TEST REPORT

No. 2013TAR833

for

TCT Mobile Limited

HSUPA/HSDPA/UMTS dual band/GSM Tri band mobile phone

Model Name: Yaris-4 VF

Marketing Name: Vodafone 785

FCC ID: RAD439

with

Hardware Version: PIO

Software Version: SVN05

Issued Date: 2013-12-30

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

FCC 2.948 Listed: No.733176

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

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai Dian District, Beijing, P. R. China,100191.

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai Dian District, Beijing, P. R. China
Postal Code:	100191
Telephone:	00861062304633
Fax:	00861062304633

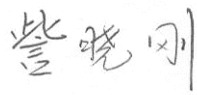
1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

1.3. Project data

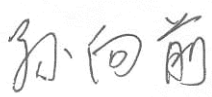
Testing Start Date:	2013-12-09
Testing End Date:	2013-12-25

1.4. Signature



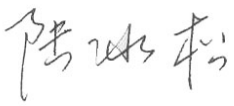
Zi Xiaogang

(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:	TCT Mobile Limited
Address /Post:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.
City:	Shanghai
Postal Code:	201203
Country:	China
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@jrdcom.com
Telephone:	0086-21-61460890
Fax:	0086-21-61460602

2.2. Manufacturer Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.
City:	Shanghai
Postal Code:	201203
Country:	China
Telephone:	0086-21-61460890
Fax:	0086-21-61460602

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	HSUPA/HSDPA/UMTS dual band/GSM Tri band mobile phone
Model Name	Yaris-4 VF
Marketing Name	Vodafone 785
FCC ID	RAD439
Frequency	PCS1900
GPRS operation mode	Class B
GPRS Class	Class 12
EGPRS Class	Class 12
Antenna	Integrated
Output power	32.60dBm maximum EIRP measured for PCS1900
Extreme vol. Limits	3.5VDC 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.
Note: The EUT is a variant model of 4015A. Only ERP and RSE have been retested, the other result is coming from 4015A.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
N13	359729050053645	PIO	SVN05
N34	359729050101493	PIO	SVN05

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

3.3. Internal Identification of AE used during the test

AE ID*	Description		
AE1	Battery	/	TCT-B-1064
AE2	Battery	/	TCT-B-1059
AE3	Battery	/	TCT-B-0520
AE4	Battery	/	TCT-B-0888
AE5	Battery	/	TCT-B-0880
AE6	Travel charger	/	TCT-CHR-1265
AE7	Travel charger	/	TCT-CHR-1399
AE8	Travel charger	/	13169CHR10
AE9	USB cable	/	TCT-DC-0203
AE10	USB cable	/	TCT-DC-0499
AE11	USB cable	/	/
AE12	USB cable	/	/

AE1, AE2

Model	CAB31P0000C1
Manufacturer	BYD
Capacitance	1300 mAh
Nominal voltage	3.7V

AE3

Model	CAB1400018C2
Manufacturer	SCUD
Capacitance	1400 mAh
Nominal Voltage	3.7 V

AE4

Model	CAB60B0000C2
Manufacturer	BAK
Capacitance	1400 mAh
Nominal Voltage	3.7 V

AE5

Model	CAB1400017C1
Manufacturer	BYD
Capacitance	1400 mAh
Nominal Voltage	3.7 V

AE6

Model	CBA3007AG0C2
Manufacturer	TENPAO
Length of cable	/

AE7

Model	CBA3007AG0C3
Manufacturer	YINGJU
Length of cable	/

AE8

Model	CBA3008AG0C1
Manufacturer	BYD
Length of cable	/

AE9

Model	CDA3122002C1
Manufacturer	JUWEI
Length of cable	100 cm

AE10

Model	CDA3122002C2
Manufacturer	Shenghua
Length of cable	100 cm

AE11

Model	CDA3122005C1
Manufacturer	JUWEI
Length of cable	/

AE12

Model	CDA3122005C2
Manufacturer	Shenghua
Length of cable	/

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

3.4. Normal Accessory setting

Fully charged battery was used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of HSUPA/HSDPA/UMTS dual band/GSM Tri band mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

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	PERSONAL COMMUNICATIONS SERVICES	10-1-12 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-12 Edition
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	2003
KDB971168 D01	Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems	2011

5. LABORATORY ENVIRONMENT

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

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 2 (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Semi-anechoic chamber 2 / Fully-anechoic chamber 3 (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(c)	P
2	Emission Limit	2.1051/22.917/24.238	P
3	Conducted Emission	15.107/15.207	P
4	Frequency Stability	2.1055/24.235	P
5	Occupied Bandwidth	2.1049(h)(i)	P
6	Emission Bandwidth	22.917(b)/24.238(b)	P
7	Band Edge Compliance	22.917(b)/24.238(b)	P
8	Conducted Spurious Emission	2.1057/22.917/24.238	P

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2014-03-28
2	Test Receiver	ESU26	100235	R&S	2014-01-05
3	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
4	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
6	Universal Radio Communication Tester	CMU200	102228	R&S	2014-06-23
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2014-03-16
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2014-03-04
9	EMI Antenna	9117	177	Schwarzbeck	2014-06-29
10	EMI Antenna	VULB 9163	482	Schwarzbeck	2014-02-17
11	EMI Antenna	3117	00119024	ETS-Lindgren	2014-02-02
12	EMI Antenna	3117	00058889	ETS-Lindgren	2014-02-02
13	Signal Generator	N5183A	MY49060052	Agilent	2014-03-18
14	Climate chamber	SH-241	92003546	ESPEC	2014-05-11
15	Loop Antenna	HFH2-Z2	829324/007	R&S	2014-12-12

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

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 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 Rhode & Schwarz Digital Radio Communication tester (CMU-200)
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).

A.1.2.2 Test Condition

RBW	VBW	Sweep Time	Span
1MHz	1MHz	300ms	10MHz

PCS1900

	Power step	Nominal Peak output power (dBm)	Power &Multislot class	Operation class
GSM	0	30dBm(1W)	1	/
GPRS	3	30dBm(1W)	12	B
EGPRS	3	30dBm(1W)	12	B

Measurement result

GSM(GMSK)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	0	29.67
1880.0	0	29.63
1909.8	0	29.68

GPRS(GMSK，1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	29.69
1880.0	3	29.59
1909.8	3	29.67

EGPRS(GMSK，1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	5	29.66
1880.0	5	29.62
1909.8	5	29.69

A.1.3 Radiated

A.1.3.1 Description

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

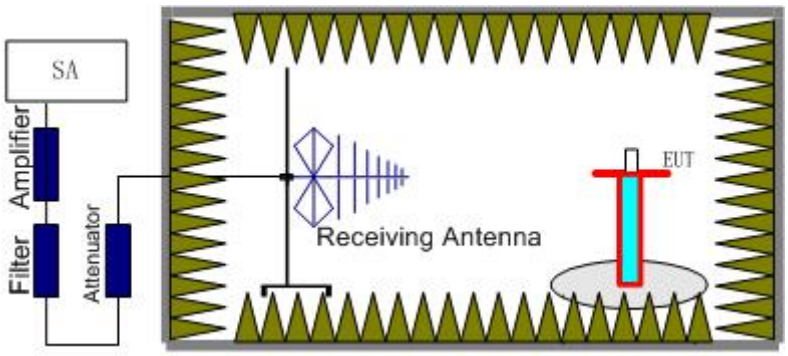
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

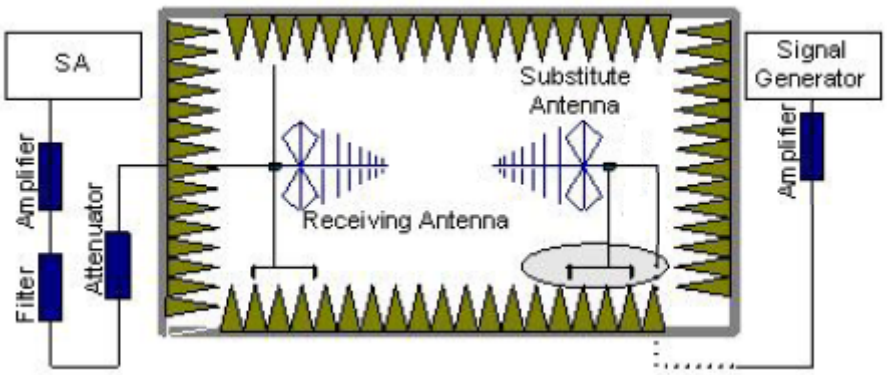
A.1.3.2 Method of Measurement

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. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.
   The cable loss (P_{cl}) ,the Substitution 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 -2.15dBi.

PCS1900-EIRP 24.232(c)

Limits

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

Measurement result

GSM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-21.78	3.19	-50.00	-4.56	29.59	33.00	3.41	H
1880.00	-20.26	3.11	-50.00	-4.43	31.06	33.00	1.94	H
1909.80	-18.56	3.18	-50.00	-4.30	32.56	33.00	0.44	H

GPRS

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-21.88	3.19	-50.00	-4.56	29.49	33.00	3.51	H
1880.00	-19.94	3.11	-50.00	-4.43	31.38	33.00	1.62	H
1909.80	-18.52	3.18	-50.00	-4.30	32.60	33.00	0.40	H

EGPRS

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-21.95	3.19	-50.00	-4.56	29.42	33.00	3.58	H
1880.00	-19.95	3.11	-50.00	-4.43	31.37	33.00	1.63	H
1909.80	-18.54	3.18	-50.00	-4.30	32.58	33.00	0.42	H

Frequency**:** 1909.80MHz

Peak EIRP(dBm)= P_{Mea}(-18.52dBm) - P_{cl}(3.18dB) - P_{Ag}(-50.00dB) - G_a (-4.30dB) =32.60dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMIT

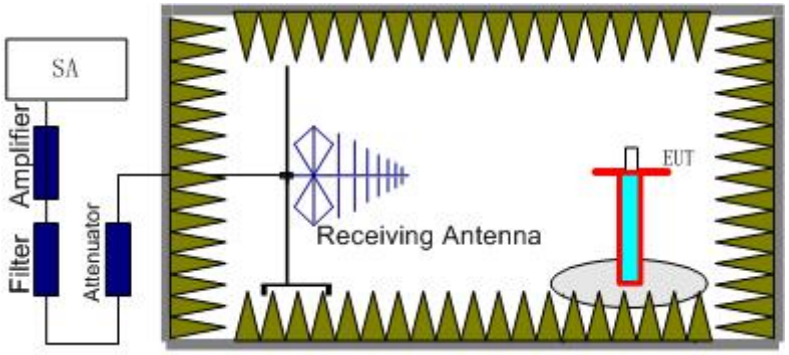
A.2.1 Measurement Method

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

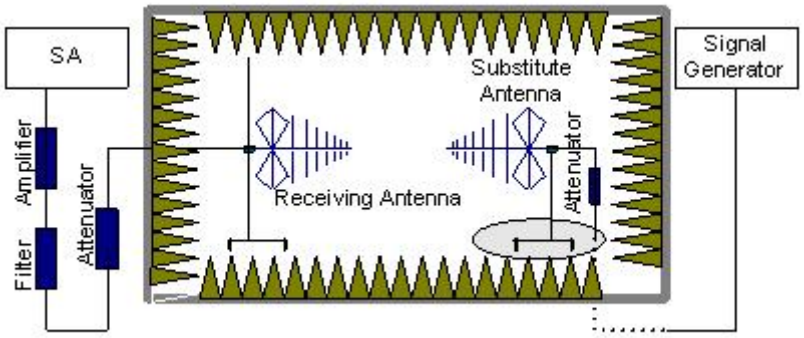
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900.

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:
   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 -2.15dBi.

A.2.2 Measurement Limit

Part 24.238 and Part 22.917 specify 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.

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
GSM 1900MHz	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
1900MHz	0.000009~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

GSM Mode Channel 512/1850.2MHz

Frequency (MHz)	P_{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3700.80	-59.20	4.44	-8.14	-55.50	-13.00	42.50	H
5550.93	-51.42	5.46	-10.02	-46.86	-13.00	33.86	V
7815.85	-62.65	6.91	-11.72	-57.84	-13.00	44.84	V
9251.38	-45.75	7.65	-12.60	-40.80	-13.00	27.80	V
13784.97	-55.23	9.10	-13.91	-50.42	-13.00	37.42	H
17383.70	-53.56	11.01	-13.09	-51.48	-13.00	38.48	V

GSM Mode Channel 661/1880.0MHz

Frequency (MHz)	P_{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
4097.15	-63.70	4.71	-8.56	-59.85	-13.00	46.85	H
6876.08	-61.23	6.07	-10.98	-56.32	-13.00	43.32	H
9399.84	-44.45	7.45	-12.60	-39.30	-13.00	26.30	H
10210.00	-59.79	7.62	-12.44	-54.97	-13.00	41.97	V
13160.20	-53.56	9.14	-13.46	-49.24	-13.00	36.24	V
16814.89	-52.43	10.49	-12.40	-50.52	-13.00	37.52	V

GSM Mode Channel 810/1909.8MHz

Frequency (MHz)	P_{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3827.36	-61.12	4.51	-8.29	-57.34	-13.00	44.34	H
7639.38	-56.79	6.72	-11.54	-51.97	-13.00	38.97	H
9549.00	-42.50	7.79	-12.58	-37.71	-13.00	24.71	H
11384.77	-58.91	8.66	-12.40	-55.17	-13.00	42.17	V
13368.58	-51.83	9.07	-13.67	-47.23	-13.00	34.23	H
17632.68	-54.58	10.63	-13.38	-51.83	-13.00	38.83	H

Note:
The radiated spurious emission measurement over 9kHz - 30MHz had been investigated. All spurious emissions were attenuated at least 20dB compared to the limit.

A.3 CONDUCTED EMISSION

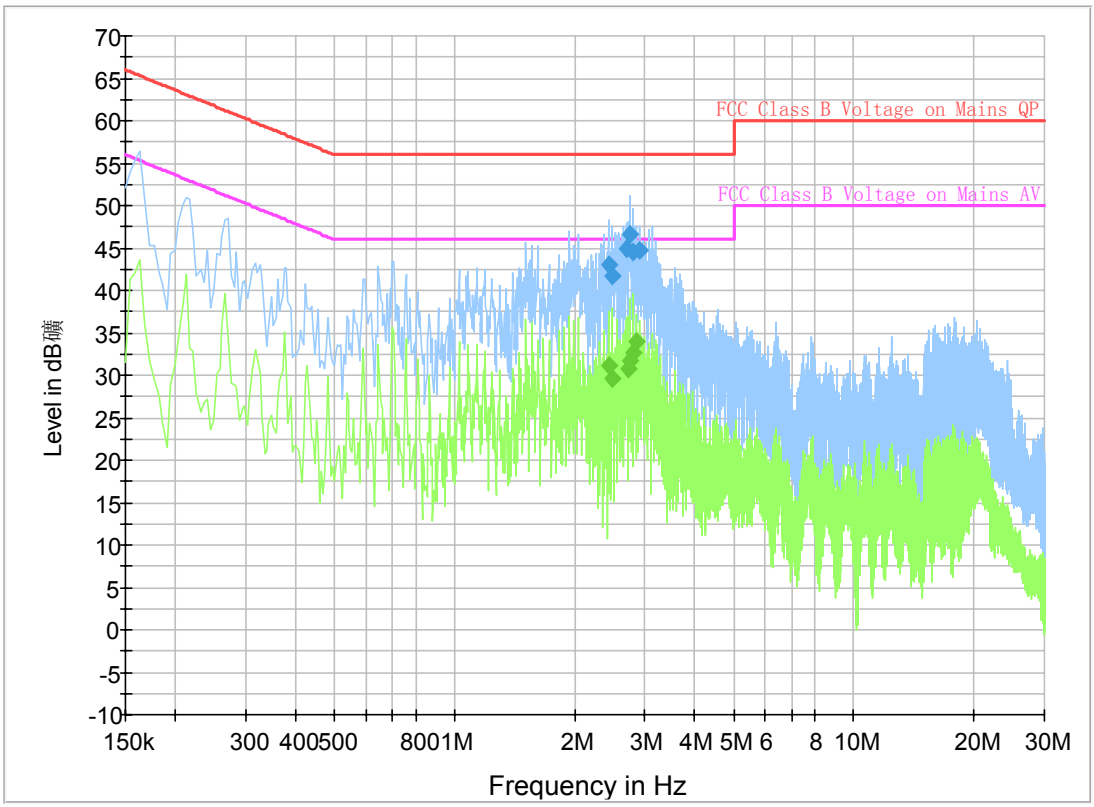
The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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

PCS1900MHz

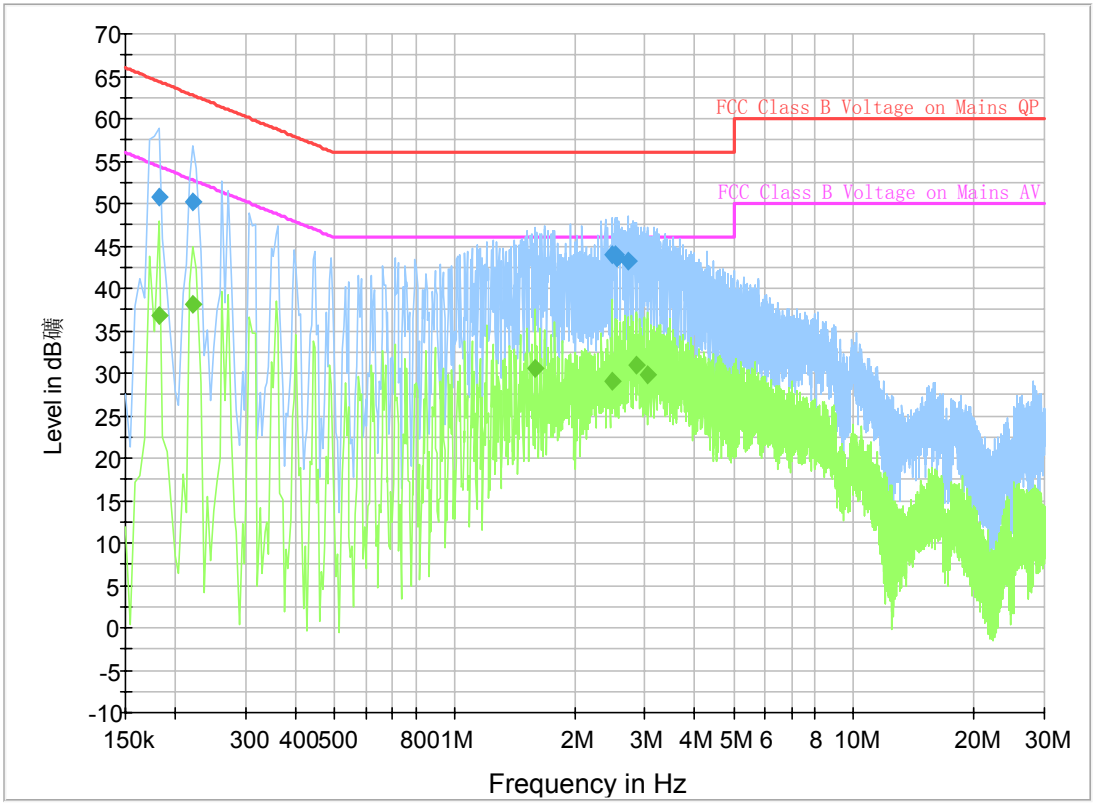


Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.427000	43.1	GND	L1	9.7	12.9	56.0
2.485500	41.6	GND	L1	9.7	14.4	56.0
2.688000	44.8	GND	L1	9.7	11.2	56.0
2.746500	46.6	GND	L1	9.7	9.4	56.0
2.805000	44.5	GND	L1	9.7	11.5	56.0
2.908500	44.7	GND	L1	9.7	11.3	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.427000	31.2	GND	L1	9.7	14.8	46.0
2.485500	29.7	GND	L1	9.7	16.3	46.0
2.733000	30.8	GND	L1	9.7	15.2	46.0
2.746500	31.7	GND	L1	9.7	14.3	46.0
2.805000	32.7	GND	L1	9.7	13.3	46.0
2.850000	33.9	GND	L1	9.7	12.1	46.0



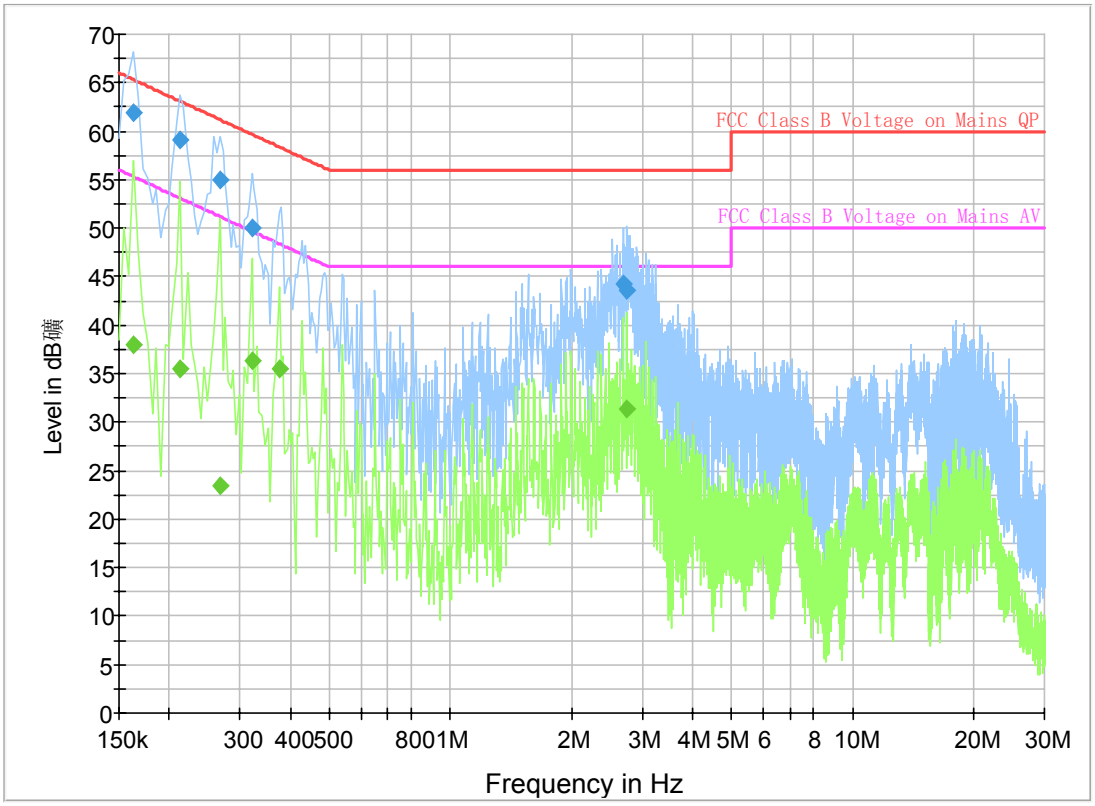
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	50.8	GND	N	9.8	13.6	64.4
0.222000	50.2	GND	N	9.8	12.5	62.7
2.481000	43.9	GND	L1	9.7	12.1	56.0
2.526000	44.0	GND	L1	9.7	12.0	56.0
2.553000	43.5	GND	L1	9.7	12.5	56.0
2.728500	43.3	GND	L1	9.7	12.7	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	36.7	GND	N	9.8	17.7	54.4
0.222000	38.2	GND	N	9.8	14.5	52.7
1.599000	30.7	GND	L1	9.7	15.3	46.0
2.481000	29.0	GND	L1	9.7	17.0	46.0
2.845500	30.9	GND	L1	9.7	15.1	46.0
3.034500	29.9	GND	L1	9.7	16.1	46.0

MP3



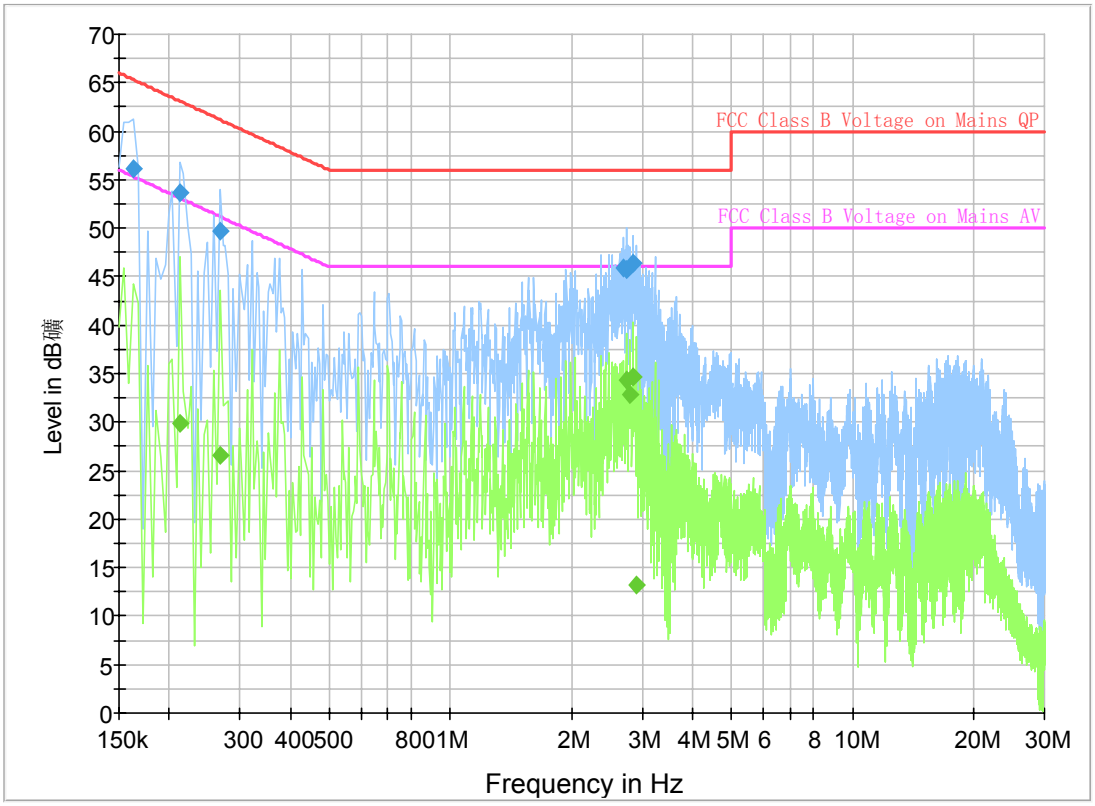
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	62.0	GND	L1	9.8	3.3	65.3
0.213000	59.2	GND	L1	9.8	3.9	63.1
0.267000	54.9	GND	L1	9.8	6.3	61.2
0.321000	50.1	GND	L1	9.8	9.6	59.7
2.697000	44.2	GND	L1	9.7	11.8	56.0
2.755500	43.6	GND	L1	9.7	12.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	38.0	GND	N	9.8	17.3	55.3
0.213000	35.4	GND	L1	9.8	17.7	53.1
0.267000	23.4	GND	L1	9.8	27.8	51.2
0.321000	36.4	GND	L1	9.8	13.3	49.7
0.375000	35.5	GND	L1	9.8	12.9	48.4
2.755500	31.4	GND	L1	9.7	14.6	46.0

CAMERA



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	56.2	GND	L1	9.8	9.1	65.3
0.213000	53.7	GND	L1	9.8	9.4	63.1
0.267000	49.6	GND	L1	9.8	11.6	61.2
2.688000	45.9	GND	L1	9.7	10.1	56.0
2.746500	45.7	GND	L1	9.7	10.3	56.0
2.850000	46.4	GND	L1	9.7	9.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	30.0	GND	L1	9.8	23.1	53.1
0.267000	26.7	GND	L1	9.8	24.6	51.2
2.746500	34.3	GND	L1	9.7	11.7	46.0
2.791500	32.9	GND	L1	9.7	13.1	46.0
2.850000	34.7	GND	L1	9.7	11.3	46.0
2.908500	13.3	GND	L1	9.7	32.7	46.0

A.4 FREQUENCY STABILITY

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℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of 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℃ increments from -30℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring 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℃.
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℃ to -30℃. 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℃ 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 3.5VDC 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)
3.5	18	0.009
3.8	26	0.014
4.2	21	0.011

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	24	0.013
-20	18	0.010
-10	24	0.013
0	26	0.014
10	27	0.015
20	31	0.016
30	19	0.010
40	25	0.013
50	30	0.016

A.5 OCCUPIED BANDWIDTH

A.5.1 Occupied Bandwidth Results

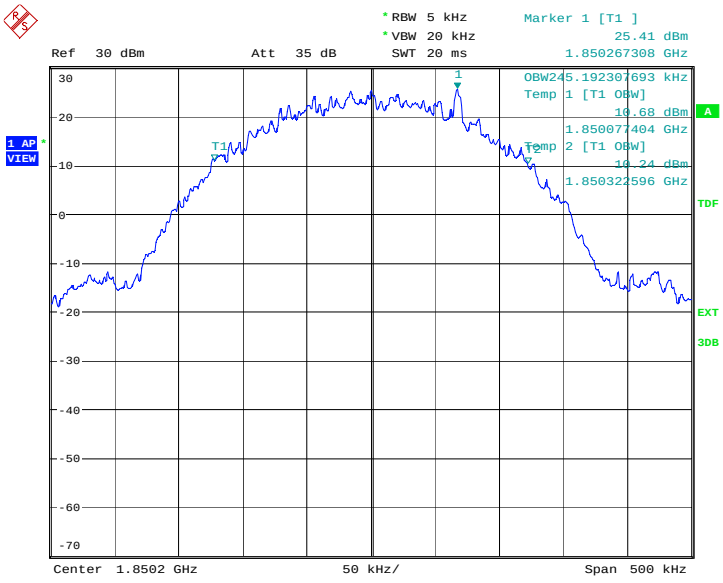
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

PCS 1900(99% BW)

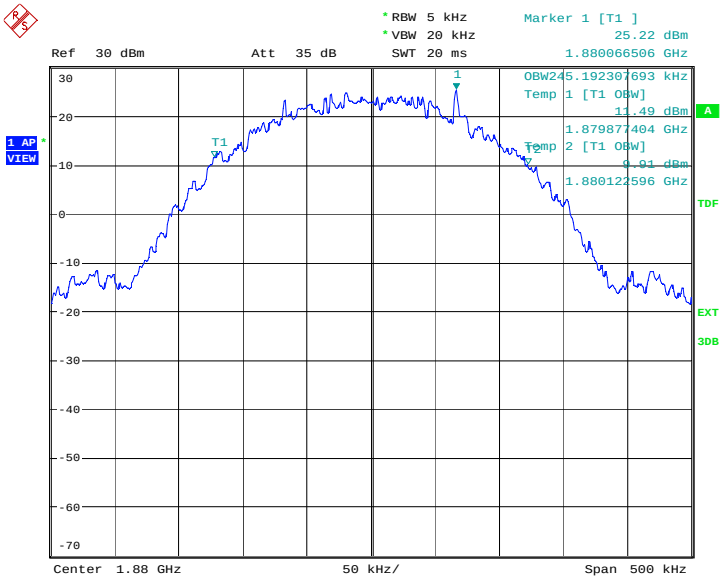
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)
1850.2	245.192
1880.0	245.192
1909.8	244.391

PCS 1900

Channel 512-Occupied Bandwidth (99% BW)

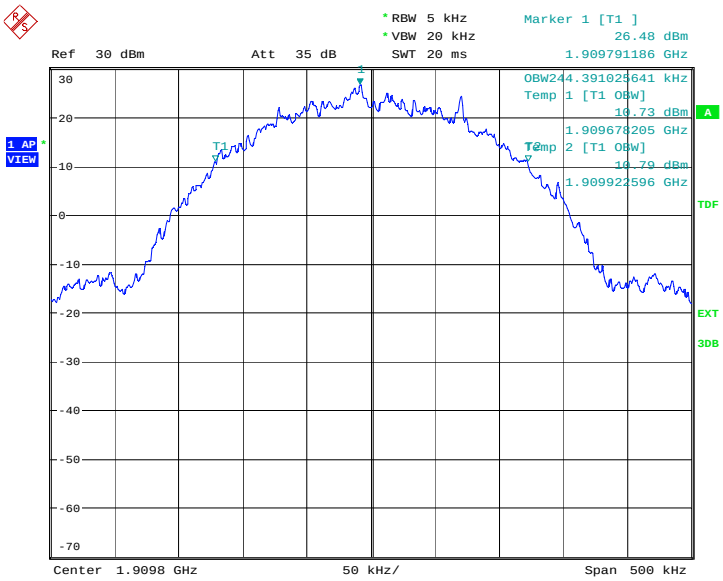


Channel 661-Occupied Bandwidth (99% BW)



Date: 19.DEC.2013 16:29:19

Channel 810-Occupied Bandwidth (99% BW)



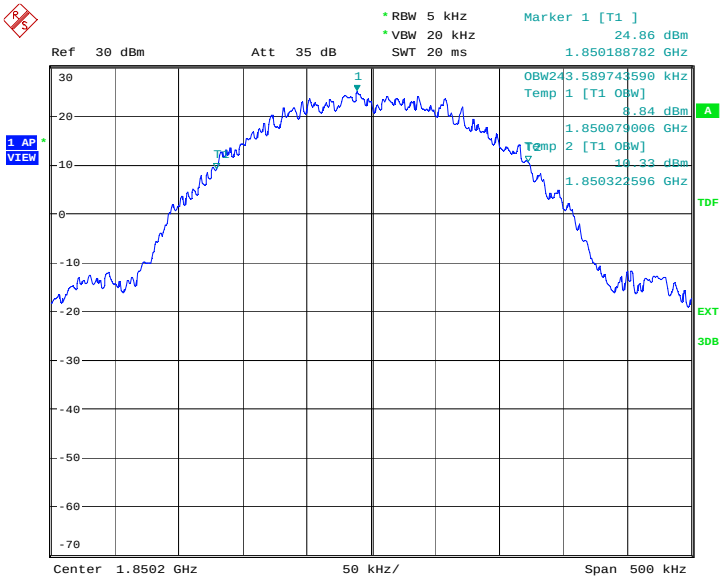
Date: 19.DEC.2013 16:29:51

GPRS 1900(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)
1850.2	243.590
1880.0	245.192
1909.8	247.596

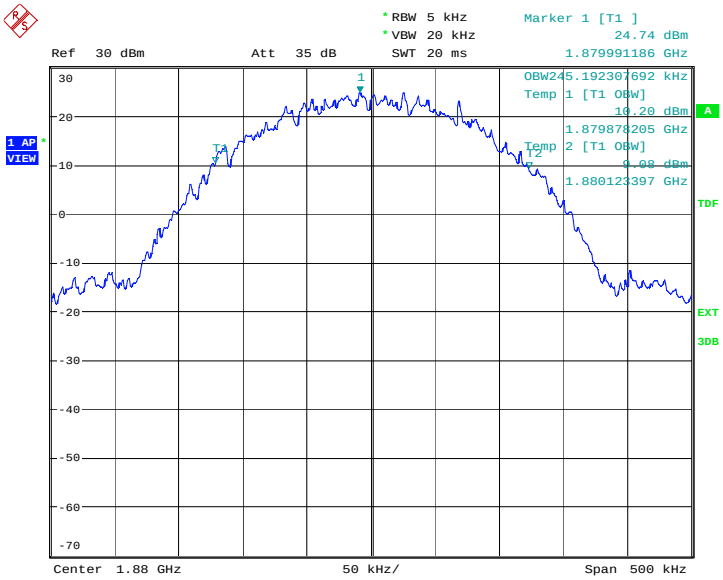
GPRS 1900

Channel 512-Occupied Bandwidth (99% BW)



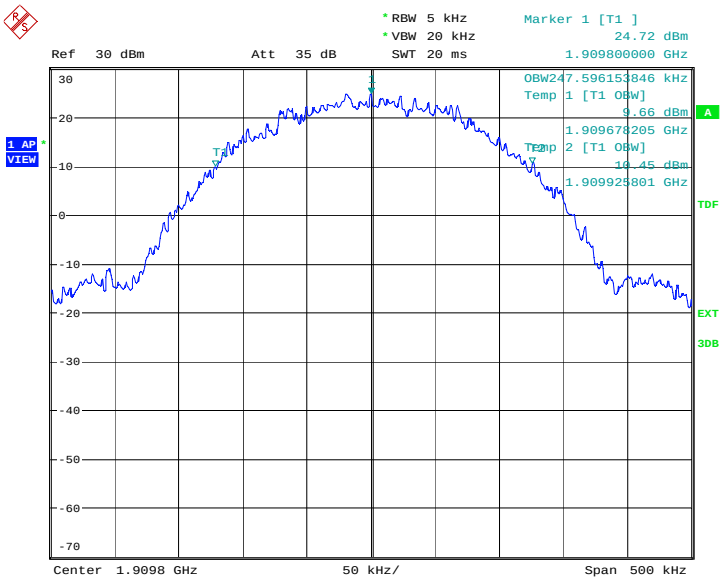
Date: 19.DEC.2013 16:52:46

Channel 661-Occupied Bandwidth (99% BW)



Date: 19.DEC.2013 16:53:18

Channel 810-Occupied Bandwidth (99% BW)



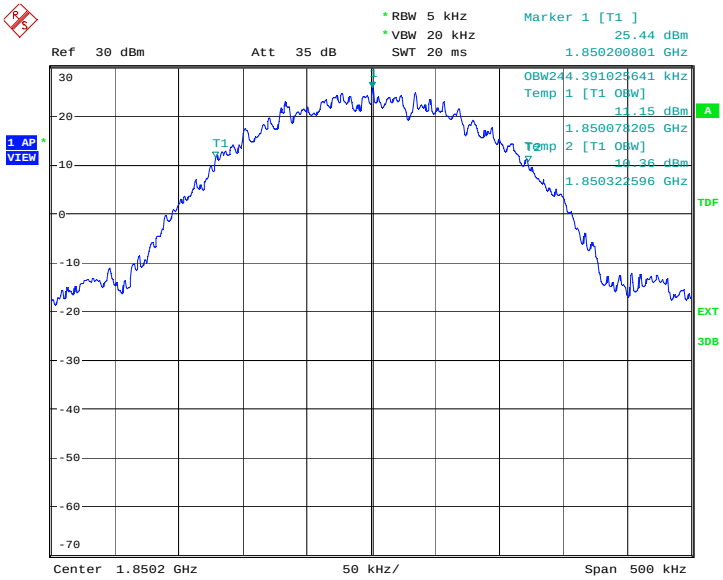
Date: 19.DEC.2013 16:53:50

EGPRS 1900-GMSK(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)
1850.2	244.391
1880.0	245.192
1909.8	242.788

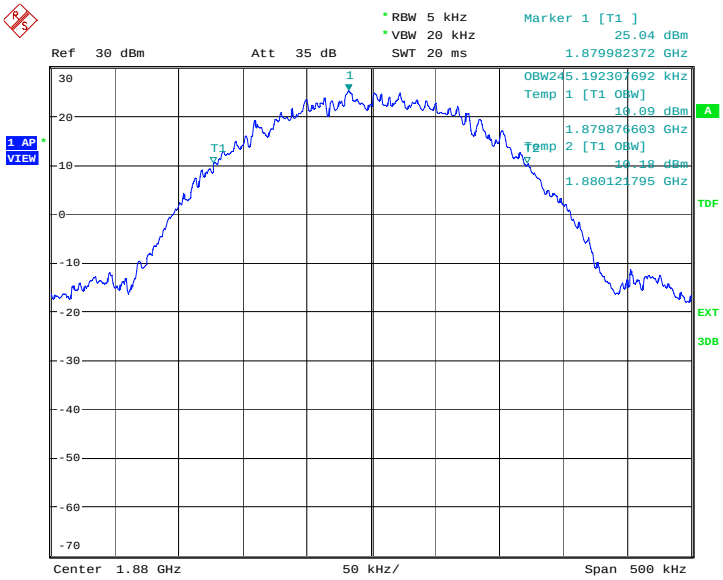
EGPRS 1900-GMSK

Channel 512-Occupied Bandwidth (99% BW)



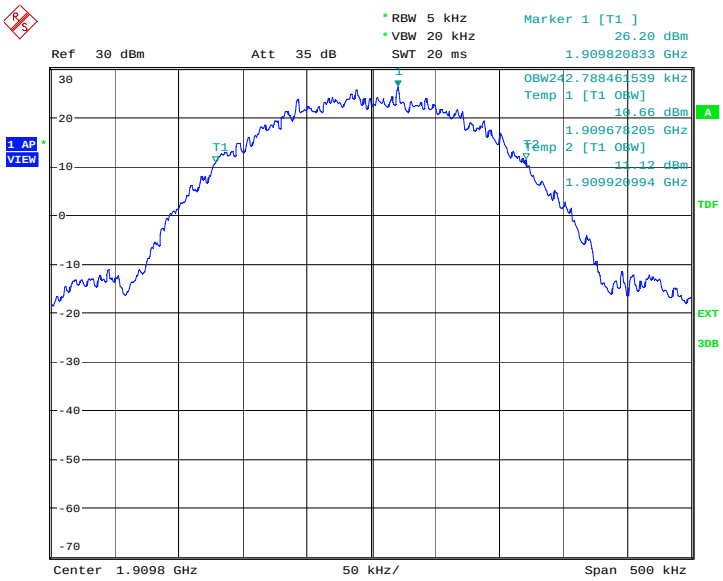
Date: 19.DEC.2013 17:02:36

Channel 661-Occupied Bandwidth (99% BW)



Date: 19.DEC.2013 17:03:08

Channel 810-Occupied Bandwidth (99% BW)



Date: 19.DEC.2013 17:03:40

A.6 EMISSION BANDWIDTH

A.6.1Emission Bandwidth Results

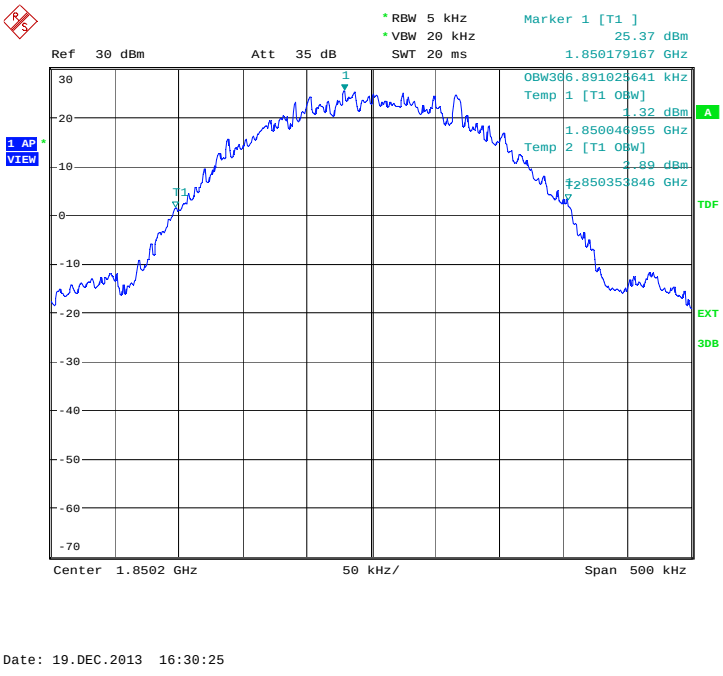
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

PCS 1900(100% BW)

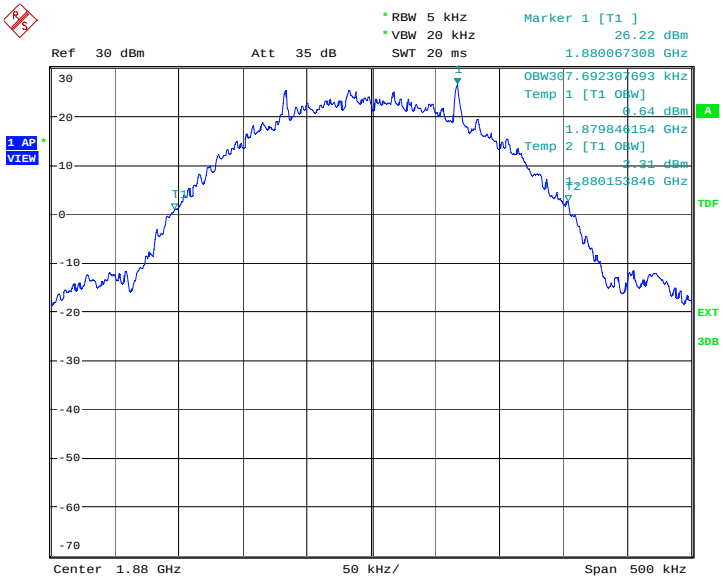
Frequency(MHz)	Emission Bandwidth (100% BW)(kHz)
1850.2	306.891
1880.0	307.692
1909.8	306.090

PCS 1900

Channel 512-Emission Bandwidth (100% BW)

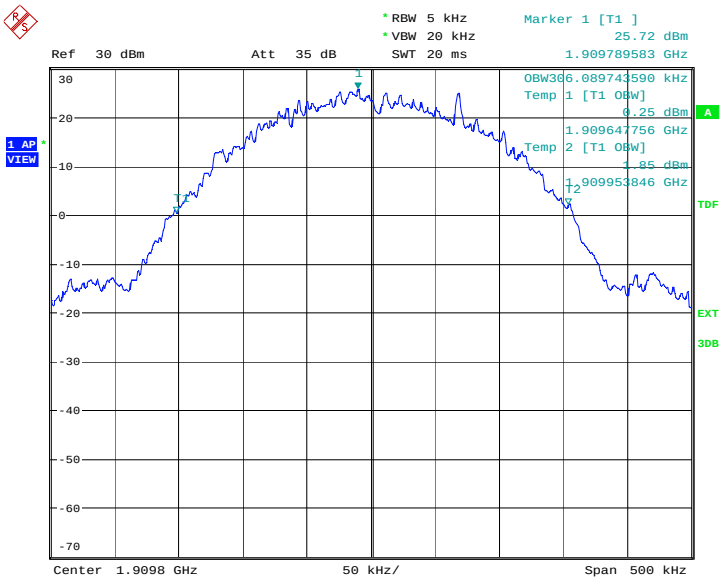


Channel 661-Emission Bandwidth (100% BW)



Date: 19.DEC.2013 16:30:57

Channel 810-Emission Bandwidth (100% BW)



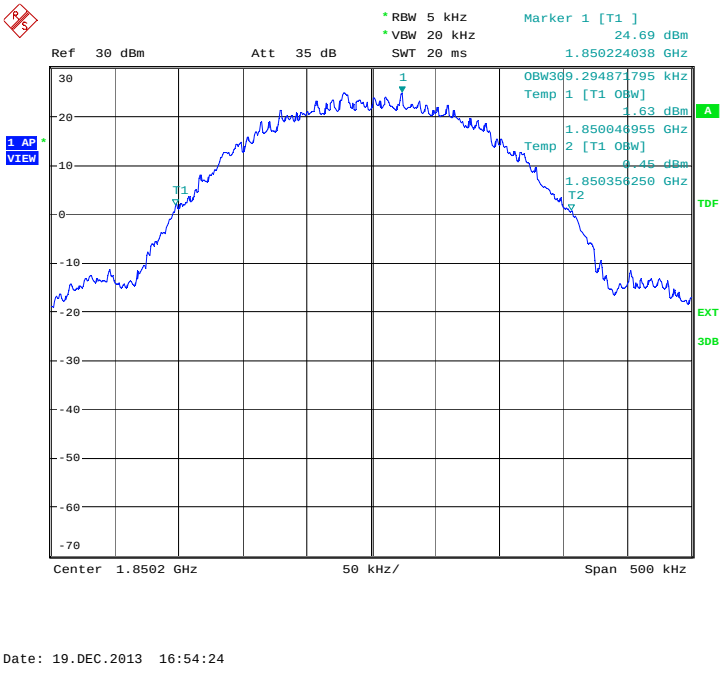
Date: 19.DEC.2013 16:31:29

GPRS 1900(100% BW)

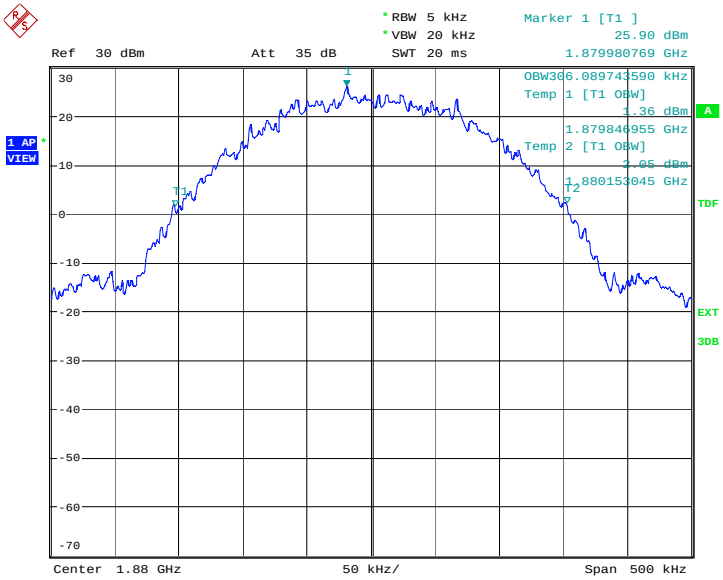
Frequency(MHz)	Emission Bandwidth (100% BW)(kHz)
1850.2	309.295
1880.0	306.090
1909.8	306.891

GPRS 1900

Channel 512-Emission Bandwidth (100% BW)

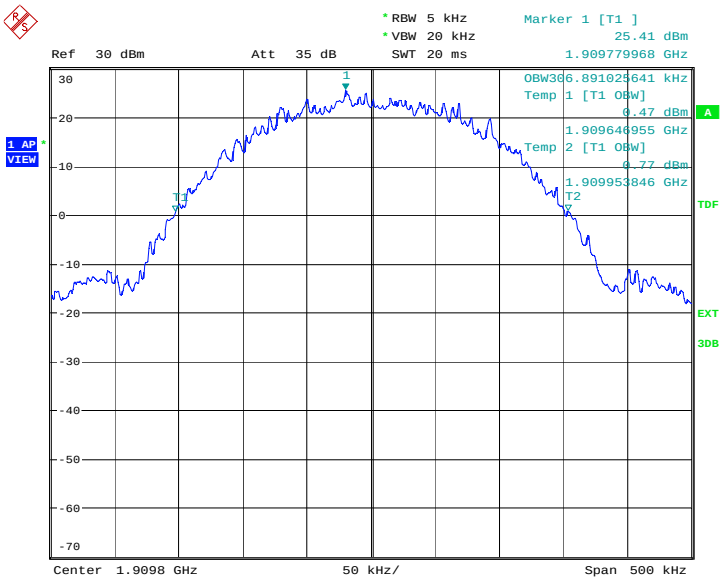


Channel 661-Emission Bandwidth (100% BW)



Date: 19.DEC.2013 16:54:56

Channel 810-Emission Bandwidth (100% BW)



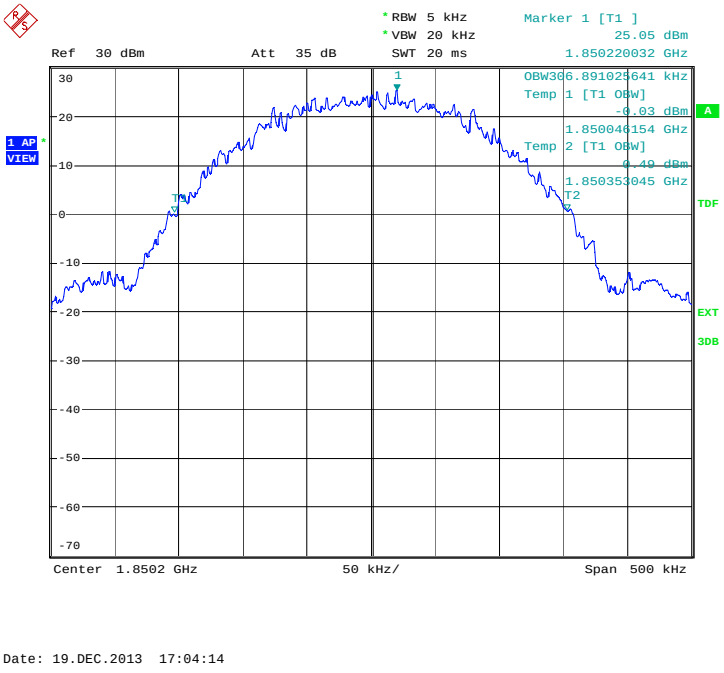
Date: 19.DEC.2013 16:55:28

EGPRS 1900-GMSK(100% BW)

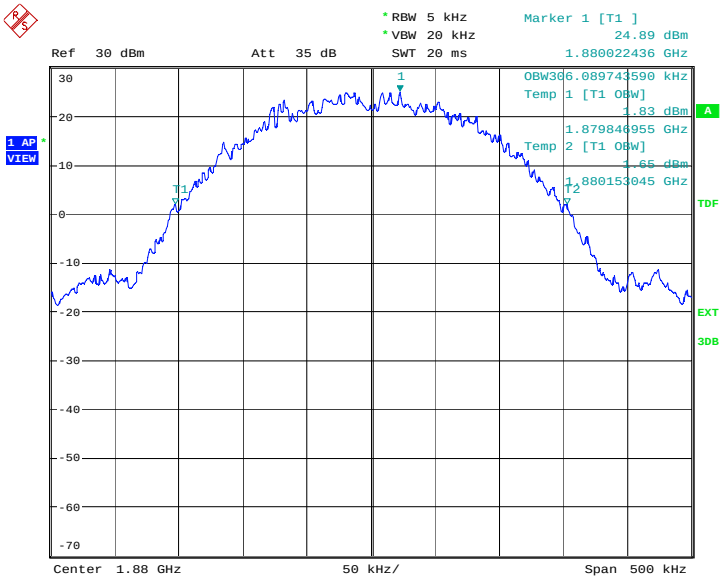
Frequency(MHz)	Emission Bandwidth (100% BW)(kHz)
1850.2	306.891
1880.0	306.090
1909.8	306.891

EGPRS 1900-GMSK

Channel 512-Emission Bandwidth (100% BW)

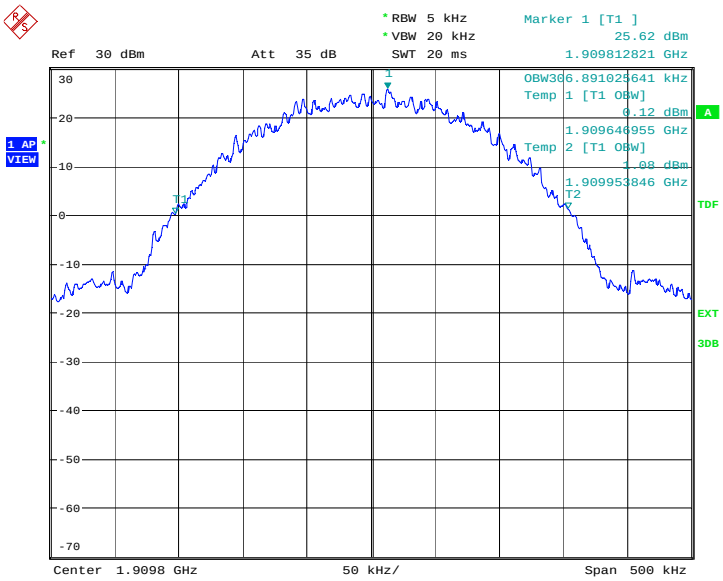


Channel 661-Emission Bandwidth (100% BW)



Date: 19.DEC.2013 17:04:46

Channel 810-Emission Bandwidth (100% BW)

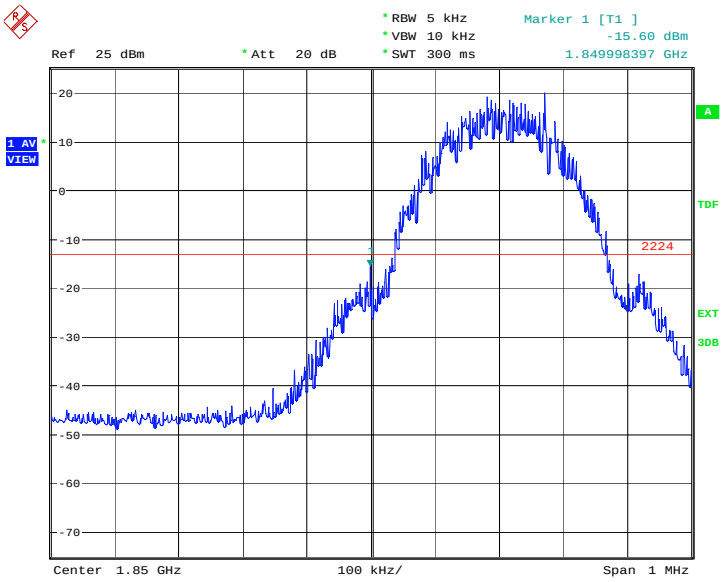


Date: 19.DEC.2013 17:05:18

A.7 BAND EDGE COMPLIANCE

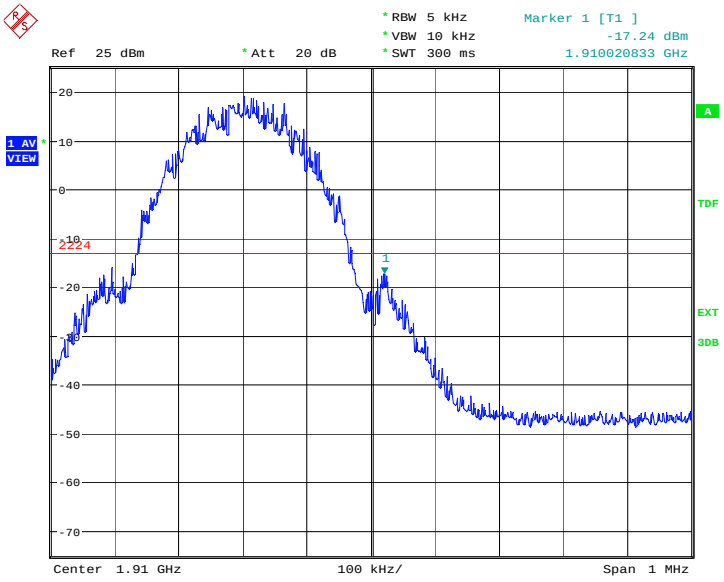
PCS 1900

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



Date: 19.DEC.2013 16:31:44

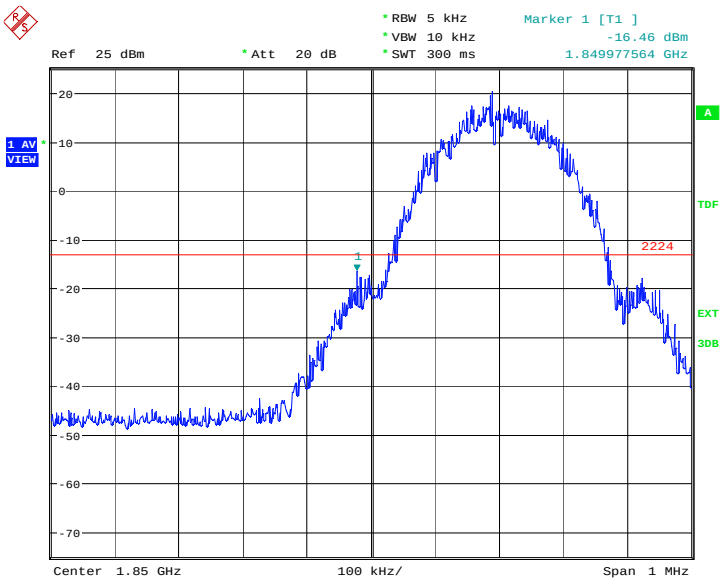
HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810



Date: 19.DEC.2013 16:31:57

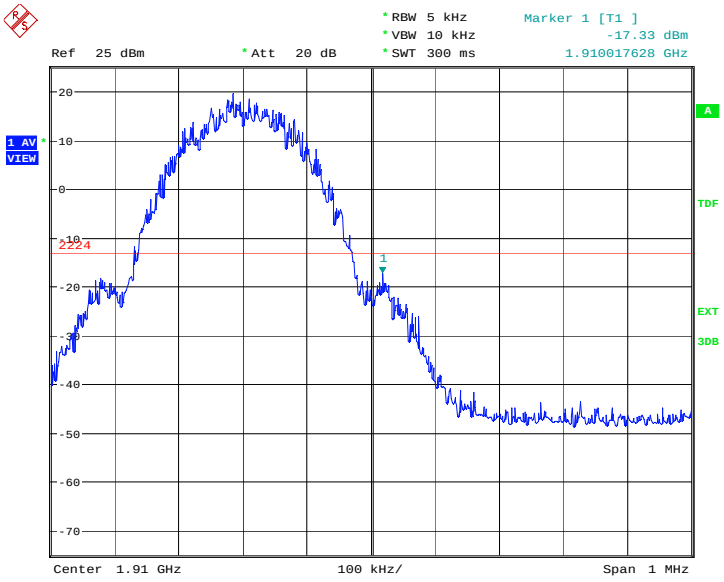
GPRS 1900

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



Date: 19.DEC.2013 16:55:42

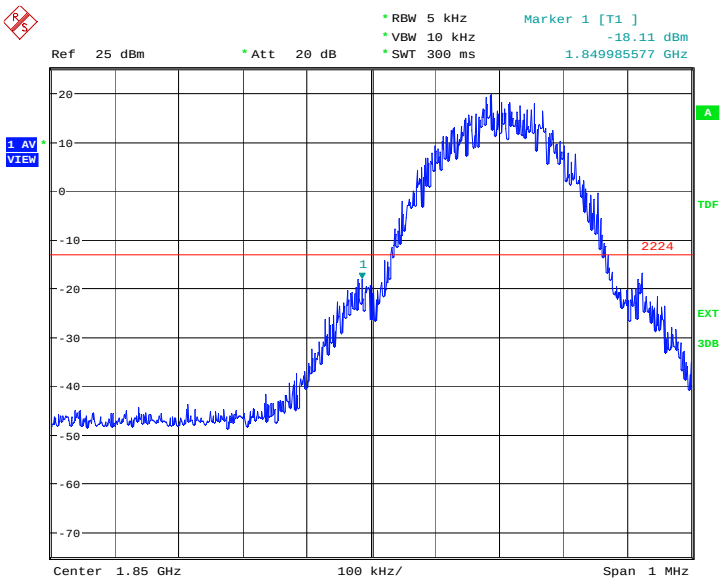
HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810



Date: 19.DEC.2013 16:55:56

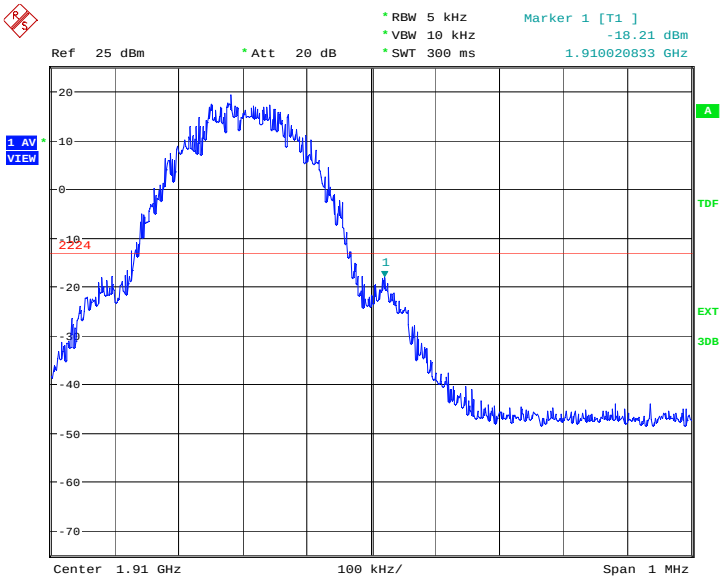
EGPRS 1900-GMSK

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



Date: 19.DEC.2013 17:05:32

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



Date: 19.DEC.2013 17:05:46

A.8 CONDUCTED SPURIOUS EMISSION

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. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
   The trace mode is set to MaxHold to get the highest signal at each frequency;
   Wait 25 seconds;
   Get the result.
4. 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

Part 24.238 and Part 22.917 specify 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. 8.3 Measurement result

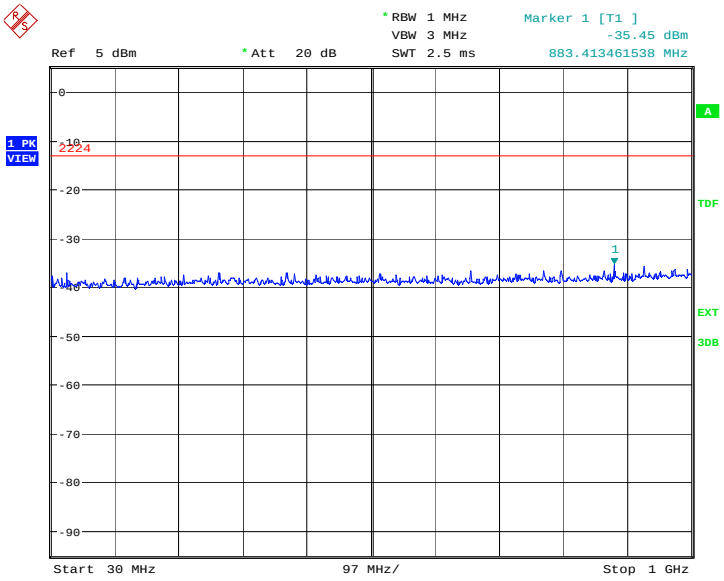
Note:

The conducted spurious emission measurement over 9kHz - 30MHz had been investigated. All spurious emissions were attenuated at least 20dB compared to the limit.

PCS1900

A.8.3.17 Channel 512: 30MHz – 1GHz

Spurious emission limit –13dBm.

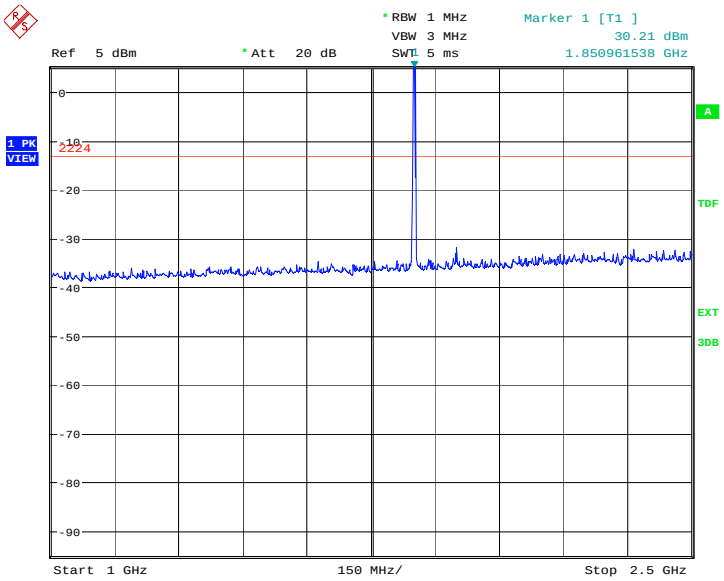


Date: 19.DEC.2013 16:32:26

A.8.3.18 Channel 512: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

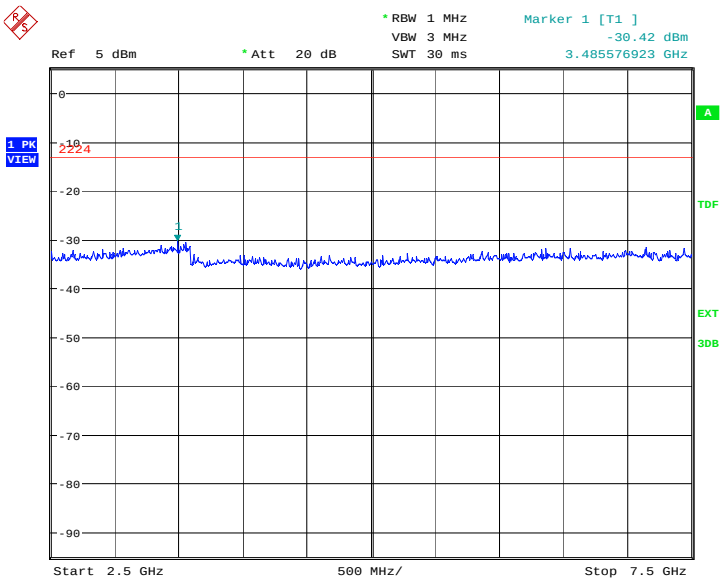
NOTE: peak above the limit line is the carrier frequency.



Date: 19.DEC.2013 16:32:54

A.8.3.19 Channel 512: 2.5GHz – 7.5GHz

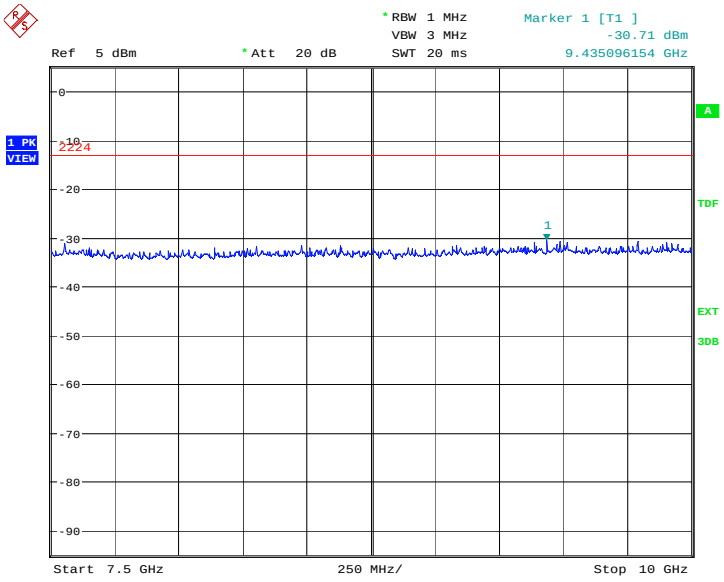
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:33:22

A.8.3.20 Channel 512: 7.5GHz –10GHz

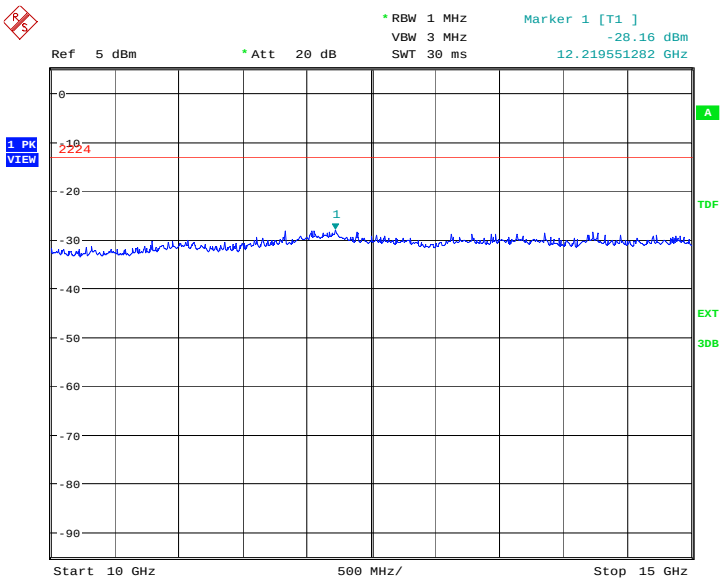
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:33:50

A.8.3.21 Channel 512: 10GHz –15GHz

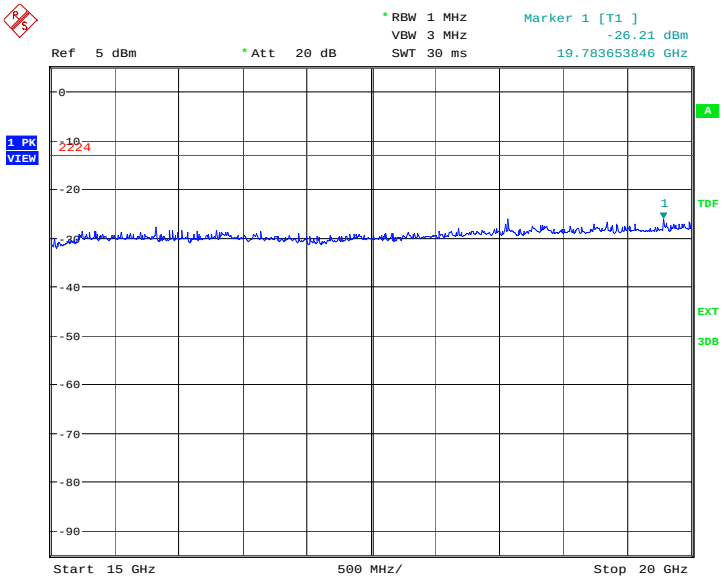
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:34:19

A.8.3.22 Channel 512: 15GHz –20GHz

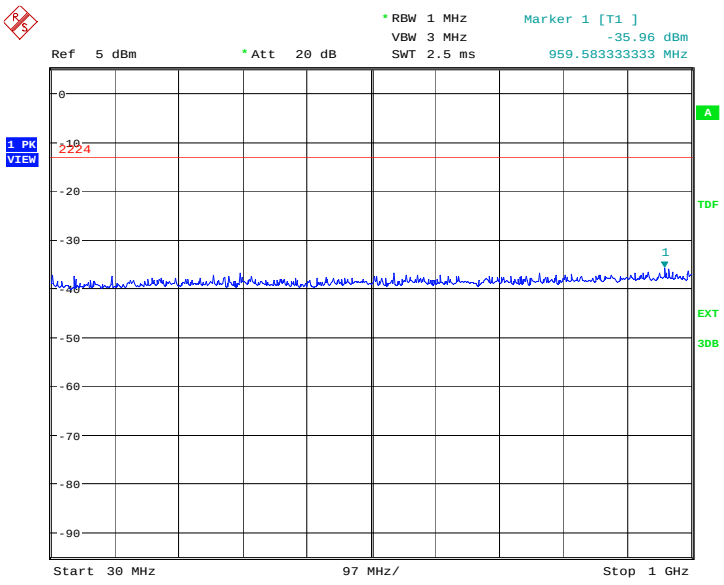
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:34:47

A.8.3.23 Channel 661: 30MHz – 1GHz

Spurious emission limit –13dBm

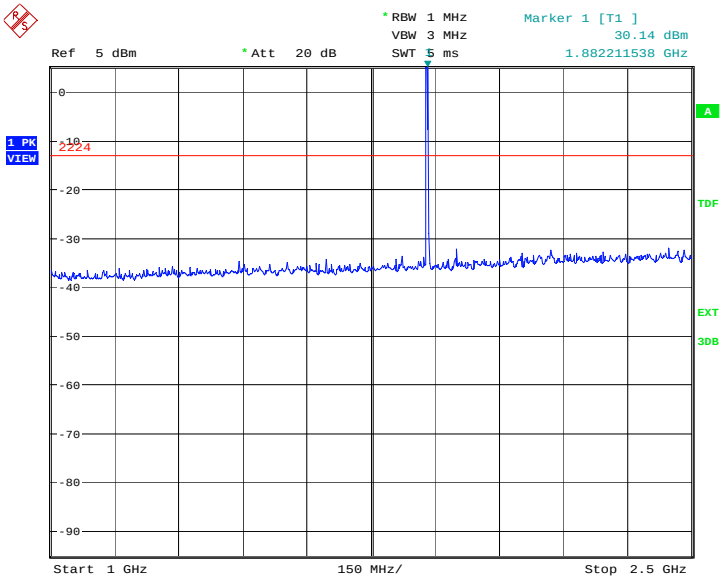


Date: 19.DEC.2013 16:35:16

A.8.3.24 Channel 661: 1GHz –2.5GHz

Spurious emission limit –13dBm

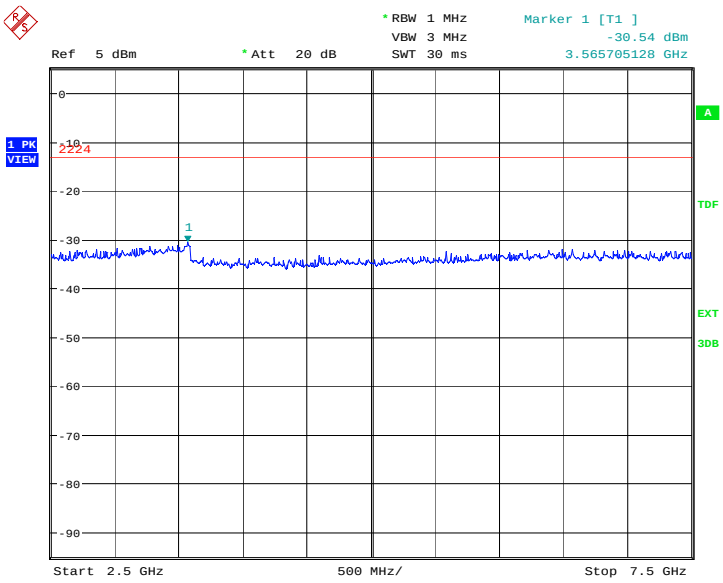
NOTE: peak above the limit line is the carrier frequency.



Date: 19.DEC.2013 16:35:44

A.8.3.25 Channel 661: 2.5GHz –7.5GHz

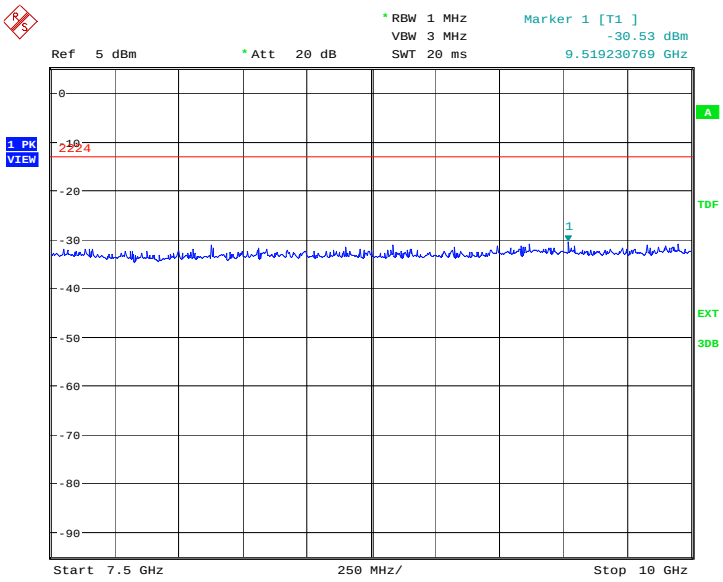
Spurious emission limit –13dBm



Date: 19.DEC.2013 16:36:12

A.8.3.26 Channel 661: 7.5GHz –10GHz

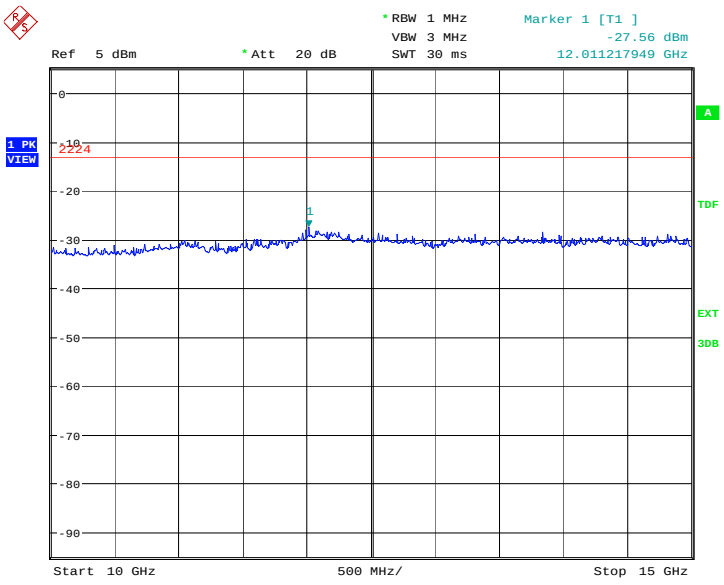
Spurious emission limit –13dBm



Date: 19.DEC.2013 16:36:40

A.8.3.27 Channel 661: 10GHz –15GHz

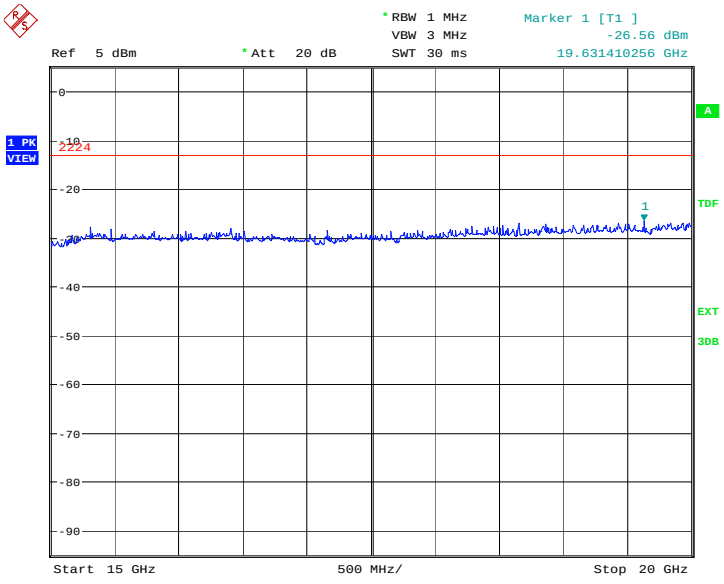
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:37:08

A.8.3.28 Channel 661: 15GHz –20GHz

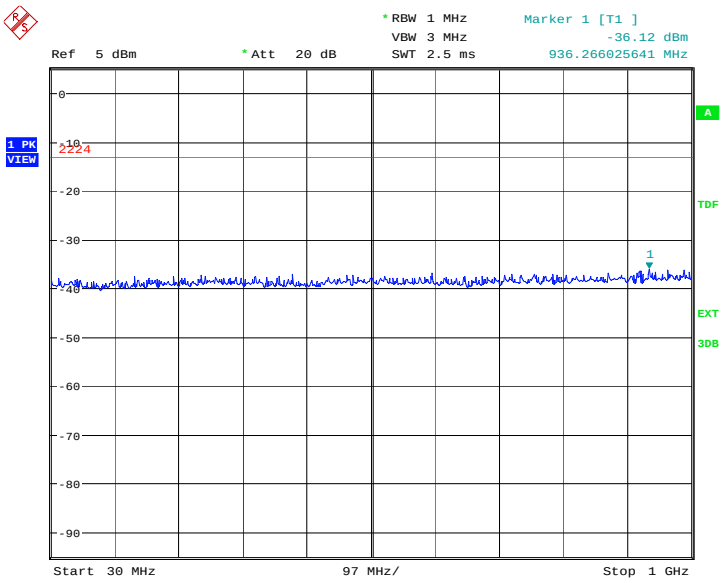
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:37:37

A.8.3.29 Channel 810: 30MHz – 1GHz

Spurious emission limit –13dBm.

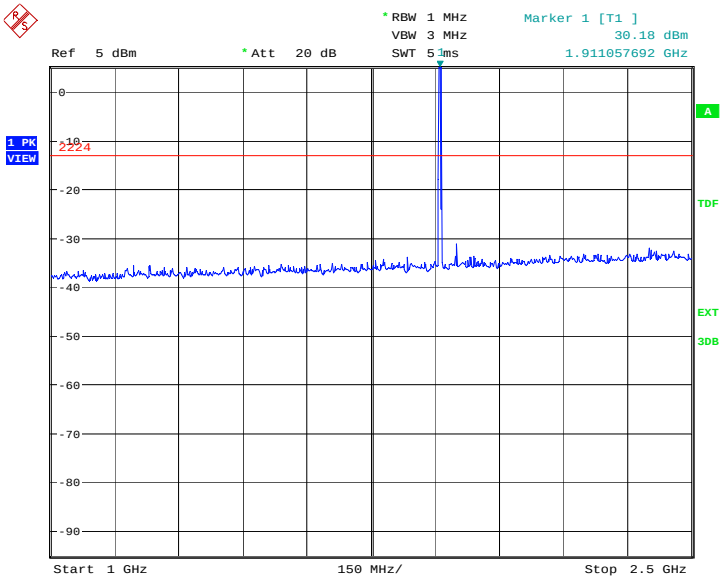


Date: 19.DEC.2013 16:38:05

A.8.3.30 Channel 810: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

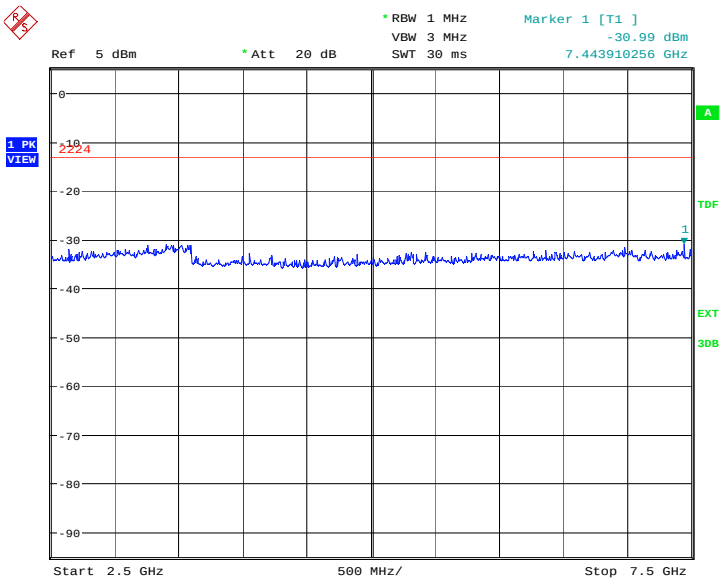
NOTE: peak above the limit line is the carrier frequency.



Date: 19.DEC.2013 16:38:33

A.8.3.31 Channel 810:2.5GHz – 7.5GHz

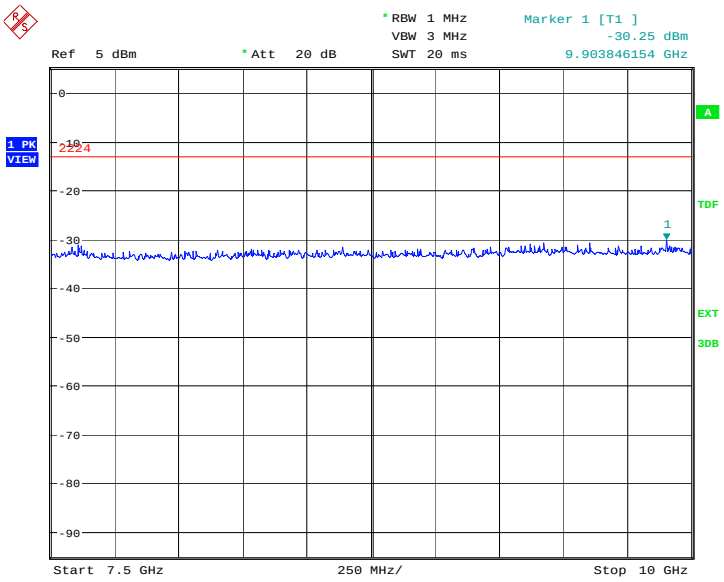
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:39:01

A.8.3.32 Channel 810: 7.5GHz – 10GHz

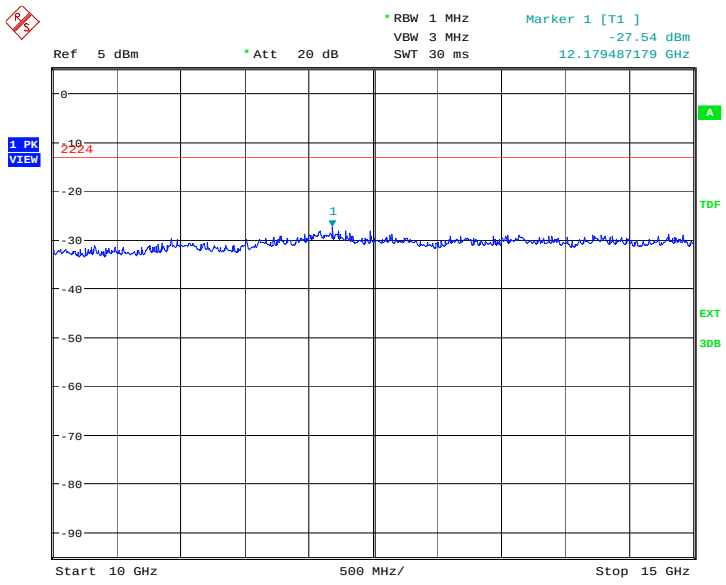
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:39:29

A.8.3.33 Channel 810: 10GHz –15GHz

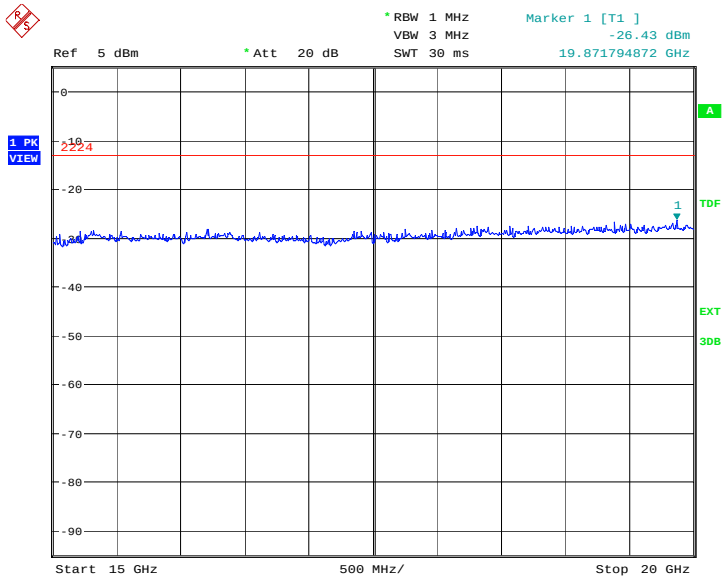
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:39:58

A.8.3.34 Channel 810: 15GHz –20GHz

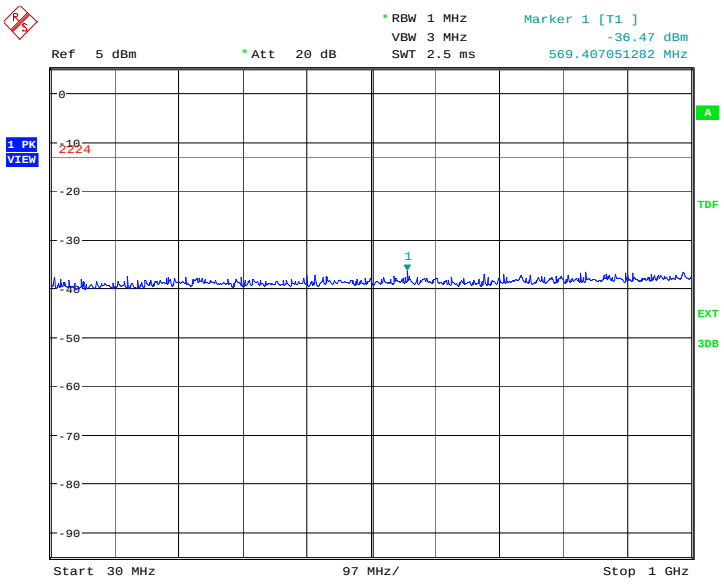
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:40:26

A.8.3.35 Idle mode: 30MHz – 1GHz

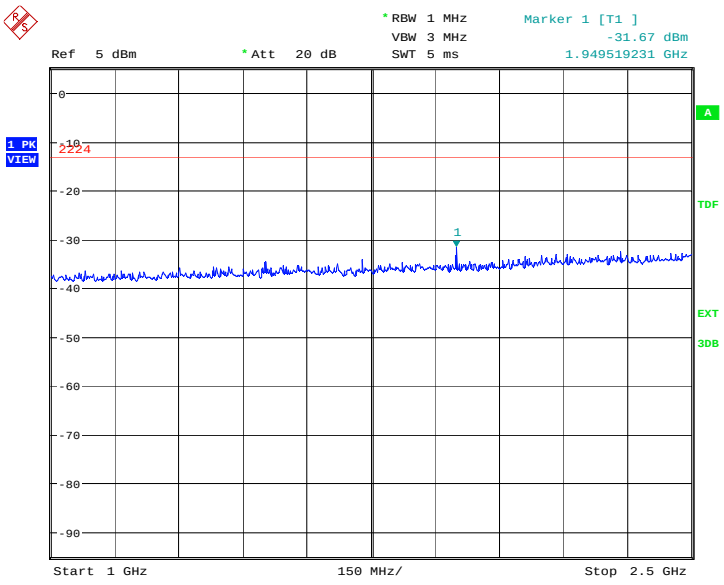
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:40:54

A.8.3.36 Idle mode: 1GHz – 2.5GHz

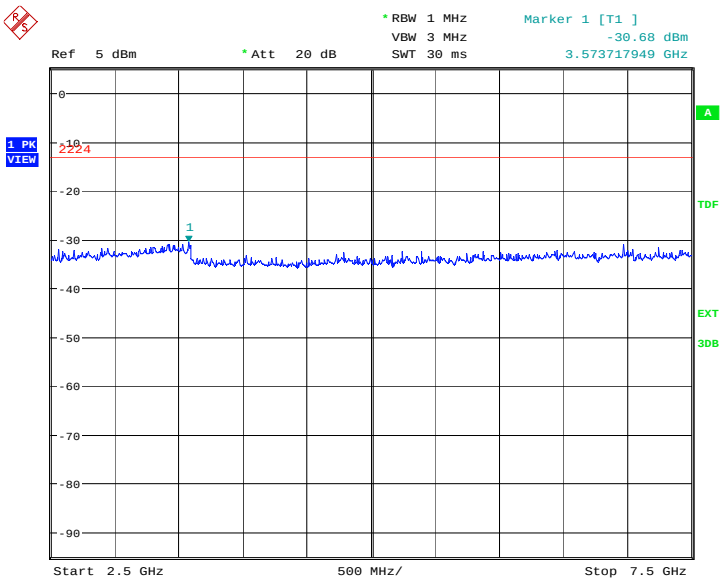
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:41:23

A.8.3.37 Idle mode: 2.5GHz – 7.5GHz

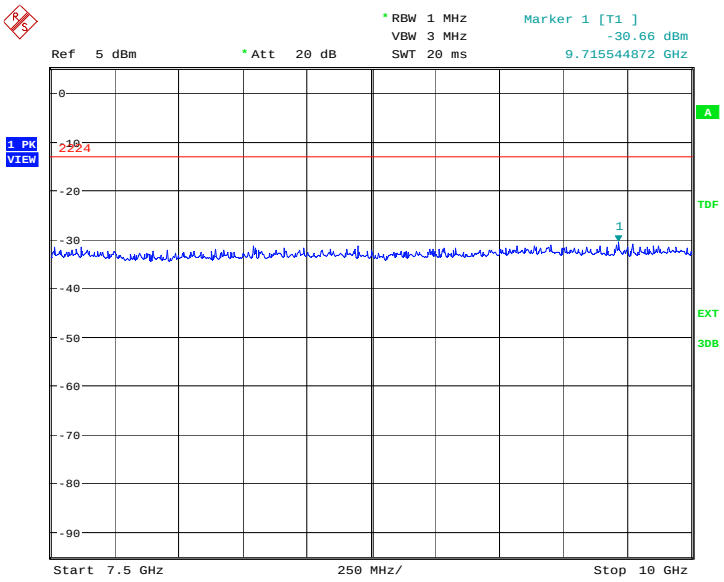
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:41:51

A.8.3.38 Idle mode: 7.5GHz – 10GHz

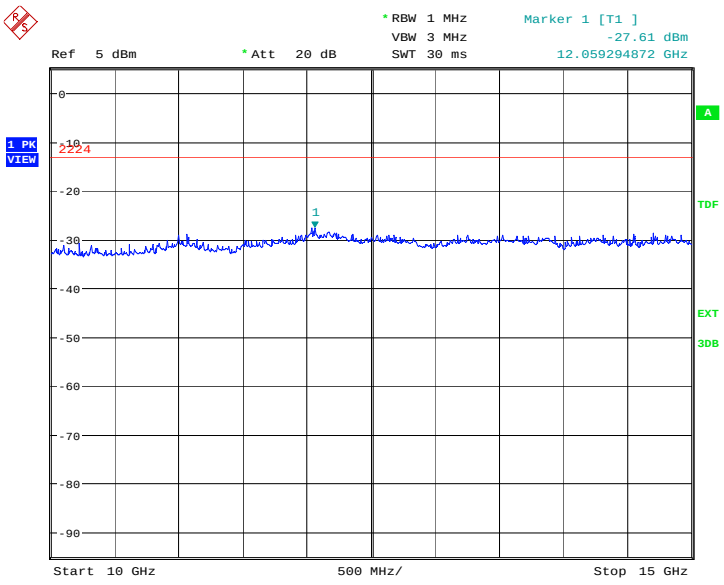
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:42:19

A.8.3.39 Idle mode: 10GHz –15GHz

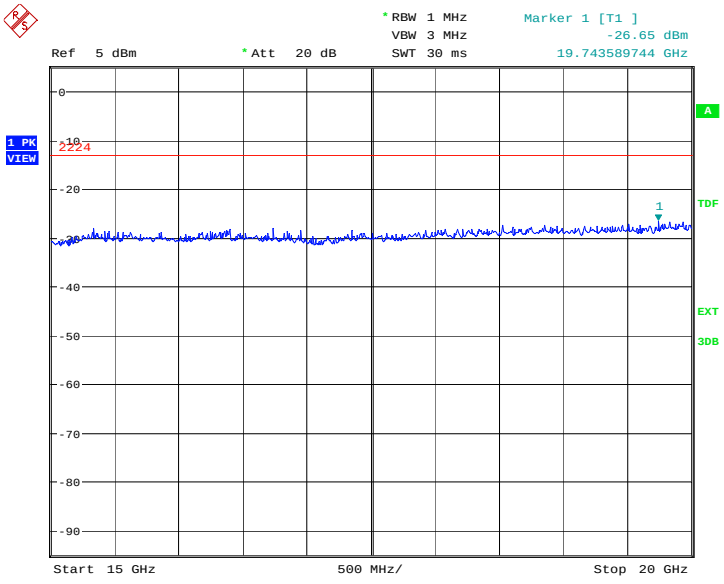
Spurious emission limit –13dBm.



Date: 19.DEC.2013 16:42:47

A.8.3.40 IDLE mode: 15GHz –20GHz

Spurious emission limit –13dBm.



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