



TESTING LABORATORY  
CERTIFICATE#4323.01



# FCC PART 27 TEST REPORT

For

## SIMCom Wireless Solutions Limited

No.633 Jinzhong Road, Shanghai, 200335 China

**FCC ID: 2AJYU-8PYA009**

<b>Report Type:</b> Original Report	<b>Product Type:</b> LTE MODULE
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<b>Report Number:</b>	RSHF200526001-00A
<b>Report Date:</b>	2020-07-08
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant:	SIMCom Wireless Solutions Limited
Tested Model:	SIM7600E-H
Product Type:	LTE MODULE
Power Supply:	DC 3.4-4.2V
RF Function:	LTE
Operating Band/Frequency:	LTE Band 7: 2500-2570 MHz(TX), 2620-2690 MHz(RX)
Modulation Type:	QPSK,16QAM

*\*All measurement and test data in this report was gathered from production sample serial number: 20200526001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-05-26)*

### Objective

This type approval report is prepared on behalf of *SIMCom Wireless Solutions Limited* in accordance with Part 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

### Related Submittal(s)/Grant(s)

No related submittal(s).

## Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-Part J as well as the following parts:

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA-603-E-2016.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6GHz~18GHz	4.92dB
	18GHz~40GHz	5.21dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

## Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

## SYSTEM TEST CONFIGURATION

### Justification

The EUT was configured for testing according to TIA-603-E-2016.

The final qualification test was performed with the EUT operating at normal mode.

### Channel List

Mode		Channel		Frequency (MHz)
LTE Band 7	5M	Low	20775	2502.5
		Middle	21100	2535
		High	21425	2567.5
	10M	Low	20800	2505
		Middle	21100	2535
		High	21400	2565
	15M	Low	20825	2507.5
		Middle	21100	2535
		High	21375	2562.5
	20M	Low	20850	2510
		Middle	21100	2535
		High	21350	2560

**Equipment Modifications**

No modifications were made to the EUT.

**Support Equipment List and Details**

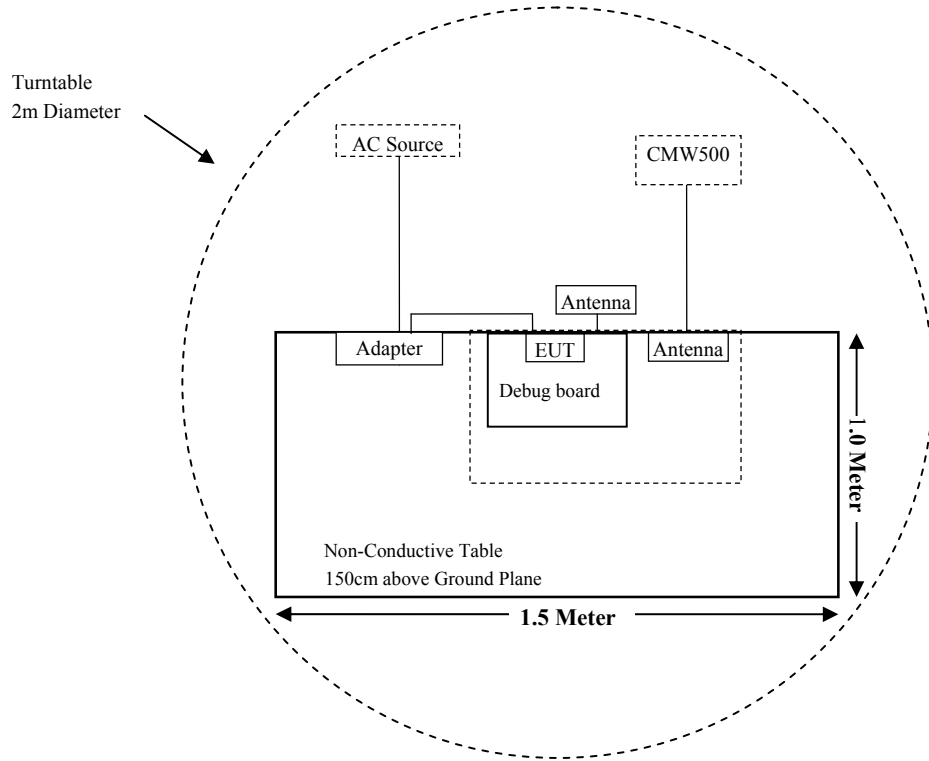
Manufacturer	Description	Model	Serial Number
Aihuaxin technology	Antenna	/	/
SIMCom	Antenna	/	/
Something High Electric (Xiamen) Company Inc.	Adapter	P-050B-050200	B2152-1839
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478

**External I/O Cable**

Cable Description	Length (m)	From Port	To
Power Cable	1.0	EUT	Adapter
Antenna Cable	2.0	EUT	Antenna

### Block Diagram of Test Setup

For Radiated Emissions (Below 1GHz& Above 1GHz):



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§1.1310& §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§2.1046; 27.50 h	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; §27.53(m)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; §27.53 (m);	Spurious Radiated Emissions	Compliant
§ 27.53 (m)	Band Edge	Compliant
§ 2.1055; § 27.54	Frequency stability	Compliant



**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test (Chamber 1#)</b>					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
HP	Signal Generator	HP 8341B	2624A00116	2019-11-30	2020-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2017-12-26	2020-12-25
Sunol Sciences	Bilog antenna	JB3	A060217	2017-08-04	2020-08-03
Sonoma Instrument	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04
<b>Radiated Emission Test (Chamber 2#)</b>					
HP	Signal Generator	HP 8341B	2624A00116	2019-11-30	2020-11-29
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3115	6229	2020-01-10	2023-01-09
ETS-LINDGREN	Horn Antenna	3116	84159	2019-12-12	2022-12-11
ETS-LINDGREN	Horn Antenna	3116	2516	2020-01-17	2023-01-16
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2020-03-22	2021-03-21
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2019-08-15	2020-08-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2019-12-14	2020-12-13
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2019-12-14	2020-12-13
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04
Mini-Circuits	Power splitter	ZFRSC-14-S+	SF019411452	2019-11-10	2020-11-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2019-12-20	2020-12-19
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2019-10-10	2020-10-09
SIMCom	RF Cable	SIMCom C01	C01	Each Time	/

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**FCC §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
<b>Frequency Range (MHz)</b>	<b>Electric Field Strength (V/m)</b>	<b>Magnetic Field Strength (A/m)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>Averaging Time (minutes)</b>
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data:**

Calculation of maximum antenna gain based on EIRP

<b>Mode</b>	<b>Max Tune-up Power (dBm)</b>	<b>ERP/EIRP Limit (dBm)</b>	<b>Max Antenna Gain (dBd)</b>	<b>Max Antenna Gain (dBi)</b>
LTE Band 7	21.5	33.00	/	11.50

Note:0dBd=2.15dBi

Calculation of maximum antenna gain based on MPE Ratio

Mode	Frequency Range	Tune-up Conducted Power		Power Density Limit	Maximum Power Density	Evaluation Distance	Maximum Antenna Gain Allowed based on MPE		MPE ratio
	(MHz)	(dBm)	(mW)	(mW/cm <sup>2</sup> )	(mW/cm <sup>2</sup> )		(numeric)	(dBi)	
LTE Band 7	2500.0-2570.0	21.50	141.25	1.00	0.9991	20	35.56	15.51	0.9991

Mode	Max Allow Antenna Gain (dBi)
LTE Band 7	11.50

**Result:** To meet RF exposure & ERP/ERIP, the maximum net gains of antenna allowed is 11.50dBi @LTE Band 7. The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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According to FCC § 2.1047(d) and Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC §2.1046; §27.50 h - RF OUTPUT POWER

### Applicable Standards

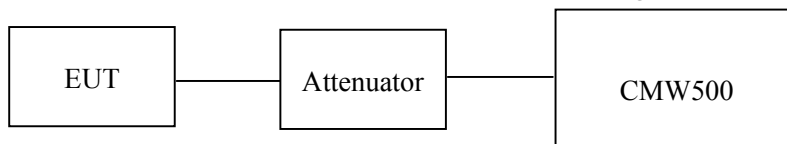
According to §27.50, Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

According to FCC §2.1046, the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

### Test Procedure

#### *Conducted method:*

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



#### *Radiated Output Power:*

The measurements procedures specified in TIA-603-E-2016 were applied.

- a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
- b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
- c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
- d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.  $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

$$ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$$

f) The maximum ERP is the maximum value determined in the preceding step.  
(Note: Effective Isotropic Radiated Power (EIRP) can be computed using the following:  
 $EIRP (dBm) = ERP (dBm) + 2.15 (dB)$

## Test Data

### Environmental Conditions

<b>Temperature:</b>	24.8~24.9 °C
<b>Relative Humidity:</b>	50~53 %
<b>ATM Pressure:</b>	101.1~101.5 kPa

*The testing was performed by Winnie Yang from 2020-06-04 to 2020-06-05 .*

**Maximum Output Power:**

**LTE Band 7**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	19.98	20.69	19.95
		1#12	20.63	20.44	20.07
		1#24	20.68	20.95	19.70
		12#0	20.03	20.48	20.37
		12#6	20.76	20.65	20.43
		12#11	20.85	20.98	19.90
		25#0	20.35	20.59	19.75
	16-QAM	1#0	20.23	20.34	20.43
		1#12	20.17	20.80	19.94
		1#24	19.94	20.54	20.16
		12#0	21.16	20.91	20.79
		12#6	20.85	20.90	19.81
		12#11	20.99	20.17	20.28
		25#0	20.81	20.72	20.44
10M	QPSK	1#0	20.25	20.15	20.66
		1#24	20.82	20.78	20.80
		1#49	20.26	20.18	20.66
		25#0	19.93	20.95	19.93
		25#12	20.88	20.36	20.17
		25#24	20.25	20.26	20.20
		50#0	20.20	20.92	20.68
	16-QAM	1#0	21.19	20.33	20.80
		1#24	20.57	20.58	19.90
		1#49	20.37	20.99	20.08
		25#0	20.60	20.74	20.51
		25#12	20.64	20.26	19.99
		25#24	20.98	21.07	20.46
		50#0	20.20	20.35	19.92



Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	20.65	20.87	20.91
		1#37	20.27	20.34	20.54
		1#74	20.74	20.28	20.07
		36#0	20.64	20.45	19.71
		36#17	20.87	20.52	20.34
		36#35	21.25	20.32	20.11
		75#0	20.09	20.16	19.91
	16-QAM	1#0	20.76	20.33	20.74
		1#37	20.87	20.46	20.98
		1#74	20.31	20.53	20.32
		36#0	20.15	20.22	20.38
		36#17	21.18	20.94	20.44
		36#35	20.80	20.48	19.99
		75#0	20.89	20.80	20.58
20M	QPSK	1#0	20.56	20.62	19.76
		1#49	20.85	20.82	20.41
		1#99	20.10	20.60	19.76
		50#0	20.73	20.40	20.63
		50#24	20.98	20.75	19.82
		50#49	20.86	20.94	20.82
		100#0	20.51	20.96	20.44
	16-QAM	1#0	20.53	20.55	20.49
		1#49	20.21	20.55	20.50
		1#99	21.25	20.63	20.78
		50#0	20.41	20.37	20.71
		50#24	20.62	20.34	20.87
		50#49	21.01	20.81	19.99
		100#0	20.81	20.14	20.52

**Peak-to-average ratio (PAR):**

**LTE Band 7**

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	20M	3.07	3.09	3.19	13
	100 RB		5.04	5.15	5.08	13
16-QAM	1 RB	20M	4.11	4.06	4.17	13
	100 RB		6.12	6.02	6.13	13

**FCC §2.1049, §27.53- OCCUPIED BANDWIDTH**

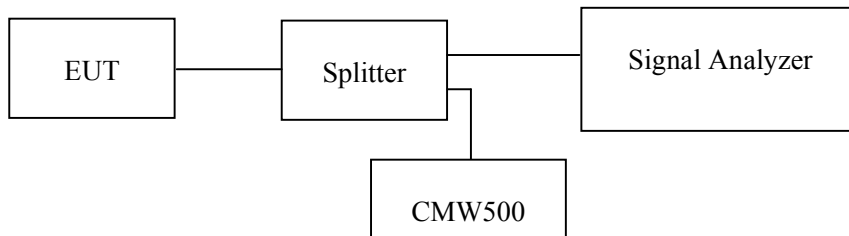
**Applicable Standards**

FCC 47 §2.1049 and §27.53.

**Test Procedure**

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 kHz/300 kHz (LTE), and the 26 dB & 99% bandwidth was recorded.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.8 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	101.5 kPa

*The testing was performed by Winnie Yang on 2020-06-04.*

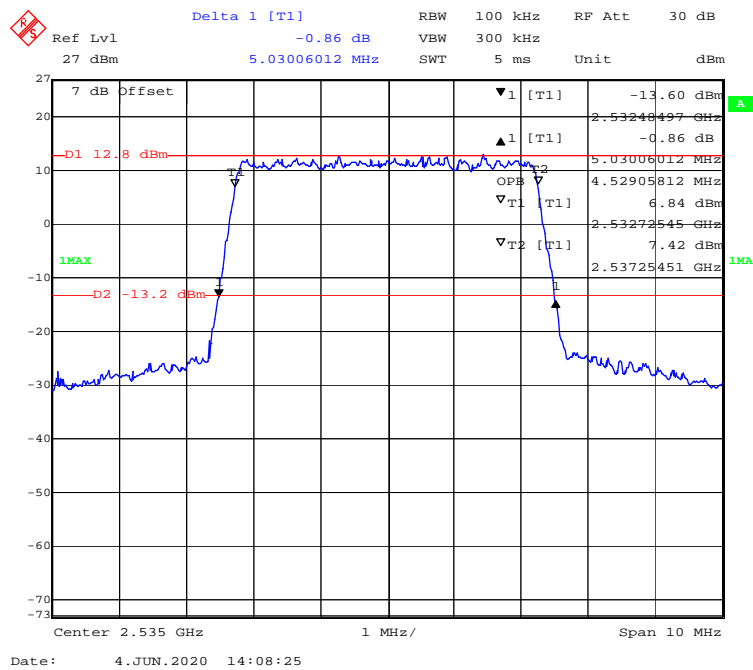
*EUT operation mode: Transmitting*

*Test Result: Compliance.*

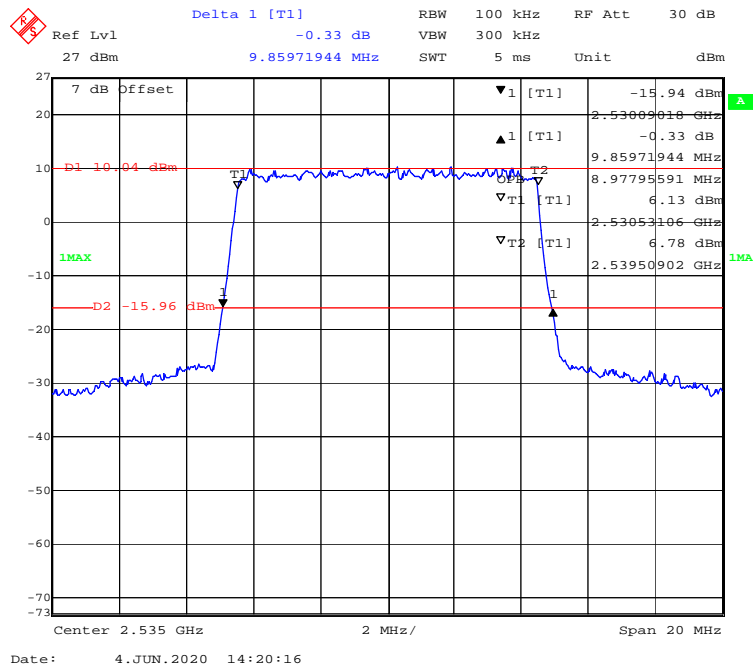
**LTE Band 7:**

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	5M	Middle	5.030	4.529
	10M		9.860	8.978
	15M		15.030	13.587
	20M		19.319	17.965
16-QAM	5M	Middle	5.010	4.529
	10M		9.780	8.978
	15M		14.910	13.527
	20M		19.479	17.956

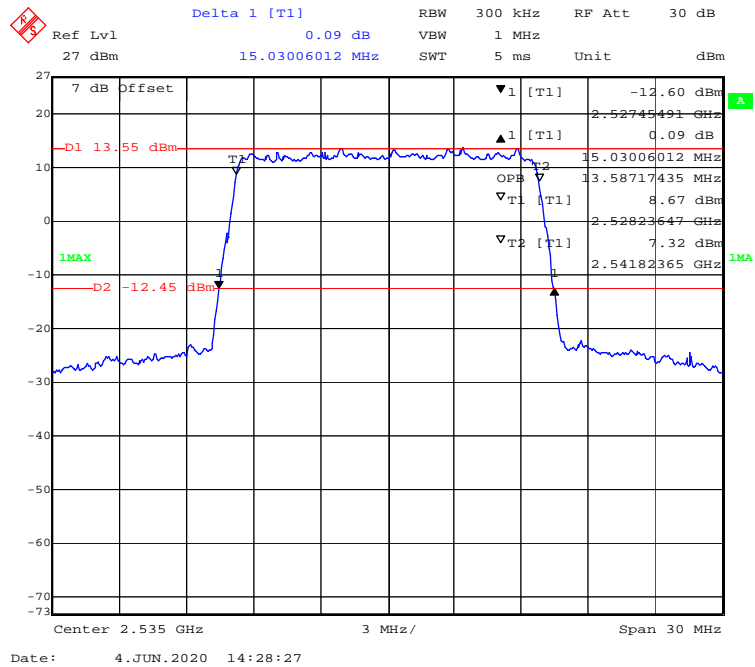
**QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



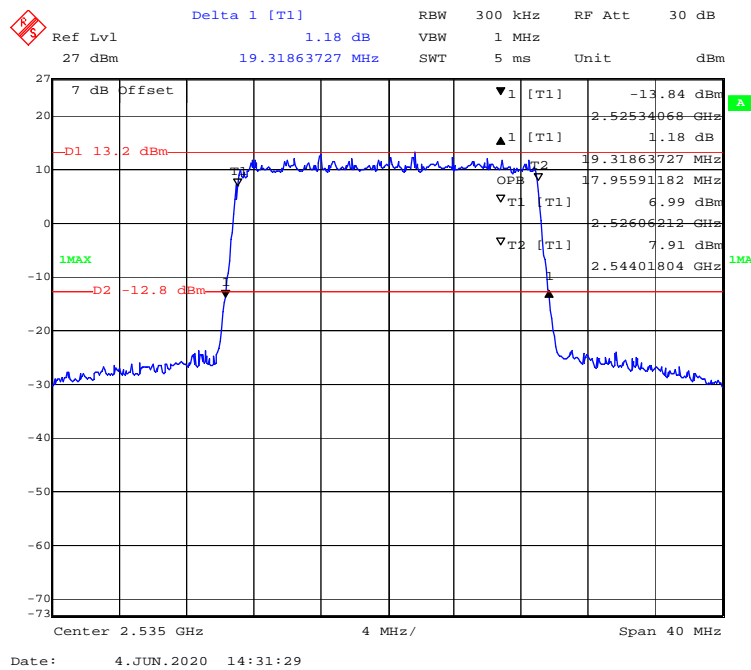
**QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



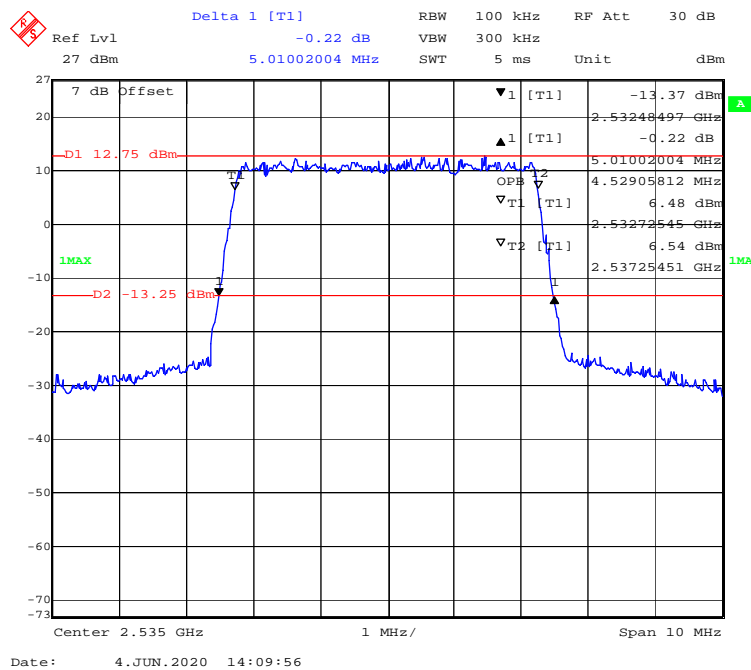
**QPSK (15.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



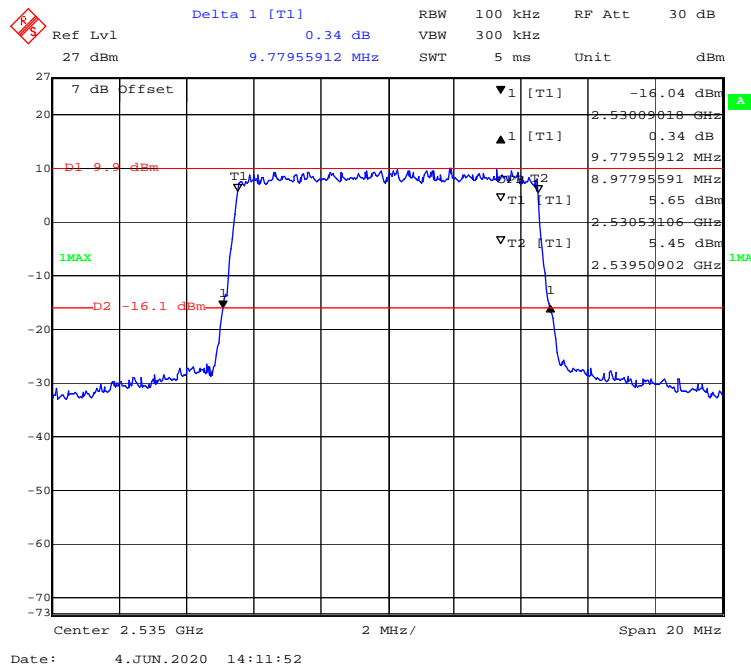
**QPSK (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



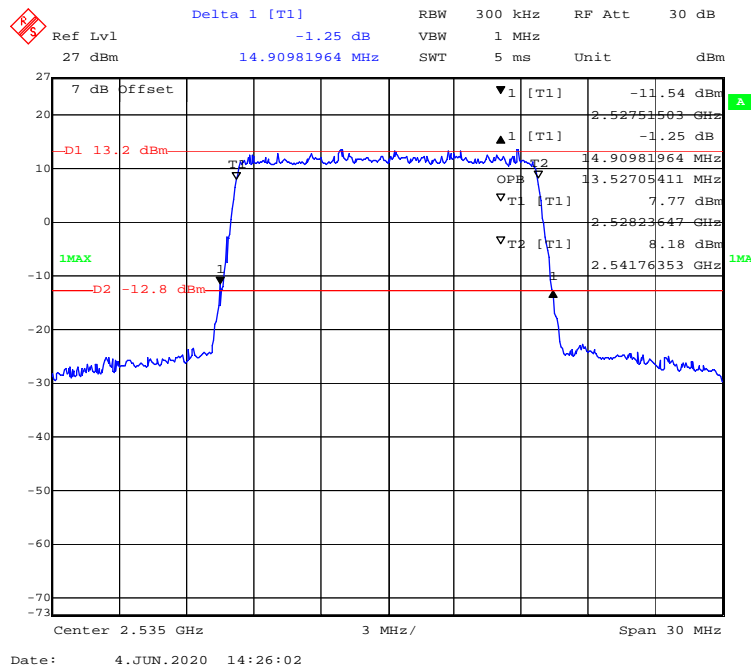
**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



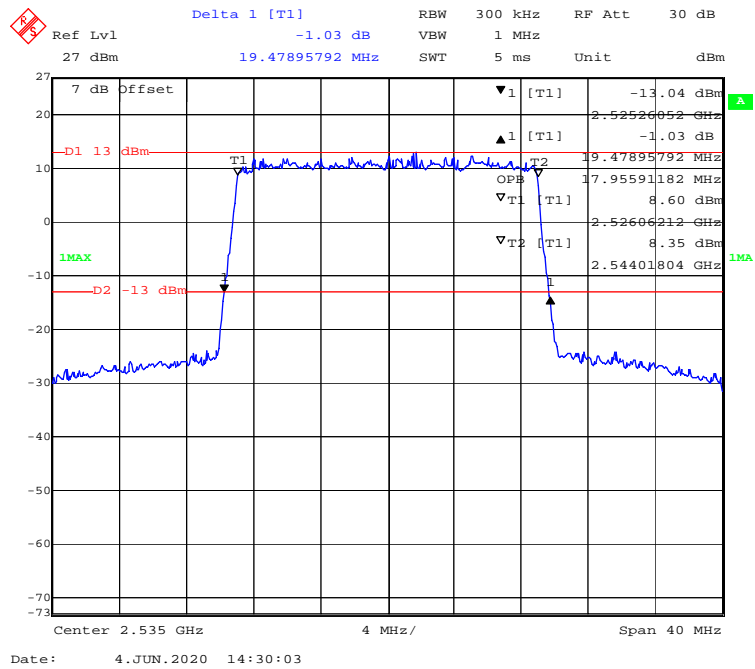
**16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



**16-QAM (15.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



**16-QAM (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**





## FCC § 2.1051; §27.53 (m) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Applicable Standards

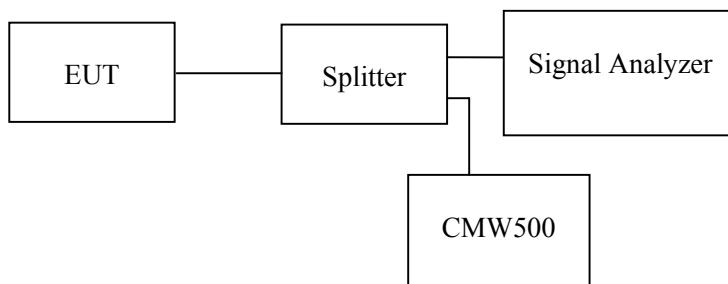
FCC §2.1051 and §27.53 (m).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

According to §27.53(m),for mobile digital stations, any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz & 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25.0 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.2 kPa

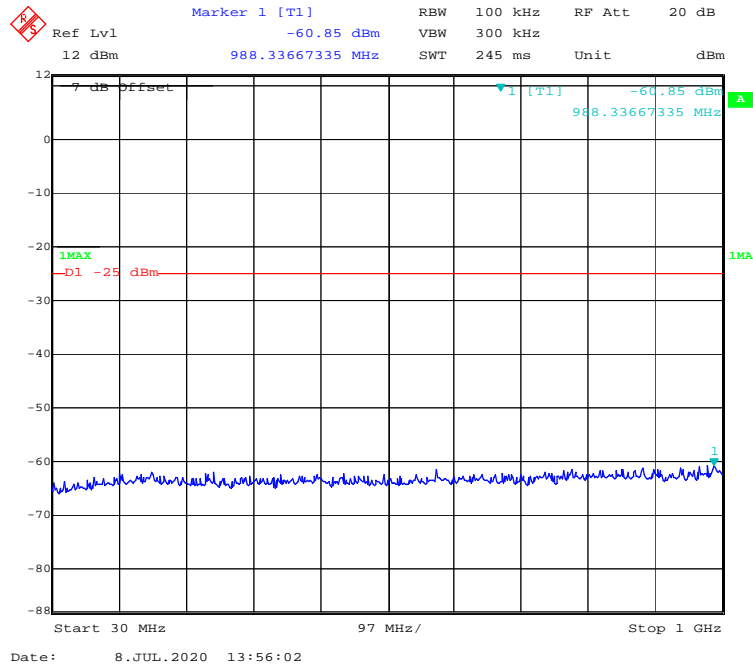
The testing was performed by Winnie Yang from 2020-07-08.

EUT operation mode: Transmitting

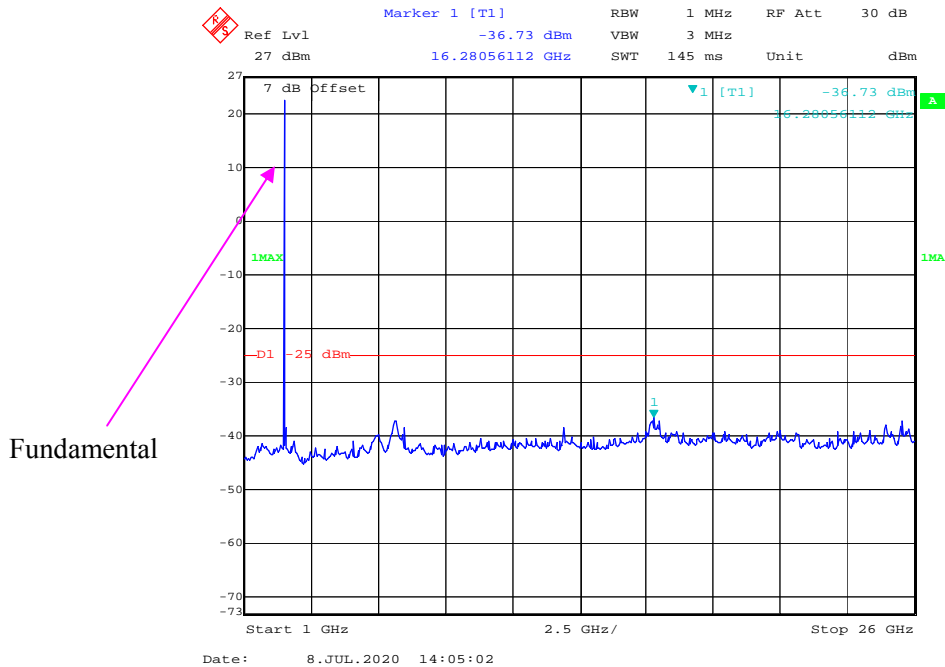
Test Result: Compliance.

### LTE Band 7

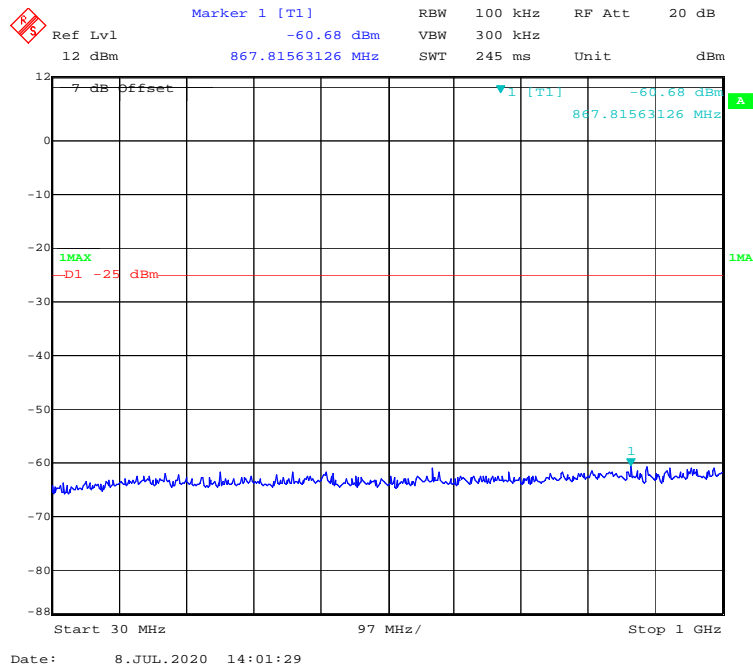
#### 30 MHz - 1 GHz (QPSK, 5.0 MHz, Middle Channel)



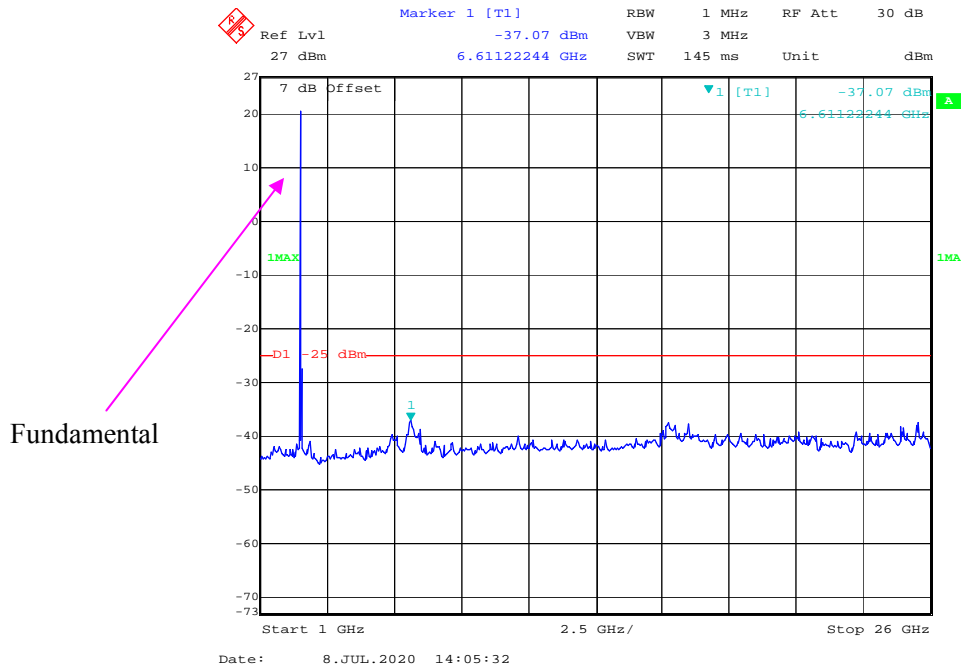
#### 1 GHz – 26 GHz (QPSK, 5.0 MHz, Middle Channel)



**30 MHz - 1 GHz (QPSK, 10.0 MHz, Middle Channel)**

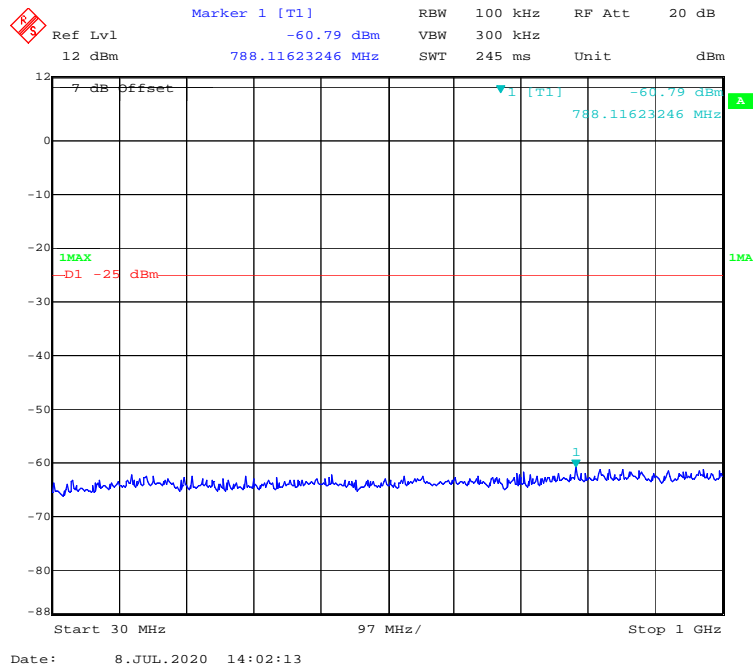


**1 GHz – 26 GHz (QPSK, 10.0 MHz, Middle Channel)**

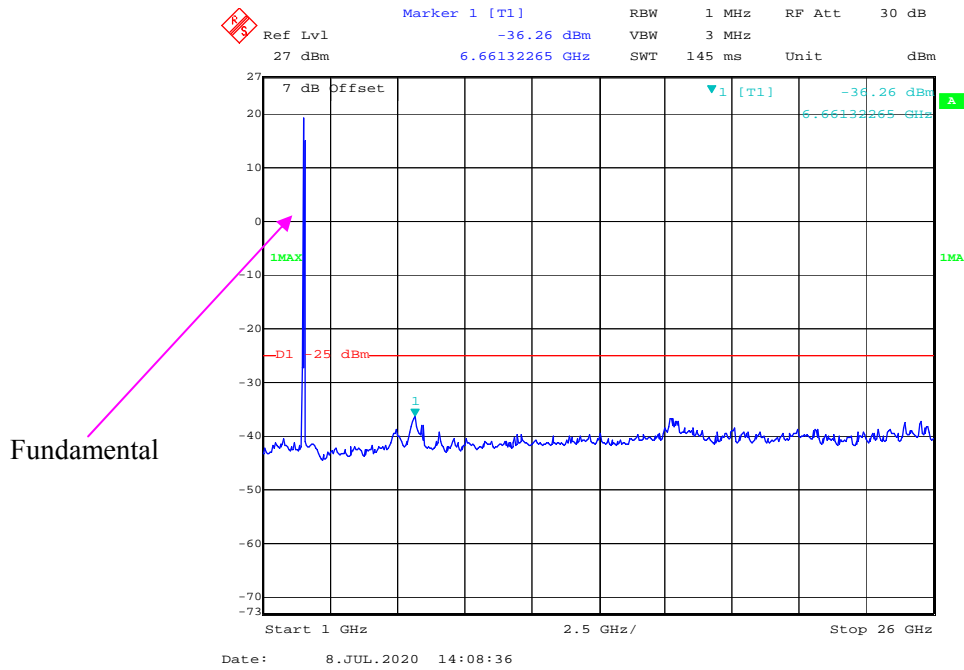




### 30 MHz - 1 GHz (QPSK, 20.0 MHz, Middle Channel)

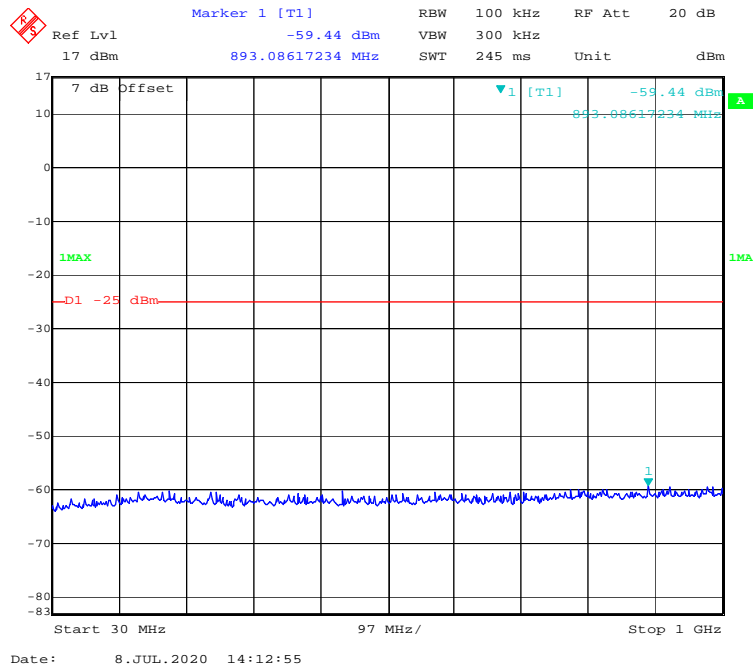


### 1 GHz - 26 GHz (QPSK, 20.0 MHz, Middle Channel)

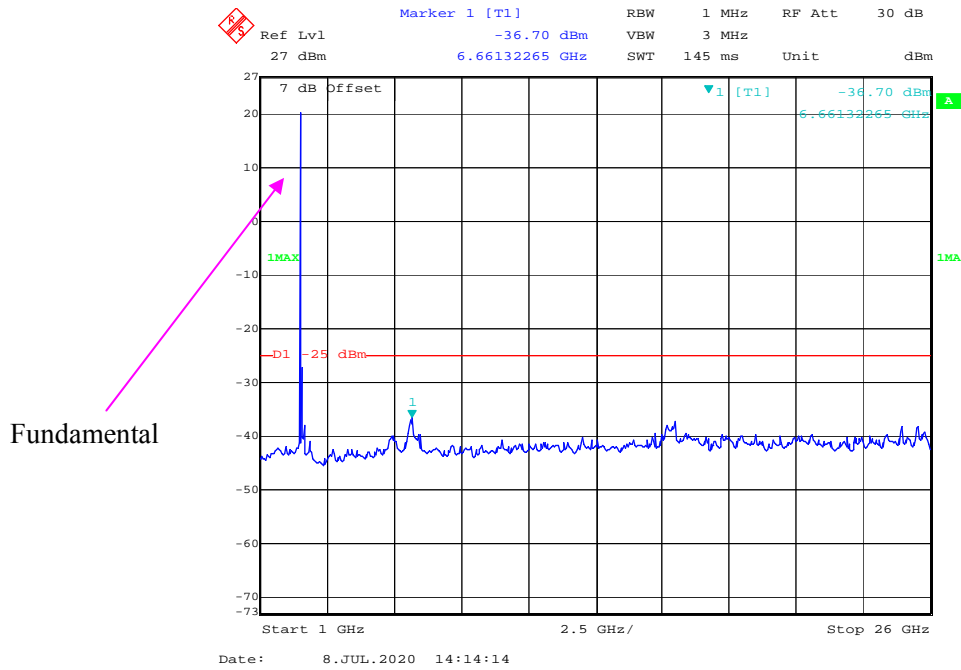




### 30 MHz - 1 GHz (16QAM, 10.0 MHz, Middle Channel)



### 1 GHz – 26 GHz (16QAM, 10.0 MHz, Middle Channel)









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**FCC § 2.1053 & §27.53 (m) - SPURIOUS RADIATED EMISSIONS**

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**Applicable Standards**

FCC § 2.1053 and § 27.53 (m)

27.53 (m), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

**Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg (\text{TX pwr in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \text{Log}_{10} (\text{power out in Watts})$

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.8 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	101.5 kPa

The testing was performed by Winnie Yang on 2020-06-04.

Test mode: Transmitting (Pre-scan with all the bandwidth, and worse case as below)

**30MHz~26GHz:**

**LTE Band 7:**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Middle Channel										
840.15	39.18	342	200	H	-55.35	0.63	-1.13	-57.11	-25	32.11
840.15	44.26	4	200	V	-54.06	0.63	-1.13	-54.69	-25	29.69
5070	32.70	277	100	H	-62.58	1.09	10.30	-53.37	-25	28.37
5070	29.83	78	150	V	-65.45	1.09	10.30	-56.24	-25	31.24
7605	32.92	139	150	H	-57.73	1.78	10.08	-49.43	-25	24.43
7605	30.16	210	150	V	-60.49	1.78	10.08	-52.19	-25	27.19
16-QAM 5MHz Bandwidth Middle Channel										
840.15	40.11	7	100	H	-54.42	0.63	-1.13	-56.18	-25	31.18
840.15	45.57	27	150	V	-52.75	0.63	-1.13	-54.51	-25	29.51
5070	33.71	177	150	H	-61.57	1.09	10.30	-52.36	-25	27.36
5070	30.60	246	200	V	-64.68	1.09	10.30	-55.47	-25	30.47
7605	33.42	178	100	H	-57.23	1.78	10.08	-48.93	-25	23.93
7605	30.63	57	150	V	-60.02	1.78	10.08	-51.72	-25	26.72

**Note:**

- 1) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
- 2) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

**FCC §27.53 (m) - BAND EDGES**

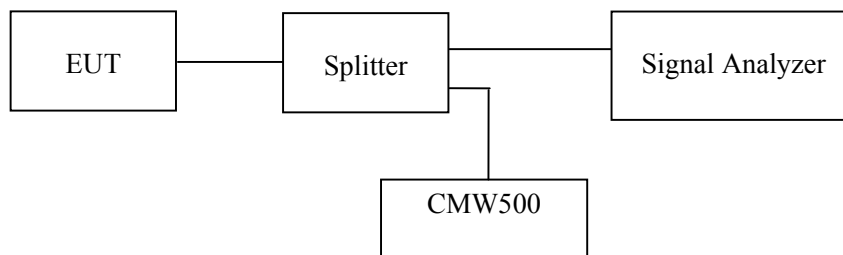
**Applicable Standards**

According to FCC §27.53 (m), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

**Test Procedure**

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.8 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	101.5 kPa

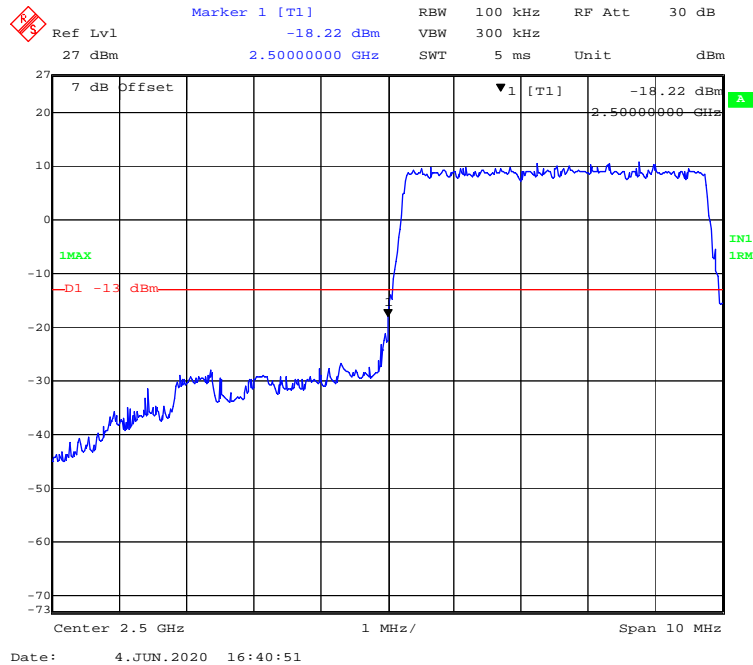
*The testing was performed by Winnie Yang on 2020-06-04.*

*EUT operation mode: Transmitting*

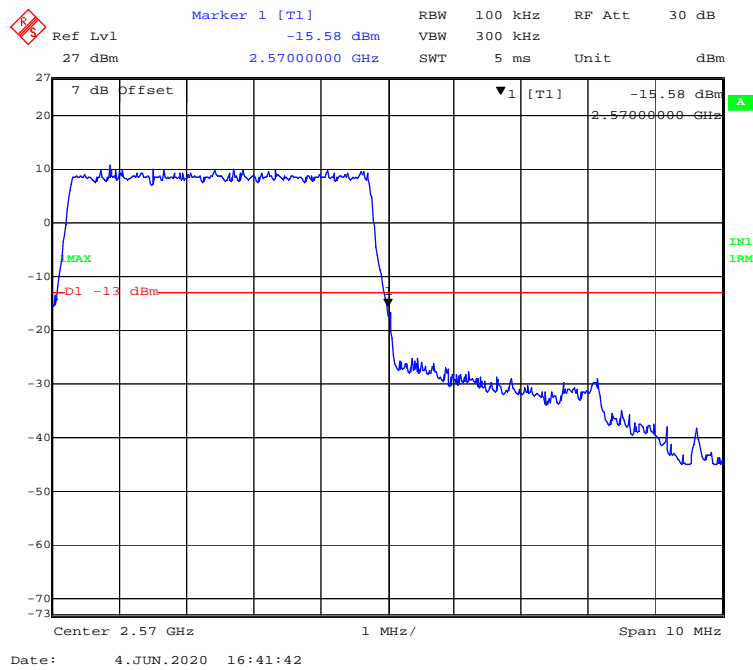
*Test Result: Compliance.*

**LTE Band 7:**

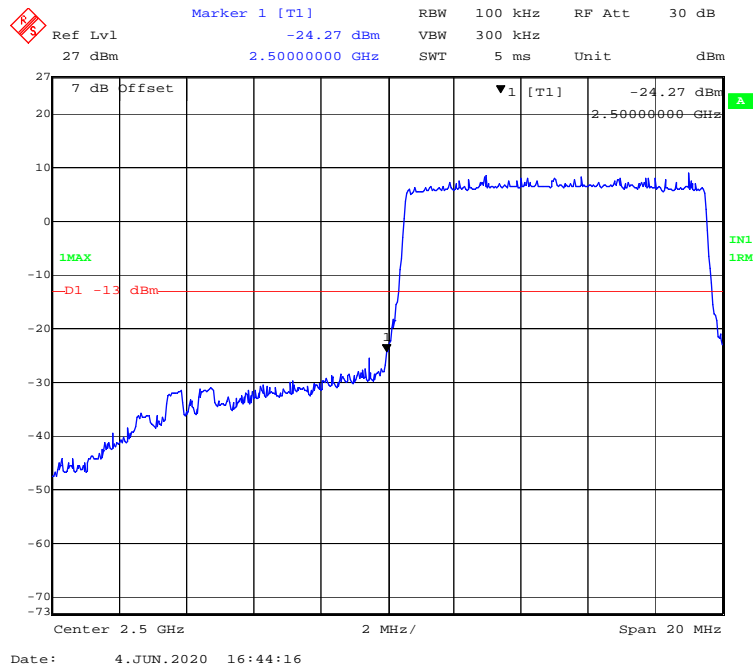
**QPSK (5.0 MHz, FULL RB) - Left Band Edge**



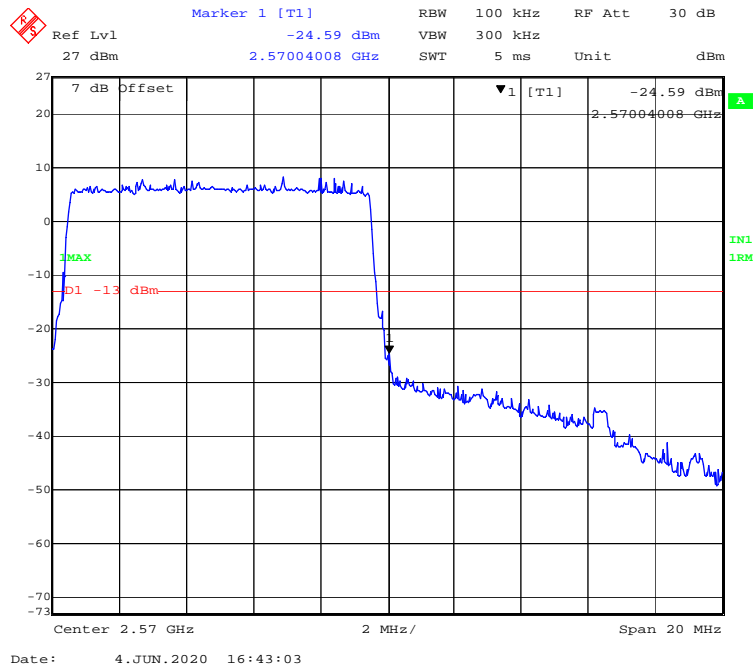
**QPSK (5.0 MHz, FULL RB) - Right Band Edge**



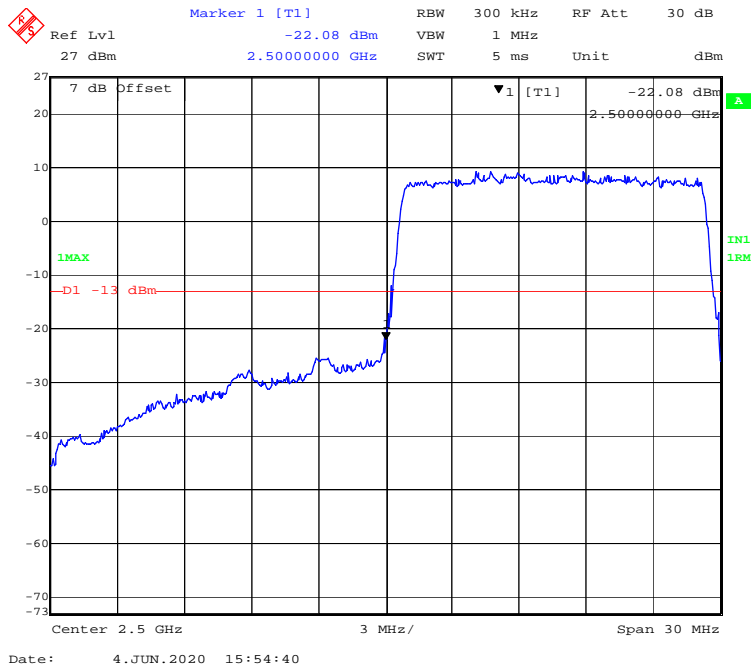
**QPSK (10.0 MHz, FULL RB) - Left Band Edge**



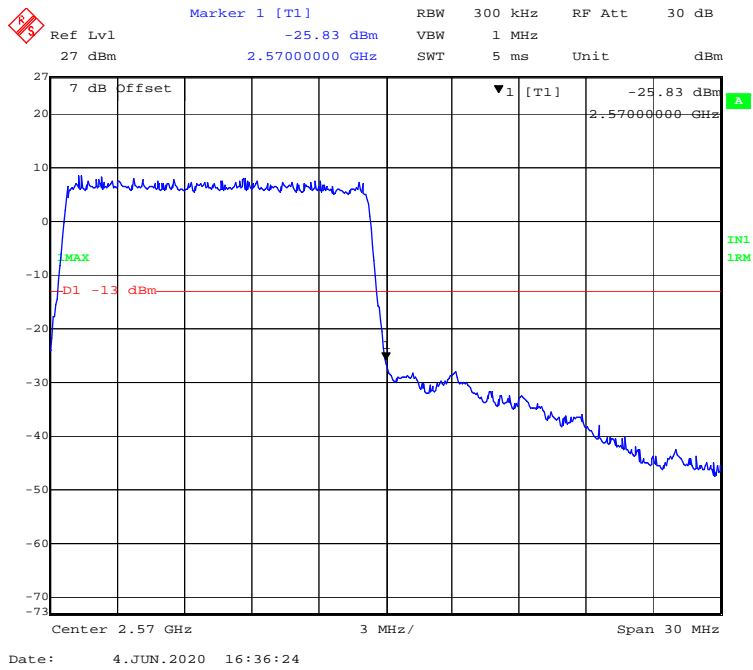
**QPSK (10.0 MHz, FULL RB) - Right Band Edge**



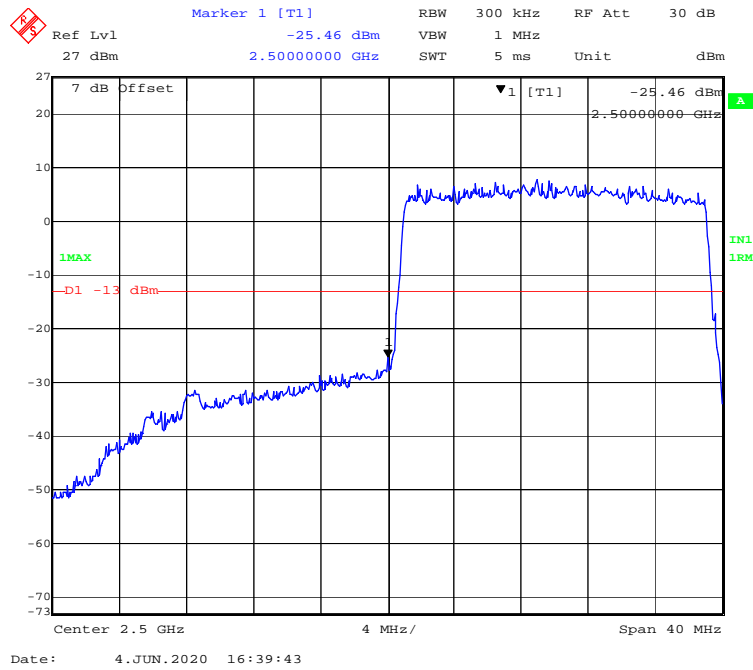
**QPSK (15.0 MHz, FULL RB) - Left Band Edge**



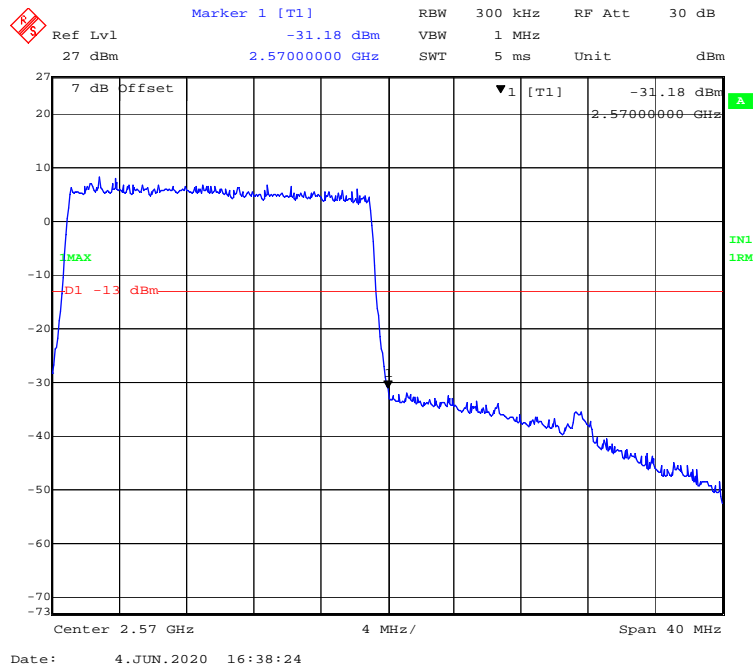
**QPSK (15.0 MHz, FULL RB) - Right Band Edge**



**QPSK (20.0 MHz, FULL RB) - Left Band Edge**

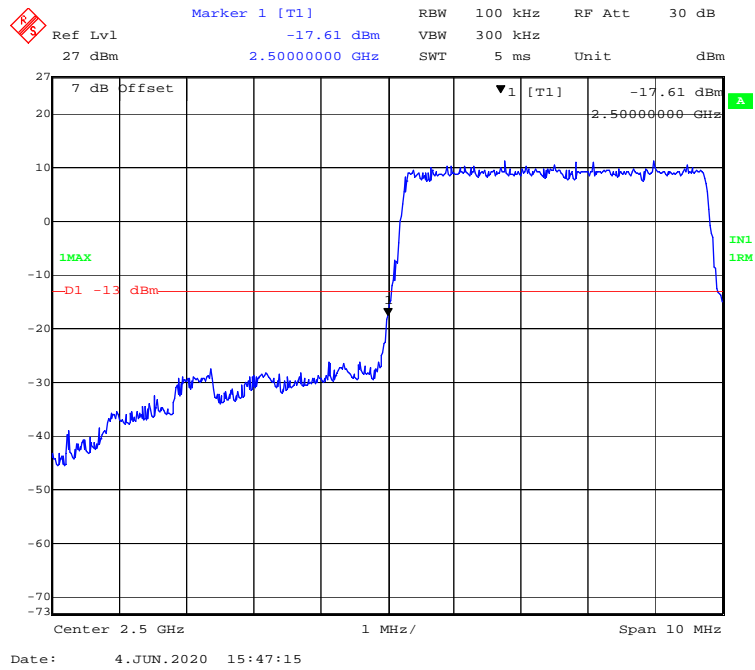


**QPSK (20.0 MHz, FULL RB) - Right Band Edge**

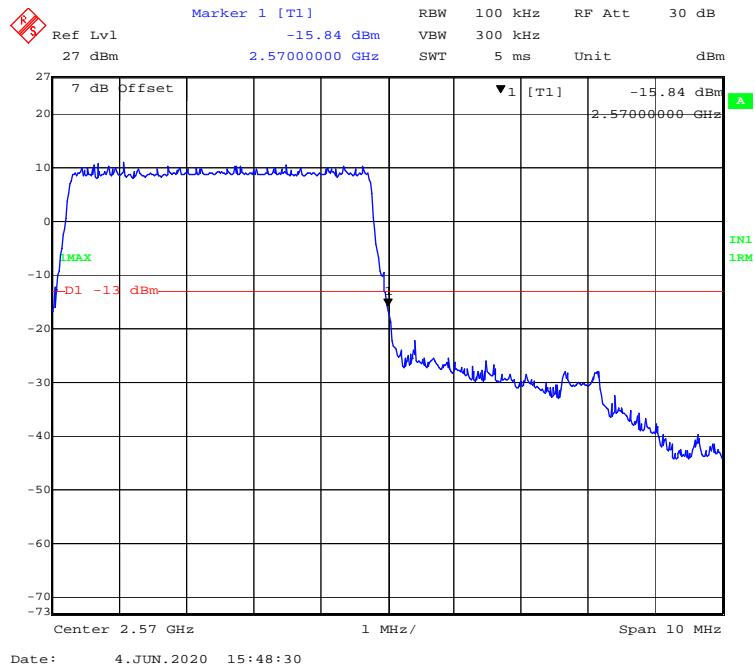




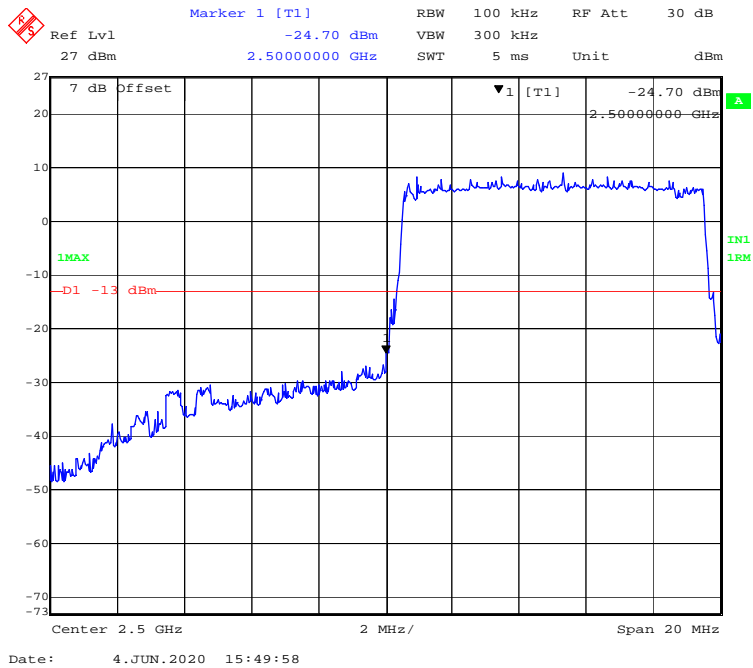
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**



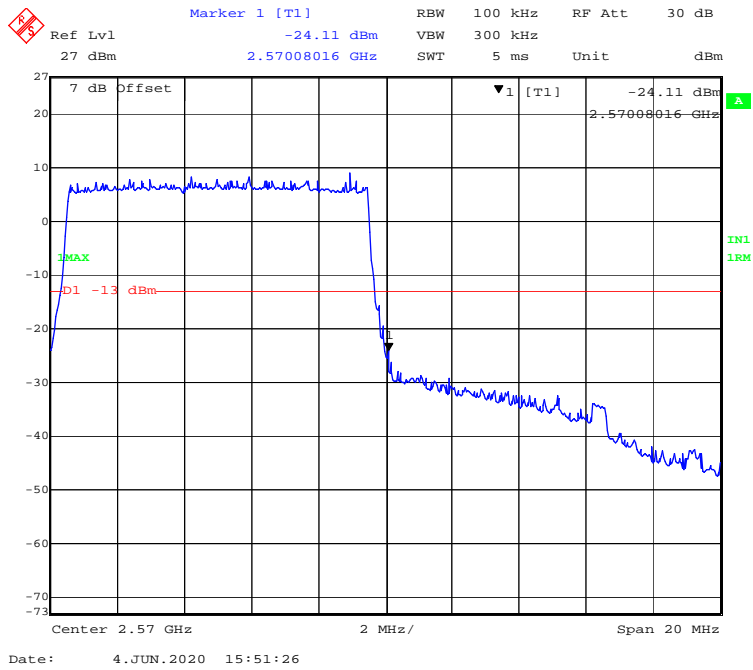
**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**



**16-QAM (10.0 MHz, FULL RB) - Left Band Edge**

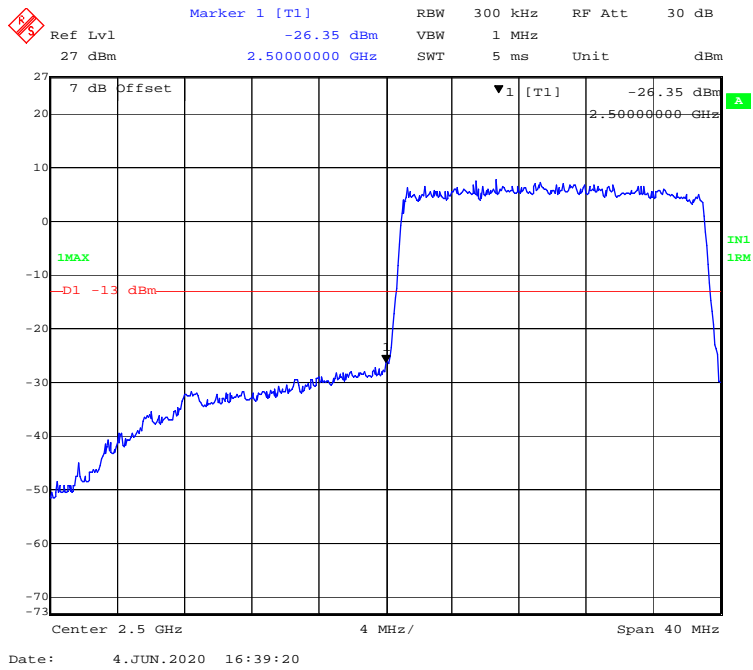


**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

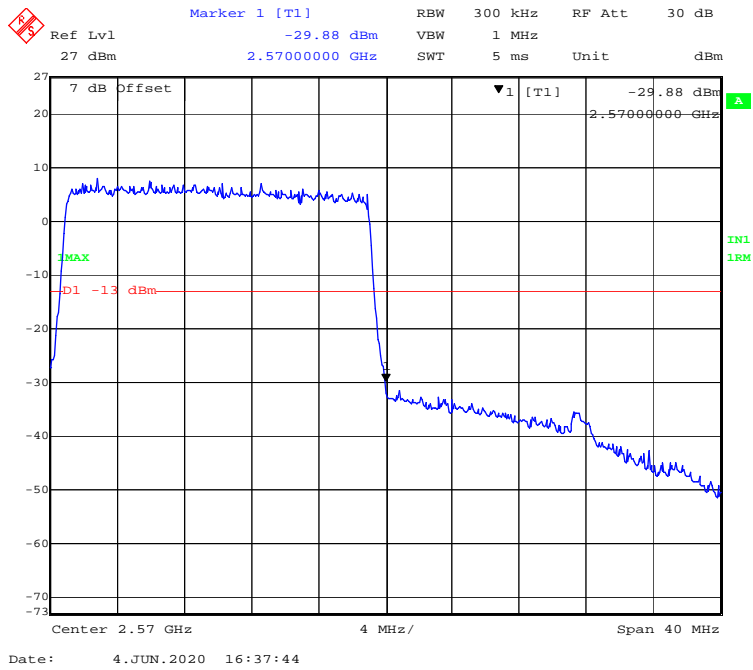




**16-QAM (20.0 MHz, FULL RB) - Left Band Edge**



**16-QAM (20.0 MHz, FULL RB) - Right Band Edge**



**FCC § 2.1055;§27.54- FREQUENCY STABILITY**

**Applicable Standards**

FCC § 2.1055 and §27.54.

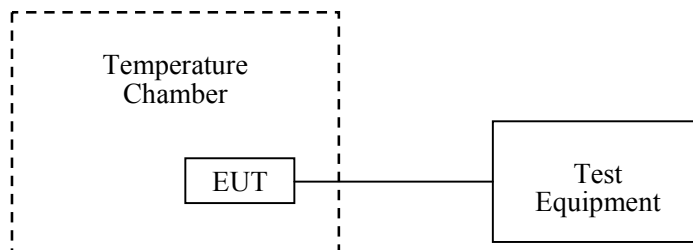
According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

**Test Procedure**

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.9 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.1 kPa

*The testing was performed by Winnie Yang on 2020-06-05.*

*EUT operation mode: Transmitting*

*Test Result: Compliance.*

**LTE Band 7:**

Low Channel & High Channel (QPSK) /Channel Bandwidth:20MHz					
Temperature	Power Supplied	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub> Limit	F <sub>H</sub> Limit
(°C)	(V <sub>DC</sub> )	(MHz)	(MHz)	(MHz)	(MHz)
-30	3.8	2500.0409	2569.9504	2500	2570
-20		2500.0408	2569.9586	2500	2570
-10		2500.0418	2569.9598	2500	2570
0		2500.0410	2569.9567	2500	2570
10		2500.0466	2569.9505	2500	2570
20		2500.0452	2569.9563	2500	2570
30		2500.0406	2569.953	2500	2570
40		2500.0401	2569.9552	2500	2570
50		2500.0413	2569.9543	2500	2570
25		V min.= 3.4	2500.0413	2569.9552	2500
25	V max.= 4.2	2500.0402	2569.9536	2500	2570

Low Channel & High Channel (16-QAM) /Channel Bandwidth:20MHz					
Temperature	Power Supplied	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub> Limit	F <sub>H</sub> Limit
(°C)	(V <sub>DC</sub> )	(MHz)	(MHz)	(MHz)	(MHz)
-30	3.8	2500.042	2569.952	2500	2570
-20		2500.041	2569.951	2500	2570
-10		2500.047	2569.950	2500	2570
0		2500.040	2569.953	2500	2570
10		2500.050	2569.956	2500	2570
20		2500.043	2569.952	2500	2570
30		2500.048	2569.955	2500	2570
40		2500.045	2569.955	2500	2570
50		2500.047	2569.959	2500	2570
25		V min.= 3.4	2500.043	2569.955	2500
25	V max.= 4.2	2500.050	2569.953	2500	2570

\*\*\*\*\* END OF REPORT \*\*\*\*\*