

# TEST REPORT

of

FCC Part 27 Subpart L

FCC ID: BEJ-TTA20ANEBR

Equipment Under Test : Telematics  
Model Name : TTA20ANEBR  
Variant Model Names : TTA20ANENR, TTA20ANEBS, TTA20ANENS,  
TTA20GNEBS, TTA20GNENS  
Applicant : LG Electronics USA.  
Manufacturer : LG Electronics Inc.  
Date of Receipt : 2018.04.30  
Date of Test(s) : 2018.05.06 ~ 2018.05.10  
Date of Issue : 2018.05.11

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Jinhyoung Cho

Date:

2018.05.11

Technical  
Manager:



Harim Lee

Date:

2018.05.11

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## TABLE OF CONTENTS

	Page
1. General Information -----	3
2. RF radiated output power & spurious radiated emission -----	7
3. Conducted Output Power -----	12
4. Occupied Bandwidth 99 % -----	14
5. Peak-Average Ratio -----	18
6. Spurious Emissions At Antenna Terminal -----	22
7. Band Edge -----	25
8. Frequency Stability -----	27

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 1. General information

### 1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

Telephone : +82 31 688 0901

FAX : +82 31 688 0921

### 1.2. Details of applicant

Applicant : LG Electronics USA.

Address : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632

Contact Person : Han, Kyung-Su

Phone No. : +1 201 816 2003

### 1.3. Details of manufacturer

Company : LG Electronics Inc.

Address : 10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

### 1.4. Description of EUT

Kind of Product	Telematics
Model Name	TTA20ANEBR
Variant Model Names	TTA20ANENR, TTA20ANEBS, TTA20ANENS, TTA20GNEBS, TTA20GNENS
Power Supply	DC 12 V
Rated Power	23 dBm
Frequency Range	1 710 MHz ~ 1 755 MHz
Emission Designator	4M14F9W

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

**SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807** <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 1.5. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 07, 2017	Annual	Jul. 07, 2018
Spectrum Analyzer	R&S	FSV30	103100	Jun. 21, 2017	Annual	Jun. 21, 2018
Spectrum Analyzer	Agilent	N9020A	MY53421758	Sep. 25, 2017	Annual	Sep. 25, 2018
Mobile Test Unit	R&S	CMW500	144034	Mar. 08, 2018	Annual	Mar. 08, 2019
Power Meter	Anritsu	ML2495A	1223004	Jun. 09, 2017	Annual	Jun. 09, 2018
Power Sensor	Anritsu	MA2411B	1207272	Jun. 09, 2017	Annual	Jun. 09, 2018
Directional Coupler	KRYTAR	152613	122660	Jun. 12, 2017	Annual	Jun. 12, 2018
Temperature Chamber	ESPEC CORP.	PL-1J	15000796	Sep. 22, 2017	Annual	Sep. 22, 2018
High Pass Filter	Wainwright Instrument GmbH	WHK3.0/18G-10SS	344	May 28, 2017	Annual	May 28, 2018
DC Power Supply	Agilent	U8002A	MY49030063	Nov. 27, 2017	Annual	Nov. 27, 2018
Preamplifier	H.P.	8447F	2944A03909	Aug. 11, 2017	Annual	Aug. 11, 2018
Preamplifier	R&S	SCU 18	102244	Sep. 22, 2017	Annual	Sep. 22, 2018
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	May 15, 2017	Annual	May 15, 2018
Test Receiver	R&S	ESU26	100109	Feb. 07, 2018	Annual	Feb. 07, 2019
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB 9163	01126	Mar. 26, 2018	Biennial	Mar. 26, 2020
Horn Antenna	R&S	HF906	100326	Feb. 14, 2018	Biennial	Feb. 14, 2020
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	UHA 9105	9105-2514	May 15, 2017	Biennial	May 15, 2019
Dipole Antenna	SCHWARZBECK MESSELEKTRONIK	VHA 9103	9103-2817	May 15, 2017	Biennial	May 15, 2019
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA 9170	BBHA9170431	Aug. 25, 2016	Biennial	Aug. 25, 2018
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA 9170	BBHA9170223	Aug. 25, 2016	Biennial	Aug. 25, 2018
Antenna Master	Innco systems GmbH	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	Innco systems GmbH	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38 330516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.4 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	SUCOFLEX	104 (3 m)	MY3258414	Jan. 12, 2018	Semi-annual	Jul. 12, 2018
Coaxial Cable	SUCOFLEX	104 (10 m)	MY3145814	Jan. 12, 2018	Semi-annual	Jul. 12, 2018
Coaxial Cable	Rosenberger	LA1-C006-1500	131014 05/20	Mar. 05, 2018	Semi-annual	Sep. 05, 2018
Coaxial Cable	Rosenberger	LA1-C006-1500	131014 06/20	Mar. 05, 2018	Semi-annual	Sep. 05, 2018
Coaxial Cable	Rosenberger	LA1-C006-1500	131014 07/20	Mar. 05, 2018	Semi-annual	Sep. 05, 2018

### ► Support equipment

Description	Manufacturer	Model	Serial Number
N/A	-	-	-

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## 1.6. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 2 and 27		
Section in FCC part	Test Item	Result
§2.1046 §27.50(d)(4)	RF Radiated Output Power	Complied
§2.1053 §27.53(h)(1)	Spurious Radiated Emission	Complied
§2.1046	Conducted Output Power	Complied
§2.1049	Occupied Bandwidth	Complied
§27.50(d)(5)	Peak-Average Ratio	Complied
§2.1051 §27.53(h)(1)	Spurious Emission at Antenna Terminal	Complied
§27.53(h)(1)	Band Edge	Complied
§2.1055 §27.54	Frequency Stability	Complied

## 1.7. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL012664	2018.05.11	Initial

## 1.8. Sample calculation for offset

Where relevant, the following sample calculation is provided:

### 1.8.1. Conducted test

Offset value (dB) = Directional Coupler (dB) + Cable loss (dB)

### 1.8.2. Radiation test

E.R.P. & E.I.R.P. = [S.G level + Amp.] (dB m) - Cable loss (dB) + Ant. gain (dB d/dB i)

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 1.9. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty(dB)
Radiated Disturbance, below 1 GHz	$\pm 5.88$
Radiated Disturbance, above 1 GHz	$\pm 5.94$

Uncertainty figures are valid to a confidence level of 95%

## 1.10. Information of Variant Models

Model Name		CAN	HW(TDD)	Back up battery
Basic model	TTA20ANEBR	High / Low Speed	O	O
Variant models	TTA20ANENR	High / Low Speed	O	X
	TTA20ANEBS	High / Low Speed	X	O
	TTA20ANENS	High / Low Speed	X	X
	TTA20GNEBS	High	X	O
	TTA20GNENS	High	X	X

Note;

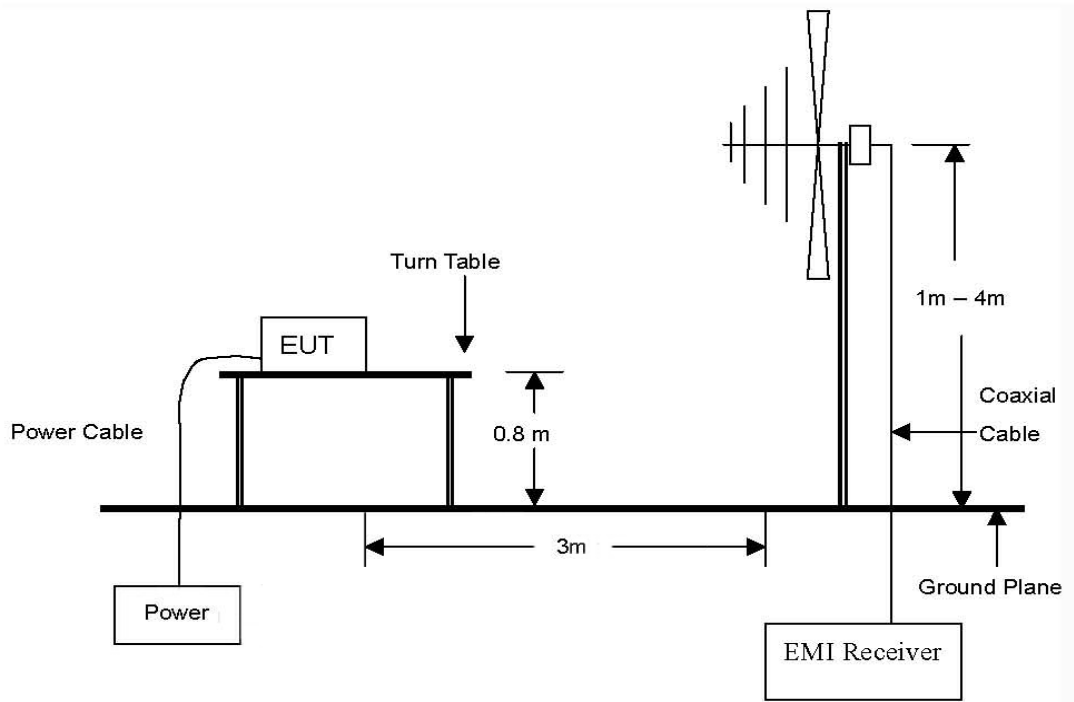
TTA20ANEBR, TTA20ANENR has TDD circuit but it's function is disabled by software.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

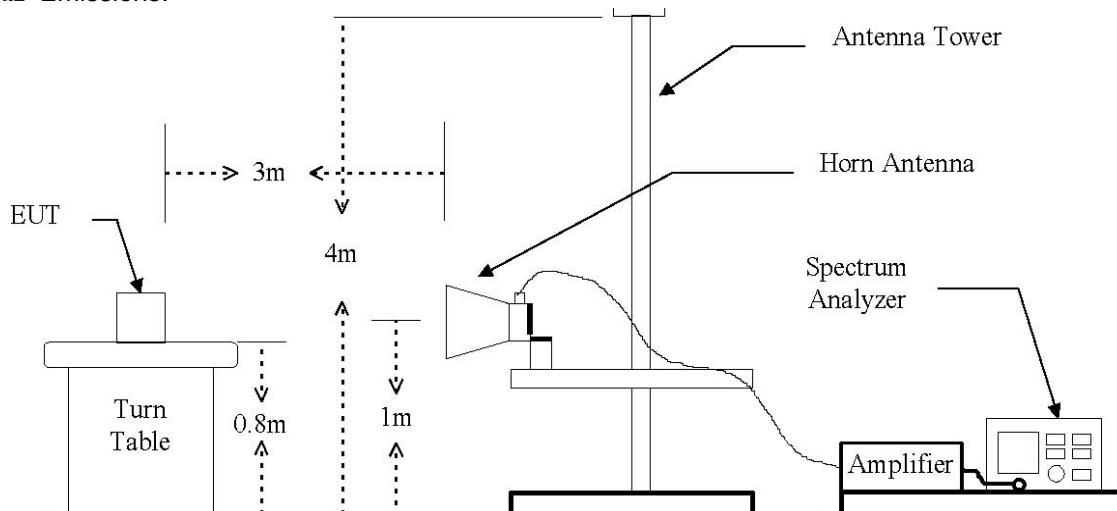
## 2. RF radiated output power & spurious radiated emission

### 2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.

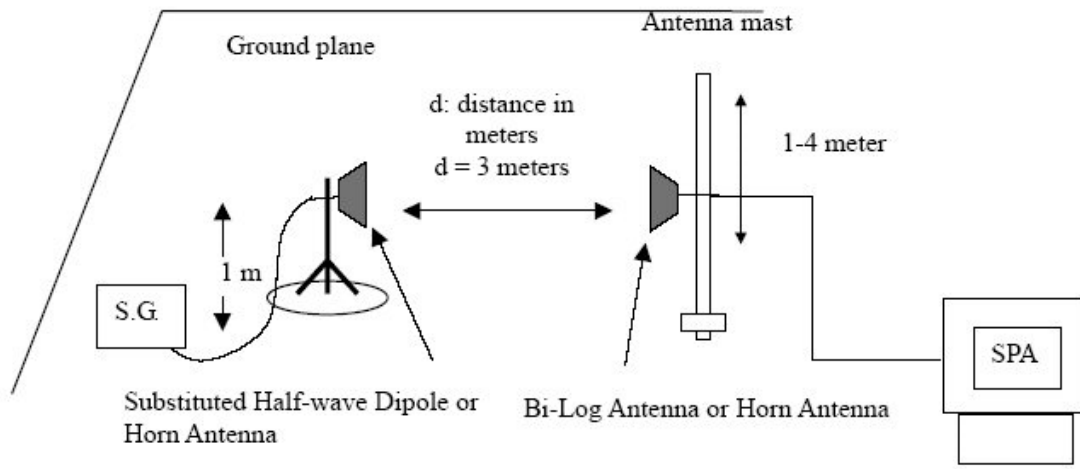


The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 20 GHz Emissions.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

The diagram below shows the test setup for substituted method.



## 2.2. Limit

### 2.2.1. Limit of radiated output power

- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP.

### 2.2.2. Limit of spurious radiated emission

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*



---

### 2.3. Test procedure: Based on ANSI/TIA 603E: 2016

1. On a test site, the EUT shall be placed at 80 cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions occupied bandwidth, RBW = 1-5 % of the OBW (not to exceed 1 MHz), VBW  $\geq 3 \times$  RBW, Detector = power averaging (rms), sweep time = auto, trace average at least 100 traces in power averaging (rms) mode, per the guidelines of KDB 971168 D01 v03.
5. Radiated spurious emissions measurement method was set as follows:  
RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, VBW  $\geq 3 \times$  RBW, Detector = Peak, trace mode = max hold, per the guidelines of KDB 971168 D01 v03.
6. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
7. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
8. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
9. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
10. The maximum signal level detected by the measuring receiver shall be noted.
11. The EUT was replaced by half-wave dipole (1 GHz below) or horn antenna (1 GHz above) connected to a signal generator.
12. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

---

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 2.4. Test result for RF radiated output power

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.

### WCDMA 4

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 712.4	H	11.38	7.76	8.08	11.70	14.79
1 712.4	V	13.15	7.76	8.08	13.47	22.23
1 732.6	H	10.82	7.80	8.14	11.16	13.06
1 732.6	V	13.65	7.80	8.14	13.99	25.06
1 752.6	H	12.09	7.84	8.19	12.44	17.54
1 752.6	V	13.00	7.84	8.19	13.35	21.63

Remark:

1. E.I.R.P. = [S.G level + Amp.] (dB m) - Cable loss (dB) + Ant. gain (dB i)

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 2.5. Spurious radiated emission

- Measured output Power: 13.99 dB m = 0.025 1 W
- Modulation Signal: WCDMA 4
- Distance: 3 meters
- Limit:  $43 + 10\log_{10}(W) = -13.00$  dB m

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (1 712.4 MHz)							
3 424.80	H	-57.02	10.71	8.80	-58.93	-13.00	-45.93
3 423.60	V	-53.25	10.71	8.80	-55.16	-13.00	-42.16
5 135.85	H	-51.77	13.18	10.18	-54.77	-13.00	-41.77
5 136.10	V	-49.55	13.18	10.18	-52.55	-13.00	-39.55
6 852.90	H	-49.03	15.52	11.55	-53.00	-13.00	-40.00
6 844.70	V	-41.84	15.52	11.54	-45.82	-13.00	-32.82
Middle Channel (1 732.6 MHz)							
3 466.50	H	-55.10	10.76	8.86	-57.00	-13.00	-44.00
3 462.80	V	-50.83	10.75	8.85	-52.73	-13.00	-39.73
5 201.05	H	-51.77	13.12	10.35	-54.54	-13.00	-41.54
5 199.75	V	-49.44	13.12	10.35	-52.21	-13.00	-39.21
6 925.95	H	-47.36	15.59	11.59	-51.36	-13.00	-38.36
6 925.75	V	-38.11	15.59	11.59	-42.11	-13.00	-29.11
High Channel (1 752.6 MHz)							
3 506.50	H	-55.55	10.80	8.91	-57.44	-13.00	-44.44
3 507.70	V	-52.71	10.80	8.91	-54.60	-13.00	-41.60
5 260.40	H	-50.92	13.30	10.45	-53.77	-13.00	-40.77
5 260.25	V	-49.18	13.30	10.45	-52.03	-13.00	-39.03
7 005.85	H	-47.19	15.72	11.53	-51.38	-13.00	-38.38
7 013.50	V	-40.52	15.75	11.52	-44.75	-13.00	-31.75

Remark:

1. E.I.R.P. = S.G level (dB m) - Cable loss (dB) + Ant. gain (dB i)

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

### 3. Conducted Output Power

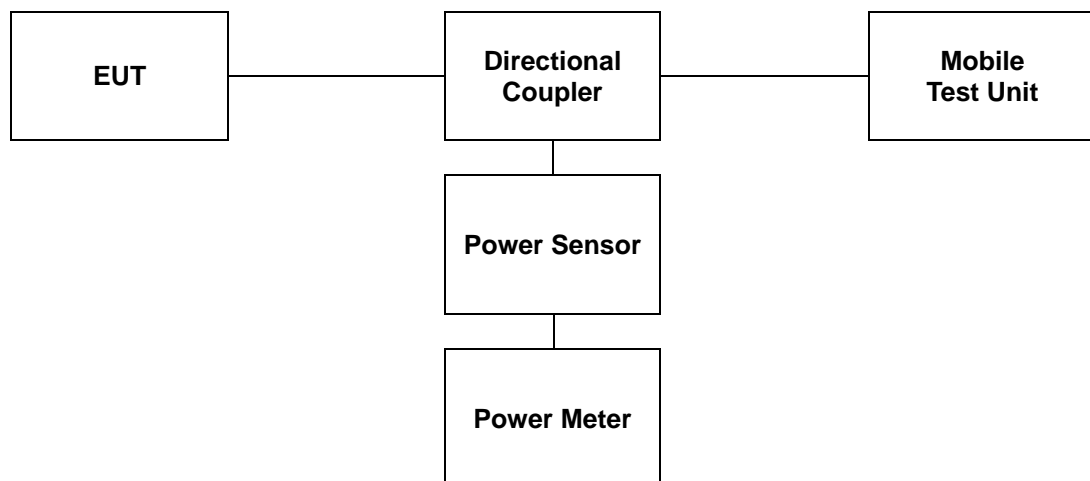
#### 3.1. Limit

CFR 47, Section FCC §2.1046.

#### 3.2. Test Procedure

Output power shall be measured at the RF output terminals for all configurations.

1. The RF output of the transmitter was connected to the input of the mobile test unit in order to establish communication with the EUT.
2. The EUT was set up for the max. output power with pseudo random data modulation by using mobile test unit parameters.
3. The measurement performed using a wideband RF power meter.
4. This EUT was tested under all configurations and the highest power was investigated and reported.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

### 3.3. Test Result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Band	3GPP Release version	Channel		1312	1413	1513
		Frequency (MHz)		1 712.4	1 732.6	1 752.6
4	99	WCDMA	RMC	<b>22.86</b>	<b>22.82</b>	<b>22.95</b>
	5	HSDPA	Subtest 1	21.85	21.97	21.86
	5		Subtest 2	21.86	21.79	21.92
	5		Subtest 3	21.38	21.32	21.44
	5		Subtest 4	21.37	21.31	21.42
	6	HSUPA	Subtest 1	21.81	21.78	21.90
	6		Subtest 2	21.34	21.30	21.47
	6		Subtest 3	21.81	21.78	21.90
	6		Subtest 4	21.80	21.73	21.84
	6		Subtest 5	21.82	21.79	21.92
	7	HSPA+		21.31	21.25	21.43

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## 4. Occupied Bandwidth 99 %

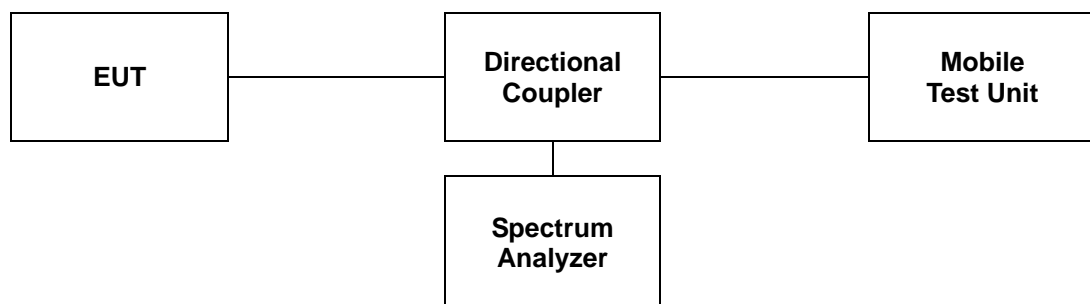
### 4.1. Limit

CFR 47, Section FCC §2.1049.

### 4.2. Test Procedure

The test follows section 4.3 of FCC KDB Publication 971168 D01 v03.

1. Set span = 2 - 5 x OBW.
2. Set resolution bandwidth (RBW) = 1 - 5 % of OBW.
3. Set video bandwidth (VBW)  $\geq 3 \times$  RBW.
4. Detector = Peak.
5. Trace mode = Max hold.
6. Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

### 4.3 Test Results

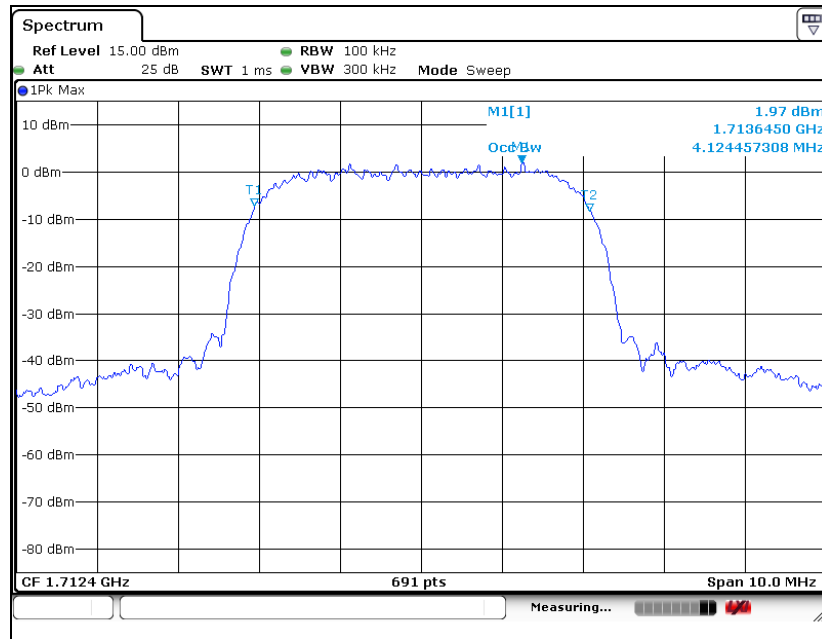
Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

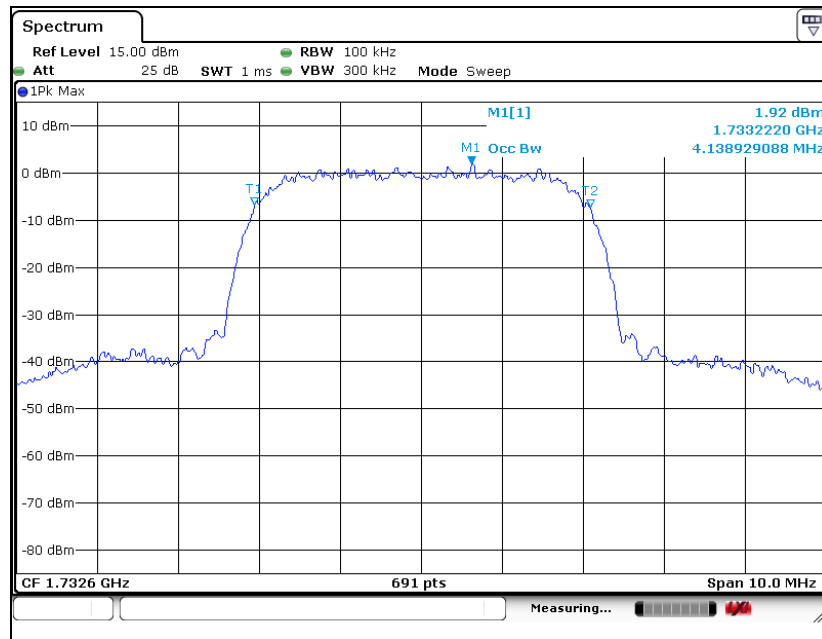
Band	Mode	Frequency (MHz)	Occupied Bandwidth (MHz)
4	RMC	1 712.4	4.124
		1 732.6	4.139
		1 752.6	4.139

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## WCDMA 4 Low Channel



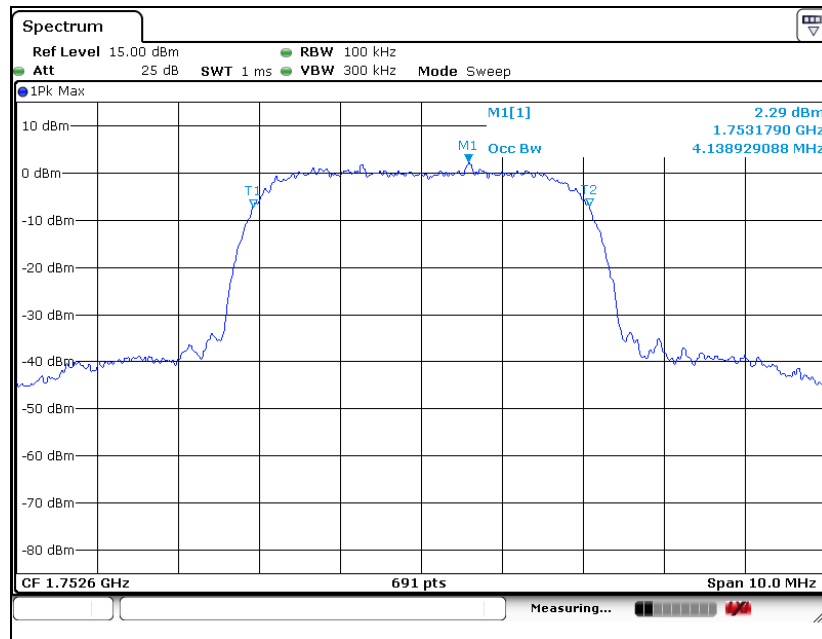
## Middle Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.



## High Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## 5. Peak-Average Ratio

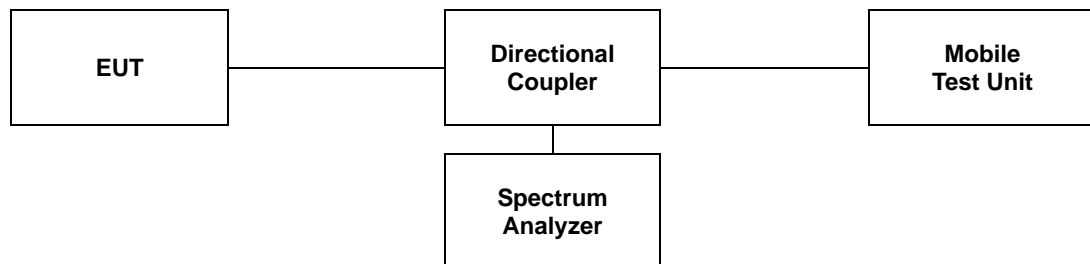
### 5.1. Limit

- §27.50(d)(5), 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 (d)(6) of this section. 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.

### 5.2. Test Procedure

The test follows section 5.7.2 of FCC KDB Publication 971168 D01 v03.

1. Refer to the instruction manual of the instrument for details on how to use the power statistics/CCDF function.
2. Set resolution/measurement bandwidth  $\geq$  OBW of the signal, or  $\geq$  signal's occupied bandwidth.
3. Set the number of counts to a value that stabilizes the measured CCDF curve.
4. Set the measurement interval as follows:
  - a) For continuous transmissions, set to  $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$  or 1 ms.
  - b) 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. Set the measurement interval to a time that is less than or equal to the burst duration.
  - c) If there are multiple carriers (i.e., multiple emission signals with specific associated necessary bandwidths) in a single antenna port, the peak power for that port shall be determined for each individual carrier by disabling the other carriers while measuring the required carrier, then the total peak power is calculated from the sum of the individual carrier peak powers.
5. Record the maximum PAPR level associated with a probability of 0.1 %.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

### 5.3 Test Results

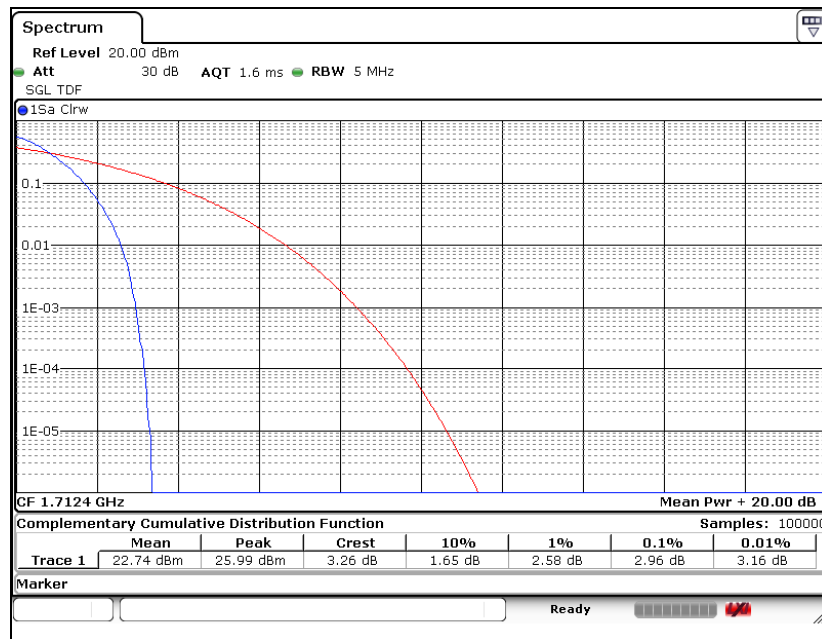
Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

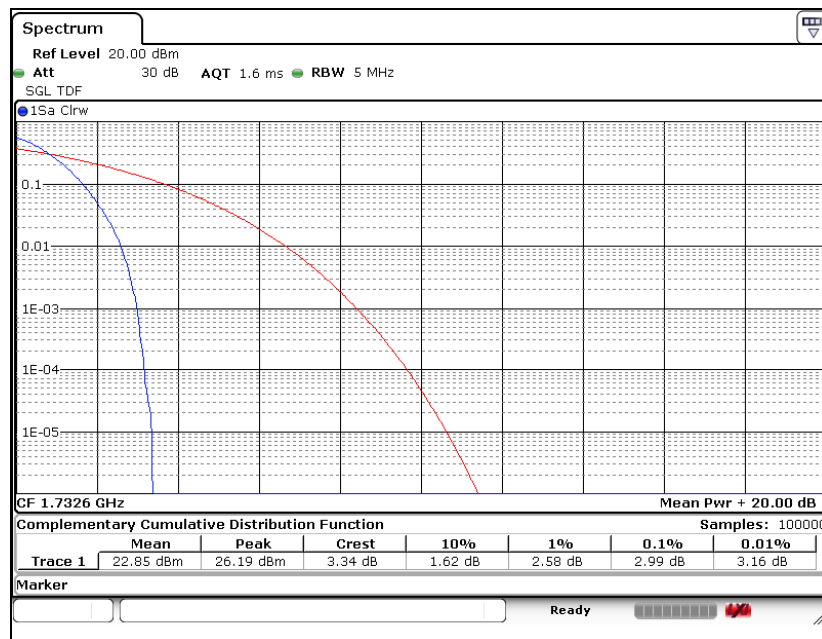
Band	Mode	Frequency (MHz)	PAR (dB)
4	RMC	1 712.4	2.96
		1 732.6	2.99
		1 752.6	2.81

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## WCDMA 4 Low Channel

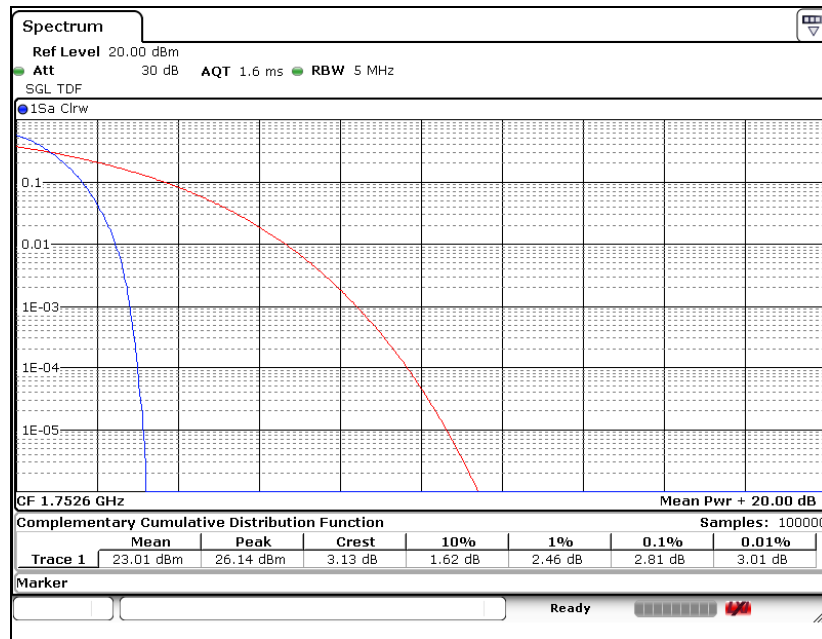


## Middle Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## High Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## 6. Spurious Emissions at Antenna Terminal

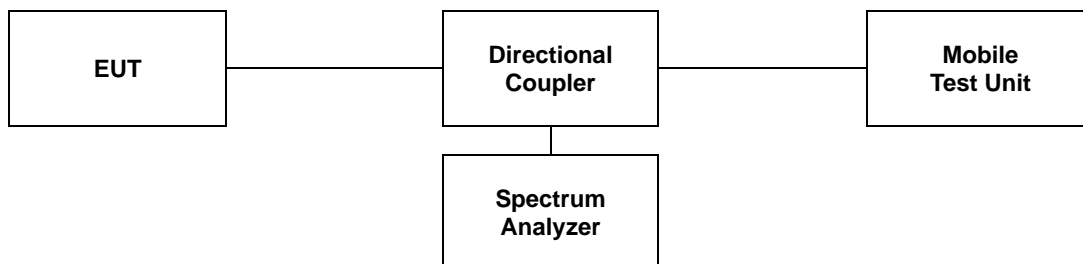
### 6.1. Limit

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### 6.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168 D01 v03.

1. Start frequency was set to 30 MHz and stop frequency was set to at least 10\* the fundamental frequency.
2. Detector = Peak.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 30 MHz to 18 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Notes;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and frequencies greater than 1 GHz. 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. The emission bandwidth is defined as the width of the signal between two point, 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.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 6.3. Test Results

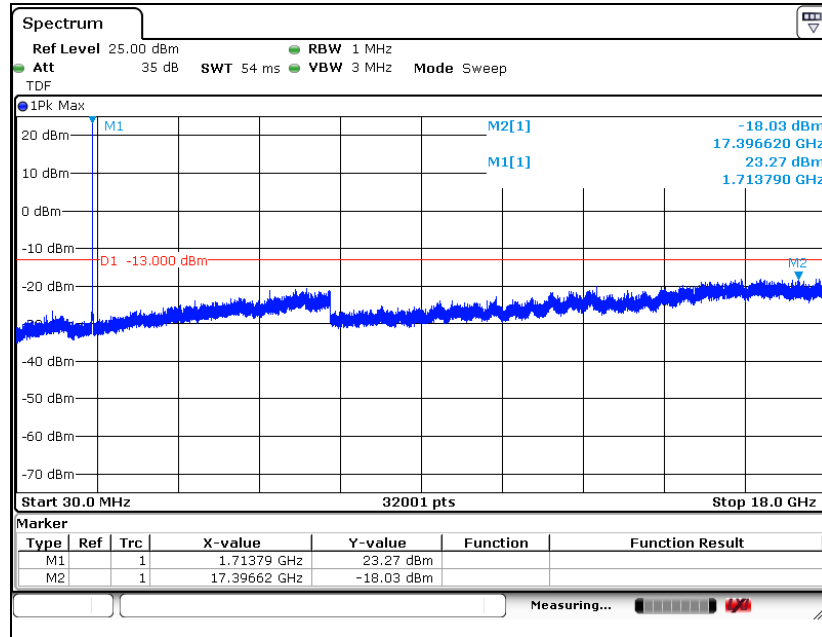
Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

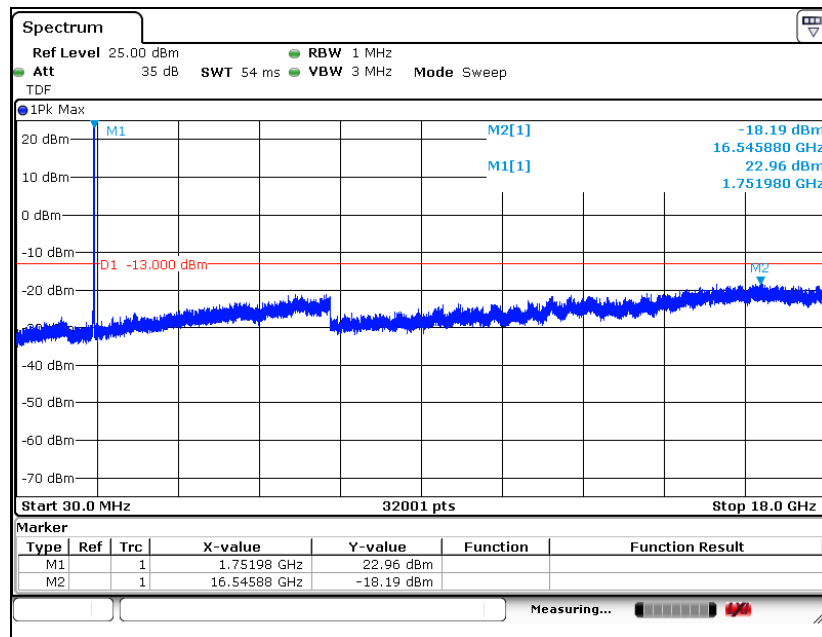
Please refer to the following plots.

### WCDMA 4

#### Low Channel

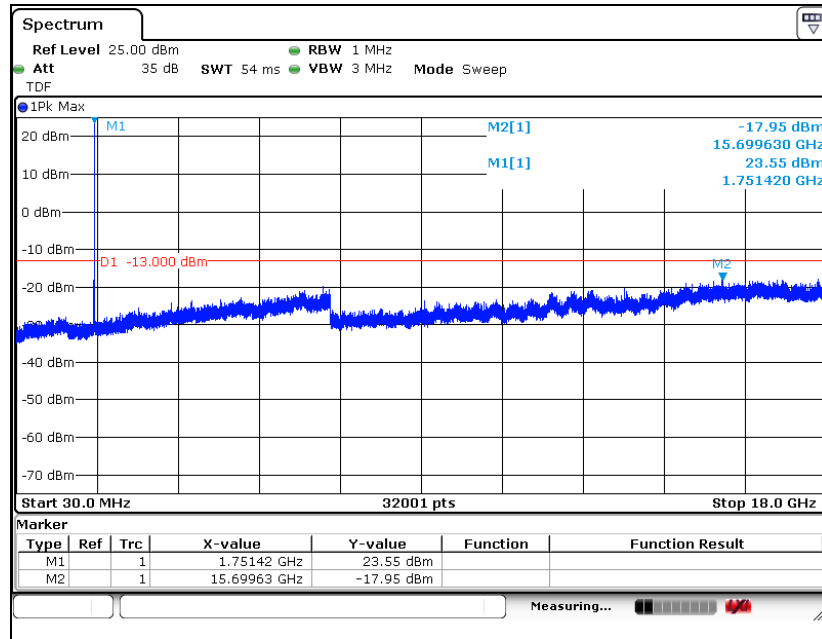


#### Middle Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## High Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.



## 7. Band Edge

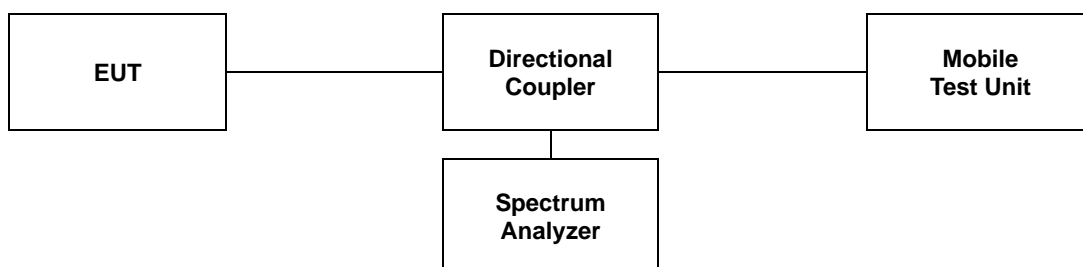
### 7.1. Limit

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### 7.2. Test Procedure

The test follows section 6.0 of FCC KDB Publication 971168 D01 v03.

1. Span was set large enough so as to capture all out of band emissions near the band edge.
2. RBW  $\geq 1$  % of OBW
3. VBW  $\geq 3 \times$  RBW.
4. Detector = RMS.
5. Trace mode = Average.
6. Sweep time = Auto.
7. The trace was allowed to stabilize.
8. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 7.3. Test Results

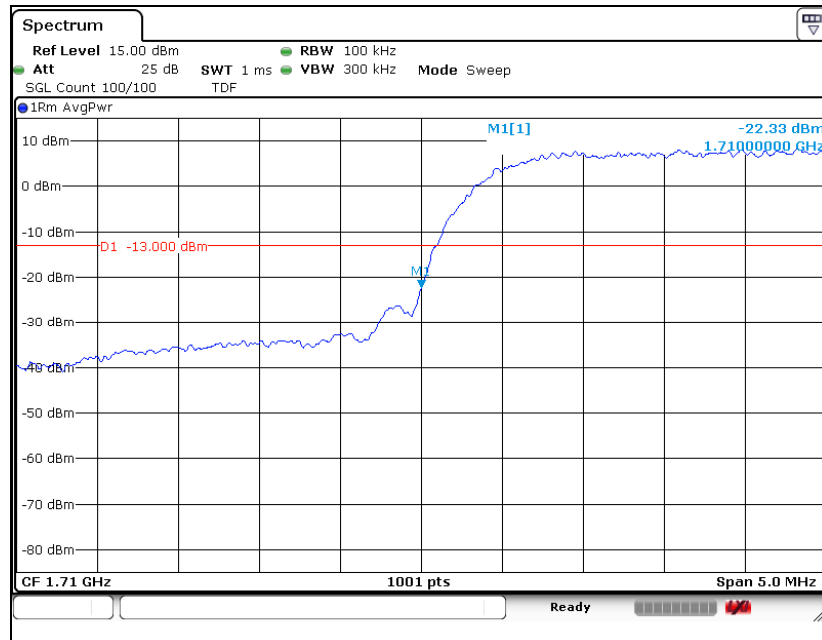
Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

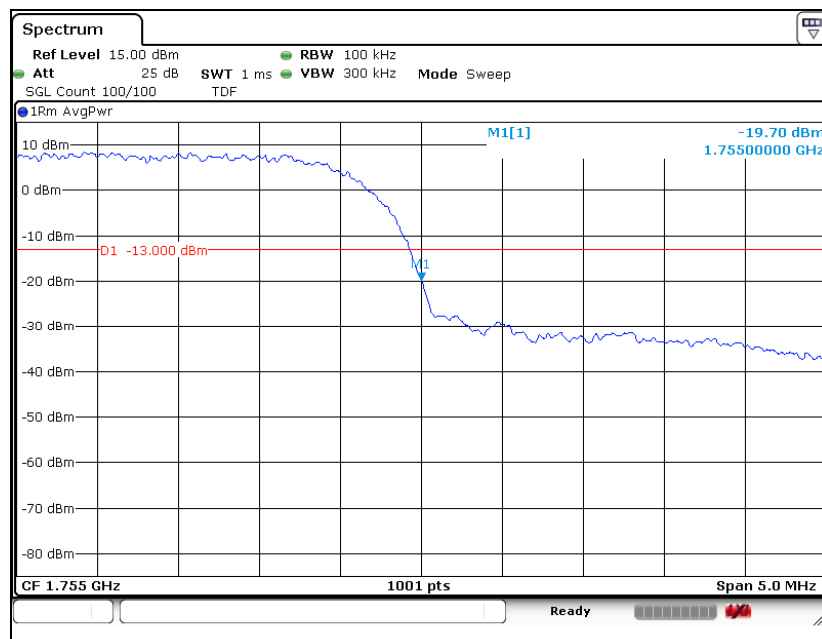
Please refer to the following plots.

### WCDMA 4

#### Low Channel



#### High Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

## 8. Frequency Stability

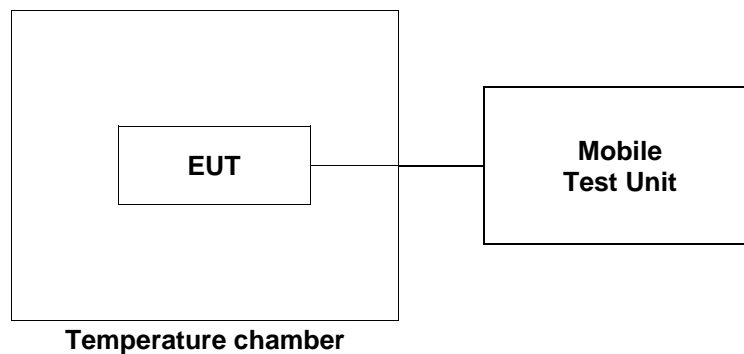
### 8.1. Limit

- § 2.1055 (a), § 2.1055 (d) & following:

- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

### 8.3. Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

#### WCDMA 4 mode at middle channel

Reference Frequency: 1 732.6 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12	5	0.002 9
40		2	0.001 2
30		3	0.001 7
23		-1	-0.000 6
10		-3	-0.001 7
0		-2	-0.001 2
-10		-4	-0.002 3
-20		2	0.001 2
-30		-2	-0.001 2
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	13.8	-3	-0.001 7
	10.2	-1	-0.000 6

- End of the Test Report -

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.