

FCC Test Report (Part 27)

Report No.: RF201007C02-3

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 / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF201007C02-3	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 27, Subpart H

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

Prepared by : 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 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)(4)	Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak To Average Ratio	Pass	Meet the requirement
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -35.80dB at 52.49MHz.

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 4		1712.4MHz ~ 1752.6MHz
	LTE Band 4	Channel Bandwidth 1.4MHz	1710.7MHz ~ 1754.3MHz
		Channel Bandwidth 3MHz	1711.5MHz ~ 1753.5MHz
		Channel Bandwidth 5MHz	1712.5MHz ~ 1752.5MHz
		Channel Bandwidth 10MHz	1715.0MHz ~ 1750.0MHz
		Channel Bandwidth 15MHz	1717.5MHz ~ 1747.5MHz
		Channel Bandwidth 20MHz	1720.0MHz ~ 1745.0MHz
Max. EIRP Power	WCDMA Band 4		88.920mW (19.49dBm)
			QPSK 16QAM
	LTE Band 4	Channel Bandwidth 1.4MHz	119.124mW (20.76dBm) 89.125mW (19.50dBm)
		Channel Bandwidth 3MHz	118.304mW (20.73dBm) 88.920mW (19.49dBm)
		Channel Bandwidth 5MHz	118.850mW (20.75dBm) 88.308mW (19.46dBm)
		Channel Bandwidth 10MHz	120.226mW (20.80dBm) 88.105mW (19.45dBm)
		Channel Bandwidth 15MHz	120.781mW (20.82dBm) 88.716mW (19.48dBm)
		Channel Bandwidth 20MHz	121.060mW (20.83dBm) 89.331mW (19.51dBm)
	WCDMA Band 4		4M15F9W
			QPSK 16QAM
Emission Designator	LTE Band 4	Channel Bandwidth 1.4MHz	1M09G7D 1M09D7W
		Channel Bandwidth 3MHz	2M70G7D 2M70D7W
		Channel Bandwidth 5MHz	4M49G7D 4M49D7W
		Channel Bandwidth 10MHz	8M95G7D 8M95D7W
		Channel Bandwidth 15MHz	13M4G7D 13M4D7W
		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

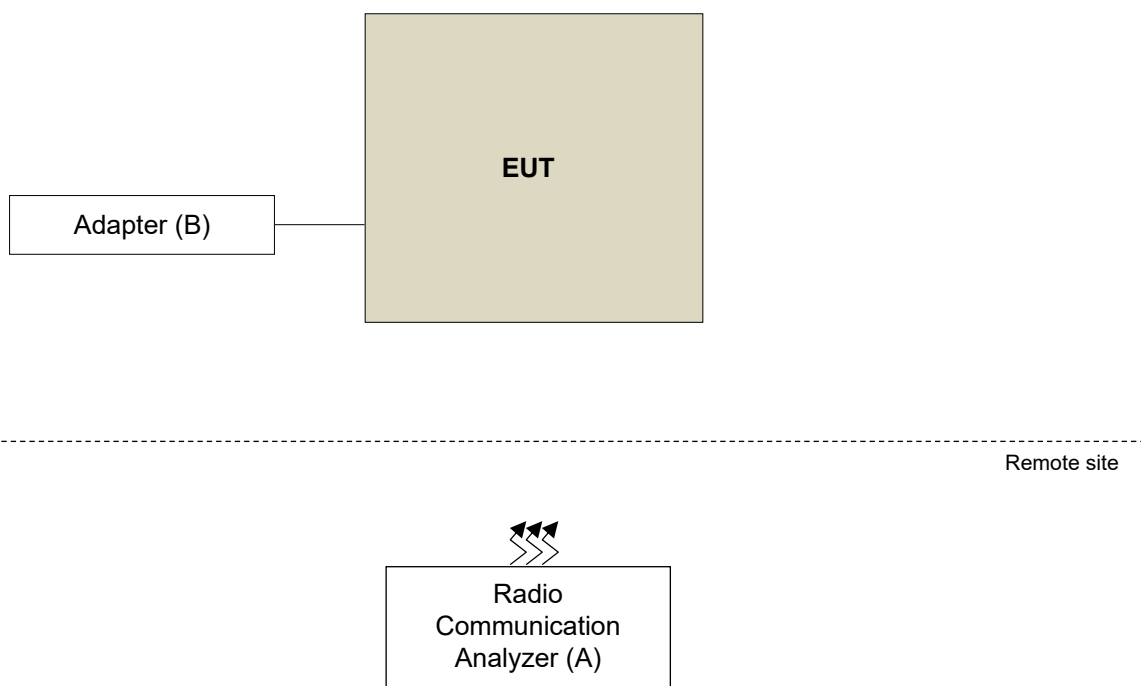
Battery	
Brand	Murata
Model	LIS1717NEPC SY6
Rating	3.8Vdc, 4000mAh

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 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA
-	Modulation Characteristics	1312 to 1513	1413 (1732.6MHz)	WCDMA, HSDPA, HSUPA
-	Frequency Stability	1312 to 1513	1312 (1712.4MHz), 1513 (1752.6MHz)	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Band Edge	1312 to 1513	1312 (1712.4MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Peak To Average Ratio	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Conducted Emission	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Radiated Emission Below 1GHz	1312 to 1513	1513 (1752.6MHz)	WCDMA
-	Radiated Emission Above 1GHz	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	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 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	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
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	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
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	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
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	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
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	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
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	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	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
-	Frequency Stability	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Emission Bandwidth	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	6 RB / 0RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	15 RB / 0RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	25RB / 0RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	50RB / 0RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
-	Band Edge	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak To Average Ratio	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	19975 to 20375	20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	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 5MHz mode. High 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
Emission 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 27

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

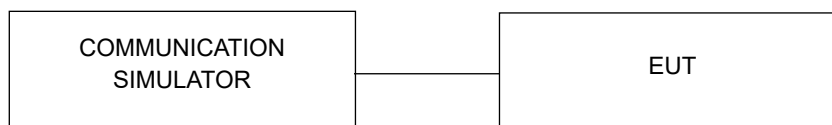
4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 1 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 IV		
TX Channel	1312	1413	1513
Rx Channel	1537	1638	1738
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	19.45	19.44	19.49
HSDPA Subtest-1	18.36	18.44	18.49
HSDPA Subtest-2	18.13	18.15	18.19
HSDPA Subtest-3	17.80	17.93	17.96
HSDPA Subtest-4	17.94	18.03	18.07
HSUPA Subtest-1	18.02	18.09	18.10
HSUPA Subtest-2	17.48	17.41	17.40
HSUPA Subtest-3	17.08	17.09	17.19
HSUPA Subtest-4	17.41	17.42	17.48
HSUPA Subtest-5	18.44	18.51	18.55

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	20.81	20.76	20.83
		1	50	20.51	20.63	20.73
		1	99	20.52	20.55	20.66
		50	0	19.49	19.68	19.71
		50	25	19.46	19.56	19.69
		50	50	19.36	19.48	19.59
		100	0	19.63	19.72	19.79
20M	16QAM	1	0	19.29	19.42	19.51
		1	50	19.33	19.41	19.44
		1	99	19.10	19.13	19.26
		50	0	18.59	18.64	18.72
		50	25	18.53	18.71	18.78
		50	50	18.51	18.52	18.64
		100	0	18.50	18.59	18.68
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	20.61	20.67	20.82
		1	37	20.56	20.68	20.71
		1	74	20.46	20.56	20.61
		36	0	19.59	19.61	19.73
		36	19	19.43	19.59	19.67
		36	39	19.36	19.45	19.59
		75	0	19.61	19.66	19.76
15M	16QAM	1	0	19.26	19.36	19.42
		1	37	19.25	19.37	19.48
		1	74	19.05	19.15	19.22
		36	0	18.63	18.65	18.76
		36	19	18.62	18.61	18.77
		36	39	18.45	18.61	18.64
		75	0	18.52	18.57	18.73

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	20.60	20.66	20.80
		1	24	20.51	20.64	20.74
		1	49	20.53	20.54	20.61
		25	0	19.57	19.65	19.67
		25	12	19.52	19.57	19.66
		25	25	19.43	19.50	19.58
		50	0	19.59	19.71	19.79
10M	16QAM	1	0	19.26	19.42	19.44
		1	24	19.34	19.40	19.45
		1	49	19.11	19.10	19.18
		25	0	18.58	18.63	18.80
		25	12	18.62	18.66	18.77
		25	25	18.46	18.59	18.60
		50	0	18.50	18.56	18.67
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	20.57	20.73	20.75
		1	12	20.53	20.61	20.71
		1	24	20.46	20.63	20.64
		12	0	19.54	19.61	19.70
		12	6	19.45	19.53	19.68
		12	13	19.46	19.45	19.59
		25	0	19.60	19.64	19.71
5M	16QAM	1	0	19.32	19.39	19.44
		1	12	19.27	19.37	19.46
		1	24	19.01	19.10	19.26
		12	0	18.64	18.67	18.80
		12	6	18.56	18.61	18.72
		12	13	18.50	18.59	18.67
		25	0	18.55	18.60	18.65

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	20.61	20.67	20.73
		1	7	20.55	20.61	20.73
		1	14	20.50	20.55	20.62
		8	0	19.57	19.66	19.70
		8	3	19.47	19.61	19.63
		8	7	19.45	19.51	19.61
		15	0	19.58	19.71	19.79
3M	16QAM	1	0	19.34	19.39	19.42
		1	7	19.34	19.38	19.49
		1	14	19.03	19.10	19.22
		8	0	18.62	18.67	18.71
		8	3	18.59	18.69	18.70
		8	7	18.47	18.55	18.66
		15	0	18.53	18.62	18.63
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	20.59	20.68	20.76
		1	2	20.55	20.59	20.71
		1	5	20.46	20.55	20.67
		3	0	19.51	19.66	19.75
		3	1	19.51	19.60	19.66
		3	3	19.43	19.53	19.55
		6	0	19.61	19.67	19.79
1.4M	16QAM	1	0	19.34	19.38	19.47
		1	2	19.25	19.39	19.50
		1	5	19.01	19.13	19.19
		3	0	18.64	18.71	18.74
		3	1	18.53	18.71	18.73
		3	3	18.53	18.61	18.64
		6	0	18.53	18.59	18.71

EIRP Power (dBm)

Band	WCDMA IV		
TX Channel	1312	1413	1513
Rx Channel	1537	1638	1738
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	19.45	19.44	19.49
HSDPA Subtest-1	18.36	18.44	18.49
HSDPA Subtest-2	18.13	18.15	18.19
HSDPA Subtest-3	17.80	17.93	17.96
HSDPA Subtest-4	17.94	18.03	18.07
HSUPA Subtest-1	18.02	18.09	18.10
HSUPA Subtest-2	17.48	17.41	17.40
HSUPA Subtest-3	17.08	17.09	17.19
HSUPA Subtest-4	17.41	17.42	17.48
HSUPA Subtest-5	18.44	18.51	18.55

*EIRP = Conducted + antenna gain

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	20.81	20.76	20.83
		1	50	20.51	20.63	20.73
		1	99	20.52	20.55	20.66
		50	0	19.49	19.68	19.71
		50	25	19.46	19.56	19.69
		50	50	19.36	19.48	19.59
		100	0	19.63	19.72	19.79
20M	16QAM	1	0	19.29	19.42	19.51
		1	50	19.33	19.41	19.44
		1	99	19.10	19.13	19.26
		50	0	18.59	18.64	18.72
		50	25	18.53	18.71	18.78
		50	50	18.51	18.52	18.64
		100	0	18.50	18.59	18.68
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	20.61	20.67	20.82
		1	37	20.56	20.68	20.71
		1	74	20.46	20.56	20.61
		36	0	19.59	19.61	19.73
		36	19	19.43	19.59	19.67
		36	39	19.36	19.45	19.59
		75	0	19.61	19.66	19.76
15M	16QAM	1	0	19.26	19.36	19.42
		1	37	19.25	19.37	19.48
		1	74	19.05	19.15	19.22
		36	0	18.63	18.65	18.76
		36	19	18.62	18.61	18.77
		36	39	18.45	18.61	18.64
		75	0	18.52	18.57	18.73

*EIRP = Conducted + antenna gain

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	20.60	20.66	20.80
		1	24	20.51	20.64	20.74
		1	49	20.53	20.54	20.61
		25	0	19.57	19.65	19.67
		25	12	19.52	19.57	19.66
		25	25	19.43	19.50	19.58
		50	0	19.59	19.71	19.79
10M	16QAM	1	0	19.26	19.42	19.44
		1	24	19.34	19.40	19.45
		1	49	19.11	19.10	19.18
		25	0	18.58	18.63	18.80
		25	12	18.62	18.66	18.77
		25	25	18.46	18.59	18.60
		50	0	18.50	18.56	18.67
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	20.57	20.73	20.75
		1	12	20.53	20.61	20.71
		1	24	20.46	20.63	20.64
		12	0	19.54	19.61	19.70
		12	6	19.45	19.53	19.68
		12	13	19.46	19.45	19.59
		25	0	19.60	19.64	19.71
5M	16QAM	1	0	19.32	19.39	19.44
		1	12	19.27	19.37	19.46
		1	24	19.01	19.10	19.26
		12	0	18.64	18.67	18.80
		12	6	18.56	18.61	18.72
		12	13	18.50	18.59	18.67
		25	0	18.55	18.60	18.65

*EIRP = Conducted + antenna gain

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	20.61	20.67	20.73
		1	7	20.55	20.61	20.73
		1	14	20.50	20.55	20.62
		8	0	19.57	19.66	19.70
		8	3	19.47	19.61	19.63
		8	7	19.45	19.51	19.61
		15	0	19.58	19.71	19.79
3M	16QAM	1	0	19.34	19.39	19.42
		1	7	19.34	19.38	19.49
		1	14	19.03	19.10	19.22
		8	0	18.62	18.67	18.71
		8	3	18.59	18.69	18.70
		8	7	18.47	18.55	18.66
		15	0	18.53	18.62	18.63
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	20.59	20.68	20.76
		1	2	20.55	20.59	20.71
		1	5	20.46	20.55	20.67
		3	0	19.51	19.66	19.75
		3	1	19.51	19.60	19.66
		3	3	19.43	19.53	19.55
		6	0	19.61	19.67	19.79
1.4M	16QAM	1	0	19.34	19.38	19.47
		1	2	19.25	19.39	19.50
		1	5	19.01	19.13	19.19
		3	0	18.64	18.71	18.74
		3	1	18.53	18.71	18.73
		3	3	18.53	18.61	18.64
		6	0	18.53	18.59	18.71

*EIRP = Conducted + antenna gain

4.2 Modulation Characteristics Measurement

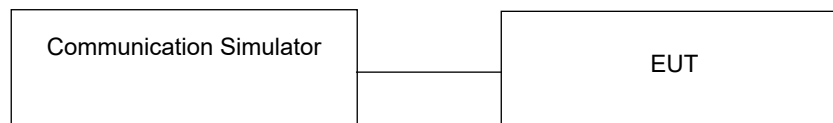
4.2.1 Limits of Modulation Characteristics

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



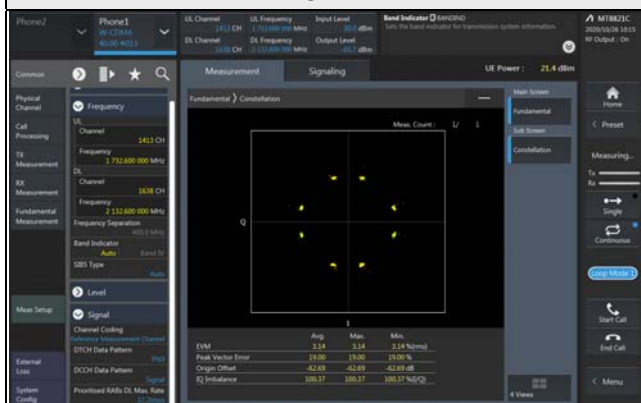
4.2.4 Test Results

WCDMA Band 4

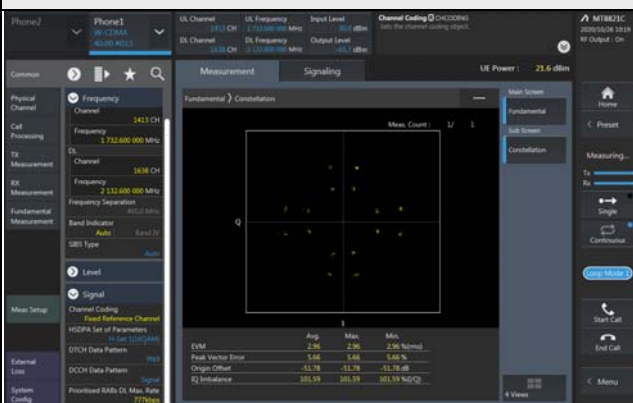
Spectrum Plot of Measurement Value

Channel: 1413 / Frequency (MHz): 1732.6MHz

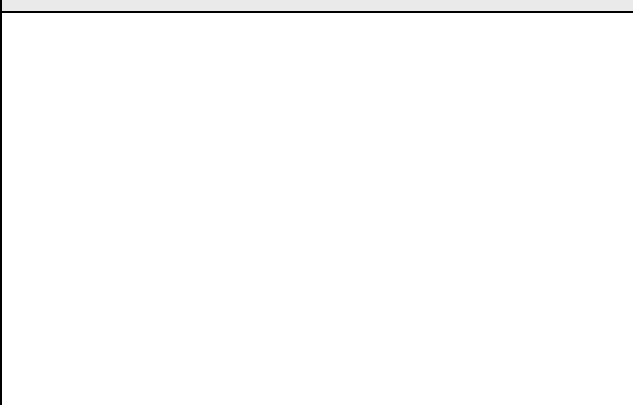
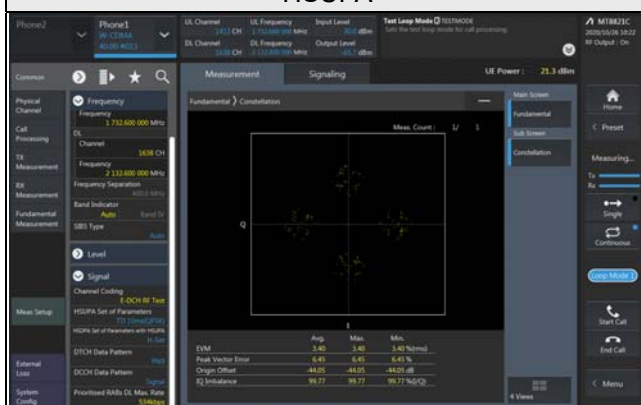
WCDMA



HSDPA



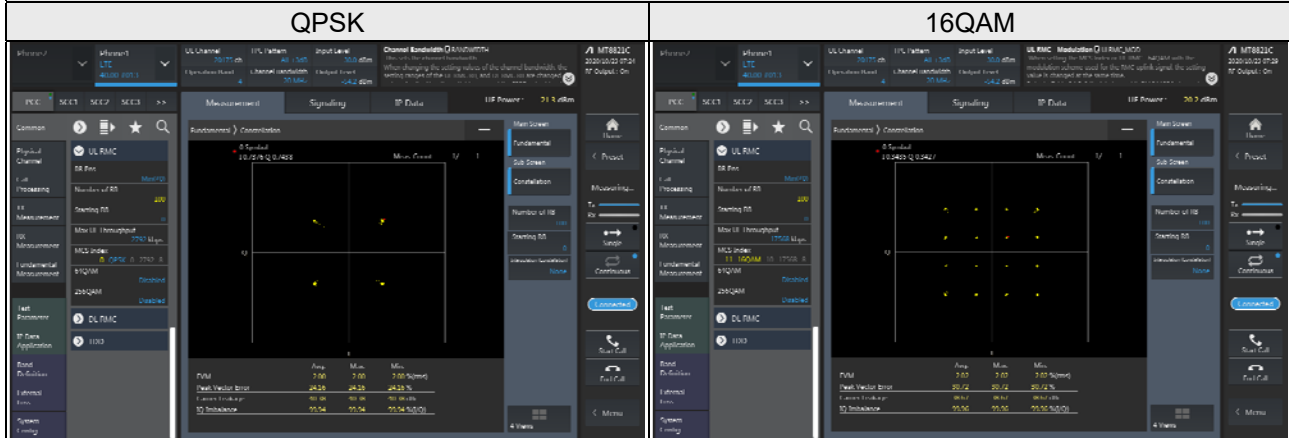
HSUPA



LTE Band 4

Spectrum Plot of Measurement Value

Channel: 20175 / Frequency (MHz): 1732.5MHz



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

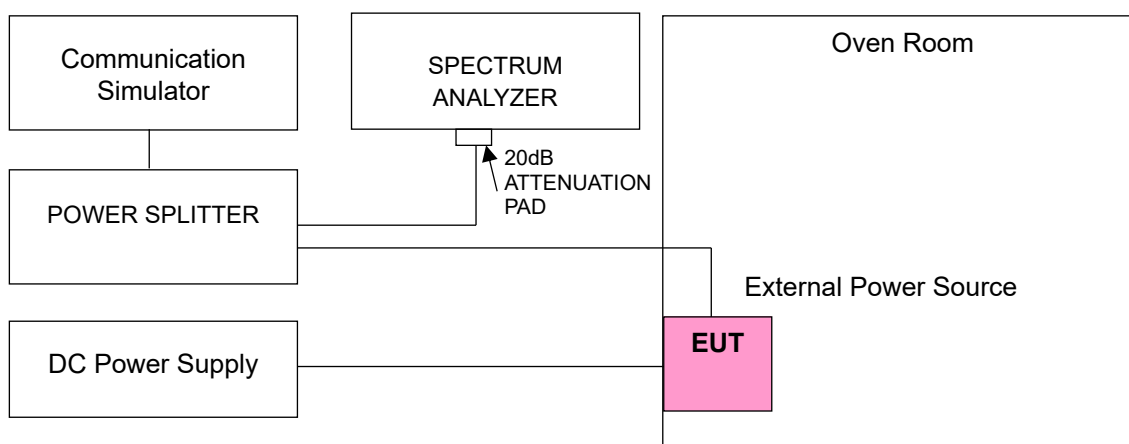
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary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

4.3.2 Test Procedure

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

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

4.3.3 Conducted Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA Band 4			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1712.400002	0.001	1752.600004	0.002
3.80	1712.400002	0.001	1752.600003	0.001
4.37	1712.400001	0.001	1752.600001	0.001

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

Frequency Error vs. Temperature

Temp. (°C)	WCDMA Band 4			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.400002	0.001	1752.600001	0.001
-20	1712.400002	0.001	1752.600001	0.001
-10	1712.400002	0.001	1752.600001	0.001
0	1712.400002	0.001	1752.600003	0.002
10	1712.400003	0.002	1752.600002	0.001
20	1712.399997	-0.002	1752.599996	-0.002
30	1712.399996	-0.002	1752.599999	-0.001
40	1712.399999	-0.001	1752.599997	-0.002
50	1712.399997	-0.002	1752.599996	-0.002
55	1712.399996	-0.002	1752.599998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1710.700002	0.001	1754.300001	0.001
3.80	1710.700001	0.001	1754.300003	0.002
4.37	1710.700002	0.001	1754.300002	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 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700002	0.001	1754.300002	0.001
-20	1710.700002	0.001	1754.300001	0.001
-10	1710.700002	0.001	1754.300002	0.001
0	1710.700002	0.001	1754.300003	0.001
10	1710.700002	0.001	1754.300001	0.001
20	1710.699998	-0.001	1754.299996	-0.002
30	1710.699996	-0.002	1754.299997	-0.002
40	1710.699997	-0.002	1754.299998	-0.001
50	1710.699997	-0.002	1754.299998	-0.001
55	1710.699997	-0.002	1754.299997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1711.500002	0.001	1753.500001	0.001
3.80	1711.500001	0.001	1753.500004	0.002
4.37	1711.500002	0.001	1753.500003	0.002

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500002	0.001	1753.500001	0.001
-20	1711.500002	0.001	1753.500001	0.001
-10	1711.500002	0.001	1753.500001	0.001
0	1711.500002	0.001	1753.500003	0.002
10	1711.500004	0.002	1753.500003	0.001
20	1711.499997	-0.002	1753.499997	-0.002
30	1711.499999	-0.001	1753.499996	-0.002
40	1711.499999	-0.001	1753.499997	-0.002
50	1711.499996	-0.002	1753.499999	-0.001
55	1711.499997	-0.002	1753.499997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1712.500001	0.001	1752.500003	0.002
3.80	1712.500004	0.002	1752.500001	0.001
4.37	1712.500003	0.002	1752.500004	0.002

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500004	0.002	1752.500003	0.001
-20	1712.500004	0.002	1752.500002	0.001
-10	1712.500004	0.002	1752.500003	0.001
0	1712.500004	0.002	1752.500002	0.001
10	1712.500003	0.002	1752.500003	0.002
20	1712.499996	-0.002	1752.499998	-0.001
30	1712.499996	-0.002	1752.499998	-0.001
40	1712.499999	-0.001	1752.499997	-0.002
50	1712.499997	-0.002	1752.499996	-0.002
55	1712.499996	-0.002	1752.499997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1715.000001	0.001	1750.000001	0.001
3.80	1715.000003	0.001	1750.000001	0.001
4.37	1715.000001	0.001	1750.000002	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 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000003	0.002	1750.000003	0.002
-20	1715.000002	0.001	1750.000004	0.002
-10	1715.000003	0.001	1750.000004	0.002
0	1715.000004	0.002	1750.000003	0.002
10	1715.000004	0.002	1750.000001	0.001
20	1714.999999	-0.001	1749.999996	-0.002
30	1714.999998	-0.001	1749.999996	-0.002
40	1714.999998	-0.001	1749.999998	-0.001
50	1714.999997	-0.002	1749.999998	-0.001
55	1714.999996	-0.002	1749.999998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1717.500004	0.002	1747.500003	0.002
3.80	1717.500003	0.002	1747.500002	0.001
4.37	1717.500003	0.002	1747.500003	0.002

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

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500002	0.001	1747.500003	0.002
-20	1717.500002	0.001	1747.500003	0.002
-10	1717.500002	0.001	1747.500003	0.002
0	1717.500004	0.002	1747.500002	0.001
10	1717.500004	0.002	1747.500003	0.001
20	1717.499997	-0.002	1747.499999	-0.001
30	1717.499998	-0.001	1747.499997	-0.002
40	1717.499999	-0.001	1747.499998	-0.001
50	1717.499998	-0.001	1747.499998	-0.001
55	1717.499997	-0.002	1747.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.23	1720.000004	0.002	1745.000002	0.001
3.80	1720.000001	0.001	1745.000004	0.002
4.37	1720.000002	0.001	1745.000002	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 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000003	0.002	1745.000003	0.002
-20	1720.000003	0.002	1745.000003	0.002
-10	1720.000003	0.002	1745.000004	0.002
0	1720.000001	0.001	1745.000001	0.001
10	1720.000001	0.001	1745.000001	0.001
20	1719.999996	-0.002	1744.999999	-0.001
30	1719.999999	-0.001	1744.999998	-0.001
40	1719.999998	-0.001	1744.999997	-0.002
50	1719.999998	-0.001	1744.999998	-0.001
55	1719.999997	-0.002	1744.999998	-0.001

4.4 Emission Bandwidth Measurement

4.4.1 Limits of Emission Bandwidth Measurement

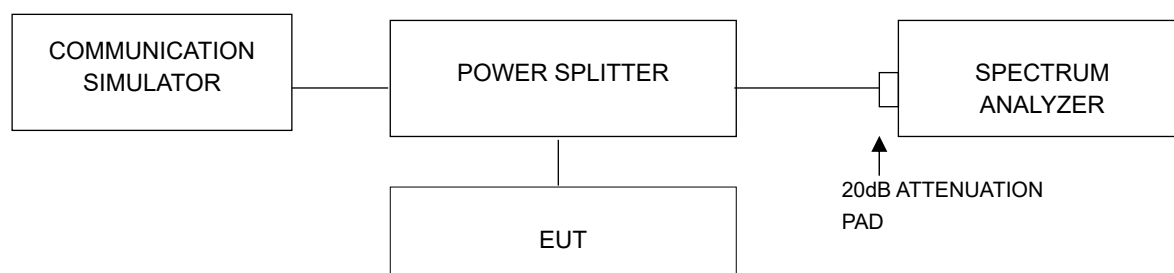
According to FCC 27.53(h)(3) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

4.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. Measurement method, please refer to section 5.4.4 of ANSI C63.26. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 30kHz and VBW = 100kHz (Channel Bandwidth: 1.4MHz), RBW = 62kHz and VBW = 200kHz (Channel Bandwidth: 3MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 5MHz), RBW = 200kHz and VBW = 1MHz (Channel Bandwidth: 10MHz), RBW = 300kHz and VBW = 1MHz (Channel Bandwidth: 15MHz) and RBW = 430kHz and VBW = 1.3MHz (Channel Bandwidth: 20MHz).

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

4.4.3 Test Setup

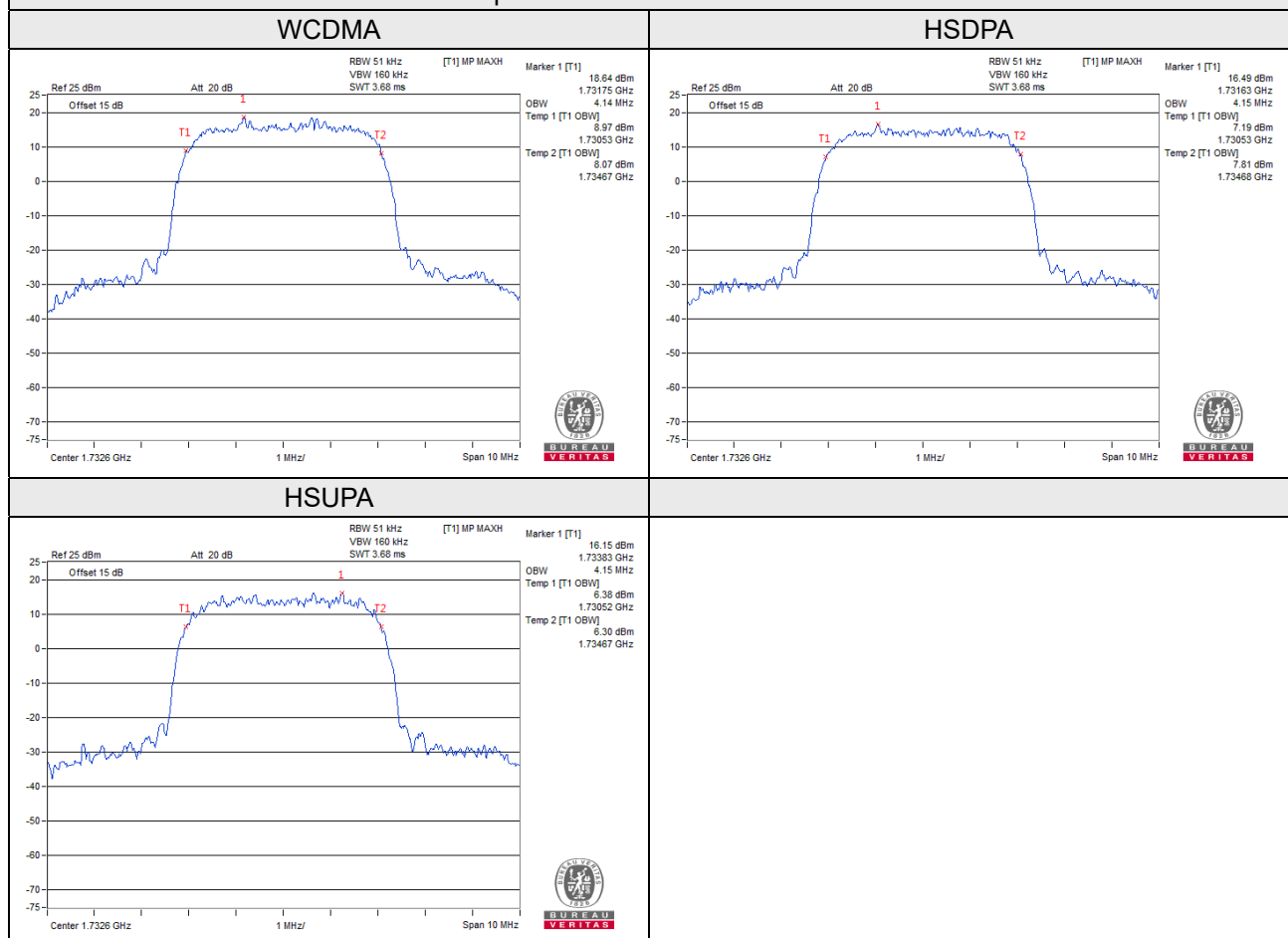


4.4.4 Test Result

Occupied Bandwidth WCDMA Band 4

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
1312	1712.4	4.14	4.14	4.14
1413	1732.6	4.14	4.15	4.15
1513	1752.6	4.14	4.12	4.12

Spectrum Plot of Worst Value



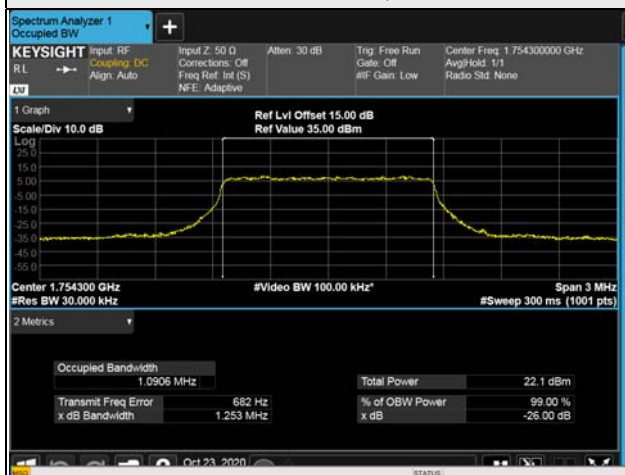
LTE Band 4

LTE Band 4, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
19957	1710.7	1.09	1.09
20175	1732.5	1.09	1.09
20393	1754.3	1.09	1.09
LTE Band 4, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
19965	1711.5	2.70	2.70
20175	1732.5	2.70	2.70
20385	1753.5	2.70	2.70
LTE Band 4, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
19975	1712.5	4.49	4.49
20175	1732.5	4.49	4.49
20375	1752.5	4.49	4.49
LTE Band 4, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20000	1715.0	8.95	8.95
20175	1732.5	8.95	8.95
20350	1750.0	8.95	8.95
LTE Band 4, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20025	1717.5	13.44	13.42
20175	1732.5	13.43	13.42
20325	1747.5	13.43	13.41

LTE Band 4, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
20050	1720.0	17.90	17.92
20175	1732.5	17.89	17.90
20300	1745.0	17.87	17.90

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / QPSK



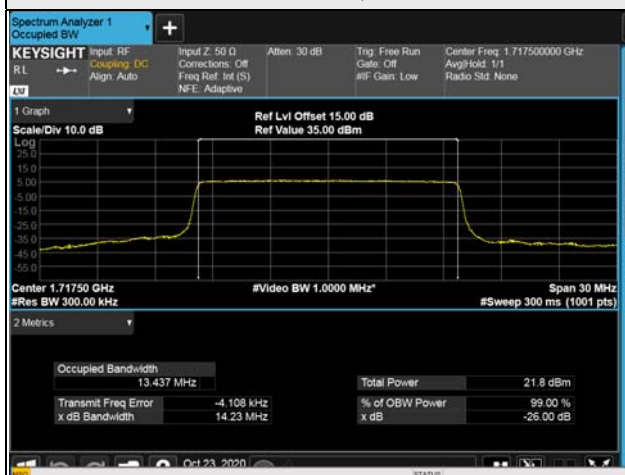
5MHz / 16QAM



10MHz / 16QAM



15MHz / QPSK



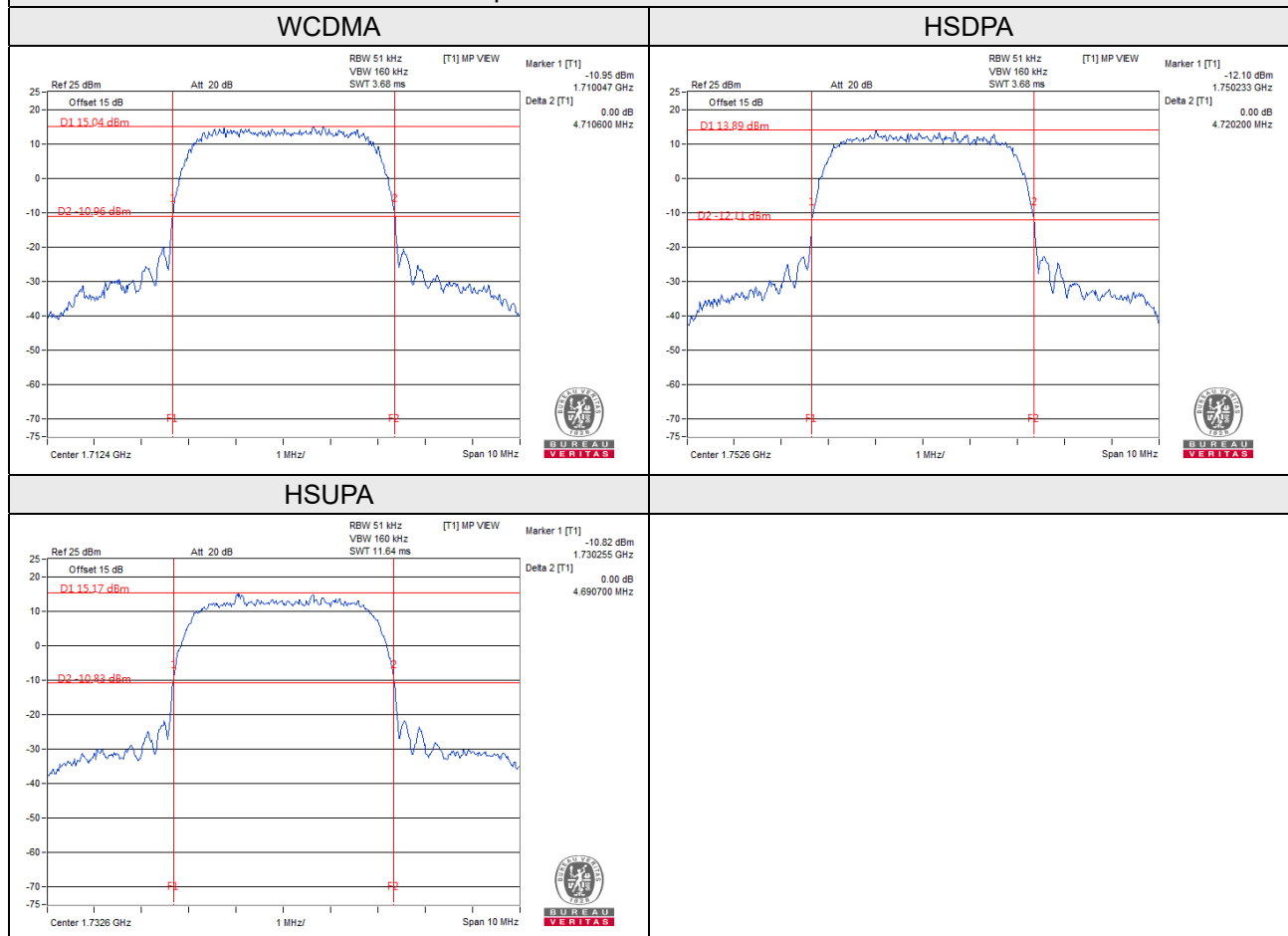
20MHz / 16QAM



26dB Bandwidth WCDMA Band 4

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
1312	1712.4	4.71	4.71	4.66
1413	1732.6	4.69	4.69	4.69
1513	1752.6	4.70	4.72	4.68

Spectrum Plot of Worst Value



LTE Band 4

LTE Band 4, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
19957	1710.7	1.26	1.26
20175	1732.5	1.26	1.25
20393	1754.3	1.25	1.25
LTE Band 4, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
19965	1711.5	2.91	2.92
20175	1732.5	2.91	2.92
20385	1753.5	2.92	2.92
LTE Band 4, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
19975	1712.5	4.81	4.82
20175	1732.5	4.82	4.82
20375	1752.5	4.83	4.83
LTE Band 4, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20000	1715.0	9.51	9.52
20175	1732.5	9.50	9.50
20350	1750.0	9.52	9.52
LTE Band 4, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20025	1717.5	14.23	14.23
20175	1732.5	14.22	14.24
20325	1747.5	14.25	14.26

LTE Band 4, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
20050	1720.0	19.02	19.03
20175	1732.5	18.99	19.00
20300	1745.0	19.00	19.01

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / QPSK



5MHz / QPSK



10MHz / 16QAM



15MHz / 16QAM



20MHz / 16QAM

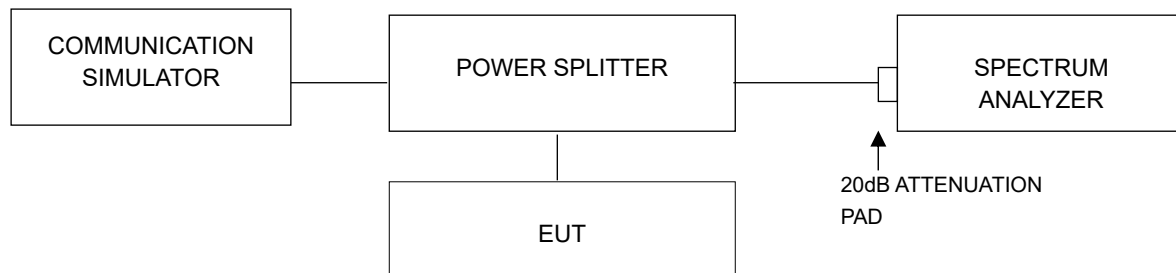


4.5 Channel Edge Measurement

4.5.1 Limits of Band Edge Measurement

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log (P)$ dB.

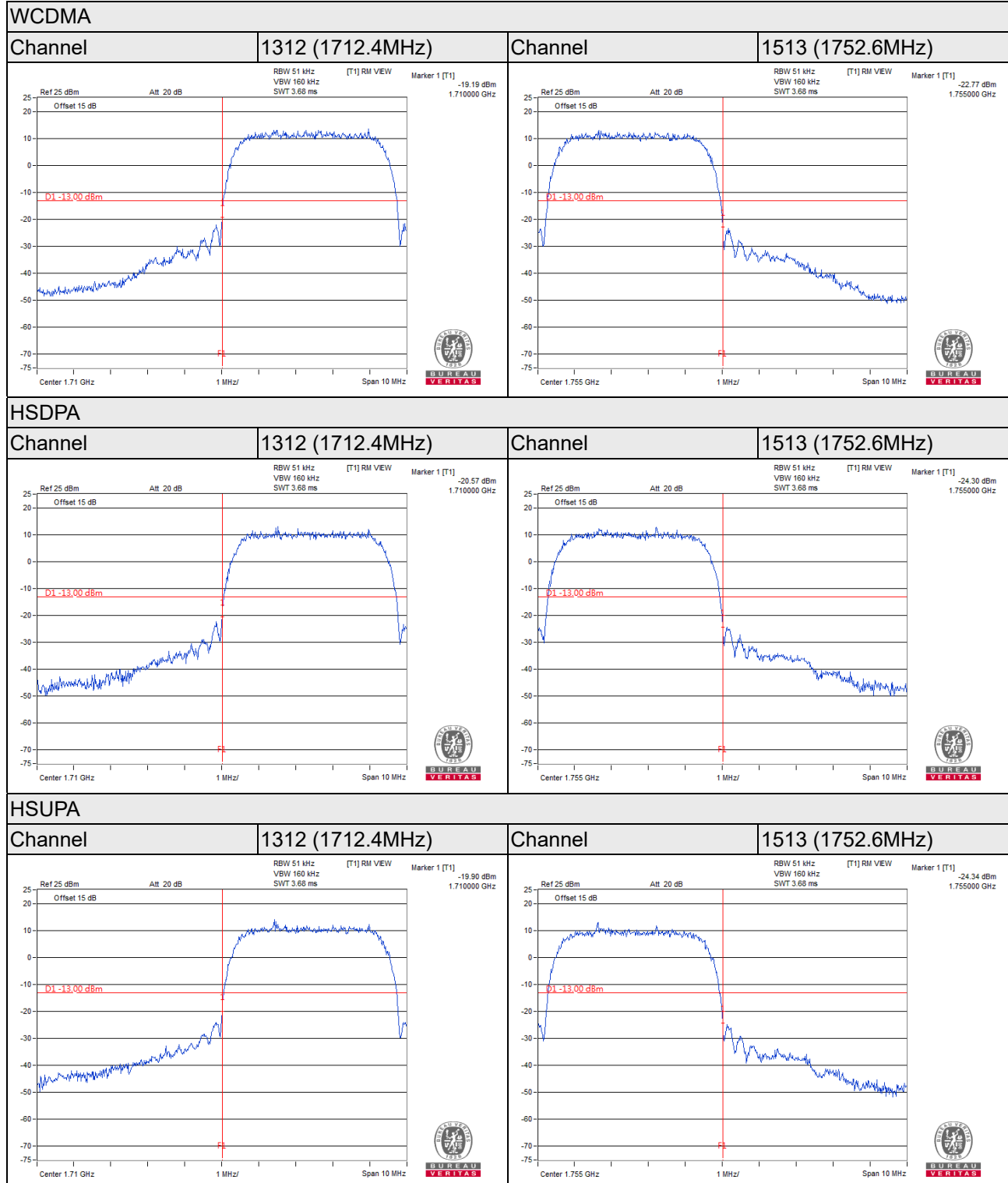
4.5.2 Test Setup



4.5.3 Test Procedures

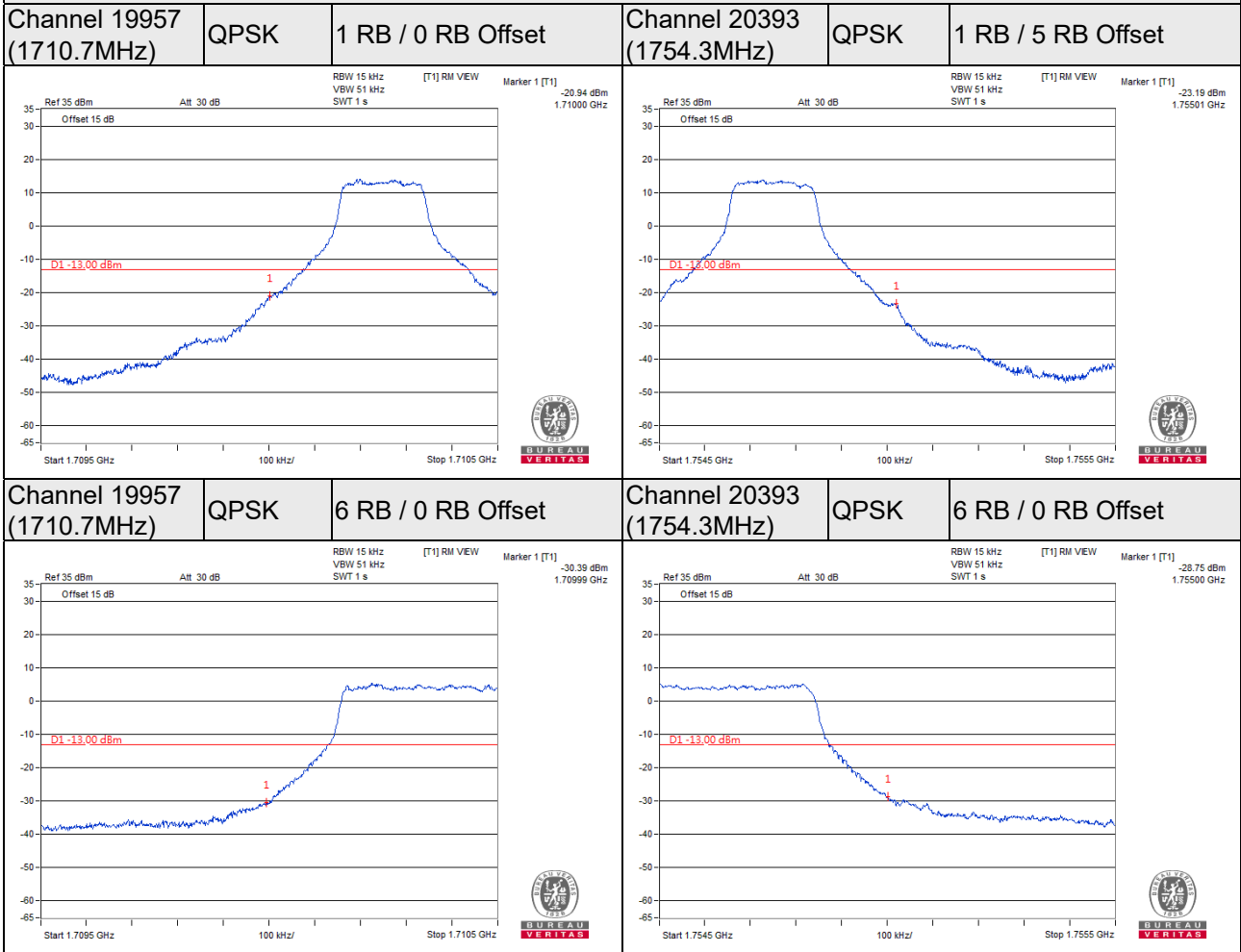
- The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 2 channels: low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 51kHz and VB of 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

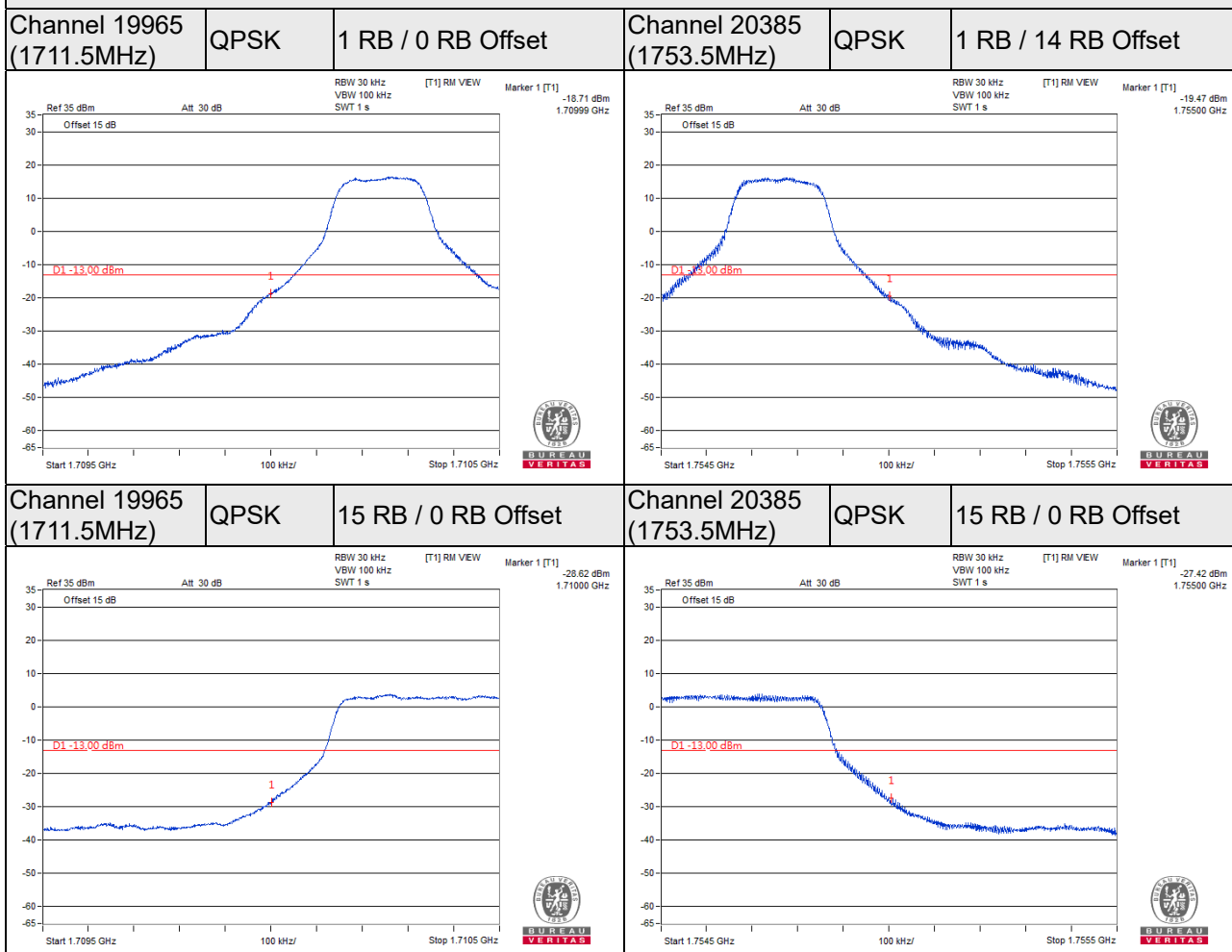


LTE Band 4

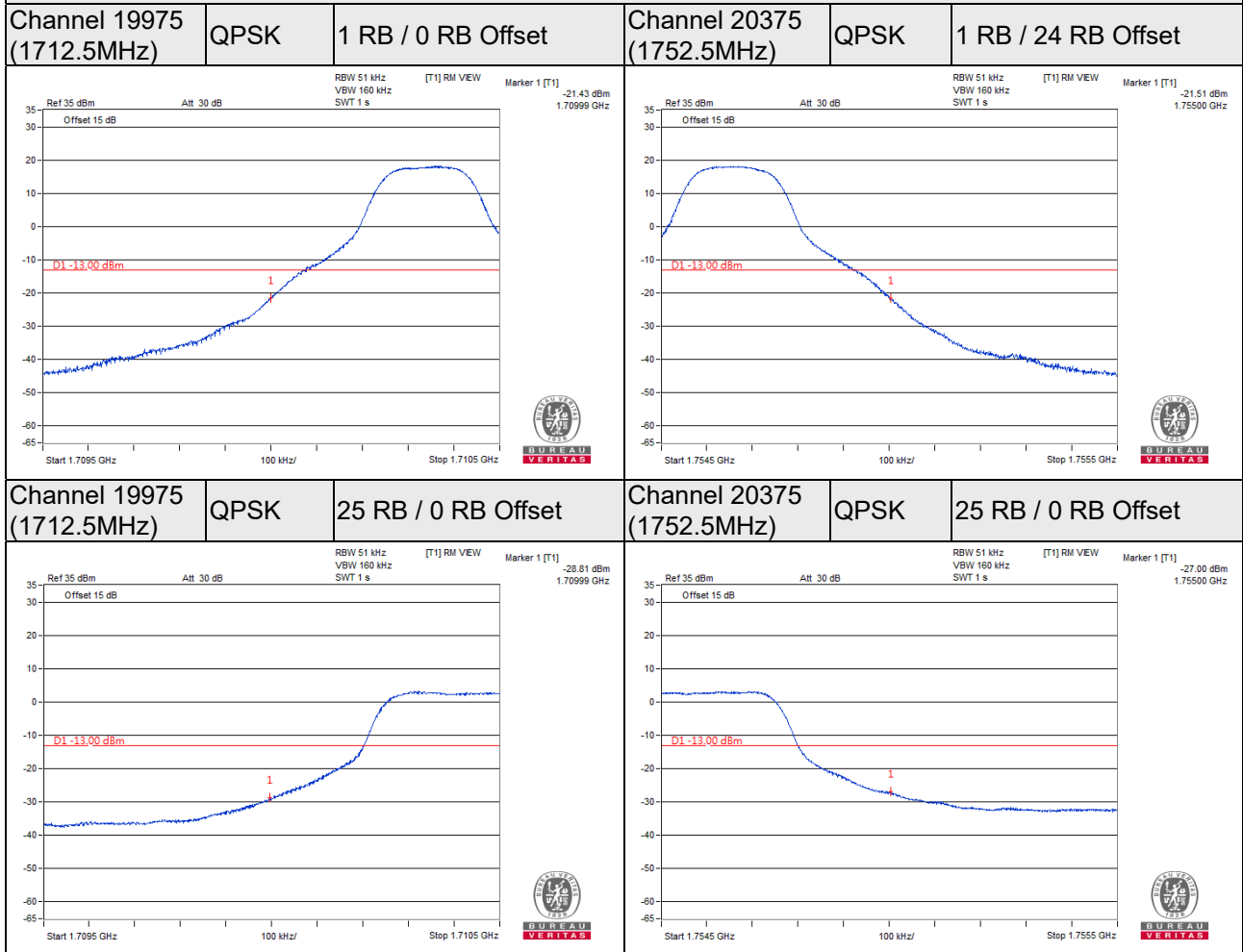
Channel Bandwidth: 1.4MHz



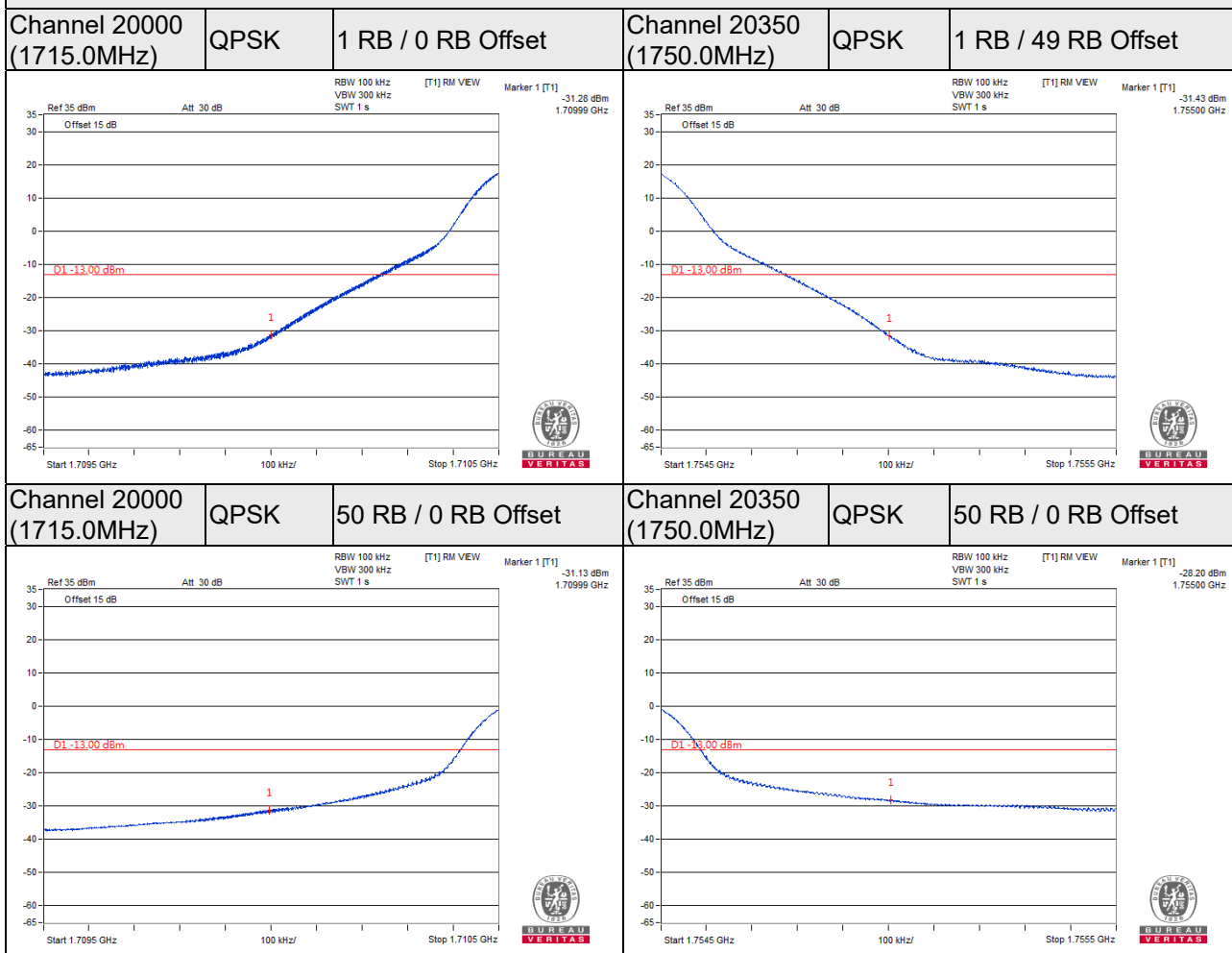
Channel Bandwidth: 3MHz



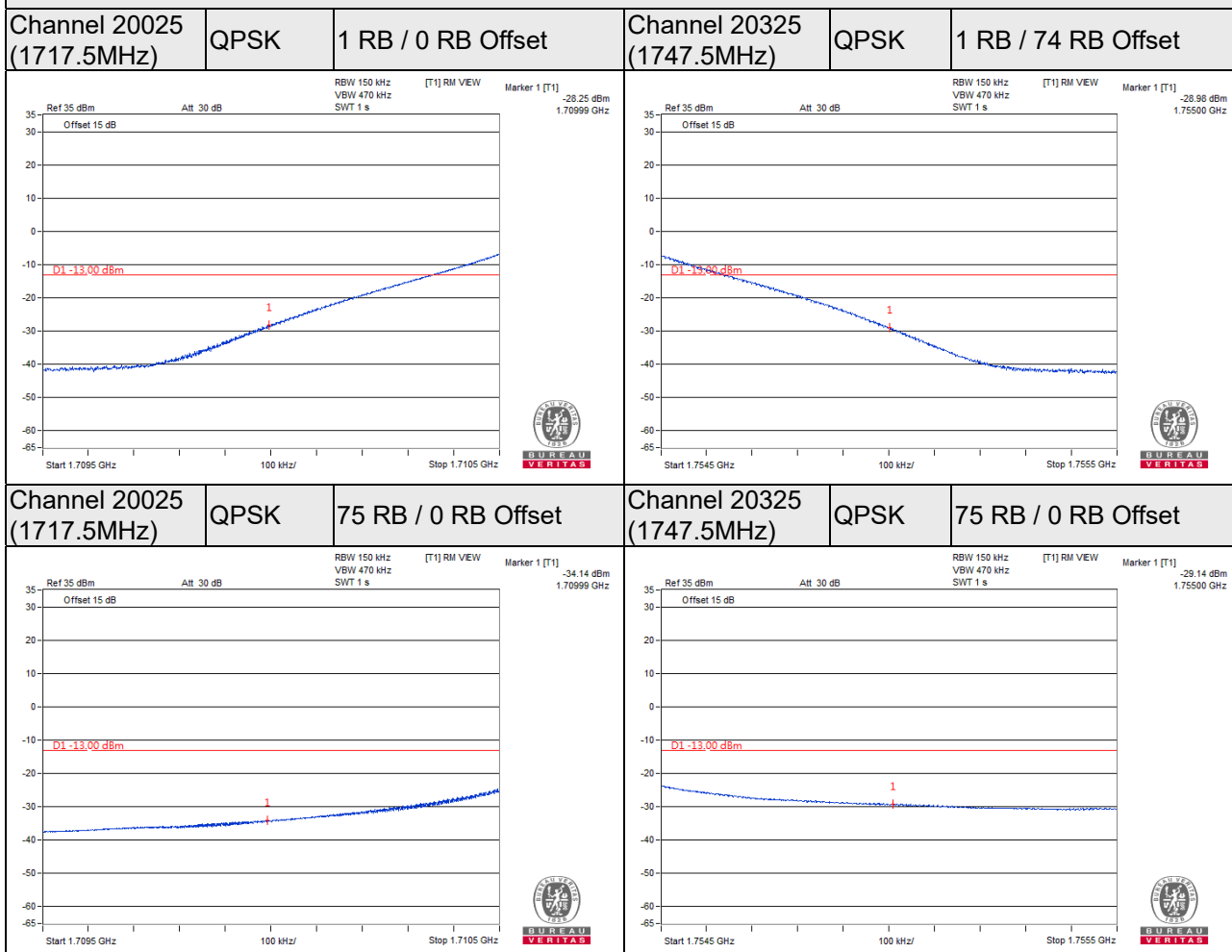
Channel Bandwidth: 5MHz



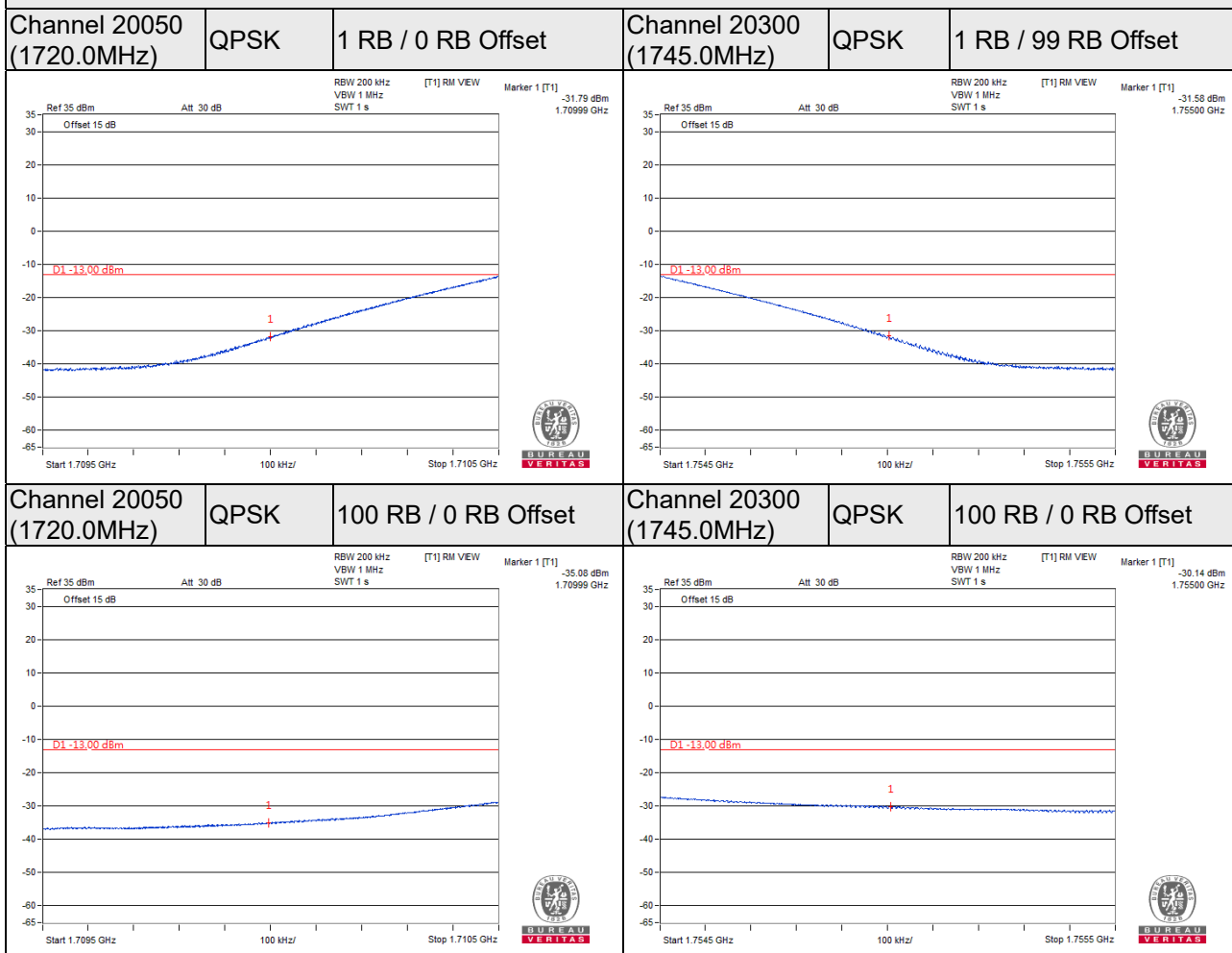
Channel Bandwidth: 10MHz



Channel Bandwidth: 15MHz



Channel Bandwidth: 20MHz

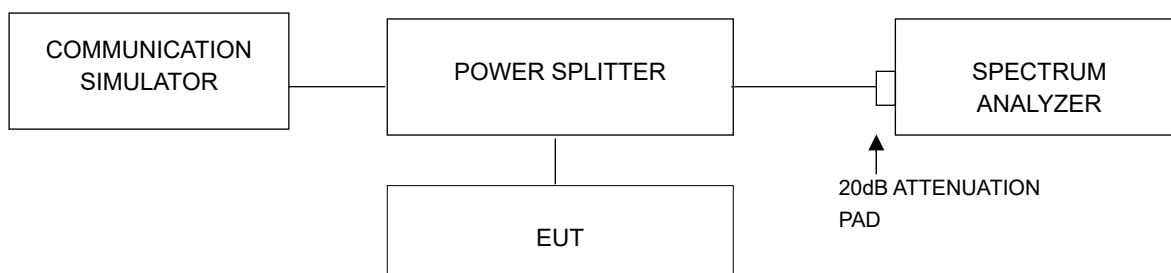


4.6 Peak to Average Ratio

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

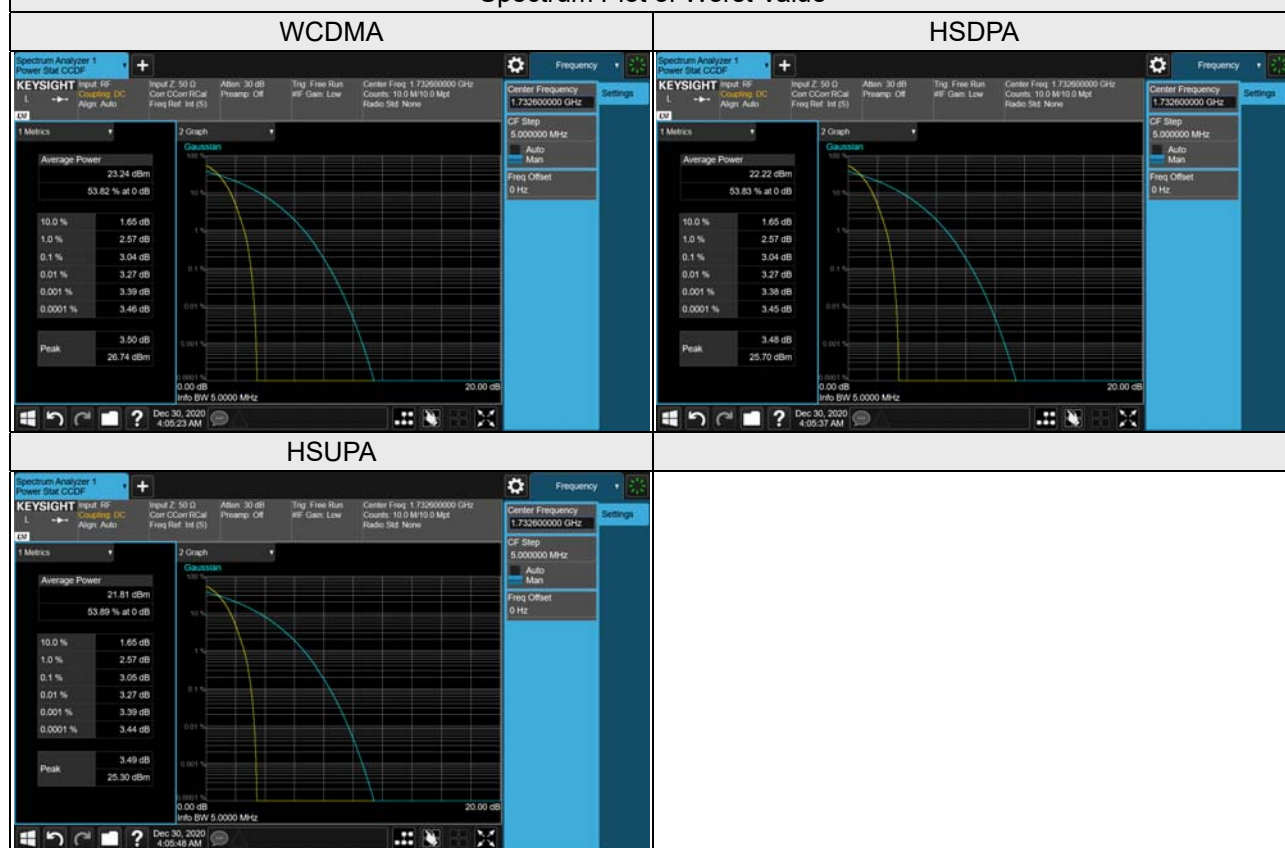
- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

WCDMA Band 4

Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
1312	1712.4	3.01	3.01	3.01
1413	1732.6	3.04	3.04	3.05
1513	1752.6	2.98	2.98	2.97

Spectrum Plot of Worst Value



LTE Band 4

LTE Band 4, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
19957	1710.7	3.56	4.68
20175	1732.5	4.22	5.29
20393	1754.3	3.40	4.43
LTE Band 4, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
19965	1711.5	3.55	4.68
20175	1732.5	4.31	5.24
20385	1753.5	3.39	4.40
LTE Band 4, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
19975	1712.5	3.64	4.62
20175	1732.5	4.34	5.24
20375	1752.5	3.07	4.05
LTE Band 4, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20000	1715.0	3.55	4.57
20175	1732.5	4.39	5.23
20350	1750.0	3.08	3.96
LTE Band 4, Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20025	1717.5	3.64	4.60
20175	1732.5	4.38	5.29
20325	1747.5	3.25	4.34

LTE Band 4, Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
20050	1720.0	3.68	4.57
20175	1732.5	4.43	5.25
20300	1745.0	3.76	4.80

Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / 16QAM



5MHz / 16QAM



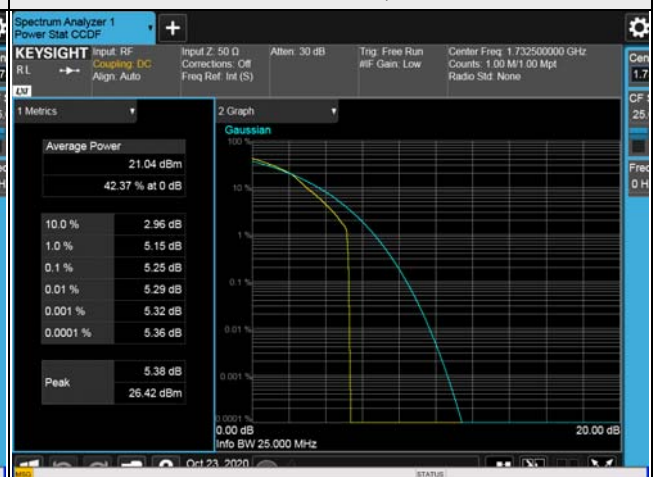
10MHz / 16QAM



15MHz / 16QAM



20MHz / 16QAM

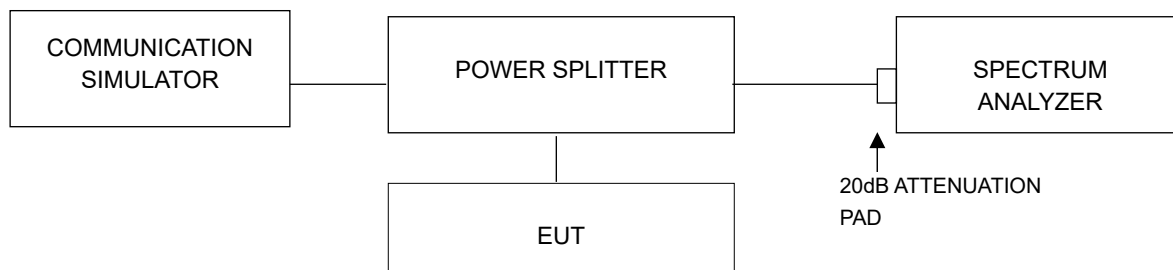


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

In the FCC 27.53(h)(1), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm .

4.7.2 Test Setup



4.7.3 Test Procedure

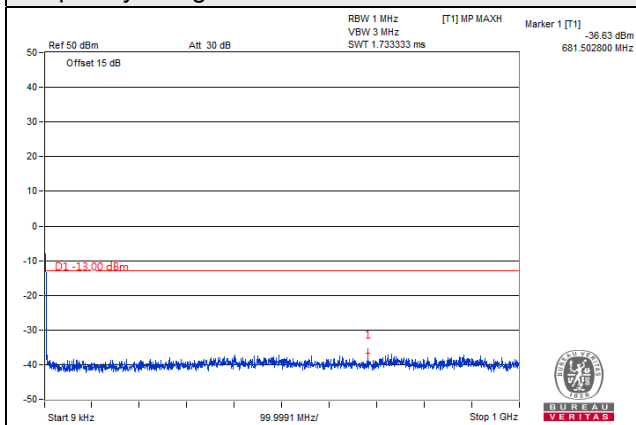
- All measurements were done at 3 channels: low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 18GHz or 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.7.4 Test Results

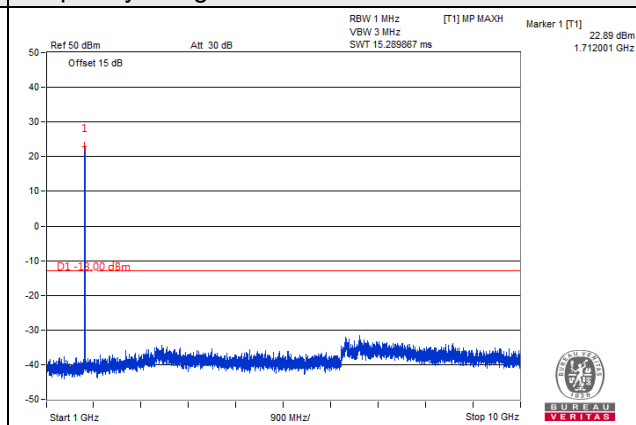
WCDMA

Channel 1312 (1712.4MHz)

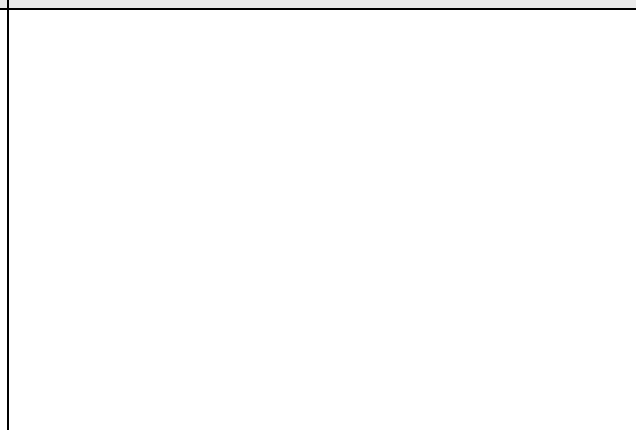
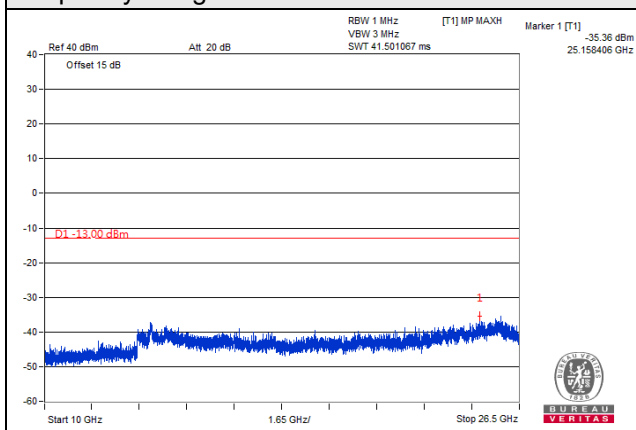
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

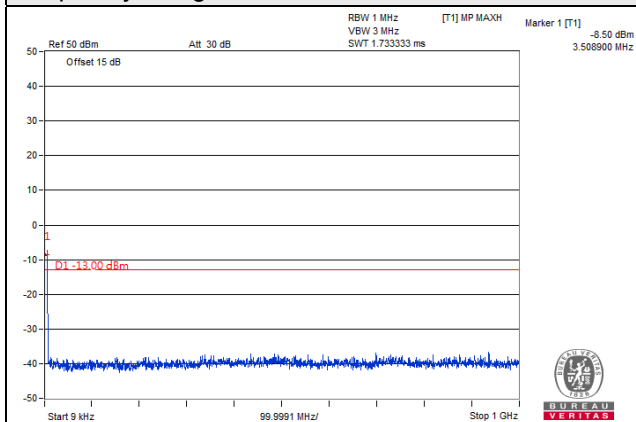


*The 9kHz signal over the limit is from Spectrum.

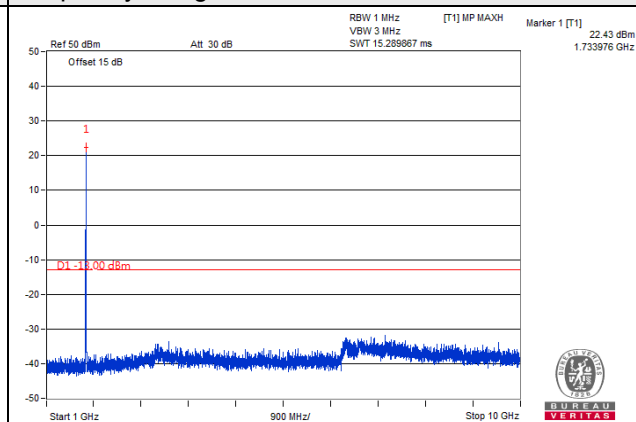
WCDMA

Channel 1413 (1732.6MHz)

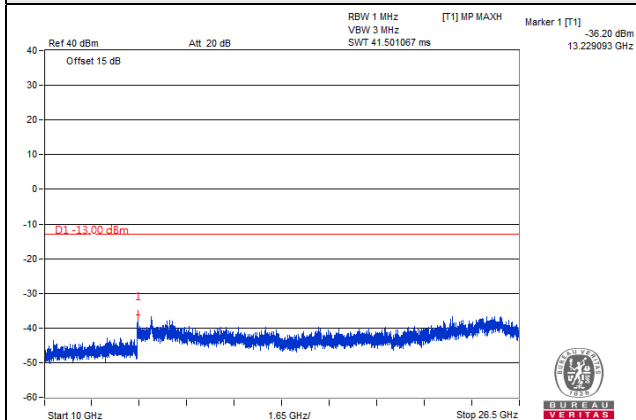
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

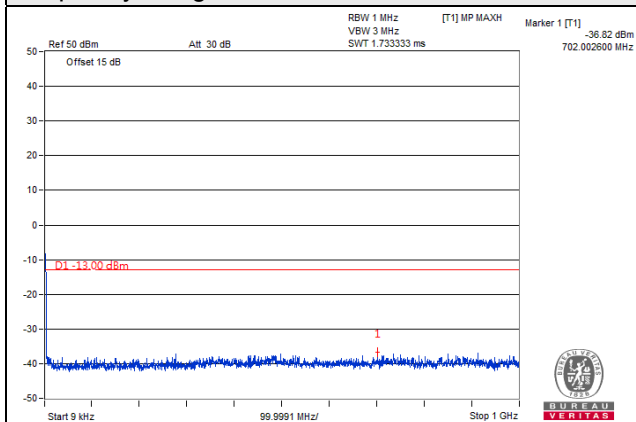


*The 9kHz signal over the limit is from Spectrum.

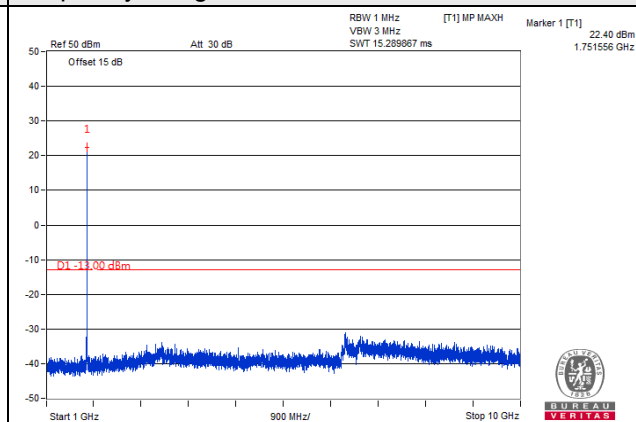
WCDMA

Channel 1513 (1752.6MHz)

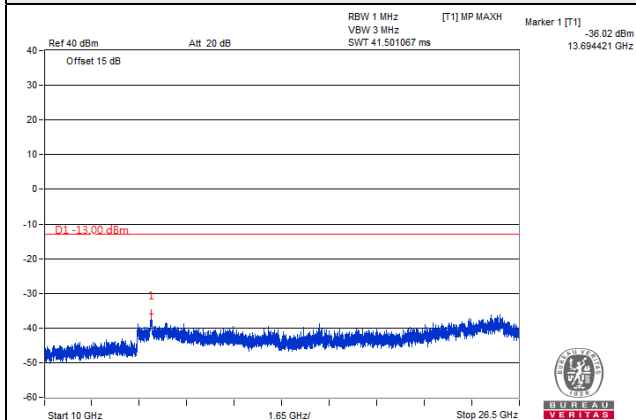
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

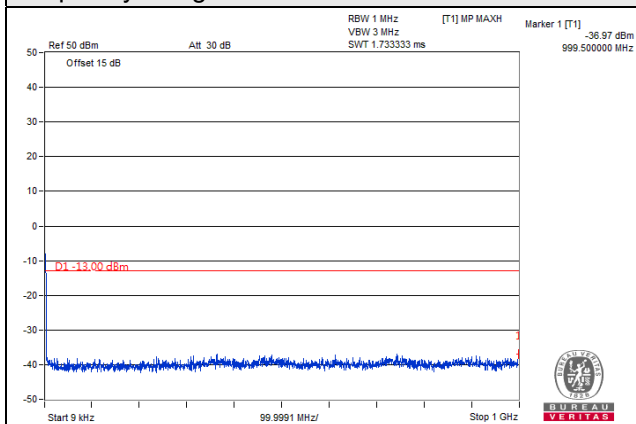


*The 9kHz signal over the limit is from Spectrum.

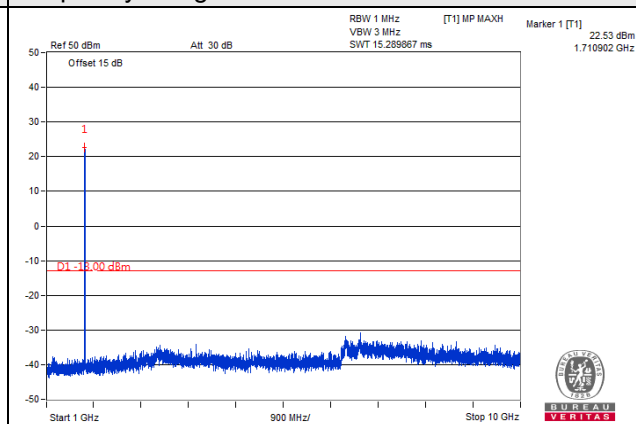
HSDPA

Channel 1312 (1712.4MHz)

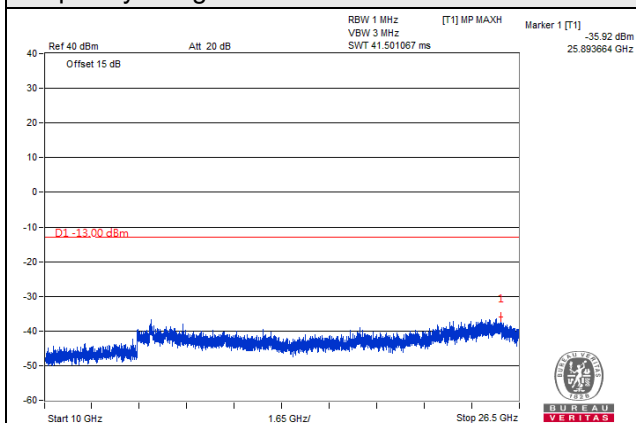
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

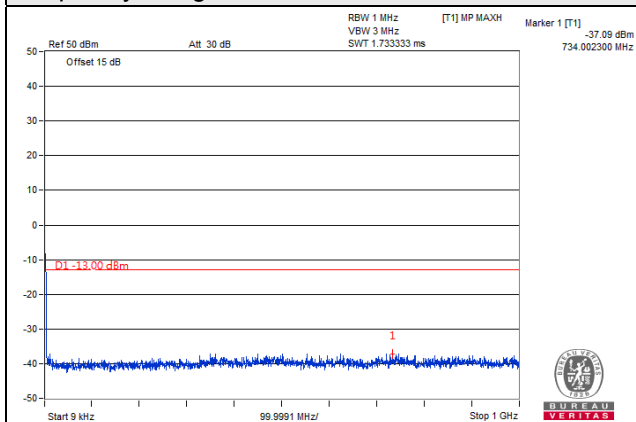


*The 9kHz signal over the limit is from Spectrum.

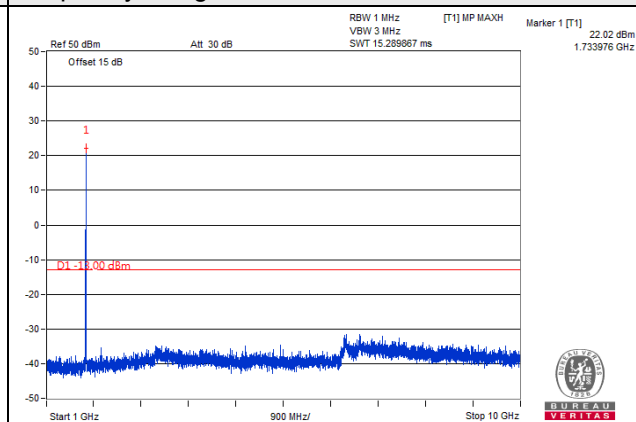
HSDPA

Channel 1413 (1732.6MHz)

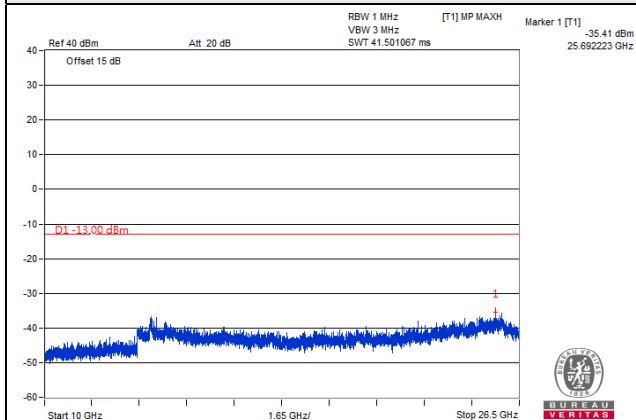
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

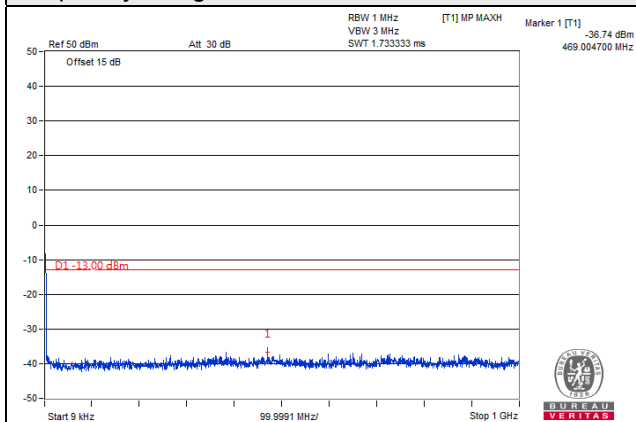


*The 9kHz signal over the limit is from Spectrum.

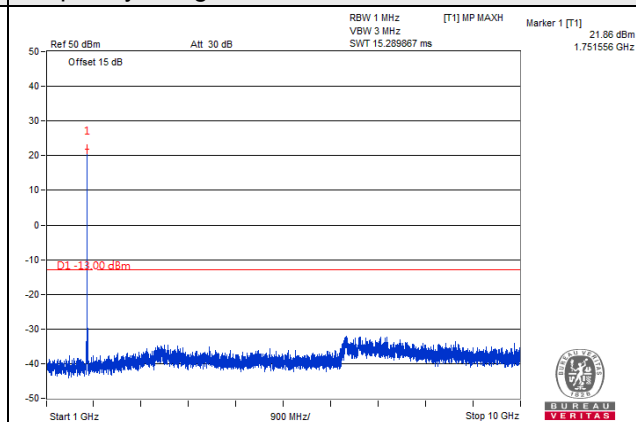
HSDPA

Channel 1513 (1752.6MHz)

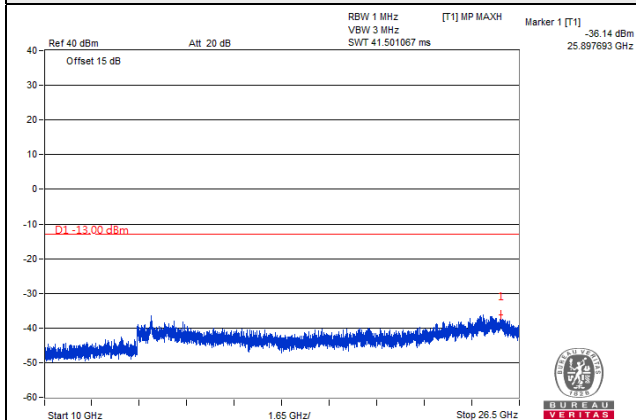
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

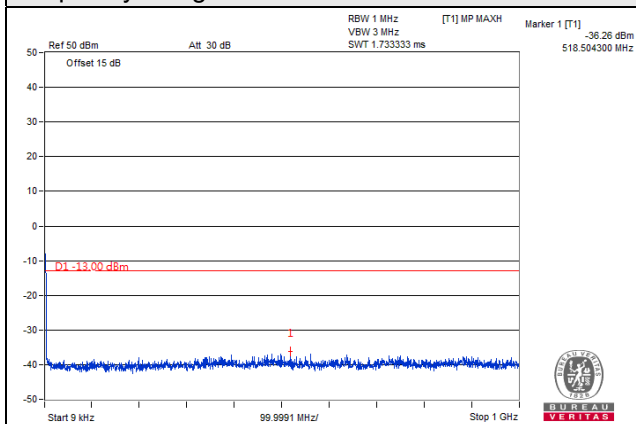


*The 9kHz signal over the limit is from Spectrum.

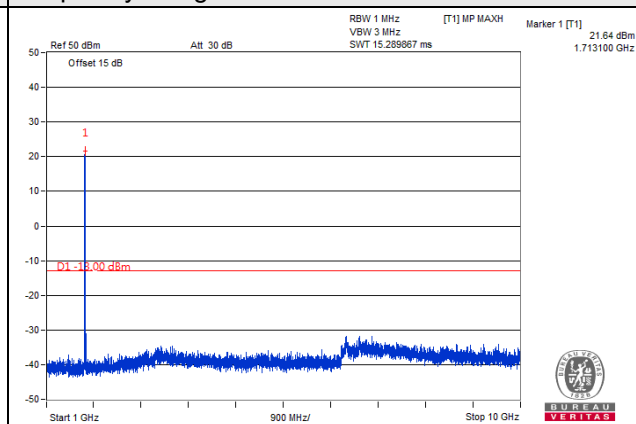
HSUPA

Channel 1312 (1712.4MHz)

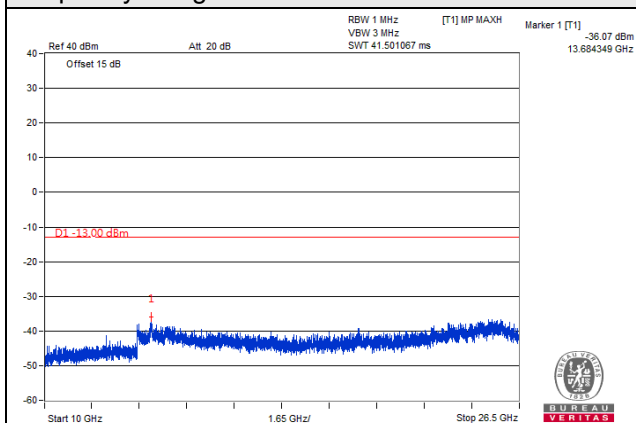
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

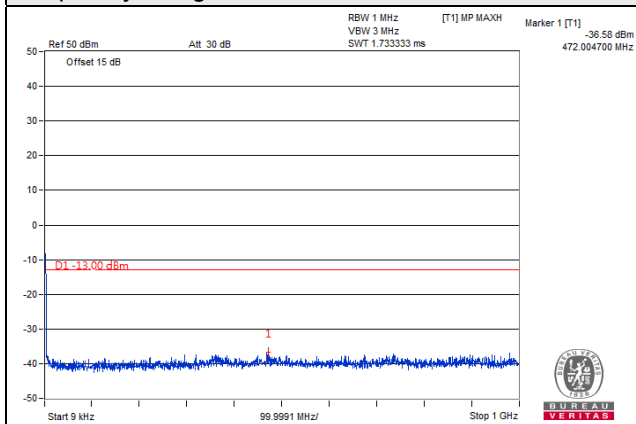


*The 9kHz signal over the limit is from Spectrum.

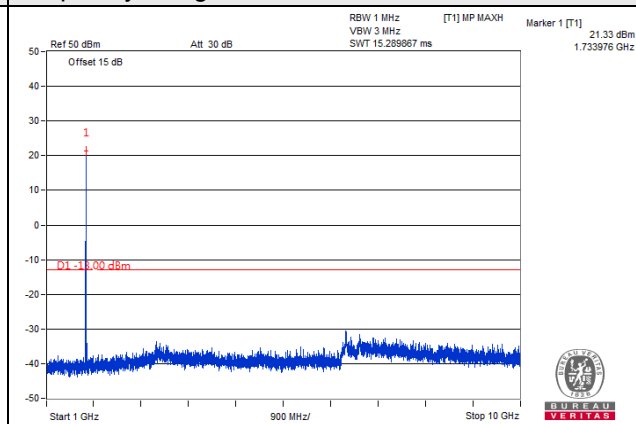
HSUPA

Channel 1413 (1732.6MHz)

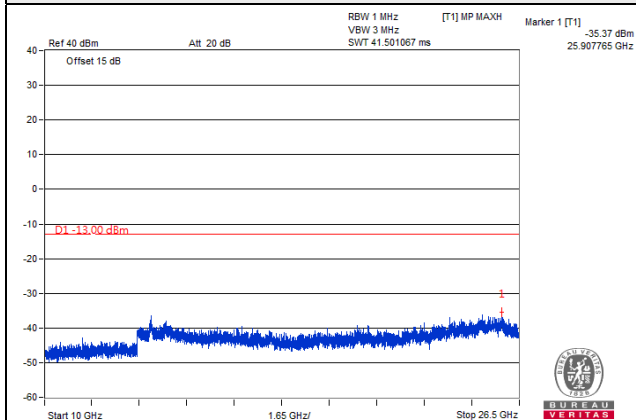
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz

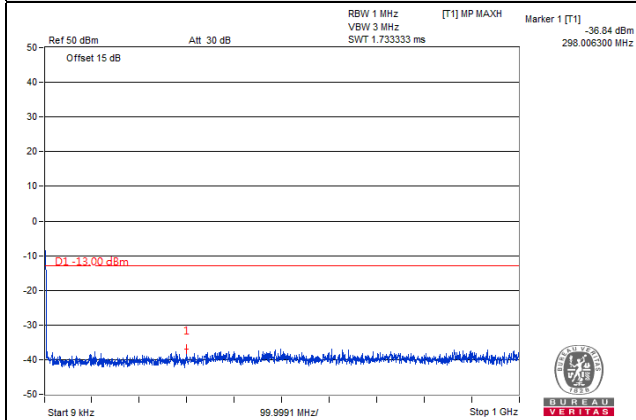


*The 9kHz signal over the limit is from Spectrum.

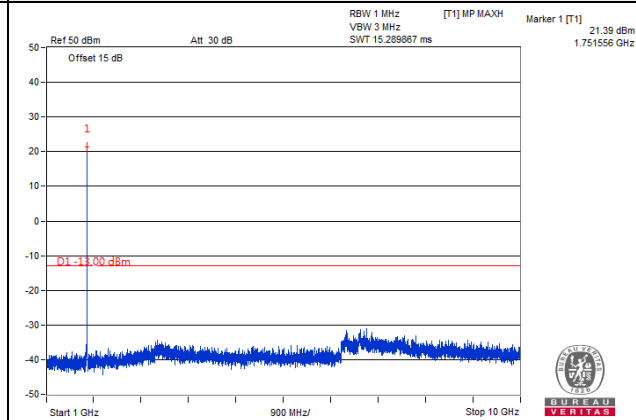
HSUPA

Channel 1513 (1752.6MHz)

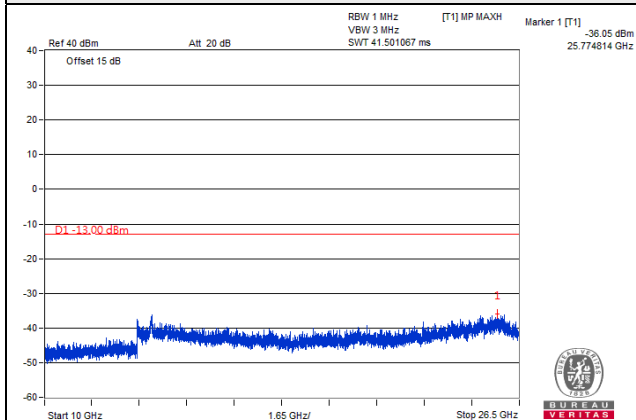
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



Frequency Range : 10GHz ~ 26.5GHz



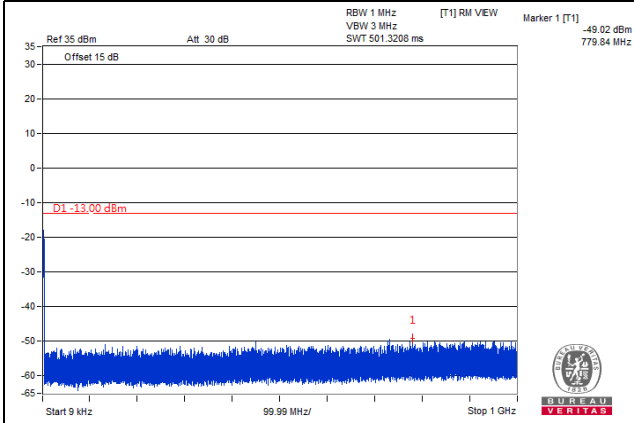
*The 9kHz signal over the limit is from Spectrum.

LTE Band 4

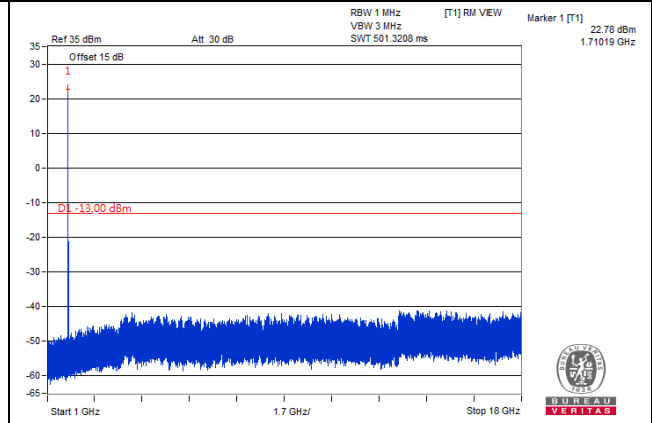
Channel Bandwidth: 1.4MHz

Channel 19957 (1710.7MHz)

Frequency Range : 9kHz ~ 1GHz

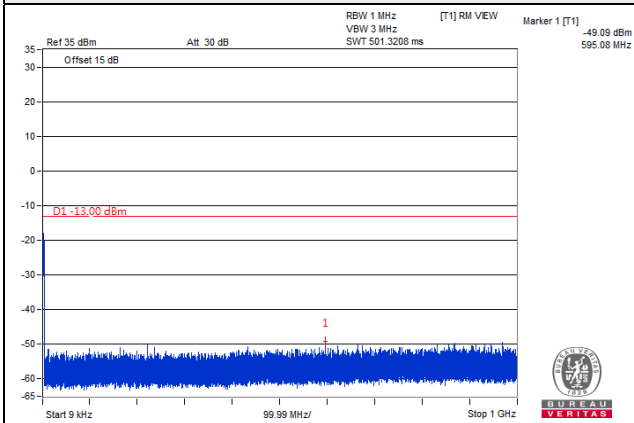


Frequency Range : 1GHz ~ 18GHz

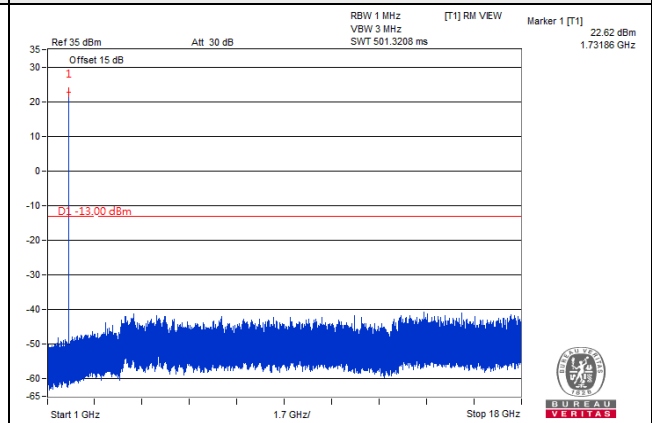


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

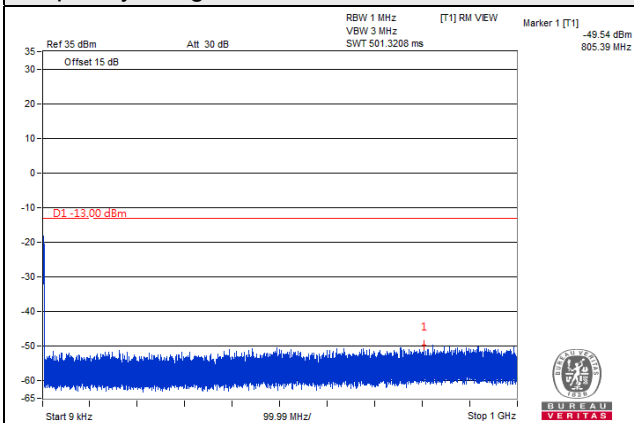


Frequency Range : 1GHz ~ 18GHz

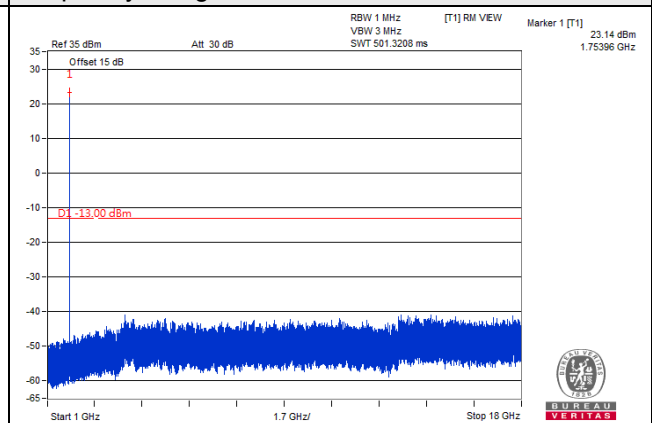


Channel 20393 (1754.3MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz

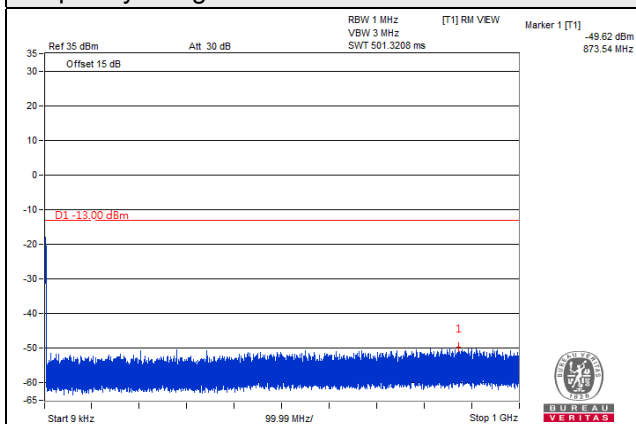


*The 9kHz signal over the limit is from Spectrum.

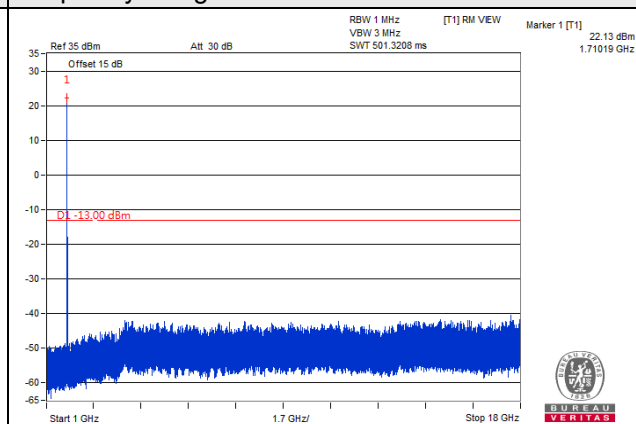
Channel Bandwidth: 3MHz

Channel 19965 (1711.5MHz)

Frequency Range : 9kHz ~ 1GHz

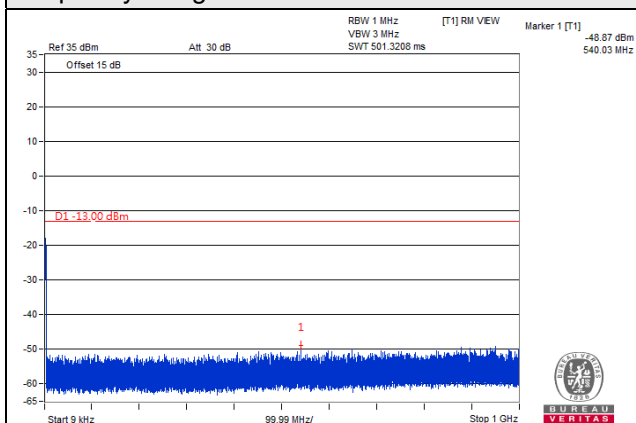


Frequency Range : 1GHz ~ 18GHz

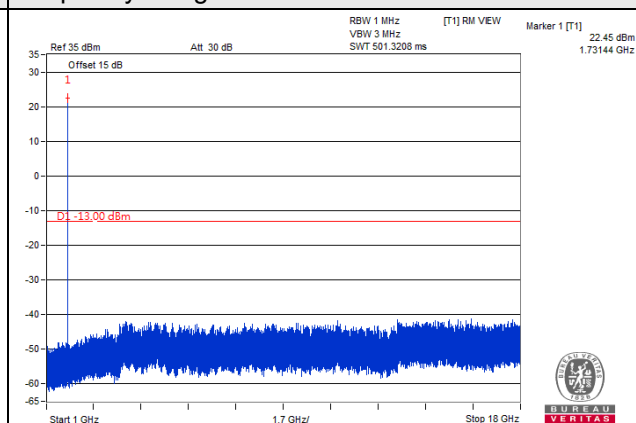


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

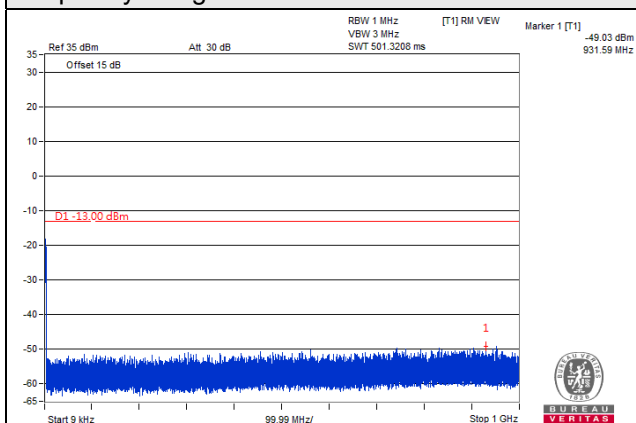


Frequency Range : 1GHz ~ 18GHz

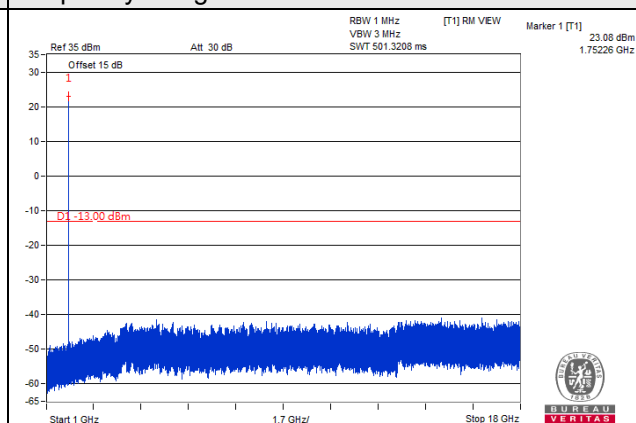


Channel 20385 (1753.5MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz

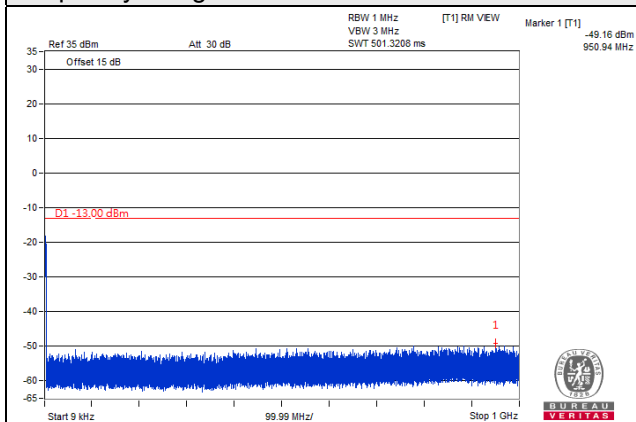


*The 9kHz signal over the limit is from Spectrum.

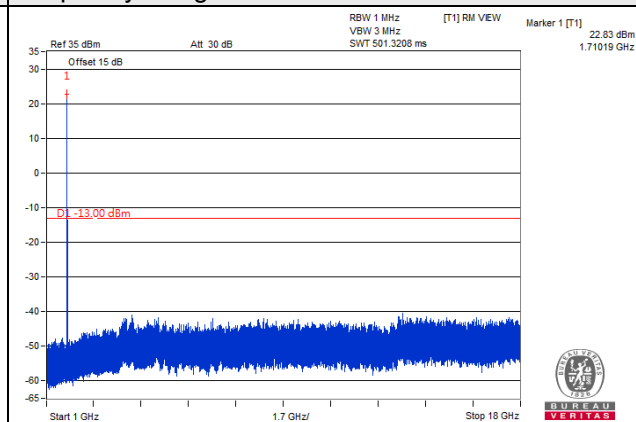
Channel Bandwidth: 5MHz

Channel 19975 (1712.5MHz)

Frequency Range : 9kHz ~ 1GHz

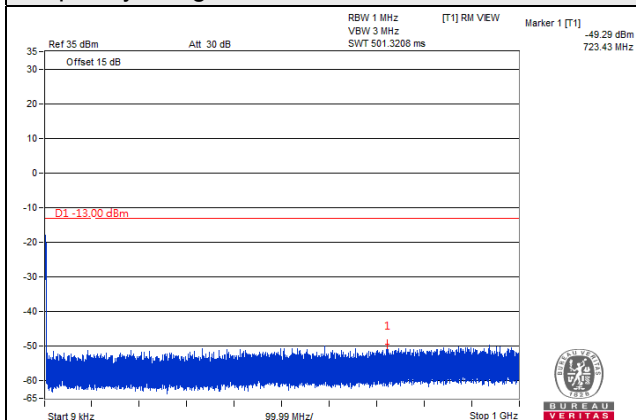


Frequency Range : 1GHz ~ 18GHz

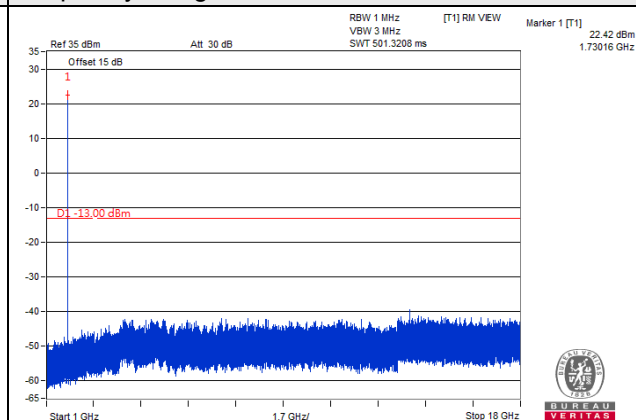


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

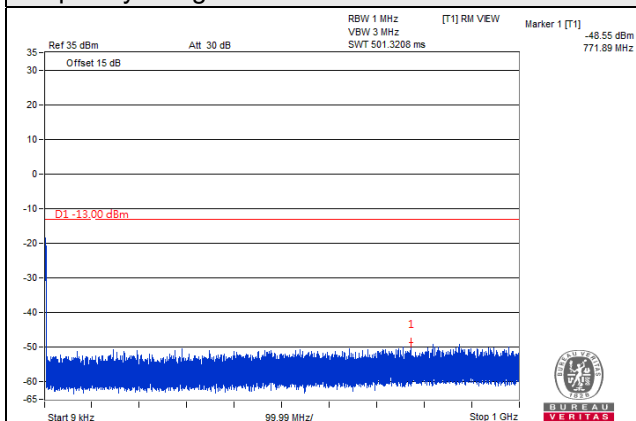


Frequency Range : 1GHz ~ 18GHz

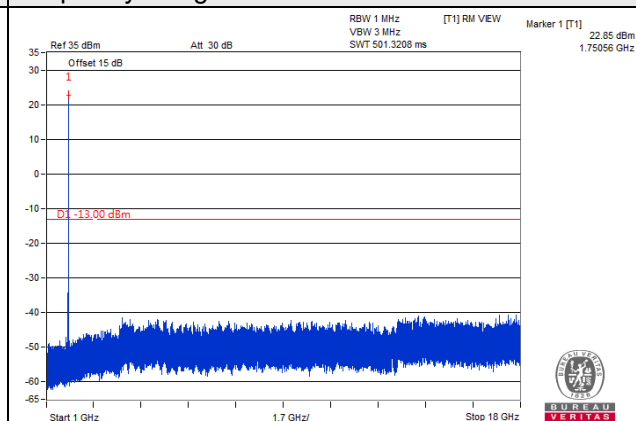


Channel 20375 (1752.5MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz

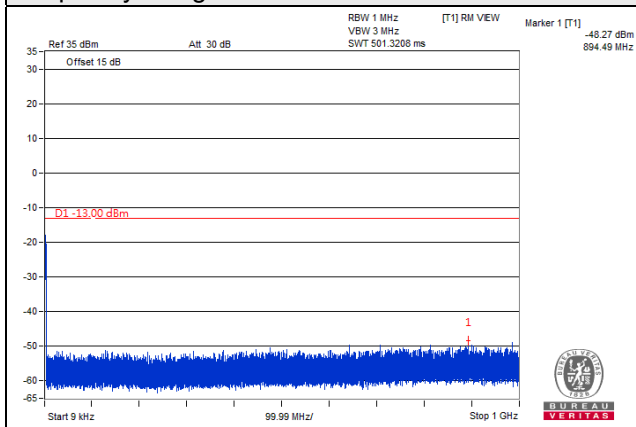


*The 9kHz signal over the limit is from Spectrum.

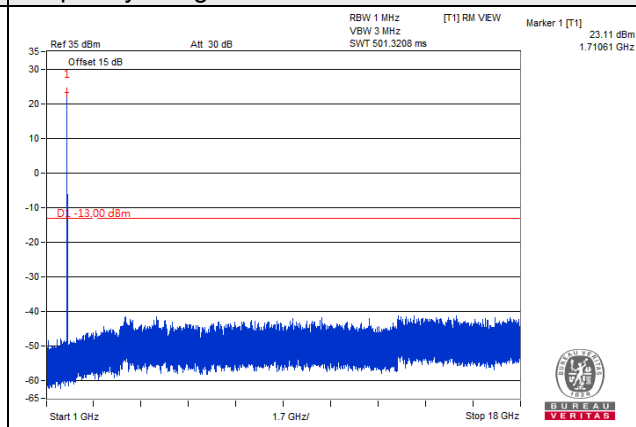
Channel Bandwidth: 10MHz

Channel 20000 (1715.0MHz)

Frequency Range : 9kHz ~ 1GHz

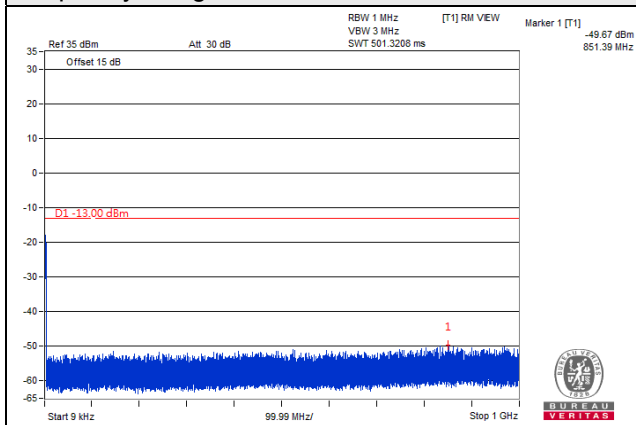


Frequency Range : 1GHz ~ 18GHz

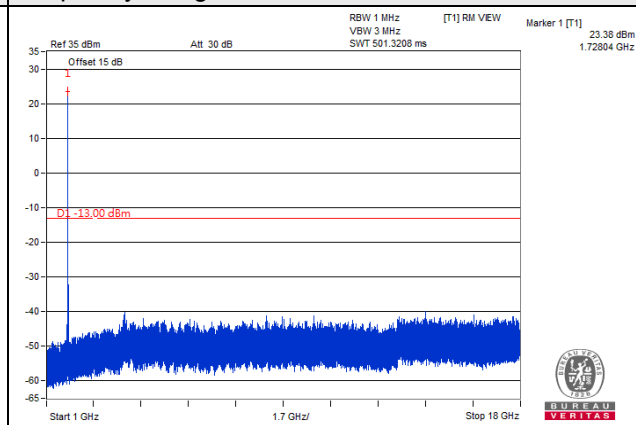


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

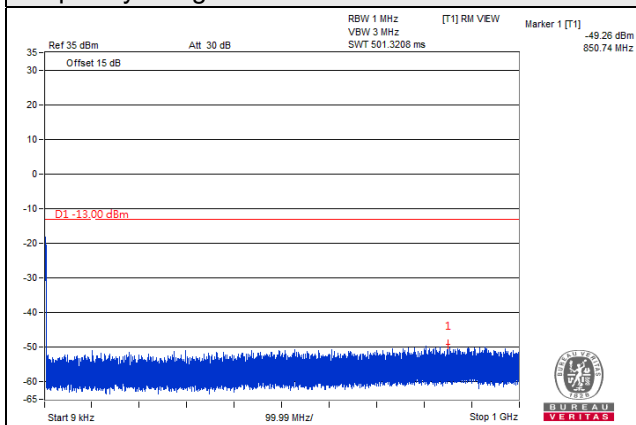


Frequency Range : 1GHz ~ 18GHz

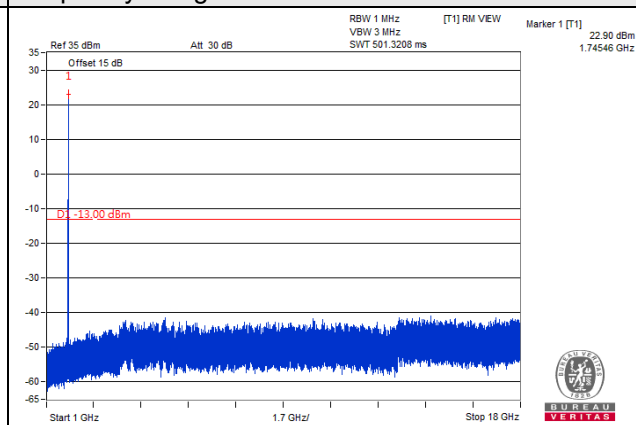


Channel 20350 (1750.0MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz

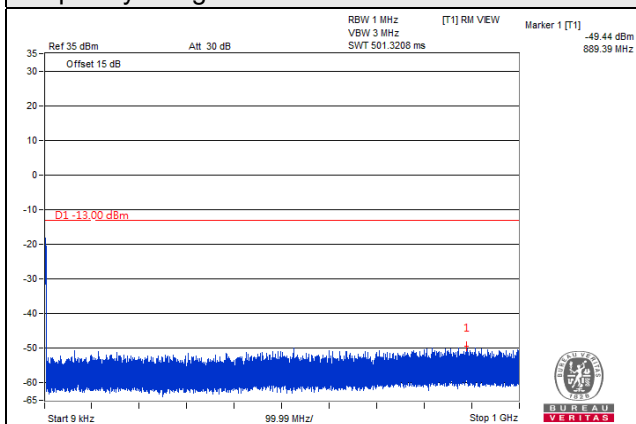


*The 9kHz signal over the limit is from Spectrum.

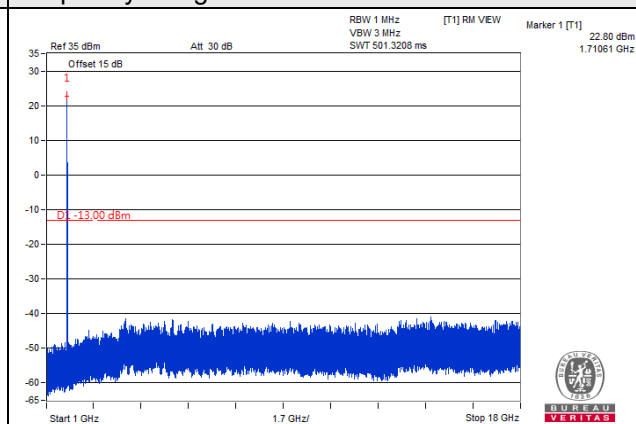
Channel Bandwidth: 15MHz

Channel 20025 (1717.5MHz)

Frequency Range : 9kHz ~ 1GHz

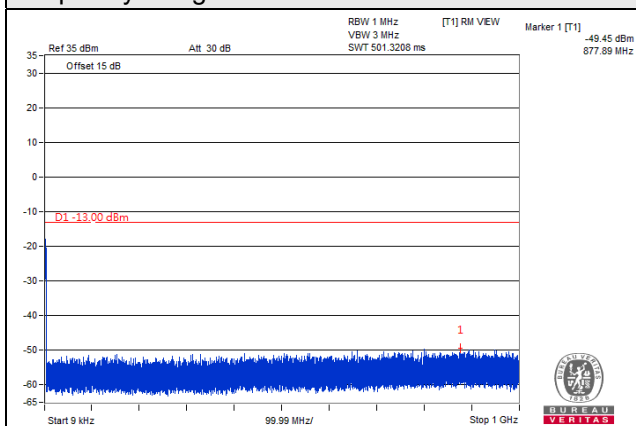


Frequency Range : 1GHz ~ 18GHz

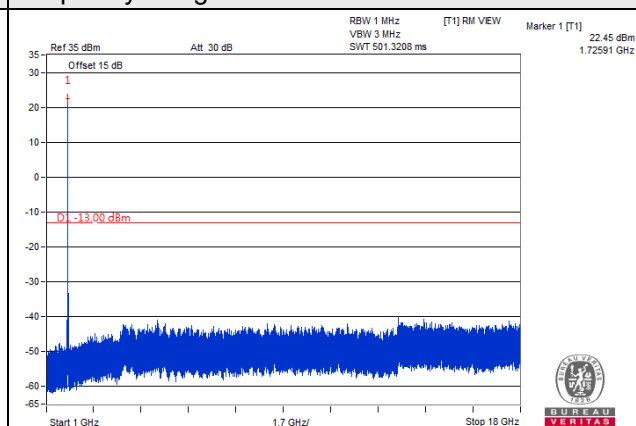


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

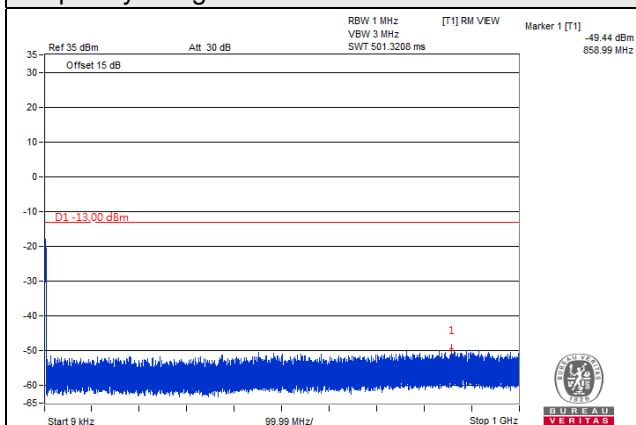


Frequency Range : 1GHz ~ 18GHz

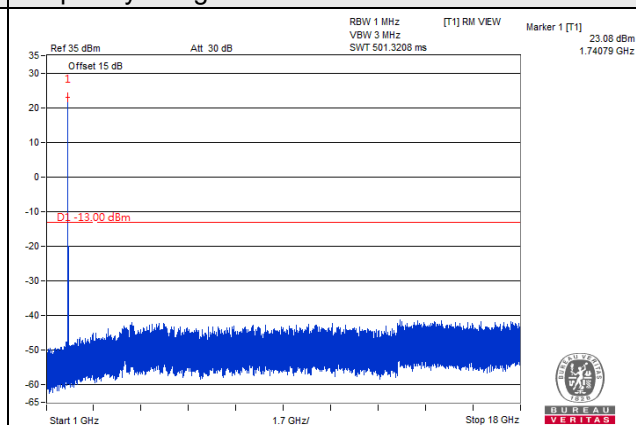


Channel 20325 (1747.5MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz

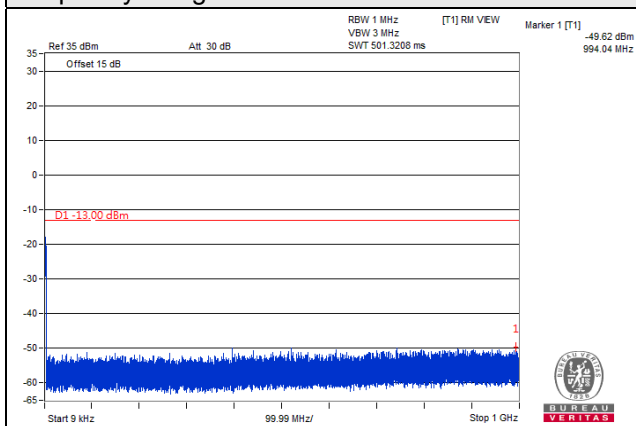


*The 9kHz signal over the limit is from Spectrum.

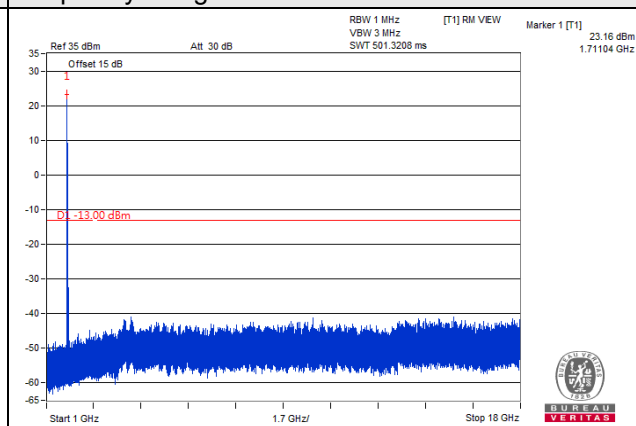
Channel Bandwidth: 20MHz

Channel 20050 (1720.0MHz)

Frequency Range : 9kHz ~ 1GHz

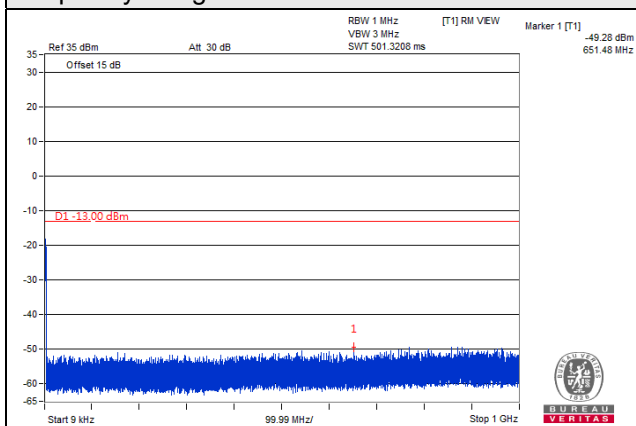


Frequency Range : 1GHz ~ 18GHz

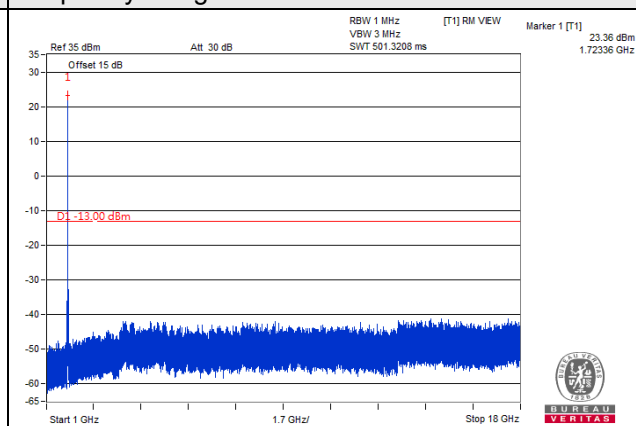


Channel 20175 (1732.5MHz)

Frequency Range : 9kHz ~ 1GHz

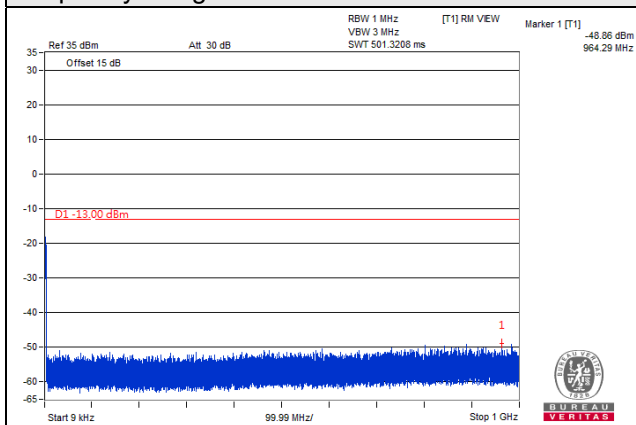


Frequency Range : 1GHz ~ 18GHz

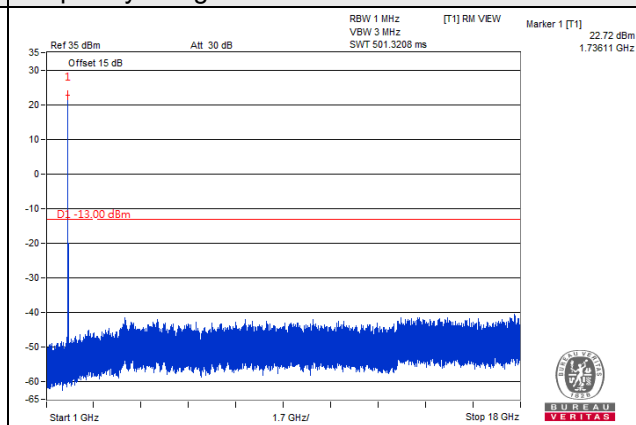


Channel 20300 (1745.0MHz)

Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 18GHz



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

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. 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, $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$.

Note:

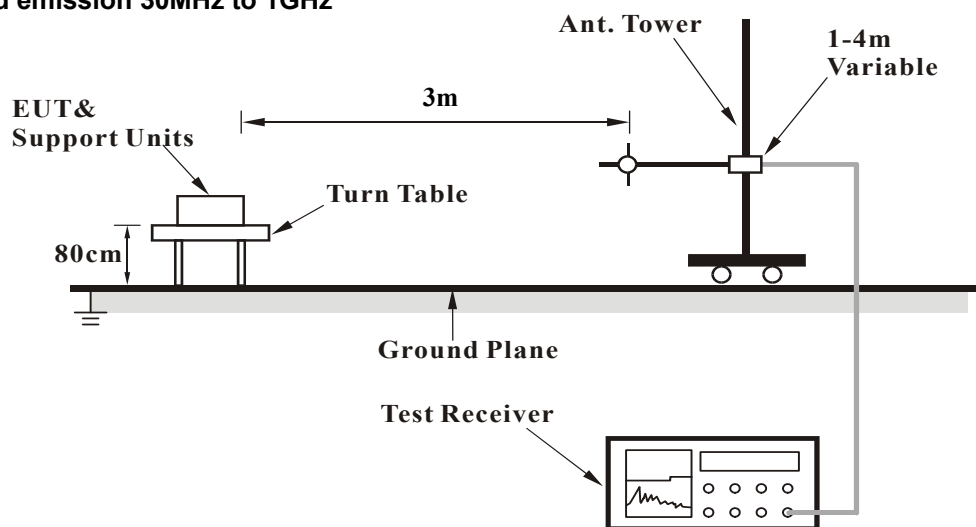
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

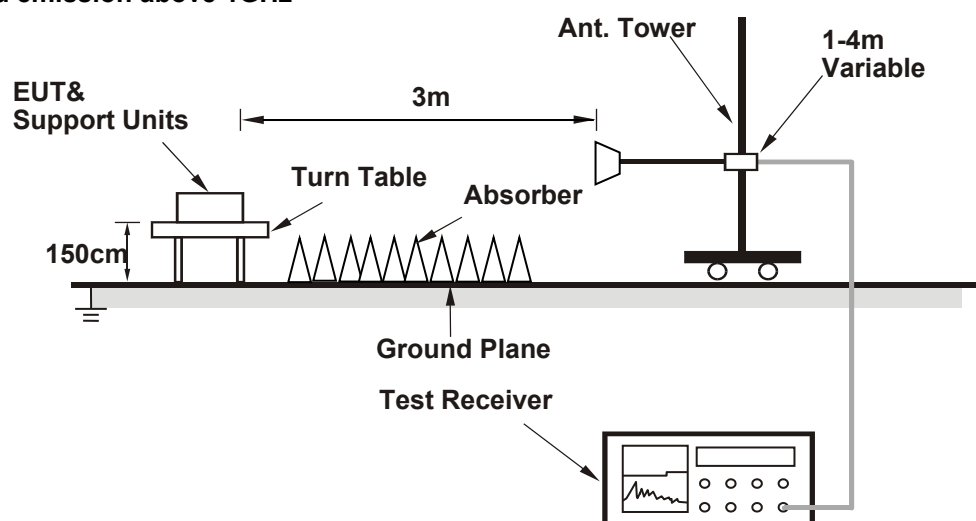
No deviation.

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

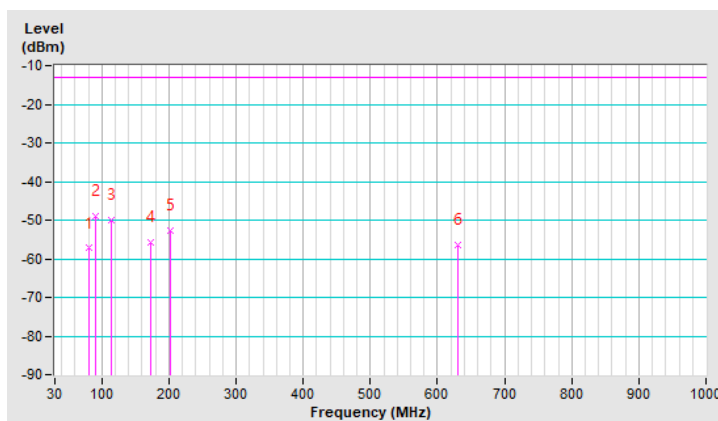
WCDMA Band 4

Mode	TX channel 1513 (1752.6MHz)	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	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.

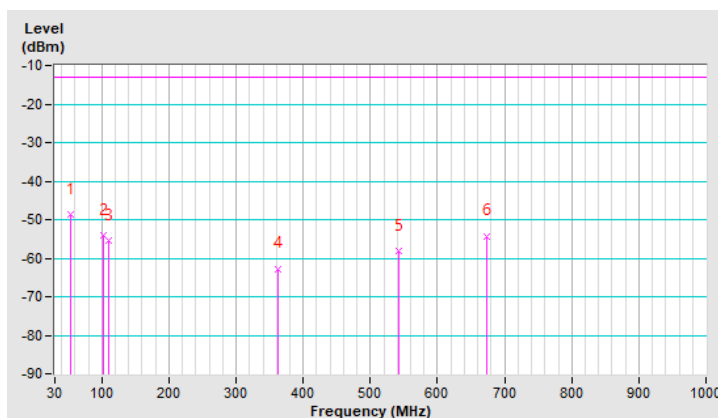


Mode	TX channel 1513 (1752.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

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	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.



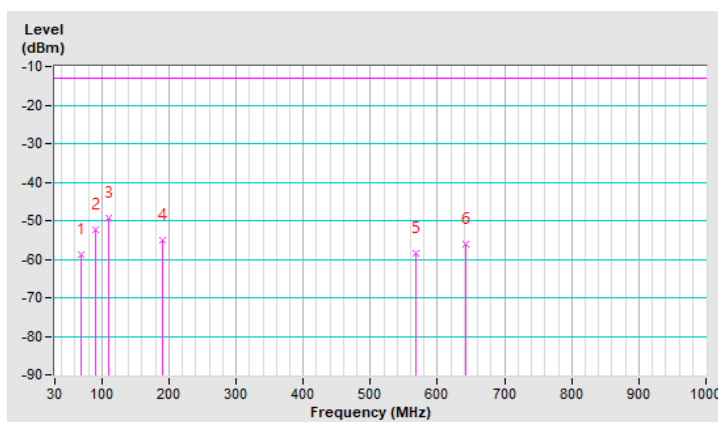
LTE Band 4, Channel Bandwidth: 5MHz

Mode	TX channel 20375 (1752.5MHz)	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	69.36	-58.70	-13.00	-45.70	2.00 H	186	47.50	-106.20
2	90.45	-52.50	-13.00	-39.50	1.50 H	52	57.10	-109.60
3	110.13	-49.30	-13.00	-36.30	1.50 H	237	57.80	-107.10
4	190.26	-55.00	-13.00	-42.00	1.50 H	83	51.10	-106.10
5	568.42	-58.40	-13.00	-45.40	1.50 H	336	37.70	-96.10
6	642.93	-56.00	-13.00	-43.00	1.50 H	128	38.40	-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.

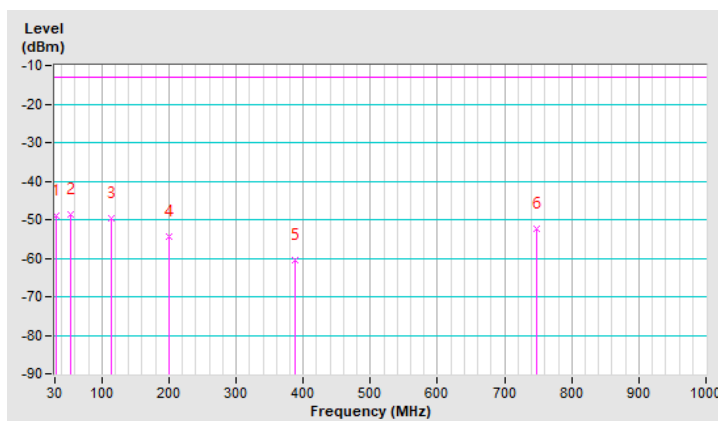


Mode	TX channel 20375 (1752.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Willy Cheng		

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	32.81	-48.90	-13.00	-35.90	1.00 V	238	57.20	-106.10
2	52.49	-48.80	-13.00	-35.80	1.00 V	323	55.50	-104.30
3	114.35	-49.50	-13.00	-36.50	2.00 V	8	57.30	-106.80
4	200.10	-54.30	-13.00	-41.30	1.00 V	136	52.30	-106.60
5	388.48	-60.40	-13.00	-47.40	1.00 V	175	39.70	-100.10
6	746.96	-52.30	-13.00	-39.30	1.00 V	282	39.80	-92.10

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.



Above 1GHz
WCDMA Band 4

Mode	TX channel 1312 (1712.4MHz)	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	3424.80	-51.30	-13.00	-38.30	1.99 H	212	43.90	-95.20
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	3424.80	-51.00	-13.00	-38.00	1.66 V	103	44.20	-95.20

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 1413 (1732.6MHz)	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	3465.20	-49.80	-13.00	-36.80	1.52 H	72	45.00	-94.80
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	3465.20	-50.20	-13.00	-37.20	1.48 V	213	44.60	-94.80

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.

Mode	TX channel 1513 (1752.6MHz)	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	3505.20	-49.70	-13.00	-36.70	1.43 H	69	44.50	-94.20
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	3505.20	-50.40	-13.00	-37.40	1.08 V	176	43.80	-94.20

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.

LTE Band 4, Channel Bandwidth: 1.4MHz

Mode	TX channel 19957 (1710.7MHz)	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	3421.40	-51.00	-13.00	-38.00	1.55 H	194	44.30	-95.30
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	3421.40	-50.80	-13.00	-37.80	1.46 V	204	44.50	-95.30

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 20175 (1732.5MHz)	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	3465.00	-50.20	-13.00	-37.20	1.43 H	212	44.60	-94.80
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	3465.00	-49.60	-13.00	-36.60	1.38 V	219	45.20	-94.80

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.

Mode	TX channel 20393 (1754.3MHz)	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	3508.60	-49.60	-13.00	-36.60	1.52 H	199	44.60	-94.20
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	3508.60	-49.50	-13.00	-36.50	1.49 V	213	44.70	-94.20

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.

LTE Band 4, Channel Bandwidth: 5MHz

Mode	TX channel 19975 (1712.5MHz)	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	3425.00	-50.00	-13.00	-37.00	1.56 H	208	45.20	-95.20
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	3425.00	-51.00	-13.00	-38.00	1.62 V	187	44.20	-95.20

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 20175 (1732.5MHz)	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	3465.00	-50.30	-13.00	-37.30	1.43 H	201	44.50	-94.80
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	3465.00	-50.20	-13.00	-37.20	1.42 V	216	44.60	-94.80

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.

Mode	TX channel 20375 (1752.5MHz)	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	3505.00	-48.90	-13.00	-35.90	1.43 H	211	45.30	-94.20
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	3505.00	-49.80	-13.00	-36.80	1.49 V	226	44.40	-94.20

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.

LTE Band 4, Channel Bandwidth: 20MHz

Mode	TX channel 20050 (1720.0MHz)	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	3440.00	-50.70	-13.00	-37.70	1.44 H	218	44.40	-95.10
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	3440.00	-51.10	-13.00	-38.10	1.43 V	211	44.00	-95.10

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 20175 (1732.5MHz)	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	3465.00	-50.80	-13.00	-37.80	1.59 H	193	44.00	-94.80
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	3465.00	-49.80	-13.00	-36.80	1.55 V	218	45.00	-94.80

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.

Mode	TX channel 20300 (1745.0MHz)	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	3490.00	-50.10	-13.00	-37.10	1.58 H	206	44.30	-94.40
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	3490.00	-50.00	-13.00	-37.00	1.51 V	207	44.40	-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.

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.

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