



FCC/IC Test Report

FOR:

NBS Payments Solutions

Model Number: NOIRE510H

Product Description: HSDPA Point of Sale Terminal

FCC ID: COL-NOIRE510H

IC ID: 2279B-NOIRE510H

47 CFR Part 2, 22, 24

RSS-132 Issue 2

RSS-133 Issue 5

TEST REPORT #: EMC_NBSPS-006-12001_WWAN_Rev1

DATE: 2012-09-25



**FCC listed:
A2LA Accredited**

**IC recognized #
3462B-1**

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1 Assessment

The following equipment (and as identified in Ch.3 of this test report) was evaluated against the applicable criteria specified in FCC CFR47 Parts 2, 22 and 24 and Industry Canada Standards RSS 132 and RSS 133 and no deviations were ascertained during the course of the tests performed.

Company	Description	Model #
NBS Payment Solutions	HSDPA Point of Sale Terminal	NOIRE510H

Responsible for Testing Laboratory:

2012-09-25	Compliance	Sajay Jose (EMC Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2012-09-25	Compliance	Zack Gray (Test Engineer)	
Date	Section	Name	Signature

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 Issuing the 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 Manager:	Sajay Jose
Test Engineer:	Zack Gray

2.2 Identification of the Client

Client:	NBS Payment Solutions
Street Address:	703 Evans Avenue, Suite 400
City/Zip Code	Toronto, ON M9C 5E9
Country	Canada
Contact Person:	Dragan Jovanovic
Phone No.	(416) 621-7410 x359
Fax:	(416) 621-2450
e-mail:	djovanovic@nbsps.com

2.3 Identification of the Manufacturer

Same as Client.

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:

Jun 28, 2012-Jul 16, 2012.

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Model No:	NOIRE510H
Product Description:	HSDPA Point of Sale Terminal
Hardware Version :	1.1.0
Software Version :	08.01.148
FCC-ID:	COL-NOIRE510H
IC-ID :	2279B -NOIRE510H
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
Type(s) of Modulation:	GSM: GMSK, 8-PSK UMTS: QPSK
Number of channels:	GSM850: 125 and PCS 1900: 300 FDD II: 278 and FDD V: 103
Antenna Info:	Dipole antenna Manufacturer stated antenna Gain: -0.67 dBi for 850 MHz band of operation 1.64 dBi for 1900 MHz band of operation
Rated Operating Voltage (V DC):	3.4V (Low) / 3.7V (Nominal) / 4.2V (Max)
Rated Operating Temperature Range:	-20°C ~ +55°C

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Notes
1	PSN51H000255	1.1.0	08.01.148	Radiated Sample
2	PSN51H000256	1.1.0	08.01.148	Conducted Sample

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	AC/DC Adapter	FSP Group Inc.	FSP030-DGAA2	H2131000520
1	AC/DC Adapter	FSP Group Inc.	FSP030-DGAA2	H2131000020
1	AC/DC Adapter	FSP Group Inc.	FSP030-DGAA2	H2131000545

4 Subject of Investigation

The objective of the measurements applied by CETECOM Inc. was to establish compliance of the EUT as described under Ch. 3 of this Test Report, with the applicable criteria specified in

- 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 with FCC ID: **COL-NOIRE510H** and IC ID: **2279B-NOIRE510H**.

This product integrates the precertified WWAN module : Telit UC864.

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 identical (within production tolerances and measurement uncertainties).

The module test data can be obtained under the FCC Filing ID: RI7UC864G, Test Report #1002FR15-02 issued by A Test Lab Techno Corp.on 2010-02-24.

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 MHz 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	GSM 850	■	□	□	□	Complies
			UMTS Band V	■	□	□	□	Complies
§2.1055 §22.355 RSS132 4.3	Frequency Stability	Nominal	GSM 850	□	□	□	■	Note 1
			UMTS Band V	□	□	□	■	Note 1
§2.1049 §22.917(b) RSS132 4.2	Occupied Bandwidth	Nominal	GSM 850	□	□	□	■	Note 1
			UMTS Band V	□	□	□	■	Note 1
§2.1051 §22.917 RSS132 4.5	Band Edge Compliance	Nominal	GSM 850	□	□	□	■	Note 1
			UMTS Band V	□	□	□	■	Note 1
§2.1051 §22.917 RSS132 4.5	Conducted Spurious Emissions	Nominal	GSM 850	□	□	□	■	Note 1
			UMTS Band V	□	□	□	■	Note 1
§2.1053 §22.917 RSS132 4.5	Radiated Spurious Emissions	Nominal	GSM 850	■	□	□	□	Complies
			UMTS Band V	■	□	□	□	Complies

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

1. Conducted measurements reused from module certification data.

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

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

1. Conducted measurements reused from module certification data.

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.

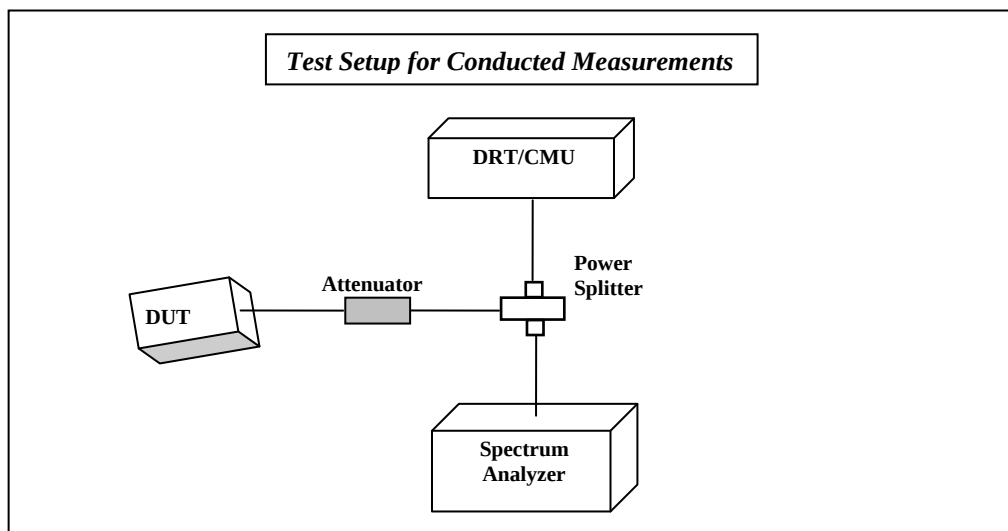
SRSP-510: Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.

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 Conducted Output Power Verification:

6.1.4.1 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.

Measurement Uncertainty= +/- 0.5 dB

6.1.4.2 Test Conditions:

Tnom: 25°C; Vnom: 3.7 V

6.1.4.3 Measurement Results:

GSM Cellular 850 (GMSK Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
824.2	32.0	32.1
836.6	32.3	32.1
848.8	32.4	31.9

GSM Cellular 850 (8PSK Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
824.2	26.8	26.7
836.6	26.7	26.8
848.8	26.9	26.6

FDD V 850 (UMTS Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
826.2	23.22	23.3
836.6	23.13	23.16
846.6	23.11	22.87

GSM PCS 1900 (GMSK Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1850.2	28.9	29.2
1880	29.2	29.5
1909.8	29.3	29.8

GSM PCS 1900 (8PSK Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1850.2	25.6	26.0
1880	25.7	26.2
1909.8	25.9	26.5

FDD II 1900 (UMTS Mode)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1852.4	22.9	22.39
1880	22.65	22.97
1907.6	22.83	22.9

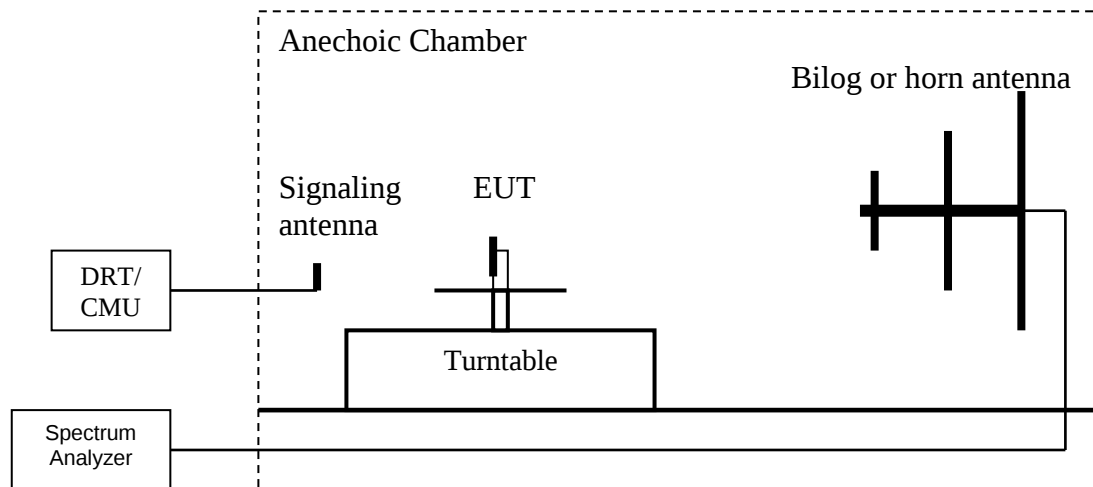
6.1.4.4 Verification Result

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.

6.1.5 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.
(**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.)
Measurement Uncertainty (Radiated): ±3.0 dB

6.1.5.1 RF Power Output 850MHz band

6.1.5.1.1 Test Conditions:

Tnom: 25°C; Vnom: 3.7 V

6.1.5.1.2 Limits:

FCC: Nominal Peak Output Power < 38.45 dBm (7W)

IC: Nominal Peak Output Power < 40.60 dBm (11.5W)

6.1.5.1.3 Test Results

GSM 850: GMSK Mode	
Frequency (MHz)	Radiated Power
	ERP (dBm)
824.2	30.03
836.6	30.48
848.8	30.62

EGPRS 850: 8PSK Mode	
Frequency (MHz)	Radiated Power
	ERP (dBm)
824.2	27.37
836.6	27.74
848.8	27.44

FDD V: UMTS Mode	
Frequency (MHz)	Radiated Power
	ERP (dBm)
826.4	22.14
836.6	22.97
846.6	23.29

6.1.5.1.4 Test Verdict

Pass.

6.1.5.2 RF Power Output 1900MHz band

6.1.5.2.1 Test Conditions:

Tnom: 25°C; Vnom: 3.7 V

6.1.5.2.2 Limits:

Nominal Peak Output Power < 33 dBm (2W)

6.1.5.2.3 Test Results

GSM 1900: GMSK Mode	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1850.2	25.84
1880.0	27.05
1909.8	26.86

EGPRS 1900: 8PSK Mode	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1850.2	24.37
1880.0	25.98
1909.8	24.49

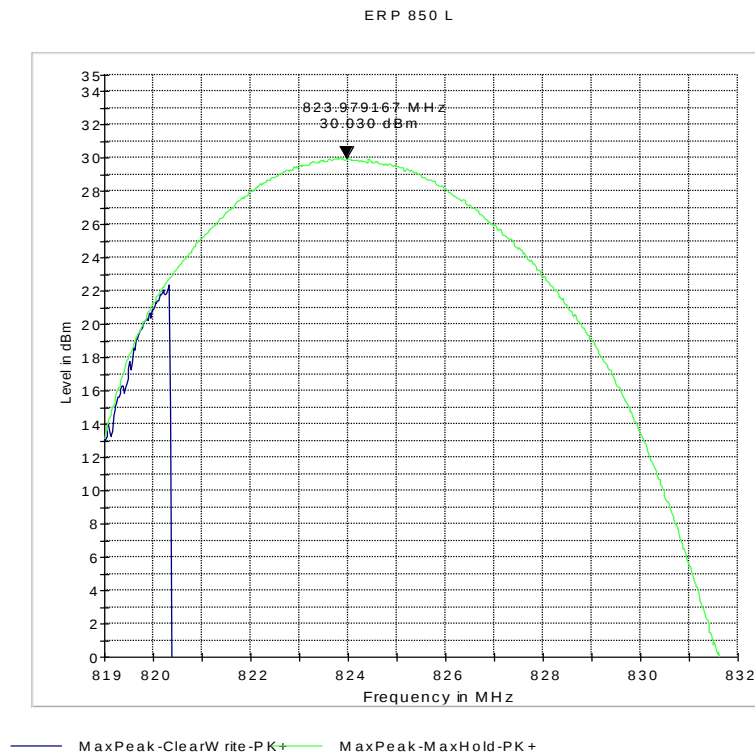
FDD II: UMTS Mode	
Frequency (MHz)	Radiated Power
	EIRP (dBm)
1852.4	22.28
1880.0	23.46
1907.6	23.1

6.1.5.2.4 Test Verdict

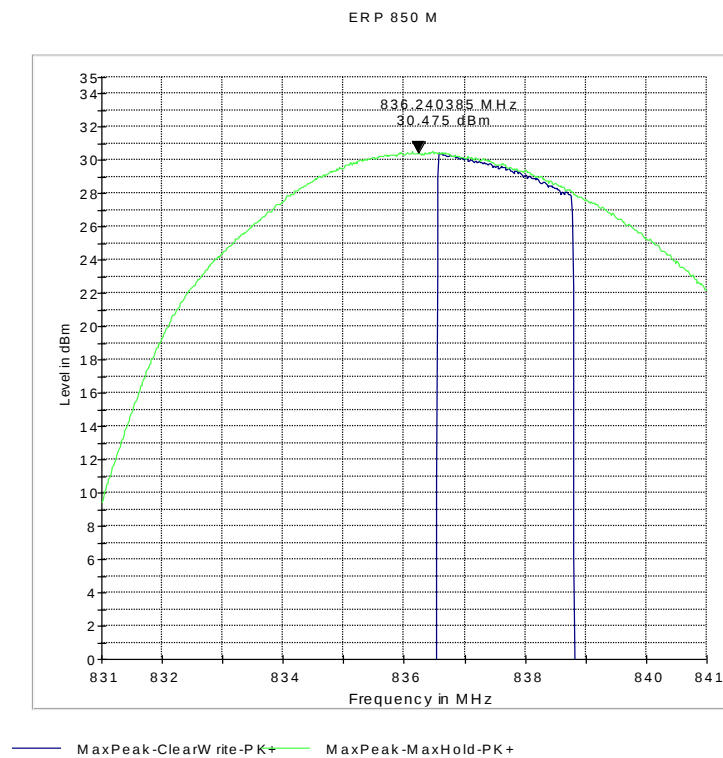
Pass.

6.1.5.3 Test Data

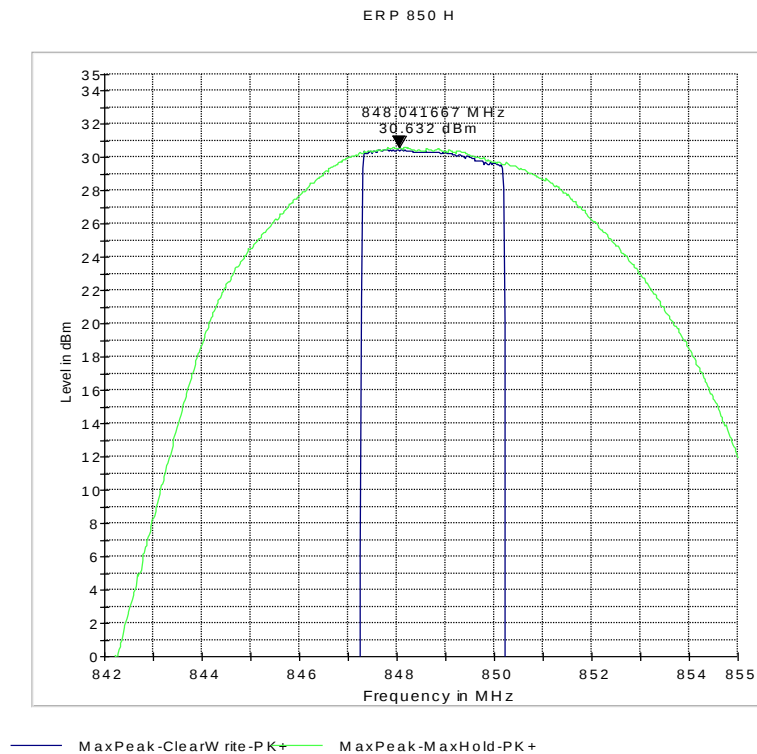
ERP (GSM 850) CHANNEL 128



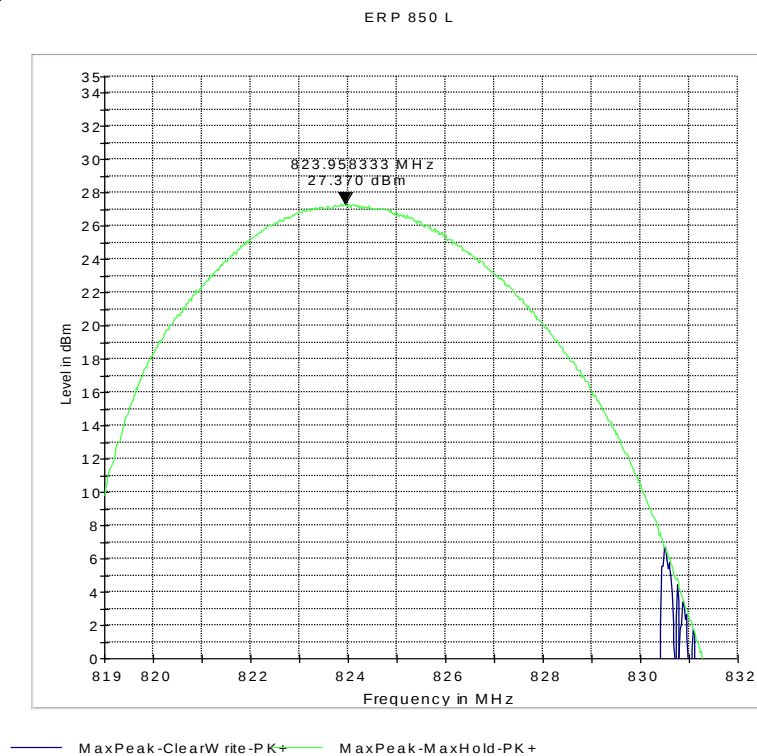
ERP (GSM 850) CHANNEL 190



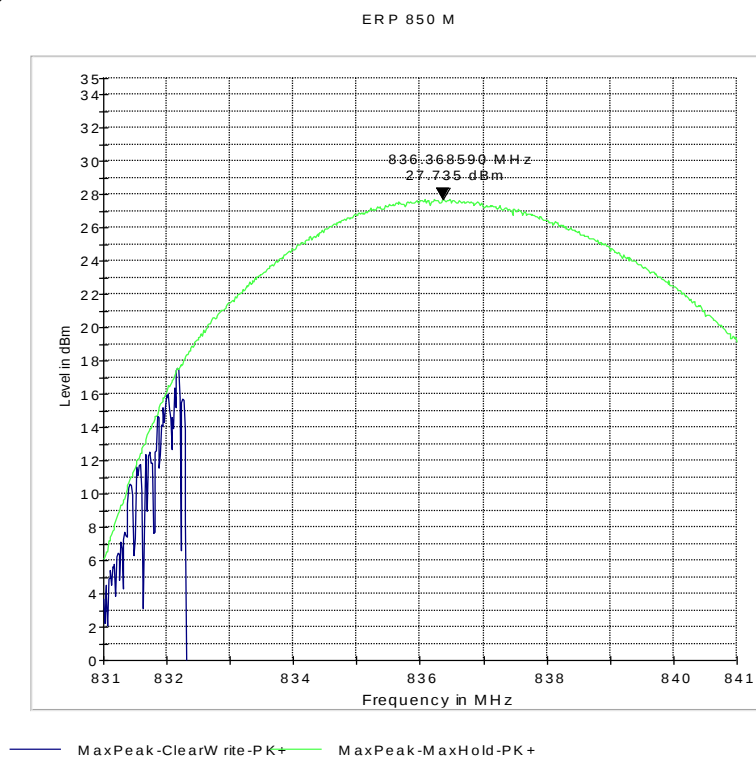
ERP (GSM 850) CHANNEL 251



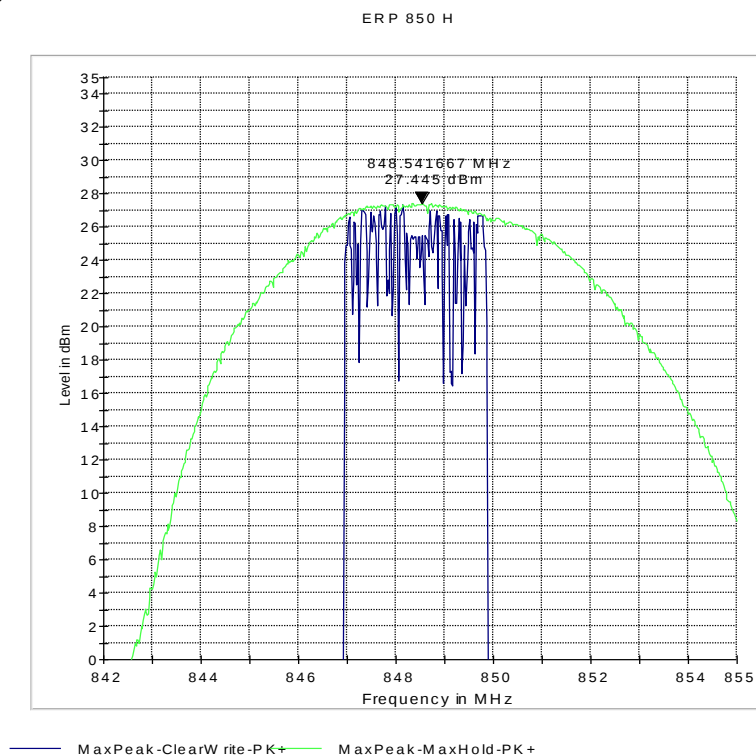
ERP (EGPRS 850) CHANNEL 128



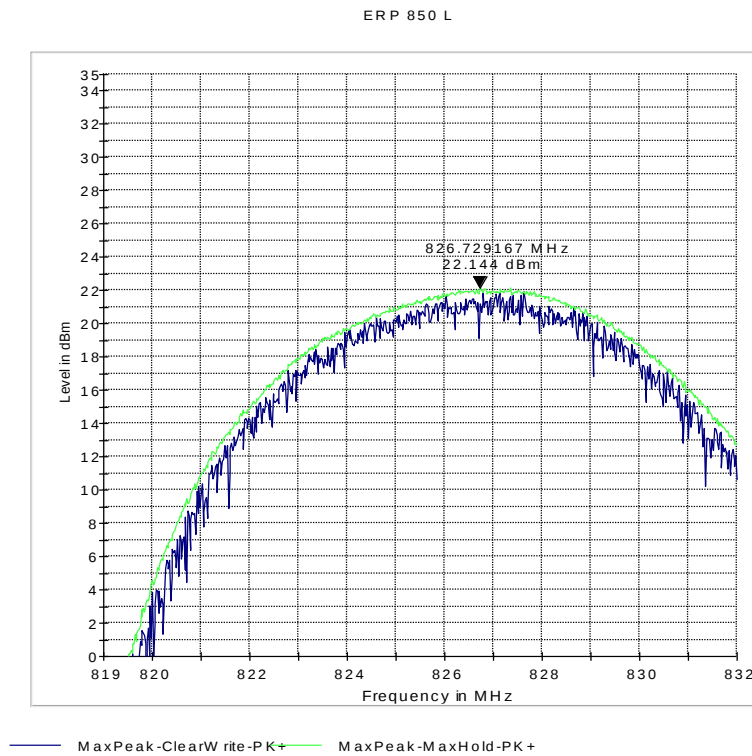
ERP (EGPRS 850) CHANNEL 190



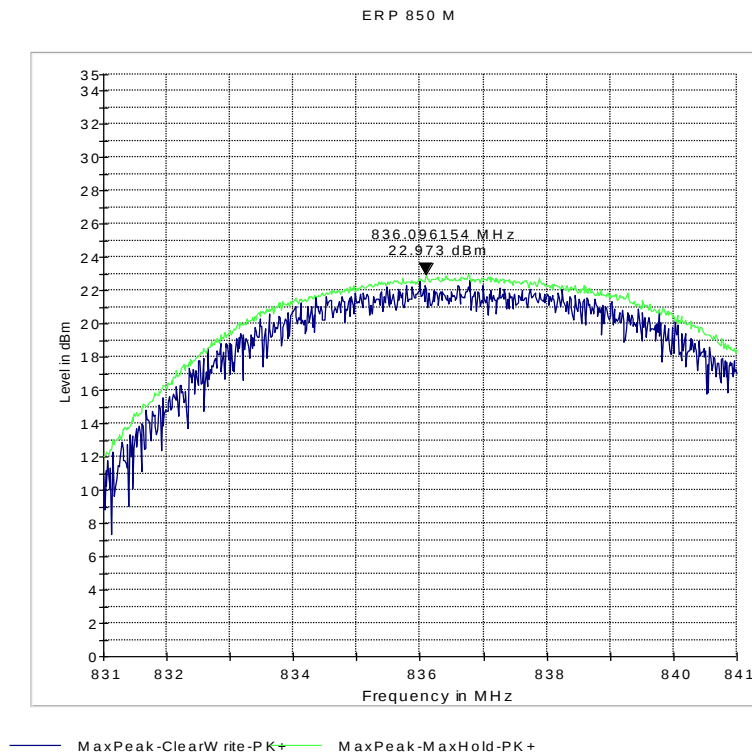
ERP (EGPRS 850) CHANNEL 251



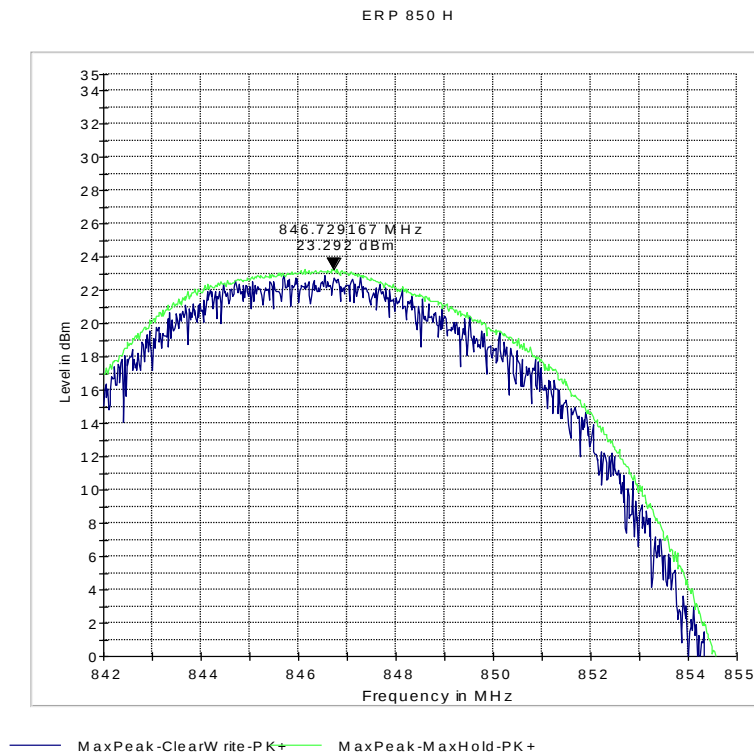
ERP (UMTS FDD5) CHANNEL 4132



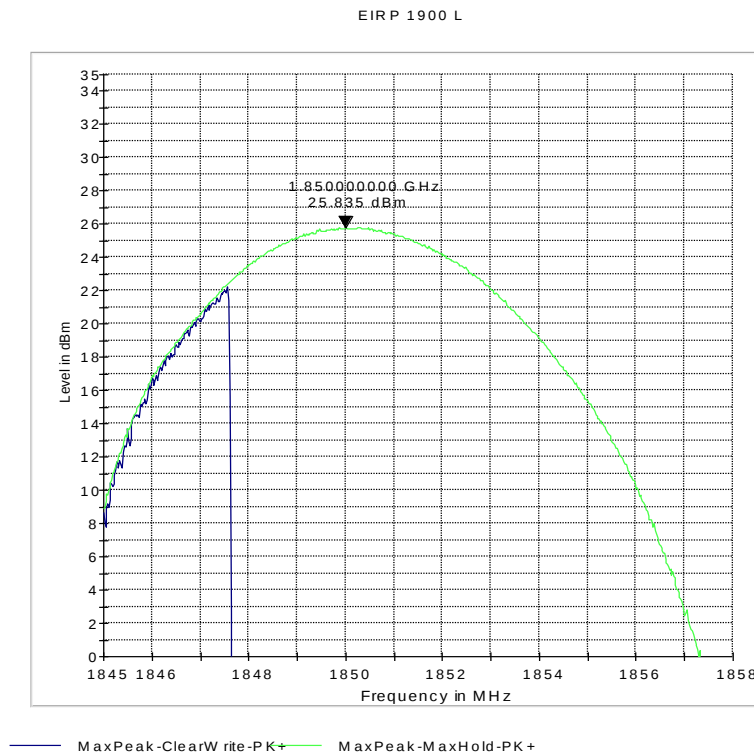
ERP (UMTS FDD5) CHANNEL 4183



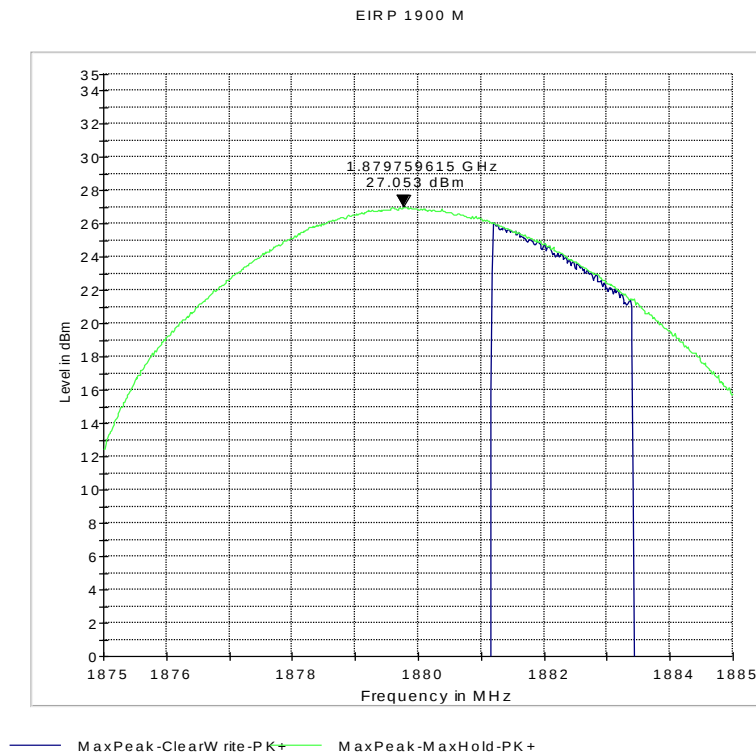
ERP (UMTS FDD5) CHANNEL 4233



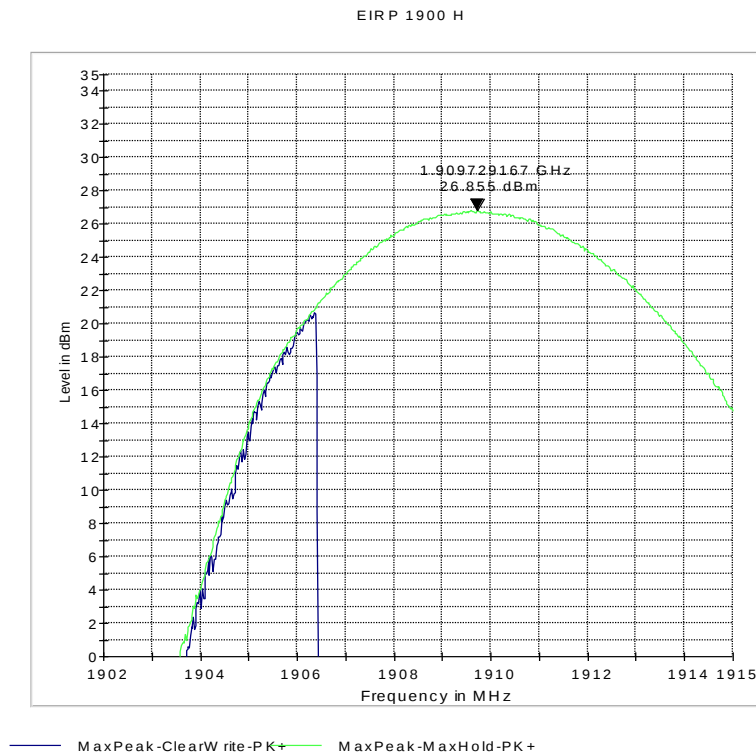
EIRP (PCS-1900) CHANNEL 512



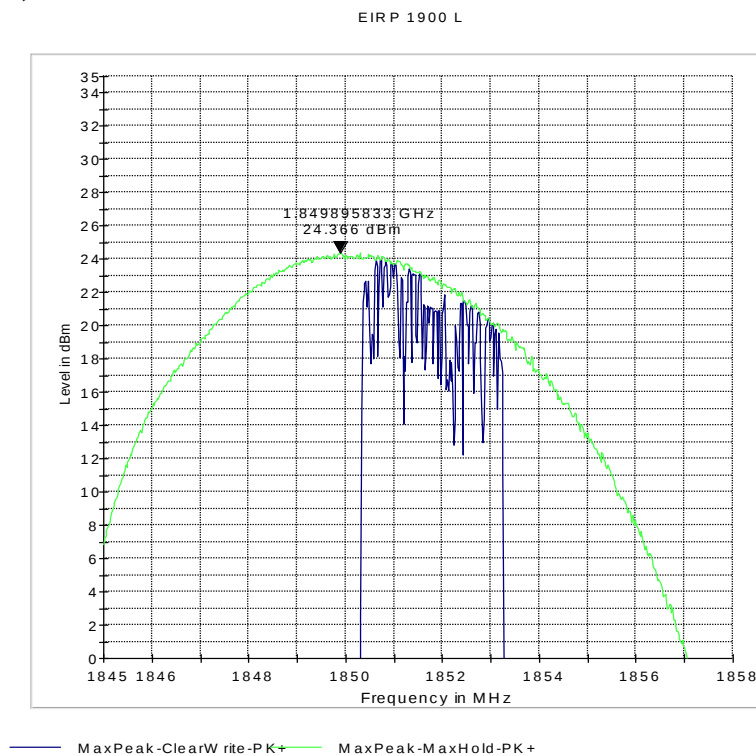
EIRP (PCS-1900) CHANNEL 661



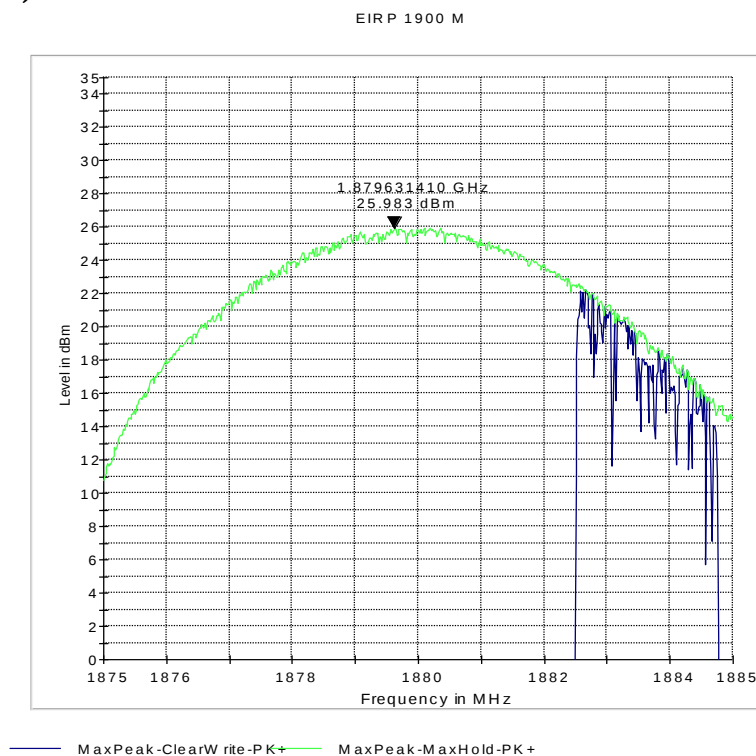
EIRP (PCS-1900) CHANNEL 810



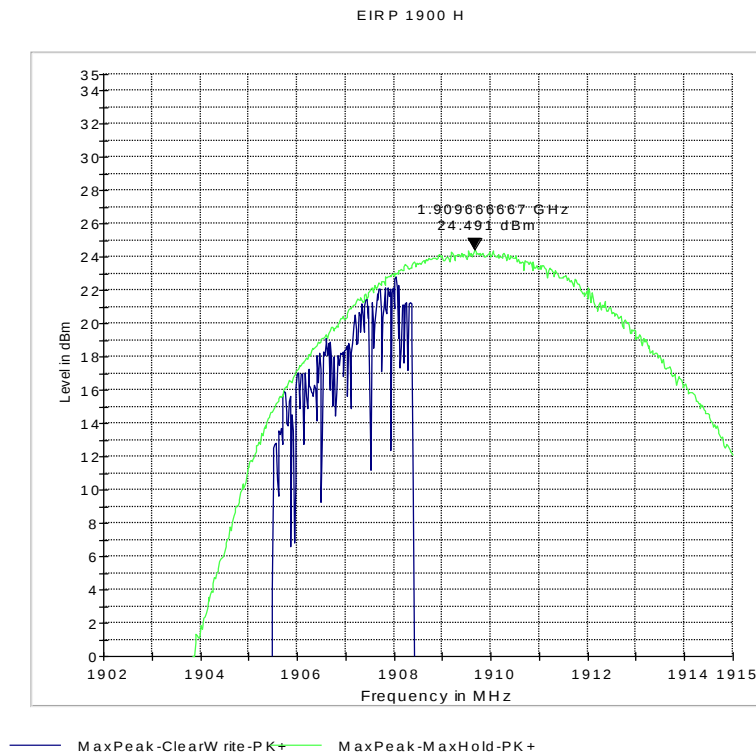
EIRP (EGPRS 1900) CHANNEL 512



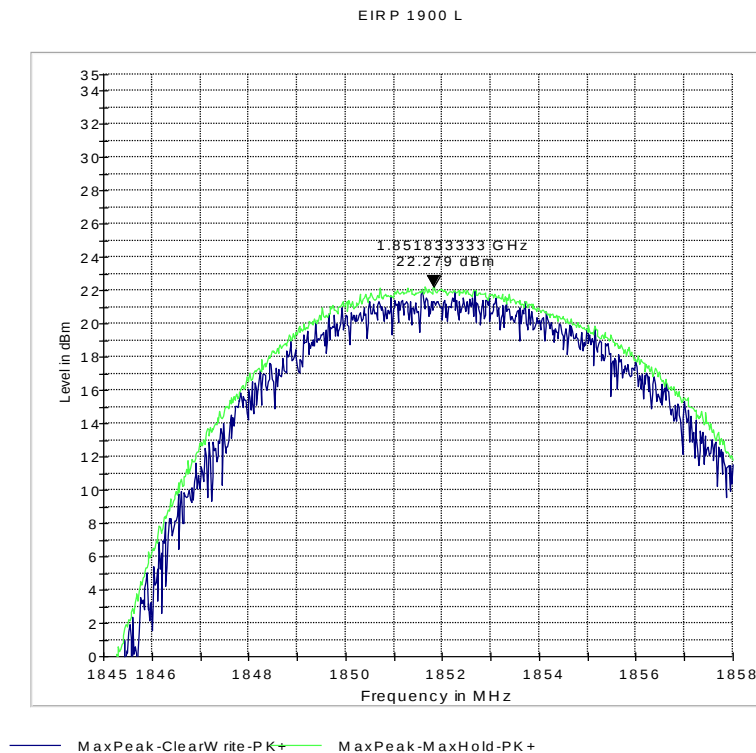
EIRP (EGPRS 1900) CHANNEL 661



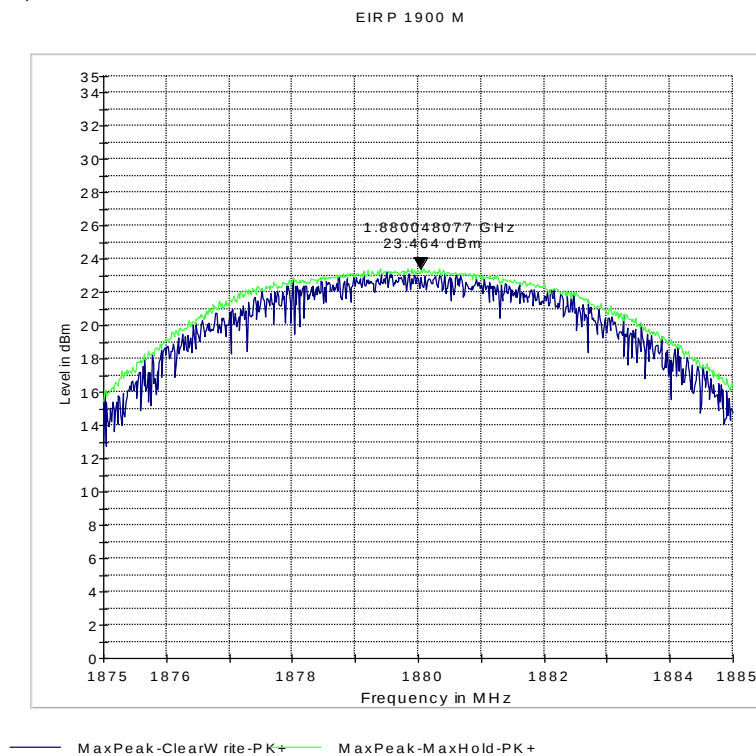
EIRP (EGPRS 1900) CHANNEL 810



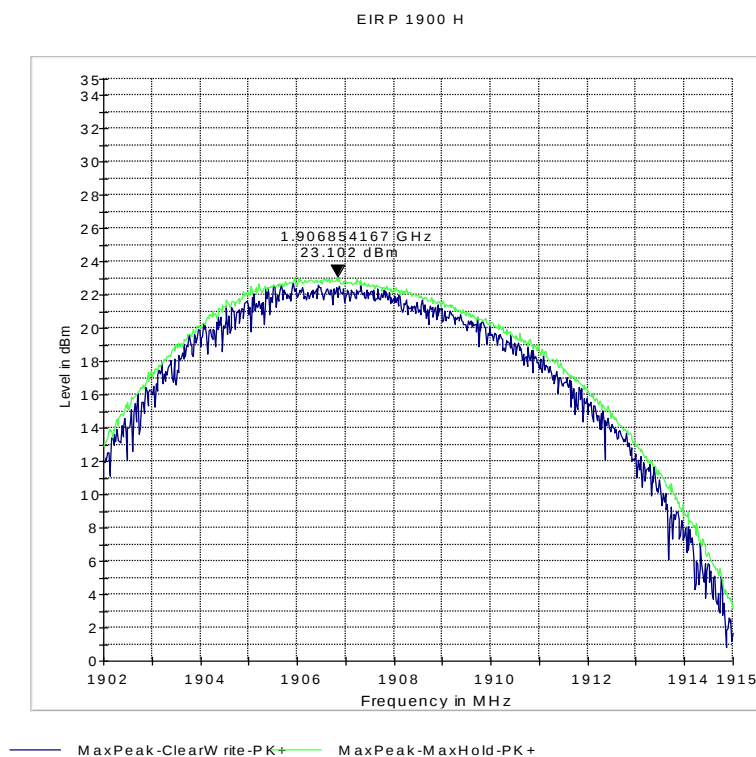
EIRP (UMTS FDD2) CHANNEL 9262



EIRP (UMTS FDD2) CHANNEL 9400



EIRP (UMTS FDD2) CHANNEL 9538



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 4.5; 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.

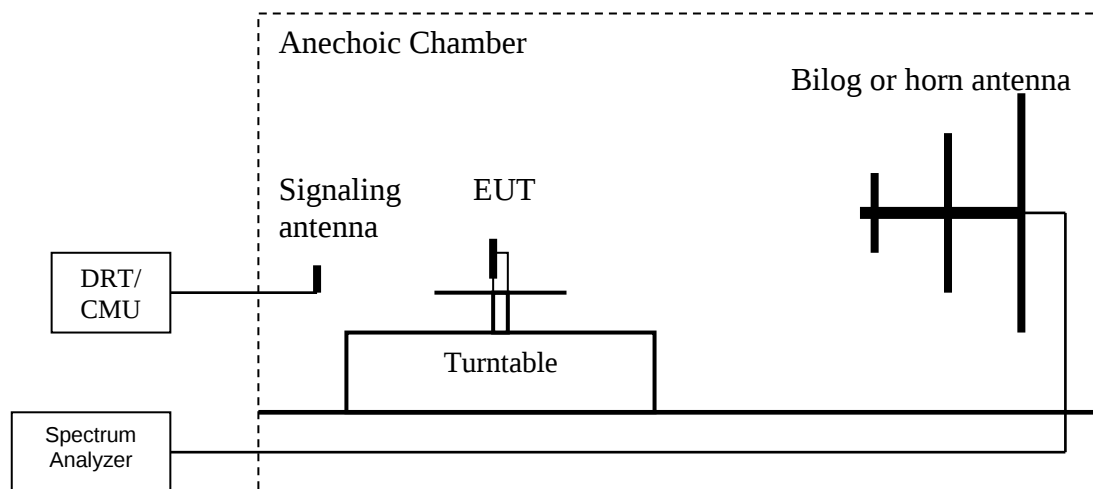
6.2.3.3 RSS-132 Section 4.5.1.1 and RSS-133 Section 6.5.1

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.

6.2.4 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.
(**Note:** 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.)

6.2.5 Sample Calculations for Radiated Measurements

6.2.5.1 Power Measurements using Substitution Procedure:

1. The measurement from the Spectrum Analyzer is used as a basis for the Substitution procedure.
2. 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 reading as in Step 1.

Radiated Power (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi)

Eg:

Frequency (MHz)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)
1000	24.5	6.5	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.

Radiated emission measurements were made in GMSK and RMC Modes (for UMTS), since these modes operate with the highest output power and hence represents the worst case scenario.

For radiated measurements, all data in this report shows the worst case emissions data between H/V antenna polarizations and for all 3 orthogonal orientations of the EUT.

Unless mentioned otherwise, the emission signals above the limit line in the plots are from the carrier.

Measurement Uncertainty= +/- 3.0 dB.

6.2.7 Test Conditions:

Tnom: 25°C; Vnom: 3.7 V

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

6.3.1 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	-41	1673.2	-39	1697.6	-34.7
3	2472.6	-39.8	2509.8	-42.1	2546.4	-40.2
4	3296.8	-45	3346.4	-43.1	3395.2	-43
5	4121	-51	4183	-50.5	4244	-50
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						

6.3.1.1 Test Verdict

Pass.

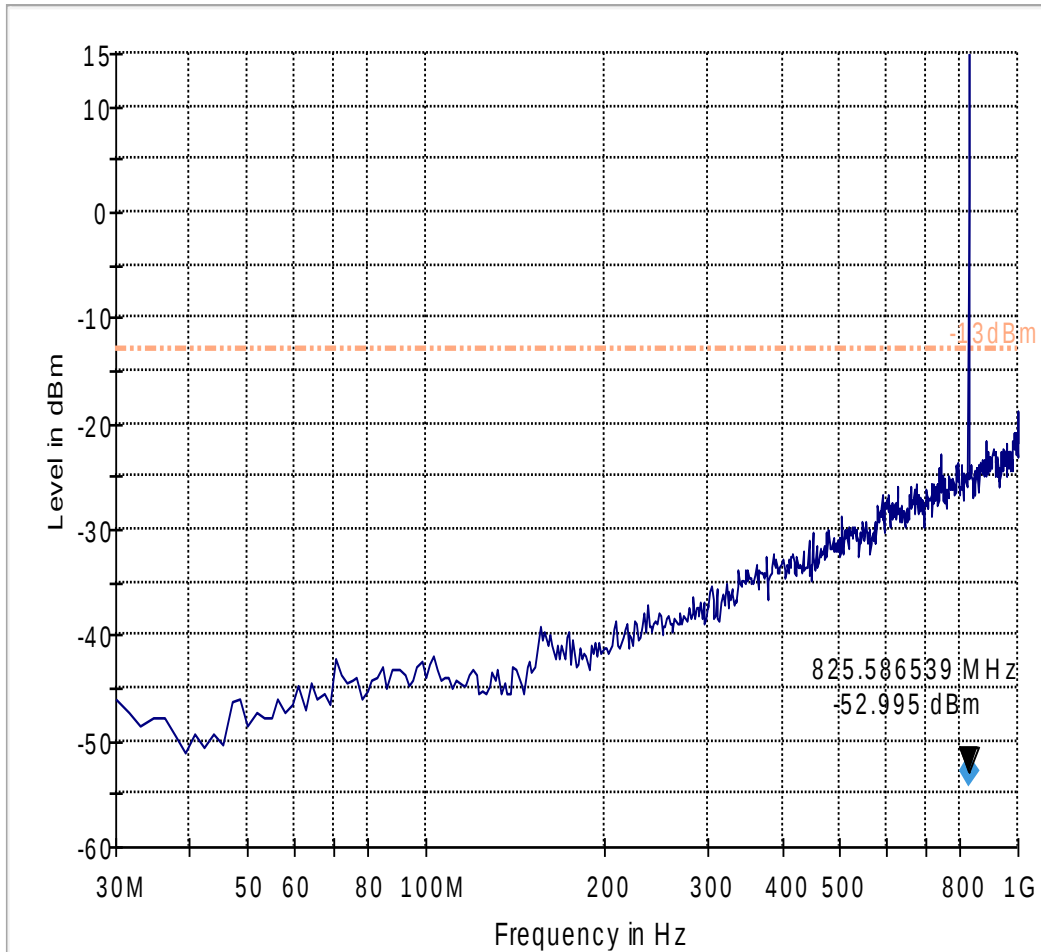
Legend for the plots:

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

Radiated Spurious Emissions (GSM-850) Tx: Low Channel
30MHz-1GHz

Emission signal above the limit line in the plots is from the Carrier.

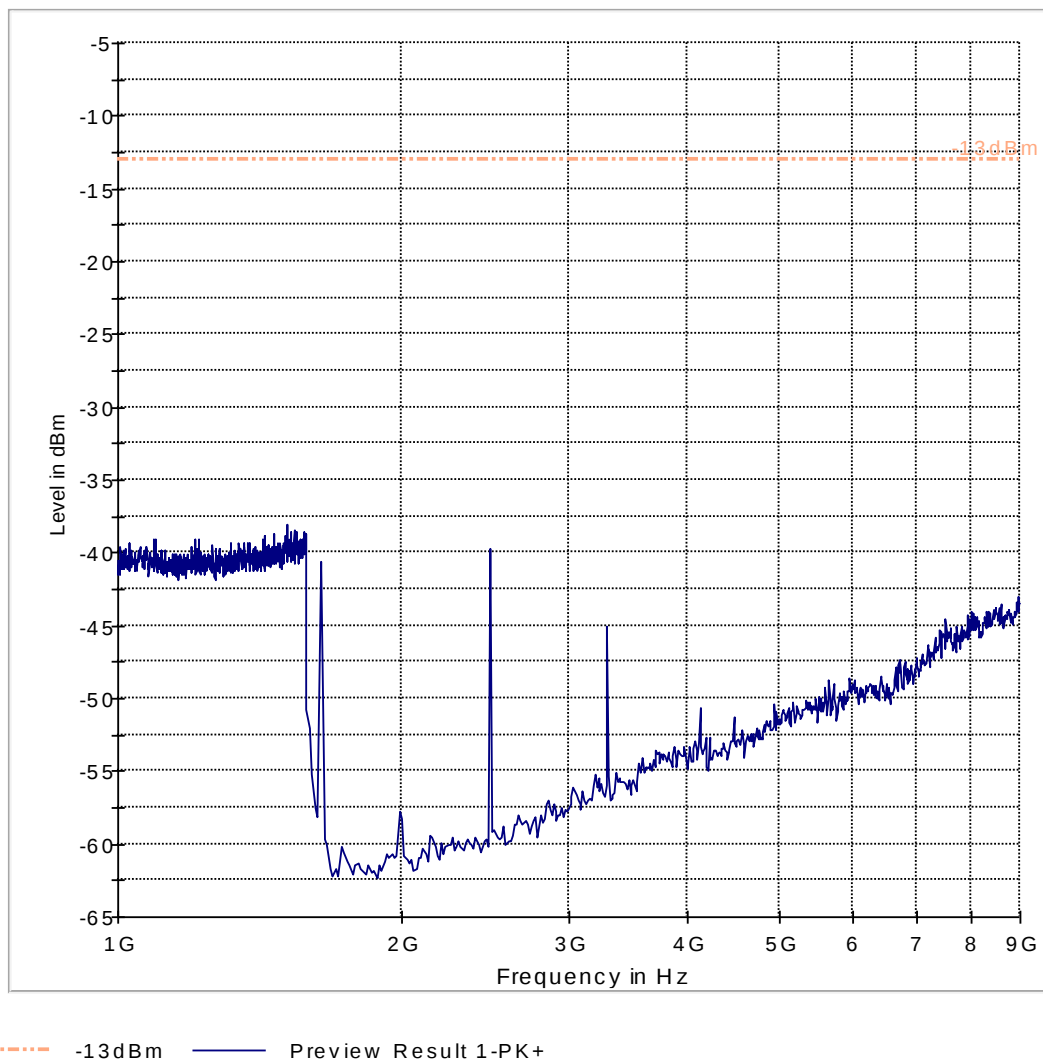
FCC 22 30-1000MHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

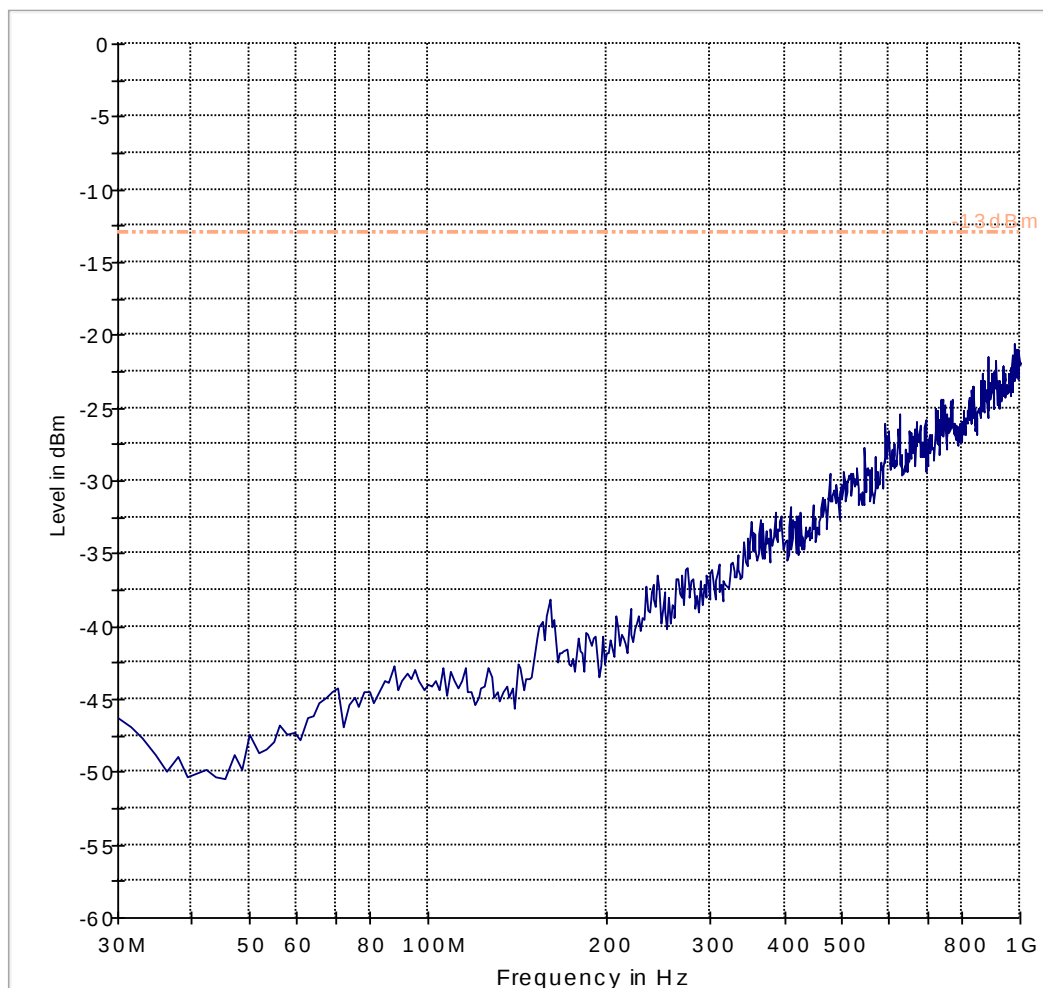
Test results: 1GHz-9GHz

FCC 22 1-9GHz



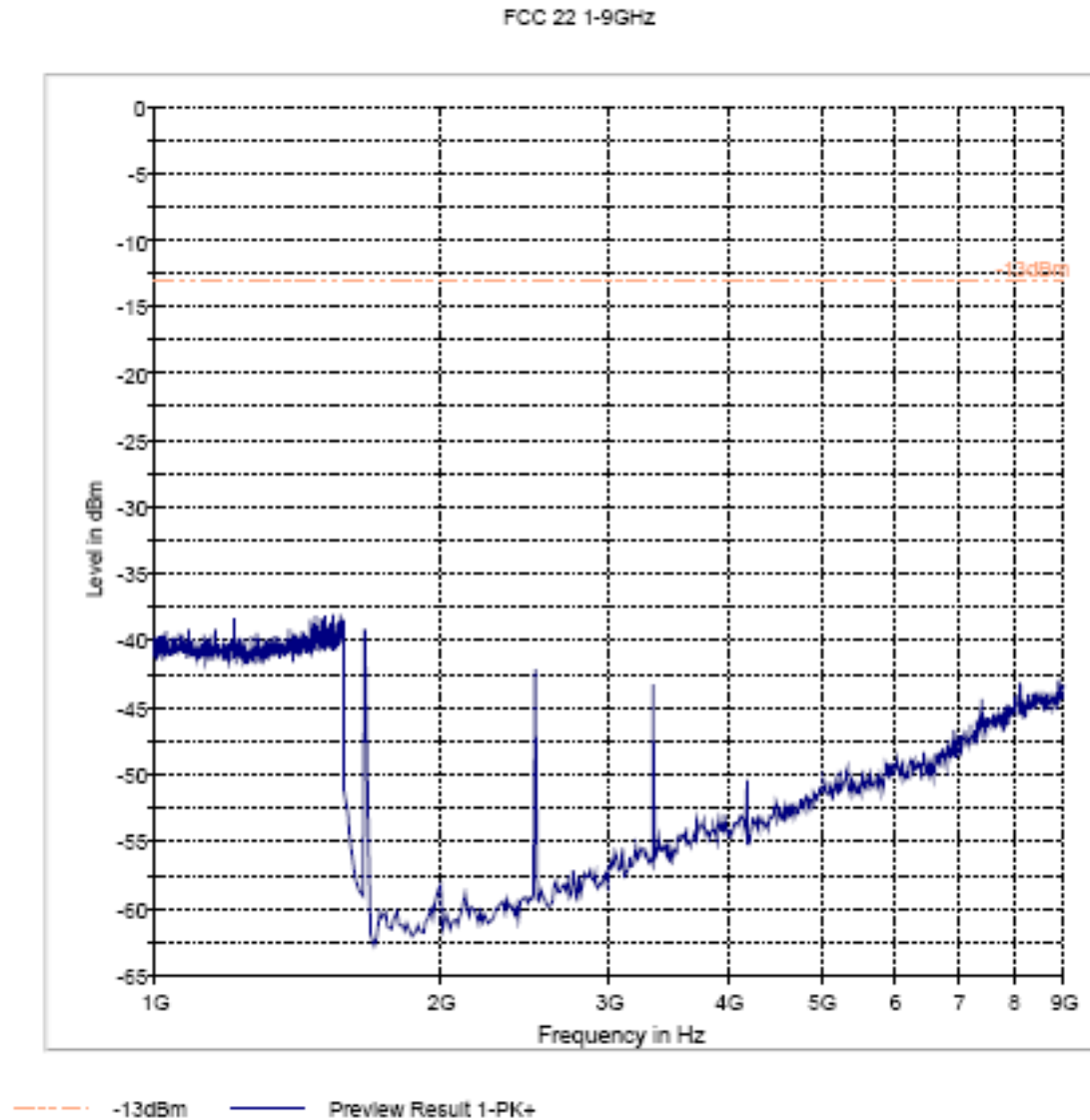
Radiated Spurious Emissions (GSM-850) Tx: Mid Channel
Test results 30M-1GHz

FCC 22 30-1000MHz



----- -13dBm — Preview Result 1-PK+

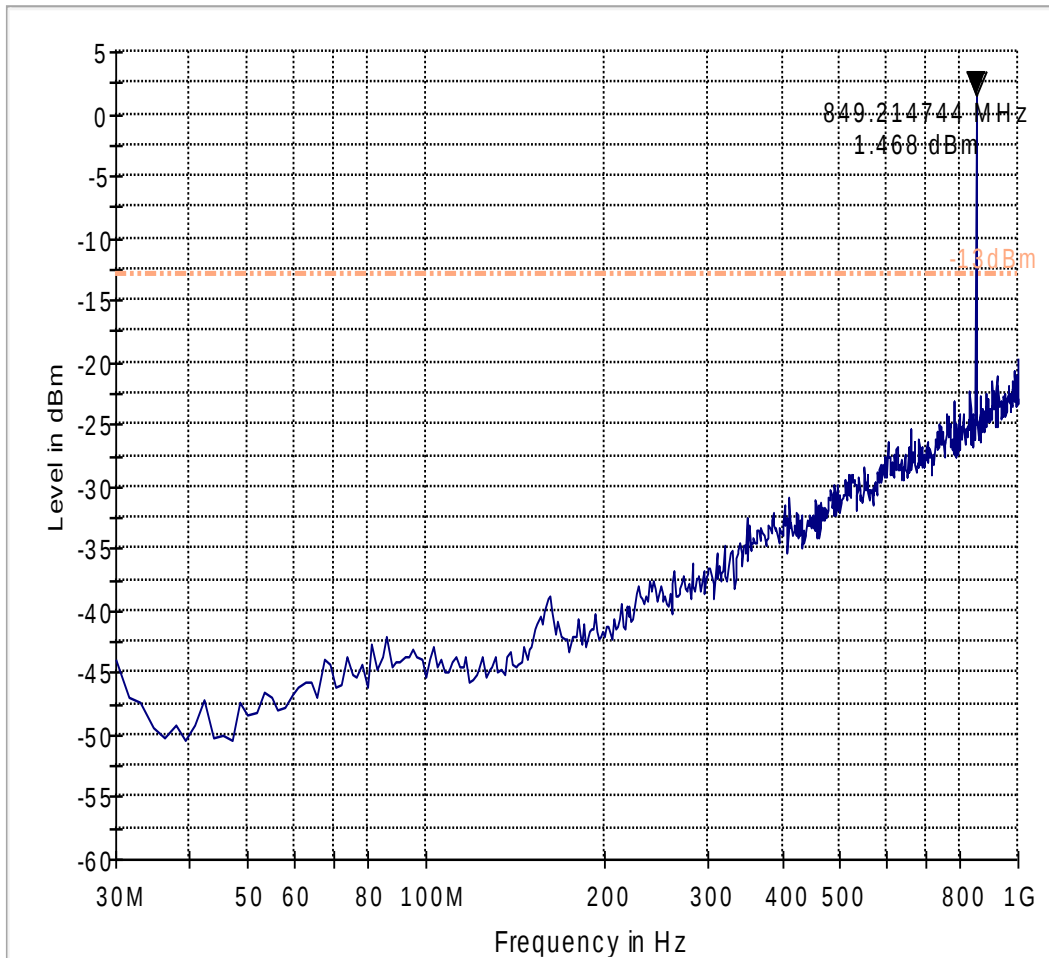
Test results: 1GHz-9GHz



Radiated Spurious Emissions (GSM-850) Tx: High Channel
30MHz-1GHz

Emission signal above the limit line in the plots is from the Carrier.

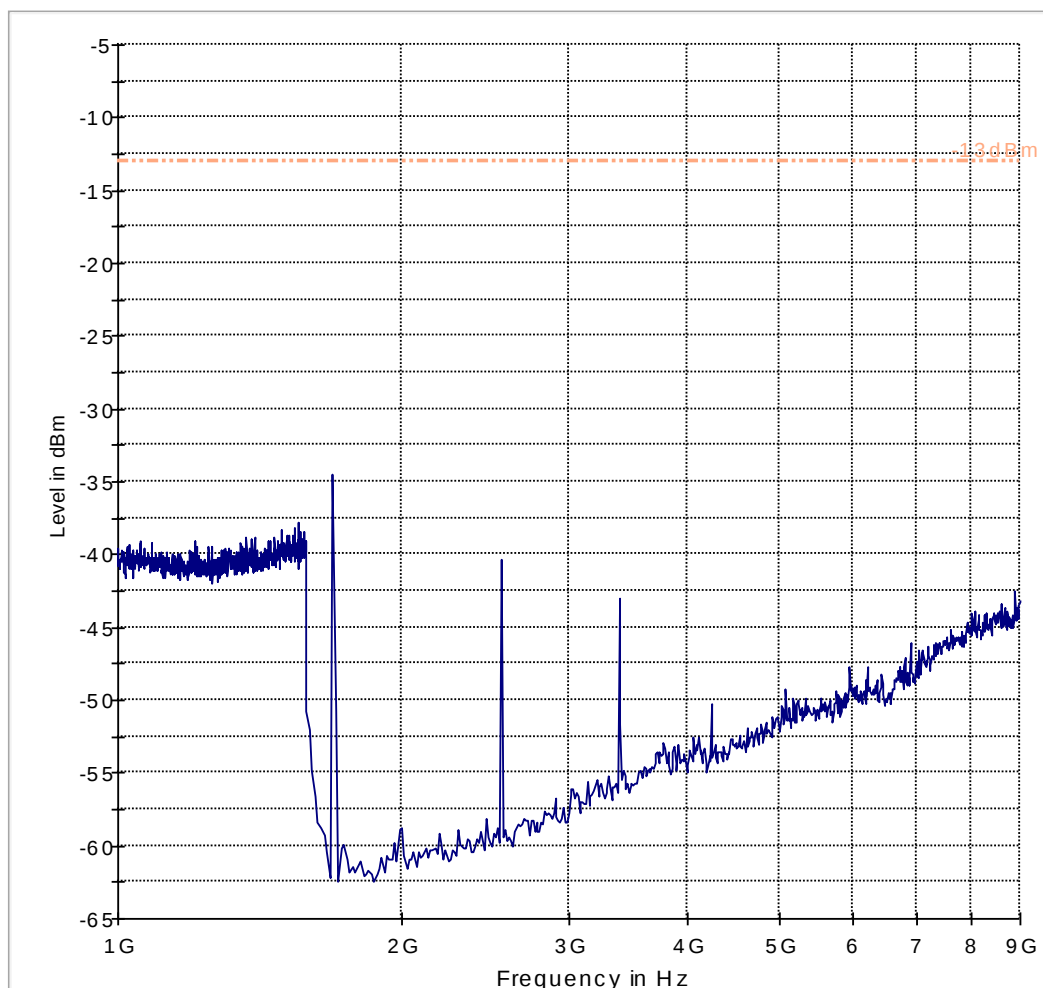
FCC 22 30-1000MHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 1GHz-9GHz

FCC 22 1-9GHz



----- -13dBm Preview Result 1-PK+

6.3.2 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	-40.8	1673.2	-47.4	1693.2	-48.1
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	-48.1	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						

6.3.2.1 Test Verdict

Pass.

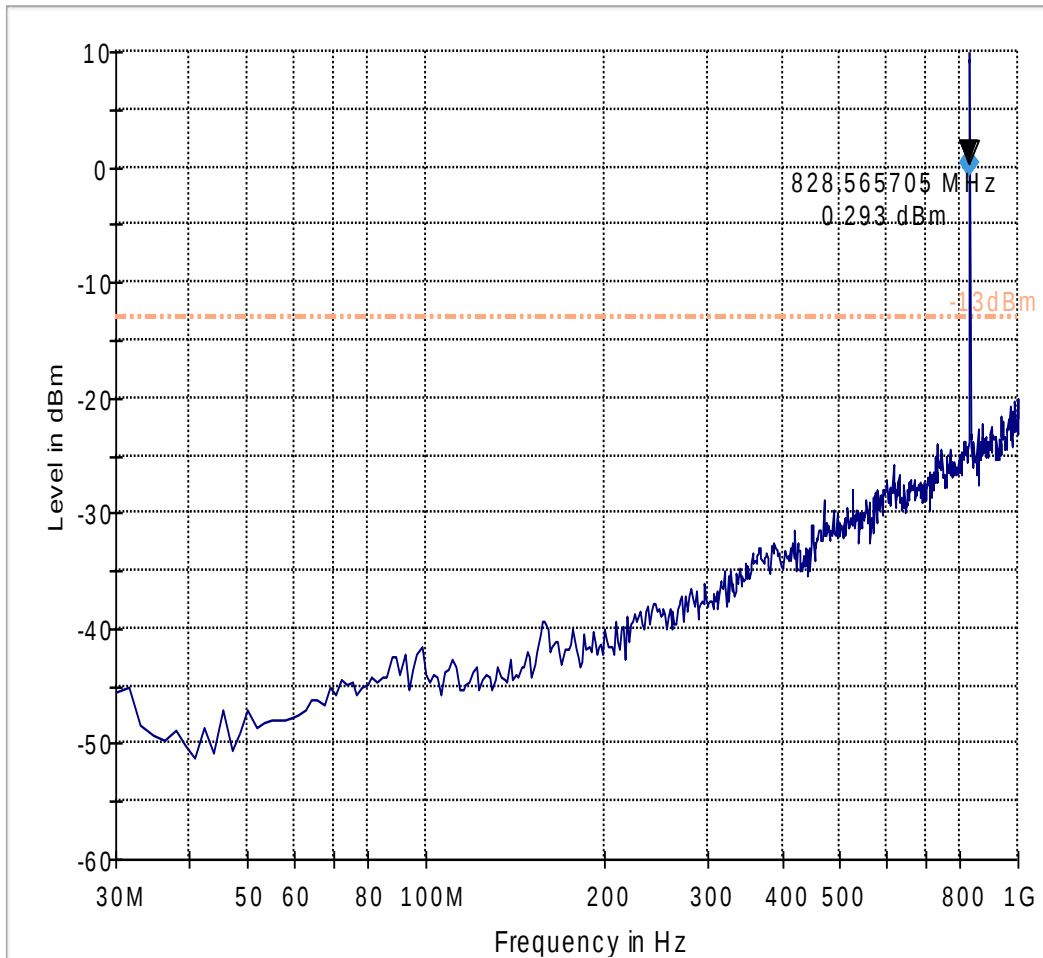
Legend for the plots:

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

Radiated Spurious Emissions (UMTS Band 5) Tx: Low Channel
30MHz-1GHz

Emission signal above the limit line in the plots is from the Carrier.

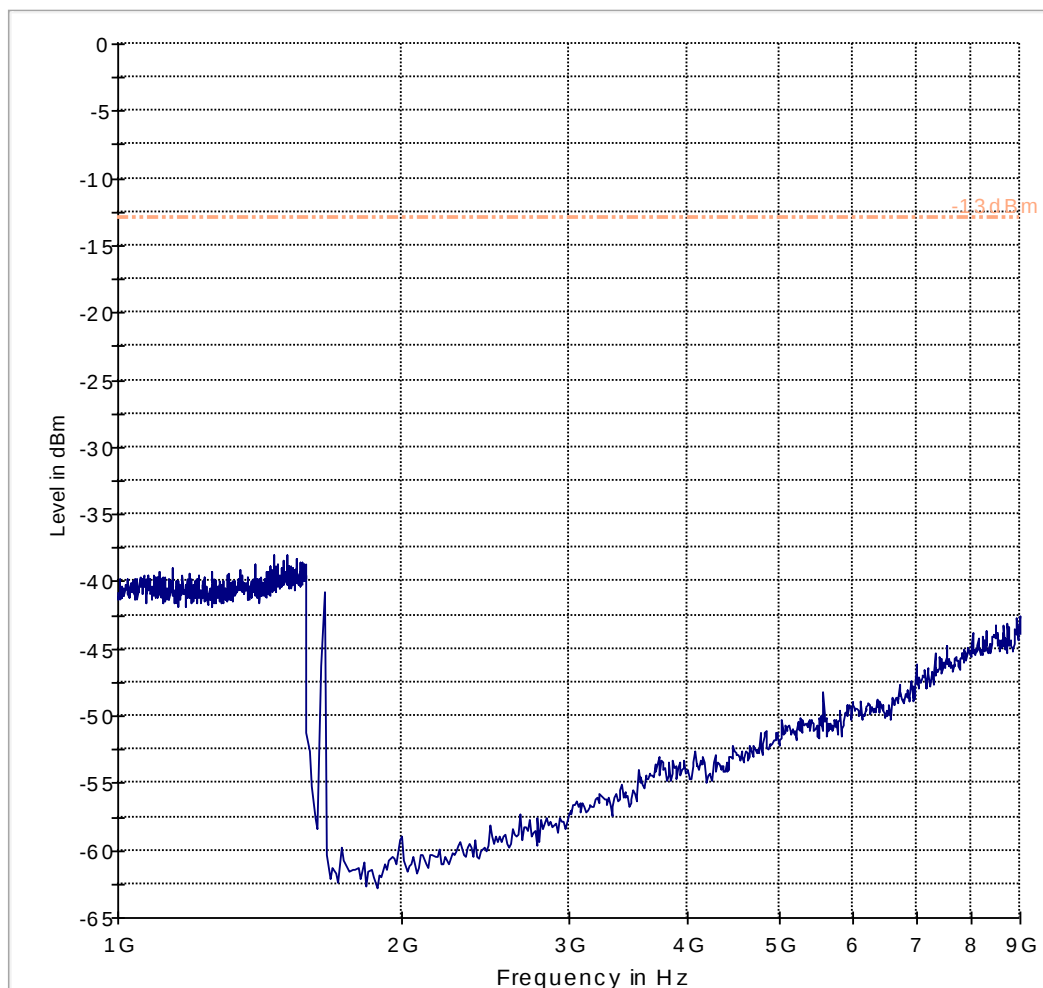
FCC 22 30-1000MHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 1GHz-9GHz

FCC 22 1-9GHz

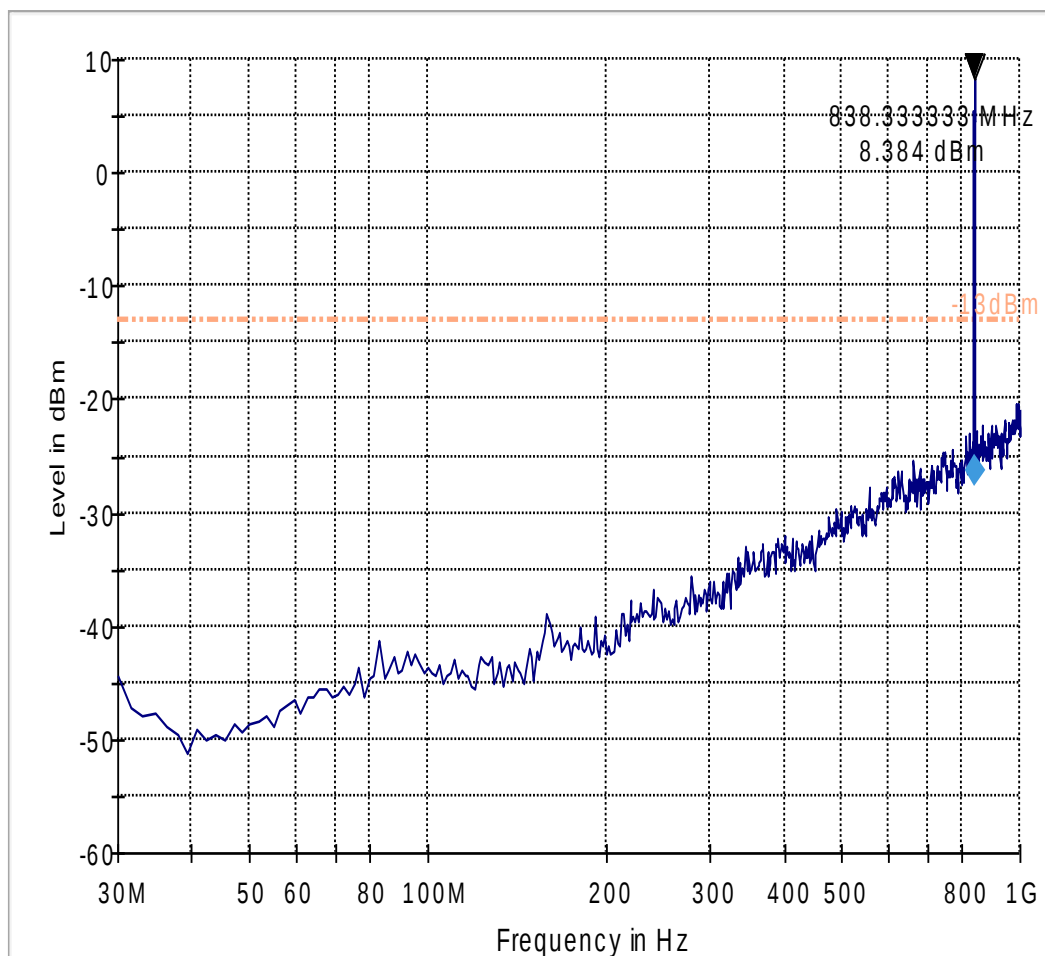


----- -13dBm — Preview Result 1-PK+

Radiated Spurious Emissions (UMTS Band 5) Tx: Mid Channel
30MHz-1GHz

Emission signal above the limit line in the plots is from the Carrier.

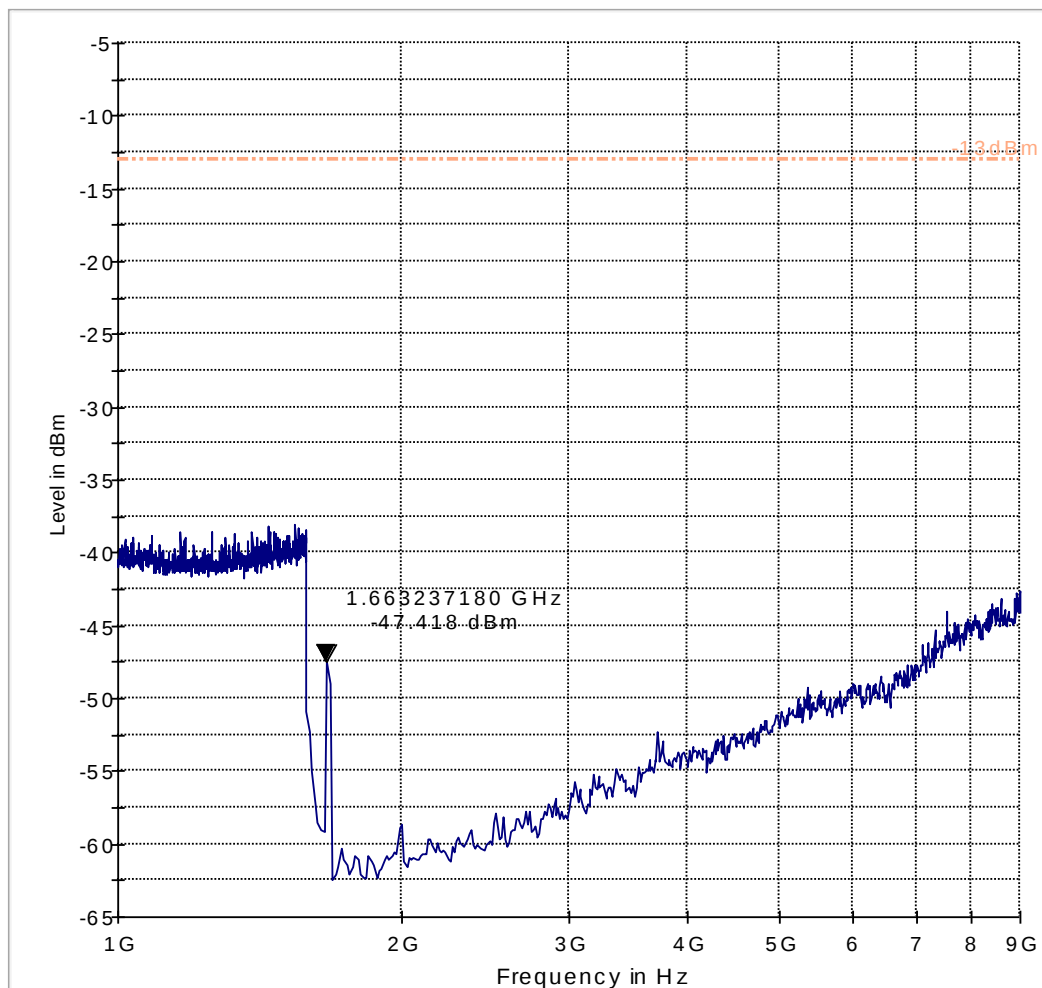
FCC 22 30-1000MHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 1GHz-9GHz

FCC 22 1-9GHz

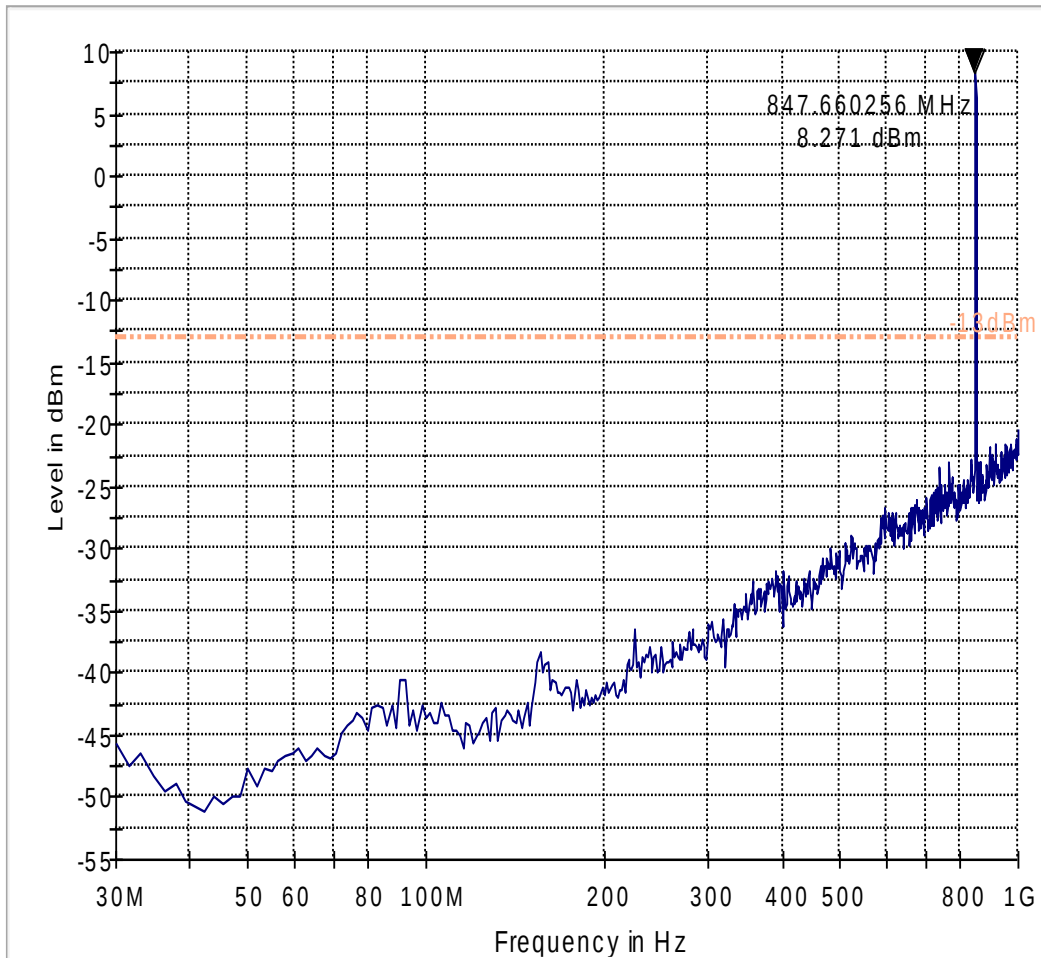


----- -13dBm ——— Preview Result 1-PK+

Radiated Spurious Emissions (UMTS Band 5) Tx: High Channel
30MHz-1GHz

Emission signal above the limit line in the plots is from the Carrier.

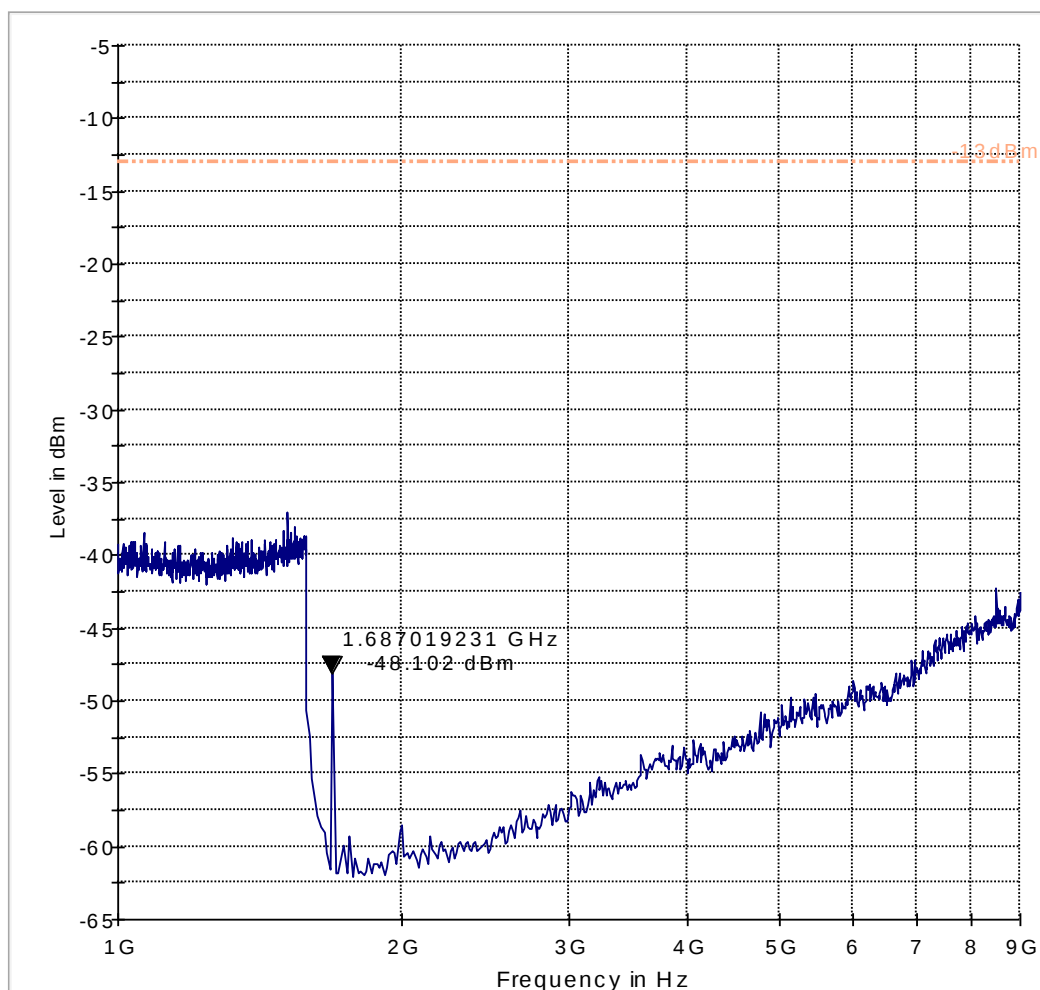
FCC 22 30-1000MHz



----- -13dBm — Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 1GHz-9GHz

FCC 22 1-9GHz



----- -13dBm Preview Result 1-PK+

6.3.3 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	-42	3760	-40	3819.6	-39.9
3	5550.6	-41	5640	-42.5	5729.4	-39.9
4	7400.8	-40.1	7520	-40	7639.2	-42
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: ± 3 dB						

6.3.3.1 Test Verdict

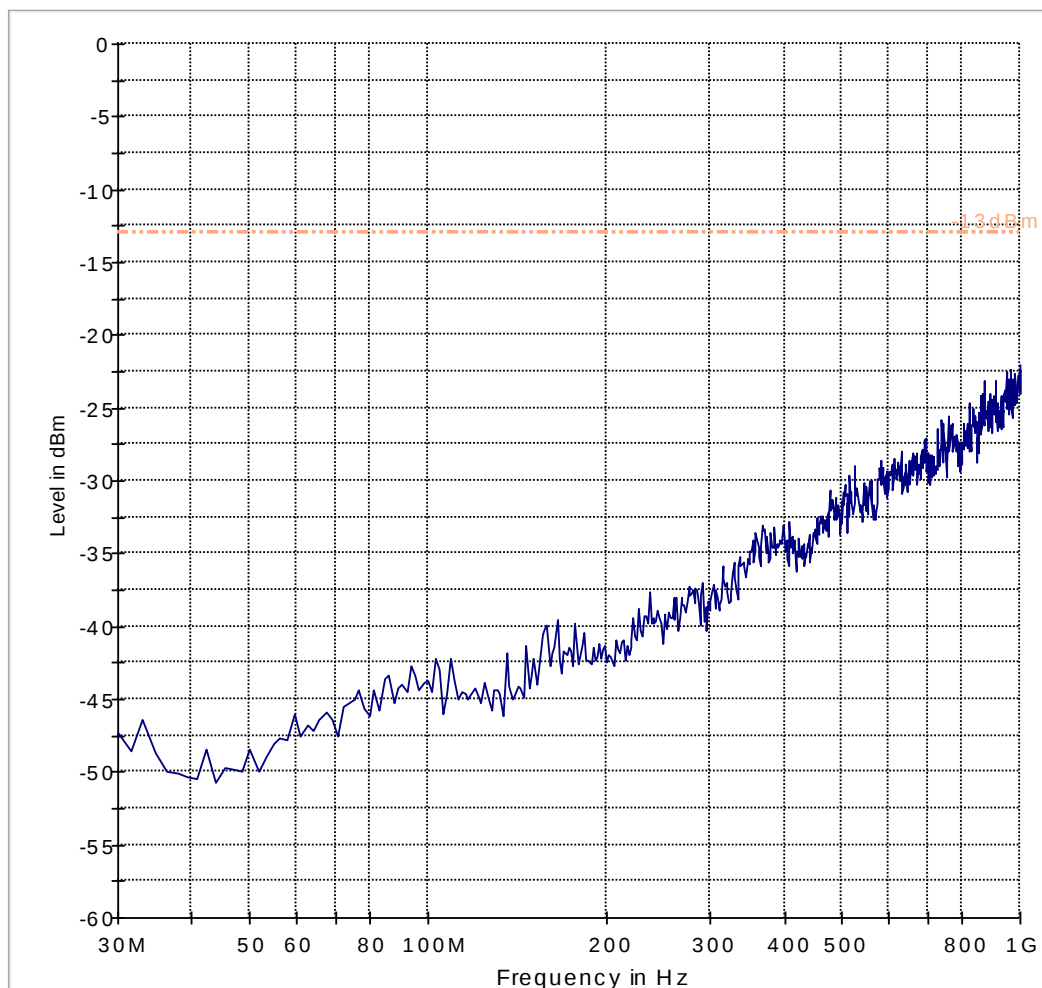
Pass.

Legend for the plots:

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

Radiated Spurious Emissions (GSM-1900) Tx: Low Channel
Test results: 30M-1GHz

FCC 24 30-1000MHz

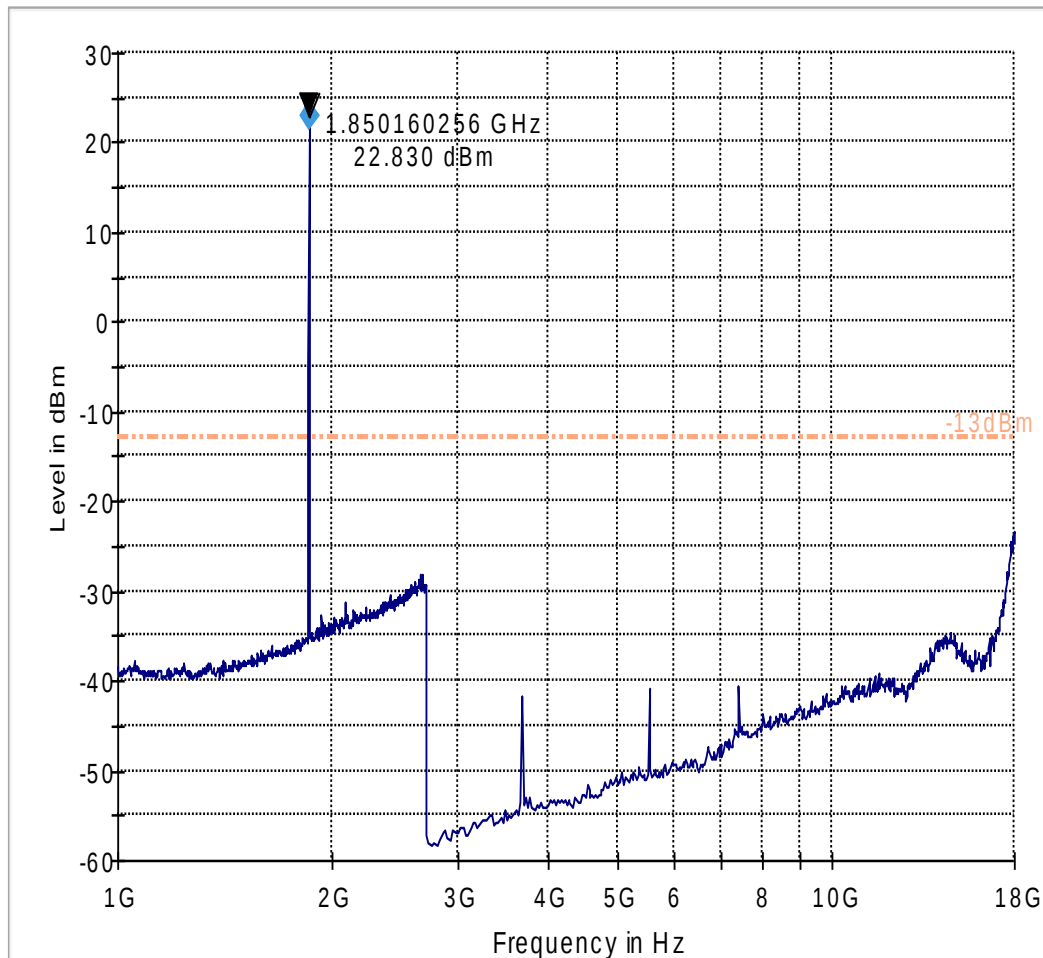


----- -13dBm — Preview Result 1-PK+

Test results: 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

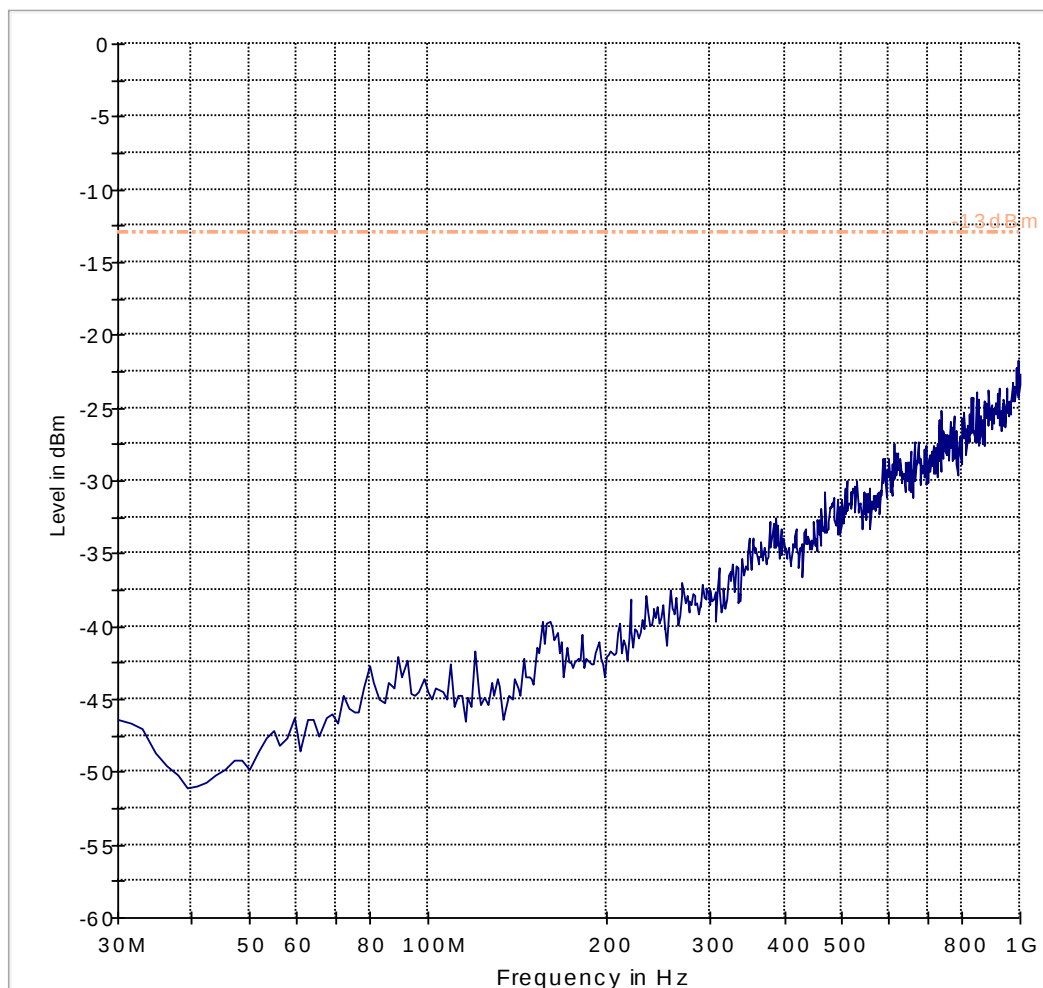
FCC 24 1-18GHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Radiated Spurious Emissions (GSM-1900) Tx: Mid Channel
Test results: 30M-1GHz

FCC 24 30-1000MHz

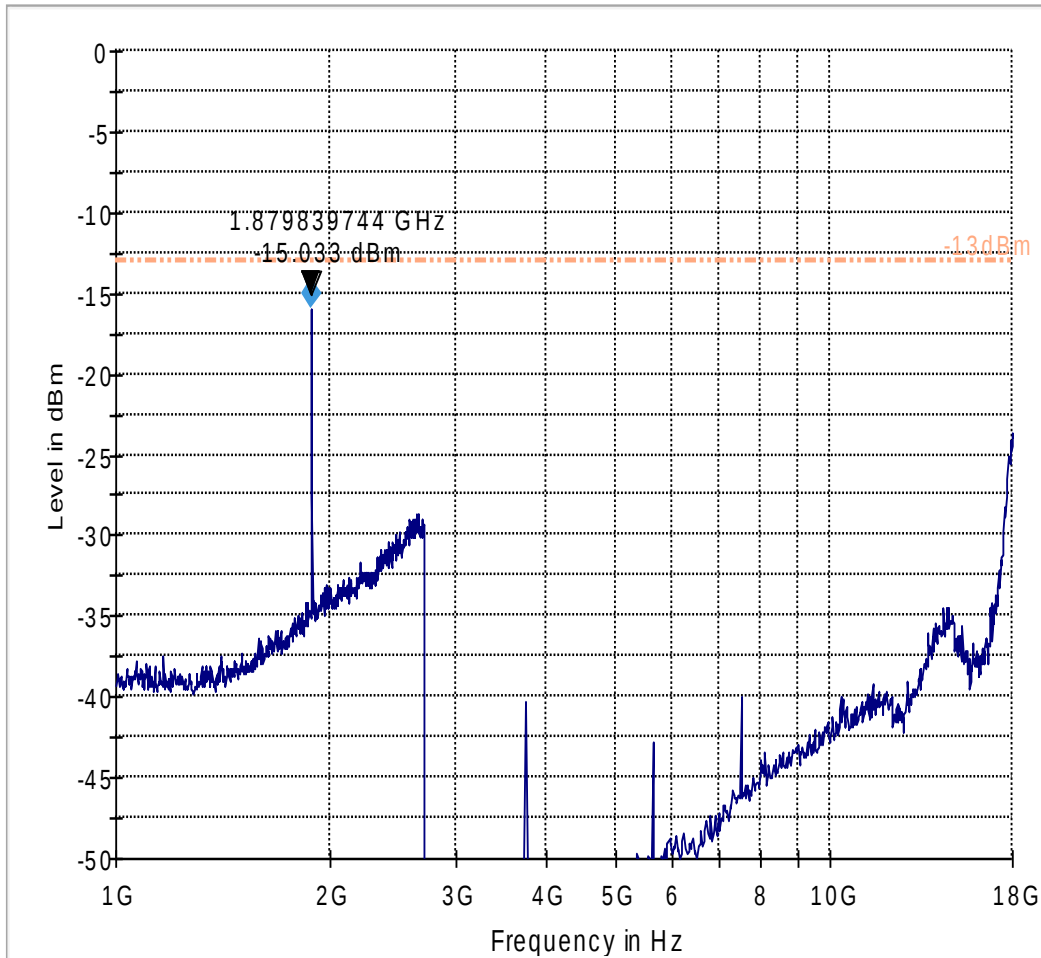


----- -13dBm — Preview Result 1-PK+

Test results: 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

FCC 24 1-18GHz

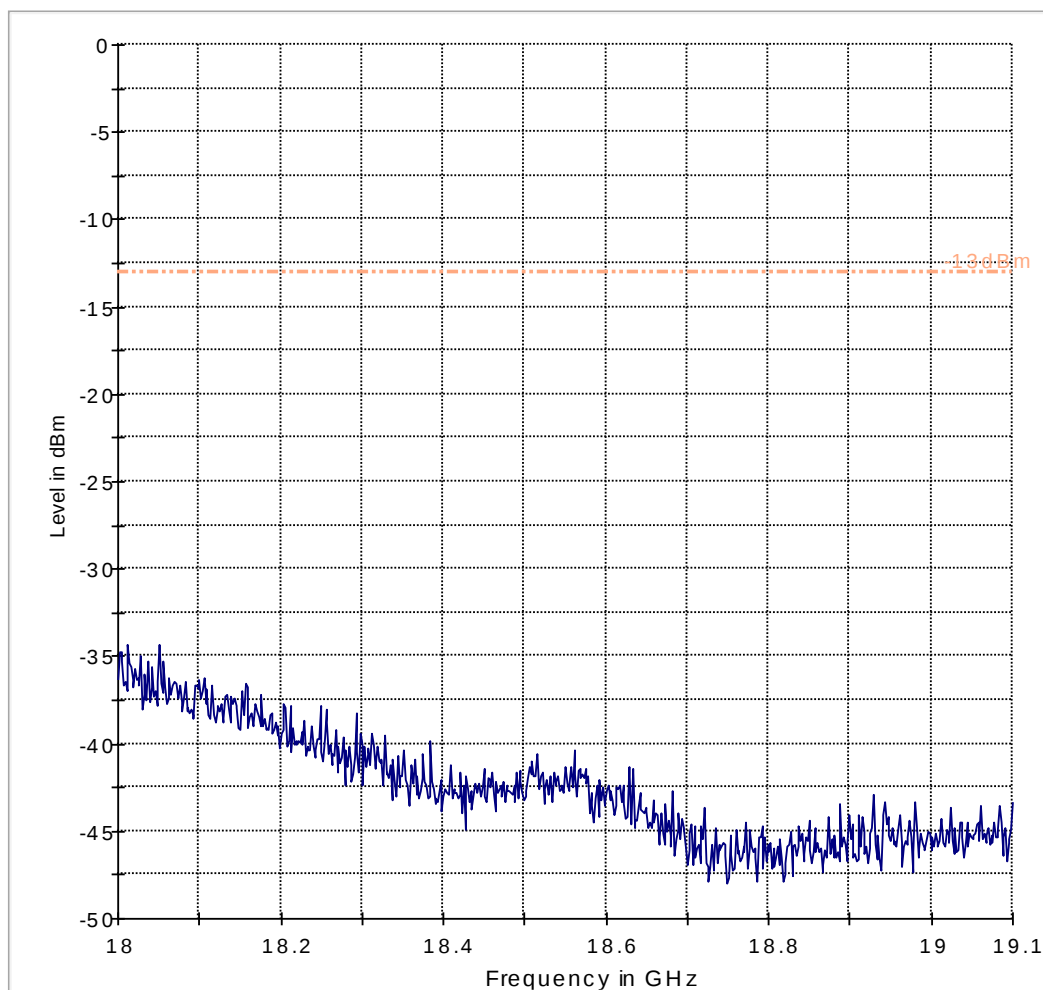


----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 18GHz-19.1GHz

Note: Worst case representation for all channels in this band of operation.

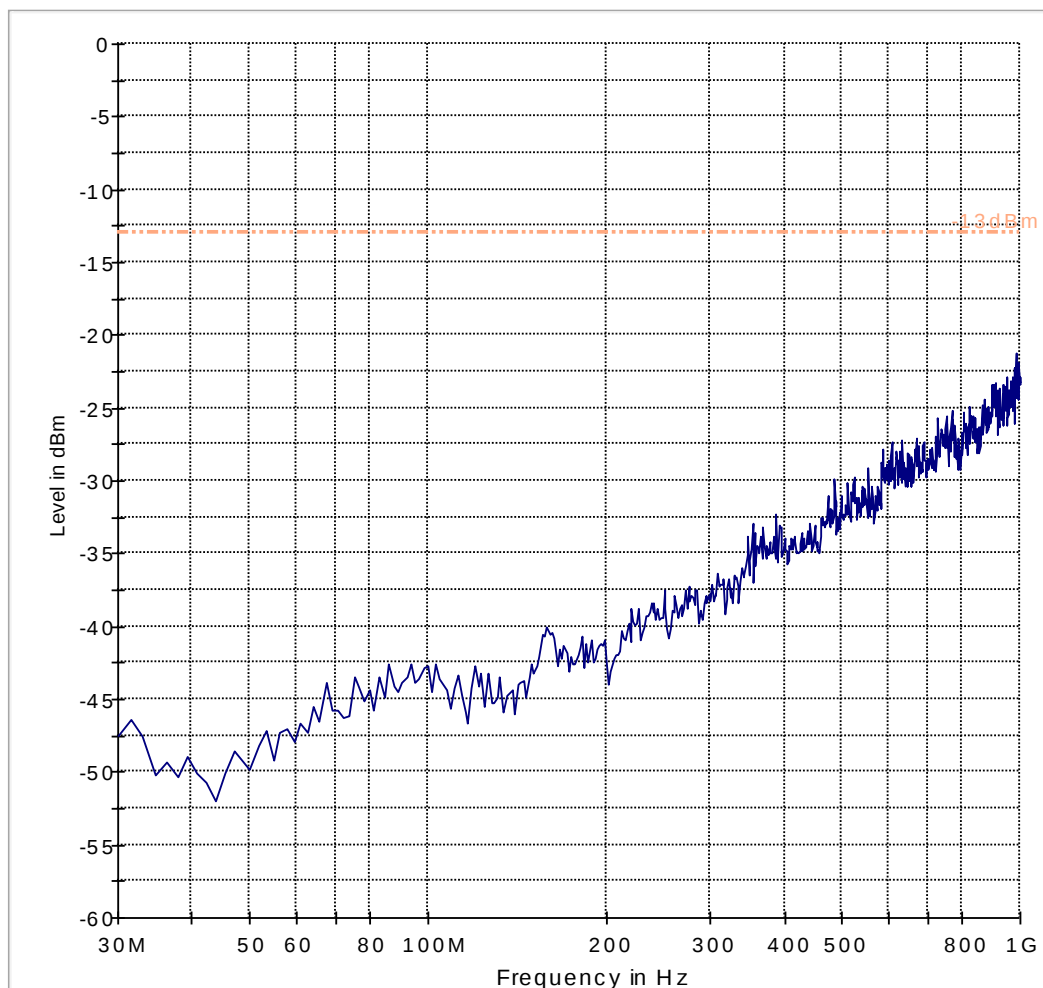
FCC 24 18-19.1GHz



----- -13dBm ——— Preview Result 1-PK+

Radiated Spurious Emissions (GSM-1900) Tx: High Channel
Test results: 30M-1GHz

FCC 24 30-1000MHz

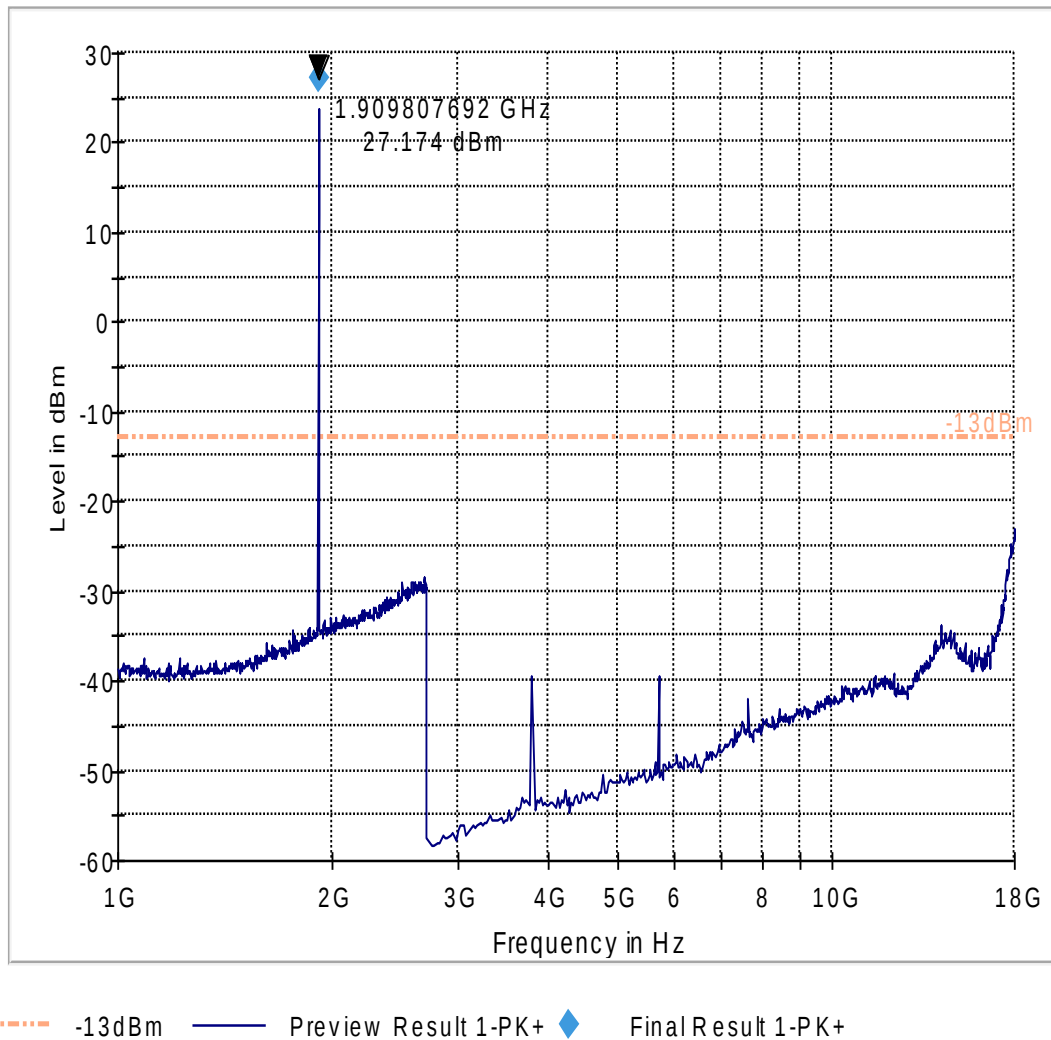


----- -13dBm — Preview Result 1-PK+

Test results: 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

FCC 24 1-18GHz



6.3.4 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	-47.5	3760	-43	3815.2	-39
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						

6.3.4.1 Test Verdict

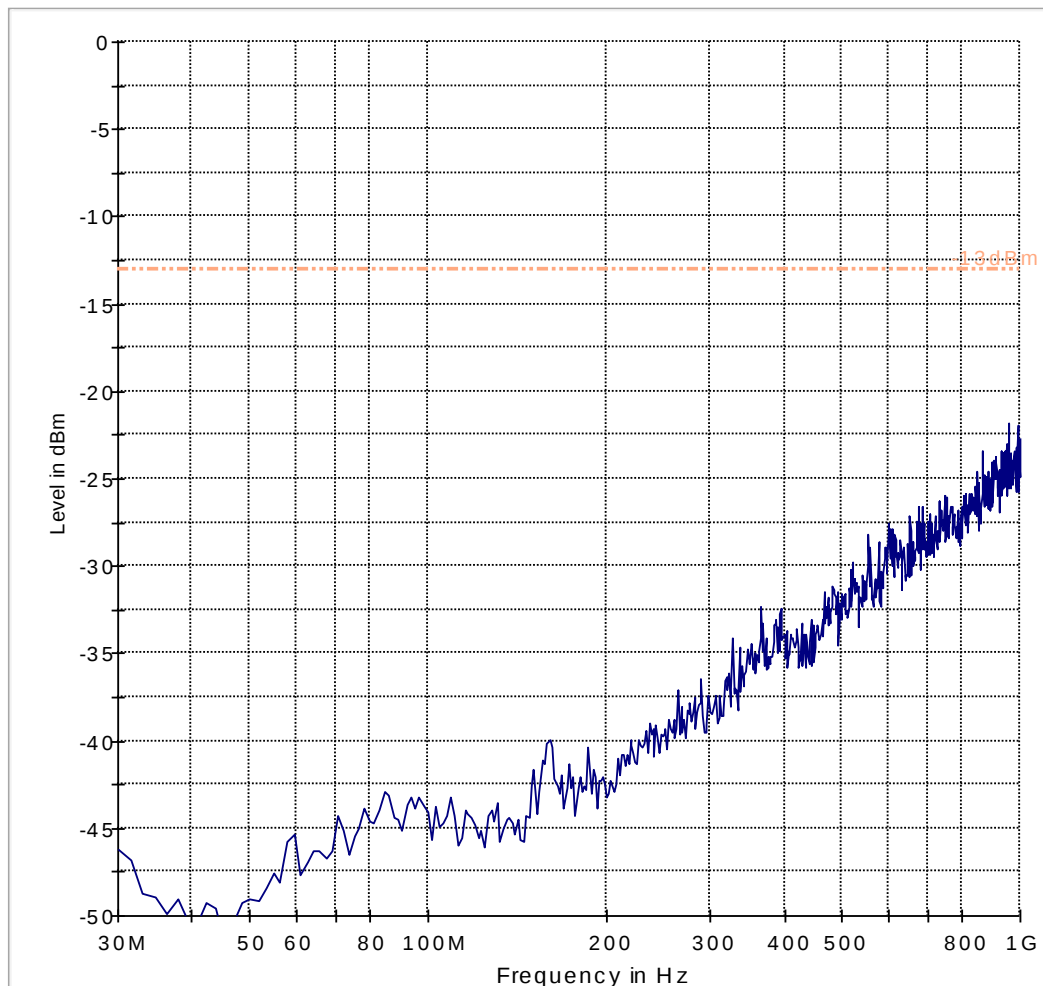
Pass.

Legend for the plots:

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

Radiated Spurious Emissions (UMTS Band 2) Tx: Low Channel
Test results: 30M-1GHz

FCC 24 30-1000MHz

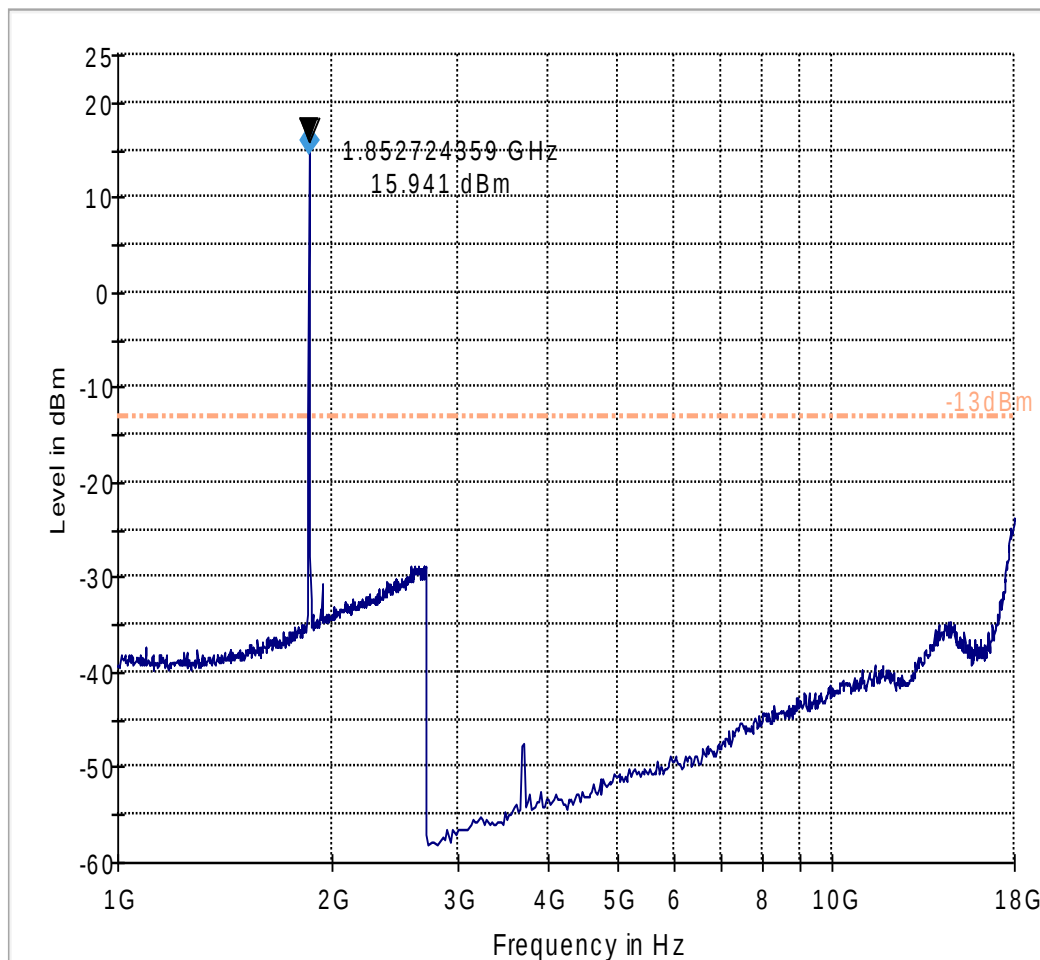


----- -13dBm — Preview Result 1-PK+

Test results: 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

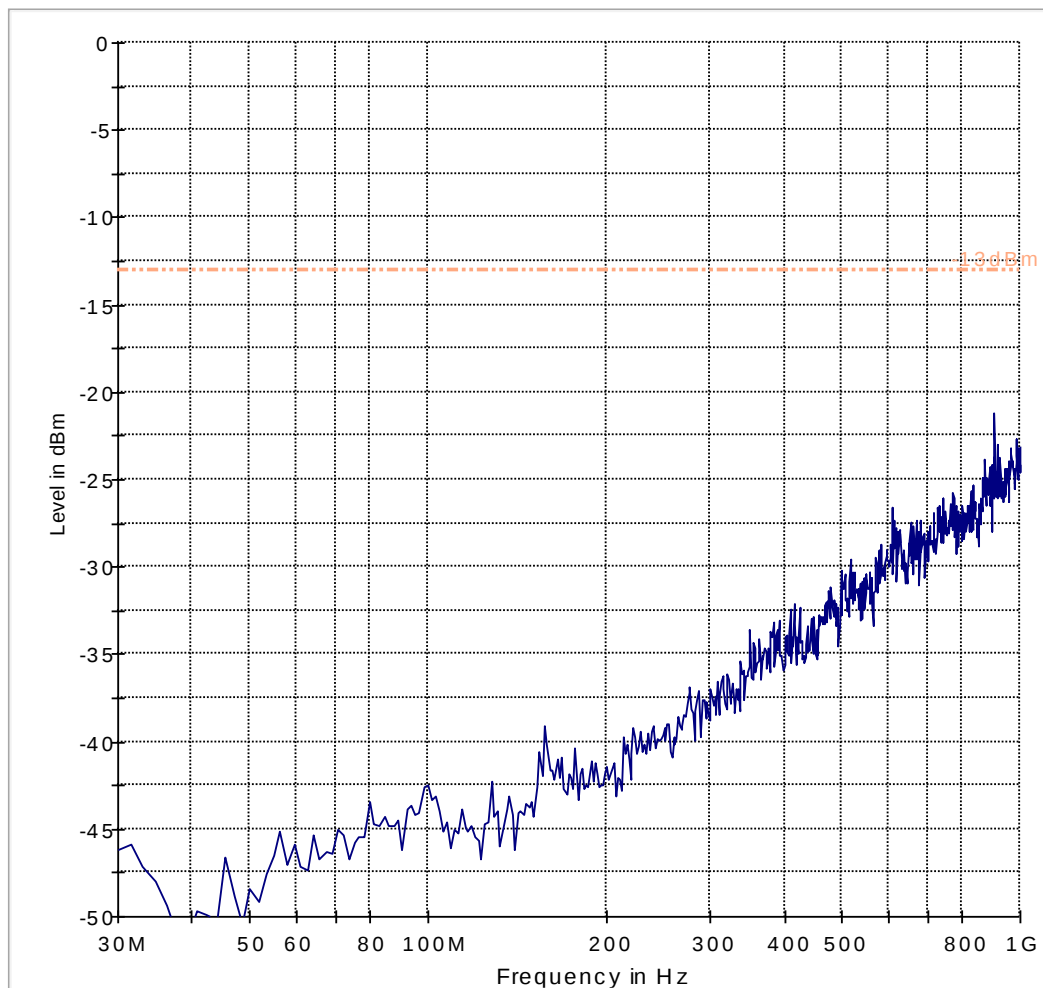
FCC 24 1-18GHz



----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Radiated Spurious Emissions (UMTS Band 2) Tx: Mid Channel
Test results: 30M-1GHz

FCC 24 30-1000MHz

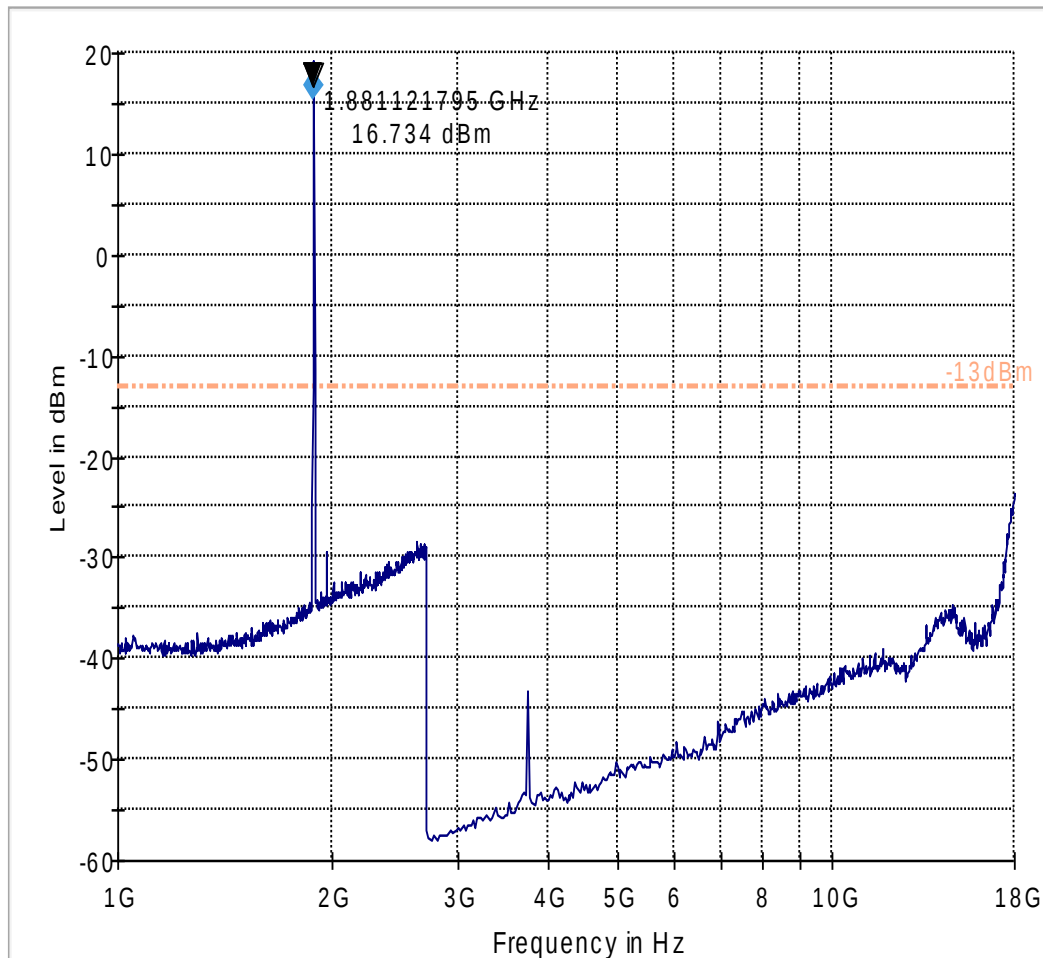


----- -13dBm — Preview Result 1-PK+

Test results 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

FCC 24 1-18GHz

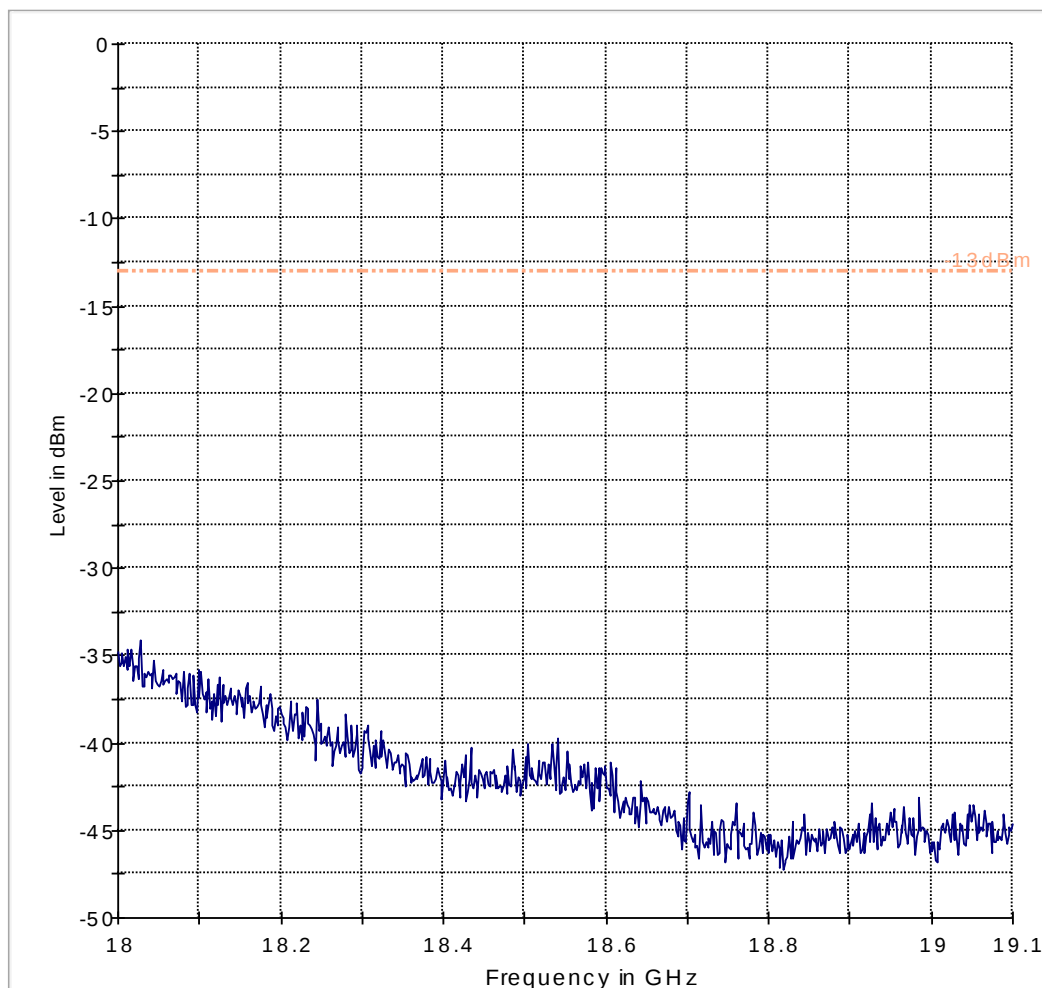


----- -13dBm ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

Test results: 18GHz-19.1GHz

Note: Worst case representation for all channels in this band of operation

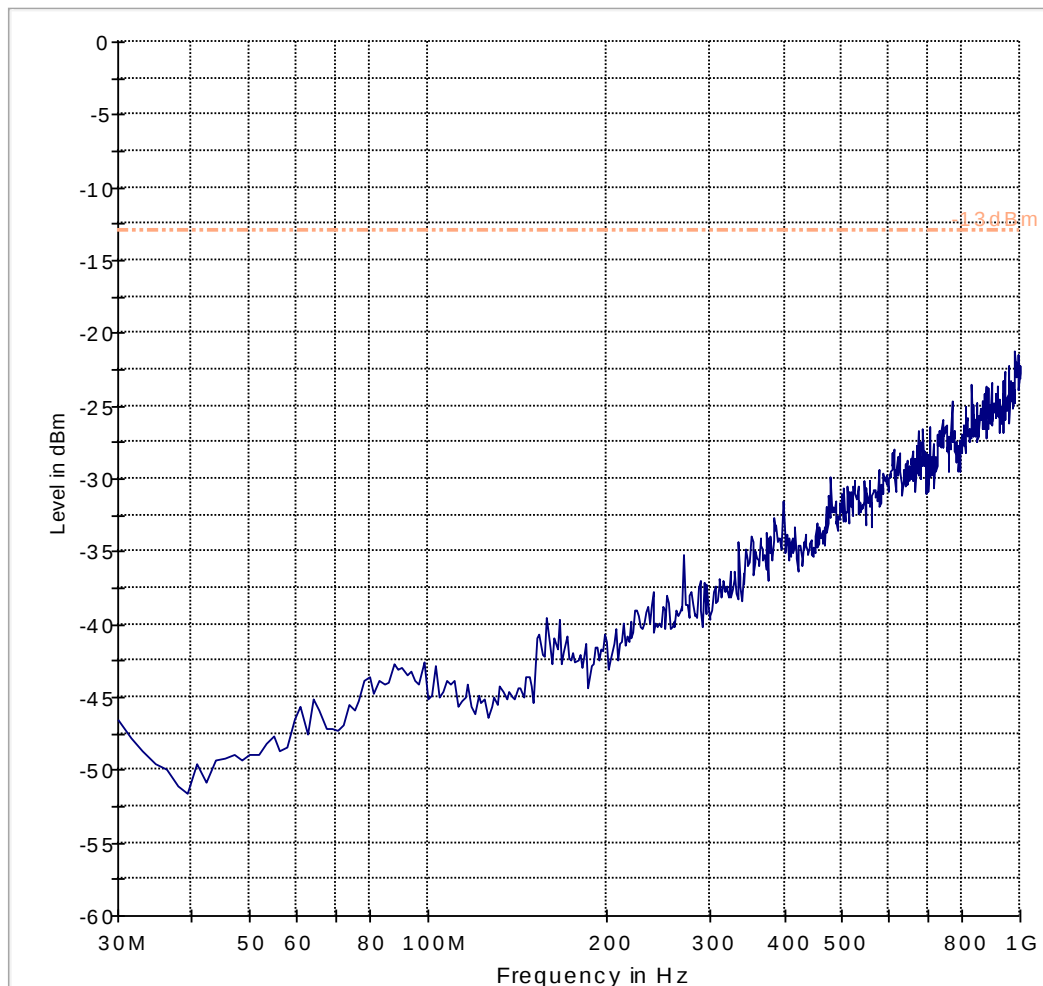
FCC 24 18-19.1GHz



----- -13dBm ——— Preview Result 1-PK+

Radiated Spurious Emissions (UMTS Band 2) Tx: High Channel
Test results 30M-1GHz

FCC 24 30-1000MHz

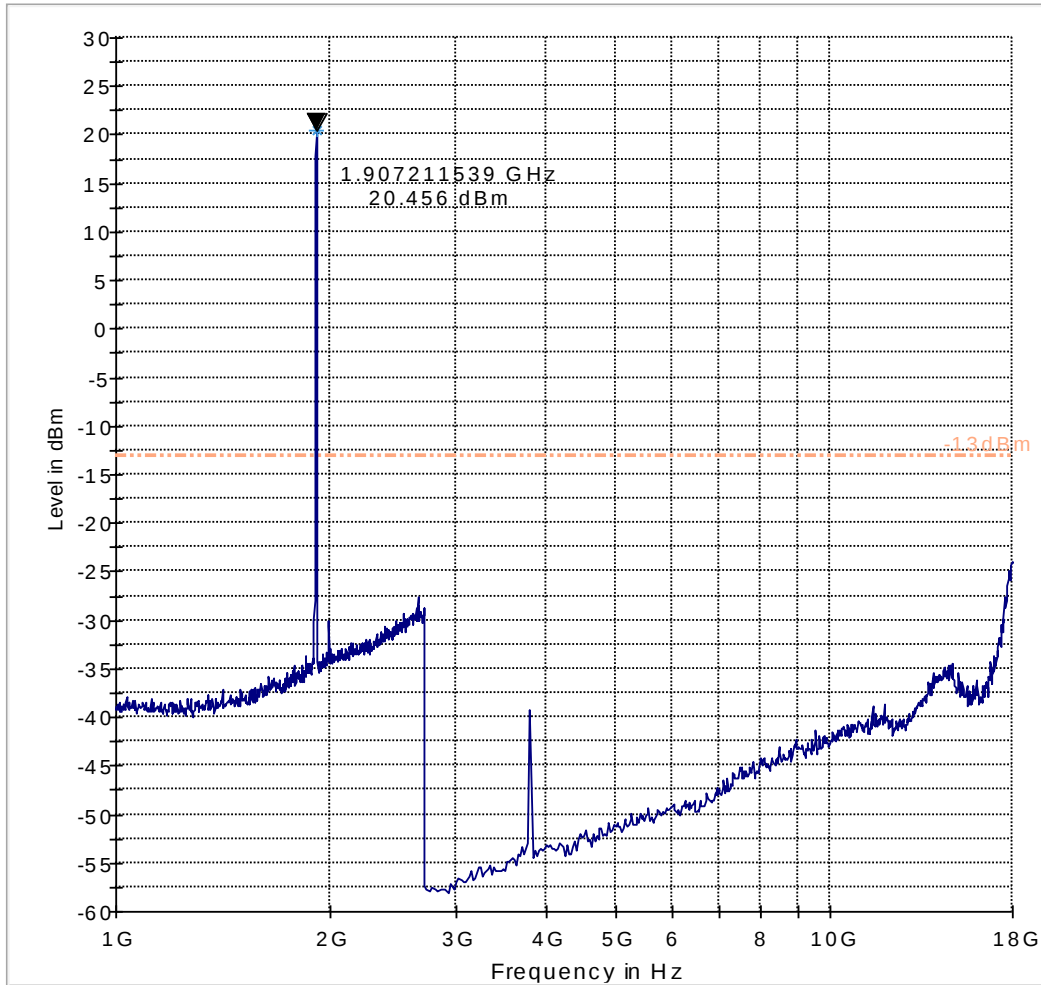


----- -13dBm — Preview Result 1-PK+

Test results: 1GHz-18GHz

Emission signal above the limit line in the plots is from the Carrier.

FCC 24 1-18GHz

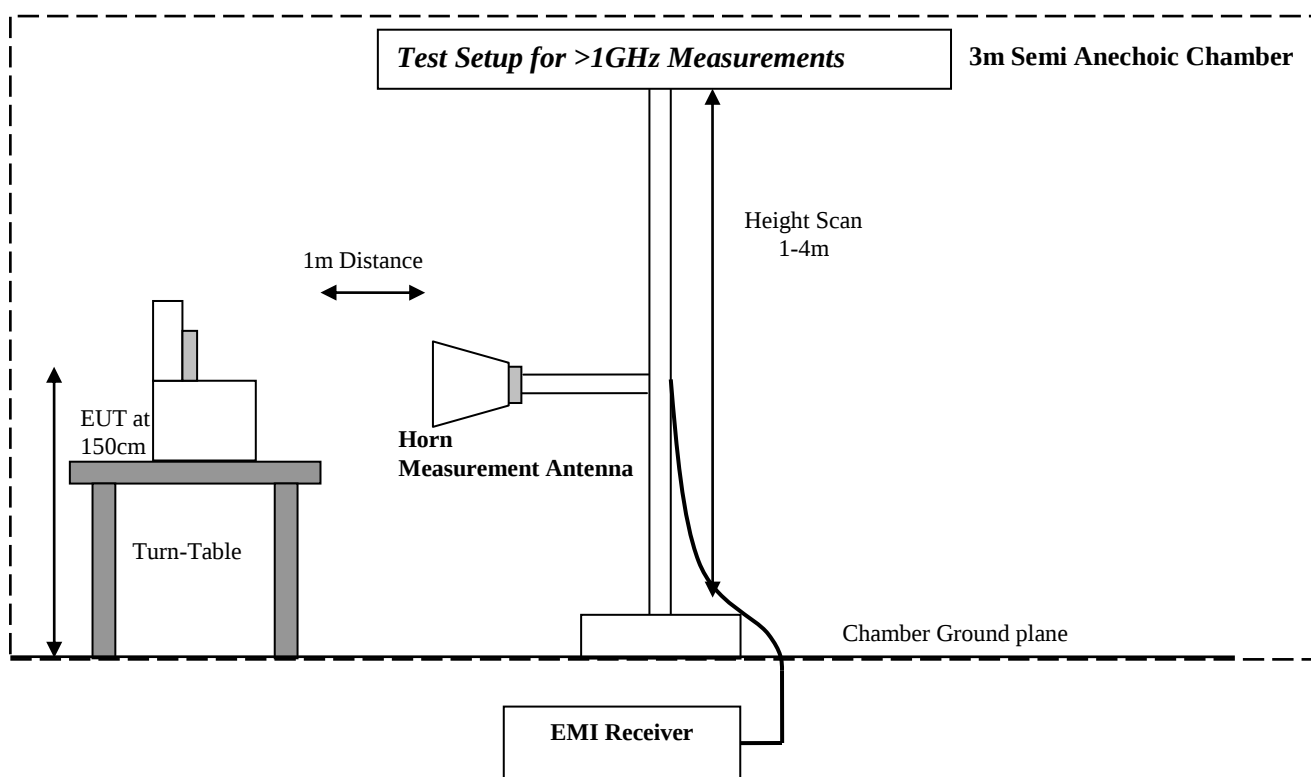
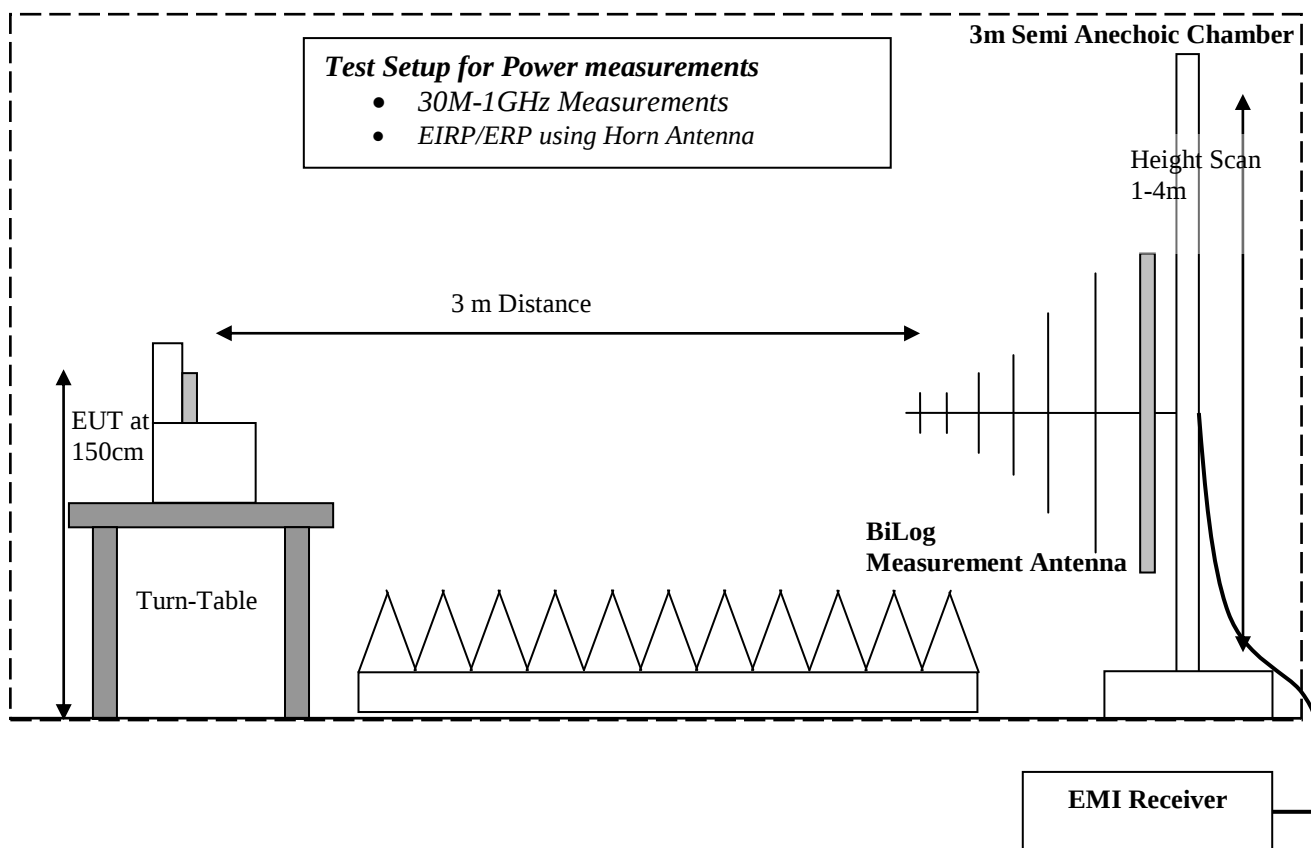


----- -13dBm ——— Preview Result 1-PK+ * Data Reduction Result 1 [2]-PK+

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	2 Years
EMI Receiver/Analyzer	ESU 40	Rohde & Schwarz	100251	Aug 2012	2 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	May 2011	2 Years
Loop Antenna	6512	EMCO	00049838	Aug 2011	3 years
Biconilog Antenna	3141	EMCO	0005-1186	Apr 2012	3 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Apr 2012	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Sep 2011	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	July 2012	2 Years
Power Smart Sensor	R&S	NRP-Z81	100161	May 2011	2 Years
Multimeter	MM200	Klein	N/A	Apr 2011	2 Years
Temp Hum Logger	TM320	Dickson	03280063	Mar 2012	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Mar 2012	1 Year

8 Test Setup Diagrams



9 Revision History

Date	Report Name	Changes to report	Report prepared by
2012-09-18	EMC_NBSPS-006-12001_WWAN	First version	Z Gray
2012-09-25	EMC_NBSPS-006-12001_WWAN_Rev1	Typo correction in Sec 4 with module FCC ID. Corrected Equipment calibration details in Sec 7.	Z Gray