

## FCC Test Report

### (PART 27)

**Report No.:** RF201118C03-9

**FCC ID:** B32V2104G

**Test Model:** V210 4G

**Received Date:** Nov. 18, 2020

**Test Date:** Nov. 28, 2020 ~ Jan. 05, 2021

**Issued Date:** Jan. 11, 2021

**Applicant:** Verifone, Inc.

**Address:** 1400 West Stanford Ranch Road Suite 200 Rocklin CA 95765 USA

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location (1):** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**Test Location (2):** B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

**FCC Registration /  
Designation Number:** 427177 / TW0011



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### Release Control Record

Issue No.	Description	Date Issued
RF201118C03-9	Original Release	Jan. 11, 2021

## 1 Certificate of Conformity

**Product:** Point of Sale Terminal

**Brand:** Verifone

**Test Model:** V210 4G

**Sample Status:** Identical Prototype


**Applicant:** Verifone, Inc.

**Test Date:** Nov. 28, 2020 ~ Jan. 05, 2021

**Standards:** FCC Part 27, Subpart C, M

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** , **Date:** Jan. 11, 2021  
Gina Liu / Specialist

**Approved by :** , **Date:** Jan. 11, 2021  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(h)(2)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(m)(6)	Occupied Bandwidth	Pass	Meet the requirement of limit.
--	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(m)(4)(6)	Out-of-Band Emissions Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -1.94 dB at 10750.00 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.0400 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

## 2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 24, 2020	Aug. 23, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSW43	101582	Mar. 31, 2020	Mar. 30, 2021
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
HORN Antenna ETS-Lindgren	3117	00155510	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 22, 2020	Nov. 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SM S-100-SMS-120+RFC- SMS-100-SMS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SM S-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 13, 2020	Feb. 12, 2021
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 19, 2019	Aug. 18, 2021
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 09, 2020	Sep. 08, 2021
DC Power Supply Topward	33010D	807748	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien Chamber 1.

### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	Point of Sale Terminal	
<b>Brand</b>	Verifone	
<b>Test Model</b>	V210 4G	
<b>Status of EUT</b>	Identical Prototype	
<b>Power Supply Rating</b>	5.0 Vdc (adapter) 3.7 Vdc (battery)	
<b>Modulation Type</b>	QPSK, 16QAM	
<b>Frequency Range</b>	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz
	LTE Band 38 (Channel Bandwidth: 5 MHz)	2572.5 ~ 2617.5 MHz
	LTE Band 38 (Channel Bandwidth: 10 MHz)	2575.0 ~ 2615.0 MHz
	LTE Band 38 (Channel Bandwidth: 15 MHz)	2577.5 ~ 2612.5 MHz
	LTE Band 38 (Channel Bandwidth: 20 MHz)	2580.0 ~ 2610.0 MHz
	LTE Band 41 (Channel Bandwidth: 5 MHz)	2498.5 ~ 2687.5 MHz
	LTE Band 41 (Channel Bandwidth: 10 MHz)	2501.0 ~ 2685.0 MHz
	LTE Band 41 (Channel Bandwidth: 15 MHz)	2503.5 ~ 2682.5 MHz
	LTE Band 41 (Channel Bandwidth: 20 MHz)	2506.0 ~ 2680.0 MHz
<b>Max. EIRP Power</b>	LTE Band 7 (Channel Bandwidth: 5 MHz)	270.27 mW
	LTE Band 7 (Channel Bandwidth: 10 MHz)	272.33 mW
	LTE Band 7 (Channel Bandwidth: 15 MHz)	274.66 mW
	LTE Band 7 (Channel Bandwidth: 20 MHz)	277.33 mW
	LTE Band 38 (Channel Bandwidth: 5 MHz)	467.41 mW
	LTE Band 38 (Channel Bandwidth: 10 MHz)	472.82 mW
	LTE Band 38 (Channel Bandwidth: 15 MHz)	477.20 mW
	LTE Band 38 (Channel Bandwidth: 20 MHz)	481.61 mW
	LTE Band 41 (Channel Bandwidth: 5 MHz)	591.29 mW
	LTE Band 41 (Channel Bandwidth: 10 MHz)	597.17 mW
	LTE Band 41 (Channel Bandwidth: 15 MHz)	600.90 mW
	LTE Band 41 (Channel Bandwidth: 20 MHz)	606.74 mW
<b>Emission Designator</b>	LTE Band 7 (Channel Bandwidth: 5 MHz)	4M49D7W
	LTE Band 7 (Channel Bandwidth: 10 MHz)	8M95G7D
	LTE Band 7 (Channel Bandwidth: 15 MHz)	13M4G7D
	LTE Band 7 (Channel Bandwidth: 20 MHz)	17M9G7D
	LTE Band 38 (Channel Bandwidth: 5 MHz)	4M49G7D
	LTE Band 38 (Channel Bandwidth: 10 MHz)	8M95G7D
	LTE Band 38 (Channel Bandwidth: 15 MHz)	13M4G7D
	LTE Band 38 (Channel Bandwidth: 20 MHz)	17M9G7D
	LTE Band 41 (Channel Bandwidth: 5 MHz)	4M49G7D
	LTE Band 41 (Channel Bandwidth: 10 MHz)	8M95G7D
	LTE Band 41 (Channel Bandwidth: 15 MHz)	13M4G7D



	LTE Band 41 (Channel Bandwidth: 20 MHz)	17M9G7D
<b>Antenna Type</b>	Refer to Note as below	
<b>Accessory Device</b>	Refer to Note as below	
<b>Data Cable Supplied</b>	Refer to Note as below	

Note:

- The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter (EU Type)	Verifone	AM11E-050A	I/P: 100-240 Vac, 50-60 Hz, 0.5 A O/P: 5 Vdc, 2.2 A
Adapter (US Type)	Verifone	AM11A-050A	I/P: 100-240 Vac, 50-60 Hz, 0.5 A O/P: 5 Vdc, 2.2 A
Battery	Verifone	BPK183-001	3.7 Vdc, 3100 mAh (11.47 Wh)

\*Adapter of US Type was chosen for final test.

- The antenna information is listed as below.

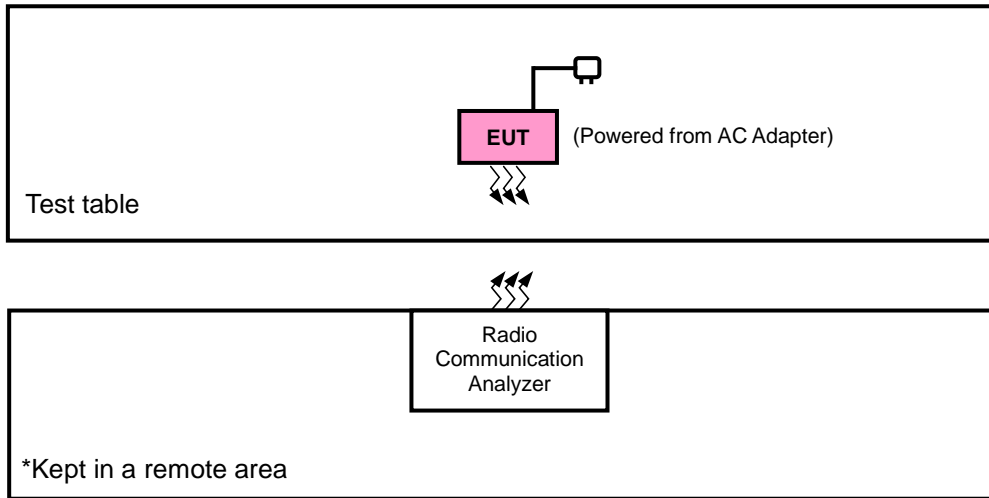
Ant. Type	Ant.	Antenna Peak Gain (dBi)								
		WCDMA 4 / LTE 4	GSM850 / WCDMA 5 / LTE 5	GSM1900 / WCDMA 2 / LTE 2, 25	LTE 7	LTE 12	LTE 13	LTE 26	LTE 38	LTE 41
Dipole	1	3.2	0	3.6	2.0	-0.5	0.3	0	2.3	3.1
	2	2.2	1.9	3.8	2.2	-4.5	-0.6	1.8	2.8	3.9

\* The Max antenna gain was chosen for final test.

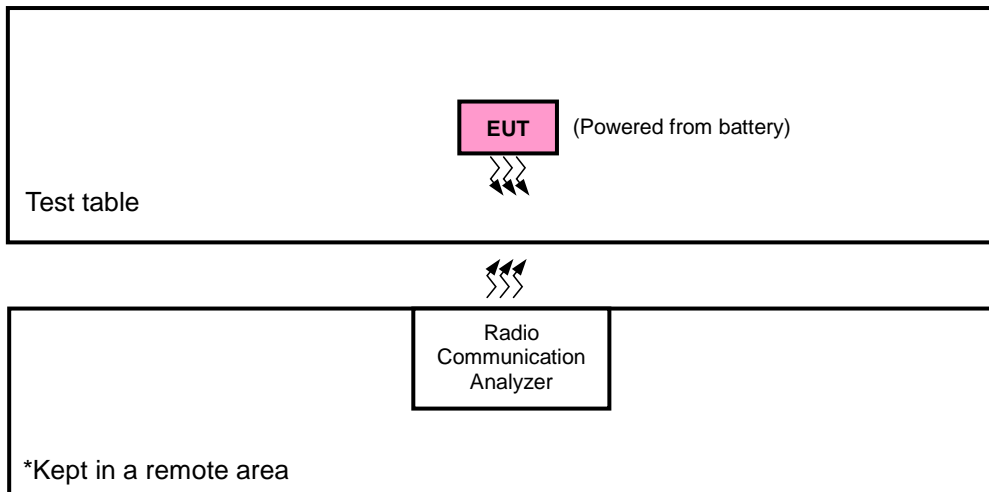
- The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
- The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

### 3.2 Configuration of System under Test

#### <Radiated Emission Test>



#### <E.I.R.P. Test>



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	EIRP	Radiated Emission
LTE Band 7	Y-plane	Y-plane
LTE Band 38	Y-plane	Y-plane
LTE Band 41	Z-plane	Z-plane

#### LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	20850 to 21350	21110	20 MHz	QPSK	100 RB / 0 RB Offset
		20775 to 21425		5 MHz	16QAM	25 RB / 0 RB Offset
-	Frequency Stability	20775 to 21425	20775, 21425	5 MHz	QPSK	25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK	50 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK	75 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Out-of-Band Emissions	20775 to 21425	20775, 21425	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Conducted Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 12 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK	1 RB / 24 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK	1 RB / 37 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 12 RB Offset
		20850 to 21350	20850, 21100, 21350	20 MHz	QPSK	1 RB / 50 RB Offset

#### Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing.

### LTE Band 38

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM	1 RB / 74 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	37850 to 38150	38000	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
		37775 to 38225		5 MHz	16QAM	25 RB / 0 RB Offset
-	Frequency Stability	37775 to 38225	37775, 38225	5 MHz	QPSK	25 RB / 0 RB Offset
		37800 to 38200	37800, 38200	10 MHz	QPSK	50 RB / 0 RB Offset
		37825 to 38175	37825, 38175	15 MHz	QPSK	75 RB / 0 RB Offset
		37850 to 38150	37850, 38150	20 MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM	1 RB / 74 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Out-of-Band Emissions	37775 to 38225	37775, 38225	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		37800 to 38200	37800, 38200	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		37825 to 38175	37825, 38175	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		37850 to 38150	37850, 38150	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Conducted Emission	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK	1 RB / 12 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK	1 RB / 24 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK	1 RB / 74 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK	1 RB / 12 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK	1 RB / 50 RB Offset

**Note:**

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing.

## LTE Band 41

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM	1 RB / 74 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	39750 to 41490	40620	20 MHz	QPSK	100 RB / 0 RB Offset
		39675 to 41565		5 MHz	16QAM	25 RB / 0 RB Offset
-	Frequency Stability	39675 to 41565	39675, 41565	5 MHz	QPSK	25 RB / 0 RB Offset
		39700 to 41540	39700, 41540	10 MHz	QPSK	50 RB / 0 RB Offset
		39725 to 41515	39725, 41515	15 MHz	QPSK	75 RB / 0 RB Offset
		39750 to 41490	39750, 41490	20 MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM	1 RB / 74 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Out-of-Band Emissions	39675 to 41565	39675, 41565	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		39700 to 41540	39700, 41540	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		39725 to 41515	39725, 41515	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		39750 to 41490	39750, 41490	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Conducted Emission	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK	1 RB / 74 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK	1 RB / 12 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK	1 RB / 50 RB Offset

### Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing.

### Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25 deg. C, 65 % RH	3.7 Vdc	Karl Lee, Charles Hsiao
Modulation Characteristics	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Frequency Stability	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Occupied Bandwidth	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Out-of-Band Emissions	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Peak to Average Ratio	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Conducted Emission	25 deg. C, 65 % RH	3.7 Vdc	Gavin Wu
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee, Charles Hsiao

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.1 General Description of Applied Standards and references**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

**Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI 63.26-2015**

**Note:** All test items have been performed and recorded as per the above standards.

**References Test Guidance:**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-E 2016**

**Note:** All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2 watts transmitter output power” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

#### 4.1.2 Test Procedures

##### **EIRP Measurement:**

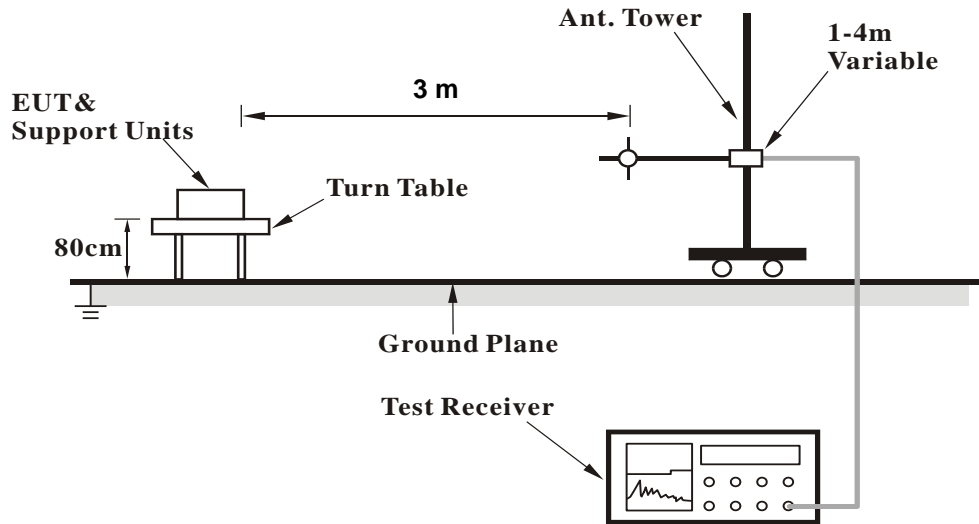
- a. All measurements were done at low, middle and high operational frequency range. RBW is 5 MHz ∙ 10 MHz ∙ 15 MHz ∙ 20 MHz for LTE mode, and VBW ≥ 3 x RBW.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$ . Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss.
- d. Measurement method refers to ANSI C63.26 section 5.2.7 & 5.2.4.

##### **Conducted Power Measurement:**

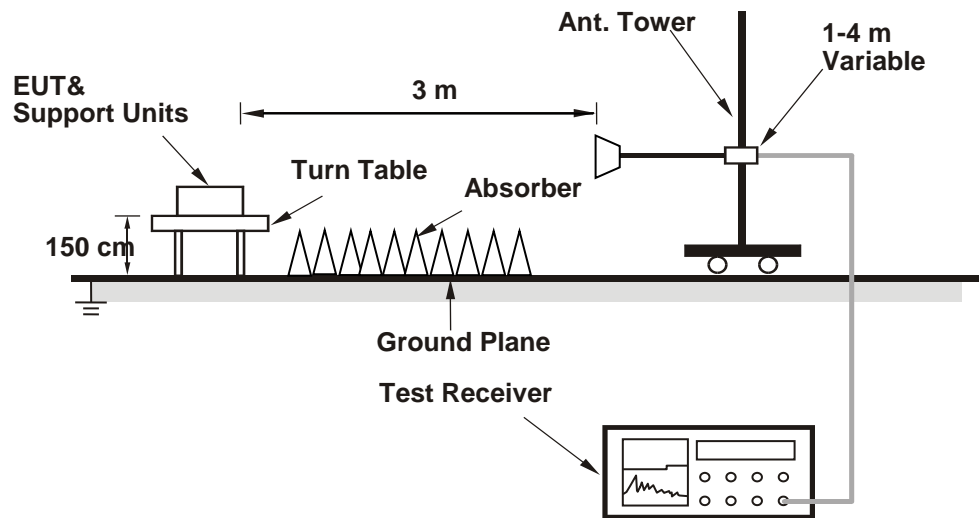
- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

**EIRP / ERP Measurement:  
<Radiated Emission below or equal 1 GHz>**



**<Radiated Emission above 1 GHz>**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

**Conducted Power Measurement:**





#### 4.1.4 Test Results

\* For 16QAM modulated conducted output power and ERP/ EIRP power with bandwidth higher than 10MHz for reference.

#### Conducted Output Power (dBm)

LTE Band 7																	
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)		
				Channel	20850	21100						21350	Channel	20825		21100	21375
				Frequency (MHz)	2510.0	2535.0						2560.0	Frequency (MHz)	2507.5		2535.0	2562.5
20M	QPSK	1	0	23.17	23.35	22.92	0	15M	QPSK	1	0	23.10	22.87	22.98	0		
		1	50	23.91	23.89	23.64	0			1	37	23.06	22.89	22.92	0		
		1	99	23.08	22.97	23.00	0			1	74	23.04	22.79	22.89	0		
		50	0	22.33	22.17	22.26	1			36	0	22.23	22.14	22.17	1		
		50	25	22.38	22.20	22.30	1			36	19	22.24	22.07	22.26	1		
		50	50	22.28	22.13	22.24	1			36	39	22.20	21.94	22.21	1		
	100	0	22.44	22.26	22.29	1	75		0	22.34	22.19	22.30	1				
	16QAM	1	0	22.41	22.23	22.26	1		16QAM	1	0	22.35	22.17	22.20	1		
		1	50	22.39	22.21	22.24	1			1	37	22.33	22.15	22.18	1		
		1	99	22.36	22.18	22.21	1			1	74	22.30	22.12	22.15	1		
		50	0							36	0						
		50	25							36	19						
50		50					36	39									

LTE Band 38																	
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)		
				Channel	37850	38000						38150	Channel	37825		38000	38175
				Frequency (MHz)	2580.0	2595.0						2610.0	Frequency (MHz)	2577.5		2595.0	2612.5
20M	QPSK	1	0	23.56	23.79	23.81	0	15M	QPSK	1	0	23.52	23.76	23.71	0		
		1	50	24.41	24.38	24.46	0			1	37	24.33	24.34	24.38	0		
		1	99	23.57	23.78	23.67	0			1	74	23.52	23.72	23.57	0		
		50	0	23.23	23.19	23.39	1			36	0	23.13	23.14	23.39	1		
		50	25	23.36	23.31	23.43	1			36	19	23.36	23.25	23.36	1		
		50	50	23.11	23.12	23.16	1			36	39	23.03	23.11	23.11	1		
	100	0	23.13	23.09	23.14	1	75		0	23.06	23.05	23.10	1				
	16QAM	1	0	23.15	23.11	23.16	1		16QAM	1	0	23.09	23.05	23.10	1		
		1	50	23.12	23.08	23.13	1			1	37	23.06	23.02	23.07	1		
		1	99	23.09	23.05	23.10	1			1	74	23.03	22.99	23.04	1		
		50	0							36	0						
		50	25							36	19						
50		50					36	39									

LTE Band 41															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
				39750	40620	41490						39725	40620	41515	
				Channel Frequency (MHz)	2506.0	2593.0						2680.0	Channel Frequency (MHz)	2503.5	
20M	QPSK	1	0	22.62	23.61	23.71	0	15M	QPSK	1	0	22.57	23.55	23.70	0
		1	50	23.83	23.97	23.93	0			1	37	23.82	23.91	23.89	0
		1	99	22.88	23.57	21.95	0			1	74	22.81	23.56	21.86	0
		50	0	22.91	22.89	22.93	1			36	0	22.85	22.84	22.89	1
		50	25	22.91	22.93	22.96	1			36	19	22.84	22.91	22.91	1
		50	50	22.92	22.88	22.92	1			36	39	22.85	22.85	22.90	1
		100	0	22.91	22.92	22.87	1			75	0	22.85	22.82	22.87	1
	16QAM	1	0	22.87	22.85	22.89	1		16QAM	1	0	22.83	22.81	22.85	1
		1	50	22.81	22.79	22.83	1			1	37	22.77	22.75	22.79	1
		1	99	22.78	22.76	22.80	1			1	74	22.74	22.72	22.76	1
		50	0							36	0				
		50	25							36	19				
		50	50							36	39				
		100	0							75	0				
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
				39700	40620	41540						39675	40620	41565	
				Channel Frequency (MHz)	2501.0	2593.0						2685.0	Channel Frequency (MHz)	2498.5	
10M	QPSK	1	0	22.47	23.43	23.68	0	5M	QPSK	1	0	22.44	23.47	23.63	0
		1	24	23.73	23.81	23.84	0			1	12	23.80	23.84	23.85	0
		1	49	22.82	23.51	21.90	0			1	24	22.79	23.51	21.90	0
		25	0	22.87	22.77	22.77	1			12	0	22.81	22.87	22.84	1
		25	12	22.73	22.80	22.96	1			12	6	22.77	22.82	22.87	1
		25	25	22.79	22.76	22.75	1			12	13	22.79	22.76	22.91	1
		50	0	22.77	22.89	22.81	1			25	0	22.79	22.79	22.83	1
	16QAM	1	0	22.84	22.74	22.76	1		16QAM	1	0	22.79	22.69	22.71	1
		1	24	22.80	22.70	22.72	1			1	12	22.75	22.65	22.67	1
		1	49	22.75	22.65	22.67	1			1	24	22.70	22.60	22.62	1
		25	0	21.78	21.68	21.70	2			12	0	21.73	21.63	21.65	2
		25	12	21.75	21.65	21.67	2			12	6	21.70	21.60	21.62	2
		25	25	21.70	21.60	21.62	2			12	13	21.65	21.55	21.57	2
		50	0							25	0	21.60	21.50	21.52	2

**EIRP Power (dBm)**

LTE Band 7							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20775	2502.5	-19.92	44.24	24.32	270.27	H
	21100	2535.0	-20.03	44.20	24.17	261.04	
	21425	2567.5	-20.81	44.80	23.99	250.67	
	20775	2502.5	-23.57	44.19	20.62	115.37	V
	21100	2535.0	-23.64	44.09	20.45	110.87	
	21425	2567.5	-24.32	44.50	20.18	104.21	
Channel Bandwidth: 5 MHz / 16QAM							
Y	20775	2502.5	-20.92	44.24	23.32	214.68	H
	21100	2535.0	-21.03	44.20	23.17	207.35	
	21425	2567.5	-21.82	44.80	22.98	198.66	
	20775	2502.5	-24.57	44.19	19.62	91.64	V
	21100	2535.0	-24.64	44.09	19.45	88.06	
	21425	2567.5	-25.32	44.50	19.18	82.78	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 7							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20800	2505.0	-19.99	44.34	24.35	272.33	H
	21100	2535.0	-19.98	44.20	24.22	264.06	
	21400	2565.0	-20.69	44.72	24.03	253.10	
	20800	2505.0	-23.57	44.23	20.66	116.31	V
	21100	2535.0	-23.60	44.09	20.49	111.89	
	21400	2565.0	-24.18	44.41	20.23	105.34	
Channel Bandwidth: 10 MHz / 16QAM							
Y	20800	2505.0	-21.00	44.34	23.34	215.82	H
	21100	2535.0	-20.99	44.20	23.21	209.27	
	21400	2565.0	-21.69	44.72	23.03	201.05	
	20800	2505.0	-24.57	44.23	19.66	92.38	V
	21100	2535.0	-24.60	44.09	19.49	88.88	
	21400	2565.0	-25.18	44.41	19.23	83.68	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 7							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20825	2507.5	-19.93	44.32	24.39	274.66	H
	21100	2535.0	-19.94	44.20	24.26	266.50	
	21375	2562.5	-20.79	44.85	24.06	254.57	
	20825	2507.5	-23.29	43.99	20.70	117.54	V
	21100	2535.0	-23.56	44.09	20.53	112.93	
	21375	2562.5	-24.25	44.51	20.26	106.17	
Channel Bandwidth: 15 MHz / 16QAM							
Y	20825	2507.5	-20.93	44.32	23.39	218.17	H
	21100	2535.0	-20.94	44.20	23.26	211.69	
	21375	2562.5	-21.79	44.85	23.06	202.21	
	20825	2507.5	-24.29	43.99	19.70	93.37	V
	21100	2535.0	-24.57	44.09	19.52	89.50	
	21375	2562.5	-25.26	44.51	19.25	84.14	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 7							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20850	2510.0	-19.73	44.16	24.43	277.33	H
	21100	2535.0	-19.91	44.20	24.29	268.35	
	21350	2560.0	-20.71	44.81	24.10	256.86	
	20850	2510.0	-24.04	44.78	20.74	118.58	V
	21100	2535.0	-23.52	44.09	20.57	113.97	
	21350	2560.0	-24.41	44.72	20.31	107.40	
Channel Bandwidth: 20 MHz / 16QAM							
Y	20850	2510.0	-20.73	44.16	23.43	220.29	H
	21100	2535.0	-20.92	44.20	23.28	212.67	
	21350	2560.0	-21.72	44.81	23.09	203.56	
	20850	2510.0	-25.04	44.78	19.74	94.19	V
	21100	2535.0	-24.52	44.09	19.57	90.53	
	21350	2560.0	-25.41	44.72	19.31	85.31	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 38							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	37775	2572.5	-17.66	44.24	26.58	454.78	H
	38000	2595.0	-17.50	44.20	26.70	467.41	
	38225	2617.5	-18.33	44.80	26.47	443.71	
	37775	2572.5	-23.66	44.19	20.53	113.01	V
	38000	2595.0	-23.41	44.09	20.68	116.90	
	38225	2617.5	-24.22	44.50	20.28	106.64	
Channel Bandwidth: 5 MHz / 16QAM							
Y	37775	2572.5	-18.66	44.24	25.58	361.24	H
	38000	2595.0	-18.51	44.20	25.69	370.42	
	38225	2617.5	-19.33	44.80	25.47	352.45	
	37775	2572.5	-24.65	44.19	19.54	89.97	V
	38000	2595.0	-24.41	44.09	19.68	92.85	
	38225	2617.5	-25.21	44.50	19.29	84.90	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 38							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	37800	2575.0	-17.72	44.34	26.62	459.30	H
	38000	2595.0	-17.45	44.20	26.75	472.82	
	38200	2615.0	-18.21	44.72	26.51	448.02	
	37800	2575.0	-23.65	44.23	20.58	114.18	V
	38000	2595.0	-23.37	44.09	20.72	117.98	
	38200	2615.0	-24.09	44.41	20.32	107.55	
Channel Bandwidth: 10 MHz / 16QAM							
Y	37800	2575.0	-18.72	44.34	25.62	364.84	H
	38000	2595.0	-18.46	44.20	25.74	374.71	
	38200	2615.0	-19.20	44.72	25.52	356.70	
	37800	2575.0	-24.65	44.23	19.58	90.70	V
	38000	2595.0	-24.36	44.09	19.73	93.93	
	38200	2615.0	-25.10	44.41	19.31	85.23	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 38							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	37825	2577.5	-17.67	44.32	26.65	462.17	H
	38000	2595.0	-17.41	44.20	26.79	477.20	
	38175	2612.5	-18.30	44.85	26.55	451.65	
	37825	2577.5	-23.37	43.99	20.62	115.40	V
	38000	2595.0	-23.34	44.09	20.75	118.80	
	38175	2612.5	-24.14	44.51	20.37	108.89	
Channel Bandwidth: 15 MHz / 16QAM							
Y	37825	2577.5	-18.68	44.32	25.64	366.27	H
	38000	2595.0	-18.41	44.20	25.79	379.05	
	38175	2612.5	-19.31	44.85	25.54	357.93	
	37825	2577.5	-24.37	43.99	19.62	91.66	V
	38000	2595.0	-24.34	44.09	19.75	94.36	
	38175	2612.5	-25.15	44.51	19.36	86.30	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 38							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	37850	2580.0	-17.46	44.16	26.70	467.74	H
	38000	2595.0	-17.37	44.20	26.83	481.61	
	38150	2610.0	-18.23	44.81	26.58	454.67	
	37850	2580.0	-24.13	44.78	20.66	116.28	V
	38000	2595.0	-23.30	44.09	20.79	119.89	
	38150	2610.0	-24.31	44.72	20.41	109.90	
Channel Bandwidth: 20 MHz / 16QAM							
Y	37850	2580.0	-18.46	44.16	25.70	371.54	H
	38000	2595.0	-18.38	44.20	25.82	381.68	
	38150	2610.0	-19.23	44.81	25.58	361.16	
	37850	2580.0	-25.14	44.78	19.64	92.04	V
	38000	2595.0	-24.30	44.09	19.79	95.24	
	38150	2610.0	-25.32	44.72	19.40	87.10	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 41							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	39675	2498.5	-16.52	44.24	27.72	591.29	H
	40620	2593.0	-16.88	44.20	27.32	539.14	
	41565	2687.5	-17.30	44.80	27.50	562.47	
	39675	2498.5	-21.69	44.19	22.50	177.87	V
	40620	2593.0	-22.03	44.09	22.06	160.62	
	41565	2687.5	-22.19	44.50	22.31	170.18	
Channel Bandwidth: 5 MHz / 16QAM							
Z	39675	2498.5	-17.52	44.24	26.72	469.68	H
	40620	2593.0	-17.89	44.20	26.31	427.27	
	41565	2687.5	-18.31	44.80	26.49	445.76	
	39675	2498.5	-22.69	44.19	21.50	141.29	V
	40620	2593.0	-23.02	44.09	21.07	127.88	
	41565	2687.5	-23.18	44.50	21.32	135.49	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 41							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	39700	2501.0	-16.58	44.34	27.76	597.17	H
	40620	2593.0	-16.83	44.20	27.37	545.38	
	41540	2685.0	-17.18	44.72	27.54	567.94	
	39700	2501.0	-21.69	44.23	22.54	179.31	V
	40620	2593.0	-22.00	44.09	22.09	161.73	
	41540	2685.0	-22.06	44.41	22.35	171.63	
Channel Bandwidth: 10 MHz / 16QAM							
Z	39700	2501.0	-17.59	44.34	26.75	473.26	H
	40620	2593.0	-17.83	44.20	26.37	433.21	
	41540	2685.0	-18.18	44.72	26.54	451.13	
	39700	2501.0	-22.69	44.23	21.54	142.43	V
	40620	2593.0	-23.01	44.09	21.08	128.17	
	41540	2685.0	-23.06	44.41	21.35	136.33	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 41							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	39725	2503.5	-16.53	44.32	27.79	600.90	H
	40620	2593.0	-16.79	44.20	27.41	550.43	
	41515	2682.5	-17.26	44.85	27.59	573.85	
	39725	2503.5	-21.41	43.99	22.58	181.22	V
	40620	2593.0	-21.98	44.09	22.11	162.48	
	41515	2682.5	-22.13	44.51	22.38	172.98	
Channel Bandwidth: 15 MHz / 16QAM							
Z	39725	2503.5	-17.54	44.32	26.78	476.21	H
	40620	2593.0	-17.79	44.20	26.41	437.22	
	41515	2682.5	-18.26	44.85	26.59	455.83	
	39725	2503.5	-22.40	43.99	21.59	144.28	V
	40620	2593.0	-22.98	44.09	21.11	129.06	
	41515	2682.5	-23.13	44.51	21.38	137.40	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 41							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	39750	2506.0	-16.33	44.16	27.83	606.74	H
	40620	2593.0	-16.75	44.20	27.45	555.52	
	41490	2680.0	-17.18	44.81	27.63	579.03	
	39750	2506.0	-22.16	44.78	22.62	182.81	V
	40620	2593.0	-21.94	44.09	22.15	163.98	
	41490	2680.0	-22.31	44.72	22.41	174.18	
Channel Bandwidth: 20 MHz / 16QAM							
Z	39750	2506.0	-17.33	44.16	26.83	481.95	H
	40620	2593.0	-17.75	44.20	26.45	441.27	
	41490	2680.0	-18.18	44.81	26.63	459.94	
	39750	2506.0	-23.16	44.78	21.62	145.21	V
	40620	2593.0	-22.95	44.09	21.14	129.96	
	41490	2680.0	-23.32	44.72	21.40	138.04	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)



## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

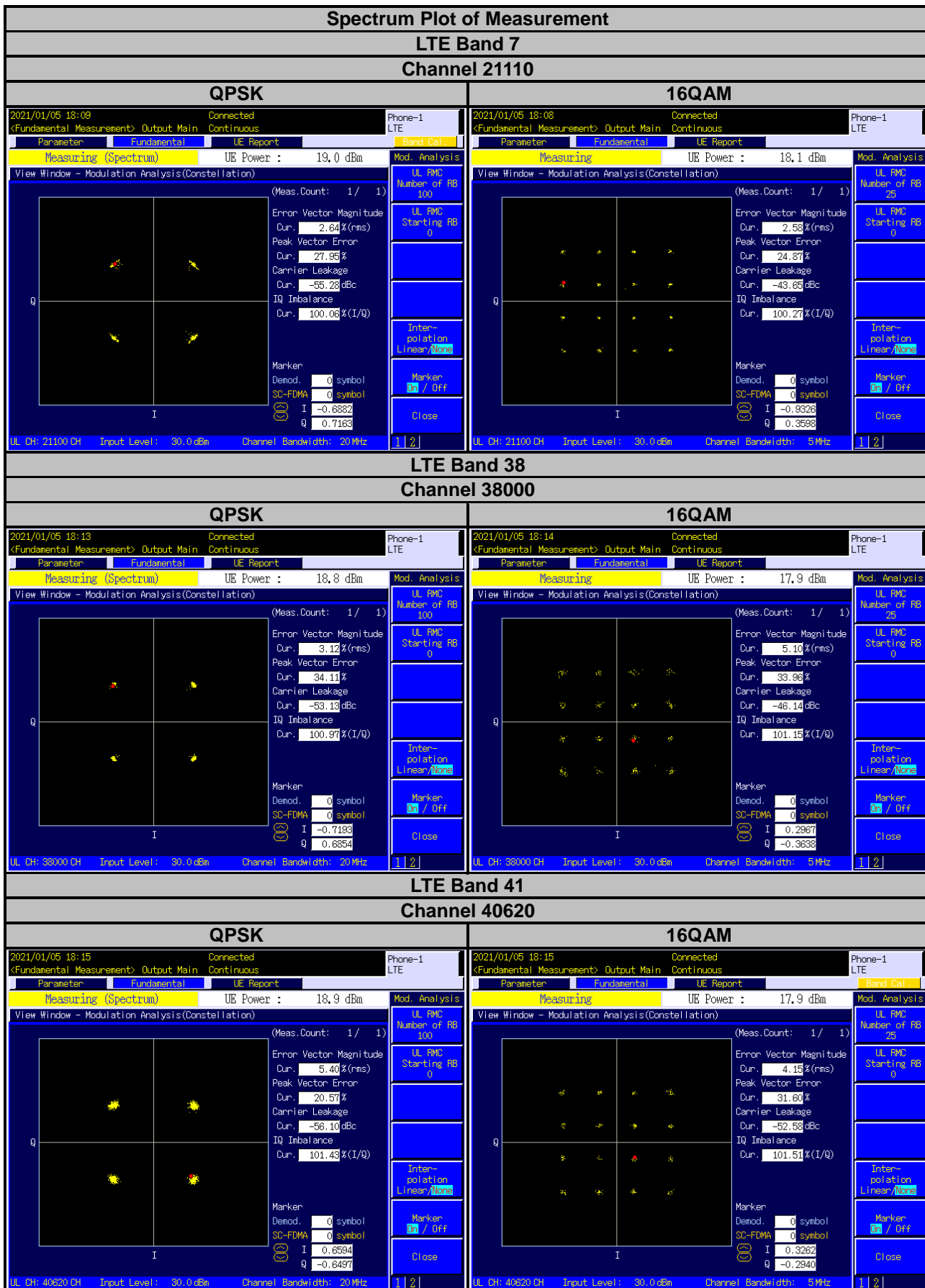
### 4.2.2 Test Setup



### 4.2.3 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

### 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

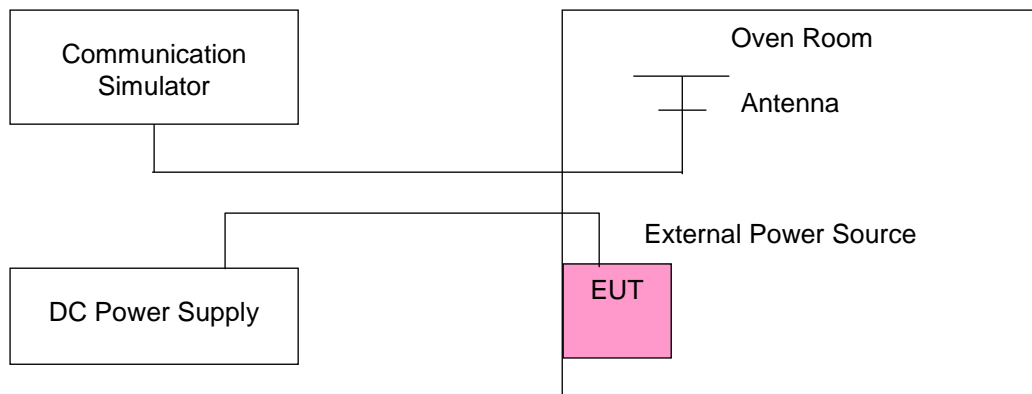
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

#### 4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2502.500002	0.000719	2567.500004	0.001441
3.14	2502.500004	0.001598	2567.500003	0.001091
4.25	2502.500001	0.000400	2567.500001	0.000389

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

##### Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2502.500004	0.001479	2567.500003	0.001091
-10	2502.500002	0.000959	2567.500003	0.001246
0	2502.500004	0.001518	2567.500001	0.000389
10	2502.500002	0.000639	2567.500002	0.000623
20	2502.499999	-0.000440	2567.499998	-0.000740
30	2502.499997	-0.001399	2567.499996	-0.001558
40	2502.499997	-0.001359	2567.499999	-0.000584
50	2502.499997	-0.001359	2567.499998	-0.000779

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2505.000003	0.001158	2565.000002	0.000702
3.14	2505.000002	0.000838	2565.000002	0.000585
4.25	2505.000002	0.000878	2565.000001	0.000429

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2505.000002	0.000639	2565.000002	0.000741
-10	2505.000002	0.000758	2565.000002	0.000702
0	2505.000003	0.001118	2565.000003	0.001053
10	2505.000003	0.001118	2565.000001	0.000468
20	2504.999999	-0.000479	2564.999998	-0.000702
30	2504.999999	-0.000599	2564.999999	-0.000429
40	2504.999997	-0.001397	2564.999997	-0.001014
50	2504.999997	-0.001198	2564.999998	-0.000819

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2507.500002	0.000758	2562.500003	0.001054
3.14	2507.500004	0.001595	2562.500003	0.001288
4.25	2507.500002	0.000798	2562.500003	0.001327

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2507.500004	0.001396	2562.500001	0.000429
-10	2507.500004	0.001555	2562.500002	0.000898
0	2507.500002	0.000837	2562.500002	0.000937
10	2507.500002	0.000718	2562.500001	0.000507
20	2507.499998	-0.000758	2562.499998	-0.000937
30	2507.499998	-0.000997	2562.499999	-0.000507
40	2507.499996	-0.001595	2562.499998	-0.000702
50	2507.499999	-0.000399	2562.499997	-0.001327

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2510.000001	0.000478	2560.000001	0.000391
3.14	2510.000003	0.001036	2560.000004	0.001563
4.25	2510.000002	0.000916	2560.000002	0.000859

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2510.000003	0.001116	2560.000003	0.000977
-10	2510.000002	0.000956	2560.000002	0.000703
0	2510.000001	0.000518	2560.000003	0.000977
10	2510.000003	0.001315	2560.000002	0.000586
20	2509.999998	-0.000637	2559.999997	-0.001055
30	2509.999998	-0.000996	2559.999997	-0.001172
40	2509.999997	-0.001076	2559.999998	-0.000938
50	2509.999996	-0.001514	2559.999998	-0.000781

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2572.500002	0.000777	2617.500003	0.001184
3.14	2572.500002	0.000816	2617.500003	0.001146
4.25	2572.500002	0.000933	2617.500003	0.001146

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2572.500001	0.000389	2617.500004	0.001375
-10	2572.500002	0.000700	2617.500004	0.001337
0	2572.500004	0.001399	2617.500003	0.001261
10	2572.500001	0.000544	2617.500002	0.000879
20	2572.499997	-0.001361	2617.499997	-0.001261
30	2572.499997	-0.001050	2617.499997	-0.001184
40	2572.499997	-0.001361	2617.499996	-0.001528
50	2572.499996	-0.001555	2617.499997	-0.001108

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.



Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2575.000001	0.000388	2615.000003	0.001185
3.14	2575.000001	0.000505	2615.000002	0.000841
4.25	2575.000003	0.001049	2615.000001	0.000535

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2575.000002	0.000893	2615.000003	0.000956
-10	2575.000002	0.000660	2615.000001	0.000535
0	2575.000003	0.001087	2615.000004	0.001453
10	2575.000003	0.001049	2615.000003	0.001185
20	2574.999998	-0.000621	2614.999999	-0.000382
30	2574.999997	-0.001010	2614.999997	-0.001185
40	2574.999998	-0.000660	2614.999998	-0.000841
50	2574.999997	-0.001126	2614.999997	-0.001109

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2577.500001	0.000388	2612.500001	0.000421
3.14	2577.500001	0.000427	2612.500003	0.001187
4.25	2577.500003	0.001009	2612.500003	0.001072

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2577.500001	0.000388	2612.500002	0.000804
-10	2577.500003	0.001319	2612.500003	0.001225
0	2577.500002	0.000776	2612.500001	0.000459
10	2577.500002	0.000737	2612.500001	0.000383
20	2577.499997	-0.001086	2612.499998	-0.000842
30	2577.499997	-0.001048	2612.499998	-0.000727
40	2577.499999	-0.000466	2612.499996	-0.001455
50	2577.499997	-0.001048	2612.499999	-0.000421

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2580.000003	0.001163	2610.000003	0.000958
3.14	2580.000002	0.000736	2610.000004	0.001418
4.25	2580.000003	0.001085	2610.000000	0.001379

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2580.000002	0.000659	2610.000001	0.000536
-10	2580.000004	0.001357	2610.000004	0.001494
0	2580.000003	0.001008	2610.000002	0.000920
10	2580.000004	0.001550	2610.000004	0.001533
20	2579.999997	-0.001008	2609.999996	-0.001379
30	2579.999997	-0.001240	2609.999997	-0.000996
40	2579.999996	-0.001434	2609.999997	-0.001073
50	2579.999998	-0.000620	2609.999996	-0.001456

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2498.500003	0.001041	2687.500002	0.000633
3.14	2498.500002	0.000640	2687.500003	0.000967
4.25	2498.500004	0.001561	2687.500001	0.000521

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2498.500002	0.000841	2687.500001	0.000521
-10	2498.500001	0.000400	2687.500001	0.000521
0	2498.500004	0.001521	2687.500002	0.000744
10	2498.500002	0.000720	2687.500003	0.001228
20	2498.499999	-0.000400	2687.499997	-0.001191
30	2498.499999	-0.000600	2687.499998	-0.000819
40	2498.499997	-0.001281	2687.499998	-0.000930
50	2498.499998	-0.000720	2687.499998	-0.000670

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2501.000003	0.001160	2685.000004	0.001304
3.14	2501.000002	0.000760	2685.000003	0.001155
4.25	2501.000002	0.000640	2685.000004	0.001415

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2501.000002	0.000920	2685.000002	0.000819
-10	2501.000004	0.001559	2685.000002	0.000857
0	2501.000001	0.000480	2685.000003	0.001080
10	2501.000003	0.001160	2685.000003	0.001192
20	2500.999999	-0.000520	2684.999997	-0.001006
30	2500.999998	-0.000680	2684.999998	-0.000894
40	2500.999997	-0.001080	2684.999998	-0.000708
50	2500.999998	-0.000640	2684.999996	-0.001378

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

## Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2503.500002	0.000719	2682.500002	0.000820
3.14	2503.500001	0.000439	2682.500002	0.000857
4.25	2503.500002	0.000959	2682.500002	0.000857

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

## Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2503.500002	0.000839	2682.500003	0.001044
-10	2503.500002	0.000719	2682.500001	0.000447
0	2503.500001	0.000399	2682.500003	0.001081
10	2503.500002	0.000599	2682.500003	0.001156
20	2503.499997	-0.001078	2682.499997	-0.001007
30	2503.499997	-0.001278	2682.499996	-0.001417
40	2503.499997	-0.001039	2682.499999	-0.000373
50	2503.499997	-0.001118	2682.499996	-0.001454

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	2506.000003	0.001077	2680.000004	0.001343
3.14	2506.000001	0.000479	2680.000004	0.001418
4.25	2506.000004	0.001556	2680.000003	0.001007

**Note:** The applicant defined the normal working voltage of the battery is from 3.14 Vdc to 4.25 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	2506.000002	0.000958	2680.000002	0.000560
-10	2506.000004	0.001596	2680.000002	0.000746
0	2506.000003	0.001317	2680.000002	0.000597
10	2506.000001	0.000399	2680.000003	0.001194
20	2505.999999	-0.000599	2679.999998	-0.000709
30	2505.999998	-0.000798	2679.999997	-0.001119
40	2505.999996	-0.001556	2679.999998	-0.000634
50	2505.999998	-0.000798	2679.999998	-0.000784

**Note:** When the EUT temperature is below -20°C, it will shut down and will not work.

## 4.4 Occupied Bandwidth Measurement

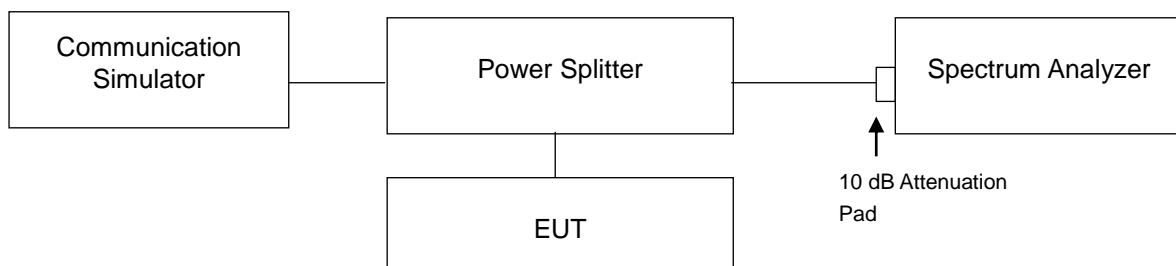
### 4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

### 4.4.2 Test Procedure

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.
- Measurement method refer to section 5.4.4 of ANSI C63.26.
- For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

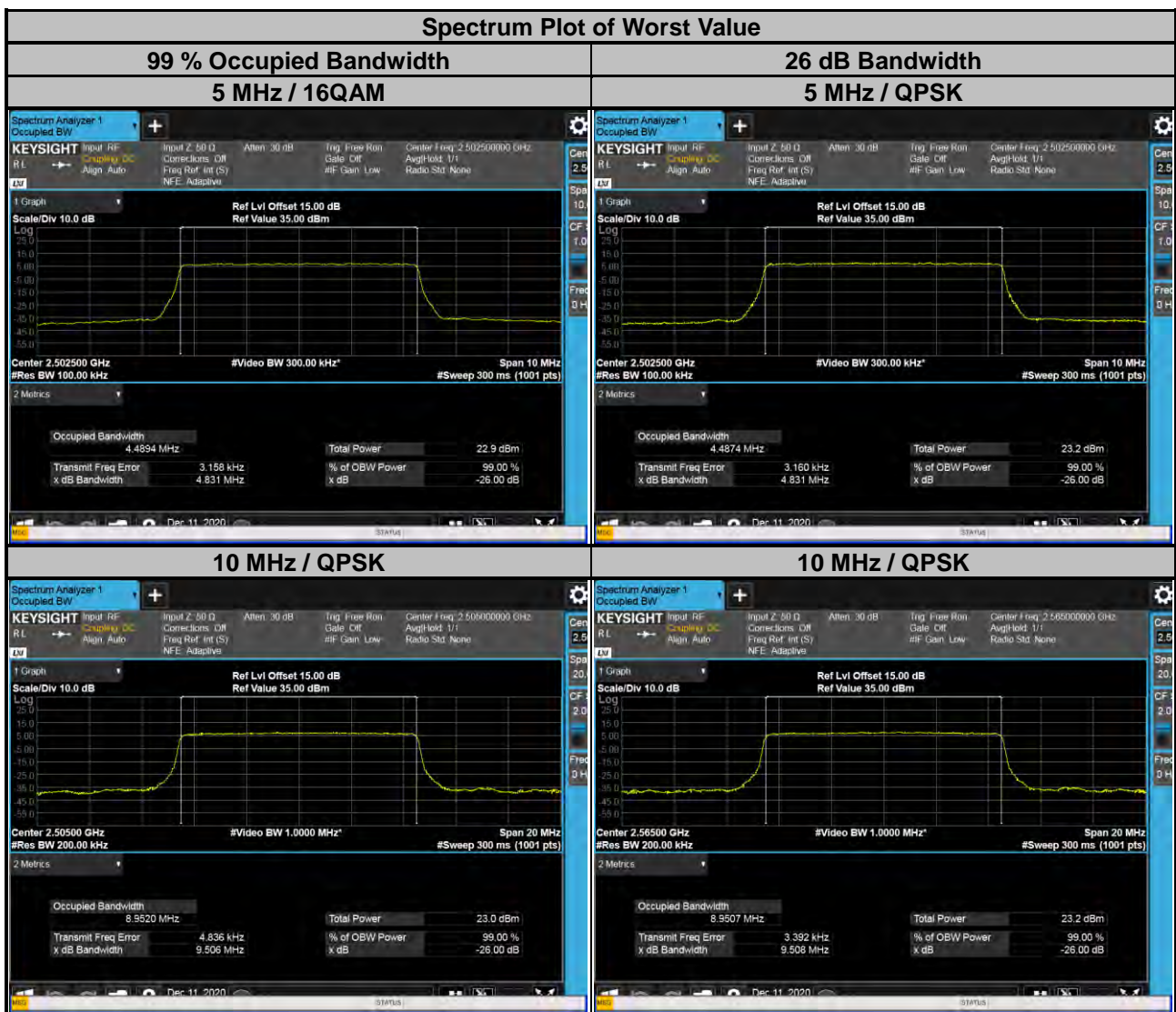
### 4.4.3 Test Setup



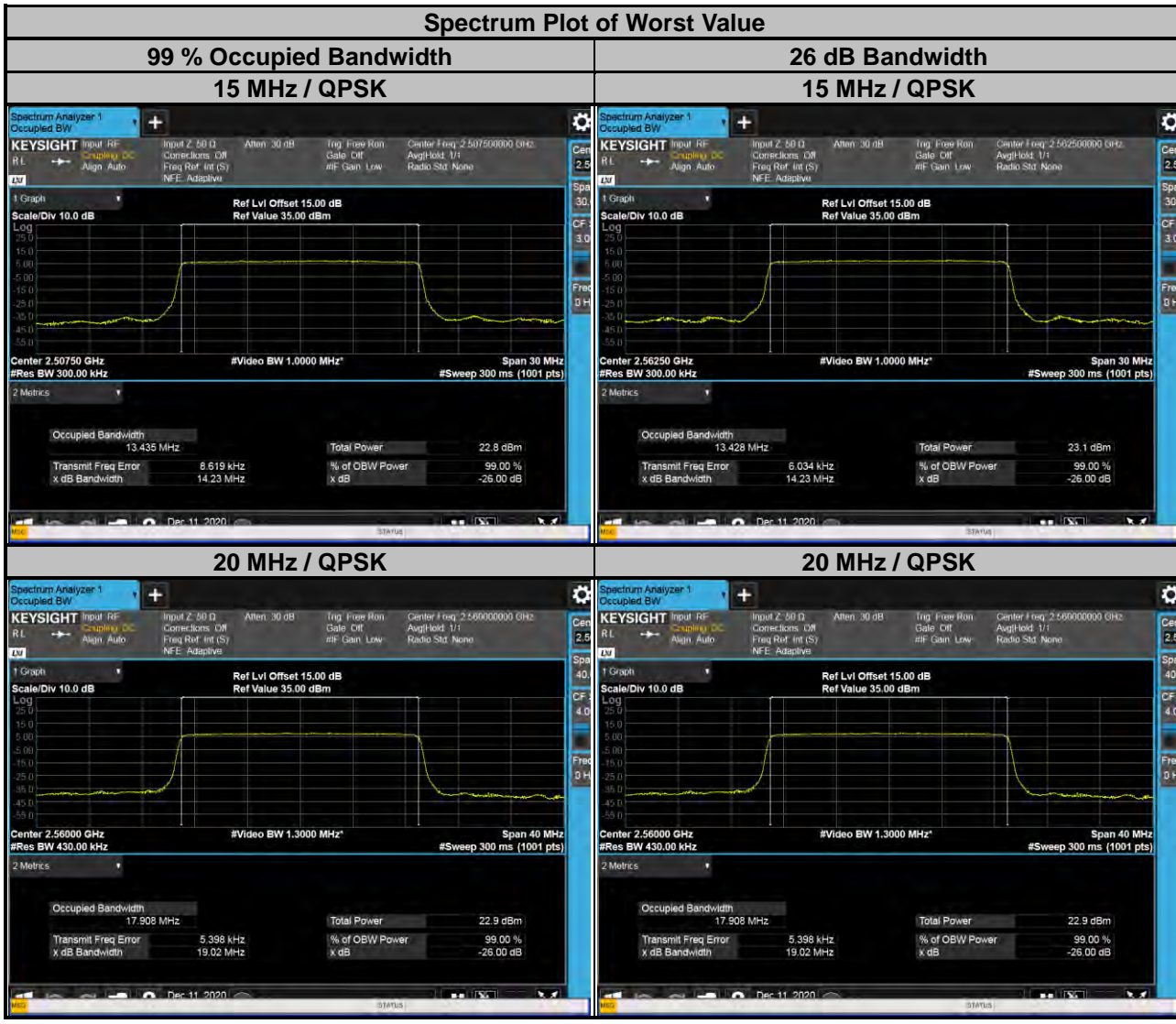


#### 4.4.4 Test Results

LTE Band 7					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20775	2502.5	4.49	4.49	4.83	4.83
21100	2535.0	4.49	4.49	4.80	4.82
21425	2567.5	4.49	4.49	4.81	4.81
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20800	2505.0	8.95	4.57	9.51	5.02
21100	2535.0	8.95	4.57	9.50	5.05
21400	2565.0	8.95	4.57	9.51	5.01



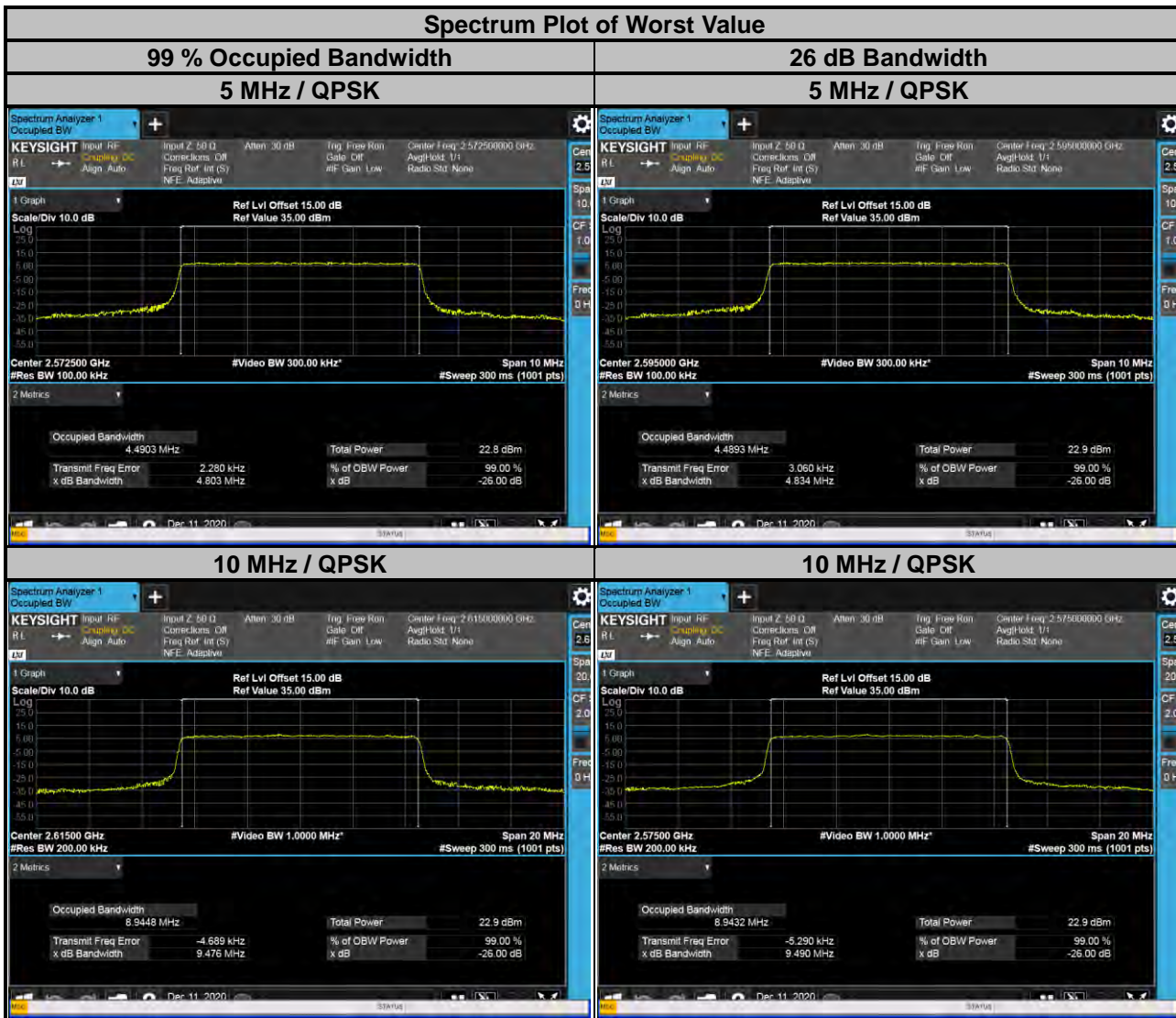
LTE Band 7					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20825	2507.5	13.43	4.67	14.23	7.25
21100	2535.0	13.43	4.67	14.22	7.22
21375	2562.5	13.43	4.67	14.23	7.19
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20850	2510.0	17.89	4.81	19.02	9.67
21100	2535.0	17.89	4.81	19.01	9.64
21350	2560.0	17.91	4.82	19.02	9.56



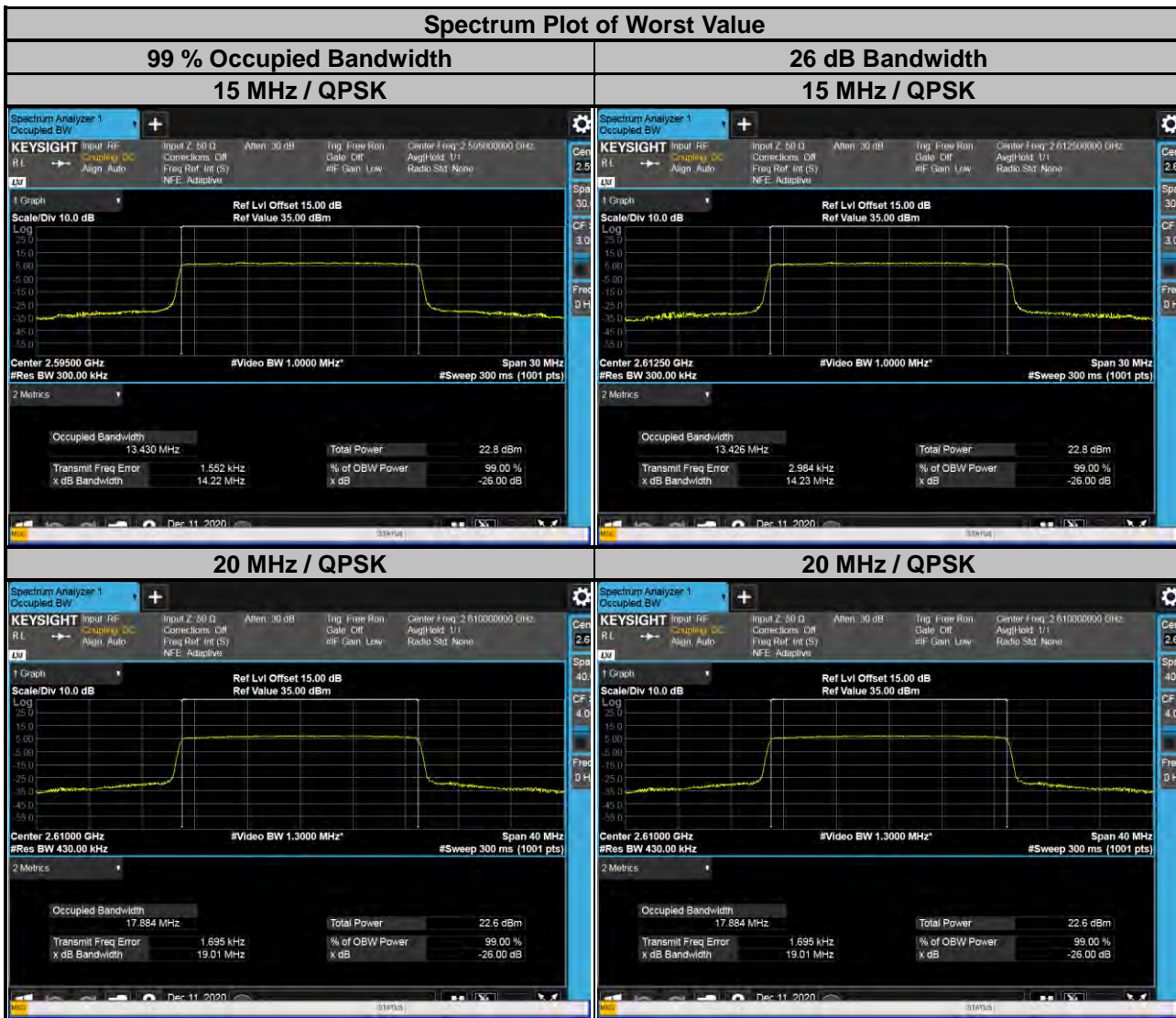
LTE Band 38					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
37775	2572.5	4.49	4.49	4.80	4.80
38000	2595.0	4.49	4.49	4.83	4.82
38225	2617.5	4.49	4.49	4.80	4.81

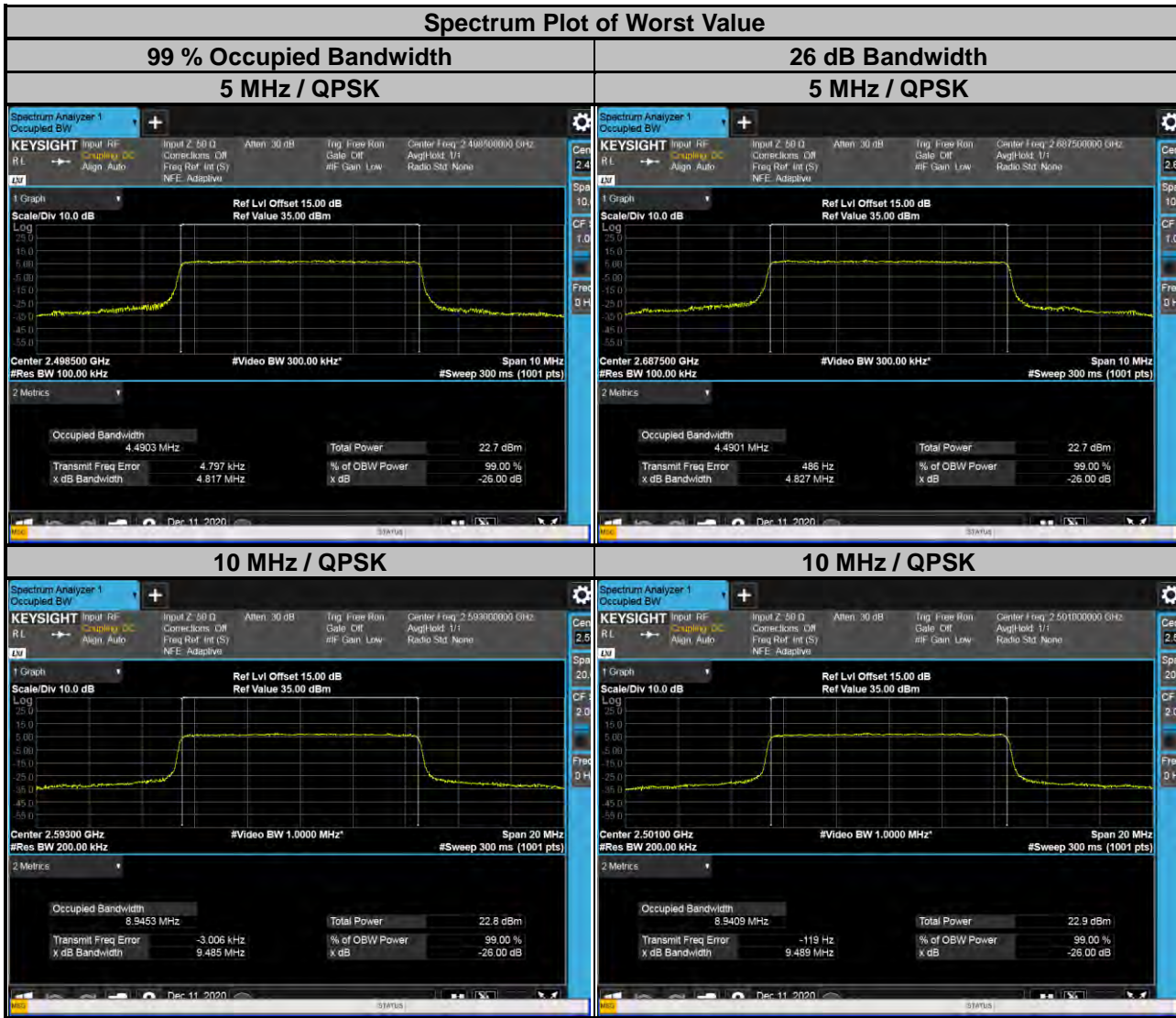
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
37800	2575.0	8.94	4.56	9.49	5.01
38000	2595.0	8.94	4.57	9.48	5.04
38200	2615.0	8.94	4.57	9.48	5.01



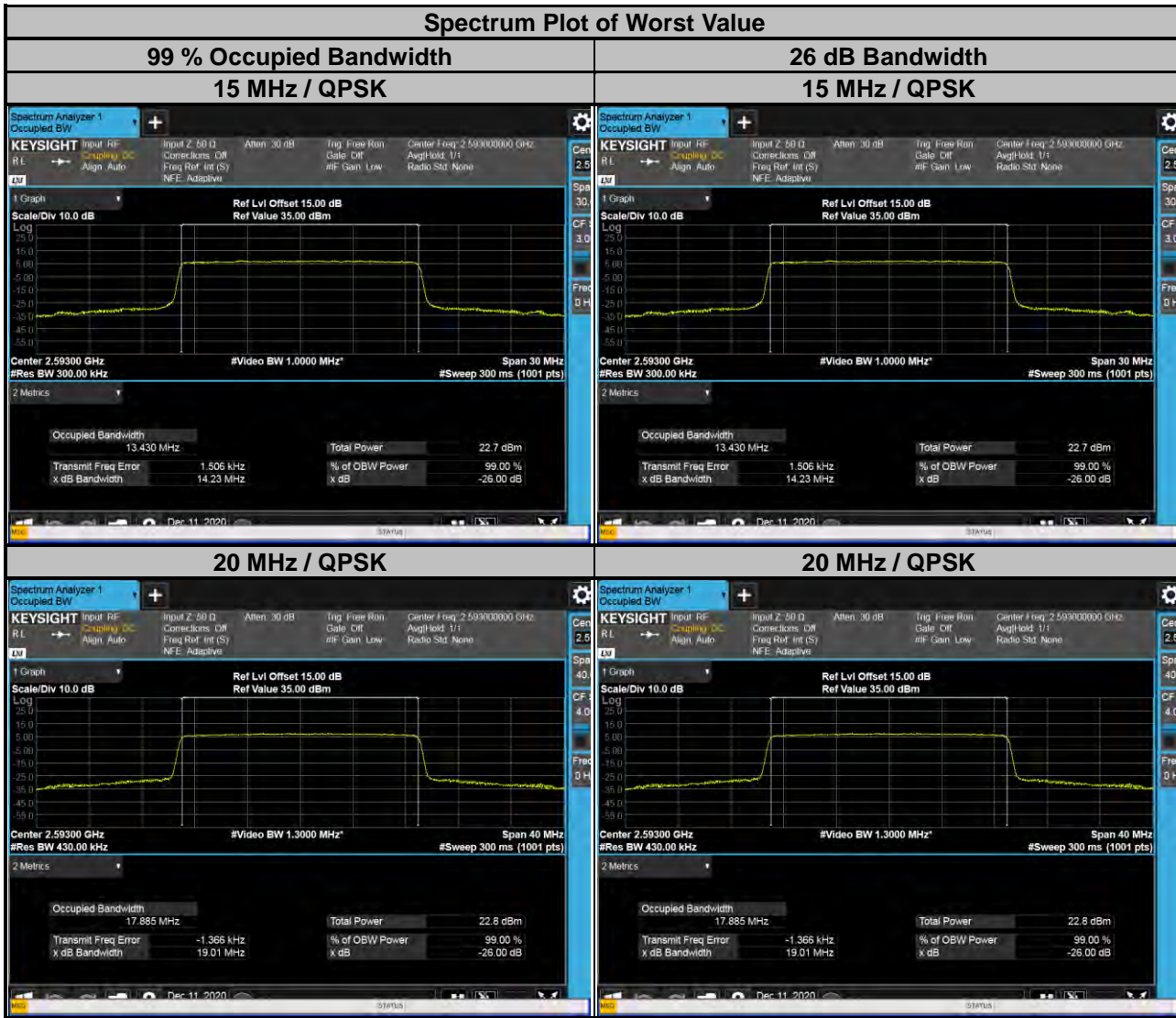
LTE Band 38					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
37825	2577.5	13.43	4.66	14.22	5.23
38000	2595.0	13.43	4.66	14.22	5.22
38175	2612.5	13.43	4.66	14.23	5.21
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
37850	2580.0	17.88	4.80	19.00	5.51
38000	2595.0	17.88	4.80	19.00	5.52
38150	2610.0	17.88	4.80	19.01	5.50



LTE Band 41					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
39675	2498.5	4.49	4.49	4.82	4.80
40620	2593.0	4.49	4.49	4.81	4.80
41565	2687.5	4.49	4.49	4.83	4.82
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
39700	2501.0	8.94	4.56	9.49	5.02
40620	2593.0	8.95	4.57	9.49	5.01
41540	2685.0	8.94	4.57	9.48	5.00



LTE Band 41					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
39725	2503.5	13.43	4.66	14.23	7.21
40620	2593.0	13.43	4.67	14.23	7.20
41515	2682.5	13.43	4.66	14.22	5.21
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
39750	2506.0	17.87	4.81	18.99	9.57
40620	2593.0	17.89	4.81	19.01	9.60
41490	2680.0	17.87	4.80	18.98	5.52

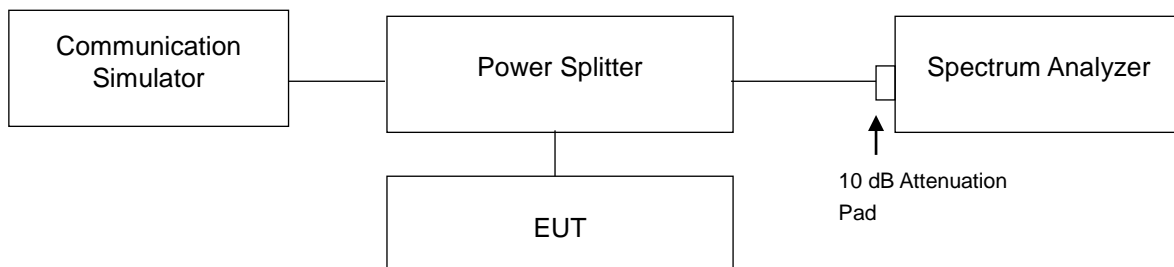


## 4.5 Out-of-Band Emissions Measurement

### 4.5.1 Limits of Out-of-Band Emissions Measurement

According to FCC 27.53(m)(4)&(6) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a 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. 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

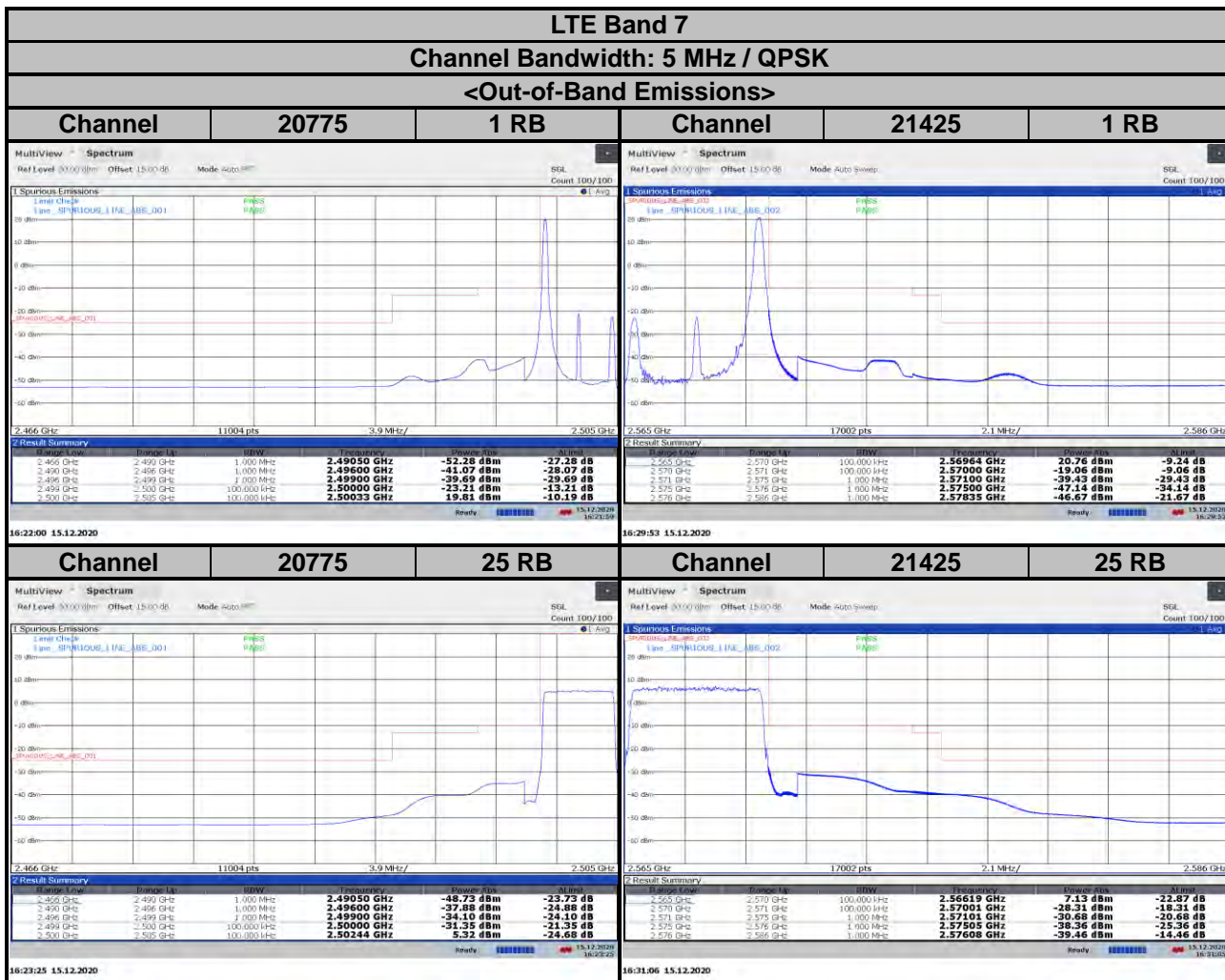
### 4.5.2 Test Setup



### 4.5.3 Test Procedures

- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- The out-of-band emissions measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the max. trace plot into the test report.

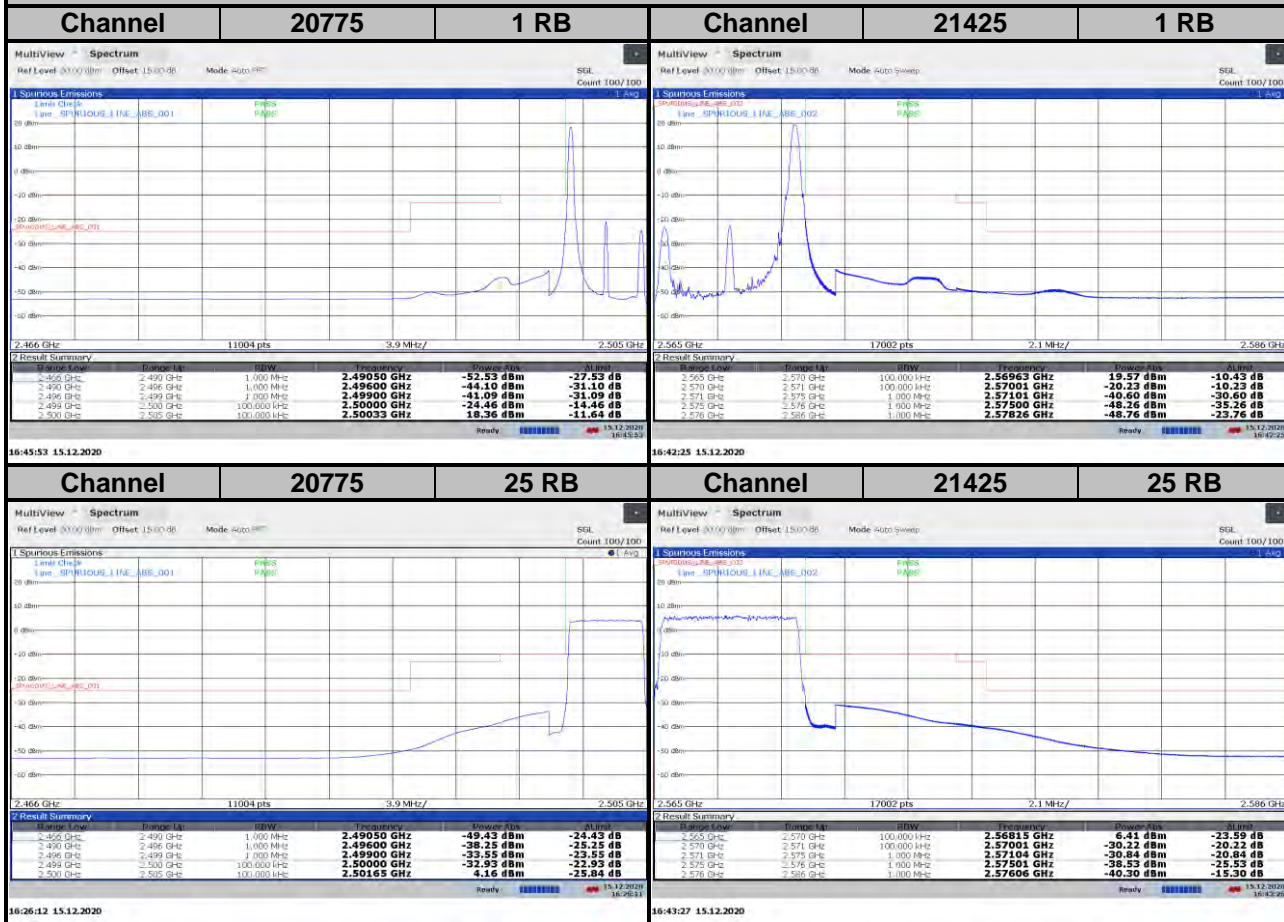
### 4.5.4 Test Results





**LTE Band 7**  
**Channel Bandwidth: 5 MHz / 16QAM**

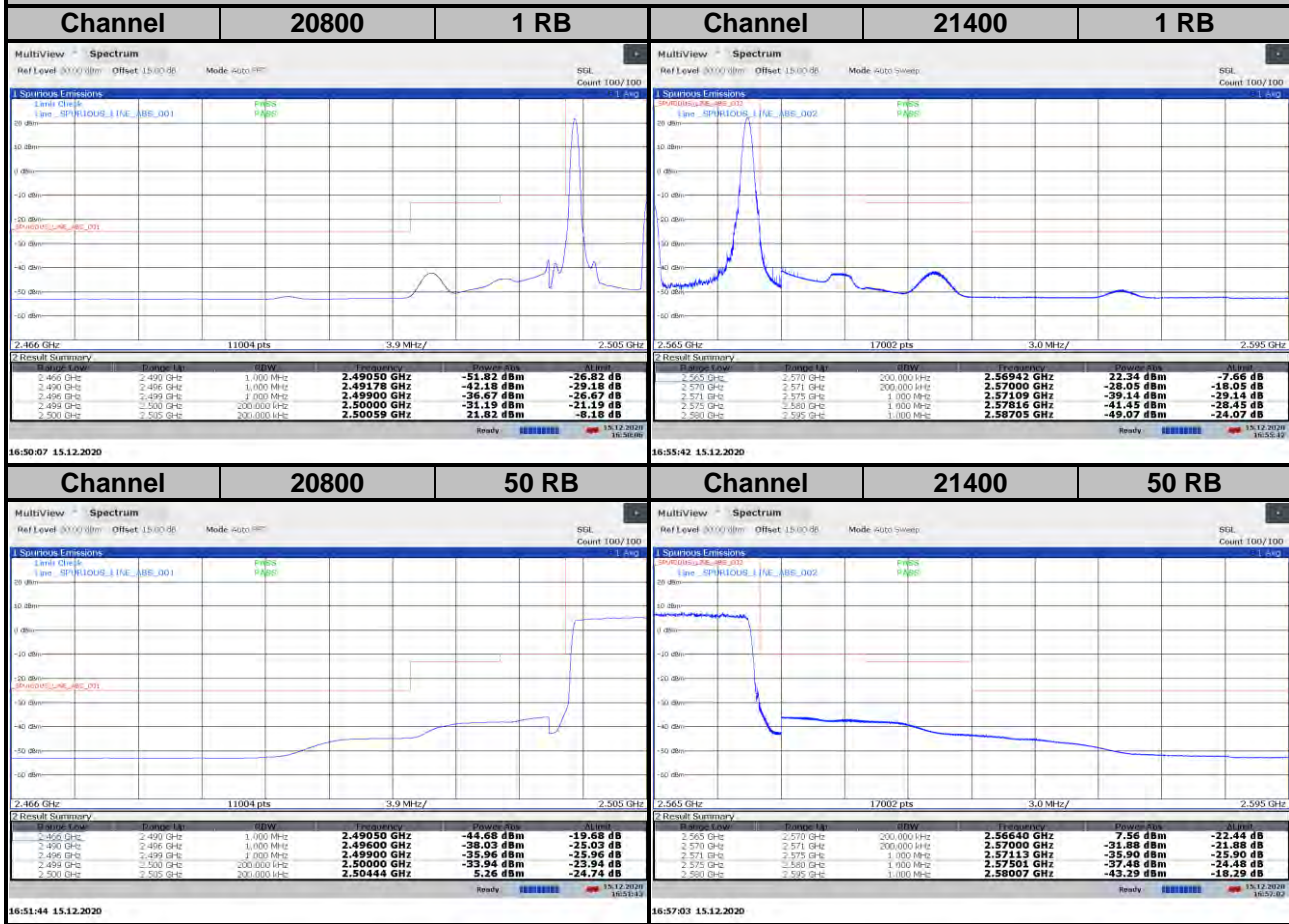
**<Out-of-Band Emissions>**



LTE Band 7

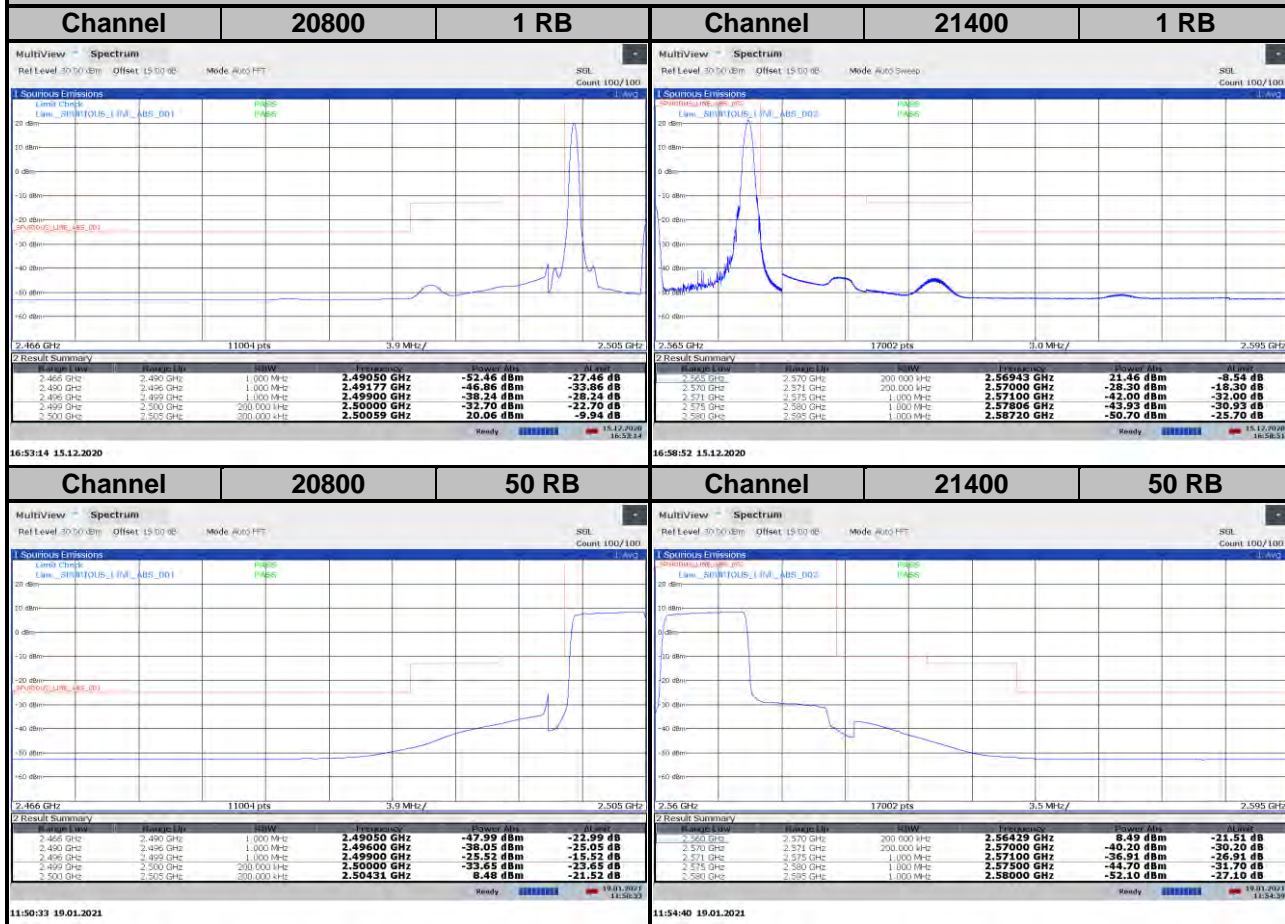
Channel Bandwidth: 10 MHz / QPSK

<Out-of-Band Emissions>



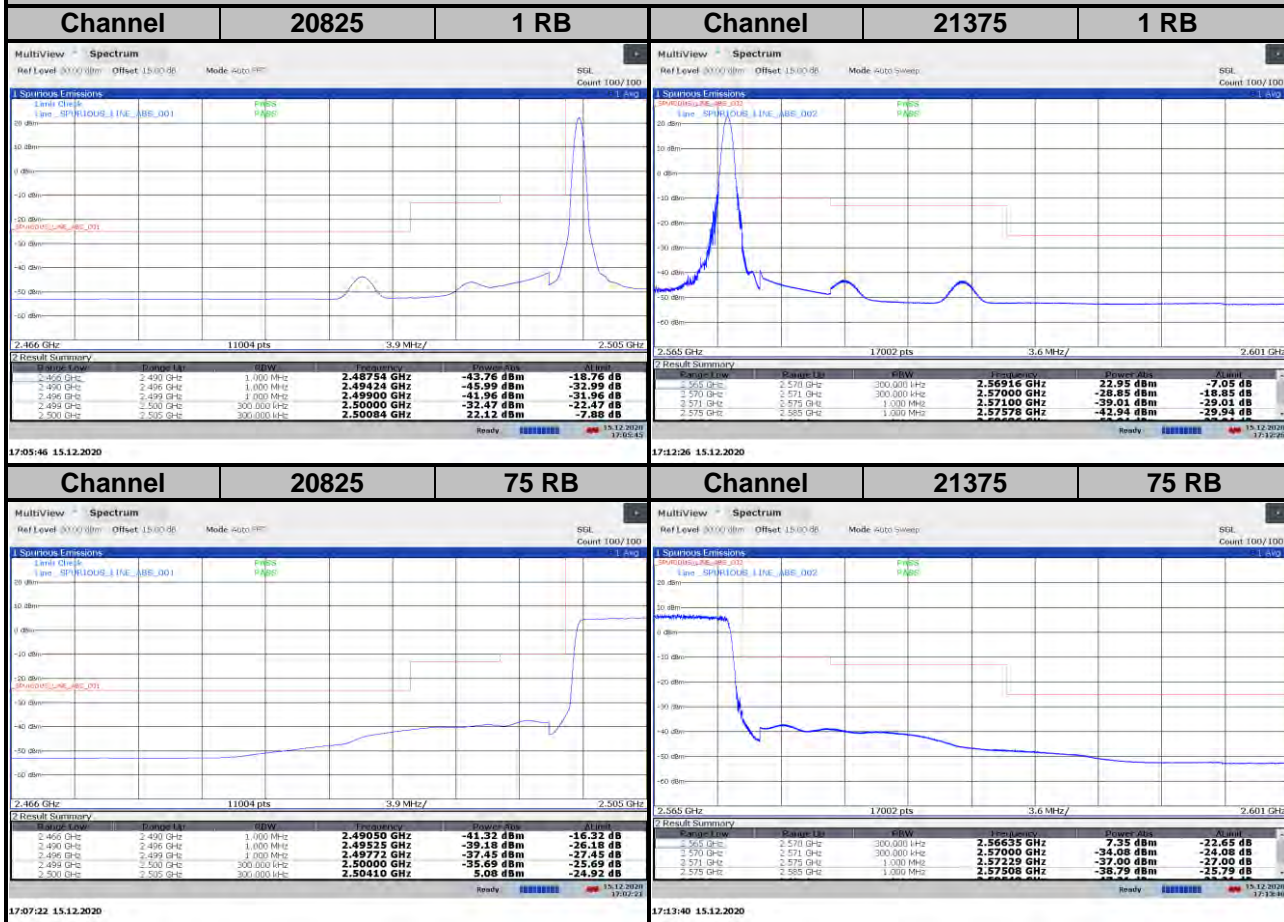
**LTE Band 7**  
**Channel Bandwidth: 10 MHz / 16QAM**

**<Out-of-Band Emissions>**



**LTE Band 7**  
**Channel Bandwidth: 15 MHz / QPSK**

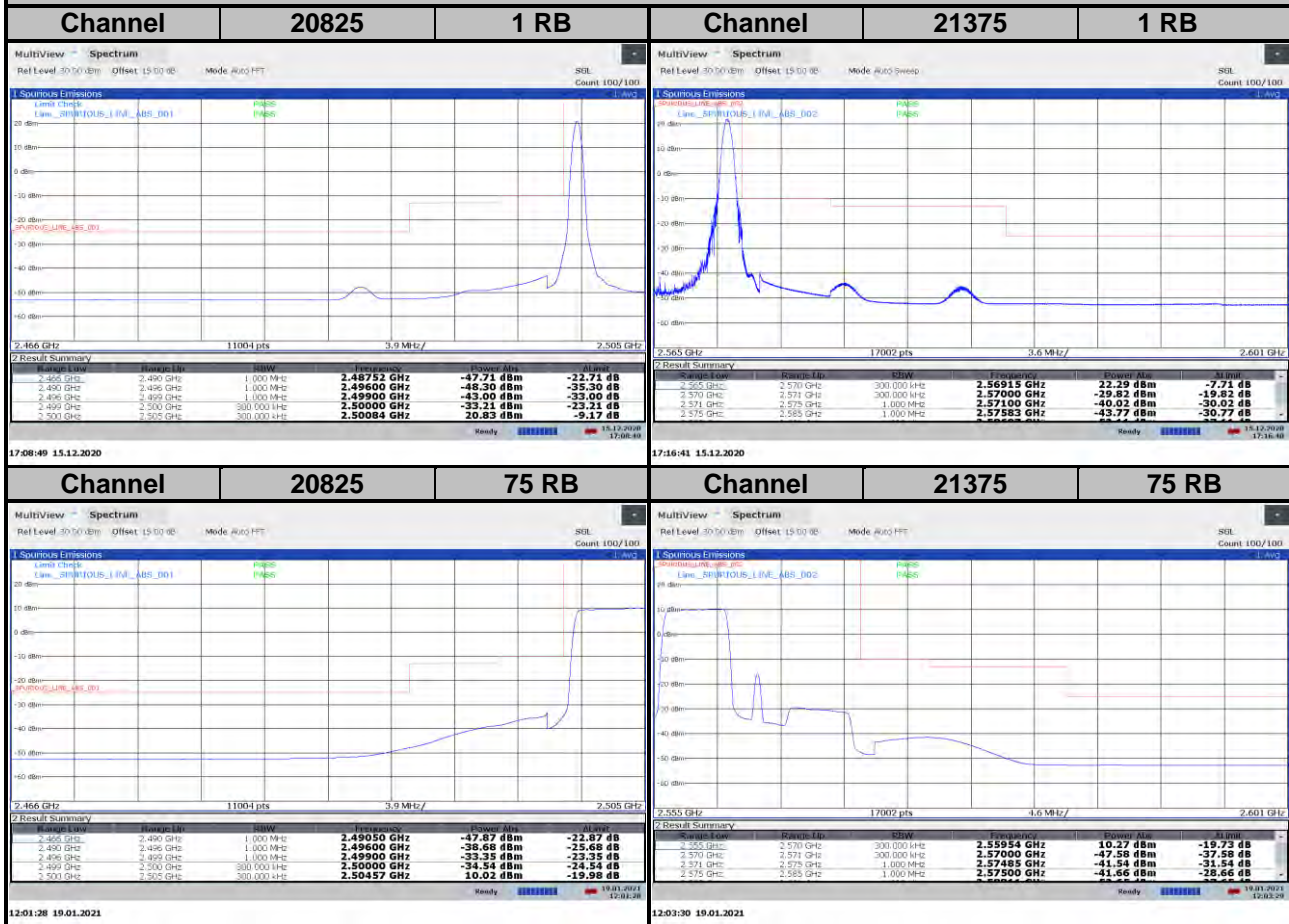
**<Out-of-Band Emissions>**



LTE Band 7

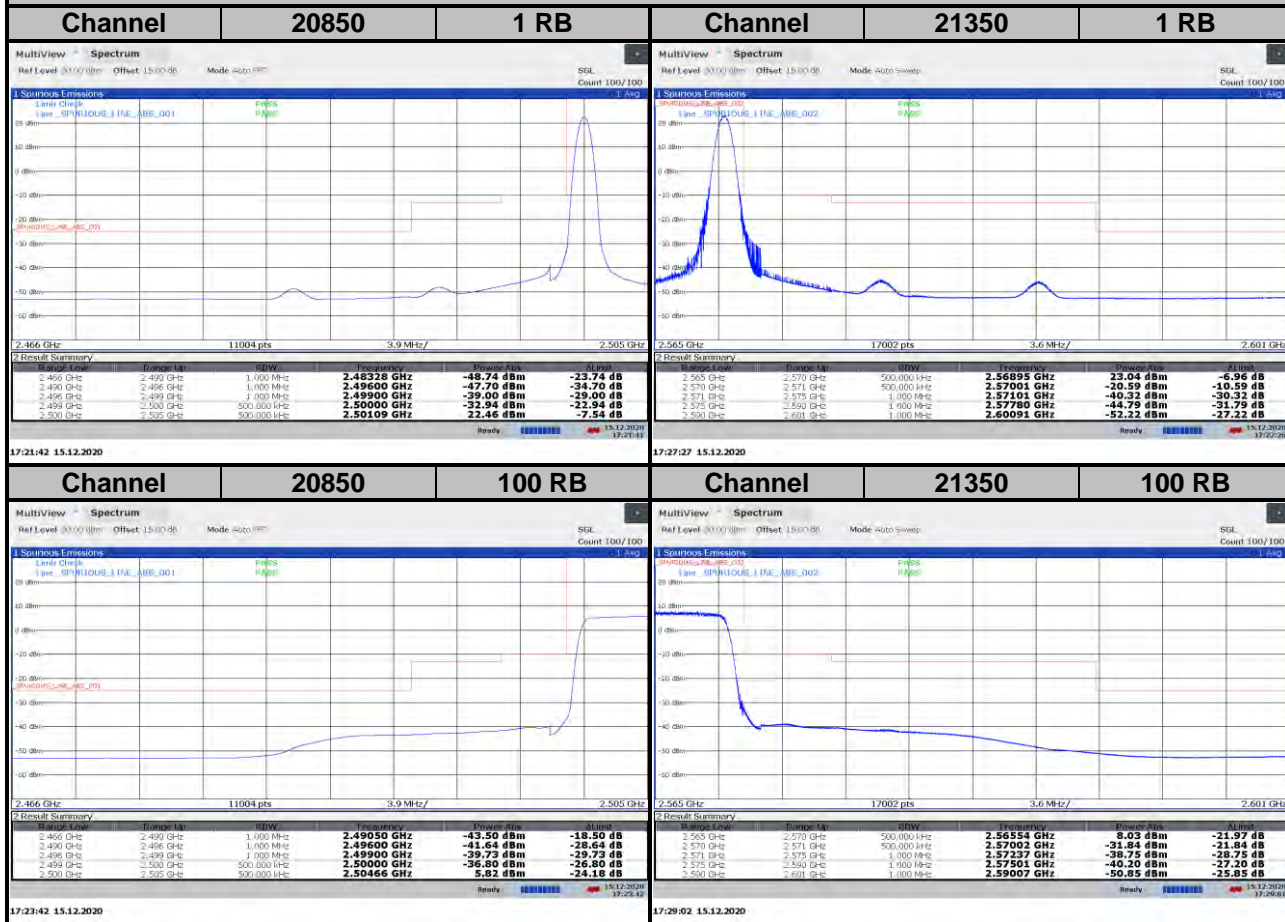
Channel Bandwidth: 15 MHz / 16QAM

<Out-of-Band Emissions>



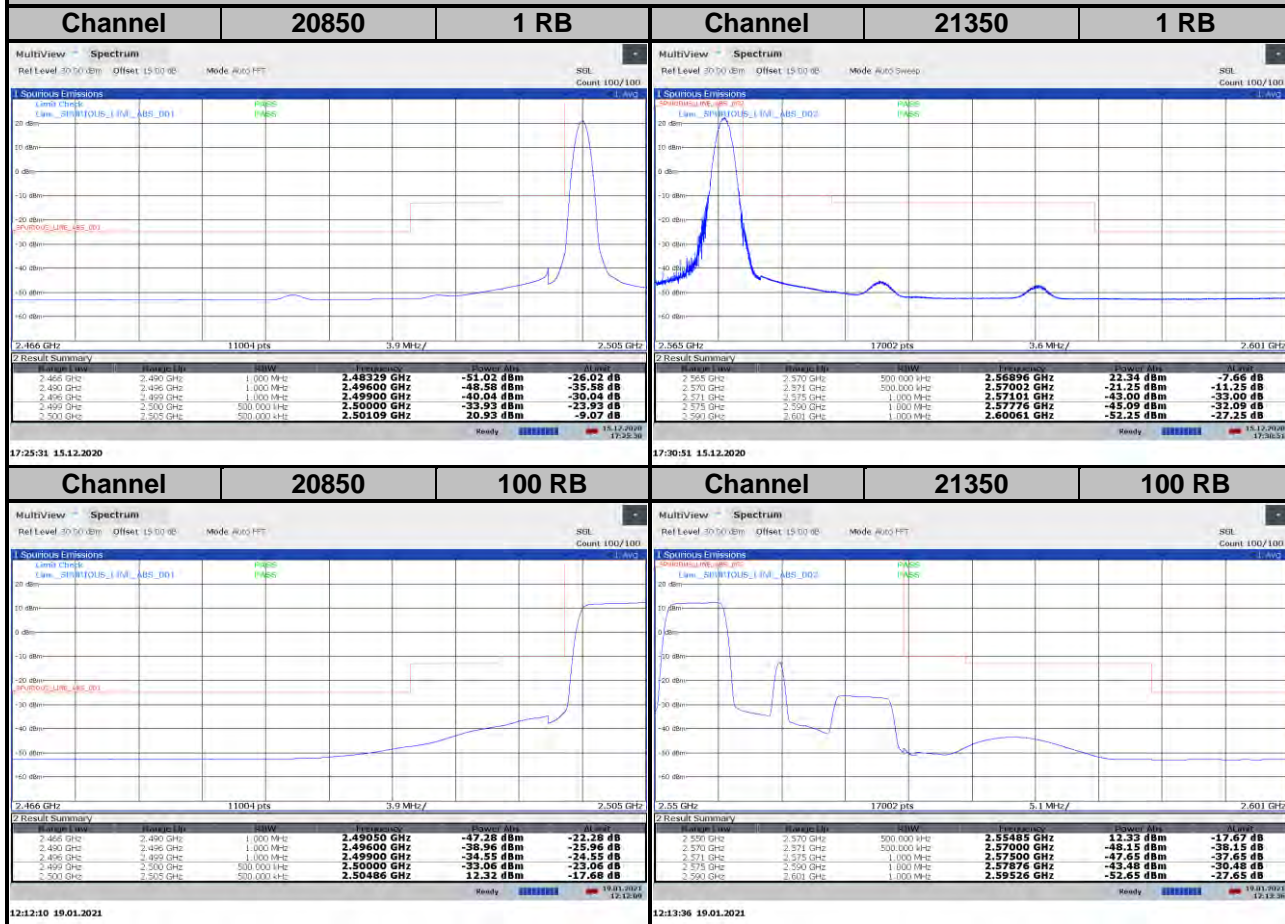
**LTE Band 7**  
**Channel Bandwidth: 20 MHz / QPSK**

**<Out-of-Band Emissions>**

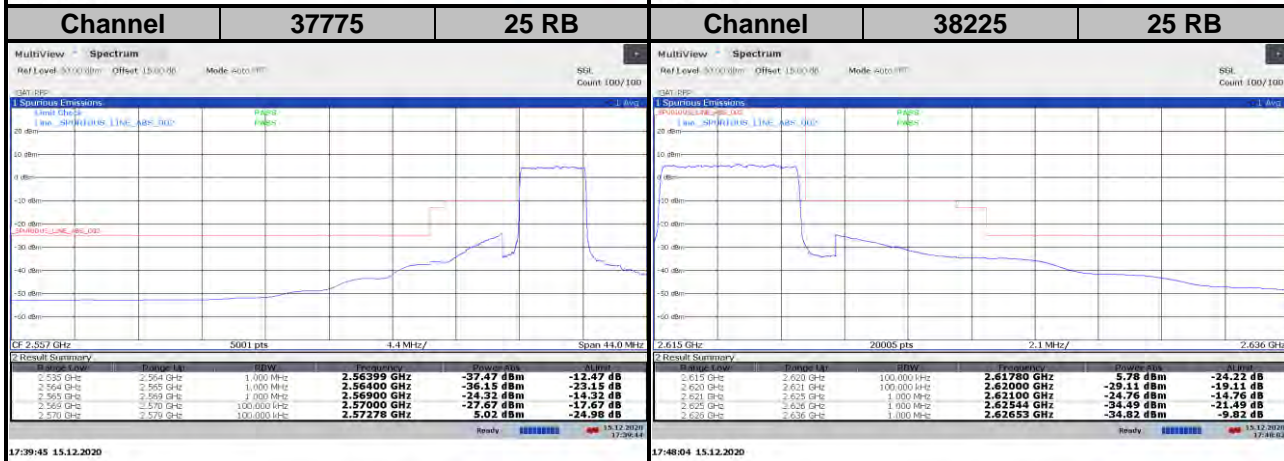
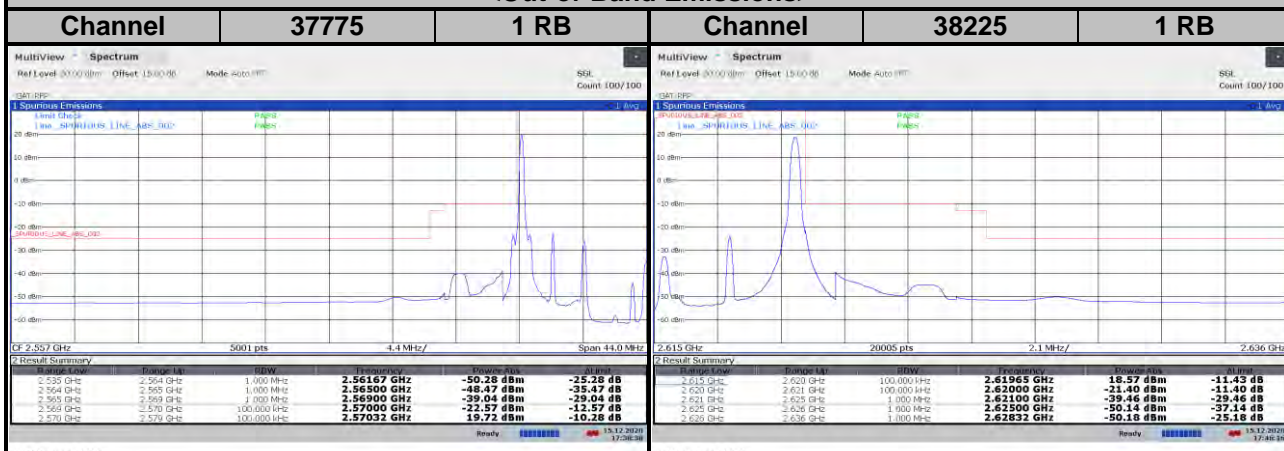


**LTE Band 7**  
**Channel Bandwidth: 20 MHz / 16QAM**

**<Out-of-Band Emissions>**



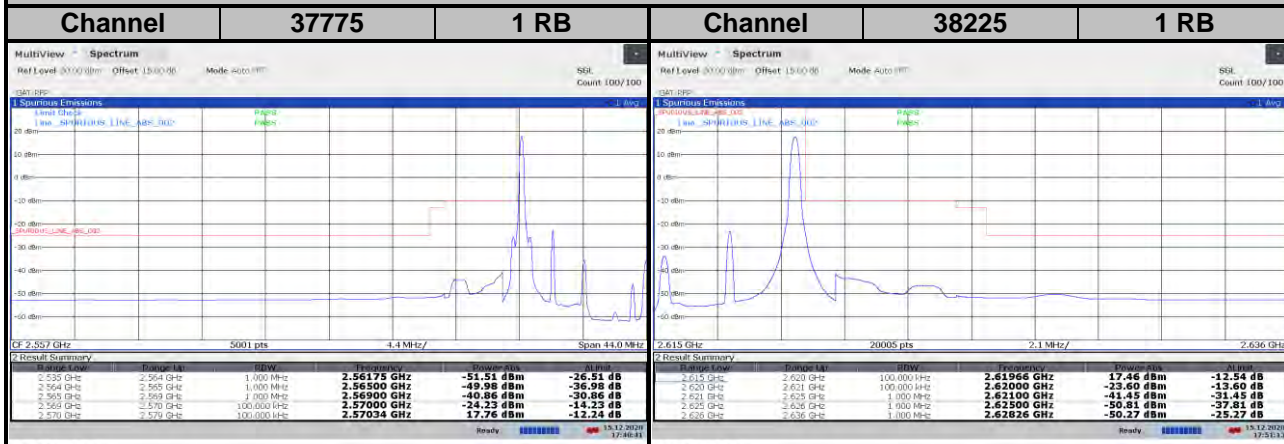
**LTE Band 38**  
**Channel Bandwidth: 5 MHz / QPSK**  
**<Out-of-Band Emissions>**





**LTE Band 38**  
**Channel Bandwidth: 5 MHz / 16QAM**

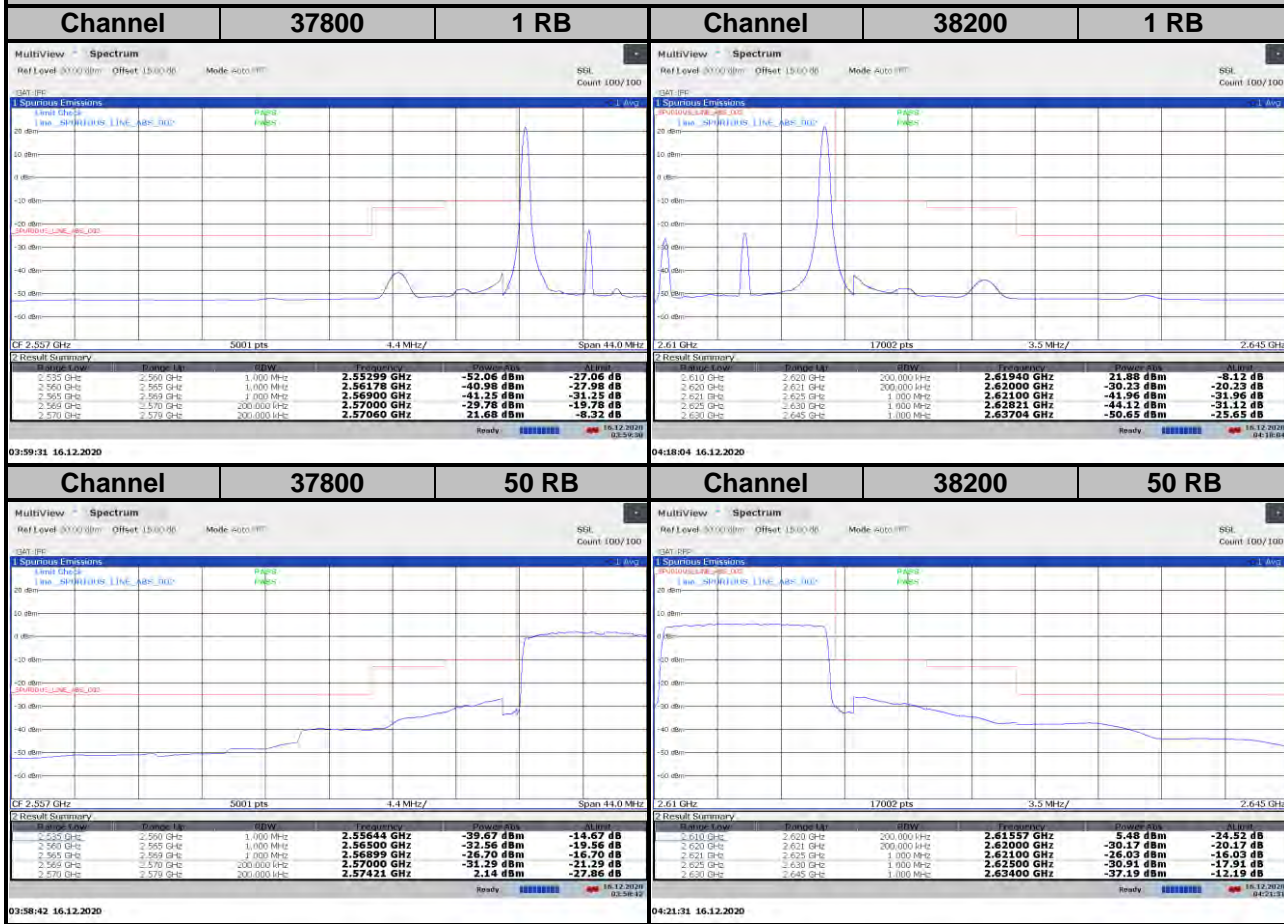
**<Out-of-Band Emissions>**



LTE Band 38

Channel Bandwidth: 10 MHz / QPSK

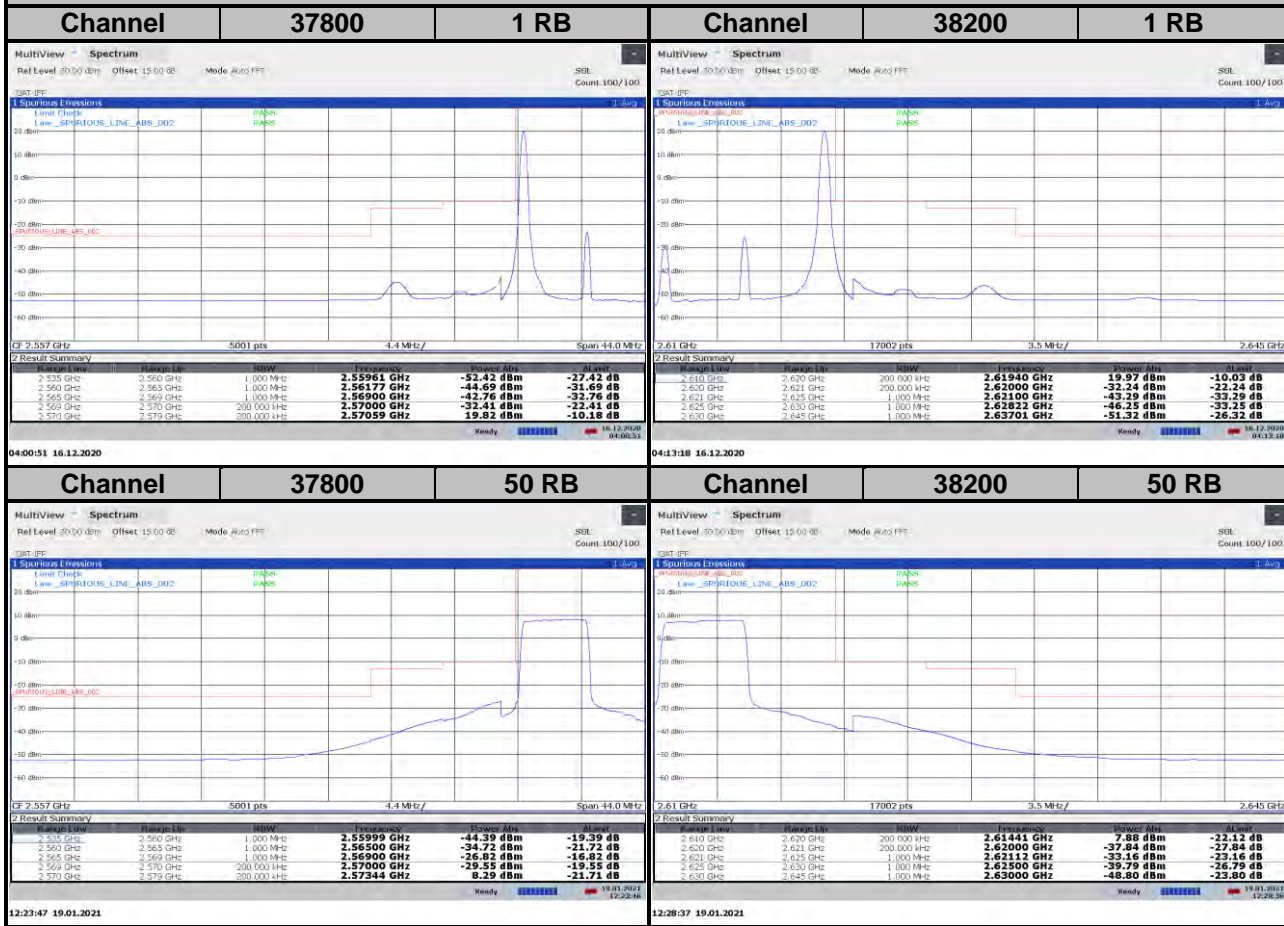
<Out-of-Band Emissions>



LTE Band 38

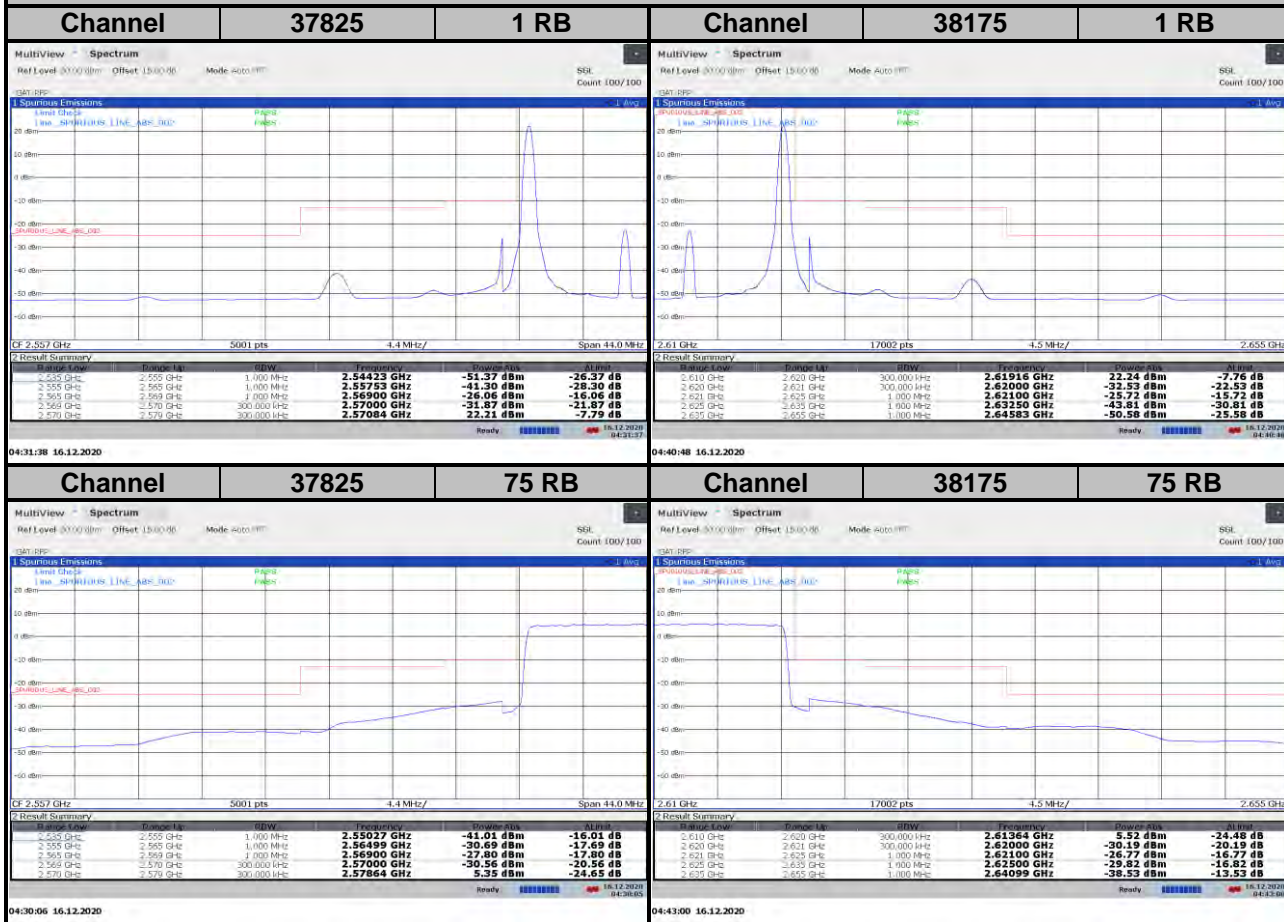
Channel Bandwidth: 10 MHz / 16QAM

<Out-of-Band Emissions>



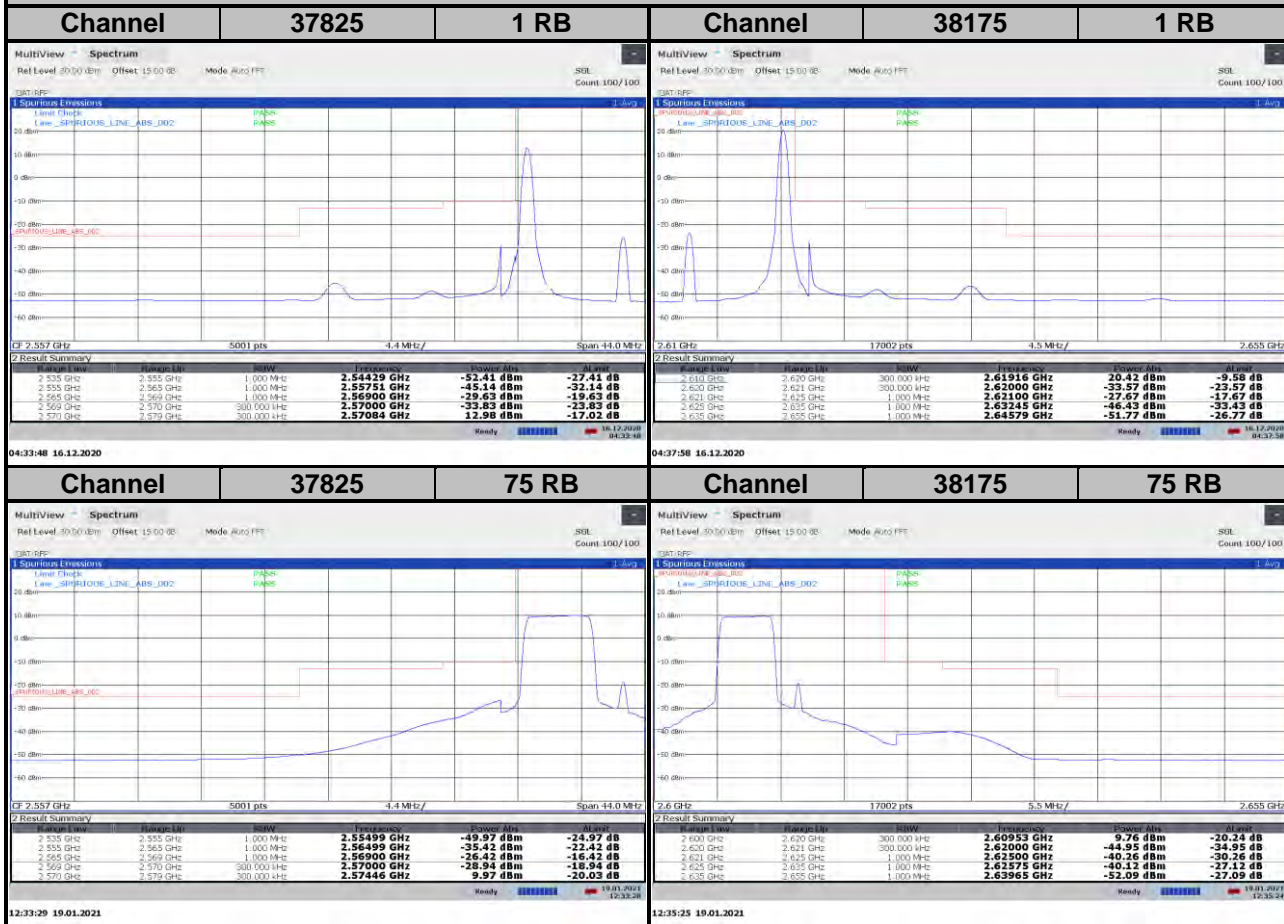
**LTE Band 38**  
**Channel Bandwidth: 15 MHz / QPSK**

**<Out-of-Band Emissions>**



**LTE Band 38**  
**Channel Bandwidth: 15 MHz / 16QAM**

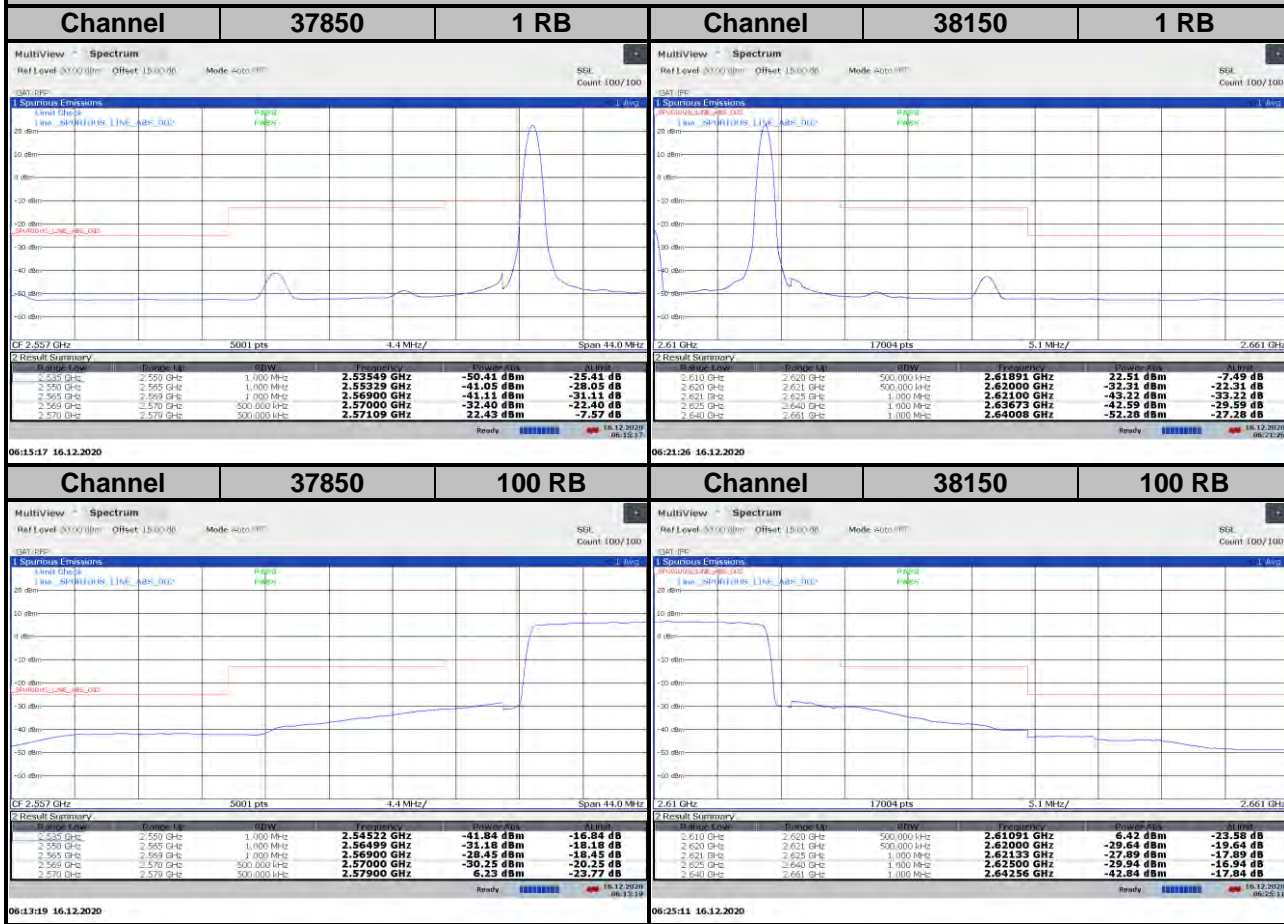
**<Out-of-Band Emissions>**



LTE Band 38

Channel Bandwidth: 20 MHz / QPSK

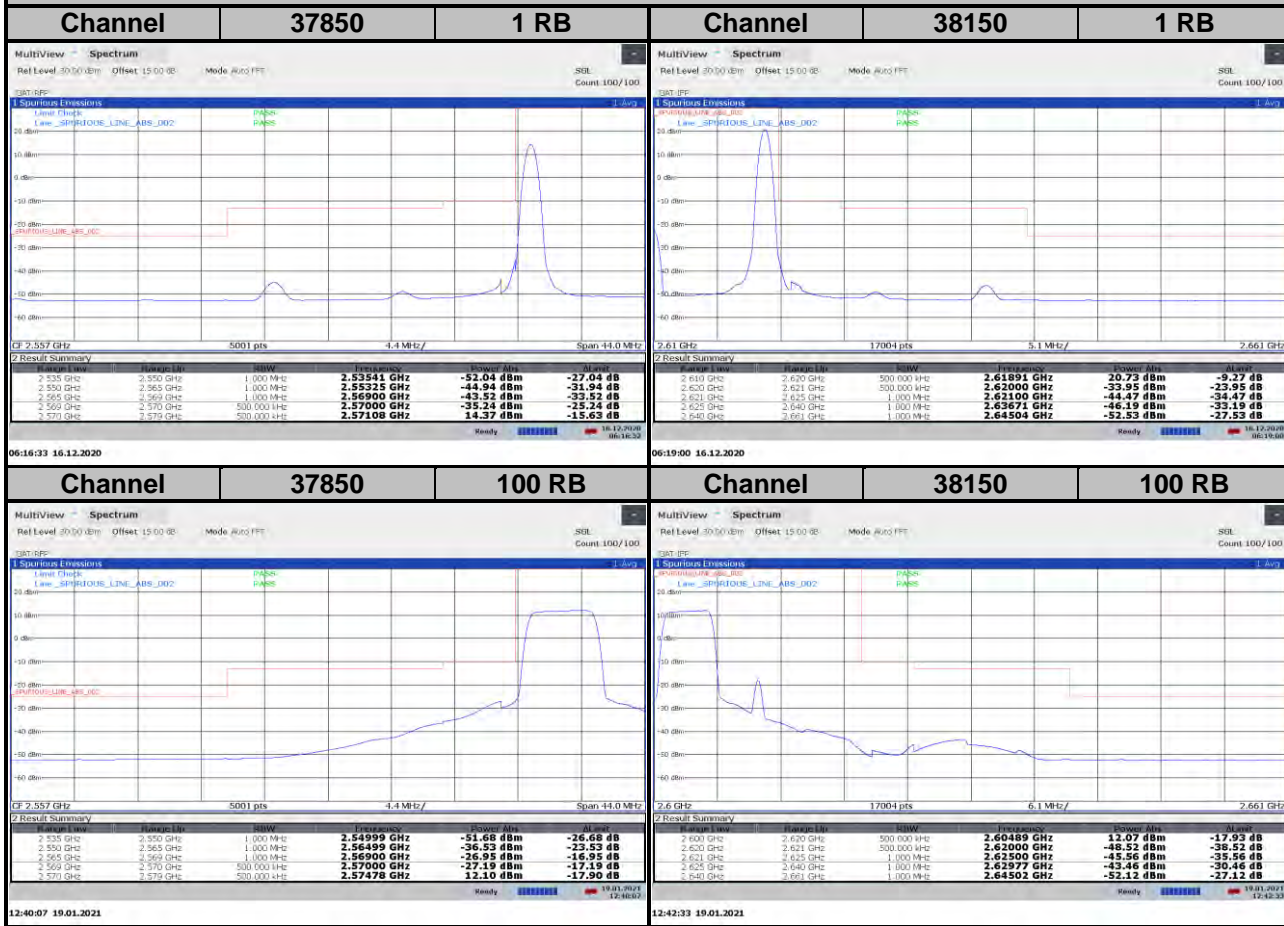
<Out-of-Band Emissions>



LTE Band 38

Channel Bandwidth: 20 MHz / 16QAM

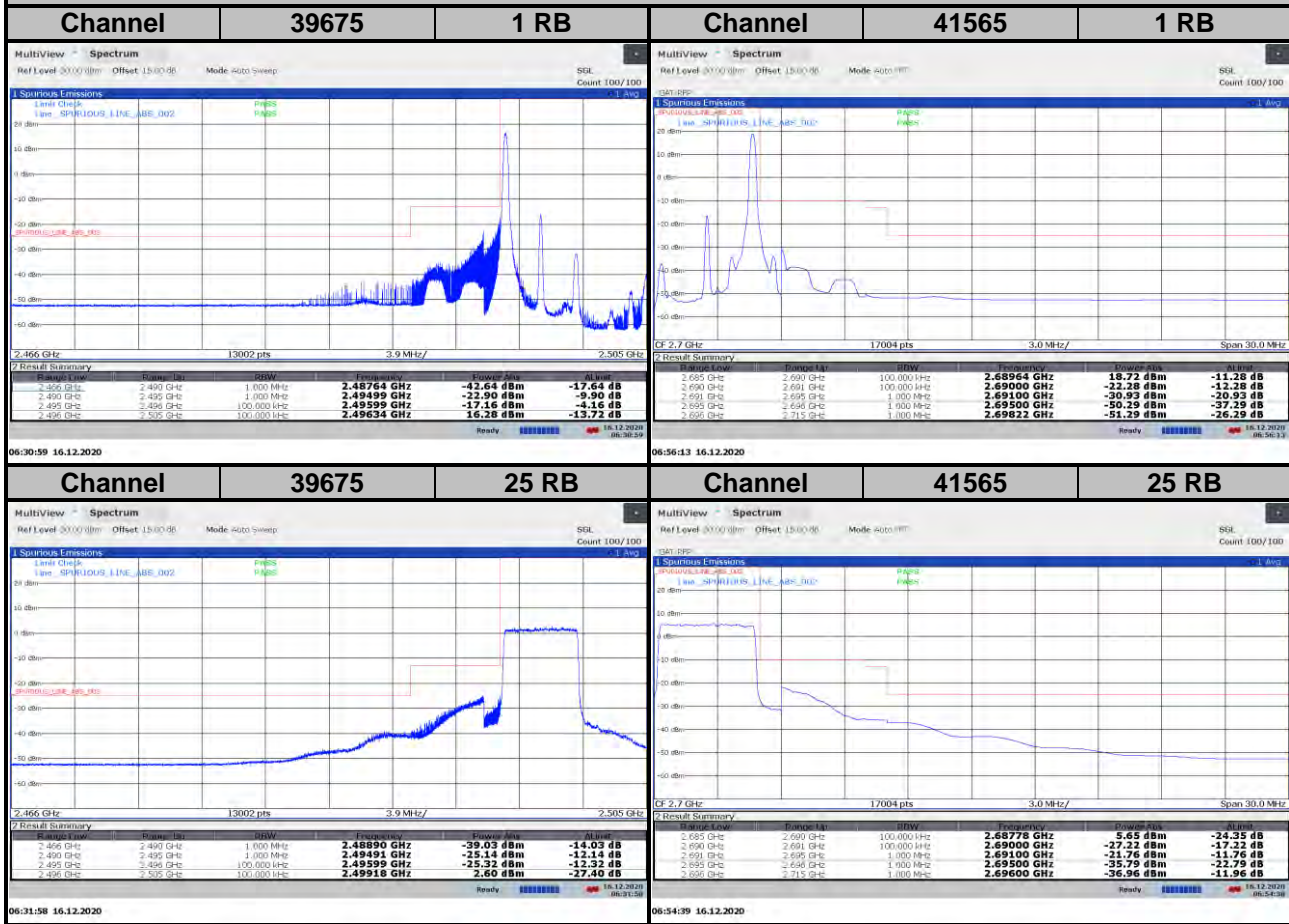
<Out-of-Band Emissions>



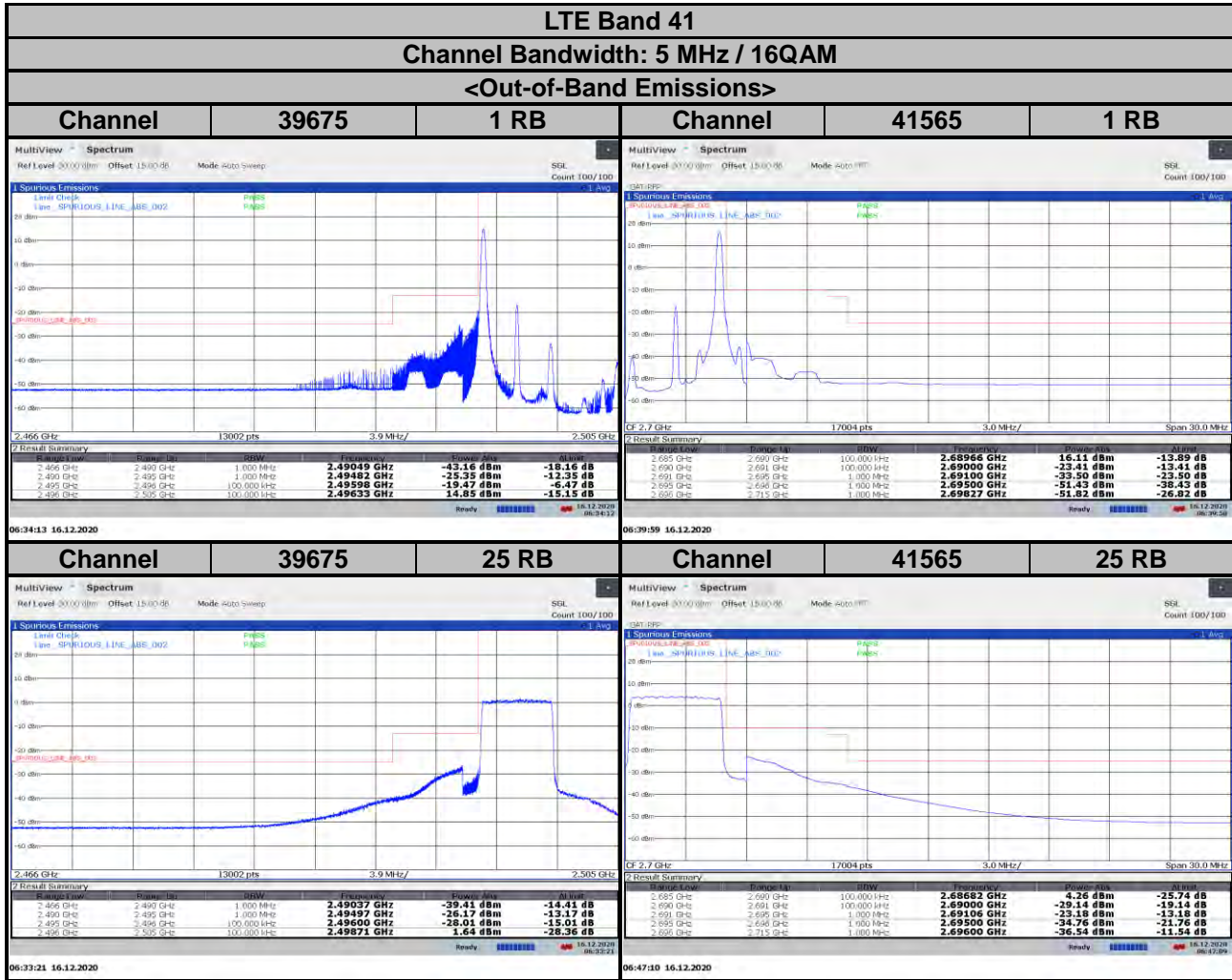
LTE Band 41

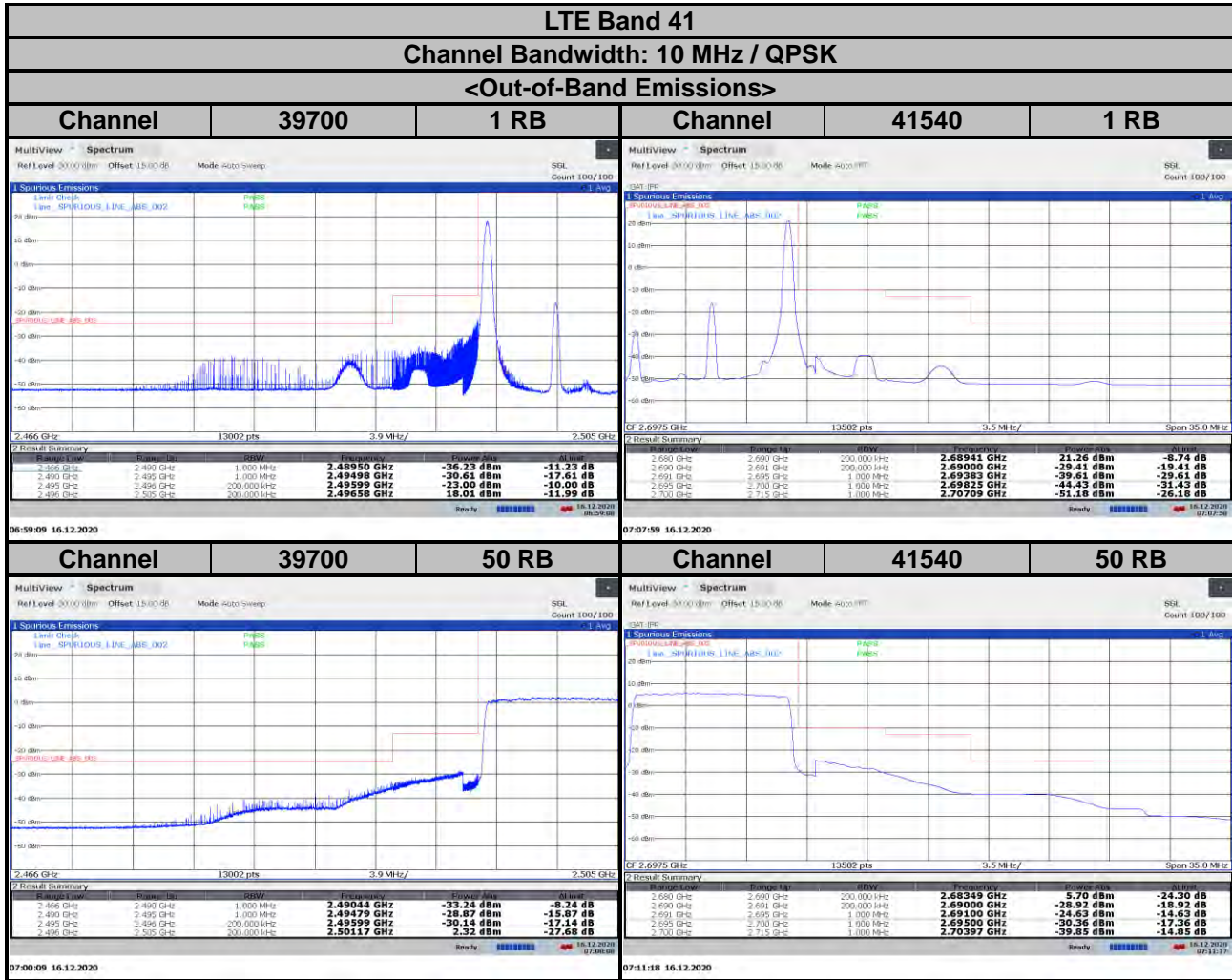
Channel Bandwidth: 5 MHz / QPSK

<Out-of-Band Emissions>





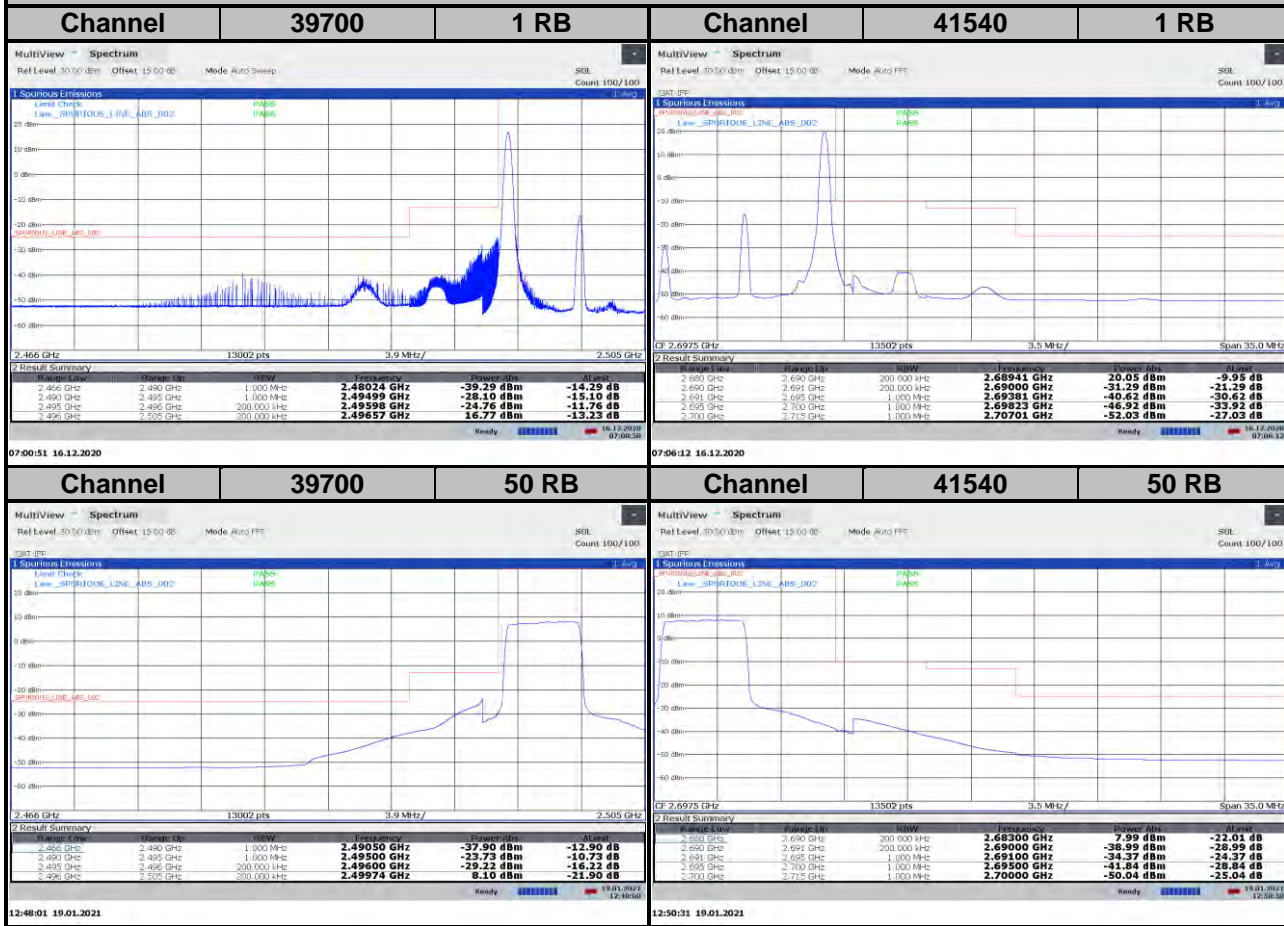




LTE Band 41

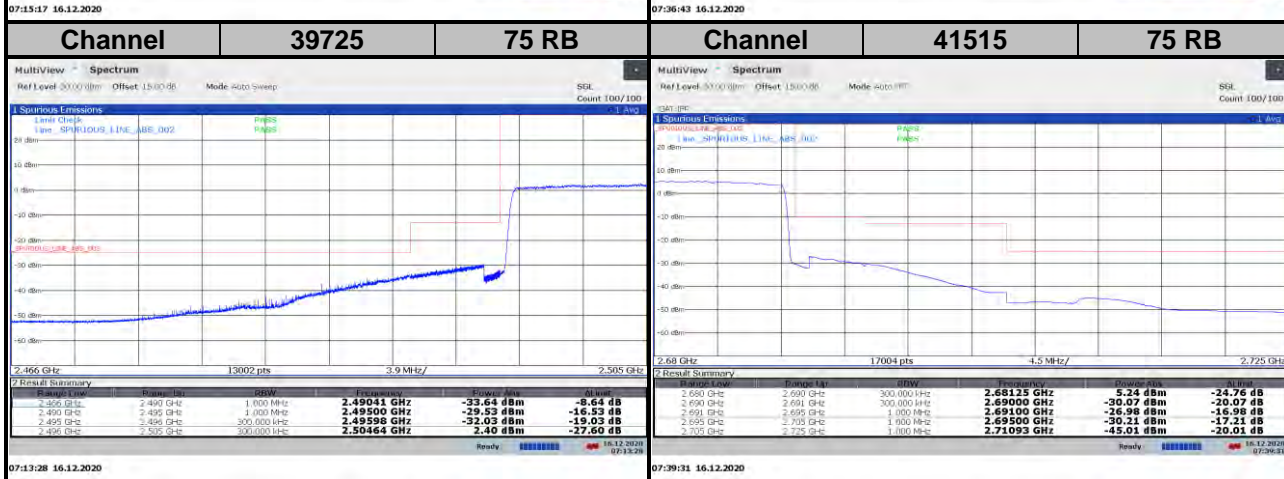
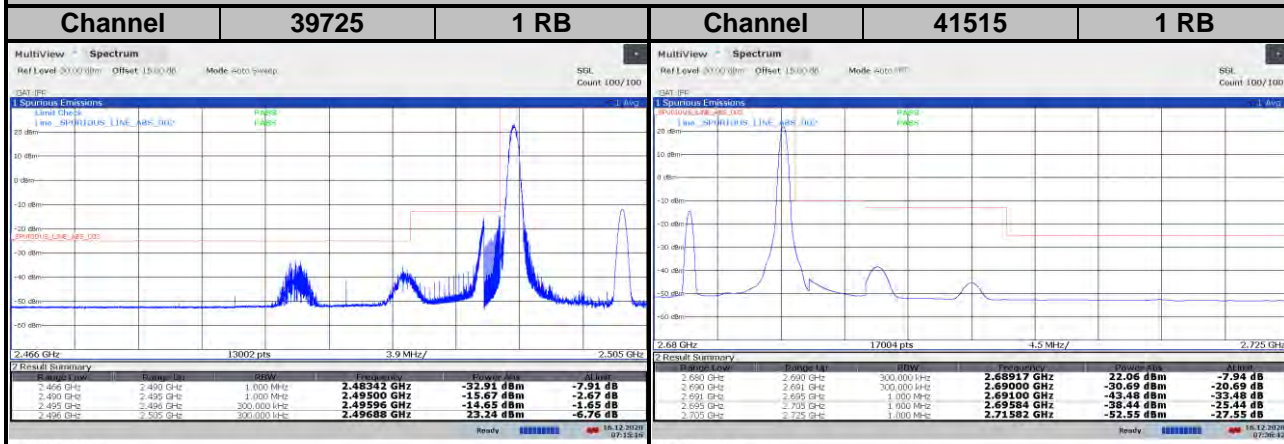
Channel Bandwidth: 10 MHz / 16QAM

<Out-of-Band Emissions>



**LTE Band 41**  
**Channel Bandwidth: 15 MHz / QPSK**

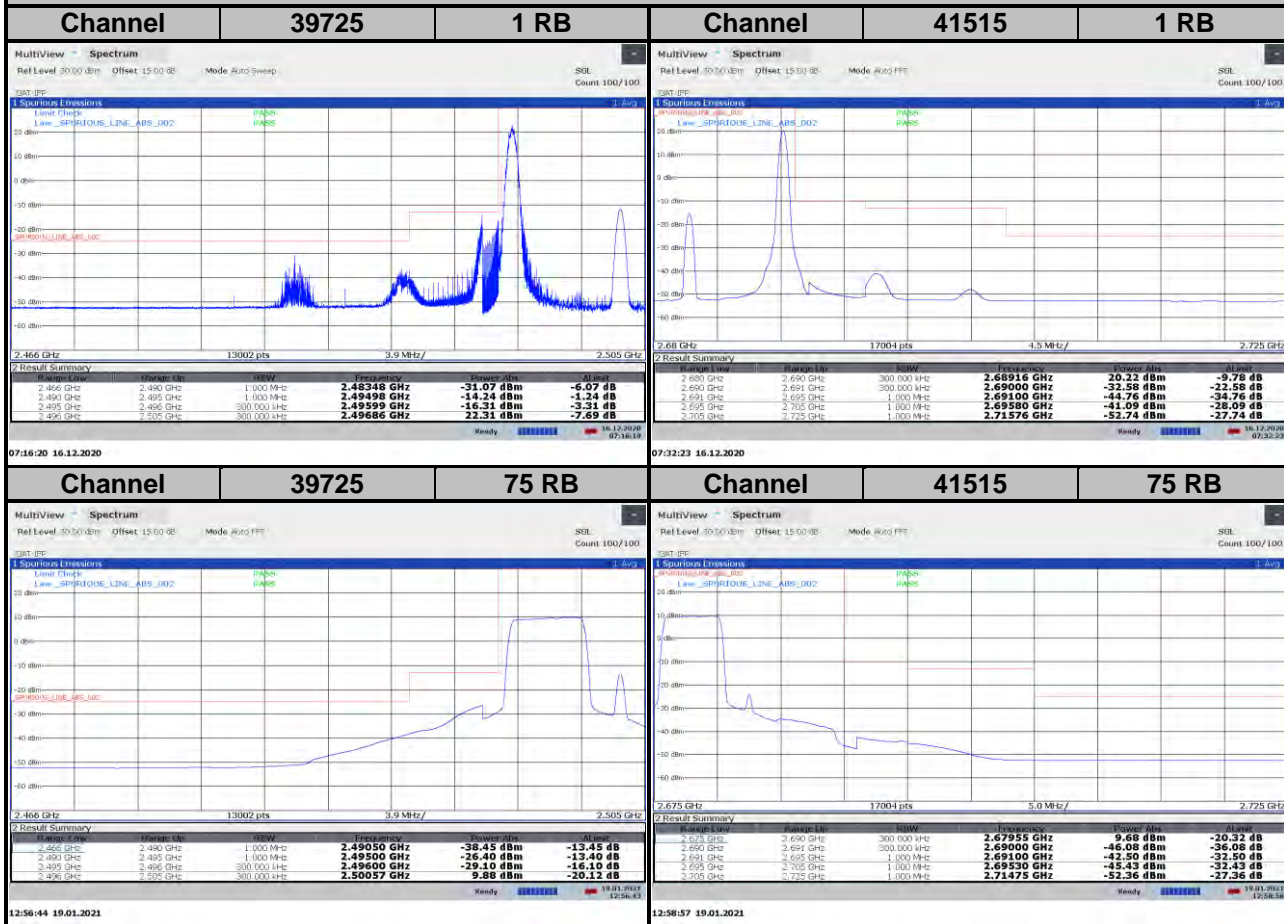
**<Out-of-Band Emissions>**



LTE Band 41

Channel Bandwidth: 15 MHz / 16QAM

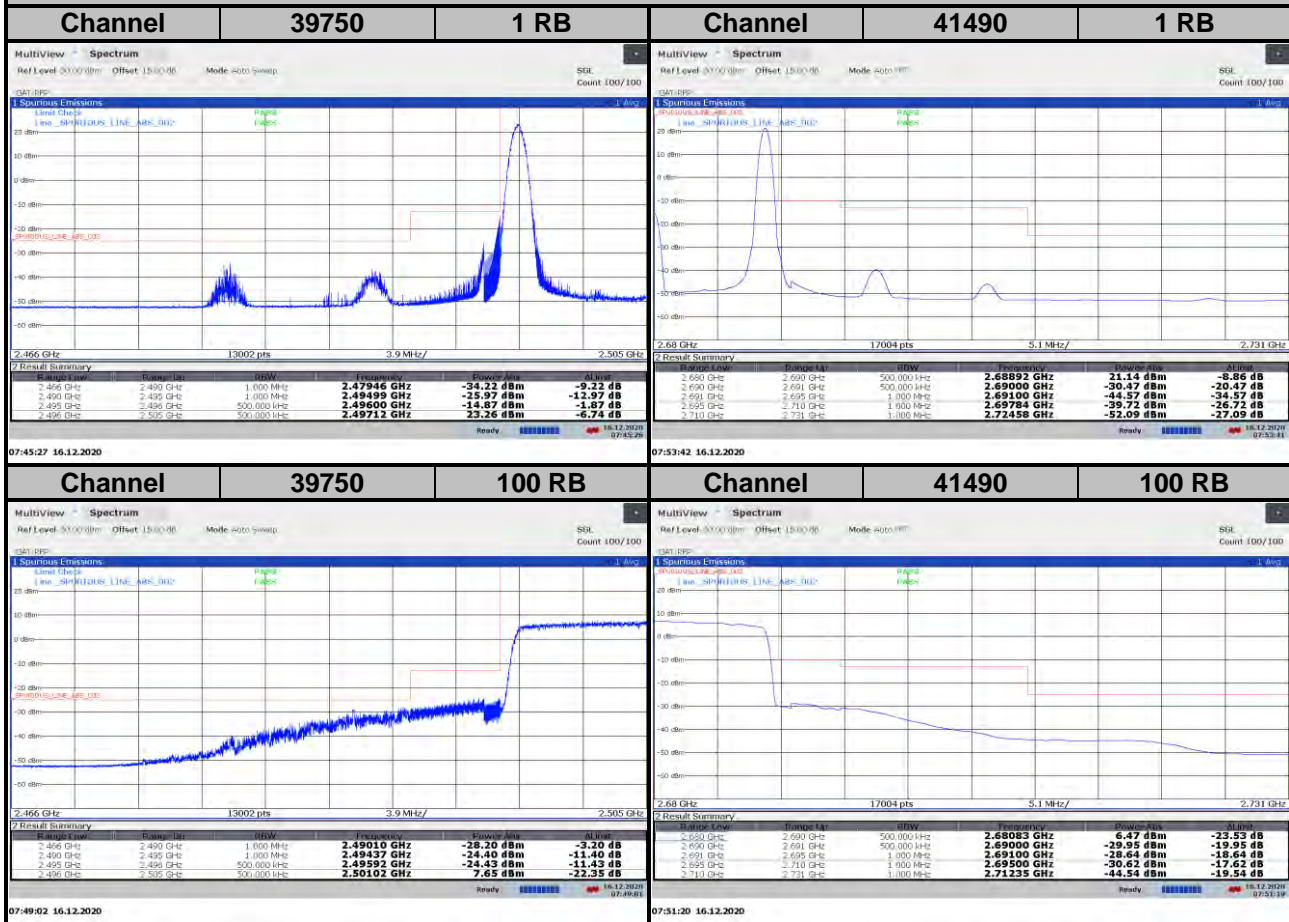
<Out-of-Band Emissions>



### LTE Band 41

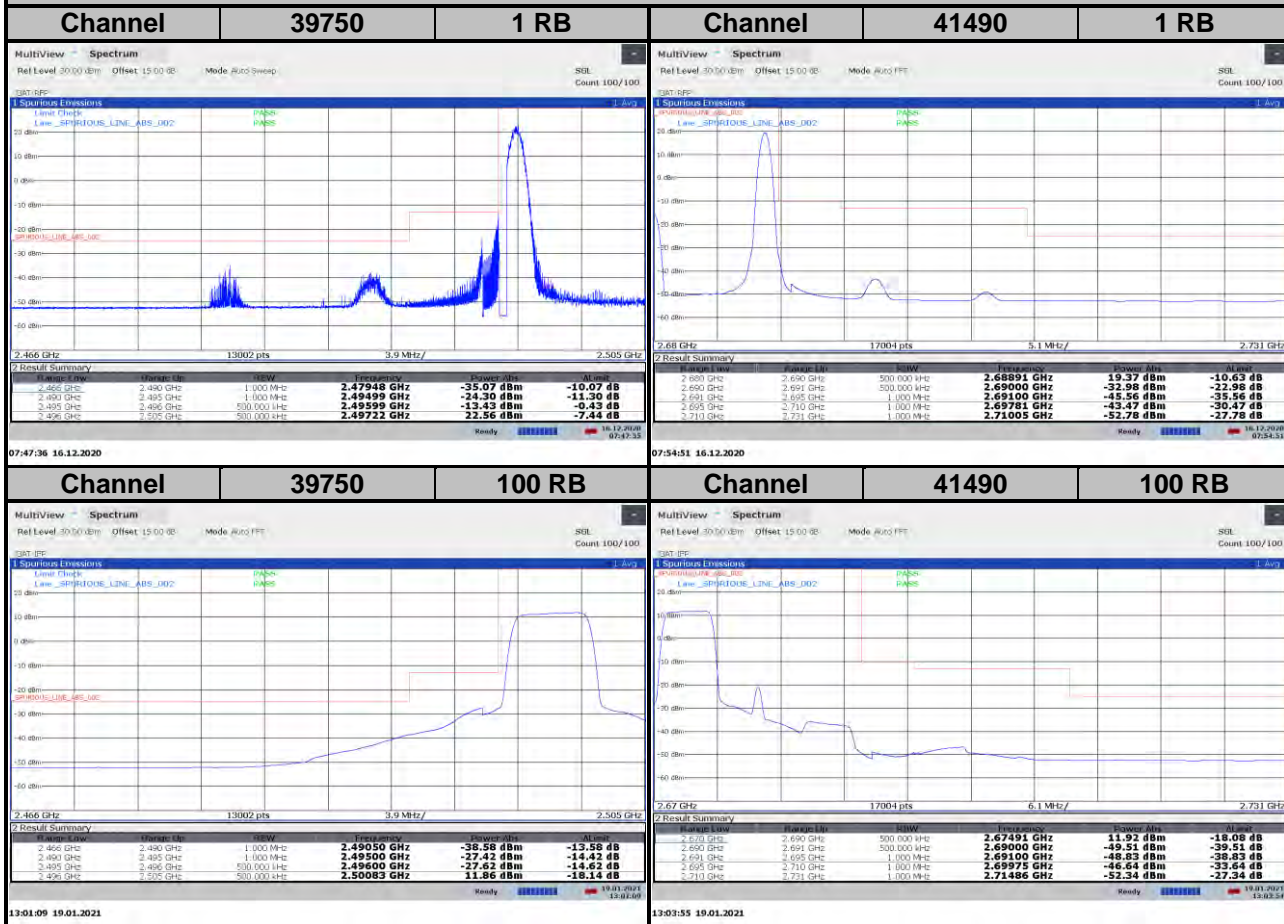
Channel Bandwidth: 20 MHz / QPSK

#### <Out-of-Band Emissions>



**LTE Band 41**  
**Channel Bandwidth: 20 MHz / 16QAM**

**<Out-of-Band Emissions>**

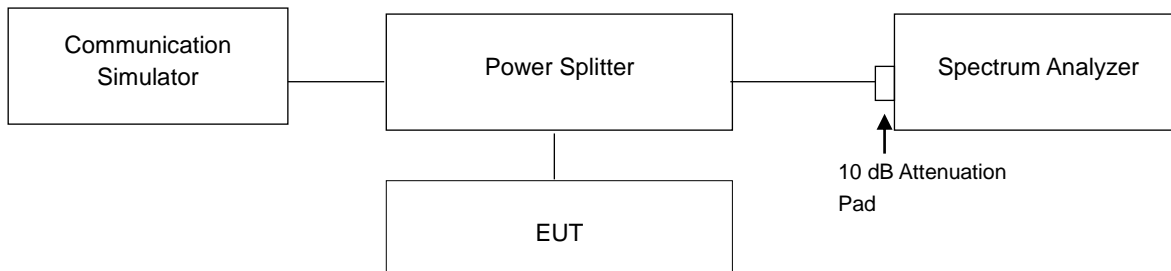


## 4.6 Peak to Average Ratio

### 4.6.1 Limits of Peak to Average Ratio Measurement

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

### 4.6.2 Test Setup



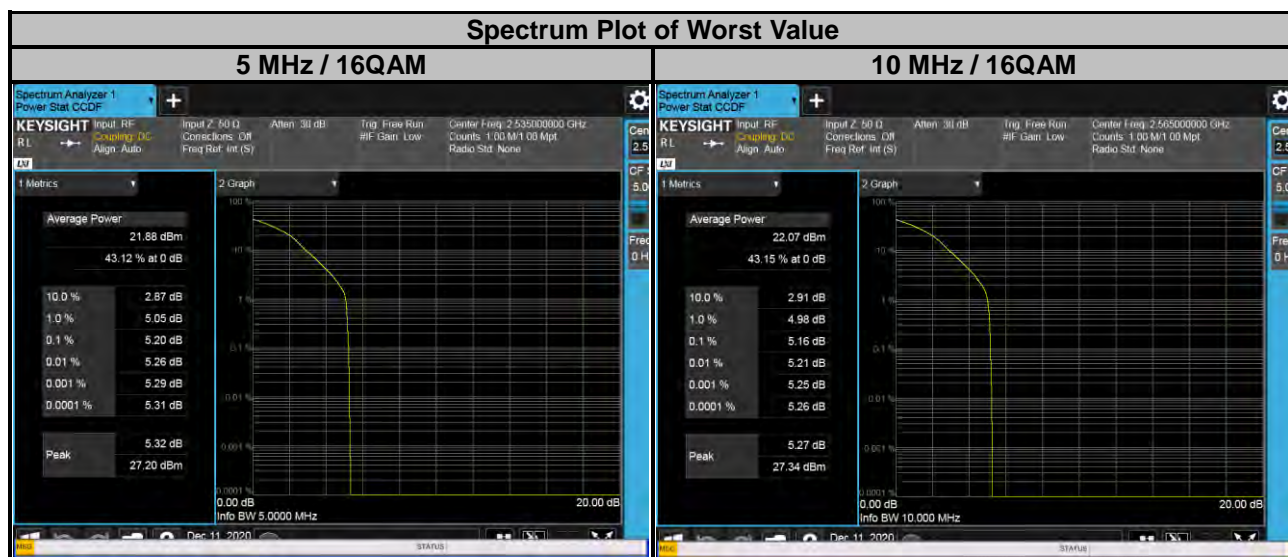
### 4.6.3 Test Procedures

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

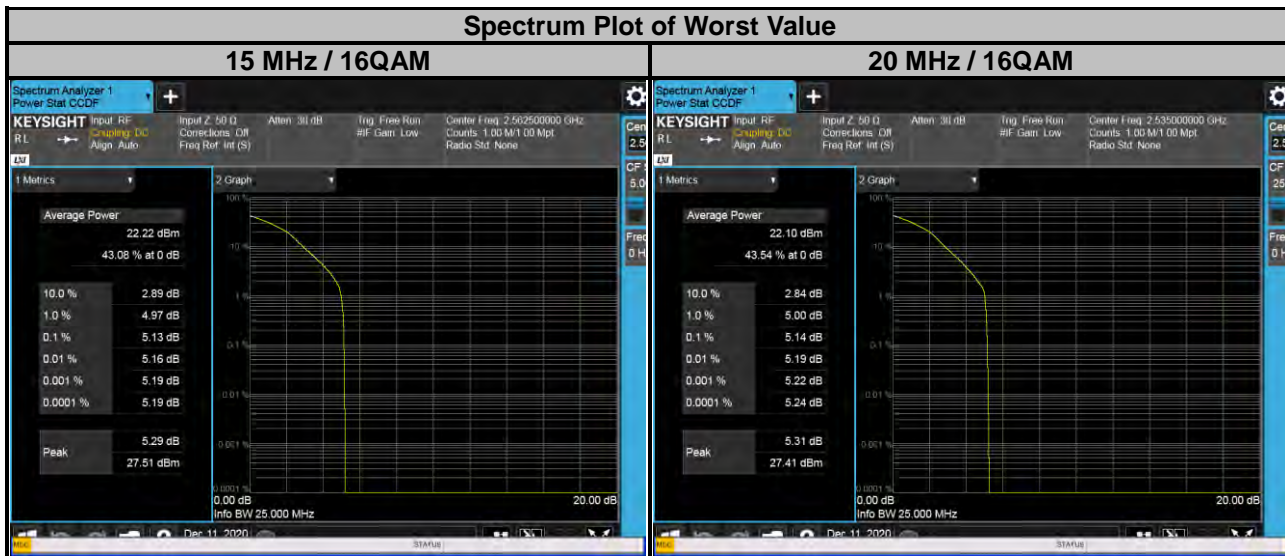


#### 4.6.4 Test Results

LTE Band 7							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20775	2502.5	4.10	5.02	20800	2505.0	4.01	4.95
21100	2535.0	4.35	5.20	21100	2535.0	4.26	5.15
21425	2567.5	4.17	5.14	21400	2565.0	4.61	5.16



LTE Band 7							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20825	2507.5	3.99	4.90	20850	2510.0	4.03	4.98
21100	2535.0	4.18	5.04	21100	2535.0	4.24	5.14
21375	2562.5	4.43	5.13	21350	2560.0	4.46	5.11



LTE Band 38							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
37775	2572.5	4.63	5.73	37800	2575.0	4.72	5.84
38000	2595.0	4.46	5.66	38000	2595.0	4.58	6.10
38225	2617.5	4.44	5.66	38200	2615.0	4.56	5.84



LTE Band 38							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
37825	2577.5	4.99	6.31	37850	2580.0	4.46	6.16
38000	2595.0	4.74	6.33	38000	2595.0	4.42	6.17
38175	2612.5	4.62	6.14	38150	2610.0	4.44	6.08



LTE Band 41							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
39675	2498.5	4.54	6.44	39700	2501.0	5.38	6.10
40620	2593.0	4.51	6.23	40620	2593.0	4.63	6.19
41565	2687.5	4.61	6.06	41540	2685.0	4.74	6.28



LTE Band 41							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
39725	2503.5	4.48	5.58	39750	2506.0	4.64	6.41
40620	2593.0	4.42	5.34	40620	2593.0	4.50	6.35
41515	2682.5	4.13	5.58	41490	2680.0	4.17	6.08

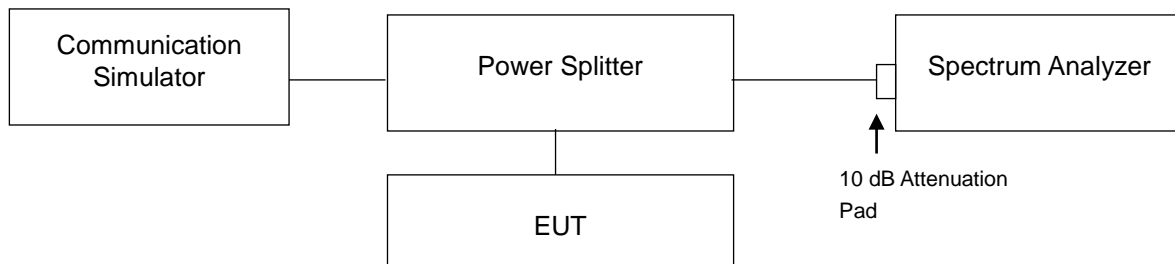


## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log (P)$  dB. The limit of emission is equal to -25 dBm.

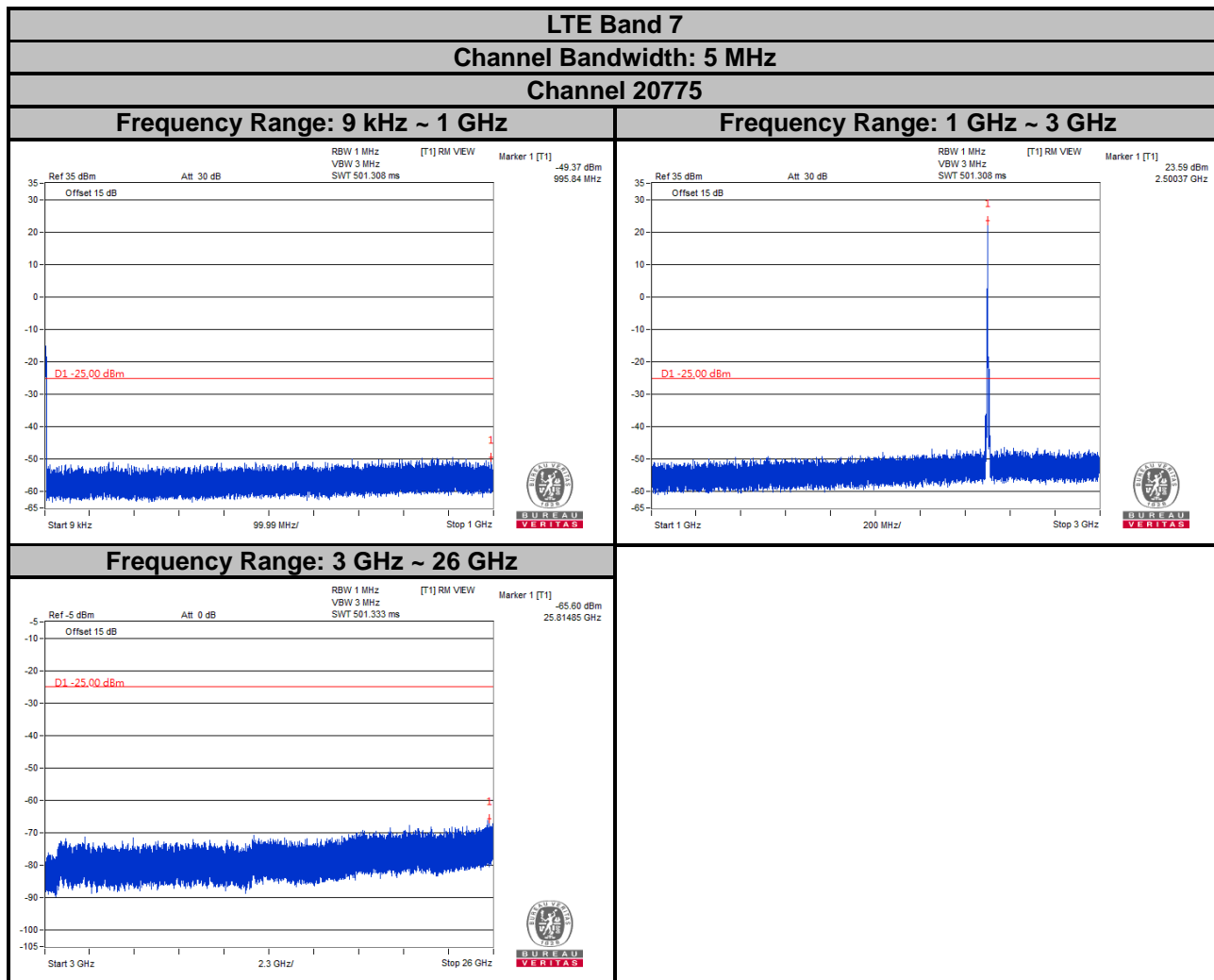
### 4.7.2 Test Setup



### 4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 26 / 27 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

#### 4.7.4 Test Results



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

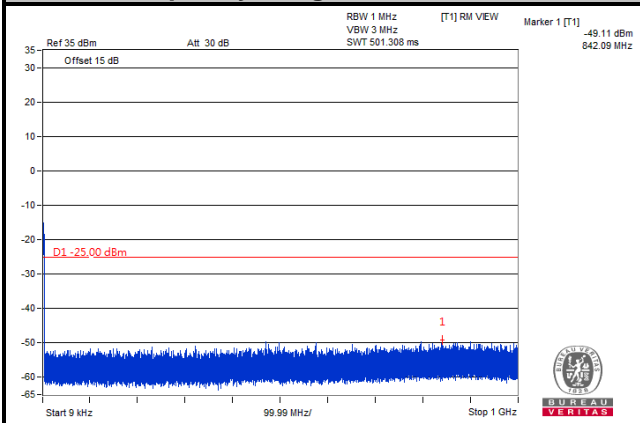


LTE Band 7

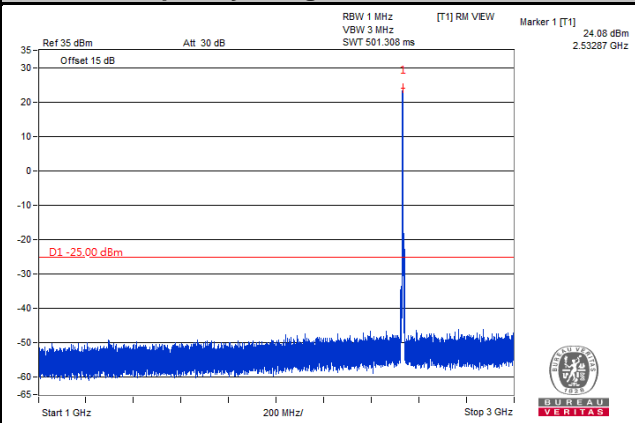
Channel Bandwidth: 5 MHz

Channel 21100

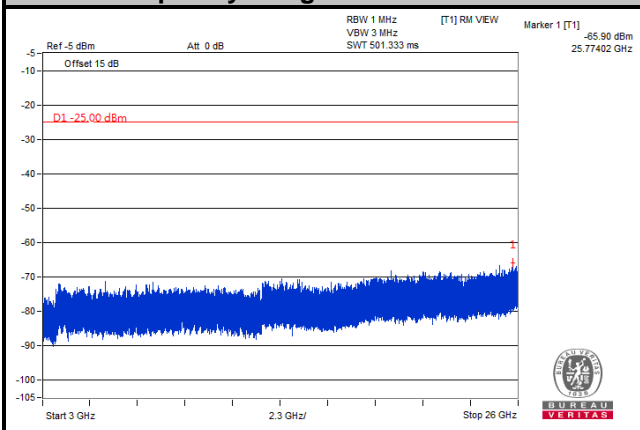
Frequency Range: 9 kHz ~ 1 GHz



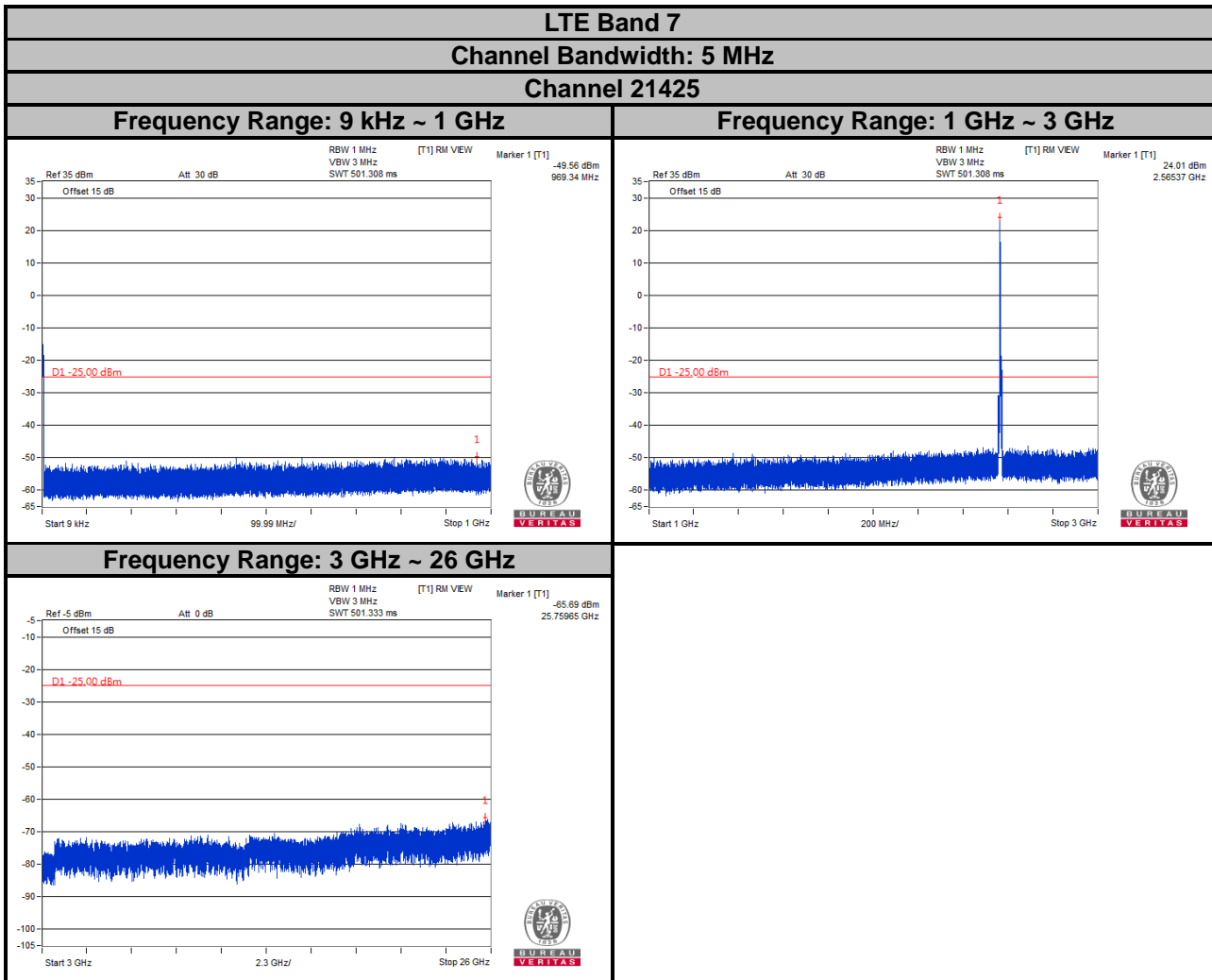
Frequency Range: 1 GHz ~ 3 GHz



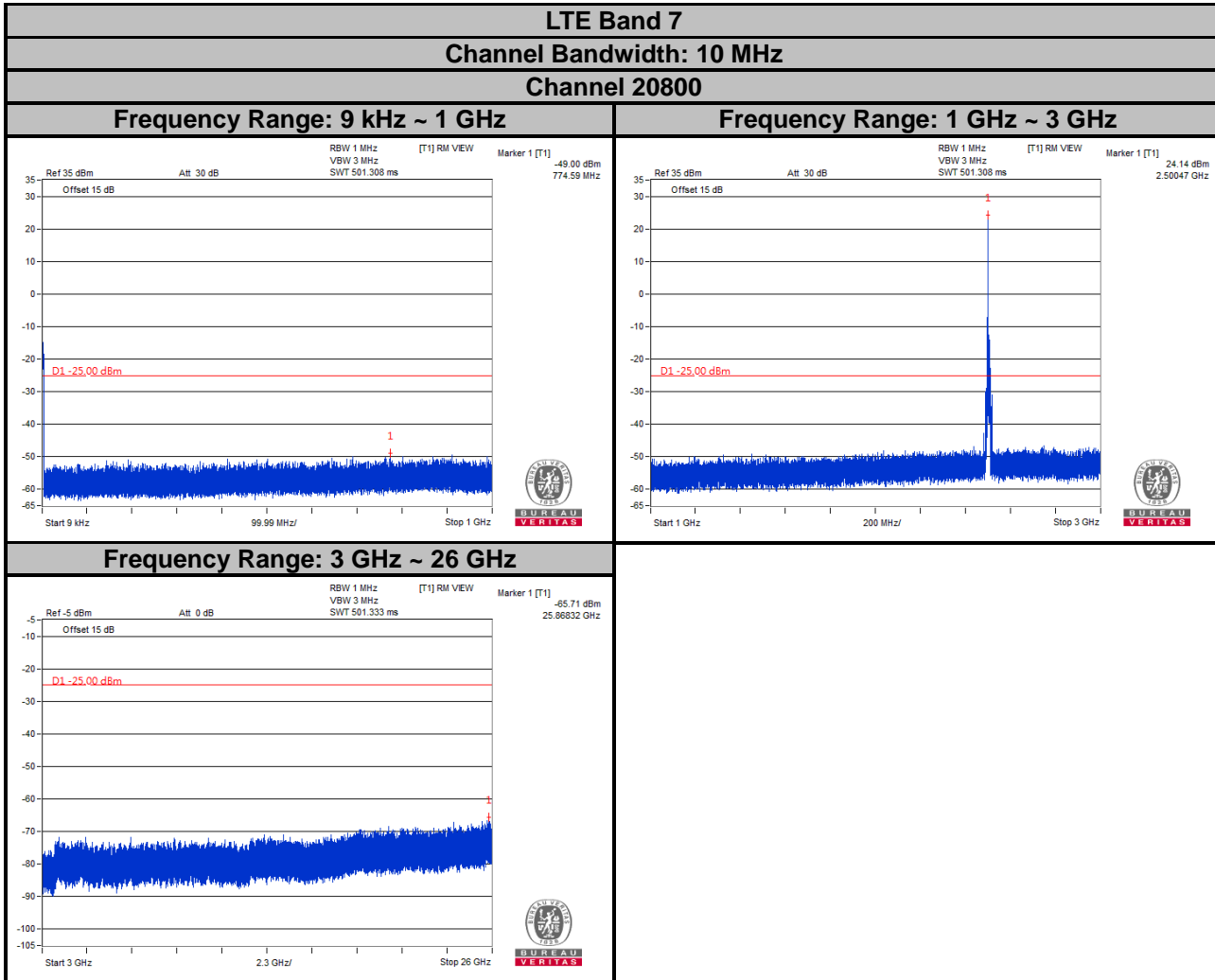
Frequency Range: 3 GHz ~ 26 GHz



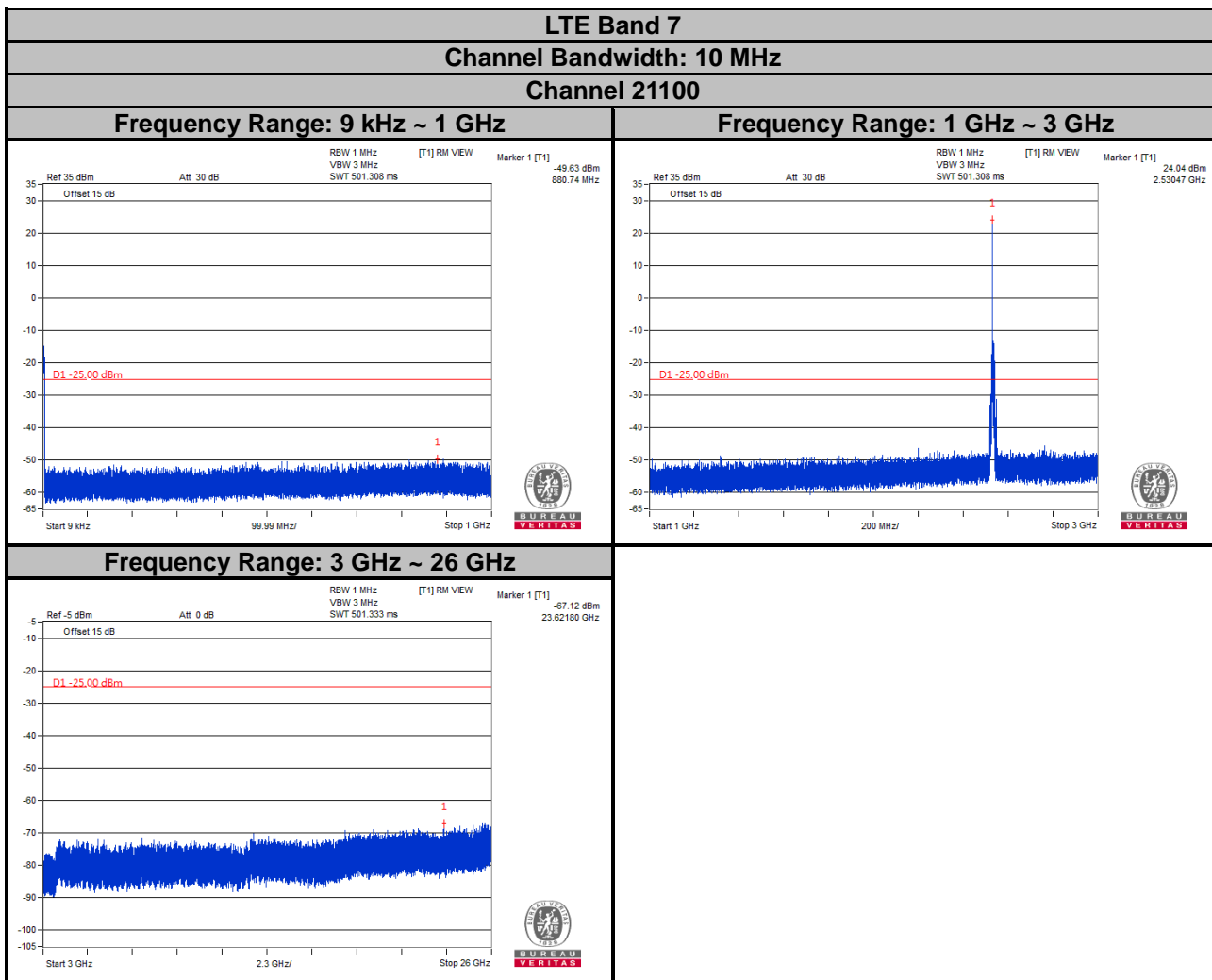
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



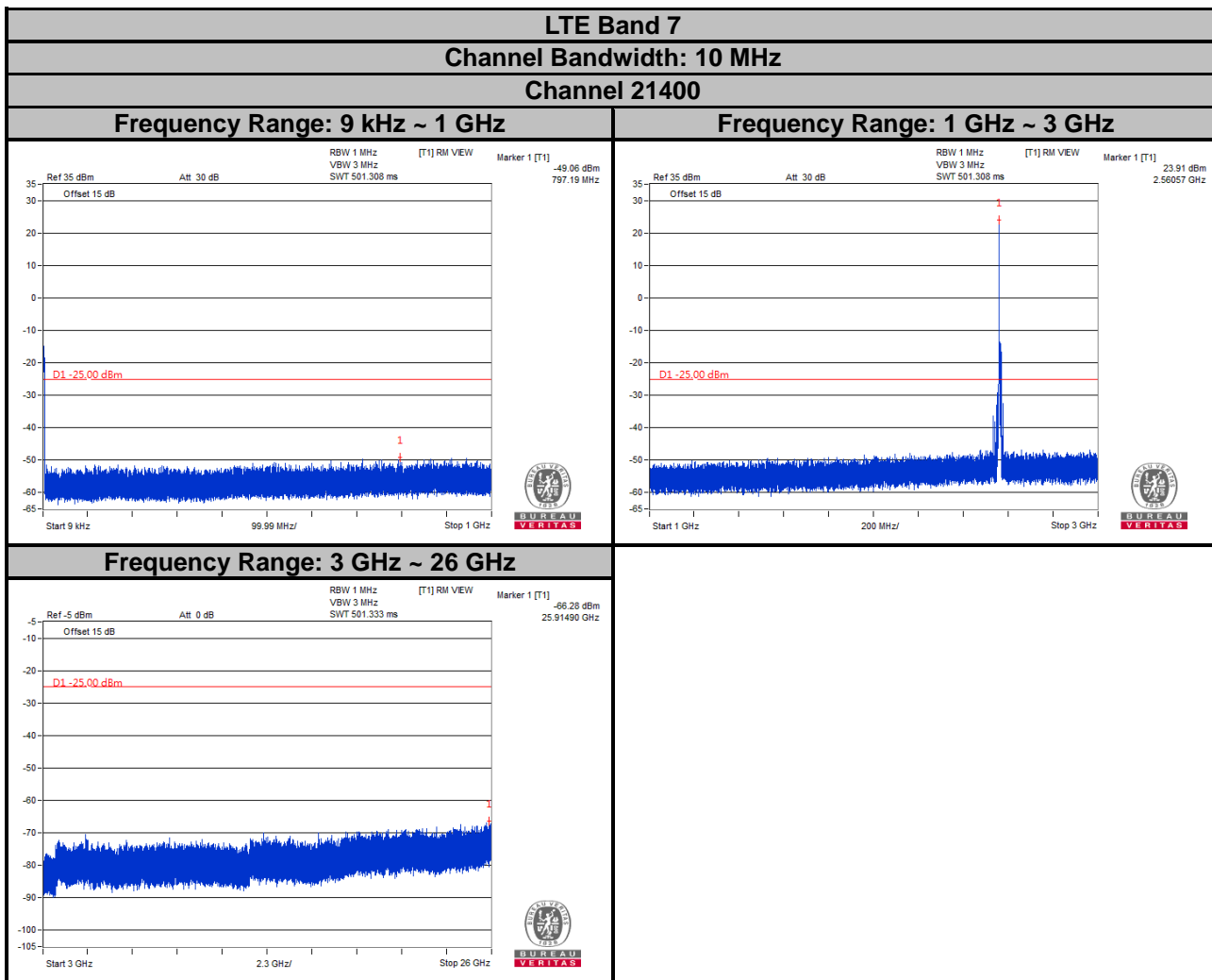
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



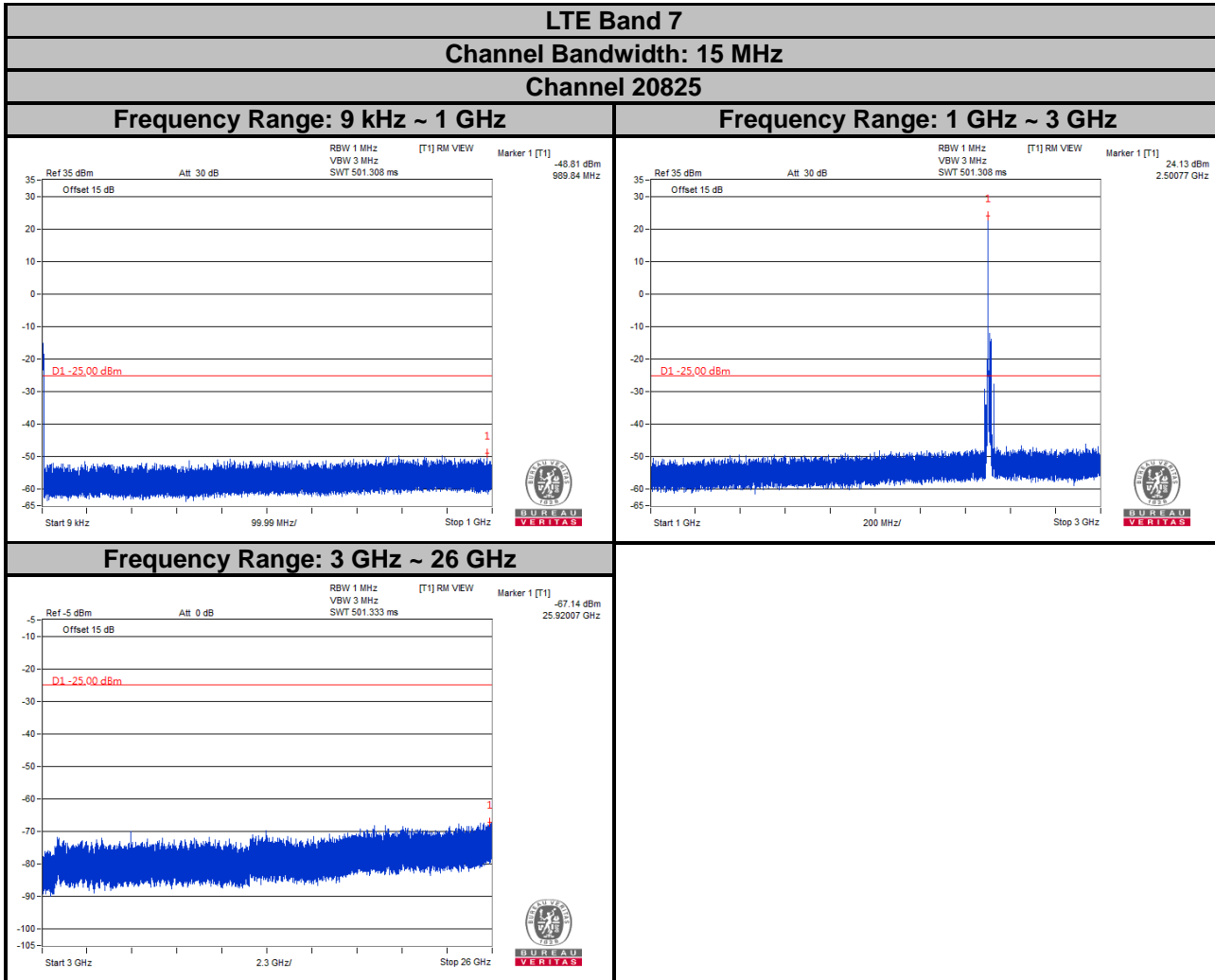
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



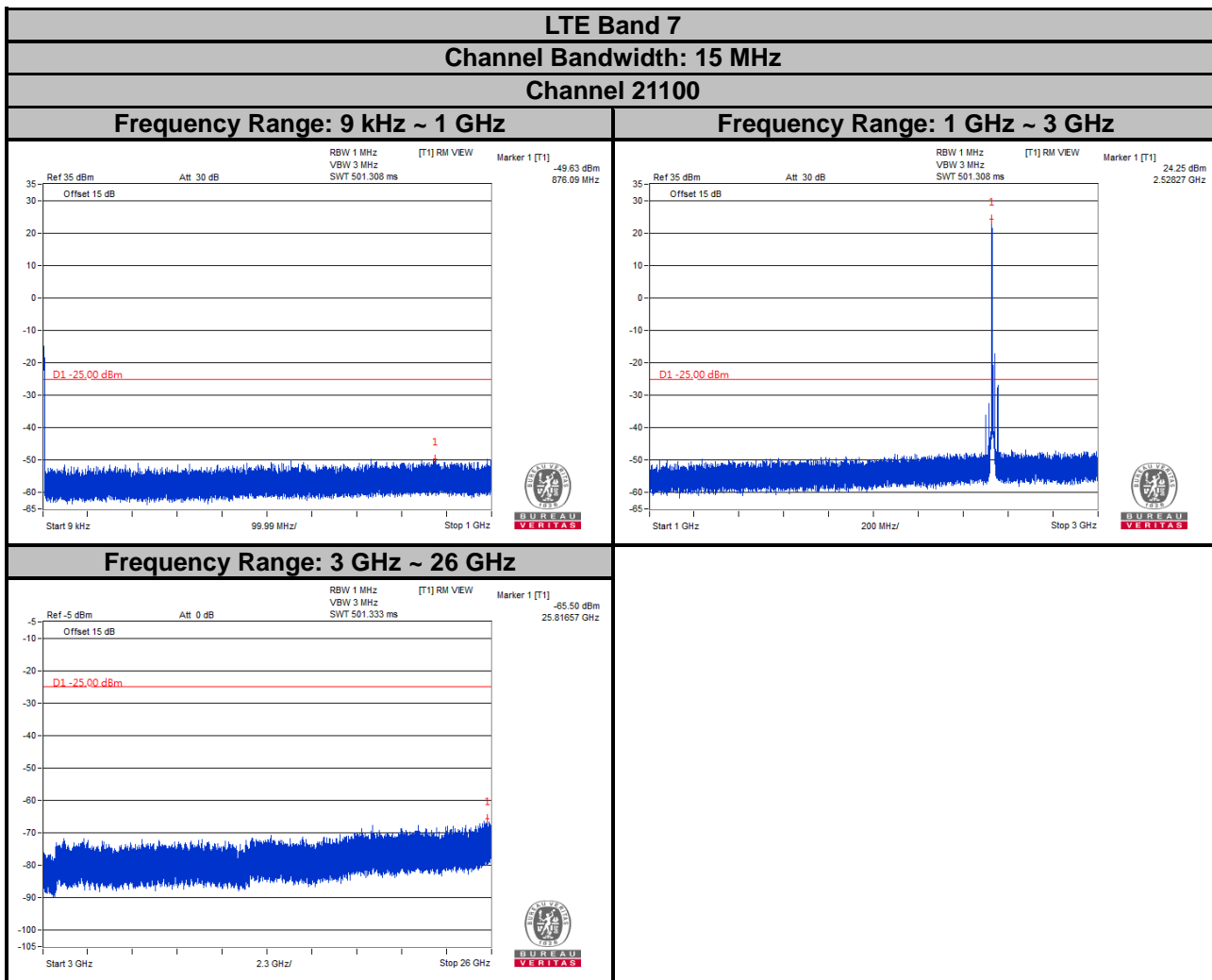
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



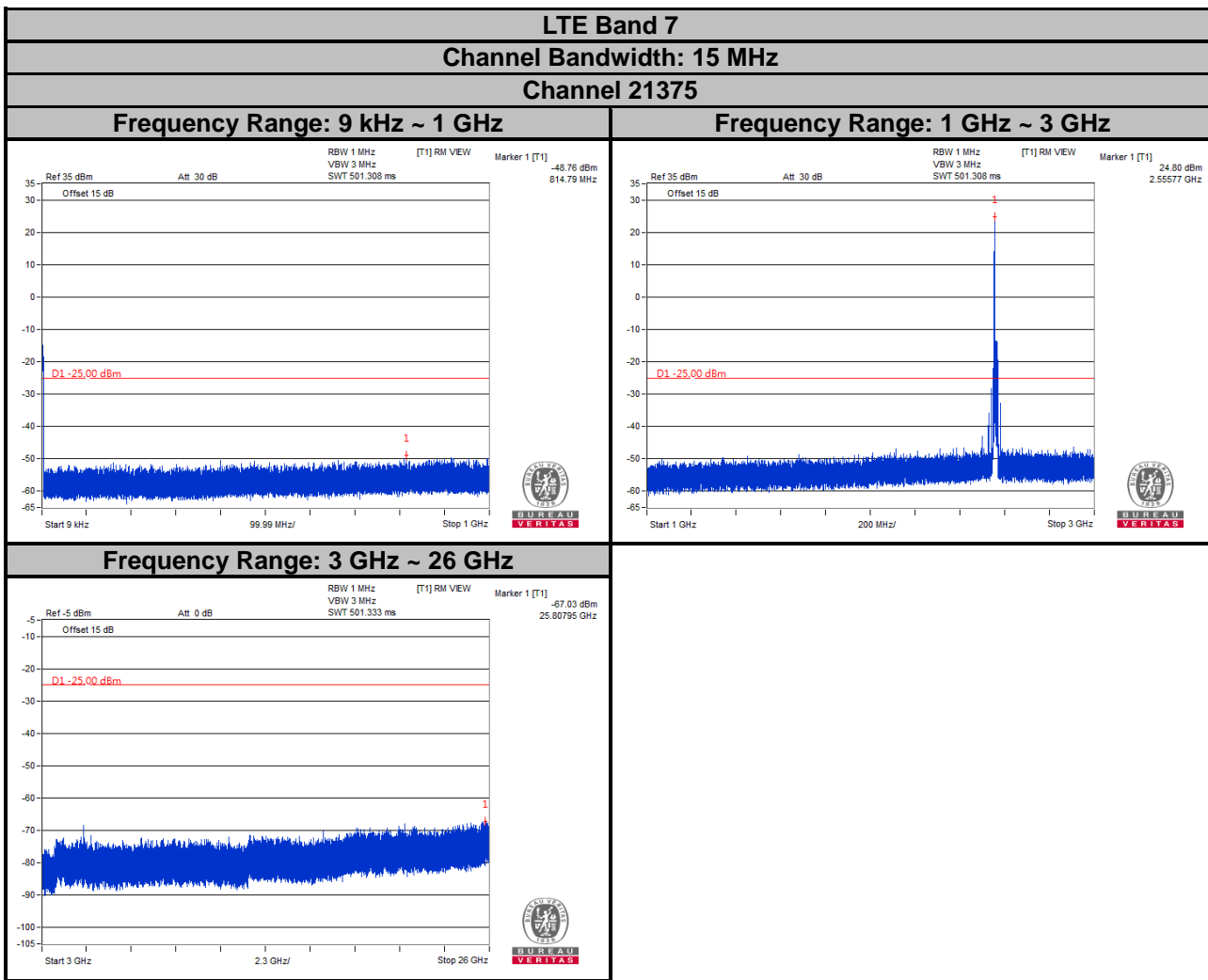
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

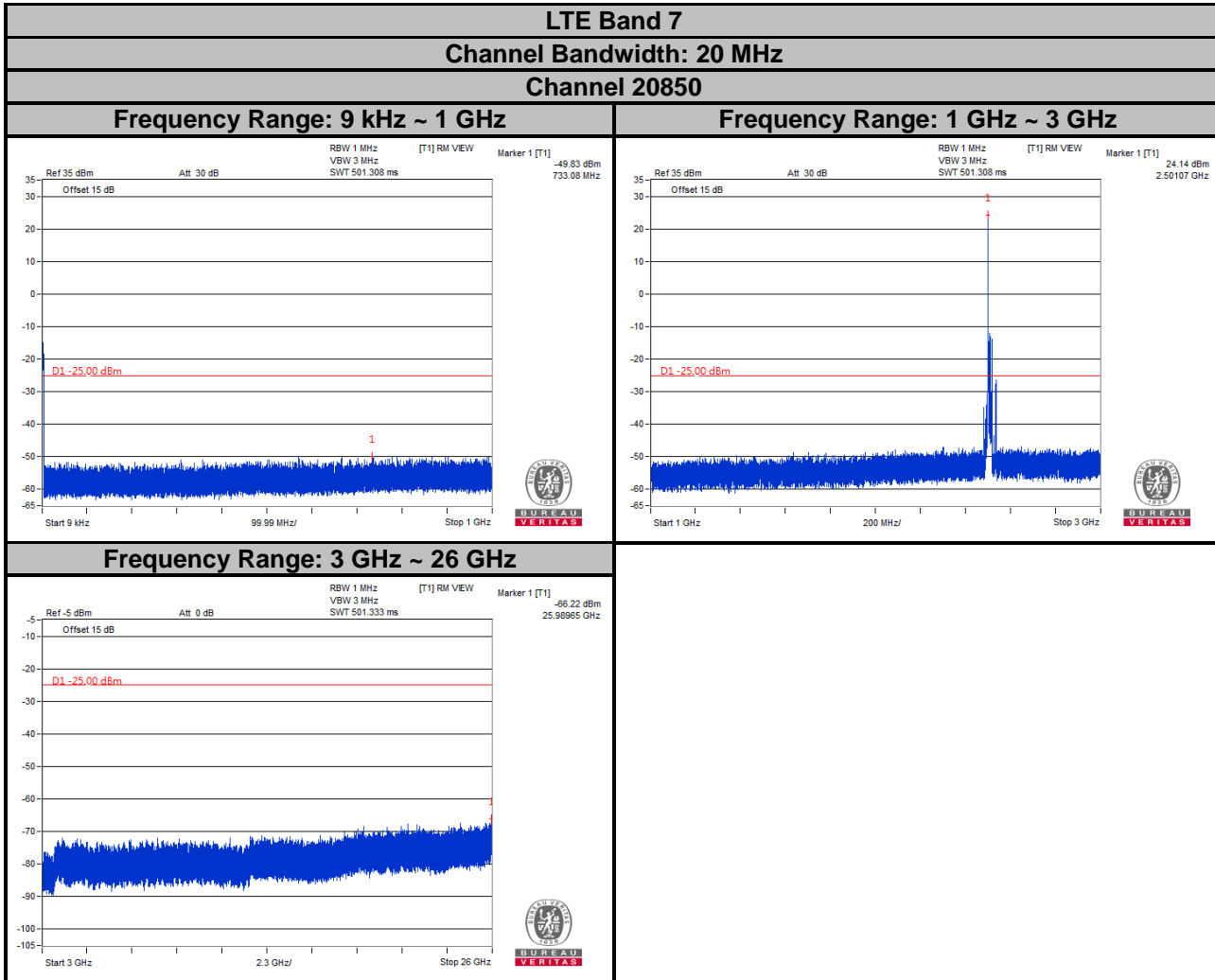


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

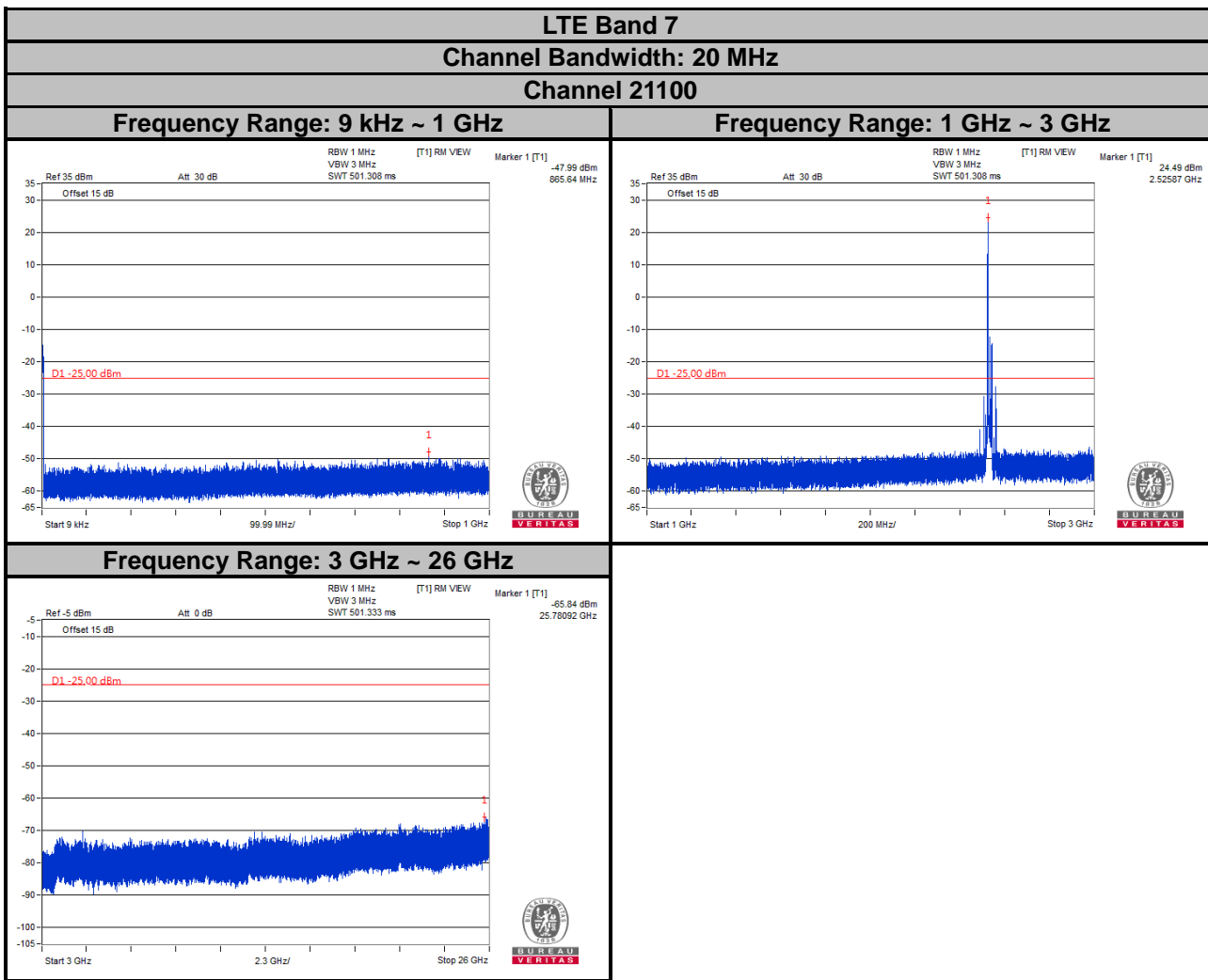


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

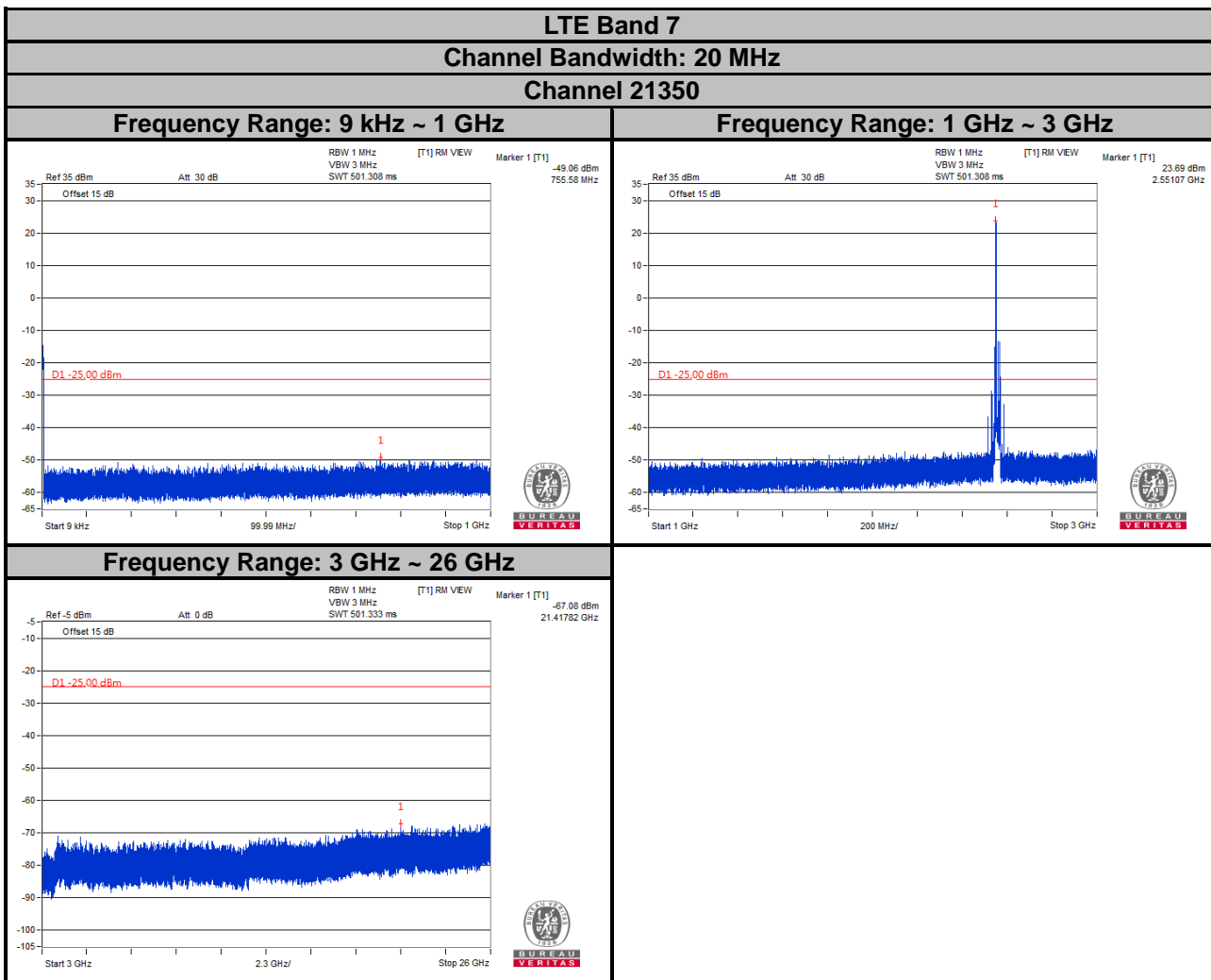




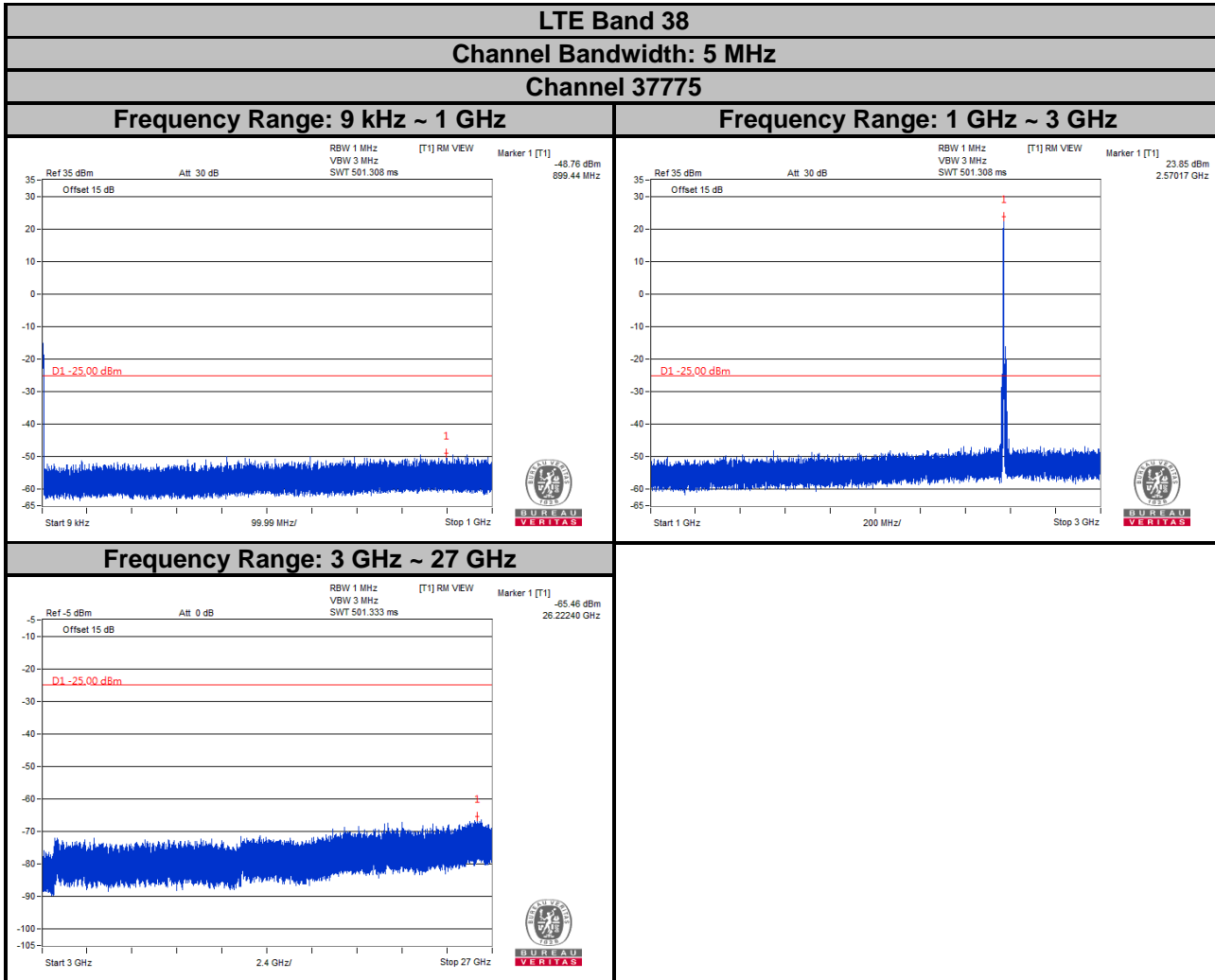
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



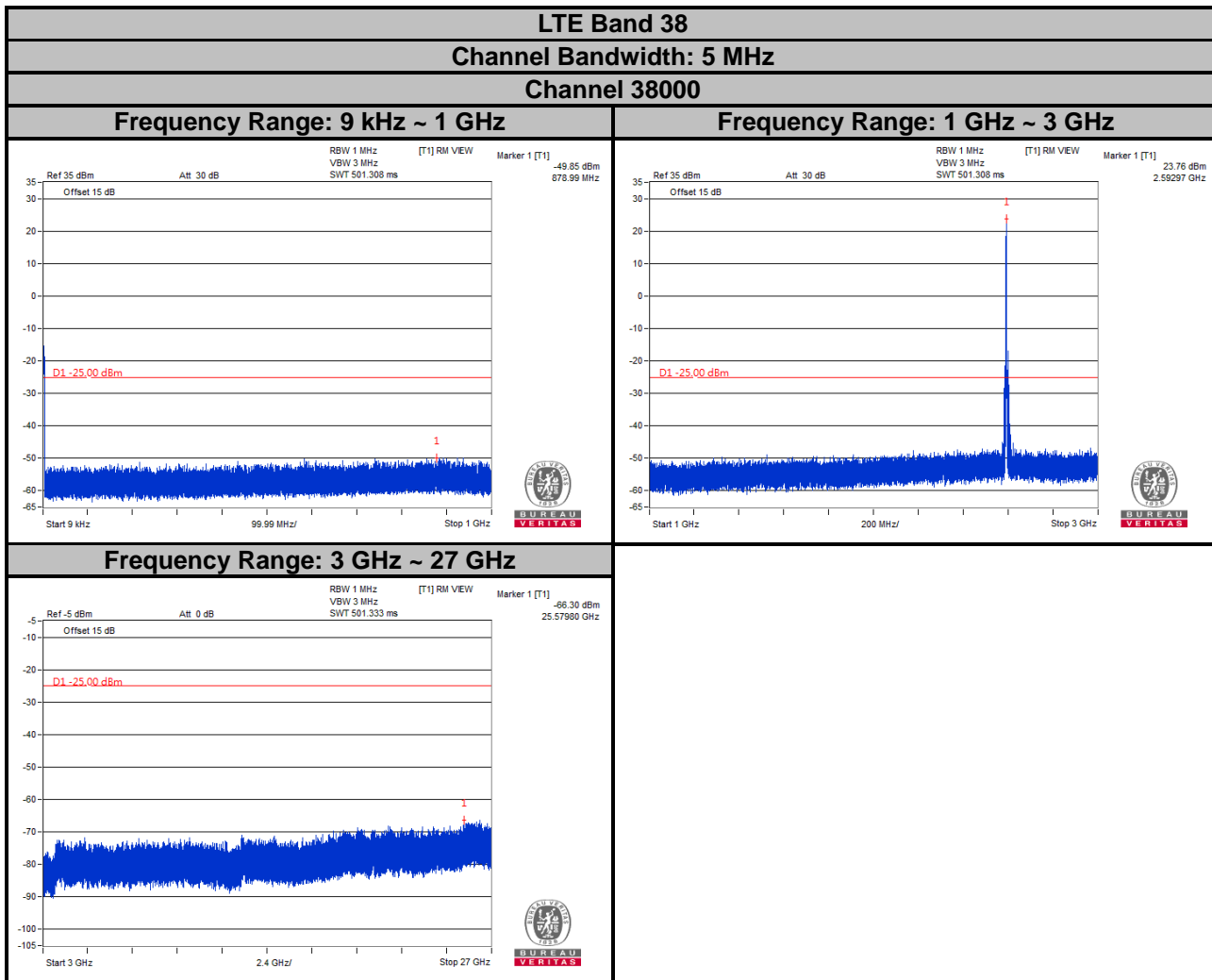
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



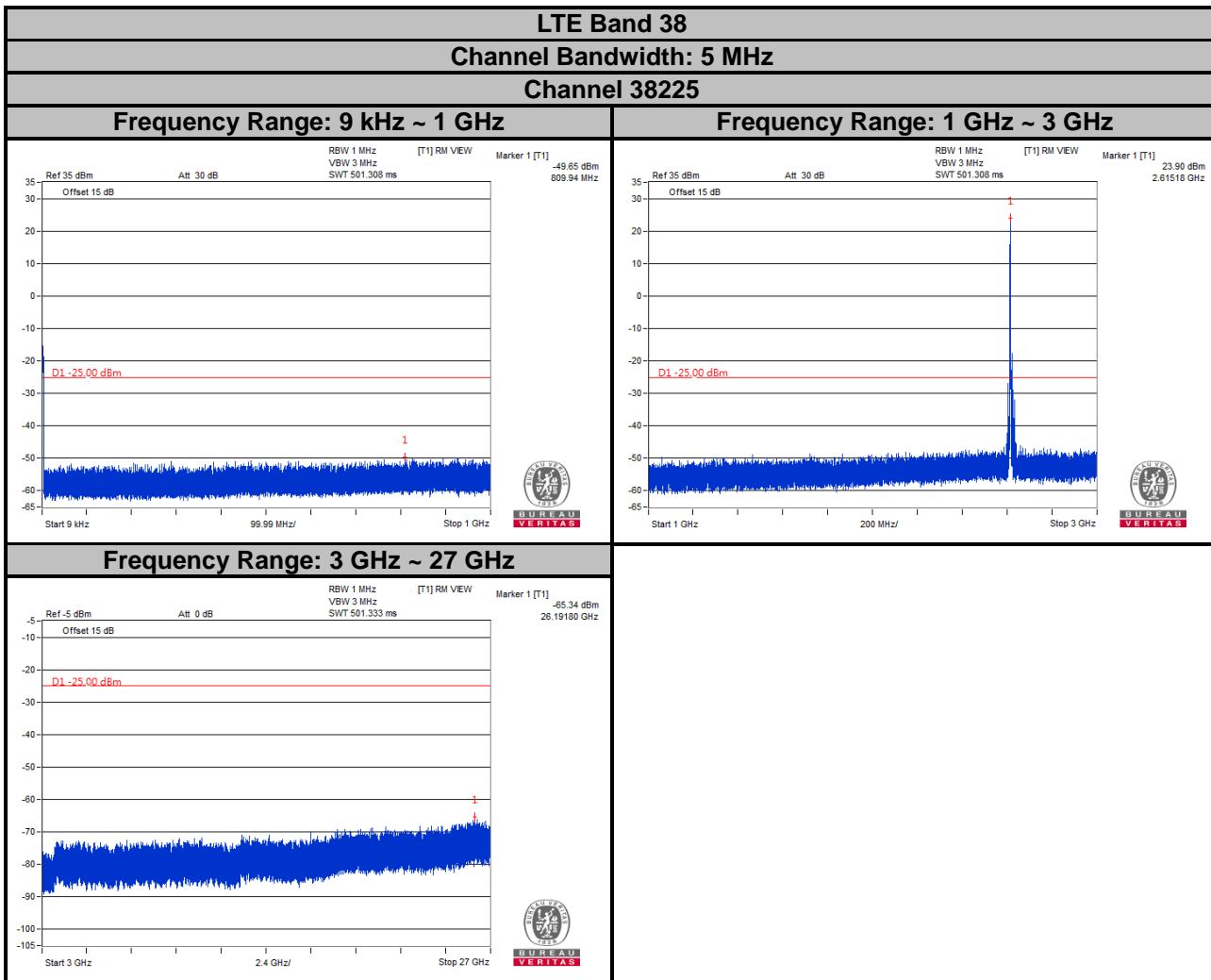
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

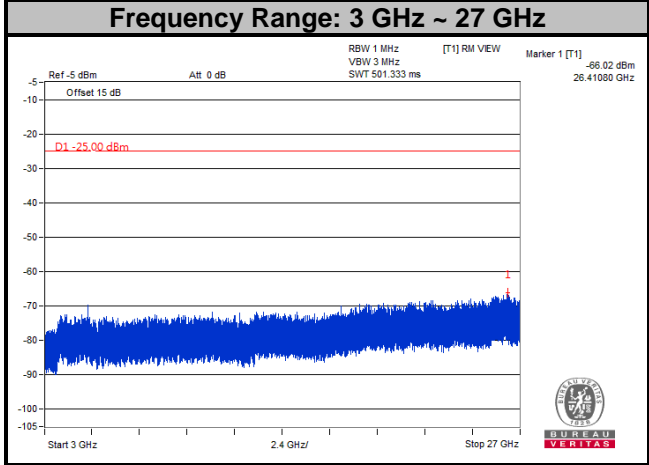
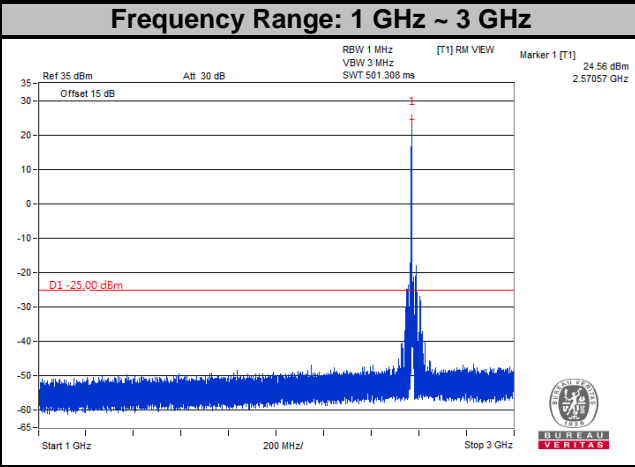
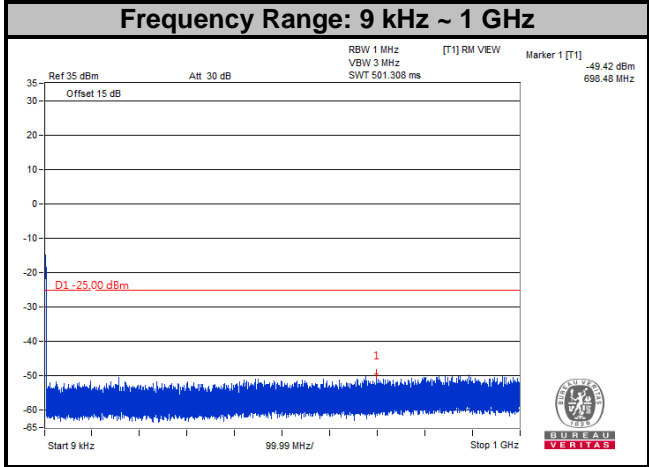


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

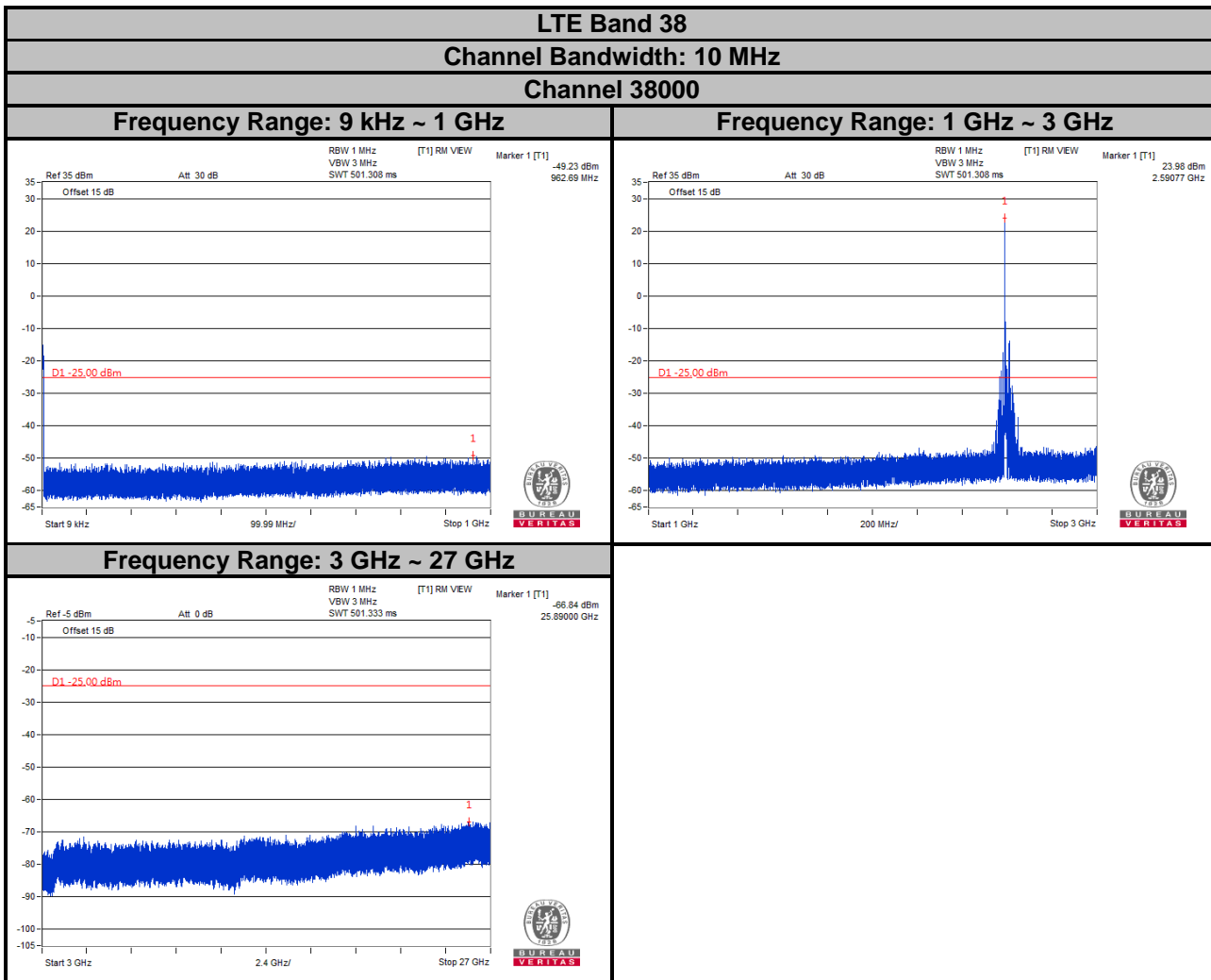


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

**LTE Band 38**  
**Channel Bandwidth: 10 MHz**  
**Channel 37800**

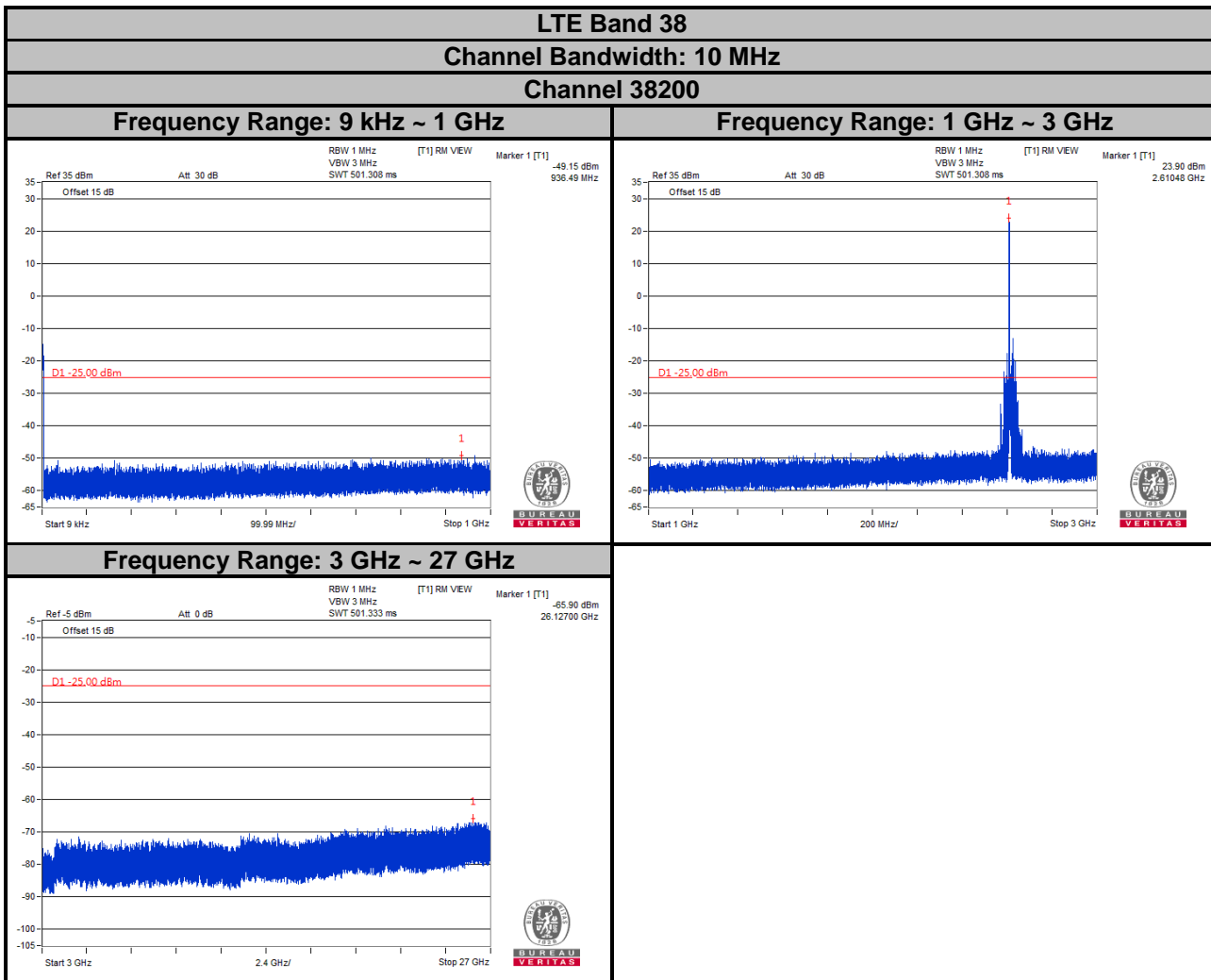


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

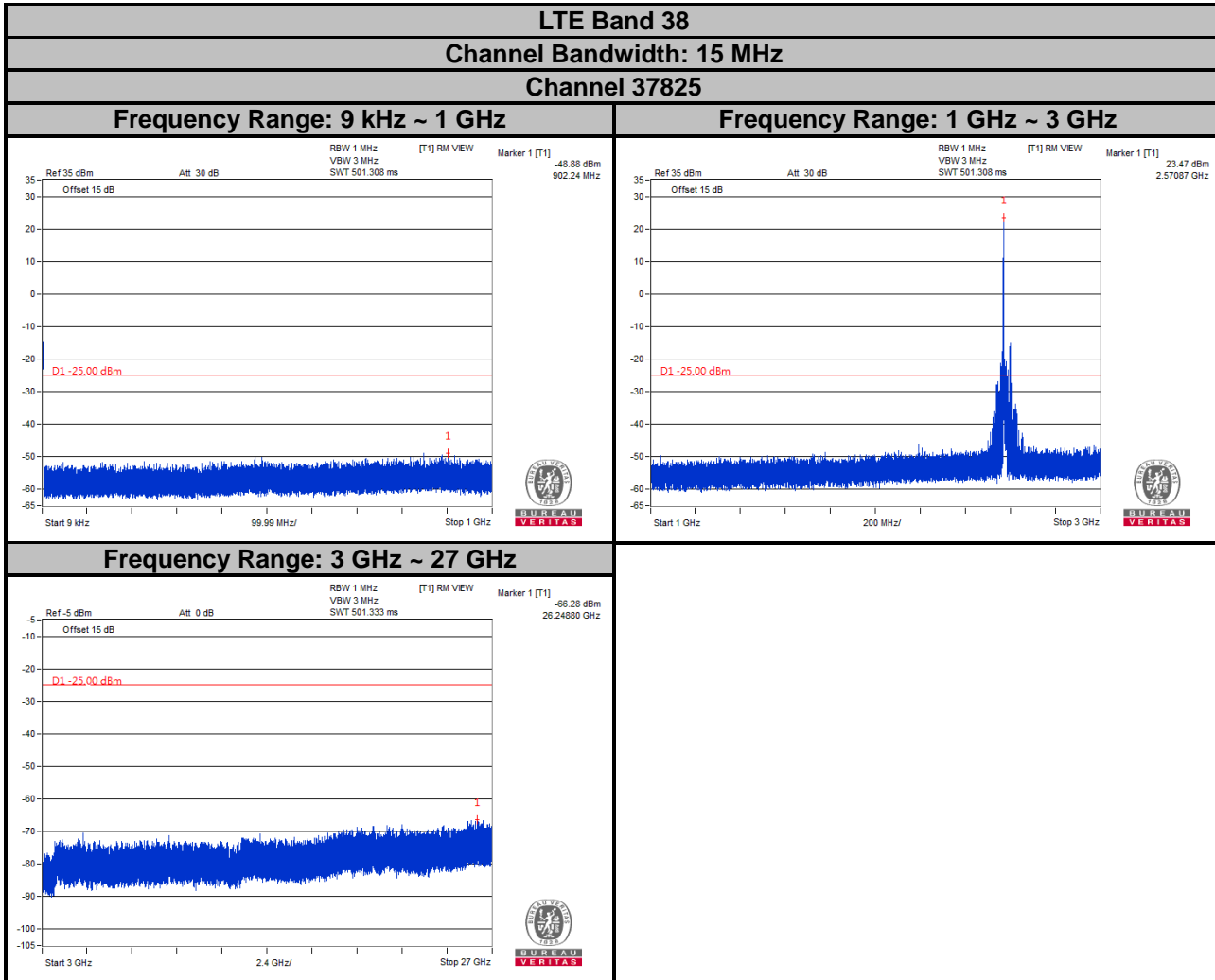


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

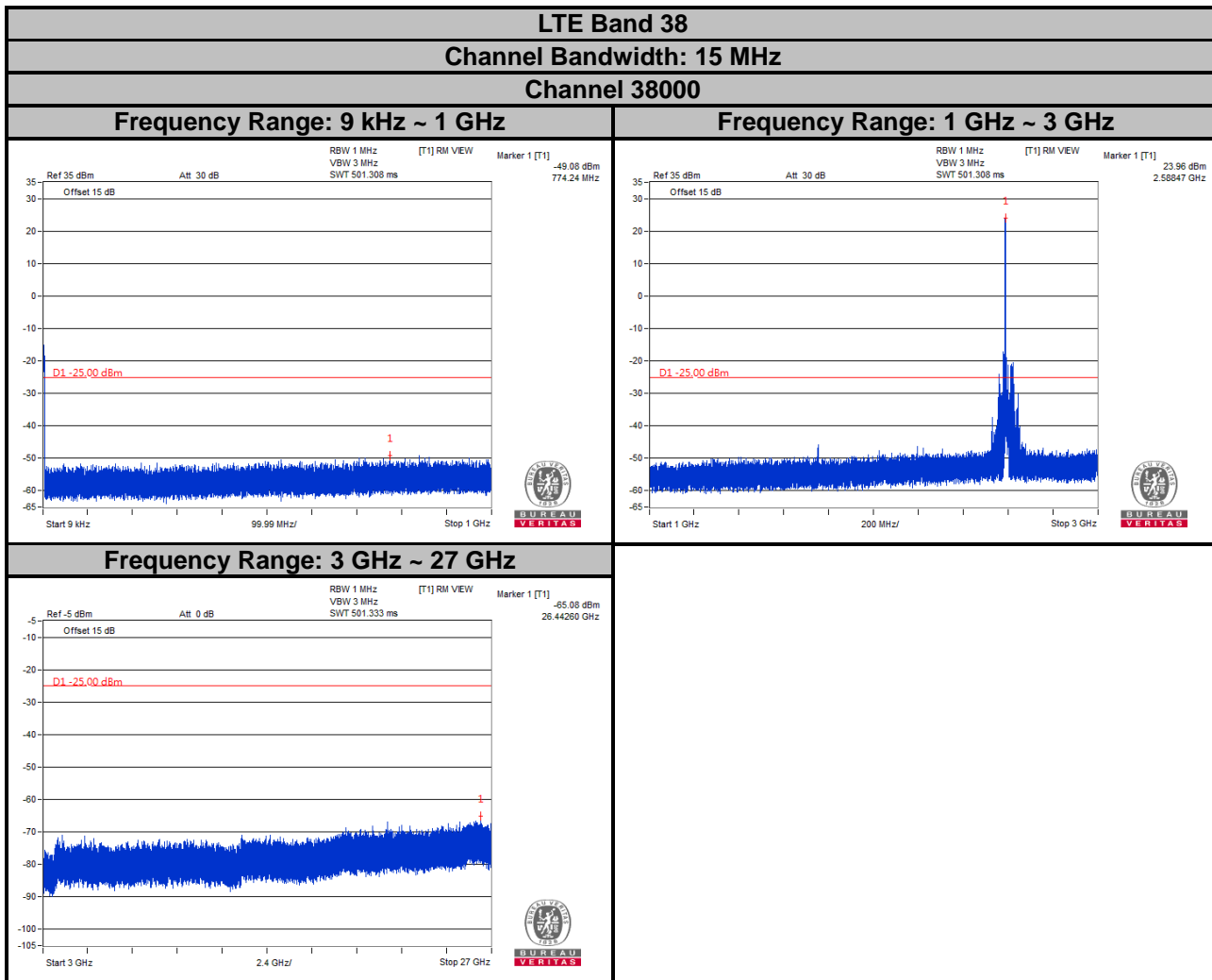




Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

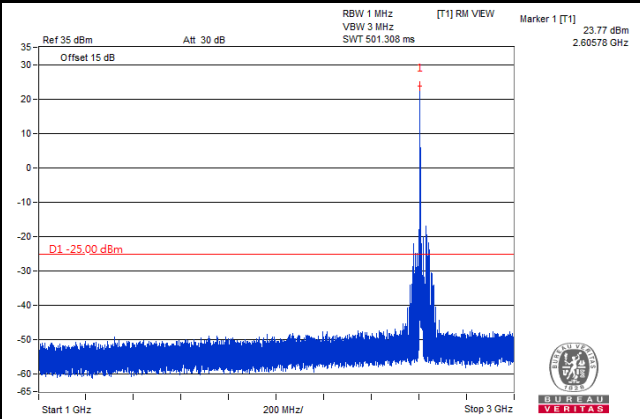
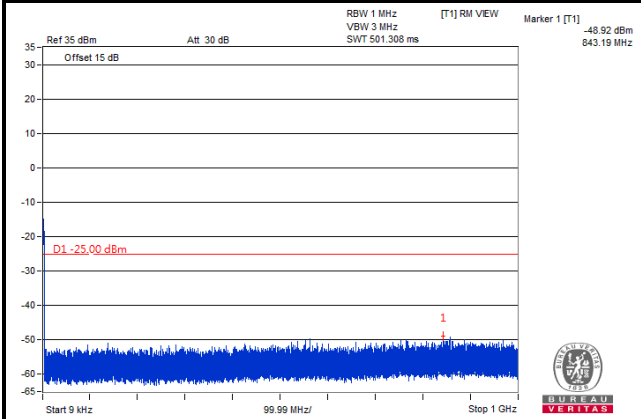
**LTE Band 38**

**Channel Bandwidth: 15 MHz**

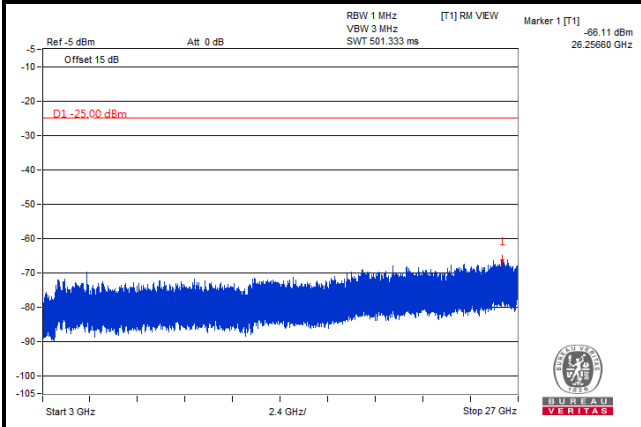
**Channel 38175**

**Frequency Range: 9 kHz ~ 1 GHz**

**Frequency Range: 1 GHz ~ 3 GHz**



**Frequency Range: 3 GHz ~ 27 GHz**



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

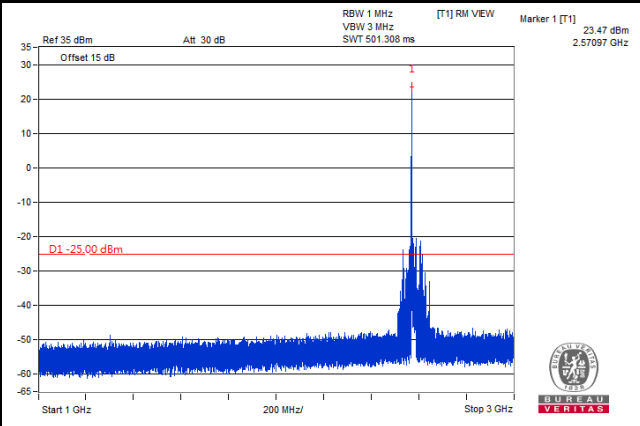
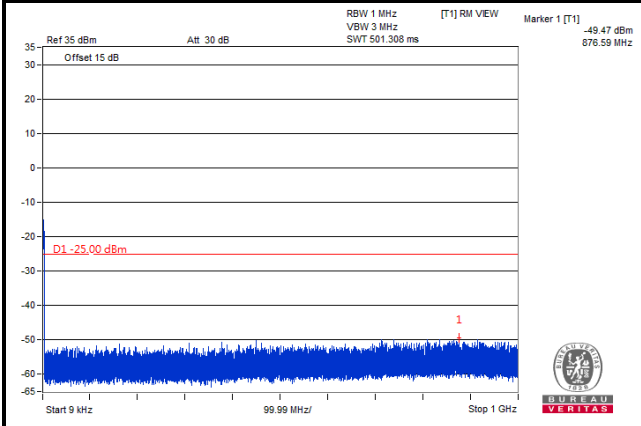
**LTE Band 38**

**Channel Bandwidth: 20 MHz**

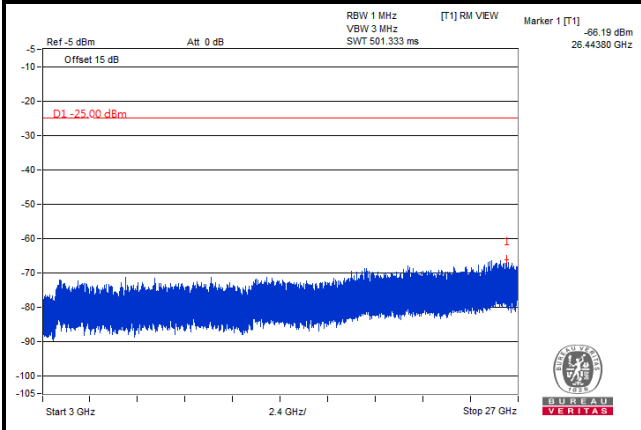
**Channel 37850**

**Frequency Range: 9 kHz ~ 1 GHz**

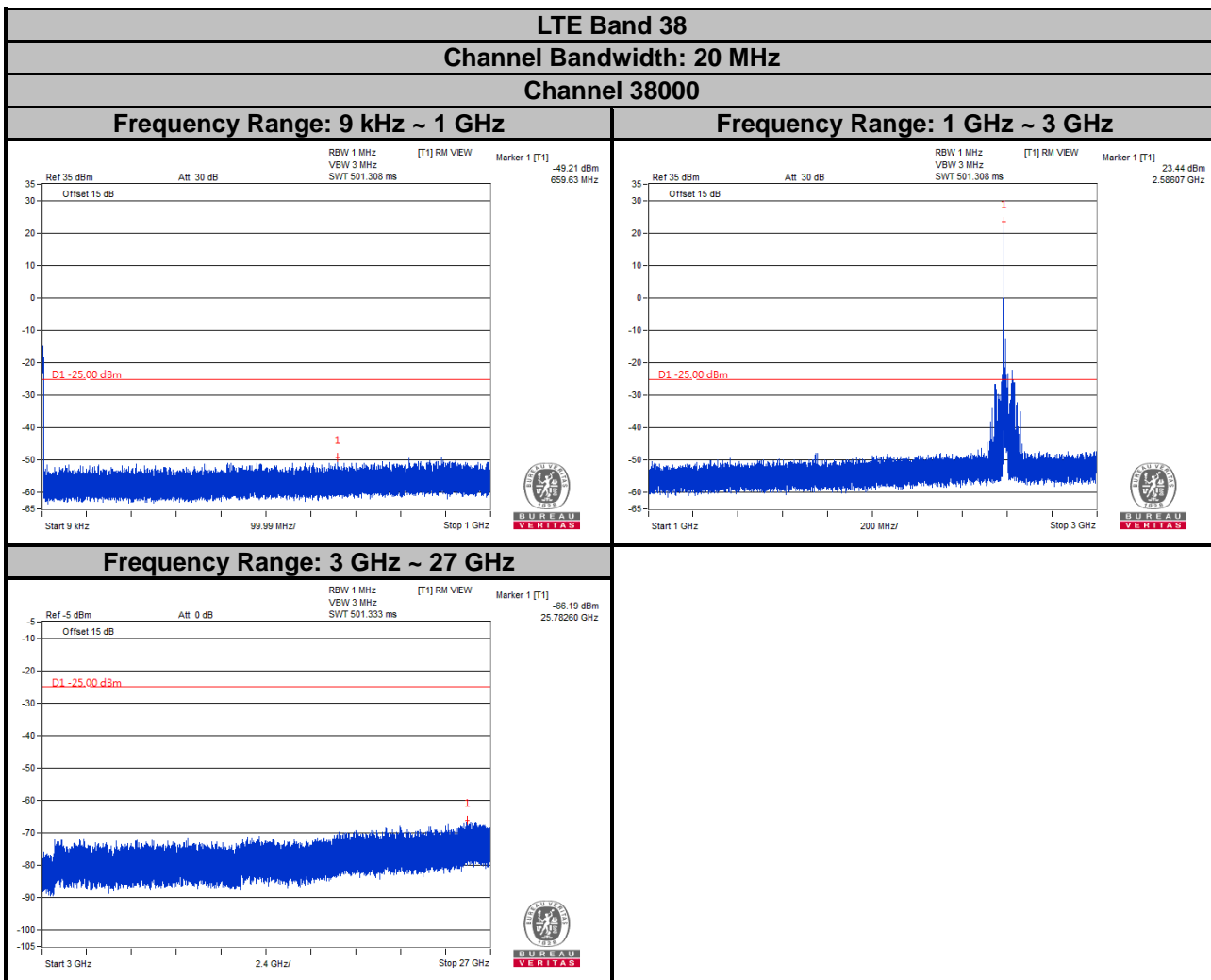
**Frequency Range: 1 GHz ~ 3 GHz**



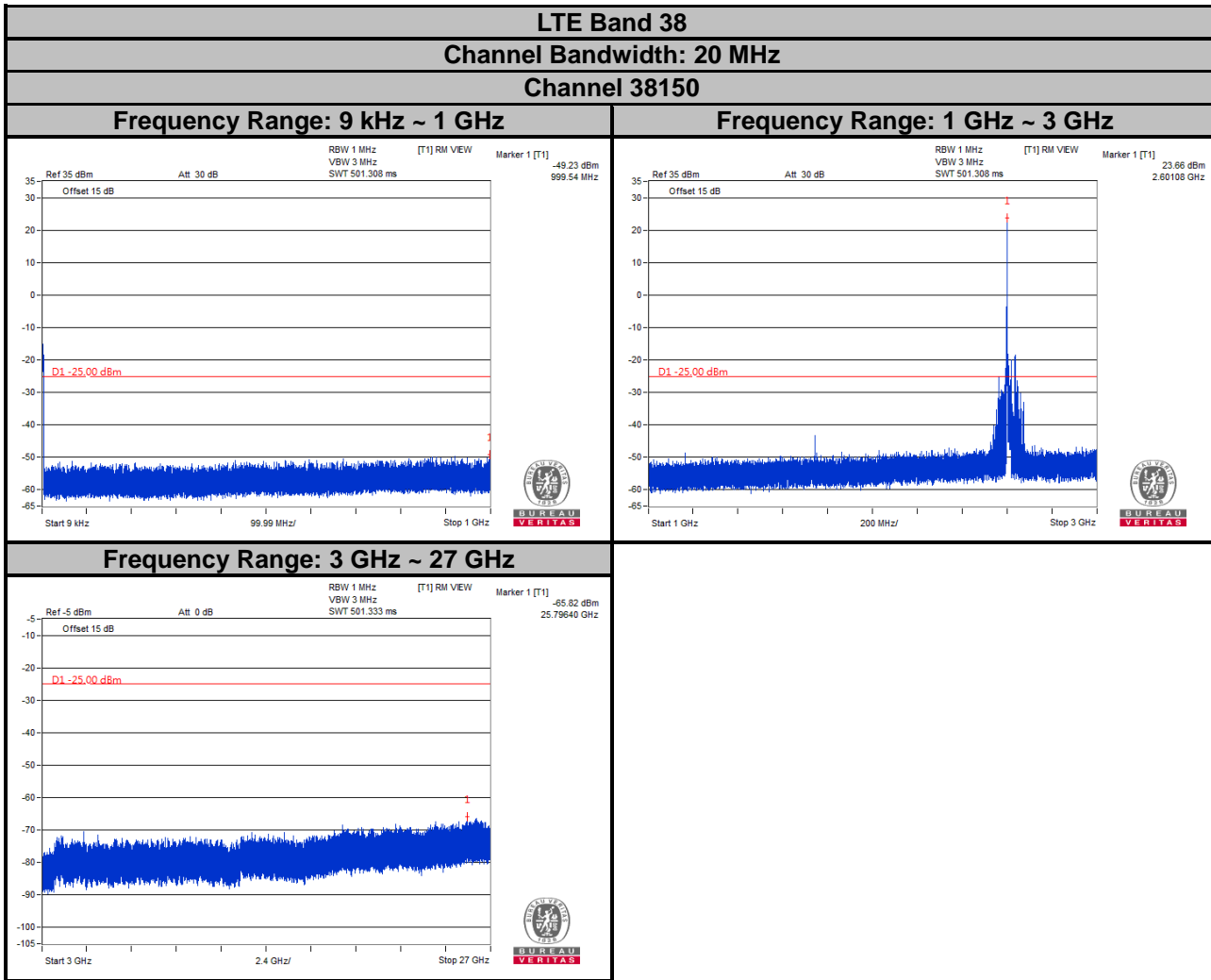
**Frequency Range: 3 GHz ~ 27 GHz**



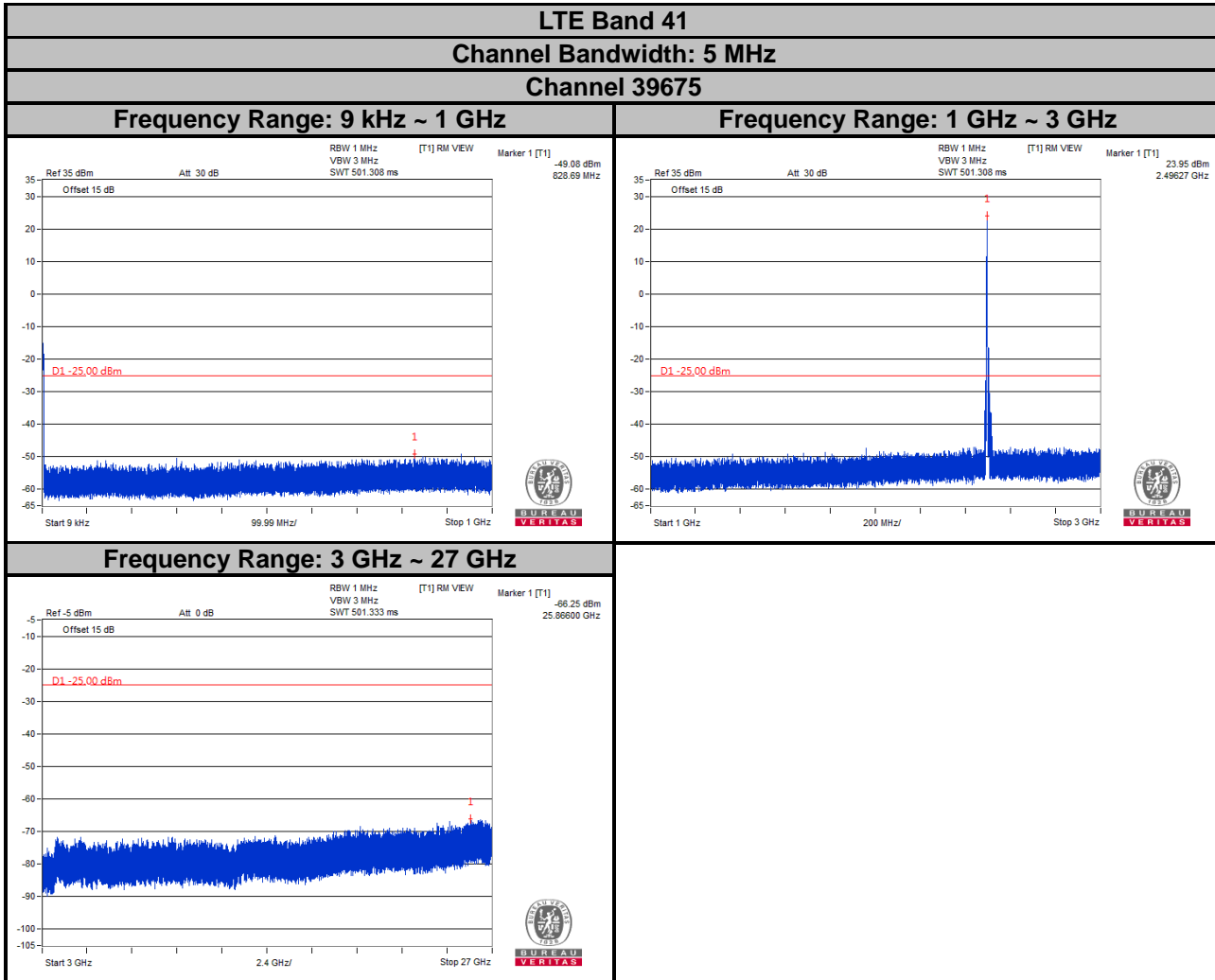
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

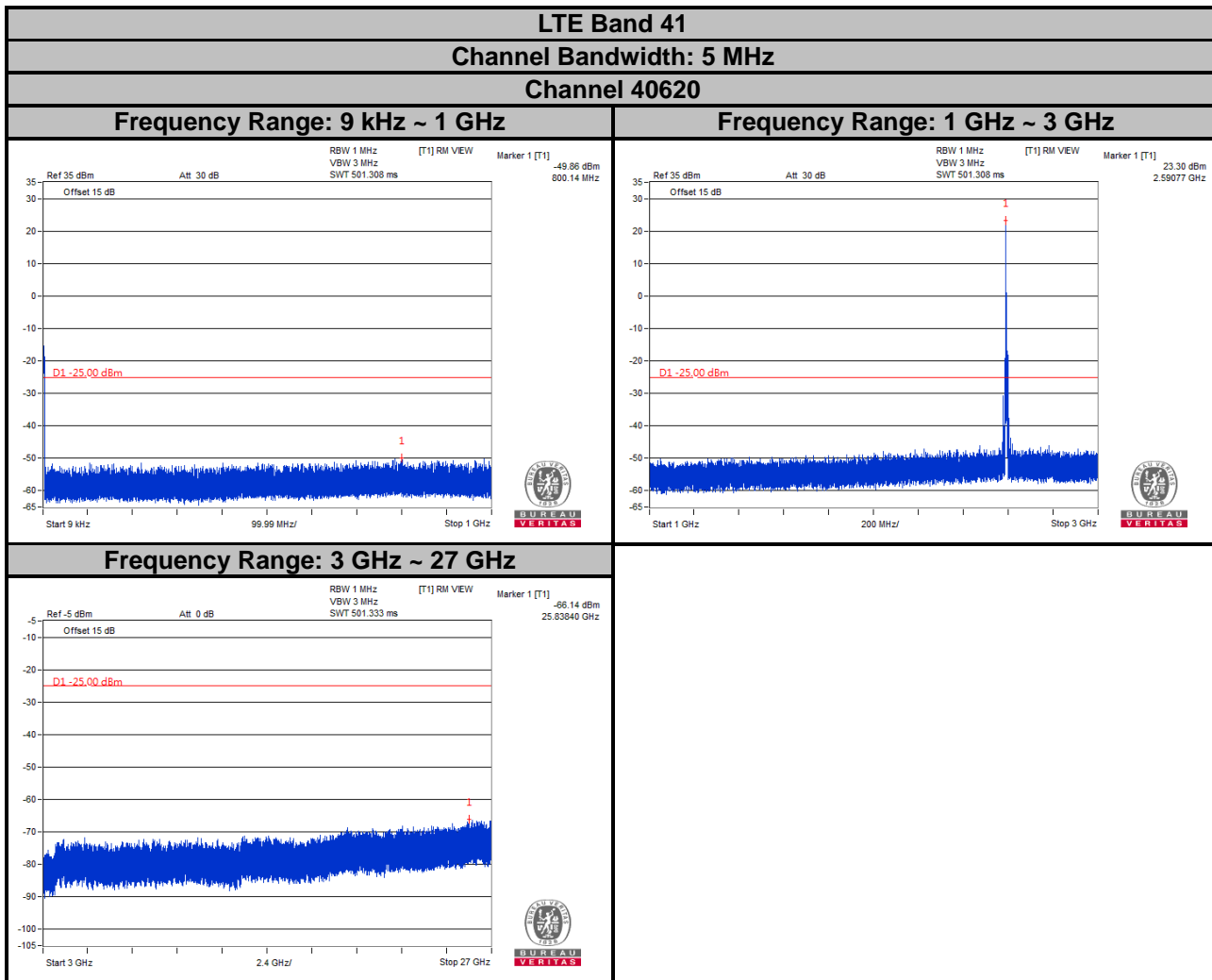


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

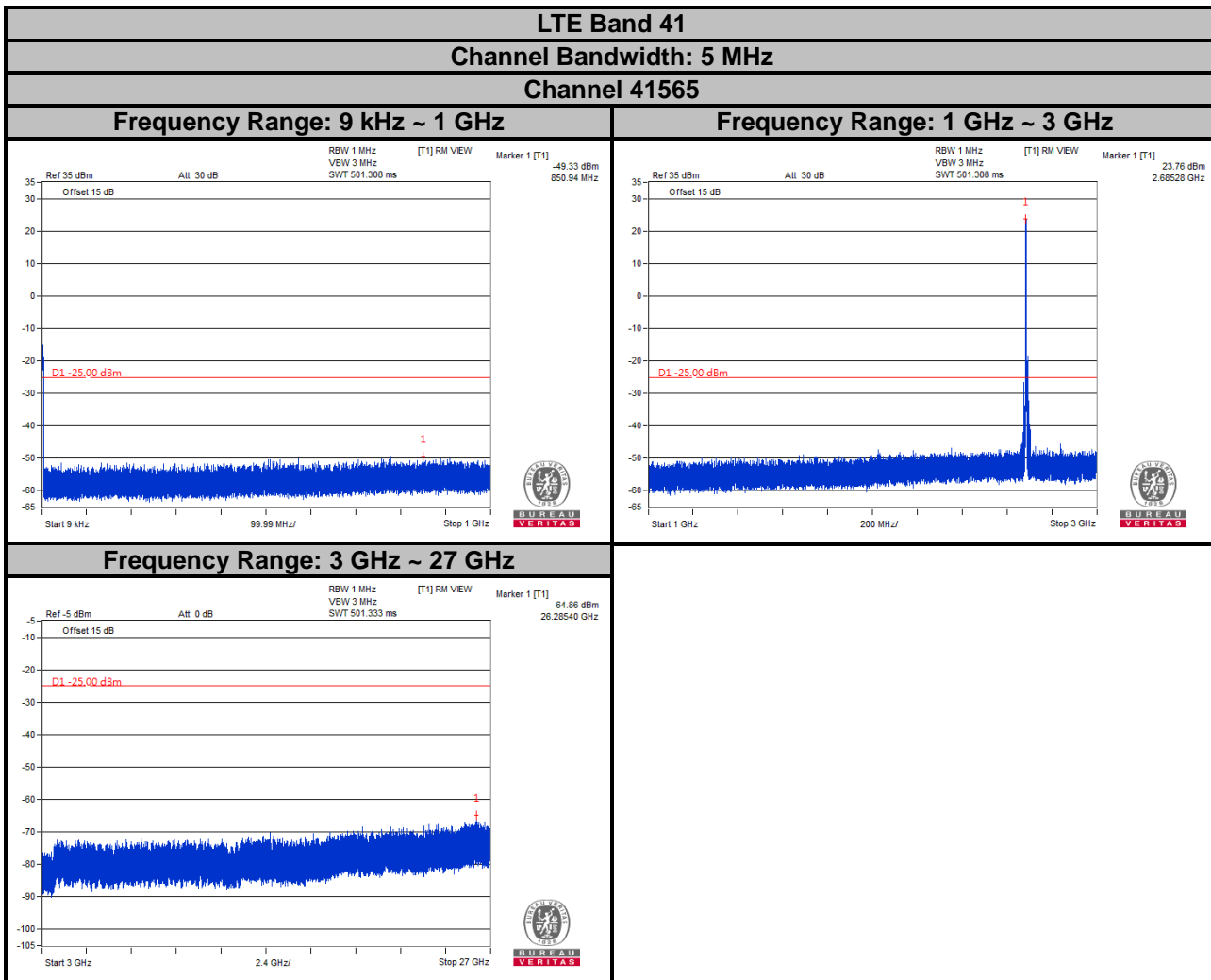


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

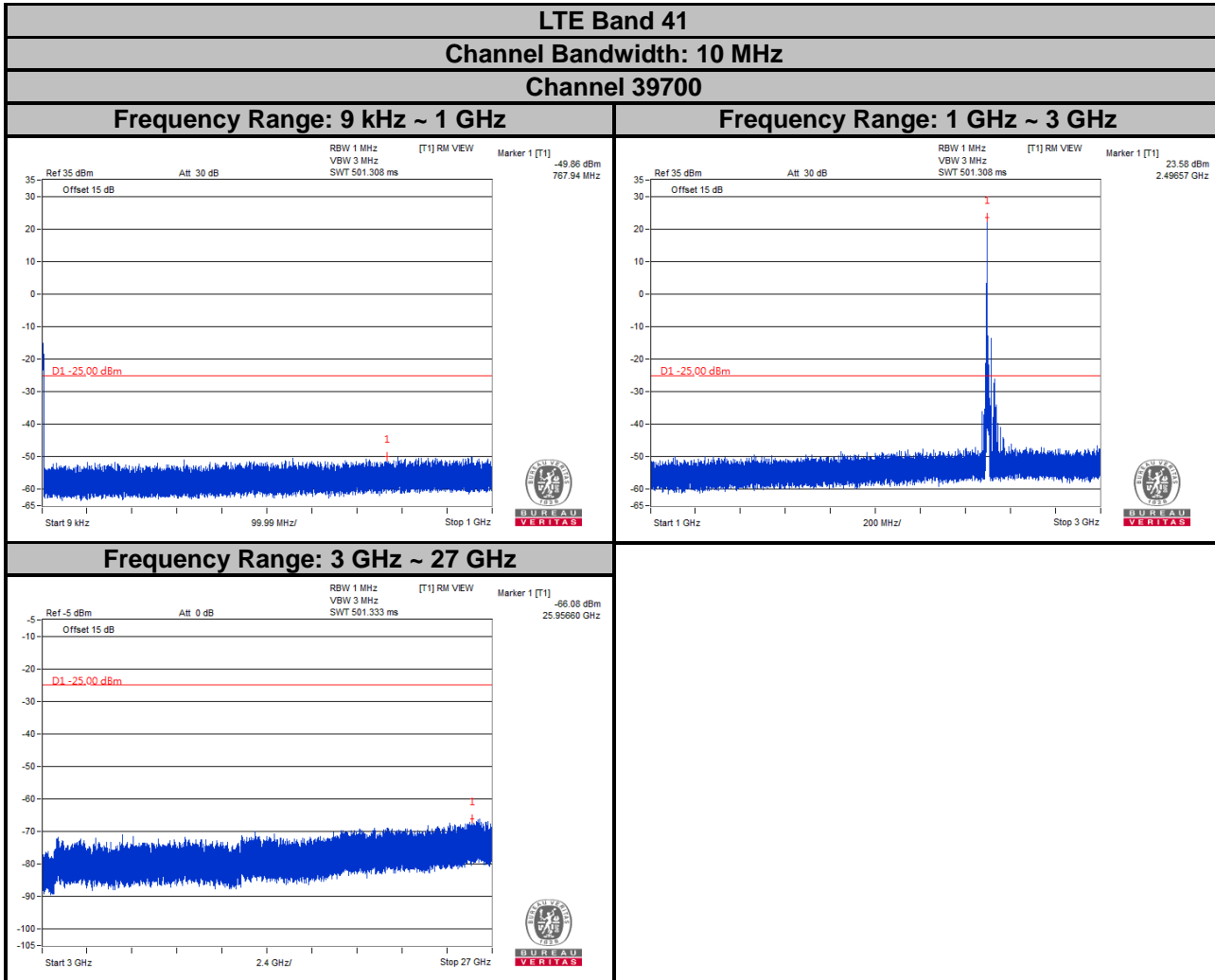




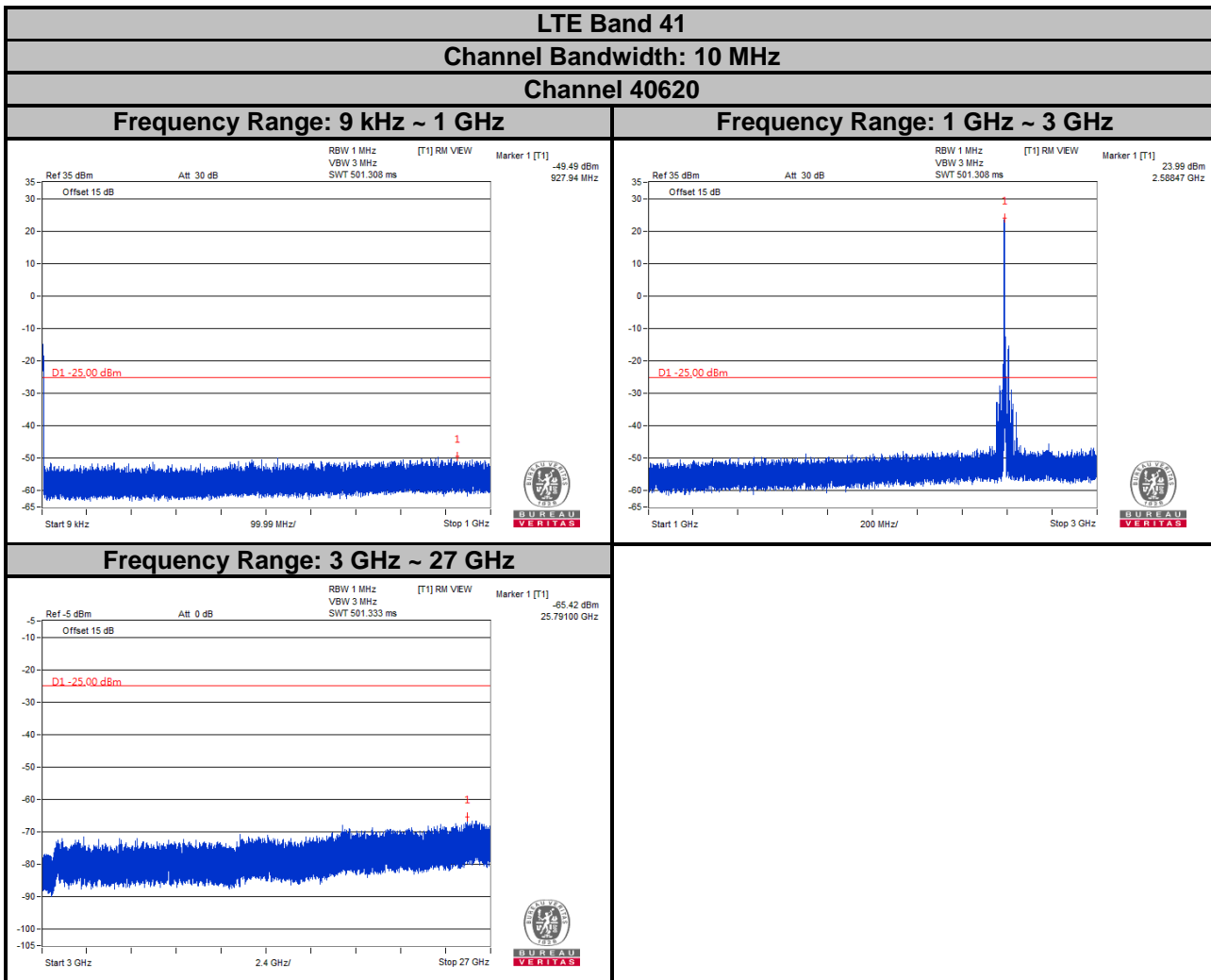
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



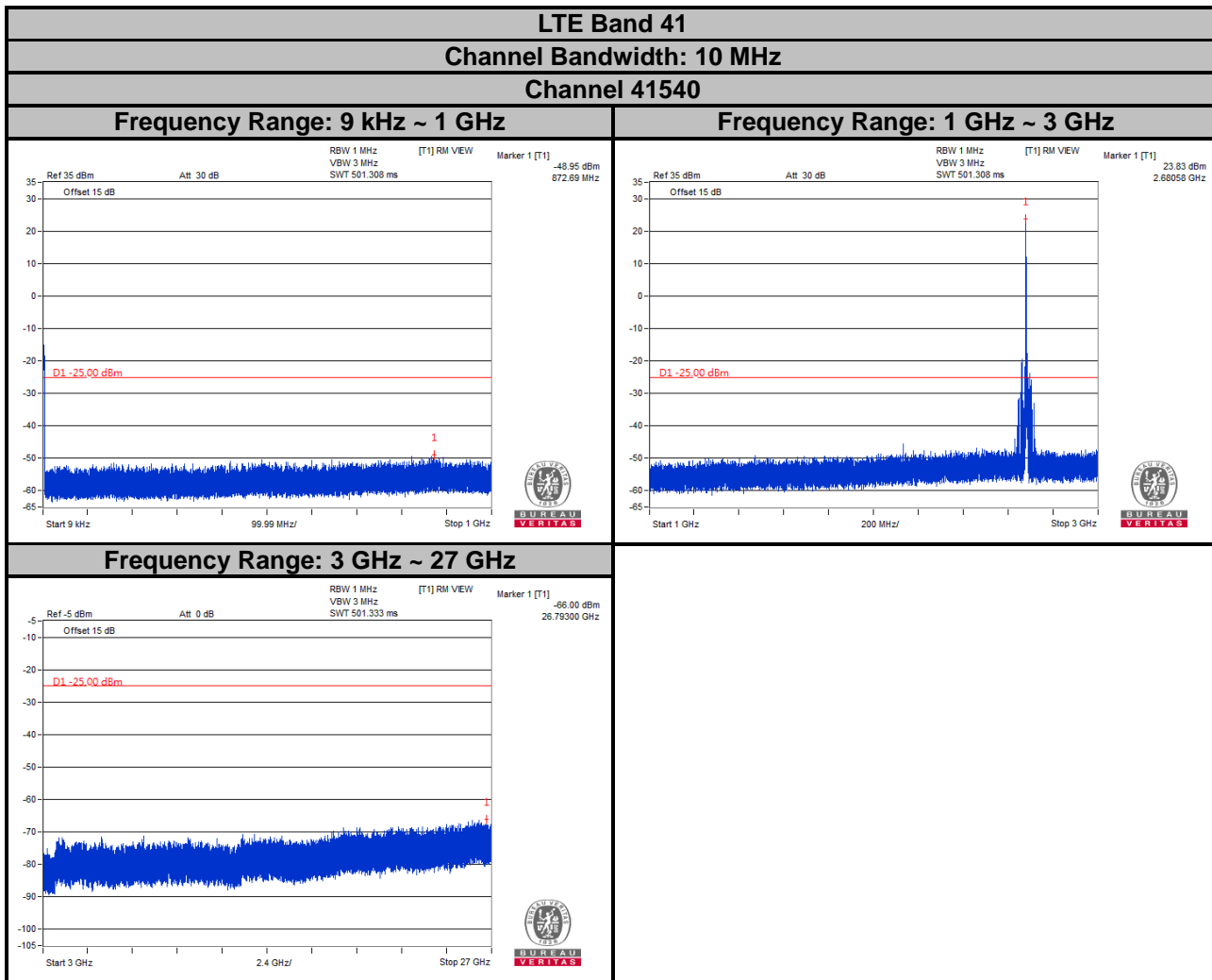
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



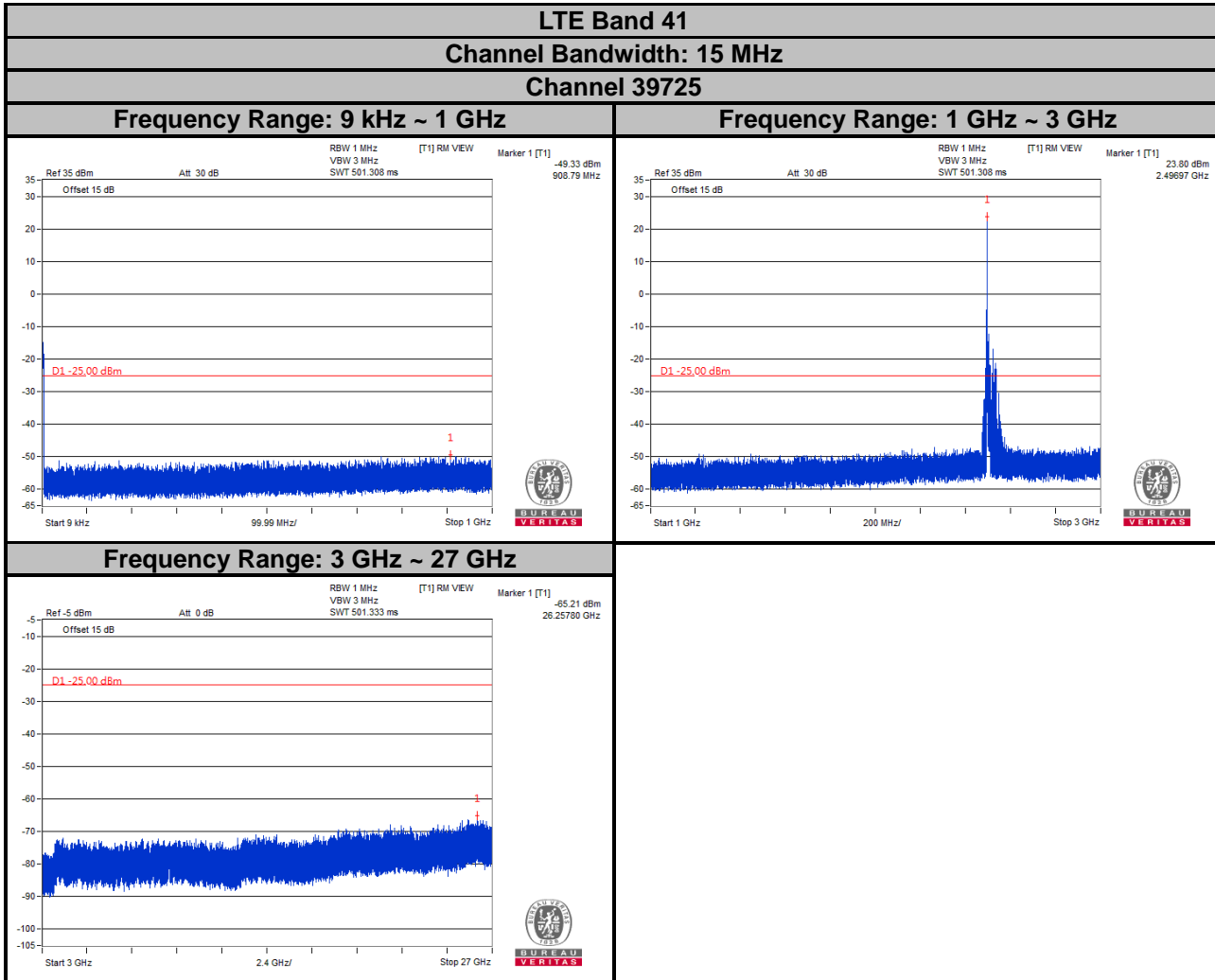
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



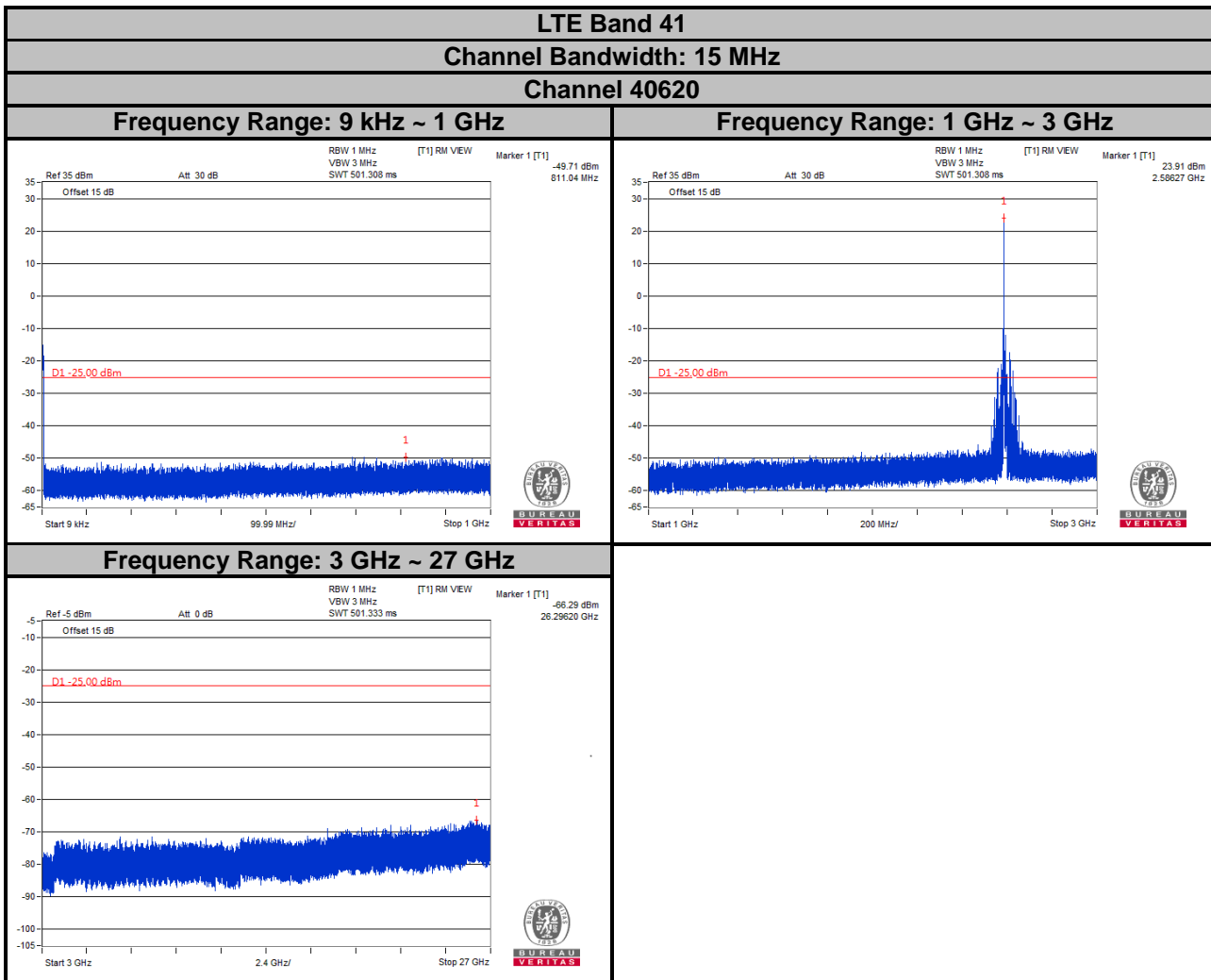
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



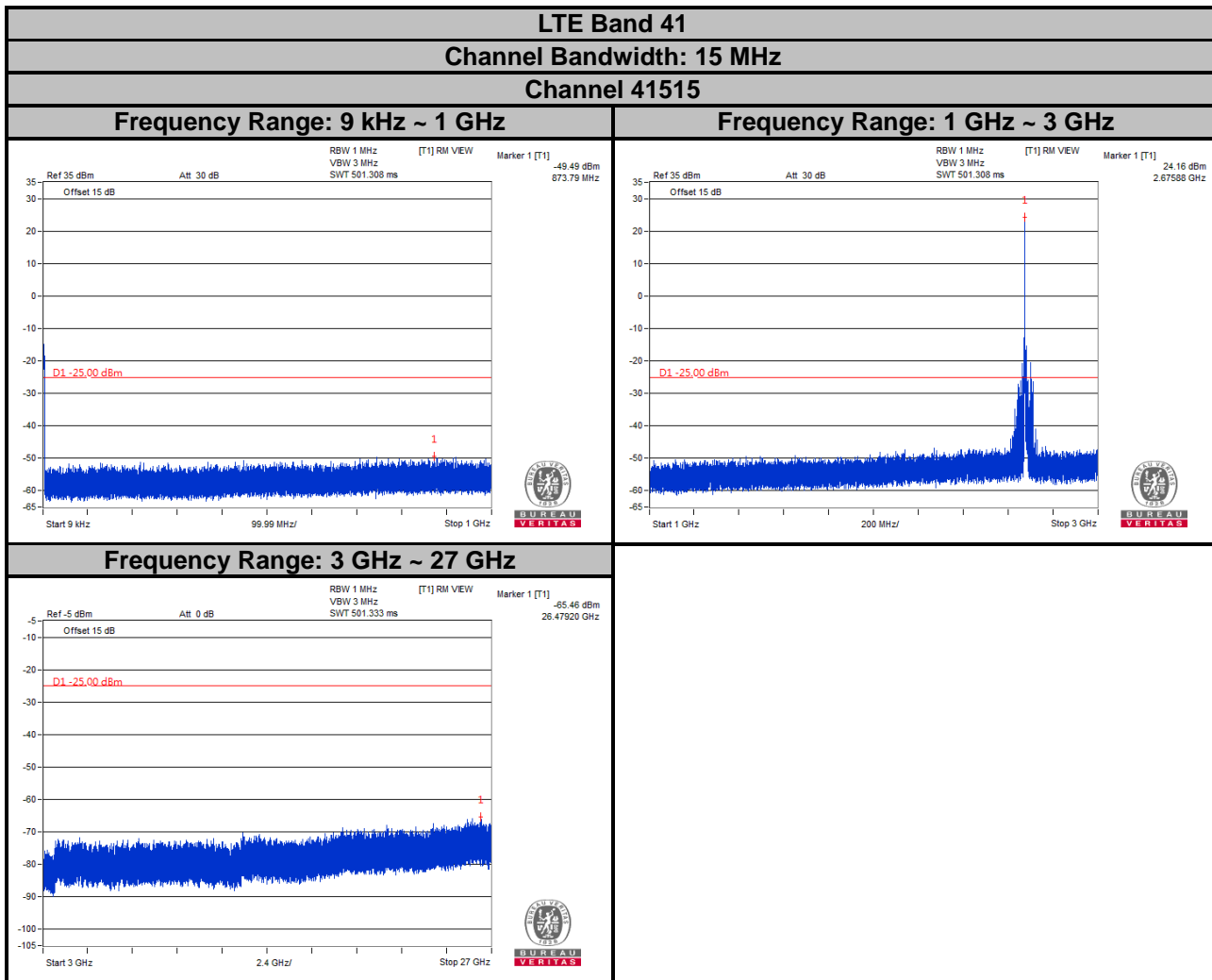
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

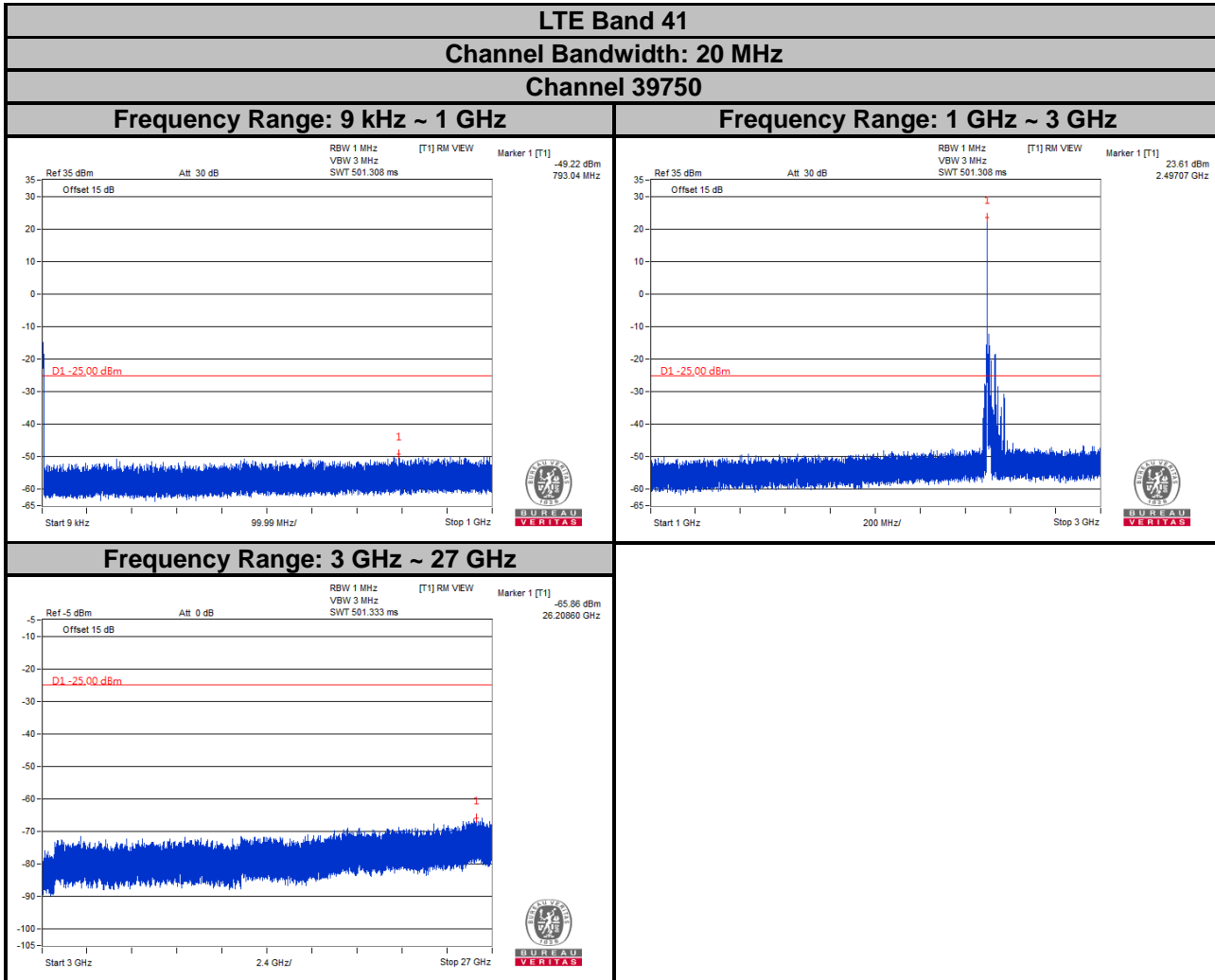


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

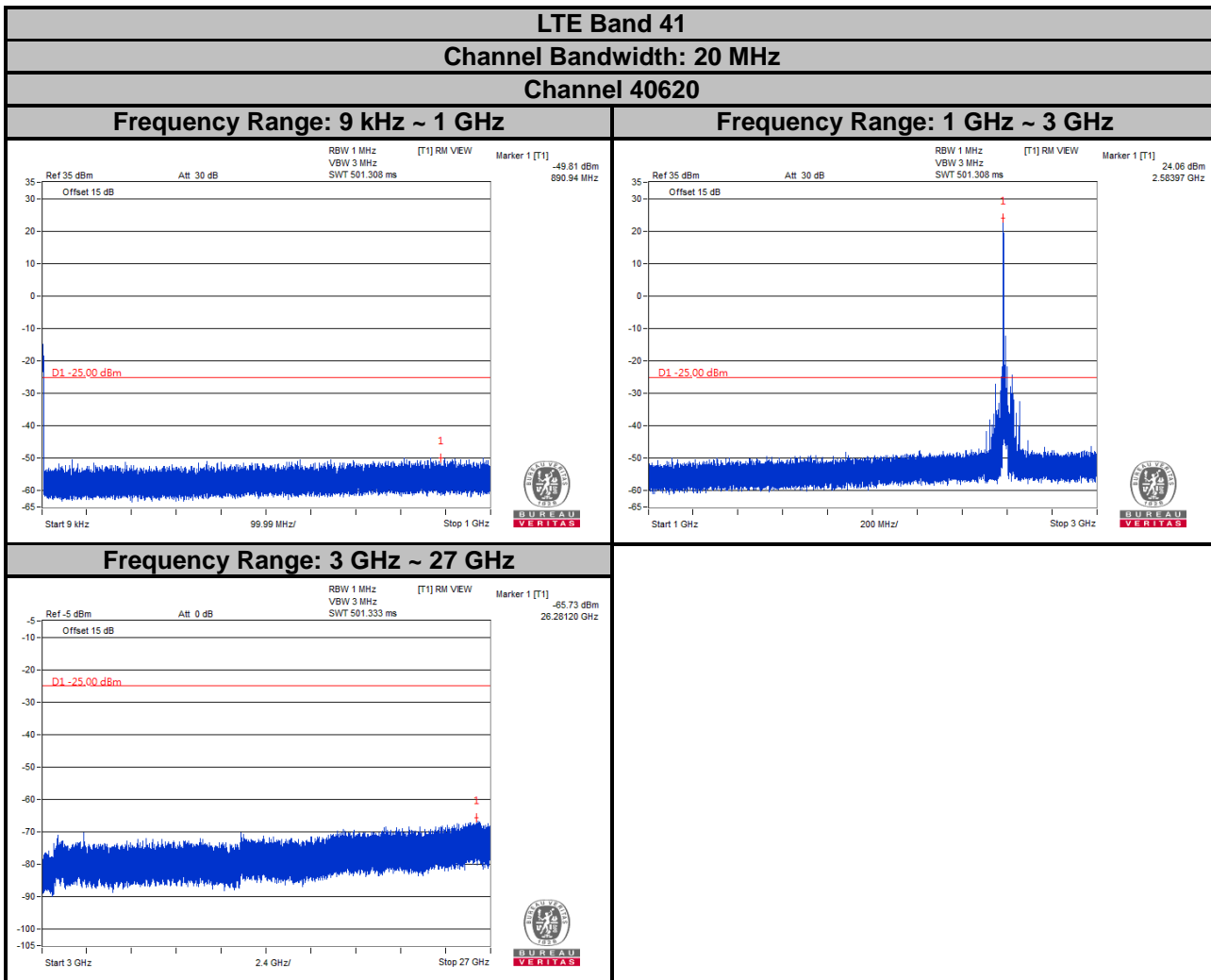


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

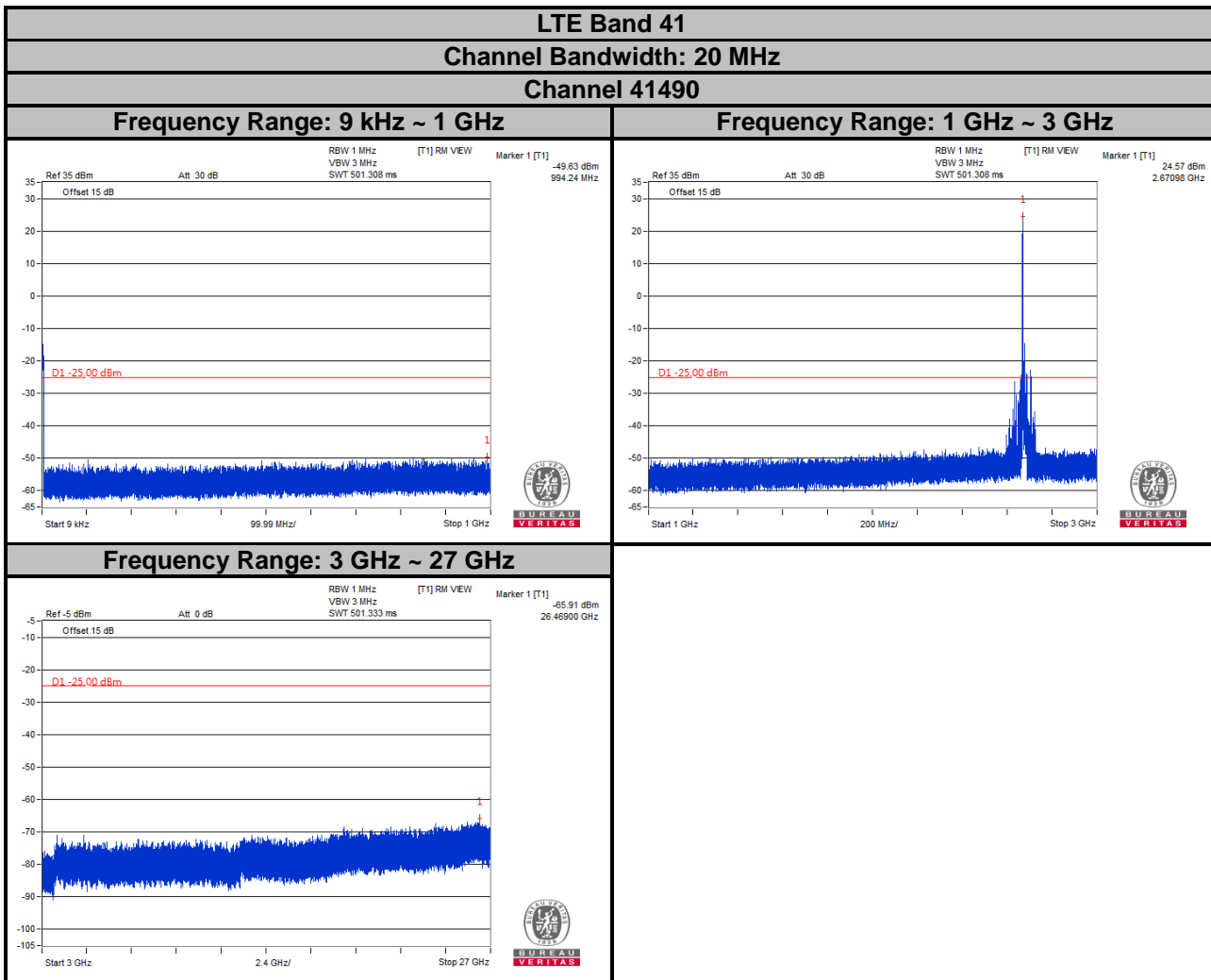




Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.



Note: The signal over the limit in 9 kHz is from spectrum analyzer.

## 4.8 Radiated Emission Measurement

### 4.8.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log (P)$  dB. The limit of emission is equal to -25 dBm.

### 4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.5.3.2.

#### NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

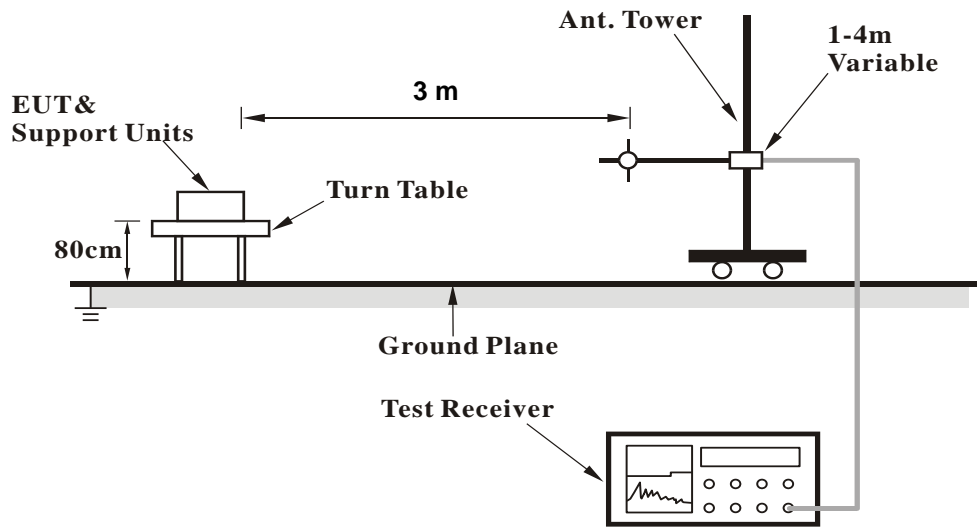
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 4.8.3 Deviation from Test Standard

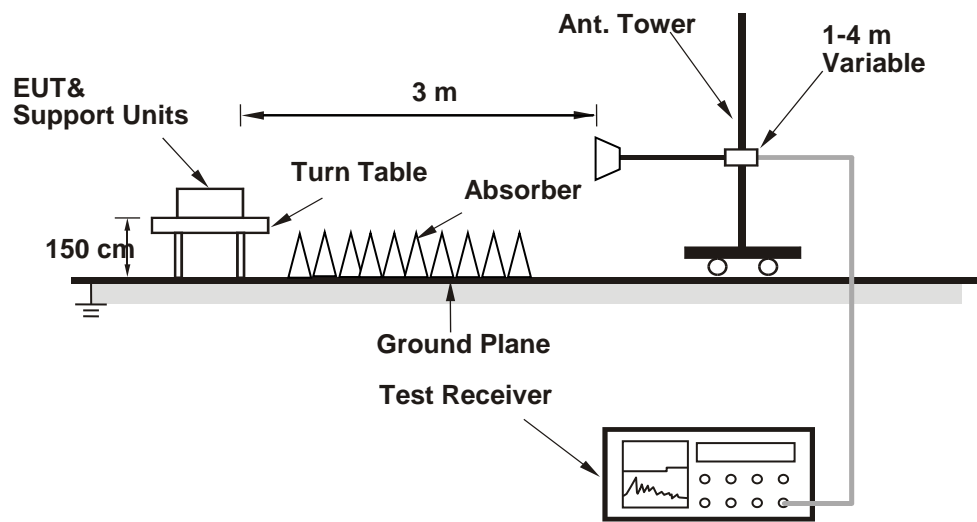
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

LTE Band 7

Channel Bandwidth: 5 MHz / QPSK

Low Channel

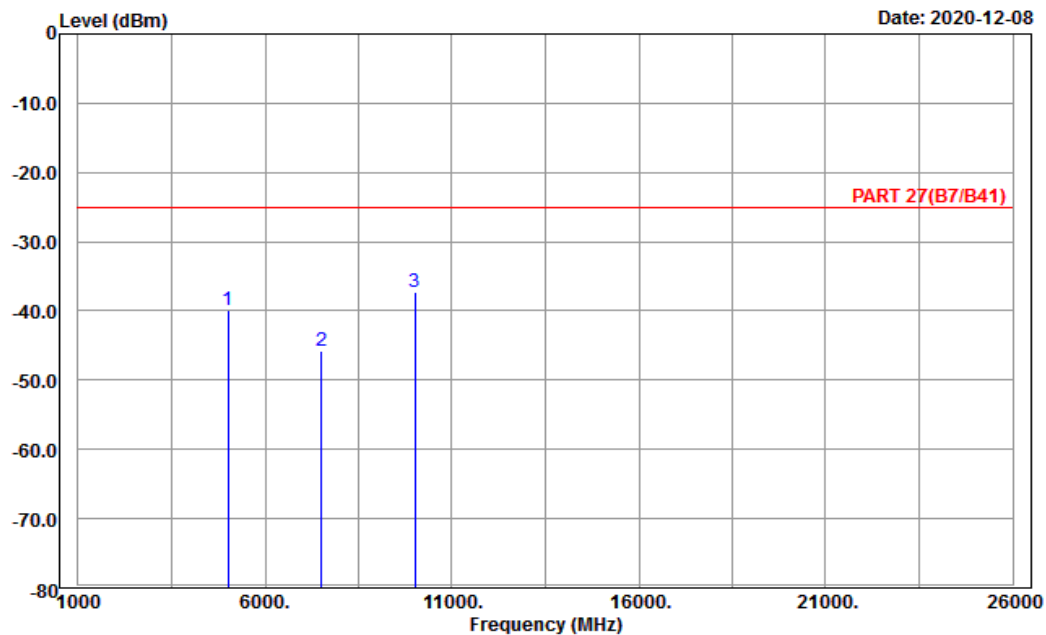


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A D T

Data: 3

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 7\_Link\_L-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5005.00	-39.88	-59.46	19.58	-25.00	-14.88	Peak
2	7507.50	-45.76	-68.44	22.68	-25.00	-20.76	Peak
3 pp	10010.00	-37.26	-63.51	26.25	-25.00	-12.26	Peak

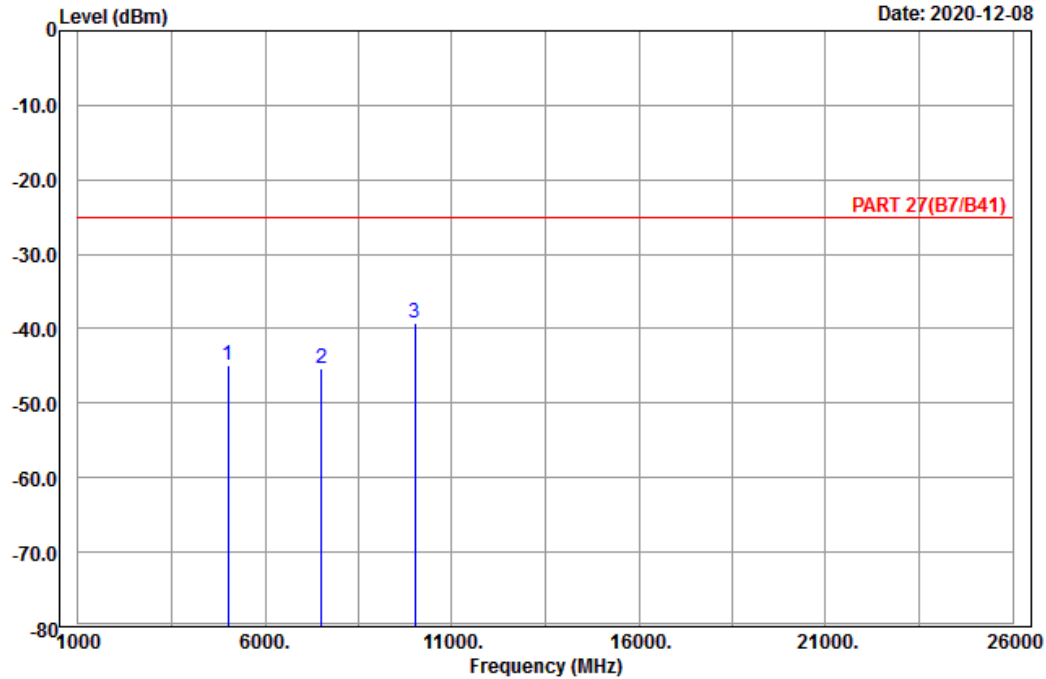


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A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_L-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5005.00	-44.96	-64.54	19.58	-25.00	-19.96	Peak
2	7507.50	-45.34	-68.02	22.68	-25.00	-20.34	Peak
3 pp	10010.00	-39.34	-65.59	26.25	-25.00	-14.34	Peak

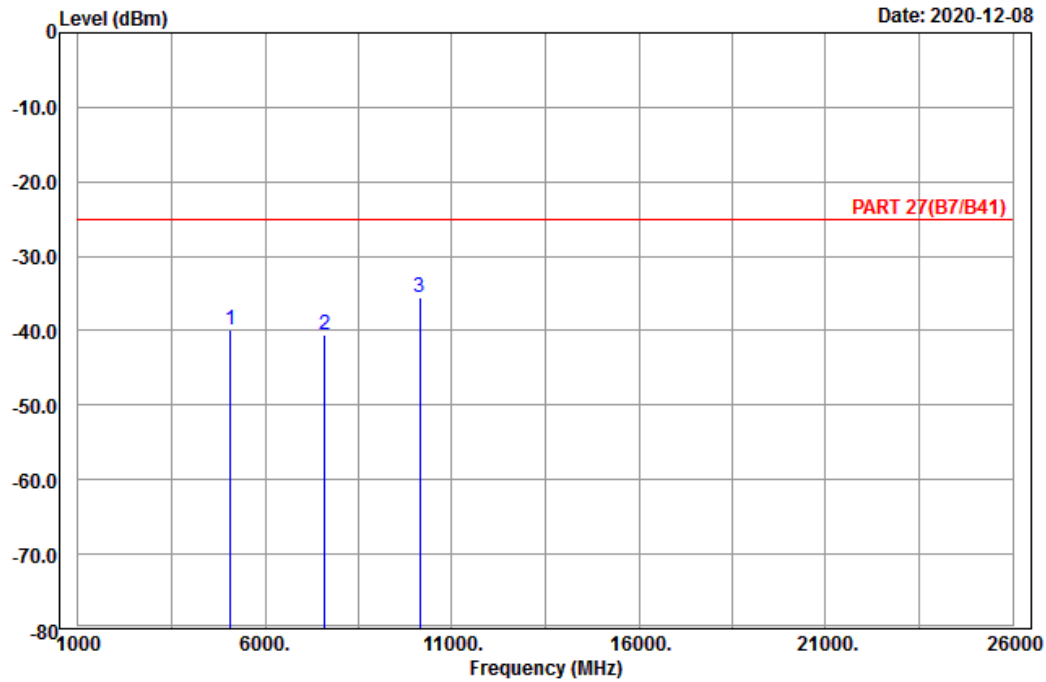
Middle Channel



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A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 7\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5070.00	-39.87	-59.26	19.39	-25.00	-14.87	Peak
2	7605.00	-40.59	-63.58	22.99	-25.00	-15.59	Peak
3 pp	10140.00	-35.54	-61.96	26.42	-25.00	-10.54	Peak



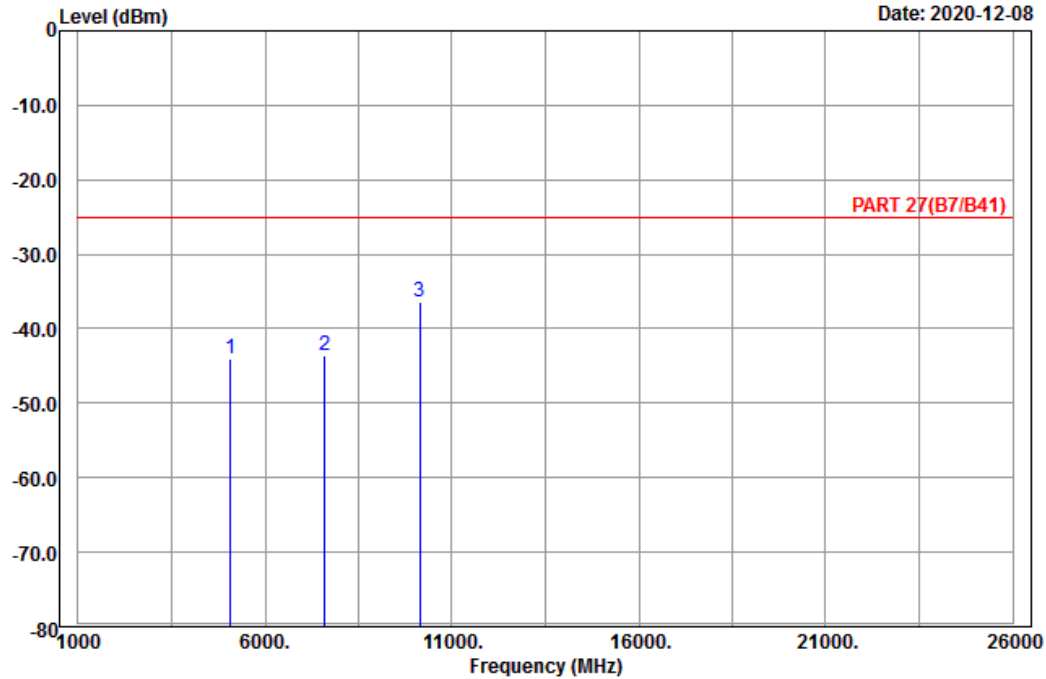


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A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5070.00	-44.14	-63.53	19.39	-25.00	-19.14	Peak
2	7605.00	-43.60	-66.59	22.99	-25.00	-18.60	Peak
3 pp	10140.00	-36.46	-62.88	26.42	-25.00	-11.46	Peak

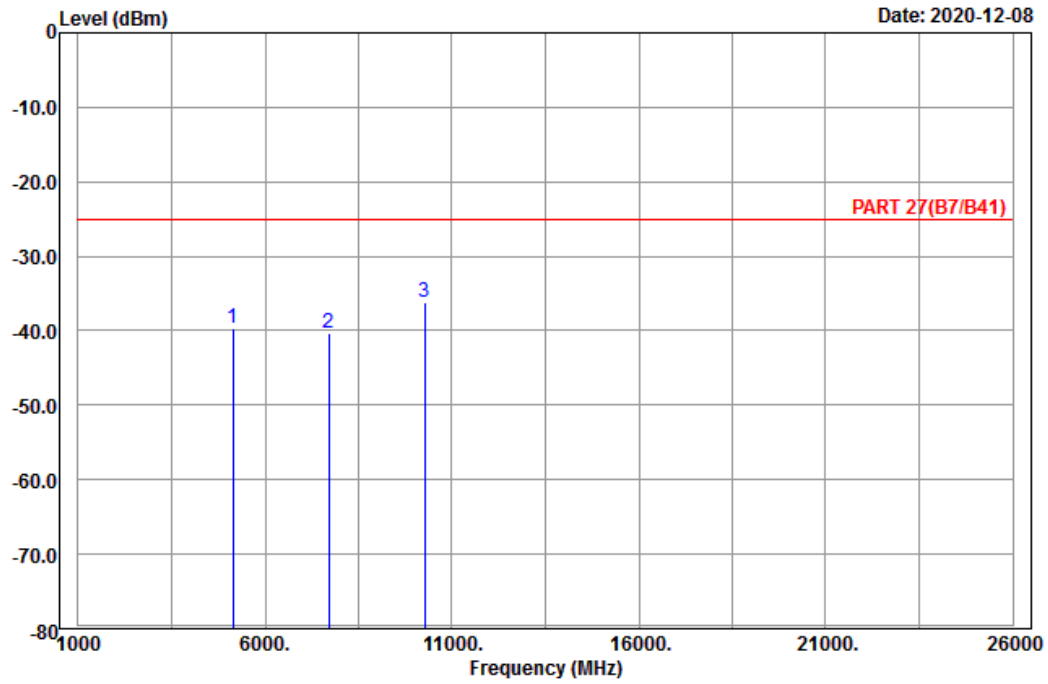
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 7\_Link\_H-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5135.00	-39.76	-59.57	19.81	-25.00	-14.76	Peak
2	7702.50	-40.22	-63.38	23.16	-25.00	-15.22	Peak
3 pp	10270.00	-36.19	-62.78	26.59	-25.00	-11.19	Peak

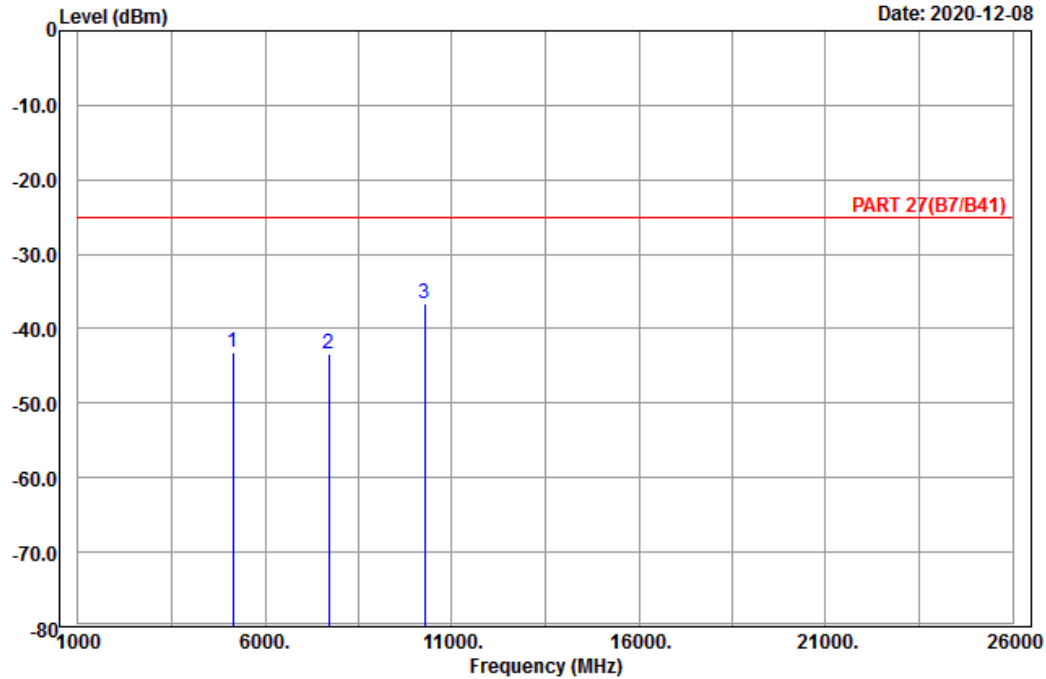


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_H-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5135.00	-43.24	-63.05	19.81	-25.00	-18.24	Peak
2	7702.50	-43.41	-66.57	23.16	-25.00	-18.41	Peak
3 pp	10270.00	-36.71	-63.30	26.59	-25.00	-11.71	Peak

Channel Bandwidth: 20 MHz / QPSK  
Low Channel

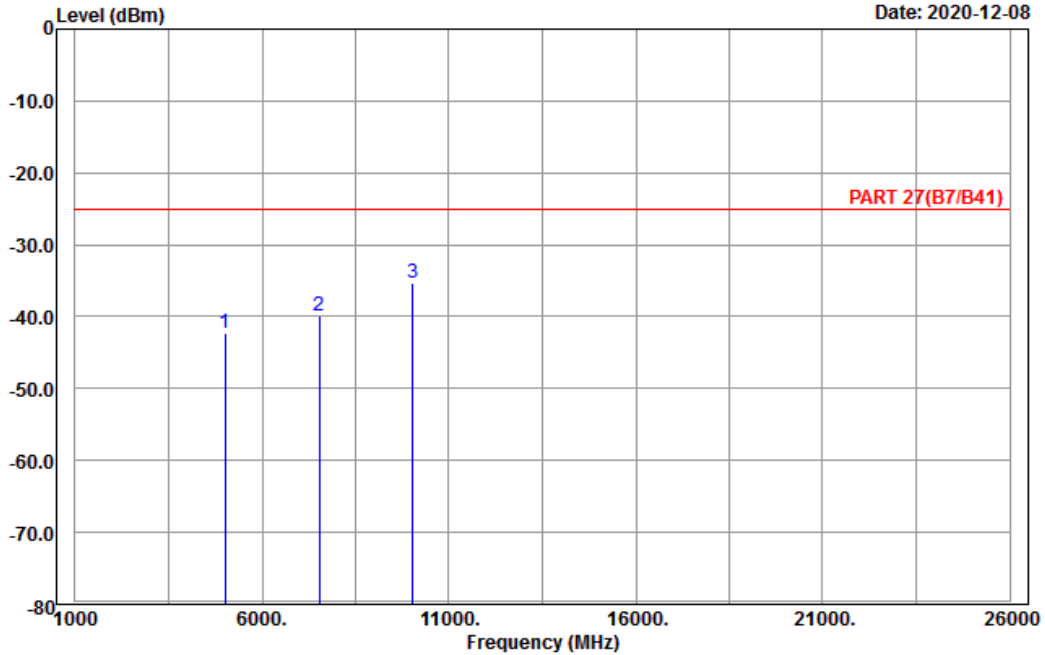


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-08



Site : 966 chamber 1  
Condition: PART 27(B7/B41) Horizontal  
Remark : LTE\_Band 7\_Link\_L-Ch  
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5020.00	-42.23	-61.31	19.08	-25.00	-17.23	Peak
2	7530.00	-39.99	-62.84	22.85	-25.00	-14.99	Peak
3 pp	10040.00	-35.35	-61.62	26.27	-25.00	-10.35	Peak

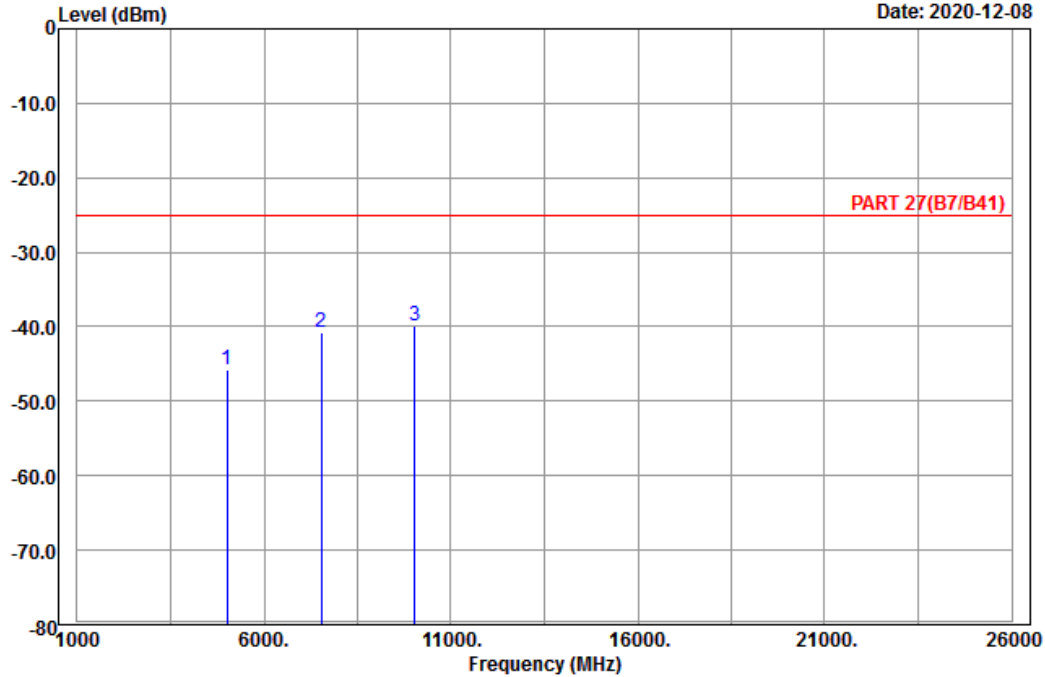


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A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_L-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5020.00	-45.69	-64.77	19.08	-25.00	-20.69	Peak
2	7530.00	-40.76	-63.61	22.85	-25.00	-15.76	Peak
3 pp	10040.00	-39.79	-66.06	26.27	-25.00	-14.79	Peak

Middle Channel

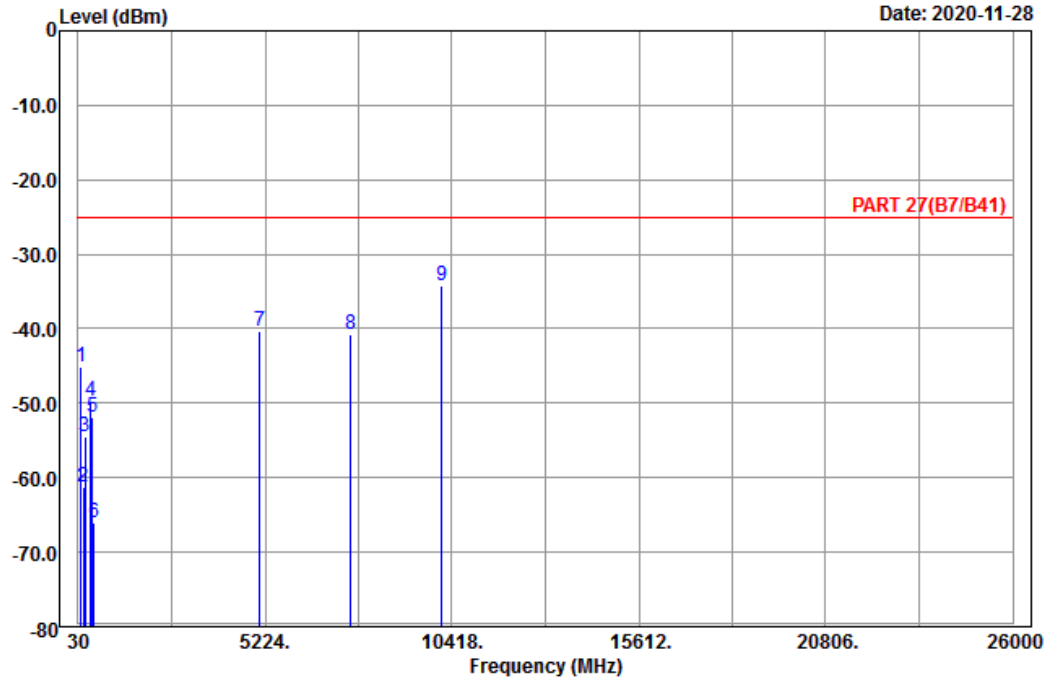


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13

Date: 2020-11-28



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 7\_Link\_M-Ch  
 Tested by: Karl Lee

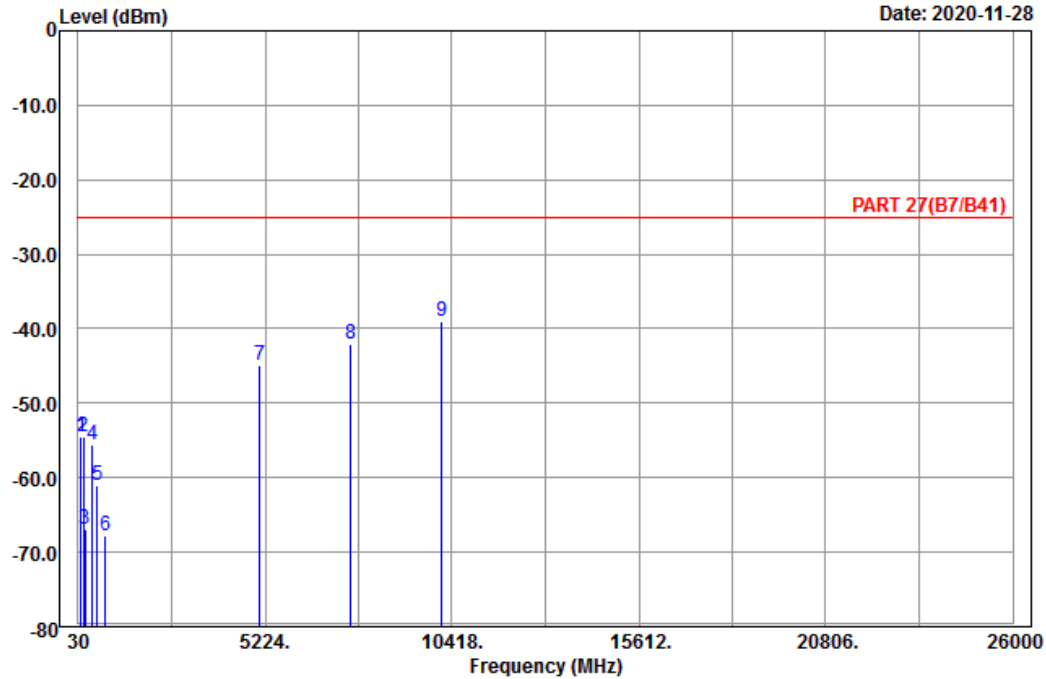
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	99.93	-45.13	-35.01	-10.12	-25.00	-20.13	Peak
2	169.59	-61.24	-54.53	-6.71	-25.00	-36.24	Peak
3	224.67	-54.46	-48.61	-5.85	-25.00	-29.46	Peak
4	376.30	-49.60	-45.62	-3.98	-25.00	-24.60	Peak
5	419.70	-51.79	-48.60	-3.19	-25.00	-26.79	Peak
6	478.50	-66.09	-61.44	-4.65	-25.00	-41.09	Peak
7	5070.00	-40.28	-59.67	19.39	-25.00	-15.28	Peak
8	7605.00	-40.72	-63.71	22.99	-25.00	-15.72	Peak
9 pp	10140.00	-34.30	-60.72	26.42	-25.00	-9.30	Peak



A D T

Data: 14

Date: 2020-11-28



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_M-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	118.29	-54.39	-46.01	-8.38	-25.00	-29.39	Peak
2	171.75	-54.53	-48.03	-6.50	-25.00	-29.53	Peak
3	211.71	-66.87	-60.84	-6.03	-25.00	-41.87	Peak
4	419.70	-55.59	-52.40	-3.19	-25.00	-30.59	Peak
5	563.20	-61.02	-59.92	-1.10	-25.00	-36.02	Peak
6	797.70	-67.71	-69.53	1.82	-25.00	-42.71	Peak
7	5070.00	-44.96	-64.35	19.39	-25.00	-19.96	Peak
8	7605.00	-42.03	-65.02	22.99	-25.00	-17.03	Peak
9	pp 10140.00	-39.12	-65.54	26.42	-25.00	-14.12	Peak

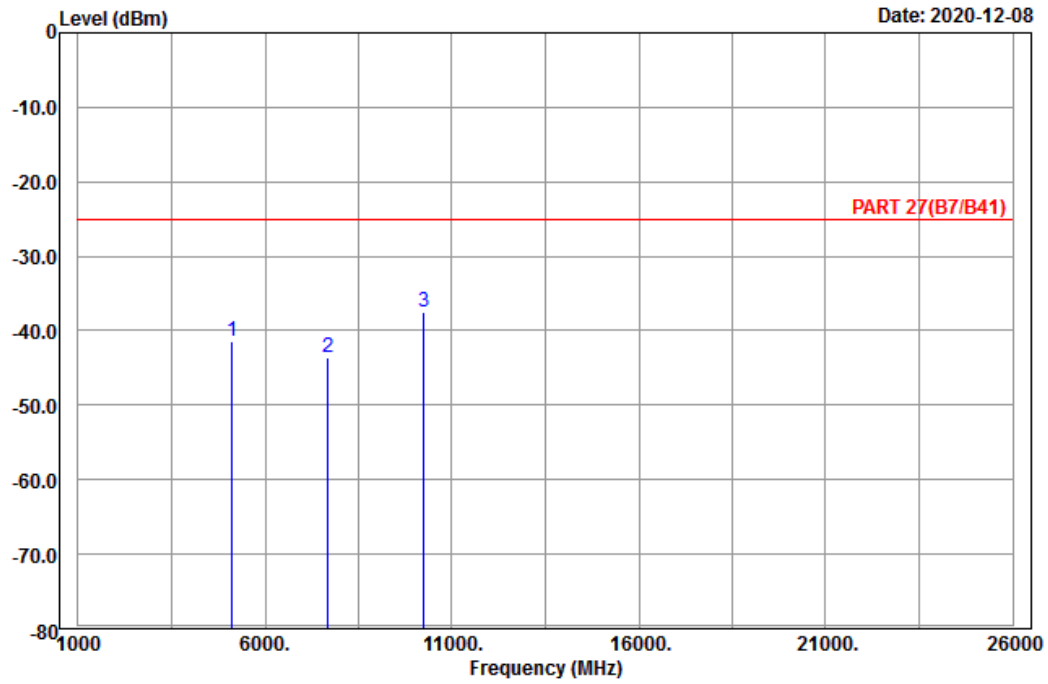
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 7\_Link\_H-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5120.00	-41.32	-61.03	19.71	-25.00	-16.32	Peak
2	7680.00	-43.60	-66.72	23.12	-25.00	-18.60	Peak
3 pp	10240.00	-37.53	-64.07	26.54	-25.00	-12.53	Peak



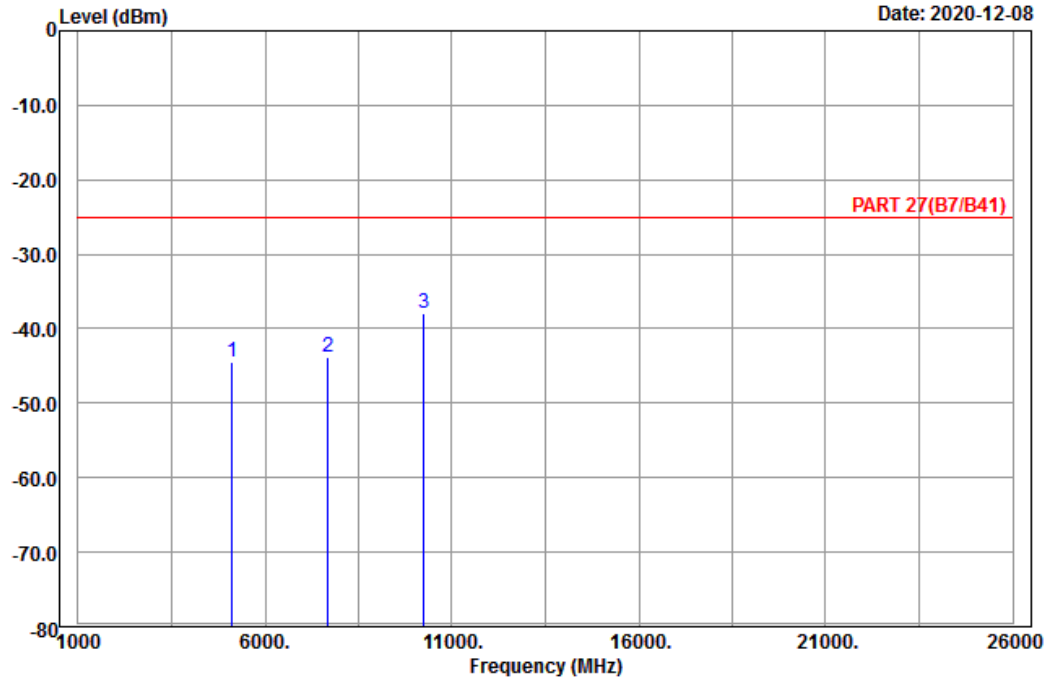


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 7\_Link\_H-Ch  
 Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5120.00	-44.36	-64.07	19.71	-25.00	-19.36	Peak
2	7680.00	-43.71	-66.83	23.12	-25.00	-18.71	Peak
3 pp	10240.00	-37.87	-64.41	26.54	-25.00	-12.87	Peak

LTE Band 38  
 Channel Bandwidth: 5 MHz / QPSK  
 Low Channel

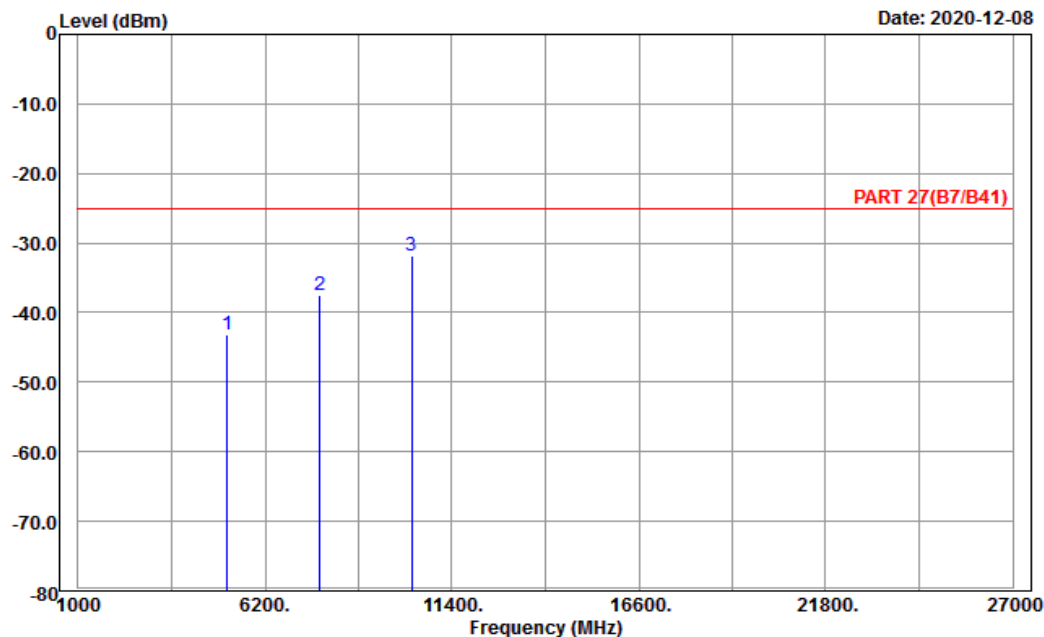


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 38\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5145.00	-43.14	-62.95	19.81	-25.00	-18.14	Peak
2	7717.50	-37.49	-60.68	23.19	-25.00	-12.49	Peak
3 pp	10290.00	-31.85	-58.47	26.62	-25.00	-6.85	Peak

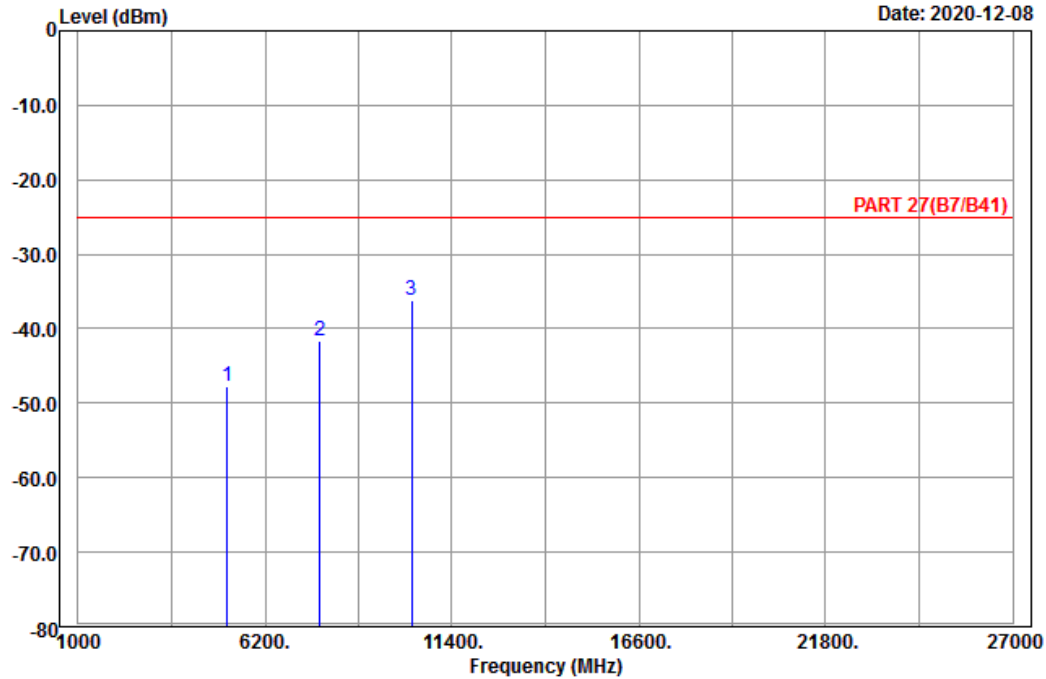


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5145.00	-47.83	-67.64	19.81	-25.00	-22.83	Peak
2	7717.50	-41.74	-64.93	23.19	-25.00	-16.74	Peak
3 pp	10290.00	-36.14	-62.76	26.62	-25.00	-11.14	Peak

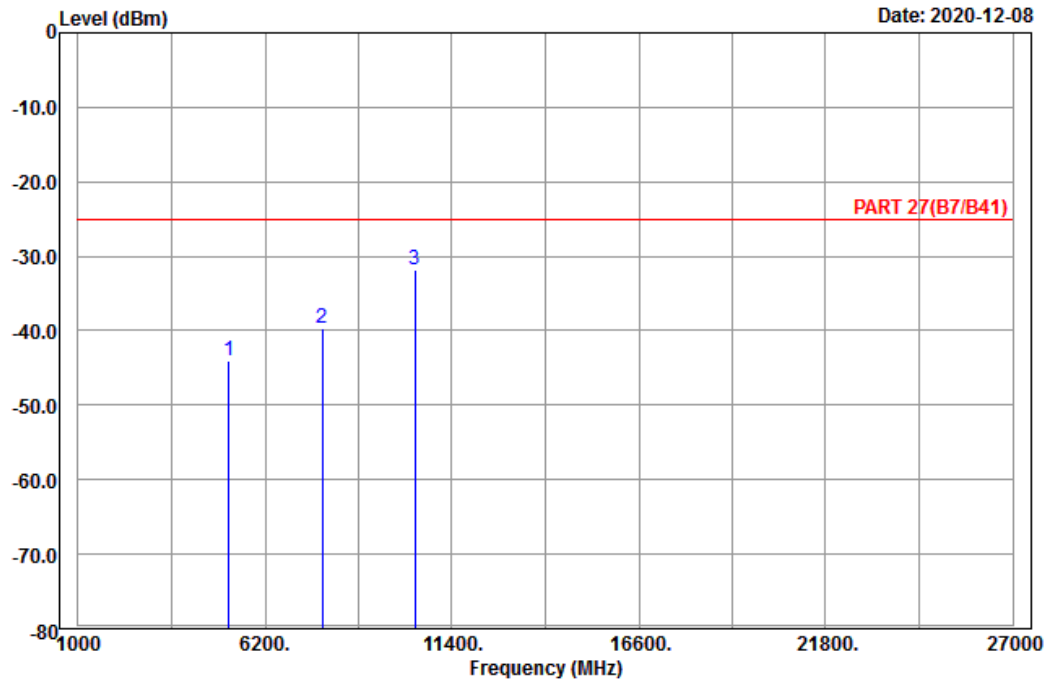
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 38\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5190.00	-44.04	-64.16	20.12	-25.00	-19.04	Peak
2	7785.00	-39.71	-63.04	23.33	-25.00	-14.71	Peak
3 pp	10380.00	-31.93	-58.67	26.74	-25.00	-6.93	Peak

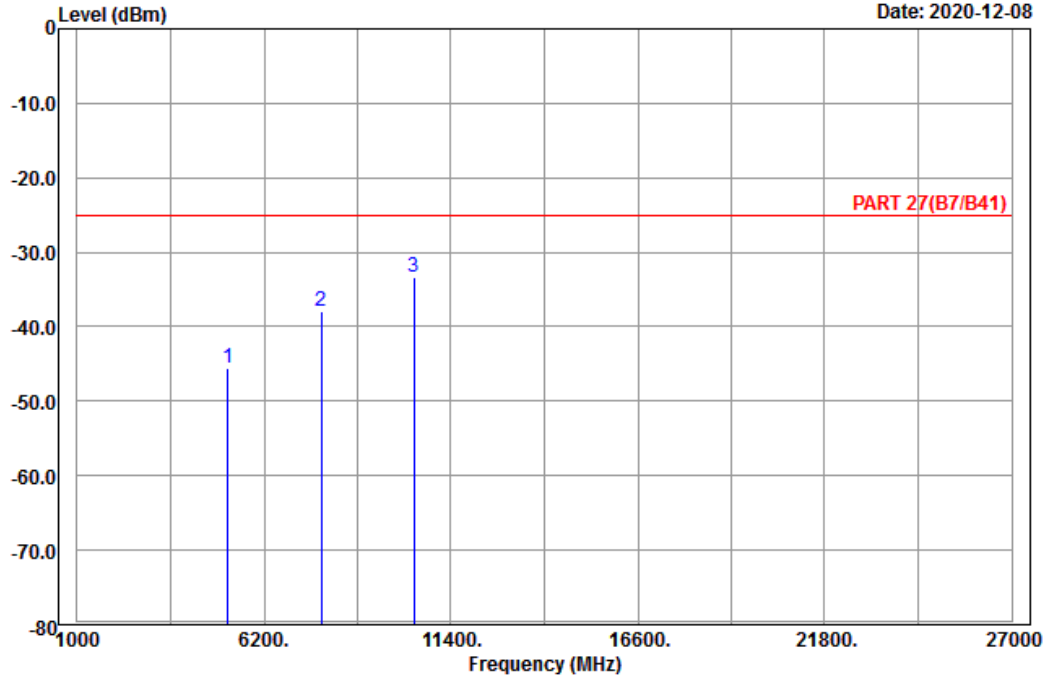


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5190.00	-45.65	-65.77	20.12	-25.00	-20.65	Peak
2	7785.00	-37.97	-61.30	23.33	-25.00	-12.97	Peak
3 pp	10380.00	-33.28	-60.02	26.74	-25.00	-8.28	Peak

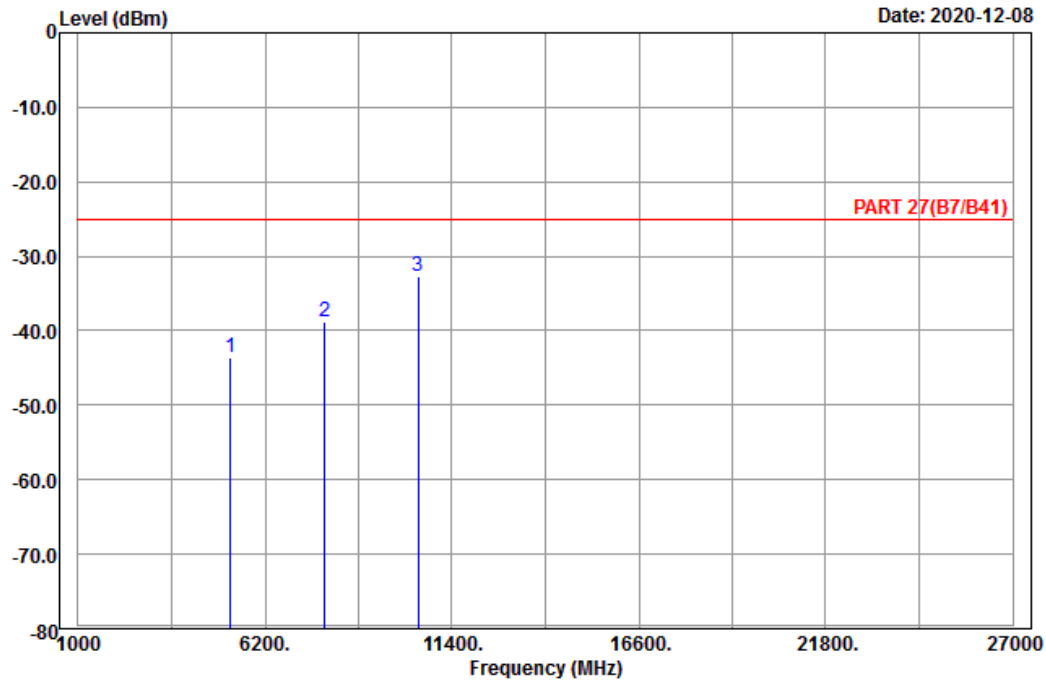
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 38\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5235.00	-43.65	-63.81	20.16	-25.00	-18.65	Peak
2	7852.50	-38.79	-62.25	23.46	-25.00	-13.79	Peak
3 pp	10470.00	-32.76	-59.42	26.66	-25.00	-7.76	Peak

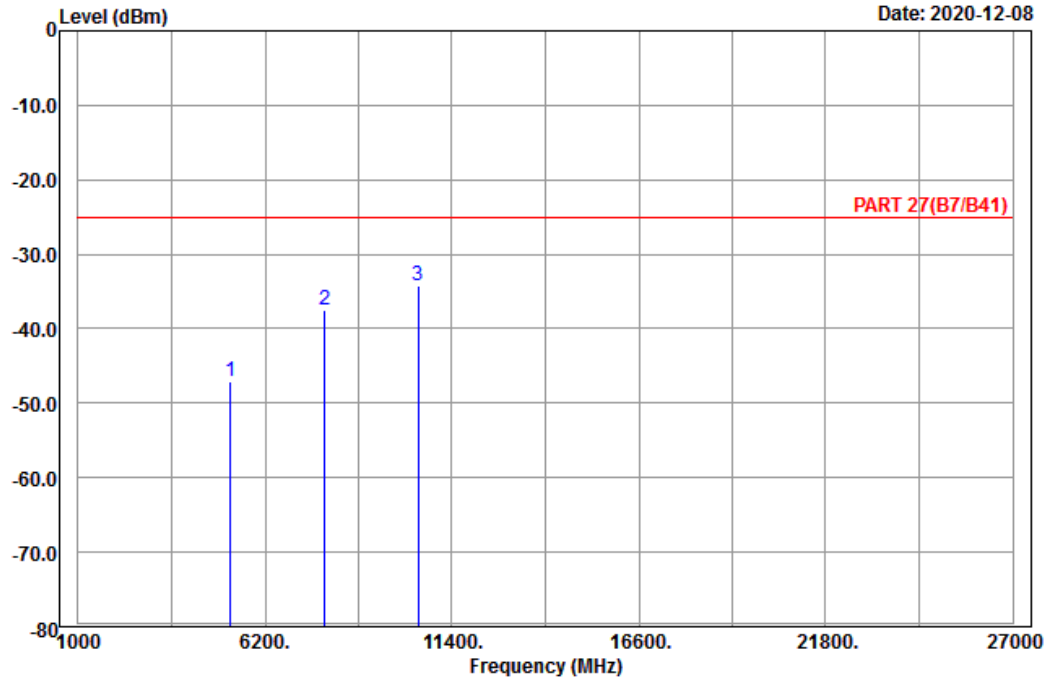


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5235.00	-47.03	-67.19	20.16	-25.00	-22.03	Peak
2	7852.50	-37.43	-60.89	23.46	-25.00	-12.43	Peak
3 pp	10470.00	-34.21	-60.87	26.66	-25.00	-9.21	Peak

Channel Bandwidth: 20 MHz / QPSK  
Low Channel

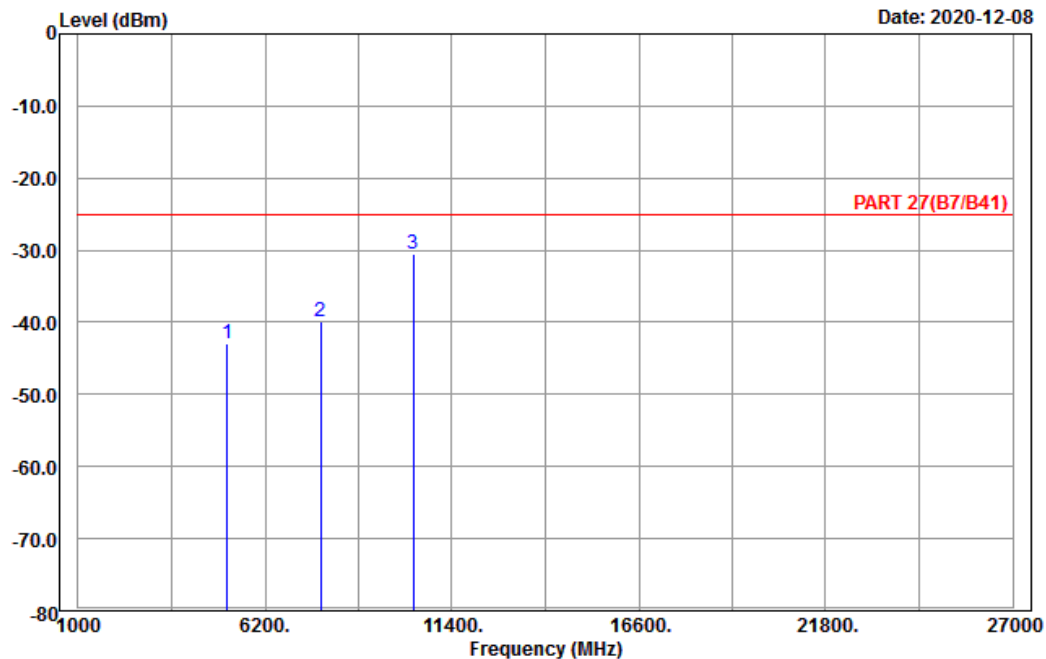


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-08



Site : 966 chamber 1  
Condition: PART 27(B7/B41) Horizontal  
Remark : LTE\_Band 38\_Link\_L-Ch  
Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5160.00	-42.88	-62.80	19.92	-25.00	-17.88	Peak
2	7740.00	-39.79	-63.02	23.23	-25.00	-14.79	Peak
3 pp	10320.00	-30.51	-57.18	26.67	-25.00	-5.51	Peak

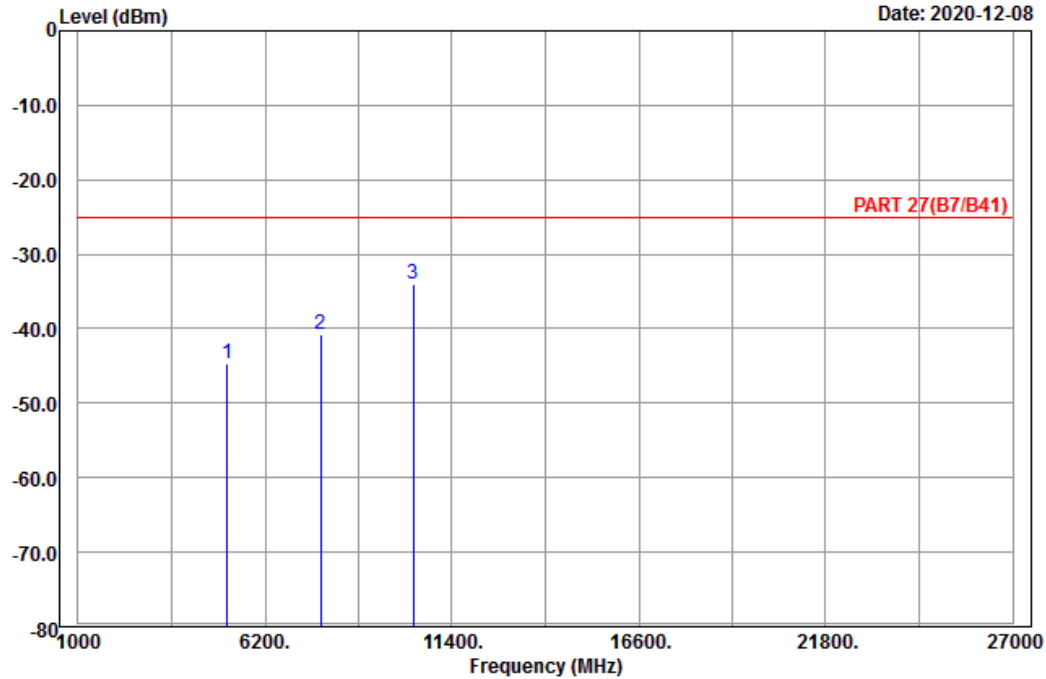




A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5160.00	-44.77	-64.69	19.92	-25.00	-19.77	Peak
2	7740.00	-40.70	-63.93	23.23	-25.00	-15.70	Peak
3 pp	10320.00	-34.00	-60.67	26.67	-25.00	-9.00	Peak

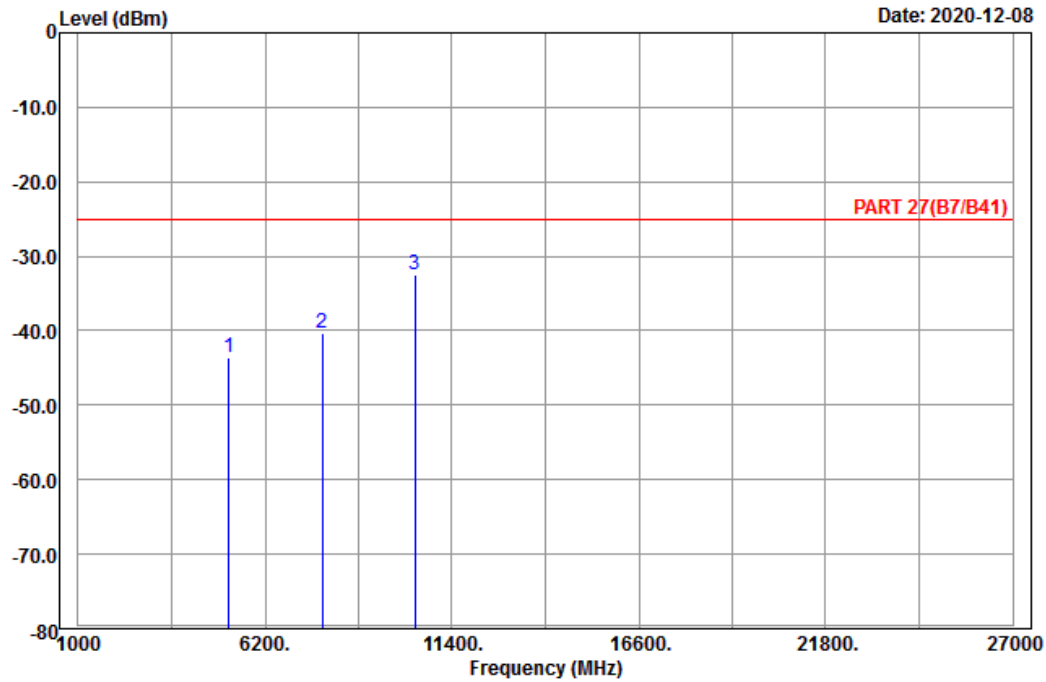
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 38\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5190.00	-43.54	-63.66	20.12	-25.00	-18.54	Peak
2	7785.00	-40.23	-63.56	23.33	-25.00	-15.23	Peak
3 pp	10380.00	-32.50	-59.24	26.74	-25.00	-7.50	Peak

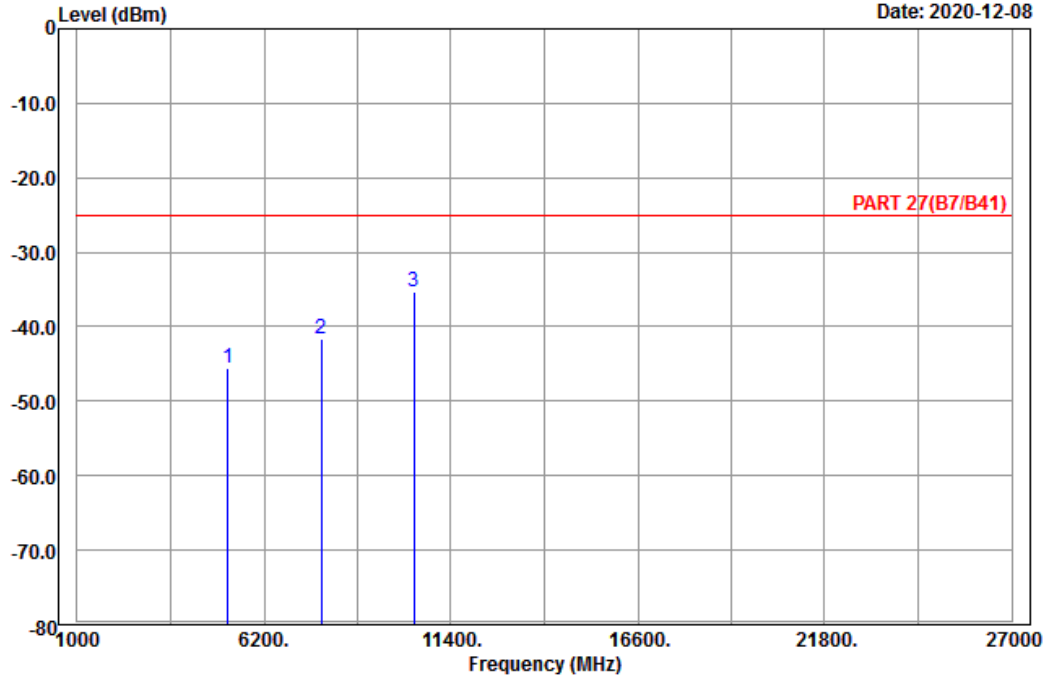


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5190.00	-45.65	-65.77	20.12	-25.00	-20.65	Peak
2	7785.00	-41.73	-65.06	23.33	-25.00	-16.73	Peak
3 pp	10380.00	-35.42	-62.16	26.74	-25.00	-10.42	Peak

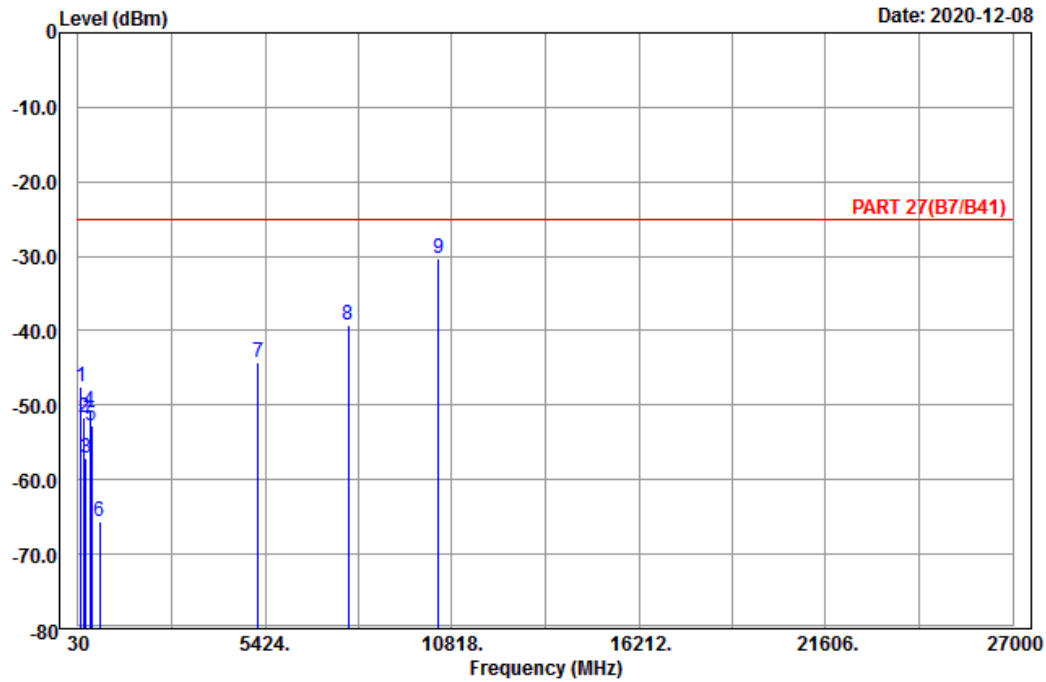
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 38\_Link\_H-Ch  
 Tested by: Charles Hsiao

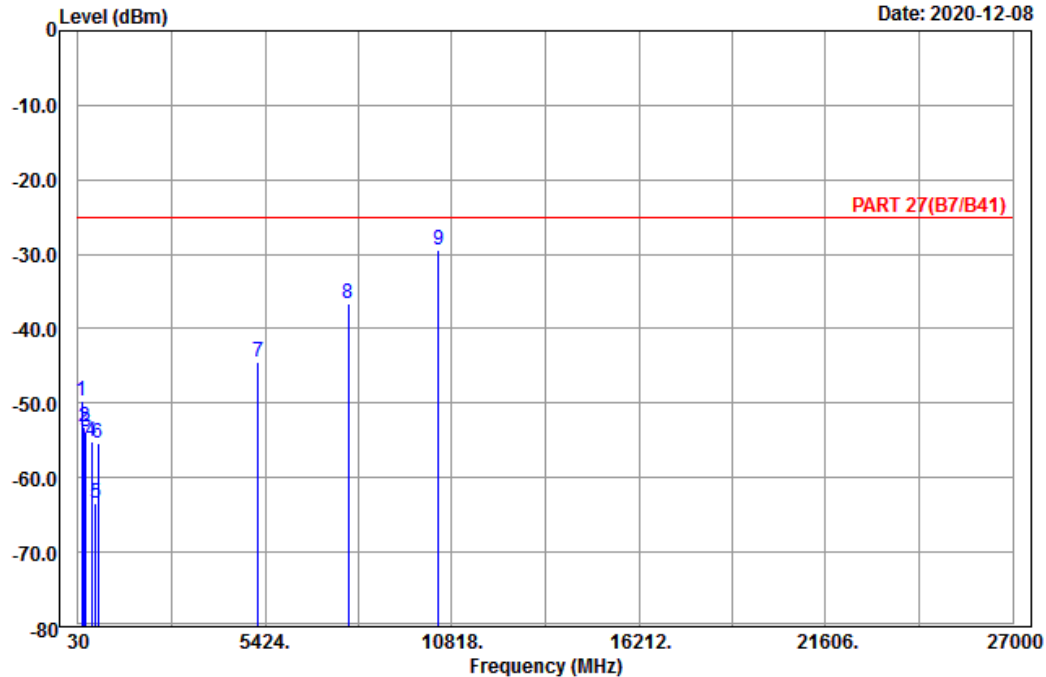
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	118.56	-47.56	-39.18	-8.38	-25.00	-22.56	Peak
2	203.88	-51.58	-45.45	-6.13	-25.00	-26.58	Peak
3	258.96	-57.18	-51.59	-5.59	-25.00	-32.18	Peak
4	373.50	-50.73	-46.59	-4.14	-25.00	-25.73	Peak
5	416.90	-52.64	-49.52	-3.12	-25.00	-27.64	Peak
6	646.50	-65.57	-65.47	-0.10	-25.00	-40.57	Peak
7	5220.00	-44.33	-64.47	20.14	-25.00	-19.33	Peak
8	7830.00	-39.15	-62.55	23.40	-25.00	-14.15	Peak
9 pp	10440.00	-30.33	-57.04	26.71	-25.00	-5.33	Peak



A D T

Data: 8

Date: 2020-12-08



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 38\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	129.63	-49.79	-42.14	-7.65	-25.00	-24.79	Peak
2	206.04	-53.15	-47.04	-6.11	-25.00	-28.15	Peak
3	259.50	-53.83	-48.23	-5.60	-25.00	-28.83	Peak
4	416.90	-55.21	-52.09	-3.12	-25.00	-30.21	Peak
5	537.30	-63.44	-60.86	-2.58	-25.00	-38.44	Peak
6	601.70	-55.32	-55.74	0.42	-25.00	-30.32	Peak
7	5220.00	-44.47	-64.61	20.14	-25.00	-19.47	Peak
8	7830.00	-36.64	-60.04	23.40	-25.00	-11.64	Peak
9	pp 10440.00	-29.50	-56.21	26.71	-25.00	-4.50	Peak

LTE Band 41  
 Channel Bandwidth: 5 MHz / QPSK  
 Low Channel

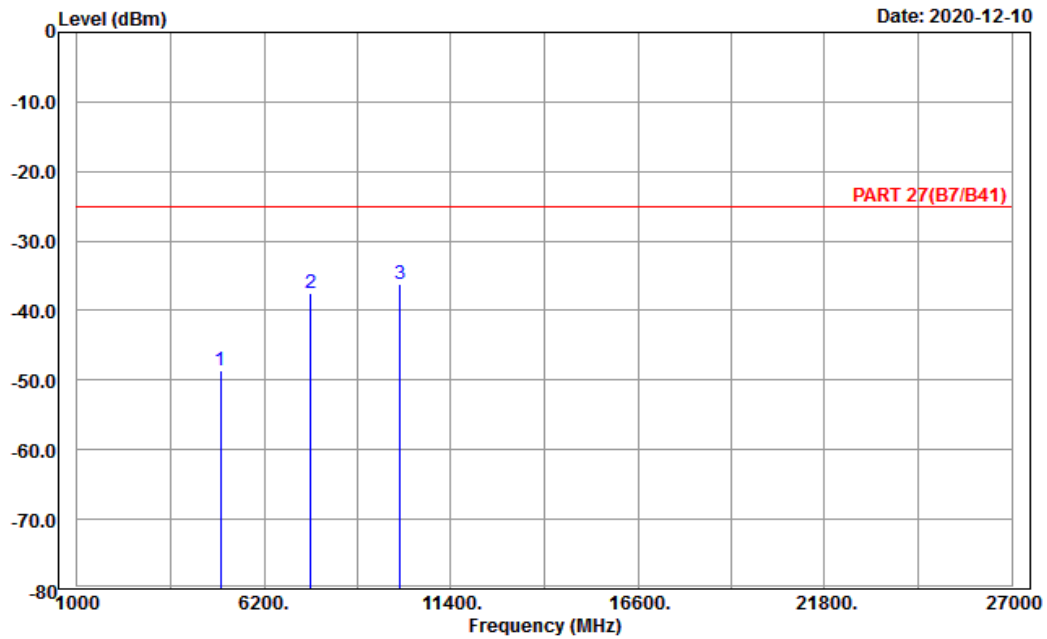


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 41\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	4997.00	-48.68	-68.26	19.58	-25.00	-23.68	Peak
2	7495.50	-37.55	-59.75	22.20	-25.00	-12.55	Peak
3 pp	9994.00	-36.24	-62.46	26.22	-25.00	-11.24	Peak

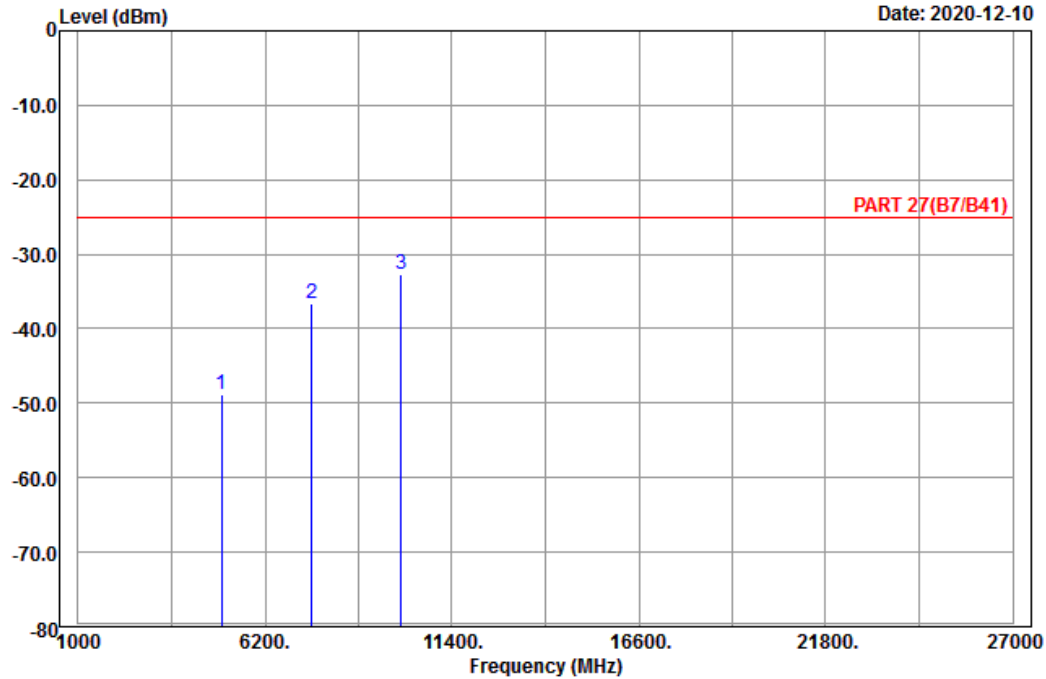


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	4997.00	-48.73	-68.31	19.58	-25.00	-23.73	Peak
2	7495.50	-36.59	-58.79	22.20	-25.00	-11.59	Peak
3 pp	9994.00	-32.60	-58.82	26.22	-25.00	-7.60	Peak

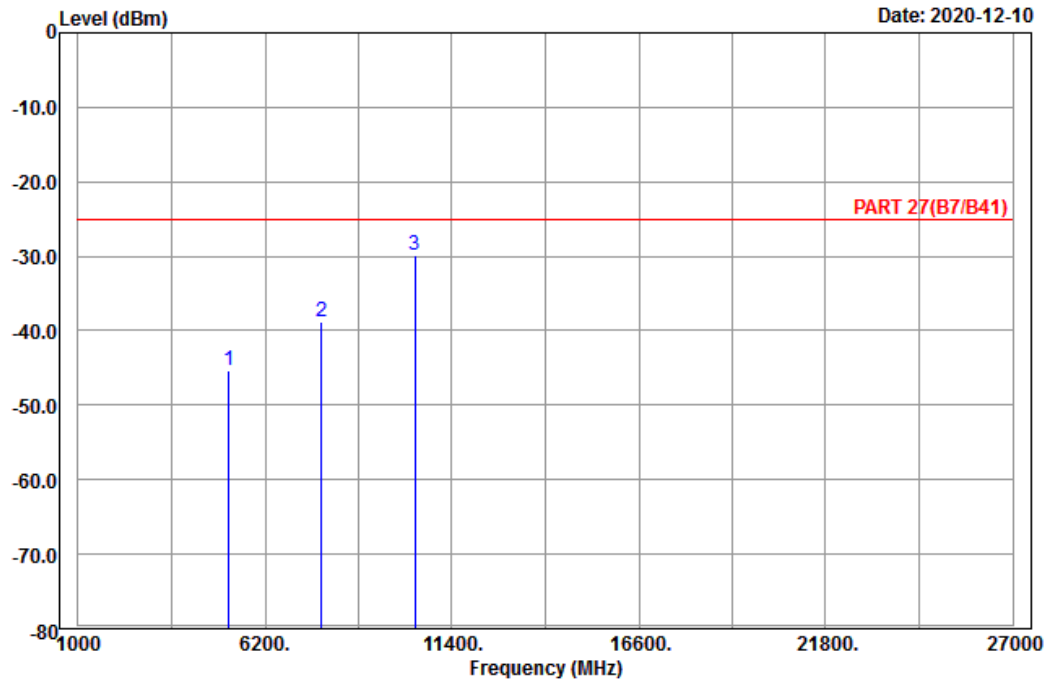
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 41\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5186.00	-45.24	-65.36	20.12	-25.00	-20.24	Peak
2	7779.00	-38.77	-62.10	23.33	-25.00	-13.77	Peak
3 pp	10372.00	-29.76	-56.50	26.74	-25.00	-4.76	Peak



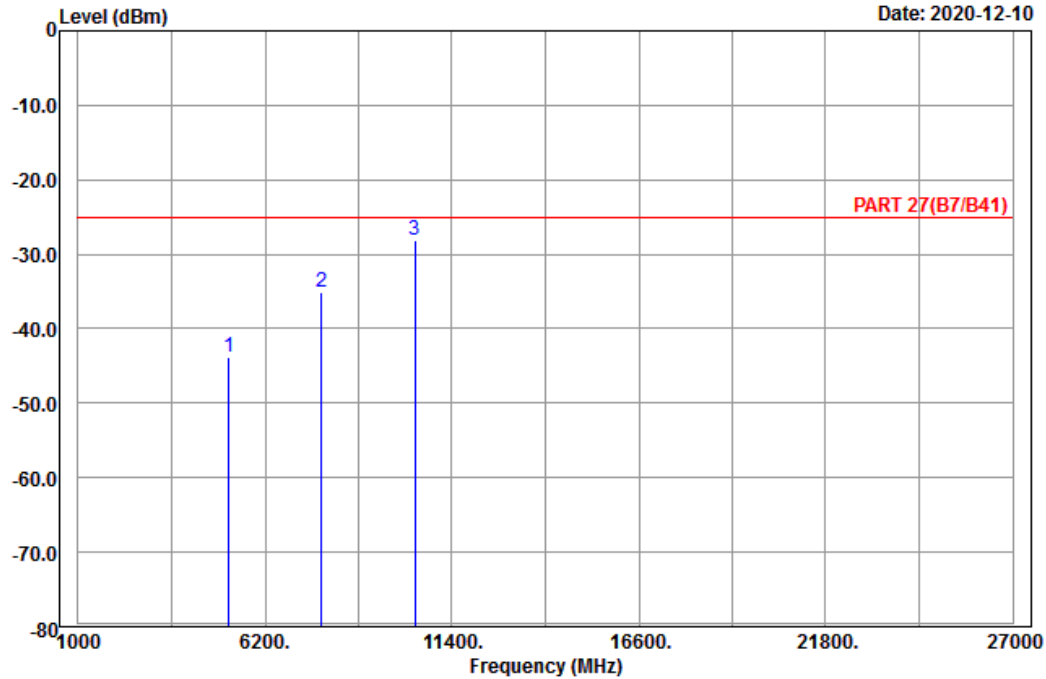


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5186.00	-43.77	-63.89	20.12	-25.00	-18.77	Peak
2	7779.00	-35.13	-58.46	23.33	-25.00	-10.13	Peak
3 pp	10372.00	-28.06	-54.80	26.74	-25.00	-3.06	Peak

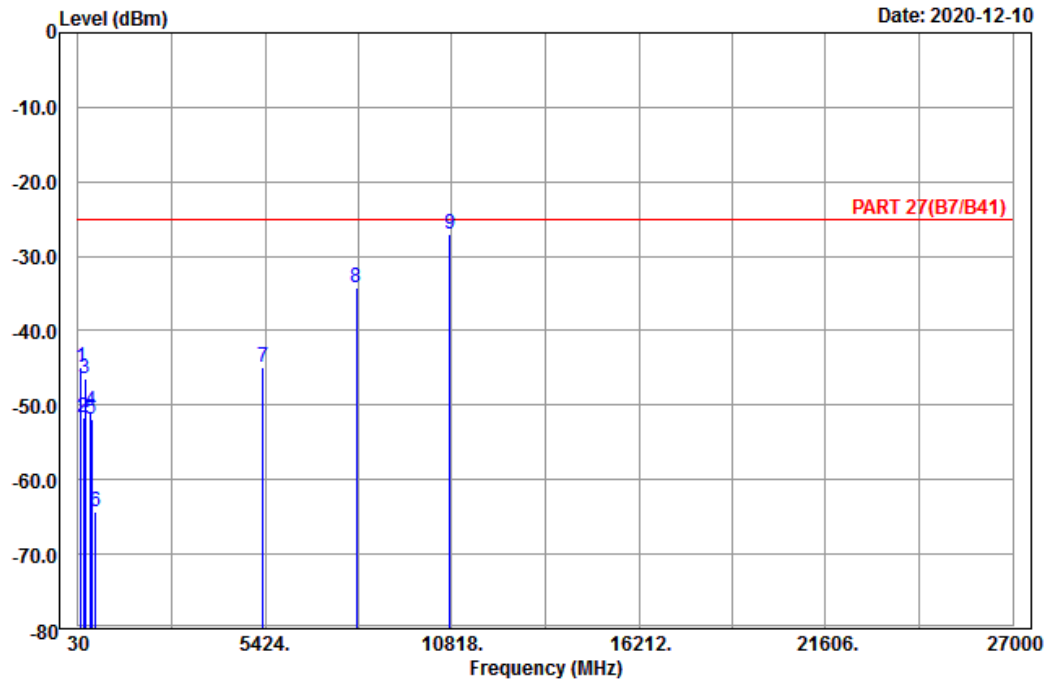
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 41\_Link\_H-Ch  
 Tested by: Charles Hsiao

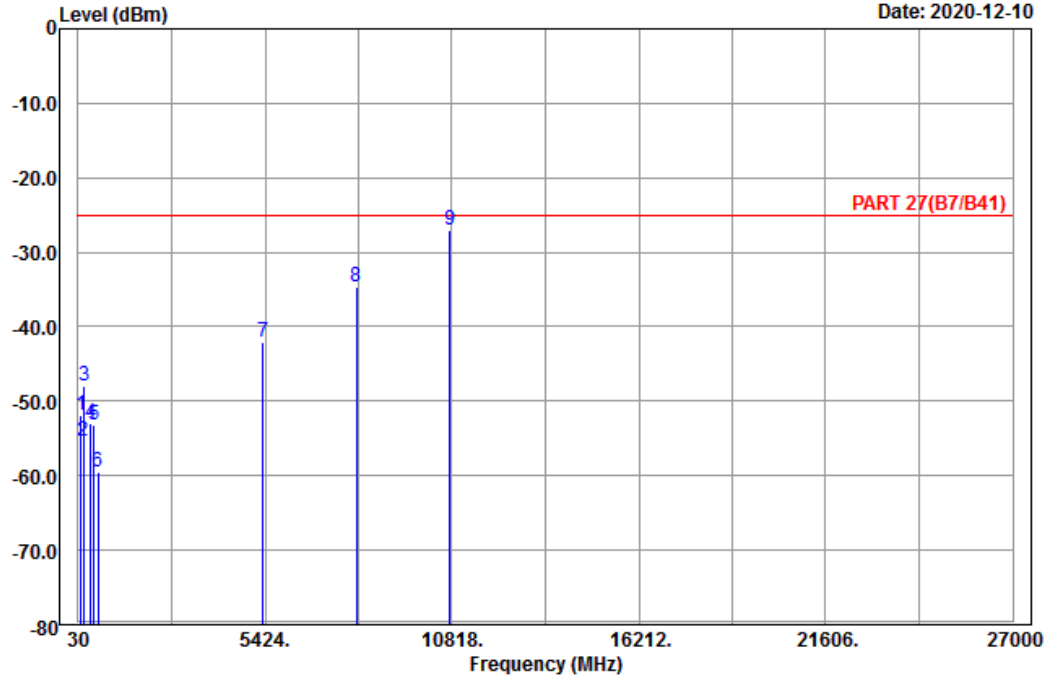
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	121.53	-44.97	-36.78	-8.19	-25.00	-19.97	Peak
2	177.69	-51.64	-45.76	-5.88	-25.00	-26.64	Peak
3	218.46	-46.45	-40.51	-5.94	-25.00	-21.45	Peak
4	383.30	-50.76	-47.14	-3.62	-25.00	-25.76	Peak
5	413.40	-51.97	-48.93	-3.04	-25.00	-26.97	Peak
6	542.90	-64.41	-62.25	-2.16	-25.00	-39.41	Peak
7	5375.00	-44.81	-65.13	20.32	-25.00	-19.81	Peak
8	8062.50	-34.16	-57.93	23.77	-25.00	-9.16	Peak
9	pp 10750.00	-27.09	-54.25	27.16	-25.00	-2.09	Peak



A D T

Data: 14

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	111.54	-51.78	-42.96	-8.82	-25.00	-26.78	Peak
2	179.04	-55.32	-49.64	-5.68	-25.00	-30.32	Peak
3	207.93	-47.91	-41.83	-6.08	-25.00	-22.91	Peak
4	404.30	-52.95	-50.10	-2.85	-25.00	-27.95	Peak
5	475.70	-53.16	-48.60	-4.56	-25.00	-28.16	Peak
6	610.10	-59.43	-59.75	0.32	-25.00	-34.43	Peak
7	5375.00	-41.97	-62.29	20.32	-25.00	-16.97	Peak
8	8062.50	-34.69	-58.46	23.77	-25.00	-9.69	Peak
9	pp 10750.00	-26.94	-54.10	27.16	-25.00	-1.94	Peak

Channel Bandwidth: 20 MHz / QPSK  
Low Channel

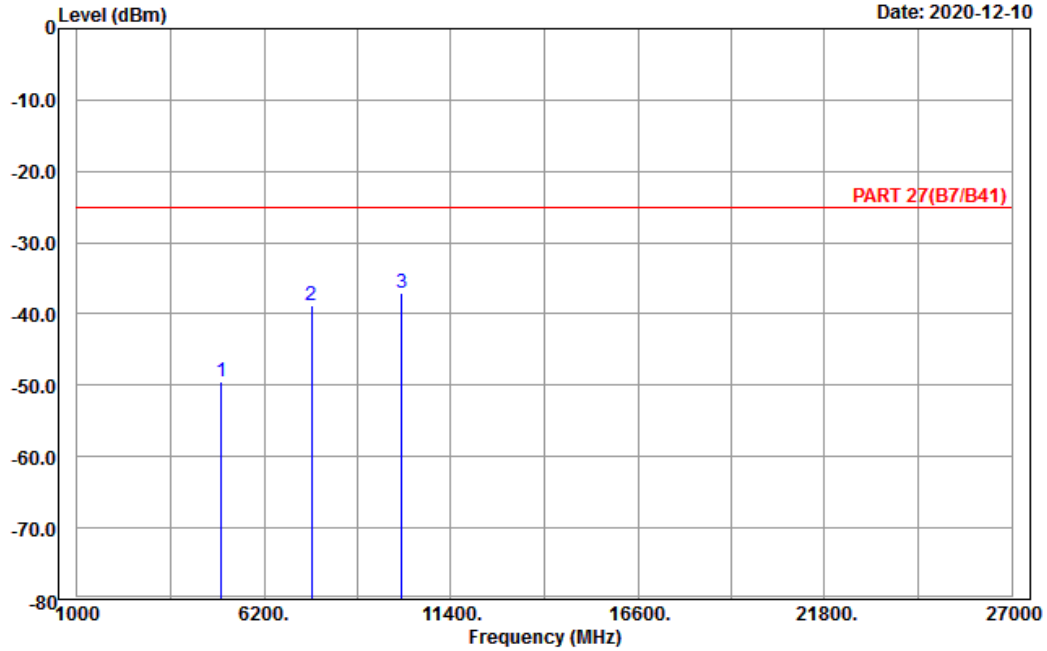


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3

Date: 2020-12-10



Site : 966 chamber 1  
Condition: PART 27(B7/B41) Horizontal  
Remark : LTE\_Band 41\_Link\_L-Ch  
Tested by: Charles Hsiao

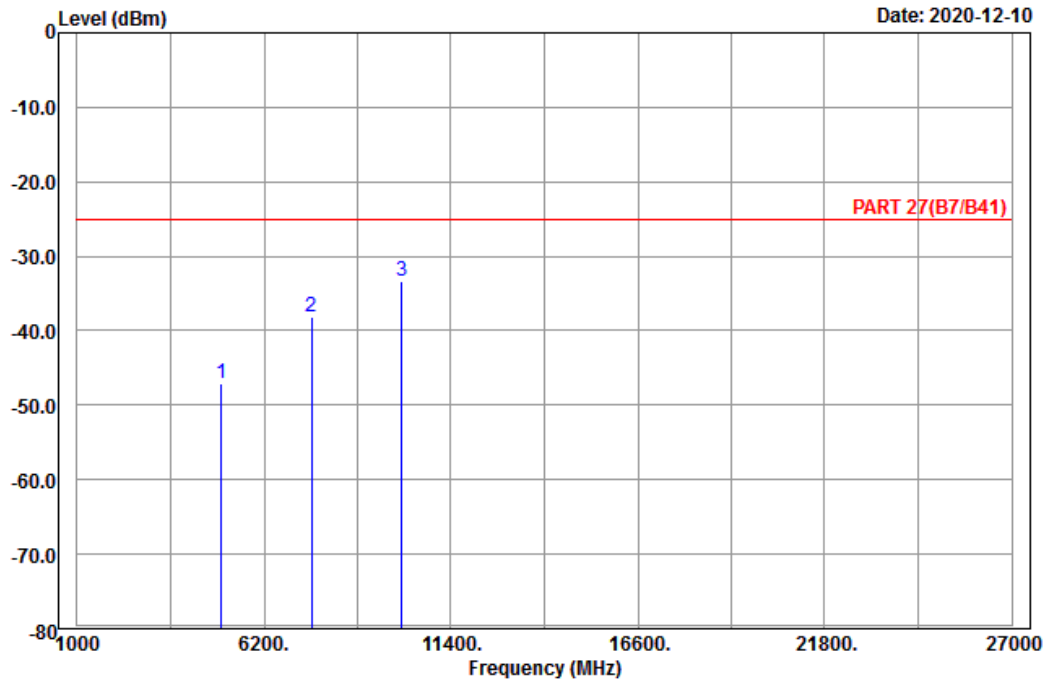
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5012.00	-49.47	-68.55	19.08	-25.00	-24.47	Peak
2	7518.00	-38.75	-61.43	22.68	-25.00	-13.75	Peak
3 pp	10024.00	-37.07	-63.32	26.25	-25.00	-12.07	Peak



A D T

Data: 4

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_L-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5012.00	-47.12	-66.20	19.08	-25.00	-22.12	Peak
2	7518.00	-38.19	-60.87	22.68	-25.00	-13.19	Peak
3 pp	10024.00	-33.29	-59.54	26.25	-25.00	-8.29	Peak

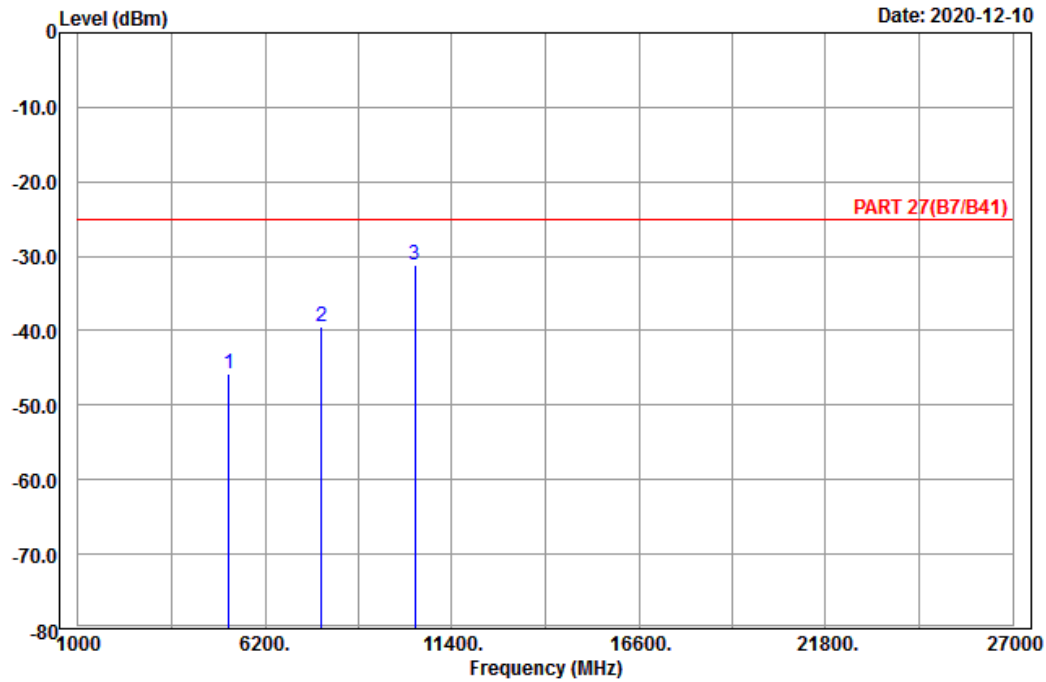
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 41\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5186.00	-45.73	-65.85	20.12	-25.00	-20.73	Peak
2	7779.00	-39.51	-62.84	23.33	-25.00	-14.51	Peak
3 pp	10372.00	-31.08	-57.82	26.74	-25.00	-6.08	Peak

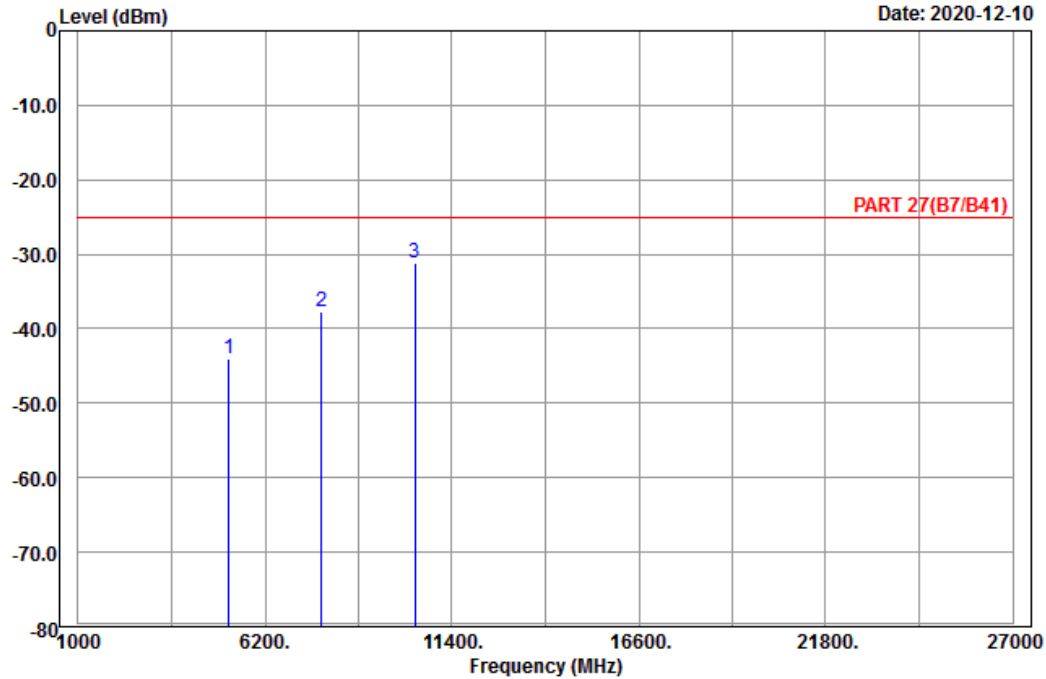


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_M-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5186.00	-43.95	-64.07	20.12	-25.00	-18.95	Peak
2	7779.00	-37.72	-61.05	23.33	-25.00	-12.72	Peak
3 pp	10372.00	-31.12	-57.86	26.74	-25.00	-6.12	Peak

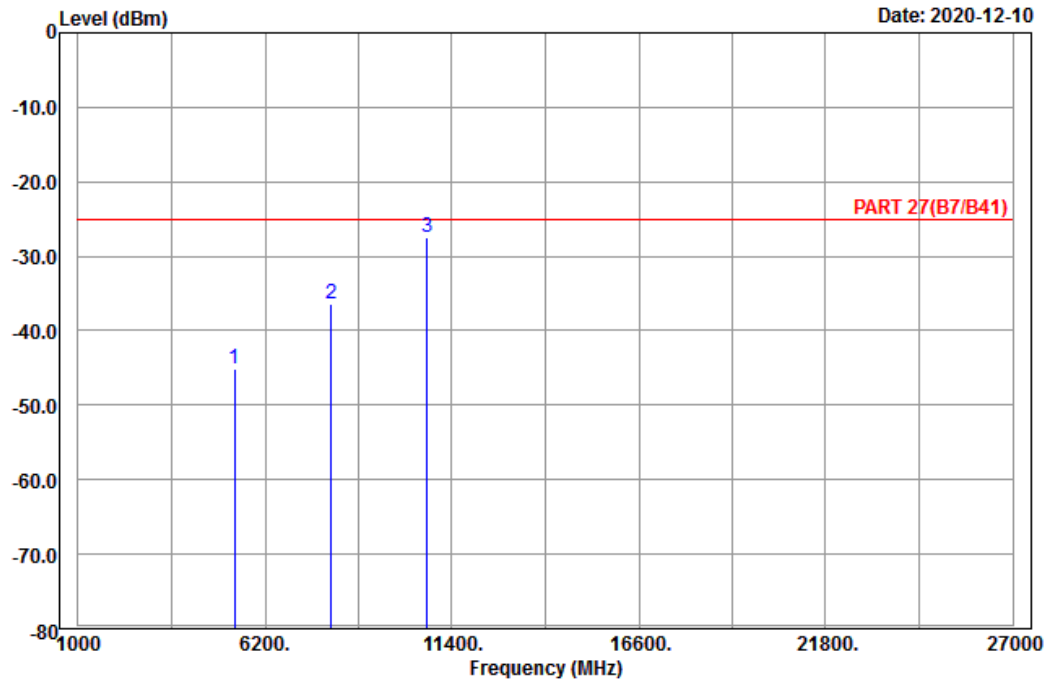
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Horizontal  
 Remark : LTE\_Band 41\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5360.00	-45.11	-65.41	20.30	-25.00	-20.11	Peak
2	8040.00	-36.30	-60.05	23.75	-25.00	-11.30	Peak
3 pp	10720.00	-27.37	-54.45	27.08	-25.00	-2.37	Peak

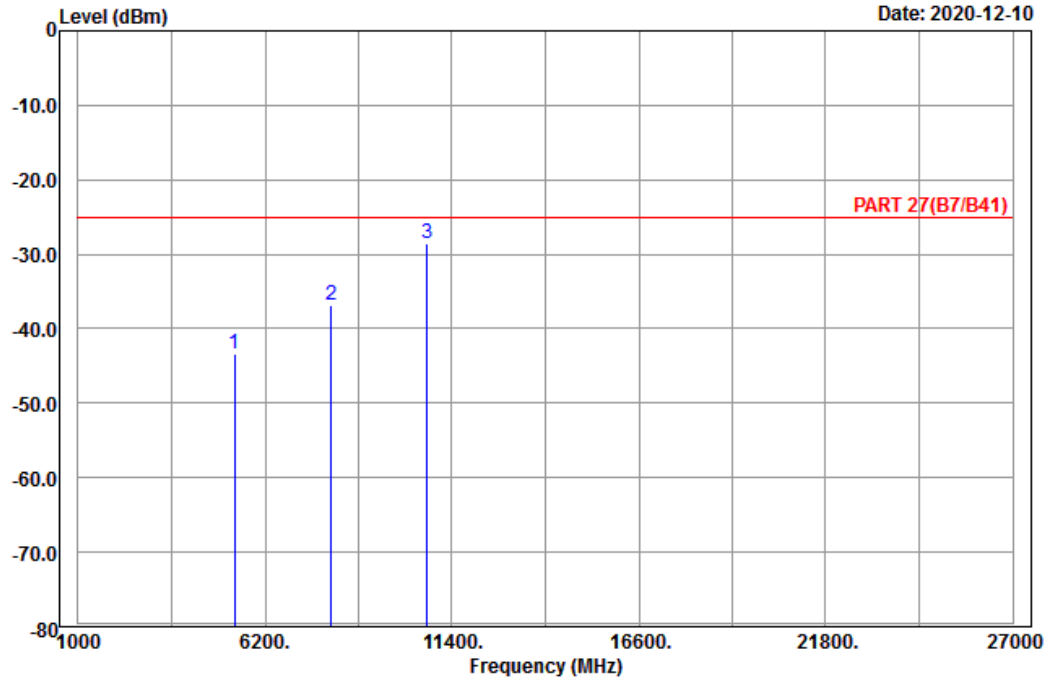




A D T

Data: 9

Date: 2020-12-10



Site : 966 chamber 1  
 Condition: PART 27(B7/B41) Vertical  
 Remark : LTE\_Band 41\_Link\_H-Ch  
 Tested by: Charles Hsiao

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	5360.00	-43.34	-63.64	20.30	-25.00	-18.34	Peak
2	8040.00	-36.75	-60.50	23.75	-25.00	-11.75	Peak
3 pp	10720.00	-28.47	-55.55	27.08	-25.00	-3.47	Peak

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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