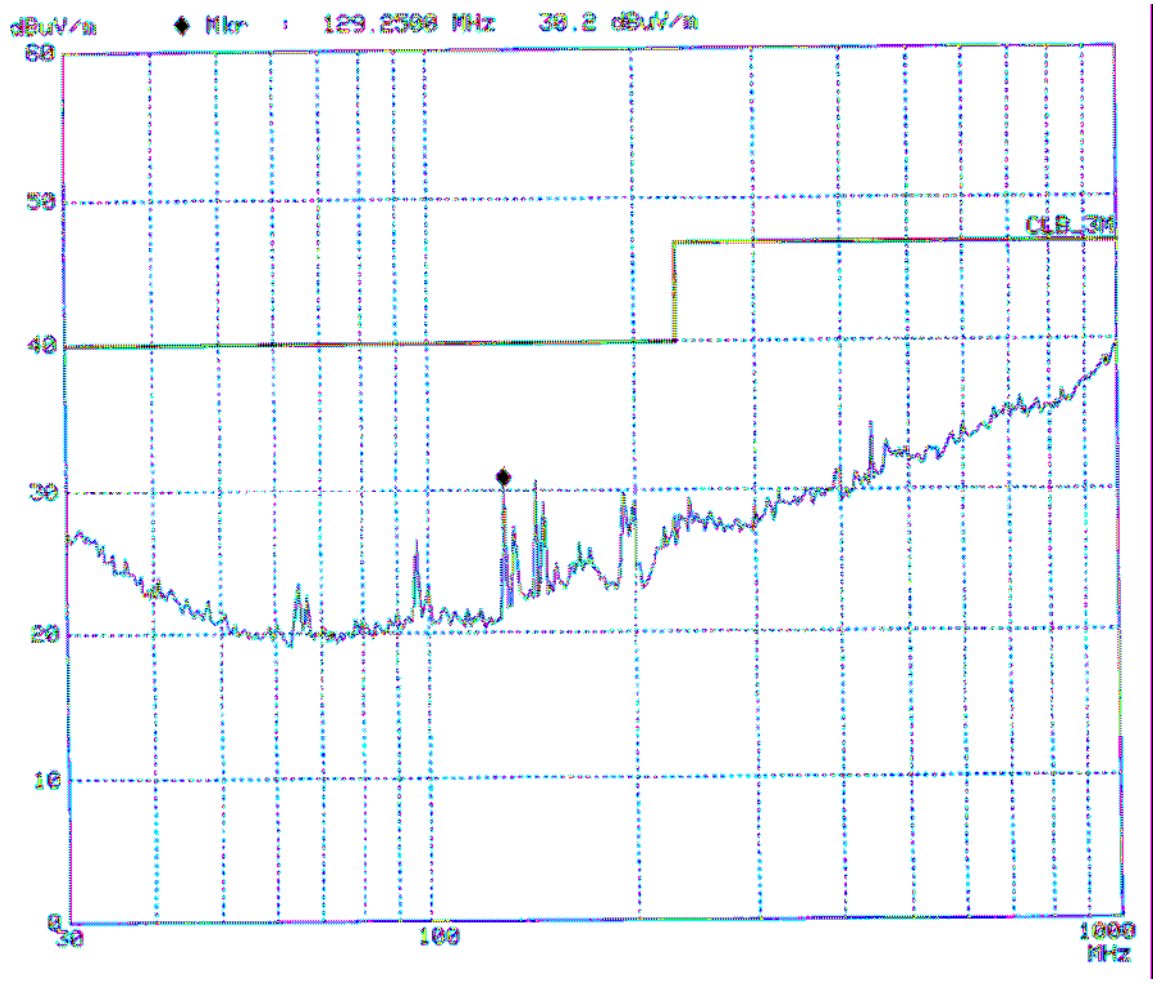
Funkstörfeldstärke [radiated el. noise] SAC

PreScan vertical, EUT Mode = 4 (BT)



v2

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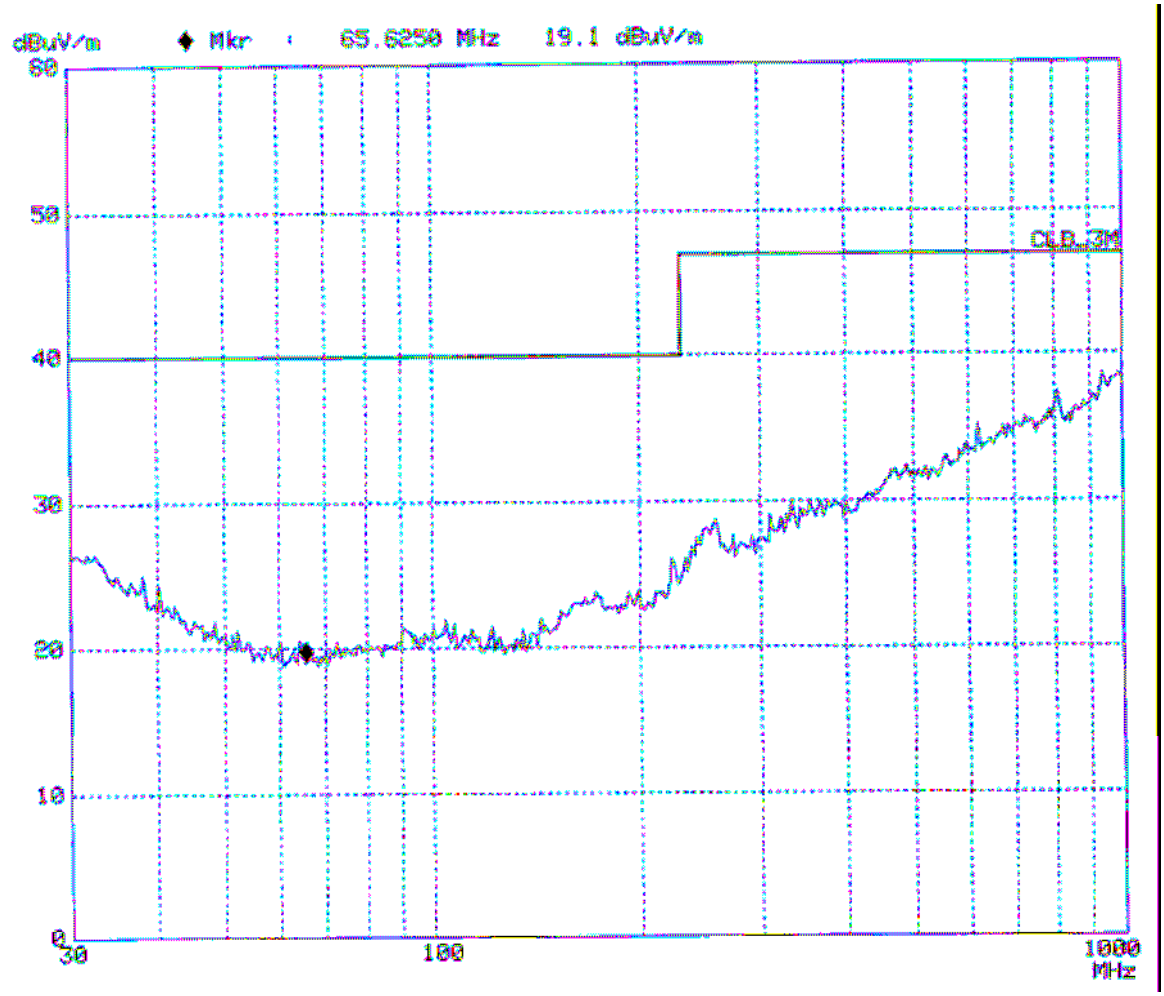
Funkstörfeldstärke [radiated el. noise] SAC

PreScan horizontal, EUT Mode = 4 (BT)



h2

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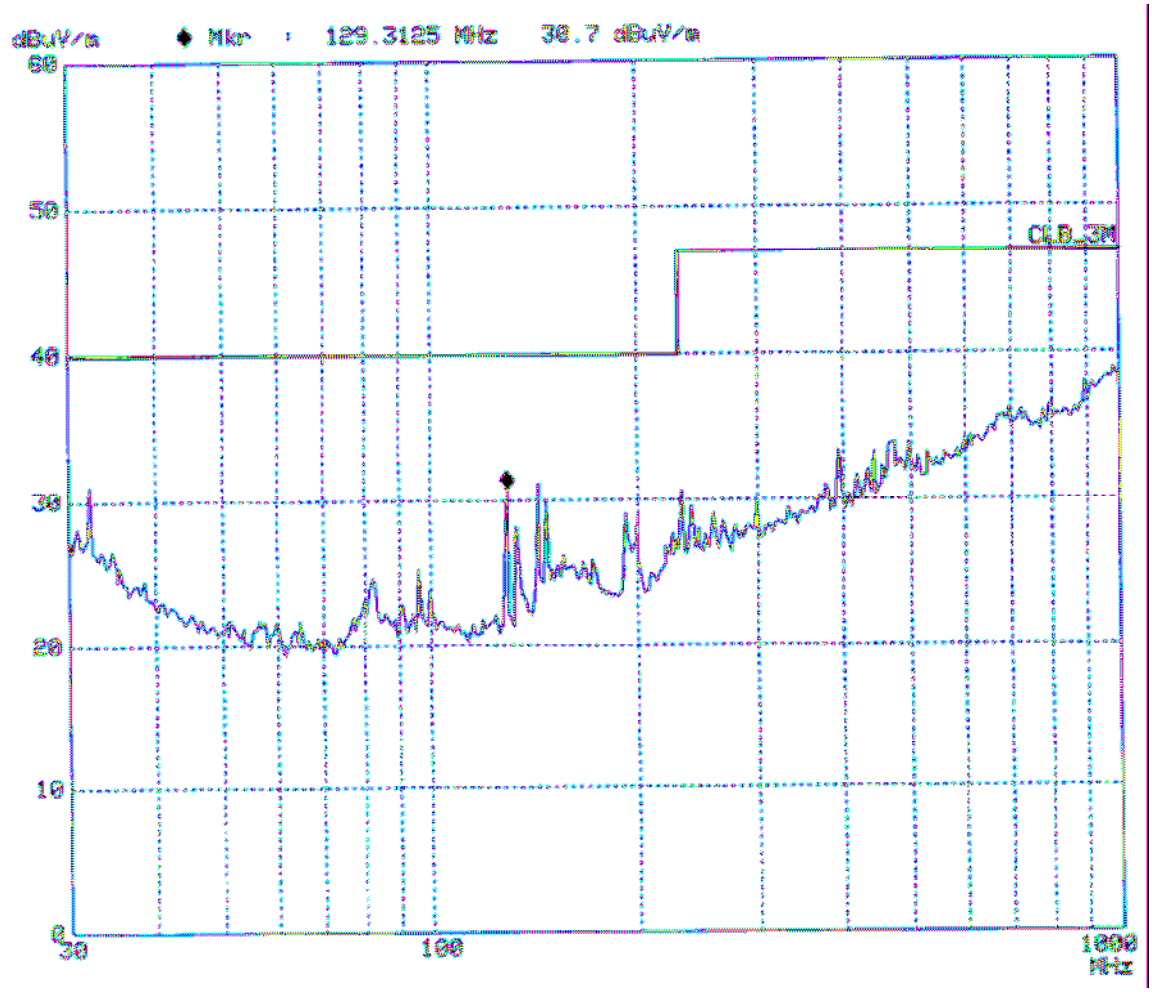
Funkstörfeldstärke [radiated el. noise] SAC

PreScan vertical, EUT Mode = 5 (BT)



v3

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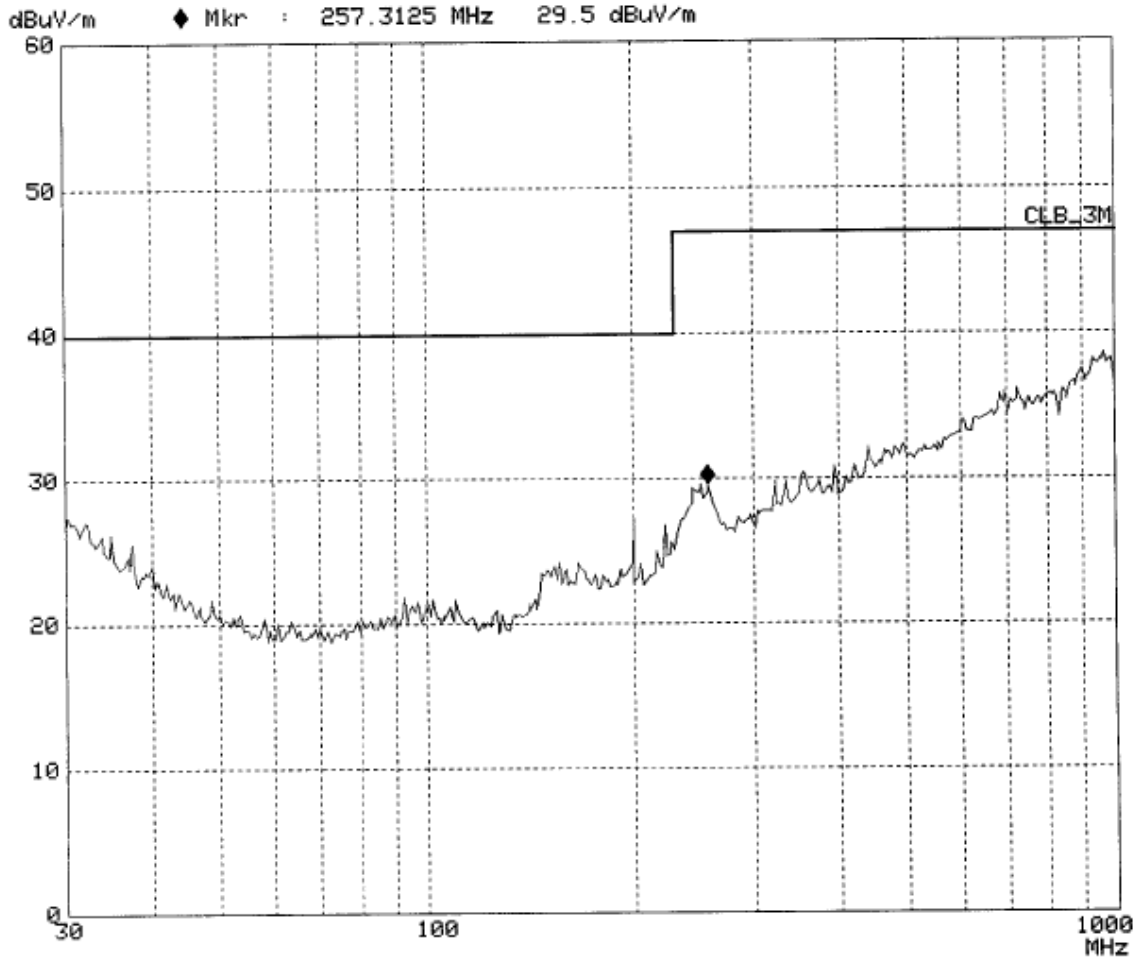
Funkstörfeldstärke [radiated el. noise] SAC

PreScan horizontal, EUT Mode = 5 (BT)



h3

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Funkstörfeldstärke [radiated el. noise] SAC

Testbasis: EN 55022 / CISPR 22 Cl.B (3m)
Client: Papenmeier
Test item: Braille Terminal
Identification: TRIO
tested by: jk
Date: 2006-07-13
Remark: PASSED
EUT-Mode: 4 ... 5 (BT)
Filename: PAP39_B.EMA

BT Mode

Radiated Disturbance 30 - 1000 MHz

Frequenc y	Measured value		Correction		Level		Limit	Deviation
	horizontal	vertical	horizontal	vertical	horizontal	vertical		
[MHz]	dBµV	dBµV	dB1/m	dB1/m	dBµV/m	dBµV/m	dBµV/m	dBµV/m
32,19	-	28,0	0,0	0,0	0,0	28,0	40,0	-12,0
64,63	-	17,0	0,0	0,0	0,0	17,0	40,0	-23,0
82,44	-	20,0	0,0	0,0	0,0	20,0	40,0	-20,0
96,00	-	25,0	0,0	0,0	0,0	25,0	40,0	-15,0
129,25	-	27,0	0,0	0,0	0,0	27,0	40,0	-13,0
129,31	-	28,0	0,0	0,0	0,0	28,0	40,0	-12,0
133,25	-	27,0	0,0	0,0	0,0	27,0	40,0	-13,0
144,00	-	30,0	0,0	0,0	0,0	30,0	40,0	-10,0
147,44	-	27,0	0,0	0,0	0,0	27,0	40,0	-13,0
192,00	-	29,0	0,0	0,0	0,0	29,0	40,0	-11,0
199,94	-	27,0	0,0	0,0	0,0	27,0	40,0	-13,0
232,18	-	20,0	0,0	0,0	0,0	20,0	47,0	-27,0
393,25	-	29,0	0,0	0,0	0,0	29,0	47,0	-18,0
442,38	-	27,0	0,0	0,0	0,0	27,0	47,0	-20,0
474,25	-	26,0	0,0	0,0	0,0	26,0	47,0	-21,0

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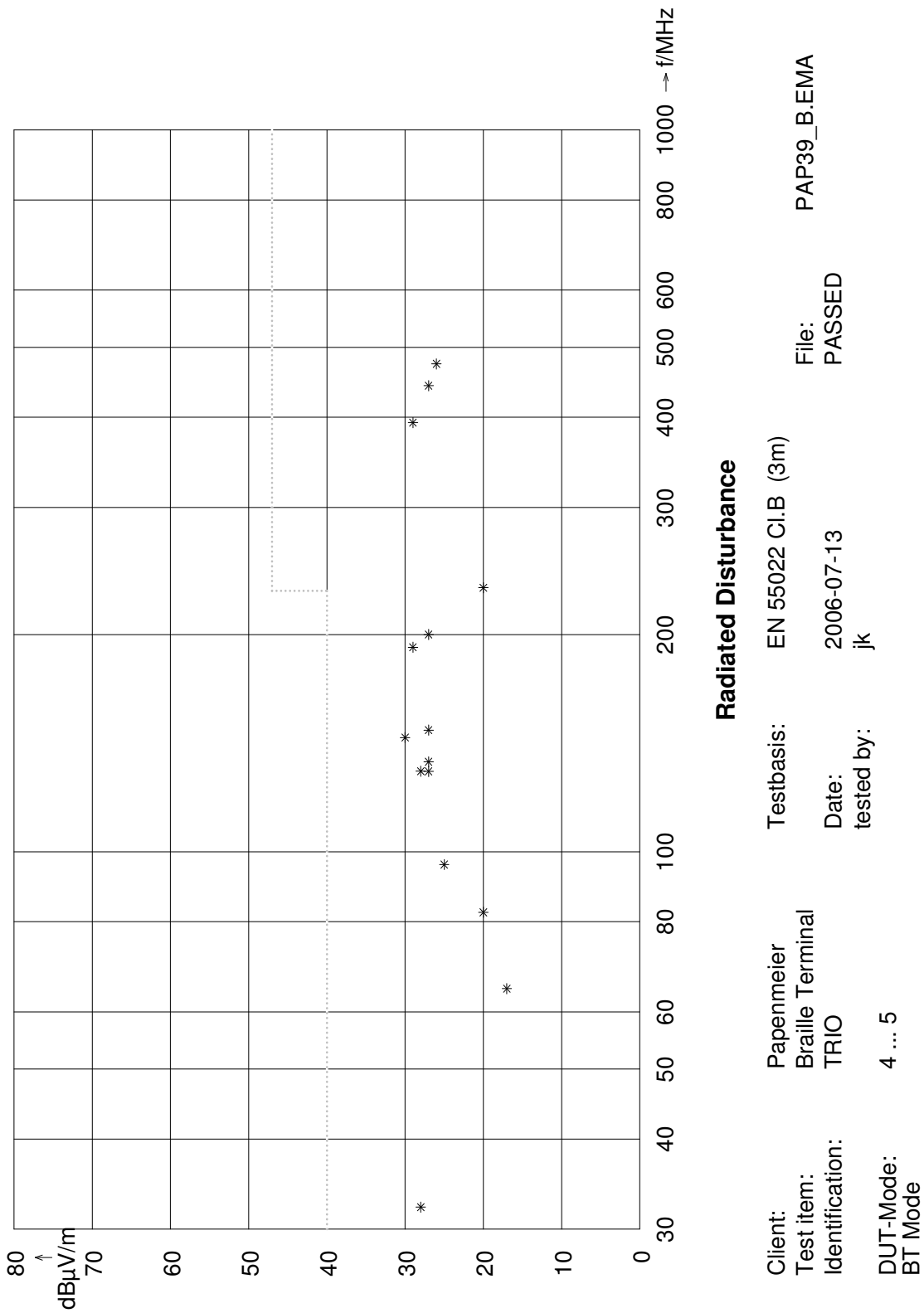
Funkstörfeldstärke [radiated el. noise] SAC



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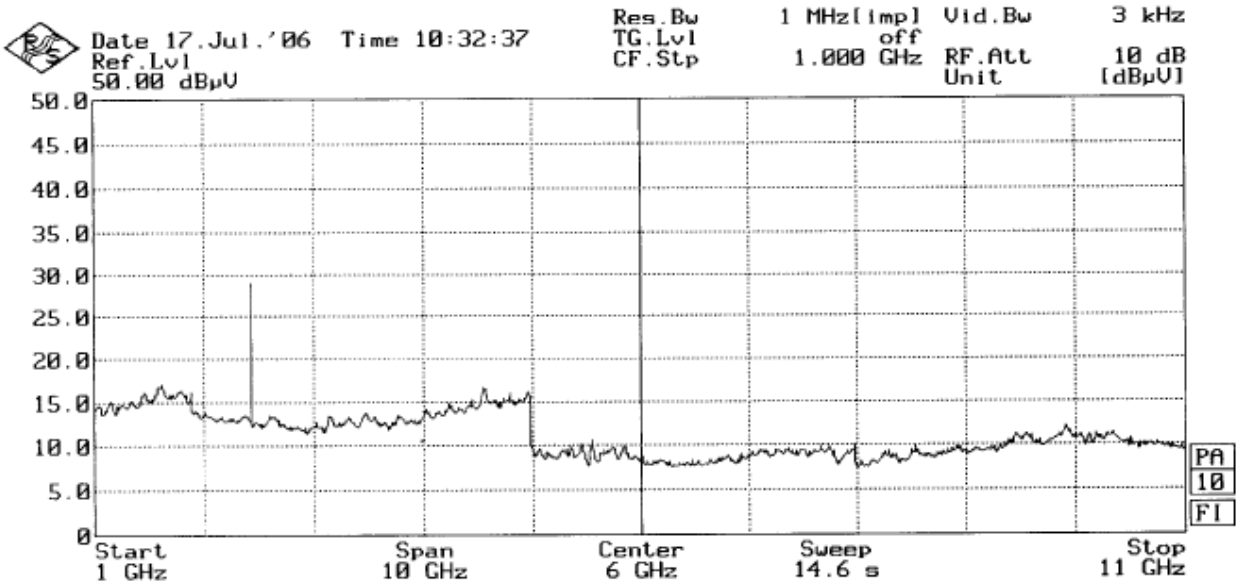
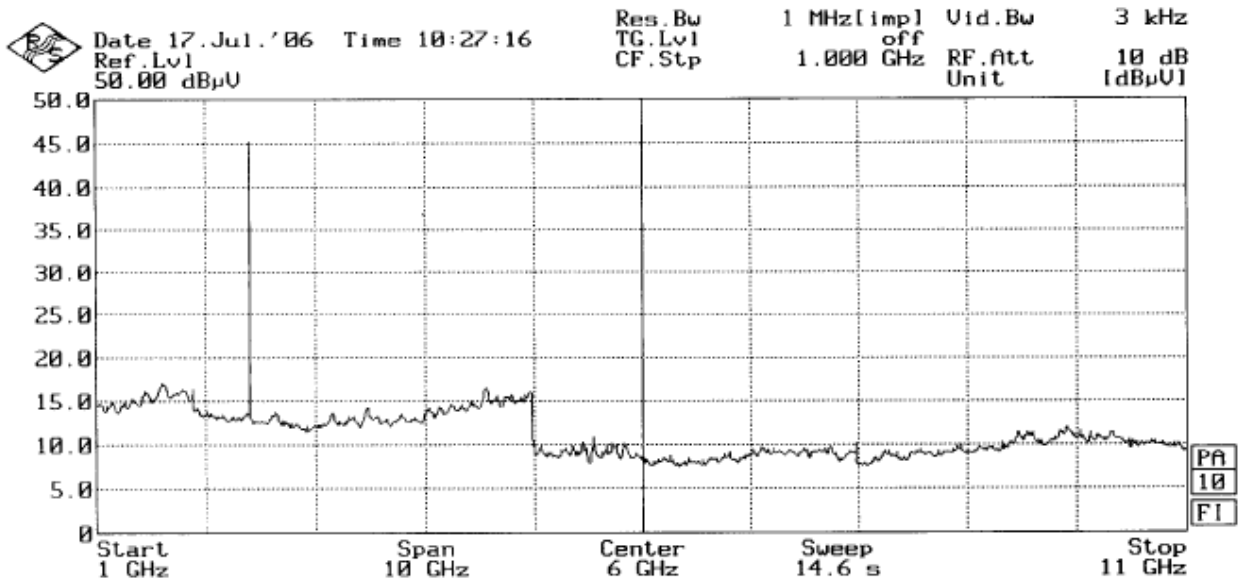
Funkstörfeldstärke [radiated el. noise] SAC



vH
Ant. = ver Alt. = 1m Dist. = 1m Detektor = Pk
EUT = Braillex TRIO
EUT Mode = BT
EUT Position = Front



hH
Ant. = hor Alt. = 1m Dist. = 1m Detektor = Pk
EUT = Braillex TRIO
EUT Mode = BT
EUT Position = Front

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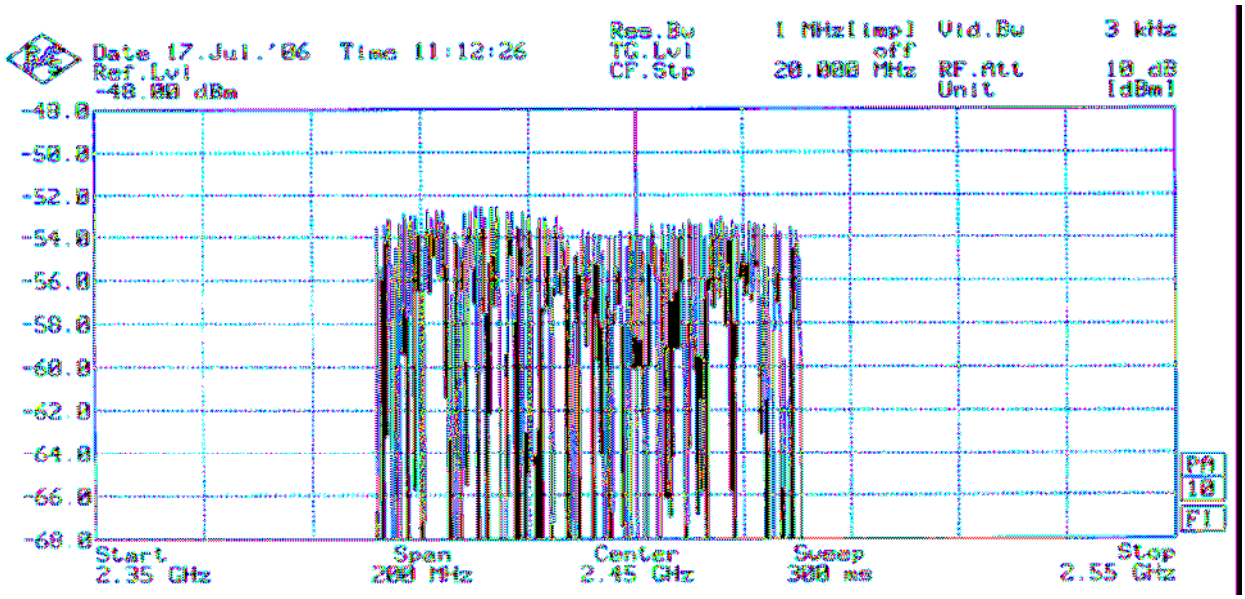
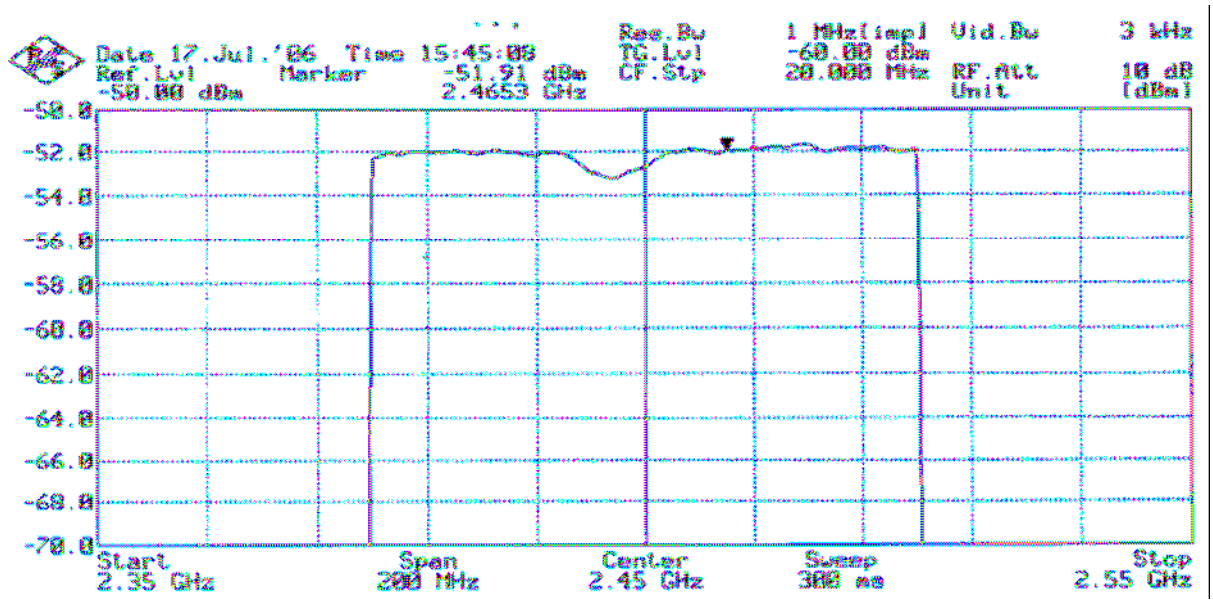
Funkstörfeldstärke [radiated el. noise] SAC



EUT Empfangspegel [level received from EUT]
Ant. = ver Alt. = 1m Dist. = 1m
EUT = Braillex TRIO
EUT Mode = BT
EUT Position = Front



empfangener Sendepegel für Substitution [received transmitter level for substitution]
Ant. = ver Alt. = 1m Dist. = 1m

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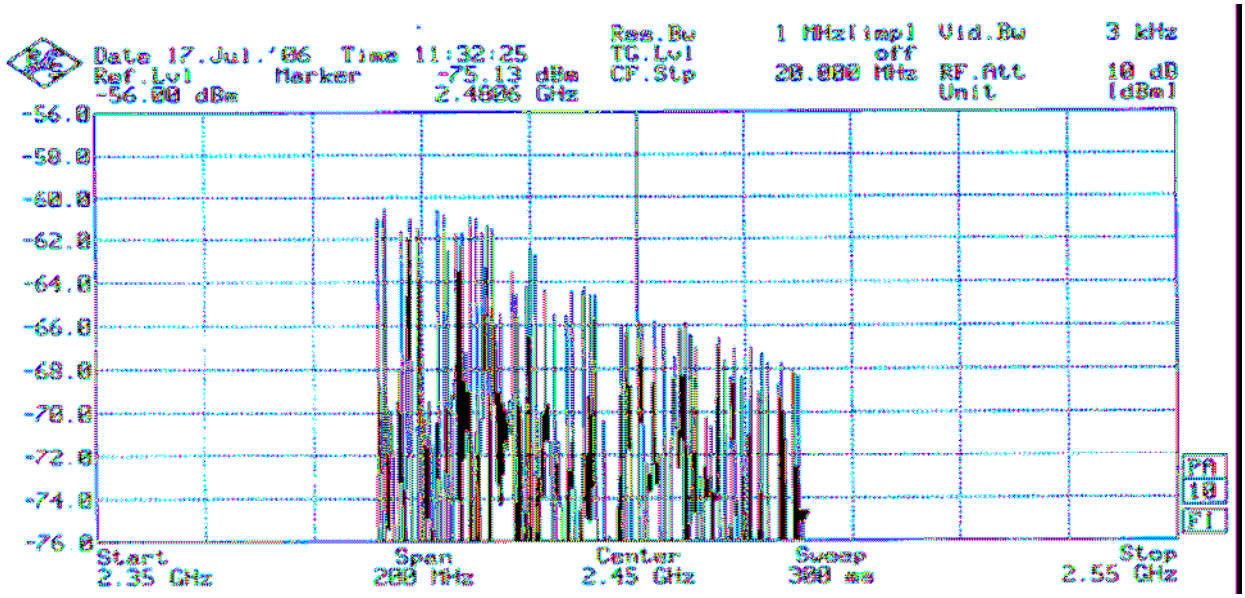
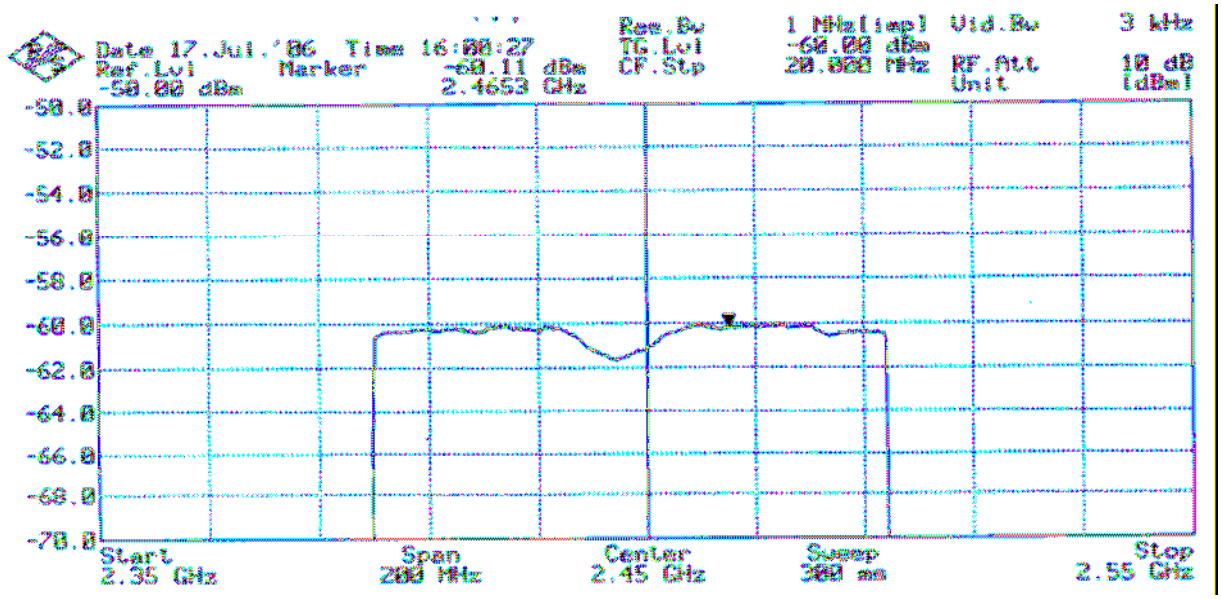
Funkstörfeldstärke [radiated el. noise] SAC



EUT Empfangspegel [level received from EUT]
Ant. = hor Alt. = 1m Dist. = 1m
EUT = Braillex TRIO
EUT Mode = BT
EUT Position = Front



empfangener Sendepegel für Substitution [received transmitter level for substitution]
Ant. = hor Alt. = 1m Dist. = 1m

TÜV Rheinland Group

Ende des Prüfberichtes / *End of Testreport*