



TEST REPORT

No. 2009TAR061

for

ZTE CORPORATION

CDMA 2000 1X Digital Mobile Phone

Type: ZTE C70

with

Hardware Version: C98A

Software Version: ZTEC70V1.0.0B01

Issued Date: May 21th, 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 Industry and Information Technology

No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China 100083.

Tel:+86(0)10-62303288-2105, Fax:+86(0)10-62304793 Email:welcome@emcite.com. www.emcite.com

©Copyright. All rights reserved by TMC Beijing.

CONTENTS

1. TEST LABORATORY.....	3
1.1. TESTING LOCATION	3
1.2. TESTING ENVIRONMENT	3
1.3. PROJECT DATA.....	3
1.4. SIGNATURE	3
2. CLIENT INFORMATION.....	4
2.1. APPLICANT INFORMATION.....	4
2.2. MANUFACTURER INFORMATION.....	4
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	5
3.1. ABOUT EUT	5
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	5
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	5
3.4. GENERAL DESCRIPTION	6
4. REFERENCE DOCUMENTS	6
4.1. REFERENCE DOCUMENTS FOR TESTING.....	6
5. LABORATORY ENVIRONMENT	6
6. SUMMARY OF TEST RESULTS.....	7
7. TEST EQUIPMENTS UTILIZED.....	7
ANNEX A: MEASUREMENT RESULTS	9
A.1 OUTPUT POWER (§22.913(A)/§24.232(B)/§27.50(D)(2)).....	9
A.2 EMISSION LIMIT (§2.1051/§24.238/§27.53(G))	12
A.3 CONDUCTED EMISSION (§15.107§15.207)	30
A.4 FREQUENCY STABILITY (§2.1055/§24.235/§27.54).....	35
A.5 OCCUPIED BANDWIDTH (§2.1049(H)(I))	38
A.6 EMISSION BANDWIDTH (§22.917(B)/§24.238(B))	44
A.7 BAND EDGE COMPLIANCE (§22.917(B)/§24.238(B)/ §27.53(G)).....	50
A.8 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917/§24.238/§27.53(G))	53

1. Test Laboratory

1.1. Testing Location

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

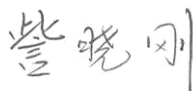
1.2. Testing Environment

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

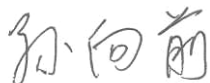
1.3. Project data

Testing Start Date: Mar 1,2009
Testing End Date: Mar 21,2009

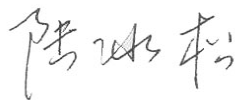
1.4. Signature



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 C70
FCC ID	Q78-ZTEC70
Frequency	CDMA 800MHz;CDMA 1700MHz;CDMA 1900MHz
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	22.86 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
N08	00000000000000	C98A	ZTEC70V1.0.0B01

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

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

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

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

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

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 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	2010-4-20
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	2010-5-15

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	20.84
384	836.52	21.14
777	848.31	22.17

CDMA 1700**Measurement result**

Channel	Frequency(MHz)	Channel power(dBm)
25	1711.25	22.12
450	1732.5	22.08
875	1753.75	21.80

CDMA 1900**Measurement result**

Channel	Frequency(MHz)	Channel power(dBm)
25	1851.25	21.34
600	1880.00	21.71
1175	1908.75	21.63

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 $A_{Rpl} = P_{in} - P_r$. 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:

$$\text{Power} = P_{\text{Mea}} + A_{\text{Rpl}}$$

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 (P_{in}).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

CDMA 800 -ERP

Measurement result

Frequency(MHz)	Channel	Peak ERP(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Polarization
824.70	1013	20.44	45.95	-25.51	Horizontal
836.52	384	21.66	45.98	-24.32	Horizontal
848.31	777	22.41	45.82	-23.41	Horizontal

ANALYZER SETTINGS: RBW = VBW = 3MHz

CDMA 1700 -EIRP

Measurement result

Frequency(MHz)	Channel	Peak ERP(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Polarization
1711.25	25	22.86	47.27	-24.41	Horizontal
1732.5	450	22.48	46.98	-24.50	Horizontal
1753.75	875	21.79	46.89	-25.10	Vertical

ANALYZER SETTINGS: RBW = VBW = 3MHz

CDMA 1900-EIRP

Measurement result

Frequency(MHz)	Channel	Peak ERP(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Polarization
1851.25	25	20.39	47.11	-26.72	Horizontal
1880.00	600	18.96	47.37	-28.41	Horizontal
1908.75	1175	17.94	47.54	-29.60	Horizontal

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMIT (§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.

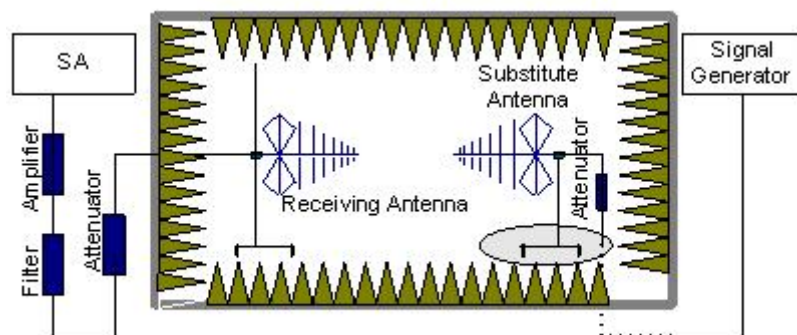
The procedure of radiated spurious emissions is as follows:

a) Pre-calibration

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

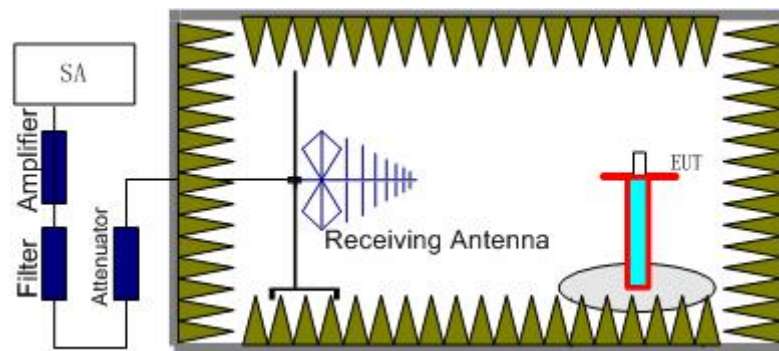
$$RSE = R_x \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + \text{Gain (dBi)} - 107 \text{ (dBuV to dBm)}$$

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 $43 + 10 \log(P)$ 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. 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:

$$\text{Power} = P_{\text{Mea}} + A_{\text{Rpl}}$$

CDMA 800 Channel 1013/824.70MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1.6485	-38.40	-2.95	-35.45	-13	Horizontal
2.4730	-48.46	0.65	-49.11	-13	Vertical
3.4790	-50.95	-1.15	-49.80	-13	Horizontal

CDMA 800 Channel 384/836.52MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1.6725	-42.44	-2.85	-39.59	-13	Horizontal
2.5105	-49.62	-0.25	-49.37	-13	Horizontal
3.5260	-52.22	-0.95	-51.27	-13	Horizontal

CDMA 800 Channel 777/848.31MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
1.6960	-40.36	-2.25	-38.11	-13	Horizontal
2.5450	-50.04	-0.15	-49.89	-13	Horizontal

CDMA 1700 Channel 25/1711.25MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
3.4195	-44.12	1.90	-46.02	-13	Vertical
4.3040	-40.16	4.0	-44.16	-13	Horizontal
10.2610	-37.29	13.6	-50.89	-13	Vertical

CDMA 1700 Channel 450/1732.5MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
2.1325	-39.80	2.4	-42.20	-13	Horizontal
3.4650	-42.72	1.7	-44.42	-13	Horizontal
4.2650	-42.54	4.7	-47.24	-13	Horizontal
10.3965	-39.69	13.2	-52.89	-13	Vertical

CDMA 1700 Channel 875/1753.75MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
2.1550	-43.73	2.2	-45.93	-13	Horizontal
3.5095	-44.28	1.8	-46.08	-13	Vertical
4.3095	-42.33	4.0	-46.33	-13	Horizontal
10.5300	-40.33	13.8	-54.13	-13	Vertical

CDMA 1900 Channel 25/1851.25MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
3.7035	-32.81	3.1	-35.91	-13	Vertical
5.5550	-46.43	4.5	-50.93	-13	Horizontal

CDMA 1900 Channel 600/1880.00MHz

Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
3.7605	-38.72	3.3	-42.02	-13	Horizontal
3.9205	-44.69	4.8	-49.49	-13	Vertical

CDMA 1900 Channel 1175/1908.75MHz

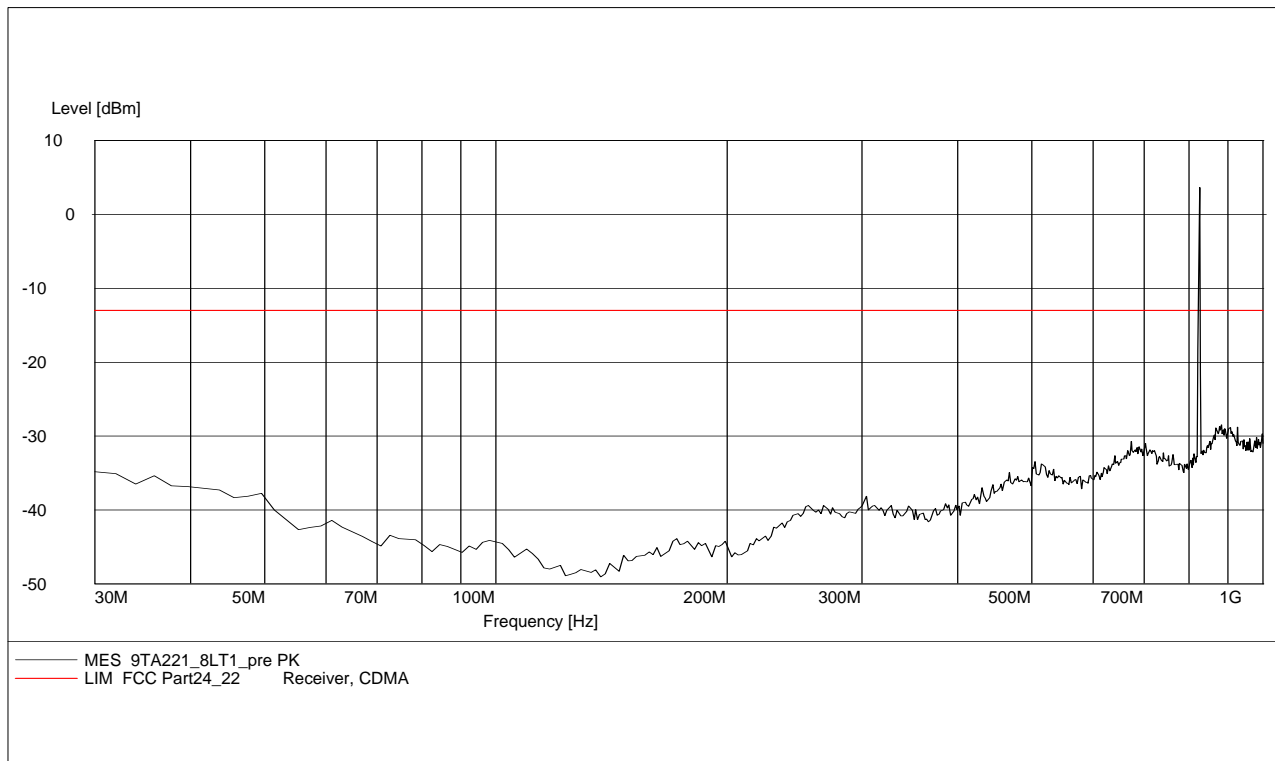
Frequency(GHz)	Power(dBm)	A _{Rpl} (dBm)	P _{Mea} (dBm)	Limit (dBm)	Polarity
3.8175	-26.45	3.5	-29.95	-13	Horizontal
11.4520	-41.22	13.8	-55.02	-13	Horizontal

CDMA 800

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

Radiated spurious emission limit :-13dBm.

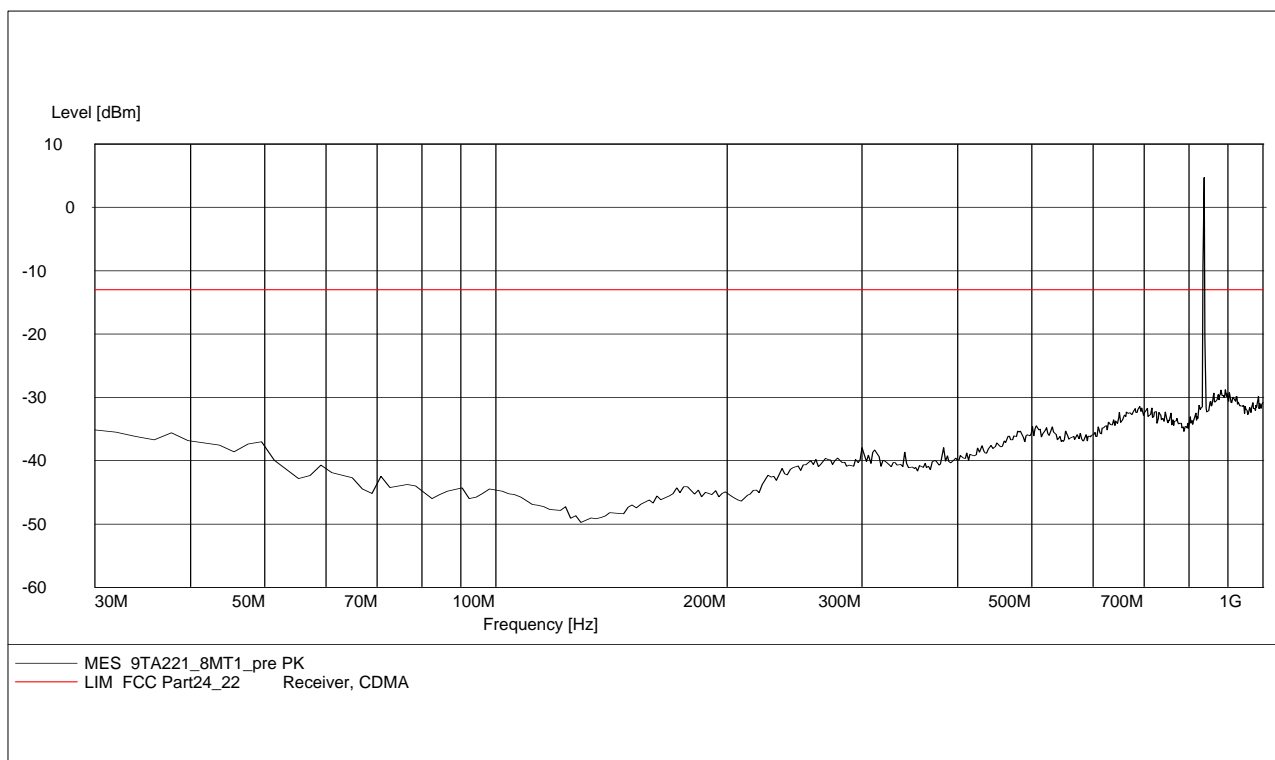
NOTE: peak above the limit line is the Carrier frequency @ ch-1013



A.2.3.2 RADIATED SPURIOUS EMISSIONS-Channel 384: 30MHz – 1GHz Set.1

Radiated spurious emission limit :-13dBm.

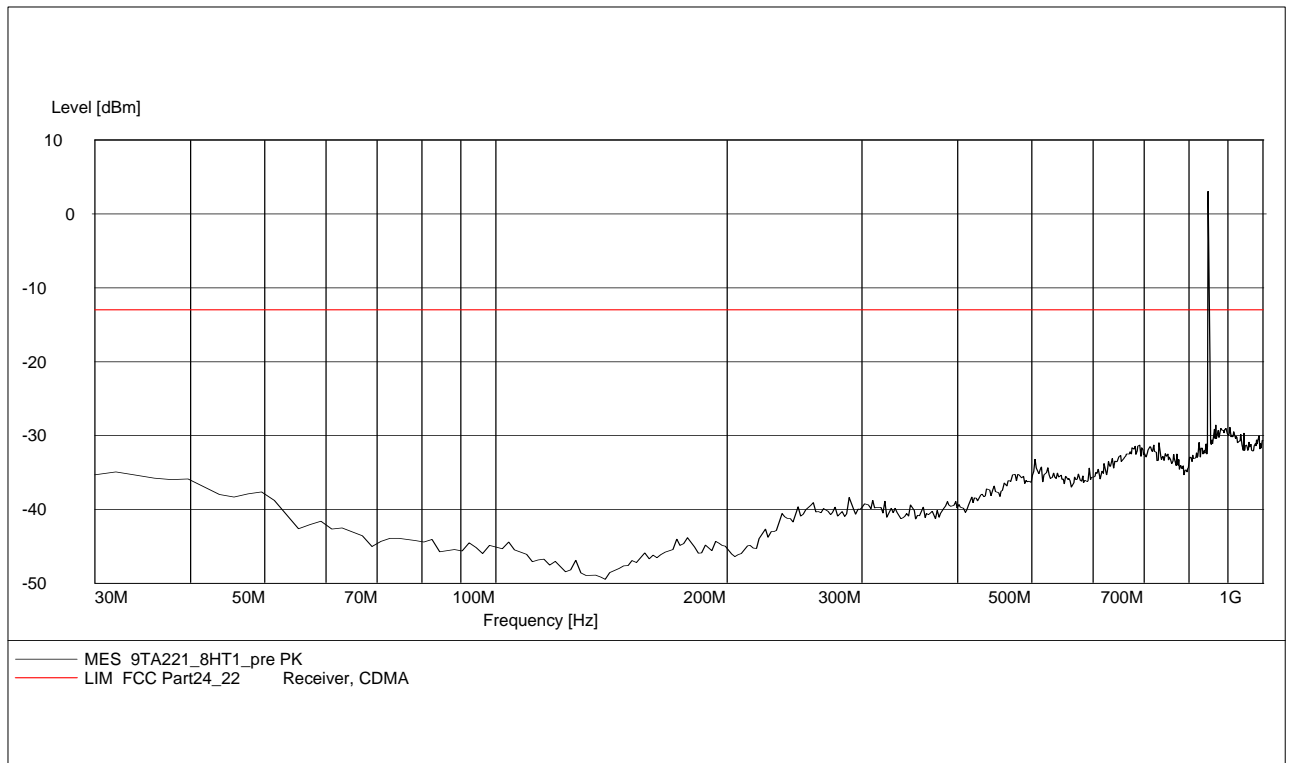
NOTE: peak above the limit line is the Carrier frequency @ ch-384



A.2.3.3 RADIATED SPURIOUS EMISSIONS-Channel 777: 30MHz – 1GHz Set.1

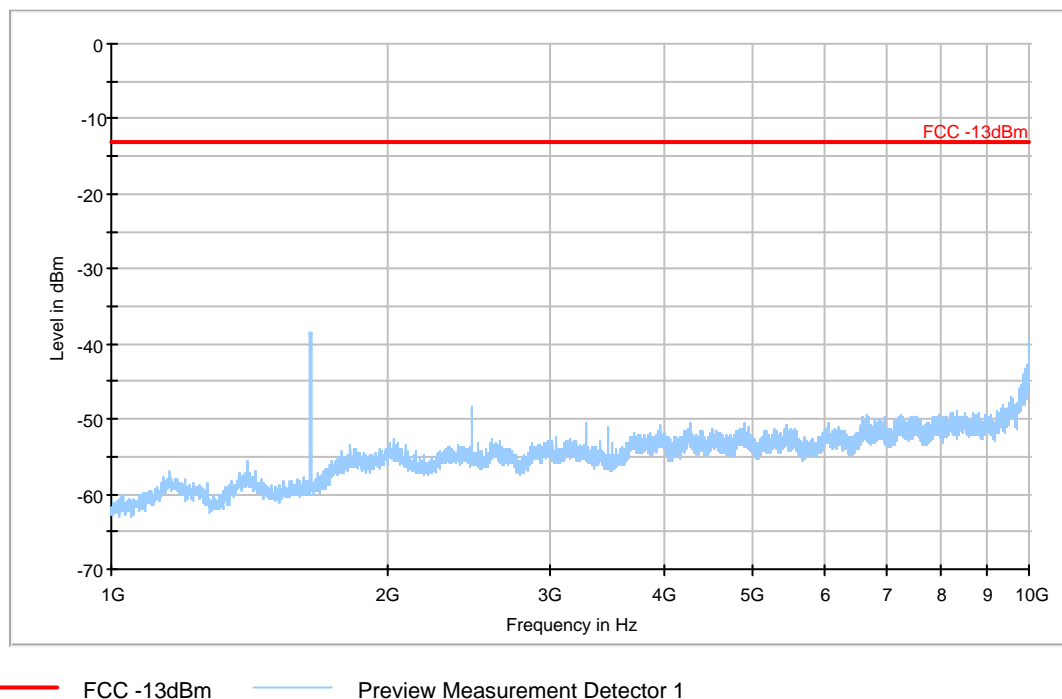
Radiated spurious emission limit :-13dBm.

NOTE: peak above the limit line is the Carrier frequency @ ch-777



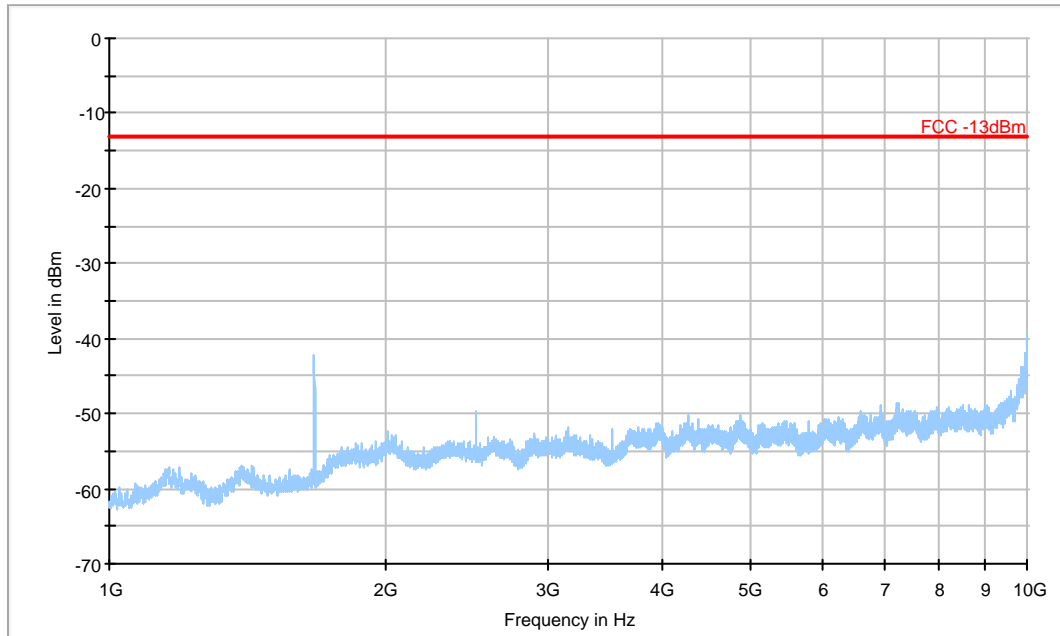
A.2.3.4 RADIATED SPURIOUS EMISSIONS-Channel 1013: 1GHz – 10GHz Set.1

Radiated spurious emission limit :-13dBm.



A.2.3.5 RADIATED SPURIOUS EMISSIONS-Channel 384: 1GHz – 10GHz Set.1

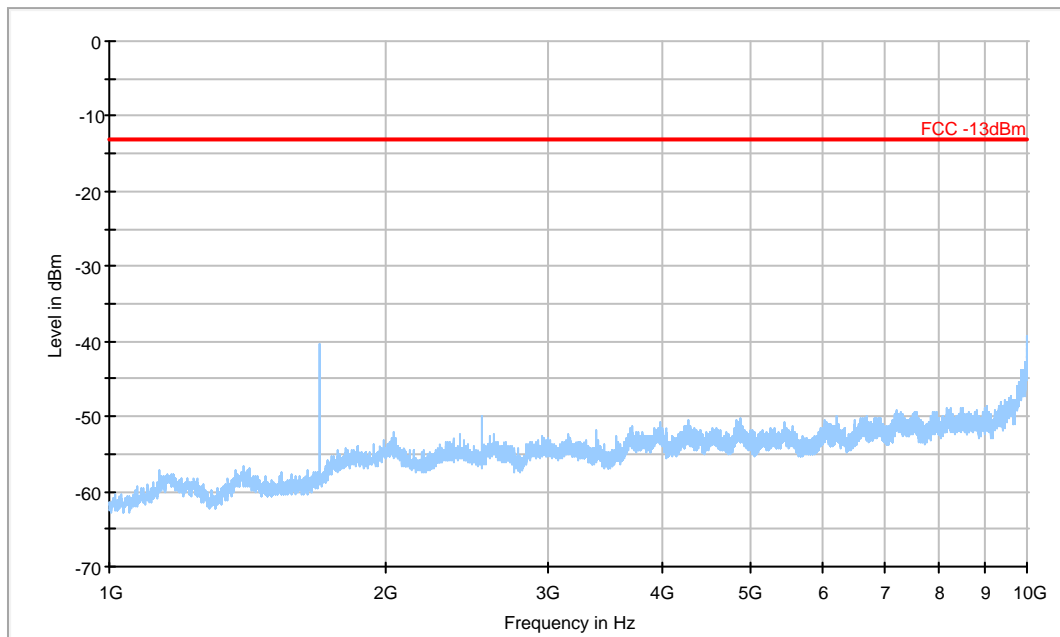
Radiated spurious emission limit :-13dBm.



— FCC -13dBm — Preview Measurement Detector 1

A.2.3.6 RADIATED SPURIOUS EMISSIONS-Channel 777: 1GHz – 10GHz Set.1

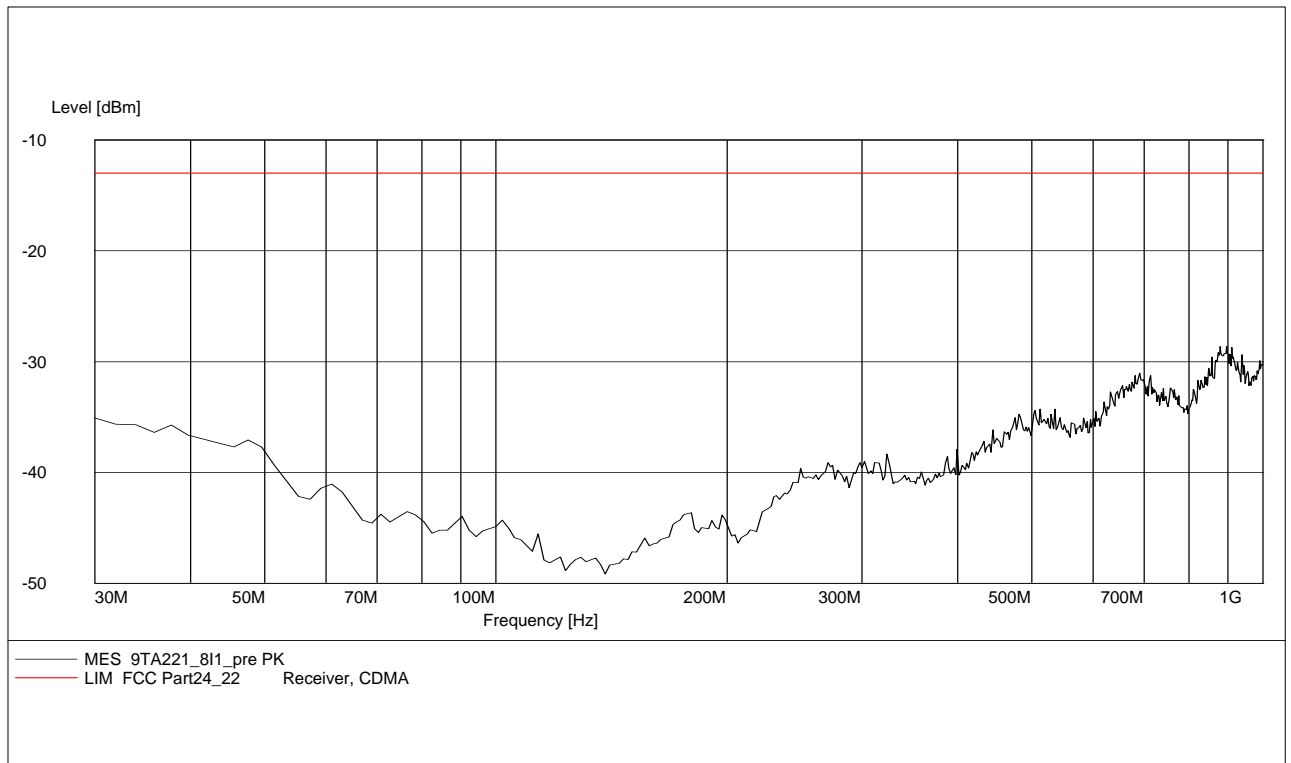
Radiated spurious emission limit :-13dBm.



— FCC -13dBm — Preview Measurement Detector 1

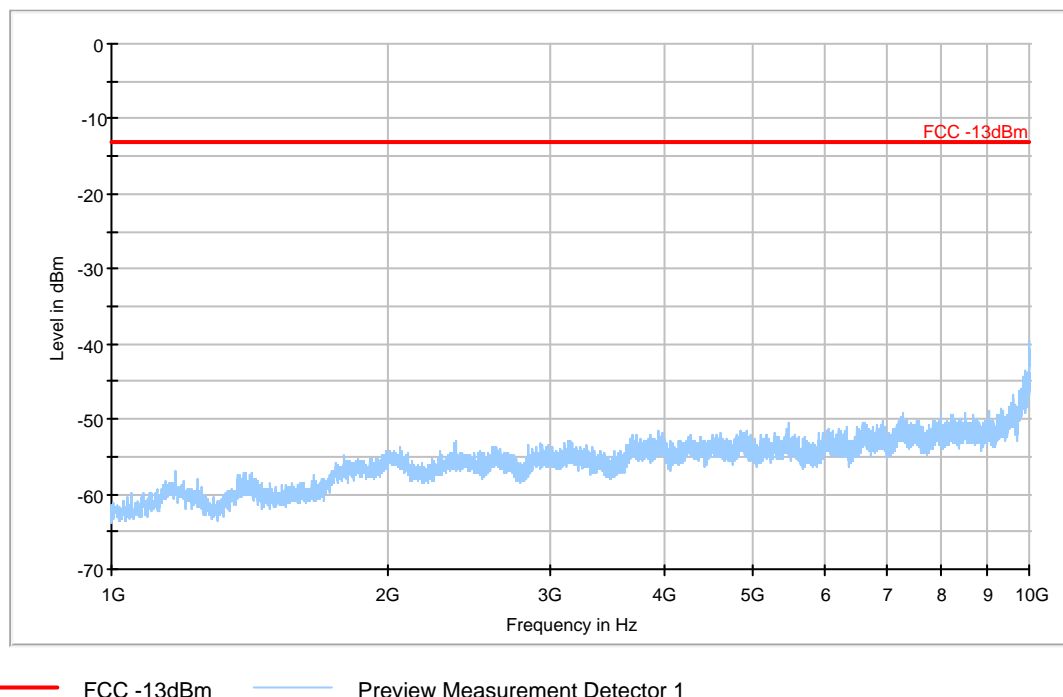
A.2.3.7 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 1GHz Set.1

Radiated spurious emission limit :-13dBm.



A.2.3.8 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 1GHz – 10GHz Set.1

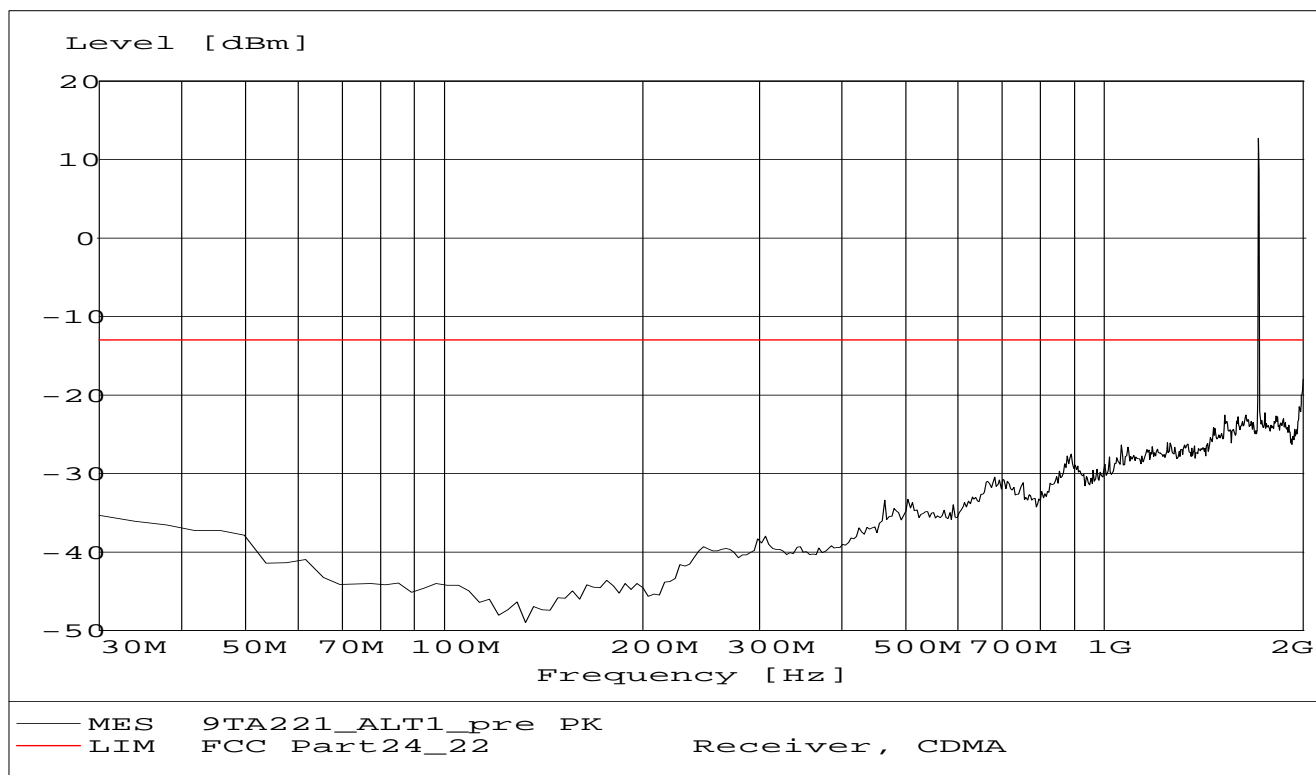
Radiated spurious emission limit :-13dBm.



CDMA 1700

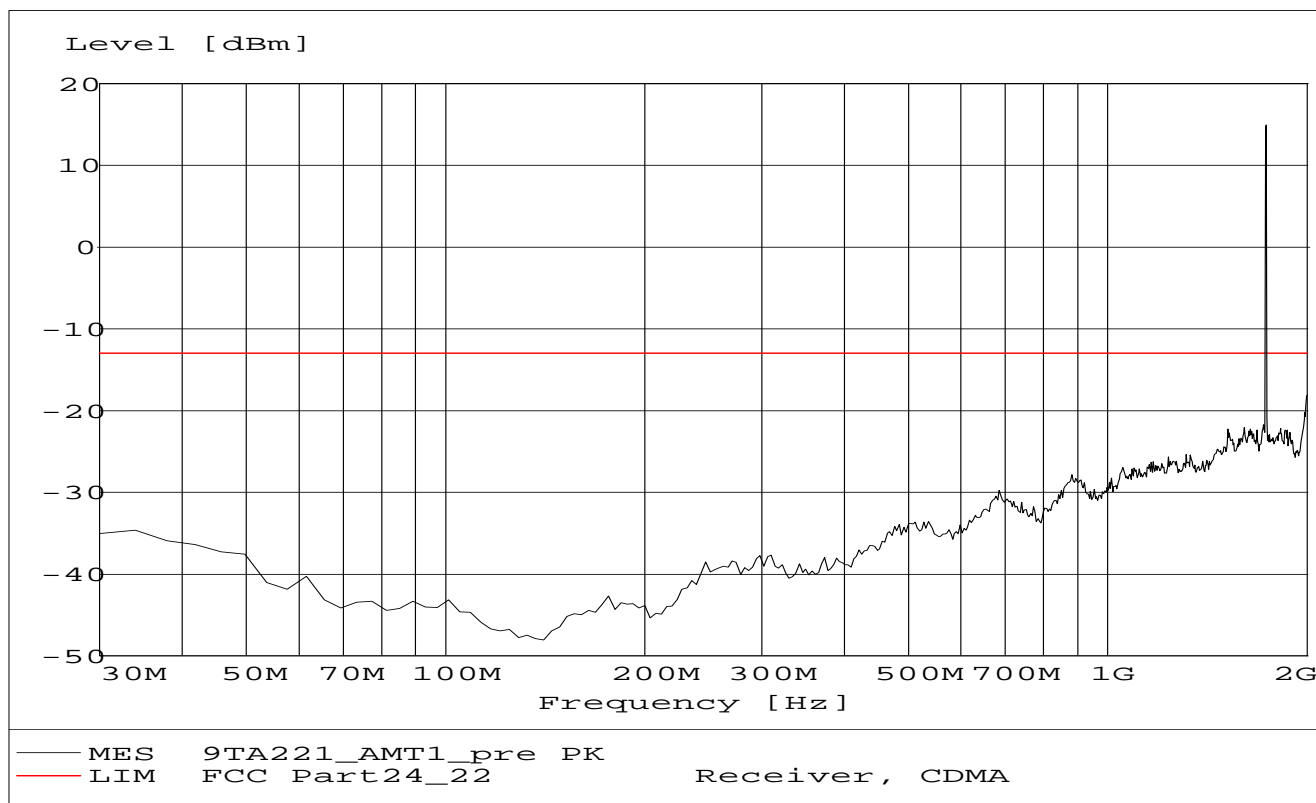
A.2.3.9 RADIATED SPURIOUS EMISSIONS-Channel 25: 30MHz – 2GHz Set.1

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



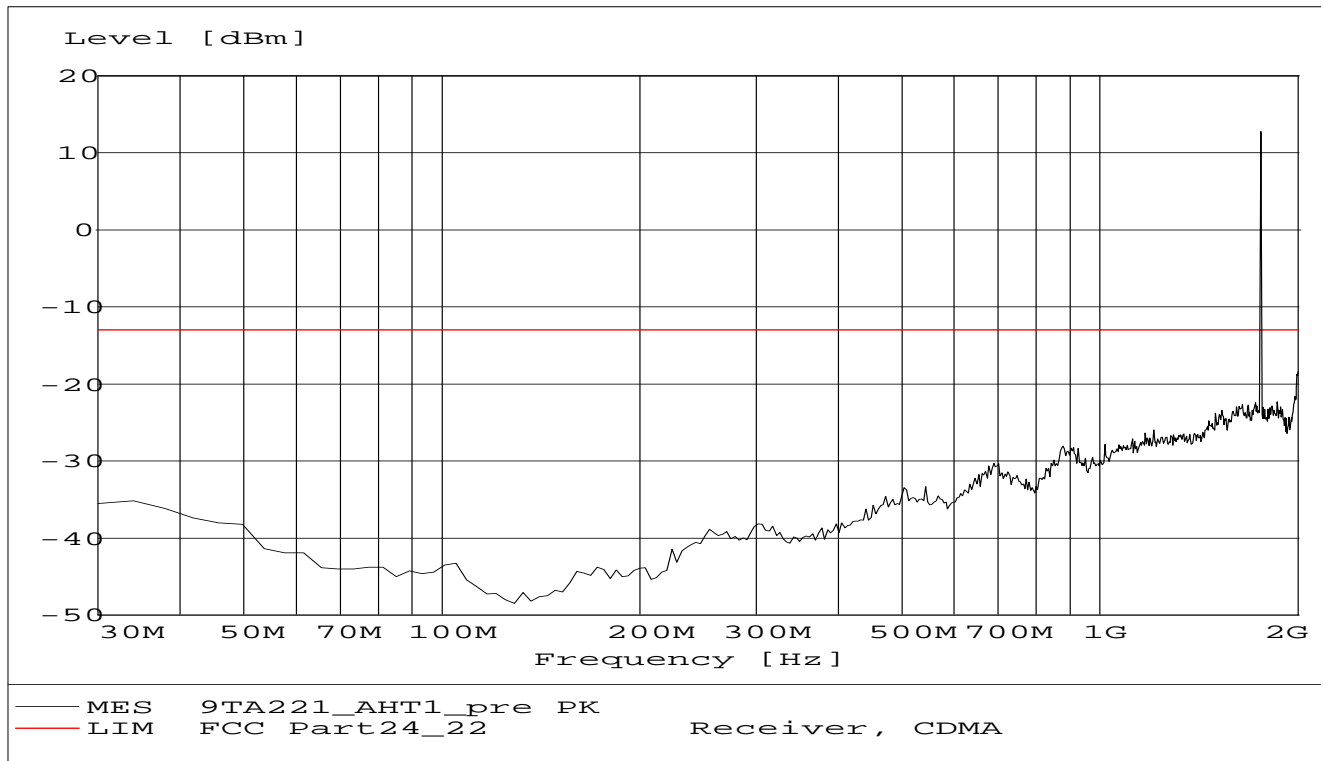
A.2.3.10 RADIATED SPURIOUS EMISSIONS-Channel 450: 30MHz – 2GHz Set.1

NOTE: peak above the limit line is the Carrier frequency @ ch-450

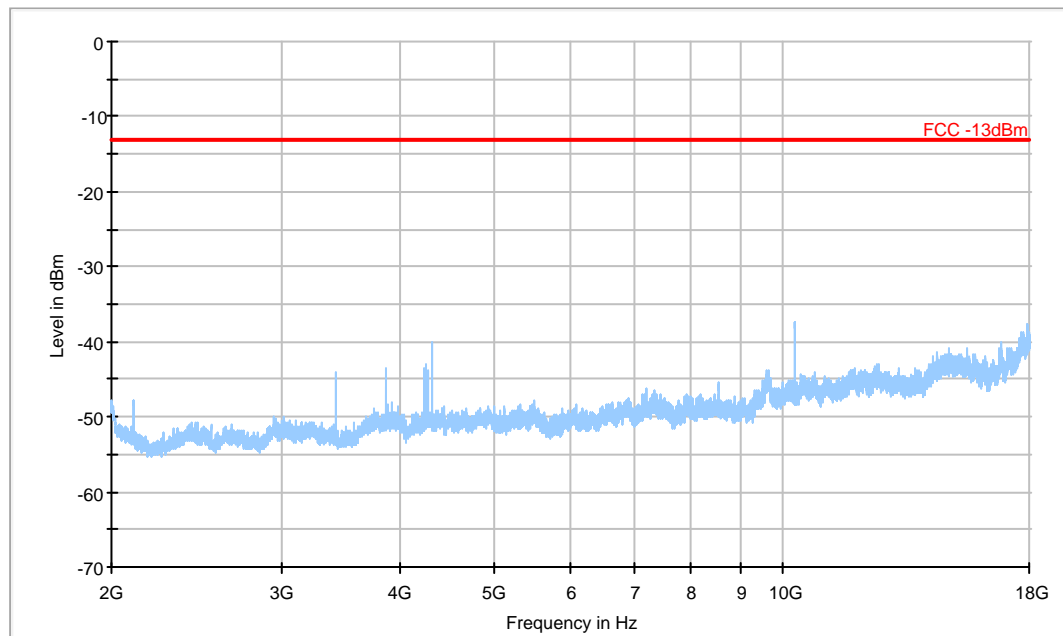


A.2.3.11 RADIATED SPURIOUS EMISSIONS-Channel 875: 30MHz – 2GHz Set.1

NOTE: peak above the limit line is the Carrier frequency @ ch-875

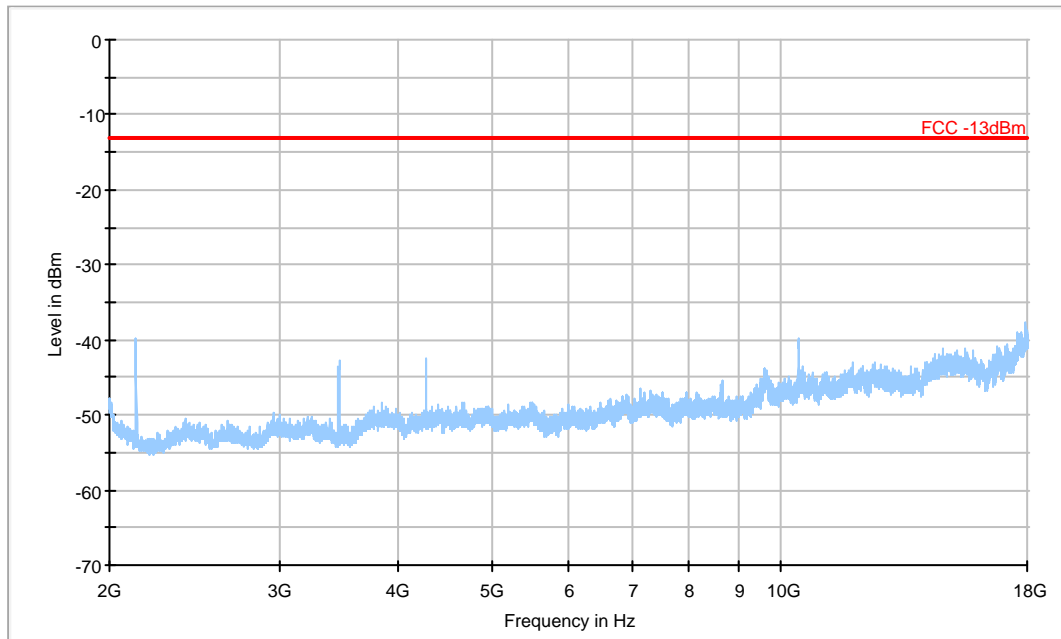


A.2.3.12 RADIATED SPURIOUS EMISSIONS-Channel 25: 2GHz – 18GHz Set.1



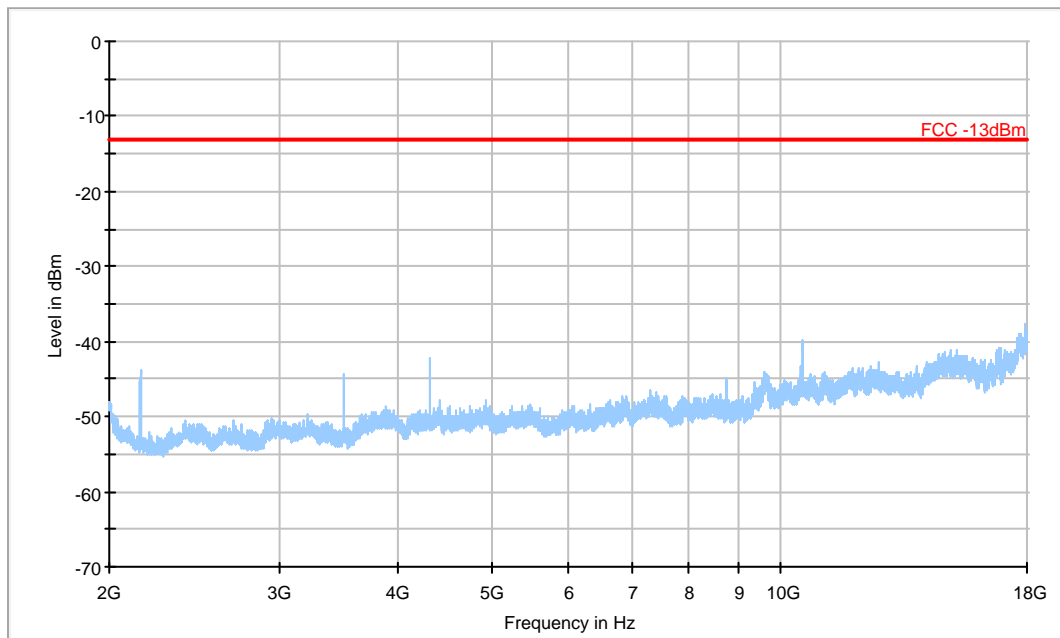
FCC -13dBm Preview Measurement Detector 1

A.2.3.13 RADIATED SPURIOUS EMISSIONS-Channel 450: 2GHz – 18GHz Set.1



— FCC -13dBm — Preview Measurement Detector 1

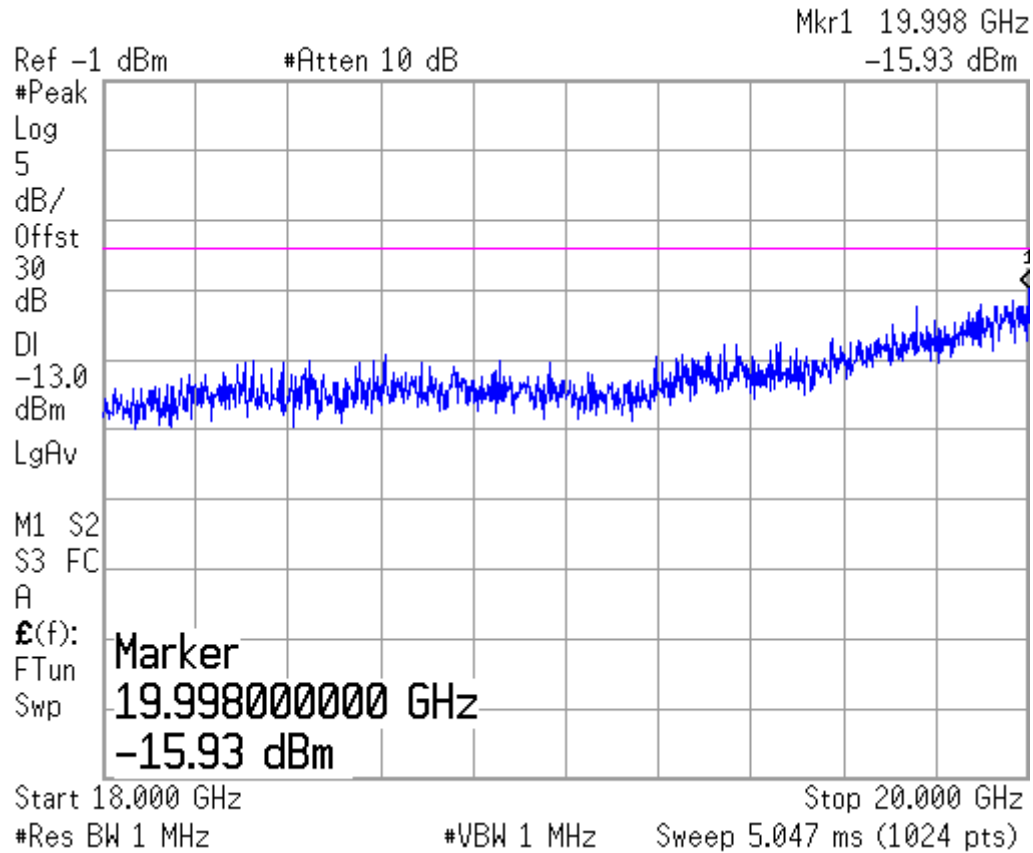
A.2.3.14 RADIATED SPURIOUS EMISSIONS-Channel 875: 2GHz – 18GHz Set.1



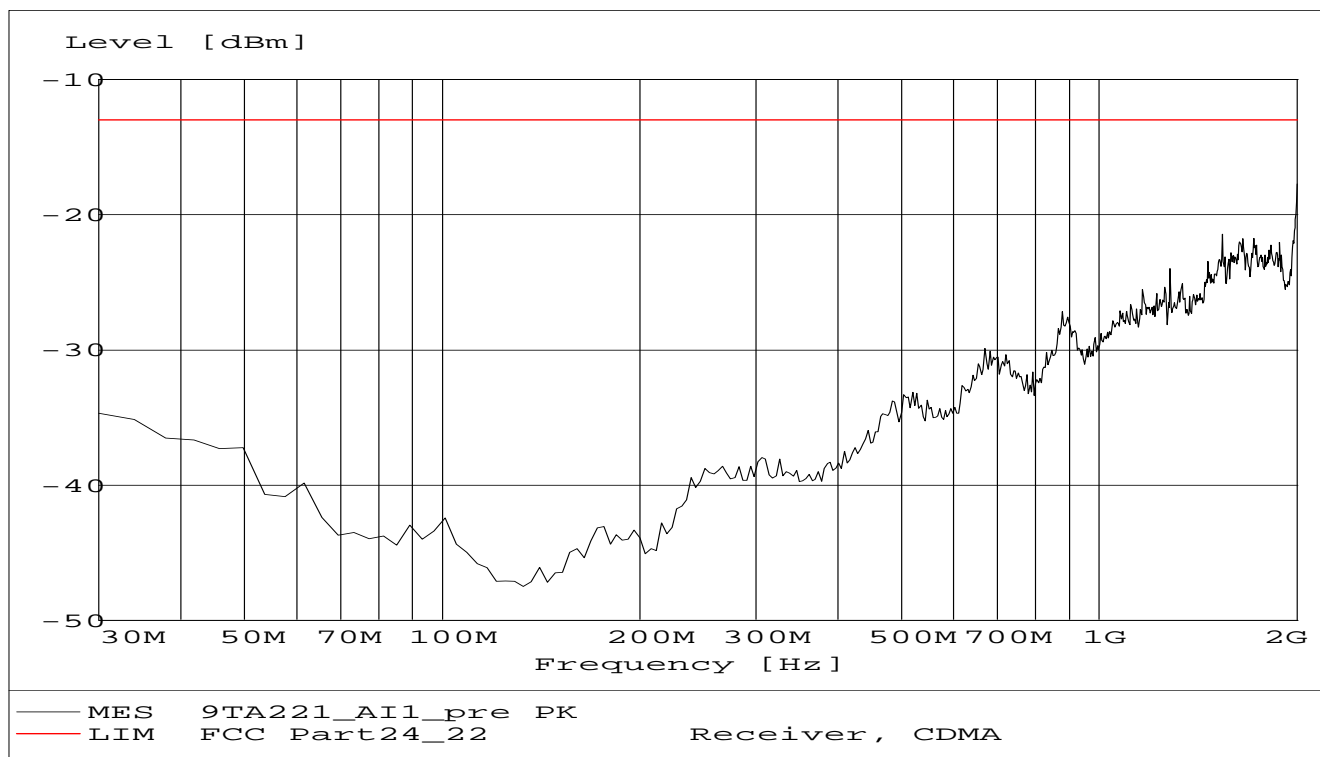
— FCC -13dBm — Preview Measurement Detector 1

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

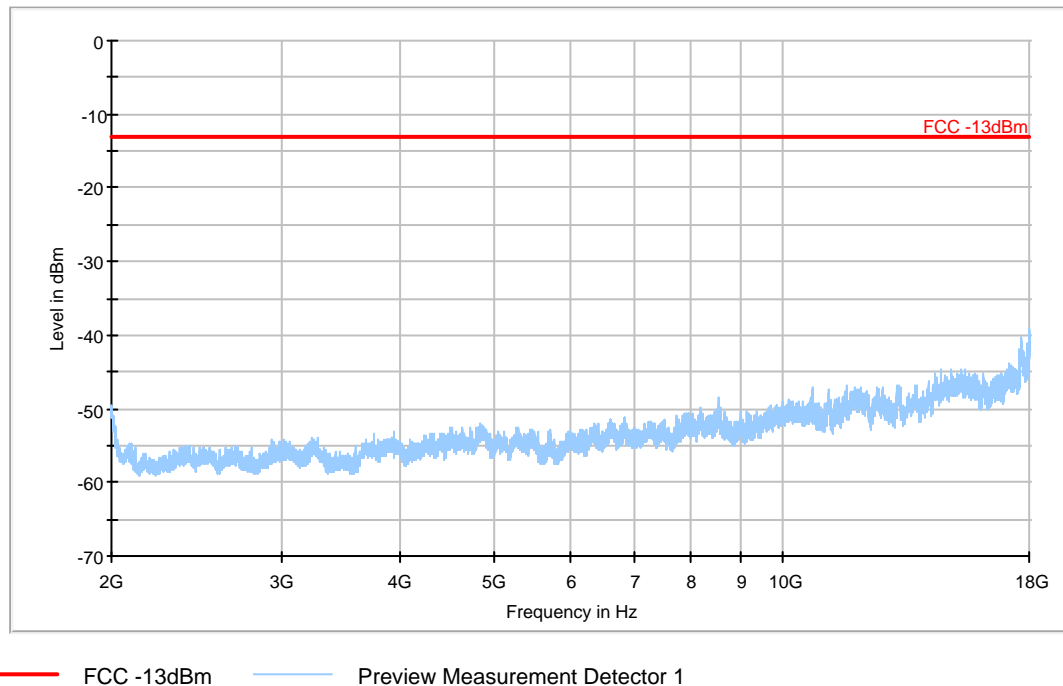
Note: This plot is valid for low, mid & high channels. It is same as the floor noise.



A.2.3.16 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 2GHz Set.1

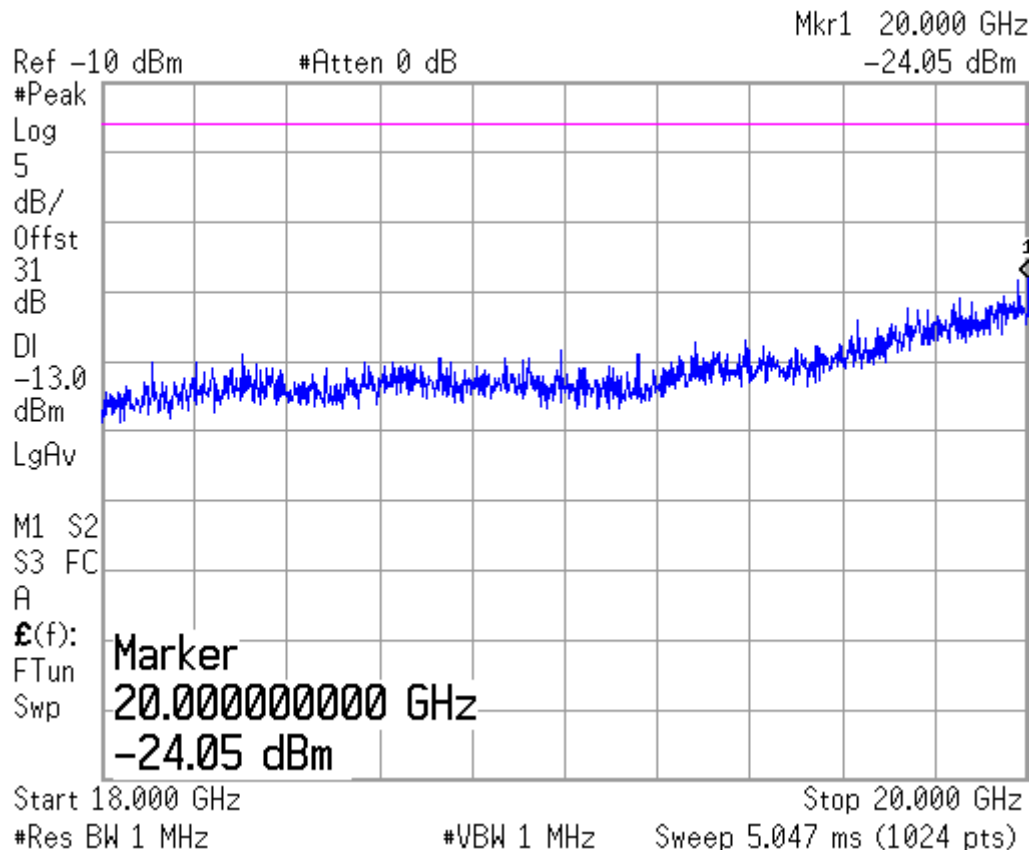


A.2.3.17 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 2GHz – 18GHz Set.1



A.2.3.18 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 18GHz – 20GHz Set.1

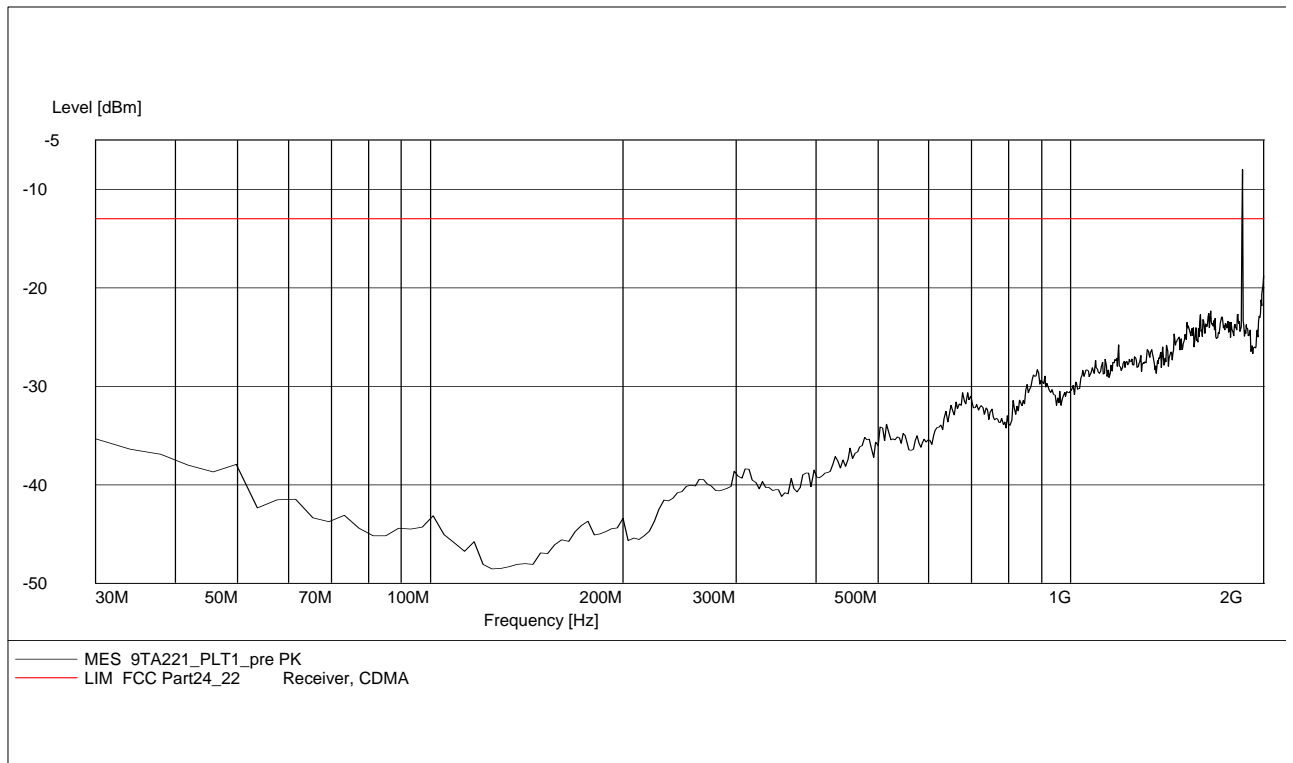
Note: It is same as the floor noise.



PCS 1900

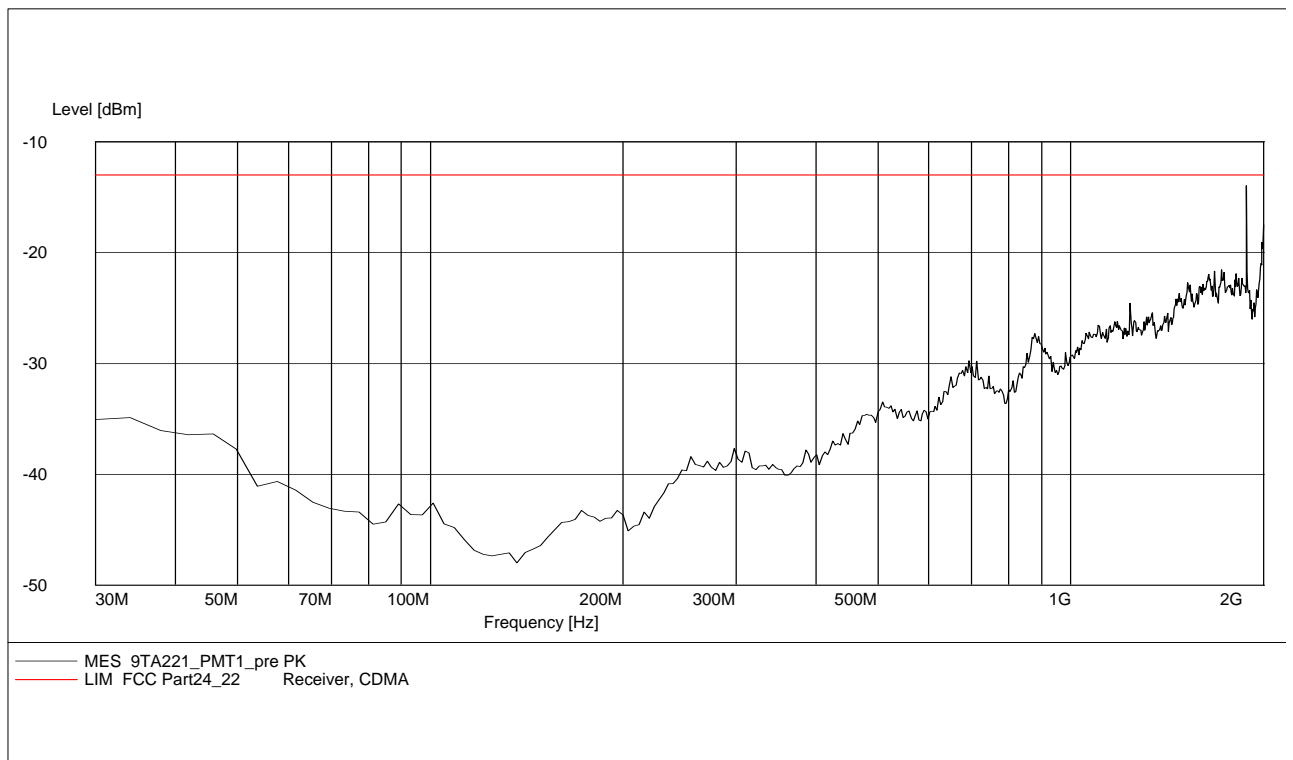
A.2.3.19 RADIATED SPURIOUS EMISSIONS-Channel 25: 30MHz – 2GHz Set.1

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



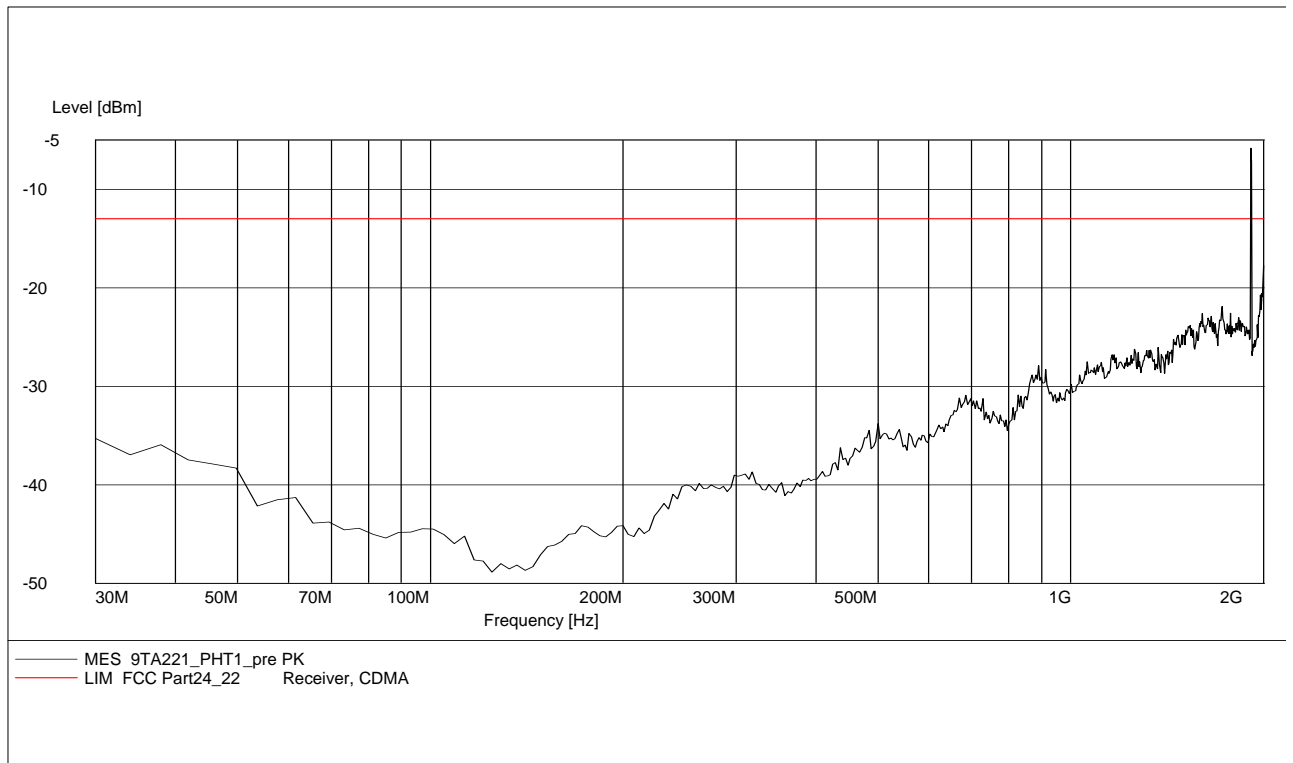
A.2.3.20 RADIATED SPURIOUS EMISSIONS-Channel 600: 30MHz – 2GHz Set.1

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

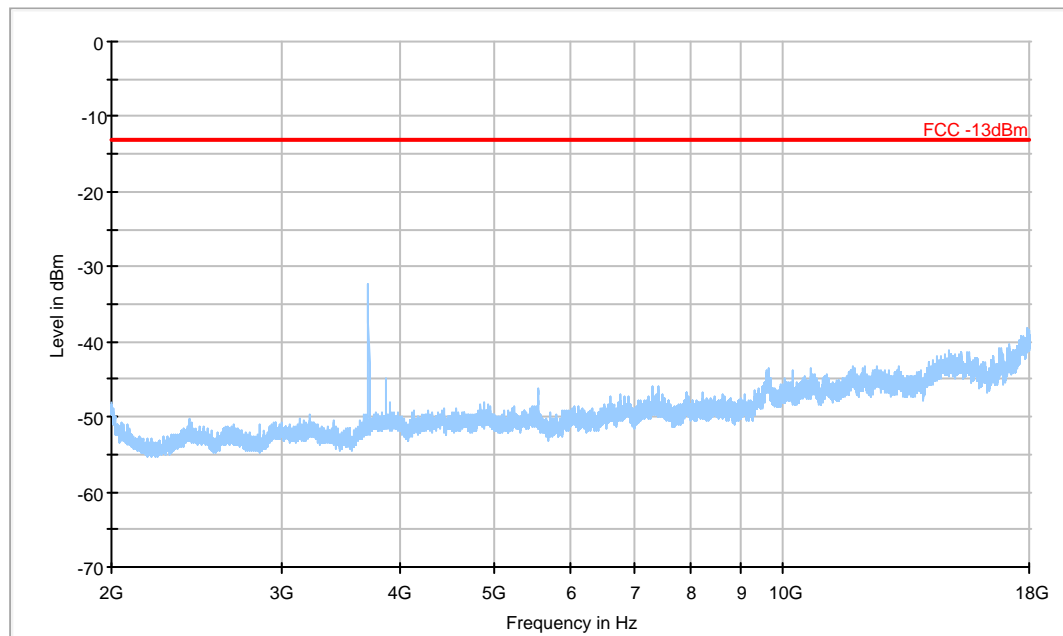


A.2.3.21 RADIATED SPURIOUS EMISSIONS-Channel 1175: 30MHz – 2GHz Set.1

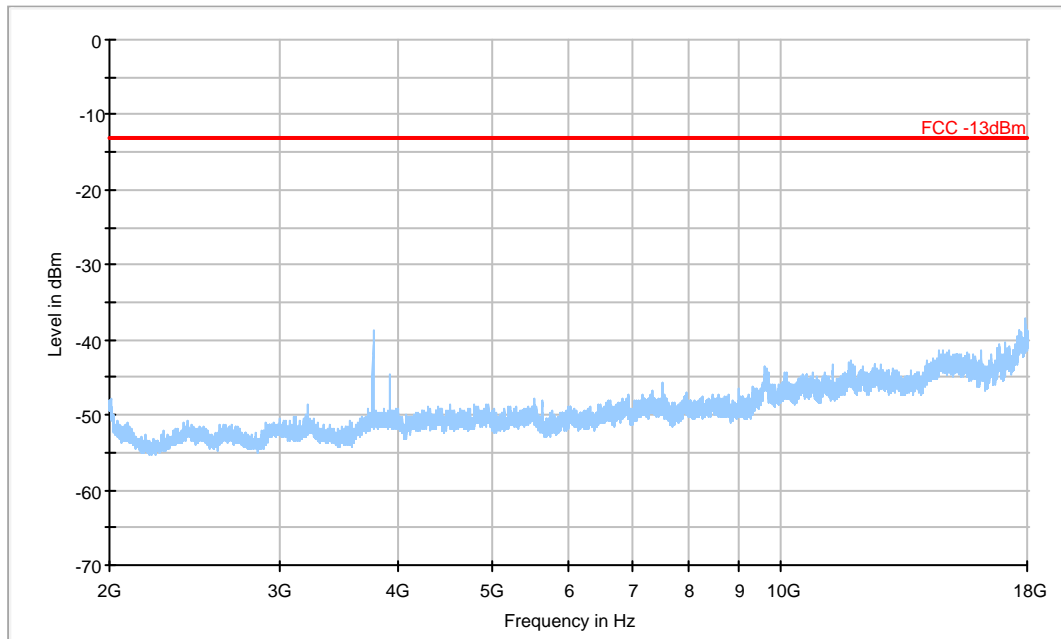
NOTE: peak above the limit line is the Carrier frequency @ ch-1175



A.2.3.22 RADIATED SPURIOUS EMISSIONS-Channel 25: 2GHz – 18GHz Set.1

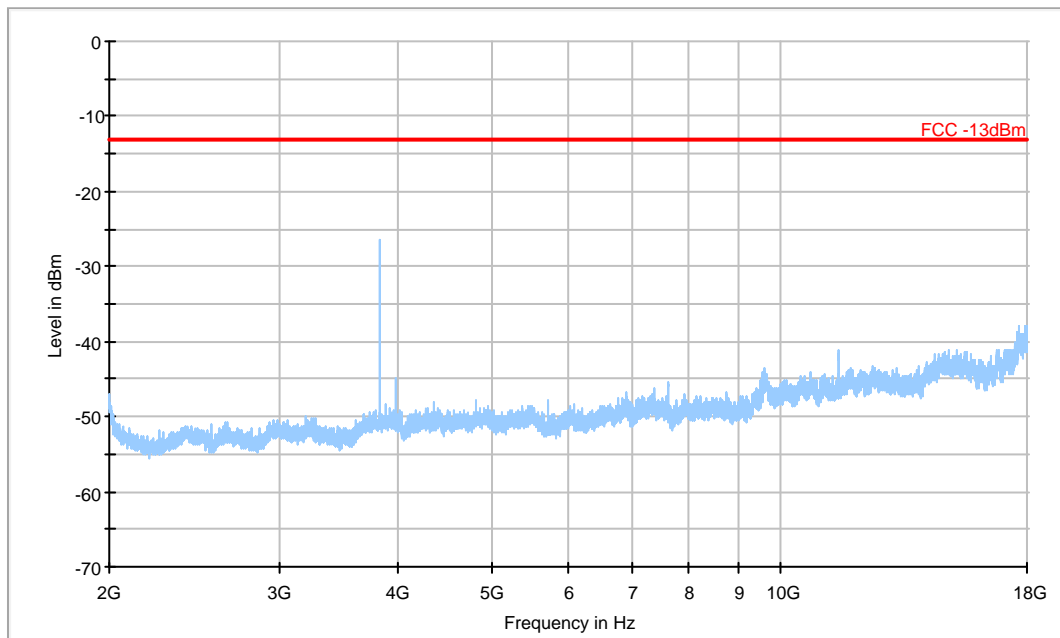


A.2.3.23 RADIATED SPURIOUS EMISSIONS-Channel 600: 2GHz – 18GHz Set.1



— FCC -13dBm — Preview Measurement Detector 1

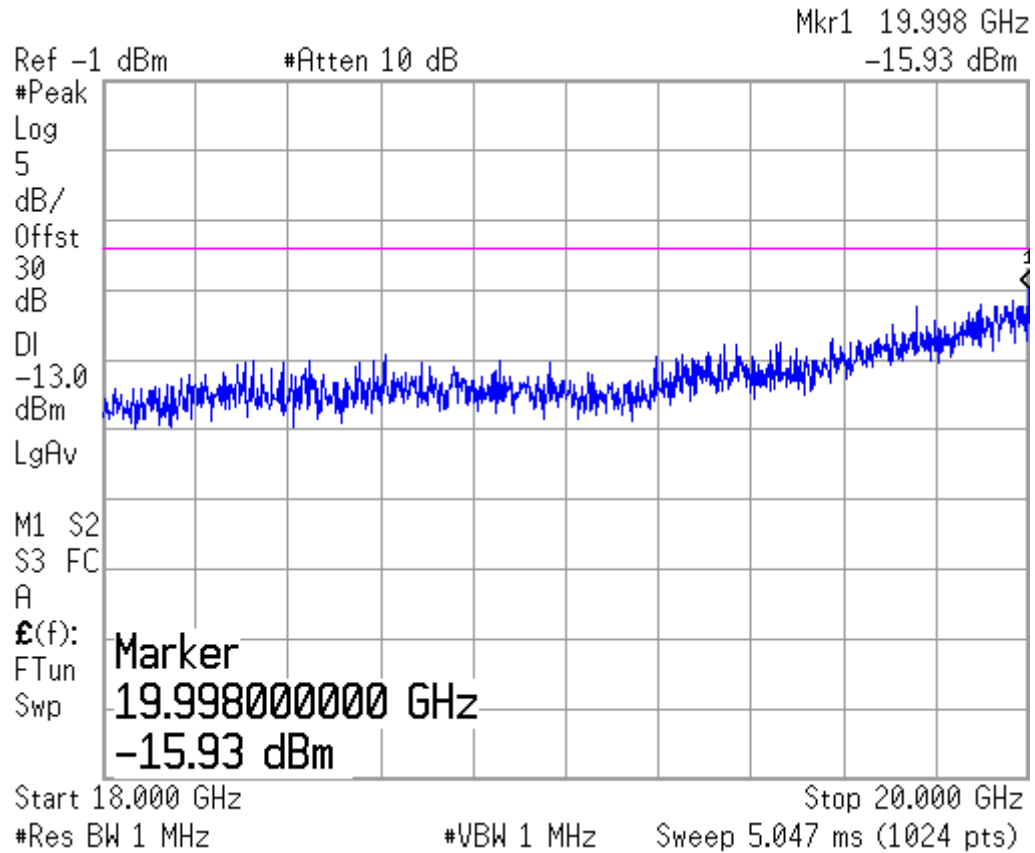
A.2.3.24 RADIATED SPURIOUS EMISSIONS-Channel 1175: 2GHz – 18GHz Set.1



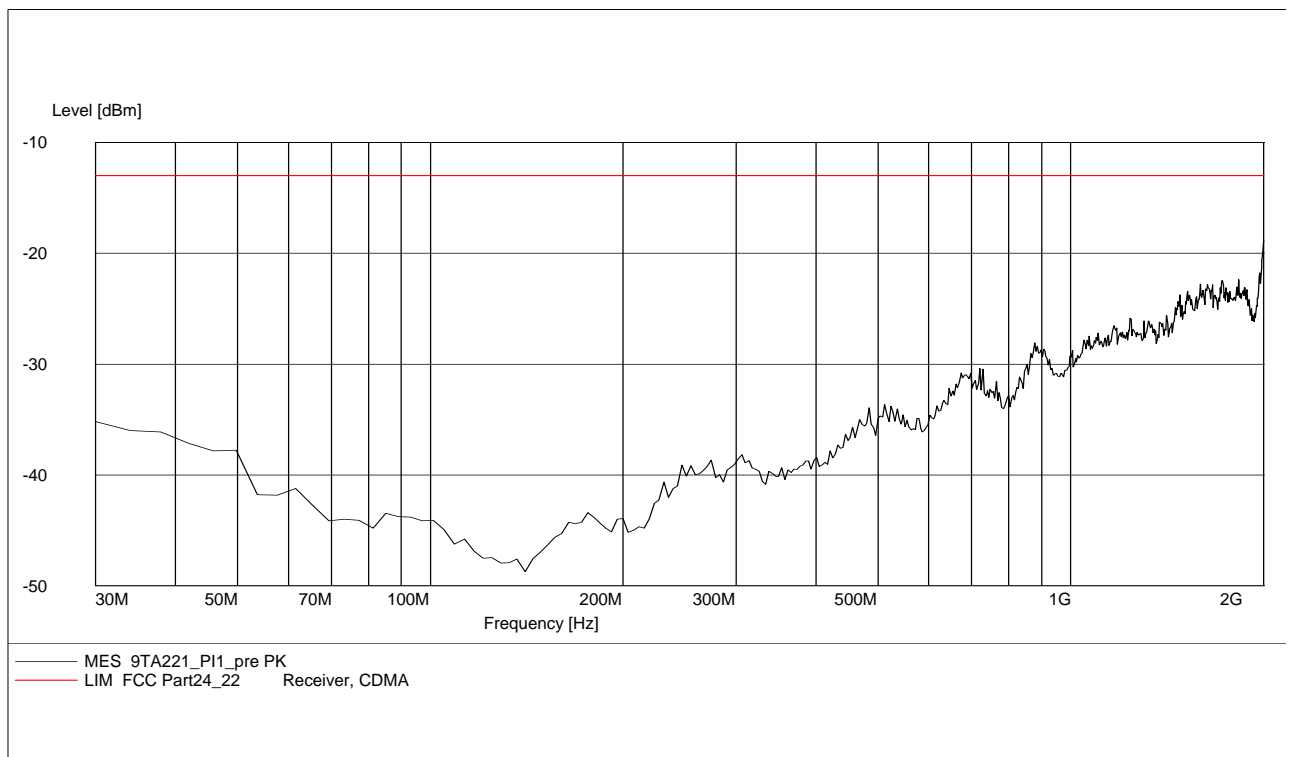
— FCC -13dBm — Preview Measurement Detector 1

A.2.3.25 Radiated spurious emission (18GHz-20GHz) Set.1

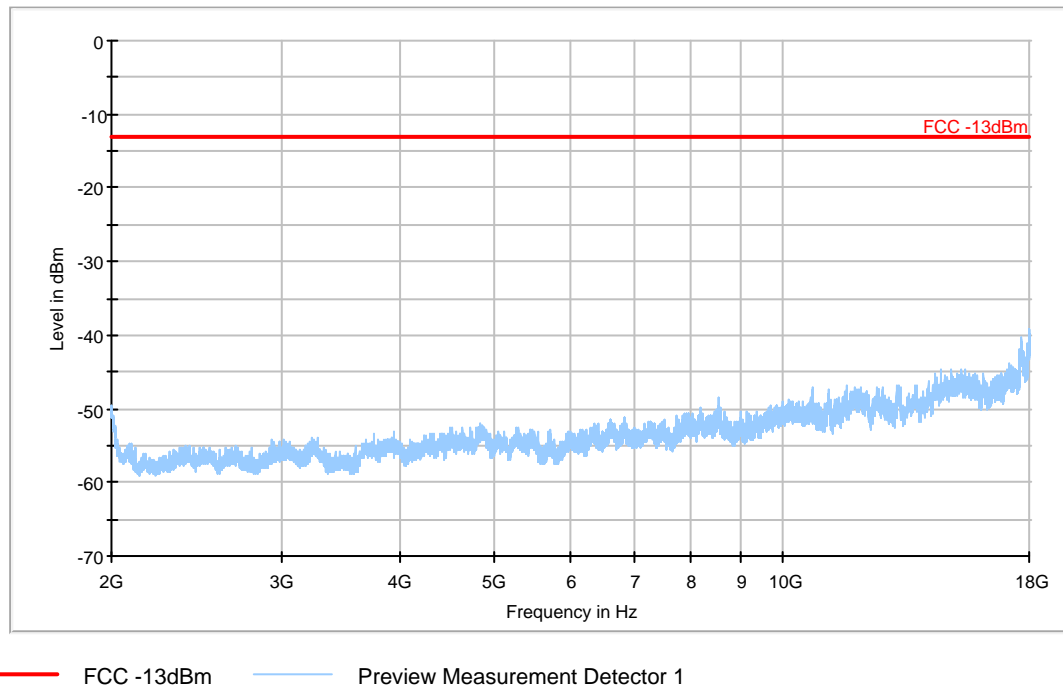
Note: This plot is valid for low, mid & high channels. It is same as the floor noise.



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

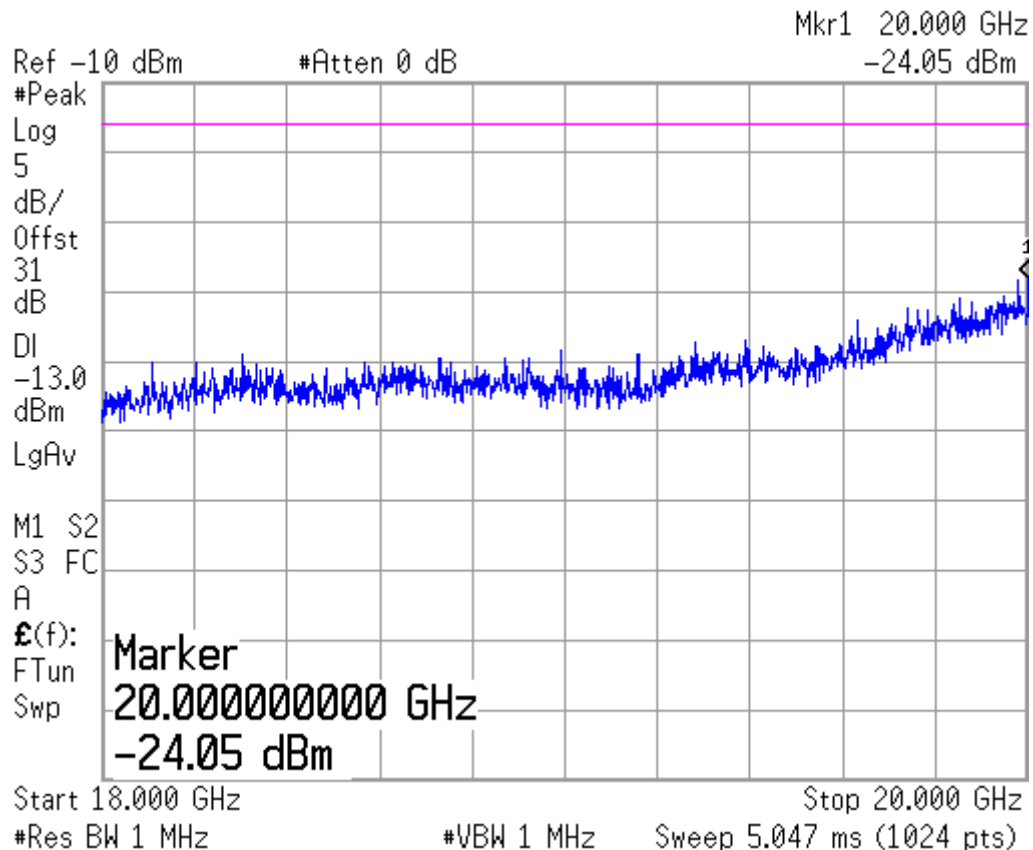


A.2.3.27 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 2GHz – 18GHz Set.1



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.

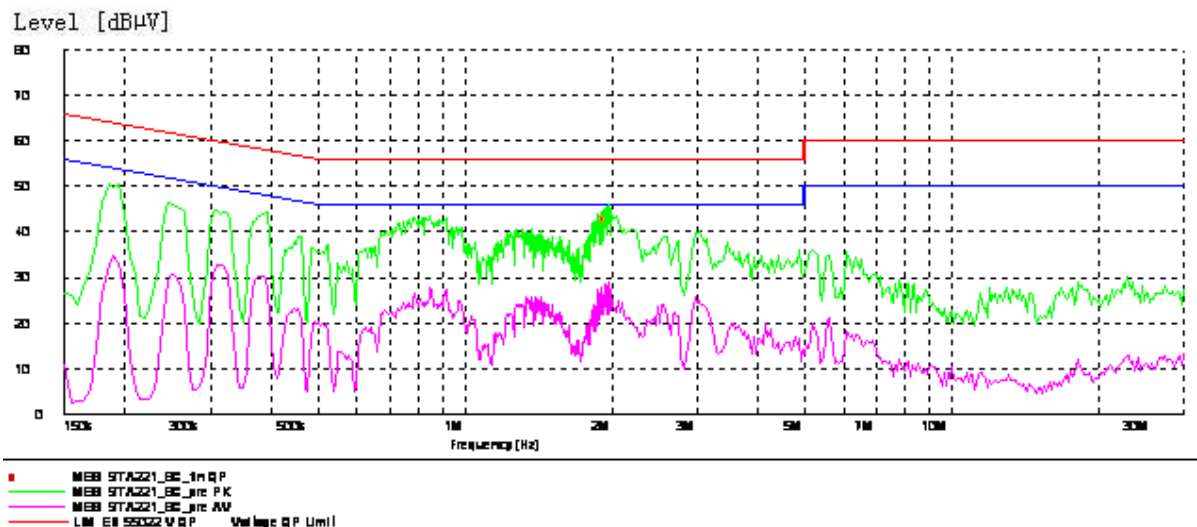
A.3.1 Limit

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

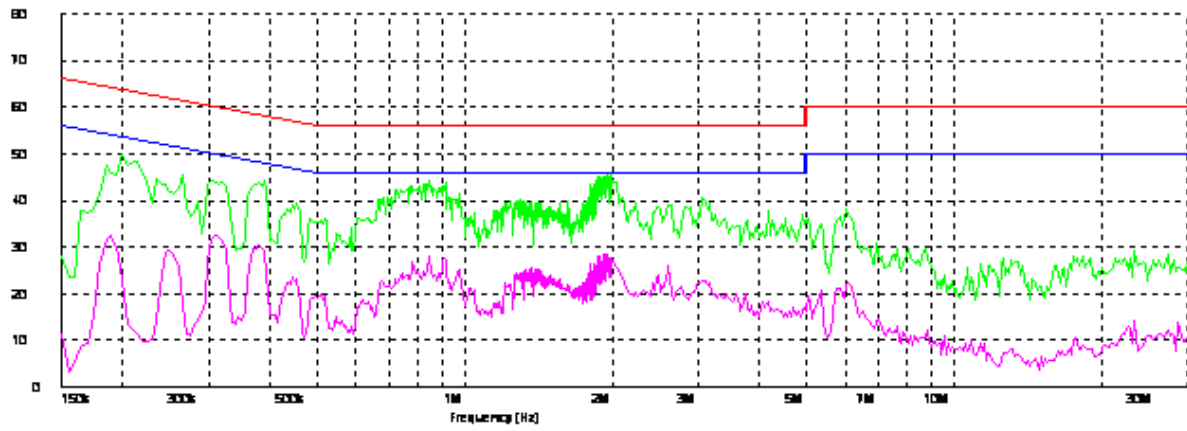


MEASUREMENT RESULT: "9TA221_8C_fin QP"

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

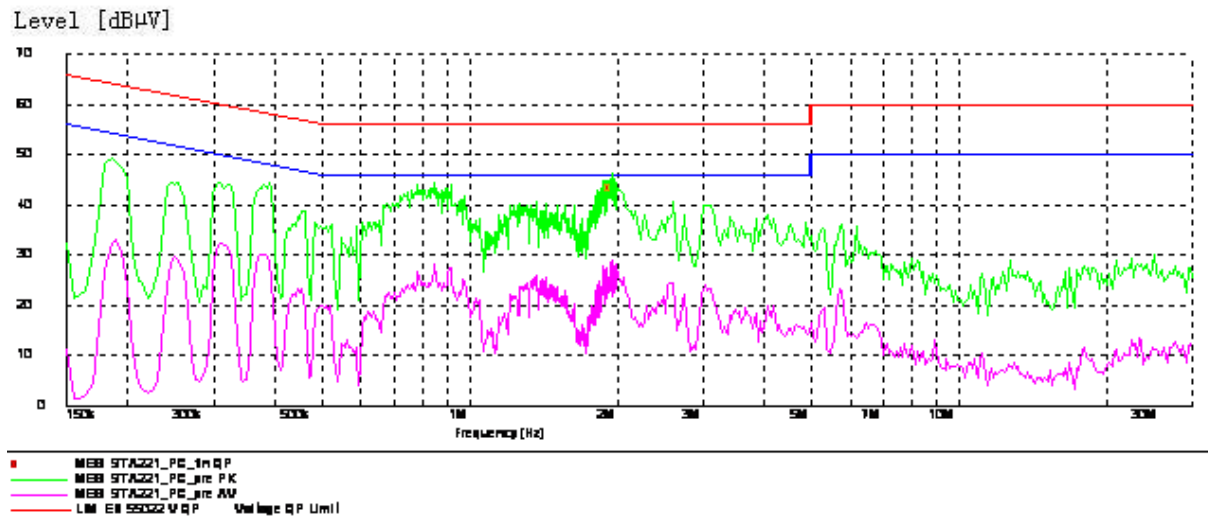
CDMA 1700

Level [dBμV]



MBB STAG221_AC_pre PK
 MBB STAG221_AC_pre AV
 LIM E8 55022 V Q P Voltage Q P Limit
 LIM E8 55022 V AV Voltage AV Limit

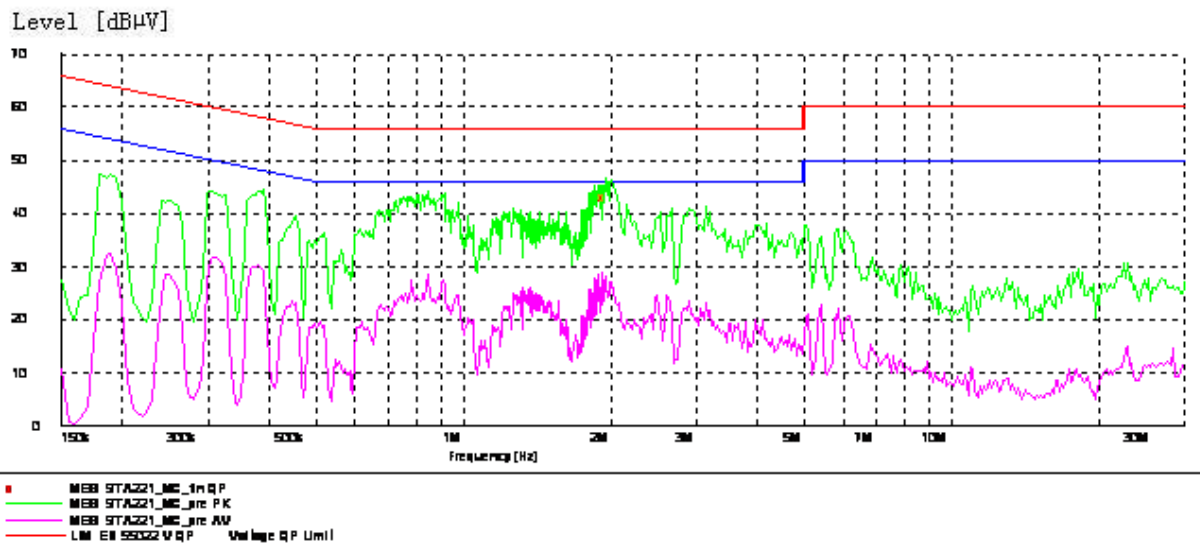
CDMA 1900



MEASUREMENT RESULT: "9TA221_PC_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
1.960000	43.30	10.1	56	12.7	L1	GND

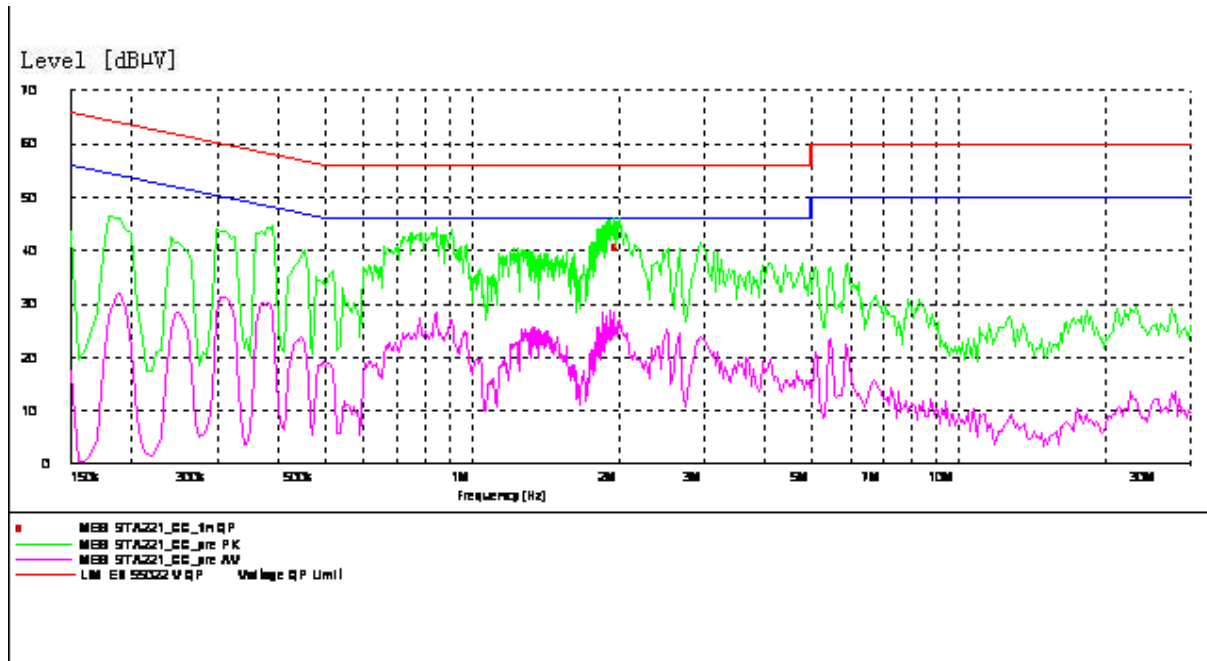
MP3



MEASUREMENT RESULT: "9TA221_MC_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
1.955000	42.90	10.1	56	13.1	L1	FLO

Camera



MEASUREMENT RESULT: "9TA221_CC_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
2.020000	40.60	10.1	56	15.4	L1	GND

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°C.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 384 for CDMA 800, channel 450 for CDMA 1700 and channel 600 for 1900 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. 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°C.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50°C to -30°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

A.4.2 Measurement Limit

A.4.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC 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	22	0.026
3.7	23	0.027
4.2	21	0.025

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	38	0.045
-20	35	0.042
-10	31	0.037
0	26	0.031
10	21	0.025
20	22	0.026
30	24	0.028
40	29	0.035
50	33	0.039

CDMA 1700

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	26	0.015
3.7	28	0.016
4.2	28	0.016

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	45	0.026
-20	40	0.023
-10	34	0.020
0	30	0.017
10	28	0.016
20	27	0.016
30	30	0.017
40	38	0.022
50	42	0.024

CDMA 1900**Frequency Error vs Voltage**

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	31	0.016
3.7	31	0.016
4.2	32	0.017

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	48	0.026
-20	41	0.022
-10	37	0.020
0	34	0.018
10	31	0.016
20	30	0.015
30	32	0.017
40	38	0.021
50	44	0.023

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.

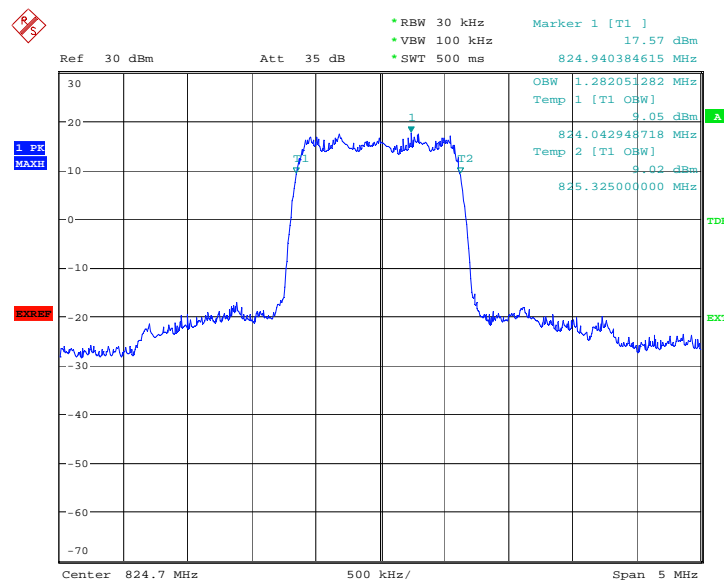
CDMA 800 (99% BW)

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

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

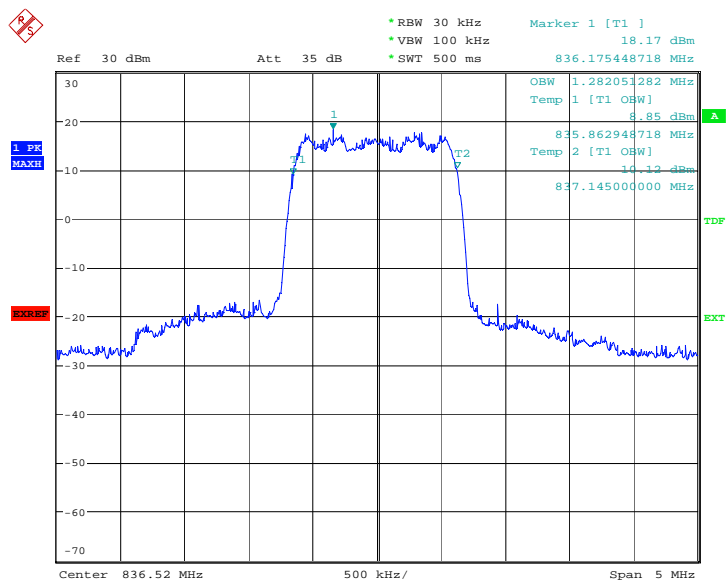
CDMA 800

Channel 1013-Occupied Bandwidth (99% BW)



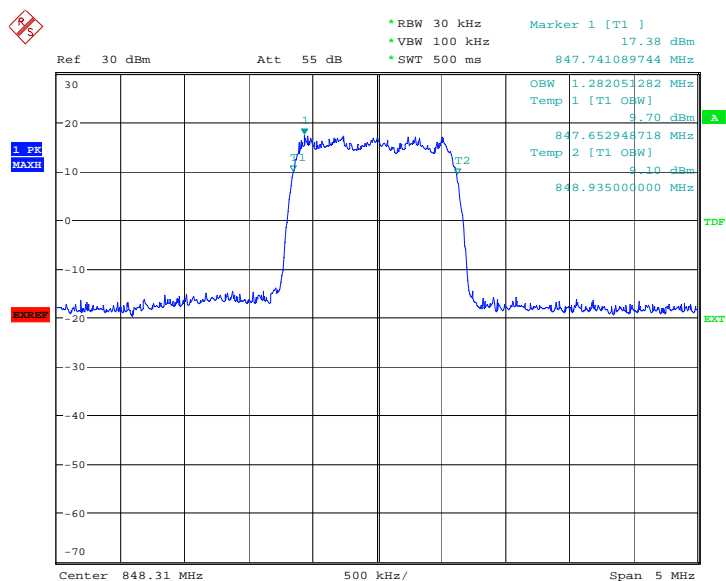
Date: 19.MAY.2009 01:40:48

Channel 384-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 01:40:21

Channel 777-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 01:39:46

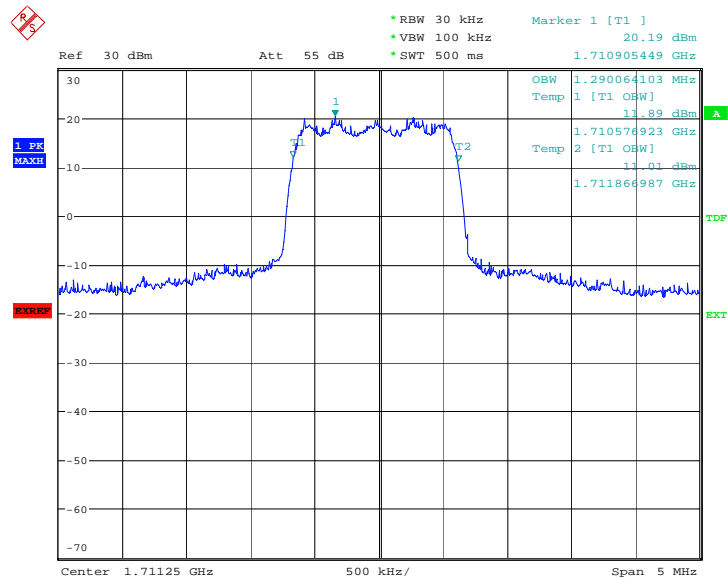
CDMA 1700 (99% BW)

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

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

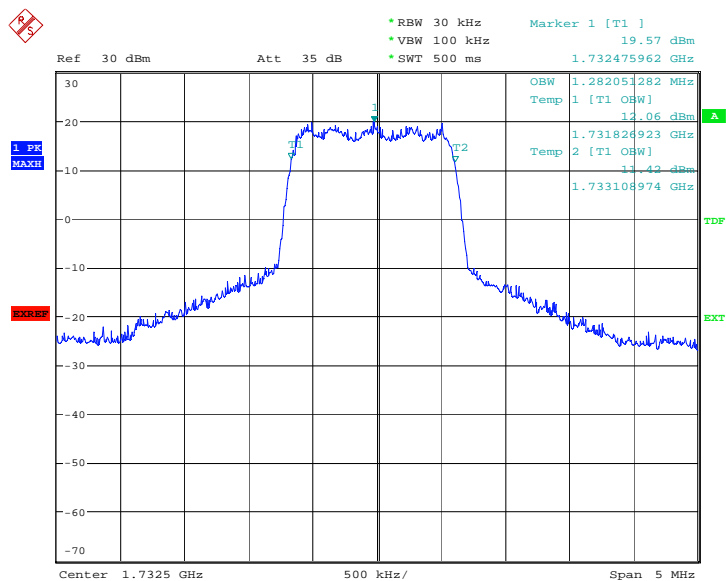
CDMA 1700

Channel 25-Occupied Bandwidth (99% BW)



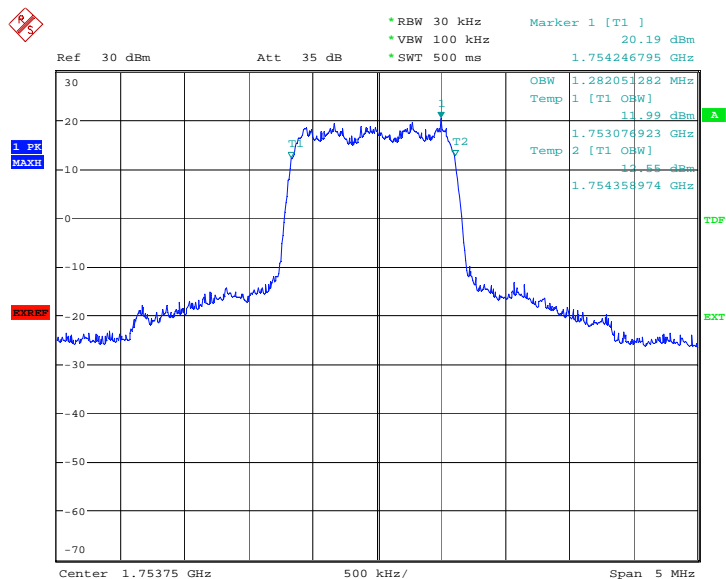
Date: 19.MAY.2009 02:57:21

Channel 450-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 02:57:51

Channel 875-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 02:58:14

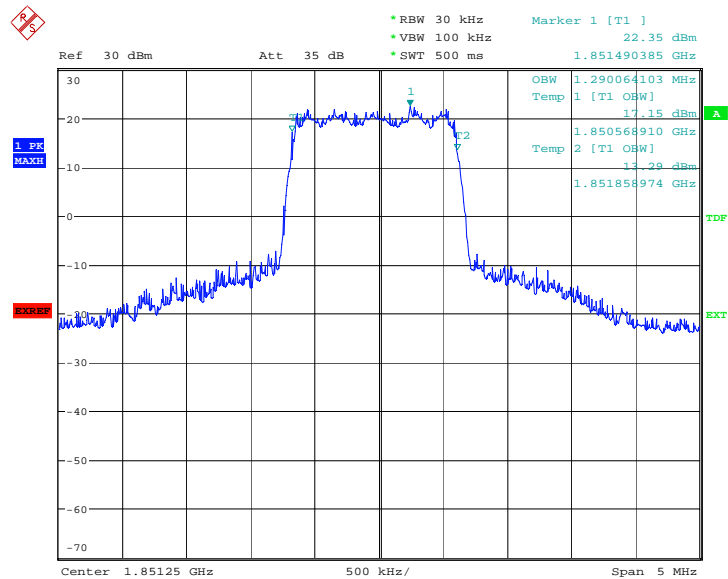
CDMA 1900(99% BW)

Channel	Occupied Bandwidth (-20dBc BW)(MHz)
25	1.290
600	1.282
1175	1.290

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

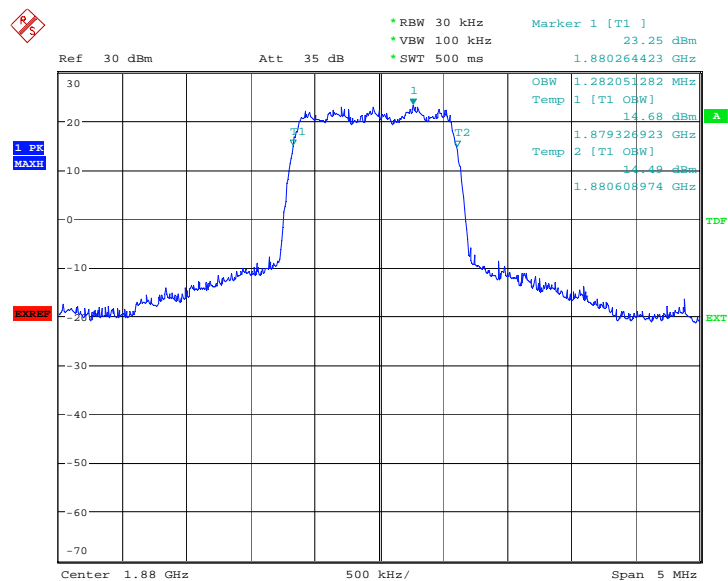
CDMA 1900

Channel 25-Occupied Bandwidth (99% BW)



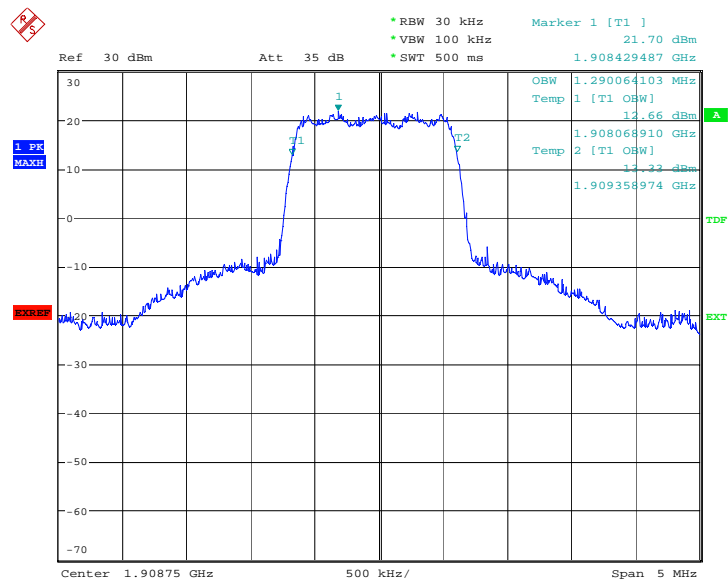
Date: 19.MAY.2009 01:46:50

Channel 600-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 01:48:02

Channel 1175-Occupied Bandwidth (99% BW)



Date: 19.MAY.2009 01:48:32

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.

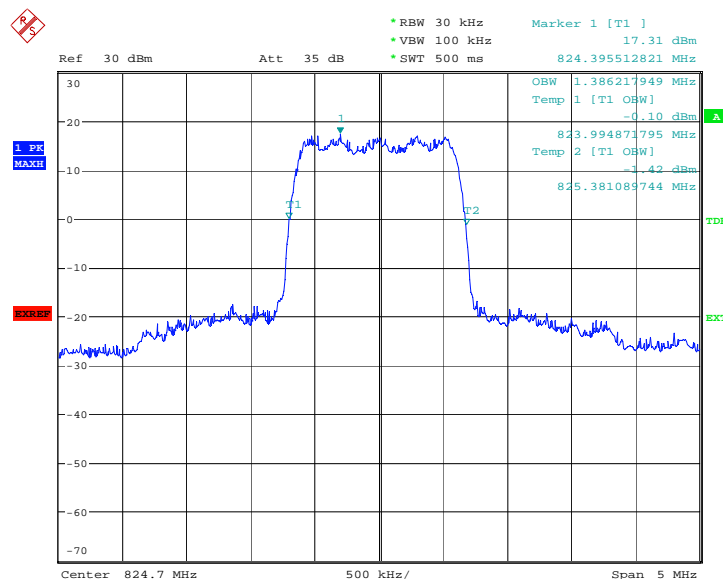
CDMA 800 (-26dBc)

Channel	Occupied Bandwidth (-26dBc BW)(MHz)
1013	1.386
384	1.394
777	1.386

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

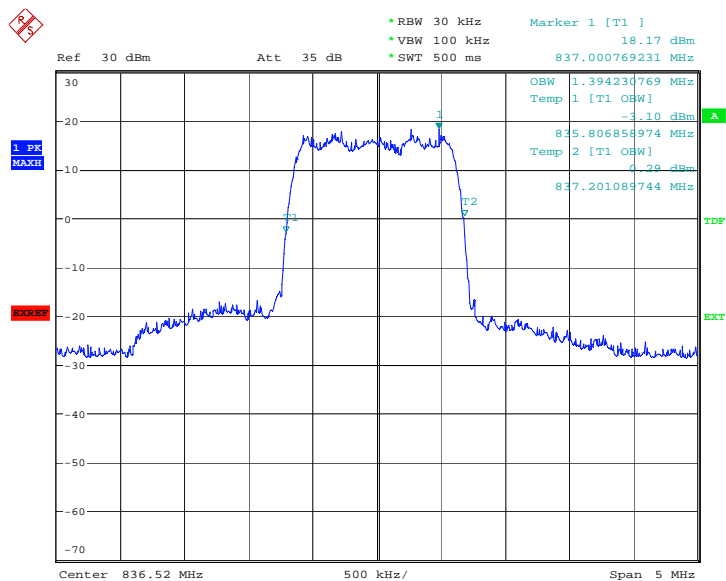
CDMA 800

Channel 1013-Occupied Bandwidth (-26dBc BW)



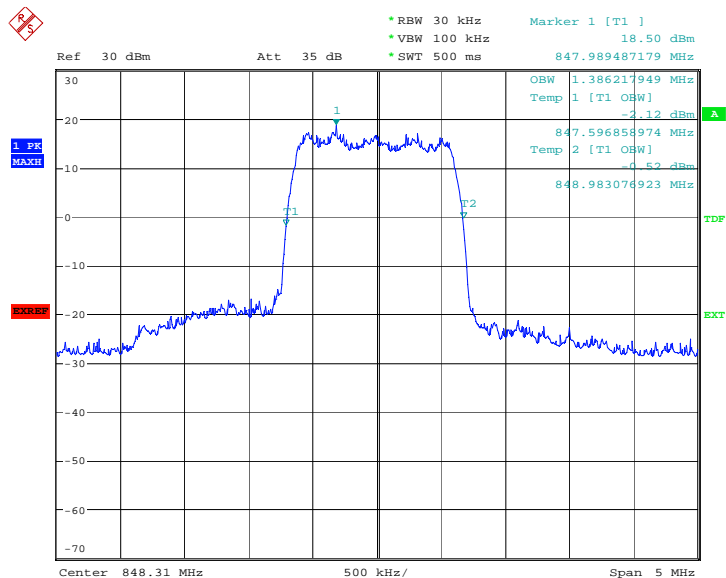
Date: 19.MAY.2009 01:54:23

Channel 384-Occupied Bandwidth (-26dBc BW)



Date: 19.MAY.2009 01:54:02

Channel 777-Occupied Bandwidth (-26dBc BW)



Date: 19.MAY.2009 01:53:43

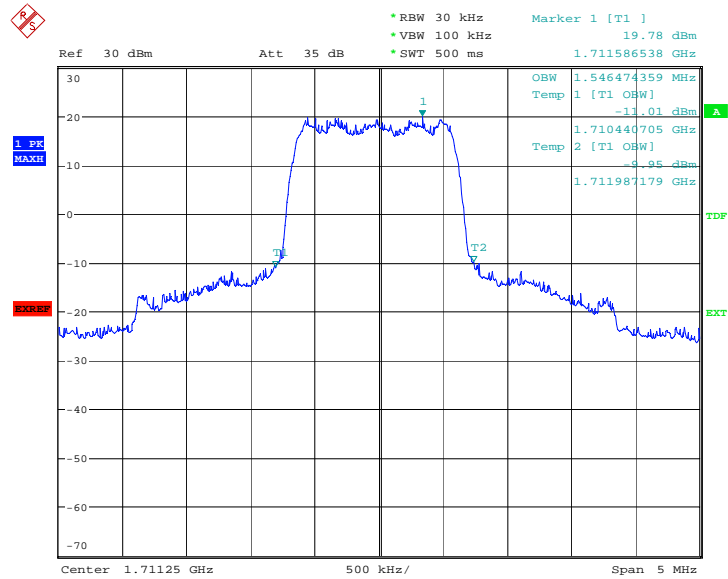
CDMA 1700 (-26dBc)

Channel	Occupied Bandwidth (-26dBc BW)(MHz)
25	1.546
450	1.482
875	1.410

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

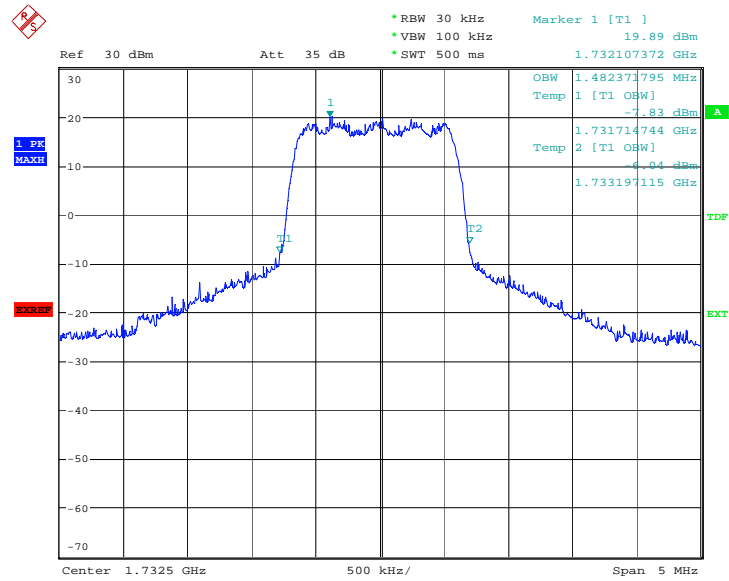
CDMA 1700

Channel 25-Occupied Bandwidth (-26dBc BW)



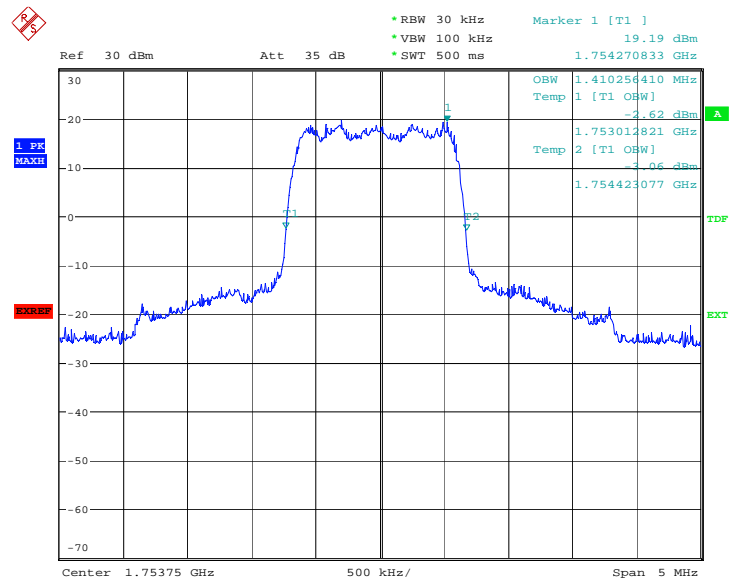
Date: 19.MAY.2009 02:59:42

Channel 450-Occupied Bandwidth (-26dBc BW)



Date: 19.MAY.2009 02:59:01

Channel 875-Occupied Bandwidth (-26dBc BW)



Date: 19.MAY.2009 02:58:37

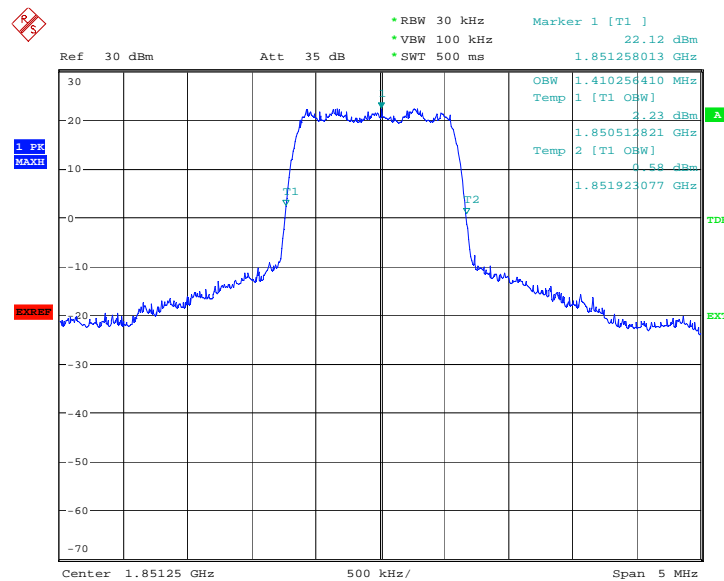
CDMA 1900 (-26dBc)

Channel	Occupied Bandwidth (-26dBc BW)(MHz)
25	1.410
600	1.410
1175	1.675

ANALYZER SETTINGS: RBW=30 kHz, VBW=100 kHz

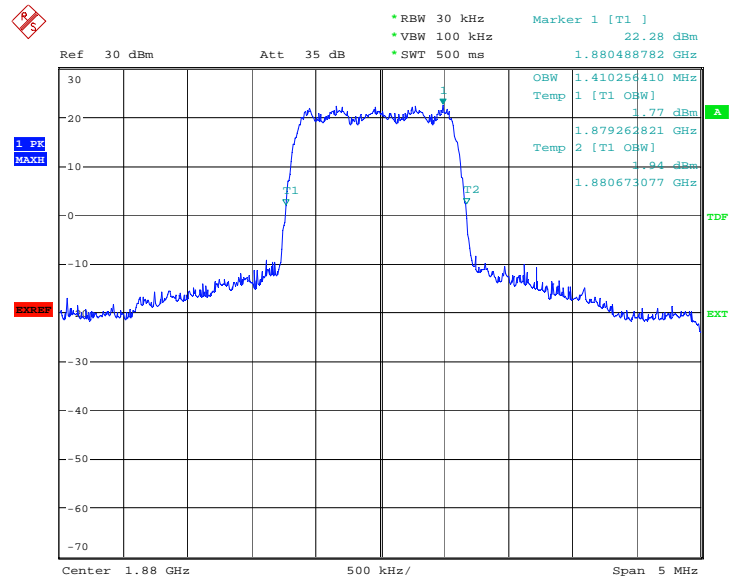
CDMA 1900

Channel 25-Occupied Bandwidth (-26dBc BW)



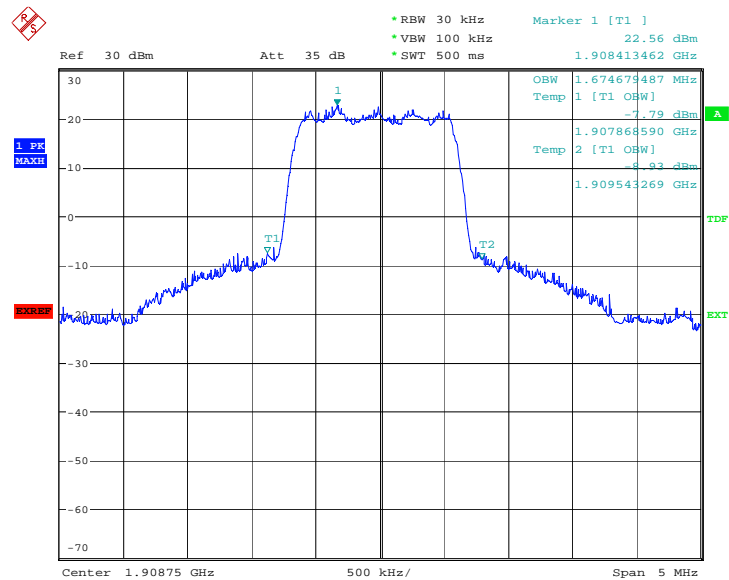
Date: 19.MAY.2009 01:52:59

Channel 600-Occupied Bandwidth (-26dBc BW)



Date: 19.MAY.2009 01:50:43

Channel 1175-Occupied Bandwidth (-26dBc BW)

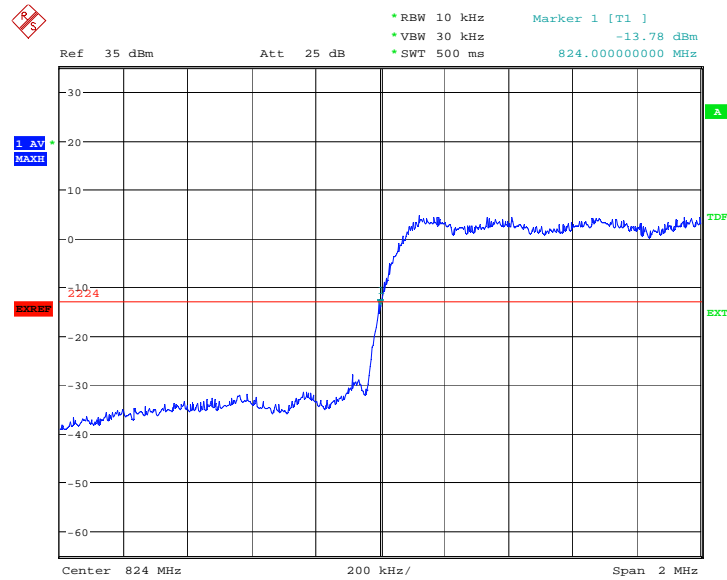


Date: 19.MAY.2009 01:49:13

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

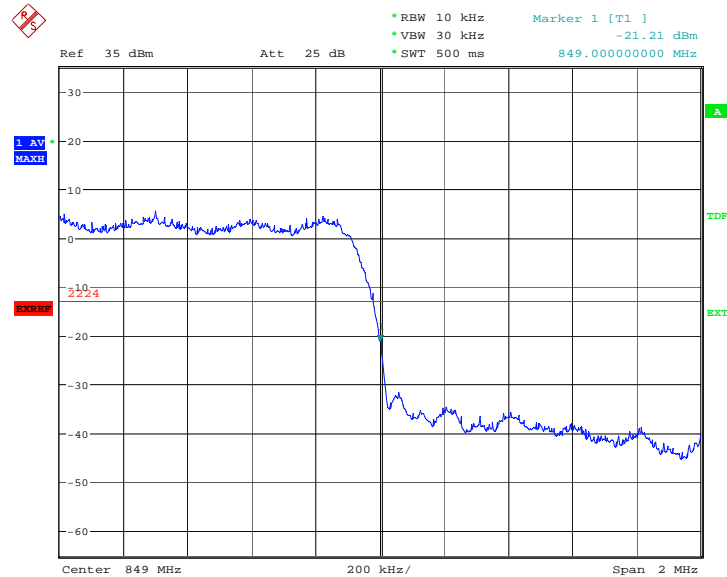
CDMA 800

BAND EDGE BLOCK-Channel 1013



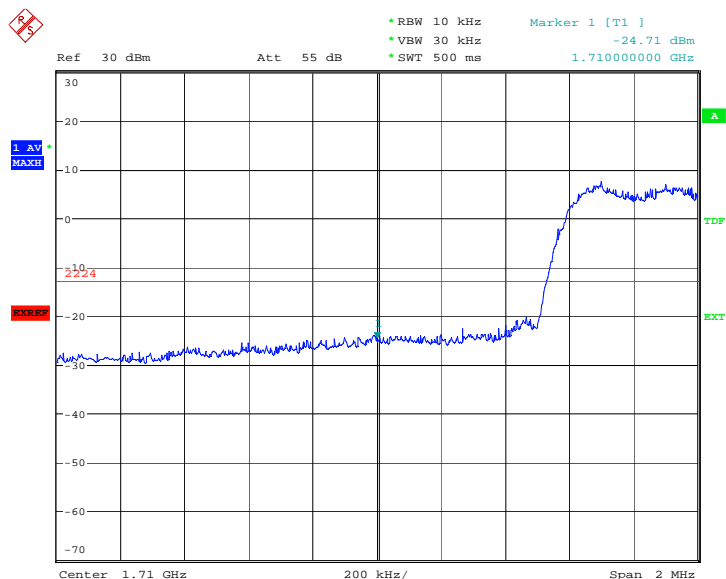
Date: 19.MAY.2009 02:07:52

BAND EDGE BLOCK-Channel 777



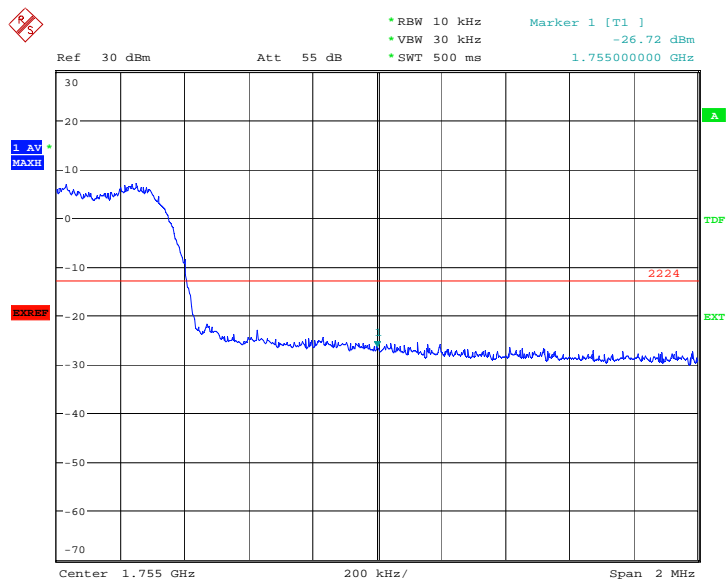
Date: 19.MAY.2009 02:08:23

CDMA 1700 BAND EDGE BLOCK-Channel 25



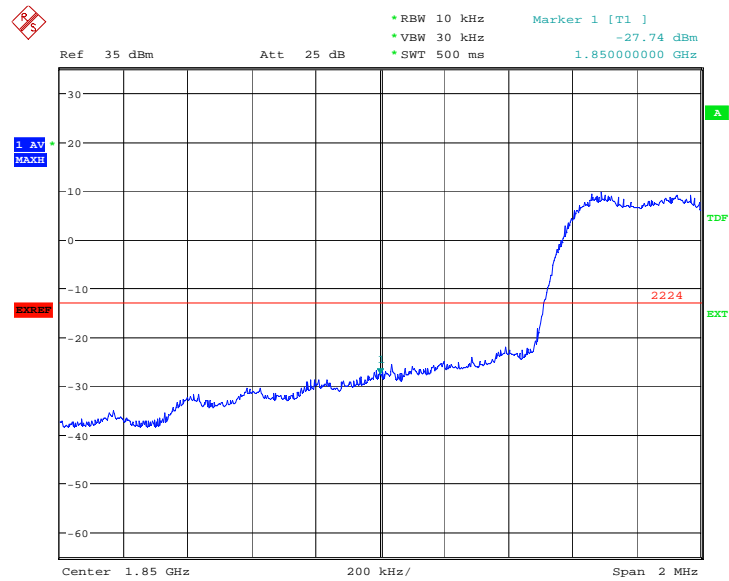
Date: 19.MAY.2009 02:34:33

BAND EDGE BLOCK-Channel 875



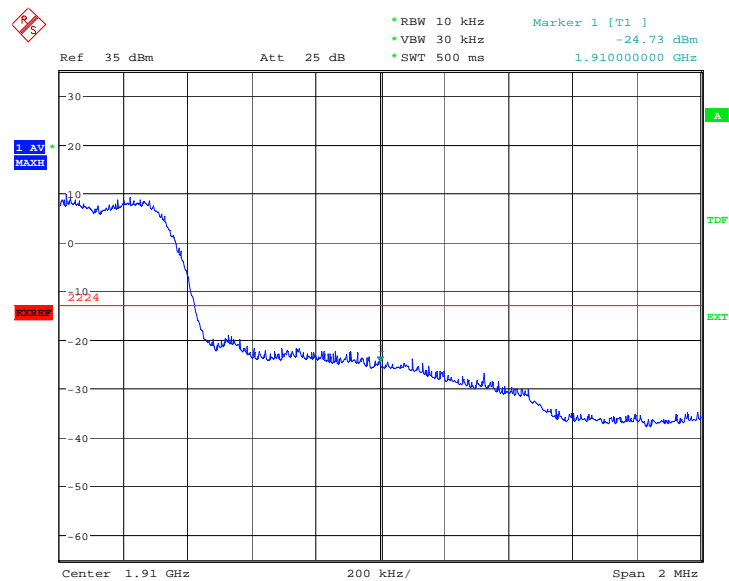
Date: 19.MAY.2009 02:35:19

CDMA 1900 BAND EDGE BLOCK-Channel 25



Date: 19.MAY.2009 02:07:07

BAND EDGE BLOCK-Channel 1175



Date: 19.MAY.2009 02:06:18

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

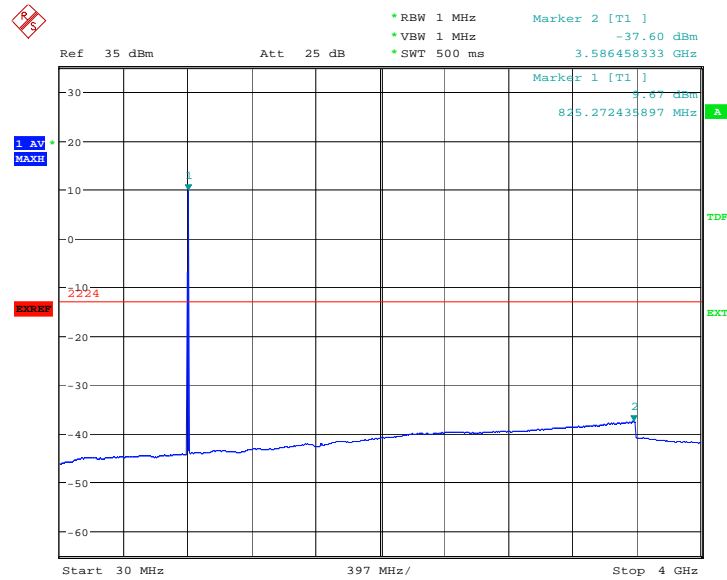
A. 8.3 Measurement result

CDMA 800

A.8.3.1 Channel 1013: 30MHz – 4GHz

Spurious emission limit –13dBm.

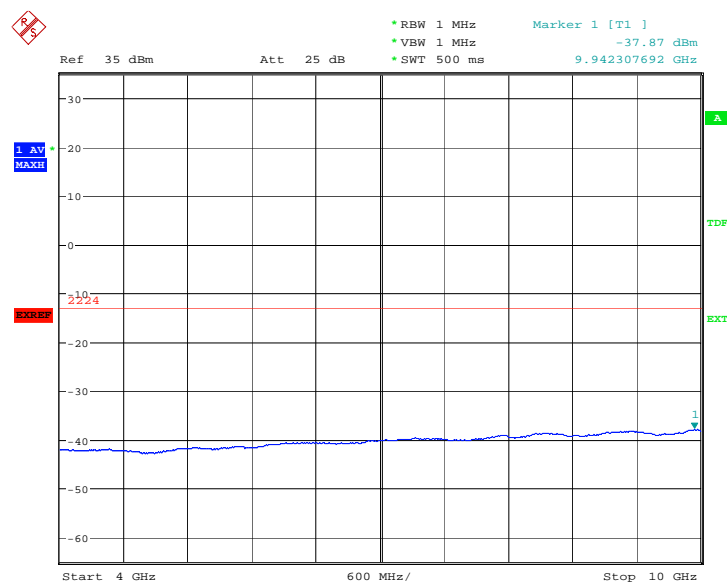
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:12:24

A.8.3.2 Channel 1013: 4GHz – 10GHz

Spurious emission limit –13dBm.

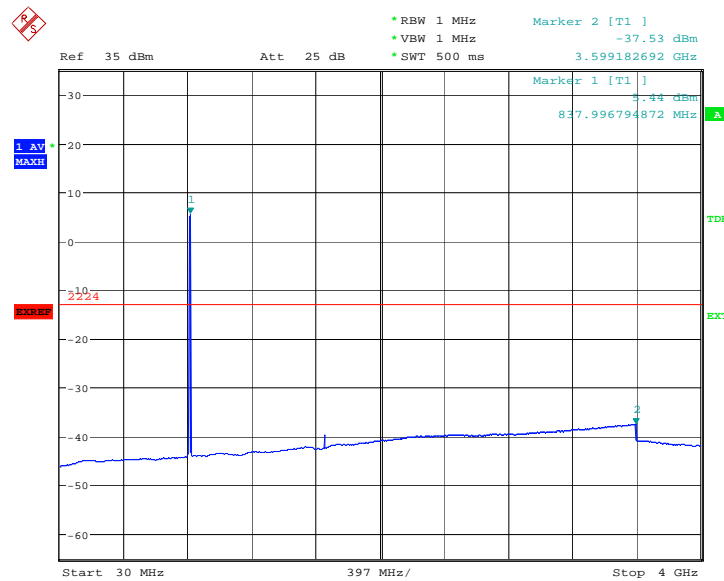


Date: 19.MAY.2009 02:13:02

A.8.3.3 Channel 384: 30MHz – 4GHz

Spurious emission limit –13dBm

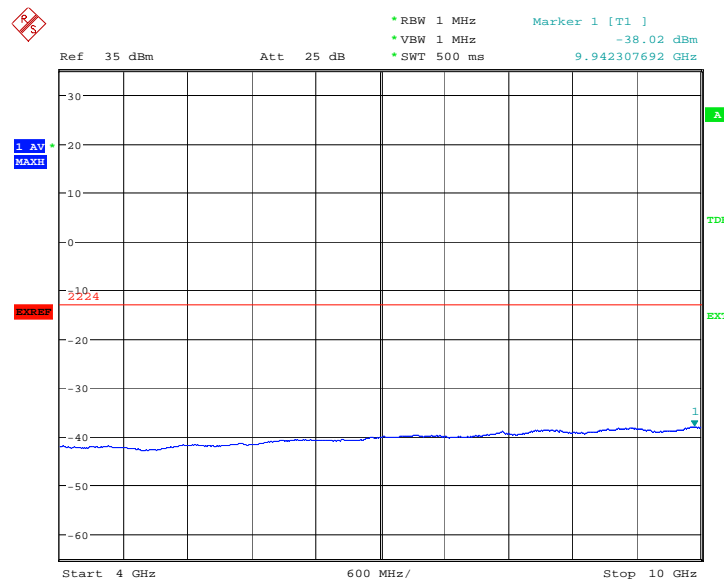
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:13:52

A.8.3.4 Channel 384: 4GHz –10GHz

Spurious emission limit –13dBm

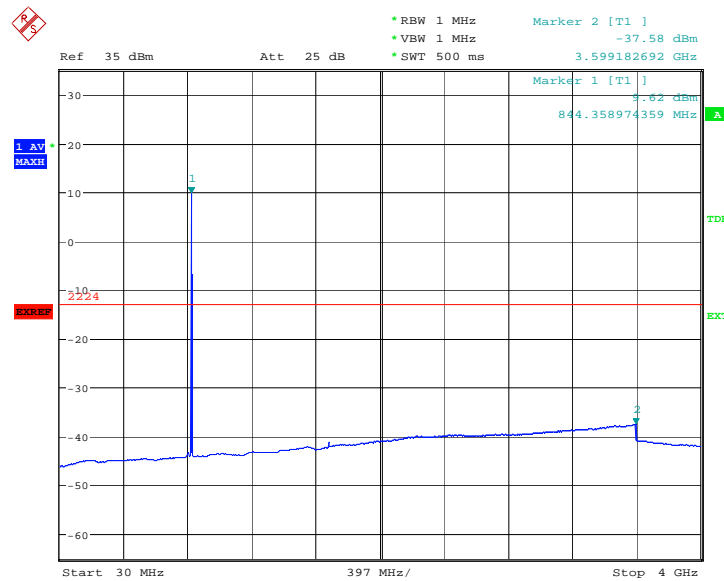


Date: 19.MAY.2009 02:14:04

A.8.3.5 Channel 777: 30MHz – 4GHz

Spurious emission limit –13dBm.

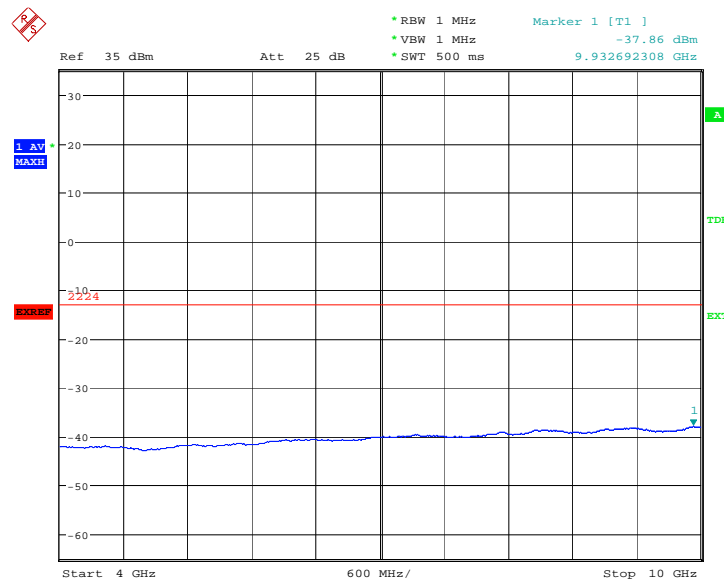
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:14:24

A.8.3.6 Channel 777: 4GHz – 10GHz

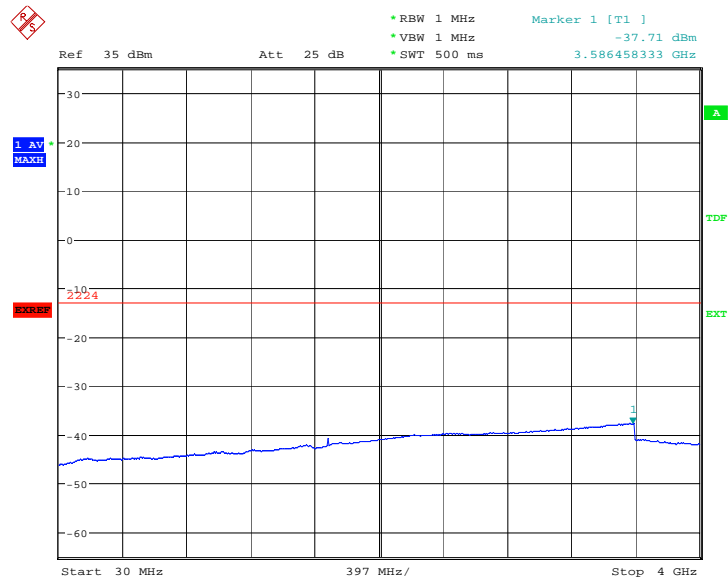
Spurious emission limit –13dBm.



Date: 19.MAY.2009 02:14:42

A.8.3.7 Idle mode: 30MHz – 4GHz

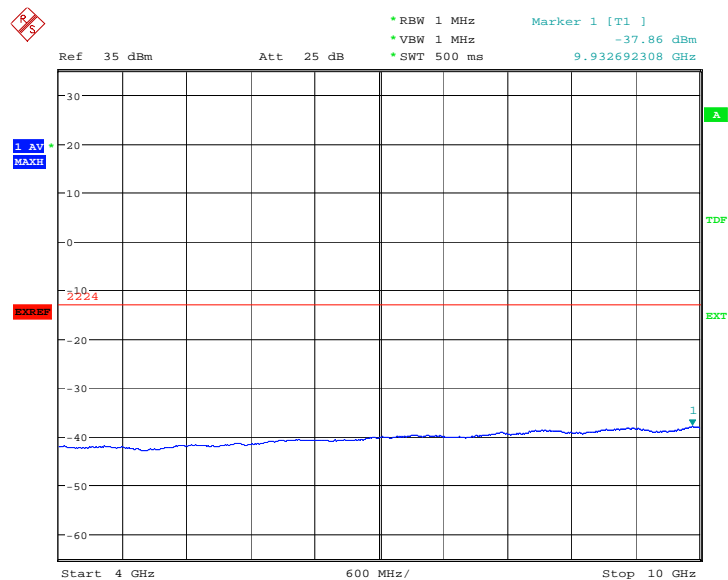
Spurious emission limit –13dBm.



Date: 19.MAY.2009 02:18:28

A.8.3.8 Idle mode: 4GHz – 10GHz

Spurious emission limit –13dBm.



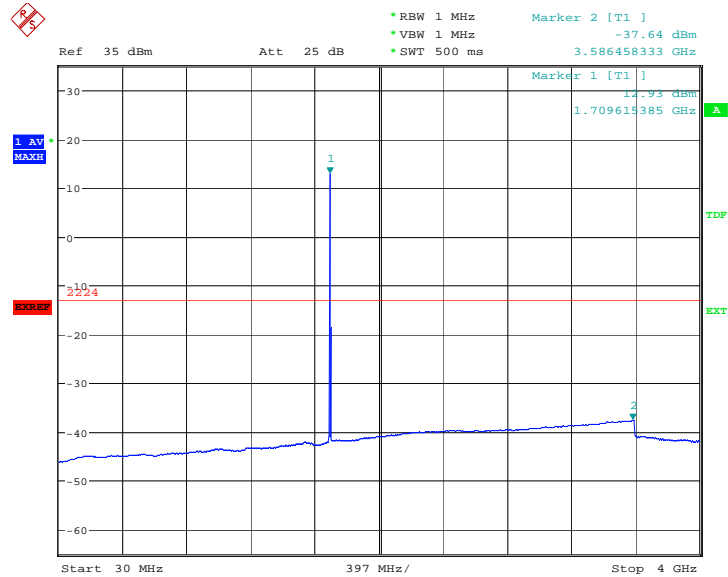
Date: 19.MAY.2009 02:18:44

CDMA 1700

A. 8.3.9 Channel 25: 30MHz – 4GHz

Spurious emission limit –13dBm.

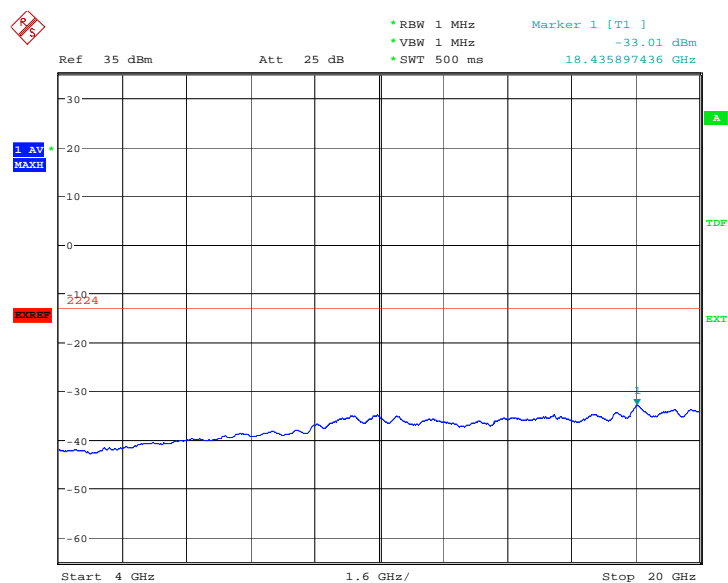
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:37:59

A. 8.3.10 Channel 25: 4GHz – 20GHz

Spurious emission limit –13dBm.

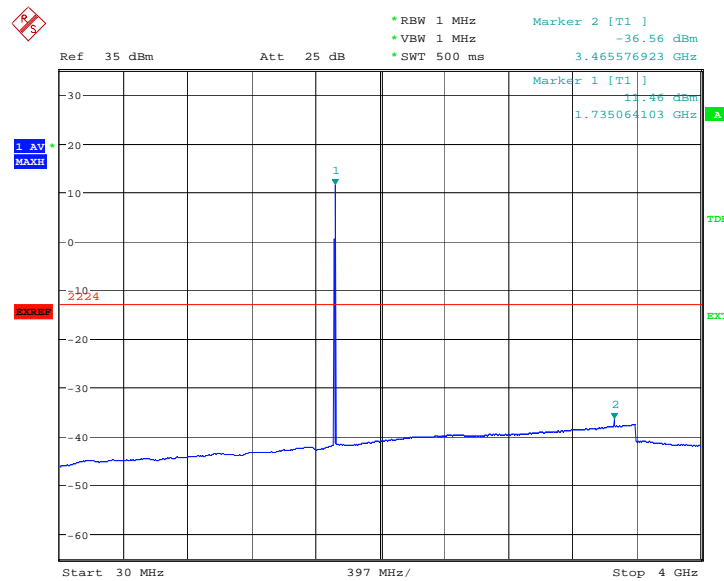


Date: 19.MAY.2009 02:38:13

A. 8.3.11 Channel 450: 30MHz – 4GHz

Spurious emission limit –13dBm

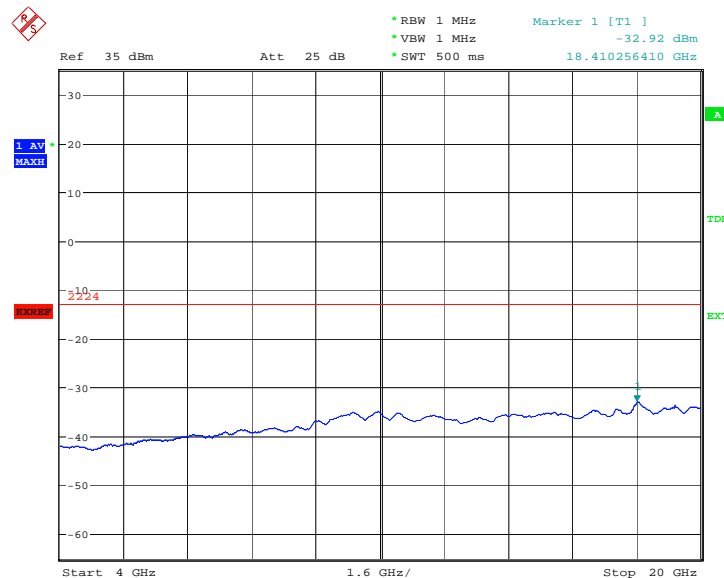
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:38:39

A. 8.3.12 Channel 450: 4GHz –20GHz

Spurious emission limit –13dBm

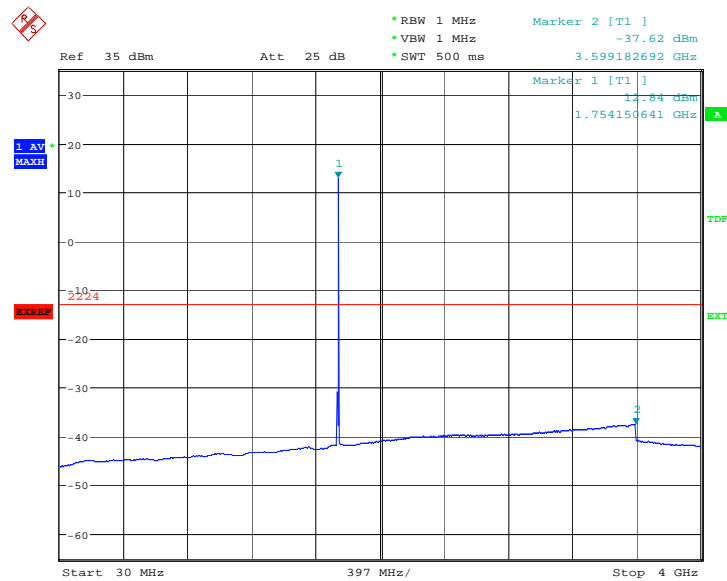


Date: 19.MAY.2009 02:38:53

A. 8.3.13 Channel 875: 30MHz – 4GHz

Spurious emission limit –13dBm.

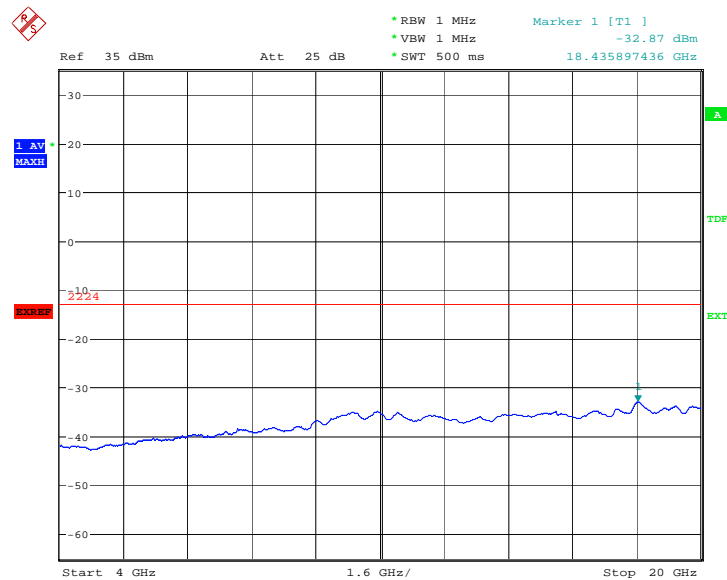
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:39:14

A. 8.3.14 Channel 875: 4GHz – 20GHz

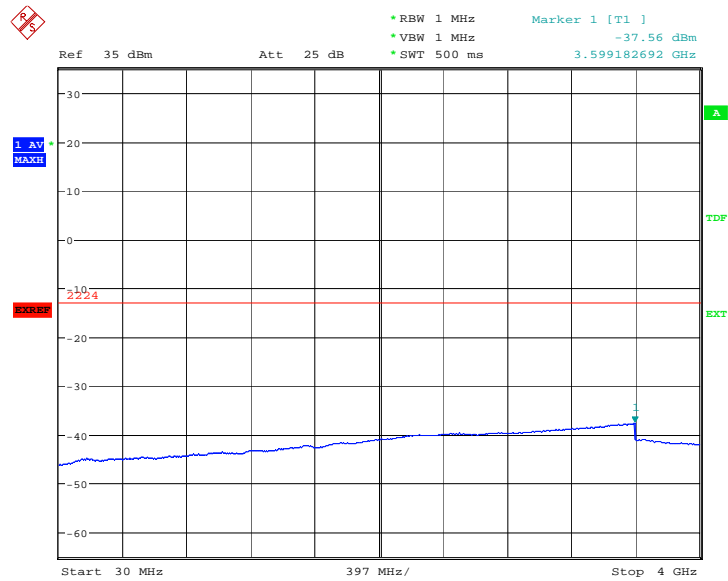
Spurious emission limit –13dBm.



Date: 19.MAY.2009 02:39:31

A. 8.3.15 Idle mode: 30MHz – 4GHz

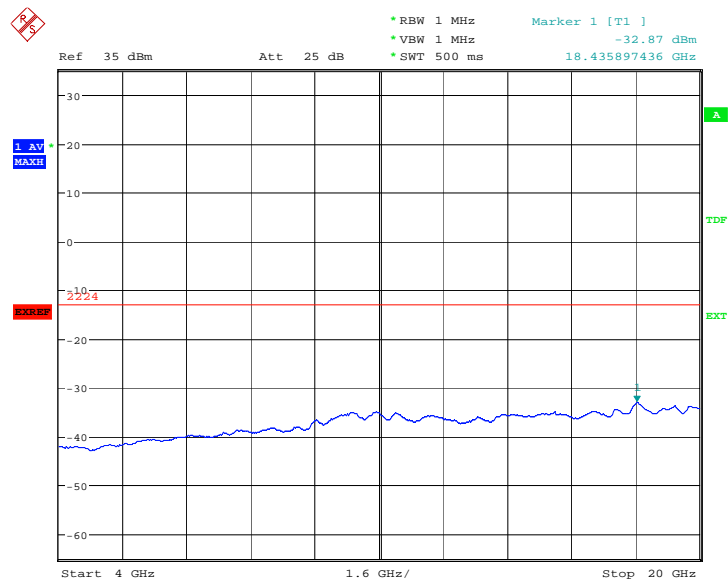
Spurious emission limit -13dBm.



Date: 19.MAY.2009 02:39:45

A. 8.3.16 Idle mode: 4GHz – 20GHz

Spurious emission limit -13dBm.



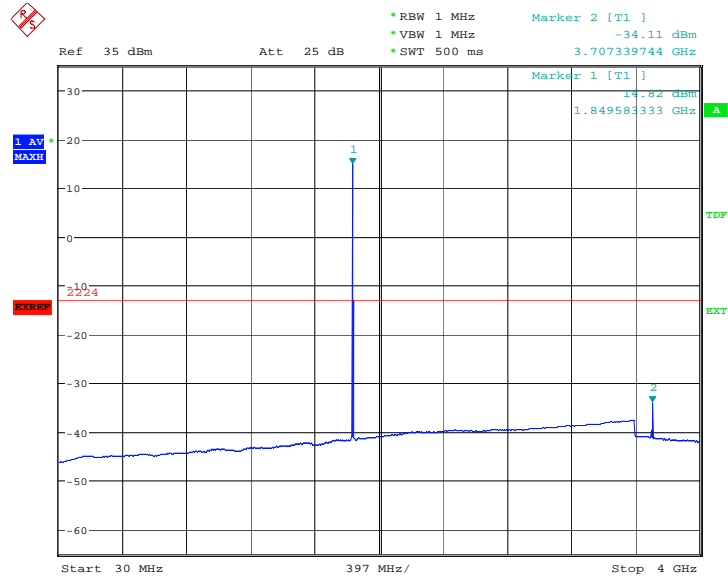
Date: 19.MAY.2009 02:40:06

CDMA 1900

A. 8.3.17 Channel 25: 30MHz – 4GHz

Spurious emission limit –13dBm.

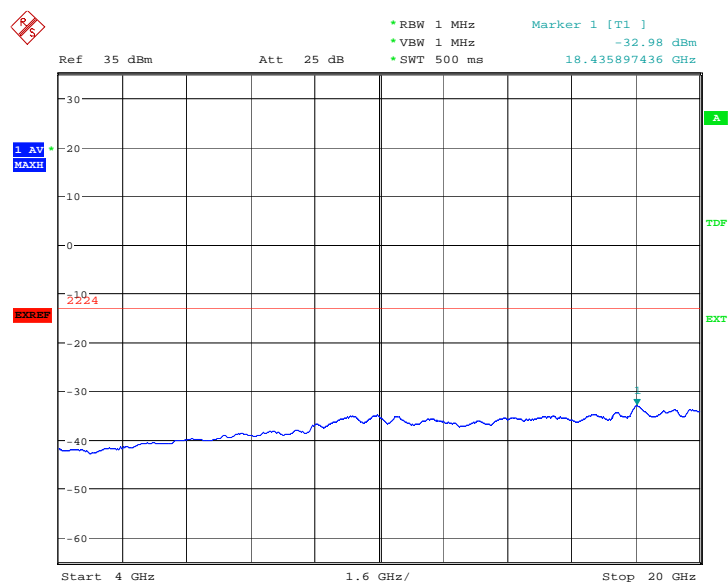
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:15:30

A. 8.3.18 Channel 25: 4GHz – 20GHz

Spurious emission limit –13dBm.

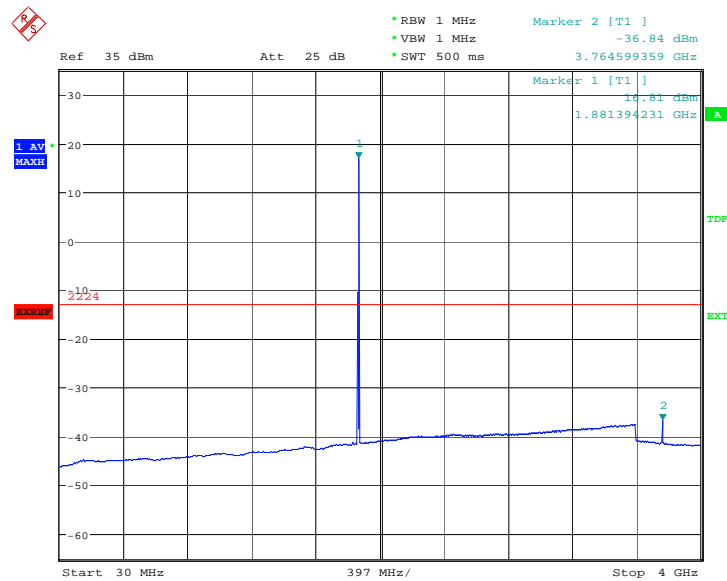


Date: 19.MAY.2009 02:15:49

A. 8.3.19 Channel 600: 30MHz – 4GHz

Spurious emission limit –13dBm

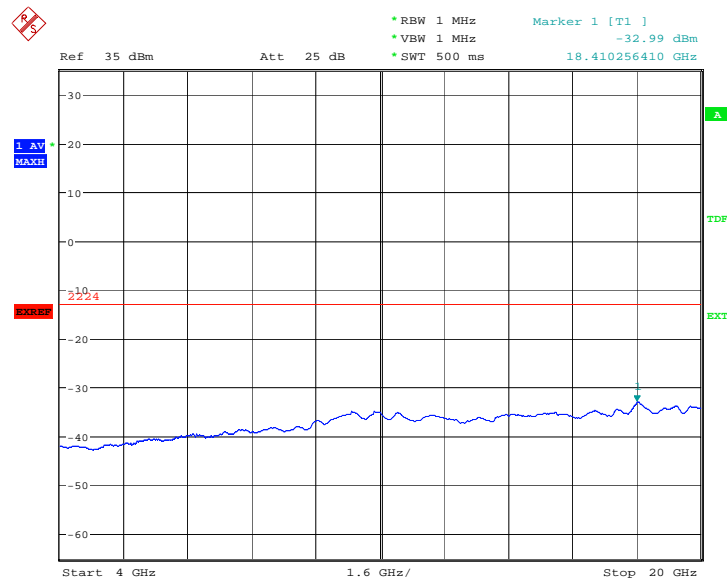
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:16:21

A. 8.3.20 Channel 600: 4GHz –20GHz

Spurious emission limit –13dBm

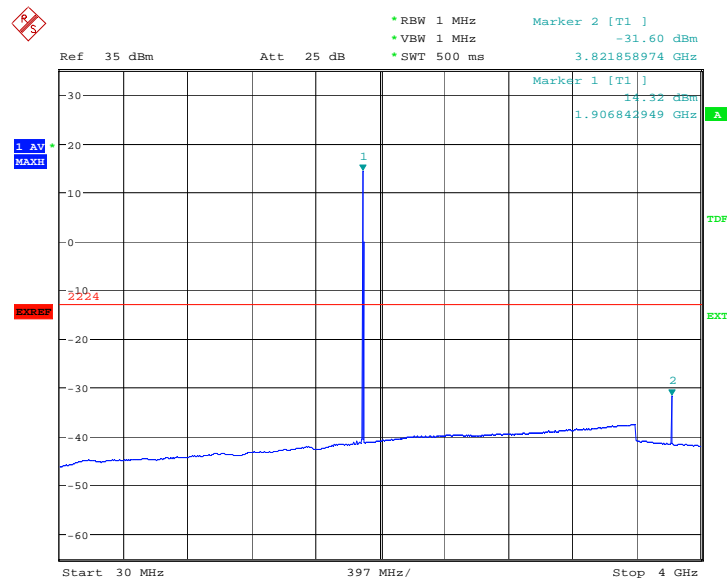


Date: 19.MAY.2009 02:16:38

A. 8.3.21 Channel 1175: 30MHz – 4GHz

Spurious emission limit –13dBm.

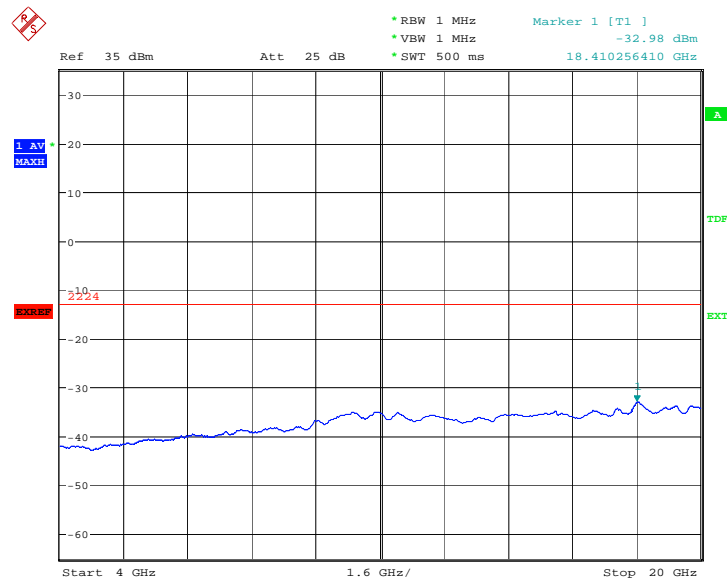
NOTE: peak above the limit line is the carrier frequency.



Date: 19.MAY.2009 02:17:26

A. 8.3.22 Channel 1175: 4GHz – 20GHz

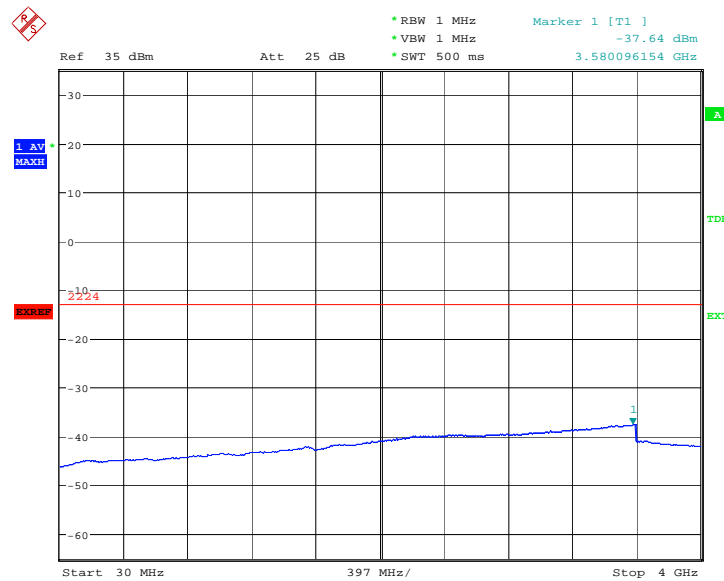
Spurious emission limit –13dBm.



Date: 19.MAY.2009 02:17:41

A. 8.3.23 Idle mode: 30MHz – 4GHz

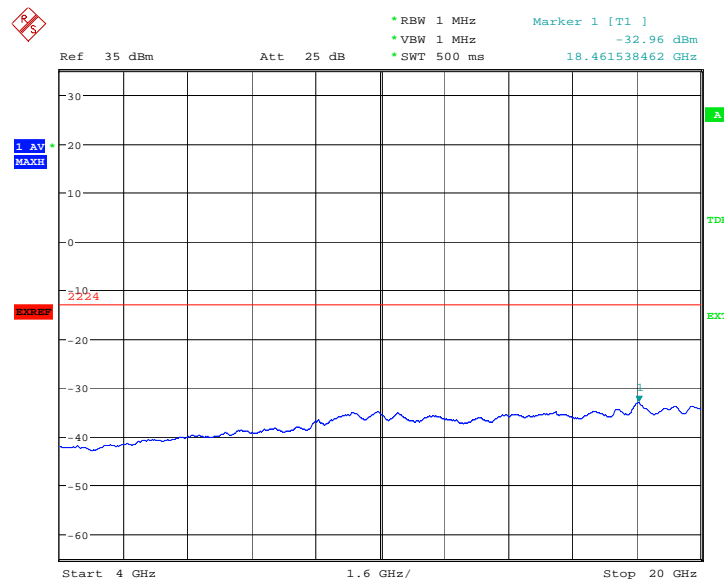
Spurious emission limit -13dBm.



Date: 19.MAY.2009 02:18:01

A. 8.3.24 Idle mode: 4GHz – 20GHz

Spurious emission limit -13dBm.



Date: 19.MAY.2009 02:18:12

END OF REPORT