



FCC ID: W5Y-1002244  
Report No.: T191120D05-RP4

IC: 24213-1002244

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Rev.: 03

**FCC 47 CFR PART 27 SUBPART L  
+  
INDUSTRY CANADA RSS-139**

**TEST REPORT**

**For**

**GUARDIAN SYSTEM LTE**

**FCC Model No.: G2-SY-CON2  
IC Model No.: G2-SY-CON2-1002244**

**Trade Name: GUARDIAN**

*Issued to*

<b>FCC:</b>	<b>Seeing Machines Pty Ltd 80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia</b>
<b>IC:</b>	<b>Seeing Machines Ltd. 80 Mildura Street Fyshwick ACT 2609 Australia</b>

*Issued by*

**Compliance Certification Services Inc.  
Wugu Laboratory  
No.11, Wugong 6th Rd., Wugu Dist.,  
New Taipei City, Taiwan. (R.O.C.)  
Issued Date: June 20, 2020**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 22, 2020	Initial Issue	ALL	Doris Chu
01	April 22, 2020	See the following Note Rev. (01)	P.6, P.9, P.11, P.30-31, P.38-41, P.18	Doris Chu
02	April 28, 2020	See the following Note Rev. (02)	P.6	Doris Chu
03	June 20, 2020	See the following Note Rev. (03)	P.1, P.4, P.6	Allison Chen

**Rev (01):**

1. Added HSPA+ in Frequency Range.
2. Revised Antenna type.
3. Revised section 4 IC Standard Section.
4. Revised section 5.2 DC Power Supplies Cal Due date indication.
5. Revised section 6.3.
6. Revised section 8.6 Test Configuration and test procedure.
7. Revised section 8.7 Test Procedure and Test Results.
8. Added HSPA+ test data.

**Rev (02):**

1. Revised section 2 power supply.

**Rev (03):**

1. Modify IC Model No.: G2-SY-CON2-1002244.

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## 1 TEST RESULT CERTIFICATION

**FCC Applicant:** Seeing Machines Pty Ltd  
80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia

**IC Applicant:** Seeing Machines Ltd.  
80 Mildura Street Fyshwick ACT 2609 Australia

**Manufacturer:** ADLINK TECHNOLOGY INC.  
9F, No. 166, Jian Yi Rd., Zhonghe Dist., New Taipei City, 235  
Taiwan

**Equipment Under Test:** GUARDIAN SYSTEM LTE

**Trade Name:** GUARDIAN

**FCC Model No.:** G2-SY-CON2

**IC Model No.:** G2-SY-CON2-1002244

**Date of Test:** December 23, 2019 ~ January 8, 2020

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APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L + RSS-139 Issue 3 2015	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

**We hereby certify that:**

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA-603-E and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 27 Subpart L and IC RSS-139 Issue 3.

The test results of this report relate only to the tested sample identified in this report.

*Approved by:*




---

Kevin Tsai  
Deputy Manager  
Compliance Certification Services Inc.

## 2 EUT DESCRIPTION

<b>Product</b>	GUARDIAN SYSTEM LTE
<b>FCC Model No.</b>	G2-SY-CON2
<b>IC Model No.</b>	G2-SY-CON2-1002244
<b>Model Discrepancy</b>	N/A
<b>Trade</b>	GUARDIAN
<b>Received Date</b>	November 20, 2019
<b>Power Supply</b>	Powered from DC supply: DC 12V.
<b>Frequency Range</b>	WCDMA / HSDPA / HSUPA / HSPA+ Band IV: 1712.4-1752.6 MHz
<b>Transmit Power (EIRP Power)</b>	WCDMA Band IV: 21.92 dBm
<b>Antenna Specification</b>	Dipole Antenna Antenna gain: 1.8 dBi
<b>HW Version</b>	V1
<b>SW Version</b>	V9

**Remark:** 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.  
 2. For test mode WCDMA, HSUPA, HSDPA and HSPA+ were pretest. The worst case was WCDMA in this test report

Emission Designator				
System	Band	Frequency Range(MHz)	Emission Designator (99% OBW)	Maximum EIRP (W)
WCDMA 12.2K RMC	IV	1712.4MHz ~1752.6MHz	4M12F9W	0.1556

### **3 TEST METHODOLOGY**

Both conducted and radiated testing were performed according to the procedures document on TIA-603-E and FCC CFR 47, Part 27 Subpart L.

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.26: 2015 and RSS-139.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

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### 3.2 DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

The EUT be set in maximum power transmission via call box during testing.

#### 3.2.1 The worst mode of measurement

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Power supply
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Power supply
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report



## 4 TEST SUMMERY

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
-	-	2	Antenna Requirement	Pass
27.50(d)	RSS-139 section 6.5	8.1	EIRP Measurement	Pass
2.1049	RSS-GEN 6.7	8.2	Occupied Bandwidth Measurement	Pass
27.53(h)	RSS-139 section 6.6	8.3	Conducted Band Edge	Pass
27.53(h)	RSS-139, section 6.5	8.4	Peak to Average Ratio	Pass
27.50(a)	RSS-139 section 6.6	8.5	Conducted Spurious Emission	Pass
27.53(h)	RSS-139 section 6.6	8.6	Spurious Radiation Measurement	Pass
2.1055, 27.54	RSS-139 section 6.4	8.7	Frequency Stability v.s. temperature measurement	Pass



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## 5 INSTRUMENT CALIBRATION

### 5.1 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at  
*No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)*

Test site	Test Engineer	Remark
Radiation	Jerry Chang	-
RF Conducted	Dally Hong	-

**Remark:** *The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.*

## 5.2 MEASUREMENT EQUIPMENT USED

### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration*

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/28/2019	06/27/2020
Coaxial Cable	Woken	WC12	CC003	06/28/2019	06/27/2020
Power Divider	Solvang Technology	STI08-0015	008	08/06/2019	08/05/2020
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020
DC Power Supplies	GW Instek	SPS-3610	GPE880163	01/14/2019	01/13/2020
Software	N/A				

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/26/2019	02/25/2020
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Coaxial Cable	EMCI	EMC105	190914+25111	09/20/2019	09/19/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	10/04/2019	10/03/2020
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				

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### 5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 6 FACILITIES AND ACCREDITATIONS

### 6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

### 6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 6.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, ISED#: 2324G.

## 7 SETUP OF EQUIPMENT UNDER TEST

### 7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### 7.2 SUPPORT EQUIPMENT

No.	Equipment	Brand	Model	Series No.	FCC ID	IC ID
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H	1000M-7260H

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 8 FCC PART 27 REQUIREMENTS & INDUSTRY CANADA RSS-139

### 8.1 EIRP MEASUREMENT

#### LIMIT

FCC Part 27.50(d)(4)

Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

RSS-139 section 6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt.

#### TEST PROCEDURES

##### CONDUCTED POWER MEASUREMENT:

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

#### TEST RESULTS

*No non-compliance noted.*

*Remark: The value of factor includes both the loss of cable and external attenuator*

**WCDMA 12.2K RMC**

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	EIRP (dBm)
WCDMA Band IV	RMC 12.2Kbps	1312/1537	1712.4	23.37	21.92
		1413/1638	1732.6	23.25	21.80
		1513/1738	1752.6	23.22	21.77



### HSDPA

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSDPA IV	1	1312/1537	1712.4	22.60	0.1820
		1413/1638	1732.6	22.80	0.1905
		1513/1738	1752.6	22.90	0.1950
	2	1312/1537	1712.4	22.40	0.1738
		1413/1638	1732.6	22.60	0.1820
		1513/1738	1752.6	22.80	0.1905
	3	1312/1537	1712.4	22.40	0.1738
		1413/1638	1732.6	22.90	0.1950
		1513/1738	1752.6	22.40	0.1738
	4	1312/1537	1712.4	22.70	0.1862
		1413/1638	1732.6	22.60	0.1820
		1513/1738	1752.6	22.60	0.1820

### HSUPA

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	Output Power (W)
HSUPA IV	1	1312/1537	1712.4	23.10	0.2042
		1413/1638	1732.6	23.20	0.2089
		1513/1738	1752.6	23.30	0.2138
	2	1312/1537	1712.4	23.60	0.2291
		1413/1638	1732.6	23.10	0.2042
		1513/1738	1752.6	23.00	0.1995
	3	1312/1537	1712.4	23.40	0.2188
		1413/1638	1732.6	23.40	0.2188
		1513/1738	1752.6	23.30	0.2138
	4	1312/1537	1712.4	23.80	0.2399
		1413/1638	1732.6	23.40	0.2188
		1513/1738	1752.6	23.60	0.2291
	5	1312/1537	1712.4	23.30	0.2138
		1413/1638	1732.6	23.10	0.2042
		1513/1738	1752.6	23.20	0.2089

**HSPA+**

Band	Data Rate or Sub-test	UL/DL Channel No.	Frequency(MHz)	Average power(dBm)	EIRP (dBm)
WCDMA Band IV	RMC 12.2Kbps	1312/1537	1712.4	23.2	21.8
		1413/1638	1732.6	23.1	21.6
		1513/1738	1752.6	23.0	21.6

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## 8.2 OCCUPIED BANDWIDTH MEASUREMENT LIMIT

For Reporting purpose only.

### TEST PROCEDURE

According to KDB 971168 D01 Power Meas License Digital System and TIA-603-E Section 2.2.12.

1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max. hold

### TEST RESULTS

*No non-compliance noted*

#### Test Data

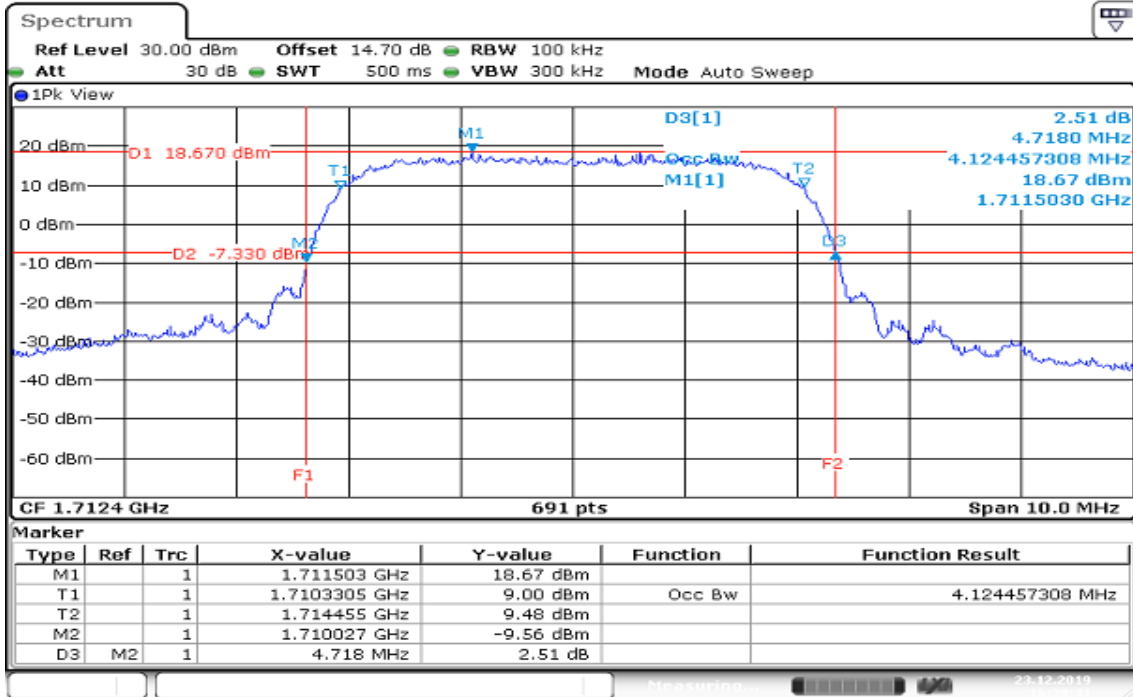
Test Mode	Channel	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2K RMC (Band IV)	Lowest	4.1245	4.7180
	Middle	4.1245	4.7030
	Highest	4.1245	4.7030

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## Test Plot

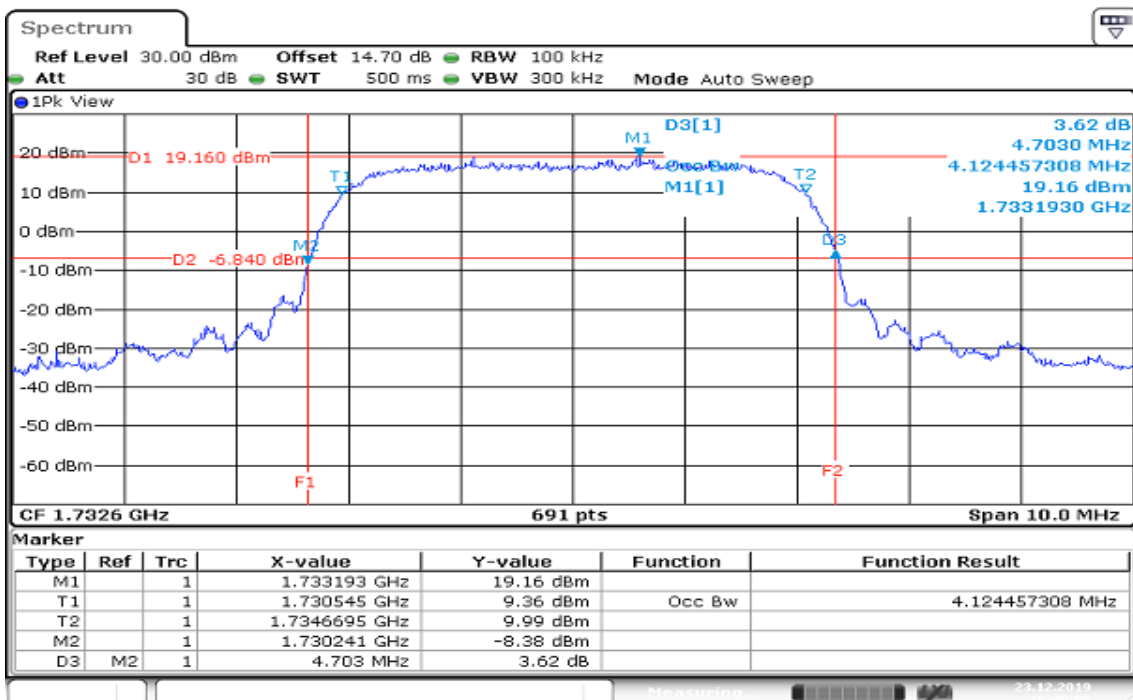
### WCDMA 12.2K RMC (BAND IV)

### Low CH



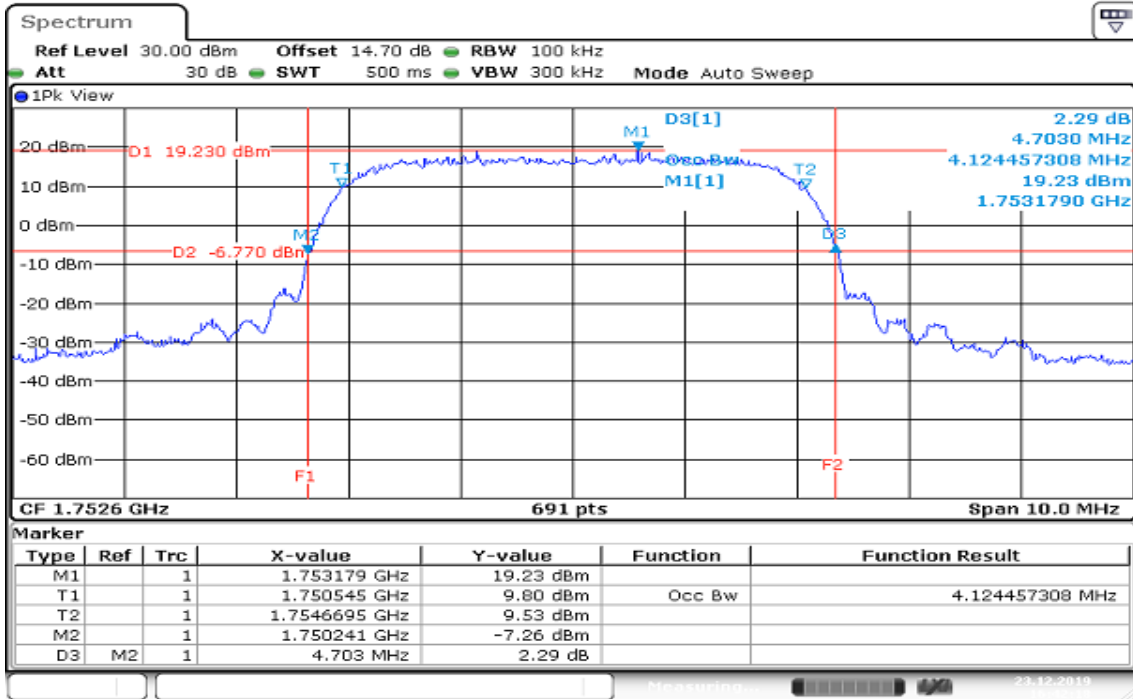
Date: 23.DEC.2019 16:39:42

### Mid CH



Date: 23.DEC.2019 16:40:56

## High CH



Date: 23.DEC.2019 16:42:19

### 8.3 PEAK TO AVERAGE POWER RATIO

#### Limit

In measuring transmissions in this band using an average power technique, peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.

#### Test Procedures

1. According to KDB 971168 D01.
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

#### Test Results

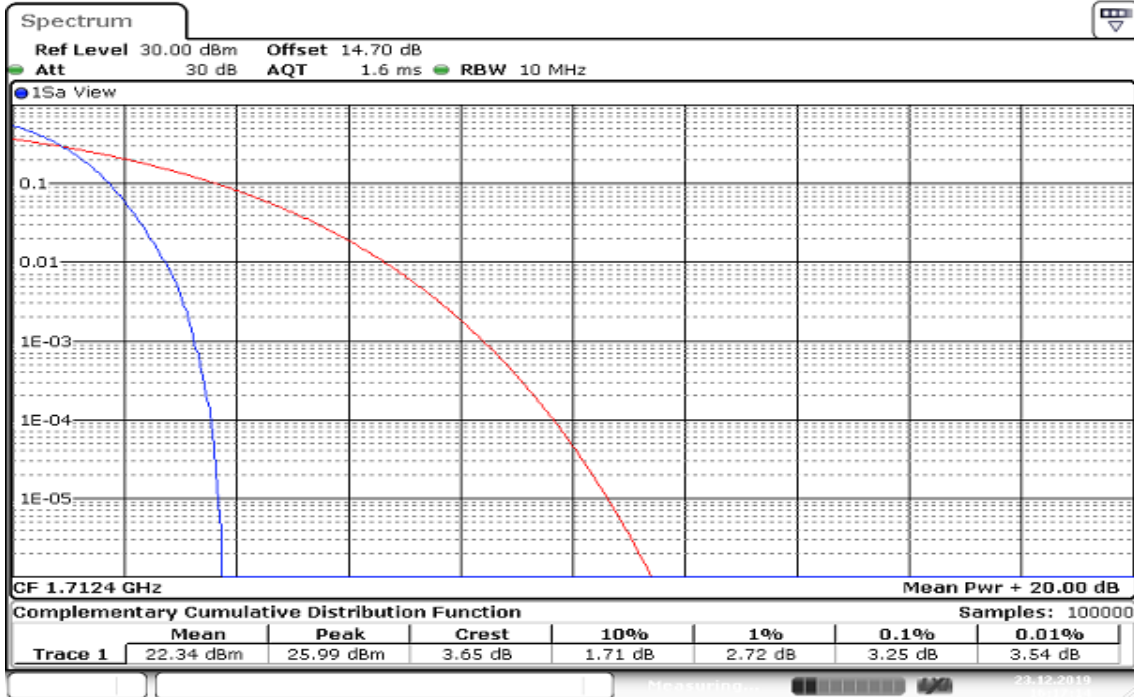
##### WCDMA 12.2K RMC (Band IV)

	0.1% (dB)
CH Low	3.25
CH Mid	3.25
CH High	3.25

## Test Plot

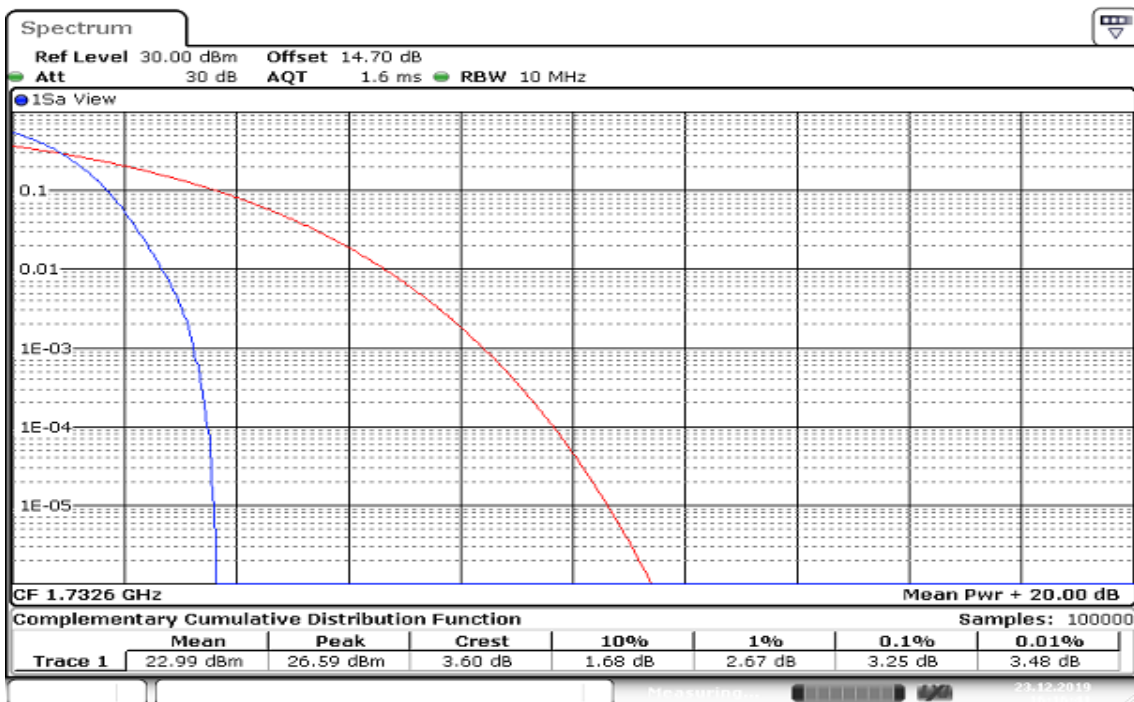
### WCDMA 12.2K RMC (BAND IV)

#### Low CH



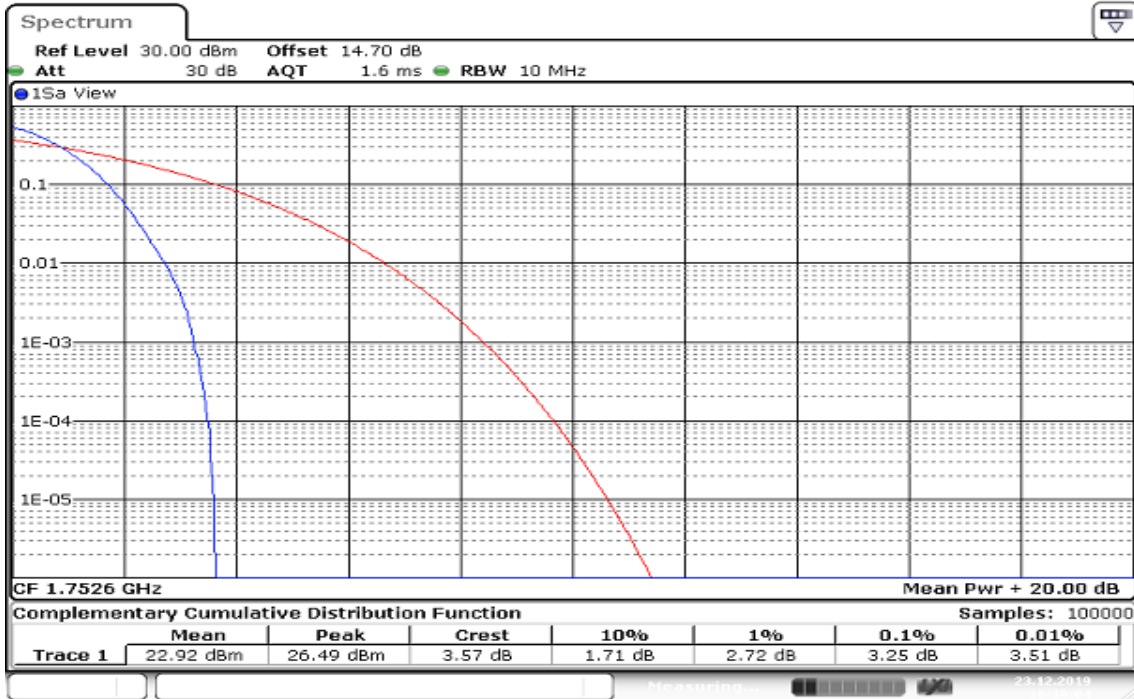
Date: 23.DEC.2019 16:17:14

#### Mid CH



Date: 23.DEC.2019 16:16:41

## High CH



Date: 23.DEC.2019 16:16:04



## 8.4 CONDUCTED BAND EDGE MEASUREMENT

### LIMIT

FCC §27.53 (h)

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.

RSS-139 section 6.6

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

### TEST PROCEDURE

According to KDB 971168 D01,

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot
4. Span was set large enough so as to capture all out of band emissions near the band edge
5. Set the spectrum analyzer, RBW=100kHz, VBW=300kHz.
6. Record the Band edge emission.

### TEST RESULTS

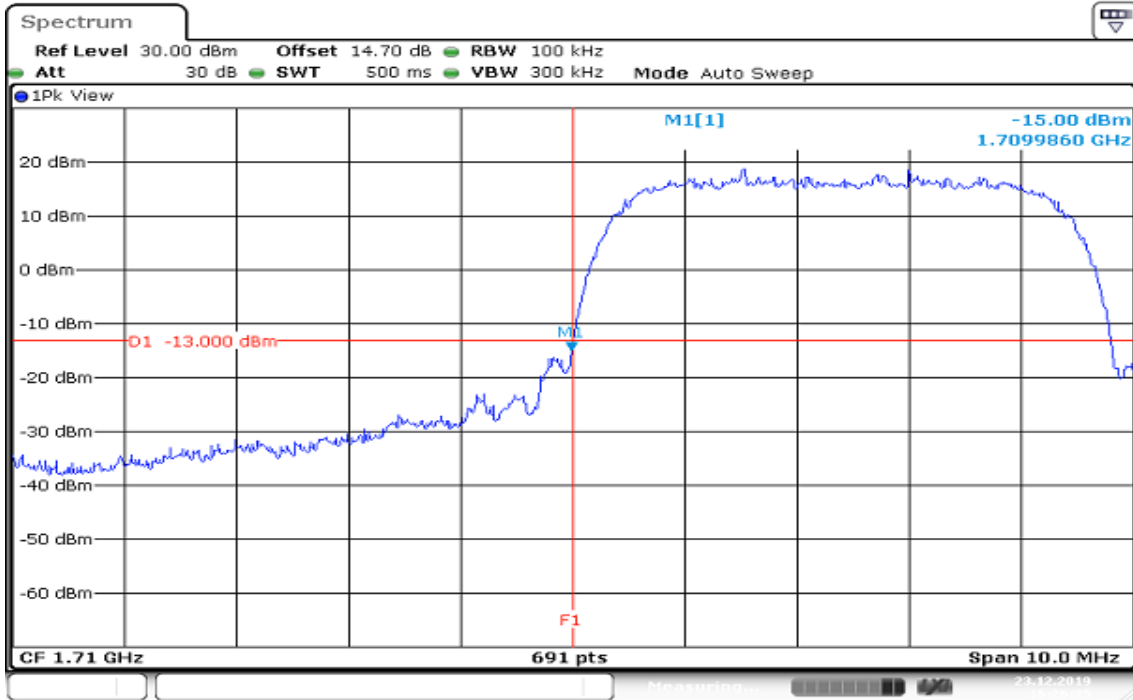
*No non-compliance noted.*

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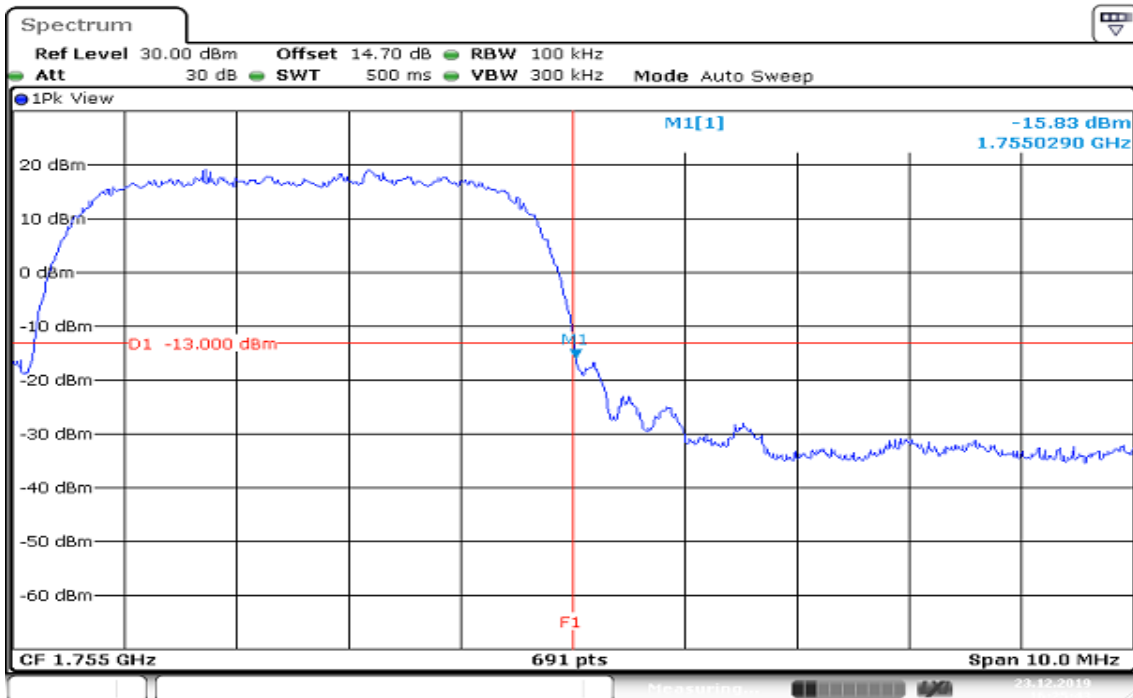
## Test Data

### WCDMA 12.2K RMC (BAND IV)

#### Low CH



#### High CH



## 8.5 CONDUCTED SPURIOUS EMISSIONS

### LIMIT

FCC §27.53 (h)

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.

RSS-139 section 6.6

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

### TEST PROCEDURE

According to KDB 971168 D01,

1. The EUT was connected to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Set the spectrum analyzer, RBW=1MHz, VBW=3MHz.
4. Record the maximum spurious emission.
5. The fundamental frequency should be excluded against the limit in operating band.

### TEST RESULTS

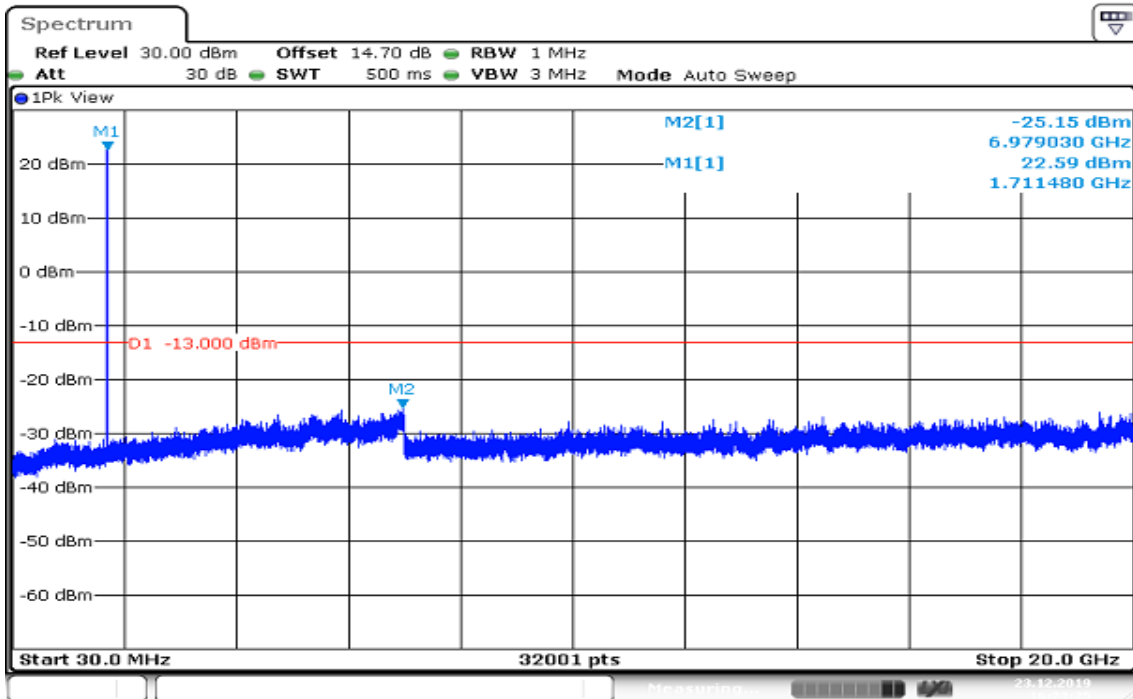
*No non-compliance noted.*

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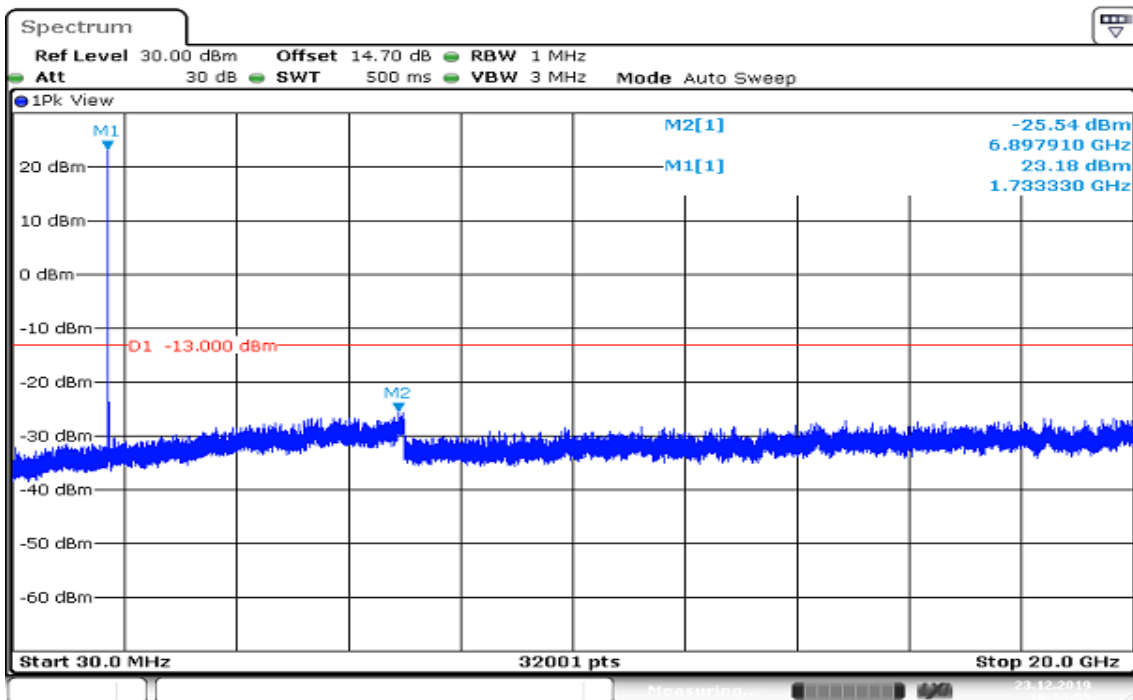
## Test Data

### WCDMA 12.2K RMC (BAND IV)

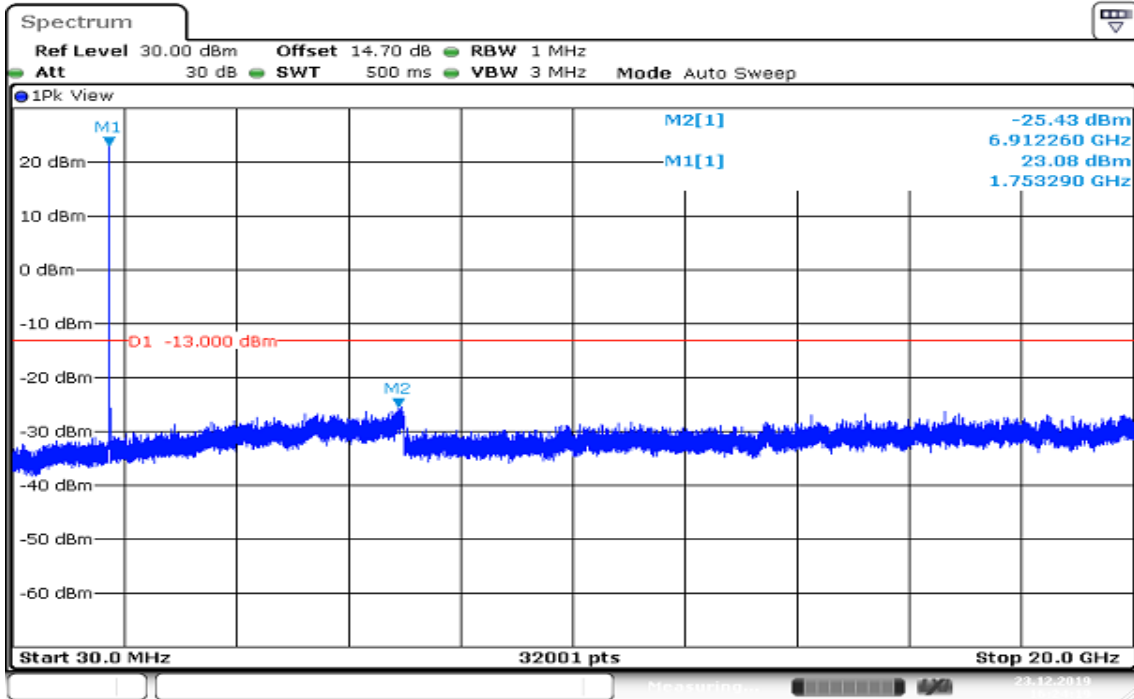
#### Low CH



#### Mid CH



## High CH



Date: 23.DEC.2019 16:24:19

## 8.6 SPURIOUS RADIATION MEASUREMENT

### LIMIT

FCC §27.53 (h)

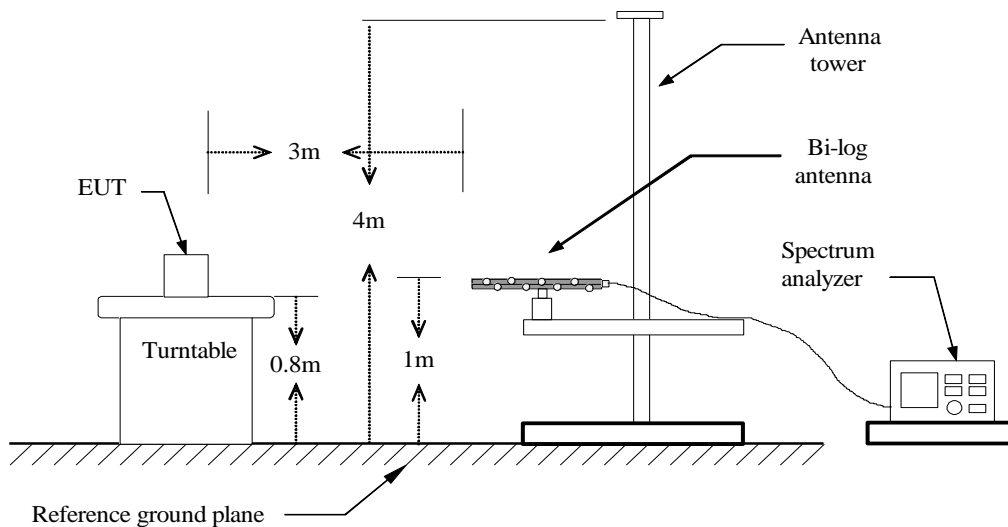
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

RSS-139 section 6.6

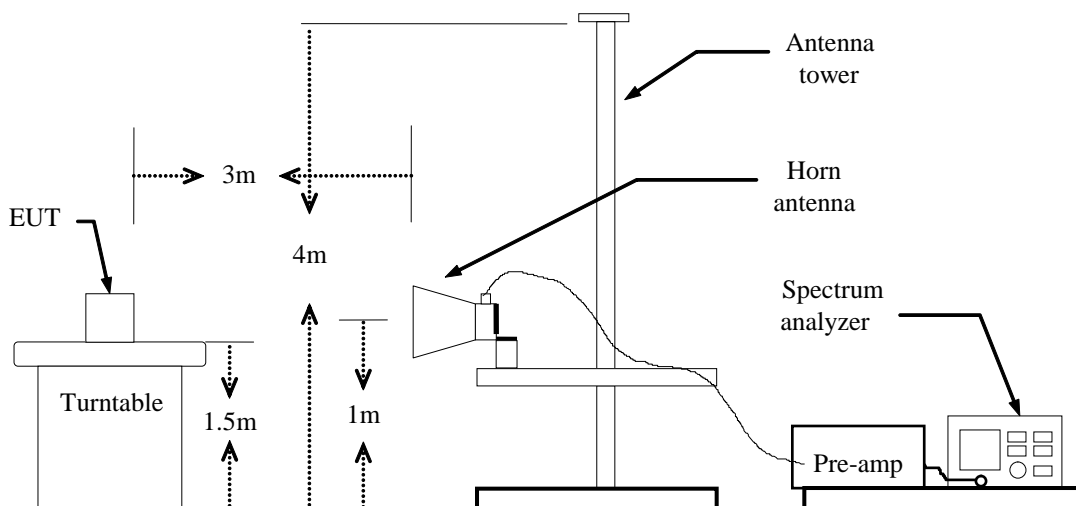
The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

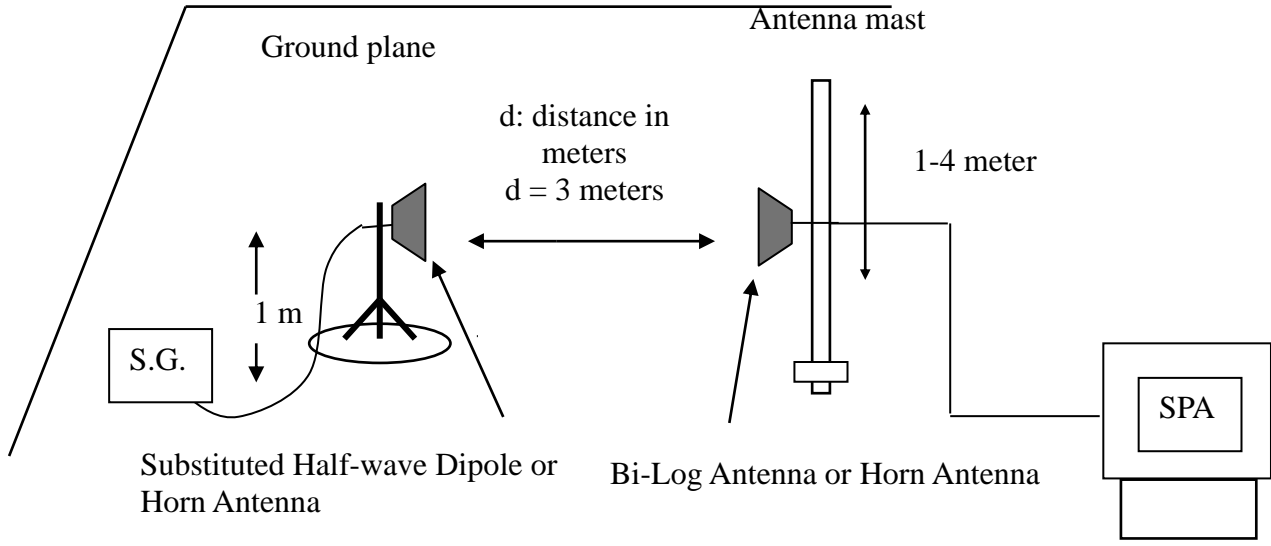
### Test Configuration

#### Below 1 GHz



#### Above 1 GHz



**Substituted Method Test Set-up****TEST PROCEDURE**

1. According to KDB 971168 D01 Power Meas License Digital System and TIA-603-E Section 2.2.12.
2. The EUT was placed on a turntable
  - (1) Below 1G : 0.8m
  - (2) Above 1G : 1.5m
  - (3) EUT set 3m from the receiving antenna
  - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

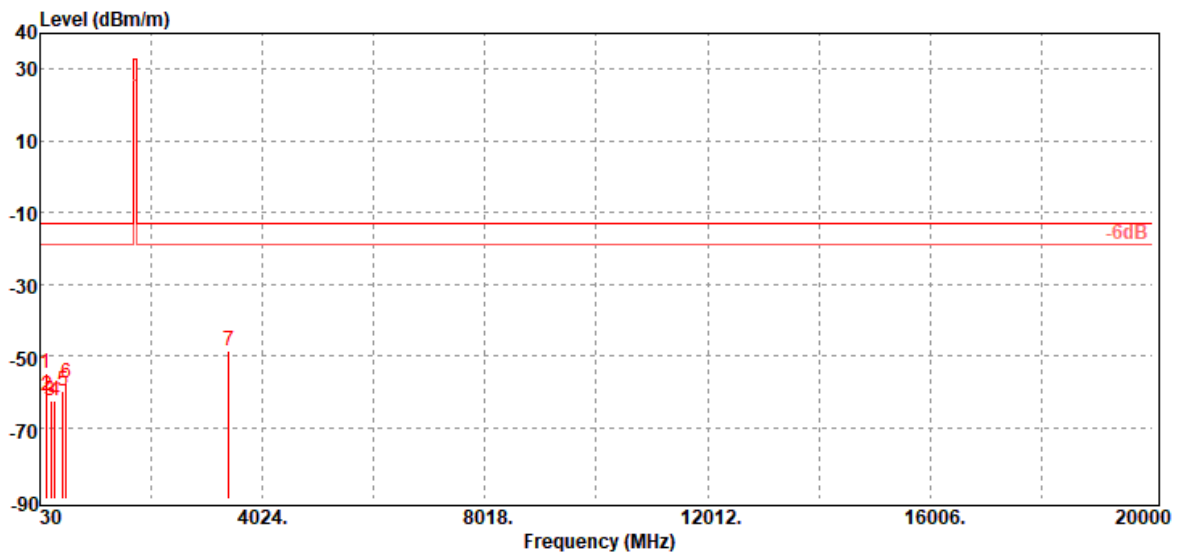
**TEST RESULTS**

*Refer to the attached tabular data sheets.*

Report No.: T191120D05-RP4

## Radiated Spurious Emission Measurement Result

<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / Low CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Ver.

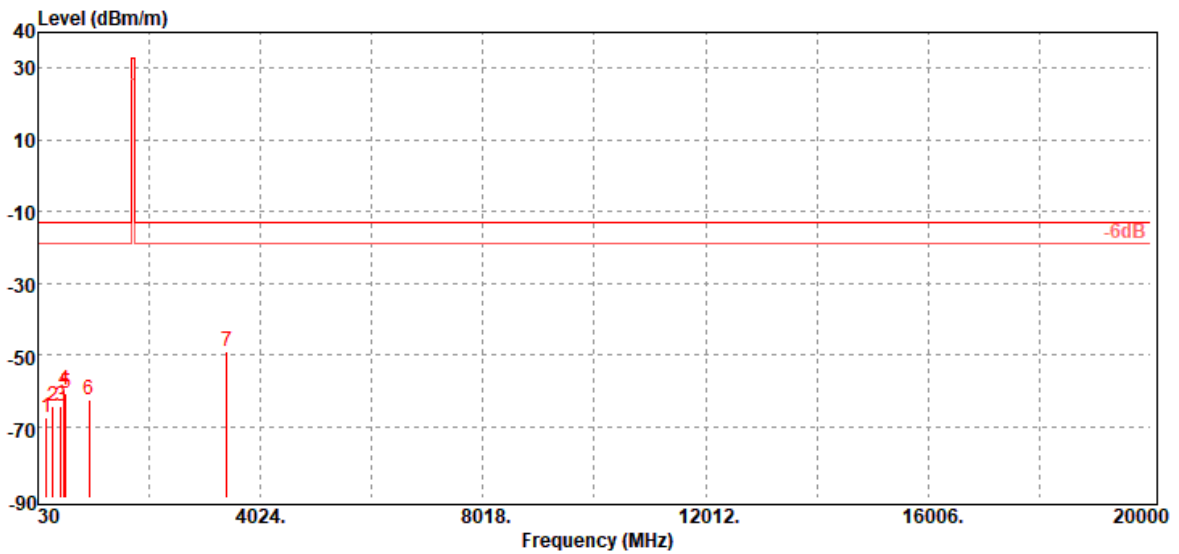


Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
131.85	-54.84	-44.09	-9.81	-0.94	-13.00	-41.84	V
159.01	-61.15	-53.71	-6.40	-1.04	-13.00	-48.15	V
226.91	-62.36	-59.14	-1.98	-1.24	-13.00	-49.36	V
299.66	-62.46	-59.02	-2.01	-1.43	-13.00	-49.46	V
444.19	-60.07	-56.22	-2.10	-1.75	-13.00	-47.07	V
500.45	-57.69	-53.83	-1.99	-1.87	-13.00	-44.69	V
3424.80	-48.54	-55.79	12.75	-5.50	-13.00	-35.54	V



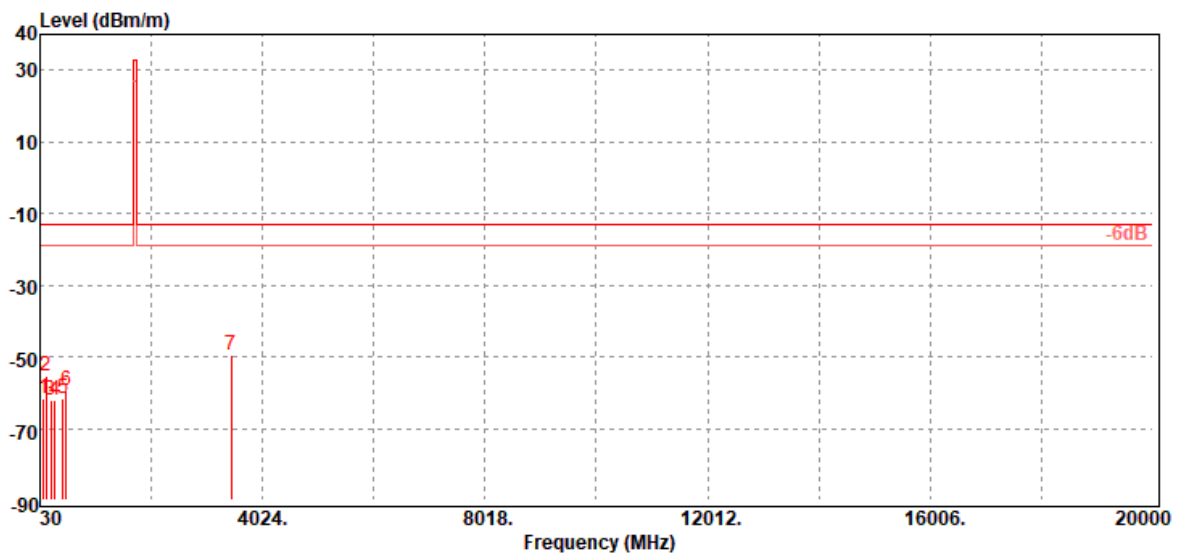
Report No.: T191120D05-RP4

<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / Low CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Hor.



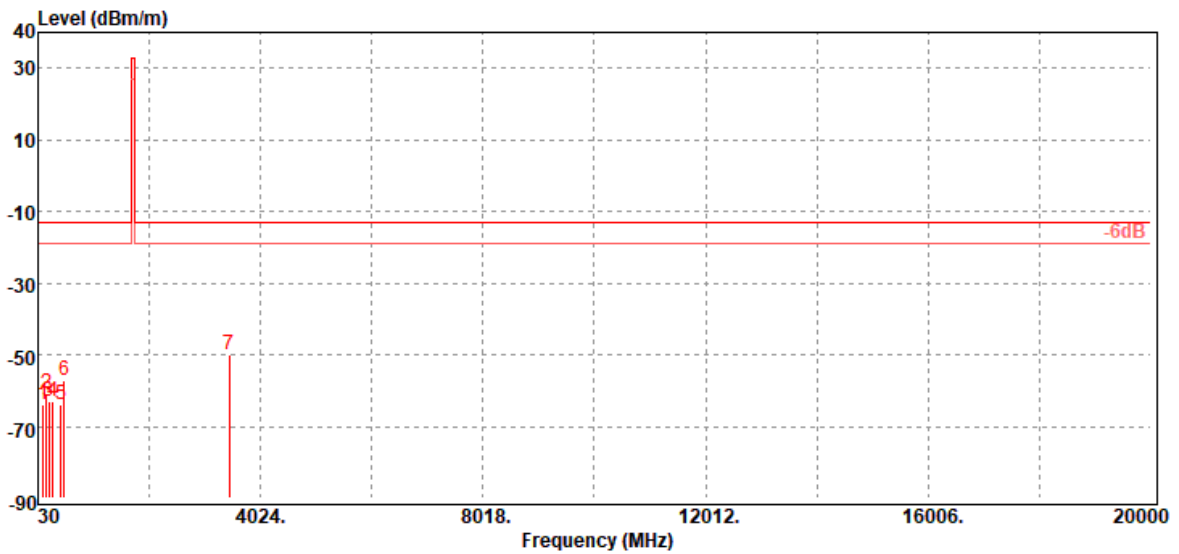
Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
188.11	-67.71	-62.68	-3.90	-1.13	-13.00	-54.71	H
299.66	-64.43	-60.99	-2.01	-1.43	-13.00	-51.43	H
442.25	-64.22	-60.38	-2.10	-1.74	-13.00	-51.22	H
500.45	-59.69	-55.83	-1.99	-1.87	-13.00	-46.69	H
524.70	-60.73	-57.51	-1.31	-1.91	-13.00	-47.73	H
946.65	-62.52	-58.71	-1.20	-2.61	-13.00	-49.52	H
3424.80	-49.24	-56.49	12.75	-5.50	-13.00	-36.24	H

<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / Mid CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Ver.



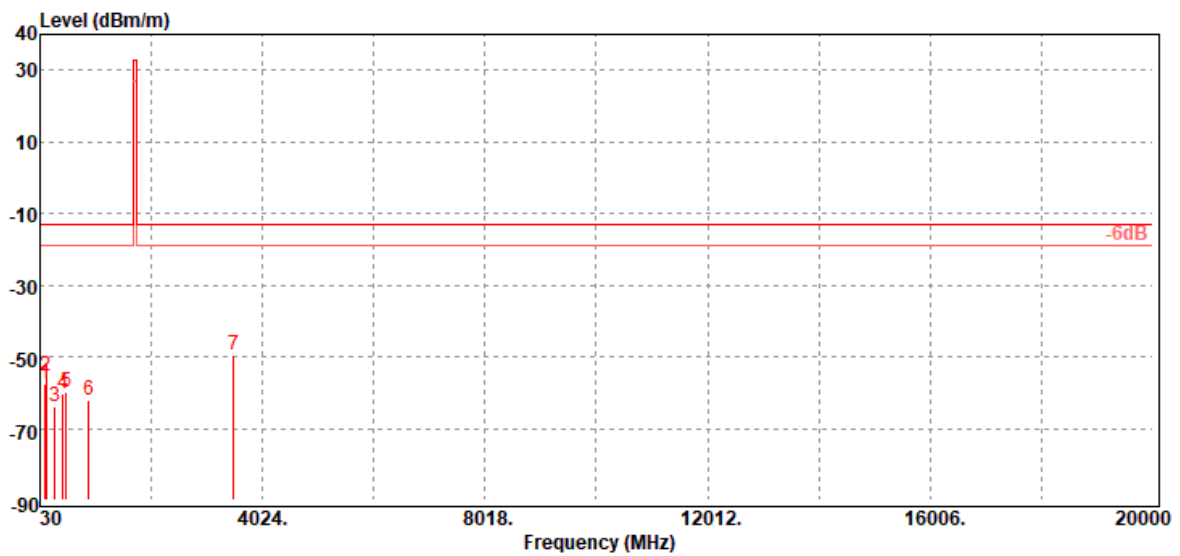
Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
88.20	-61.68	-53.75	-7.16	-0.77	-13.00	-48.68	V
134.76	-55.50	-45.2	-9.35	-0.95	-13.00	-42.50	V
226.91	-61.90	-58.68	-1.98	-1.24	-13.00	-48.90	V
299.66	-62.23	-58.79	-2.01	-1.43	-13.00	-49.23	V
445.16	-61.65	-57.8	-2.10	-1.75	-13.00	-48.65	V
500.45	-59.45	-55.59	-1.99	-1.87	-13.00	-46.45	V
3465.20	-49.64	-56.75	12.64	-5.53	-13.00	-36.64	V

<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / Mid CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Hor.



Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
125.06	-63.89	-52.48	-10.49	-0.92	-13.00	-50.89	H
175.50	-60.87	-54.93	-4.85	-1.09	-13.00	-47.87	H
225.94	-63.03	-59.86	-1.94	-1.23	-13.00	-50.03	H
299.66	-63.22	-59.78	-2.01	-1.43	-13.00	-50.22	H
440.31	-63.84	-60	-2.10	-1.74	-13.00	-50.84	H
500.45	-57.29	-53.43	-1.99	-1.87	-13.00	-44.29	H
3465.20	-49.94	-57.05	12.64	-5.53	-13.00	-36.94	H

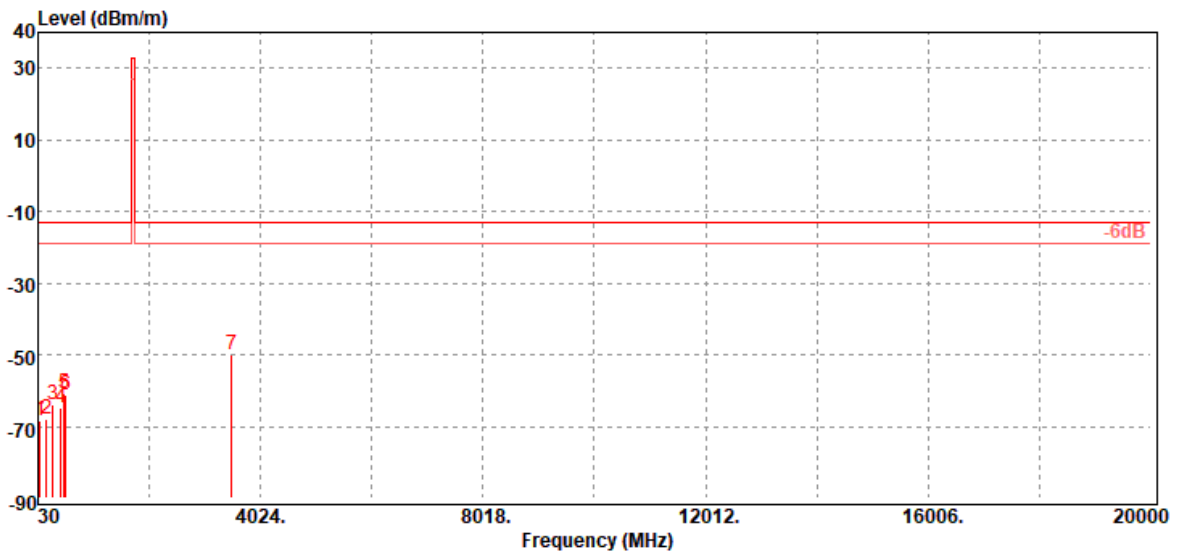
<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / High CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Ver.



Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
129.91	-57.55	-46.43	-10.19	-0.93	-13.00	-44.55	V
136.70	-55.48	-45.46	-9.06	-0.96	-13.00	-42.48	V
299.66	-63.87	-60.43	-2.01	-1.43	-13.00	-50.87	V
444.19	-60.11	-56.26	-2.10	-1.75	-13.00	-47.11	V
500.45	-59.90	-56.04	-1.99	-1.87	-13.00	-46.90	V
910.76	-61.90	-57.96	-1.38	-2.56	-13.00	-48.90	V
3505.20	-49.38	-56.31	12.49	-5.56	-13.00	-36.38	V

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<b>Operation Mode:</b>	WCDMA 12.2k RMC Band IV / TX / High CH	<b>Test Date:</b>	January 8, 2020
<b>Temperature:</b>	18.6°C	<b>Tested by:</b>	Jerry Chang
<b>Humidity:</b>	59 % RH	<b>Polarity:</b>	Hor.



Freq. (MHz)	ERP/EIRP (dBm)	SG Output Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
71.71	-68.31	-58.01	-9.60	-0.70	-13.00	-55.31	H
178.41	-67.80	-62.14	-4.56	-1.10	-13.00	-54.80	H
299.66	-64.12	-60.68	-2.01	-1.43	-13.00	-51.12	H
440.31	-64.89	-61.05	-2.10	-1.74	-13.00	-51.89	H
500.45	-60.58	-56.72	-1.99	-1.87	-13.00	-47.58	H
522.76	-61.19	-57.94	-1.34	-1.91	-13.00	-48.19	H
3505.20	-49.79	-56.72	12.49	-5.56	-13.00	-36.79	H

## 8.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to the FCC part 27.54 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-139 section 6.4

### Test Procedure

Use Anritsu 8820 with frequency Error measurement capability.

Temp = -40°C to +65°C

Voltage= 85% to 115% of the nominal value.

### **The Worst case: DC 12V**

***NOTE:** The frequency error was recorded frequency error from the communication simulator.*

Report No.: T191120D05-RP4

## **TEST RESULTS**

*No non-compliance noted.*

### **FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz at 20(°C)				
Limit: 2.5 ppm = 4281 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	65	-2.00	-0.0012	+/- 2.5
12	50	1.00	0.0006	
12	40	0.00	0.0000	
12	30	-1.00	-0.0006	
12	20	0.00	0.0000	
12	10	0.00	0.0000	
12	0	1.00	0.0006	
12	-10	0.00	0.0000	
12	-20	0.00	0.0000	
12	-30	0.01	0.0000	
12	-40	-1.00	-0.0006	

### **FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV Low Channel 1712.4 MHz at 20(°C)				
Limit: 2.5 ppm = 4281 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	-1.00	-0.0006	+/- 2.5
12		0.00	0.0000	
13.8		-2.00	-0.0012	

**FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz at 20(°C)				
Limit: 2.5 ppm = 4331.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	65	-1.00	-0.0006	+/- 2.5
12	50	0.00	0.0000	
12	40	1.00	0.0006	
12	30	1.00	0.0006	
12	20	0.00	0.0000	
12	10	0.00	0.0000	
12	0	-2.00	-0.0012	
12	-10	-1.00	-0.0006	
12	-20	0.00	0.0000	
12	-30	-1.00	-0.0006	
12	-40	1.00	0.0006	

**FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV Mid Channel 1732.6 MHz at 20(°C)				
Limit: 2.5 ppm = 4331.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	-1.00	-0.0006	+/- 2.5
12		0.00	0.0000	
13.8		0.00	0.0000	



**FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz at 20(°C)				
Limit: 2.5 ppm = 4381.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	65	0.00	0.0000	+/- 2.5
12	50	1.00	0.0006	
12	40	-1.00	-0.0006	
12	30	2.00	0.0011	
12	20	0.00	0.0000	
12	10	-2.00	-0.0011	
12	0	-1.00	-0.0006	
12	-10	0.00	0.0000	
12	-20	1.00	0.0006	
12	-30	0.00	0.0000	
12	-40	-1.00	-0.0006	

**FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:**

Reference Frequency: WCDMA 12.2k RMC Band IV High Channel 1752.6 MHz at 20(°C)				
Limit: 2.5 ppm = 4381.5 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	0.00	0.0000	+/- 2.5
12		0.00	0.0000	
13.8		-1.00	-0.0006	

- End of Test Report -