TEST REPORT

No. 2009TAR028

for

ZTE CORPORATION

CDMA 2000 1X Digital Mobile Phone

Type: ZTE C90

with

Hardware Version: C93A

Software Version: ZTEC90V1.0.0B01

Issued Date: Apr 5th, 2009

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. DAT-P-114/01-01

FCC 2.948 Listed: No.733176

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

TMC Beijing, Telecommunication Metrology Center of Ministry of Information Industry

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MII
Address: No 52, Huayuan beilu, Haidian District, Beijing,P.R.China
Postal Code: 100083
Telephone: 00861062303288
Fax: 00861062304793
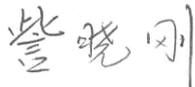
1.2. Testing Environment

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

1.3. Project data

Testing Start Date: Mar 7,2009
Testing End Date: Mar 27,2009

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:	ZTE CORPORATION
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,Nanshan District,Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68897541
Fax:	+86-21-50801070

2.2. Manufacturer Information

Company Name:	ZTE CORPORATION
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,Nanshan District,Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68897541
Fax:	+86-21-50801070

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

3.1. About EUT

Description	CDMA 2000 1X Digital Mobile Phone
Model	ZTE C90
FCC ID	Q78-ZTEC90
Frequency	CDMA 800MHz;CDMA 1700MHz;CDMA 1900MHz
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	23.92 dBm maximum EIRP measured for CDMA 1700
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.7 VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Photographs of EUT are shown in ANNEX A of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MII of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
N06	A000000B17A923	C93A	ZTEC90V1.0.0B01

*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	SN
AE1	Battery	B0010810080174909
AE2	Travel Adapter	100802191616252

AE1

Model	Li3710T42P3h504057
Manufacturer	ZTE CORPORATION
Capacitance	1000mAh
Nominal Voltage	3.7V

AE2

Model	STC-A22O50U5-C
Manufacturer	ZTE CORPORATION
Length of DC line	125cm

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

3.4. General Description

The Equipment Under Test (EUT) is a model of CDMA 2000 1X Digital Mobile Phone with integrated antenna. It consists of Hand Telephone Set and normal options: lithium battery, charger. 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	PERSONAL COMMUNICATIONS SERVICES	V 10.1.06
FCC Part 22	PUBLIC MOBILE SERVICES	V 10.1.06
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	V 10.1.07
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

5. LABORATORY ENVIRONMENT

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

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

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

Temperature	Min. = 15 ℃, Max. = 30 ℃
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 2000 MHz

6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(b)/27.50(d)(2)	P
2	Emission Limit	2.1051/22.917/24.238/27.53(g)	P
3	Conducted Emission	15.107/207	P
4	Frequency Stability	2.1055/24.235/ 27.54	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)/ 27.53(g)	P
8	Conducted Spurious Emission	2.1057/22.917/24.238/ 27.53(g)	P

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE
1	Test Receiver	ESS	847151/015	R&S	2009-10-30
2	Test Receiver	ESI40	831564/002	R&S	2010-2-11
3	BiLog Antenna	3142B	9908-1403	EMCO	2010-1-16
4	BiLog Antenna	3142B	9908-1405	EMCO	2009-9-19
5	Signal Generator	SMT06	831285/005	R&S	2009-12-26
6	Signal Generator	SMP04	100070	R&S	2009-4-20
7	LISN	ESH2-Z5	829991/012	R&S	2009-8
8	Spectrum Analyzer	FSU26	200030	R&S	2009-6-18

9	Universal Radio Communication Tester	CMU200	100680	R&S	2009-8-23
10	Dual-Ridge Waveguide Horn Antenna	3115	9906-5827	EMCO	2010-3
11	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO	2010-3
12	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2010-3
13	Climatic chamber	PL-2G	343074	ESPEC	2009-5-15

ANNEX A: MEASUREMENT RESULTS

A.1   OUTPUT POWER   (§22.913(a)/§24.232(b)/§27.50(d)(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 Rhode & Schwarz Spectrum Analyzer FSU (peak)

These measurements were done at 3 frequencies, 1851.25 MHz, 1880.0 MHz and 1908.75 MHz for PCS CDMA band, 824.7MHz, 836.52MHz and 848.31MHz for CDMA 800 band , 1711.25MHz, 1732.5MHz and 1753.75MHz for AWS band (bottom, middle and top of operational frequency range).

CDMA 800

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)
1013	824.70	27.55
384	836.52	26.85
777	848.31	27.01

CDMA 1700

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)
25	1711.25	27.62
450	1732.5	27.21
875	1753.75	27.75

CDMA 1900

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)
25	1851.25	27.35
600	1880.00	27.50
1175	1908.75	26.82

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."

Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. 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. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (P_{in}) is applied to the input of the dipole, and the power received (P_r) at the chamber's probe antenna is recorded.

2. The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as A_{Rpl}=Pin + 2.15 - Pr. The A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the cable loss and the air loss.

   The measurement results are obtained as described below:

   Power=P_{Mea}+A_{Rpl}

3. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.

4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

5. The EUT is then put into continuously transmitting mode at its maximum power level.

6. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.

7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).

8. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi..

CDMA 800 -ERP

Measurement result

Channel	Frequency(MHz)	Peak ERP(dBm)
1013	824.70	22.32
384	836.52	22.23
777	848.31	22.98

ANALYZER SETTINGS: RBW = VBW = 3MHz

CDMA 1700 -EIRP

Measurement result

Channel	Frequency(MHz)	Peak ERP(dBm)
1013	824.70	21.02
384	836.52	21.71
777	848.31	22.30

ANALYZER SETTINGS: RBW = VBW = 3MHz

CDMA 1900-EIRP

Measurement result

Channel	Frequency(MHz)	Peak EIRP(dBm)
25	1851.25	23.73
600	1880.00	23.92
1175	1908.75	22.66

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMT   (§2.1051/§24.238/§27.53(g))

A.2.1 Measurement Method

The measurements 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 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 CDMA 800, CDMA 1700 and CDMA 1900 band.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration

With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as,

RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）

The SA is calibrated using following setup.
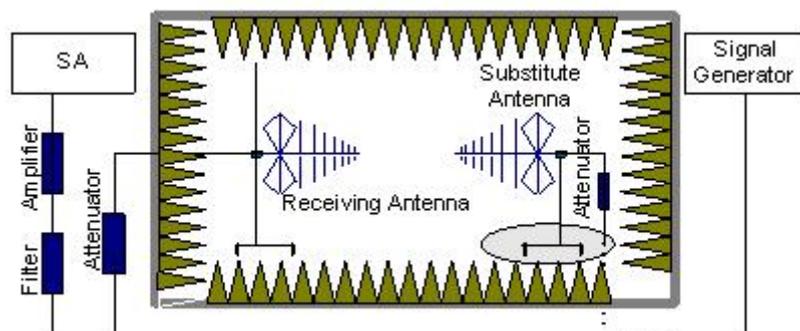
b) EUT test

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 test item 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 test item 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 and 1MHz bandwidth.
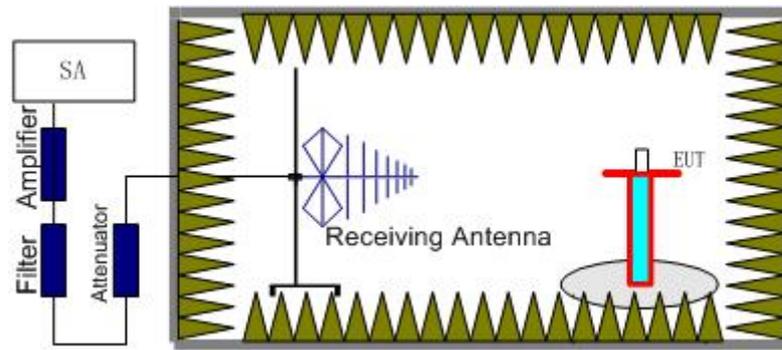
A.2.2 Measurement Limit

Sec. 24.238 Emission Limits.

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(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. 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 CDMA 800, CDMA 1700 and CDMA 1900 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.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss.

The measurement results are obtained as described below:

Power=P_{Mea}+A_{Rpl}

CDMA 800 Channel 1013/824.70MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1.6500	-37.73	-2.95	-34.78	-13	Horizontal
2.4785	-47.58	0.65	-48.23	-13	Vertical

CDMA 800 Channel 384/836.52MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1.6735	-36.87	-2.85	-34.02	-13	Horizontal
3.5265	-46.09	-0.95	-45.14	-13	Horizontal

CDMA 800 Channel 777/848.31MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1.6960	-34.77	-2.25	-32.52	-13	Horizontal
3.5730	-44.70	0.35	-45.05	-13	Horizontal
5.0915	-43.63	1.85	-45.48	-13	Horizontal

CDMA 1700 Channel 25/1711.25MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2.1100	-19.28	3.4	-22.68	-13	Horizontal
3.4200	-40.37	1.9	-42.27	-13	Vertical
5.1295	-18.65	4.7	-23.35	-13	Horizontal
13.6782	-38.76	14.1	-52.86	-13	Horizontal

CDMA 1700 Channel 450/1732.5MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2.1320	-20.01	2.4	-22.41	-13	Horizontal
3.4645	-37.18	2.1	-39.28	-13	Vertical
5.1985	-17.00	4.6	-21.60	-13	Horizontal
12.1278	-23.93	14.5	-38.43	-13	Horizontal

CDMA 1700 Channel 875/1753.75MHz

Frequency(GHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2.1550	-18.90	2.2	-21.10	-13	Horizontal
3.5095	-39.79	1.8	-41.59	-13	Vertical
5.2655	-21.72	5.6	-27.32	-13	Horizontal
12.1278	-29.70	14.5	-44.20	-13	Horizontal

CDMA 1900 Channel 25/1851.25MHz

Frequency(GHz)	Power(dBm)	A_{Rpl}(dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2.3955	-49.57	3.8	-53.37	-13	Vertical
3.8625	-44.12	3.6	-47.72	-13	Horizontal

CDMA 1900 Channel 600/1880.00MHz

Frequency(GHz)	Power(dBm)	A_{Rpl}(dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
3.9200	-44.78	4.4	-49.18	-13	Horizontal
9.6160	-43.68	12.4	-56.08	-13	Horizontal

CDMA 1900 Channel 1175/1908.75MHz

Frequency(GHz)	Power(dBm)	A_{Rpl}(dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
3.9775	-45.89	4.2	-50.09	-13	Horizontal
9.6040	-44.11	11.9	-56.01	-13	Horizontal

CDMA 800

A.2.3.1 RADIATED SPURIOUS EMISSIONS-Channel 1013: 30MHz –1GHz Set.1

Radiated spurious emission limit :-13dBm.

NOTE: peak above the limit line is the Carrier frequency @ ch-1013
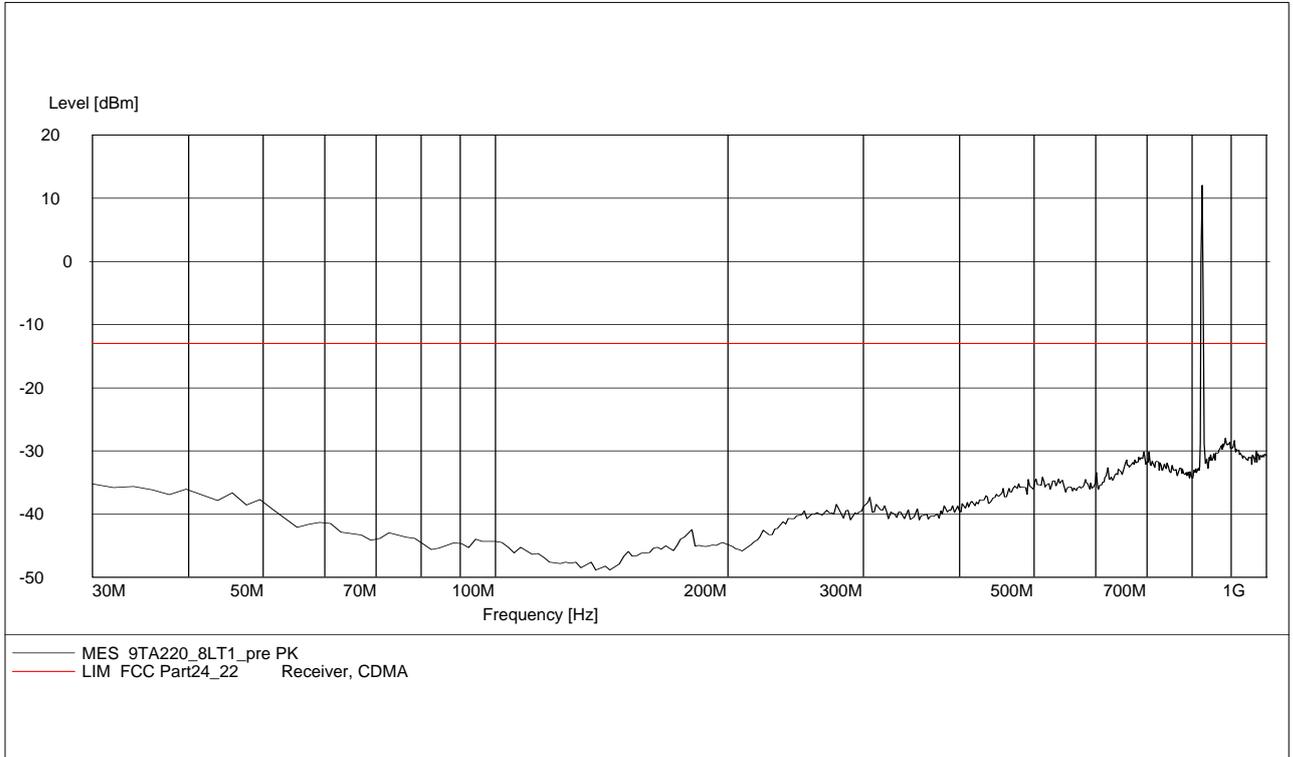
A.2.3.2 RADIATED SPURIOUS EMISSIONS-Channel 384: 30MHz – 1GHz Set.1

Radiated spurious emission limit :-13dBm.

NOTE: peak above the limit line is the Carrier frequency @ ch-384
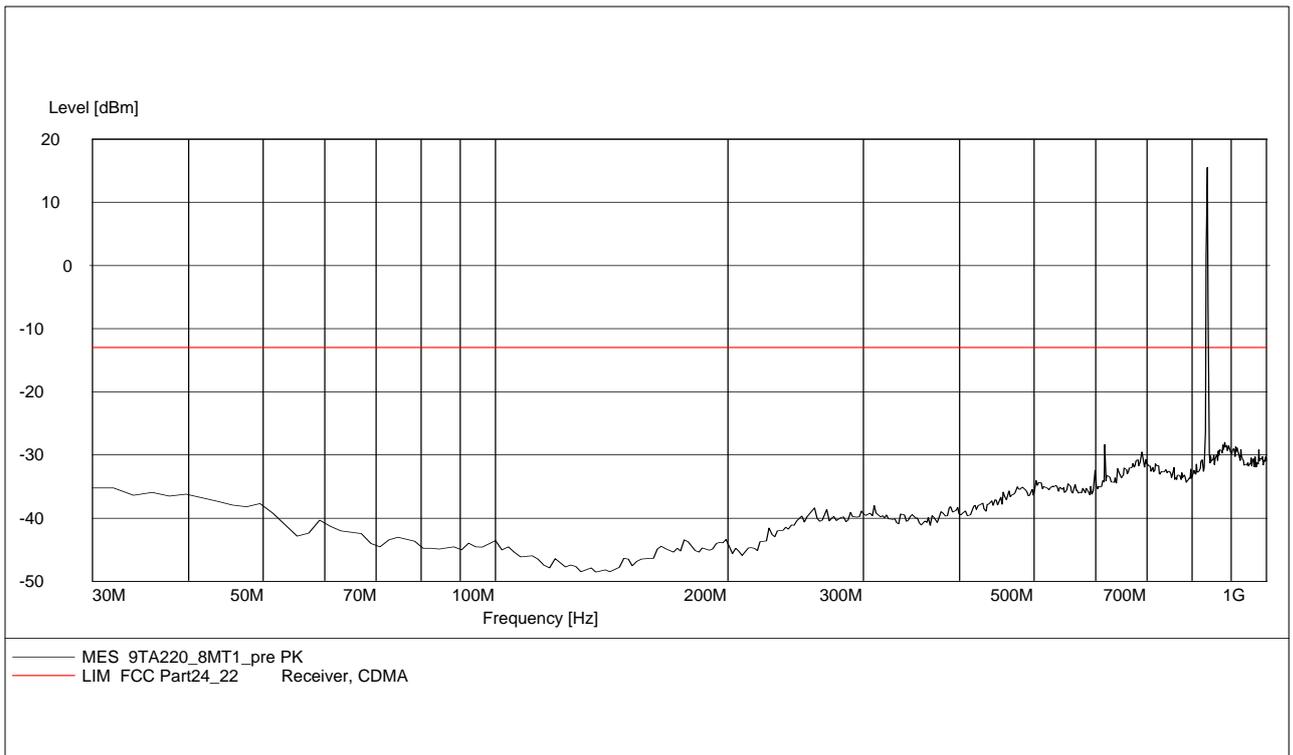
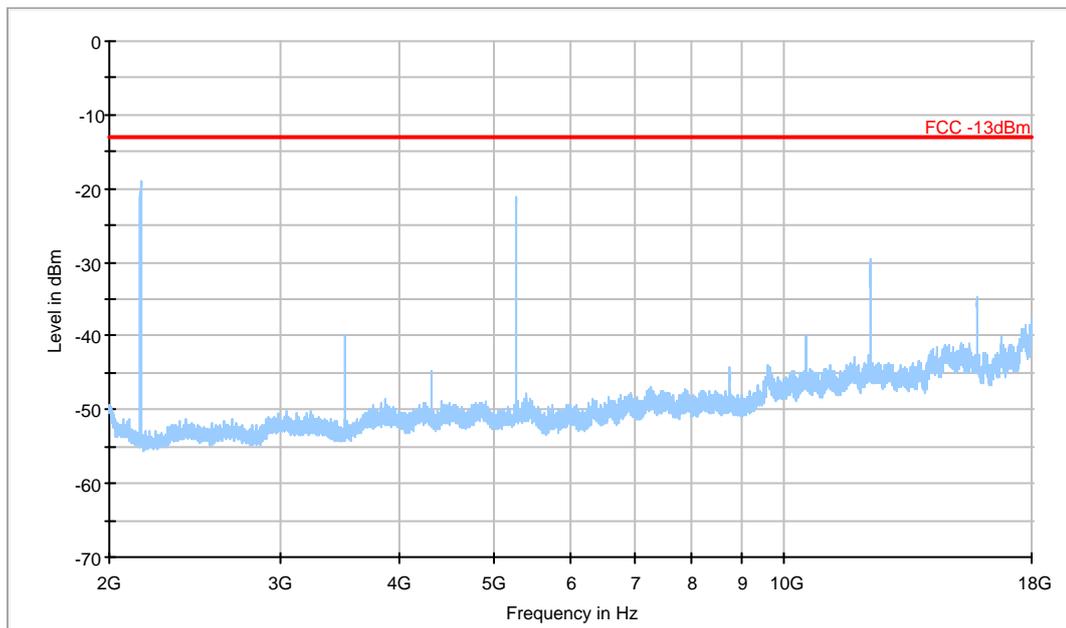**A.2.3.3 RADIATED SPURIOUS EMISSIONS-Channel 777: 30MHz – 1GHz Set.1**

Radiated spurious emission limit :-13dBm.

NOTE: peak above the limit line is the Carrier frequency @ ch-777
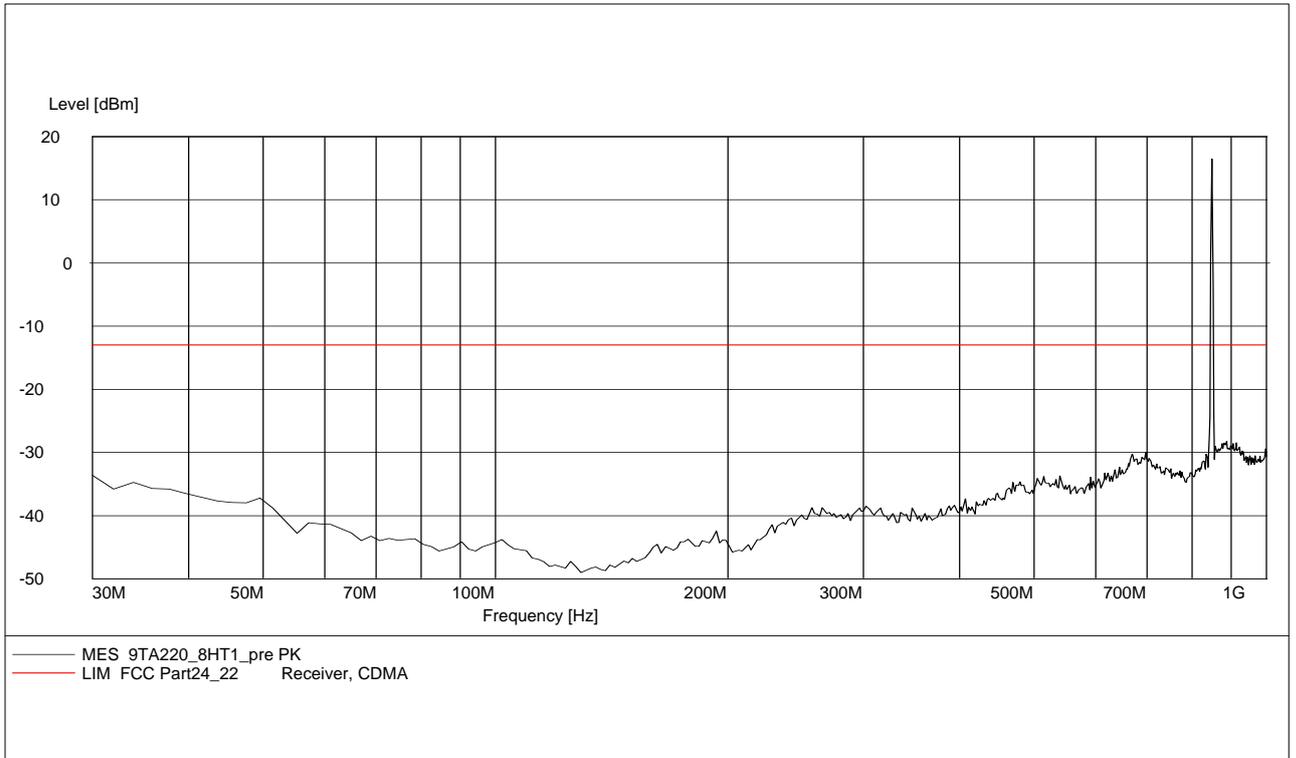
A.2.3.4 RADIATED SPURIOUS EMISSIONS-Channel 1013: 1GHz – 10GHz Set.1

Radiated spurious emission limit :-13dBm.
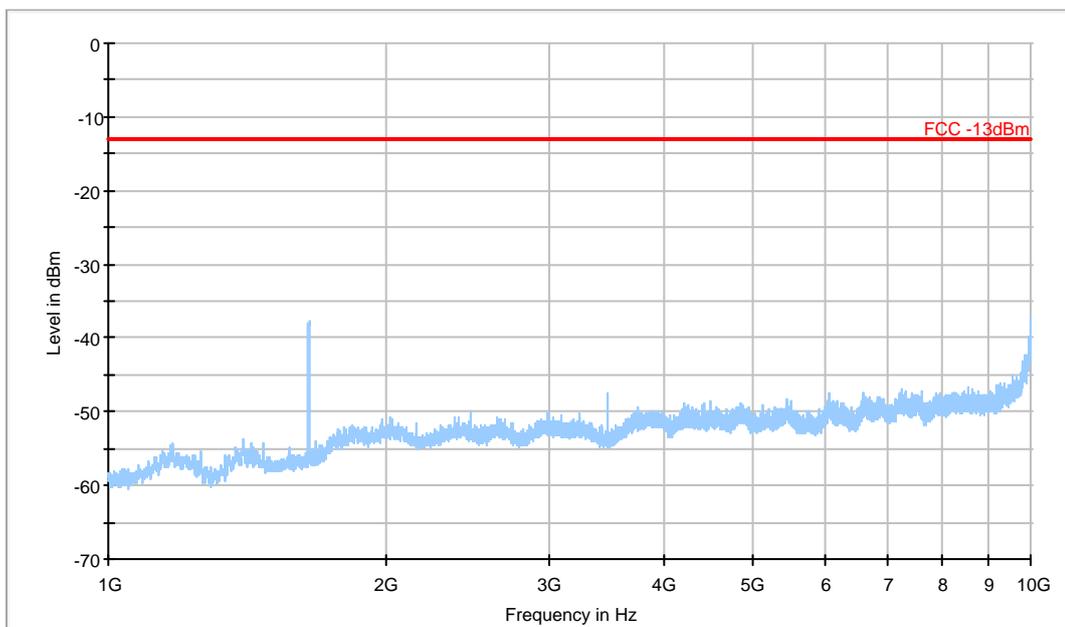
A.2.3.5 RADIATED SPURIOUS EMISSIONS-Channel 384: 1GHz – 10GHz Set.1
Radiated spurious emission limit :-13dBm.
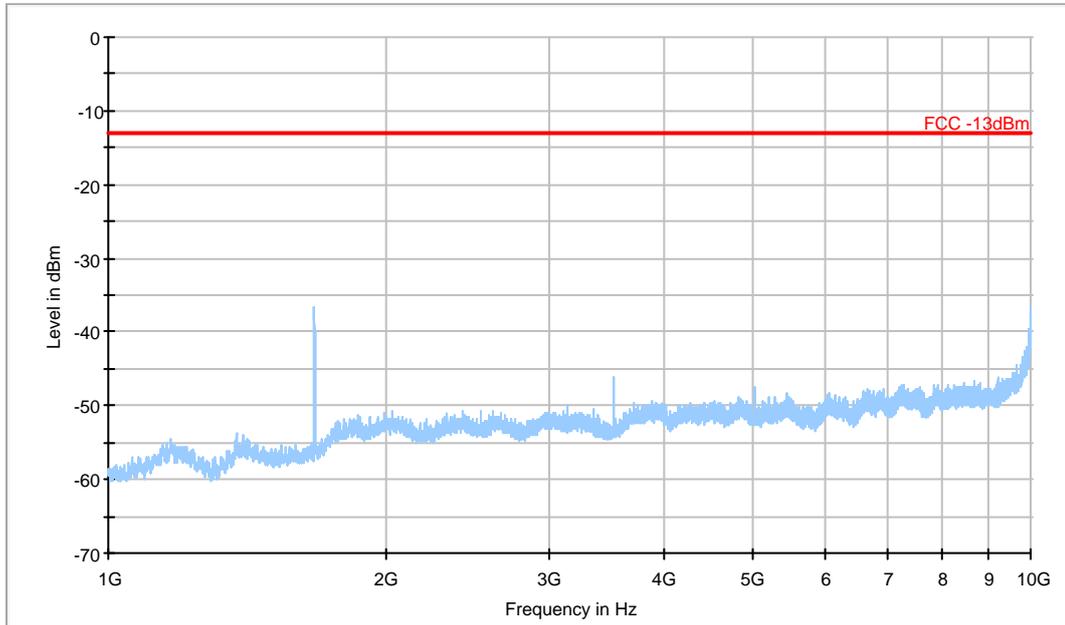
FCC -13dBm   Preview Measurement Detector 1

A.2.3.6 RADIATED SPURIOUS EMISSIONS-Channel 777: 1GHz – 10GHz Set.1
Radiated spurious emission limit :-13dBm.
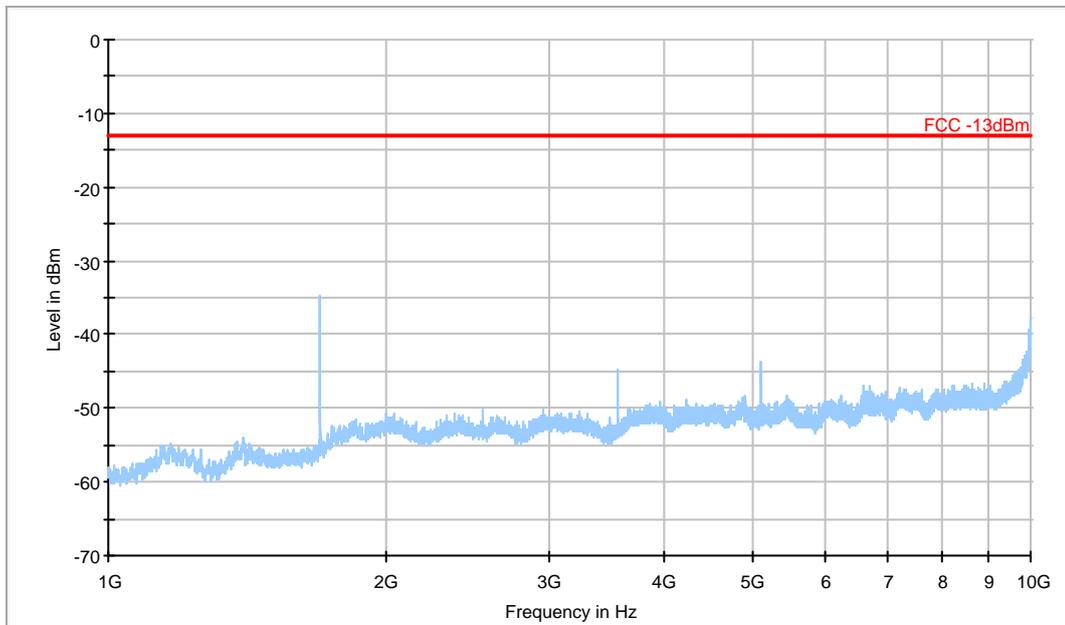
FCC -13dBm   Preview Measurement Detector 1

A.2.3.7 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 1GHz Set.1
Radiated spurious emission limit :-13dBm.
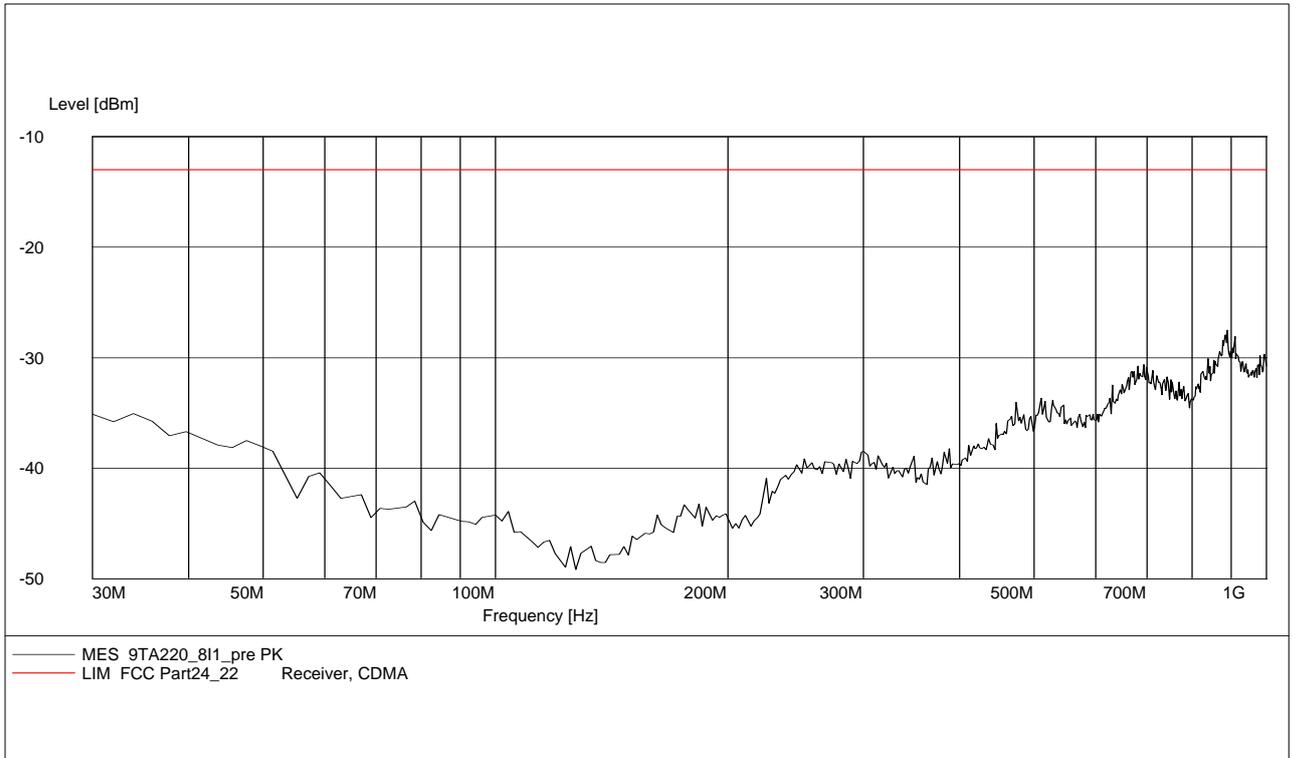
A.2.3.8 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 1GHz – 10GHz Set.1
Radiated spurious emission limit :-13dBm.
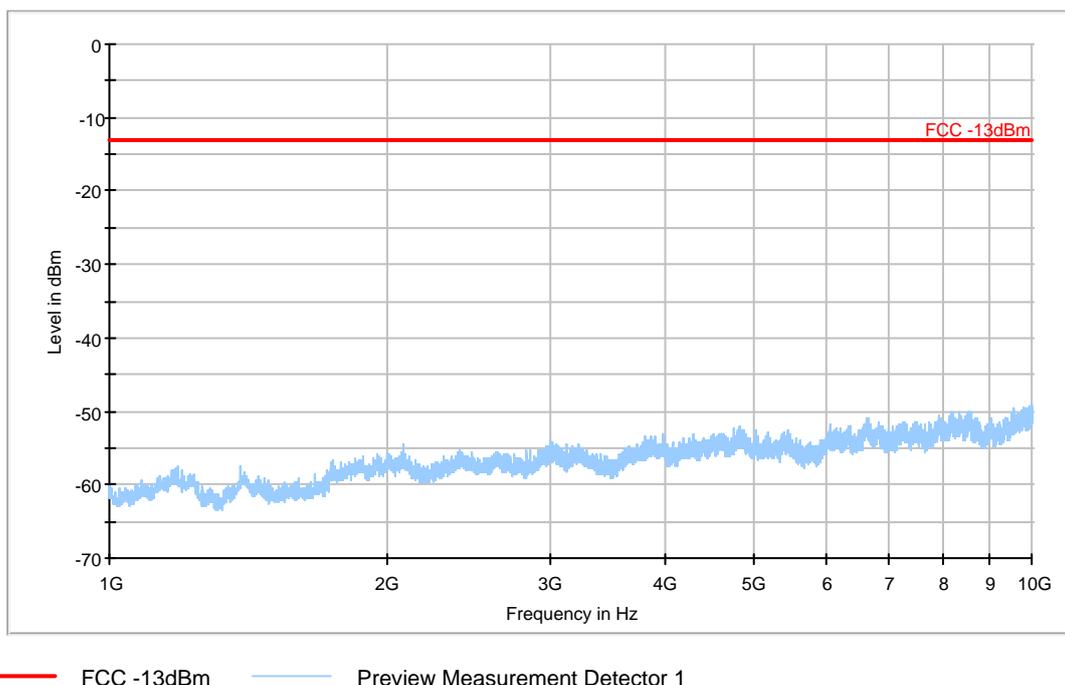
CDMA 1700

A.2.3.9 RADIATED SPURIOUS EMISSIONS-Channel 25: 30MHz – 2GHz Set.1

NOTE: peak above the limit line is the Carrier frequency @ ch-25
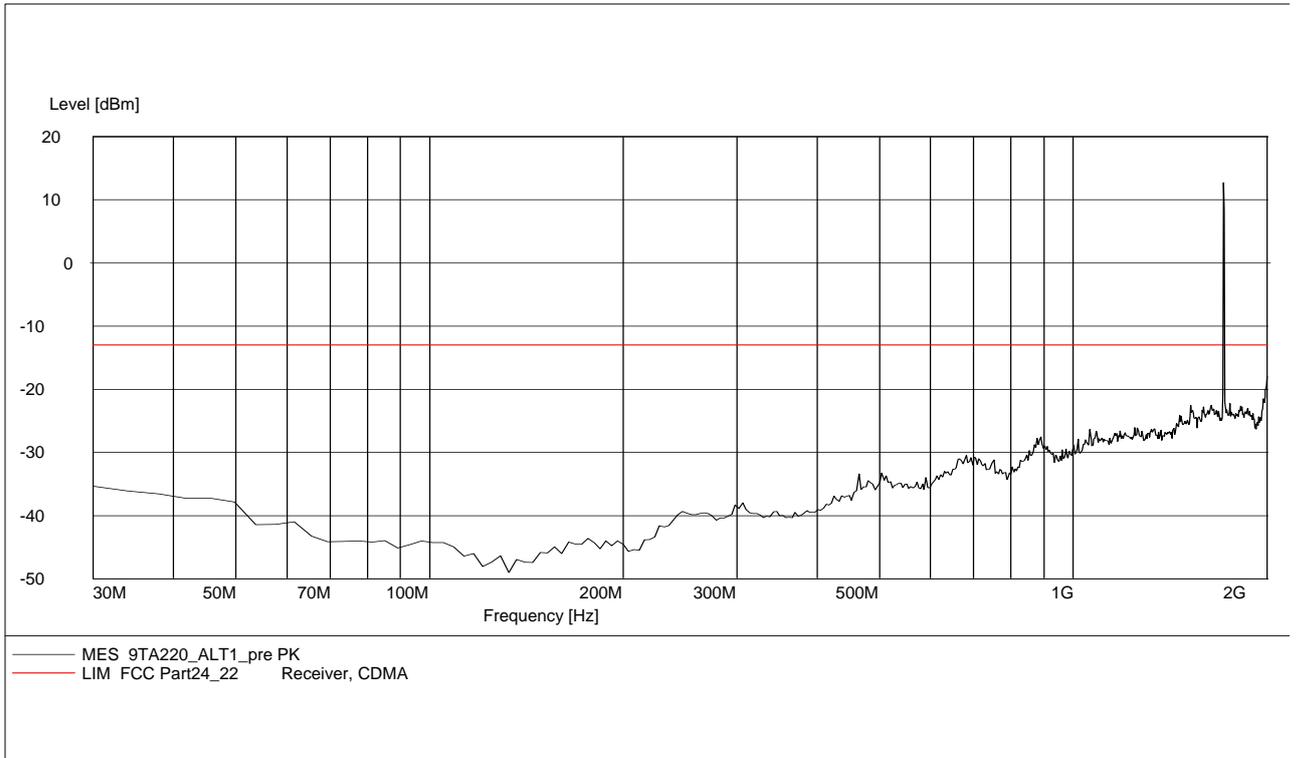
A.2.3.10 RADIATED SPURIOUS EMISSIONS-Channel 450: 30MHz – 2GHz Set.1

NOTE: peak above the limit line is the Carrier frequency @ ch-450
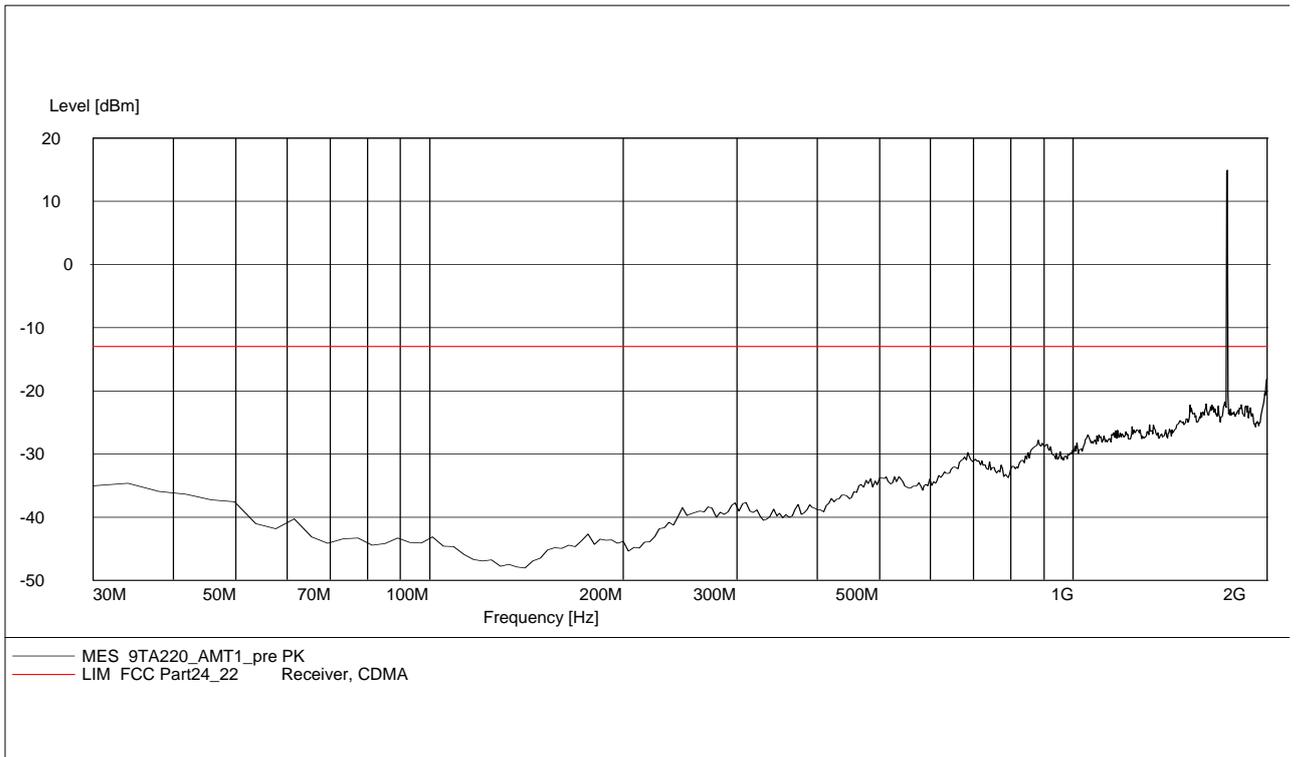
A.2.3.11 RADIATED SPURIOUS EMISSIONS-Channel 875: 30MHz – 2GHz Set.1
NOTE: peak above the limit line is the Carrier frequency @ ch-875

MES 9TA220_AHT1_pre PK
LIM FCC Part24_22   Receiver, CDMA
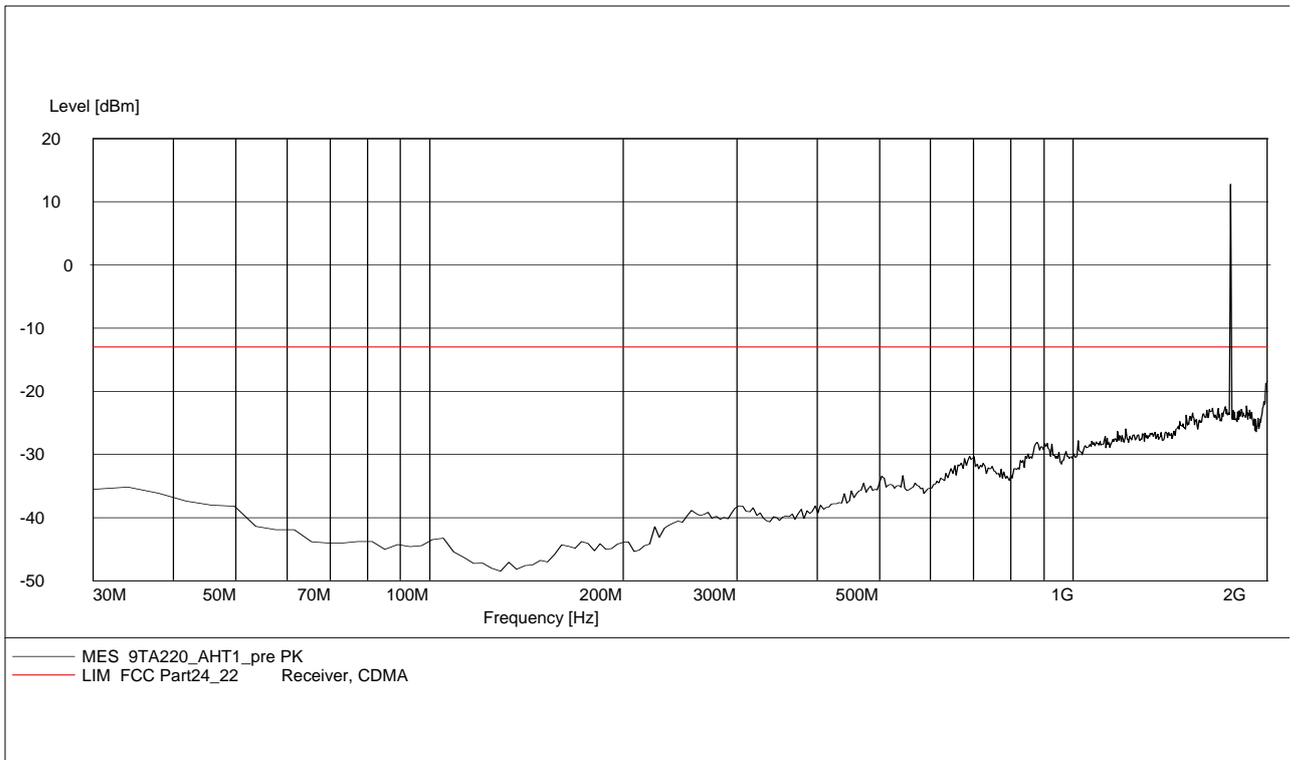
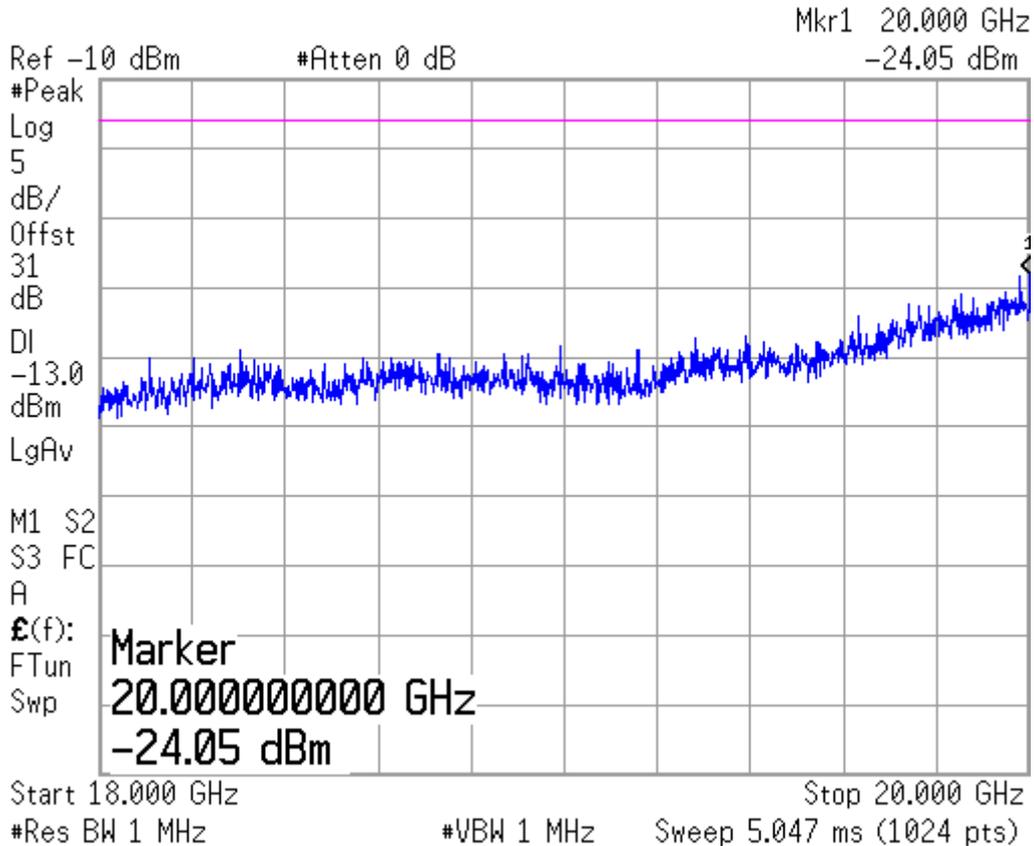## A.2.3.12 RADIATED SPURIOUS EMISSIONS-Channel 25: 2GHz – 18GHz Set.1
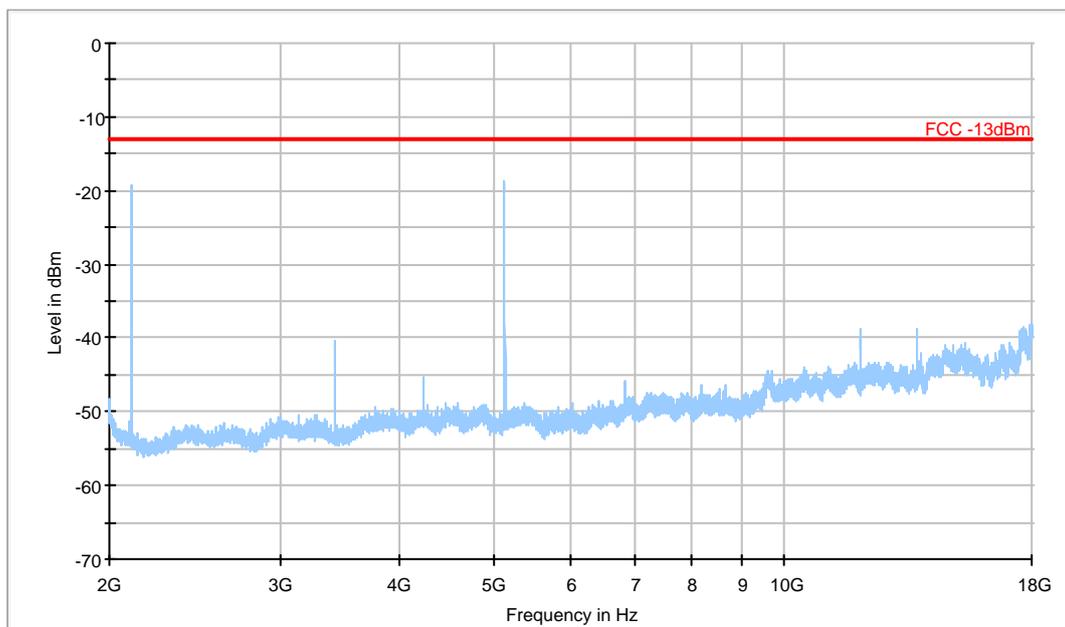
FCC -13dBm   Preview Measurement Detector 1

A.2.3.13 RADIATED SPURIOUS EMISSIONS-Channel 450: 2GHz – 18GHz Set.1
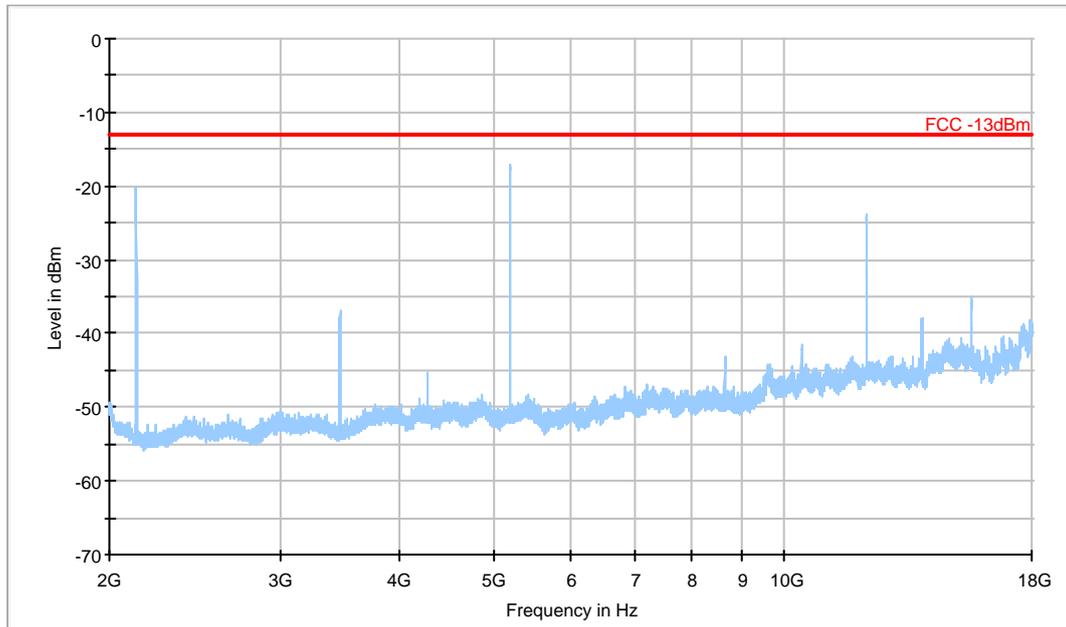
FCC -13dBm   Preview Measurement Detector 1

A.2.3.14 RADIATED SPURIOUS EMISSIONS-Channel 875: 2GHz – 18GHz Set.1

FCC -13dBm   Preview Measurement Detector 1

A.2.3.15 Radiated spurious emission (18GHz-20GHz) Set.1

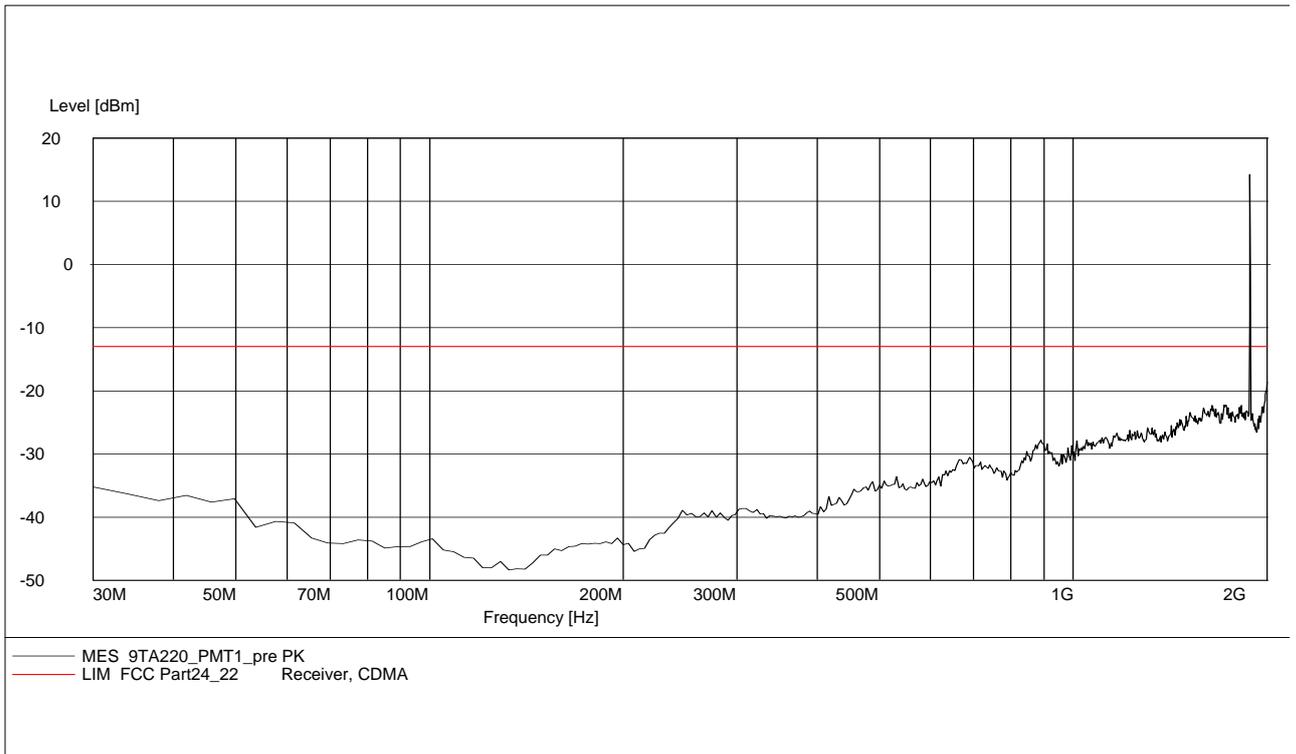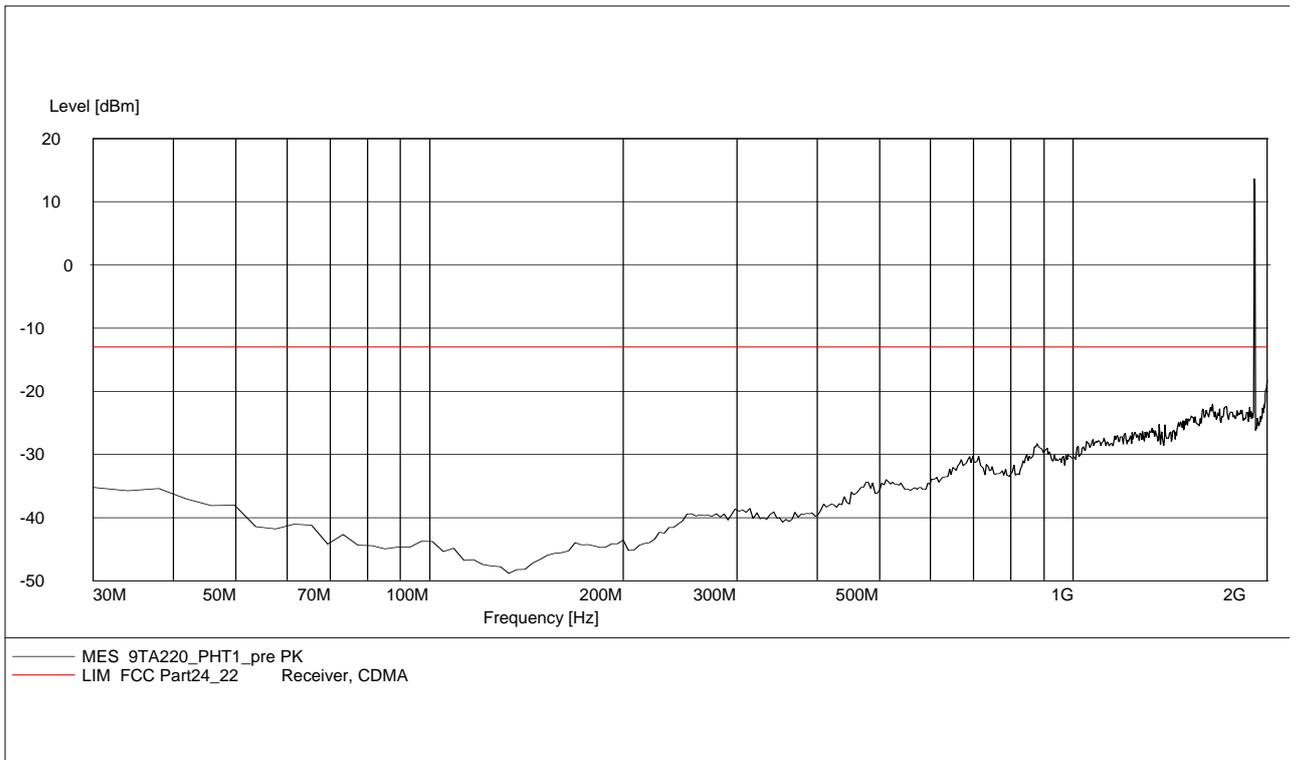**Note: This plot is valid for low, mid & high channels. It is same as the floor noise.**
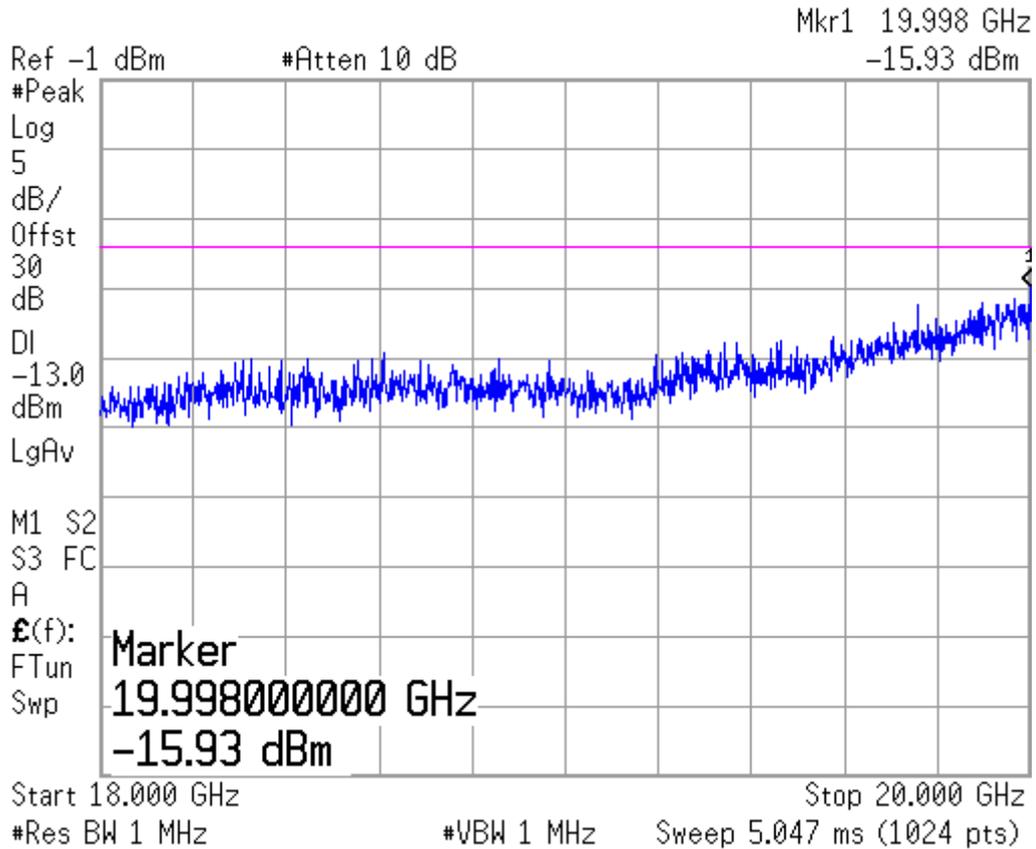
A.2.3.16 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 2GHz Set.1
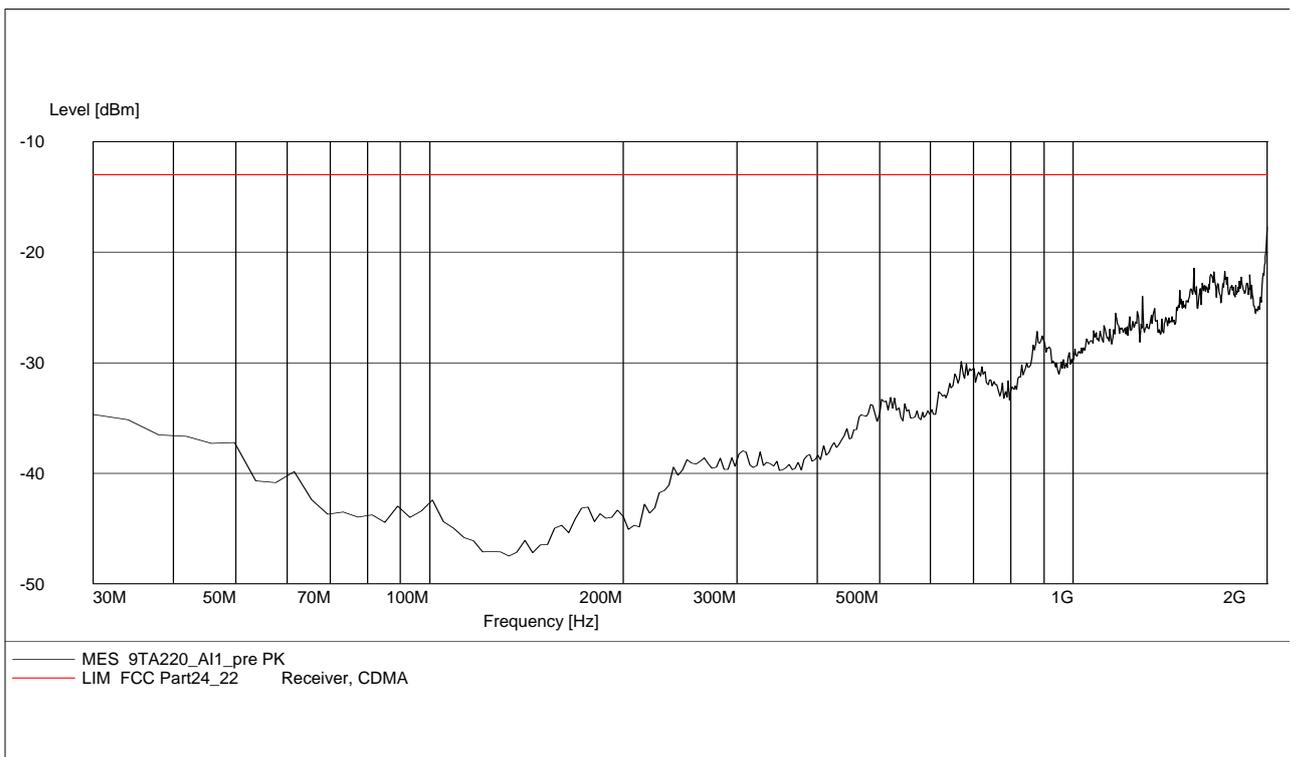
A.2.3.17 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 2GHz – 18GHz Set.1
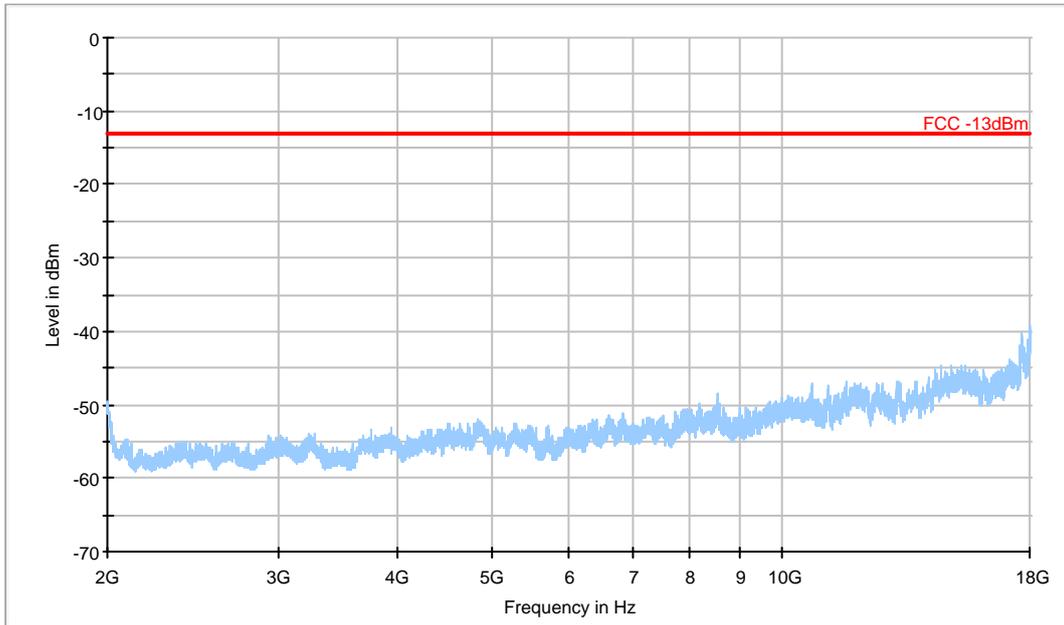
FCC -13dBm   Preview Measurement Detector 1

A.2.3.18 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 18GHz – 20GHz Set.1
### Note: It is same as the floor noise.

PCS 1900

A.2.3.19 RADIATED SPURIOUS EMISSIONS-Channel 25: 30MHz – 2GHz Set.1

**NOTE: peak above the limit line is the Carrier frequency @ ch-25**

Level [dBm]

MES 9TA220_PLT1_pre PK
LIM FCC Part24_22   Receiver, CDMA
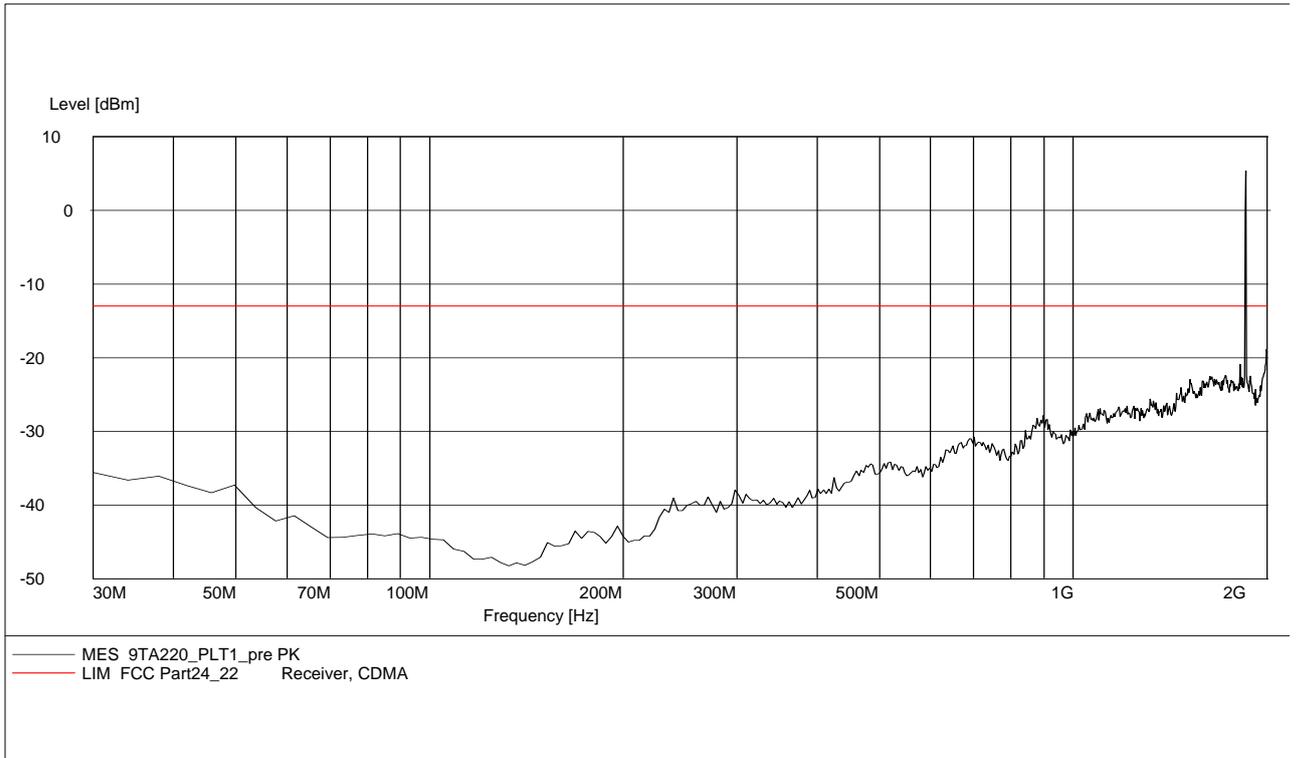
A.2.3.20 RADIATED SPURIOUS EMISSIONS-Channel 600: 30MHz – 2GHz Set.1

NOTE: peak above the limit line is the Carrier frequency @ ch-600

Level [dBm]

MES 9TA220_PMT1_pre PK
LIM FCC Part24_22   Receiver, CDMA

A.2.3.21 RADIATED SPURIOUS EMISSIONS-Channel 1175: 30MHz – 2GHz Set.1
NOTE: peak above the limit line is the Carrier frequency @ ch-1175

MES 9TA220_PHT1_pre PK
LIM FCC Part24_22   Receiver, CDMA

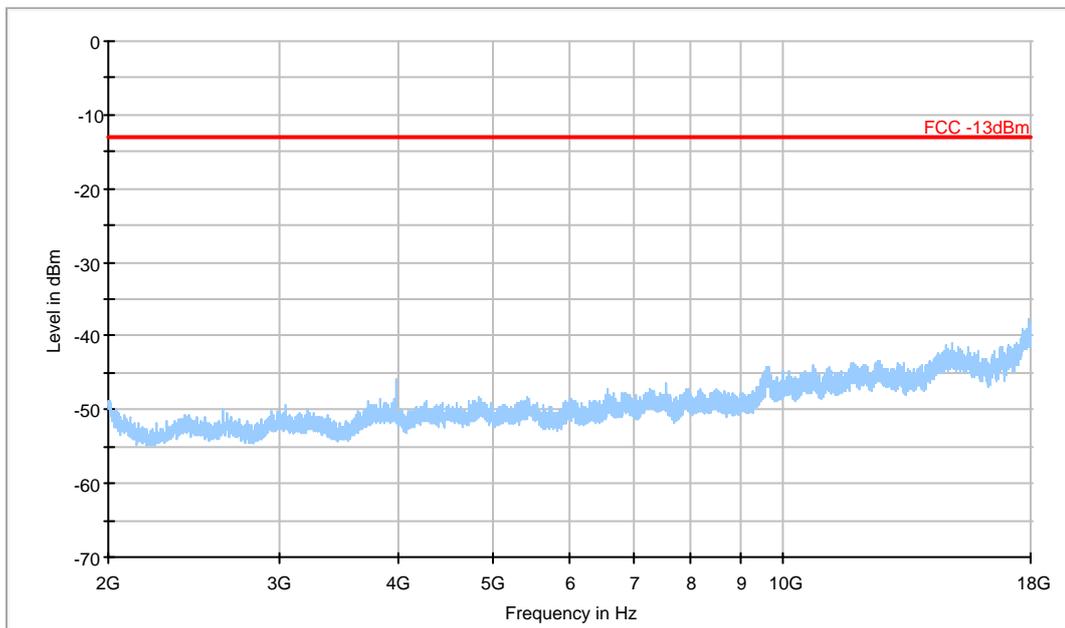### A.2.3.22 RADIATED SPURIOUS EMISSIONS-Channel 25: 2GHz – 18GHz Set.1
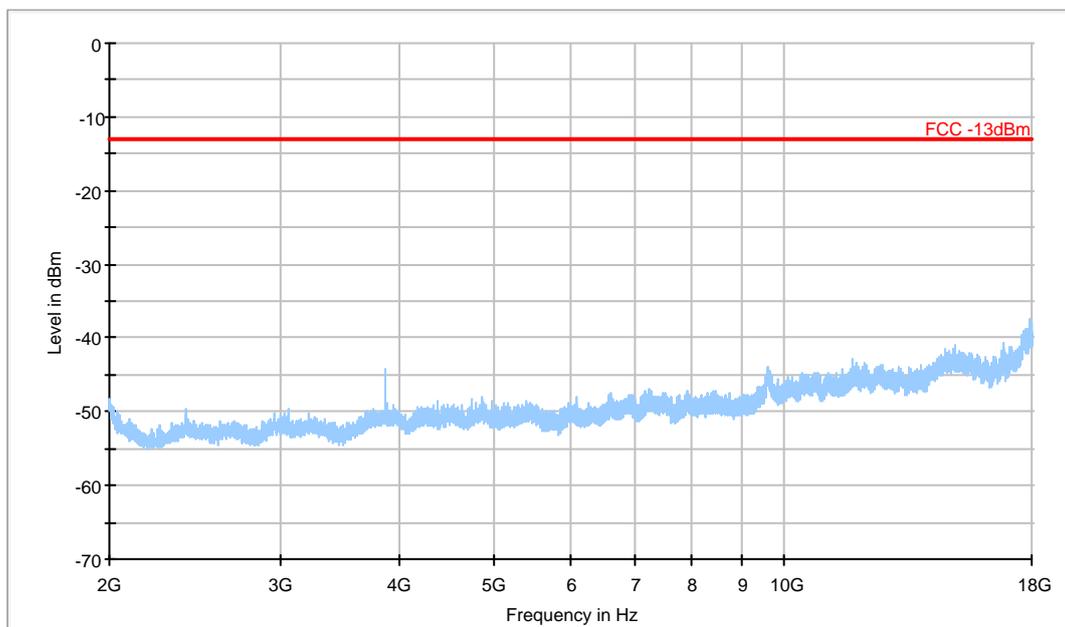
FCC -13dBm   Preview Measurement Detector 1

A.2.3.23 RADIATED SPURIOUS EMISSIONS-Channel 600: 2GHz – 18GHz Set.1
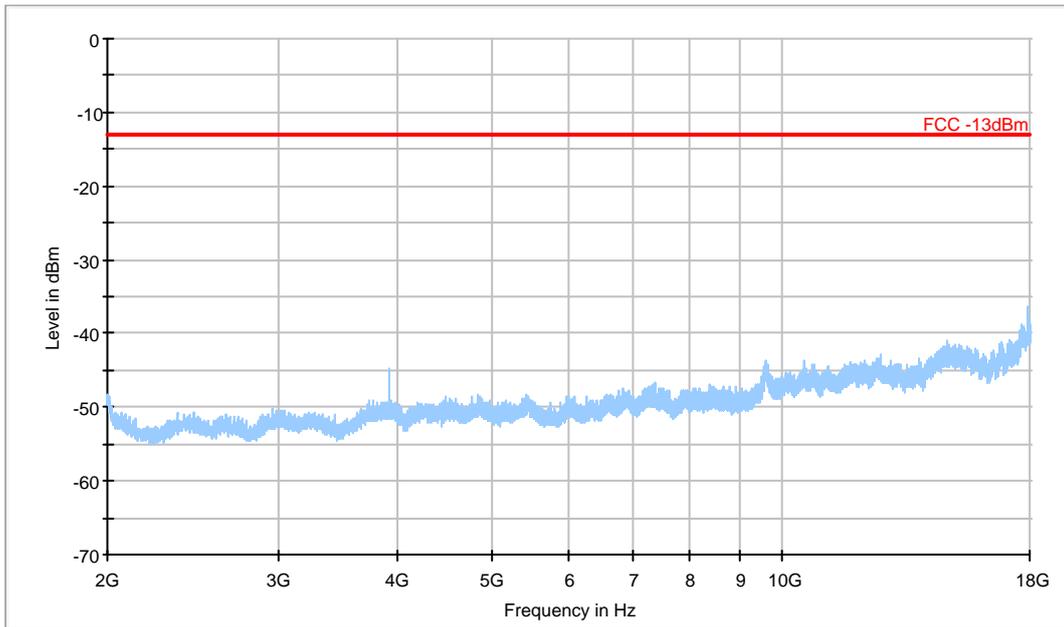
FCC -13dBm ——— Preview Measurement Detector 1 ———
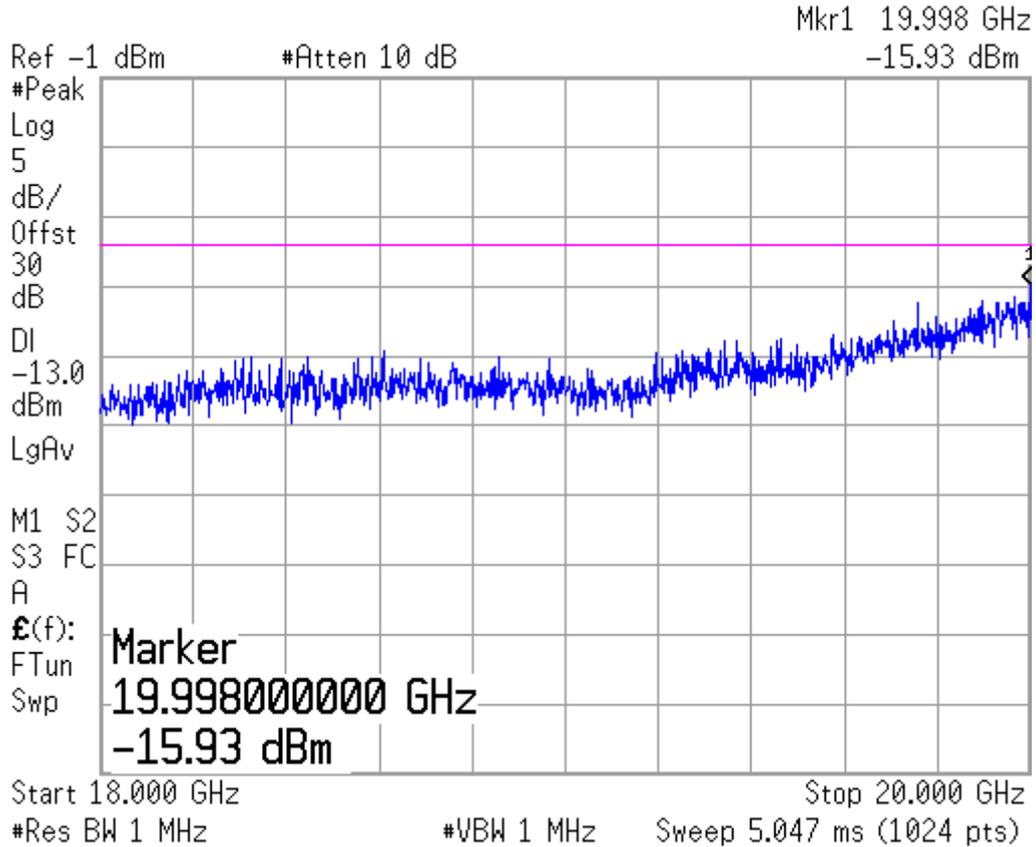
A.2.3.24 RADIATED SPURIOUS EMISSIONS-Channel 1175: 2GHz – 18GHz Set.1
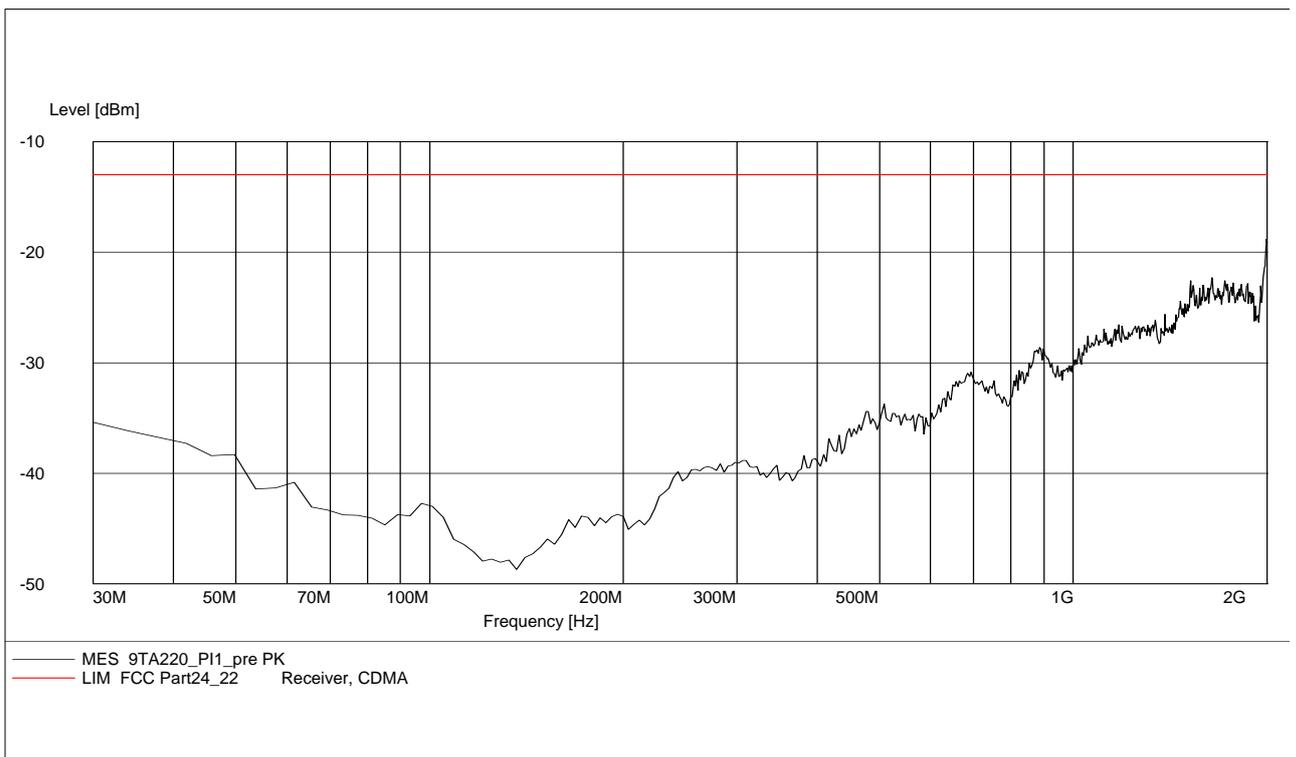

FCC -13dBm ——— Preview Measurement Detector 1 ———

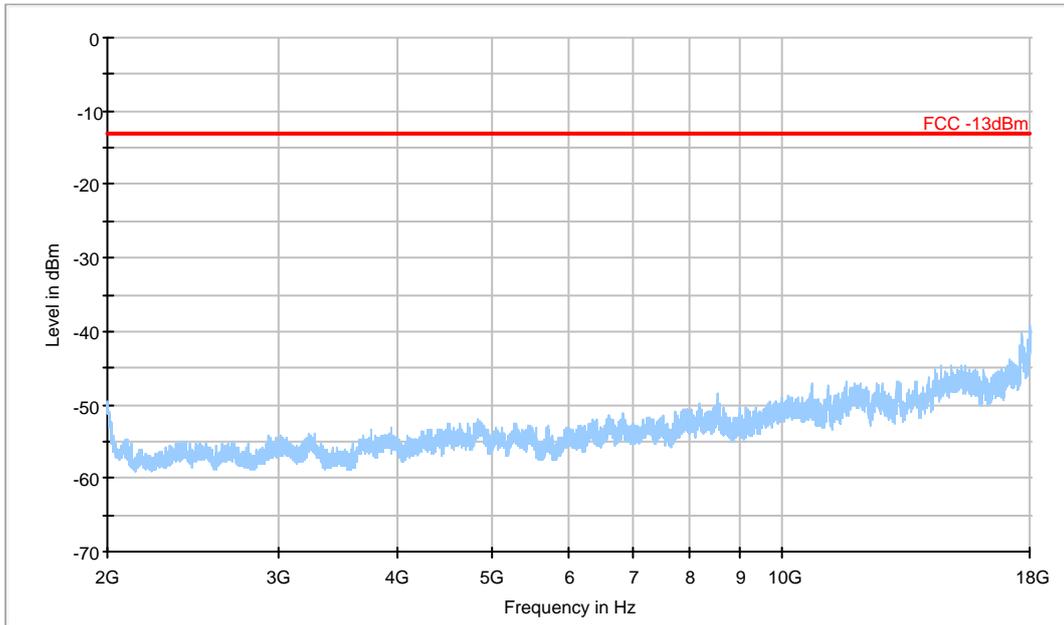**A.2.3.25 Radiated spurious emission (18GHz-20GHz) Set.1**
Note: This plot is valid for low, mid & high channels. It is same as the floor noise.

A.2.3.26 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 2GHz Set.1
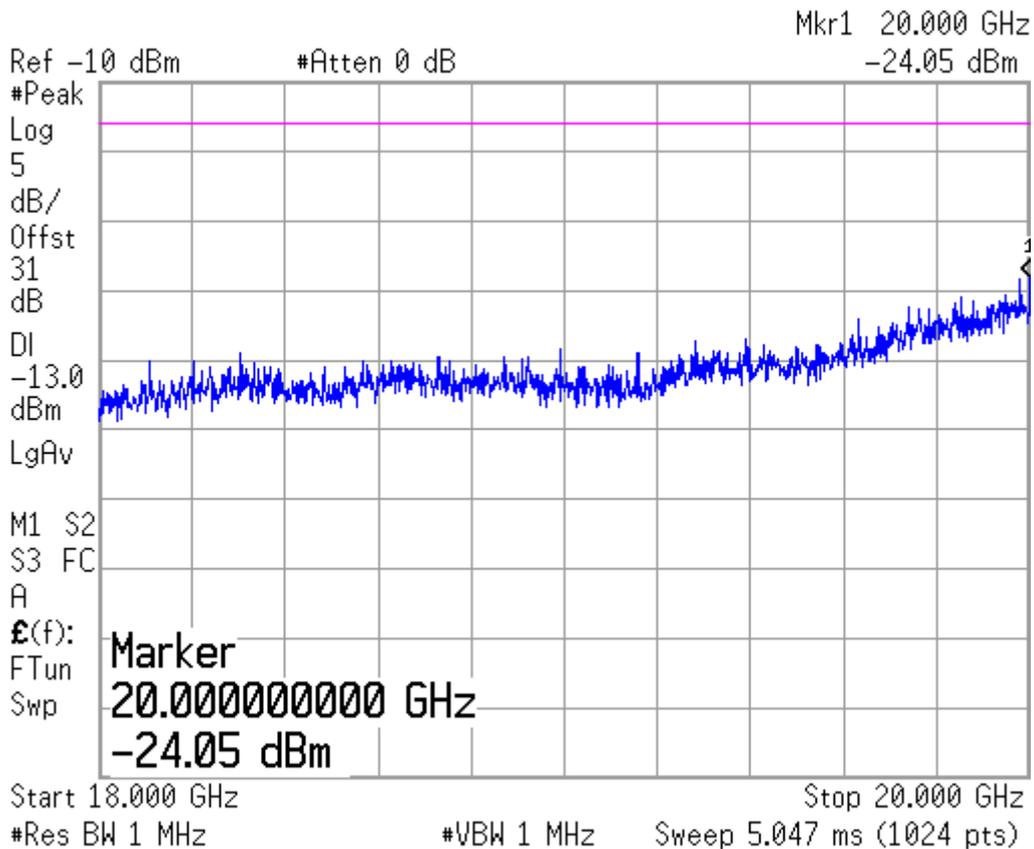
A.2.3.27 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 2GHz – 18GHz Set.1

——— FCC -13dBm   ——— Preview Measurement Detector 1

A.2.3.28 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 18GHz – 20GHz Set.1
Note: It is same as the floor noise.

A.3   CONDUCTED EMISSION   (§15.107§15.207)

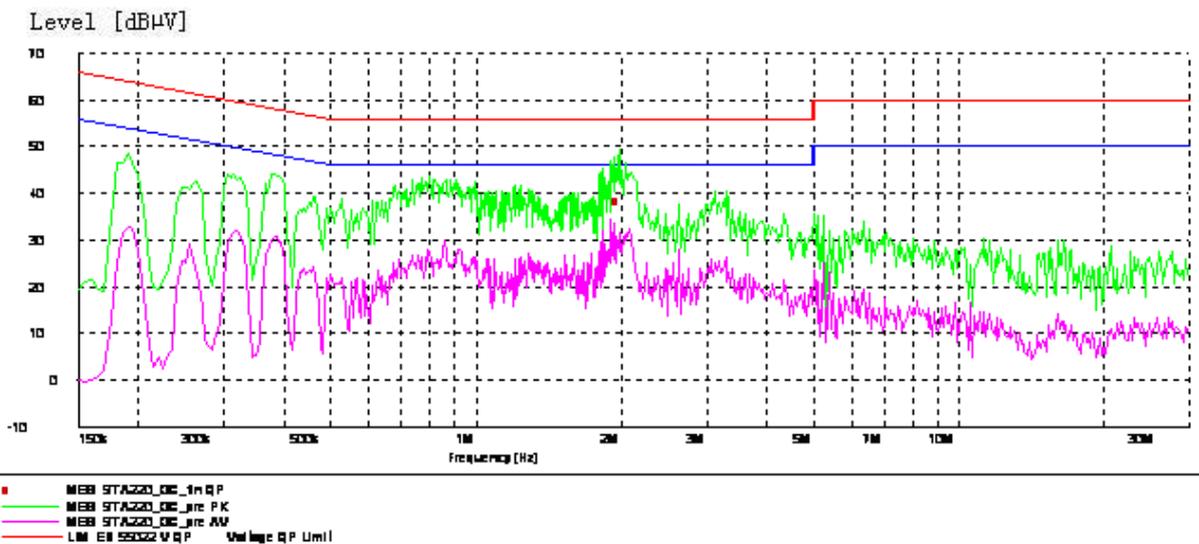The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

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
CDMA 800

MEASUREMENT RESULT: "9TA220_GC_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
1.990000	38.60	10.1	56	17.4	N	GND

CDMA 1700

Level [dBμV]

MEB 9TA220_AC_fin QP
MEB 9TA220_AC_pre PK
MEB 9TA220_AC_pre AV
LM EN 55022 V QP   Voltage QP Limit
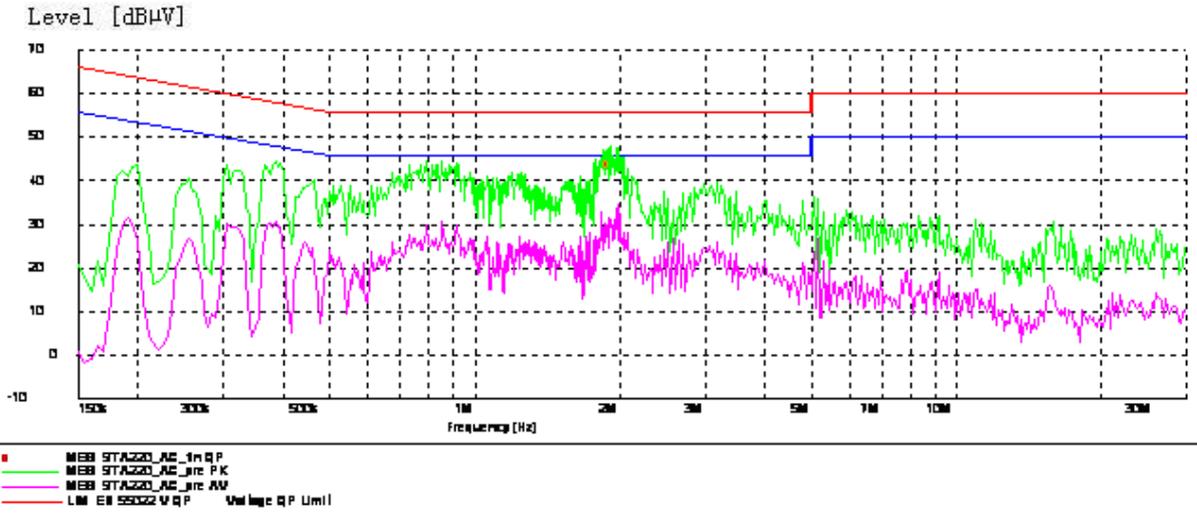
MEASUREMENT RESULT: "9TA220_AC_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
1.915000	43.50	10.1	56	12.5	L1	FLO

CDMA 1900

Level [dBµV]

- ■ MES 9TA220_PC_fin QP
- ■ MES 9TA220_PC_pre PK
- ■ MES 9TA220_PC_pre AV
- LIM EN 55022 V QP   Voltage QP Limit
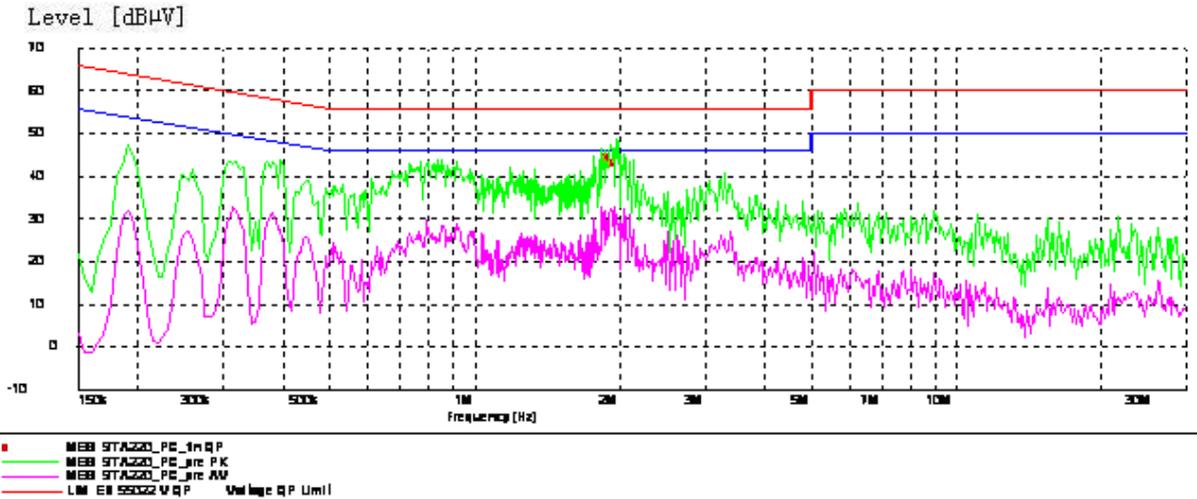
MEASUREMENT RESULT: "9TA220_PC_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
1.920000	44.50	10.1	56	11.5	L1	GND
1.965000	43.10	10.1	56	12.9	L1	GND

MP3
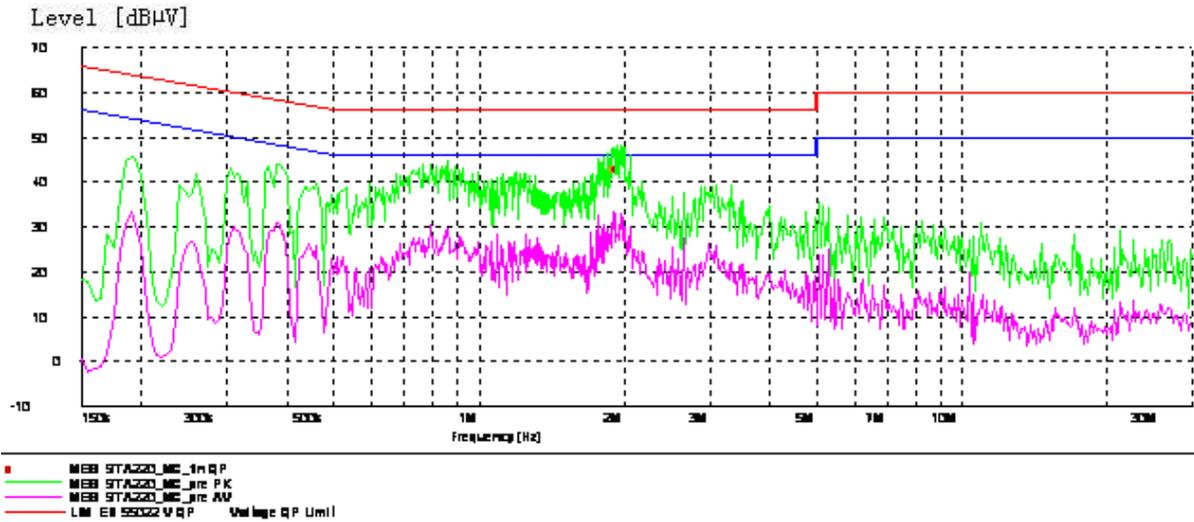
MEASUREMENT RESULT: "9TA220_MC_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
1.935000	43.30	10.1	56	12.7	L1	FLO

Camera
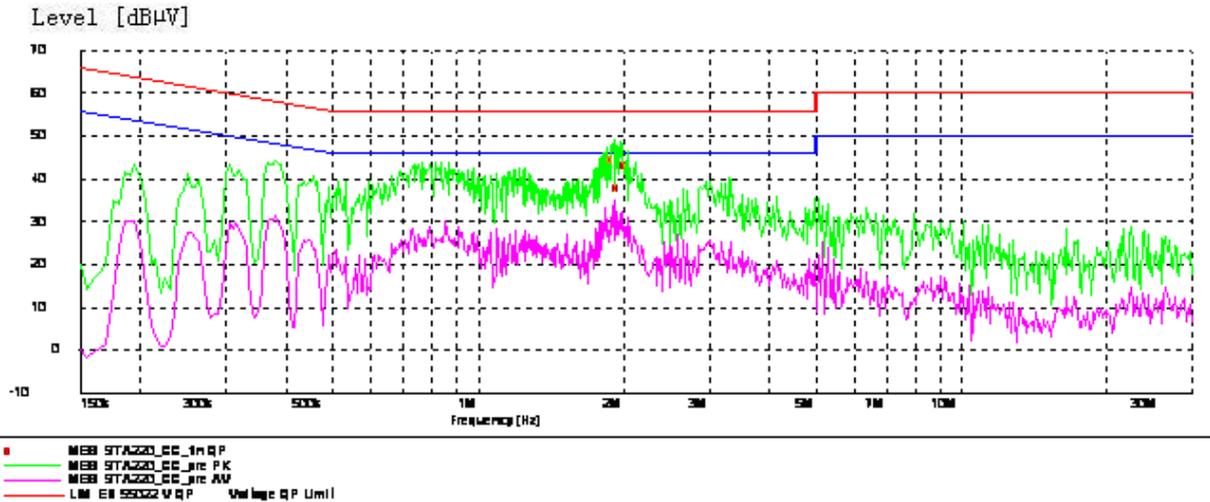
MEASUREMENT RESULT: "9TA220_CC_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
1.915000	44.40	10.1	56	11.6	L1	FLO
1.960000	37.90	10.1	56	18.2	N	FLO
2.048385	42.90	10.1	56	13.1	L1	FLO

Bluetooth
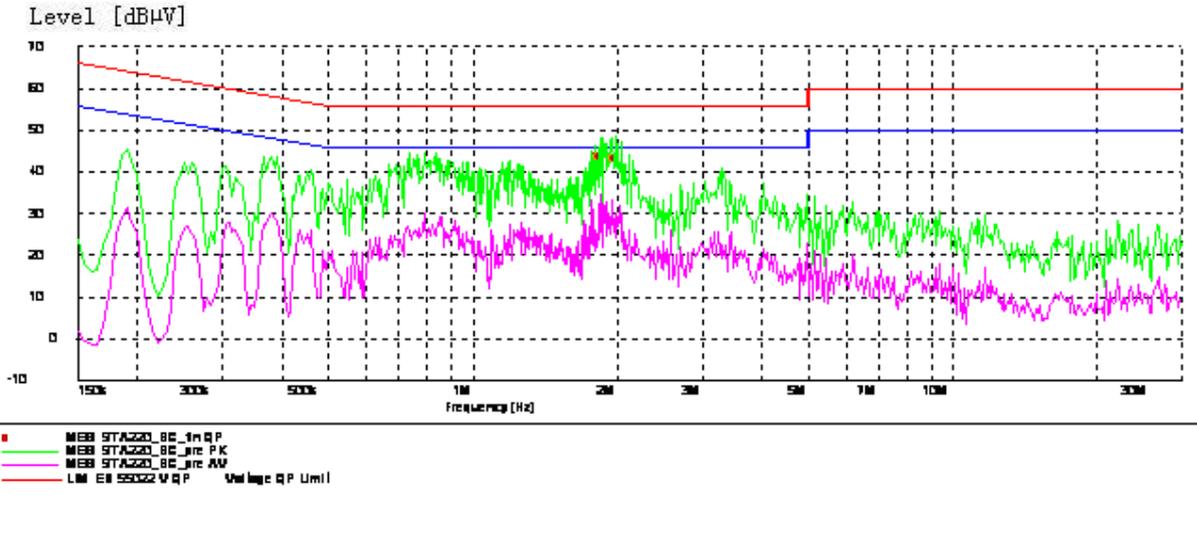
MEASUREMENT RESULT: "9TA220_BC_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
1.850000	43.70	10.1	56	12.3	L1	GND
1.985000	43.30	10.1	56	12.7	L1	FLO

A.4 FREQUENCY STABILITY (§2.1055/§24.235/§27.54)

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 channel 661 for PCS 1900 , channel 190 for GSM850 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 3.7VDC. 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

CDMA 800
Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	17	0.020
3.7	13	0.016
4.2	16	0.019

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	22	0.026
-20	20	0.024
-10	19	0.023
0	17	0.020
10	17	0.020
20	16	0.019
30	17	0.020
40	19	0.023
50	23	0.027

CDMA 1700
Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	16	0.009
3.7	12	0.007
4.2	17	0.010

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	33	0.019
-20	27	0.016
-10	23	0.013
0	20	0.012
10	16	0.009
20	15	0.009
30	17	0.010
40	23	0.013
50	26	0.015

CDMA 1900

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	27	0.014
3.7	21	0.011
4.2	25	0.013

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	37	0.020
-20	34	0.018
-10	33	0.018
0	27	0.014
10	24	0.013
20	25	0.013
30	27	0.014
40	29	0.015
50	35	0.019

A.5 OCCUPIED BANDWIDTH   (§2.1049(h)(i))

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 CDMA frequency band. The table below lists the measured -20dBc BW (99%BW). Spectrum analyzer plots are included on the following pages.

CDMA 800 (99% BW)

Channel	Occupied Bandwidth (−20dBc BW)(MHz)
1013	1.282
384	1.282
777	1.282

ANALYZER SETTINGS: RBW=VBW=3kHz

CDMA 800
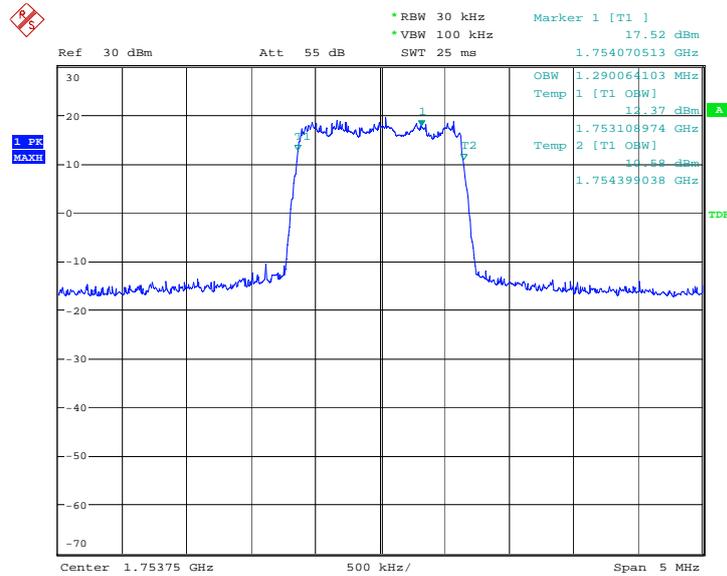
Channel 1013-Occupied Bandwidth (99% BW)
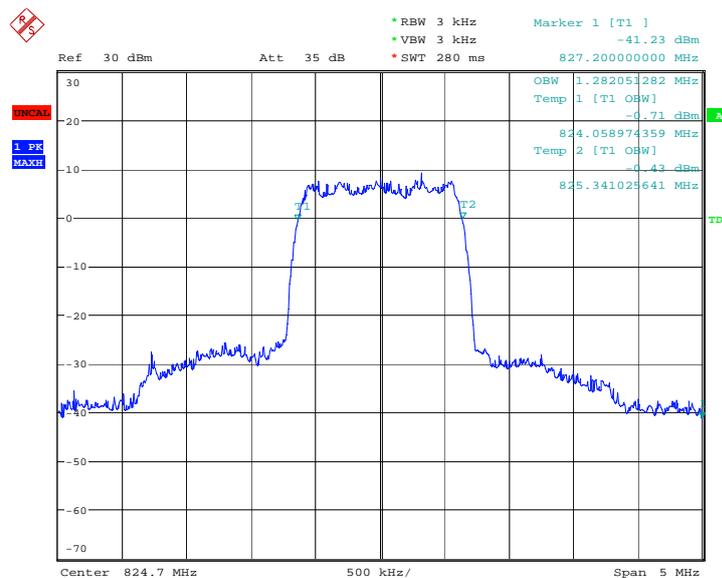
Date: 5.MAR.2009 06:15:38

Channel 384-Occupied Bandwidth (99% BW)
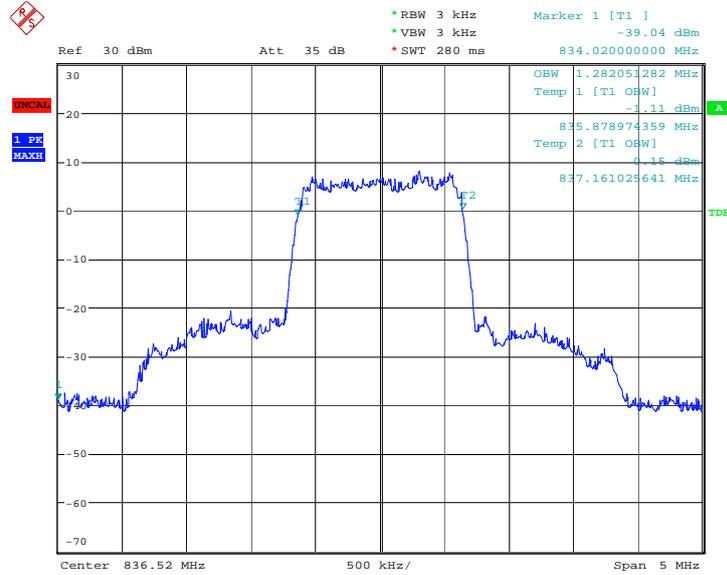
Date: 5.MAR.2009 06:16:21

Channel 777-Occupied Bandwidth (99% BW)
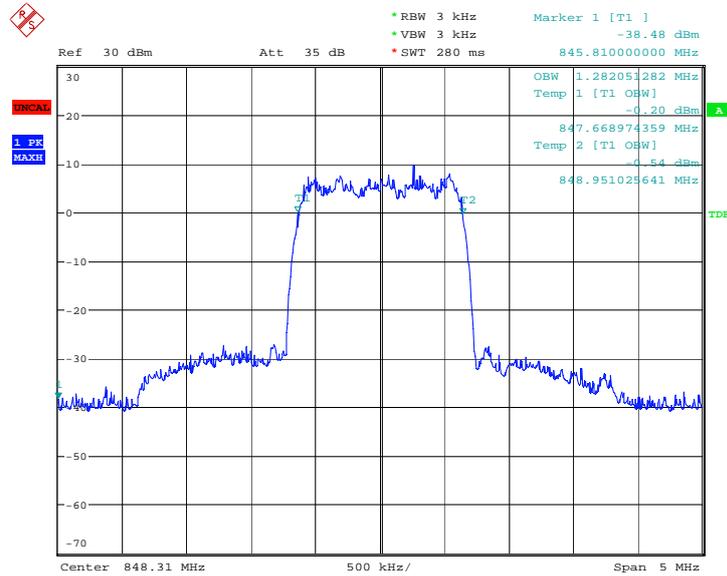
Date: 5.MAR.2009 06:17:07

### CDMA 1700 (99% BW)

Channel	Occupied Bandwidth (−20dBc BW)(MHz)
25	1.290
450	1.282
875	1.290

ANALYZER SETTINGS: RBW=VBW=3kHz

CDMA 1700

Channel 25-Occupied Bandwidth (99% BW)
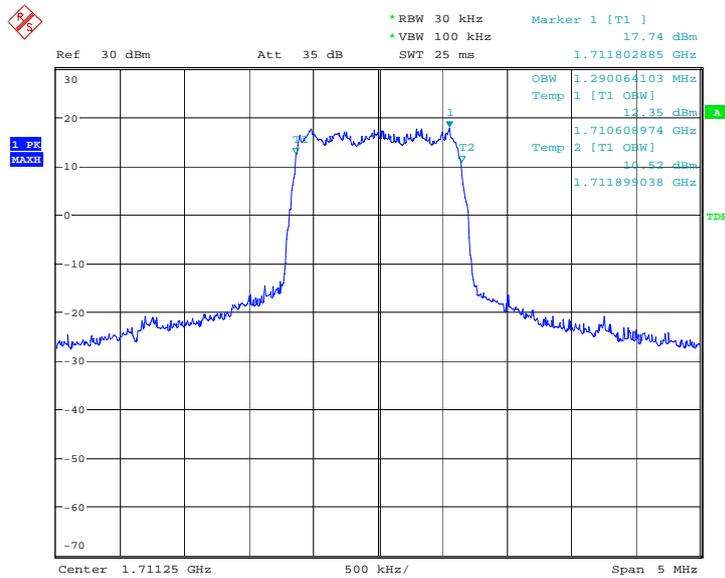
Date: 11.MAR.2009 08:45:16

Channel 450-Occupied Bandwidth (99% BW)

```
                                    * RBW 30 kHz        Marker 1 [T1 ]
                                    * VBW 100 kHz                  18.12 dBm
    Ref  30 dBm        Att  35 dB   SWT 25 ms            1.732500000 GHz
    30                                          OBW  1.282051282 MHz
                                                Temp 1 [T1 OBW]
                                                             10.91 dBm    A
    20                                                 1.731858974 GHz
 1 PK                                           Temp 2 [T1 OBW]
 MAXH  10      T1                    T2                      11.56 dBm
                                                   1.733141026 GHz
     0                                                                   TDF
   -10
   -20
   -30
   -40
   -50
   -60
   -70
    Center  1.7325 GHz        500 kHz/              Span  5 MHz
```
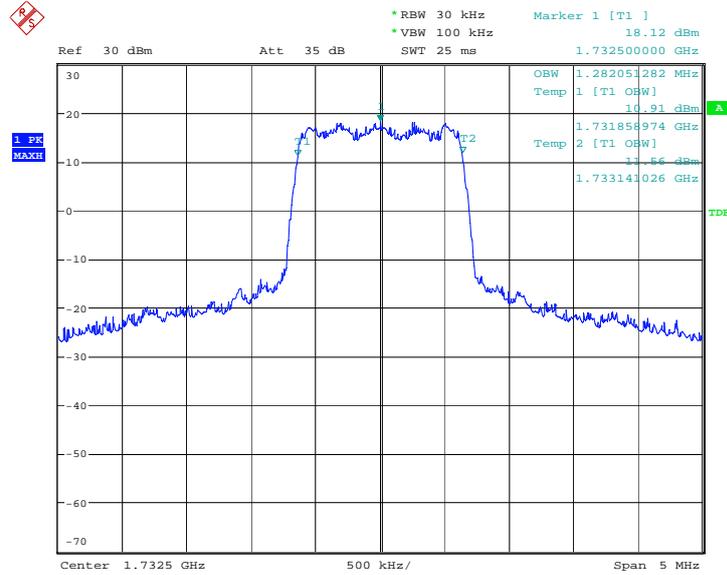
Date: 11.MAR.2009 08:44:32

Channel 875-Occupied Bandwidth (99% BW)

```
                                    * RBW 30 kHz        Marker 1 [T1 ]
                                    * VBW 100 kHz                  17.52 dBm
    Ref  30 dBm        Att  55 dB   SWT 25 ms            1.754070513 GHz
    30                                          OBW  1.290064103 MHz
                                                Temp 1 [T1 OBW]
    20                              1                          12.37 dBm    A
 1 PK         T1                                    1.753108974 GHz
 MAXH  10                            T2          Temp 2 [T1 OBW]
                                                             10.58 dBm
     0                                             1.754399038 GHz
   -10                                                                   TDF
   -20
   -30
   -40
   -50
   -60
   -70
    Center  1.75375 GHz       500 kHz/              Span  5 MHz
```

Date: 11.MAR.2009 08:43:48

CDMA 1900(99% BW)

Channel	Occupied Bandwidth (−20dBc BW)(MHz)
25	1.282
600	1.282
1175	1.274

ANALYZER SETTINGS: RBW=VBW=3kHz

CDMA 1900

Channel 25-Occupied Bandwidth (99% BW)
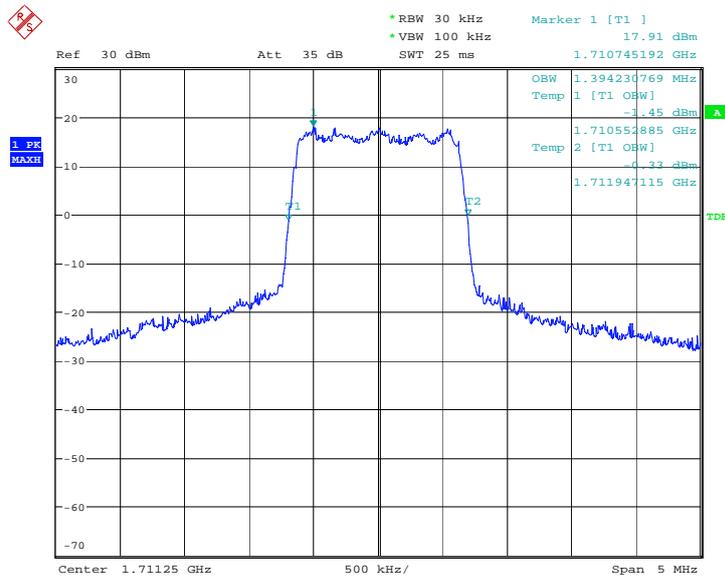
Date: 11.MAR.2009 08:45:45

Channel 600-Occupied Bandwidth (99% BW)
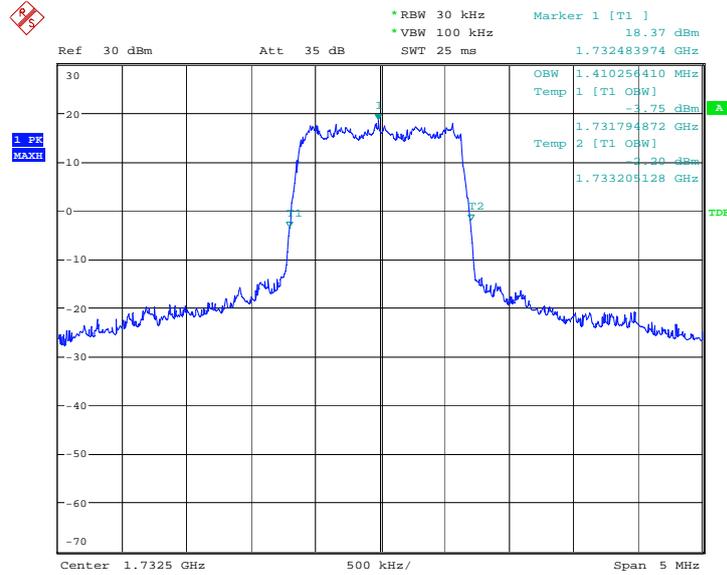
Date: 11.MAR.2009 08:46:14

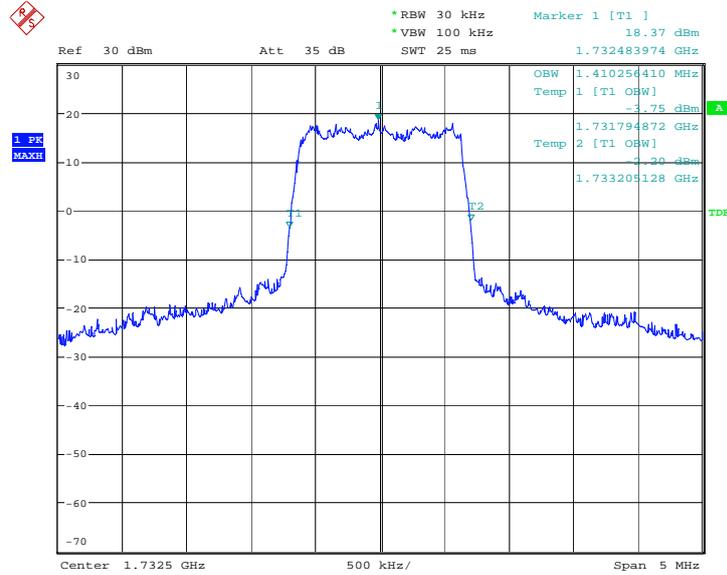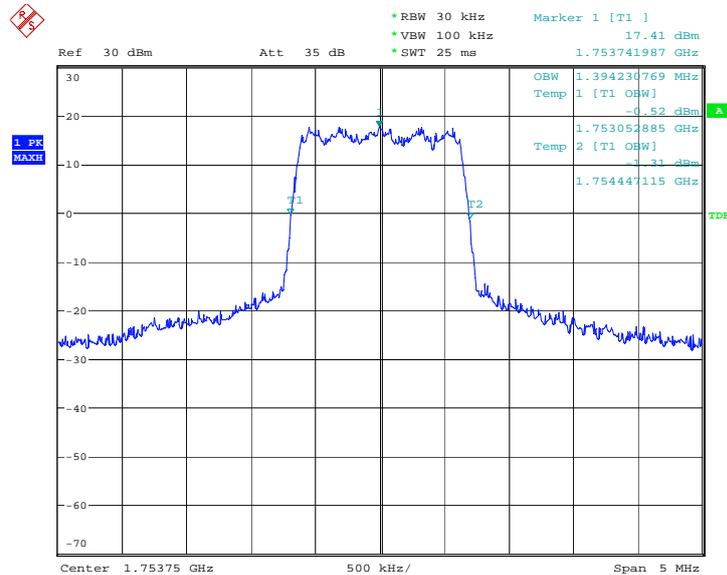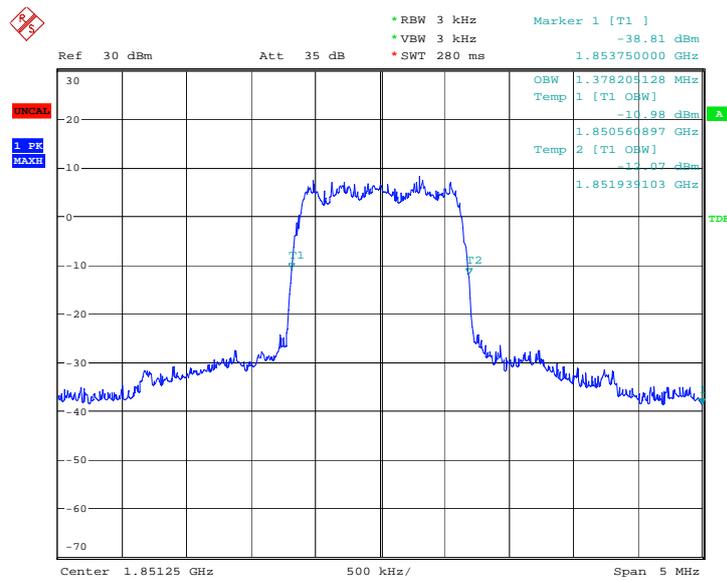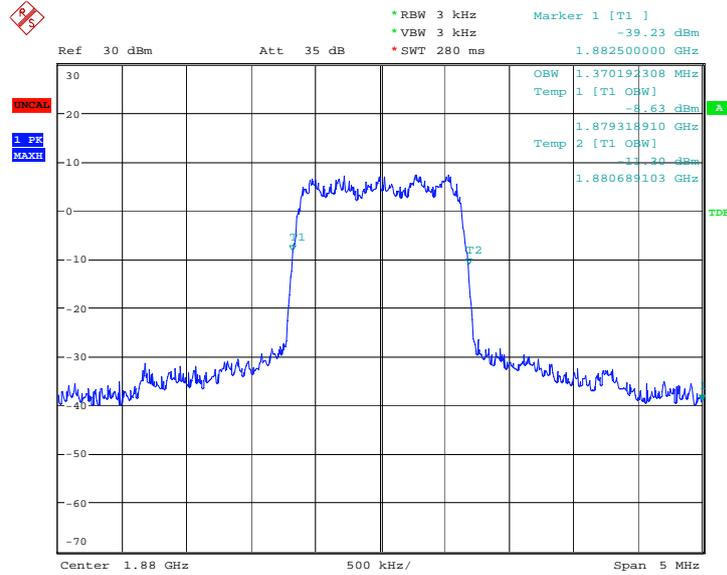## Channel 1175-Occupied Bandwidth (99% BW)
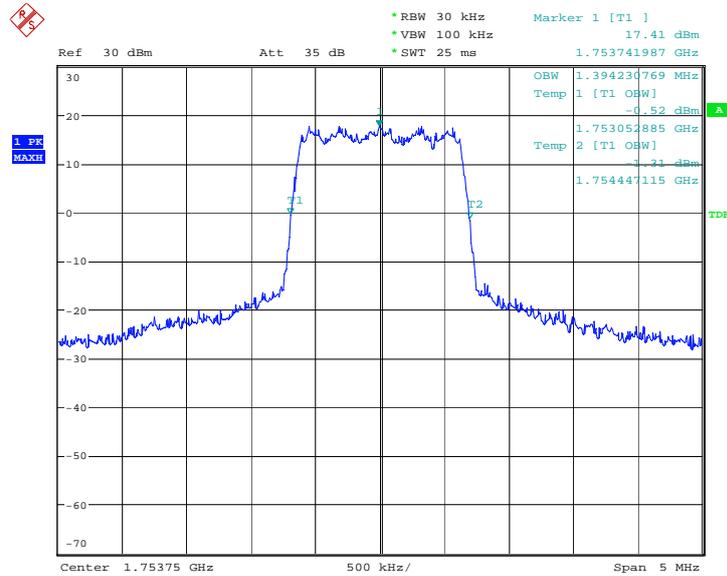
Date: 11.MAR.2009 09:10:18

A.6 EMISSION BANDWIDTH   (§22.917(b)/§24.238(b))

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 CDMA 800, CDMA 1700 and CDMA 1900 band. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

CDMA 800 (-26dBc)

Channel	Occupied Bandwidth (–26dBc BW)(MHz)
1013	1.378
384	1.434
777	1.370

ANALYZER SETTINGS: RBW=VBW=3kHz

CDMA 800

Channel 1013-Occupied Bandwidth (-26dBc BW)
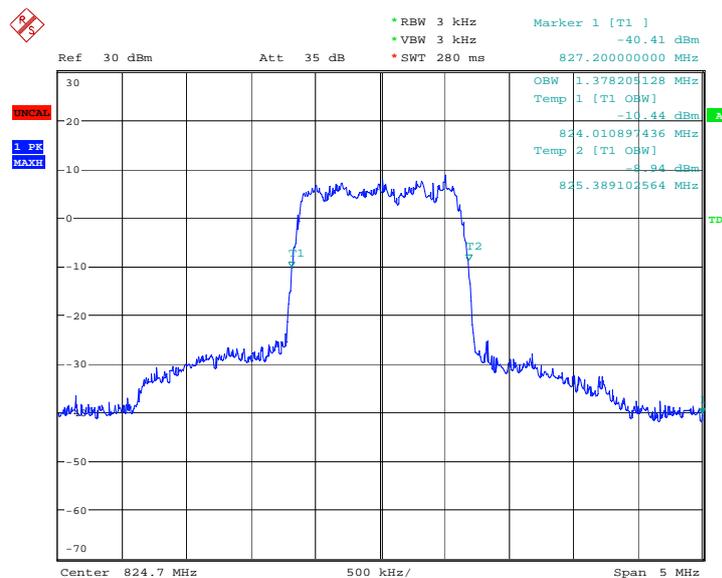
Date: 5.MAR.2009 06:22:58

Channel 384-Occupied Bandwidth (-26dBc BW)
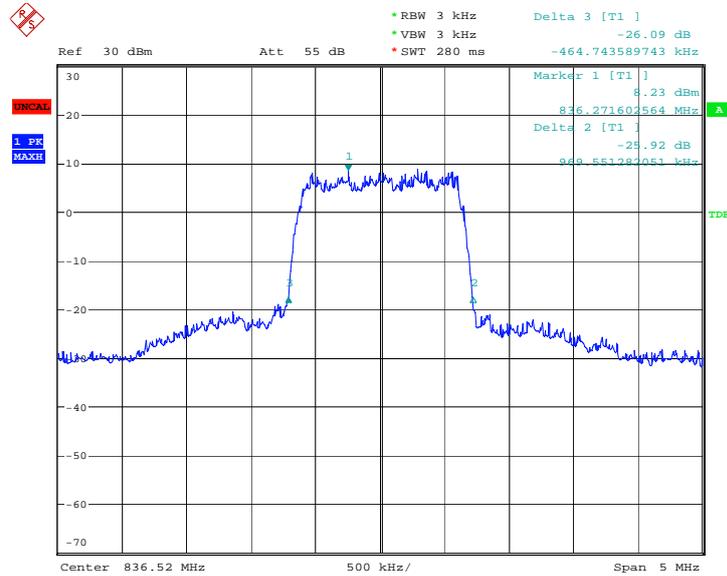
Date: 5.MAR.2009 06:27:07

Channel 777-Occupied Bandwidth (-26dBc BW)
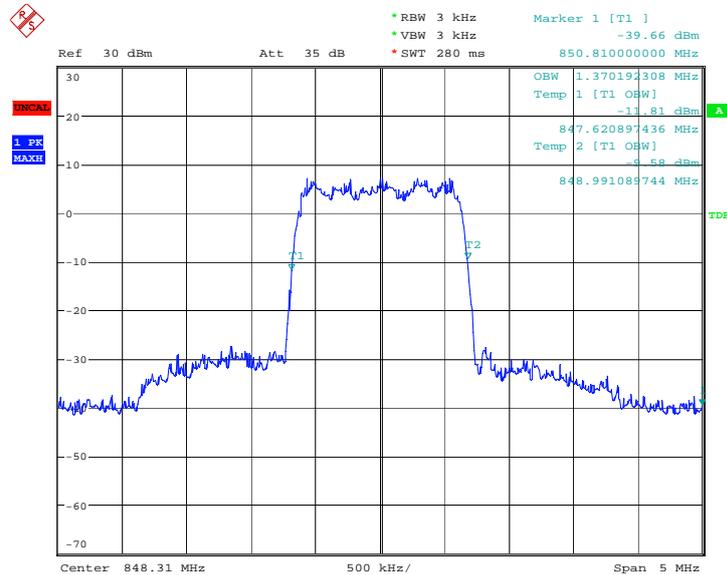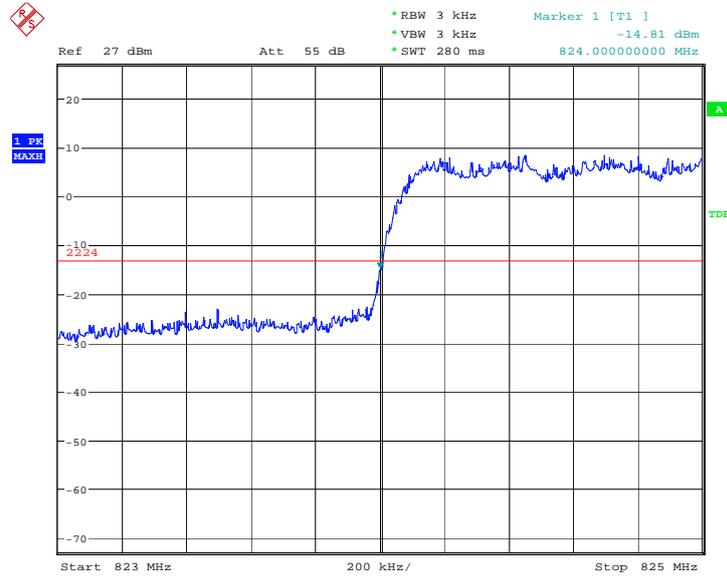

Date: 5.MAR.2009 06:21:43

CDMA 1700 (-26dBc)

Channel	Occupied Bandwidth (−26dBc BW)(MHz)
25	1.394
450	1.410
875	1.394

ANALYZER SETTINGS: RBW=VBW=3kHz;

CDMA 1700

Channel 25-Occupied Bandwidth (-26dBc BW)
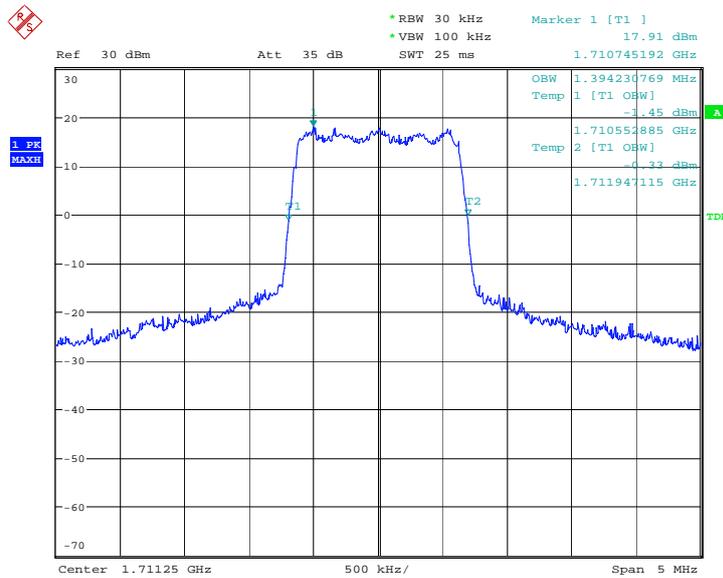
Date: 11.MAR.2009 08:45:45

Channel 450-Occupied Bandwidth (-26dBc BW)

Date: 11.MAR.2009 08:46:14

Channel 875-Occupied Bandwidth (-26dBc BW)

Date: 11.MAR.2009 09:10:18

CDMA 1900 (-26dBc)

Channel	Occupied Bandwidth (−26dBc BW)(MHz)
25	1.378
600	1.370
1175	1.370

ANALYZER SETTINGS: RBW=VBW=3kHz;

CDMA 1900

Channel 25-Occupied Bandwidth (-26dBc BW)

Date: 5.MAR.2009 06:21:04

Channel 600-Occupied Bandwidth (-26dBc BW)

Date: 5.MAR.2009 06:20:23

Channel 1175-Occupied Bandwidth (-26dBc BW)
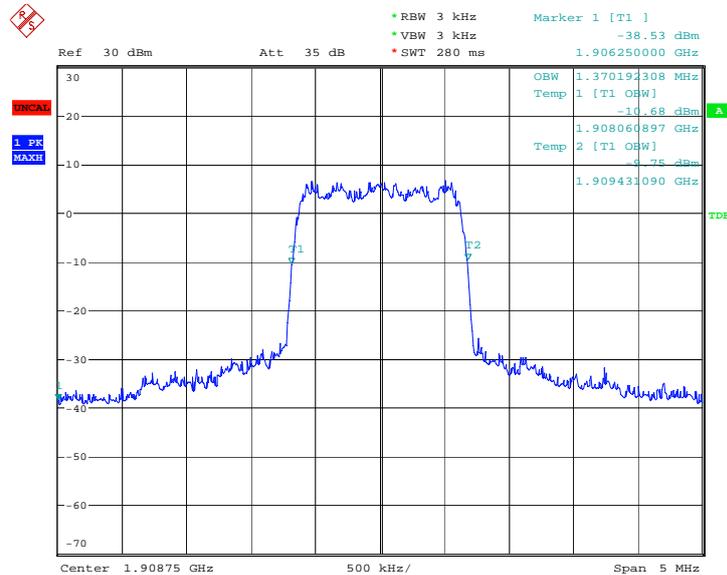
Date: 5.MAR.2009 06:19:58

A.7 BAND EDGE COMPLIANCE   (§22.917(b)/§24.238(b)/ §27.53(g))

CDMA 800

BAND EDGE BLOCK-Channel 1013

Date: 5.MAR.2009 09:08:48

BAND EDGE BLOCK-Channel 777
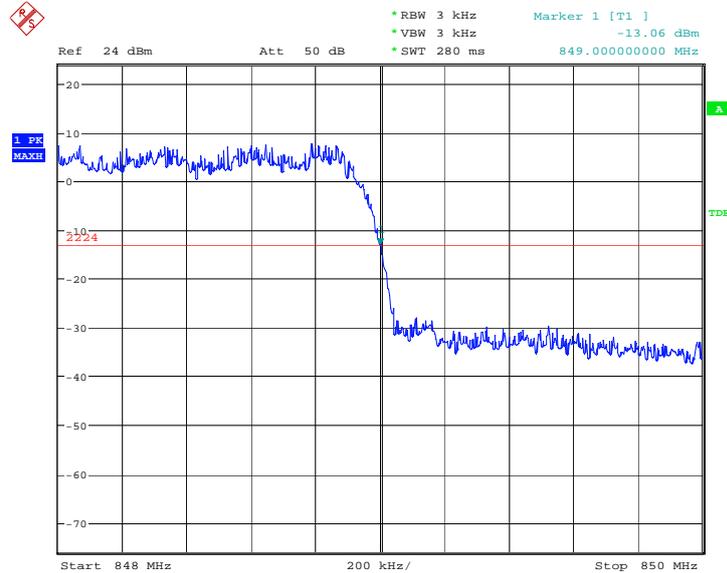
Date: 5.MAR.2009 09:11:27

CDMA 1700
BAND EDGE BLOCK-Channel 25
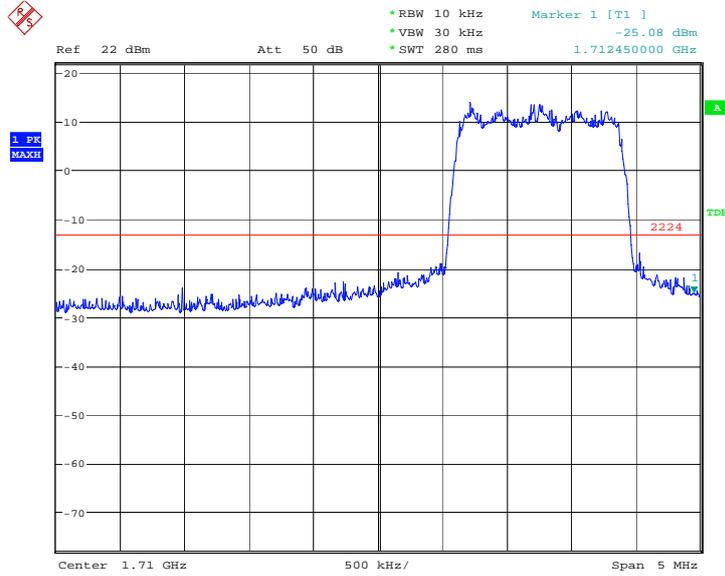
Date: 11.MAR.2009 08:58:31

BAND EDGE BLOCK-Channel 875
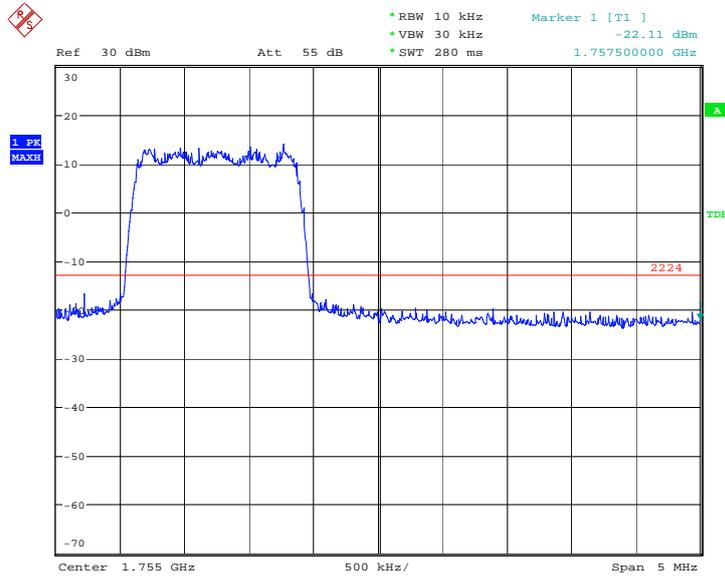
Date: 11.MAR.2009 08:57:39

CDMA 1900
BAND EDGE BLOCK-Channel 25

```
                              * RBW  3 kHz      Marker 1 [T1 ]
                              * VBW  3 kHz              -25.94 dBm
  Ref  24 dBm      Att  50 dB * SWT  280 ms       1.850000000 GHz
```



```
  Center  1.85 GHz            500 kHz/            Span  5 MHz
```
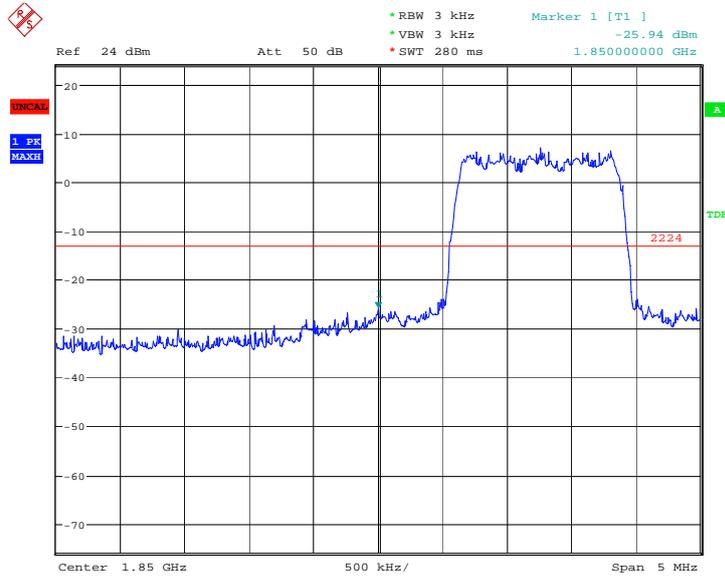
Date: 5.MAR.2009 09:14:15

BAND EDGE BLOCK-Channel 1175

```
                              * RBW  3 kHz      Marker 1 [T1 ]
                              * VBW  3 kHz              -30.89 dBm
  Ref  24 dBm      Att  50 dB * SWT  280 ms       1.910000000 GHz
```



```
  Center  1.91 GHz            500 kHz/            Span  5 MHz
```
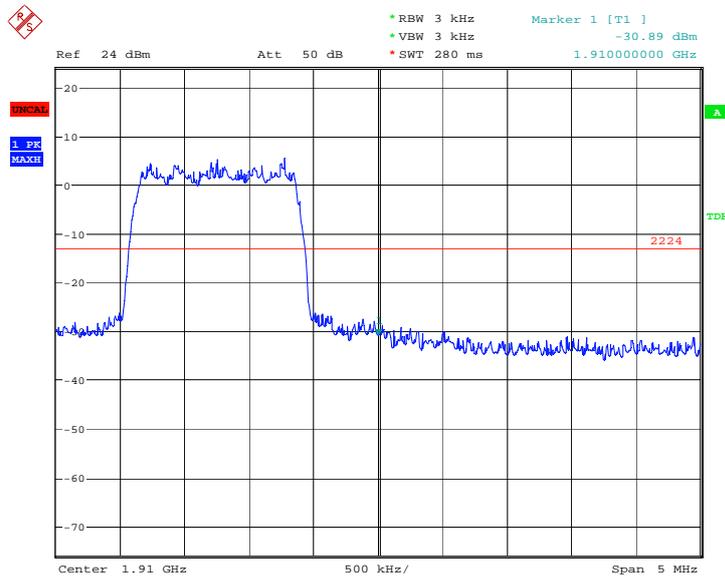
Date: 5.MAR.2009 09:15:48

A.8 CONDUCTED SPURIOUS EMISSION   (§2.1057/§22.917/§24.238/§27.53(g))

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.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

CDMA 800 Transmitter

Channel	Frequency (MHz)
1013	824.70
384	836.52
777	848.31

CDMA 1700 Transmitter

Channel	Frequency (MHz)
25	1711.25
450	1732.50
875	1753.75

CDMA 1900 Transmitter

Channel	Frequency (MHz)
25	1851.25
600	1880.00
1175	1909.75

A. 8.2 Measurement Limit

Sec. 24.238 Emission Limits.

(a) 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 $43+10Log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

A. 8.3 Measurement result

CDMA 800

A.8.3.1 Channel 1013: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

NOTE: peak above the limit line is the carrier frequency.
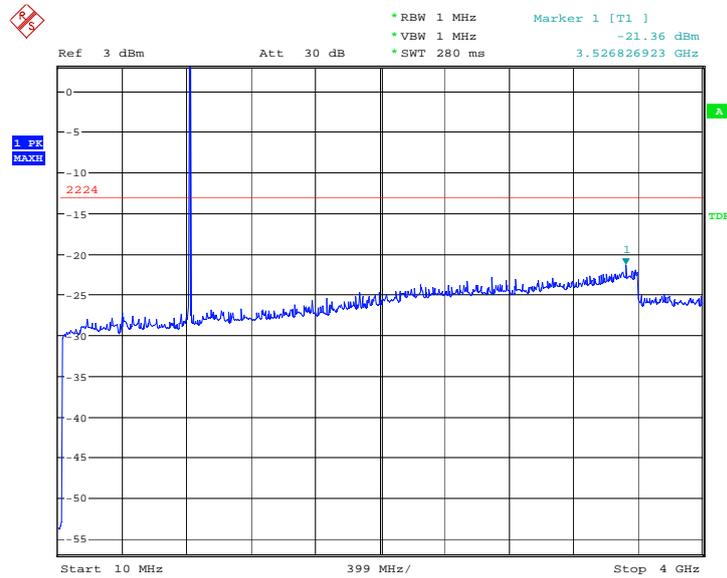
Date: 5.MAR.2009 06:48:13

A.8.3.2 Channel 1013: 4GHz – 10GHz Set.1
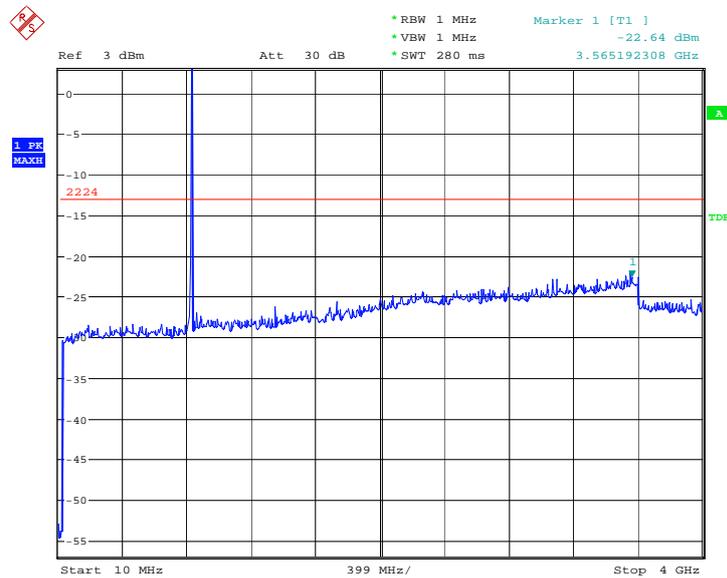
Spurious emission limit –13dBm.
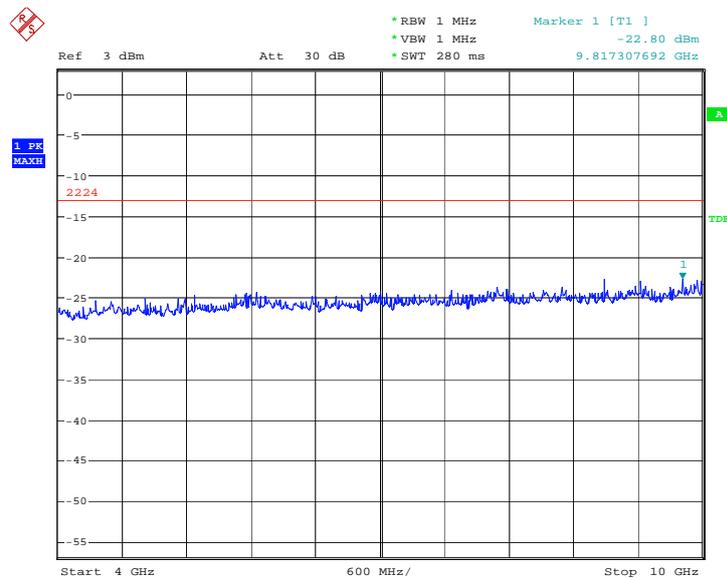
Date: 5.MAR.2009 06:48:34

A.8.3.3 Channel 384: 10MHz – 4GHz Set.1
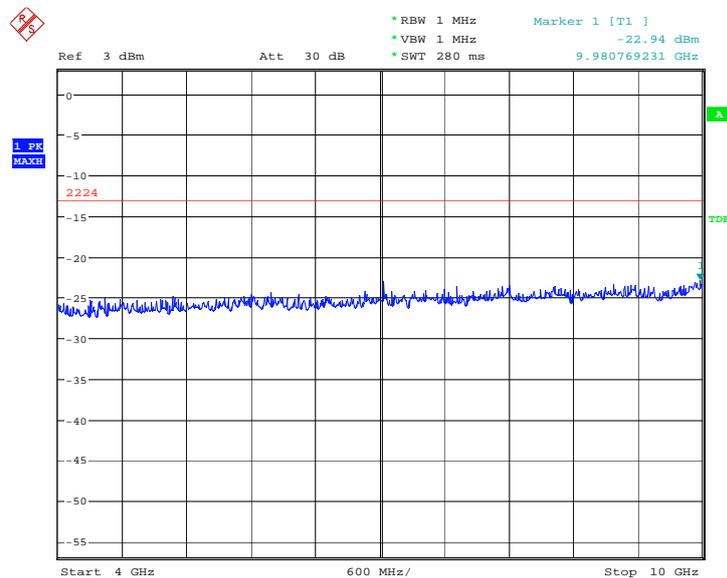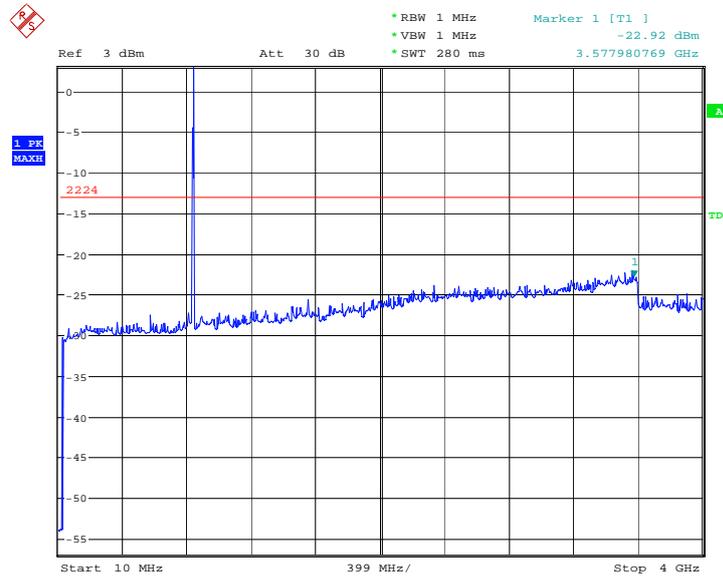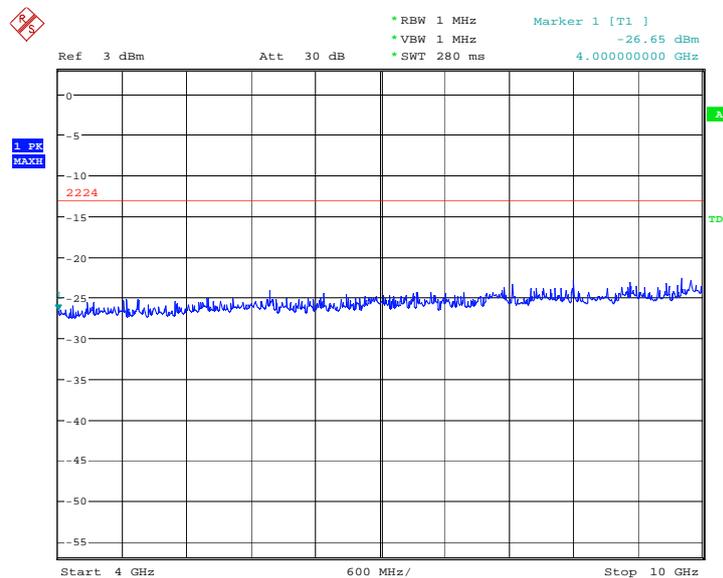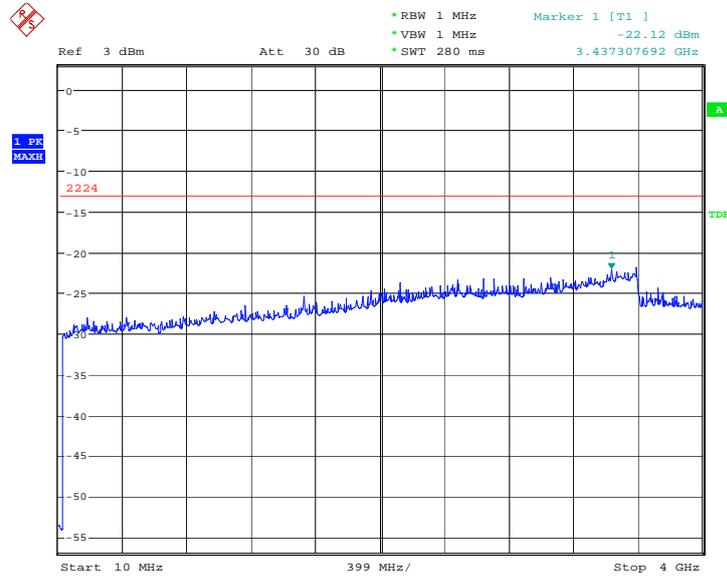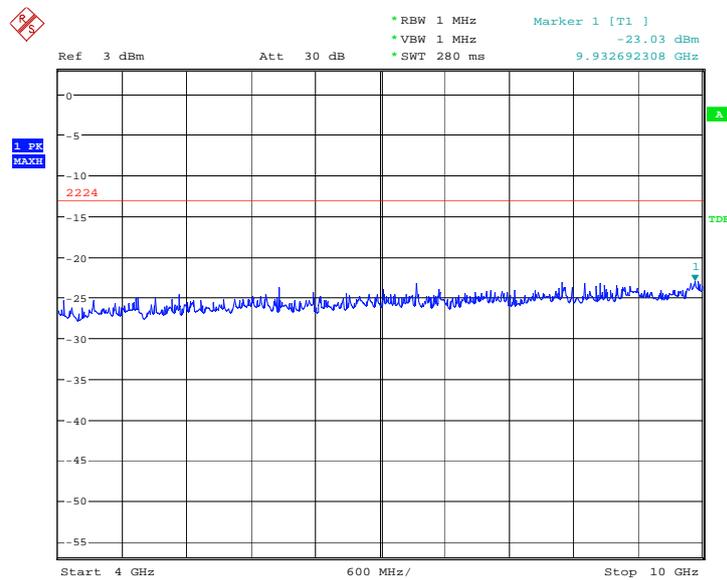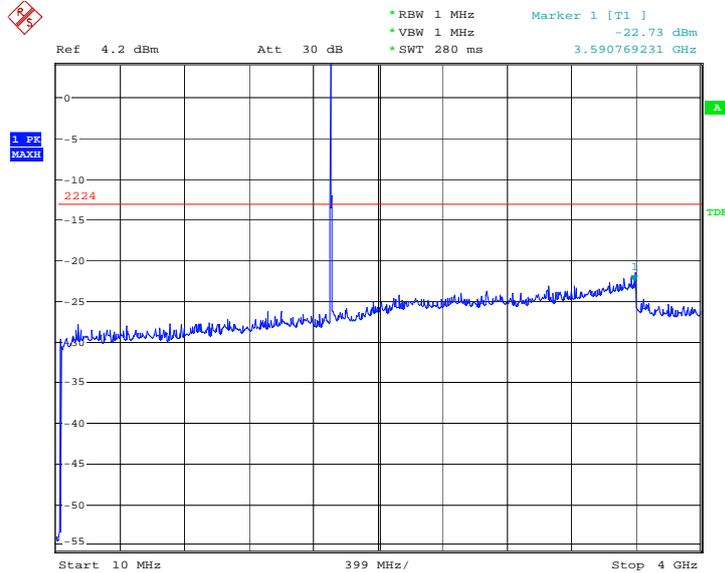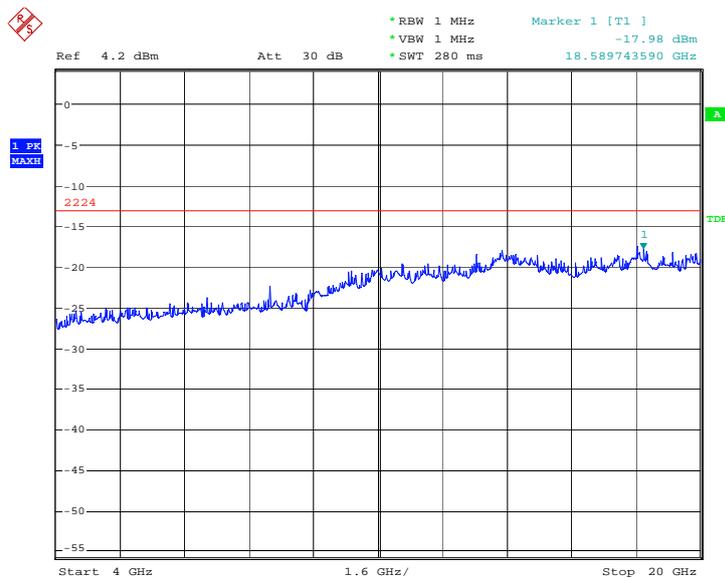
Spurious emission limit –13dBm

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

Date: 5.MAR.2009 06:46:48

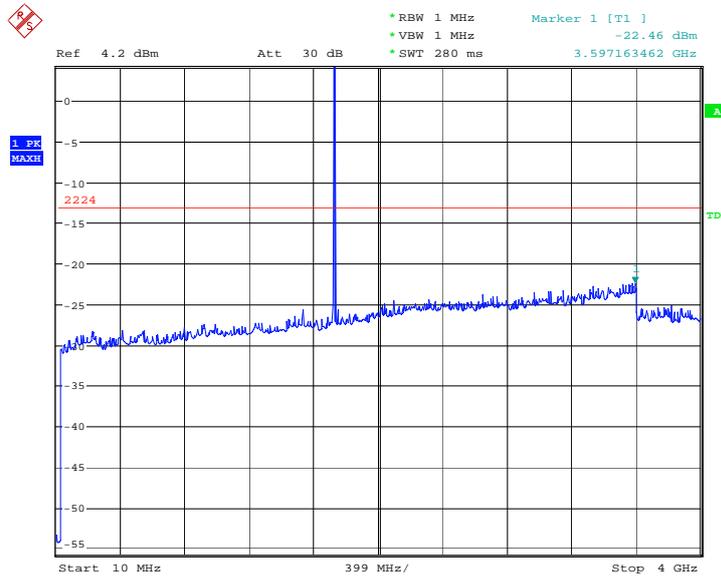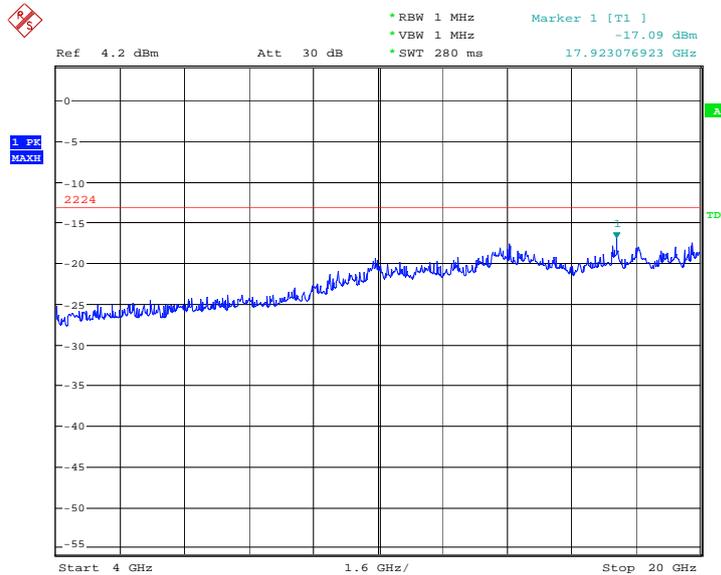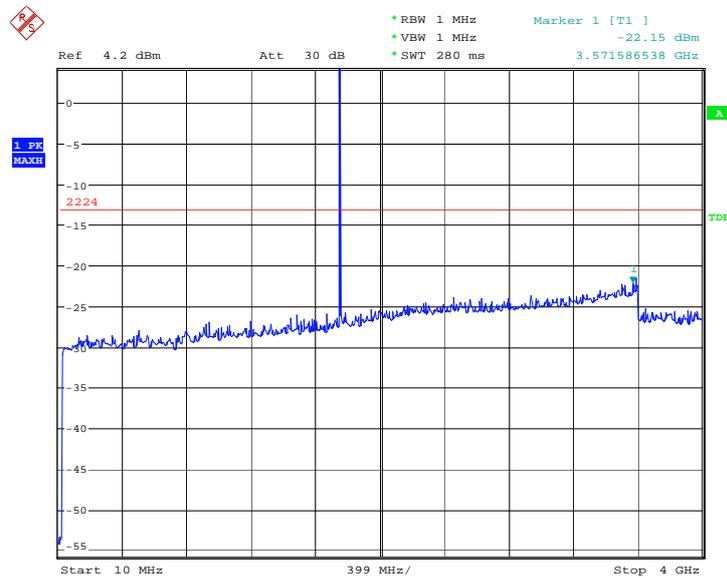### A.8.3.4 Channel 384: 4GHz –10GHz Set.1

Spurious emission limit –13dBm

Date: 5.MAR.2009 06:46:22

A.8.3.5 Channel 777: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

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


```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz                -22.92 dBm
Ref   3 dBm            Att  30 dB   * SWT 280 ms         3.577980769 GHz
```

Date: 5.MAR.2009 06:45:23

A.8.3.6 Channel 777: 4GHz – 10GHz Set.1

Spurious emission limit –13dBm.


```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz                -26.65 dBm
Ref   3 dBm            Att  30 dB   * SWT 280 ms         4.000000000 GHz
```

Date: 5.MAR.2009 06:45:44

A.8.3.7 Idle mode: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

Date: 5.MAR.2009 06:49:29

A.8.3.8 Idle mode: 4GHz – 10GHz Set.1

Spurious emission limit –13dBm.

Date: 5.MAR.2009 06:49:46

CDMA 1700

A. 8.3.9 Channel 25: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

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

```
                                        *RBW 1 MHz      Marker 1 [T1 ]
                                        *VBW 1 MHz            -22.73 dBm
        Ref  4.2 dBm        Att  30 dB  *SWT 280 ms      3.590769231 GHz

                                                                       A
1 PK
MAXH

        2224

Start 10 MHz              399 MHz/                    Stop  4 GHz
```

Date: 11.MAR.2009 08:52:28

A. 8.3.10 Channel 25: 4GHz – 20GHz Set.1

Spurious emission limit –13dBm.

```
                                        *RBW 1 MHz      Marker 1 [T1 ]
                                        *VBW 1 MHz            -17.98 dBm
        Ref  4.2 dBm        Att  30 dB  *SWT 280 ms      18.589743590 GHz

                                                                       A
1 PK
MAXH

        2224

Start 4 GHz               1.6 GHz/                    Stop  20 GHz
```

Date: 11.MAR.2009 08:52:51

A. 8.3.11 Channel 450: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm

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

Date: 11.MAR.2009 08:53:22

A. 8.3.12 Channel 450: 4GHz –20GHz Set.1

Spurious emission limit –13dBm

Date: 11.MAR.2009 08:53:47

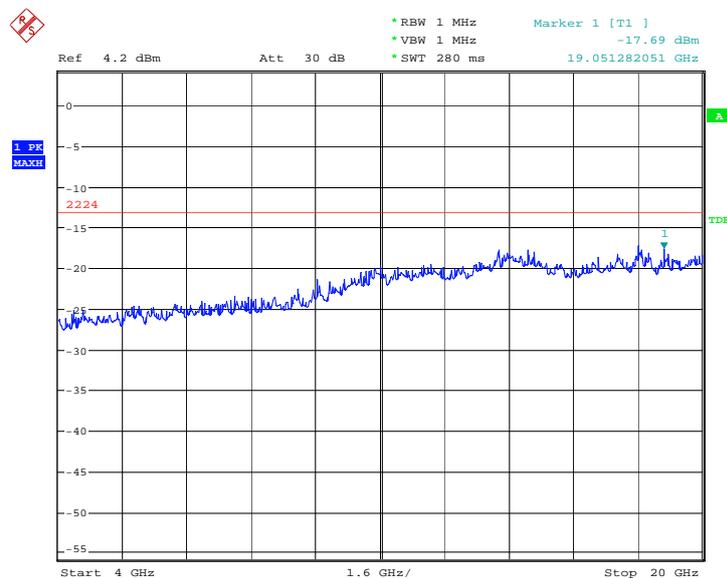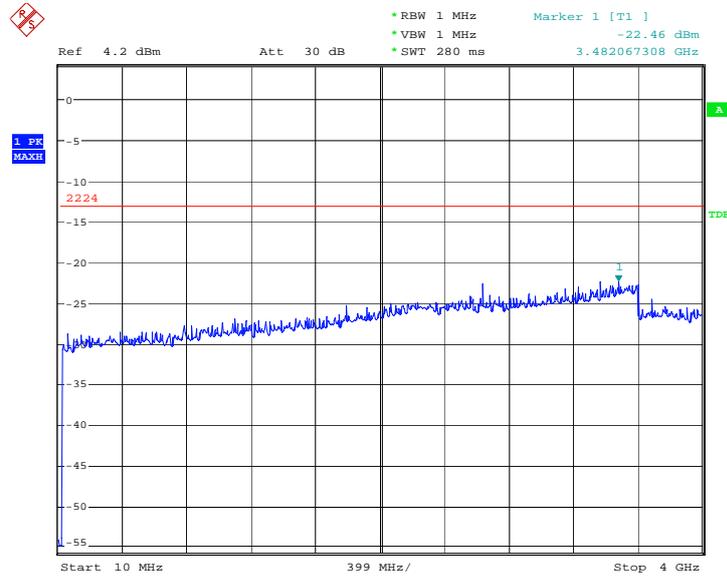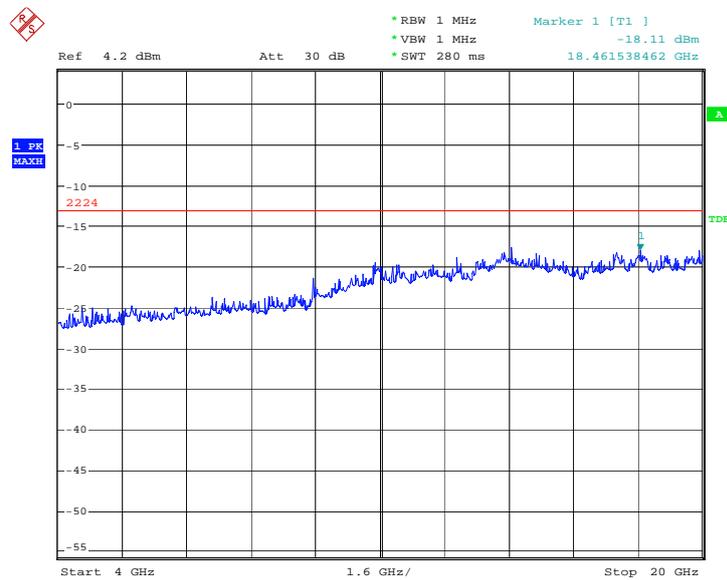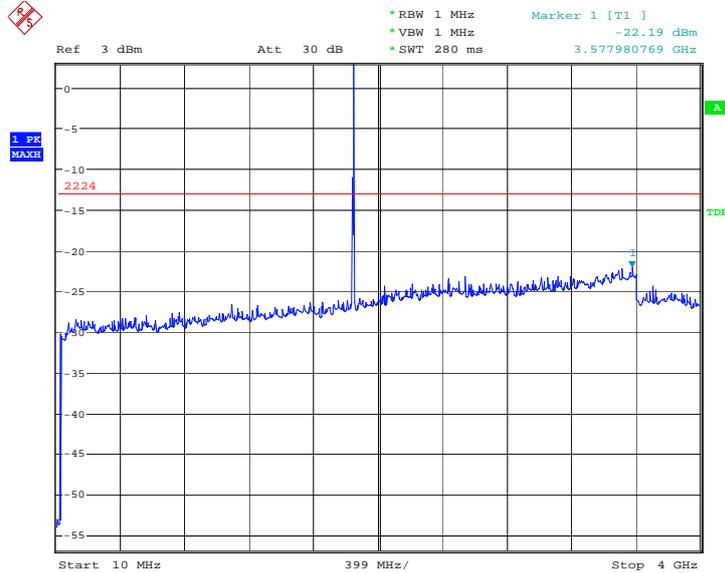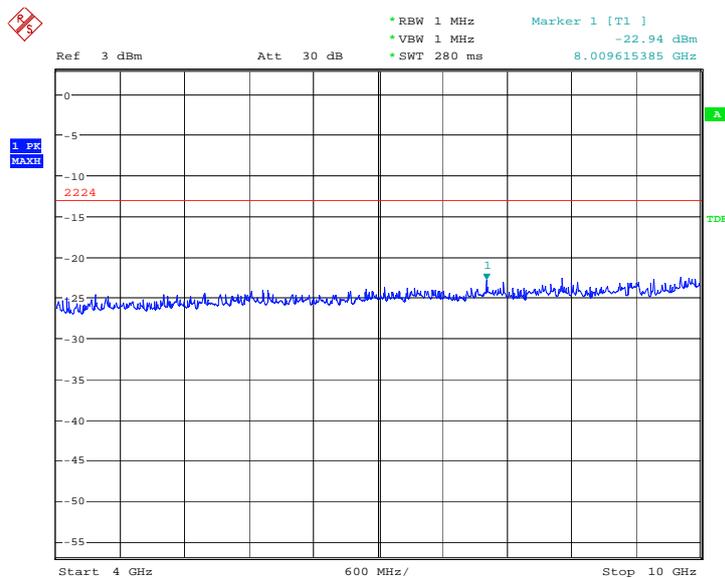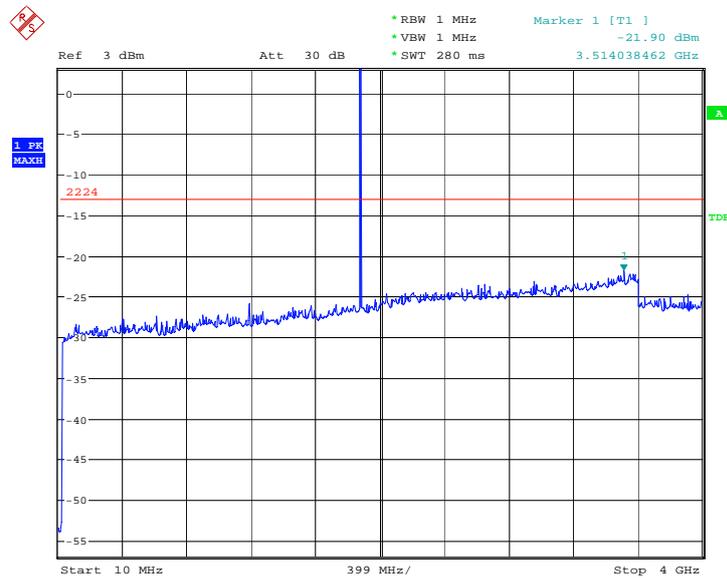## A. 8.3.13 Channel 875: 10MHz – 4GHz Set.1

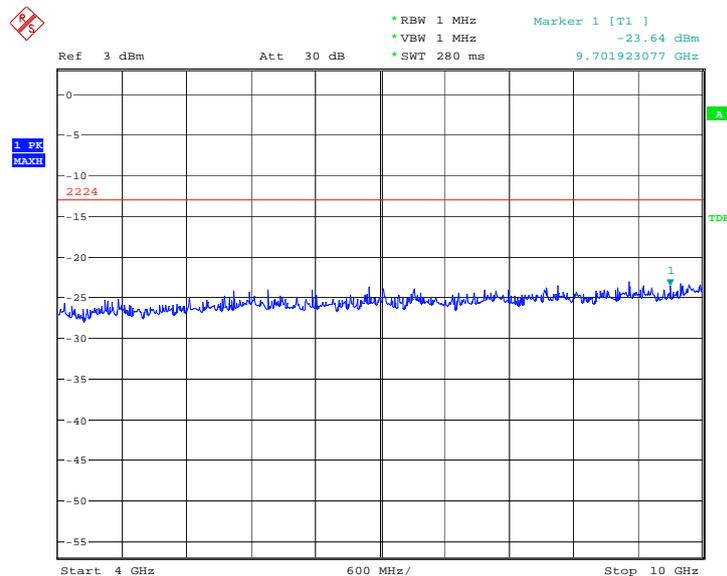Spurious emission limit –13dBm.

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

Date: 11.MAR.2009 08:54:17

A. 8.3.14 Channel 875: 4GHz – 20GHz Set.1

Spurious emission limit –13dBm.

Date: 11.MAR.2009 08:54:42

A. 8.3.15 Idle mode: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

Date: 11.MAR.2009 08:55:08

A. 8.3.16 Idle mode: 4GHz – 20GHz Set.1

Spurious emission limit -13dBm.

Date: 11.MAR.2009 08:55:26

CDMA 1900

A. 8.3.17 Channel 25: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

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

Date: 5.MAR.2009 06:44:35

A. 8.3.18 Channel 25: 4GHz – 20GHz Set.1

Spurious emission limit –13dBm.

Date: 5.MAR.2009 06:43:29

A. 8.3.19 Channel 600: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm

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

Date: 5.MAR.2009 06:41:50

A. 8.3.20 Channel 600: 4GHz –20GHz Set.1
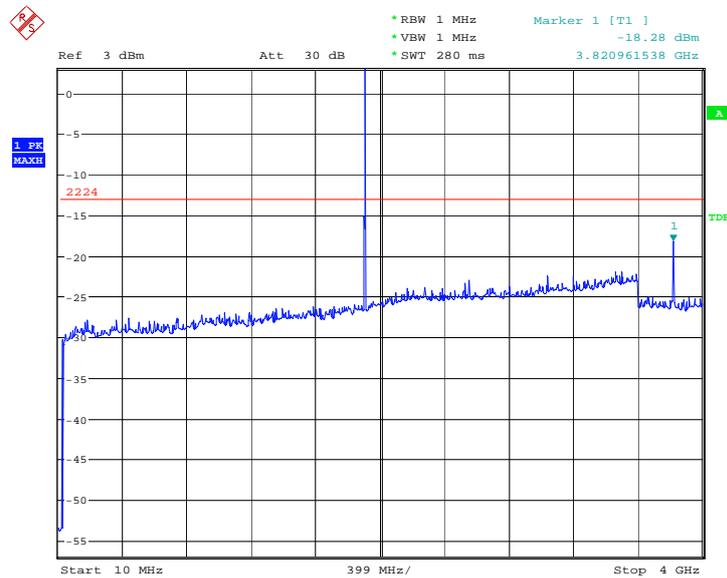
Spurious emission limit –13dBm

Date: 5.MAR.2009 06:42:12

A. 8.3.21 Channel 1175: 10MHz – 4GHz Set.1
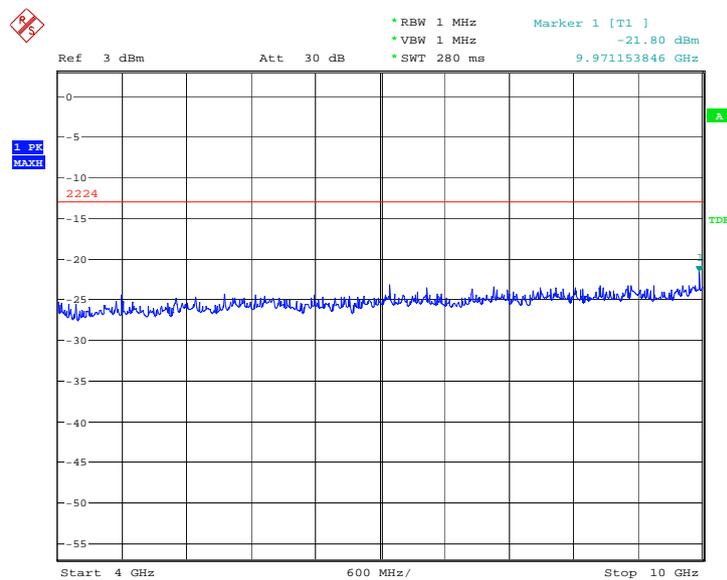
Spurious emission limit –13dBm.

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

Date: 5.MAR.2009 06:40:26
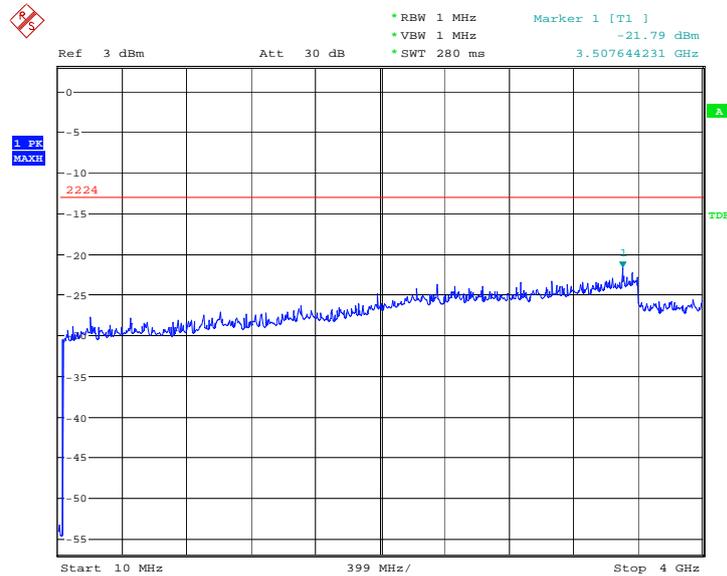
A. 8.3.22 Channel 1175: 4GHz – 20GHz Set.1

Spurious emission limit –13dBm.

Date: 5.MAR.2009 06:40:56
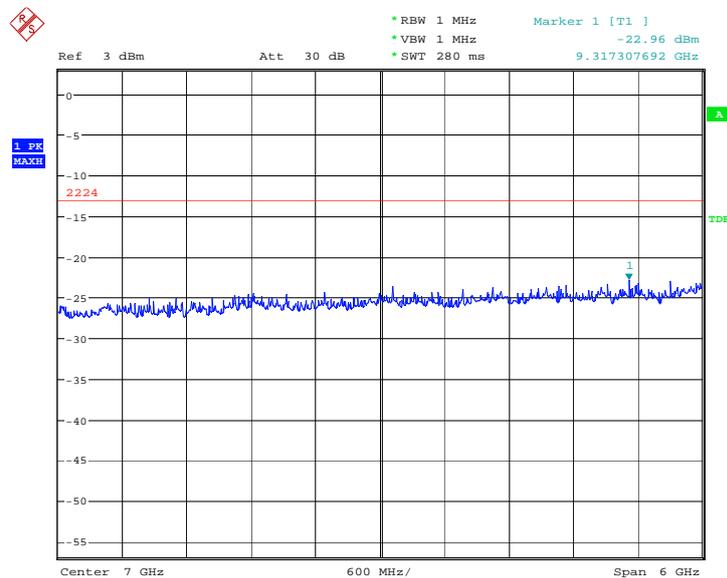
A. 8.3.23 Idle mode: 10MHz – 4GHz Set.1

Spurious emission limit –13dBm.

Date: 5.MAR.2009 06:50:13

A. 8.3.24 Idle mode: 4GHz – 20GHz Set.1

Spurious emission limit -13dBm.

Date: 5.MAR.2009 06:50:34

END OF REPORT