FCC Test Report
(Part 90 Subpart S)

Report No.:	RF180129C24-3
FCC ID:	JOYDA39
Test Model:	AL-T52V1
Received Date:	Jan. 29, 2018
Test Date:	Feb. 02 ~ Feb. 06, 2018
Issued Date:	Feb. 27, 2018
Applicant:	Kyocera Corporation
Address:	2-1-1 Kagahara,Tsuzuki-ku Yokohama-city Kanagawa 224-8502 Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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

Table of Contents

Release Control Record **4**

1 Certificate of Conformity **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 6
2.2 Test Site and Instruments 7

3 General Information **8**

3.1 General Description of EUT 8
3.2 Configuration of System under Test 10
3.2.1 Description of Support Units 10
3.3 Test Mode Applicability and Tested Channel Detail 11
3.4 EUT Operating Conditions 13
3.5 General Description of Applied Standards 13

4 Test Types and Results **14**

4.1 Output Power Measurement 14
4.1.1 Limits of Output Power Measurement 14
4.1.2 Test Procedures 14
4.1.3 Test Setup 15
4.1.4 Test Results 16
4.2 Modulation Characteristics Measurement 21
4.2.1 Limits of Modulation Characteristics 21
4.2.2 Test Procedure 21
4.2.3 Test Setup 21
4.2.4 Test Results 22
4.3 Frequency Stability Measurement 23
4.3.1 Limits of Frequency Stability Measurement 23
4.3.2 Test Procedure 23
4.3.3 Test Setup 23
4.3.4 Test Results 24
4.4 Occupied Bandwidth Measurement 25
4.4.1 Test Procedure 25
4.4.2 Test Setup 25
4.4.3 Test Result 26
4.5 Band Edge Measurement 30
4.5.1 Limits of Band Edge Measurement 30
4.5.2 Test Setup 30
4.5.3 Test Procedures 30
4.5.4 Test Results 31
4.6 Emission Mask Measurement 35
4.6.1 Limits of Emission Mask Measurement 35
4.6.2 Test Procedures 35
4.6.3 Test Setup 35
4.6.4 Test Results 36
4.7 Peak to Average Ratio 50
4.7.1 Limits of Peak to Average Ratio Measurement 50
4.7.2 Test Setup 50
4.7.3 Test Procedures 50
4.7.4 Test Results 51
4.8 Conducted Spurious Emissions 53
4.8.1 Limits of Conducted Spurious Emissions Measurement 53
4.8.2 Test Setup 53
4.8.3 Test Procedure 53
4.8.4 Test Results 54
4.9 Radiated Emission Measurement 64

4.9.1 Limits of Radiated Emission Measurement 64
4.9.2 Test Procedure 64
4.9.3 Deviation from Test Standard 64
4.9.4 Test Setup 65
4.9.5 Test Results 66

5 Pictures of Test Arrangements 77

Appendix – Information on the Testing Laboratories 78

Release Control Record

Issue No.	Description	Date Issued
RF180129C24-3	Original release	Feb. 27, 2018

1 Certificate of Conformity

Product: Telematics Module

Brand: Kyocera

Test Model: AL-T52V1

Sample Status: Engineering sample

Applicant: Kyocera Corporation

Test Date: Feb. 02 ~ Feb. 06, 2018

Standards: FCC Part 90, Subpart S
FCC Part 2

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

Prepared by : _____ , **Date:** Feb. 27, 2018
Suntee Liu / Specialist

Approved by : _____ , **Date:** Feb. 27, 2018
Bruce Chen / Project Engineer

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	Emission Masks	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 -11.7dB at 30.00MHz.

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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Mar. 27, 2017	Mar. 26, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 11, 2017	May 10, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2017	Aug. 07, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2017	Feb. 21, 2018
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2018	Jan. 14, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2017	Aug. 07, 2018
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 01, 2017	Jul. 31, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 07, 2017	Jun. 06, 2018
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-9.

3 General Information

3.1 General Description of EUT

Product	Telematics Module	
Brand	Kyocera	
Test Model	AL-T52V1	
Sample Status	Engineering sample	
Power Supply Rating	5Vdc	
Modulation Type	LTE: QPSK, 16QAM	
Operating Frequency	LTE Band 26 (Channel Bandwidth 1.4MHz)	814.7~823.3MHz
	LTE Band 26 (Channel Bandwidth 3MHz)	815.5~822.5MHz
	LTE Band 26 (Channel Bandwidth 5MHz)	816.5~821.5MHz
	LTE Band 26 (Channel Bandwidth 10MHz)	819.0MHz
Max. ERP Power	LTE Band 26 (Channel Bandwidth 1.4MHz)	239.883mW (23.8dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	223.872mW (23.5dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	218.776mW (23.4dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	204.174mW (23.1dBm)
Antenna Type	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	Refer to Note	
Cable Supplied	0.08m module cable	

Note:

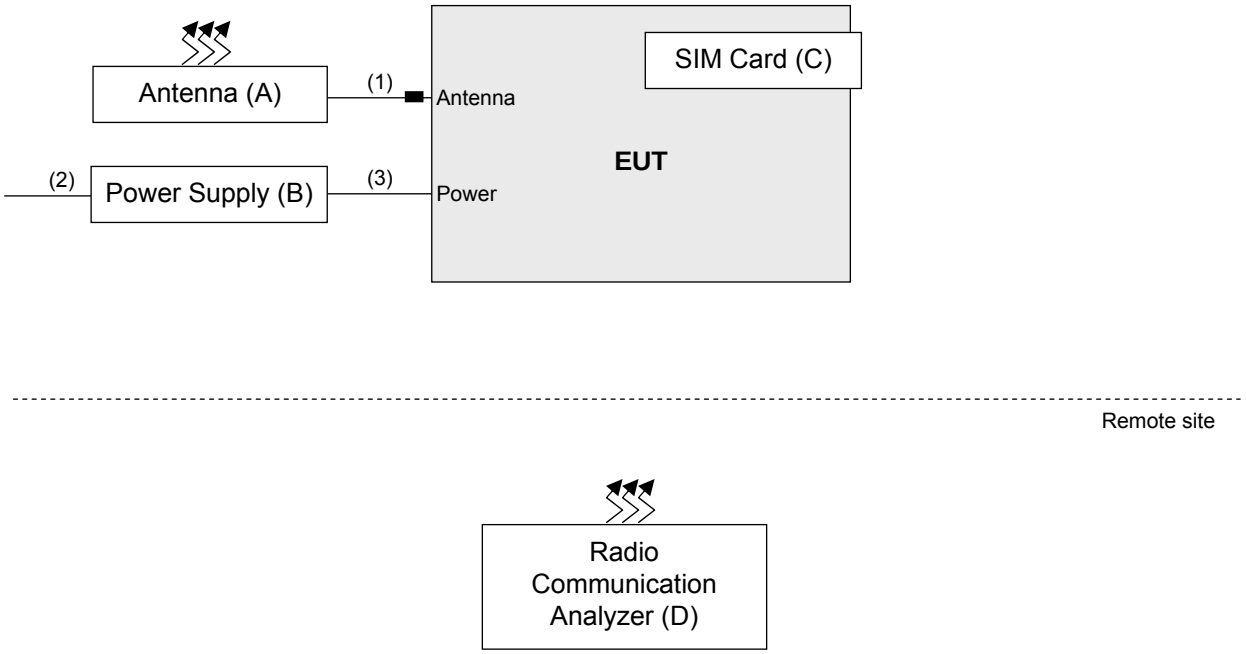
1. The EUT uses following antennas (support units).

Antenna 1					
Antenna Type	AUX		Connecter Type	SMA	
Manufacturer	YOKOWO		Part Number	86769-459B1	
Band	B12	B13	B5 / B26	B4	B2
Frequency (MHz)	704	782	832	1730	1880
Gain (dBi)	3.1	3.2	3.8	2.6	2.0

Antenna 2				
Antenna Type	AUX	Connecter Type	SMA	
Manufacturer	taoglas	Part Number	TG.30.8113	
Band	B12 / B13	B5 / B26	B4	B2
Frequency (MHz)	700-800	824-960	1710-1880	1850-1990
Free Space Straight Gain (dBi)	1.1	0.3	1.9	2.7
Free Space Bent Gain (dBi)	2.6	1.5	2.7	3.1

For B2: Antenna 2 was chosen for final test according to manufacturer's requirement.
For B5 / B26 / B4 / B12 / B13: Antenna 1 was chosen for final test according to manufacturer's requirement.

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.	Antenna	taoglas	TG.30.8113	NA	NA	Provided by manufacturer
B.	Power Supply	Inspower	DC400-20D	212004	FCC DoC Approved	Provided by manufacturer Input:100-240Vac, 0.4A, 50-60Hz Output: 5Vdc, 3A
C.	SIM Card	NA	NA	NA	NA	Provided by manufacturer
D.	Radio Communication Tester	R&S	CMU200	123112	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna	1	3	N	1	Provided by manufacturer
2.	Power	1	1.75	N	0	Provided by manufacturer
3.	Module cable	2	0.08	N	0	Attached on EUT

Note: The core(s) is(are) originally attached to the cable(s).

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

LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Modulation Characteristics	26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Frequency Stability	26697 to 26783	26740 (819.0MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
-	Band Edge	26697 to 26783	26697 (814.7MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
-	Emission Mask	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
-	Condcudeted Emission	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	26697 to 26783	26697 (814.7MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber. Low channel was the worst case for all final tests.
2. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, Occupied bandwidth and Peak to average ratio items were tested under QPSK and 16QAM modes, and the other test items were tested under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
ERP	25deg. C, 65%RH	120Vac, 60Hz	Greg Lin
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Emission Mask	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Radiated Emission	25deg. C, 66%RH 25deg. C, 65%RH	120Vac, 60Hz	James Yang Greg Lin

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 90
KDB 971168 D01 Power Meas License Digital Systems v02r02
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

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. All measurements were done at low, middle and high operational frequency range. 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(below or equal 1GHz) and/or 1.5m(above 1GHz) 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 = Output power level of S.G – TX cable loss + 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 power = E.I.R.P power - 2.15dBi.

   Where:

   $ERP/EIRP = P_{Meas} + G_T - L_C$

   P_{Meas} : Measure transmitter output power.
   G_T : Gain of the transmitting antenna.
   L_C : signal attenuation in the connecting cable between the transmitter and antenna.

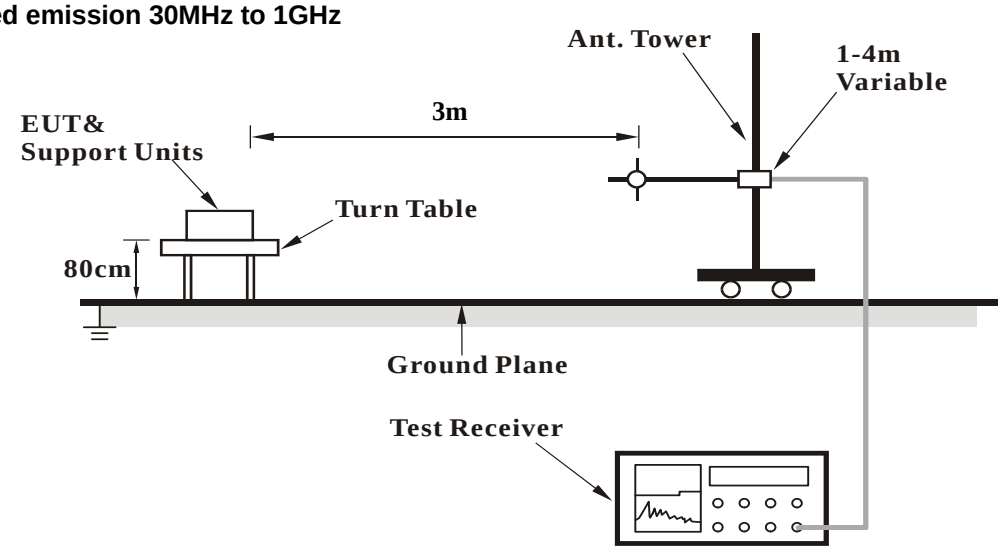
Conducted Power Measurement:

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

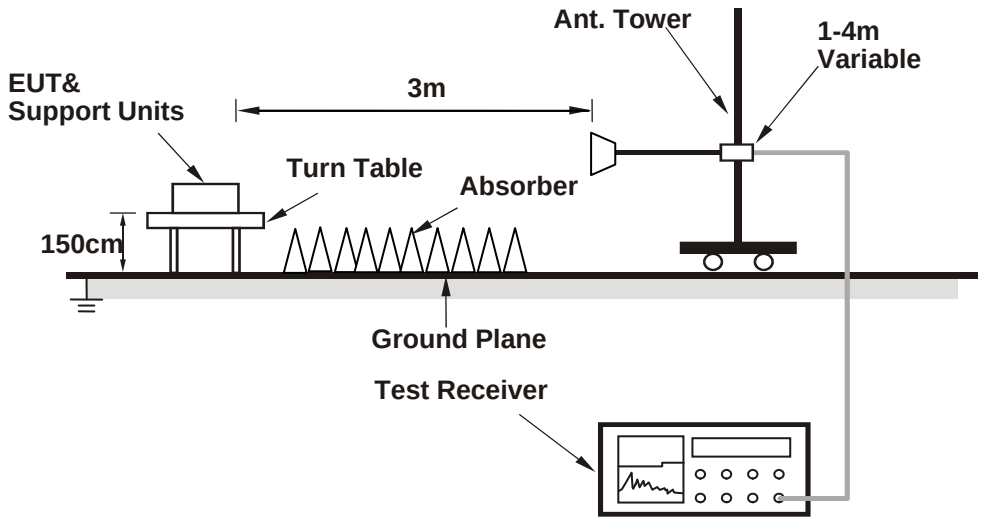
4.1.3 Test Setup

EIRP / ERP Measurement:

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

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			16QAM		
			CH 26697	CH 26740	CH 26783	CH 26697	CH 26740	CH 26783
			814.7 MHz	819.0 MHz	823.3 MHz	814.7 MHz	819.0 MHz	823.3 MHz
26 / 1.4MHz	1	0	23.66	23.68	23.72	22.53	22.61	22.68
	1	2	23.58	23.62	23.71	22.48	22.52	22.52
	1	5	23.46	23.58	23.65	22.45	22.48	22.59
	3	0	23.15	23.48	23.56	22.31	22.42	22.63
	3	1	23.32	23.45	23.60	22.29	22.45	22.64
	3	3	23.22	23.44	23.54	22.27	22.47	22.61
	6	0	22.61	22.76	22.89	21.46	21.62	21.89
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 26705	CH 26740	CH 26775	CH 26705	CH 26740	CH 26775
			815.5 MHz	819.0 MHz	822.5 MHz	815.5 MHz	819.0 MHz	822.5 MHz
26 / 3MHz	1	0	23.64	23.70	23.90	22.41	22.45	22.53
	1	7	23.58	23.65	23.87	22.38	22.43	22.48
	1	14	23.55	23.58	23.83	22.32	22.40	22.45
	8	0	22.71	22.75	22.92	21.18	21.38	21.58
	8	3	22.76	22.90	22.93	21.15	21.42	21.56
	8	7	22.80	22.91	22.97	21.21	21.45	21.57
	15	0	22.62	22.85	22.92	21.16	21.26	21.44
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 26715	CH 26740	CH 26765	CH 26715	CH 26740	CH 26765
			816.5 MHz	819.0 MHz	821.5 MHz	816.5 MHz	819.0 MHz	821.5 MHz
26 / 5MHz	1	0	23.61	23.70	23.85	22.43	22.45	22.50
	1	12	23.52	23.62	23.77	22.39	22.41	22.40
	1	24	23.51	23.64	23.76	22.37	22.44	22.43
	12	0	22.54	22.77	22.91	21.26	21.43	21.62
	12	6	22.58	22.68	22.93	21.28	21.58	21.68
	12	13	22.53	22.62	22.93	21.17	21.56	21.63
	25	0	22.49	22.83	22.91	21.33	21.42	21.58
Band / BW	RB Size	RB Offset	QPSK			16QAM		
			CH 26740			CH 26740		
			819.0 MHz			819.0 MHz		
26 / 10MHz	1	0	23.82			22.48		
	1	24	24.23			22.42		
	1	49	23.75			22.46		
	25	0	22.83			21.58		
	25	12	22.92			21.56		
	25	25	22.82			21.55		
	50	0	22.79			21.49		

ERP Power

LTE Band 26, Channel Bandwidth 1.4MHz

MODE		TX channel 26697					
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	814.70	-7.6	19.3	3.9	23.2	50.0	-26.8
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	814.70	-17.9	10.0	3.9	13.9	50.0	-36.1

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	-7.3	19.9	3.9	**23.8**	50.0	-26.2
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	-16.7	11.4	3.9	15.3	50.0	-34.7

MODE		TX channel 26783					
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	823.30	-8.4	19.2	3.9	23.1	50.0	-26.9
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	823.30	-17.1	11.2	3.9	15.1	50.0	-34.9

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

LTE Band 26, 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	-7.9	19.1	3.9	23.0	50.0	-27.0
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	-17.8	10.1	3.9	14.0	50.0	-36.0

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	-7.6	19.6	3.9	**23.5**	50.0	-26.5
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	-17.2	10.9	3.9	14.8	50.0	-35.2

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	-8.1	19.4	3.9	23.3	50.0	-26.7
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	-17.2	11.0	3.9	14.9	50.0	-35.1

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

LTE Band 26, 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	-8.0	19.0	3.9	22.9	50.0	-27.1
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	-18.2	9.8	3.9	13.7	50.0	-36.3

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	-7.8	19.4	3.9	23.3	50.0	-26.7
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	-17.8	10.3	3.9	14.2	50.0	-35.8

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	-7.9	19.5	3.9	**23.4**	50.0	-26.6
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	-16.8	11.4	3.9	15.3	50.0	-34.7

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

LTE Band 26, 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	-8.0	19.2	3.9	**23.1**	50.0	-26.9
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	-18.2	9.9	3.9	13.8	50.0	-36.2

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

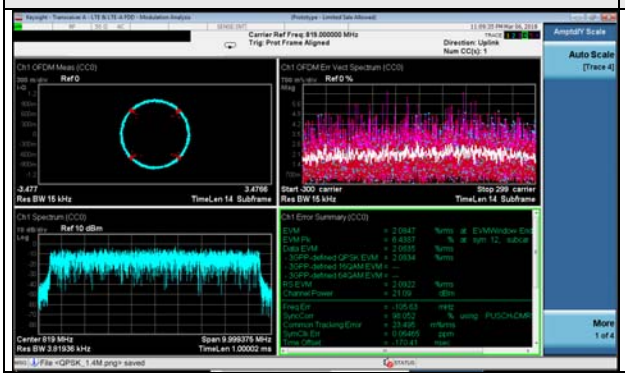
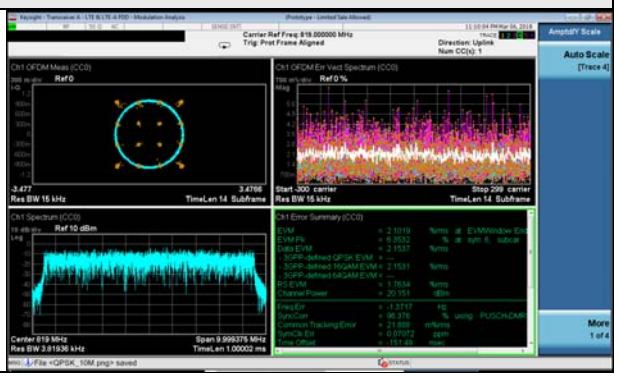
N/A

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

LTE Band 26	
Spectrum Plot of Measurement Value	
Channel: 26740 / Frequency (MHz): 819.0MHz	
Channel Bandwidth 10MHz / QPSK	Channel Bandwidth 10MHz / 16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

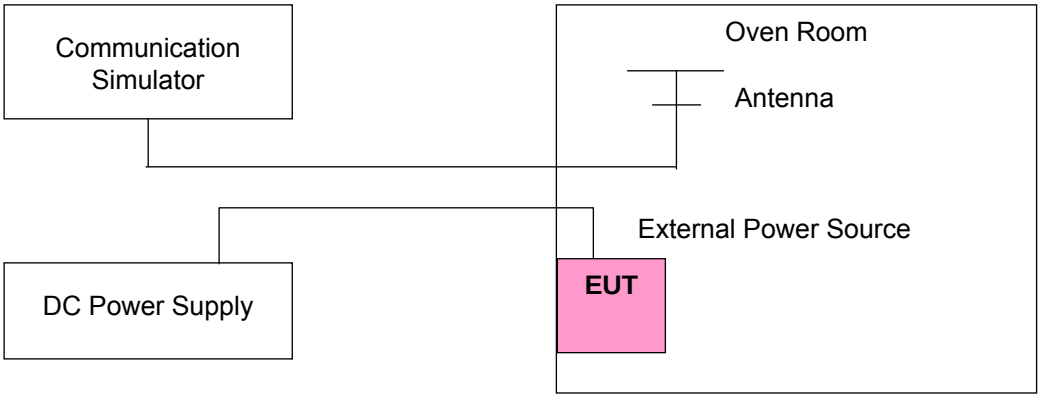
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)	Limit (ppm)
	LTE Band 26	
4.3	0.03860	2.5
3.8	0.04323	2.5
3.4	0.07274	2.5

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.3Vdc.

Frequency Error vs. Temperature.

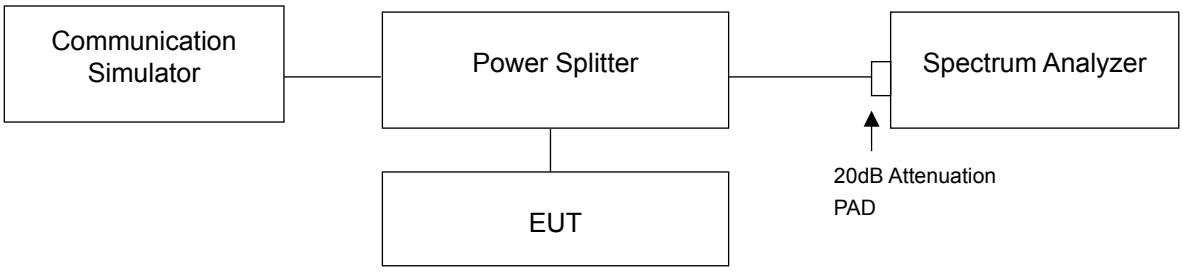
Temp. (℃)	Frequency Error (ppm)	Limit (ppm)
	LTE Band 26	
50	0.00429	2.5
40	0.00451	2.5
30	0.03461	2.5
20	0.04323	2.5
10	0.00133	2.5
0	0.05566	2.5
-10	0.07650	2.5
-20	0.02562	2.5

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

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.

4.4.2 Test Setup



4.4.3 Test Result

Occupied Bandwidth

LTE Band 26, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26697	814.7	1.10	1.10
26740	819.0	1.09	1.09
26783	823.3	1.09	1.10

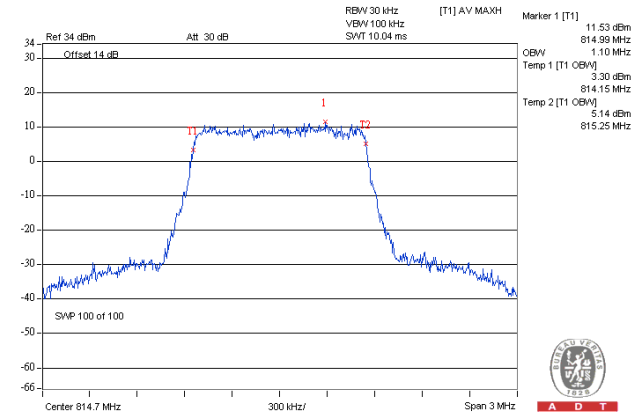
LTE Band 26, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26705	815.5	2.69	2.68
26740	819.0	2.69	2.69
26775	822.5	2.69	2.68

LTE Band 26, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26715	816.5	4.48	4.48
26740	819.0	4.48	4.47
26765	821.5	4.48	4.47

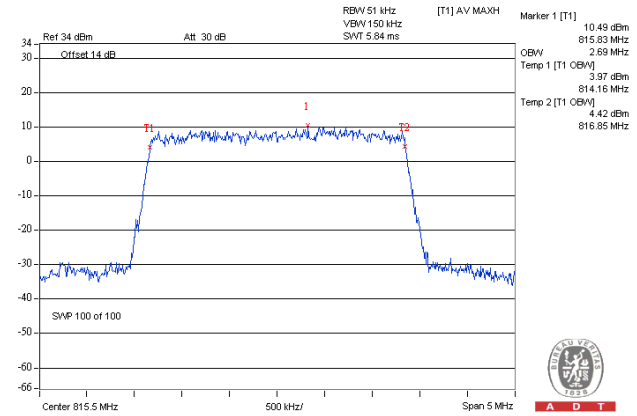
LTE Band 26, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM
26740	819.0	8.93	8.93

Spectrum Plot of Worst Value

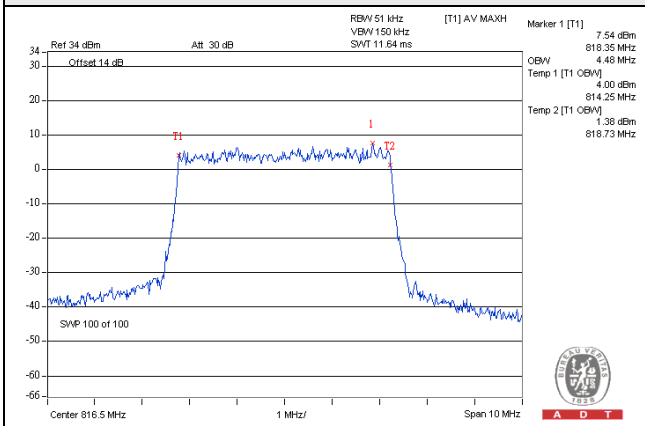
1.4MHz / QPSK



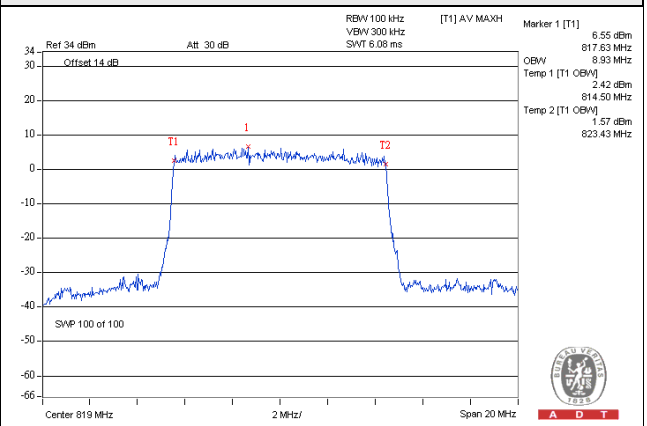
3MHz / QPSK



5MHz / QPSK



10MHz / QPSK



26dB Bandwidth

LTE Band 26, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26697	814.7	1.277	1.259
26740	819.0	1.288	1.273
26783	823.3	1.282	1.296

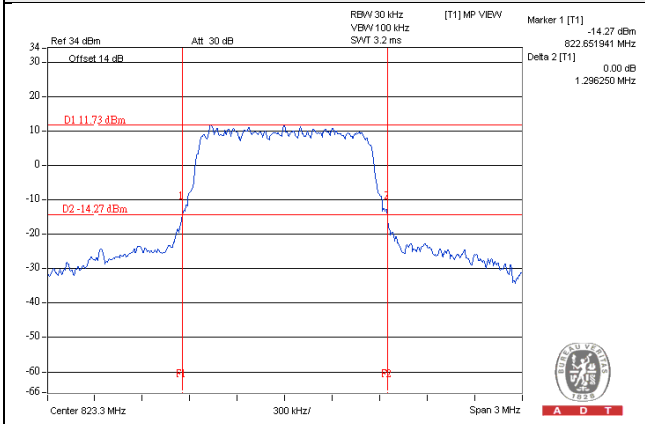
LTE Band 26, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26705	815.5	2.921	2.940
26740	819.0	2.939	2.978
26775	822.5	2.925	2.947

LTE Band 26, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26715	816.5	4.913	4.915
26740	819.0	4.909	4.926
26765	821.5	4.876	4.911

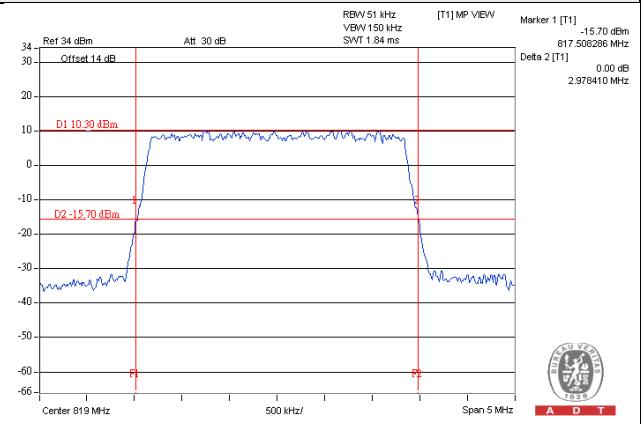
LTE Band 26, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		QPSK	16QAM
26740	819.0	9.602	9.628

Spectrum Plot of Worst Value

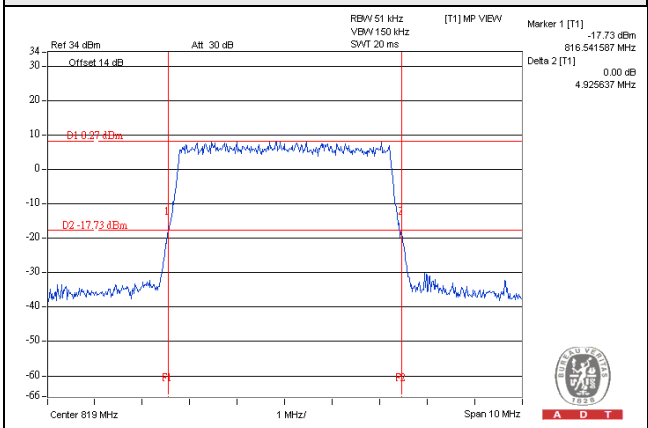
1.4MHz / 16QAM



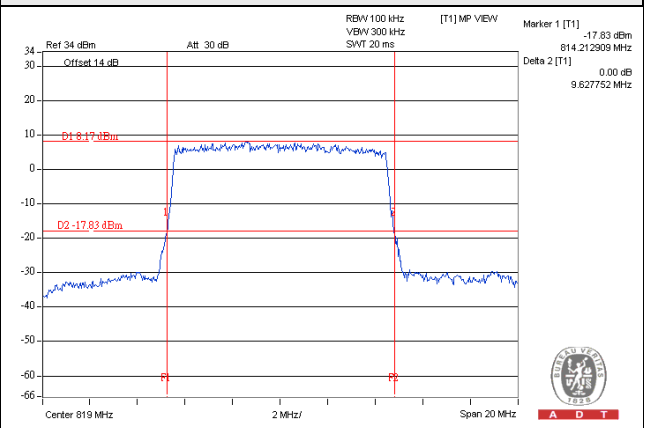
3MHz / 16QAM



5MHz / 16QAM



10MHz / 16QAM

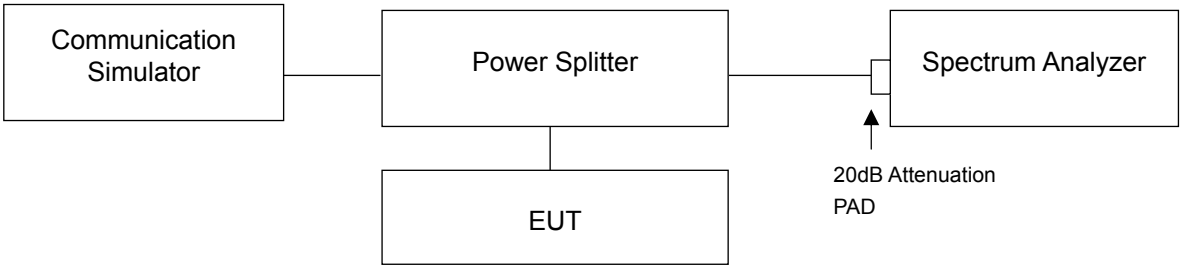


4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

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

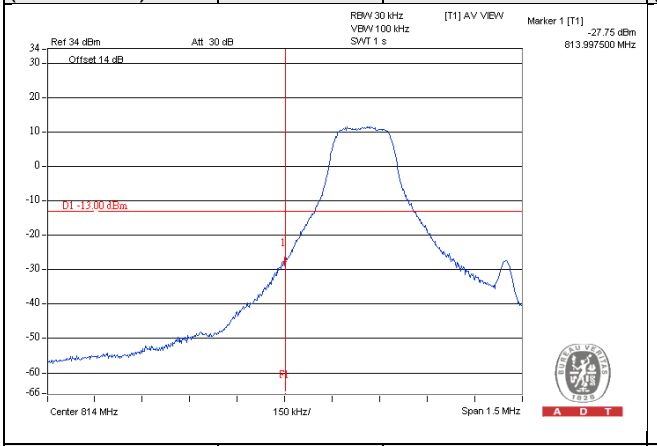
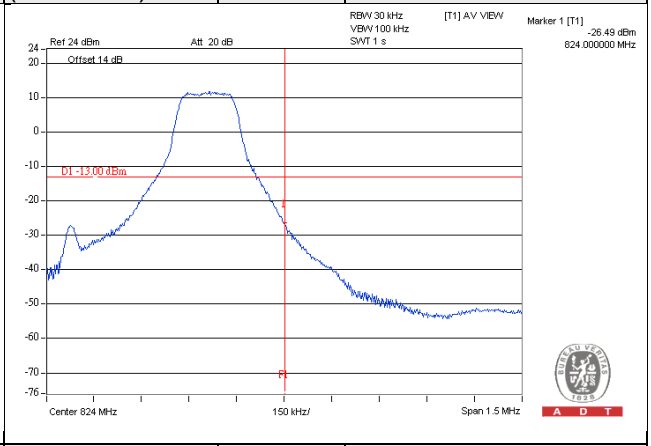
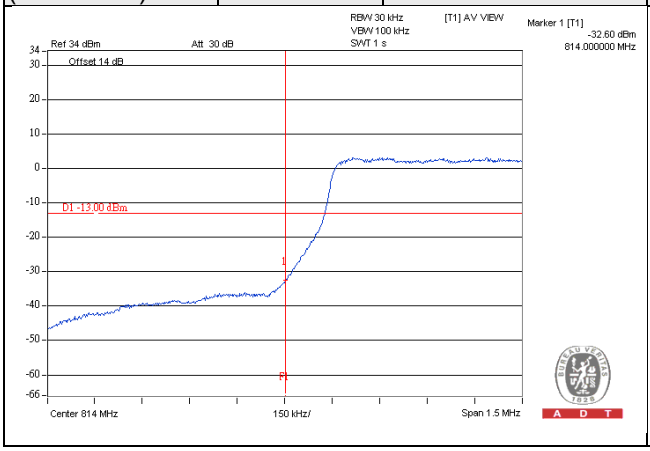
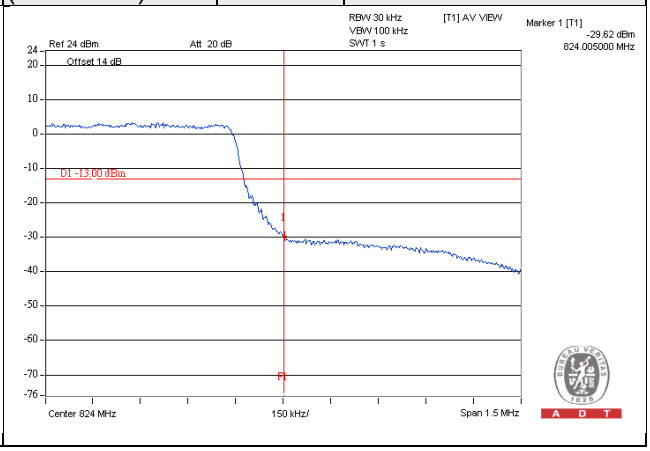
4.5.2 Test Setup

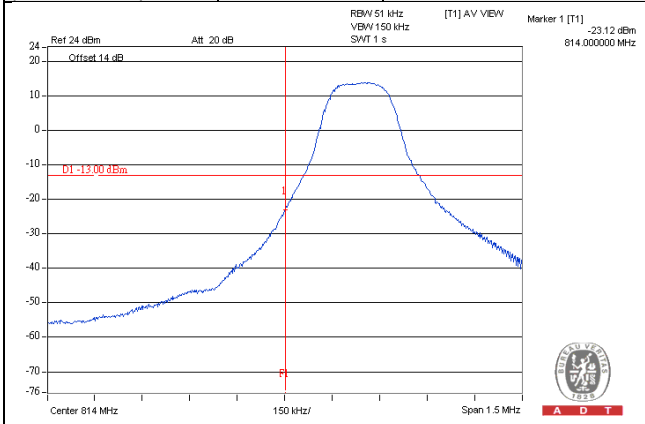
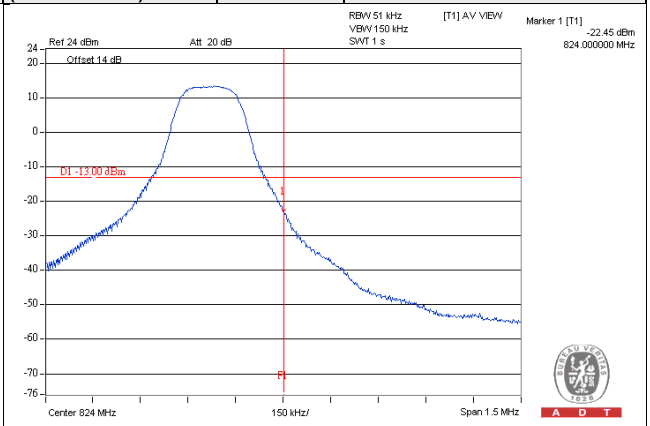
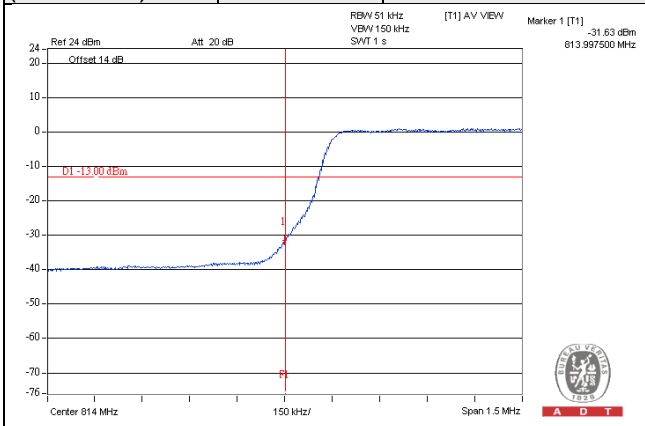
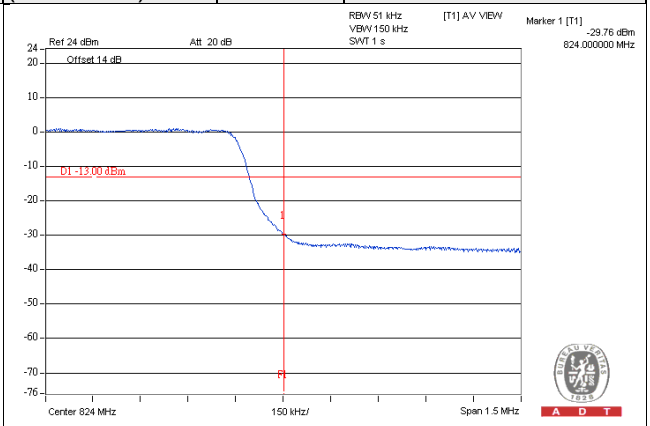


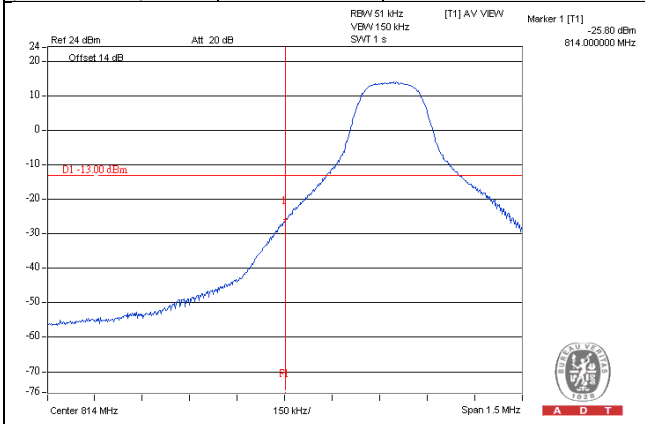
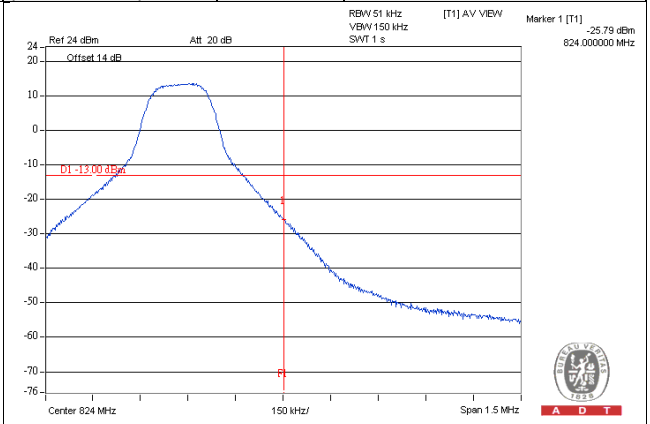
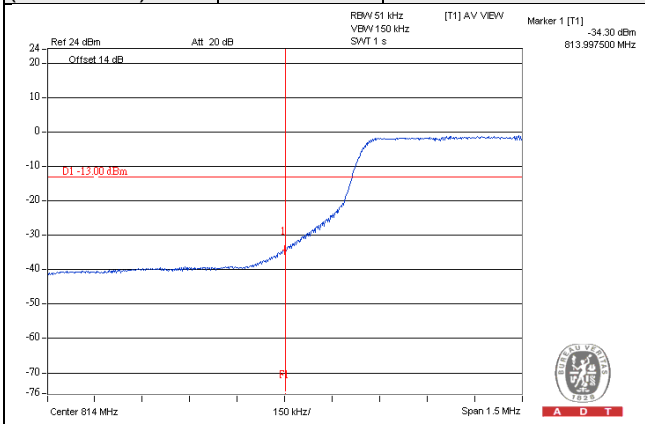
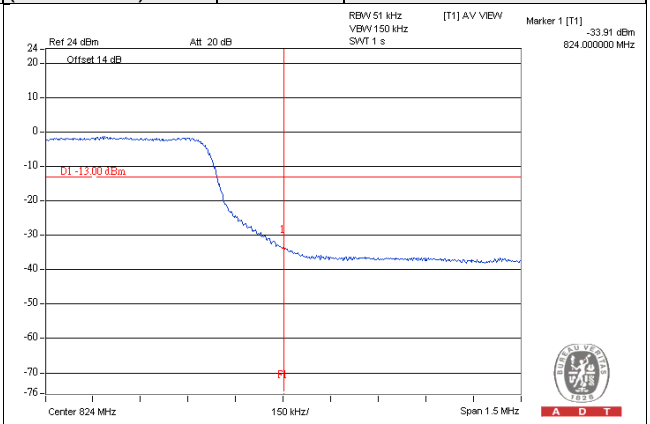
4.5.3 Test Procedures

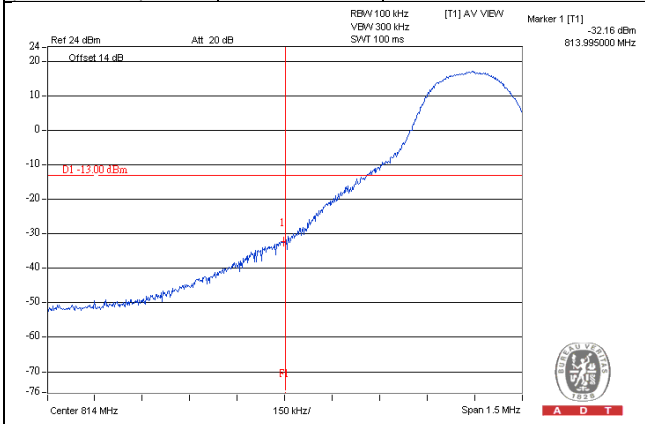
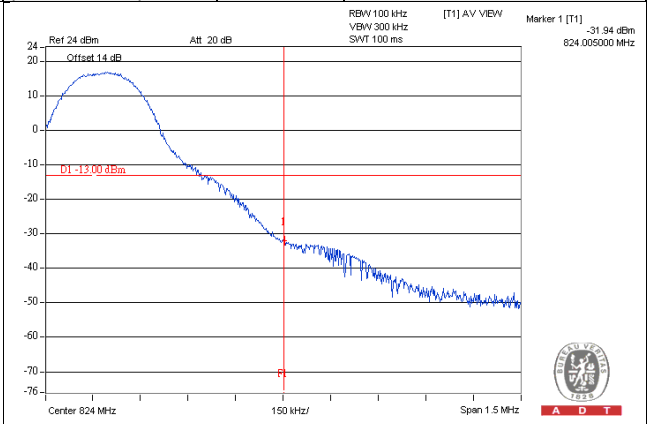
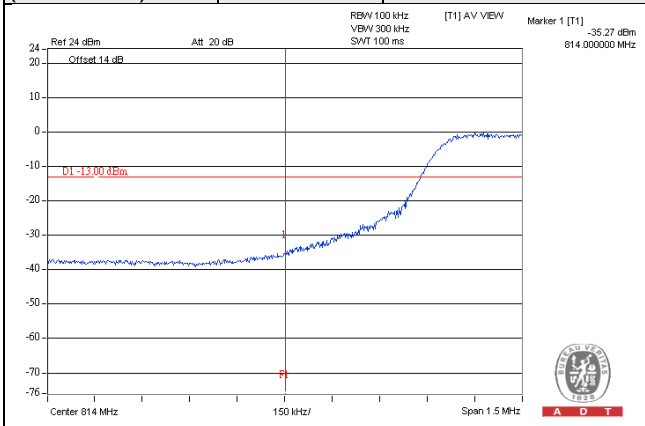
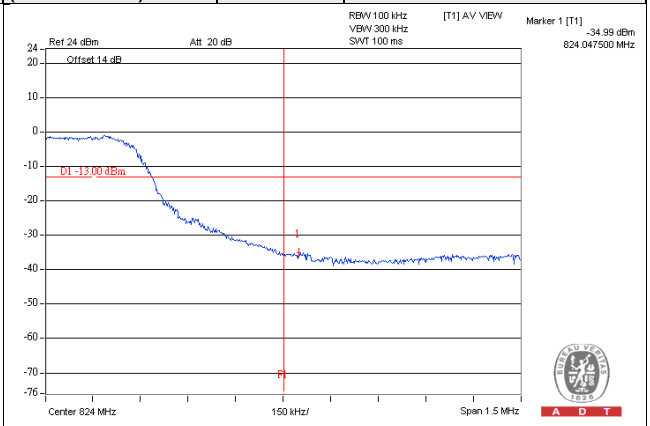
a. All measurements were done at low and high operational frequency range.
b. The band edge measurement used the power splitter via EUT RF power connector between signal generator and spectrum analyzer. This splitter loss, attenuator loss and cable loss are the worst loss 21 dB in the transmitted path track.
c. 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.
d. Record the max trace plot into the test report.

4.5.4 Test Results

LTE Band 26, Channel Bandwidth 1.4MHz					
Channel 26697 (814.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 26783 (823.3MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 26697 (814.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 26783 (823.3MHz)	QPSK	6 RB / 0 RB Offset
					

LTE Band 26, Channel Bandwidth 3MHz					
Channel 26705 (815.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26775 (822.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 26705 (815.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 26775 (822.5MHz)	QPSK	15 RB / 0 RB Offset
					

LTE Band 26, Channel Bandwidth 5MHz					
Channel 26715 (816.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26765 (821.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 26715 (816.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 26765 (821.5MHz)	QPSK	25 RB / 0 RB Offset
					

LTE Band 26, Channel Bandwidth 10MHz					
Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 26740 (819.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	50 RB / 0 RB Offset
					

4.6 Emission Mask Measurement

4.6.1 Limits of Emission Mask Measurement

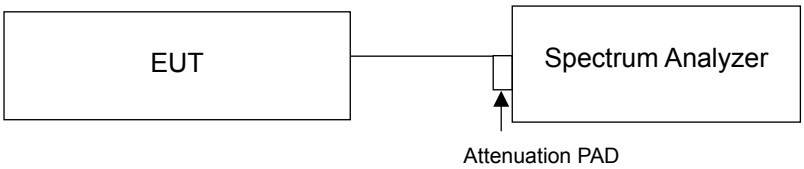
Per 90.210, equipment used in 809-824/854-869 MHz licensed band to EA or non-EA systems shall comply with the emission mask provisions of §90.691 of this chapter.

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 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log10(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.

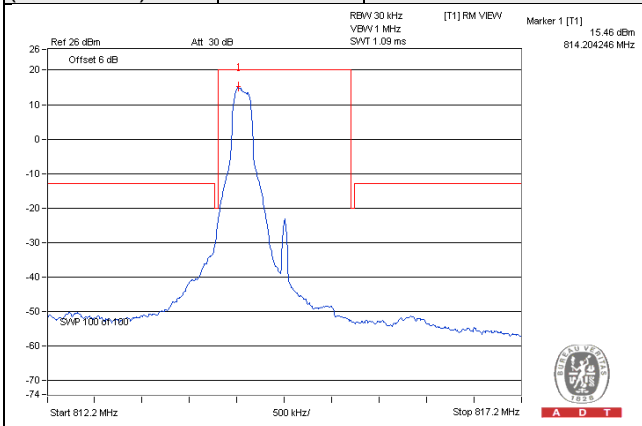
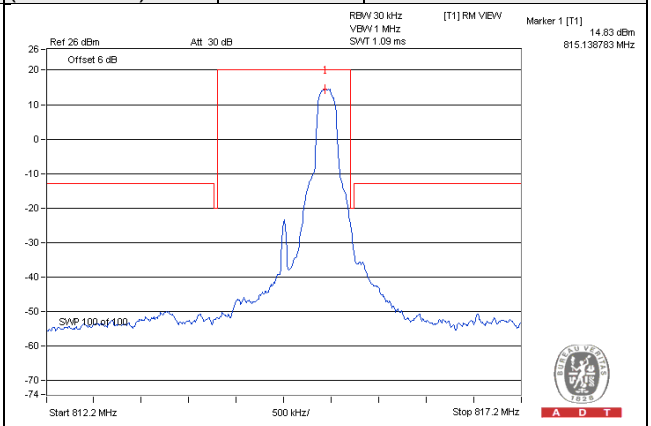
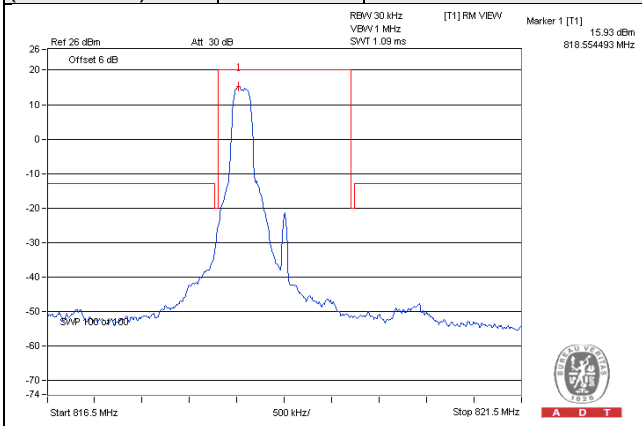
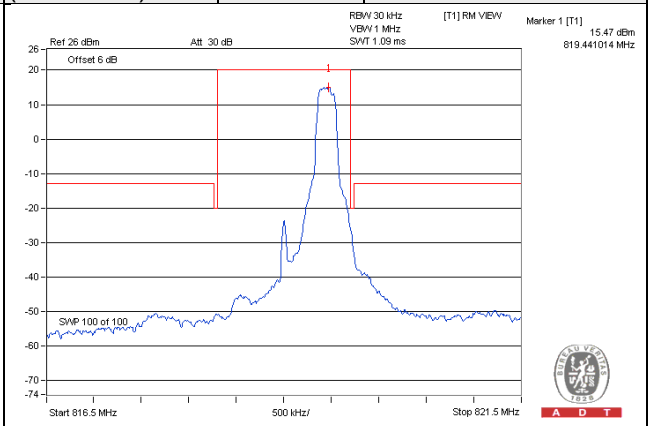
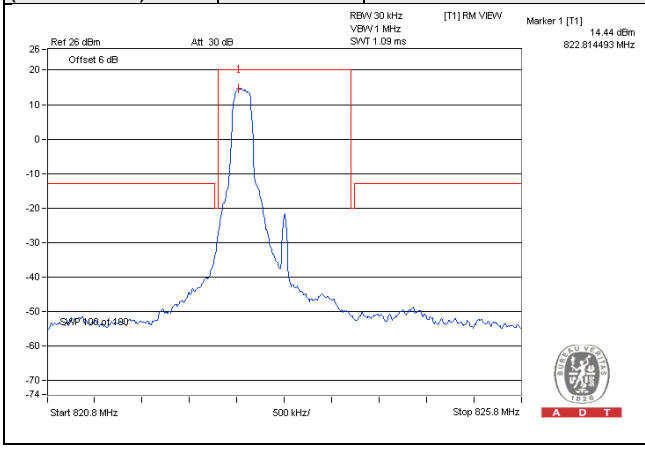
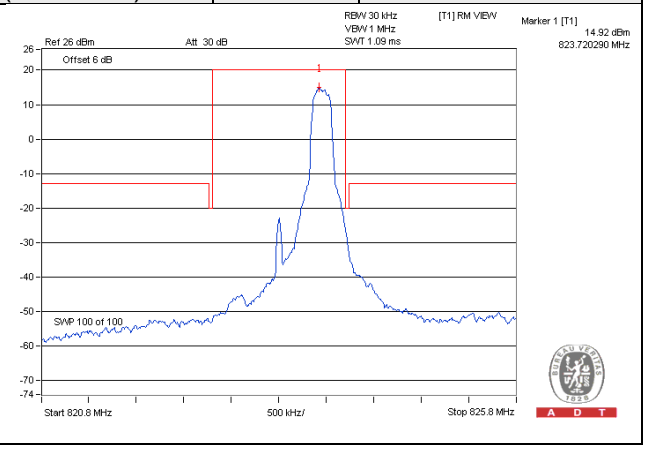
4.6.2 Test Procedures

1. The power was measured with Agilent Spectrum Analyzer. All measurements were done at 1 channel.
2. The measurement used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.
3. Record the test plot.

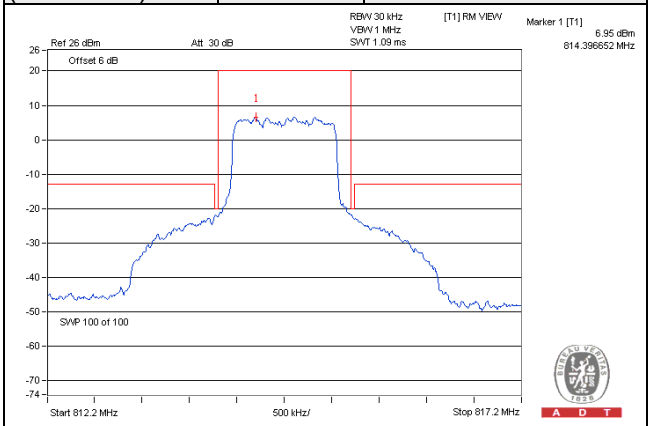
4.6.3 Test Setup



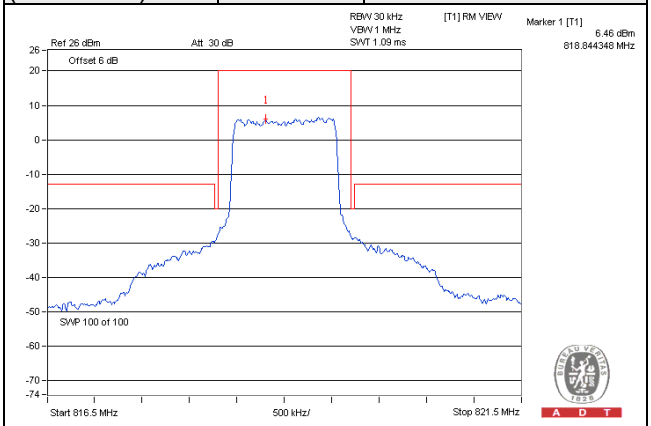
4.6.4 Test Results

LTE Band 26, Channel Bandwidth 1.4MHz					
Channel 26697 (814.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 26697 (814.7MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 26783 (823.3MHz)	QPSK	1 RB / 0 RB Offset	Channel 26783 (823.3MHz)	QPSK	1 RB / 5 RB Offset
					

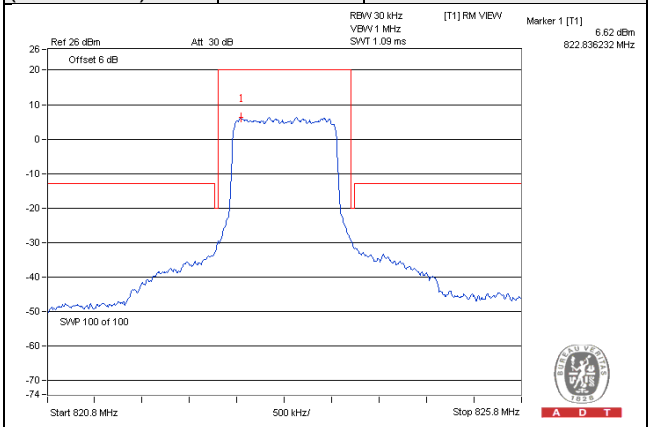
LTE Band 26, Channel Bandwidth 1.4MHz		
Channel 26697 (814.7MHz)	QPSK	6 RB / 0 RB Offset

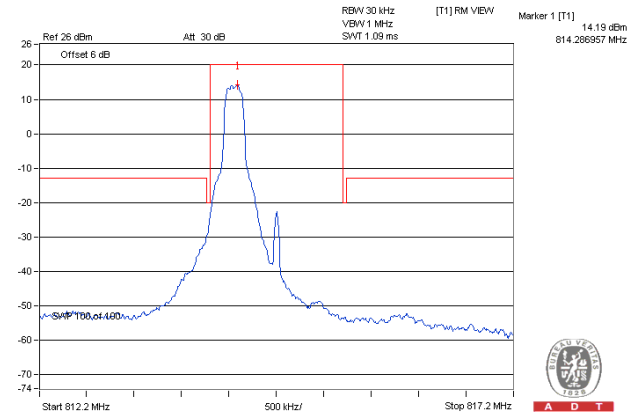
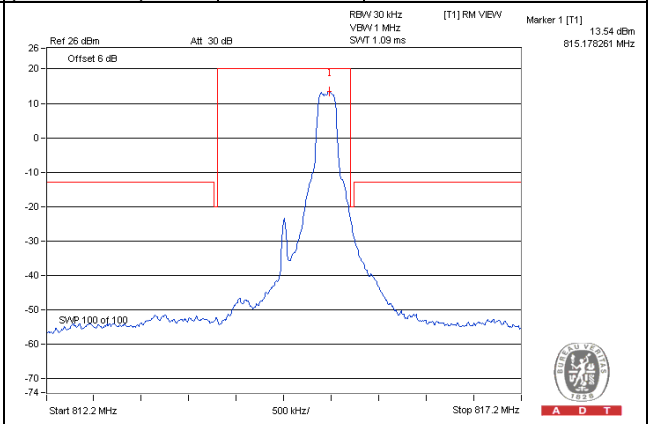
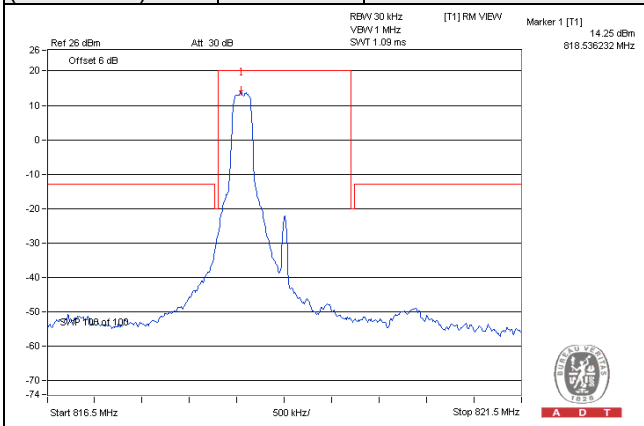
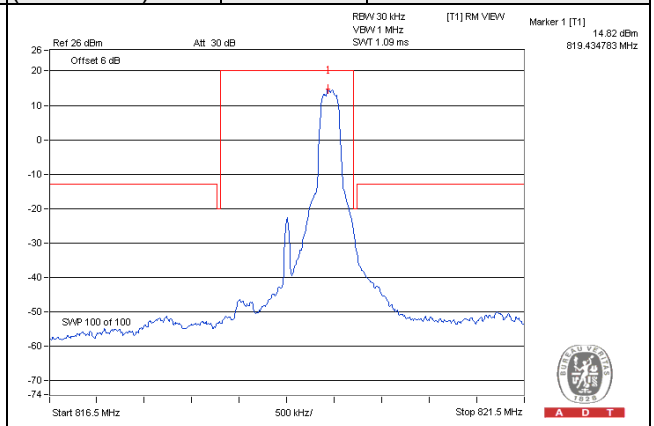
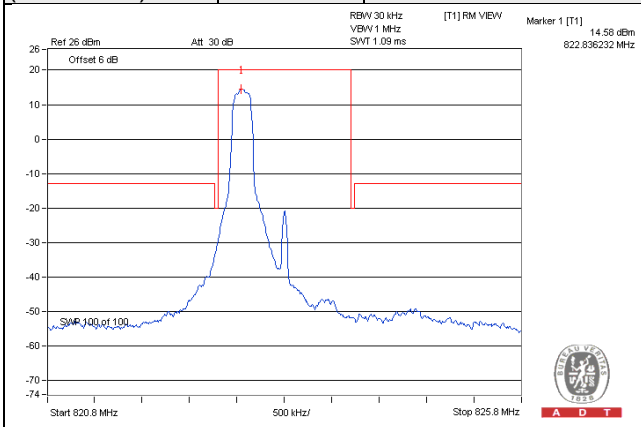
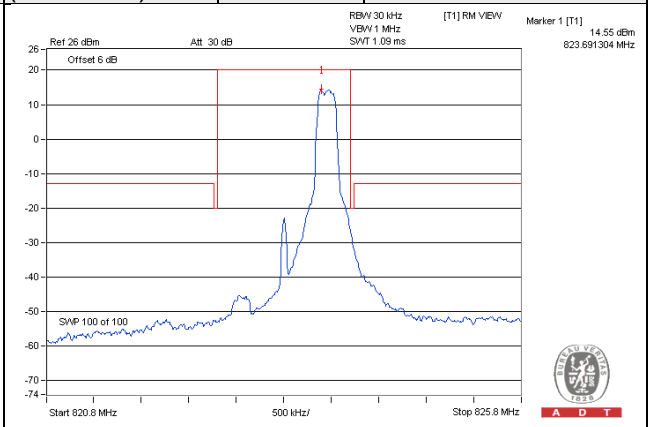


Channel 26740 (819.0MHz)	QPSK	6 RB / 0 RB Offset

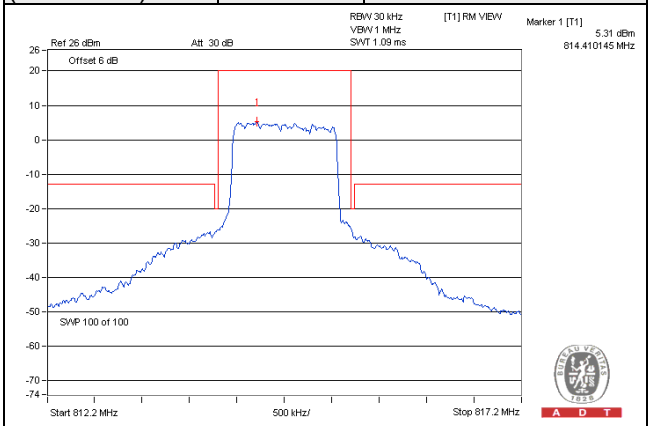


Channel 26783 (823.3MHz)	QPSK	6 RB / 0 RB Offset

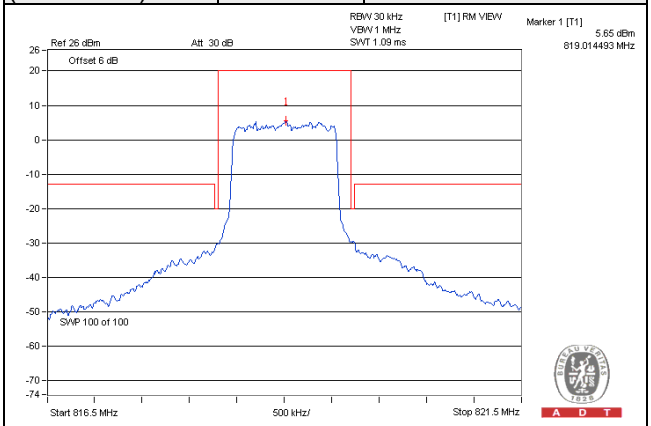


LTE Band 26, Channel Bandwidth 1.4MHz					
Channel 26697 (814.7MHz)	16QAM	1 RB / 0 RB Offset	Channel 26697 (814.7MHz)	16QAM	1 RB / 5 RB Offset
					
Channel 26740 (819.0MHz)	16QAM	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	16QAM	1 RB / 5 RB Offset
					
Channel 26783 (823.3MHz)	16QAM	1 RB / 0 RB Offset	Channel 26783 (823.3MHz)	16QAM	1 RB / 5 RB Offset
					

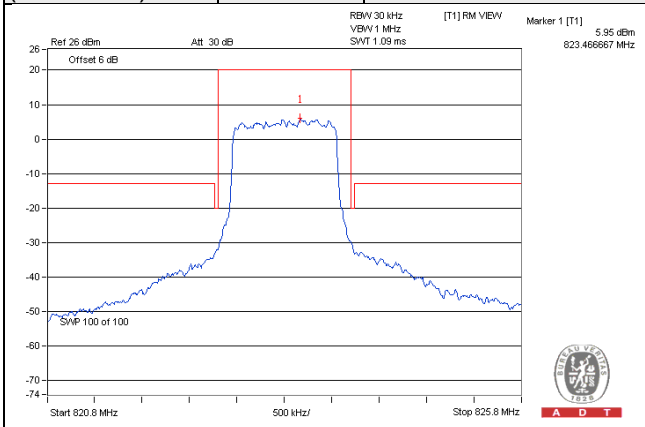
LTE Band 26, Channel Bandwidth 1.4MHz		
Channel 26697 (814.7MHz)	16QAM	6 RB / 0 RB Offset

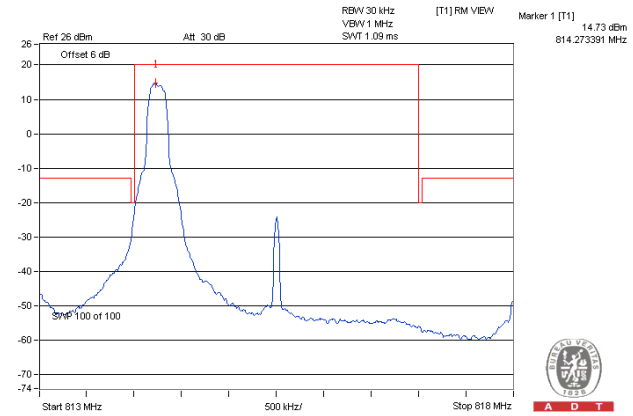
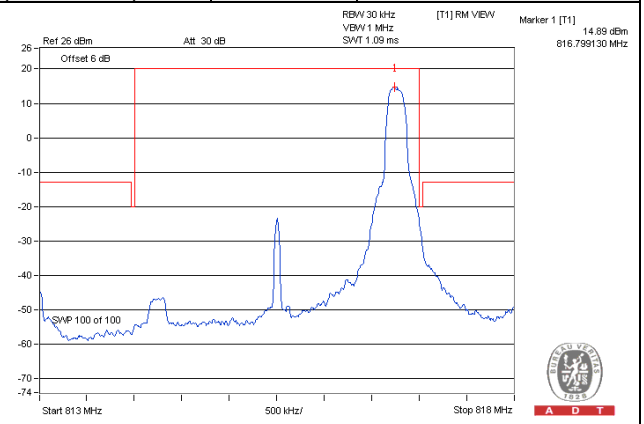
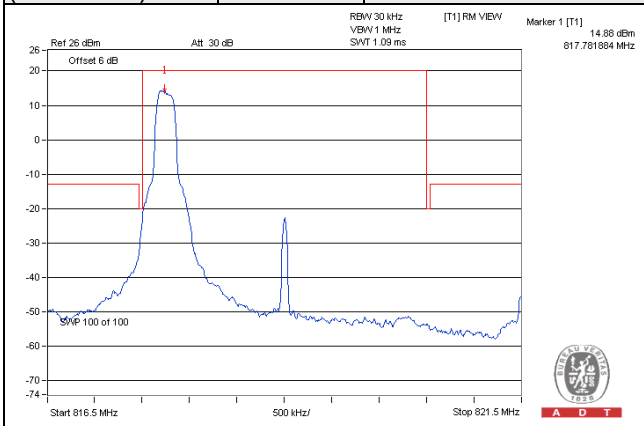
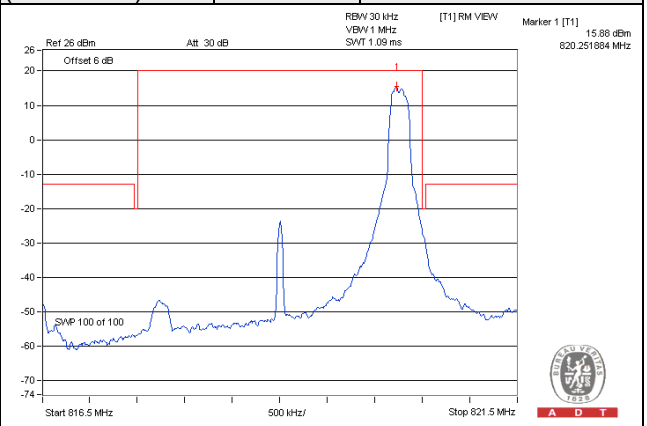
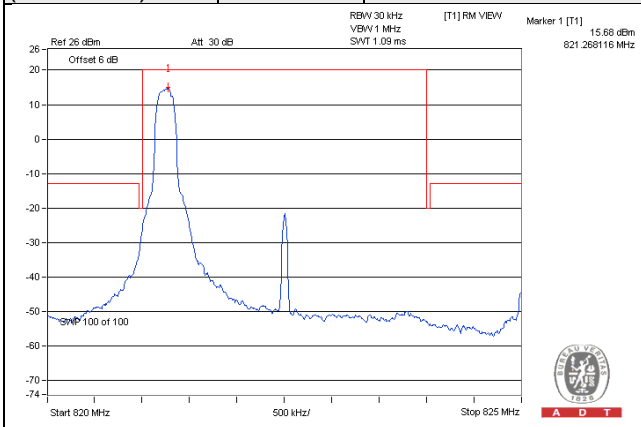
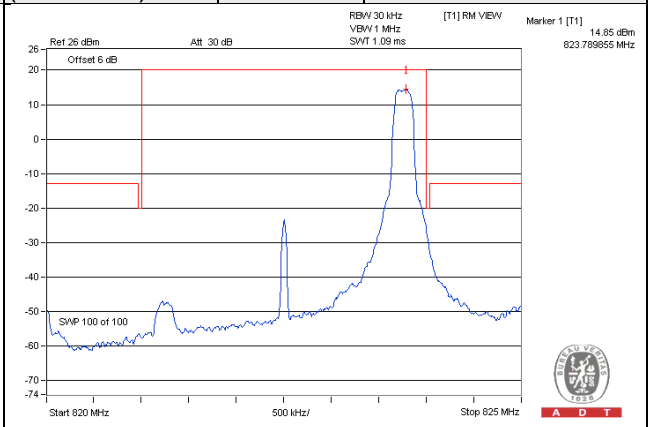


Channel 26740 (819.0MHz)	16QAM	6 RB / 0 RB Offset

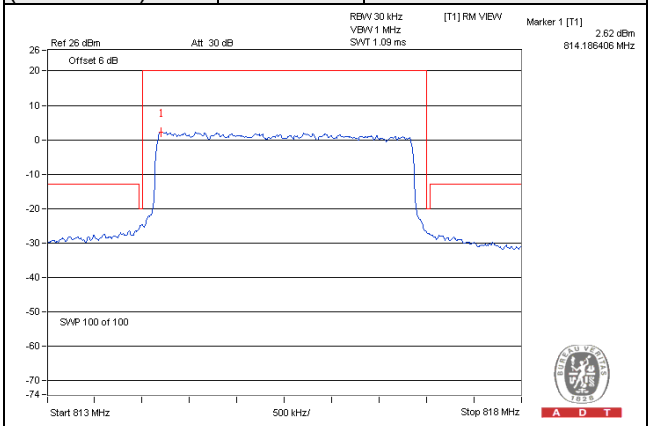


Channel 26783 (823.3MHz)	16QAM	6 RB / 0 RB Offset

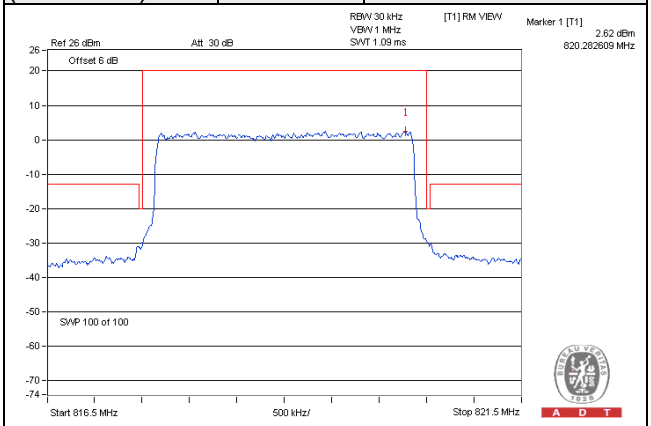


LTE Band 26, Channel Bandwidth 3MHz					
Channel 26705 (815.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26705 (815.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 26775 (822.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26775 (822.5MHz)	QPSK	1 RB / 14 RB Offset
					

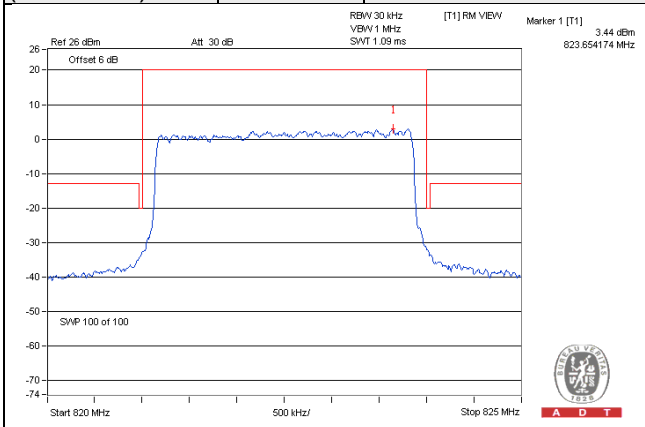
LTE Band 26, Channel Bandwidth 3MHz		
Channel 26705 (815.5MHz)	QPSK	15 RB / 0 RB Offset

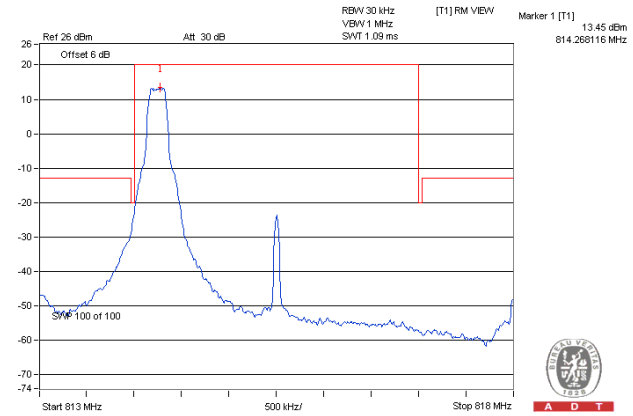
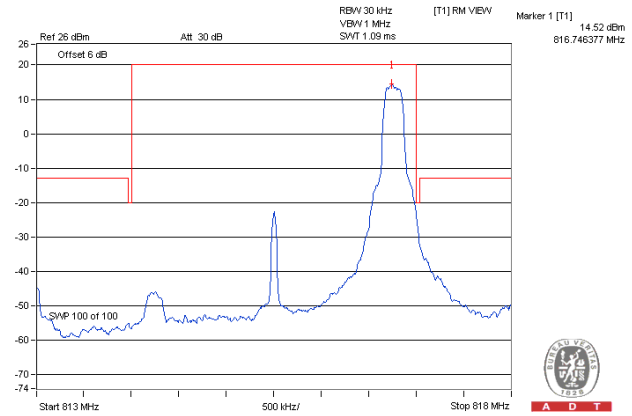
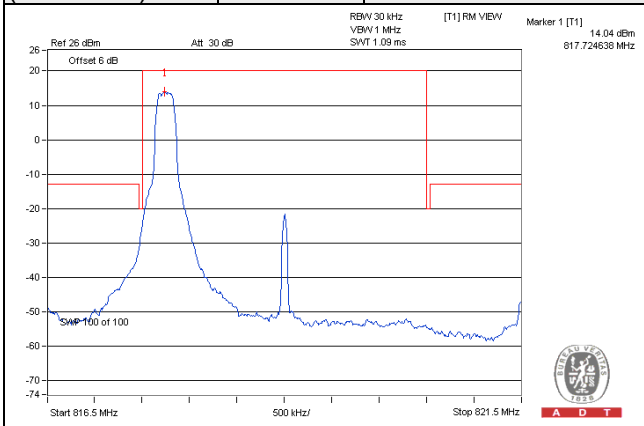
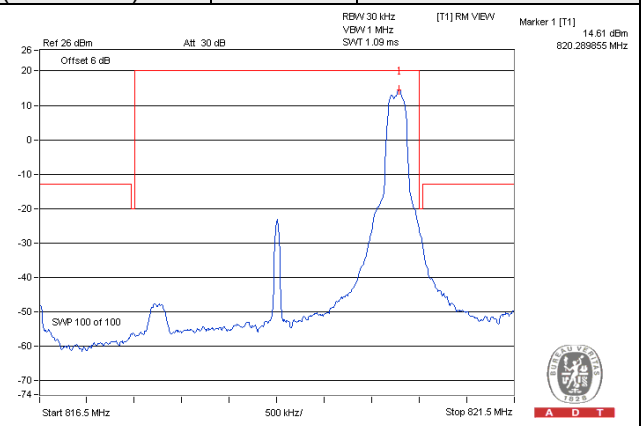
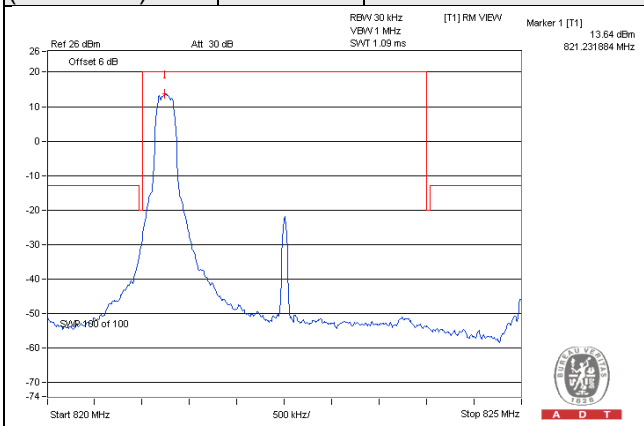
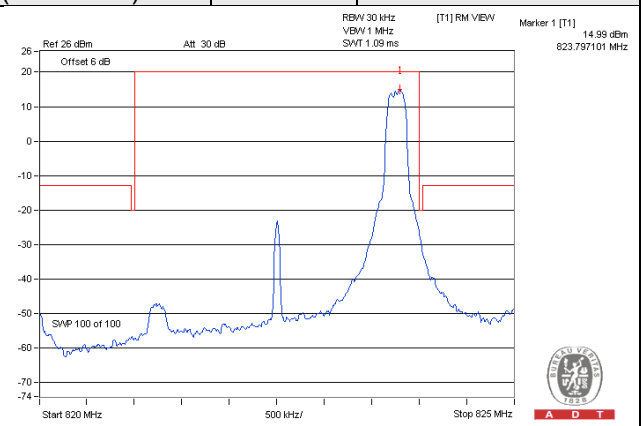


Channel 26740 (819.0MHz)	QPSK	15 RB / 0 RB Offset

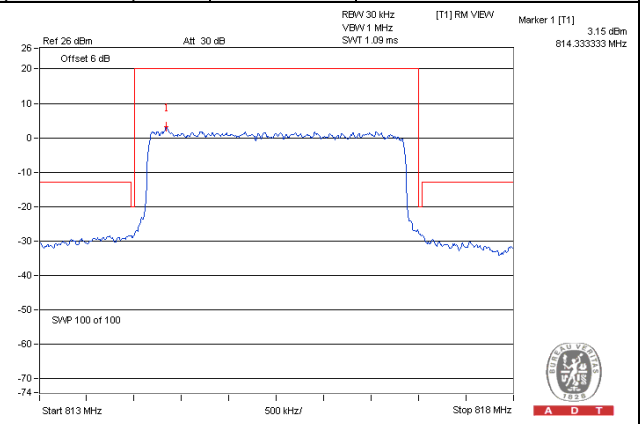


Channel 26775 (822.5MHz)	QPSK	15 RB / 0 RB Offset

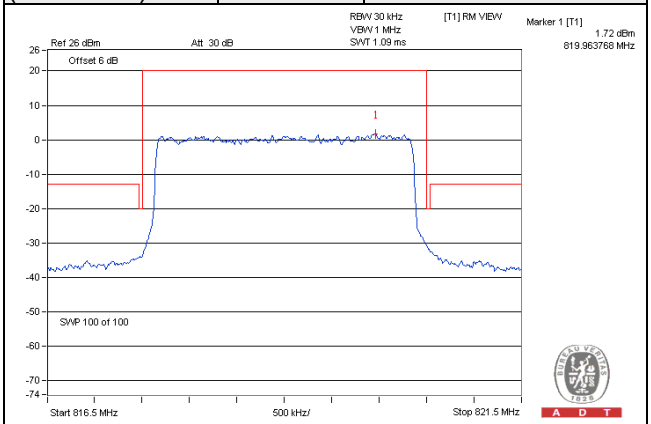


LTE Band 26, Channel Bandwidth 3MHz					
Channel 26705 (815.5MHz)	16QAM	1 RB / 0 RB Offset	Channel 26705 (815.5MHz)	16QAM	1 RB / 14 RB Offset
					
Channel 26740 (819.0MHz)	16QAM	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	16QAM	1 RB / 14 RB Offset
					
Channel 26775 (822.5MHz)	16QAM	1 RB / 0 RB Offset	Channel 26775 (822.5MHz)	16QAM	1 RB / 14 RB Offset
					

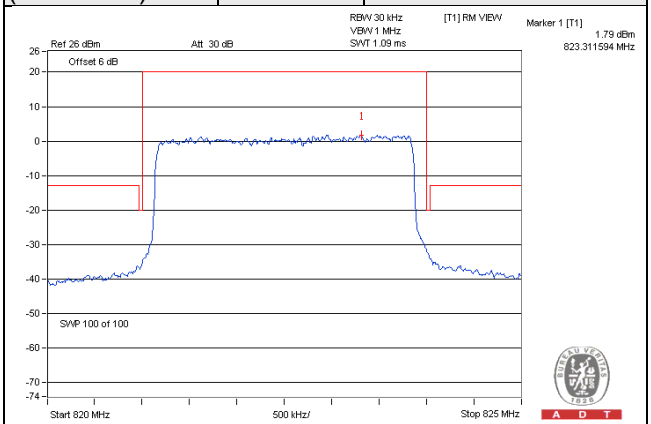
LTE Band 26, Channel Bandwidth 3MHz		
Channel 26705 (815.5MHz)	16QAM	15 RB / 0 RB Offset

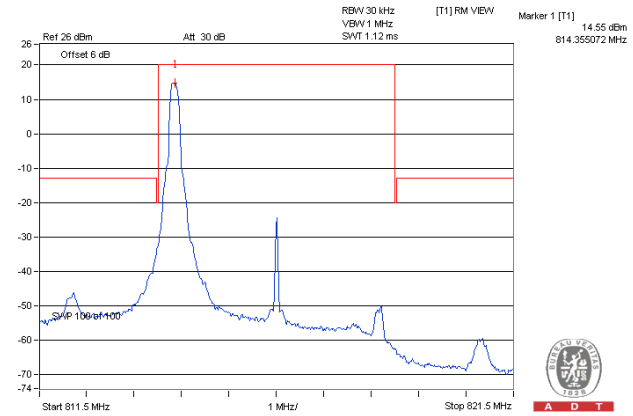
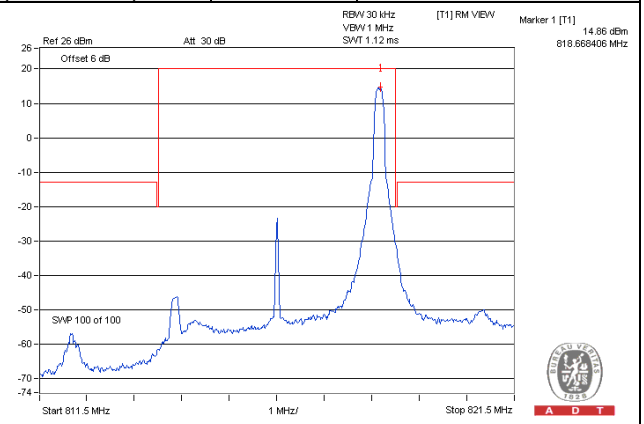
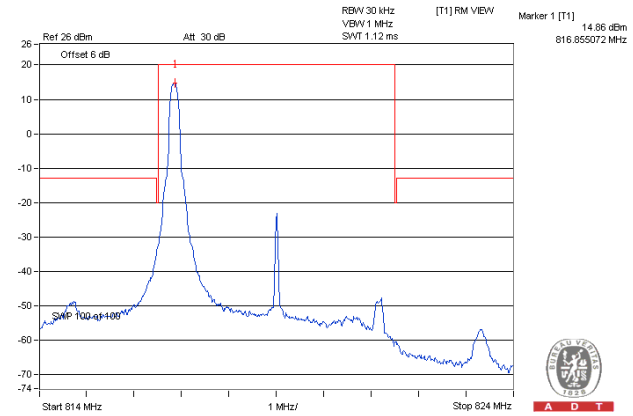
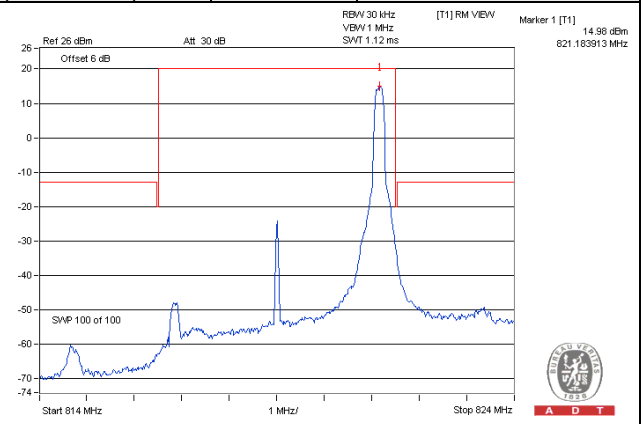
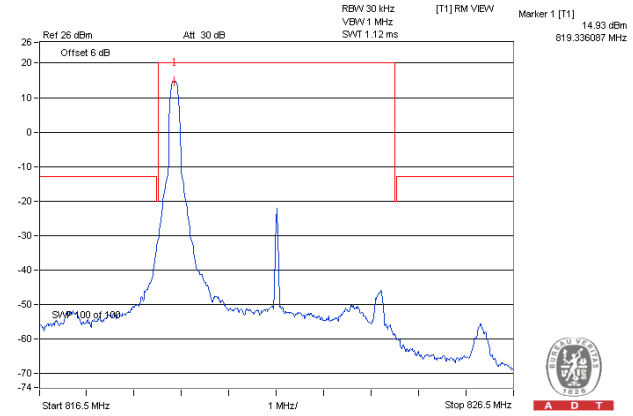
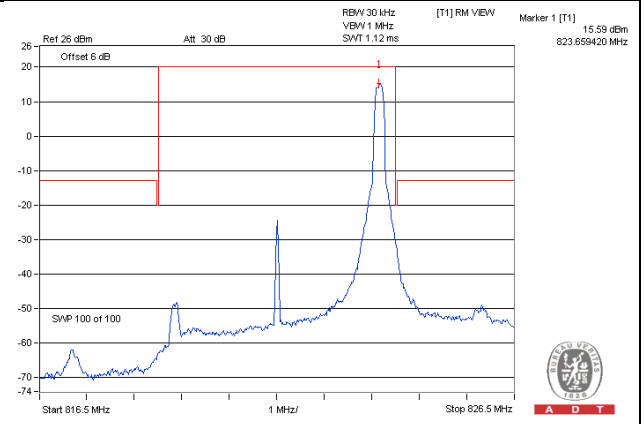


Channel 26740 (819.0MHz)	16QAM	15 RB / 0 RB Offset

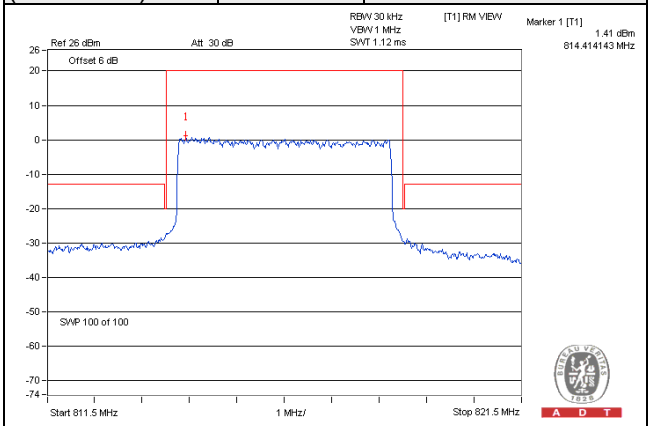


Channel 26775 (822.5MHz)	16QAM	15 RB / 0 RB Offset

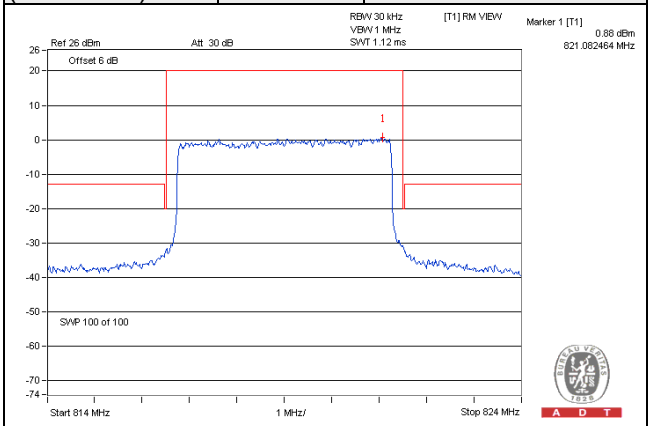


LTE Band 26, Channel Bandwidth 5MHz					
Channel 26715 (816.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26715 (816.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 26765 (821.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 26765 (821.5MHz)	QPSK	1 RB / 24 RB Offset
					

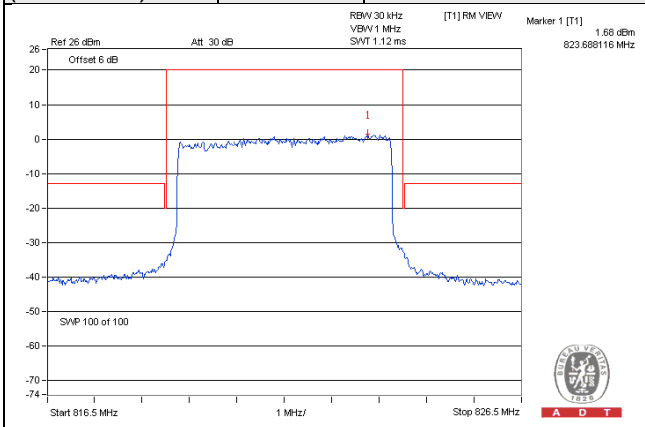
LTE Band 26, Channel Bandwidth 5MHz		
Channel 26715 (816.5MHz)	QPSK	25 RB / 0 RB Offset

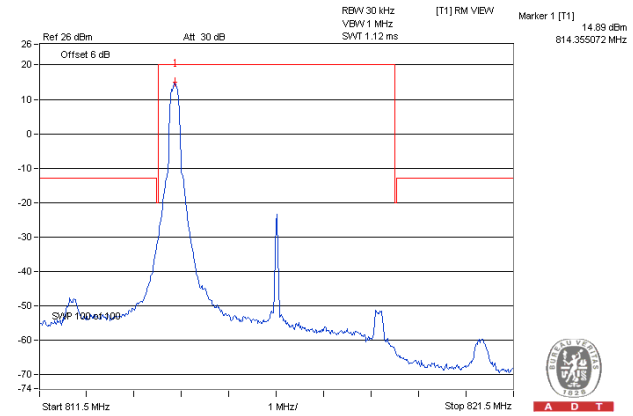
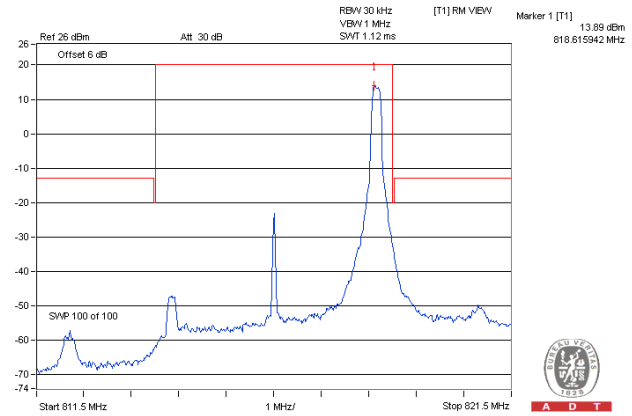
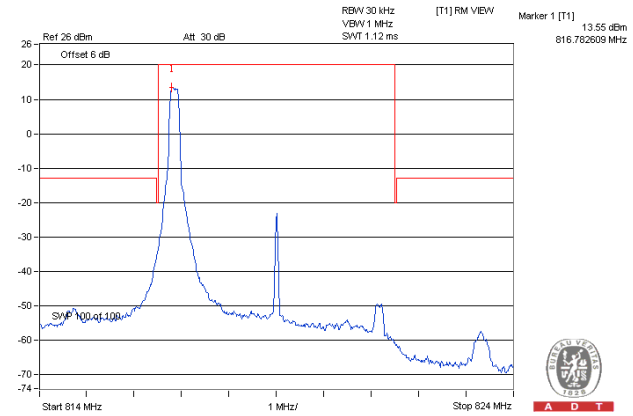
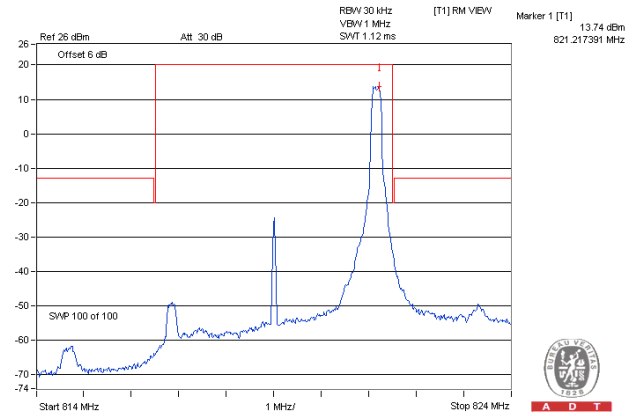
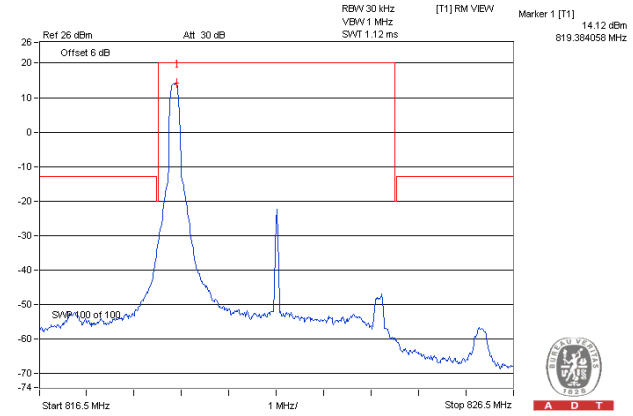
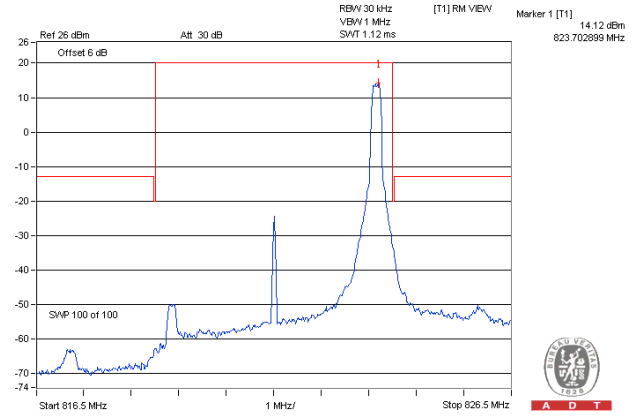


Channel 26740 (819.0MHz)	QPSK	25 RB / 0 RB Offset

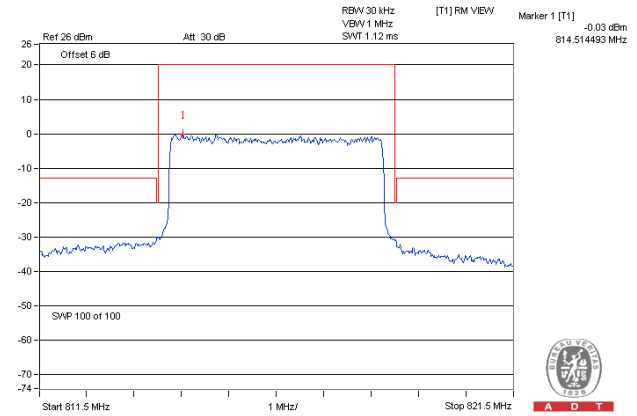


Channel 26765 (821.5MHz)	QPSK	25 RB / 0 RB Offset

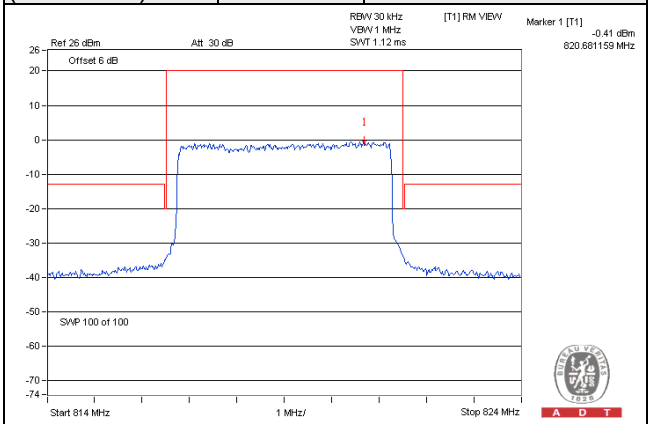


LTE Band 26, Channel Bandwidth 5MHz					
Channel 26715 (816.5MHz)	16QAM	1 RB / 0 RB Offset	Channel 26715 (816.5MHz)	16QAM	1 RB / 24 RB Offset
					
Channel 26740 (819.0MHz)	16QAM	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	16QAM	1 RB / 24 RB Offset
					
Channel 26765 (821.5MHz)	16QAM	1 RB / 0 RB Offset	Channel 26765 (821.5MHz)	16QAM	1 RB / 24 RB Offset
					

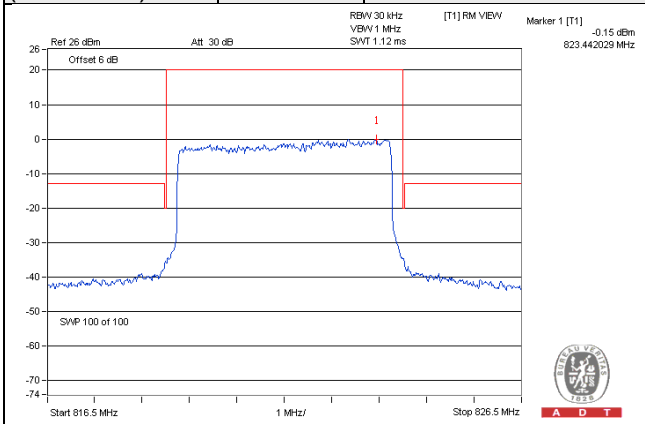
LTE Band 26, Channel Bandwidth 5MHz		
Channel 26715 (816.5MHz)	16QAM	25 RB / 0 RB Offset

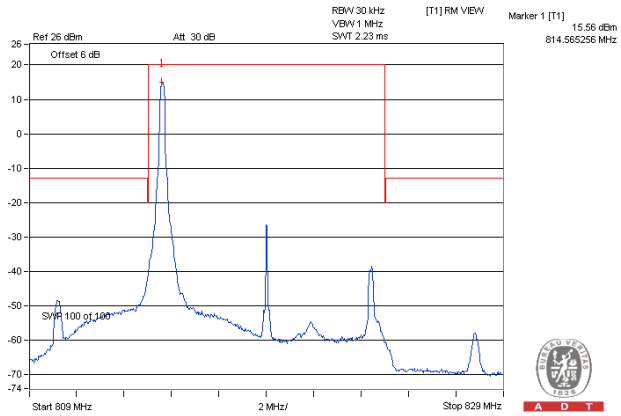
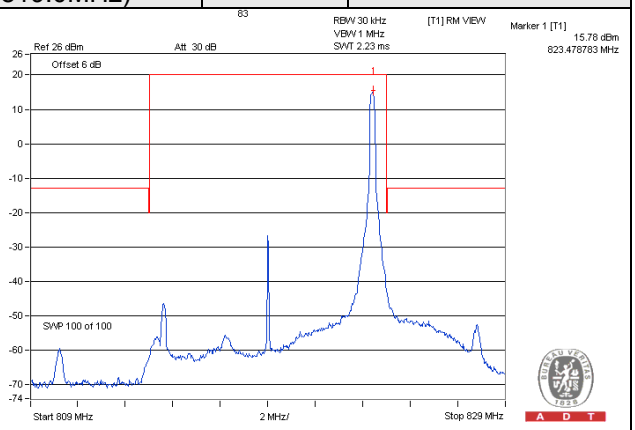


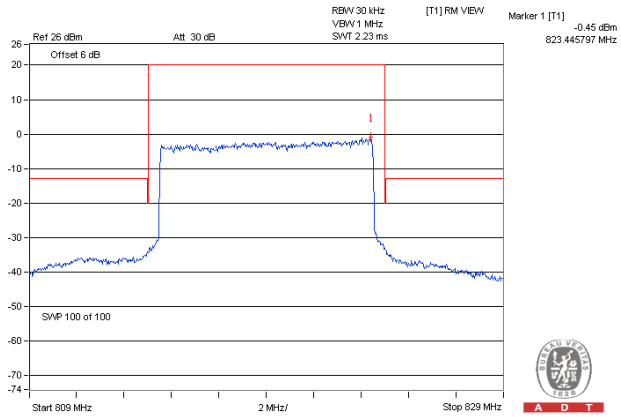
Channel 26740 (819.0MHz)	16QAM	25 RB / 0 RB Offset

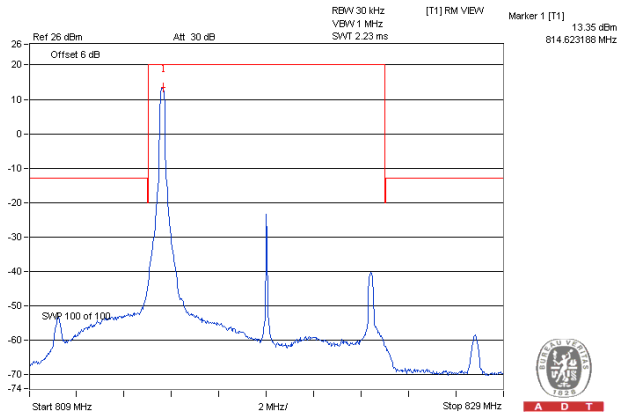
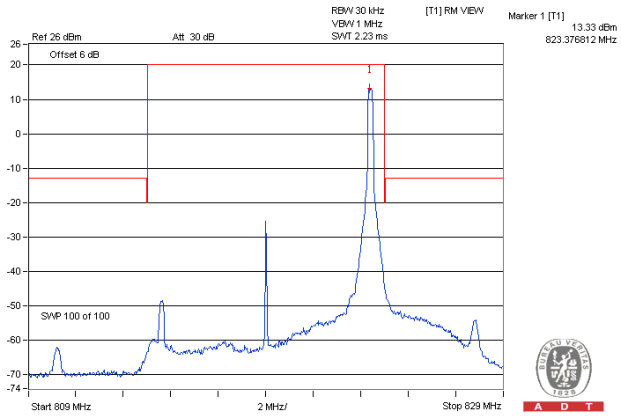


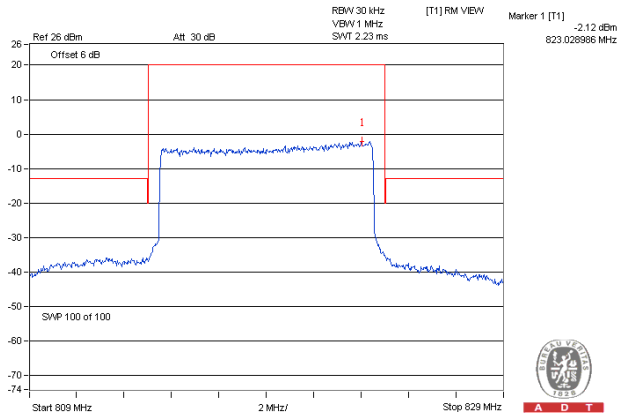
Channel 26765 (821.5MHz)	16QAM	25 RB / 0 RB Offset



LTE Band 26, Channel Bandwidth 10MHz					
Channel 26740 (819.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	QPSK	1 RB / 49 RB Offset
					

LTE Band 26, Channel Bandwidth 10MHz					
Channel 26740 (819.0MHz)	QPSK	50 RB / 0 RB Offset			
					

LTE Band 26, Channel Bandwidth 10MHz					
Channel 26740 (819.0MHz)	16QAM	1 RB / 0 RB Offset	Channel 26740 (819.0MHz)	16QAM	1 RB / 49 RB Offset
					

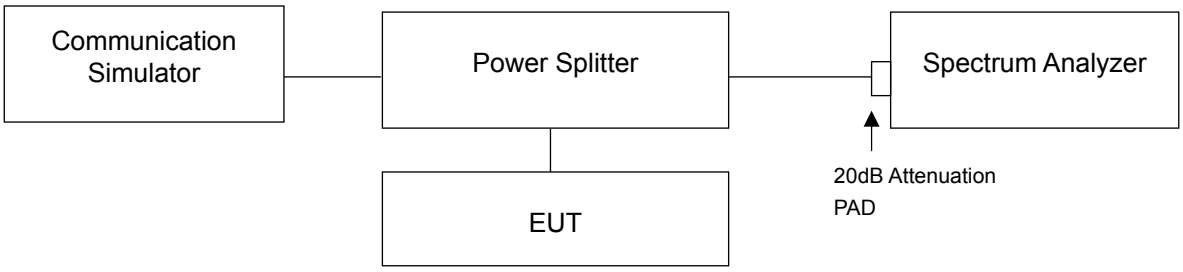
LTE Band 26, Channel Bandwidth 10MHz					
Channel 26740 (819.0MHz)	16QAM	50 RB / 0 RB Offset			
					

4.7 Peak to Average Ratio

4.7.1 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

4.7.2 Test Setup



4.7.3 Test Procedures

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

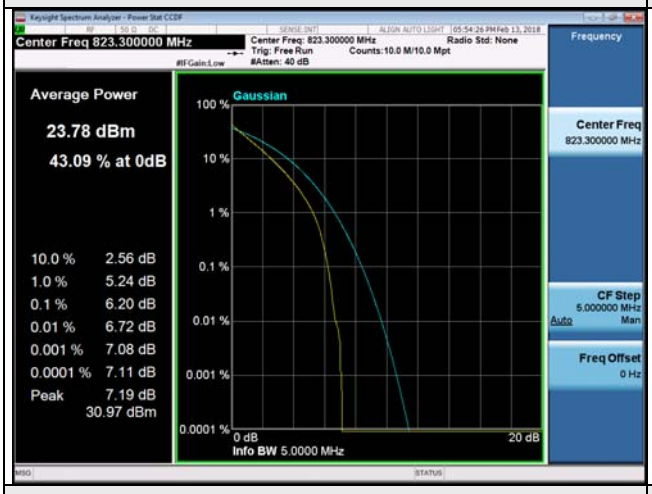
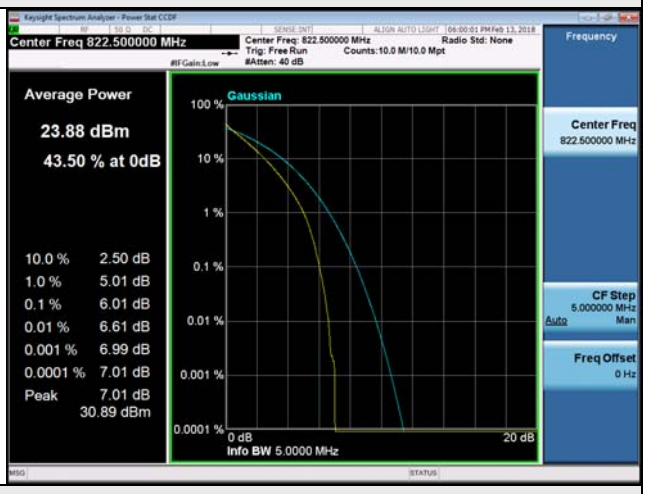
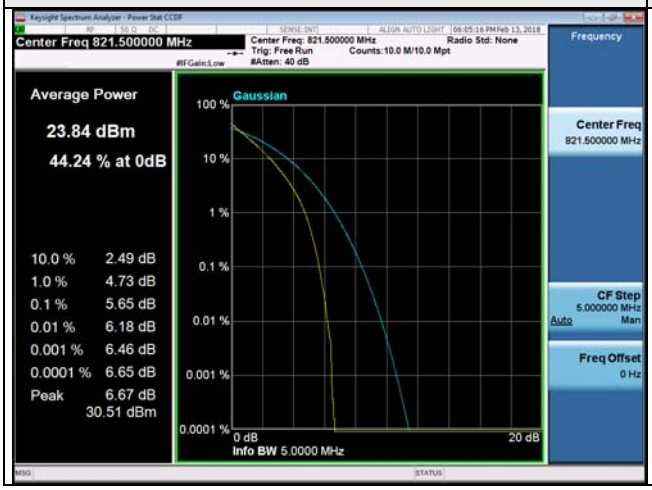
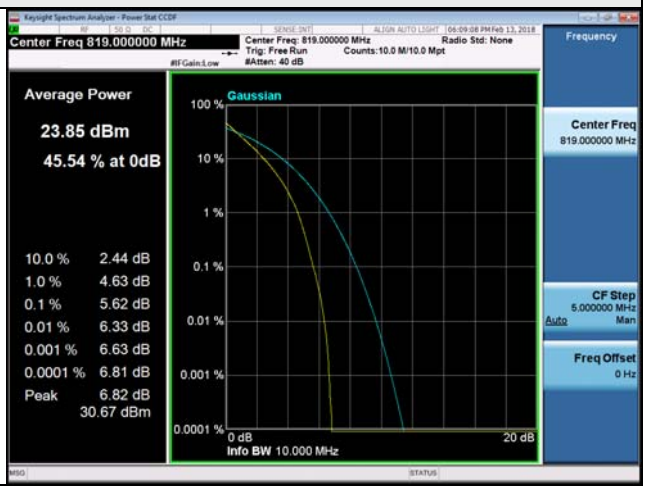
4.7.4 Test Results

LTE Band 26, Channel Bandwidth 1.4MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26697	814.7	5.84	5.84
26740	819.0	5.84	5.84
26783	823.3	6.20	6.19

LTE Band 26, Channel Bandwidth 3MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26705	815.5	5.76	5.74
26740	819.0	5.74	5.74
26775	822.5	6.01	6.00

LTE Band 26, Channel Bandwidth 5MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26715	816.5	5.52	5.53
26740	819.0	5.55	5.56
26765	821.5	5.65	5.63

LTE Band 26, Channel Bandwidth 10MHz			
Channel	Frequency (MHz)	Peak To Average Ratio (dB)	
		QPSK	16QAM
26740	819.0	5.62	5.58

Spectrum Plot of Worst Value	
1.4MHz / QPSK	3MHz / QPSK
	
5MHz / QPSK	10MHz / QPSK
	

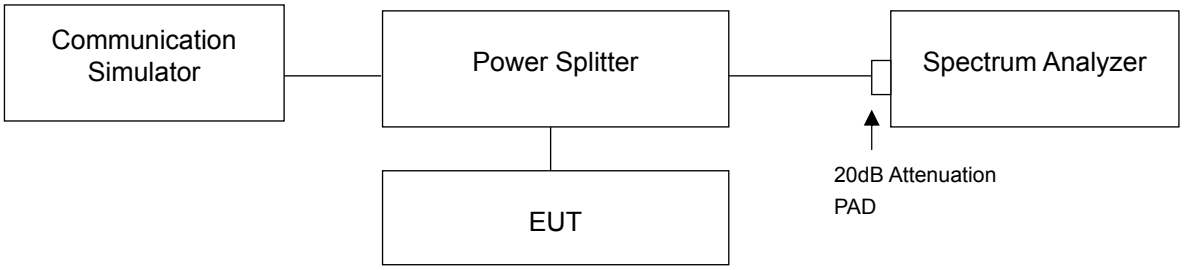
4.8 Conducted Spurious Emissions

4.8.1 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 log10(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.

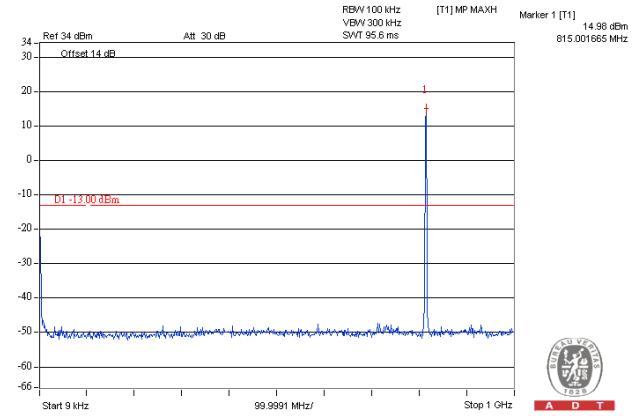
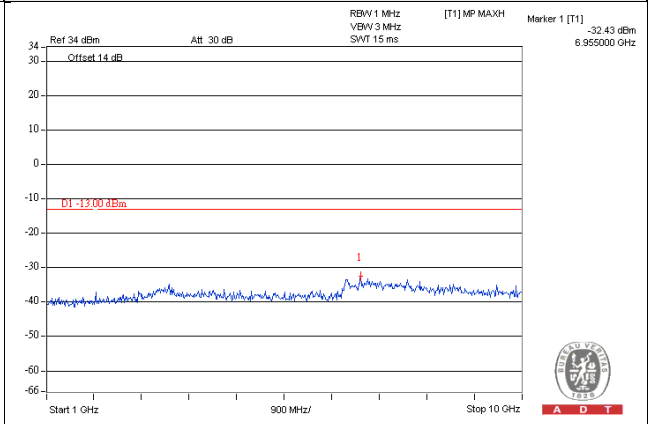
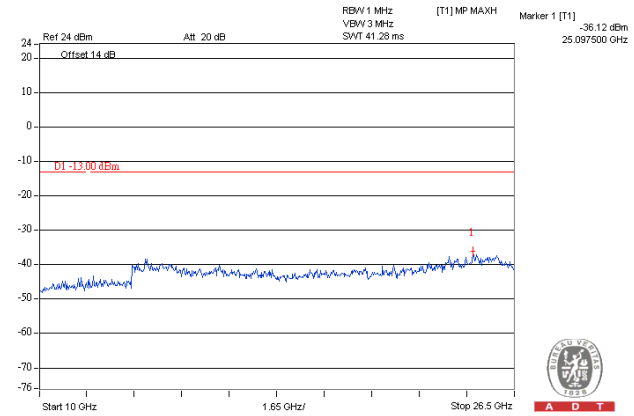
4.8.2 Test Setup

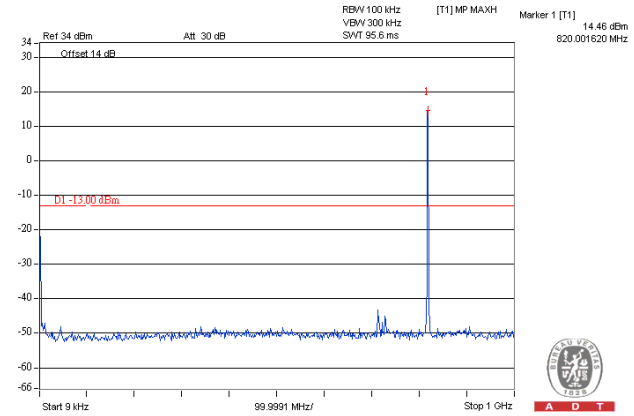
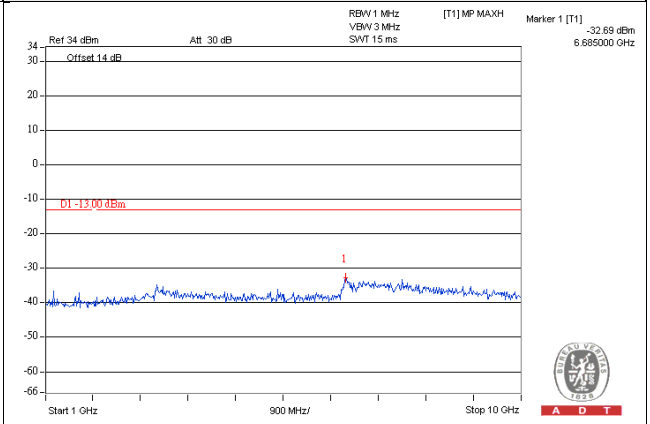
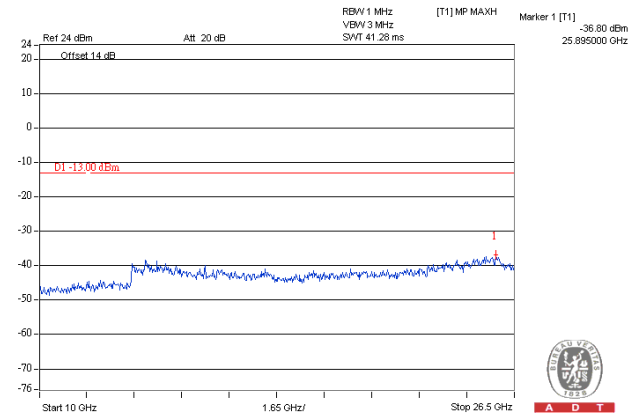


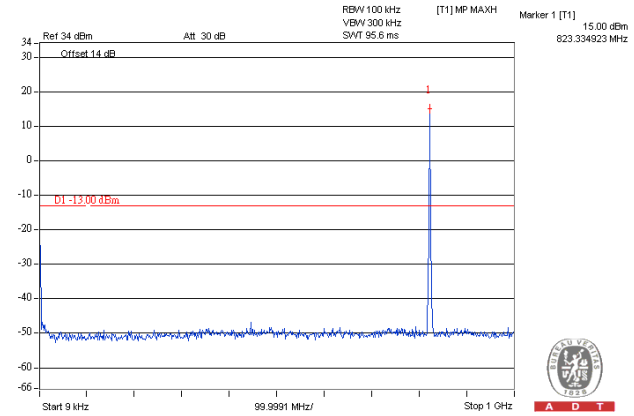
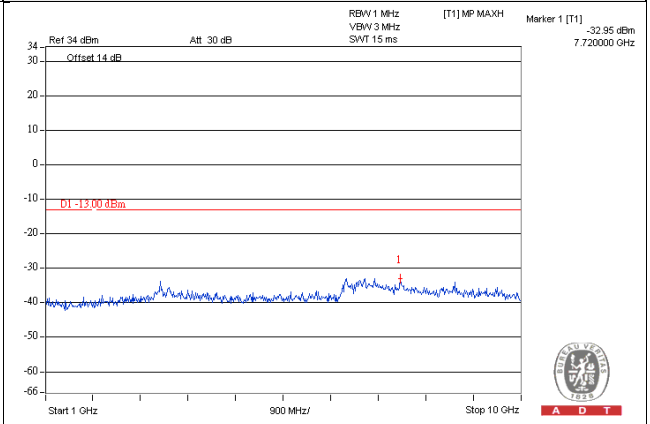
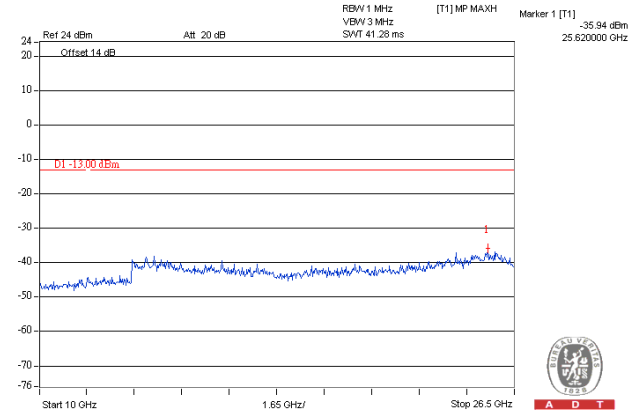
4.8.3 Test Procedure

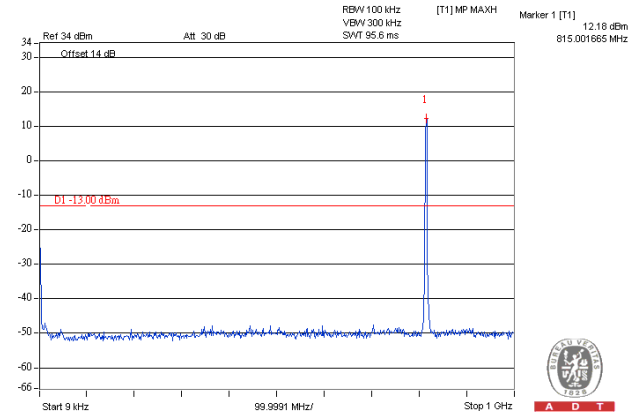
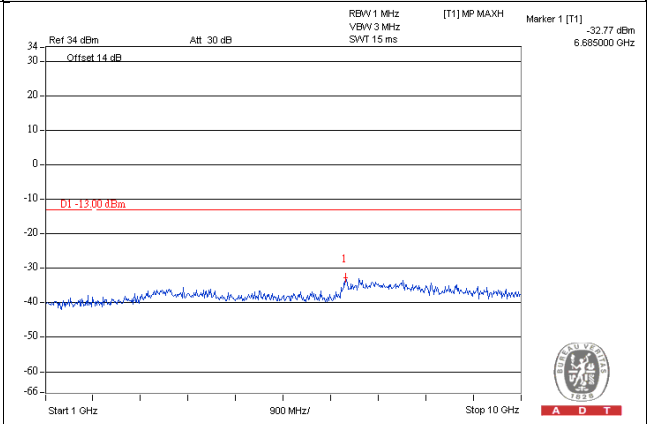
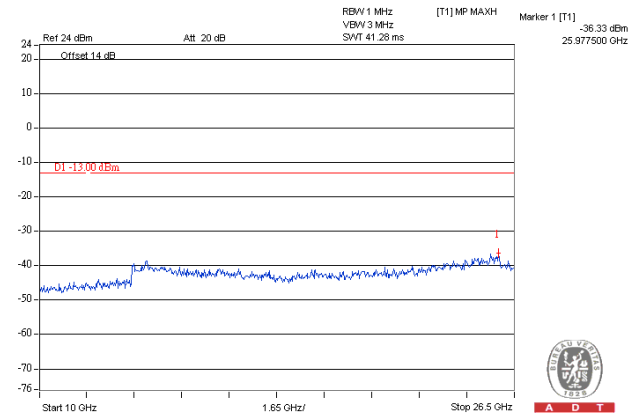
a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Agilent Spectrum Analyzer.
b. The conducted spurious emission used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.
c. When the spectrum scanned from 9kHz to 9GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.

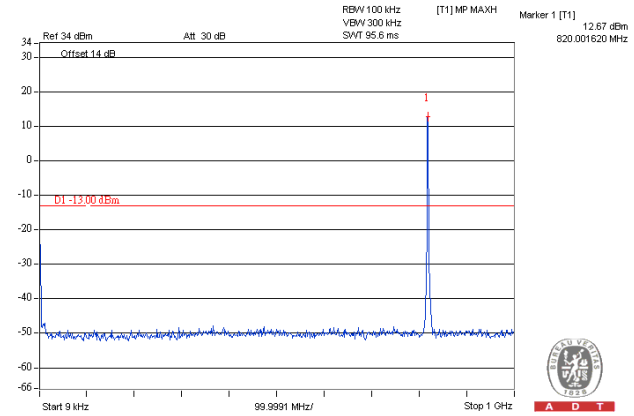
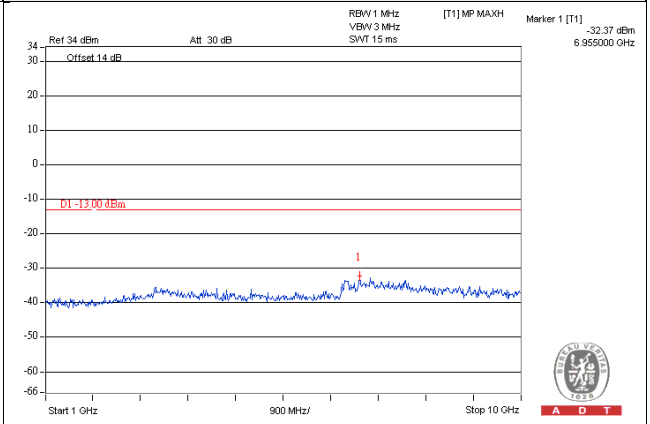
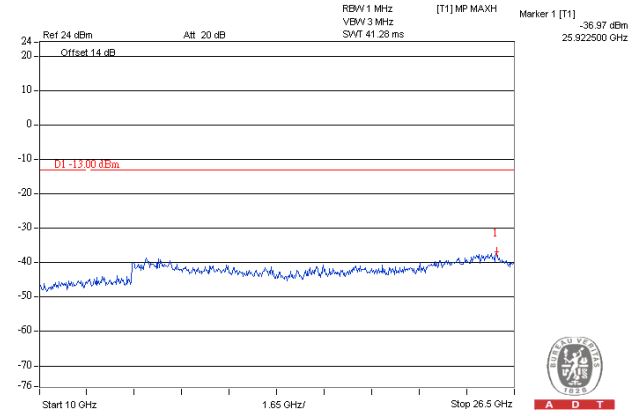
4.8.4 Test Results

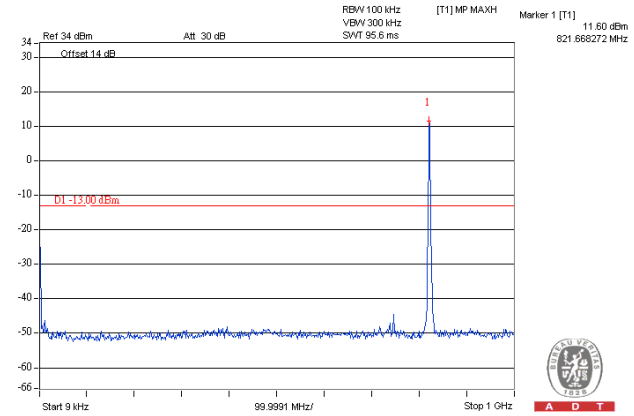
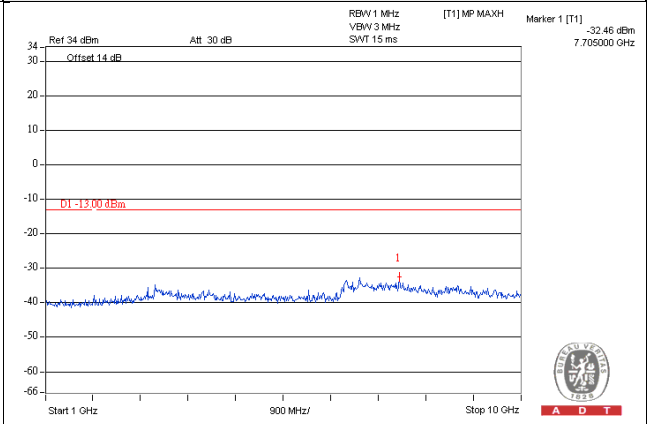
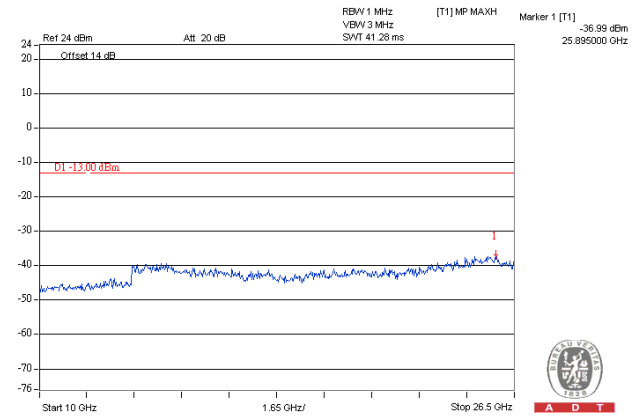
LTE Band 26, Channel Bandwidth 1.4MHz	
Channel 26697 (814.7MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

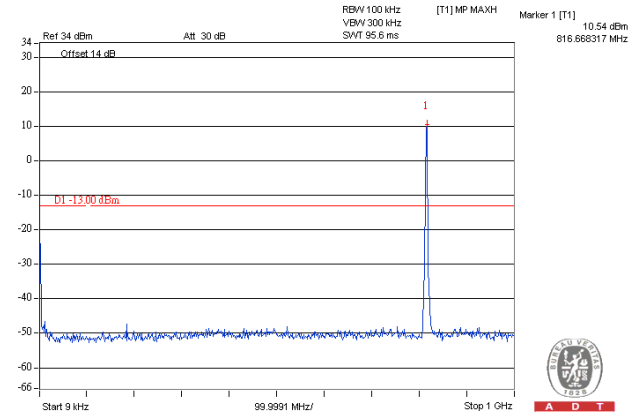
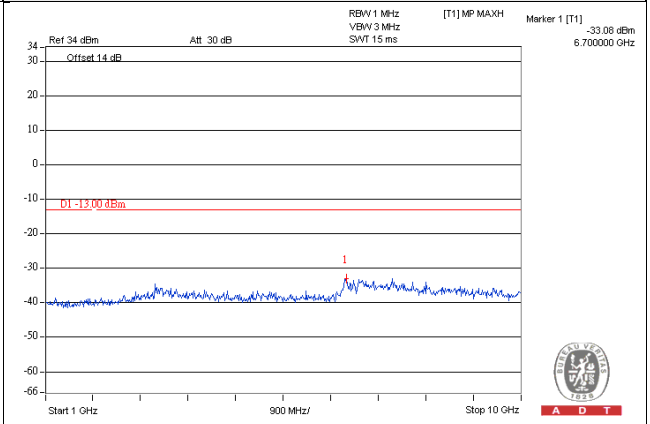
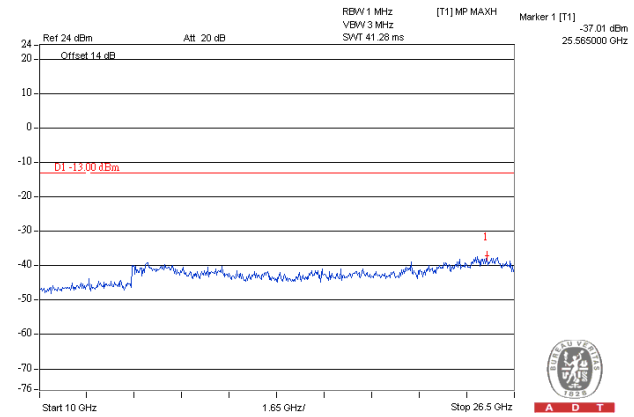
LTE Band 26, Channel Bandwidth 1.4MHz	
Channel 26740 (819.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

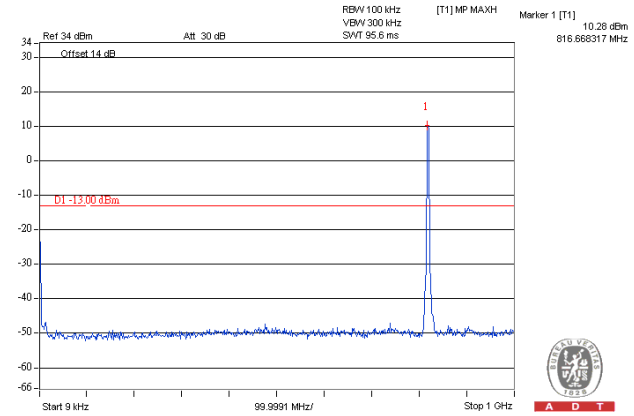
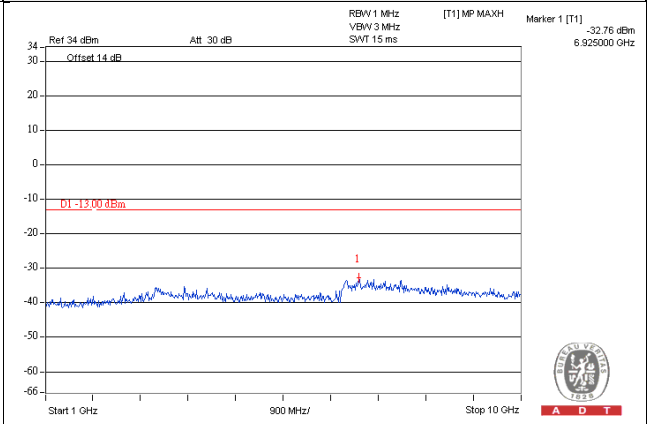
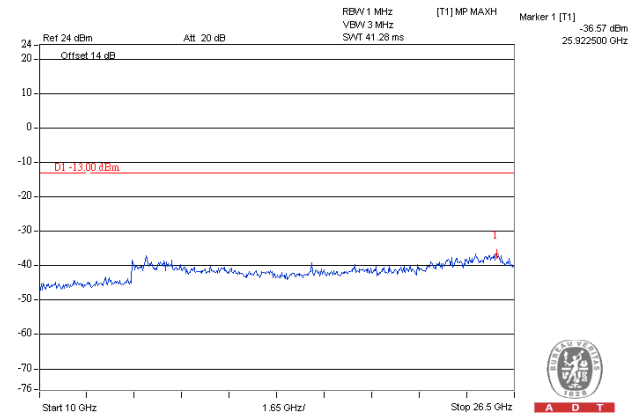
LTE Band 26, Channel Bandwidth 1.4MHz	
Channel 26783 (823.3MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

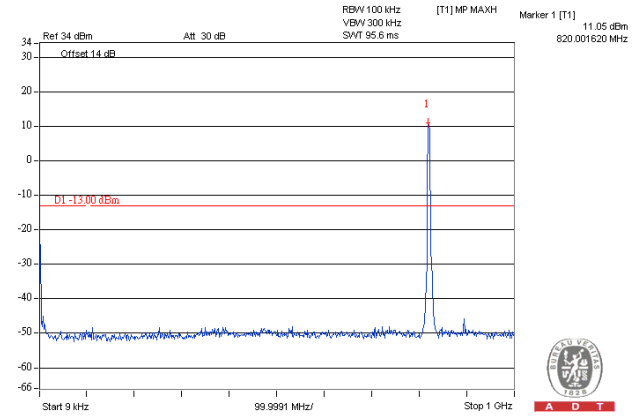
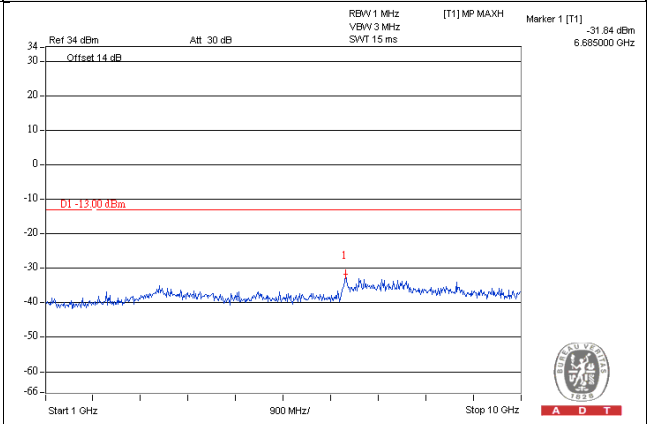
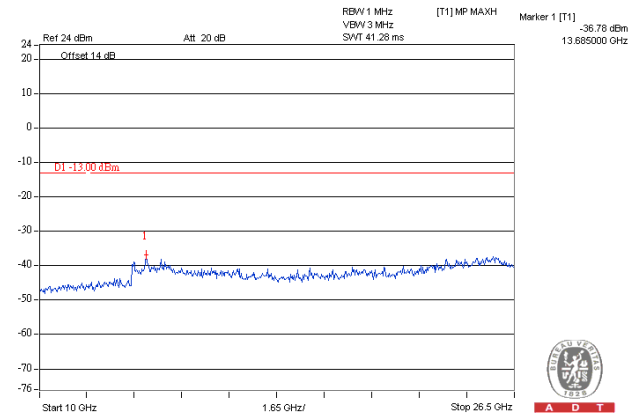
LTE Band 26, Channel Bandwidth 3MHz	
Channel 26705 (815.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

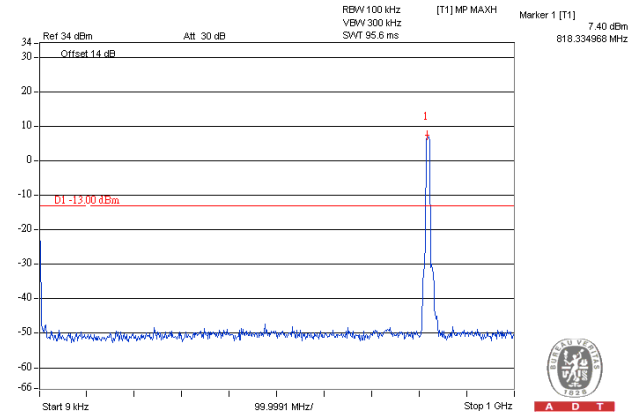
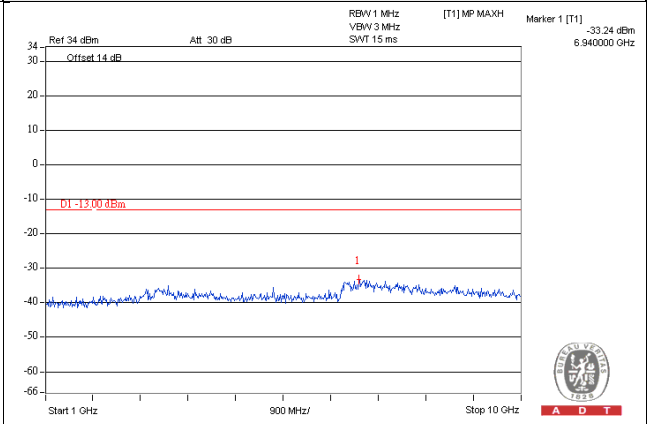
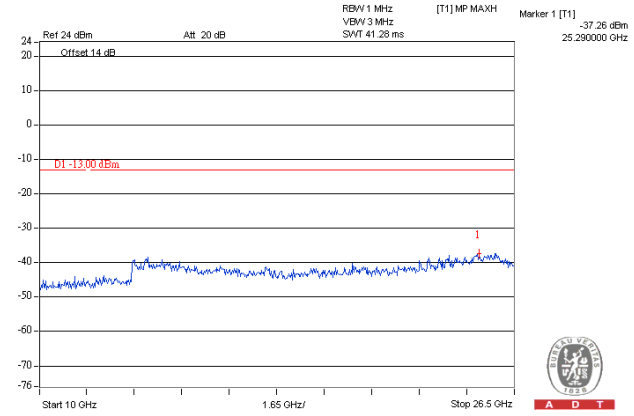
LTE Band 26, Channel Bandwidth 3MHz	
Channel 26740 (819.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 26, Channel Bandwidth 3MHz	
Channel 26775 (822.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 26, Channel Bandwidth 5MHz	
Channel 26715 (816.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 26, Channel Bandwidth 5MHz	
Channel 26740 (819.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 26, Channel Bandwidth 5MHz	
Channel 26765 (821.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

LTE Band 26, Channel Bandwidth 10MHz	
Channel 26740 (819.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~26.5GHz	
	

4.9 Radiated Emission Measurement

4.9.1 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 log10(P) dB. The limit of emission equal to –13dBm.

4.9.2 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. EIRP = Output power level of S.G – TX cable loss + 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, E.R.P power = E.I.R.P power - 2.15dBi.

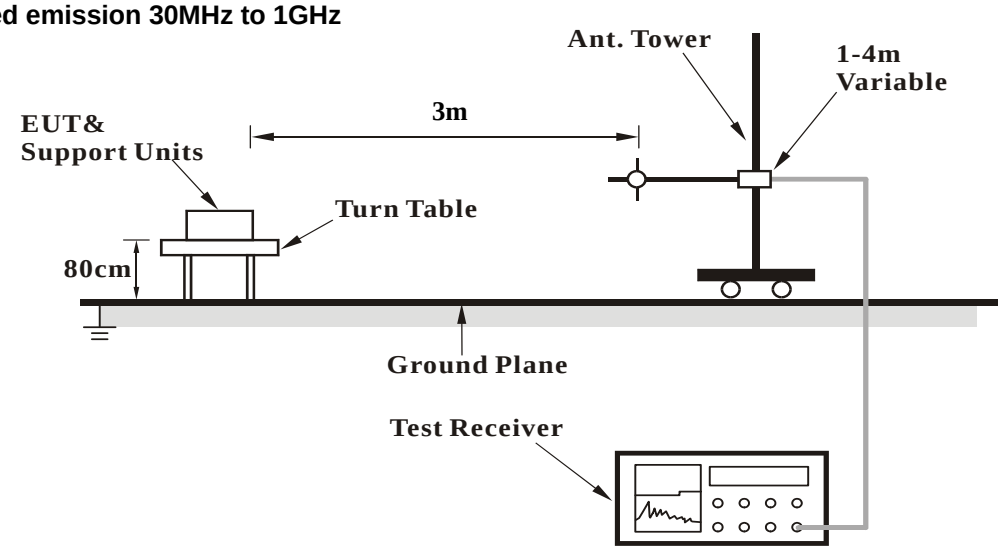
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.9.3 Deviation from Test Standard

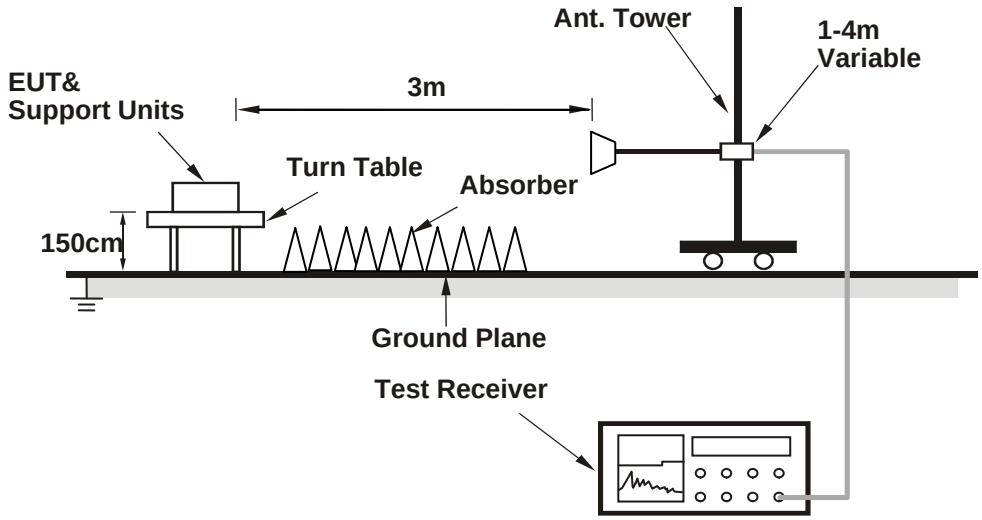
No deviation.

4.9.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

4.9.5 Test Results

Below 1GHz
LTE Band 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26697 (814.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

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	30.97	-45.9	-25.6	-18.8	-44.4	-25.0	-19.4
2	138.64	-52.9	-57.8	-3.2	-61.0	-25.0	-36.0
3	308.39	-59.1	-69.3	3.9	-65.4	-25.0	-40.4
4	429.64	-63.4	-69.5	3.5	-66.0	-25.0	-41.0
5	579.02	-69.4	-74.3	3.7	-70.6	-25.0	-45.6
6	957.32	-70.0	-67.4	3.8	-63.6	-25.0	-38.6
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	30.00	-29.4	-22.1	-19.4	-41.5	-25.0	-16.5
2	45.52	-33.2	-33.3	-10.4	-43.7	-25.0	-18.7
3	138.64	-49.2	-51.2	-3.2	-54.4	-25.0	-29.4
4	363.68	-54.9	-61.3	3.9	-57.4	-25.0	-32.4
5	660.50	-64.7	-64.9	3.7	-61.2	-25.0	-36.2
6	957.32	-71.2	-67.8	3.8	-64.0	-25.0	-39.0

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

LTE Band 26, Channel Bandwidth 3MHz

Mode	TX channel 26705 (815.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

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	30.00	-39.6	-18.3	-19.4	-37.7	-25.0	-12.7
2	140.58	-53.8	-58.5	-3.0	-61.5	-25.0	-36.5
3	261.83	-61.1	-66.3	-1.6	-67.9	-25.0	-42.9
4	363.68	-60.4	-68.9	3.9	-65.0	-25.0	-40.0
5	495.60	-69.5	-75.6	3.8	-71.8	-25.0	-46.8
6	957.32	-70.0	-67.4	3.8	-63.6	-25.0	-38.6
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	30.00	-34.3	-27.0	-19.4	-46.4	-25.0	-21.4
2	62.98	-45.4	-51.9	-2.4	-54.3	-25.0	-29.3
3	169.68	-49.0	-51.6	-2.8	-54.4	-25.0	-29.4
4	363.68	-54.9	-61.3	3.9	-57.4	-25.0	-32.4
5	429.64	-60.5	-66.5	3.5	-63.0	-25.0	-38.0
6	957.32	-70.2	-66.8	3.8	-63.0	-25.0	-38.0

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

LTE Band 26, Channel Bandwidth 5MHz

Mode	TX channel 26715 (816.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

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	**30.00**	**-38.6**	**-17.3**	**-19.4**	**-36.7**	**-25.0**	**-11.7**
2	47.46	-50.6	-43.4	-9.2	-52.6	-25.0	-27.6
3	139.61	-53.8	-58.6	-3.1	-61.7	-25.0	-36.7
4	246.31	-56.4	-63.8	-1.6	-65.4	-25.0	-40.4
5	363.68	-60.1	-68.7	3.9	-64.8	-25.0	-39.8
6	957.32	-69.5	-67.0	3.8	-63.2	-25.0	-38.2
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	30.97	-32.1	-25.7	-18.8	-44.5	-25.0	-19.5
2	64.92	-45.5	-52.7	-1.9	-54.6	-25.0	-29.6
3	170.65	-48.5	-51.2	-2.8	-54.0	-25.0	-29.0
4	363.68	-54.8	-61.2	3.9	-57.3	-25.0	-32.3
5	528.58	-67.0	-72.1	3.9	-68.2	-25.0	-43.2
6	957.32	-69.9	-66.5	3.8	-62.7	-25.0	-37.7

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

LTE Band 26, Channel Bandwidth 10MHz

Mode	TX channel 26740 (819.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	James Yang		

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	30.00	-41.2	-20.0	-19.4	-39.4	-25.0	-14.4
2	138.64	-53.6	-58.5	-3.2	-61.7	-25.0	-36.7
3	308.39	-58.4	-68.7	3.9	-64.8	-25.0	-39.8
4	429.64	-63.8	-69.9	3.5	-66.4	-25.0	-41.4
5	660.50	-68.0	-71.5	3.7	-67.8	-25.0	-42.8
6	957.32	-70.8	-68.2	3.8	-64.4	-25.0	-39.4
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	-39.5	-35.9	-15.2	-51.1	-25.0	-26.1
2	167.74	-42.5	-45.0	-2.9	-47.9	-25.0	-22.9
3	363.68	-55.0	-61.4	3.9	-57.5	-25.0	-32.5
4	429.64	-60.4	-66.4	3.5	-62.9	-25.0	-37.9
5	660.50	-63.9	-64.1	3.7	-60.4	-25.0	-35.4
6	990.30	-70.8	-66.5	3.4	-63.1	-25.0	-38.1

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 1.4MHz

Mode	TX channel 26697 (814.7MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1629.40	-60.5	-52.6	1.0	-51.6	-13.0	-38.6
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	1629.40	-61.2	-54.0	1.0	-53.0	-13.0	-40.0

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 (819.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1638.00	-59.8	-52.0	1.0	-51.0	-13.0	-38.0
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	1638.00	-60.8	-53.5	1.0	-52.5	-13.0	-39.5

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 26783 (823.3MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1646.60	-60.6	-52.9	0.9	-52.0	-13.0	-39.0
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	1646.60	-61.6	-54.3	0.9	-53.4	-13.0	-40.4

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

LTE Band 26, Channel Bandwidth 3MHz

Mode	TX channel 26705 (815.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1631.00	-60.2	-52.4	1.0	-51.4	-13.0	-38.4
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	1631.00	-61.6	-54.4	1.0	-53.4	-13.0	-40.4

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 (831MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1638.00	-60.0	-52.3	1.0	-51.3	-13.0	-38.3
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	1638.00	-61.1	-53.9	1.0	-52.9	-13.0	-39.9

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 (822.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1645.00	-60.4	-52.6	1.0	-51.6	-13.0	-38.6
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	1645.00	-61.6	-54.4	1.0	-53.4	-13.0	-40.4

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

LTE Band 26, Channel Bandwidth 5MHz

Mode	TX channel 26715 (816.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	-60.6	-52.8	1.0	-51.8	-13.0	-38.8
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	-61.8	-54.5	1.0	-53.5	-13.0	-40.5

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 (831MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1638.00	-60.1	-52.4	1.0	-51.4	-13.0	-38.4
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	1638.00	-61.4	-54.1	1.0	-53.1	-13.0	-40.1

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 (821.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1643.00	-60.5	-52.7	1.0	-51.7	-13.0	-38.7
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	1643.00	-61.6	-54.4	1.0	-53.4	-13.0	-40.4

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

LTE Band 26, Channel Bandwidth 10MHz

Mode	TX channel 26740 (819.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

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	1638.00	-60.2	-52.5	1.0	-51.5	-13.0	-38.5
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	1638.00	-61.2	-54.0	1.0	-53.0	-13.0	-40.0

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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---