

# RF TEST REPORT

Test item : GNSS Data Collector  
Model No. : FCC: Zeno 20  
IC: ZENO20C  
Order No. : DTNC1503-00989, DTNC1503-00990  
Date of receipt : 2015-03-04  
Test duration : 2015-03-09 ~ 2015-03-21  
Date of issue : 2015-05-08  
Use of report : FCC & IC Original Grant

Applicant : Leica Geosystems AG  
Heinrich-Wild-Strasse Heerbrugg CH-9435 Switzerland

Test laboratory : DT&C Co., Ltd.  
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : §22(H), §24(E), RSS-132, RSS-133  
Test environment : See appended test report  
Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

Tested by:



Engineer  
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## Test Report Version

Test Report No.	Date	Description
DRTFCC1505-0092	May 08, 2015	Initial issue

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## 1. GENERAL INFORMATION

**Applicant Name:** Leica Geosystems AG

**Address:** Heinrich-Wild-Strasse Heerbrugg CH-9435 Switzerland

**FCC ID** : RFD-ZENO20C  
**IC** : 3177A-ZENO20C  
**FCC Classification** : PCS Licensed Transmitter (PCB)  
**EUT** : GNSS Data Collector  
**Model Name** : FCC: Zeno 20  
IC: ZENO20C  
**Add Model Name** : N/A  
**Supplying power** : DC 3.7V  
**Antenna Information** : Internal Antenna  
- Type: Built-In type

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
Cellular band CDMA 1x	824.70 MHz ~ 848.31 MHz	1M37F9W	0.143	21.54
Cellular band CDMA 1x EVDO(Rev. A):	824.70 MHz ~ 848.31 MHz	1M32F9W	0.140	21.46
PCS band CDMA 1x	1851.25 MHz ~ 1908.75 MHz	1M38F9W	0.357	25.53
PCS band CDMA 1 x EVDO(Rev. A):	1851.25 MHz ~ 1908.75 MHz	1M33F9W	0.340	25.31

## 2. INTRODUCTION

### 2.1. EUT DESCRIPTION

The Equipment Under Test(EUT) supports a dual band(Cellular/PCS) and 2.4GHz WLAN with Bluetooth.

### 2.2. Support equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

Note: The above equipment were supported by manufacturer.

### 2.3. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 2.4. TEST FACILITY

The 3m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935. The site is constructed in conformance with the requirements.

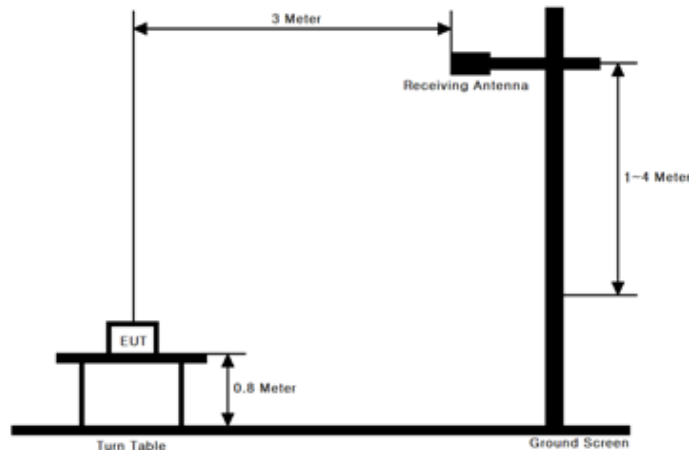
- **Semi anechoic chamber registration Number: 165783 (FCC) & 5740A-3 (IC)**

### 3. DESCRIPTION OF TESTS

#### 3.1 ERP & EIRP

(Effective Radiated Power & Equivalent Isotropic Radiated Power)

##### *Test Set-up*



##### *Test Procedure*

- ANSI/TIA-603-C-2004 - Section 2.2.17
- KDB971168 v02r02 - Section 5.2.1

These measurements were performed at 3 & 10 m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

##### Test setting

1. Set span to at least 1.5 times the OBW.
  2. Set RBW = 1-5 % of the OBW, not to exceed 1 MHz.
  3. Set VBW  $\geq 3 \times$  RBW.
  4. Set number of points in sweep  $\geq 2 \times$  span / RBW.
  5. Sweep time = auto couple.
  6. Detector = RMS (power averaging).
  7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle  $\geq 98$  %), then set the trigger to free run.
  8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle  $< 98$  %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep.
- Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
  10. 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. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

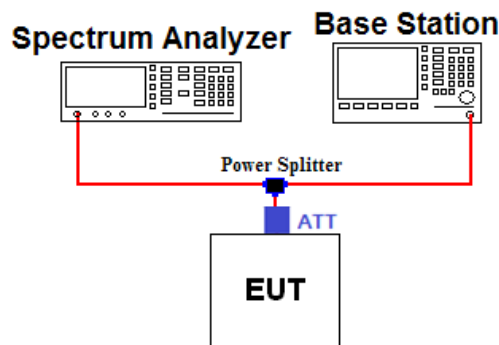
The ERP/EIRP is calculated using the following formula:

**ERP/EIRP = The conducted power at the substitute antenna's terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]**

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn antenna and an isotropic antenna are taken into consideration.

## 3.2 PEAK TO AVERAGE RATIO

### *Test set-up*



### *Test Procedure*

A peak to average ratio measurement is performed using the following procedure.

#### ■ CCDF Procedure

##### - KDB971168 v02r02-Section 5.7.1

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Set the measurement interval as follows:
  - 1) For continuous transmissions, set to 1 ms
  - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%

## ■ Alternate Procedure

### - KDB971168 v02r02-Section 5.7.2

Use one of the measurement procedures of the peak power and record as  $P_{Pk}$ .

Use one of the measurement procedures of the average power and record as  $P_{Avg}$ .

Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = P_{Pk} \text{ (dBm)} - P_{Avg} \text{ (dBm)}.$$

### - Peak Power Measurement

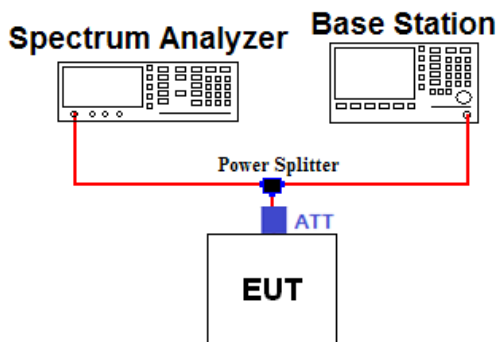
1. Set the RBW  $\geq$  OBW
2. Set VBW  $\geq 3 \times$  RBW
3. Set span  $\geq 2 \times$  RBW
4. Sweep time = auto couple
5. Detector = peak
6. Ensure that the number of measurement points  $\geq$  span/RBW.
7. Trace mode = max hold
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the peak amplitude level.

### - Average Power Measurement

1. Set span to at least 1.5 times the OBW.
2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
3. Set VBW  $\geq 3 \times$  RBW.
4. Set number of points in sweep  $\geq 2 \times$  span / RBW.
5. Sweep time = auto-couple.
6. Detector = RMS (power averaging).
7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle  $\geq 98\%$ ), then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle  $< 98\%$ ), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep.  
Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
10. 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. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

### 3.3 OCCUPIED BANDWIDTH.

#### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Note. 1: The offset values from EUT to Spectrum analyzer were measured and used for test.  
Offset value = Cable A + Splitter + ATT + Cable B

#### Test Procedure

##### - KDB971168 v02r02-Section 4.2

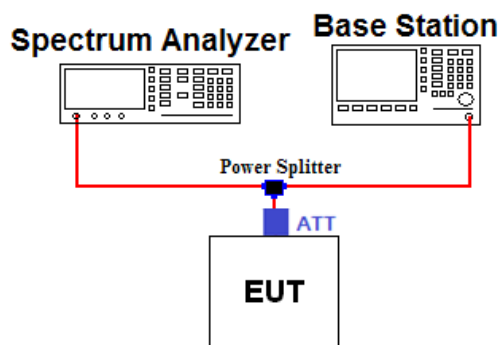
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

#### Test setting

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2.  $RBW = 1 \sim 5 \%$  of the expected OBW &  $VBW \geq 3 \times RBW$
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within  $1 \sim 5 \%$  of the 99 % occupied bandwidth observed in step 6.

### 3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL.

#### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test.  
Offset value = Cable A + Splitter + ATT + Cable B

#### Test Procedure

##### - KDB971168 v02r02 - Section 6.0

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all modulations.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB

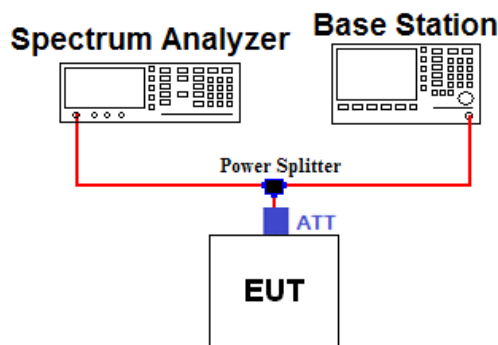
#### Test setting

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW  $\geq 1$  % of the emission
4. VBW  $\geq 3 \times$  RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep time = Auto couple or 1 s for band edge
7. Number of sweep point  $\geq 2 \times$  span / RBW
8. The trace was allowed to stabilize

Note 1: 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 to demonstrate compliance with the out-of-band emissions limit. 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 emission are attenuated at least 26 dB below the transmitter power.

### 3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

#### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
-	-	-	-
-	-	-	-
-	-	-	-

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test.  
Offset value = Cable A + Splitter + ATT + Cable B

#### Test Procedure

##### - KDB971168 v02r02 - Section 6.0

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths. The spectrum is scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB

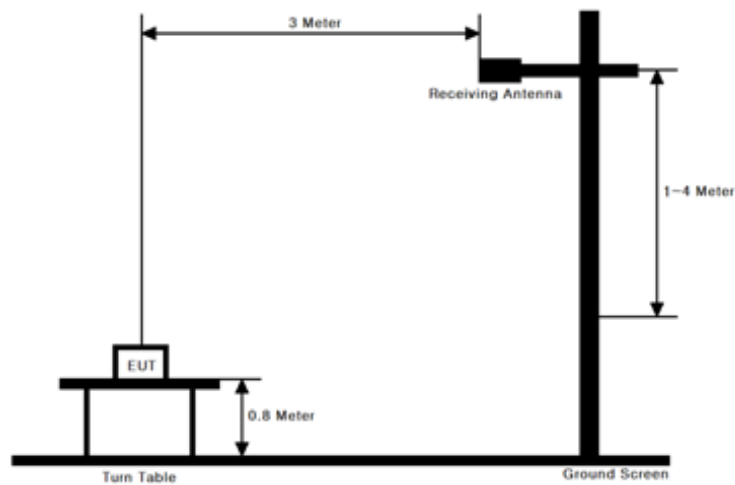
#### Test setting

1. RBW = 100 KHz or 1 MHz & VBW  $\geq 3 \times$  RBW ( Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point  $\geq 2 \times$  span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24.

### 3.6 RADIATED SPURIOUS EMISSIONS

#### *Test Set-up*



#### *Test Procedure*

- **ANSI/TIA-603-C-2004 - Section 2.2.12**
- **KDB971168 v02r02 - Section 5.8**

These measurements were performed at 3 & 10m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

#### Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz /  $VBW \geq 3 \times RBW$
2. Detector = Peak & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point  $\geq 2 \times \text{span} / RBW$
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

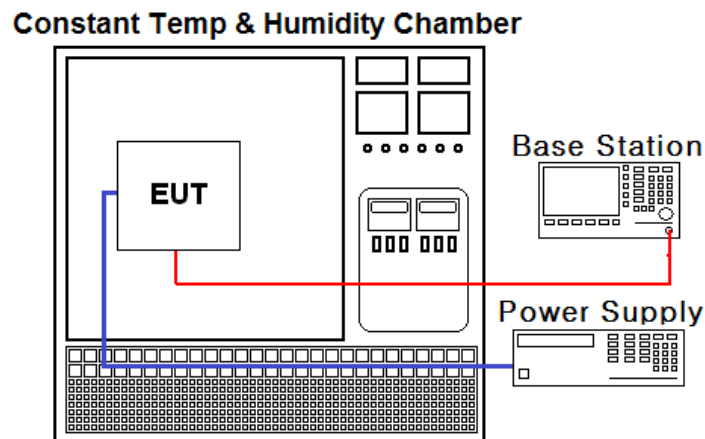
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

### 3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

#### Test Set-up



#### Test Procedure

- ANSI/TIA-603-C-2004
- KDB971168 v02r02 - Section 9.0

The frequency stability of the transmitter is measured by:

a.) **Temperature:**

The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:**

The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

#### Specification:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency for Part 22.

#### Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.  
(25 °C to provide a reference)
2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.  
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

## 4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	E4440A	14/10/21	15/10/21	US45303022
Dynamic Measurement DC Source	Agilent	66332A	15/01/06	16/01/06	GB37470190
Dynamic Measurement DC Source	Agilent Technologies	66332A	14/09/11	15/09/11	MY43000211
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Multimeter	HP	34401A	15/01/06	16/01/06	US36099541
8960 Series 10 Wireless Comms Test Set	Agilent Technologies	E5515C	14/09/12	15/09/12	GB41321164
Power Splitter	Anritsu	K241B	14/10/21	15/10/21	1701102
2W 3dB Attenuator	SMAJK	SMAJK-2-3	14/10/21	15/10/21	3
2W 3dB Attenuator	SMAJK	SMAJK-2-3	14/10/21	15/10/21	4
Thermo hygrometer	BODYCOM	BJ5478	14/05/13	15/05/13	120612-2
Vector Signal Generator	Rohde Schwarz	SMBV100A	15/01/06	16/01/06	255571
Loop Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
Dipole Antenna	Schwarzbeck	VHA9103	13/10/24	15/10/24	2116
Dipole Antenna	Schwarzbeck	VHA9103	14/04/01	16/04/01	2117
Dipole Antenna	Schwarzbeck	UHA9105	13/10/24	15/10/24	2261
Dipole Antenna	Schwarzbeck	UHA9105	14/04/01	16/04/01	2262
HORN ANT	ETS	3115	15/02/09	17/02/09	00021097
HORN ANT	ETS	3115	14/02/26	16/02/26	6419
HORN ANT	Schwarzbeck	BBHA 9170	13/09/06	15/09/06	BBHA9170440
HORN ANT	A.H.Systems	SAS-574	13/05/27	15/05/27	155
Low Noise Pre Amplifier	TSJ	MLA-010K01-B01-27	14/04/09	15/04/09	1844538
			15/04/09	16/04/09	
Amplifier (30dB)	Agilent	8449B	14/11/06	15/11/06	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	14/09/11	15/09/11	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	14/09/11	15/09/11	3
TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB 9160	14/04/04	16/04/04	3357
Amplifier	EMPOWER	BBS3Q7ELU	14/09/12	15/09/12	1020

## 5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	RSS Section(s)	Parameter	Status Note 1
2.1046	RSS-132 (5.4) RSS-133 (4.1)	Conducted Output Power	<b>C</b> Note 2
22.913(a) 24.232(c)	RSS-132 [5.4] [SRSP-503(5.1.3)] RSS-133 [6.4] [SRSP-510(5.1.2)]	Effective Radiated Power Equivalent Isotropic Radiated Power	<b>C</b>
22.917(a) 24.238(a) 2.1049	RSS-Gen [6.6]	Occupied Bandwidth	<b>NA</b> Note 3
22.917(a) 24.238(a) 2.1051	RSS-132 [5.5] RSS-133 [6.5]	Band Edge Spurious and Harmonic Emissions at Antenna Terminal	<b>NA</b> Note 3
24.232(d)	RSS-133 [6.4]	Peak to Average Ratio	<b>NA</b> Note 3
22.917(a) 24.238(a) 2.1053	RSS-132 [5.5] RSS-133 [6.5]	Radiated Spurious and Harmonic Emissions	<b>C</b>
22.355 24.235 2.1055	RSS-132 [5.3] RSS-133 [6.3]	Frequency Stability	<b>NA</b> Note 3

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: Refer to RF Exposure Report. (Test Report\_SAR)

Note 3: These test items were not performed because this device uses the granted module.  
(FCCID: QIPVVS8)

Please refer to the test report of the granted module.

The module test report number:

- MDE\_CINTE\_1209\_FCC22a\_V1, MDE\_CINTE\_1209\_FCC24a\_V1 (By 7Layers AG)

The sample was tested according to the following specification:

**ANSI/TIA/EIA-603-C-2004 and KDB 971168 D01 v02r02**

## 6. SAMPLE CALCULATION

### A. Emission Designator

#### Cellular CDMA1x

Emission Designator = **1M37F9W**

#### PCS CDMA1x

Emission Designator = **1M38F9W**

#### Cellular CDMA 1x EVDO(Rev. A)

Emission Designator = **1M32F9W**

#### PCS CDMA 1x EVDO(Rev. A)

Emission Designator = **1M33F9W**

Note: Emission designators of the granted module were used.

### B. ERP Sample Calculation

MODE	Ch./ Freq		Spectrum Reading	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result	
	channel	Freq.(MHz)	Value(dBm)					(dBm)	(W)
CDMA850	128	824.7	-15.67	Z	V	19.79	1.19	20.98	0.125

#### ERP = @ Ant Terminal LEVEL(dBm) + Ant. Gain

- 1) The EUT mounted on a non-conductive turntable is 0.8 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain is the rating of effective radiated power (ERP).

## **7. TEST DATA**

### **7.1 PEAK TO AVERAGE RATIO**

- Not Applicable

### **7.2 OCCUPIED BANDWIDTH**

- Not Applicable

### **7.3 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL**

- Not Applicable

### **7.4 BAND EDGE**

- Not Applicable

## 7.5 EFFECTIVE RADIATED POWER

### - Cellular CDMA1x

CH.	EUT Position (Axis)	Test mode						
		Pol. (H/V)	LEVEL @ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.
824.70 1013	Z	V	19.79	1.19	20.98	0.125	DC 3.7V	-
836.52 384	X	H	20.18	1.19	21.37	0.137	DC 3.7V	-
<b>848.31 777</b>	<b>Z</b>	<b>H</b>	<b>20.35</b>	<b>1.19</b>	<b>21.54</b>	<b>0.143</b>	<b>DC 3.7V</b>	-

### - Cellular CDMA 1x EVDO(Rev. A)

CH.	EUT Position (Axis)	Test mode						
		Pol. (H/V)	LEVEL @ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.
824.70 1013	Z	V	19.69	1.19	20.88	0.122	DC 3.7V	-
836.52 384	X	H	20.16	1.19	21.35	0.136	DC 3.7V	-
<b>848.31 777</b>	<b>Z</b>	<b>H</b>	<b>20.27</b>	<b>1.19</b>	<b>21.46</b>	<b>0.140</b>	<b>DC 3.7V</b>	-

#### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

## 7.6 EQUIVALENT ISOTROPIC RADIATED POWER

### - PCS CDMA1x

CH.	EUT Position (Axis)	Test mode						
		Pol. (H/V)	LEVEL @ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1851.25 25	X	H	16.36	8.89	25.25	0.335	DC 3.7V	-
<b>1880.00 600</b>	<b>X</b>	<b>H</b>	<b>16.61</b>	<b>8.92</b>	<b>25.53</b>	<b>0.357</b>	<b>DC 3.7V</b>	-
1908.75 1175	Y	V	15.51	8.95	24.46	0.279	DC 3.7V	-

### - PCS CDMA 1x EVDO(Rev. A)

CH.	EUT Position (Axis)	Test mode						
		Pol. (H/V)	LEVEL @ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1851.25 25	X	H	16.13	8.89	25.02	0.318	DC 3.7V	-
<b>1880.00 600</b>	<b>X</b>	<b>H</b>	<b>16.39</b>	<b>8.92</b>	<b>25.31</b>	<b>0.340</b>	<b>DC 3.7V</b>	-
1908.75 1175	Y	V	15.40	8.95	24.35	0.272	DC 3.7V	-

#### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

## 7.7 RADIATED SPURIOUS EMISSIONS

### 7.7.1 RADIATED SPURIOUS EMISSIONS (Cellular CDMA1x)

Channel (ERP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
1013 (0.125 W)	1648.38	Y	H	-52.92	6.50	-46.42	67.40	33.98
	2474.42	Y	H	-45.91	7.54	-38.37	59.35	
	-	-	-	-	-	-	-	
384 (0.137 W)	1671.54	X	H	-51.71	6.53	-45.18	66.55	34.37
	2507.84	Y	H	-46.85	7.57	-39.28	60.65	
	-	-	-	-	-	-	-	
777 (0.143 W)	1695.44	Z	H	-52.23	6.56	-45.67	67.21	34.54
	2544.27	X	H	-47.47	7.59	-39.88	61.42	
	-	-	-	-	-	-	-	

- Limit Calculation=  $43 + 10 \log_{10}(ERP [W])$  [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

#### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

## 7.7.2 RADIATED SPURIOUS EMISSIONS (Cellular CDMA 1x EVDO(Rev. A))

Channel (ERP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
1013 (0.122 W)	1650.40	Y	H	-53.02	6.50	-46.52	67.40	33.88
	2473.37	Y	H	-45.99	7.53	-38.46	59.34	
	-	-	-	-	-	-	-	
384 (0.136 W)	1672.56	X	H	-52.40	6.53	-45.87	67.22	34.35
	2507.85	Y	H	-46.84	7.57	-39.27	60.62	
	-	-	-	-	-	-	-	
777 (0.140 W)	1695.47	Z	H	-52.07	6.56	-45.51	66.97	34.46
	2545.30	X	H	-47.33	7.59	-39.74	61.20	
	-	-	-	-	-	-	-	

- Limit Calculation=  $43 + 10 \log_{10}(\text{ERP [W]})$  [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

#### 7.7.4 RADIATED SPURIOUS EMISSIONS (PCS CDMA1x)

Channel (EIRP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
25 (0.335W)	3703.10	X	H	-43.72	9.78	-33.94	59.19	38.25
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	
600 (0.357W)	3760.28	X	H	-45.18	9.72	-35.46	60.99	38.53
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	
1175 (0.279W)	3817.52	Y	V	-43.22	9.66	-33.56	58.02	37.46
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	

- Limit Calculation =  $43 + 10 \log_{10}( \text{EIRP [W]} )$  [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

#### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

### 7.7.5 RADIATED SPURIOUS EMISSIONS (PCS CDMA 1x EVDO(Rev. A))

Channel (EIRP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
25 (0.439W)	3703.26	X	H	-43.33	9.78	-33.55	58.57	38.02
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	
600 (0.214W)	3759.99	X	H	-44.06	9.72	-34.34	59.65	38.31
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	
1175 (0.377W)	3816.42	Y	V	-42.68	9.66	-33.02	57.37	37.35
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	

- Limit Calculation =  $43 + 10 \log_{10}(\text{EIRP [W]})$  [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

#### NOTES:

This EUT was tested under all configurations and the highest power is reported and CDMA 1x EVDO mode used a Power control bits of "All up". Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.