



FCC Test Report

FOR:

Harman International

Model Number: VP3 NA and VP4 NA
Product Description: Automotive Infotainment Unit

FCC ID: QNG-BE2801

47 CFR Part 2, 22, 24

TEST REPORT #: EMC_HARMA_018_11001_BE2801_WWAN_Rev1
DATE: 2012-09-06



FCC listed:
A2LA Accredited

IC recognized #
3462B-1

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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 no deviations were ascertained during the course of the tests performed.

Company	Description	Model Number
Harman International	Automotive Infotainment Unit	VP3 NA
		VP4 NA

Responsible for Testing Laboratory:

2012-09-06	Compliance	Sajay Jose (Test Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2012-09-06	Compliance	Josie Sabado (EMC 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:	Josie Sabado

2.2 Identification of the Client

Client:	Harman International
Street Address:	26500 Haggerty Road
City/Zip Code	Farmington Hills, MI 48331
Country	USA
Contact Person:	Shain E. Chmura
Phone No.	+1 (248) 592-3157
e-mail:	schmura@harman.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:

May 30, 2012-June 28, 2012.

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	Uconnect
Model No:	VP3 NA VP4 NA
Product Description:	Automotive Infotainment Unit
FCC-ID:	QNG-BE2801
Frequency Range of test/ number of channels:	CDMA Band Class 0: 824.7 – 848.31 MHz / 656 Channels CDMA Band Class 1: 1851.25 – 1908.75 MHz / 906 Channels
Type(s) of Modulation:	QPSK, HPSK
Other radios supported in the device:	802.11 b/g: 2412 – 2462 MHz / 11 Channels Bluetooth: 2402 – 2480 MHz / 79 Channels GPS: 1.575 GHz / 1 Channel
Antenna Type and Gain:	External Max Antenna Gain (As stated by manufacturer)- 850 Band: -2.5 dBi 1900 Band: -2.5 dBi
Operating Voltage:	12 VDC
Rated Operating temperature range:	-40°C to 85°C
Prototype / Production unit:	Pre-Production

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Model	Notes/Comments
1	T00BE349170251	PV	11.48.1	VP3	Radiated Unit

3.3 Identification of Accessory Equipment

AE #	Type	Manufacturer	Model	Serial Number
1	GPS Antenna	N/A	N/A	N/A
2	Cellular and GPS Combined Antenna	N/A	N/A	N/A

3.4 Identification of Support Test Equipment

STE #	Type	Manufacturer	Model	Serial Number
1	Laptop	IBM	ThinkPad T41	55274-641-4106881-23841
2	Optical CAN Transceiver	SonTec Electricity	OPTOCAN 2000	CAN 12/133HS
3	Optical CAN Transceiver	SonTec Electricity	OPTOCAN 2000	CAN 12/134HS
4	Vehicle Interface	EEPOD LLC	MCS1	N/A

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

This test report is to support a request for new equipment authorization under the FCC ID: QNG-BE2801.

The product comes in two variants- VP3 NA and VP4 NA. All testing was performed on VP3 NA Variant. The only hardware difference between VP3 and VP4 is the flash NAND memory size (8GB on VP3 and 16GB on VP4). Both variants use the same software, but certain non-radio relevant features are disabled on VP3.

Based on this declaration from the manufacturer, testing was only performed on VP3 variant, and deemed sufficient to establish compliance of VP4 variant to the applicable requirements.

This product integrates the precertified WWAN module : Sierra Wireless AR5550.

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: N7NAR5550, Test Report #10U13438-1, Revision B issued by CCS on December 02, 2010.

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)	RF Output Power	Nominal	CDMA 1xRTT EVDO Rev. A	■	□	□	□	Complies
§2.1055 §22.355	Frequency Stability	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1049 §22.917(b)	Occupied Bandwidth	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1051 §22.917	Band Edge Compliance	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1051 §22.917	Conducted Spurious Emissions	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1053 §22.917	Radiated Spurious Emissions	Nominal	EVDO Rev. A	■	□	□	□	Complies

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

1. Conducted measurements leveraged 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)	RF Output Power	Nominal	CDMA 1xRTT EVDO Rev. A	■	□	□	□	Complies
§2.1055 §24.235	Frequency Stability	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1049 §24.238(b)	Occupied Bandwidth	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1051 §24.238	Band Edge Compliance	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1051 §24.238	Conducted Spurious Emissions	Nominal	CDMA 1xRTT EVDO Rev. A	□	□	□	■	See Note 1
§2.1053 §24.238	Radiated Spurious Emissions	Nominal	EVDO Rev. A	■	□	□	□	Complies

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

1. Conducted measurements leveraged 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

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.

6.1.3 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.

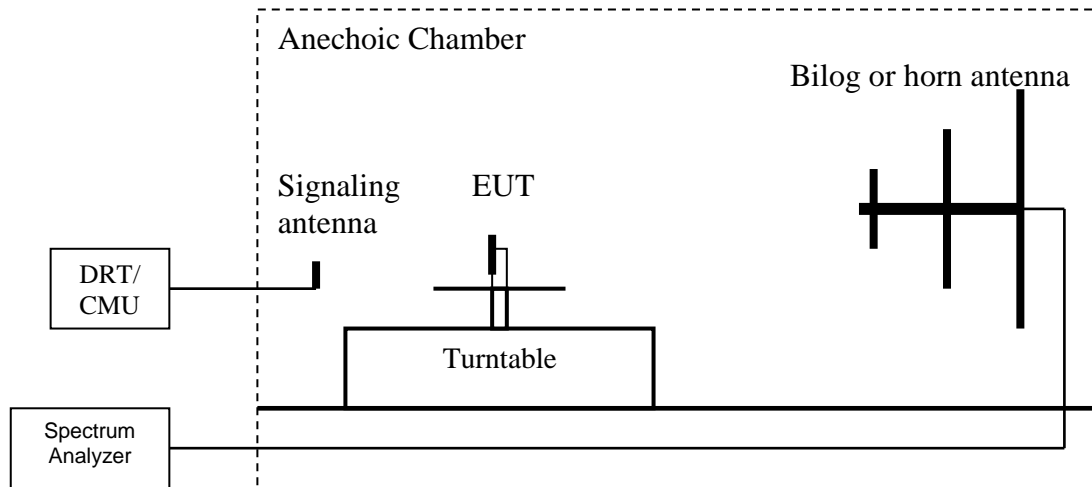
6.1.3.2 FCC 24.232 (b)(c) Power limits.

(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.

6.1.4 Radiated Output Power Measurement procedure

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



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

(**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 RF Power Output

6.1.5.1 Test Conditions:

Tnom: 25°C; Vnom: 12 V

850 MHz Band:

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

Radiated Power ERP (dBm)		
Frequency (MHz)	CDMA 850 (1xRTT)	CDMA 850 (EVDO Rev. A)
824.70	28.49	28.95
836.52	28.70	28.57
848.31	29.06	28.51

1900 MHz Band:

Limit: FCC: Nominal Peak Output Power < 33 dBm (2W)

Radiated Power EIRP (dBm)		
Frequency (MHz)	CDMA 1900 (1xRTT)	CDMA 1900 (EVDO Rev. A)
1851.21	24.12	26.22
1880.0	23.96	27.29
1908.75	24.24	25.63

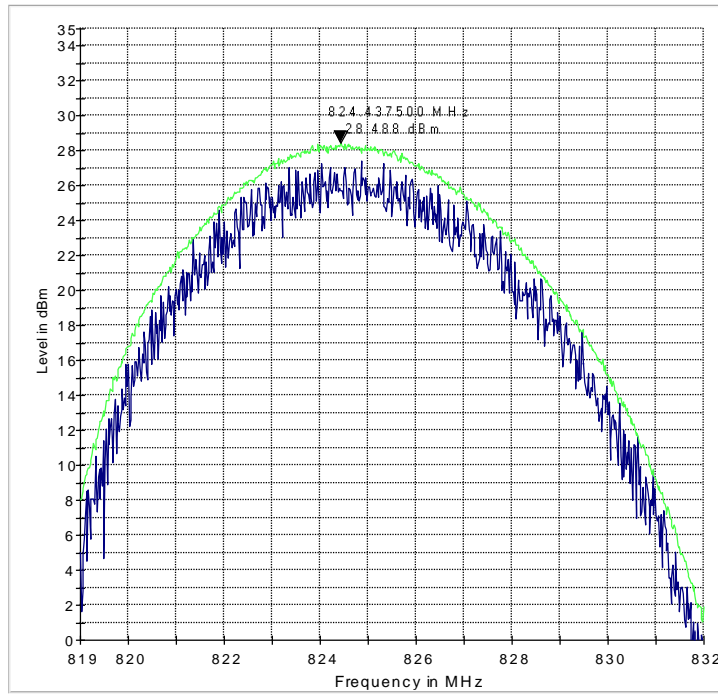
6.1.5.2 Measurement Result

Pass.

6.1.5.3 Results

ERP (CDMA 850) CHANNEL 1013

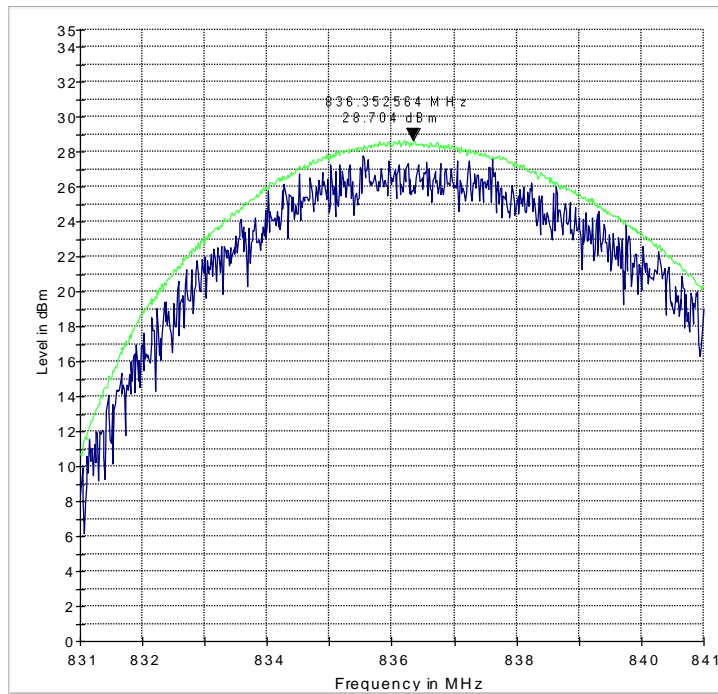
ERP 850 L



— MaxPeak-ClearW rite-PK+ — MaxPeak-MaxHold-PK+

ERP (CDMA 850) CHANNEL 384

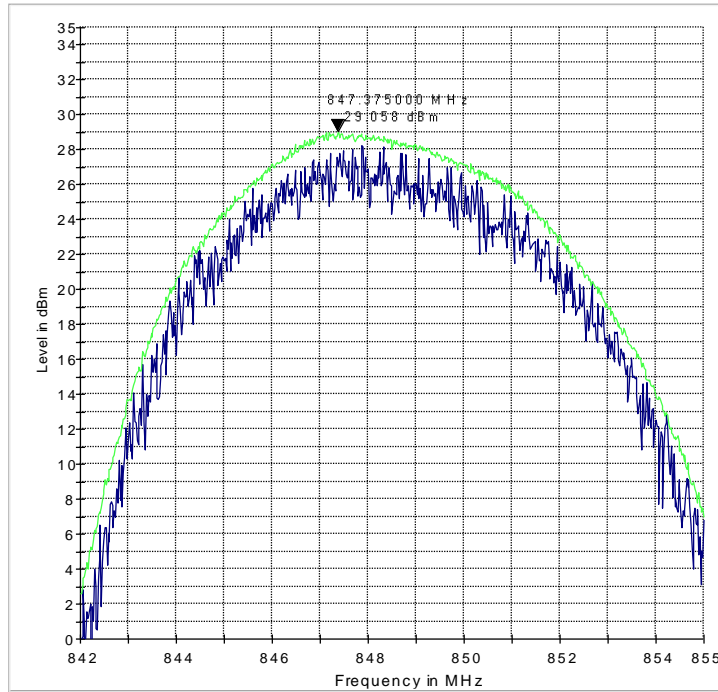
ERP 850 M



— MaxPeak-ClearW rite-PK+ — MaxPeak-MaxHold-PK+

ERP (CDMA 850) CHANNEL 777

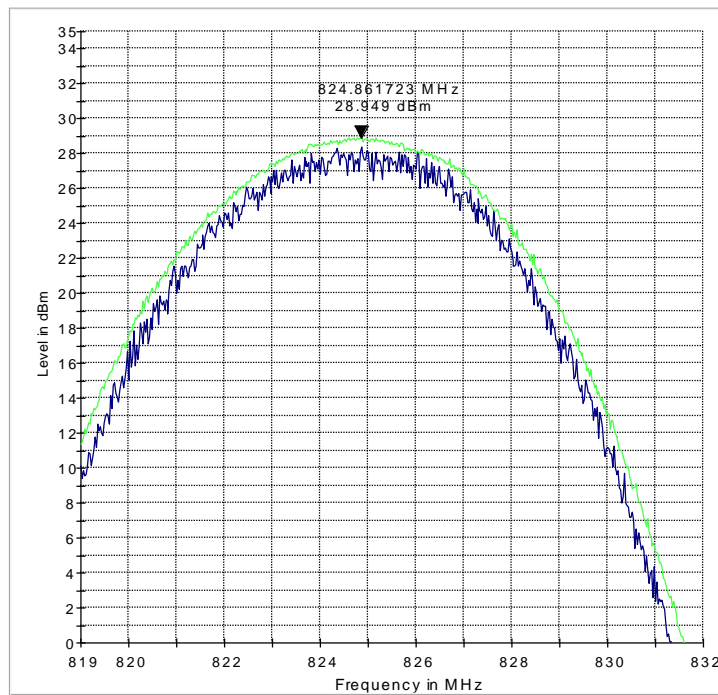
ERP 850 H



— MaxPeak-ClearWrite-PK+ — MaxPeak-MaxHold-PK+

ERP (EVDO 850) CHANNEL 1013

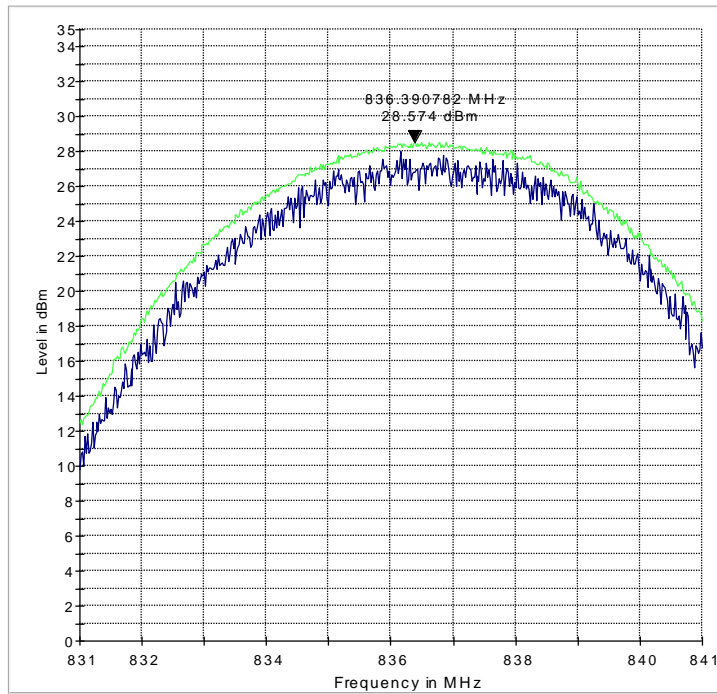
ERP 850 L



— MaxPeak-ClearWrite-PK+ — MaxPeak-MaxHold-PK+

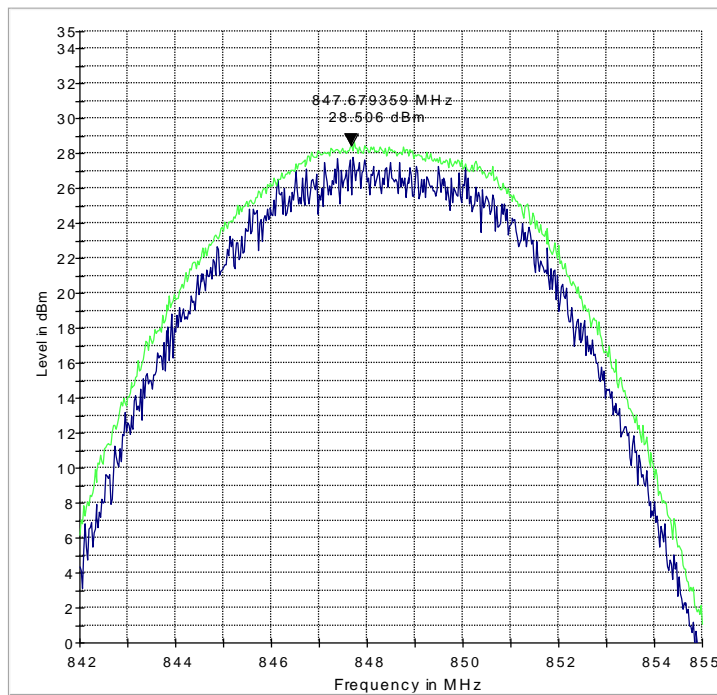
ERP (EVDO 850) CHANNEL 384

ERP 850 M



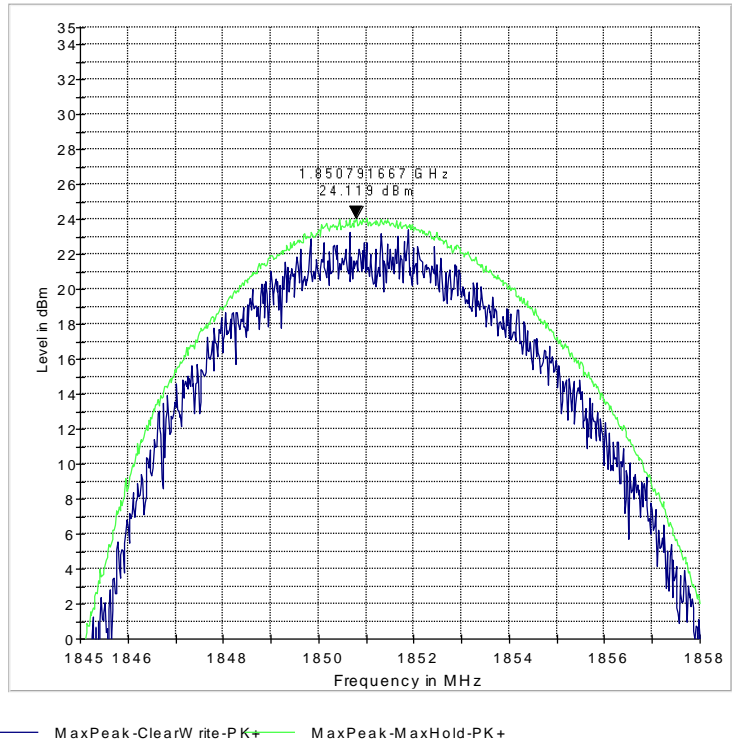
ERP (EVDO 850) CHANNEL 777

ERP 850 H



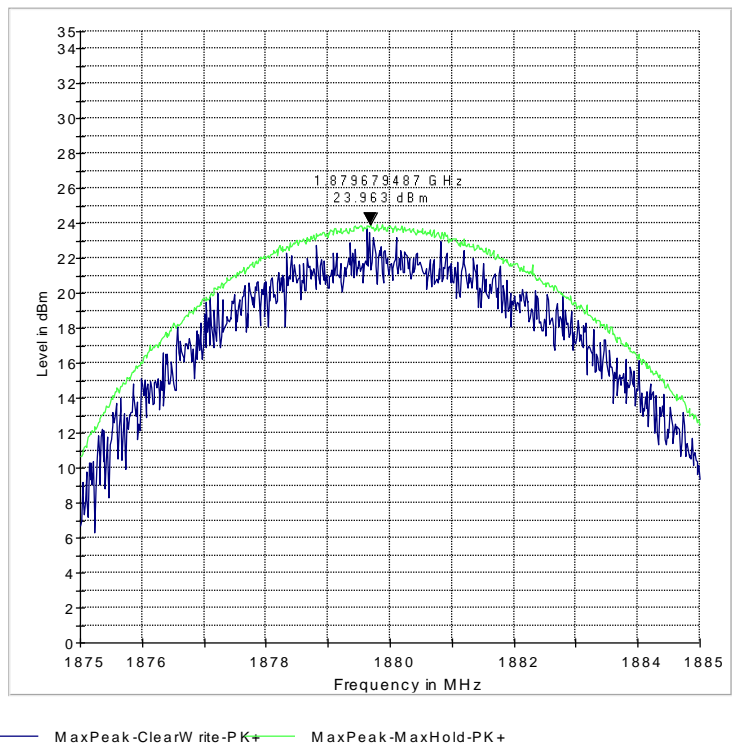
EIRP (CDMA-1900) CHANNEL 25

EIRP 1900 L



EIRP (CDMA-1900) CHANNEL 600

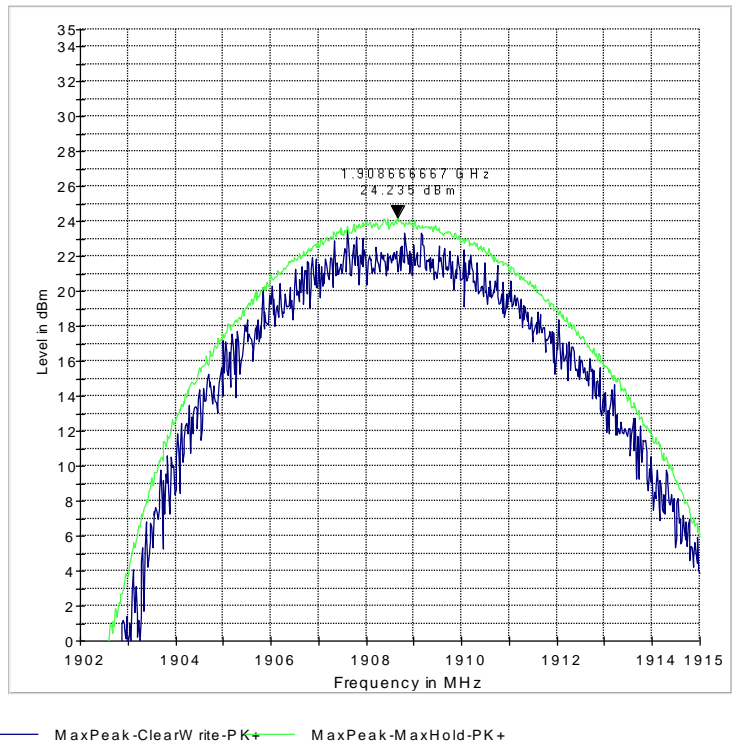
EIRP 1900 M





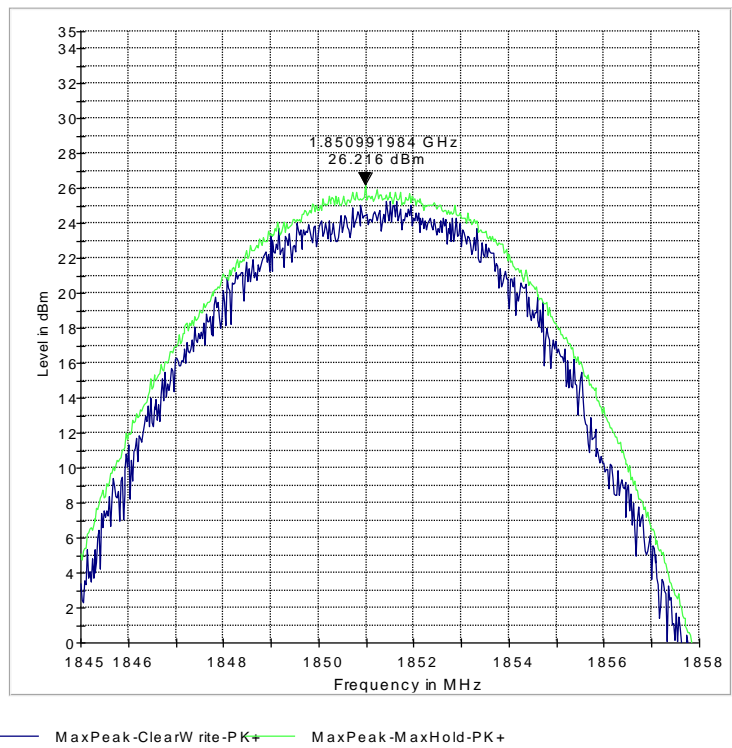
EIRP (CDMA-1900) CHANNEL 1175

EIRP 1900 H



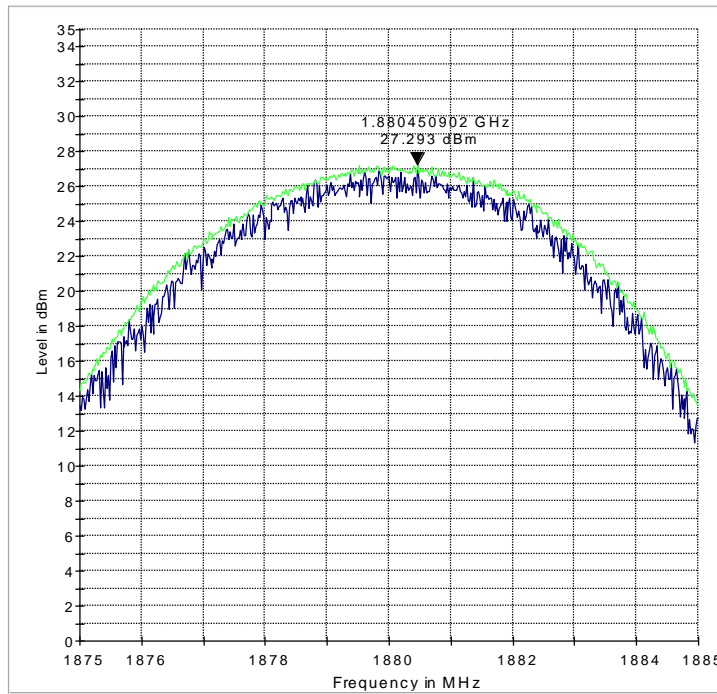
EIRP (EVDO-1900) CHANNEL 25

EIRP 1900 L



EIRP (EVDO-1900) CHANNEL 600

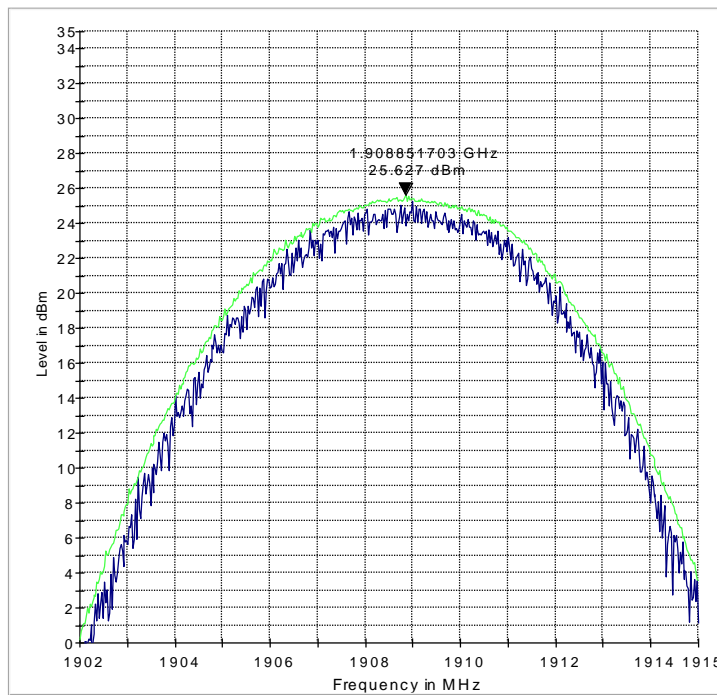
EIRP 1900 M



— MaxPeak-ClearW rite-PK+ — MaxPeak-MaxHold-PK+

EIRP (EVDO-1900) CHANNEL 1175

EIRP 1900 H

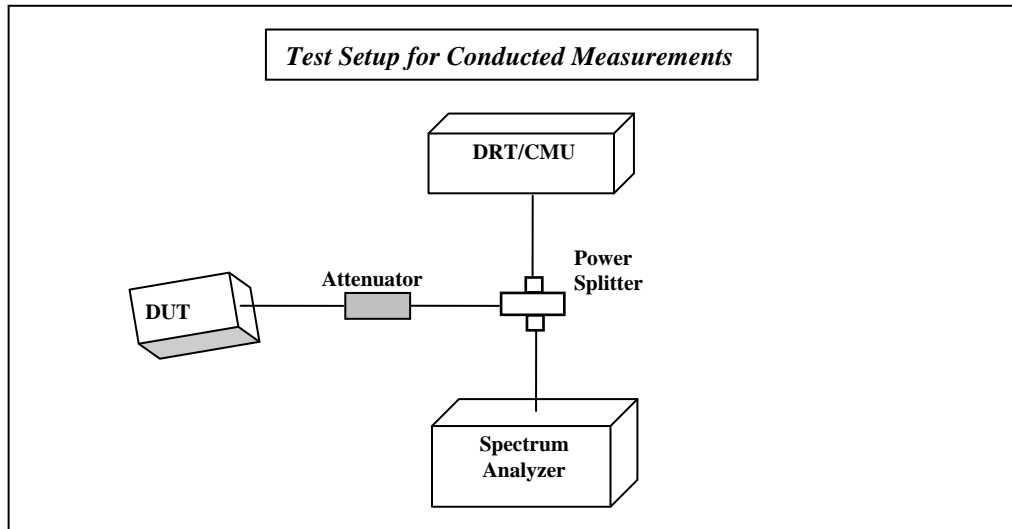


— MaxPeak-ClearW rite-PK+ — MaxPeak-MaxHold-PK+

6.1.6 Conducted Output Power Verification:

6.1.6.1 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.
6. CDMA 1xRTT power verification was performed in RC3 SO55 (Loopback mode).

6.1.6.2 Test Conditions:

Tnom: 25°C; Vnom: 12 V

6.1.6.3 Measurement Results:

CDMA 850 (1xRTT)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
824.70	29.21	29.23
836.52	29.14	29.38
848.31	29.63	28.99

CDMA 850 (EVDO Rel. 0)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
824.70	29.99	29.81
836.52	30.06	29.97
848.31	30.00	29.38

CDMA 850 (EVDO Rev. A)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
824.70	30.01	30.87
836.52	30.06	31.25
848.31	30.31	31.24

CDMA 1900 (1xRTT)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1851.21	29.23	27.29
1880.0	29.69	27.99
1908.75	28.69	27.41

CDMA 1900 (EVDO Rel. 0)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1851.21	29.11	27.91
1880.0	30.15	28.24
1908.75	29.72	28.09

CDMA 1900 (EVDO Rev. A)		
Frequency (MHz)	Conducted Output Power from module certification	Conducted Output Power from the EUT
	(dBm)	(dBm)
1851.21	30.03	29.56
1880.0	30.47	30.03
1908.75	29.60	29.55

6.1.6.4 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.

6.2 Spurious Emissions Radiated

6.2.1 References

6.2.2 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238

6.2.3 Measurement requirements:

6.2.3.1 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.

6.2.3.2 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.

6.2.4 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.

6.2.4.1 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 or 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.

6.2.4.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

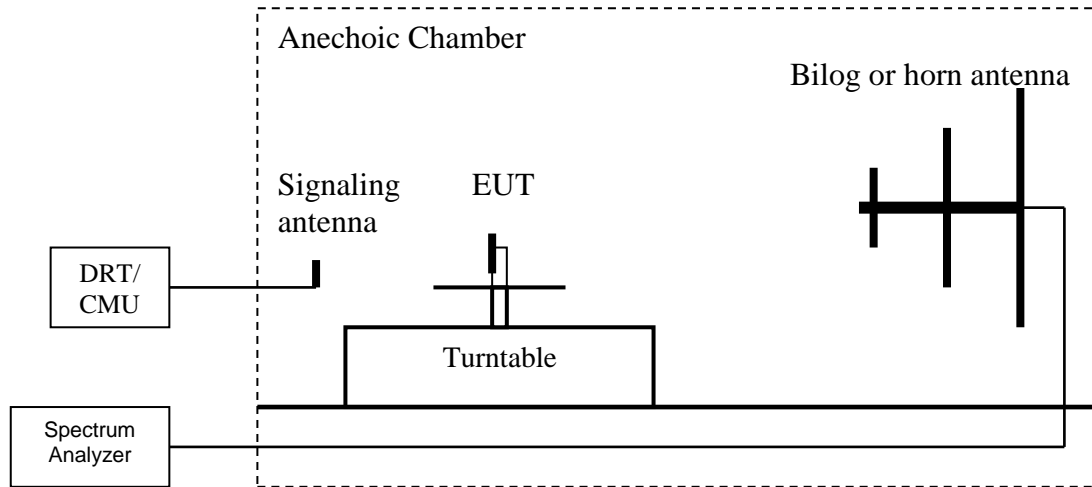
The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(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 or 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.

6.2.5 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.)

Spectrum analyzer settings: RBW=VBW=1MHz

6.2.6 Sample Calculations for Radiated Measurements

6.2.6.1 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

6.2.7 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 CDMA 850 and CDMA 1900 bands.

Radiated emission measurements were made only in CDMA EVDO Rev.A., since this mode operates 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.

6.3 Test Conditions:

Tnom: 25°C; Vnom: 12 V

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

6.3.1.1 Test Results Transmitter Spurious Emission EVDO 850:

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

6.3.1.2 Measurement Result

Pass.

Legend for the plots:

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

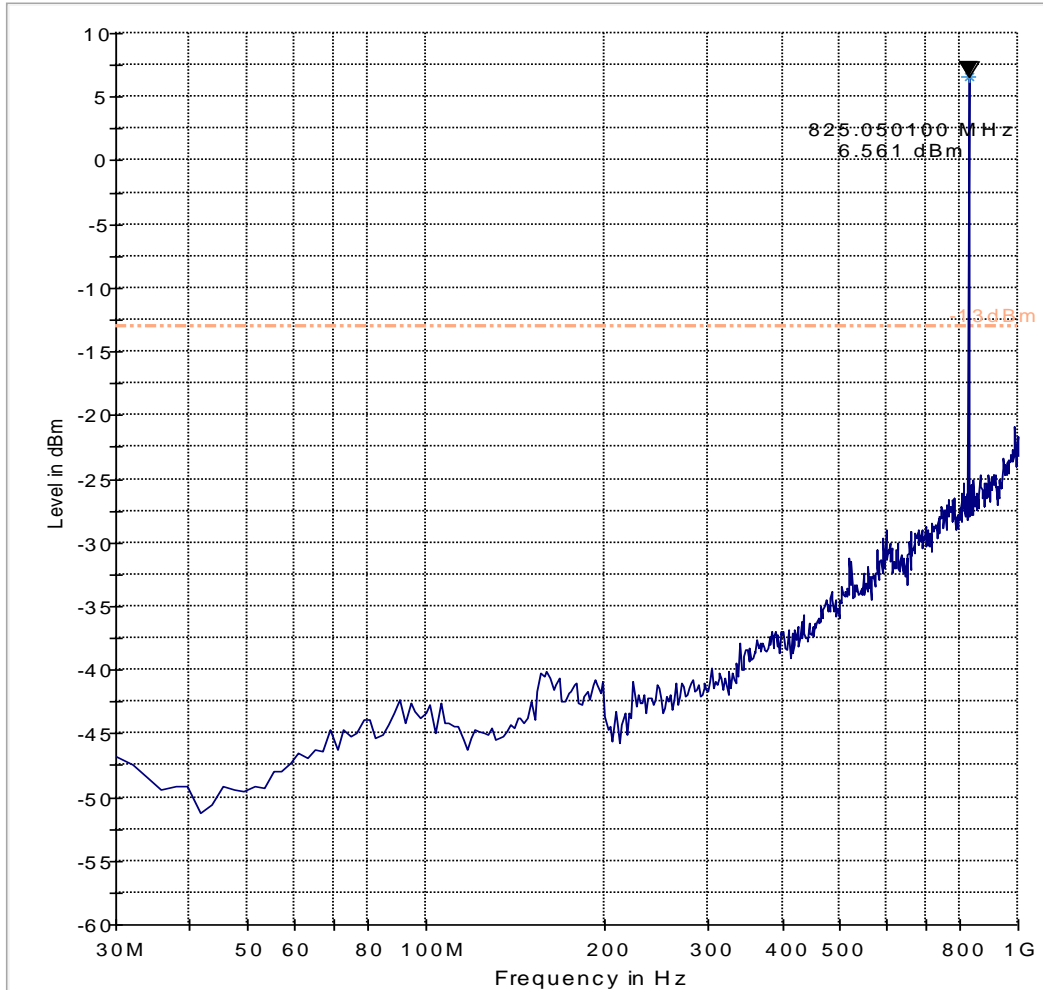


Radiated Spurious Emissions (EVDO-850) Tx: Low Channel

30MHz-1GHz

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

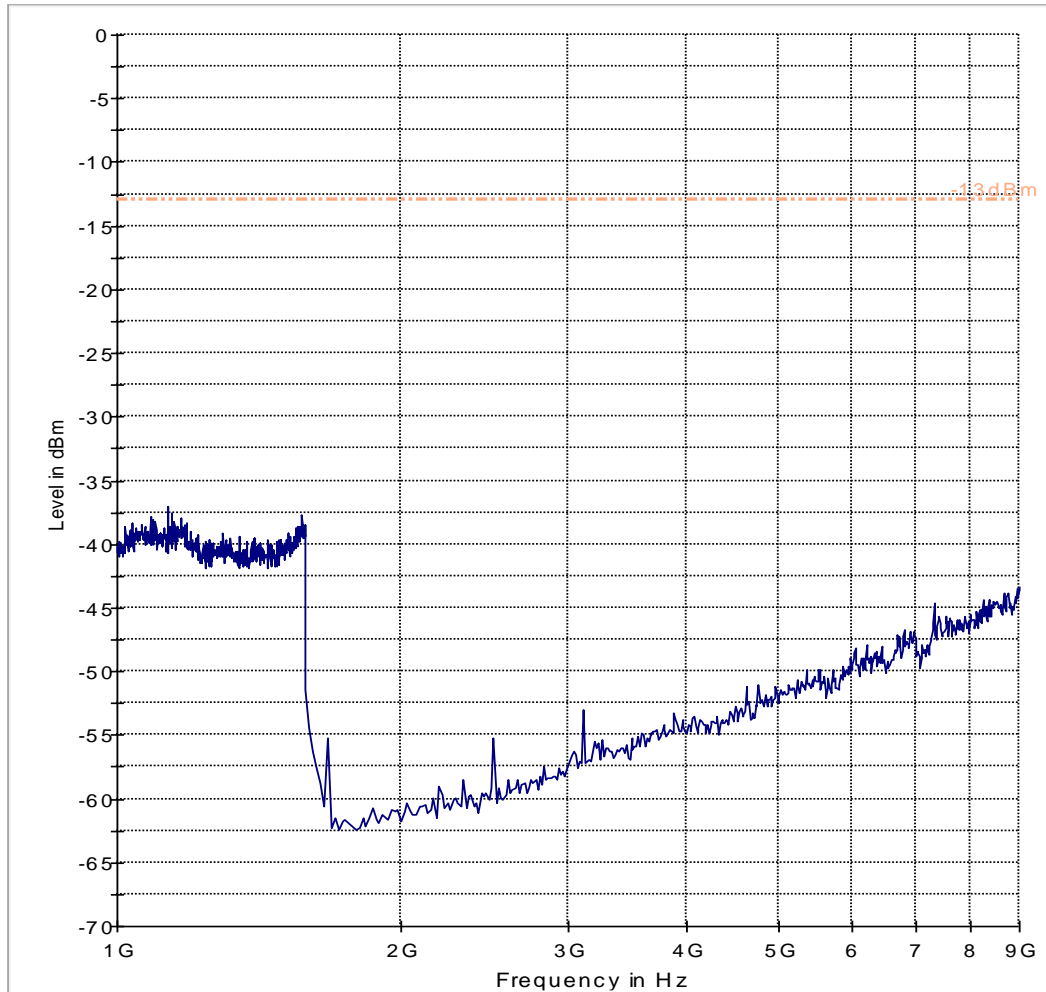
FCC 22 30-1000MHz



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

1GHz-9GHz

FCC 22 1-9GHz



----- -13dBm ——— Preview Result 1-PK+

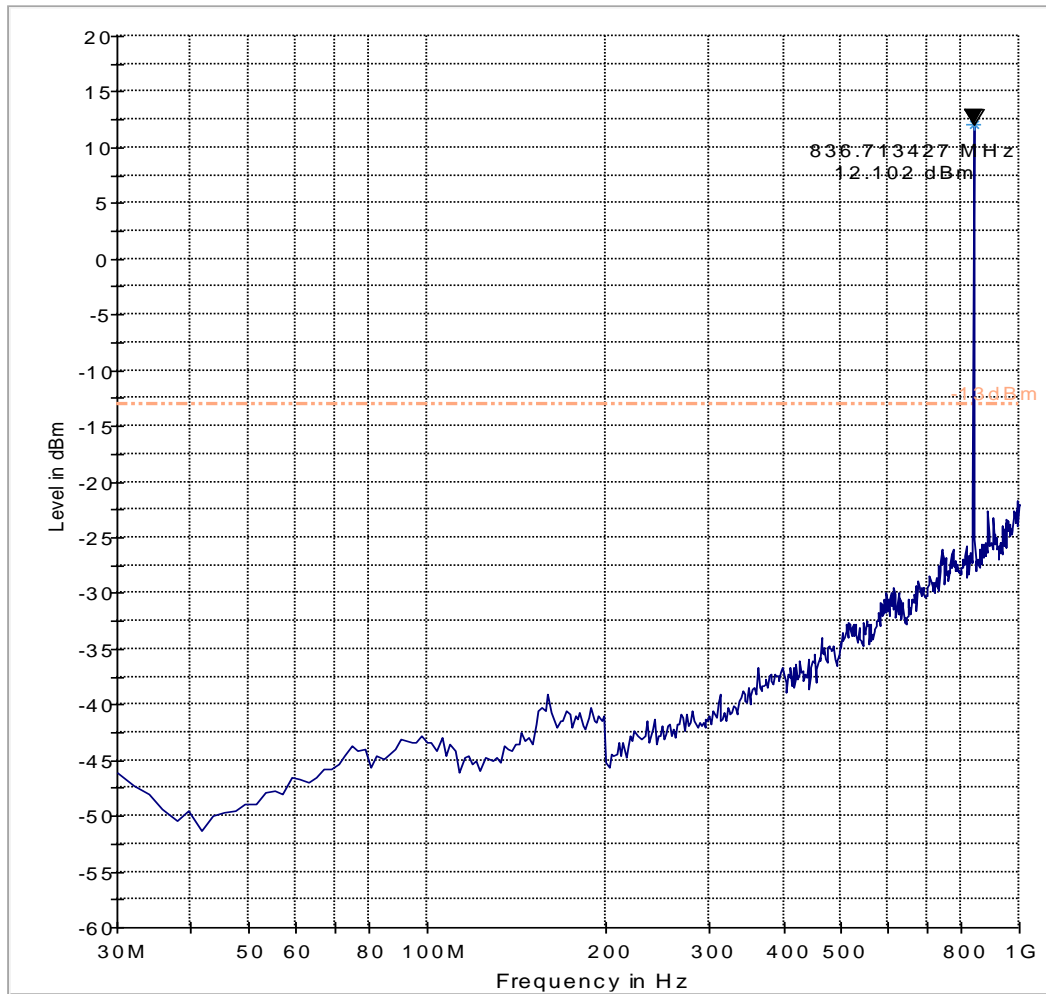


Radiated Spurious Emissions (EVDO-850) Tx: Mid Channel

30MHz-1GHz

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

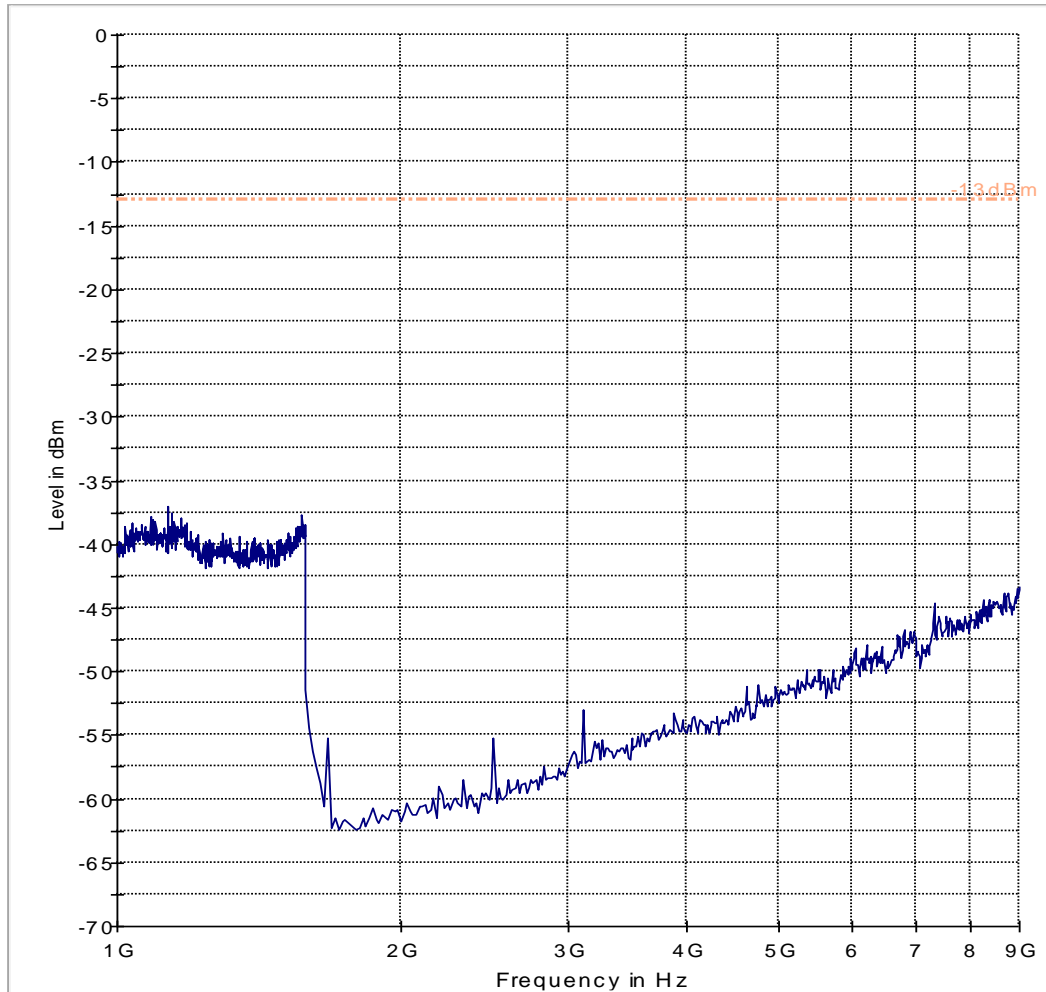
FCC 22 30-1000MHz



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

1GHz-9GHz

FCC 22 1-9GHz



----- -13dBm ——— Preview Result 1-PK+

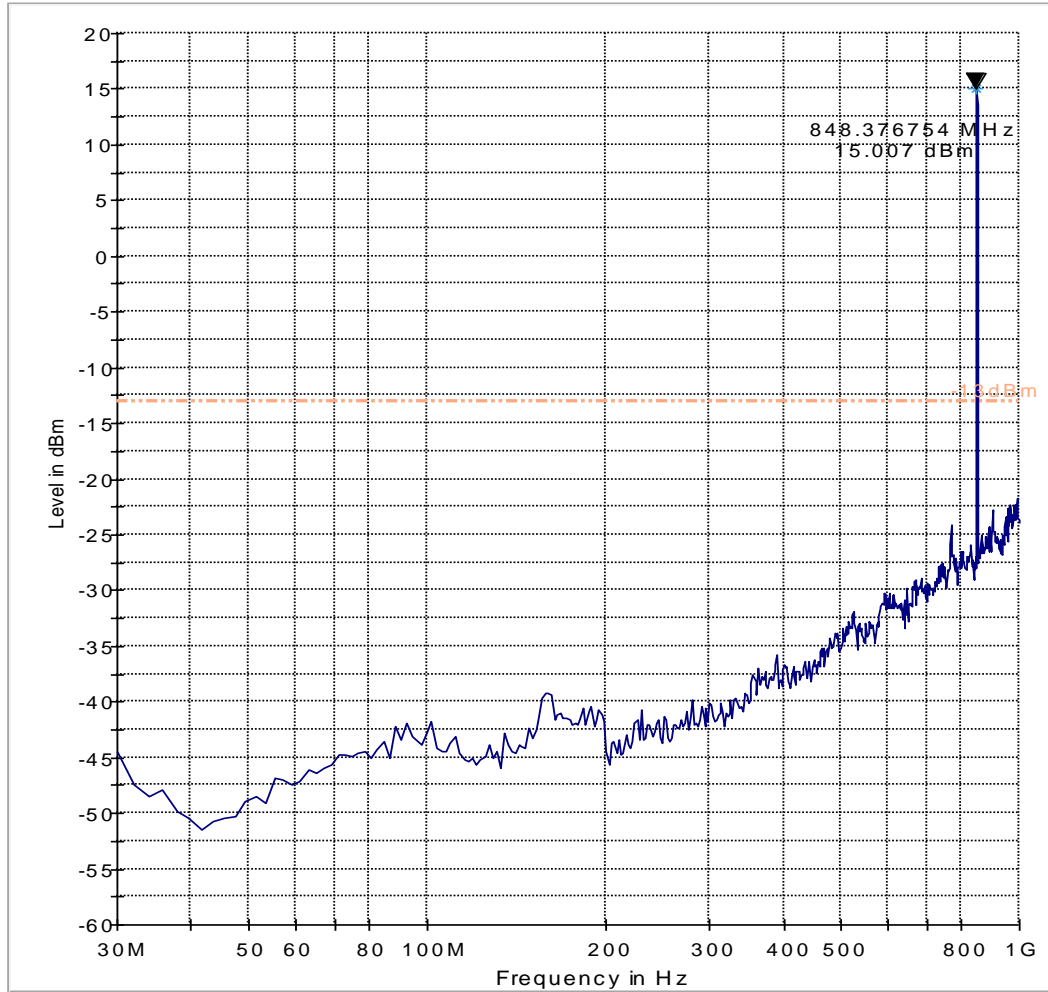


Radiated Spurious Emissions (EVDO-850) Tx: High Channel

30MHz-1GHz

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

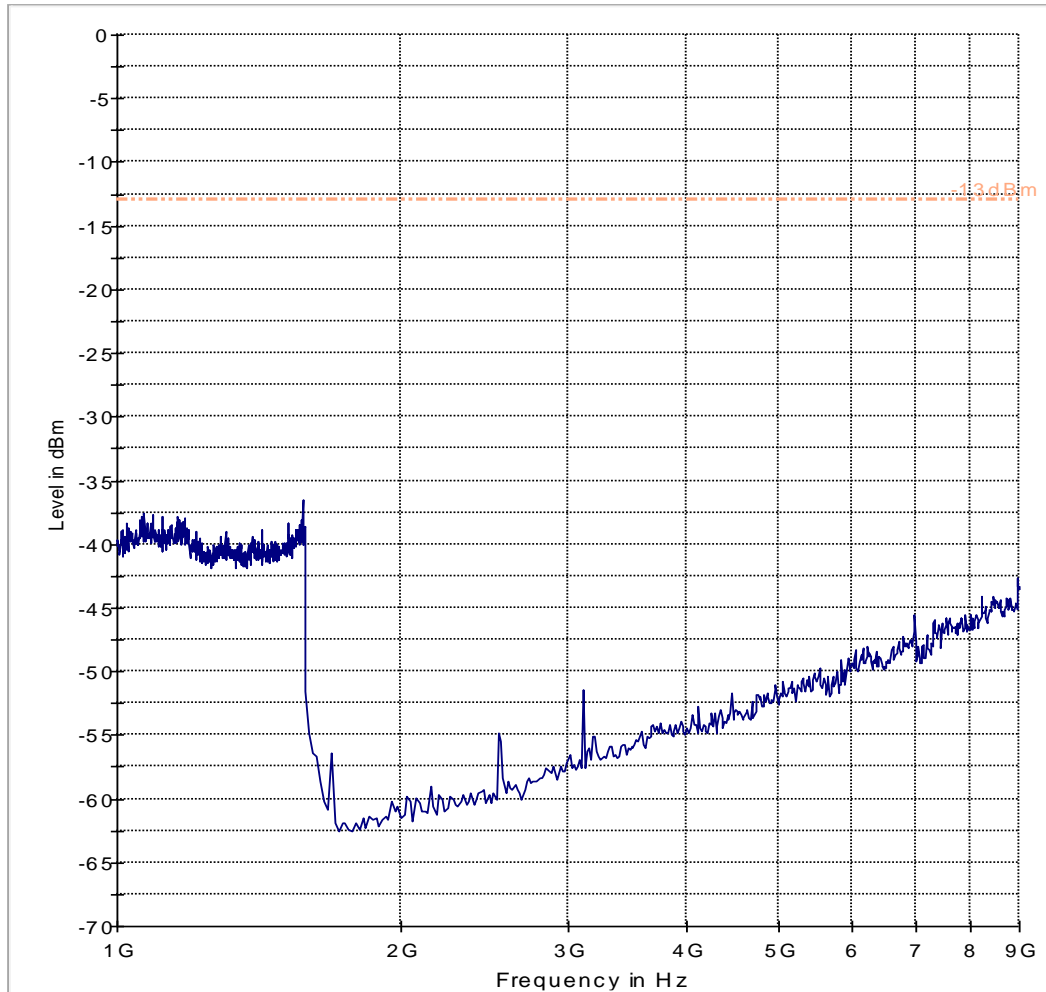
FCC 22 30-1000MHz



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

1GHz-9GHz

FCC 22 1-9GHz



----- -13dBm ——— Preview Result 1-PK+

6.3.1.3 Test Results Transmitter Spurious Emission EVDO-1900:

Harmonic	Tx ch-25 Freq.(MHz)	Level (dBm)	Tx ch-600 Freq. (MHz)	Level (dBm)	Tx ch-1175 Freq. (MHz)	Level (dBm)
1	1851.25	-	1880.0	-	1908.75	-
2	3702.5	NF	3760	NF	3817.5	NF
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	12958.75	NF	13160	NF	13361.25	NF
8	14810	NF	15040	NF	15270	NF
9	16661.25	NF	16920	NF	17178.75	NF
10	18512.5	NF	18800	NF	19087.5	NF
NF = Noise Floor						
Measurement Uncertainty: ±3dB						

6.3.1.4 Measurement Result

Pass.

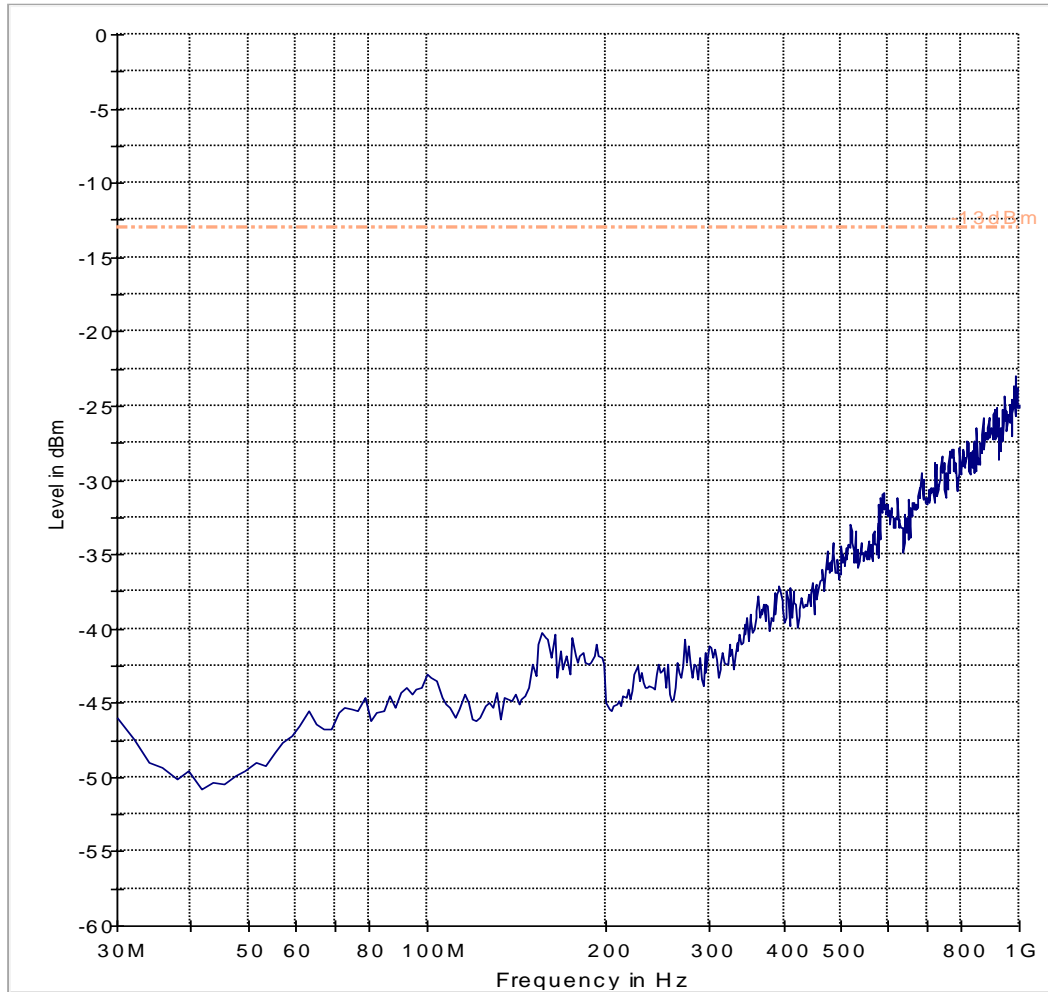
Legend for the plots:

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

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

30MHz-1GHz

FCC 24 30-1000MHz

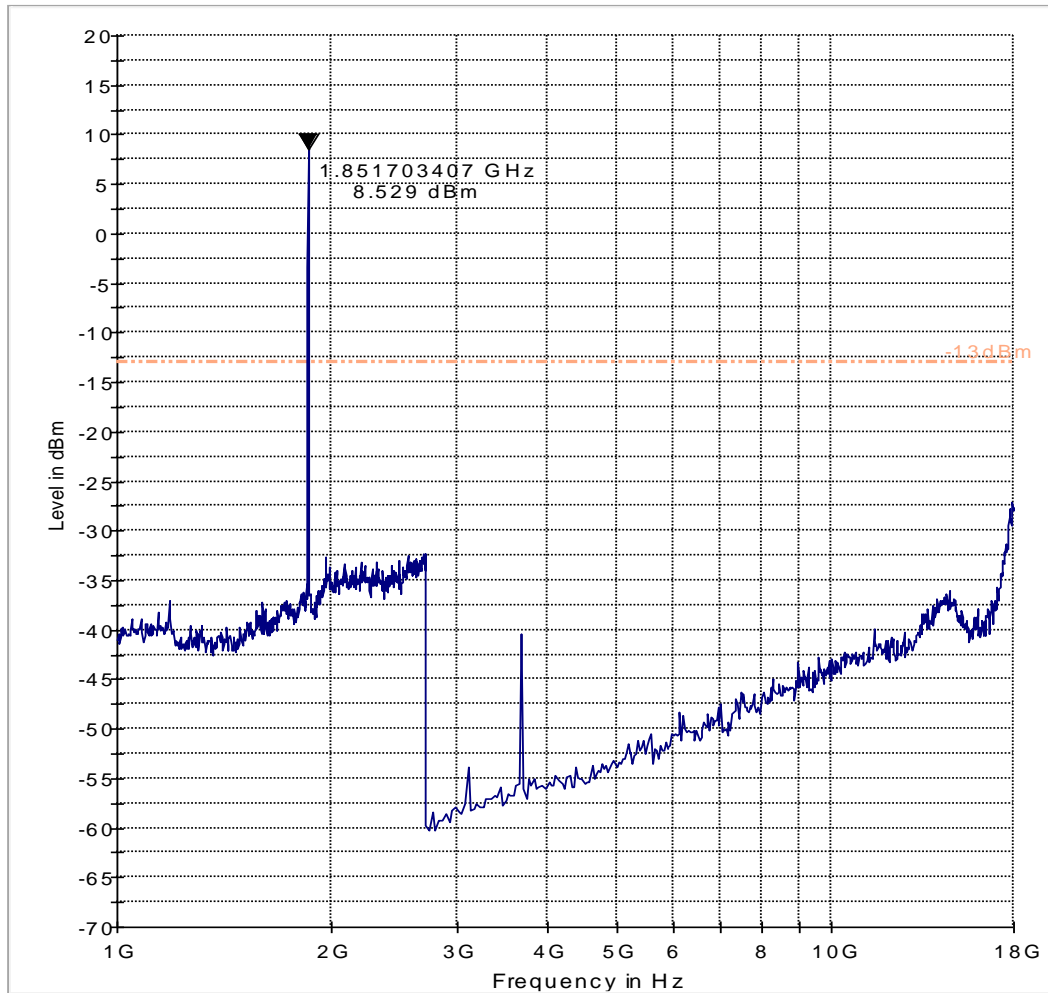


----- -13dBm ——— Preview Result 1-PK+

1GHz-18GHz

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

FCC 24 1-18GHz

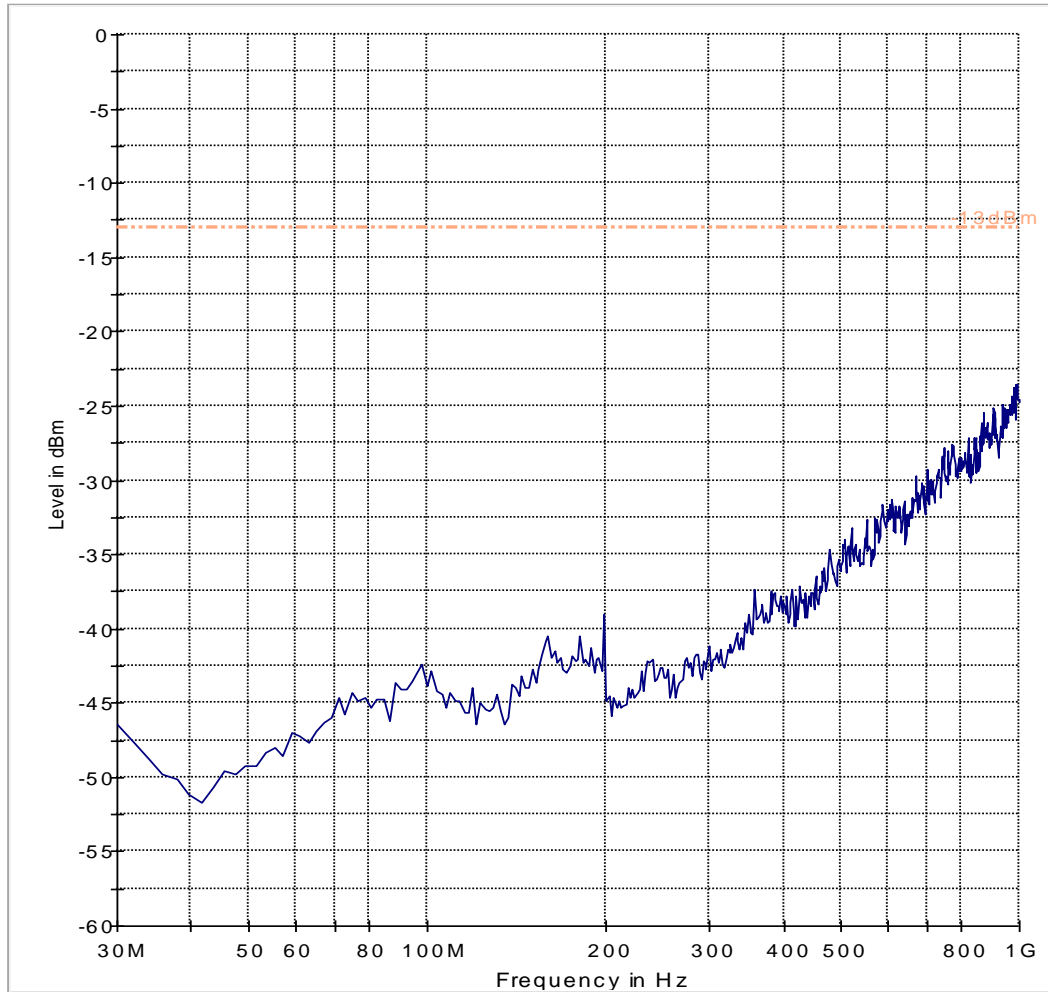


----- -13dBm ——— Preview Result 1-PK+

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

30MHz-1GHz

FCC 24 30-1000MHz



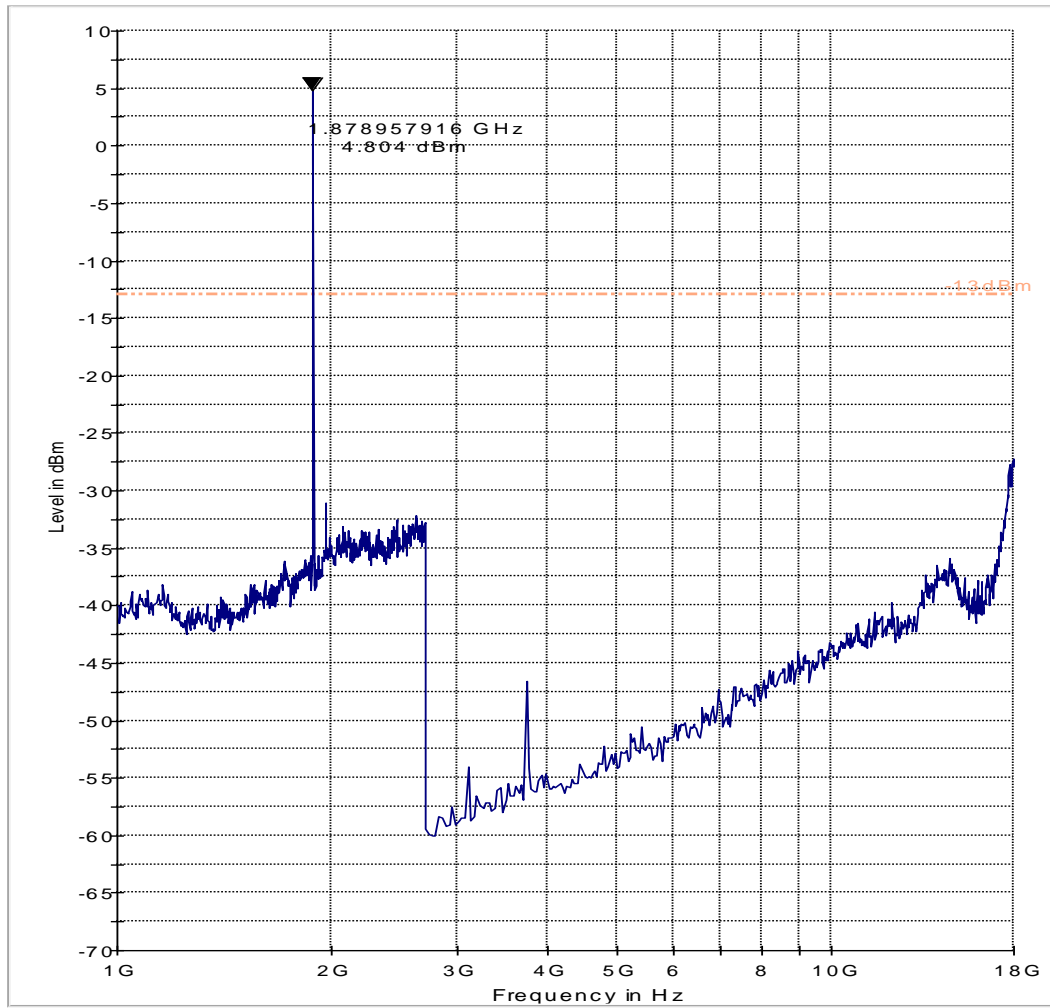
----- -13dBm ——— Preview Result 1-PK+



1GHz-18GHz

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

FCC 24 1-18GHz

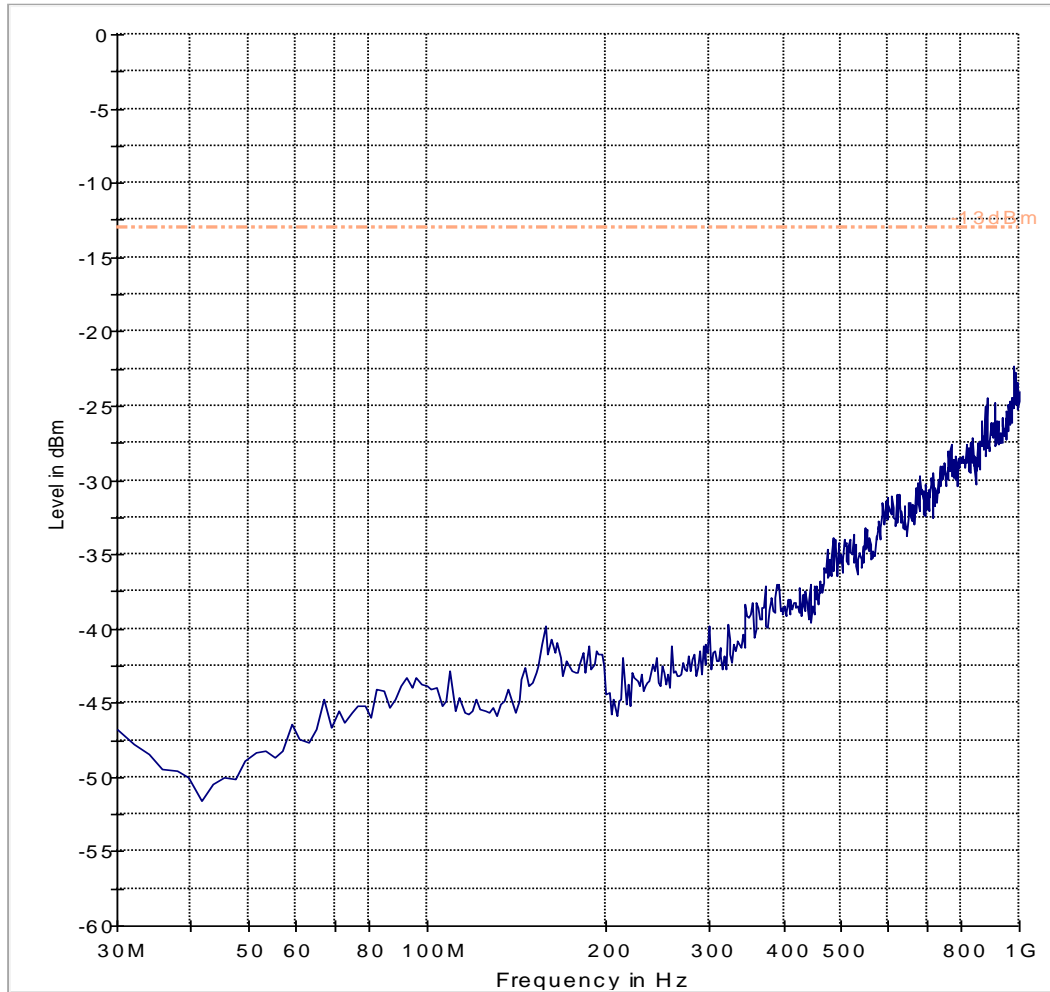


-13dBm Preview Result 1-PK+

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

30MHz-1GHz

FCC 24 30-1000MHz



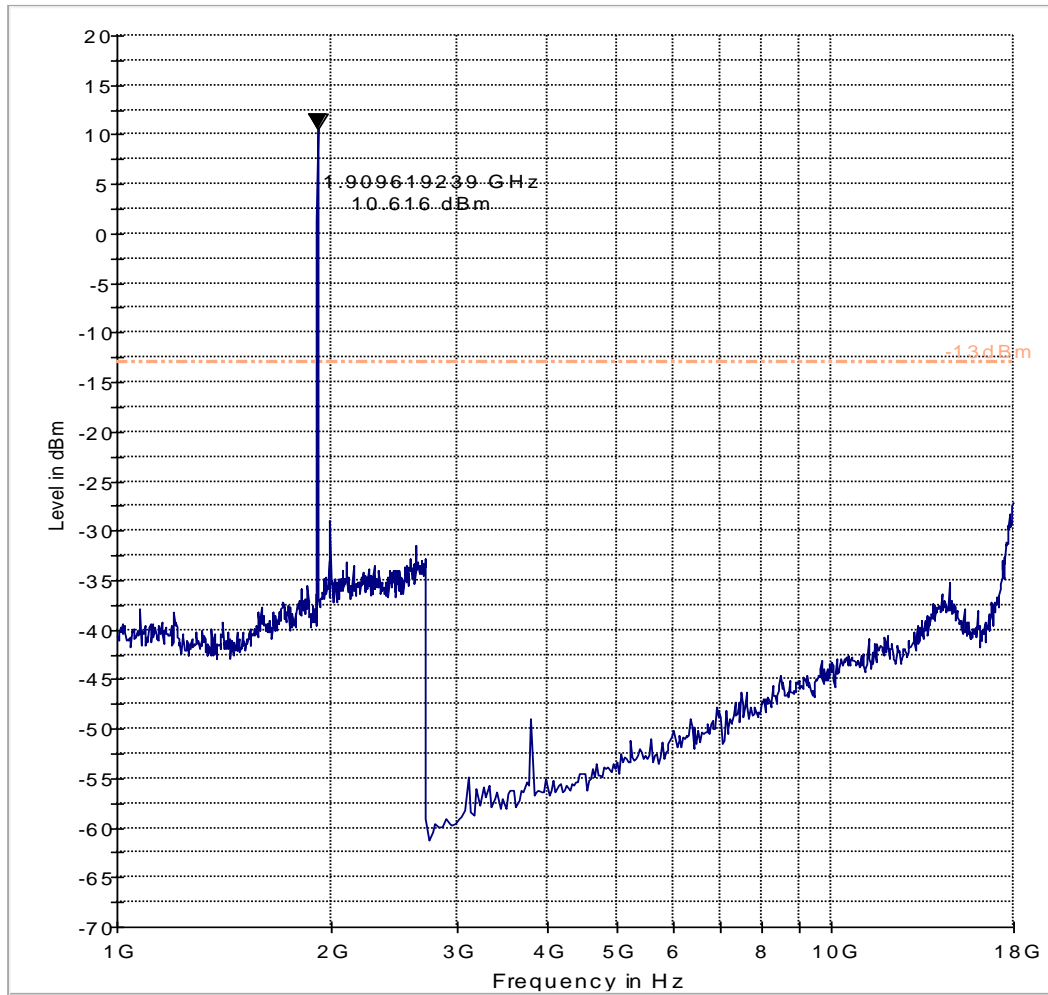
----- -13dBm ——— Preview Result 1-PK+



1GHz-18GHz

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

FCC 24 1-18GHz

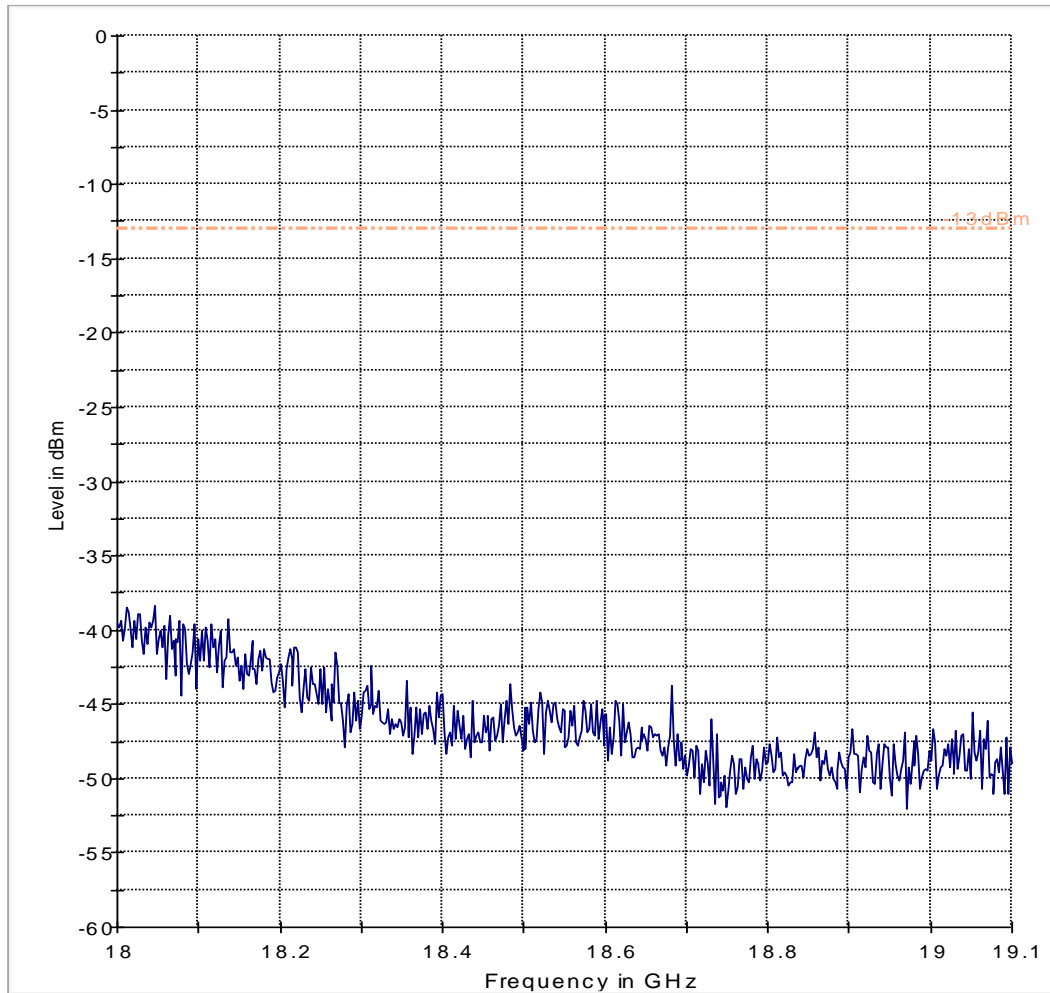


----- -13dBm ——— Preview Result 1-PK+

Test results 18GHz-19.1GHz

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

FCC 24 18-19.1GHz

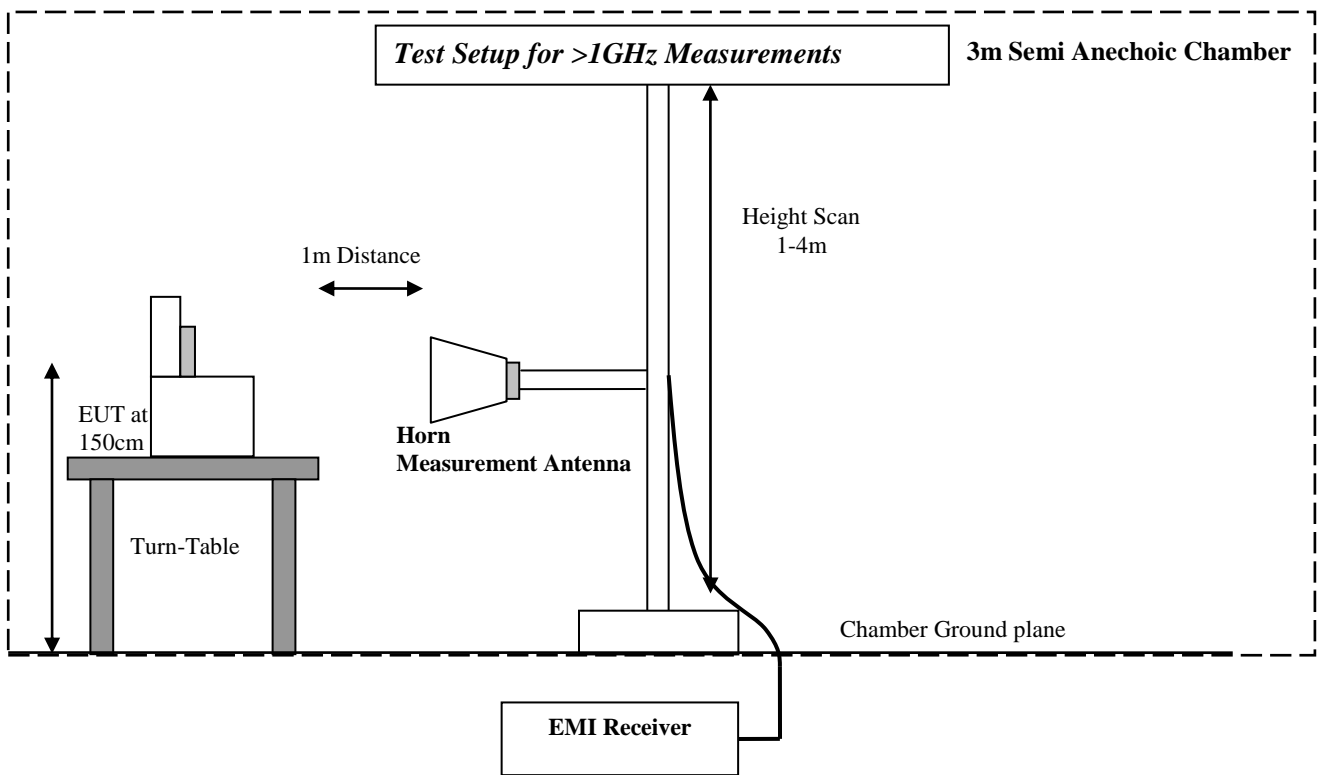
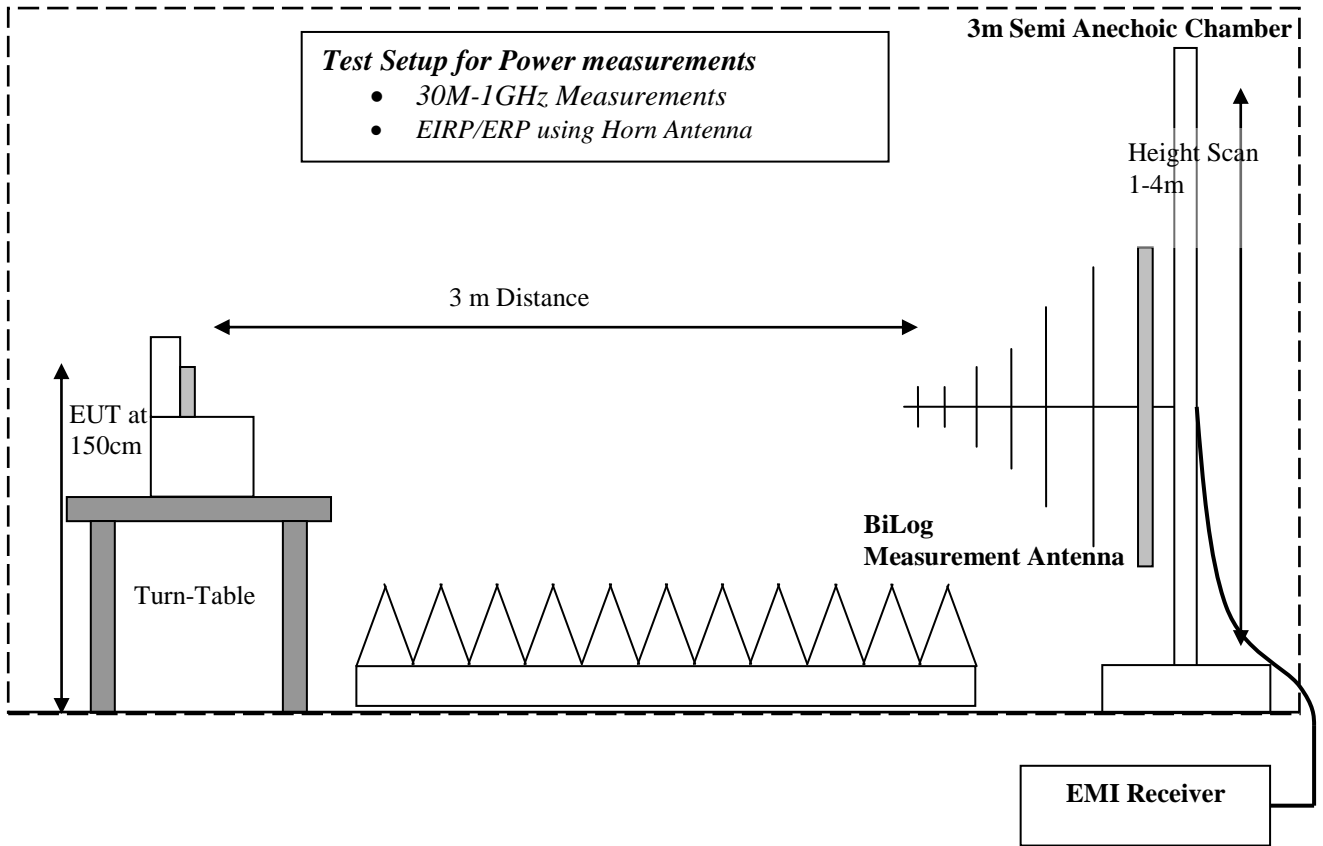


----- -13dBm ——— Preview Result 1-PK+

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	ESIB 40	Rohde & Schwarz	100107	May 2011	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	June 2011	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
2012-07-02	EMC_HARMA_018_11001_BE2801_WWAN	First Version	J Sabado
2012-09-06	EMC_HARMA_018_11001_BE2801_WWAN_Rev1	Added Sec 2.4 and 2.5. Added env. test conditions for each test.	J Sabado