



## FCC & Test Report

For:  
Verizon Telematics Inc.

Model Name:  
VT-100

Product Description:  
GPS navigation device with GPS receiver, 1xRTT CDMA  
modem, OBD-II vehicle interface and a Bluetooth radio

FCC ID: ZOQVT-100

Per:  
47 CFR Parts 22 and 24

REPORT #: EMC\_VERIT-009-15001\_FCC\_22\_24

DATE: 2015-11-09



A2LA Accredited

IC recognized #  
3462B-1

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## 1 **Assessment**

The following device as further described in section 3 of this report was evaluated against the applicable criteria specified in the Code of Federal Regulations Title 47 parts 22 and 24.

No deficiencies were ascertained.

Company Name	Product Description	Model #
Verizon Telematics Inc.	GPS navigation device with GPS receiver, 1xRTT CDMA modem, OBD-II vehicle interface and a Bluetooth radio	VT-100

### Responsible for Testing Laboratory:

2015-11-09	Compliance	Franz Engert (Compliance Manager)	
Date	Section	Name	Signature

### Responsible for the Report:

2015-11-09	Compliance	Kris Lazarov (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.  
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 EMC Test Report

<b>Company Name:</b>	CETECOM Inc.
<b>Department:</b>	Compliance
<b>Street Address:</b>	411 Dixon Landing Road
<b>City/Zip Code</b>	Milpitas, CA 95035
<b>Country</b>	USA
<b>Telephone:</b>	+1 (408) 586 6200
<b>Fax:</b>	+1 (408) 586 6299
<b>Compliance Manager:</b>	Franz Engert
<b>Responsible Project Leader:</b>	Kris Lazarov

### 2.2 Identification of the Client

<b>Applicant's Name:</b>	Verizon Telematics Inc.
<b>Street Address:</b>	2002 Summit Blvd #1800
<b>City/Zip Code</b>	Atlanta, GA 30319
<b>Country</b>	USA
<b>Contact Person:</b>	Chris Kang
<b>Phone No.</b>	1-404-573-5034
<b>e-mail:</b>	chris.kang@verizon.com

### 2.3 Identification of the Manufacturer

<b>Manufacturer's Name:</b>	Same as Applicant
<b>Manufacturers Address:</b>	-----
<b>City/Zip Code</b>	-----
<b>Country</b>	-----

### 3 Equipment Under Test (EUT)

#### 3.1 EUT Specifications

<b>Model No</b>	VT-100
<b>HW Version / SW Version</b>	A0 / V1.0.0
<b>FCC-ID</b>	ZOQVT-100
<b>Product Description</b>	GPS navigation device with GPS receiver, 1xRTT CDMA modem, OBD-II vehicle interface and a Bluetooth radio
<b>Transceiver Technology / Type(s) of Modulation</b>	CDMA 800 (BC0); 1900 (BC1) / QPSK / HPSK (CDMA2000)
<b>Frequency Range</b>	824 MHz to 849 MHz / 1850 MHz to 1910 MHz
<b>Max. declared antenna gain</b>	Pulse Custom Antenna for CDMA 1xRTT -1 dBi for BC0, -0.2 for BC1
<b>Max. declared average conducted output power including tune up</b>	23.5dBm BC0 23.5dBm BC1
<b>Power Supply/ Rated Operating Voltage Range</b>	Vmin: 6V DC / Vnom: 12.5V DC / Vmax: 18V DC
<b>Operating Temperature Range</b>	-30 °C to 70 °C
<b>Other Radios included in the device</b>	Bluetooth EDR 2.1 / GPS
<b>Sample Revision</b>	<input type="checkbox"/> Prototype <input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-Production

#### 3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Comments
1	2	A0	V1.0.0	Radiated Measurements
2	3	A0	V1.0.0	Conducted Measurements

#### 3.3 Test Sample Configuration

Set-up #	EUT / AE used for set-up	Comments
1	EUT#1	Radiated Measurements
2	EUT#2	Conducted Measurements

#### **4 Subject of Investigation**

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant requirements specified in the Code of Federal Regulations Title 47 parts 22 and 24.

##### **4.1 Dates of Testing:**

9/23/2015 - 11/03/2015

##### **4.2 Measurement Uncertainty**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=1.

Radiated measurement

9 kHz to 30MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	±2.3 dB (Horn Antenna)

Conducted measurement

150 kHz to 30 MHz	±0.7 dB (LISN)
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RF conducted measurement	±0.5 dB
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##### **4.3 Environmental Conditions during Testing:**

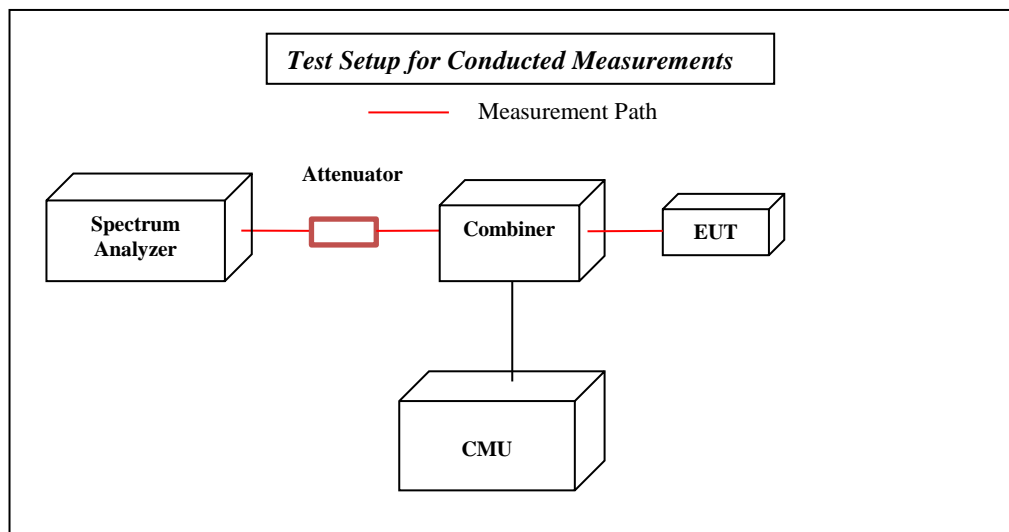
The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25°C
- Relative humidity: 40-60%

Deviating test conditions are indicated at individual test description where applicable.

## 5 Measurement Procedures

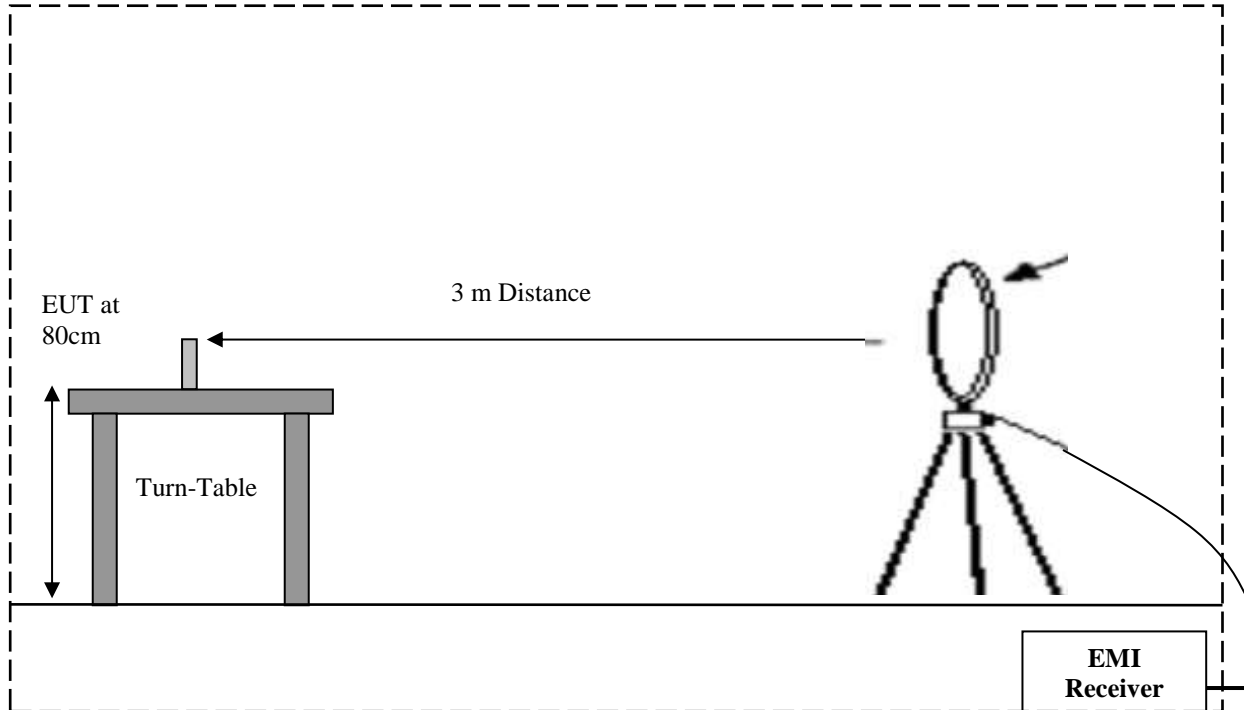
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v02r02 – “Measurement Guidance for Certification of Licensed Digital Transmitters” and according to relevant parts of TIA-603C 2004 as detailed below.



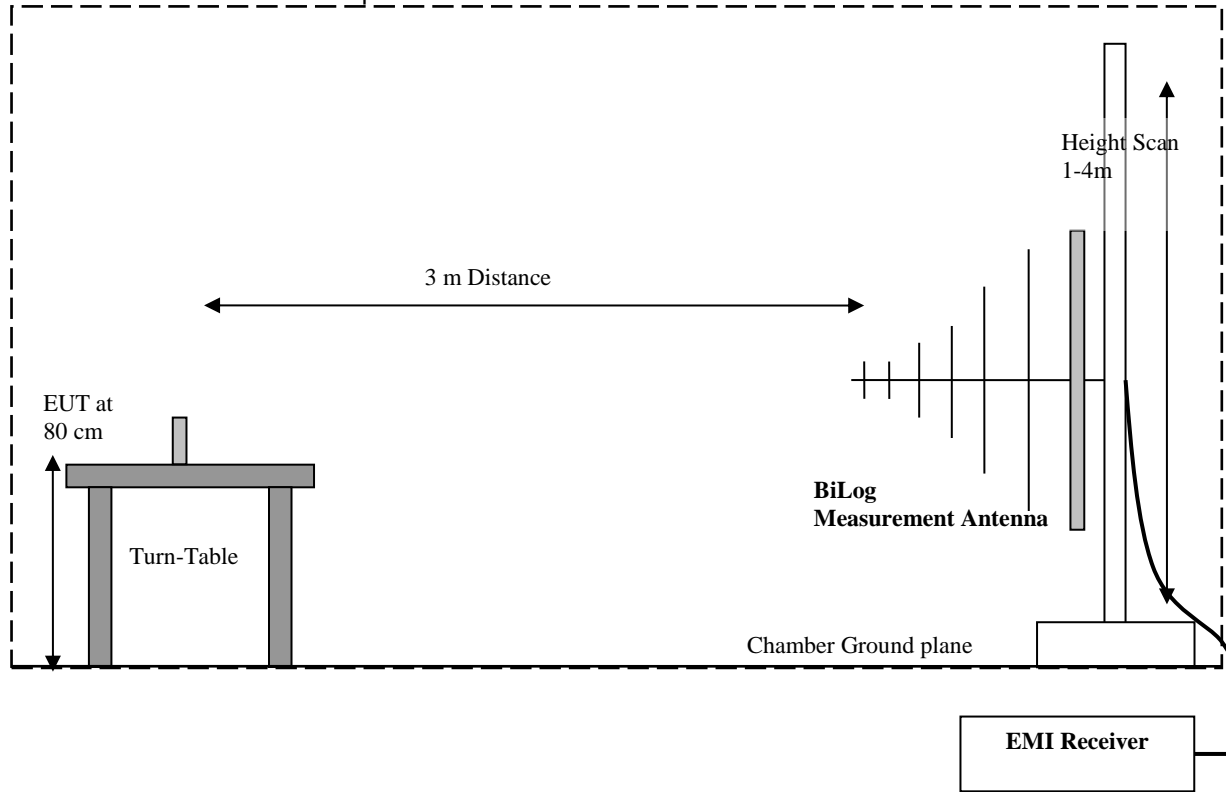
### 5.1 Radiated Measurement

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

### Radiated Emissions Test Setup below 30MHz Measurements

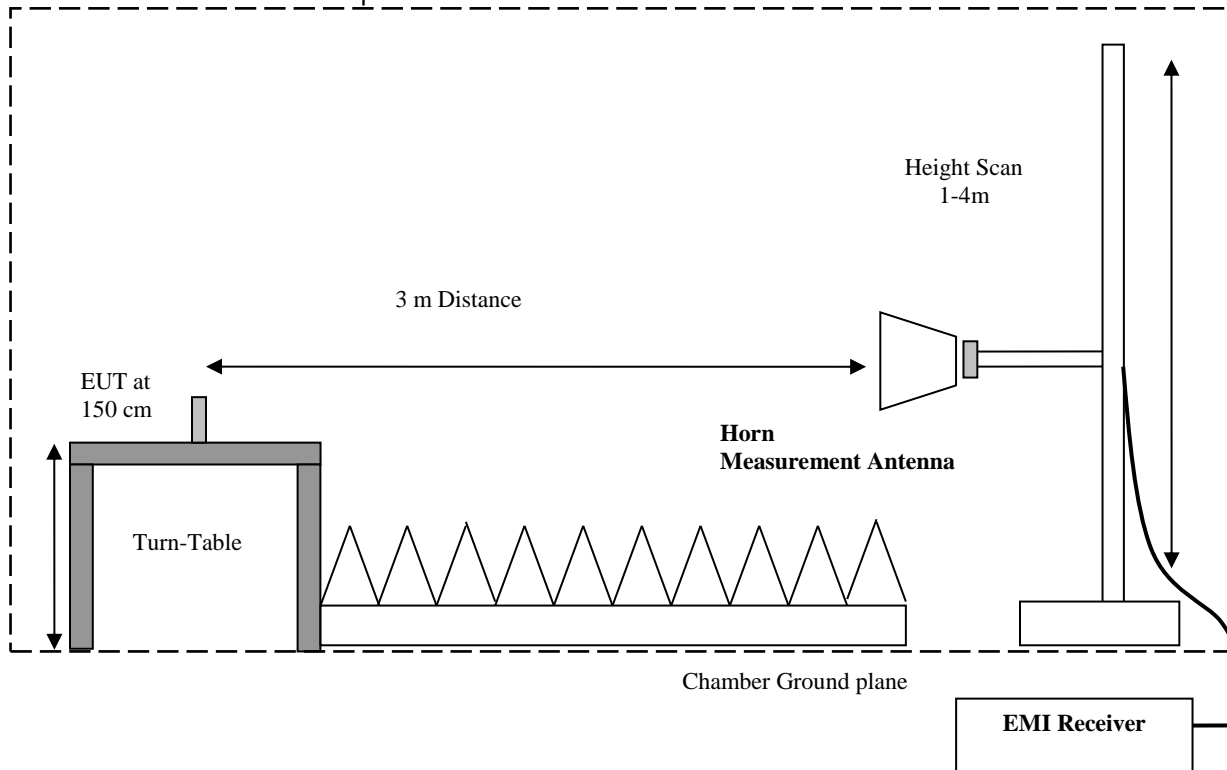


### Radiated Emissions Test Setup 30MHz-1GHz Measurements





## Radiated Emissions Test Setup above 1GHz Measurements



## 5.2 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

- Measured reading in dB $\mu$ V
- Cable Loss between the receiving antenna and SA in dB and
- Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} - \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

Frequency (MHz)	Measured SA (dB $\mu$ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB $\mu$ V/m)
1000	80.5	3.5	14	98.0

## 6 Measurement Results Summary

### 6.1 CDMA 850MHz 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	■	□	□	□	Complies
§2.1055; §22.355	Frequency Stability	Nominal	CDMA	■	□	□	□	Complies
§2.1049; §22.917	Occupied Bandwidth	Nominal	CDMA	■	□	□	□	Complies
§2.1051; §22.917	Band Edge Compliance	Nominal	CDMA	■	□	□	□	Complies
§2.1051; §22.917	Conducted Spurious Emissions	Nominal	CDMA	□	□	□	■	Note 2
§2.1053; §22.917	Radiated Spurious Emissions	Nominal	CDMA	■	□	□	□	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: The device is equipped with internal antenna and spurious emissions were evaluated with radiated measurement

### 6.2 CDMA 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	■	□	□	□	Complies
§2.1055; §24.235	Frequency Stability	Nominal	CDMA	■	□	□	□	Complies
§2.1049; §24.238	Occupied Bandwidth	Nominal	CDMA	■	□	□	□	Complies
§2.1051; §24.238	Band Edge Compliance	Nominal	CDMA	■	□	□	□	Complies
§2.1051; §24.238	Conducted Spurious Emissions	Nominal	CDMA	□	□	□	■	Note 2
§2.1053; §24.238	Radiated Spurious Emissions	Nominal	CDMA	■	□	□	□	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: The device is equipped with internal antenna and spurious emissions were evaluated with radiated measurement

## 7 Test Result Data

### 7.1 RF Output Power

#### 7.1.1 Conducted Measurement according to FCC: CFR 47 Part 2.1046; CFR Part 22.913; Part 24.232, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02 - Section 5.2.1

Spectrum Analyzer settings for conducted output power measurements:

- RBW = 1-5% of the OBW, not to exceed 1 MHz.
- VBW  $\geq 3 \times$  RBW
- Set span  $\geq 1.5 \times$  OBW
- Set number of points in sweep  $\geq 2 \times$  span / RBW.
- Sweep time = auto couple
- Detector = RMS
- Trace average at least 100 traces in power averaging (i.e., RMS) mode
- Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges.

Spectrum Analyzer settings for CCDF procedure for PAPR measurements:

- RBW  $\geq$  OBW
- Number of counts = 10000
- Sweep time  $\geq$  1ms
- Record the maximum PAPR level associated with a probability of 0.1%

#### 7.1.2 Limits:

##### 7.1.2.1 FCC Part 22.913 (a) for ERP (850 MHz Band)

(a) The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts (38.45dBm).

##### 7.1.2.2 FCC Part 24.232 (c),(d),(e) for EIRP (1900 MHz Band)

(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

(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.

(e) 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 instrument 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 for the emission in question over the full bandwidth of the channel.

### 7.1.3 Test conditions and setup:

Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input (VDC)	Measurement Path Correction (dB)
22	2	CDMA 800 / 1900	12.5	23.9 CDMA 800 24.5 CDMA 1900

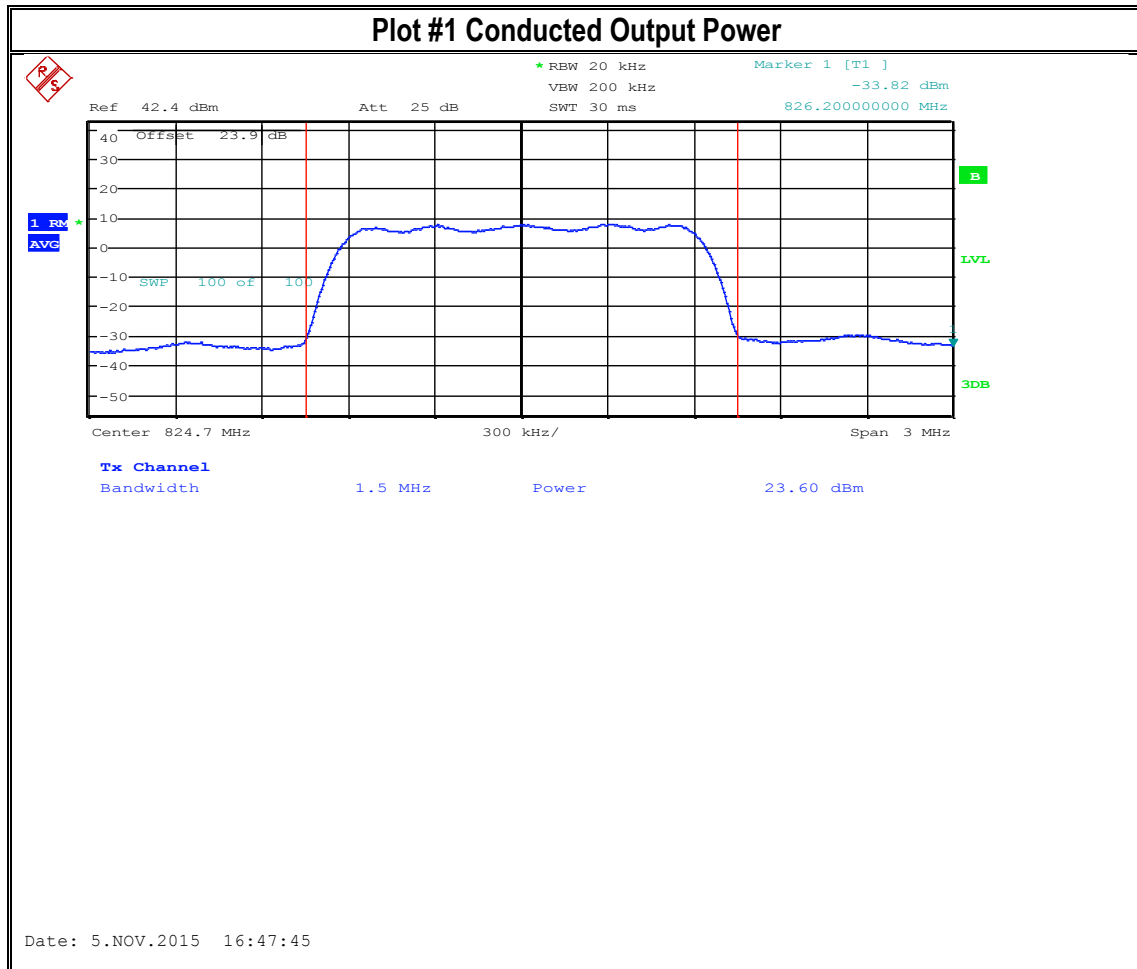
### 7.1.4 Measurement result ERP / EIRP:

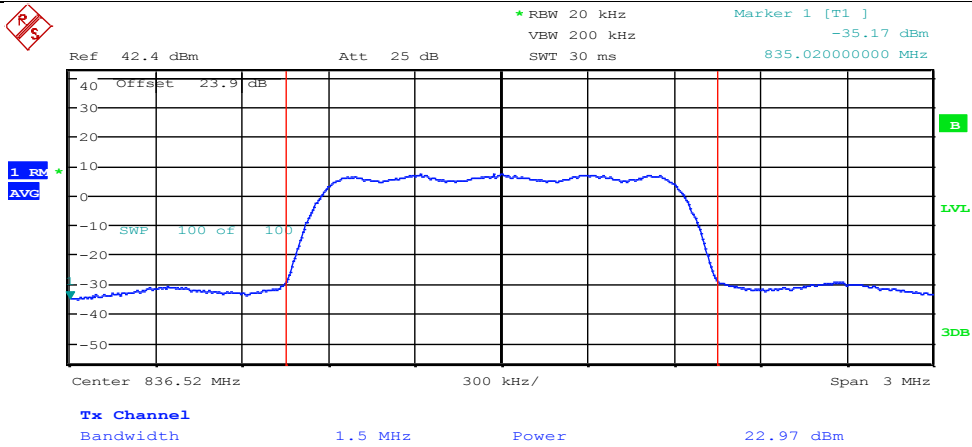
Plot #	Chanel #	Frequency (MHz)	Maximum AVG Conducted Output Power (dBm)	Antenna Gain (dBi)	Calc. ERP/EIRP (dBm)	Limit (dBm)	Result
1	1013 CDMA 800	824.7	23.60	-1	20.45 ERP	< 38.45 ERP	Pass
2	384 CDMA 800	836.52	22.97	-1	19.82 ERP	< 38.45 ERP	Pass
3	777 CDMA 800	848.31	23.29	-1	20.14 ERP	< 38.45 ERP	Pass
4	25 PCS 1900	1851.25	23.23	-0.2	23.03 EIRP	< 33 EIRP	Pass
5	600 PCS 1900	1880	23.05	-0.2	22.85 EIRP	< 33 EIRP	Pass
6	1175 PCS 1900	1908.75	22.98	-0.2	22.78 EIRP	< 33 EIRP	Pass

### 7.1.5 Peak-to-average power ratio:

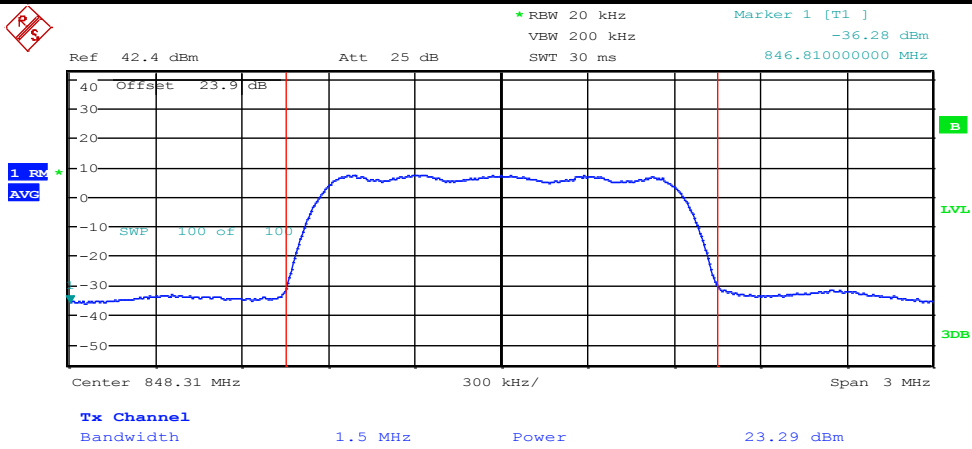
Plot #	Chanel #	Frequency (MHz)	PAPR level at 0.1% probability (dB)	Limit (dB)	Result
7	384 CDMA 800	836.52	3.88	< 13	Pass
8	600 PCS 1900	1880	3.30	< 13	Pass

## 7.1.6 Measurement Plots:

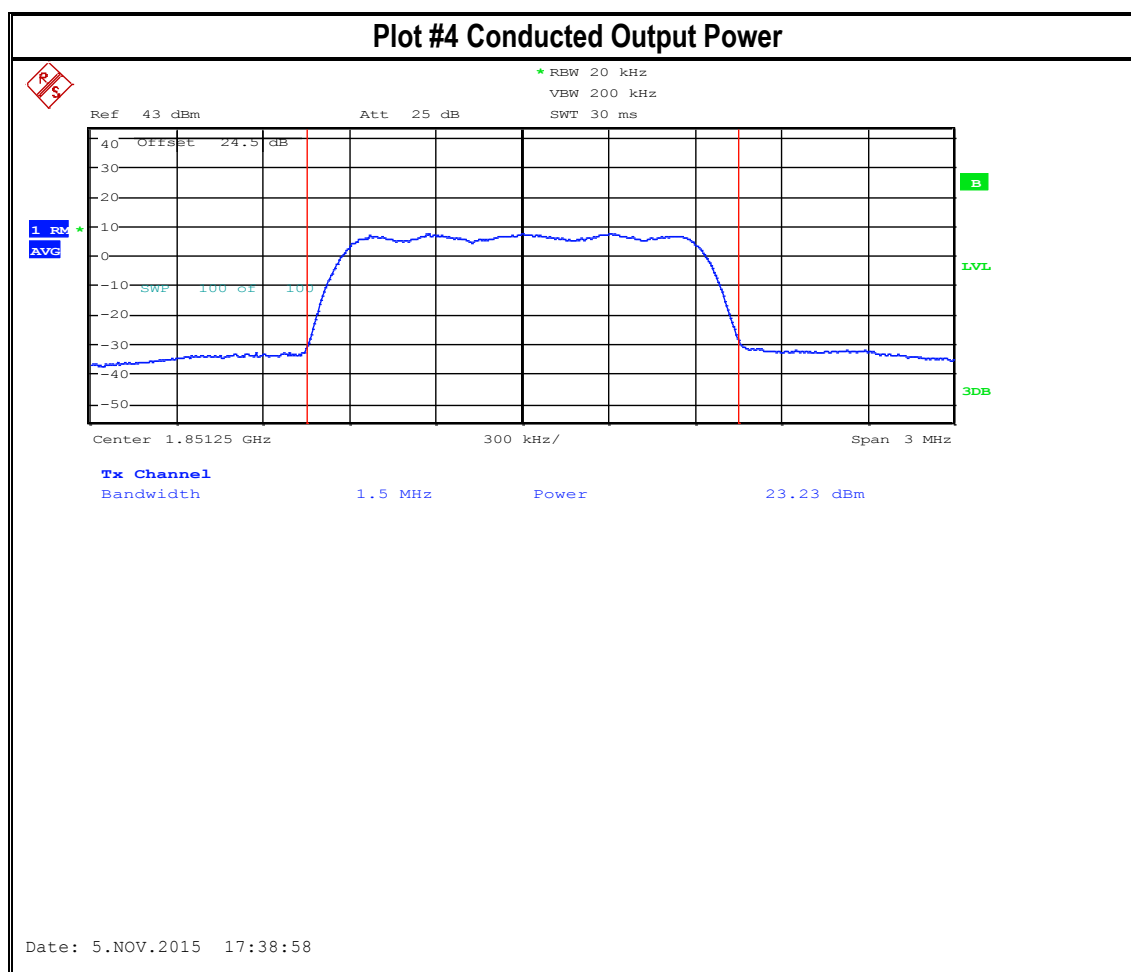


**Plot #2 Conducted Output Power**

Date: 5.NOV.2015 16:48:41

**Plot #3 Conducted Output Power**

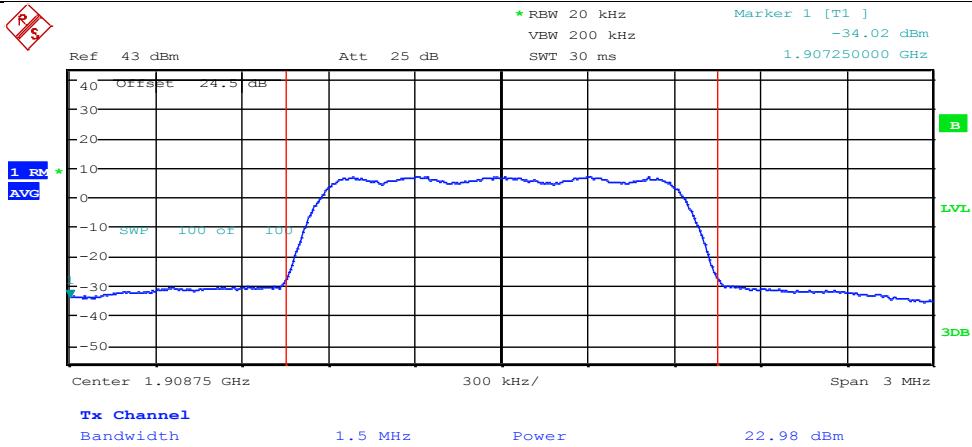
Date: 5.NOV.2015 16:49:38



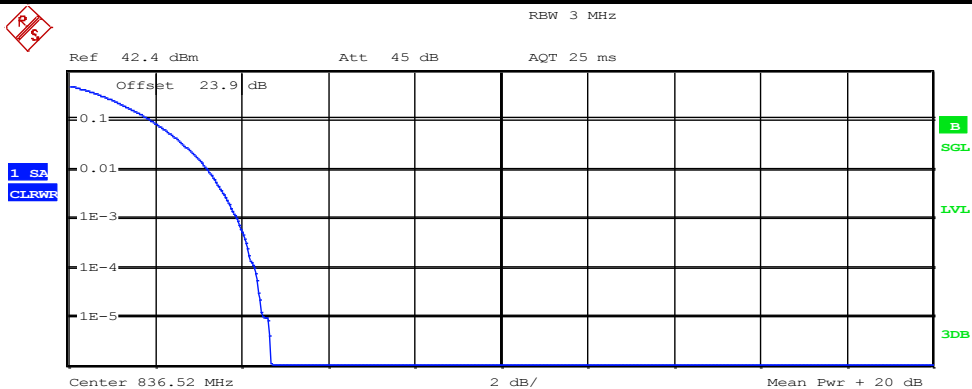


**Plot #5 Conducted Output Power**

Date: 5.NOV.2015 16:44:29

**Plot #6 Conducted Output Power**

Date: 5.NOV.2015 16:43:20

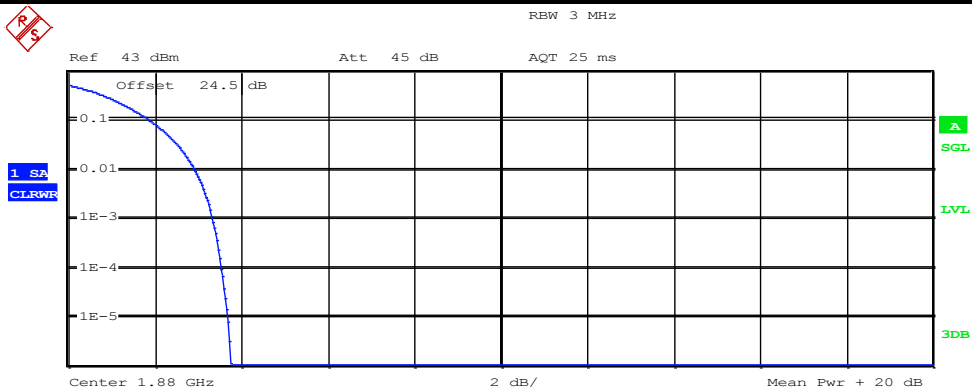
**Plot #7 PAPR level at 0.1% probability**

Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	22.61 dBm
Peak	27.28 dBm
Crest	4.67 dB
10 %	1.89 dB
1 %	3.17 dB
.1 %	3.88 dB
.01 %	4.29 dB

Date: 5.NOV.2015 16:54:56

**Plot #8 PAPR level at 0.1% probability**

Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean	22.45 dBm
Peak	26.19 dBm
Crest	3.73 dB
10 %	1.86 dB
1 %	2.88 dB
.1 %	3.30 dB
.01 %	3.53 dB

Date: 5.NOV.2015 15:14:28

## 7.2 Frequency Stability

### 7.2.1 Measurement according to FCC: CFR 47 Part 2.1055; 22.355; 24.235, utilizing KDB 971168 D01 Power Meas. License Digital Systems v02r02 – Section 9

Part 2.1055 Required Measurements:

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
  - (1) From -30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
- (d) The frequency stability shall be measured with variation of primary supply voltage as follows:
  - (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

CMU-200 Settings:

- Initiate a call at middle channel for the band of interest
- Run a single mode Statistic Count of 100
- Record the reported Carrier Freq. Error
- Repeat the test for -30C; 25C and 50C temperature
- Repeat the test for 6VDC; 12.5VDC; and 18VDC supply voltage

### 7.2.2 Limits: FCC Part 22.355 for 850 MHz, and FCC Part 24.235 for 1900 MHz Band

**Part 22.355** Frequency tolerance:

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section:

Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

**Part 24.235** Frequency stability:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**7.2.3 Test conditions and setup:**

Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input (VDC)
See table 7.1.4.1	2	CDMA 800 / 1900	See table 7.1.4.2

**7.2.4 Measurement result:**

**7.2.4.1** Frequency stability over variation of ambient temperature:

Temperature (C)	Power Input (VDC)	Cellular Carrier Freq.Error (Hz)	Cellular Carrier Frequency tolerance (ppm)	PCS Carrier Freq.Error (Hz)	Limit (ppm)	Result
25	12.5	-5	0.005	4	2.5	Pass
-30	12.5	2	0.002	4	2.5	Pass
50	12.5	-4	0.004	2	2.5	Pass

**7.2.4.2** Frequency stability over variation of primary supply voltage:

Power Input (VDC)	Temperature (C)	Cellular Carrier Freq.Error (Hz)	Cellular Carrier Frequency tolerance (+/-ppm)	PCS Carrier Freq.Error (Hz)	Limit (ppm)	Result
12.5	25	-5	0.005	4	2.5	Pass
6	25	5	0.005	2	2.5	Pass
18	25	5	0.005	-3	2.5	Pass

### 7.3 Occupied Bandwidth

#### 7.3.1 Measurement according to FCC: CFR 47 Part 2.1049, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02 - Power bandwidth (99%) measurement procedure - Section 4.2

Spectrum Analyzer settings:

- $RBW \geq 1\%$  to 5% of anticipated OBW.
- $VBW \geq 3 \times RBW$ .
- Set span  $\geq 2$  to 5 times OBW
- Sweep time = auto couple.
- Detector = Peak
- Trace mode = Max hold.
- Allow trace to fully stabilize.
- Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

#### 7.3.2 Requirement: FCC Part 2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

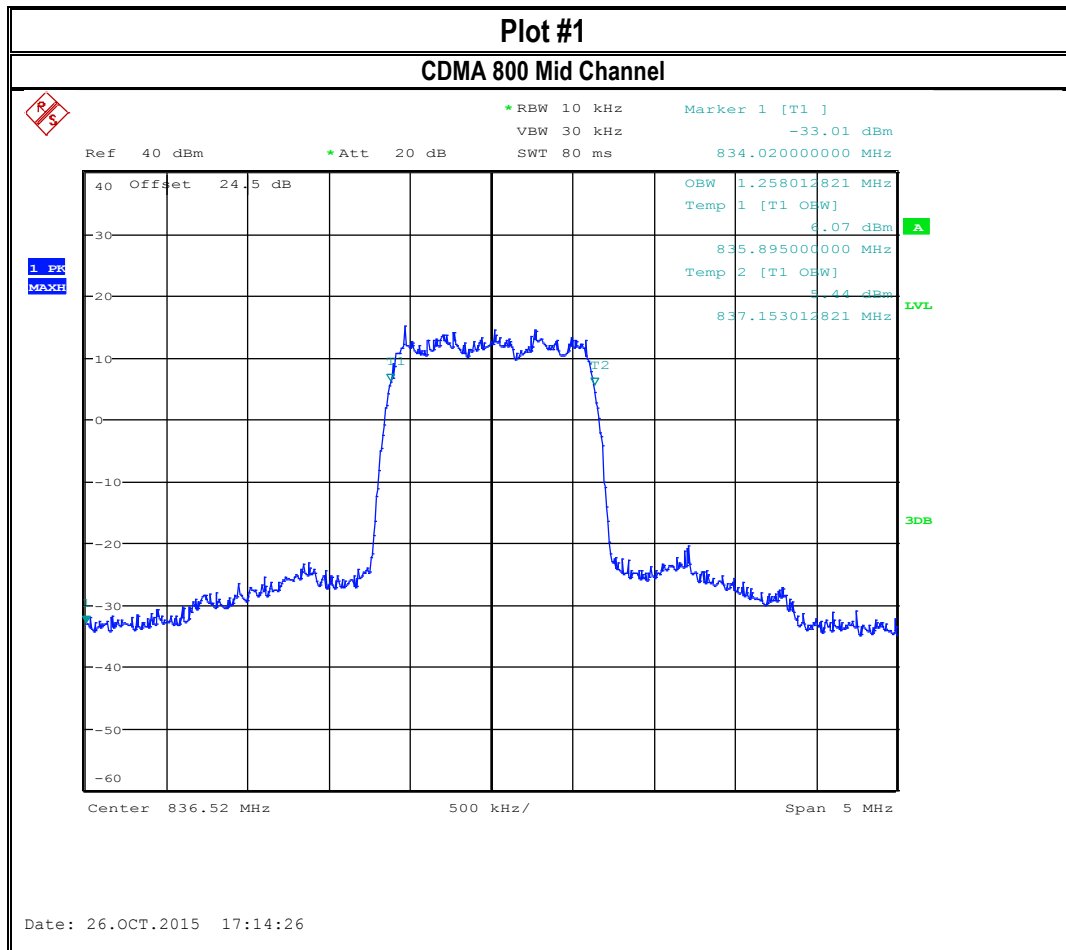
#### 7.3.3 Test conditions and setup:

Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input (VDC)
22	2	CDMA 800 / 1900	12.5

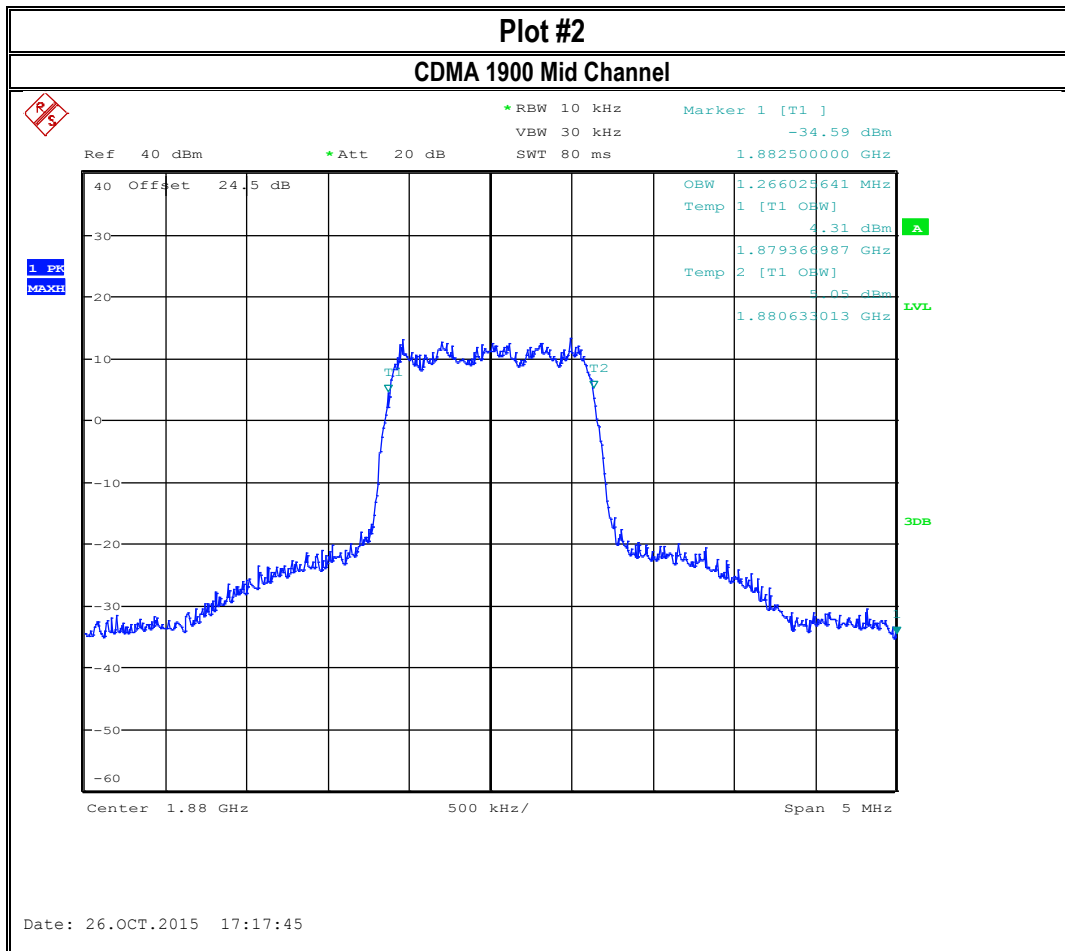
#### 7.3.4 Measurement result:

Plot #	EUT operating mode	OBW (MHz)
1	CDMA 800 Mid Channel	1.258
2	CDMA 1900 Mid Channel	1.266

### 7.3.5 Measurement Plots:







## 7.4 Band Edge Compliance

### 7.4.1 Measurement according to FCC: CFR 47 Part 2.1051; 22.917; 24.238, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02 – Section 6

Spectrum Analyzer settings:

- $RBW \geq 1\%$  of OBW.
- $VBW \geq 3 \times RBW$ .
- Set span  $\geq 1$  MHz
- Sweep time = auto couple.
- Detector = RMS
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the peak amplitude level.

### 7.4.2 Limits: FCC Part 22.917 (a) for 850 MHz, and FCC Part 24.238 (a) 1900 MHz Band

- (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.
- (b) Measurement procedure. Compliance with these rules 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.

Note: The limit calculation result is a constant of -13dBm.

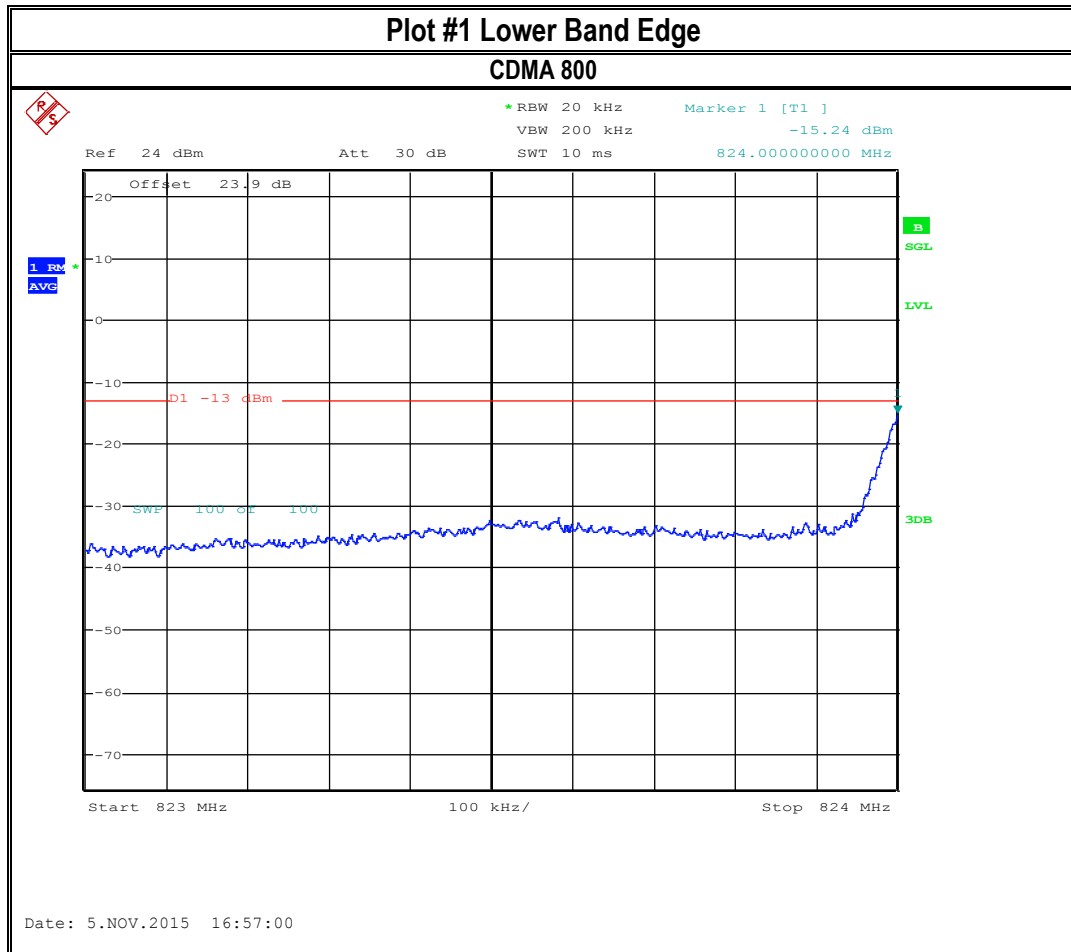
### 7.4.3 Test conditions and setup:

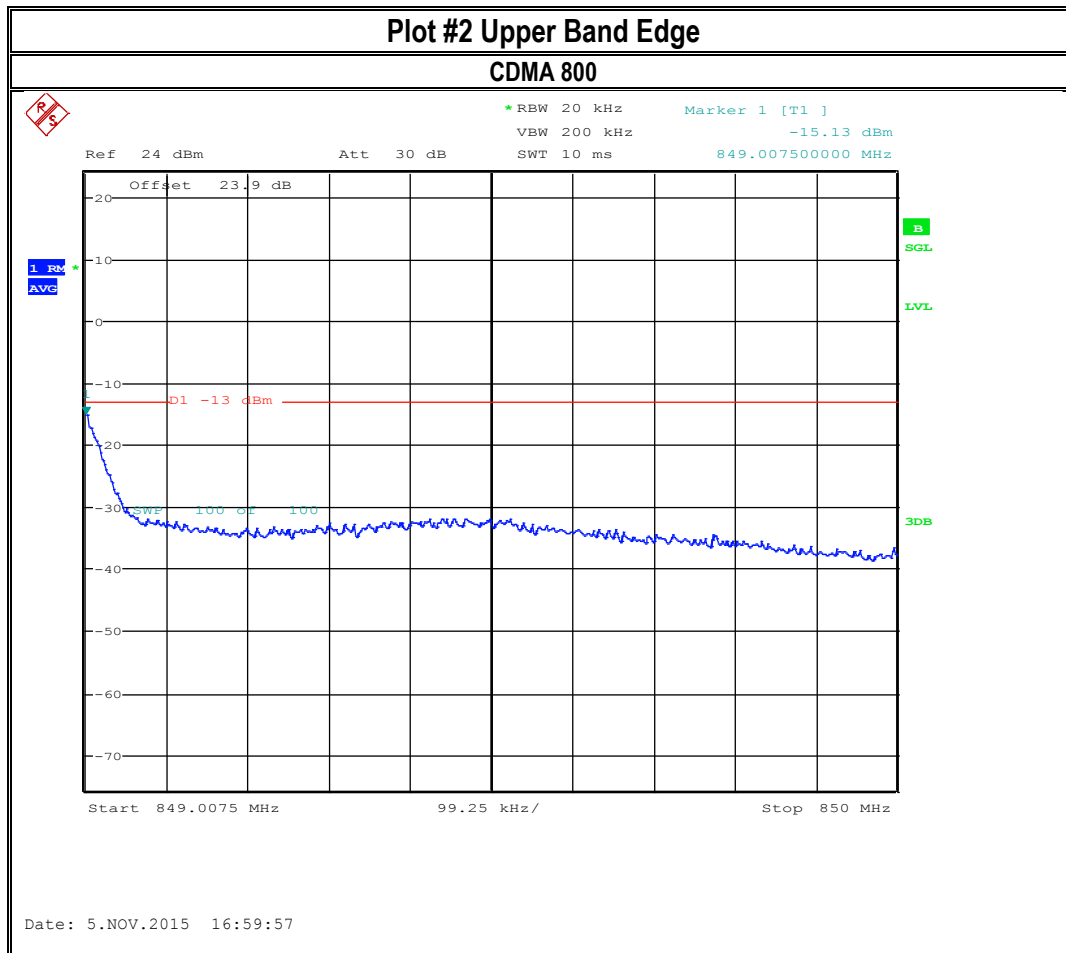
Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input (VDC)	Measurement Path Correction (dB)
22	2	CDMA 800 / 1900	12.5	23.9 CDMA 800 24.5 CDMA 1900

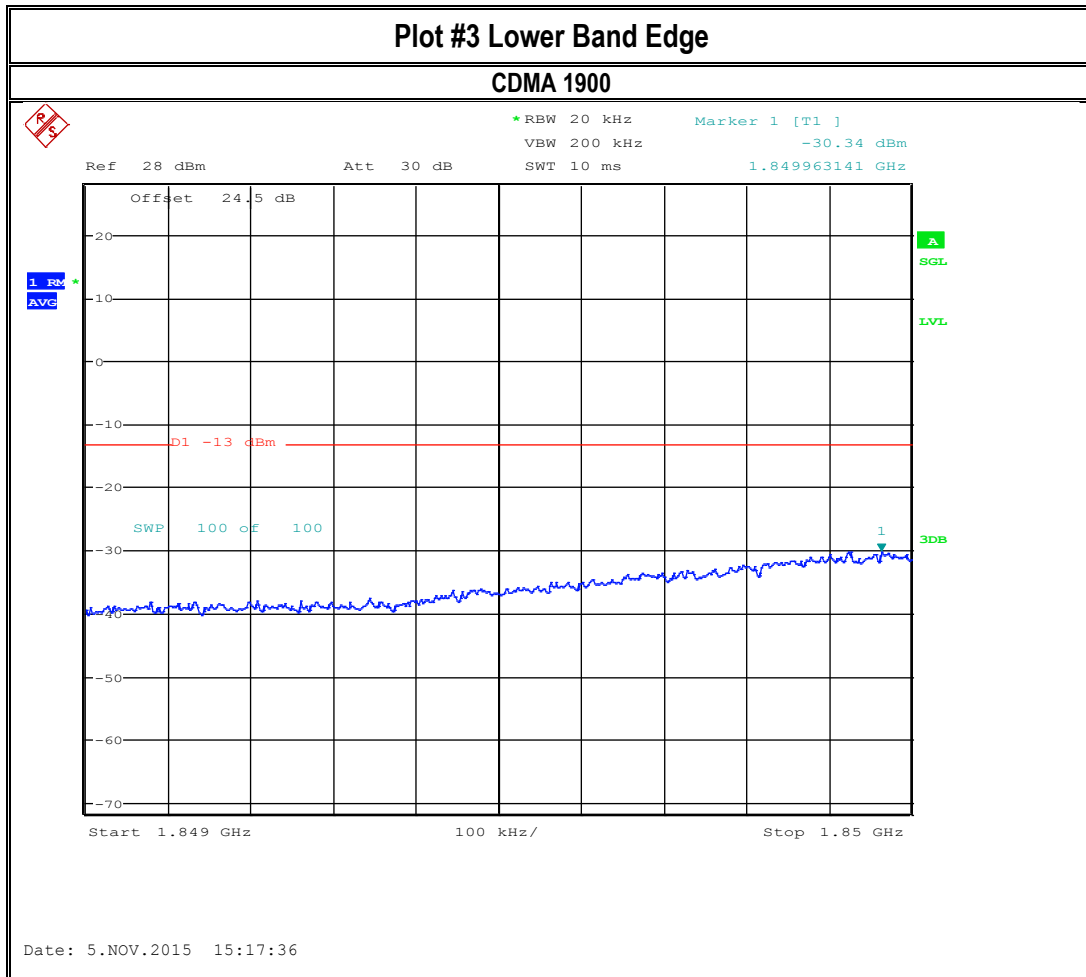
### 7.4.4 Measurement result:

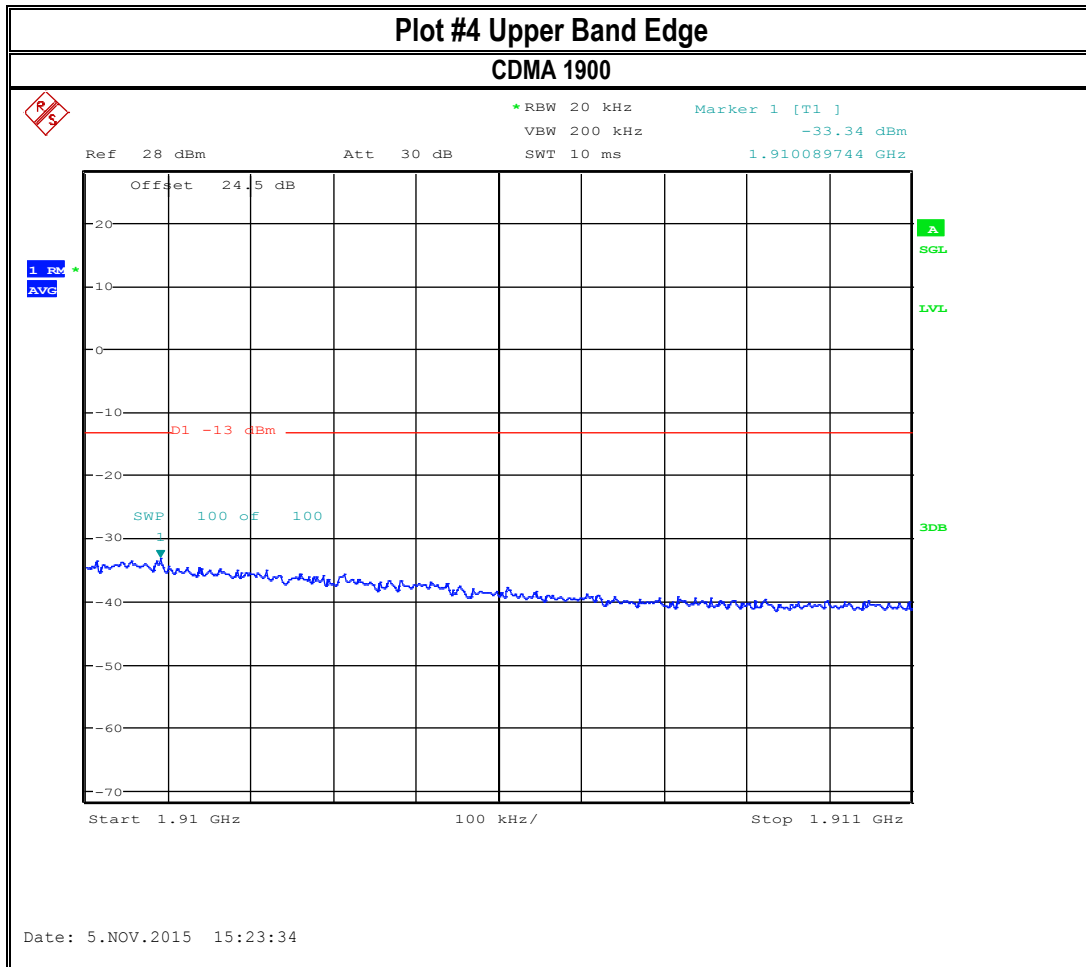
Plot #	Band Edge	EUT operating mode	Peak RF Power (dBm)	Limit (dBm)	Result
1	Lower Band Edge	CDMA 800	-15.24	-13	Pass
2	Upper Band Edge	CDMA 800	-15.13	-13	Pass
3	Lower Band Edge	CDMA 1900	-30.34	-13	Pass
4	Upper Band Edge	CDMA 1900	-23.34	-13	Pass

#### 7.4.5 Measurement Plots:









## 7.5 Radiated Spurious Emissions

### 7.5.1 Measurement according to FCC: CFR 47 Part 2.1053; CFR Part 22.917; Part 24.238, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02, and according to TIA-603C 2004- 2.2.12.

#### Spectrum Analyzer Settings for FCC 22

Frequency Range	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

#### Spectrum Analyzer Settings for FCC 24

Frequency Range	30MHz – 1 GHz	1 – 2.7 GHz	2.7 – 18 GHz	18 – 19.1 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto	Auto

### 7.5.2 Limits: FCC Part 22.917 (a) for 850 MHz, and FCC Part 24.238 (a) 1900 MHz Band

- 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.

Note: For output power levels from 0dBm to +30dBm, the limit calculation result is a constant of -13dBm.

### 7.5.3 Test conditions and setup:

Ambient Temperature (C)	EUT Set-Up #	EUT operating mode	Power Input
22	1	CDMA 800 / 1900	12.5

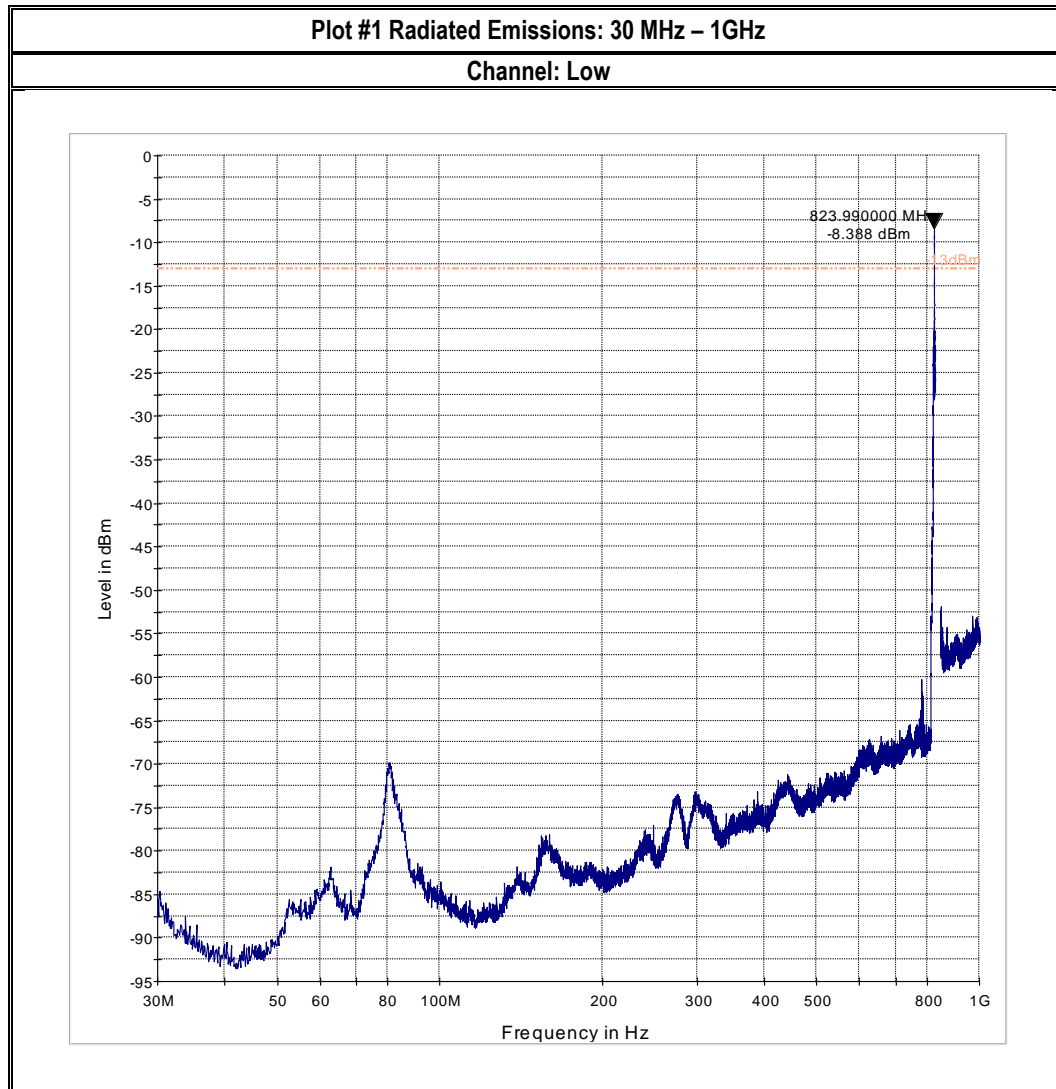
### 7.5.4 Measurement result:

Plot #	Channel #	EUT operating mode	Scan Frequency	Limit (dBm)	Result
1-2	Low	CDMA 800	30 MHz – 9 GHz	-13	Pass (1)
3-5	Mid	CDMA 800	9 kHz – 9 GHz	-13	Pass
6-7	High	CDMA 800	30 MHz – 9 GHz	-13	Pass (1)
8-9	Low	CDMA 1900	30 MHz – 18 GHz	-13	Pass (1)
10-13	Mid	CDMA 1900	9 kHz – 22 GHz	-13	Pass
14-15	High	CDMA 1900	30 MHz – 18 GHz	-13	Pass (1)

Note: Band edge compliance was demonstrated with conducted measurement – see section 7.2

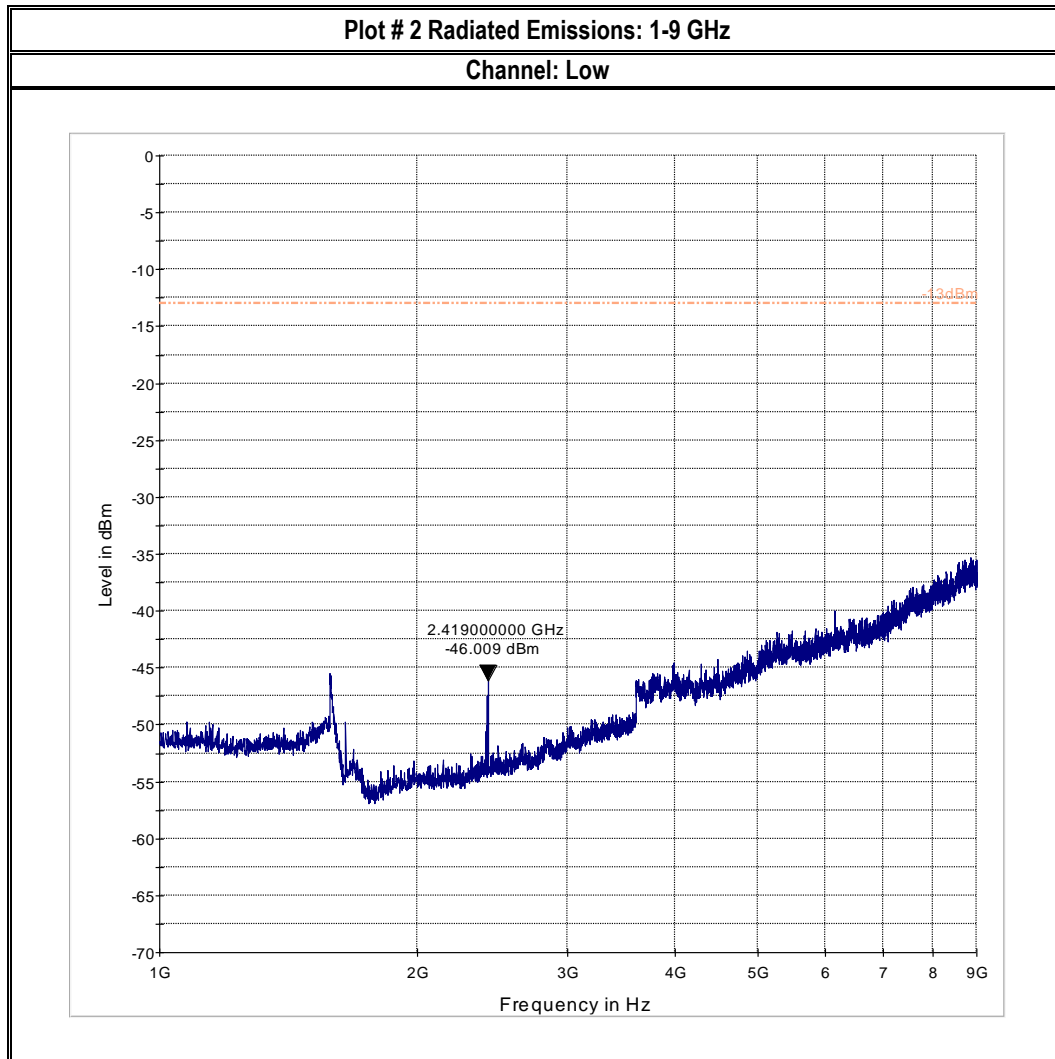
## 7.5.5 Measurement Plots:

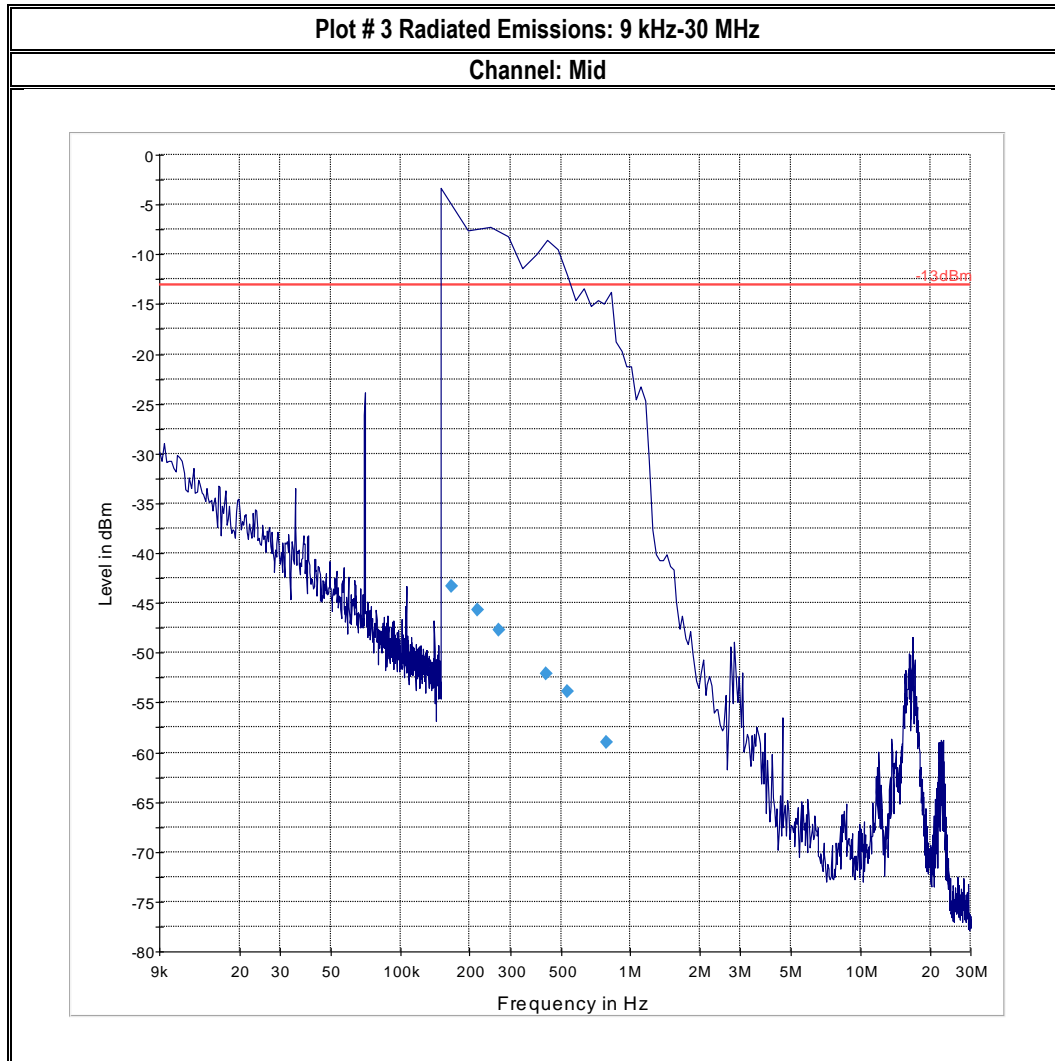
### CDMA 800



Note: Due to limited resolution during radiated measurements on the Band edges the manual conducted measurement from section 7.2 prevails.





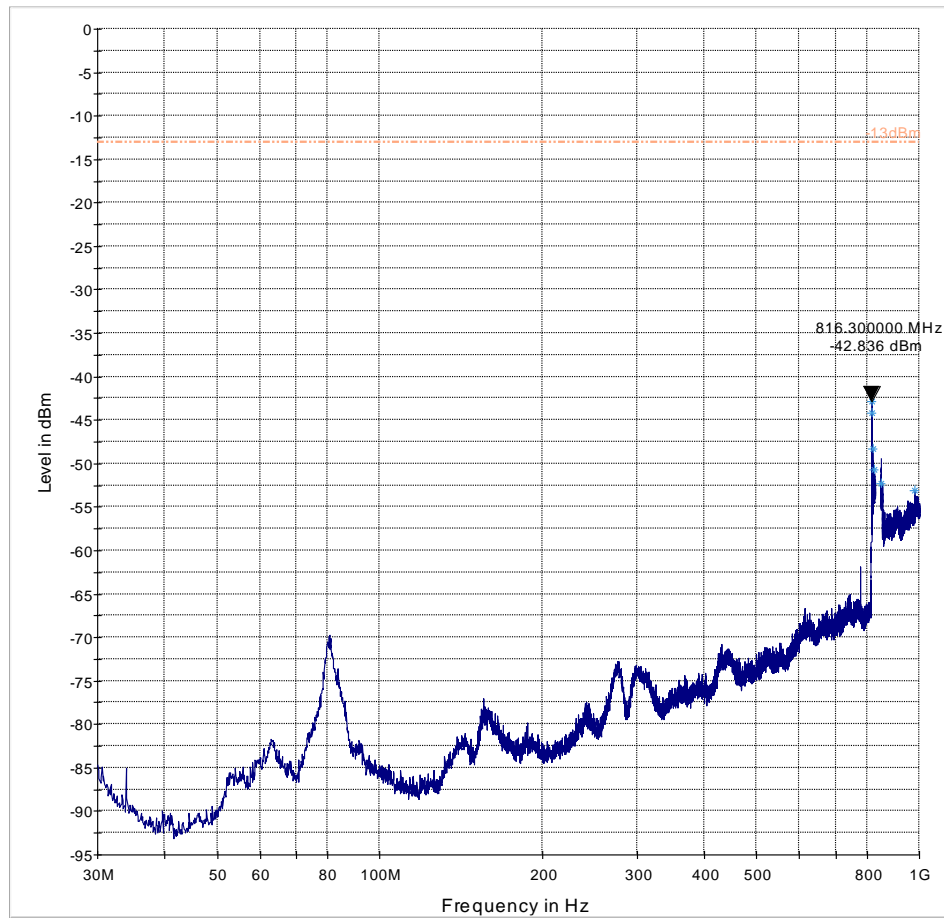


### Final Measurements

Frequency (MHz)	RMS (dBm)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBm)
0.167019	-43.3	50.0	9.000	274.0	H	206.0	-35.3	30.3	-13.0
0.217452	-45.7	50.0	9.000	263.0	H	129.0	-37.5	32.7	-13.0
0.268750	-47.7	50.0	9.000	195.0	H	206.0	-39.2	34.7	-13.0
0.429231	-52.1	50.0	9.000	203.0	H	206.0	-43.1	39.1	-13.0
0.529519	-53.9	50.0	9.000	180.0	H	194.0	-44.8	40.9	-13.0
0.782212	-59.0	50.0	9.000	170.0	H	245.0	-47.8	46.0	-13.0

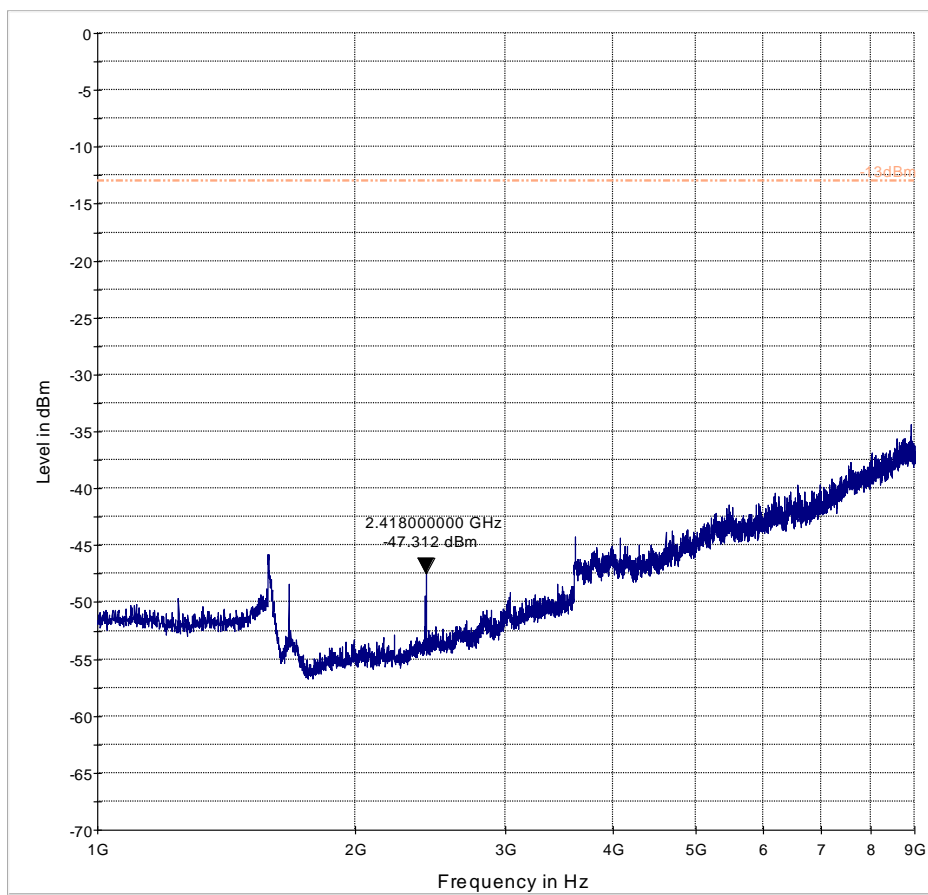
Plot #4 Radiated Emissions: 30 MHz – 1GHz

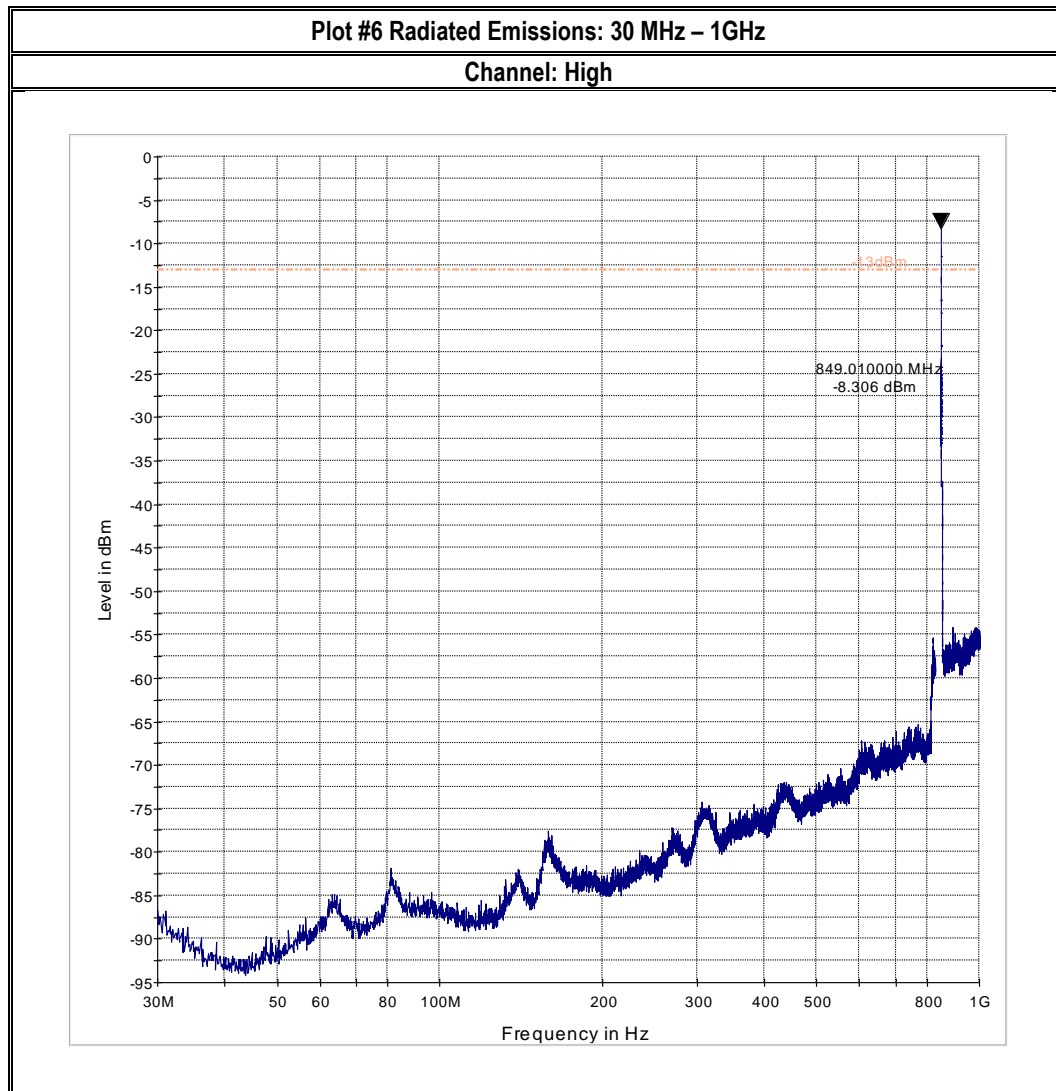
Channel: Mid



Plot #5 Radiated Emissions: 1-9 GHz

Channel: Mid

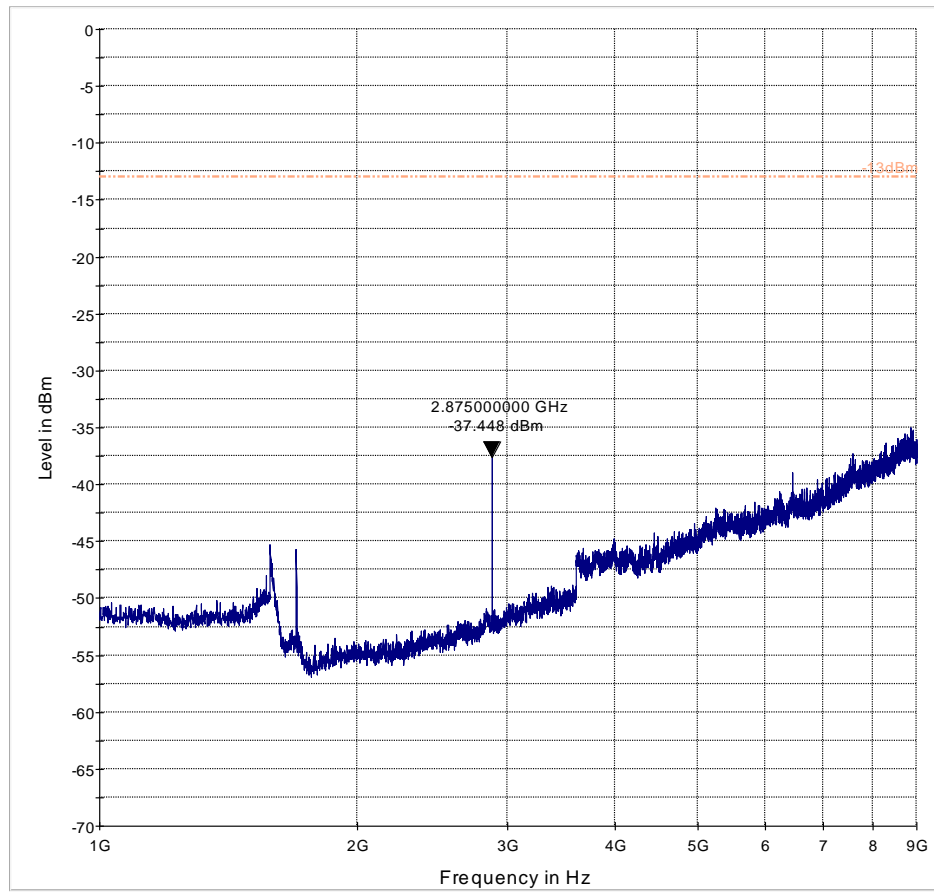




Note: Due to limited resolution during radiated measurements on the Band edges the manual conducted measurement from section 7.2 prevails.

**Plot #7 Radiated Emissions: 1-9 GHz**

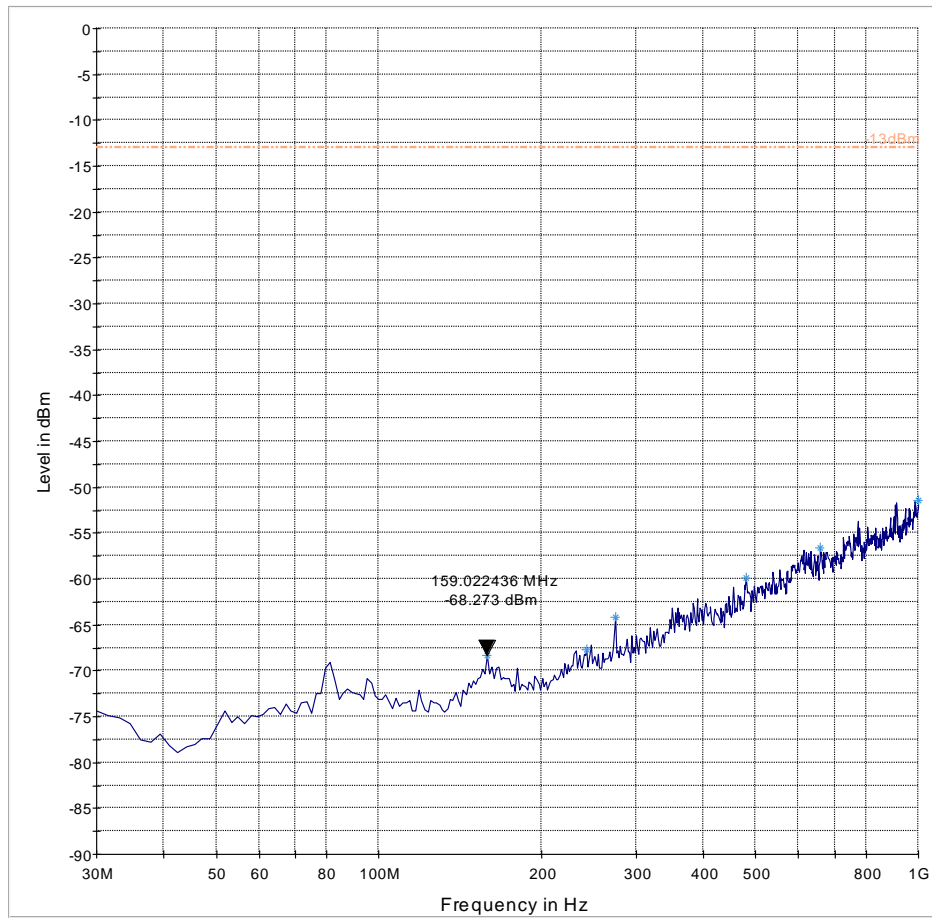
**Channel: High**

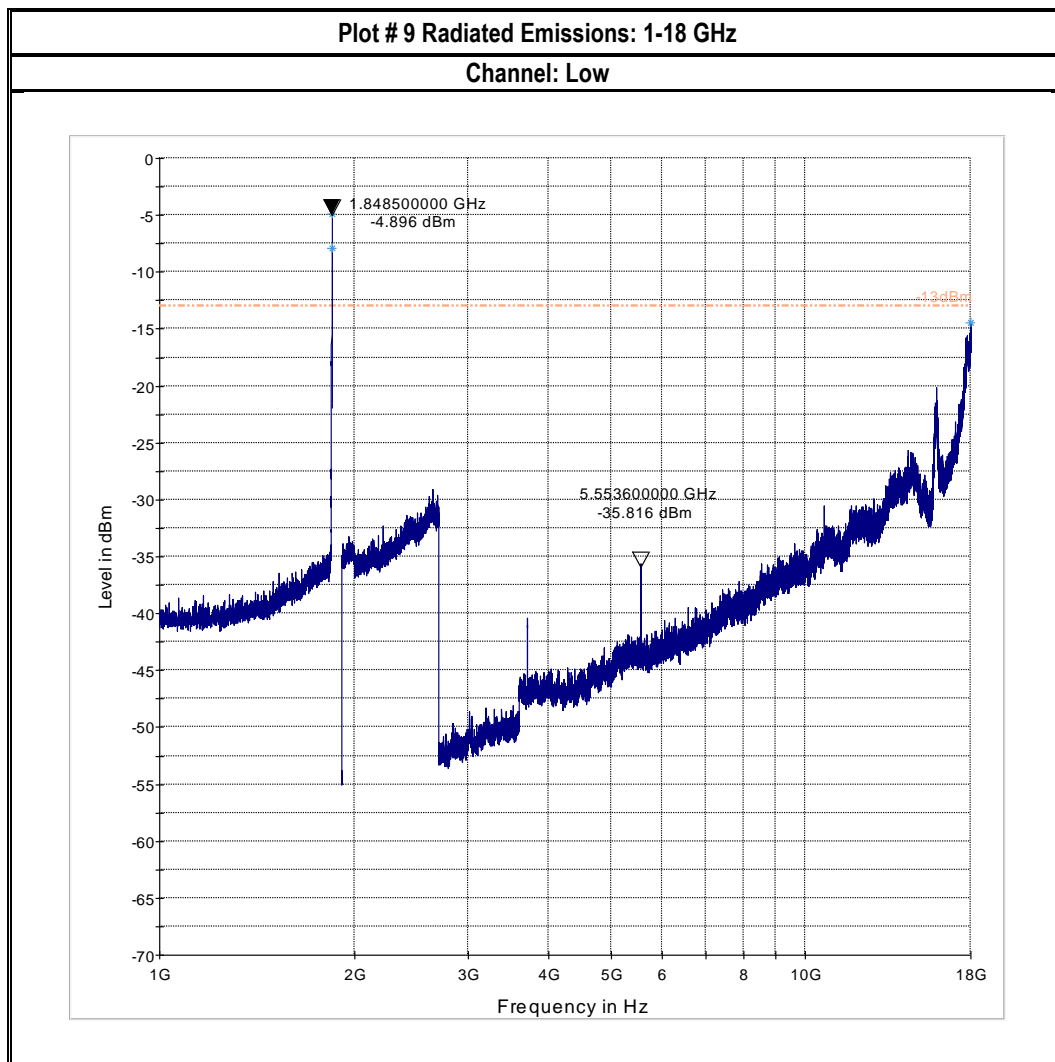


**CDMA 1900**

**Plot #8 Radiated Emissions: 30 MHz – 1GHz**

**Channel: Low**



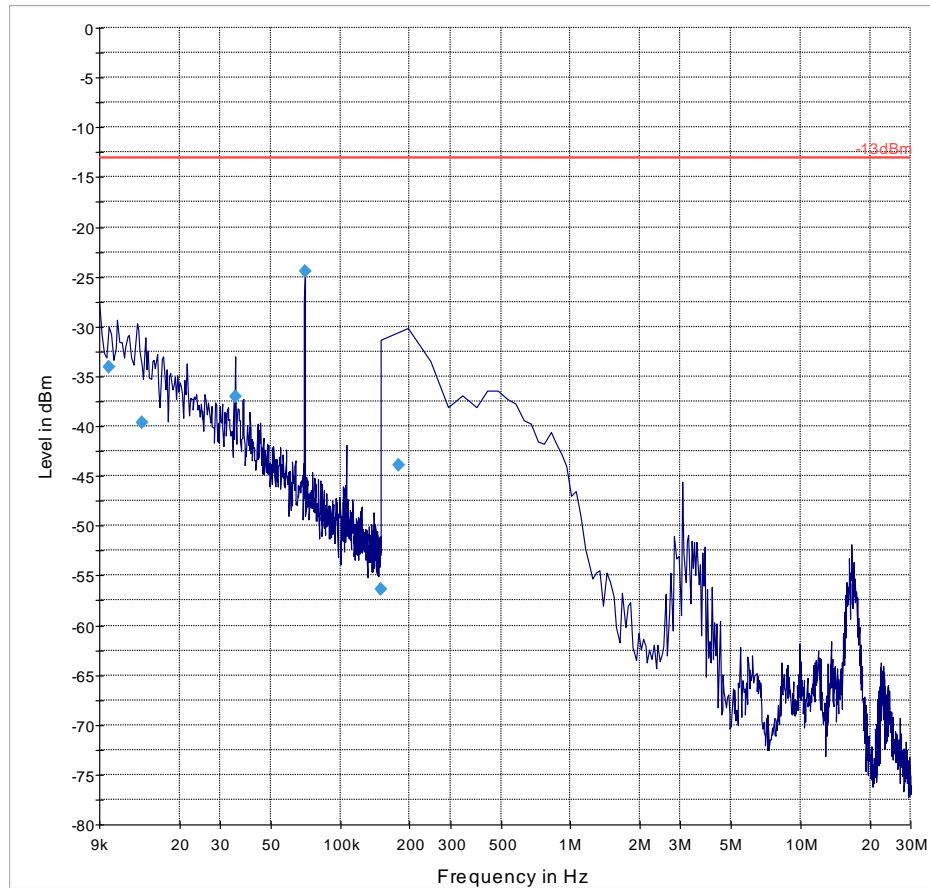


Note: Due to limited resolution during radiated measurements on the Band edges the manual conducted measurement from section 7.2 prevails.



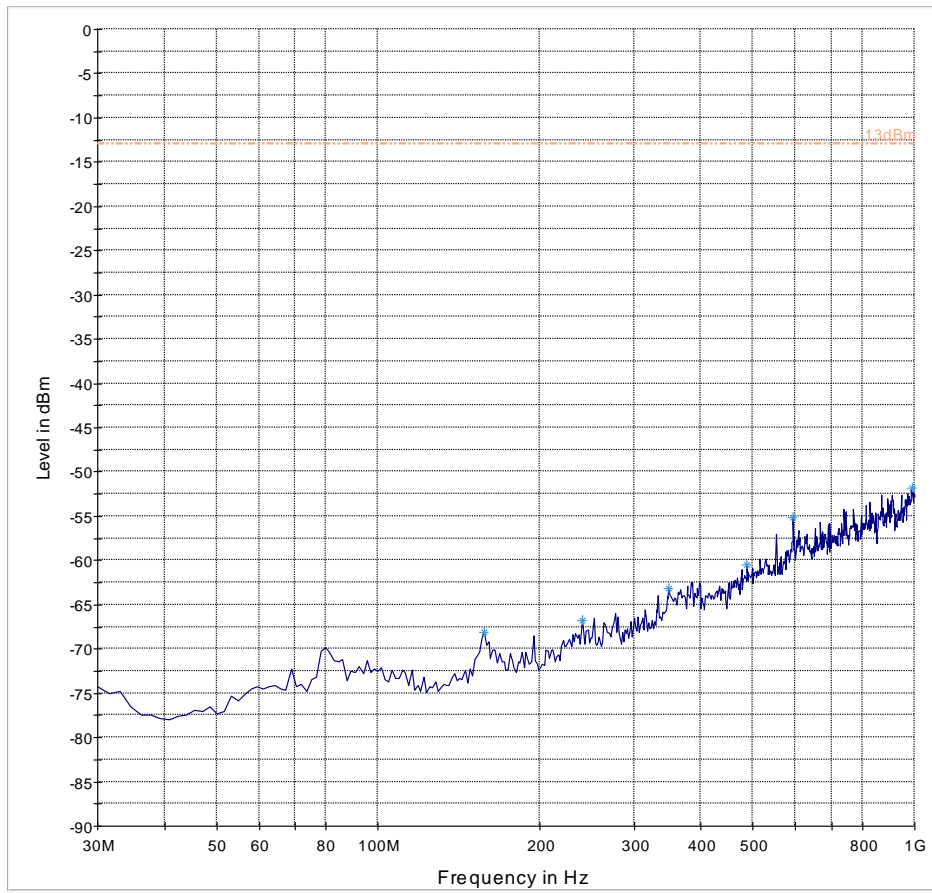
**Plot # 10 Radiated Emissions: 9 kHz-30 MHz**

**Channel: Mid**



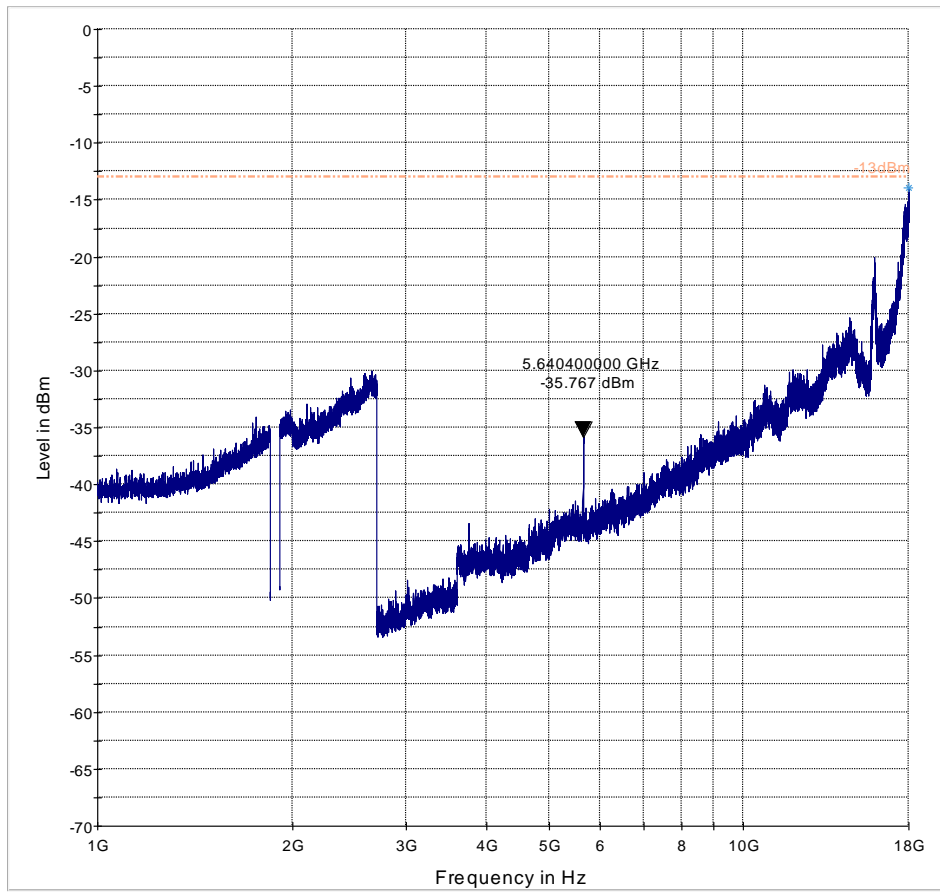
Plot #11 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid



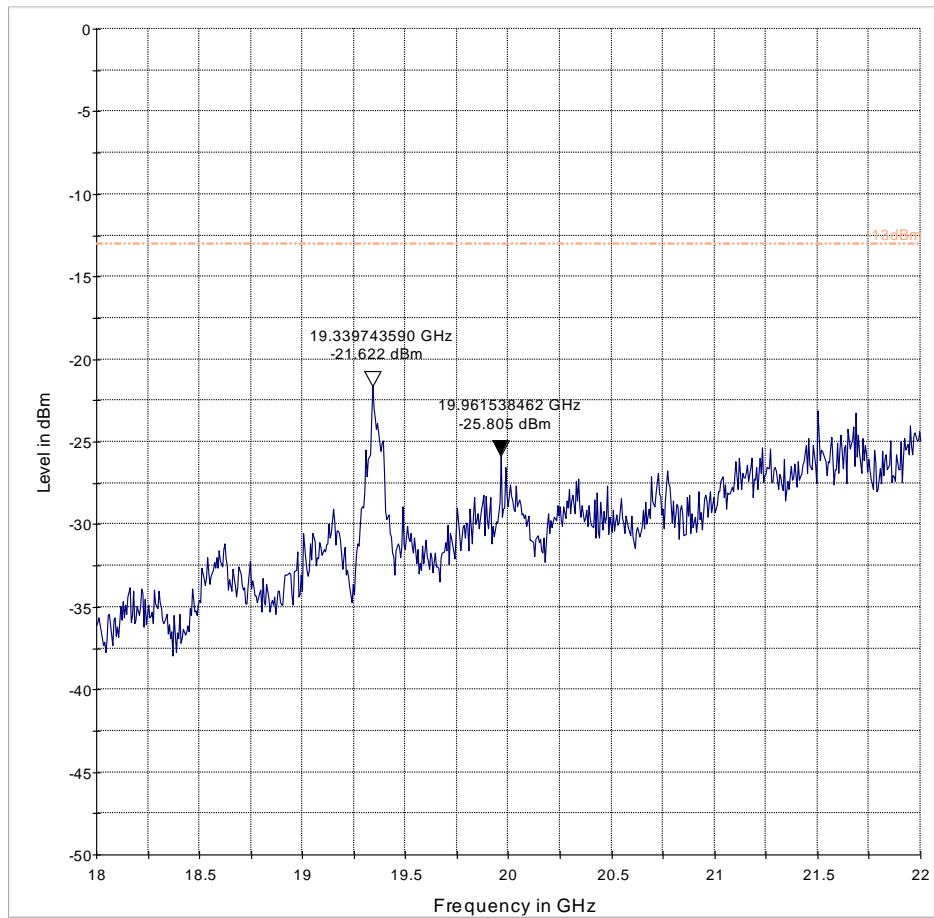
Plot #12 Radiated Emissions: 1-18 GHz

Channel: Mid



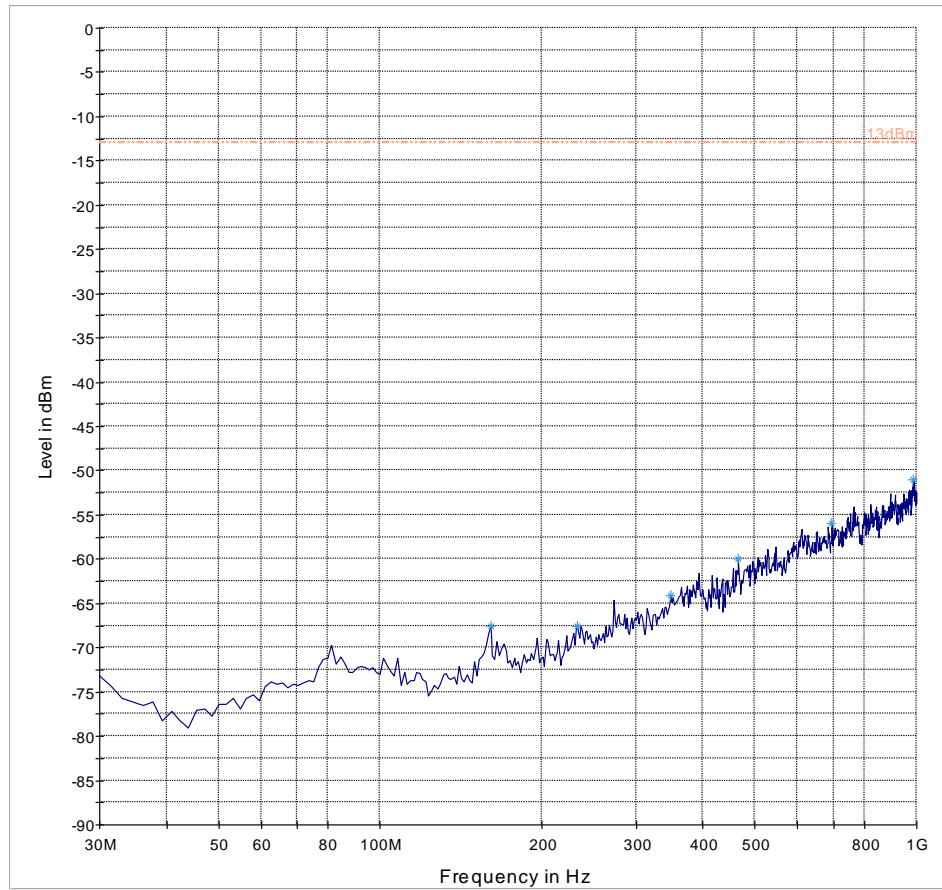
**Plot #13 Radiated Emissions: 18-24 GHz**

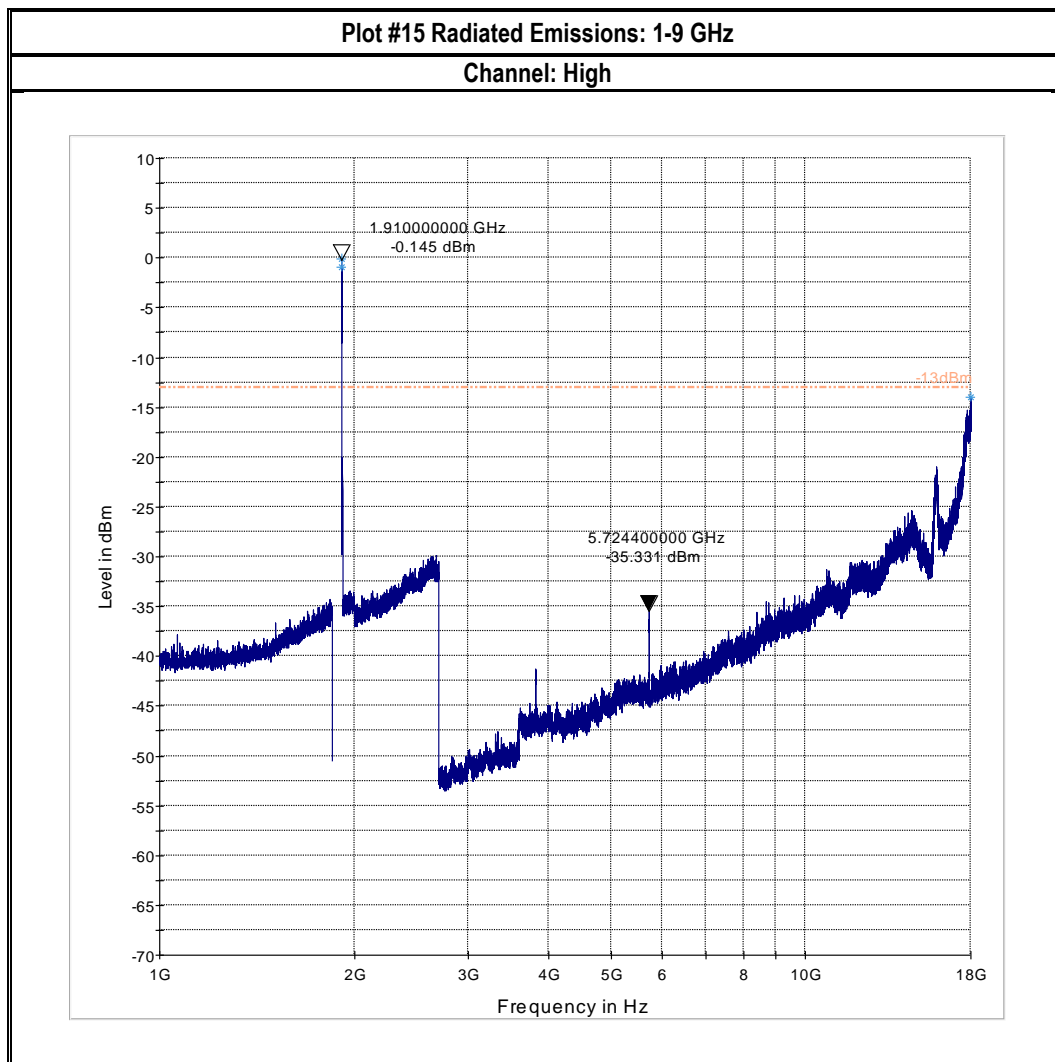
**Channel: Mid**



**Plot #14 Radiated Emissions: 30 MHz – 1GHz**

**Channel: High**





Note: Due to limited resolution during radiated measurements on the Band edges the manual conducted measurement from section 7.2 prevails.

## 8 Test setup photos

Setup photos are included in supporting file name: "EMC\_VERIT-009-15001\_Setup\_photos.pdf"

## 9 Test Equipment And Ancillaries Used For Testing

Item Name	Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Antenna Biconilog 3149	Biconilog Antenna	EMCO	3149	63983	3 years	9-Apr-14
Antenna Binconical 3110B SN 0004-3357	Binconical Antenna	EMCO	3110B	0004-3357	3 years	10/4/2011
Antenna Horn 3116	Horn Antenna	ETS Lindgren	3116	70497	3 years	7/22/2015
Antenna Loop 6512	Loop Antenna	ETS Lindgren	6512	49838	3 years	3/13/2014
Antenna Loop Passive	Loop Antenna	ETS Lindgren	6507	161344	3 years	13-Feb-15
Current Probe EZ-17 Immunity	RF Current Probe Conducted Emissions	R&S	EZ-17	834613/007	3 years	6/17/2013
DFS Generator PXI-5421 AWG	DFS Generator / PXI-5421 card	National Instruments	NI PXI-1042	E965F1	3 years	7/3/2012
DFS Generator PXI-5610 Upconverter	DFS Upconverter PXI-5610 card	National Instruments	NI PXI-1042	E93740	3 years	6/29/2012
Digital Barometer	Compact Digital Barometer	Control Company	35519-055	91119547	2 Years	4/7/2015
Digital Radio Comm. Tester CMU 200 #1	Digital Radio Comm. Tester	R&S	CMU 200 #1	101821	2 Years	7/4/2015
Spectrum Analyzer FSU26 #2	Spectrum Analyzer	R&S	FSU26	200065	3 years	7/4/2015
Thermometer Humidity TM320	Thermometer Humidity	Dickson	TM320	5280063	1 Year	7/29/2015

Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.

Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

## 10 Revision History

Date	Report Name	Changes to report	Report prepared by
2015-11-03	EMC_VERIT-009-15001_FCC_22_24	Initial Version	Kris Lazarov
2015-11-09	EMC_VERIT-009-15001_FCC_22_24	Added declared maximum power and gains from OD. Recalculated ERP/EIRP based on these gains	Franz Engert