FCC 47 CFR PART 27 SUBPART C

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: December 22, 2020

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 11, 2020	Initial Issue	ALL	Angel Cheng
01	December 22, 2020	1. Revised section 8.1.	P.16-20	Angel Cheng

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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: September 16 ~ 21, 2020

APPLICABLE STANDARDS	
Standard	**TEST RESULT**
FCC Part 27, Subpart C, 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

Product	Module	
Model No.	WP7610	
Model Discrepancy	N/A	
Trade	Advantech; Advantech Service-IoT	
Received Date	February 7, 2020	
Power Supply	Powered from host device.	
Modulation Technology	LTE Band XIII (13)	QPSK, 16QAM
	LTE Band XVII (17)	QPSK, 16QAM
Frequency Range	LTE Band XIII (13) Channel Bandwidth: 5MHz	779.5MHz ~ 784.5MHz
	LTE Band XIII (13) Channel Bandwidth: 10MHz	782MHz
	LTE Band XVII (17) Channel Bandwidth: 5MHz	706.5MHz ~ 713.5MHz
	LTE Band XVII (17) Channel Bandwidth: 10MHz	709MHz ~ 711MHz
Antenna Specification	Part No.: MA231.LBC.002 PIFA Antenna LTE Band 13 & 17 Antenna gain: 2.26 dBi	
Host device information	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 XIII (13): 777 MHz ~ 787 MHz

Three channels had been tested for each channel bandwidth.

Channel	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low CH	23205	779.5	-	-
Middle CH	23230	752.0	23230	782.0
High CH	23255	784.5	-	-

LTE Band XVII (17): 704 MHz ~ 716 MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low channel (L)	23755	706.5	23780	709.0
Middle channel (M)	23790	710.0	23790	710.0
High channel (H)	23825	713.5	23800	711.0

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	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ 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	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ 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

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	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	08/05/2020	08/04/2021
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/19/2020	07/18/2021
Software	N/A				

Test date: 2020/09/18 ~ 19

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	07/24/2020	07/23/2021
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
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/19/2020	07/18/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
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				

Test date: 2020/09/21

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	07/24/2020	07/23/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2020	02/24/2021
Coaxial Cable	EMCI	EMC105	190914+25111	09/19/2020	09/18/2021
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
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PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
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				

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 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.

FCC 27.50 (b) (10): Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands 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 13

Temperature:	24℃	**Test Date:**	September 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 13	5M	23205	779.5	QPSK	1	0	0	23.37	23.48
					1	12	0	23.71	23.82
					1	24	0	23.60	23.71
					12	0	1	22.57	22.68
					12	6	1	22.74	22.85
					12	11	1	22.65	22.76
					25	0	1	22.46	22.57
				16QAM	1	0	1	22.47	22.58
					1	12	1	22.82	22.93
					1	24	1	22.69	22.80
					12	0	2	21.59	21.70
					12	6	2	21.74	21.85
					12	11	2	21.82	21.93
					25	0	2	21.69	21.80
		23230	782.0	QPSK	1	0	0	23.69	23.80
					1	12	0	23.35	23.46
					1	24	0	23.58	23.69
					12	0	1	22.55	22.66
					12	6	1	22.72	22.83
					12	11	1	22.63	22.74
					25	0	1	22.44	22.55
				16QAM	1	0	1	22.45	22.56
					1	12	1	22.80	22.91
					1	24	1	22.67	22.78
					12	0	2	21.57	21.68
					12	6	2	21.72	21.83
					12	11	2	21.80	21.91
					25	0	2	21.67	21.78
		23255	784.5	QPSK	1	0	0	23.41	23.52
					1	12	0	23.75	23.86
					1	24	0	23.64	23.75
					12	0	1	22.61	22.72
					12	6	1	22.78	22.89
					12	11	1	22.69	22.80
					25	0	1	22.50	22.61
				16QAM	1	0	1	22.51	22.62
					1	12	1	22.86	22.97
					1	24	1	22.73	22.84
					12	0	2	21.63	21.74
					12	6	2	21.78	21.89
					12	11	2	21.86	21.97
					25	0	2	21.73	21.84

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power
Band 13	10M	23230	782.0	QPSK	1	0	0	23.43	23.54
					1	24	0	23.77	23.88
					1	49	0	23.66	23.77
					25	0	1	22.63	22.74
					25	12	1	22.80	22.91
					25	24	1	22.71	22.82
					50	0	1	22.52	22.63
				16QAM	1	0	1	22.53	22.64
					1	24	1	22.88	22.99
					1	49	1	22.75	22.86
					25	0	2	21.65	21.76
					25	12	2	21.80	21.91
					25	24	2	21.88	21.99
					50	0	2	21.75	21.86

LTE Band 17

Temperature:	24℃	**Test Date:**	September 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 17	5M	23755	706.5	QPSK	1	0	0	23.48	23.59
					1	12	0	22.84	22.95
					1	24	0	22.86	22.97
					12	0	1	21.50	21.61
					12	6	1	21.71	21.82
					12	11	1	21.82	21.93
					25	0	1	21.53	21.64
				16QAM	1	0	1	21.56	21.67
					1	12	1	21.75	21.86
					1	24	1	21.88	21.99
					12	0	2	20.58	20.69
					12	6	2	20.75	20.86
					12	11	2	20.89	21.00
					25	0	2	20.49	20.60
		23790	710.0	QPSK	1	0	0	23.20	23.31
					1	12	0	23.30	23.41
					1	24	0	23.12	23.23
					12	0	1	22.32	22.43
					12	6	1	22.31	22.42
					12	11	1	22.25	22.36
					25	0	1	22.33	22.44
				16QAM	1	0	1	22.29	22.40
					1	12	1	22.32	22.43
					1	24	1	22.34	22.45
					12	0	2	21.42	21.53
					12	6	2	21.39	21.50
					12	11	2	21.40	21.51
					25	0	2	21.52	21.63
		23825	713.5	QPSK	1	0	0	23.09	23.20
					1	12	0	23.19	23.30
					1	24	0	23.17	23.28
					12	0	1	22.31	22.42
					12	6	1	22.27	22.38
					12	11	1	22.44	22.55
					25	0	1	22.20	22.31
				16QAM	1	0	1	22.51	22.62
					1	12	1	22.26	22.37
					1	24	1	22.76	22.87
					12	0	2	21.37	21.48
					12	6	2	21.38	21.49
					12	11	2	21.42	21.53
					25	0	2	21.33	21.44

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	ERP Power
Band 17	10M	23780	709.0	QPSK	1	0	0	23.55	23.66
					1	24	0	23.41	23.52
					1	49	0	23.34	23.45
					25	0	1	22.61	22.72
					25	12	1	22.57	22.68
					25	24	1	22.36	22.47
					50	0	1	22.61	22.72
				16QAM	1	0	1	22.85	22.96
					1	24	1	22.50	22.61
					1	49	1	22.54	22.65
					25	0	2	21.66	21.77
					25	12	2	21.43	21.54
					25	24	2	21.44	21.55
					50	0	2	21.79	21.90
		23790	710.0	QPSK	1	0	0	23.28	23.39
					1	24	0	23.38	23.49
					1	49	0	23.20	23.31
					25	0	1	22.40	22.51
					25	12	1	22.39	22.50
					25	24	1	22.33	22.44
					50	0	1	22.41	22.52
				16QAM	1	0	1	22.37	22.48
					1	24	1	22.40	22.51
					1	49	1	22.42	22.53
					25	0	2	21.50	21.61
					25	12	2	21.47	21.58
					25	24	2	21.48	21.59
					50	0	2	21.60	21.71
		23800	711.0	QPSK	1	0	0	23.18	23.29
					1	24	0	23.28	23.39
					1	49	0	23.26	23.37
					25	0	1	22.40	22.51
					25	12	1	22.36	22.47
					25	24	1	22.53	22.64
					50	0	1	22.29	22.40
				16QAM	1	0	1	22.60	22.71
					1	24	1	22.35	22.46
					1	49	1	22.85	22.96
					25	0	2	21.46	21.57
					25	12	2	21.47	21.58
					25	24	2	21.51	21.62
					50	0	2	21.42	21.53

8.2 RADIATED EMISSION MEASUREMENT

LIMITS

27.53(c)(2), Band XIII (13)

For operations in the 600 MHz band and the 698-746MHz 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.

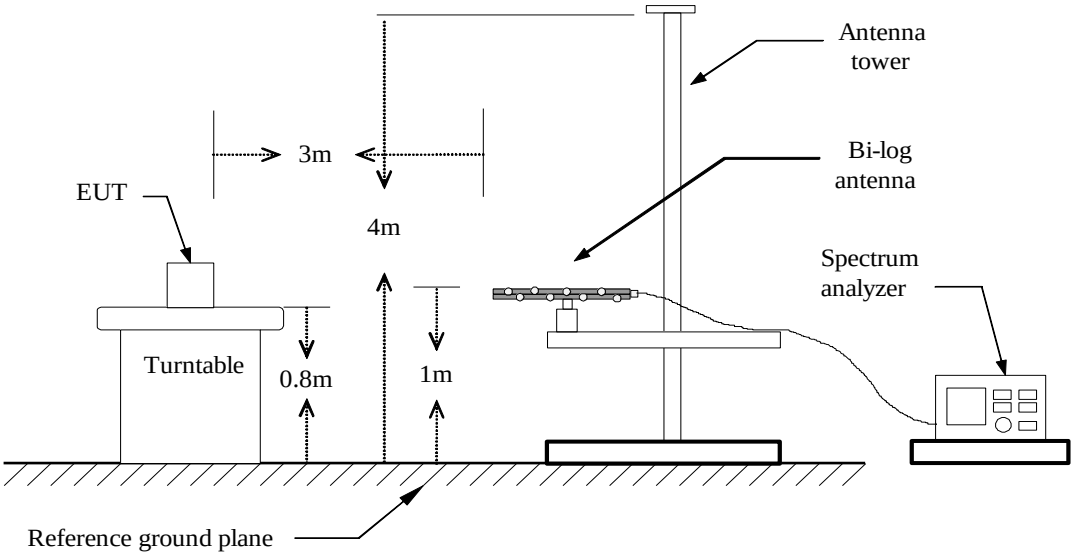
FCC §27.53(g), Band XVII (17)

For operations in the 600 MHz band and the 698-746MHz 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.

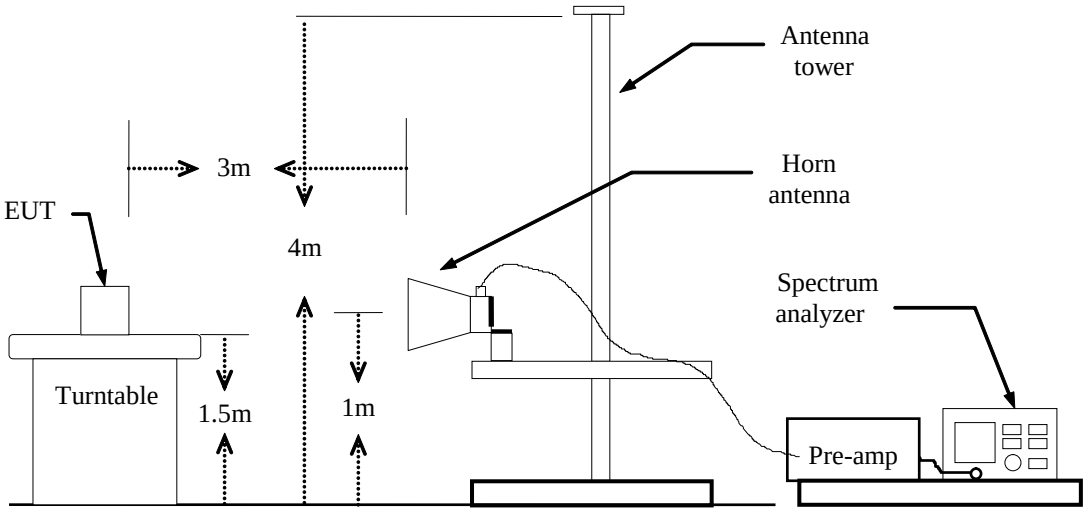
Limit Line: -13dBm

Test Configuration

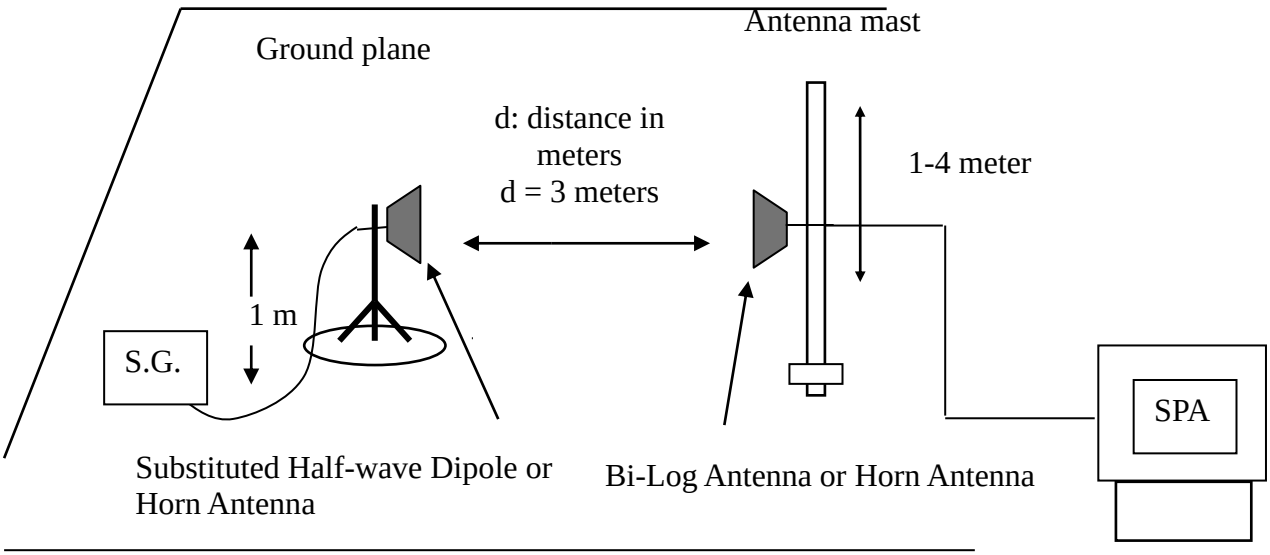
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up

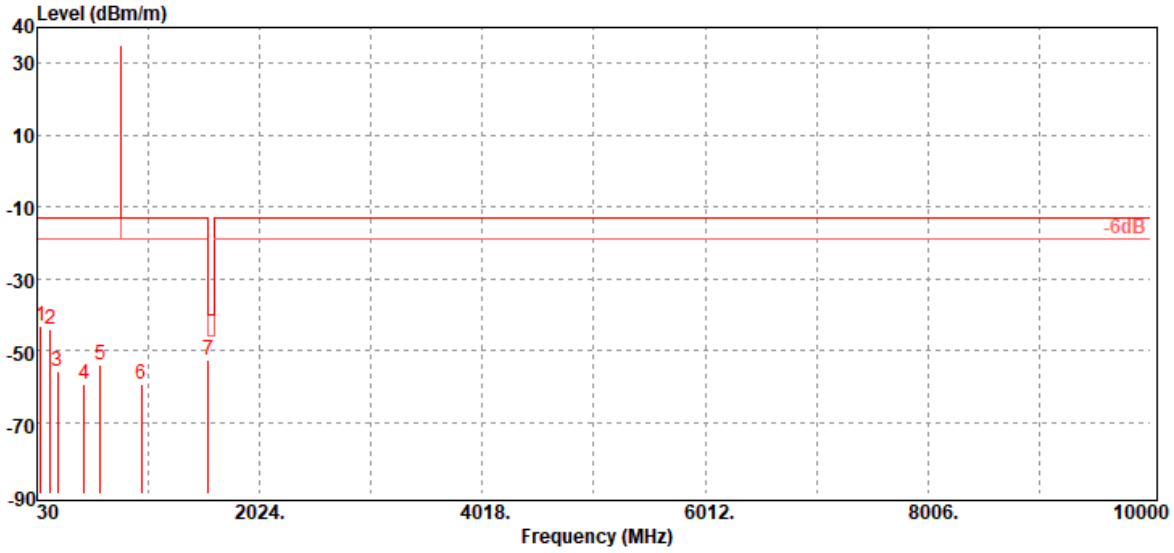


TEST PROCEDURES

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.

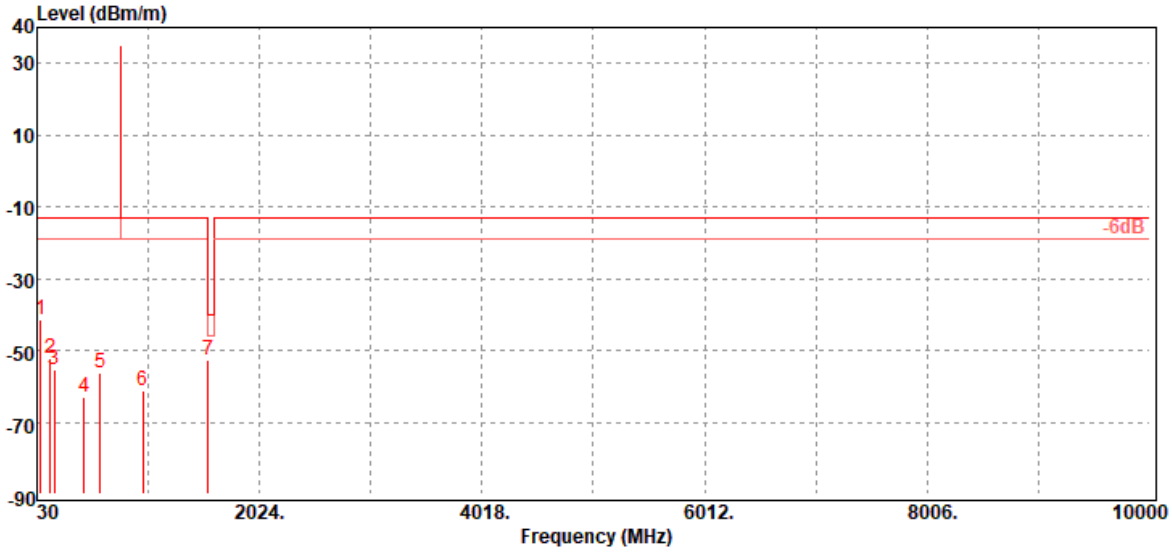
LTE Band 13 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / Low CH	**Test Date:**	September 18, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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)
65.89	-43.37	-32.86	-9.84	-0.67	-13.00	-30.37	V
149.31	-44.18	-36.01	-7.17	-1.00	-13.00	-31.18	V
216.24	-55.84	-52.55	-2.08	-1.21	-13.00	-42.84	V
449.04	-59.39	-55.53	-2.10	-1.76	-13.00	-46.39	V
598.42	-54.02	-51.09	-0.87	-2.06	-13.00	-41.02	V
967.02	-59.57	-55.64	-1.30	-2.63	-13.00	-46.57	V
1564.00	-52.52	-58.46	9.38	-3.44	-40.00	-12.52	V

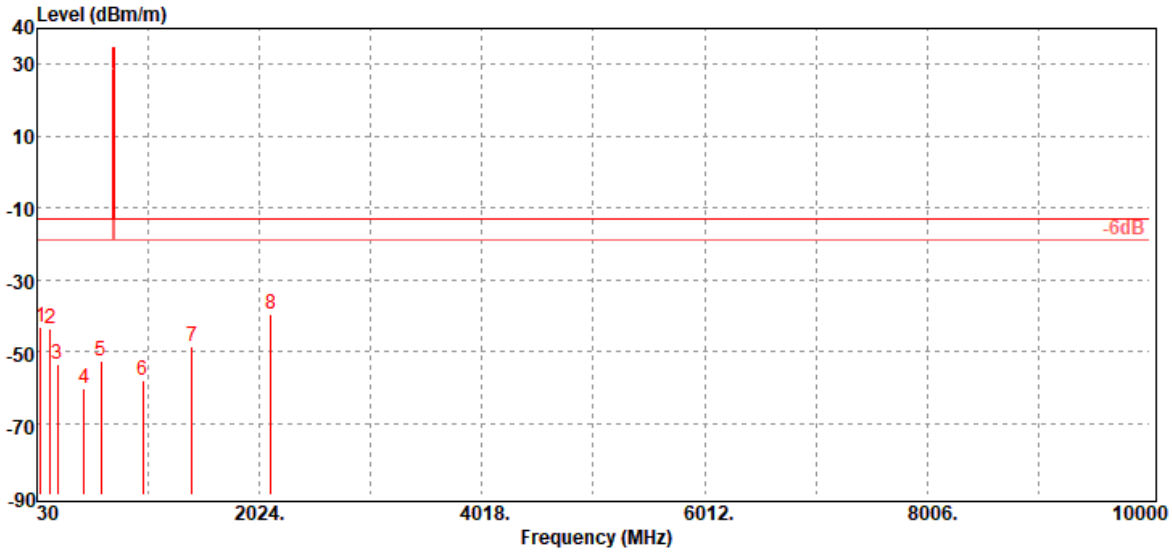
Operation Mode:	Tx / Low CH	**Test Date:**	September 18, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**Polarity:**	Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
65.89	-41.62	-31.11	-9.84	-0.67	-13.00	-28.62	H
150.28	-52.22	-44.11	-7.10	-1.01	-13.00	-39.22	H
182.29	-55.15	-49.84	-4.20	-1.11	-13.00	-42.15	H
450.98	-62.95	-59.09	-2.10	-1.76	-13.00	-49.95	H
598.42	-56.24	-53.31	-0.87	-2.06	-13.00	-43.24	H
979.63	-61.01	-57.05	-1.31	-2.65	-13.00	-48.01	H
1564.00	-52.74	-58.68	9.38	-3.44	-40.00	-12.74	H

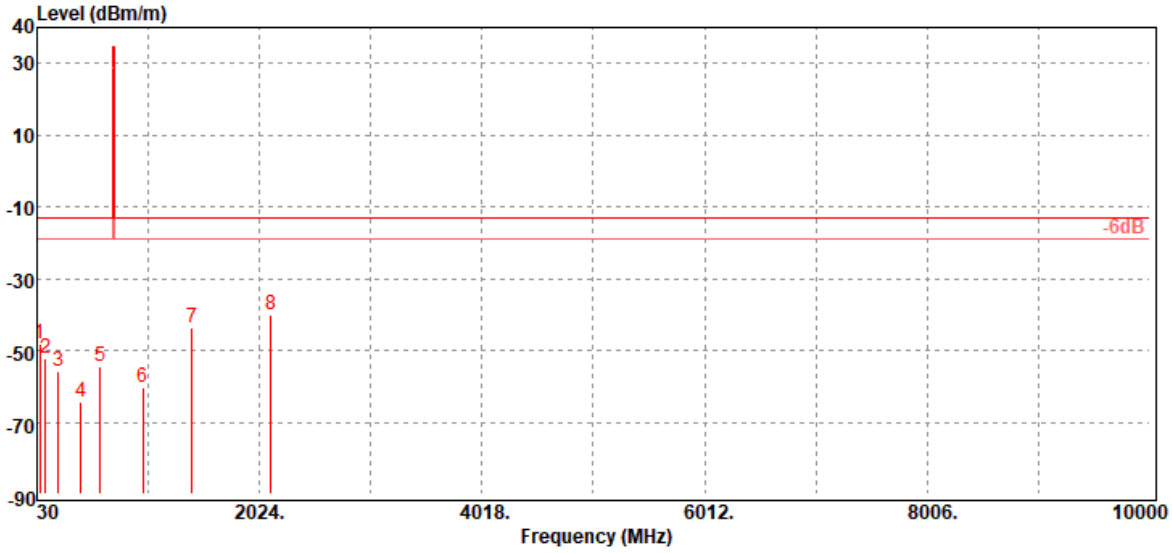
LTE Band 17 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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)
65.89	-43.27	-32.76	-9.84	-0.67	-13.00	-30.27	V
150.28	-43.53	-35.42	-7.10	-1.01	-13.00	-30.53	V
217.21	-53.68	-50.41	-2.06	-1.21	-13.00	-40.68	V
449.04	-60.26	-56.40	-2.10	-1.76	-13.00	-47.26	V
600.36	-52.62	-49.64	-0.91	-2.07	-13.00	-39.62	V
980.60	-57.85	-53.89	-1.31	-2.65	-13.00	-44.85	V
1418.00	-48.44	-53.29	8.11	-3.26	-13.00	-35.44	V
2127.00	-39.49	-44.94	9.58	-4.13	-13.00	-26.49	V

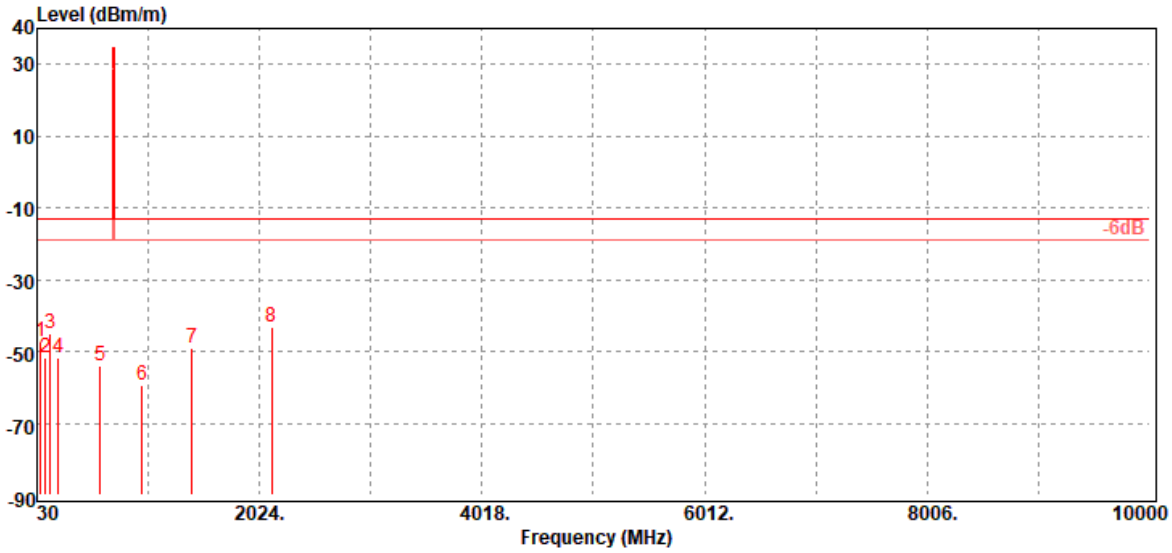
Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**Polarity:**	Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
54.25	-48.24	-36.99	-10.65	-0.60	-13.00	-35.24	H
106.63	-52.25	-41.94	-9.46	-0.85	-13.00	-39.25	H
221.09	-55.95	-52.75	-1.98	-1.22	-13.00	-42.95	H
419.94	-64.41	-60.81	-1.90	-1.70	-13.00	-51.41	H
598.42	-54.24	-51.31	-0.87	-2.06	-13.00	-41.24	H
979.63	-60.20	-56.24	-1.31	-2.65	-13.00	-47.20	H
1418.00	-43.87	-48.72	8.11	-3.26	-13.00	-30.87	H
2127.00	-40.23	-45.68	9.58	-4.13	-13.00	-27.23	H

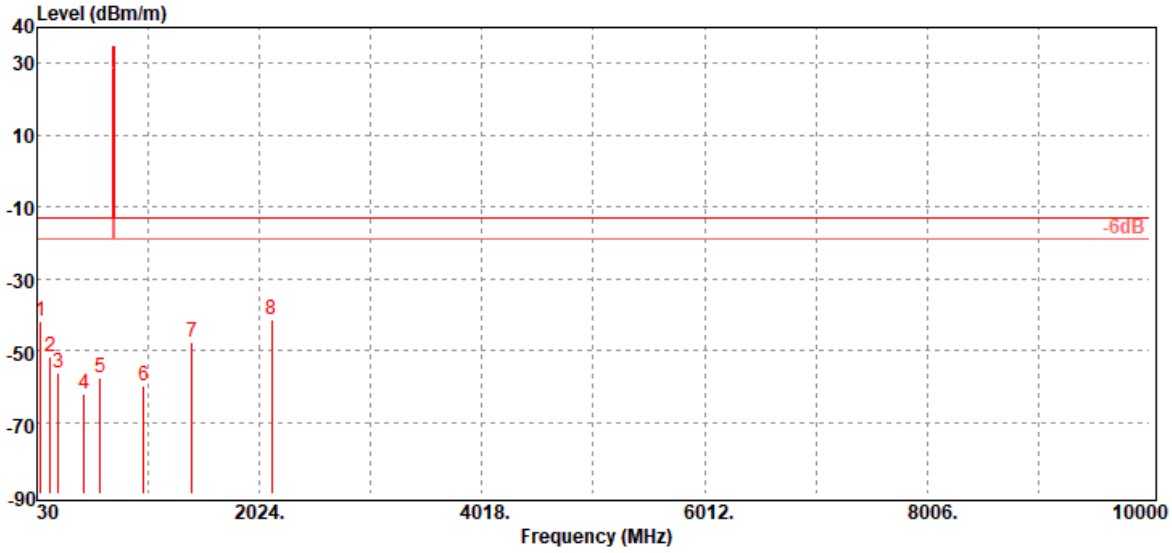
LTE Band 17 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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)
65.89	-47.19	-36.68	-9.84	-0.67	-13.00	-34.19	V
106.63	-51.71	-41.40	-9.46	-0.85	-13.00	-38.71	V
149.31	-44.84	-36.67	-7.17	-1.00	-13.00	-31.84	V
220.12	-51.84	-48.62	-2.00	-1.22	-13.00	-38.84	V
595.51	-53.93	-51.06	-0.81	-2.06	-13.00	-40.93	V
967.99	-59.24	-55.30	-1.30	-2.64	-13.00	-46.24	V
1420.00	-49.08	-53.94	8.12	-3.26	-13.00	-36.08	V
2130.00	-43.07	-48.50	9.56	-4.13	-13.00	-30.07	V

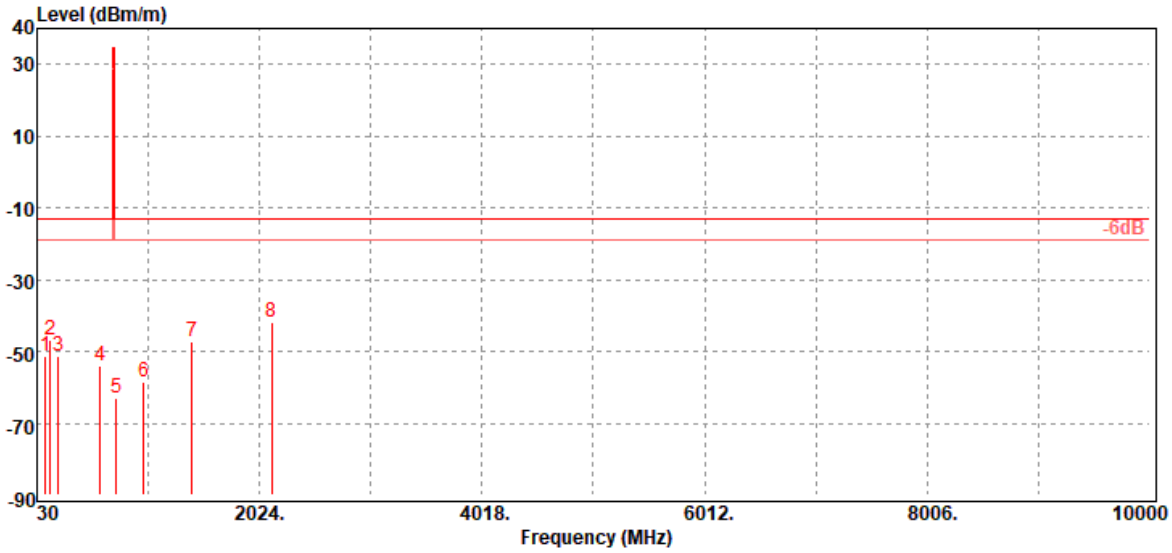
Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**Polarity:**	Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
65.89	-41.78	-31.27	-9.84	-0.67	-13.00	-28.78	H
148.34	-51.75	-43.48	-7.27	-1.00	-13.00	-38.75	H
220.12	-56.41	-53.19	-2.00	-1.22	-13.00	-43.41	H
449.04	-62.29	-58.43	-2.10	-1.76	-13.00	-49.29	H
599.39	-57.42	-54.46	-0.89	-2.07	-13.00	-44.42	H
982.54	-59.91	-55.91	-1.35	-2.65	-13.00	-46.91	H
1420.00	-47.83	-52.69	8.12	-3.26	-13.00	-34.83	H
2130.00	-41.41	-46.84	9.56	-4.13	-13.00	-28.41	H

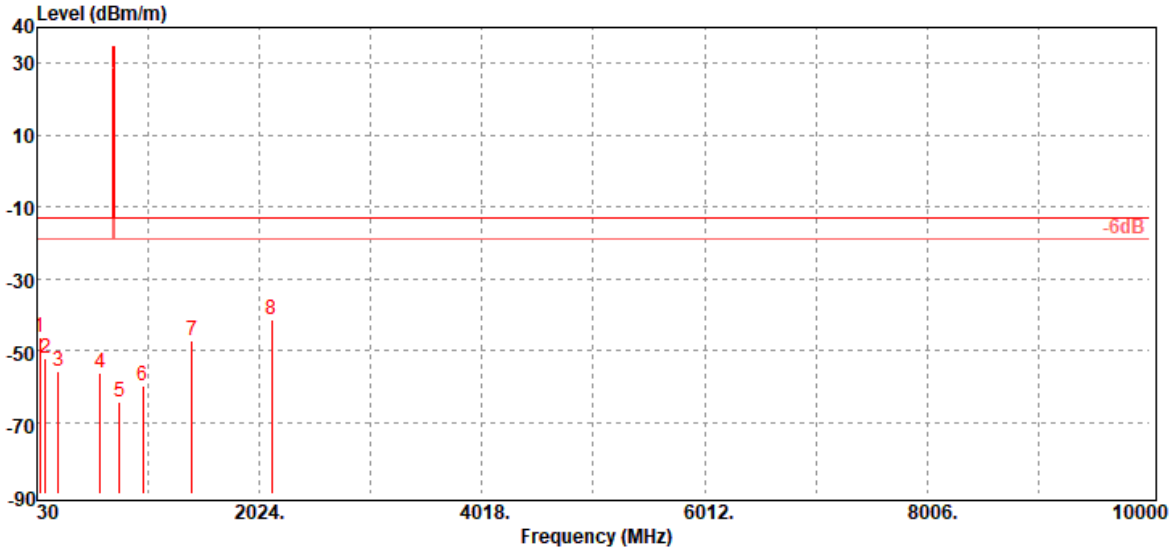
LTE Band 17 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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	-51.24	-41.03	-9.37	-0.84	-13.00	-38.24	V
149.31	-46.67	-38.50	-7.17	-1.00	-13.00	-33.67	V
221.09	-51.24	-48.04	-1.98	-1.22	-13.00	-38.24	V
598.42	-54.06	-51.13	-0.87	-2.06	-13.00	-41.06	V
739.07	-63.22	-59.63	-1.30	-2.29	-13.00	-50.22	V
982.54	-58.29	-54.29	-1.35	-2.65	-13.00	-45.29	V
1422.00	-47.08	-51.95	8.13	-3.26	-13.00	-34.08	V
2133.00	-41.70	-47.10	9.54	-4.14	-13.00	-28.70	V

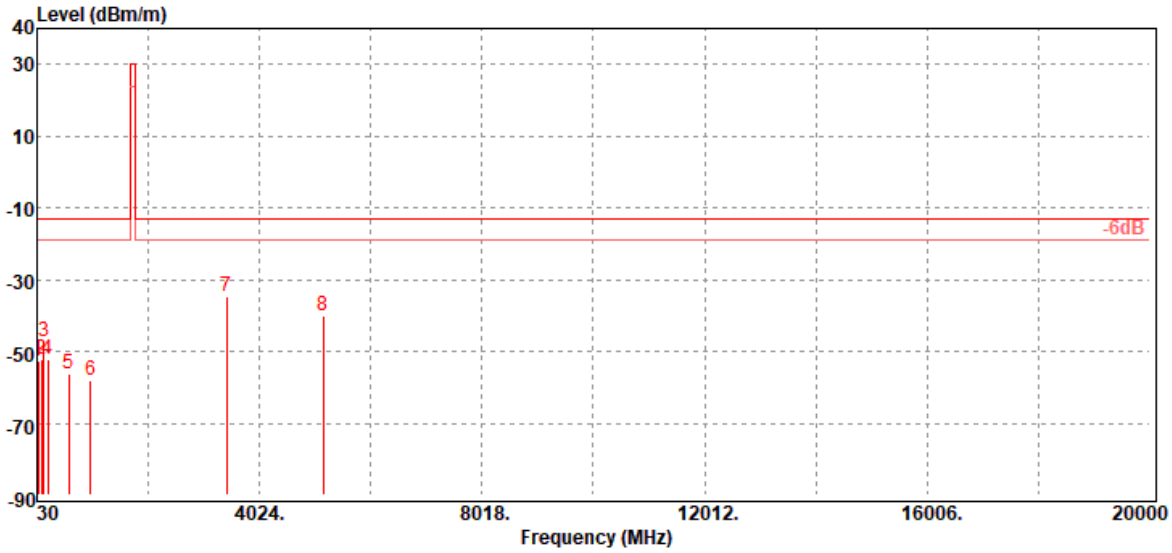
Operation Mode:	Tx / High CH	**Test Date:**	September 21, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**Polarity:**	Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
54.25	-46.32	-35.07	-10.65	-0.60	-13.00	-33.32	H
106.63	-52.18	-41.87	-9.46	-0.85	-13.00	-39.18	H
221.09	-55.96	-52.76	-1.98	-1.22	-13.00	-42.96	H
597.45	-56.31	-53.40	-0.85	-2.06	-13.00	-43.31	H
773.02	-64.17	-60.43	-1.40	-2.34	-13.00	-51.17	H
979.63	-60.00	-56.04	-1.31	-2.65	-13.00	-47.00	H
1422.00	-47.07	-51.94	8.13	-3.26	-13.00	-34.07	H
2133.00	-41.28	-46.68	9.54	-4.14	-13.00	-28.28	H

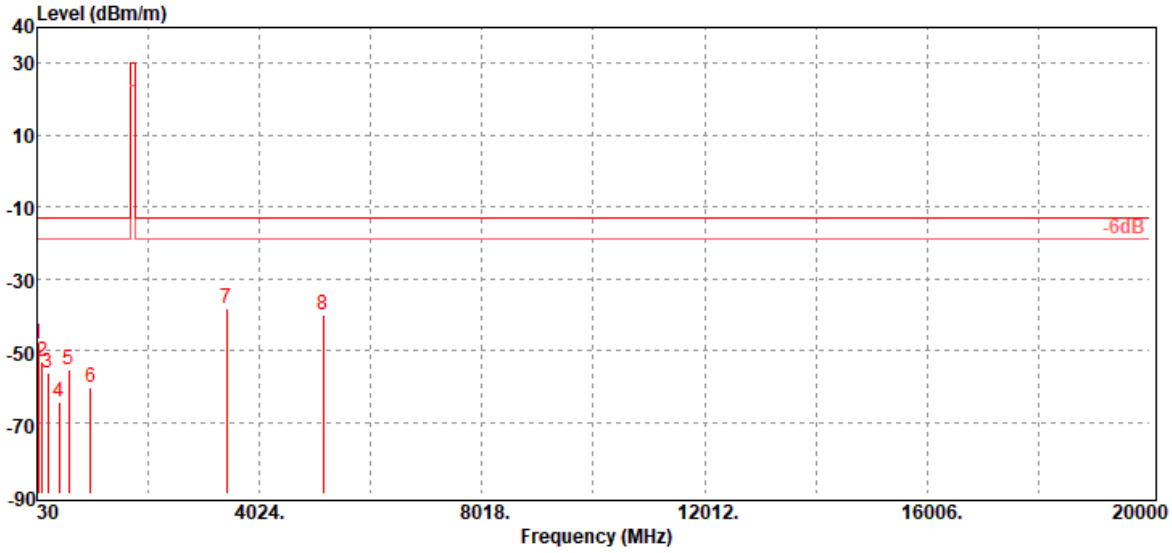
LTE Band 66 / BW: 20MHz / QPSK / RB =1, RB Offset = 0

Operation Mode:	Tx / High CH	**Test Date:**	September 19, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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)
54.25	-52.88	-41.63	-10.65	-0.60	-13.00	-39.88	V
106.63	-52.00	-41.69	-9.46	-0.85	-13.00	-39.00	V
150.28	-47.04	-38.93	-7.10	-1.01	-13.00	-34.04	V
220.12	-52.39	-49.17	-2.00	-1.22	-13.00	-39.39	V
594.54	-56.33	-53.45	-0.82	-2.06	-13.00	-43.33	V
990.30	-58.02	-53.96	-1.40	-2.66	-13.00	-45.02	V
3440.00	-34.86	-42.07	12.72	-5.51	-13.00	-21.86	V
5160.00	-40.16	-46.21	12.76	-6.71	-13.00	-27.16	V

Operation Mode:	Tx / High CH	**Test Date:**	September 19, 2020
Temperature:	23.4℃	**Tested by:**	Jerry Chang
Humidity:	54%RH	**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)
53.28	-47.98	-36.55	-10.84	-0.59	-13.00	-34.98	H
127.97	-52.94	-41.80	-10.21	-0.93	-13.00	-39.94	H
221.09	-56.44	-53.24	-1.98	-1.22	-13.00	-43.44	H
421.88	-64.51	-60.91	-1.90	-1.70	-13.00	-51.51	H
597.45	-55.58	-52.67	-0.85	-2.06	-13.00	-42.58	H
985.45	-60.34	-56.28	-1.40	-2.66	-13.00	-47.34	H
3440.00	-38.29	-45.50	12.72	-5.51	-13.00	-25.29	H
5160.00	-39.93	-45.98	12.76	-6.71	-13.00	-26.93	H

- End of Test Report -