FCC/IC Test Report

FOR:

Model Name: WT1000
Wireless CDMA Barcode Scanner with GPS and Voice

FCC ID: S9O-WT1000
IC ID: 5941A-WT1000

47 CFR Part 2, 22, 24

RSS-132 Issue 2

RSS-133 Issue 5

TEST REPORT #: EMC_WIRED_001_11001_FCC_22_24
DATE: 2011-10-03

ACCREDITED
TESTING LABORATORY
Certificate #2135.01

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed: A2LA Accredited

IC recognized # 3462B-1

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Hans Peter May.

Table of Contents

1 Assessment

The following device was tested against the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and Industry Canada Standards RSS 132 and RSS 133 and no deviations were ascertained during the course of the tests performed.

Company	Description	Model #
WiredTime.com, Inc.	Wireless CDMA Barcode Scanner with GPS and Voice	WT1000

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2011-10-03	Compliance	Sajay Jose EMC Lab Manager	Sajay Jose 2011.10.03 17:09:10 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2011-10-03	Compliance	Calvin Lee EMC Engineer	Calvin Lee Digitally signed by Calvin Lee DN: cn=Calvin Lee, c=US, o=CETECOM Inc, ou=Compliance, email=calvin.lee@cetecomusa.com Date: 2011.10.03 17:06:56 -07'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Director:	Heiko Strehlow
Responsible Project Leader:	Josie Sabado

2.2 Identification of the Client

Applicant's Name:	WIREDTIME.COM.INC
Street Address:	5-350 Shirley Avenue
City/Zip Code	Kitchener, ON, CANADA N2B 2E1
Country	Canada
Contact Person:	Rohan Abraham
Phone No.	519-570-3225
Fax:	519-570-3096
e-mail:	rabraham@wiredtime.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as above.
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	Mercury
Model No:	WT1000
Product Type:	Barcode Scanner Device
Hardware Revision :	2.0
Software Revision :	1.0
FCC-ID:	S9O-WT1000
IC-ID :	5941A-WT1000
Frequency:	Cellular US CDMA: 824.70-848.31 MHz PCS CDMA: 1851.25- 1908.75 MHz GPS: 1575.42 MHz (Receive Only)
Antenna Type:	Dipole 1.03 dBi Gain
Power Supply:	2.7V (Low)/ 3.8V(Nom)/ 4.2V(Max)
Temperature Range:	-30°C ~ 50°C

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version
1	80A56171	2.0	1.0

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	AC Adapter	n/a	VS-AC-04	n/a

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in the following test standards:

- 47 CFR Part 2: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations.
- 47 CFR Part 22: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 22- Public mobile services
- 47 CFR Part 24: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 24- Personal communication services
- RSS 132- Issue 2: Spectrum management and telecommunication policy- Radio Standards Specifications Cellular telephones employing new technologies operating in the bands 824-849MHz and 869-894MHz
- RSS 133- Issue 5: Spectrum management and telecommunication policy- Radio Standards Specifications- 2GHz personal communication services

This test report is to support a request for new equipment authorization under the **FCC ID S90-WT1000** and IC ID **5941A-WT1000.**

All testing was performed on the product referred to in Section 3 as EUT.

The EUT carries a pre-certified Dual-Band CDMA module/GPS with FCC ID# R17CC864-DUAL. Since the module design is not modified and the module is integrated in device under test, only radiated measurements were performed at Cetecom Inc. This test report contains full radiated testing as per FCC 22H/24E on the EUT with the pre-certified Dual-Band CDMA module. All FCC 22H/24E conducted measurements are covered under the test report# HCT-RF09-0716-1 which can be found on http://www.fcc.gov/oet/ea/fccid/ and entering the FCC ID.

5 Summary of Measurement Results

850 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a) RSS132 4.4	RF Output Power	Nominal	CDMA 850	■	☐	☐	☐	Complies
			EVDO 850	☐	☐	☐	■	Complies
§2.1055 §22.355 RSS132 4.3	Frequency Stability	Nominal	CDMA 850	☐	☐	☐	■	Complies
			EVDO 850	☐	☐	☐	■	Complies
§2.1049 §22.917(b) RSS132 4.2	Occupied Bandwidth	Nominal	CDMA 850	☐	☐	☐	■	Complies
			EVDO 850	☐	☐	☐	■	Complies
§2.1051 §22.917 RSS132 4.5	Band Edge Compliance	Nominal	CDMA 850	☐	☐	☐	■	Complies
			EVDO 850	☐	☐	☐	■	Complies
§2.1051 §22.917 RSS132 4.5	Conducted Spurious Emissions	Nominal	CDMA 850	☐	☐	☐	■	Complies
			EVDO 850	☐	☐	☐	■	Complies
§2.1053 §22.917 RSS132 4.5	Radiated Spurious Emissions	Nominal	CDMA 850	■	☐	☐	☐	Complies
			EVDO 850	☐	☐	☐	☐	Complies
§15.107 §15.207 RSS Gen	Line Conducted Emissions	Nominal	CDMA 850	■	☐	☐	☐	Complies
			EVDO 850	☐	☐	☐	☐	Complies
§2.1053 §15.109 RSS Gen	Receiver Emissions-Radiated	Nominal	RX Mode	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Telit CC864-DUAL module does not support EVDO modulation.

All FCC 22H/24E conducted measurements are covered under test report# HCT-RF09-0716-1

1900 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a) RSS133 6.4	RF Output Power	Nominal	CDMA 1900	■	☐	☐	☐	Complies
			EVDO 1900	☐	☐	☐	■	Complies
§2.1055 §24.235 RSS133 6.3	Frequency Stability	Nominal	CDMA 1900	☐	☐	☐	■	Complies
			EVDO 1900	☐	☐	☐	■	Complies
§2.1049 §24.238(b) RSS133 6.2	Occupied Bandwidth	Nominal	CDMA 1900	☐	☐	☐	■	Complies
			EVDO 1900	☐	☐	☐	■	Complies
§2.1051 §24.238 RSS133 6.5	Band Edge Compliance	Nominal	CDMA 1900	☐	☐	☐	■	Complies
			EVDO 1900	☐	☐	☐	■	Complies
§2.1051 §24.238 RSS133 6.5	Conducted Spurious Emissions	Nominal	CDMA 1900	☐	☐	☐	■	Complies
			EVDO 1900	☐	☐	☐	■	Complies
§2.1053 §24.238 RSS133 6.5	Radiated Spurious Emissions	Nominal	CDMA 1900	■	☐	☐	☐	Complies
			EVDO 1900	☐	☐	☐	☐	Complies
§15.107 §15.207 RSS Gen	Line conducted Emissions	Nominal	CDMA 1900	■	☐	☐	☐	Complies
			EVDO 1900	☐	☐	☐	☐	Complies
§2.1053 §15.109 RSS Gen	Receiver Emissions-Radiated	Nominal	RX Mode	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Telit CC864-DUAL module does not support EVDO modulation.

All FCC 22H/24E conducted measurements are covered under test report# HCT-RF09-0716-1

6 Measurements

6.1 RF Power Output

6.1.1 References

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232
IC: RSS-Gen Section 4.8; RSS 132 Section 4.4; RSS 133 Section 6.4

6.1.2 Measurement requirements:

6.1.2.1 FCC 2.1046: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

6.1.2.2 RSS-Gen 4.8: RF power output.

Transmitter output power measurements shall be carried out before the unwanted emissions test. The transmitter output power value, obtained from this test, serves as the reference level used to determine the unwanted emissions.

6.1.3 Limits:

6.1.3.1 FCC 22.913 (a) Effective radiated power limits.

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

6.1.3.2 FCC 24.232 (b)(c) Power limits.

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

6.1.3.3 RSS-132 Section 4.4

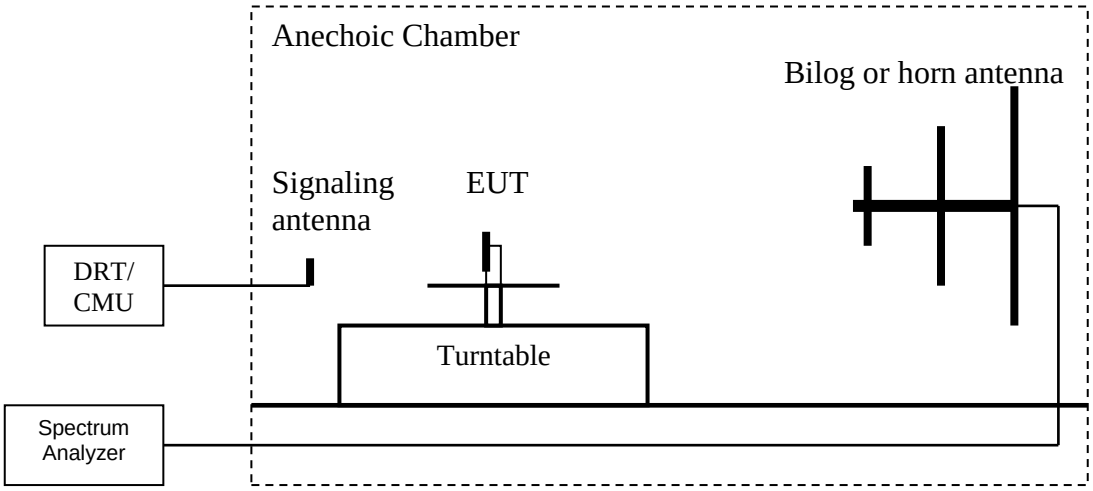
The transmitter output power shall not exceed the limits given in SRSP-503.
SRSP-503: The maximum EIRP shall be 11.5W for mobile stations.

6.1.3.4 RSS-133 Section 6.4

The average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.
SRSP-510: Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

6.1.4 Radiated Output Power Measurement procedure

Ref: TIA-603C 2004 -2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in center of the turn table.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

Spectrum analyzer settings: RBW=VBW=5MHz
(**Note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

6.1.5 RF Power Output 850MHz band

Limit: FCC: Nominal Peak Output Power < 38.45 dBm (7W)
IC: Nominal Peak Output Power < 40.60 dBm (11.5W)
Measurement Uncertainty (Conducted): ±0.5 dB
Measurement Uncertainty (Radiated): ±3.0 dB
Calculated antenna gain= Radiated peak power- Conducted peak power

CDMA Cellular 850	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.70	24.03
836.52	25.19
848.31	25.59

6.1.5.1 Measurement Result

Pass.

6.1.6 RF Power Output 1900MHz band

Limit: Nominal Peak Output Power < 33 dBm (2W)
PAR many not exceed 13dB
Measurement Uncertainty (Conducted): ±0.5 dB
Measurement Uncertainty (Radiated): ±3.0 dB
Calculated antenna gain= Radiated peak power- Conducted peak power

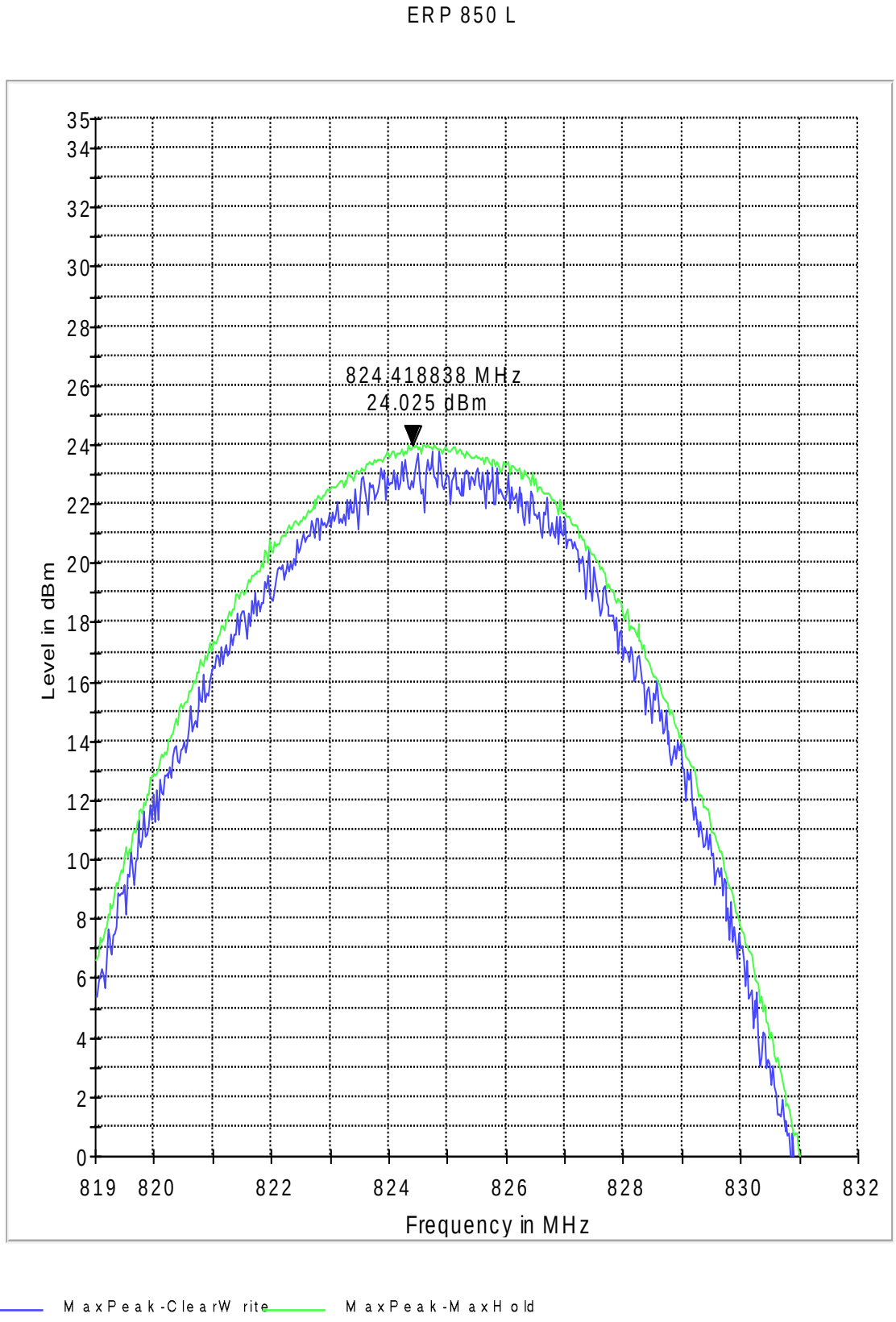
CDMA PCS 1900	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1851.25	27.72
1880	26.44
1908.75	25.92

6.1.6.1 Measurement Result

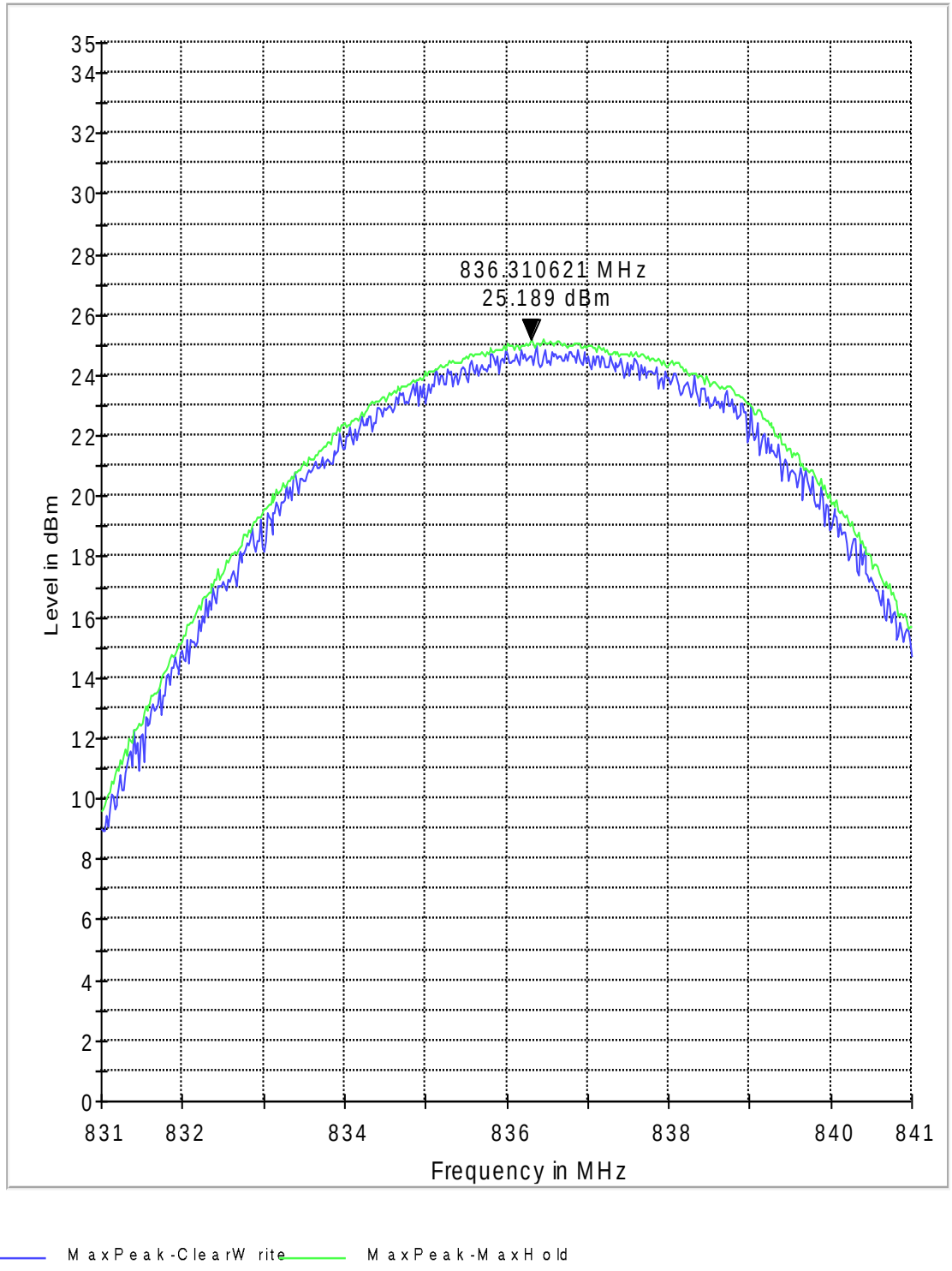
Pass.

6.1.7 Results:

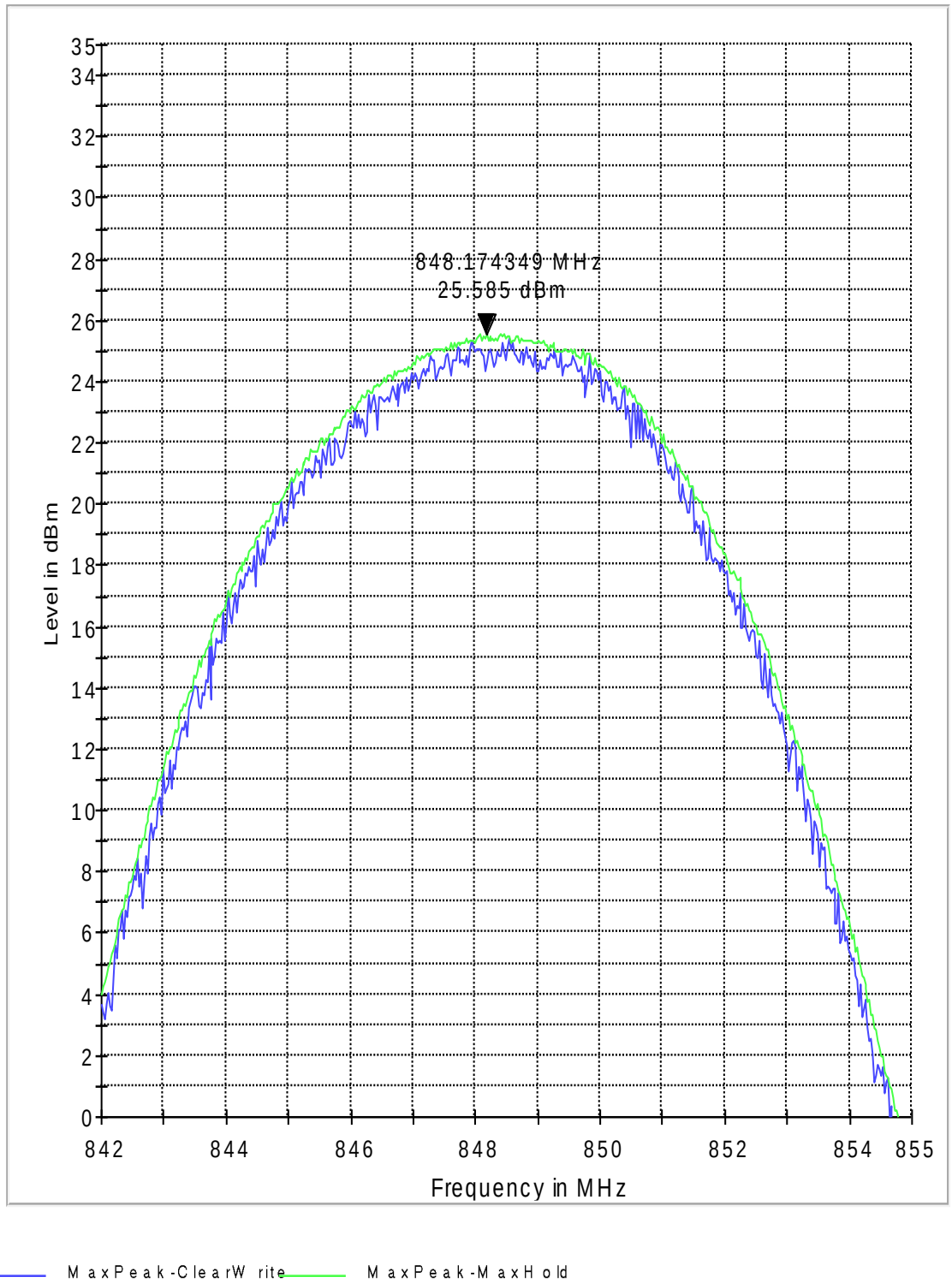
ERP (CDMA Cellular 850) CHANNEL 1013



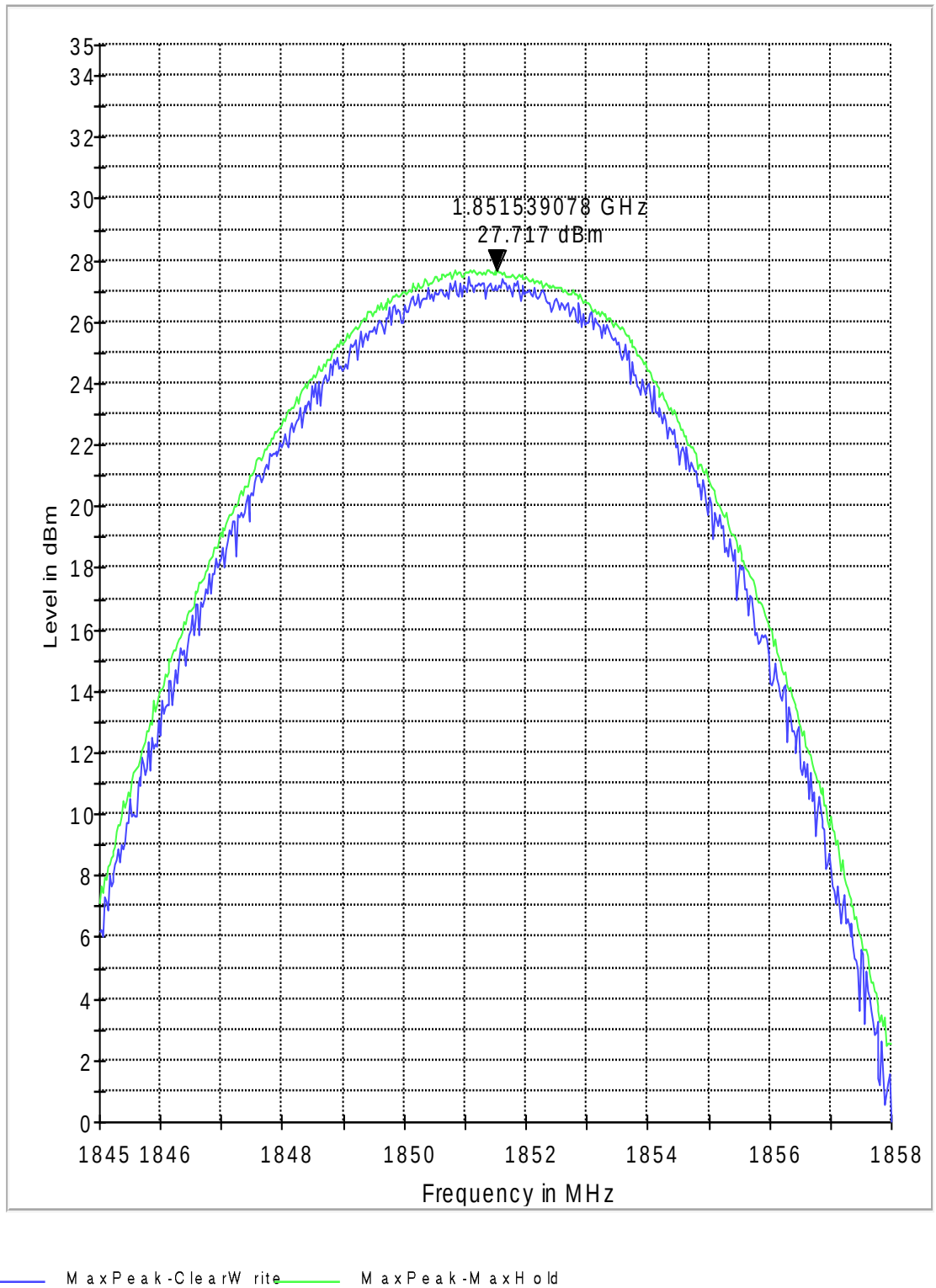
ERP (CDMA Cellular 850) CHANNEL 384



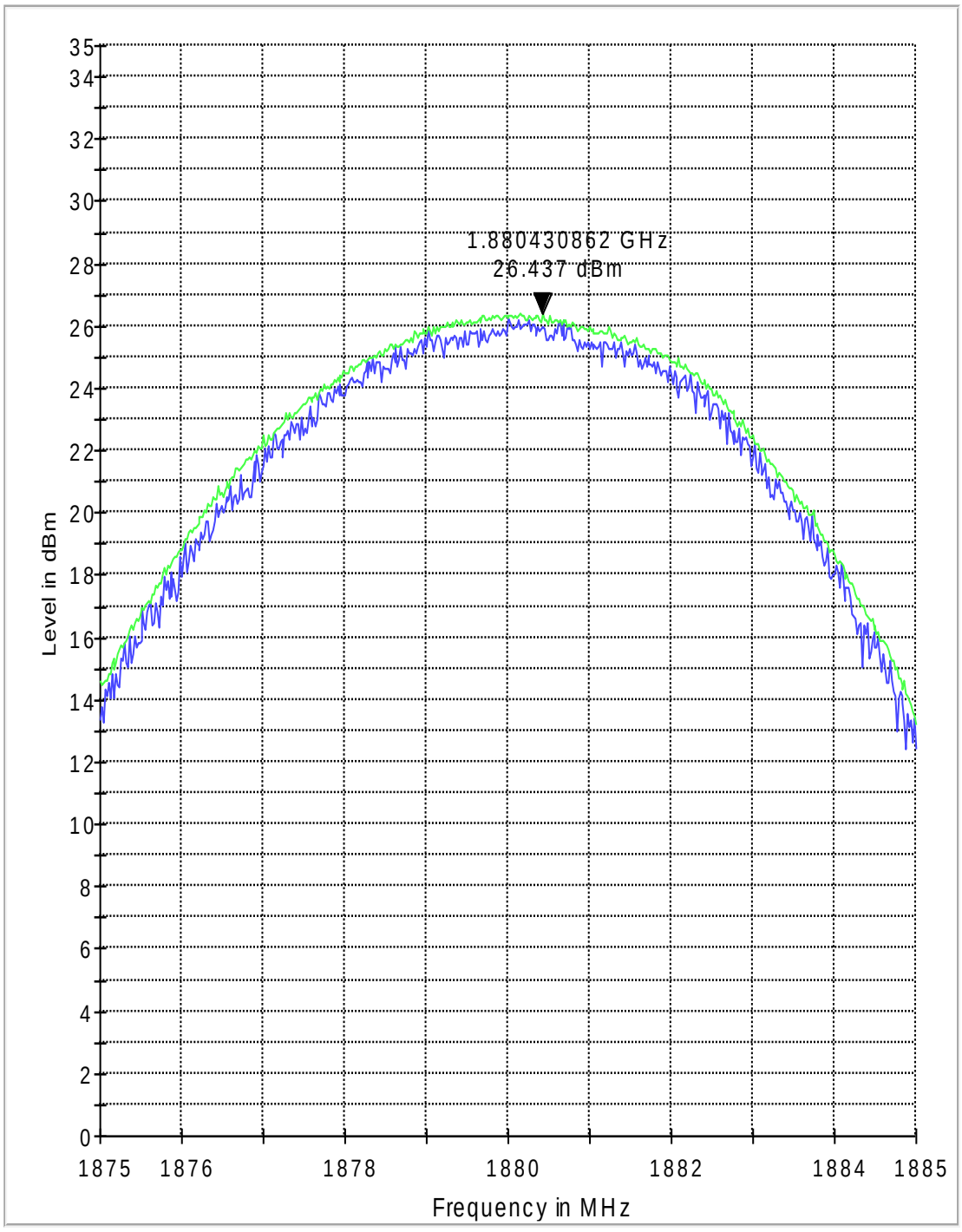
ERP (CDMA Cellular 850) CHANNEL 777



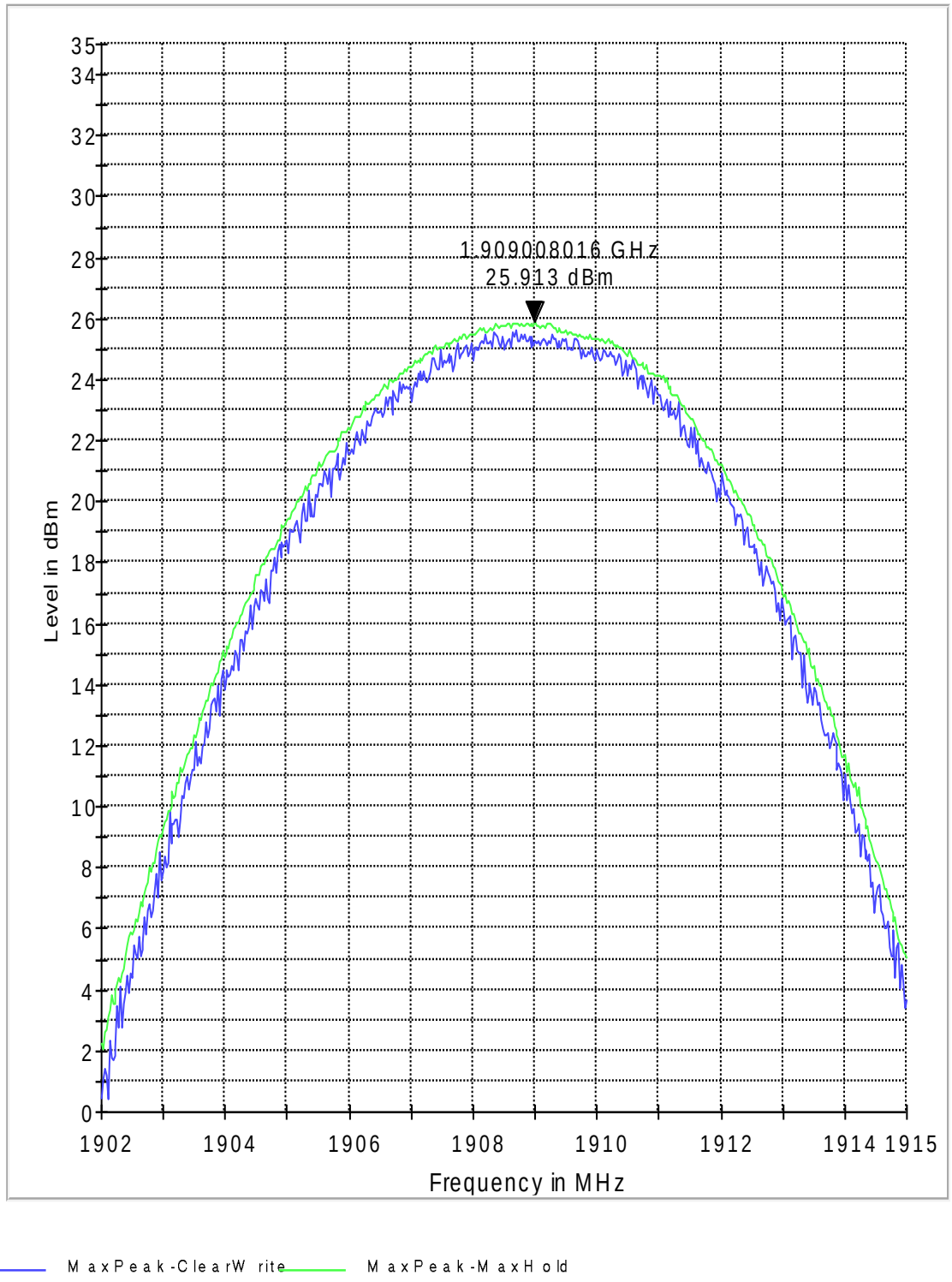
EIRP (CDMA PCS 1900) CHANNEL 25



EIRP (CDMA PCS 1900) CHANNEL 600



EIRP (CDMA PCS 1900) CHANNEL 1175



6.2 Occupied Bandwidth/Emission Bandwidth

Refer to the test report issued under HCT Co., LTD Report# HCT-RF09-0716-1 (Issued on 2009-07-29)

6.3 Frequency Stability

Refer to the test report issued under HCT Co., LTD Report# HCT-RF09-0716-1 (Issued on 2009-07-29)

6.4 Conducted Spurious Emissions

Refer to the test report issued under HCT Co., LTD Report# HCT-RF09-0716-1 (Issued on 2009-07-29)

6.5 Spurious Emissions Radiated

6.5.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238
IC: RSS-Gen Section 4.9; RSS 132 Section 4.5; RSS 133 Section 6.5

6.5.2 Measurement requirements:

6.5.2.1 FCC 2.1053: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

6.5.2.2 RSS-Gen 4.9: Transmitter unwanted spurious emissions

The same parameter, peak power or average power, used for the transmitter output power measurement shall be used for unwanted emission measurements.
The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency), or from 30 MHz, whichever is the lower, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

6.5.3 Limits:

(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

6.5.3.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.5.3.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the

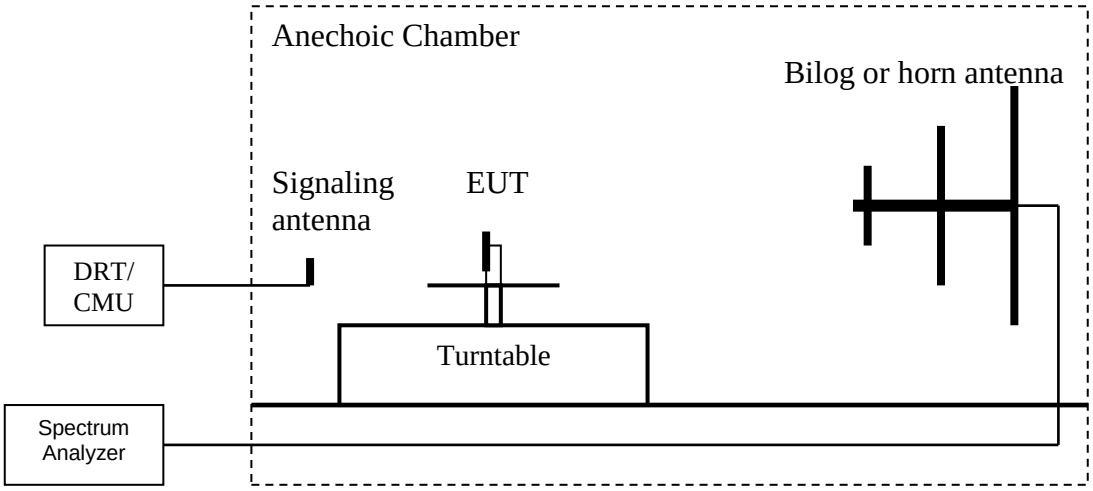
transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.5.3.3 RSS-132 Section 4.5.1.1 and RSS-133 Section 6.5.1

In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least $43 + 10 \log_{10}(P)$, dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any 100 kHz bandwidth.
After the first 1.5 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any MHz of bandwidth.

6.5.4 Radiated out of band measurement procedure:

Ref: TIA-603C 2004- 2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
    (N**ote:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings: RBW=VBW=1MHz

Measurement Survey:

The site is constructed in accordance with ANSI C63.4 requirements and is recognized by the FCC to be in compliance for a 3m site. The spectrum is scanned from 30MHz to the 10th harmonic of the highest frequency generated by the EUT.
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the 850 & 1900 bands. 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 850 & 1900 band into any of the other blocks respectively. 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.

All measurements are done in horizontal and vertical antenna polarization; and on three orientations of the EUT. The plots show the worst case where it is not indicated otherwise. Unless mentioned otherwise, the peaks in the plots are from the carrier frequency.

6.5.5 Radiated out of band emissions results on EUT- Transmit Mode:

6.5.5.1 Test Results Transmitter Spurious Emission CDMA 850:

Harmonic	Tx ch-1013 Freq. (MHz)	Level (dBm)	Tx ch-384 Freq. (MHz)	Level (dBm)	Tx ch-777 Freq. (MHz)	Level (dBm)
1	**824.7**	-	**836.52**	-	**848.31**	-
2	**1649.4**	NF	**1673.04**	NF	**1696.62**	NF
3	**2474.1**	NF	**2509.56**	NF	**2544.93**	NF
4	**3298.8**	NF	**3346.08**	NF	**3393.24**	NF
5	**4123.5**	NF	**4182.6**	NF	**4241.55**	NF
6	**4948.2**	NF	**5019.12**	NF	**5089.86**	NF
7	**5772.9**	NF	**5855.64**	NF	**5938.17**	NF
8	**6597.6**	NF	**6692.16**	NF	**6786.48**	NF
9	**7422.3**	NF	**7528.68**	NF	**7634.79**	NF
10	**8247**	NF	**8365.2**	NF	**8483.1**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

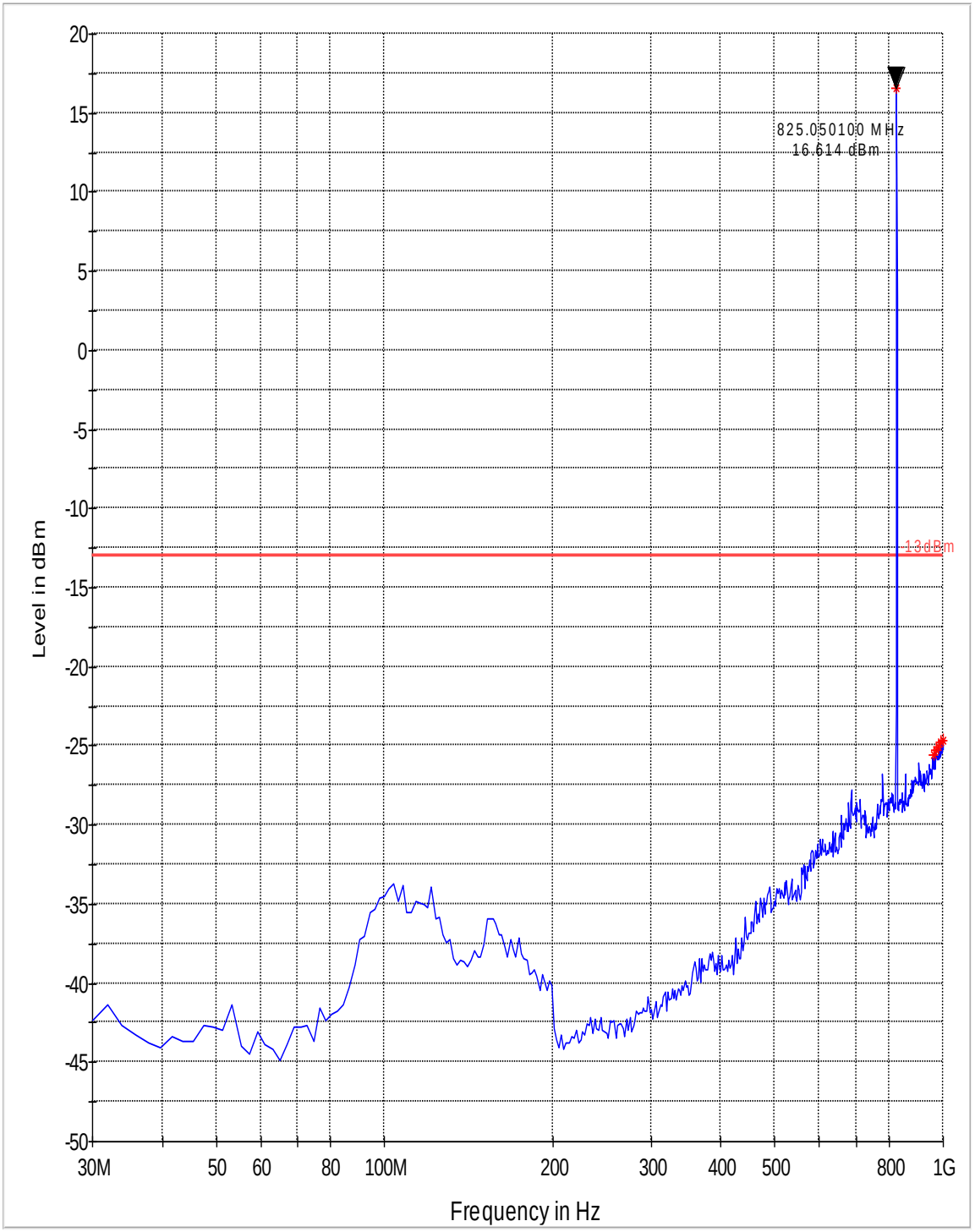
6.5.5.2 Measurement Result

Pass.

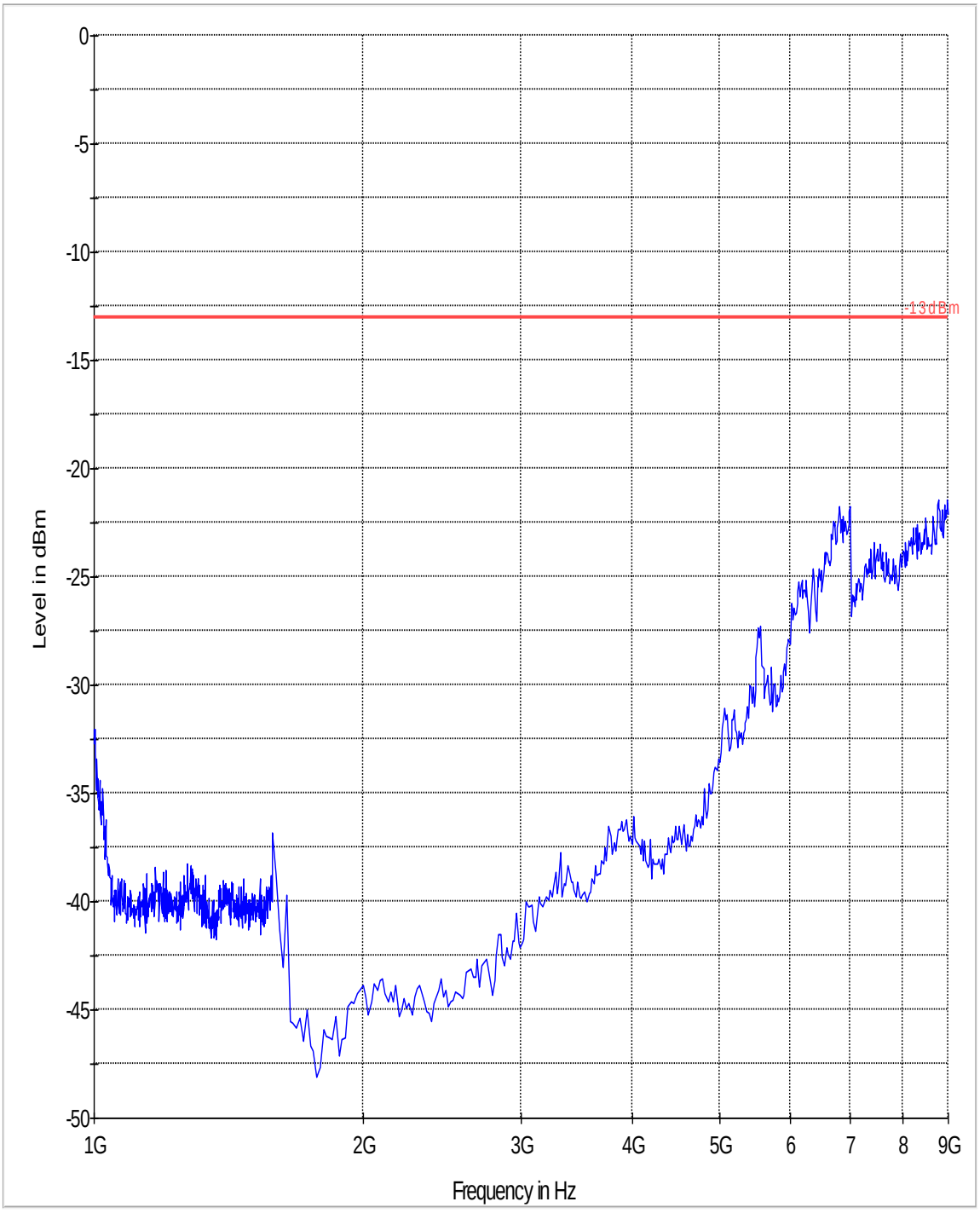
Legend for the plots:

-13dBm.LimitLine
Preview Result
Data Reduction Result
Final Measurement Result

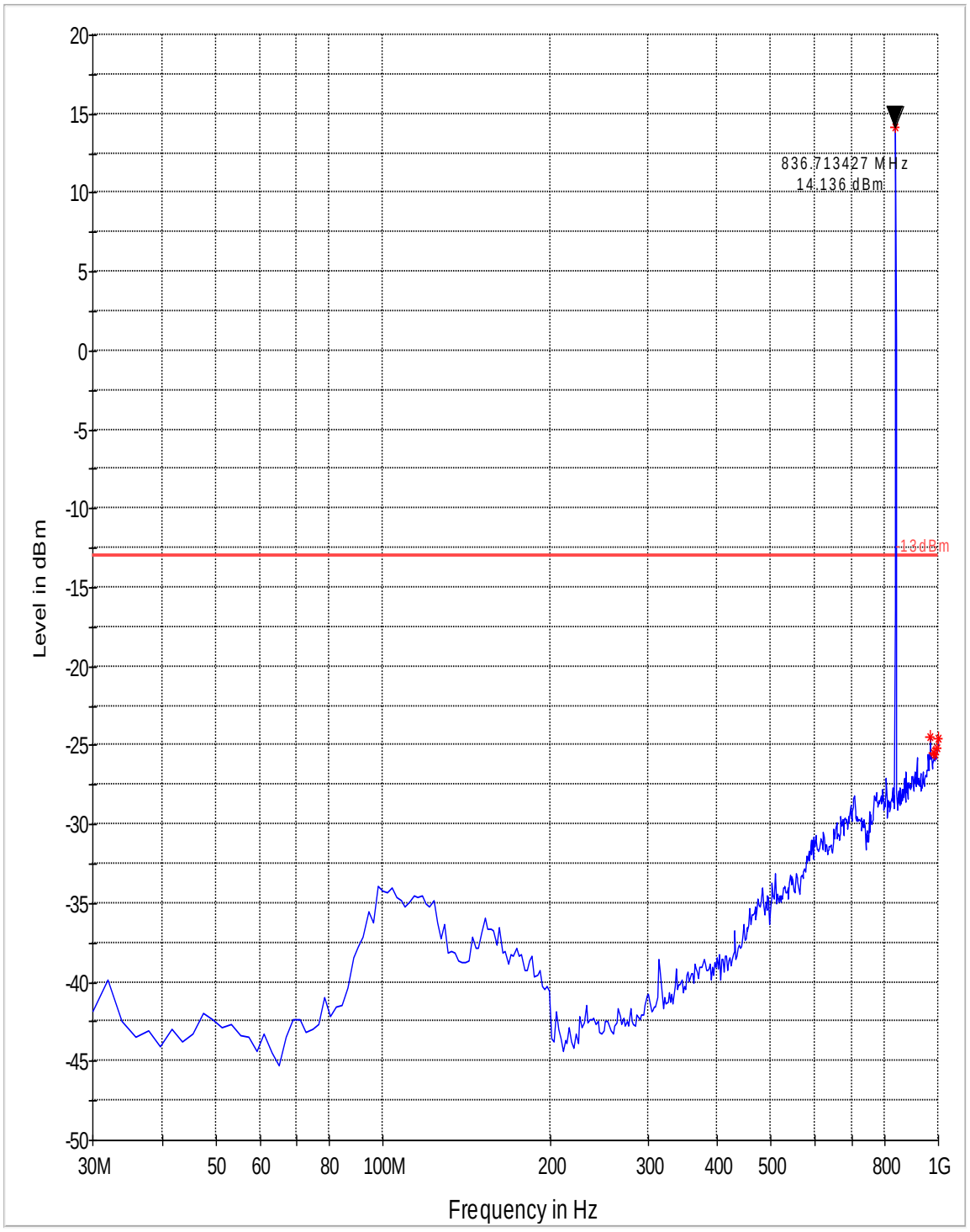
Radiated Spurious Emissions (CDMA-850) Tx: Low Channel
Test Results 30MHz-1GHz
Note: Marker placed on transmit signal



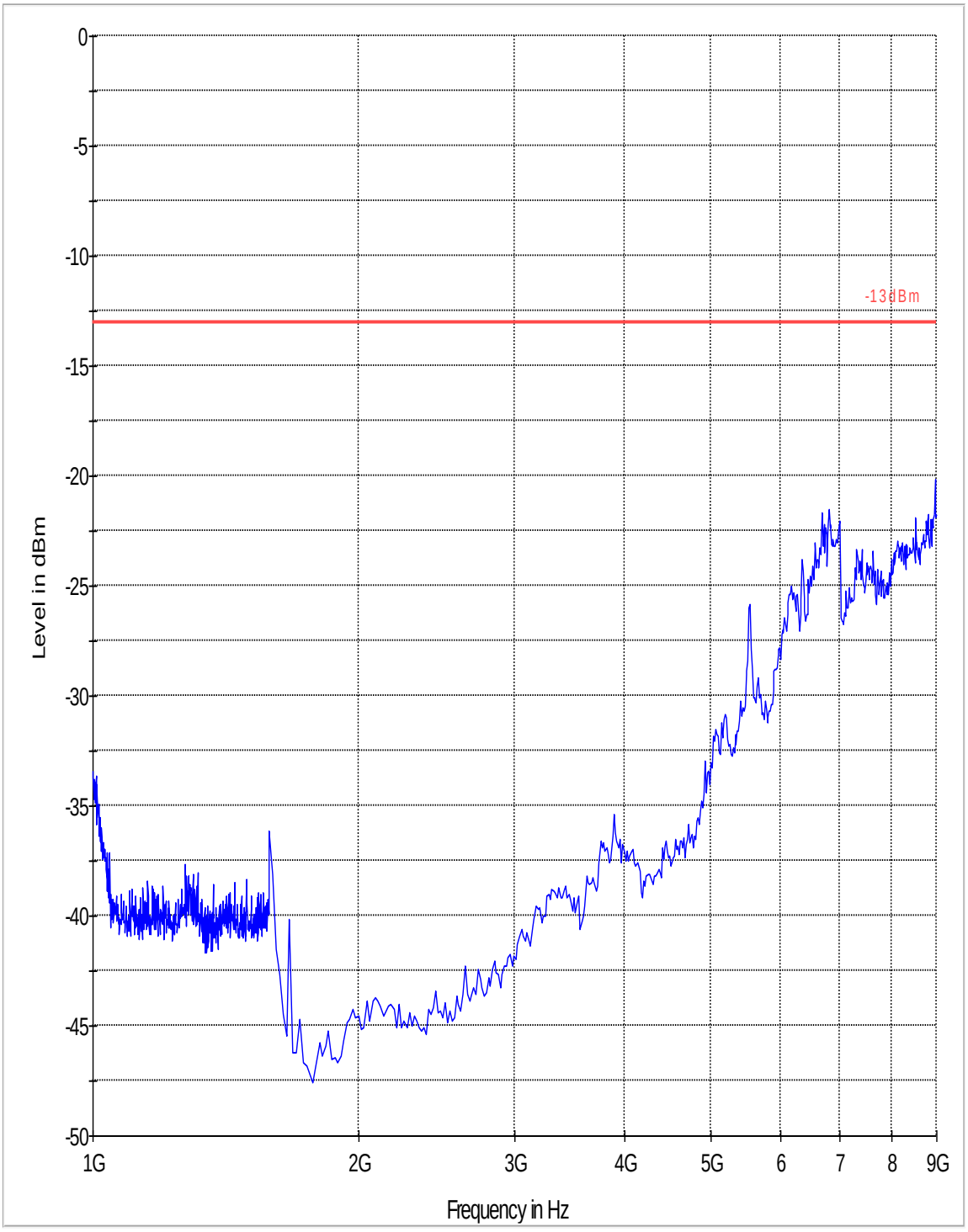
Radiated Spurious Emissions (CDMA-850) Tx: Low Channel
Test Results 1GHz-9GHz



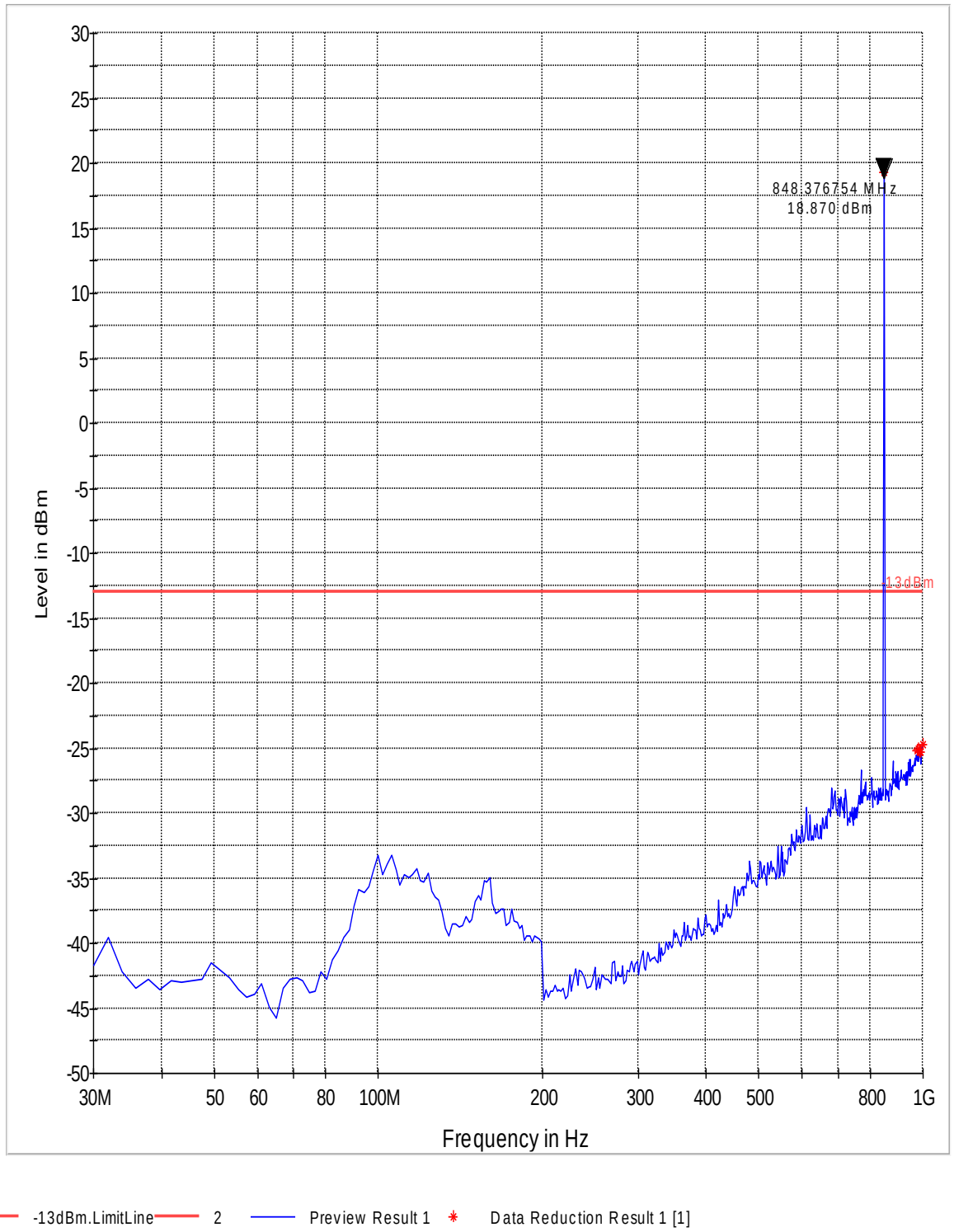
Radiated Spurious Emissions (CDMA-850) Tx: Mid Channel
Test Results 30MHz-1GHz
Note: Marker placed on transmit signal



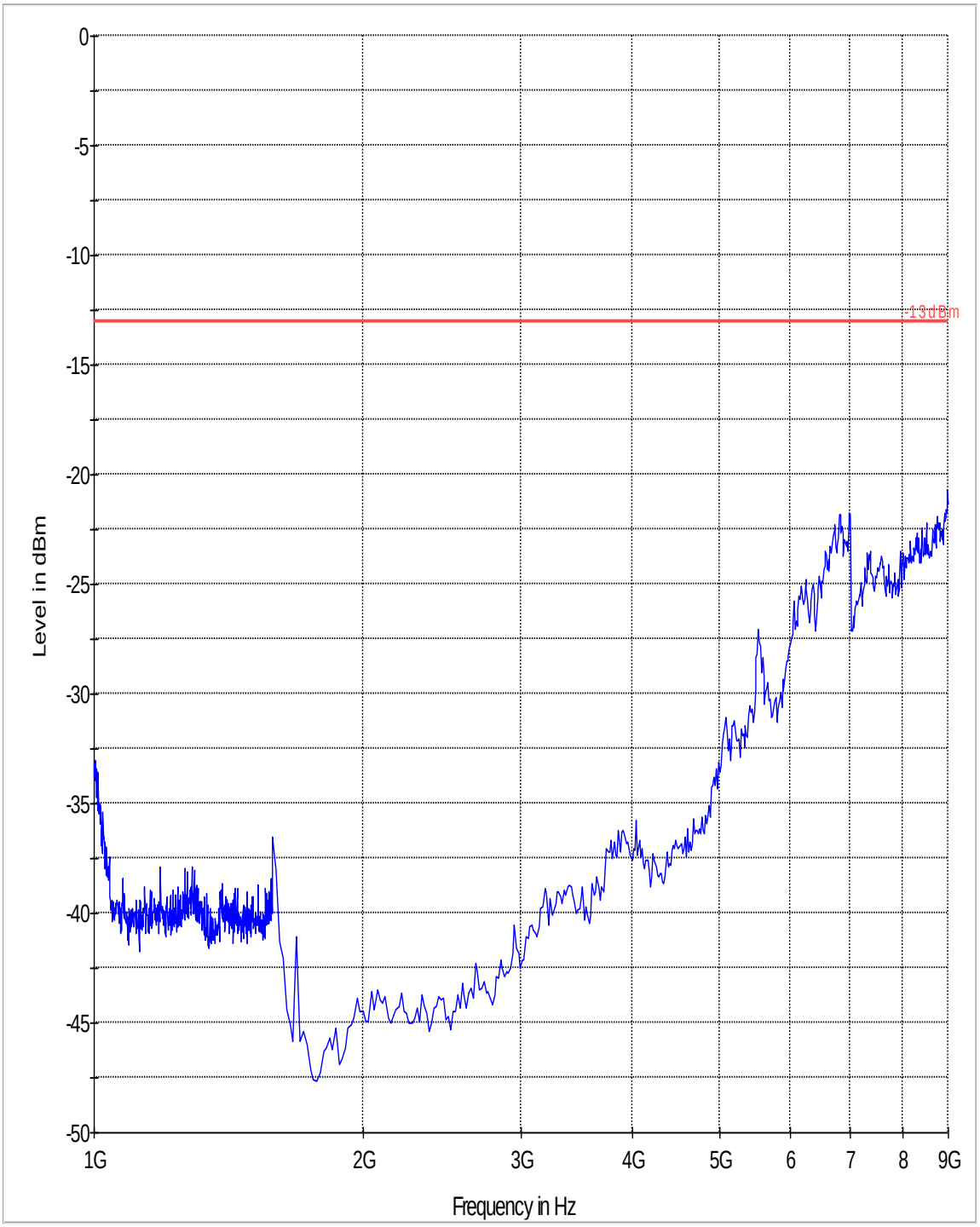
Radiated Spurious Emissions (CDMA-850) Tx: Mid Channel
Test Results 1GHz-9GHz



Radiated Spurious Emissions (CDMA-850) Tx: High Channel
Test Results 30MHz-1GHz
Note: Marker placed on transmit signal



Radiated Spurious Emissions (CDMA-850) Tx: High Channel
Test Results 1GHz-9GHz



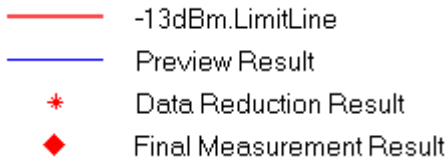
6.5.5.3 Test Results Transmitter Spurious Emission CDMA-1900:

Harmonic	Tx ch-25 Freq.(MHz)	Level (dBm)	Tx ch-600 Freq. (MHz)	Level (dBm)	Tx ch-1175 Freq. (MHz)	Level (dBm)
1	**1851.25**	-	**1880.0**	-	**1908.75**	-
2	**3702.5**	-25.22	**3760**	-28.94	**3817.5**	-21.29
3	**5553.75**	-30.96	**5640**	-36.50	**5726.25**	-39.90
4	**7405**	NF	**7520**	NF	**7635**	NF
5	**9256.25**	NF	**9400**	NF	**9543.75**	NF
6	**11107.5**	NF	**11280**	NF	**11452.5**	NF
7	**12958.75**	NF	**13160**	NF	**13361.25**	NF
8	**14810**	NF	**15040**	NF	**15270**	NF
9	**16661.25**	NF	**16920**	NF	**17178.75**	NF
10	**18512.5**	NF	**18800**	NF	**19087.5**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

6.5.5.4 Measurement Result

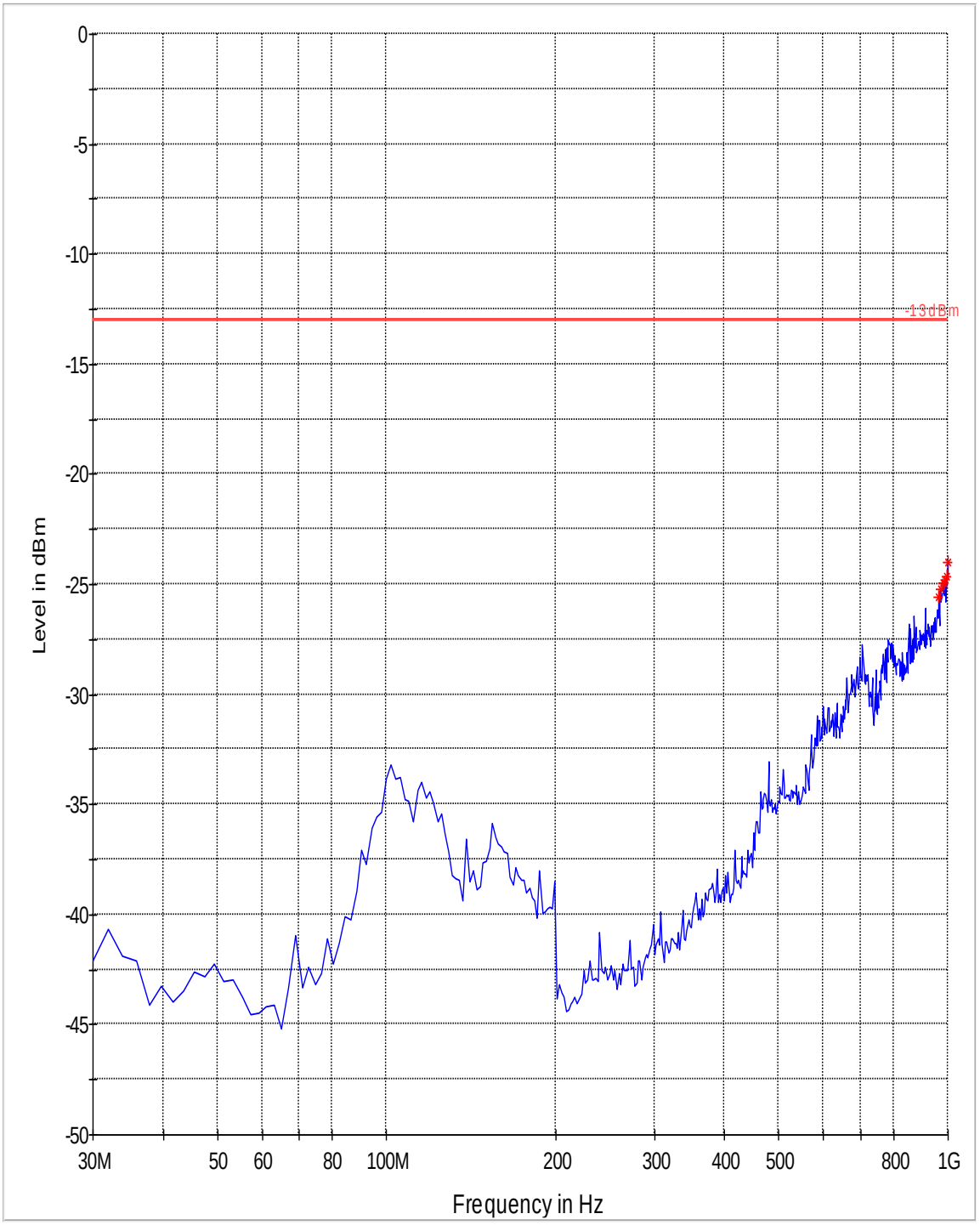
Pass.

Legend for the plots:

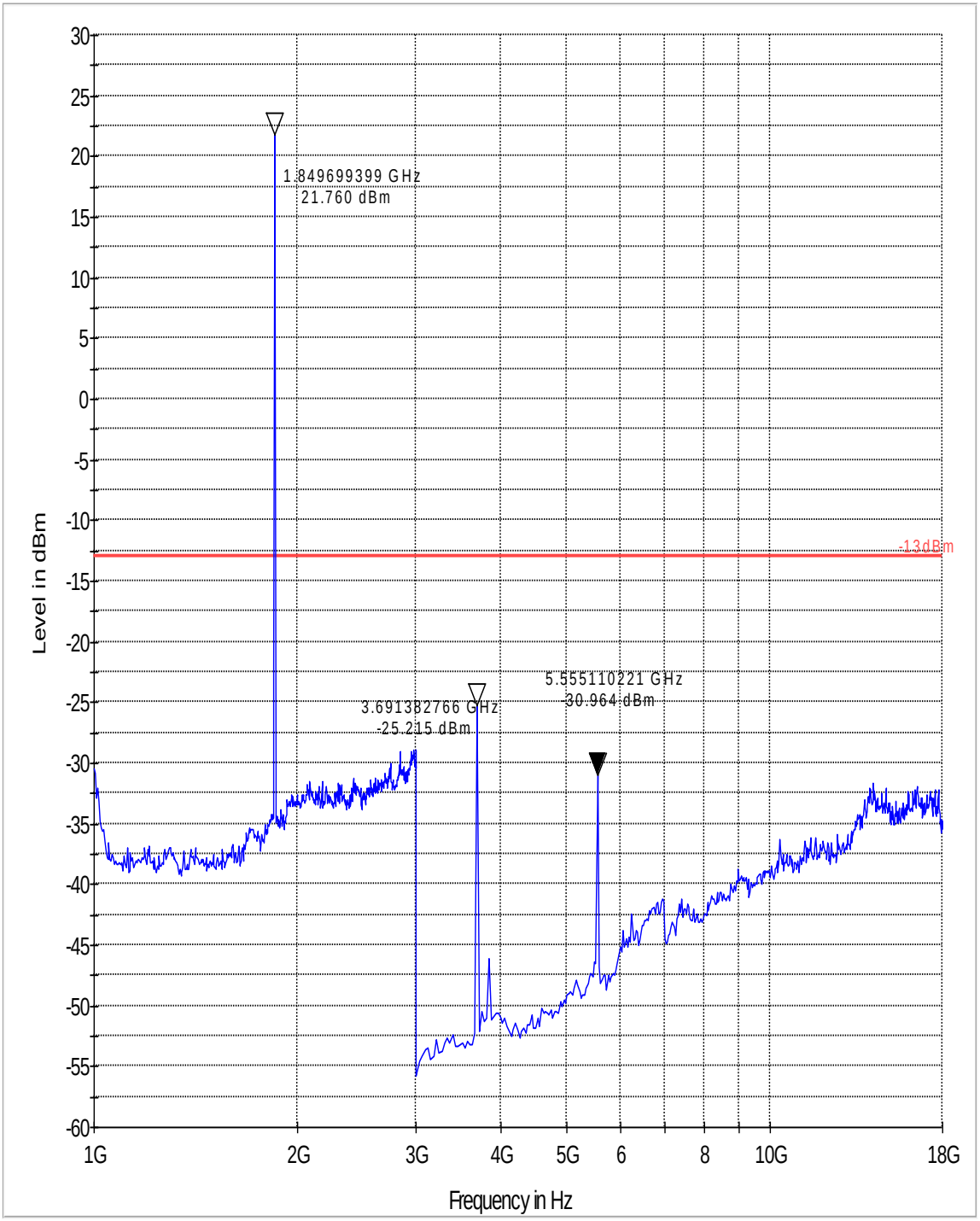


Radiated Spurious Emissions (CDMA-1900) Tx: Low Channel

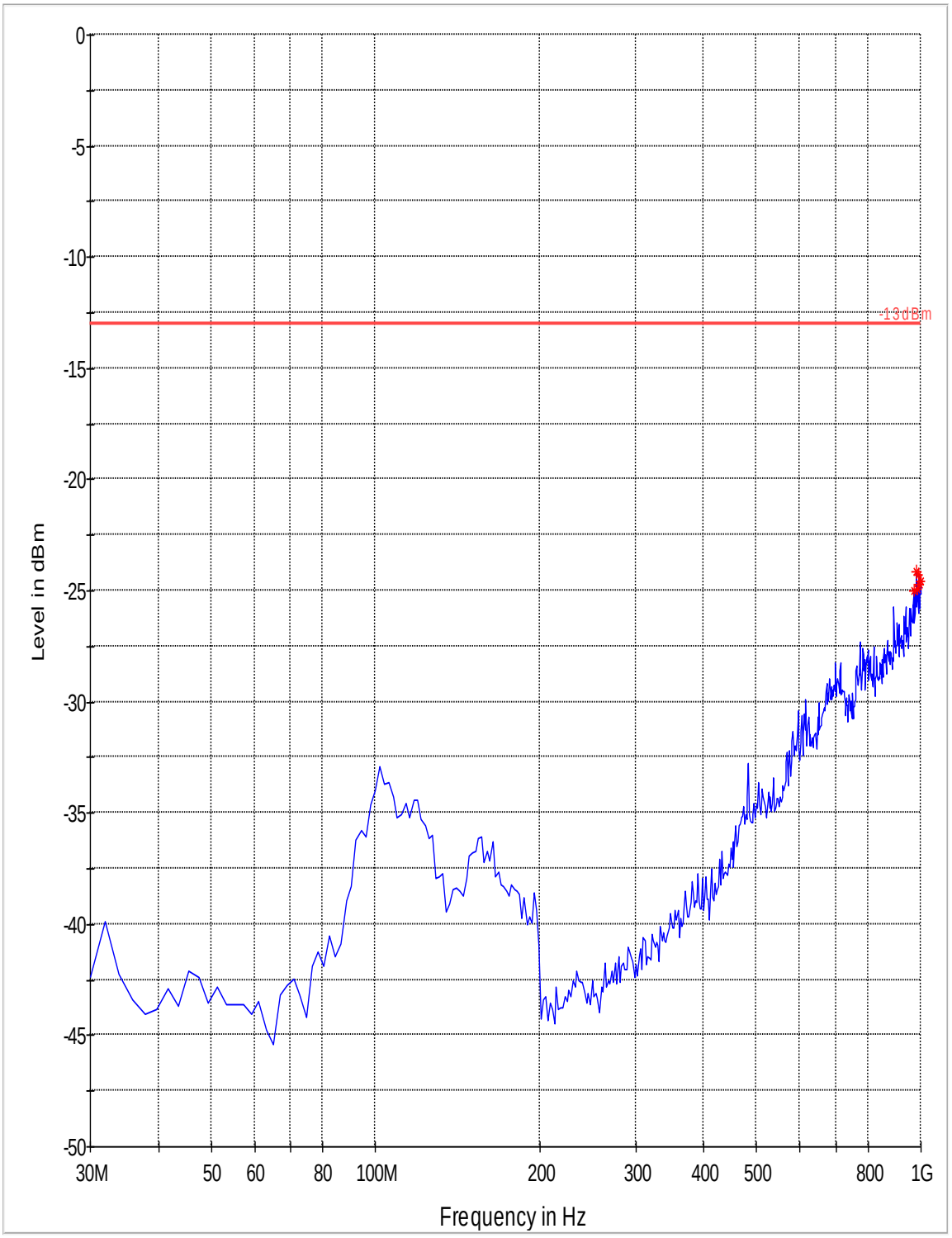
Test Results 30MHz-1GHz



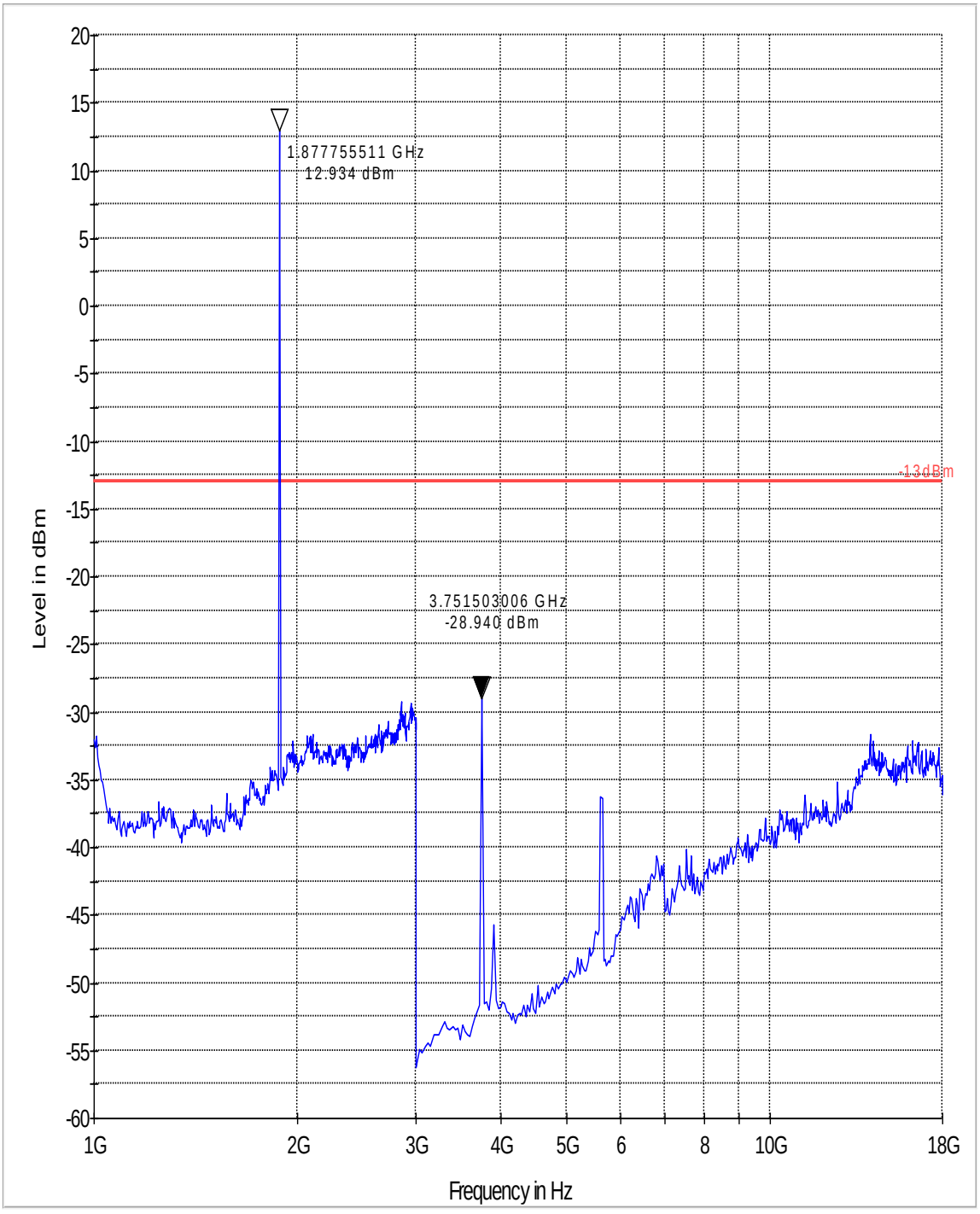
Radiated Spurious Emissions (CDMA-1900) Tx: Low Channel
Test Results 1GHz-18GHz
Note: Marker placed on transmit signal



Radiated Spurious Emissions (CDMA-1900) Tx: Mid Channel
Test Results 30MHz-1GHz

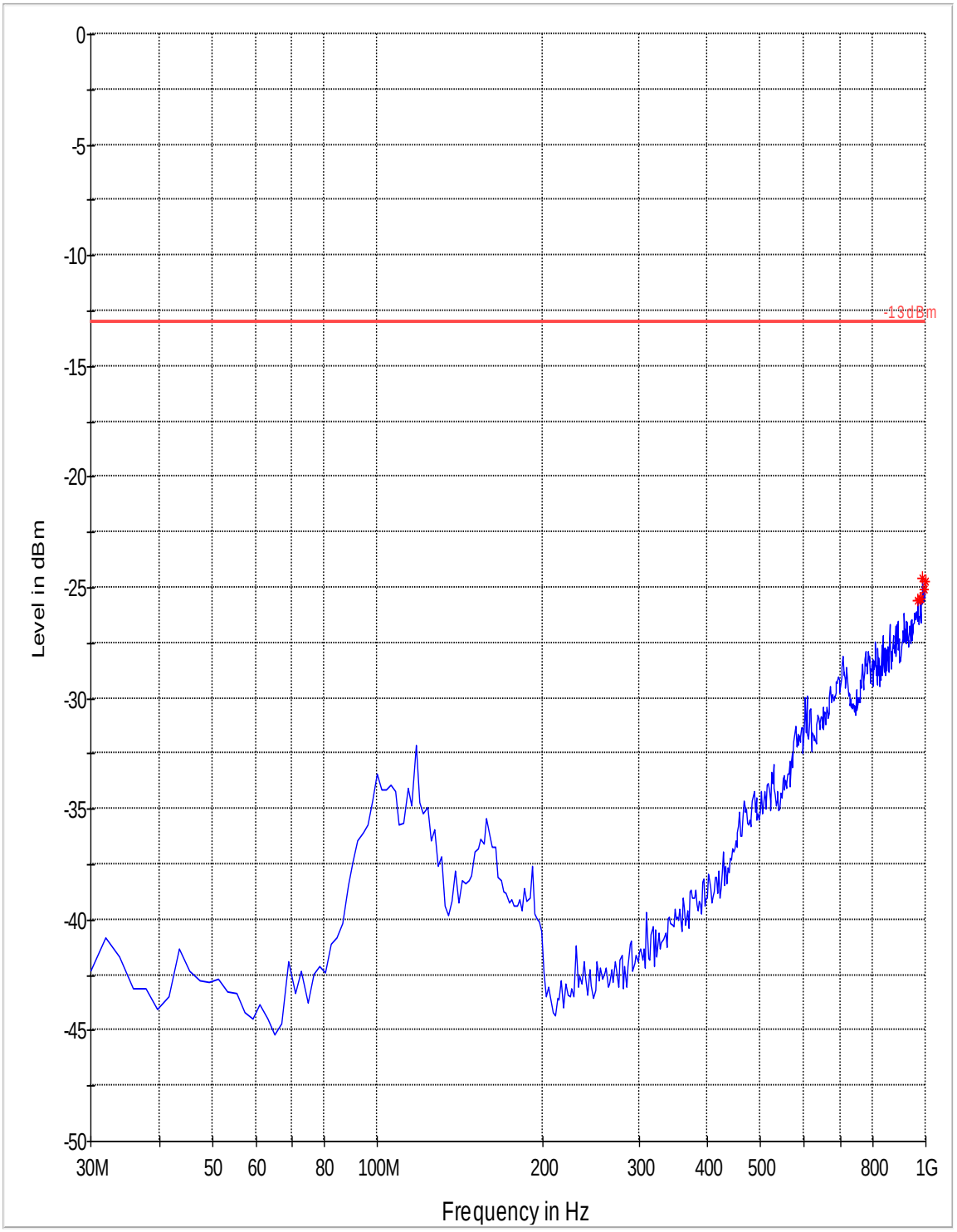


Radiated Spurious Emissions (CDMA-1900) Tx: Mid Channel
Test Results 1GHz-18GHz
Note: Marker placed on transmit signal.

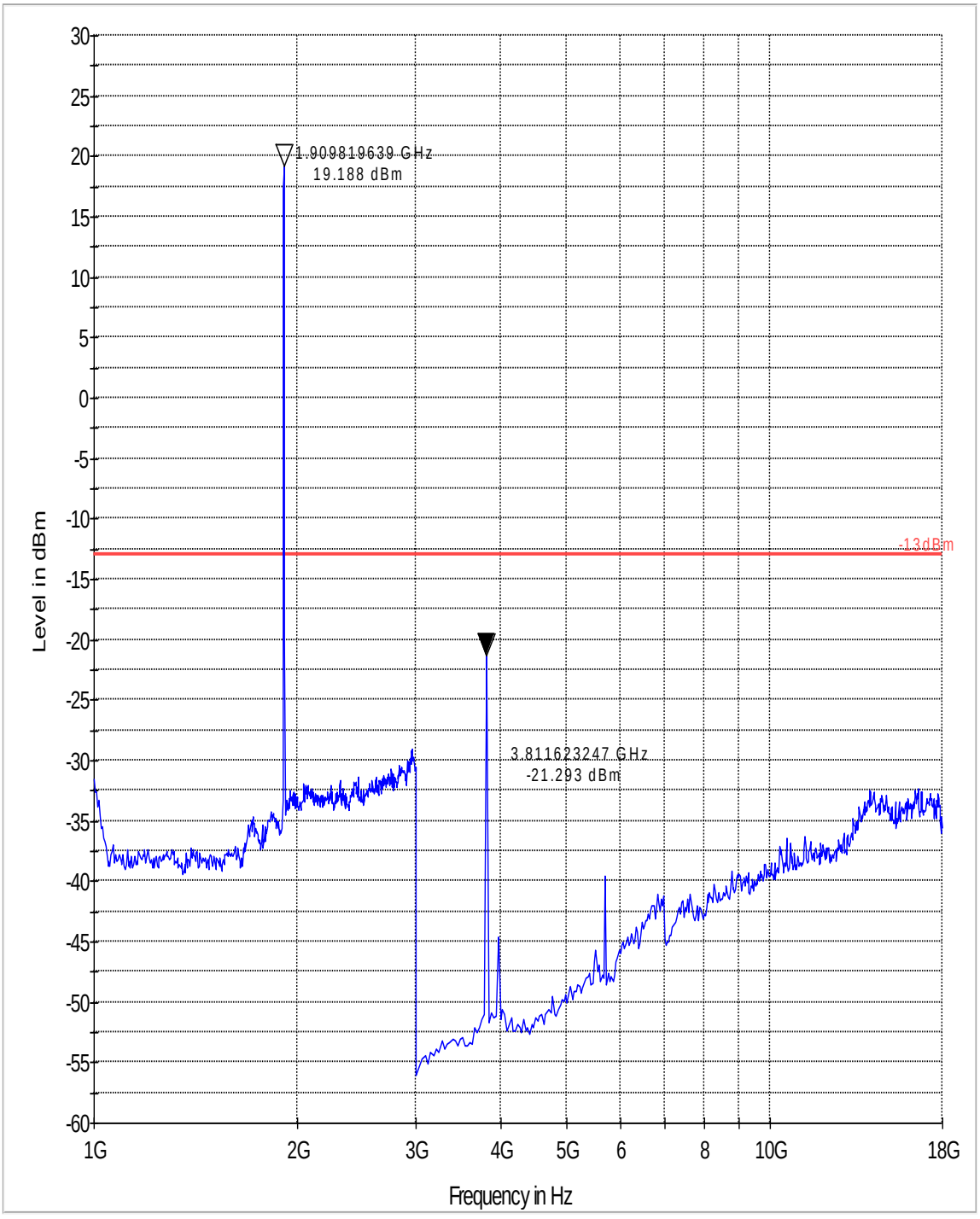


Radiated Spurious Emissions (CDMA-1900) Tx: High Channel

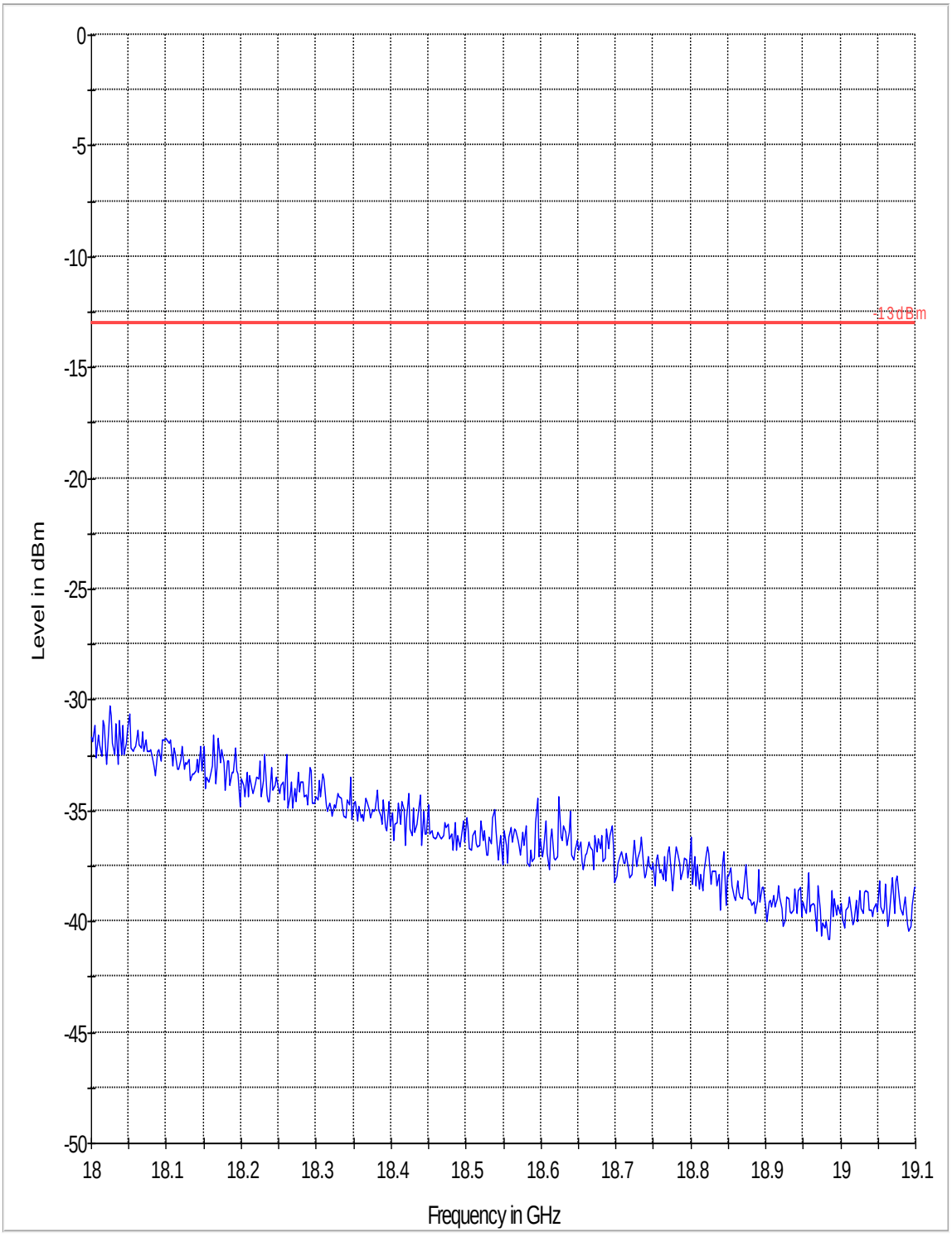
Test Results 30MHz-1GHz



Radiated Spurious Emissions (CDMA-1900) Tx: High Channel
Test Results 1GHz-18GHz
Note: Marker placed on transmit signal.



Test results 18GHz-19.1GHz
Note: Worst case representation of all channels



6.5.6 Radiated out of band emissions results on EUT- Receive Mode:

6.5.7 References

FCC: CFR Part 15.109, 2.1053
IC: RSS-Gen Section 4.10; RSS 132 Section 4.6; RSS-133 Section 6.6

6.5.8 Limits

6.5.8.1 §15.109 Radiated emission limits- Unintentional Radiators:

6.5.8.2 RSS-Gen Section 6

If a radiated measurement is made, all spurious emissions shall comply with the limits of table (1) as shown.

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (µV/m)
30–88	100 (40dBµV/m)
88–216	150 (43.5 dBµV/m)
216–960	200 (46 dBµV/m)
Above 960	500 (54 dBµV/m)

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission (MHz)	Field strength (µV/m)
30–88	90
88–216	150
216–960	210
Above 960	300

6.5.9 Measurement settings:

RBW= 120kHz below 1GHz and 1MHz above 1GHz.

6.5.10 Results

Plots reported here represent the worse case emissions for all EUT orientations and horizontal/vertical polarizations of the measurement antenna.

6.5.10.1 Measurement Result

Pass.

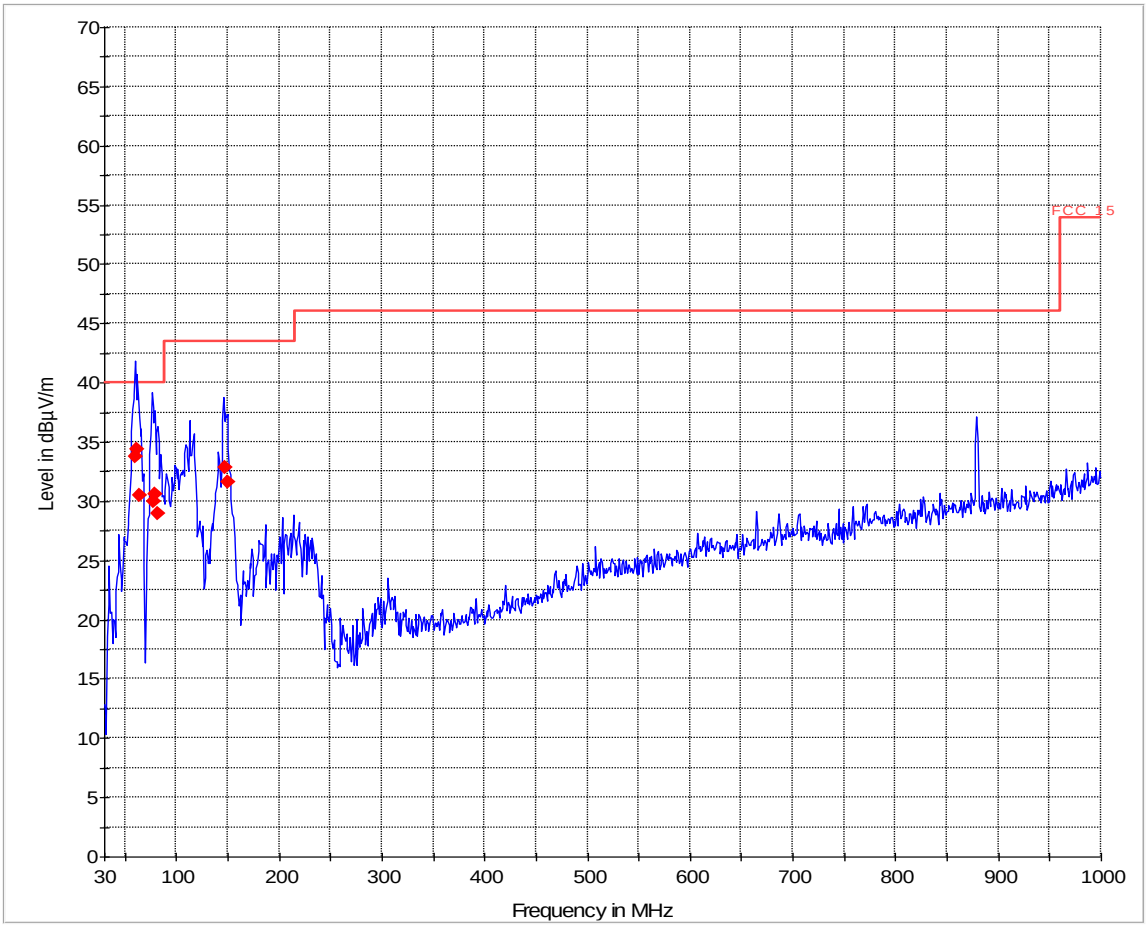
6.5.10.2 Test Results Receiver Spurious Emission

Receive Mode: 30MHz-1GHz

Test Mode: Idle; 30M-1GHz

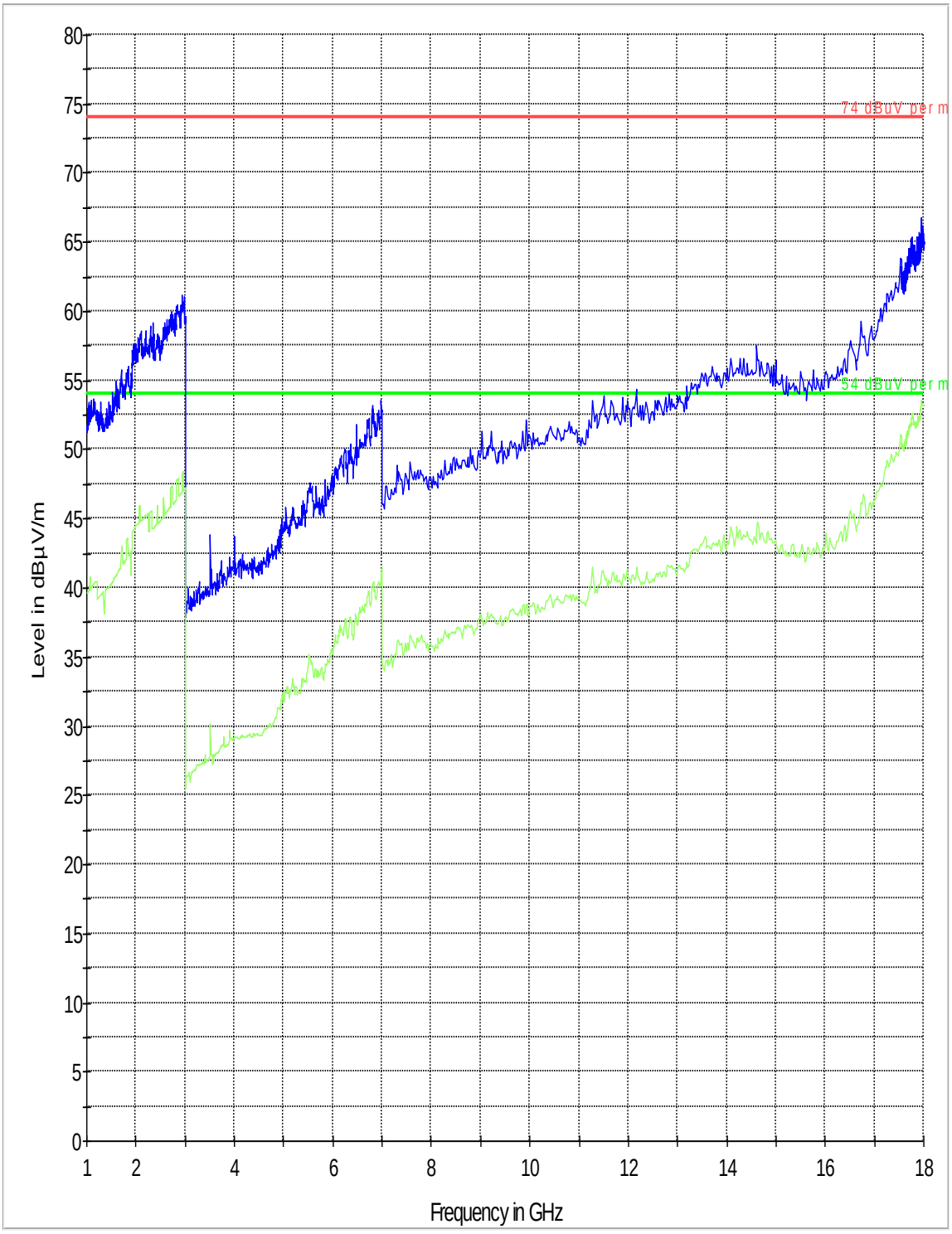
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
60.516909	33.8	20.0	120.000	165.0	V	16.0	8.0	6.2	40.0
61.231708	34.4	20.0	120.000	146.0	V	41.0	8.1	5.6	40.0
64.219108	30.5	20.0	120.000	155.0	V	16.0	8.4	9.5	40.0
77.941836	30.0	20.0	120.000	120.0	V	173.0	9.4	10.0	40.0
78.657446	30.6	20.0	120.000	120.0	V	104.0	9.5	9.4	40.0
81.447064	29.0	20.0	120.000	120.0	V	279.0	9.6	11.0	40.0
147.832067	32.8	20.0	120.000	120.0	V	135.0	10.1	10.7	43.5
149.859789	31.6	20.0	120.000	120.0	V	0.0	10.4	11.9	43.5

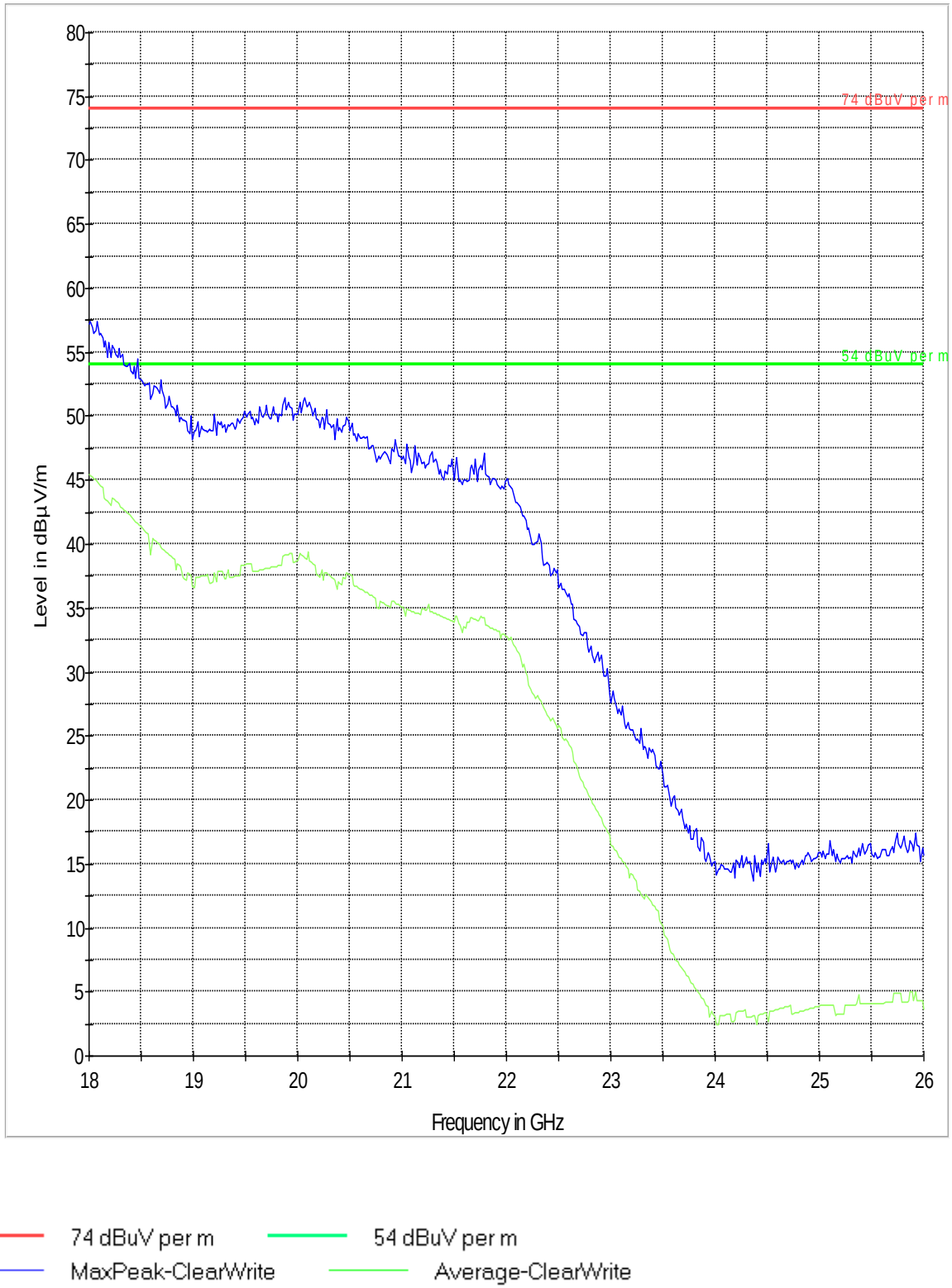


FCC 15.LimitLine — MaxPeak-ClearWrite
Data Reduction Result — Final Measurement Result

Receive Mode: 1GHz-18GHz



Receive Mode: 18GHz-26.0GHz



6.6 AC Power Line Conducted Emissions

6.6.1 References:

FCC: CFR Part 15.207
IC: RSS-Gen Section 7.2.2
The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network.

6.6.2 Limits:

6.6.2.1 §15.207 Conducted limits- Intentional Radiators:

(a) Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

6.6.2.2 RSS-Gen 7.2.2

Except when the requirements applicable to a given device state otherwise, for any licence-exempt radiocommunication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown below. The tighter limit applies at the frequency range boundaries.

Table 1:

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 the logarithm of the frequency.

6.6.3 Measurement settings:

RBW= 9kHz

6.6.4 Results

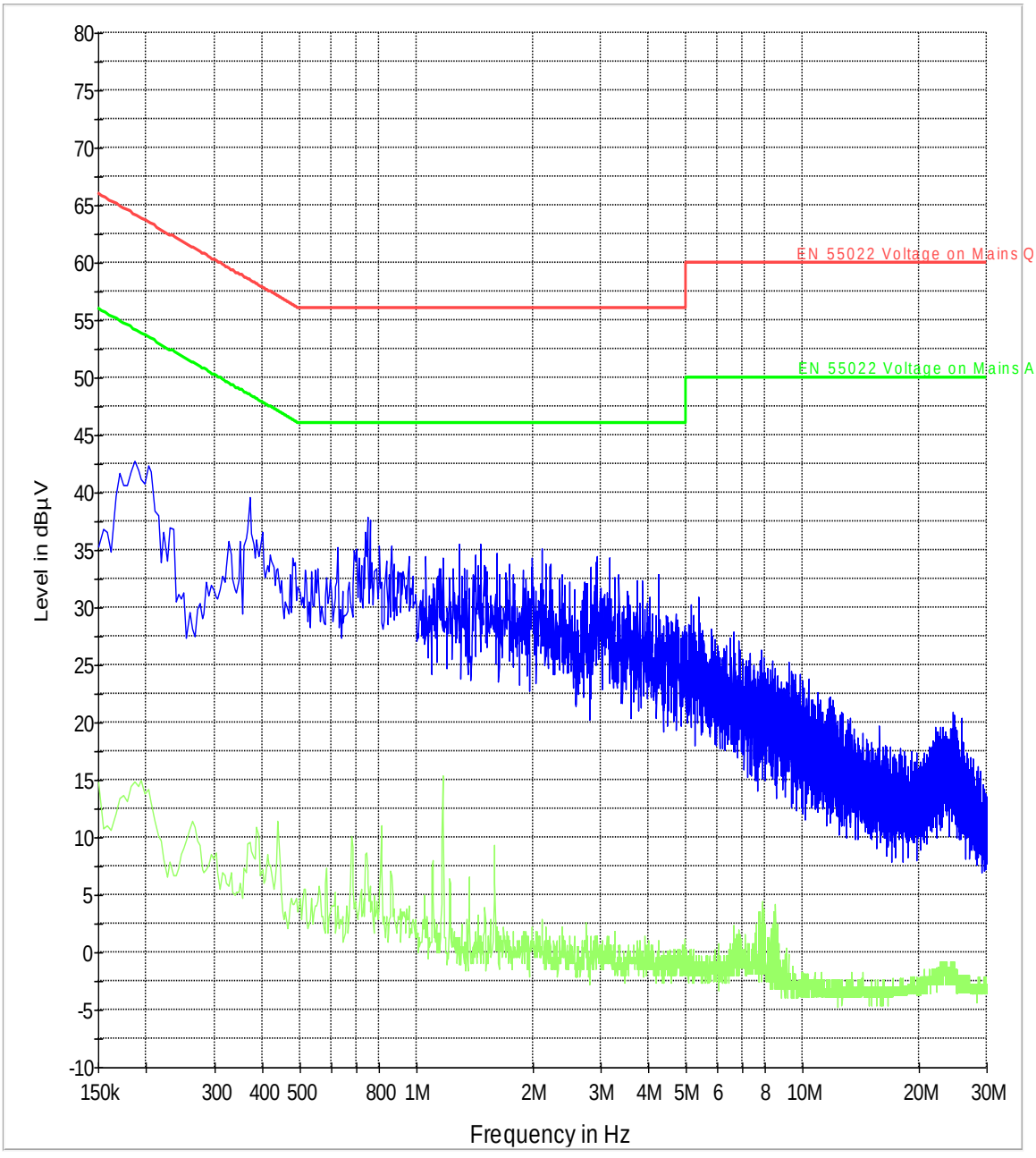
Plots shown here represent the combined worse case emissions for Lines, Phase and Neutral.

6.6.4.1 Measurement Result

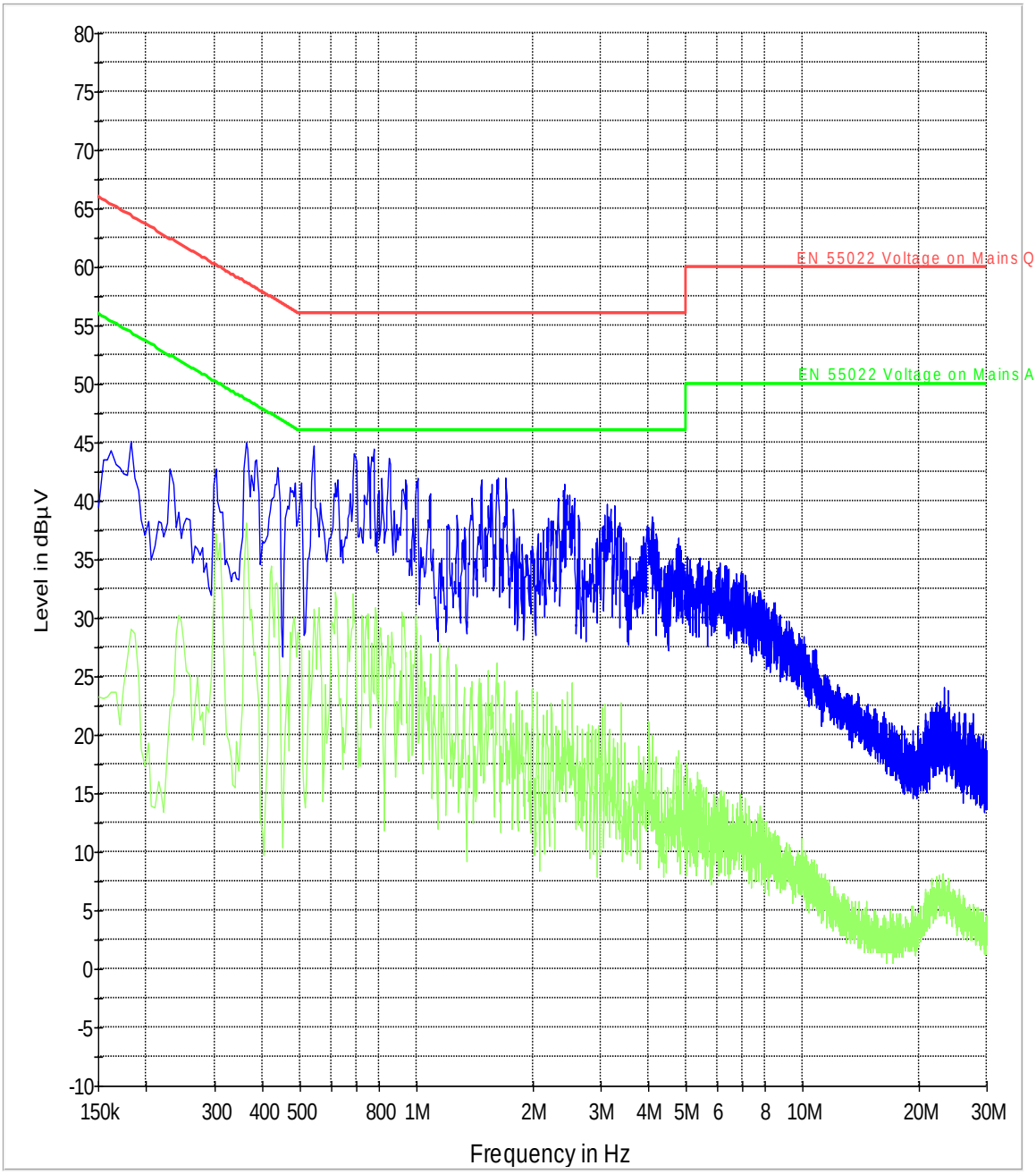
Pass.

6.6.4.2 Test Results:

850 TX Mode:



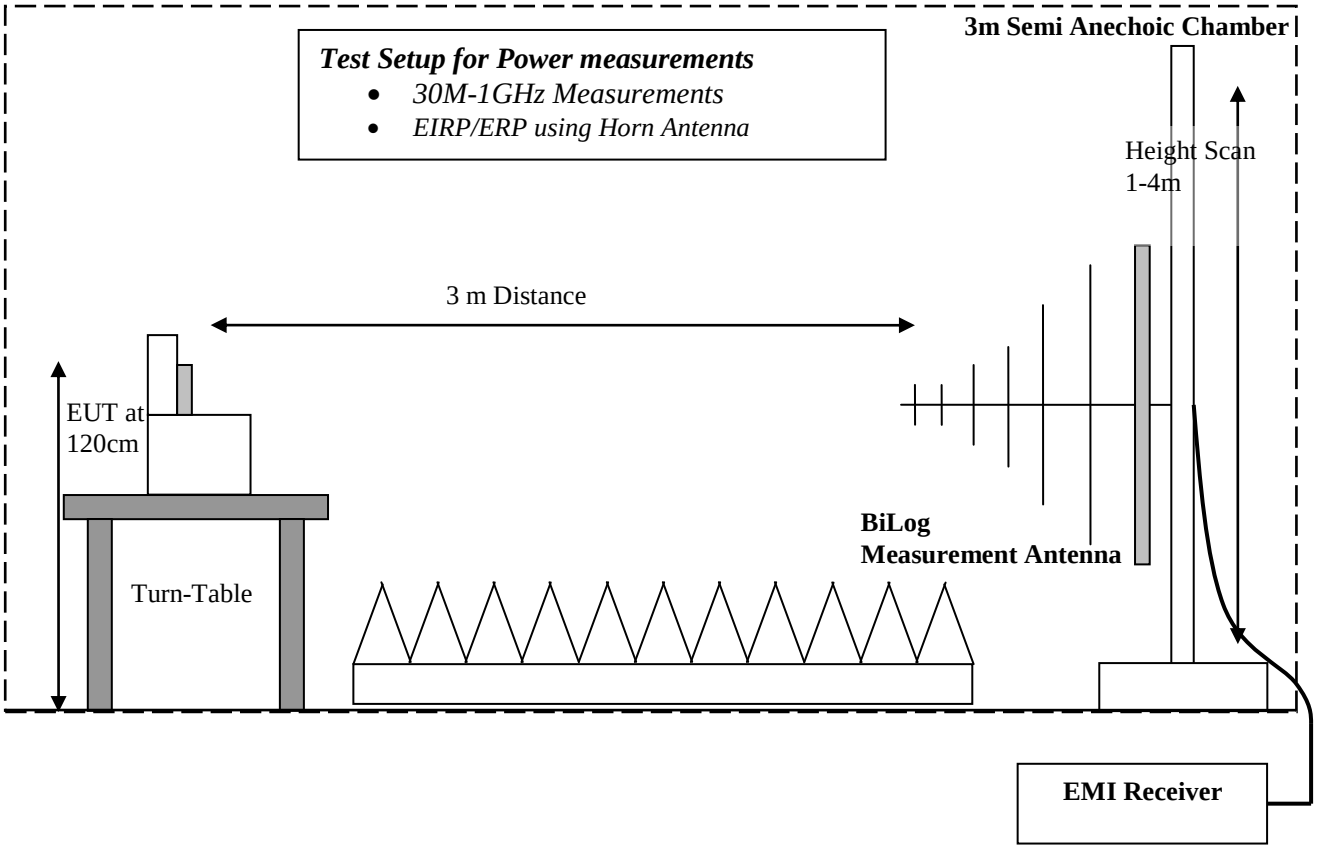
1900 TX Mode:

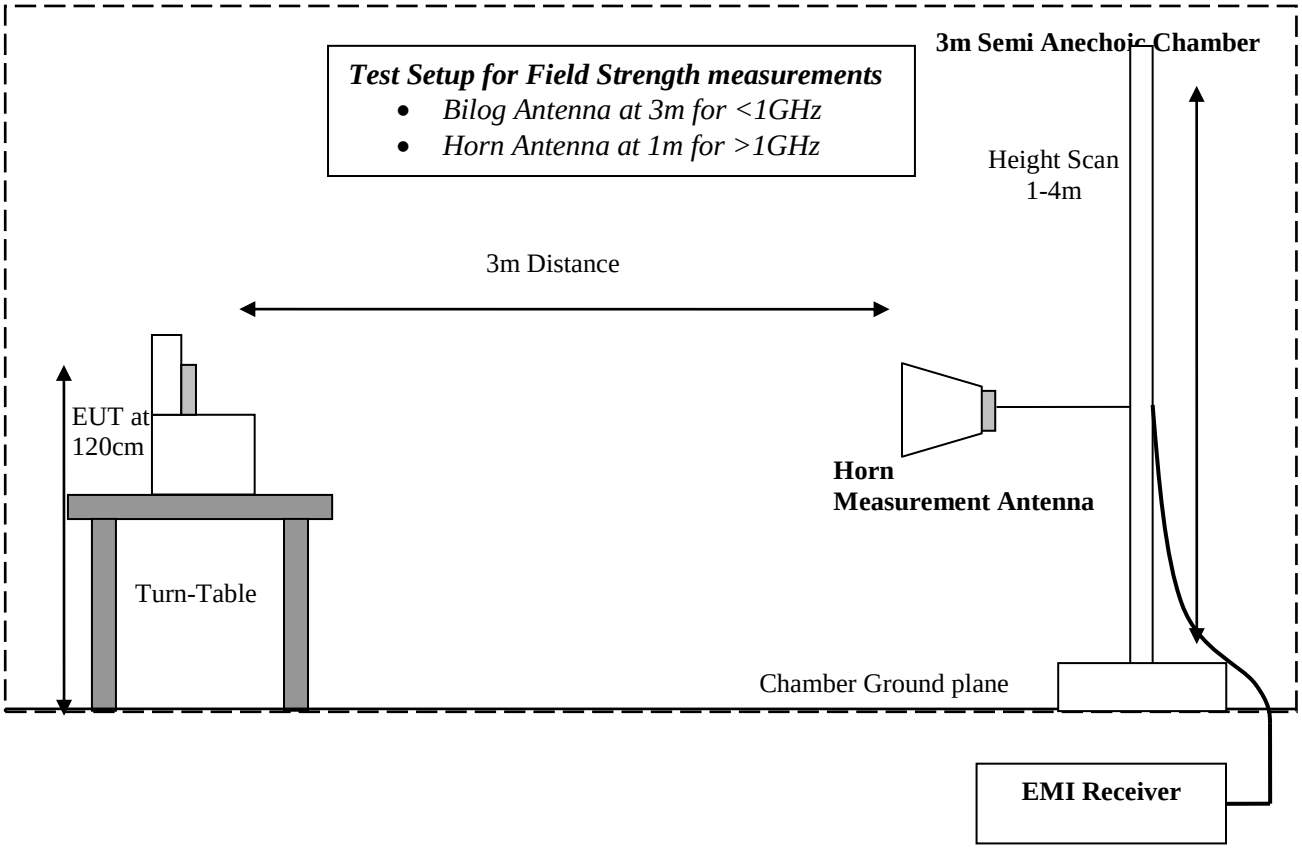

80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
Level in dBµV
150k
300
400
500
800
1M
2M
3M
4M
5M
6
8
10M
20M
30M
Frequency in Hz
EN 55022 Voltage on Mains QP
EN 55022 Voltage on Mains AV
MaxPeak-ClearWrite
Average-ClearWrite
Voltage on Mains QP
Voltage on Mains AV

7 Test Equipment and Ancillaries used for tests

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	101821	May 2011	1 year
EMI Receiver/Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2011	1 year
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	May 2011	1 year
Loop Antenna	6512	EMCO	00049838	April 2009	3 years
Biconilog Antenna	3141	EMCO	0005-1186	June 2009	3 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Jan 2009	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Jan 2009	3 years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
LISN	50-25-2-08	FCC	08014	June 2011	1 year
Power Smart Sensor	R&S	NRP-Z81	100161	May 2011	1 Year
DC Power Supply	E3610A	Hewlett Packard	KR83021224	n/a	n/a
Multimeter	MM200	Klein	N/A	Apr 2011	1 Year
Temp Hum Logger	TM320	Dickson	03280063	Feb 2011	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Feb 2011	1 Year

8 Block Diagrams





9 Revision History

Date	Report Name	Changes to report	Report prepared by
10/03/11	**EMC_WIRED_001_11001_FCC22_24**	**First Version**	**Calvin Lee**