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CETECOM ICT Services
consulting - testing - certification

TEST REPORT

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

Test report no.: 1-2977-56-07/11

Testing laboratory

CETECOM ICT Services GmbH
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Accredited test laboratory:
The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAkkS registration number: D-PL-12076-01-01

Area of Testing: Radio/Satellite Communications

Applicant

Sony Ericsson Mobile Communications AB
Nya Vattentornet
22188 Lund / SWEDEN
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Fax: +46 46 19 32 95
Contact: Håkan Sjöberg
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Manufacturer

Sony Ericsson 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:	Mobile Phone GPRS/EDGE 850/900/1800/1900; UMTS (HSDPA/HSUPA) FDDI/FDDVIII; BT+EDR; WLAN; AGPS; ANT+
Model name:	AAD-3880119-BV
FCC ID:	PY7A3880119
IC:	4170B-A3880119
Frequency:	ISM band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz, highest channel 2480 MHz)
Power supply:	3.7 V DC by Li-Ion Battery and charger
Temperature range:	-20 °C to 55 °C

Test performed:

2011-07-07 Joerg Warken

Test report authorised:

2011-07-07 Jakob Reschke

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2 General information

2.1 Notes

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 generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.

2.2 Application details

Date of receipt of order:	2011-06-15
Date of receipt of test item:	2011-06-15
Start of test:	2011-06-15
End of test:	2011-07-07
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Version	Test standard description
47 CFR Part 15	2009-10	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}	20 °C	during room temperature tests
	T_{max}	55 °C	during high temperature tests
	T_{min}	-20 °C	during low temperature tests
Relative humidity content:		54 %	
Air pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.7 V	DC by Li-Ion Battery and charger
	V_{max}	4.1 V	
	V_{min}	3.4 V	

5 Test item

Kind of test item	:	Mobile Phone GPRS/EDGE 850/900/1800/1900; UMTS (HSDPA/HSUPA) FDDI/FDDVIII; BT+EDR; WLAN; AGPS; ANT+
Type identification	:	AAD-3880119-BV
S/N serial number	:	Radiated units: CB511TQ1TV, CB511TQ1TF Conducted units: CB511TQ1NR, CB511TQ1JT
HW hardware status	:	AP1
SW software status	:	4.0.A.2.276 ETS rev 1_0_28_C
Frequency band [MHz]	:	ISM band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz, highest channel 2480 MHz)
Type of modulation	:	Digital Transmission System using GFSK Modulation
Number of channels	:	79
Antenna	:	Integrated print antenna
Power supply	:	3.7 V DC by Li-Ion Battery and charger
Temperature range	:	-20℃ to 55 ℃

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, Annex 2	Passed	2011-07-08	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Results (max.)
CFR 15.35(c) RSS Gen (Issue 3) / 4.5	Timing of the transmitter	Nominal	Nominal	TX	☒	☐	☐	☐	Not limited
RSS Gen (Issue 3) / 4.6.1	99% - Occupied Bandwidth	Nominal	Nominal	TX	☒	☐	☐	☐	Not limited
§15.249(a)(e) RSS-210 / A2.9(a)	Maximum field strength	Nominal	Nominal	TX	☒	☐	☐	☐	complies
§15.249(d) RSS-210 / A2.9(a)(b)	Band edge compliance radiated	Nominal	Nominal	TX	☒	☐	☐	☐	complies
§15.249(d) RSS-210 / A2.9(a)(b)	TX spurious emissions radiated	Nominal	Nominal	TX	☒	☐	☐	☐	complies
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	Idle	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	Spurious emissions radiated < 30 MHz	Nominal	Nominal	TX/Idle	☒	☐	☐	☐	complies
§15.107(a) RSS-Gen	Spurious emissions conducted < 30 MHz	Nominal	Nominal	TX/Idle	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

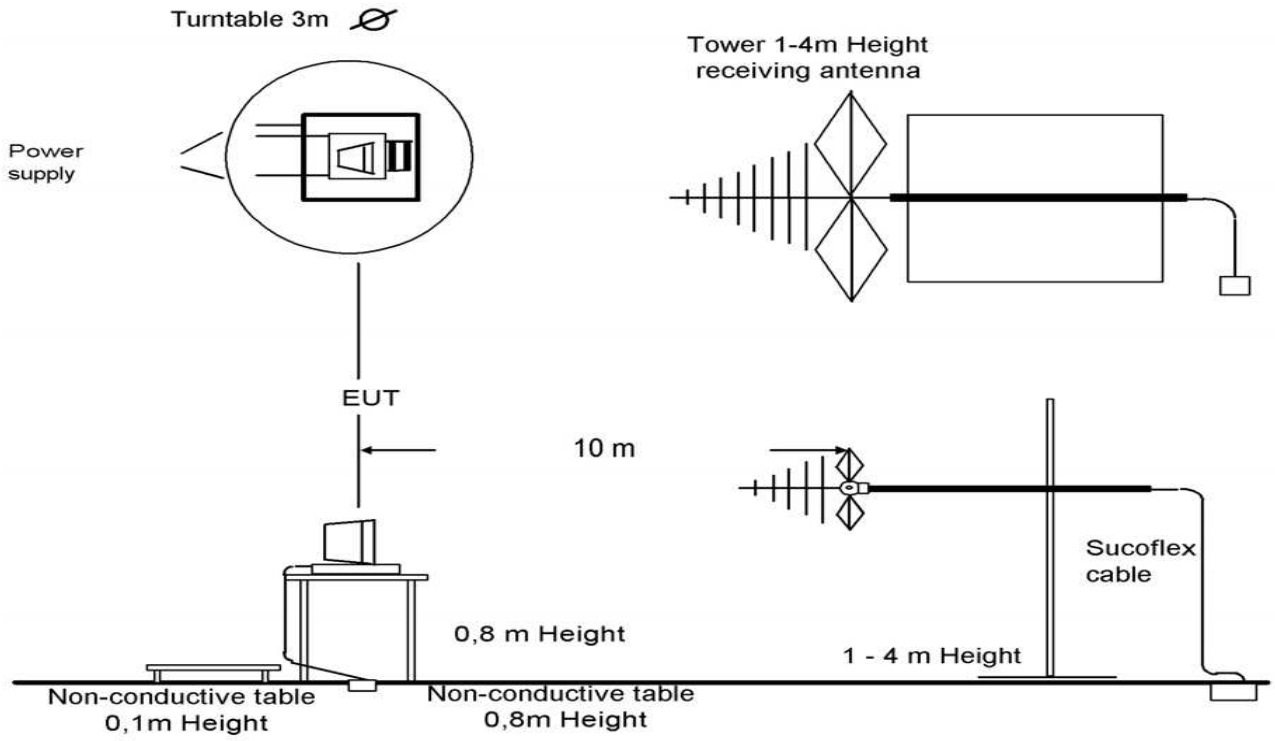
8 RF measurements

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 C63.10-2009 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 C63.10-2009 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 or with battery.

8.2 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode:

☐ No test mode available.
Iperf was used to ping another device with the largest support packet size

☒ Special software is used.
EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

Test report number	1-2977-56-07/11
Equipment model number	AAD-3880119-BV
Certification number	4170B-A3880119
Manufacturer (complete address)	Sony Ericsson Mobile Communications AB Nya Vattentornet 22188 Lund / SWEDEN
Tested to radio standards specification no.	RSS 210, Issue 8, Annex 2
Open area test site IC No.	IC 3462C-1
Frequency range	ISM band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz, highest channel 2480 MHz)
RF-field strength [dBµV/m @ 3 m] (max.)	98.70
Occupied bandwidth (99%-BW) [kHz]	920
Type of modulation	Digital Transmission System using GFSK modulation
Emission designator (TRC-43)	9K20G7W
Antenna information	Integrated print antenna
Transmitter spurious (worst case) [dBµV/m @ 3m]	44 (noise floor)
Receiver spurious (worst case) [dBµV/m @ 3m]	45 (noise floor)

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:

2011-07-08	**Joerg Warken**	
Date	Name	Signature

9 Measurement results

9.1 Timing of the transmitter

Measurement:

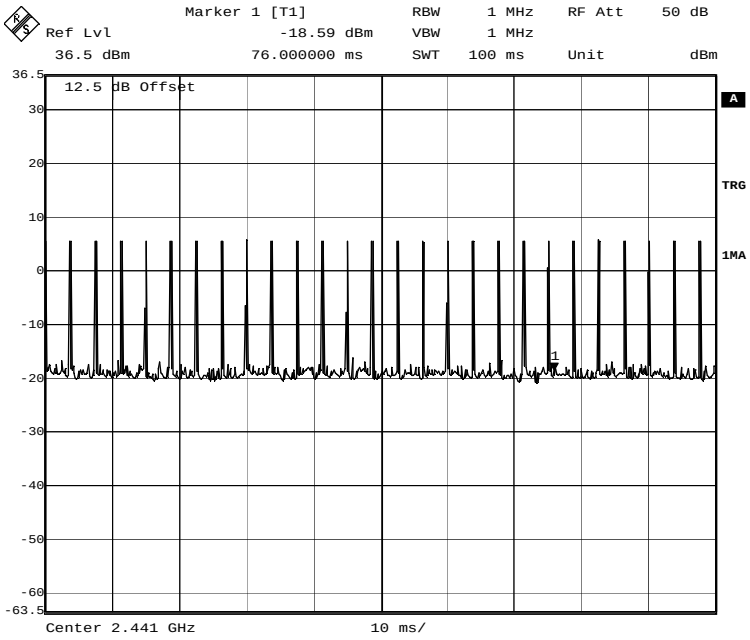
Measurement parameter	
Detector:	Peak
Sweep time:	See plot
Resolution bandwidth:	See plot
Video bandwidth:	See plot
Span:	Zero
Trace-Mode:	Single

Limits:

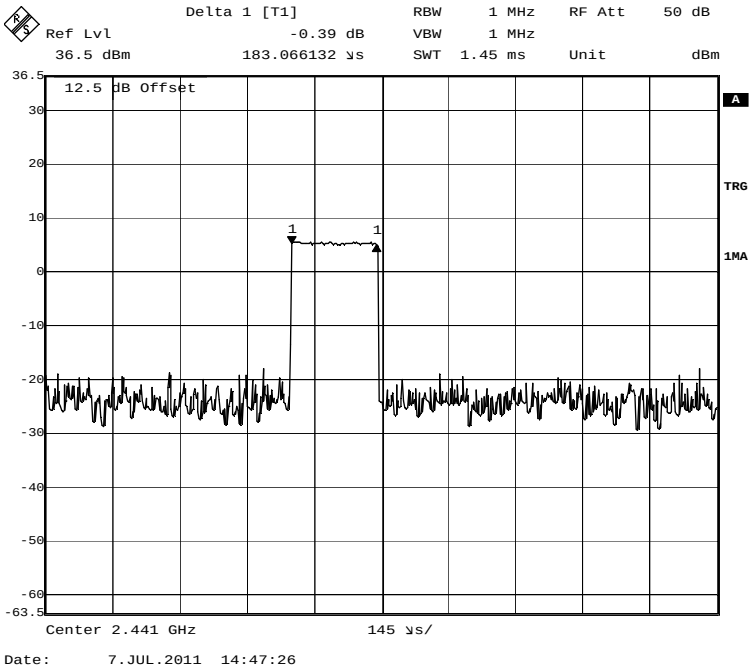
FCC	IC
CFR 15.35 (c)	RSS-GEN Issue 3 Section 4.5
Timing of the transmitter	
(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be 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.	

Result:

Plot 1: Transmit bursts (within 100ms)



Plot 2: Transmit burst in detail



Transmit time (Tx on) within 100 ms = 27 x 183 µs = 4.941 ms
Assumed transmit time (Tx on) within 100 ms for further calculations: 5 ms

The peak-to-average correction factor [dB] is calculated with: 20Log [Tx on / 100ms].

Result: peak-to-average correction factor [dB]: 26

9.2 Spectrum bandwidth – 99% bandwidth

Description:

Measurement of the 99% bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 kHz
Video bandwidth:	10 kHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

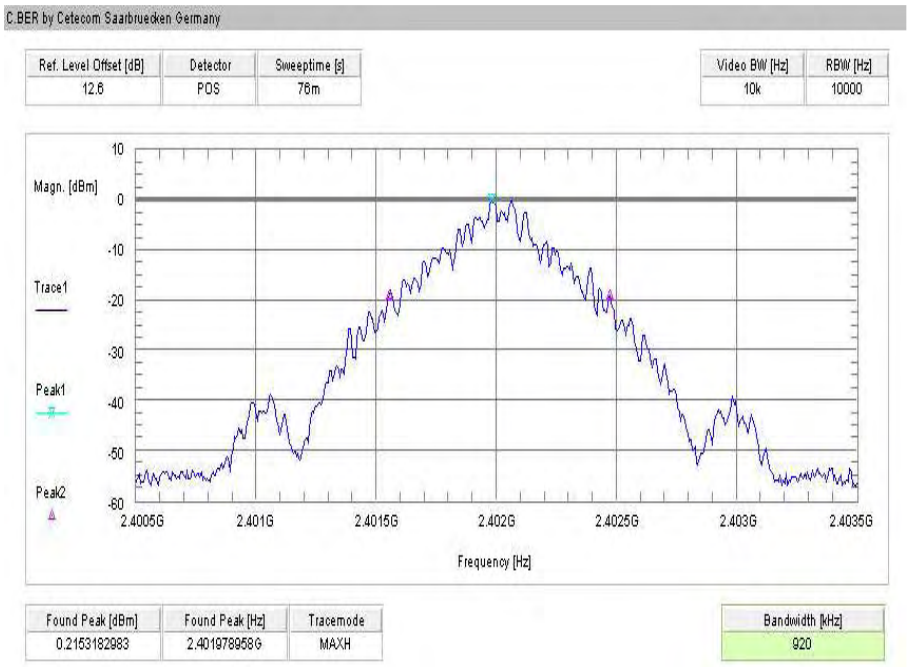
FCC	IC
-	RSS Gen, Issue 3, 4.6.1
Spectrum Bandwidth – 99% Bandwidth	
Required for emission designator	

Results:

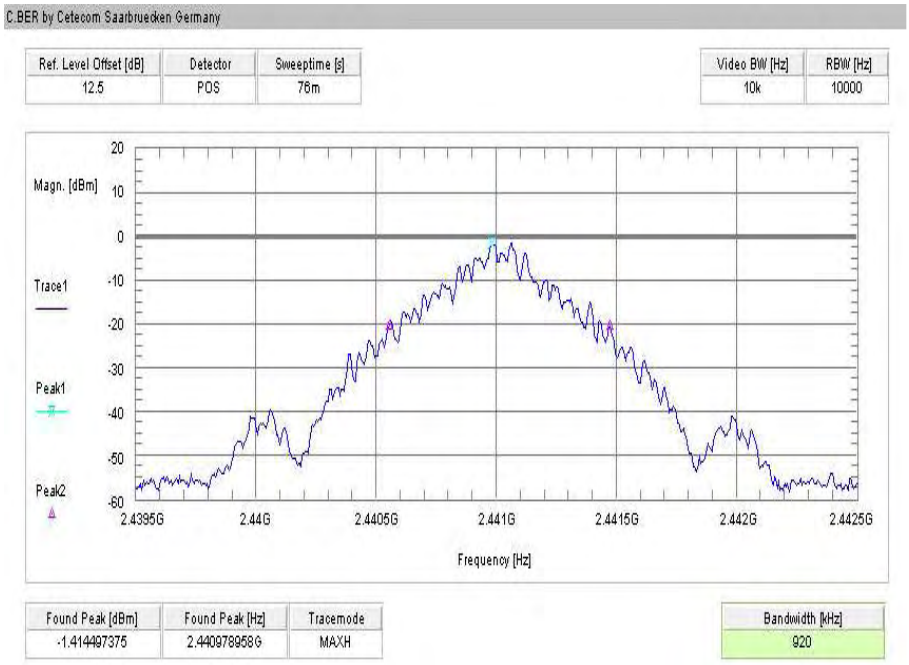
Modulation	99% BANDWIDTH [kHz]		
Frequency	2402 MHz	2441 MHz	2480 MHz
ANT+	920	920	920
Measurement uncertainty	± 30 kHz		

Plots: ANT+

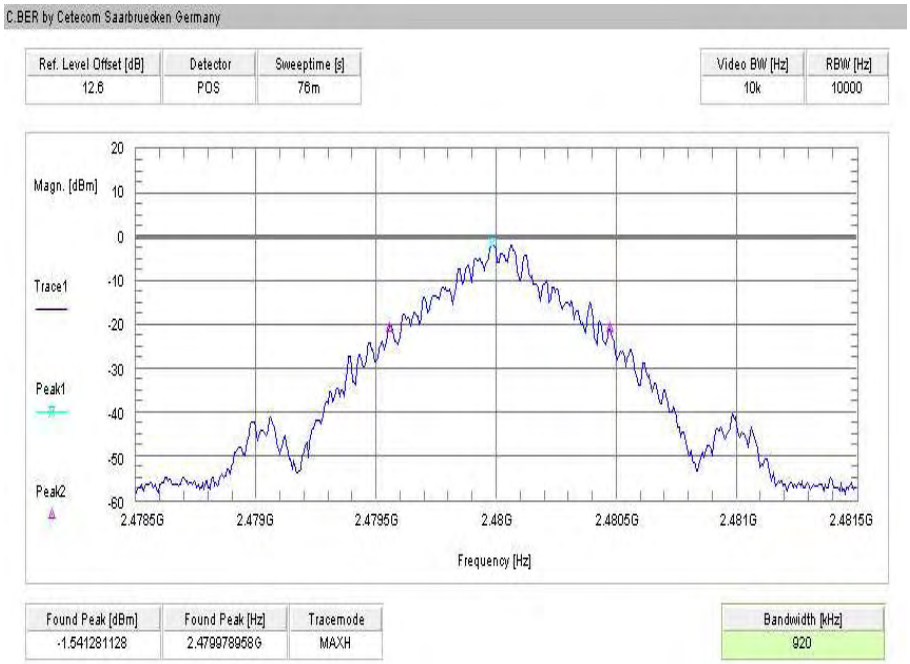
Plot 1: lowest channel



Plot 2: middle channel



Plot 3: highest channel



9.3 Maximum field strength

Description:

Measurement of the maximum field strength radiated.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	1 MHz
Span:	3 MHz
Trace-Mode:	Max Hold
Measurement distance:	3 m

Limits:

FCC	IC
CFR 15.249(a)(e)	RSS-210, Issue 8, A2.9(a)
Maximum field strength	
The field strength of emissions of intentional radiators shall comply with the following: Field strength of fundamental: 50 mV/m / (94 dBµV/m) @ 3 m (AVG) 500 mV/m / (114 dBµV/m) @ 3 m (Peak)	

Result:

Modulation	Maximum field strength [dBµV/m]		
Frequency	2402 MHz	2441 MHz	2480 MHz
Peak	98.70	98.19	98.45
AVG*)	72.70	72.19	72.45
Measurement uncertainty	± 3 dB		

*) Average value calculated with duty cycle correction factor. (see chapter 9.1)

Result: **The result of the measurement is passed.**

9.4 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to lowest channel for the lower restricted band and to highest channel for the upper restricted band. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Span:	Lower Band: 2300 – 2400 MHz Higher Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

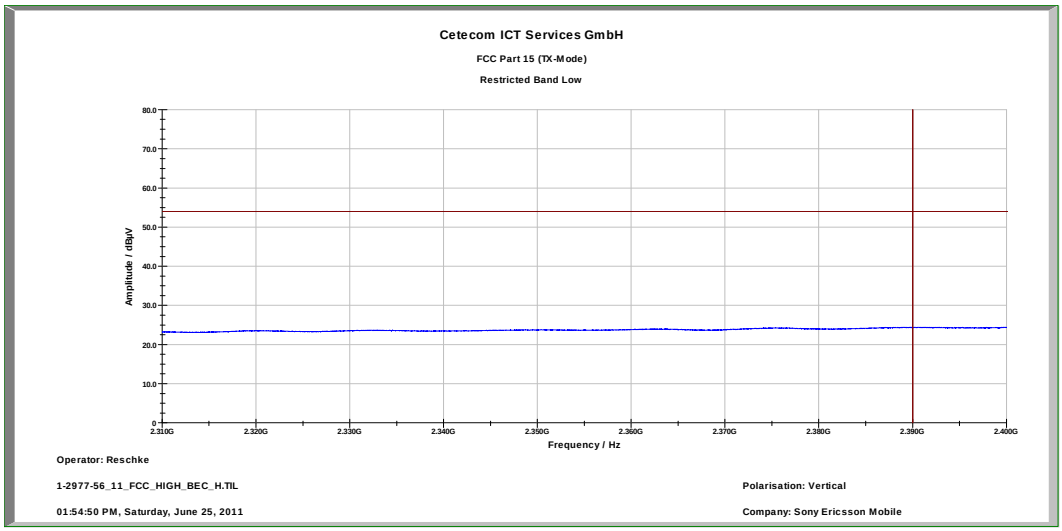
Limits:

FCC	IC
CFR Part 15.249(d)	RSS 210, Issue 8, A 2.9(a)(b)
Band Edge Compliance Radiated	
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209 / RSS GEN, whichever is the lesser attenuation.	
54 dBµV/m (AVG) / 74 dBµV/m (Pk)	

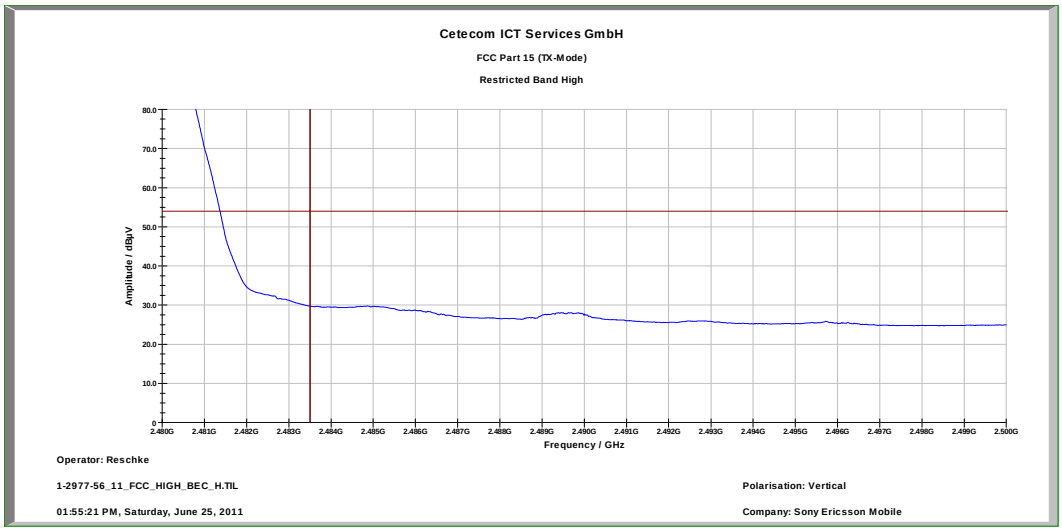
Result:

Modulation	Band Edge Compliance Radiated [dBµV/m]
	GFSK
Lower Band Edge – Lowest Channel	< 54 dBµV/m (see plots 1/3)
Upper Band Edge – Highest Channel	< 54 dBµV/m (see plot 2/4)
Measurement uncertainty	± 3 dB

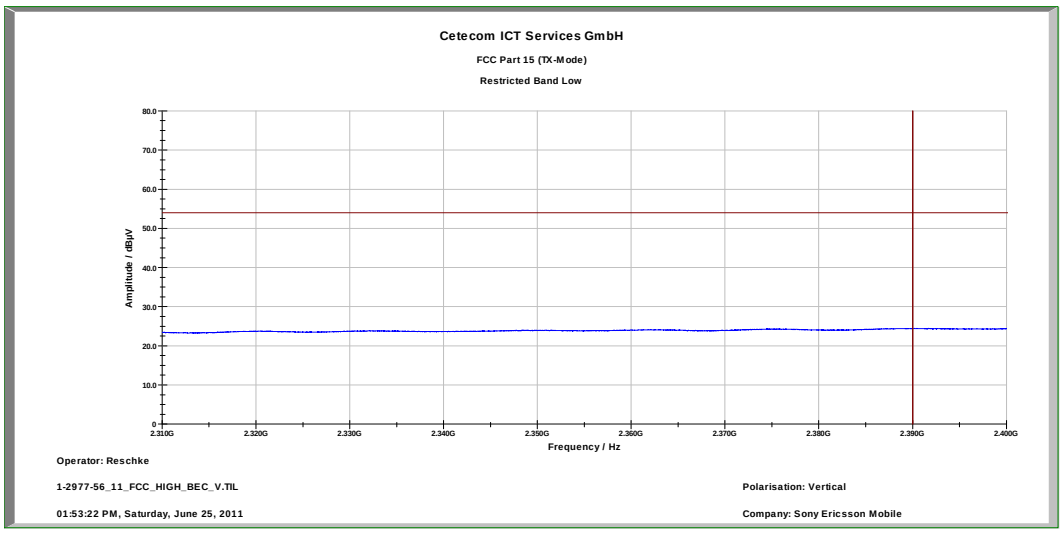
Plot 1: lower band edge, horizontal polarization



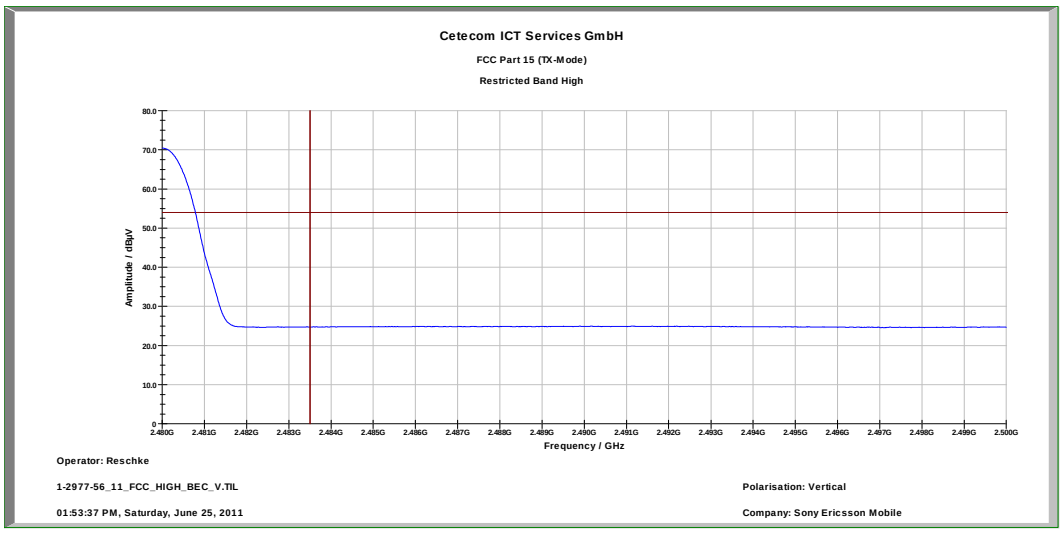
Plot 2: upper band edge, horizontal polarization



Plot 3: lower band edge, vertical polarization



Plot 4: upper band edge, vertical polarization



Result: **The result of the measurement is passed.**

9.5 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at lowest, middle and highest channel.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz or Duty cycle correction
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC	IC	
CFR Part 15.249(d)	RSS 210, Issue 8, A 2.9(a)(b)	
TX spurious emissions radiated		
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209 / RSS GEN, whichever is the lesser attenuation.		
§15.209		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Results:

TX Spurious Emissions Radiated [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			± 3 dB					

Result: **The result of the measurement is passed.**

Plot 1: Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

CETECOM ICT Services GmbH

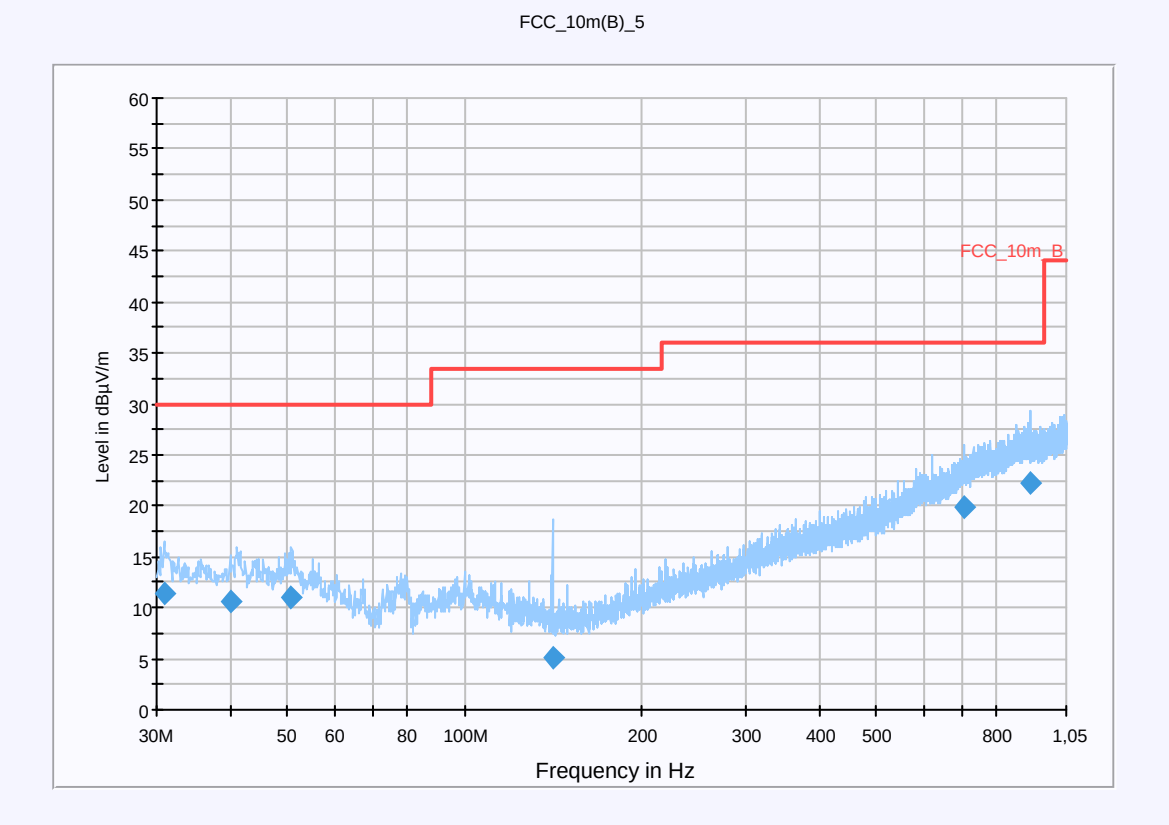
Common Information

EUT:	AAD-3880119-BV
Serial Number:	CB511TQ1TV IMEI: 00440214-301464-9
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	ANT+ TX Ch. 0 + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

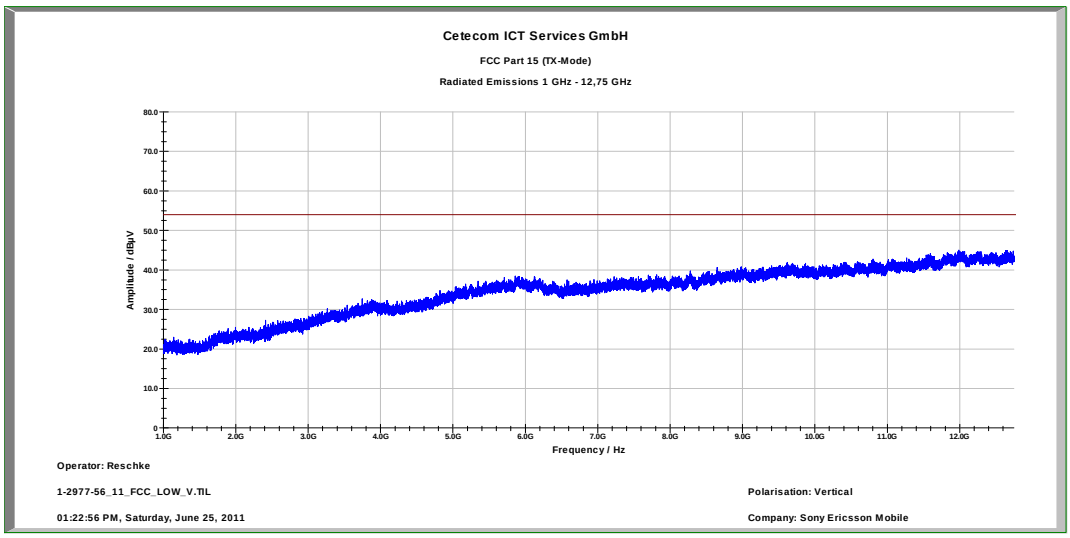
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

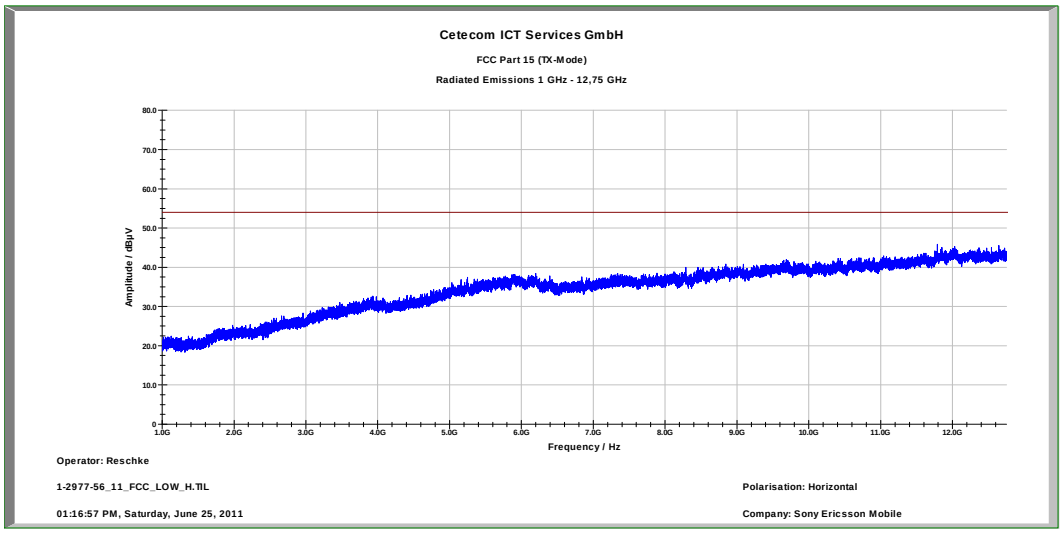
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.840000	11.4	15000.000	120.000	182.0	V	6.0	12.6	18.6	30.0	
39.960000	10.5	15000.000	120.000	211.0	V	141.0	13.4	19.5	30.0	
50.880000	11.0	15000.000	120.000	120.0	V	193.0	13.3	19.0	30.0	
140.880000	5.0	15000.000	120.000	220.0	V	232.0	8.7	28.5	33.5	
706.560000	19.8	15000.000	120.000	256.0	V	69.0	22.7	16.2	36.0	
914.880000	22.2	15000.000	120.000	270.0	V	29.0	25.2	13.8	36.0	

Plot 2: Lowest channel, 1 GHz to 12.75 GHz, vertical polarization



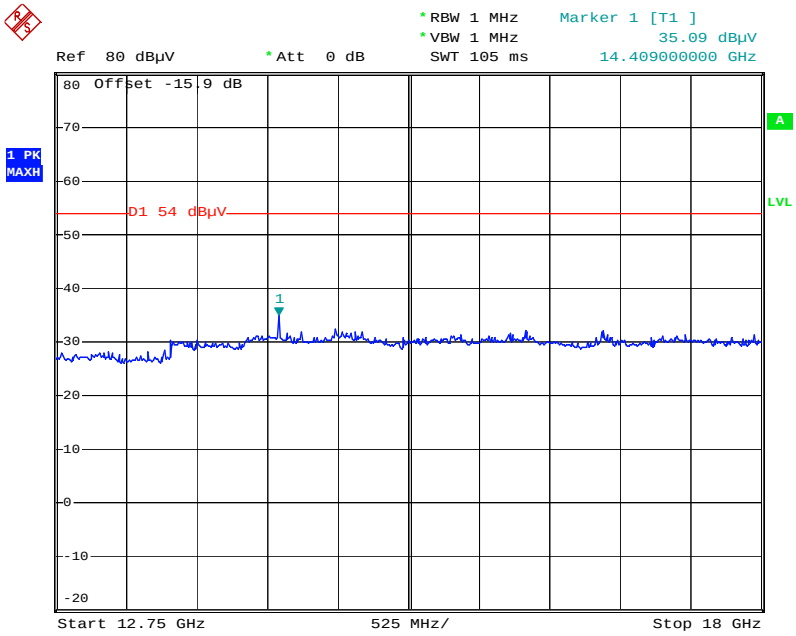
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: Lowest channel, 1 GHz to 12.75 GHz, horizontal polarization



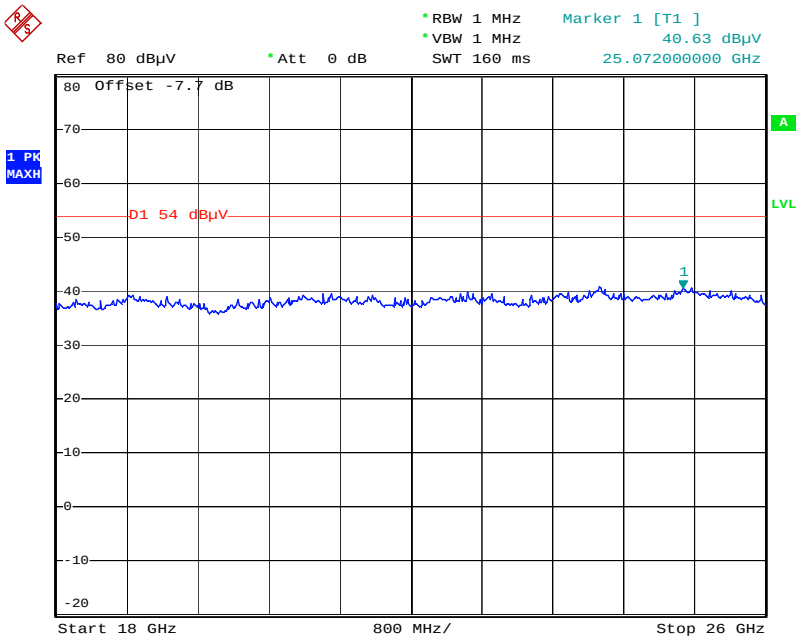
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: Lowest channel, 12 GHz to 18 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:33:58

Plot 5: Lowest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:50:03

Plot 6: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

CETECOM ICT Services GmbH

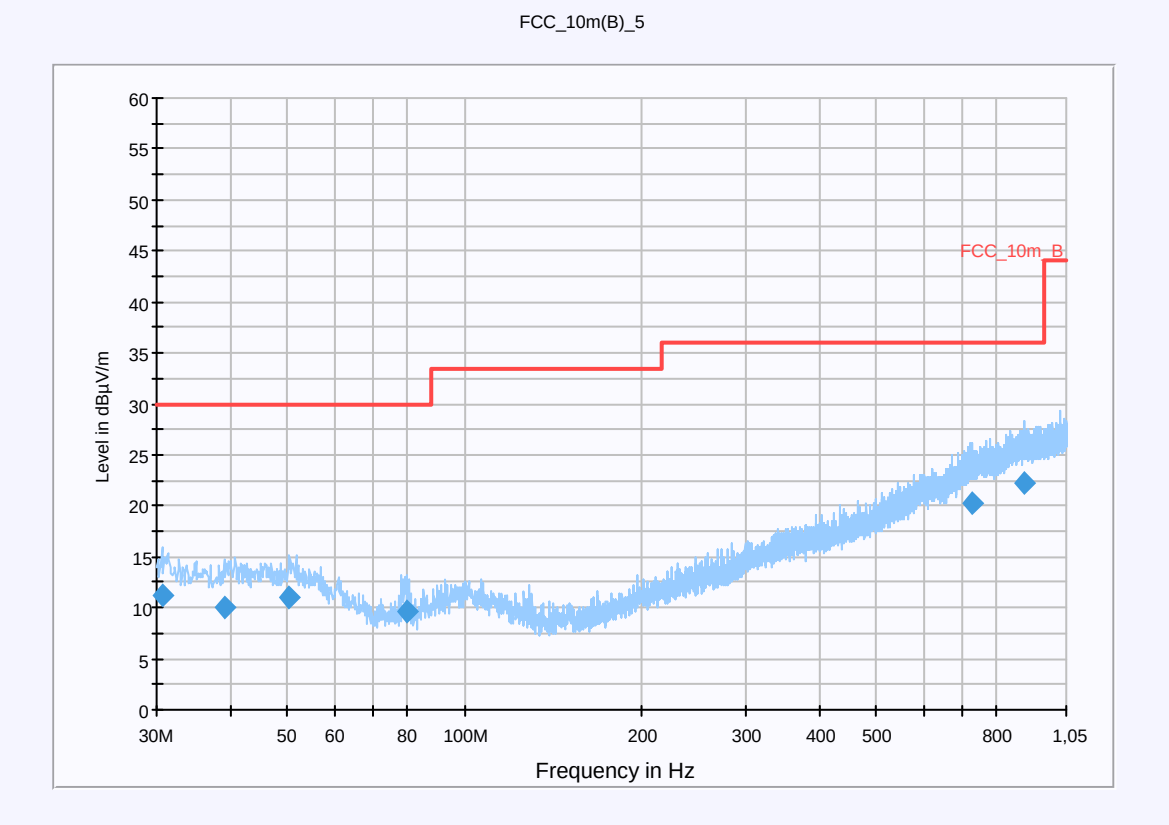
Common Information

EUT:	AAD-3880119-BV
Serial Number:	CB511TQ1TV IMEI: 00440214-301464-9
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	ANT+ TX Ch. 39 + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

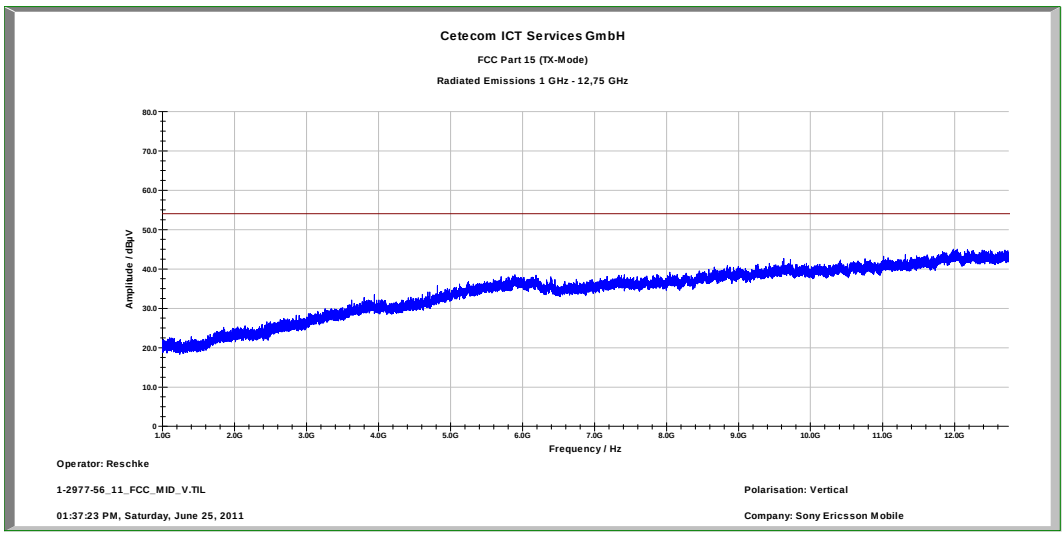
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

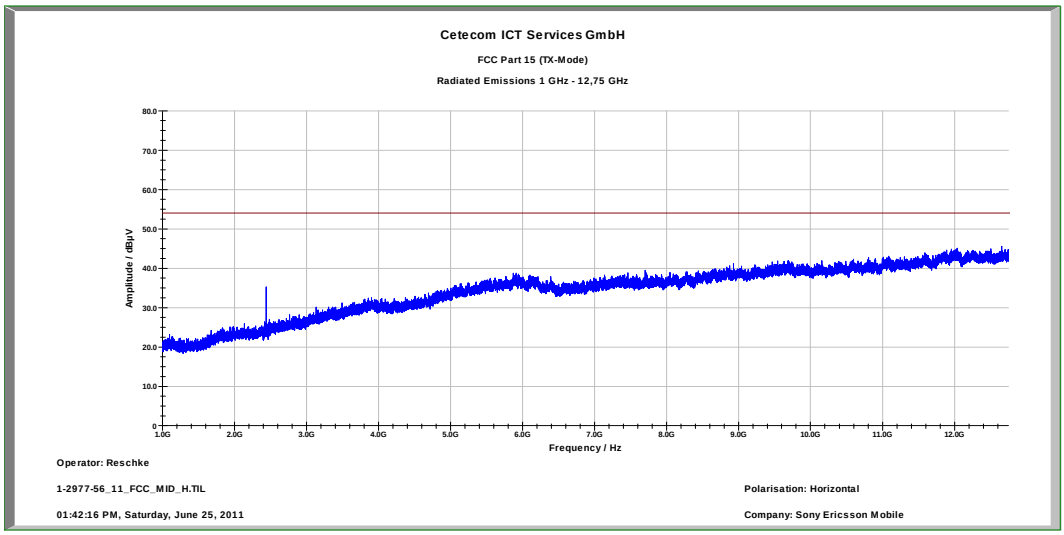
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.600000	11.2	15000.000	120.000	259.0	V	235.0	12.6	18.8	30.0	
39.000000	10.0	15000.000	120.000	106.0	V	326.0	13.4	20.0	30.0	
50.400000	11.0	15000.000	120.000	233.0	V	-2.0	13.3	19.0	30.0	
79.800000	9.7	15000.000	120.000	270.0	V	-2.0	9.1	20.3	30.0	
728.640000	20.3	15000.000	120.000	243.0	H	217.0	23.2	15.7	36.0	
893.280000	22.2	15000.000	120.000	270.0	H	177.0	25.1	13.8	36.0	

Plot 7: Middle channel, 1 GHz to 12.75 GHz, vertical polarization



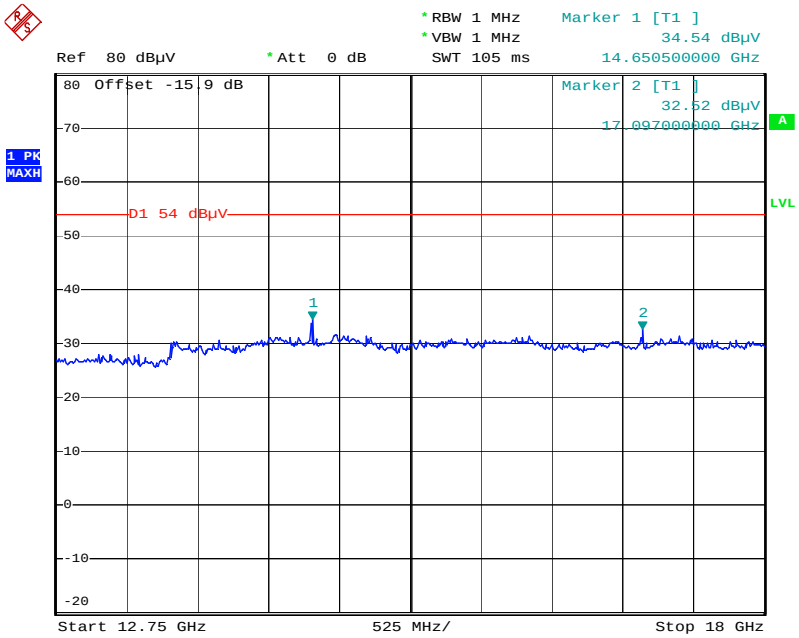
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 8: Middle channel, 1 GHz to 12.75 GHz, horizontal polarization



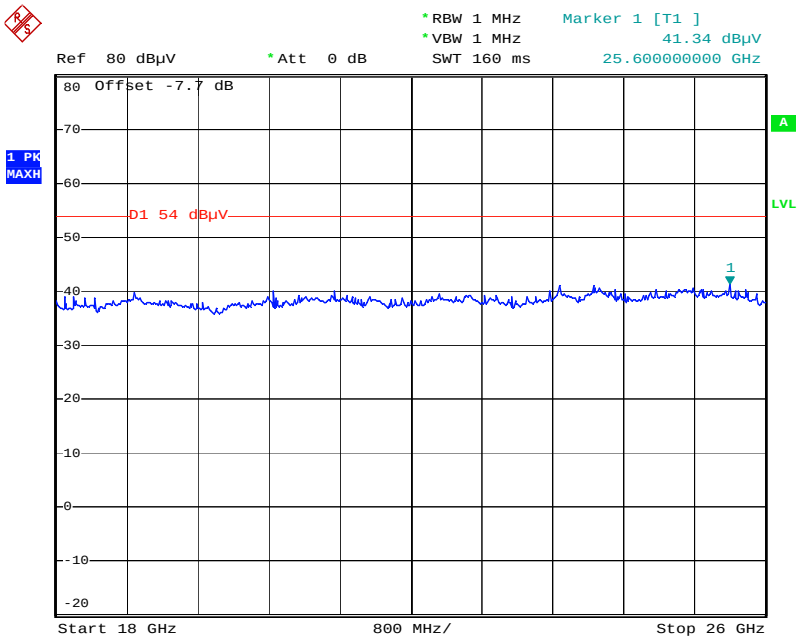
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 9: Middle channel, 12 GHz to 18 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:36:48

Plot 10: Middle channel, 18 GHz to 25 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:48:50

Plot 11: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

CETECOM ICT Services GmbH

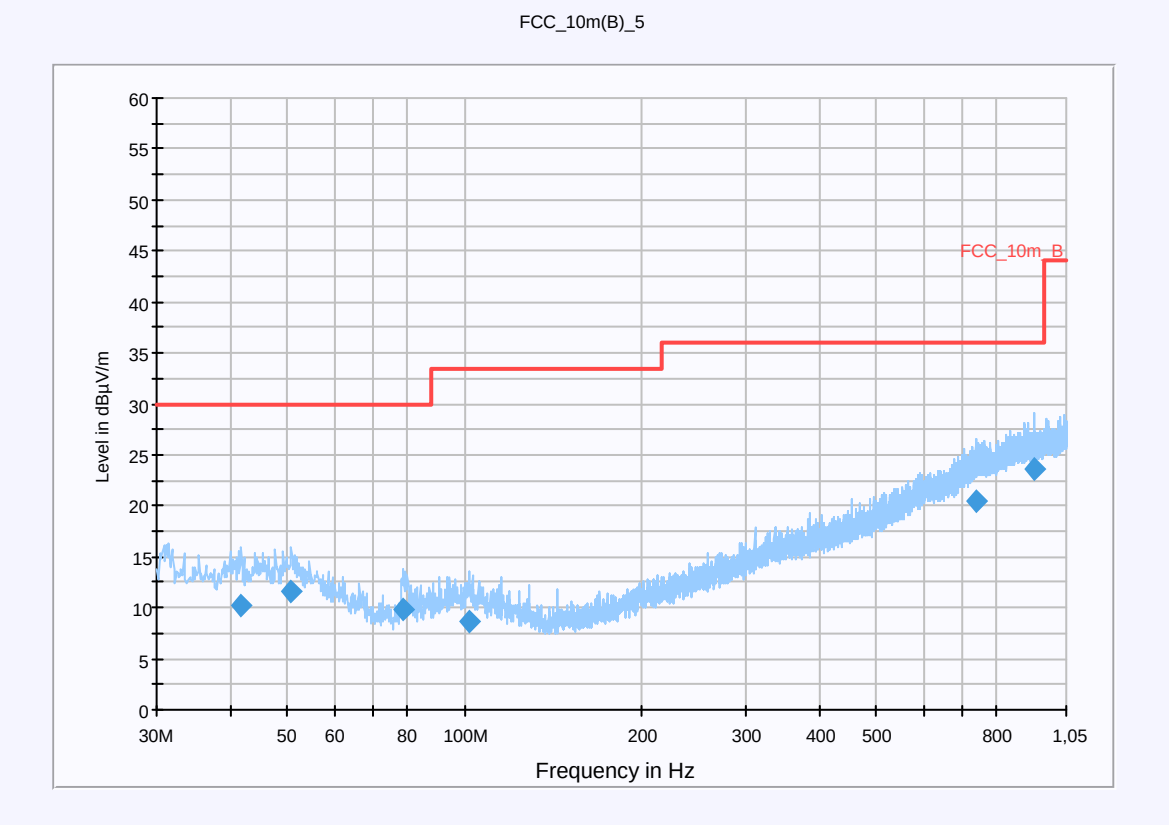
Common Information

EUT:	AAD-3880119-BV
Serial Number:	CB511TQ1TV IMEI: 00440214-301464-9
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	ANT+ TX Ch. 78 + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

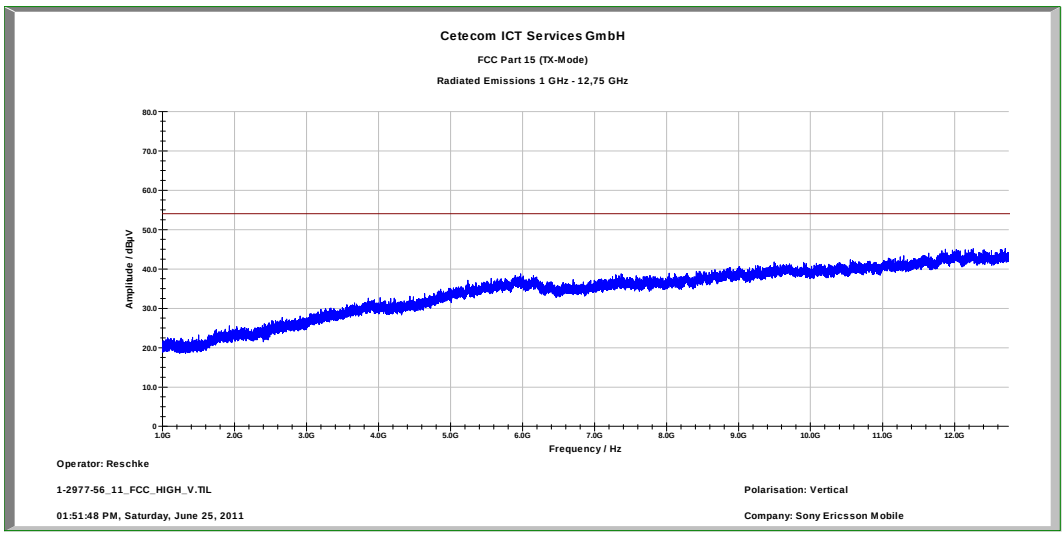
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

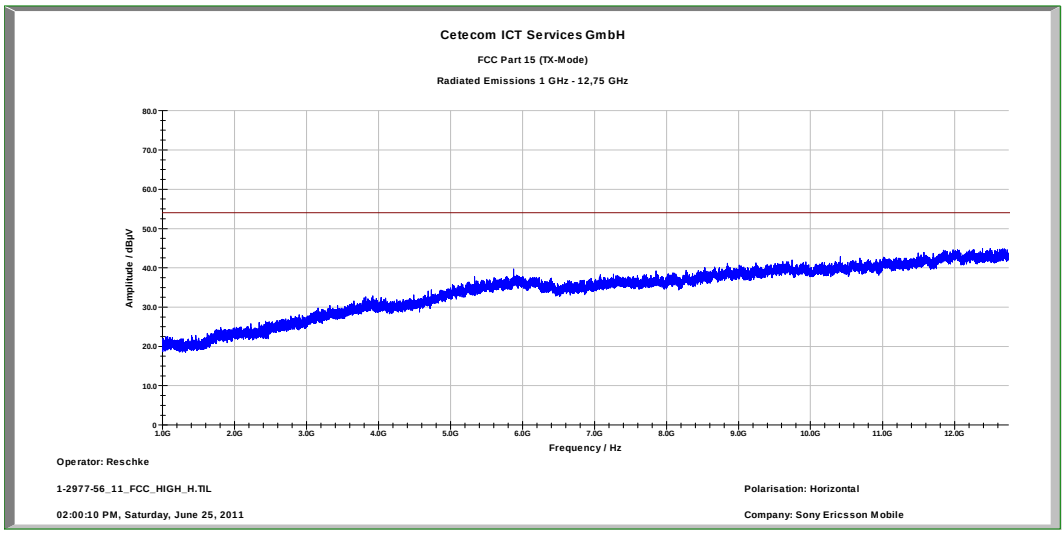
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
41.760000	10.3	15000.000	120.000	212.0	V	145.0	13.4	19.7	30.0	
50.880000	11.6	15000.000	120.000	98.0	V	145.0	13.3	18.4	30.0	
78.720000	9.8	15000.000	120.000	270.0	V	-2.0	9.1	20.2	30.0	
101.640000	8.6	15000.000	120.000	270.0	V	285.0	11.8	24.9	33.5	
735.360000	20.4	15000.000	120.000	256.0	H	334.0	23.3	15.6	36.0	
927.480000	23.7	15000.000	120.000	98.0	H	276.0	25.3	12.3	36.0	

Plot 12: Highest channel, 1 GHz to 12.75 GHz, vertical polarization



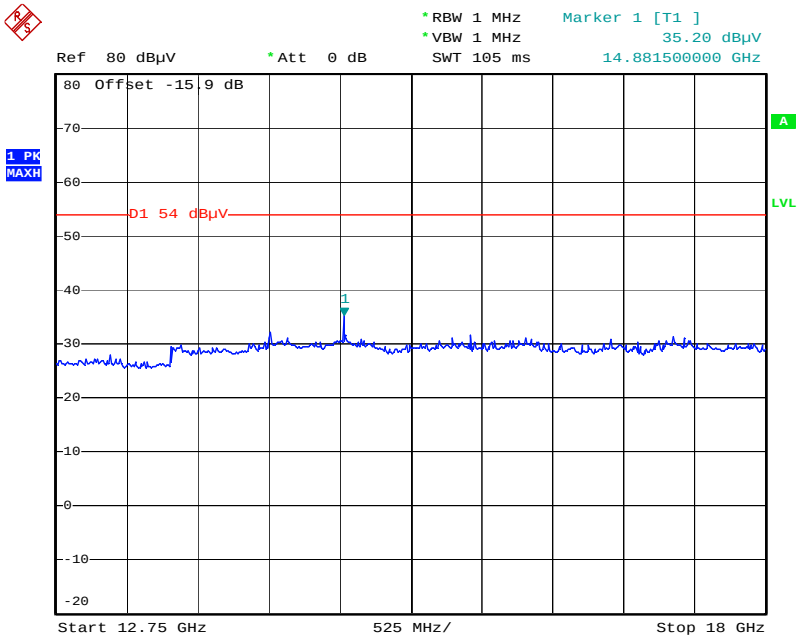
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 13: Highest channel, 1 GHz to 12.75 GHz, horizontal polarization



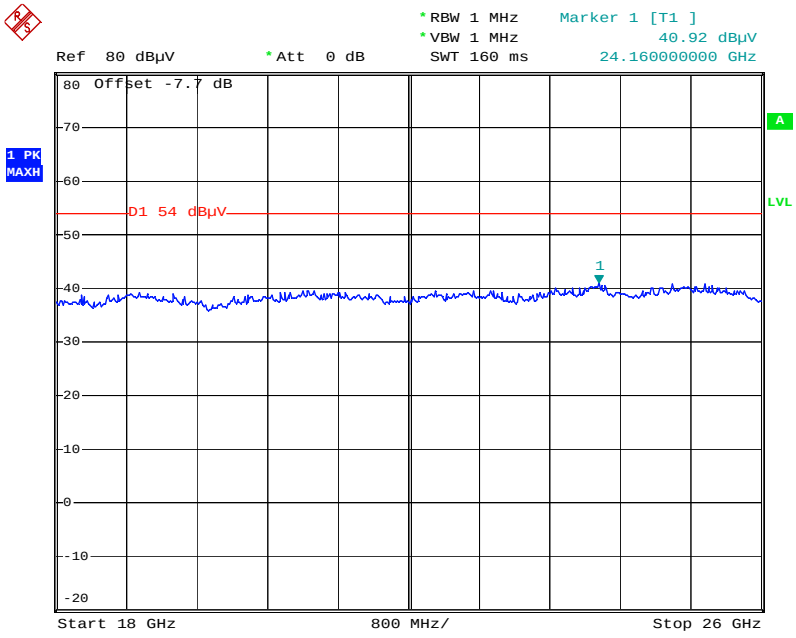
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 14: Highest channel, 12 GHz to 18 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:42:40

Plot 15: Highest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:47:44

9.6 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

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

Results:

RX Spurious Emissions Radiated [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	± 3 dB	

Result: **The result of the measurement is passed.**

Plots: RX / Idle – mode

Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization

CETECOM ICT Services GmbH

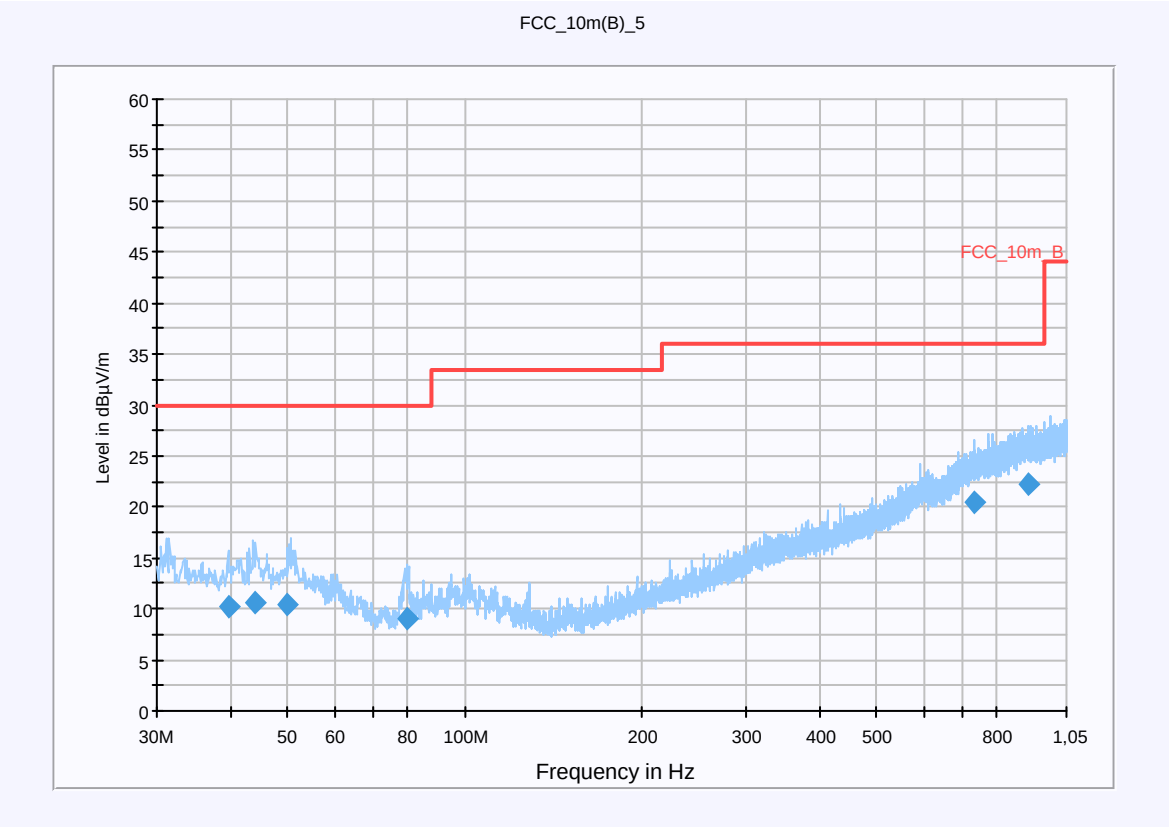
Common Information

EUT:	AAD-3880119-BV
Serial Number:	CB511TQ1TV IMEI: 00440214-301464-9
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	ANT+ RX + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

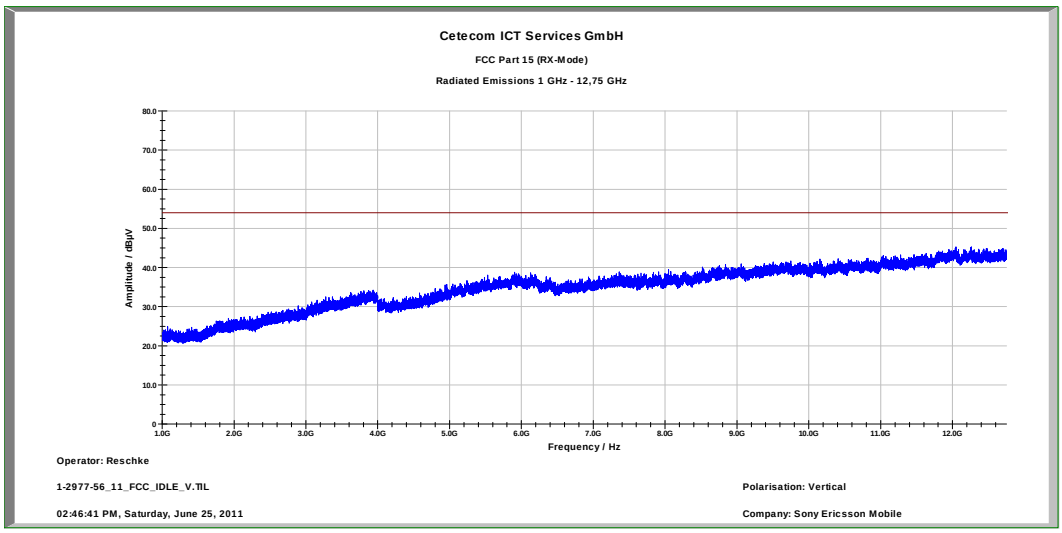
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



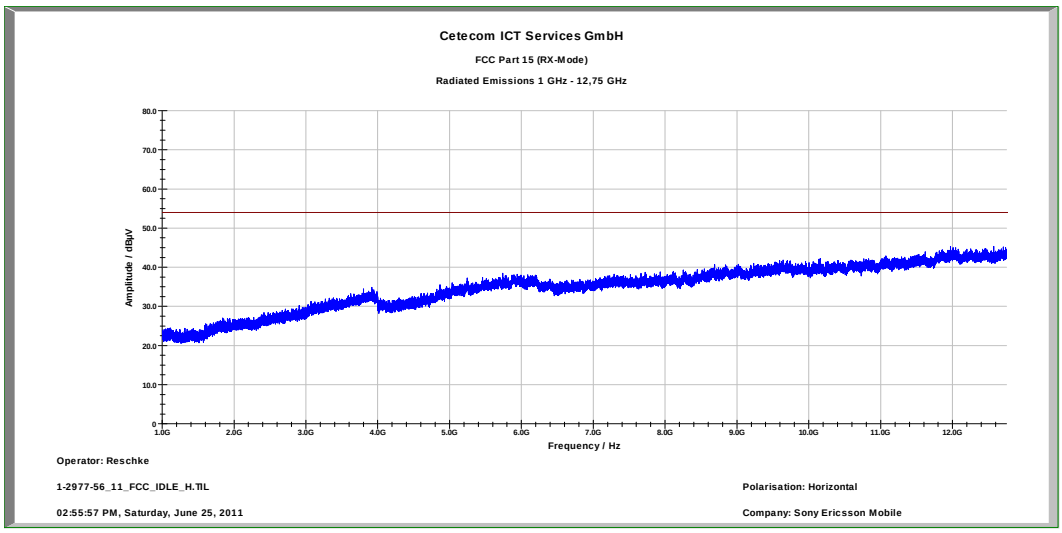
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.720000	10.3	15000.000	120.000	201.0	V	109.0	13.4	19.7	30.0	
44.160000	10.6	15000.000	120.000	158.0	V	189.0	13.3	19.4	30.0	
49.920000	10.4	15000.000	120.000	223.0	V	25.0	13.4	19.6	30.0	
79.680000	9.1	15000.000	120.000	263.0	V	295.0	9.1	20.9	30.0	
733.800000	20.4	15000.000	120.000	270.0	V	-2.0	23.3	15.6	36.0	
904.560000	22.3	15000.000	120.000	225.0	H	-2.0	25.2	13.7	36.0	

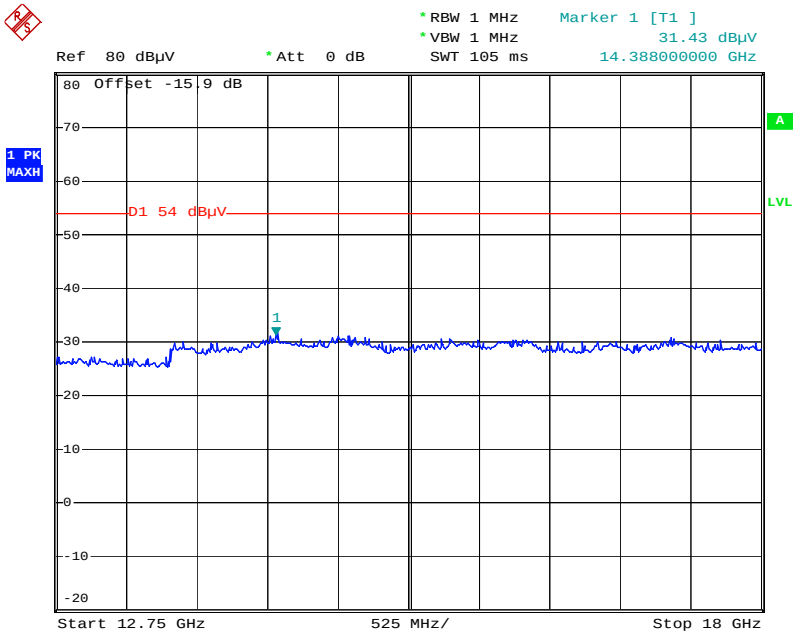
Plot 2: 1 GHz to 12.75 GHz, vertical polarization



Plot 3: 1 GHz to 12.75 GHz, horizontal polarization

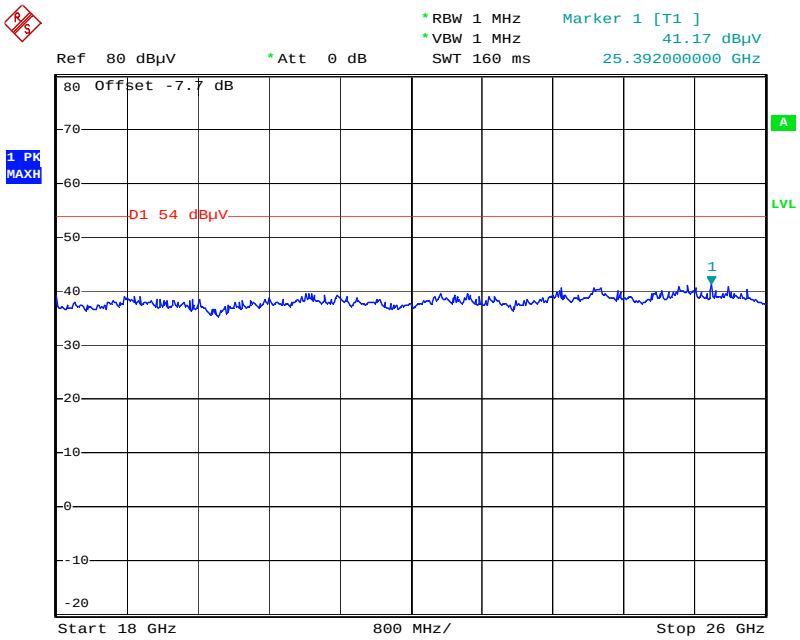


Plot 4: 12 GHz to 18 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:43:28

Plot 5: 18 GHz to 25 GHz, vertical & horizontal polarization



Date: 5.JUL.2011 09:46:25

9.7 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to lowest, middle and highest channel. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

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

Limits:

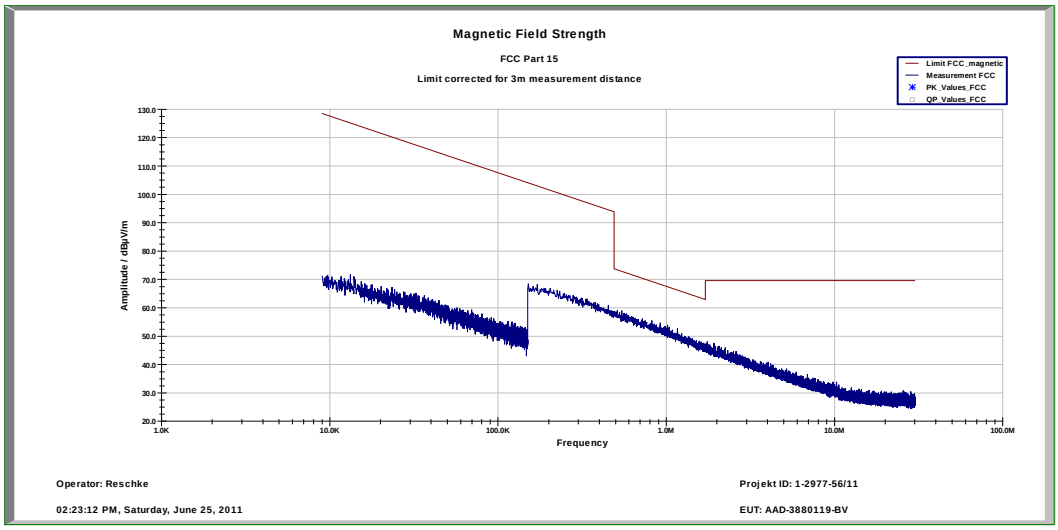
FCC		IC
CFR Part 15.209(a)		RSS –Gen
Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Results:

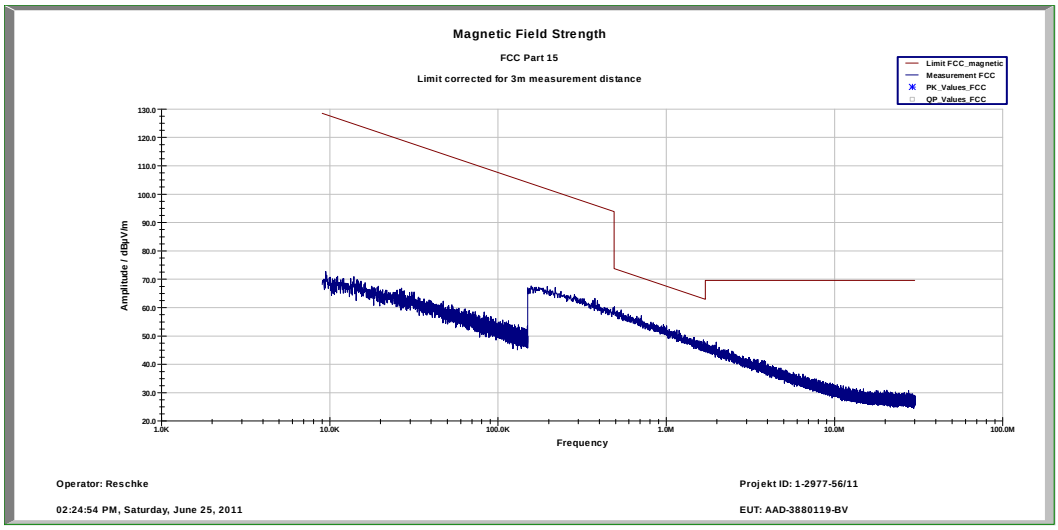
Spurious Emissions Radiated < 30 MHz [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			± 3 dB					

Result: **The result of the measurement is passed.**

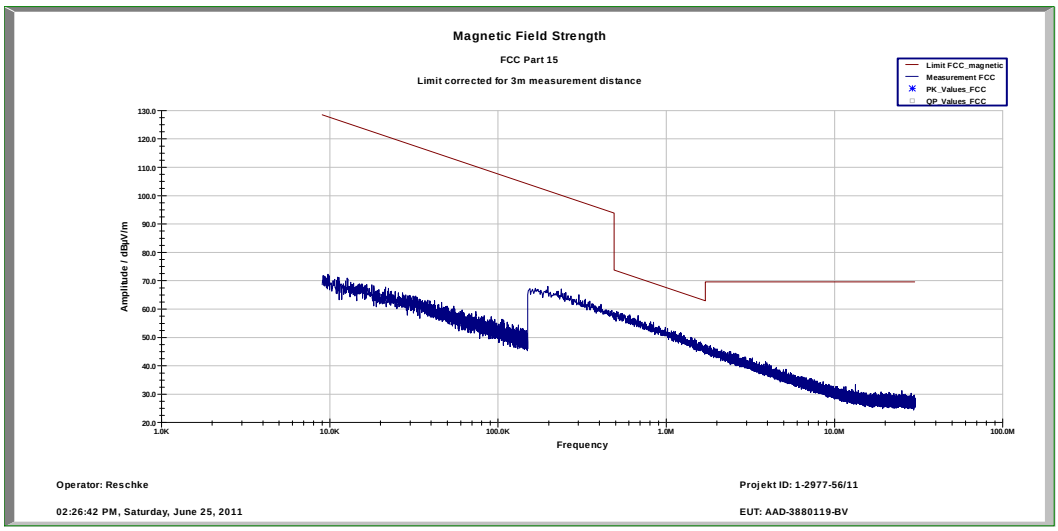
Plot 1: 9 kHz to 30 MHz / lowest channel



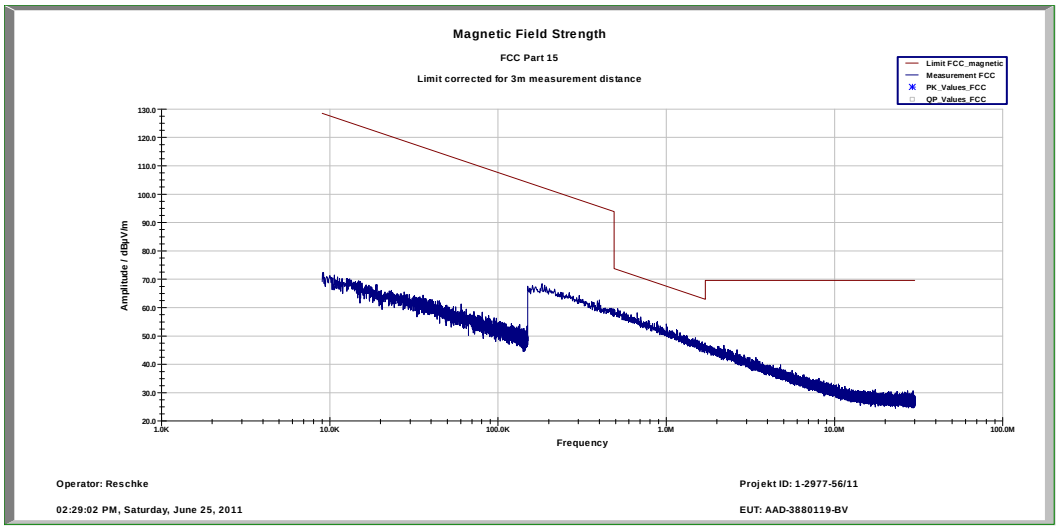
Plot 2: 9 kHz to 30 MHz / middle channel



Plot 3: 9 kHz to 30 MHz / highest channel



Plot 4: 9 kHz to 30 MHz / Idle mode



9.8 Spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to middle channel and Idle mode. If critical peaks are found the lowest and highest channel will be measured too. 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
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part 15.107(a)		ICES-003, Issue 4
TX 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

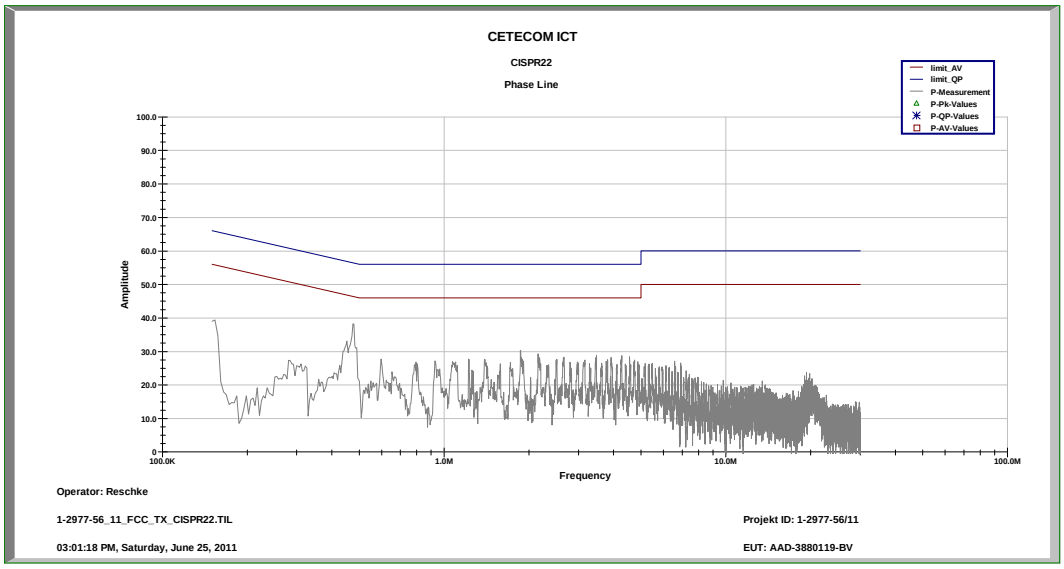
*Decreases with the logarithm of the frequency

Results:

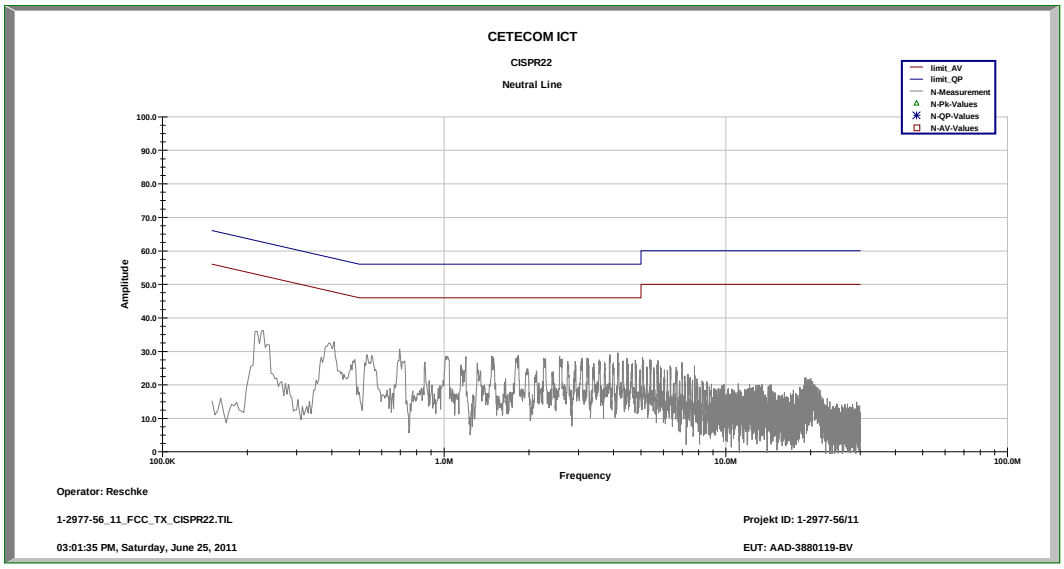
Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	± 3 dB	

Result: **The result of the measurement is passed.**

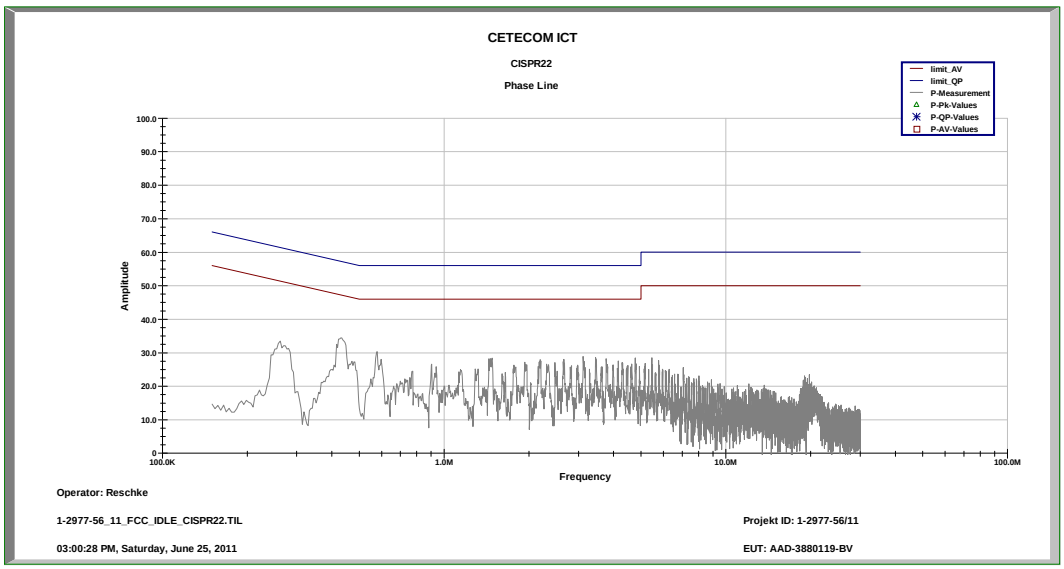
Plot 1: 9 kHz to 30 MHz / phase Line, TX mode



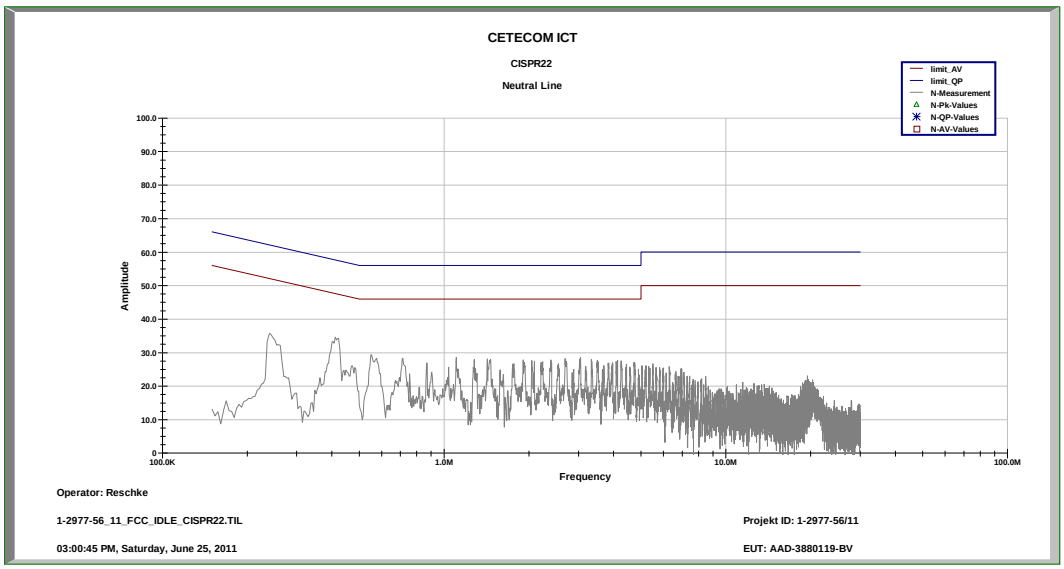
Plot 2: 9 kHz to 30 MHz / neutral Line, TX mode



Plot 3: 9 kHz to 30 MHz / phase Line, Idle mode



Plot 4: 9 kHz to 30 MHz / neutral Line, Idle mode



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.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	31.07.2009	31.07.2011
2	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
3	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
4	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
5	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
6	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
7	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	10.01.2011	10.01.2013
8	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
9	n. a.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
10	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	05.03.2009	05.09.2011
11	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
12	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
13	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
14	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
15	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
16	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
17	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
18	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	05.01.2011	05.01.2013
19	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
20	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
21	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
22	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
23	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		

24	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
25	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
26	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
27	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
28	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
29	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
30	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
31	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
32	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlkl!	08.09.2010	08.09.2012
33	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlkl!	17.12.2008	17.12.2011

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