

## TEST REPORT

Test report no.: 1-4254/12-19-13-B



Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-01

### Testing laboratory

**CETECOM ICT Services GmbH**  
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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](mailto: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 - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I 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 FDDI/FDDV/FDDVI/FDDXIX; HSPA; LTE Band 1; BT3.1; WLAN a/b/g/n; AGPS; RFID, FM Rx
Model name:	PM-0000-BV
FCC ID:	PY7PM-0000
IC:	4170B-PM-0000
Frequency:	13.56 MHz
Technology tested:	RFID
Antenna:	Integrated loop antenna
Power Supply:	3.7 V DC by Li-polymer battery
Temperature Range:	-20°C to +55 °C

### Test report authorised:

2012-05-15   
Marco Bertolino  
Testing Manager

### Test performed:

2012-05-15   
p.o. Andreas Luckenbill

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## 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:	2012-03-27
Date of receipt of test item:	2012-04-26
Start of test:	2012-04-26
End of test:	2012-05-04
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 - 210 Issue 8	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

#### 4 Test environment

Temperature:	$T_{nom}$	+22 °C during room temperature tests
	$T_{max}$	+55 °C during high temperature tests
	$T_{min}$	-20 °C during low temperature tests
Relative humidity content:		41 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	$V_{nom}$	3.7 V DC by Li-polymer battery
	$V_{max}$	4.1 V
	$V_{min}$	3.3 V

#### 5 Test item

Kind of test item	:	GSM Mobile Phone GPRS/EGPRS 850/900/1800/1900; UMTS FDDI/FDDV/FDDVI/FDDXIX; HSPA; LTE Band 1; BT3.1; WLAN a/b/g/n; AGPS; RFID, FM Rx
Type identification	:	PM-0000-BV
S/N serial number	:	Rad. CB5A1JYVGF, CB5A1JYVGS
HW hardware status	:	AP
SW software status	:	7.0.A.0.474
Frequency band [MHz]	:	13.56 MHz
Type of modulation	:	Modulated carrier
Number of channels	:	1
Antenna	:	Integrated loop antenna
Power supply	:	3.7 V DC by Li-polymer battery
Temperature range	:	-20°C to +55 °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 RSS 210, Issue 8	Passed	2012-05-16	-/-

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Pass	Fail	NA	NP	Results (max.)
§ 15.35 (c)/ RSS-GEN Issue 2	Timing of the transmitter (Duty cycle correction factor )	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§ 15.225 (a)/ RSS-210 Issue 8	Fieldstrength of Fundamental	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§ 15.209/ RSS-210 Issue 8	Fieldstrength of harmonics and spurious	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§ 15.225 (e)/ RSS-210 Issue 8	Frequency tolerance	Nominal	Extreme	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
		Extreme	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Note:** NA = Not Applicable; NP = Not Performed

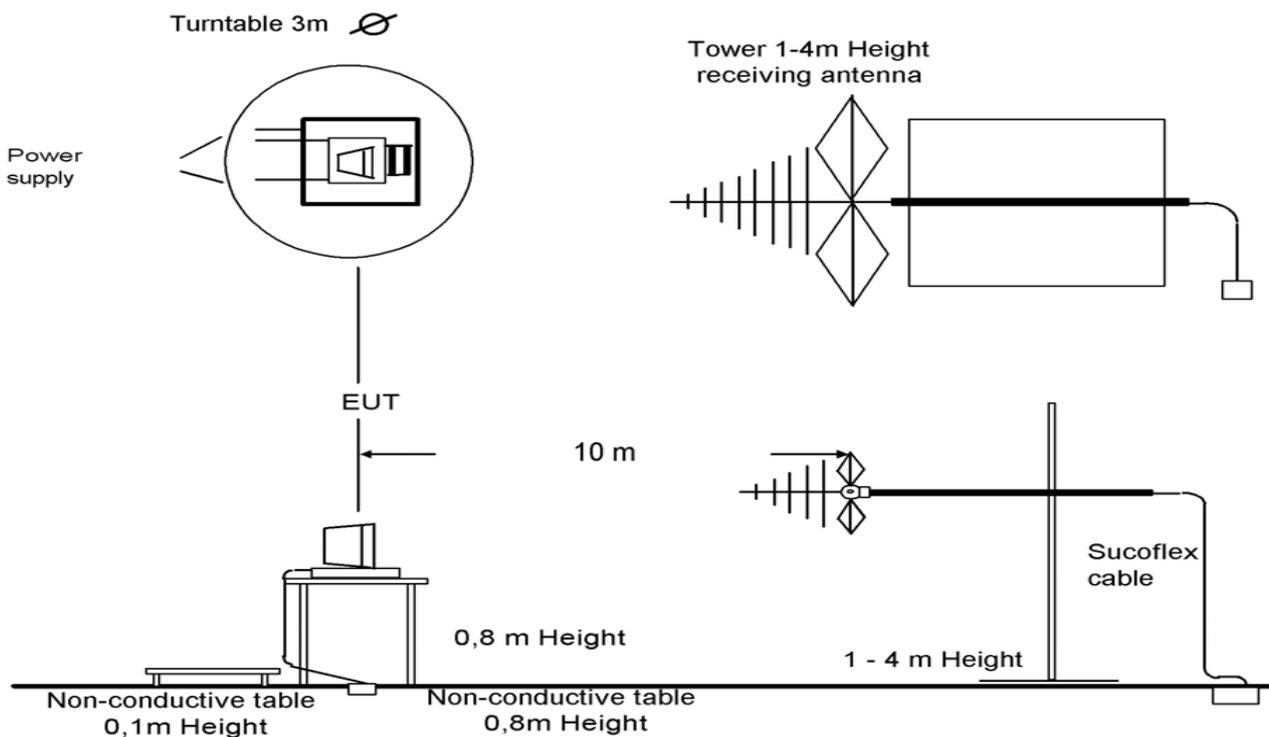
**8 RF measurements**

**8.1 Description of test setup**

**8.1.1 Radiated measurements**

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2. Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



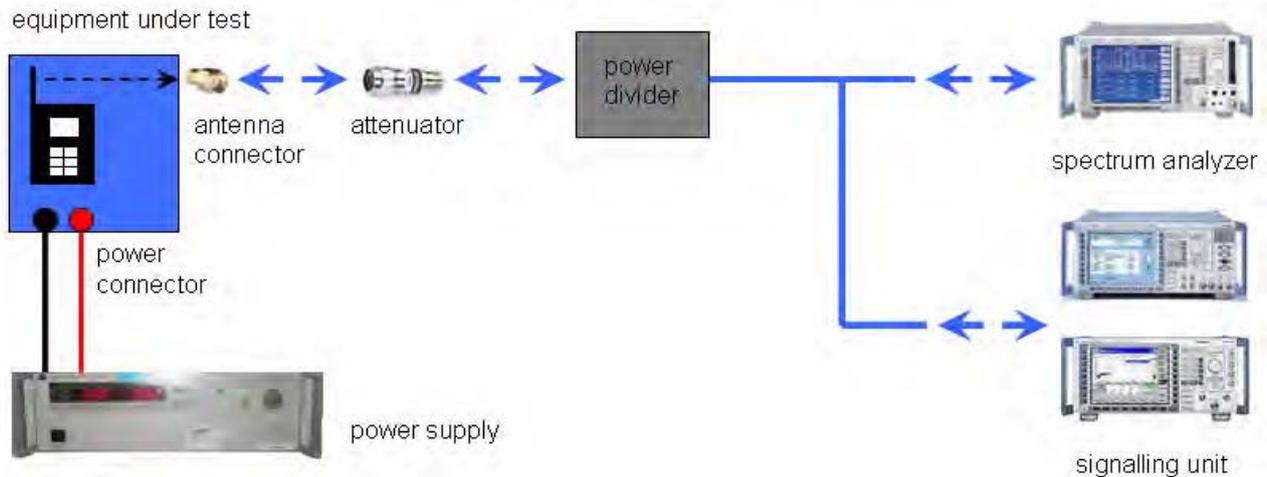
**Picture 1: Diagram radiated measurements**

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

### 8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

### 8.2 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: The EUT was tested without a charger. If the charger is plugged in, the test software shows error and stops transmission.

### 8.3 RSP100 test report cover sheet / performance test data

Test Report Number	:	1-4254/12-19-13-B
Equipment Model Number	:	PM-0000-BV
Certification Number	:	4170B-PM-0000
Manufacturer (complete Address)	:	Sony Mobile Communications AB Nya Vattentorget 22188 Lund / SWEDEN
Tested to radio standards specification no.	:	RSS 210, Issue 8
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range or fixed frequency	:	13.56 MHz
Field Strength [dB $\mu$ V/m] (at which distance)	:	44 dB $\mu$ V/m @ 10 m
Occupied bandwidth (99%-BW) [Hz]	:	14 Hz
Type of modulation	:	N0N
Emission Designator (TRC-43)	:	14H0N0N
Antenna Information	:	Integrated loop antenna
Transmitter Spurious (worst case) [dB $\mu$ V/m @ 3m]	:	62 dB $\mu$ V/m below 30 MHz (noise floor)
Receiver Spurious (worst case) [dB $\mu$ V/m @ 3m]	:	No receiver mode!

**ATTESTATION:  
DECLARATION OF COMPLIANCE:**

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

**Laboratory Manager:**

2012-05-15  
Date

Andreas Luckenbill  
Name

p. e.   
Signature

## 9 Measurement results

### 9.1 Timing of the transmitter

#### Measurement:

Measurement parameter	
Detector:	-/-
Sweep time:	-/-
Resolution bandwidth:	-/-
Video bandwidth:	-/-
Span:	-/-
Trace-Mode:	-/-

#### Limits:

FCC	IC
Timing of the transmitter	
<p>(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.</p>	

Duty cycle: 100%

**Result:** [passed](#)

## 9.2 Field strength of the fundamental

### Measurement:

Measurement parameter	
Detector:	Quasi Peak
Resolution bandwidth:	200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz
Video bandwidth:	≥ RBW
Trace-Mode:	Max Hold

### Limits:

FCC		IC
Fundamental Frequency (MHz)	Field strength of Fundamental ( $\mu\text{V}/\text{m}$ )	Measurement distance (m)
13.553 to 13.567	15848 $\mu\text{V}/\text{m}$ (84 dB $\mu\text{V}/\text{m}$ )	30
	158489 $\mu\text{V}/\text{m}$ (104 dB $\mu\text{V}/\text{m}$ )	10 (Recalculated acc. to FCC part15.31 (f2))

### Result:

TEST CONDITIONS		MAXIMUM POWER (dB $\mu\text{V}/\text{m}$ )	
Frequency		13.56 MHz	13.56 MHz
Mode		at 10 m distance	at 30 m distance
$T_{\text{nom}}$	$V_{\text{nom}}$	44 dB $\mu\text{V}/\text{m}$	24 dB $\mu\text{V}/\text{m}^*$
Measurement uncertainty		±3dB	

\* Limits recalculated from 10m to 30m with 40 dB/decade according to FCC 15.31 (f2).

**Result: passed**

### 9.3 Field strength of the harmonics and spurious

**Measurement:**

Measurement parameter	
Detector:	Quasi Peak / Average
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	100 kHz
Span:	Steps 100 MHz
Trace-Mode:	Free Run

**Limits:**

FCC		IC	
SUBCLAUSE § 15.209			
Field strength of the harmonics and spurious.			
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)	
0.0009 – 0.490	2400/F(kHz)	300	
0.490 – 1.705	24000/F(kHz)	30	
1.705 – 30	30 (29.5 dBµV/m)	30	
30 – 88	100 (40 dBµV/m)	3	
88 – 216	150 (43.5 dBµV/m)	3	
216 – 960	200 (46 dBµV/m)	3	

**Result:**

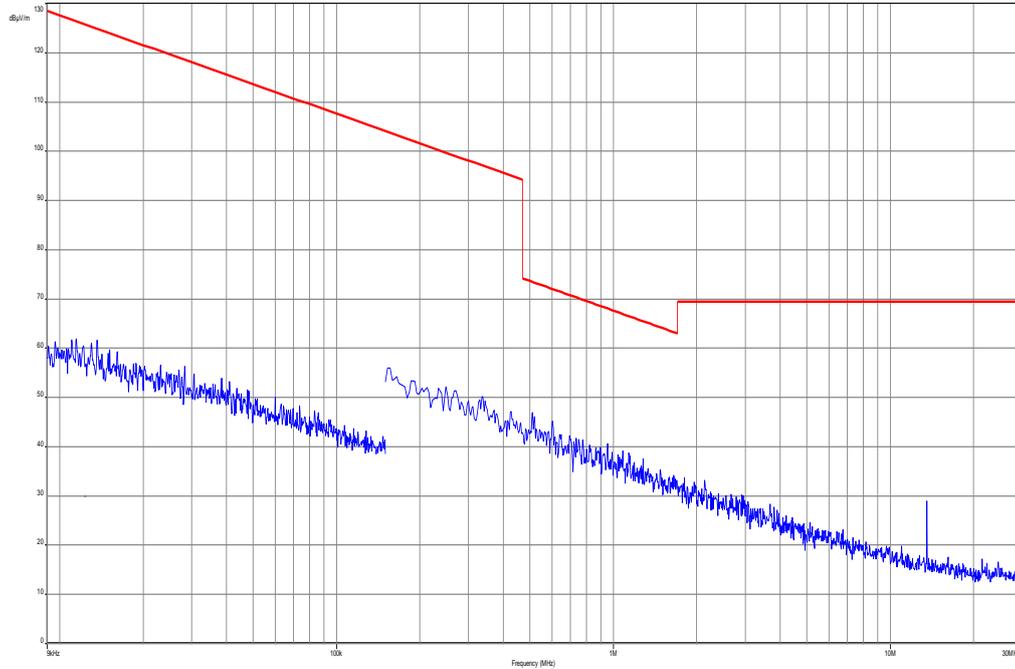
EMISSION LIMITATIONS				
f [MHz]	Detector	Limit max. allowed [dBµV/m]	Amplitude of emission [dBµV/m]	Results
No peaks detected				

**Result:** passed

**Plots of the measurements**

**Plot 1:** 9 kHz – 30 MHz;  
Part 15.209 Magnetics, Measurement distance 3m

Transmit frequency 13.56 MHz



**Plot 2: 30 MHz – 1000 MHz**

**Common Information**

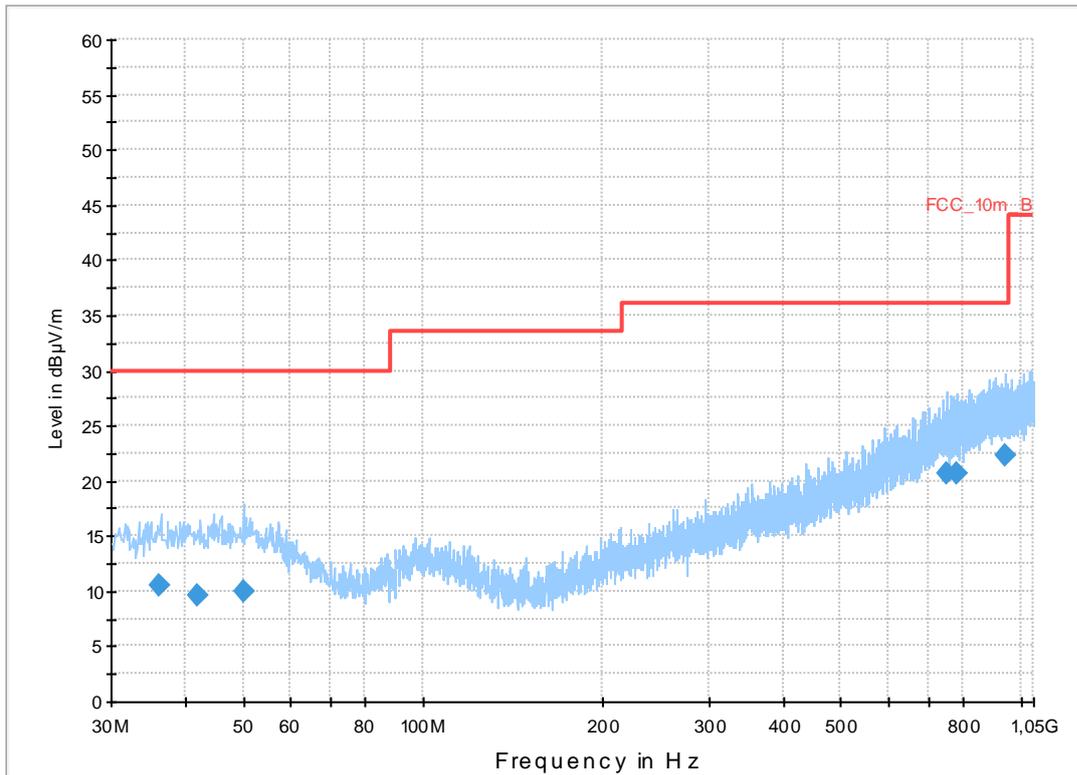
EUT: PM-0000-BV  
 Serial Number: CB5A1JYVGF (IMEI: 00440245-009929-0) + CB5A1JYVGS (IMEI: 00440245-009853-2)  
 Test Description: FCC part 15 class B @ 10 m  
 Operating Conditions: RFID TX/RX + charging  
 Operator Name: Hennemann  
 Comment: battery powered

**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(B)\_3



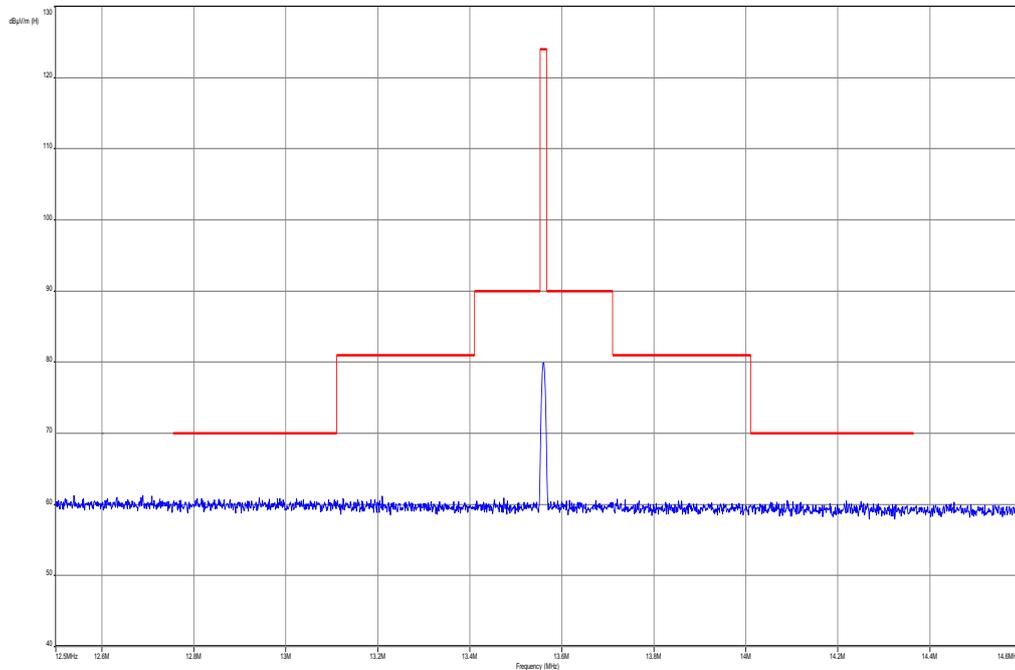
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.008100	10.4	1000.0	120.000	122.0	V	190.0	13.1	19.6	30.0	
41.832000	9.7	1000.0	120.000	111.0	V	-10.0	13.4	20.3	30.0	
50.023950	9.9	1000.0	120.000	98.0	H	100.0	13.4	20.1	30.0	
750.022050	20.7	1000.0	120.000	170.0	H	190.0	23.7	15.3	36.0	
781.347150	20.7	1000.0	120.000	170.0	H	-10.0	23.7	15.3	36.0	
940.455900	22.2	1000.0	120.000	170.0	V	280.0	25.3	13.8	36.0	

**Plot 3: Spectrum mask part 15.225 (a, b, c, d)**

Limits recalculated from 30m to 3m with 40 dB/decade according to FCC 15.31 (f2)

RBW /VBW 9 kHz



The transmitter holds the requirements of FCC 15.225 (a, b, c and d)

## 9.4 Frequency tolerance

**Measurement:**

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 Hz
Video bandwidth:	30 Hz
Span:	1 kHz
Trace-Mode:	Free run

**Limits:**

FCC	IC
<b>SUBCLAUSE § 15.225</b>	RSS-210 Issue 8 Annex 2.6
<p>The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.</p>	

**Result: passed**

Frequency tolerance								
Over temperature variation			Over voltage variation			MHz		
Limit is +/- 1.356 kHz			Limit is +/- 1.356 kHz					
T (°C)]	Frequency	result	Power voltage	Frequency	result	F [MHz]	Detector	Level [µV/m]
-20°C	13.450202	Pass	3.3	13.560116	Pass			
-10°C	13.560213	Pass	3.4	13.560118	Pass			
0°C	13.560236	Pass	3.5	13.560120	Pass			
10°C	13.560198	Pass	3.6	13.560120	Pass			
20°C	13.560138	Pass	3.7	13.560128	Pass			
30°C	13.560078	Pass	3.8	13.560128	Pass			
40°C	13.559989	Pass	3.9	13.560128	Pass			
50°C	13.559970	Pass	4.0	13.560132	Pass			
			4.1	13.560134	Pass			
			4.2	13.560140	Pass			
Measurement uncertainty			±100 Hz					

## 9.5 AC line conducted

Not applicable!

The EUT stops transmission, when power connector is connected.

## 10 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.	Spectrum Analyzer 9kHz to 30GHz - 140...+30dBm	FSP30	R&S	100886	300003575	k	07.09.2010	07.09.2012
2	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
3	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
4	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
5	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	04.01.2012	04.01.2014
6	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
7	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
8	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
9	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
10	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
11	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	
12	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	06.01.2012	06.01.2014
13	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
14	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
15	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
16	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
17	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
18	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	14.10.2011	14.10.2014
19	n. a.	MXE EMI Receiver 20 Hz bis 26.5 GHz	N9038A	Agilent Technologies	MY51210197	3000042xx	k	19.12.2011	19.12.2012
20	n. a.	Temperature Test Chamber	T-40/50	CTS GmbH	064023	300003540	vIKI!	20.09.2011	20.09.2013

**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
vk!l	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

## 11 Observations

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