FCC/IC Test Report

FOR:

Company: Trimble Navigation Limited

Model Number: 88161

EUT Description: Industrial Handheld Computer

FCC ID: JUP88161
IC ID: 1756A-88161

47 CFR Part 2, 22, 24

IC RSS-GEN Issue 3, RSS-132 Issue 3, RSS-133 Issue 6

TEST REPORT #: EMC_TRIM2-017-13001_WWAN
DATE: 2013-10-09

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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 #
Trimble Navigation Limited	Industrial Handheld Computer	88161

Report reviewed by:

Date	Section	Name	Signature
2013-10-09	Compliance	Franz Engert (Manager of Compliance)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2013.10.14 18:10:31 -0700'

Responsible for the Report:

Date	Section	Name	Signature
2013-10-09	Compliance	Josie Sabado (Test Lab Manager)	

The test results of this test report relate exclusively to the test item specified in Section3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory

Company Name:	CETECOM Inc.
Department:	Compliance
Address: Milpitas, CA location:	411 Dixon Landing Road Milpitas, CA 95035, U.S.A.
Address:San Diego, CA location:	6370 Nancy Ridge Drive, Suite 101 San Diego, CA 92121, U.S.A.
Telephone:	+1 (858) 362 2400
Fax:	+1 (858) 587 4809
Test Lab Manager:	Tunji Yusuf
Responsible Project Leader	Yadvinder Garcha

2.2 Identification of the Client

Applicant's Name:	Trimble Navigation Limited
Street Address:	935 Stewart Drive, Sunnyvale
City/Zip Code	CA, 94088-3642
Country	USA
Contact Person:	Bruce Maule
Phone No.	+6439635628
e-mail:	bruce_maule@trimble.com

2.3 Identification of the Manufacturer

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

2.4 Environmental conditions during Test:

The following environmental conditions were maintained during the course of testing:
Ambient Temperature: 20-25°C
Relative humidity: 40-60%

2.5 Dates of Testing:

June 14 - June 21, 2013;
September 20 - September 26, 2013

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	GeoExplorer® 7 Series handheld, Geo 7X
Model No:	88161
Product Description:	Industrial Handheld Computer
FCC-ID:	JUP88161
IC-ID :	1756A-88161
Integrated Module Info:	Cinterion PXS8 (FCC ID: QIPPXS8 / IC ID: 7830A-PXS8) • 850/900/1800/1900MHz GSM power class 4/1; GPRS Class B, Multislot 12 operation; EDGE Multislot class 12 operation; modulation: GSM&GPRS&EDGE(MCS-1-4): GMSK; EDGE(MCS-5-8): 8PSK; • 850/1900/2100 MHz WCDMA / HSPA+; HSDPA Category 10 data rate - 14.4 Mbps; HSUPA Category 6 data rate - 5.76 Mbps; modulation: all QPSK (no QAM in uplink for given data rates); • 800/1900 MHz CDMA 1xRTT / EV-D0; CDMA EVDO Rev A data rate - 3.1 Mbps modulation: QPSK, HPSK;
Other radios included in the device:	WLAN 802.11 b/g Murata LBEE19NJZC Bluetooth: Murata LBEE19NJZC GPS 1575.42MHz, 1227.60MHz
Frequency:	GSM 850: 824.2-848.8MHz; PCS 1900: 1850.2-1909.8MHz FDD V: 826.4-846.6MHz; FDD II: 1852.4-1907.6MHz CDMA/EVDO BC0: 824.7 – 848.31; CDMA/EVDO BC1: 1851.25 – 1908.75
Number of channels:	GSM850: 125 and PCS 1900: 300 FDD II: 278 and FDD V: 103 BC0: 656 and BC1: 906
Antenna Info:	PiFA Foil Antenna Manufacturer stated antenna Gain: 0.46 dBi for 850 MHz band of operation 1.11 dBi for 1900 MHz band of operation
Rated Operating Voltage (V DC):	9V DC (Low) / 11.1V DC (Nom) / 15.75V DC (High)
Rated Operating Temperature Range:	–20°C ~ +60°C
Prototype / Production unit:	Identical Prototype

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Notes
1	5315414838	Rev A	6.7.0	-/-
2	5315414830	Rev A	6.7.0	-/-

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 3: 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 6: 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: **JUP88161** and IC ID **1756A-88161**.
All testing was performed on the product referred to in Section 3 as EUT.

This product integrates the precertified WWAN module : Cinterion PXS8.

Per guidelines from KDB 996369, conducted signal test data from module certification has been re-used for this certification as the output power has been verified to be within production tolerances and measurement uncertainities.

The module test data can be obtained under the FCC Filing ID: QIPPXS8, Test Report numbers:
MDE_CINTE_1203_FCC22a_V1 issued by 7Layers AG on July 02, 2012
MDE_CINTE_1203_FCC22b_V1 issued by 7Layers AG on June 27, 2012
MDE_CINTE_1203_FCC24a_V1 issued by 7Layers AG on June 27, 2012
MDE_CINTE_1203_FCC24b_V1 issued by 7Layers AG on June 27, 2012

This test report contains full radiated testing as per FCC 22H/24E and conducted power verification required per KDB 996369.

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 5.4	RF Output Power	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
			CDMA BC0	■	☐	☐	☐	Complies
§2.1055 §22.355 RSS132 5.3	Frequency Stability	Nominal	GSM 850	☐	☐	☐	■	See Note 1
			UMTS Band V	☐	☐	☐	■	See Note 1
			CDMA BC0	☐	☐	☐	■	See Note 1
§2.1049 §22.917(b) RSS132 5.2	Occupied Bandwidth	Nominal	GSM 850	☐	☐	☐	■	See Note 1
			UMTS Band V	☐	☐	☐	■	See Note 1
			CDMA BC0	☐	☐	☐	■	See Note 1
§2.1051 §22.917 RSS132 5.5	Band Edge Compliance	Nominal	GSM 850	☐	☐	☐	■	See Note 1
			UMTS Band V	☐	☐	☐	■	See Note 1
			CDMA BC0	☐	☐	☐	■	See Note 1
§2.1051 §22.917 RSS132 5.5	Conducted Spurious Emissions	Nominal	GSM 850	☐	☐	☐	■	See Note 1
			UMTS Band V	☐	☐	☐	■	See Note 1
			CDMA BC0	☐	☐	☐	■	See Note 1
§2.1053 §22.917 RSS132 5.5	Radiated Spurious Emissions	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
			CDMA BC0	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

1. Measurements leveraged from module's test report. See test report listed under section 4.

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	GSM 1900	■	□	□	□	Complies
			UMTS Band II	■	□	□	□	Complies
			CDMA BC1	■	□	□	□	Complies
§2.1055 §24.235 RSS133 6.3	Frequency Stability	Nominal	GSM 1900	□	□	□	■	See Note 1
			UMTS Band II	□	□	□	■	See Note 1
			CDMA BC1	□	□	□	■	See Note 1
§2.1049 §24.238(b) RSS133 6.2	Occupied Bandwidth	Nominal	GSM 1900	□	□	□	■	See Note 1
			UMTS Band II	□	□	□	■	See Note 1
			CDMA BC1	□	□	□	■	See Note 1
§2.1051 §24.238 RSS133 6.5	Band Edge Compliance	Nominal	GSM 1900	□	□	□	■	See Note 1
			UMTS Band II	□	□	□	■	See Note 1
			CDMA BC1	□	□	□	■	See Note 1
§2.1051 §24.238 RSS133 6.5	Conducted Spurious Emissions	Nominal	GSM 1900	□	□	□	■	See Note 1
			UMTS Band II	□	□	□	■	See Note 1
			CDMA BC1	□	□	□	■	See Note 1
§2.1053 §24.238 RSS133 6.5	Radiated Spurious Emissions	Nominal	GSM 1900	■	□	□	□	Complies
			UMTS Band II	■	□	□	□	Complies
			CDMA BC1	■	□	□	□	Complies

Note: NA= Not Applicable; NP= Not Performed.

1. Measurements leveraged from module's test report. See test report listed under section 4.

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 5.4; 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.

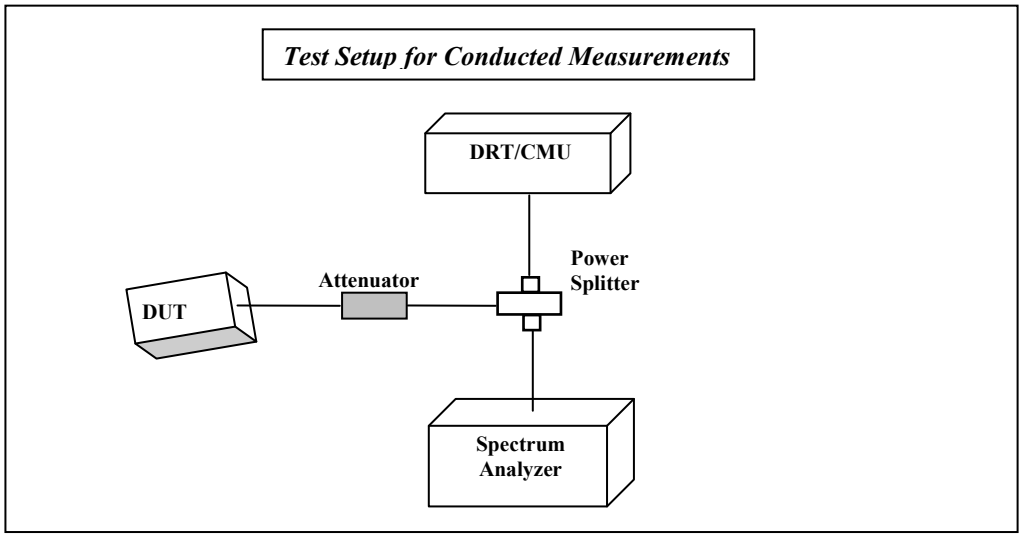
6.1.2.2 RSS-Gen 4.8: RF power output.

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 Conducted Output Power Measurement Verification

6.1.3.1 Measurement Procedure:

Ref: TIA-603C 2004 2.2.1



1. Connect the equipment as shown in the above diagram. A Digital Radio Communication Tester (DRT: R&S CMU200 here) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the CMU200 to set the EUT to its maximum power at the required channel.
3. Record the Peak Output power level measured by the CMU200.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band and for all types of modulation schemes.
    a. GMSK mode measurements are performed in GPRS 1 uplink timeslot configuration.
    b. UMTS mode measurements are performed in RMC 12.2 kbps configuration.
    c. CDMA mode measurements are performed in RC 3/3 SO55 configuration.

Measurement Uncertainty= +/- 0.5 dB

6.1.3.2 Test Conditions:

Tnom: 22^{o}C; Vnom: 11.1VDC

6.1.3.3 Verification Result

Peak output power from module certification test report has been compared to the measured peak conducted power from the EUT.
All results within manufacturer tolerance and measurement uncertainty.

6.1.3.4 Measurement Results:

GSM Cellular 850 (GMSK Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
824.2	33.8	33.05	32.65
836.6	33.4	33.15	33.05
848.8	33.5	33.15	32.85

GSM Cellular 850 (8PSK Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
824.2	30.3	29.95	26.75
836.6	30.3	29.85	26.75
848.8	30.3	29.95	26.75

FDD V 850 (UMTS Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
826.2	27.2	27.8	24.05
836.6	27.2	27.7	24
846.6	27.2	27.7	24.11

CDMA BC0			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
824.7	28.36	28.07	24.25
836.52	27.70	28.06	24.21
848.31	28.36	28.02	24.05

EVDO BC0			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
824.7	29.30	28.28	24.24
836.52	28.36	27.87	24.2
848.31	29.4	28	24.32

GSM PCS 1900 (GMSK Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
1850.2	30.1	30.5	30.3
1880	30.5	30.5	30
1909.8	30.2	30.8	30.3

GSM PCS 1900 (8PSK Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
1850.2	29.4	28.6	25.4
1880	29.3	28.5	25.3
1909.8	29.4	28.5	25.3

FDD II 1900 (UMTS Mode)			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
1852.4	27	27.7	24.35
1880	26.5	27.7	24.5
1907.6	26.5	27.65	24.39

CDMA BC1			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
1851.25	27.90	27.22	23.22
1880	27.90	27.47	23.11
1908.75	26.57	27.05	23.51

EVDO BC1			
Frequency (MHz)	Conducted Peak Output Power from module certification	Conducted Peak Output Power from the EUT	Conducted Average Output Power from the EUT
	(dBm)	(dBm)	(dBm)
1851.25	28.40	27.76	23.69
1880	28.66	28.14	23.68
1908.75	26.96	27.54	24.05

6.1.4 Conducted Peak-to-Average Power Ratio Measurement

A PAPR measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

6.1.4.1 Limits

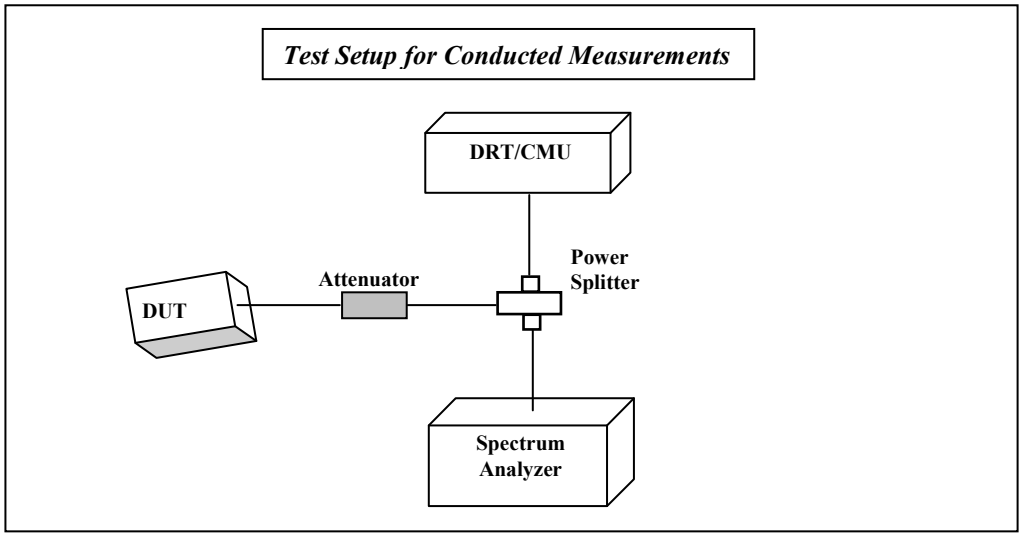
FCC 24.232 (d)
Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

RSS-132, Issue 3
The peak-to-average power ratio shall not exceed 13 dB for more than 0.1% of the time.

RSS-133, Issue 6
The peak-to-average power ratio shall not exceed 13 dB for more than 0.1% of the time.

6.1.4.2 Measurement Procedure:

Ref: TIA-603C 2004 2.2.1



1. Connect the equipment as shown in the above diagram. A Digital Radio Communication Tester (DRT: R&S CMU200 here) is used to enable the EUT to transmit.
2. Adjust the settings of the CMU200 to set the EUT to its maximum power at the required channel.
3. For GSM/ EGPRS: PAPR is calculated as the difference between the measured peak output power and measured average output power.
   For UMTS, CDMA and EVDO Mode: PAPR is measured with a CCDF measurement function on the Spectrum Analyzer according to KDB 971168 v01.
4. Correct the measured level for all losses in the RF path.

Measurement Uncertainty= +/- 0.5 dB

6.1.4.3 Test Conditions:

Tnom: 22°C; Vnom: 11.1VDC

6.1.4.4 Test Verdict

Pass

6.1.4.5 Test Results

6.1.4.5.1 850 MHz Band

Peak-to-Average Power Ratio (dB)			
Channel	**GSM 850: GMSK**	**GSM 850: 8PSK**	**UMTS FDD V**
Low	0.4	3.2	3.08
Mid	0.1	3.1	2.69
High	0.3	3.2	2.98

Peak-to-Average Power Ratio (dB)		
Channel	**CDMA BC0**	**EVDO BC0**
Low	3.65	4.39
Mid	3.49	4.13
High	3.43	4.13

6.1.4.5.2 1900 MHz Band

Peak-to-Average Power Ratio (dB)			
Channel	**PCS 1900: GMSK**	**PCS 1900: 8PSK**	**UMTS FDD II**
Low	0.2	3.2	2.82
Mid	0.5	3.2	2.95
High	0.5	3.2	2.76

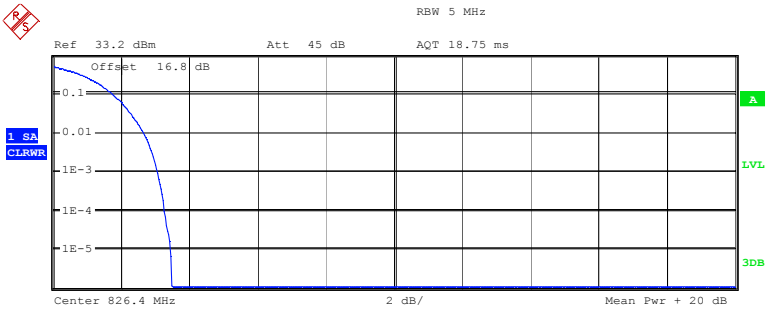
Peak-to-Average Power Ratio (dB)		
Channel	**CDMA BC1**	**EVDO BC1**
Low	3.69	4.33
Mid	3.78	4.23
High	3.27	3.59

6.1.4.6 Test Verdict:

Pass

6.1.4.7 Plots:

UMTS FDD V – Channel 4132



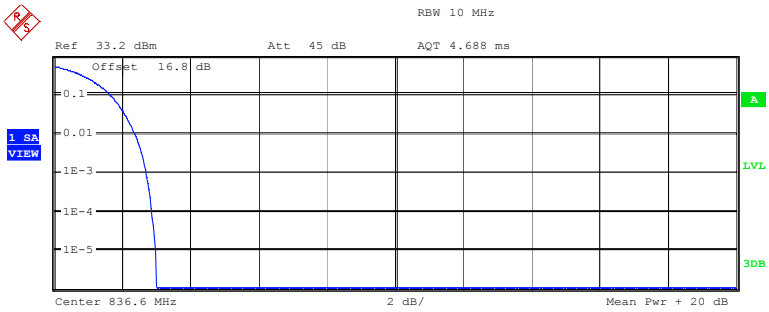
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.37 dBm
Peak	27.84 dBm
Crest	3.48 dB
10 %	1.73 dB
1 %	2.66 dB
.1 %	3.08 dB
.01 %	3.27 dB

low

Date: 26.SEP.2013 15:54:12

UMTS FDD V – Channel 4183



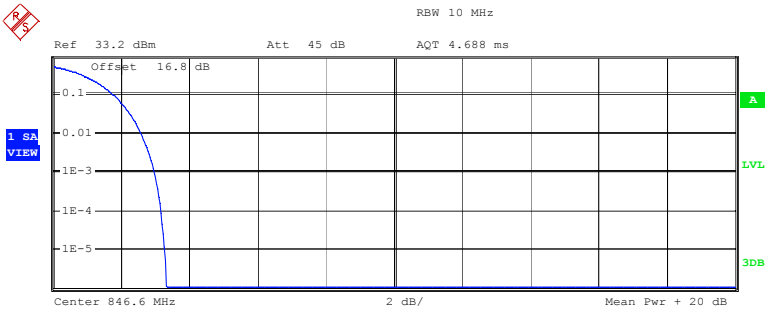
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.83 dBm
Peak	27.83 dBm
Crest	3.00 dB
10 %	1.63 dB
1 %	2.37 dB
.1 %	2.69 dB
.01 %	2.85 dB

low

Date: 26.SEP.2013 15:56:04

UMTS FDD V – Channel 4233



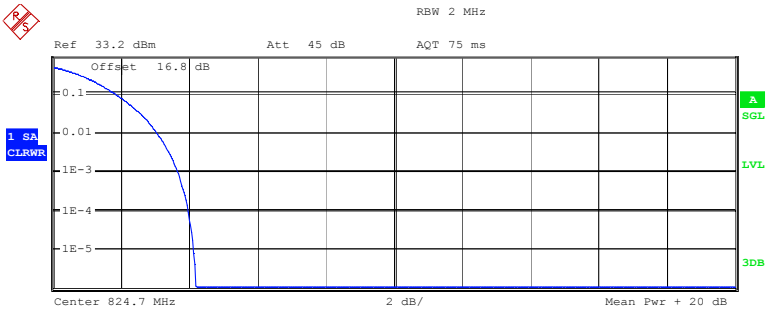
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.58 dBm
Peak	27.90 dBm
Crest	3.32 dB
10 %	1.73 dB
1 %	2.56 dB
.1 %	2.98 dB
.01 %	3.17 dB

low

Date: 26.SEP.2013 15:59:05

CDMA BC0 – Channel 1013



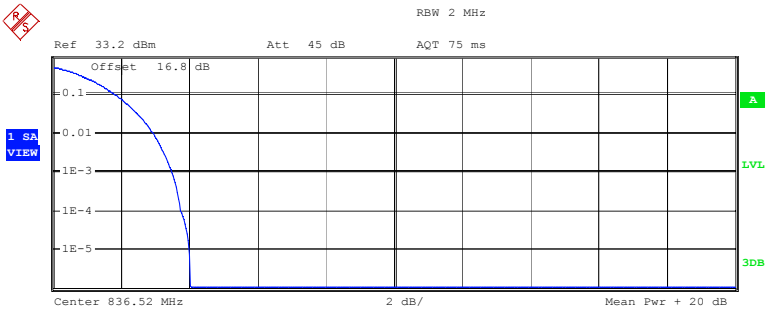
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.21 dBm
Peak	28.41 dBm
Crest	4.20 dB
10 %	1.83 dB
1 %	3.04 dB
.1 %	3.65 dB
.01 %	3.97 dB

low

Date: 26.SEP.2013 16:49:52

CDMA BC0 – Channel 384



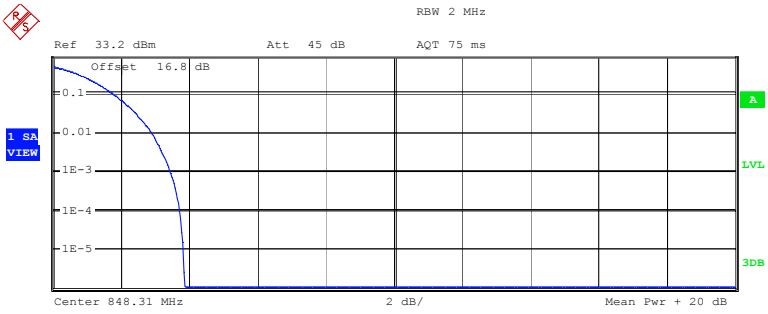
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.24 dBm
Peak	28.27 dBm
Crest	4.03 dB
10 %	1.79 dB
1 %	2.92 dB
.1 %	3.49 dB
.01 %	3.75 dB

low

Date: 26.SEP.2013 16:52:25

CDMA BC0 – Channel 777



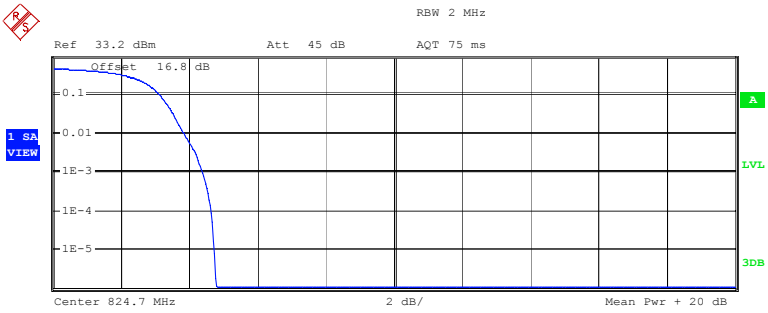
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	23.86 dBm
Peak	27.70 dBm
Crest	3.85 dB
10 %	1.76 dB
1 %	2.88 dB
.1 %	3.43 dB
.01 %	3.72 dB

low

Date: 26.SEP.2013 16:56:06

EVDO BC0 – Channel 1013



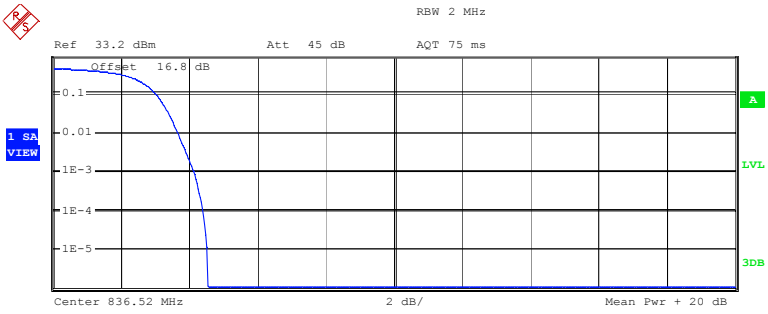
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.27 dBm
Peak	29.04 dBm
Crest	4.78 dB
10 %	3.11 dB
1 %	3.85 dB
.1 %	4.39 dB
.01 %	4.65 dB

low

Date: 26.SEP.2013 16:35:04

EVDO BC0 – Channel 384



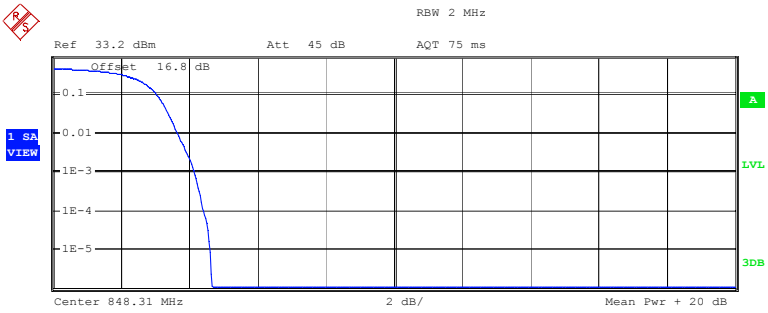
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.29 dBm
Peak	28.83 dBm
Crest	4.54 dB
10 %	3.01 dB
1 %	3.65 dB
.1 %	4.13 dB
.01 %	4.39 dB

low

Date: 26.SEP.2013 16:36:39

EVDO BC0 – Channel 777



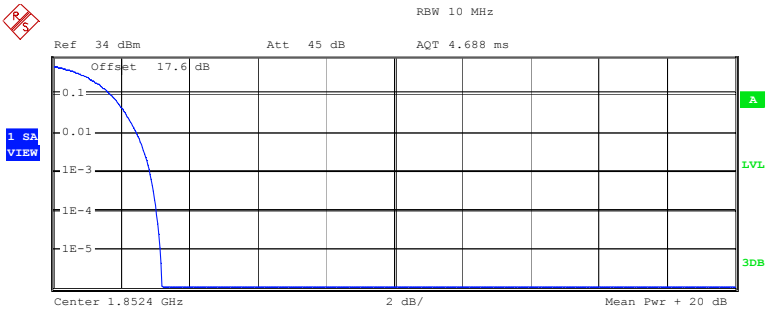
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.18 dBm
Peak	28.83 dBm
Crest	4.65 dB
10 %	3.04 dB
1 %	3.65 dB
.1 %	4.13 dB
.01 %	4.42 dB

low

Date: 26.SEP.2013 16:38:13

UMTS FDD II – Channel 9262



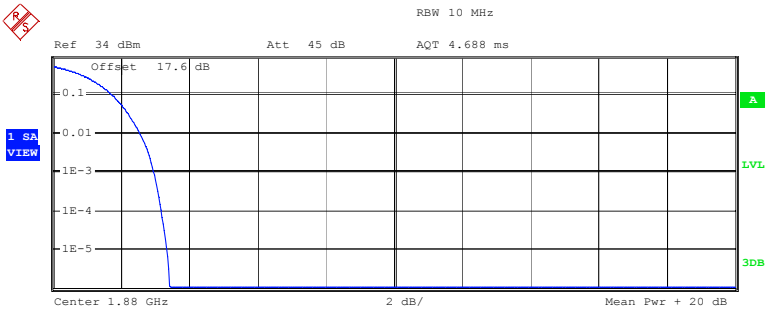
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.66 dBm
Peak	27.85 dBm
Crest	3.19 dB
10 %	1.67 dB
1 %	2.44 dB
.1 %	2.82 dB
.01 %	3.04 dB

low

Date: 26.SEP.2013 16:03:10

UMTS FDD II – Channel 9400



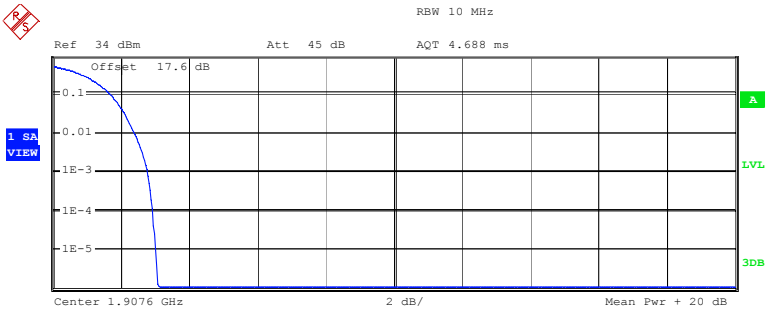
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.43 dBm
Peak	27.85 dBm
Crest	3.43 dB
10 %	1.70 dB
1 %	2.53 dB
.1 %	2.95 dB
.01 %	3.17 dB

low

Date: 26.SEP.2013 16:05:21

UMTS FDD II – Channel 9538



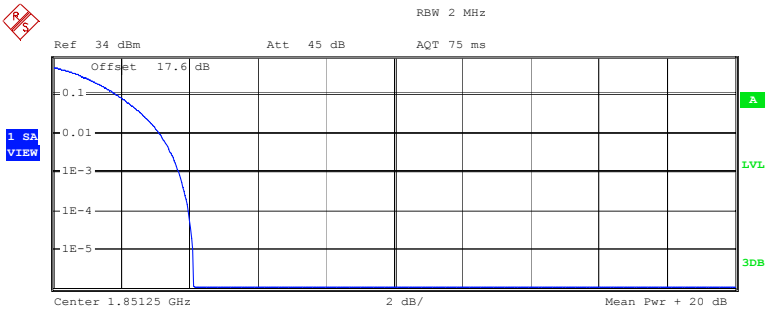
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.27 dBm
Peak	27.36 dBm
Crest	3.09 dB
10 %	1.67 dB
1 %	2.37 dB
.1 %	2.76 dB
.01 %	2.92 dB

low

Date: 26.SEP.2013 16:07:15

CDMA BC1 – Channel 25



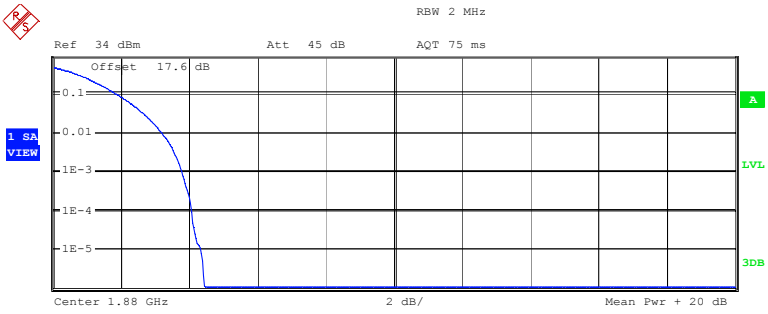
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	23.74 dBm
Peak	27.87 dBm
Crest	4.13 dB
10 %	1.86 dB
1 %	3.11 dB
.1 %	3.69 dB
.01 %	3.97 dB

low

Date: 26.SEP.2013 17:02:27

CDMA BC1 – Channel 600



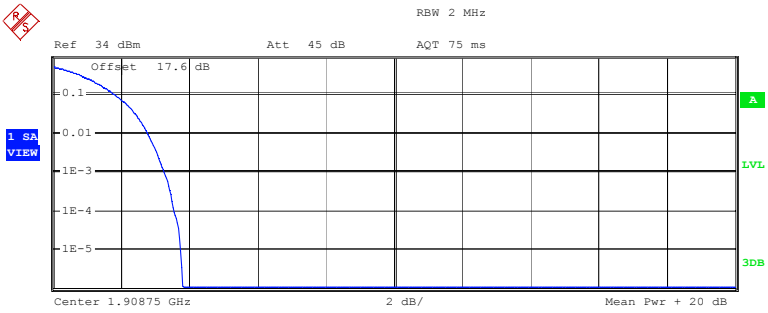
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	23.64 dBm
Peak	28.08 dBm
Crest	4.44 dB
10 %	1.86 dB
1 %	3.17 dB
.1 %	3.78 dB
.01 %	4.07 dB

low

Date: 26.SEP.2013 17:03:30

CDMA BC1 – Channel 1175



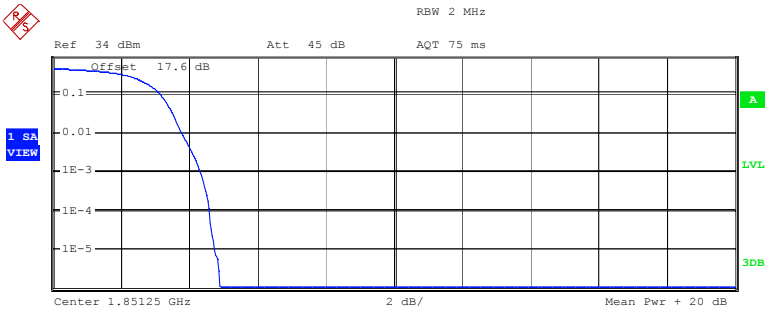
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	23.79 dBm
Peak	27.59 dBm
Crest	3.79 dB
10 %	1.79 dB
1 %	2.76 dB
.1 %	3.27 dB
.01 %	3.56 dB

low

Date: 26.SEP.2013 17:05:20

EVDO BC1 – Channel 25



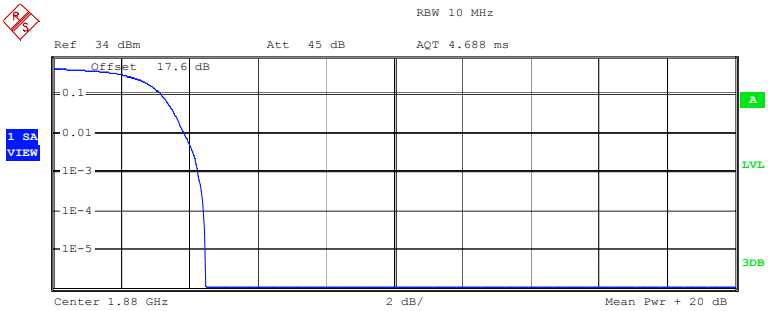
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.03 dBm
Peak	28.93 dBm
Crest	4.89 dB
10 %	3.14 dB
1 %	3.78 dB
.1 %	4.33 dB
.01 %	4.58 dB

low

Date: 26.SEP.2013 16:17:07

EVDO BC1 – Channel 600



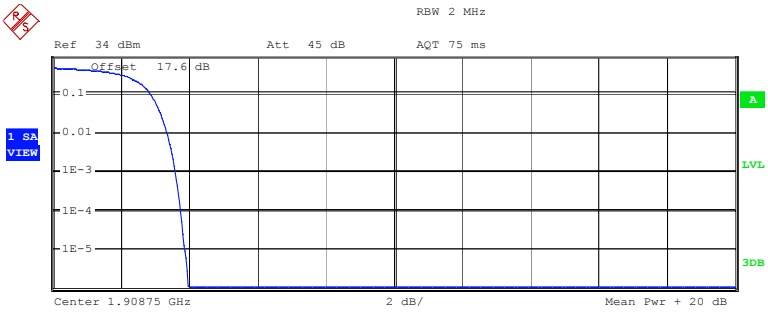
Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.23 dBm
Peak	28.70 dBm
Crest	4.47 dB
10 %	3.17 dB
1 %	3.85 dB
.1 %	4.23 dB
.01 %	4.42 dB

low

Date: 26.SEP.2013 16:22:50

EVDO BC1 – Channel 1175



Complementary Cumulative Distribution Function (150000 samples)

	Trace 1
Mean	24.26 dBm
Peak	28.22 dBm
Crest	3.97 dB
10 %	2.85 dB
1 %	3.33 dB
.1 %	3.59 dB
.01 %	3.75 dB

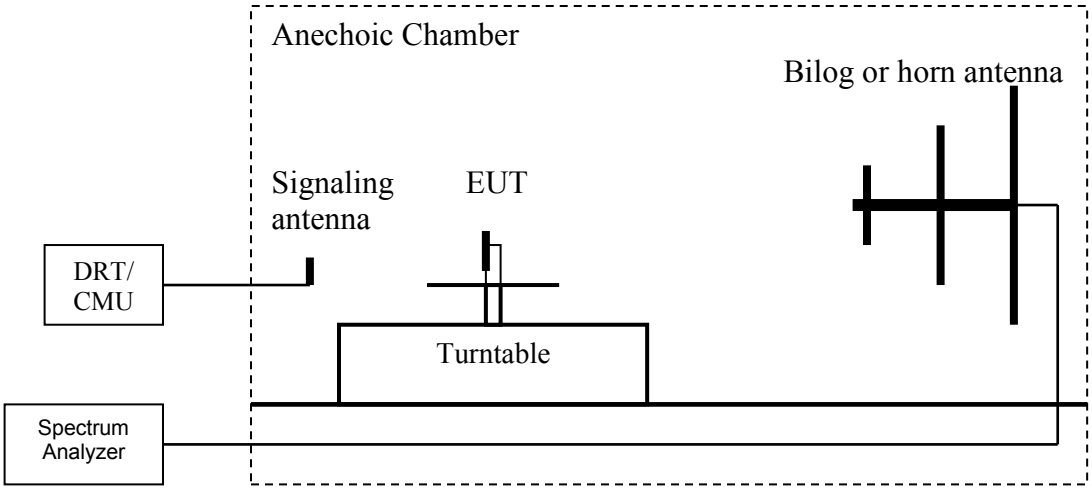
low

Date: 26.SEP.2013 16:26:33

6.1.5 Radiated Output Power Measurement

6.1.5.1 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. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360 degree. Raise the measurement antenna up to 4 meters in 1 meter increments and rotate the EUT 360 degree at each height to maximize all emissions. Measure and record all spurious emission peak levels in dBm (LVL) up to the tenth harmonic of the carrier frequency.
5. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
6. 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.
7. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) + Antenna Gain(dBd/dBi) – Analyzer reading (dBm).
8. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
9. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
11. Measurement instrument: RBW ≥ OBW; VBW ≥ RBW.

6.1.5.2 Measurement Uncertainty

± 3.0 dB

6.1.5.3 Test Conditions:

Tnom: 22°C; Vnom: 11.1 VDC
All measuements made with the following spectrum analyzer settings:
RBW = VBW = 5MHz

6.1.5.4 Lab Locations

E(I)RP for GSM, UMTS, and CDMA technologies were measured at CETECOM Inc. in San Diego, CA.

E(I)RP for EVDO was measured at CETECOM Inc. in Milpitas, CA.

6.1.5.5 Test Verdict

Pass.

6.1.5.6 Test Results

6.1.5.6.1 RF Power Output 850MHz band

Limits:

FCC 22.913 (a) Effective radiated power limits.

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

RSS-132, Issue 3

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.

GSM 850: GMSK Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.2	30.255
836.6	30.186
848.8	29.923

EGPRS 850: 8PSK Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.2	26.048
836.6	26.196
848.8	26.588

FDD V: UMTS Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
826.4	23.664
836.6	21.815
846.6	22.518

CDMA BC0	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.7	24.564
836.52	23.124
848.31	22.560

EVDO BC0	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.7	25.19
836.52	24.28
848.31	23.50

6.1.5.7 RF Power Output 1900MHz band

Limits:

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.

RSS-133, Issue 6

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.

GSM 1900: GMSK Mode	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1850.2	29.069
1880.0	27.359
1909.8	29.198

EGPRS 1900: 8PSK Mode	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1850.2	28.484
1880.0	26.384
1909.8	28.178

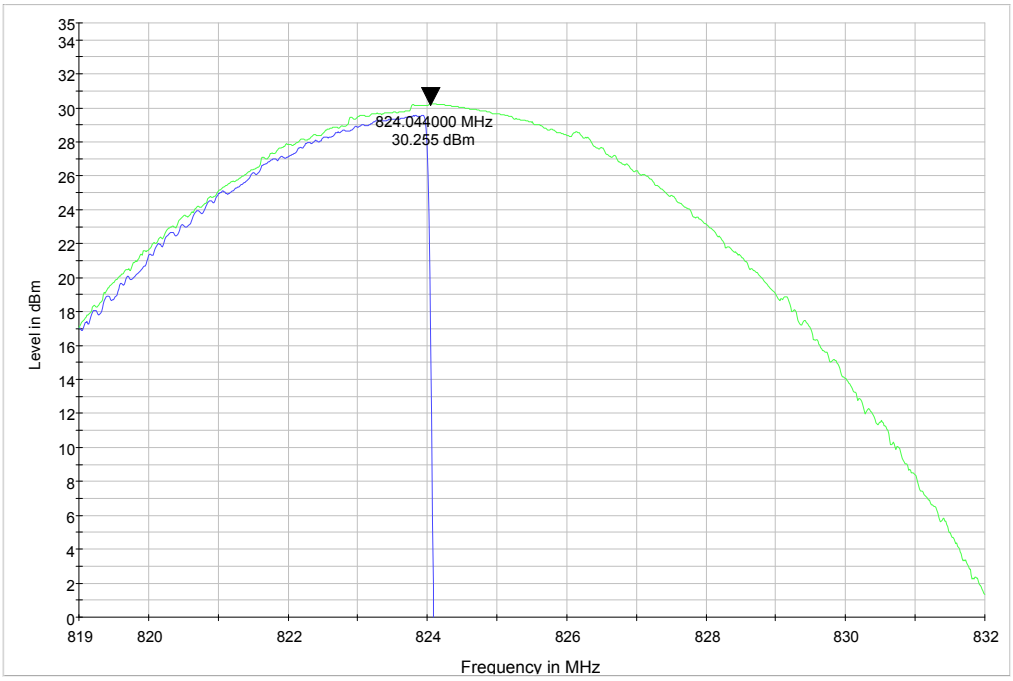
FDD II: UMTS Mode	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1852.4	27.689
1880.0	25.929
1907.6	26.458

CDMA BC1	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1851.25	28.750
1880	28.059
1908.75	26.288

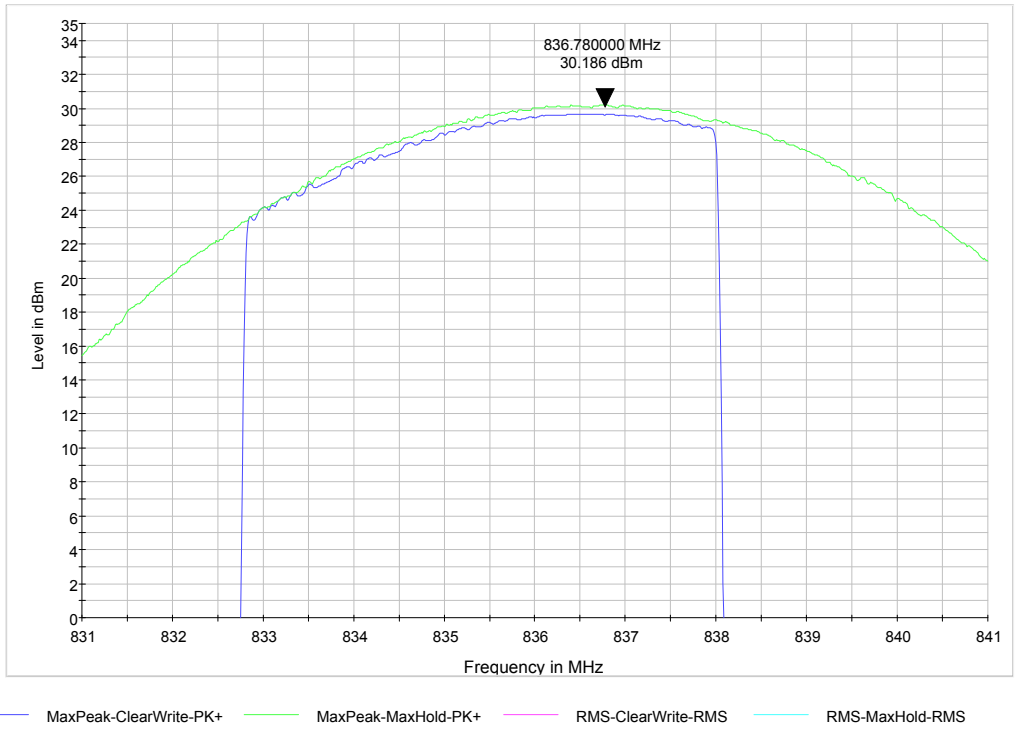
EVDO BC1	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1851.25	27.05
1880	27.12
1908.75	25.79

6.1.5.8 Plots:

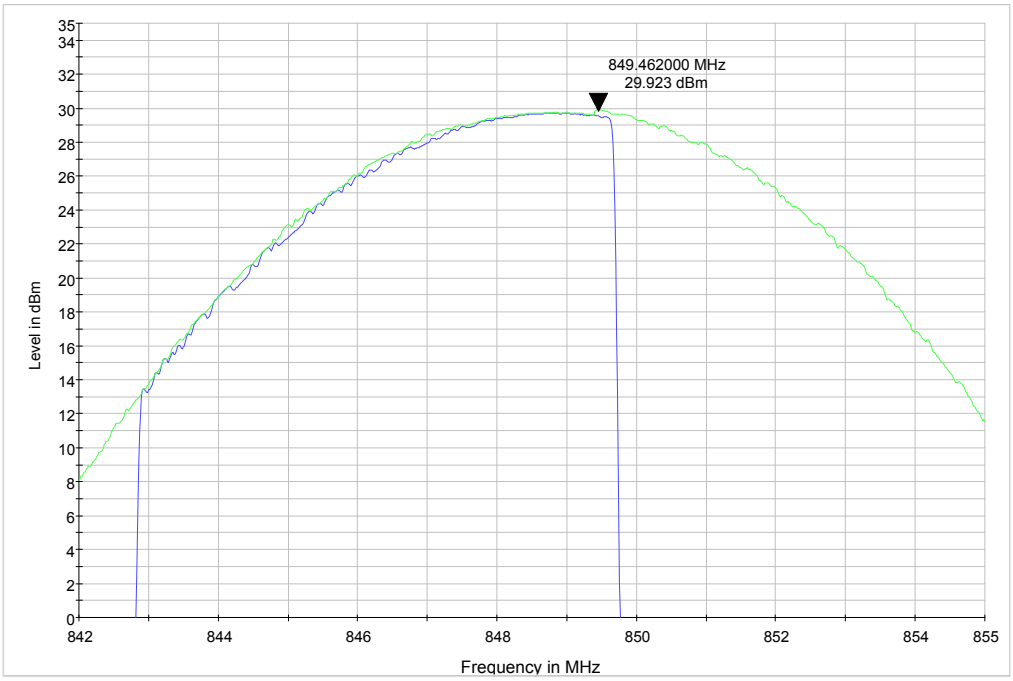
ERP (GSM 850) CHANNEL 128



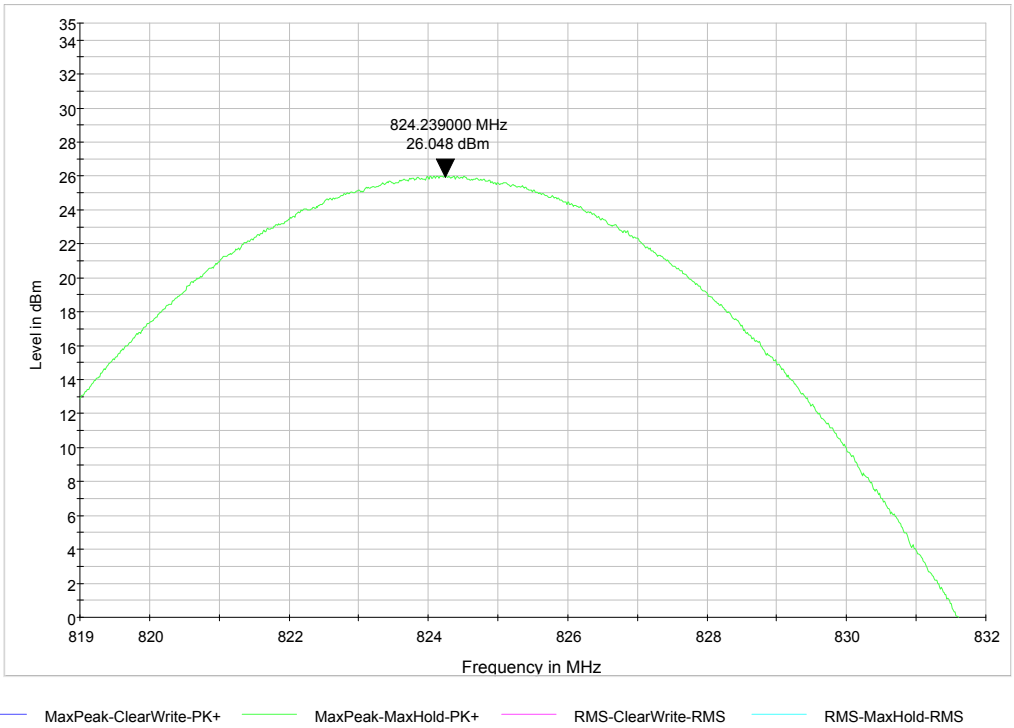
ERP (GSM 850) CHANNEL 190



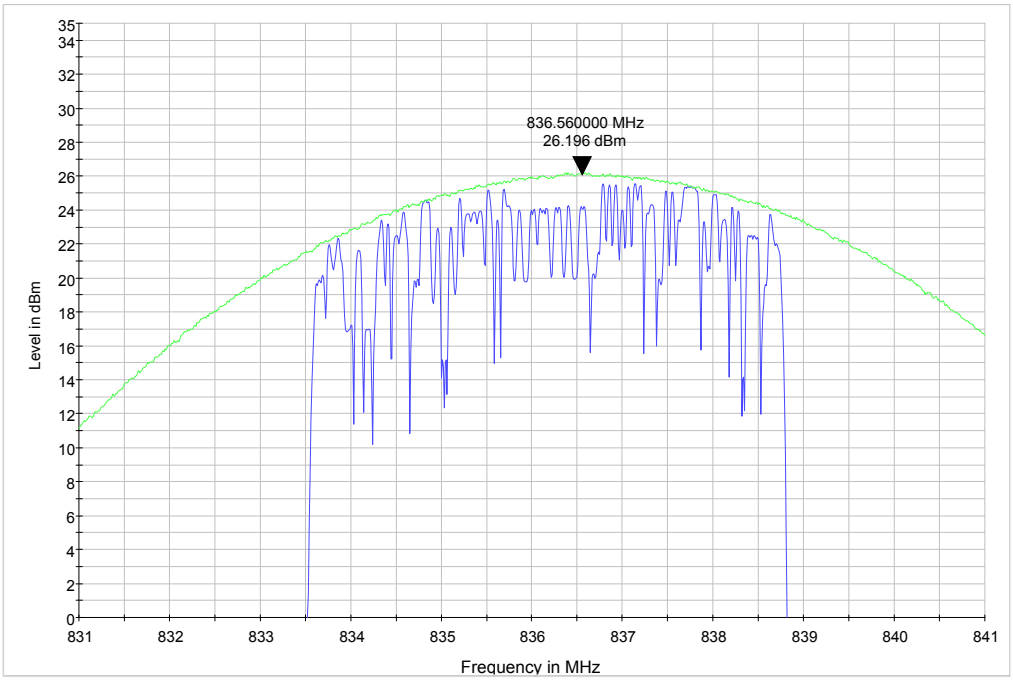
ERP (GSM 850) CHANNEL 251



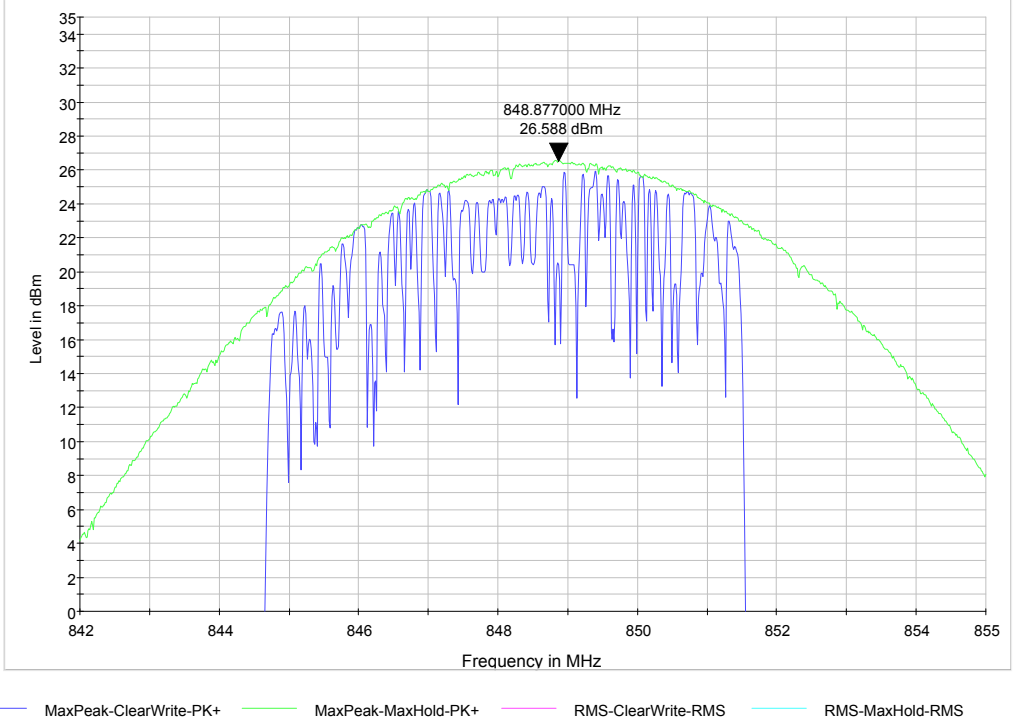
ERP (EGPRS 850) CHANNEL 128



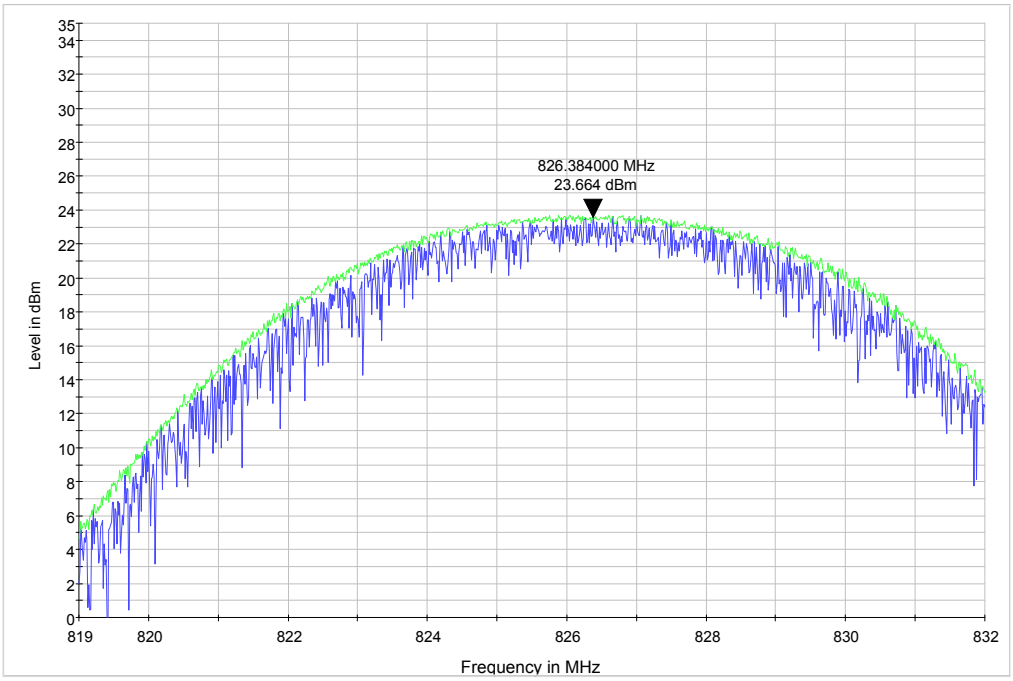
ERP (EGPRS 850) CHANNEL 190



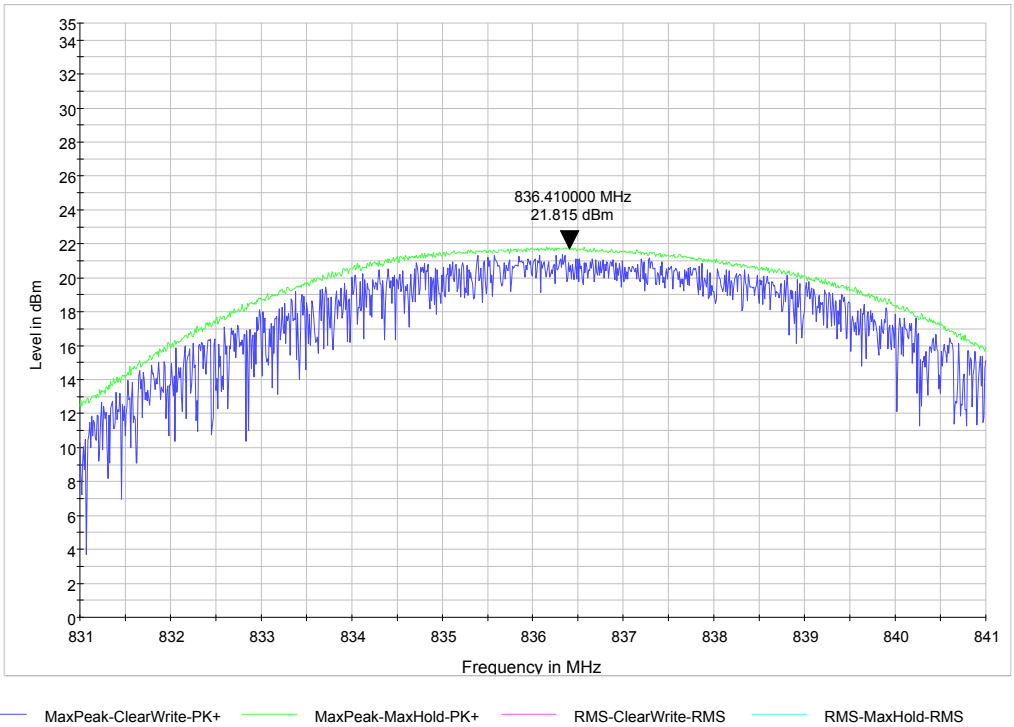
ERP (EGPRS 850) CHANNEL 251



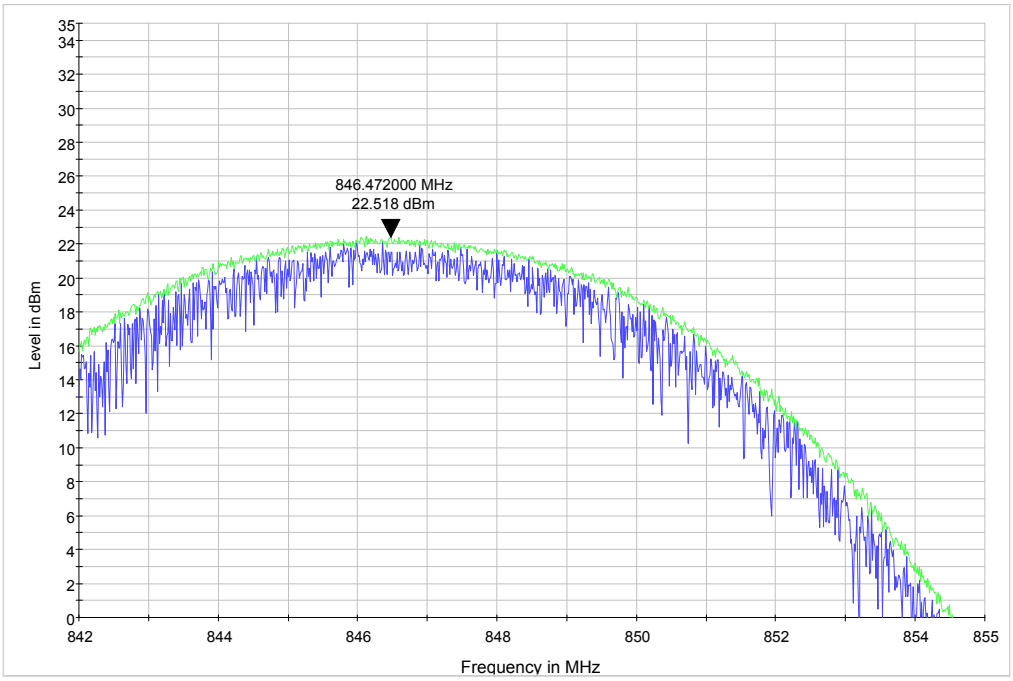
ERP (UMTS FDD5) CHANNEL 4132



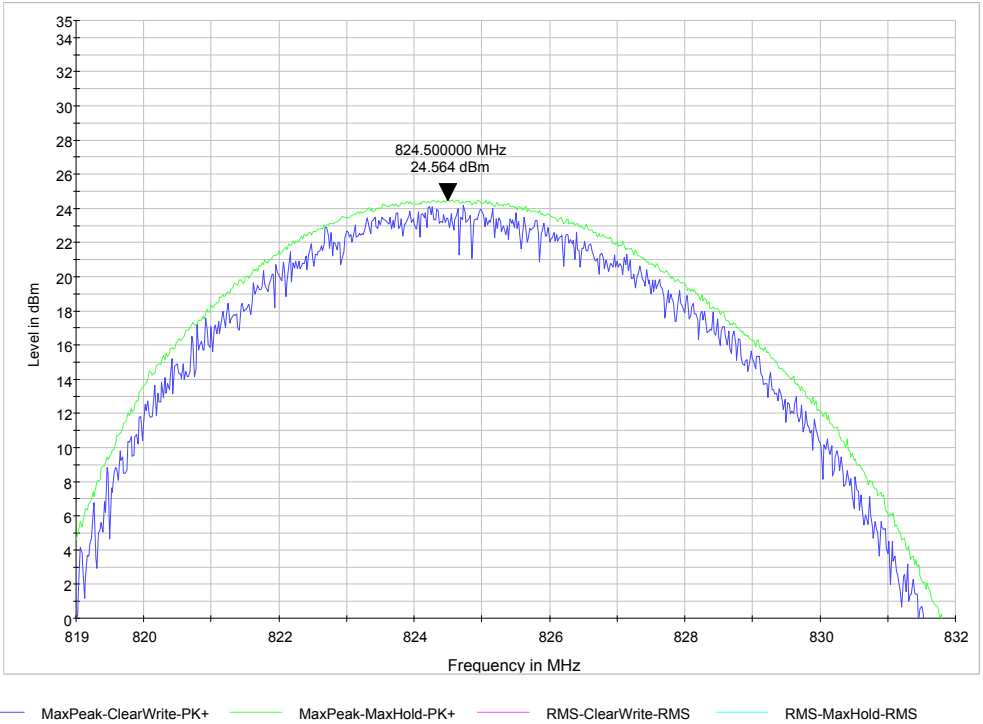
ERP (UMTS FDD5) CHANNEL 4183



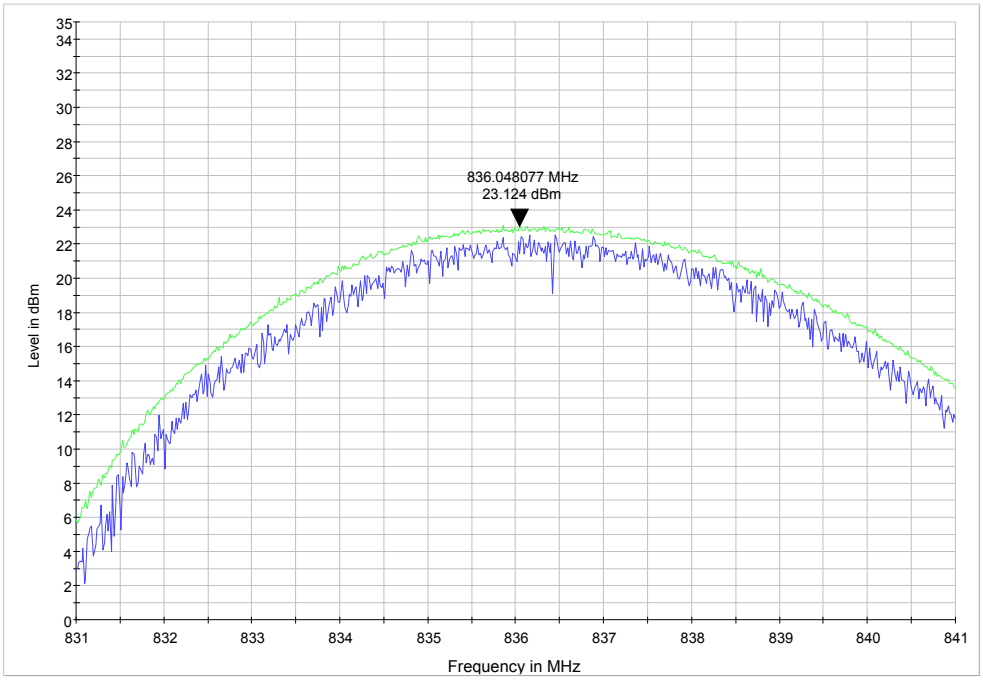
ERP (UMTS FDD5) CHANNEL 4233



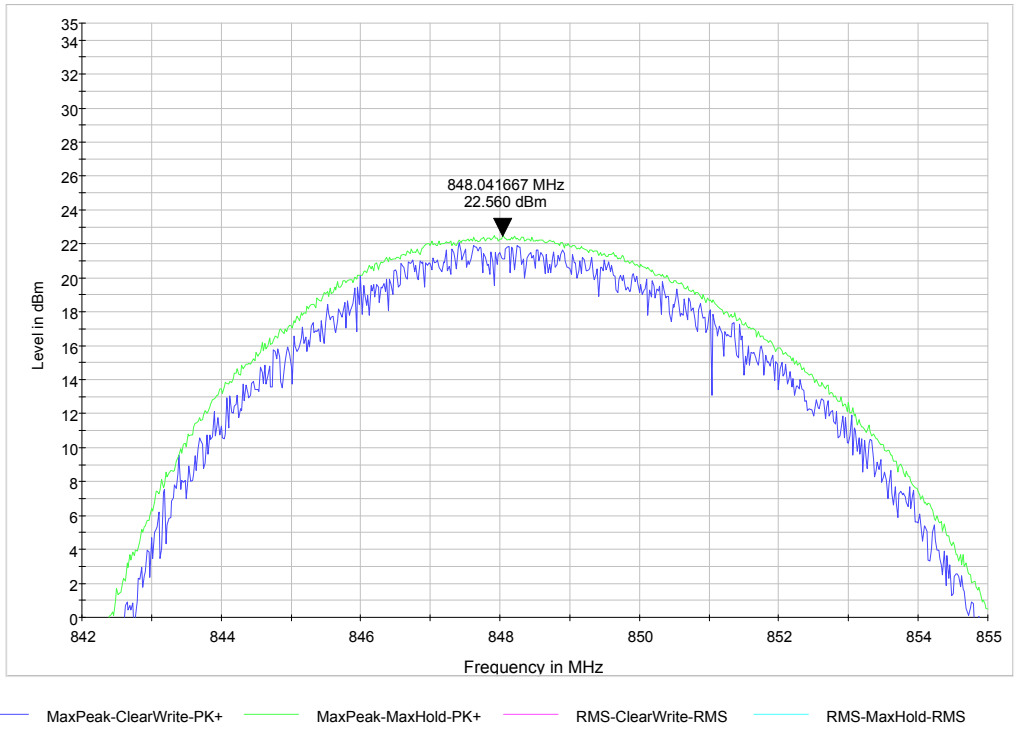
ERP (CDMA BC0) CHANNEL 1013



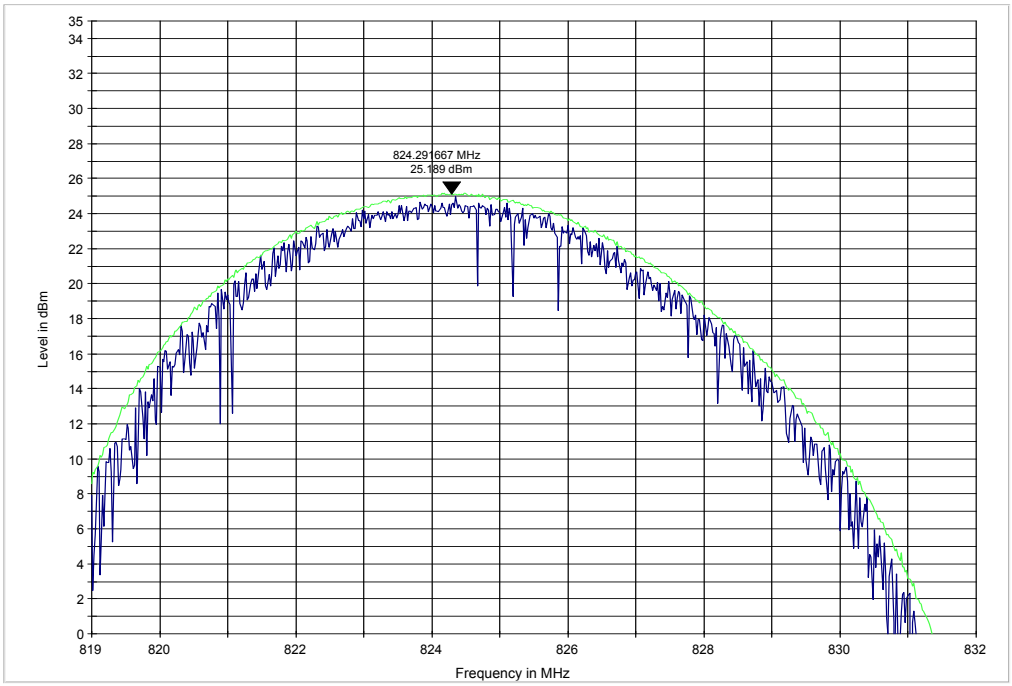
ERP (CDMA BC0) CHANNEL 384



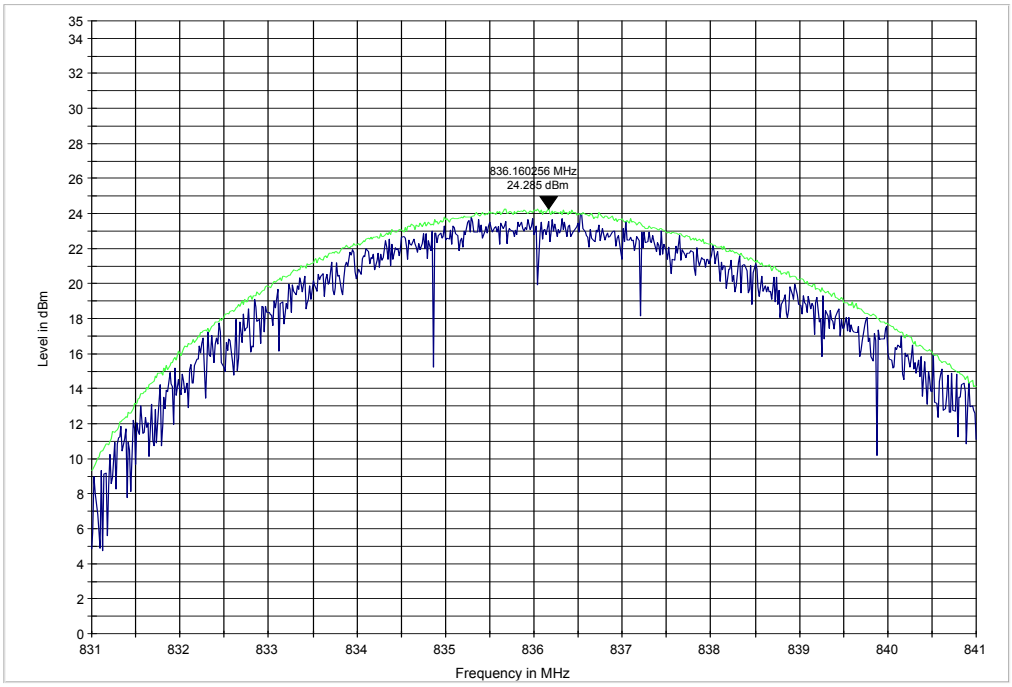
ERP (CDMA BC0) CHANNEL 777



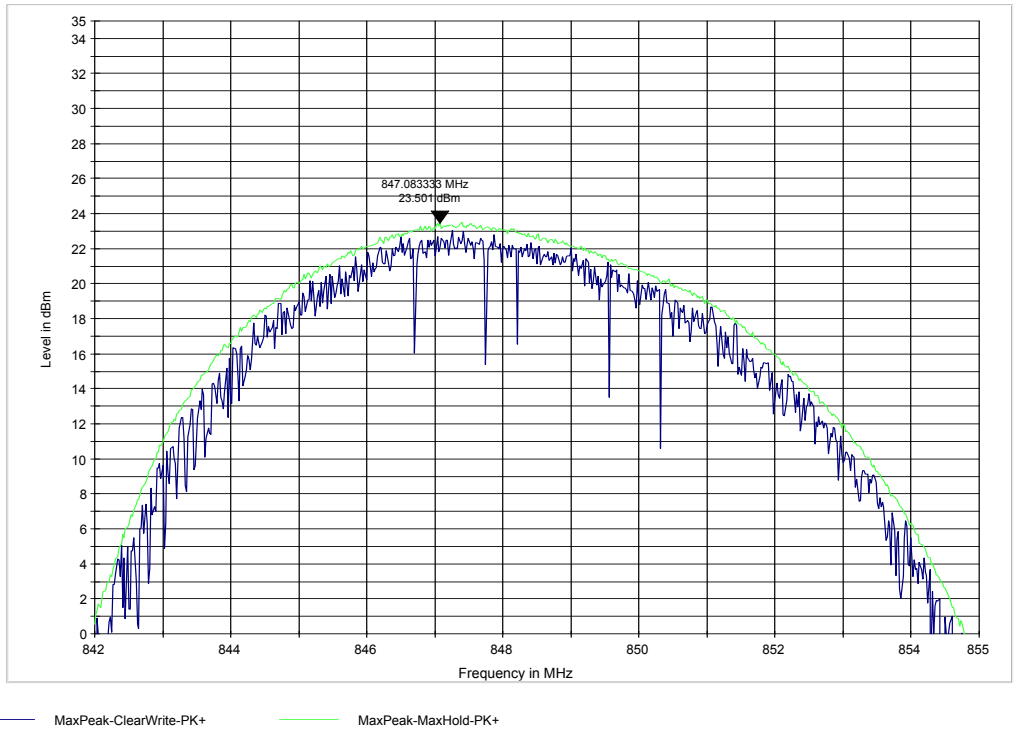
ERP (EVDO BC0) CHANNEL 1013



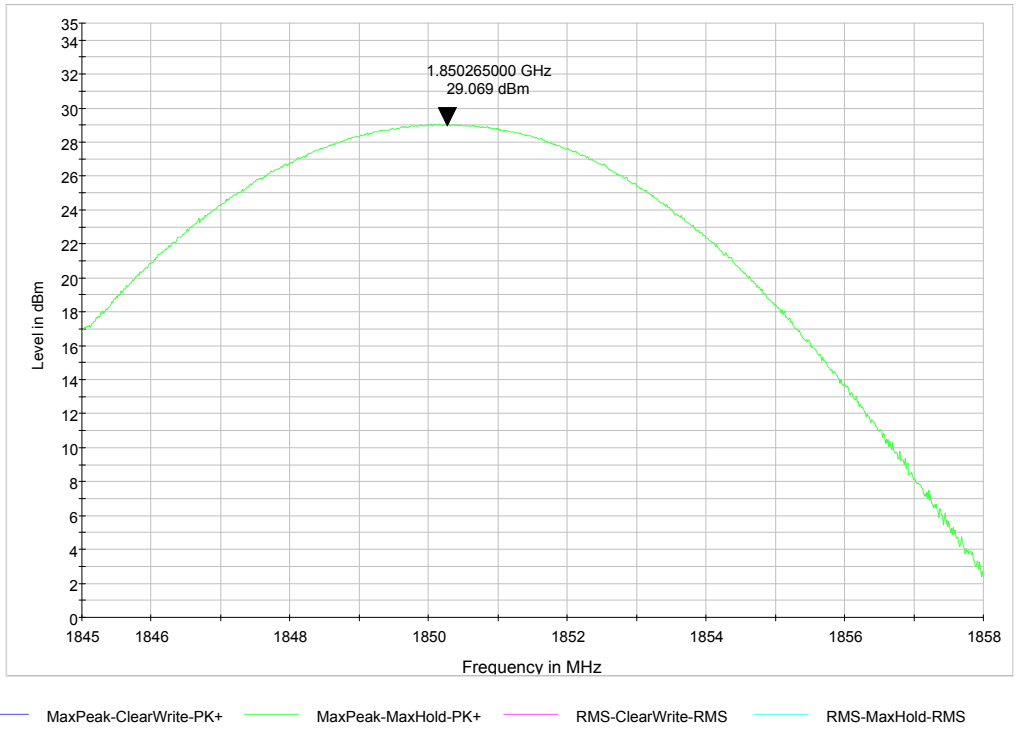
ERP (EVDO BC0) CHANNEL 384



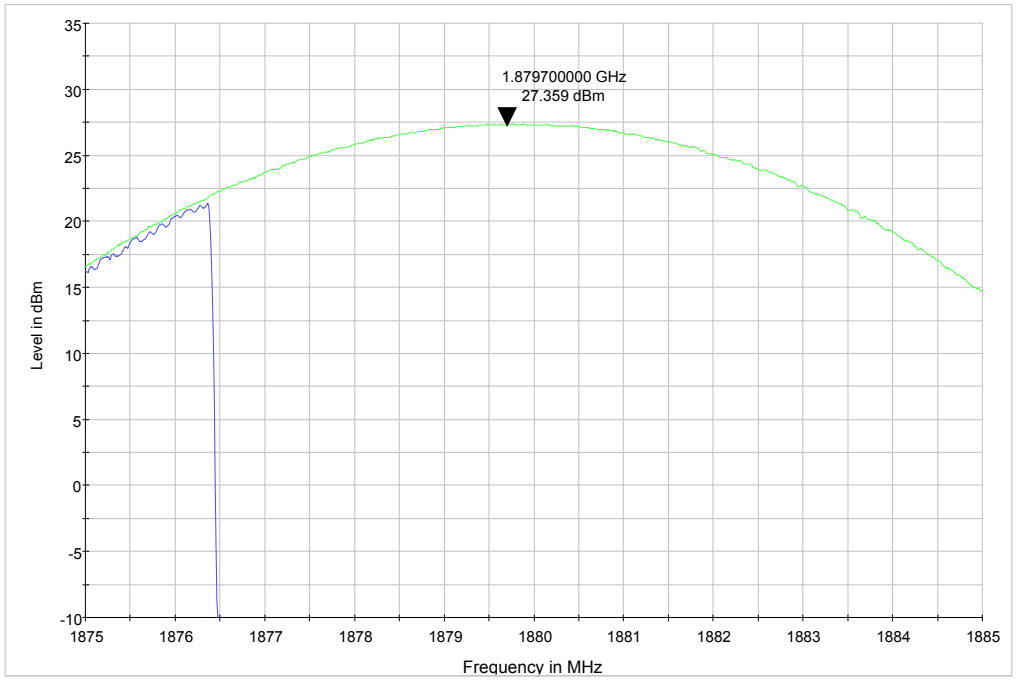
ERP (EVDO BC0) CHANNEL 777



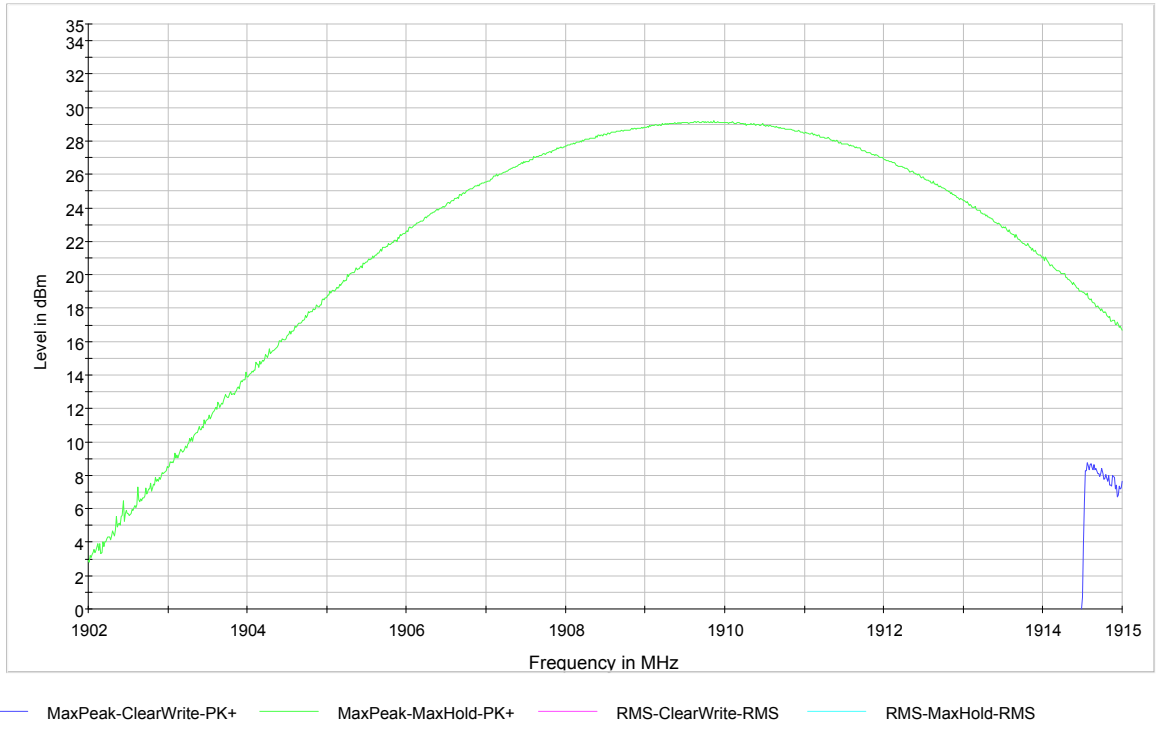
EIRP (PCS-1900) CHANNEL 512



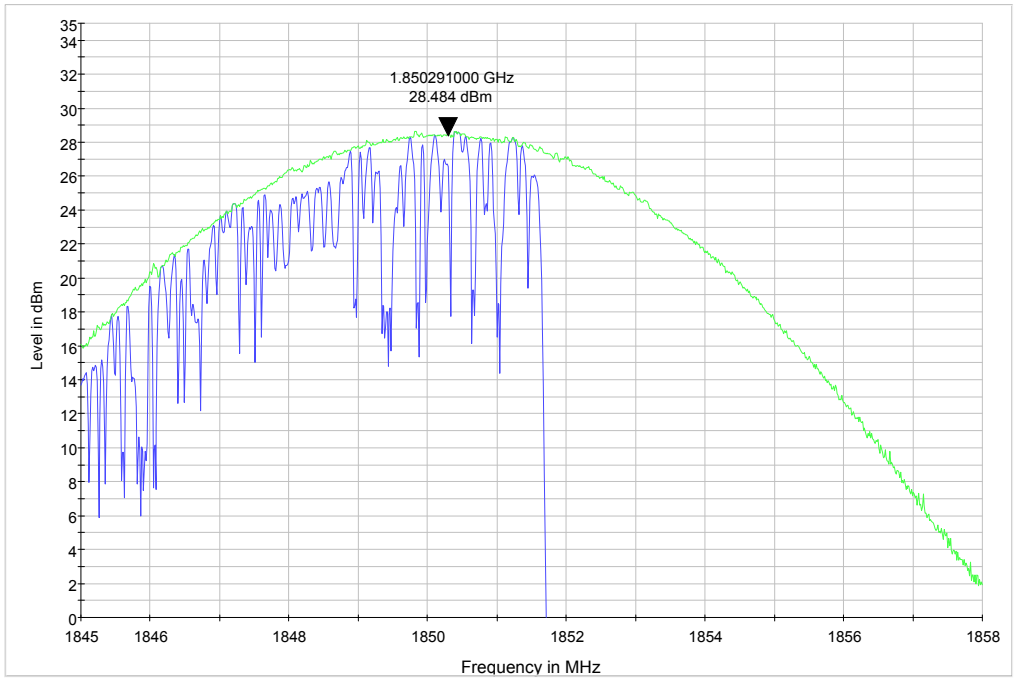
EIRP (PCS-1900) CHANNEL 661



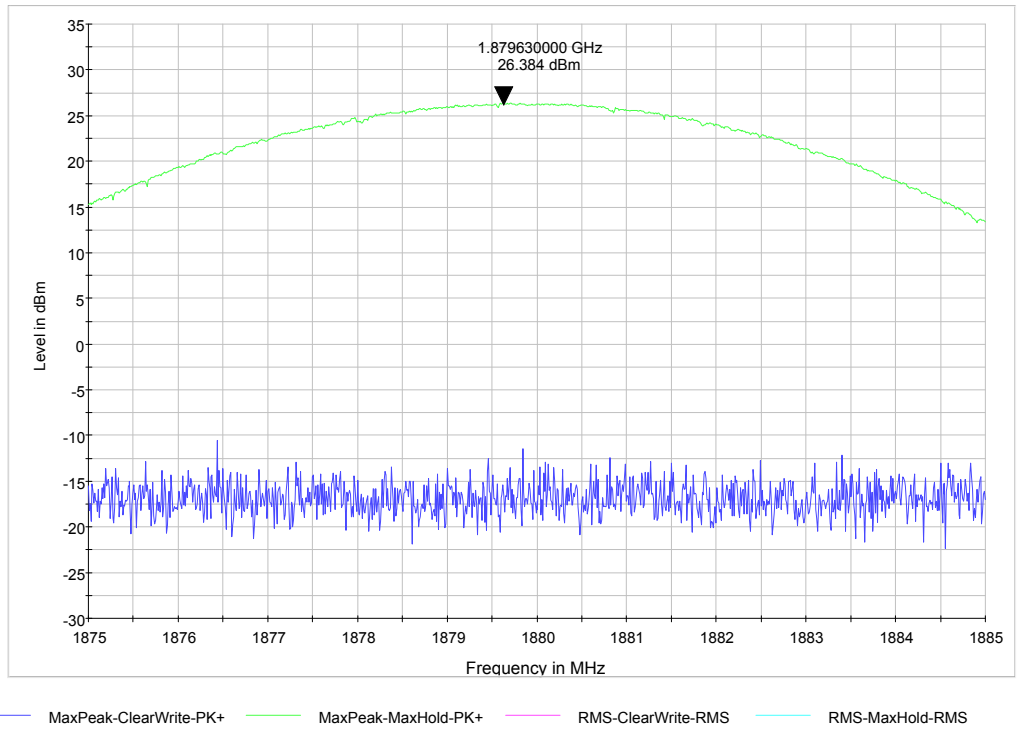
EIRP (PCS-1900) CHANNEL 810



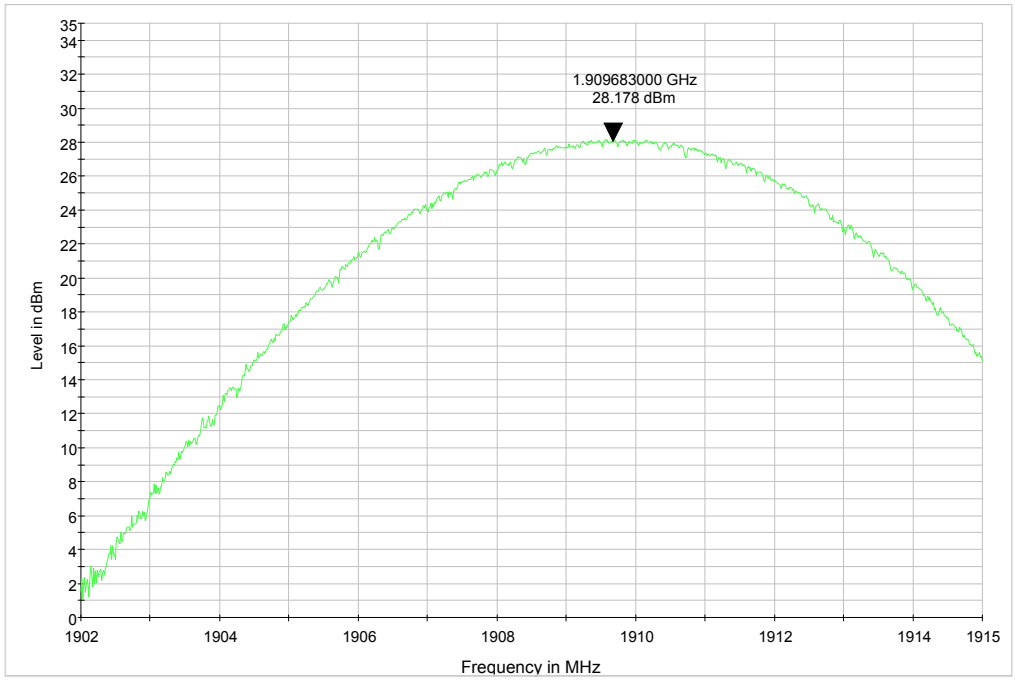
EIRP (EGPRS 1900) CHANNEL 512



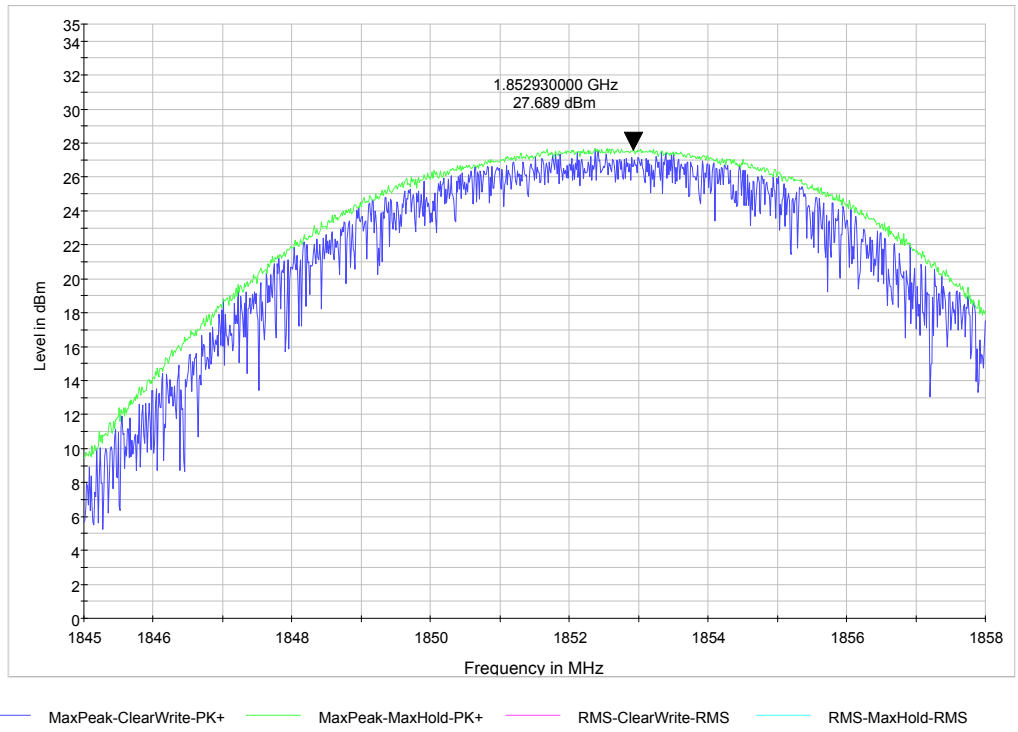
EIRP (EGPRS 1900) CHANNEL 661



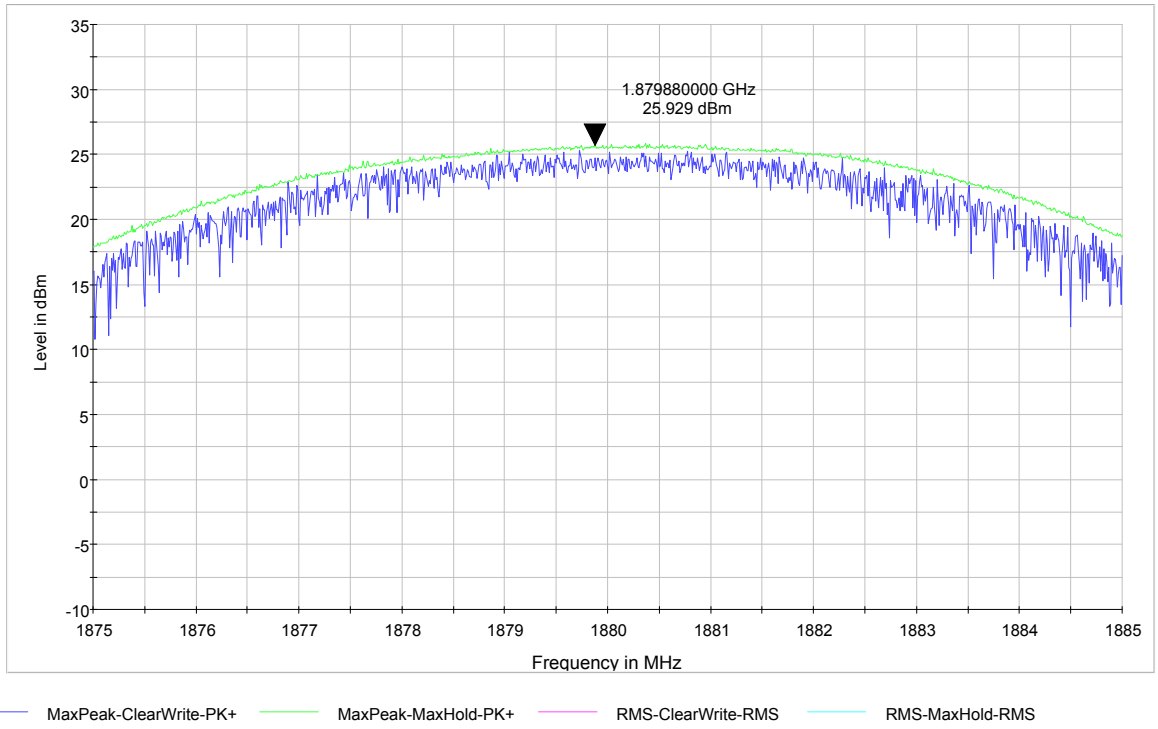
EIRP (EGPRS 1900) CHANNEL 810



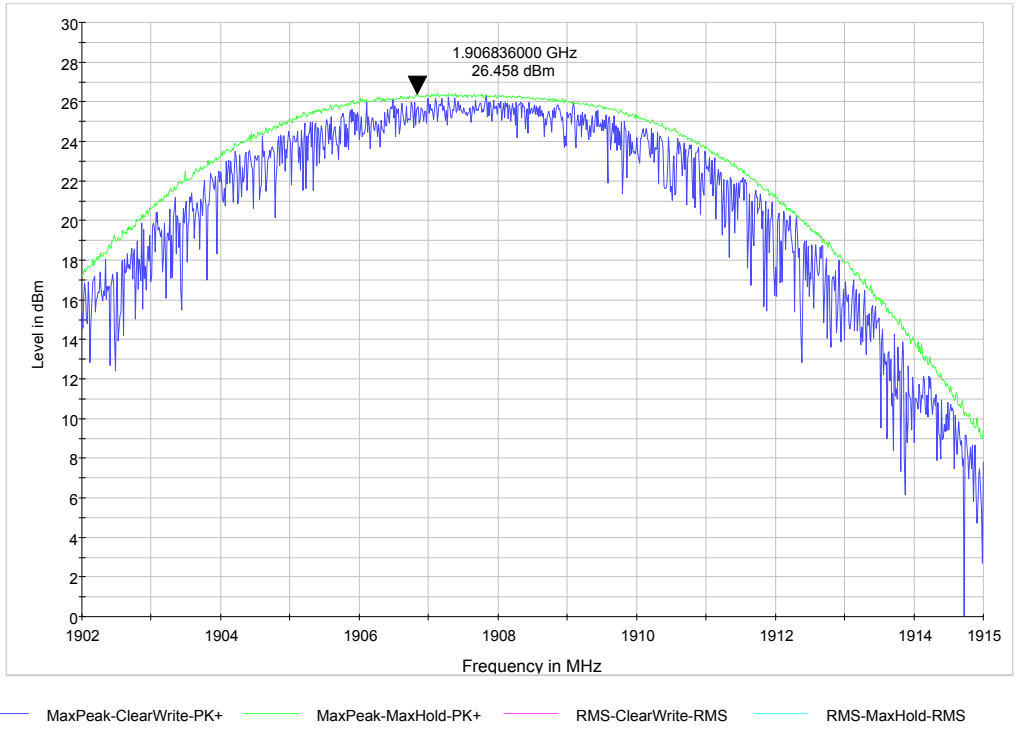
EIRP (UMTS FDD2) CHANNEL 9262



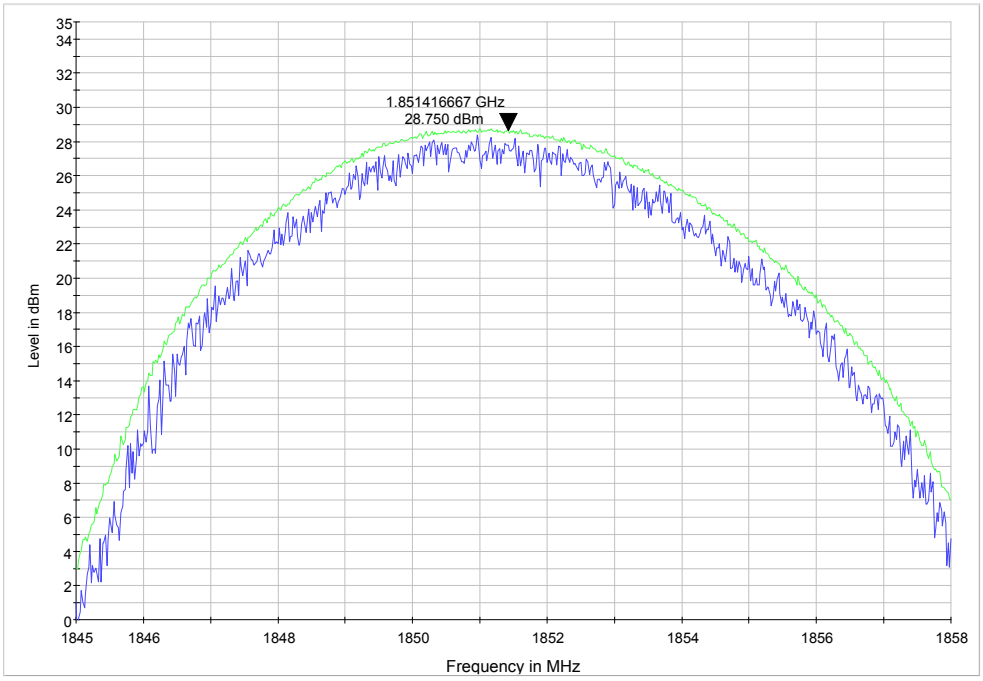
EIRP (UMTS FDD2) CHANNEL 9400



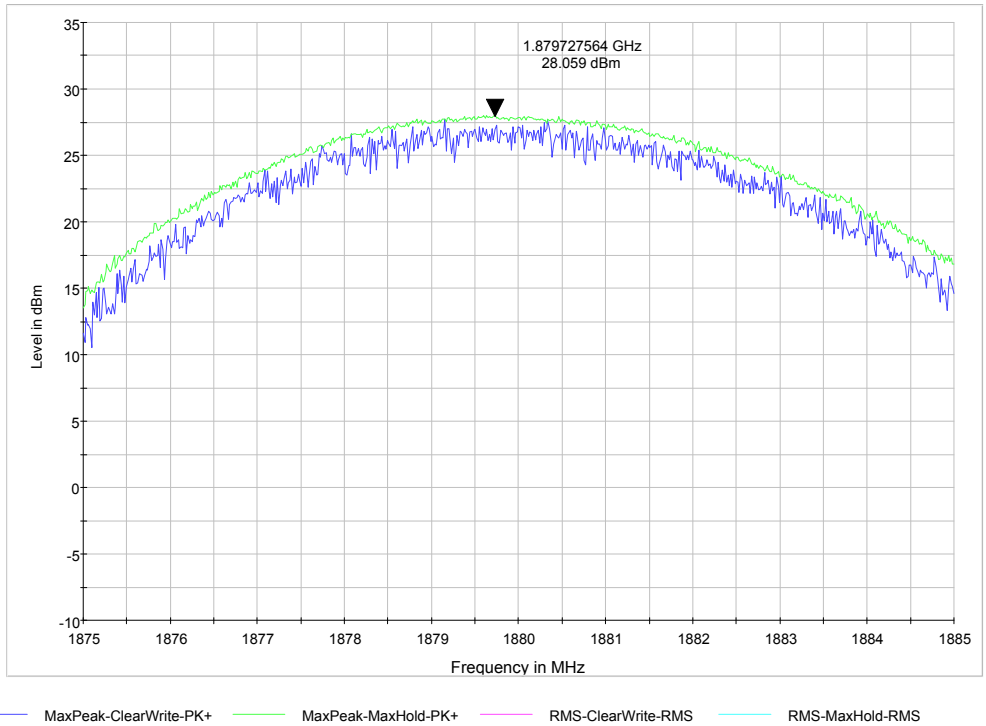
EIRP (UMTS FDD2) CHANNEL 9538



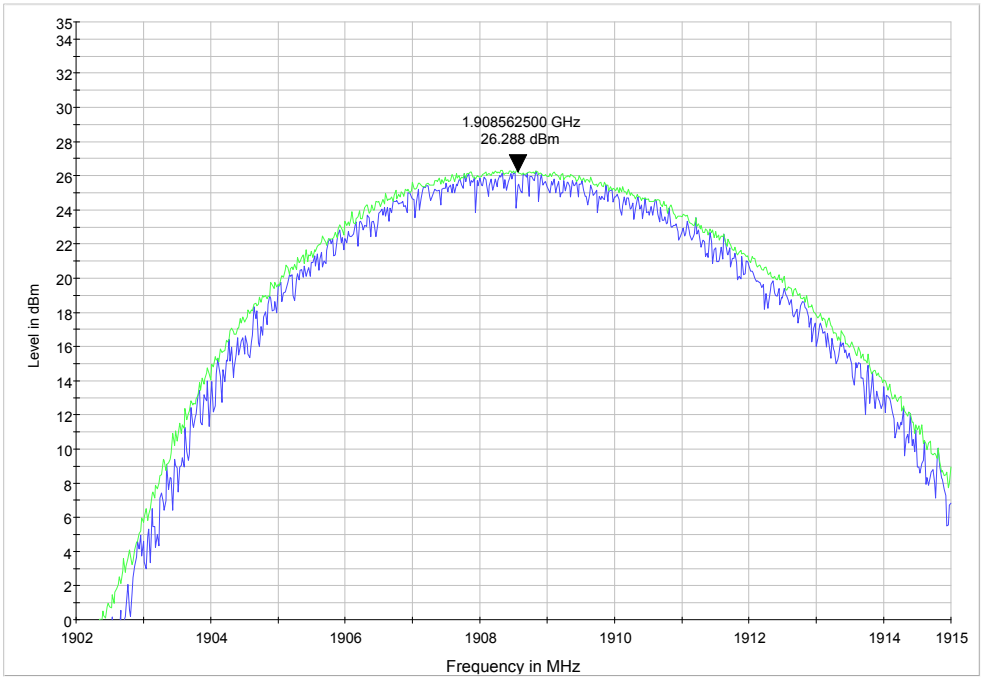
EIRP (CDMA BC1) CHANNEL 25



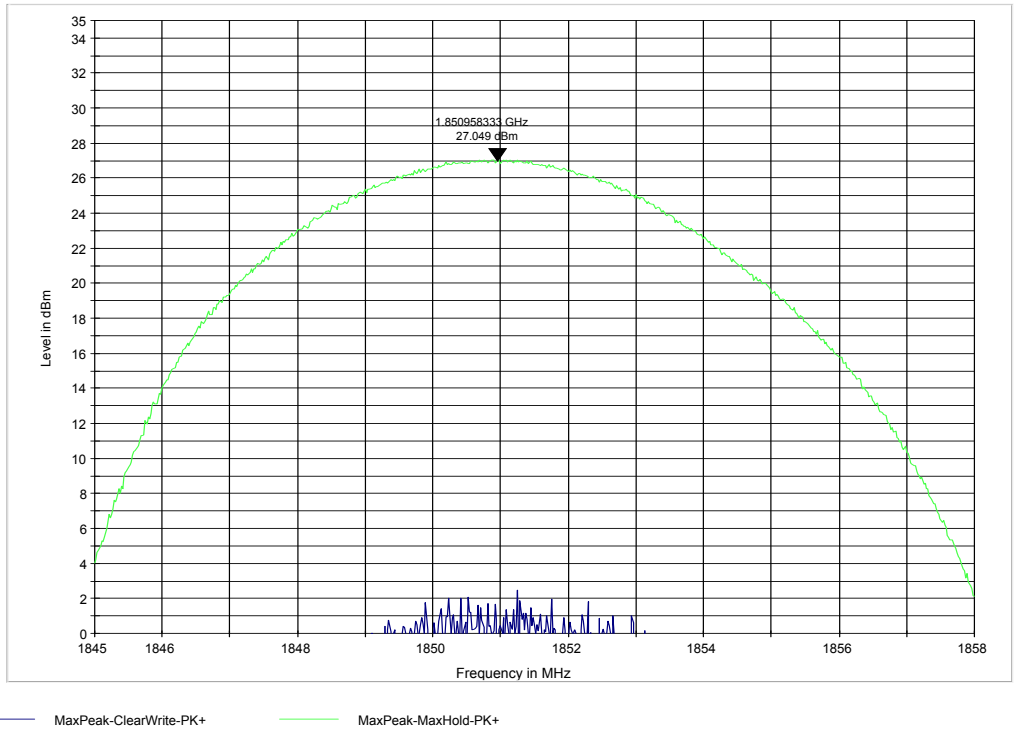
EIRP (CDMA BC1) CHANNEL 600



EIRP (CDMA BC1) CHANNEL 1175



EIRP (EVDO BC1) CHANNEL 25



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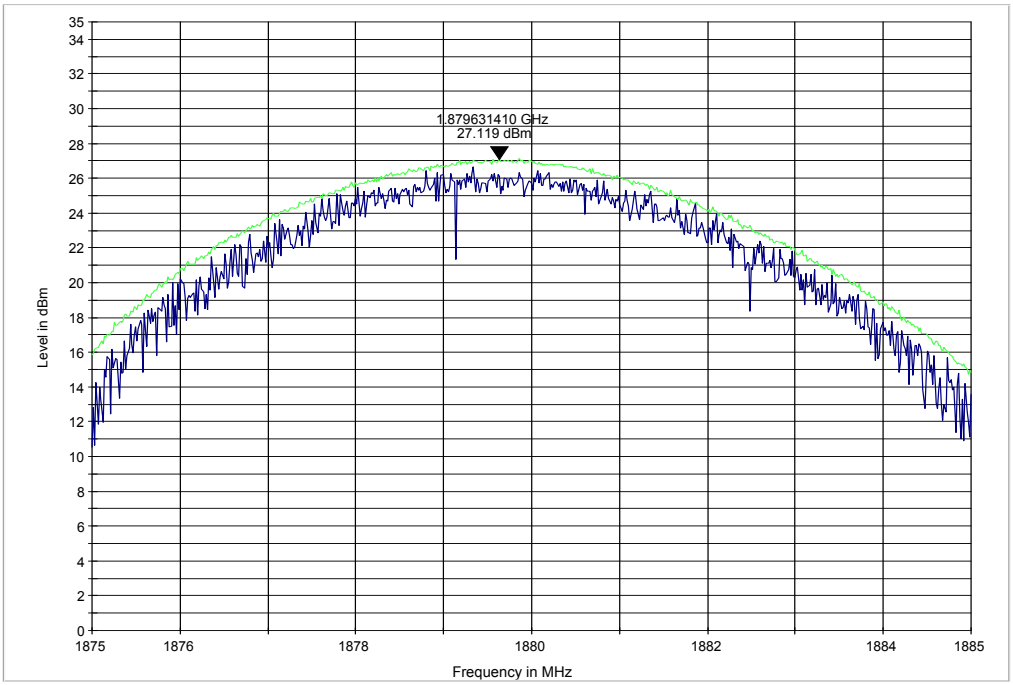
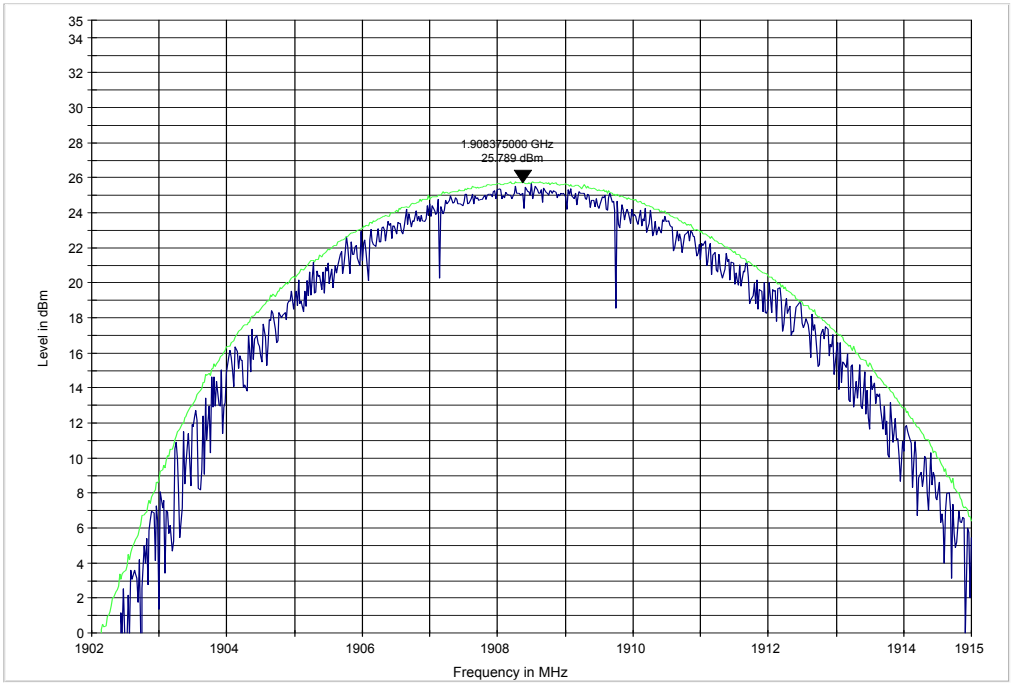


EIRP (EVDO BC1) CHANNEL 1175



6.2 Spurious Emissions Radiated

6.2.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238
IC: RSS-Gen Section 4.9; RSS 132 Section 5.5; RSS 133 Section 6.5

6.2.2 Measurement requirements:

6.2.2.1 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.

6.2.2.2 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.

6.2.3 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.

6.2.3.1 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.

6.2.3.2 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

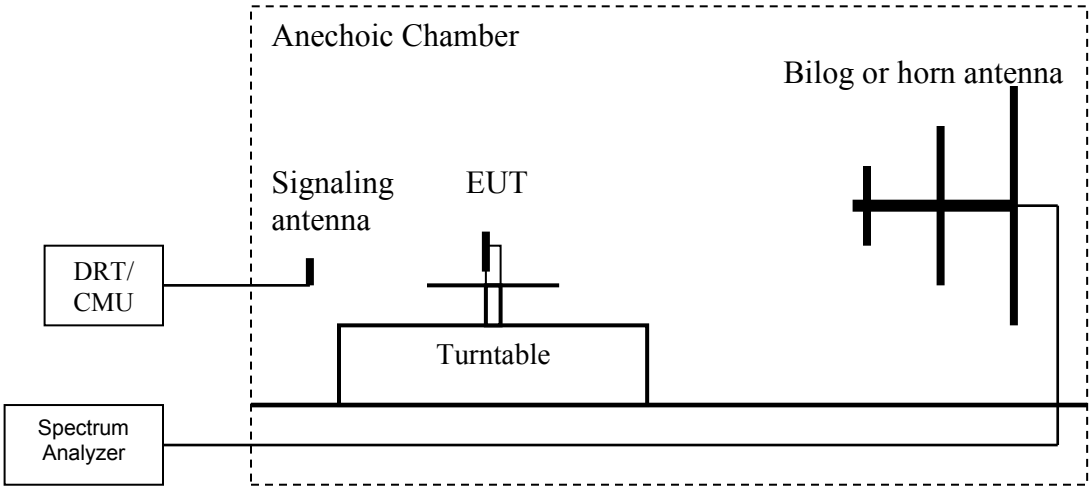
transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined 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.

6.2.3.3 RSS-132 Section 5.5.1.1, 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.

6.2.4 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

6.2.5 Sample Calculations for Radiated Measurements

6.2.5.1 Power Measurements using Substitution Procedure:

The measurement on the Spectrum Analyzer is used as a basis for the Substitution procedure.
The EUT is replaced with a Signal Generator and an antenna. The setting on the Signal Generator is varied until the Spectrum Analyzer displays the original reading. EIRP is calculated as-

EIRP (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi)
Eg:

Frequency (MHz)	Measured SA (dBµV)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Dipole Gain (dBd)	Cable Loss (dB)	EIRP (dBm)
1000	95.5	24.5	6.5	0	3.5	27.5

6.2.6 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 GSM-850 & PCS-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 GSM-850 & PCS-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.

Radiated emission measurements were made with

- Circuit Switched mode GMSK modulation because this mode represents the worst case emission for all the modulations for GSM
- UMTS FDD mode
- CDMA RC3/3 SO55 mode

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.

6.2.7 Test Conditions:

Tnom: 22°C; Vnom: 11.1 V

6.2.8 Test Verdict:

Pass.

6.2.9 Test Results:

6.2.9.1 Test Results Transmitter Spurious Emission GSM850:

Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
1	**824.2**	-	**836.6**	-	**848.8**	-
2	**1648.4**	-27.74	**1673.2**	NF	**1697.6**	-28.77
3	**2472.6**	NF	**2509.8**	NF	**2546.4**	NF
4	**3296.8**	NF	**3346.4**	NF	**3395.2**	NF
5	**4121**	NF	**4183**	NF	**4244**	NF
6	**4945.2**	NF	**5019.6**	NF	**5092.8**	NF
7	**5769.4**	NF	**5856.2**	NF	**5941.6**	NF
8	**6593.6**	NF	**6692.8**	NF	**6790.4**	NF
9	**7417.8**	NF	**7529.4**	NF	**7639.2**	NF
10	**8242**	NF	**8366**	NF	**8488**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

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

6.2.9.2 Test Results Transmitter Spurious Emission UMTS FDDV

Harmonic	Tx ch-4132 Freq. (MHz)	Level (dBm)	Tx ch-4183 Freq. (MHz)	Level (dBm)	Tx ch-4233 Freq. (MHz)	Level (dBm)
1	**826.4**	-	**836.6**	-	**846.6**	-
2	**1652.8**	NF	**1673.2**	NF	**1693.2**	NF
3	**2479.2**	NF	**2509.8**	NF	**2539.8**	NF
4	**3305.6**	NF	**3346.4**	NF	**3386.4**	NF
5	**4132**	NF	**4183**	NF	**4233**	NF
6	**4958.4**	NF	**5019.6**	NF	**5079.6**	NF
7	**5784.8**	NF	**5856.2**	NF	**5926.2**	NF
8	**6611.2**	NF	**6692.8**	NF	**6772.8**	NF
9	**7437.6**	NF	**7529.4**	NF	**7619.4**	NF
10	**8264**	NF	**8366**	NF	**8466**	NF
NF= Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

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

6.2.9.3 Test Results Transmitter Spurious Emission CDMA BC0

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						

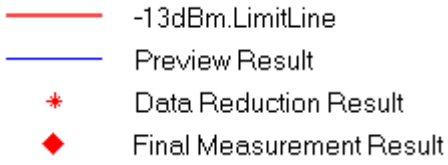
Legend for the plots:

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

6.2.9.4 Test Results Transmitter Spurious Emission PCS-1900:

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
1	**1850.2**	-	**1880.0**	-	**1909.8**	-
2	**3700.4**	NF	**3760**	-70	**3819.6**	-67.47
3	**5550.6**	NF	**5640**	NF	**5729.4**	NF
4	**7400.8**	NF	**7520**	NF	**7639.2**	NF
5	**9251**	NF	**9400**	NF	**9549**	NF
6	**11101.2**	NF	**11280**	NF	**11458.8**	NF
7	**12951.4**	NF	**13160**	NF	**13368.6**	NF
8	**14801.6**	NF	**15040**	NF	**15278.4**	NF
9	**16651.8**	NF	**16920**	NF	**17188.2**	NF
10	**18502**	NF	**18800**	NF	**19098**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:



6.2.9.5 Test Results Transmitter Spurious Emission UMTS FDD2:

Harmonic	Tx ch-9262 Freq. (MHz)	Level (dBm)	Tx ch-9400 Freq. (MHz)	Level (dBm)	Tx ch-9538 Freq. (MHz)	Level (dBm)
1	**1852.4**	-	**1880.0**	-	**1907.6**	-
2	**3704.8**	-55.44	**3760**	-53.85	**3815.2**	-53.71
3	**5557.2**	NF	**5640**	NF	**5722.8**	NF
4	**7409.6**	NF	**7520**	NF	**7630.4**	NF
5	**9262**	NF	**9400**	NF	**9538**	NF
6	**11114.4**	NF	**11280**	NF	**11445.6**	NF
7	**12966.8**	NF	**13160**	NF	**13353.2**	NF
8	**14819.2**	NF	**15040**	NF	**15260.8**	NF
9	**16671.6**	NF	**16920**	NF	**17168.4**	NF
10	**18524**	NF	**18800**	NF	**19076**	NF
NF= Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

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

6.2.9.6 Test Results Transmitter Spurious Emission CDMA BC1:

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**	-57.75	**3760**	-53.11	**3817.5**	-53.05
3	**5553.75**	NF	**5640**	NF	**5726.25**	NF
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	**12958.8**	NF	**13160**	NF	**13361.3**	NF
8	**14810**	NF	**15040**	NF	**15270**	NF
9	**16661.3**	NF	**16920**	NF	**17178.8**	NF
10	**18512.5**	NF	**18800**	NF	**19087.5**	NF
NF= Noise Floor Measurement Uncertainty: ±3dB						

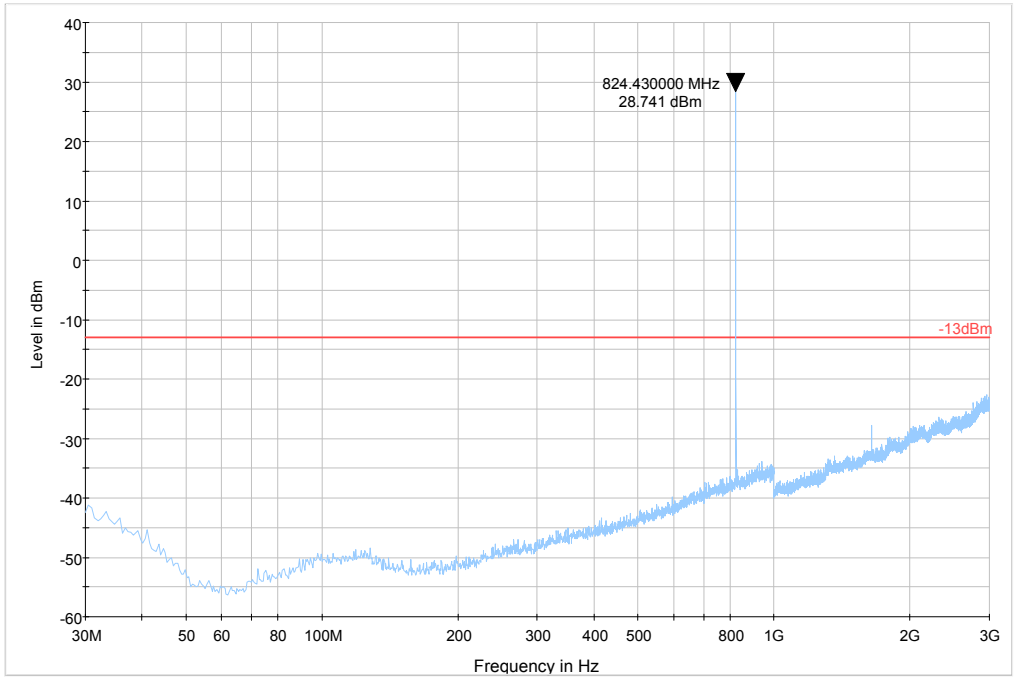
Legend for the plots:

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

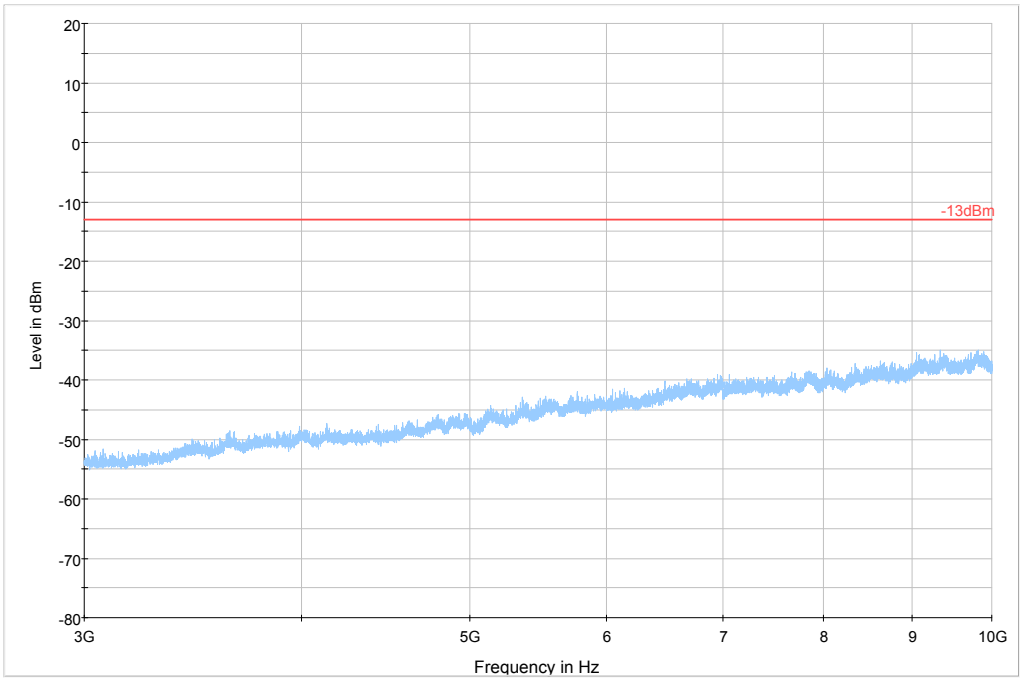
6.2.9.7 Plots:

Radiated Spurious Emissions (GSM-850) Tx: Low Channel

Test results 30M-3GHz

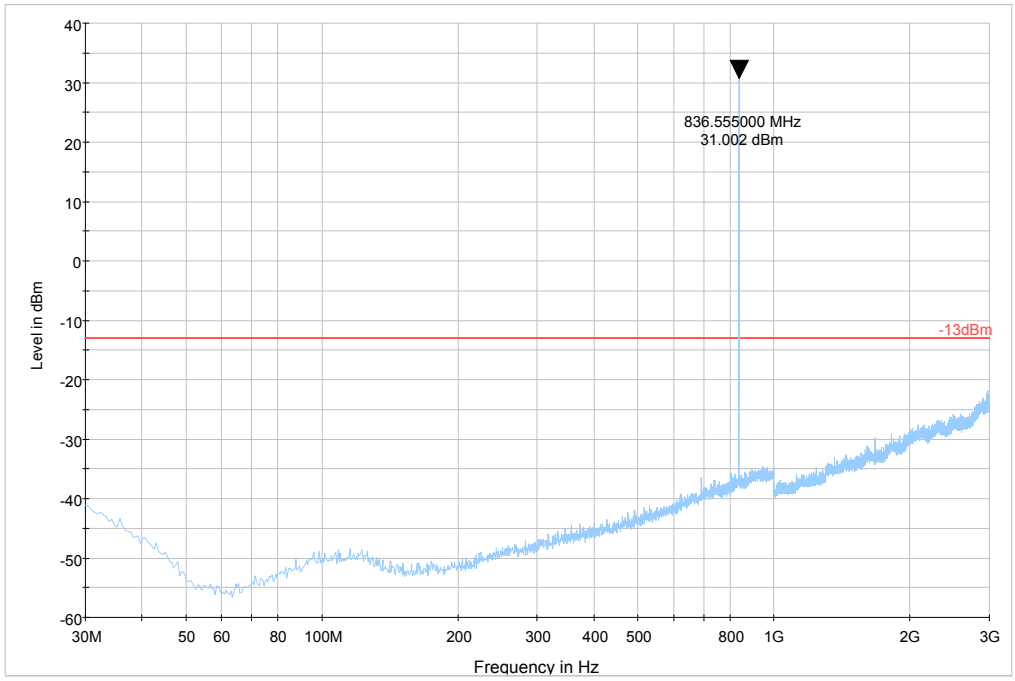


Test results 3GHz-9GHz

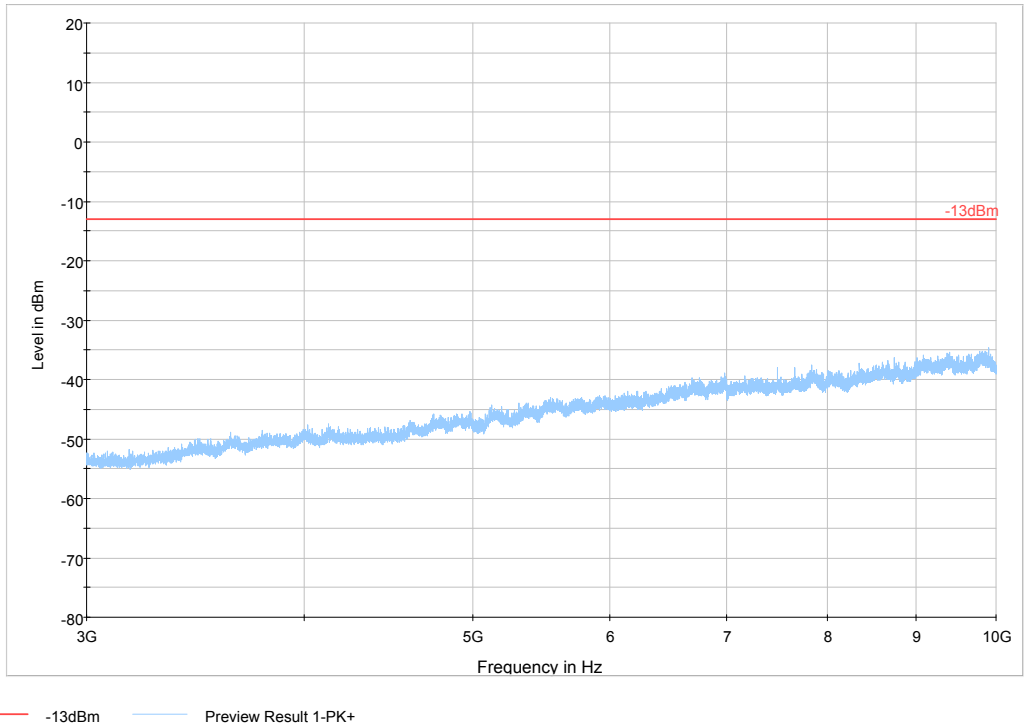


Radiated Spurious Emissions (GSM-850) Tx: Mid Channel

Test results 30M-3GHz

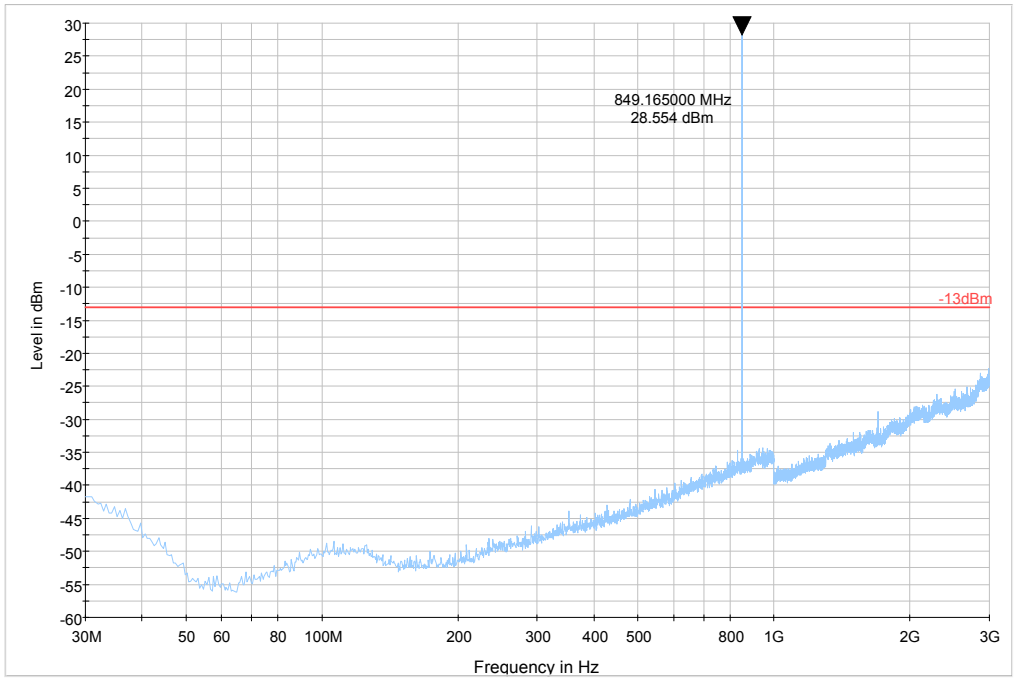


Test results 3GHz-9GHz

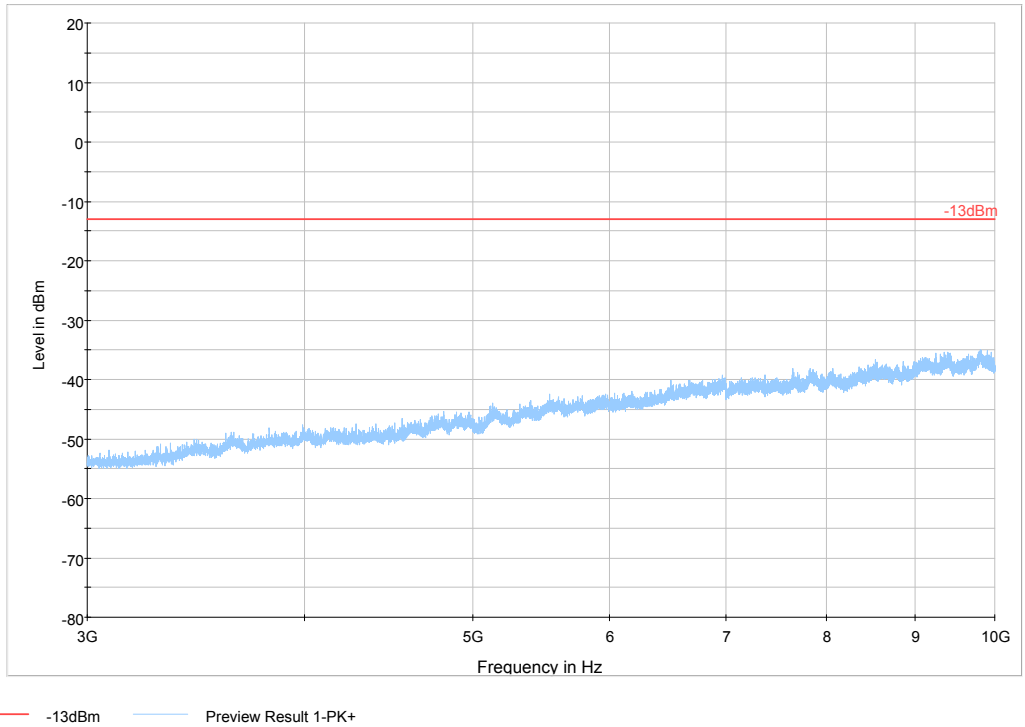


Radiated Spurious Emissions (GSM-850) Tx: High Channel

Test results 30M-3GHz

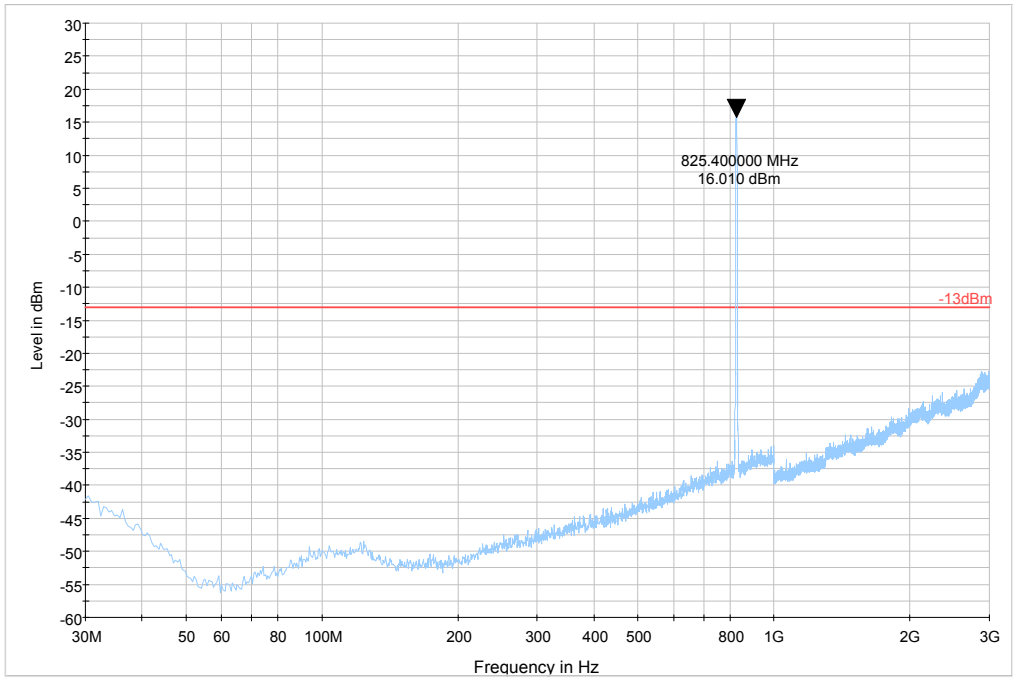


Test results 3GHz-9GHz

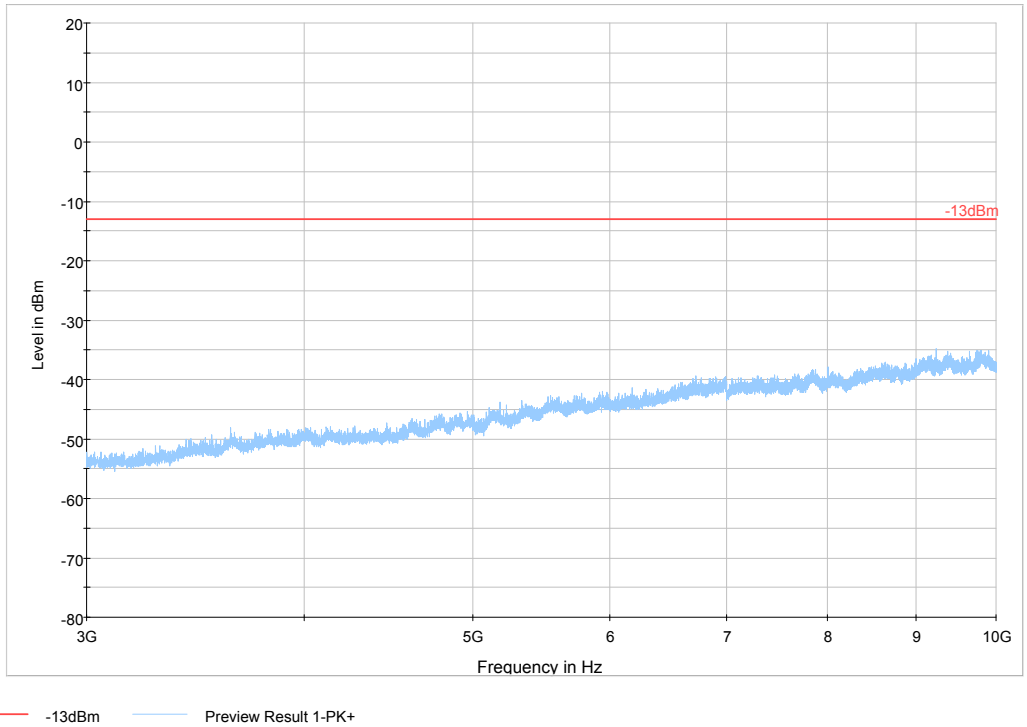


Radiated Spurious Emissions (UMTS Band 5) Tx: Low Channel

Test results 30M-3GHz

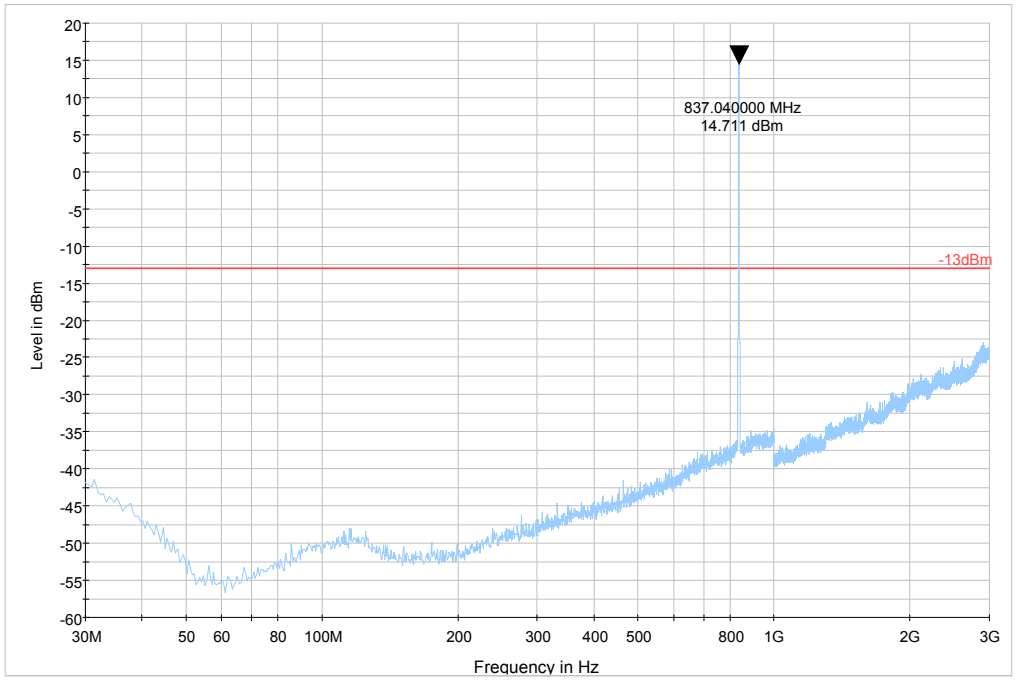


Test results 3GHz-9GHz

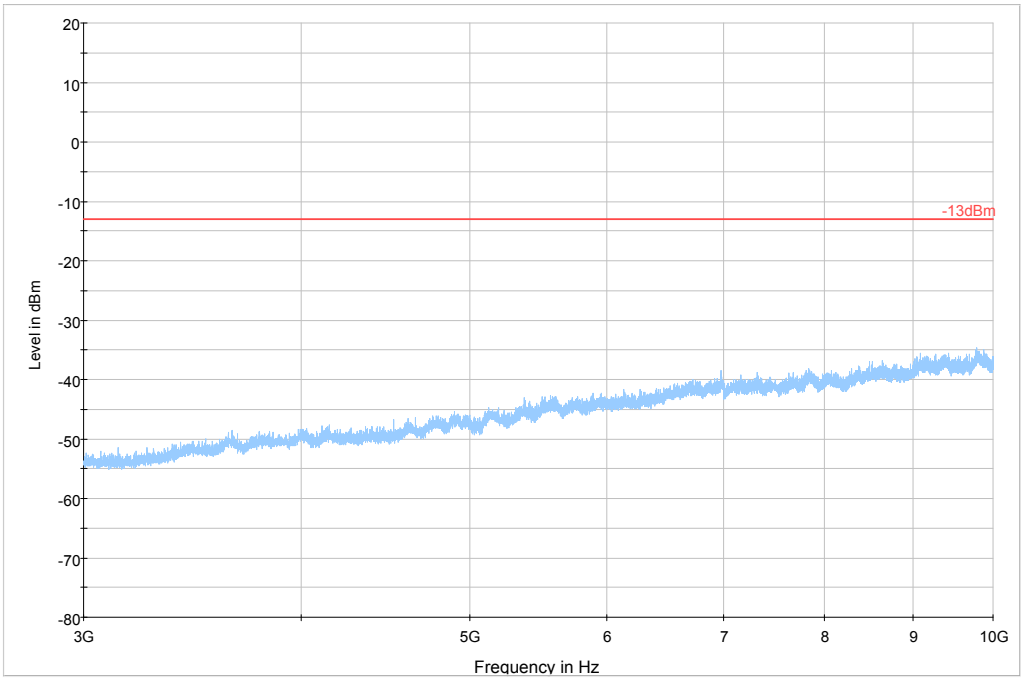


Radiated Spurious Emissions (UMTS Band 5) Tx: Mid Channel

Test results 30M-3GHz

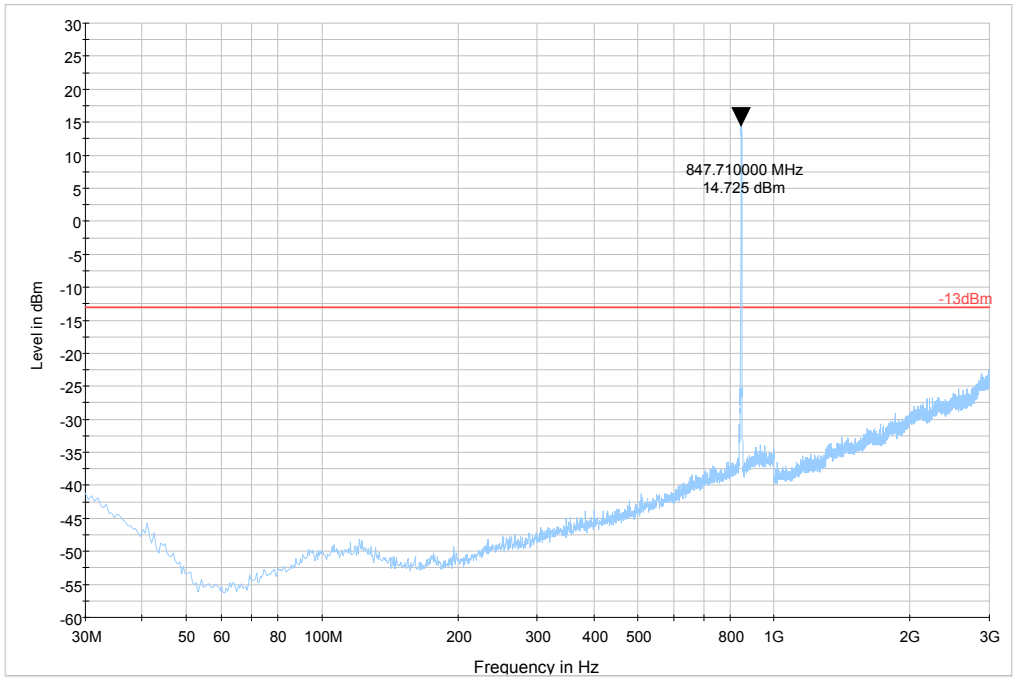


Test results 3GHz-9GHz

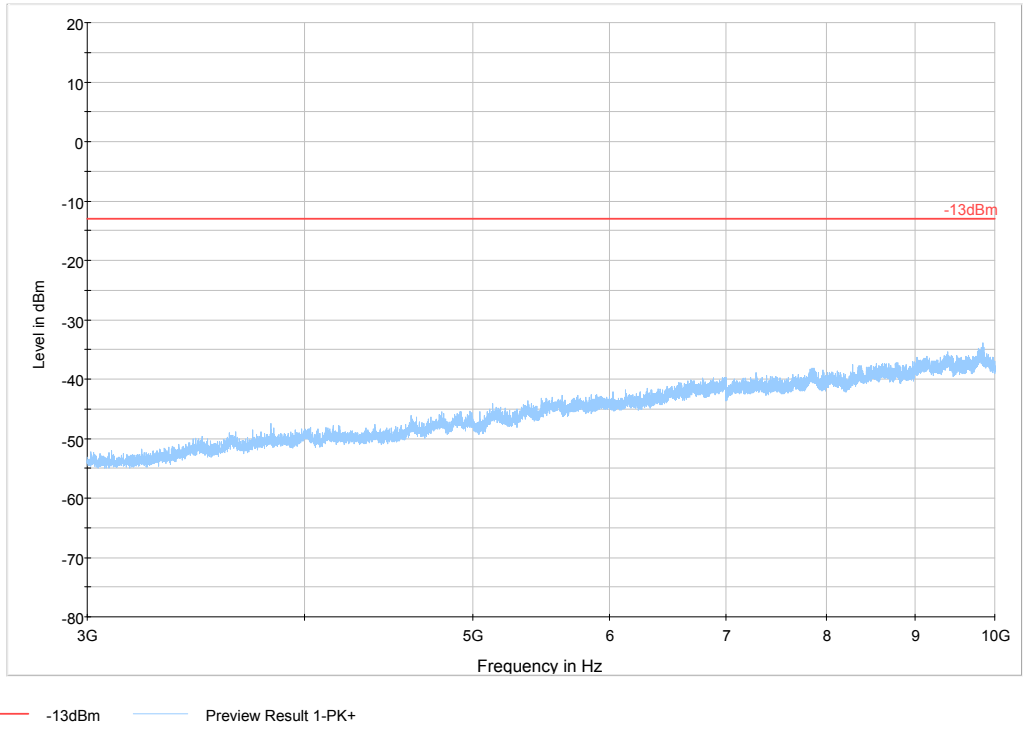


Radiated Spurious Emissions (UMTS Band 5) Tx: High Channel

Test results 30M-3GHz

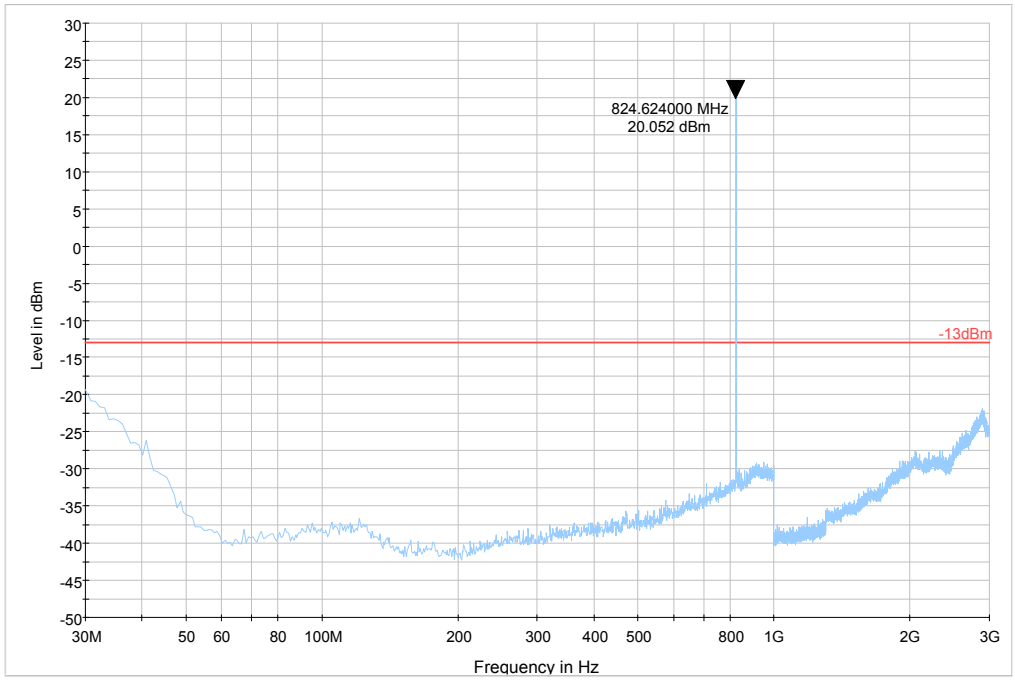


Test results 3GHz-9GHz

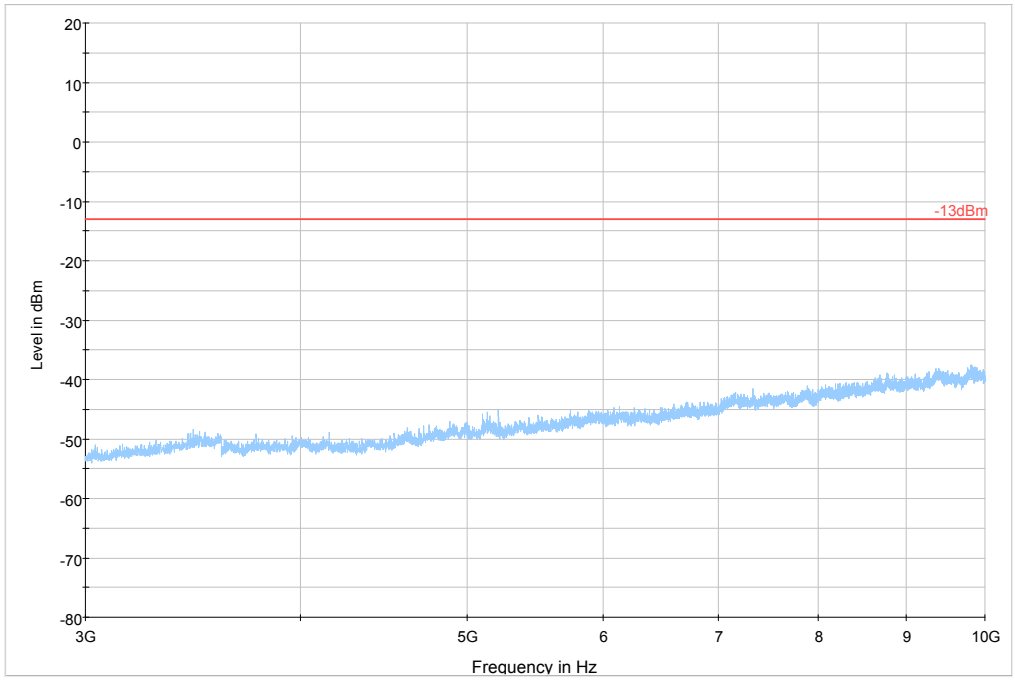


Radiated Spurious Emissions (CDMA BC0) Tx: Low Channel

Test results 30M-3GHz

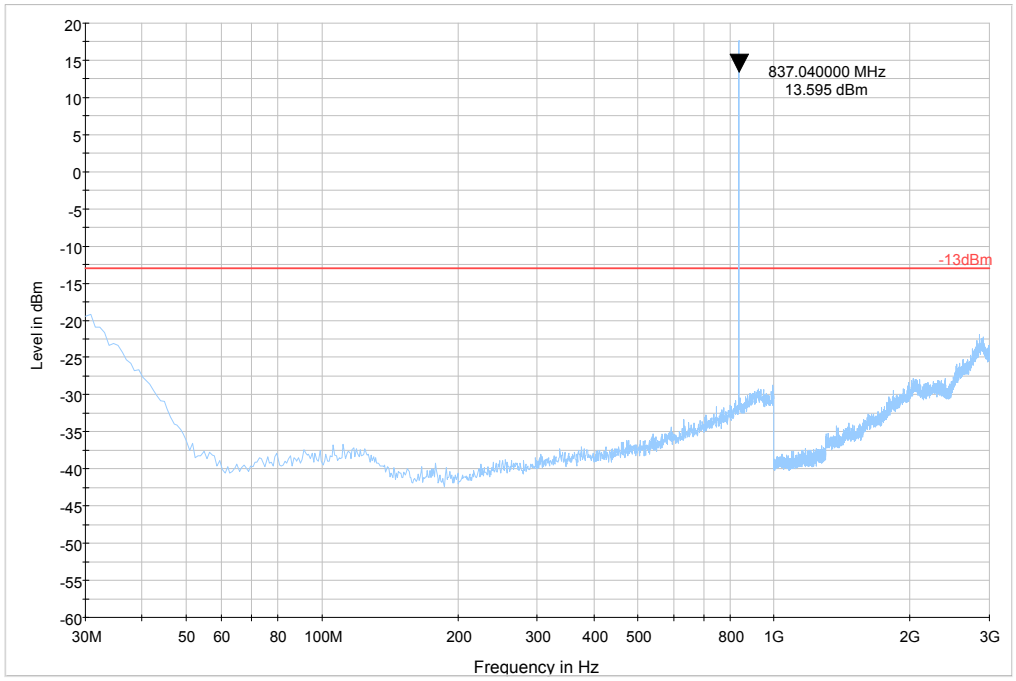


Test results 3GHz-9GHz

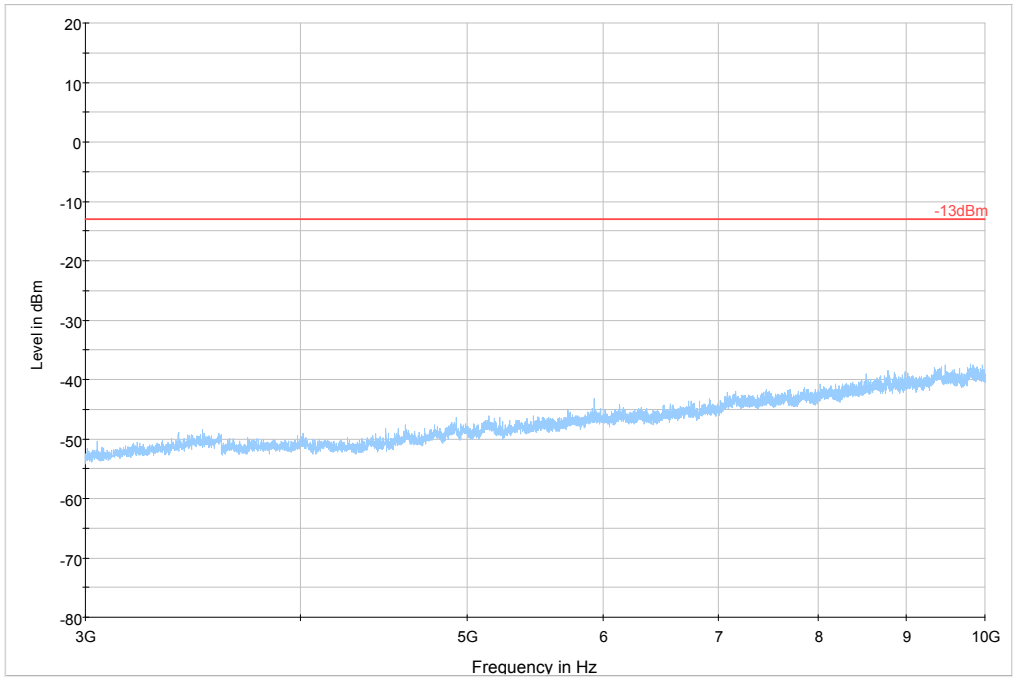


Radiated Spurious Emissions (CDMA BC0) Tx: Mid Channel

Test results 30M-3GHz

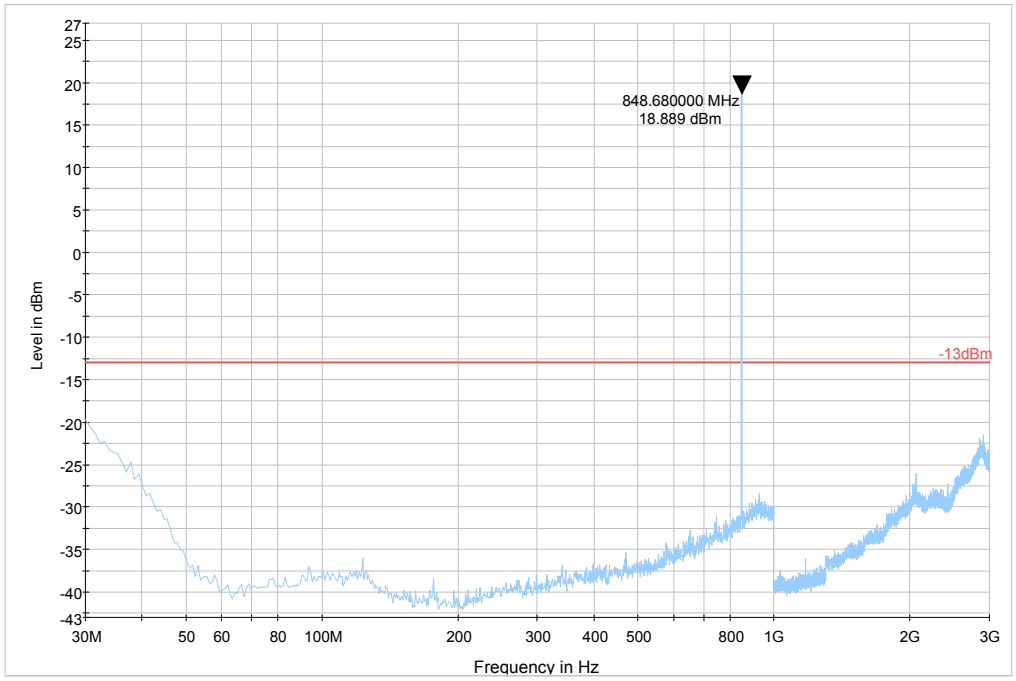


Test results 3GHz-9GHz

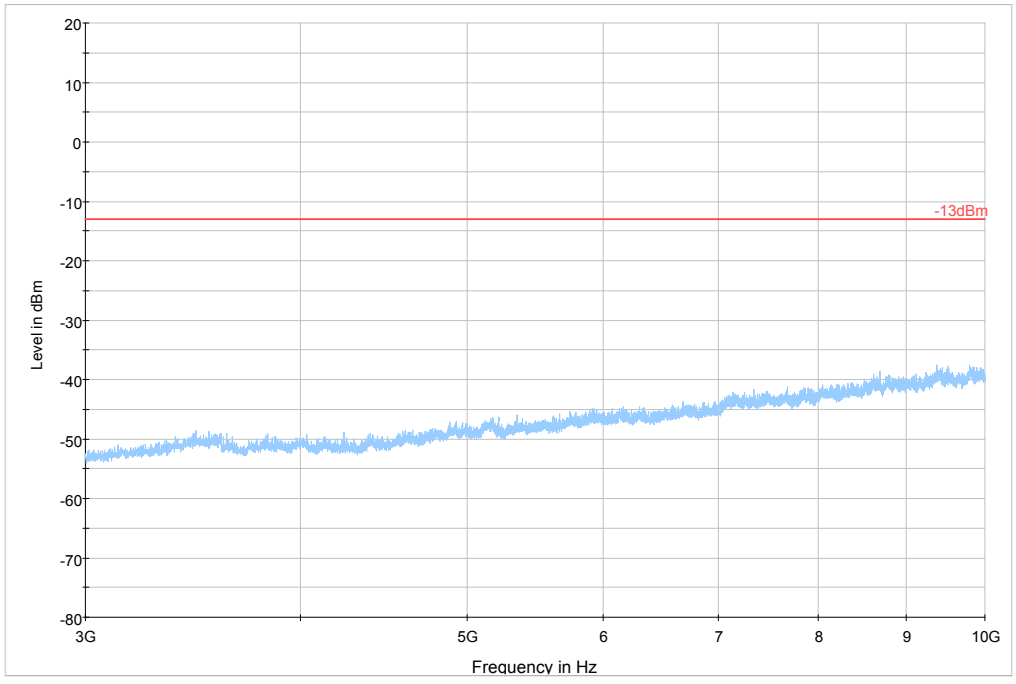


Radiated Spurious Emissions (CDMA BC0) Tx: High Channel

Test results 30M-3GHz

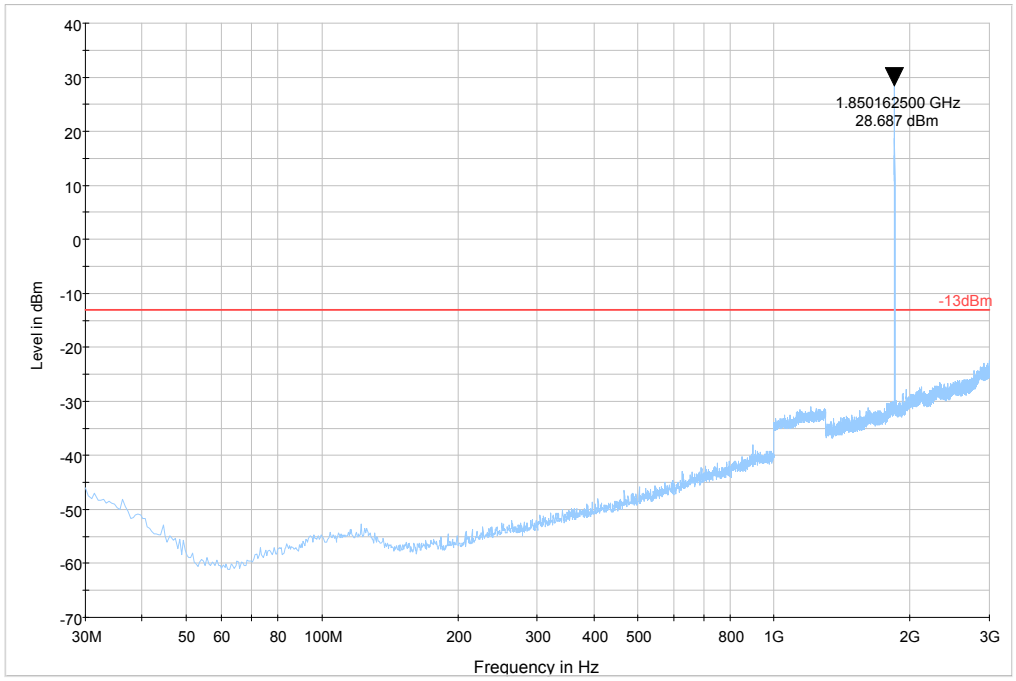


Test results 3GHz-9GHz

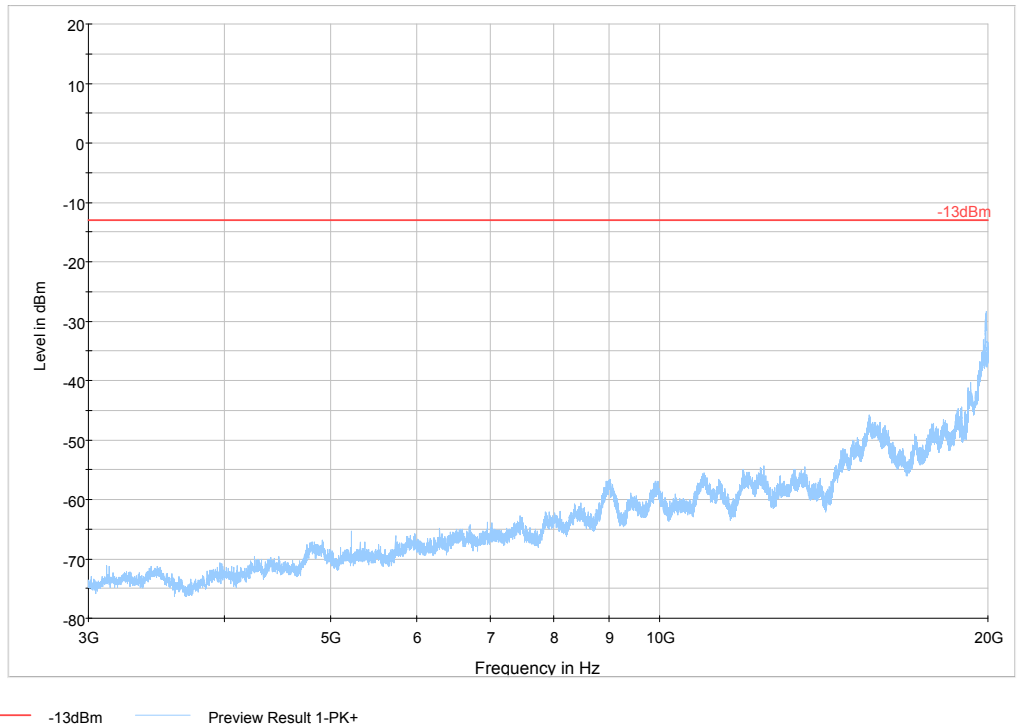


Radiated Spurious Emissions (GSM-1900) Tx: Low Channel

Test results 30M-3GHz

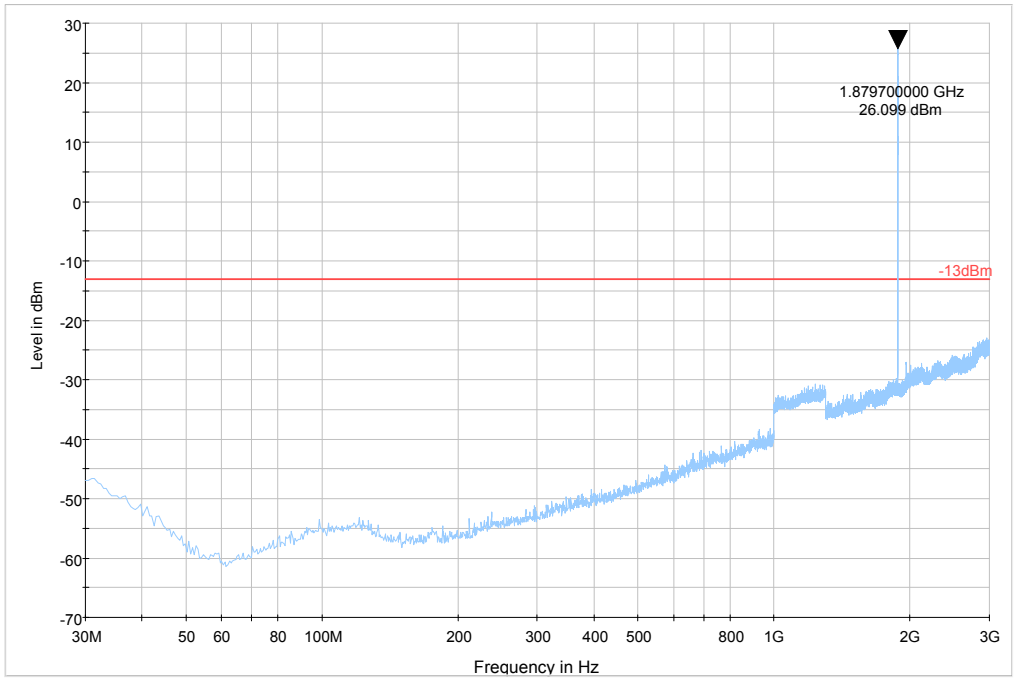


Test results 3GHz-20GHz

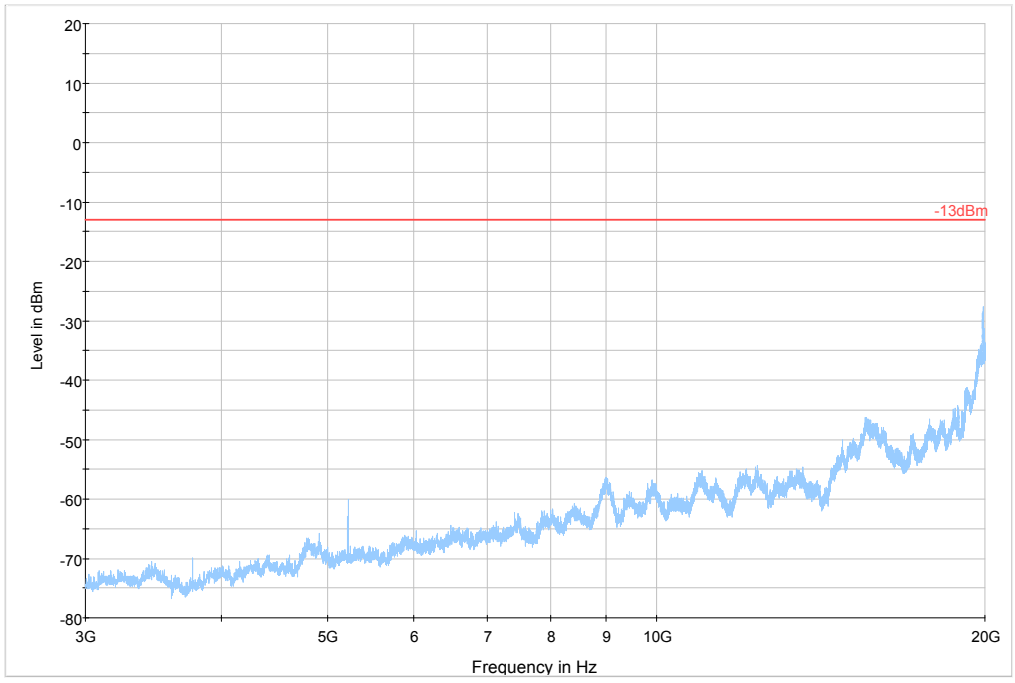


Radiated Spurious Emissions (GSM-1900) Tx: Mid Channel

Test results 30M-3GHz

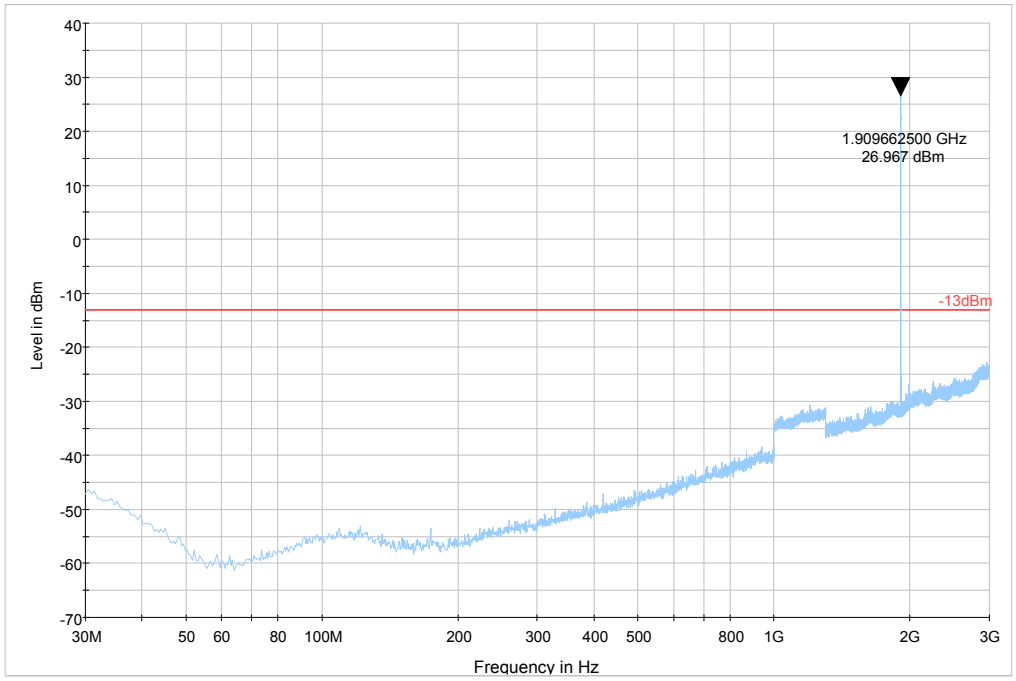


Test results 3GHz-20GHz

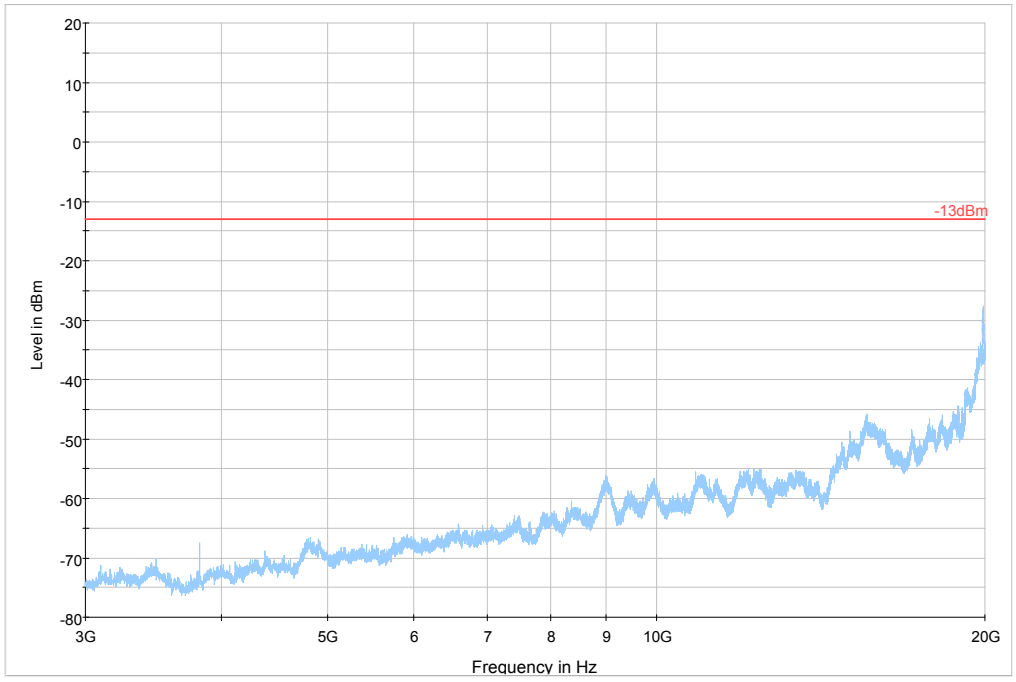


Radiated Spurious Emissions (GSM-1900) Tx: High Channel

Test results 30M-3GHz

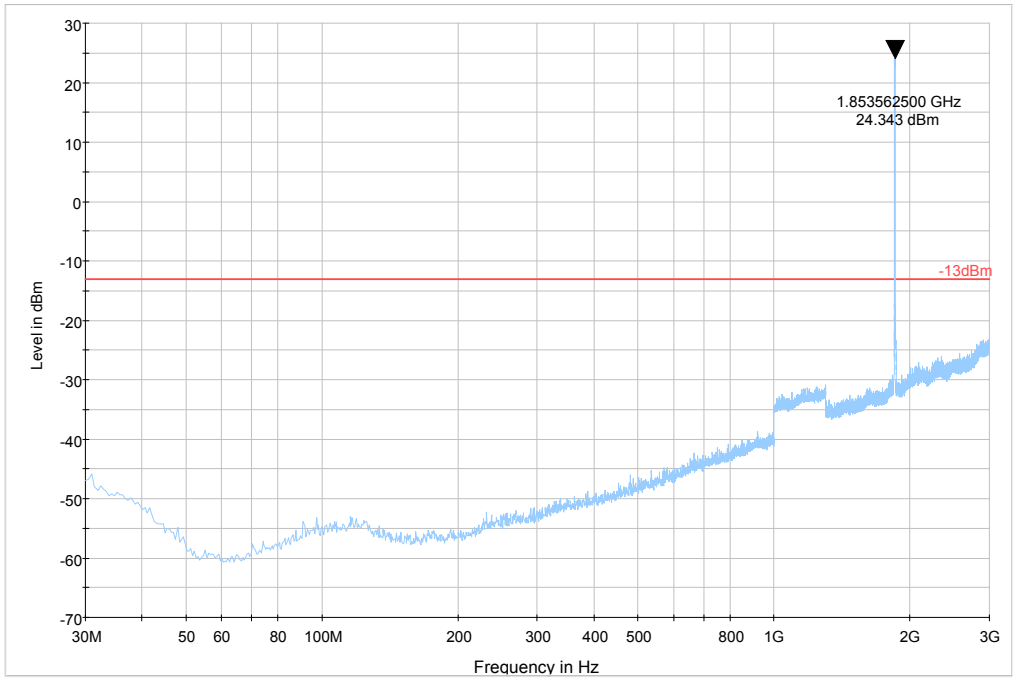


Test results 3GHz-20GHz

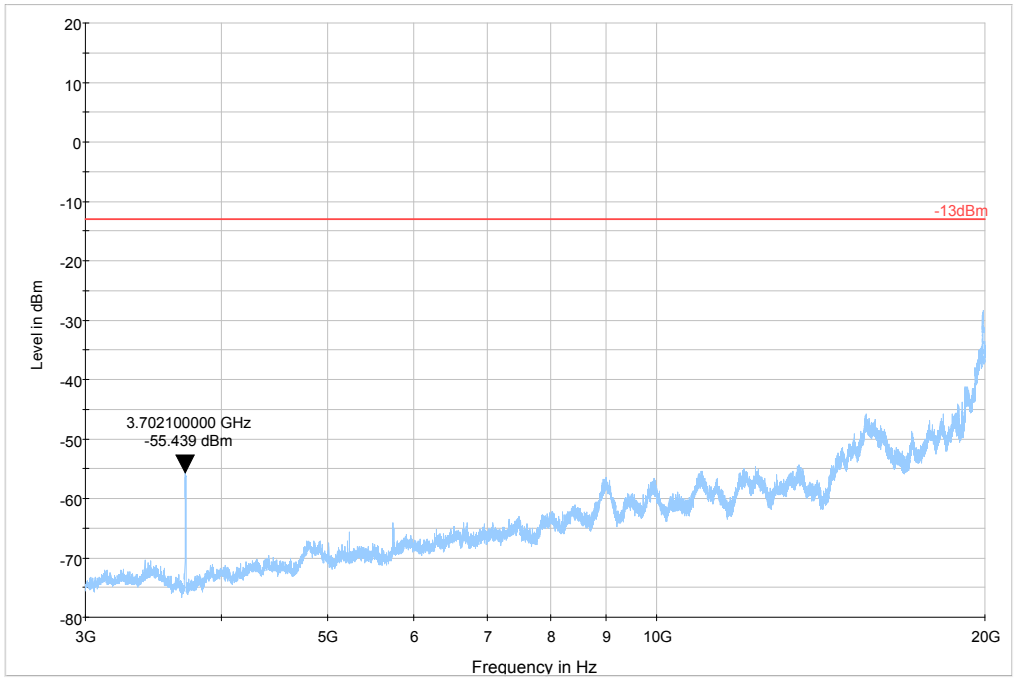


Radiated Spurious Emissions (UMTS Band 2) Tx: Low Channel

Test results 30M-3GHz

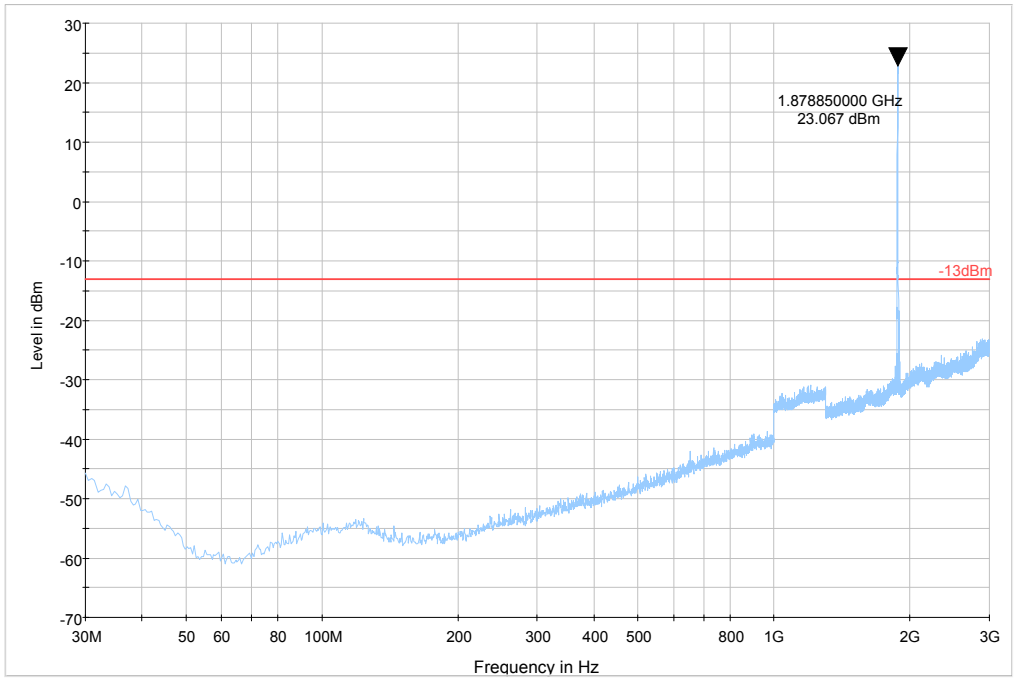


Test results 3GHz-20GHz

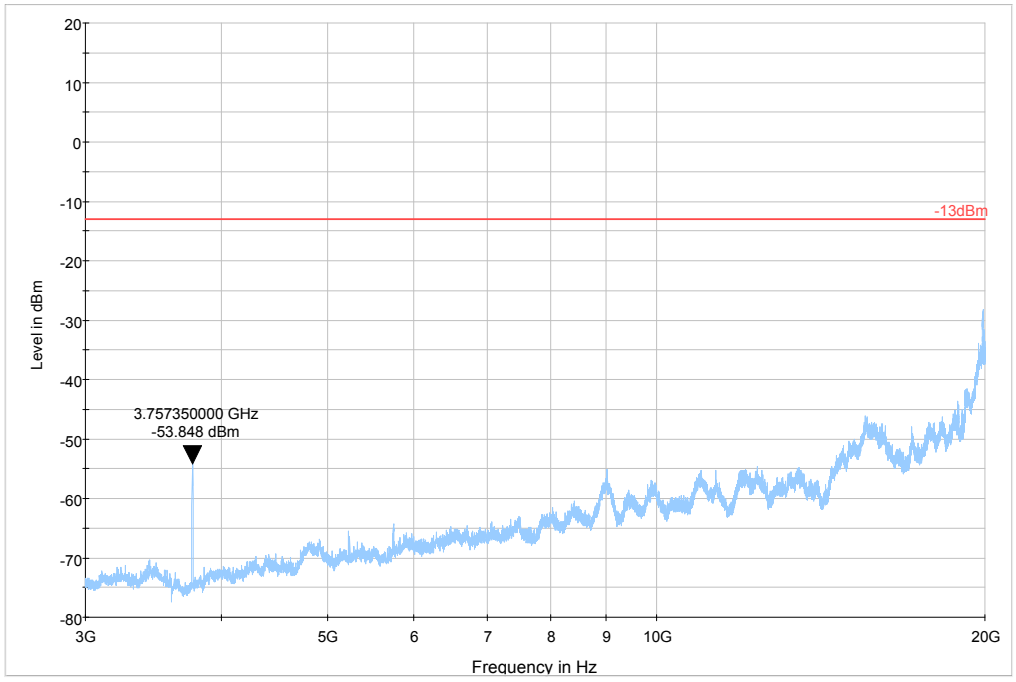


Radiated Spurious Emissions (UMTS Band 2) Tx: Mid Channel

Test results 30M-3GHz

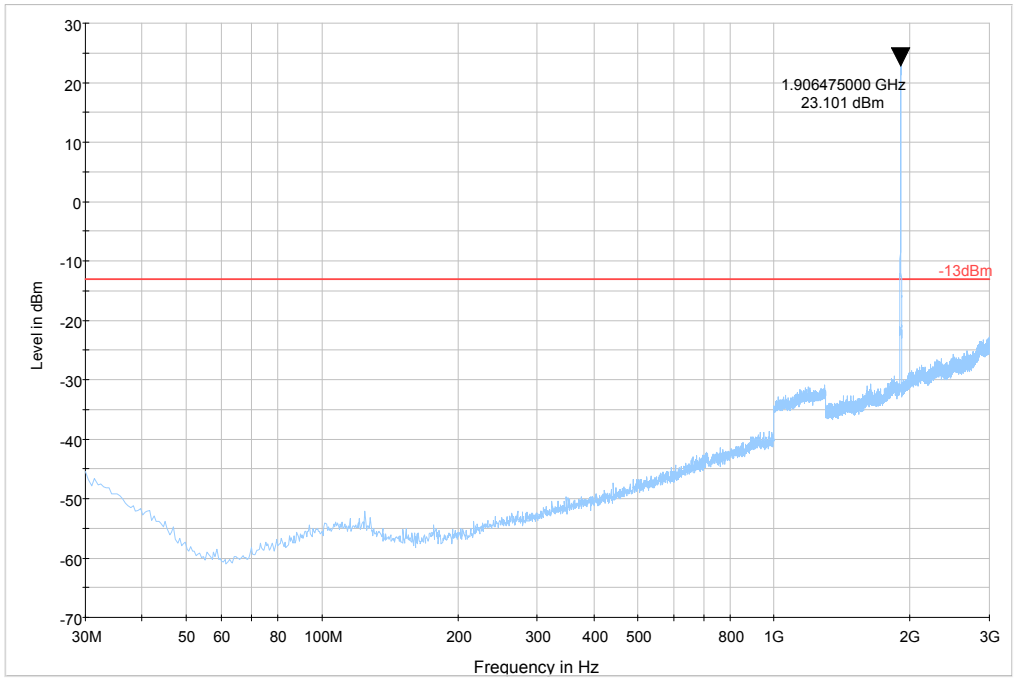


Test results 3GHz-20GHz



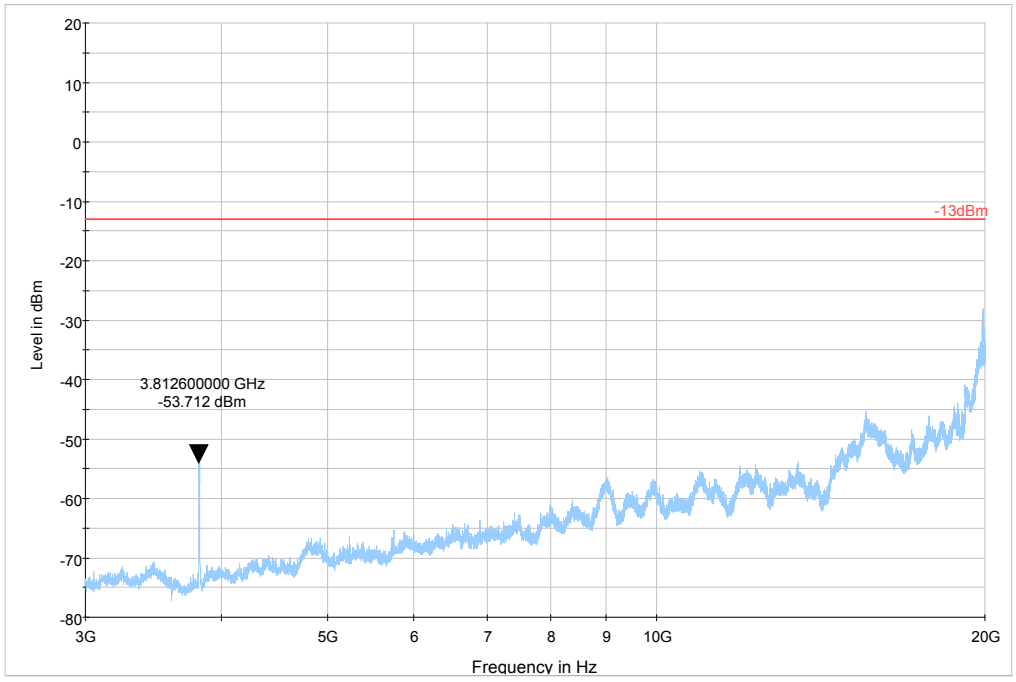
Radiated Spurious Emissions (UMTS Band 2) Tx: High Channel

Test results 30M-3GHz



-13dBm Preview Result 1-PK+

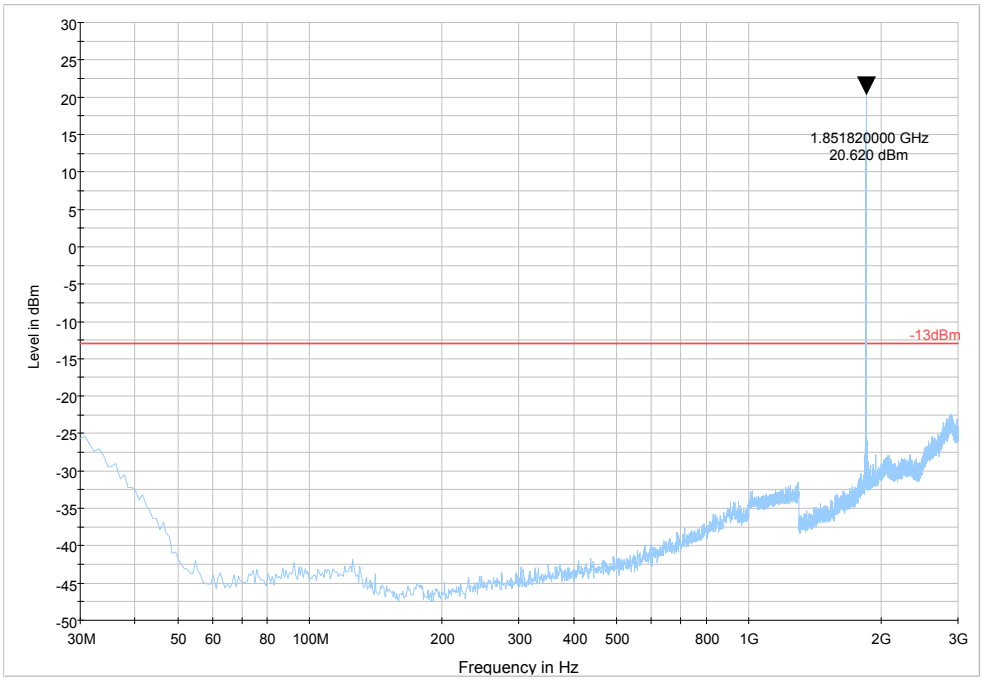
Test results 3GHz-20GHz



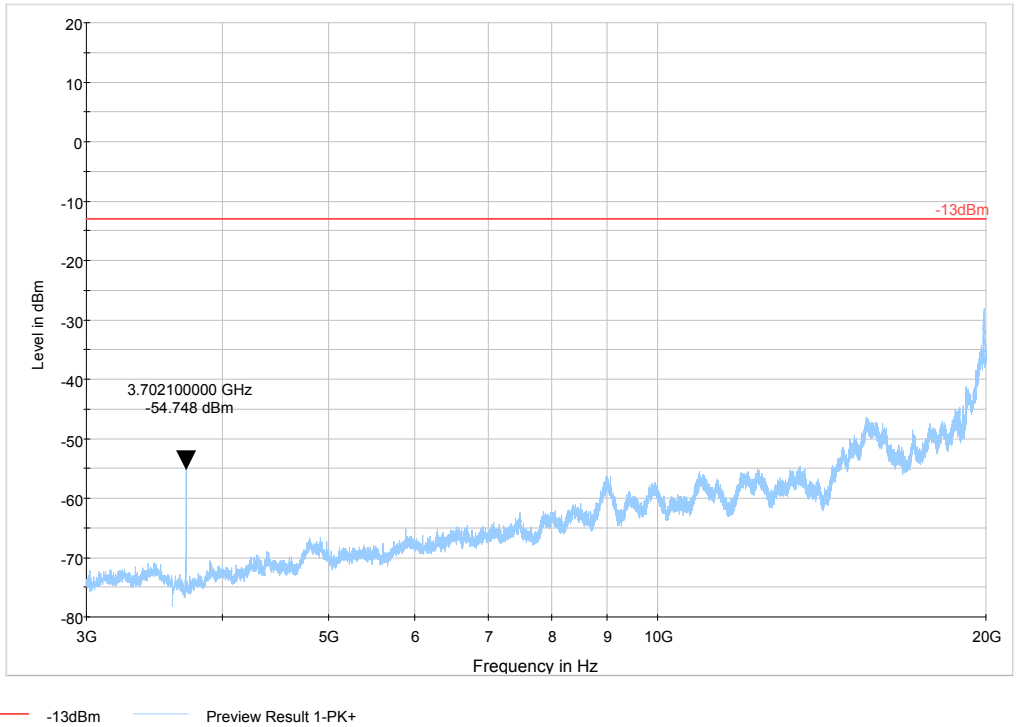
-13dBm Preview Result 1-PK+

Radiated Spurious Emissions (CDMA BC1) Tx: Low Channel

Test results 30M-3GHz

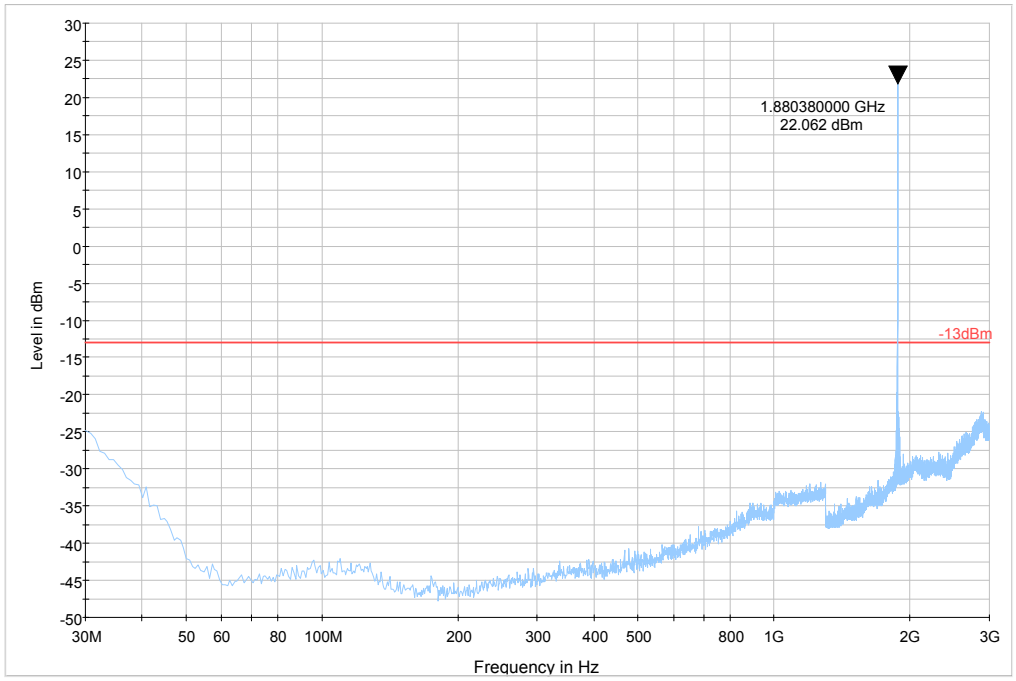


Test results 3GHz-20GHz

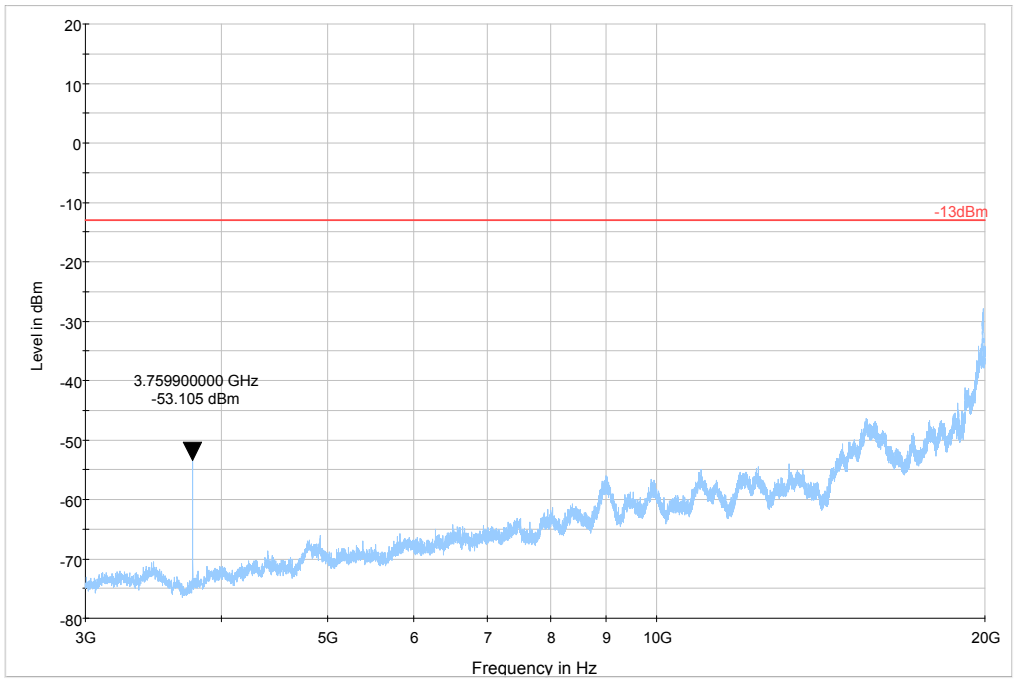


Radiated Spurious Emissions (CDMA BC1) Tx: Mid Channel

Test results 30M-3GHz

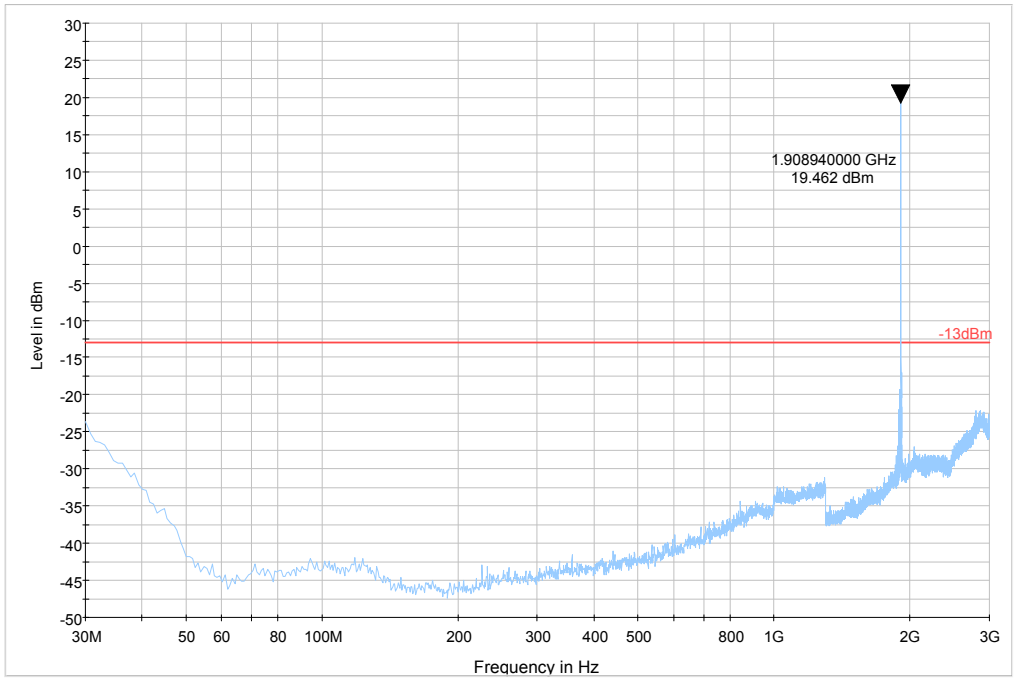


Test results 3GHz-20GHz

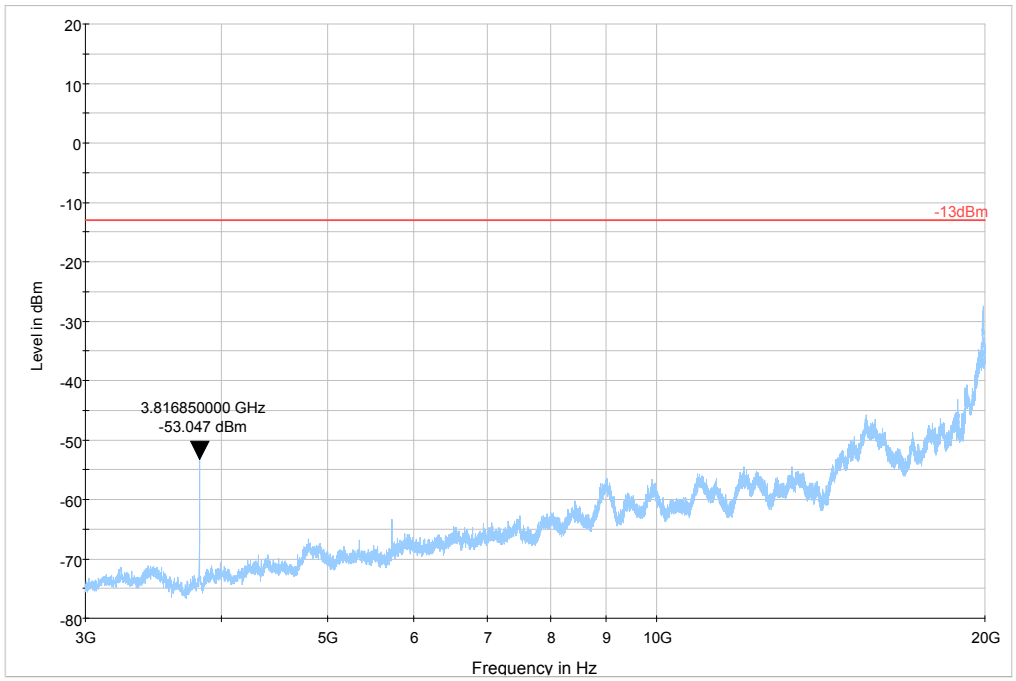


Radiated Spurious Emissions (CDMA BC1) Tx: High Channel

Test results 30M-3GHz



Test results 3GHz-20GHz



7 Test Equipment and Ancillaries used for tests

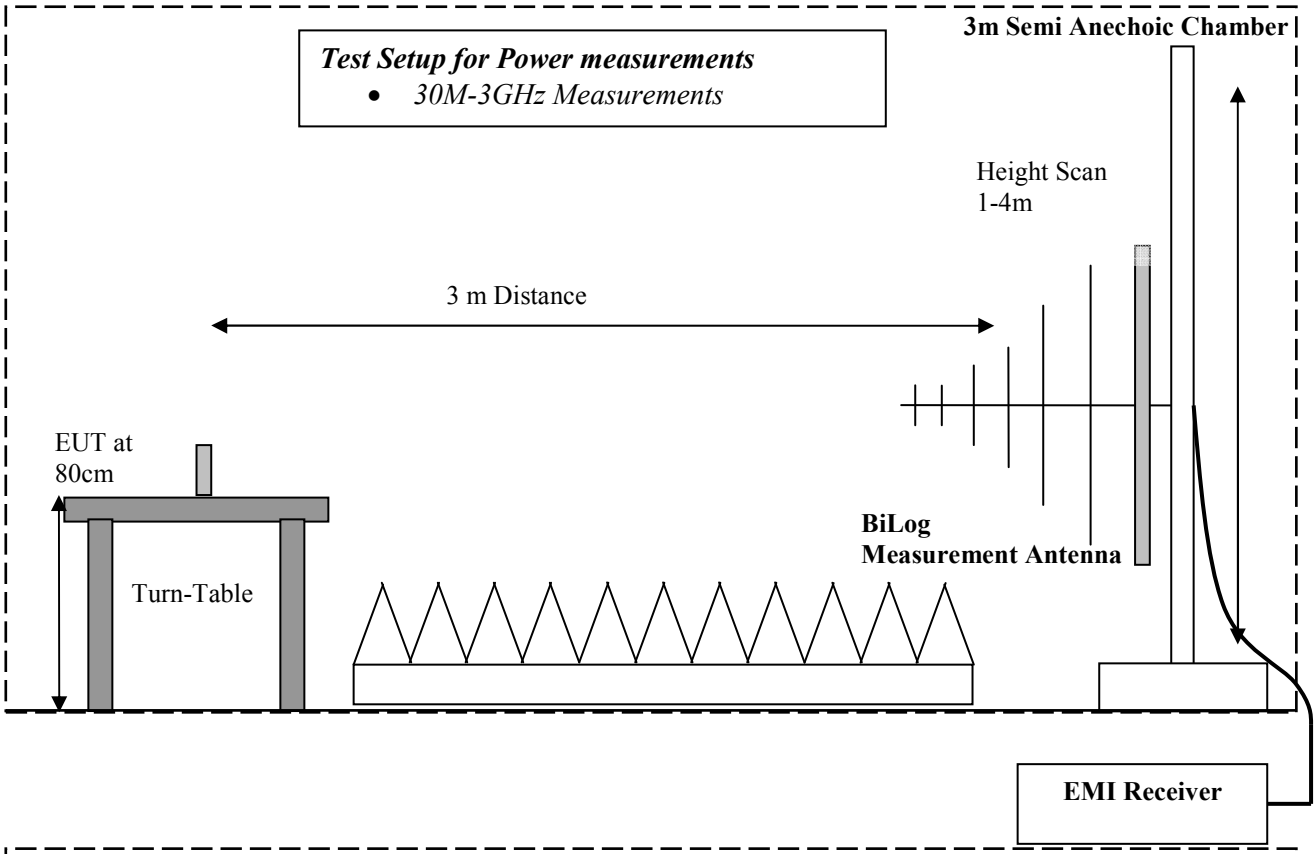
Test Equipment of the Test Lab in San Diego, CA

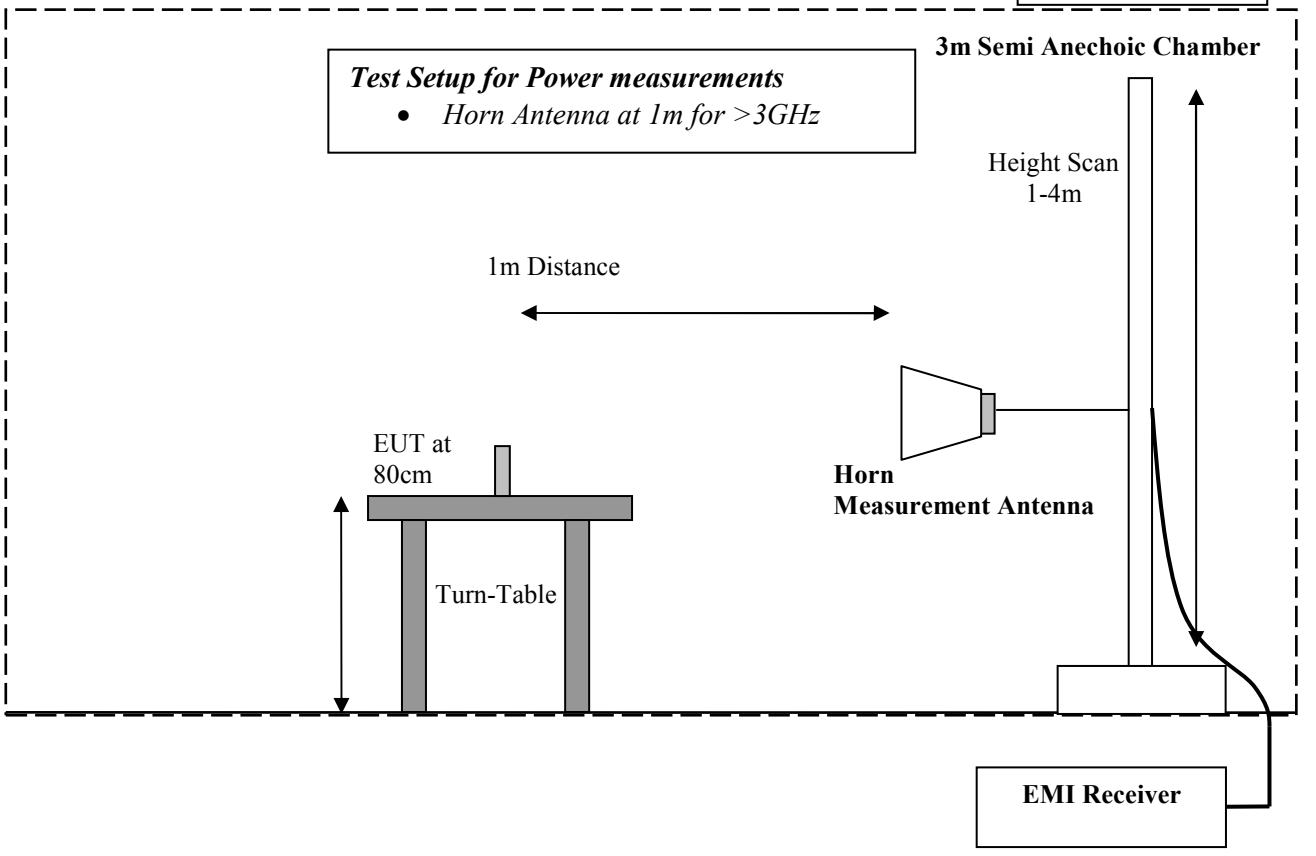
Equipment Name	Manufacturer	Type/Model	Serial No.	Cal Date	Cal Interval	Next cal date
Signal Analyzer	Rohde and Schwarz	FSV 13	101014	2/2012	2 years	2/2014
Spectrum Analyzer	Rohde und Schwarz	FSU 26	200302	6/2013	2 years	6/2015
Receiver	Rohde und Schwarz	ESR3	101663	2/2013	2 years	2/2015
Radiocommunication Tester	Rohde and Schwarz	CMU 200	121672	2/2012	2 years	2/2014
Horn Antenna	ETS Lindgren	3115	35111	4/2012	2 year	4/2014
Log Periodic Antenna	Rohde and Schwarz	HL 050	100515	4/2013	2 year	4/2015
Ultralog Antenna	Rohde and Schwarz	HL 562	100495	2/2012	2 year	2/2014
Open Switch Control Unit	Rohde and Schwarz	OPS 130	10085	n/a		
Extention Unit Open Switch Control Unit	Rohde and Schwarz	OSP 150	10086	n/a		
Signal Generator	Rohde and Schwarz	SMF 100A	101833	2/2012	2 years	2/2014
Turn Table TT	Maturo	1.5 SI	TT 1.5SI/204/6070910	n/a		
Compact antenna Mast	Maturo	CAM 4.0-P	CAM4.0-P/067/6000910	n/a		
Multiple Control Unit	Maturo	MCU	2140910	n/a		
Pre-Amplifier	Rohde and Schwarz	TS-PR 18	100072	Part of the system calibration		
High Pass Filter	Mini-Circuits	SHP-1200+	RUU11201224	Part of the system calibration		
High Pass Filter	Wainwright Instr.	WHKX 3.0/18	109	Part of the system calibration		
Multimeter	Fluke	115 True RMS	21752138	3/2013	2 years	3/2015
DC Power Supply	GW Instek	GPS-1850D	EM845907	n/a		
Temperatur Chamber	Test Equity	107	0700533	n/a		
Temperatur Chamber	Test Equity	115	150300	n/a		
Thermometer	Fluke	5411B	17560031	12/2012	2 years	12/2014
Antenna	TECT Electronics	FPA3-0.8-6.0R/1329	408213-0001	n/a		

Test Equipment of the Test Lab in Milpitas, CA

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	109879	June 2013	2 Years
EMI Receiver/Analyzer	ESU 40	Rohde & Schwarz	100251	Aug 2012	2 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	June 2013	2 Years
Horn Antenna (1-18GHz)	3115	ETS	00035114	Mar 2012	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	
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
2013-10-09	EMC_TRIM2-017-13001_WWAN	First Version	Josie Sabado