

FCC Test Report (Part 24)

Report No.: RF201007C02-2

FCC ID: 2AA5WKMP7R2BC

Test Model: PA-MR10LN

Received Date: Oct. 07, 2020

Test Date: Oct. 17 ~ Dec. 30, 2020

Issued Date: Dec. 30, 2020

Applicant: NEC Platforms, Ltd.

Address: 2-3, tsukasa-machi, kanda, chiyoda-ku, Tokyo 101-8532 Japan

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

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

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, TAIWAN

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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Test Site and Instruments	7
3 General Information	8
3.1 General Description of EUT	8
3.2 Configuration of System under Test	10
3.2.1 Description of Support Units	10
3.3 Test Mode Applicability and Tested Channel Detail	11
3.4 EUT Operating Conditions	15
3.5 General Description of Applied Standards and References	15
4 Test Types and Results	16
4.1 Output Power Measurement	16
4.1.1 Limits of Output Power Measurement	16
4.1.2 Test Procedures	16
4.1.3 Test Setup	16
4.1.4 Test Results	17
4.2 Modulation Characteristics Measurement	25
4.2.1 Limits of Modulation Characteristics	25
4.2.2 Test Procedure	25
4.2.3 Test Setup	25
4.2.4 Test Results	26
4.3 Frequency Stability Measurement	28
4.3.1 Limits of Frequency Stability Measurement	28
4.3.2 Test Procedure	28
4.3.3 Conducted Setup	28
4.3.4 Test Results	29
4.4 Occupied Bandwidth Measurement	36
4.4.1 Test Procedure	36
4.4.2 Test Setup	36
4.4.3 Test Result	37
4.5 Band Edge Measurement	45
4.5.1 Limits of Band Edge Measurement	45
4.5.2 Test Setup	45
4.5.3 Test Procedures	45
4.5.4 Test Results	46
4.6 Peak to Average Ratio	53
4.6.1 Limits of Peak to Average Ratio Measurement	53
4.6.2 Test Setup	53
4.6.3 Test Procedures	53
4.6.4 Test Results	54
4.7 Conducted Spurious Emissions	58
4.7.1 Limits of Conducted Spurious Emissions Measurement	58
4.7.2 Test Setup	58
4.7.3 Test Procedure	58
4.7.4 Test Results	59
4.8 Radiated Emission Measurement	74
4.8.1 Limits of Radiated Emission Measurement	74
4.8.2 Test Procedure	74
4.8.3 Deviation from Test Standard	74
4.8.4 Test Setup	75
4.8.5 Test Results	76

5	Pictures of Test Arrangements	88
	Appendix – Information of the Testing Laboratories	89

Release Control Record

Issue No.	Description	Date Issued
RF201007C02-2	Original release	Dec. 30, 2020

1 Certificate of Conformity

Product: Aterm MR10LN

Brand: NEC

Test Model: PA-MR10LN

Sample Status: Engineering sample

Applicant: NEC Platforms, Ltd.

Test Date: Oct. 17 ~ Dec. 30, 2020

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 : Celine Chou , **Date:** Nov. 04, 2020
Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Nov. 04, 2020
Bruce Chen / Senior 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 Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1046 24.232(d)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement
2.1055 24.235	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238	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 -34.20dB at 3760.00MHz.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102579	Jul. 07, 2020	Jul. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 23, 2020	Mar. 22, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2020	May 31, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun 06, 2020	Jun 05, 2021
DC Power Supply Keysight	U8002A	MY56330015	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 13, 2020	Feb. 12, 2021
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 25, 2019	Dec. 24, 2020
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2019	Nov. 24, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.

3 General Information

3.1 General Description of EUT

Product	Aterm MR10LN		
Brand	NEC		
Test Model	PA-MR10LN		
Sample Status	Engineering sample		
Power Supply Rating	5Vdc from adapter or host equipment 3.8Vdc from battery		
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM		
Operating Frequency	WCDMA Band 2	1852.4MHz ~ 1907.6MHz	
	LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7MHz ~ 1909.3MHz	
	LTE Band 2 (Channel Bandwidth 3MHz)	1851.5MHz ~ 1908.5MHz	
	LTE Band 2 (Channel Bandwidth 5MHz)	1852.5MHz ~ 1907.5MHz	
	LTE Band 2 (Channel Bandwidth 10MHz)	1855.0MHz ~ 1905.0MHz	
	LTE Band 2 (Channel Bandwidth 15MHz)	1857.5MHz ~ 1902.5MHz	
	LTE Band 2 (Channel Bandwidth 20MHz)	1860.0MHz ~ 1900.0MHz	
Max. EIRP Power	WCDMA Band 2	99.083mW (19.96dBm)	
		QPSK	16QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	95.940mW (19.82dBm)	76.384mW (18.83dBm)
	LTE Band 2 (Channel Bandwidth 3MHz)	95.280mW (19.79dBm)	76.736mW (18.85dBm)
	LTE Band 2 (Channel Bandwidth 5MHz)	96.605mW (19.85dBm)	76.736mW (18.85dBm)
	LTE Band 2 (Channel Bandwidth 10MHz)	95.719mW (19.81dBm)	75.683mW (18.79dBm)
	LTE Band 2 (Channel Bandwidth 15MHz)	96.161mW (19.83dBm)	76.208mW (18.82dBm)
	LTE Band 2 (Channel Bandwidth 20MHz)	96.828mW (19.86dBm)	76.736mW (18.85dBm)
Emission Designator	WCDMA Band 2	4M15F9W	
		QPSK	16QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W
	LTE Band 2 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W
	LTE Band 2 (Channel Bandwidth 5MHz)	4M49G7D	4M49D7W
	LTE Band 2 (Channel Bandwidth 10MHz)	8M95G7D	8M95D7W
	LTE Band 2 (Channel Bandwidth 15MHz)	13M4G7D	13M4D7W
	LTE Band 2 (Channel Bandwidth 20MHz)	17M9G7D	17M9D7W

Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Adapter, Battery
Cable Supplied	1.0m shielded USB cable without core

Note:

1. The EUT consumes power from the following adapter and battery.

Adapter (for support unit only)	
Brand	Sony
Model	ACC-283N
Input Power	100-240Vac, 0.2A, 50/60Hz
Output Power	5Vdc, 1.5A

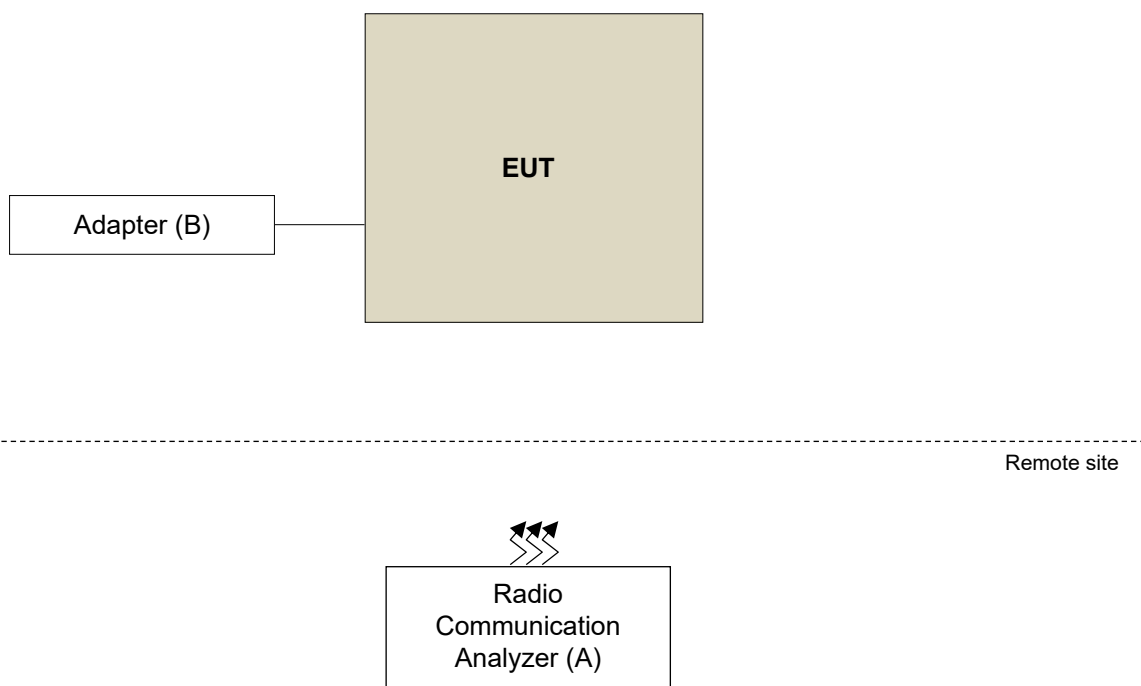
Battery	
Brand	Murata
Model	LIS1717NEPC SY6
Rating	3.8Vdc, 4000mAh

2. The following antennas were provided to the EUT.

Type	Connector	Gain (dBi)						
		WCDMA B2	WCDMA B4	WCDMA B5	LTE B2	LTE B4	LTE B5	LTE B26
Inverted F	NA	0.0	0.0	-1.0	0.0	0.0	-1.0	-1.0

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

3.2 Configuration of System under 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. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
B.	Adapter	Sony	ACC-283N	NA	NA	Provided by manufacturer

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

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 on X-plane. Following channel(s) was (were) selected for the final test as listed below.

WCDMA Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA
-	Modulation Characteristics	9262 to 9538	9400 (1880.0MHz)	WCDMA, HSDPA, HSUPA
-	Frequency Stability	9262 to 9538	9262 (1852.4MHz), 9538 (1907.6MHz)	WCDMA
-	Occupied Bandwidth	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Band Edge	9262 to 9538	9262 (1852.4MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Peak To Average Ratio	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Conducted Emission	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Radiated Emission Below 1GHz	9262 to 9538	9538 (1907.6MHz)	WCDMA
-	Radiated Emission Above 1GHz	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA

Note: For radiated emission below 1GHz, low, mid and high channels were pre-tested E.I.R.P. in chamber. High channel was found to be the worst case and therefore had been chosen for all final tests.

LTE Band 2

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 18900 (1880.00MHz), 19185 (1908.50MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 18900 (1880.00MHz), 19150 (1905.00MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 18900 (1880.00MHz), 19125 (1902.50MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset
-	Modulation Characteristics	18700 to 19100	18900 (1880.00MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
-	Frequency Stability	18607 to 19193	18607 (1850.70MHz), 19193 (1909.30MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 19185 (1908.50MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 19175 (1907.50MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 19150 (1905.00MHz)	10MHz	QPSK	50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 19125 (1902.50MHz)	15MHz	QPSK	75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 19100 (1900.00MHz)	20MHz	QPSK	100 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Occupied Bandwidth	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK / 16QAM	6 RB / 0RB Offset
		18615 to 19185	18615 (1851.50MHz), 18900 (1880.00MHz), 19185 (1908.50MHz)	3MHz	QPSK / 16QAM	15 RB / 0RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK / 16QAM	25RB / 0RB Offset
		18650 to 19150	18650 (1855.00MHz), 18900 (1880.00MHz), 19150 (1905.00MHz)	10MHz	QPSK / 16QAM	50RB / 0RB Offset
		18675 to 19125	18675 (1857.50MHz), 18900 (1880.00MHz), 19125 (1902.50MHz)	15MHz	QPSK / 16QAM	75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
-	Band Edge	18607 to 19193	18607 (1850.70MHz), 19193 (1909.30MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 19185 (1908.50MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 19175 (1907.50MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 19150 (1905.00MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 19125 (1902.50MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 19100 (1900.00MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 18900 (1880.00MHz), 19185 (1908.50MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 18900 (1880.00MHz), 19150 (1905.00MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 18900 (1880.00MHz), 19125 (1902.50MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 18900 (1880.00MHz), 19185 (1908.50MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 18900 (1880.00MHz), 19150 (1905.00MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 18900 (1880.00MHz), 19125 (1902.50MHz)	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	18607 to 19193	18900 (1880.00MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber with 1.4MHz mode. Mid channel was found to be the worst case and therefore had been chosen for all final tests.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
EIRP	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Modulation Characteristics	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Frequency Stability	24deg. C, 64%RH	3.80Vdc	Willy Cheng
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	Willy Cheng
Radiated Emission	26deg. C, 70%RH	120Vac, 60Hz	Willy Cheng

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 and References

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

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 24

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

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

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

4.1.3 Test Setup



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

4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA II		
TX Channel	9262	9400	9538
Rx Channel	9662	9800	9938
Frequency	1852.4	1880	1907.6
RMC 12.2K	19.86	19.96	19.77
HSDPA Subtest-1	18.44	18.44	18.33
HSDPA Subtest-2	18.45	18.50	18.40
HSDPA Subtest-3	17.93	17.96	17.88
HSDPA Subtest-4	17.94	17.93	17.86
HSUPA Subtest-1	18.05	18.04	18.01
HSUPA Subtest-2	16.85	16.87	16.77
HSUPA Subtest-3	17.06	17.10	17.09
HSUPA Subtest-4	17.09	17.03	17.01
HSUPA Subtest-5	18.40	18.34	18.32

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	19.83	19.86	19.51
		1	50	19.82	19.81	19.75
		1	99	19.64	19.69	19.71
		50	0	18.93	18.93	18.91
		50	25	18.85	18.91	18.91
		50	50	18.79	18.80	18.81
		100	0	18.81	18.82	18.78
20M	16QAM	1	0	18.85	18.81	18.82
		1	50	18.77	18.77	18.70
		1	99	18.52	18.51	18.56
		50	0	17.88	17.96	17.89
		50	25	17.80	17.89	17.77
		50	50	17.72	17.74	17.73
		100	0	17.93	17.90	17.94
BW	MCS Index	Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	19.80	19.83	19.46
		1	37	19.77	19.83	19.72
		1	74	19.68	19.70	19.72
		36	0	18.95	18.98	18.86
		36	19	18.84	18.89	18.93
		36	39	18.80	18.76	18.74
		75	0	18.83	18.81	18.76
15M	16QAM	1	0	18.79	18.82	18.76
		1	37	18.75	18.76	18.80
		1	74	18.57	18.58	18.50
		36	0	17.84	17.88	17.89
		36	19	17.85	17.80	17.79
		36	39	17.73	17.77	17.73
		75	0	17.89	17.95	17.85

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	19.76	19.81	19.43
		1	24	19.77	19.75	19.80
		1	49	19.66	19.72	19.73
		25	0	18.96	18.94	18.94
		25	12	18.86	18.93	18.87
		25	25	18.82	18.79	18.81
		50	0	18.76	18.77	18.76
10M	16QAM	1	0	18.79	18.79	18.75
		1	24	18.74	18.73	18.77
		1	49	18.51	18.60	18.54
		25	0	17.87	17.95	17.91
		25	12	17.77	17.89	17.79
		25	25	17.68	17.73	17.74
		50	0	17.95	17.89	17.92
BW	MCS Index	Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	19.82	19.85	19.42
		1	12	19.77	19.81	19.74
		1	24	19.65	19.75	19.68
		12	0	18.96	18.99	18.94
		12	6	18.85	18.97	18.85
		12	13	18.78	18.79	18.76
		25	0	18.80	18.83	18.80
5M	16QAM	1	0	18.76	18.85	18.75
		1	12	18.76	18.79	18.79
		1	24	18.52	18.61	18.56
		12	0	17.86	17.87	17.90
		12	6	17.87	17.82	17.84
		12	13	17.73	17.80	17.67
		25	0	17.93	17.89	17.89

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	19.73	19.77	19.47
		1	7	19.74	19.79	19.78
		1	14	19.63	19.74	19.72
		8	0	18.91	18.97	18.90
		8	3	18.86	18.96	18.88
		8	7	18.81	18.78	18.75
		15	0	18.79	18.86	18.83
3M	16QAM	1	0	18.81	18.82	18.85
		1	7	18.78	18.82	18.78
		1	14	18.49	18.58	18.54
		8	0	17.89	17.91	17.94
		8	3	17.85	17.86	17.80
		8	7	17.77	17.70	17.70
		15	0	17.86	17.97	17.92
BW	MCS Index	Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	19.81	19.78	19.46
		1	2	19.73	19.82	19.74
		1	5	19.64	19.75	19.72
		3	0	18.92	18.91	18.87
		3	1	18.93	18.88	18.90
		3	3	18.79	18.83	18.82
		6	0	18.81	18.87	18.81
1.4M	16QAM	1	0	18.82	18.80	18.83
		1	2	18.73	18.77	18.72
		1	5	18.48	18.61	18.56
		3	0	17.86	17.94	17.84
		3	1	17.84	17.86	17.79
		3	3	17.77	17.75	17.73
		6	0	17.91	17.96	17.89

EIRP Power (dBm)

Band	WCDMA II		
TX Channel	9262	9400	9538
Rx Channel	9662	9800	9938
Frequency	1852.4	1880	1907.6
RMC 12.2K	19.86	19.96	19.77
HSDPA Subtest-1	18.44	18.44	18.33
HSDPA Subtest-2	18.45	18.50	18.40
HSDPA Subtest-3	17.93	17.96	17.88
HSDPA Subtest-4	17.94	17.93	17.86
HSUPA Subtest-1	18.05	18.04	18.01
HSUPA Subtest-2	16.85	16.87	16.77
HSUPA Subtest-3	17.06	17.10	17.09
HSUPA Subtest-4	17.09	17.03	17.01
HSUPA Subtest-5	18.40	18.34	18.32

*EIRP = Conducted + antenna gain

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	19.83	19.86	19.51
		1	50	19.82	19.81	19.75
		1	99	19.64	19.69	19.71
		50	0	18.93	18.93	18.91
		50	25	18.85	18.91	18.91
		50	50	18.79	18.80	18.81
		100	0	18.81	18.82	18.78
20M	16QAM	1	0	18.85	18.81	18.82
		1	50	18.77	18.77	18.70
		1	99	18.52	18.51	18.56
		50	0	17.88	17.96	17.89
		50	25	17.80	17.89	17.77
		50	50	17.72	17.74	17.73
		100	0	17.93	17.90	17.94
BW	MCS Index	Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	19.80	19.83	19.46
		1	37	19.77	19.83	19.72
		1	74	19.68	19.70	19.72
		36	0	18.95	18.98	18.86
		36	19	18.84	18.89	18.93
		36	39	18.80	18.76	18.74
		75	0	18.83	18.81	18.76
15M	16QAM	1	0	18.79	18.82	18.76
		1	37	18.75	18.76	18.80
		1	74	18.57	18.58	18.50
		36	0	17.84	17.88	17.89
		36	19	17.85	17.80	17.79
		36	39	17.73	17.77	17.73
		75	0	17.89	17.95	17.85

*EIRP = Conducted + antenna gain

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	19.76	19.81	19.43
		1	24	19.77	19.75	19.80
		1	49	19.66	19.72	19.73
		25	0	18.96	18.94	18.94
		25	12	18.86	18.93	18.87
		25	25	18.82	18.79	18.81
		50	0	18.76	18.77	18.76
10M	16QAM	1	0	18.79	18.79	18.75
		1	24	18.74	18.73	18.77
		1	49	18.51	18.60	18.54
		25	0	17.87	17.95	17.91
		25	12	17.77	17.89	17.79
		25	25	17.68	17.73	17.74
		50	0	17.95	17.89	17.92
BW	MCS Index	Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	19.82	19.85	19.42
		1	12	19.77	19.81	19.74
		1	24	19.65	19.75	19.68
		12	0	18.96	18.99	18.94
		12	6	18.85	18.97	18.85
		12	13	18.78	18.79	18.76
		25	0	18.80	18.83	18.80
5M	16QAM	1	0	18.76	18.85	18.75
		1	12	18.76	18.79	18.79
		1	24	18.52	18.61	18.56
		12	0	17.86	17.87	17.90
		12	6	17.87	17.82	17.84
		12	13	17.73	17.80	17.67
		25	0	17.93	17.89	17.89

*EIRP = Conducted + antenna gain

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	19.73	19.77	19.47
		1	7	19.74	19.79	19.78
		1	14	19.63	19.74	19.72
		8	0	18.91	18.97	18.90
		8	3	18.86	18.96	18.88
		8	7	18.81	18.78	18.75
		15	0	18.79	18.86	18.83
3M	16QAM	1	0	18.81	18.82	18.85
		1	7	18.78	18.82	18.78
		1	14	18.49	18.58	18.54
		8	0	17.89	17.91	17.94
		8	3	17.85	17.86	17.80
		8	7	17.77	17.70	17.70
		15	0	17.86	17.97	17.92
BW	MCS Index	Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	19.81	19.78	19.46
		1	2	19.73	19.82	19.74
		1	5	19.64	19.75	19.72
		3	0	18.92	18.91	18.87
		3	1	18.93	18.88	18.90
		3	3	18.79	18.83	18.82
		6	0	18.81	18.87	18.81
1.4M	16QAM	1	0	18.82	18.80	18.83
		1	2	18.73	18.77	18.72
		1	5	18.48	18.61	18.56
		3	0	17.86	17.94	17.84
		3	1	17.84	17.86	17.79
		3	3	17.77	17.75	17.73
		6	0	17.91	17.96	17.89

*EIRP = Conducted + antenna gain

4.2 Modulation Characteristics Measurement

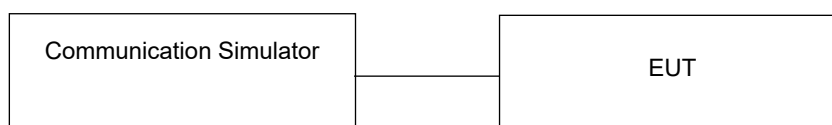
4.2.1 Limits of Modulation Characteristics

N/A

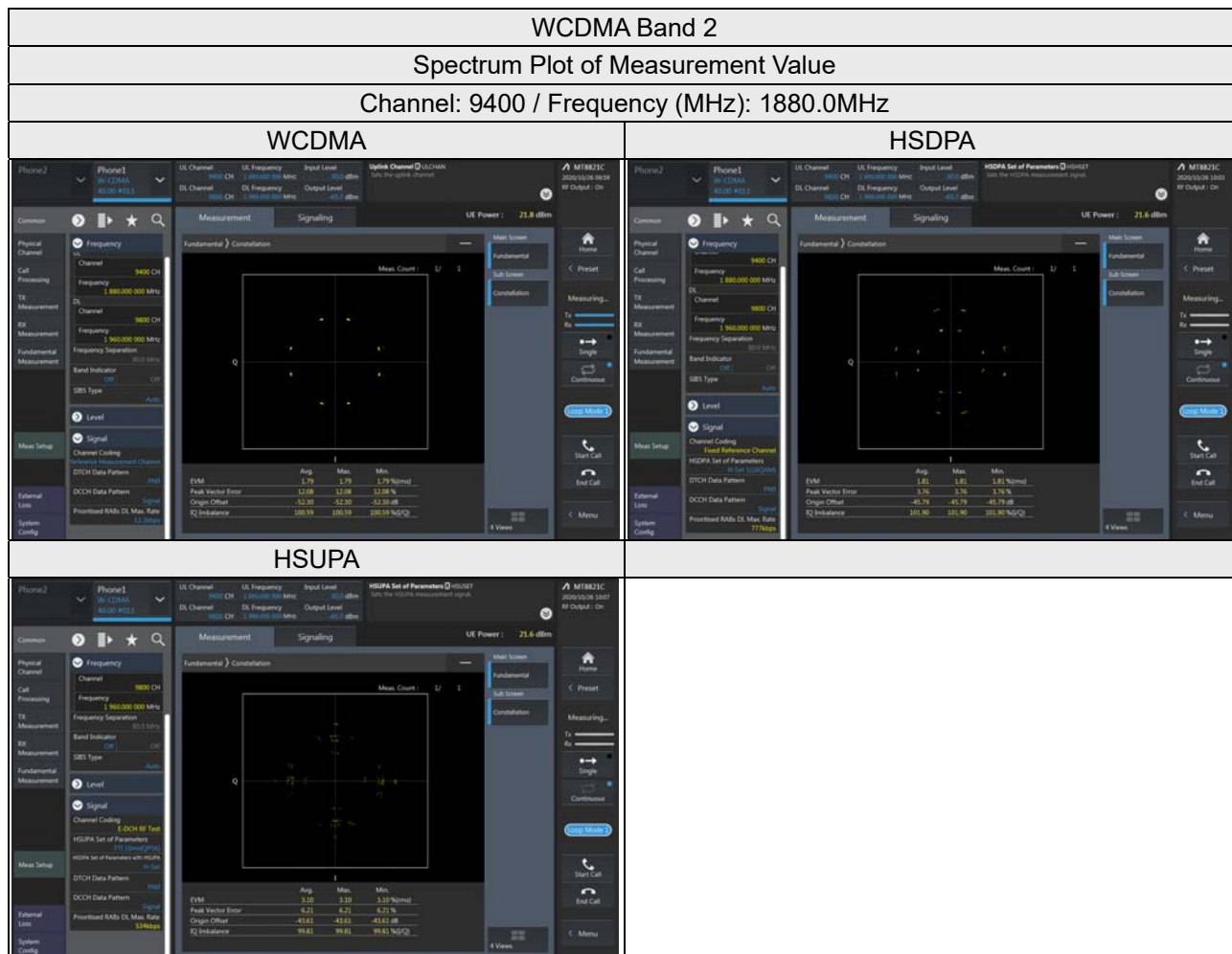
4.2.2 Test Procedure

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.

4.2.3 Test Setup



4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

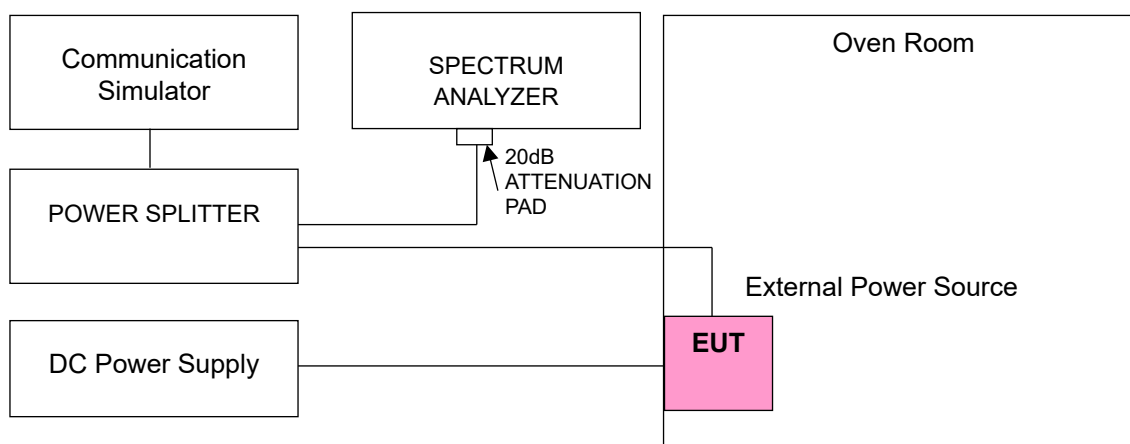
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Conducted Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1852.400003	0.001	1907.600002	0.001
3.80	1852.400003	0.002	1907.600002	0.001
4.37	1852.400001	0.001	1907.600004	0.002

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.400002	0.001	1907.600002	0.001
-20	1852.400002	0.001	1907.600002	0.001
-10	1852.400002	0.001	1907.600002	0.001
0	1852.400002	0.001	1907.600003	0.002
10	1852.400002	0.001	1907.600002	0.001
20	1852.399999	-0.001	1907.599997	-0.002
30	1852.399997	-0.002	1907.599999	-0.001
40	1852.399999	-0.001	1907.599998	-0.001
50	1852.399998	-0.001	1907.599999	-0.001
55	1852.399998	-0.001	1907.599999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1850.700002	0.001	1909.300000	0.002
3.80	1850.700002	0.001	1909.300003	0.002
4.37	1850.700004	0.002	1909.300001	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700002	0.001	1909.300003	0.001
-20	1850.700002	0.001	1909.300002	0.001
-10	1850.700002	0.001	1909.300002	0.001
0	1850.700001	0.001	1909.300002	0.001
10	1850.700003	0.001	1909.300001	0.001
20	1850.699997	-0.001	1909.299996	-0.002
30	1850.699996	-0.002	1909.299997	-0.002
40	1850.699998	-0.001	1909.299999	-0.001
50	1850.699999	-0.001	1909.299998	-0.001
55	1850.699998	-0.001	1909.299998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1851.500003	0.001	1908.500003	0.001
3.80	1851.500001	0.001	1908.500001	0.001
4.37	1851.500002	0.001	1908.500002	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500002	0.001	1908.500002	0.001
-20	1851.500002	0.001	1908.500002	0.001
-10	1851.500002	0.001	1908.500002	0.001
0	1851.500001	0.001	1908.500003	0.001
10	1851.500002	0.001	1908.500001	0.001
20	1851.499997	-0.002	1908.499999	-0.001
30	1851.499997	-0.002	1908.499997	-0.002
40	1851.499999	-0.001	1908.499997	-0.002
50	1851.499997	-0.002	1908.499997	-0.001
55	1851.499997	-0.002	1908.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1852.500003	0.002	1907.500003	0.001
3.80	1852.500002	0.001	1907.500001	0.001
4.37	1852.500002	0.001	1907.500002	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500003	0.002	1907.500002	0.001
-20	1852.500003	0.002	1907.500003	0.001
-10	1852.500003	0.002	1907.500003	0.001
0	1852.500001	0.001	1907.500004	0.002
10	1852.500003	0.002	1907.500002	0.001
20	1852.499998	-0.001	1907.499997	-0.001
30	1852.499996	-0.002	1907.499998	-0.001
40	1852.499997	-0.002	1907.499996	-0.002
50	1852.499997	-0.002	1907.499997	-0.001
55	1852.499998	-0.001	1907.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1855.000002	0.001	1905.000002	0.001
3.80	1855.000001	0.001	1905.000002	0.001
4.37	1855.000001	0.001	1905.000001	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000003	0.002	1905.000003	0.002
-20	1855.000003	0.002	1905.000003	0.002
-10	1855.000003	0.002	1905.000003	0.002
0	1855.000002	0.001	1905.000004	0.002
10	1855.000004	0.002	1905.000002	0.001
20	1854.999996	-0.002	1904.999996	-0.002
30	1854.999996	-0.002	1904.999997	-0.001
40	1854.999998	-0.001	1904.999997	-0.002
50	1854.999999	-0.001	1904.999996	-0.002
55	1854.999997	-0.002	1904.999998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1857.500004	0.002	1902.500002	0.001
3.80	1857.500003	0.001	1902.500001	0.001
4.37	1857.500003	0.001	1902.500002	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500002	0.001	1902.500003	0.002
-20	1857.500002	0.001	1902.500003	0.002
-10	1857.500002	0.001	1902.500003	0.002
0	1857.500002	0.001	1902.500003	0.001
10	1857.500004	0.002	1902.500003	0.001
20	1857.499998	-0.001	1902.499998	-0.001
30	1857.499997	-0.001	1902.499997	-0.002
40	1857.499998	-0.001	1902.499996	-0.002
50	1857.499997	-0.002	1902.499998	-0.001
55	1857.499997	-0.002	1902.499997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1860.000002	0.001	1900.000001	0.001
3.80	1860.000002	0.001	1900.000001	0.001
4.37	1860.000002	0.001	1900.000002	0.001

Note: The applicant defined the normal working voltage is from 3.23Vdc to 4.37Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000003	0.001	1900.000002	0.001
-20	1860.000002	0.001	1900.000001	0.001
-10	1860.000003	0.001	1900.000002	0.001
0	1860.000004	0.002	1900.000001	0.001
10	1860.000003	0.002	1900.000002	0.001
20	1859.999998	-0.001	1899.999999	-0.001
30	1859.999998	-0.001	1899.999998	-0.001
40	1859.999997	-0.002	1899.999999	-0.001
50	1859.999996	-0.002	1899.999999	-0.001
55	1859.999997	-0.001	1899.999996	-0.002

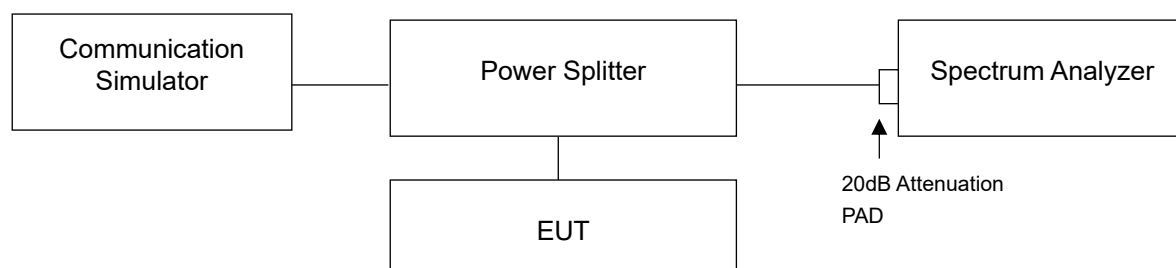
4.4 Occupied Bandwidth Measurement

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. Measurement method, please refer to section 5.4.4 of ANSI C63.26. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

4.4.2 Test Setup



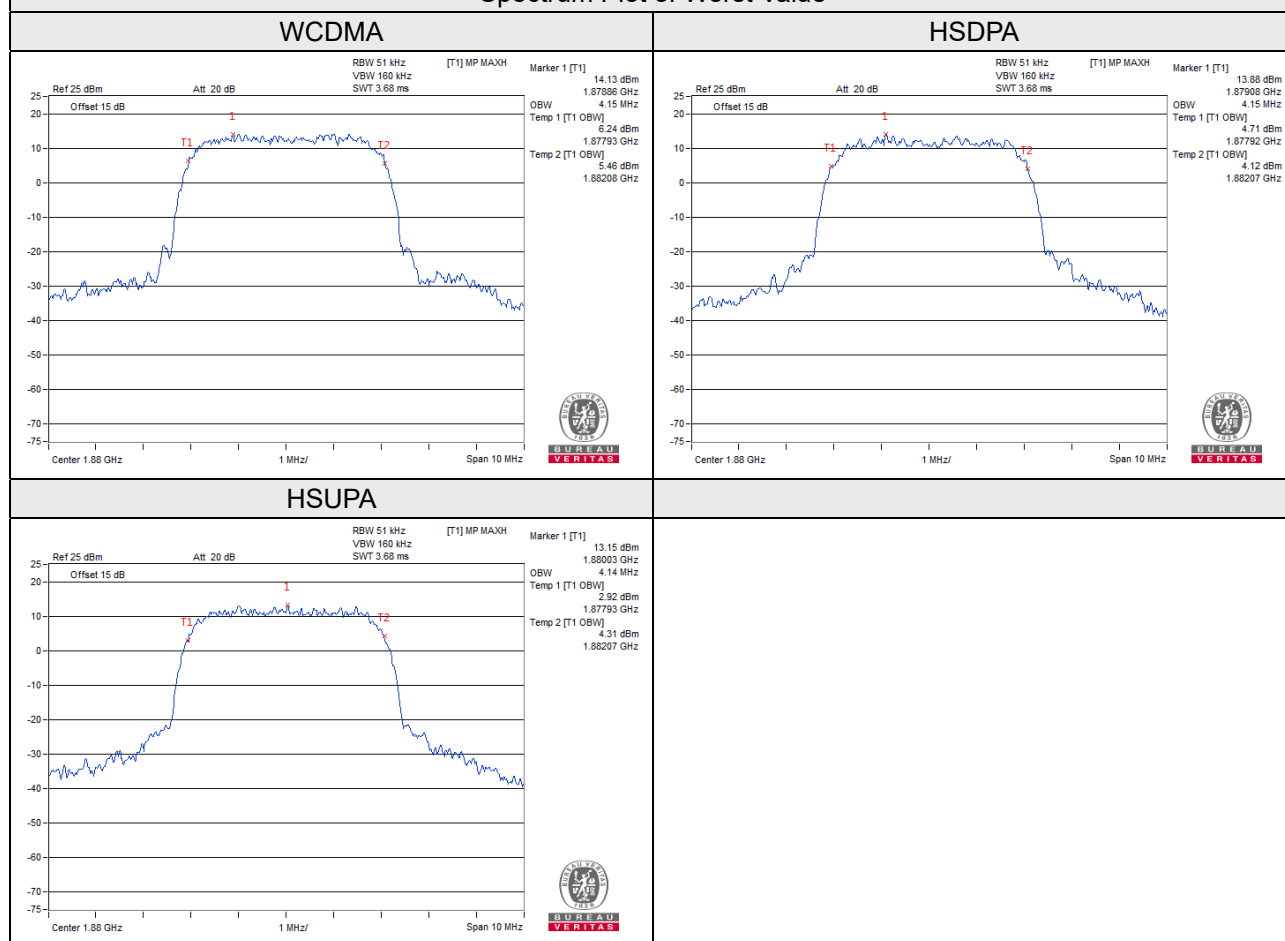
4.4.3 Test Result

Occupied Bandwidth

WCDMA Band 2

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.14	4.12	4.13
9400	1880.0	4.15	4.15	4.14
9538	1907.6	4.13	4.12	4.12

Spectrum Plot of Worst Value



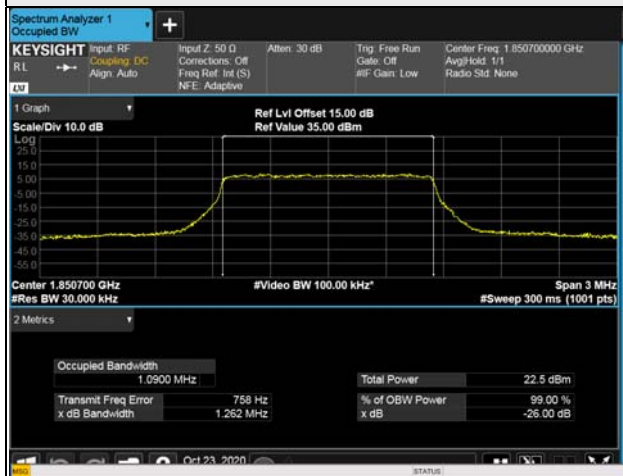
LTE Band 2

LTE Band 2, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18607	1850.7	1.09	1.09
18900	1880.0	1.09	1.09
19193	1909.3	1.09	1.09
LTE Band 2, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18615	1851.5	2.70	2.70
18900	1880.0	2.70	2.70
19185	1908.5	2.70	2.70
LTE Band 2, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18625	1852.5	4.49	4.49
18900	1880.0	4.49	4.49
19175	1907.5	4.48	4.49
LTE Band 2, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18650	1855.0	8.95	8.95
18900	1880.0	8.95	8.95
19150	1905.0	8.94	8.94
LTE Band 2, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18675	1857.5	13.43	13.41
18900	1880.0	13.43	13.42
19125	1902.5	13.41	13.40

LTE Band 2, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
18700	1860.0	17.88	17.90
18900	1880.0	17.89	17.91
19100	1900.0	17.83	17.87

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / QPSK



5MHz / 16QAM



10MHz / QPSK



15MHz / QPSK



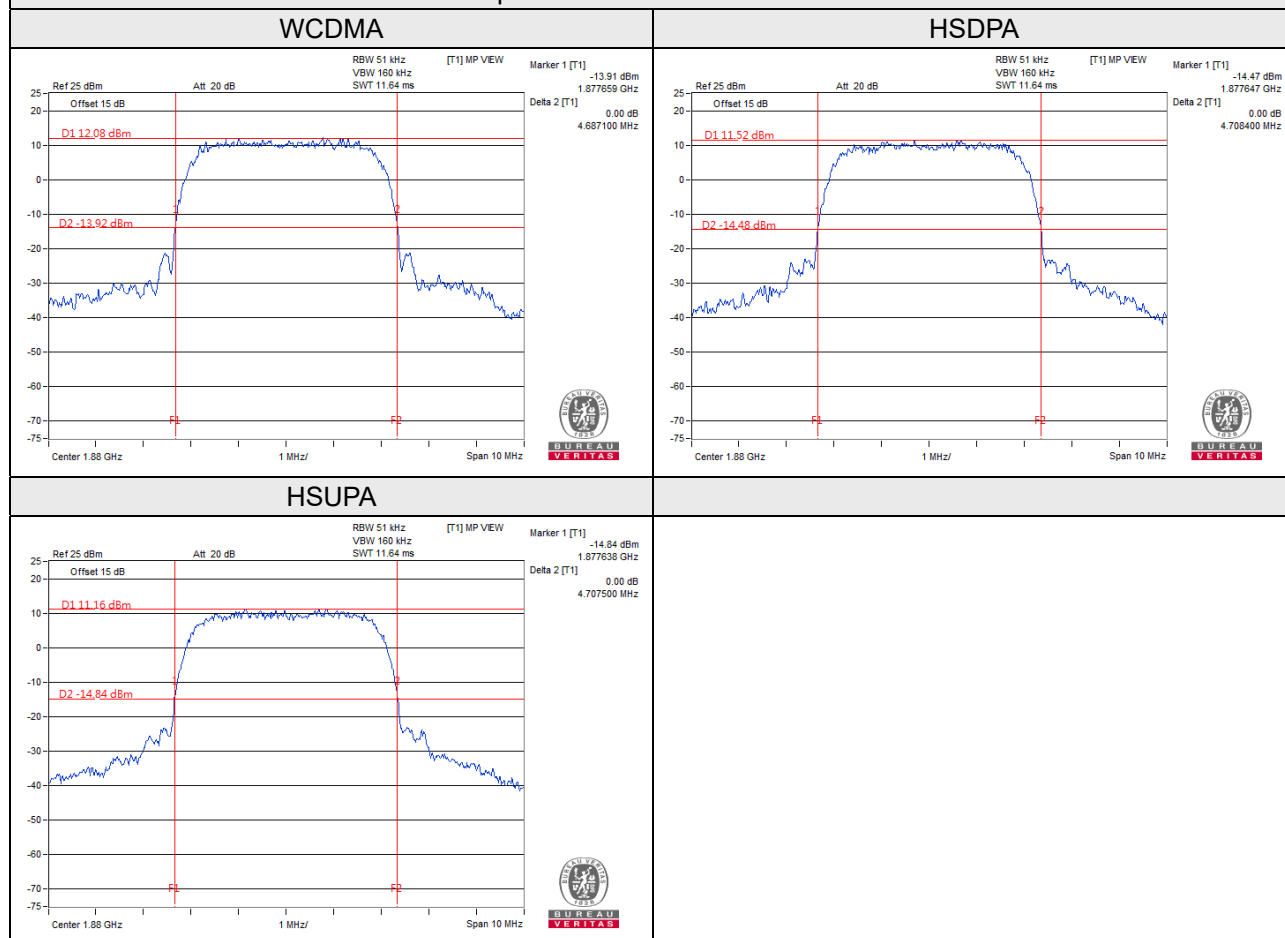
20MHz / 16QAM



26dB Bandwidth WCDMA Band 2

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.69	4.70	4.69
9400	1880.0	4.69	4.71	4.71
9538	1907.6	4.68	4.64	4.65

Spectrum Plot of Worst Value



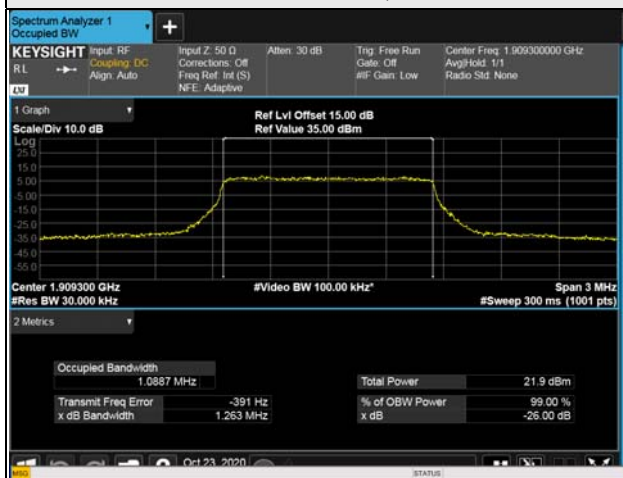
LTE Band 2

LTE Band 2, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18607	1850.7	1.25	1.26
18900	1880.0	1.25	1.26
19193	1909.3	1.26	1.26
LTE Band 2, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18615	1851.5	2.91	2.93
18900	1880.0	2.93	2.93
19185	1908.5	2.93	2.92
LTE Band 2, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18625	1852.5	4.80	4.81
18900	1880.0	4.81	4.82
19175	1907.5	4.81	4.81
LTE Band 2, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18650	1855.0	9.49	9.51
18900	1880.0	9.52	9.52
19150	1905.0	9.51	9.51
LTE Band 2, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18675	1857.5	14.22	14.23
18900	1880.0	14.23	14.22
19125	1902.5	14.22	14.22

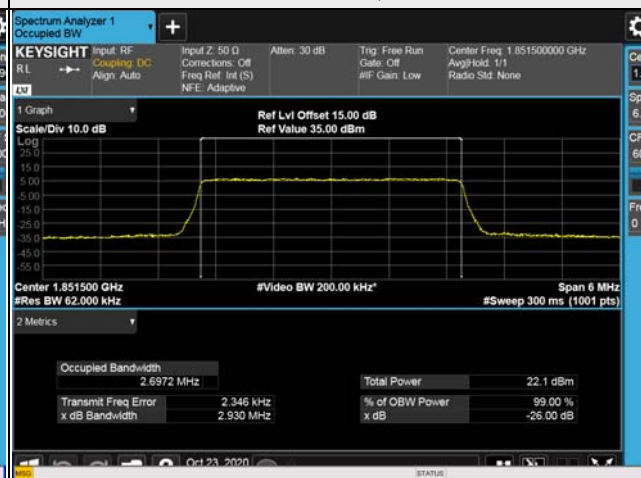
LTE Band 2, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
18700	1860.0	19.01	19.01
18900	1880.0	19.01	19.02
19100	1900.0	18.98	18.98

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / 16QAM



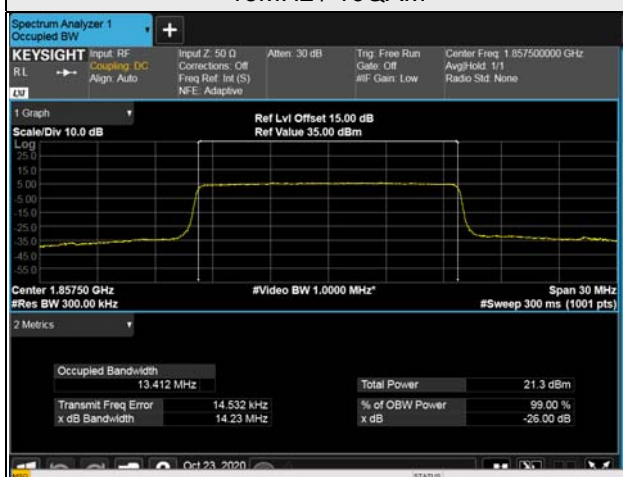
5MHz / 16QAM



10MHz / 16QAM



15MHz / 16QAM



20MHz / 16QAM

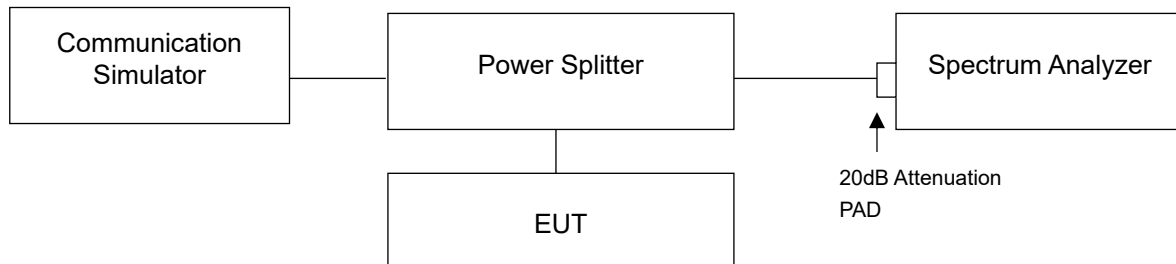


4.5 Band Edge Measurement

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.

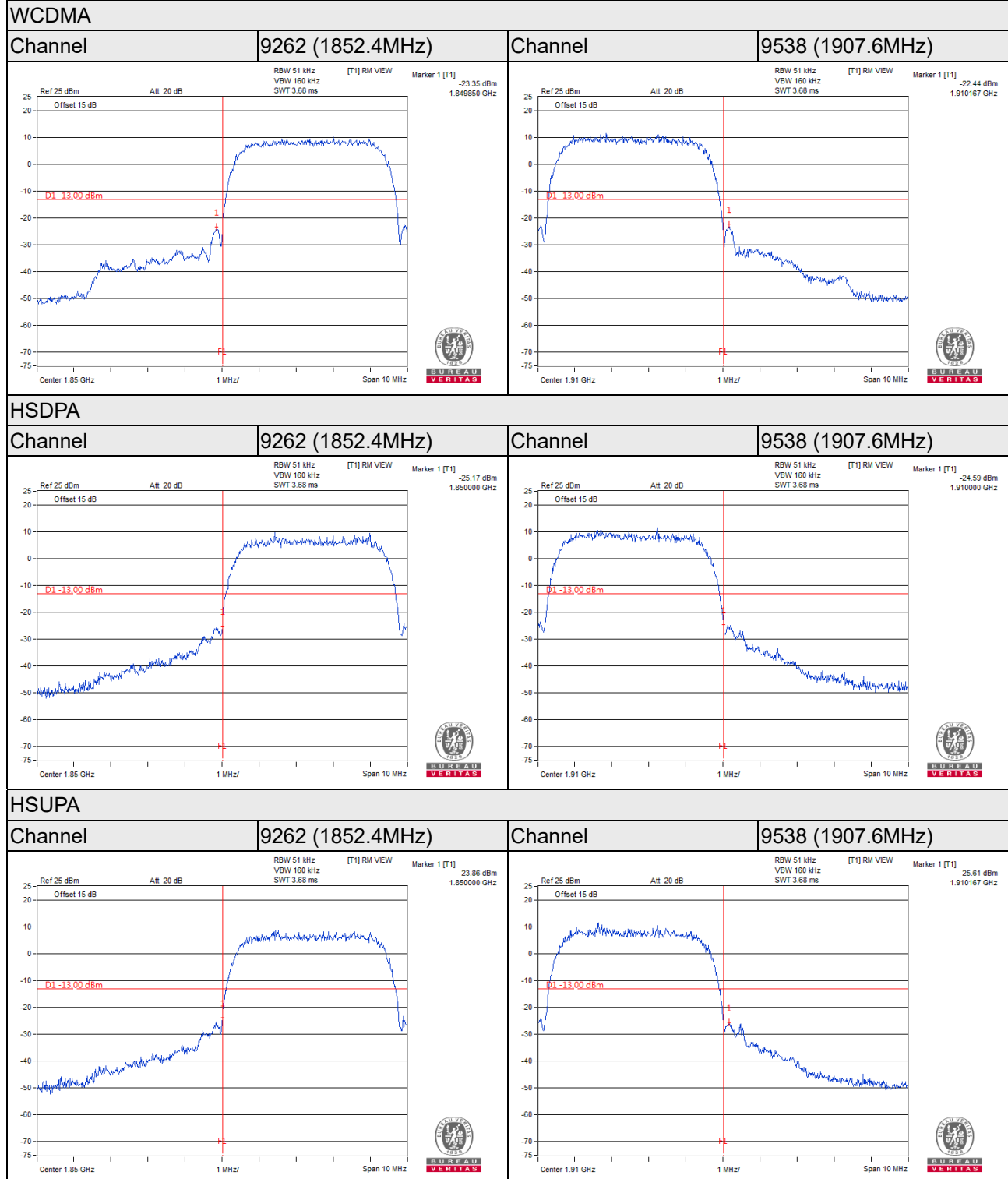
4.5.2 Test Setup



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 10MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (WCDMA / HSDPA / HSUPA).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (LTE Channel Bandwidth 5MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
- Record the max trace plot into the test report.

4.5.4 Test Results



LTE Band 2, Channel Bandwidth 1.4MHz

Channel 18607
(1850.70MHz)

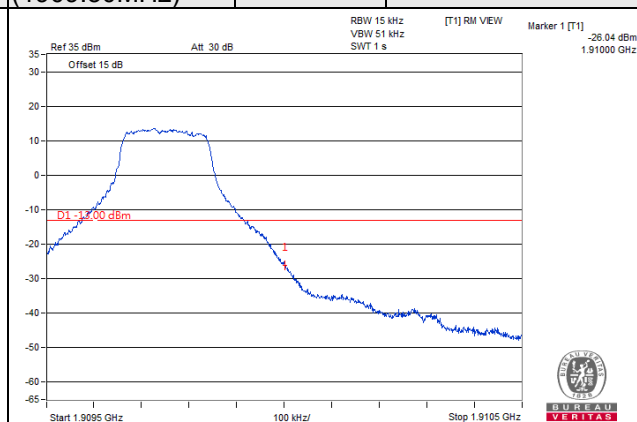
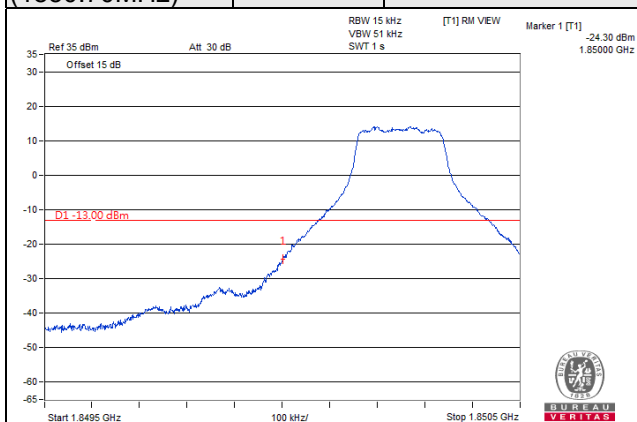
QPSK

1 RB / 0 RB Offset

Channel 19193
(1909.30MHz)

QPSK

1 RB / 5 RB Offset



Channel 18607
(1850.70MHz)

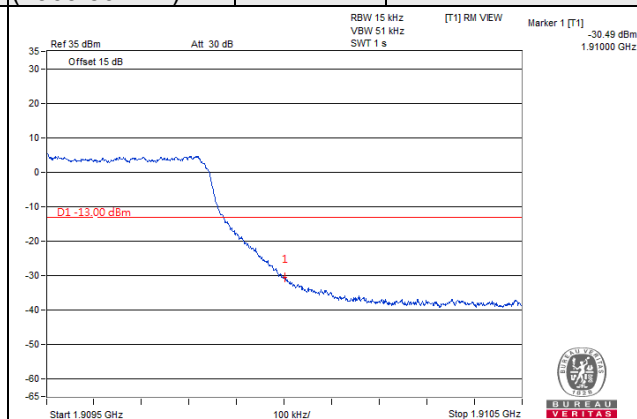
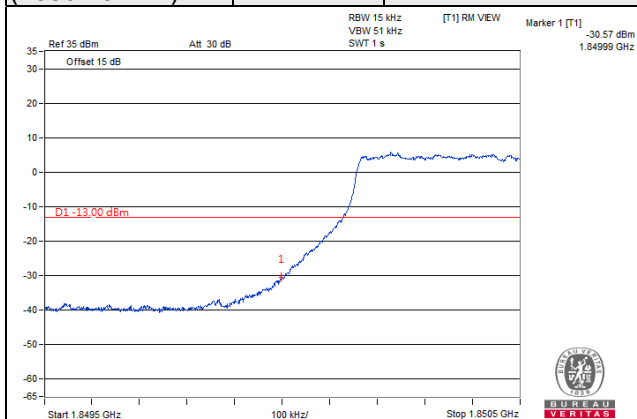
QPSK

6 RB / 0 RB Offset

Channel 19193
(1909.30MHz)

QPSK

6 RB / 0 RB Offset



LTE Band 2, Channel Bandwidth 3MHz

Channel 18615
(1851.50MHz)

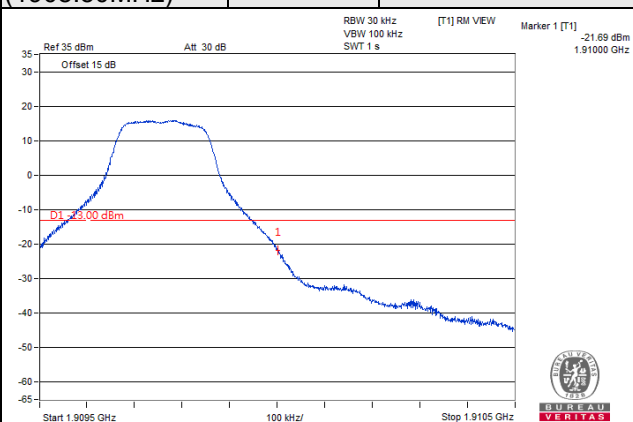
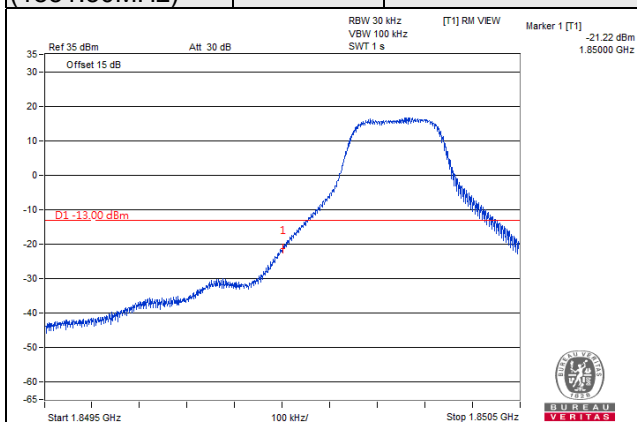
QPSK

1 RB / 0 RB Offset

Channel 19185
(1908.50MHz)

QPSK

1 RB / 14 RB Offset



Channel 18615
(1851.50MHz)

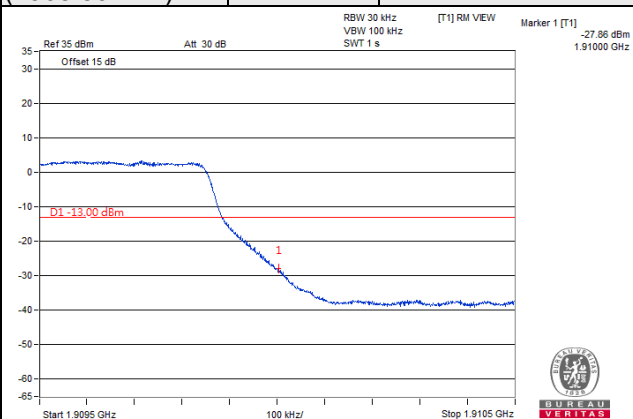
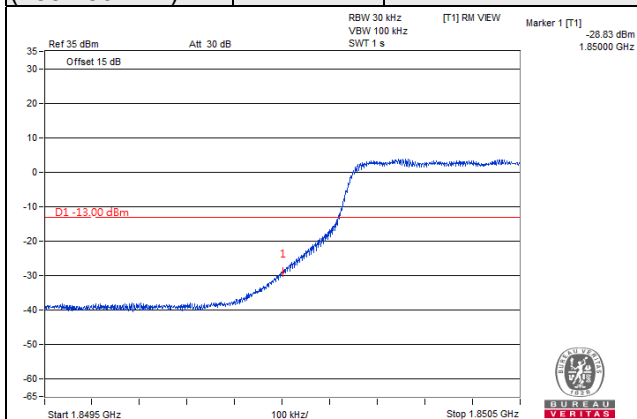
QPSK

15 RB / 0 RB Offset

Channel 19185
(1908.50MHz)

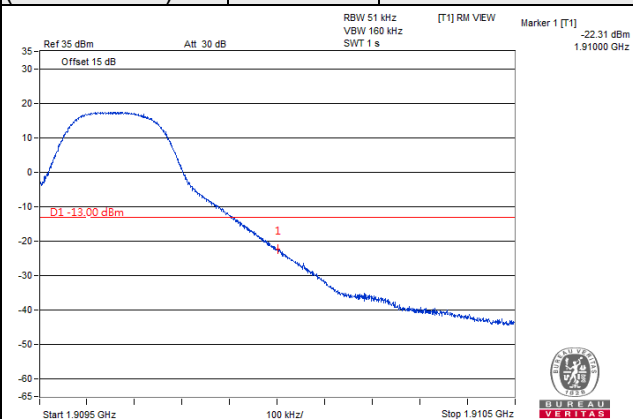
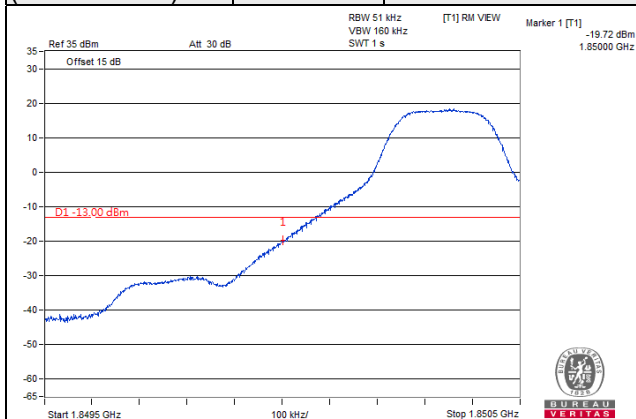
QPSK

15 RB / 0 RB Offset

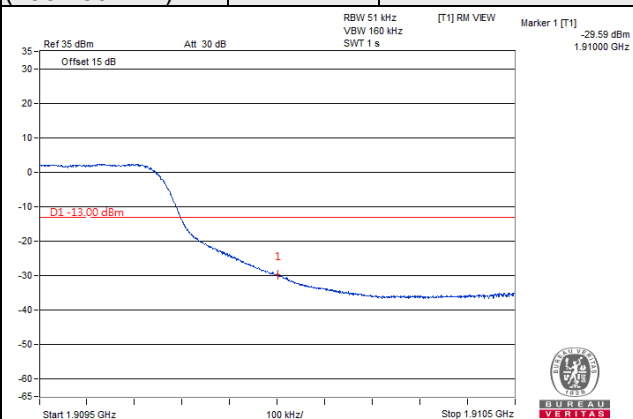
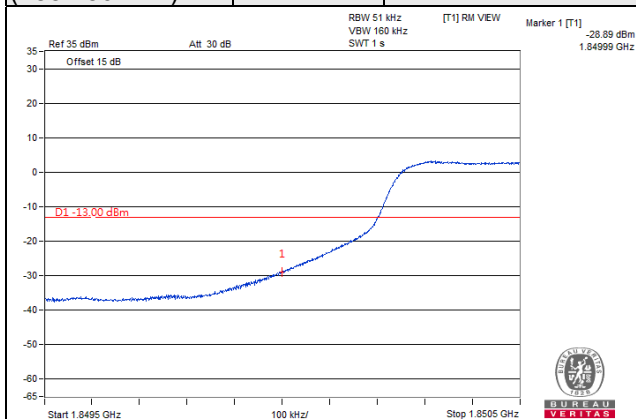


LTE Band 2, Channel Bandwidth 5MHz

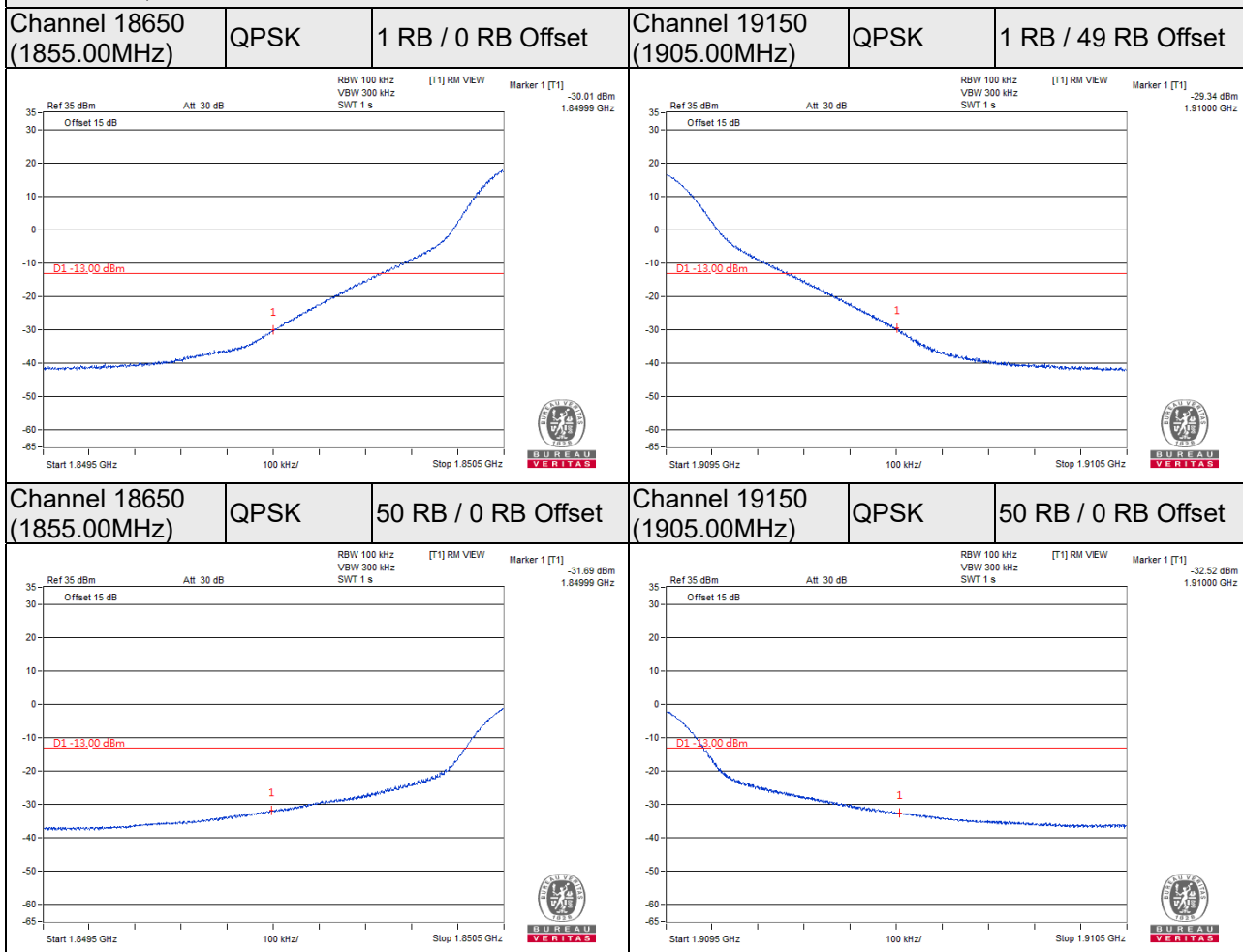
Channel 18625 (1852.50MHz)	QPSK	1 RB / 0 RB Offset	Channel 19175 (1907.50MHz)	QPSK	1 RB / 24 RB Offset
-------------------------------	------	--------------------	-------------------------------	------	---------------------



Channel 18625 (1852.50MHz)	QPSK	25 RB / 0 RB Offset	Channel 19175 (1907.50MHz)	QPSK	25 RB / 0 RB Offset
-------------------------------	------	---------------------	-------------------------------	------	---------------------



LTE Band 2, Channel Bandwidth 10MHz



LTE Band 2, Channel Bandwidth 15MHz

Channel 18675
(1857.50MHz)

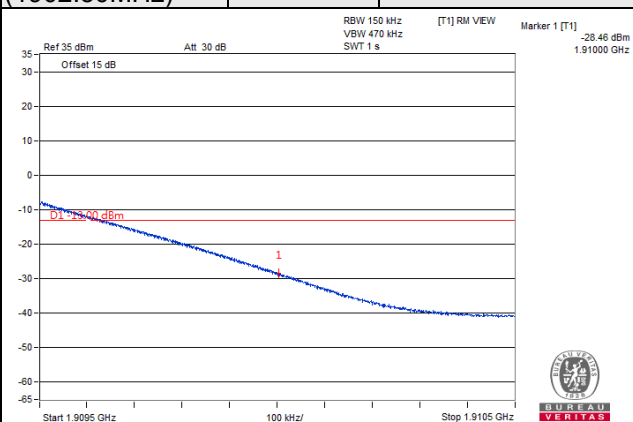
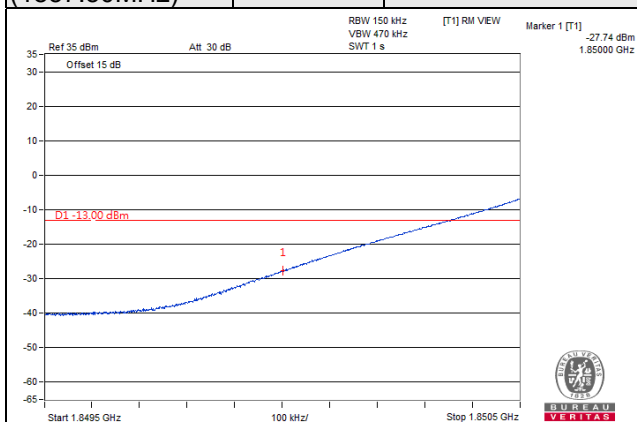
QPSK

1 RB / 0 RB Offset

Channel 19125
(1902.50MHz)

QPSK

1 RB / 74 RB Offset



Channel 18675
(1857.50MHz)

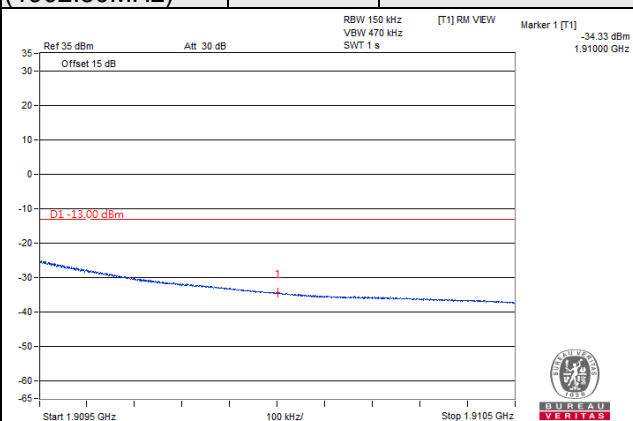
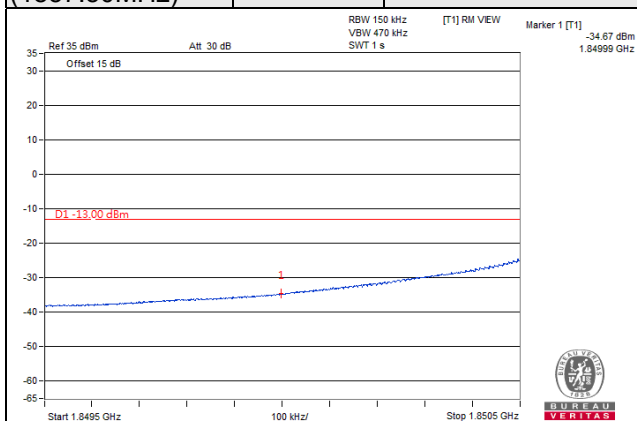
QPSK

75 RB / 0 RB Offset

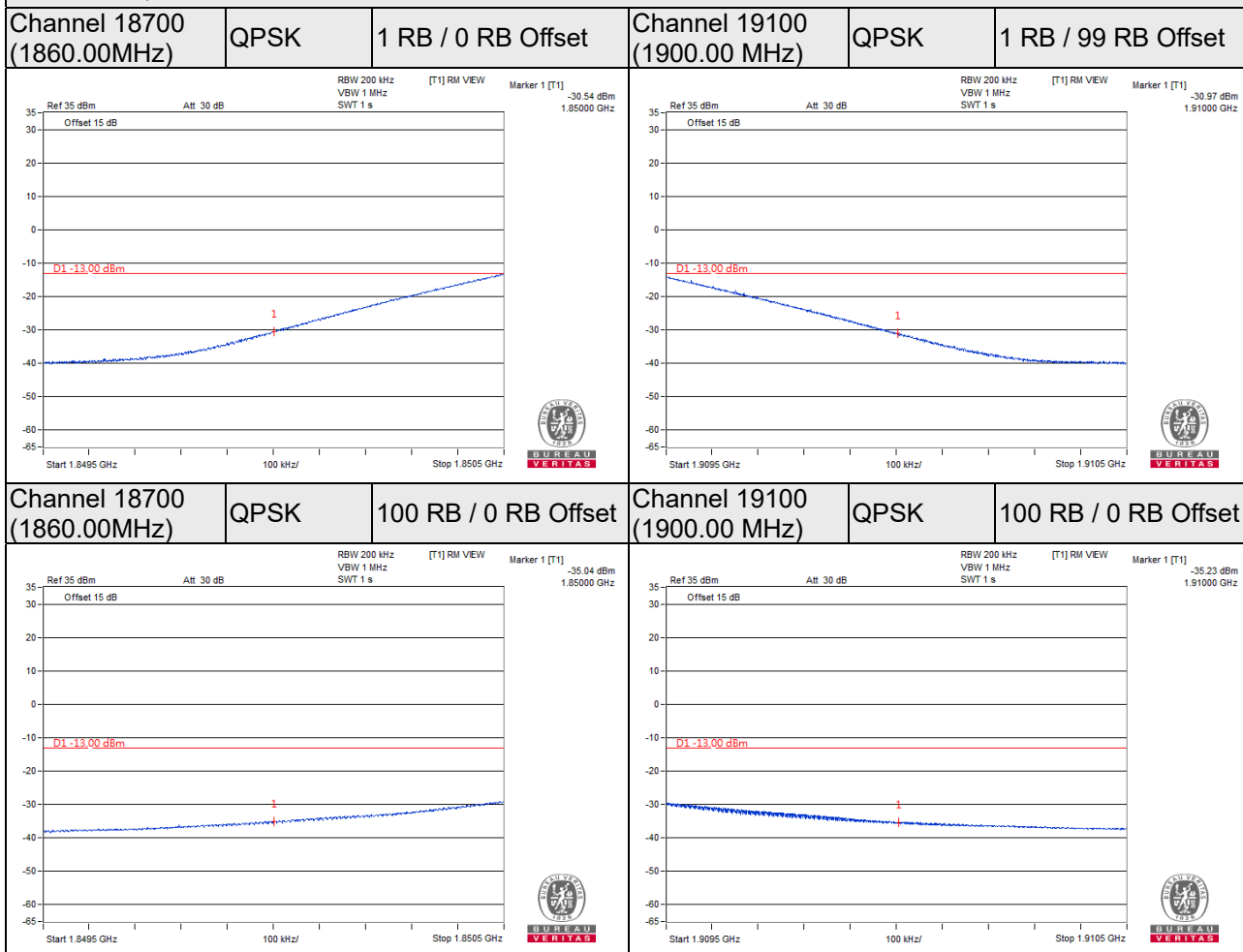
Channel 19125
(1902.50MHz)

QPSK

75 RB / 0 RB Offset



LTE Band 2, Channel Bandwidth 20MHz

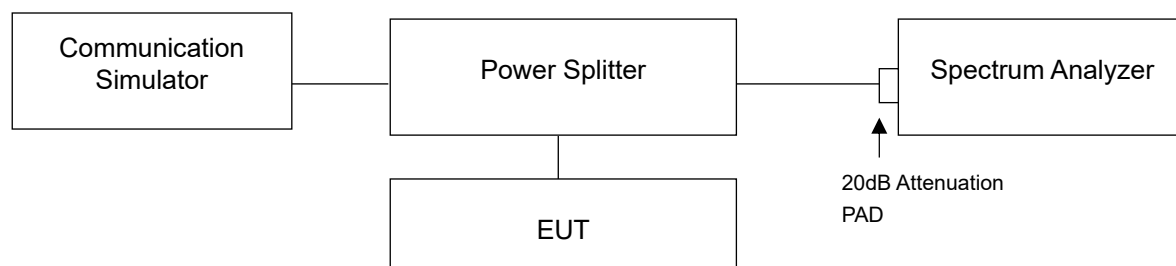


4.6 Peak to Average Ratio

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

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

4.6.4 Test Results

WCDMA Band 2

Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	3.23	3.24	3.24
9400	1880.0	3.24	3.23	3.23
9538	1907.6	3.23	3.22	3.23

Spectrum Plot of Worst Value



LTE Band 2

LTE Band 2, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18607	1850.7	4.47	5.27
18900	1880.0	4.49	5.27
19193	1909.3	4.51	5.25
LTE Band 2, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18615	1851.5	4.46	5.25
18900	1880.0	4.50	5.28
19185	1908.5	4.47	5.25
LTE Band 2, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18625	1852.5	4.44	5.23
18900	1880.0	4.45	5.18
19175	1907.5	4.41	5.16
LTE Band 2, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18650	1855.0	4.37	5.18
18900	1880.0	4.43	5.20
19150	1905.0	4.35	5.20
LTE Band 2, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18675	1857.5	4.34	5.17
18900	1880.0	4.43	5.22
19125	1902.5	4.36	5.13

LTE Band 2, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
18700	1860.0	4.29	5.12
18900	1880.0	4.40	5.17
19100	1900.0	4.34	5.17

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / 16QAM



5MHz / 16QAM



10MHz / 16QAM



15MHz / 16QAM



20MHz / 16QAM

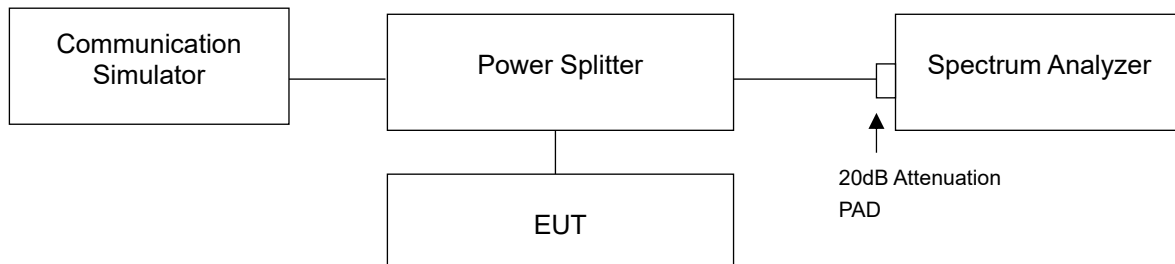


4.7 Conducted Spurious Emissions

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 -13dBm .

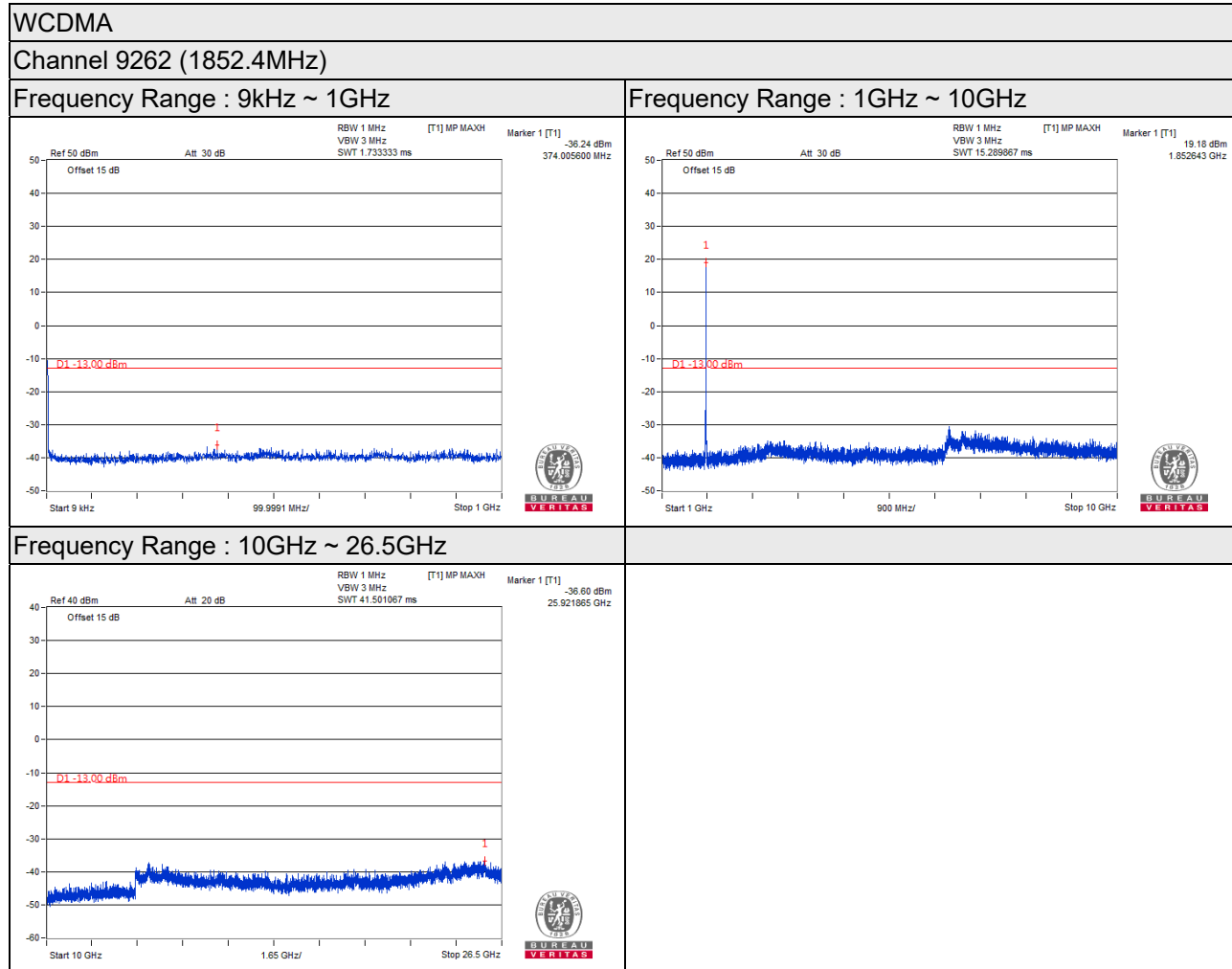
4.7.2 Test Setup



4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 20GHz or 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.7.4 Test Results

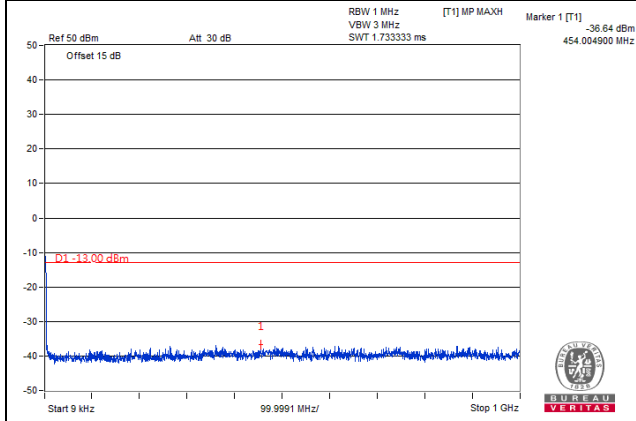


*The 9kHz signal over the limit is from Spectrum.

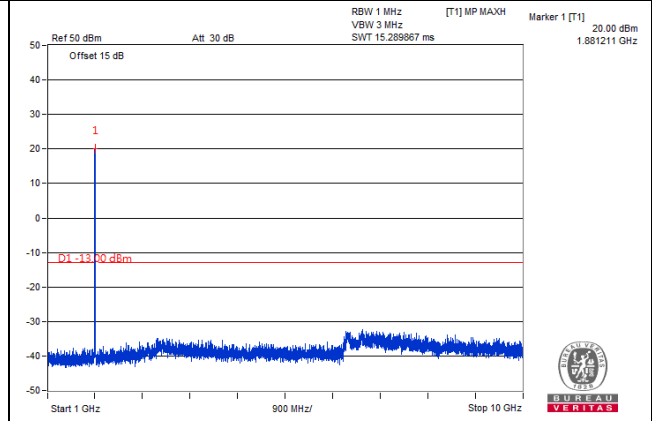
WCDMA

Channel 9400 (1880.0MHz)

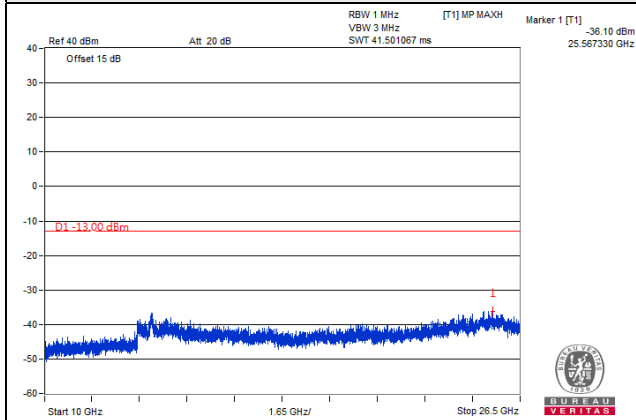
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

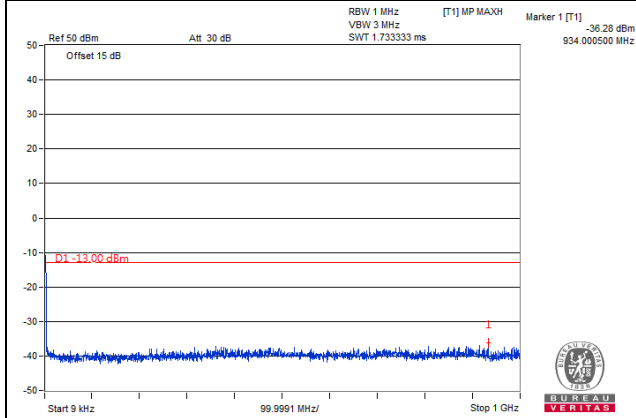


*The 9kHz signal over the limit is from Spectrum.

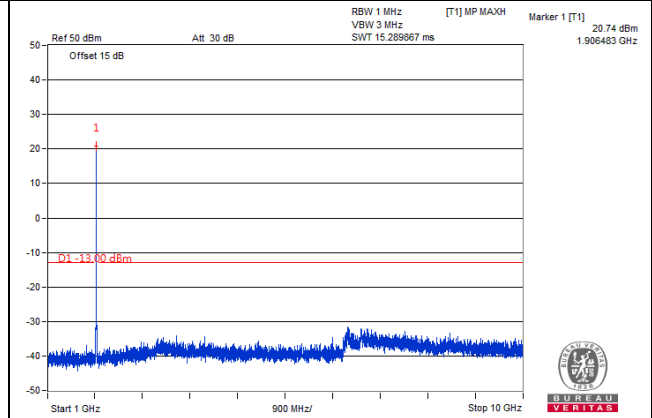
WCDMA

Channel 9538 (1907.6MHz)

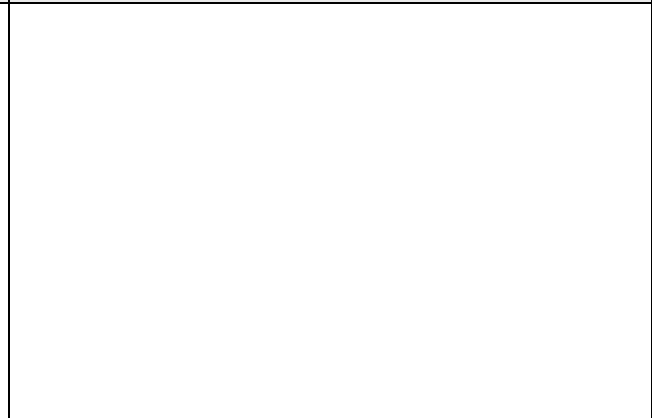
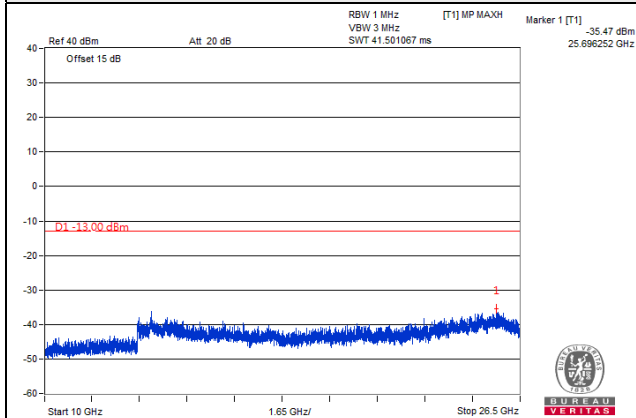
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

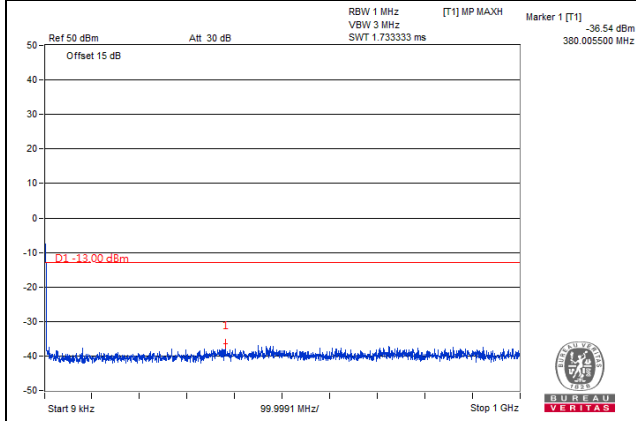


*The 9kHz signal over the limit is from Spectrum.

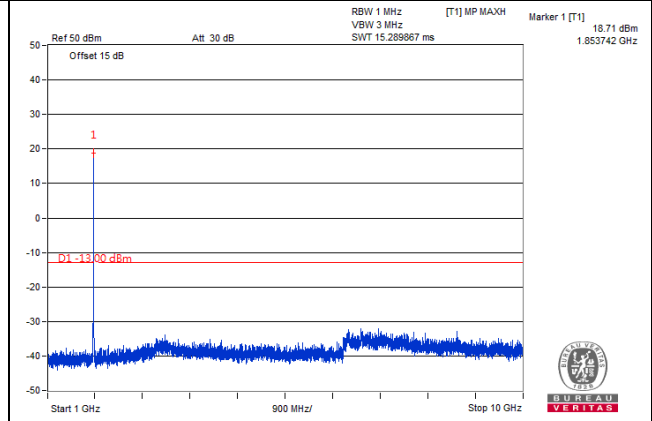
HSDPA

Channel 9262 (1852.4MHz)

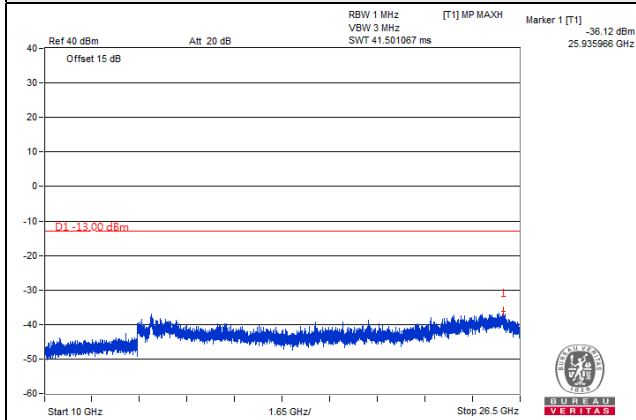
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

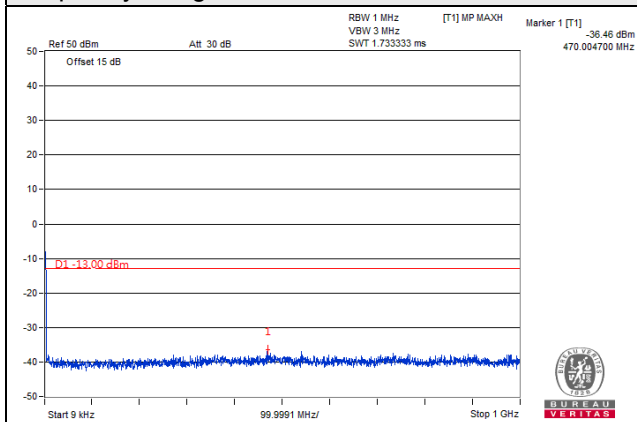


*The 9kHz signal over the limit is from Spectrum.

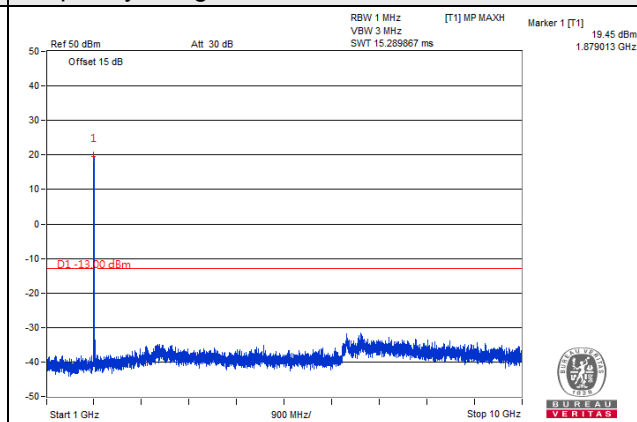
HSDPA

Channel 9400 (1880.0MHz)

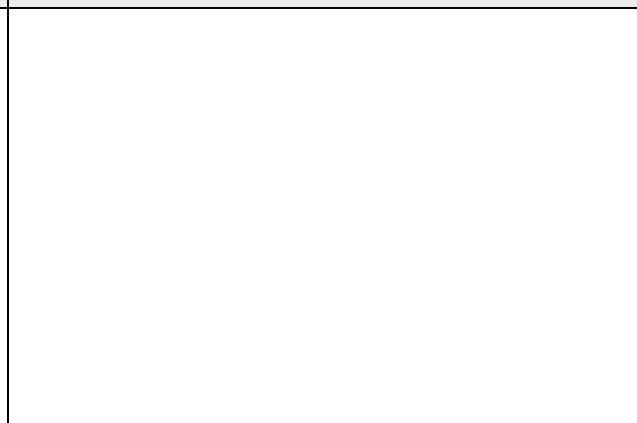
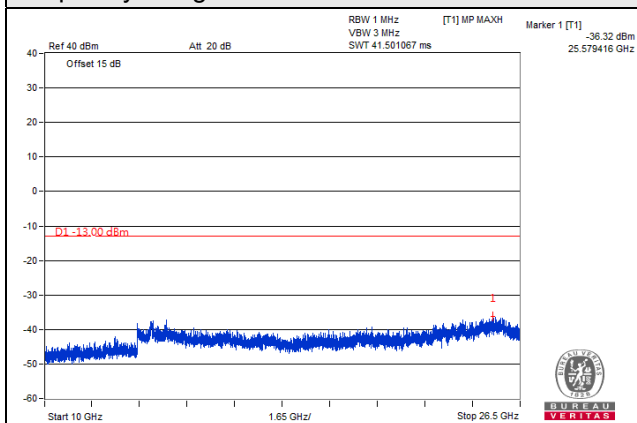
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

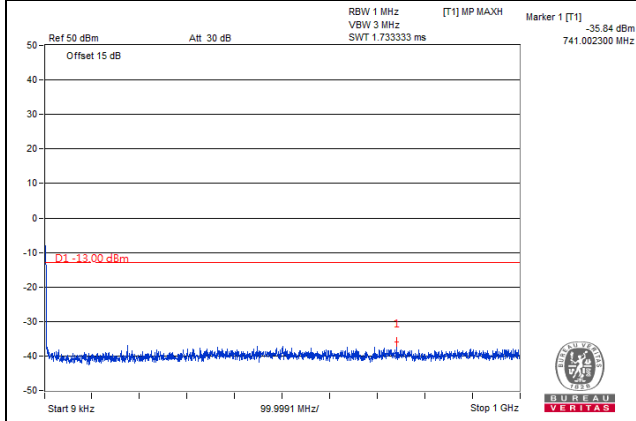


*The 9kHz signal over the limit is from Spectrum.

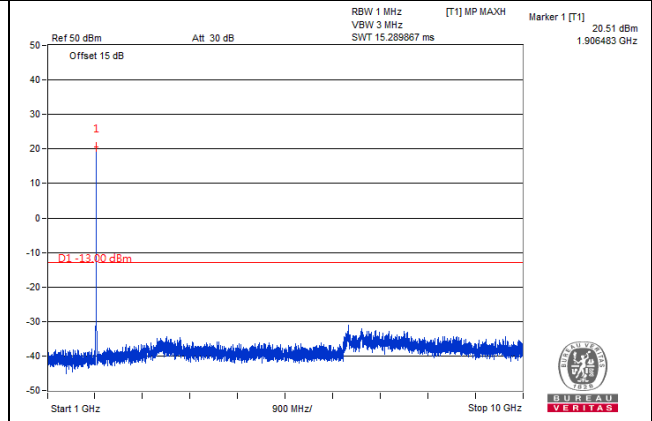
HSDPA

Channel 9538 (1907.6MHz)

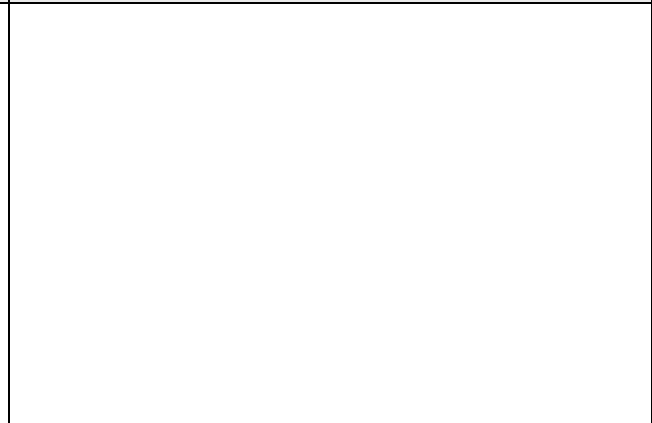
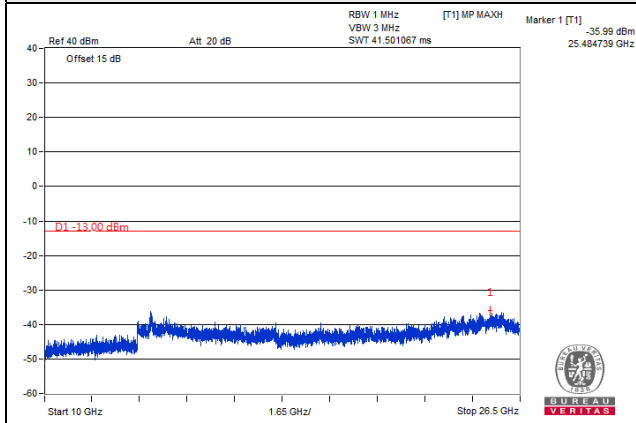
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

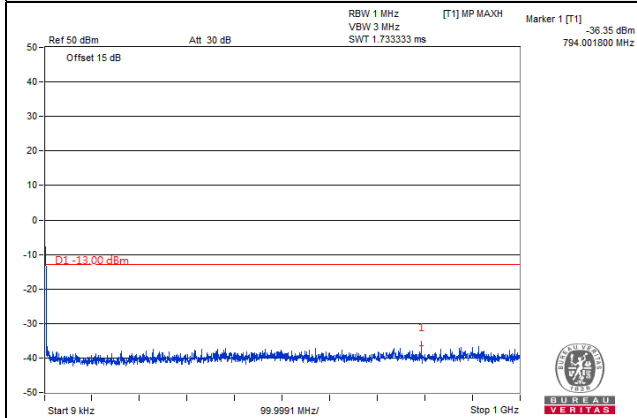


*The 9kHz signal over the limit is from Spectrum.

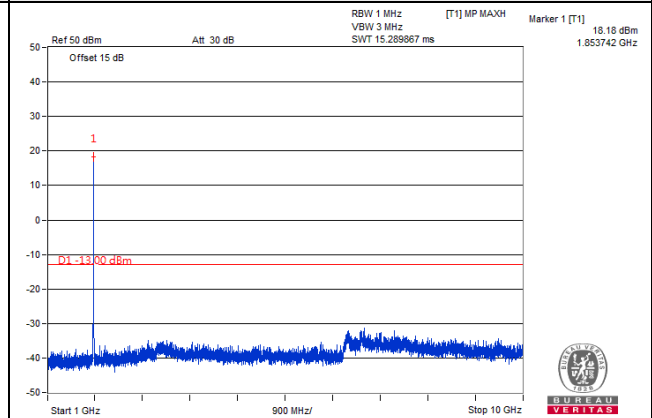
HSUPA

Channel 9262 (1852.4MHz)

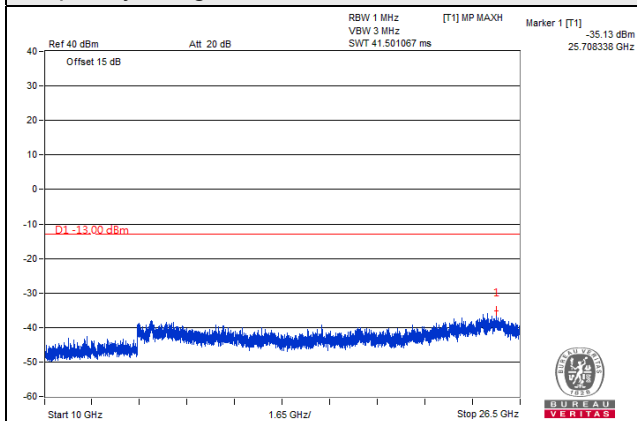
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

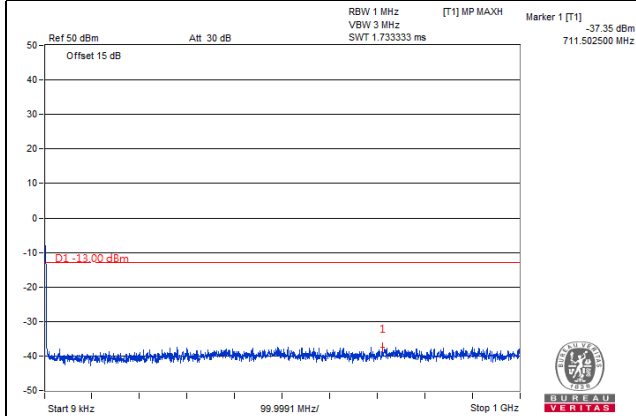


*The 9kHz signal over the limit is from Spectrum.

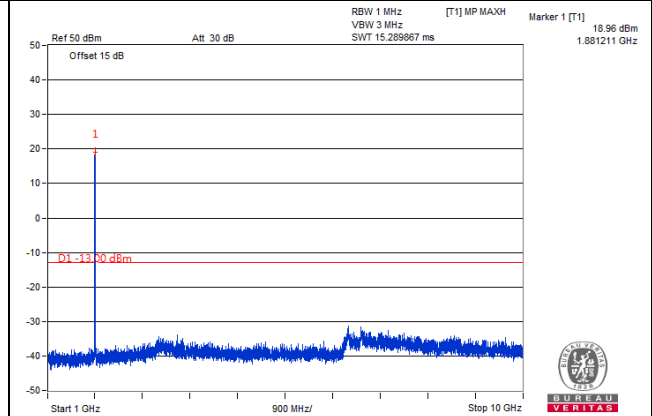
HSUPA

Channel 9400 (1880.0MHz)

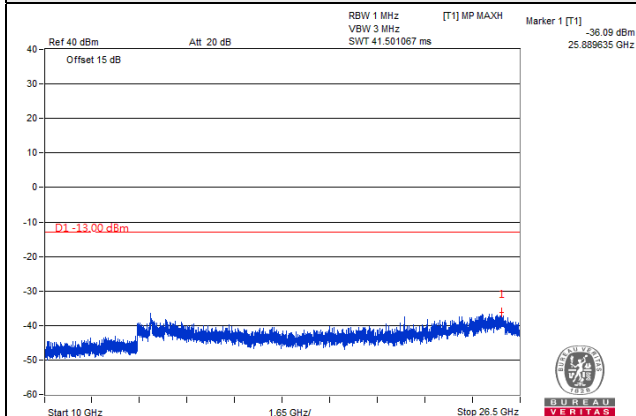
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

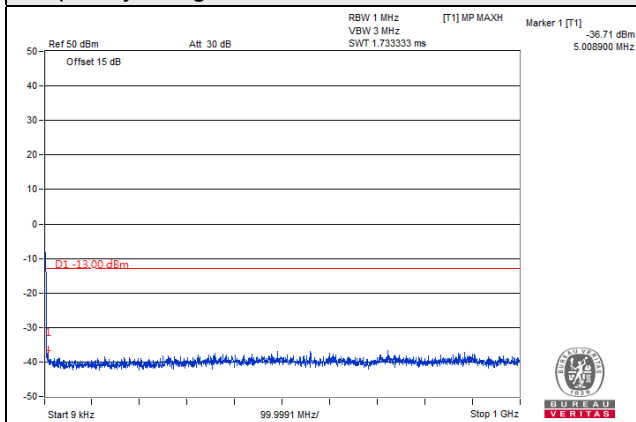


*The 9kHz signal over the limit is from Spectrum.

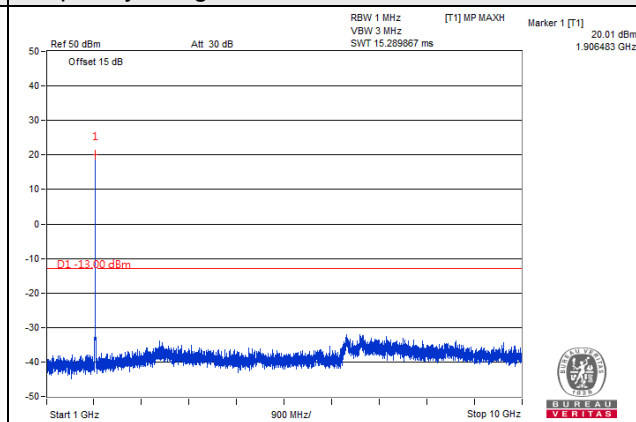
HSUPA

Channel 9538 (1907.6MHz)

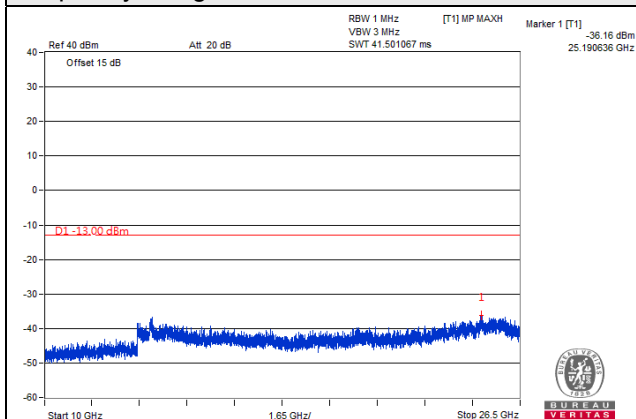
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

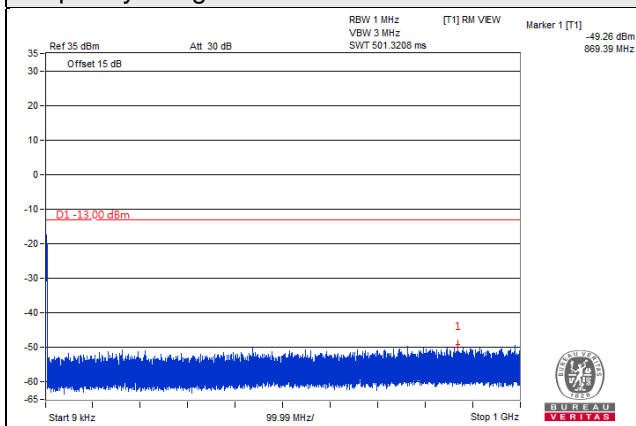


*The 9kHz signal over the limit is from Spectrum.

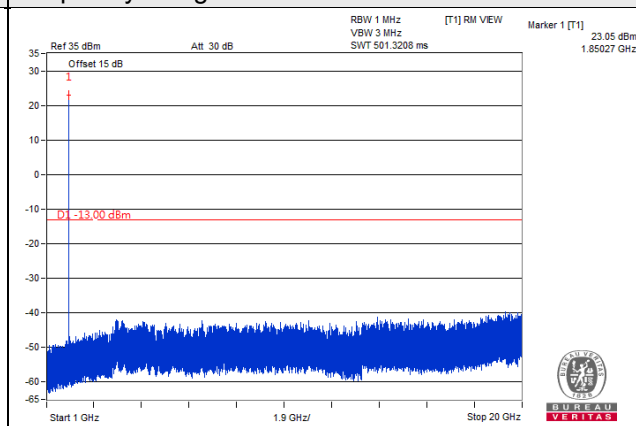
LTE Band 2, Channel Bandwidth 1.4MHz

Channel 18607 (1850.70MHz)

Frequency Range : 9kHz ~ 1GHz

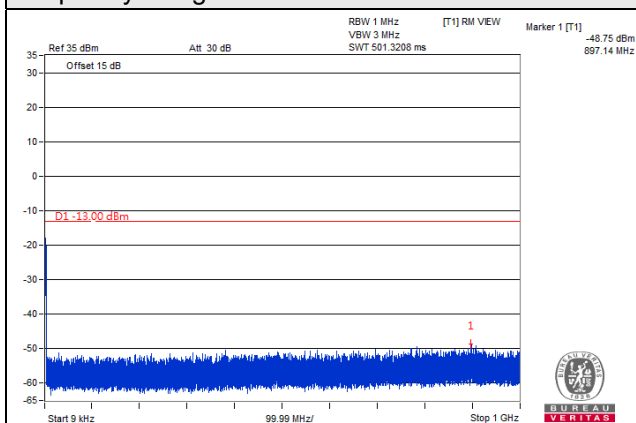


Frequency Range : 1GHz ~ 20GHz

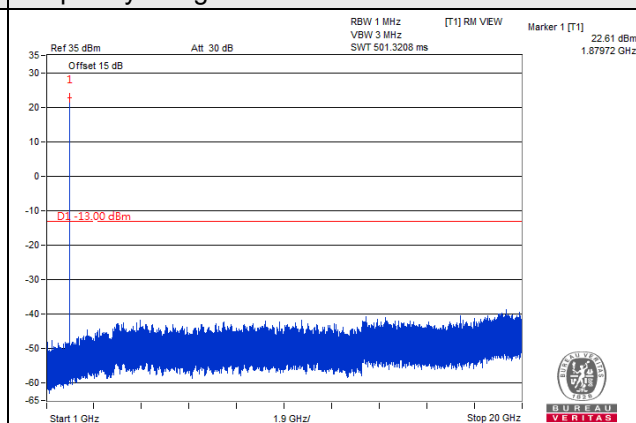


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

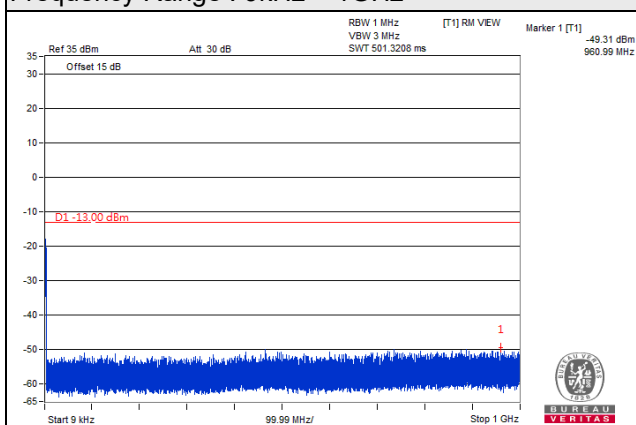


Frequency Range : 1GHz ~ 20GHz

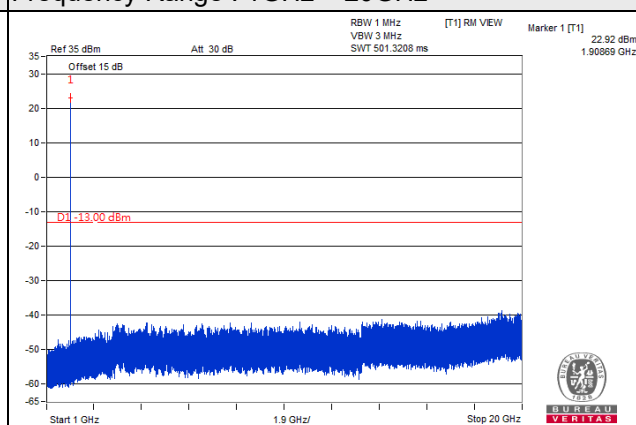


Channel 19193 (1909.30MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz

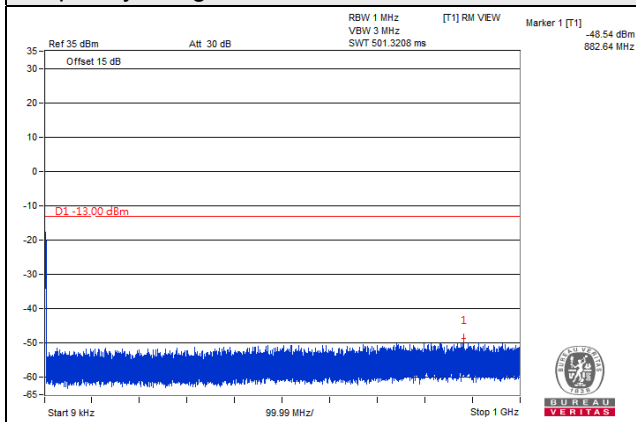


*The 9kHz signal over the limit is from Spectrum.

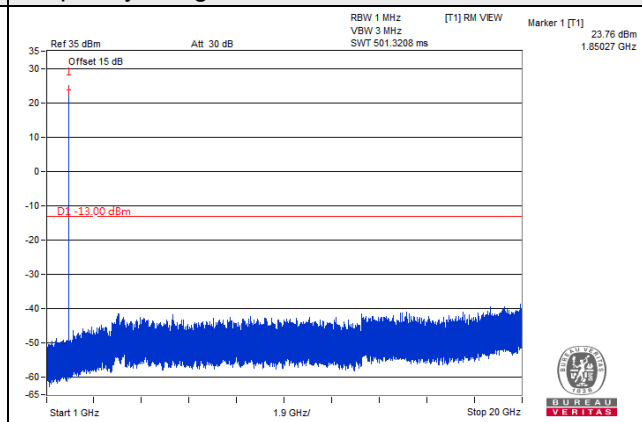
LTE Band 2, Channel Bandwidth 3MHz

Channel 18615 (1851.50MHz)

Frequency Range : 9kHz ~ 1GHz

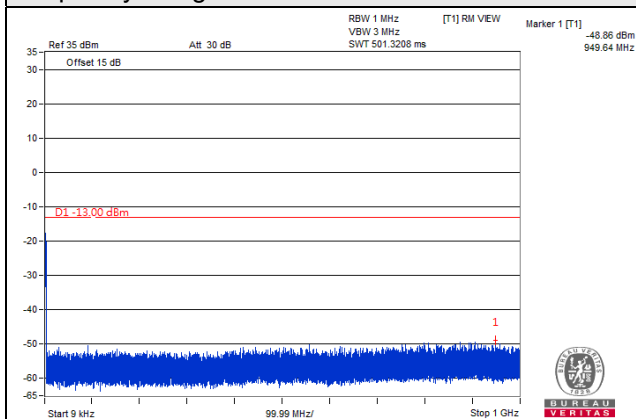


Frequency Range : 1GHz ~ 20GHz

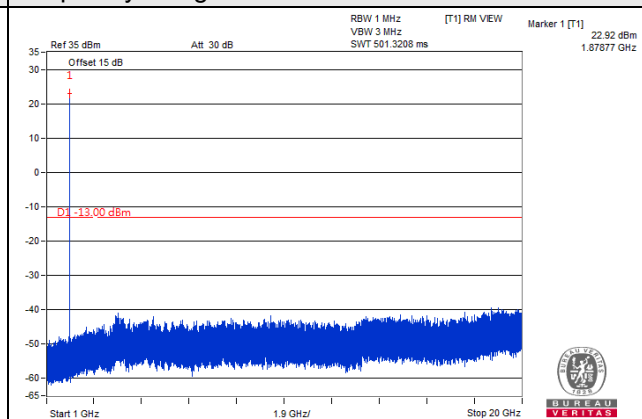


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

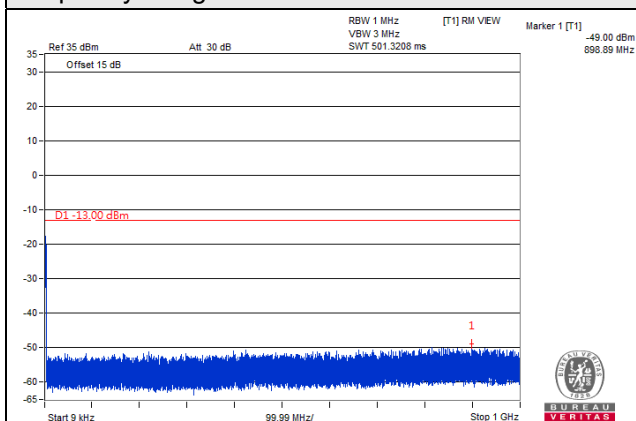


Frequency Range : 1GHz ~ 20GHz

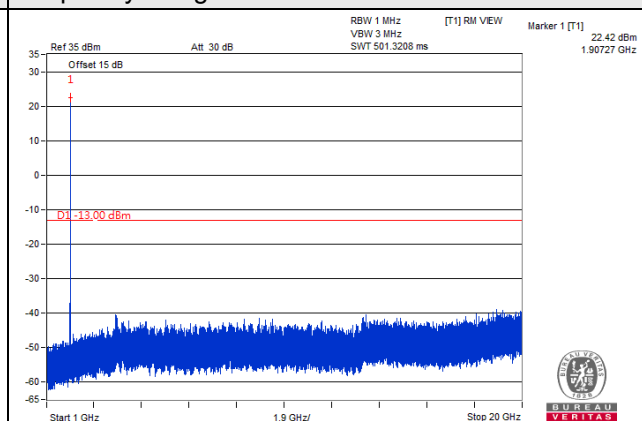


Channel 19185 (1908.50MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz

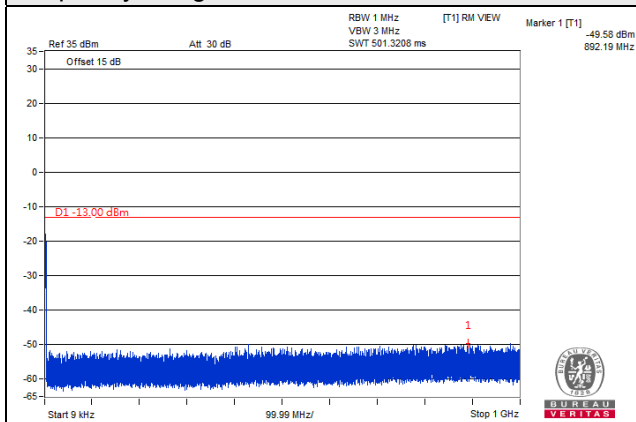


*The 9kHz signal over the limit is from Spectrum.

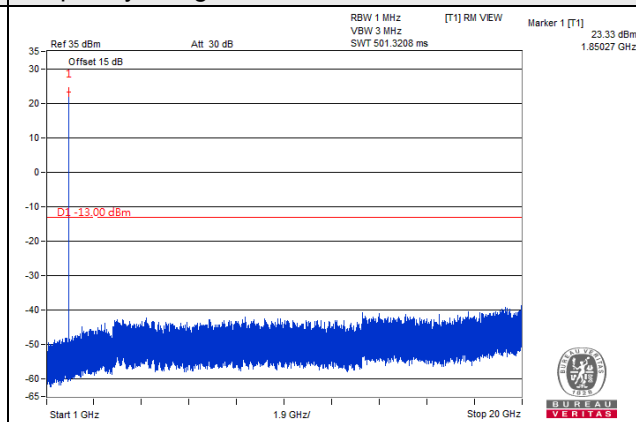
LTE Band 2, Channel Bandwidth 5MHz

Channel 18625 (1852.50MHz)

Frequency Range : 9kHz ~ 1GHz

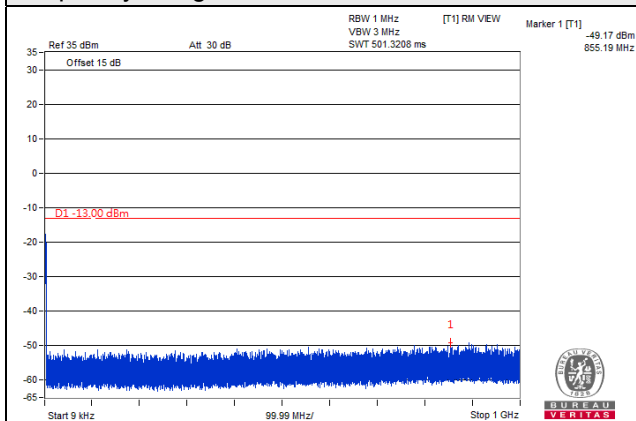


Frequency Range : 1GHz ~ 20GHz

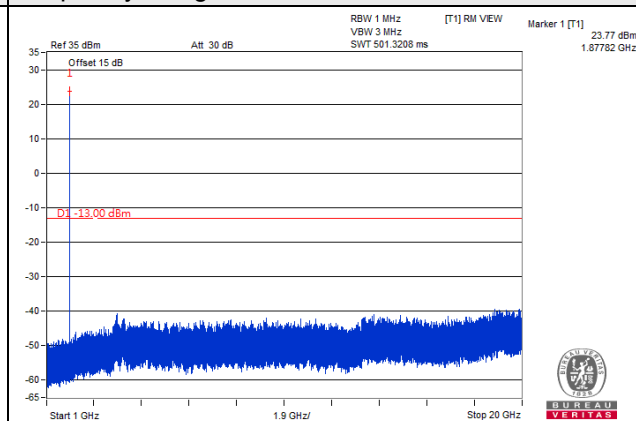


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

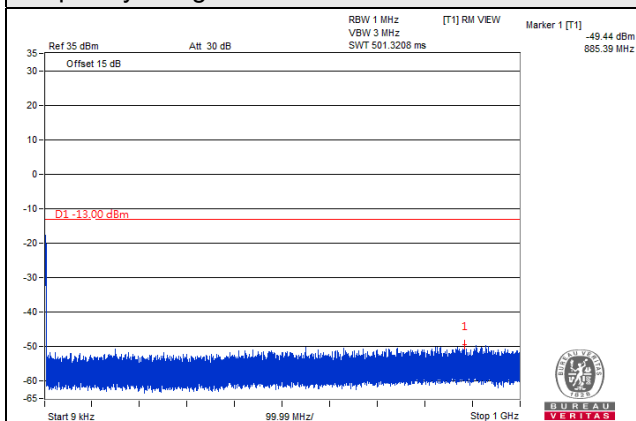


Frequency Range : 1GHz ~ 20GHz

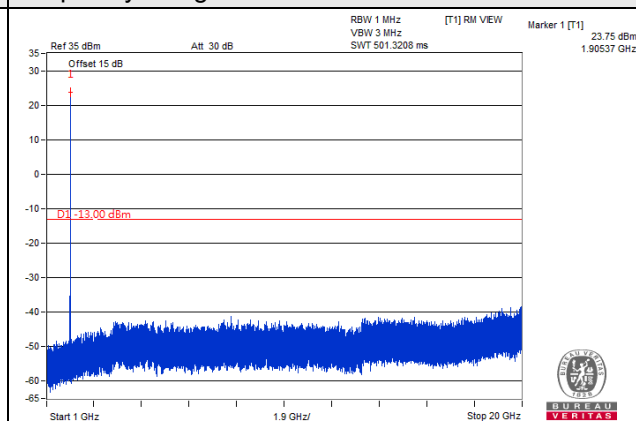


Channel 19175 (1907.50MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz

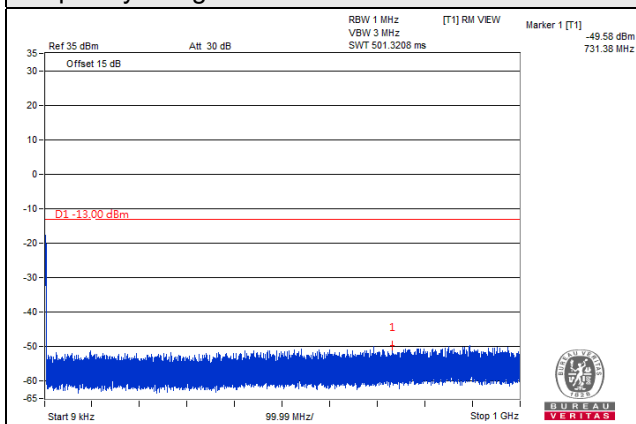


*The 9kHz signal over the limit is from Spectrum.

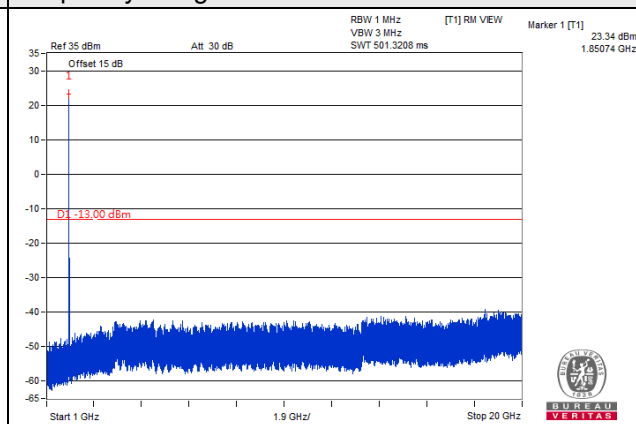
LTE Band 2, Channel Bandwidth 10MHz

Channel 18650 (1855.00MHz)

Frequency Range : 9kHz ~ 1GHz

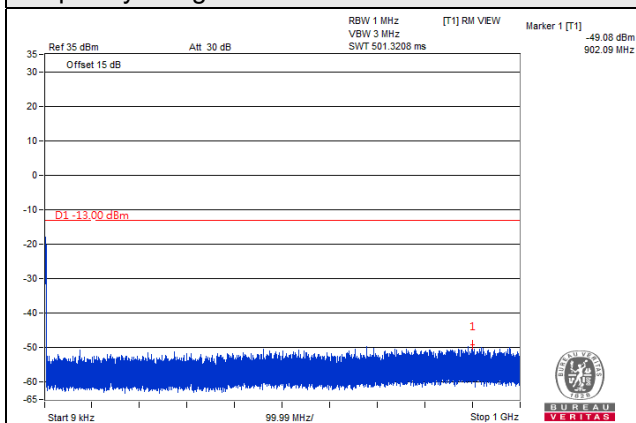


Frequency Range : 1GHz ~ 20GHz

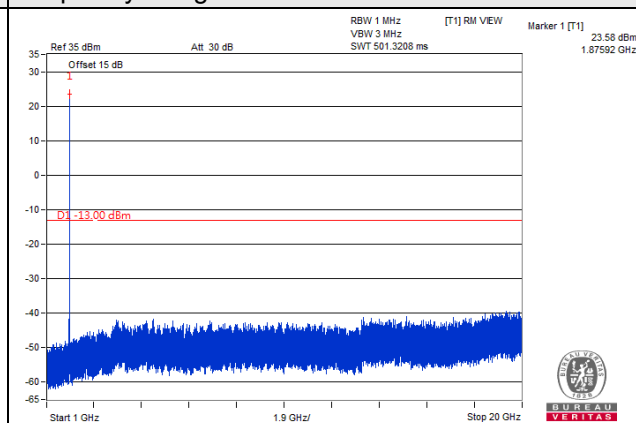


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

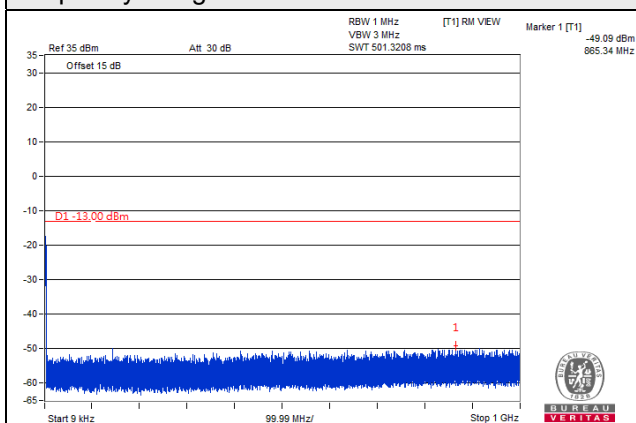


Frequency Range : 1GHz ~ 20GHz

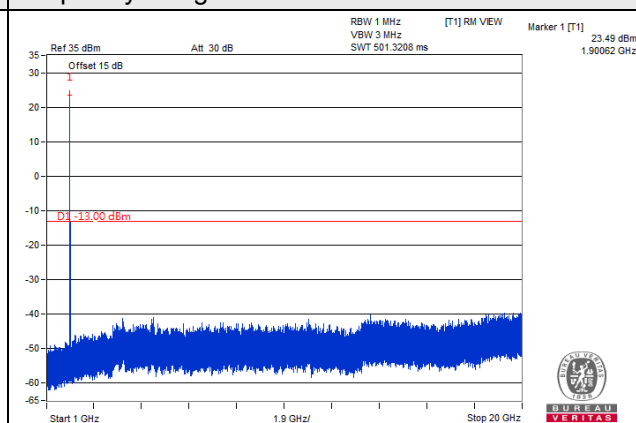


Channel 19150 (1905.00MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz

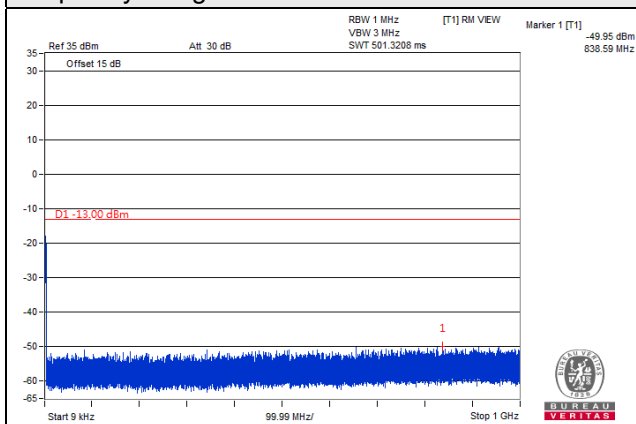


*The 9kHz signal over the limit is from Spectrum.

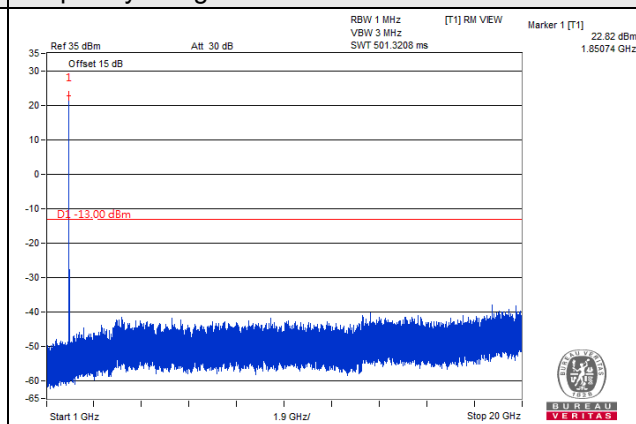
LTE Band 2, Channel Bandwidth 15MHz

Channel 18675 (1857.50MHz)

Frequency Range : 9kHz ~ 1GHz

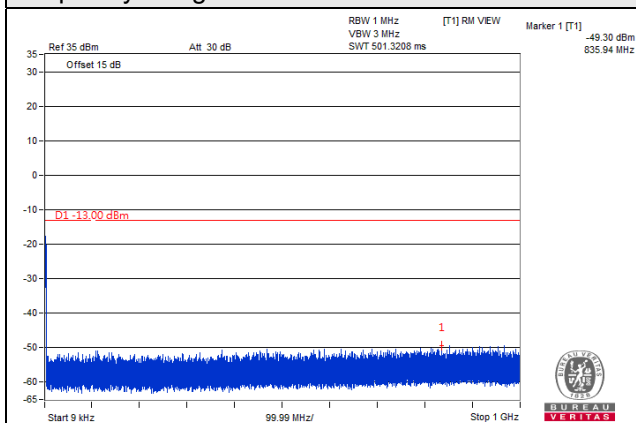


Frequency Range : 1GHz ~ 20GHz

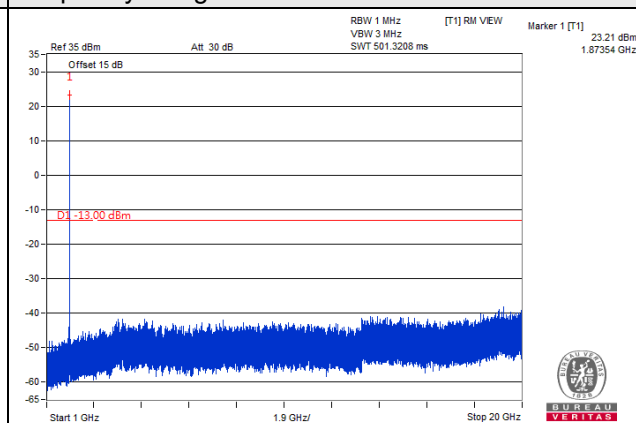


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

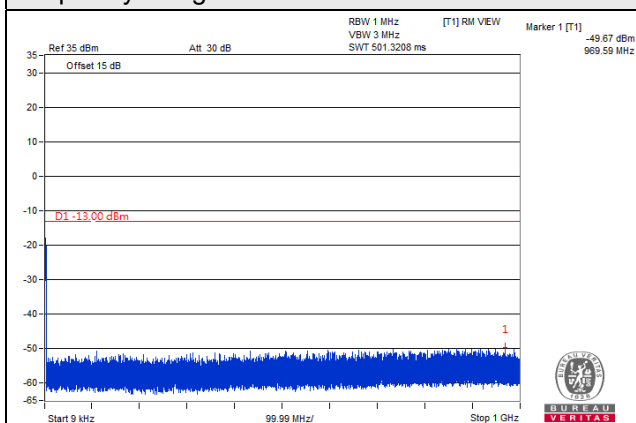


Frequency Range : 1GHz ~ 20GHz

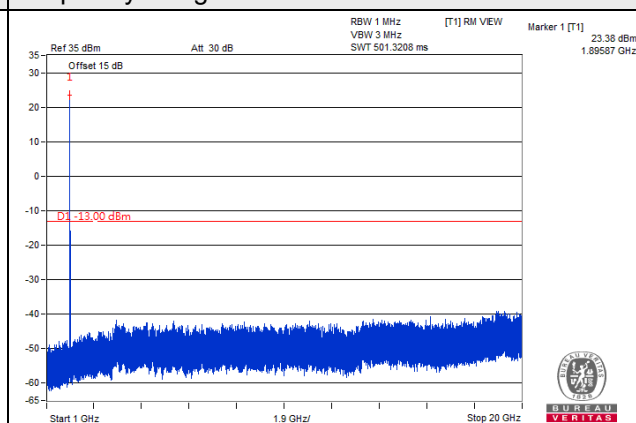


Channel 19125 (1902.50MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz

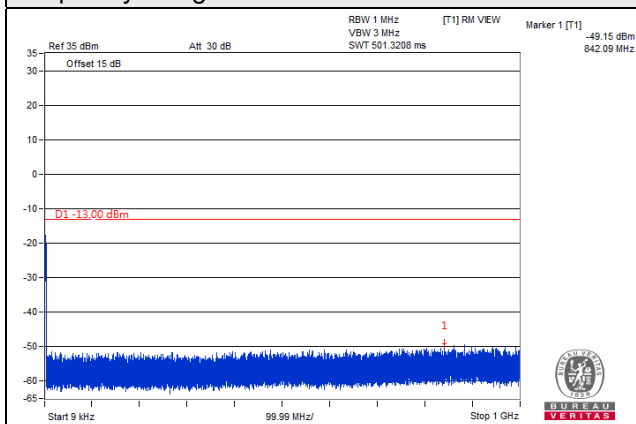


*The 9kHz signal over the limit is from Spectrum.

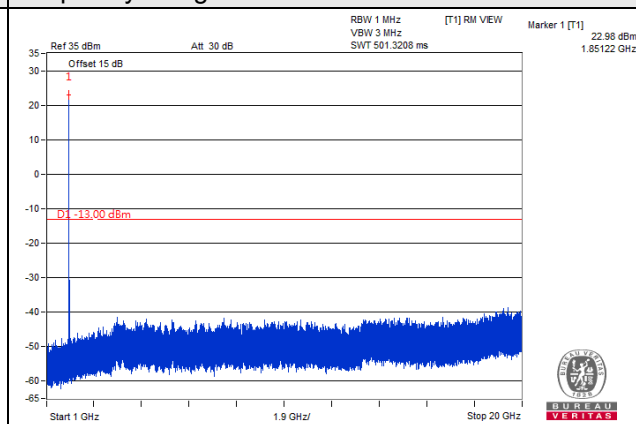
LTE Band 2, Channel Bandwidth 20MHz

Channel 18700 (1860.00MHz)

Frequency Range : 9kHz ~ 1GHz

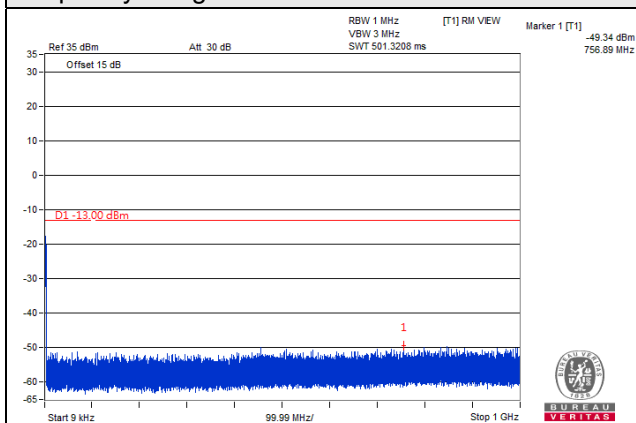


Frequency Range : 1GHz ~ 20GHz

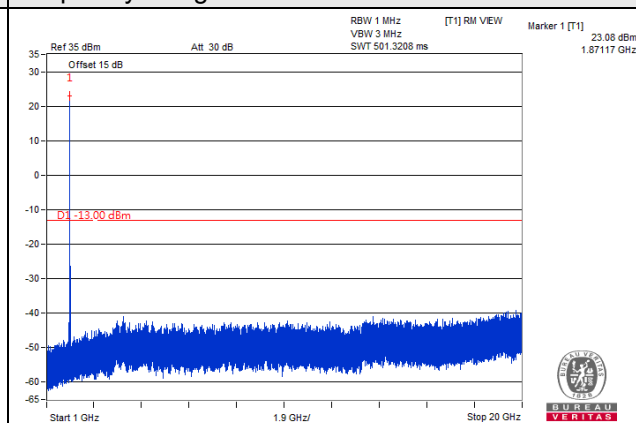


Channel 18900 (1880.00MHz)

Frequency Range : 9kHz ~ 1GHz

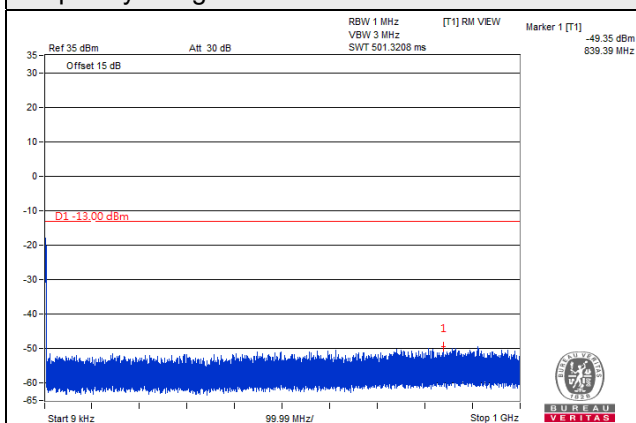


Frequency Range : 1GHz ~ 20GHz

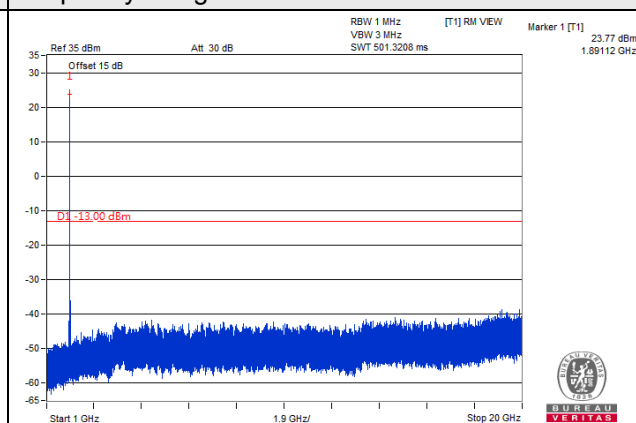


Channel 19100 (1900.00MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 20GHz



*The 9kHz signal over the limit is from Spectrum.

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 equal to -13dBm .

4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m 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 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.5.3.2.
- c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

Note:

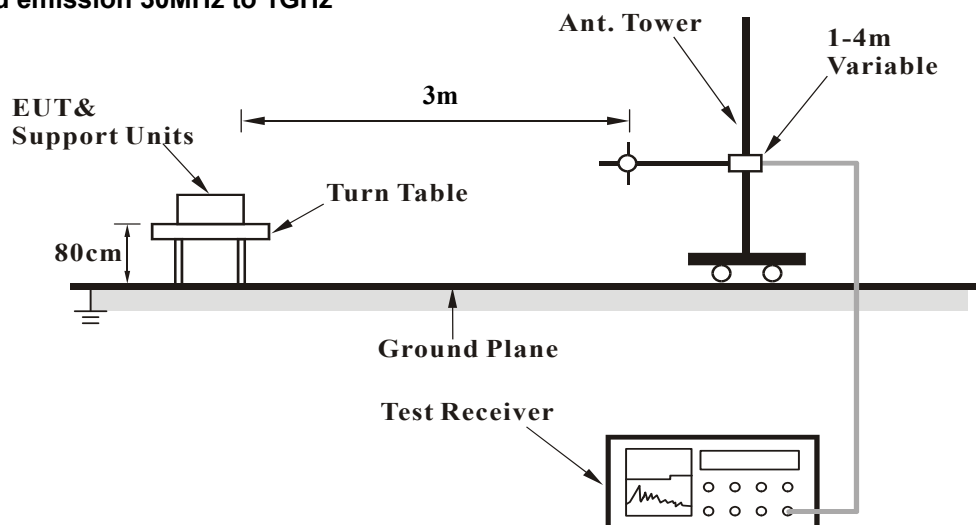
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

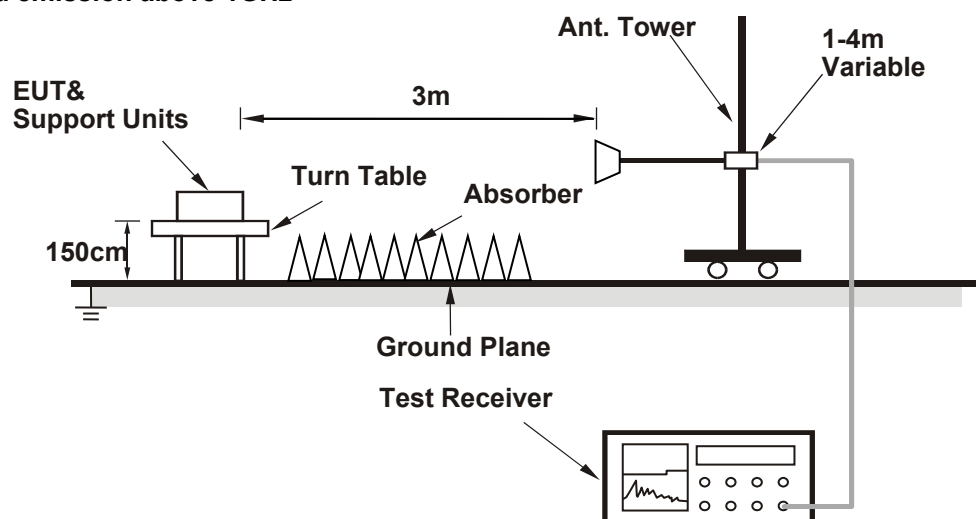
No deviation.

4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

4.8.5 Test Results

Below 1GHz

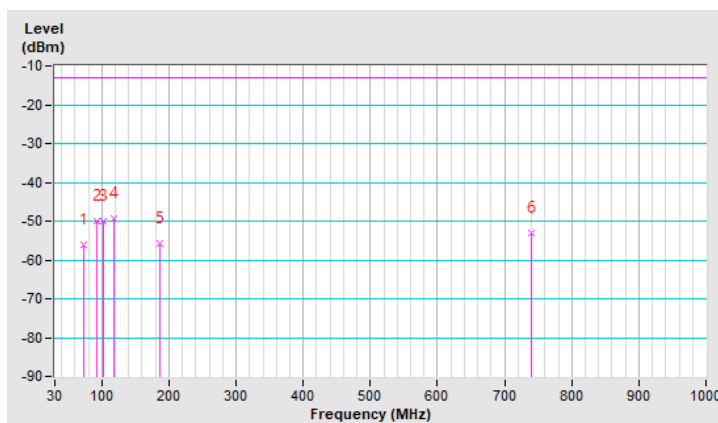
WCDMA Band 2

Mode	TX channel 9538 (1907.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	72.17	-56.10	-13.00	-43.10	1.51 H	246	50.60	-106.70
2	93.26	-50.00	-13.00	-37.00	1.51 H	246	59.40	-109.40
3	101.70	-49.90	-13.00	-36.90	1.99 H	5	58.40	-108.30
4	118.57	-49.40	-13.00	-36.40	1.51 H	326	56.80	-106.20
5	186.04	-55.90	-13.00	-42.90	1.51 H	85	49.80	-105.70
6	739.93	-53.00	-13.00	-40.00	1.99 H	154	39.20	-92.20

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

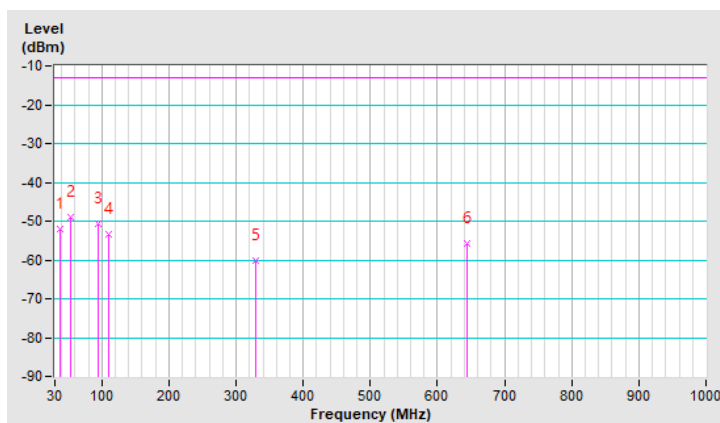


Mode	TX channel 9538 (1907.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.03	-52.10	-13.00	-39.10	1.00 V	102	53.20	-105.30
2	52.49	-48.90	-13.00	-35.90	1.00 V	14	55.40	-104.30
3	94.67	-50.80	-13.00	-37.80	2.00 V	200	58.50	-109.30
4	110.13	-53.50	-13.00	-40.50	1.00 V	240	53.60	-107.10
5	329.43	-60.10	-13.00	-47.10	1.00 V	213	41.10	-101.20
6	644.33	-55.80	-13.00	-42.80	2.00 V	253	38.60	-94.40

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.



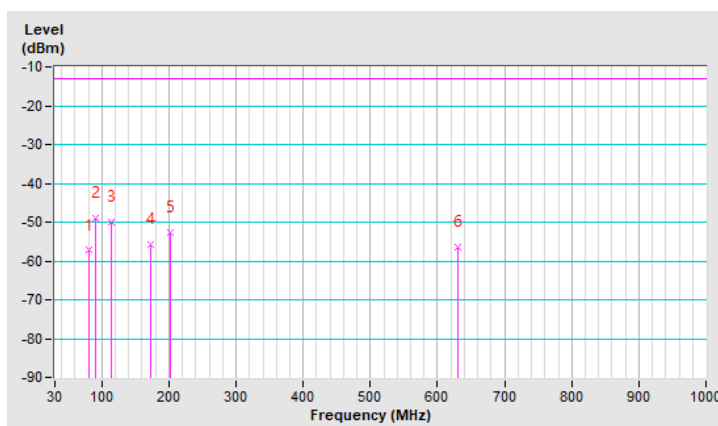
LTE Band 2, Channel Bandwidth: 1.4MHz

Mode	TX channel 18900 (1880.00MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	80.61	-57.30	-13.00	-44.30	2.00 H	165	51.50	-108.80
2	90.45	-49.00	-13.00	-36.00	2.00 H	255	60.60	-109.60
3	114.35	-50.10	-13.00	-37.10	1.49 H	15	56.70	-106.80
4	171.99	-55.90	-13.00	-42.90	1.49 H	92	48.40	-104.30
5	202.91	-52.60	-13.00	-39.60	2.00 H	243	54.00	-106.60
6	630.28	-56.50	-13.00	-43.50	1.00 H	135	38.00	-94.50

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

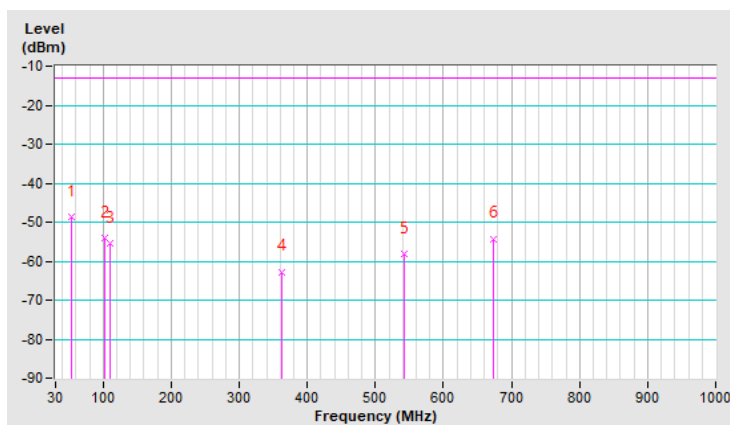


Mode	TX channel 18900 (1880.00MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	52.49	-48.80	-13.00	-35.80	1.00 V	9	55.50	-104.30
2	101.70	-54.10	-13.00	-41.10	1.00 V	9	54.20	-108.30
3	110.13	-55.50	-13.00	-42.50	1.50 V	162	51.60	-107.10
4	361.77	-62.70	-13.00	-49.70	1.00 V	93	38.00	-100.70
5	541.71	-58.20	-13.00	-45.20	1.00 V	9	38.50	-96.70
6	672.45	-54.20	-13.00	-41.20	1.00 V	24	39.70	-93.90

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.



Above 1GHz
WCDMA Band 2

Mode	TX channel 9262 (1852.4MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3704.80	-49.40	-13.00	-36.40	1.66 H	218	43.90	-93.30
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3704.80	-48.40	-13.00	-35.40	1.32 V	169	44.90	-93.30

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-49.60	-13.00	-36.60	1.88 H	236	43.50	-93.10
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.40	-13.00	-35.40	1.64 V	131	44.70	-93.10

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9538 (1907.6MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.20	-48.10	-13.00	-35.10	1.96 H	231	44.60	-92.70
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.20	-48.70	-13.00	-35.70	1.68 V	261	44.00	-92.70

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 1.4MHz

Mode	TX channel 18607 (1850.70MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-47.60	-13.00	-34.60	3.04 H	124	45.80	-93.40
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3701.40	-47.80	-13.00	-34.80	1.36 V	155	45.60	-93.40

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.60	-13.00	-34.60	1.32 H	210	45.50	-93.10
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.20	-13.00	-34.20	1.30 V	158	45.90	-93.10

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19193 (1909.30MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3818.60	-47.70	-13.00	-34.70	1.43 H	229	45.00	-92.70
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3818.60	-47.80	-13.00	-34.80	1.28 V	165	44.90	-92.70

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 5MHz

Mode	TX channel 18625 (1852.50MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-47.90	-13.00	-34.90	1.39 H	195	45.40	-93.30
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-48.00	-13.00	-35.00	1.23 V	215	45.30	-93.30

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.00	-13.00	-35.00	1.25 H	206	45.10	-93.10
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.40	-13.00	-34.40	1.31 V	203	45.70	-93.10

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19175 (1907.50MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.00	-47.50	-13.00	-34.50	1.10 H	219	45.20	-92.70
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3815.00	-47.40	-13.00	-34.40	1.39 V	224	45.30	-92.70

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 20MHz

Mode	TX channel 18700 (1860.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-47.50	-13.00	-34.50	1.49 H	223	45.80	-93.30
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3720.00	-47.70	-13.00	-34.70	1.36 V	202	45.60	-93.30

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.40	-13.00	-34.40	1.49 H	202	45.70	-93.10
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-47.70	-13.00	-34.70	1.41 V	190	45.40	-93.10

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19100 (1900.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3800.00	-48.00	-13.00	-35.00	1.41 H	218	44.80	-92.80
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3800.00	-47.60	-13.00	-34.60	1.33 V	211	45.20	-92.80

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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

Lin Kou 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 Lab

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.

--- END ---