

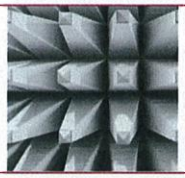

CETECOM™
CETECOM ICT Services
consulting - testing - certification ➤➤➤

TEST REPORT

Test report no.: 1-4254/12-61-03-A

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing Laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
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Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
Area of Testing: Radio/Satellite Communications

Applicant

Sony Mobile Communications AB
Nya Vattentornet
22188 Lund/SWEDEN
Phone: +46 46 19 30 00
Fax: +46 46 19 32 95
Contact: Håkan Sjöberg
e-mail: hakan.sjoberg@sonymobile.com
Phone: +46 46 19 35 59

Manufacturer

Sony Mobile Communications AB
Nya Vattentornet
22188 Lund/SWEDEN

Test Standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - Gen Issue 3	General Requirements and Information for the Certification of Radiocommunication Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**GSM Mobile Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VIII; LTE FDD 1/3/5/7/8/20; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS**
Model name:	**PM-0240-BV**
Frequency [MHz]:	GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz UMTS: 826.4 – 846.6 MHz, LTE: (Band 5) 824 – 849 MHz
Technology tested:	Receiver
Antenna:	Integrated antenna
Power Supply:	3.7 V DC by Li - polymer battery
Temperature Range:	-30°C to +60 °C

Test report authorised:

2013-01-09 Stefan Bös
Senior Testing Manager

Test performed:

2013-01-09 Andreas Luckenbill
Expert

1 Table of contents

2 General Information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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In no case this test report can be considered as a Letter of Approval.

2.2 Application details

Date of receipt of order:	2012-11-02
Date of receipt of test item:	2012-11-05
Start of test:	2012-11-05
End of test:	2013-01-09
Person(s) present during the test:	-/-

3 Test standard/s

Test Standard	Date	Test Standard Description
47 CFR Part 15	2010-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - Gen Issue 3	2010-12	General Requirements and Information for the Certification of Radiocommunication Equipment

4 Test Environment

Temperature:	T_{nom}	+20 °C during room temperature tests
	T_{max}	+60 °C during high temperature tests
	T_{min}	-30 °C during low temperature tests
Relative humidity:		55 %
Air pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li - polymer battery
	V_{max}	4.4 V
	V_{min}	3.3 V

5 Test item

Kind of test item	**:**	**GSM Mobile Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VIII; LTE FDD 1/3/5/7/8/20; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS**
Type identification	**:**	**PM-0240-BV**
S/N serial number	**:**	**Radiated unit: CB5121TU0P, CB5121SWDK**
HW hardware status	**:**	**SP1.2**
SW software status	**:**	**10.1.A.0.194, 10.1.A.1.17**
Frequency Band [MHz]	**:**	**GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz** **UMTS: 826.4 – 846.6 MHz,** **LTE: (Band 5) 824 – 849 MHz**
Antenna	**:**	**Integrated antenna**
Power Supply	**:**	**3.7 V DC by Li - polymer battery**
Temperature Range	**:**	**-30°C to +60 °C**

6 Test Laboratories sub-contracted

None

7 Summary of Measurement Results

☒	**No deviations from the technical specifications were ascertained**
☐	There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	CFR Part 15.107, 15.109 RSS-GEN, Issue 3	passed	2013-01-09	-/-

7.1 Receiver

Test Case	temperature conditions	power source voltages	Pass	Fail	NA	NP	Remark
RX-Spurious Emissions Conducted < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-

Note: NA = Not applicable; NP = Not performed

8 Measurement Results

8.1 RX Spurious Emissions Conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to Idle mode. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

Measurement:

Measurement parameter	
Detector:	Peak - Quasi Peak / Average
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part 15.107(a)		ICES-003, Issue 5
RX Spurious Emissions Conducted < 30 MHz		
Frequency (MHz)	Quasi-Peak (dBµV/m)	Average (dBµV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

*Decreases with the logarithm of the frequency

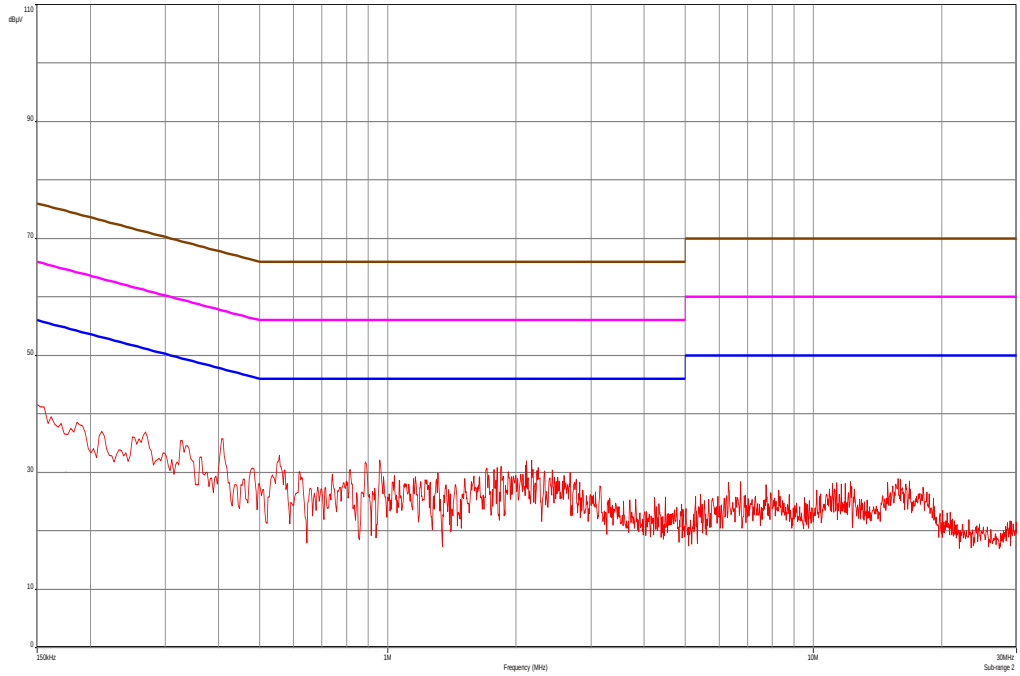
Result:

RX Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks detected!		
Measurement uncertainty	± 3 dB	

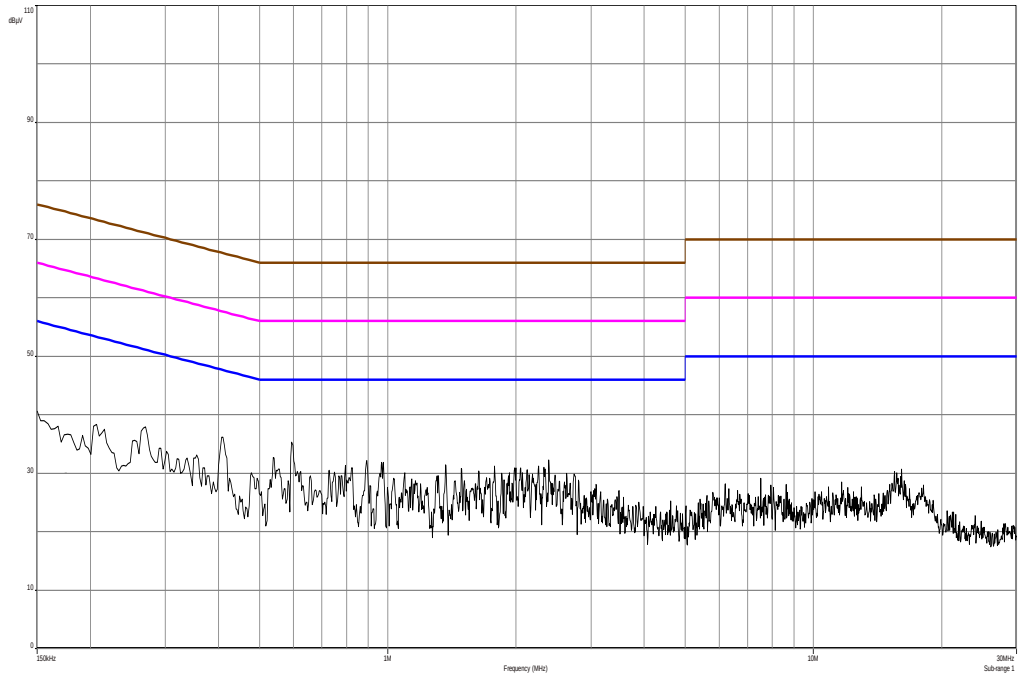
Result: **Passed**

Plots:

Plot 1: 150 kHz to 30 MHz / Phase Line



Plot 2: 150 kHz to 30 MHz / Neutral Line



8.2 Spurious Emissions Radiated – Receiver Mode

Description:

The measurement was performed in worst case. The EUT was not connected to the CMU 200. So the EUT performs a network search. In this mode all oscillators are active.

Measurement:

Measurement parameters	
Detector:	Below 1 GHz Peak / QuasiPeak Above 1 GHz Peak / Average
Sweep time:	2 sec
Video bandwidth:	Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz
Resolution bandwidth:	1 MHz
Span:	100 MHz Steps
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part 15.109 CFR Part 2.1053		RSS Gen, Issue 3, Section 4.10 ICES-003 Issue 5
Spurious Emissions Radiated – Receiver Mode		
Frequency (MHz)	**Field Strength (dBµV/m)**	**Measurement distance (m)**
30 – 88	30.0	10
88 - 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

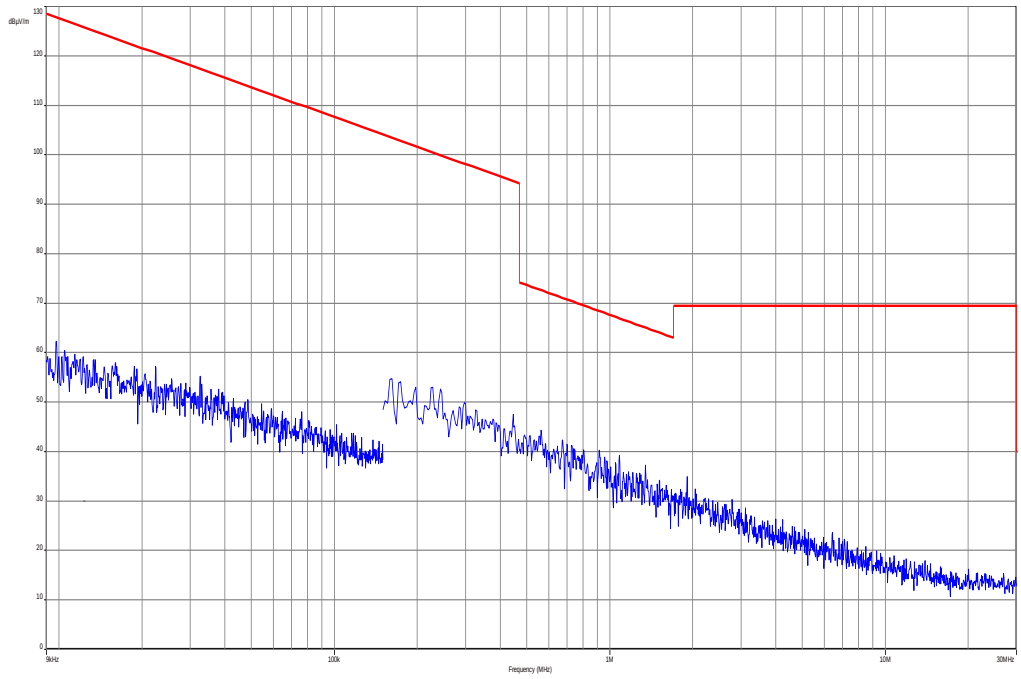
Results:

Spurious Emission Level (dBµV/m)		
Frequency (MHz)	**Detector**	**Level (dBµV/m)**
No peaks detected!		
Measurement uncertainty	± 3dB	

Result: **Passed**

Plots:

Plot 1: Receiver mode up to 30 MHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Plot 2: Receiver mode 30 MHz to 1 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card

Common Information

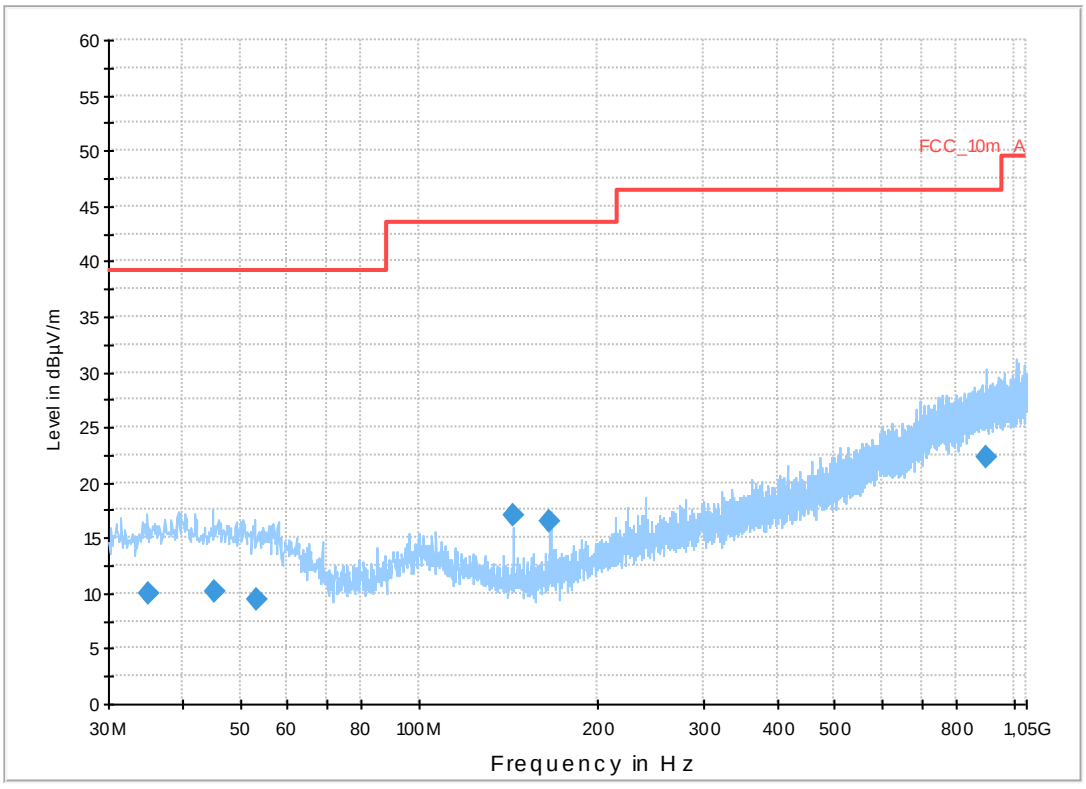
EUT:	PM-0240-BV
Serial Number:	CB5121SWDK (IMEI: 00440245-045229-1)
Test Description:	FCC part 15 class B @ 10m
Operating Conditions:	traffic on USB (copy data via USB in both directions continuously) + charging + data transfer to connected SD-Card
Operator Name:	Hennemann
Comment:	notebook battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB

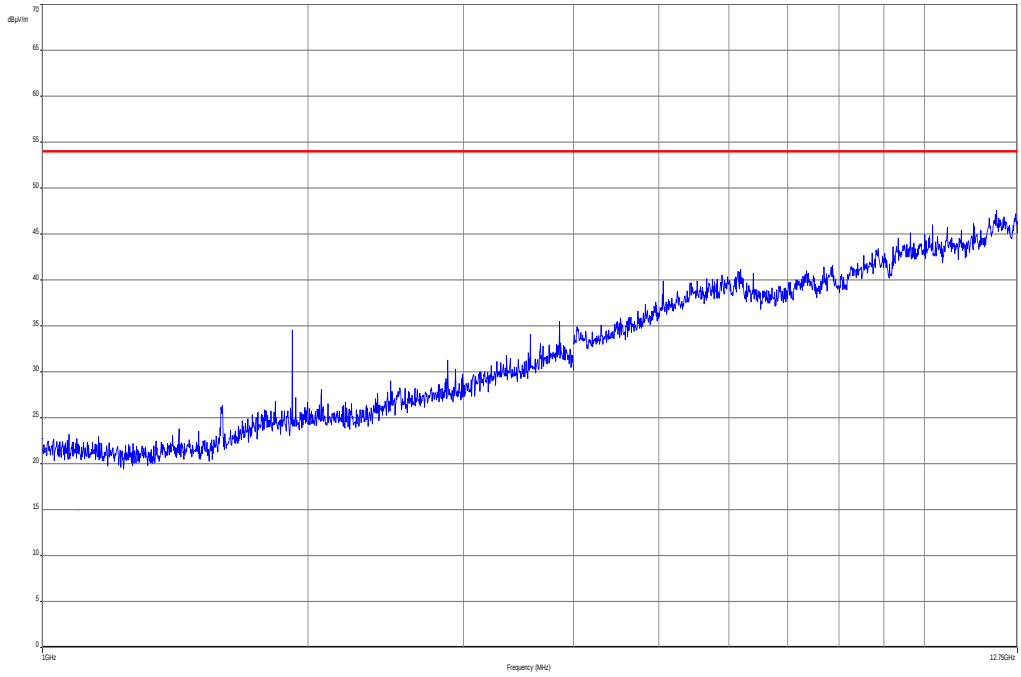
FCC_10m(A)_3



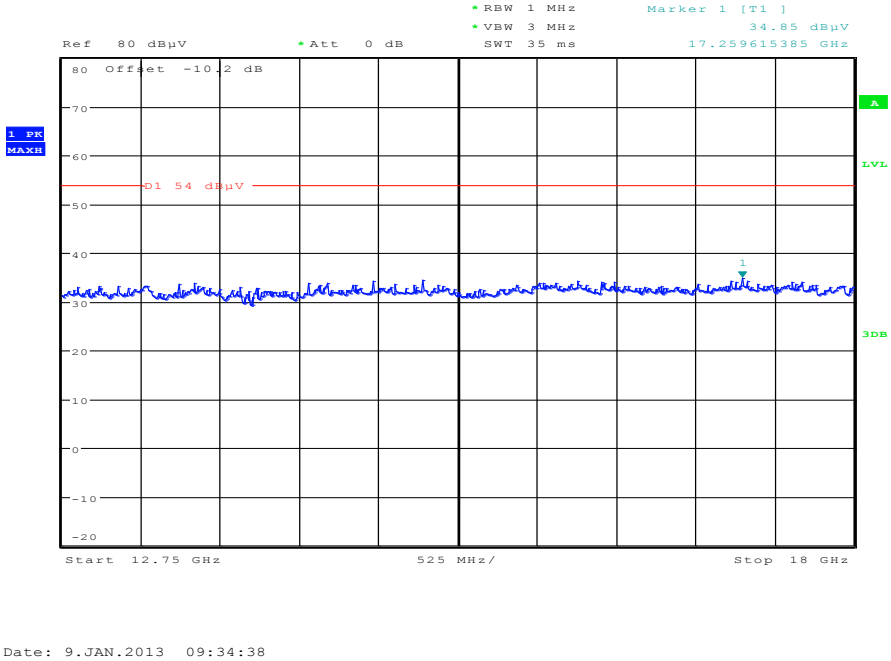
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
34.933650	10.0	1000.0	120.000	203.0	V	229.0	13.0	29.1	39.1	
45.134850	10.1	1000.0	120.000	148.0	H	90.0	13.3	29.0	39.1	
53.401800	9.4	1000.0	120.000	106.0	V	240.0	13.0	29.7	39.1	
144.010050	17.0	1000.0	120.000	98.0	V	46.0	8.8	26.5	43.5	
165.994350	16.5	1000.0	120.000	105.0	V	275.0	9.6	27.0	43.5	
897.733800	22.4	1000.0	120.000	220.0	V	30.0	25.2	24.0	46.4	

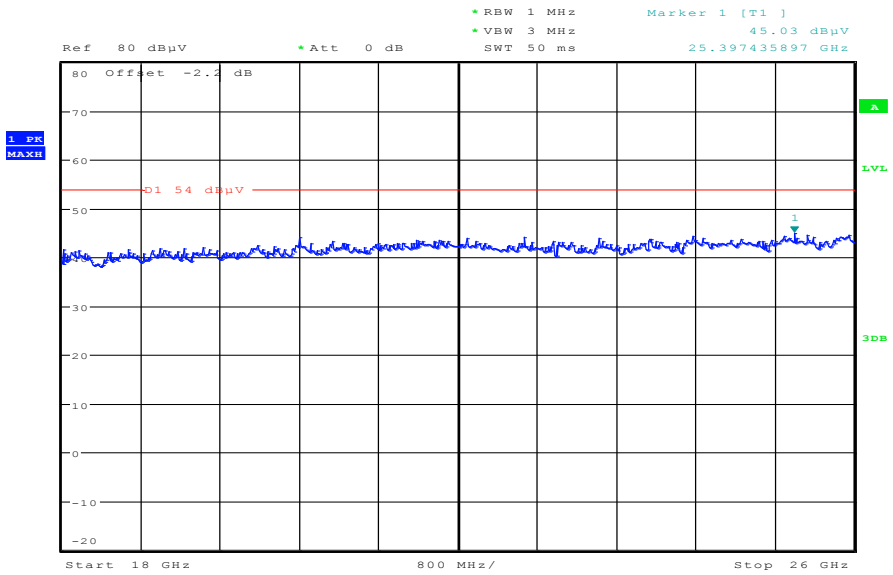
Plot 3: Receiver mode 1 GHz to 12.75 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Plot 4: Receiver mode 12.75 GHz to 18 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Plot 5: Receiver mode 18 GHz to 25 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Date: 9.JAN.2013 09:35:50

Costumer requested measurement:

Plot 1: Receiver mode 30 MHz to 1 GHz, HDMI connected

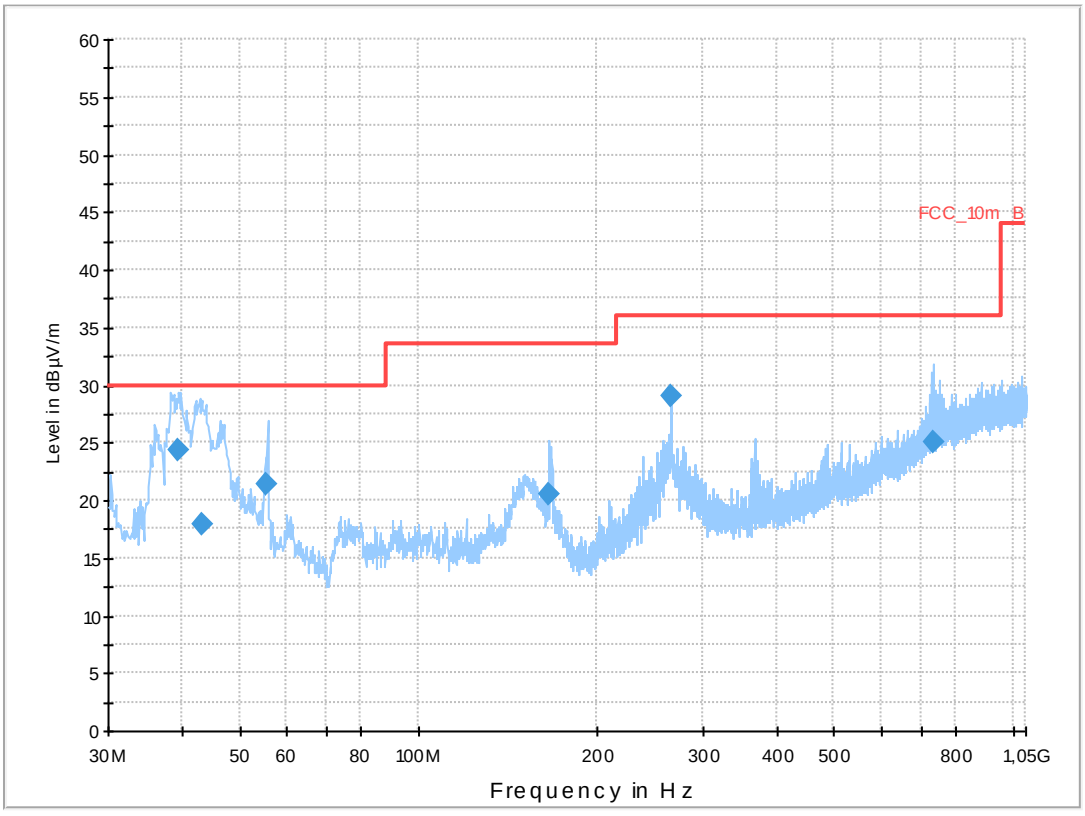
Common Information

EUT:	PM-0240-BV
Serial Number:	CB5121SWDK
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	video out via HDMI (camera active) + GPS idle + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.218400	24.4	1000.0	120.000	100.0	V	36.0	13.4	5.6	30.0	
43.316550	17.9	1000.0	120.000	100.0	V	140.0	13.3	12.1	30.0	
55.270650	21.5	1000.0	120.000	274.0	V	304.0	12.8	8.5	30.0	
165.610050	20.5	1000.0	120.000	100.0	V	135.0	9.5	13.0	33.5	
265.519500	29.0	1000.0	120.000	113.0	V	165.0	13.7	7.0	36.0	
734.373300	25.0	1000.0	120.000	132.0	H	315.0	23.3	11.0	36.0	

9 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
2	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	11.05.2011	11.05.2013
3	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
4	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
5	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
6	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
7	9	Isolating Transformer	MPL IEC625 Bus Regeltrennt ravo	Erfi	91350	300001155	ne		
8	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
9	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
10	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKl!	14.10.2011	14.10.2014
11	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	19.12.2011	19.12.2013
12	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
13	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
14	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
15	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
16	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
17	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		
18	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004xxx	k	22.10.2012	22.10.2013
19	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
20	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
21	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
22	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	04.01.2012	04.01.2013
23	n. a.	Analyzer-	ARS 16/1	SPS	A3509 07/0	300003314	k	14.07.2011	14.07.2013

		Reference-System (Harmonics and Flicker)			0205				
24	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
25	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
26	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
27	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
28	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	12.04.2012	12.04.2014
29	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	06.01.2012	06.01.2014

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

10 Observations

No observations exceeding those reported with the single test cases have been made.