

FCC Test Report

(PART 22)

Report No.: RF170302D08

FCC ID: P2713245

Test Model: 13245

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Applicant: Sercomm Corp.

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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	9
3.2.1 Description Of Support Units	9
3.3 Test Mode Applicability and Tested Channel Detail	10
3.4 EUT Operating Conditions.....	11
3.5 General Description of Applied Standards.....	11
4 Test Types and Results	12
4.1 Output Power Measurement.....	12
4.1.1 Limits of Output Power Measurement.....	12
4.1.2 Test Procedures	12
4.1.3 Test Setup	13
4.1.4 Test Results.....	14
4.2 Modulation characteristics Measurement.....	20
4.2.1 Limits of Modulation characteristics	20
4.2.2 Test Procedure	20
4.2.3 Test Setup	20
4.2.4 Test Results.....	20
4.3 Frequency Stability Measurement	21
4.3.1 Limits of Frequency Stability Measurement	21
4.3.2 Test Procedure	21
4.3.3 Test Setup	21
4.3.4 Test Results.....	22
4.4 Occupied Bandwidth Measurement	23
4.4.1 Test Procedure	23
4.4.2 Test Setup	23
4.4.3 Test Result	24
4.5 Band Edge Measurement.....	28
4.5.1 Limits of Band Edge Measurement	28
4.5.2 Test Setup	28
4.5.3 Test Procedures	28
4.5.4 Test Results.....	29
4.6 Peak To Average Ratio.....	33
4.5.1 Limits of Peak To Average Ratio Measurement	33
4.5.2 Test Setup	33
4.5.3 Test Procedures	33
4.5.4 Test Results	34
4.7 Conducted Spurious Emissions	36
4.7.1 Limits of Conducted Spurious Emissions Measurement	36
4.7.2 Test Setup	36
4.7.3 Test Procedure	36
4.7.4 Test Results.....	37
4.8 Radiated Emission Measurement	61
4.8.1 Limits of Radiated Emission Measurement	61
4.8.2 Test Procedure	61
4.8.3 Deviation from Test Standard.....	61
4.8.4 Test Setup	62
4.8.5 Test Results.....	63

5	Pictures of Test Arrangements.....	71
	Appendix – Information on the Testing Laboratories.....	72

Release Control Record

Issue No.	Description	Date Issued
RF170302D08	Original release.	May 4, 2017

1 Certificate of Conformity

Product: Verizon LTE
Brand: Verizon
Test Model: 13245
Sample Status: Engineering sample
Applicant: Sercomm Corp.
Test Date: Apr. 18 ~ 26, 2017
Standards: FCC Part 22, Subpart H

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

Prepared by : Celia Chen , **Date:** May 4, 2017
Celia Chen / Supervisor

Approved by : Rex Lai , **Date:** May 4, 2017
Rex Lai / Assistant Manager

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	PASS	Meet the requirement of limit.
2.1047	Modulation characteristics	PASS	Meet the requirement
---	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -8.58dB at 4356.00MHz.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.54 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	5.48 dB

2.2 Test Site And Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	886.57D	2432A03504	Feb. 21, 2017	Feb. 20, 2018
HP Preamplifier	886.59B	3008A01201	Feb. 22, 2017	Feb. 21, 2018
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2017	Feb. 20, 2018
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 08, 2017	Feb. 07, 2018
Schwarzbeck Antenna	VULB 9168	139	Dec. 13, 2016	Dec. 12, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 30, 2016	Dec. 29, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Dec. 27, 2016	Dec. 26, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2016	Aug. 14, 2017
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2016	Aug. 14, 2017
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 25, 2016	May 24, 2017
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 26, 2016	Jul. 25, 2017
Loop Antenna EMCI	LPA600	270	Aug. 20, 2015	Aug. 19, 2017
EMCO Horn Antenna	3115	00028257	Dec. 15, 2016	Dec. 14, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 30, 2016	Sep. 29, 2017
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2016 Apr. 24, 2017	Apr. 23, 2017 Apr. 23, 2018
Anritsu Power Meter	ML2495A	0842014	Apr. 24, 2016 Apr. 24, 2017	Apr. 23, 2017 Apr. 23, 2018

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 886.59B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

3 General Information

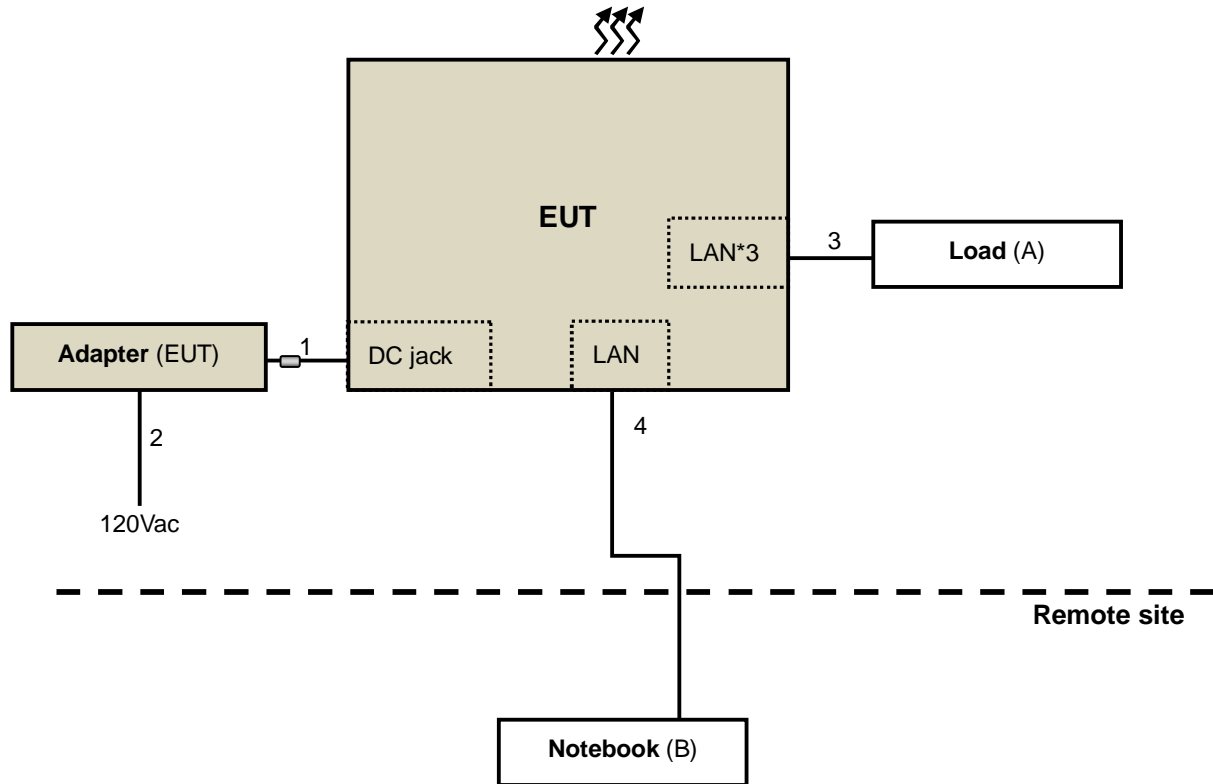
3.1 General Description of EUT

Product	Verizon LTE	
Brand	Verizon	
Test Model	13245	
Status of EUT	Engineering sample	
Power Supply Rating	12Vdc (adapter)	
Modulation Type	QPSK, 16QAM, 64QAM	
Operating Frequency	LTE Band 5 (Channel Bandwidth 3MHz)	871.5MHz ~ 891.5MHz
	LTE Band 5 (Channel Bandwidth 5MHz)	874MHz ~ 889MHz
	LTE Band 5 (Channel Bandwidth 10MHz)	876.5MHz ~ 886.5MHz
	LTE Band 5 (Channel Bandwidth 20MHz)	879MHz ~ 884MHz
Max. ERP Power	LTE Band 5 (Channel Bandwidth 3MHz)	180.717mW (22.57dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	183.231mW (22.63dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	185.780mW (22.69dBm)
	LTE Band 5 (Channel Bandwidth 20MHz)	194.536mW (22.89dBm)
Antenna Type	LTE Band 5	Dipole antenna with 1.2dBi gain
Antenna Connector	SMA	
Accessory Device	Adapter	
Data Cable Supplied	N/A	

Note: The EUT uses following adapter.

Adapter	
Brand	PHIHONG
Model	PSA120U-120L6
Input Power	100-240Vac, 1.6A, 50-60Hz
Output Power	12Vdc, 9A
Power cord	Non-shielded AC 3 Pin (1.8m) Non-shielded DC (1m) with one ferrite core

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.	Load	N/A	N/A	N/A	N/A	Provided by Lab
B.	Notebook PC	DELL	E6530	9331GV1	FCC DoC Approved	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.0	N	1	Supplied by client
2.	AC power cord	1	1.8	N	0	Supplied by client
3.	LAN cable	3	1.0	N	0	Provided by Lab
4.	LAN cable	1	10.0	N	0	Provided by Lab

3.3 Test Mode Applicability and Tested Channel Detail

LTE Band 5

Test item	Available channel	Tested channel	Channel Bandwidth	Modulation
EIRP	2425 to 2625	2425, 2525, 2625	5MHz	QPSK
	2450 to 2600	2450, 2525, 2600	10MHz	QPSK
	2475 to 2575	2475, 2525, 2575	15MHz	QPSK
	2500 to 2550	2550, 2525, 2550	20MHz	QPSK
Modulation characteristics	2475 to 2575	2525	15MHz	QPSK, 16QAM, 64QAM
Frequency Stability	2475 to 2575	2525	5MHz	QPSK
Occupied Bandwidth	2425 to 2625	2425, 2525, 2625	5MHz	QPSK, 16QAM, 64QAM
	2450 to 2600	2450, 2525, 2600	10MHz	QPSK, 16QAM, 64QAM
	2475 to 2575	2475, 2525, 2575	15MHz	QPSK, 16QAM, 64QAM
	2500 to 2550	2550, 2525, 2550	20MHz	QPSK, 16QAM, 64QAM
Band Edge	2425 to 2625	2425, 2625	5MHz	QPSK
	2450 to 2600	2450, 2600	10MHz	QPSK
	2475 to 2575	2475, 2575	15MHz	QPSK
	2500 to 2550	2550, 2550	20MHz	QPSK
Peak to Average Ratio	2425 to 2625	2425, 2525, 2625	5MHz	QPSK, 16QAM, 64QAM
	2450 to 2600	2450, 2525, 2600	10MHz	QPSK, 16QAM, 64QAM
	2475 to 2575	2475, 2525, 2575	15MHz	QPSK, 16QAM, 64QAM
	2500 to 2550	2550, 2525, 2550	20MHz	QPSK, 16QAM, 64QAM
Conducuted Emission	2425 to 2625	2425, 2525, 2625	5MHz	QPSK
	2450 to 2600	2450, 2525, 2600	10MHz	QPSK
	2475 to 2575	2475, 2525, 2575	15MHz	QPSK
	2500 to 2550	2550, 2525, 2550	20MHz	QPSK
Radiated Emission Below 1GHz	2425 to 2625	2425	5MHz	QPSK
	2450 to 2600	2450	10MHz	QPSK
	2475 to 2575	2475	15MHz	QPSK
	2500 to 2550	2550	20MHz	QPSK
Radiated Emission Above 1GHz	2425 to 2625	2425, 2525, 2625	5MHz	QPSK
	2450 to 2600	2450, 2525, 2600	10MHz	QPSK
	2475 to 2575	2475, 2525, 2575	15MHz	QPSK
	2500 to 2550	2550, 2525, 2550	20MHz	QPSK

NOTE:

1. For radiated emission below 1 GHz, the low, mid and high channels were pre-tested in chamber. The low channel was the worst case and chosen for final test.
2. The conducted output power for QPSK /16QAM / 64QAM, measured value of QPSK is higher than 16QAM / 64QAM mode. Therefore, the Frequency Stability, Band Edge, Conducuted Emission and Radiated Emission were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	20deg. C, 76%RH	120Vac, 60Hz	Dalen Dai
Modulation characteristics	20deg. C, 76%RH	120Vac, 60Hz	Saxon Lee
Frequency Stability	20deg. C, 76%RH	120Vac, 60Hz	Saxon Lee
Occupied Bandwidth	20deg. C, 76%RH	120Vac, 60Hz	Saxon Lee
Band Edge	20deg. C, 76%RH	120Vac, 60Hz	Saxon Lee
Peak To Average Ratio	20deg. C, 76%RH	120Vac, 60Hz	Saxon Lee
Conducted Emission	20deg. C, 73%RH	120Vac, 60Hz	Saxon Lee
Radiated Emission	20deg. C, 73%RH	120Vac, 60Hz	Dalen Dai

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v02r02

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI/TIA/EIA-603-D 2010

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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

4.1.2 Test Procedures

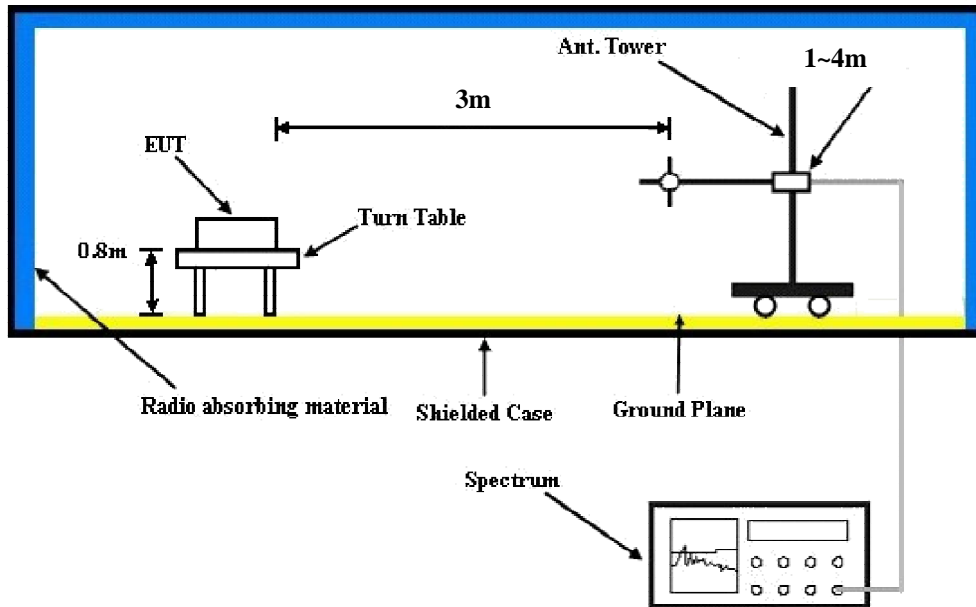
EIRP / ERP Measurement:

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

Conducted Power Measurement:

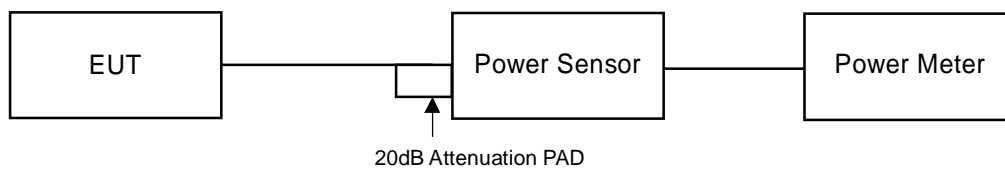
A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.1.3 Test Setup
EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

Band / BW	Low CH			Mid CH			High CH		
	2425			2525			2625		
	871.5 MHz			881.5 MHz			891.5 MHz		
	QPSK								
Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	
5 / 5M	17.44	17.57	20.52	17.41	17.53	20.48	17.40	17.51	20.47
Band / BW	16QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 5M	17.43	17.57	20.51	17.41	17.56	20.50	17.46	17.54	20.51
Band / BW	64QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 5M	17.43	17.52	20.49	17.41	17.46	20.45	17.42	17.56	20.50

Band / BW	Low CH			Mid CH			High CH		
	2450			2525			2600		
	874 MHz			881.5 MHz			889 MHz		
	QPSK								
Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	
5 / 10M	17.42	17.53	20.49	17.50	17.57	20.55	17.41	17.51	20.47
Band / BW	16QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 10M	17.42	17.55	20.50	17.48	17.58	20.54	17.42	17.53	20.49
Band / BW	64QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 10M	17.45	17.54	20.51	17.46	17.56	20.52	17.43	17.51	20.48

Band / BW	Low CH			Mid CH			High CH		
	2475			2525			2575		
	876.5 MHz			881.5 MHz			886.5 MHz		
	QPSK								
Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	
5 / 15M	17.46	17.53	20.51	17.50	17.59	20.56	17.47	17.55	20.52
Band / BW	16QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 15M	17.44	17.52	20.49	17.46	17.55	20.52	17.47	17.58	20.54
Band / BW	64QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 15M	17.41	17.55	20.49	17.44	17.58	20.52	17.46	17.55	20.52

Band / BW	Low CH			Mid CH			High CH		
	2500			2525			2550		
	879 MHz			881.5 MHz			884 MHz		
	QPSK								
Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total	
5 / 20M	17.43	17.61	20.53	17.49	17.62	20.57	17.50	17.64	20.58
Band / BW	16QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 20M	17.48	17.55	20.53	17.51	17.59	20.56	17.47	17.51	20.50
Band / BW	64QAM								
	Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
5 / 20M	17.47	17.58	20.54	17.49	17.59	20.55	17.49	17.57	20.54

ERP Power (dBm)

LTE Band 5

Channel Bandwidth: 5MHz

MODE		TX channel 2425					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	871.50	7.69	-14.07	27.55	13.48	38.45	-24.97
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	871.50	16.86	-4.98	27.55	22.57	38.45	-15.88

MODE		TX channel 2525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	7.18	-14.46	27.73	13.27	38.45	-25.18
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	16.76	-5.30	27.73	22.43	38.45	-16.02

MODE		TX channel 2625					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	891.50	6.99	-14.49	27.88	13.39	38.45	-25.06
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	891.50	16.87	-5.38	27.88	22.50	38.45	-15.95

NOTE: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 10MHz

MODE		TX channel 2450					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	874.00	7.25	-14.56	27.67	13.11	38.45	-25.34
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	874.00	16.93	-5.04	27.67	22.63	38.45	-15.82

MODE		TX channel 2525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	6.99	-14.65	27.73	13.08	38.45	-25.37
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	16.88	-5.18	27.73	22.55	38.45	-15.90

MODE		TX channel 2600					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	889.00	6.88	-14.65	27.85	13.20	38.45	-25.25
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	889.00	16.83	-5.38	27.85	22.47	38.45	-15.98

NOTE: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 15MHz

MODE		TX channel 2475					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	876.50	7.11	-14.61	27.66	13.05	38.45	-25.40
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	876.50	17.00	-4.97	27.66	22.69	38.45	-15.76

MODE		TX channel 2525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	7.14	-14.50	27.73	13.23	38.45	-25.22
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	16.84	-5.22	27.73	22.51	38.45	-15.94

MODE		TX channel 2575					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	886.50	6.73	-14.82	27.80	12.98	38.45	-25.47
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	886.50	16.89	-5.26	27.80	22.54	38.45	-15.91

NOTE: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 20MHz

MODE		TX channel 2500					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	879.00	6.51	-15.16	27.69	12.53	38.45	-25.92
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	879.00	17.21	-4.80	27.69	22.89	38.45	-15.56

MODE		TX channel 2525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	6.79	-14.85	27.73	12.88	38.45	-25.57
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	881.50	17.00	-5.06	27.73	22.67	38.45	-15.78

MODE		TX channel 2550					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	884.00	6.54	-15.07	27.78	12.71	38.45	-25.74
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	884.00	17.14	-4.98	27.78	22.80	38.45	-15.65

NOTE: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

4.2 Modulation characteristics Measurement

4.2.1 Limits of Modulation characteristics

N/A

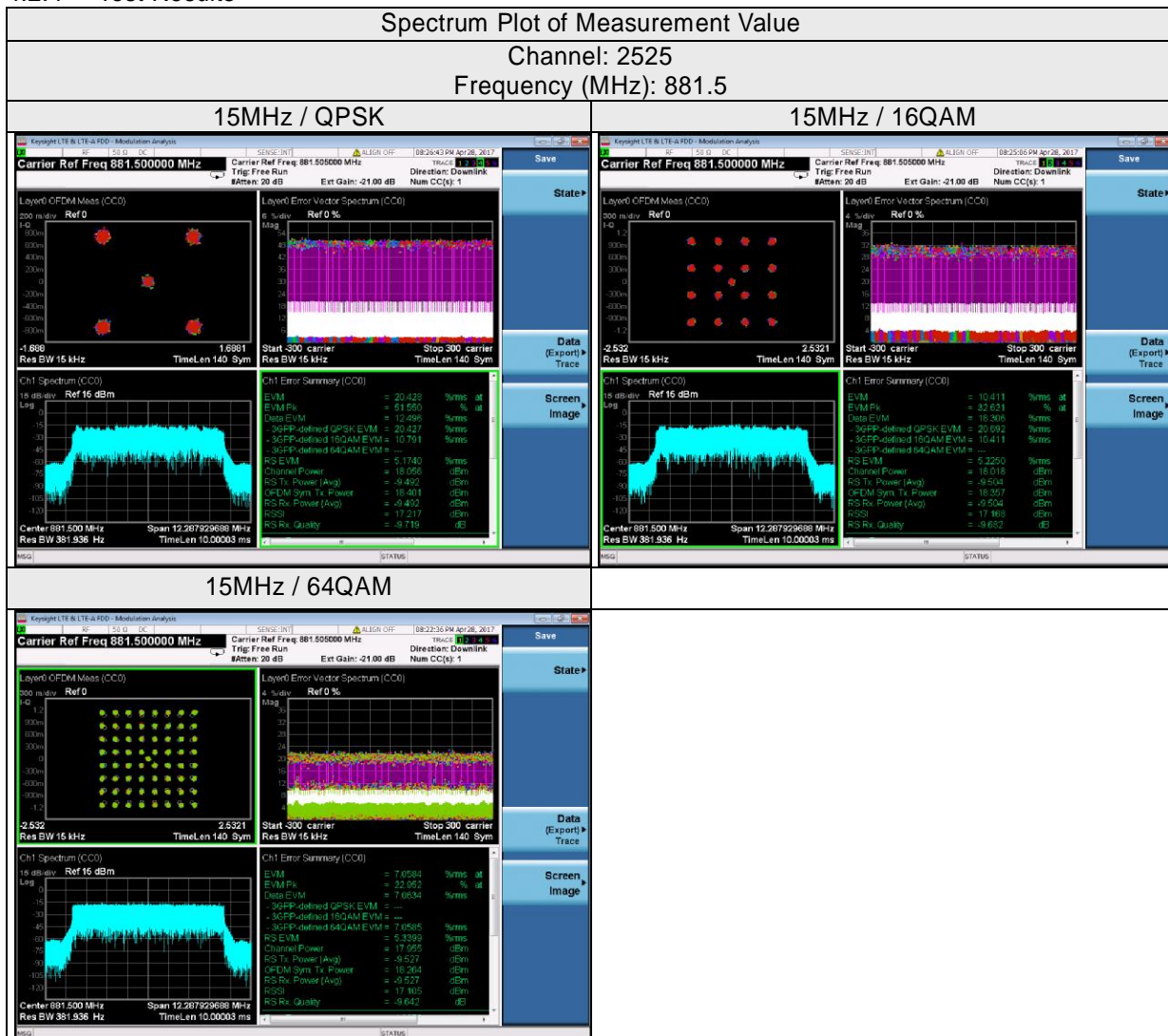
4.2.2 Test Procedure

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

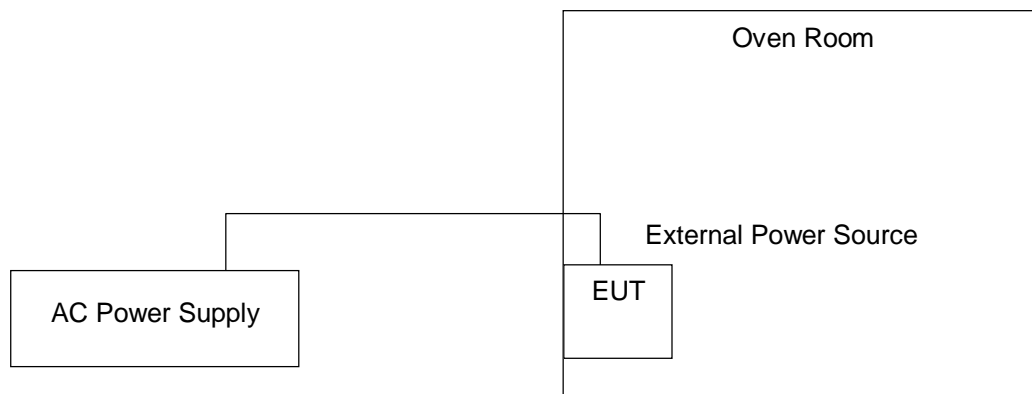
4.3.1 Limits of Frequency Stability Measurement

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

4.3.2 Test Procedure

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)		Limit (ppm)
	LTE Band 5		
	Chain 0	Chain 1	
132	0.0136131594	0.0124787294	2.5
120	0.0124787294	0.0113442995	2.5
108	0.0113442995	0.0102098695	2.5

Note: The applicant defined the normal working voltage is from 132Vac to 108Vac.

Frequency Error vs. Temperature

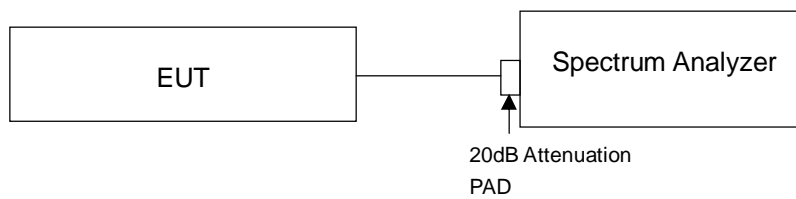
Temp. (°C)	Frequency Error (ppm)		Limit (ppm)
	LTE Band 5		
	Chain 0	Chain 1	
40	0.0158820193	0.0136131594	2.5
30	0.0136131594	0.0124787294	2.5
20	0.0124787294	0.0113442995	2.5
10	0.0113442995	0.0102098695	2.5
0	0.0113442995	0.0102098695	2.5

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

All measurements were done at low, middle and high operational frequency range. The software provided by client to control a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.2 Test Setup

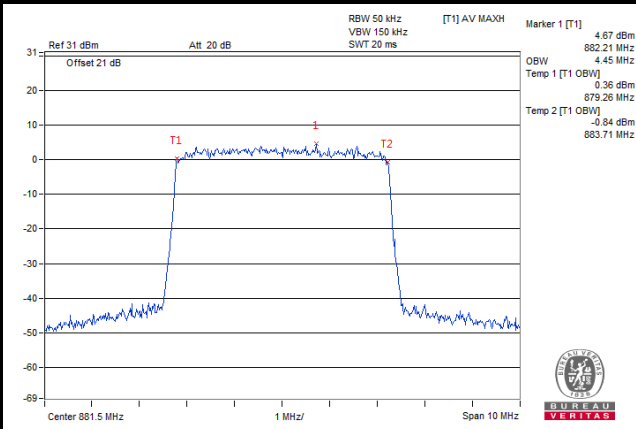


4.4.3 Test Result

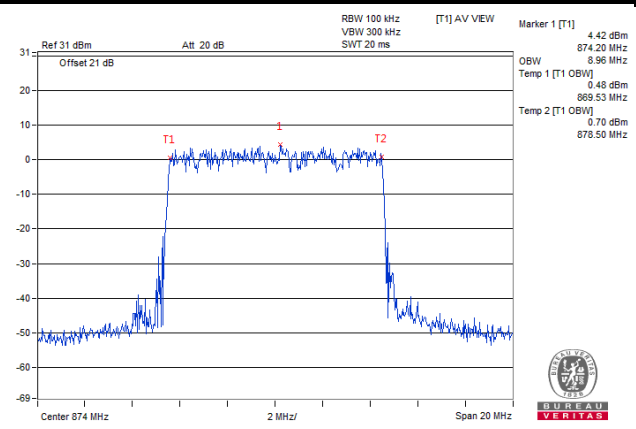
LTE Band 5							
Channel Bandwidth 5MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2425	871.5	4.40	4.41	4.33	4.43	4.43	4.43
2525	881.5	4.43	4.30	4.36	4.41	4.43	4.45
2625	891.5	4.40	4.36	4.38	4.43	4.41	4.43
Channel Bandwidth 10MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2450	874	8.86	8.80	8.96	8.90	8.93	8.90
2525	881.5	8.83	8.76	8.83	8.93	8.90	8.86
2600	889	8.93	8.93	8.80	8.83	8.90	8.90
Channel Bandwidth 15MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2475	876.5	13.33	13.26	13.36	13.23	13.30	13.26
2525	881.5	13.20	13.30	13.30	13.30	13.30	13.26
2575	886.5	13.23	13.33	13.33	13.30	13.26	13.30
Channel Bandwidth 20MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2500	879	17.73	17.66	17.73	17.73	17.80	17.73
2525	881.5	17.73	17.66	17.80	17.80	17.80	17.73
2550	884	17.73	17.60	17.60	17.80	17.73	17.73

Spectrum Plot Of Worst Value

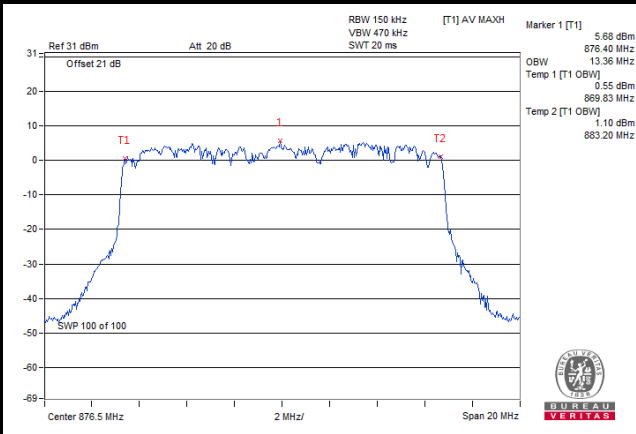
5MHz / 64QAM



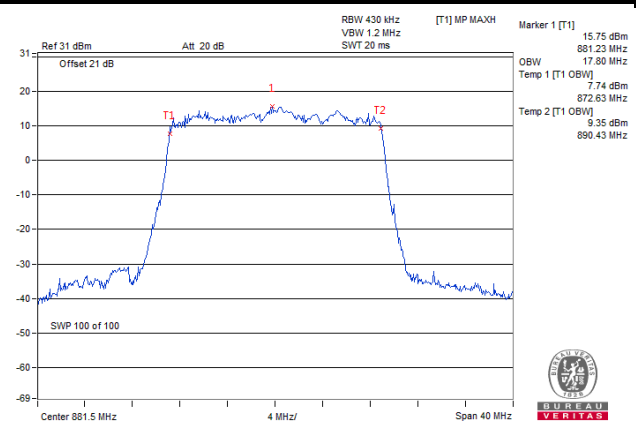
10MHz / 16QAM



15MHz / 16QAM



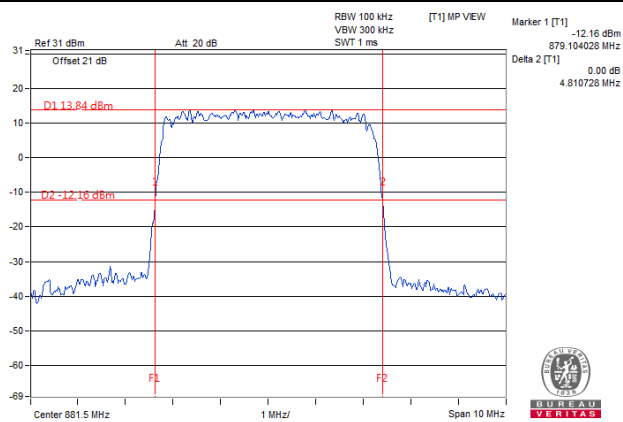
20MHz / 16QAM



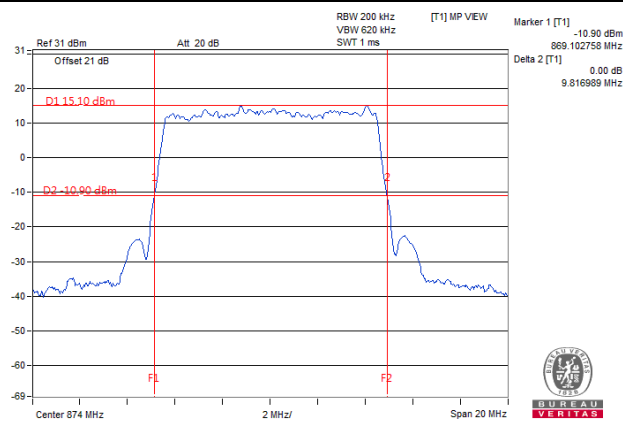
LTE Band 5			
Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)	
		QPSK	
		Chain 0	Chain 1
2425	871.5	4.80	4.79
2525	881.5	4.80	4.81
2625	891.5	4.77	4.76
Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)	
		QPSK	
		Chain 0	Chain 1
2450	874	9.68	9.81
2525	881.5	9.74	9.70
2600	889	9.73	9.76
Channel Bandwidth 15MHz			
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)	
		QPSK	
		Chain 0	Chain 1
2475	876.5	14.59	14.53
2525	881.5	14.63	14.61
2575	886.5	14.78	14.64
Channel Bandwidth 20MHz			
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)	
		QPSK	
		Chain 0	Chain 1
2500	879	19.39	19.34
2525	881.5	19.25	19.32
2550	884	19.31	19.26

Spectrum Plot Of Worst Value

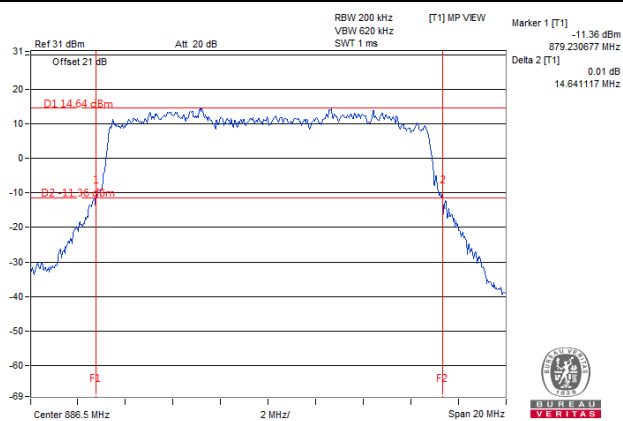
5MHz / QPSK



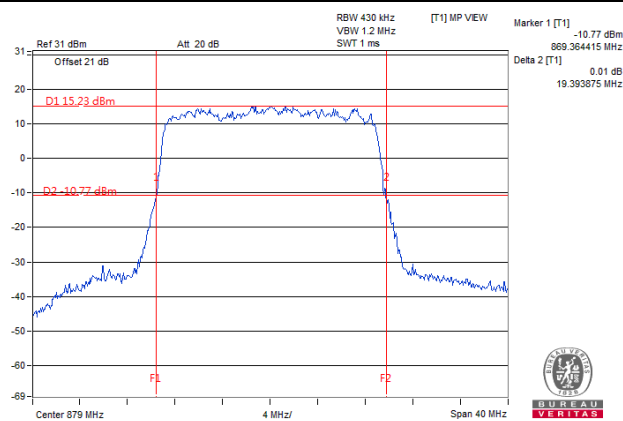
10MHz / QPSK



15MHz / QPSK



20MHz / QPSK



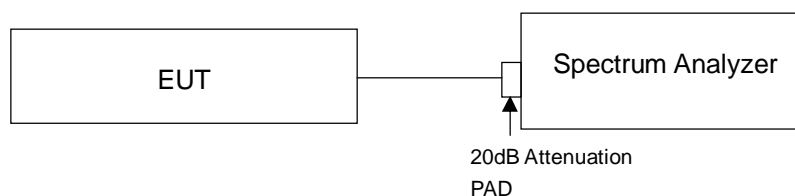
4.5 Band Edge Measurement

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.

Note: The results for each of the transmit chains shall be individually compared with the limits after these limits have been added by $10 \times \log(N)$ (number of active transmit chains).

4.5.2 Test Setup



4.5.3 Test Procedures

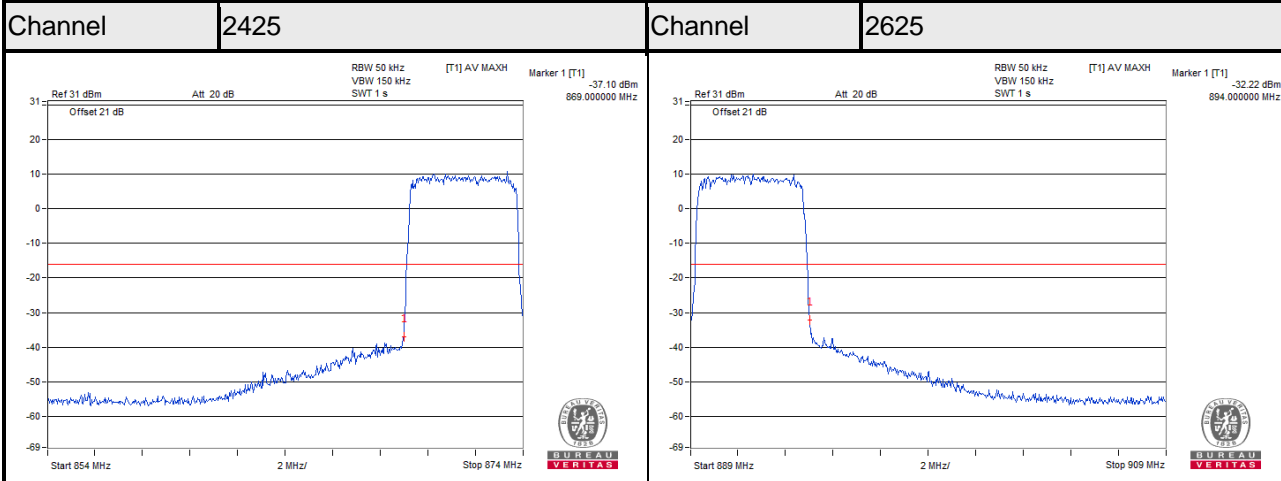
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 50kHz and VB of the spectrum is 150kHz (LTE Channel Bandwidth 5MHz).
- c. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 430kHz and VB of the spectrum is 1200kHz (LTE Channel Bandwidth 20MHz).
- f. Record the max trace plot into the test report.

4.5.4 Test Results

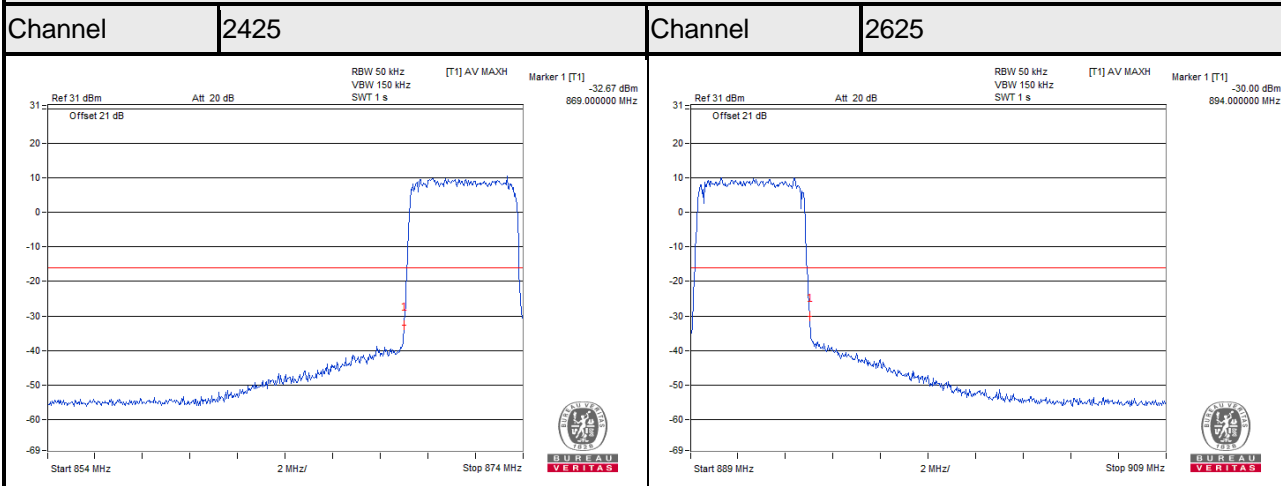
LTE Band 5

Channel Bandwidth 5MHz

Chain 0



Chain 1

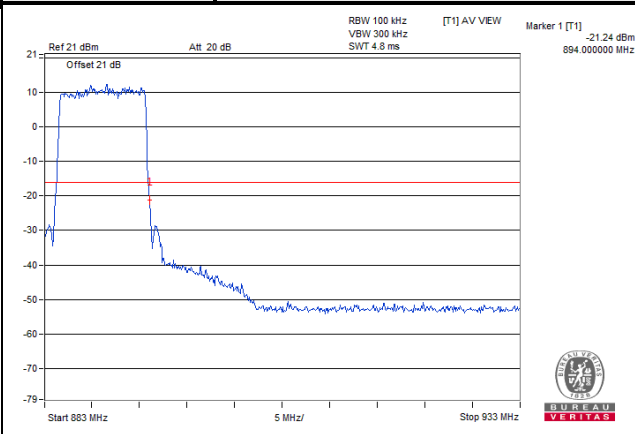
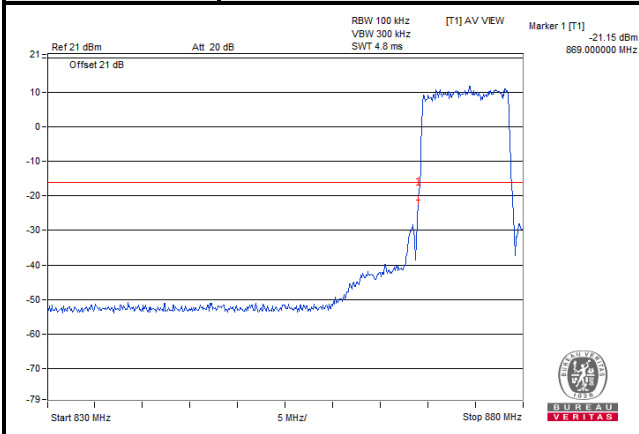


LTE Band 5

Channel Bandwidth 10MHz

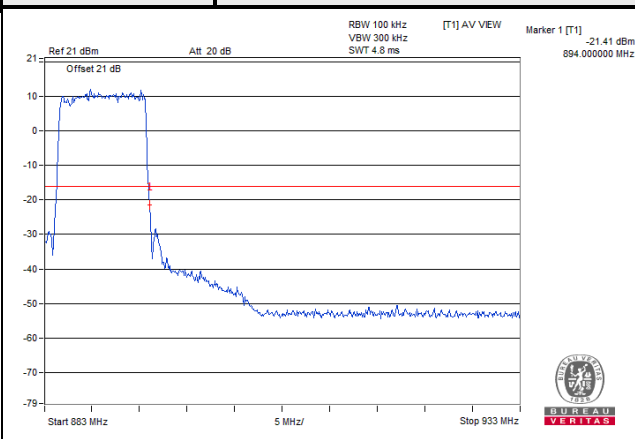
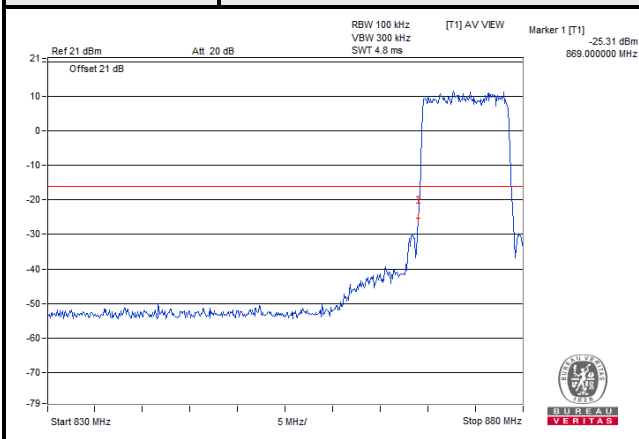
Chain 0

Channel	2450	Channel	2600
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Chain 1

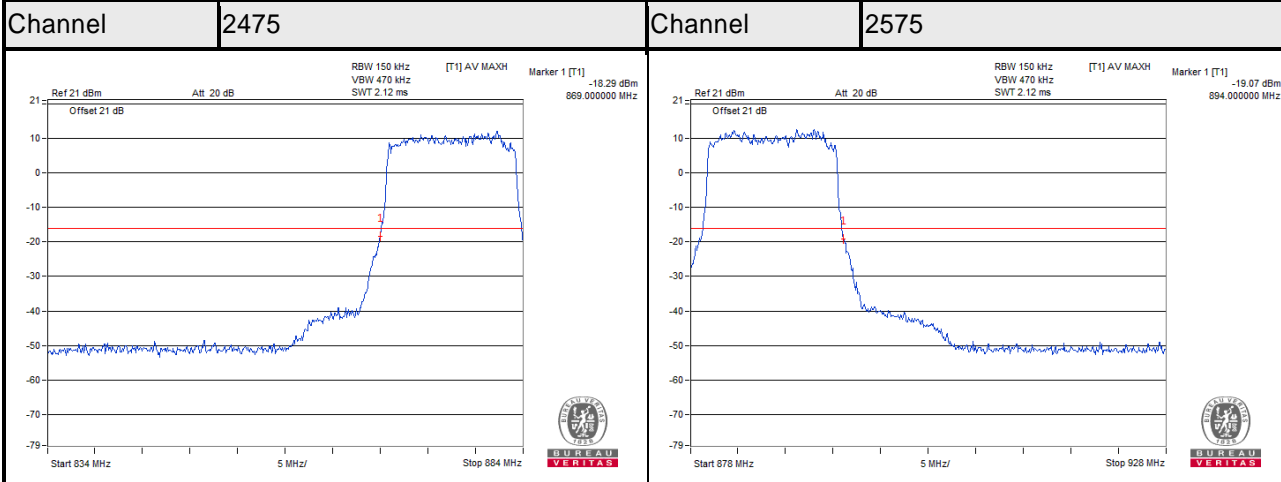
Channel	2450	Channel	2600
---------	------	---------	------



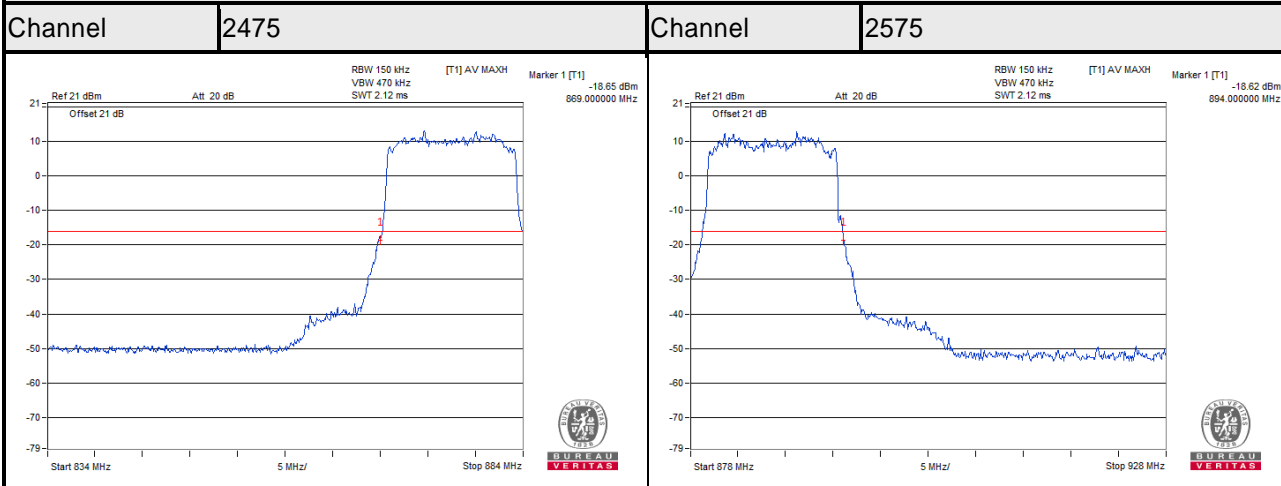
LTE Band 5

Channel Bandwidth 15MHz

Chain 0



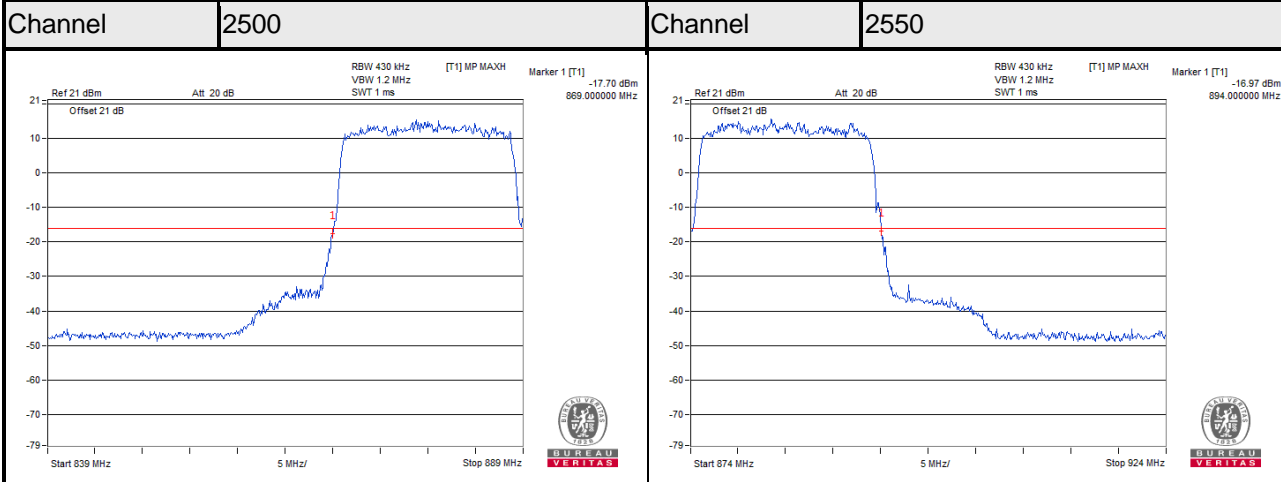
Chain 1



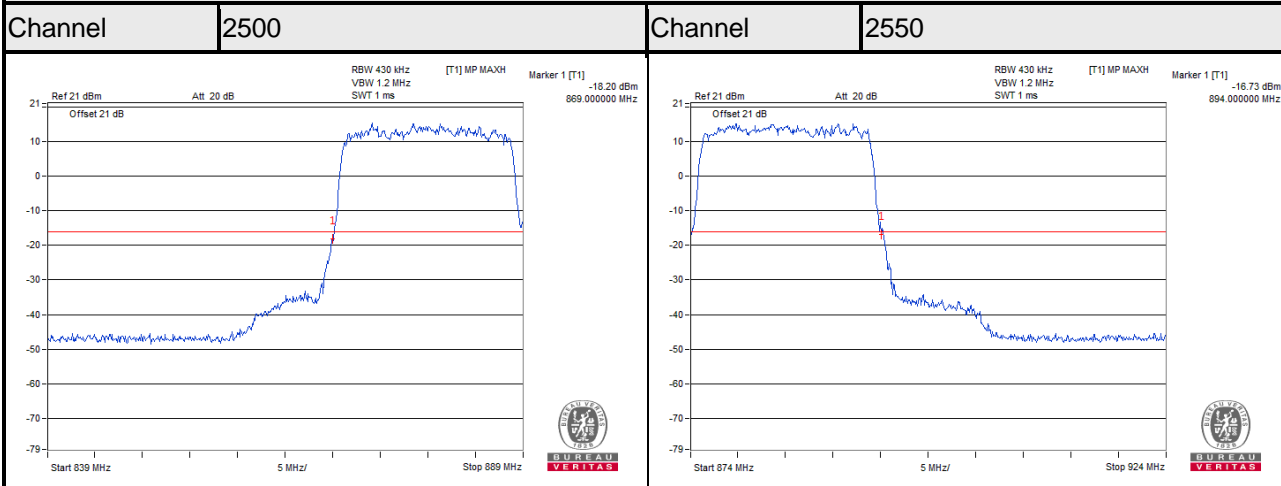
LTE Band 5

Channel Bandwidth 20MHz

Chain 0



Chain 1

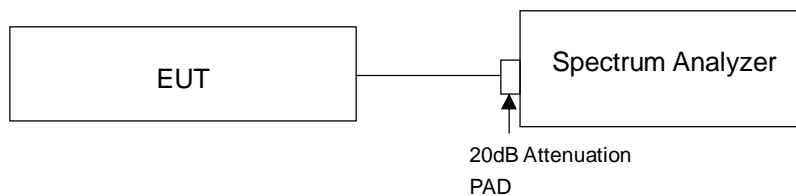


4.6 Peak To Average Ratio

4.5.1 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

4.5.2 Test Setup



4.5.3 Test Procedures

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

4.5.4 Test Results

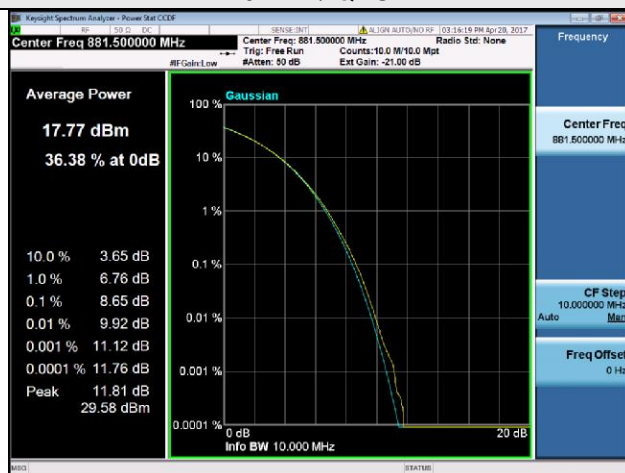
LTE Band 5							
Channel Bandwidth 5MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2425	871.5	8.54	8.55	8.69	8.69	8.46	8.46
2525	881.5	8.54	8.54	8.70	8.70	8.46	8.46
2625	891.5	8.55	8.54	8.71	8.70	8.51	8.46
Channel Bandwidth 10MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2450	874.0	8.64	8.63	8.57	8.57	8.60	8.61
2525	881.5	8.63	8.65	8.57	8.57	8.61	8.60
2600	889.0	8.63	8.64	8.57	8.57	8.61	8.61
Channel Bandwidth 15MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2475	876.5	8.53	8.53	8.70	8.70	8.59	8.59
2525	881.5	8.53	8.53	8.71	8.70	8.59	8.59
2575	886.5	8.53	8.53	8.70	8.70	8.59	8.58
Channel Bandwidth 20MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
2500	879.0	8.54	8.55	8.57	8.56	8.57	8.57
2525	881.5	8.55	8.55	8.57	8.57	8.58	8.56
2550	884.0	8.55	8.55	8.57	8.57	8.57	8.57

Spectrum Plot Of Worst Value

5MHz / 16QAM



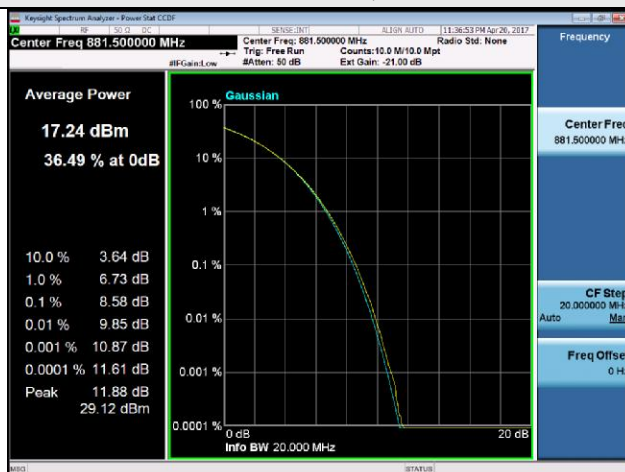
10MHz / QPSK



15MHz / 16QAM



20MHz / 64QAM



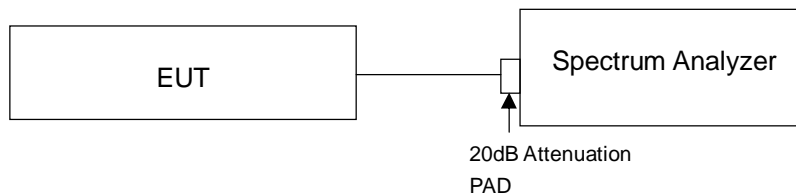
4.7 Conducted Spurious Emissions

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 .

Note: The results for each of the transmit chains shall be individually compared with the limits after these limits have been added by $10 \times \log(N)$ (number of active transmit chains).

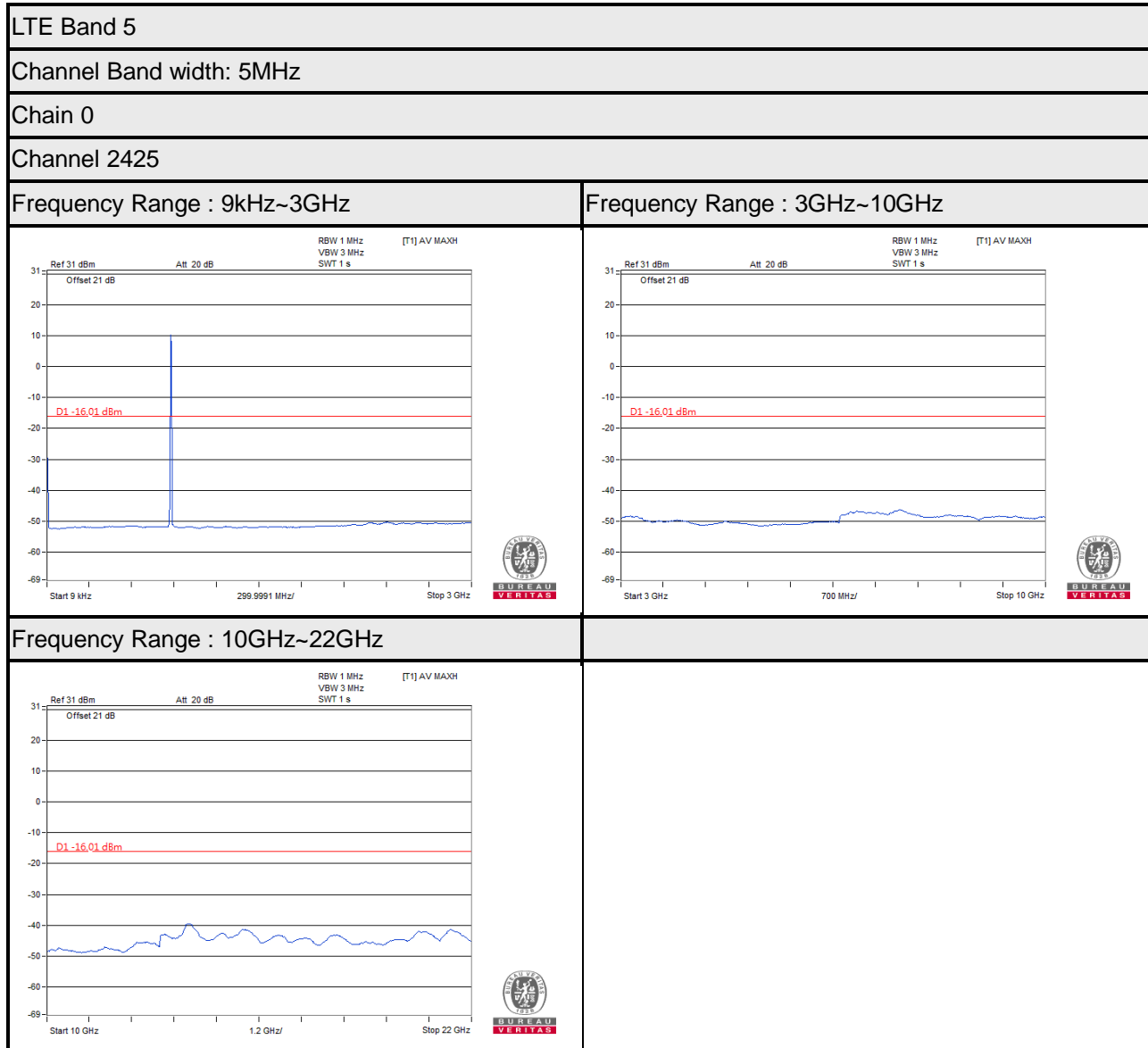
4.7.2 Test Setup



4.7.3 Test Procedure

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

4.7.4 Test Results



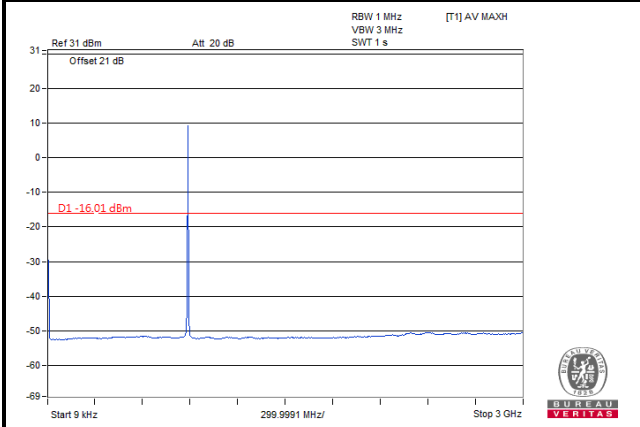
LTE Band 5

Channel Band width: 5MHz

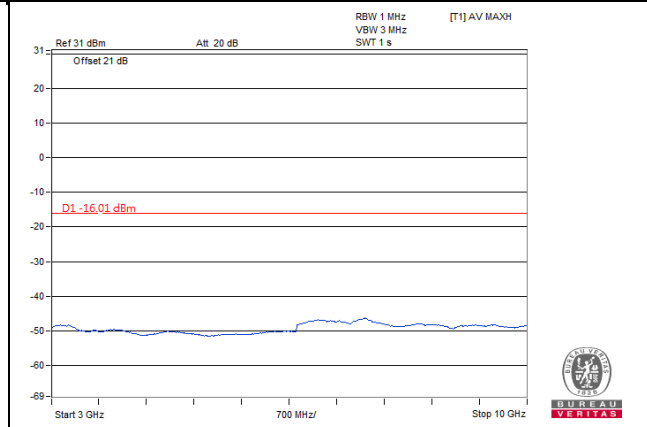
Chain 0

Channel 2525

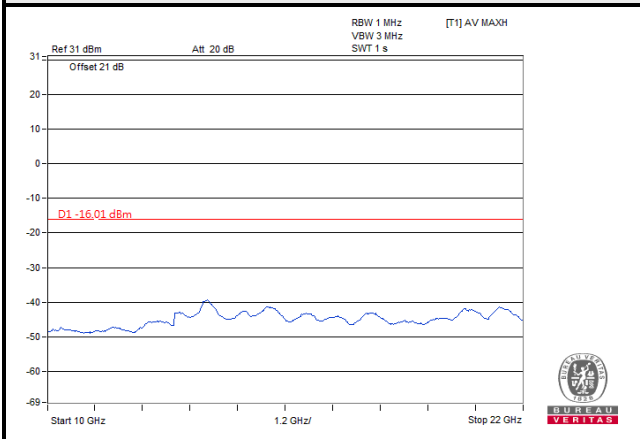
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



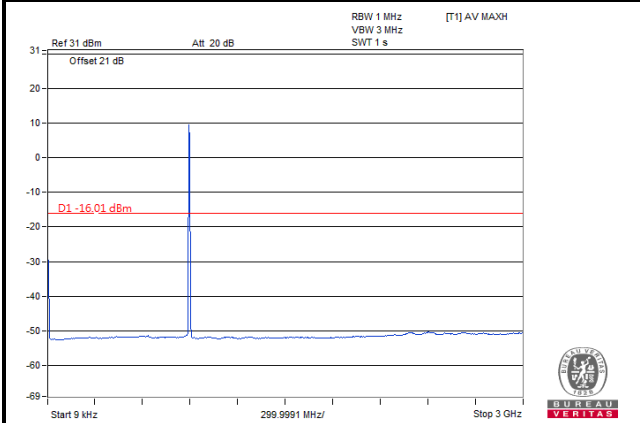
LTE Band 5

Channel Band width: 5MHz

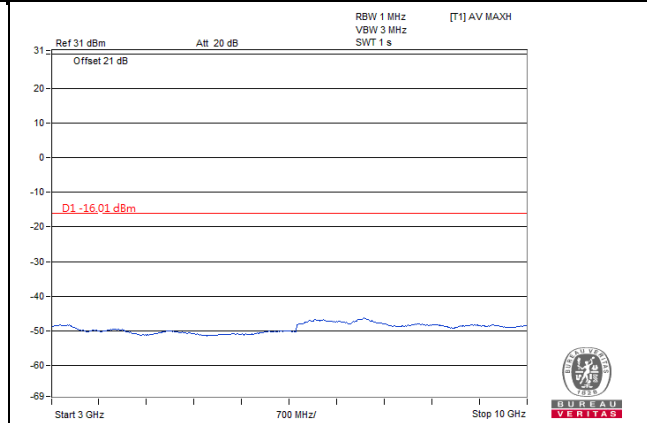
Chain 0

Channel 2625

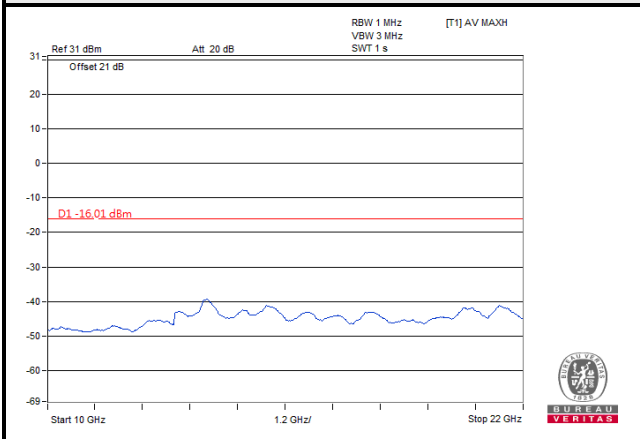
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



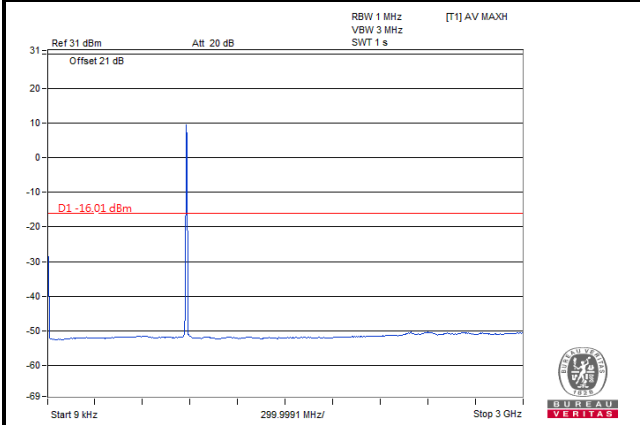
LTE Band 5

Channel Band width: 5MHz

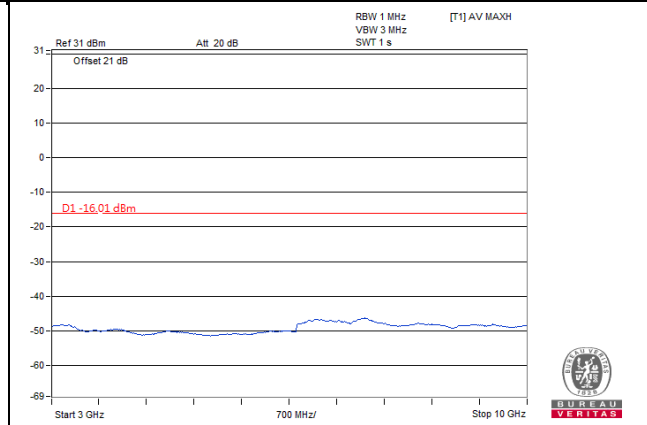
Chain 1

Channel 2425

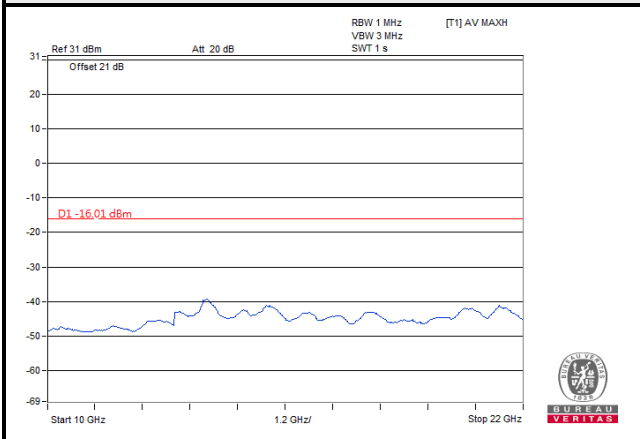
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

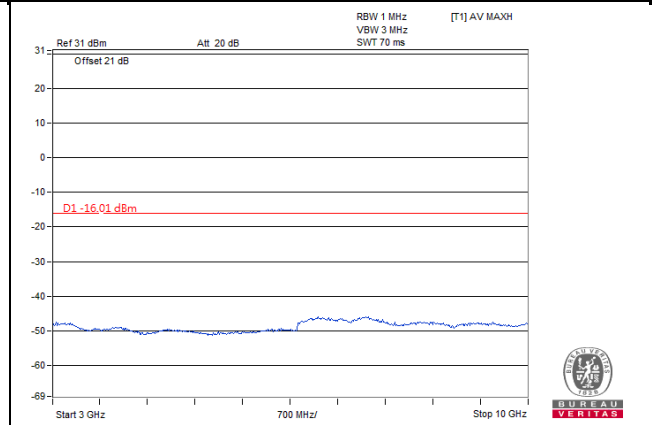
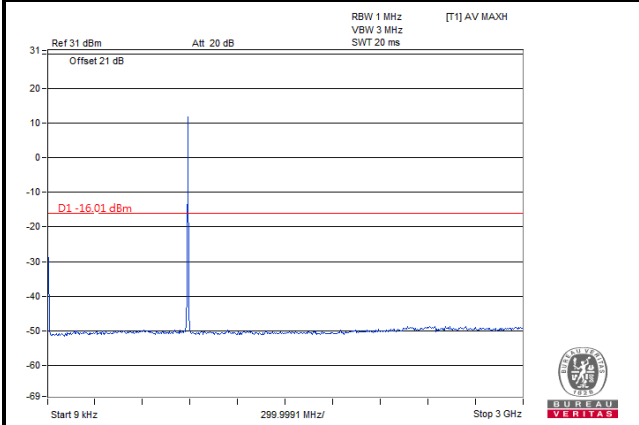
Channel Band width: 5MHz

Chain 1

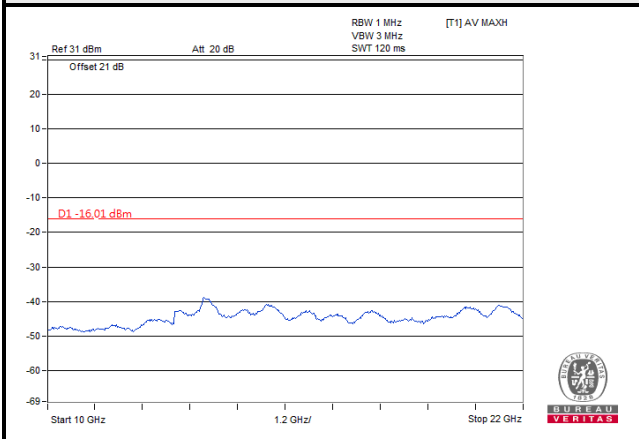
Channel 2525

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

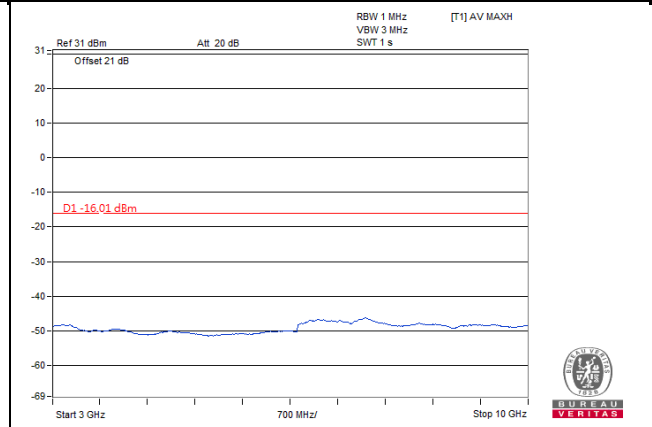
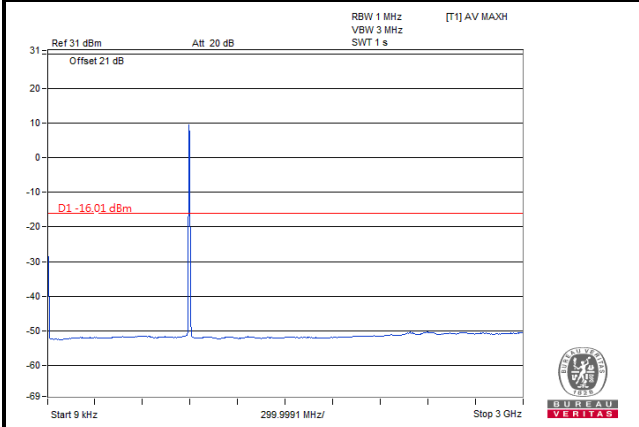
Channel Band width: 5MHz

Chain 1

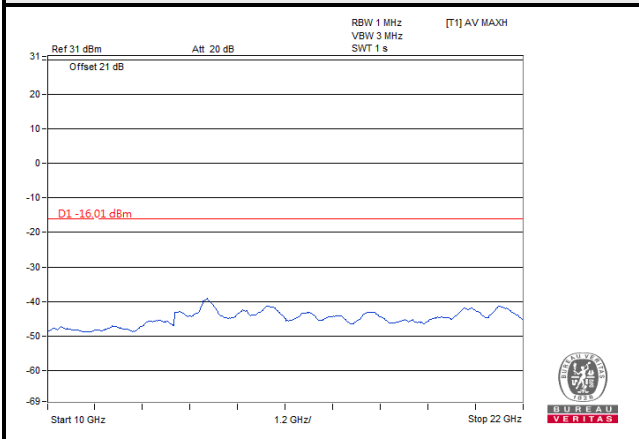
Channel 2625

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

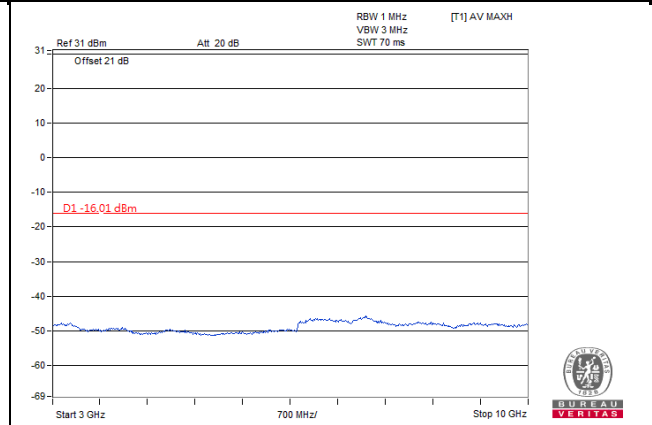
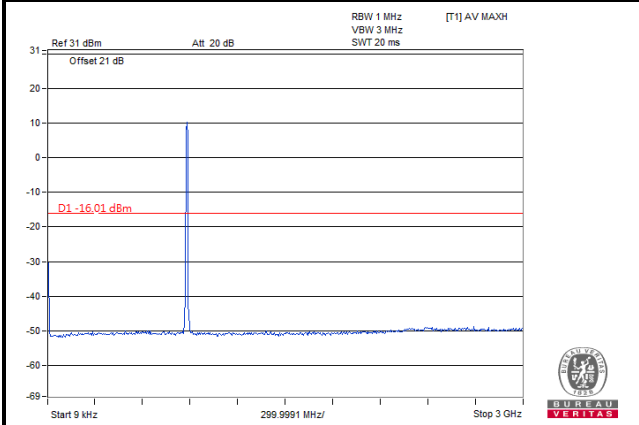
Channel Band width: 10MHz

Chain 0

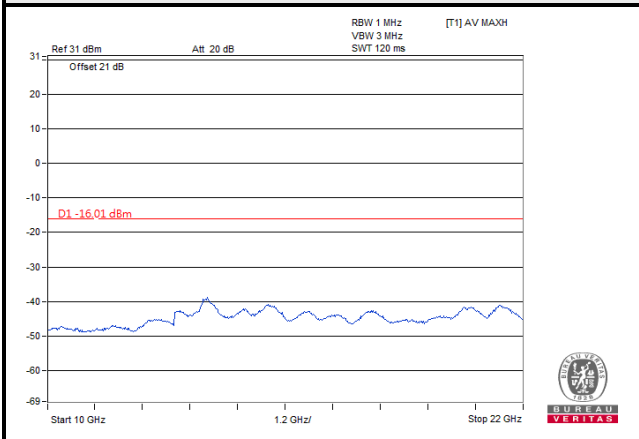
Channel 2450

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

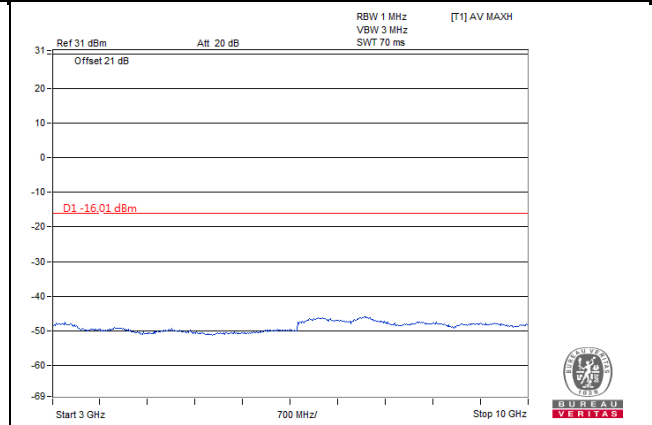
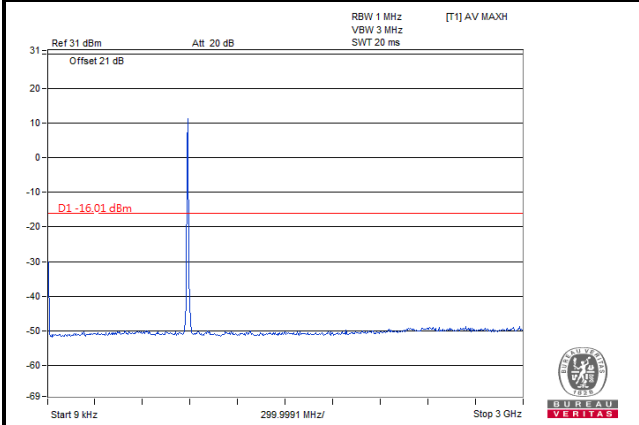
Channel Band width: 10MHz

Chain 0

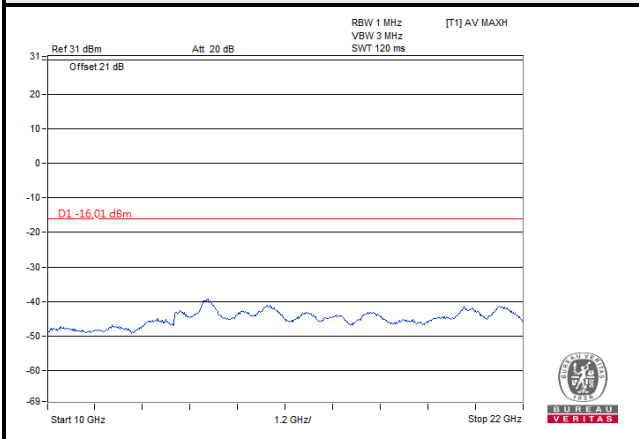
Channel 2525

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

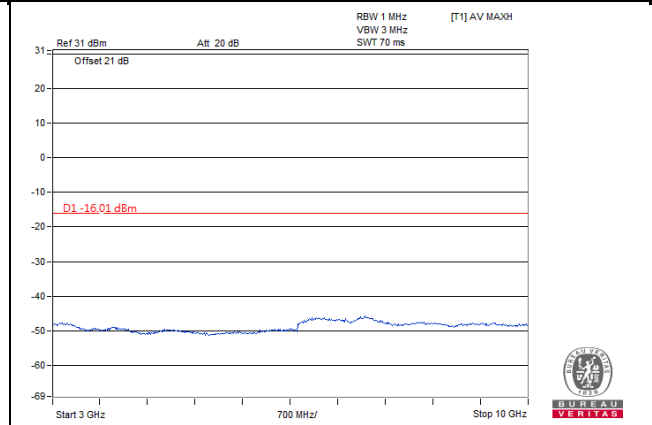
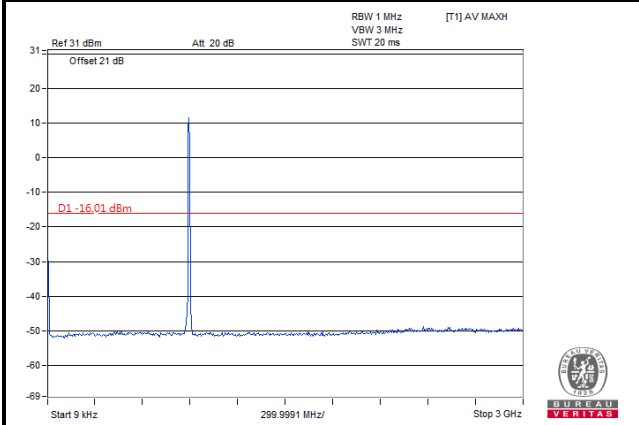
Channel Band width: 10MHz

Chain 0

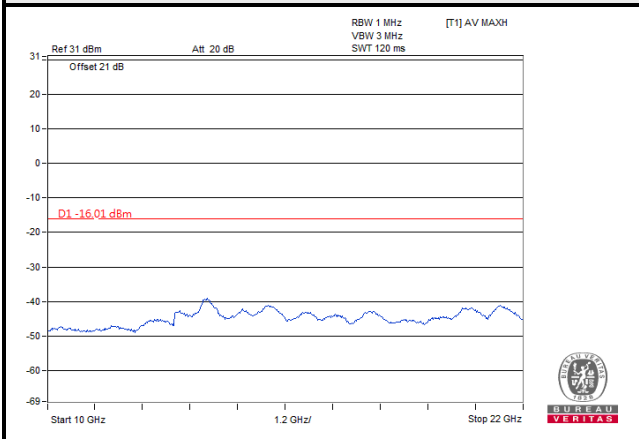
Channel 2600

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

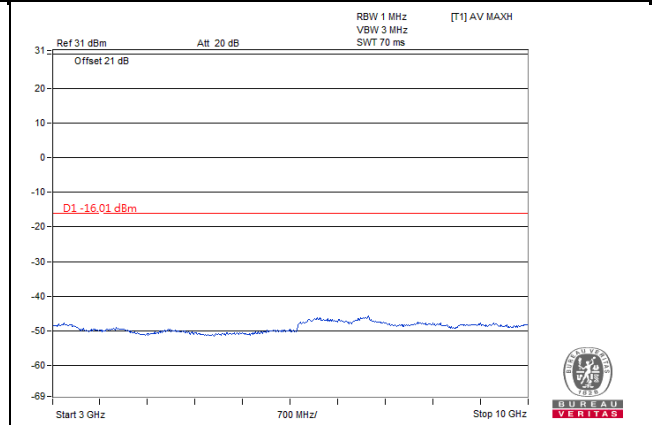
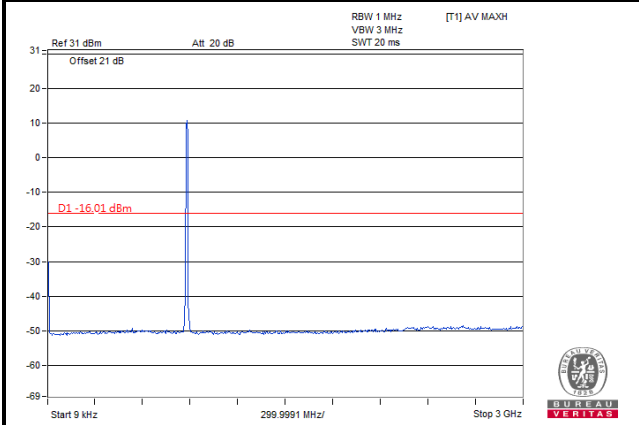
Channel Band width: 10MHz

Chain 1

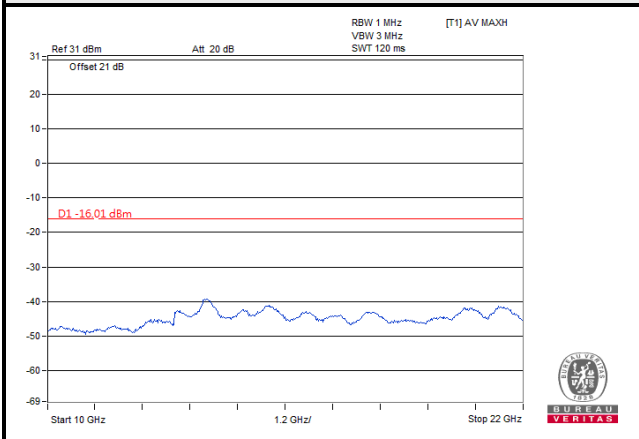
Channel 2450

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

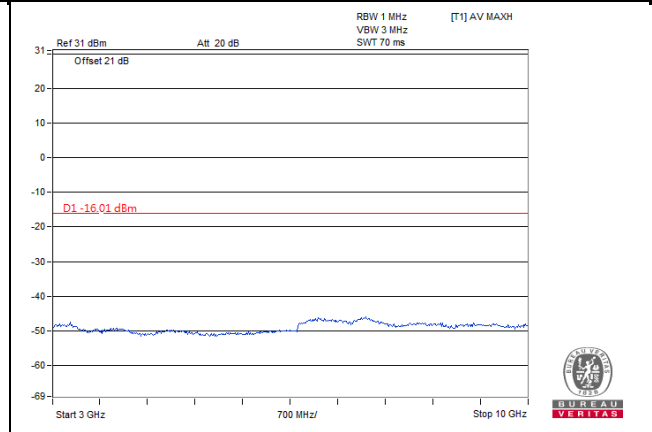
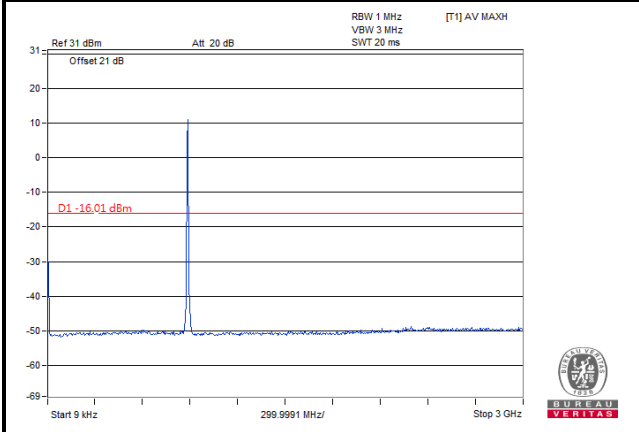
Channel Band width: 10MHz

Chain 1

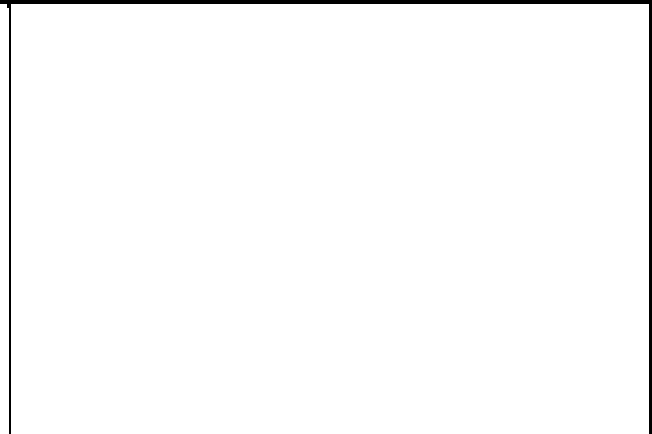
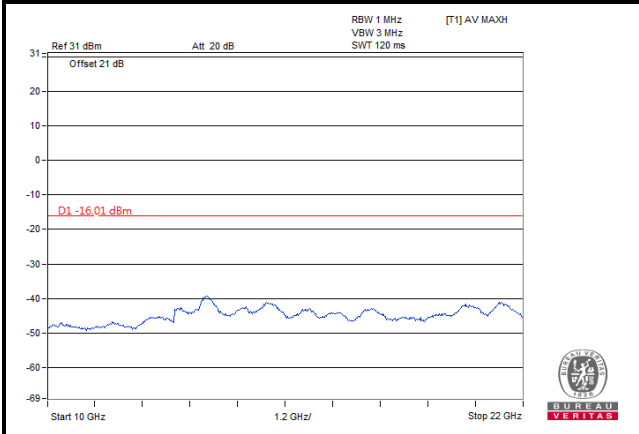
Channel 2525

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

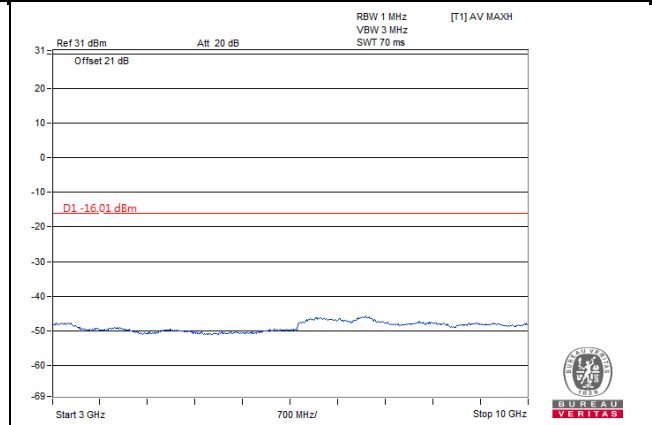
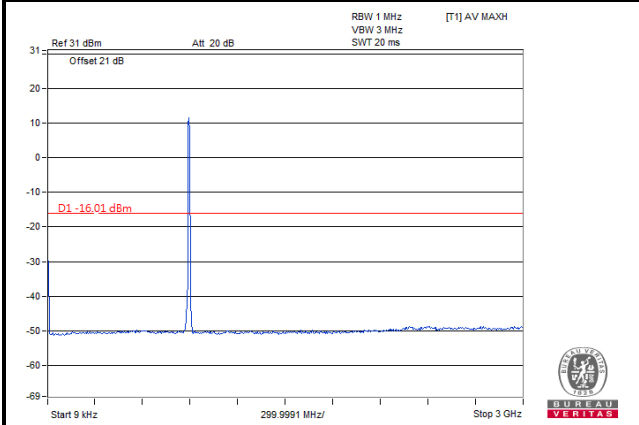
Channel Band width: 10MHz

Chain 1

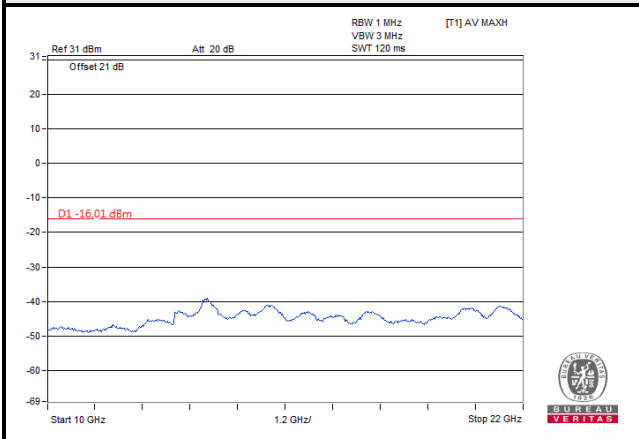
Channel 2600

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



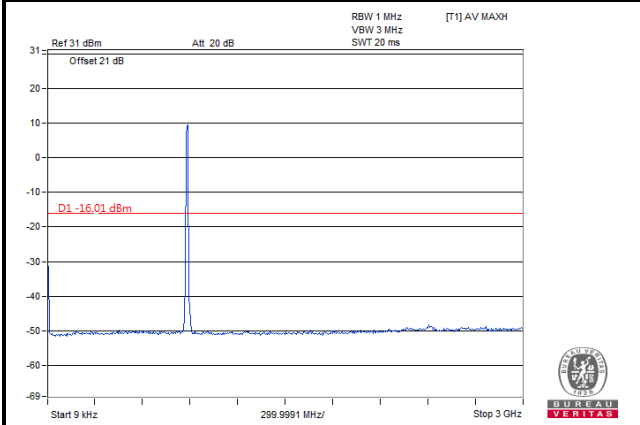
LTE Band 5

Channel Band width: 15MHz

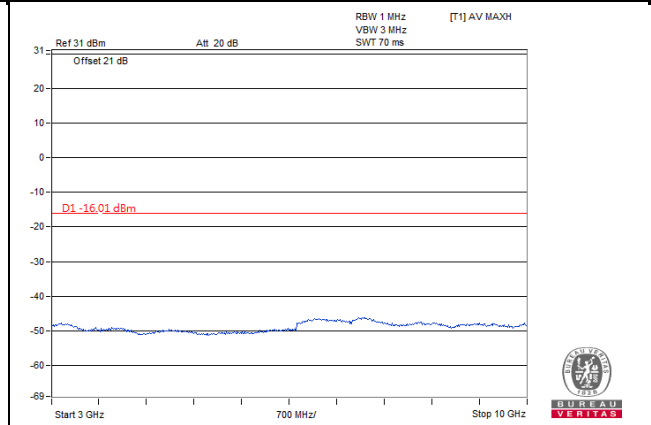
Chain 0

Channel 2475

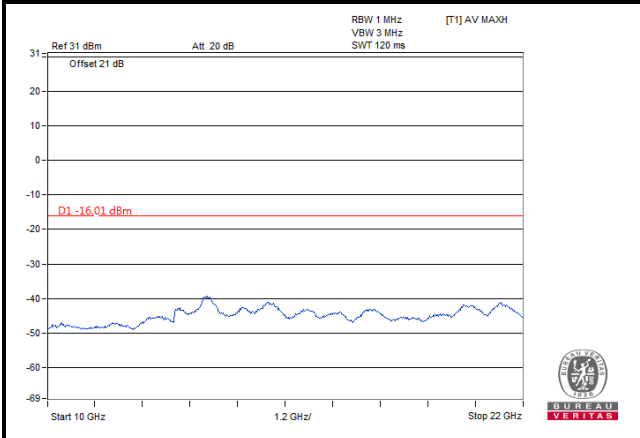
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

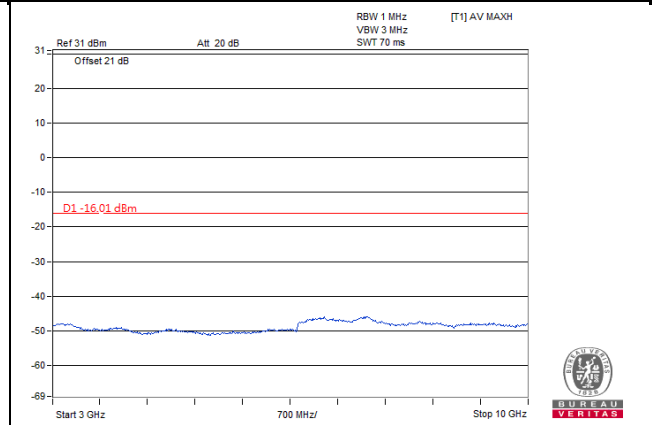
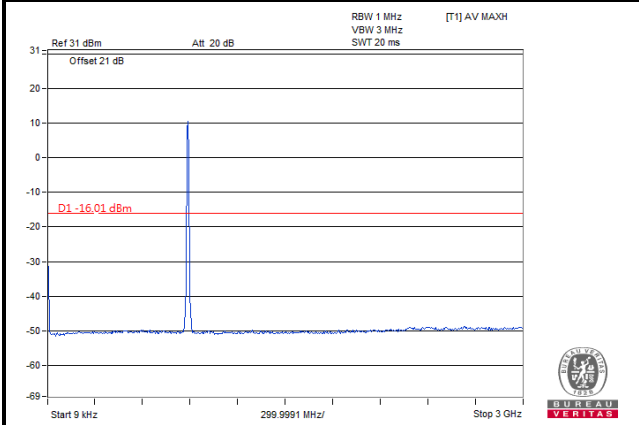
Channel Band width: 15MHz

Chain 0

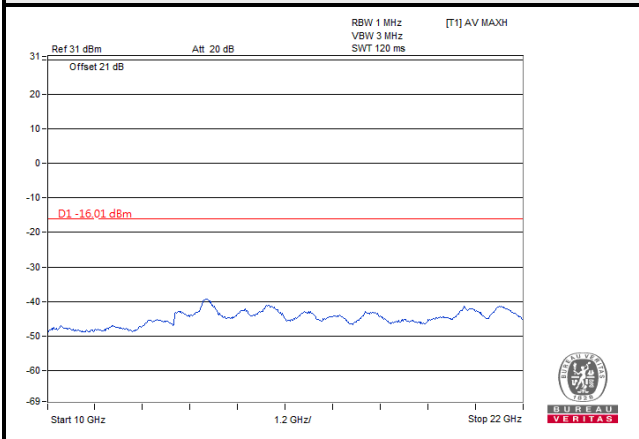
Channel 2525

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



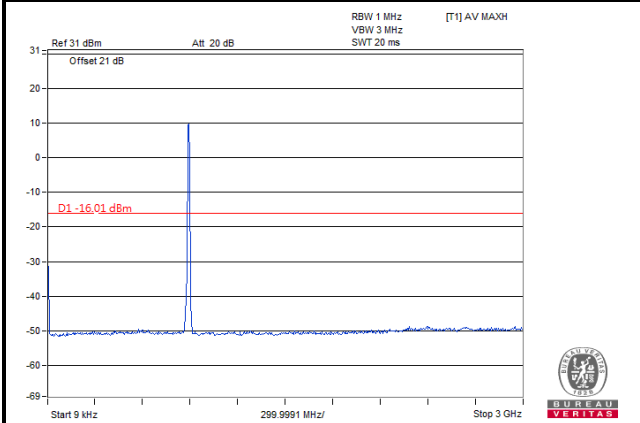
LTE Band 5

Channel Band width: 15MHz

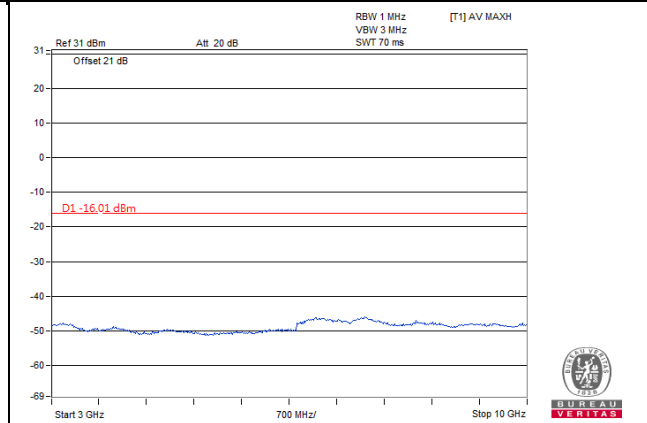
Chain 0

Channel 2575

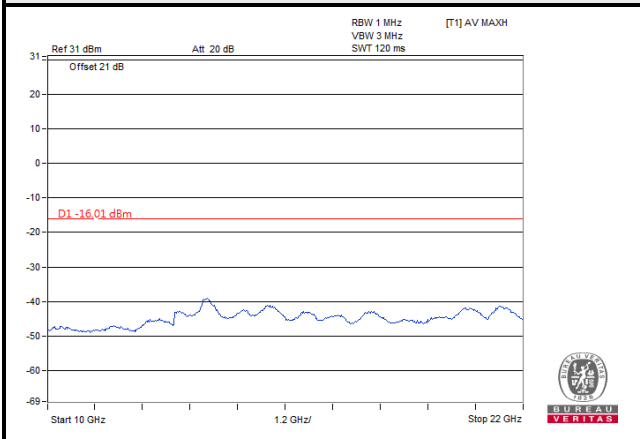
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

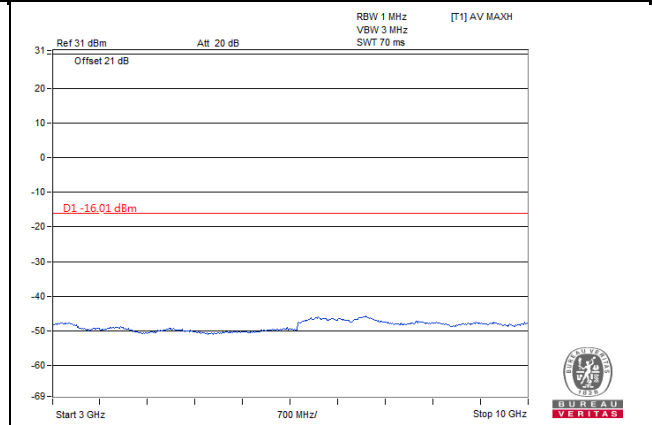
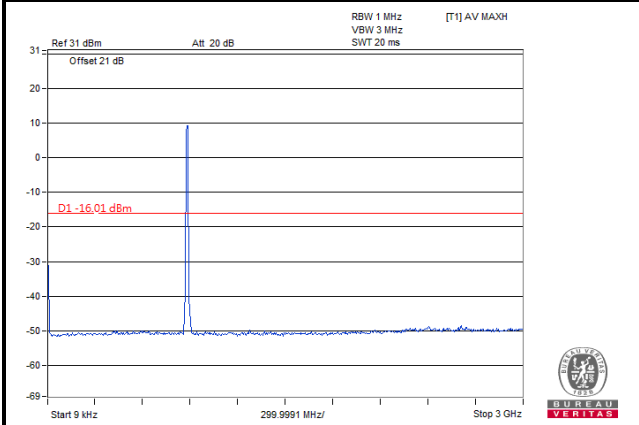
Channel Band width: 15MHz

Chain 1

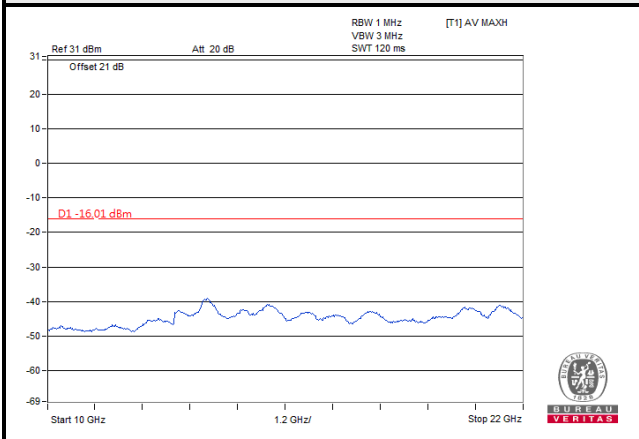
Channel 2475

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

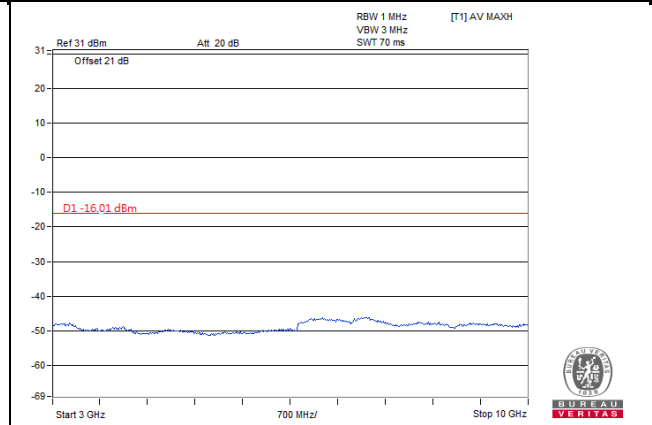
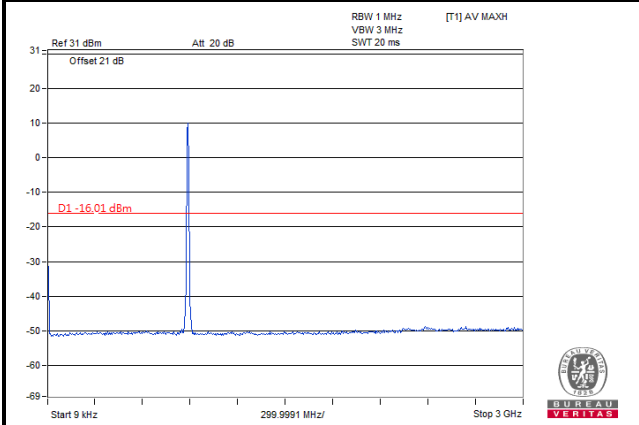
Channel Band width: 15MHz

Chain 1

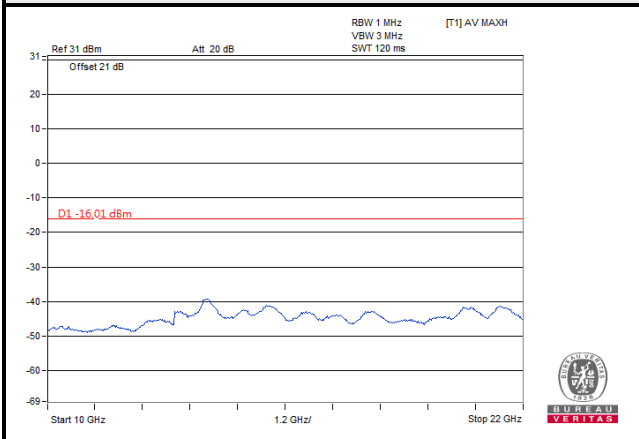
Channel 2525

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



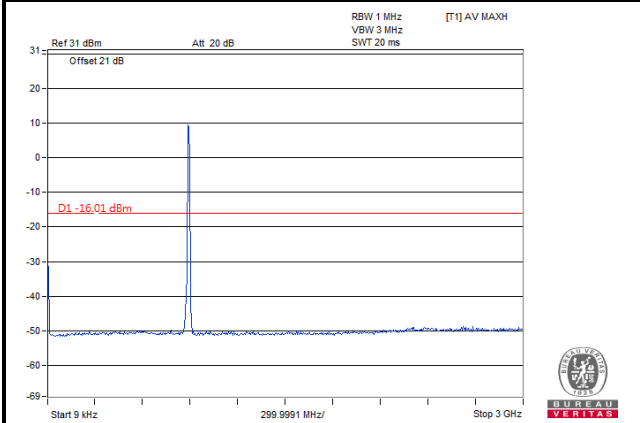
LTE Band 5

Channel Band width: 15MHz

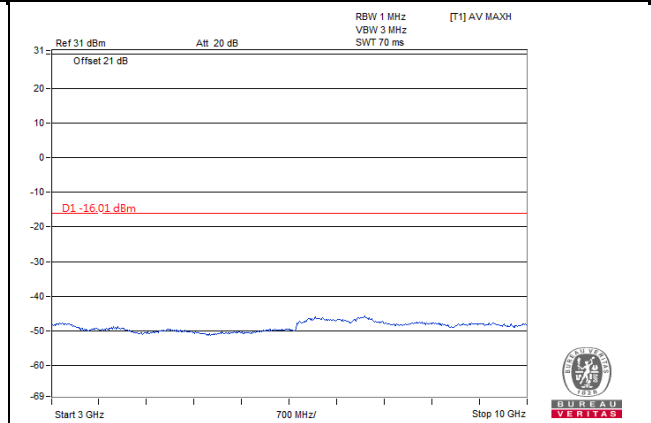
Chain 1

Channel 2575

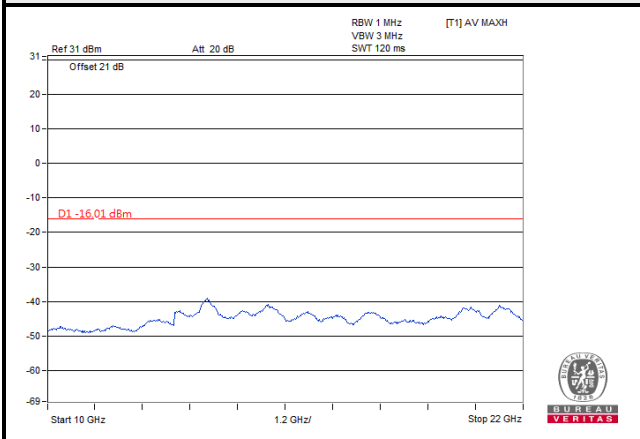
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

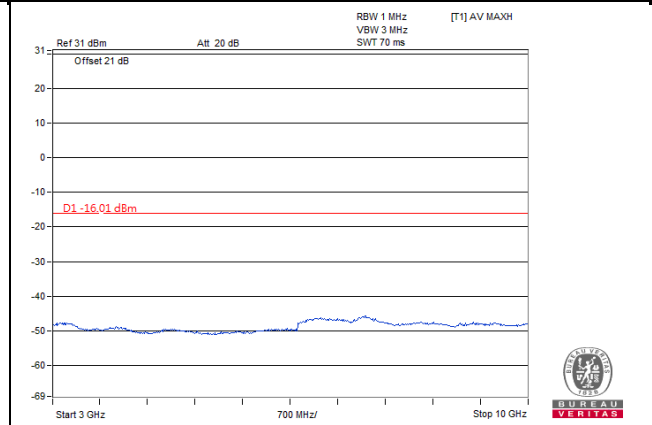
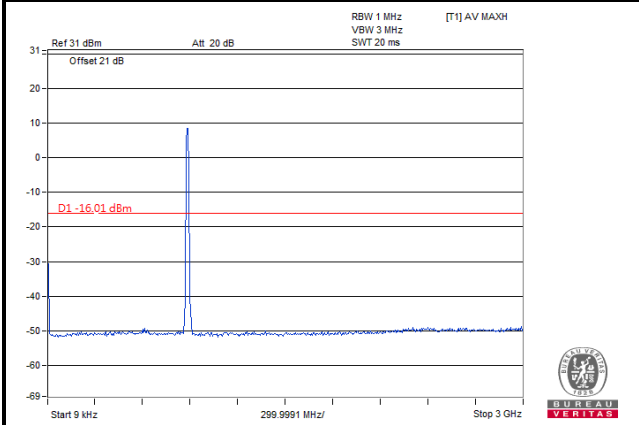
Channel Band width: 20MHz

Chain 0

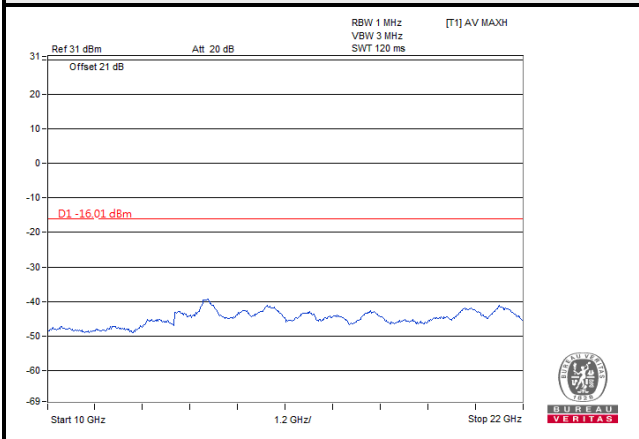
Channel 2500

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



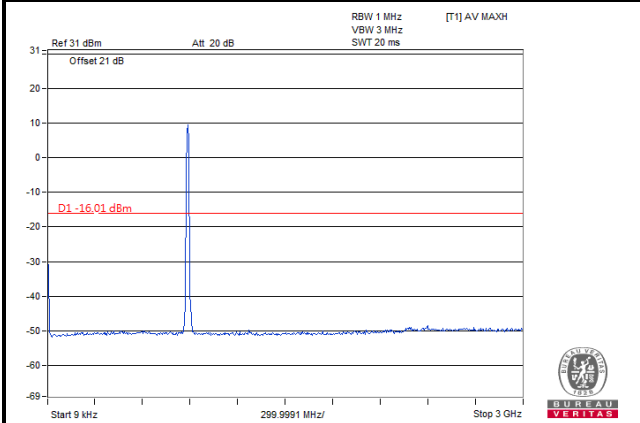
LTE Band 5

Channel Band width: 20MHz

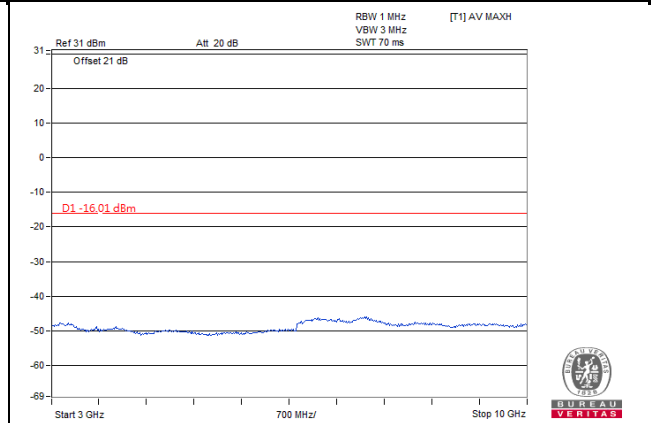
Chain 0

Channel 2525

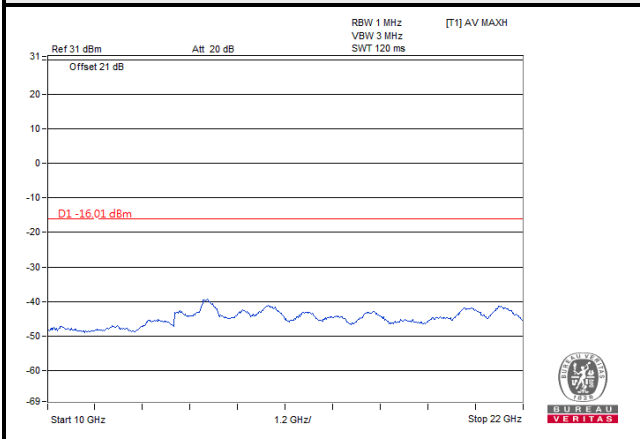
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

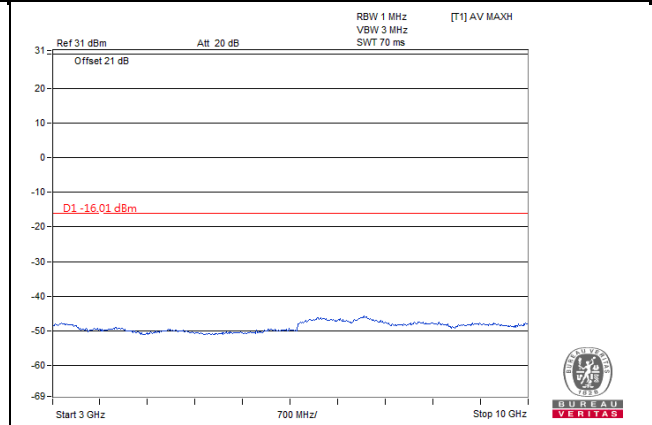
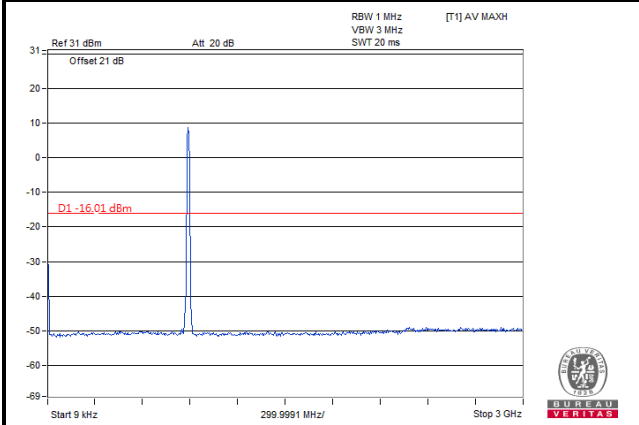
Channel Band width: 20MHz

Chain 0

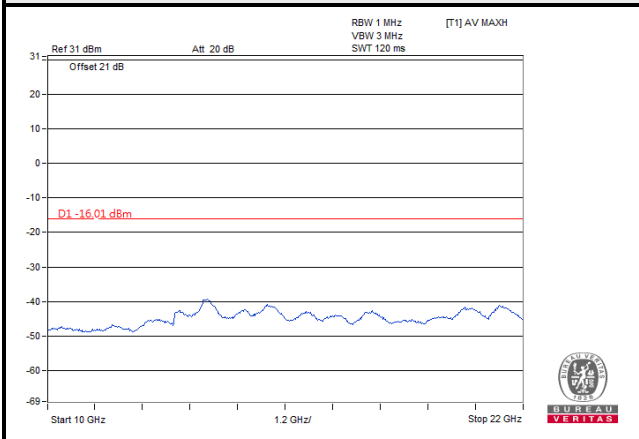
Channel 2550

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

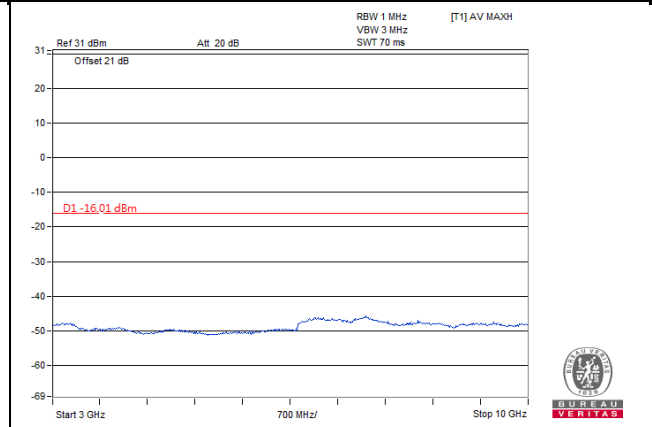
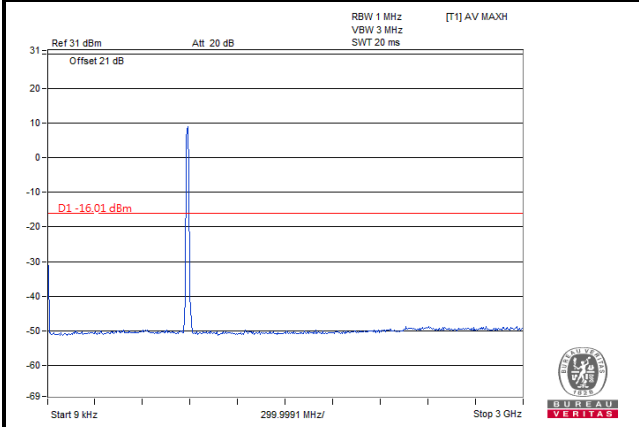
Channel Band width: 20MHz

Chain 1

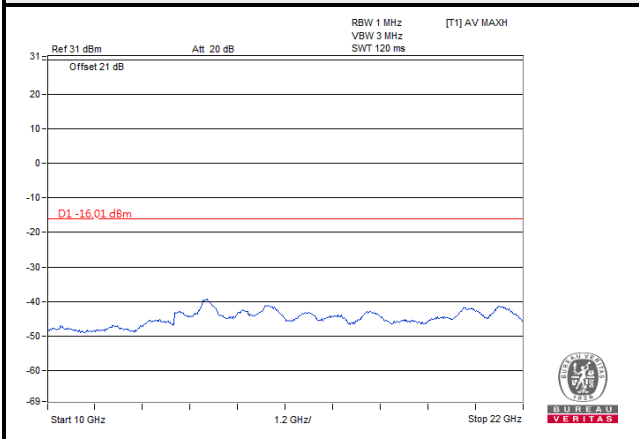
Channel 2500

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



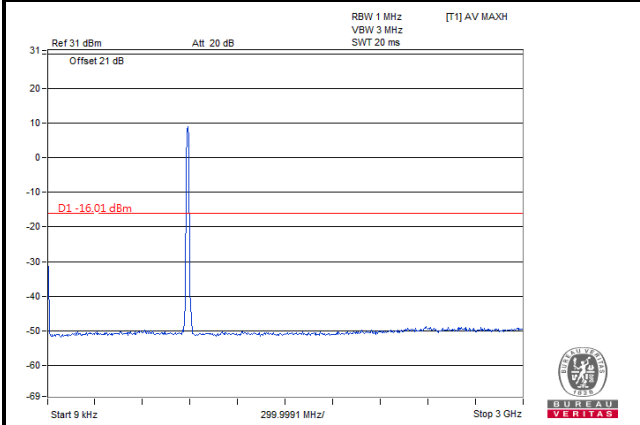
LTE Band 5

Channel Band width: 20MHz

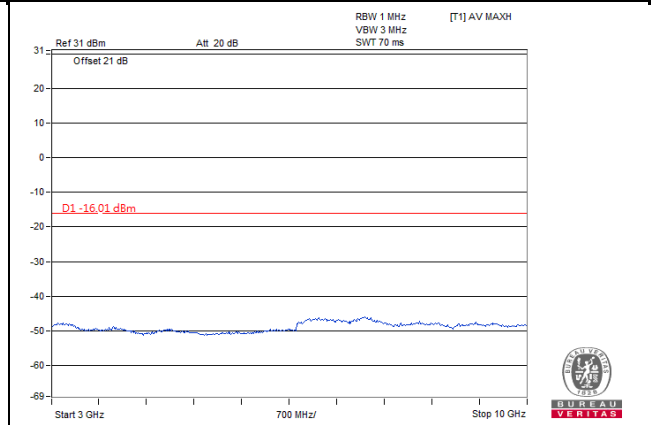
Chain 1

Channel 2525

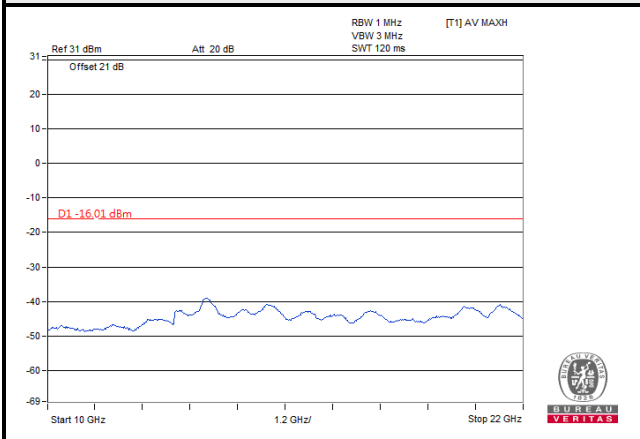
Frequency Range : 9kHz~3GHz



Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



LTE Band 5

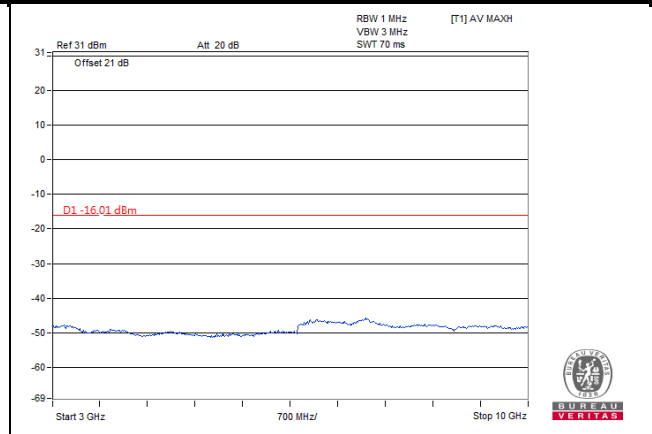
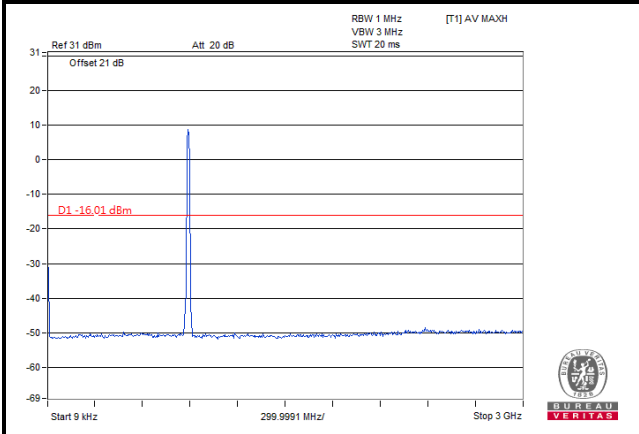
Channel Band width: 20MHz

Chain 1

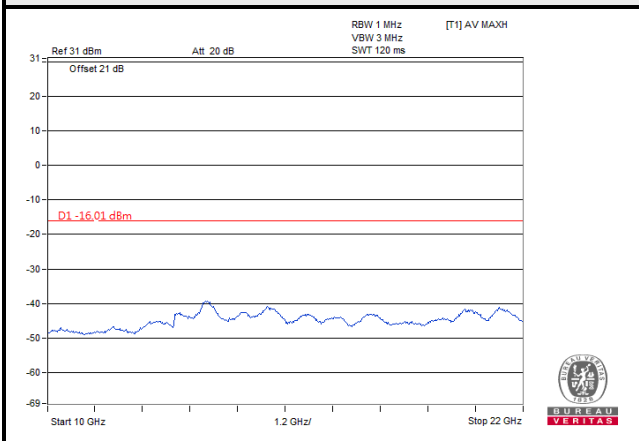
Channel 2550

Frequency Range : 9kHz~3GHz

Frequency Range : 3GHz~10GHz



Frequency Range : 10GHz~22GHz



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

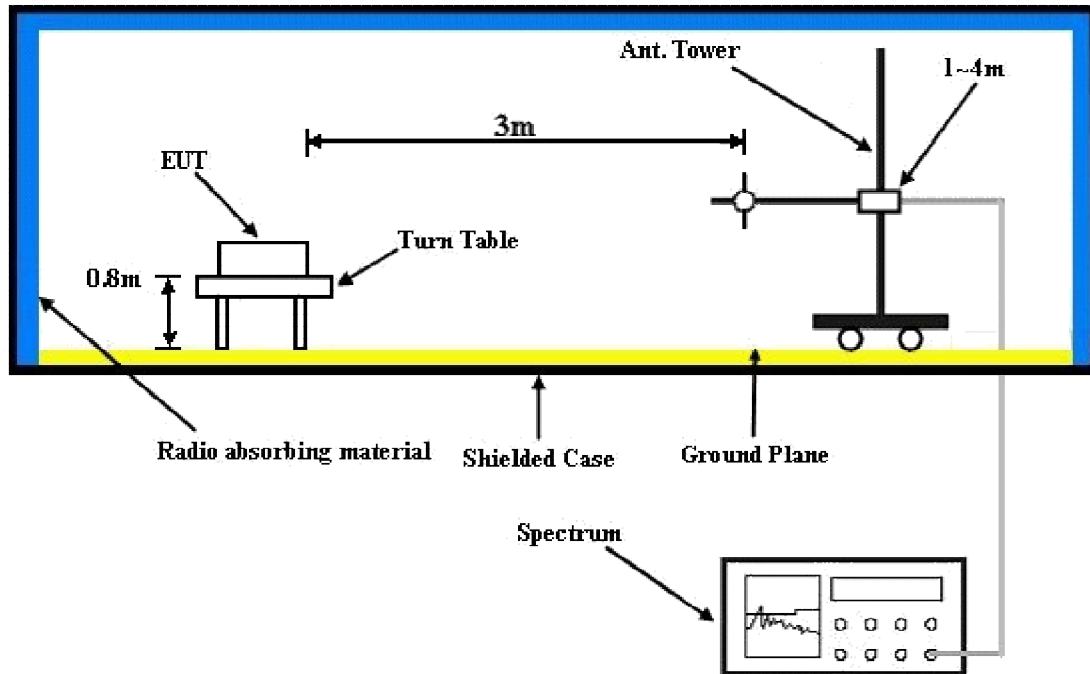
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$.

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

4.8.3 Deviation from Test Standard

No deviation.

4.8.4 Test Setup



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

4.8.5 Test Results

Below 1GHz

LTE Band 5

Channel Bandwidth: 5MHz

Mode	TX channel 2425	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	54.25	-64.63	-82.02	14.65	-67.37	-13.00	-54.37
2	250.19	-58.03	-77.92	14.23	-63.69	-13.00	-50.69
3	399.57	-68.81	-89.30	18.72	-70.58	-13.00	-57.58
4	500.45	-59.68	-81.05	21.31	-59.74	-13.00	-46.74
5	588.72	-64.58	-86.12	23.31	-62.81	-13.00	-49.81
6	800.18	-66.74	-88.13	26.60	-61.53	-13.00	-48.53
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	79.47	-58.25	-77.11	10.53	-66.58	-13.00	-53.58
2	167.74	-64.49	-81.69	14.40	-67.29	-13.00	-54.29
3	399.57	-67.07	-87.54	18.72	-68.82	-13.00	-55.82
4	500.45	-68.17	-90.17	21.31	-68.86	-13.00	-55.86
5	800.18	-66.21	-88.07	26.60	-61.47	-13.00	-48.47
6	944.71	-69.50	-91.71	28.66	-63.05	-13.00	-50.05

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

Mode	TX channel 2450	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	99.84	-60.64	-78.20	10.38	-67.82	-13.00	-54.82
2	250.19	-58.48	-78.37	14.23	-64.14	-13.00	-51.14
3	288.99	-60.92	-79.58	15.85	-63.73	-13.00	-50.73
4	500.45	-59.48	-80.85	21.31	-59.54	-13.00	-46.54
5	595.51	-67.73	-89.13	23.49	-65.64	-13.00	-52.64
6	800.18	-66.97	-88.36	26.60	-61.76	-13.00	-48.76

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	150.28	-67.35	-83.63	15.05	-68.58	-13.00	-55.58
2	298.69	-66.34	-86.22	16.09	-70.13	-13.00	-57.13
3	375.32	-67.82	-88.08	18.22	-69.86	-13.00	-56.86
4	500.45	-65.06	-87.06	21.31	-65.75	-13.00	-52.75
5	547.98	-66.19	-87.76	22.17	-65.59	-13.00	-52.59
6	800.18	-65.55	-87.41	26.60	-60.81	-13.00	-47.81

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 15MHz

Mode	TX channel 2475	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	77.53	-59.73	-78.40	10.80	-67.60	-13.00	-54.60
2	250.19	-58.45	-78.34	14.23	-64.11	-13.00	-51.11
3	298.69	-60.74	-79.68	16.09	-63.59	-13.00	-50.59
4	500.45	-59.09	-80.46	21.31	-59.15	-13.00	-46.15
5	624.61	-65.96	-88.09	24.12	-63.97	-13.00	-50.97
6	800.18	-68.07	-89.46	26.60	-62.86	-13.00	-49.86
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	78.50	-59.09	-77.87	10.60	-67.27	-13.00	-54.27
2	107.60	-62.14	-78.03	11.39	-66.64	-13.00	-53.64
3	405.39	-66.40	-86.97	18.86	-68.11	-13.00	-55.11
4	532.46	-66.89	-88.61	21.90	-66.71	-13.00	-53.71
5	630.43	-68.24	-90.75	24.24	-66.51	-13.00	-53.51
6	800.18	-65.55	-87.41	26.60	-60.81	-13.00	-47.81

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 20MHz

Mode	TX channel 2500	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	77.53	-61.20	-79.87	10.80	-69.07	-13.00	-56.07
2	250.19	-57.81	-77.70	14.23	-63.47	-13.00	-50.47
3	500.45	-59.00	-80.37	21.31	-59.06	-13.00	-46.06
4	624.61	-66.37	-88.50	24.12	-64.38	-13.00	-51.38
5	749.74	-65.30	-87.83	26.19	-61.64	-13.00	-48.64
6	800.18	-66.88	-88.27	26.60	-61.67	-13.00	-48.67

Antenna Polarity & Test Distance: Vertical at 3 M							
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No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	104.69	-61.96	-78.67	11.05	-67.62	-13.00	-54.62
2	153.19	-68.24	-84.79	15.07	-69.72	-13.00	-56.72
3	412.18	-66.65	-87.40	19.07	-68.33	-13.00	-55.33
4	500.45	-62.63	-84.63	21.31	-63.32	-13.00	-50.32
5	673.11	-67.69	-89.91	24.67	-65.24	-13.00	-52.24
6	800.18	-66.91	-88.77	26.60	-62.17	-13.00	-49.17

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Above 1GHz

LTE Band 5

Channel Bandwidth: 5MHz

Mode	TX channel 2425	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4356.53	-31.60	-49.06	20.75	-28.31	-13.00	-15.31
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4356.00	-25.18	-42.33	20.75	-21.58	-13.00	-8.58

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2525	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4410.00	-33.73	-51.20	20.86	-30.34	-13.00	-17.34
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-27.22	-44.39	20.86	-23.53	-13.00	-10.53

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2625	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4455.00	-35.96	-53.20	20.93	-32.27	-13.00	-19.27
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4455.00	-28.55	-45.47	20.93	-24.54	-13.00	-11.54

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

Mode	TX channel 2450	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4370.00	-38.90	-56.39	20.79	-35.60	-13.00	-22.60
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4370.00	-31.99	-49.16	20.79	-28.37	-13.00	-15.37

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2525	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-37.52	-55.03	20.86	-34.17	-13.00	-21.17
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-32.15	-49.32	20.86	-28.46	-13.00	-15.46

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2600	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4440.00	-37.68	-55.00	20.91	-34.09	-13.00	-21.09
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4440.00	-30.80	-47.80	20.91	-26.89	-13.00	-13.89

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 15MHz

Mode	TX channel 2475	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4375.00	-40.16	-57.65	20.79	-36.86	-13.00	-23.86
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4375.00	-35.01	-52.18	20.79	-31.39	-13.00	-18.39

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2525	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-39.29	-56.80	20.86	-35.94	-13.00	-22.94
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-33.06	-50.23	20.86	-29.37	-13.00	-16.37

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2575	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4440.00	-37.74	-55.06	20.91	-34.15	-13.00	-21.15
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4440.00	-32.30	-49.30	20.91	-28.39	-13.00	-15.39

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 20MHz

Mode	TX channel 2500	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4385.00	-40.43	-57.93	20.81	-37.12	-13.00	-24.12
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-34.81	-51.98	20.86	-31.12	-13.00	-18.12

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2525	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-41.08	-58.59	20.86	-37.73	-13.00	-24.73
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4405.00	-36.42	-53.59	20.86	-32.73	-13.00	-19.73

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 2550	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4415.00	-43.18	-60.64	20.88	-39.76	-13.00	-26.76
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	4415.00	-35.51	-52.64	20.88	-31.76	-13.00	-18.76

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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