

## FCC Test Report

### (PART 22)

**Report No.:** RF190211C01-6

**FCC ID:** B32CM5

**Test Model:** CM5

**Received Date:** Feb. 06, 2019

**Test Date:** Feb. 06, 2019 ~ Feb. 16, 2019

**Issued Date:** Mar. 20, 2019

**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

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

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

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

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



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### Release Control Record

Issue No.	Description	Date Issued
RF190211C01-6	Original Release	Mar. 20, 2019

## 1 Certificate of Conformity

**Product:** Point of Sale Terminal

**Brand:** Verifone

**Test Model:** CM5


**Sample Status:** Identical Prototype


**Applicant:** Verifone, Inc.

**Test Date:** Feb. 06, 2019 ~ Feb. 16, 2019

**Standards:** FCC Part 22, Subpart H

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:** Mar. 20, 2019  
Ivonne Wu / Supervisor

**Approved by :** , **Date:** Mar. 20, 2019  
Dylan Chiou / Project Engineer

## 2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1046 22.913 (d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
22.917	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -37.62 dB at 2472.60 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) ( $\pm$ )
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. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100980	Apr. 17, 2018	Apr. 16, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 19, 2018	Nov. 18, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
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
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
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. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
  4. The IC Site Registration No. is 7450I-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>	CM5	
<b>Status of EUT</b>	Identical Prototype	
<b>Power Supply Rating</b>	5.0 Vdc (adapter or host equipment) 3.85 Vdc (Li-ion battery)	
<b>Modulation Type</b>	GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	QPSK
	LTE	QPSK, 16QAM
<b>Frequency Range</b>	GPRS/EDGE	824.2 ~ 848.8 MHz
	WCDMA	826.4 ~ 846.6 MHz
	LTE 5 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 5 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 5 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 5 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 26 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 26 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 26 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
<b>Max. ERP Power</b>	GPRS	1035.14 mW
	EDGE	223.87 mW
	WCDMA	65.46 mW
	LTE 5 (Channel Bandwidth: 1.4 MHz)	102.33 mW
	LTE 5 (Channel Bandwidth: 3 MHz)	103.28 mW
	LTE 5 (Channel Bandwidth: 5 MHz)	103.99 mW
	LTE 5 (Channel Bandwidth: 10 MHz)	104.95 mW
	LTE 26 (Channel Bandwidth: 1.4 MHz)	90.16 mW
	LTE 26 (Channel Bandwidth: 3 MHz)	90.78 mW
	LTE 26 (Channel Bandwidth: 5 MHz)	91.62 mW
	LTE 26 (Channel Bandwidth: 10 MHz)	92.26 mW
LTE 26 (Channel Bandwidth: 15 MHz)	93.11 mW	

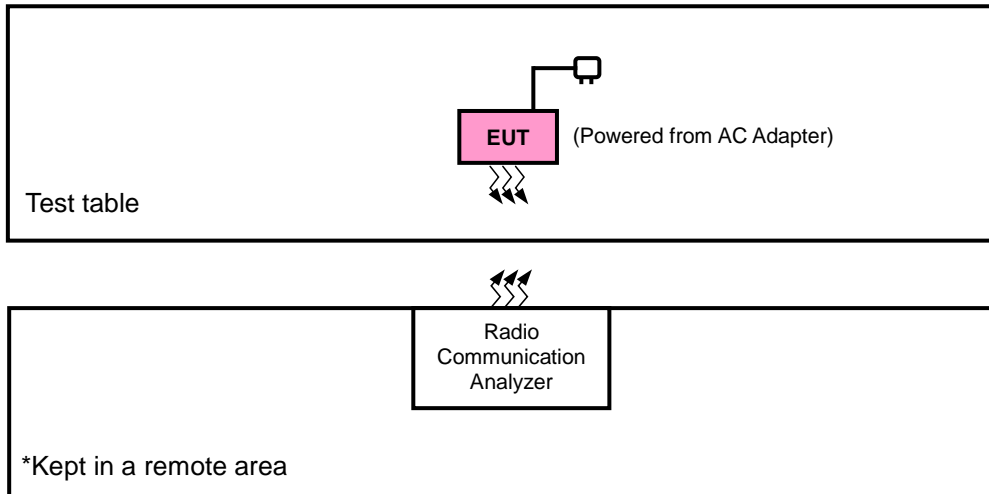
<b>Emission Designator</b>	GPRS	247KGXW
	EDGE	246KG7W
	WCDMA	4M17F9W
	LTE 5 (Channel Bandwidth: 1.4 MHz)	1M09D7W
	LTE 5 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE 5 (Channel Bandwidth: 5 MHz)	4M50D7W
	LTE 5 (Channel Bandwidth: 10 MHz)	8M97D7W
	LTE 26 (Channel Bandwidth: 1.4 MHz)	1M09D7W
	LTE 26 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE 26 (Channel Bandwidth: 5 MHz)	4M50D7W
	LTE 26 (Channel Bandwidth: 10 MHz)	8M97D7W
	LTE 26 (Channel Bandwidth: 15 MHz)	13M5G7D
<b>Antenna Type</b>	Fixed Internal Antenna with -1.5 dBi gain	
<b>Accessory Device</b>	Refer to Note as below	
<b>Data Cable Supplied</b>	Refer to Note as below	

Note:

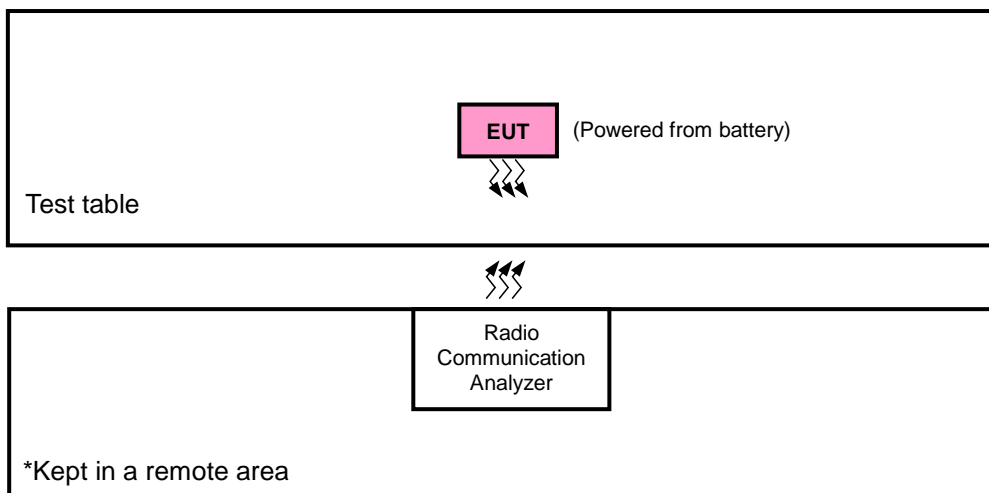
1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

### 3.2 Configuration of System under Test

#### <Radiated Emission Test>



#### <E.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	ERP	Radiated Emission
GPRS	X-plane	X-axis
EDGE	X-plane	X-axis
WCDMA	X-plane	X-axis
LTE Band 5	X-plane	X-axis
LTE Band 26	X-plane	X-axis

#### GPRS

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128, 189, 251	GPRS, EDGE
-	Modulation Characteristics	128 to 251	189	GPRS, EDGE
-	Frequency Stability	128 to 251	128, 251	GPRS, EDGE
-	Occupied Bandwidth	128 to 251	128, 189, 251	GPRS, EDGE
-	Band Edge	128 to 251	128, 251	GPRS, EDGE
-	Peak to Average Ratio	128 to 251	128, 189, 251	GPRS, EDGE
-	Conducted Emission	128 to 251	128, 189, 251	GPRS, EDGE
-	Radiated Emission	128 to 251	128, 189, 251	GPRS, EDGE

#### WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
-	Modulation Characteristics	4132 to 4233	4182	WCDMA
-	Frequency Stability	4132 to 4233	4132, 4233	WCDMA
-	Occupied Bandwidth	4132 to 4233	4132, 4182, 4233	WCDMA
-	Band Edge	4132 to 4233	4132, 4233	WCDMA
-	Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA
-	Conducted Emission	4132 to 4233	4132, 4182, 4233	WCDMA
-	Radiated Emission	4132 to 4233	4132, 4182, 4233	WCDMA

## LTE Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode		
-	ERP	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
-	Modulation Characteristics	20450 to 20600	20525	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset		
-	Frequency Stability	20407 to 20643	20407, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset		
		20415 to 20635	20415, 20635	3 MHz	QPSK	1 RB / 0 RB Offset		
		20425 to 20625	20425, 20625	5 MHz	QPSK	1 RB / 0 RB Offset		
		20450 to 20600	20450, 20600	10 MHz	QPSK	1 RB / 0 RB Offset		
-	Occupied Bandwidth	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset		
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset		
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset		
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset		
-	Band Edge	20407 to 20643	20407	1.4MHz	QPSK	1 RB / 0 RB Offset 6 RB / 0 RB Offset		
			20643	1.4MHz	QPSK	1 RB / 5 RB Offset 6 RB / 0 RB Offset		
		20415 to 20635	20415	3 MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset		
			20635	3 MHz	QPSK	1 RB / 14 RB Offset 15 RB / 0 RB Offset		
		20425 to 20625	20425	5 MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
			20625	5 MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset		
		20450 to 20600	20450	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset		
			20600	10 MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset		
		-	Peak to Average Ratio	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Conducted Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset		
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK	1 RB / 0 RB Offset		
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 0 RB Offset		
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 0 RB Offset		
-	Radiated Emission	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK	1 RB / 0 RB Offset		
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK	1 RB / 0 RB Offset		
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK	1 RB / 0 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.

### LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode		
-	ERP	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		
-	Modulation Characteristics	26865 to 26965	26915	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset		
-	Frequency Stability	26797 to 27033	26797, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset		
		26805 to 27025	26805, 27025	3 MHz	QPSK	1 RB / 0 RB Offset		
		26815 to 27015	26815, 27015	5 MHz	QPSK	1 RB / 0 RB Offset		
		26840 to 26990	26840, 26990	10 MHz	QPSK	1 RB / 0 RB Offset		
		26865 to 26965	26865, 26965	15 MHz	QPSK	1 RB / 0 RB Offset		
-	Occupied Bandwidth	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset		
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset		
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset		
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset		
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset		
-	Band Edge	26797 to 27033	26797	1.4 MHz	QPSK	1 RB / 0 RB Offset 6 RB / 0 RB Offset		
			27033	1.4 MHz	QPSK	1 RB / 5 RB Offset 6 RB / 0 RB Offset		
		26805 to 27025	26805	3 MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset		
			27025	3 MHz	QPSK	1 RB / 14 RB Offset 15 RB / 0 RB Offset		
		26815 to 27015	26815	5 MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset		
			27015	5 MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset		
		26840 to 26990	26840	10 MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset		
			26990	10 MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset		
		26865 to 26965	26865	15 MHz	QPSK	1 RB / 0 RB Offset 75 RB / 0 RB Offset		
			26965	15 MHz	QPSK	1 RB / 74 RB Offset 75 RB / 0 RB Offset		
		-	Peak to Average Ratio	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
				26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
26865 to 26965	26865, 26915, 26965			15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset		

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK	1 RB / 0 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.

**Test Condition:**

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	3.85 Vdc	Karl Lee
Modulation Characteristics	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Band Edge	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Conducted Emission	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee / Harry Hsueh

### 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.

### 3.5 General Description of Applied Standards

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

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

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

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

**ANSI 63.26-2015**

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

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GPRS & EDGE, 5 MHz for WCDMA, and 10 MHz for LTE mode.
- 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. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$ .

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

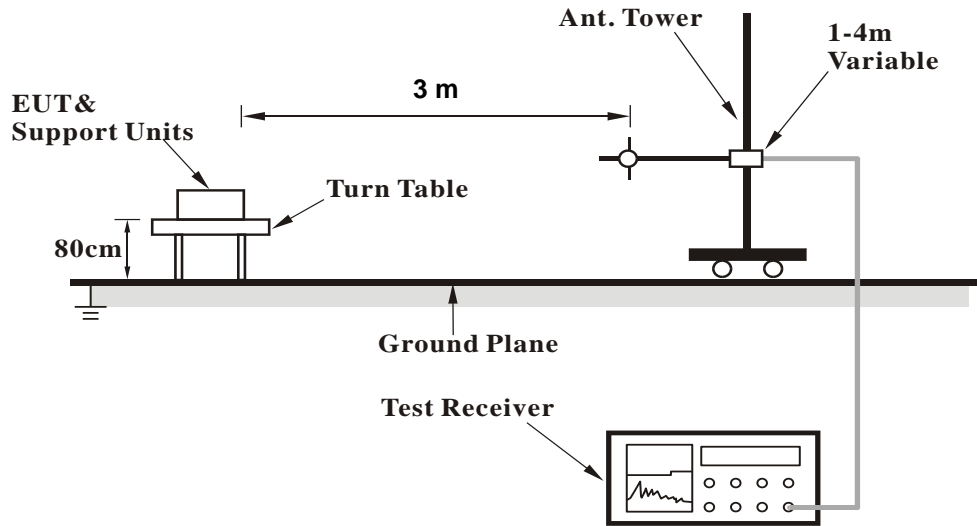
The EUT was set up for the maximum power with GPRS, EDGE, WCDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.



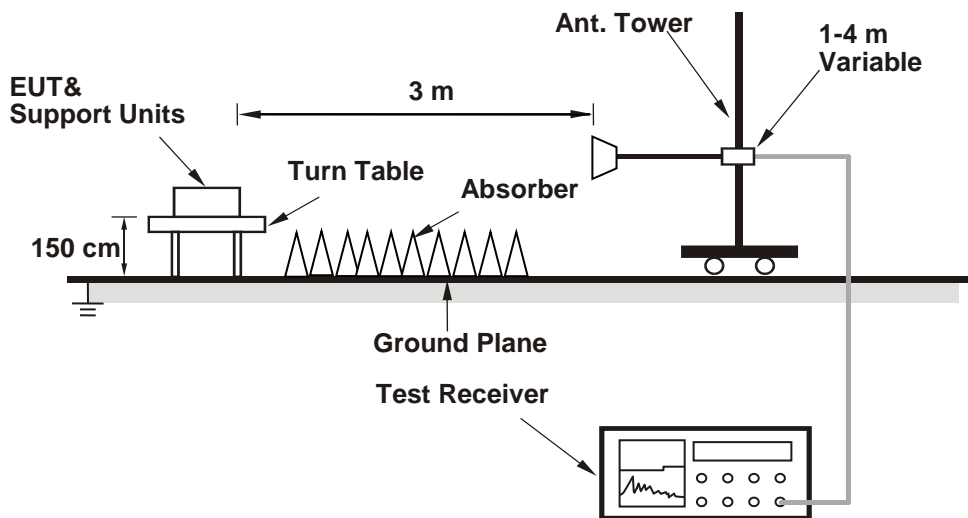
4.1.3 Test Setup

**EIRP / ERP Measurement:**

**<Radiated Emission below or equal 1 GHz>**

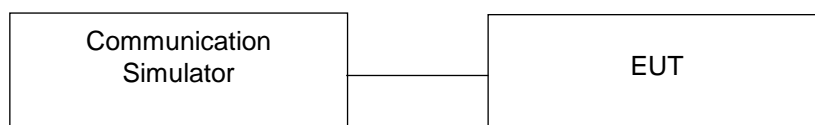


**<Radiated Emission above 1 GHz>**



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

**Conducted Power Measurement:**



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

Band	GPRS 850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GPRS (GMSK, 1Tx-slot)	33.18	33.34	33.31
GPRS (GMSK, 2Tx-slot)	32.27	32.43	32.40
GPRS (GMSK, 3Tx-slot)	29.73	29.89	29.86
GPRS (GMSK, 4Tx-slot)	28.69	28.85	28.82
EDGE (8PSK, 1Tx-slot)	26.75	26.91	26.88
EDGE (8PSK, 2Tx-slot)	26.67	26.83	26.80
EDGE (8PSK, 3Tx-slot)	26.49	26.65	26.62
EDGE (8PSK, 4Tx-slot)	26.31	26.47	26.44

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.63	23.78	23.69
HSDPA Subtest-1	23.48	23.70	23.76
HSDPA Subtest-2	23.43	23.72	23.63
HSDPA Subtest-3	23.11	23.24	23.17
HSDPA Subtest-4	22.91	23.24	23.15
DC-HSDPA Subtest-1	23.42	23.64	23.70
DC-HSDPA Subtest-2	23.37	23.66	23.57
DC-HSDPA Subtest-3	23.05	23.18	23.11
DC-HSDPA Subtest-4	22.85	23.18	23.09
HSUPA Subtest-1	23.01	23.51	23.54
HSUPA Subtest-2	21.69	21.70	21.78
HSUPA Subtest-3	22.61	22.66	22.65
HSUPA Subtest-4	21.60	21.64	21.75
HSUPA Subtest-5	23.60	23.70	23.60

LTE Band 5															
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)
				20450	20525	20600						20425	20525	20625	
		Channel	20450	20525	20600	Channel	20425			20525	20625				
Frequency (MHz)	829.0	836.5	844.0	Frequency (MHz)	826.5	836.5	846.5								
10M	QPSK	1	0	23.27	23.52	23.47	0	5M	QPSK	1	0	23.26	23.39	23.35	0
		1	24	23.15	23.40	23.35	0			1	12	22.93	23.33	23.16	0
		1	49	23.14	23.39	23.34	0			1	24	22.93	23.28	23.28	0
		25	0	22.33	22.58	22.53	1			12	0	22.20	22.41	22.42	1
		25	12	22.06	22.31	22.26	1			12	6	21.88	22.26	22.24	1
		25	25	22.06	22.31	22.26	1			12	13	21.92	22.14	22.07	1
	50	0	22.18	22.43	22.38	1	25		0	22.11	22.36	22.18	1		
	16QAM	1	0	22.73	22.98	22.93	1		16QAM	1	0	22.68	22.84	22.79	1
		1	24	22.27	22.52	22.47	1			1	12	22.21	22.43	22.32	1
		1	49	22.43	22.68	22.63	1			1	24	22.23	22.50	22.57	1
		25	0	21.49	21.74	21.69	2			12	0	21.33	21.66	21.60	2
		25	12	20.93	21.18	21.13	2			12	6	20.72	21.12	21.02	2
		25	25	21.13	21.38	21.33	2			12	13	21.03	21.25	21.32	2
	50	0	21.24	21.49	21.44	2	25		0	21.10	21.39	21.37	2		
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)
				20415	20525	20635						20407	20525	20643	
		Channel	20415	20525	20635	Channel	20407			20525	20643				
Frequency (MHz)	825.5	836.5	847.5	Frequency (MHz)	824.7	836.5	848.3								
3M	QPSK	1	0	23.19	23.46	23.40	0	1.4M	QPSK	1	0	23.25	23.36	23.37	0
		1	7	23.05	23.24	23.29	0			1	2	23.09	23.26	23.26	0
		1	14	23.07	23.36	23.23	0			1	5	23.09	23.26	23.16	0
		8	0	22.11	22.47	22.52	1			3	0	23.14	23.37	23.36	0
		8	3	21.98	22.09	22.06	1			3	1	22.92	23.26	23.15	0
		8	7	21.88	22.24	22.20	1			3	3	22.88	23.25	23.22	0
	15	0	22.09	22.35	22.16	1	6		0	22.05	22.33	22.36	1		
	16QAM	1	0	22.58	22.95	22.83	1		16QAM	1	0	22.65	22.90	22.86	1
		1	7	22.16	22.43	22.37	1			1	2	22.14	22.42	22.34	1
		1	14	22.27	22.63	22.51	1			1	5	22.36	22.44	22.44	1
		8	0	21.37	21.62	21.54	2			3	0	22.40	22.63	22.53	1
		8	3	20.73	20.98	20.93	2			3	1	21.82	22.04	22.01	1
		8	7	20.97	21.20	21.16	2			3	3	22.02	22.30	22.20	1
		15	0	21.15	21.26	21.30	2			6	0	21.01	21.27	21.23	2

LTE Band 26															
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)
				26865	26915	26965						26840	26915	26990	
				Channel Frequency (MHz)	831.5	836.5						841.5	Channel Frequency (MHz)	829.0	
15M	QPSK	1	0	23.48	23.46	23.47	0	10M	QPSK	1	0	23.35	23.42	23.47	0
		1	37	23.07	22.97	23.06	0			1	24	22.97	22.88	22.98	0
		1	74	23.35	23.35	23.34	0			1	49	23.22	23.26	23.26	0
		36	0	22.26	22.24	22.25	1			25	0	22.14	22.14	22.25	1
		36	19	22.17	22.15	22.16	1			25	12	22.14	22.10	22.10	1
		36	39	22.30	22.27	22.29	1			25	25	22.17	22.23	22.28	1
		75	0	22.29	22.19	22.28	1			50	0	22.17	22.08	22.22	1
	16QAM	1	0	22.40	22.34	22.39	1		16QAM	1	0	22.31	22.23	22.29	1
		1	37	21.89	21.89	21.88	1			1	24	21.84	21.87	21.85	1
		1	74	22.17	22.09	22.16	1			1	49	22.05	22.05	22.16	1
		36	0	21.28	21.25	21.27	2			25	0	21.22	21.14	21.23	2
		36	19	21.21	21.11	21.20	2			25	12	21.10	21.07	21.15	2
		36	39	21.32	21.32	21.31	2			25	25	21.17	21.25	21.23	2
		75	0	21.22	21.13	21.21	2			50	0	21.14	21.08	21.12	2
5M	QPSK	1	0	23.23	23.34	23.22	0	3M	QPSK	1	0	23.34	23.47	23.35	1
		1	12	22.85	22.87	22.94	0			1	7	22.78	22.88	22.92	1
		1	24	23.14	23.11	23.08	0			1	14	23.24	23.25	23.23	1
		12	0	22.13	22.01	22.05	1			8	0	22.09	22.16	22.14	3
		12	6	22.05	22.10	21.98	1			8	3	22.05	22.02	22.02	3
		12	13	22.16	22.09	22.10	1			8	7	22.15	22.13	22.23	3
		25	0	22.11	21.93	22.14	1			15	0	22.02	22.14	22.22	6
	16QAM	1	0	22.27	22.20	22.23	1		16QAM	1	0	22.13	22.27	22.37	1
		1	12	21.73	21.81	21.69	1			1	7	21.86	21.76	21.75	1
		1	24	21.90	22.00	22.00	1			1	14	21.90	22.07	22.10	1
		12	0	21.09	21.01	21.17	2			8	0	21.00	21.17	21.23	2
		12	6	21.02	20.96	21.11	2			8	3	20.92	21.15	21.06	2
		12	13	21.03	21.24	21.22	2			8	7	21.21	21.14	21.12	2
		25	0	21.14	20.99	21.13	2			15	0	20.99	21.04	21.06	2
1.4M	QPSK	1	0	23.31	23.44	23.28	0		QPSK	1	2	22.86	22.94	22.90	0
		1	5	23.20	23.14	23.27	0			1	5	23.20	23.14	23.27	0
		3	0	23.02	23.13	23.18	0			3	0	23.02	23.13	23.18	0
		3	1	23.04	22.97	22.95	0			3	1	23.04	22.97	22.95	0
		3	3	23.10	23.20	23.28	0			3	3	23.10	23.20	23.28	0
		6	0	22.01	22.14	22.07	1			6	0	22.01	22.14	22.07	1
		16QAM	1	0	22.11	22.26	22.24			1	16QAM	1	0	22.11	22.26
	1		2	21.74	21.84	21.69	1		1	2		21.74	21.84	21.69	1
	1		5	22.03	22.02	21.99	1		1	5		22.03	22.02	21.99	1
	3		0	22.06	22.12	22.14	1		3	0		22.06	22.12	22.14	1
	3		1	21.97	22.03	22.06	1		3	1		21.97	22.03	22.06	1
	3		3	22.20	22.11	22.24	1		3	3		22.20	22.11	22.24	1
	6		0	20.93	20.98	21.05	2		6	0		20.93	20.98	21.05	2

**ERP Power (dBm)**

GPRS							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	128	824.2	1.00	31.208	30.06	1013.44	H
	189	836.4	1.00	31.3	30.15	1035.14	
	251	848.8	1.06	31.222	30.13	1030.86	
	128	824.2	-4.27	31.504	25.08	322.40	V
	189	836.4	-3.80	31.117	25.17	328.62	
	251	848.8	-4.63	31.922	25.14	326.74	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

EDGE							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	128	824.2	-5.66	31.208	23.40	218.68	H
	189	836.4	-5.65	31.3	23.50	223.87	
	251	848.8	-5.60	31.222	23.47	222.43	
	128	824.2	-10.96	31.504	18.39	69.09	V
	189	836.4	-10.46	31.117	18.51	70.91	
	251	848.8	-11.32	31.922	18.45	70.02	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

WCDMA							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	4132	826.4	-10.99	31.208	18.07	64.09	H
	4182	836.4	-10.99	31.3	18.16	65.46	
	4233	846.6	-10.96	31.222	18.11	64.74	
	4132	826.4	-16.26	31.504	13.09	20.39	V
	4182	836.4	-15.82	31.117	13.15	20.64	
	4233	846.6	-16.64	31.922	13.13	20.57	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20407	824.7	-9.17	31.208	19.89	97.45	H
	20525	836.5	-9.05	31.3	20.10	102.33	
	20643	848.3	-9.01	31.222	20.06	101.44	
	20407	824.7	-14.47	31.504	14.88	30.79	V
	20525	836.5	-13.88	31.117	15.09	32.26	
	20643	848.3	-14.73	31.922	15.04	31.93	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	20407	824.7	-10.18	31.208	18.88	77.23	H
	20525	836.5	-10.05	31.3	19.10	81.28	
	20643	848.3	-10.01	31.222	19.06	80.57	
	20407	824.7	-15.48	31.504	13.87	24.40	V
	20525	836.5	-14.89	31.117	14.08	25.57	
	20643	848.3	-15.73	31.922	14.04	25.36	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20415	825.5	-9.12	31.208	19.94	98.58	H
	20525	836.5	-9.01	31.3	20.14	103.28	
	20635	847.5	-8.97	31.222	20.10	102.38	
	20415	825.5	-14.43	31.504	14.92	31.07	V
	20525	836.5	-13.85	31.117	15.12	32.49	
	20635	847.5	-14.70	31.922	15.07	32.15	
Channel Bandwidth: 3 MHz / 16QAM							
X	20415	825.5	-10.12	31.208	18.94	78.31	H
	20525	836.5	-10.01	31.3	19.14	82.04	
	20635	847.5	-9.98	31.222	19.09	81.13	
	20415	825.5	-15.43	31.504	13.92	24.68	V
	20525	836.5	-14.86	31.117	14.11	25.75	
	20635	847.5	-15.71	31.922	14.06	25.48	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20425	826.5	-9.08	31.208	19.98	99.49	H
	20525	836.5	-8.98	31.3	20.17	103.99	
	20625	846.5	-8.93	31.222	20.14	103.32	
	20425	826.5	-14.39	31.504	14.96	31.36	V
	20525	836.5	-13.83	31.117	15.14	32.67	
	20625	846.5	-14.66	31.922	15.11	32.45	
Channel Bandwidth: 5 MHz / 16QAM							
X	20425	826.5	-10.09	31.208	18.97	78.85	H
	20525	836.5	-9.98	31.3	19.17	82.60	
	20625	846.5	-9.93	31.222	19.14	82.07	
	20425	826.5	-15.40	31.504	13.95	24.85	V
	20525	836.5	-14.82	31.117	14.15	25.98	
	20625	846.5	-15.67	31.922	14.10	25.72	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 5							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	20450	829.0	-9.04	31.208	20.02	100.42	H
	20525	836.5	-8.94	31.3	20.21	104.95	
	20600	844.0	-8.89	31.222	20.18	104.28	
	20450	829.0	-14.35	31.504	15.00	31.65	V
	20525	836.5	-13.78	31.117	15.19	33.01	
	20600	844.0	-14.62	31.922	15.15	32.75	
Channel Bandwidth: 10 MHz / 16QAM							
X	20425	826.5	-10.05	31.208	19.01	79.58	H
	20525	836.5	-9.94	31.3	19.21	83.37	
	20625	846.5	-9.90	31.222	19.17	82.64	
	20425	826.5	-15.35	31.504	14.00	25.14	V
	20525	836.5	-14.78	31.117	14.19	26.22	
	20625	846.5	-15.63	31.922	14.14	25.95	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26797	824.7	-9.71	31.208	19.35	86.06	H
	26915	836.5	-9.60	31.3	19.55	90.16	
	27033	848.3	-9.60	31.222	19.47	88.55	
	26797	824.7	-15.05	31.504	14.30	26.94	V
	26915	836.5	-14.47	31.117	14.50	28.16	
	27033	848.3	-15.30	31.922	14.47	28.00	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	26797	824.7	-10.72	31.208	18.34	68.20	H
	26915	836.5	-10.61	31.3	18.54	71.45	
	27033	848.3	-10.61	31.222	18.46	70.18	
	26797	824.7	-16.05	31.504	13.30	21.40	V
	26915	836.5	-15.48	31.117	13.49	22.32	
	27033	848.3	-16.31	31.922	13.46	22.19	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26805	825.5	-9.67	31.208	19.39	86.86	H
	26915	836.5	-9.57	31.3	19.58	90.78	
	27025	847.5	-9.56	31.222	19.51	89.37	
	26805	825.5	-15.01	31.504	14.34	27.19	V
	26915	836.5	-14.43	31.117	14.54	28.42	
	27025	847.5	-15.26	31.922	14.51	28.26	
Channel Bandwidth: 3 MHz / 16QAM							
X	26805	825.5	-10.68	31.208	18.38	68.83	H
	26915	836.5	-10.58	31.3	18.57	71.94	
	27025	847.5	-10.56	31.222	18.51	70.99	
	26805	825.5	-16.02	31.504	13.33	21.55	V
	26915	836.5	-15.44	31.117	13.53	22.53	
	27025	847.5	-16.27	31.922	13.50	22.40	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15



LTE Band 26							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26815	826.5	-9.63	31.208	19.43	87.66	H
	26915	836.5	-9.53	31.3	19.62	91.62	
	27015	846.5	-9.52	31.222	19.55	90.20	
	26815	826.5	-14.97	31.504	14.38	27.44	V
	26919	836.5	-14.40	31.117	14.57	28.62	
	27015	846.5	-15.24	31.922	14.53	28.39	
Channel Bandwidth: 5 MHz / 16QAM							
X	26815	826.5	-10.64	31.208	18.42	69.47	H
	26915	836.5	-10.53	31.3	18.62	72.78	
	27015	846.5	-10.54	31.222	18.53	71.32	
	26815	826.5	-15.98	31.504	13.37	21.75	V
	26919	836.5	-15.41	31.117	13.56	22.68	
	27015	846.5	-16.25	31.922	13.52	22.50	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26840	829.0	-9.59	31.208	19.47	88.47	H
	26915	836.5	-9.50	31.3	19.65	92.26	
	26990	844.0	-9.48	31.222	19.59	91.03	
	26840	829.0	-14.93	31.504	14.42	27.69	V
	26919	836.5	-14.36	31.117	14.61	28.89	
	26990	844.0	-15.20	31.922	14.57	28.65	
Channel Bandwidth: 10 MHz / 16QAM							
X	26840	829.0	-10.59	31.208	18.47	70.27	H
	26915	836.5	-10.51	31.3	18.64	73.11	
	26990	844.0	-10.49	31.222	18.58	72.14	
	26840	829.0	-15.94	31.504	13.41	21.95	V
	26919	836.5	-15.36	31.117	13.61	22.95	
	26990	844.0	-16.21	31.922	13.56	22.71	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 26							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	26865	831.5	-9.53	31.208	19.53	89.70	H
	26915	836.5	-9.46	31.3	19.69	93.11	
	26965	841.5	-9.44	31.222	19.63	91.88	
	26865	831.5	-14.89	31.504	14.46	27.95	V
	26915	836.5	-14.32	31.117	14.65	29.15	
	26965	841.5	-15.16	31.922	14.61	28.92	
Channel Bandwidth: 15 MHz / 16QAM							
X	26865	831.5	-10.54	31.208	18.52	71.09	H
	26915	836.5	-10.46	31.3	18.69	73.96	
	26965	841.5	-10.45	31.222	18.62	72.81	
	26865	831.5	-15.90	31.504	13.45	22.15	V
	26915	836.5	-15.33	31.117	13.64	23.10	
	26965	841.5	-16.16	31.922	13.61	22.97	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

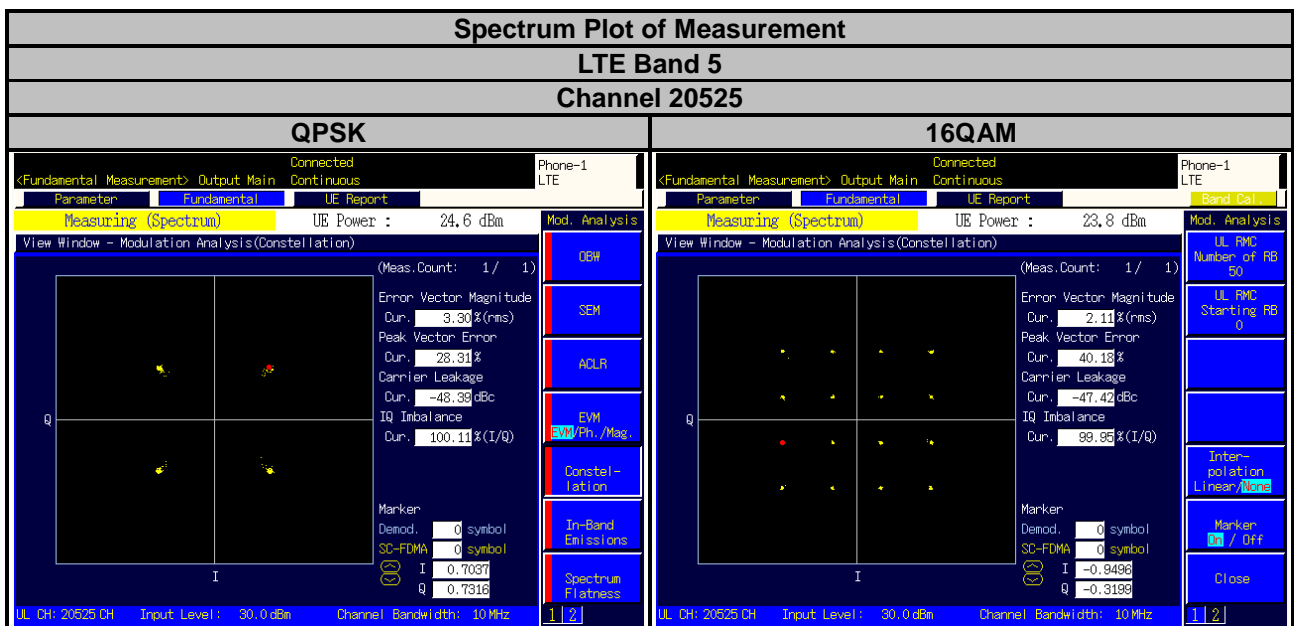
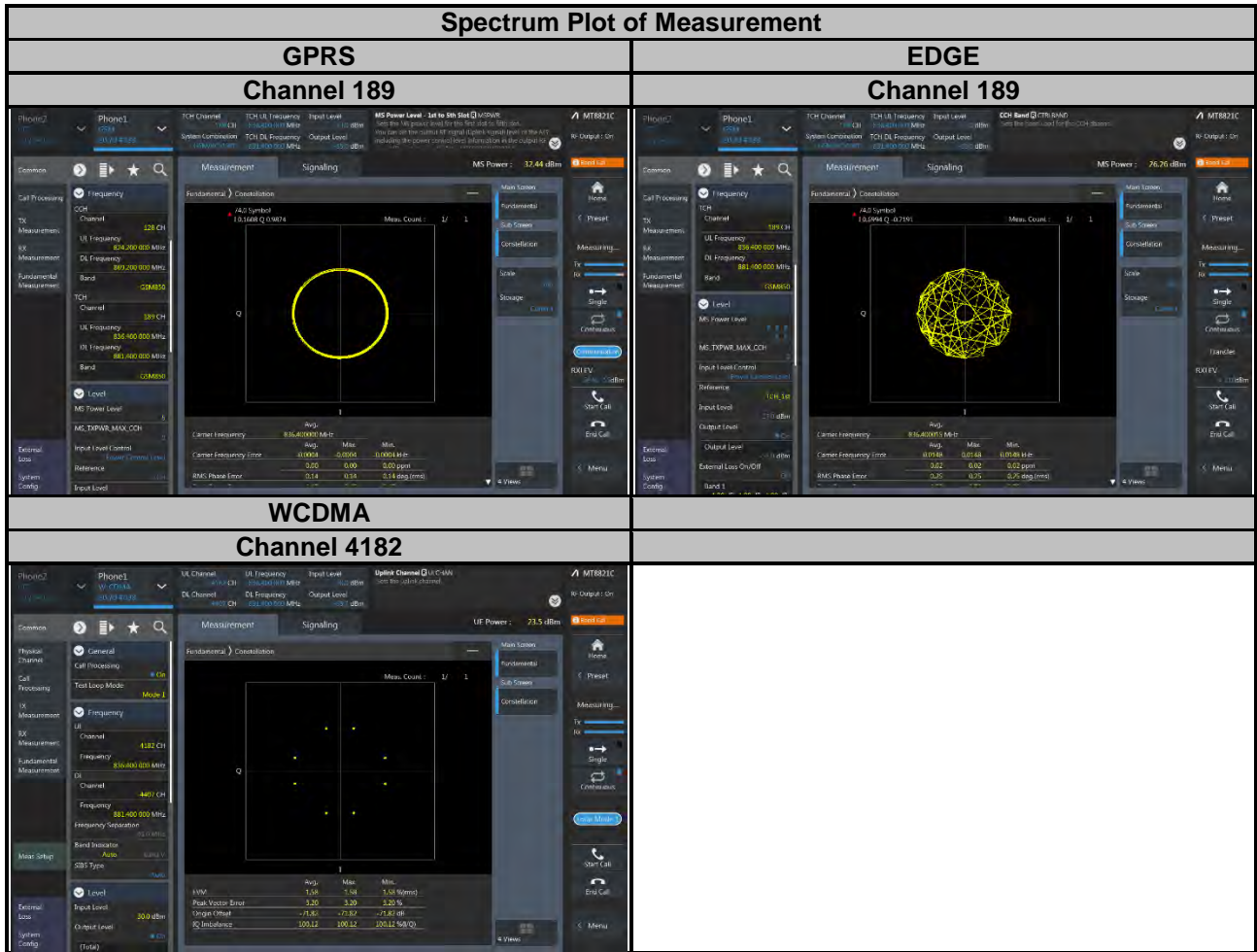
### 4.2.2 Test Setup



### 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



### Spectrum Plot of Measurement

#### LTE Band 26

#### Channel 26915

#### QPSK



#### 16QAM



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

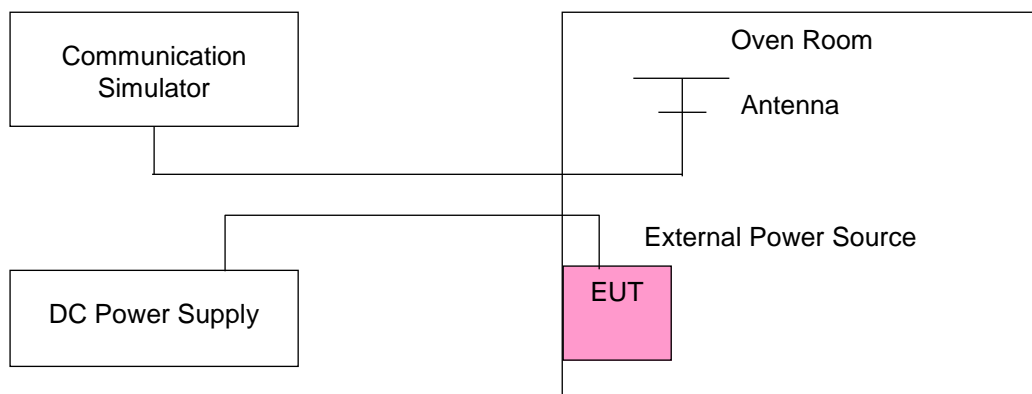
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

#### 4.3.2 Test Procedure

- a. 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.
- b. 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.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5$  °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)	GPRS				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.200003	0.004	848.800004	0.004	2.5
3.27	824.200002	0.002	848.800002	0.003	2.5
4.43	824.200003	0.003	848.800002	0.002	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

##### Frequency Error vs. Temperature

Temp. (°C)	GPRS				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.200001	0.001	848.800001	0.001	2.5
-20	824.200003	0.004	848.800004	0.005	2.5
-10	824.200004	0.004	848.800003	0.004	2.5
0	824.200004	0.004	848.800002	0.003	2.5
10	824.200002	0.002	848.800002	0.002	2.5
20	824.199998	-0.002	848.799998	-0.003	2.5
30	824.199999	-0.002	848.799998	-0.003	2.5
40	824.199997	-0.004	848.799997	-0.004	2.5
50	824.199999	-0.002	848.799997	-0.004	2.5
55	824.199999	-0.001	848.799998	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	EDGE				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.200002	0.003	848.800003	0.003	2.5
3.27	824.200002	0.002	848.800002	0.002	2.5
4.43	824.200004	0.004	848.800003	0.004	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	EDGE				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.200003	0.004	848.800004	0.004	2.5
-20	824.200002	0.002	848.800003	0.004	2.5
-10	824.200003	0.004	848.800002	0.002	2.5
0	824.200004	0.005	848.800004	0.004	2.5
10	824.200003	0.003	848.800002	0.002	2.5
20	824.199998	-0.003	848.799996	-0.005	2.5
30	824.199997	-0.004	848.799997	-0.004	2.5
40	824.199998	-0.003	848.799997	-0.004	2.5
50	824.199999	-0.002	848.799996	-0.004	2.5
55	824.199996	-0.005	848.799997	-0.004	2.5



Frequency Error vs. Voltage

Voltage (Volts)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.400001	0.001	846.600002	0.002	2.5
3.27	826.400002	0.002	846.600002	0.002	2.5
4.43	826.400002	0.003	846.600003	0.003	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.400004	0.004	846.600004	0.004	2.5
-20	826.400003	0.003	846.600003	0.004	2.5
-10	826.400002	0.003	846.600002	0.002	2.5
0	826.400002	0.003	846.600004	0.005	2.5
10	826.400004	0.005	846.600003	0.003	2.5
20	826.399998	-0.002	846.599996	-0.004	2.5
30	826.399996	-0.005	846.599998	-0.002	2.5
40	826.399998	-0.003	846.599998	-0.003	2.5
50	826.399998	-0.003	846.599999	-0.002	2.5
55	826.399997	-0.004	846.599999	-0.002	2.5

## Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.700002	0.002	848.300003	0.003	2.5
3.27	824.700003	0.003	848.300002	0.003	2.5
4.43	824.700002	0.002	848.300003	0.004	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

## Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.700001	0.001	848.300004	0.005	2.5
-20	824.700001	0.002	848.300002	0.003	2.5
-10	824.700004	0.005	848.300002	0.002	2.5
0	824.700004	0.004	848.300001	0.001	2.5
10	824.700002	0.002	848.300002	0.002	2.5
20	824.699998	-0.002	848.299997	-0.004	2.5
30	824.699996	-0.005	848.299997	-0.003	2.5
40	824.699998	-0.002	848.299999	-0.002	2.5
50	824.699996	-0.004	848.299999	-0.002	2.5
55	824.699998	-0.003	848.299998	-0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	825.500003	0.004	847.500004	0.005	2.5
3.27	825.500003	0.004	847.500003	0.004	2.5
4.43	825.500001	0.002	847.500001	0.002	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	825.500002	0.002	847.500004	0.004	2.5
-20	825.500003	0.003	847.500003	0.004	2.5
-10	825.500003	0.004	847.500003	0.004	2.5
0	825.500004	0.004	847.500001	0.001	2.5
10	825.500002	0.002	847.500002	0.002	2.5
20	825.499998	-0.003	847.499998	-0.002	2.5
30	825.499998	-0.003	847.499999	-0.001	2.5
40	825.499998	-0.003	847.499999	-0.002	2.5
50	825.499998	-0.002	847.499997	-0.004	2.5
55	825.499997	-0.003	847.499998	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.500003	0.004	846.500001	0.002	2.5
3.27	826.500003	0.003	846.500001	0.001	2.5
4.43	826.500003	0.003	846.500001	0.001	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.500003	0.003	846.500004	0.005	2.5
-20	826.500002	0.002	846.500001	0.001	2.5
-10	826.500003	0.004	846.500003	0.003	2.5
0	826.500002	0.002	846.500004	0.005	2.5
10	826.500003	0.003	846.500002	0.002	2.5
20	826.499999	-0.002	846.499998	-0.002	2.5
30	826.499996	-0.004	846.499998	-0.002	2.5
40	826.499996	-0.005	846.499996	-0.005	2.5
50	826.499996	-0.004	846.499997	-0.004	2.5
55	826.499999	-0.002	846.499998	-0.003	2.5

## Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	829.000003	0.004	844.000003	0.004	2.5
3.27	829.000003	0.003	844.000004	0.005	2.5
4.43	829.000003	0.004	844.000002	0.003	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

## Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	829.000002	0.002	844.000001	0.001	2.5
-20	829.000004	0.004	844.000002	0.002	2.5
-10	829.000002	0.003	844.000003	0.003	2.5
0	829.000002	0.003	844.000002	0.002	2.5
10	829.000003	0.004	844.000003	0.003	2.5
20	828.999999	-0.001	843.999998	-0.003	2.5
30	828.999998	-0.002	843.999997	-0.004	2.5
40	828.999996	-0.004	843.999998	-0.002	2.5
50	828.999999	-0.001	843.999996	-0.004	2.5
55	828.999998	-0.002	843.999996	-0.005	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	824.700003	0.004	848.300000	0.003	2.5
3.27	824.700003	0.003	848.300000	0.004	2.5
4.43	824.700002	0.002	848.300000	0.004	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	824.700003	0.003	848.300000	0.004	2.5
-20	824.700003	0.003	848.300000	0.002	2.5
-10	824.700001	0.002	848.300000	0.002	2.5
0	824.700003	0.004	848.300000	0.004	2.5
10	824.700002	0.003	848.300000	0.001	2.5
20	824.699998	-0.002	848.300000	-0.001	2.5
30	824.699998	-0.002	848.300000	-0.003	2.5
40	824.699998	-0.002	848.300000	-0.002	2.5
50	824.699997	-0.004	848.300000	-0.002	2.5
55	824.699997	-0.003	848.300000	-0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	825.500004	0.004	847.500000	0.003	2.5
3.27	825.500003	0.003	847.500000	0.004	2.5
4.43	825.500004	0.004	847.500000	0.003	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	825.500002	0.002	847.500000	0.002	2.5
-20	825.500001	0.002	847.500000	0.004	2.5
-10	825.500003	0.004	847.500000	0.004	2.5
0	825.500004	0.004	847.500000	0.002	2.5
10	825.500002	0.003	847.500000	0.003	2.5
20	825.499997	-0.003	847.500000	-0.002	2.5
30	825.499999	-0.002	847.500000	-0.003	2.5
40	825.499997	-0.004	847.500000	-0.004	2.5
50	825.499998	-0.003	847.500000	-0.003	2.5
55	825.499998	-0.003	847.500000	-0.005	2.5

## Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	826.500002	0.003	846.500003	0.004	2.5
3.27	826.500003	0.003	846.500004	0.004	2.5
4.43	826.500002	0.002	846.500002	0.003	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

## Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	826.500003	0.003	846.500004	0.004	2.5
-20	826.500003	0.004	846.500004	0.004	2.5
-10	826.500003	0.003	846.500002	0.003	2.5
0	826.500003	0.004	846.500003	0.003	2.5
10	826.500001	0.001	846.500003	0.003	2.5
20	826.499998	-0.002	846.499997	-0.003	2.5
30	826.499996	-0.005	846.499997	-0.004	2.5
40	826.499997	-0.004	846.499997	-0.003	2.5
50	826.499996	-0.004	846.499998	-0.002	2.5
55	826.499997	-0.004	846.499998	-0.003	2.5



## Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	829.000004	0.005	844.000003	0.004	2.5
3.27	829.000004	0.004	844.000001	0.001	2.5
4.43	829.000003	0.004	844.000001	0.002	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

## Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	829.000001	0.002	844.000001	0.002	2.5
-20	829.000003	0.003	844.000003	0.003	2.5
-10	829.000001	0.001	844.000001	0.001	2.5
0	829.000004	0.004	844.000002	0.002	2.5
10	829.000004	0.004	844.000003	0.003	2.5
20	828.999998	-0.002	843.999999	-0.002	2.5
30	828.999998	-0.002	843.999998	-0.002	2.5
40	828.999999	-0.002	843.999998	-0.002	2.5
50	828.999996	-0.005	843.999996	-0.004	2.5
55	828.999997	-0.003	843.999999	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	831.500002	0.002	841.500001	0.001	2.5
3.27	831.500003	0.003	841.500002	0.002	2.5
4.43	831.500004	0.004	841.500003	0.003	2.5

**Note:** The applicant defined the normal working voltage of the battery is from 3.27 Vdc to 4.43 Vdc.

Frequency Error vs. Temperature

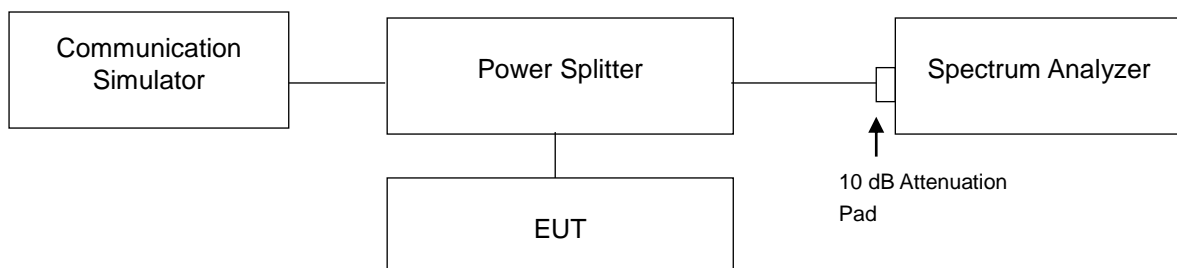
Temp. (°C)	LTE Band 26				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	831.500003	0.004	841.500004	0.005	2.5
-20	831.500002	0.003	841.500001	0.001	2.5
-10	831.500003	0.004	841.500002	0.002	2.5
0	831.500004	0.005	841.500004	0.004	2.5
10	831.500003	0.003	841.500004	0.005	2.5
20	831.499998	-0.002	841.499997	-0.004	2.5
30	831.499998	-0.002	841.499998	-0.002	2.5
40	831.499999	-0.001	841.499999	-0.001	2.5
50	831.499999	-0.001	841.499999	-0.001	2.5
55	831.499998	-0.002	841.499997	-0.003	2.5

## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Procedure

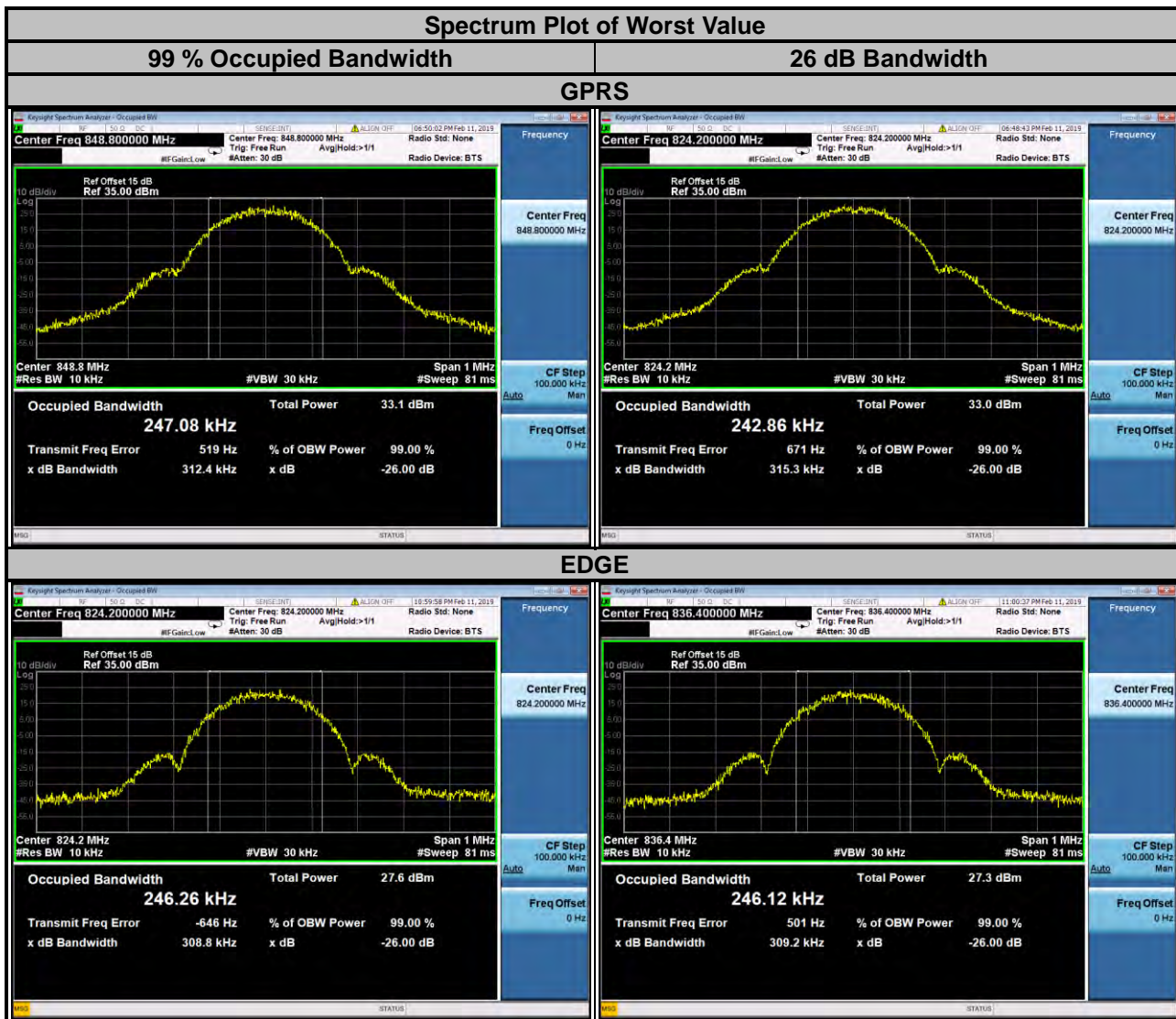
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

### 4.4.2 Test Setup

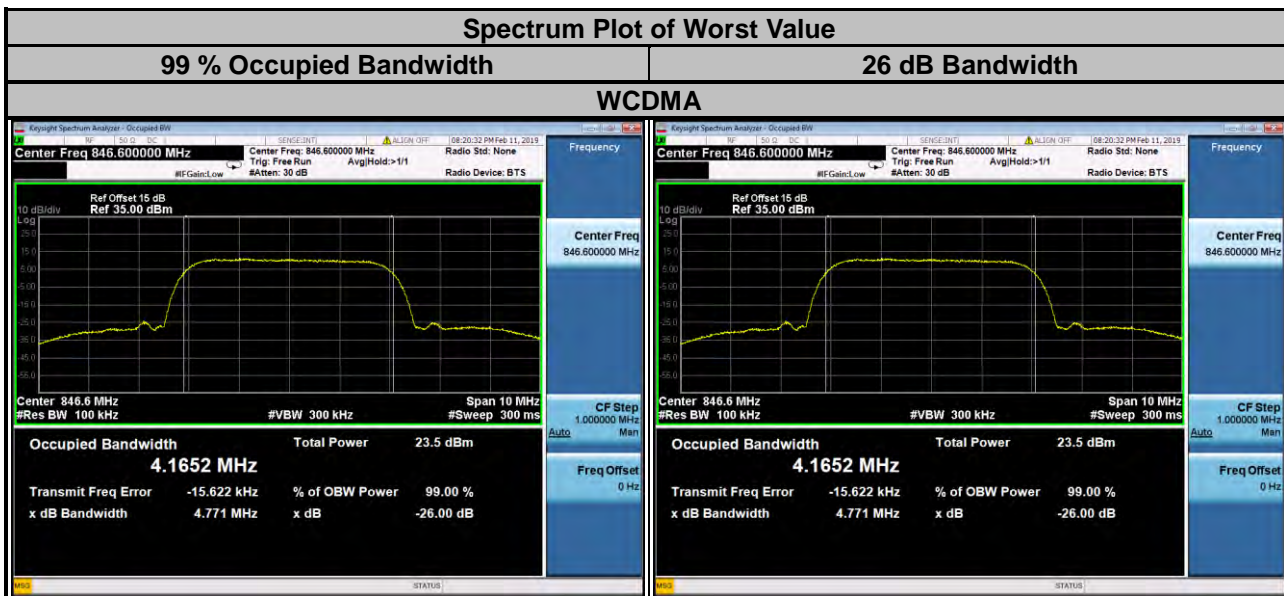


### 4.4.3 Test Result

GPRS				EDGE			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)	Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	242.86	315.30	128	824.2	246.26	308.80
189	836.4	244.44	314.90	189	836.4	246.12	309.20
251	848.8	247.08	312.40	251	848.8	243.12	308.40



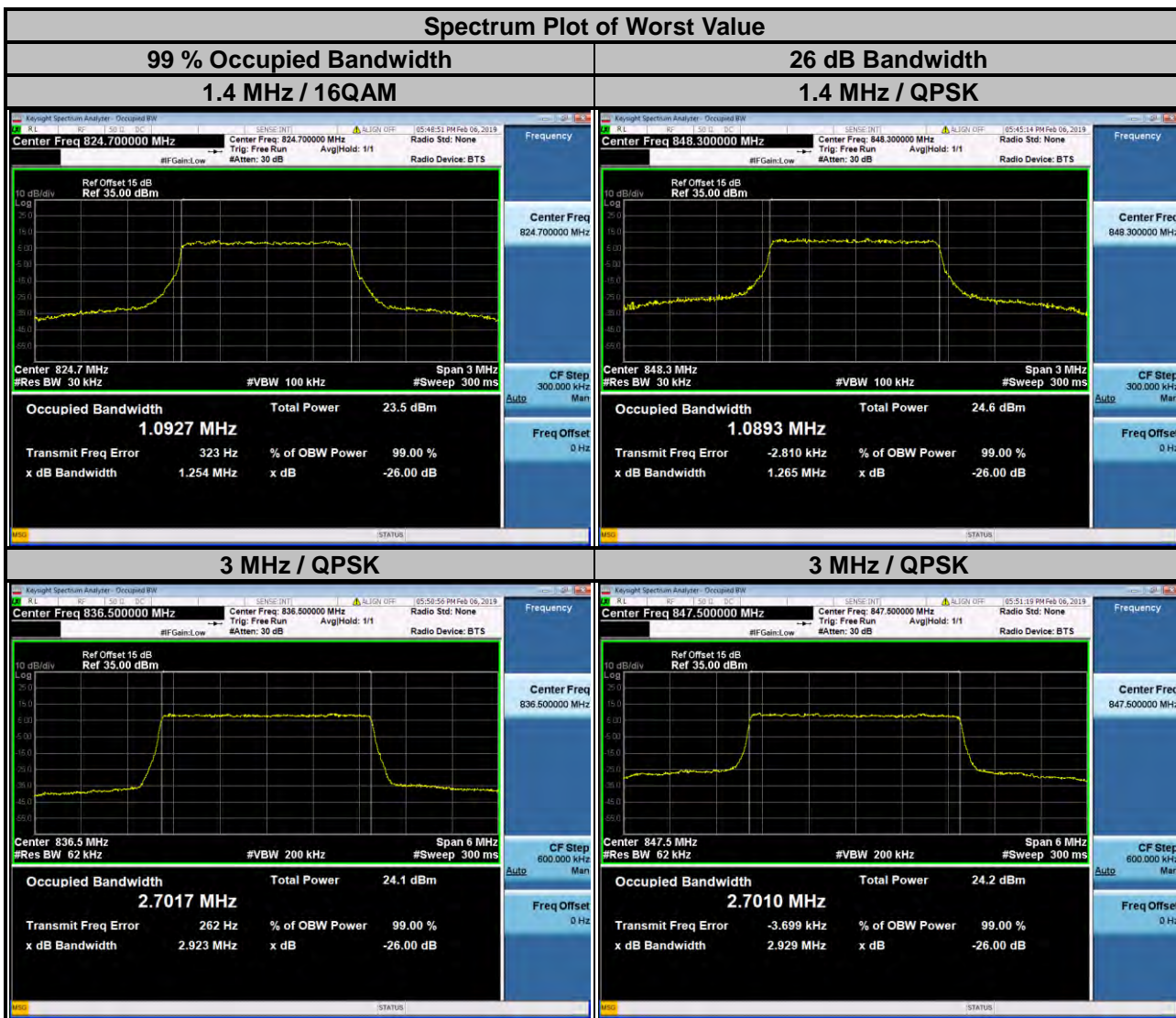
WCDMA			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.1597	4.758
4182	836.4	4.1598	4.740
4233	846.6	4.1652	4.771



LTE Band 5					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20407	824.7	1.0886	1.0927	1.250	1.254
20525	836.5	1.0883	1.0883	1.253	1.250
20643	848.3	1.0893	1.0894	1.265	1.252

Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20415	825.5	2.7016	2.6994	2.923	2.928
20525	836.5	2.7017	2.6965	2.923	2.919
20635	847.5	2.7010	2.6979	2.929	2.926



LTE Band 5					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20425	826.5	4.4964	4.4968	4.836	4.835
20525	836.5	4.4936	4.4929	4.811	4.824
20625	846.5	4.4913	4.4915	4.828	4.809

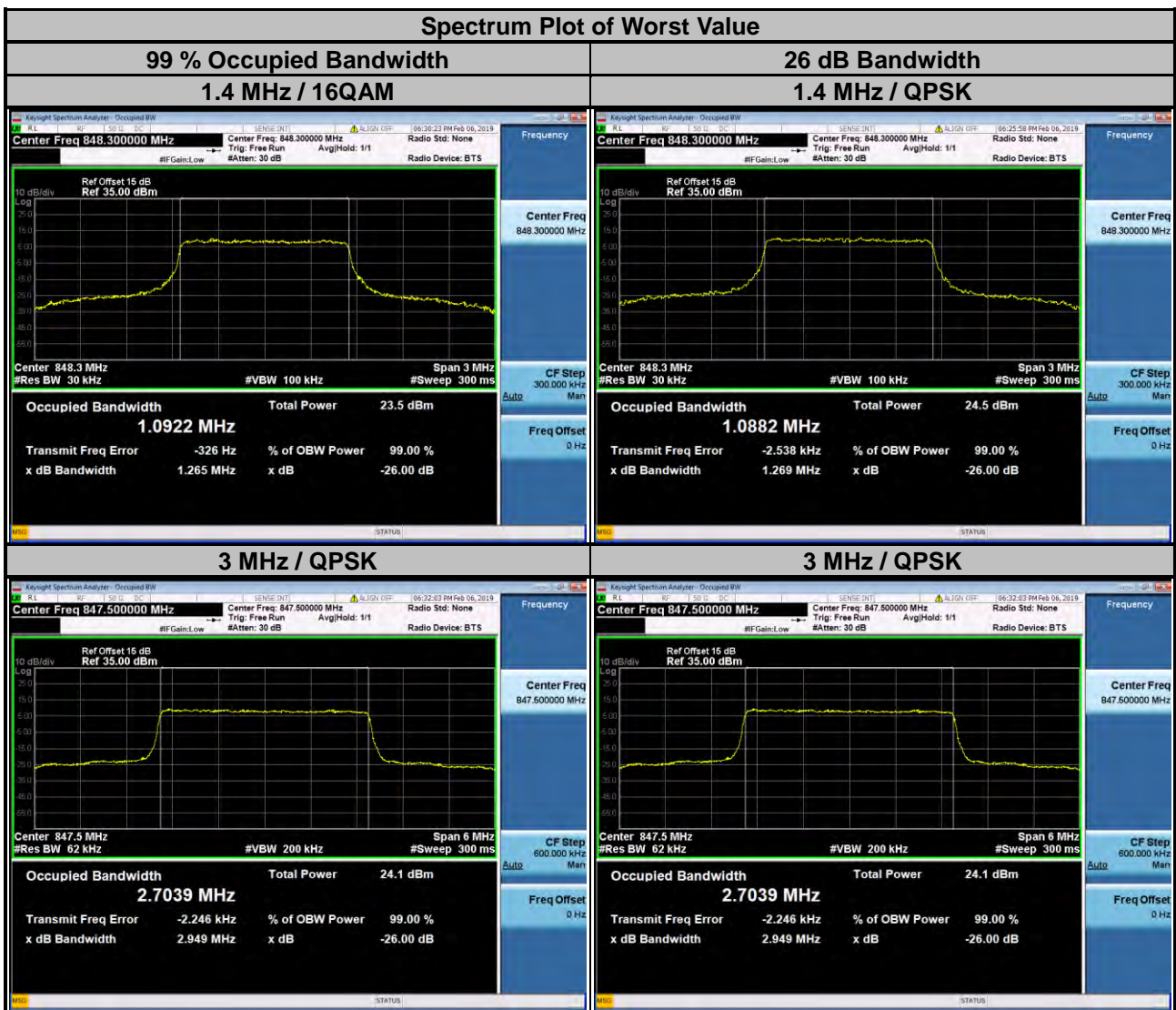
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20450	829.0	8.9671	8.9737	9.525	9.533
20525	836.5	8.9602	8.9560	9.507	9.522
20600	844.0	8.9444	8.9441	9.518	9.507



LTE Band 26					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26797	824.7	1.0885	1.0878	1.252	1.257
26915	836.5	1.0873	1.0887	1.254	1.248
27033	848.3	1.0882	1.0922	1.269	1.265

Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26805	825.5	2.7035	2.6981	2.927	2.930
26915	836.5	2.7020	2.6986	2.933	2.930
27025	847.5	2.7039	2.7000	2.949	2.929





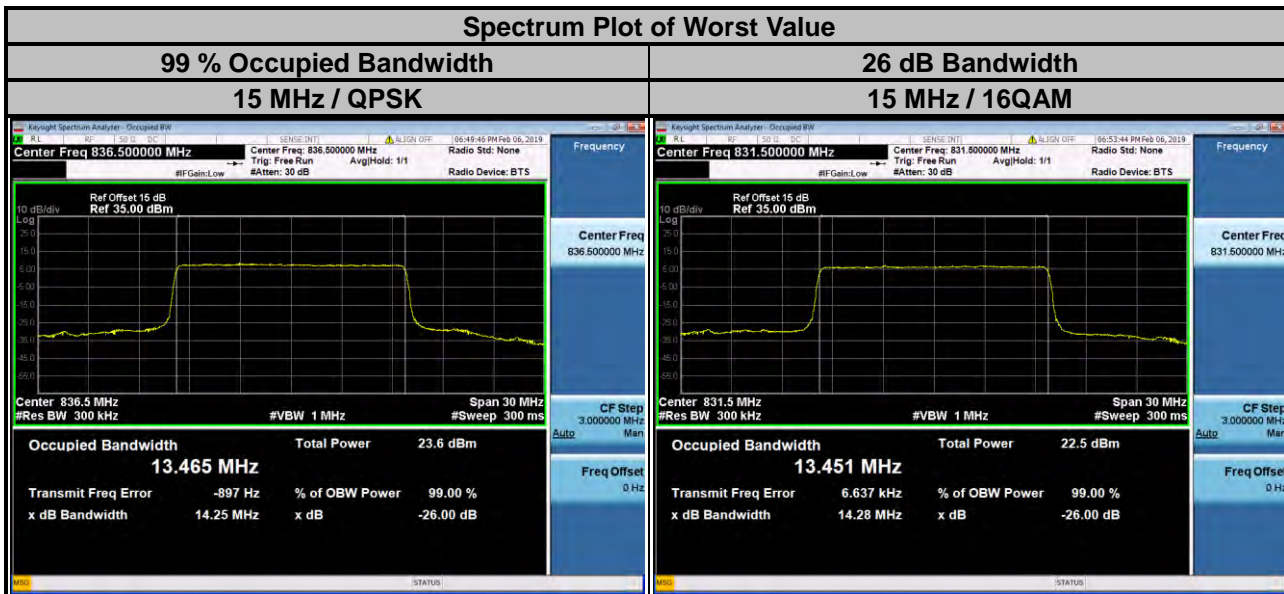
LTE Band 26					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26815	826.5	4.4968	4.4972	4.828	4.835
26915	836.5	4.4953	4.4991	4.833	4.841
27015	846.5	4.4940	4.4909	4.817	4.820

Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26840	829.0	8.9669	8.9671	9.550	9.540
26915	836.5	8.9602	8.9675	9.519	9.527
26990	844.0	8.9437	8.9458	9.503	9.515



LTE Band 26					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
26865	831.5	13.459	13.451	14.26	14.28
26915	836.5	13.465	13.455	14.26	14.26
26965	841.5	13.451	13.435	14.25	14.24

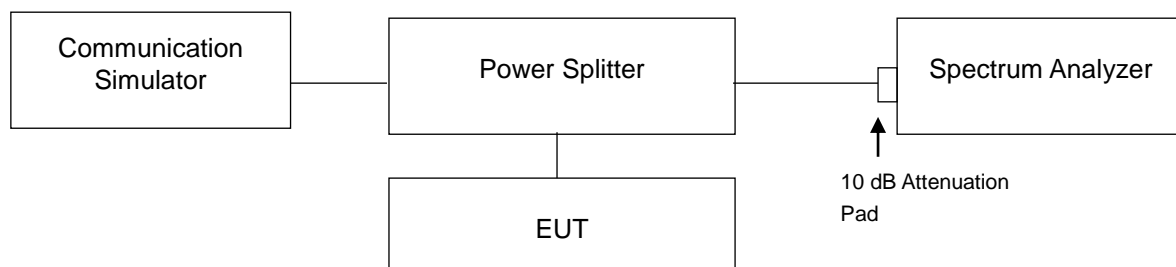


## 4.5 Band Edge Measurement

### 4.5.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

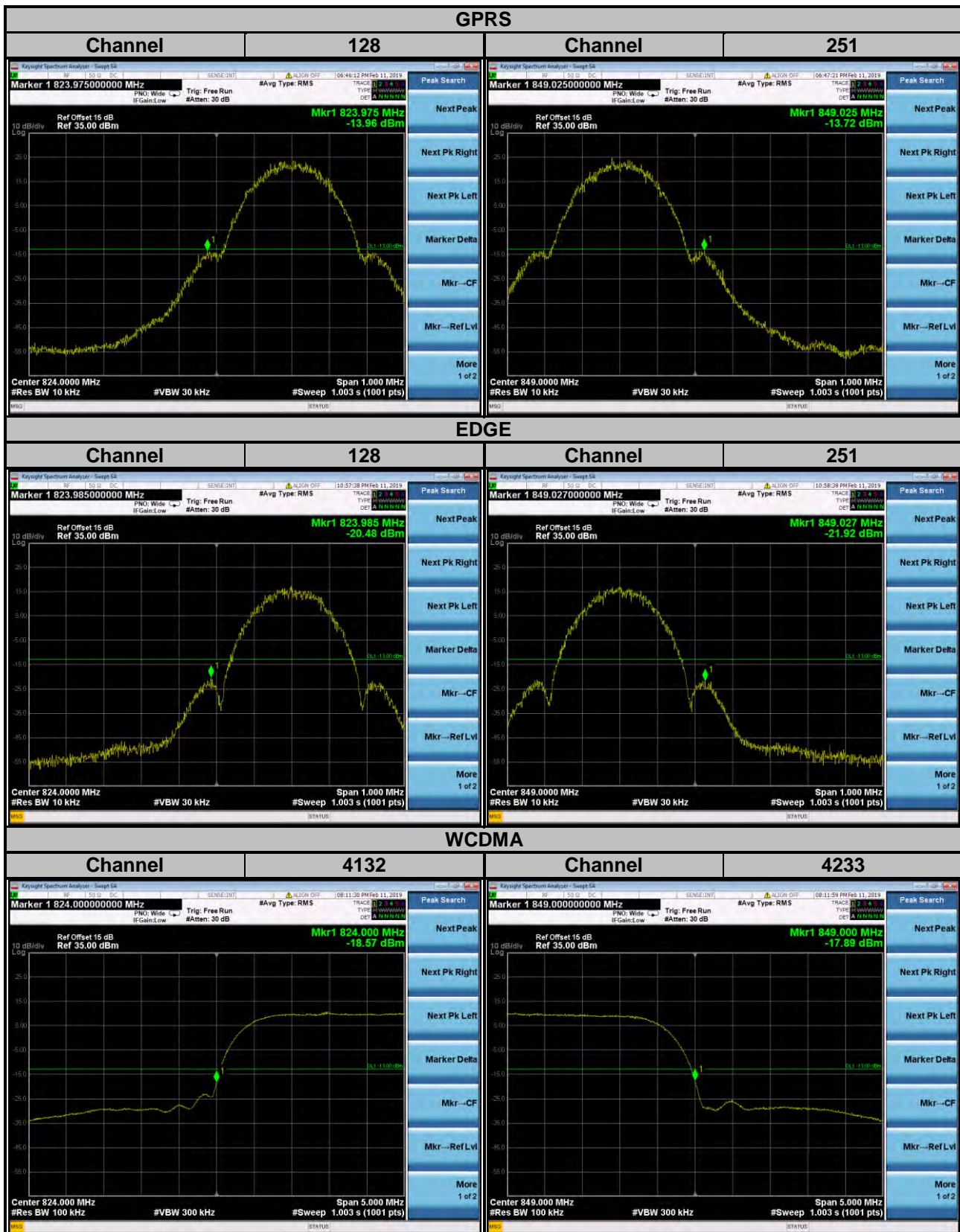
### 4.5.2 Test Setup



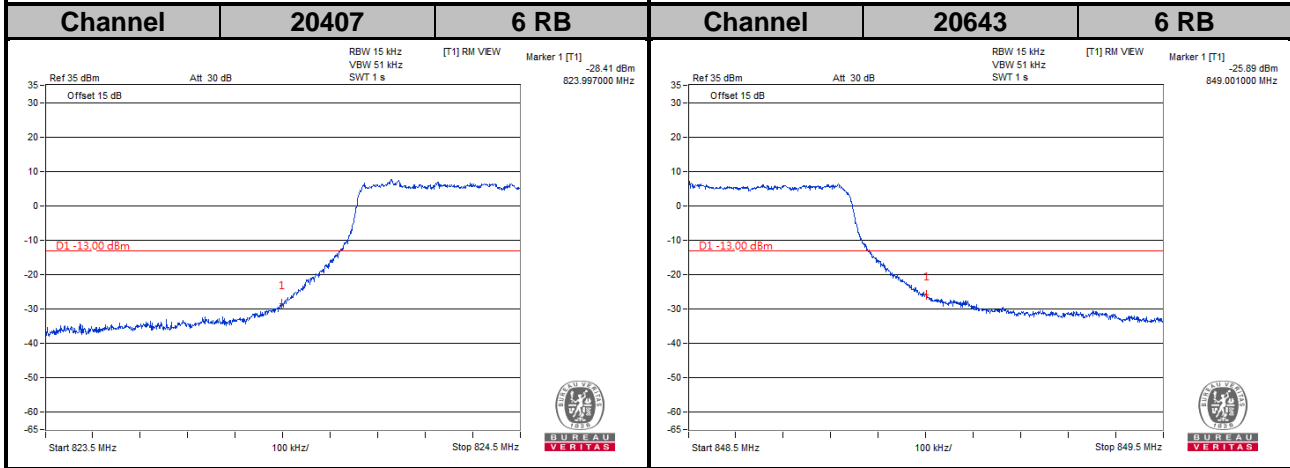
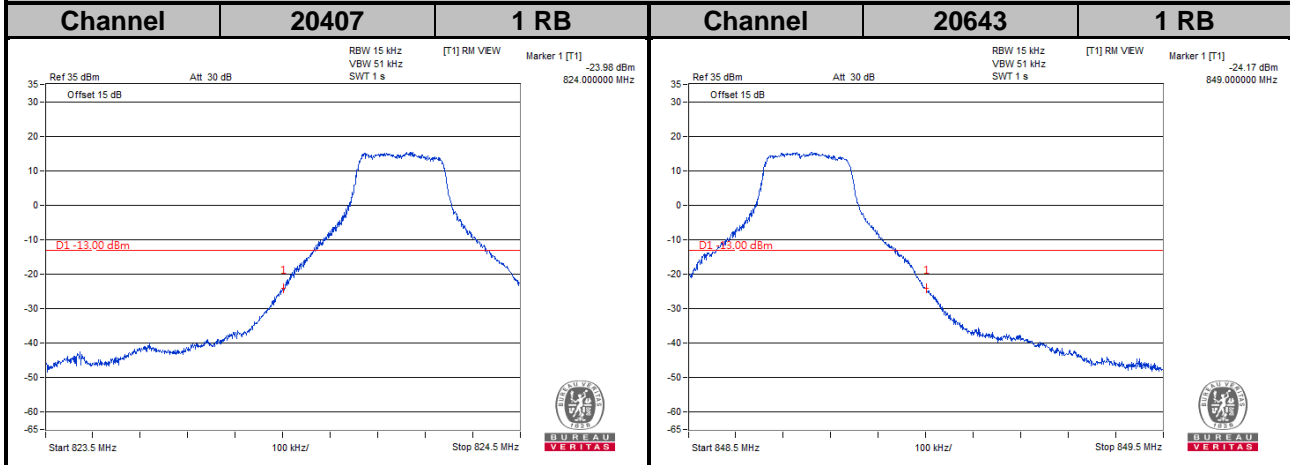
### 4.5.3 Test Procedures

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GPRS/EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 62 kHz and VB of the spectrum is 200 kHz (LTE Bandwidth 5 MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- h. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- i. Record the max trace plot into the test report.

### 4.5.4 Test Results

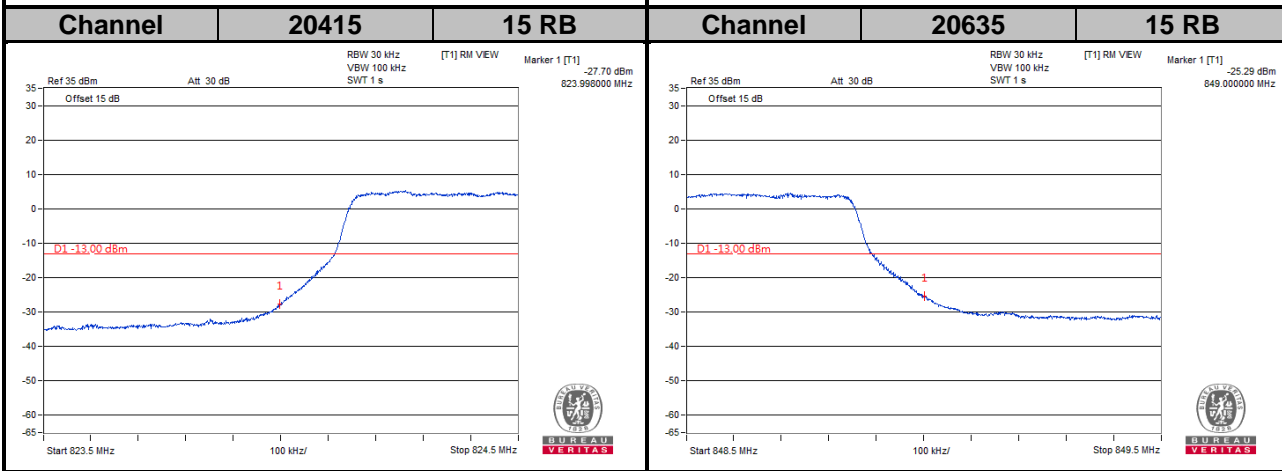
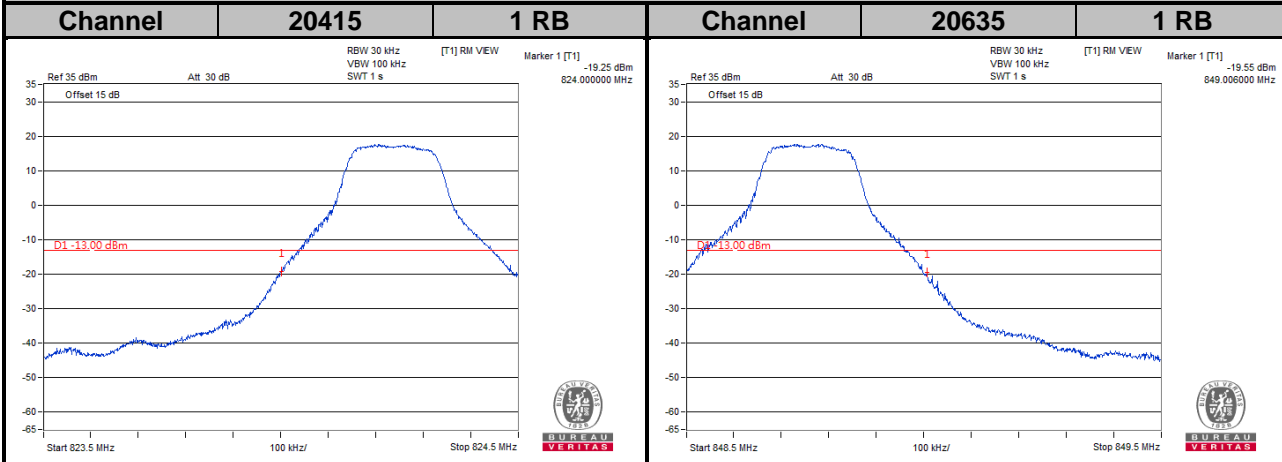


**LTE Band 5**  
**Channel Bandwidth: 1.4 MHz**

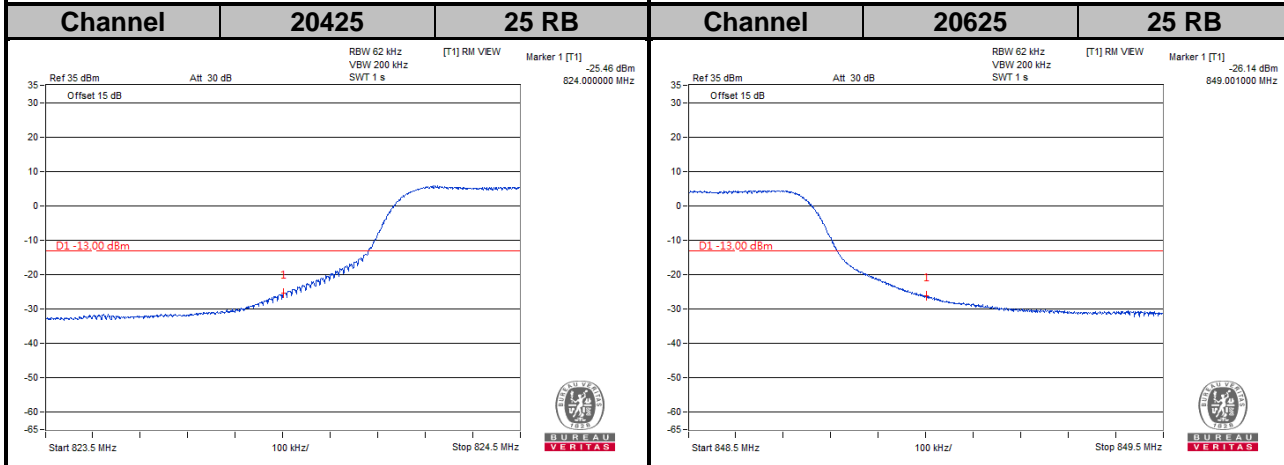
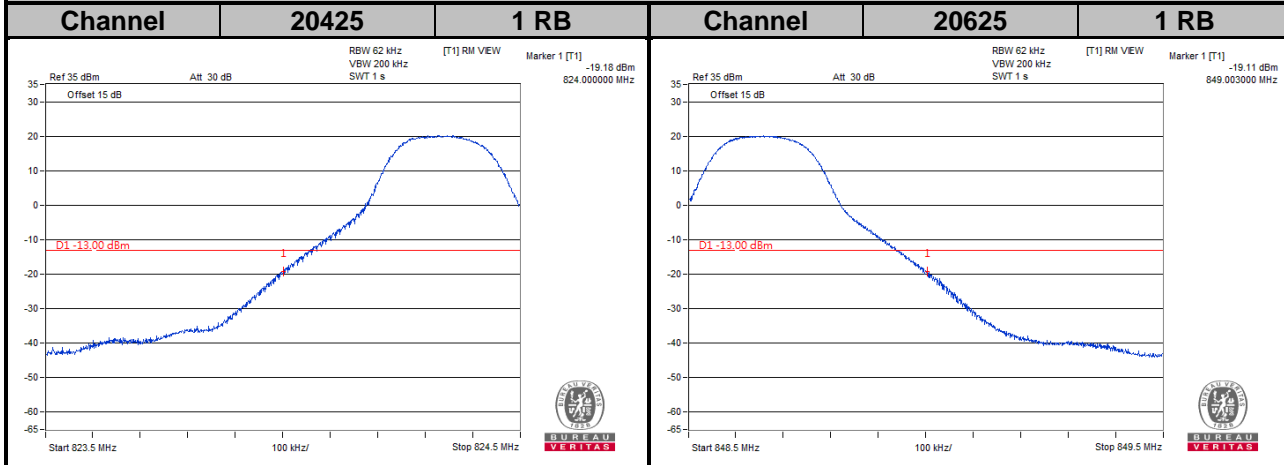


LTE Band 5

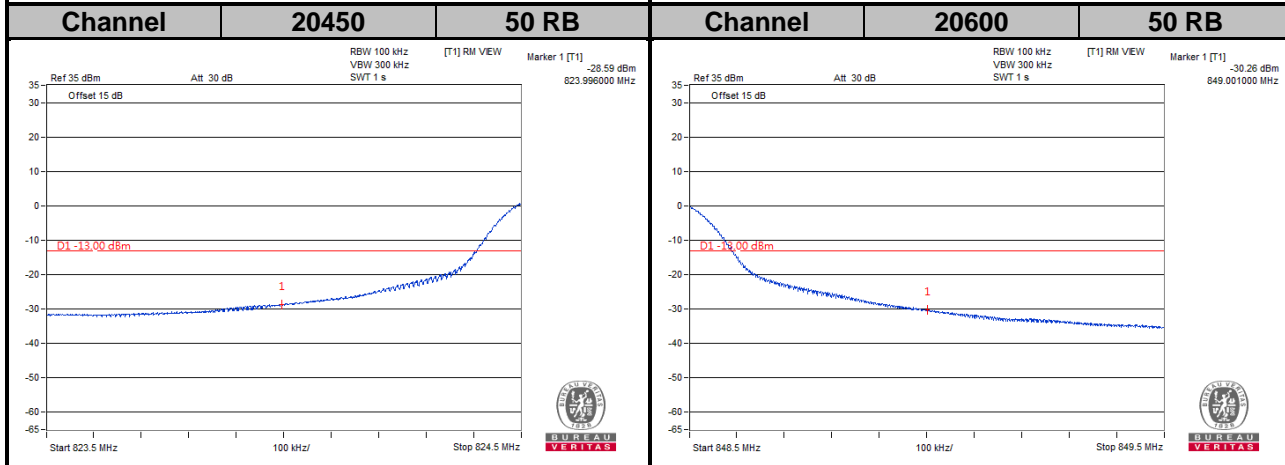
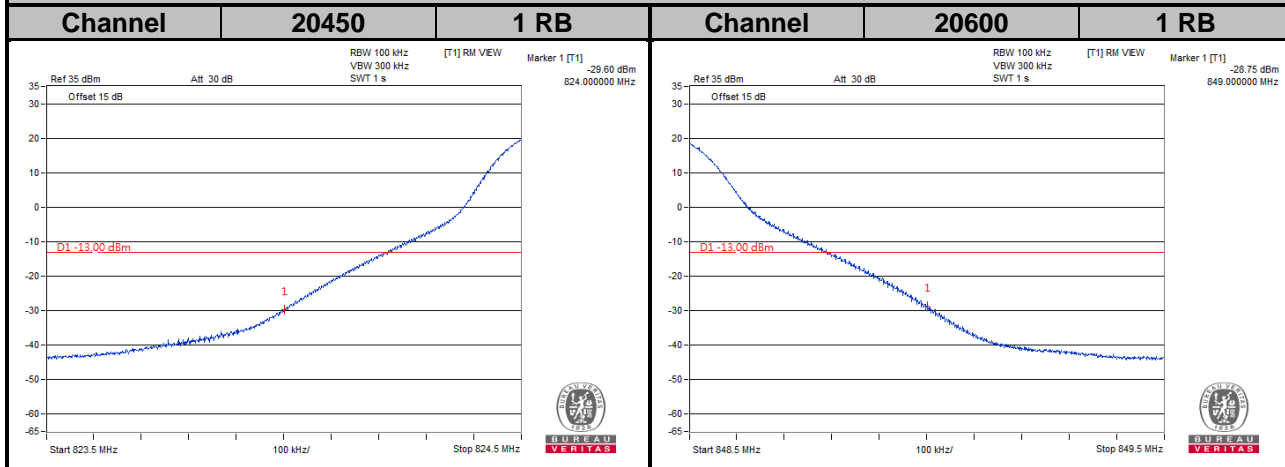
Channel Bandwidth: 3 MHz



**LTE Band 5**  
**Channel Bandwidth: 5 MHz**

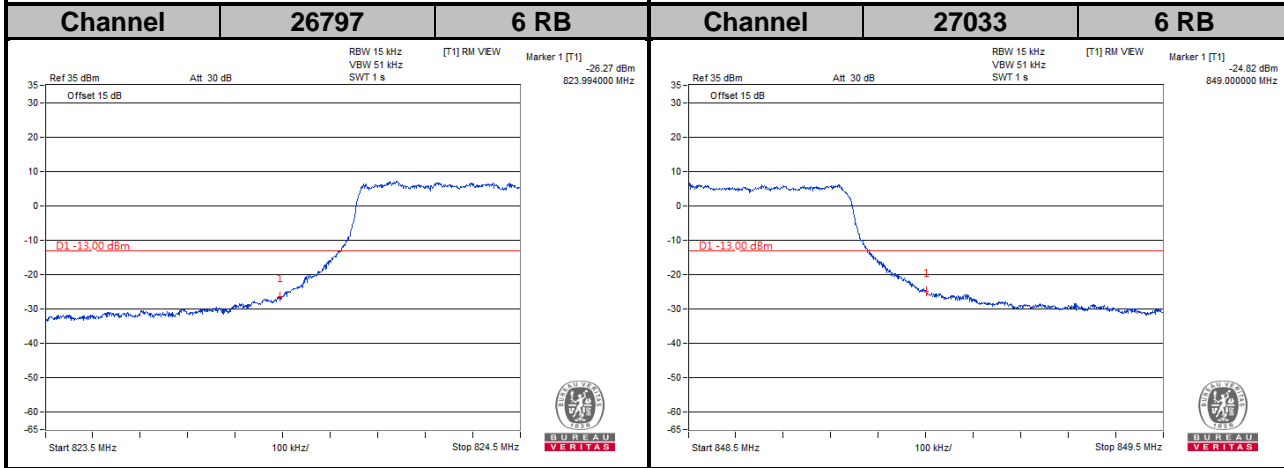
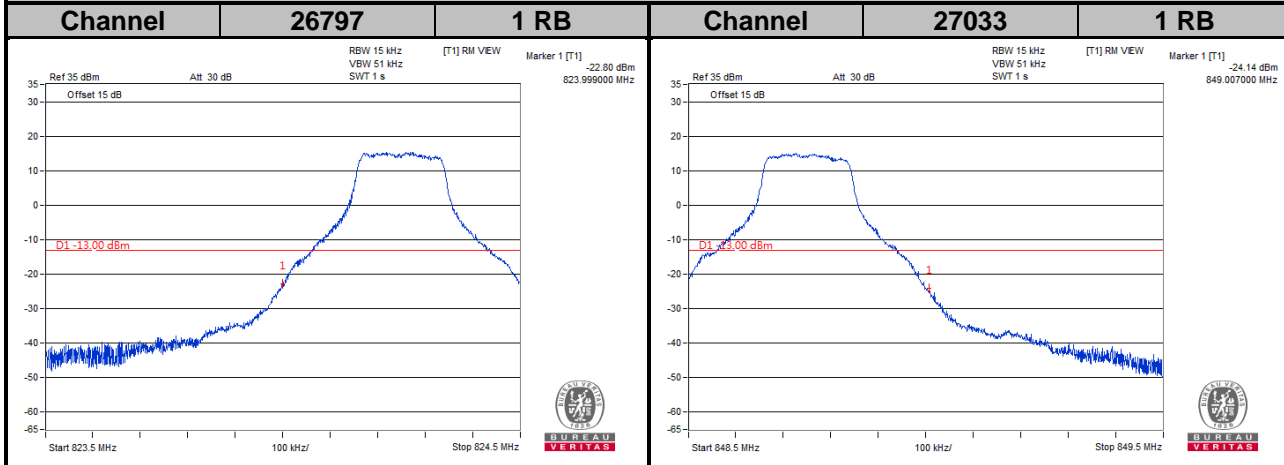


**LTE Band 5**  
**Channel Bandwidth: 10 MHz**

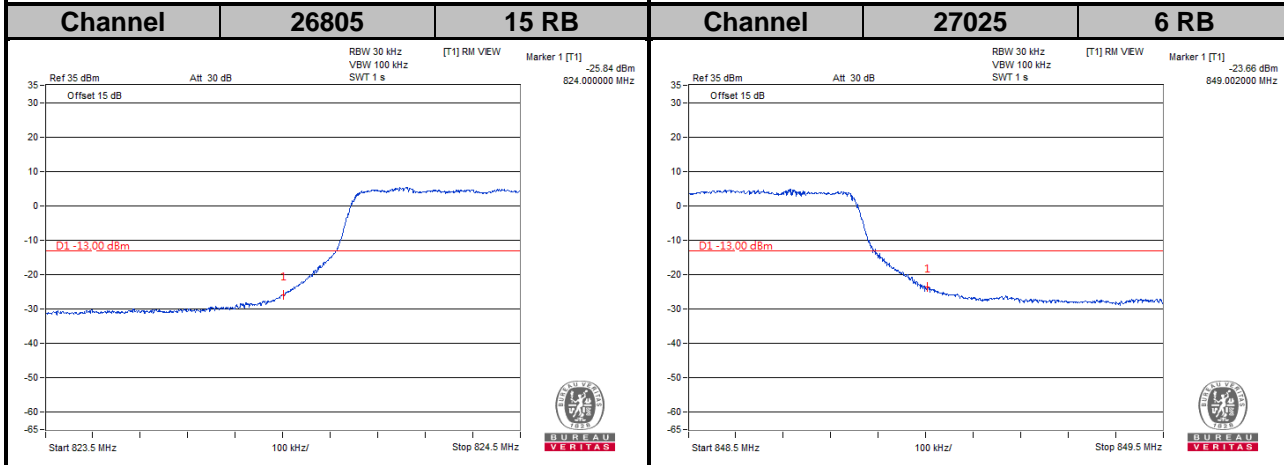
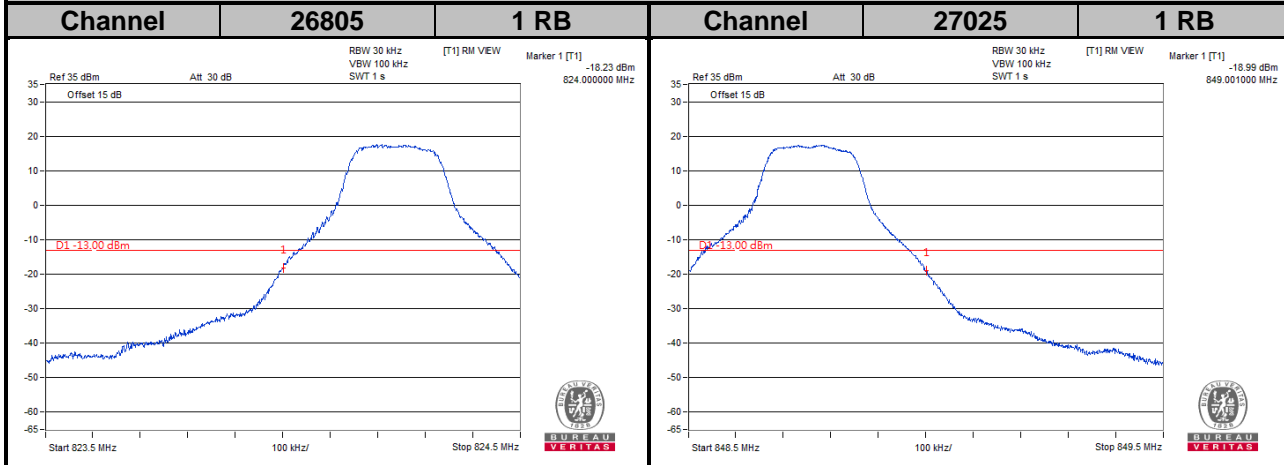




**LTE Band 26**  
**Channel Bandwidth: 1.4 MHz**

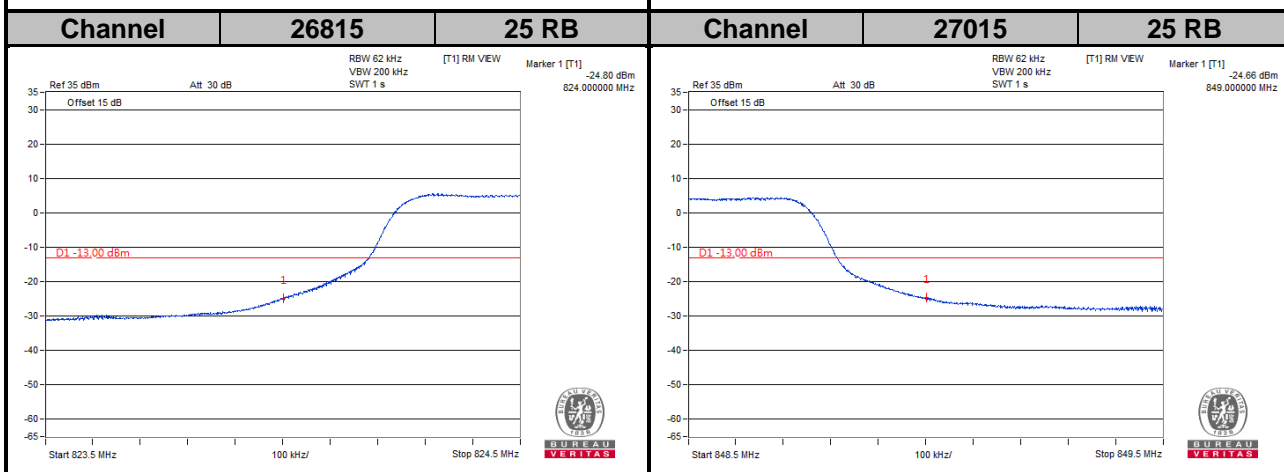
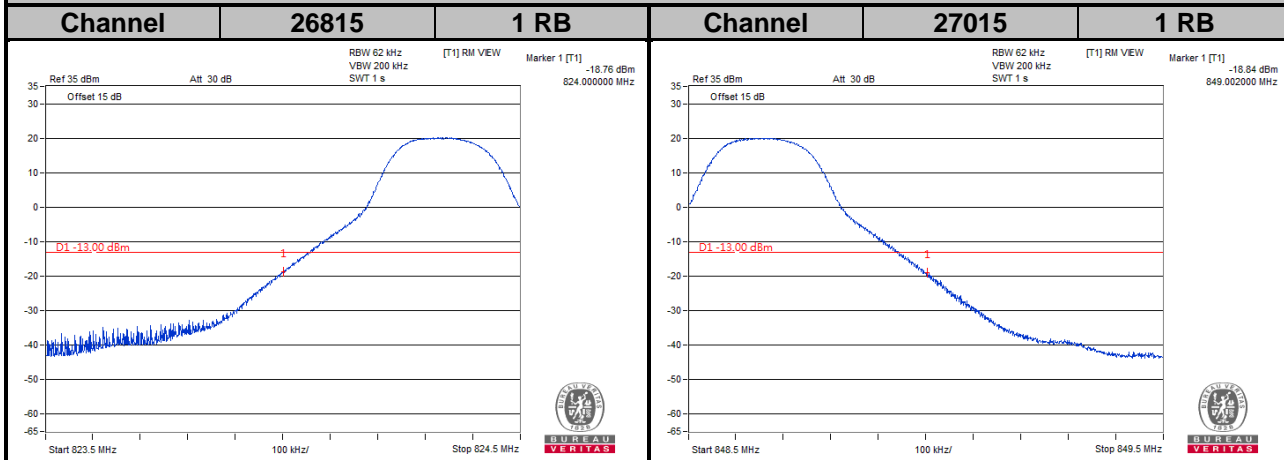


**LTE Band 26**  
**Channel Bandwidth: 3 MHz**



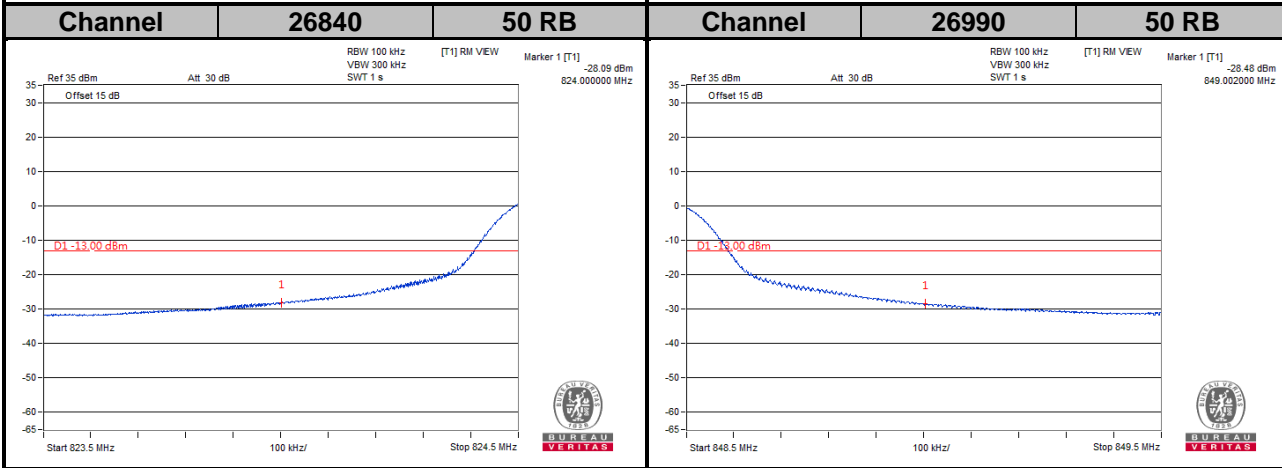
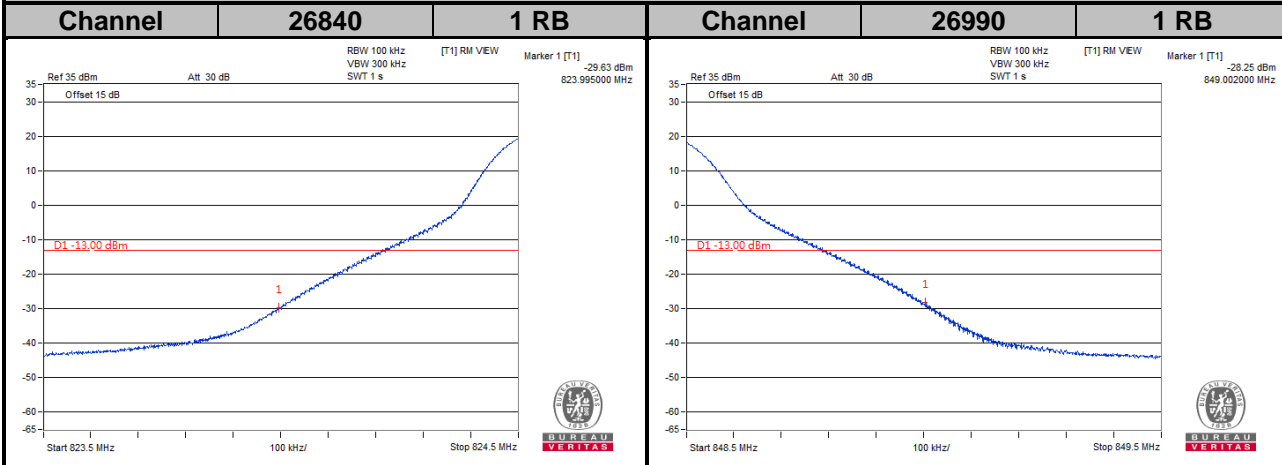
LTE Band 26

Channel Bandwidth: 5 MHz

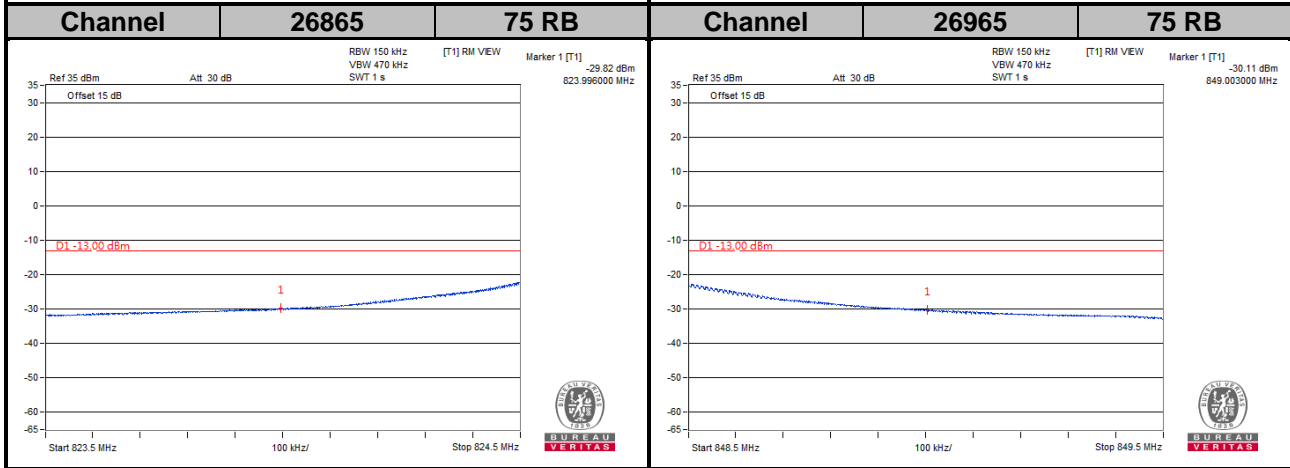
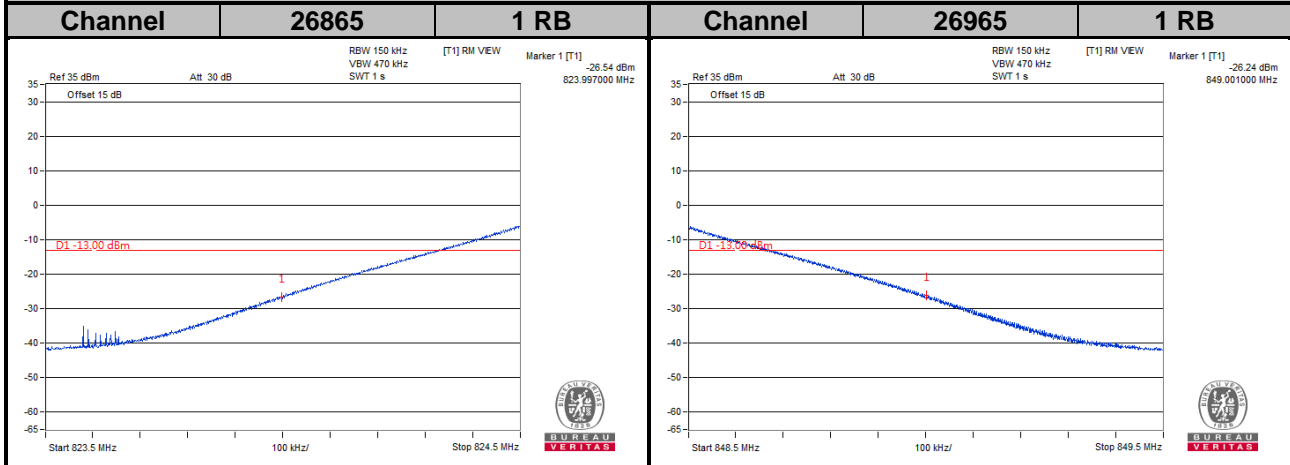


LTE Band 26

Channel Bandwidth: 10 MHz



**LTE Band 26**  
**Channel Bandwidth: 15 MHz**

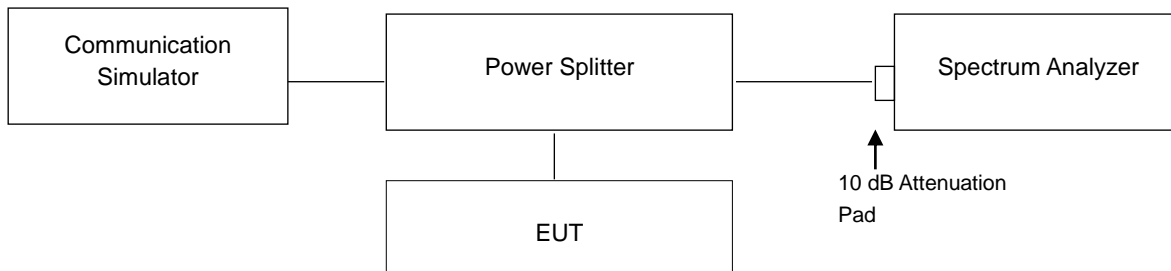


## 4.6 Peak to Average Ratio

### 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

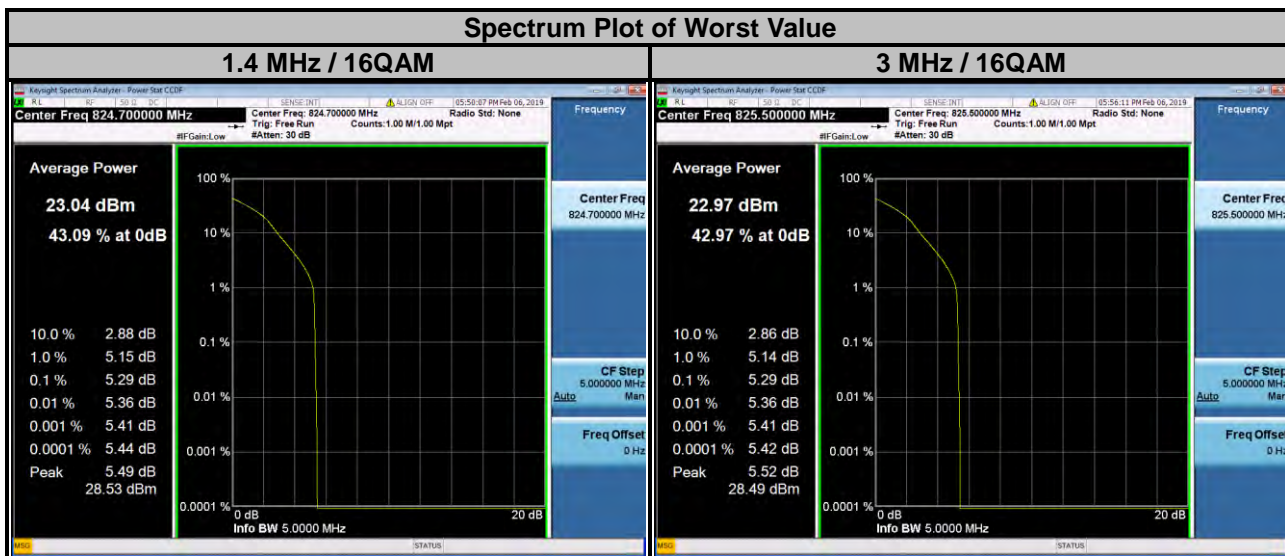
1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		GPRS	EDGE			WCDMA
128	824.2	0.59	3.35	4132	826.4	2.97
189	836.4	0.58	3.34	4182	836.4	2.95
251	848.8	0.59	3.35	4233	846.6	2.69

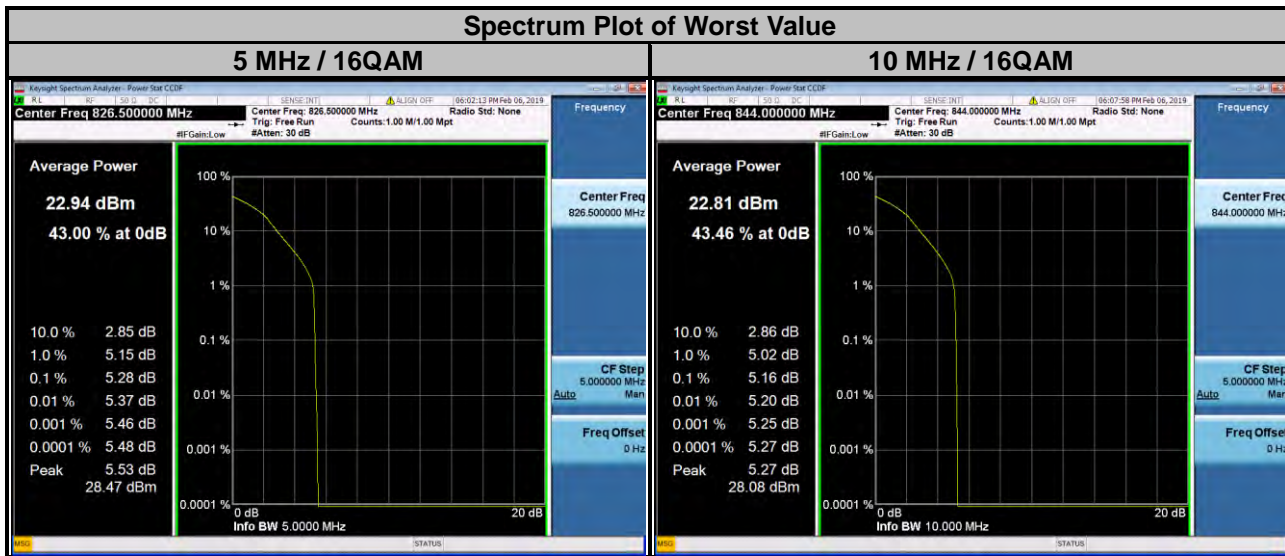


LTE Band 5							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20407	824.7	4.54	5.29	20415	825.5	4.52	5.29
20525	836.5	4.43	5.24	20525	836.5	4.36	5.25
20643	848.3	3.54	4.37	20635	847.5	3.59	4.16

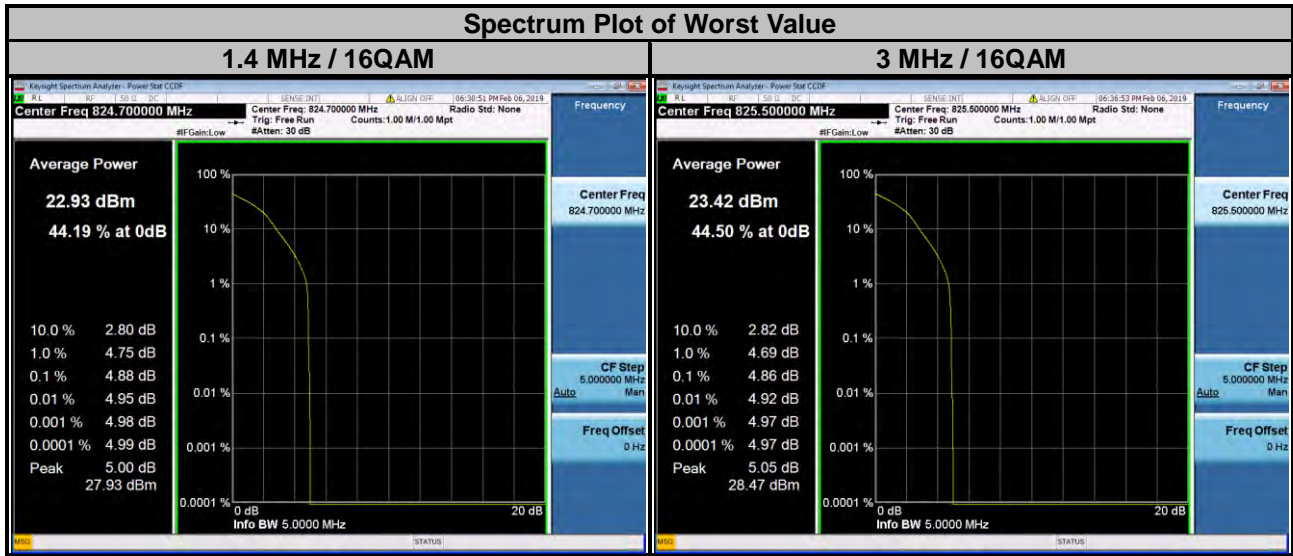




LTE Band 5							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20425	826.5	4.52	5.28	20450	829.0	4.46	5.15
20525	836.5	4.42	4.99	20525	836.5	4.40	5.14
20625	846.5	4.04	4.84	20600	844.0	4.33	5.16



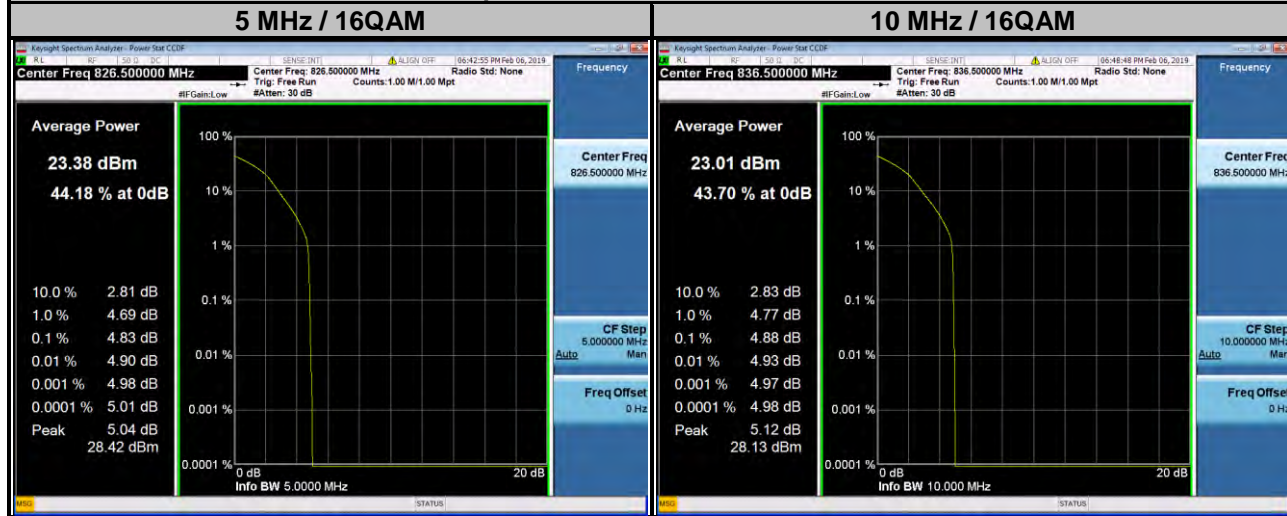
LTE Band 26							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
26797	824.7	4.32	4.88	26805	825.5	4.18	4.86
26915	836.5	4.09	4.80	26915	836.5	4.13	4.74
27033	848.3	3.44	4.15	27025	847.5	3.46	4.32



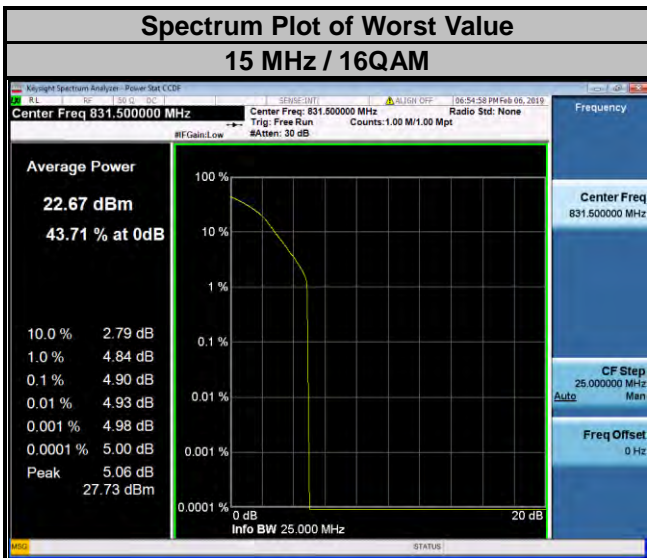
### LTE Band 26

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
26815	826.5	4.18	4.83	26840	829.0	4.10	4.79
26915	836.5	4.14	4.72	26915	836.5	4.10	4.88
27015	846.5	3.79	4.43	26990	844.0	4.04	4.78

### Spectrum Plot of Worst Value



LTE Band 26			
Channel Bandwidth: 15 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM
26865	831.5	4.07	4.90
26915	836.5	4.14	4.86
26965	841.5	4.00	4.74

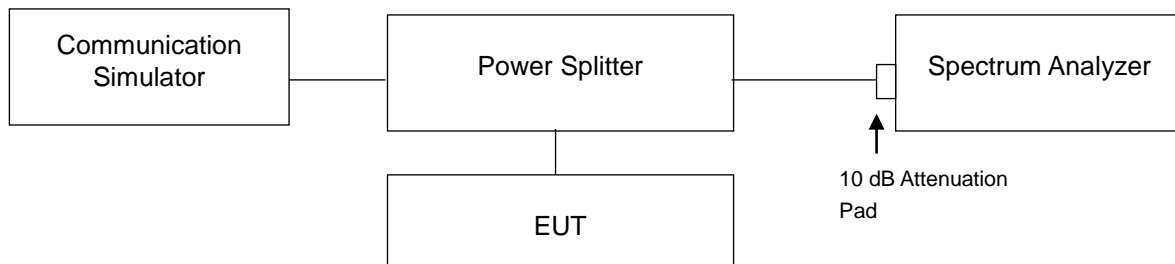


## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13 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 = 100 kHz and VBW = 300 kHz is used for conducted emission measurement.
- Measuring frequency range is from 1 GHz to 9 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

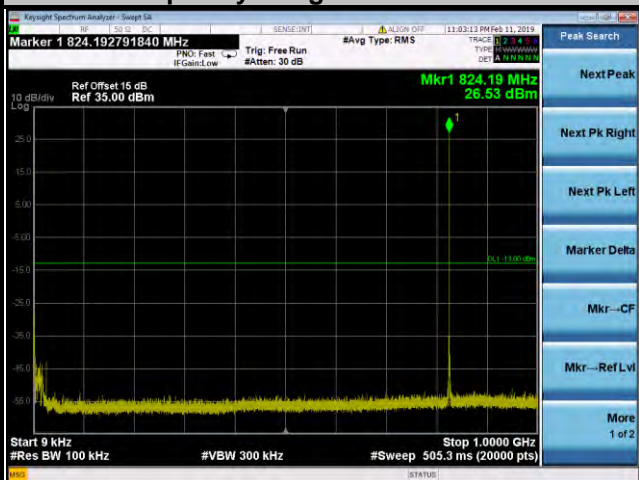
#### 4.7.4 Test Results



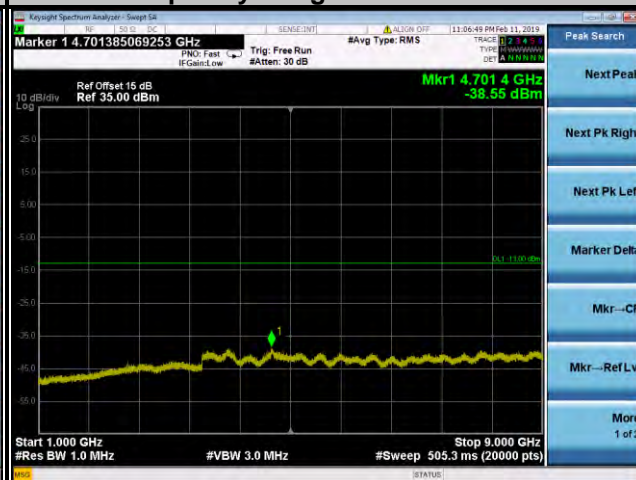
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

### EDGE Channel 128

Frequency Range: 9 kHz ~ 1 GHz

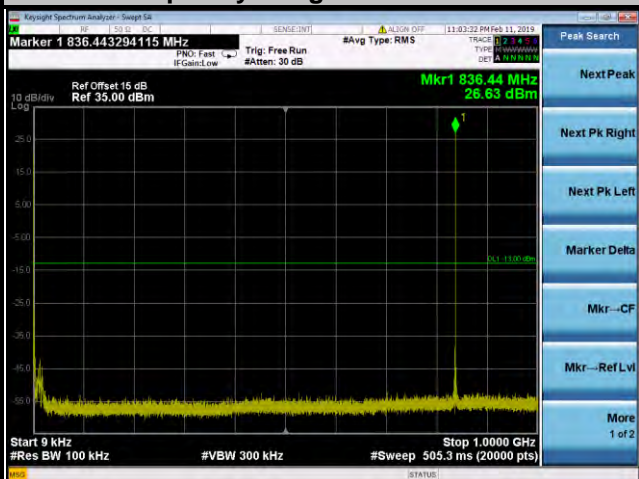


Frequency Range: 1 GHz ~ 9 GHz

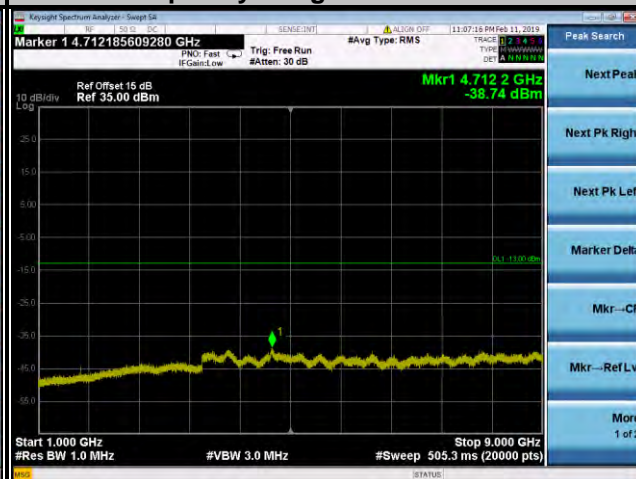


### Channel 189

Frequency Range: 9 kHz ~ 1 GHz

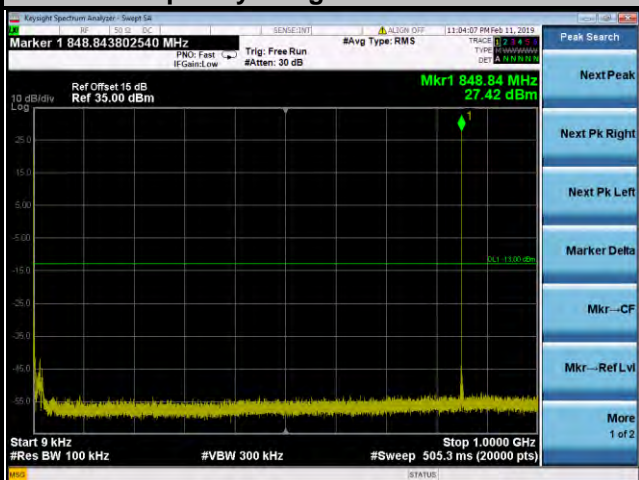


Frequency Range: 1 GHz ~ 9 GHz

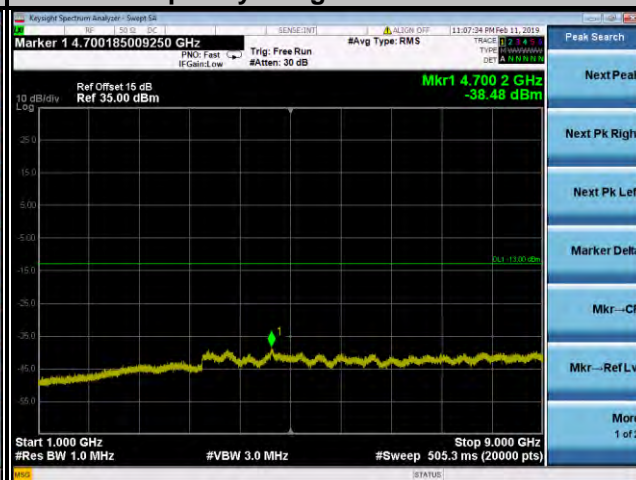


### Channel 251

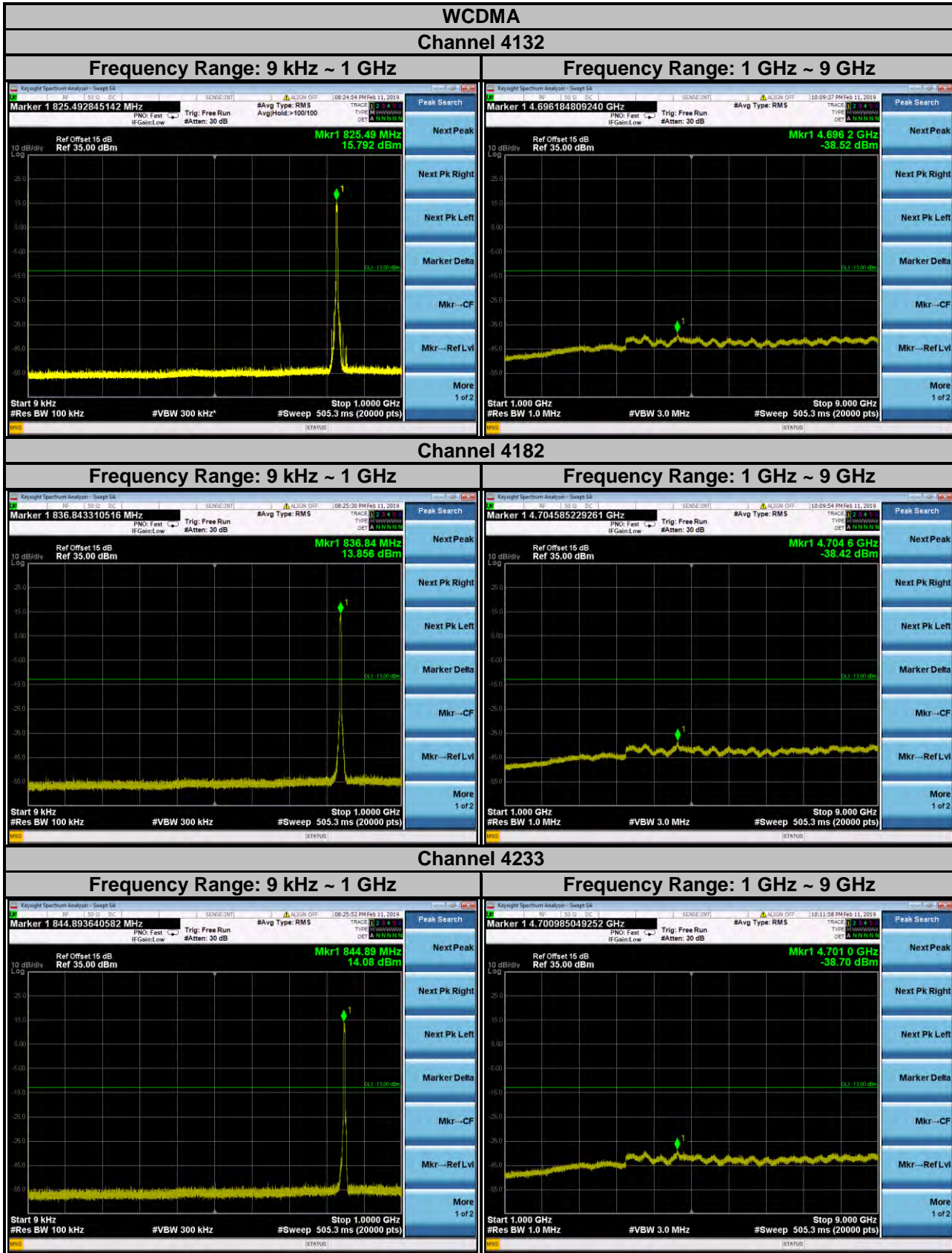
Frequency Range: 9 kHz ~ 1 GHz



Frequency Range: 1 GHz ~ 9 GHz



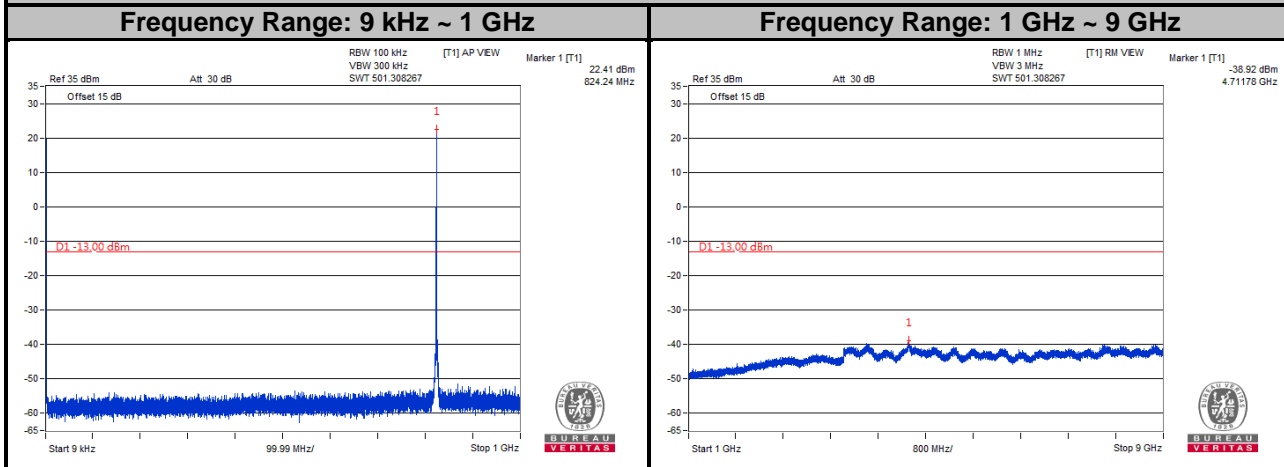
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



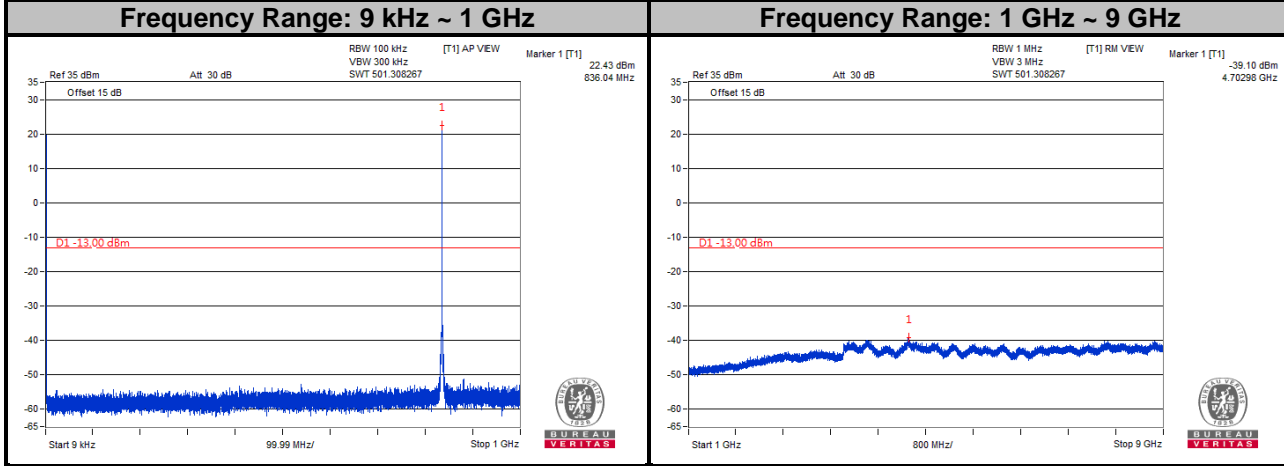
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



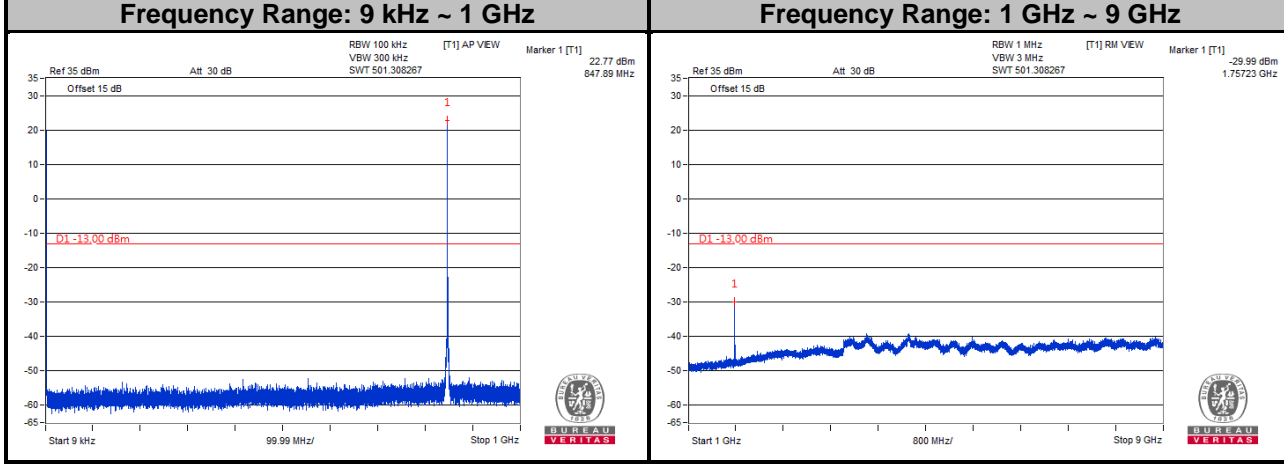
**LTE Band 5**  
**Channel Bandwidth: 1.4 MHz**  
**Channel 20407**



**Channel 20525**

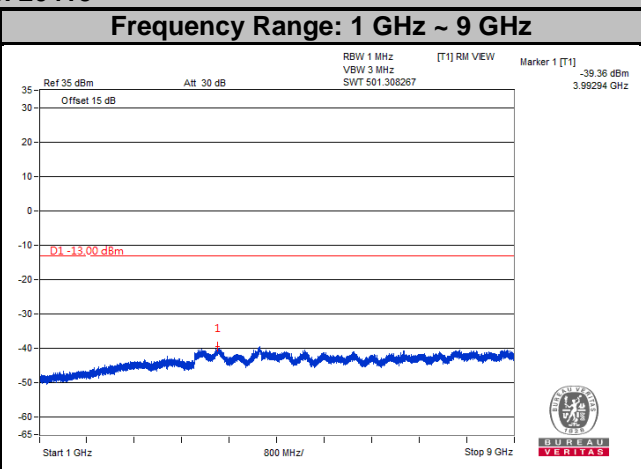
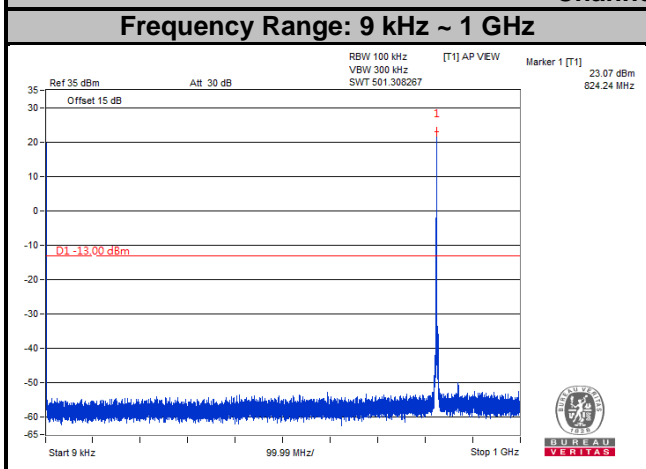


**Channel 20643**

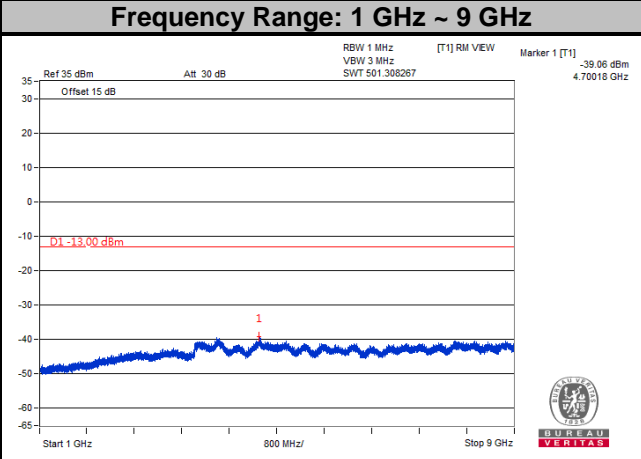
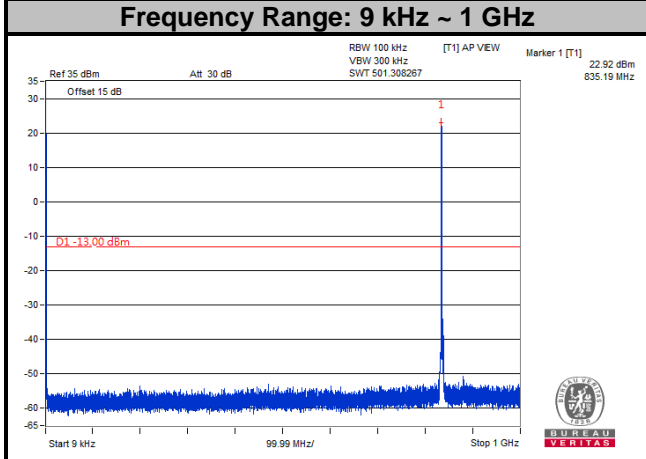


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

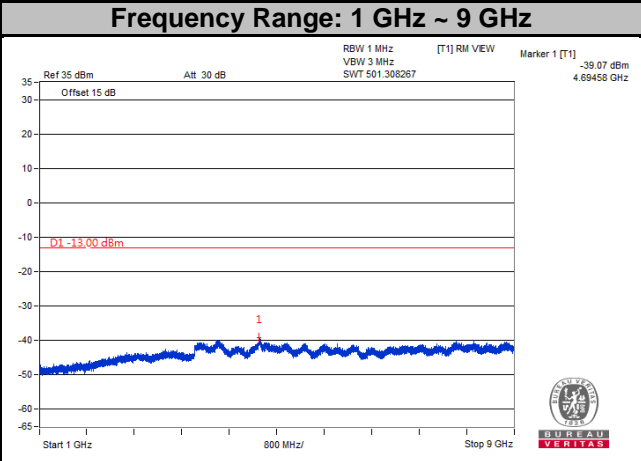
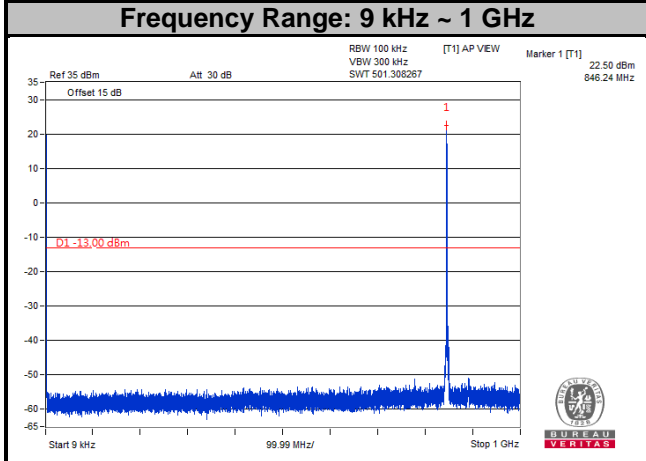
**LTE Band 5**  
**Channel Bandwidth: 3 MHz**  
**Channel 20415**



**Channel 20525**

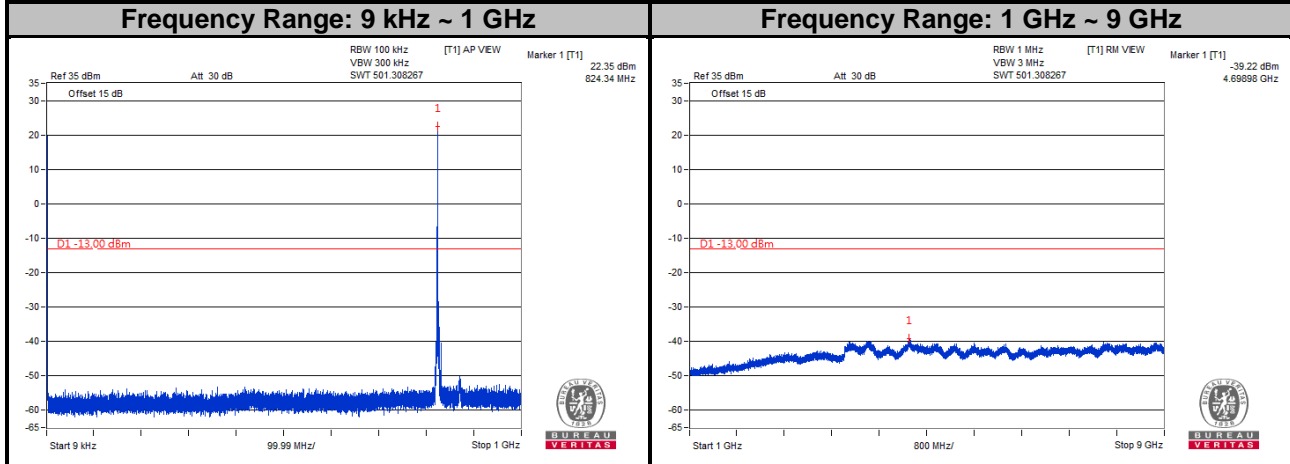


**Channel 20635**

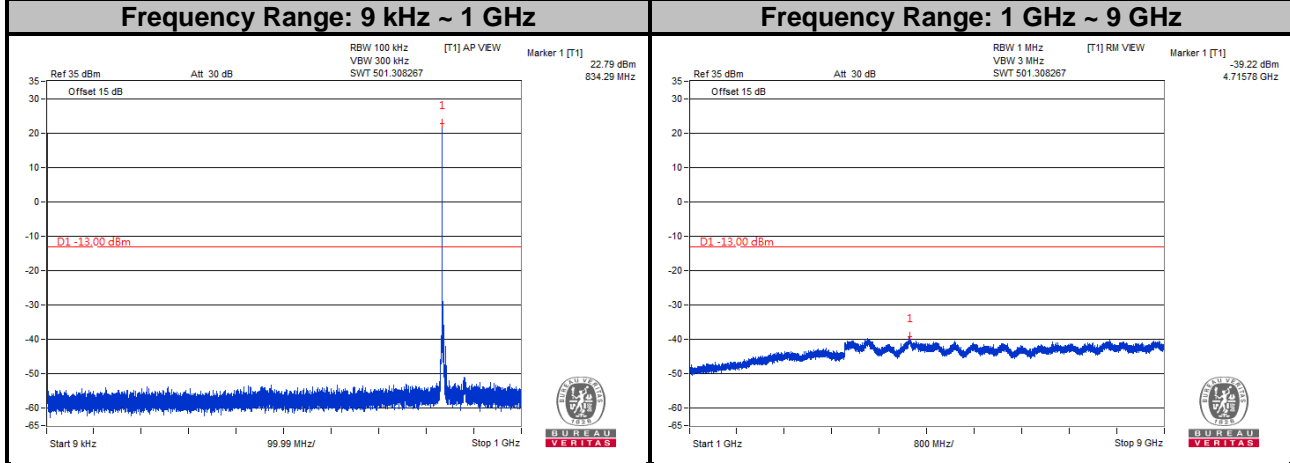


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

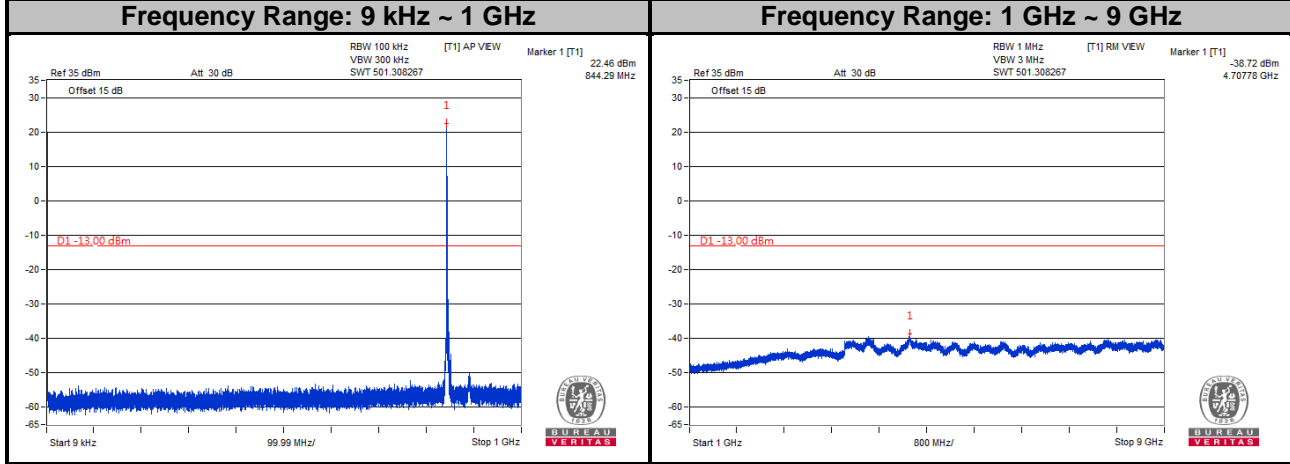
**LTE Band 5**  
**Channel Bandwidth: 5 MHz**  
**Channel 20425**



**Channel 20525**

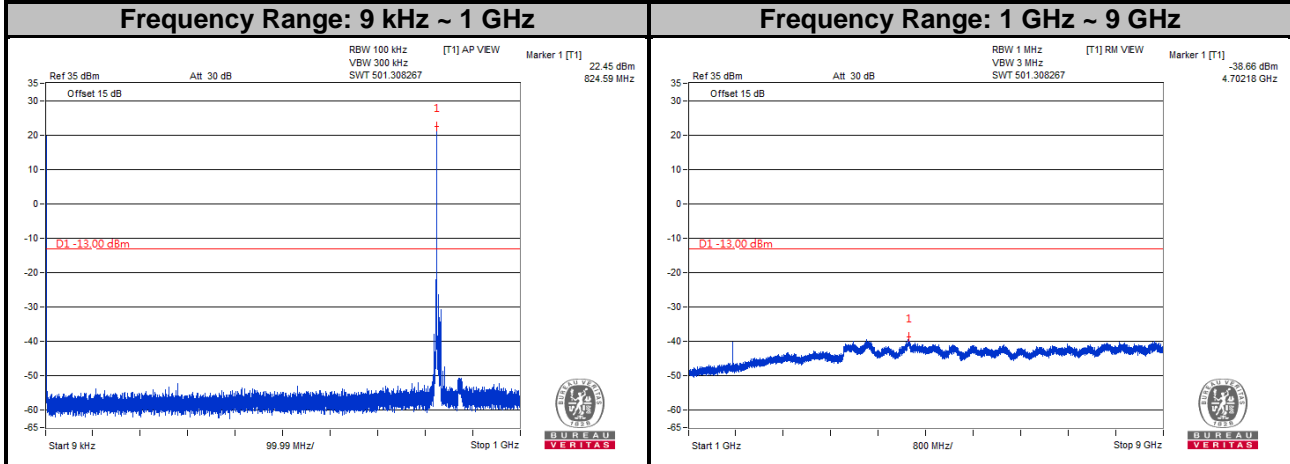


**Channel 20625**

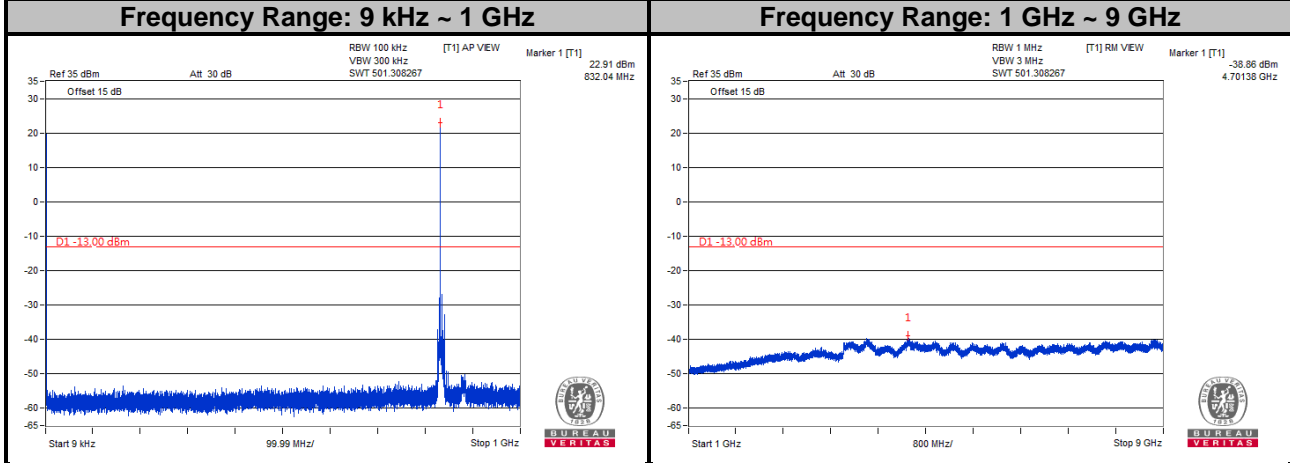


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

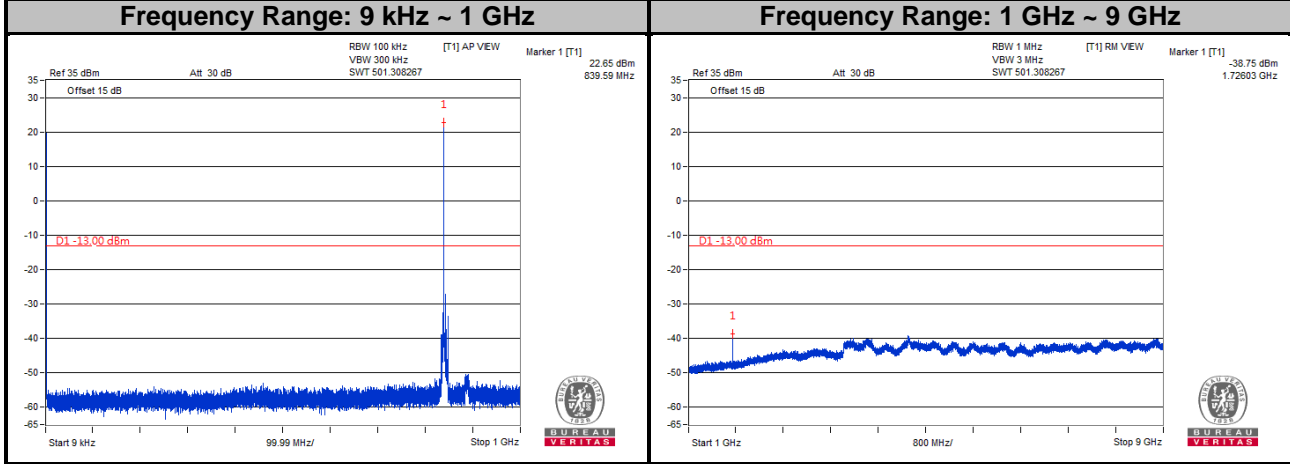
**LTE Band 5**  
**Channel Bandwidth: 10 MHz**  
**Channel 20450**



**Channel 20525**

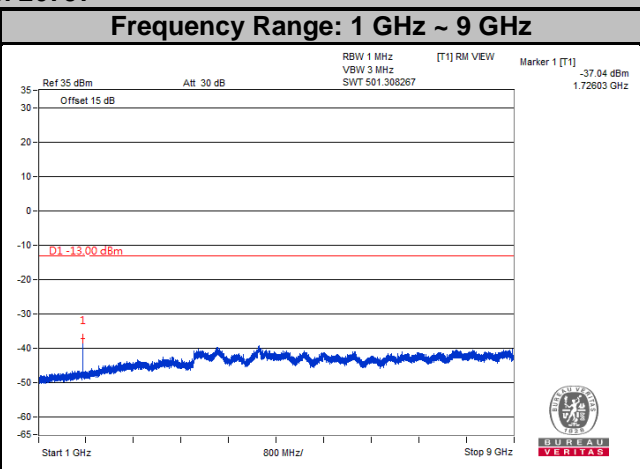
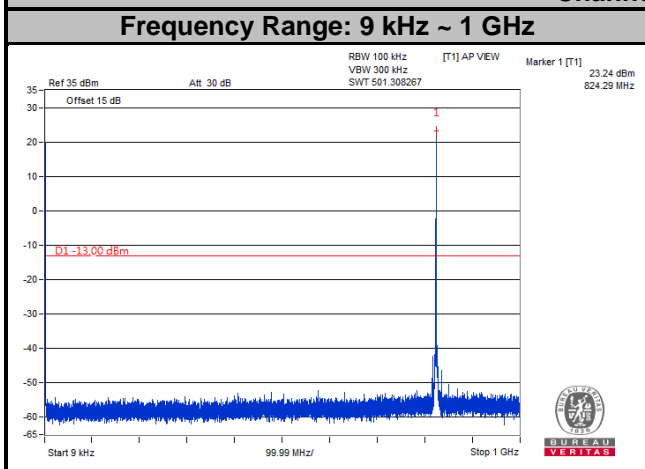


**Channel 20600**

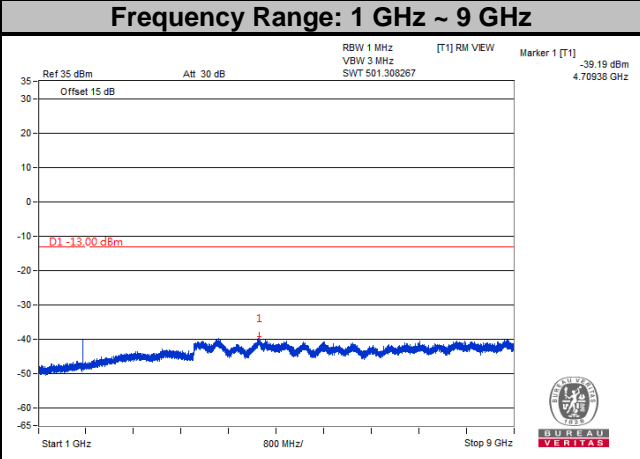
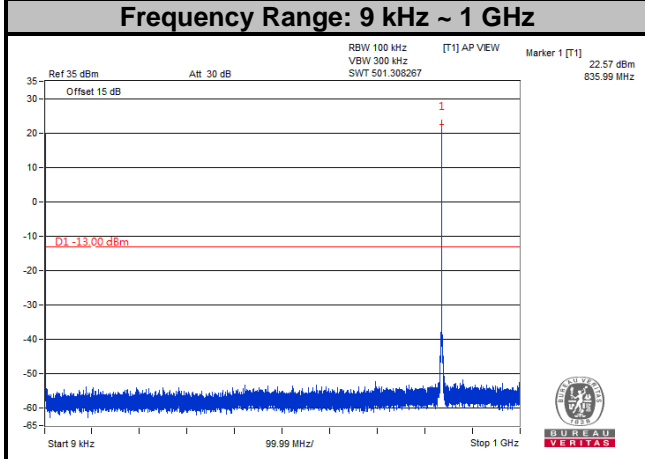


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

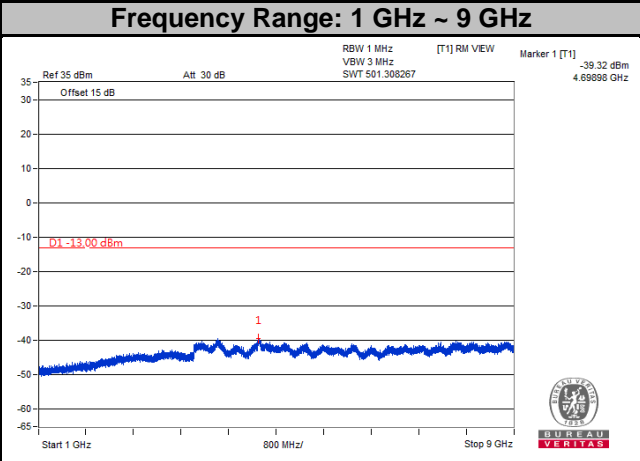
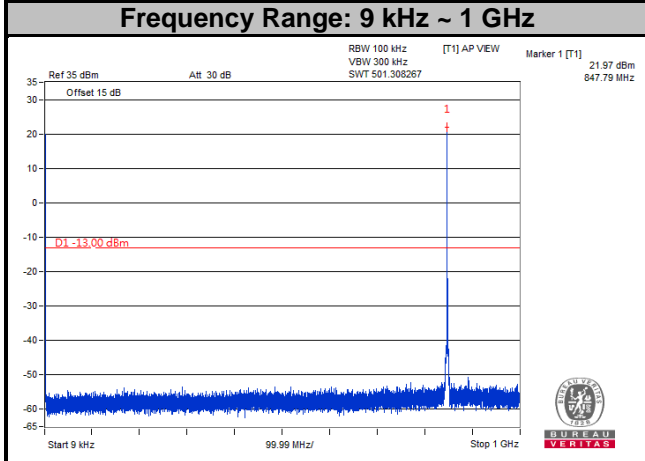
**LTE Band 26**  
**Channel Bandwidth: 1.4 MHz**  
**Channel 26797**



**Channel 26915**

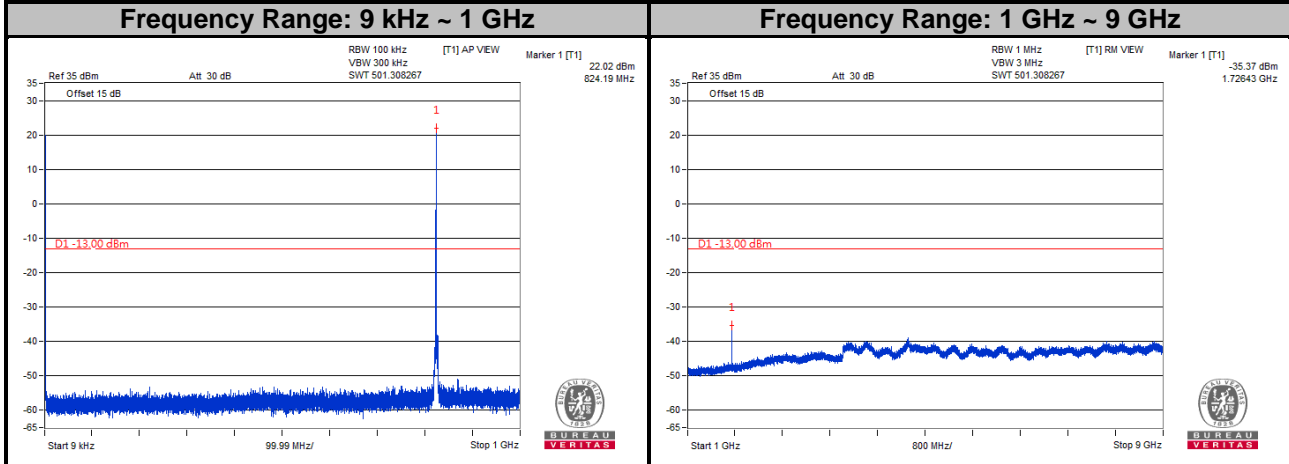


**Channel 27033**

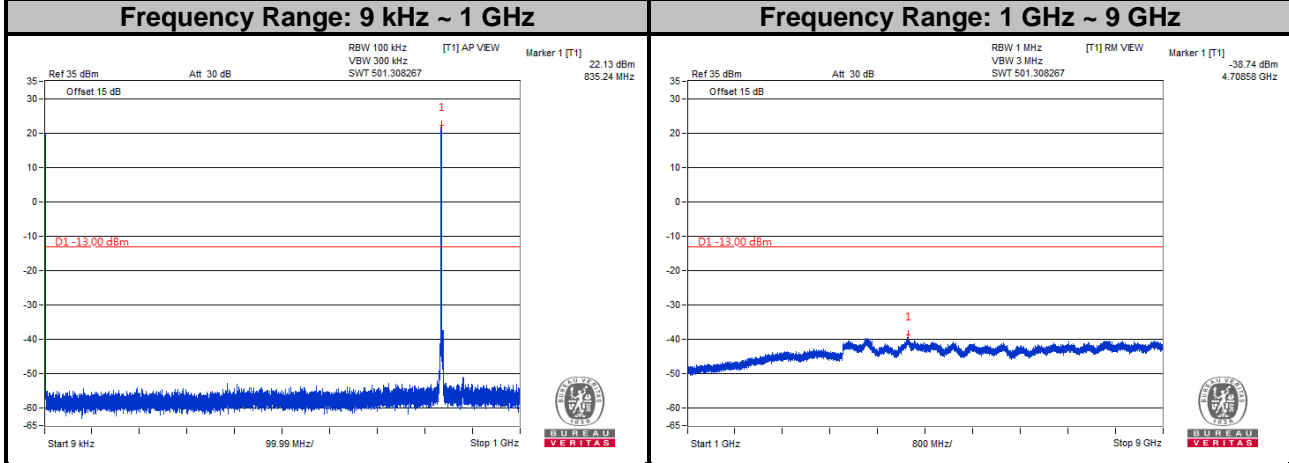


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

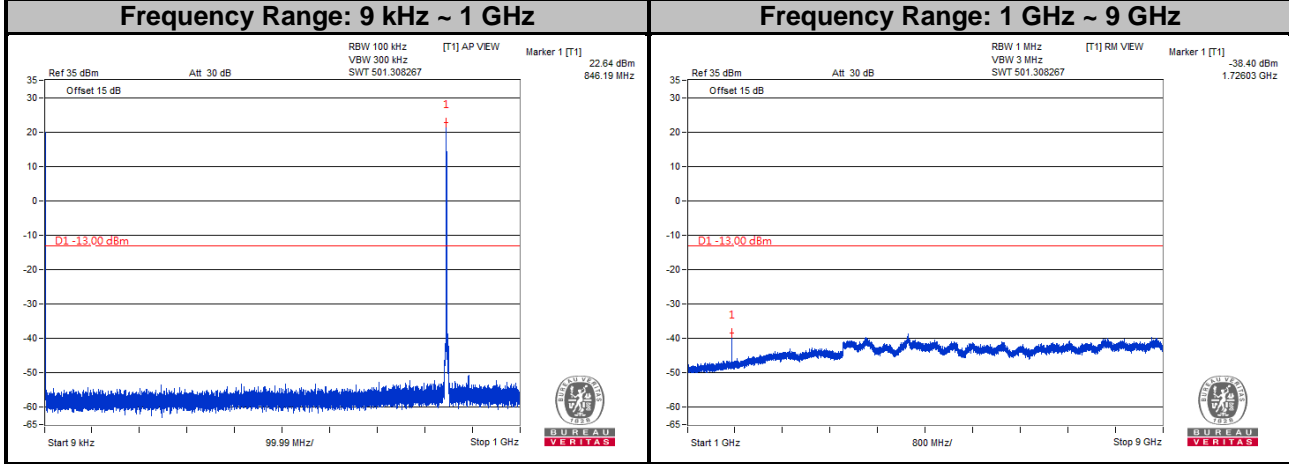
**LTE Band 26**  
**Channel Bandwidth: 3 MHz**  
**Channel 26805**



**Channel 26915**

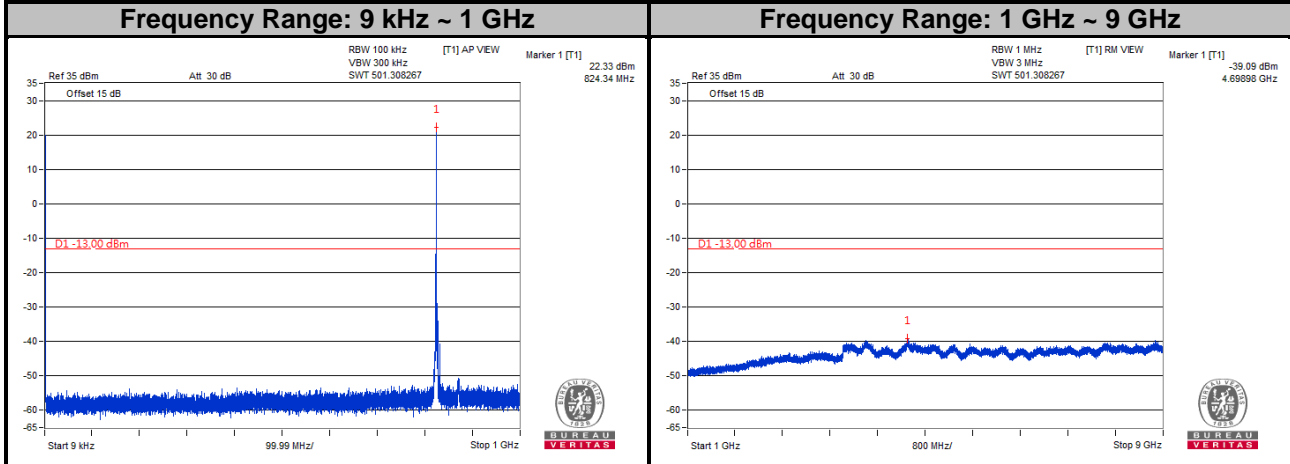


**Channel 27025**

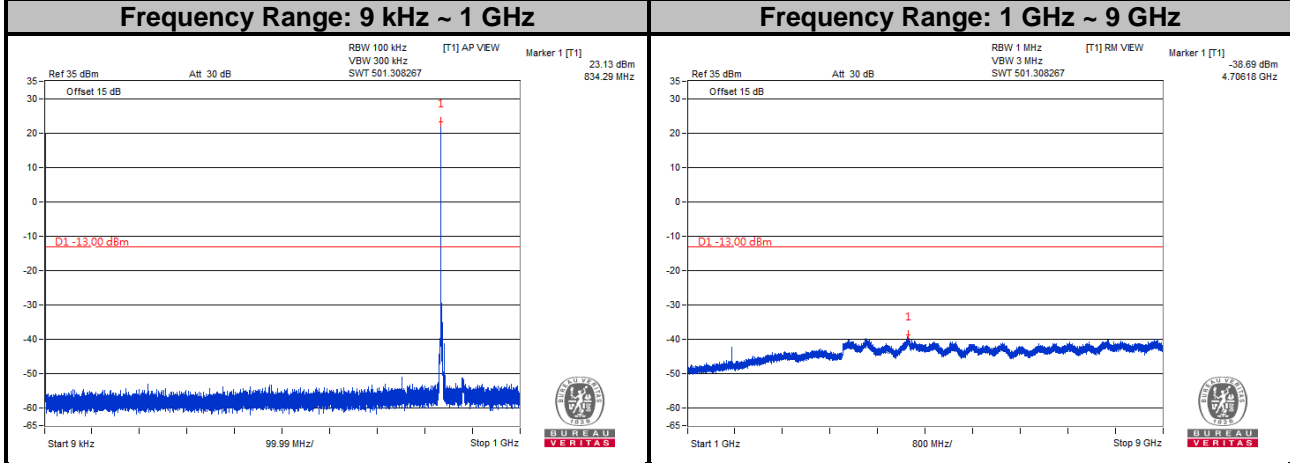


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

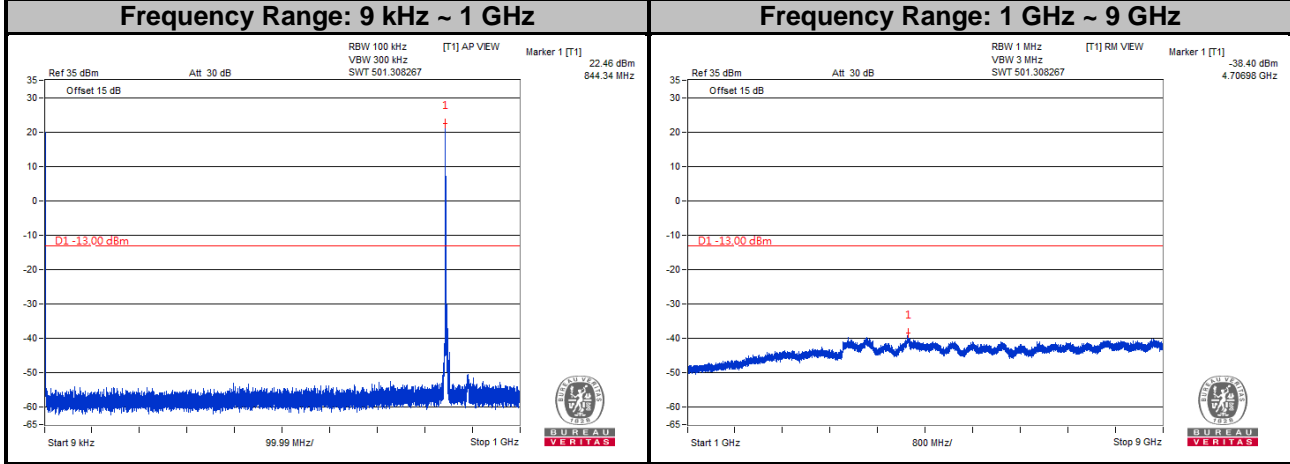
**LTE Band 26**  
**Channel Bandwidth: 5 MHz**  
**Channel 26815**



**Channel 26915**

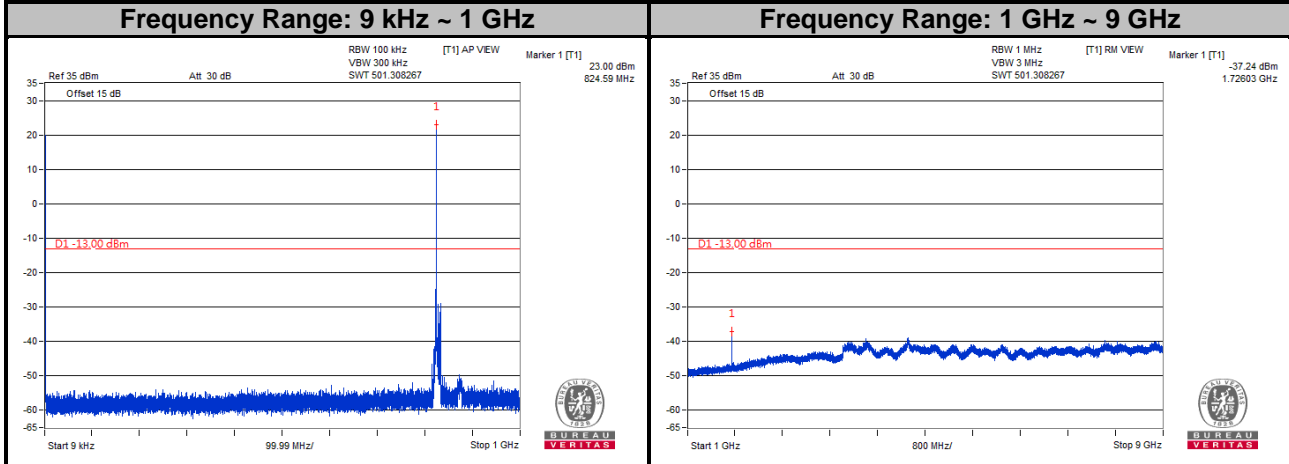


**Channel 27015**

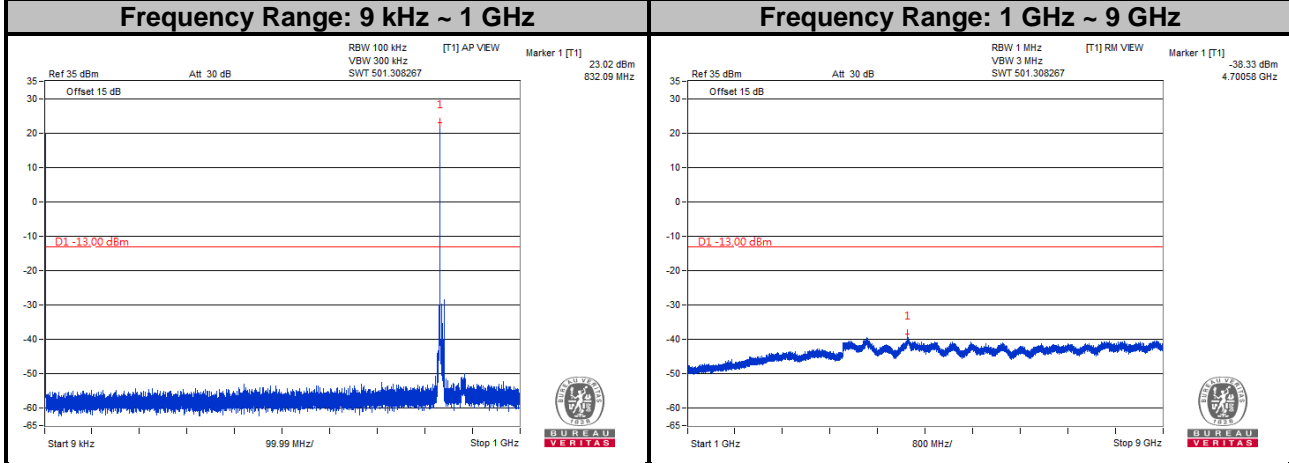


Note: The signal over the limit in 9 kHz is from spectrum analyzer.

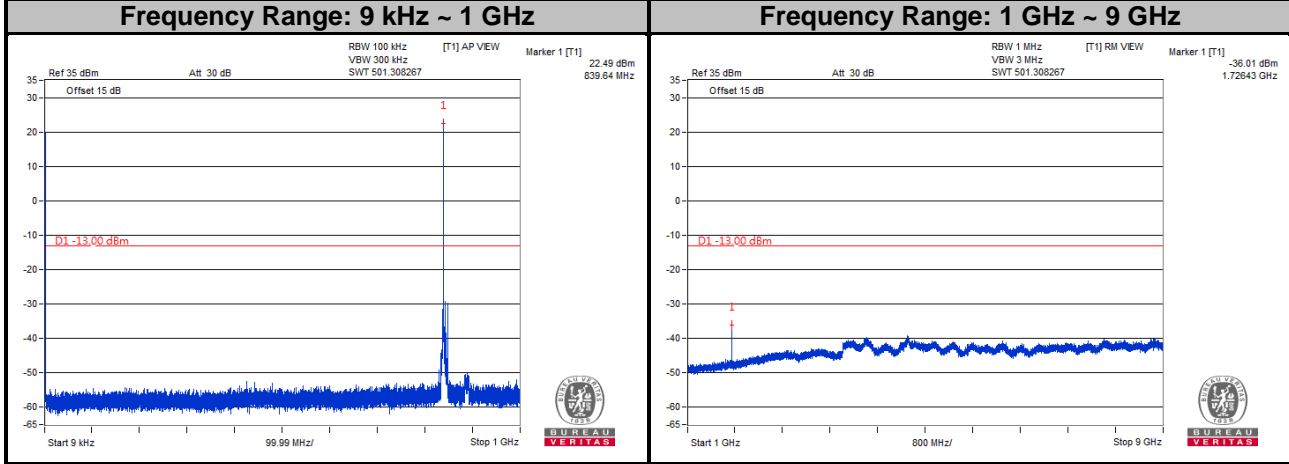
**LTE Band 26**  
**Channel Bandwidth: 10 MHz**  
**Channel 26840**



**Channel 26915**



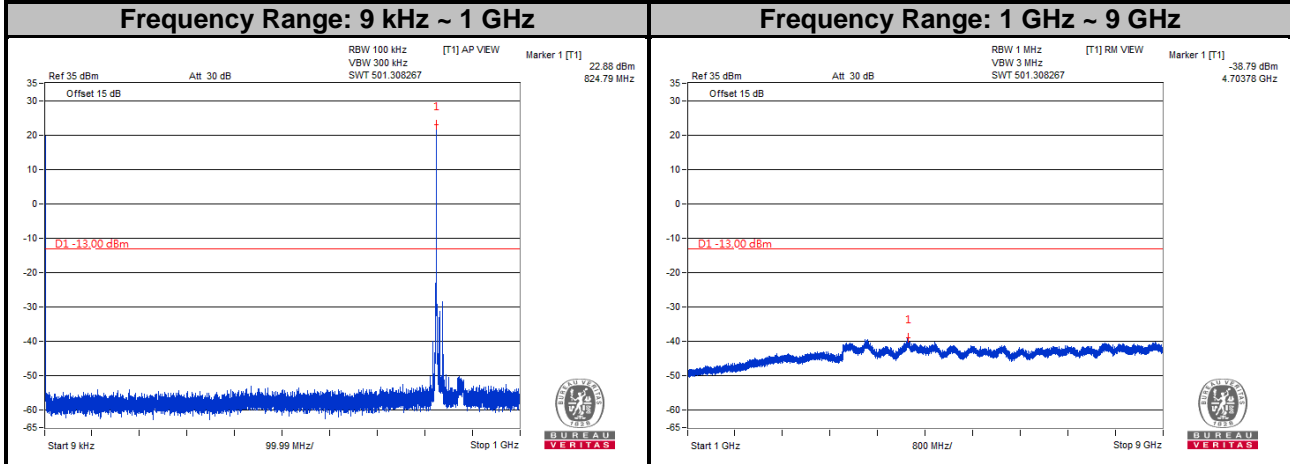
**Channel 26990**



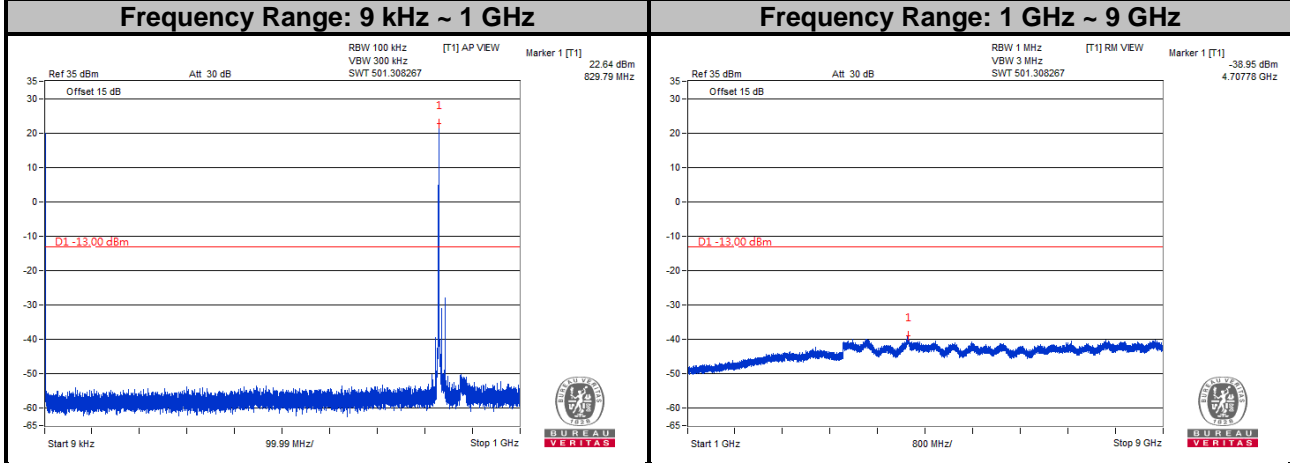
Note: The signal over the limit in 9 kHz is from spectrum analyzer.



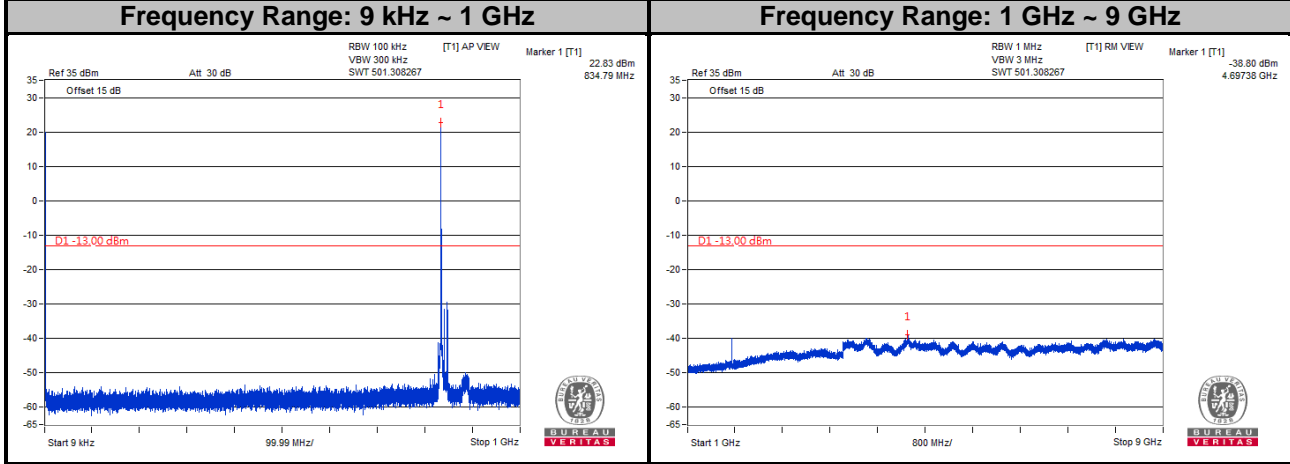
**LTE Band 26**  
**Channel Bandwidth: 15 MHz**  
**Channel 26865**



**Channel 26915**



**Channel 26965**



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 of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13 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. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- d. 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.

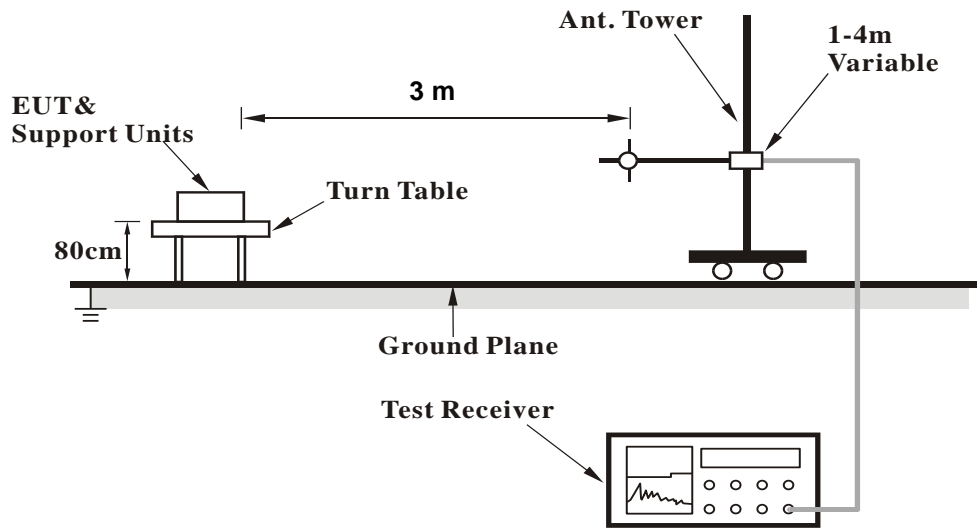
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

### 4.8.3 Deviation from Test Standard

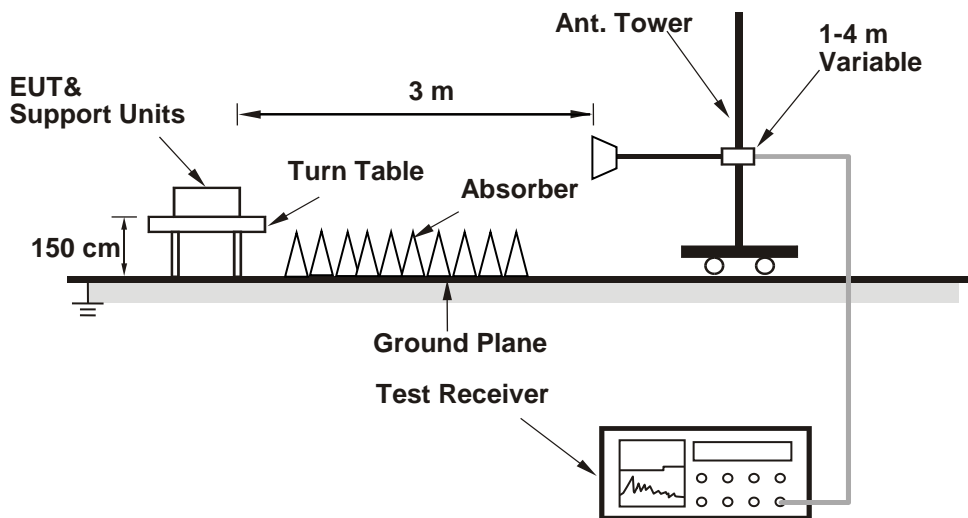
No deviation.

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

GPRS:  
Low Channel

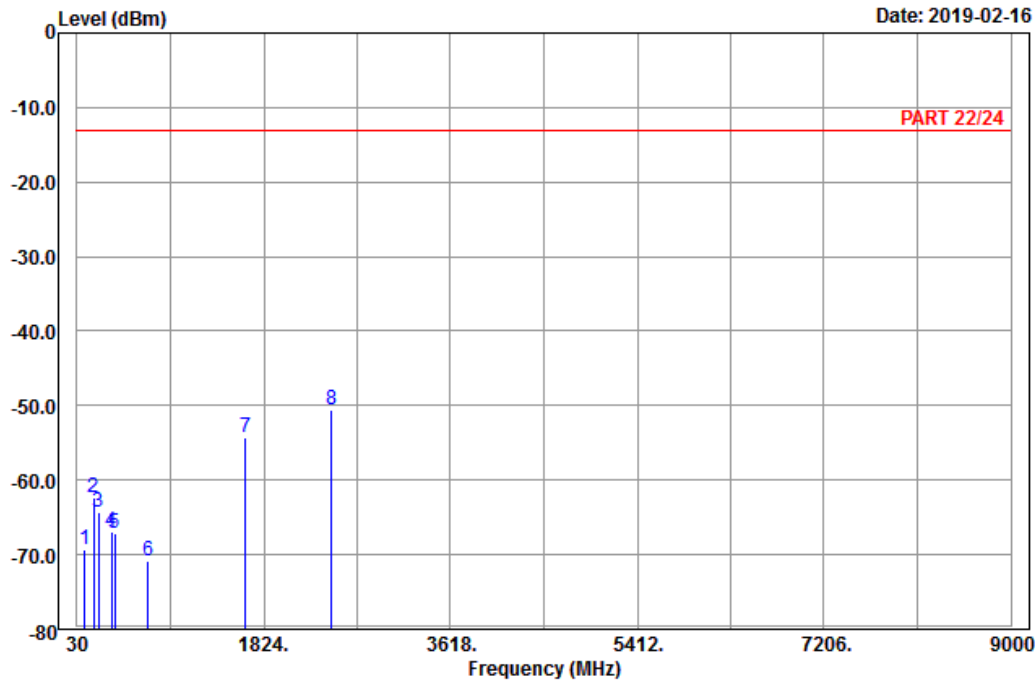


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A D T

Data: 7

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : GPRS 850\_Link\_CH128  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	101.55	-69.24	-59.35	-13.00	-56.24	-9.89	Peak
2	187.41	-62.29	-56.60	-13.00	-49.29	-5.69	Peak
3	234.93	-64.20	-58.48	-13.00	-51.20	-5.72	Peak
4	363.70	-67.02	-62.37	-13.00	-54.02	-4.65	Peak
5	393.80	-67.14	-64.09	-13.00	-54.14	-3.05	Peak
6	712.30	-70.83	-70.23	-13.00	-57.83	-0.60	Peak
7	1648.40	-54.28	-62.01	-13.00	-41.28	7.73	Peak
8 pp	2472.60	-50.62	-61.65	-13.00	-37.62	11.03	Peak

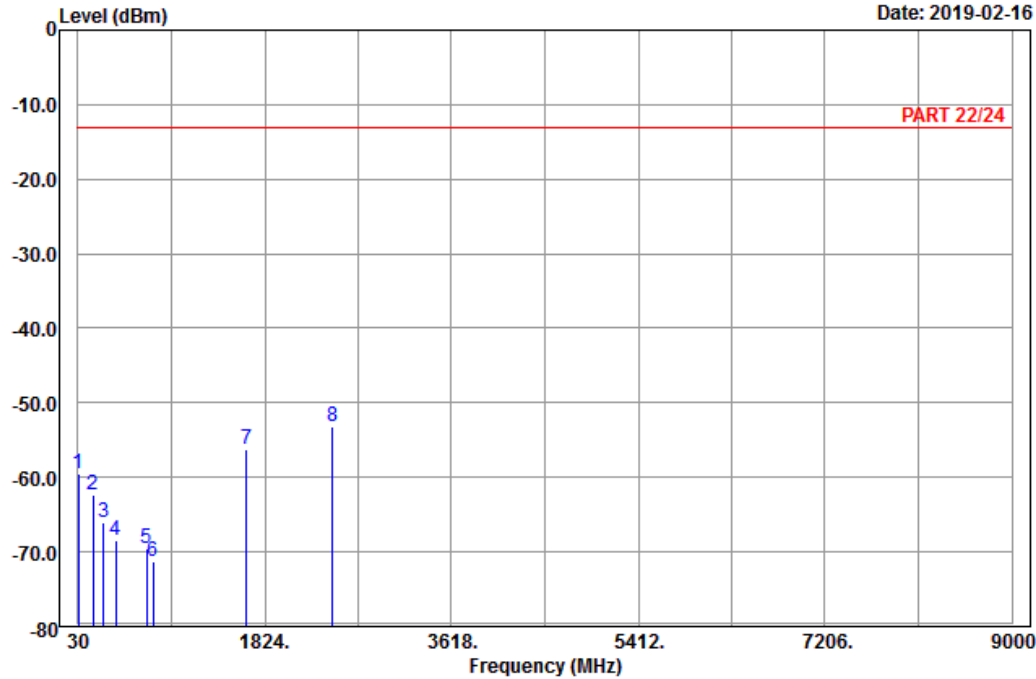


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : GPRS 850\_Link\_CH128  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	31.35	-59.42	-48.77	-13.00	-46.42	-10.65	Peak
2	176.88	-62.30	-56.31	-13.00	-49.30	-5.99	Peak
3	277.05	-66.05	-60.29	-13.00	-53.05	-5.76	Peak
4	393.10	-68.41	-65.31	-13.00	-55.41	-3.10	Peak
5	690.60	-69.62	-69.29	-13.00	-56.62	-0.33	Peak
6	754.30	-71.27	-70.28	-13.00	-58.27	-0.99	Peak
7	1648.40	-56.22	-63.95	-13.00	-43.22	7.73	Peak
8 pp	2472.60	-53.27	-64.30	-13.00	-40.27	11.03	Peak

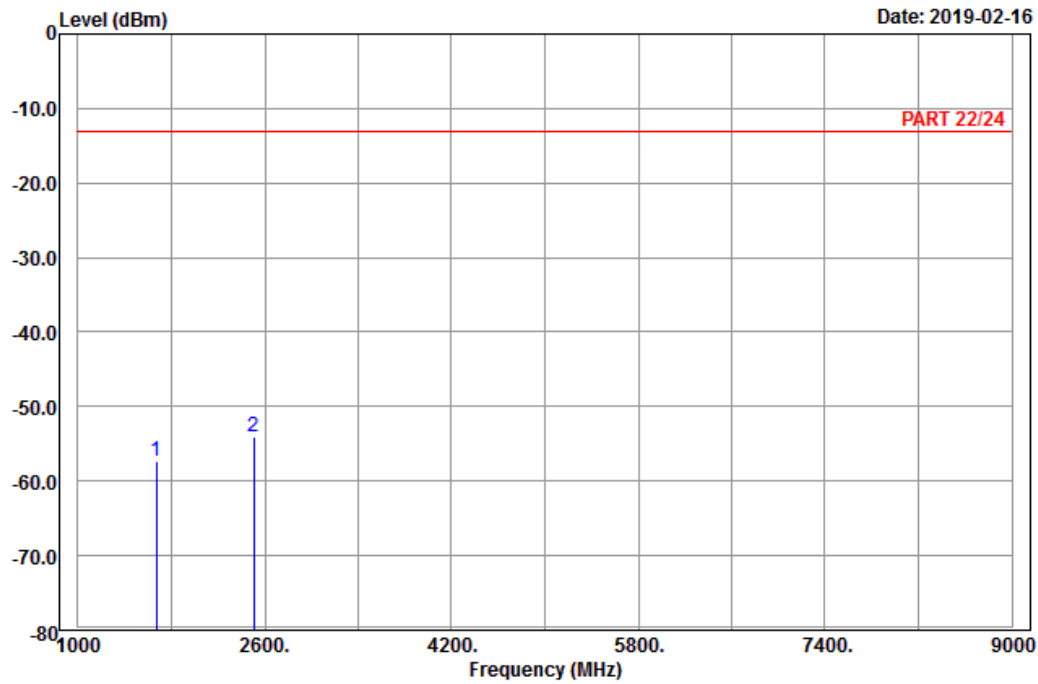
Middle Channel



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A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : GPRS 850\_Link\_CH189  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1672.80	-57.41	-65.32	-13.00	-44.41	7.91	Peak
2	2509.20	-54.07	-65.35	-13.00	-41.07	11.28	Peak

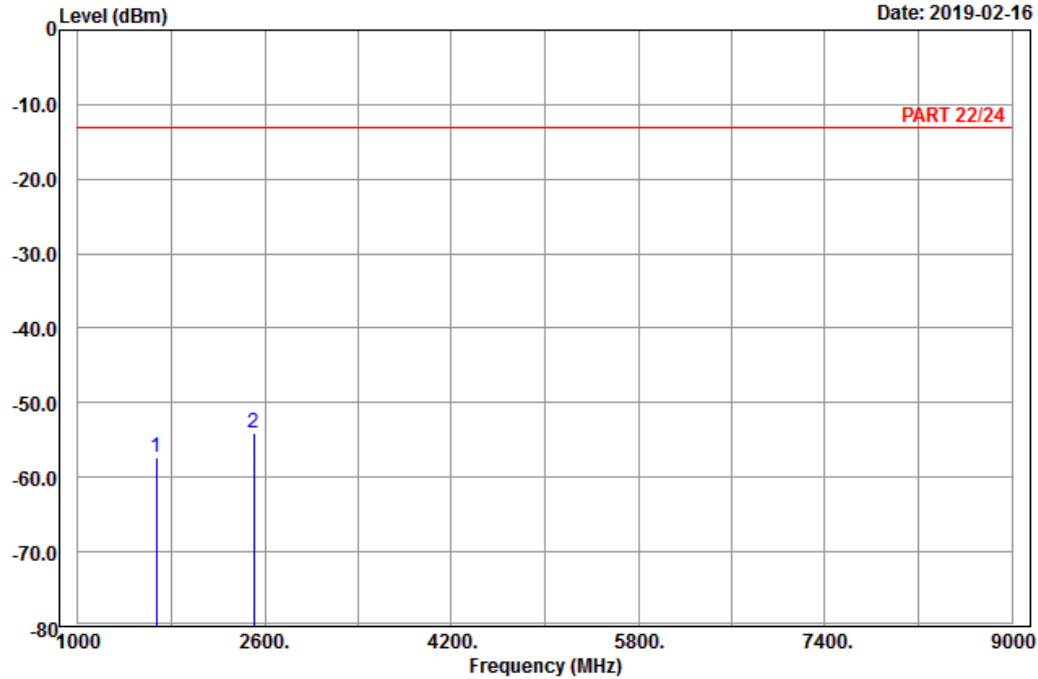


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A D T

Data: 4

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : GPRS 850\_Link\_CH189  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1672.80	-57.37	-65.28	-13.00	-44.37	7.91	Peak
2 pp	2509.20	-54.01	-65.29	-13.00	-41.01	11.28	Peak

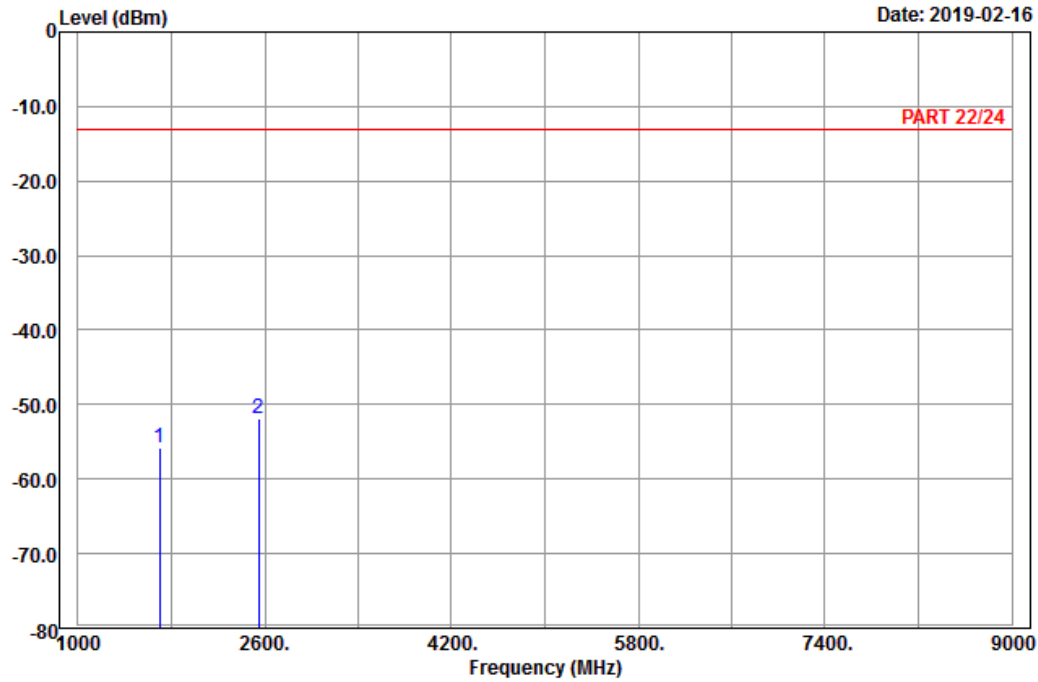
# High Channel



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A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : GPRS 850\_Link\_CH251  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1697.60	-55.78	-63.92	-13.00	-42.78	8.14	Peak
2	2546.40	-51.97	-63.44	-13.00	-38.97	11.47	Peak



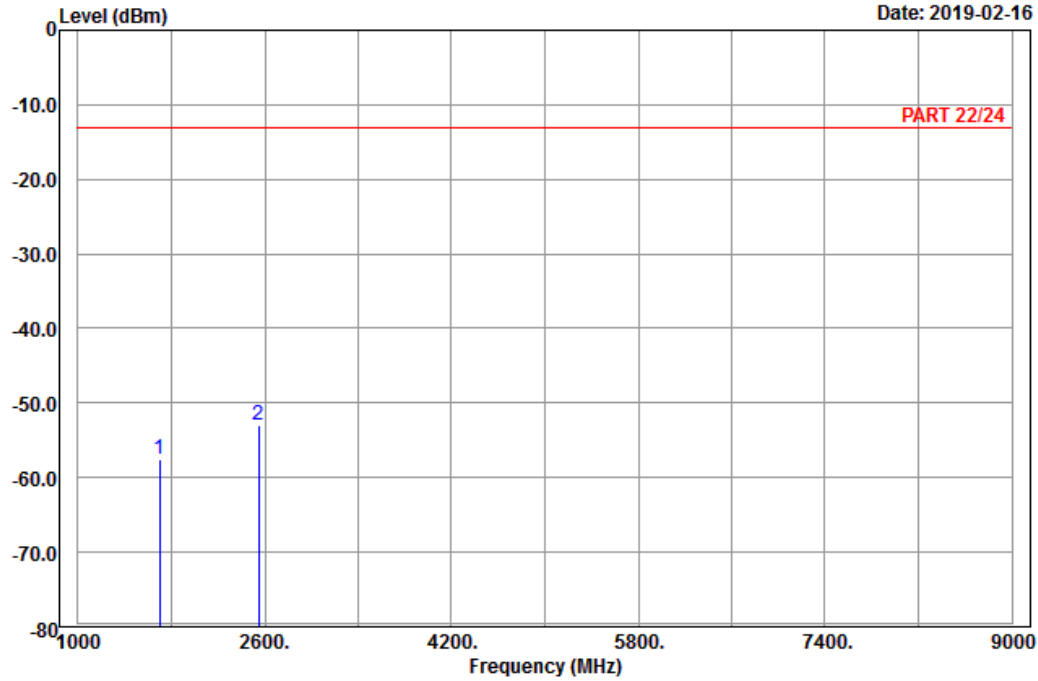


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A D T

Data: 4

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : GPRS 850\_Link\_CH251  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1697.60	-57.58	-65.72	-13.00	-44.58	8.14	Peak
2 pp	2546.40	-53.01	-64.48	-13.00	-40.01	11.47	Peak

EDGE:  
Low Channel

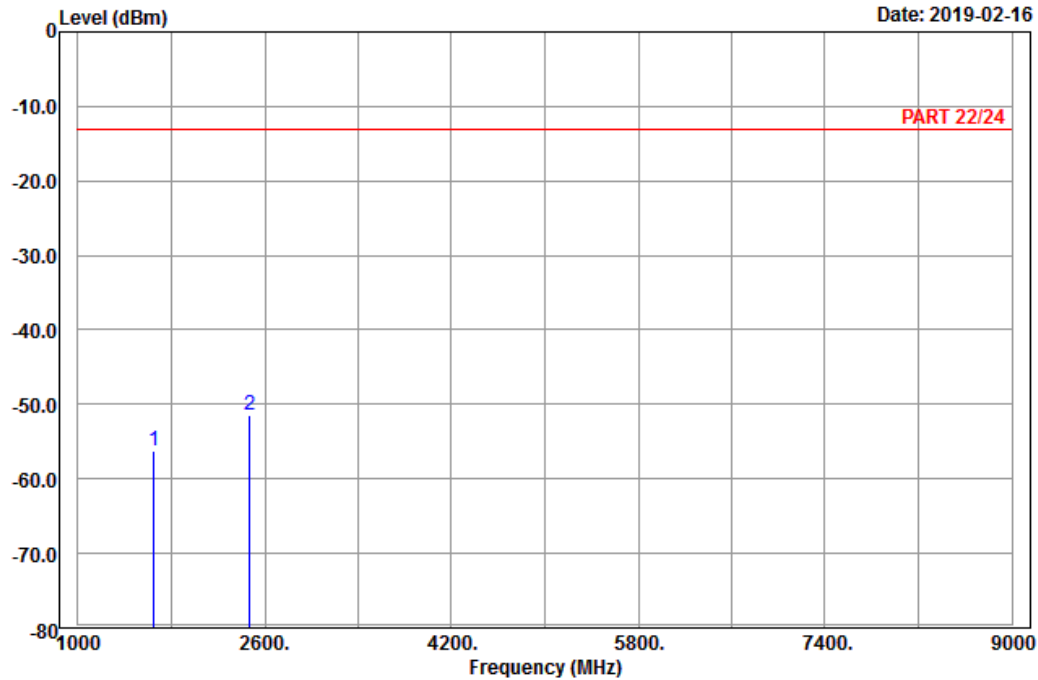


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A D T

Data: 3

Date: 2019-02-16



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : EDGE 850\_Link\_CH128  
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1648.40	-56.16	-63.89	-13.00	-43.16	7.73	Peak
2 pp	2472.60	-51.37	-62.40	-13.00	-38.37	11.03	Peak

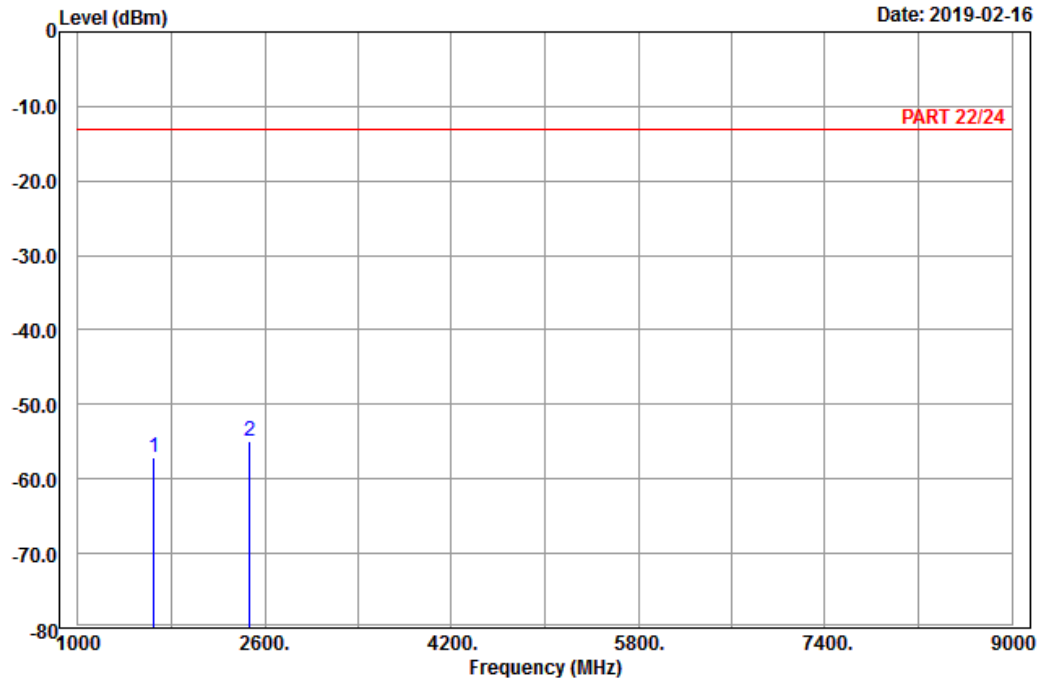


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : EDGE 850\_Link\_CH128  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1648.40	-57.10	-64.83	-13.00	-44.10	7.73	Peak
2 pp	2472.60	-54.93	-65.96	-13.00	-41.93	11.03	Peak

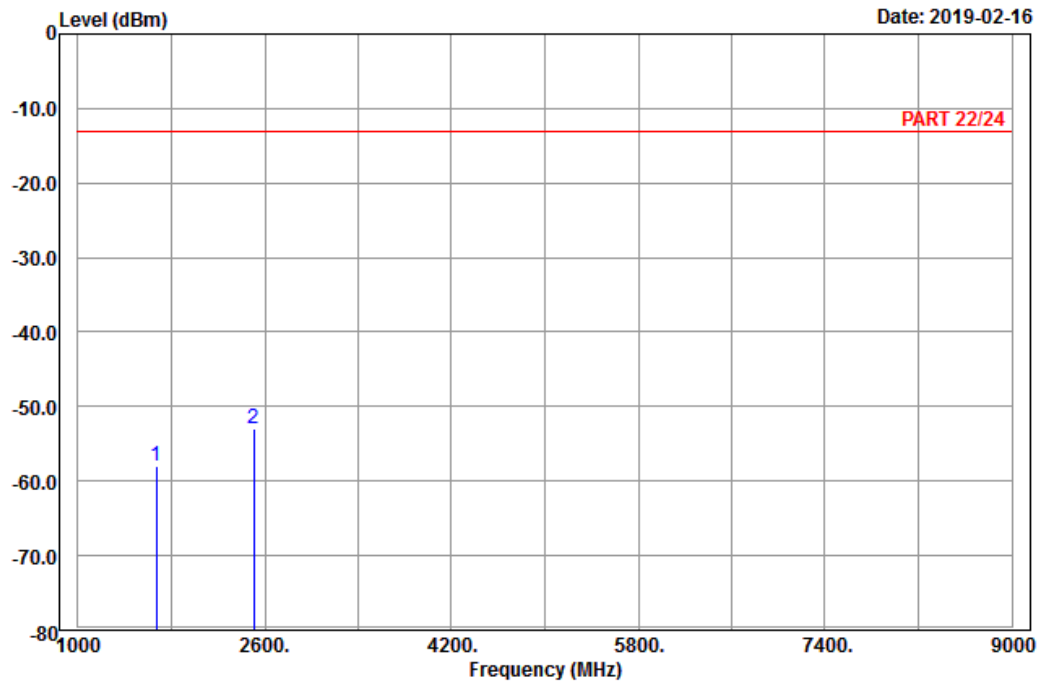
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : EDGE 850\_Link\_CH189  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1672.80	-58.02	-65.93	-13.00	-45.02	7.91	Peak
2	2509.20	-53.06	-64.34	-13.00	-40.06	11.28	Peak

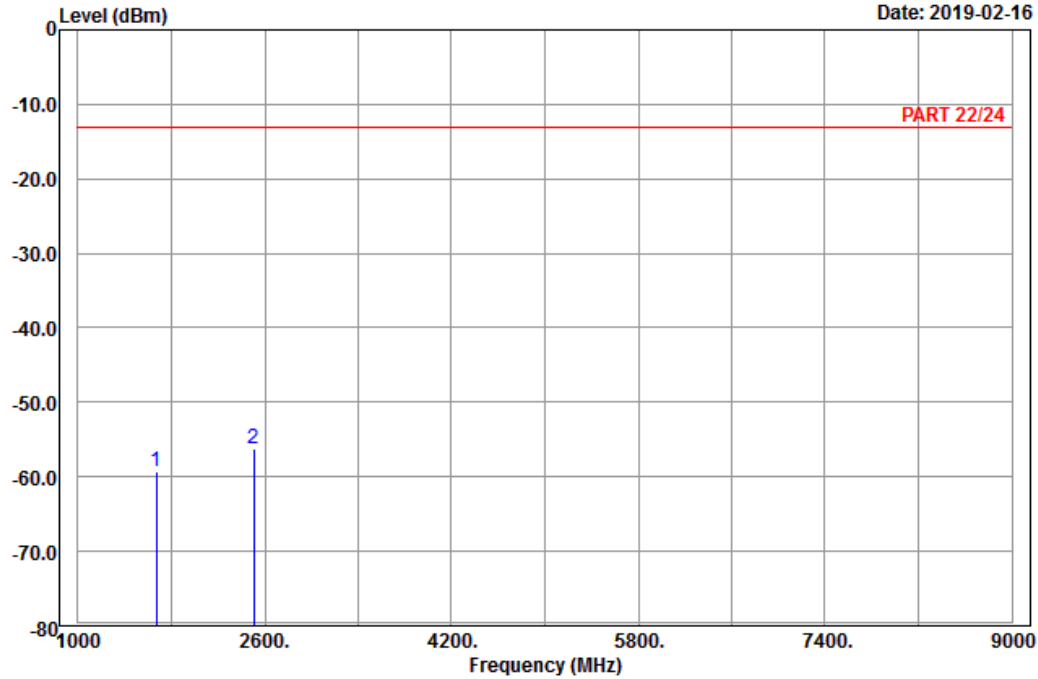


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : EDGE 850\_Link\_CH189  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1672.80	-59.37	-67.28	-13.00	-46.37	7.91	Peak
2 pp	2509.20	-56.22	-67.50	-13.00	-43.22	11.28	Peak

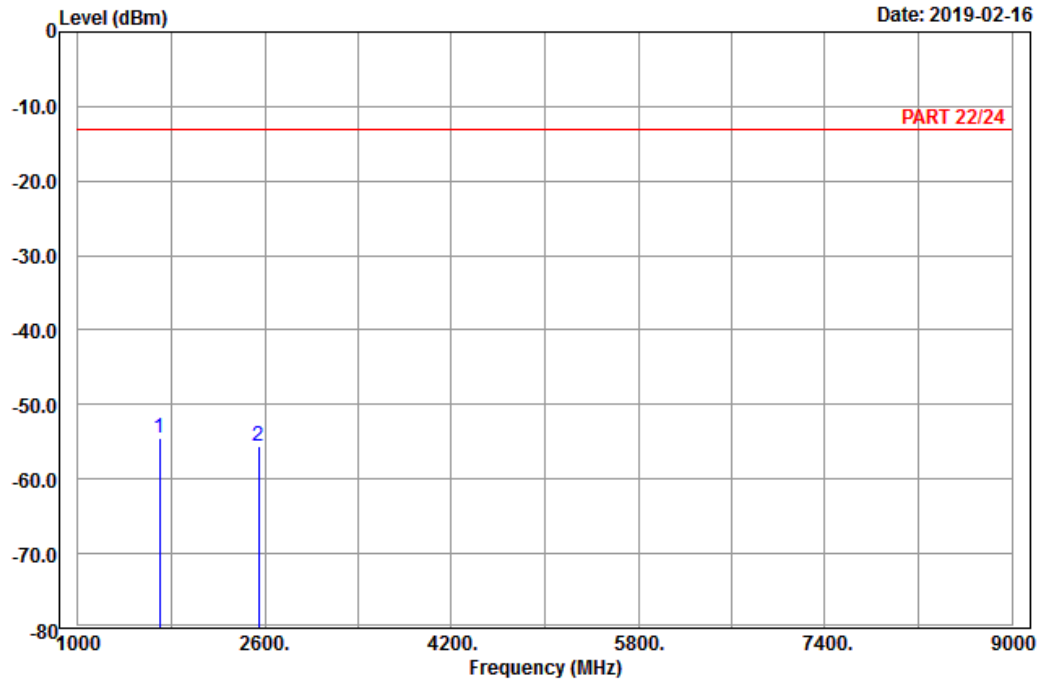
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : EDGE 850\_Link\_CH251  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1697.60	-54.50	-62.64	-13.00	-41.50	8.14	Peak
2	2546.40	-55.61	-67.08	-13.00	-42.61	11.47	Peak

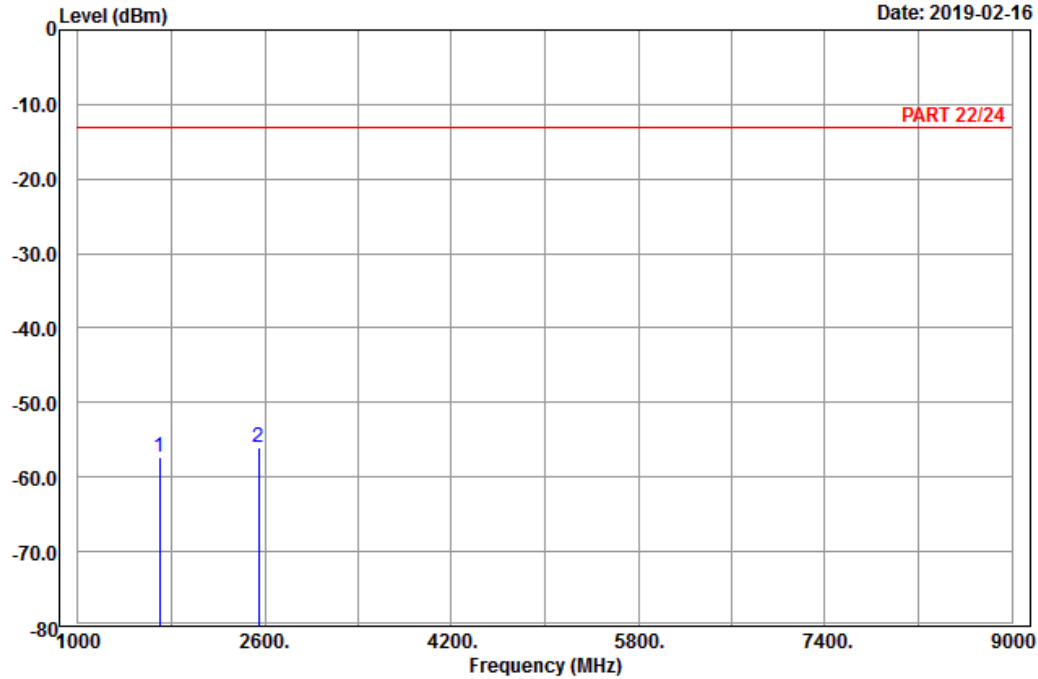


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2019-02-16



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : EDGE 850\_Link\_CH251  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1697.60	-57.39	-65.53	-13.00	-44.39	8.14	Peak
2 pp	2546.40	-56.11	-67.58	-13.00	-43.11	11.47	Peak

WCDMA:  
Low Channel

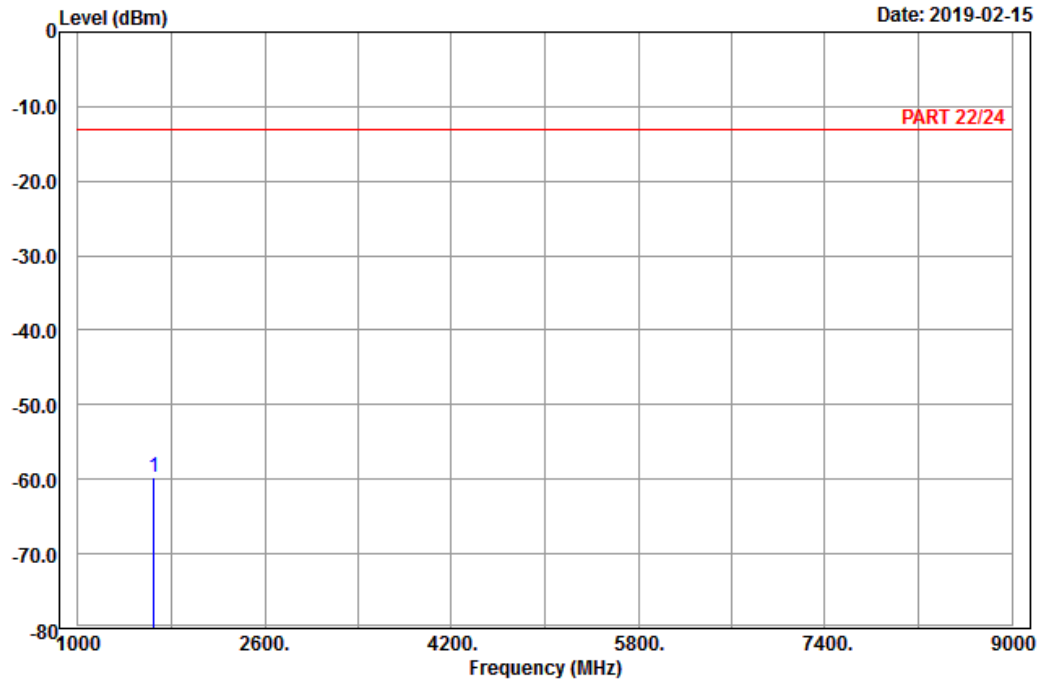


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2019-02-15



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : Band V\_Link\_CH4132  
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1652.80	-59.66	-67.39	-13.00	-46.66	7.73	Peak



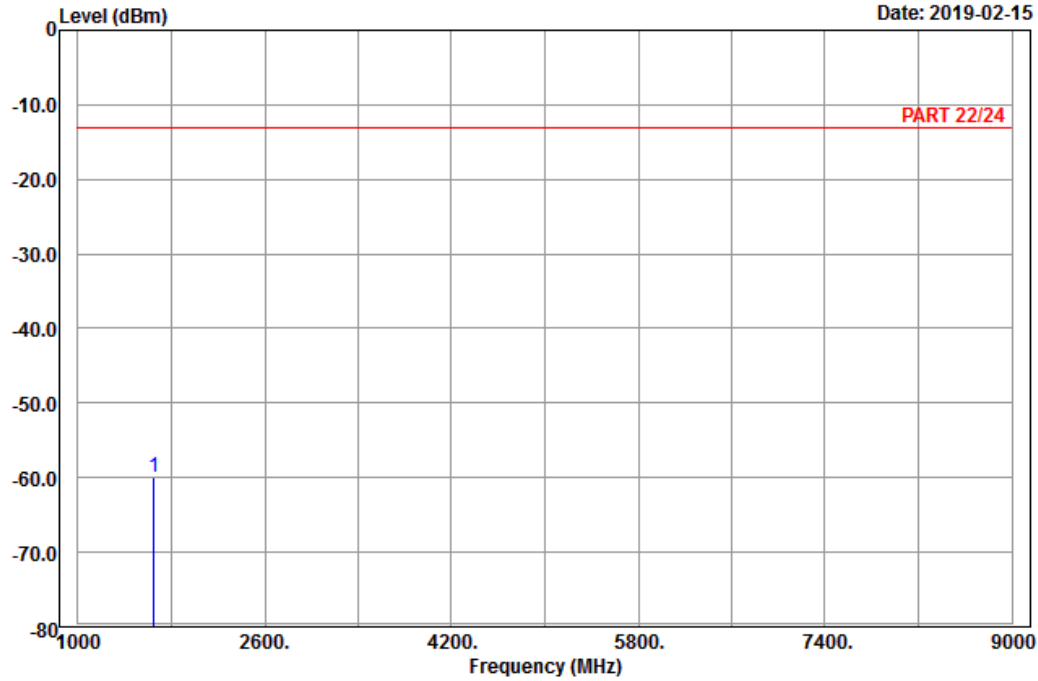


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A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4132  
 Tested by: Karl Lee

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1652.80	-60.02	-67.75	-13.00	-47.02	7.73 Peak

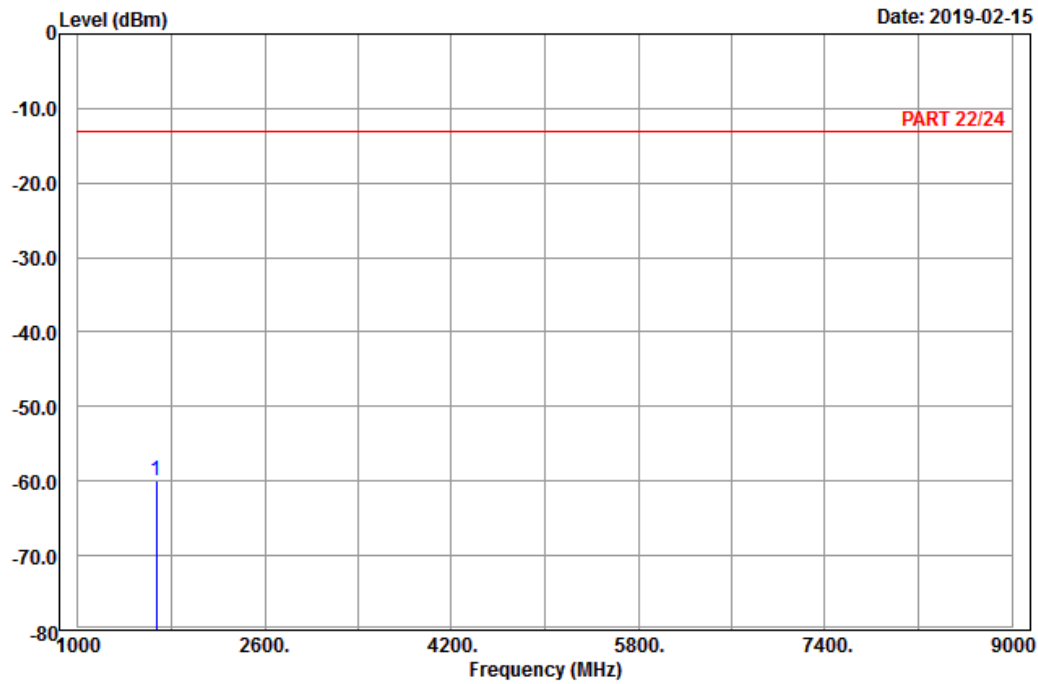
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : Band V\_Link\_CH4182  
 Tested by: Karl Lee

Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-60.05	-67.96	-13.00	-47.05	7.91	Peak

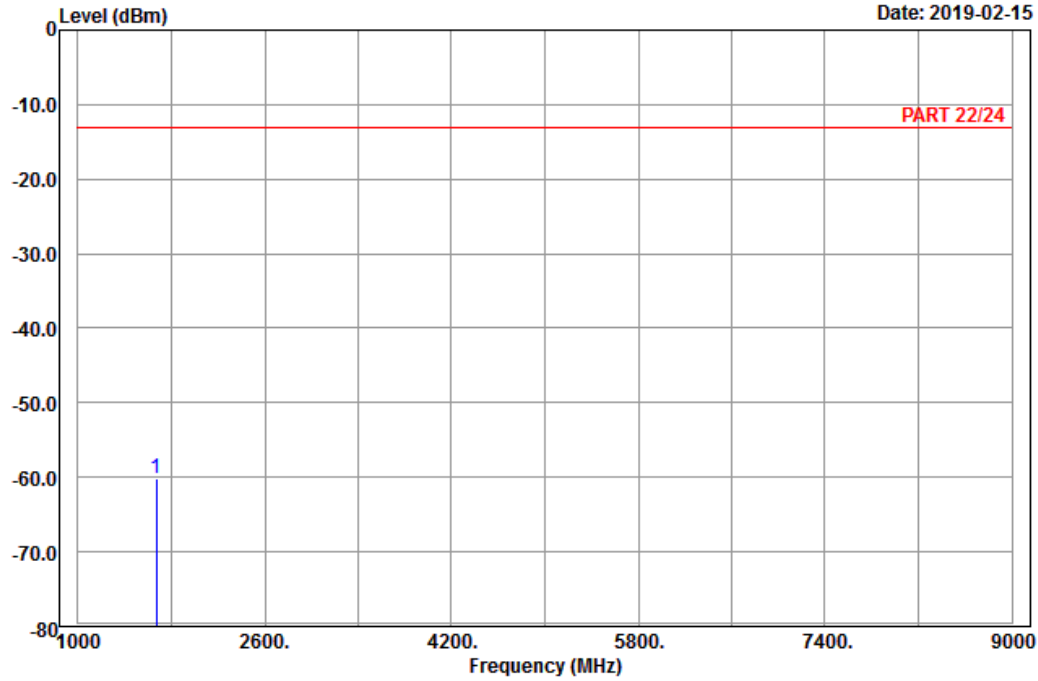


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4182  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1672.80	-60.07	-67.98	-13.00	-47.07	7.91	Peak

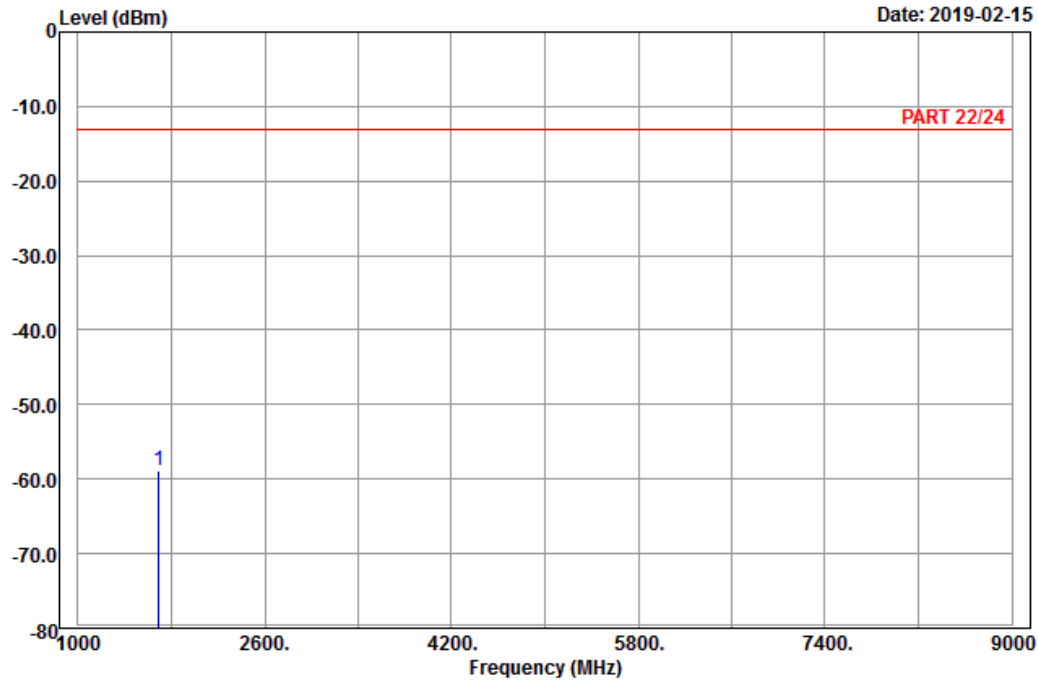
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : Band V\_Link\_CH4233  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1693.20	-58.81	-66.95	-13.00	-45.81	8.14	Peak

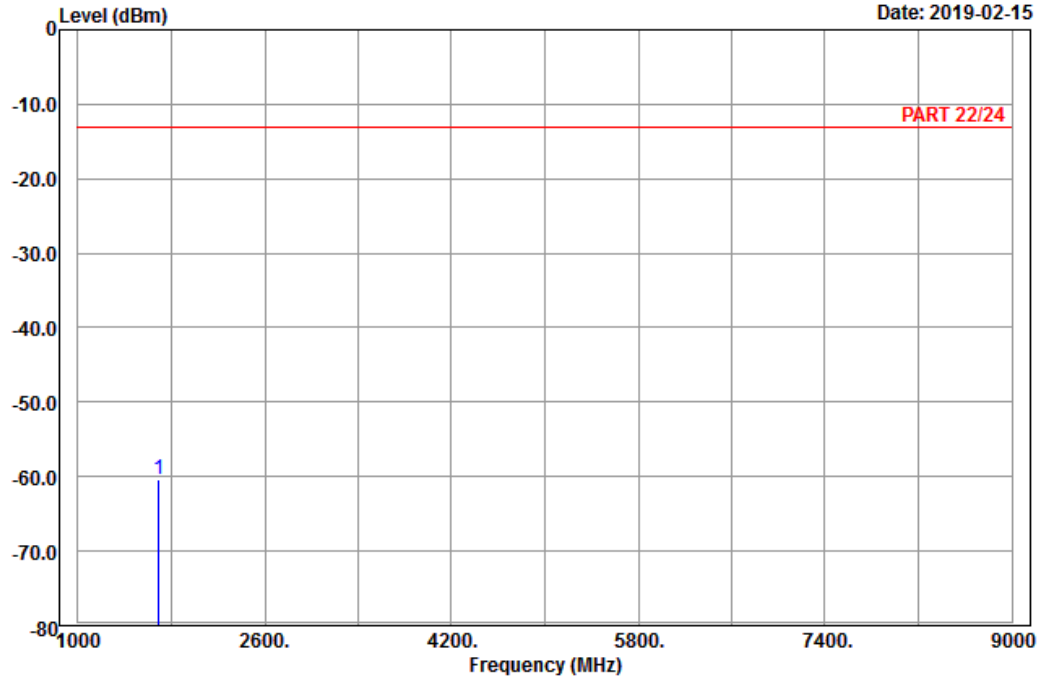


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : Band V\_Link\_CH4233  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1693.20	-60.28	-68.42	-13.00	-47.28	8.14	Peak

LTE Band 5  
 Channel Bandwidth: 1.4 MHz / QPSK  
 Low Channel

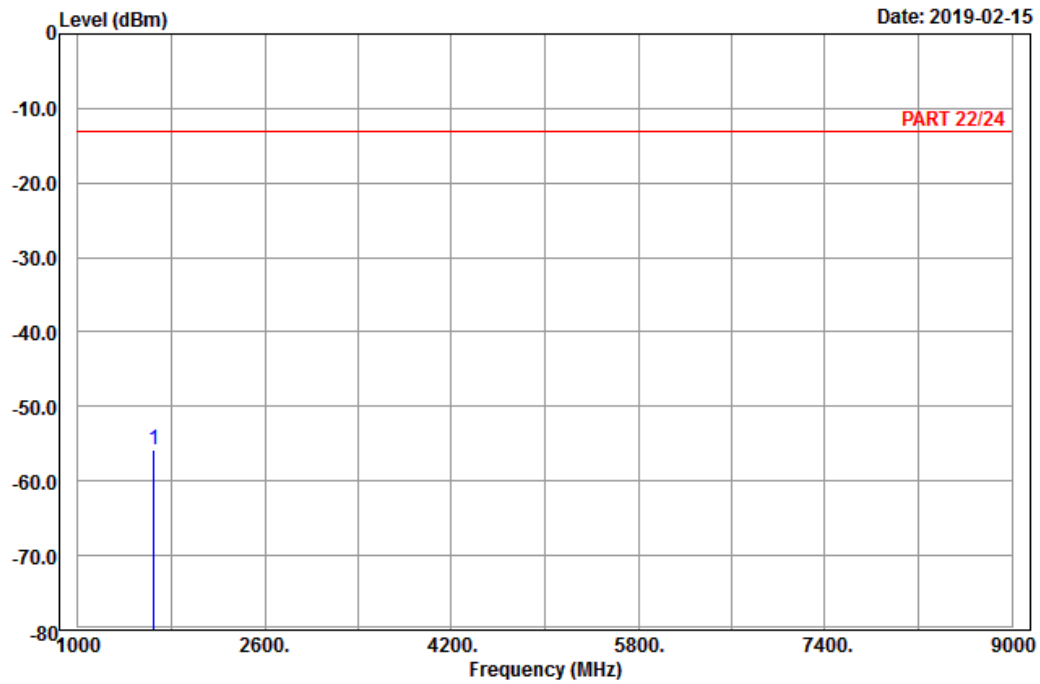


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20407  
 Tested by: Harry Hsueh

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1649.40	-55.77	-63.50	-13.00	-42.77	7.73 Peak

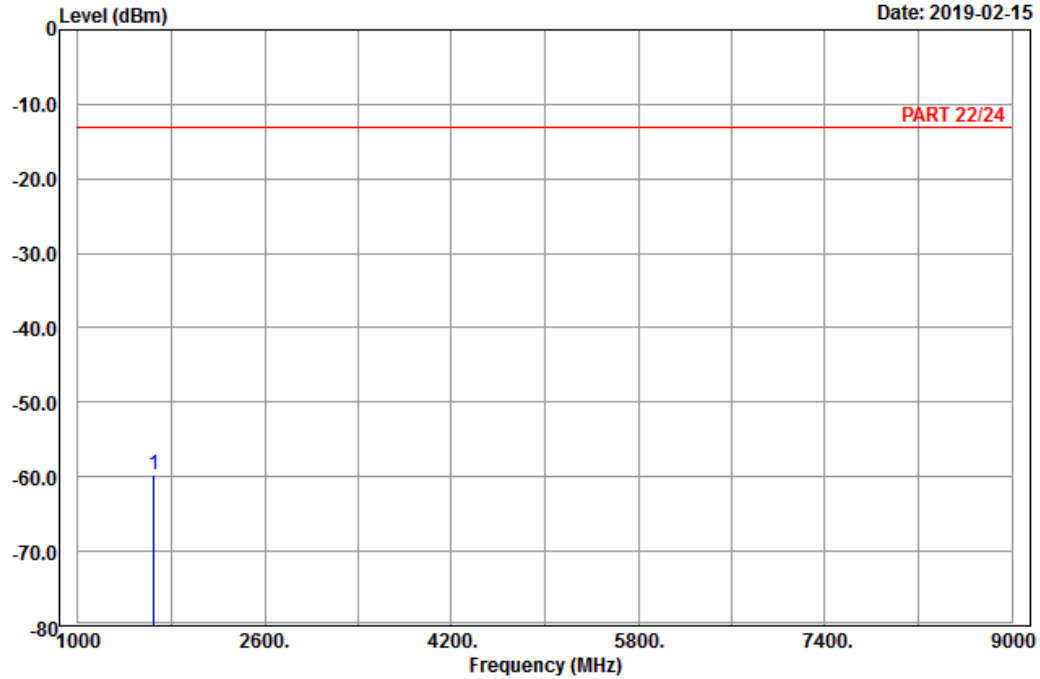


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20407  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1649.40	-59.76	-67.49	-13.00	-46.76	7.73	Peak

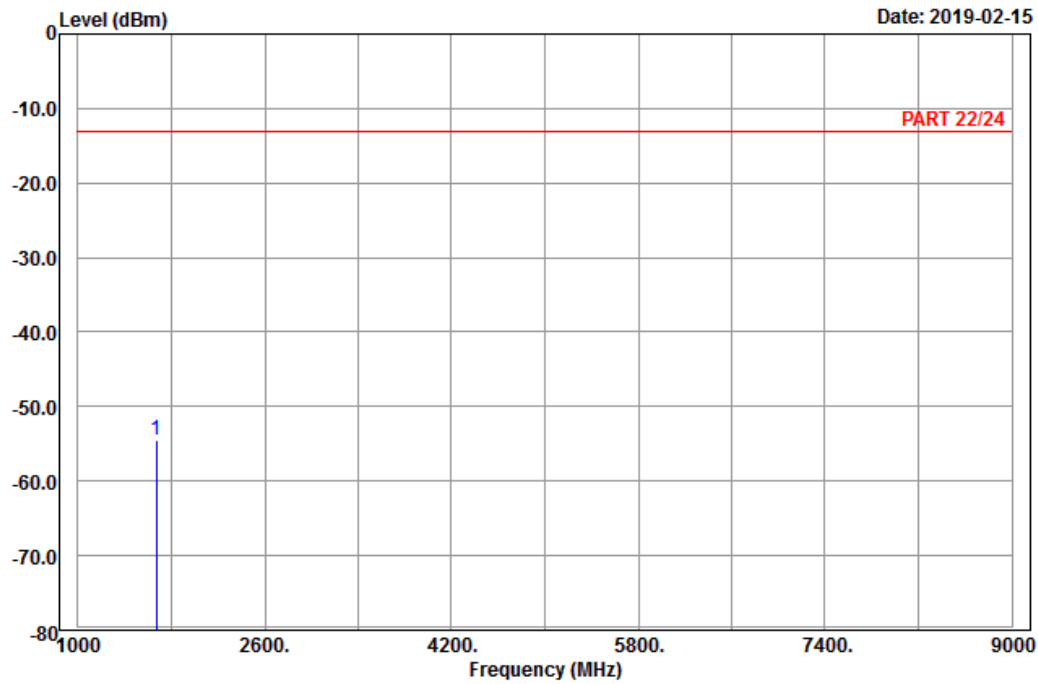
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Harry Hsueh

Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-54.46	-62.37	-13.00	-41.46	7.91	Peak



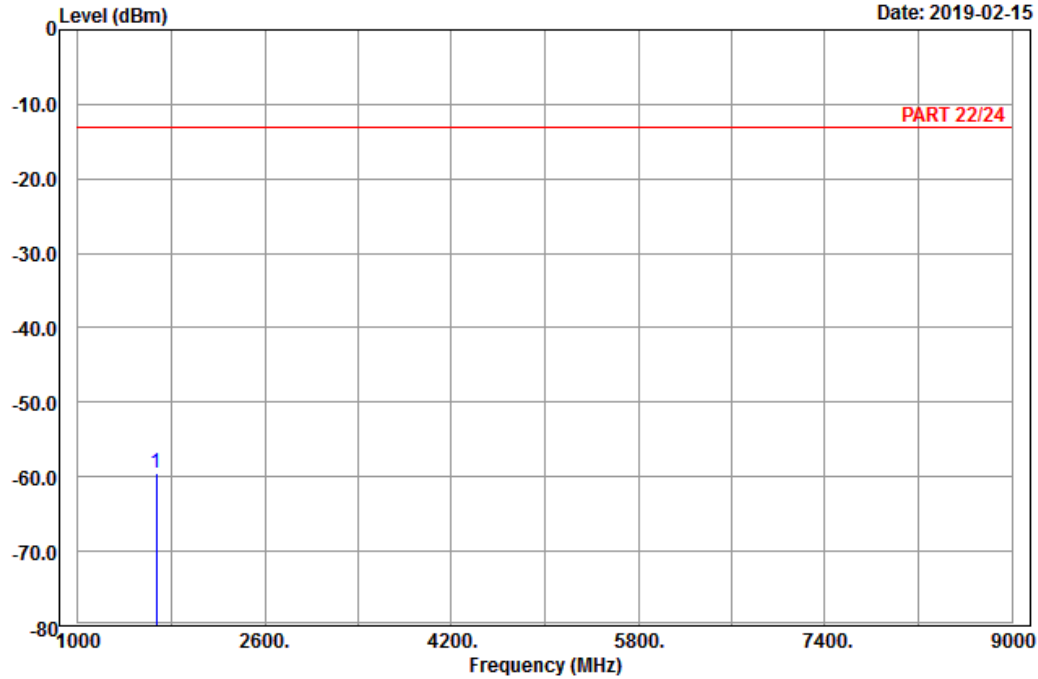


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-59.60	-67.51	-13.00	-46.60	7.91	Peak

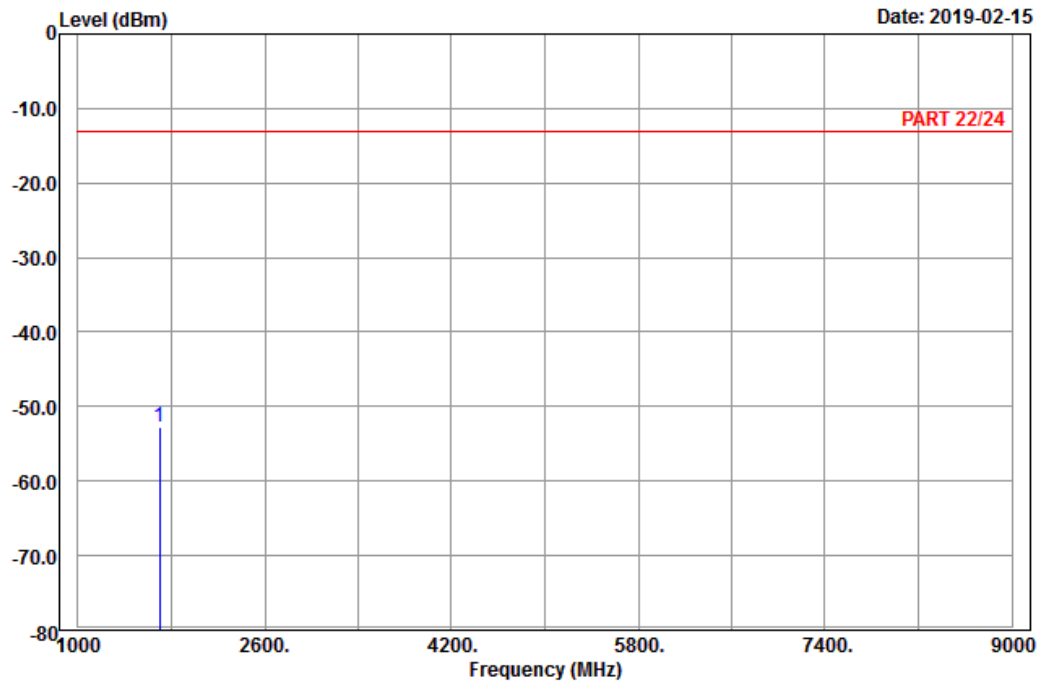
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20643  
 Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit	Over	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1696.60	-52.67	-60.81	-13.00	-39.67	8.14	Peak

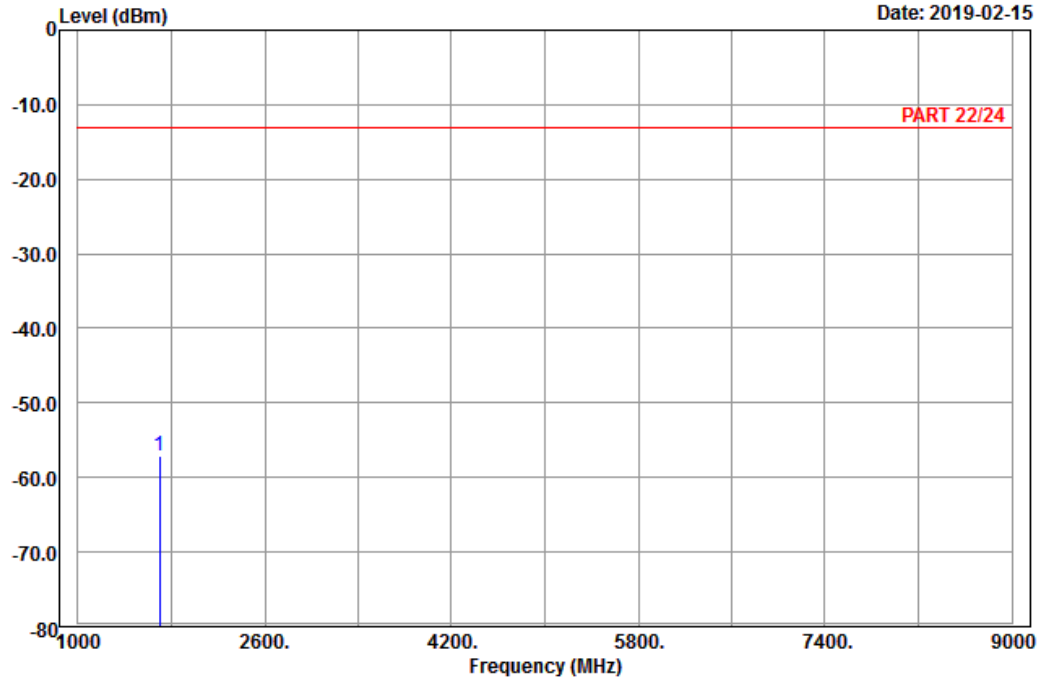


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20643  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1696.60	-57.04	-65.18	-13.00	-44.04	8.14	Peak

Channel Bandwidth: 5 MHz / QPSK  
 Low Channel

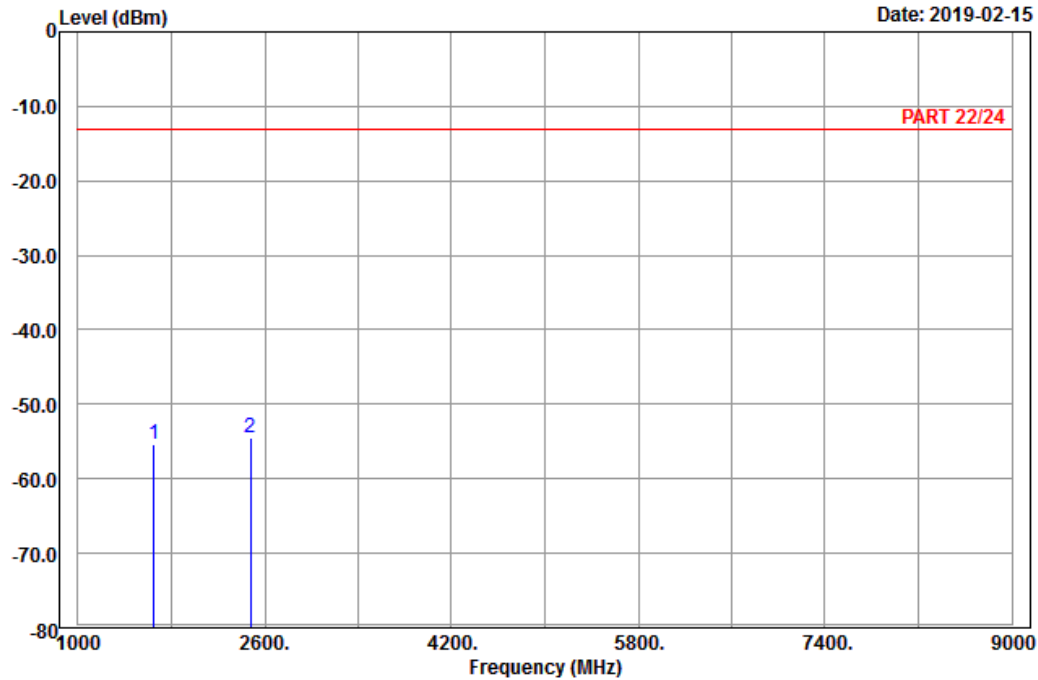


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20425  
 Tested by: Harry Hsueh

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1653.00	-55.44	-63.17	-13.00	-42.44	7.73	Peak
2	pp 2479.50	-54.49	-65.52	-13.00	-41.49	11.03	Peak

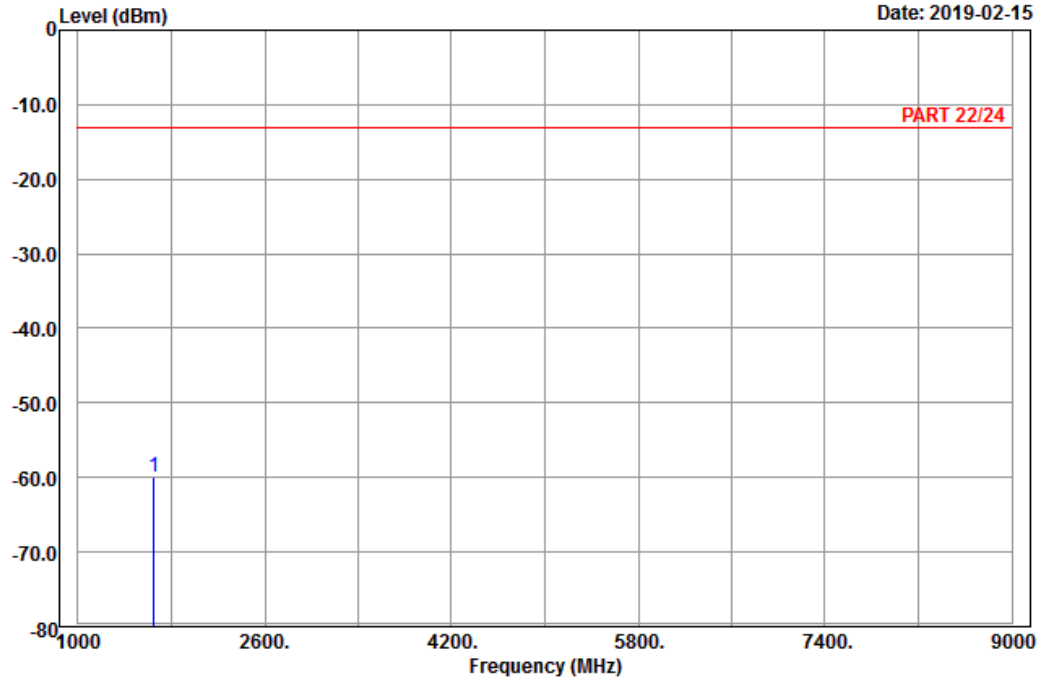


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20425  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1653.00	-59.94	-67.67	-13.00	-46.94	7.73	Peak

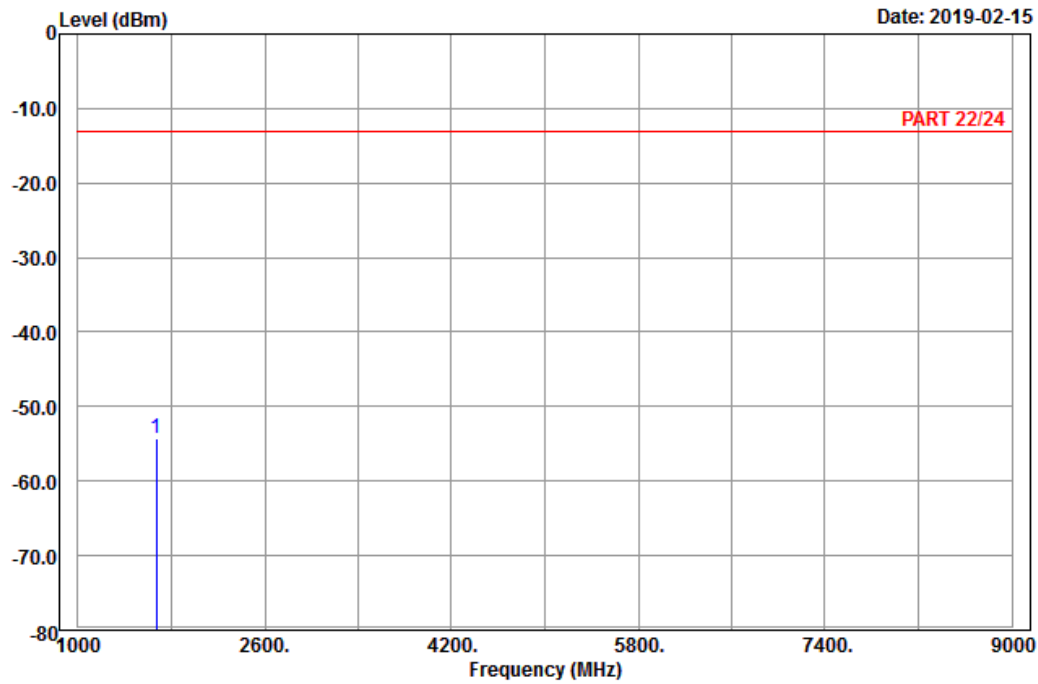
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Harry Hsueh

Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-54.22	-62.13	-13.00	-41.22	7.91	Peak

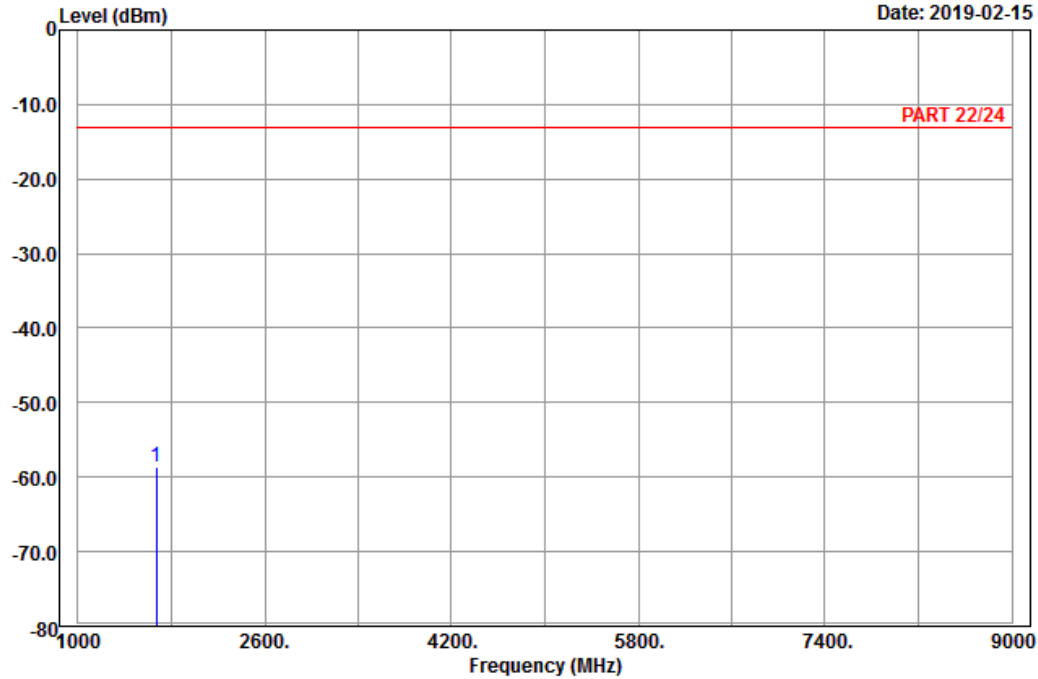


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-58.61	-66.52	-13.00	-45.61	7.91	Peak

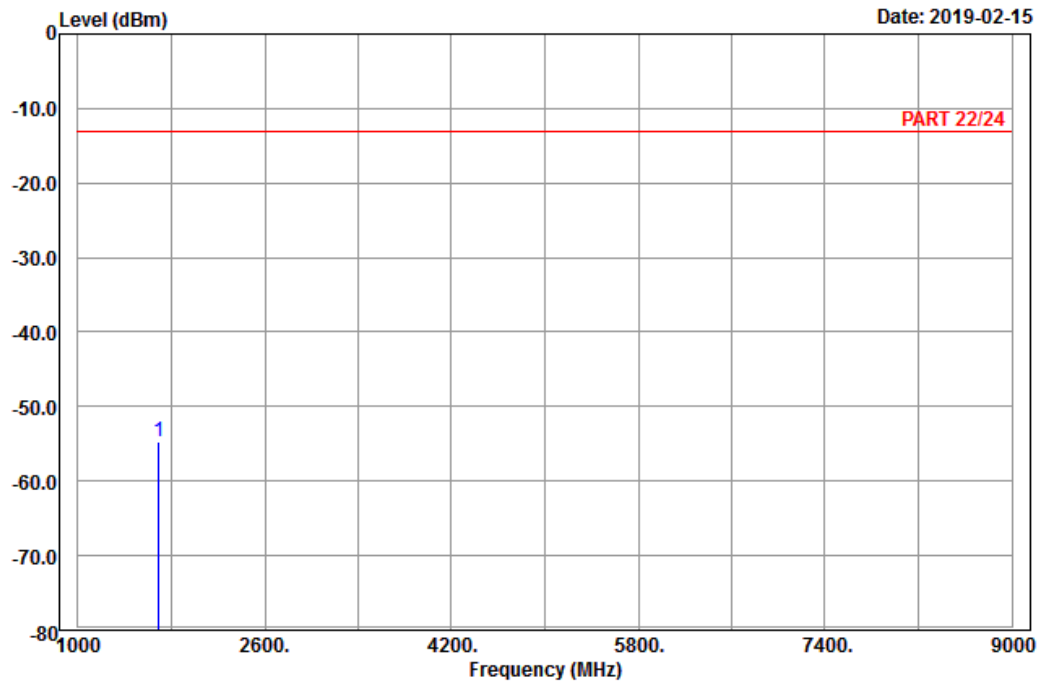
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20625  
 Tested by: Harry Hsueh

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1693.00	-54.82	-62.84	-13.00	-41.82	8.02 Peak



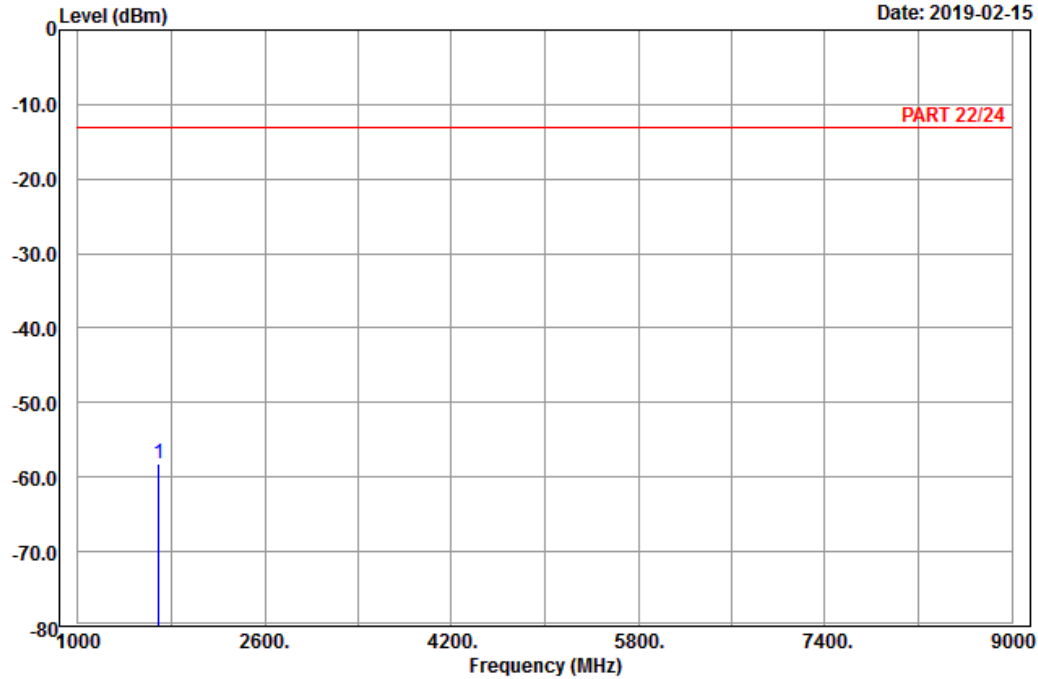


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20625  
 Tested by: Harry Hsueh

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.00	-58.22	-66.24	-13.00	-45.22	8.02	Peak

Channel Bandwidth: 10 MHz / QPSK  
Low Channel

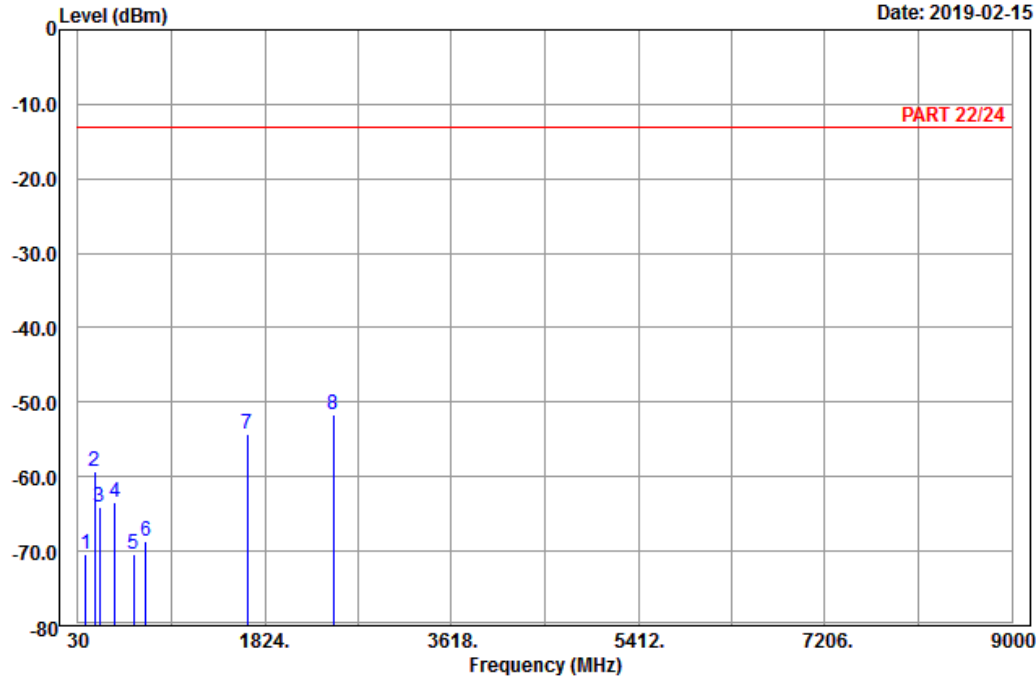


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9

Date: 2019-02-15



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 5\_Link\_CH20450  
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	103.98	-70.42	-60.77	-13.00	-57.42	-9.65	Peak
2	190.92	-59.25	-53.47	-13.00	-46.25	-5.78	Peak
3	236.28	-64.12	-58.43	-13.00	-51.12	-5.69	Peak
4	383.30	-63.50	-59.88	-13.00	-50.50	-3.62	Peak
5	566.70	-70.35	-69.37	-13.00	-57.35	-0.98	Peak
6	678.00	-68.75	-68.48	-13.00	-55.75	-0.27	Peak
7	1658.00	-54.28	-62.19	-13.00	-41.28	7.91	Peak
8 pp	2487.00	-51.57	-62.61	-13.00	-38.57	11.04	Peak

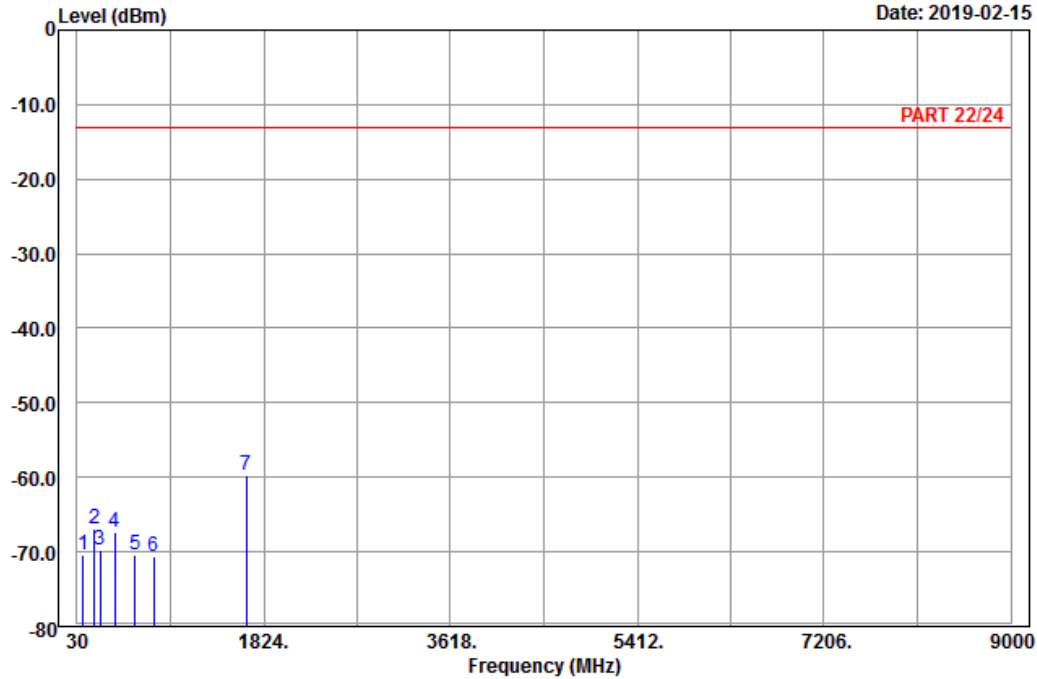


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20450  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	86.70	-70.30	-59.19	-13.00	-57.30	-11.11	Peak
2	194.97	-66.87	-60.91	-13.00	-53.87	-5.96	Peak
3	255.18	-69.65	-64.10	-13.00	-56.65	-5.55	Peak
4	391.70	-67.26	-64.11	-13.00	-54.26	-3.15	Peak
5	584.20	-70.42	-70.16	-13.00	-57.42	-0.26	Peak
6	770.40	-70.55	-70.58	-13.00	-57.55	0.03	Peak
7 pp	1658.00	-59.78	-67.69	-13.00	-46.78	7.91	Peak

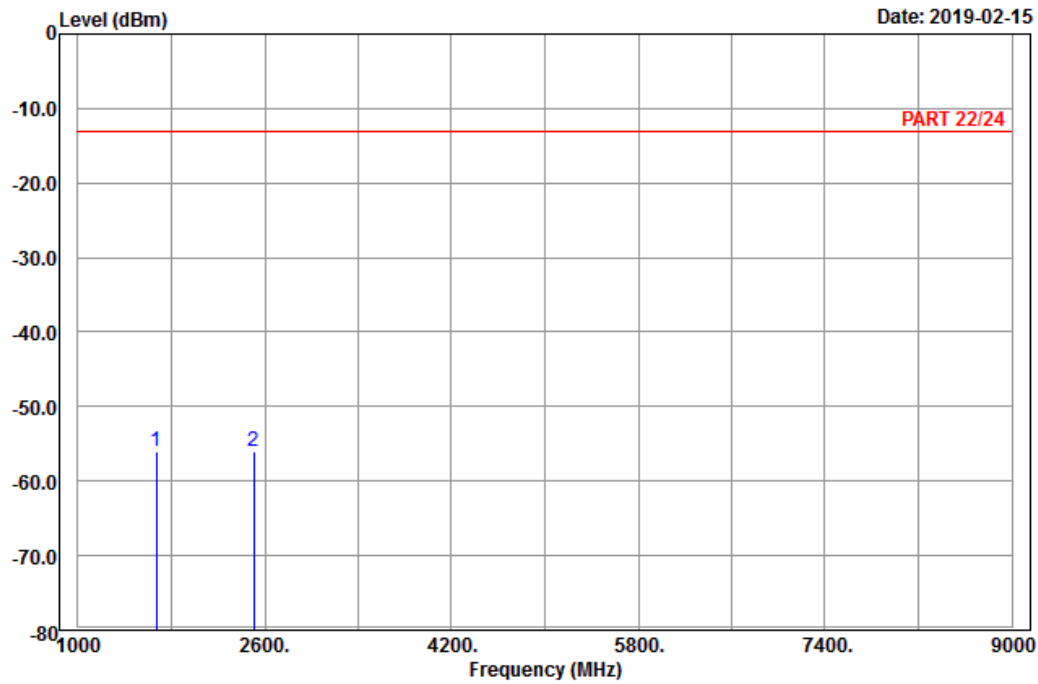
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1673.00	-55.92	-63.83	-13.00	-42.92	7.91	Peak
2	2509.50	-56.12	-67.40	-13.00	-43.12	11.28	Peak

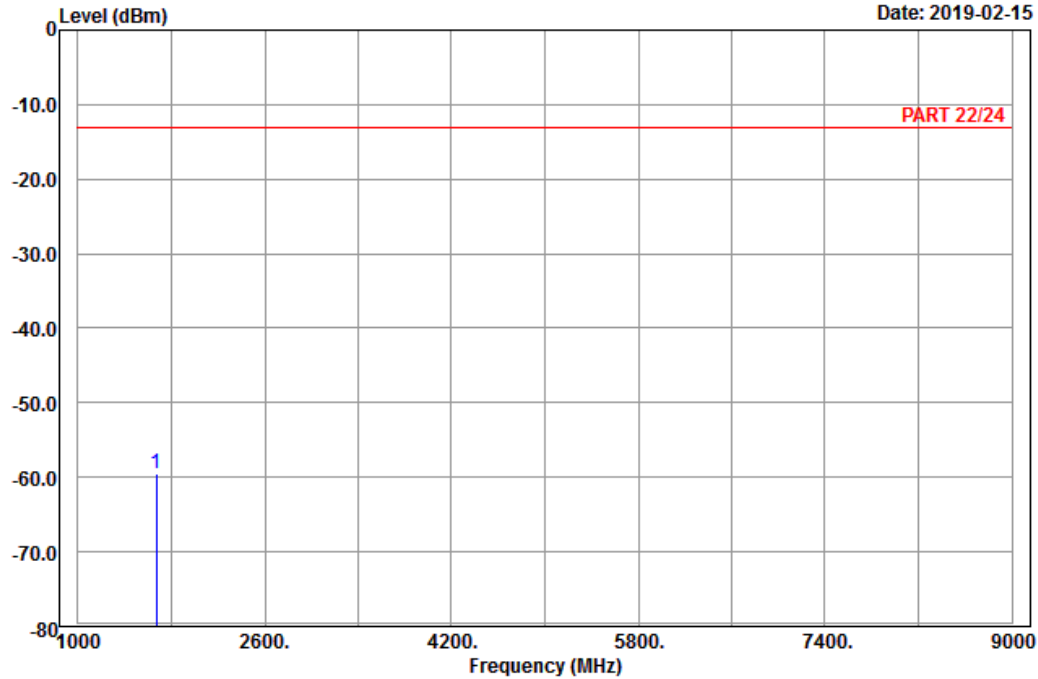


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20525  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-59.42	-67.33	-13.00	-46.42	7.91	Peak

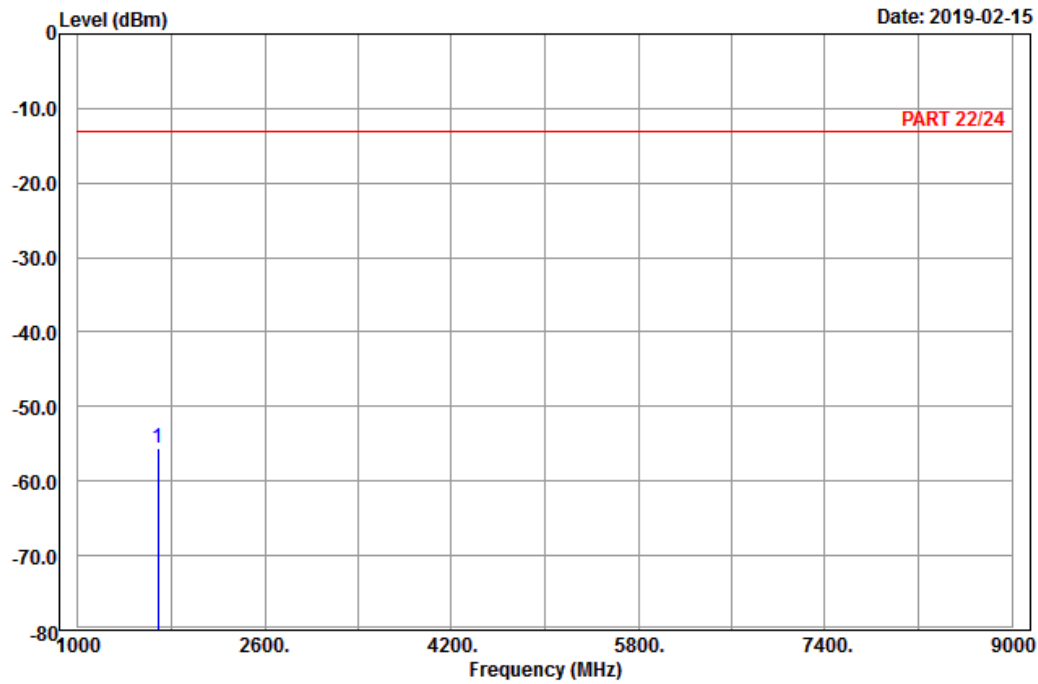
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 5\_Link\_CH20600  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1688.00	-55.62	-63.64	-13.00	-42.62	8.02	Peak

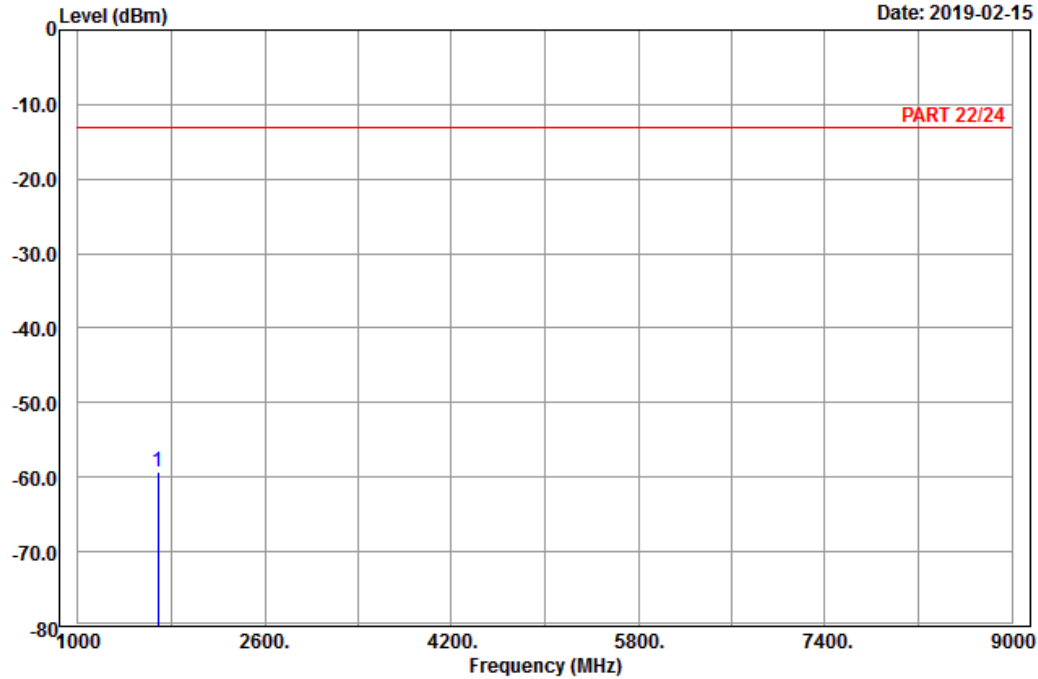


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 5\_Link\_CH20600  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1688.00	-59.36	-67.38	-13.00	-46.36	8.02	Peak

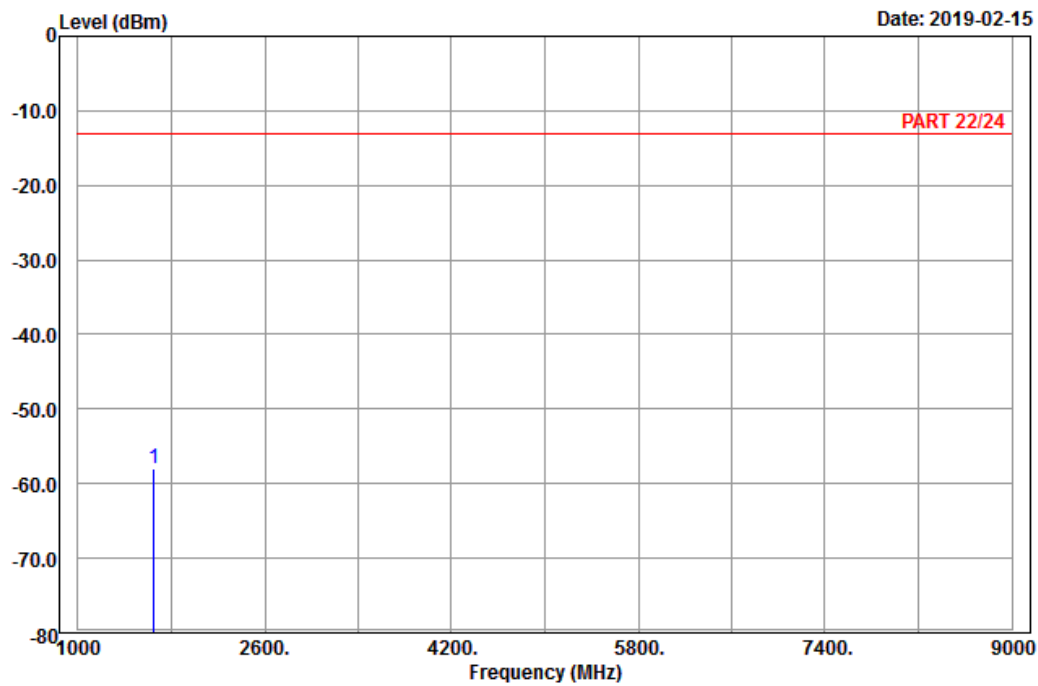
LTE Band 26  
 Channel Bandwidth: 1.4 MHz / QPSK  
 Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26797  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1649.40	-57.92	-65.65	-13.00	-44.92	7.73	Peak



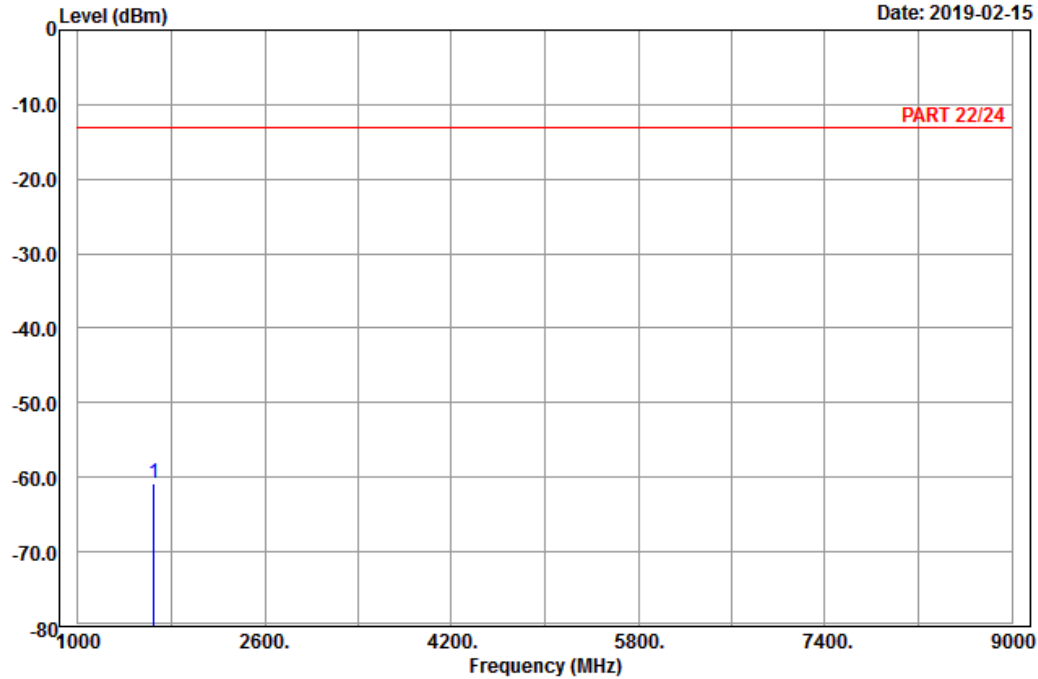


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26797  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1649.40	-60.82	-68.55	-13.00	-47.82	7.73	Peak

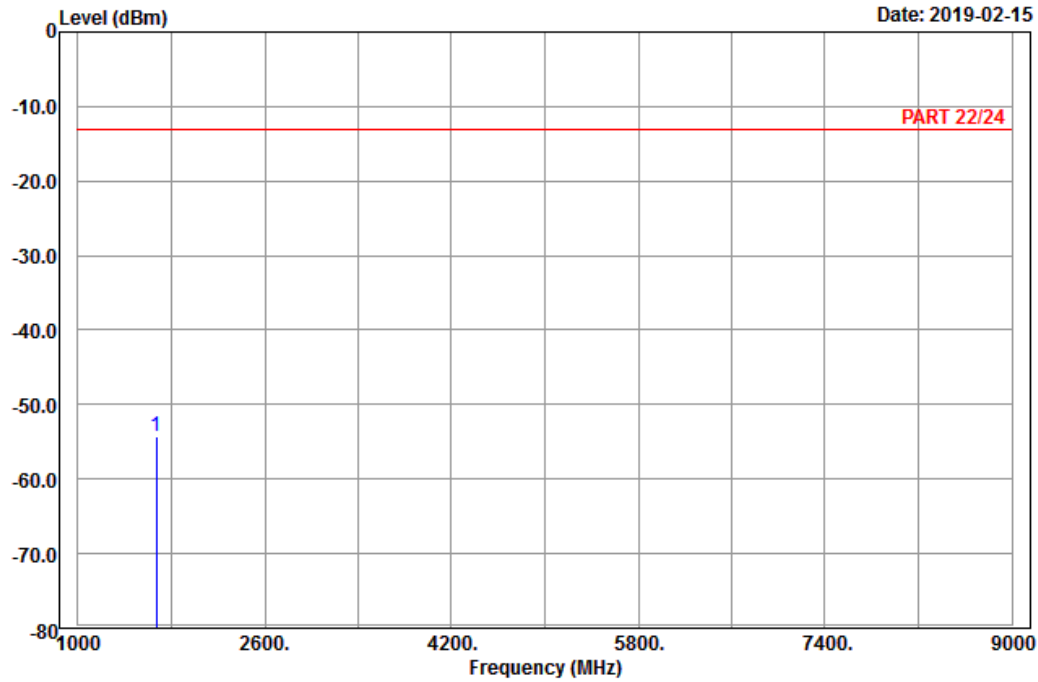
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1673.00	-54.17	-62.08	-13.00	-41.17	7.91	Peak

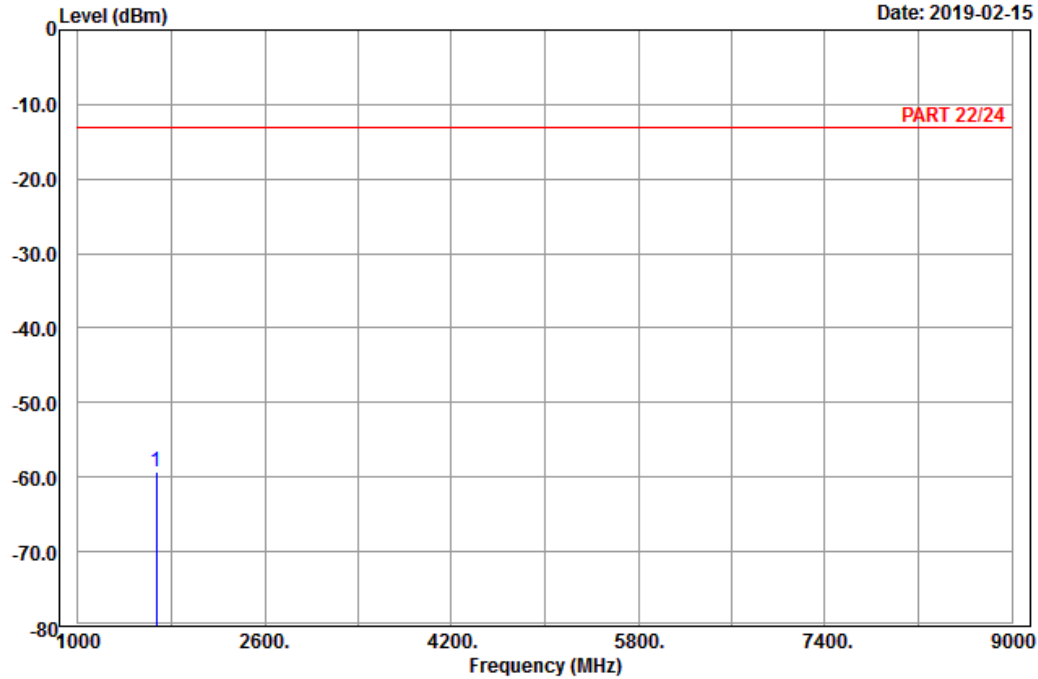


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-59.22	-67.13	-13.00	-46.22	7.91	Peak

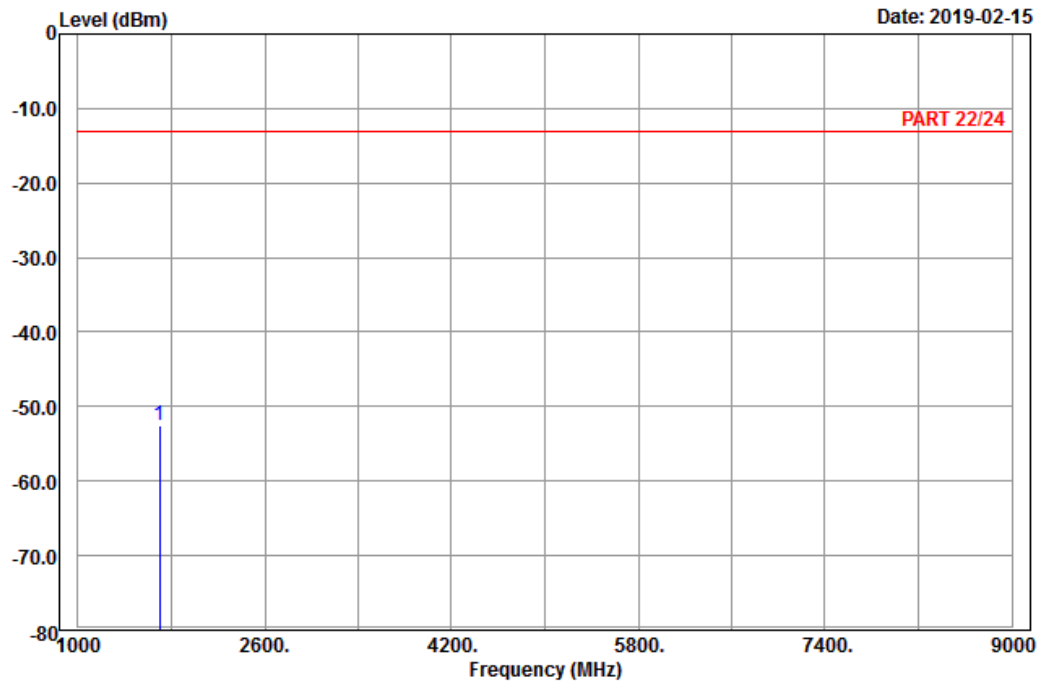
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH27033  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1696.60	-52.62	-60.76	-13.00	-39.62	8.14	Peak

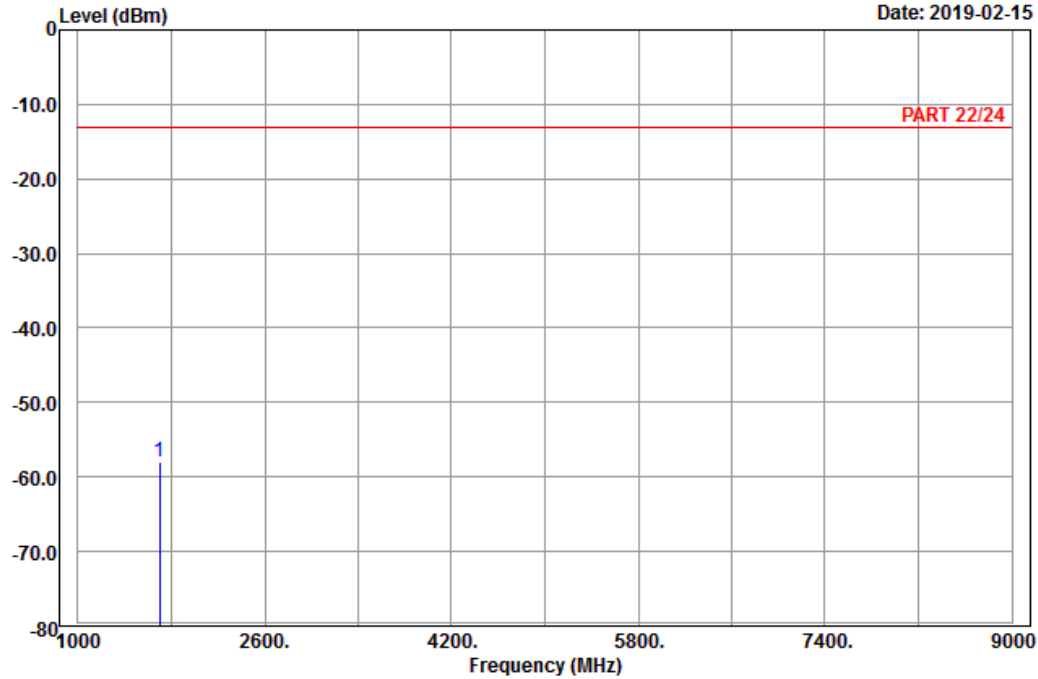


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH27033  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1696.60	-57.98	-66.12	-13.00	-44.98	8.14	Peak

Channel Bandwidth: 5 MHz / QPSK  
Low Channel

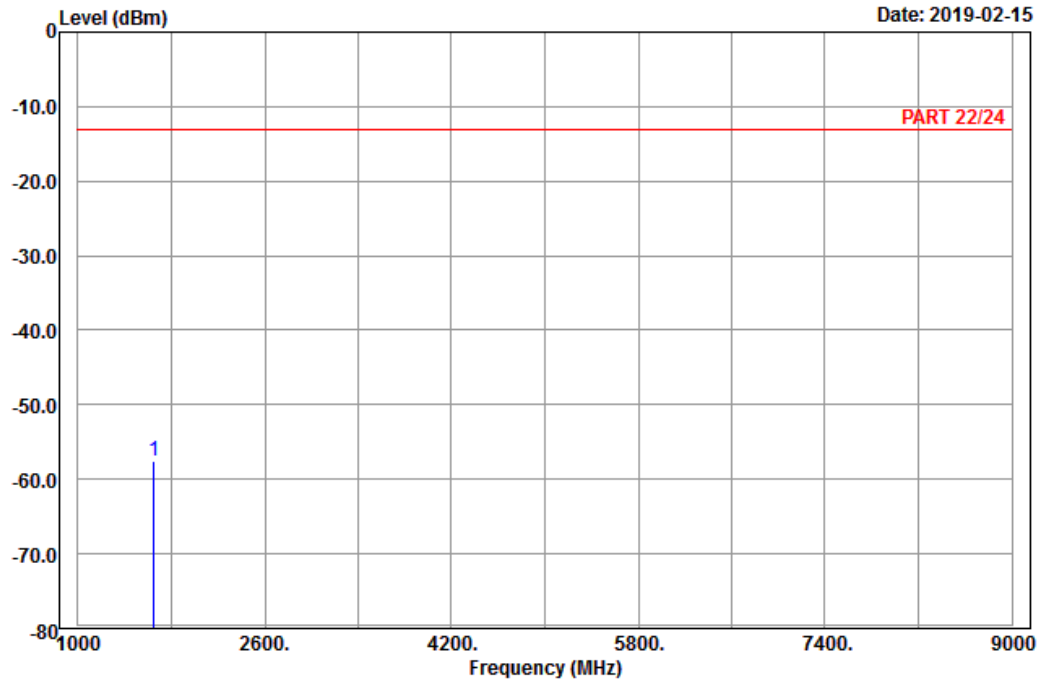


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2019-02-15



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26815  
Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1653.00	-57.57	-65.30	-13.00	-44.57	7.73	Peak

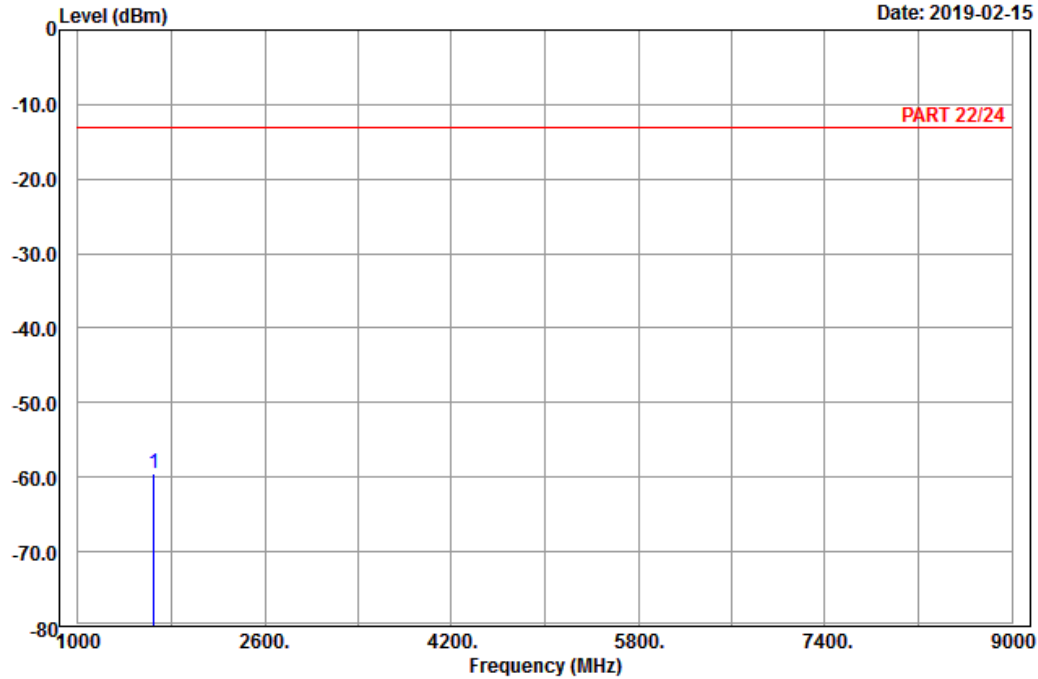


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26815  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1653.00	-59.45	-67.18	-13.00	-46.45	7.73	Peak

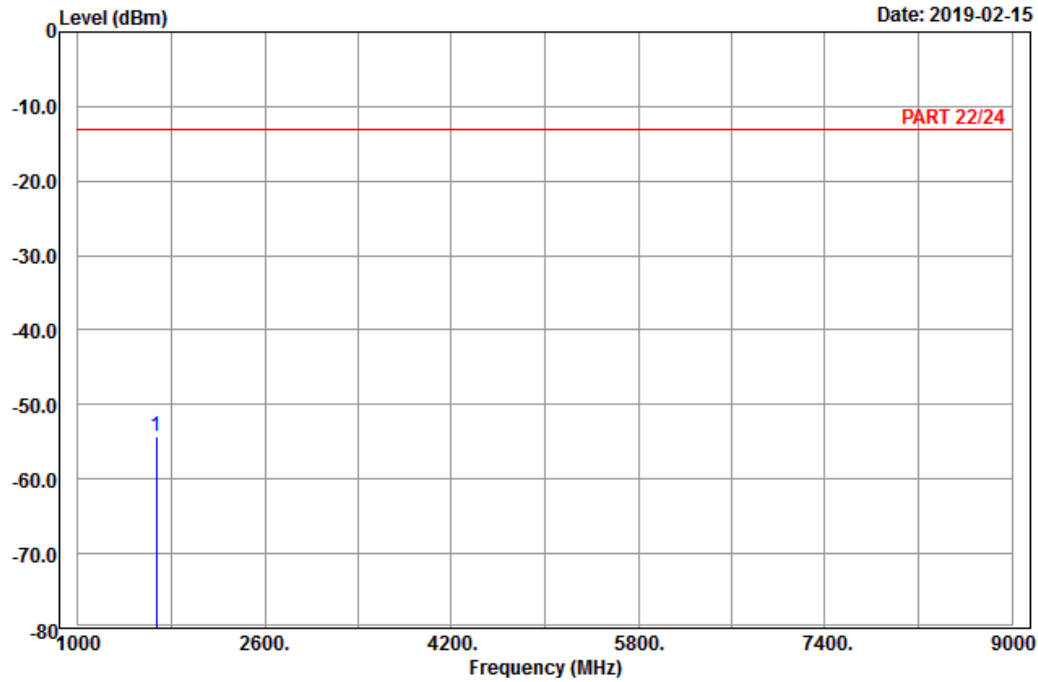
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-54.33	-62.24	-13.00	-41.33	7.91	Peak



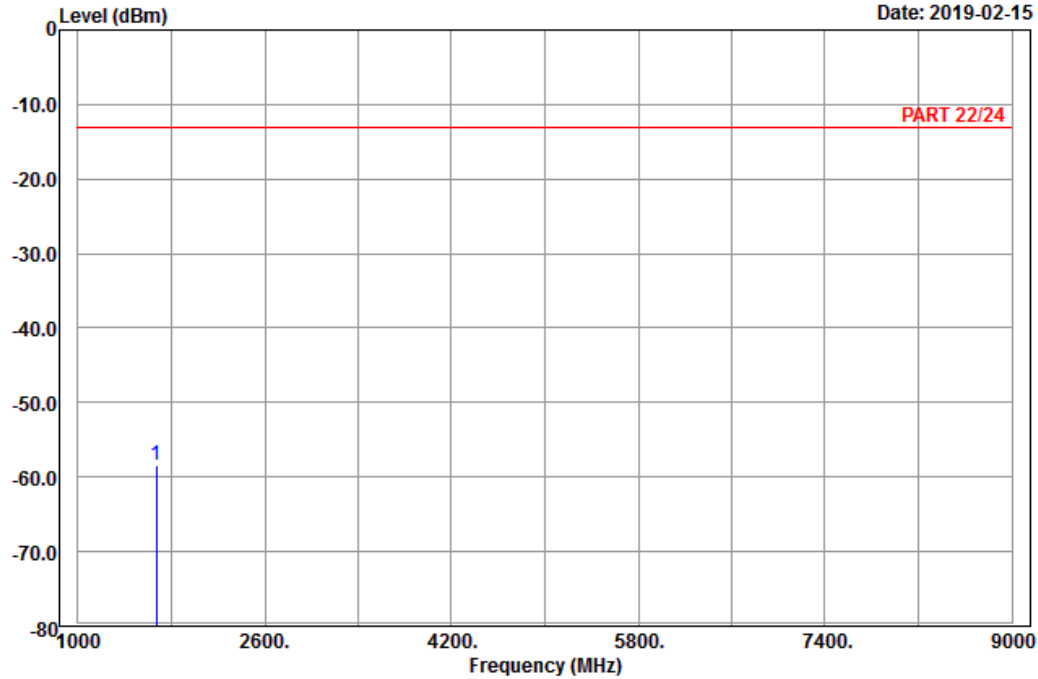


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1673.00	-58.51	-66.42	-13.00	-45.51	7.91	Peak

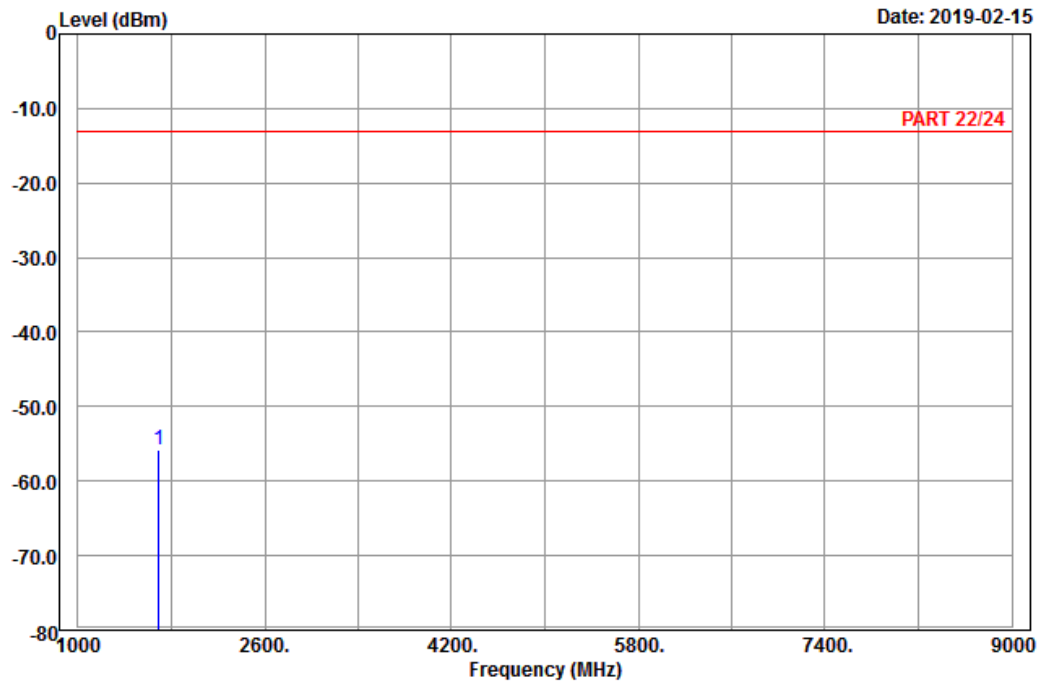
# High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH27015  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	pp 1693.00	-55.81	-63.83	-13.00	-42.81	8.02	Peak

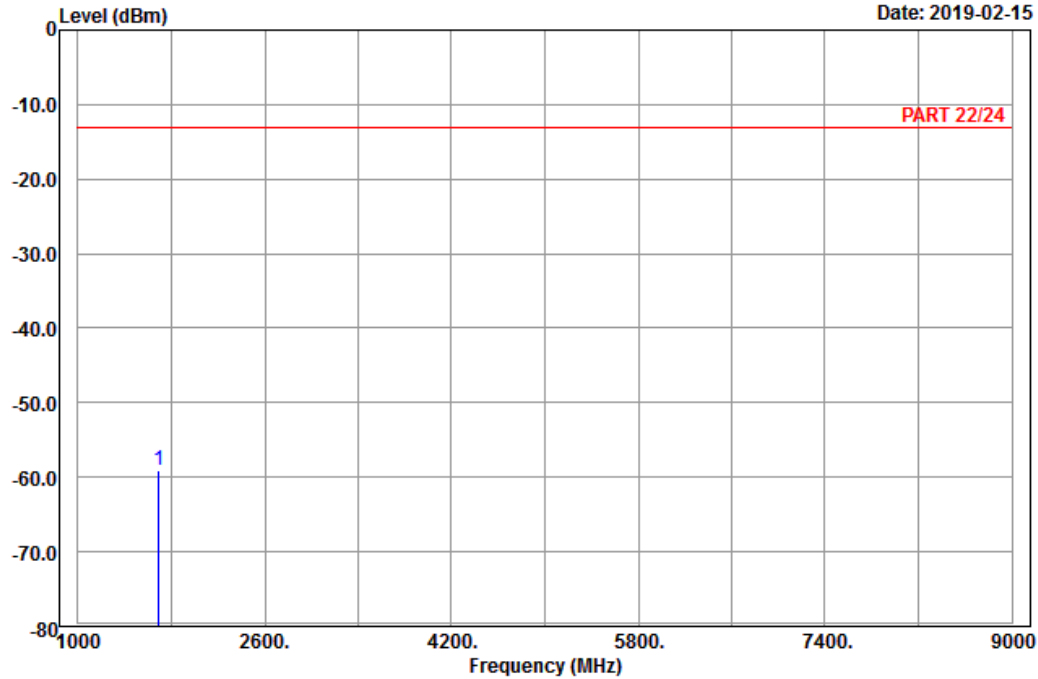


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH27015  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1693.00	-58.98	-67.00	-13.00	-45.98	8.02	Peak

Channel Bandwidth: 15 MHz / QPSK  
Low Channel

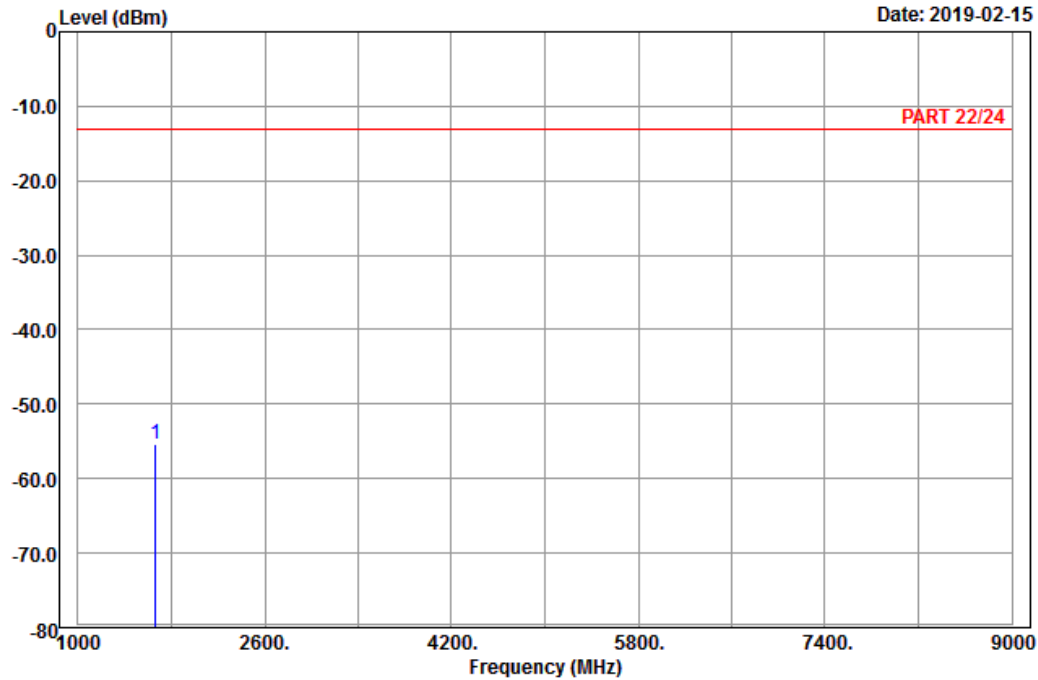


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5

Date: 2019-02-15



Site : 966 chamber 1  
Condition: PART 22/24 Horizontal  
Remark : LTE\_Band 26\_Link\_CH26865  
Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1663.00	-55.27	-63.18	-13.00	-42.27	7.91	Peak

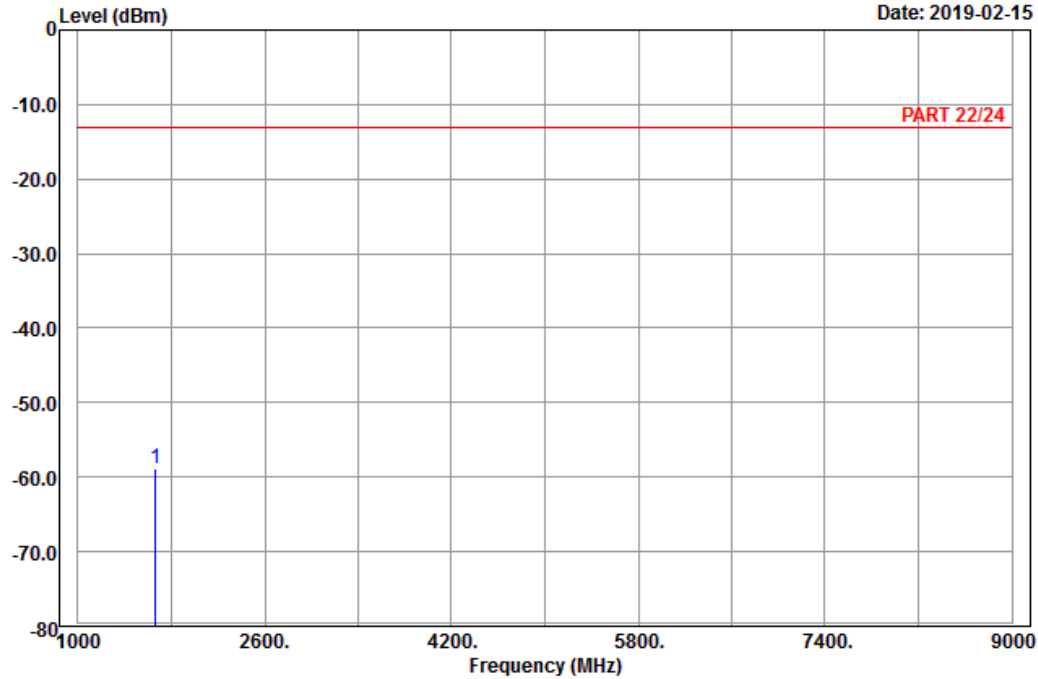


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26865  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 1663.00	-58.91	-66.82	-13.00	-45.91	7.91	Peak

Middle Channel

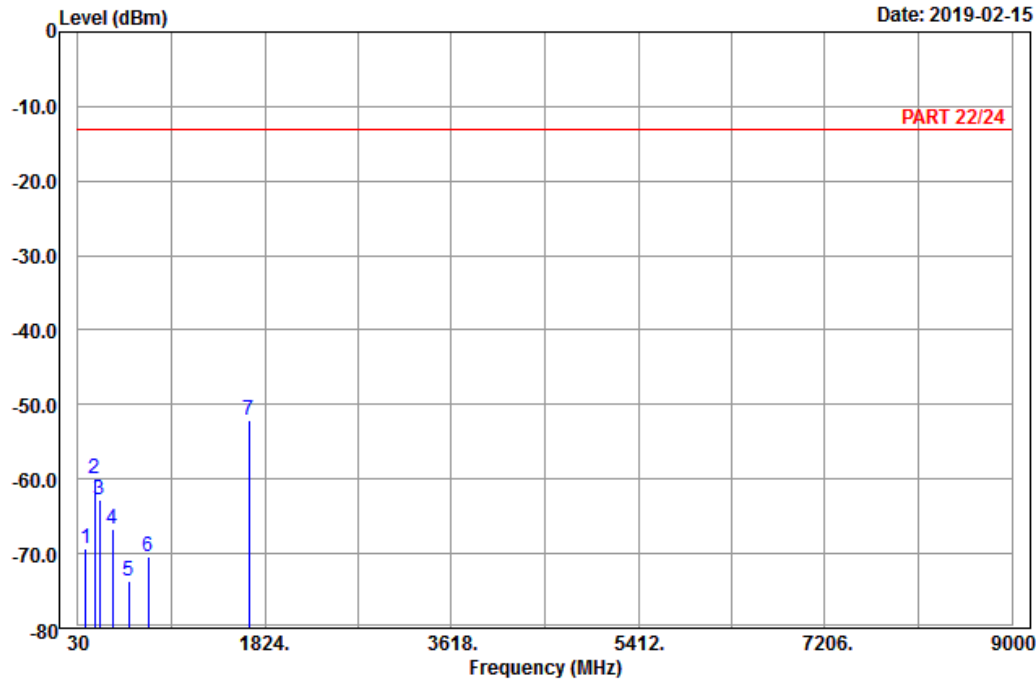


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

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Data: 9

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1	100.20	-69.38	-59.26	-13.00	-56.38	-10.12 Peak
2	192.54	-60.04	-54.17	-13.00	-47.04	-5.87 Peak
3	238.71	-62.77	-57.11	-13.00	-49.77	-5.66 Peak
4	358.10	-66.80	-61.84	-13.00	-53.80	-4.96 Peak
5	519.80	-73.79	-69.93	-13.00	-60.79	-3.86 Peak
6	705.30	-70.37	-69.90	-13.00	-57.37	-0.47 Peak
7 pp	1673.00	-52.04	-59.95	-13.00	-39.04	7.91 Peak

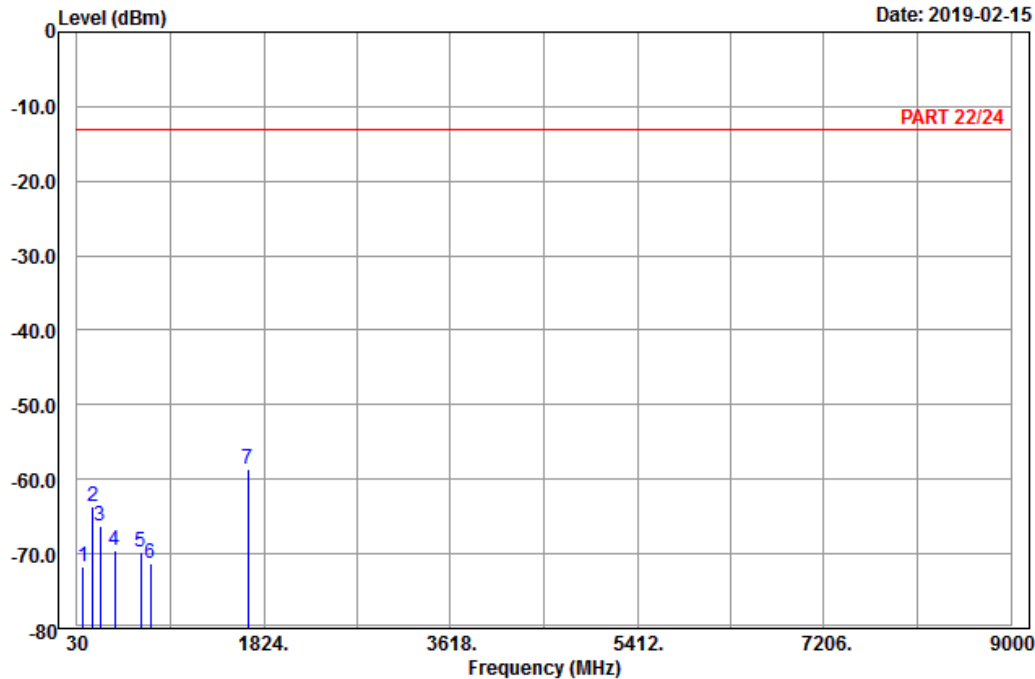


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Data: 10

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26915  
 Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	85.62	-71.62	-60.40	-13.00	-58.62	-11.22	Peak
2	179.58	-63.66	-57.98	-13.00	-50.66	-5.68	Peak
3	249.51	-66.18	-60.66	-13.00	-53.18	-5.52	Peak
4	393.80	-69.45	-66.40	-13.00	-56.45	-3.05	Peak
5	643.70	-69.66	-69.59	-13.00	-56.66	-0.07	Peak
6	735.40	-71.22	-70.18	-13.00	-58.22	-1.04	Peak
7 pp	1673.00	-58.71	-66.62	-13.00	-45.71	7.91	Peak

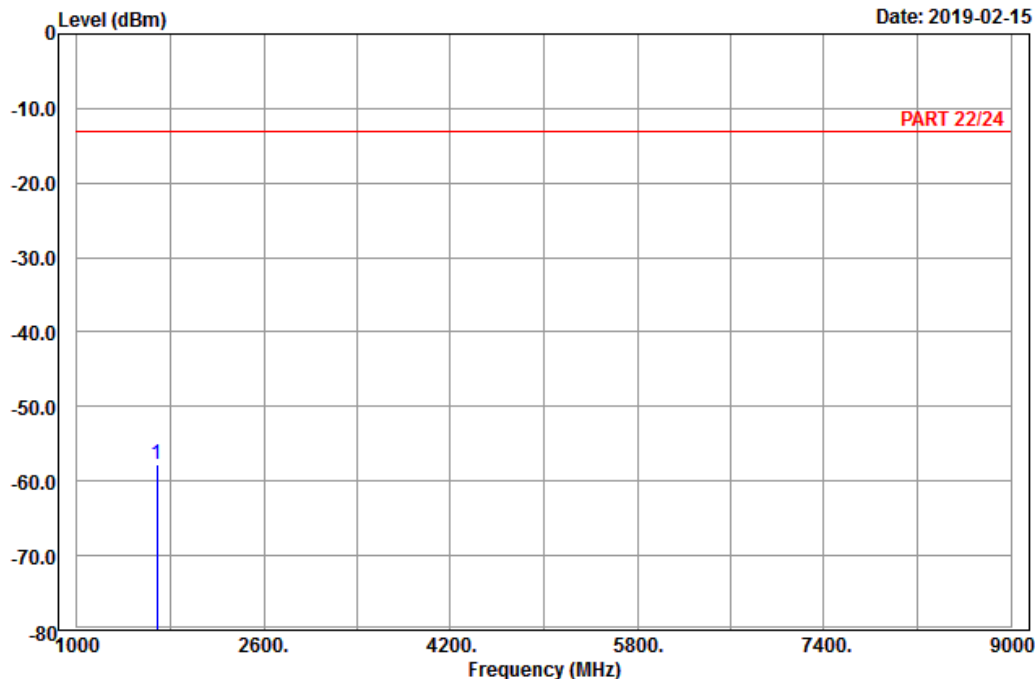
High Channel



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Data: 5



Site : 966 chamber 1  
 Condition: PART 22/24 Horizontal  
 Remark : LTE\_Band 26\_Link\_CH26965  
 Tested by: Karl Lee

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1683.00	-57.68	-65.70	-13.00	-44.68	8.02 Peak



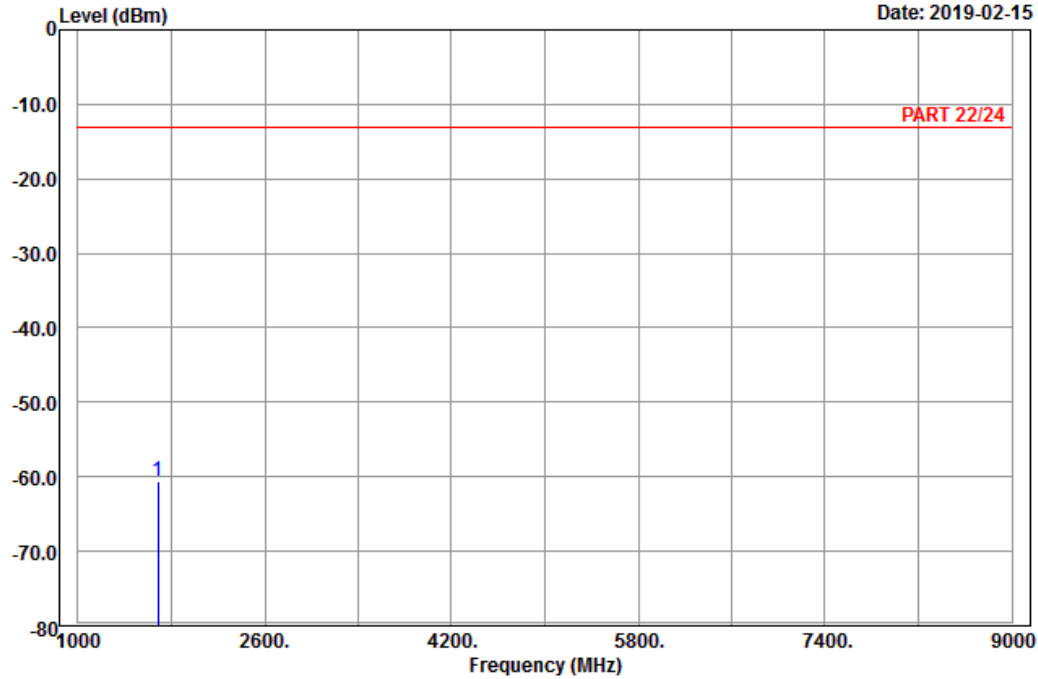


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6

Date: 2019-02-15



Site : 966 chamber 1  
 Condition: PART 22/24 Vertical  
 Remark : LTE\_Band 26\_Link\_CH26965  
 Tested by: Karl Lee

	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor Remark
MHz	dBm	dBm	dBm	dB	dB
1 pp 1683.00	-60.68	-68.70	-13.00	-47.68	8.02 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.

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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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