



TEST REPORT

No. 2011TAR350

for

Sony Ericsson Mobile Communications AB

GSM triple bands and TD-SCDMA dual bands mobile phone

Type: AAK-7880002-BV

FCC ID: PY7A7880002

IC No.: 4170B- A7880002

with

Hardware Version: A

Software Version: R1AA023

Issued Date: Jul. 25th, 2011

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

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1. Test Laboratory

1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan beilu, Haidian District, Beijing, P.R.China
Postal Code: 100191
Telephone: +86-10-62304633-2678
Fax: +86-10-62304633-2504

1.2. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%
Air pressure 990 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Testing Start Date: May 20th, 2011
Testing End Date: Jun. 26th, 2011

1.4. Signature



Qu Pengfei

(Prepared this test report)



Sun Xiangqian

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Sony Ericsson Mobile Communications(China) Co., Ltd.
Address /Post: Sony Ericsson Building, No.16, Guangshun South Street, Chaoyang District, Beijing
City: Beijing
Postal Code: 100102
Country: China
Contact Person: Ma, Gang
Telephone: +86-10-58656312
Fax: +86-10-58656750

2.2. Manufacturer Information

Company Name: Sony Ericsson Mobile Communications AB
Address /Post: Nya Vattentorget, 22188 Lund, Sweden
City: Lund
Postal Code: 22188
Country: Sweden
Contact Person: Nordlof, Anders
Telephone: +46-46-193919
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	GSM 900/1800/1900, GPRS, EDGE, TD-SCDMA 1880-1920MHz/2010-2025MHz, BT EDR2.0, WLAN, GPS, CMMB TV Receiver, FM-receiver mobile phone
Type	AAK-7880002-BV
FCC ID	PY7A7880002
IC No	4170B-A7880002
Frequency range	PCS 1900: 1850.2MHz-1909.8MHz
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	31.00 dBm maximum EIRP measured for PCS1900
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 3.8VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	IMEI	HW Version	SW Version
#20058	BX902DP89M	004402140218748	A	R1AA023
N11	BX902DNX4G	004402141999619	A	R1AA023
N12	BX902DQUE1	004402141999874	A	R1AA023

*EUT ID: is used to identify the test sample in the lab internally.
#20058 is for radiated test. N11 and N12 are for conducted test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Revision
#20067	Battery	078886DT0HLS	2
#17522	Travel Charger	1109W50500931	AP
#17513	USB Cable	09510D2E0341082	1

#20067

Type Number	CBA-0002019
Manufacturer	SonyEricsson
Capacitance	1200mAh
Nominal Voltage	3.7V

#17522

Type Number	CAA-0002016-BV
Manufacturer	Salcomp

#17513

Type Number	EC700
Manufacturer	Sony Ericsson
Length of DC line	141cm

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

Equipment Under Test (EUT) is a model of GSM 900/1800/1900 triple bands and TD-SCDMA dual bands (1880-1920/2010-2025MHz) mobile phone with integrated antenna.

It has MP3, Camera, FM radio, USB memory, GPS receiver, CMMB receiver, Bluetooth and WLAN (802.11 b/g) functions. It also supports GPRS function with multi-slots class 10 and EGPRS function with multi-slots class 10 too.

It consists of normal options: lithium battery and travel Charger. Since subscribers often use MS during charging, EUT is to be test in accordance with "Base Station and ancillary equipment for fixed use" besides in accordance with "Portable and ancillary equipment for portable use".

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24 RSS-133	PERSONAL COMMUNICATIONS SERVICES 2 GHz Personal Communications Services	V 10.1.09 Issue 5, 2009
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Fully-anechoic chamber 2 (6.8 meters×4.0 meters×3.67 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:

P	Pass
NA	Not applicable
F	Fail

PCS 1900

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict
1	Output Power	24.232(b)	6.2	A.1	P
2	Emission Limit	24.238, 2.1051	6.2	A.2	P
3	Conducted Emission	15.107/207	/	A.3	P
4	Frequency Stability	24.235, 2.1055	6.3	A.4	P
5	Occupied Bandwidth	2.1049(h)(i)	5.6	A.5	P
6	Emission Bandwidth	24.238(b)	5.6	A.6	P
7	Band Edge Compliance	24.238(b)	6.3	A.7	P
8	Conducted Spurious Emission	24.238, 2.1057	6.5	A.8	P

Receiver Radiated Emission

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict
1	Receiver Radiated Emissions	15.109 , 2.1053	4.6, 6.6	A.9	P

6.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by TMC according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1. This report only deals with the GSM/GPRS/EGPRS functions among the features described in section 3. TD-SCDMA and CMMB TV receiver functions are not within the scope of FCC certification.

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE
1.	Test Receiver	ESCI	100344	R&S	2012-03-12
2	Test Receiver	ESI40	831564/002	R&S	2012-02-11
4	BiLog Antenna	VULB 9163	9163-302	Schwarzbeck	2012-02-10
5	BiLog Antenna	VULB 9163	9163-301	Schwarzbeck	2012-01-04
6	Biconical Antenna	9117	9117-177	Schwarzbeck	2011-07-04
7	Signal Generator	SMP04	100070	R&S	2012-04-18
8	LISN	ESH2-Z5	829991/012	R&S	2012-04-17
9	Universal Radio Communication Tester	CMU200	116455	R&S	2012-05-20
10	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2011-07-09
11	Dual-Ridge Waveguide Horn Antenna	3115	5827	ETS-Lindgren	2013-08-13
12	Dual-Ridge Waveguide Horn Antenna	3115	6914	ETS-Lindgren	2012-01-18
13	Dual-Ridge Waveguide Horn Antenna	3117	00119021	ETS-Lindgren	2012-05-07
14	Dual-Ridge Waveguide Horn Antenna	3117	00058889	ETS-Lindgren	2012-01-28
15	Climatic chamber	PL-2G	343074	ESPEC	2012-05-12

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 24.232(b)

IC: RSS 133, Issue 5, Section 6.2

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max power transmission and proper modulation.

This result contains peak output power and EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

The power was measured with spectrum analyzer's peak detector.

These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band (bottom, middle and top of operational frequency range).

PCS1900

Limit

	Power step	Nominal Peak output power (dBm)	Tolerance (dB)	Target (dBm)
GSM	0	30dBm(1W)	± 2	30±1
GPRS	3	30dBm(1W)	± 2	30±1
EGPRS	5	30dBm(1W)	± 2	30±1

Measurement result

GSM (GMSK)

Frequency(MHz)	Power Step	Peak output power(dBm)
1850.2	0	28.39
1880.0	0	28.43
1909.8	0	28.46

GPRS (GMSK, Time Slot 1)

Frequency(MHz)	Power Step	Peak output power(dBm)
1850.2	3	28.54
1880.0	3	28.61
1909.8	3	28.63

EGPRS (8PSK, Time Slot 1)

Frequency(MHz)	Power Step	Peak output power(dBm)
1850.2	5	26.02
1880.0	5	26.13
1909.8	5	26.18

Note: Expanded measurement uncertainty for PCS1900 is $U=0.83\text{dB}$, $k=2$.

A.1.3 Radiated

A.1.3.1 Description

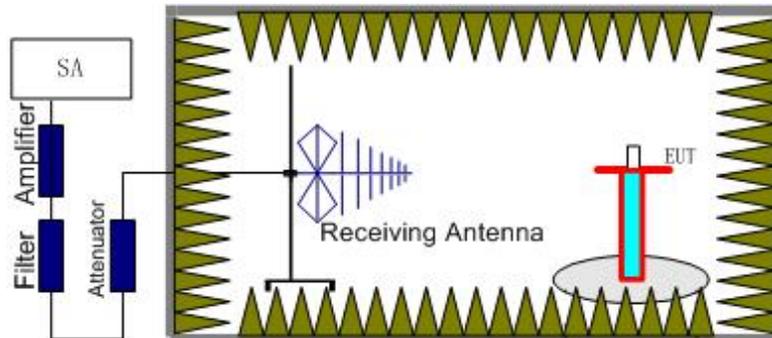
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

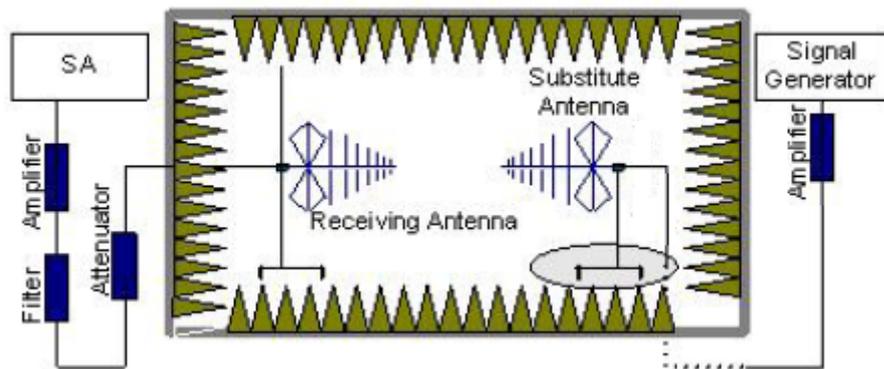
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitute Antenna.
The cable loss (P_{cl}) ,the Substitute Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
The measurement results are obtained as described below:
Power(EIRP)= $P_{Mea} + P_{Ag} + P_{cl} + G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15.

For test layout photo, please refer to Pic.1 in Annex B.

PCS1900-EIRP 24.232(b)

Limits

	Power Step	Burst Peak EIRP (dBm)
GSM	0	≤33dBm (2W)
GPRS	3	≤33dBm (2W)
EGPRS	5	≤33dBm (2W)

Measurement result

GSM

Frequency (MHz)	Peak EIRP(dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a (dBi)	P _{Mea} (dBm)	Polarization
1850.2	31.00	-4.29	50.00	4.56	-19.28	Horizontal
1880.0	30.05	-4.24	50.00	4.43	-20.15	Horizontal
1909.8	29.02	-4.25	50.00	4.30	-21.04	Horizontal

GPRS

Frequency (MHz)	Peak EIRP(dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a (dBi)	P _{Mea} (dBm)	Polarization
1850.2	25.03	-4.29	50.00	4.56	-25.25	Horizontal
1880.0	24.07	-4.24	50.00	4.43	-26.13	Horizontal
1909.8	22.66	-4.25	50.00	4.30	-27.40	Horizontal

EGPRS

Frequency (MHz)	Peak EIRP(dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a (dBi)	P _{Mea} (dBm)	Polarization
1850.2	20.94	-4.29	50.00	4.56	-29.34	Horizontal
1880.0	19.78	-4.24	50.00	4.43	-30.42	Horizontal
1909.8	19.18	-4.25	50.00	4.30	-30.88	Horizontal

Sample calculation: GSM, 1880MHz

$$\text{Peak EIRP(dBm)} = P_{\text{Mea}}(-20.15\text{dBm}) + G_a(4.43\text{dBi}) + P_{\text{Ag}}(50.00\text{dB}) + P_{\text{cl}}(-4.24\text{dB}) = 30.05 \text{ dBm}$$

ANALYZER SETTINGS: RBW = VBW = 3MHz

Note: Expanded measurement uncertainty for PCS1900 is $U = 1.07\text{dB}$, $k=2$.

A.2 EMISSION LIMIT

Reference

FCC: CFR Part 24.238(b), 2.1051,

IC: RSS 133, Issue 5, Section 6.2

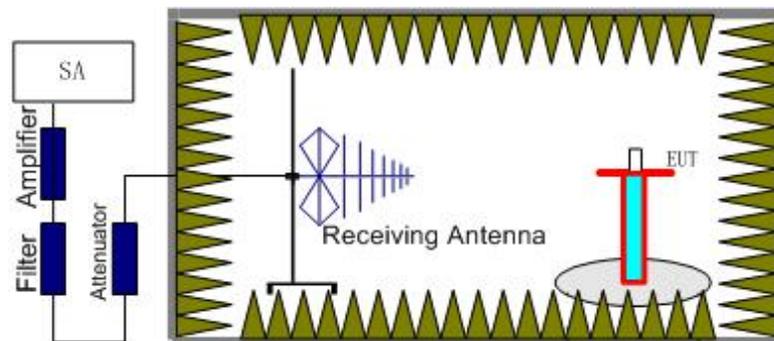
A.2.1 Measurement Method

The measurements procedures in TIA-603C-2004 are used. This measurement is carried out in both fully-anechoic chamber 1 and fully-anechoic chamber 2.

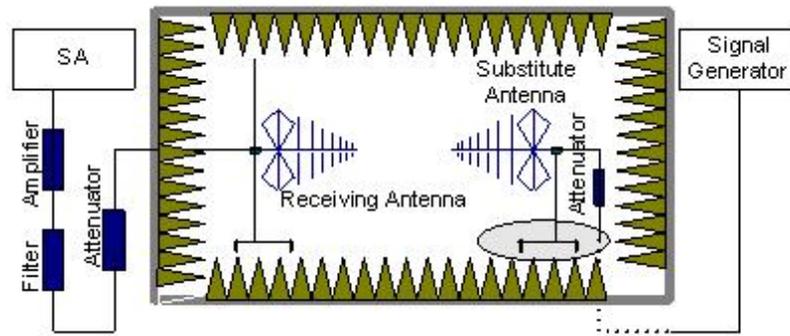
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the PCS1900 band.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} + P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dB}$.
- 7.

A.2.2 Measurement Limit

Part 24.238 specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 into any of the other blocks.

The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

GSM Mode Channel 512/1850.2MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{pl} (dB)	G _a (dBi)	Power (dBm)	Limit (dBm)	Polarity
3700.58	-48.77	5.90	-8.14	-46.53	-13	Vertical
5550.36	-45.92	7.46	-10.02	-43.36	-13	Vertical
7401.08	-30.66	8.18	-11.34	-27.50	-13	Horizontal
9251.20	-49.21	8.74	-12.60	-45.35	-13	Horizontal
11100.78	-45.96	9.59	-12.40	-43.15	-13	Vertical
16652.38	-40.00	10.92	-12.40	-38.52	-13	Vertical

GSM Mode Channel 661/1880.0MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{pl} (dB)	G _a (dBi)	Power (dBm)	Limit (dBm)	Polarity
3760.02	-44.73	5.94	-8.21	-42.46	-13.00	Vertical
5640.07	-43.37	7.44	-10.06	-40.75	-13.00	Vertical
7520.03	-27.74	8.34	-11.42	-24.66	-13.00	Horizontal
9400.14	-50.44	8.89	-12.60	-46.73	-13.00	Horizontal
11280.24	-45.61	9.55	-12.40	-42.76	-13.00	Vertical
16920.71	-39.29	11.17	-12.40	-38.06	-13.00	Vertical

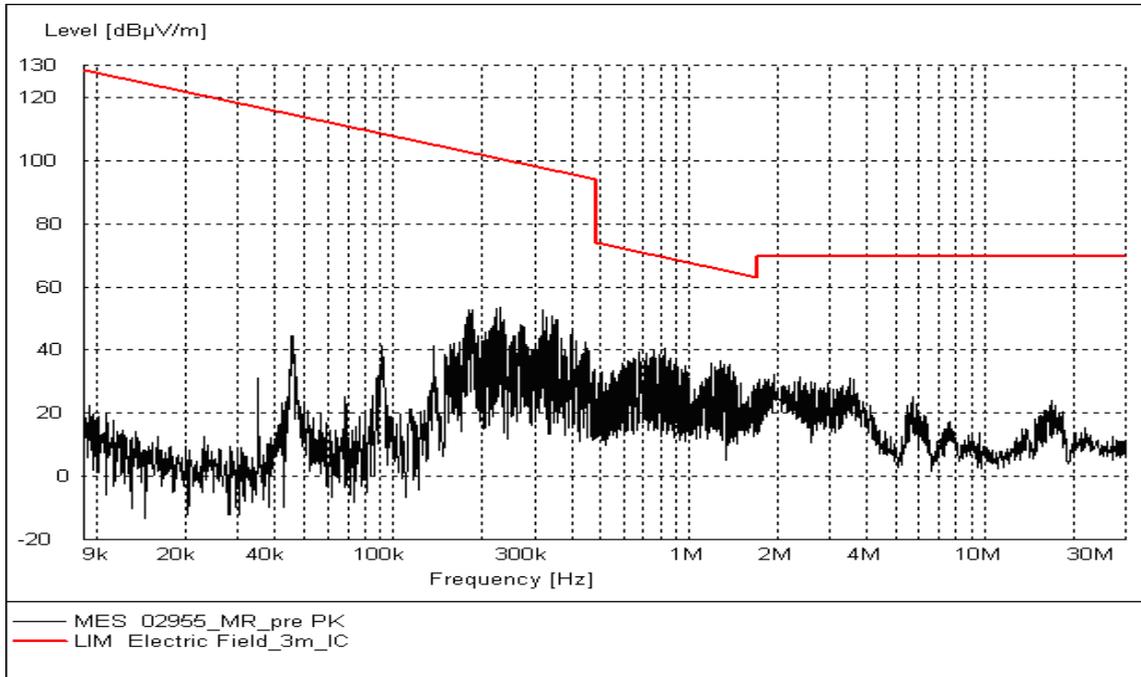
GSM Mode Channel 810/1909.8MHz

Frequency (MHz)	P _{Mea} (dBm)	P _{pl} (dB)	G _a (dBi)	Power (dBm)	Limit (dBm)	Polarity
3819.74	-42.15	6.10	-8.28	-39.97	-13.00	Horizontal
5729.51	-41.73	7.59	-10.09	-39.23	-13.00	Vertical
7639.25	-28.30	8.24	-11.54	-25.00	-13.00	Horizontal
9548.98	-51.22	8.91	-12.58	-47.55	-13.00	Horizontal
11458.37	-46.69	9.53	-12.40	-43.82	-13.00	Vertical
15278.57	-44.65	10.50	-13.44	-41.71	-13.00	Vertical

Note: Expanded measurement uncertainty for this test item is $U = 4.21\text{dB}$, $k=2$.

PCS 1900

A.2.3.1 RADIATED SPURIOUS EMISSIONS-EUT in Traffic Mode: 9 kHz – 30 MHz (Valid for 3 channels)



A.3 CONDUCTED EMISSION

Reference

FCC: CFR Part 15.107/207

The measurement procedure in ANSI C63.4-2009 is used. Conducted Emission is measured with travel charger. For test layout photo, please refer to Pic.2 in Annex B.

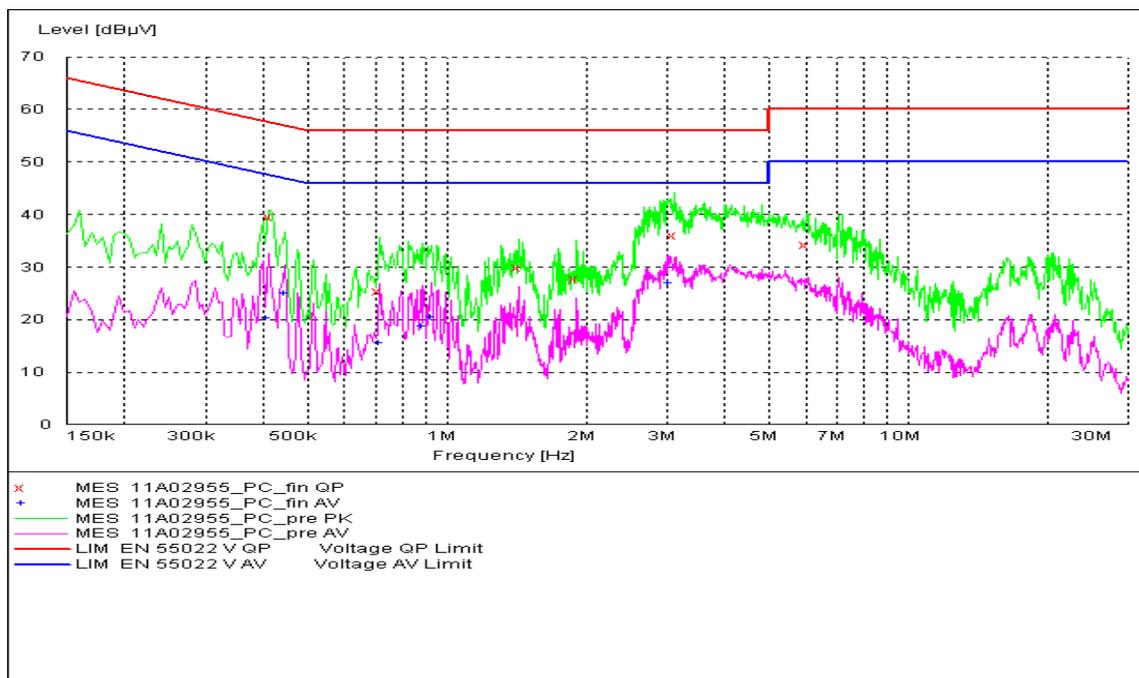
A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi -Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with logarithm of the frequency

A.3.2 Measurement result

PCS 1900MHz



IF bandwidth 9 kHz

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

MEASUREMENT RESULT: "11A02955_PC_fin QP"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.415000	39.60	10.1	58	18.0	L1	GND
0.715000	25.40	10.1	56	30.6	L1	GND
1.430000	29.90	10.1	56	26.1	L1	GND
1.910000	27.80	10.1	56	28.2	L1	GND
3.102012	36.00	10.1	56	20.0	L1	GND
6.021846	34.20	10.2	60	25.8	L1	GND

MEASUREMENT RESULT: "11A02955_PC_fin AV"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.410000	20.30	10.1	48	27.4	L1	GND
0.445000	25.00	10.1	47	21.9	L1	GND
0.715000	15.60	10.1	46	30.4	L1	GND
0.890000	18.80	10.1	46	27.2	L1	GND
0.925000	20.50	10.1	46	25.5	L1	GND
3.025611	26.90	10.1	46	19.1	L1	GND

A.4 FREQUENCY STABILITY

Reference

FCC: CFR Part 24.235, 2.1055

IC: RSS 133, Issue 5, Section 6.3

A.4.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50°C to -30°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

A.4.2 Measurement Limit

A.4.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4VDC and 4.2VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

A.4.3 Measurement results

PCS 1900

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.6	15	0.008
3.8	17	0.009
4.2	17	0.009

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	19	0.010
-20	18	0.010
-10	18	0.010
0	17	0.009
10	17	0.009
20	16	0.009
30	17	0.009
40	17	0.009
50	18	0.010

Expanded measurement uncertainty for this test item is 10Hz, k=2

A.5 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

IC: RSS 133, Issue 5, Section 5.6.

A.5.1 Occupied Bandwidth Results

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US PCS frequency band. The table below lists the measured -20dBc BW (99%). Spectrum analyzer plots are included on the following pages.

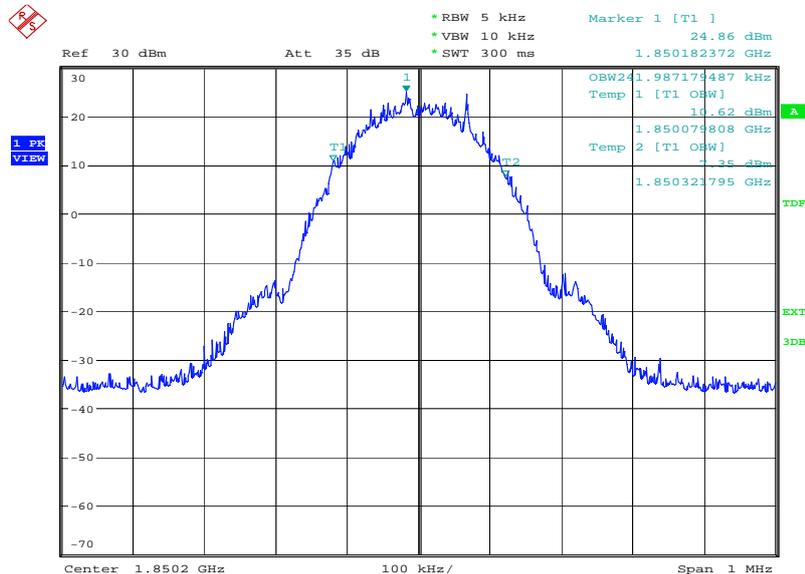
PCS 1900(99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
1850.2	241.987
1880.0	241.987
1909.8	241.987

Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

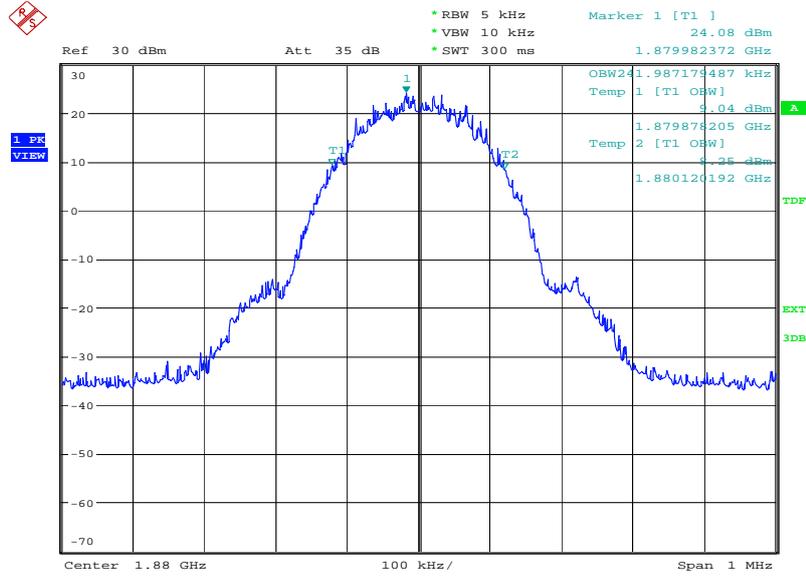
PCS 1900

Channel 512-Occupied Bandwidth (99%)



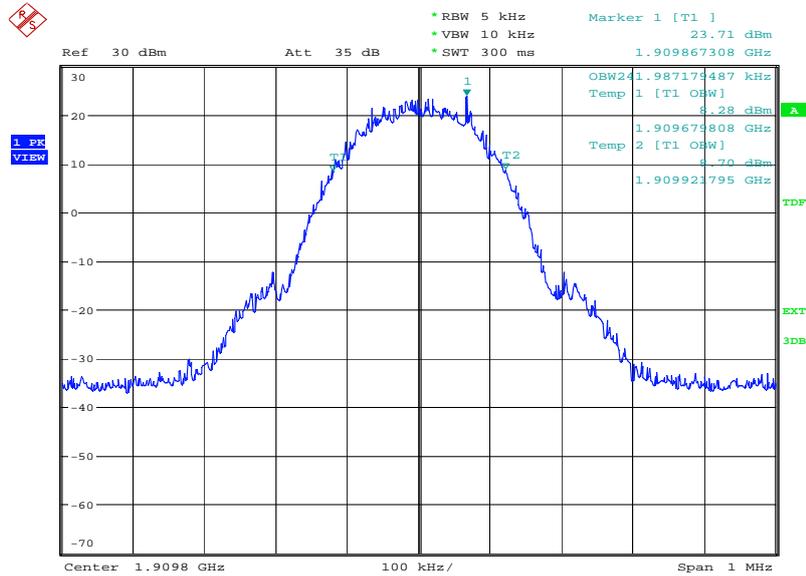
Date: 28 JUN 2011 08:20:23

Channel 661-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:20:55

Channel 810-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:21:28

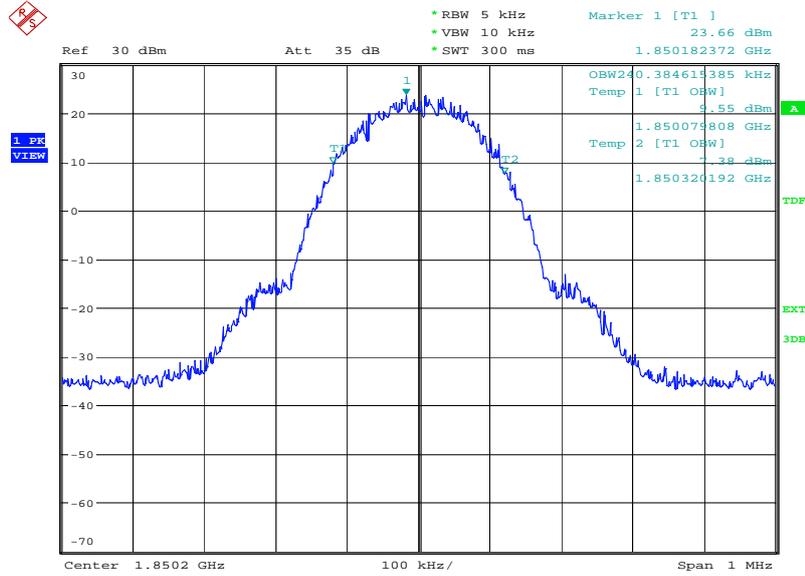
GPRS 1900(99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
1850.2	240.385
1880.0	238.782
1909.8	240.385

Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

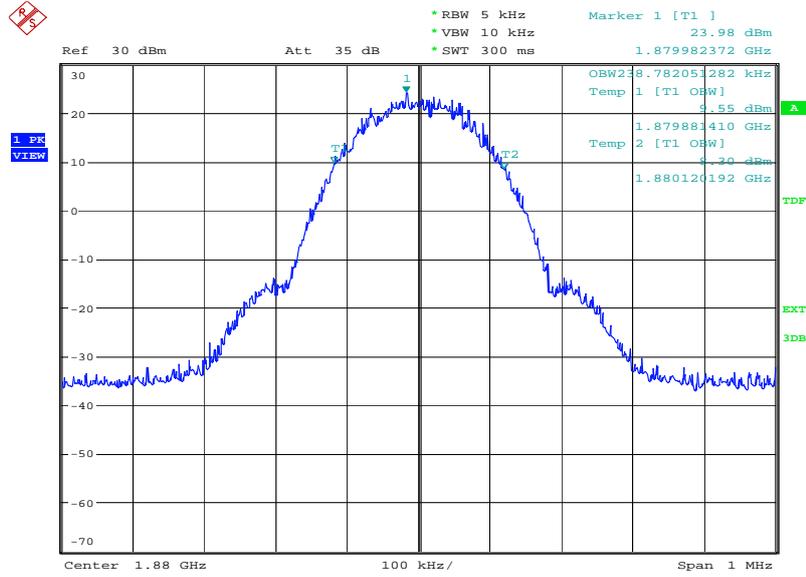
GPRS 1900

Channel 512-Occupied Bandwidth (99%)



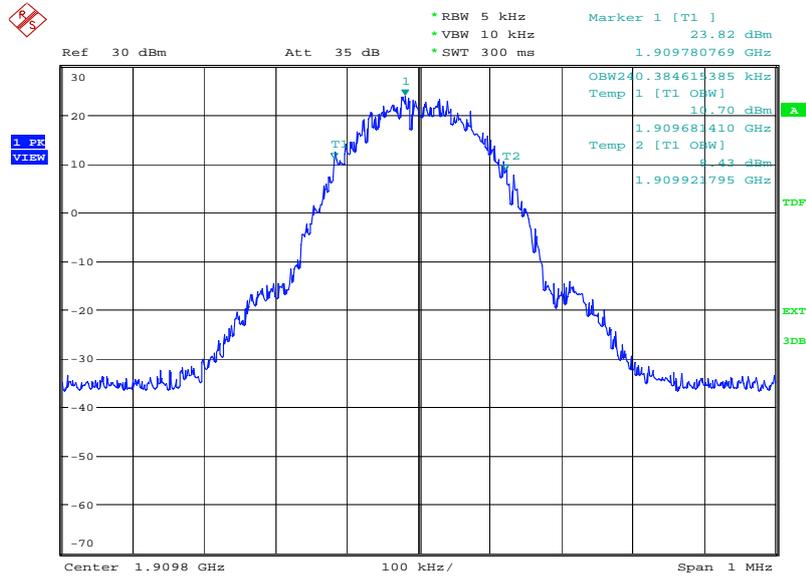
Date: 28.JUN.2011 08:25:54

Channel 661-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:26:26

Channel 810-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:26:59

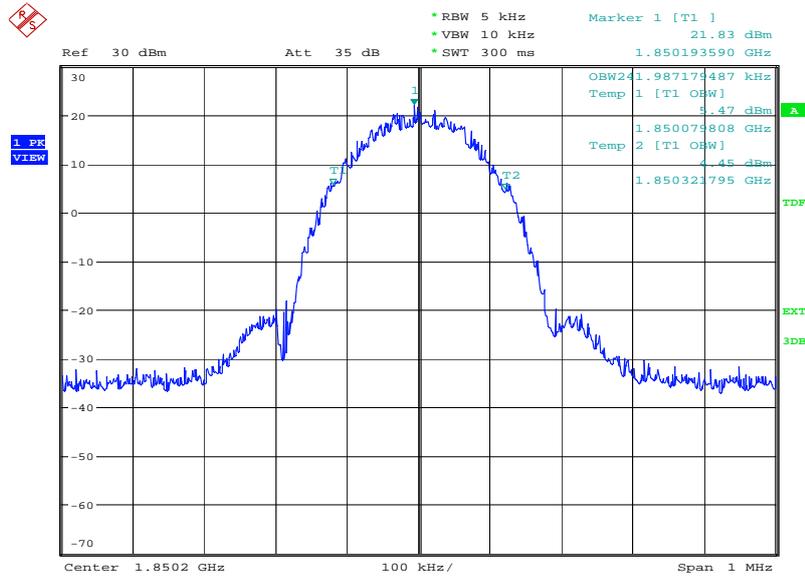
EGPRS 1900(99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
1850.2	241.987
1880.0	237.179
1909.8	237.179

Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

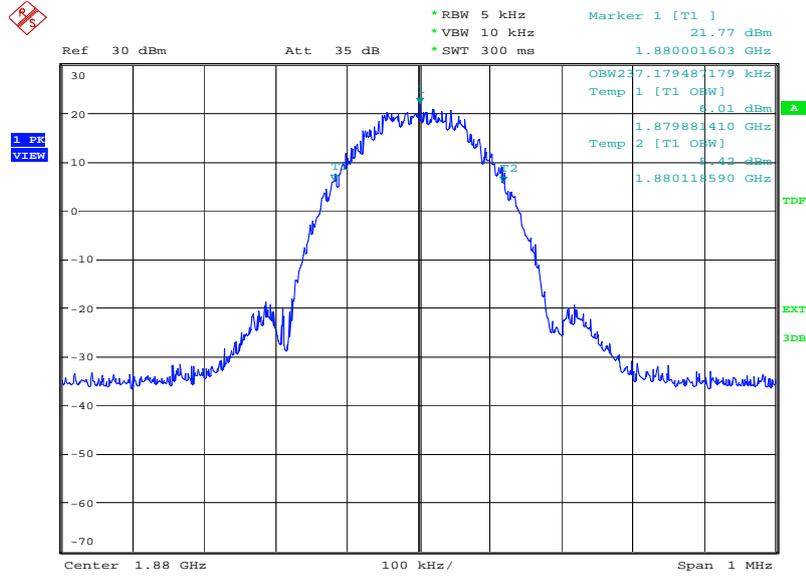
EGPRS 1900

Channel 512-Occupied Bandwidth (99%)



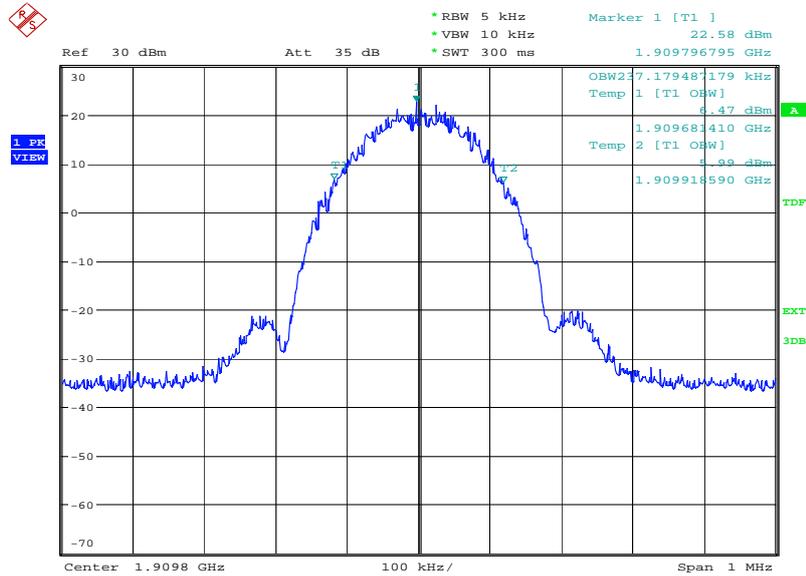
Date: 28.JUN.2011 08:30:32

Channel 661-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:31:04

Channel 810-Occupied Bandwidth (99%)



Date: 28.JUN.2011 08:31:36

A.6 EMISSION BANDWIDTH

Reference

FCC: CFR Part 24.238(b)

IC: RSS 133, Issue 5, Section 5.6

A.6.1 Emission Bandwidth Results

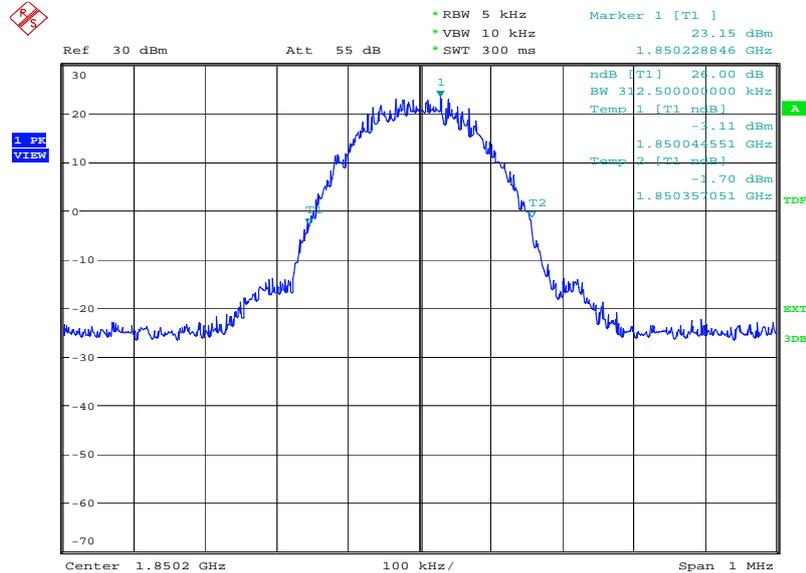
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the PCS1900. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

PCS 1900(-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)
1850.2	312.500
1880.0	299.679
1909.8	309.295

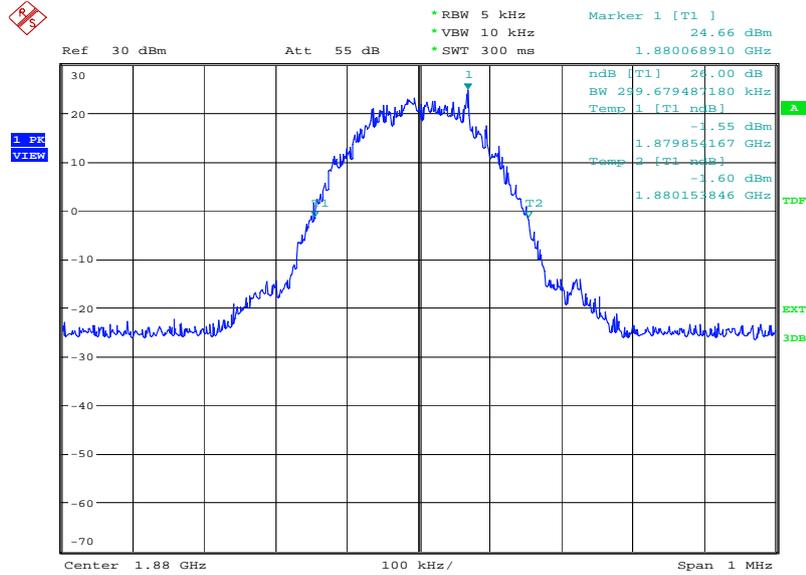
PCS 1900

Channel 512-Occupied Bandwidth (-26dBc BW)



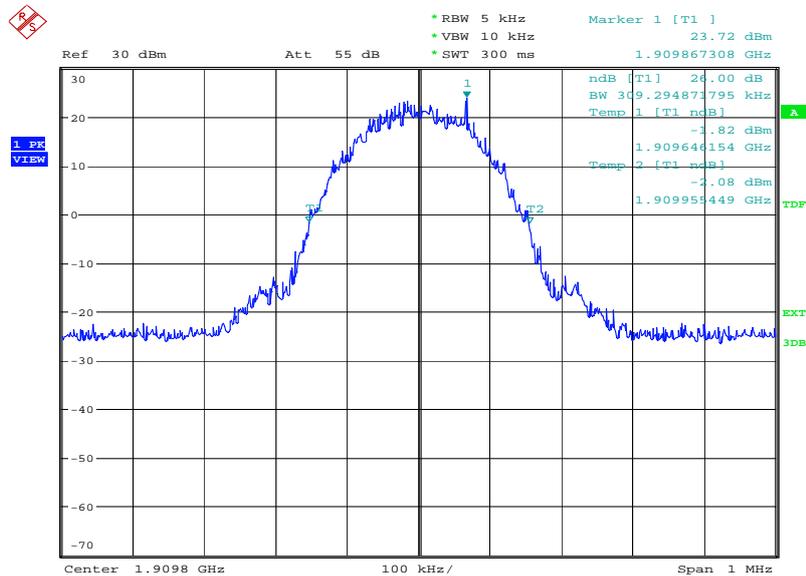
Date: 16.MAY.2011 06:40:57

Channel 661-Occupied Bandwidth (-26dBc BW)



Date: 16.MAY.2011 06:41:24

Channel 810-Occupied Bandwidth (-26dBc BW)



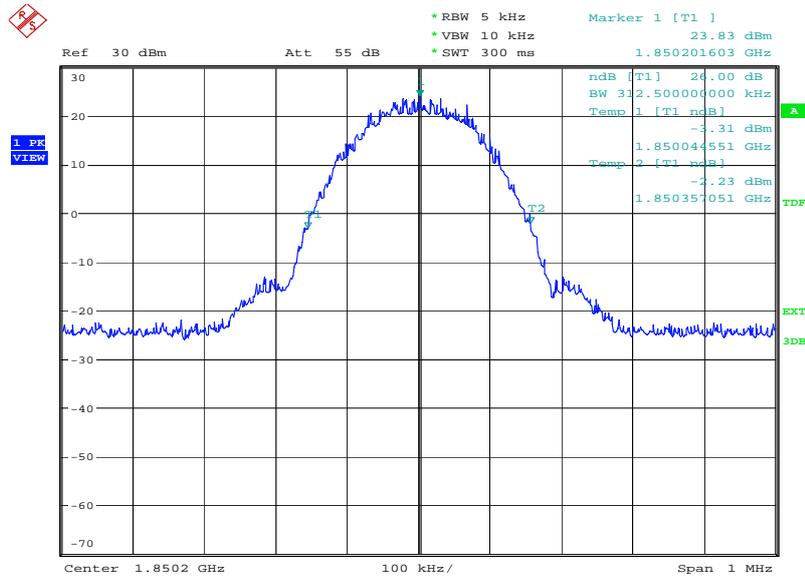
Date: 16.MAY.2011 06:41:52

GPRS 1900(-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)
1850.2	312.500
1880.0	312.500
1909.8	310.897

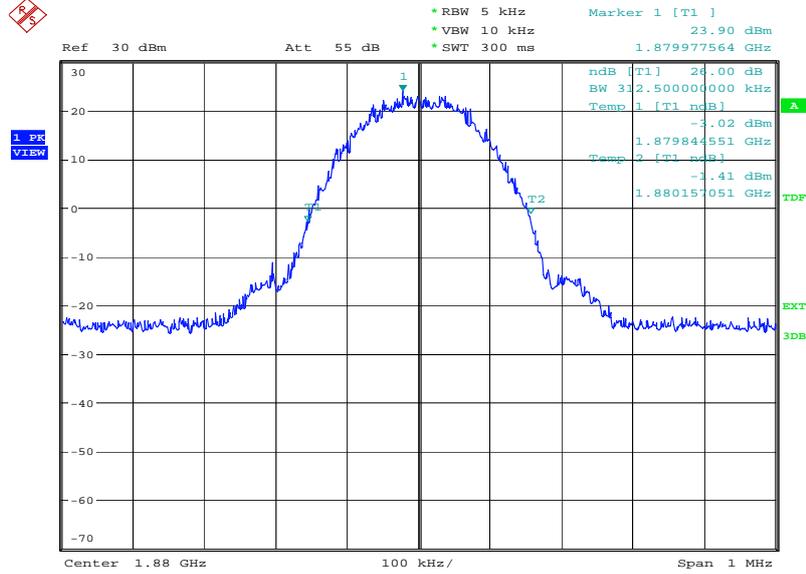
GPRS 1900

Channel 512-Occupied Bandwidth (-26dBc BW)



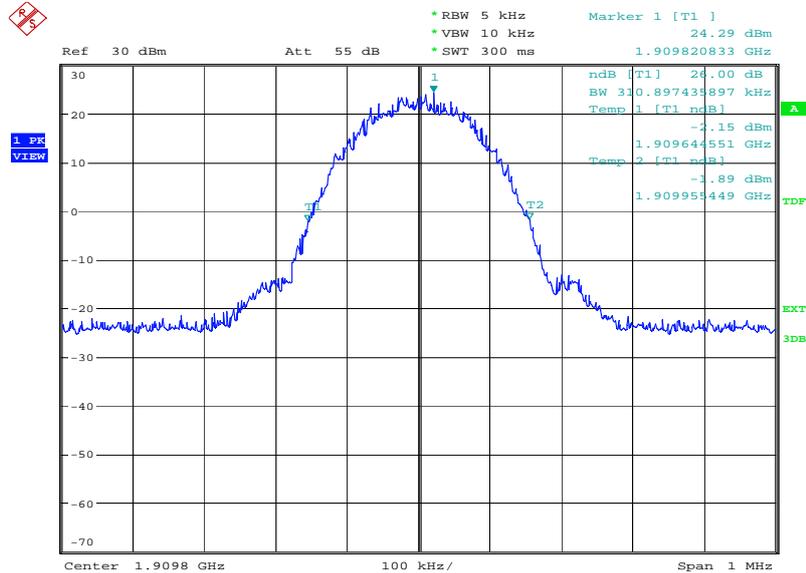
Date: 28.JUN.2011 07:26:25

Channel 661-Occupied Bandwidth (-26dBc BW)



Date: 28.JUN.2011 07:28:18

Channel 810-Occupied Bandwidth (-26dBc BW)



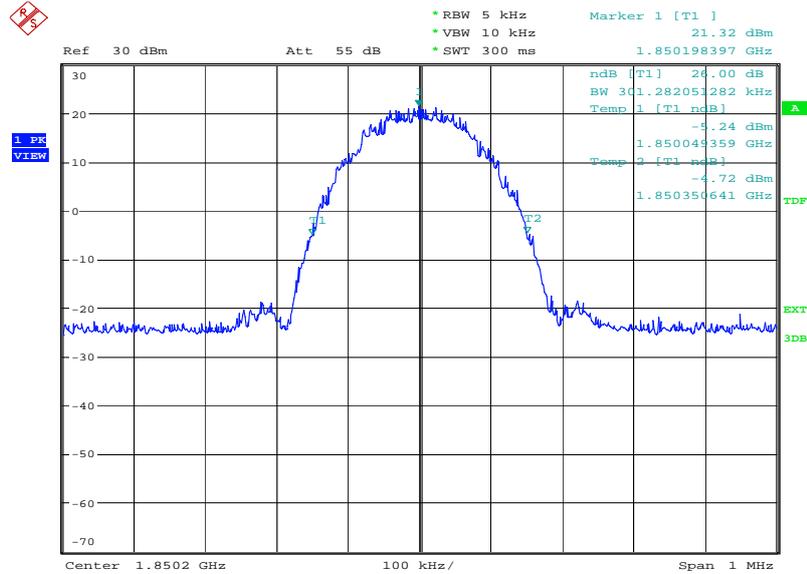
Date: 28.JUN.2011 07:30:10

EGPRS 1900(-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)
1850.2	301.282
1880.0	302.885
1909.8	306.090

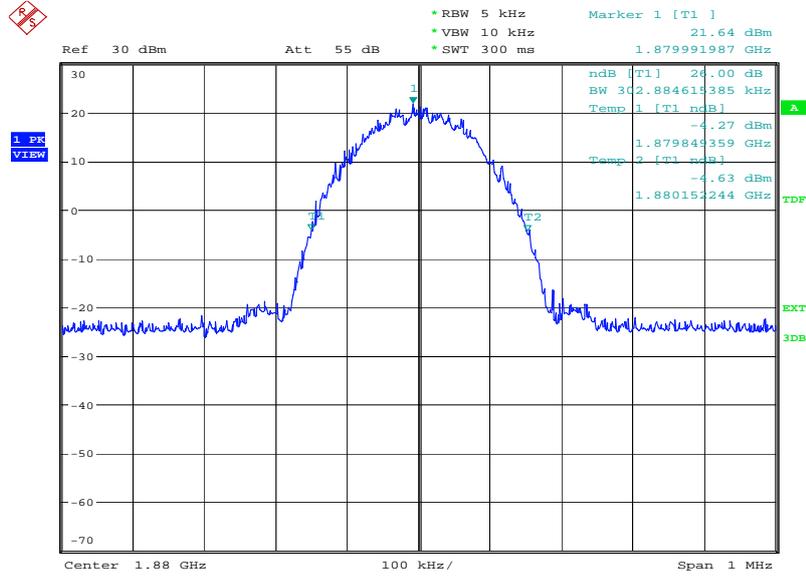
EGPRS 1900

Channel 512-Occupied Bandwidth (-26dBc BW)



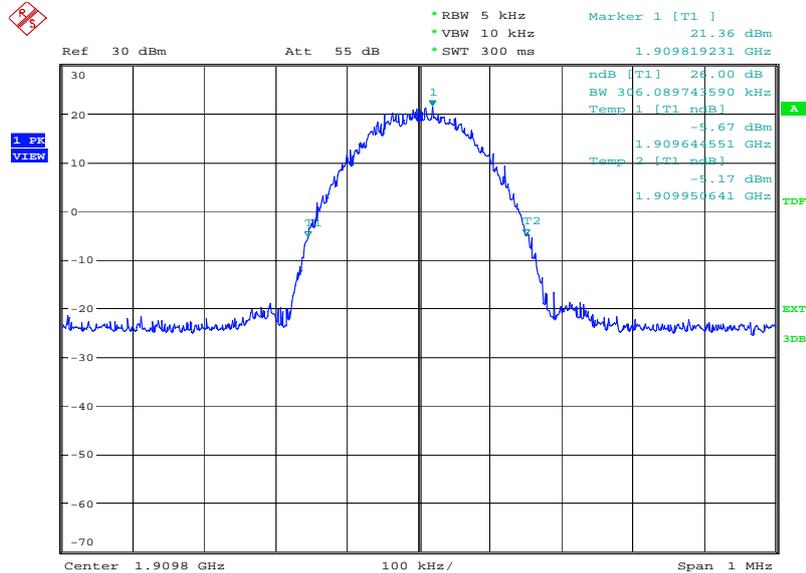
Date: 28.JUN.2011 07:41:53

Channel 661-Occupied Bandwidth (-26dBc BW)



Date: 28.JUN.2011 07:43:45

Channel 810-Occupied Bandwidth (-26dBc BW)



Date: 28.JUN.2011 07:45:38

A.7 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 24.238(b)

IC: RSS 133, Issue 5, Section 6.3

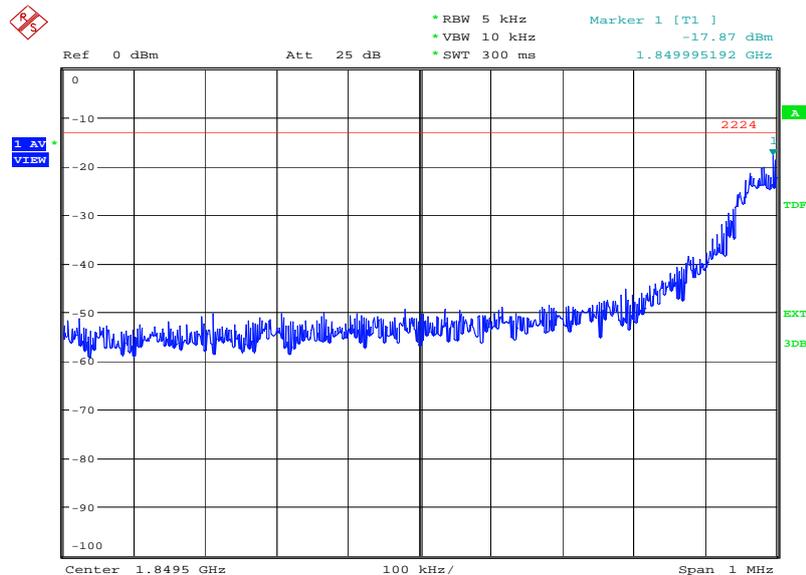
A.7.1 Measurement limit

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43+10\text{Log}(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

A.7.2 Measurement result

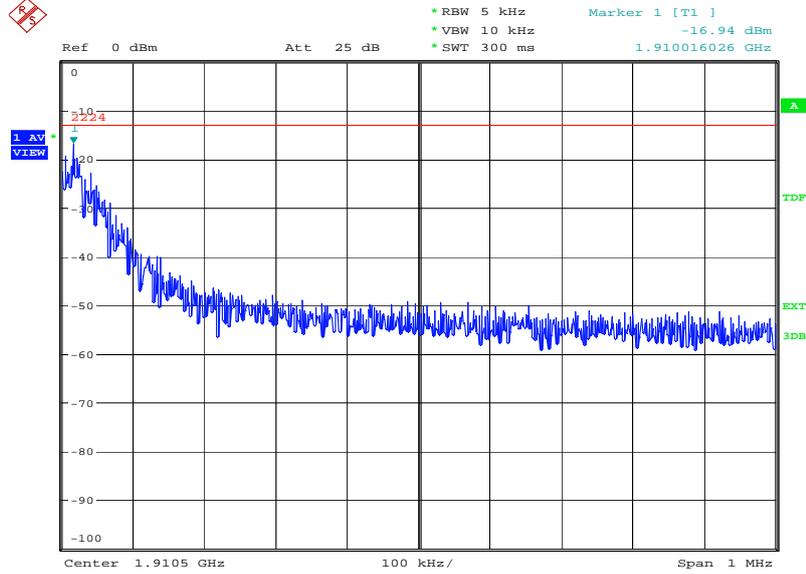
PCS 1900

LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



Date: 16.MAY.2011 06:42:21

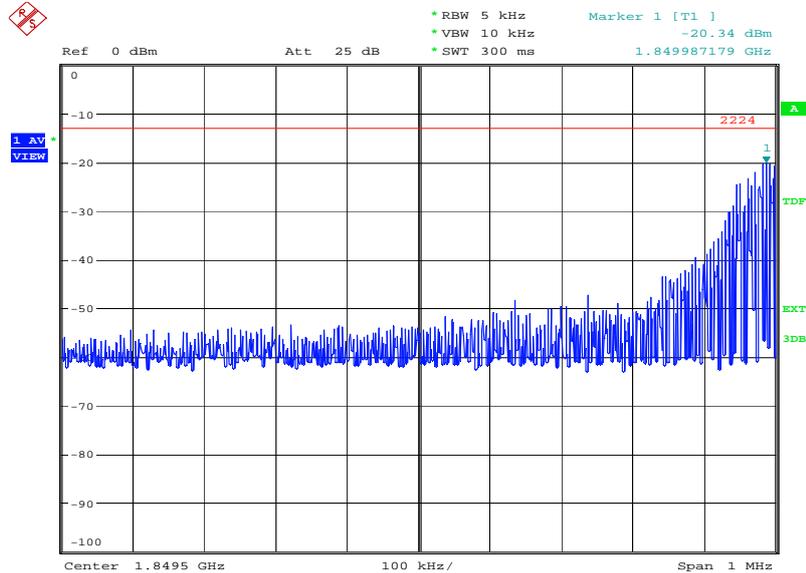
HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810



Date: 16.MAY.2011 06:42:50

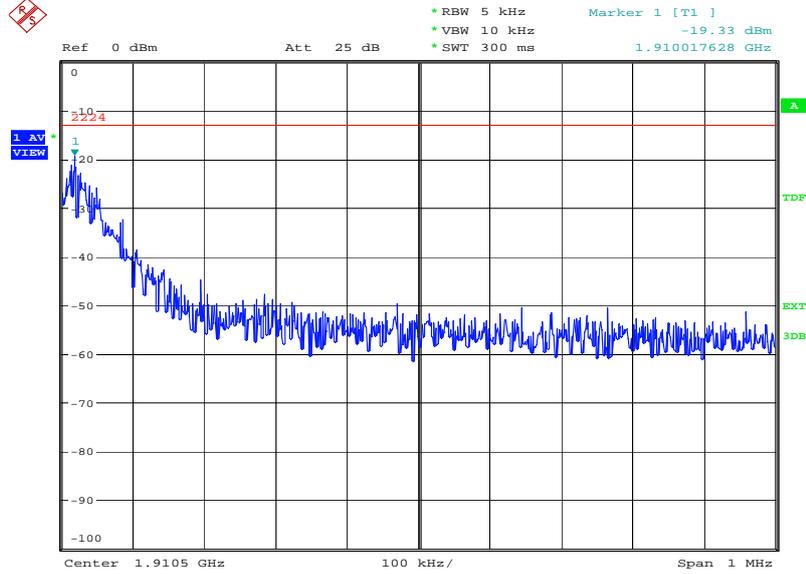
GPRS 1900

LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



Date: 28.JUN.2011 07:30:19

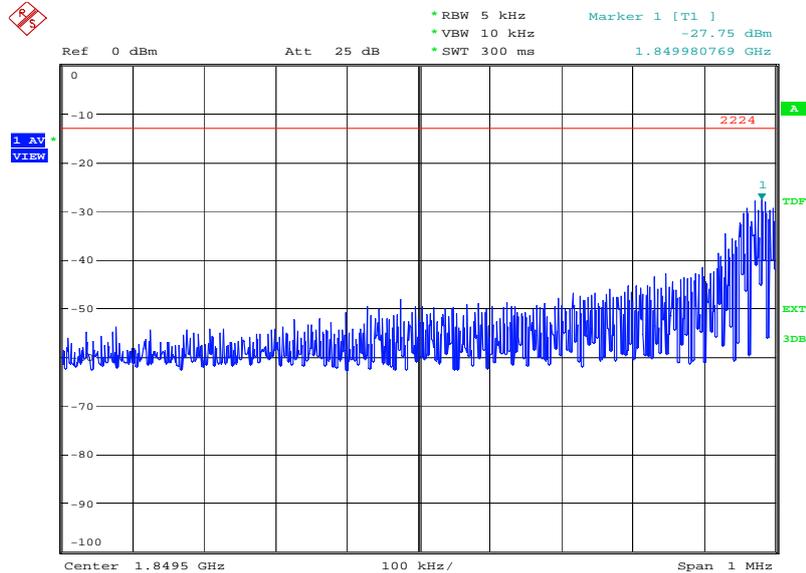
HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810



Date: 28.JUN.2011 07:30:28

EGPRS 1900

LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



Date: 28.JUN.2011 07:45:47

A.8 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 24.238, 2.1057

IC: RSS 133, Issue 5, Section 6.5

A.8.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

PCS1900 Transmitter

Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

A. 8.2 Measurement Limit

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43+10\text{Log}(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

A. 8.3 Measurement result

PCS1900

Harmonic	Tx ch. 512 Freq. (MHz)	Level (dBm)	Tx ch. 661 Freq. (MHz)	Level (dBm)	Tx ch. 810 Freq. (MHz)	Level (dBm)
2	3700.4	nf	3760	nf	3819.6	nf
3	5550.6	nf	5640	nf	5729.4	nf
4	7400.8	nf	7520	nf	7639.2	nf
5	9251.0	nf	9400	nf	9549.0	nf
6	11101.2	nf	11280	nf	11458.8	nf
7	12951.4	nf	13160	nf	13368.6	nf
8	14801.6	nf	15040	nf	15278.4	nf
9	16651.8	nf	16920	nf	17188.2	nf
10	18502.0	nf	18800	nf	19098.0	nf

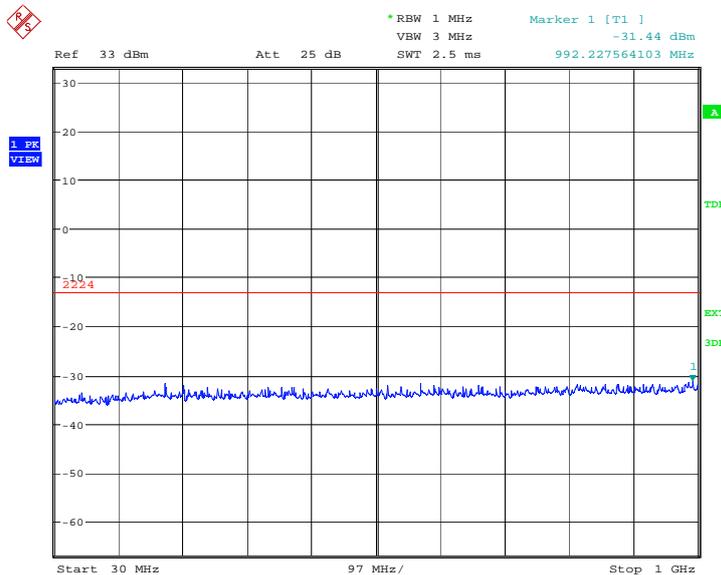
nf: Noise floor

PCS1900

A.8.3.1 Channel 512: 30MHz – 1GHz

Spurious emission limit –13dBm.

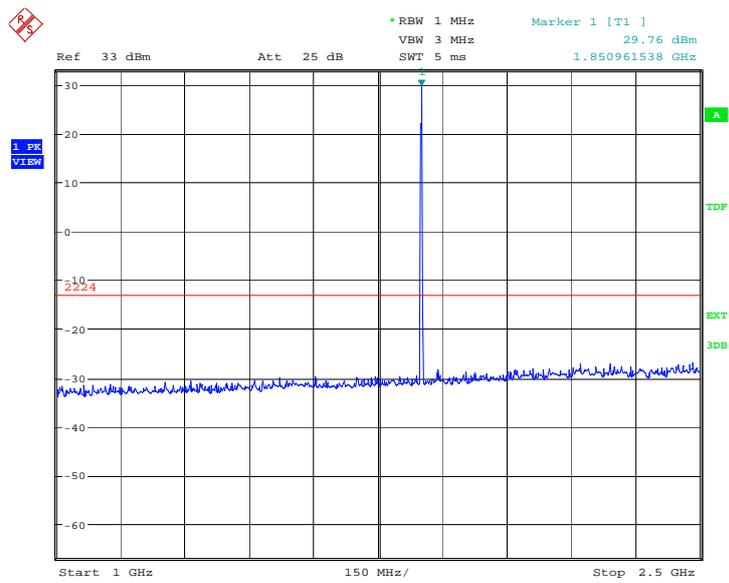
NOTE: peak above the limit line is the carrier frequency.



Date: 16.MAY.2011 06:43:19

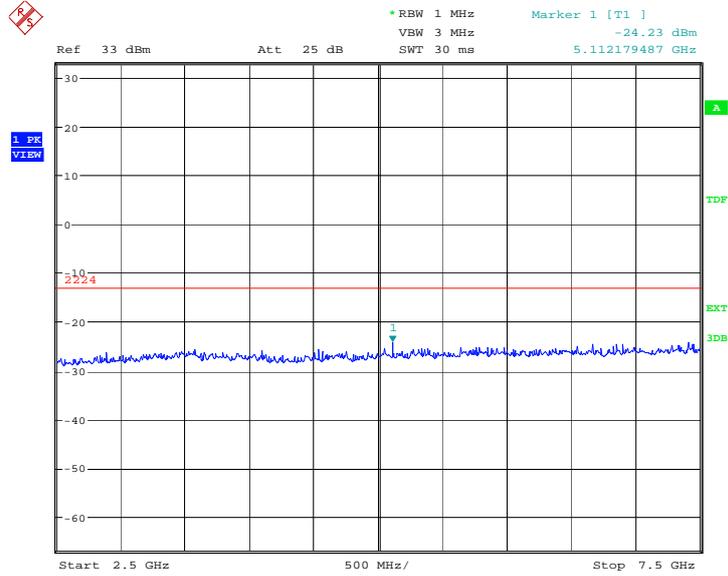
A.8.3.2 Channel 512: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



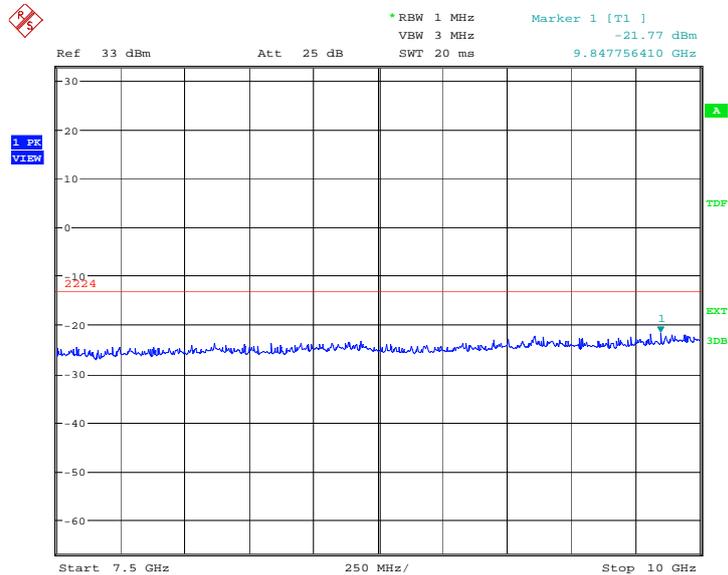
Date: 16.MAY.2011 06:43:48

A.8.3.3 Channel 512: 2.5GHz – 7.5GHz
Spurious emission limit –13dBm.



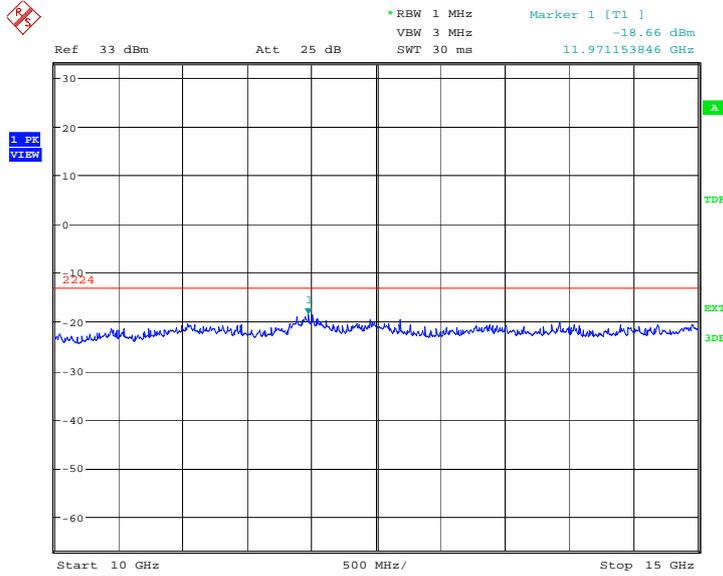
Date: 16.MAY.2011 06:44:16

A.8.3.4 Channel 512: 7.5GHz –10GHz
Spurious emission limit –13dBm.



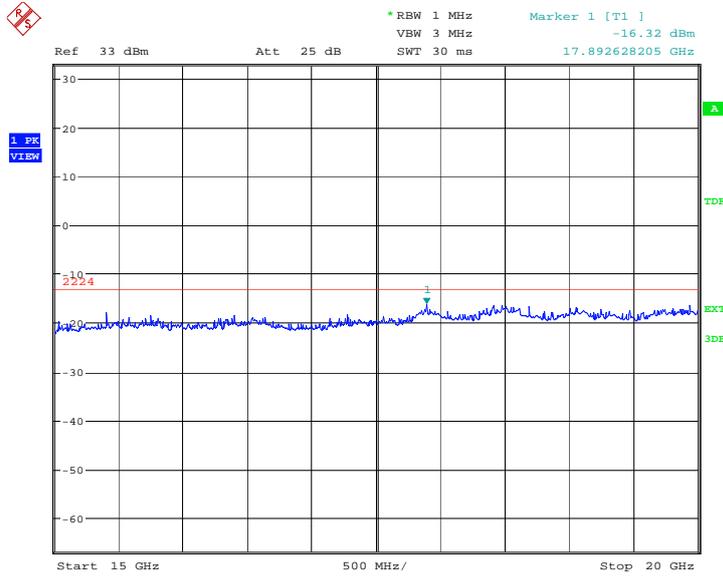
Date: 16.MAY.2011 06:44:45

A.8.3.5 Channel 512: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 16.MAY.2011 06:45:13

A.8.3.6 Channel 512: 15GHz –20GHz
Spurious emission limit –13dBm.

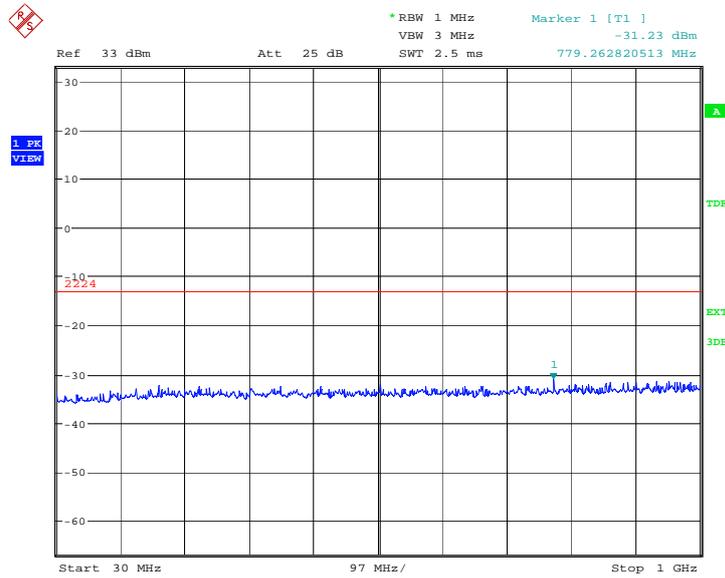


Date: 16.MAY.2011 06:45:42

A.8.3.7 Channel 661: 30MHz – 1GHz

Spurious emission limit –13dBm

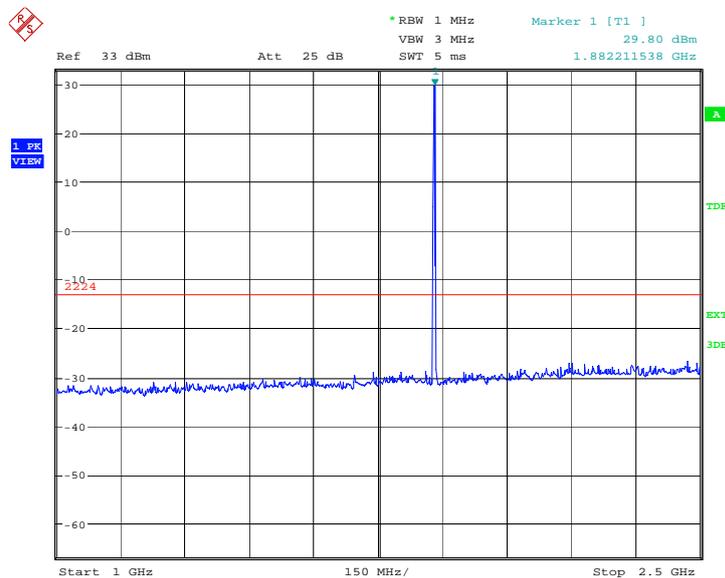
NOTE: peak above the limit line is the carrier frequency.



Date: 16.MAY.2011 06:46:11

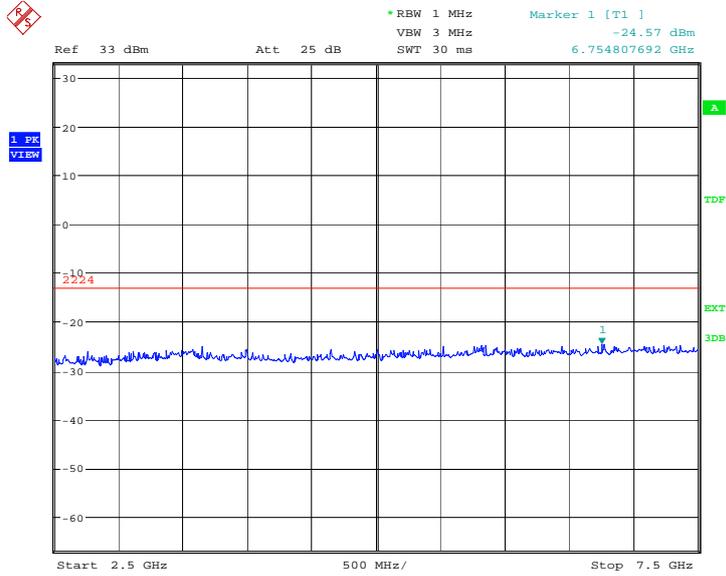
A.8.3.8 Channel 661: 1GHz –2.5GHz

Spurious emission limit –13dBm



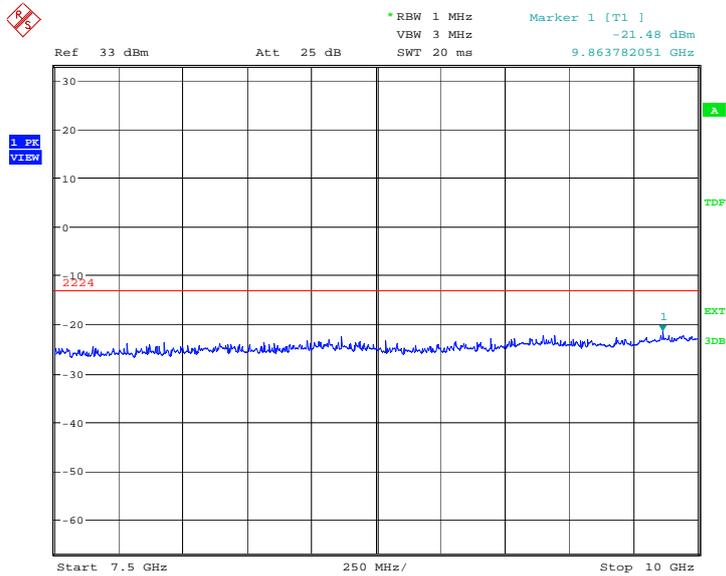
Date: 16.MAY.2011 06:46:40

A.8.3.9 Channel 661: 2.5GHz –7.5GHz
Spurious emission limit –13dBm



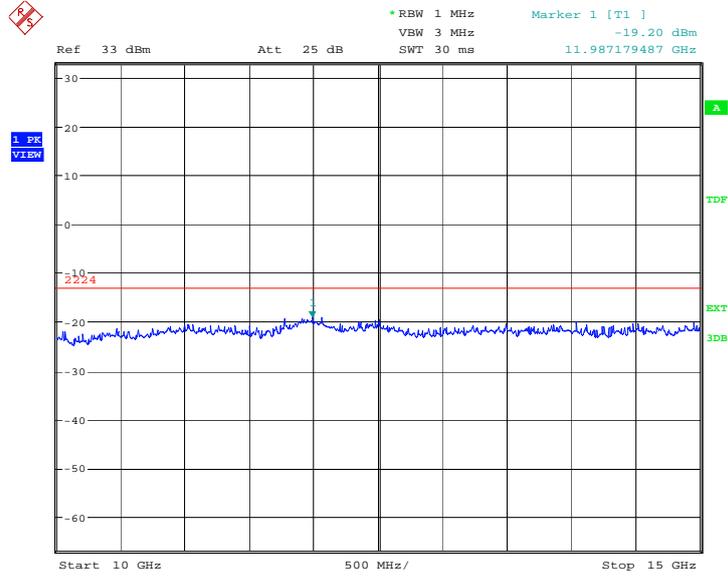
Date: 16.MAY.2011 06:47:08

A.8.3.10 Channel 661: 7.5GHz –10GHz
Spurious emission limit –13dBm



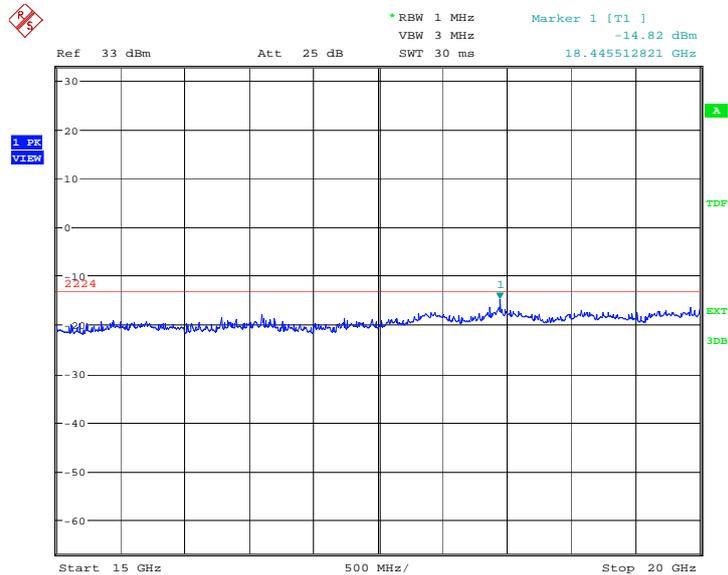
Date: 16.MAY.2011 06:47:37

A.8.3.11 Channel 661: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 16.MAY.2011 06:48:05

A.8.3.12 Channel 661: 15GHz –20GHz
Spurious emission limit –13dBm.

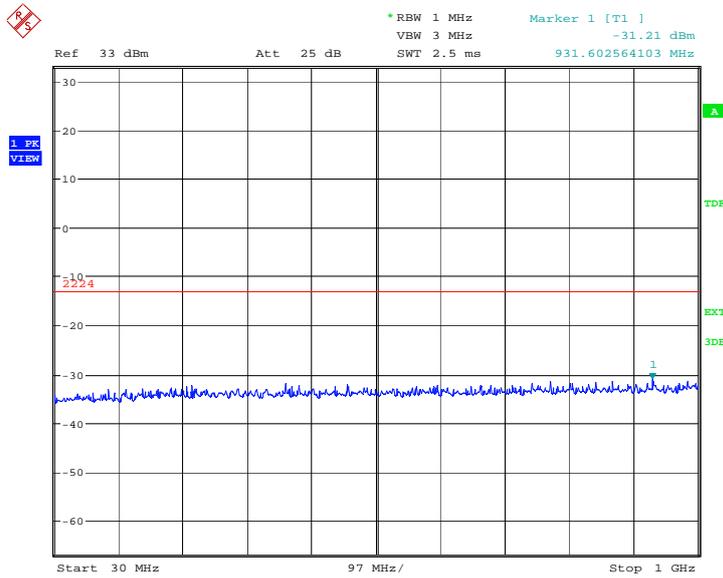


Date: 16.MAY.2011 06:48:34

A.8.3.13 Channel 810: 30MHz – 1GHz

Spurious emission limit –13dBm.

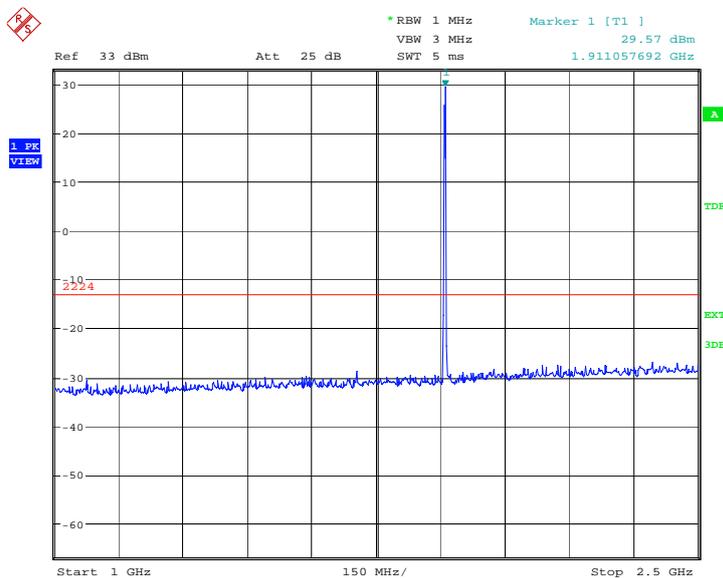
NOTE: peak above the limit line is the carrier frequency.



Date: 16.MAY.2011 06:49:03

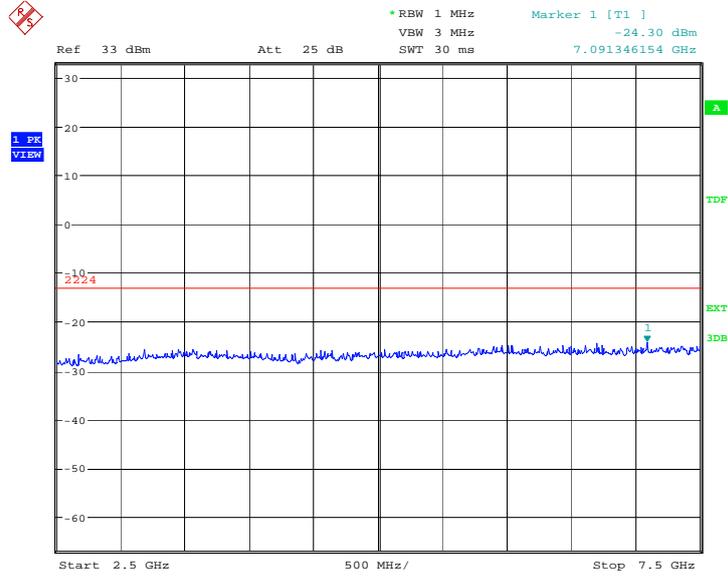
A.8.3.14 Channel 810: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



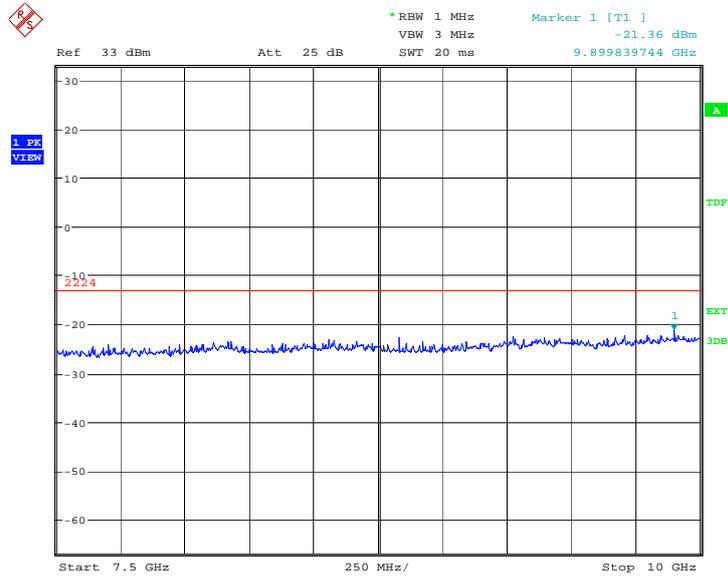
Date: 16.MAY.2011 06:49:31

A.8.3.15 Channel 810:2.5GHz – 7.5GHz
Spurious emission limit –13dBm.



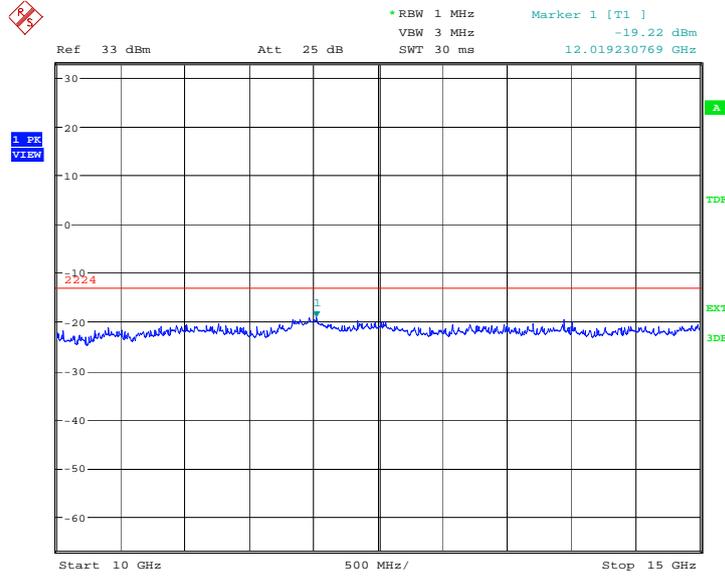
Date: 16.MAY.2011 06:49:59

A.8.3.16 Channel 810: 7.5GHz – 10GHz
Spurious emission limit –13dBm.



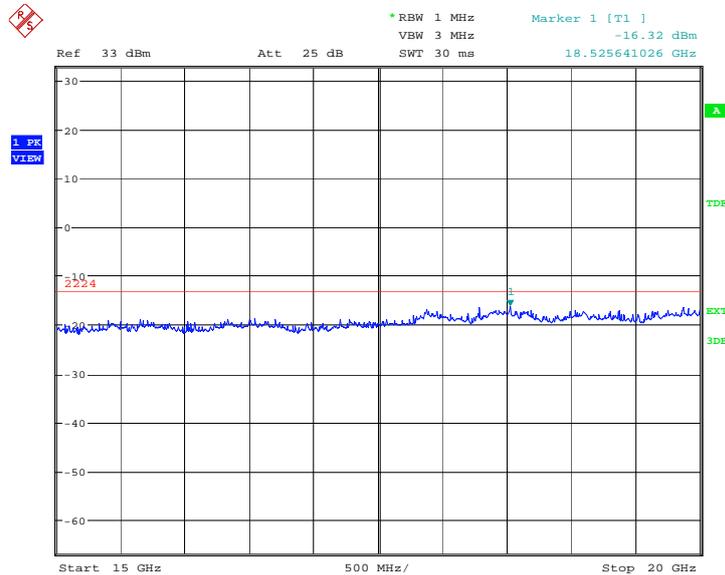
Date: 16.MAY.2011 06:50:27

A.8.3.17 Channel 810: 10GHz –15GHz
Spurious emission limit –13dBm.



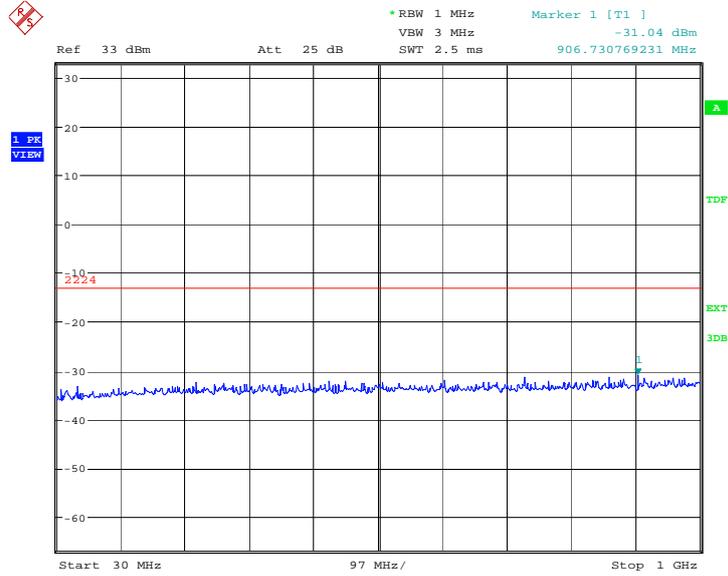
Date: 16.MAY.2011 06:50:55

A.8.3.18 Channel 810: 15GHz –20GHz
Spurious emission limit –13dBm.



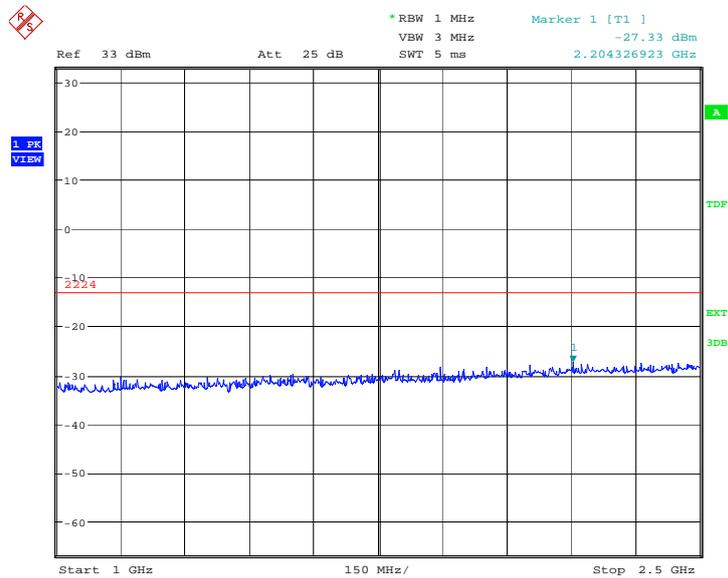
Date: 16.MAY.2011 06:51:24

A.8.3.19 Idle mode: 30MHz – 1GHz
Spurious emission limit –13dBm.



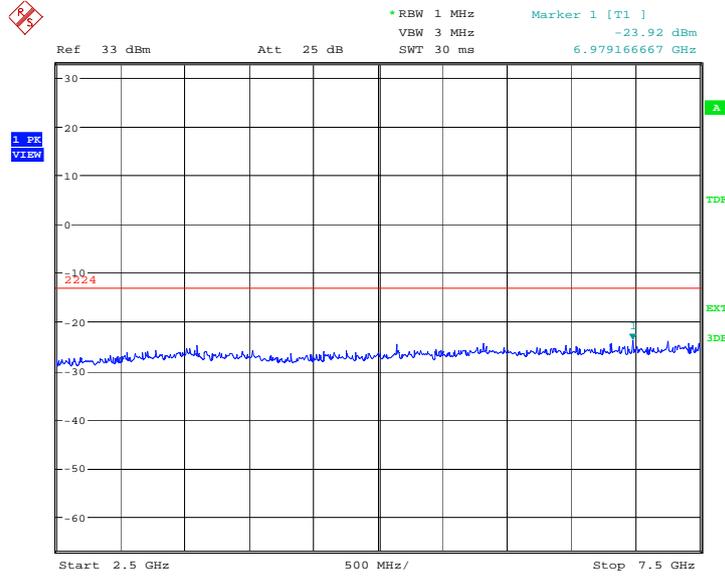
Date: 16.MAY.2011 06:51:52

A.8.3.20 Idle mode: 1GHz – 2.5GHz
Spurious emission limit –13dBm.



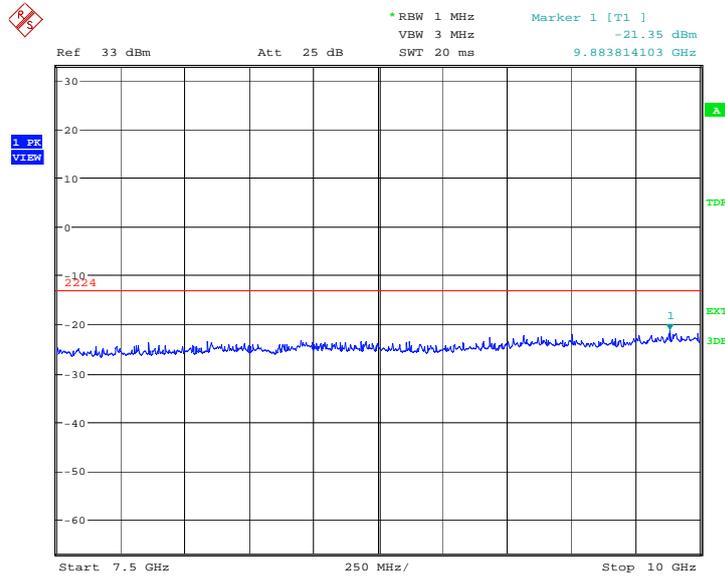
Date: 16.MAY.2011 06:52:20

A.8.3.21 Idle mode: 2.5GHz – 7.5GHz
Spurious emission limit –13dBm.



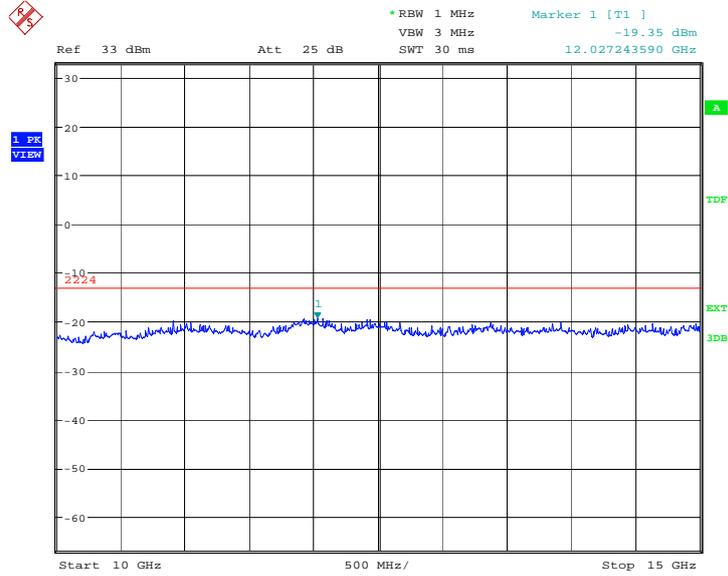
Date: 16.MAY.2011 06:52:49

A.8.3.22 Idle mode: 7.5GHz – 10GHz
Spurious emission limit –13dBm.



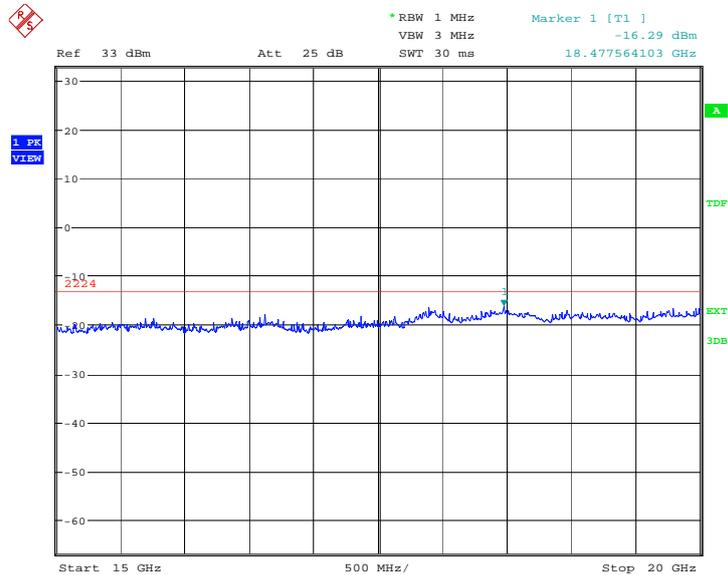
Date: 16.MAY.2011 06:53:17

A.8.3.23 Idle mode: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 16.MAY.2011 06:53:45

A.8.3.24 IDLE mode: 15GHz –20GHz
Spurious emission limit –13dBm.



Date: 16.MAY.2011 06:54:13

A.9 RECEIVER RADIATION EMISSION

Reference

FCC: CFR Part 15.109, 2.1053

IC: RSS 133, Issue 5, Section 6.6

A.9.1 Method of Measurement

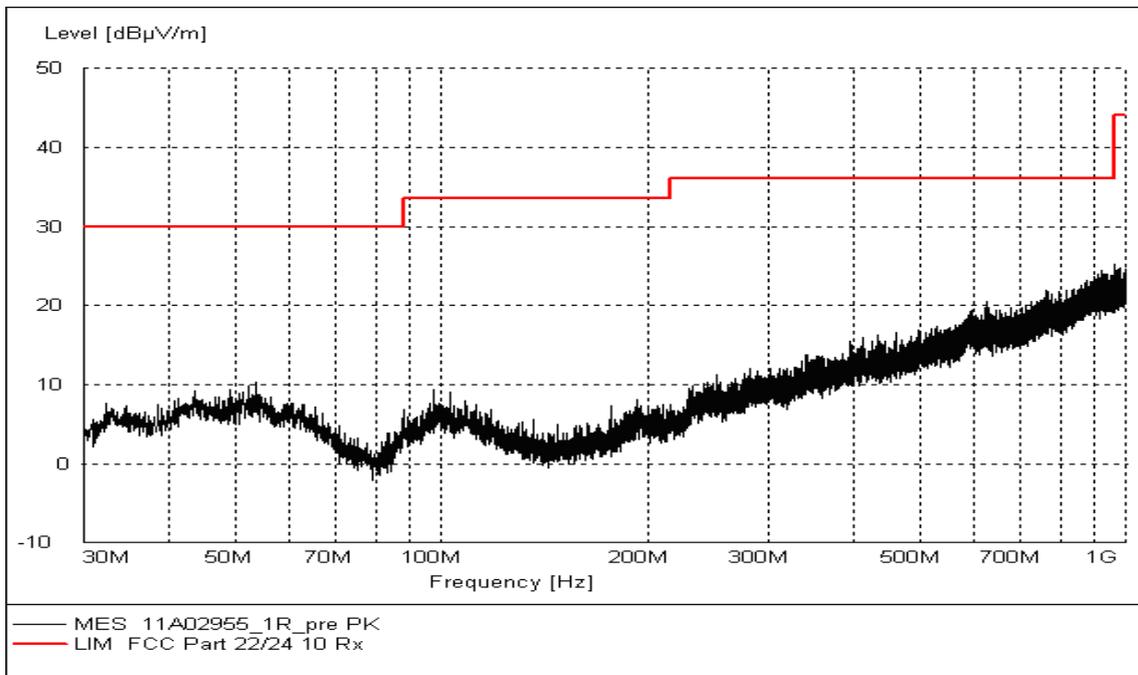
The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

A.9.2 Method of Measurement

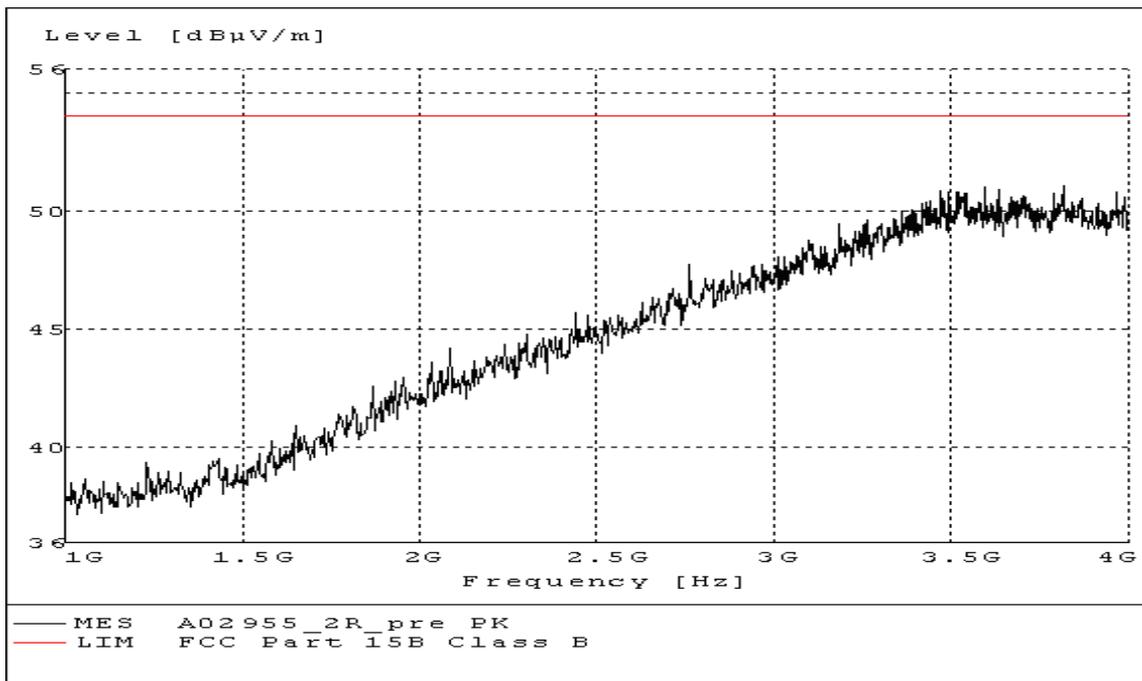
Frequency of Emission (MHz)	Limit (dB μ V/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

A. 9.3 Measurement results



IF bandwidth: 120 kHz

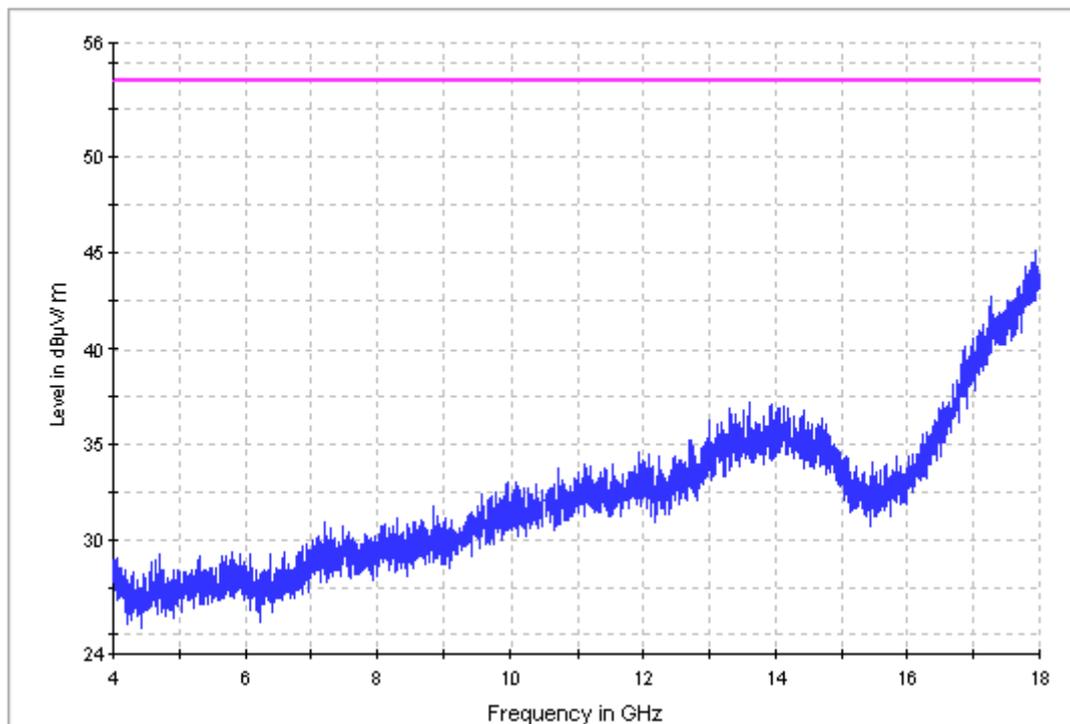
Idle Mode: 30MHz-1GHz



RBW / VBW 1 MHz

Idle Mode: 1GHz-4GHz

FCC 4-18G



RBW / VBW 1 MHz

Idle Mode: 4GHz-18GHz

ANNEX B: TEST LAYOUT

Pic.1 Radiated spurious emission



Pic.2 Conducted emission

ANNEX C: EUT photograph



Mobile Phone



Mobile Phone



Mobile Phone



Mobile Phone



Mobile Phone



Mobile Phone



Mobile Phone



Mobile phone Disassembly



Mobile phone Disassembly



Mobile phone Disassembly



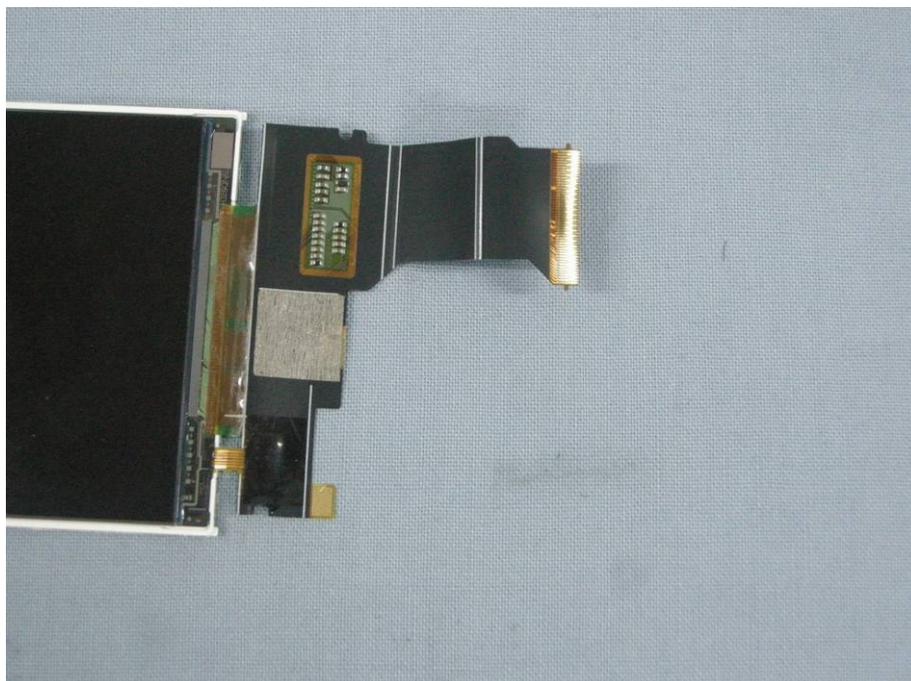
Mobile phone Disassembly



Mobile phone Disassembly



Mobile phone Disassembly



Mobile phone Disassembly



Battery



Battery



Travel Charger



Label of Travel Charger

END OF REPORT