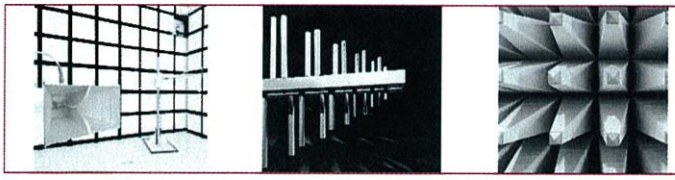

CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-4254/12-04-10

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

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

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 Ericsson 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@sonyericsson.com
Phone: +46 46 19 35 59

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:	**GSM Mobile Phone 850/900/1800/1900; GPRS/EGPRS; UMTS FDDI/FDDII/FDDV; HSPA; LTE Band 4/17; BT EDR; WLAN b/g/n; ANT+; GPS; HDMI; RFID**
Model name:	**AAL-8880001-BV**
FCC ID:	**PY7A8880001**
IC:	**4170B-A8880001**
Frequency [MHz]:	2400.00 – 2483.50 MHz
Technology tested:	ANT+
Antenna:	Integrated antenna
Power Supply:	3.7 V DC by Li-Polymer Battery
Temperature Range:	-20°C to +55 °C

Test report authorised:

2012-02-02 Stefan Bös
Senior Testing Manager

Test performed:

2012-02-02 Jakob Reschke
Testing Manager

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.

This test report is electronically signed and valid without handwritten signature. For verification of the electronical signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2012-01-10
Date of receipt of test item:	2012-01-16
Start of test:	2012-01-16
End of test:	2012-01-30
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:		54 %	
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}	3.4 V	

5 Test item

Kind of test item	**:**	**GSM Mobile Phone 850/900/1800/1900; GPRS/EGPRS; UMTS FDDI/FDDII/FDDV; HSPA; LTE Band 4/17; BT EDR; WLAN b/g/n; ANT+; GPS; HDMI; RFID**
Type identification	**:**	**AAL-8880001-BV**
S/N serial number	**:**	**Rad. CB5A1JE2RG, CB5A1JE2SJ** **Cond. CB5A1JE2NY, CB5A1JE2SA**
HW hardware status	**:**	**AP2**
SW software status	**:**	**6.0.C.0.257, 6.0.C.0.243** **s_atp_aoba_0_0_22**
Frequency band [MHz]	**:**	**2400.00 – 2483.50 MHz**
Type of modulation	**:**	**Digital Transmission System using GFSK modulation**
Number of channels	**:**	**79**
Antenna	**:**	**Integrated 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, Annex 2	Passed	2012-02-02	-/-

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

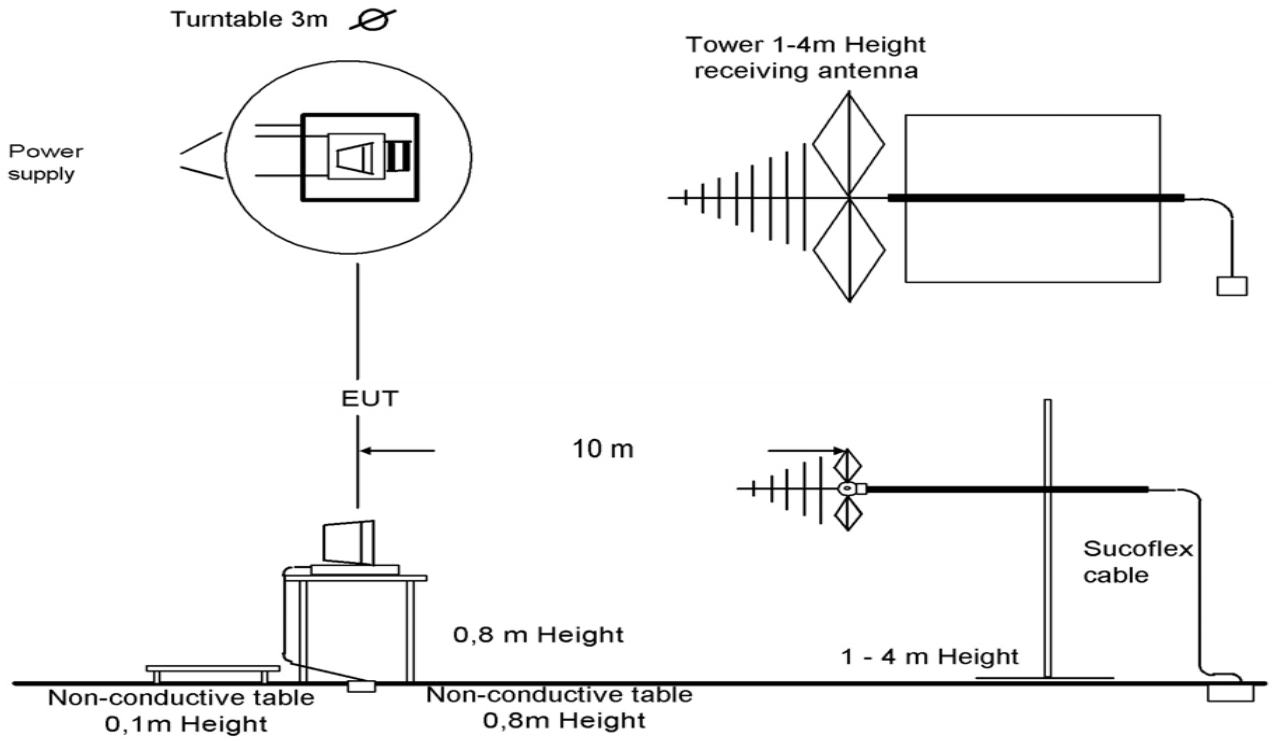
8 RF measurements

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	:	**1-4254/12-04-10**
Equipment model number	:	**AAL-8880001-BV**
Certification number	:	**4170B-A8880001**
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.)	:	**98.6 Peak 72.6 Average**
Occupied bandwidth (99%-BW) [kHz]	:	**1130**
Type of modulation	:	**Digital Transmission System using GFSK modulation**
Emission designator (TRC-43)	:	**1M13FXD**
Antenna information	:	**Integrated antenna**
Transmitter spurious (worst case) [µV/m @ 3m]:		**177 (noise floor)**
Receiver spurious (worst case) [µV/m @ 3m]	:	**177 (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:

2012-02-02	**Jakob Reschke**	
Date	Name	Signature

9 Measurement results

9.1 Timing of the transmitter

Measurement:

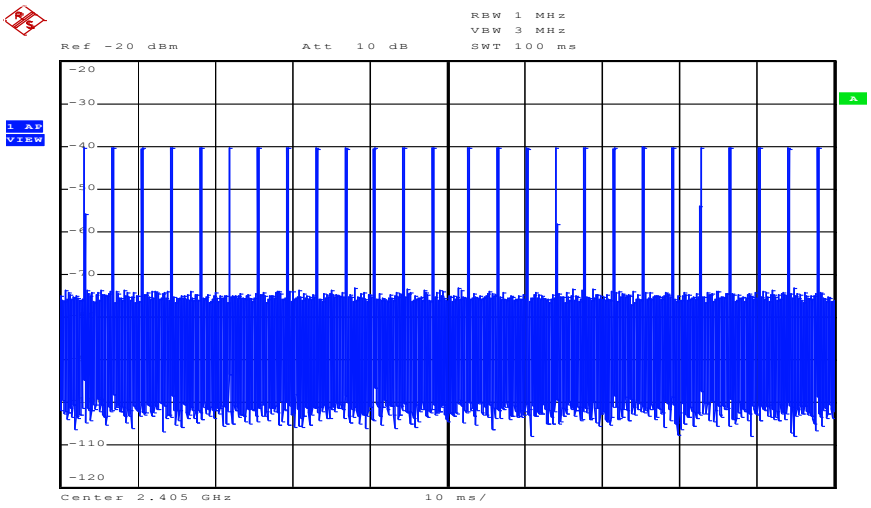
Measurement parameter	
Detector:	Peak
Sweep time:	See plot
Resolution bandwidth:	See plot
Video bandwidth:	See plot
Span:	Zero
Trace-Mode:	Single

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.	

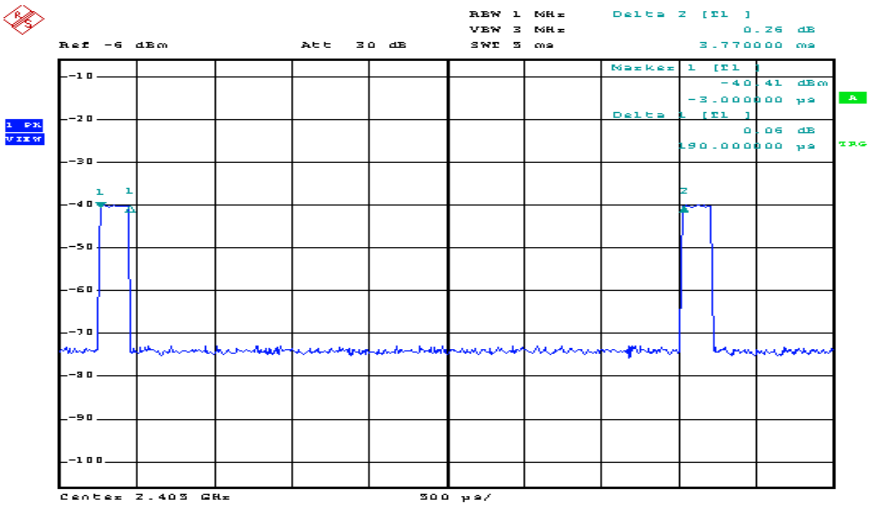
Result:

Plot 1: Transmit bursts (within 100ms)



Date: 30.JAN.2012 15:40:42

Plot 2: Transmit burst in detail



Date: 30.JAN.2012 15:44:47

Transmit time (Tx on) within 100 ms = 26 x 190 µs = 4940 µs
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:	100 kHz
Video bandwidth:	100 kHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

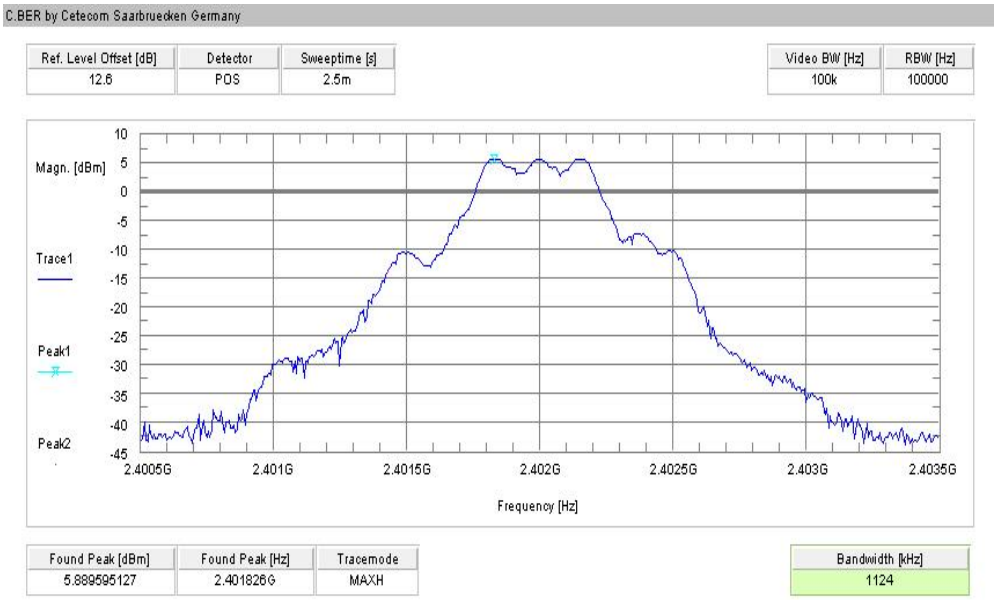
FCC	IC
-	RSS Gen, Issue 3, 4.6.1
Spectrum Bandwidth – 99% Bandwidth	
Required for emission designator	

Results:

Modulation	99% BANDWIDTH [kHz]		
Frequency	2402 MHz	2441 MHz	2480 MHz
ANT+	1124	1130	1118
Measurement uncertainty	± 30 kHz		

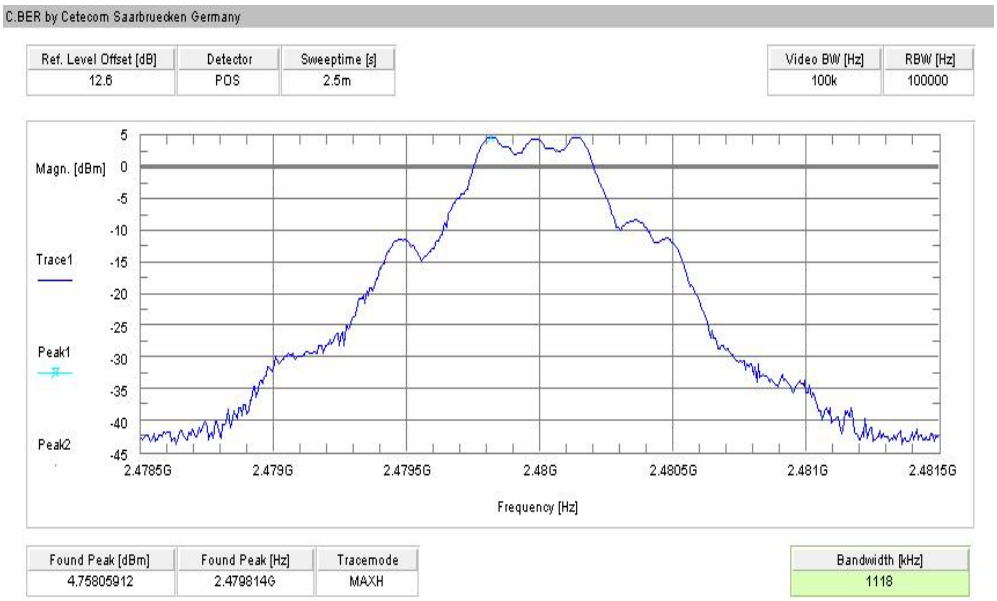
Plots: ANT+

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	97.7	98.6	94.8
AVG*)	71.7	72.6	68.8
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

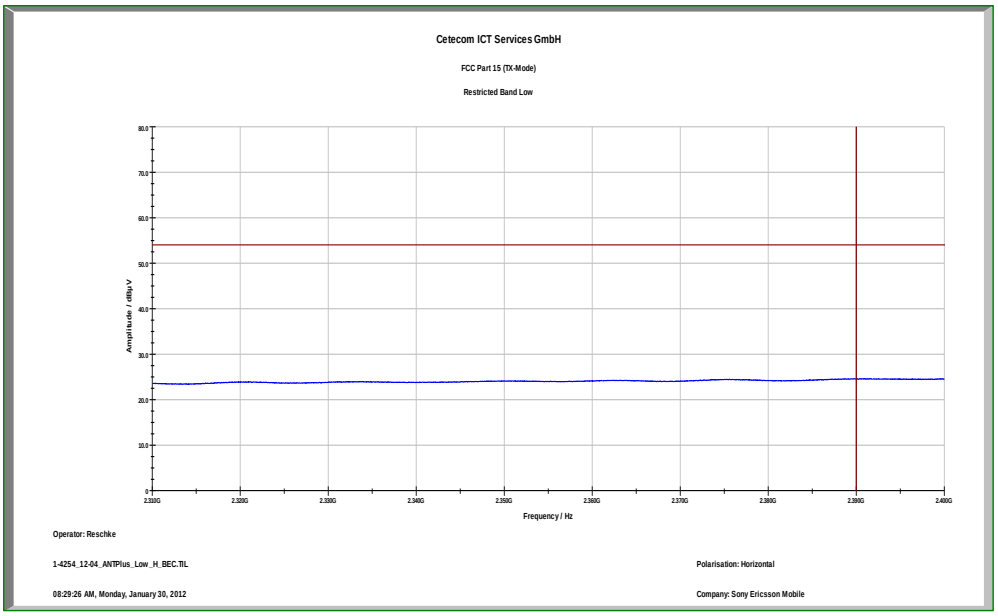
Limits:

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)	

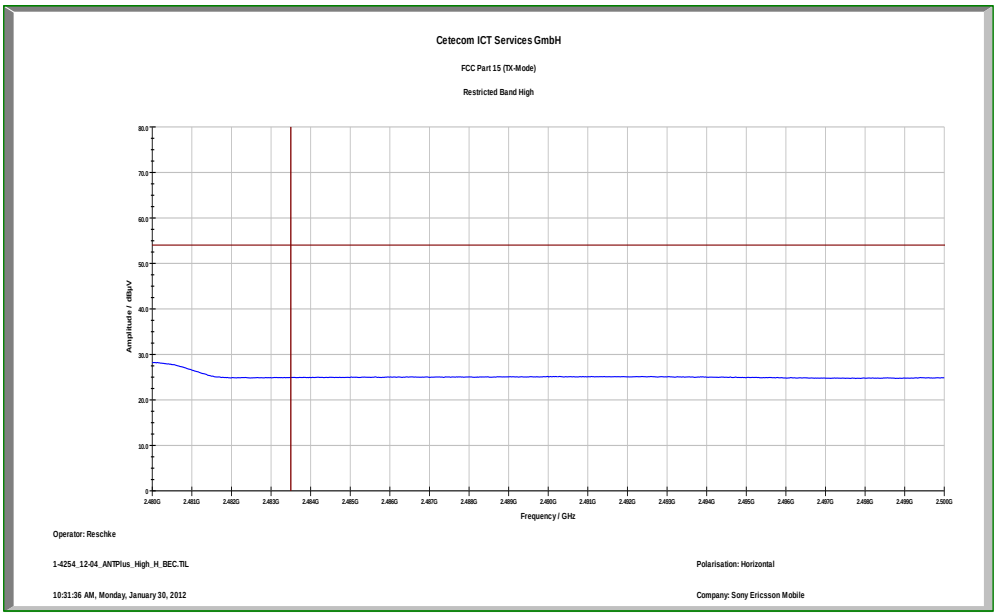
Result:

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

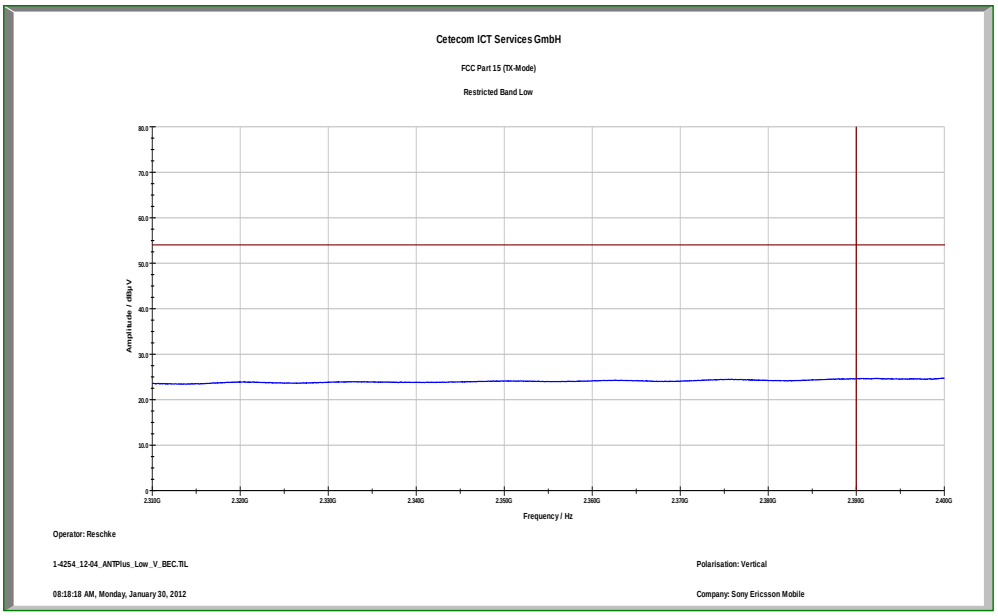
Plot 1: lower band edge, horizontal polarization



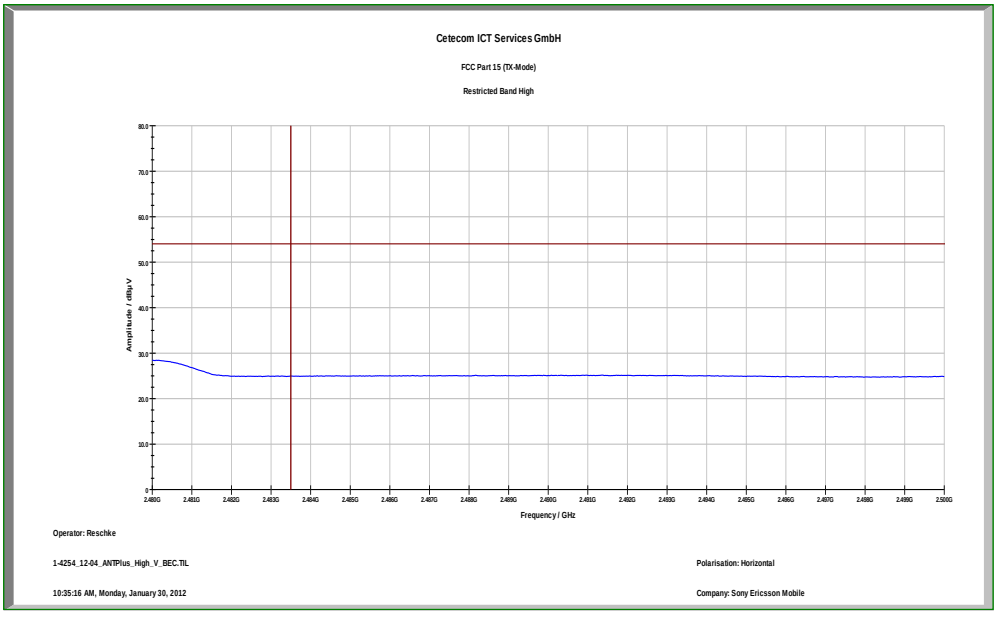
Plot 2: upper band edge, horizontal polarization



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: F > 1 GHz:	100 kHz 1 MHz
Video bandwidth:	Sweep: Remeasurement:	100 kHz 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

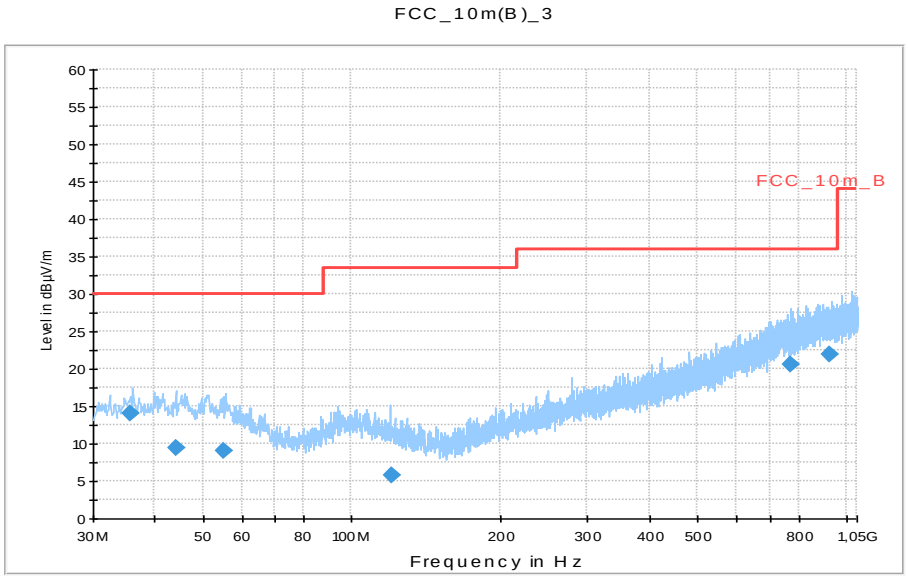
Common Information

EUT:	AAL-8880001-BV
Serial Number:	CB5A1JE2SJ
Test Description:	FCC part 15 B 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)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

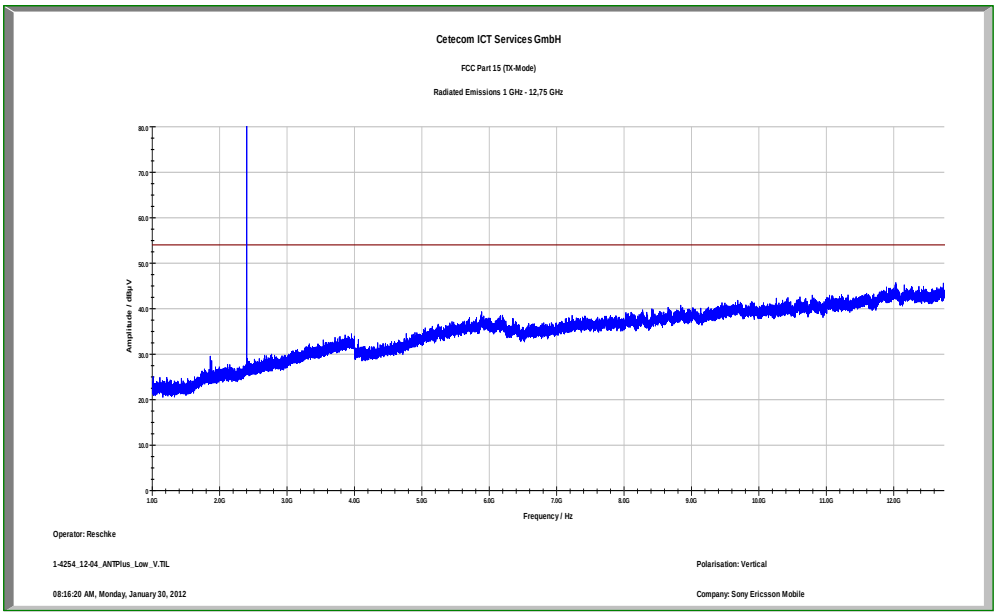
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



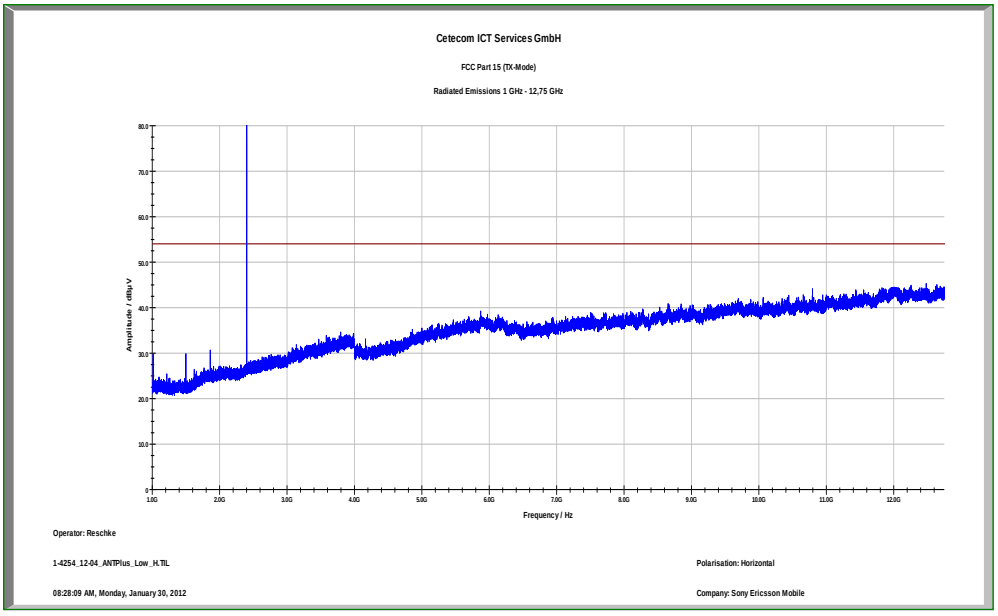
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.758050	14.0	1000.0	120.000	170.0	V	95.0	13.1	16.0	30.0	
44.056650	9.4	1000.0	120.000	98.0	V	8.0	13.3	20.6	30.0	
55.067250	9.1	1000.0	120.000	155.0	H	284.0	12.9	20.9	30.0	
120.179400	5.8	1000.0	120.000	98.0	V	-6.0	10.2	27.7	33.5	
773.159550	20.5	1000.0	120.000	170.0	H	259.0	23.7	15.5	36.0	
928.723350	22.0	1000.0	120.000	134.0	H	265.0	25.3	14.0	36.0	

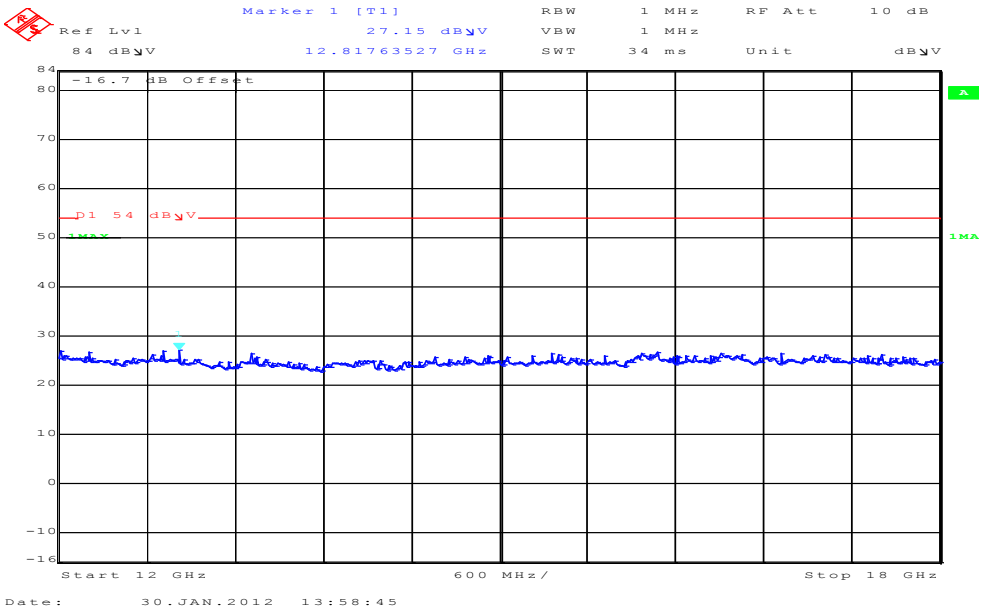
Plot 2: Lowest channel, 1 GHz to 12.75 GHz, vertical polarization



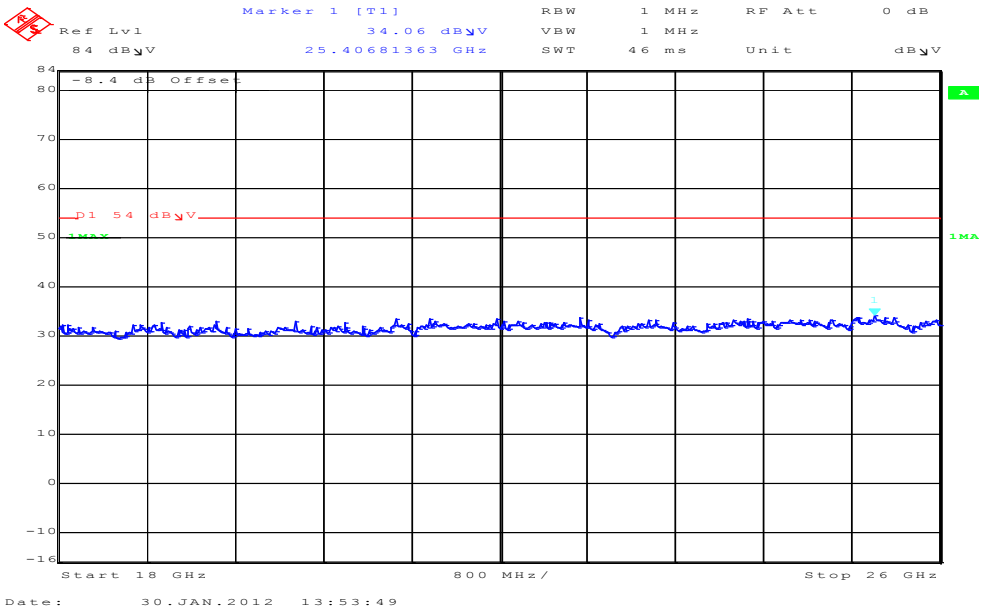
Plot 3: Lowest channel, 1 GHz to 12.75 GHz, horizontal polarization



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



Plot 5: Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



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

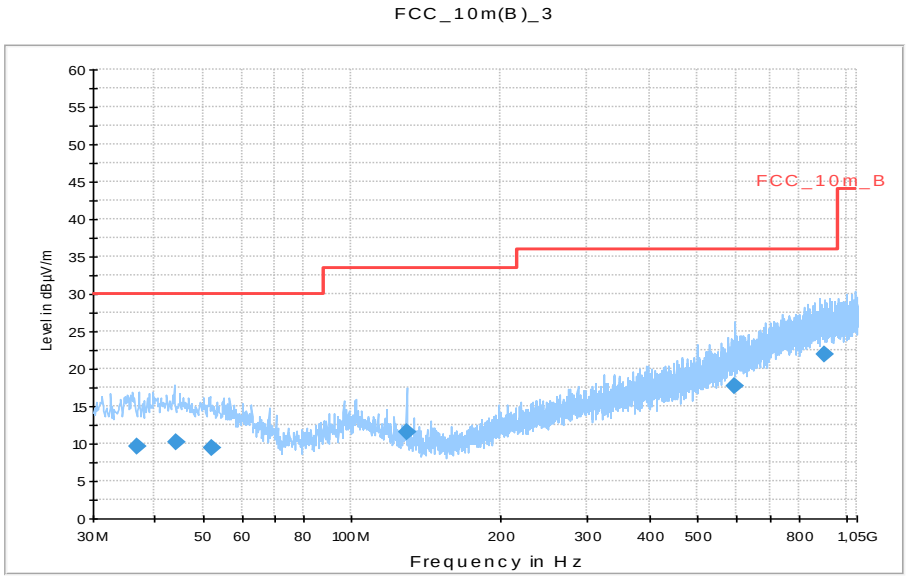
Common Information

EUT:	AAL-8880001-BV
Serial Number:	CB5A1JE2SJ
Test Description:	FCC part 15 B 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)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

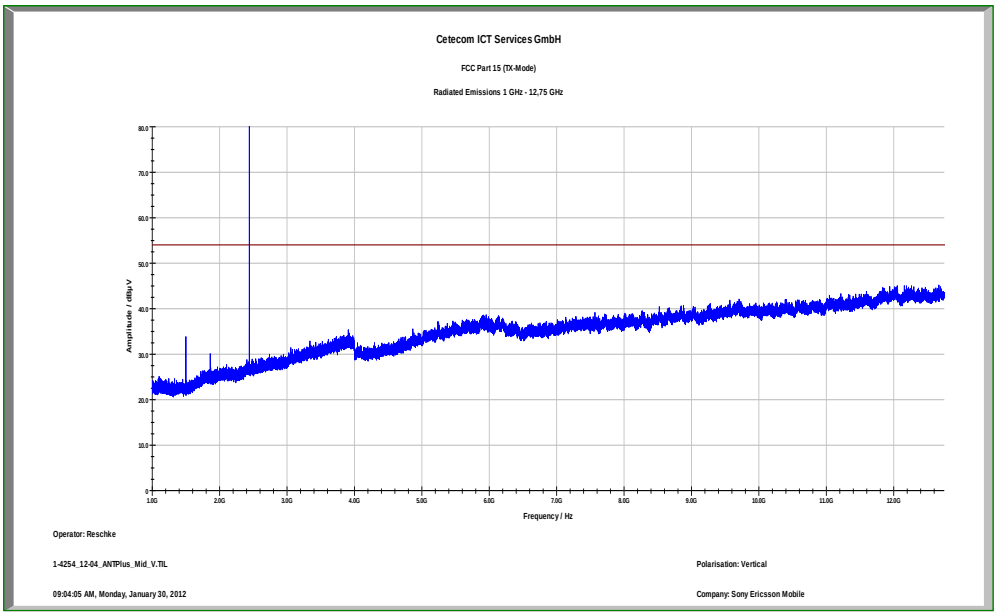
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



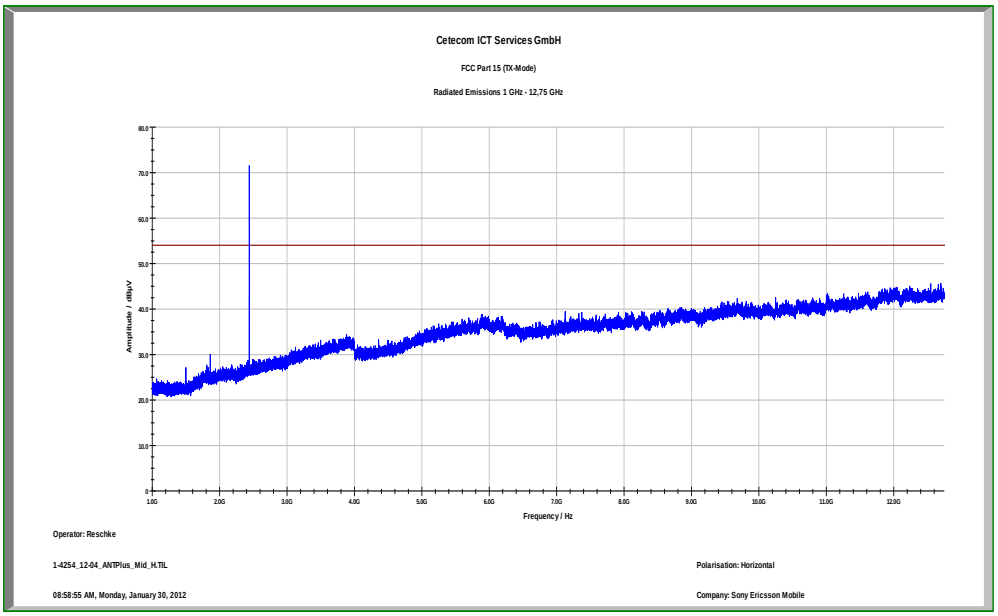
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.774750	9.6	1000.0	120.000	155.0	H	106.0	13.2	20.4	30.0	
44.183550	10.1	1000.0	120.000	98.0	V	106.0	13.3	19.9	30.0	
52.059000	9.4	1000.0	120.000	142.0	H	276.0	13.2	20.6	30.0	
129.031950	11.5	1000.0	120.000	170.0	V	8.0	9.5	22.0	33.5	
596.707650	17.7	1000.0	120.000	170.0	V	185.0	20.7	18.3	36.0	
906.506100	22.0	1000.0	120.000	170.0	H	8.0	25.2	14.0	36.0	

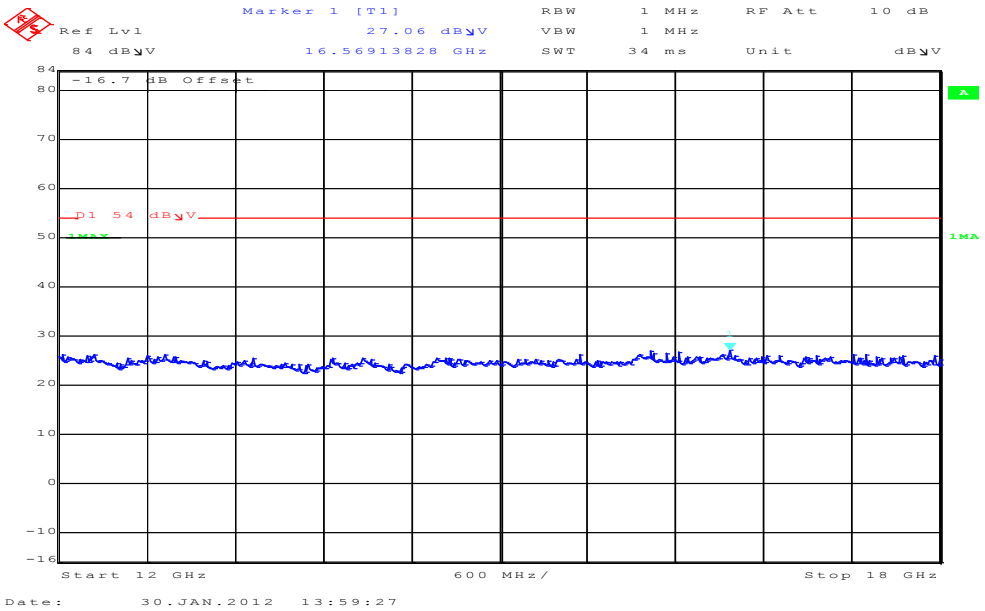
Plot 7: Middle channel, 1 GHz to 12.75 GHz, vertical polarization



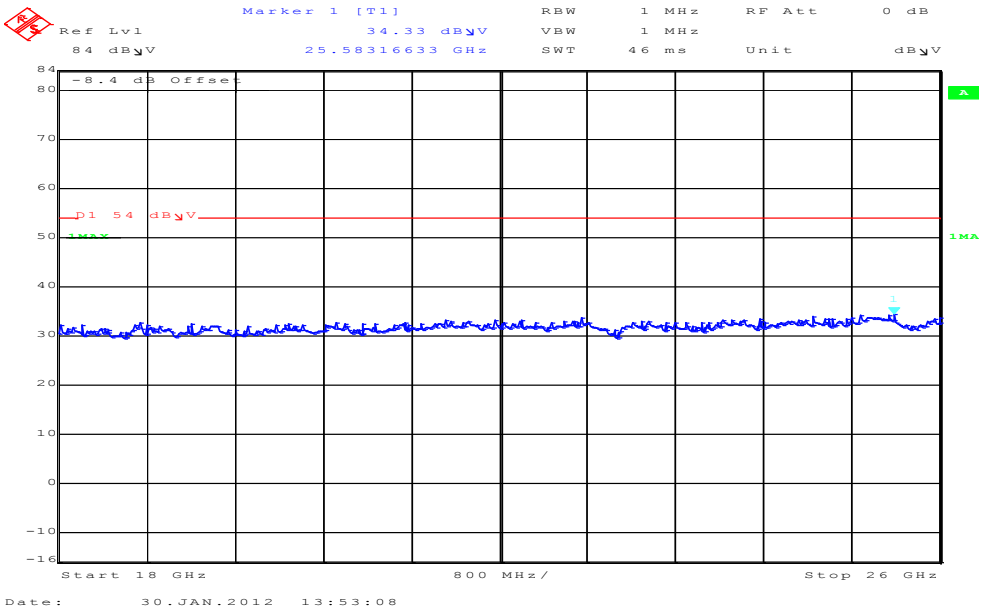
Plot 8: Middle channel, 1 GHz to 12.75 GHz, horizontal polarization



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



Plot 10: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



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

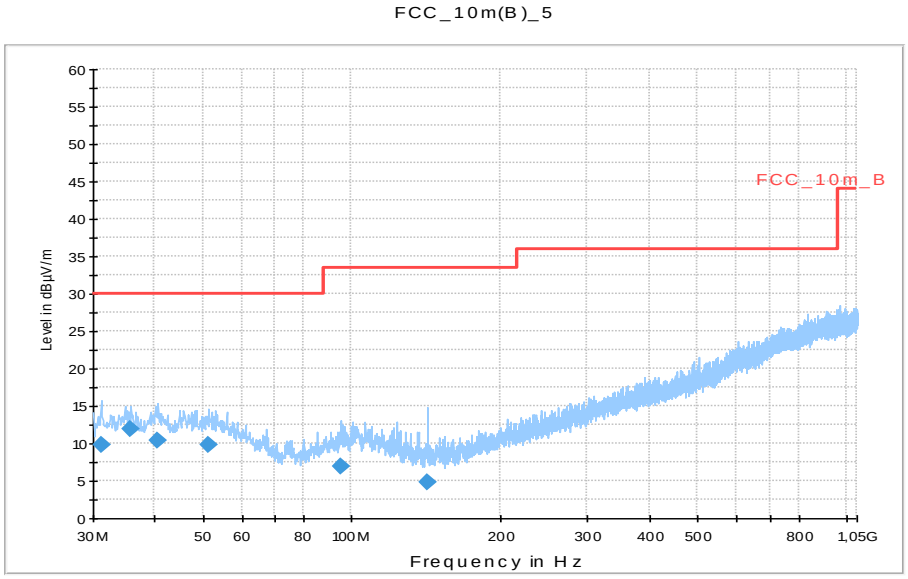
Common Information

EUT:	AAL-8880001-BV
Serial Number:	CB5A1JE2SJ
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	ANT + TX CH78 + charging
Operator Name:	Wolsdorfer
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

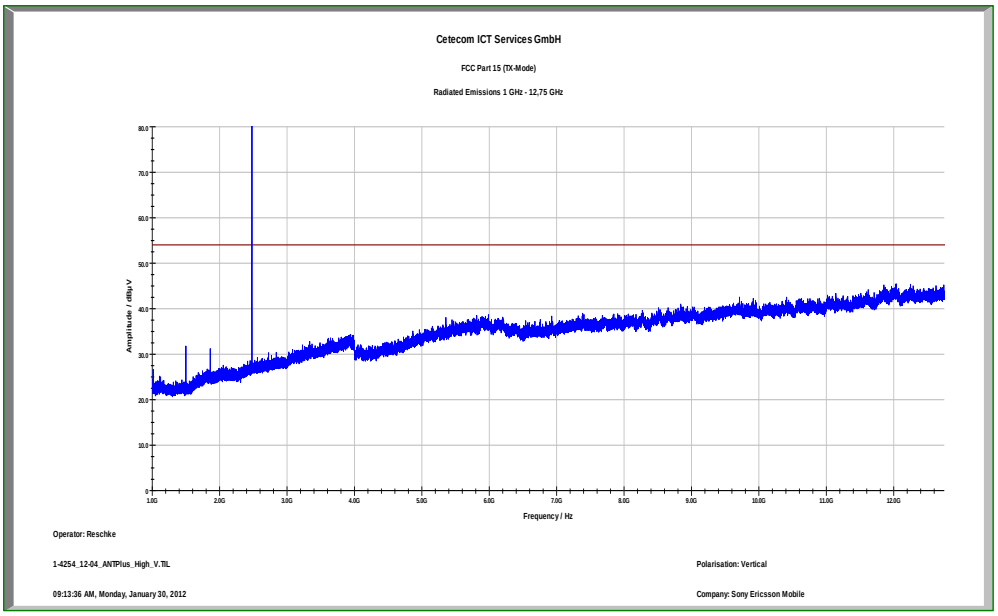
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



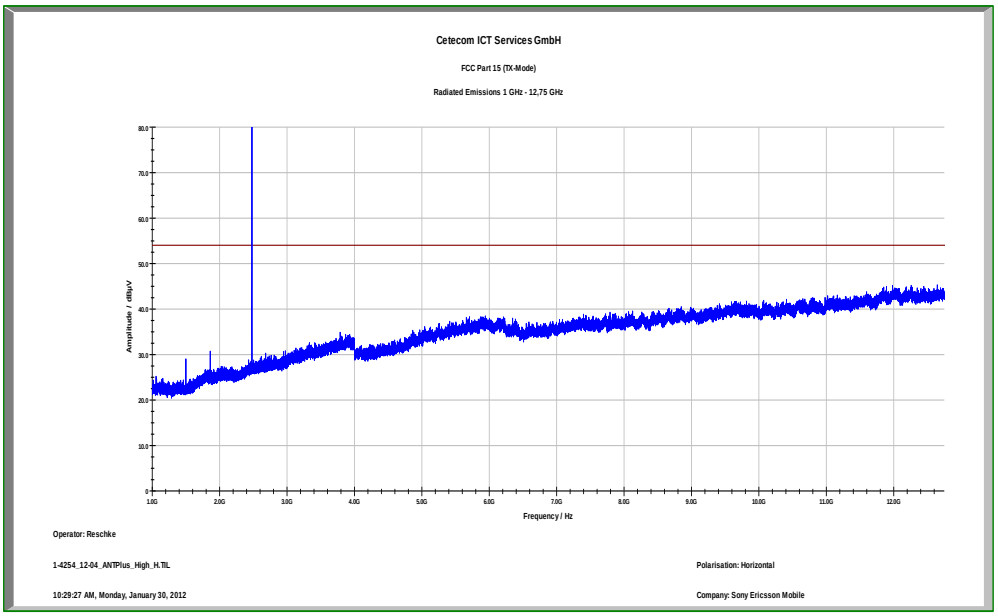
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.200000	9.8	1000.0	120.000	185.0	V	118.0	12.6	20.2	30.0	
35.760000	11.9	1000.0	120.000	229.0	V	304.0	13.1	18.1	30.0	
40.560000	10.5	1000.0	120.000	208.0	V	321.0	13.4	19.5	30.0	
51.360000	9.8	1000.0	120.000	143.0	V	312.0	13.2	20.2	30.0	
94.920000	6.9	1000.0	120.000	270.0	V	255.0	11.2	26.6	33.5	
142.440000	4.7	1000.0	120.000	175.0	V	61.0	8.7	28.8	33.5	

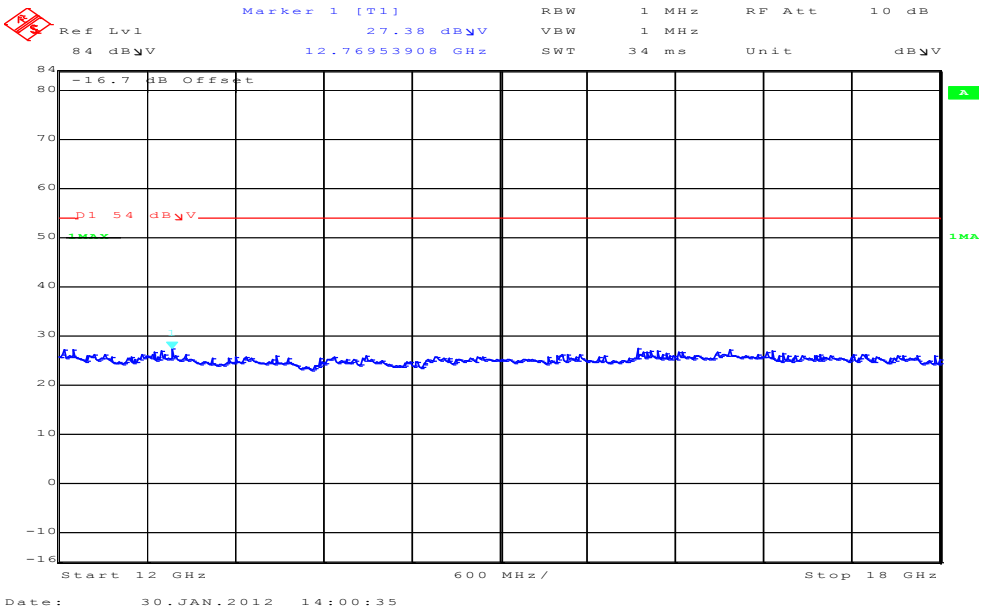
Plot 12: Highest channel, 1 GHz to 12.75 GHz, vertical polarization



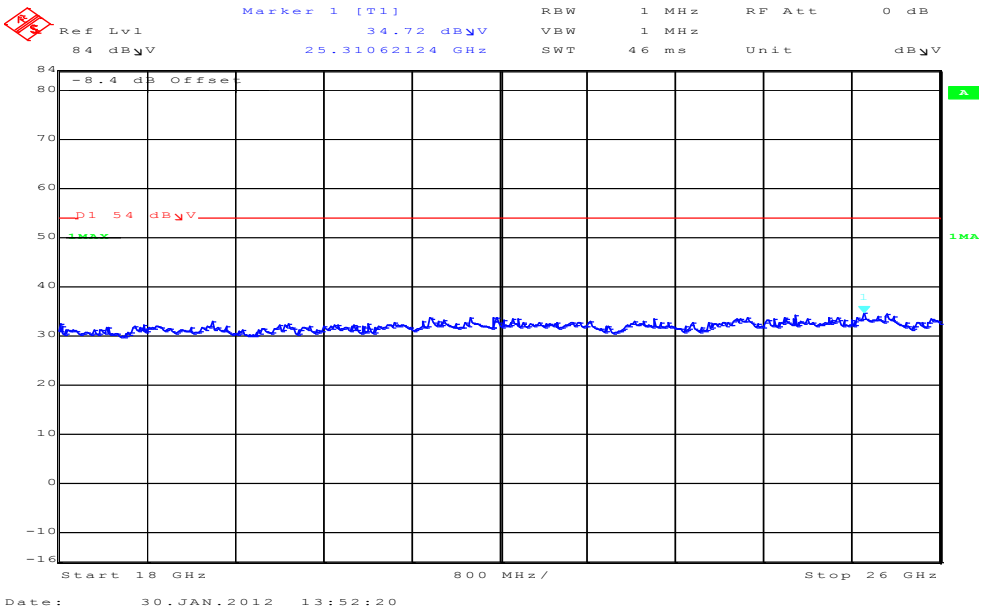
Plot 13: Highest channel, 1 GHz to 12.75 GHz, horizontal polarization



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



Plot 15: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



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

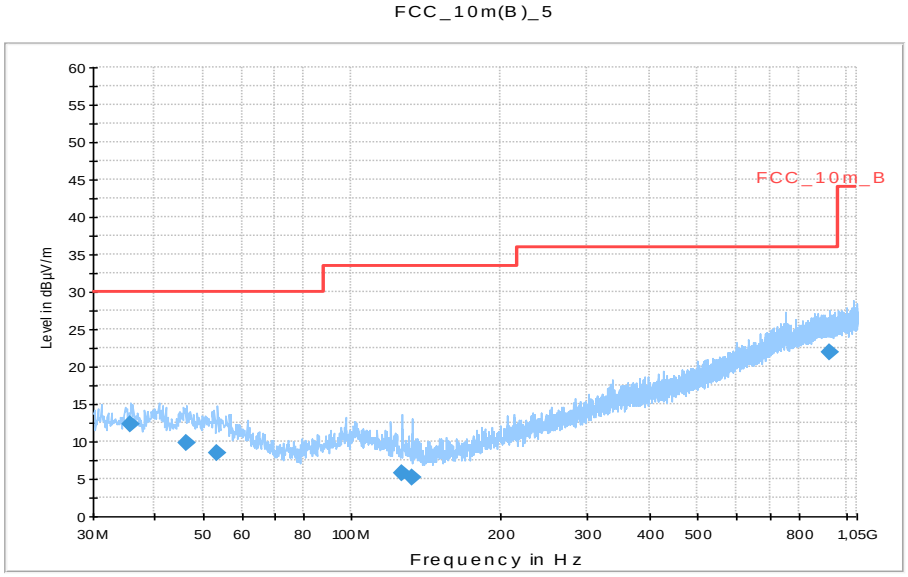
Common Information

EUT:	AAL-8880001-BV
Serial Number:	CB5A1JE2SJ
Test Description:	FCC part 15 B class B @ 10m
Operating Conditions:	ANT + RX mode + charging
Operator Name:	Wolsdorfer
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

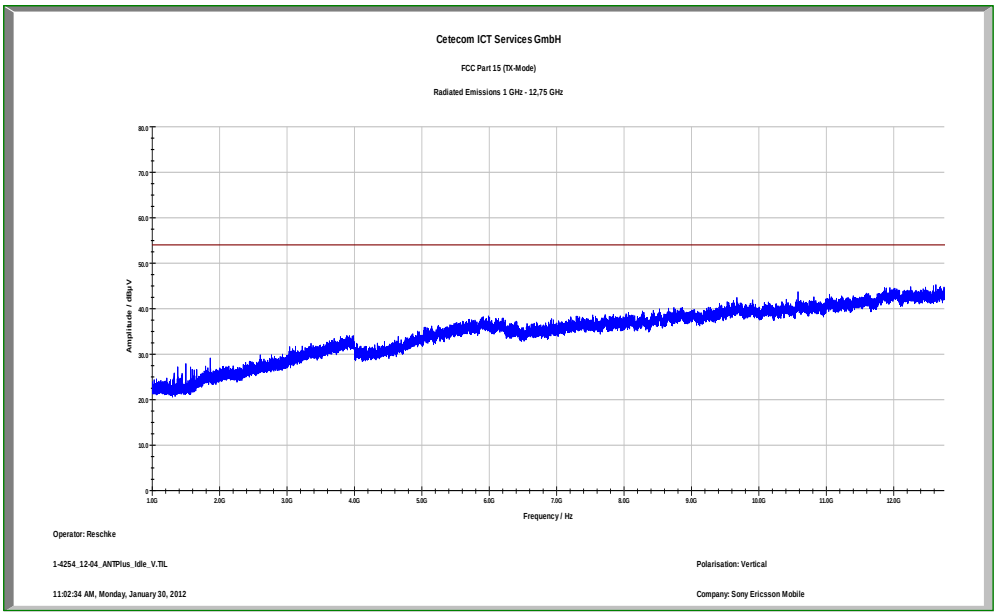
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



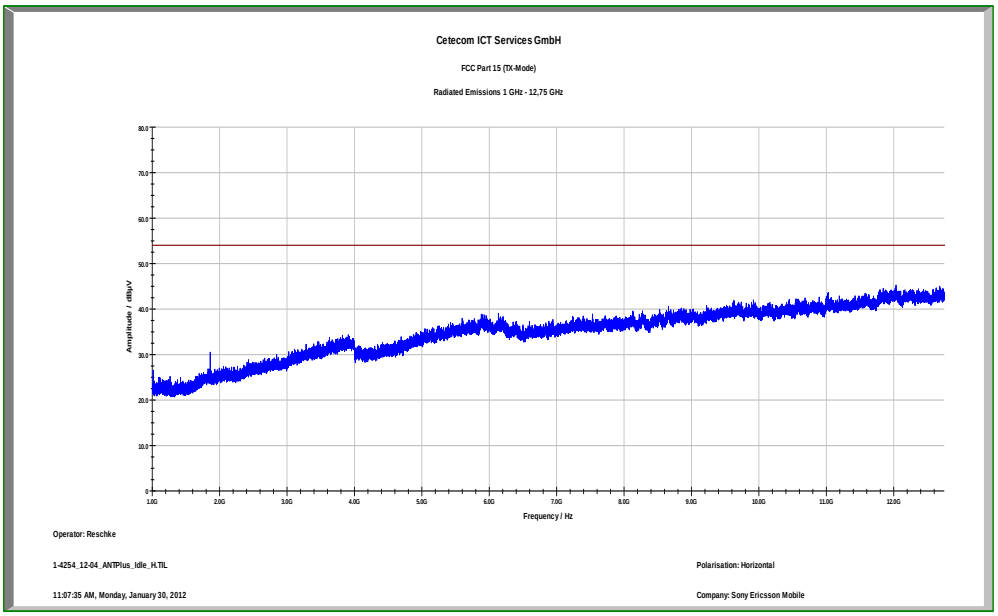
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.760000	12.3	1000.0	120.000	223.0	V	285.0	13.1	17.7	30.0	
46.320000	9.7	1000.0	120.000	205.0	H	-2.0	13.3	20.3	30.0	
53.520000	8.4	1000.0	120.000	112.0	H	227.0	13.0	21.6	30.0	
126.480000	5.8	1000.0	120.000	134.0	V	253.0	9.7	27.7	33.5	
132.600000	5.2	1000.0	120.000	270.0	V	262.0	9.2	28.3	33.5	
927.360000	21.9	1000.0	120.000	270.0	H	253.0	25.3	14.1	36.0	

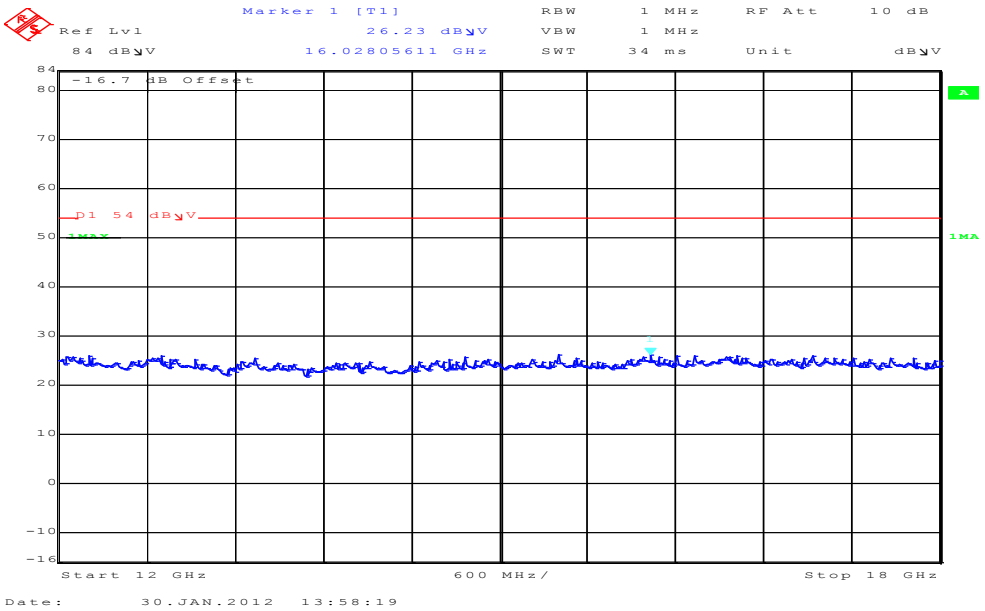
Plot 2: 1 GHz to 12.75 GHz, vertical polarization



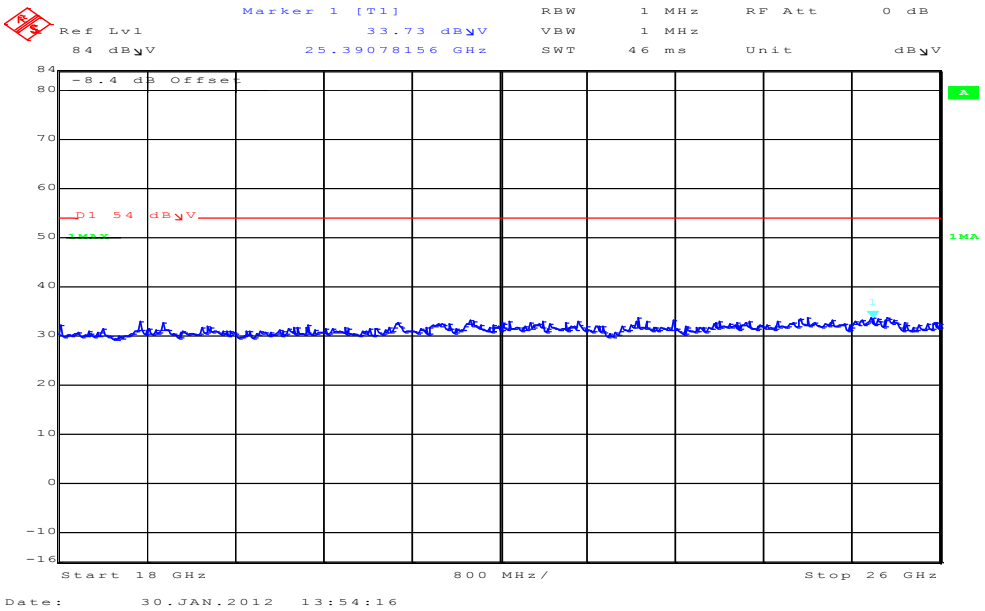
Plot 3: 1 GHz to 12.75 GHz, horizontal polarization



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



Plot 5: 18 GHz to 26 GHz, vertical & horizontal polarization



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:

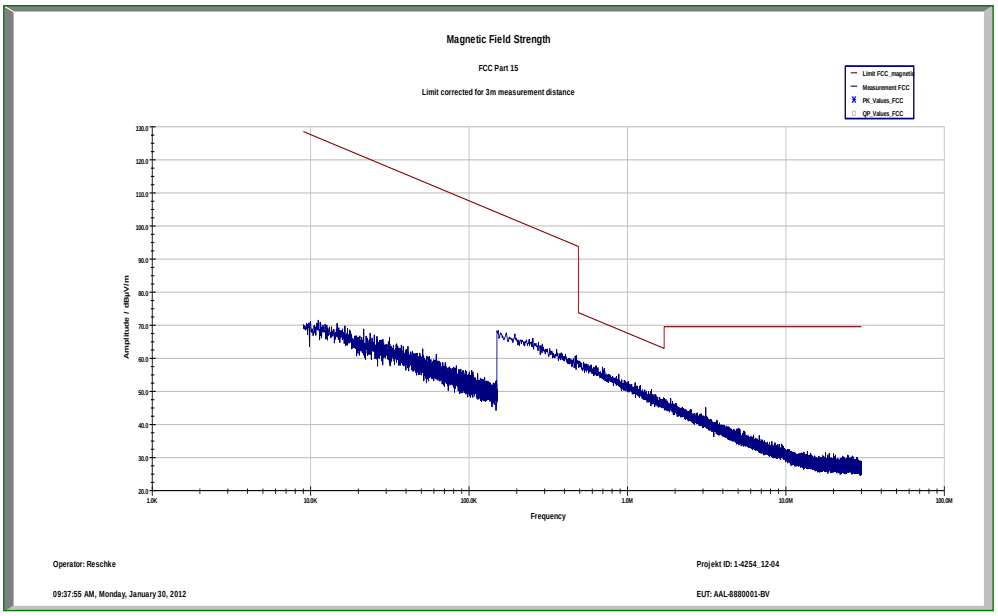
FCC		IC
CFR Part 15.209(a)		RSS –Gen
Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Results:

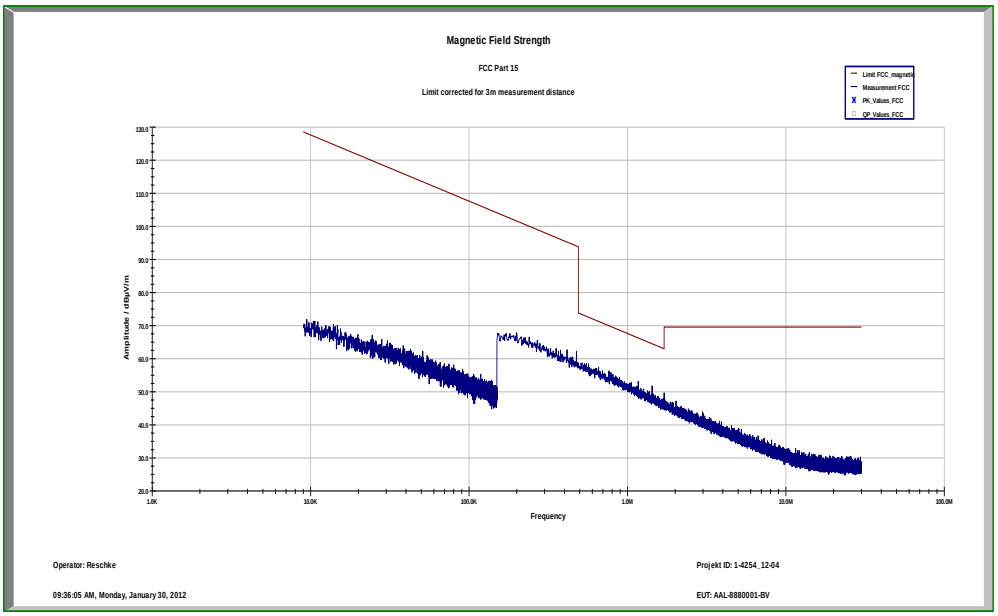
Spurious Emissions Radiated < 30 MHz [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			± 3 dB					

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

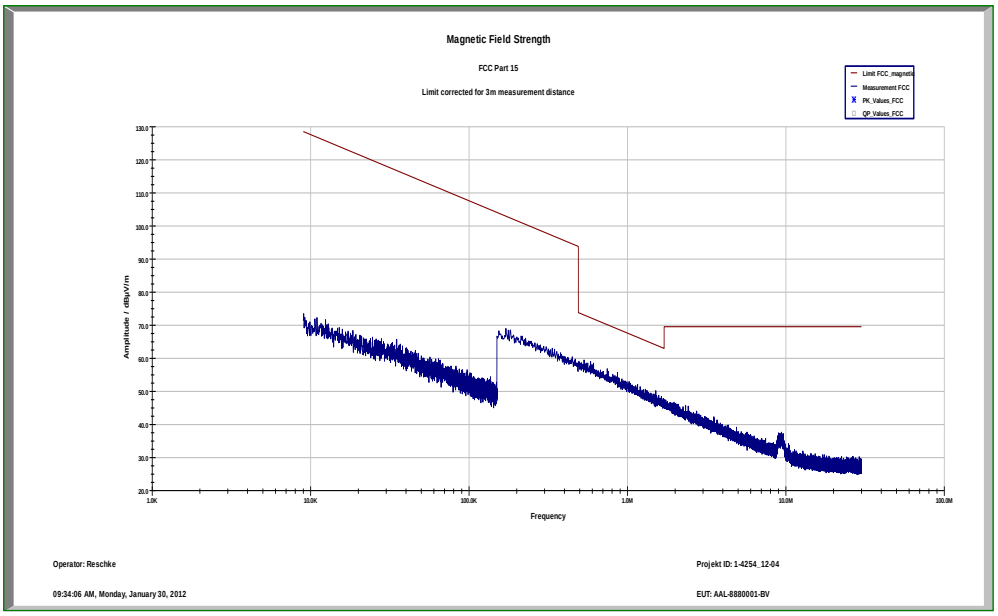
Plot 1: 9 kHz to 30 MHz / lowest channel



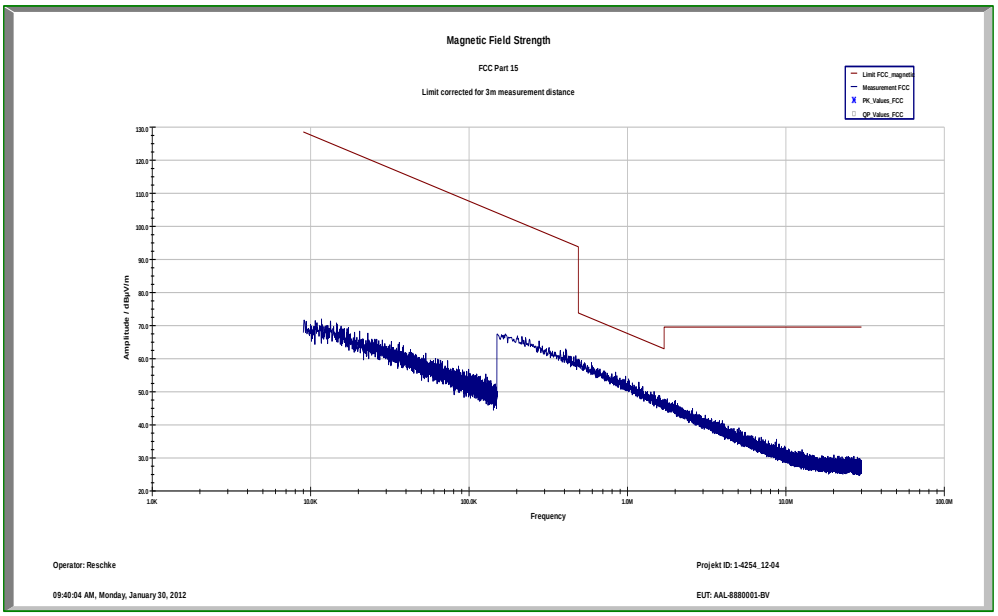
Plot 2: 9 kHz to 30 MHz / middle channel



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

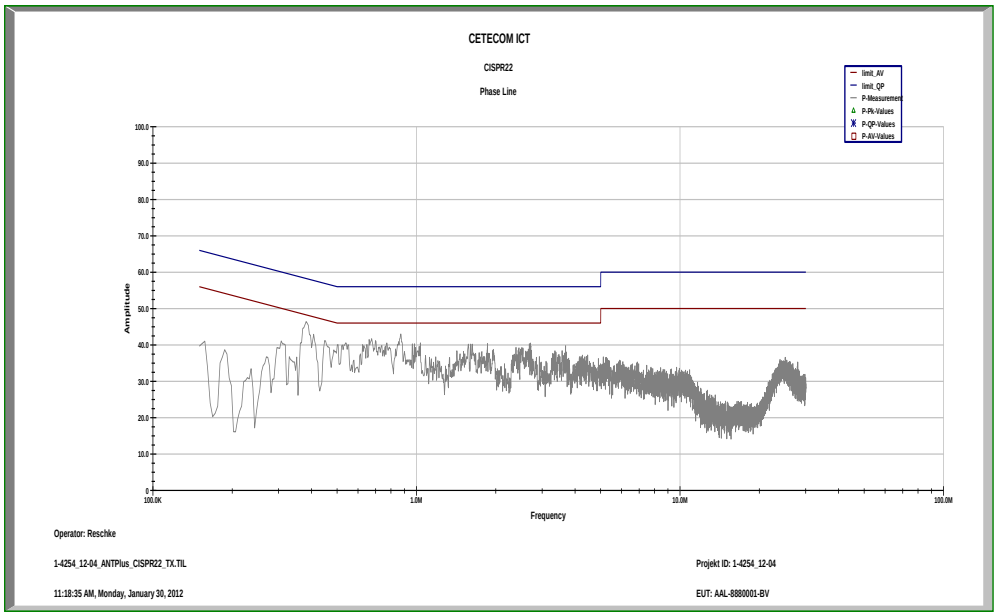
*Decreases with the logarithm of the frequency

Results:

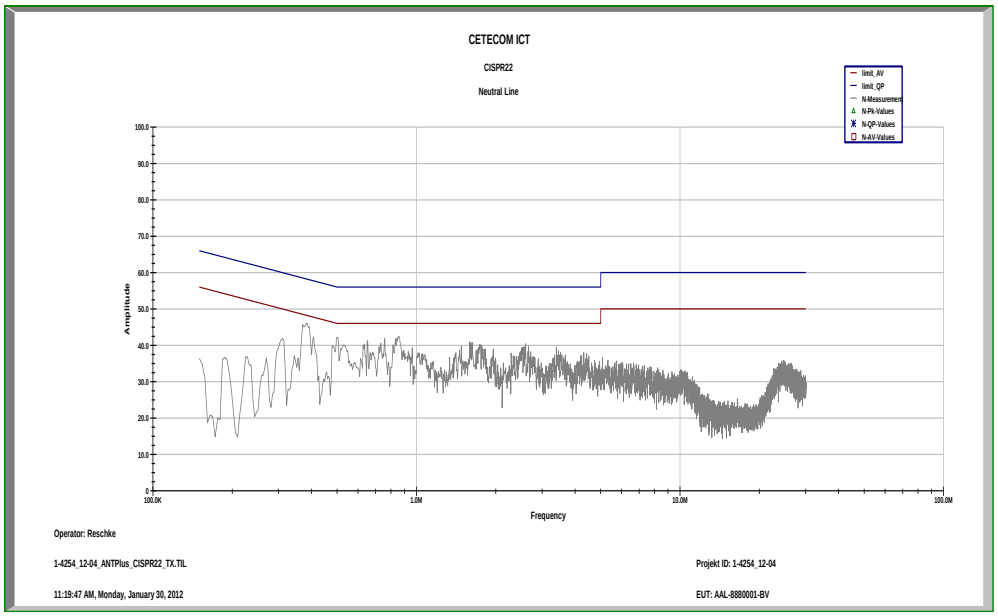
Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	± 3 dB	

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

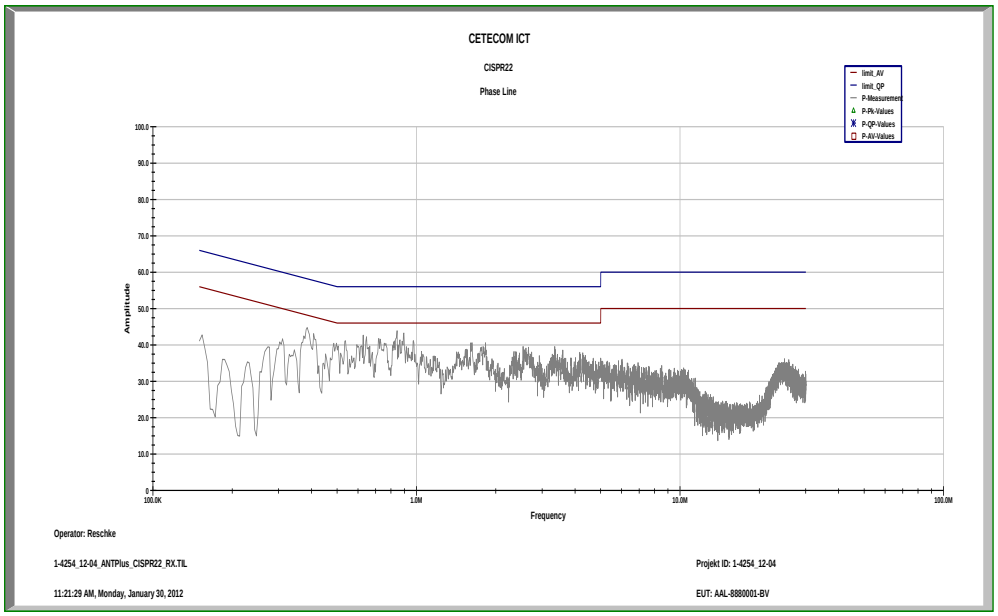
Plot 1: 9 kHz to 30 MHz / phase Line, TX mode



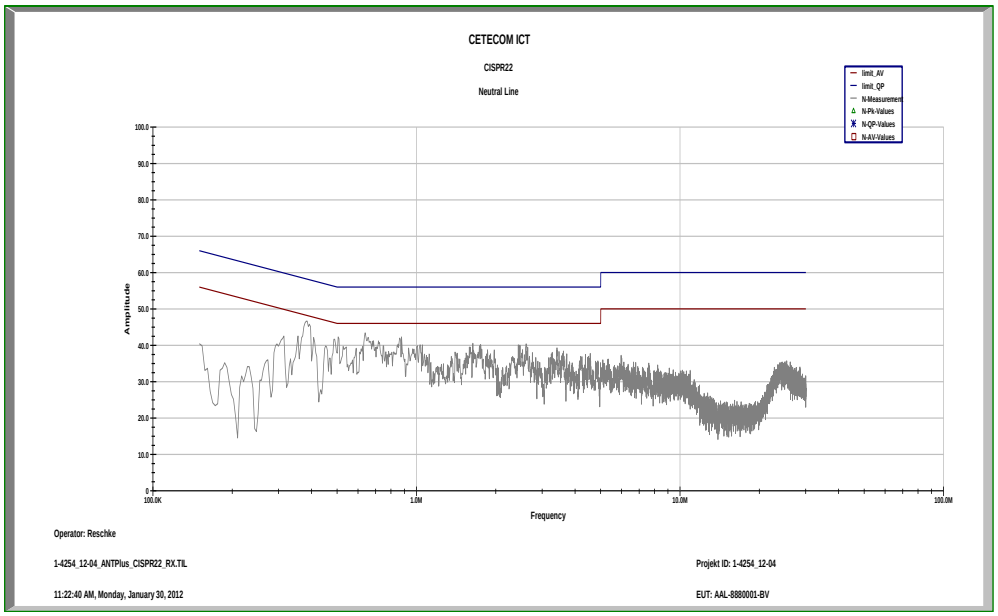
Plot 2: 9 kHz to 30 MHz / neutral Line, TX mode



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.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
2	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
3	n. a.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	11.05.2011	11.05.2013
5	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
6	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
7	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
17	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
18	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
21	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
22	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012

23	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKl!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKl!	14.10.2011	14.10.2014
25	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
26	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
27	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
28	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	05.01.2011	05.01.2013
29	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
30	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
31	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
32	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
33	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
34	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
35	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	10.01.2011	10.01.2013
36	n. a.	Switch / Control Unit	3488A	HP Meßtechnik		300001691	ne		
37	n. a.	Power Supply DC	NGPE 40/40	R&S	388	400000078	vlKl!	13.09.2010	13.09.2012
38	n. a.	Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW	NRV-Z1	R&S	833894/011	300002681-0010	k	09.09.2010	09.09.2012
39	n. a.	Hygro-Thermometer	-/-, 5-45°C, 20-100%rF	Thies Clima	-/-	400000080	k	04.08.2011	04.08.2012
40	n. a.	Vector Signal Generator, 300 kHz to 2.2 GHz	SMIQ03B	R&S	835541/055	300002681-0001	k	18.08.2011	18.08.2014
41	n. a.	Vector Signal Generator, 300 kHz to 2.2 GHz	SMIQ03B	R&S	835541/056	300002681-0002	g	26.08.2008	
42	n. a.	Signal Generator 0.01/2 - 20 GHz, Frequ. Resol. 0.1Hz	SMP02	R&S	835133/011	300002681-0003	k	12.08.2011	12.08.2014
43	n. a.	Dual Channel Power Meter	NRVD	R&S	835430/044	300002681-0004	k	13.09.2010	13.09.2012
44	n. a.	Switch / Control Unit	SSCU	R&S	338864/003	300002681-0006	ne		
45	n. a.	Precision Step Attenuator 50 Ohms, 0 - 2700MHz	RSP	R&S	834500/010	300002681-0007	NK!	26.08.2008	
46	n. a.	Frequency Standard (Rubidium Frequency Standard)	MFS (Rubidium)	R&S (Datum)	002	300002681-0009	Ve	13.09.2010	13.09.2012
47	n. a.	Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW	NRV-Z1	R&S	833894/012	300002681-0013	NK!	26.08.2008	
48	n. a.	Directional Coupler	101020010	Krytar	70215	300002840	ev		

49	n. a.	DC-Blocker	8143	Inmet Corp.	none	300002842	ne		
50	n. a.	Powersplitter	6005-3	Inmet Corp.		300002841	ev		
51	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	58566046820010	300003019	Ve	20.09.2011	20.09.2013
52	n. a.	CBT (Bluetooth Tester + EDR Signalling)	CBT 1153.9000K35	R&S	100185	300003416	vlKl!	13.09.2010	13.09.2012
53	n. a.	Spectrum Analyzer 9kHz to 30GHz -140..+30dBm	FSP30	R&S	100886	300003575	k	07.09.2010	07.09.2012
54	n. a.	CBT-K57 Software-Option for CBT/CBT32	CBT-K57	R&S	101051	300003910	ne		
55	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	Ve	04.11.2010	04.11.2012
56	11b	Microwave System Amplifier, 0.5-26.5 GHz; 25 dB gain	83017A	HP Meßtechnik	00419	300002268	ev	10.03.2011	
57	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
58	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		

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

11 Observations

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

Annex A Photographs of the test setup

Photo documentation

Photo 1:

Photo 2:

Annex B External photographs of the EUT

Photo documentation

Photo 3:

Photo 4:

Photo 5:

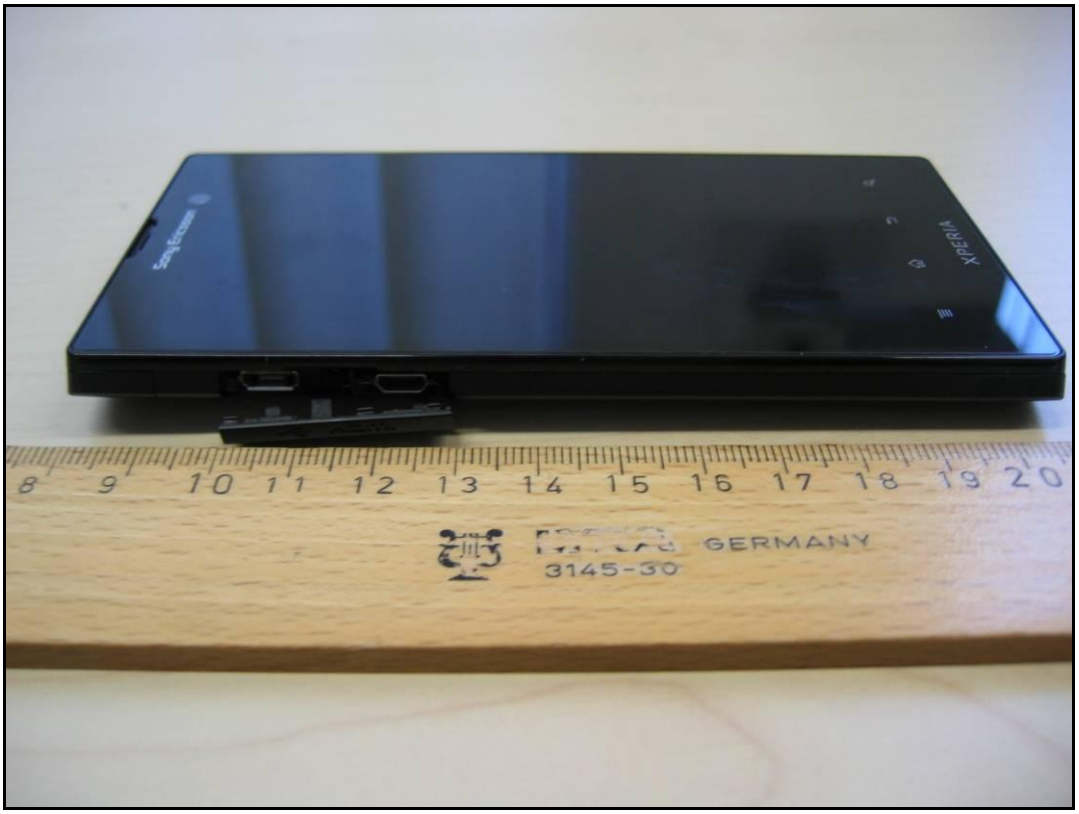


Photo 6:

Photo 7:

Photo 8:

Photo 9:

Annex C Internal photographs of the EUT

Photo documentation

Photo 10:

Photo 11:

Photo 12:

Photo 13:

Photo 14:

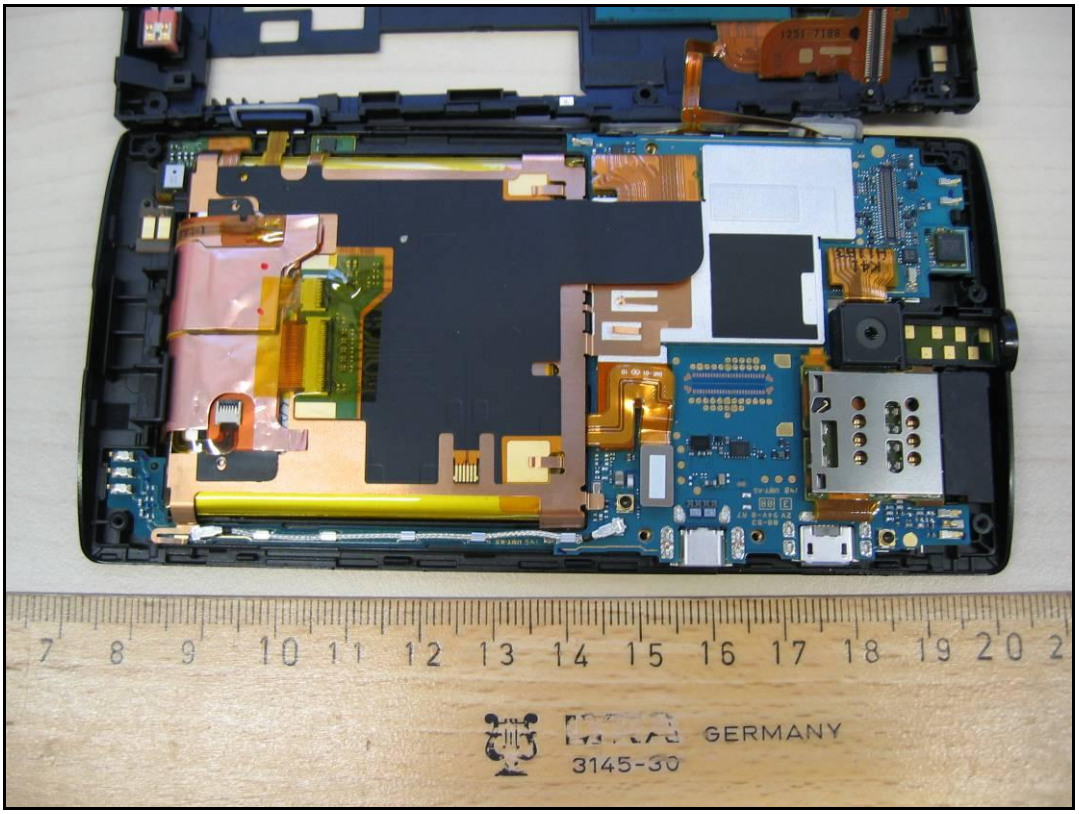


Photo 15:

Photo 16:

Photo 17:

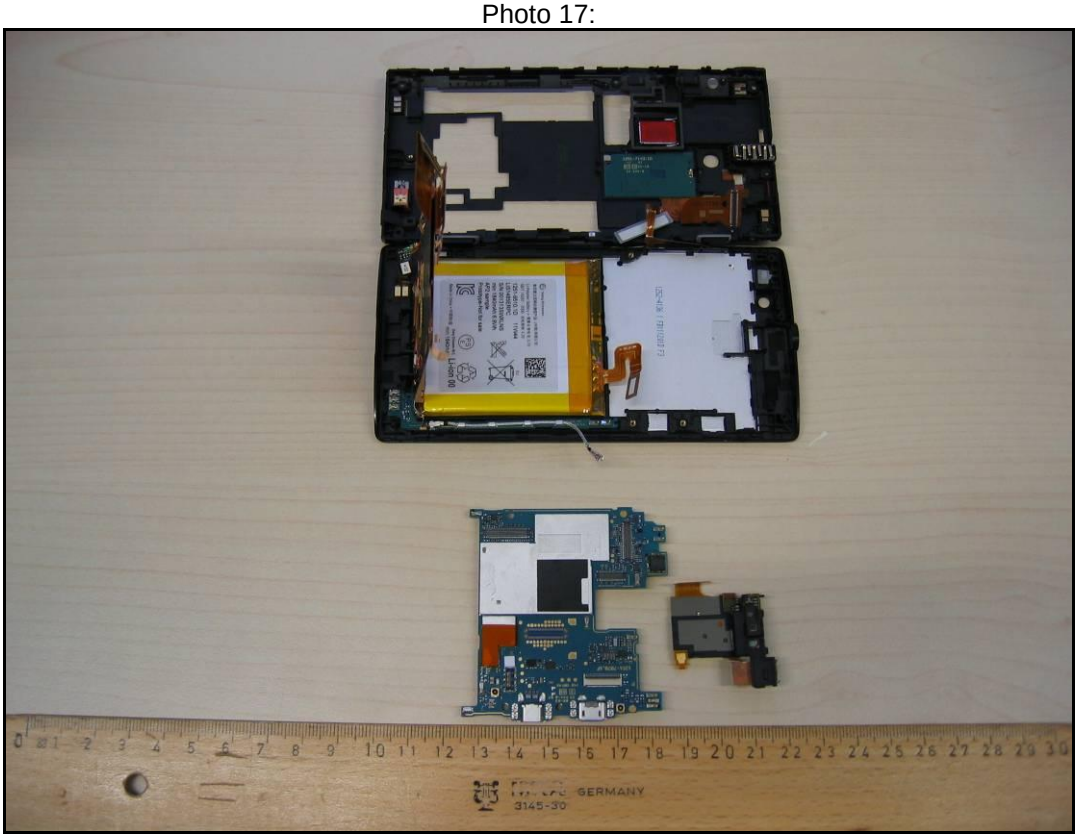


Photo 18:

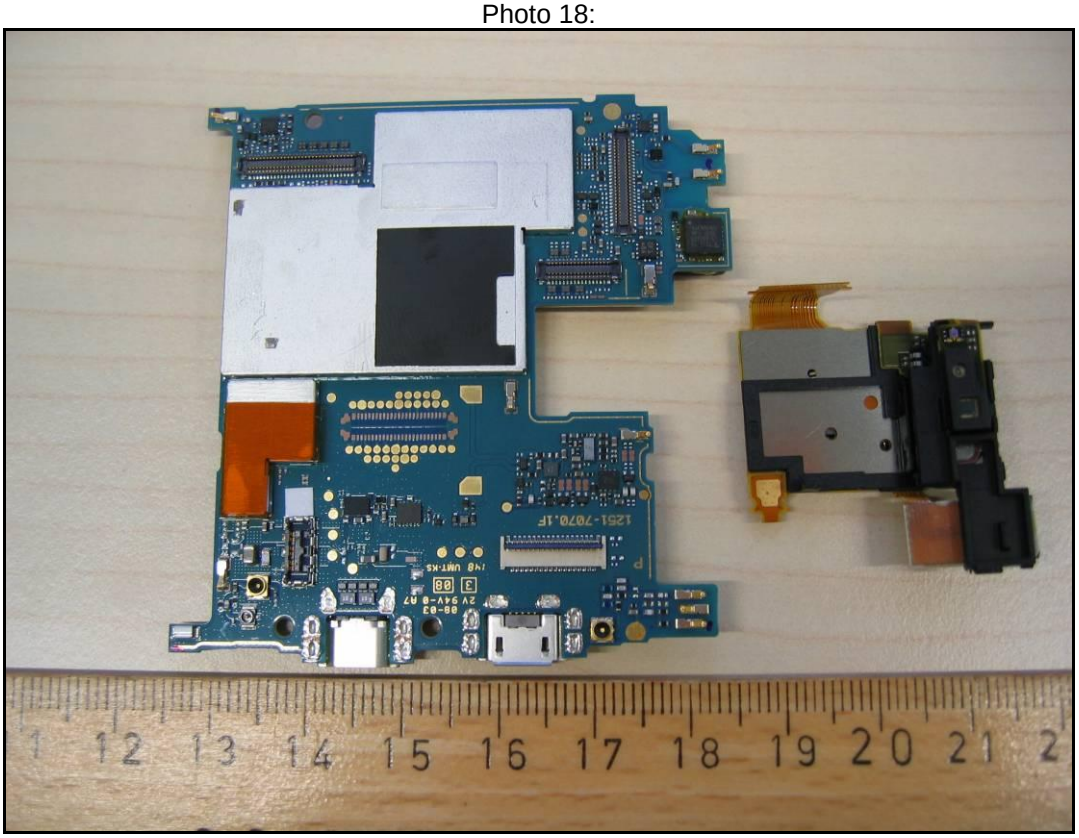


Photo 19:

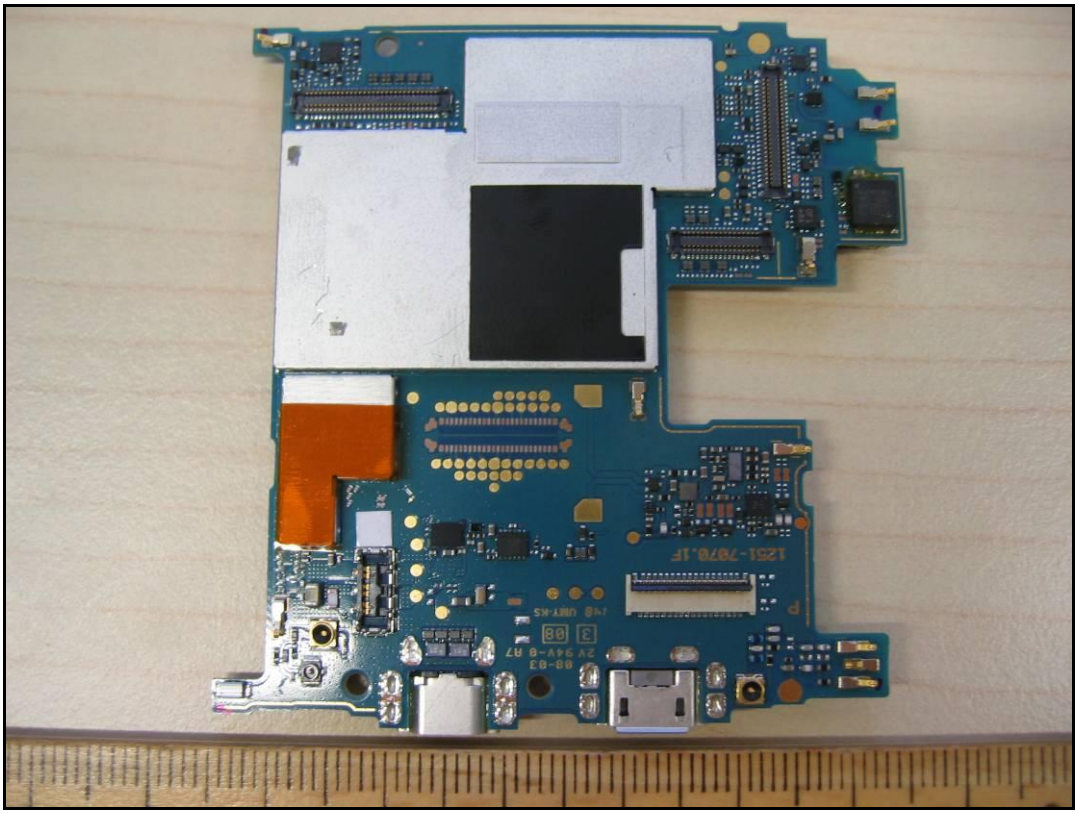


Photo 20:

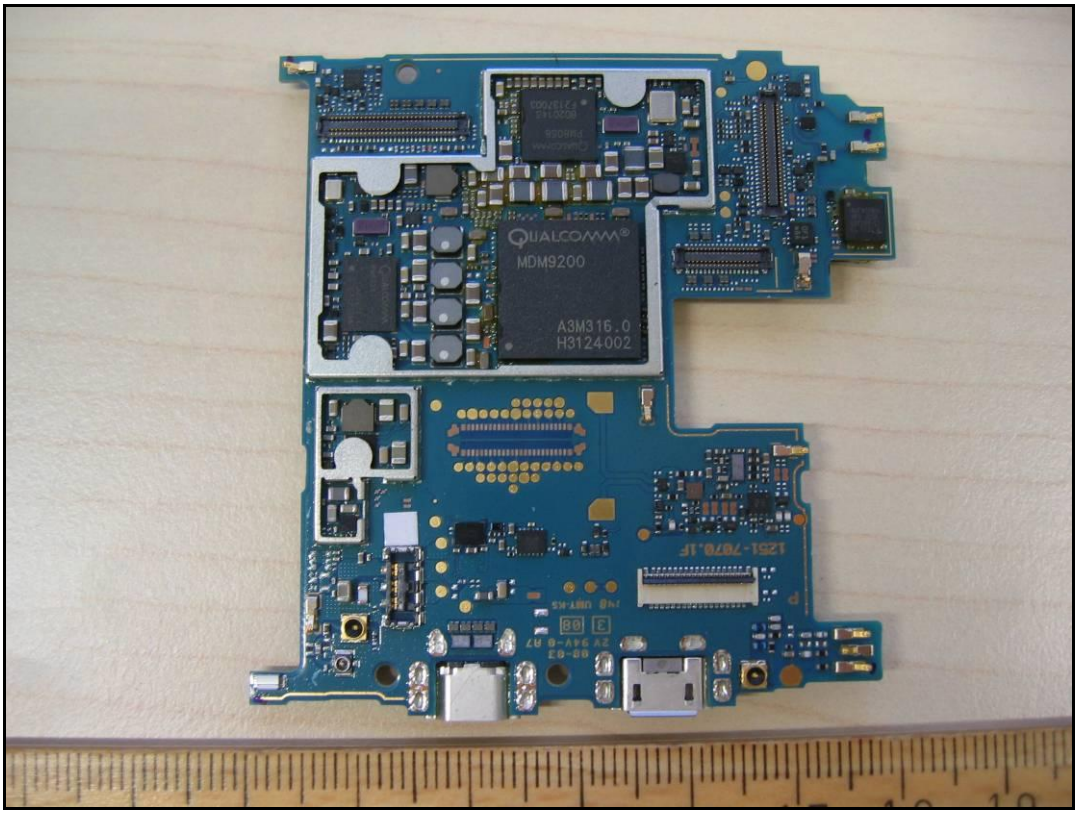


Photo 21:

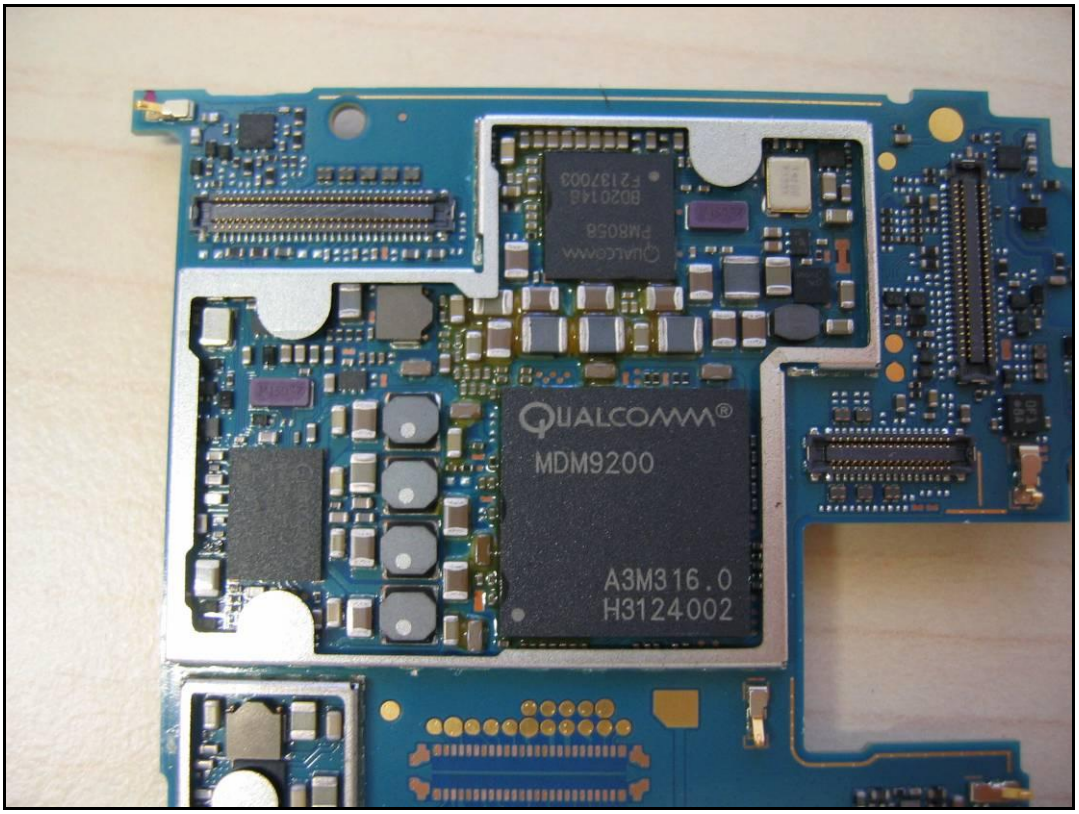


Photo 22:

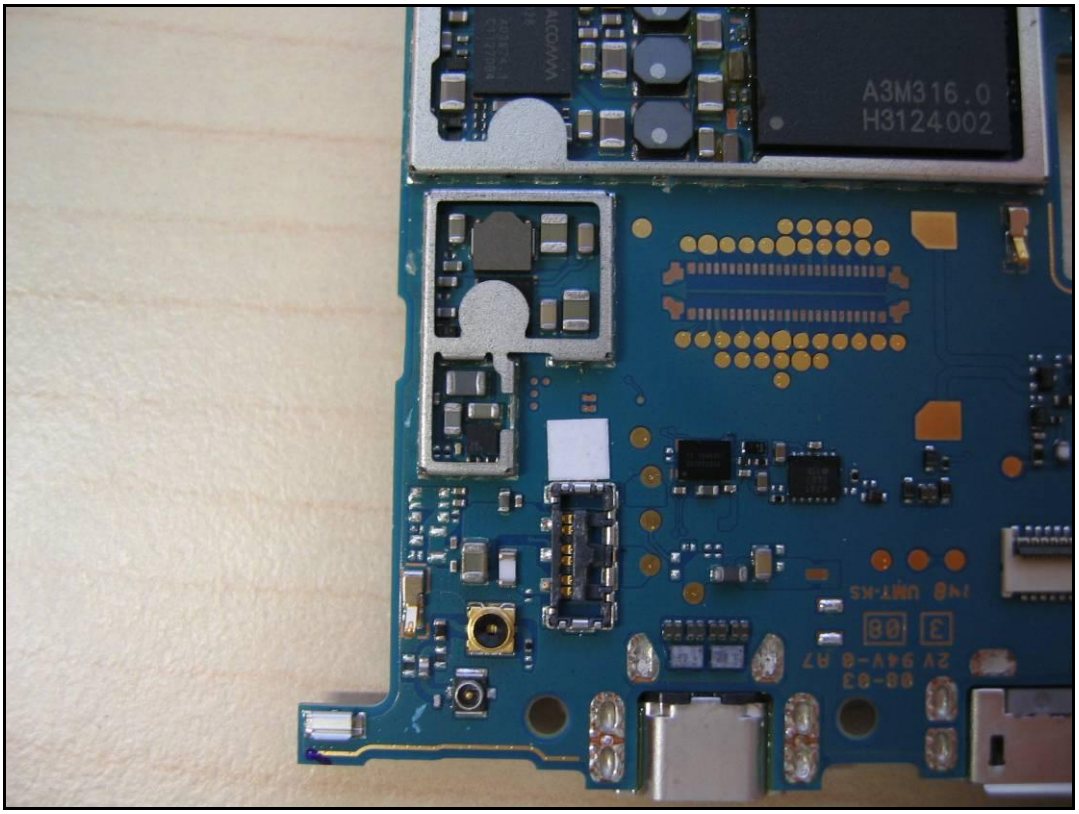


Photo 23:

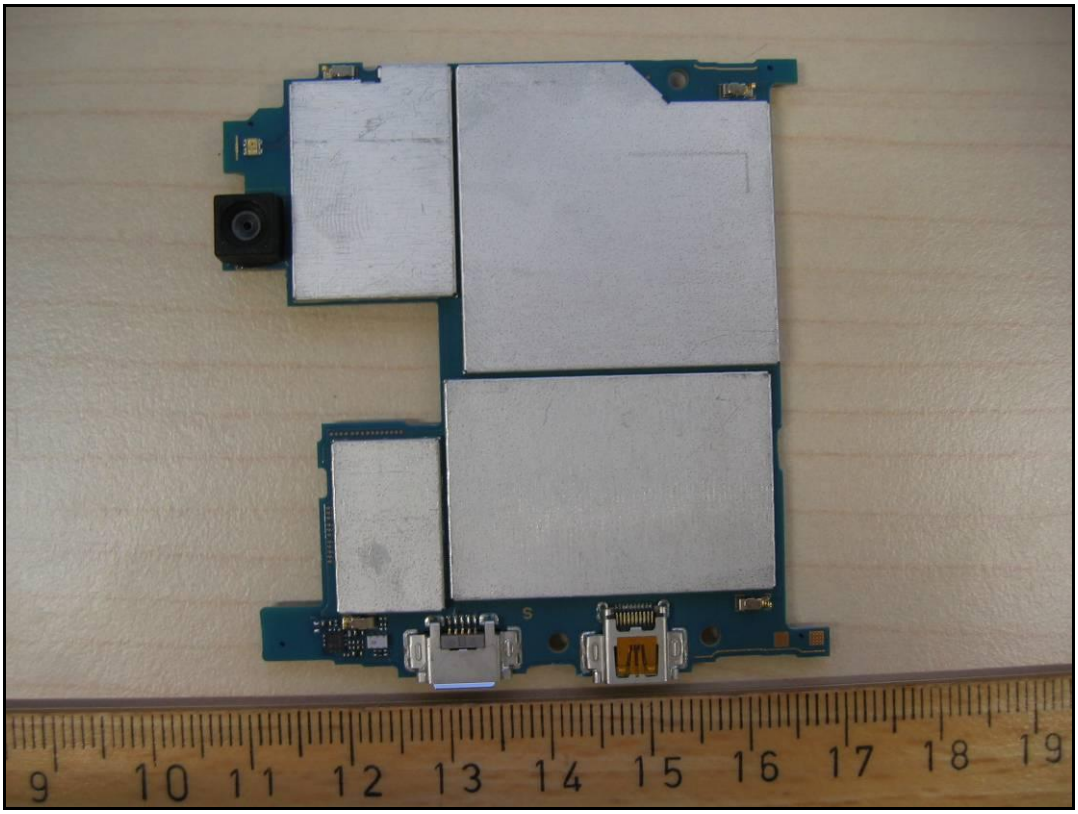


Photo 24:

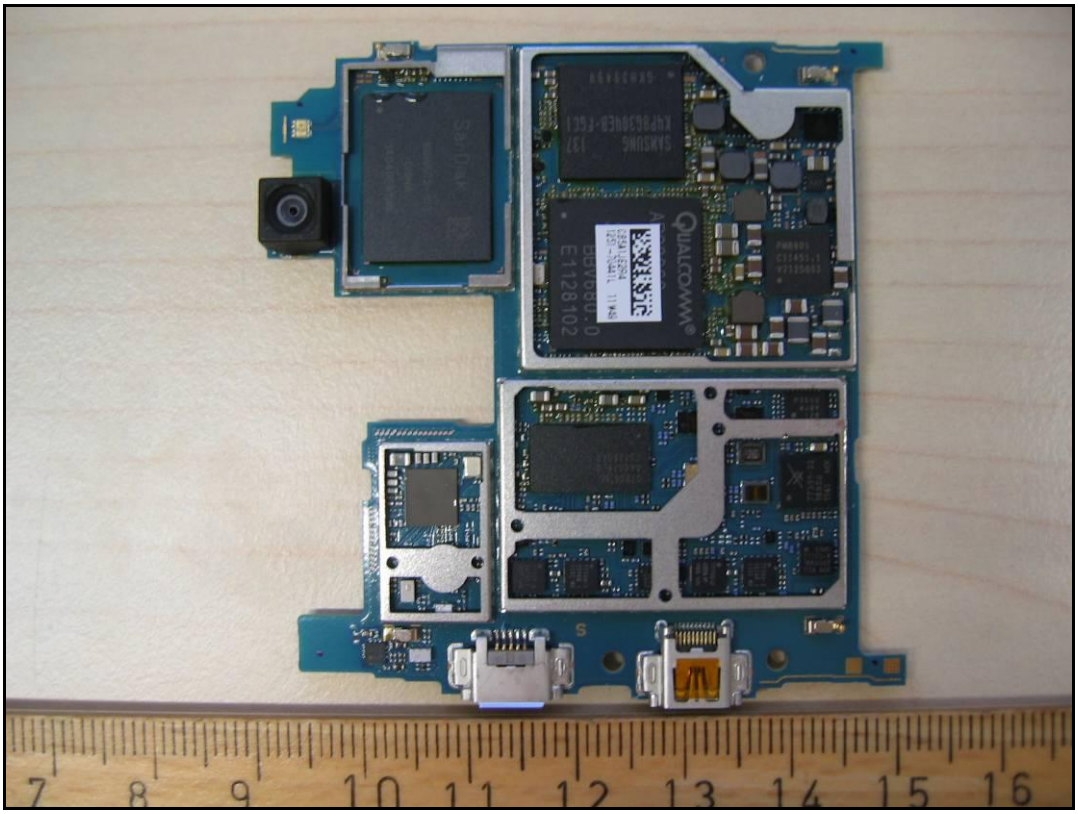


Photo 25:

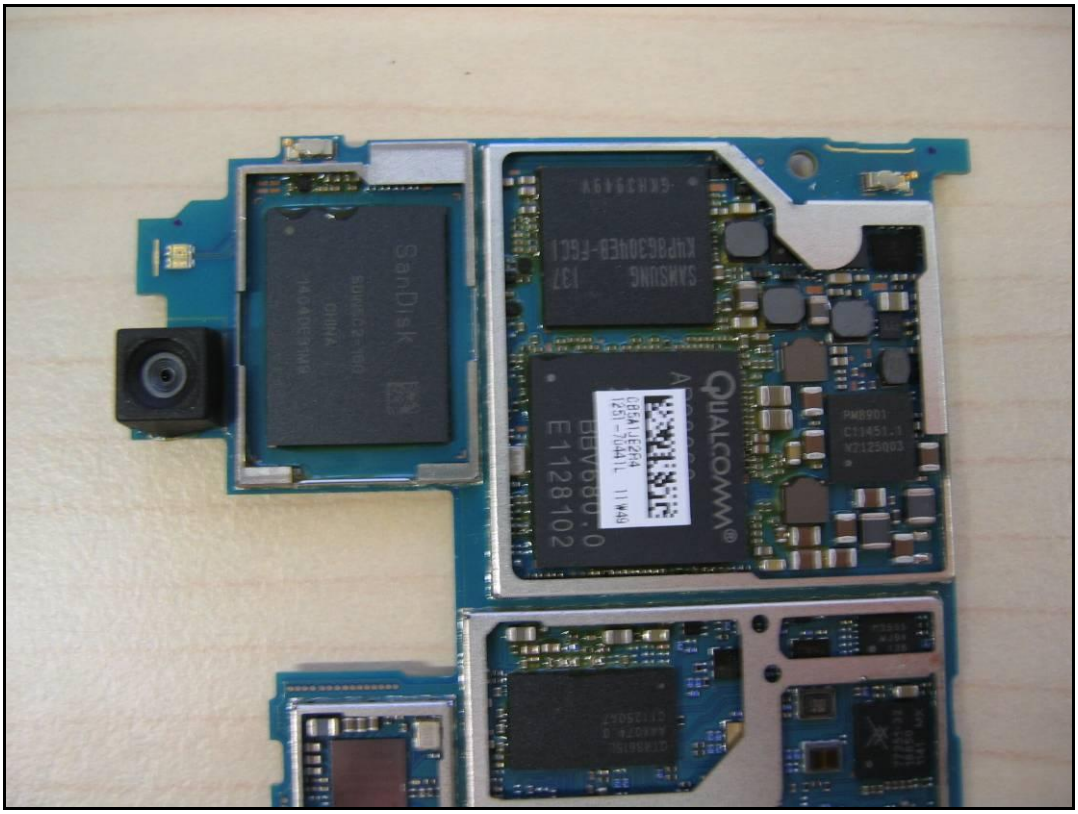
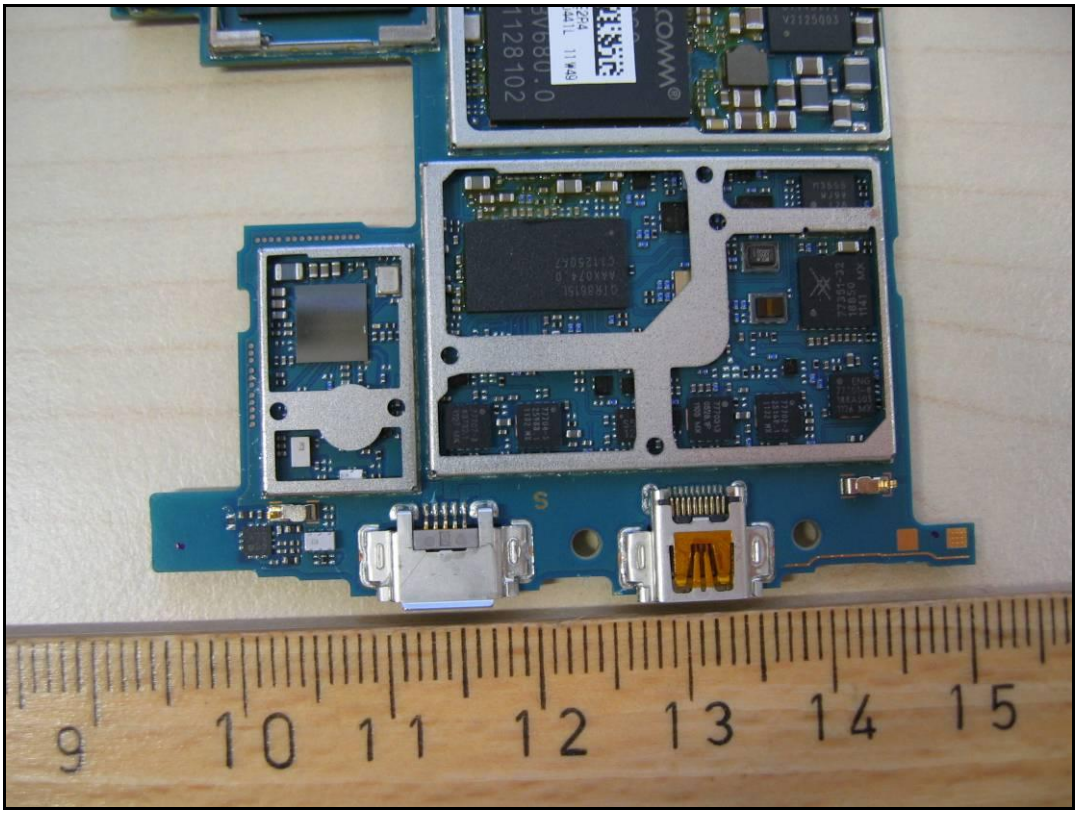


Photo 26:



Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2012-02-02

Annex E Further information

Glossary

AVG - Average
DUT - Device under test
EMC - Electromagnetic Compatibility
EN - European Standard
EUT - Equipment under test
ETSI - European Telecommunications Standard Institute
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - Not applicable
PP - Positive peak
QP - Quasi peak
S/N - Serial number
SW - Software

Annex F Accreditation Certificate

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Entrusted according to Section 8 subsection1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10
66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

Wired communications and DECT
Acoustic
Radio
Shirt Range Devices (SRD)
RFID
WiMax and Richtfunk
Mobile radio (GSM / DCS), Over the Air (OTA) Performance
Electromagnetic Compatibility (EMC) incl. Automotive
Product safety
SAR and Hearing Aid Compatibility (HAC)
Environmental simulation
Smart Card Terminals
Bluetooth
Wi-Fi-Services

The accreditation certificate shall only apply in connection with the notice of accreditation of 13.04.2011 with the accreditation number D-PL-12076-01 and is valid until 03.09.2014. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 82 pages.

Registration number of the certificate: **D-PL-12076-01-01**

Frankfurt am Main, 13.04.2011

Dipl.-Ing. (FH) Rolf Egner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

Front side of certificate

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Back side of certificate

Note:
The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

http://www.cetecom.com/fileadmin/de/CETECOM_D_Saarbruecken/accreditations_Jan_2010/DAKKS_Akkredi_Urk_EN17025-En_incl_Annex.pdf