

FCC Test Report

(Part 90S)

Report No.: RF160401D01-3

FCC ID: P27LC4R

Test Model: LC4R

Received Date: Apr. 1, 2016

Test Date: Apr. 15 ~ May 27, 2016

Issued Date: Jun. 1, 2016

Applicant: Sercomm Corp.

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

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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 Frequency Stability Measurement	19
4.2.1 Limits of Frequency Stability Measurement	19
4.2.2 Test Procedure	19
4.2.3 Test Setup	19
4.2.4 Test Results.....	20
4.3 Occupied Bandwidth Measurement	21
4.3.1 Limits of Occupied Bandwidth Measurement.....	21
4.3.2 Test Procedure	21
4.3.3 Test Setup	21
4.3.4 Test Result	22
4.4 Band Edge Measurement.....	26
4.4.1 Limits of Band Edge Measurement	26
4.4.2 Test Setup	26
4.4.3 Test Procedures	26
4.4.4 Test Results.....	27
4.5 Emission Mask Measurement.....	33
4.5.1 Limits of Emission Mask Measurement	33
4.5.2 Test Procedures	33
4.5.3 Test Setup	33
4.5.4 Test Results.....	34
4.6 Peak to Average Ratio.....	44
4.6.1 Limits of Peak to Average Ratio Measurement.....	44
4.6.2 Test Setup	44
4.6.3 Test Procedures	44
4.6.4 Test Results.....	45
4.7 Conducted Spurious Emissions	47
4.7.1 Limits of Conducted Spurious Emissions Measurement	47
4.7.2 Test Setup	47
4.7.3 Test Procedure	47
4.7.4 Test Results.....	48
4.8 Radiated Emission Measurement	62
4.8.1 Limits of Radiated Emission Measuremen	62
4.8.2 Test Procedure	62
4.8.3 Deviation from Test Standard.....	62
4.8.4 Test Setup	63

4.8.5 Test Results.....	64
5 Pictures of Test Arrangements.....	70
Appendix – Information on the Testing Laboratories.....	71

Release Control Record

Issue No.	Description	Date Issued
RF160401D01-3	Original release.	Jun. 1, 2016

1 Certificate of Conformity

Product: LTE module

Brand: Sercomm

Test Model: LC4R

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Apr. 15 ~ May 27, 2016

Standards: FCC Part 90, Subpart S

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 / Supervisor

Date:

Jun. 1, 2016

Approved by :



Rex Lai / Assistant Manager

Date:

Jun. 1, 2016

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 90.635 (b)	Maximum Peak Output Power Limit: max. 3 watts e.r.p peak power	PASS	Meet the requirement of limit.
2.1055 90.213	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	PASS	Meet the requirement of limit.
2.1051 90.691	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 90.691	Emission Mask	PASS	Meet the requirement of limit.
---	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1051 90.691	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 90.691	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -18.27dB at 1630.00MHz.

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	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

2.2 Test Site and Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2016	Feb. 25, 2017
HP Preamplifier	8449B	3008A01201	Feb. 26, 2016	Feb. 25, 2017
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2016	Feb. 28, 2017
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 02, 2016	Feb. 01, 2017
Schwarzbeck Antenna	VULB 9168	139	Jan. 04, 2016	Jan. 03, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Jan. 08, 2016	Jan. 07, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Jan. 21, 2016	Jan. 20, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 14, 2015	Jul. 13, 2016
EMCO Horn Antenna	3115	00028257	Jan. 19, 2016	Jan. 18, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 28, 2015 Apr. 28, 2016	Apr. 27, 2016 Apr. 27, 2017
Anritsu Power Meter	ML2495A	0842014	Apr. 28, 2015 Apr. 28, 2016	Apr. 27, 2016 Apr. 27, 2017

- 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: 8449B) 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.

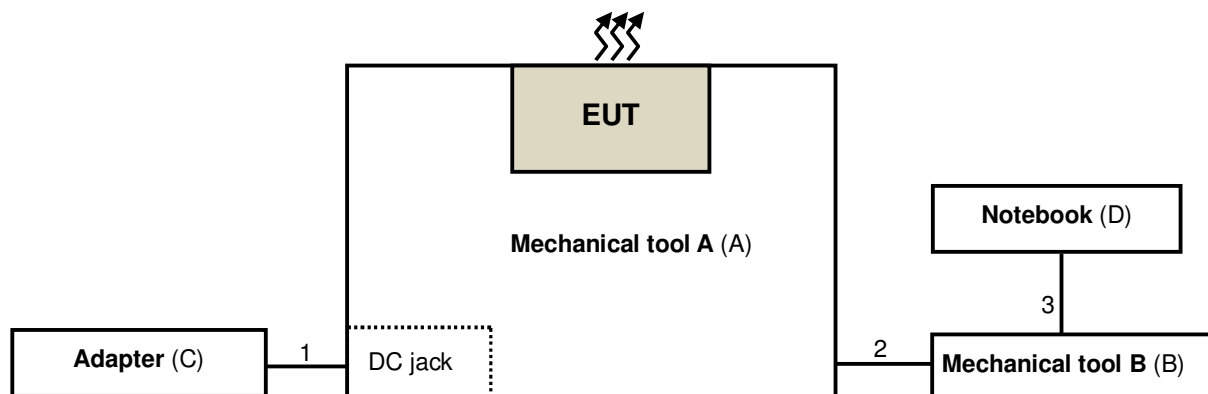
3 General Information

3.1 General Description of EUT

Product	LTE module	
Brand	Sercomm	
Test Model	LC4R	
Status of EUT	Engineering sample	
Power Supply Rating	3.3Vdc	
Modulation Type	QPSK, 16QAM, 64QAM	
Operating Frequency	LTE Band 26 (Channel Bandwidth 3MHz)	815.5MHz ~ 822.5MHz
	LTE Band 26 (Channel Bandwidth 5MHz)	816.5MHz ~ 821.5MHz
	LTE Band 26 (Channel Bandwidth 10MHz)	819MHz
Max. ERP Power	LTE Band 26 (Channel Bandwidth 3MHz)	450.817mW (26.54dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	350.752mW (25.45dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	381.944mW (25.82dBm)
Antenna Type	LTE Band 26	Dipole antenna with 1.2dBi gain
Antenna Connector	I-PEX	
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note: The EUT is a LTE module.

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.	Mechanical tool A	N/A	N/A	N/A	N/A	Supplied by client
B.	Mechanical tool B	N/A	N/A	N/A	N/A	Supplied by client
C.	Adapter	FAIRWAY	WT10A-050U	N/A	N/A	Supplied by client
D.	Notebook	DELL	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	3.0	N	0	Supplied by client
2.	Data cable	1	0.2	N	0	Supplied by client
3.	USB cable	1	1.0	Y	0	Supplied by client

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:

[LTE Band 26](#)

Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
ERP	26705 to 26775	26705, 26740, 26775	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	50 RB / 0 RB Offset
Frequency Stability	26705 to 26775	26740	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26740	5MHz	QPSK	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	50 RB / 0 RB Offset
Occupied Bandwidth	26705 to 26775	26705, 26740, 26775	3MHz	QPSK/16QAM/64QAM	15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK/16QAM/64QAM	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK/16QAM/64QAM	50 RB / 0 RB Offset
Band Edge	26705 to 26775	26705	3MHz	QPSK	1 RB / 0 RB Offset
		26775	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26715	5MHz	QPSK	1 RB / 14 RB Offset
		26765	5MHz	QPSK	15 RB / 0 RB Offset
		26765	5MHz	QPSK	1 RB / 24 RB Offset
	26740	26740	10MHz	QPSK	25 RB / 0 RB Offset
		26740	10MHz	QPSK	1 RB / 0 RB Offset
		26740	10MHz	QPSK	1 RB / 49 RB Offset
		26740	10MHz	QPSK	50 RB / 0 RB Offset
Emission Mask	26705 to 26775	26705, 26740, 26775	3MHz	QPSK	1 RB / 0 RB Offset
					1 RB / 14 RB Offset
					15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK	1 RB / 0 RB Offset
					1 RB / 24 RB Offset
					25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	1 RB / 0 RB Offset
					1 RB / 49 RB Offset
					50 RB / 0 RB Offset
Peak to Average Ratio	26705 to 26775	26705, 26740, 26775	3MHz	QPSK/16QAM/64QAM	15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK/16QAM/64QAM	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK/16QAM/64QAM	50 RB / 0 RB Offset
Condcudeted Emission	26705 to 26775	26705, 26740, 26775	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	50 RB / 0 RB Offset
Radiated Emission Below 1GHz	26705 to 26775	26705	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26715	5MHz	QPSK	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	50 RB / 0 RB Offset
Radiated Emission Above 1GHz	26705 to 26775	26705, 26740, 26775	3MHz	QPSK	15 RB / 0 RB Offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK	25 RB / 0 RB Offset
	26740	26740	10MHz	QPSK	50 RB / 0 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Frequency Stability	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Occupied Bandwidth	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Band Edge	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Emission Mask	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Peak To Average Ratio	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Conducted Emission	22deg. C, 76%RH	3.3Vdc	Dalen Dai
Radiated Emission	22deg. C, 76%RH	3.3Vdc	Dalen Dai

3.4 EUT Operating Conditions

The software provided by client to enable the 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 90

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

The radiated peak output power shall be according to the specific rule Part 90.635 that “Mobile station are limited to 100 watts e.r.p”.

4.1.2 Test Procedures

EIRP / ERP Measurement:

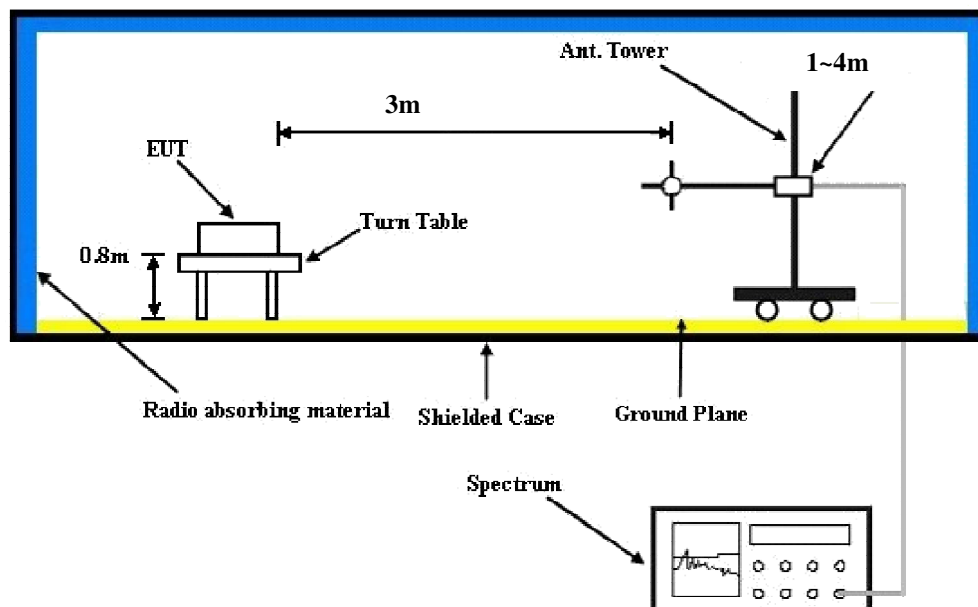
- a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Agilent Spectrum Analyzer. All measurements were done at 1 channel. RWB is 1MHz and VBW is 3MHz.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed 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.

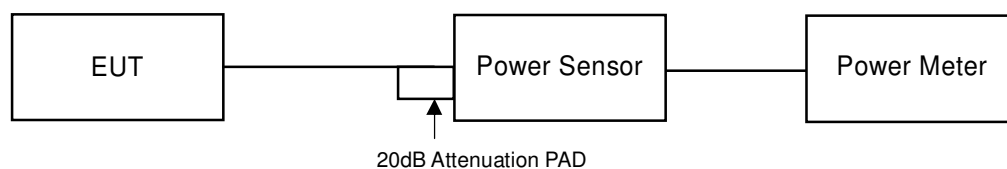
4.1.3 Test Setup

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	RB Size	RB Offset	QPSK								
			Low CH			Mid CH			High CH		
			26705			26740			26775		
			815.5 MHz			819 MHz			822.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 3M	1	0	21.62	21.44	24.54	21.68	21.31	24.51	21.57	21.35	24.47
	1	7	21.56	21.40	24.49	21.64	21.40	24.53	21.53	21.30	24.43
	1	14	21.37	21.39	24.39	21.60	21.29	24.46	21.49	21.27	24.39
	8	0	22.29	22.16	25.24	22.35	22.16	25.27	21.96	21.93	24.96
	8	3	22.35	22.13	25.25	22.41	22.33	25.38	21.94	21.88	24.92
	8	7	22.61	22.37	25.50	22.32	22.20	25.27	21.97	21.92	24.96
	15	0	23.03	22.92	25.99	22.96	22.81	25.90	22.16	21.94	25.06
Band / BW	RB Size	RB Offset	16QAM								
			Low CH			Mid CH			High CH		
			26705			26740			26775		
			815.5 MHz			819 MHz			822.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 3M	1	0	21.60	21.40	24.51	21.62	21.14	24.40	21.51	21.36	24.45
	1	7	21.50	21.39	24.46	21.59	21.37	24.49	21.50	21.33	24.43
	1	14	21.29	21.16	24.24	21.53	21.16	24.36	21.48	21.27	24.39
	8	0	22.28	22.15	25.23	22.24	22.08	25.17	21.91	21.76	24.85
	8	3	22.31	22.20	25.27	22.33	22.25	25.30	21.90	21.79	24.86
	8	7	22.43	22.34	25.40	22.19	22.13	25.17	21.95	21.84	24.91
	15	0	22.91	22.84	25.89	22.91	22.79	25.86	22.08	21.90	25.00
Band / BW	RB Size	RB Offset	64QAM								
			Low CH			Mid CH			High CH		
			26705			26740			26775		
			815.5 MHz			819 MHz			822.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 3M	1	0	21.52	21.35	24.45	21.52	21.34	24.44	21.43	21.30	24.38
	1	7	21.43	21.29	24.37	21.39	21.19	24.30	21.46	21.35	24.42
	1	14	21.45	21.30	24.39	21.44	21.25	24.36	21.52	21.37	24.46
	8	0	22.28	22.11	25.21	22.29	22.13	25.22	21.92	21.86	24.90
	8	3	22.31	22.06	25.20	22.31	22.21	25.27	21.90	21.75	24.84
	8	7	22.29	22.13	25.22	22.18	22.06	25.13	21.94	21.84	24.90
	15	0	22.90	22.78	25.85	22.86	22.78	25.83	22.02	21.91	24.98

Band / BW	RB Size	RB Offset	QPSK								
			Low CH			Mid CH			High CH		
			26715			26740			26765		
			816.5 MHz			819 MHz			821.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 5M	1	0	21.06	20.84	23.96	20.97	20.82	23.91	21.08	21.03	24.07
	1	12	20.98	20.83	23.92	20.91	20.80	23.87	20.99	20.95	23.98
	1	24	21.02	20.81	23.93	20.94	20.78	23.87	21.02	20.97	24.01
	12	0	22.83	22.75	25.80	22.86	22.71	25.80	21.96	21.93	24.96
	12	6	22.89	22.72	25.82	22.85	22.69	25.78	21.94	21.88	24.92
	12	13	22.87	22.74	25.82	22.86	22.70	25.79	21.97	21.92	24.96
	25	0	23.01	22.80	25.92	22.98	22.75	25.88	22.03	21.94	25.00
Band / BW	RB Size	RB Offset	16QAM								
			Low CH			Mid CH			High CH		
			26715			26740			26765		
			816.5 MHz			819 MHz			821.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 5M	1	0	20.94	20.87	23.92	20.92	20.81	23.88	21.11	20.96	24.05
	1	12	20.97	20.81	23.90	20.86	20.75	23.82	21.04	20.98	24.02
	1	24	20.89	20.76	23.84	20.91	20.77	23.85	20.95	20.83	23.90
	12	0	22.80	22.64	25.73	22.87	22.79	25.84	21.96	21.88	24.93
	12	6	22.83	22.62	25.74	22.90	22.74	25.83	22.01	21.88	24.96
	12	13	22.82	22.65	25.75	22.88	22.76	25.83	21.96	21.89	24.94
	25	0	22.88	22.70	25.80	22.89	22.78	25.85	21.97	21.95	24.97
Band / BW	RB Size	RB Offset	64QAM								
			Low CH			Mid CH			High CH		
			26715			26740			26765		
			816.5 MHz			819 MHz			821.5 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 5M	1	0	20.98	20.86	23.93	20.85	20.79	23.83	21.07	20.92	24.01
	1	12	20.90	20.83	23.88	20.82	20.71	23.78	20.94	20.86	23.91
	1	24	20.92	20.84	23.89	20.83	20.74	23.80	21.03	20.95	24.00
	12	0	22.86	22.75	25.82	22.71	22.63	25.68	21.96	21.90	24.94
	12	6	22.87	22.72	25.81	22.74	22.68	25.72	21.98	21.93	24.97
	12	13	22.84	22.69	25.78	22.73	22.64	25.70	21.99	21.91	24.96
	25	0	22.89	22.82	25.87	22.80	22.75	25.79	22.05	21.89	24.98

Band / BW	RB Size	RB Offset	QPSK			16QAM			64QAM		
			Mid CH			Mid CH			Mid CH		
			26740			26740			26740		
			819 MHz			819 MHz			819 MHz		
			Chain0	Chain1	Total	Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 10M	1	0	21.13	21.08	24.12	21.02	20.98	24.01	21.03	20.97	24.01
	1	24	20.87	20.84	23.87	20.85	20.81	23.84	21.02	20.95	24.00
	1	49	20.95	20.91	23.94	20.94	20.90	23.93	20.96	20.91	23.95
	25	0	22.90	22.88	25.90	22.86	22.83	25.86	22.89	22.88	25.90
	25	12	23.02	22.96	26.00	22.82	22.79	25.82	22.94	22.86	25.91
	25	25	22.99	22.93	25.97	22.79	22.73	25.77	22.97	22.90	25.95
	50	0	23.07	22.95	26.02	22.95	22.84	25.91	22.99	22.93	25.97

ERP Power (dBm)

Channel Bandwidth: 3MHz

MODE		TX channel 26705					
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	815.50	9.49	-12.24	26.92	14.68	50.00	-35.32
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	815.50	20.56	-1.29	26.92	25.63	50.00	-24.37

MODE		TX channel 26740					
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	819.00	9.34	-12.46	26.98	14.52	50.00	-35.48
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	819.00	21.27	-0.57	26.98	26.41	50.00	-23.59

MODE		TX channel 26775					
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	822.50	9.64	-12.22	27.03	14.81	50.00	-35.19
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	822.50	21.33	-0.49	27.03	26.54	50.00	-23.46

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

Channel Bandwidth: 5MHz

MODE		TX channel 26715					
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	816.50	9.19	-12.58	26.95	14.37	50.00	-35.63
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	816.50	20.36	-1.50	26.95	25.45	50.00	-24.55

MODE		TX channel 26740					
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	819.00	9.42	-12.38	26.98	14.60	50.00	-35.40
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	819.00	20.22	-1.62	26.98	25.36	50.00	-24.64

MODE		TX channel 26765					
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	821.50	8.70	-13.13	27.01	13.88	50.00	-36.12
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	821.50	20.08	-1.74	27.01	25.27	50.00	-24.73

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

Channel Bandwidth: 10MHz

MODE		TX channel 26740					
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	819.00	10.21	-11.59	26.98	15.39	50.00	-34.61
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	819.00	20.68	-1.16	26.98	25.82	50.00	-24.18

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

4.2 Frequency Stability Measurement

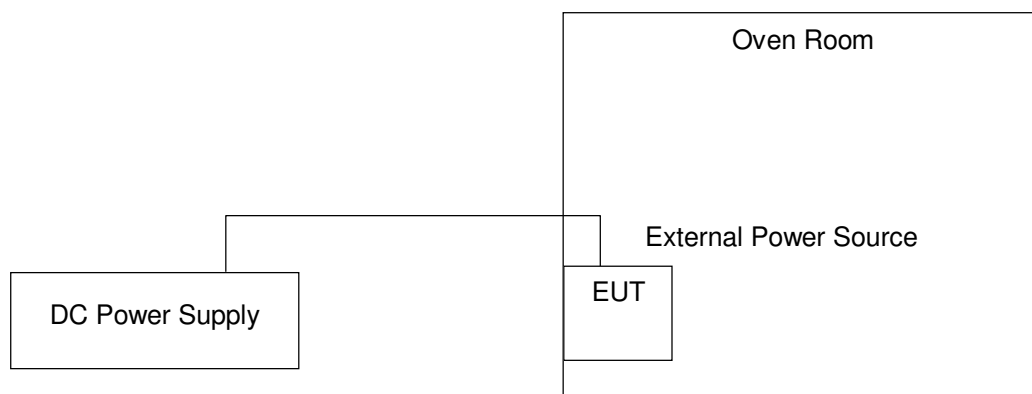
4.2.1 Limits of Frequency Stability Measurement

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

4.2.2 Test Procedure

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

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)						Limit (ppm)
	LTE Band 26						
	3MHz		5MHz		10MHz		
	Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1	
3.465	0.0183150183	0.0195360195	0.0305250305	0.0268620269	0.0354090354	0.0317460317	2.5
3.3	0.0158730159	0.0183150183	0.0280830281	0.0231990232	0.0305250305	0.0293040293	2.5
3.135	0.0134310134	0.0146520147	0.0268620269	0.0195360195	0.0280830281	0.0256410256	2.5

Note: The applicant defined the normal working voltage is from 3.135Vdc to 3.465Vdc.

Frequency Error vs. Temperature

Temp. (°C)	Frequency Error (ppm)						Limit (ppm)
	LTE Band 26						
	3MHz		5MHz		10MHz		
	Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1	
50	0.0195360195	0.0219780220	0.0293040293	0.0293040293	0.0341880342	0.0329670330	2.5
40	0.0170940171	0.0195360195	0.0280830281	0.0280830281	0.0317460317	0.0305250305	2.5
30	0.0158730159	0.0183150183	0.0244200244	0.0244200244	0.0305250305	0.0293040293	2.5
20	0.0134310134	0.0170940171	0.0231990232	0.0219780220	0.0280830281	0.0280830281	2.5
10	0.0122100122	0.0146520147	0.0195360195	0.0207570208	0.0244200244	0.0244200244	2.5
0	0.0097680098	0.0122100122	0.0158730159	0.0183150183	0.0231990232	0.0207570208	2.5

4.3 Occupied Bandwidth Measurement

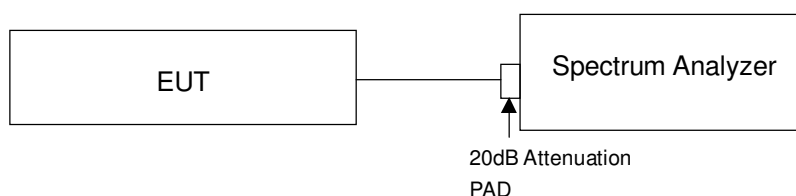
4.3.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.3.2 Test Procedure

All measurements were done at low, middle and high operational frequency range, RB of the spectrum is 1% of occupied bandwidth and VB of the spectrum is 3 times RBW. 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.

4.3.3 Test Setup

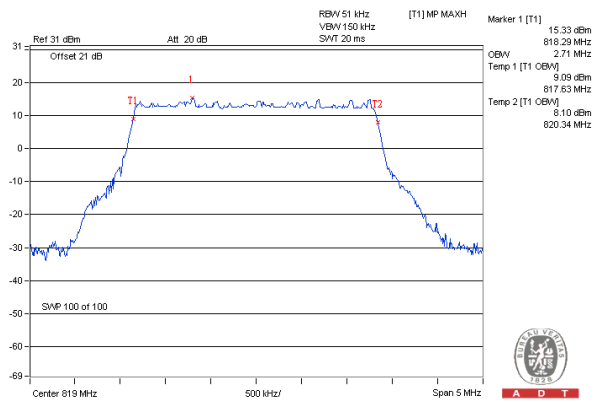


4.3.4 Test Result

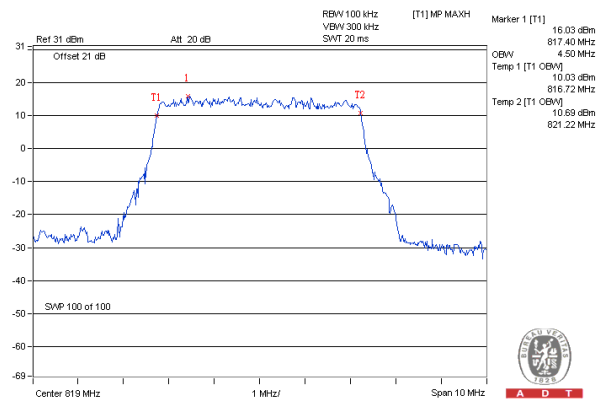
LTE Band 26							
Channel Bandwidth 3MHz							
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
26705	815.50	2.68	2.68	2.70	2.70	2.70	2.69
26740	819.00	2.69	2.71	2.70	2.70	2.71	2.69
26775	822.50	2.70	2.71	2.70	2.70	2.71	2.71
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
26715	816.50	4.47	4.45	4.47	4.47	4.50	4.48
26740	819.00	4.48	4.47	4.48	4.47	4.50	4.50
26765	821.50	4.47	4.47	4.47	4.47	4.50	4.50
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
26740	819.00	8.97	8.93	8.93	8.93	8.93	8.97

Spectrum Plot Of Worst Value

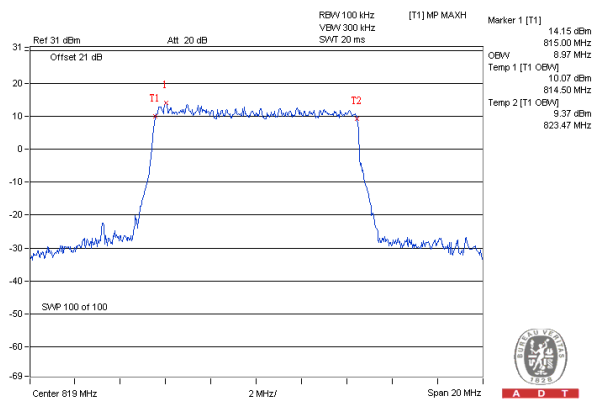
3MHz / QPSK



5MHz / 64QAM



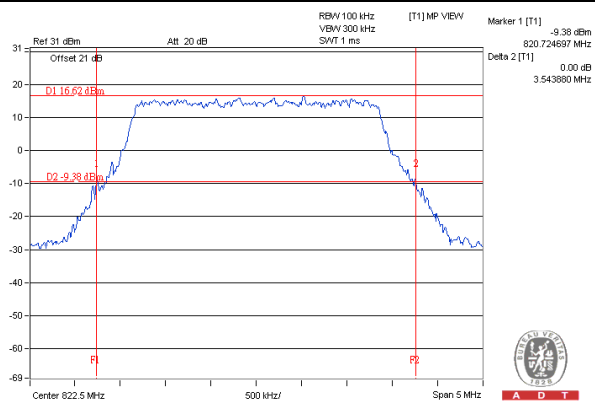
10MHz / QPSK



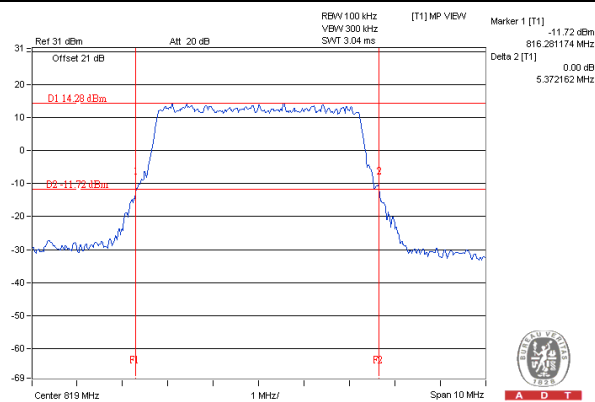
LTE Band 26					
Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)			
		QPSK			
		1RB		15RB	
		Chain 0	Chain 1	Chain 0	Chain 1
26705	815.50	1.28	1.26	3.45	3.51
26740	819.00	1.14	1.20	3.48	3.44
26775	822.50	1.15	1.14	3.48	3.54
Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)			
		QPSK			
		1RB		25RB	
		Chain 0	Chain 1	Chain 0	Chain 1
26715	816.50	1.22	1.24	5.22	5.19
26740	819.00	1.21	1.17	5.37	5.30
26765	821.50	1.17	1.15	5.26	5.32
Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	-26dBc Bandwidth (MHz)			
		QPSK			
		1RB		50RB	
		Chain 0	Chain 1	Chain 0	Chain 1
26740	819.00	1.41	1.45	10.05	9.86

Spectrum Plot Of Worst Value

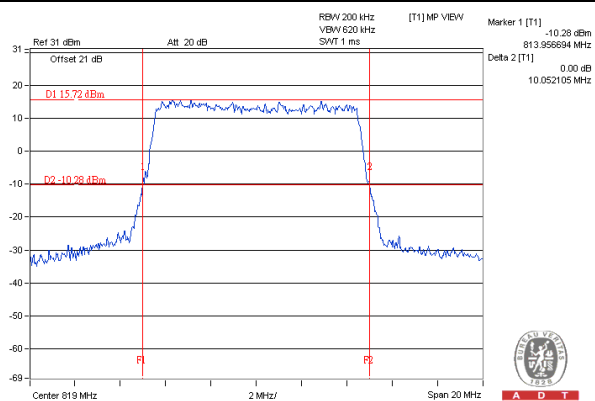
3MHz / QPSK / 15RB



5MHz / QPSK / 25RB



10MHz / QPSK / 50RB

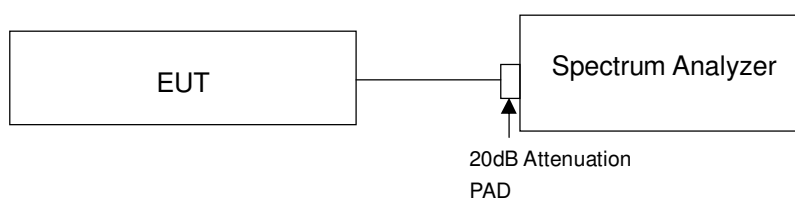


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

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

4.4.2 Test Setup



4.4.3 Test Procedures

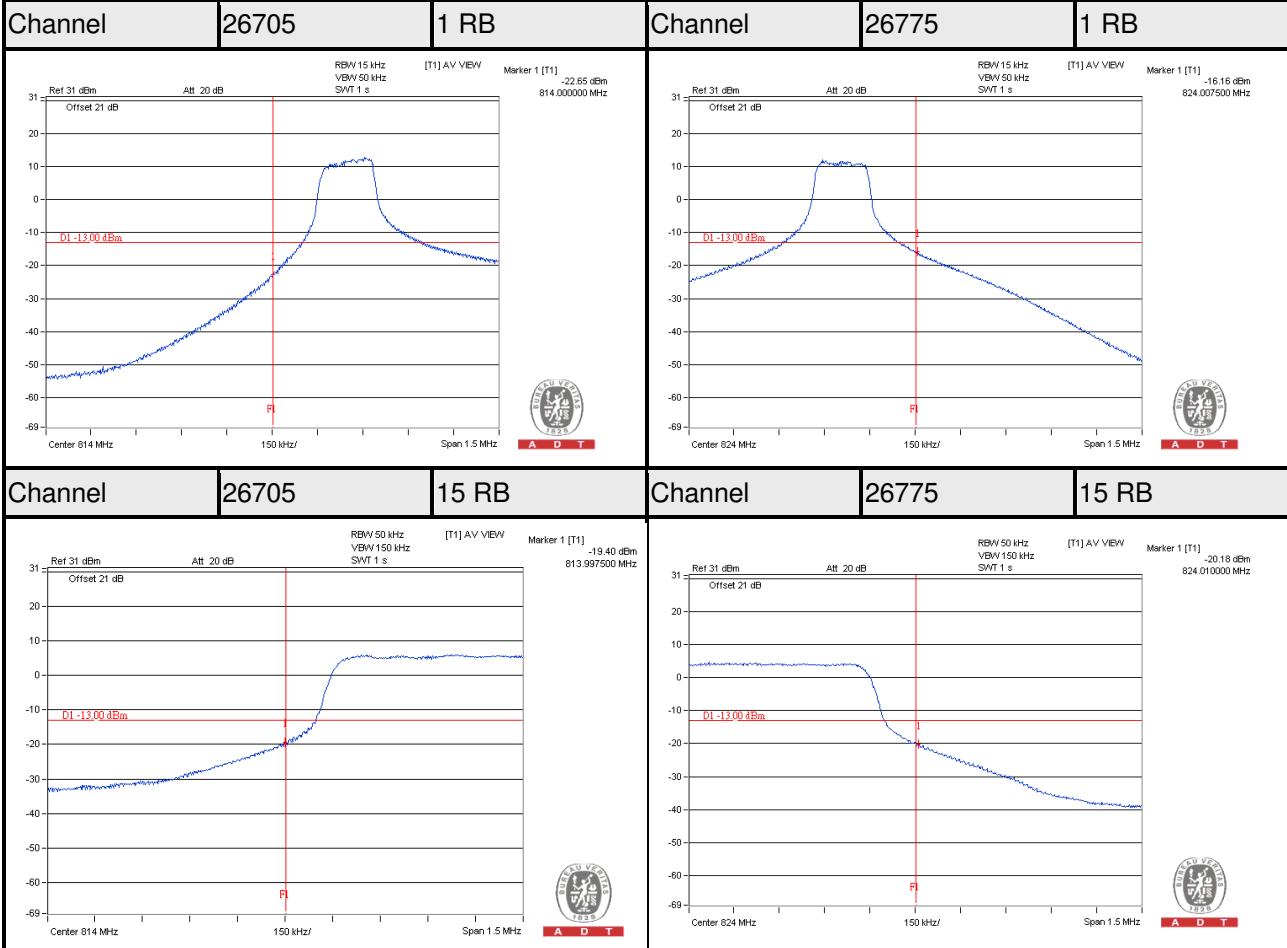
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 15kHz and VB of the spectrum is 50kHz (LTE Channel Bandwidth 3MHz, 5MHz, 10MHz for 1RB Size).
- c. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 50kHz and VB of the spectrum is 150kHz (LTE Channel Bandwidth 3MHz for 15RB Size).
- d. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 5MHz for 25RB Size).
- e. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 150kHz and VB of the spectrum is 500kHz (LTE Channel Bandwidth 10MHz for 50RB Size).
- f. Record the max trace plot into the test report.

4.4.4 Test Results

LTE Band 26

Channel Bandwidth 3MHz

Chain 0

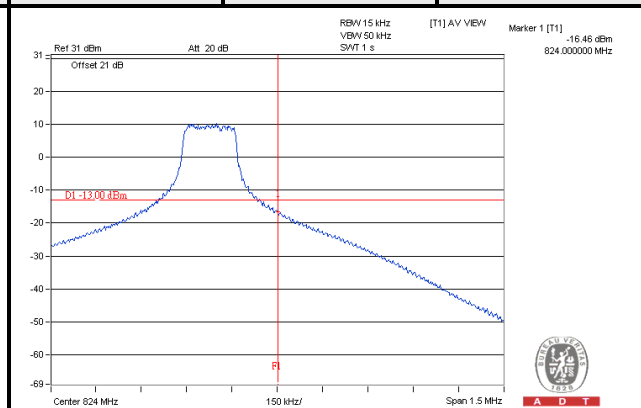
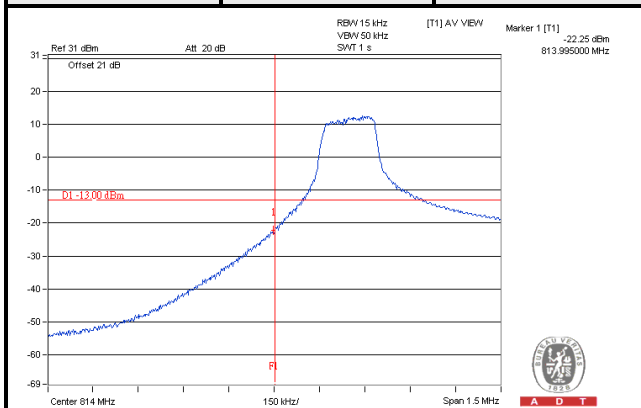


LTE Band 26

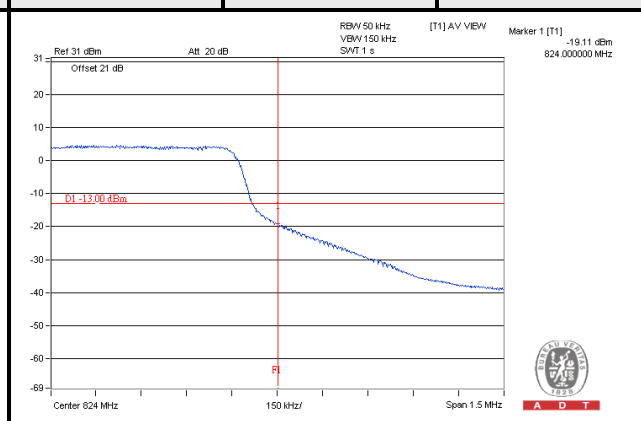
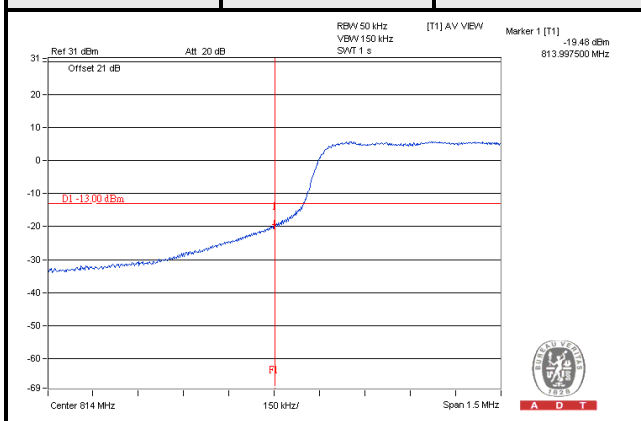
Channel Bandwidth 3MHz

Chain 1

Channel	26705	1 RB	Channel	26775	1 RB
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Channel	26705	15 RB	Channel	26775	15 RB
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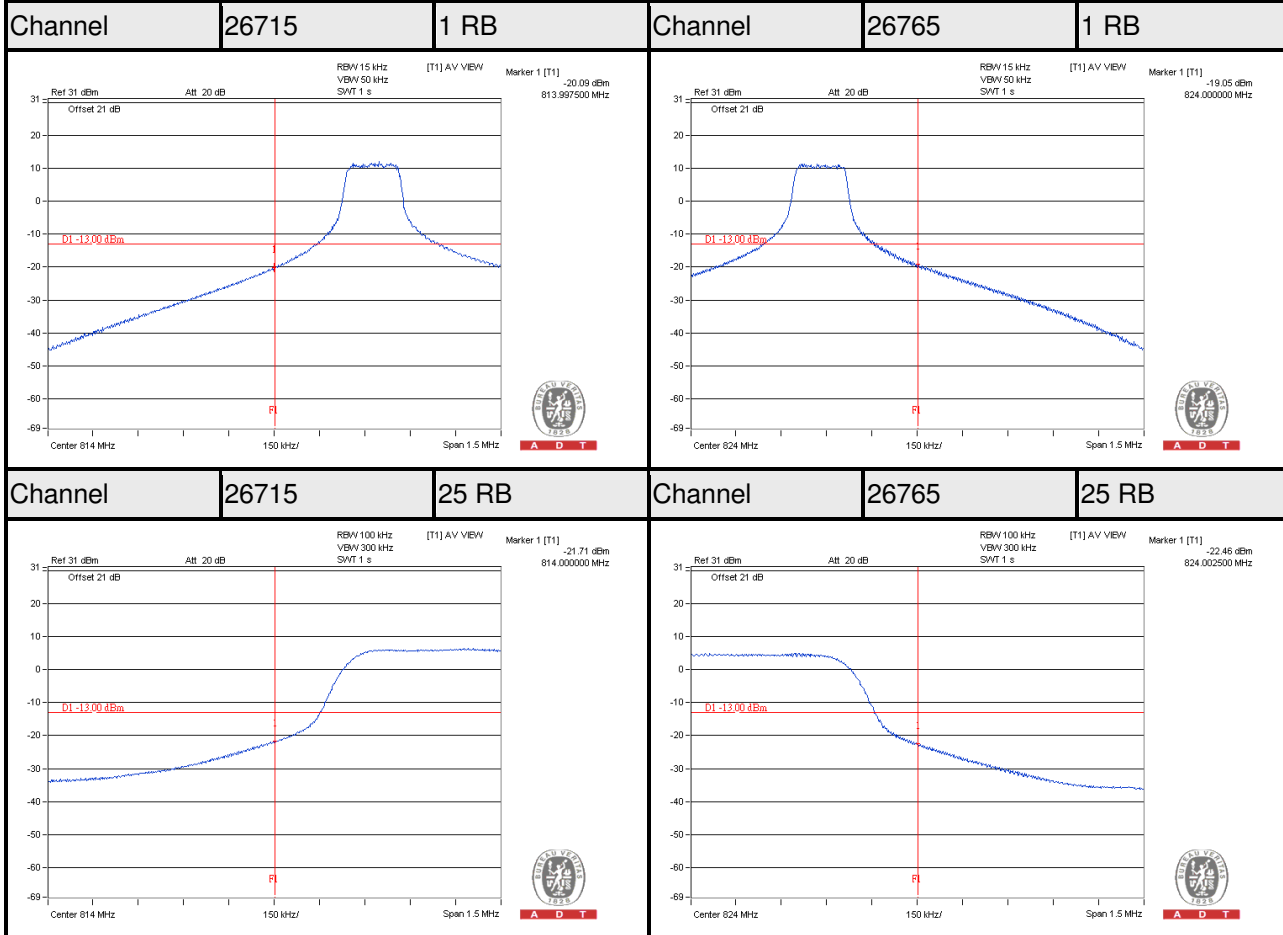


Band / BW	RB Size	Band Edge (dBm)					
		Low CH			High CH		
		26705			26775		
		815.5 MHz			822.5 MHz		
		Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 3M	1	-22.65	-22.25	-19.44	-16.16	-16.46	-13.30
	15	-19.40	-19.48	-16.43	-20.18	-19.11	-16.60

LTE Band 26

Channel Bandwidth 5MHz

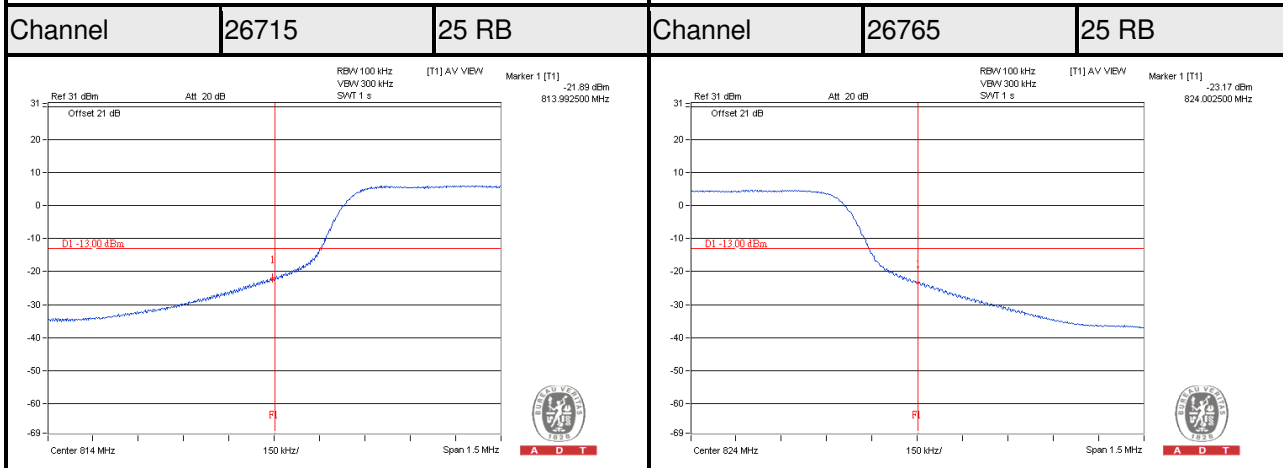
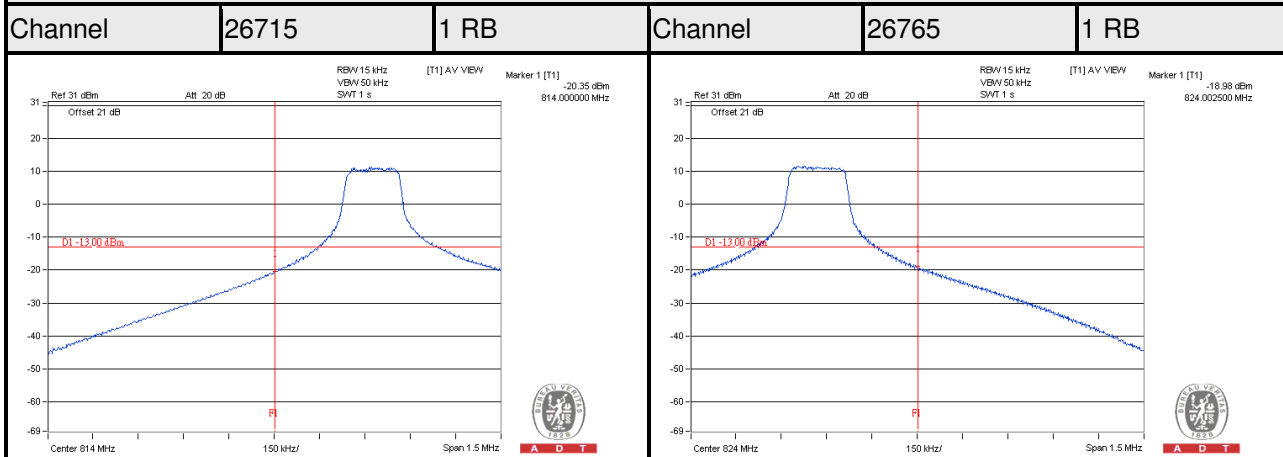
Chain 0



LTE Band 26

Channel Bandwidth 5MHz

Chain 1

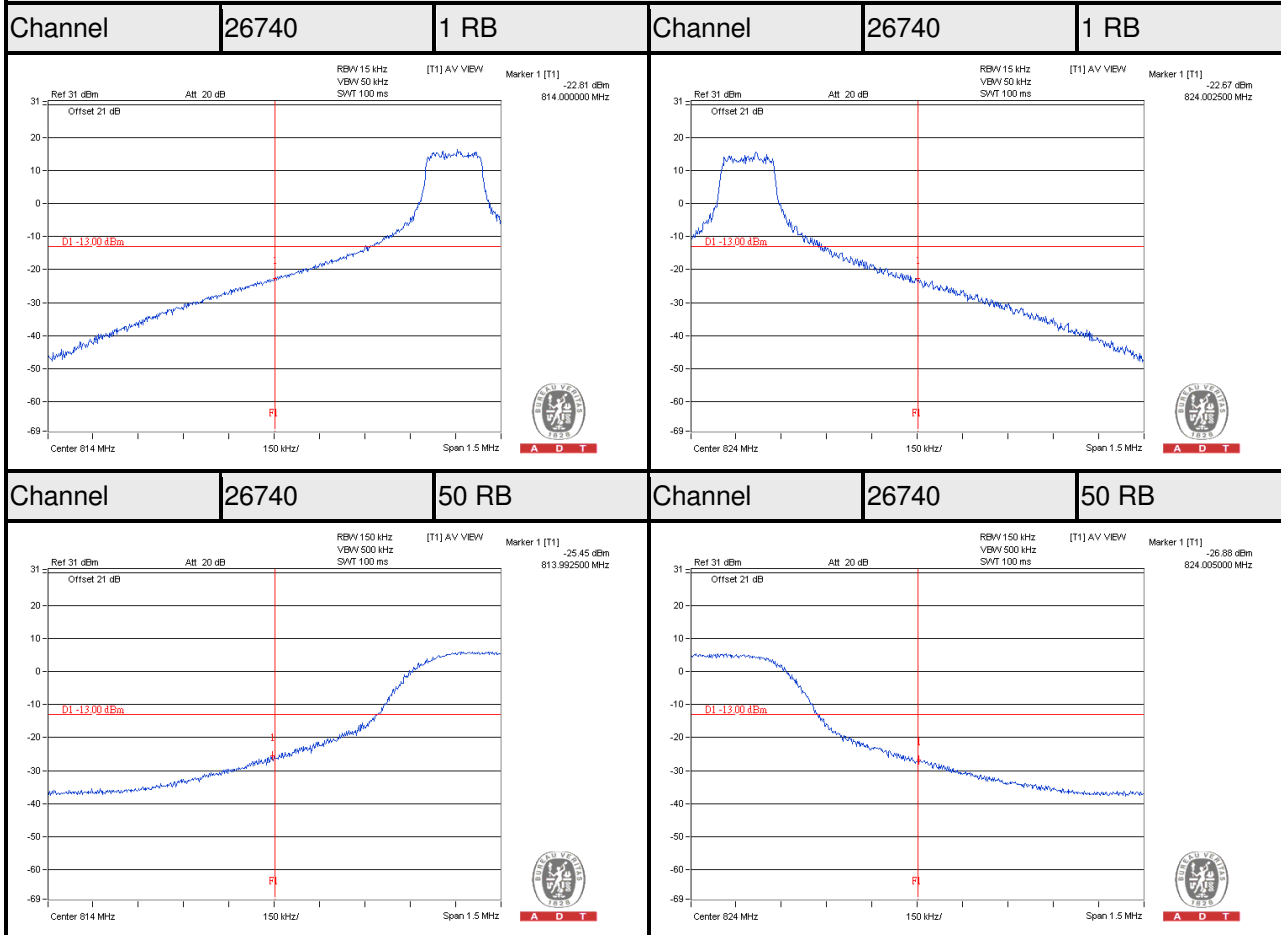


Band / BW	RB Size	Band Edge (dBm)					
		Low CH			High CH		
		26715			26765		
		816.5 MHz			821.5 MHz		
		Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 5M	1	-20.09	-20.35	-17.21	-19.05	-18.98	-16.00
	25	-21.71	-21.89	-18.79	-22.46	-23.17	-19.79

LTE Band 26

Channel Bandwidth 10MHz

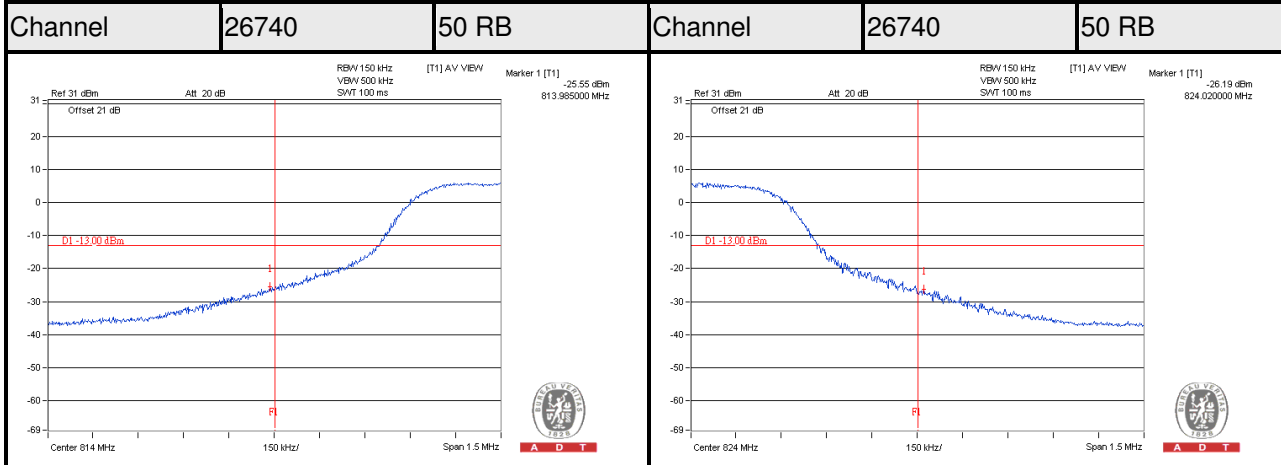
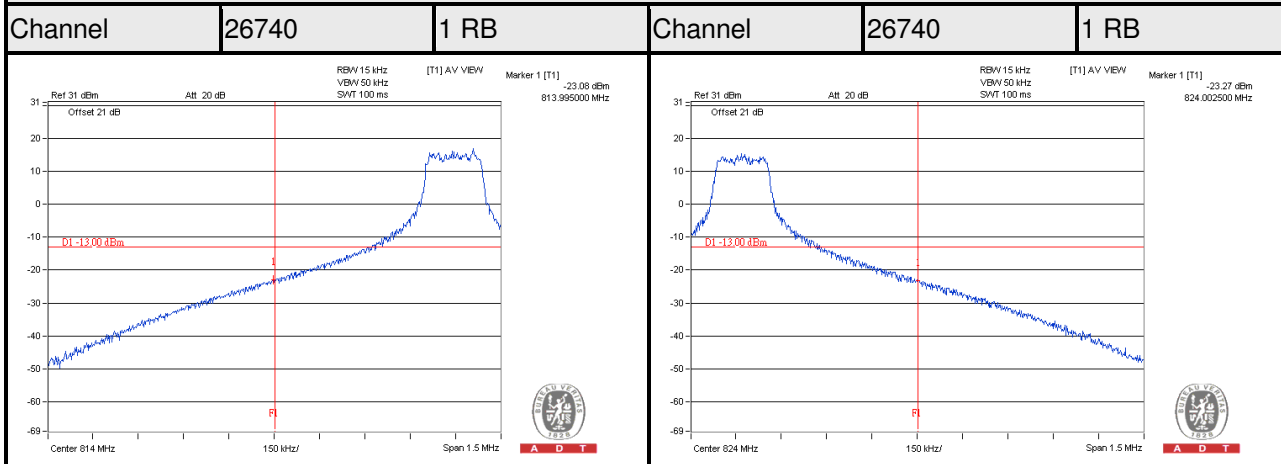
Chain 0



LTE Band 26

Channel Bandwidth 10MHz

Chain 1



Band / BW	RB Size	Band Edge (dBm)					
		Low CH			High CH		
		26740			26740		
		819 MHz			819 MHz		
		Chain0	Chain1	Total	Chain0	Chain1	Total
26 / 10M	1	-22.81	-23.08	-19.93	-22.67	-23.27	-19.95
	50	-25.45	-25.55	-22.49	-26.88	-26.19	-23.51

4.5 Emission Mask Measurement

4.5.1 Limits of Emission Mask Measurement

Per 90.210, equipment used in 809-824/854-869 MHz licensed band to EA or non-EA systems shall comply with the emission mask provisions of §90.691 of this chapter.

Per 90.691, Emission mask requirements

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

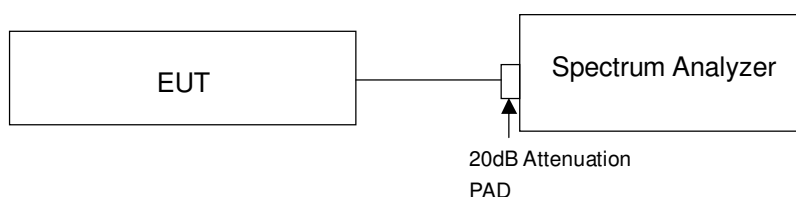
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

4.5.2 Test Procedures

1. The power was measured with Spectrum Analyzer. All measurements were done at 1 channel.
2. For §90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.
3. Record the test plot.

4.5.3 Test Setup

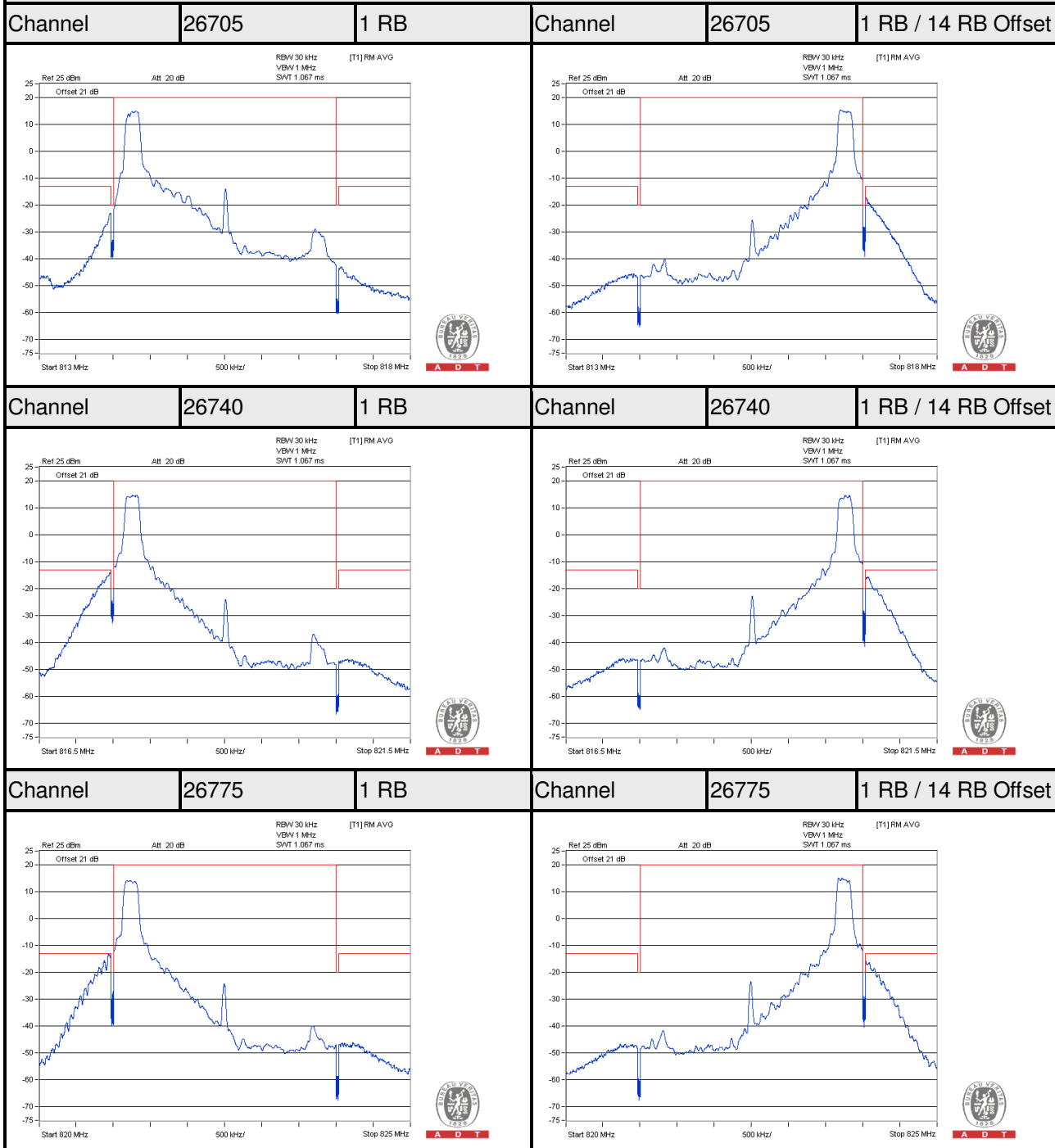


4.5.4 Test Results

LTE Band 26

Channel Bandwidth 3MHz_QPSK

Chain 0

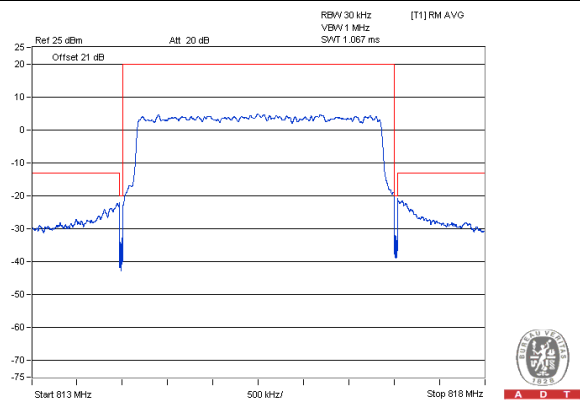


LTE Band 26

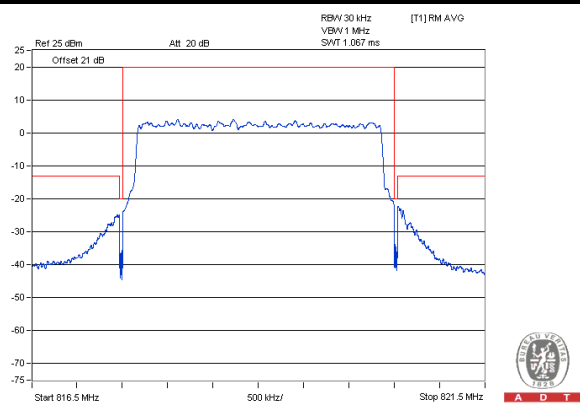
Channel Bandwidth 3MHz_QPSK

Chain 0

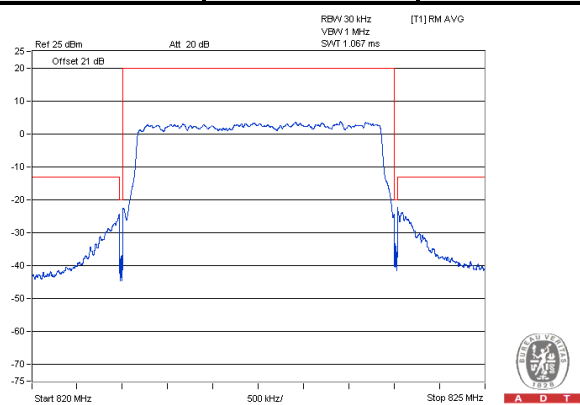
Channel	26705	15 RB
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Channel	26740	15 RB
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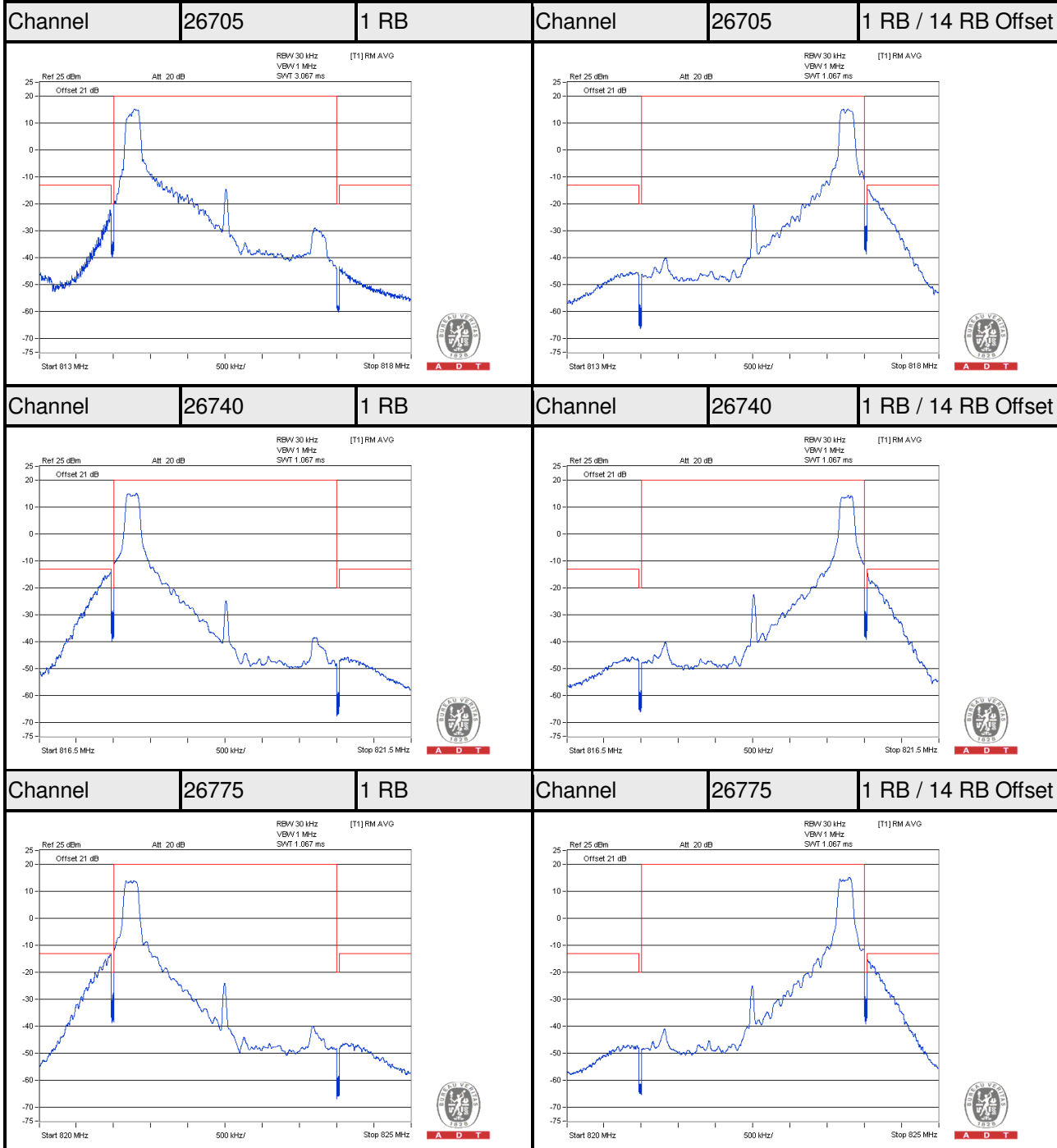
Channel	26775	15 RB
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LTE Band 26

Channel Bandwidth 3MHz_QPSK

Chain 1

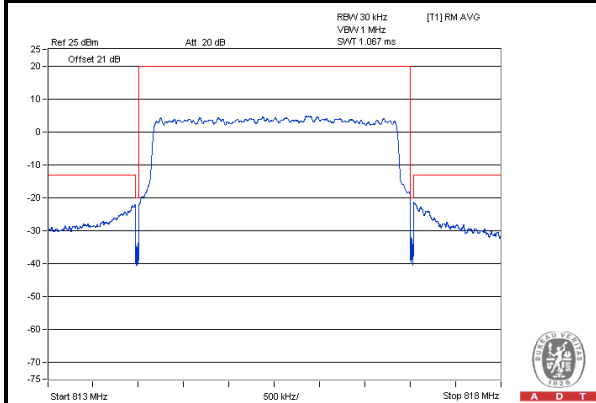


LTE Band 26

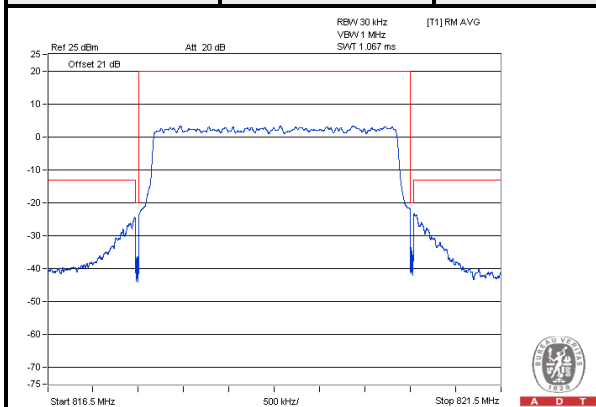
Channel Bandwidth 3MHz_QPSK

Chain 1

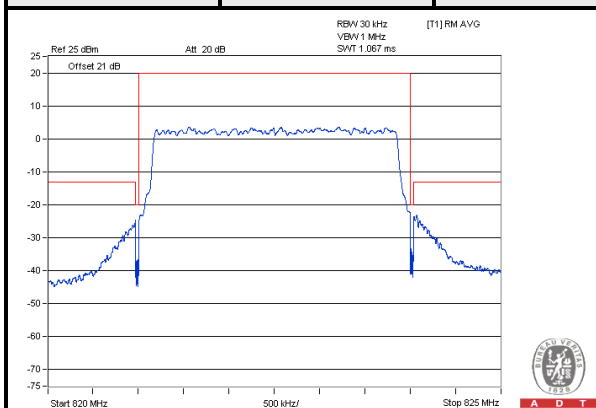
Channel	26705	15 RB
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Channel	26740	15 RB
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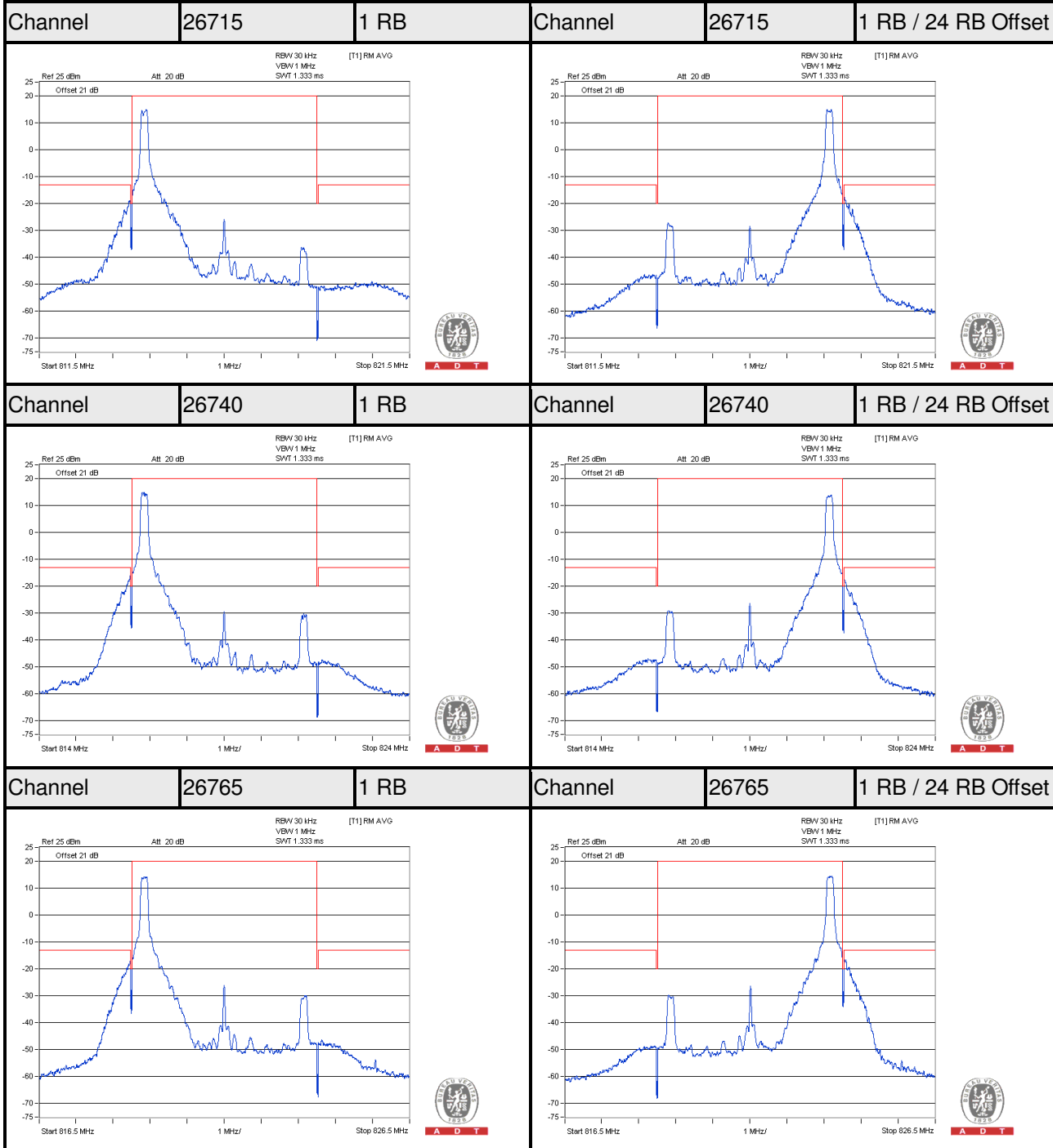
Channel	26775	15 RB
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LTE Band 26

Channel Bandwidth 5MHz_QPSK

Chain 0

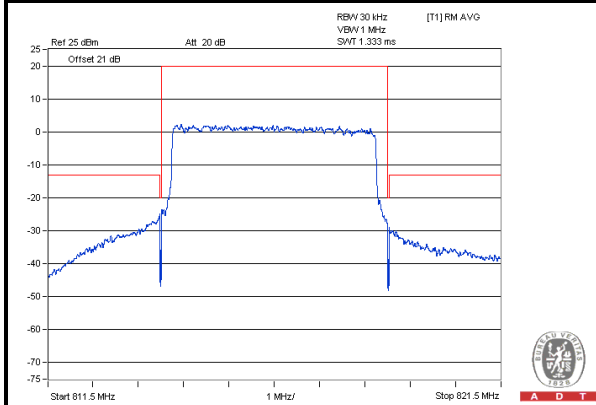


LTE Band 26

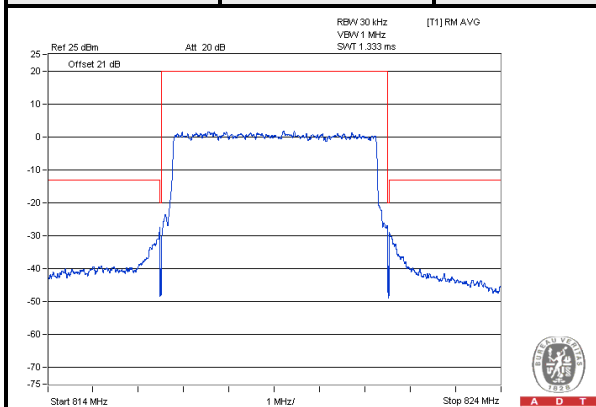
Channel Bandwidth 5MHz_QPSK

Chain 0

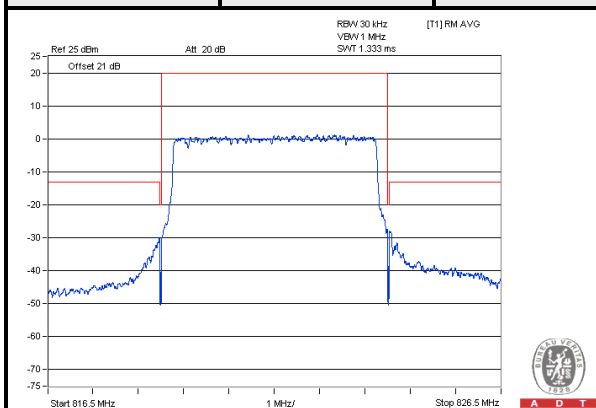
Channel	26715	25 RB
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Channel	26740	25 RB
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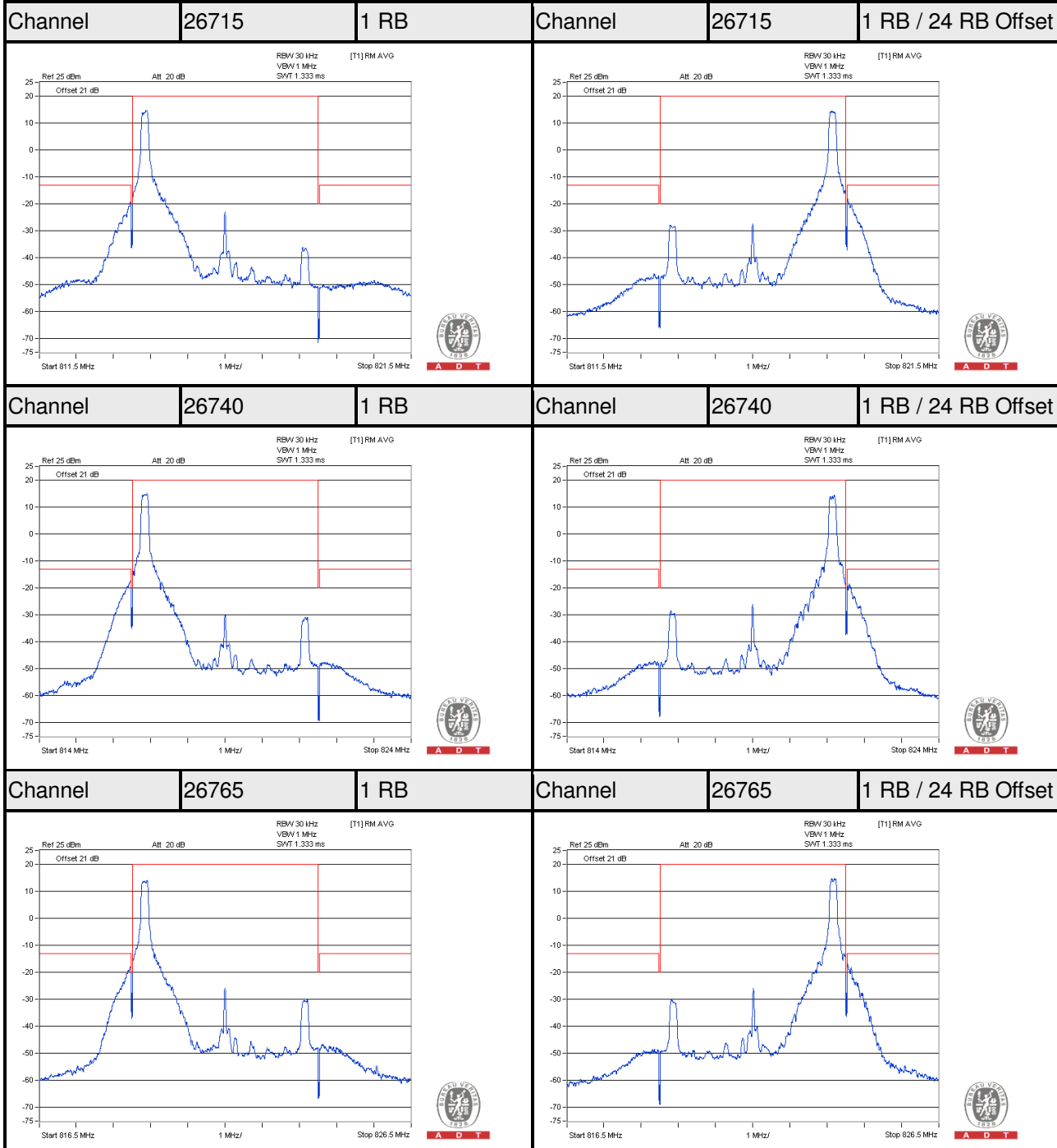
Channel	26765	25 RB
---------	-------	-------



LTE Band 26

Channel Bandwidth 5MHz_QPSK

Chain 1

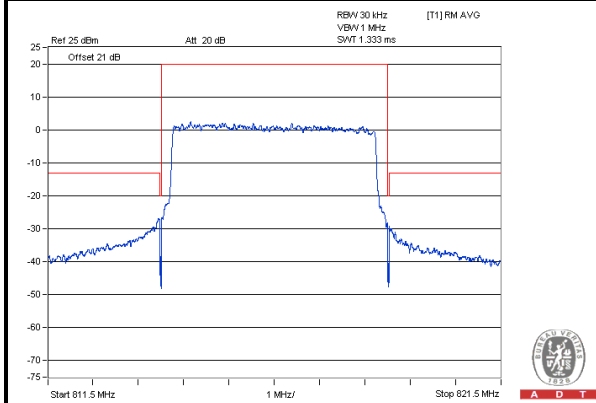


LTE Band 26

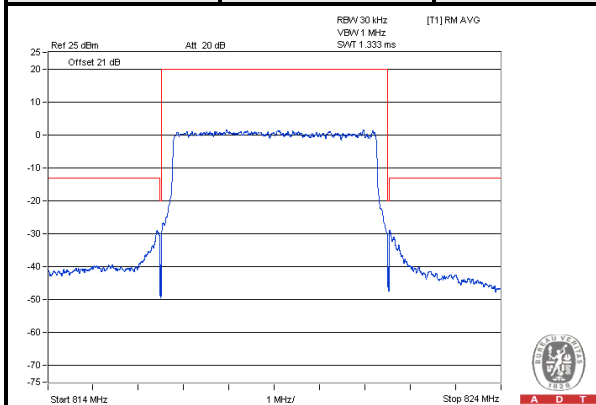
Channel Bandwidth 5MHz_QPSK

Chain 1

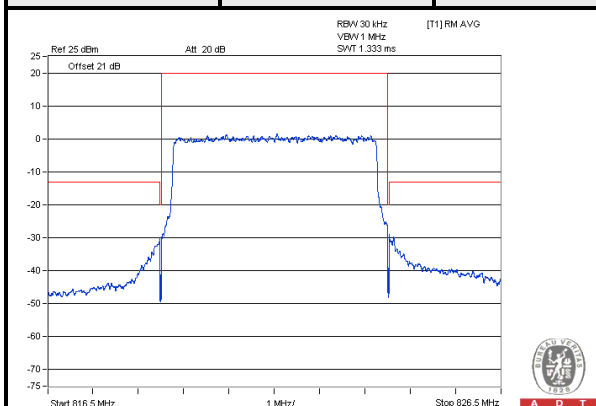
Channel	26715	25 RB
---------	-------	-------



Channel	26740	25 RB
---------	-------	-------



Channel	26765	25 RB
---------	-------	-------

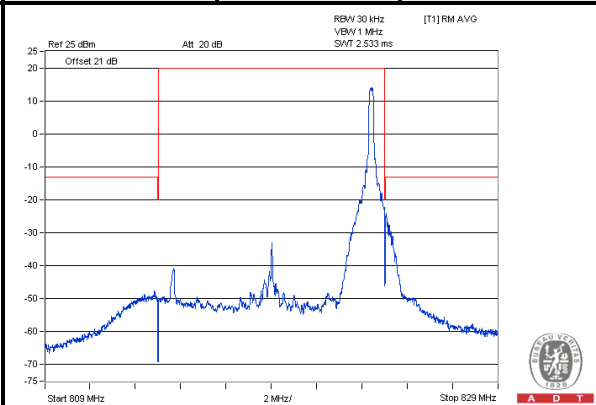
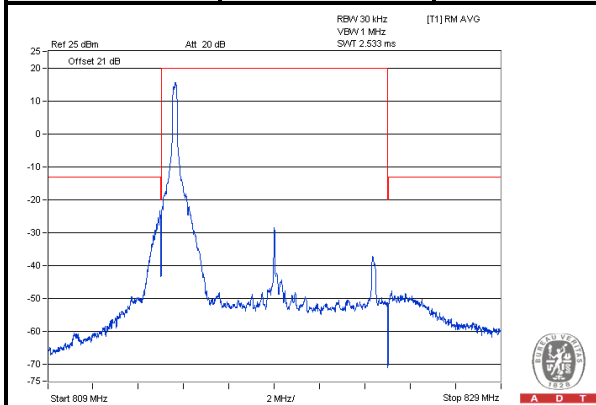


LTE Band 26

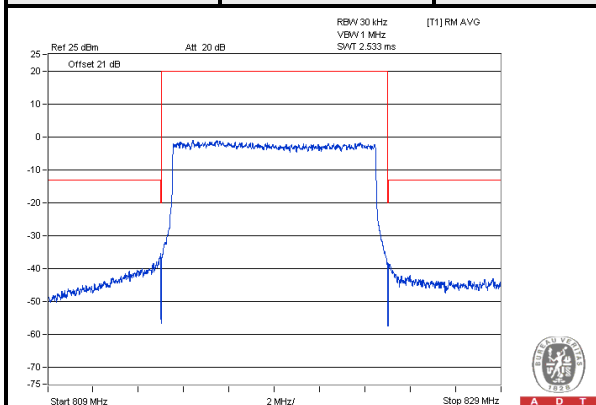
Channel Bandwidth 10MHz_QPSK

Chain 0

Channel	26740	1 RB	Channel	26740	1 RB / 49 RB Offset
---------	-------	------	---------	-------	---------------------



Channel	26740	50 RB
---------	-------	-------

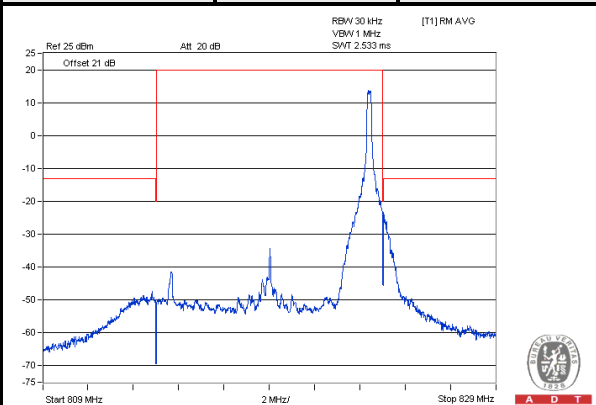
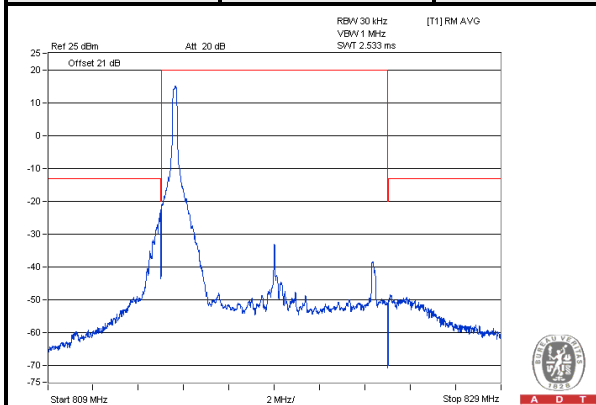


LTE Band 26

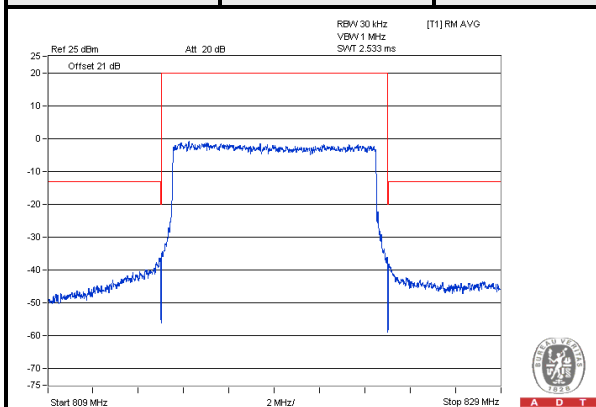
Channel Bandwidth 10MHz_QPSK

Chain 1

Channel	26740	1 RB	Channel	26740	1 RB / 49 RB Offset
---------	-------	------	---------	-------	---------------------



Channel	26740	50 RB
---------	-------	-------

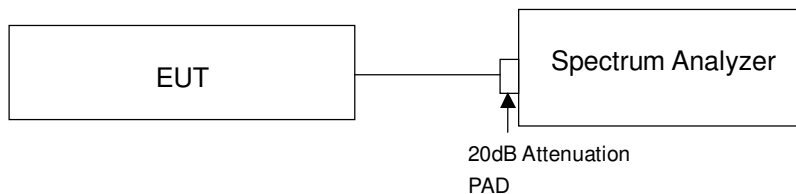


4.6 Peak to Average Ratio

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

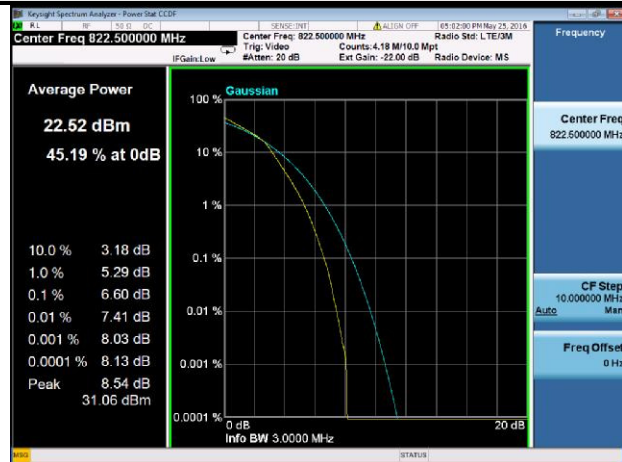
- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

LTE Band 26							
Channel Bandwidth 3MHz							
Channel	Frequency (MHz)	Peak To Average Ratio (dB)					
		QPSK		16QAM		64QAM	
		Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
26705	815.50	4.68	4.85	5.47	5.75	5.66	5.82
26740	819.00	5.77	5.92	6.20	6.42	6.21	6.37
26775	822.50	5.67	5.80	6.42	6.60	6.37	6.49
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
26715	816.50	5.05	5.20	5.57	5.81	5.61	5.72
26740	819.00	5.63	5.79	5.91	6.20	5.65	5.98
26765	821.50	5.67	5.94	6.36	6.67	6.82	6.94
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
26740	819.00	5.74	6.02	6.21	6.50	6.25	6.60

Spectrum Plot Of Worst Value

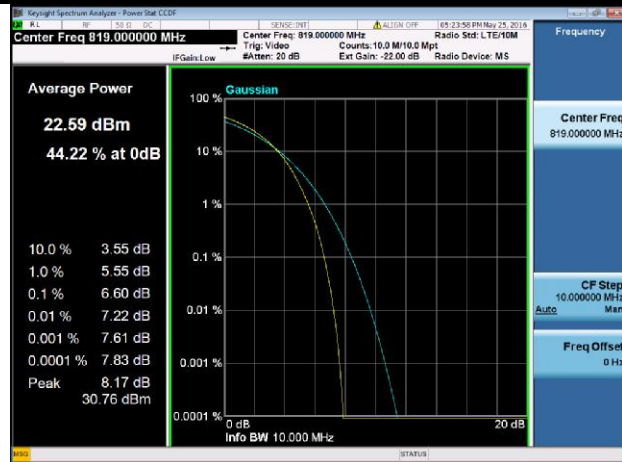
3MHz / 16QAM



5MHz / 64QAM



10MHz / 64QAM



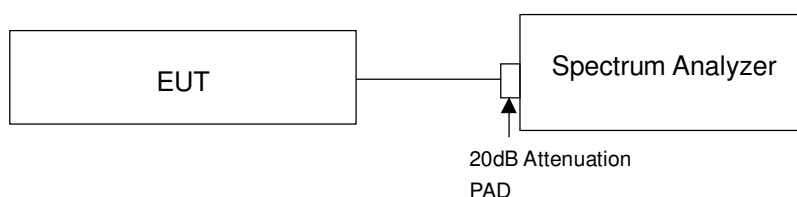
4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm .

On all frequencies between 769 – 775 MHz and 799 – 805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

4.7.2 Test Setup



4.7.3 Test Procedure

- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer.
- When the spectrum scanned from 9kHz to 9GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set $RB=1\text{MHz}$, $VB=3\text{MHz}$.

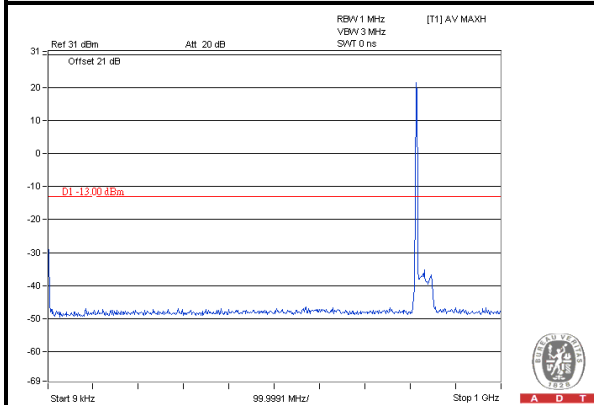
4.7.4 Test Results

LTE Band 26 Channel Band width: 3MHz

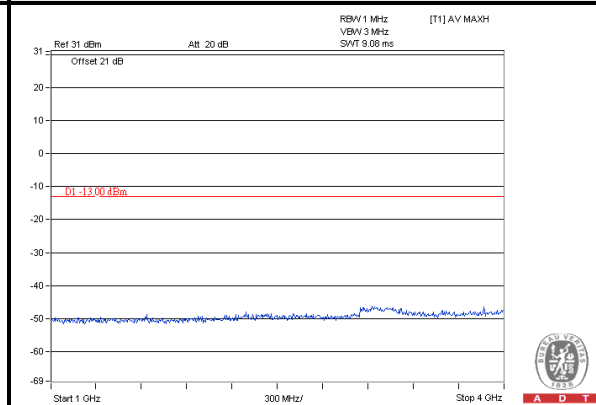
Chain 0

Channel 26705

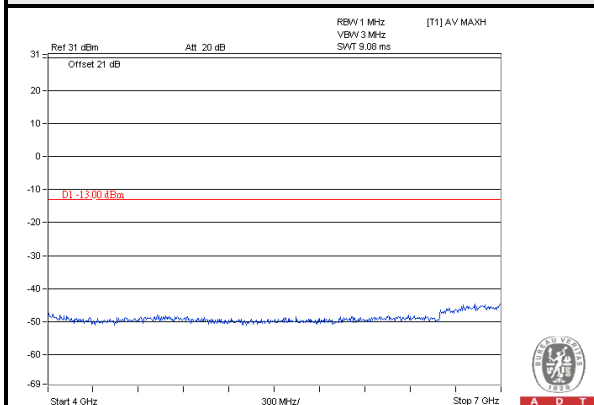
Frequency Range : 9kHz~1GHz



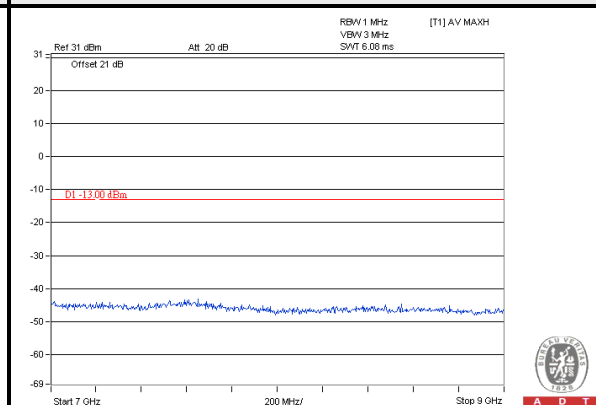
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

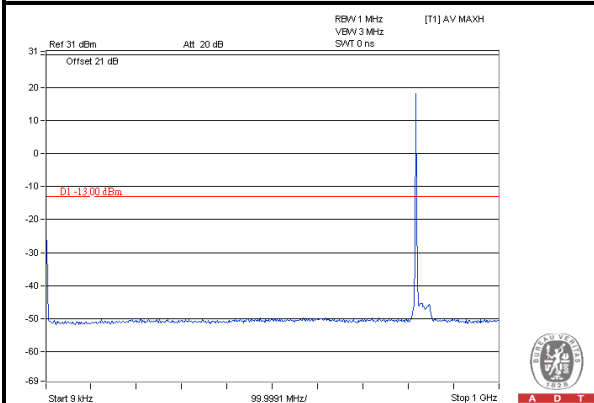


LTE Band 26 Channel Band width: 3MHz

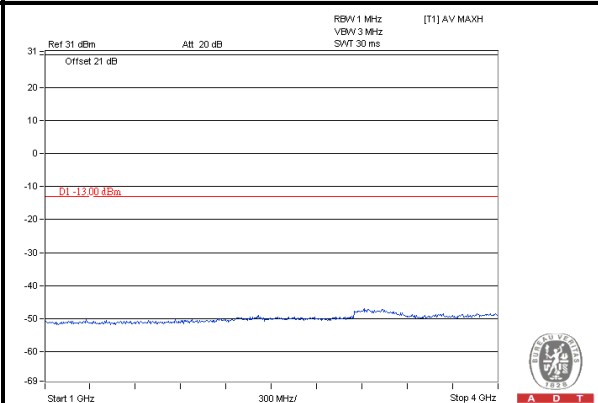
Chain 0

Channel 26740

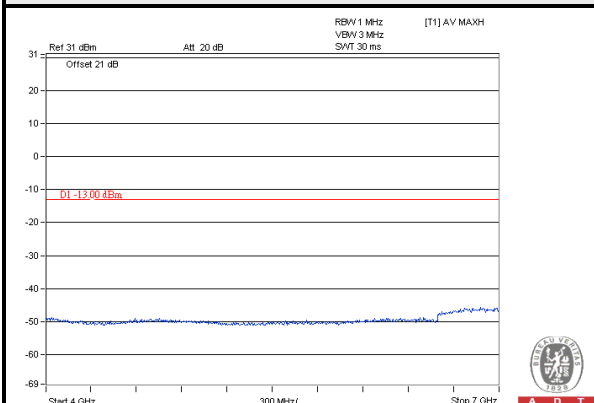
Frequency Range : 9kHz~1GHz



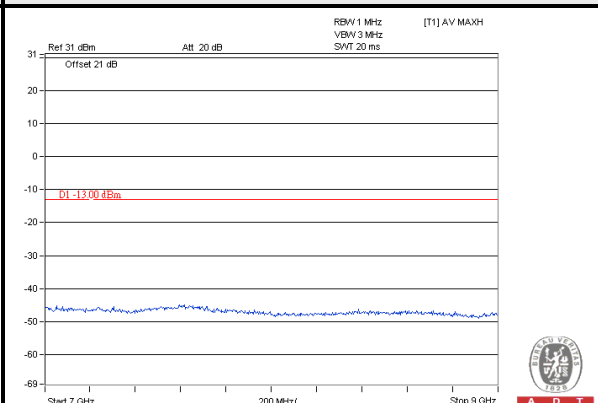
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

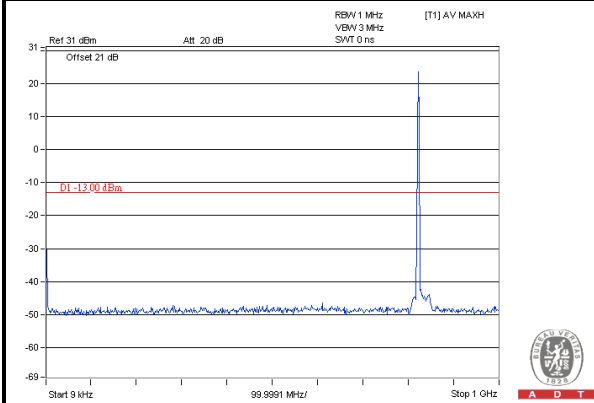


LTE Band 26 Channel Band width: 3MHz

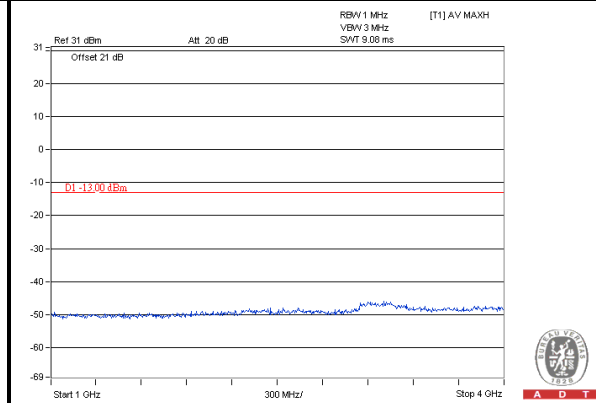
Chain 0

Channel 26775

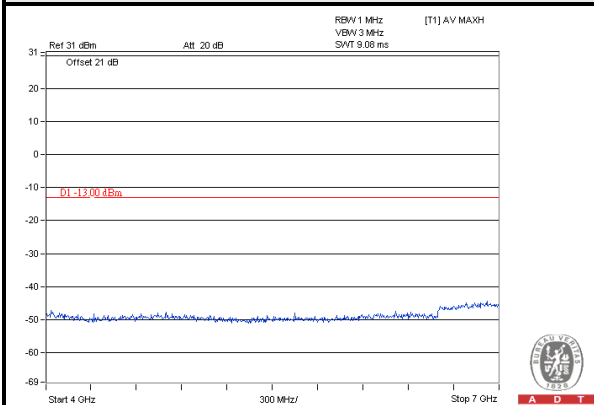
Frequency Range : 9kHz~1GHz



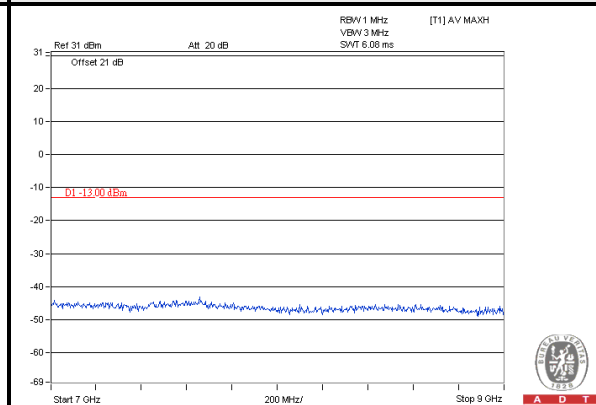
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

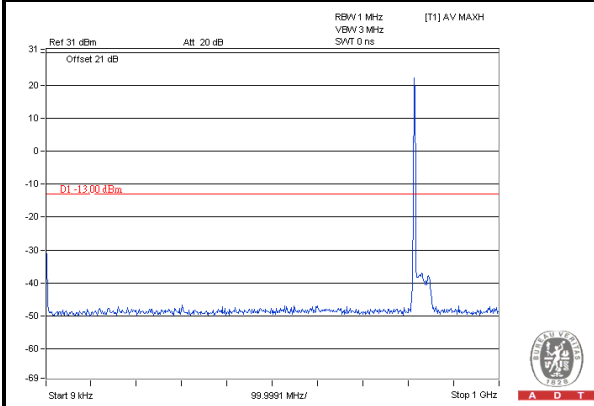


LTE Band 26 Channel Band width: 3MHz

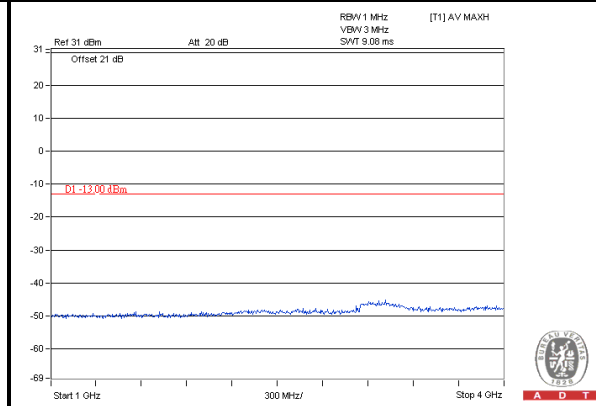
Chain 1

Channel 26705

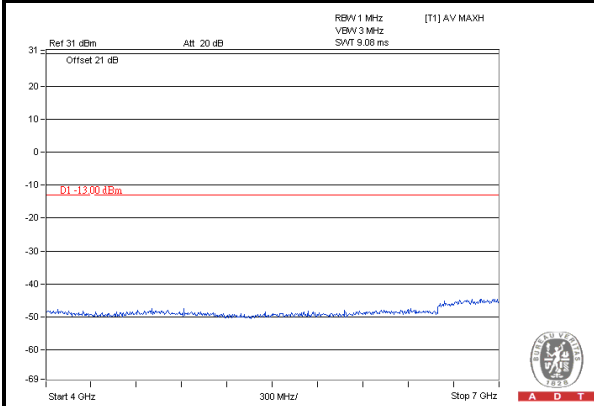
Frequency Range : 9kHz~1GHz



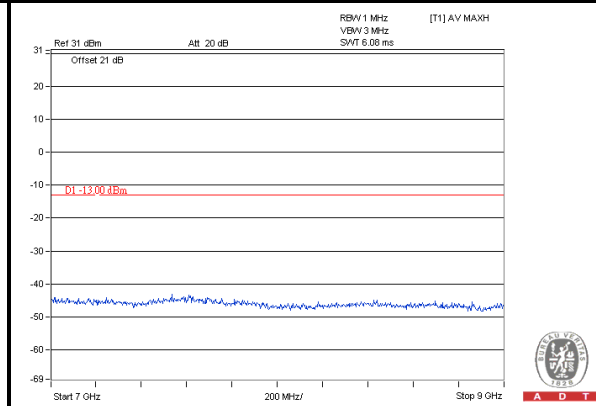
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

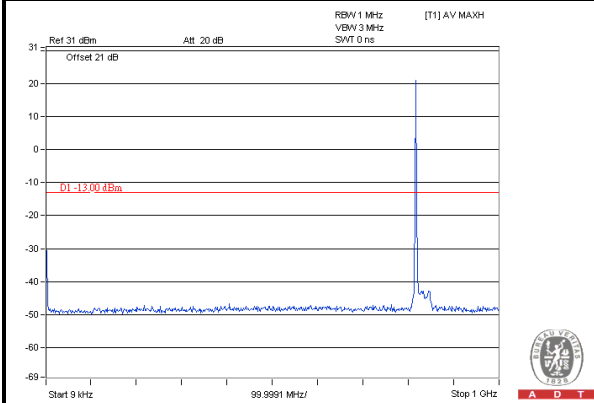


LTE Band 26 Channel Band width: 3MHz

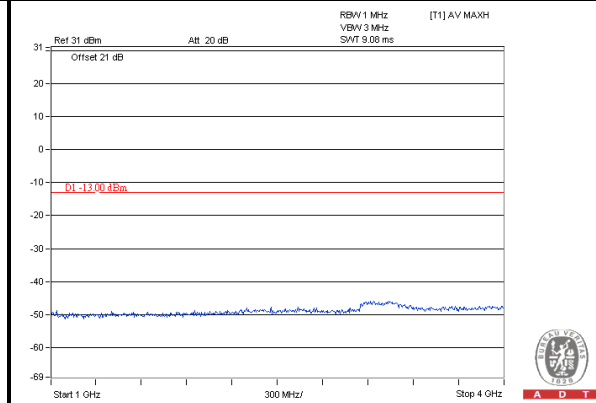
Chain 1

Channel 26740

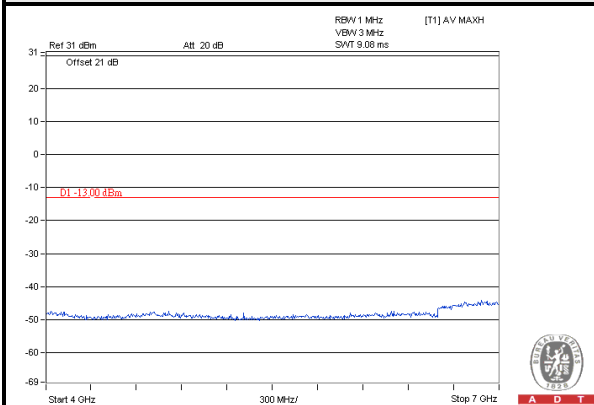
Frequency Range : 9kHz~1GHz



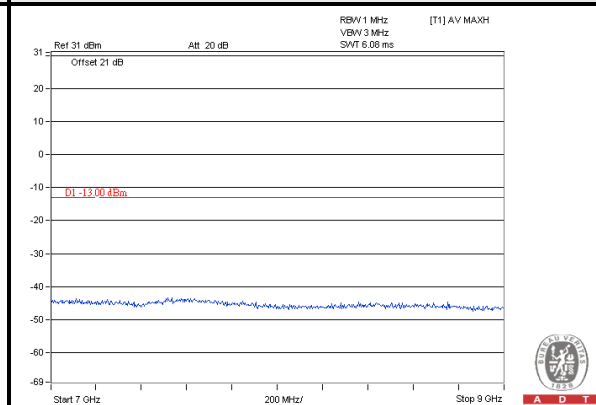
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

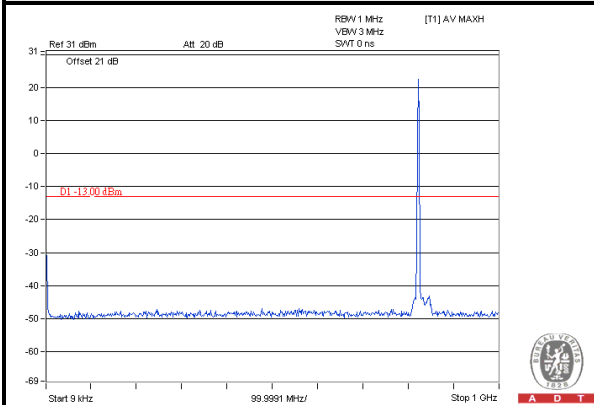


LTE Band 26 Channel Band width: 3MHz

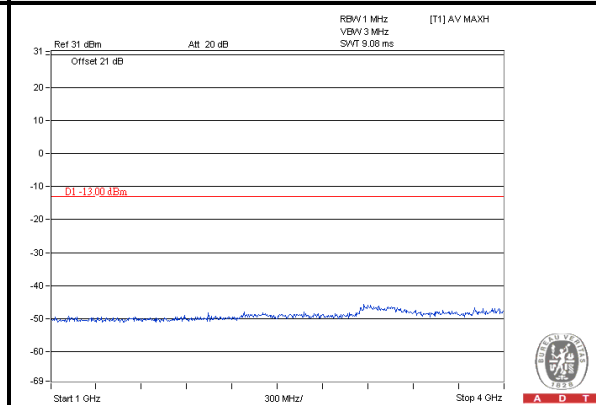
Chain 1

Channel 26775

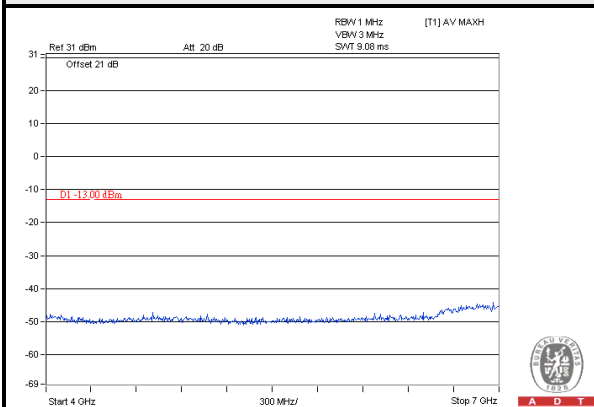
Frequency Range : 9kHz~1GHz



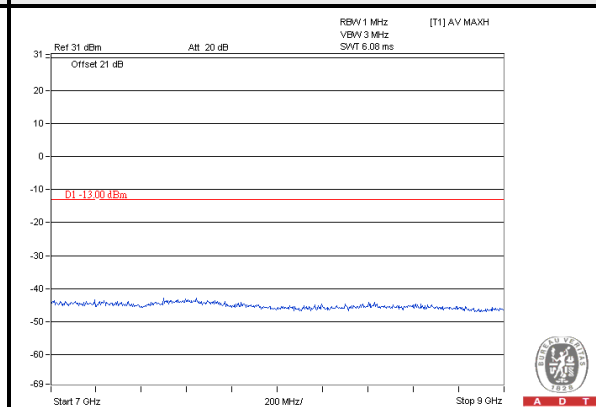
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

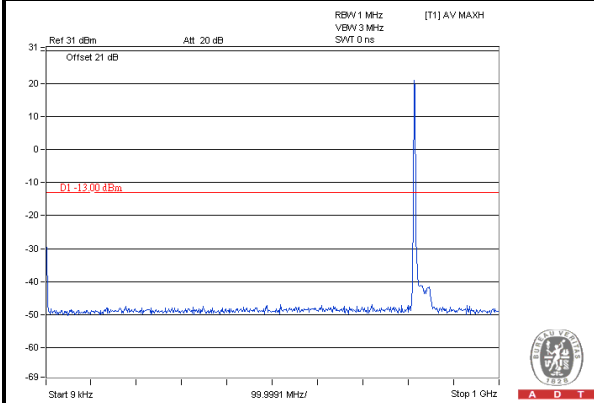


LTE Band 26 Channel Band width: 5MHz

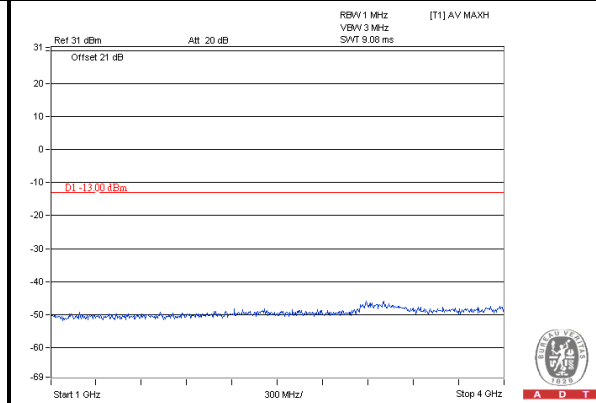
Chain 0

Channel 26715

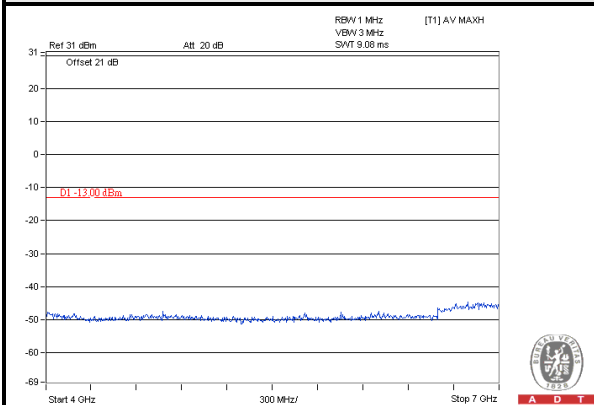
Frequency Range : 9kHz~1GHz



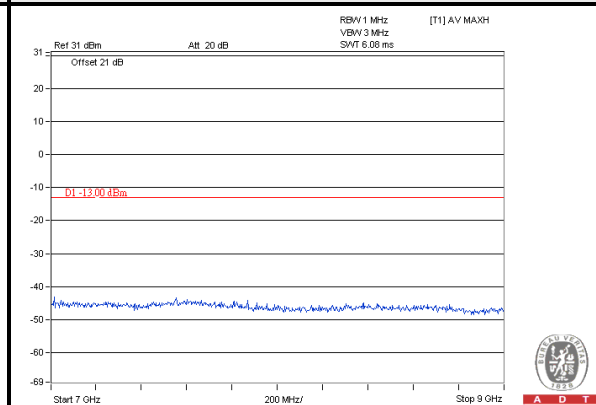
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

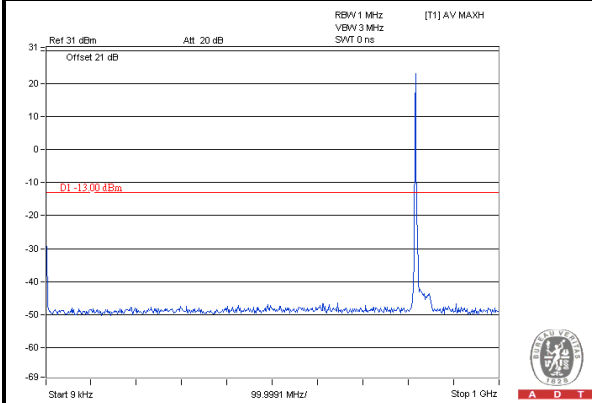


LTE Band 26 Channel Band width: 5MHz

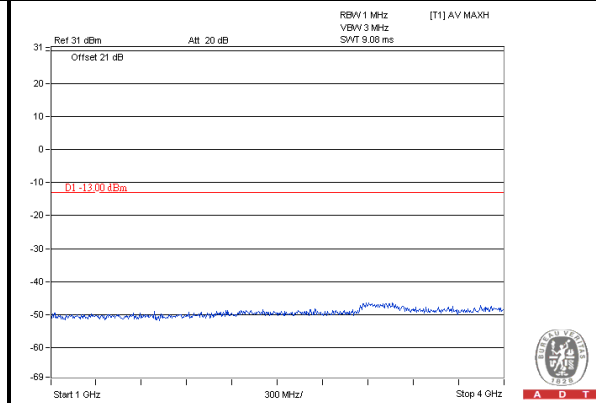
Chain 0

Channel 26740

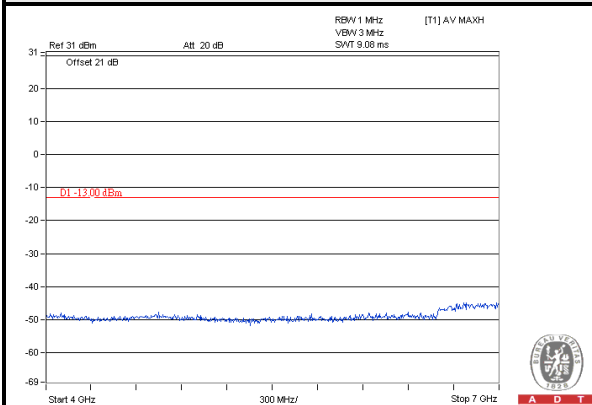
Frequency Range : 9kHz~1GHz



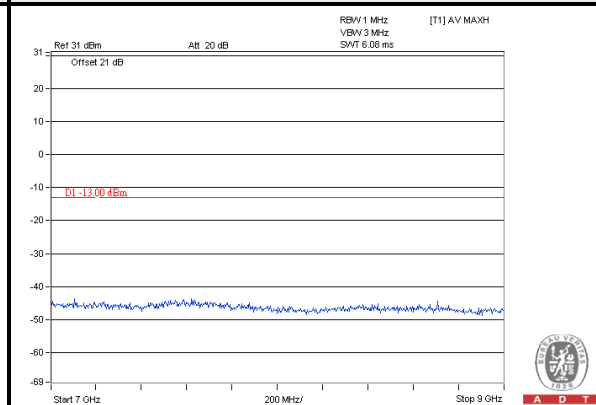
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

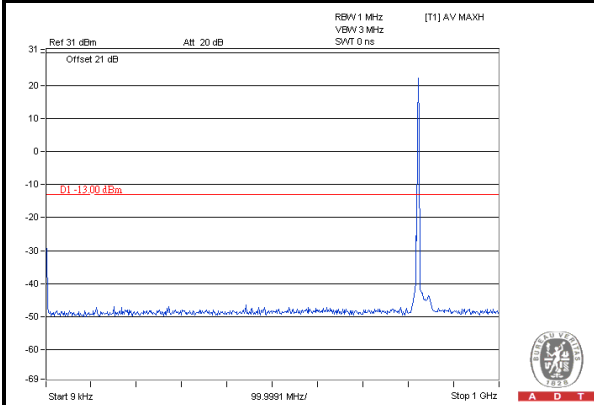


LTE Band 26 Channel Band width: 5MHz

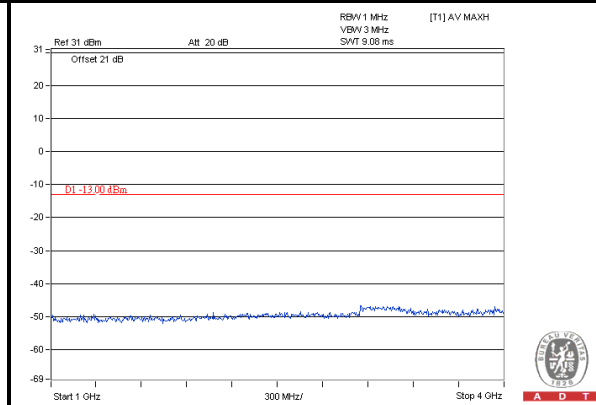
Chain 0

Channel 26765

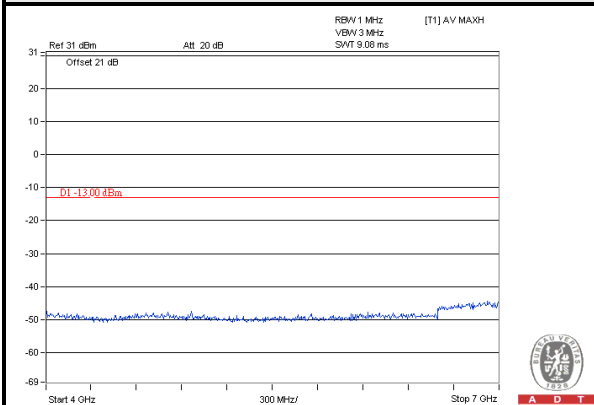
Frequency Range : 9kHz~1GHz



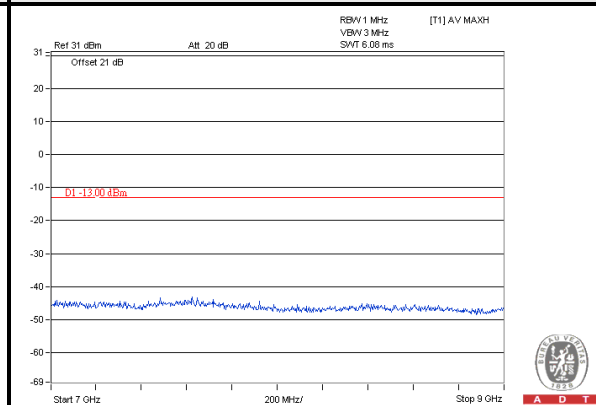
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

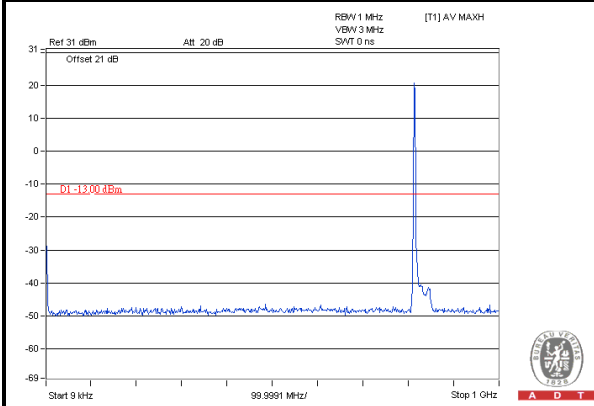


LTE Band 26 Channel Band width: 5MHz

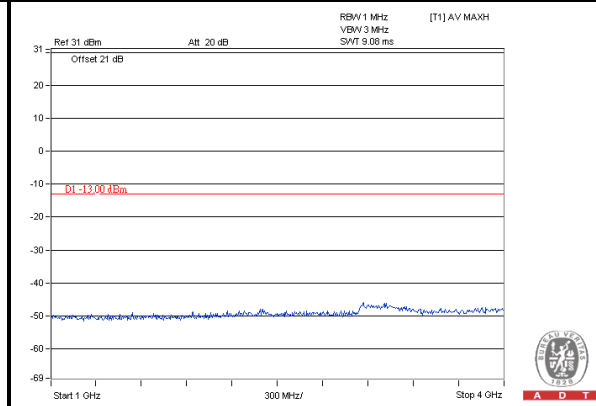
Chain 1

Channel 26715

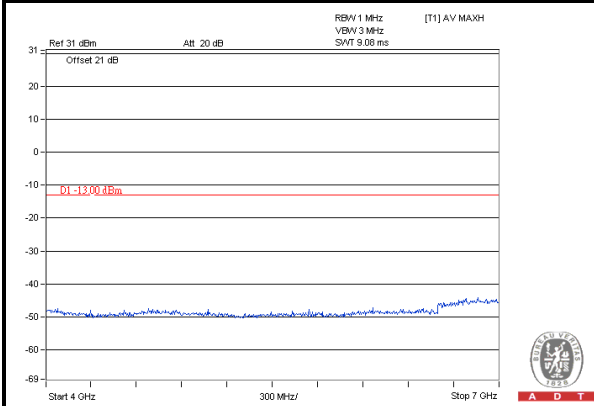
Frequency Range : 9kHz~1GHz



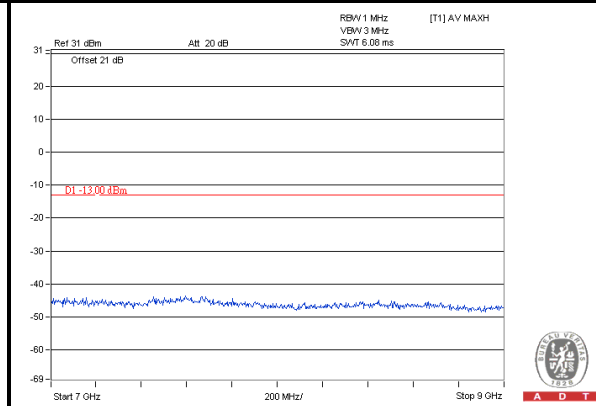
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

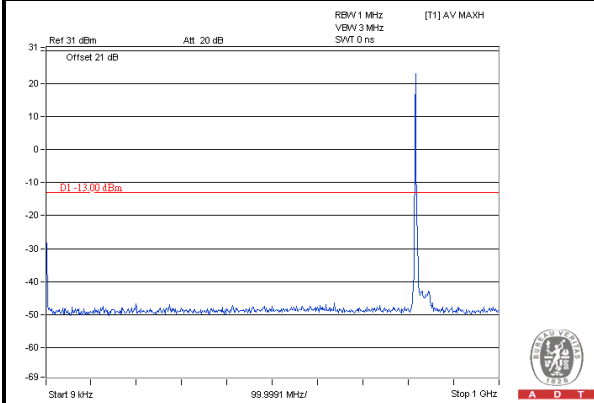


LTE Band 26 Channel Band width: 5MHz

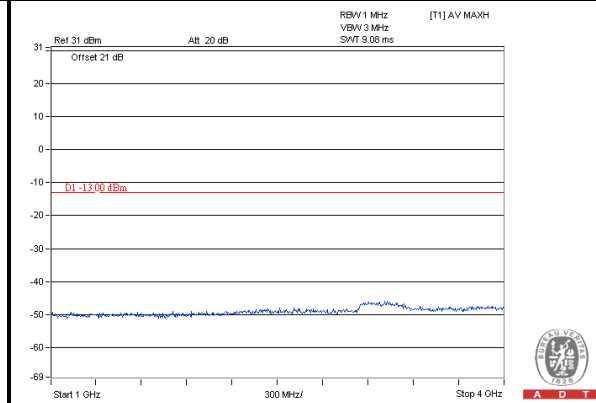
Chain 1

Channel 26740

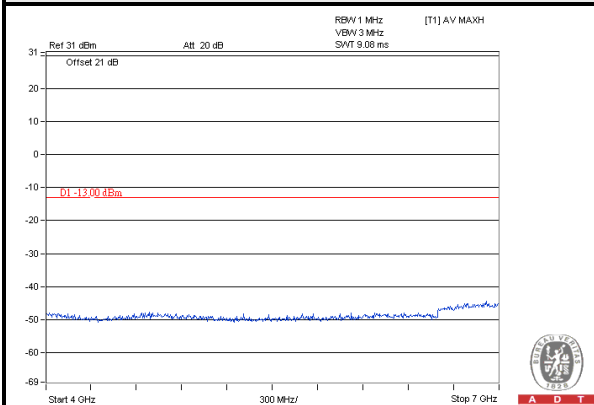
Frequency Range : 9kHz~1GHz



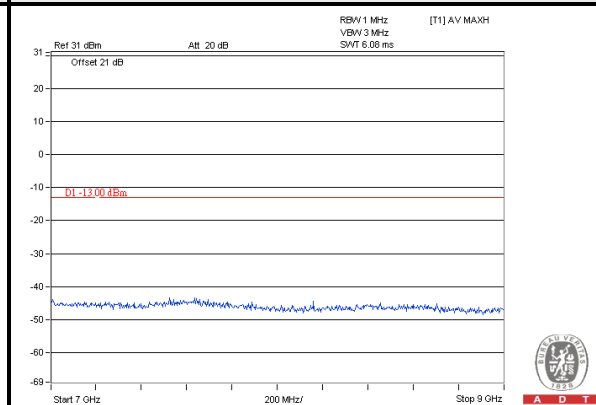
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

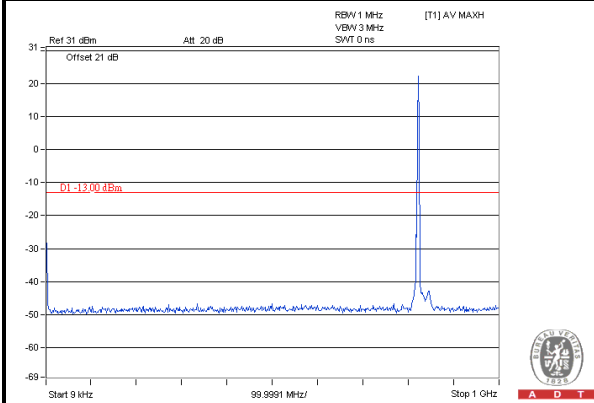


LTE Band 26 Channel Band width: 5MHz

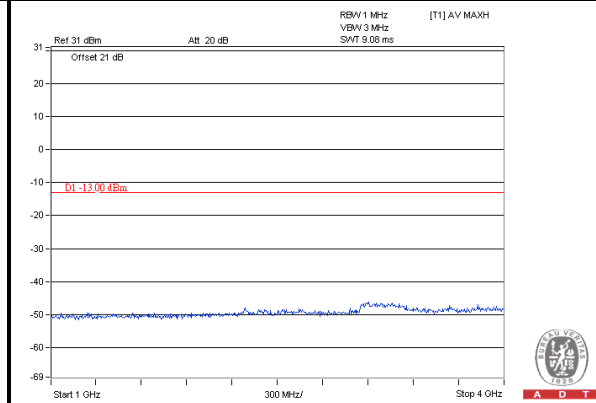
Chain 1

Channel 26765

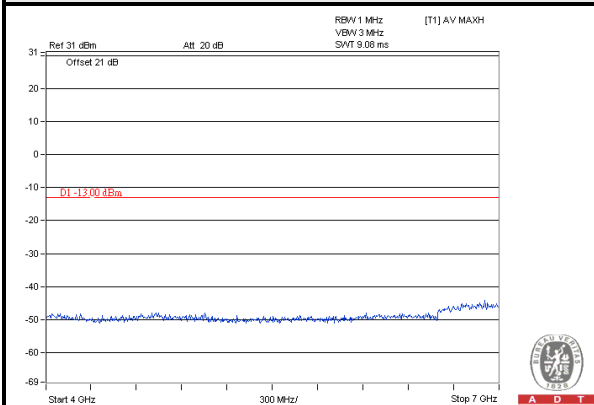
Frequency Range : 9kHz~1GHz



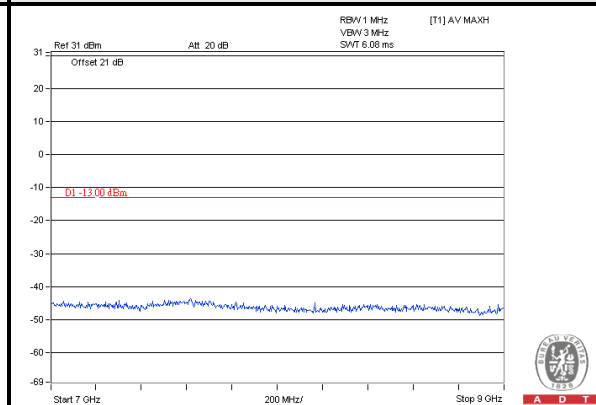
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

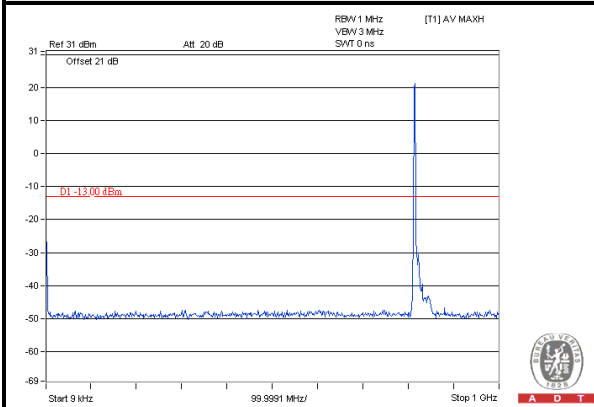


LTE Band 26 Channel Band width: 10MHz

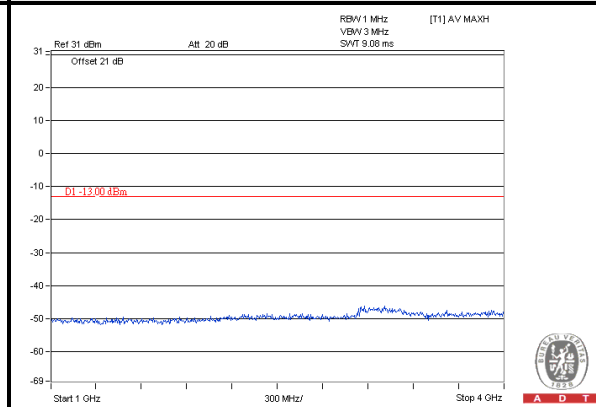
Chain 0

Channel 26740

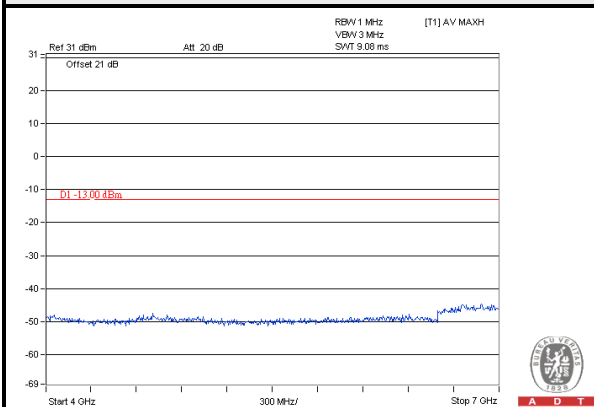
Frequency Range : 9kHz~1GHz



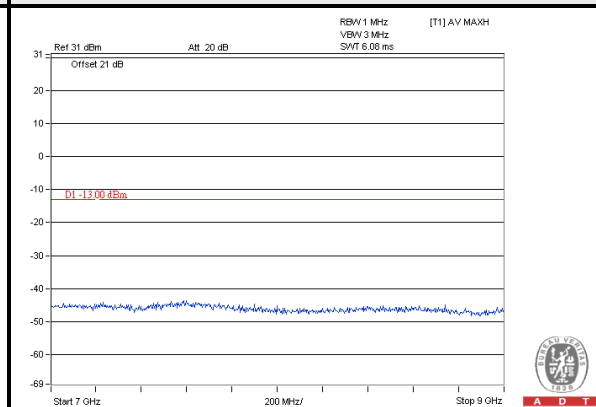
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz

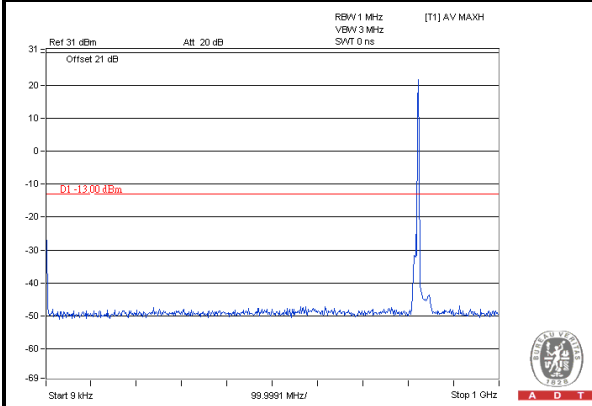


LTE Band 26 Channel Band width: 10MHz

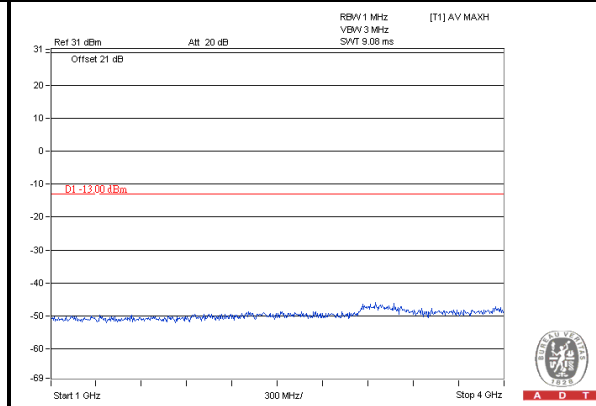
Chain 1

Channel 26740

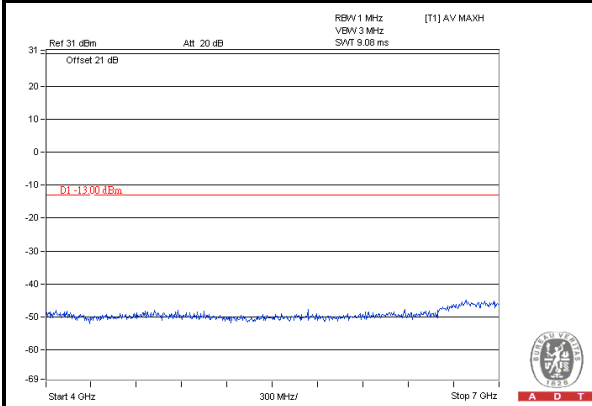
Frequency Range : 9kHz~1GHz



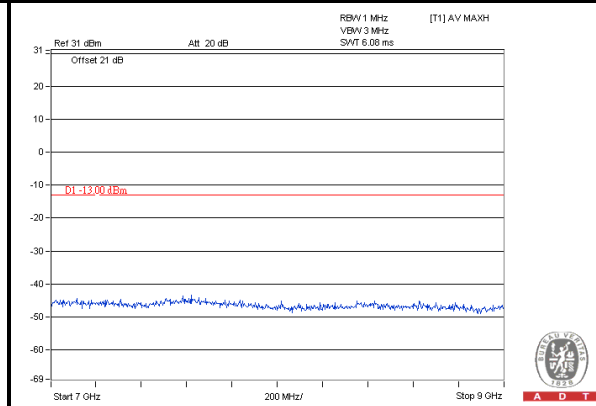
Frequency Range : 1GHz~4GHz



Frequency Range : 4GHz~7GHz



Frequency Range : 7GHz~9GHz



4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

4.8.2 Test Procedure

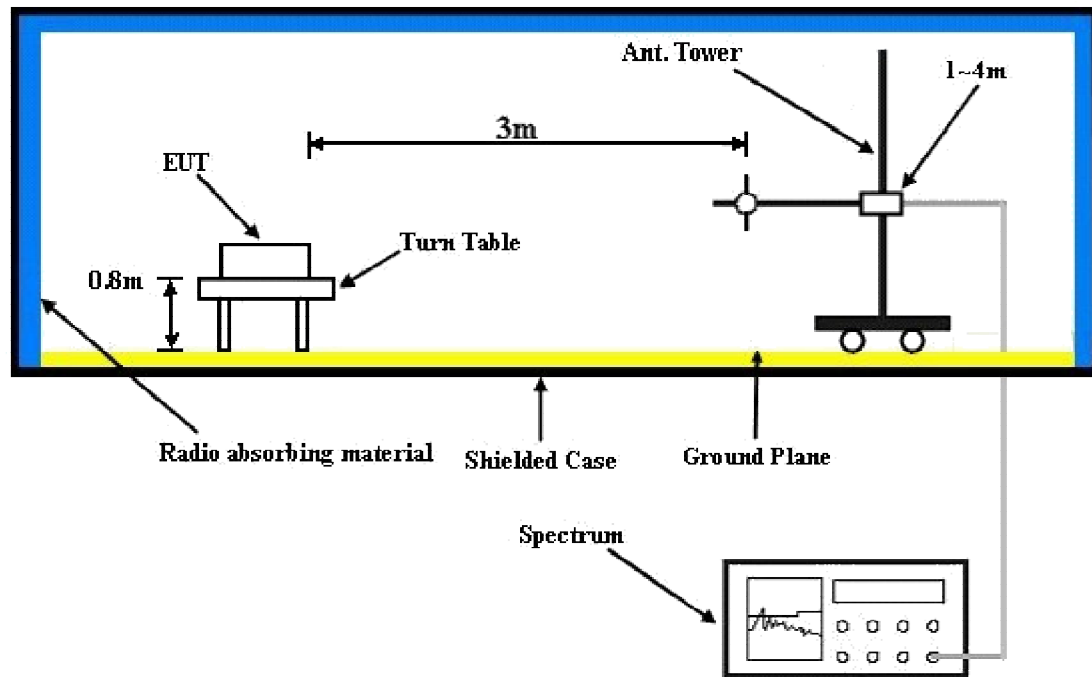
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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 26

Channel Bandwidth: 3MHz

Mode	TX channel 26705	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	117.30	-63.58	-80.85	12.49	-68.36	-13.00	-55.36
2	156.10	-64.34	-81.15	14.98	-66.17	-13.00	-53.17
3	256.01	-60.22	-79.93	14.47	-65.46	-13.00	-52.46
4	321.00	-63.61	-83.33	16.86	-66.47	-13.00	-53.47
5	407.33	-67.39	-87.99	18.90	-69.09	-13.00	-56.09
6	507.24	-66.99	-88.51	21.46	-67.05	-13.00	-54.05
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	39.70	-69.23	-82.13	13.77	-68.36	-13.00	-55.36
2	164.83	-63.44	-80.65	14.69	-65.96	-13.00	-52.96
3	247.28	-61.45	-79.68	14.12	-65.56	-13.00	-52.56
4	321.00	-67.33	-87.37	16.86	-70.51	-13.00	-57.51
5	511.12	-69.68	-91.65	21.57	-70.08	-13.00	-57.08
6	580.96	-69.98	-91.93	23.09	-68.84	-13.00	-55.84

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: 5MHz

Mode	TX channel 26715	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	117.30	-65.70	-82.97	12.49	-70.48	-13.00	-57.48
2	184.23	-65.56	-83.20	12.92	-70.28	-13.00	-57.28
3	294.81	-63.05	-81.83	15.97	-65.86	-13.00	-52.86
4	372.41	-68.61	-89.11	18.14	-70.97	-13.00	-57.97
5	546.04	-61.14	-83.25	22.08	-61.17	-13.00	-48.17
6	667.29	-74.94	-97.05	24.57	-72.48	-13.00	-59.48
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	36.79	-70.35	-84.17	13.43	-70.74	-13.00	-57.74
2	77.53	-66.80	-85.63	10.80	-74.83	-13.00	-61.83
3	182.29	-65.34	-83.37	13.04	-70.33	-13.00	-57.33
4	256.01	-65.25	-83.61	14.47	-69.14	-13.00	-56.14
5	589.69	-71.86	-93.91	23.33	-70.58	-13.00	-57.58
6	722.58	-76.37	-98.68	25.35	-73.33	-13.00	-60.33

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 26740	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	121.18	-63.33	-80.67	12.81	-67.86	-13.00	-54.86
2	159.98	-62.57	-79.69	15.08	-64.61	-13.00	-51.61
3	247.28	-58.06	-77.78	14.12	-63.66	-13.00	-50.66
4	312.27	-65.07	-84.58	16.65	-67.93	-13.00	-54.93
5	493.66	-68.65	-90.03	21.15	-68.88	-13.00	-55.88
6	584.84	-68.68	-90.27	23.18	-67.09	-13.00	-54.09
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	36.79	-69.82	-83.64	13.43	-70.21	-13.00	-57.21
2	119.24	-69.04	-85.95	12.61	-73.34	-13.00	-60.34
3	242.43	-62.85	-81.14	13.91	-67.23	-13.00	-54.23
4	303.54	-72.66	-92.60	16.26	-76.34	-13.00	-63.34
5	424.79	-73.74	-94.93	19.58	-75.35	-13.00	-62.35
6	580.96	-71.49	-93.44	23.09	-70.35	-13.00	-57.35

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 26

Channel Bandwidth: 3MHz

Mode	TX channel 26705	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	1629.00	-35.34	-51.34	12.07	-39.27	-13.00	-26.27
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	1629.00	-41.19	-57.19	12.07	-45.12	-13.00	-32.12

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 26740	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	1636.00	-36.33	-52.24	12.06	-40.18	-13.00	-27.18
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	1636.00	-42.55	-58.41	12.06	-46.35	-13.00	-33.35

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 26775	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	1642.00	-37.62	-53.48	12.07	-41.41	-13.00	-28.41
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	1642.00	-43.00	-58.75	12.07	-46.68	-13.00	-33.68

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: 5MHz

Mode	TX channel 26715	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	1630.00	-27.35	-43.33	12.06	-31.27	-13.00	-18.27
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	1630.00	-33.45	-49.43	12.06	-37.37	-13.00	-24.37

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 26740	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	1633.00	-34.92	-50.88	12.07	-38.81	-13.00	-25.81
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	1633.00	-36.43	-52.36	12.07	-40.29	-13.00	-27.29

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 26765	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	1639.00	-35.91	-51.79	12.06	-39.73	-13.00	-26.73
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	1639.00	-37.56	-53.36	12.06	-41.30	-13.00	-28.30

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 26740	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	1630.00	-39.00	-54.98	12.06	-42.92	-13.00	-29.92
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	1630.00	-40.75	-56.73	12.06	-44.67	-13.00	-31.67

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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