



FCC ID: M82-WP7610  
Report No.: T200207D01-RP5

Page: 1 / 82  
Rev.: 01

## FCC 47 CFR PART 27 SUBPART C, H

# TEST REPORT

For

Module

Model No.: WP7610

Trade Name: Advantech; Advantech Service-IoT

*Issued to*

**Advantech Co., Ltd.**  
**No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114,**  
**Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**  
**Wugu Laboratory**  
**No.11, Wugong 6th Rd., Wugu Dist.,**  
**New Taipei City, Taiwan. (R.O.C.)**  
**Issued Date: November 12, 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.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com.tw/Terms-and-Conditions> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com.tw/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	August 12, 2020	Initial Issue	ALL	Angel Cheng
01	November 12, 2020	1. Revised temperature 、 humidity and test date. 2. Added Host device information.	P.5, P.14	Angel Cheng

## TABLE OF CONTENTS

<b>1.</b>	<b>TEST RESULT CERTIFICATION .....</b>	<b>4</b>
<b>2.</b>	<b>EUT DESCRIPTION .....</b>	<b>5</b>
<b>3.</b>	<b>TEST METHODOLOGY .....</b>	<b>6</b>
3.1	DESCRIPTION OF TEST TYPE .....	6
3.2	THE WORST MODE OF MEASUREMENT .....	7
<b>4.</b>	<b>TEST SUMMARY .....</b>	<b>8</b>
<b>5.</b>	<b>INSTRUMENT CALIBRATION .....</b>	<b>9</b>
5.1	FACILITIES AND TEST LOCATION .....	9
5.2	MEASUREMENT EQUIPMENT USED .....	9
5.3	MEASUREMENT UNCERTAINTY .....	11
<b>6.</b>	<b>FACILITIES AND ACCREDITATIONS .....</b>	<b>12</b>
6.1	FACILITIES .....	12
6.2	EQUIPMENT .....	12
6.3	LABORATORY ACCREDITATIONS AND LISTING .....	12
<b>7.</b>	<b>SETUP OF EQUIPMENT UNDER TEST .....</b>	<b>13</b>
7.1	SETUP CONFIGURATION OF EUT .....	13
7.2	SUPPORT EQUIPMENT .....	13
<b>8.</b>	<b>TEST PROCEDURE AND RESULT .....</b>	<b>14</b>
8.1	ERP & EIRP MEASUREMENT .....	14
8.2	RADIATED EMISSION MEASUREMENT .....	19
	<b>APPENDIX A PHOTOGRAPHS OF TEST SETUP .....</b>	<b>A-1</b>

Report No.: T200207D01-RP5

## 1. TEST RESULT CERTIFICATION

**Applicant:** Advantech Co., Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.

**Manufacturer:** Advantech Co.Ltd.  
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,  
Taipei 114, Taiwan, R.O.C.

**Equipment Under Test:** Module

**Trade Name:** Advantech; Advantech Service-IoT

**Model No.:** WP7610

**Date of Test:** February 24 ~ July 16, 2020

APPLICABLE STANDARDS	
Standard	TEST RESULT
FCC Part 27, Subpart C, H, FCC Part 2	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.	

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:




---

Kevin Tsai  
Deputy Manager  
Compliance Certification Services Inc.

## 2. EUT DESCRIPTION

<b>Product</b>	Module	
<b>Model No.</b>	WP7610	
<b>Model Discrepancy</b>	N/A	
<b>Trade</b>	Advantech; Advantech Service-IoT	
<b>Received Date</b>	February 7, 2020	
<b>Power Supply</b>	Powered from host device.	
<b>Modulation Technology</b>	LTE Band 12	QPSK, 16QAM
<b>Frequency Range</b>	LTE Band 12 Channel Bandwidth: 1.4MHz	699.7 MHz ~ 715.3MHz
	LTE Band 12 Channel Bandwidth: 3MHz	700.5MHz ~ 714.5MHz
	LTE Band 12 Channel Bandwidth: 5MHz	701.5MHz ~ 713.5MHz
	LTE Band 12 Channel Bandwidth: 10MHz	704MHz ~ 711MHz
<b>Antenna Specification</b>	Part No.: MA231.LBC.002 PIFA Antenna LTE Band 12 Antenna gain: 2.26 dBi	
<b>Host device information</b>	Product : Computer Trade name: ADVANTECH Model: TREK-572	

- Note:** 1. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
2. Disclaimer  
 Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

### 3. TEST METHODOLOGY

#### 3.1 DESCRIPTION OF TEST TYPE

The EUT (model: WP7610) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

#### LTE Band 12: 699 MHz ~ 716 MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	1.4MHz		3MHz		5MHz		10MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	23017	699.7	23025	700.5	23035	701.5	23060	704
Middle CH	23095	707.5	23095	707.5	23095	707.5	23095	707.5
High CH	23173	715.3	23165	714.5	23155	713.5	23130	711

Report No.: T200207D01-RP5

### 3.2 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Adapter
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 Adapter
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 SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
27.50(c)	8.1	ERP and EIRP Measurement	Pass
27.53(g)	8.2	Spurious Radiation Measurement	Pass



Report No.: T200207D01-RP5

## 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 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
Radiation	Jerry Chang	-
RF Conducted	Jane Wang	-

**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 once a year.

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
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
Software	N/A				

#### For Co-Location

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/25/2020	02/24/2021
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2020	02/24/2021
Coaxial Cable	EMCI	EMC105	190914+25111	09/20/2019	09/19/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/15/2020	01/14/2021
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	10/04/2019	10/03/2020
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/25/2020	02/24/2021
Pre-Amplifier	HP	8449B	3008A00965	02/25/2020	02/24/2021
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
----------	------------------

**For 966A**

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	01/15/2020	01/14/2021
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
Software	e3 6.11-20180413				

### 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  $k=2$ .

Report No.: T200207D01-RP5

## 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 24891, 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 I for the actual connections between EUT and support equipment.

### 7.2 SUPPORT EQUIPMENT

No.	Equipment	Brand	Model	Series No.	FCC ID	IC ID
	N/A					

**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. TEST PROCEDURE AND RESULT

### 8.1 ERP & EIRP MEASUREMENT

#### LIMIT

According to FCC §2.1046

**FCC 27.50 (c) (10):** The portable stations (hand-held devices) in the 600MHz uplink band and the 698-746MHz band, and fixed and mobile stations in the 600MHz uplink band are limited to 3 Watts ERP.

#### 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.*

##### LTE Band 12

Temperature:	24°C	Test Date:	July 16, 2020
Humidity:	50 % RH	Tested by:	Jane Wang

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power			
Band 12	1.4M	23017	699.7	QPSK	1	0	0	22.55	22.66			
					1	2	0	22.66	<b>22.77</b>			
					1	5	0	22.13	22.24			
					3	0	1	21.89	22.00			
					3	1	1	21.80	21.91			
					3	2	1	21.57	21.68			
					6	0	1	21.64	21.75			
				16QAM	1	0	1	21.61	21.72			
					1	2	1	21.81	<b>21.92</b>			
					1	5	1	21.38	21.49			
					3	0	2	20.98	21.09			
					3	1	2	21.01	21.12			
					3	2	2	20.96	21.07			
					6	0	2	21.03	21.14			
		23095	707.5	QPSK	1	0	0	22.49	<b>22.60</b>			
					1	2	0	22.36	22.47			
					1	5	0	22.27	22.38			
					3	0	1	21.69	21.80			
					3	1	1	21.39	21.50			
					3	2	1	21.31	21.42			
					6	0	1	21.53	21.64			
				16QAM	1	0	1	21.72	<b>21.83</b>			
					1	2	1	21.56	21.67			
					1	5	1	21.55	21.66			
					3	0	2	20.72	20.83			
					3	1	2	20.38	20.49			
					3	2	2	20.36	20.47			
					6	0	2	20.69	20.80			
					23173	715.3	QPSK	1	0	0	22.28	22.39
								1	2	0	22.36	<b>22.47</b>
1	5	0	22.12	22.23								
3	0	1	21.31	21.42								
3	1	1	21.38	21.49								
3	2	1	21.27	21.38								
6	0	1	21.47	21.58								
16QAM	1	0	1	21.31			21.42					
	1	2	1	21.44			<b>21.55</b>					
	1	5	1	21.32			21.43					
	3	0	2	20.45			20.56					
	3	1	2	20.38			20.49					
	3	2	2	20.25			20.36					
6	0	2	20.20	20.31								

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power
Band 12	3M	23025	700.5	QPSK	1	0	0	22.58	22.69
					1	7	0	22.69	<b>22.80</b>
					1	14	0	22.16	22.27
					8	0	1	21.92	22.03
					8	4	1	21.83	21.94
					8	7	1	21.60	21.71
					15	0	1	21.67	21.78
				16QAM	1	0	1	21.64	21.75
					1	7	1	21.84	<b>21.95</b>
					1	14	1	21.41	21.52
					8	0	2	21.01	21.12
					8	4	2	21.04	21.15
					8	7	2	20.99	21.10
					15	0	2	21.06	21.17
		23095	707.5	QPSK	1	0	0	22.50	<b>22.61</b>
					1	7	0	22.37	22.48
					1	14	0	22.28	22.39
					8	0	1	21.70	21.81
					8	4	1	21.40	21.51
					8	7	1	21.32	21.43
					15	0	1	21.54	21.65
				16QAM	1	0	1	21.73	<b>21.84</b>
					1	7	1	21.57	21.68
					1	14	1	21.56	21.67
					8	0	2	20.73	20.84
					8	4	2	20.39	20.50
					8	7	2	20.37	20.48
					15	0	2	20.70	20.81
		23165	714.5	QPSK	1	0	0	22.30	22.41
					1	7	0	22.38	<b>22.49</b>
					1	14	0	22.14	22.25
					8	0	1	21.33	21.44
					8	4	1	21.40	21.51
					8	7	1	21.29	21.40
					15	0	1	21.49	21.60
				16QAM	1	0	1	21.33	21.44
1	7				1	21.46	<b>21.57</b>		
1	14				1	21.34	21.45		
8	0				2	20.47	20.58		
8	4				2	20.40	20.51		
8	7				2	20.27	20.38		
15	0				2	20.22	20.33		



Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power			
Band 12	5M	23035	701.5	QPSK	1	0	0	22.60	22.71			
					1	12	0	22.71	<b>22.82</b>			
					1	24	0	22.18	22.29			
					12	0	1	21.94	22.05			
					12	6	1	21.85	21.96			
					12	11	1	21.62	21.73			
					25	0	1	21.69	21.80			
				16QAM	1	0	1	21.66	21.77			
					1	12	1	21.86	<b>21.97</b>			
					1	24	1	21.43	21.54			
					12	0	2	21.03	21.14			
					12	6	2	21.06	21.17			
					12	11	2	21.01	21.12			
					25	0	2	21.08	21.19			
		23095	707.5	QPSK	1	0	0	22.51	<b>22.62</b>			
					1	12	0	22.38	22.49			
					1	24	0	22.29	22.40			
					12	0	1	21.71	21.82			
					12	6	1	21.41	21.52			
					12	11	1	21.33	21.44			
					25	0	1	21.55	21.66			
				16QAM	1	0	1	21.74	<b>21.85</b>			
					1	12	1	21.58	21.69			
					1	24	1	21.57	21.68			
					12	0	2	20.74	20.85			
					12	6	2	20.40	20.51			
					12	11	2	20.38	20.49			
					25	0	2	20.71	20.82			
					23155	713.5	QPSK	1	0	0	22.32	22.43
								1	12	0	22.40	<b>22.51</b>
1	24	0	22.16	22.27								
12	0	1	21.35	21.46								
12	6	1	21.42	21.53								
12	11	1	21.31	21.42								
25	0	1	21.51	21.62								
16QAM	1	0	1	21.35			21.46					
	1	12	1	21.48			<b>21.59</b>					
	1	24	1	21.36			21.47					
	12	0	2	20.49			20.60					
	12	6	2	20.42			20.53					
	12	11	2	20.29			20.40					
25	0	2	20.24	20.35								

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power			
Band 12	10M	23060	704.0	QPSK	1	0	0	22.65	22.76			
					1	24	0	22.76	<b>22.87</b>			
					1	49	0	22.23	22.34			
					25	0	1	21.99	22.10			
					25	12	1	21.90	22.01			
					25	24	1	21.67	21.78			
					50	0	1	21.74	21.85			
				16QAM	1	0	1	21.71	21.82			
					1	24	1	21.91	<b>22.02</b>			
					1	49	1	21.48	21.59			
					25	0	2	21.08	21.19			
					25	12	2	21.11	21.22			
					25	24	2	21.06	21.17			
					50	0	2	21.13	21.24			
		23095	707.5	QPSK	1	0	0	22.55	<b>22.66</b>			
					1	24	0	22.42	22.53			
					1	49	0	22.33	22.44			
					25	0	1	21.75	21.86			
					25	12	1	21.45	21.56			
					25	24	1	21.37	21.48			
					50	0	1	21.59	21.70			
				16QAM	1	0	1	21.78	<b>21.89</b>			
					1	24	1	21.62	21.73			
					1	49	1	21.61	21.72			
					25	0	2	20.78	20.89			
					25	12	2	20.44	20.55			
					25	24	2	20.42	20.53			
					50	0	2	20.75	20.86			
					23130	711.0	QPSK	1	0	0	22.39	22.50
								1	24	0	22.47	<b>22.58</b>
1	49	0	22.23	22.34								
25	0	1	21.42	21.53								
25	12	1	21.49	21.60								
25	24	1	21.38	21.49								
50	0	1	21.58	21.69								
16QAM	1	0	1	21.42			21.53					
	1	24	1	21.55			<b>21.66</b>					
	1	49	1	21.43			21.54					
	25	0	2	20.56			20.67					
	25	12	2	20.49			20.60					
	25	24	2	20.36			20.47					
50	0	2	20.31	20.42								

## 8.2 RADIATED EMISSION MEASUREMENT

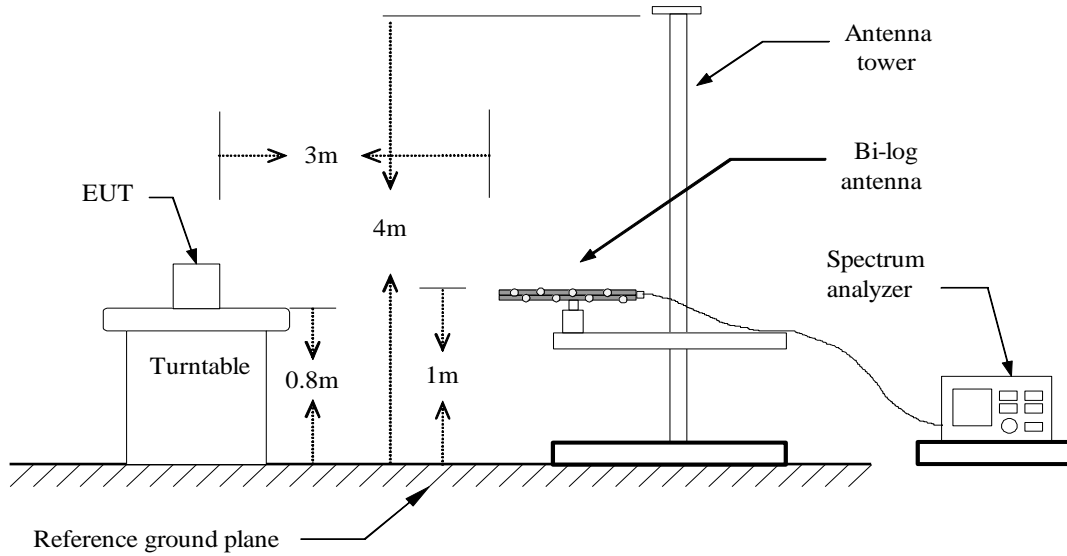
### LIMITS

#### **FCC §27.53(g), Band 12**

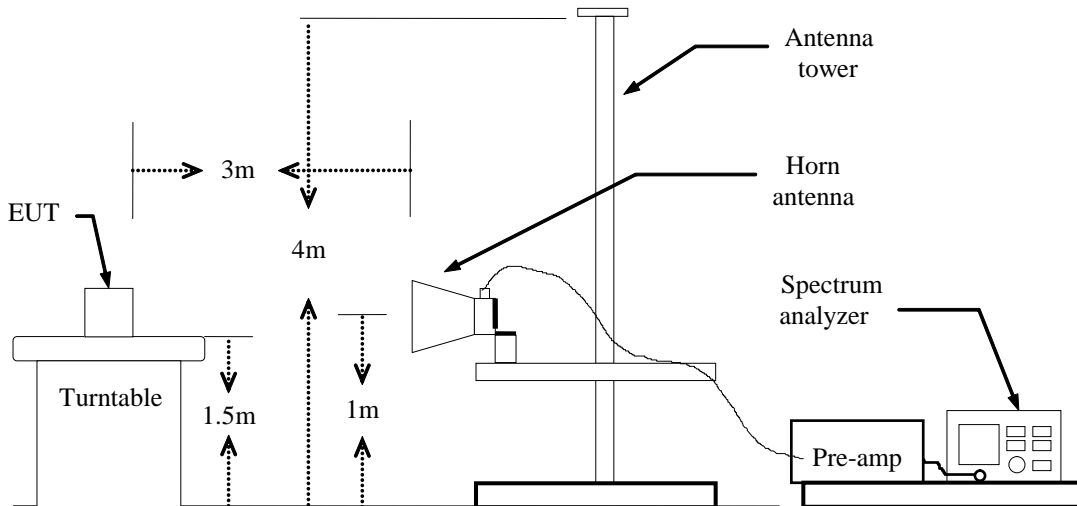
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

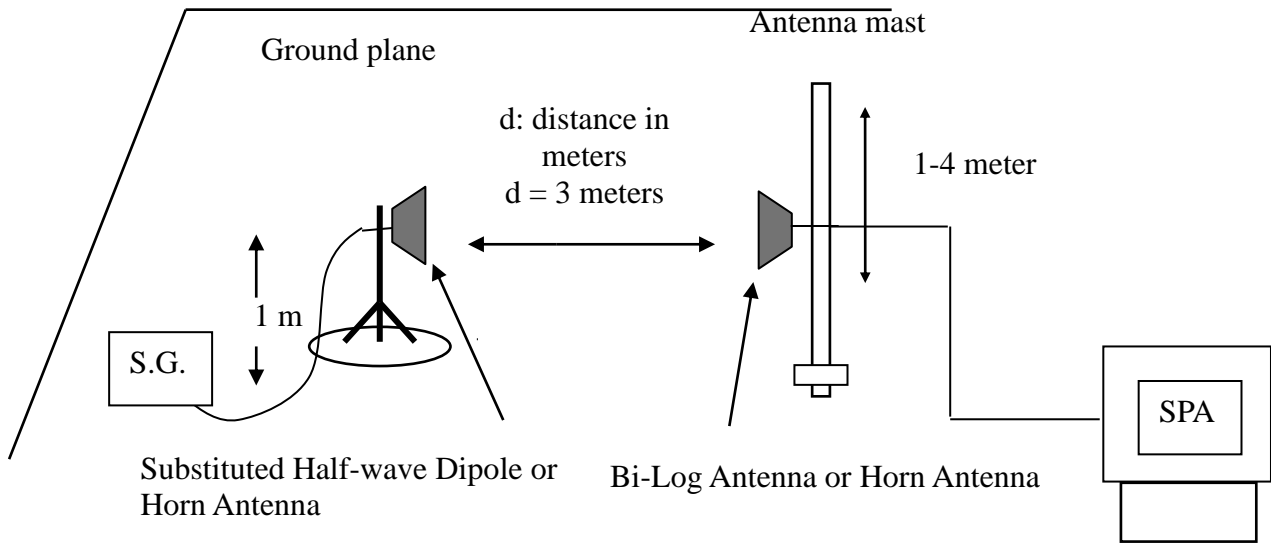
## Test Configuration

### Below 1 GHz



### Above 1 GHz



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

1. According to KDB 971168 D01 and TIA-603-E.
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.

Report No.: T200207D01-RP5

## Test Results

LTE Band 12 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Co-Location

Test Date:

February 29, 2020

Temperature: 21.4°C

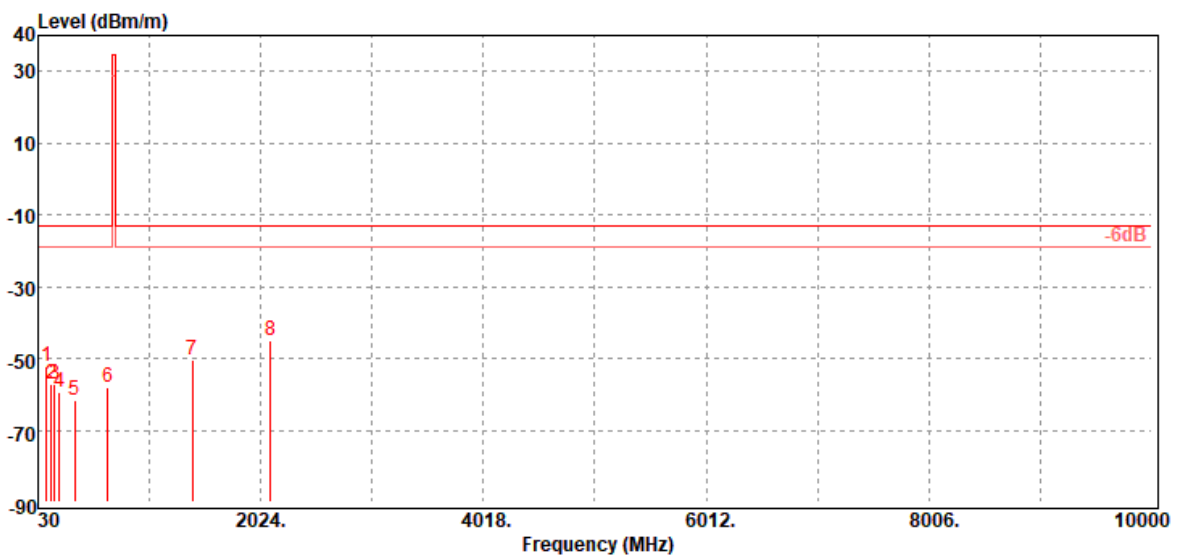
Tested by:

Jerry Chang

Humidity: 51RH

Polarity:

Ver.

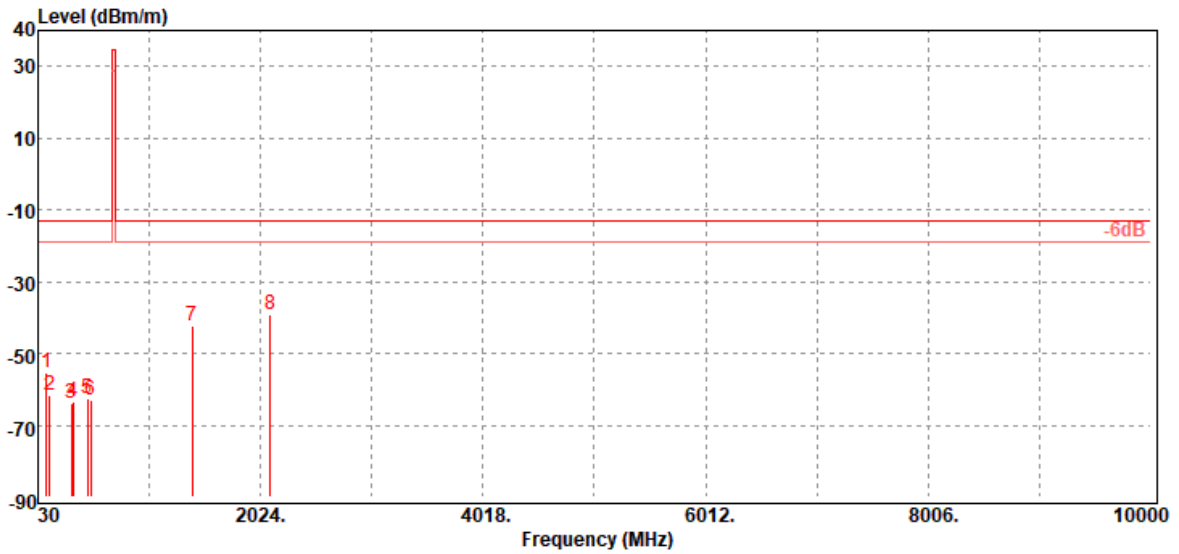


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
105.66	-52.19	-41.98	-9.37	-0.84	-13.00	-39.19	V
148.34	-57.09	-48.82	-7.27	-1.00	-13.00	-44.09	V
177.44	-57.24	-51.49	-4.66	-1.09	-13.00	-44.24	V
219.15	-59.21	-55.97	-2.02	-1.22	-13.00	-46.21	V
354.95	-61.89	-58.93	-1.40	-1.56	-13.00	-48.89	V
650.80	-58.19	-54.36	-1.68	-2.15	-13.00	-45.19	V
1408.00	-50.36	-55.16	8.05	-3.25	-13.00	-37.36	V

Report No.: T200207D01-RP5

**Operation Mode:** Co-Location  
**Temperature:** 21.4°C  
**Humidity:** 51RH

**Test Date:** February 29, 2020  
**Tested by:** Jerry Chang  
**Polarity:** 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)
105.66	-55.37	-45.16	-9.37	-0.84	-13.00	-42.37	H
133.79	-61.64	-51.17	-9.52	-0.95	-13.00	-48.64	H
325.85	-64.06	-60.79	-1.78	-1.49	-13.00	-51.06	H
347.19	-63.58	-60.54	-1.50	-1.54	-13.00	-50.58	H
473.29	-62.47	-58.26	-2.40	-1.81	-13.00	-49.47	H
502.39	-63.06	-59.23	-1.95	-1.88	-13.00	-50.06	H
1408.00	-42.39	-47.19	8.05	-3.25	-13.00	-29.39	H

Report No.: T200207D01-RP5

**LTE Band 12 / BW: 10MHz / QPSK / RB =1, RB Offset = 0**

**Operation Mode:** Tx / Low CH

**Test Date:**

February 24, 2020

**Temperature:** 21.4°C

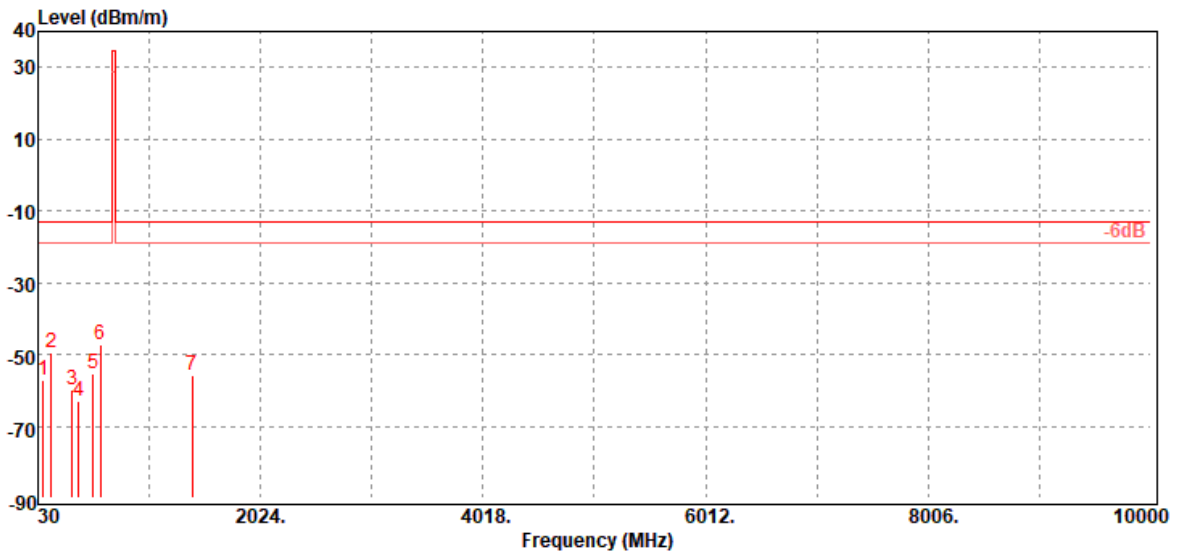
**Tested by:**

Jerry Chang

**Humidity:** 51RH

**Polarity:**

Ver.



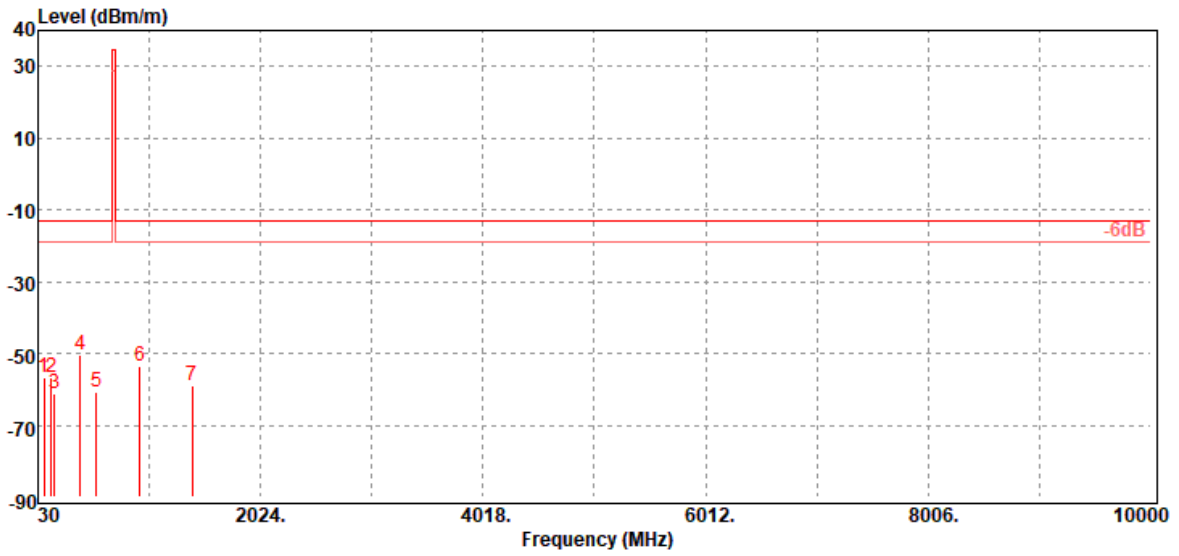
Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
80.44	-57.34	-48.15	-8.46	-0.73	-13.00	-44.34	V
149.31	-49.54	-41.37	-7.17	-1.00	-13.00	-36.54	V
335.55	-59.91	-56.81	-1.59	-1.51	-13.00	-46.91	V
390.84	-62.99	-59.92	-1.43	-1.64	-13.00	-49.99	V
521.79	-55.47	-52.2	-1.36	-1.91	-13.00	-42.47	V
585.81	-47.07	-43.86	-1.17	-2.04	-13.00	-34.07	V
1408.00	-55.62	-60.42	8.05	-3.25	-13.00	-42.62	V



Report No.: T200207D01-RP5

**Operation Mode:** Tx / Low CH  
**Temperature:** 21.4°C  
**Humidity:** 51RH

**Test Date:** February 24, 2020  
**Tested by:** Jerry Chang  
**Polarity:** 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)
81.41	-56.56	-47.42	-8.40	-0.74	-13.00	-43.56	H
149.31	-56.89	-48.72	-7.17	-1.00	-13.00	-43.89	H
177.44	-61.09	-55.34	-4.66	-1.09	-13.00	-48.09	H
408.30	-50.61	-47.14	-1.80	-1.67	-13.00	-37.61	H
550.89	-60.71	-57.54	-1.22	-1.95	-13.00	-47.71	H
939.86	-53.43	-49.53	-1.30	-2.60	-13.00	-40.43	H
1408.00	-58.96	-63.76	8.05	-3.25	-13.00	-45.96	H

Report No.: T200207D01-RP5

**Operation Mode:** Tx / Mid CH

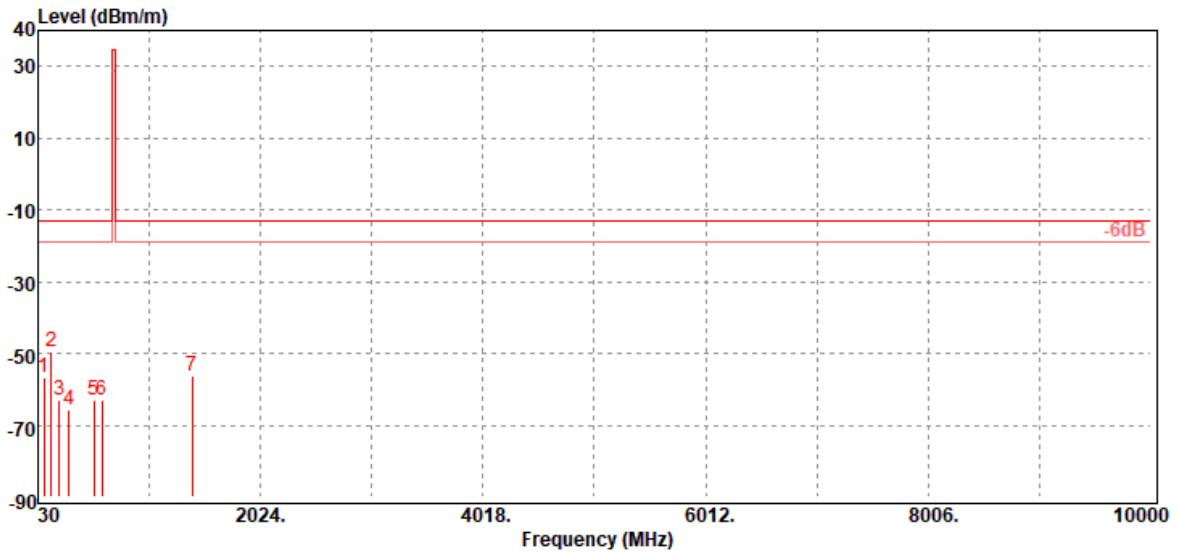
**Test Date:** February 24, 2020

**Temperature:** 21.4°C

**Tested by:** Jerry Chang

**Humidity:** 51RH

**Polarity:** Ver.

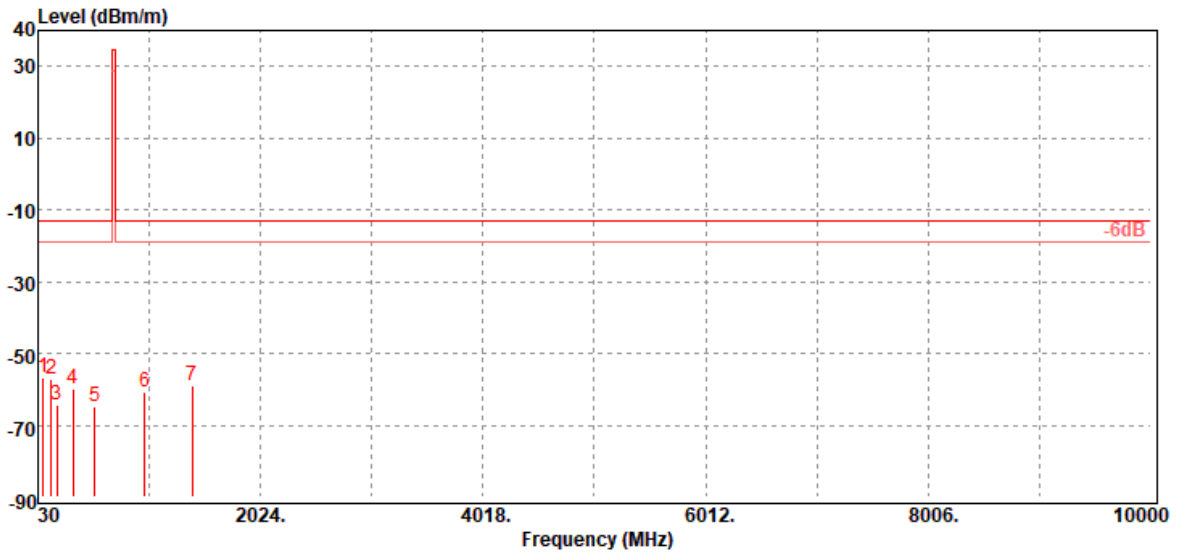


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
81.41	-56.68	-47.54	-8.40	-0.74	-13.00	-43.68	V
150.28	-49.64	-41.53	-7.10	-1.01	-13.00	-36.64	V
221.09	-62.99	-59.79	-1.98	-1.22	-13.00	-49.99	V
308.39	-65.71	-62.29	-1.97	-1.45	-13.00	-52.71	V
534.40	-62.82	-59.59	-1.30	-1.93	-13.00	-49.82	V
600.36	-62.83	-59.85	-0.91	-2.07	-13.00	-49.83	V
1415.00	-56.36	-61.2	8.09	-3.25	-13.00	-43.36	V

Report No.: T200207D01-RP5

**Operation Mode:** Tx / Mid CH  
**Temperature:** 21.4°C  
**Humidity:** 51RH

**Test Date:** February 24, 2020  
**Tested by:** Jerry Chang  
**Polarity:** 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)
80.44	-56.67	-47.48	-8.46	-0.73	-13.00	-43.67	H
149.31	-57.21	-49.04	-7.17	-1.00	-13.00	-44.21	H
199.75	-64.58	-58.62	-4.80	-1.16	-13.00	-51.58	H
345.25	-59.98	-56.94	-1.50	-1.54	-13.00	-46.98	H
537.31	-64.80	-61.57	-1.30	-1.93	-13.00	-51.80	H
987.39	-60.68	-56.62	-1.40	-2.66	-13.00	-47.68	H
1415.00	-58.85	-63.69	8.09	-3.25	-13.00	-45.85	H

Report No.: T200207D01-RP5

**Operation Mode:** Tx / High CH

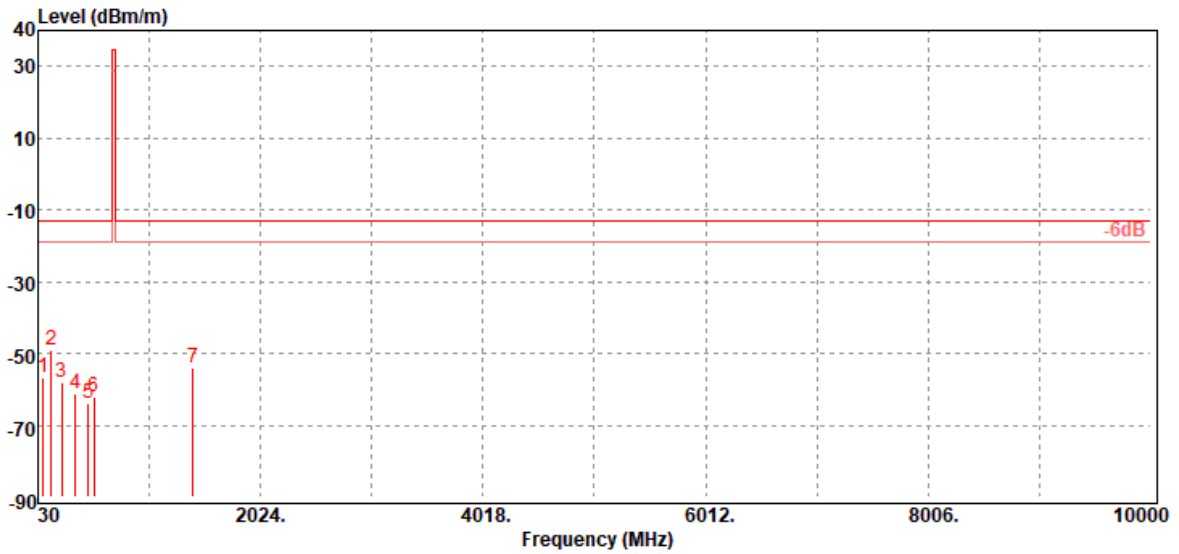
**Test Date:** February 24, 2020

**Temperature:** 21.4°C

**Tested by:** Jerry Chang

**Humidity:** 51RH

**Polarity:** 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)
80.44	-56.70	-47.51	-8.46	-0.73	-13.00	-43.70	V
149.31	-48.90	-40.73	-7.17	-1.00	-13.00	-35.90	V
241.46	-58.19	-54.87	-2.04	-1.28	-13.00	-45.19	V
364.65	-61.29	-57.91	-1.80	-1.58	-13.00	-48.29	V
481.05	-64.01	-59.81	-2.38	-1.82	-13.00	-51.01	V
532.46	-62.25	-59.03	-1.30	-1.92	-13.00	-49.25	V
1422.00	-54.00	-58.87	8.13	-3.26	-13.00	-41.00	V

Report No.: T200207D01-RP5

**Operation Mode:** Tx / High CH

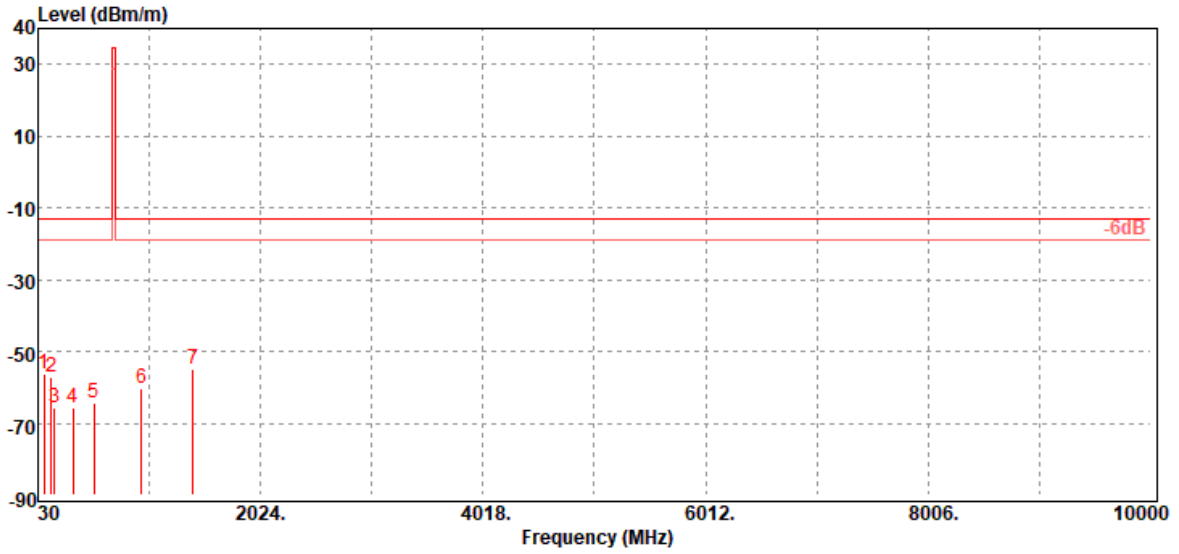
**Test Date:** February 24, 2020

**Temperature:** 21.4°C

**Tested by:** Jerry Chang

**Humidity:** 51RH

**Polarity:** 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)
81.41	-56.34	-47.2	-8.40	-0.74	-13.00	-43.34	H
149.31	-57.02	-48.85	-7.17	-1.00	-13.00	-44.02	H
178.41	-65.53	-59.87	-4.56	-1.10	-13.00	-52.53	H
343.31	-65.71	-62.68	-1.50	-1.53	-13.00	-52.71	H
534.40	-64.37	-61.14	-1.30	-1.93	-13.00	-51.37	H
953.44	-60.37	-56.55	-1.20	-2.62	-13.00	-47.37	H
1422.00	-54.79	-59.66	8.13	-3.26	-13.00	-41.79	H

**- End of Test Report -**