

FCC Test Report

(PART 24)

Report No.: RF180112C19-1

FCC ID: XIA-NTC100

Test Model: NTC-100, NTC-100G

Received Date: Jan. 12, 2018

Test Date: Jun. 20, 2018 ~ Jul. 31, 2018

Issued Date: Sep. 20, 2018

Applicant: NetComm Wireless Limited

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

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(R.O.C)

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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF180112C19-1	Original Release	Sep. 20, 2018

1 Certificate of Conformity

Product: 4G LTE Cat M1 / NB1 Industrial IoT Serial Modem

Brand:  NetCommWireless

Test Model: NTC-100, NTC-100G

Applicant: NetComm Wireless Limited

Test Date: Jun. 20, 2018 ~ Jul. 31, 2018

Standards: FCC Part 24, Subpart E

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 : Evonne Liu, **Date:** Sep. 20, 2018
Evonne Liu / Specialist

Approved by : Dylan Chiou, **Date:** Sep. 20, 2018
Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1046 24.232(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 24.238(b)	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238(b)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -21.39 dB at 3701.40 MHz.

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	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210129	Feb. 06, 2018	Feb. 05, 2019
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 24, 2017	Nov. 23, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Nov. 23, 2017	Nov. 22, 2018
Horn Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	148	Dec. 13, 2017	Dec. 12, 2018
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier EMCI	EMC 012645	980115	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 184045	980116	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 330H	980112	Oct. 13, 2017	Oct. 12, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 20, 2017	Oct. 19, 2018
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer	MT8821C	6261786083	Dec. 21, 2017	Dec. 20, 2018
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 08, 2017	Sep. 07, 2018
DC Power Supply Topward	33010D	807748	Oct. 25, 2016	Oct. 24, 2018
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019

- 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 HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

Product	4G LTE Cat M1 / NB1 Industrial IoT Serial Modem		
Brand	 NetCommWireless		
Test Model	NTC-100, NTC-100G		
EUT Rating	Rated Voltage :4.5~36VDC Rated Current :0.23~0.03A		
Modulation Type	Cat-M1	QPSK, 16QAM	
	NB-IOT	BPSK, QPSK	
Frequency Range	Cat-M1	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1850.7 ~ 1909.3 MHz
		LTE Band 2 (Channel Bandwidth: 3 MHz)	1851.5 ~ 1908.5 MHz
		LTE Band 2 (Channel Bandwidth: 5 MHz)	1852.5 ~ 1907.5 MHz
		LTE Band 2 (Channel Bandwidth: 10 MHz)	1855.0 ~ 1905.0 MHz
		LTE Band 2 (Channel Bandwidth: 15 MHz)	1857.5 ~ 1902.5 MHz
		LTE Band 2 (Channel Bandwidth: 20 MHz)	1860.0 ~ 1900.0 MHz
	NB-IOT	1850.1 ~ 1909.9 MHz for Stand-alone, In-band and Guard-band	
Max. EIRP Power	Cat-M1	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	325.09 mW
		LTE Band 2 (Channel Bandwidth: 3 MHz)	307.61 mW
		LTE Band 2 (Channel Bandwidth: 5 MHz)	289.73 mW
		LTE Band 2 (Channel Bandwidth: 10 MHz)	276.06 mW
		LTE Band 2 (Channel Bandwidth: 15 MHz)	259.42 mW
		LTE Band 2 (Channel Bandwidth: 20 MHz)	241.55 mW
	NB-IOT	373.25 mW for Stand-alone	
Emission Designator	Cat-M1	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1M09G7D
		LTE Band 2 (Channel Bandwidth: 3 MHz)	1M08G7D
		LTE Band 2 (Channel Bandwidth: 5 MHz)	1M09G7D
		LTE Band 2 (Channel Bandwidth: 10 MHz)	1M09G7D
		LTE Band 2 (Channel Bandwidth: 15 MHz)	1M09G7D
		LTE Band 2 (Channel Bandwidth: 20 MHz)	1M10G7D
	NB-IOT	1K86G7D for Stand-alone	
Antenna Type	Dipole Antenna with 3.42 dBi gain		

Note:

- The models as below are identical to each other except for the following.

Brand	Model	Difference(s)
 NetCommWireless	NTC-100	Without GPS
	NTC-100G	With GPS

* The model "NTC-100" was chosen for final test.

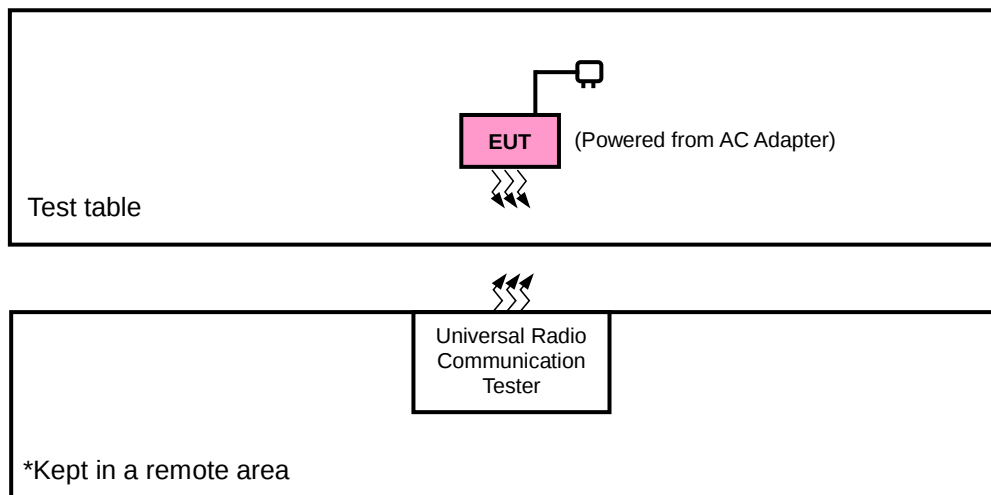
2. The EUT contains following accessory devices.

Accessory	Within the box: 1.Y-cable(Nano-fit to DE-9 and DC power input) :0.15M ,w/o core 2.DIN rail mounting bracket Optional Accessory 1.GPS Active Patch Antenna : 3M , w/o core 2.LTE Tube Antenna : Type:Dipole 3.adaptor: Brand: Ten Pao International Inc. Model: S018KM1200150(1.5M/0core) Input: 100-240V~50/60Hz 500mA Output: 12.0V / 1500mA
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3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test / E.I.R.P. Test >



3.2.1 Description of Support Units

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

3.3 Test Mode Applicability and Tested Channel Detail

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

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

Band	EIRP	Radiated Emission
LTE Band 2	Z-plane	X-axis

LTE Band 2

Cat-M1

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	18625 to 19175	18900	5 MHz	QPSK, 16QAM	6 RB / 0 RB Offset, 5 RB / 0 RB Offset
-	Frequency Stability	18607 to 19193	18607, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 19185	3 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 19150	10 MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 19125	15 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 19100	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
-	Peak to Average Ratio	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	18607 to 19193	18607	1.4 MHz	QPSK	1 RB / 0 RB Offset
			19193	1.4 MHz	QPSK	6 RB / 0 RB Offset
		18615 to 19185	18615	3 MHz	QPSK	1 RB / 5 RB Offset
			19185	3 MHz	QPSK	6 RB / 0 RB Offset
		18625 to 19175	18625	5 MHz	QPSK	1 RB / 0 RB Offset
			19175	5 MHz	QPSK	6 RB / 0 RB Offset
		18650 to 19150	18650	10 MHz	QPSK	1 RB / 5 RB Offset
			19150	10 MHz	QPSK	6 RB / 0 RB Offset
		18675 to 19125	18675	15 MHz	QPSK	1 RB / 0 RB Offset
			19125	15 MHz	QPSK	6 RB / 0 RB Offset
		18700 to 19100	18700	20 MHz	QPSK	1 RB / 5 RB Offset
			19100	20 MHz	QPSK	6 RB / 0 RB Offset
-	Conducted Emission	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1 GHz	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1 GHz	18607 to 19193	18607	1.4 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

NB-IOT

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Sub-carrier spacing	Modulation	Mode
-	ERP	18601 to 19199	18601, 18900, 19199	3.75 kHz	BPSK	1 RB / 0 RB Offset
		18601 to 19199	18601, 18900, 19199	15 kHz	QPSK	3 RB / 3 RB Offset
-	Frequency Stability	18601 to 19199	18601, 18900, 19199	3.75 kHz	BPSK	1 RB / 0 RB Offset
		18601 to 19199	18601, 18900, 19199	15 kHz	QPSK	3 RB / 3 RB Offset
-	Occupied Bandwidth	18601 to 19199	18601, 18900, 19199	3.75 kHz	BPSK	1 RB / 0 RB Offset
		18601 to 19199	18601, 18900, 19199	15 kHz	QPSK	3 RB / 3 RB Offset
						12 RB / 0 RB Offset
-	Band Edge	18601 to 19199	18601, 19199	3.75 kHz	BPSK	1 RB / 0 RB Offset
			18601, 19199	15 kHz	QPSK	1 RB / 0 RB Offset
						3 RB / 3 RB Offset
-	Peak to Average Ratio	18601 to 19199	18900	3.75 kHz	BPSK	1 RB / 0 RB Offset
			18900	15 kHz	QPSK	1 RB / 0 RB Offset
						3 RB / 3 RB Offset
-	Conducted Emission	18601 to 19199	18601, 18900, 19199	15 kHz	QPSK	3 RB / 3 RB Offset
-	Radiated Emission	18601 to 19199	18601, 18900, 19199	15 kHz	QPSK	3 RB / 3 RB Offset

NOTE:

Selection is tested with Stand-alone, In-band and Guard-band, The worst case was found in Stand-alone.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	26 deg. C, 58 % RH	120 Vac, 60 Hz	Jisyong Wang
Modulation Characteristics	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Frequency Stability	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Occupied Bandwidth	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Band Edge	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Peak to Average Ratio	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Conducted Emission	26 deg. C, 58 % RH	120 Vac, 60 Hz	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang

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 24

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 2 watts e.i.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 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, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}$.

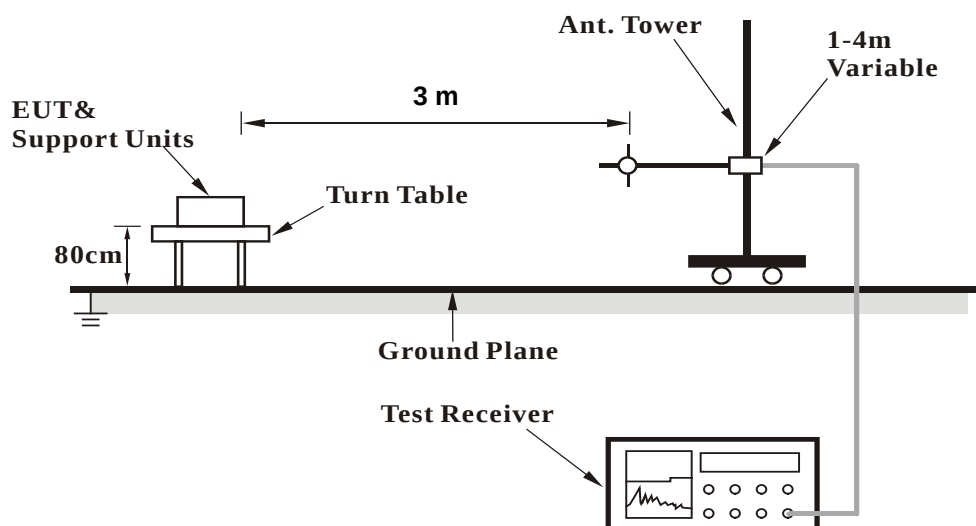
Conducted Power Measurement:

The EUT was set up for the maximum power with 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.

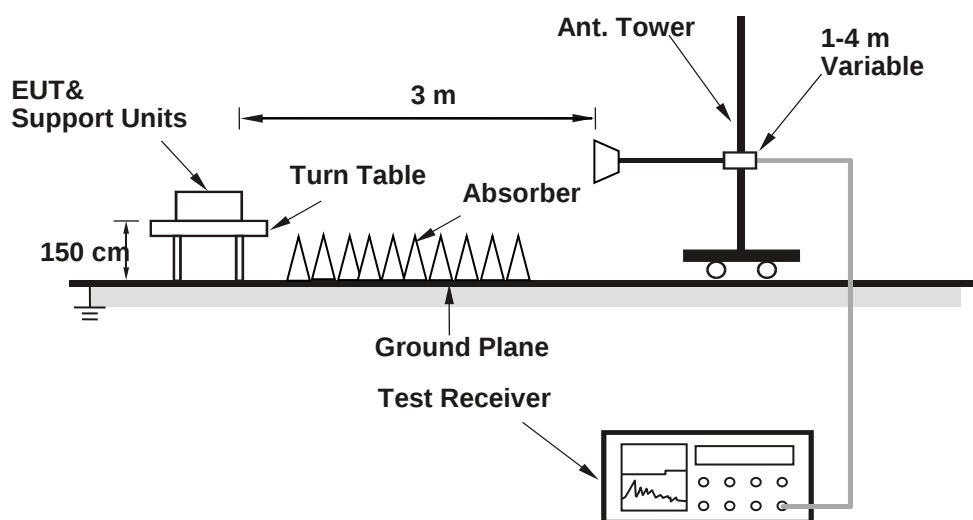
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

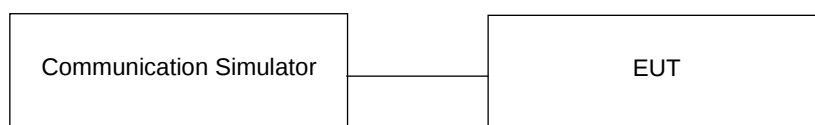


<Radiated Emission above 1 GHz>



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)

Cat-M1

eMTC	Band 2	Region(s):	FCC	Power:	Class 3	23	Tolerance:	3.2
------	--------	------------	-----	--------	---------	----	------------	-----

maximum:	22.44
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BW(MHz):	1.4
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Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18607	1850.7	607	1930.7	QPSK	1	0	0	-85	22.31
					QPSK	1	5	0	-85	22.27
					QPSK	3	3	0	-85	21.59
					QPSK	6	0	0	-85	20.07
					16QAM	1	0	0	-85	21.27
					16QAM	1	5	0	-85	21.37
					16QAM	3	0	0	-85	19.88
					16QAM	5	0	0	-85	20
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	22.44
					QPSK	1	5	0	-85	22.4
					QPSK	3	3	0	-85	21.22
					QPSK	6	0	0	-85	19.83
					16QAM	1	0	0	-85	21.14
					16QAM	1	5	0	-85	21.18
					16QAM	3	0	0	-85	19.89
					16QAM	5	0	0	-85	19.8
High Range	19193	1909.3	1193	1989.3					-85	
					QPSK	1	0	0	-85	21.88
					QPSK	1	5	0	-85	21.83
					QPSK	3	3	0	-85	21.5
					QPSK	6	0	0	-85	19.96
					16QAM	1	0	0	-85	20.61
					16QAM	1	5	0	-85	21.38
					16QAM	3	0	0	-85	19.81
					16QAM	5	0	0	-85	19.83

BW(MHz):		3								
Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18615	1851.5	615	1931.5	QPSK	1	0	0	-85	21.37
					QPSK	1	5	0	-85	21.36
					QPSK	1	0	1	-85	21.3
					QPSK	1	5	1	-85	21.29
					QPSK	3	3	0	-85	21.58
					QPSK	3	3	1	-85	21.57
					QPSK	6	0	0	-85	20.16
					QPSK	6	0	1	-85	20.52
					16QAM	1	0	0	-85	21.73
					16QAM	1	5	0	-85	21.87
					16QAM	1	0	1	-85	21.76
					16QAM	1	5	1	-85	21.72
					16QAM	3	0	0	-85	20.46
					16QAM	3	3	1	-85	20.48
					16QAM	5	0	0	-85	20.13
					16QAM	5	0	1	-85	20.01
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	21.27
					QPSK	1	5	0	-85	21.29
					QPSK	1	0	1	-85	21.28
					QPSK	1	5	1	-85	21.28
					QPSK	3	3	0	-85	21.28
					QPSK	3	3	1	-85	21.27
					QPSK	6	0	0	-85	19.84
					QPSK	6	0	1	-85	19.83
					16QAM	1	0	0	-85	21.41
					16QAM	1	5	0	-85	21.49
					16QAM	1	0	1	-85	21.48
					16QAM	1	5	1	-85	21.47
					16QAM	3	0	0	-85	20.29
					16QAM	3	3	1	-85	20.31
					16QAM	5	0	0	-85	19.98
					16QAM	5	0	1	-85	19.88
High Range	19185	1908.5	1185	1988.5					-85	
					QPSK	1	0	0	-85	21.68
					QPSK	1	5	0	-85	21.81
					QPSK	1	0	1	-85	21.77
					QPSK	1	5	1	-85	21.72

					QPSK	3	3	0	-85	20.71
					QPSK	3	3	1	-85	20.68
					QPSK	6	0	0	-85	20.03
					QPSK	6	0	1	-85	20.02
					16QAM	1	0	0	-85	20.63
					16QAM	1	5	0	-85	20.77
					16QAM	1	0	1	-85	20.74
					16QAM	1	5	1	-85	20.76
					16QAM	3	0	0	-85	19.9
					16QAM	3	3	1	-85	19.91
					16QAM	5	0	0	-85	19.99
					16QAM	5	0	1	-85	19.87

BW(MHz):		5								
Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18625	1852.5	625	1932.5	QPSK	1	0	0	-85	21.97
					QPSK	1	5	0	-85	21.94
					QPSK	1	0	1	-85	21.93
					QPSK	1	5	1	-85	21.89
					QPSK	1	0	3	-85	22.07
					QPSK	1	5	3	-85	22.01
					QPSK	3	0	0	-85	20.88
					QPSK	3	3	3	-85	20.85
					QPSK	6	0	0	-85	20.92
					QPSK	6	0	1	-85	20.89
					QPSK	6	0	3	-85	20.87
					16QAM	1	0	0	-85	21.76
					16QAM	1	5	0	-85	21.74
					16QAM	1	0	1	-85	21.75
					16QAM	1	5	1	-85	21.78
					16QAM	1	0	3	-85	21.74
					16QAM	1	5	3	-85	21.77
					16QAM	3	0	0	-85	20.7
					16QAM	3	3	3	-85	20.66
					16QAM	5	0	0	-85	19.85
					16QAM	5	0	1	-85	19.84
					16QAM	5	0	3	-85	19.8
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	21.68
					QPSK	1	5	0	-85	21.62
					QPSK	1	0	1	-85	21.66
					QPSK	1	5	1	-85	21.67
					QPSK	1	0	3	-85	21.65
					QPSK	1	5	3	-85	21.69
					QPSK	3	0	0	-85	20.52
					QPSK	3	3	3	-85	20.47
					QPSK	6	0	0	-85	20.62
					QPSK	6	0	1	-85	20.6
					QPSK	6	0	3	-85	20.61
					16QAM	1	0	0	-85	21.46
					16QAM	1	5	0	-85	21.39
					16QAM	1	0	1	-85	21.44
					16QAM	1	5	1	-85	21.36

					16QAM	1	0	3	-85	21.39
					16QAM	1	5	3	-85	21.45
					16QAM	3	0	0	-85	20.29
					16QAM	3	3	3	-85	20.33
					16QAM	5	0	0	-85	19.97
					16QAM	5	0	1	-85	19.84
					16QAM	5	0	3	-85	19.83
High Range	19175	1907.5	1175	1987.5					-85	
					QPSK	1	0	0	-85	21.72
					QPSK	1	5	0	-85	21.77
					QPSK	1	0	1	-85	21.66
					QPSK	1	5	1	-85	21.68
					QPSK	1	0	3	-85	21.72
					QPSK	1	5	3	-85	21.68
					QPSK	3	0	0	-85	20.69
					QPSK	3	3	3	-85	20.66
					QPSK	6	0	0	-85	20.78
					QPSK	6	0	1	-85	20.73
					QPSK	6	0	3	-85	20.71
					16QAM	1	0	0	-85	21.59
					16QAM	1	5	0	-85	21.63
					16QAM	1	0	1	-85	21.54
					16QAM	1	5	1	-85	21.67
					16QAM	1	0	3	-85	21.47
					16QAM	1	5	3	-85	21.45
					16QAM	3	0	0	-85	20.55
					16QAM	3	3	3	-85	20.59
					16QAM	5	0	0	-85	20.05
					16QAM	5	0	1	-85	19.95
					16QAM	5	0	3	-85	19.91

BW(MHz):		10								
Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18650	1855	650	1935	QPSK	1	0	0	-85	22.08
					QPSK	1	5	0	-85	22.1
					QPSK	1	0	3	-85	22.11
					QPSK	1	5	3	-85	22.03
					QPSK	1	0	7	-85	21.96
					QPSK	1	5	7	-85	21.95
					QPSK	4	0	0	-85	21.97
					QPSK	4	2	7	-85	21.92
					QPSK	6	0	0	-85	20.87
					QPSK	6	0	7	-85	20.88
					16QAM	1	0	0	-85	21.88
					16QAM	1	5	0	-85	21.9
					16QAM	1	0	3	-85	21.84
					16QAM	1	5	3	-85	21.88
					16QAM	1	0	7	-85	21.79
					16QAM	1	5	7	-85	21.91
					16QAM	4	2	0	-85	21.17
					16QAM	4	2	7	-85	21.24
					16QAM	5	0	0	-85	20.8
					16QAM	5	0	7	-85	20.75
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	21.72
					QPSK	1	5	0	-85	21.77
					QPSK	1	0	3	-85	21.7
					QPSK	1	5	3	-85	21.67
					QPSK	1	0	7	-85	21.68
					QPSK	1	5	7	-85	21.78
					QPSK	4	0	0	-85	21.64
					QPSK	4	2	7	-85	21.66
					QPSK	6	0	0	-85	20.57
					QPSK	6	0	7	-85	20.61
					16QAM	1	0	0	-85	21.43
					16QAM	1	5	0	-85	21.51
					16QAM	1	0	3	-85	21.5
					16QAM	1	5	3	-85	21.48
					16QAM	1	0	7	-85	21.46
					16QAM	1	5	7	-85	21.39

					16QAM	4	2	0	-85	20.81
					16QAM	4	2	7	-85	20.72
					16QAM	5	0	0	-85	20.41
					16QAM	5	0	7	-85	20.51
High Range	19150	1905	1150	1985					-85	
					QPSK	1	0	0	-85	21.71
					QPSK	1	5	0	-85	21.75
					QPSK	1	5	7	-85	21.66
					QPSK	1	0	3	-85	21.68
					QPSK	1	5	3	-85	21.7
					QPSK	1	0	7	-85	21.67
					QPSK	4	0	0	-85	21.66
					QPSK	4	2	7	-85	21.68
					QPSK	6	0	0	-85	20.6
					QPSK	6	0	7	-85	20.55
					16QAM	1	0	0	-85	21.48
					16QAM	1	5	0	-85	21.51
					16QAM	1	0	3	-85	21.46
					16QAM	1	5	3	-85	21.49
					16QAM	1	0	7	-85	21.37
					16QAM	1	5	7	-85	21.5
					16QAM	4	2	0	-85	21.46
					16QAM	4	2	7	-85	21.33
					16QAM	5	0	0	-85	20.52
					16QAM	5	0	7	-85	20.47

BW(MHz):		15								
Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18675	1857.5	675	1937.5	QPSK	1	0	0	-85	22.07
					QPSK	1	5	0	-85	22.11
					QPSK	1	0	5	-85	22.03
					QPSK	1	5	5	-85	21.98
					QPSK	1	0	11	-85	21.88
					QPSK	1	5	11	-85	21.9
					QPSK	3	0	0	-85	21.94
					QPSK	3	3	11	-85	21.89
					QPSK	6	0	0	-85	21.82
					QPSK	6	0	11	-85	21.8
					16QAM	1	0	0	-85	21.95
					16QAM	1	5	0	-85	22
					16QAM	1	0	5	-85	21.88
					16QAM	1	5	5	-85	21.82
					16QAM	1	0	11	-85	21.87
					16QAM	1	5	11	-85	21.79
					16QAM	3	0	0	-85	22.23
					16QAM	3	3	11	-85	22.21
					16QAM	5	0	0	-85	22.07
					16QAM	5	0	11	-85	21.88
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	21.95
					QPSK	1	5	0	-85	21.84
					QPSK	1	0	5	-85	21.76
					QPSK	1	5	5	-85	21.79
					QPSK	1	0	11	-85	21.8
					QPSK	1	5	11	-85	21.86
					QPSK	3	0	0	-85	21.64
					QPSK	3	3	11	-85	21.59
					QPSK	6	0	0	-85	21.77
					QPSK	6	0	11	-85	21.7
					16QAM	1	0	0	-85	21.73
					16QAM	1	5	0	-85	21.62
					16QAM	1	0	5	-85	21.68
					16QAM	1	5	5	-85	21.57
					16QAM	1	0	11	-85	21.74
					16QAM	1	5	11	-85	21.63

High Range					16QAM	3	0	0	-85	21.87
					16QAM	3	3	11	-85	21.82
					16QAM	5	0	0	-85	21.59
					16QAM	5	0	11	-85	21.57
	19125	1902.5	1125	1982.5					-85	
					QPSK	1	0	0	-85	21.81
					QPSK	1	5	11	-85	21.71
					QPSK	1	0	5	-85	21.68
					QPSK	1	5	5	-85	21.85
					QPSK	1	0	11	-85	21.82
					QPSK	1	5	11	-85	21.73
					QPSK	3	0	0	-85	21.7
					QPSK	3	3	11	-85	21.69
					QPSK	6	0	0	-85	21.7
					QPSK	6	0	11	-85	21.69
					16QAM	1	0	0	-85	21.51
					16QAM	1	5	0	-85	22.01
					16QAM	1	0	5	-85	21.52
					16QAM	1	5	5	-85	21.43
					16QAM	1	0	11	-85	21.11
					16QAM	1	5	11	-85	21.53
					16QAM	3	0	0	-85	21.52
					16QAM	3	3	11	-85	21.43
					16QAM	5	0	0	-85	21.69
					16QAM	5	0	11	-85	21.52

BW(MHz):		20								
Test Frequency ID	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power				EUT	
					Modulation	RB Size	RB Offset	Narrowband Index	Cell power (dBm/15kHz)	power (dBm)
Low Range	18700	1860	700	1940	QPSK	1	0	0	-85	22.11
					QPSK	1	5	0	-85	21.93
					QPSK	1	0	7	-85	22.1
					QPSK	1	5	7	-85	22.04
					QPSK	1	0	15	-85	21.9
					QPSK	1	5	15	-85	22.03
					QPSK	3	0	0	-85	21.89
					QPSK	3	3	15	-85	21.9
					QPSK	6	0	0	-85	21.94
					QPSK	6	0	15	-85	21.85
					16QAM	1	0	0	-85	22.13
					16QAM	1	5	0	-85	21.77
					16QAM	1	0	7	-85	21.38
					16QAM	1	5	7	-85	21.76
					16QAM	1	0	15	-85	21.8
					16QAM	1	5	15	-85	21.78
					16QAM	3	0	0	-85	21.71
					16QAM	3	3	15	-85	21.76
					16QAM	5	0	0	-85	22.01
					16QAM	5	0	15	-85	21.89
Mid Range	18900	1880	900	1960	QPSK	1	0	0	-85	21.87
					QPSK	1	5	0	-85	21.76
					QPSK	1	0	7	-85	21.88
					QPSK	1	5	7	-85	21.75
					QPSK	1	0	15	-85	21.77
					QPSK	1	5	15	-85	21.89
					QPSK	3	0	0	-85	21.69
					QPSK	3	3	15	-85	21.56
					QPSK	6	0	0	-85	21.77
					QPSK	6	0	15	-85	21.66
					16QAM	1	0	0	-85	22.07
					16QAM	1	5	0	-85	21.59
					16QAM	1	0	7	-85	22.01
					16QAM	1	5	7	-85	21.47
					16QAM	1	0	15	-85	21.69
					16QAM	1	5	15	-85	21.81

					16QAM	3	0	0	-85	21.56
					16QAM	3	3	15	-85	21.48
					16QAM	6	0	0	-85	21.72
					16QAM	6	0	15	-85	21.55
High Range	19100	1900	1100	1980					-85	
					QPSK	1	0	0	-85	21.61
					QPSK	1	5	0	-85	21.8
					QPSK	1	0	7	-85	21.76
					QPSK	1	5	7	-85	21.63
					QPSK	1	0	15	-85	21.58
					QPSK	1	5	15	-85	21.72
					QPSK	3	0	0	-85	21.6
					QPSK	3	3	15	-85	21.59
					QPSK	6	0	0	-85	21.66
					QPSK	6	0	15	-85	21.59
					16QAM	1	0	0	-85	21.97
					16QAM	1	5	0	-85	21.82
					16QAM	1	0	7	-85	21.36
					16QAM	1	5	7	-85	21.47
					16QAM	1	0	15	-85	21.5
					16QAM	1	5	15	-85	21.59
					16QAM	3	0	0	-85	21.41
					16QAM	3	3	15	-85	21.42
					16QAM	6	0	0	-85	21.57
					16QAM	6	0	15	-85	21.4

NB-IOT

NB-IoT	Band 2	Region(s):	FCC	Power:	Class 3	23	Tolerance:	3.2
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maximum:	22.91
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Stand-alone

Test Frequency ID	N _{UL}	M _{UL}	Frequency of Uplink [MHz]	N _{DL}	M _{DL}	Frequency of Downlink [MHz]	Test Configuration Initial of Power			EUT	
							Modulation	Ntones	Sub-carrier spacing (kHz)	Cell power (dBm/15kHz)	power (dBm)
Low Range	18601	0	1850.1	601	-0.5	1930.1	BPSK	1@0	3.75	-110	21.94
							QPSK	1@0	15	-110	22.01
							QPSK	3@3	15	-110	22.56
							QPSK	12@0	15	-110	20.86
Mid Range	18900	0	1880	900	-0.5	1960	BPSK	1@0	3.75	-110	21.65
							BPSK	1@47	3.75	-110	21.58
							QPSK	1@0	15	-110	21.91
							QPSK	1@11	15	-110	21.83
							QPSK	3@3	15	-110	22.78
							QPSK	12@0	15	-110	20.91
High Range	19199	0	1909.9	1199	-0.5	1989.9	BPSK	1@47	3.75	-110	21.74
							QPSK	1@11	15	-110	22.06
							QPSK	3@3	15	-110	22.91
							QPSK	12@0	15	-110	20.93

In-band	BW(MHz):	3
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Test Frequency ID	N _{UL}	M _{UL}	Frequency of Uplink [MHz]	N _{DL}	M _{DL}	Frequency of Downlink [MHz]	LTE Host Cell			Test Configuration Initial of Power			EUT	
							N _{DL}	Frequency of Downlink [MHz]	DL PRB Location	Modulation	Ntones	Sub-carrier spacing (kHz)	Cell power (dBm/15kHz)	power (dBm)
Low Range	18606	0	1850.6	606	-2	1930.5925	615	1931.5	-5	BPSK	1@0	3.75	-110	21.7
										QPSK	1@0	15	-110	21.74
										QPSK	3@3	15	-110	22.45
										QPSK	12@0	15	-110	20.51
Mid Range	18891	0	1879.1	891	-2	1959.0925	900	1960	-5	BPSK	1@0	3.75	-110	21.64
										BPSK	1@47	3.75	-110	21.56
										QPSK	1@0	15	-110	21.73
										QPSK	1@11	15	-110	21.75
										QPSK	3@3	15	-110	22.45
										QPSK	12@0	15	-110	20.67
High Range	19194	0	1909.4	1194	1	1989.4075	1185	1988.5	5	BPSK	1@47	3.75	-110	21.76
										QPSK	1@11	15	-110	21.72
										QPSK	3@3	15	-110	22.71
										QPSK	12@0	15	-110	20.78

In-band	BW(MHz):	10	NB-IoT PRB:	30										
Test Frequency ID	N _{UL}	M _{UL}	Frequency of Uplink [MHz]	N _{DL}	M _{DL}	Frequency of Downlink [MHz]	LTE Host Cell			Test Configuration Initial of Power			EUT	
							N _{DL}	Frequency of Downlink [MHz]	DL PRB Location	Modulation	N _{tones}	Sub-carrier spacing (kHz)	Cell power (dBm/15kHz)	power (dBm)
Low Range	18660	-2	1855.99	660	-1	1935.9975	650	1935	5	BPSK	1@0	3.75	-110	20.33
										QPSK	1@0	15	-110	21.37
										QPSK	3@3	15	-110	22.63
										QPSK	12@0	15	-110	20.39
Mid Range	18910	-2	1880.99	910	-1	1960.9975	900	1960	5	BPSK	1@0	3.75	-110	20.32
										BPSK	1@47	3.75	-110	21.45
										QPSK	1@0	15	-110	21.39
										QPSK	1@11	15	-110	21.71
										QPSK	3@3	15	-110	22.61
										QPSK	12@0	15	-110	20.37
High Range	19160	-2	1905.99	1160	-1	1985.9975	1150	1985	5	BPSK	1@47	3.75	-110	20.61
										QPSK	1@11	15	-110	21.73
										QPSK	3@3	15	-110	22.56
										QPSK	12@0	15	-110	20.73

In-band	BW(MHz):	10	NB-IoT PRB:	35										
Test Frequency ID	N _{UL}	M _{UL}	Frequency of Uplink [MHz]	N _{DL}	M _{DL}	Frequency of Downlink [MHz]	LTE Host Cell			Test Configuration Initial of Power			EUT	
							N _{DL}	Frequency of Downlink [MHz]	DL PRB Location	Modulation	N _{tones}	Sub-carrier spacing (kHz)	Cell power (dBm/15kHz)	power (dBm)
Low Range	18669	-2	1856.89	669	-1	1936.8975	650	1935	10	BPSK	1@0	3.75	-110	20.35
										QPSK	1@0	15	-110	21.42
										QPSK	3@3	15	-110	22.58
										QPSK	12@0	15	-110	20.59
Mid Range	18919	-2	1881.89	919	-1	1961.8975	900	1960	10	BPSK	1@0	3.75	-110	20.33
										BPSK	1@47	3.75	-110	21.46
										QPSK	1@0	15	-110	21.36
										QPSK	1@11	15	-110	21.62
										QPSK	3@3	15	-110	22.32
										QPSK	12@0	15	-110	20.35
High Range	19169	-2	1906.89	1169	-1	1986.8975	1150	1985	10	BPSK	1@47	3.75	-110	20.3
										QPSK	1@11	15	-110	21.83
										QPSK	3@3	15	-110	22.67
										QPSK	12@0	15	-110	20.68

Guard-band	BW(MHz):	5
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Test Frequency ID	N _{UL}	M _{UL}	Frequency of Uplink [MHz]	N _{DL}	M _{DL}	Frequency of Downlink [MHz]	LTE Host Cell			Test Configuration Initial of Power			EUT	
							NDL	Frequency of Downlink [MHz]	DL PRB Location	Modulation	Ntones	Sub-carrier spacing (kHz)	Cell power (dBm/15kHz)	power (dBm)
Low Range	18601	0	1850.1	601	1	1930.1075	625	1932.5	-24	BPSK	1@0	3.75	-110	21.61
										QPSK	1@0	15	-110	21.64
										QPSK	3@3	15	-110	22.55
										QPSK	12@0	15	-110	20.49
Mid Range	18876	0	1877.6	876	1	1957.6075	900	1960	-24	BPSK	1@0	3.75	-110	21.42
										BPSK	1@47	3.75	-110	22.19
										QPSK	1@0	15	-110	21.68
										QPSK	1@11	15	-110	20.17
										QPSK	3@3	15	-110	22.18
										QPSK	12@0	15	-110	20.45
High Range	19199	0	1909.9	1199	-2	1989.8925	1175	1987.5	24	BPSK	1@47	3.75	-110	21.44
										QPSK	1@11	15	-110	21.51
										QPSK	3@3	15	-110	22.53
										QPSK	12@0	15	-110	20.47

EIRP Power (dBm)

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LTE Band 2							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18607	1850.7	-16.54	36.57	20.03	100.69	H
	18900	1880.0	-16.97	37.22	20.25	105.93	
	19193	1909.3	-17.33	37.18	19.85	96.61	
	18607	1850.7	-12.60	37.65	25.05	319.89	V
	18900	1880.0	-12.46	37.58	25.12	325.09	
	19193	1909.3	-12.57	37.48	24.91	309.74	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	18607	1850.7	-17.56	36.57	19.01	79.62	H
	18900	1880.0	-17.99	37.22	19.23	83.75	
	19193	1909.3	-18.35	37.18	18.83	76.38	
	18607	1850.7	-13.62	37.65	24.03	252.93	V
	18900	1880.0	-13.48	37.58	24.10	257.04	
	19193	1909.3	-13.59	37.48	23.89	244.91	

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

LTE Band 2							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18615	1851.5	-16.78	36.57	19.79	95.28	H
	18900	1880.0	-17.21	37.22	20.01	100.23	
	19185	1908.5	-17.57	37.18	19.61	91.41	
	18615	1851.5	-12.84	37.65	24.81	302.69	V
	18900	1880.0	-12.70	37.58	24.88	307.61	
	19185	1908.5	-12.81	37.48	24.67	293.09	
Channel Bandwidth: 3 MHz / 16QAM							
Z	18615	1851.5	-17.76	36.57	18.81	76.03	H
	18900	1880.0	-18.19	37.22	19.03	79.98	
	19185	1908.5	-18.55	37.18	18.63	72.95	
	18615	1851.5	-13.82	37.65	23.83	241.55	V
	18900	1880.0	-13.68	37.58	23.90	245.47	
	19185	1908.5	-13.79	37.48	23.69	233.88	

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

LTE Band 2							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18625	1852.5	-17.04	36.57	19.53	89.74	H
	18900	1880.0	-17.47	37.22	19.75	94.41	
	19175	1907.5	-17.83	37.18	19.35	86.10	
	18625	1852.5	-13.10	37.65	24.55	285.10	V
	18900	1880.0	-12.96	37.58	24.62	289.73	
	19175	1907.5	-13.07	37.48	24.41	276.06	
Channel Bandwidth: 5 MHz / 16QAM							
Z	18625	1852.5	-18.06	36.57	18.51	70.96	H
	18900	1880.0	-18.49	37.22	18.73	74.64	
	19175	1907.5	-18.85	37.18	18.33	68.08	
	18625	1852.5	-14.12	37.65	23.53	225.42	V
	18900	1880.0	-13.98	37.58	23.60	229.09	
	19175	1907.5	-14.09	37.48	23.39	218.27	

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

LTE Band 2							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18650	1855.0	-17.25	36.57	19.32	85.51	H
	18900	1880.0	-17.68	37.22	19.54	89.95	
	19150	1905.0	-18.04	37.18	19.14	82.04	
	18650	1855.0	-13.31	37.65	24.34	271.64	V
	18900	1880.0	-13.17	37.58	24.41	276.06	
	19150	1905.0	-13.28	37.48	24.20	263.03	
Channel Bandwidth: 10 MHz / 16QAM							
Z	18650	1855.0	-18.27	36.57	18.30	67.61	H
	18900	1880.0	-18.70	37.22	18.52	71.12	
	19150	1905.0	-19.06	37.18	18.12	64.86	
	18650	1855.0	-14.33	37.65	23.32	214.78	V
	18900	1880.0	-14.19	37.58	23.39	218.27	
	19150	1905.0	-14.30	37.48	23.18	207.97	

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

LTE Band 2							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18675	1857.5	-17.52	36.57	19.05	80.35	H
	18900	1880.0	-17.95	37.22	19.27	84.53	
	19125	1902.5	-18.31	37.18	18.87	77.09	
	18675	1857.5	-13.58	37.65	24.07	255.27	V
	18900	1880.0	-13.44	37.58	24.14	259.42	
	19125	1902.5	-13.55	37.48	23.93	247.17	
Channel Bandwidth: 15 MHz / 16QAM							
Z	18675	1857.5	-18.54	36.57	18.03	63.53	H
	18900	1880.0	-18.97	37.22	18.25	66.83	
	19125	1902.5	-19.33	37.18	17.85	60.95	
	18675	1857.5	-14.60	37.65	23.05	201.84	V
	18900	1880.0	-14.46	37.58	23.12	205.12	
	19125	1902.5	-14.57	37.48	22.91	195.43	

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

LTE Band 2							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18700	1860.0	-17.83	36.57	18.74	74.82	H
	18900	1880.0	-18.26	37.22	18.96	78.70	
	19100	1900.0	-18.62	37.18	18.56	71.78	
	18700	1860.0	-13.89	37.65	23.76	237.68	V
	18900	1880.0	-13.75	37.58	23.83	241.55	
	19100	1900.0	-13.86	37.48	23.62	230.14	
Channel Bandwidth: 20 MHz / 16QAM							
Z	18700	1860.0	-18.85	36.57	17.72	59.16	H
	18900	1880.0	-19.28	37.22	17.94	62.23	
	19100	1900.0	-19.64	37.18	17.54	56.75	
	18700	1860.0	-14.91	37.65	22.74	187.93	V
	18900	1880.0	-14.77	37.58	22.81	190.99	
	19100	1900.0	-14.88	37.48	22.60	181.97	

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

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LTE Band 2							
Channel Bandwidth: QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	18601	1850.1	-16.75	36.57	19.82	95.94	H
	18900	1880.0	-17.33	37.22	19.89	97.50	
	19199	1909.9	-17.12	37.18	20.06	101.39	
	18601	1850.1	-12.23	37.65	25.42	348.34	V
	18900	1880.0	-12.10	37.58	25.48	353.18	
	19199	1909.9	-11.76	37.48	25.72	373.25	
Channel Bandwidth: BPSK							
Z	18601	1850.1	-18.01	36.57	18.56	71.78	H
	18900	1880.0	-18.43	37.22	18.79	75.68	
	19199	1909.9	-18.14	37.18	19.04	80.17	
	18601	1850.1	-13.45	37.65	24.20	263.03	V
	18900	1880.0	-13.43	37.58	24.15	260.02	
	19199	1909.9	-13.03	37.48	24.45	278.61	

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

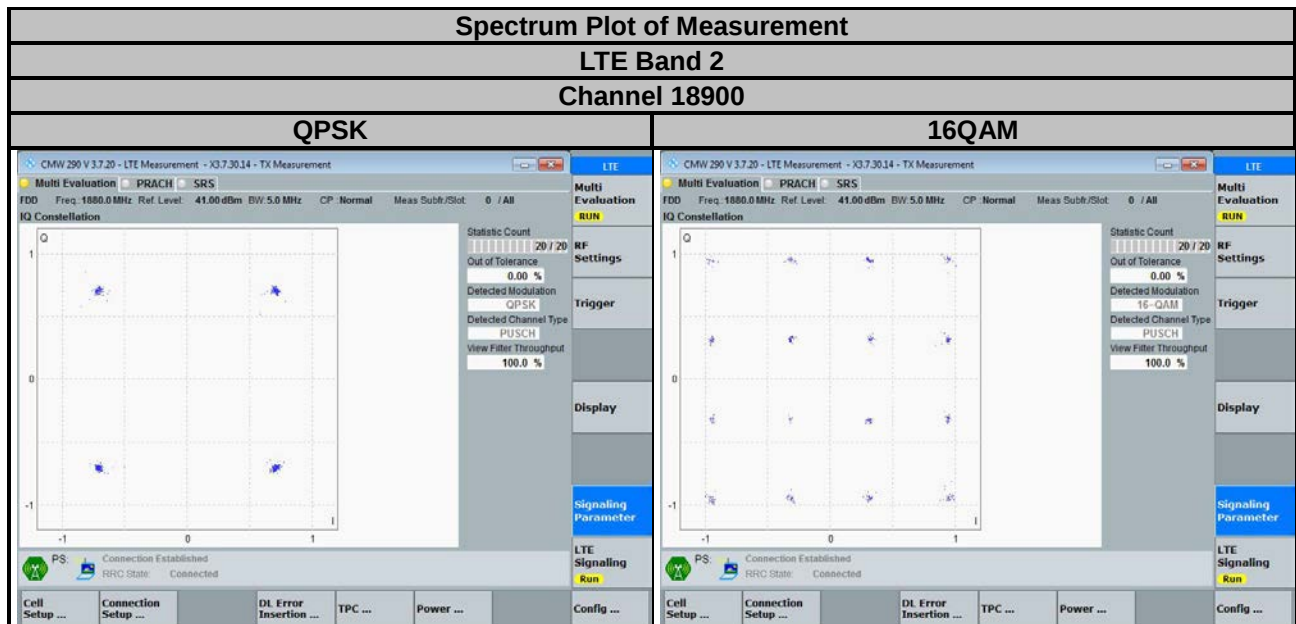
4.2.2 Test Setup



4.2.3 Test Procedure

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

4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

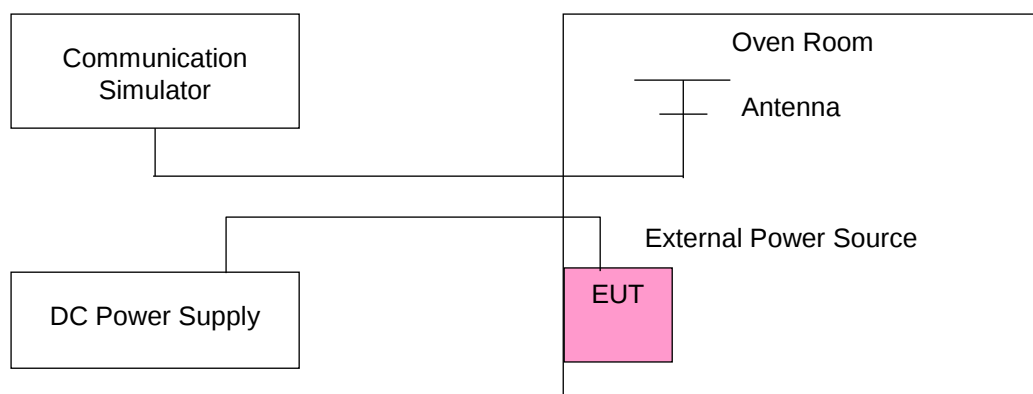
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 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

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Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1850.700003	0.002	1909.300003	0.002	2.5
12	1850.700002	0.001	1909.300003	0.001	2.5
13.8	1850.700003	0.002	1909.300002	0.001	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1850.700001	0.001	1909.300003	0.001	2.5
-20	1850.700003	0.001	1909.300002	0.001	2.5
-10	1850.700001	0.001	1909.300002	0.001	2.5
0	1850.700001	0.001	1909.300002	0.001	2.5
10	1850.700004	0.002	1909.300003	0.002	2.5
20	1850.699999	-0.001	1909.299998	-0.001	2.5
30	1850.699999	-0.001	1909.299998	-0.001	2.5
40	1850.699997	-0.002	1909.299996	-0.002	2.5
50	1850.699996	-0.002	1909.299996	-0.002	2.5
55	1850.699997	-0.002	1909.299998	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1851.500004	0.002	1908.500002	0.001	2.5
12	1851.500001	0.001	1908.500001	0.001	2.5
13.8	1851.500003	0.001	1908.500004	0.002	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1851.500003	0.001	1908.500001	0.001	2.5
-20	1851.500003	0.001	1908.500004	0.002	2.5
-10	1851.500001	0.001	1908.500003	0.002	2.5
0	1851.500003	0.001	1908.500003	0.002	2.5
10	1851.500002	0.001	1908.500003	0.002	2.5
20	1851.499997	-0.002	1908.499997	-0.002	2.5
30	1851.499997	-0.001	1908.499997	-0.002	2.5
40	1851.499997	-0.002	1908.499996	-0.002	2.5
50	1851.499998	-0.001	1908.499997	-0.002	2.5
55	1851.499997	-0.001	1908.499997	-0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1852.500004	0.002	1907.500002	0.001	2.5
12	1852.500001	0.001	1907.500003	0.002	2.5
13.8	1852.500003	0.002	1907.500003	0.001	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1852.500002	0.001	1907.500003	0.002	2.5
-20	1852.500003	0.002	1907.500002	0.001	2.5
-10	1852.500002	0.001	1907.500002	0.001	2.5
0	1852.500002	0.001	1907.500004	0.002	2.5
10	1852.500002	0.001	1907.500003	0.001	2.5
20	1852.499996	-0.002	1907.499999	-0.001	2.5
30	1852.499996	-0.002	1907.499998	-0.001	2.5
40	1852.499999	-0.001	1907.499996	-0.002	2.5
50	1852.499999	-0.001	1907.499997	-0.001	2.5
55	1852.499996	-0.002	1907.499997	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1855.000001	0.001	1905.000003	0.002	2.5
12	1855.000002	0.001	1905.000003	0.002	2.5
13.8	1855.000002	0.001	1905.000002	0.001	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1855.000001	0.001	1905.000004	0.002	2.5
-20	1855.000001	0.001	1905.000003	0.001	2.5
-10	1855.000004	0.002	1905.000004	0.002	2.5
0	1855.000002	0.001	1905.000003	0.002	2.5
10	1855.000002	0.001	1905.000002	0.001	2.5
20	1854.999996	-0.002	1904.999999	-0.001	2.5
30	1854.999997	-0.002	1904.999997	-0.001	2.5
40	1854.999997	-0.002	1904.999997	-0.002	2.5
50	1854.999997	-0.002	1904.999996	-0.002	2.5
55	1854.999996	-0.002	1904.999999	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1857.500003	0.002	1902.500003	0.002	2.5
12	1857.500001	0.001	1902.500003	0.002	2.5
13.8	1857.500002	0.001	1902.500004	0.002	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1857.500001	0.001	1902.500001	0.001	2.5
-20	1857.500003	0.002	1902.500004	0.002	2.5
-10	1857.500003	0.001	1902.500003	0.002	2.5
0	1857.500004	0.002	1902.500002	0.001	2.5
10	1857.500003	0.002	1902.500002	0.001	2.5
20	1857.499998	-0.001	1902.499998	-0.001	2.5
30	1857.499997	-0.002	1902.499996	-0.002	2.5
40	1857.499997	-0.002	1902.499997	-0.002	2.5
50	1857.499998	-0.001	1902.499996	-0.002	2.5
55	1857.499997	-0.002	1902.499997	-0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 20 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1860.000002	0.001	1900.000004	0.002	2.5
12	1860.000001	0.001	1900.000002	0.001	2.5
13.8	1860.000002	0.001	1900.000002	0.001	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 20 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1860.000004	0.002	1900.000003	0.001	2.5
-20	1860.000004	0.002	1900.000003	0.002	2.5
-10	1860.000004	0.002	1900.000002	0.001	2.5
0	1860.000003	0.002	1900.000001	0.001	2.5
10	1860.000003	0.002	1900.000003	0.002	2.5
20	1859.999998	-0.001	1899.999998	-0.001	2.5
30	1859.999999	-0.001	1899.999998	-0.001	2.5
40	1859.999997	-0.002	1899.999998	-0.001	2.5
50	1859.999997	-0.001	1899.999999	-0.001	2.5
55	1859.999996	-0.002	1899.999997	-0.002	2.5

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Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
10.2	1880.000002	0.001	1880.000004	0.002	2.5
12	1880.000004	0.002	1880.000002	0.001	2.5
13.8	1880.000004	0.002	1880.000001	0.001	2.5

Note: The applicant defined the normal working voltage of the adapter is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

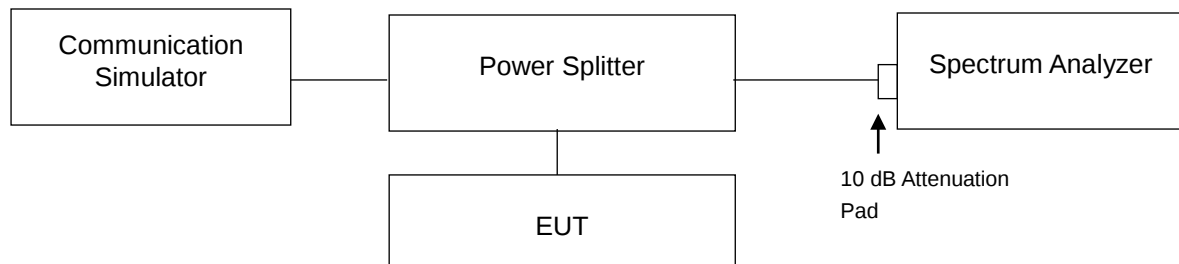
Temp. (°C)	LTE Band 2				Limit (ppm)
	Channel Bandwidth: 20 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1880.000001	0.001	1880.000003	0.002	2.5
-20	1880.000004	0.002	1880.000002	0.001	2.5
-10	1880.000003	0.002	1880.000003	0.002	2.5
0	1880.000003	0.001	1880.000004	0.002	2.5
10	1880.000003	0.001	1880.000001	0.001	2.5
20	1879.999997	-0.002	1879.999999	-0.001	2.5
30	1879.999999	-0.001	1879.999998	-0.001	2.5
40	1879.999997	-0.001	1879.999998	-0.001	2.5
50	1879.999998	-0.001	1879.999998	-0.001	2.5
55	1879.999996	-0.002	1879.999996	-0.002	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.

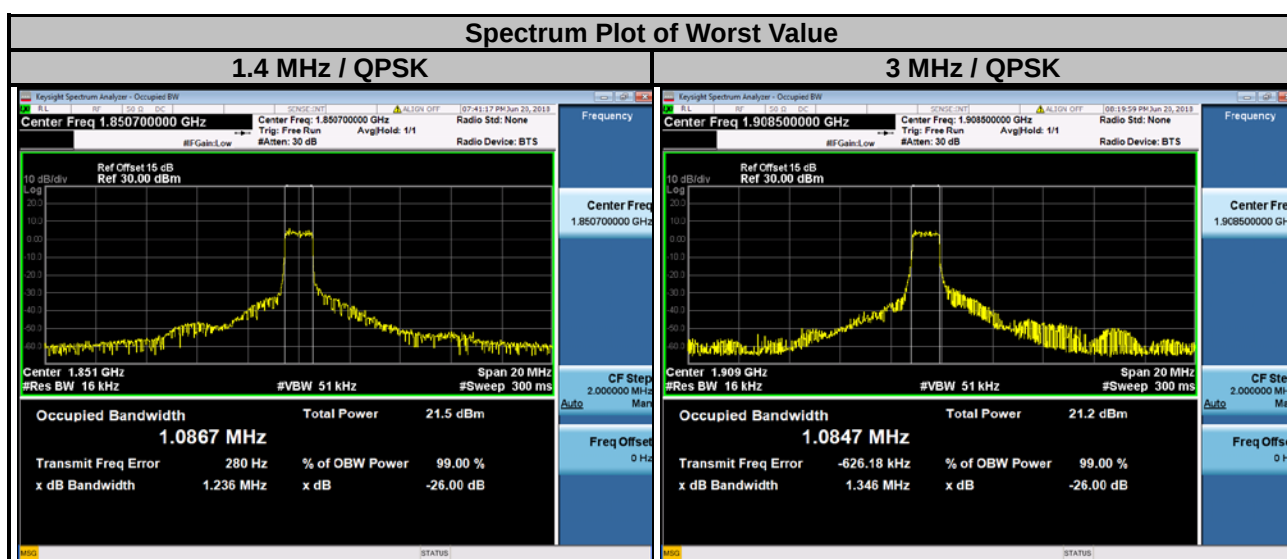
4.4.2 Test Setup



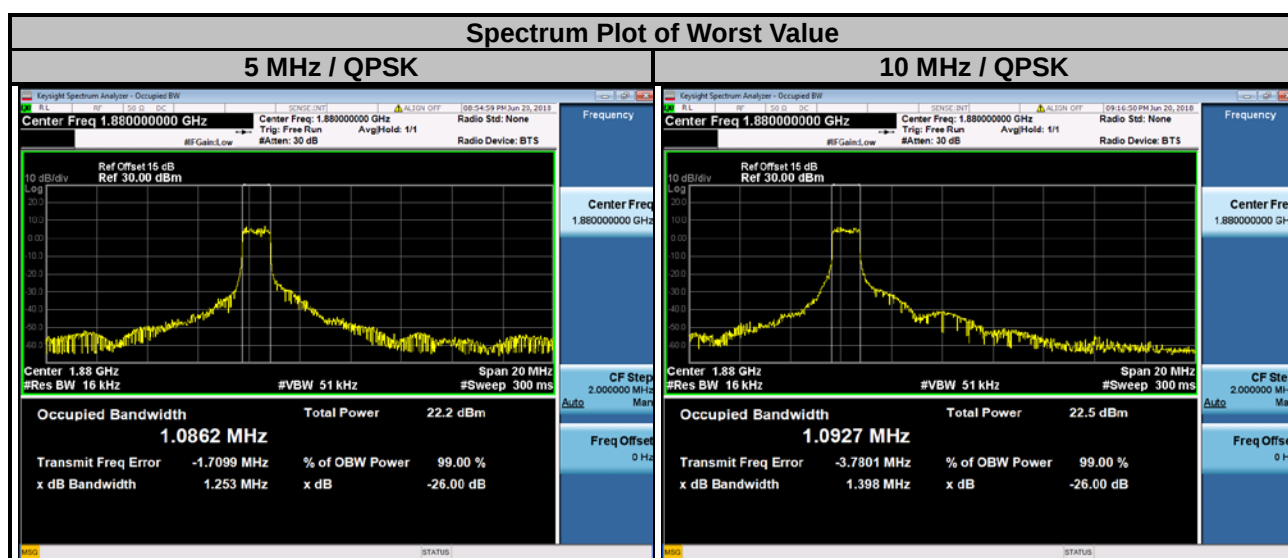
4.4.3 Test Result

Cat-M1

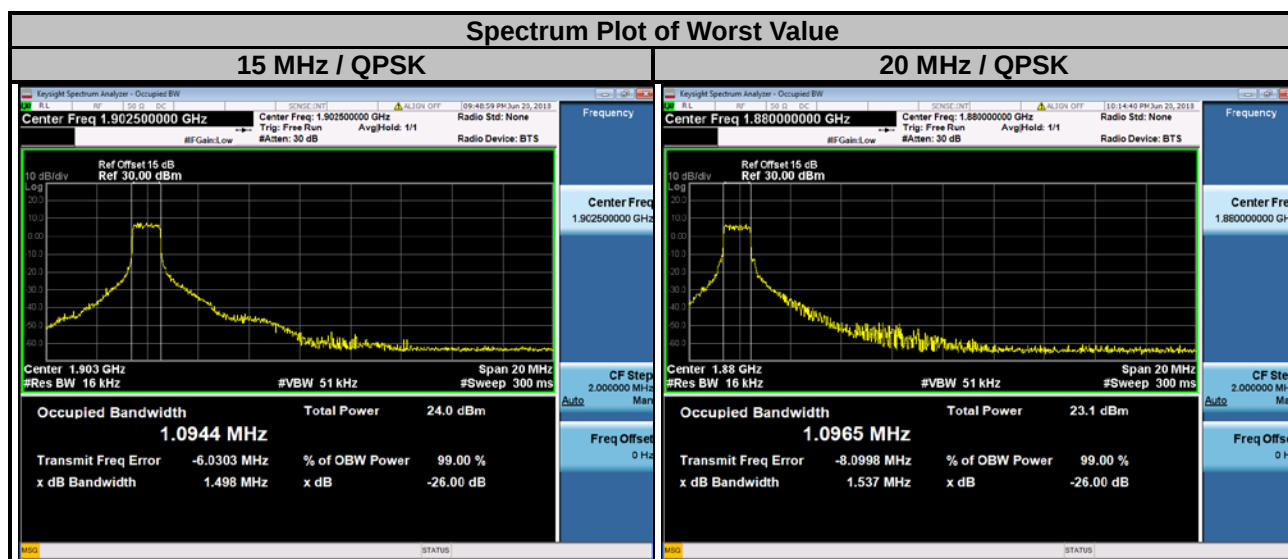
LTE Band 2							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.0867	0.9095	18615	1851.5	1.0807	0.9088
18900	1880.0	1.0862	0.9063	18900	1880.0	1.0804	0.9092
19193	1909.3	1.0860	0.9051	19185	1908.5	1.0847	0.9043



LTE Band 2							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	1.0834	0.9104	18650	1855.0	1.0876	0.9130
18900	1880.0	1.0862	0.9132	18900	1880.0	1.0927	0.9118
19175	1907.5	1.0838	0.9089	19150	1905.0	1.0898	0.9153

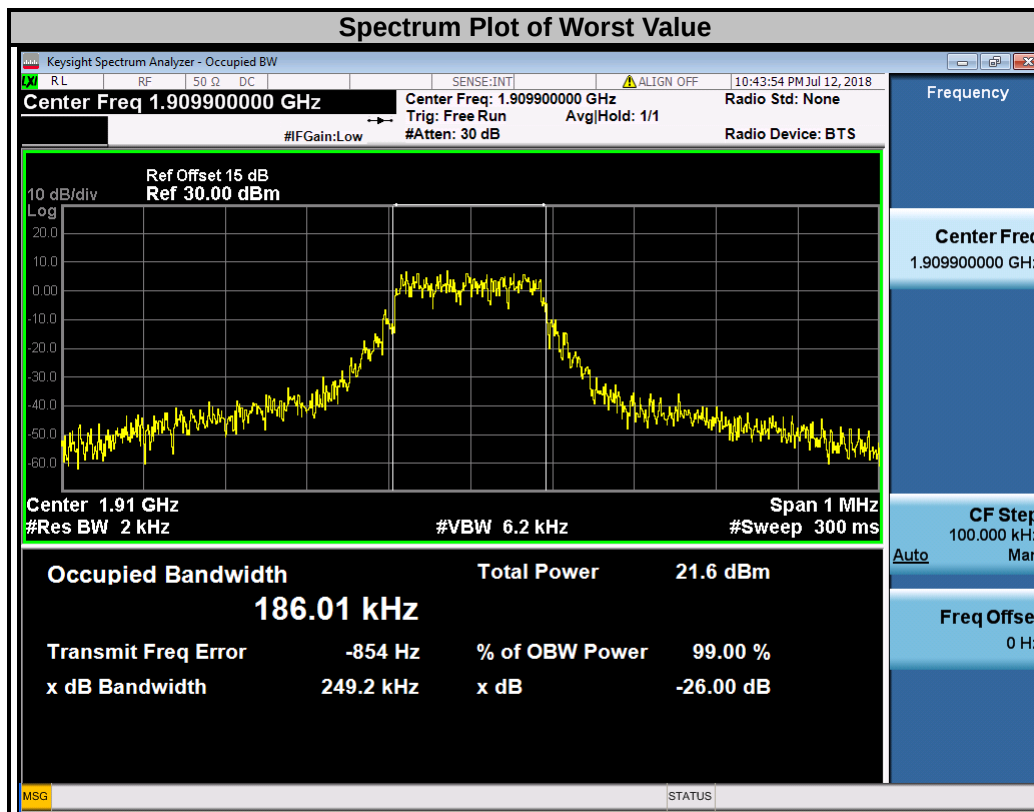


LTE Band 2							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	1.0862	0.9213	18700	1860.0	1.0893	0.9161
18900	1880.0	1.0838	0.9182	18900	1880.0	1.0965	0.9279
19125	1902.5	1.0944	0.9247	19100	1900.0	1.0907	0.9155



NB-IOT

99 % Occupied Bandwidth (kHz)					
Channel	Frequency (MHz)	Modulation	Ntones	Sub-carrier spacing (kHz)	99%
18601	1850.1	BPSK	1@0	3.75	56.56
		QPSK	1@0	15	120.26
		QPSK	3@3	15	130.43
		QPSK	12@0	15	183.45
18900	1880	BPSK	1@0	3.75	53.94
		QPSK	1@0	15	119.23
		QPSK	3@3	15	116.11
		QPSK	12@0	15	184.49
19199	1909.9	BPSK	1@47	3.75	52.51
		QPSK	1@11	15	123.75
		QPSK	3@3	15	131.89
		QPSK	12@0	15	186.01

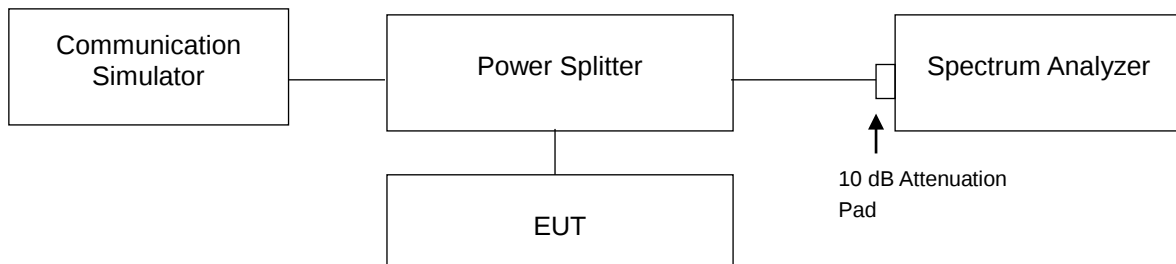


4.5 Band Edge Measurement

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

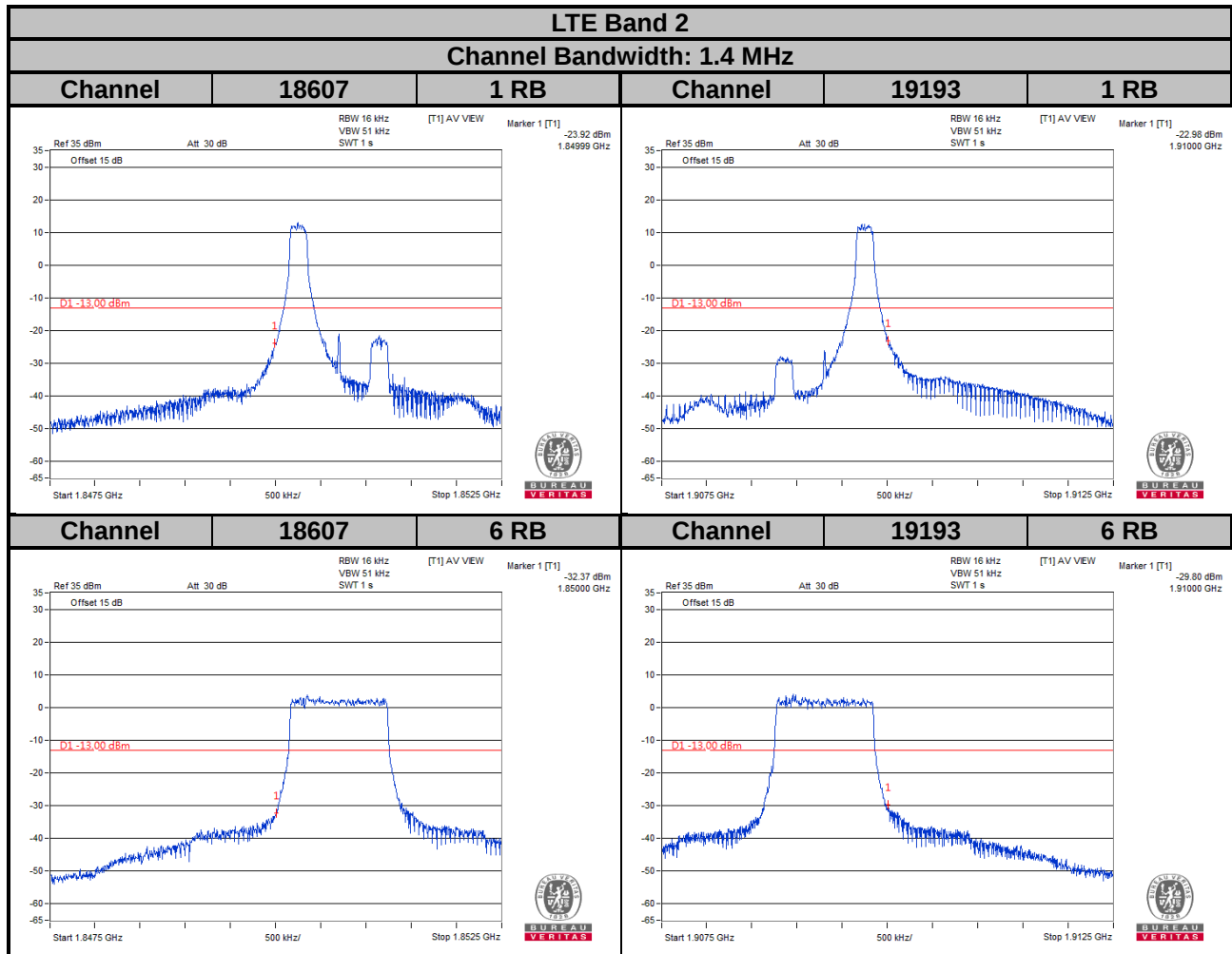


4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 16 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 / 3 / 5 / 10 / 15 / 20 MHz) for **Cat-M1**.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 Hz and VB of the spectrum is 160 Hz (BPSK) for **NB-IOT**.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 Hz and VB of the spectrum is 620 kHz (QPSK) for **NB-IOT**.
- Record the max trace plot into the test report.

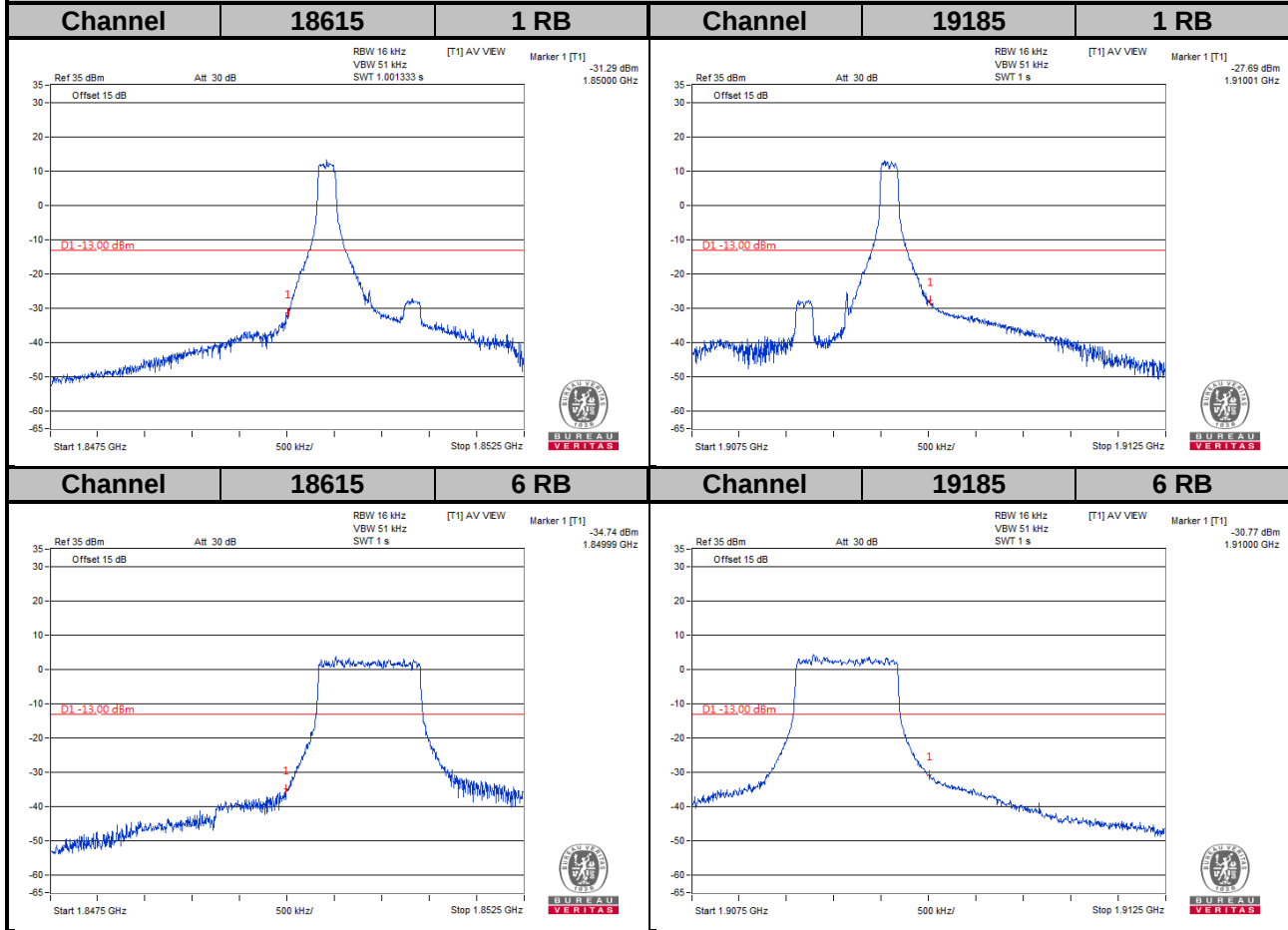
4.5.4 Test Results

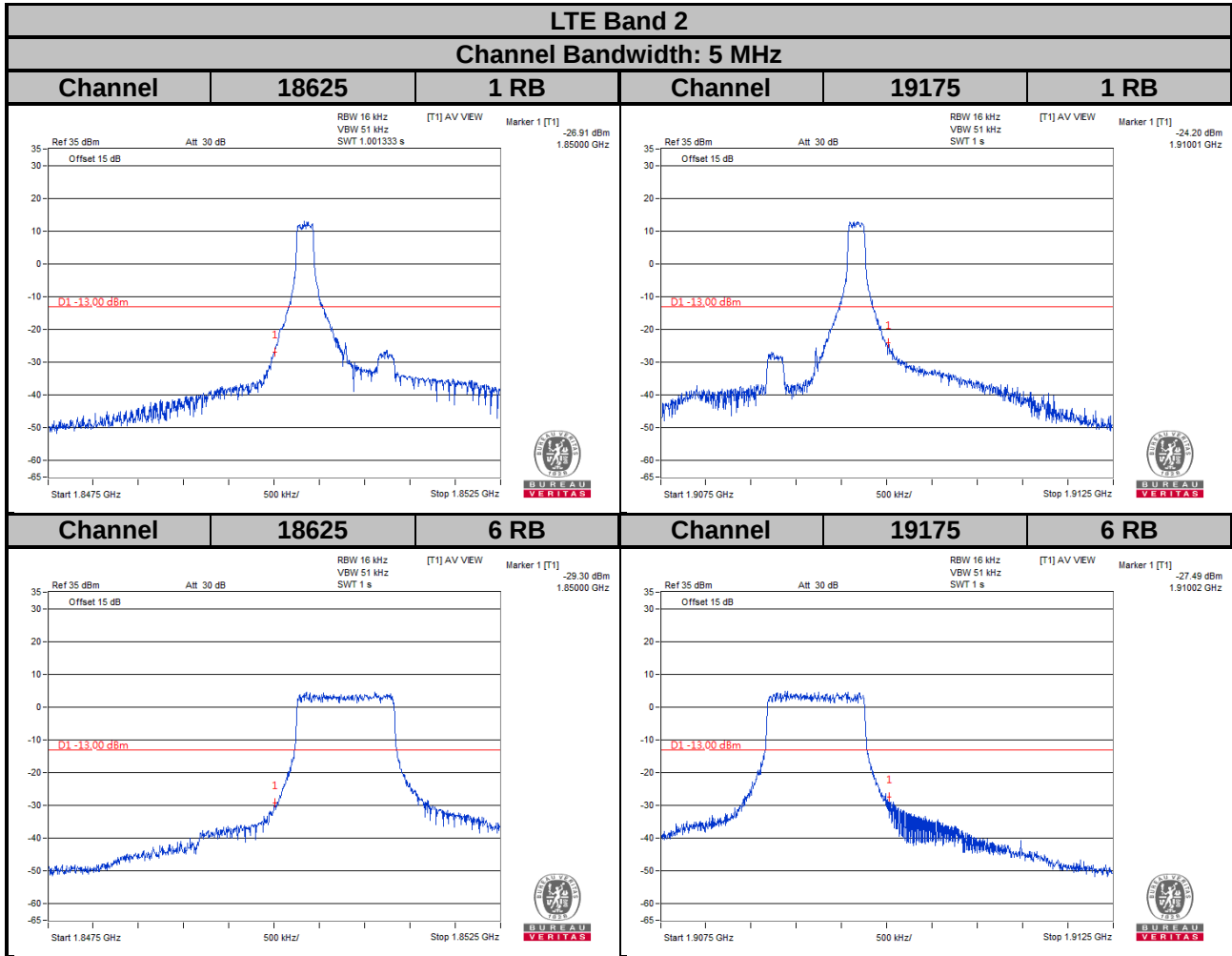
Cat-M1



LTE Band 2

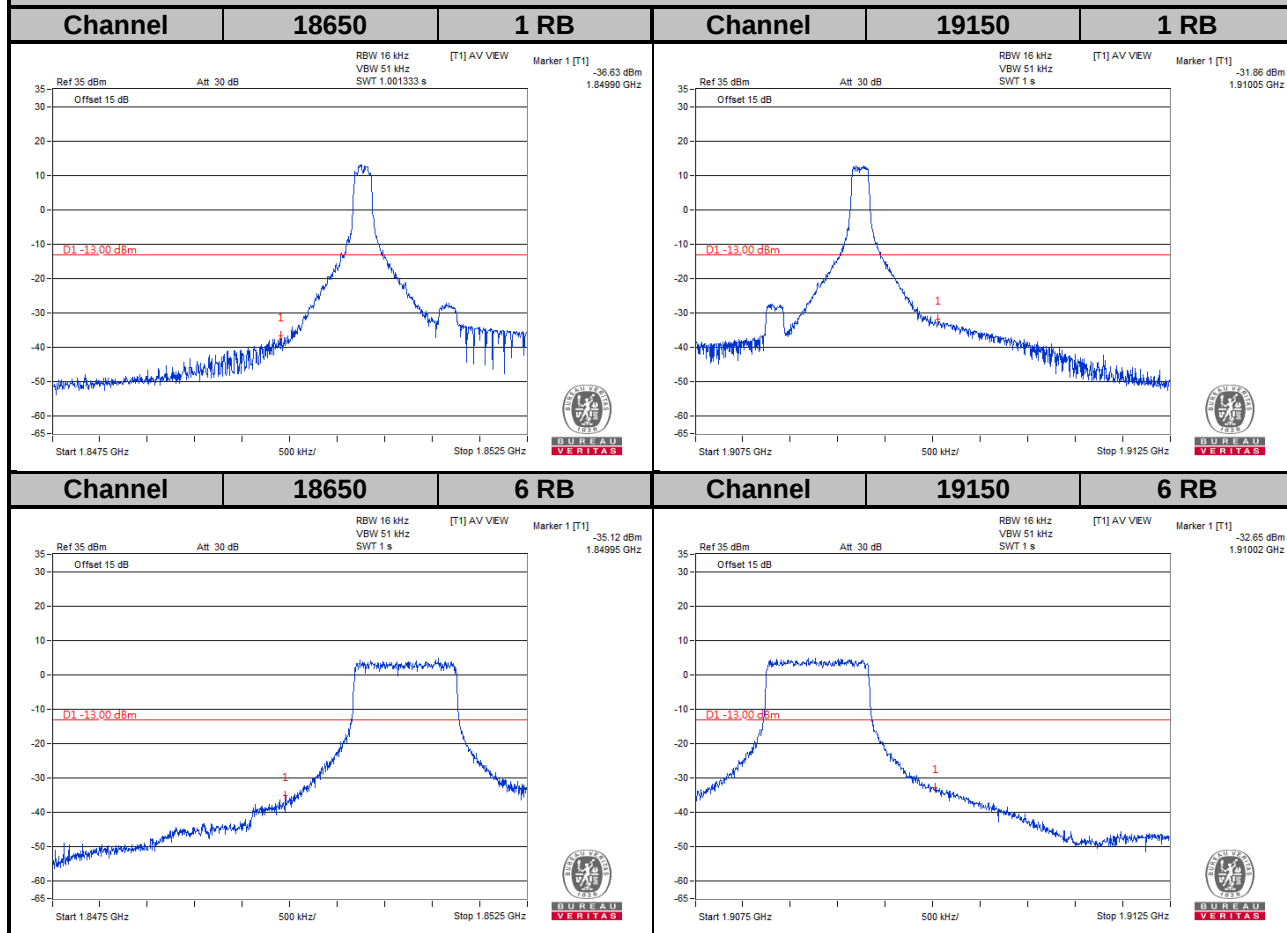
Channel Bandwidth: 3 MHz

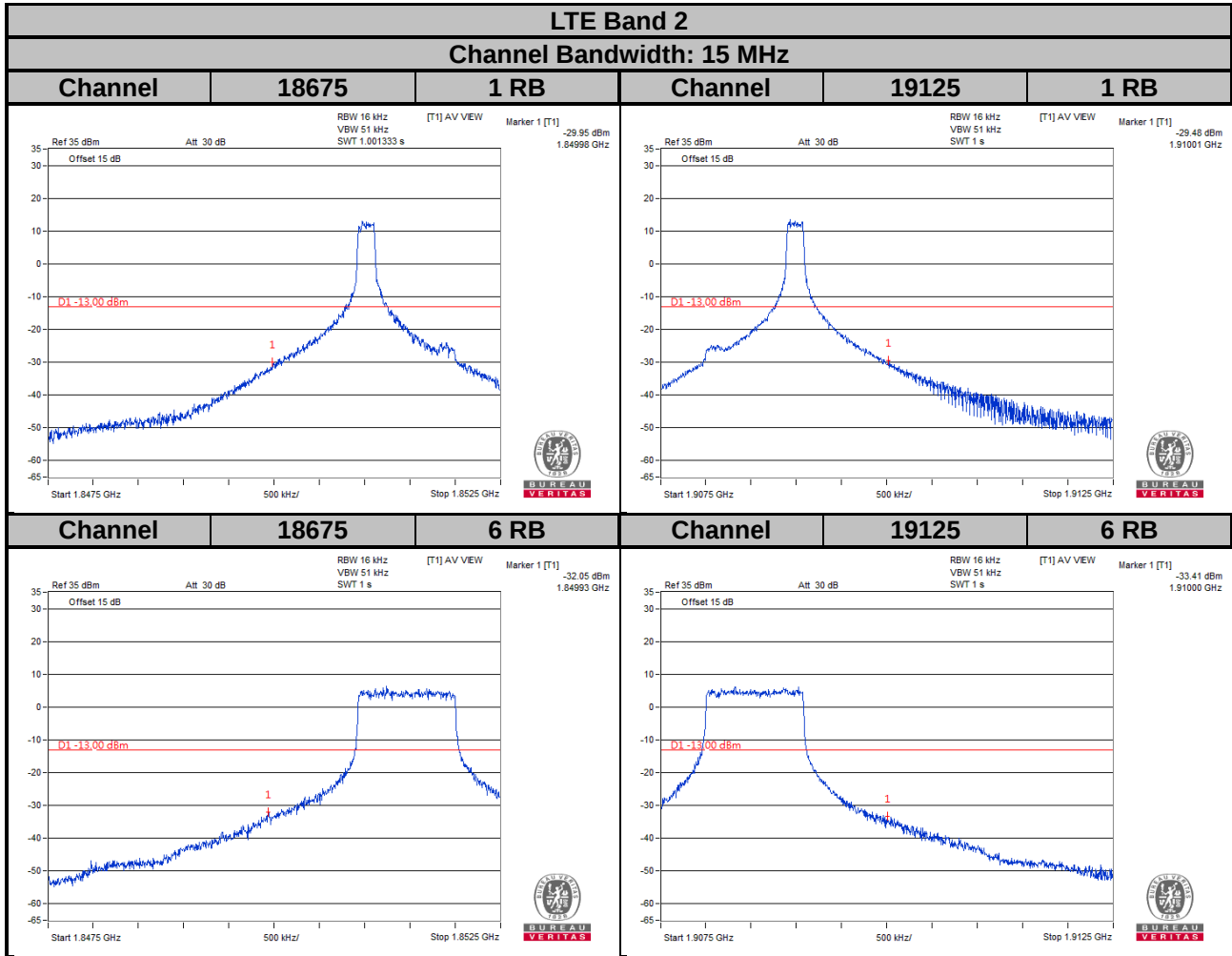


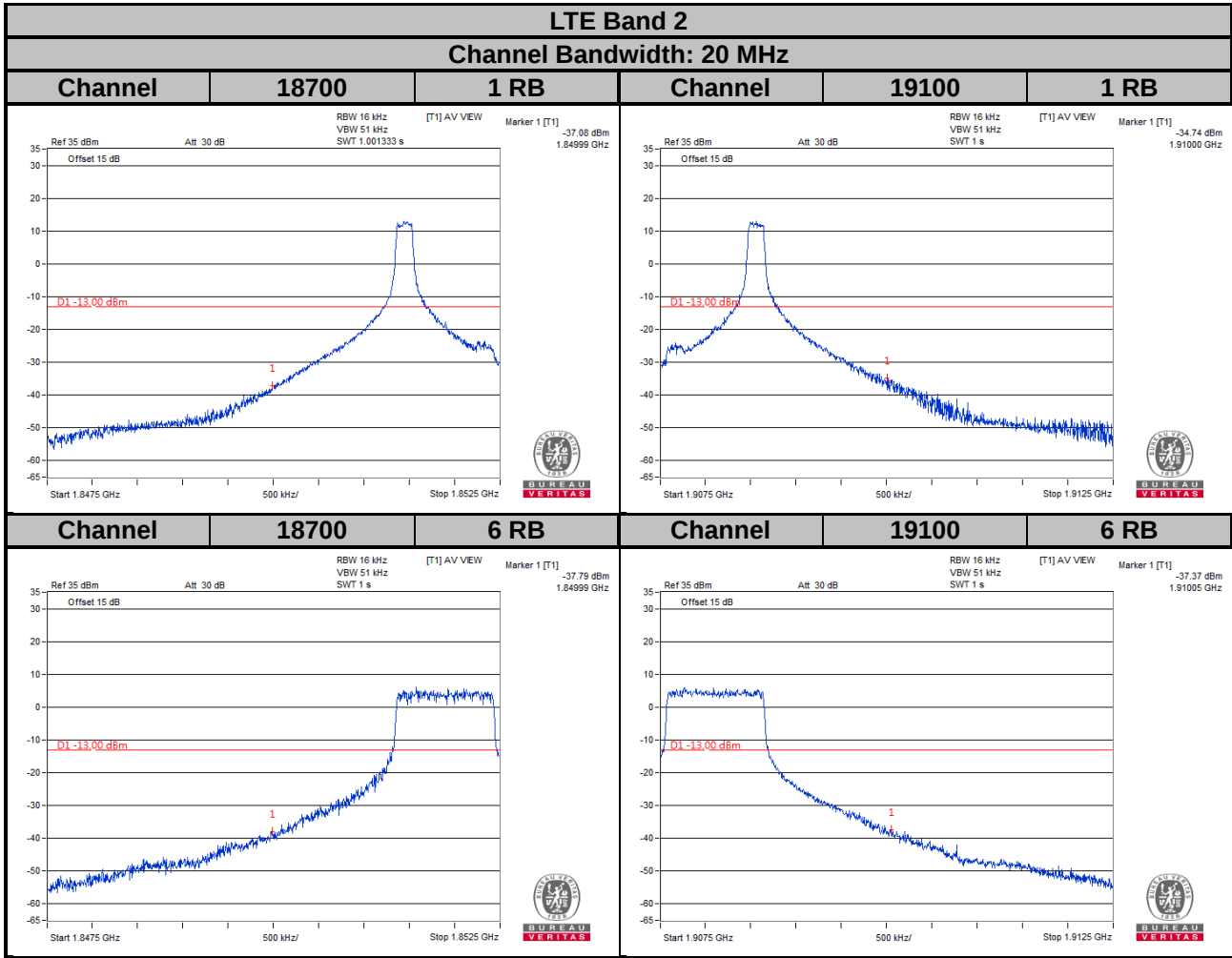


LTE Band 2

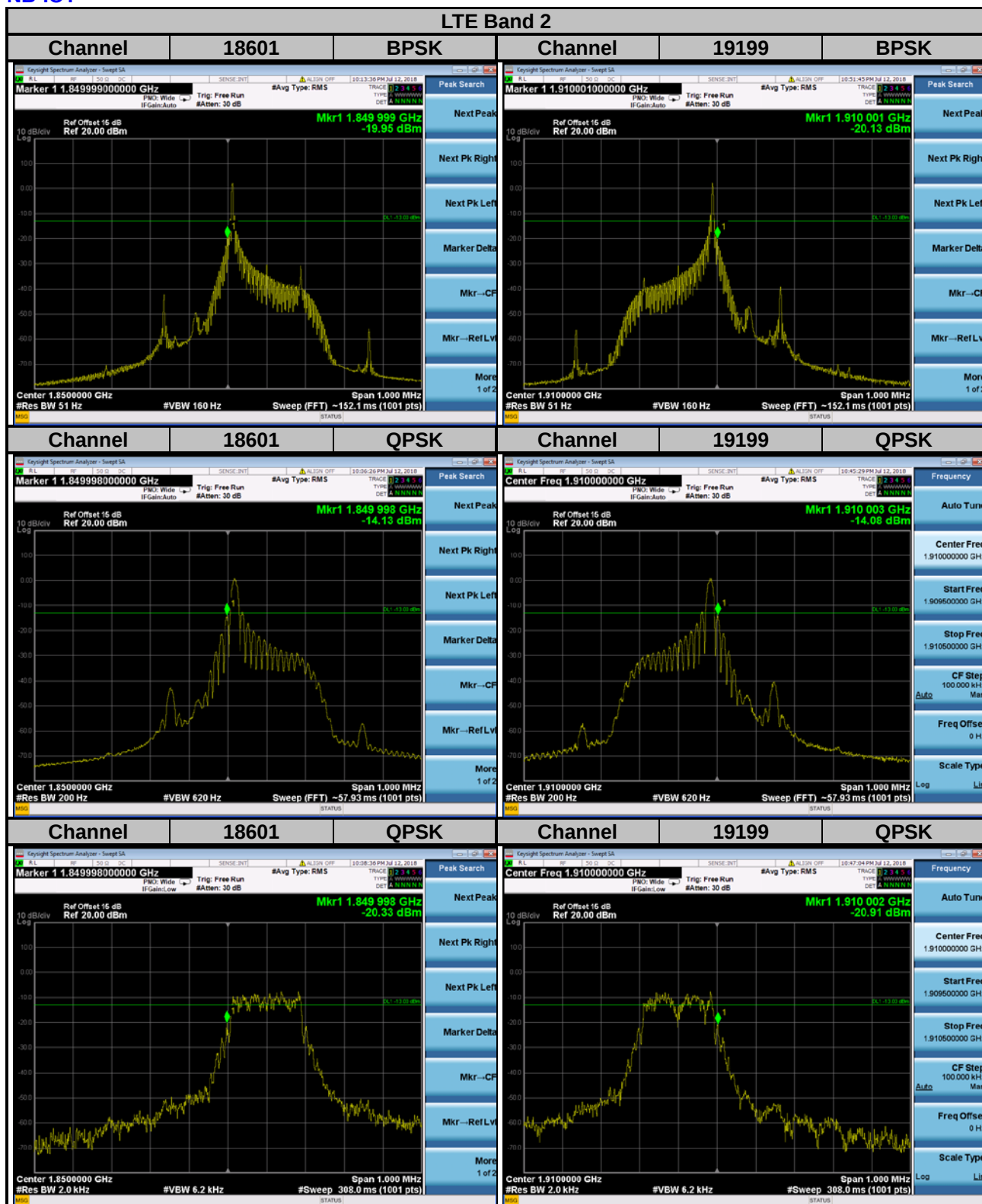
Channel Bandwidth: 10 MHz







NB-IOT

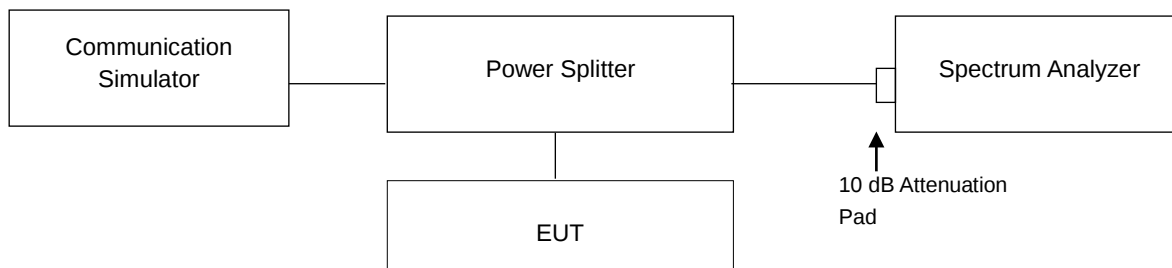


4.6 Peak to Average Ratio

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



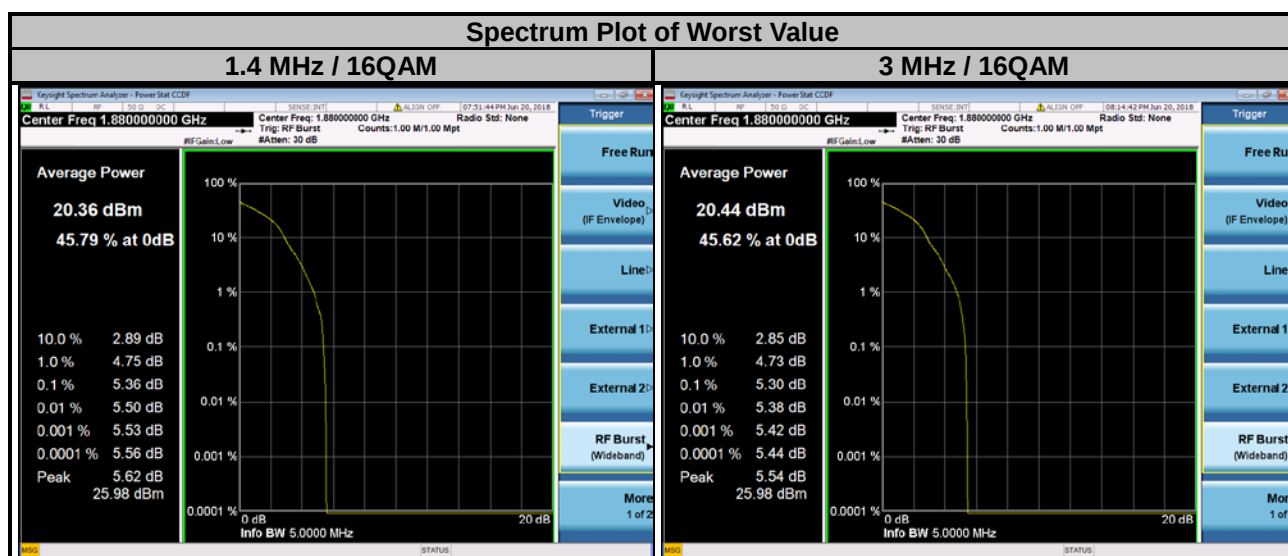
4.6.3 Test Procedures

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 %.

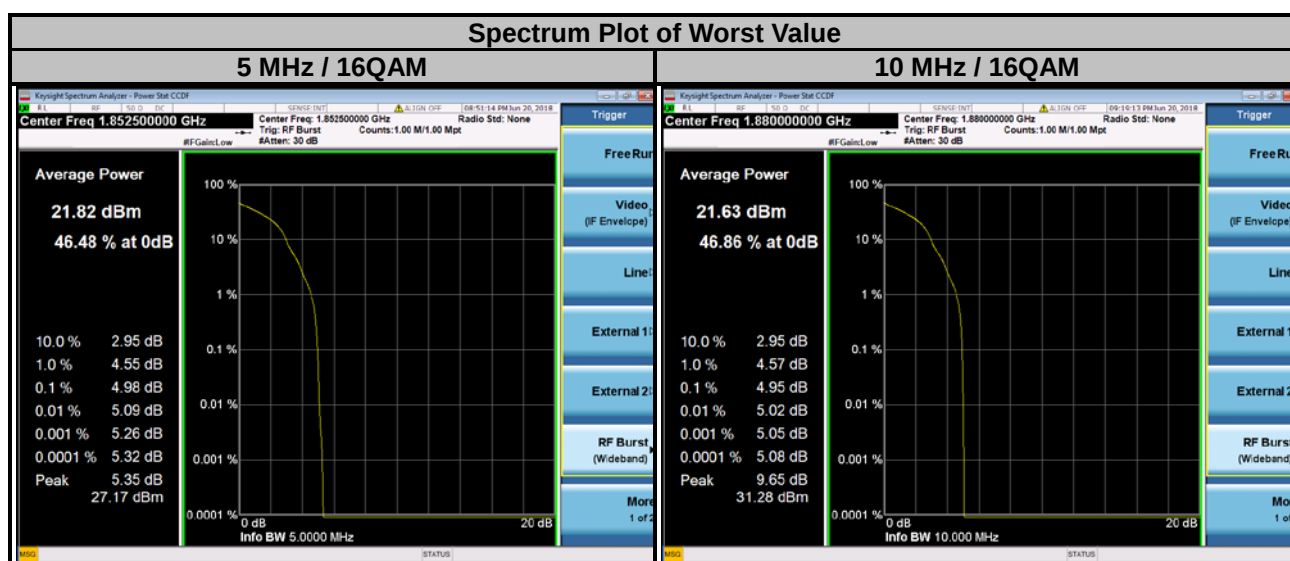
4.6.4 Test Results

Cat-M1

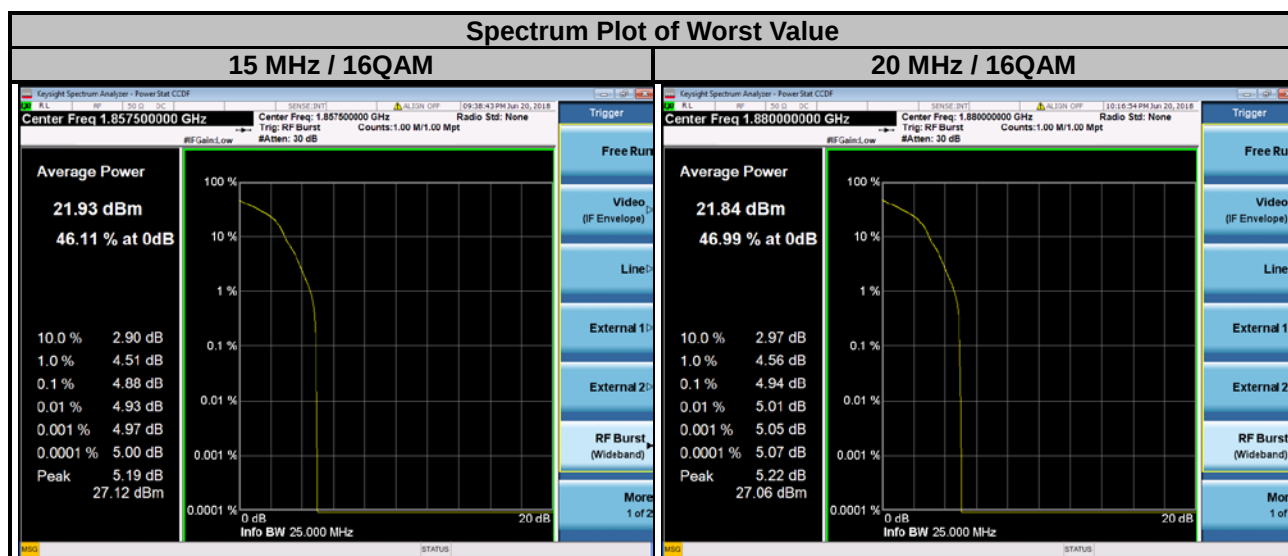
LTE Band 2							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	4.52	5.32	18615	1851.5	4.37	5.28
18900	1880.0	4.52	5.36	18900	1880.0	4.46	5.30
19193	1909.3	4.44	5.30	19185	1908.5	4.36	5.19



LTE Band 2							
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
18625	1852.5	4.43	4.98	18650	1855.0	4.36	4.92
18900	1880.0	4.57	4.94	18900	1880.0	4.43	4.95
19175	1907.5	4.41	4.90	19150	1905.0	4.37	4.90

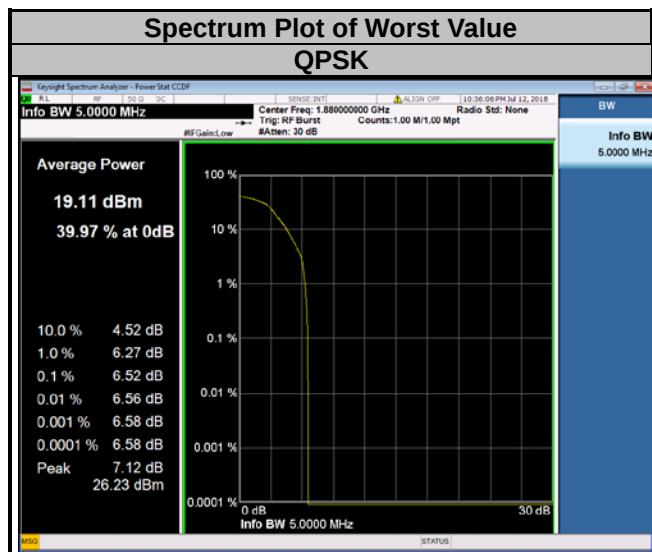


LTE Band 2							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	4.34	4.88	18700	1860.0	4.38	4.88
18900	1880.0	4.38	4.83	18900	1880.0	4.41	4.94
19125	1902.5	4.32	4.76	19100	1900.0	4.39	4.79



NB-IOT

Peak to Average Ratio (dB)					
Channel	Frequency (MHz)	Modulation	Sub-carrier spacing (kHz)	CCDF	Limit
18900	1880	BPSK	3.75	1.77	13.00
18900	1880	QPSK	15	1.59	
18900	1880	QPSK	15	6.52	

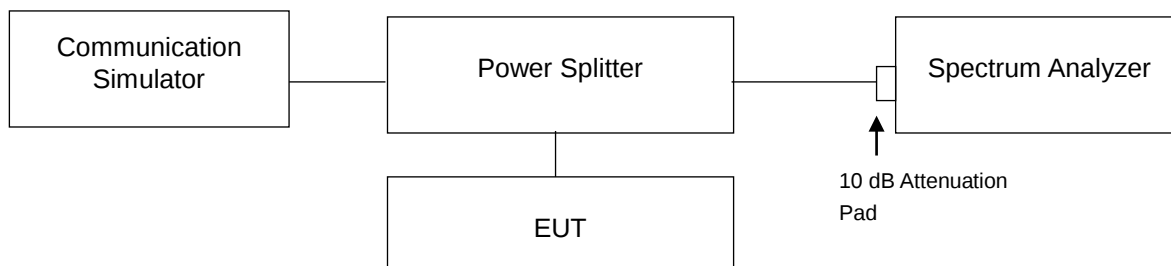


4.7 Conducted Spurious Emissions

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

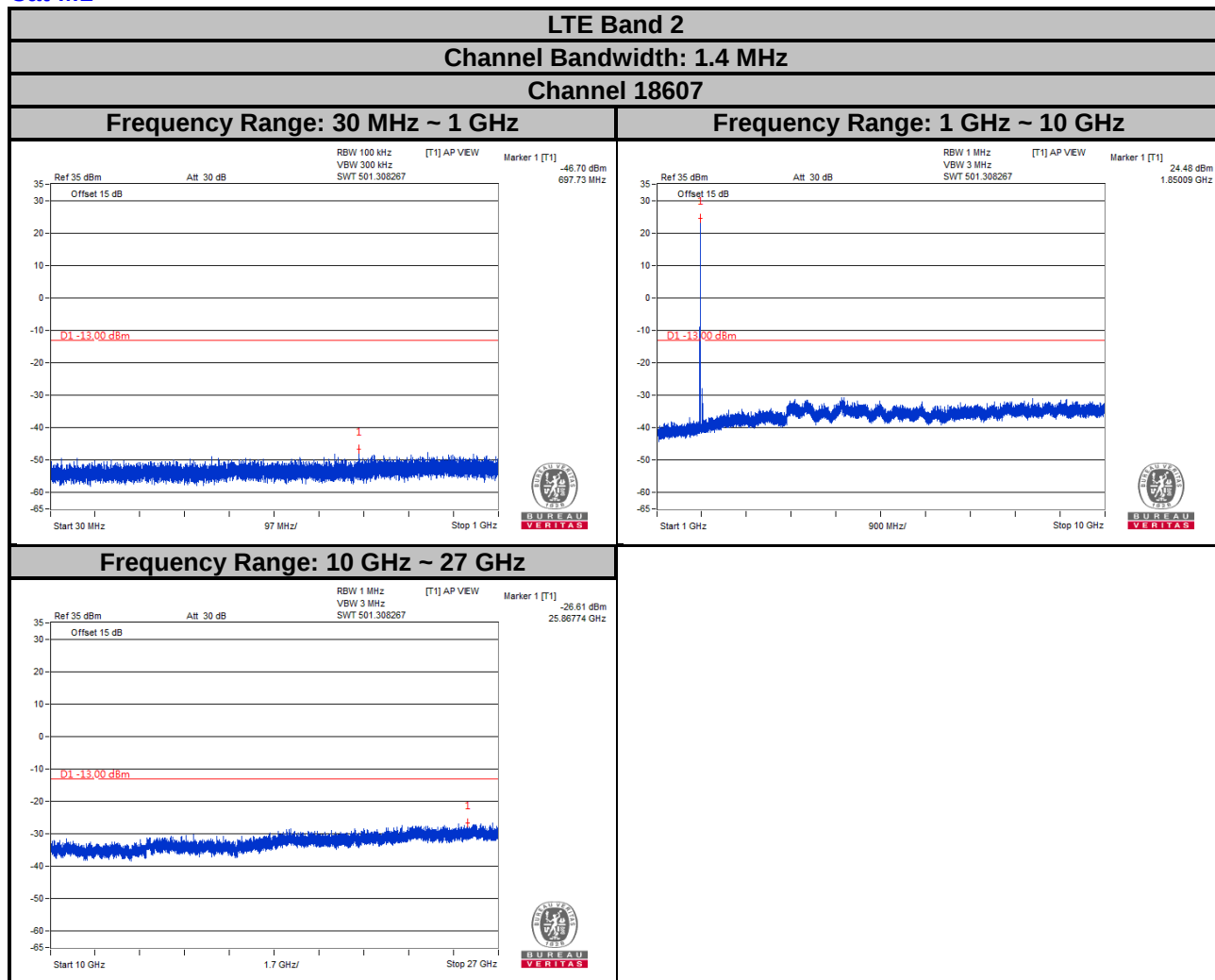


4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- For LTE, measuring frequency range is from 30 MHz to 27 GHz. 20 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

Cat-M1

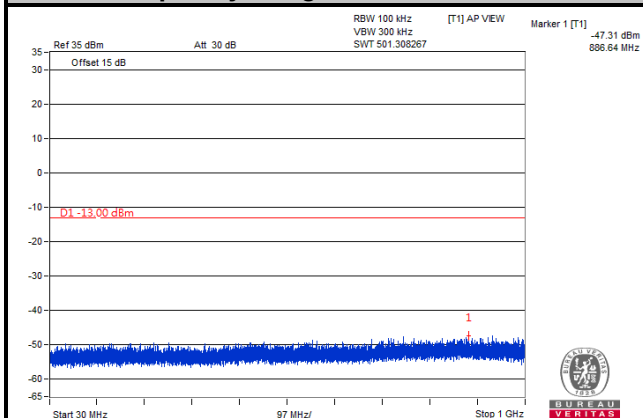


LTE Band 2

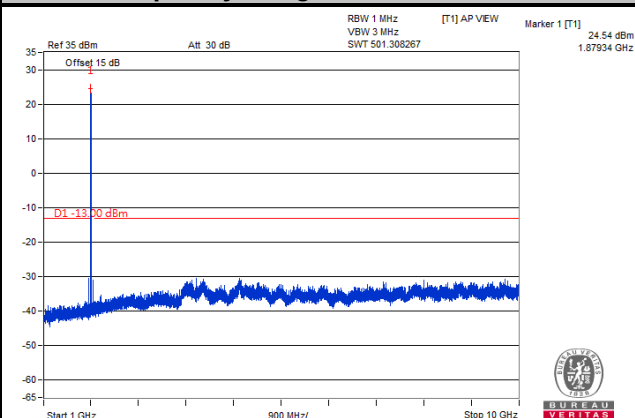
Channel Bandwidth: 1.4 MHz

Channel 18900

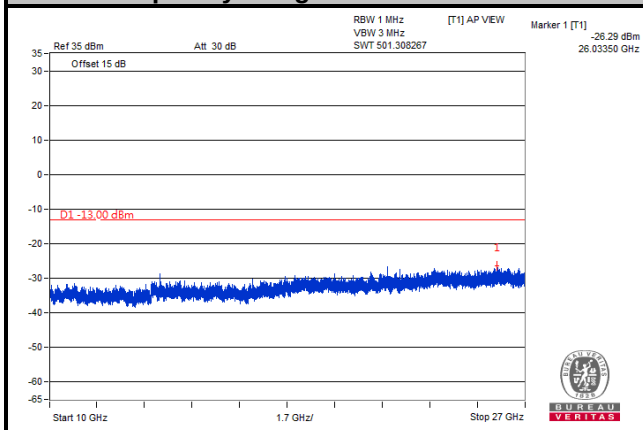
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

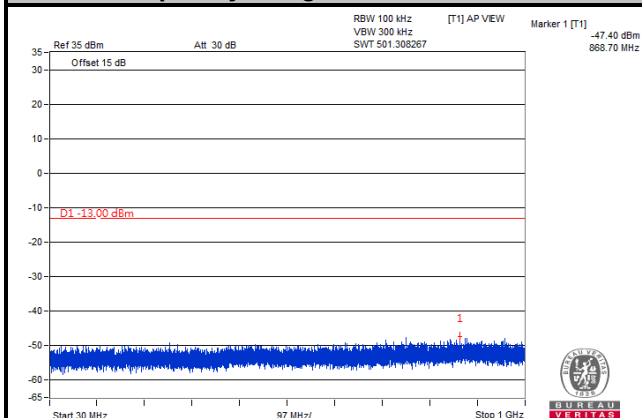


LTE Band 2

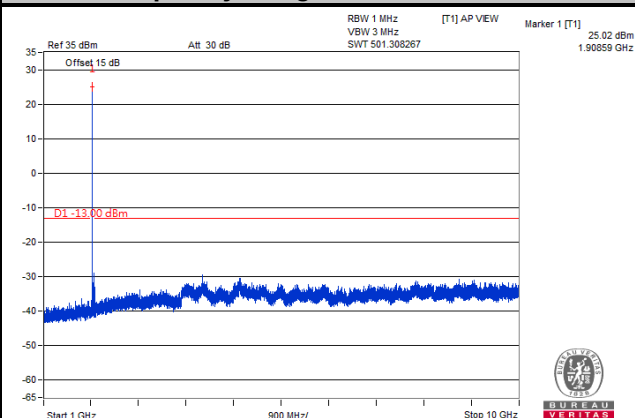
Channel Bandwidth: 1.4 MHz

Channel 19193

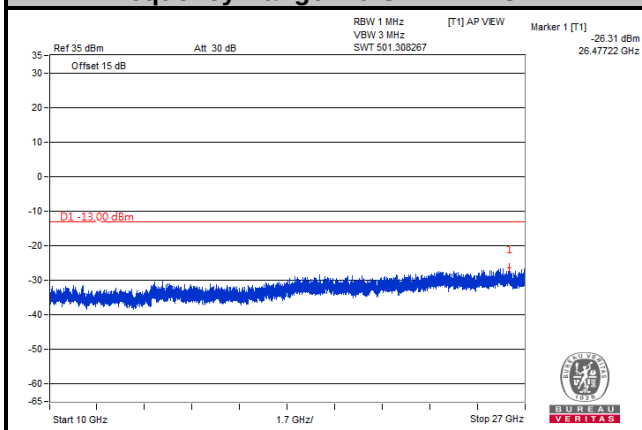
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

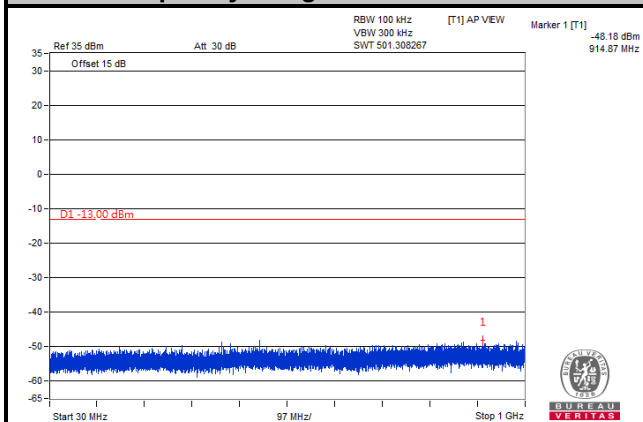


LTE Band 2

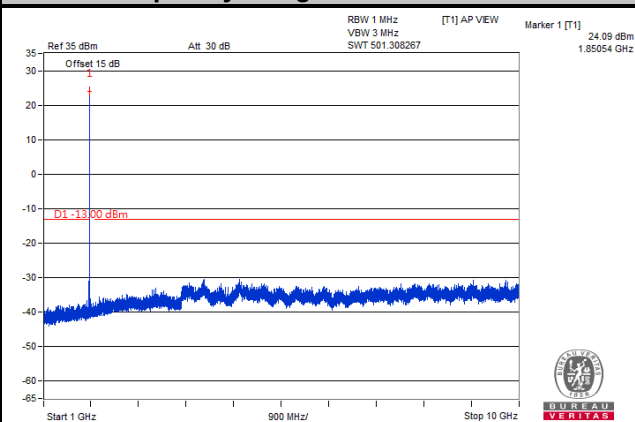
Channel Bandwidth: 3 MHz

Channel 18615

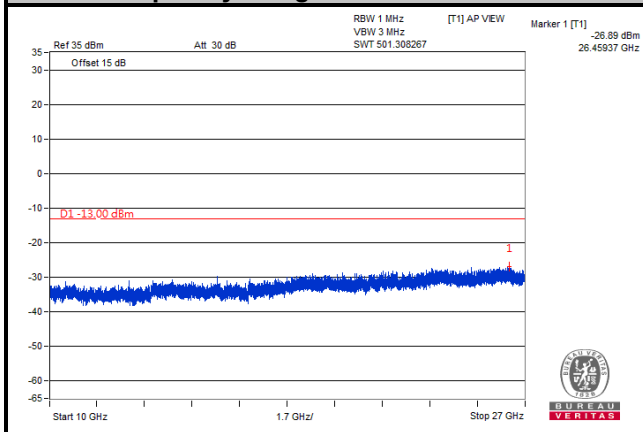
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

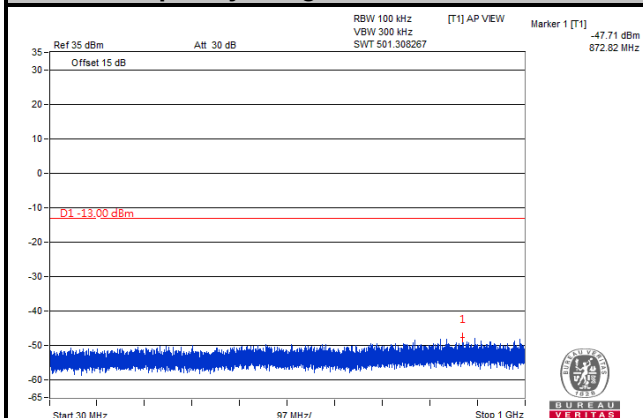


LTE Band 2

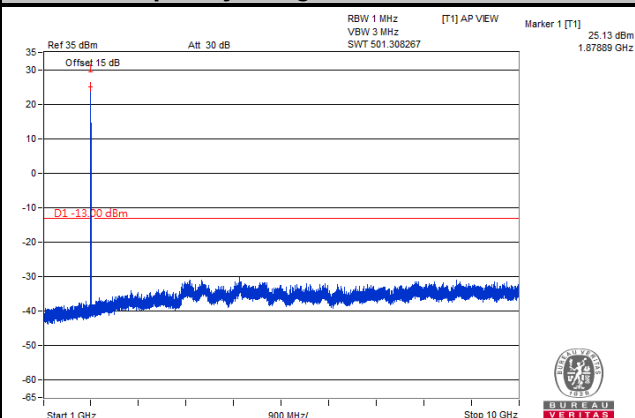
Channel Bandwidth: 3 MHz

Channel 18900

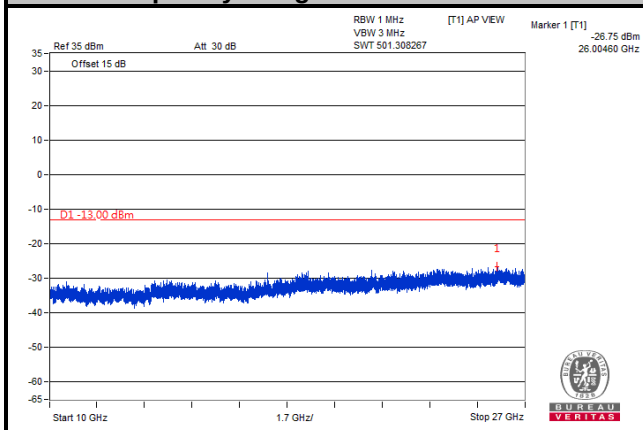
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

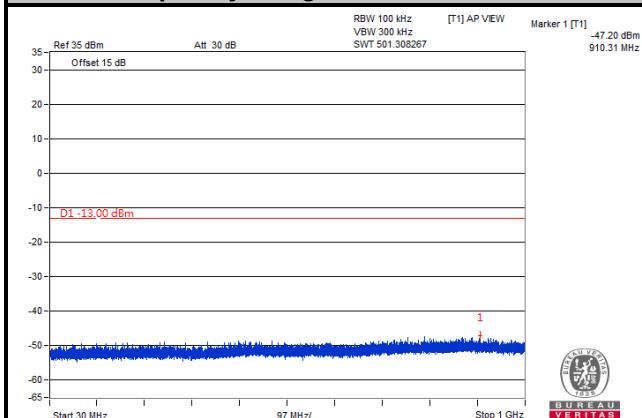


LTE Band 2

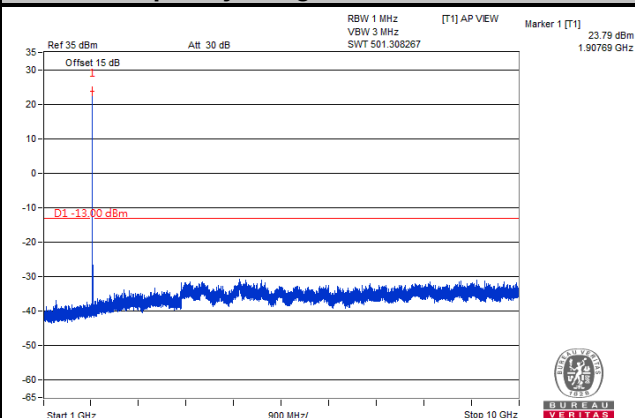
Channel Bandwidth: 3 MHz

Channel 19185

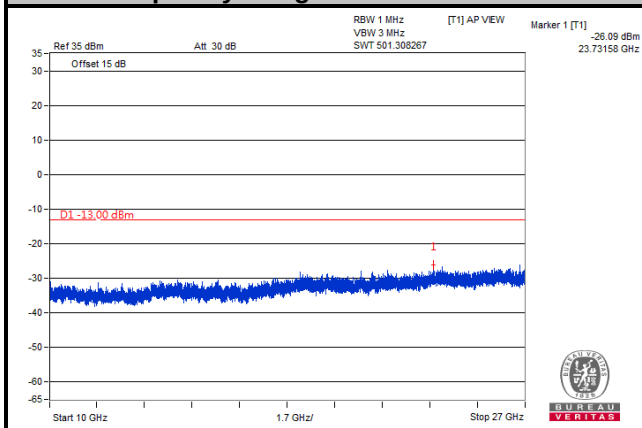
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

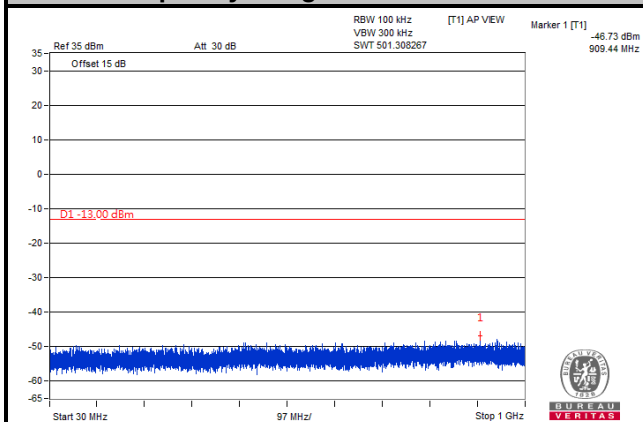


LTE Band 2

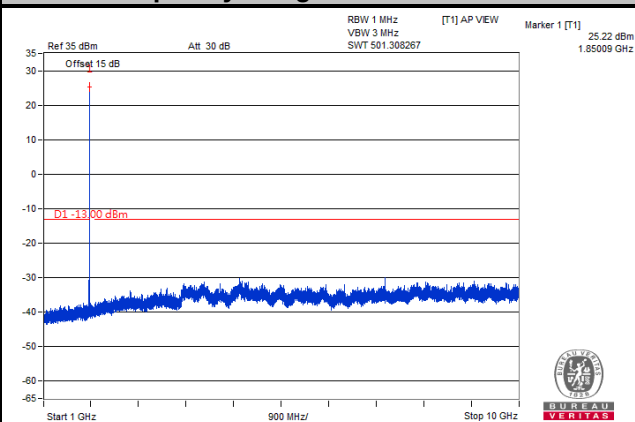
Channel Bandwidth: 5 MHz

Channel 18625

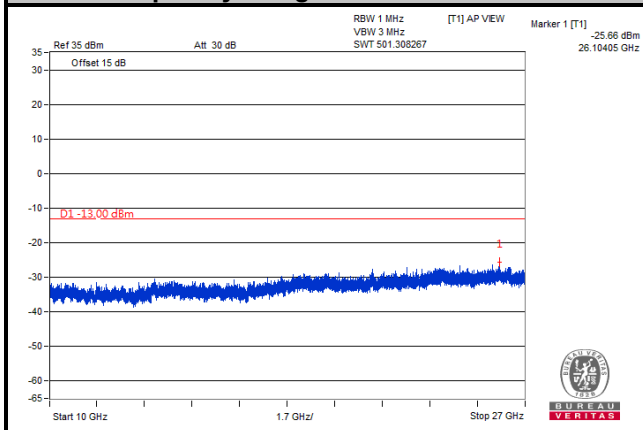
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

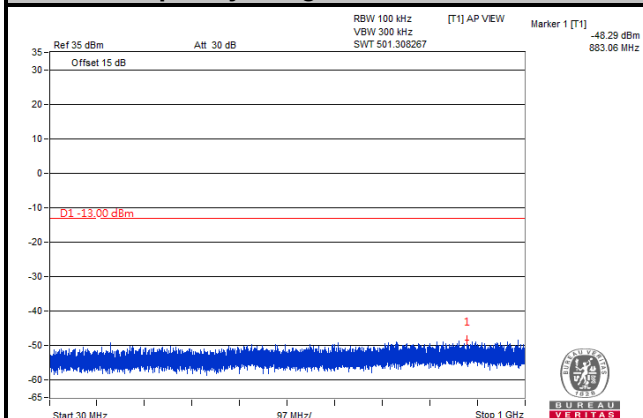


LTE Band 2

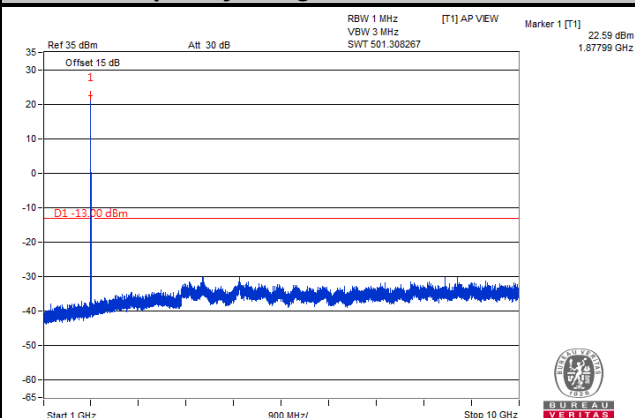
Channel Bandwidth: 5 MHz

Channel 18900

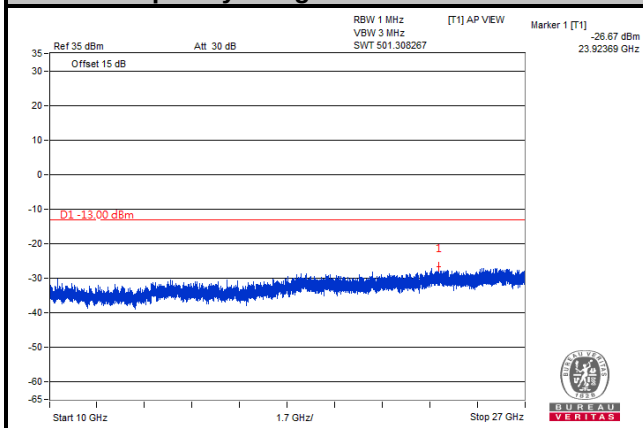
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

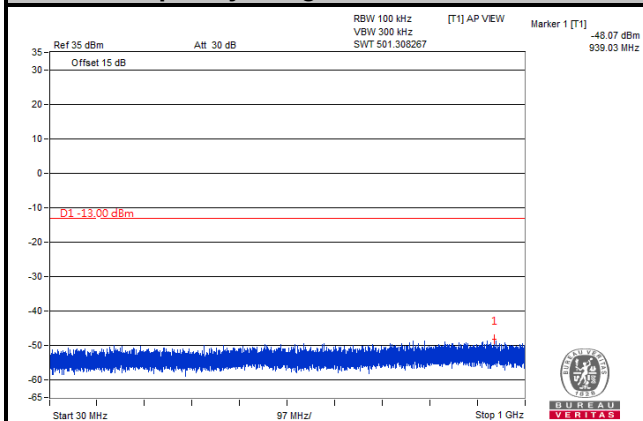


LTE Band 2

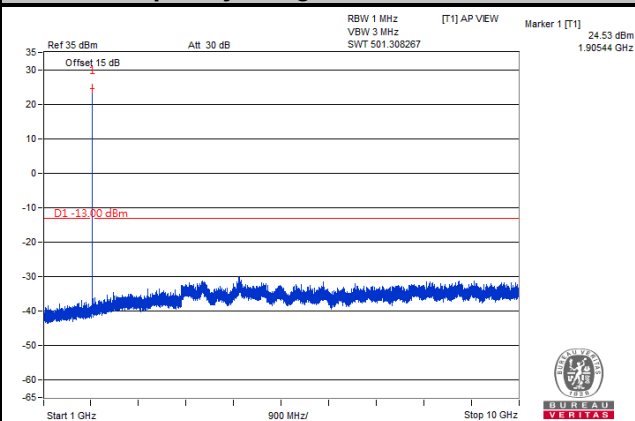
Channel Bandwidth: 5 MHz

Channel 19175

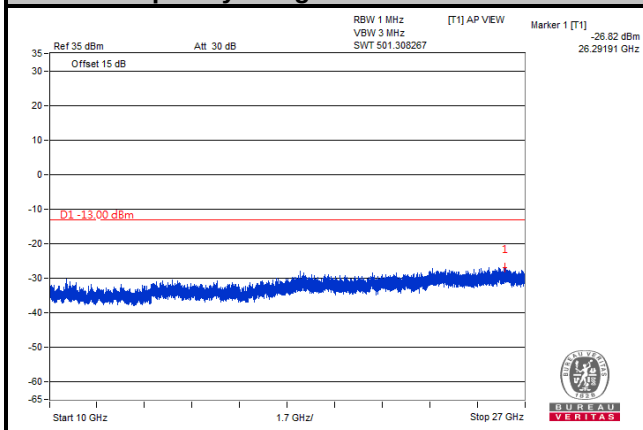
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz



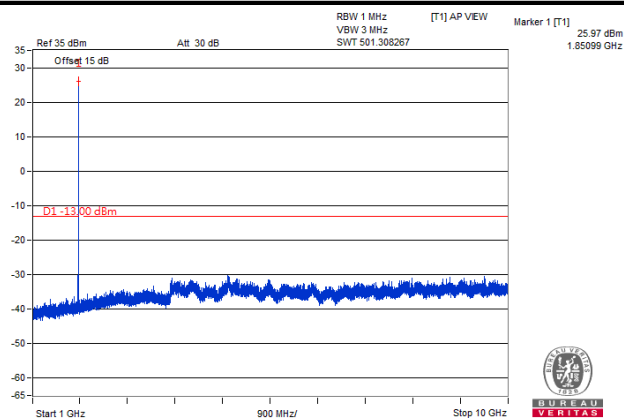
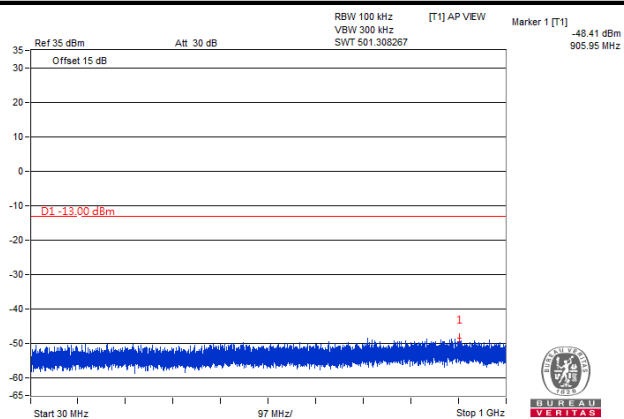
LTE Band 2

Channel Bandwidth: 10 MHz

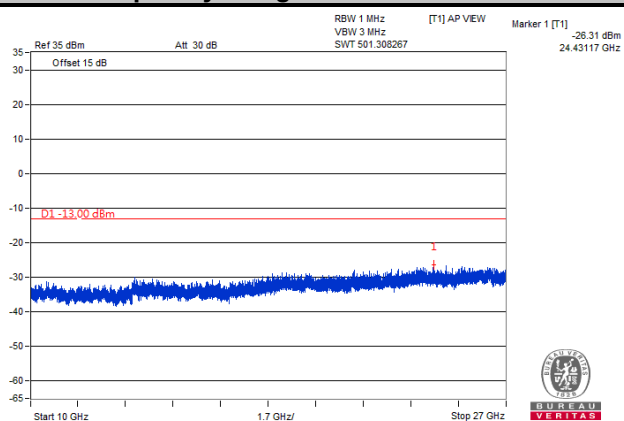
Channel 18650

Frequency Range: 30 MHz ~ 1 GHz

Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

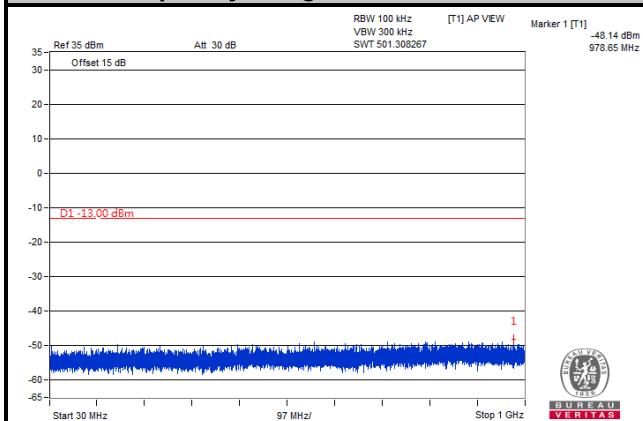


LTE Band 2

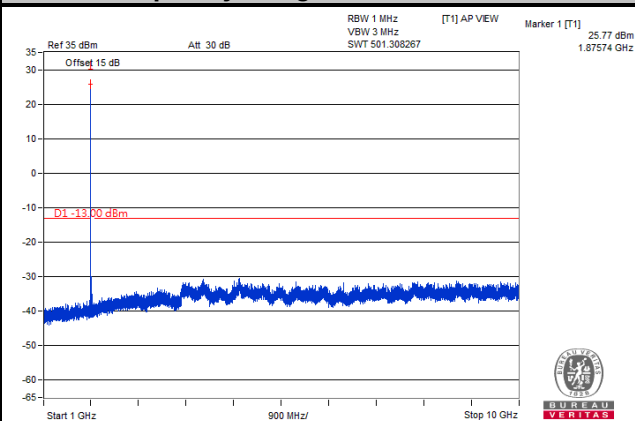
Channel Bandwidth: 10 MHz

Channel 18900

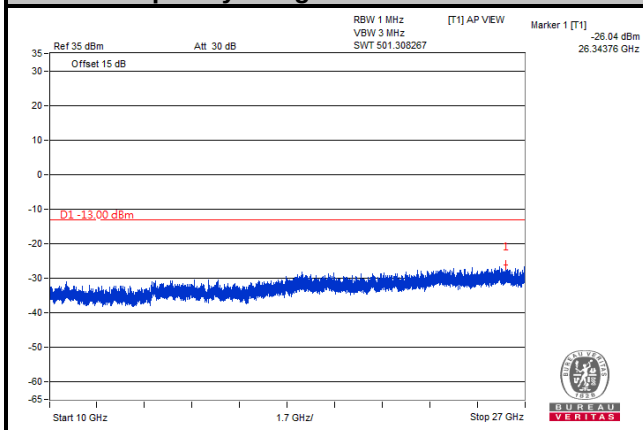
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

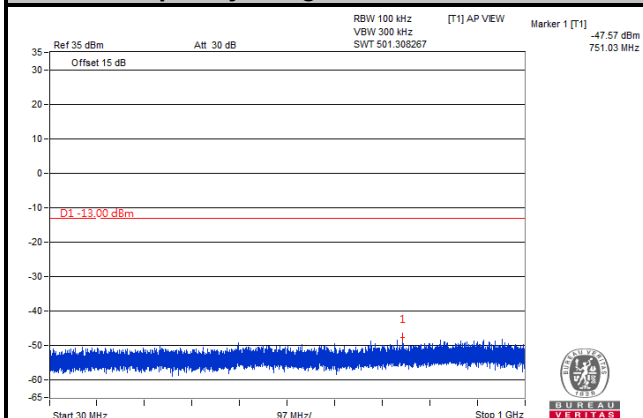


LTE Band 2

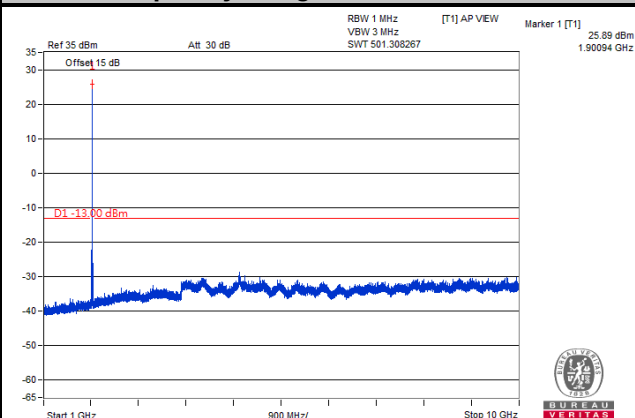
Channel Bandwidth: 10 MHz

Channel 19150

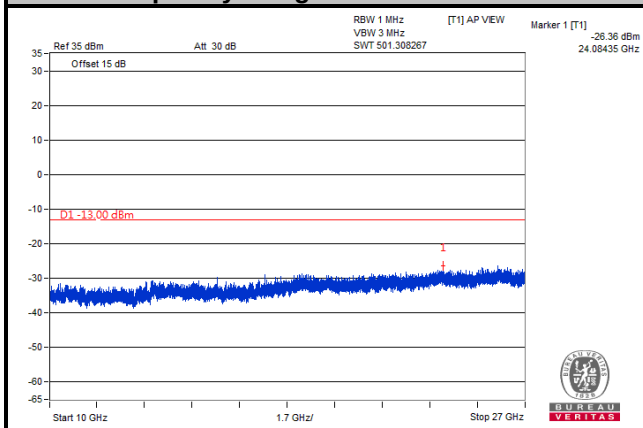
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

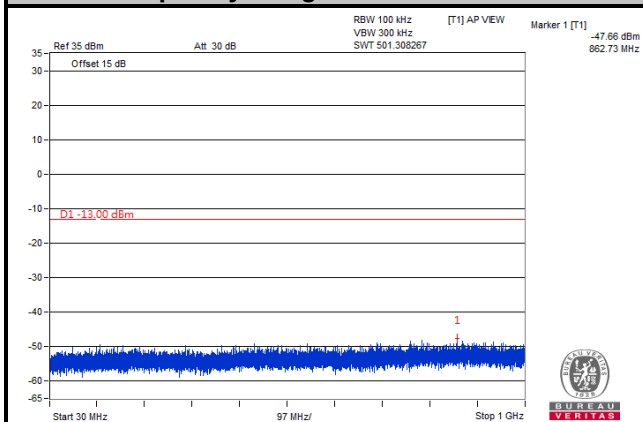


LTE Band 2

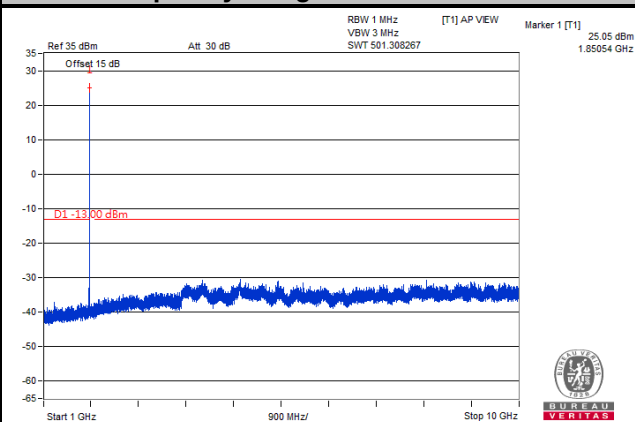
Channel Bandwidth: 15 MHz

Channel 18675

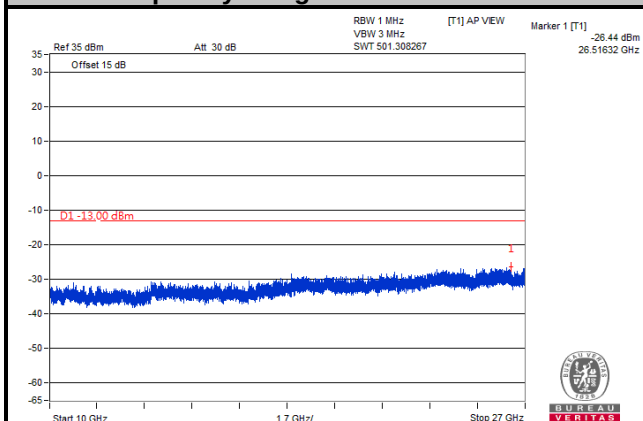
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

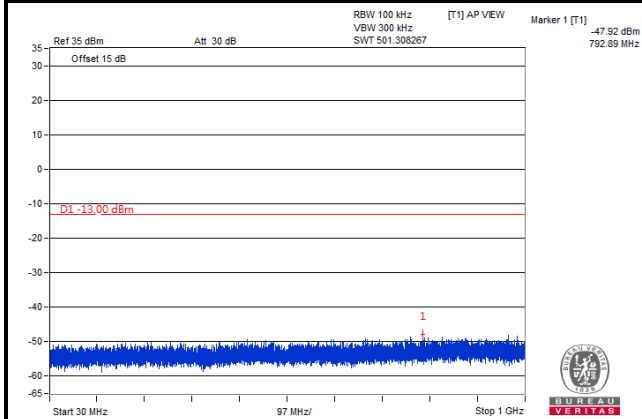


LTE Band 2

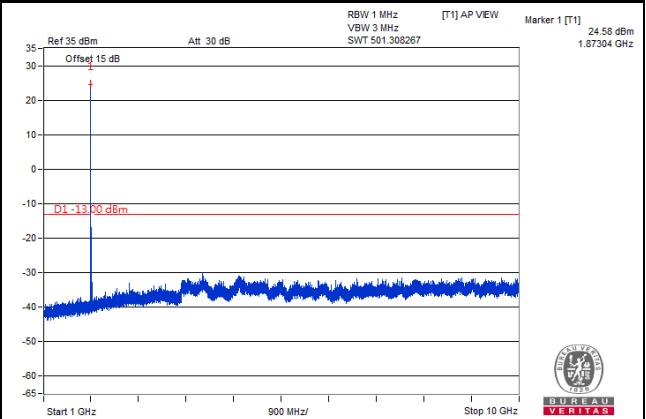
Channel Bandwidth: 15 MHz

Channel 18900

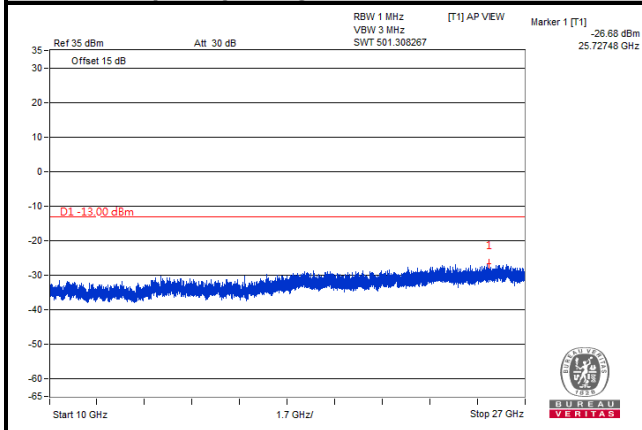
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

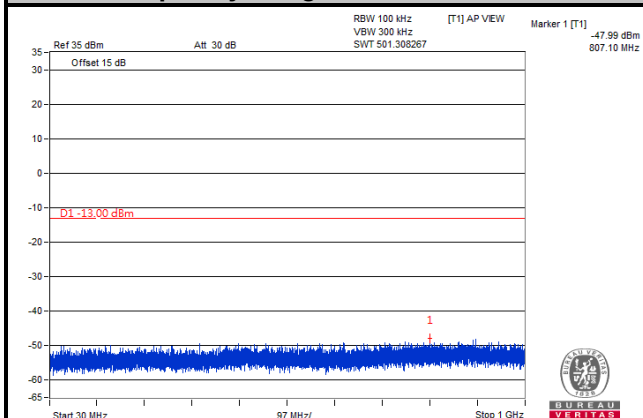


LTE Band 2

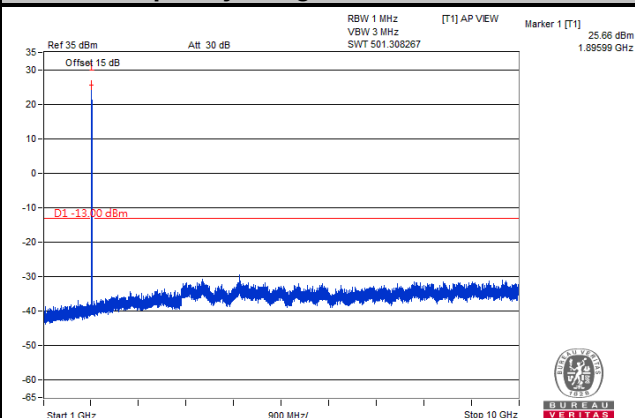
Channel Bandwidth: 15 MHz

Channel 19125

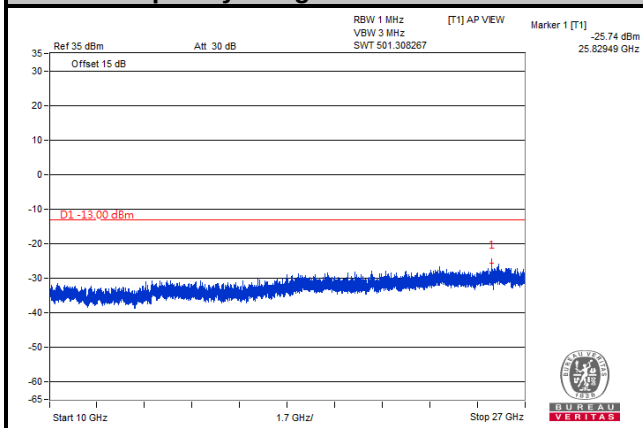
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

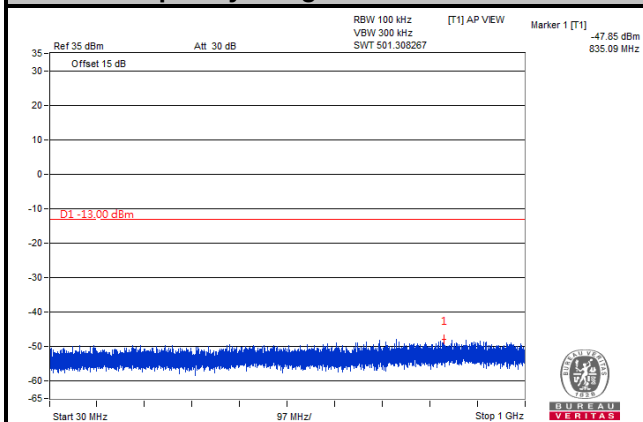


LTE Band 2

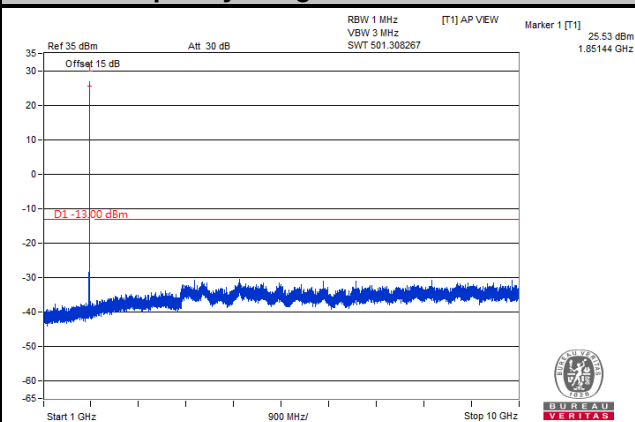
Channel Bandwidth: 20 MHz

Channel 18700

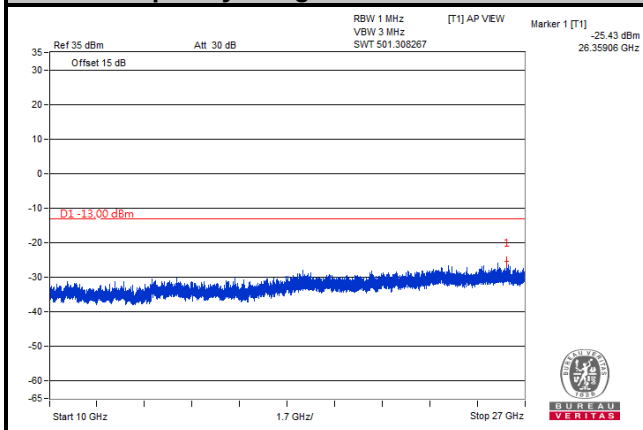
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

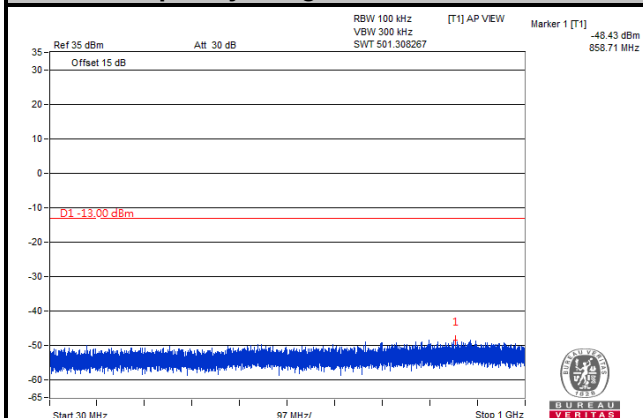


LTE Band 2

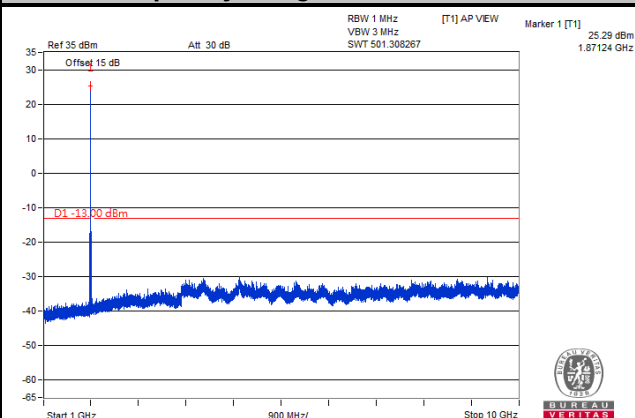
Channel Bandwidth: 20 MHz

Channel 18900

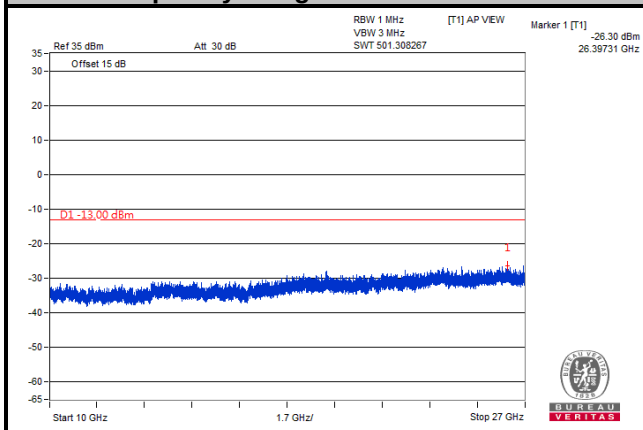
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

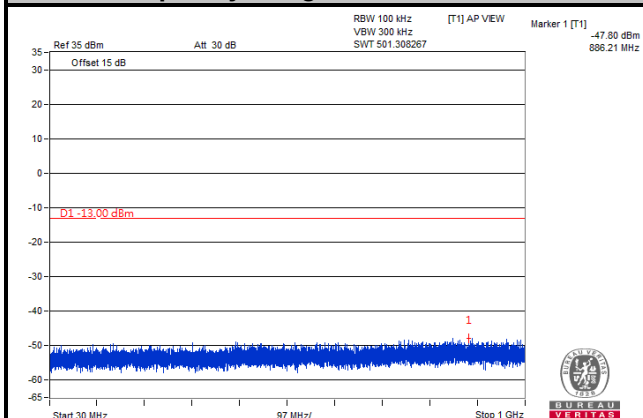


LTE Band 2

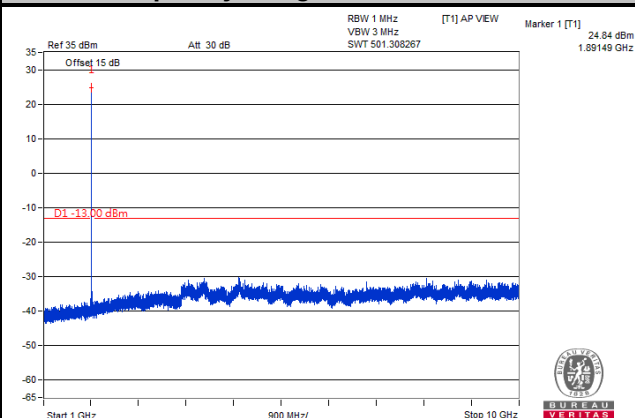
Channel Bandwidth: 20 MHz

Channel 19100

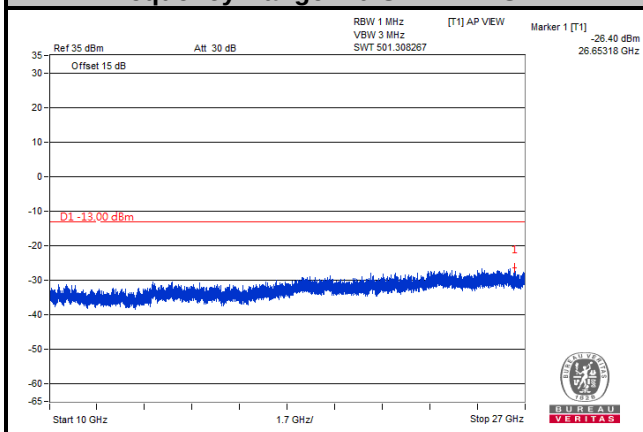
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz



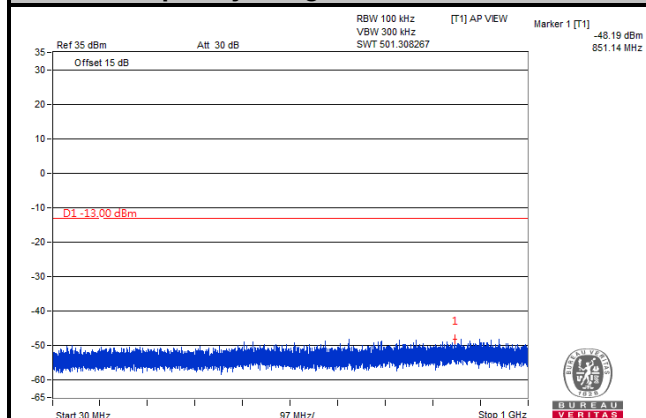
NB-IOT

LTE Band 2

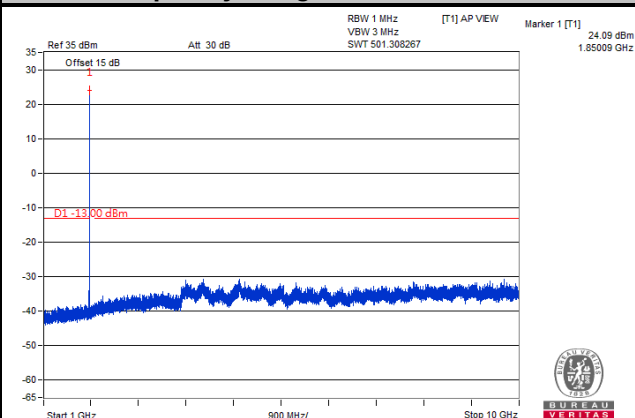
QPSK

Channel 601

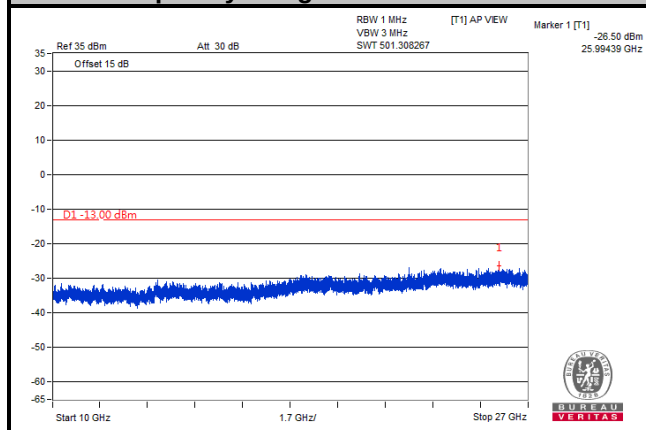
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

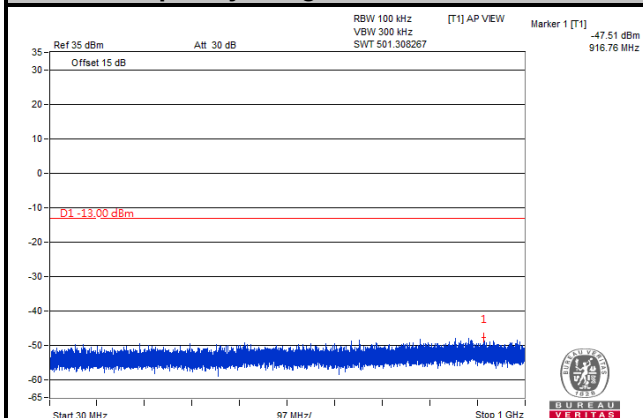


LTE Band 2

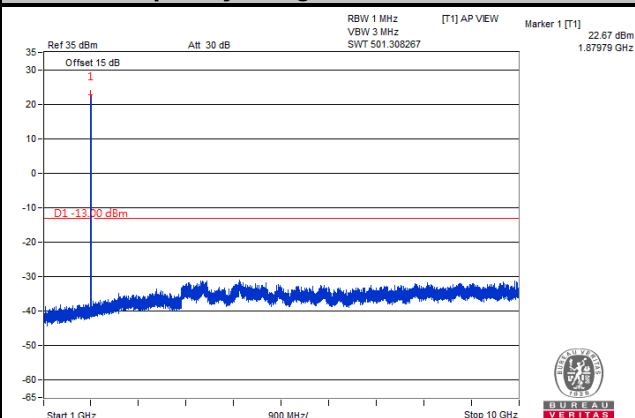
QPSK

Channel 900

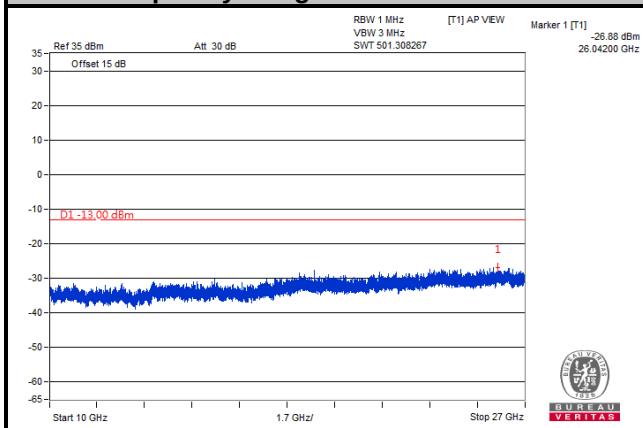
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz

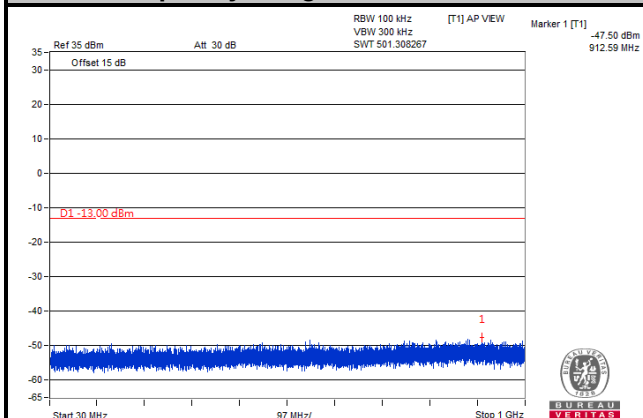


LTE Band 2

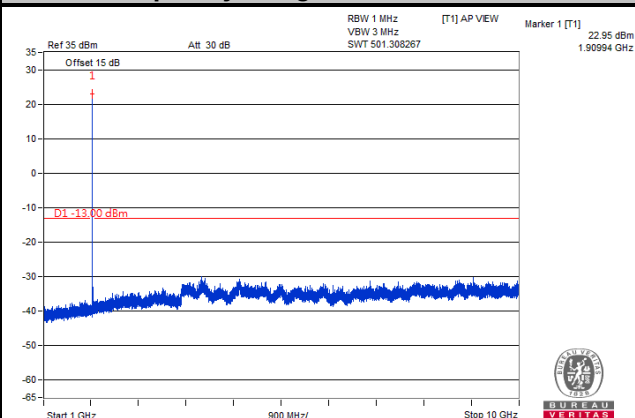
QPSK

Channel 1199

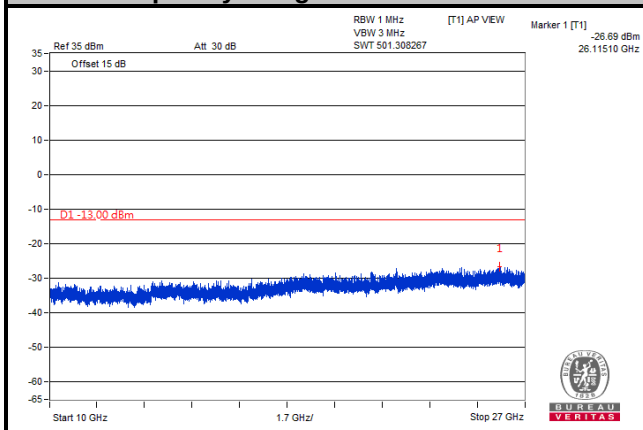
Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: 1 GHz ~ 10 GHz



Frequency Range: 10 GHz ~ 27 GHz



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

- 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.
- 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.
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15 \text{ dB}.$

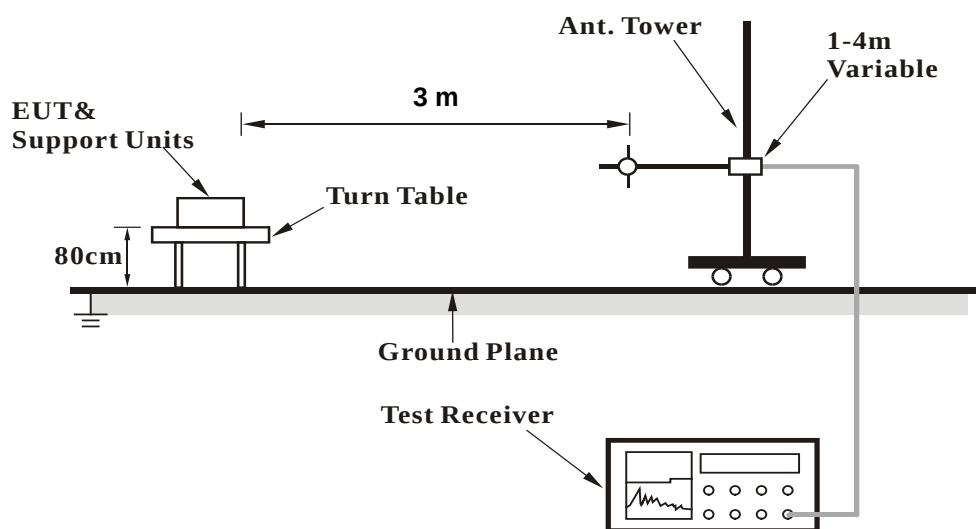
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.8.3 Deviation from Test Standard

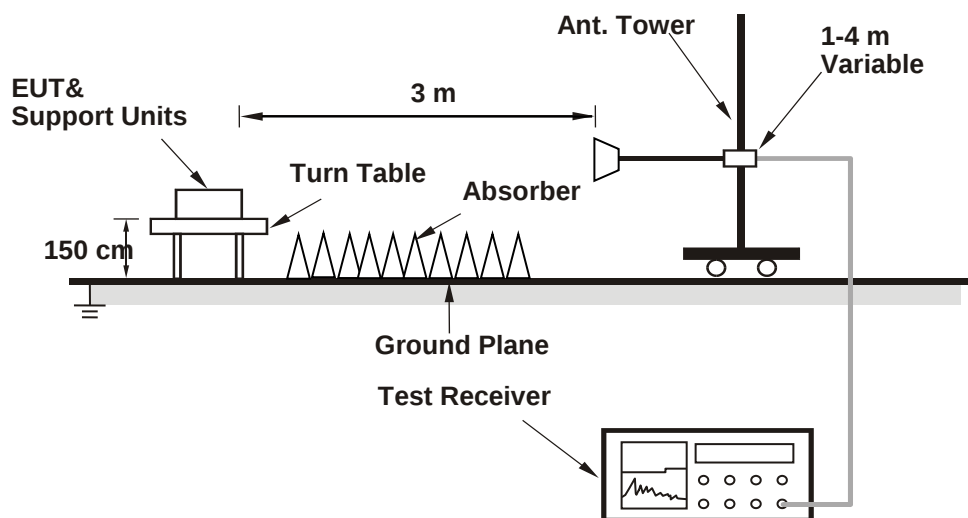
No deviation.

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

Cat-M1

LTE Band 2

Channel Bandwidth: 1.4 MHz / QPSK

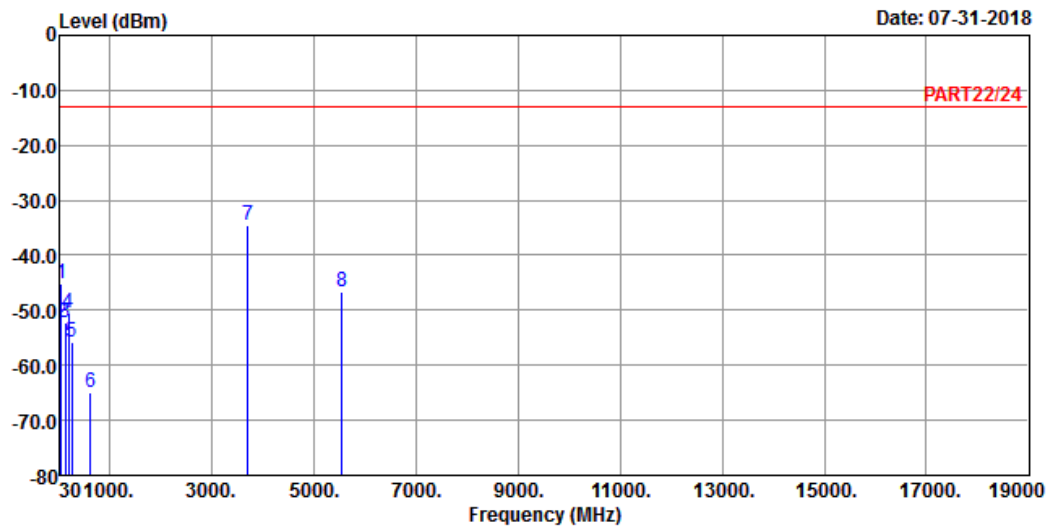
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7



Site : 966 Chamber 5

Condition: PART22/24 HORIZONTAL

Remak : Cat-M1 Band 2 QPSK_1.4M Link_L-CH

Tested by: Thomas Wei

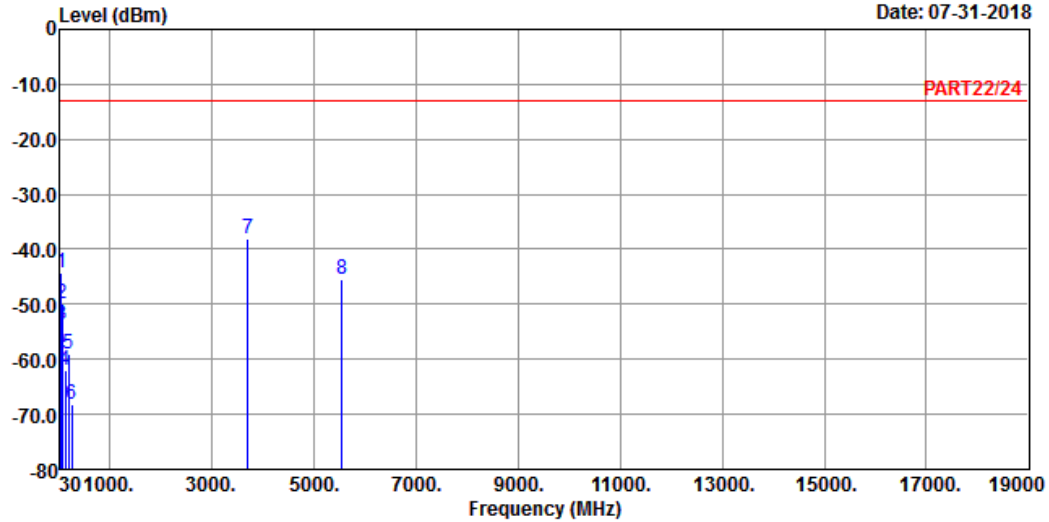
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.31	-45.31	-43.32	-13.00	-32.31	-1.99	Peak
2	53.49	-52.27	-46.46	-13.00	-39.27	-5.81	Peak
3	136.65	-52.34	-43.68	-13.00	-39.34	-8.66	Peak
4	190.38	-50.43	-43.34	-13.00	-37.43	-7.09	Peak
5	251.94	-55.88	-49.85	-13.00	-42.88	-6.03	Peak
6	619.90	-64.95	-64.15	-13.00	-51.95	-0.80	Peak
7 pp	3701.40	-34.39	-27.46	-13.00	-21.39	-6.93	Peak
8	5552.10	-46.72	-44.82	-13.00	-33.72	-1.90	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : Cat-M1 Band 2 QPSK_1.4M Link_L-CH
Tested by: Thomas Wei

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.31	-44.36	-42.37	-13.00	-31.36	-1.99	Peak
2	60.78	-49.94	-42.20	-13.00	-36.94	-7.74	Peak
3	68.61	-53.73	-45.41	-13.00	-40.73	-8.32	Peak
4	123.69	-61.85	-52.46	-13.00	-48.85	-9.39	Peak
5	188.76	-59.02	-51.90	-13.00	-46.02	-7.12	Peak
6	253.29	-68.16	-62.11	-13.00	-55.16	-6.05	Peak
7 pp	3701.40	-38.03	-31.10	-13.00	-25.03	-6.93	Peak
8	5552.10	-45.61	-43.71	-13.00	-32.61	-1.90	Peak

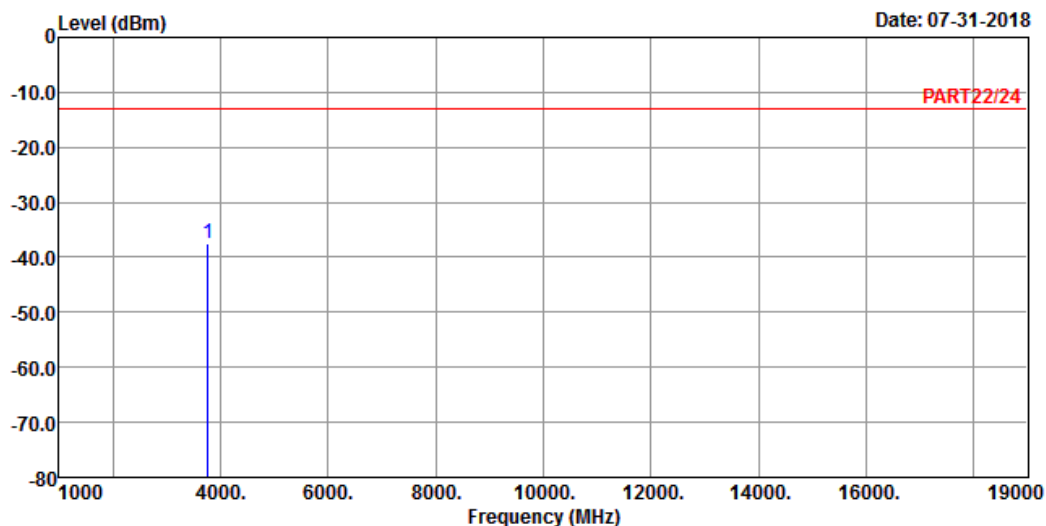
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_1.4M Link_M-CH
Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

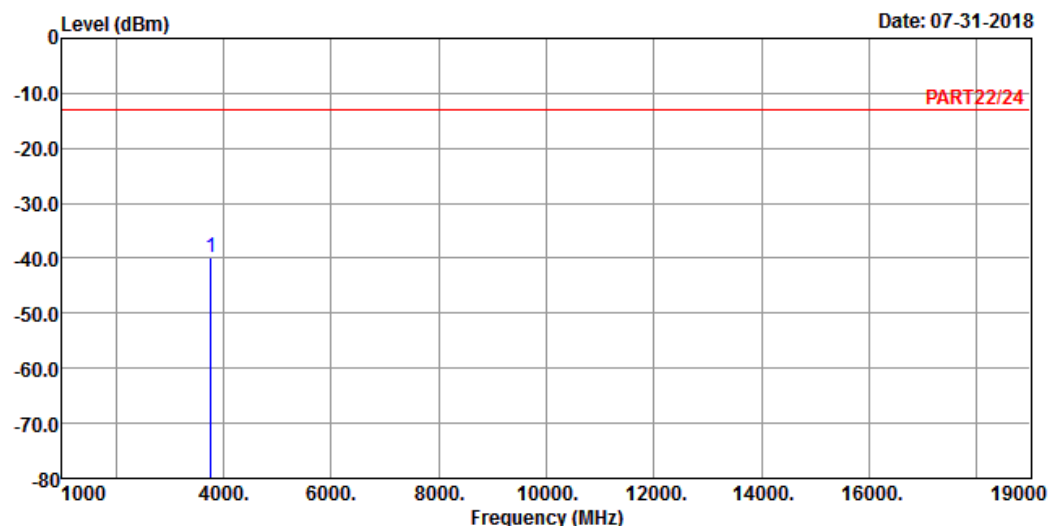
1 pp 3760.00 -37.63 -30.98 -13.00 -24.63 -6.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : Cat-M1 Band 2 QPSK_1.4M Link_M-CH
 Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-39.72	-33.07	-13.00	-26.72	-6.65	Peak

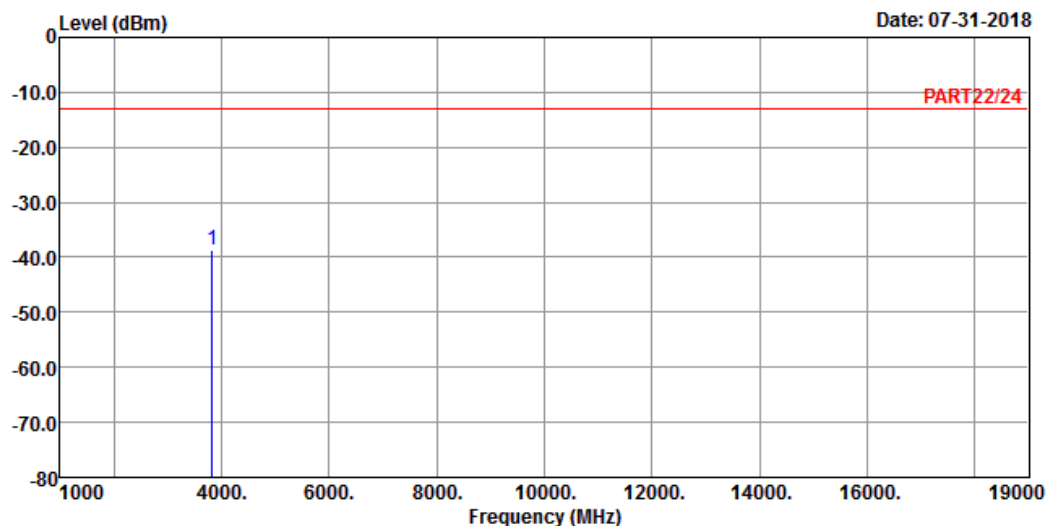
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_1.4M Link_H-CH
Tested by: Thomas Wei

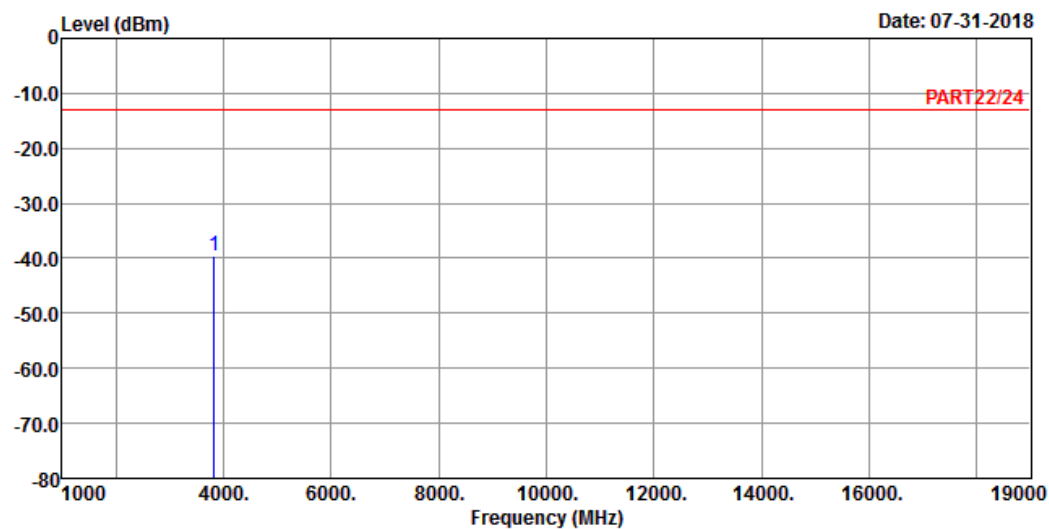
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3818.60	-38.66	-32.26	-13.00	-25.66	-6.40	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_1.4M Link_H-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3818.60	-39.59	-33.19	-13.00	-26.59	-6.40	Peak

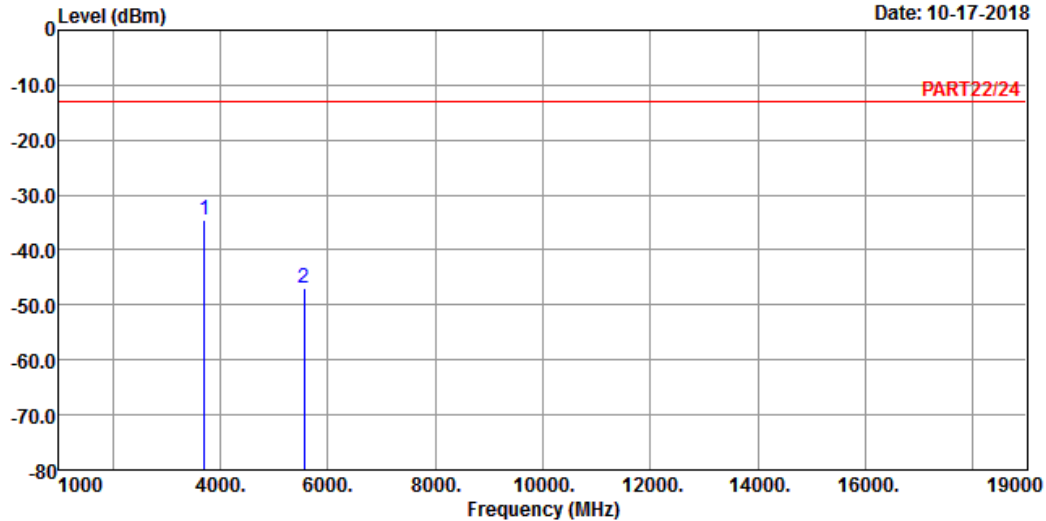
Channel Bandwidth: 3 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_3M Link_L-CH
Tested by: Thomas Wei

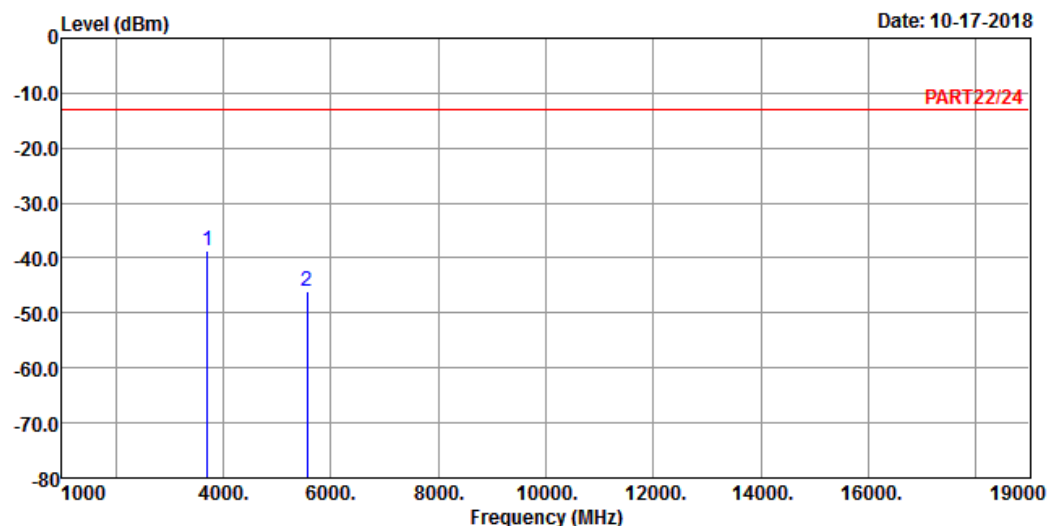
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3703.00	-34.62	-27.69	-13.00	-21.62	-6.93	Peak
2	5554.50	-46.99	-45.09	-13.00	-33.99	-1.90	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_3M Link_L-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3703.00	-38.62	-31.69	-13.00	-25.62	-6.93	Peak
2	5554.50	-45.98	-44.08	-13.00	-32.98	-1.90	Peak

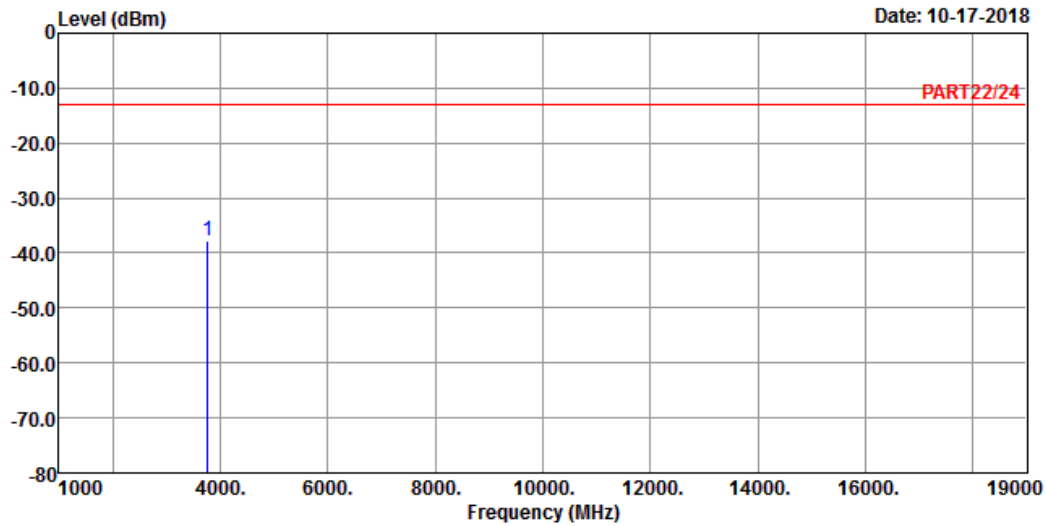
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_3M Link_M-CH
Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

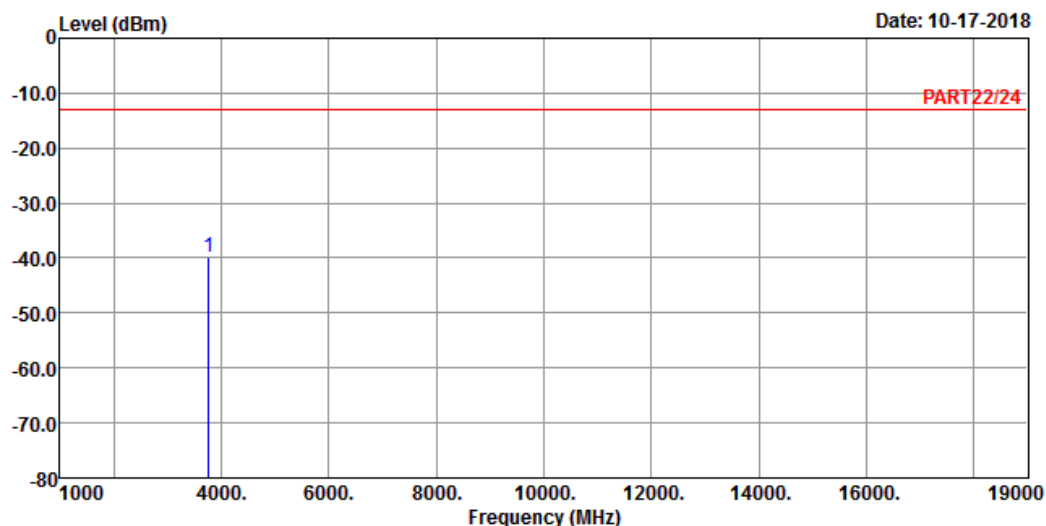
1 pp 3760.00 -37.85 -31.20 -13.00 -24.85 -6.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_3M Link_M-CH

Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-39.99	-33.34	-13.00	-26.99	-6.65	Peak

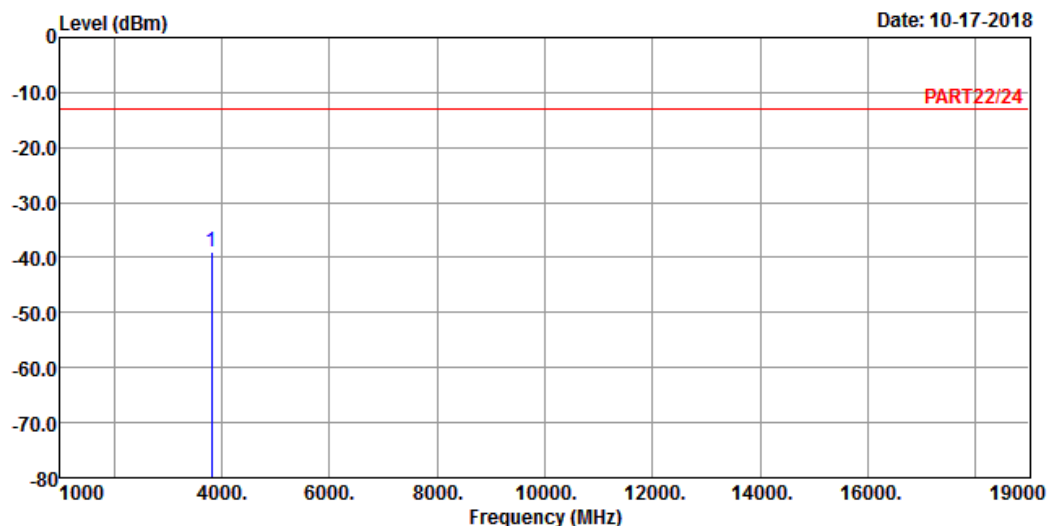
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_3M Link_H-CH
Tested by: Thomas Wei

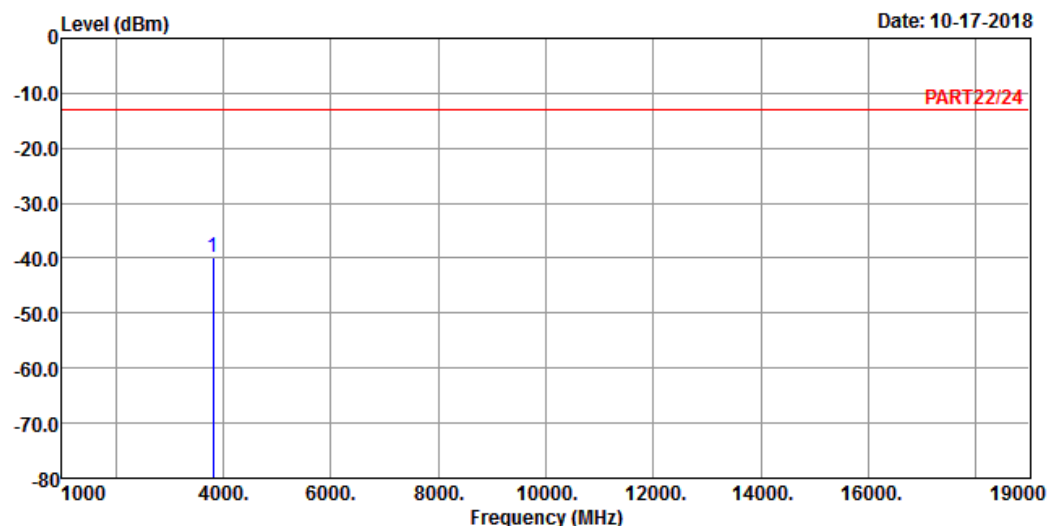
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3817.00	-38.95	-32.55	-13.00	-25.95	-6.40	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_3M Link_H-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3817.00	-39.78	-33.38	-13.00	-26.78	-6.40	Peak

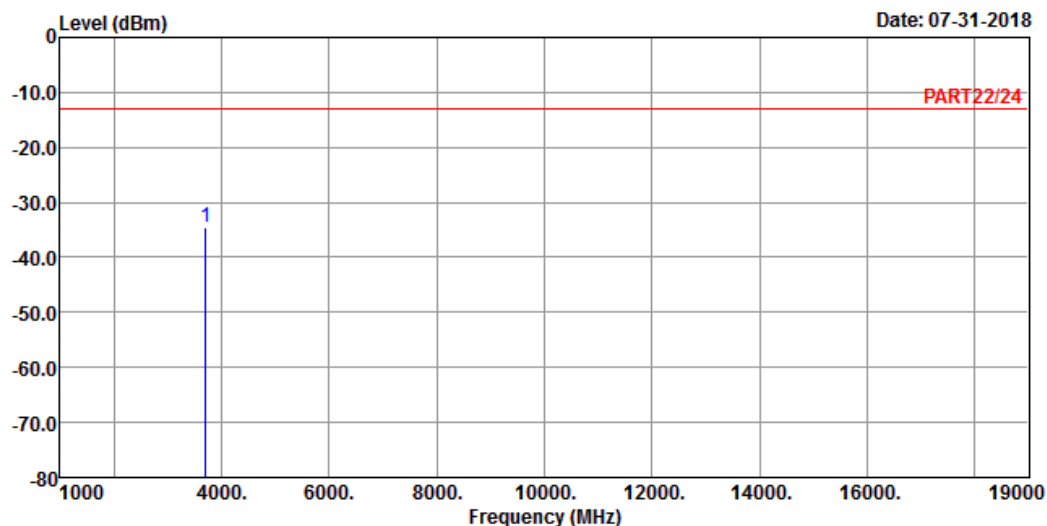
Channel Bandwidth: 5 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_5M Link_L-CH
Tested by: Thomas Wei

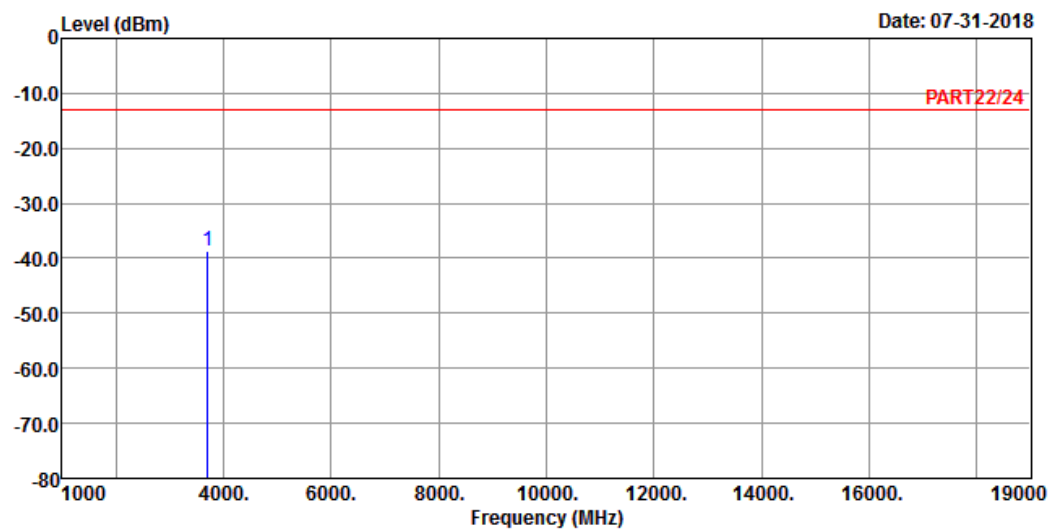
Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3705.00	-34.50	-27.57	-13.00	-21.50	-6.93	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_5M Link_L-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3705.00	-38.72	-31.79	-13.00	-25.72	-6.93	Peak

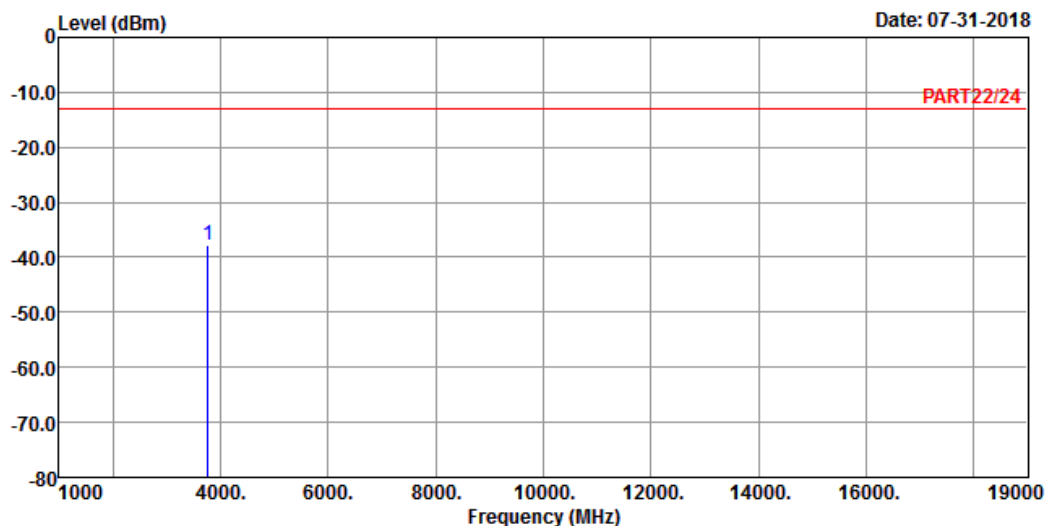
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_5M Link_M-CH
Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

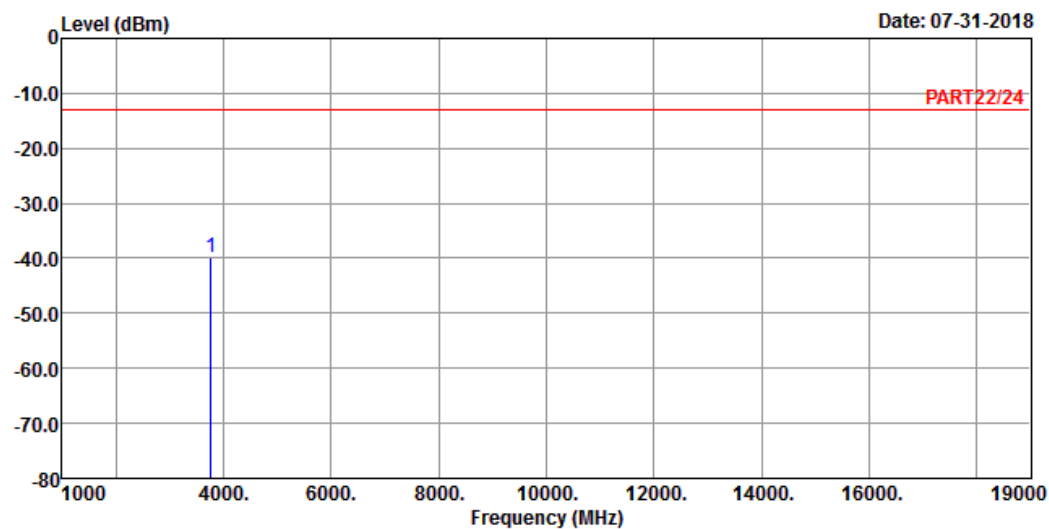
1 pp 3760.00 -37.81 -31.16 -13.00 -24.81 -6.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_5M Link_M-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-39.86	-33.21	-13.00	-26.86	-6.65	Peak

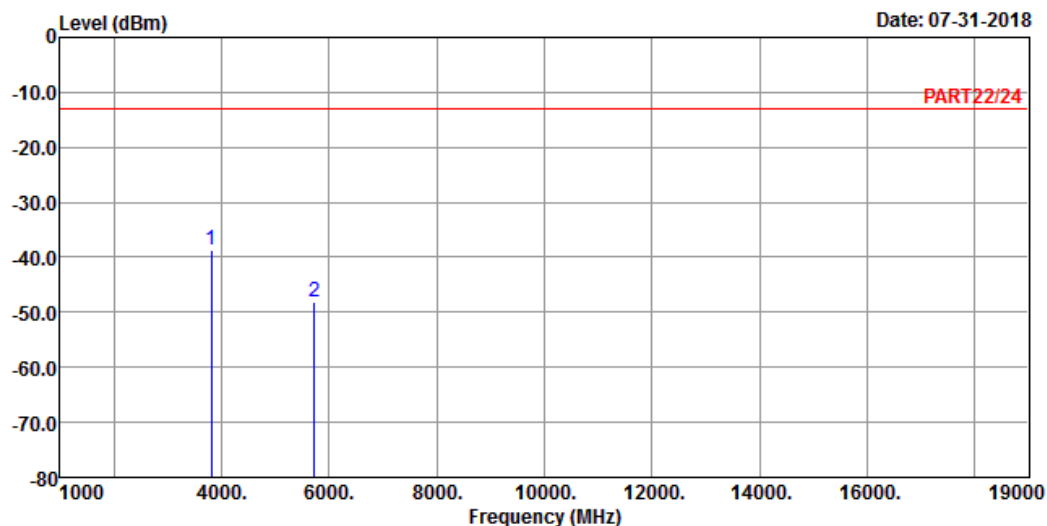
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_5M Link_H-CH
Tested by: Thomas Wei

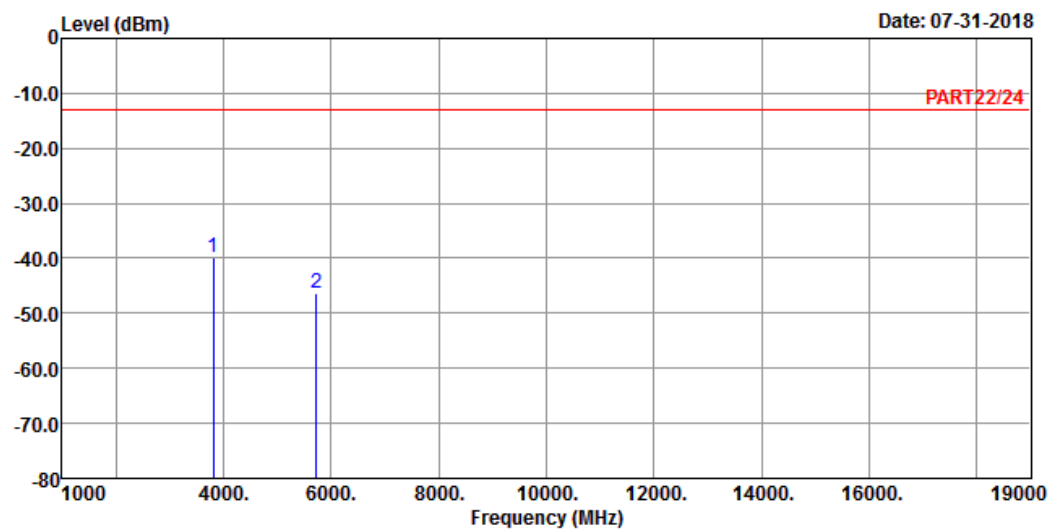
			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3815.00	-38.72	-32.32	-13.00	-25.72	-6.40	Peak
2	5722.50	-48.11	-46.42	-13.00	-35.11	-1.69	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_5M Link_H-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3815.00	-39.79	-33.39	-13.00	-26.79	-6.40	Peak
2	5722.50	-46.26	-44.57	-13.00	-33.26	-1.69	Peak

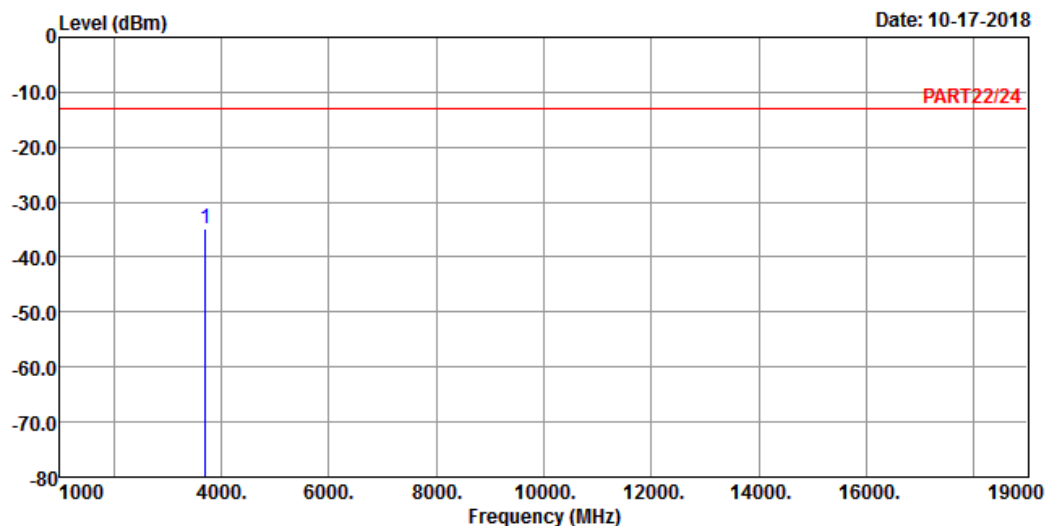
Channel Bandwidth: 10 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_10M Link_L-CH
Tested by: Thomas Wei

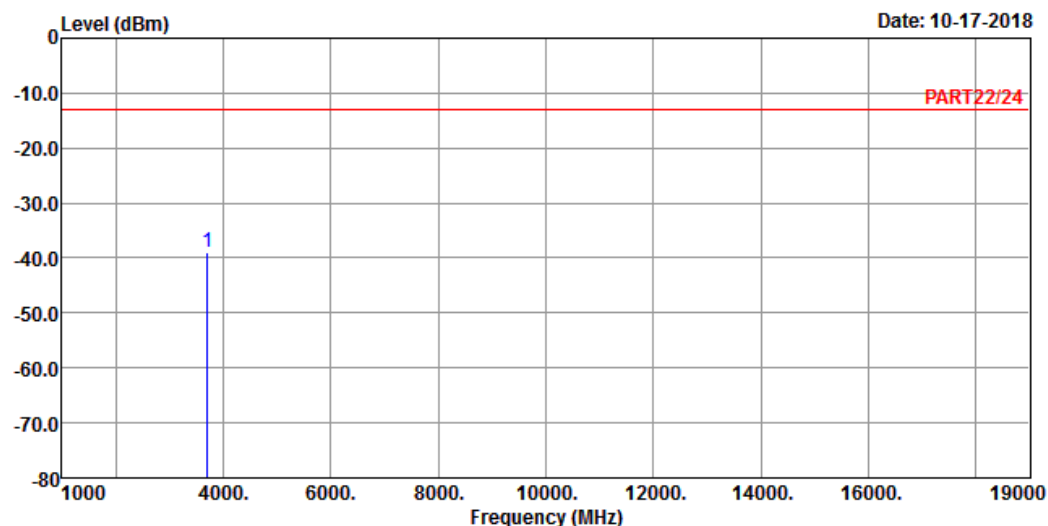
Freq	Level	Read	Limit	Over		
MHz	dBm	Level	Line	Limit	Factor	Remark
1 pp 3710.00	-34.85	-27.98	-13.00	-21.85	-6.87	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : Cat-M1 Band 2 QPSK_10M Link_L-CH
 Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3710.00	-38.99	-32.12	-13.00	-25.99	-6.87	Peak

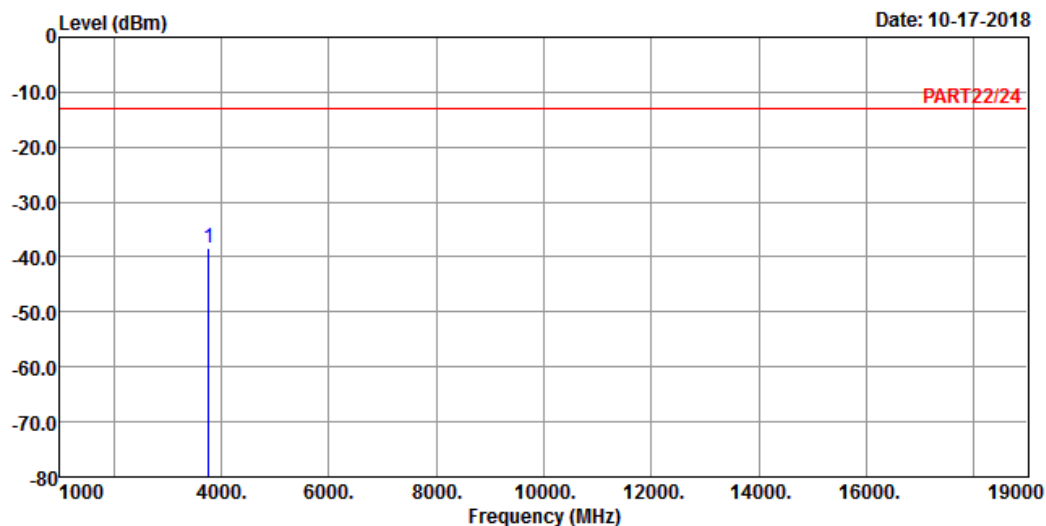
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_10M Link_M-CH
Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

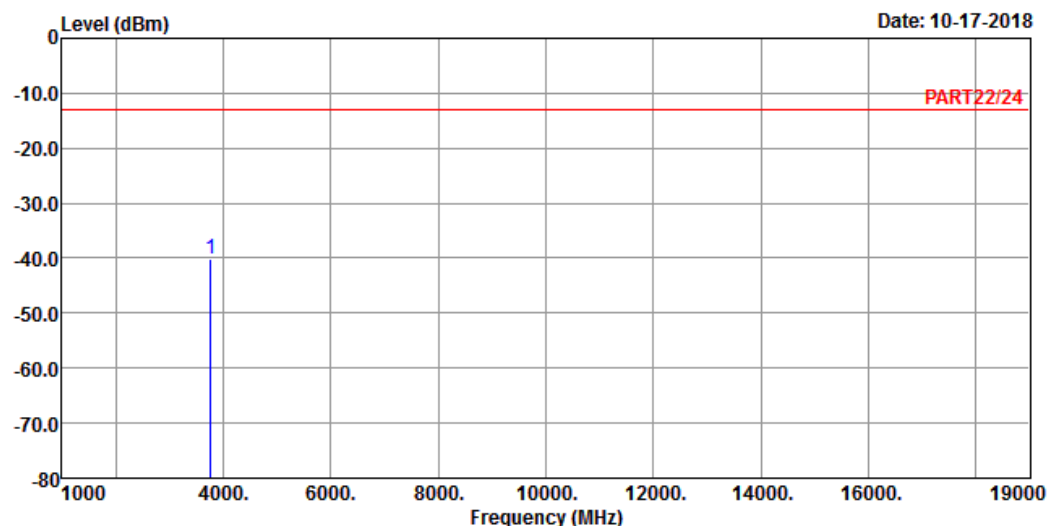
1 pp 3760.00 -38.25 -31.60 -13.00 -25.25 -6.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_10M Link_M-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over		Remark
		Level	Line	Limit	Factor	
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-40.23	-33.58	-13.00	-27.23	-6.65	Peak

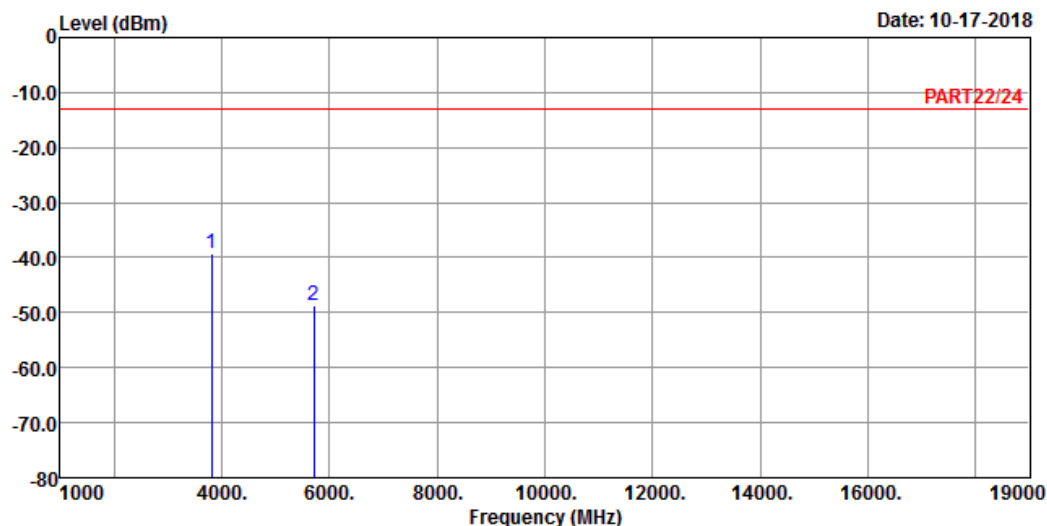
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_10M Link_H-CH
Tested by: Thomas Wei

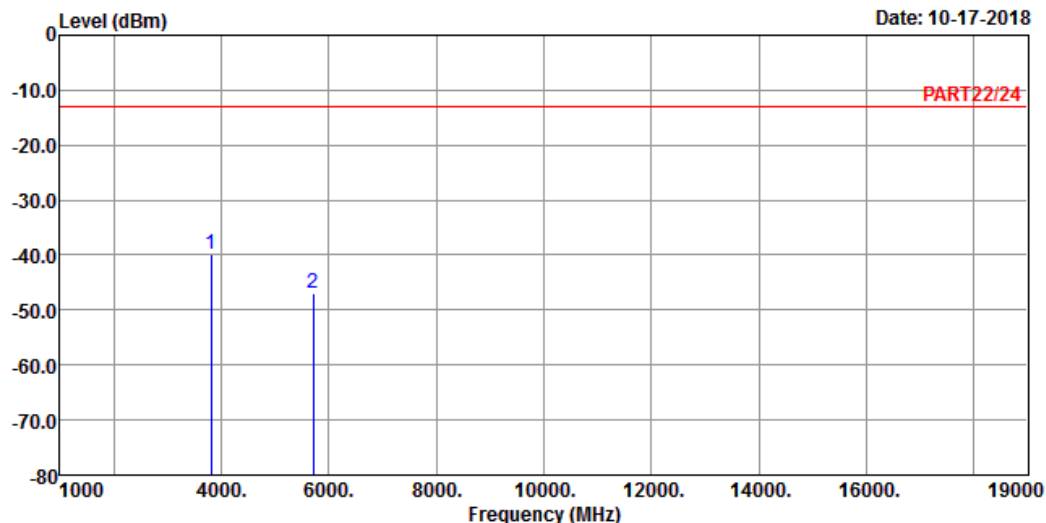
		Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor Remark
	MHz	dBm	dBm	dBm	dB	dB
1 pp	3810.00	-39.23	-32.83	-13.00	-26.23	-6.40 Peak
2	5715.00	-48.62	-46.93	-13.00	-35.62	-1.69 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : Cat-M1 Band 2 QPSK_10M Link_H-CH
 Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3810.00	-39.98	-33.58	-13.00	-26.98	-6.40	Peak
2	5715.00	-46.85	-45.16	-13.00	-33.85	-1.69	Peak

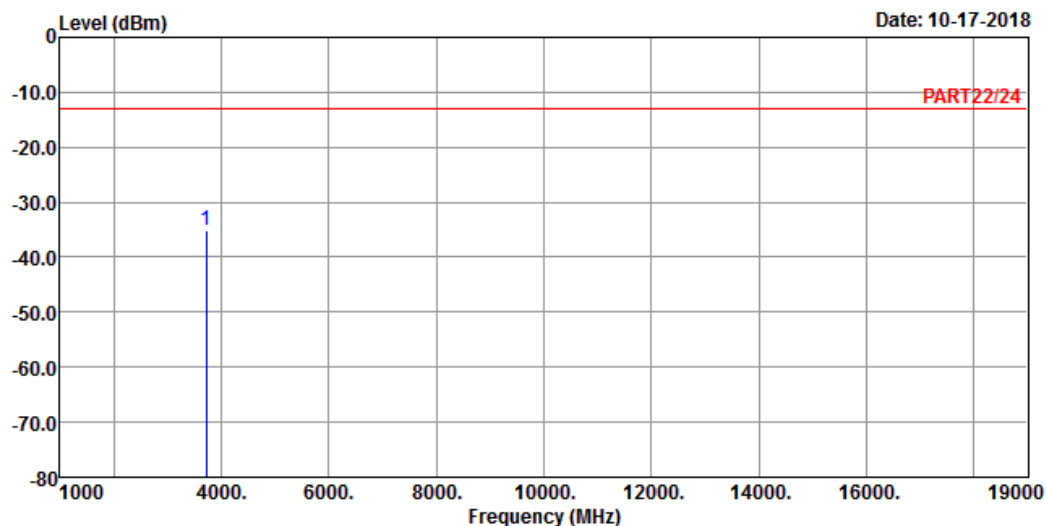
Channel Bandwidth: 15 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_15M Link_L-CH
Tested by: Thomas Wei

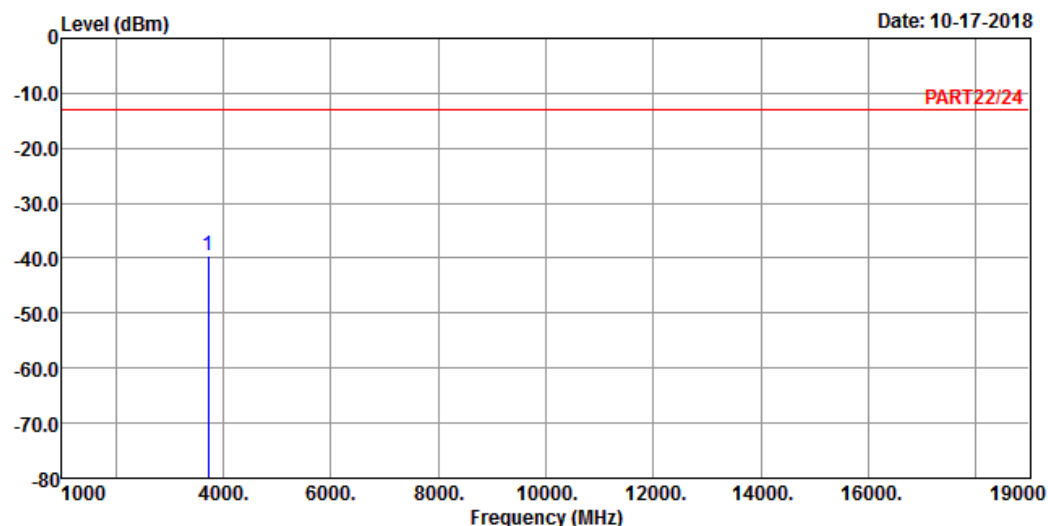
Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3715.00	-35.25	-28.38	-13.00	-22.25	-6.87	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_15M Link_L-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3715.00	-39.53	-32.66	-13.00	-26.53	-6.87	Peak

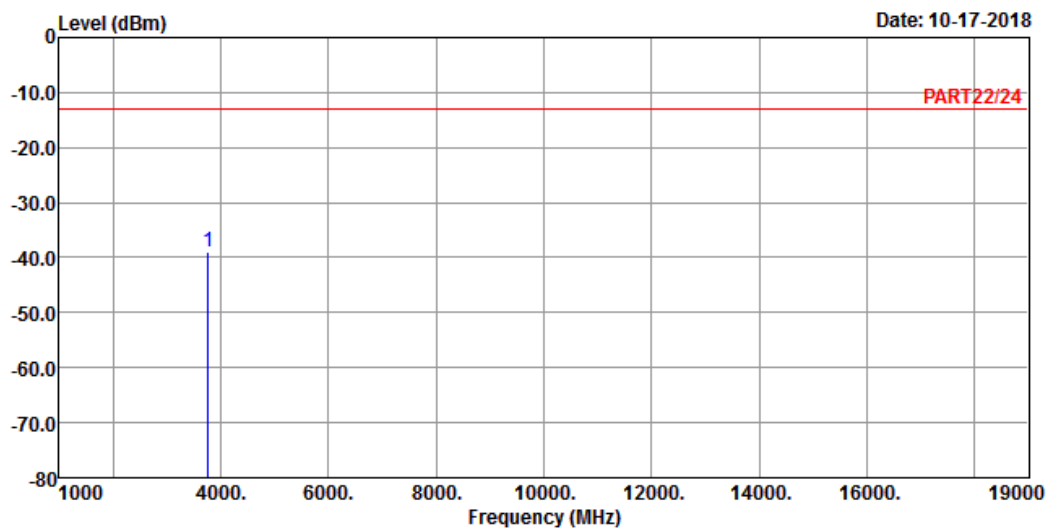
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : Cat-M1 Band 2 QPSK_15M Link_M-CH
 Tested by: Thomas Wei

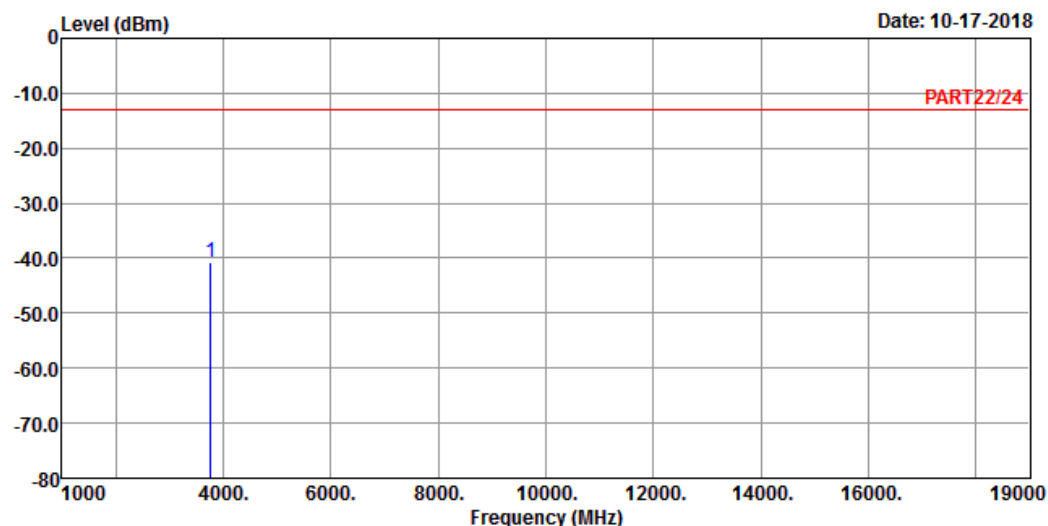
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-38.96	-32.31	-13.00	-25.96	-6.65	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_15M Link_M-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over			Remark
		Level	Line	Limit	Factor		
MHz	dBm	dBm	dBm	dB	dB		
1 pp 3760.00	-40.85	-34.20	-13.00	-27.85	-6.65	Peak	

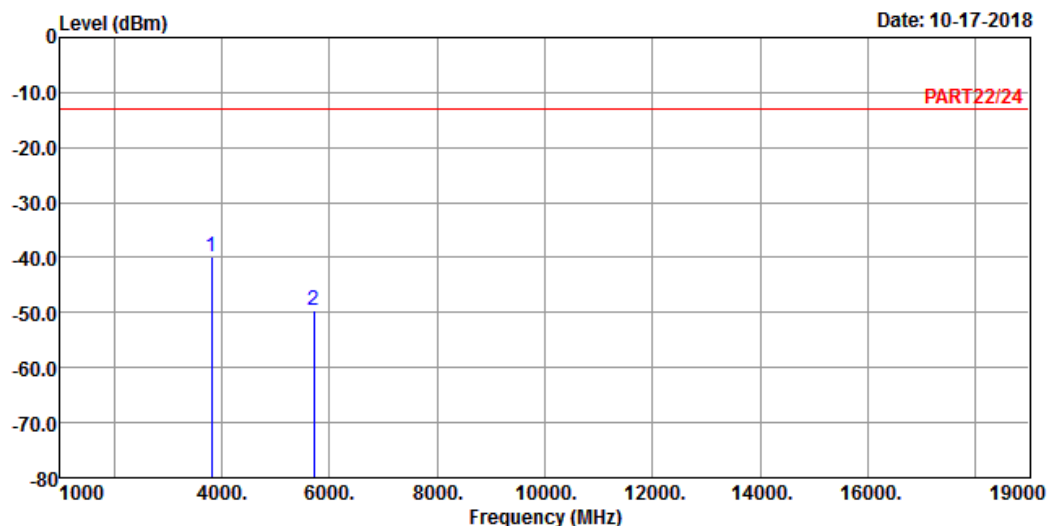
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_15M Link_H-CH
Tested by: Thomas Wei

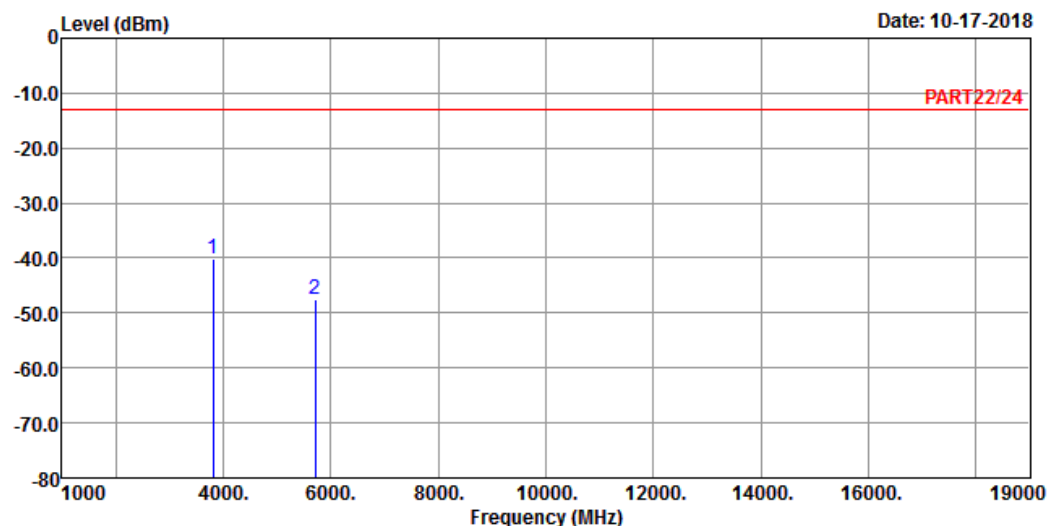
		Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor Remark
	MHz	dBm	dBm	dBm	dB	dB
1 pp	3805.00	-39.75	-33.32	-13.00	-26.75	-6.43 Peak
2	5707.50	-49.45	-47.72	-13.00	-36.45	-1.73 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_15M Link_H-CH

Tested by: Thomas Wei

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3805.00	-40.25	-33.82	-13.00	-27.25	-6.43	Peak
2	5707.50	-47.52	-45.79	-13.00	-34.52	-1.73	Peak

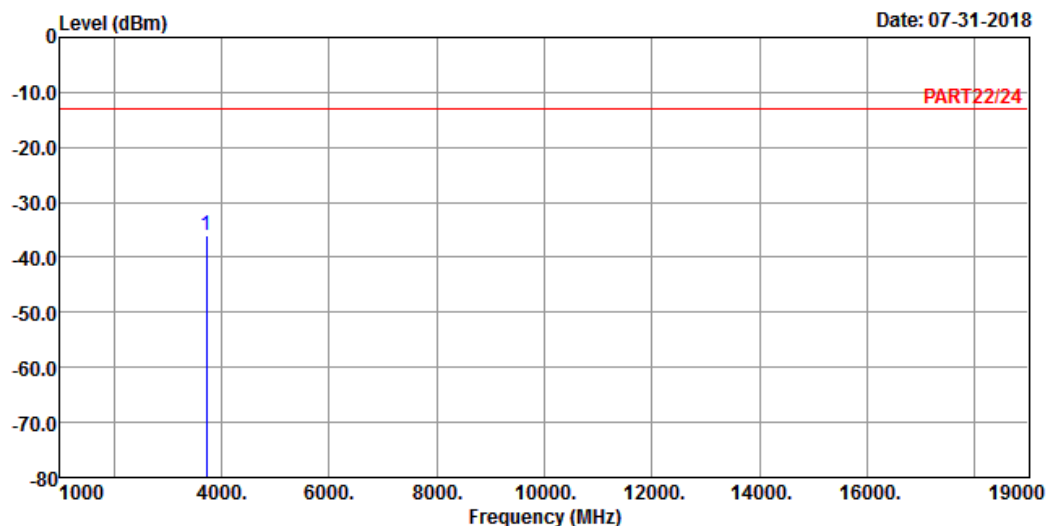
Channel Bandwidth: 20 MHz / QPSK
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_20M Link_L-CH
Tested by: Thomas Wei

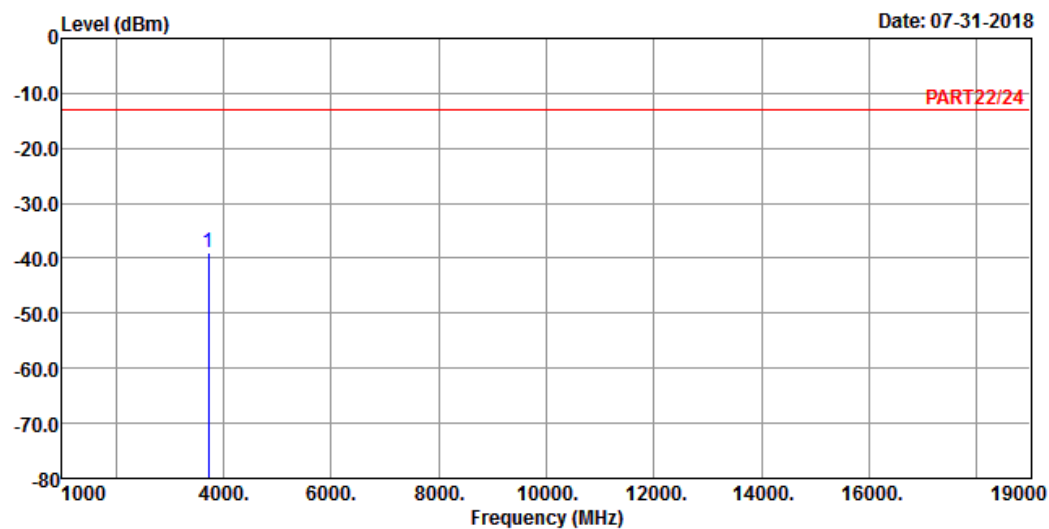
Freq	Level	Read	Limit	Over		
MHz	dBm	Level	Line	Limit	Factor	Remark
1 pp 3720.00	-35.87	-29.05	-13.00	-22.87	-6.82	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : Cat-M1 Band 2 QPSK_20M Link_L-CH
 Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3720.00	-38.92	-32.10	-13.00	-25.92	-6.82	Peak

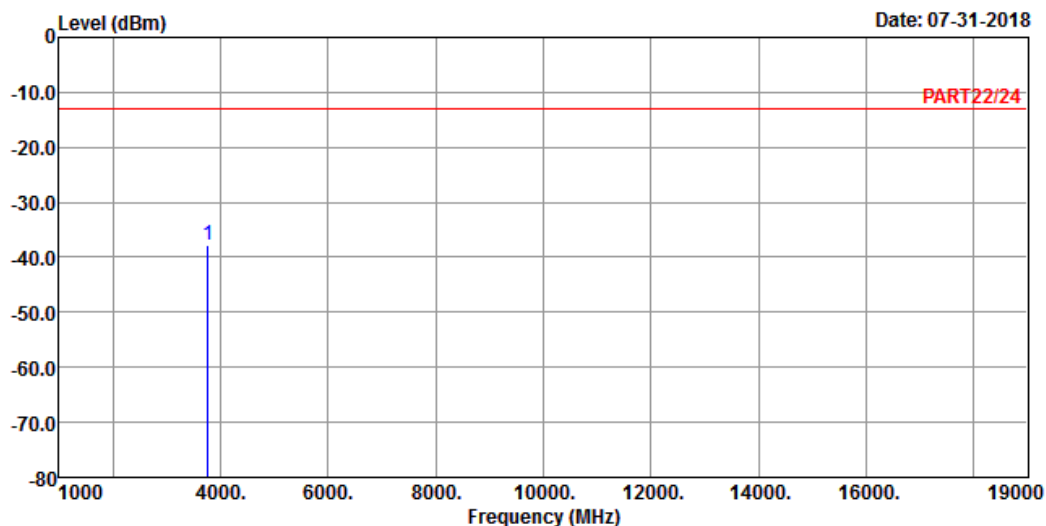
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 1



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_20M Link_M-CH
Tested by: Thomas Wei

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

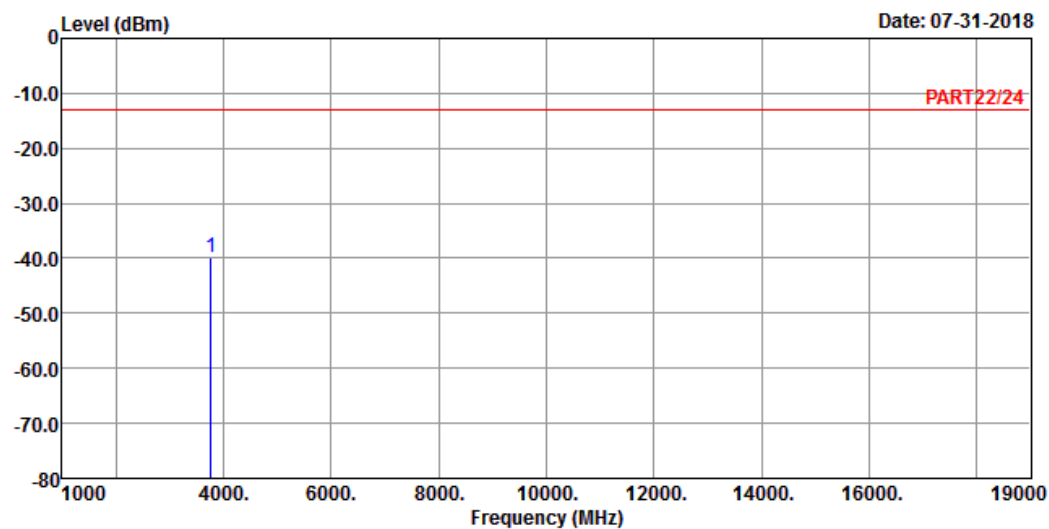
1 pp 3760.00 -37.81 -31.16 -13.00 -24.81 -6.65 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 2



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : Cat-M1 Band 2 QPSK_20M Link_M-CH
 Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3760.00	-39.85	-33.20	-13.00	-26.85	-6.65	Peak

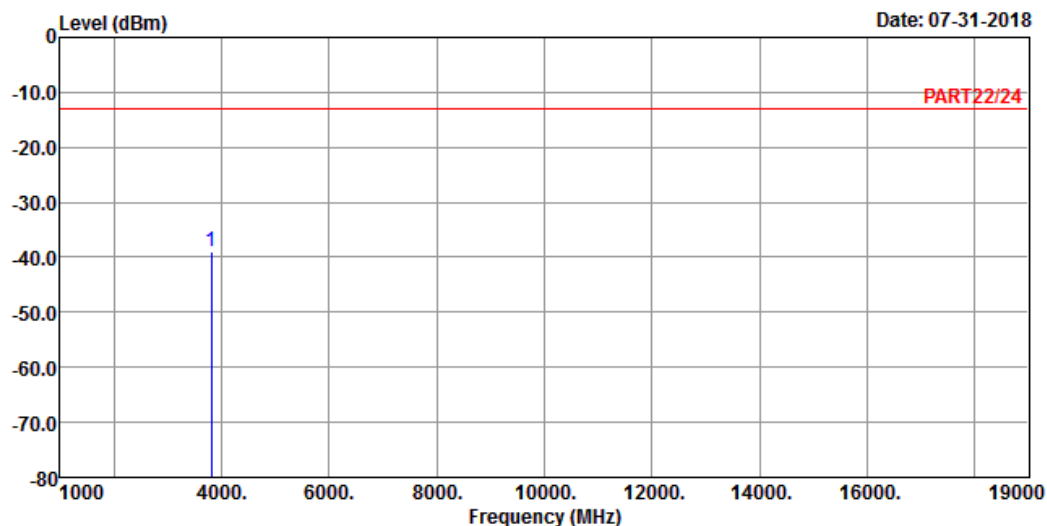
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : Cat-M1 Band 2 QPSK_20M Link_H-CH
Tested by: Thomas Wei

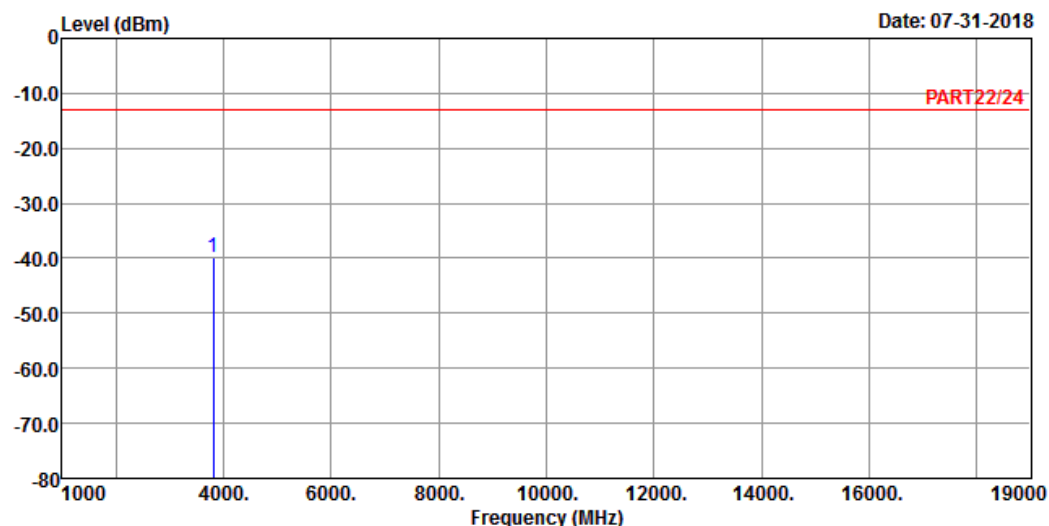
		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.00	-38.96	-32.56	-13.00	-25.96	-6.40	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : Cat-M1 Band 2 QPSK_20M Link_H-CH

Tested by: Thomas Wei

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3815.00	-39.92	-33.52	-13.00	-26.92	-6.40	Peak

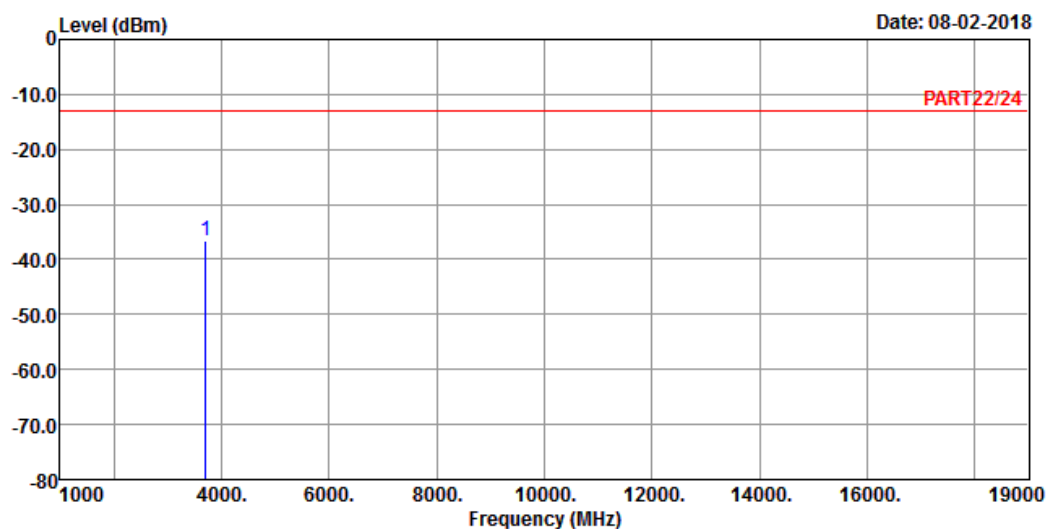
NB-IOT
LTE Band 2
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : NB-IOT Band 2 Stand-alone_Link_L-Ch
Tested by: Jisyong Wang

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

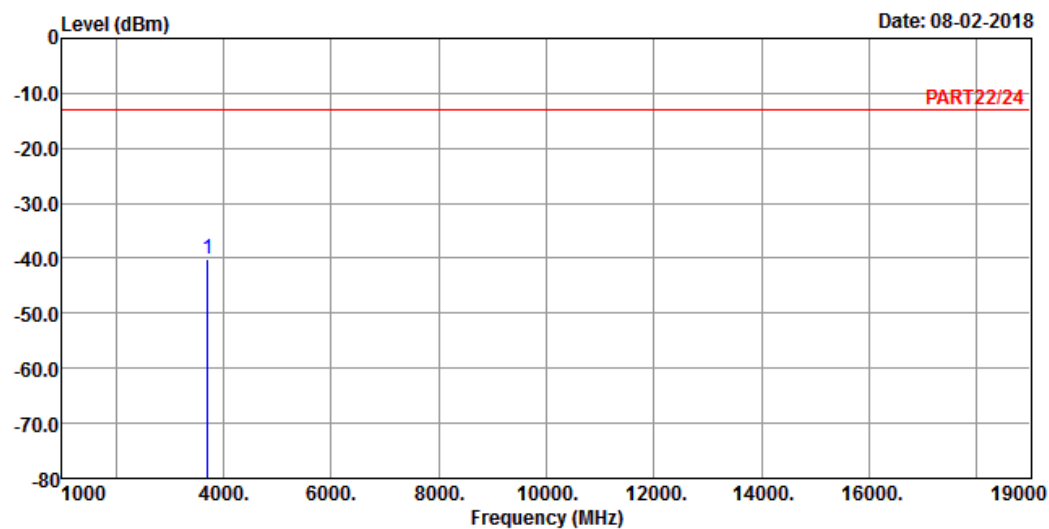
1 pp 3700.20 -36.52 -29.59 -13.00 -23.52 -6.93 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : NB-IOT Band 2 Stand-alone_Link_L-Ch

Tested by: Jisyong Wang

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 3700.20	-40.12	-33.19	-13.00	-27.12	-6.93	Peak

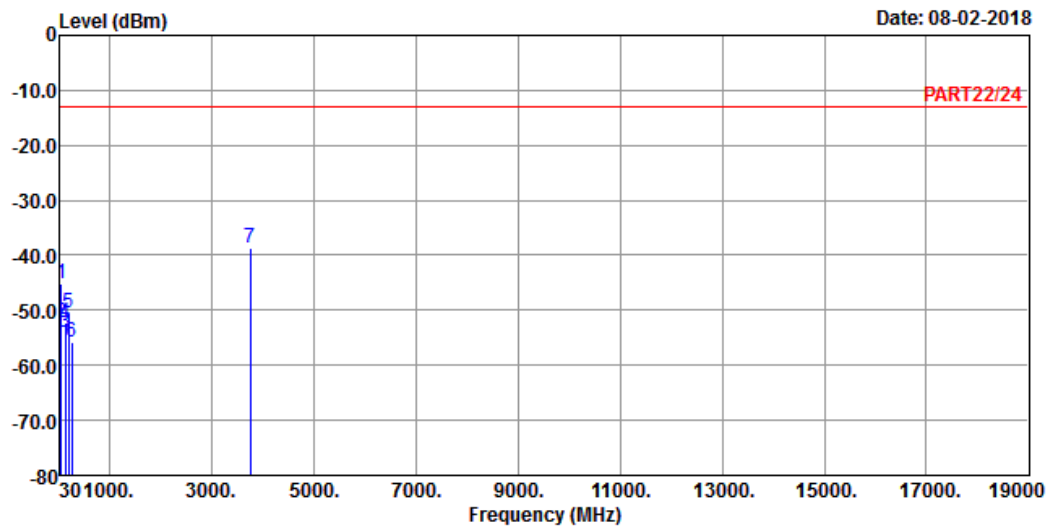
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 7



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : NB-IOT Band 2 Stand-alone_Link_M-Ch
 Tested by: Jisyong Wang

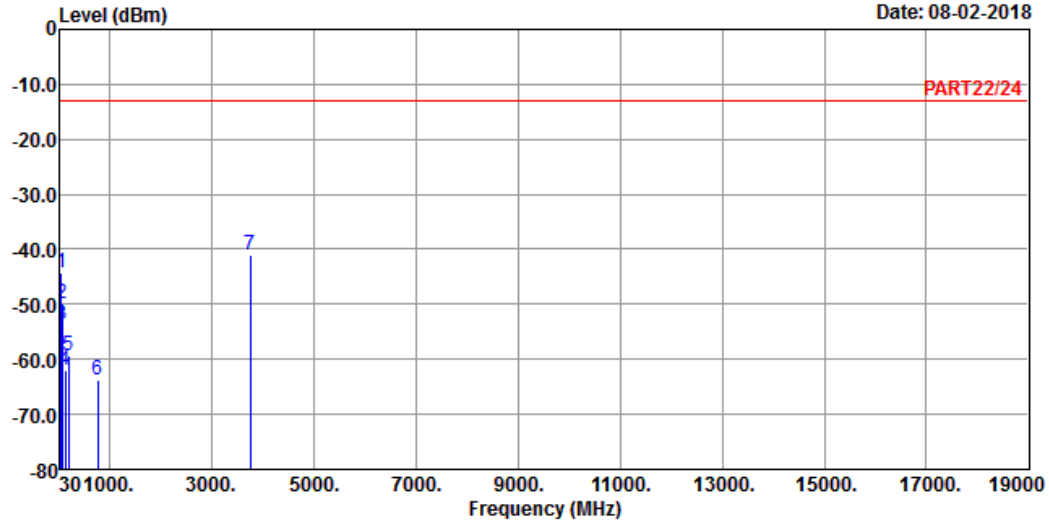
			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.31	-45.31	-43.32	-13.00	-32.31	-1.99	Peak
2	52.41	-52.27	-46.73	-13.00	-39.27	-5.54	Peak
3	122.34	-54.08	-44.46	-13.00	-41.08	-9.62	Peak
4	136.65	-52.34	-43.68	-13.00	-39.34	-8.66	Peak
5	190.38	-50.43	-43.34	-13.00	-37.43	-7.09	Peak
6	251.94	-55.88	-49.85	-13.00	-42.88	-6.03	Peak
7 pp	3760.00	-38.69	-32.04	-13.00	-25.69	-6.65	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 8



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : NB-IOT Band 2 Stand-alone_Link_M-Ch

Tested by: Jisyong Wang

			Read	Limit	Over		
	Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	44.31	-44.36	-42.37	-13.00	-31.36	-1.99	Peak
2	60.78	-49.94	-42.20	-13.00	-36.94	-7.74	Peak
3	68.61	-53.73	-45.41	-13.00	-40.73	-8.32	Peak
4	123.69	-61.85	-52.46	-13.00	-48.85	-9.39	Peak
5	189.30	-59.31	-52.19	-13.00	-46.31	-7.12	Peak
6	767.60	-63.79	-64.62	-13.00	-50.79	0.83	Peak
7 pp	3760.00	-41.02	-34.37	-13.00	-28.02	-6.65	Peak

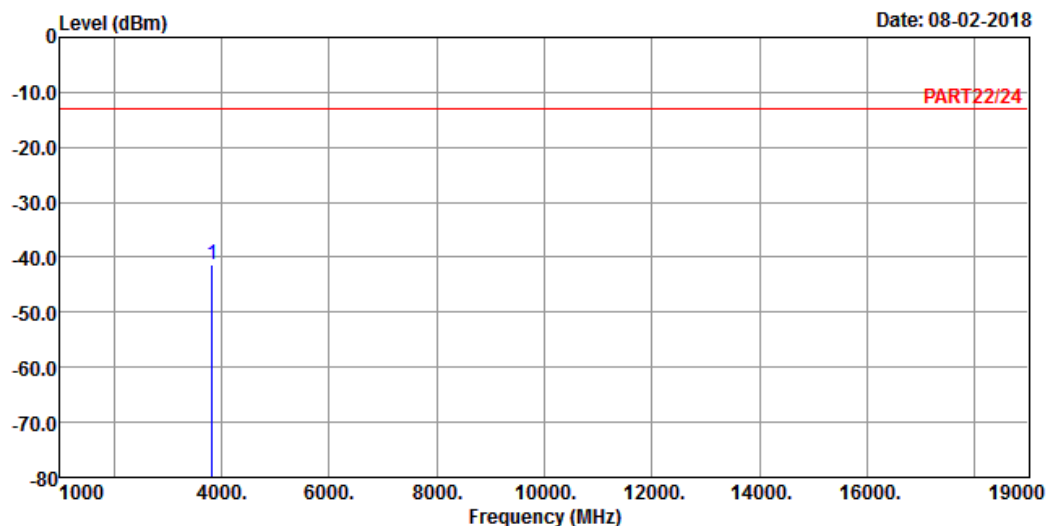
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : NB-IOT Band 2 Stand-alone_Link_H-Ch
Tested by: Jisyong Wang

		Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	

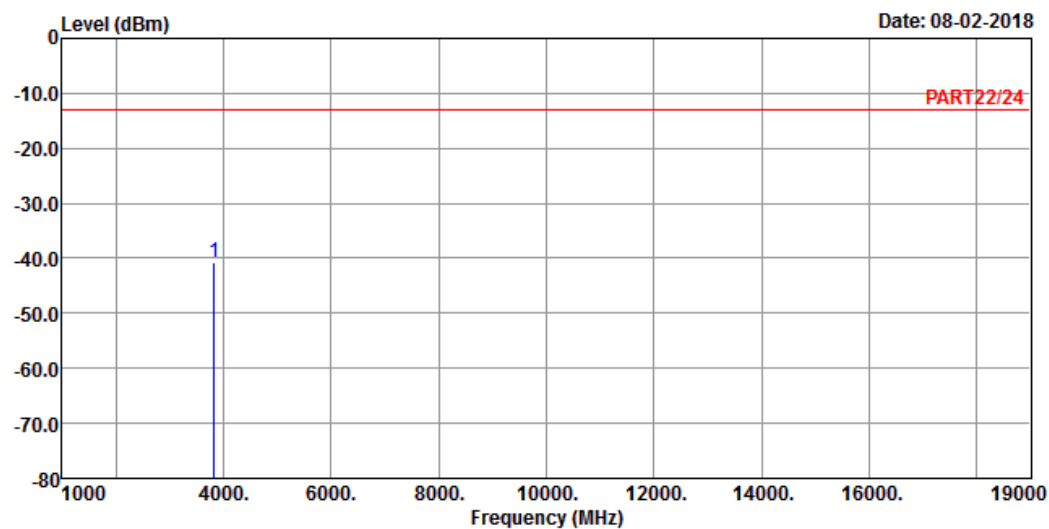
1 pp 3819.80 -41.25 -34.85 -13.00 -28.25 -6.40 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5

Condition: PART22/24 VERTICAL

Remak : NB-IOT Band 2 Stand-alone_Link_H-Ch

Tested by: Jisyong Wang

Freq	Level	Read	Limit	Over		Factor	Remark
		Level	Line	Limit	Limit		
MHz	dBm	dBm	dBm	dB	dB	dB	
1 pp 3819.80	-40.62	-34.22	-13.00	-27.62	-6.40	Peak	

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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