

FCC

RF Test Report

Applicant : D Link Corporation
Product Type : 4G LTE M2M modem
Trade Name : D-Link
Model Number : DWM-311
Test Specification : FCC 47 CFR PART 24E
FCC 47 CFR PART 27
ANSI/TIA-603-D 2010
Application Purpose : Original
Receive Date : Jun. 28, 2016
Test Period : Jun. 28 ~ Jun. 30, 2016
Issue Date : Jul. 01, 2016

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C)
Tel : +886-3-2710188 / Fax : +886-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330

Note: This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp. This document may be altered or revised by A Test Lab Techno Corp. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, or any government agencies. The test results in the report only apply to the tested sample.



Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jul. 01, 2016	Initial Issue	Snow Wang



Verification of Compliance

Issued Date: Jul. 01, 2016

Applicant : D Link Corporation
Product Type : 4G LTE M2M modem
Trade Name : D-Link
Model Number : DWM-311
FCC ID : KA2WM311A1
EUT Rated Voltage : DC 5V, 1A
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 24E
FCC 47 CFR PART 27
ANSI/TIA-603-D 2010
Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C)
Tel : +886-3-2710188 / Fax : +886-3-2710190
Taiwan Accreditation Foundation accreditation number: 1330
<http://www.atl-lab.com.tw/e-index.htm>



A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By

: Fly Lu

(Manager)

(Fly Lu)

Reviewed By

: Eric Ou Yang

(Testing Engineer)

(Eric Ou Yang)

TABLE OF CONTENTS

1	General Information.....	6
1.1.	EUT Description	6
1.2.	Mode of Operation.....	8
1.3.	EUT Exercise Software	12
1.4.	Configuration of Test System Details	13
1.5.	Test Site Environment	13
1.6.	Summary of Test Result	14
2	Conducted Output Average Power Test.....	15
2.1.	Limit	15
2.2.	Test Instruments	15
2.3.	Test Setup.....	15
2.4.	Test Procedure	15
2.5.	Uncertainty	15
2.6.	Test Result.....	16
3	Effective Radiated Power / Equivalent Isotropic Radiated Power Test.....	26
3.1.	Limit	26
3.2.	Test Instruments	26
3.3.	Test Setup.....	27
3.4.	Test Procedure	28
3.5.	Uncertainty	28
3.6.	Test Result.....	29
4	Frequency Stability Test	32
4.1.	Limit	32
4.2.	Test Instruments	32
4.3.	Setup	32
4.4.	Test Procedure	33
4.5.	Uncertainty	33
4.6.	Test Result.....	34
5	Emission Bandwidth & Occupied Bandwidth Test	36
5.1.	Limit	36
5.2.	Test Instruments	36
5.3.	Setup	36
5.4.	Test Procedure	37
5.5.	Uncertainty	37
5.6.	Test Result.....	38
5.7.	Test Graphs	41

6	Peak to Average Ratio Test	61
6.1.	Limit	61
6.2.	Test Instruments	61
6.3.	Setup	61
6.4.	Test Procedure	62
6.5.	Uncertainty	62
6.6.	Test Result.....	63
6.7.	Test Graphs	64
7	Band Edge Test.....	74
7.1.	Limit	74
7.2.	Test Instruments	74
7.3.	Setup	75
7.4.	Test Procedure	75
7.5.	Uncertainty	75
7.6.	Test Result.....	76
8	Conducted Spurious Emission Test.....	88
8.1.	Limit	88
8.2.	Test Instruments	88
8.3.	Setup	88
8.4.	Test Procedure	89
8.5.	Uncertainty	89
8.6.	Test Graphs	90
9	Radiated Emission Test	108
9.1.	Limit	108
9.2.	Test Instruments	108
9.3.	Setup	109
9.4.	Test Procedure	110
9.5.	Uncertainty	110
9.6.	Test Result.....	111



1 General Information

1.1. EUT Description

Applicant	D Link Corporation 17595 Mt. Herrmann Fountain Valley, CA 92708 United States			
Manufacturer	D Link Corporation 17595 Mt. Herrmann Fountain Valley, CA 92708 United States			
Product Type	4G LTE M2M modem			
Trade Name	D-Link			
Model Number	DWM-311			
FCC ID	KA2WM311A1			
IMEI No.	358430050907341			
Mode	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
LTE	2	1850 ~ 1910	1930 ~ 1990	QPSK, 16QAM
	4	1710 ~ 1755	2110 ~ 2155	QPSK, 16QAM
	13	777 ~ 787	746 ~ 756	QPSK, 16QAM
Channel Bandwidth	LTE Band 2	5MHz, 10MHz, 15MHz, 20MHz		
	LTE Band 4	5MHz, 10MHz, 15MHz, 20MHz		
	LTE Band 13	5MHz, 10MHz		
Antenna information	Type		Max. Gain (dBi)	
	LTE External Antenna		LTE Band 2	2.87 dBi
			LTE Band 4	2.02 dBi
			LTE Band 13	-0.65 dBi

Frequency Band	Channel Bandwidth (MHz)	Max. RF Output Power (W)	E.R.P. /E.I.R.P. (W)	
LTE Band 2	5	0.208	0.175	(E.I.R.P.)
LTE Band 2	10	0.207	0.169	(E.I.R.P.)
LTE Band 2	15	0.210	0.171	(E.I.R.P.)
LTE Band 2	20	0.207	0.193	(E.I.R.P.)
LTE Band 4	5	0.203	0.182	(E.I.R.P.)
LTE Band 4	10	0.202	0.178	(E.I.R.P.)
LTE Band 4	15	0.202	0.185	(E.I.R.P.)
LTE Band 4	20	0.203	0.185	(E.I.R.P.)
LTE Band 13	5	0.201	0.177	(E.R.P.)
LTE Band 13	10	0.197	0.166	(E.R.P.)

Frequency Band	Channel Bandwidth (MHz)	Occupied Bandwidth (MHz)		Emission Designator	
		QPSK	16QAM	QPSK	16QAM
LTE Band 2	5	4.4629	4.4954	4M46G7D	4M50W7D
LTE Band 2	10	8.9186	8.9175	8M92G7D	8M92W7D
LTE Band 2	15	13.4056	13.3879	13M41G7D	13M39W7D
LTE Band 2	20	17.8813	17.8813	17M88G7D	17M88W7D
LTE Band 4	5	4.4671	4.4960	4M47G7D	4M50W7D
LTE Band 4	10	8.9174	8.9268	8M92G7D	8M93W7D
LTE Band 4	15	13.4176	13.3827	13M42G7D	13M38W7D
LTE Band 4	20	17.9025	17.8937	17M90G7D	17M89W7D
LTE Band 13	5	4.4656	4.4952	4M47G7D	4M50W7D
LTE Band 13	10	8.8699	8.8697	8M87G7D	8M87W7D

1.2. Mode of Operation

Three channels had been tested for each channel bandwidth.

LTE Band 2						
Channel Bandwidth	1.4MHz		3MHz		5MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	18607	1850.7	18615	1851.5	18625	1852.5
Middle CH	18900	1880.0	18900	1880.0	18900	1880.0
High CH	19193	1909.3	19185	1908.5	19175	1907.5
Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	18650	1855.0	18675	1857.5	18700	1860.0
Middle CH	18900	1880.0	18900	1880.0	18900	1880.0
High CH	19150	1905.0	19125	1902.5	19100	1900.0

LTE Band 4						
Channel Bandwidth	1.4MHz		3MHz		5MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	19957	1710.7	19965	1711.5	19975	1712.5
Middle CH	20175	1732.5	20175	1732.5	20175	1732.5
High CH	20393	1754.3	20385	1753.5	20375	1752.5
Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	20000	1715.0	20025	1717.5	20050	1720.0
Middle CH	20175	1732.5	20175	1732.5	20175	1732.5
High CH	20350	1750.0	20325	1747.5	20300	1745.0

LTE Band 13				
Channel Bandwidth	5MHz		10MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	23205	779.5	---	---
Middle CH	23230	782.0	23230	782.0
High CH	23255	784.5	---	---

Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission: 30MHz to 26900 MHz.

Band	Channel Bandwidth	Test Modes	
LTE Band 2	5 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 13) Link ☐ LTE(RB Size 1, RB Offset 24) Link ☐ LTE(RB Size 12, RB Offset 0) Link ☐ LTE(RB Size 12, RB Offset 6) Link ☐ LTE(RB Size 12, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 0) Link	QPSK
	10 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 25) Link ☐ LTE(RB Size 1, RB Offset 49) Link ☐ LTE(RB Size 25, RB Offset 0) Link ☐ LTE(RB Size 25, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 25) Link ☐ LTE(RB Size 50, RB Offset 0) Link	QPSK
	15 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 38) Link ☐ LTE(RB Size 1, RB Offset 74) Link ☐ LTE(RB Size 38, RB Offset 0) Link ☐ LTE(RB Size 38, RB Offset 18) Link ☐ LTE(RB Size 38, RB Offset 38) Link ☐ LTE(RB Size 75, RB Offset 0) Link	QPSK
	20 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 50) Link ☐ LTE(RB Size 1, RB Offset 99) Link ☐ LTE(RB Size 50, RB Offset 0) Link ☐ LTE(RB Size 50, RB Offset 25) Link ☐ LTE(RB Size 50, RB Offset 50) Link ☐ LTE(RB Size 100, RB Offset 0) Link	QPSK

Band	Channel Bandwidth	Test Modes	
LTE Band 4	5 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 13) Link ☐ LTE(RB Size 1, RB Offset 24) Link ☐ LTE(RB Size 12, RB Offset 0) Link ☐ LTE(RB Size 12, RB Offset 6) Link ☐ LTE(RB Size 12, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 0) Link	QPSK
	10 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 25) Link ☐ LTE(RB Size 1, RB Offset 49) Link ☐ LTE(RB Size 25, RB Offset 0) Link ☐ LTE(RB Size 25, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 25) Link ☐ LTE(RB Size 50, RB Offset 0) Link	QPSK
	15 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 38) Link ☐ LTE(RB Size 1, RB Offset 74) Link ☐ LTE(RB Size 38, RB Offset 0) Link ☐ LTE(RB Size 38, RB Offset 18) Link ☐ LTE(RB Size 38, RB Offset 38) Link ☐ LTE(RB Size 75, RB Offset 0) Link	QPSK
	20 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 50) Link ☐ LTE(RB Size 1, RB Offset 99) Link ☐ LTE(RB Size 50, RB Offset 0) Link ☐ LTE(RB Size 50, RB Offset 25) Link ☐ LTE(RB Size 50, RB Offset 50) Link ☐ LTE(RB Size 100, RB Offset 0) Link	QPSK

Band	Channel Bandwidth	Test Modes	
LTE Band 13	5 MHz	☐ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 13) Link ☒ LTE(RB Size 1, RB Offset 24) Link ☐ LTE(RB Size 12, RB Offset 0) Link ☐ LTE(RB Size 12, RB Offset 6) Link ☐ LTE(RB Size 12, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 0) Link	QPSK
	10 MHz	☒ LTE(RB Size 1, RB Offset 0) Link ☐ LTE(RB Size 1, RB Offset 25) Link ☐ LTE(RB Size 1, RB Offset 49) Link ☐ LTE(RB Size 25, RB Offset 0) Link ☐ LTE(RB Size 25, RB Offset 13) Link ☐ LTE(RB Size 25, RB Offset 25) Link ☐ LTE(RB Size 50, RB Offset 0) Link	QPSK

Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Description	Modulation		Channel			Antenna
	QPSK	16QAM	B	M	T	1
Conducted Output Average Power	V	V	V	V	V	V
Equivalent Isotropic Radiated Power / Equivalent Radiated Power	V	V (Note)	V	V	V	V
Frequency Stability	---	V	---	V	---	V
Emission Bandwidth & Occupied Bandwidth	V	V	V	V	V	V
Peak to average ratio	V	V	---	V	---	V
Band Edge	V	---	V	---	V	V
Conducted Spurious Emissions	V	---	V	V	V	V
Radiated Spurious Emissions	V	V (Note)	V	V	V	V

V: measured

---: not measured

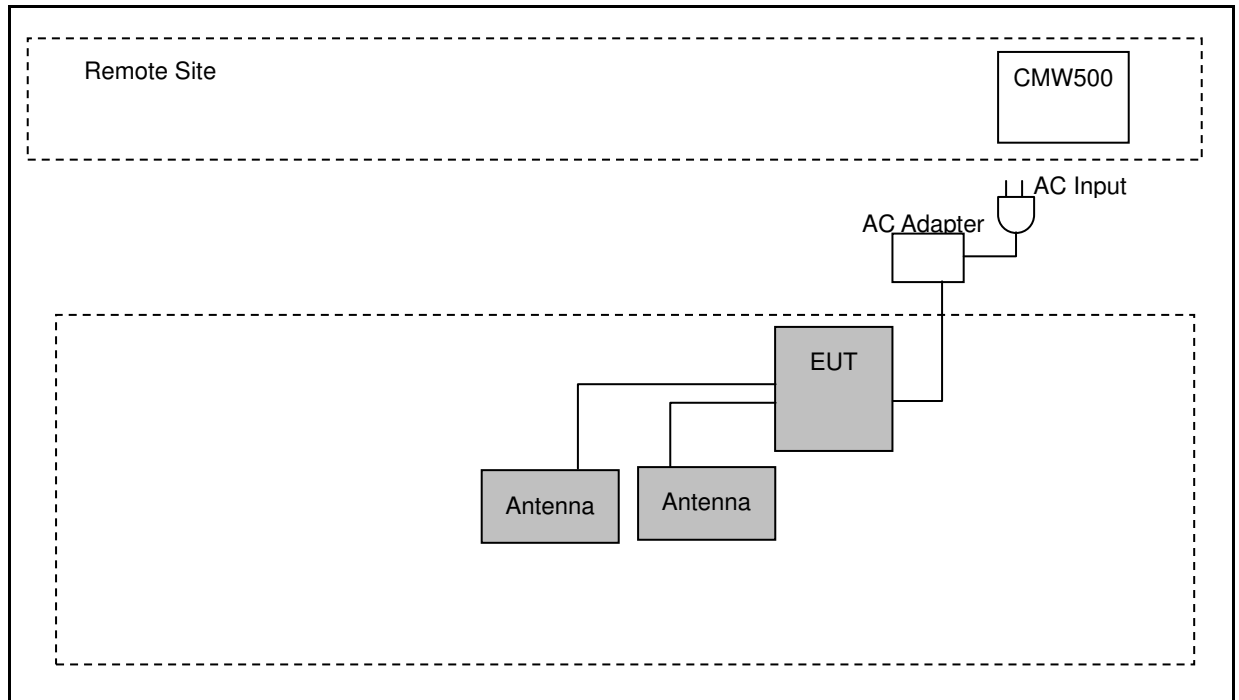
Note: Only M Channel

1.3. EUT Exercise Software

1	Setup the EUT and Base Station (CMW500) as shown on 1.4.
2	Turn on the power of all equipment.
3	EUT run test program test.

Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1

1.4. Configuration of Test System Details



1.5. Test Site Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950



1.6. Summary of Test Result

FCC Rule	Description	Result
§2.1046	Conducted Output Average Power	Not specified
§24.232 §27.50 KDB 971168 D01 (5.1.1)	Equivalent Isotropic Radiated Power / Equivalent Radiated Power	Pass
§2.1055 §24.235 §27.54 KDB 971168 D01 (9)	Frequency Stability	Pass
§2.1049 KDB 971168 D01 (4.1)	Emission Bandwidth	Pass
§2.1049	Occupied Bandwidth	Not specified
§24.232 §27.50 KDB 971168 D01 (5.7.1)	Peak to average ratio	Pass
§24.238 §27.53	Band Edge	Pass
§2.1051 §24.238 §27.53 KDB 971168 D01 (6)	Conducted Spurious Emissions	Pass
§2.1053 §24.238 §27.53 KDB 971168 D01 (7)	Radiated Spurious Emissions	Pass

2 Conducted Output Average Power Test

2.1. Limit

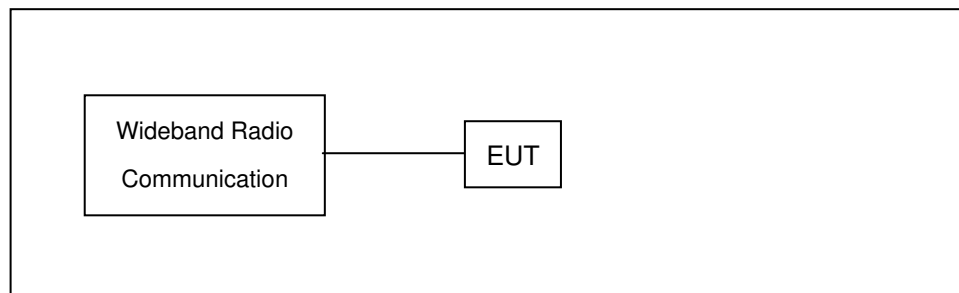
N/A

2.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Wideband Radio Communication Tester	R & S	CMW500	103168	10/30/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

2.3. Test Setup



2.4. Test Procedure

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

2.5. Uncertainty

The measurement uncertainty is defined as for Conducted Power measurement is 1.2 dB.



2.6. Test Result

Test Item	Conducted Output Average Power		
Date of Test	06/28/2016	Test Site	TE05

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	5 MHz	QPSK	18625	1852.5	1	0	23.19	0.208
					1	12	23.04	0.201
					1	24	22.78	0.190
					12	0	22.19	0.166
					12	6	22.13	0.163
					12	13	22.05	0.160
					25	0	22.05	0.160
			18900	1880.0	1	0	23.10	0.204
					1	12	22.91	0.195
					1	24	22.88	0.194
					12	0	22.18	0.165
					12	6	22.15	0.164
					12	13	22.06	0.161
					25	0	22.05	0.160
			19175	1907.5	1	0	23.14	0.206
					1	12	23.08	0.203
					1	24	22.86	0.193
					12	0	22.07	0.161
					12	6	22.05	0.160
					12	13	22.05	0.160
					25	0	22.01	0.159
		16QAM	18625	1852.5	1	0	22.30	0.170
					1	12	22.09	0.162
					1	24	21.96	0.157
					12	0	21.22	0.132
					12	6	21.13	0.130
					12	13	21.11	0.129
					25	0	21.05	0.127
			18900	1880.0	1	0	22.37	0.173
					1	12	22.15	0.164
					1	24	22.02	0.159
					12	0	21.26	0.134
					12	6	21.07	0.128
					12	13	21.01	0.126
					25	0	21.00	0.126
			19175	1907.5	1	0	22.23	0.167
					1	12	22.10	0.162
					1	24	21.91	0.155
					12	0	21.05	0.127
					12	6	21.02	0.126
					12	11	21.02	0.126
					25	0	21.01	0.126

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	10 MHz	QPSK	18650	1855.0	1	0	23.15	0.207
					1	24	22.95	0.197
					1	49	22.48	0.177
					25	0	22.47	0.177
					25	12	22.31	0.170
					25	25	22.25	0.168
			18900	1880.0	50	0	22.22	0.167
					1	0	23.05	0.202
					1	24	22.99	0.199
					1	49	22.65	0.184
					25	0	22.48	0.177
					25	12	22.28	0.169
					25	25	22.27	0.169
					50	0	22.19	0.166
			19150	1905.0	1	0	23.10	0.204
					1	24	22.83	0.192
					1	49	22.73	0.187
					25	0	22.33	0.171
					25	12	22.29	0.169
					25	25	22.19	0.166
		16QAM	18650	1855.0	50	0	22.12	0.163
					1	0	22.22	0.167
					1	24	22.17	0.165
					1	49	22.05	0.160
					25	0	21.36	0.137
					25	12	21.22	0.132
			18900	1880.0	25	25	21.20	0.132
					50	0	21.18	0.131
					1	0	22.07	0.161
					1	24	21.84	0.153
					1	49	21.81	0.152
					25	0	21.48	0.141
					25	12	21.33	0.136
					25	25	21.28	0.134
					50	0	21.21	0.132
			19150	1905.0	1	0	22.15	0.164
					1	24	22.11	0.163
					1	49	21.81	0.152
					25	0	21.23	0.133
					25	12	21.12	0.129
					25	25	21.08	0.128
					50	0	20.99	0.126

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	15 MHz	QPSK	18675	1857.5	1	0	23.22	0.210
					1	38	23.15	0.207
					1	74	23.05	0.202
					36	0	22.88	0.194
					36	18	22.82	0.191
					36	39	22.81	0.191
			18900	1880.0	75	0	22.64	0.184
					1	0	23.06	0.202
					1	38	22.95	0.197
					1	74	22.79	0.190
					36	0	22.55	0.180
					36	18	22.50	0.178
					36	39	22.49	0.177
					75	0	22.41	0.174
			19125	1902.5	1	0	23.18	0.208
					1	38	23.16	0.207
					1	74	23.15	0.207
					36	0	23.15	0.207
					36	18	22.96	0.198
					36	39	22.77	0.189
		16QAM	18675	1857.5	75	0	22.76	0.189
					1	0	22.39	0.173
					1	38	22.33	0.171
					1	74	21.90	0.155
					36	0	21.89	0.155
					36	18	21.61	0.145
			18900	1880.0	36	39	21.49	0.141
					75	0	21.43	0.139
					1	0	22.16	0.164
					1	38	22.10	0.162
					1	74	21.67	0.147
					36	0	21.66	0.147
					36	18	21.38	0.137
					36	39	21.26	0.134
			19125	1902.5	75	0	21.20	0.132
					1	0	22.26	0.168
					1	38	22.20	0.166
					1	74	21.77	0.150
					36	0	21.76	0.150
					36	18	21.48	0.141
					36	39	21.36	0.137
					75	0	21.30	0.135

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	20 MHz	QPSK	18700	1860.0	1	0	23.17	0.207
					1	49	23.10	0.204
					1	99	23.04	0.201
					50	0	22.31	0.170
					50	25	22.07	0.161
					50	50	22.04	0.160
			18900	1880.0	100	0	22.02	0.159
					1	0	23.06	0.202
					1	49	22.99	0.199
					1	99	22.96	0.198
					50	0	22.37	0.173
					50	25	22.36	0.172
					50	50	22.26	0.168
					100	0	22.24	0.167
			19100	1900.0	1	0	23.10	0.204
					1	49	23.06	0.202
					1	99	23.00	0.200
					50	0	22.61	0.182
					50	25	22.44	0.175
					50	50	22.37	0.173
		16QAM	18700	1860.0	100	0	22.33	0.171
					1	0	22.34	0.171
					1	49	22.12	0.163
					1	99	22.11	0.163
					50	0	21.50	0.141
					50	25	21.42	0.139
			18900	1880.0	50	50	21.30	0.135
					100	0	21.25	0.133
					1	0	22.08	0.161
					1	49	21.97	0.157
					1	99	21.76	0.150
					50	0	21.31	0.135
					50	25	21.21	0.132
					50	50	21.01	0.126
			19100	1900.0	100	0	21.00	0.126
					1	0	22.12	0.163
					1	49	22.01	0.159
					1	99	22.00	0.158
					50	0	21.56	0.143
					50	25	21.31	0.135
					50	50	21.29	0.135
					100	0	21.19	0.132

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	5 MHz	QPSK	19975	1712.5	1	0	23.08	0.203
					1	12	23.06	0.202
					1	24	23.01	0.200
					12	0	22.69	0.186
					12	6	22.59	0.182
					12	13	22.47	0.177
					25	0	22.28	0.169
			20175	1732.5	1	0	23.02	0.200
					1	12	22.94	0.197
					1	24	22.84	0.192
					12	0	22.19	0.166
					12	6	22.12	0.163
					12	13	22.08	0.161
					25	0	21.90	0.155
			20375	1752.5	1	0	22.95	0.197
					1	12	22.81	0.191
					1	24	22.62	0.183
					12	0	21.40	0.138
					12	6	21.40	0.138
					12	13	21.38	0.137
					25	0	21.31	0.135
		16QAM	19975	1712.5	1	0	22.23	0.167
					1	12	22.18	0.165
					1	24	21.84	0.153
					12	0	21.72	0.149
					12	6	21.61	0.145
					12	13	21.59	0.144
					25	0	20.84	0.121
			20175	1732.5	1	0	22.14	0.164
					1	12	22.08	0.161
					1	24	21.85	0.153
					12	0	21.28	0.134
					12	6	21.11	0.129
					12	13	21.05	0.127
					25	0	20.93	0.124
			20375	1752.5	1	0	22.08	0.161
					1	12	22.01	0.159
					1	24	21.56	0.143
					12	0	20.94	0.124
					12	6	20.91	0.123
					12	11	20.91	0.123
					25	0	20.87	0.122

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	10 MHz	QPSK	2000	1715.0	1	0	23.06	0.202
					1	24	23.01	0.200
					1	49	22.91	0.195
					25	0	22.83	0.192
					25	12	22.75	0.188
					25	25	22.71	0.187
			20175	1732.5	50	0	21.95	0.157
					1	0	23.01	0.200
					1	24	22.96	0.198
					1	49	22.94	0.197
					25	0	22.50	0.178
					25	12	22.50	0.178
					25	25	22.36	0.172
					50	0	22.16	0.164
			20350	1750.0	1	0	22.93	0.196
					1	24	22.86	0.193
					1	49	22.81	0.191
					25	0	21.80	0.151
					25	12	21.64	0.146
					25	25	21.63	0.146
		16QAM	2000	1715.0	50	0	21.62	0.145
					1	0	22.12	0.163
					1	24	22.08	0.161
					1	49	21.57	0.144
					25	0	21.31	0.135
					25	12	21.23	0.133
			20175	1732.5	25	25	21.08	0.128
					50	0	21.05	0.127
					1	0	21.91	0.155
					1	24	21.82	0.152
					1	49	21.80	0.151
					25	0	21.51	0.142
					25	12	21.49	0.141
					25	25	21.35	0.136
					50	0	21.13	0.130
			20350	1750.0	1	0	21.83	0.152
					1	24	21.75	0.150
					1	49	21.68	0.147
					25	0	20.95	0.124
					25	12	20.88	0.122
					25	25	20.86	0.122
					50	0	20.81	0.121

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	15 MHz	QPSK	20025	1717.5	1	0	23.05	0.202
					1	38	23.03	0.201
					1	74	22.81	0.191
					36	0	22.55	0.180
					36	18	22.54	0.179
					36	39	22.47	0.177
			20175	1732.5	75	0	22.05	0.160
					1	0	23.03	0.201
					1	38	23.01	0.200
					1	74	22.86	0.193
					36	0	22.78	0.190
					36	18	22.72	0.187
					36	39	22.46	0.176
					75	0	21.93	0.156
		16QAM	20325	1747.5	1	0	22.88	0.194
					1	38	22.82	0.191
					1	74	22.76	0.189
					36	0	22.71	0.187
					36	18	22.67	0.185
					36	39	22.65	0.184
			20025	1717.5	75	0	21.84	0.153
					1	0	22.19	0.166
					1	38	22.13	0.163
					1	74	21.72	0.149
					36	0	21.69	0.148
					36	18	21.57	0.144
					36	39	21.48	0.141
			20175	1732.5	75	0	21.21	0.132
					1	0	22.13	0.163
					1	38	22.09	0.162
					1	74	21.96	0.157
					36	0	21.93	0.156
					36	18	21.86	0.153
					36	39	21.74	0.149
			20325	1747.5	75	0	21.66	0.147
					1	0	22.06	0.161
					1	38	22.01	0.159
					1	74	21.78	0.151
					36	0	21.38	0.137
					36	18	21.13	0.130
					36	39	21.12	0.129
					75	0	21.04	0.127

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	20 MHz	QPSK	20050	1720.0	1	0	23.08	0.203
					1	49	23.01	0.200
					1	99	22.77	0.189
					50	0	22.71	0.187
					50	25	22.46	0.176
					50	50	22.39	0.173
			20175	1732.5	100	0	22.01	0.159
					1	0	22.94	0.197
					1	49	22.88	0.194
					1	99	22.69	0.186
					50	0	22.57	0.181
					50	25	22.52	0.179
					50	50	22.34	0.171
					100	0	21.94	0.156
			20300	1745.0	1	0	22.84	0.192
					1	49	22.76	0.189
					1	99	22.54	0.179
					50	0	22.46	0.176
					50	25	22.37	0.173
					50	50	22.25	0.168
					100	0	21.86	0.153
		16QAM	20050	1720.0	1	0	22.29	0.169
					1	49	22.25	0.168
					1	99	21.84	0.153
					50	0	21.14	0.130
					50	25	20.98	0.125
					50	50	20.95	0.124
			20175	1732.5	100	0	20.92	0.124
					1	0	22.26	0.168
					1	49	22.21	0.166
					1	99	21.89	0.155
					50	0	21.61	0.145
					50	25	20.99	0.126
					50	50	20.92	0.124
					100	0	20.87	0.122
			20300	1745.0	1	0	22.22	0.167
					1	49	22.16	0.164
					1	99	21.97	0.157
					50	0	20.95	0.124
					50	25	20.91	0.123
					50	50	20.88	0.122
					100	0	20.86	0.122

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 13	5 MHz	QPSK	23205	779.5	1	0	23.03	0.201
					1	12	23.01	0.200
					1	24	22.92	0.196
					12	0	22.17	0.165
					12	6	22.06	0.161
					12	13	21.98	0.158
			23230	782.0	25	0	21.94	0.156
					1	0	22.93	0.196
					1	12	22.90	0.195
					1	24	22.85	0.193
					12	0	21.97	0.157
					12	6	21.87	0.154
					12	13	21.84	0.153
					25	0	21.77	0.150
			23255	784.5	1	0	22.91	0.195
					1	12	22.88	0.194
					1	24	22.15	0.164
					12	0	21.93	0.156
					12	6	21.77	0.150
					12	13	21.72	0.149
		16QAM	23205	779.5	25	0	21.38	0.137
					1	0	22.13	0.163
					1	12	21.73	0.149
					1	24	21.55	0.143
					12	0	21.12	0.129
					12	6	21.08	0.128
			23230	782.0	12	13	20.98	0.125
					25	0	20.97	0.125
					1	0	21.72	0.149
					1	12	21.67	0.147
					1	24	21.56	0.143
					12	0	20.96	0.125
					12	6	20.87	0.122
					12	13	20.83	0.121
					25	0	20.81	0.121
			23255	784.5	1	0	21.71	0.148
					1	12	21.41	0.138
					1	24	21.06	0.128
					12	0	20.83	0.121
					12	6	20.74	0.119
					12	13	20.71	0.118
					25	0	20.63	0.116



Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 13	10 MHz	QPSK	23230	782.0	1	0	22.94	0.197
					1	24	22.81	0.191
					1	49	22.45	0.176
					25	0	22.37	0.173
					25	12	22.16	0.164
					25	25	22.05	0.160
					50	0	21.82	0.152
		16QAM	23230	782.0	1	0	22.20	0.166
					1	24	22.05	0.160
					1	49	21.42	0.139
					25	0	21.32	0.136
					25	12	21.26	0.134
					25	25	21.04	0.127
					50	0	20.98	0.125



3 Effective Radiated Power / Equivalent Isotropic Radiated Power Test

3.1. Limit

For FCC Part 27(d)(4): The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 1 Watts.

For FCC Part 27.50(b)(9): Control stations and mobile stations transmitting in the 746-757 MHz, and 776-788 MHz bands are limited to 30 watts ERP.

For FCC Part 24.232(b): The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

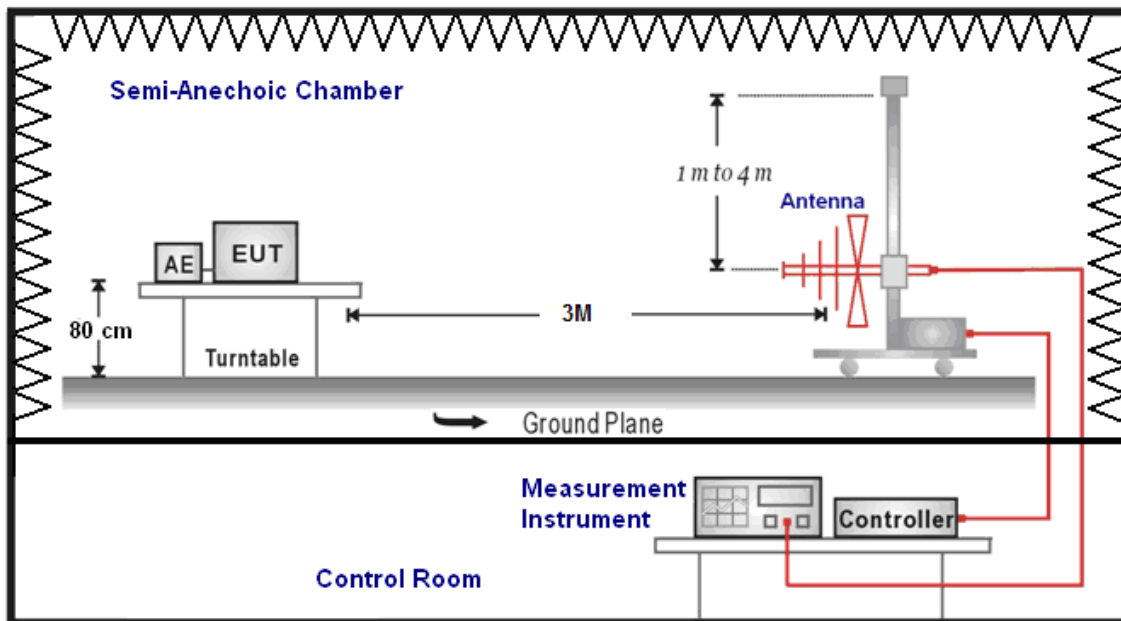
3.2. Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/08/2016	1 year
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/08/2016	1 year
Pre Amplifier	Agilent	8449B	3008A02237	10/07/2015	1 year
Pre Amplifier	Agilent	8447D	2944A11119	01/11/2016	1 year
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	416	09/25/2015	1 year
Sleeve Dipole(CF880) (780-980MHz)	ETS	3126-880	00064344	10/06/2014	2 years
Sleeve Dipole(CF1845) (1695-1995MHz)	ETS	3126-1845	00083335	10/06/2014	2 years
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/06/2016	1 year
Horn Antenna (18~40GHz)	ETS	3116	00086467	09/01/2015	1 year
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	1 year
Microwave Cable	EMCI	EMC102-KM-KM-1 4000	151001	10/15/2015	1 year
Microwave Cable	EMCI	EMC-104-SM-SM-1 4000	140202	10/15/2015	1 year
Microwave Cable	EMCI	EMC104-SM-SM-6 00	140301	10/15/2015	1 year
Test Site	ATL	TE01	888001	08/27/2015	1 year

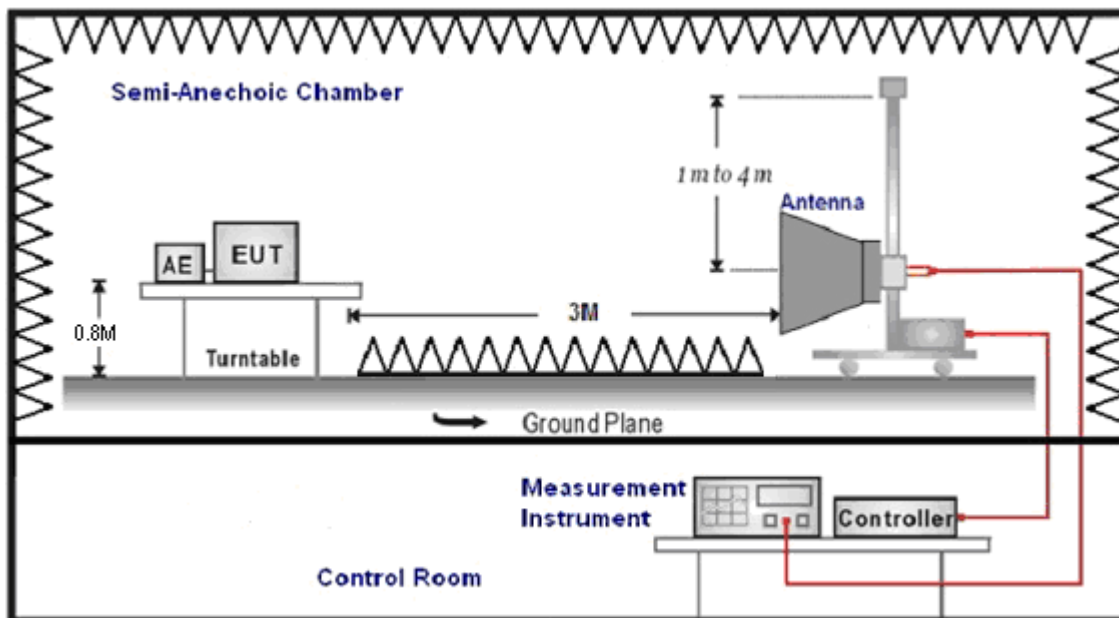
Note: N.C.R. = No Calibration Request.

3.3. Test Setup

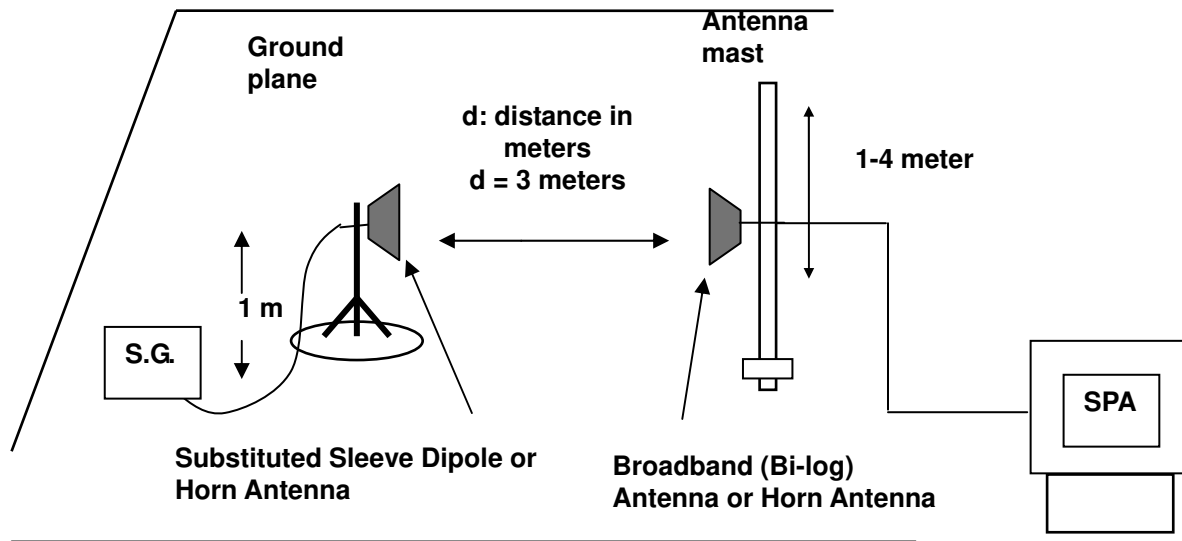
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



3.4. Test Procedure

- The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RWB and VBW is 5MHz for LTE mode.
- E.I.R.P power 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.
- The substitution antenna (Note:1 & 2) 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.
- $E.I.R.P. = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- $E.R.P. = E.I.R.P. - 2.15 \text{ dB}$

Note: 1. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

2. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenna

3.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is $\pm 3.072 \text{ dB}$.

3.6. Test Result

Test Item	E.I.R.P. / E.R.P.		
Date of Test	06/28/2016~06/29/2016	Test Site	TE01

LTE Band 2								
Channel Bandwidth	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.I.R.P.		Limit (W)
						(dBm)	(W)	
5 MHz	QPSK	1852.5	H	8.84	9.48	18.32	0.068	< 2
			V	12.94	9.48	22.42	0.175	< 2
		1880.0	H	9.14	9.59	18.73	0.075	< 2
			V	12.71	9.59	22.30	0.170	< 2
		1907.5	H	9.38	9.70	19.08	0.081	< 2
			V	12.62	9.70	22.32	0.171	< 2
	16QAM	1880.0	H	8.09	9.59	17.68	0.059	< 2
			V	11.62	9.59	21.21	0.132	< 2
10 M	QPSK	1855.0	H	9.22	9.48	18.70	0.074	< 2
			V	12.81	9.48	22.29	0.169	< 2
		1880.0	H	9.23	9.58	18.81	0.076	< 2
			V	12.60	9.58	22.18	0.165	< 2
		1905.0	H	9.22	9.68	18.90	0.078	< 2
			V	12.61	9.68	22.29	0.169	< 2
	16QAM	1880.0	H	8.29	9.58	17.87	0.061	< 2
			V	11.47	9.58	21.05	0.127	< 2
15 MHz	QPSK	1857.5	H	9.37	9.48	18.85	0.077	< 2
			V	12.86	9.48	22.34	0.171	< 2
		1880.0	H	8.69	9.58	18.27	0.067	< 2
			V	12.70	9.58	22.28	0.169	< 2
		1902.5	H	8.98	9.66	18.64	0.073	< 2
			V	12.58	9.66	22.24	0.167	< 2
	16QAM	1880.0	H	7.63	9.58	17.21	0.053	< 2
			V	11.62	9.58	21.20	0.132	< 2
20 MHz	QPSK	1860.0	H	9.47	9.49	18.96	0.079	< 2
			V	13.37	9.49	22.86	0.193	< 2
		1880.0	H	8.77	9.57	18.34	0.068	< 2
			V	12.95	9.56	22.51	0.178	< 2
		1900.0	H	9.11	9.64	18.75	0.075	< 2
			V	13.15	9.63	22.78	0.190	< 2
	16QAM	1880.0	H	7.71	9.56	17.27	0.053	< 2
			V	11.61	9.57	21.18	0.131	< 2

LTE Band 4								
Channel Bandwidth	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.I.R.P.		Limit (W)
						(dBm)	(W)	
5 MHz	QPSK	1712.5	H	9.69	8.93	18.62	0.073	< 1
			V	13.38	8.93	22.31	0.170	< 1
		1732.5	H	9.68	9.01	18.69	0.074	< 1
			V	13.59	9.01	22.60	0.182	< 1
		1752.5	H	9.35	9.09	18.44	0.070	< 1
			V	13.30	9.09	22.39	0.173	< 1
	16QAM	1732.5	H	8.54	9.01	17.55	0.057	< 1
			V	12.33	9.01	21.34	0.136	< 1
10 M	QPSK	1715.0	H	9.71	8.93	18.64	0.073	< 1
			V	13.53	8.93	22.46	0.176	< 1
		1732.5	H	9.57	9.01	18.58	0.072	< 1
			V	13.49	9.01	22.50	0.178	< 1
		1750.0	H	9.18	9.07	18.25	0.067	< 1
			V	13.30	9.07	22.37	0.173	< 1
	16QAM	1732.5	H	8.37	9.01	17.38	0.055	< 1
			V	12.28	9.01	21.29	0.135	< 1
15 MHz	QPSK	1717.5	H	9.48	8.93	18.41	0.069	< 1
			V	13.53	8.93	22.46	0.176	< 1
		1732.5	H	9.55	8.99	18.54	0.071	< 1
			V	13.32	8.99	22.31	0.170	< 1
		1747.5	H	9.29	9.05	18.34	0.068	< 1
			V	13.63	9.05	22.68	0.185	< 1
	16QAM	1732.5	H	8.39	8.99	17.38	0.055	< 1
			V	12.24	8.99	21.23	0.133	< 1
20 MHz	QPSK	1720.0	H	9.66	8.93	18.59	0.072	< 1
			V	13.62	8.93	22.55	0.180	< 1
		1732.5	H	9.39	8.99	18.38	0.069	< 1
			V	13.68	8.98	22.66	0.185	< 1
		1745.0	H	9.89	9.03	18.92	0.078	< 1
			V	13.40	9.03	22.43	0.175	< 1
	16QAM	1732.5	H	8.31	8.98	17.29	0.054	< 1
			V	12.37	8.98	21.35	0.136	< 1

LTE Band 13								
Channel Bandwidth	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.R.P.		Limit (W)
						(dBm)	(W)	
5 M	QPSK	779.5	H	10.36	8.49	18.85	0.077	< 30
			V	13.70	8.49	22.19	0.166	< 30
		782.0	H	10.57	8.54	19.11	0.081	< 30
			V	13.94	8.54	22.48	0.177	< 30
		784.5	H	10.62	8.55	19.17	0.083	< 30
			V	13.85	8.56	22.41	0.174	< 30
	16QAM	782.0	H	7.27	10.68	17.95	0.062	< 30
			V	10.54	10.69	21.23	0.133	< 30
10 MHz	QPSK	782.0	H	9.42	8.51	17.93	0.062	< 30
			V	13.71	8.50	22.21	0.166	< 30
	16QAM	782.0	H	6.19	10.66	16.85	0.048	< 30
			V	10.51	10.66	21.17	0.131	< 30

4 Frequency Stability Test

4.1. Limit

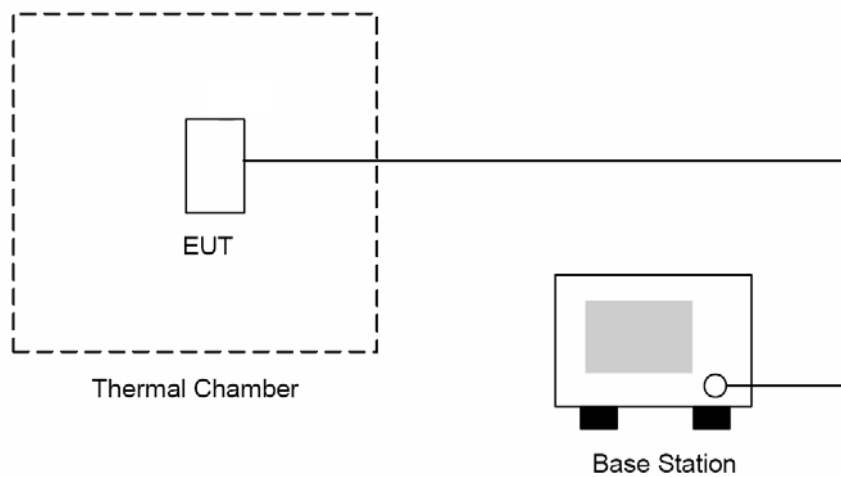
According to the FCC rule shall be tested the frequency stability. The rule is defined that” The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) -30°C ~ 50°C.

4.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Wideband Radio Communication Test	R & S	CMW500	103168	10/30/2015	1 year
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/18/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

4.3. Setup





4.4. Test Procedure

The measurement is made according to FCC rules:

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was note within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
5. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
6. The temperature tests were performed for the worst case.
7. Test data was recorded.

4.5. Uncertainty

The measurement uncertainty is defined as for Frequency Stability measurement is $\pm 10\text{Hz}$.



4.6. Test Result

Test Item	Frequency Stability		
Date of Test	06/29/2016	Test Site	TE05

LTE Band 2 _ 16QAM						
Voltage						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
20 MHz	1880.0	138	20	0.99	0.001	± 1.5
		120	20	5.02	0.003	± 1.5
		102	20	15.59	0.008	± 1.5
Temperature						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
20 MHz	1880.0	120	-20	-3.59	-0.002	± 1.5
		120	-10	8.73	0.005	± 1.5
		120	0	1.99	0.001	± 1.5
		120	10	-9.38	-0.005	± 1.5
		120	20	-1.27	-0.001	± 1.5
		120	30	-2.68	-0.001	± 1.5
		120	40	1.88	0.001	± 1.5
		120	50	0.91	0.000	± 1.5
		120	60	-10.15	-0.005	± 1.5

LTE Band 4 _ 16QAM						
Voltage						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
20 MHz	1732.5	138	20	-0.27	0.000	± 1.5
		120	20	-6.4	-0.004	± 1.5
		102	20	1.24	0.001	± 1.5
Temperature						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
20 MHz	1732.5	120	-20	-3.02	-0.002	± 1.5
		120	-10	6.91	0.004	± 1.5
		120	0	2.34	0.001	± 1.5
		120	10	-16.09	-0.009	± 1.5
		120	20	8.3	0.005	± 1.5
		120	30	-10.65	-0.006	± 1.5
		120	40	12.44	0.007	± 1.5
		120	50	1.13	0.001	± 1.5
		120	60	-5.75	-0.003	± 1.5

LTE Band 13 _ 16QAM						
Voltage						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
10 MHz	782.0	138	20	3.1	0.004	± 1.5
		120	20	-1.01	-0.001	± 1.5
		102	20	-1.8	-0.002	± 1.5
Temperature						
Channel Bandwidth	Frequency (MHz)	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)
10 MHz	782.0	120	-20	9.77	0.012	± 1.5
		120	-10	8.63	0.011	± 1.5
		120	0	-6.04	-0.008	± 1.5
		120	10	-0.08	0.000	± 1.5
		120	20	12.64	0.016	± 1.5
		120	30	5.73	0.007	± 1.5
		120	40	0.48	0.001	± 1.5
		120	50	-9.41	-0.012	± 1.5
		120	60	-9.13	-0.012	± 1.5

5 Emission Bandwidth & Occupied Bandwidth Test

5.1. Limit

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.

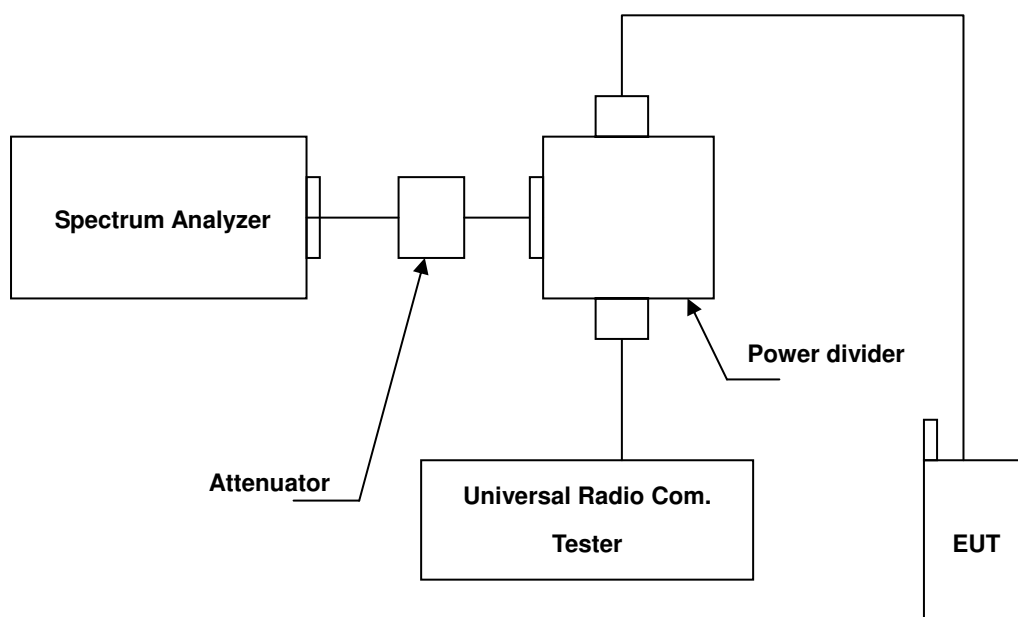
The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Spectrum Analyzer	Agilent	N9030A	MY53120541	12/14/2015	1 year
Wideband Radio Communication Test	R & S	CMW500	103168	10/30/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

5.3. Setup



5.4. Test Procedure

The measurement is made according to FCC rules:

- a. The EUT makes a phone call to the communication simulator. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels. (low, middle and high operational frequency range.)
- b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The communication simulator station system controlled 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.

5.5. Uncertainty

The measurement uncertainty is defined as $\pm 10\text{Hz}$



5.6. Test Result

Test Item	Emission Bandwidth & Occupied Bandwidth		
Date of Test	06/28/2016	Test Site	TE05

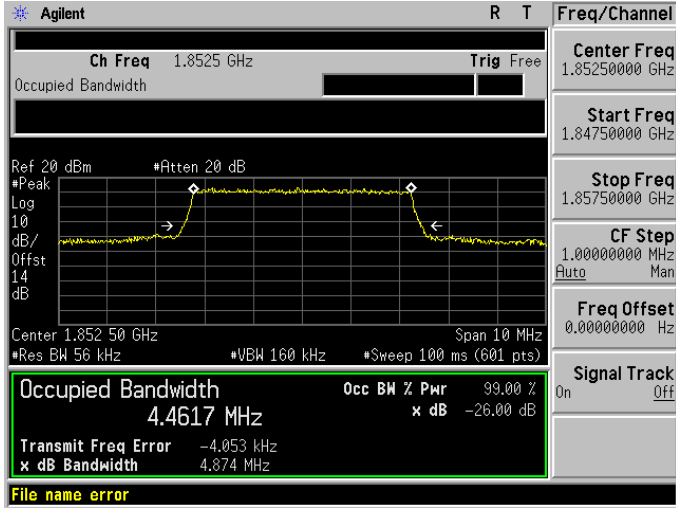
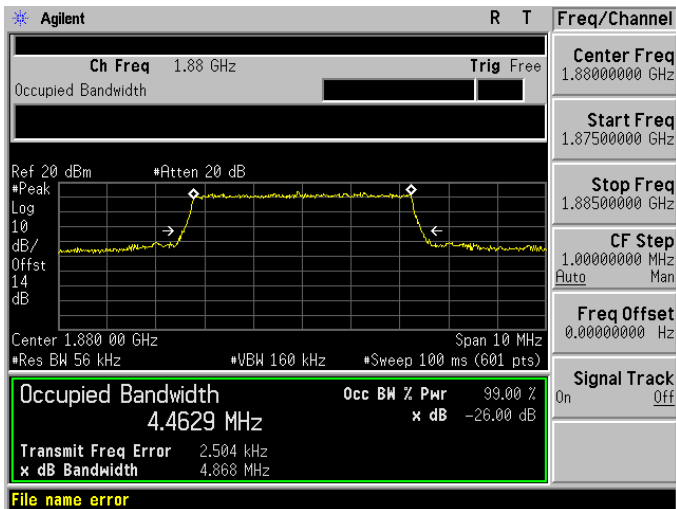
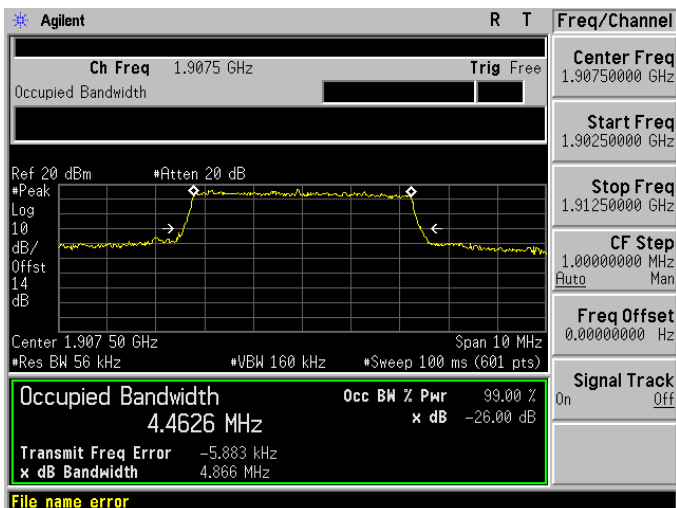
LTE Band 2				
Modulation	Channel Bandwidth	Frequency (MHz)	26dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
QPSK	5 MHz	1852.5	4.874	4.4617
		1880.0	4.868	4.4629
		1907.5	4.866	4.4626
	10 MHz	1855.0	9.647	8.9186
		1880.0	9.654	8.9124
		1905.0	9.575	8.8968
	15 MHz	1857.5	14.534	13.4056
		1880.0	14.405	13.3619
		1902.5	14.314	13.3626
	20 MHz	1860.0	19.312	17.8813
		1880.0	19.308	17.8214
		1900.0	19.074	17.8262
16QAM	5 MHz	1852.5	4.918	4.4954
		1880.0	4.914	4.4924
		1907.5	4.874	4.4900
	10 MHz	1855.0	9.702	8.9175
		1880.0	9.683	8.9151
		1905.0	9.690	8.9006
	15 MHz	1857.5	14.392	13.3879
		1880.0	14.351	13.3689
		1902.5	14.368	13.3622
	20 MHz	1860.0	19.312	17.8813
		1880.0	19.308	17.8214
		1900.0	19.074	17.8262

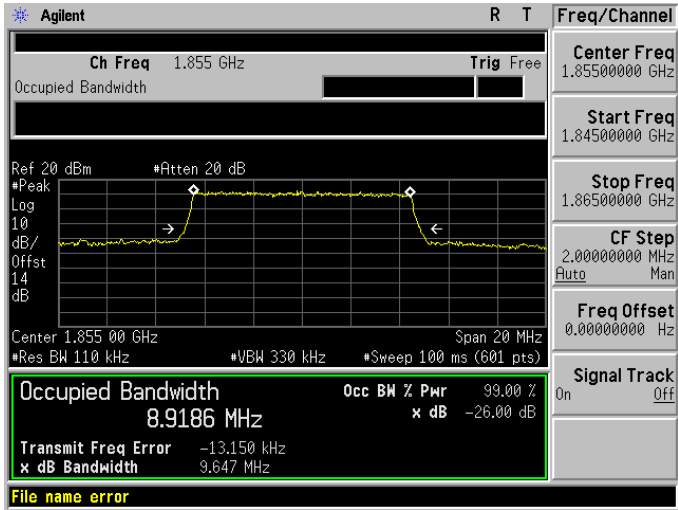
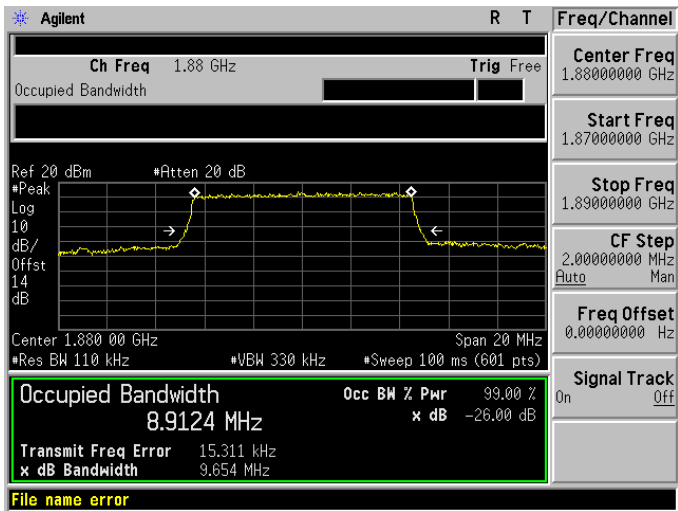
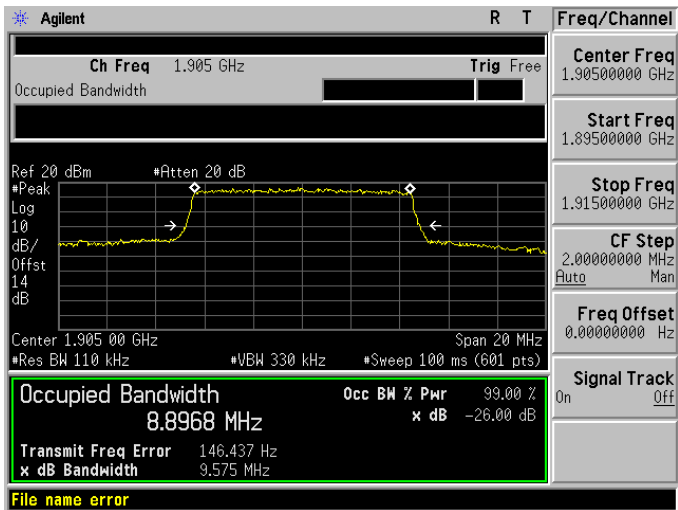
LTE Band 4				
Modulation	Channel Bandwidth	Frequency (MHz)	26dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
QPSK	5 MHz	1712.5	4.874	4.4671
		1732.5	4.860	4.4579
		1752.5	4.884	4.4638
	10 MHz	1715.0	9.601	8.9027
		1732.5	9.593	8.8946
		1750.0	9.663	8.9174
	15 MHz	1717.5	14.482	13.4176
		1732.5	14.445	13.4162
		1747.5	14.521	13.4147
	20 MHz	1720.0	19.162	17.9025
		1732.5	19.203	17.8456
		1745.0	19.250	17.8305
16QAM	5 MHz	1712.5	4.907	4.4906
		1732.5	4.935	4.4960
		1752.5	4.940	4.4943
	10 MHz	1715.0	9.618	8.9080
		1732.5	9.695	8.9092
		1750.0	9.728	8.9268
	15 MHz	1717.5	14.337	13.3827
		1732.5	14.367	13.3669
		1747.5	14.427	13.3808
	20 MHz	1720.0	19.096	17.8937
		1732.5	19.024	17.8299
		1745.0	19.118	17.8241



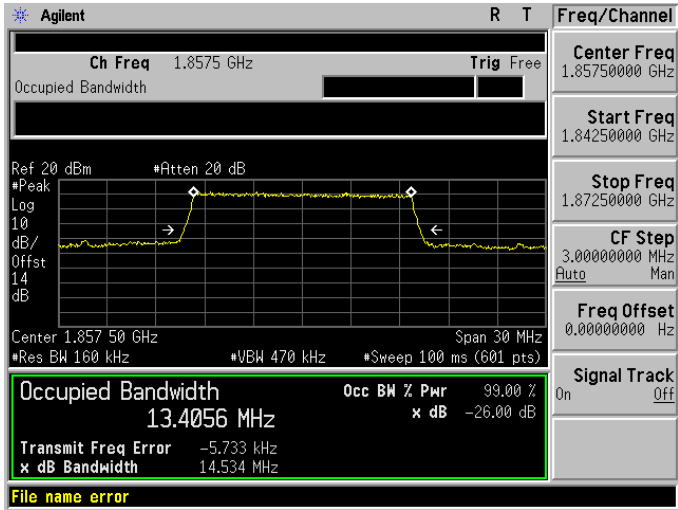
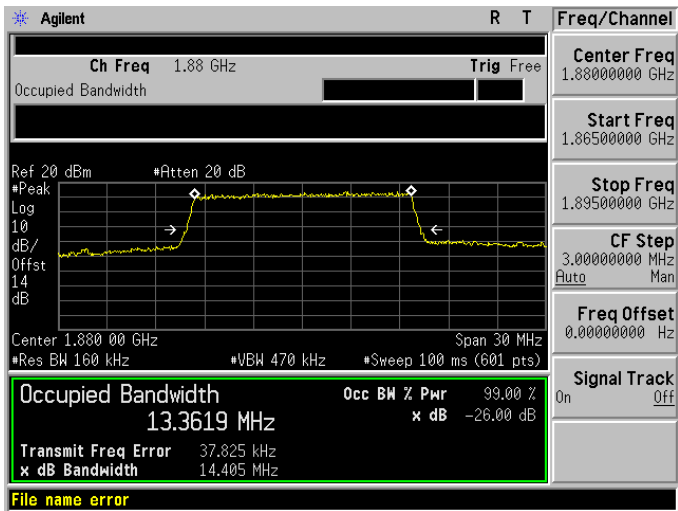
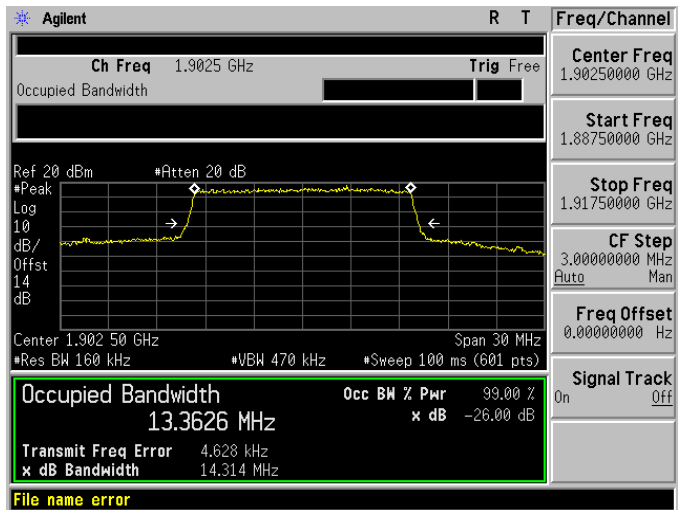
LTE Band 13				
Modulation	Channel Bandwidth	Frequency (MHz)	-26dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
QPSK	5 MHz	779.5	4.881	4.4656
		782.0	4.844	4.4585
		784.5	4.840	4.4606
	10 MHz	782.0	9.580	8.8699
16QAM	5 MHz	779.5	4.898	4.4903
		782.0	4.906	4.4817
		784.5	4.865	4.4952
	10 MHz	782.0	9.630	8.8697

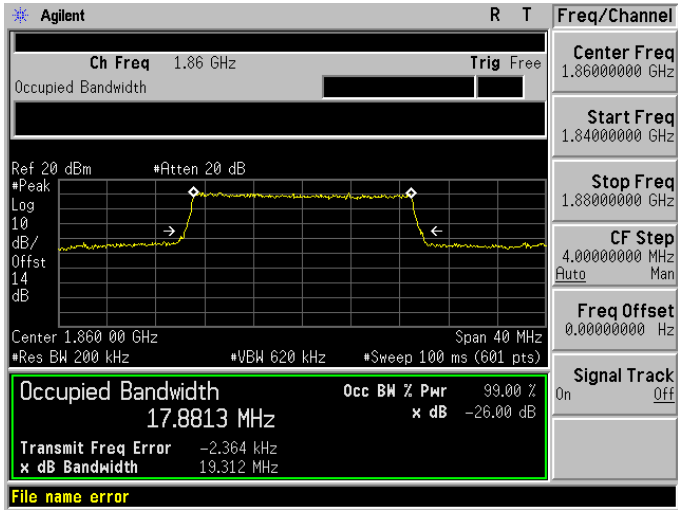
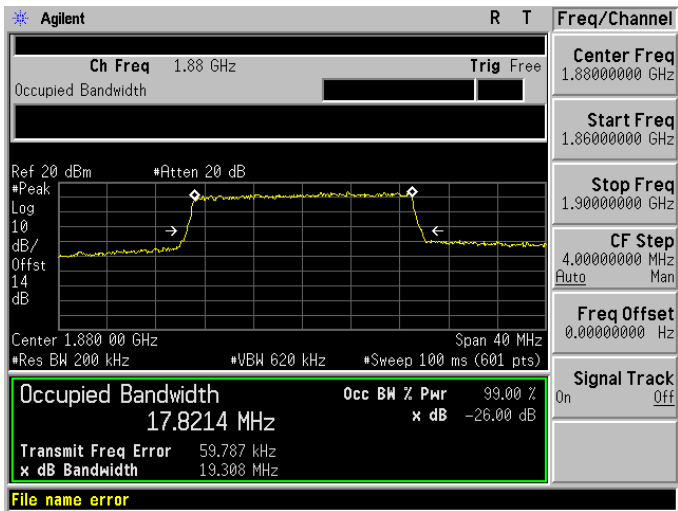
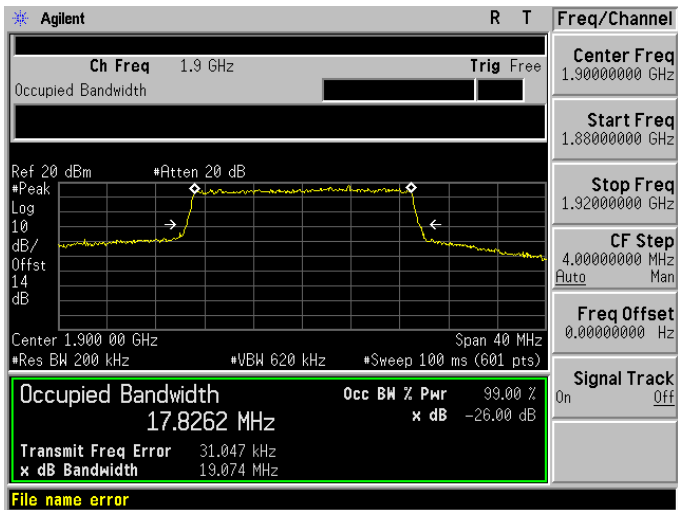
5.7. Test Graphs

LTE Band 2 (Channel Bandwidth: 5 MHz) _ QPSK	
1852.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.8525 GHz Trig Free Occupied Bandwidth Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.852 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4617 MHz Occ BW % Pwr 99.00 % Transmit Freq Error -4.053 kHz x dB -26.00 dB x dB Bandwidth 4.874 MHz File name error Freq/Channel Center Freq 1.85250000 GHz Start Freq 1.84750000 GHz Stop Freq 1.85750000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Occupied Bandwidth Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.880 00 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4629 MHz Occ BW % Pwr 99.00 % Transmit Freq Error 2.504 kHz x dB -26.00 dB x dB Bandwidth 4.868 MHz File name error Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
1907.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.9075 GHz Trig Free Occupied Bandwidth Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.907 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4626 MHz Occ BW % Pwr 99.00 % Transmit Freq Error -5.883 kHz x dB -26.00 dB x dB Bandwidth 4.866 MHz File name error Freq/Channel Center Freq 1.90750000 GHz Start Freq 1.90250000 GHz Stop Freq 1.91250000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

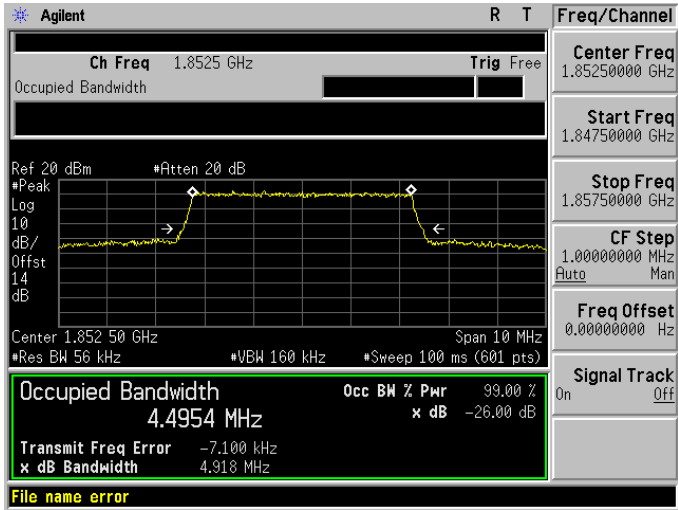
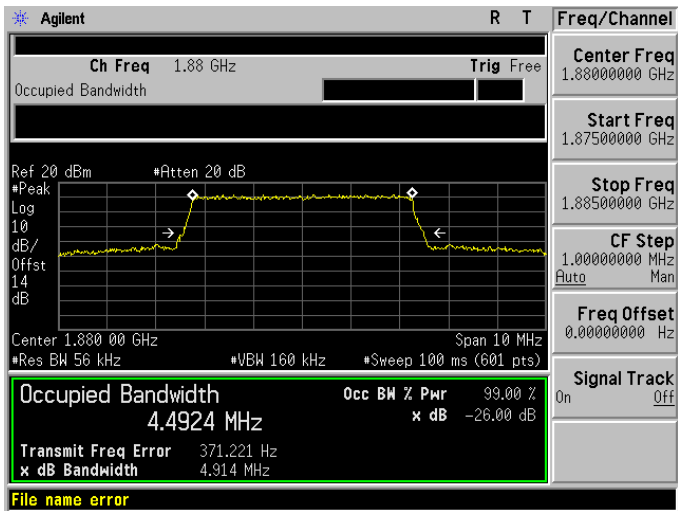
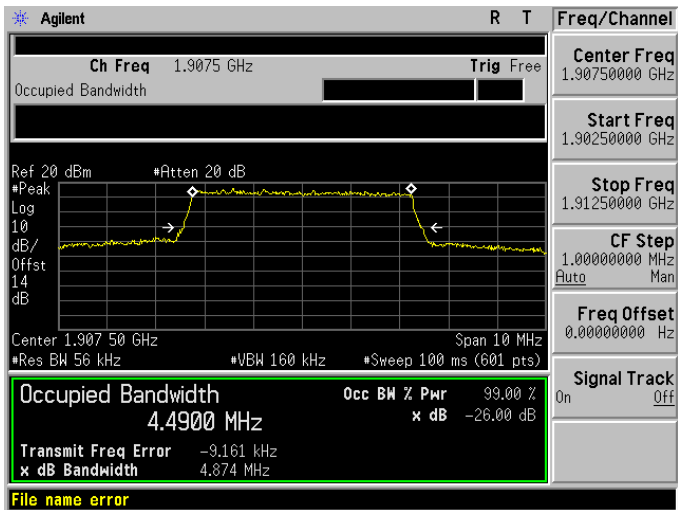
LTE Band 2 (Channel Bandwidth: 10 MHz) _ QPSK	
1855.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.855 GHz Trig Free Center Freq 1.85500000 GHz Start Freq 1.84500000 GHz Stop Freq 1.86500000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.855 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9186 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -13.150 kHz x dB Bandwidth 9.647 MHz File name error
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Center Freq 1.88000000 GHz Start Freq 1.87000000 GHz Stop Freq 1.89000000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.880 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9124 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 15.311 kHz x dB Bandwidth 9.654 MHz File name error
1905.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.905 GHz Trig Free Center Freq 1.90500000 GHz Start Freq 1.89500000 GHz Stop Freq 1.91500000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.905 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.8968 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 146.437 Hz x dB Bandwidth 9.575 MHz File name error

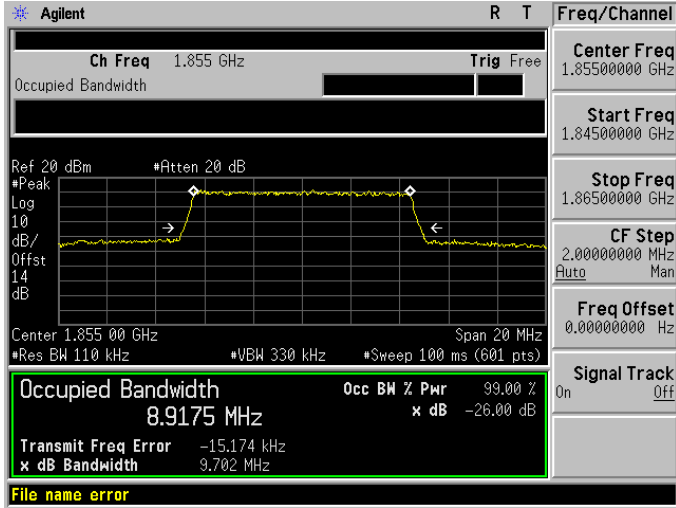
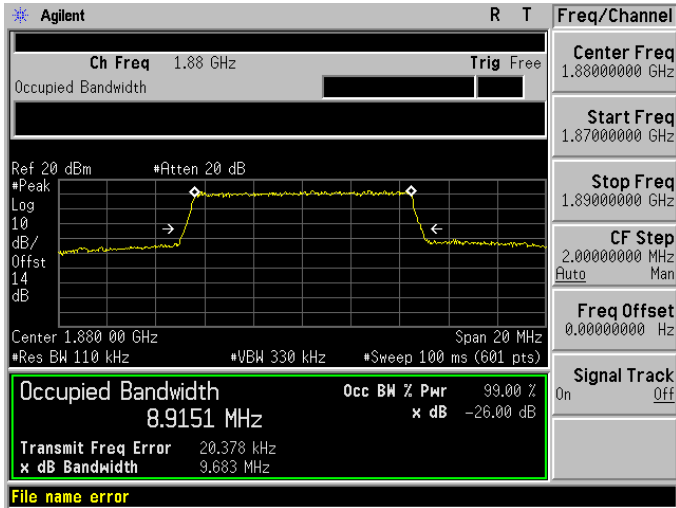
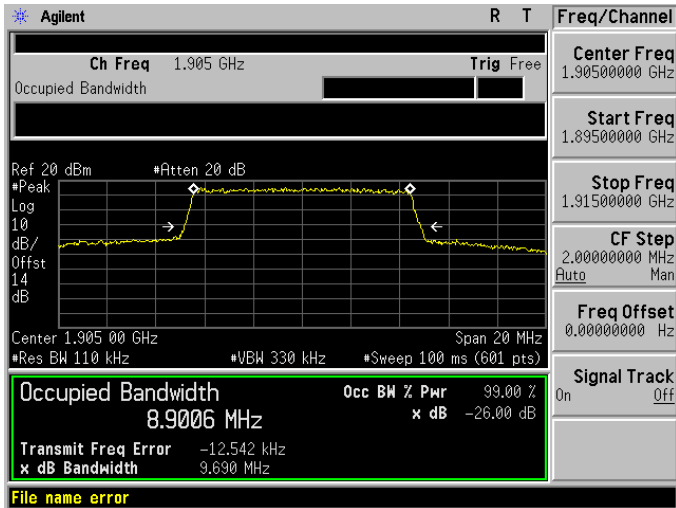


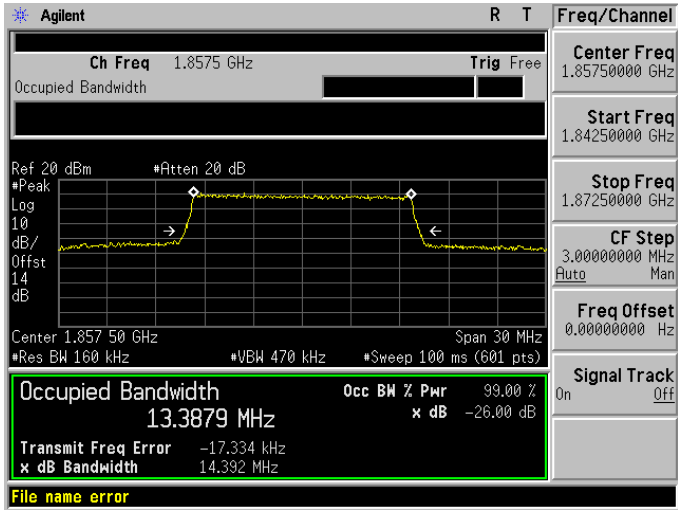
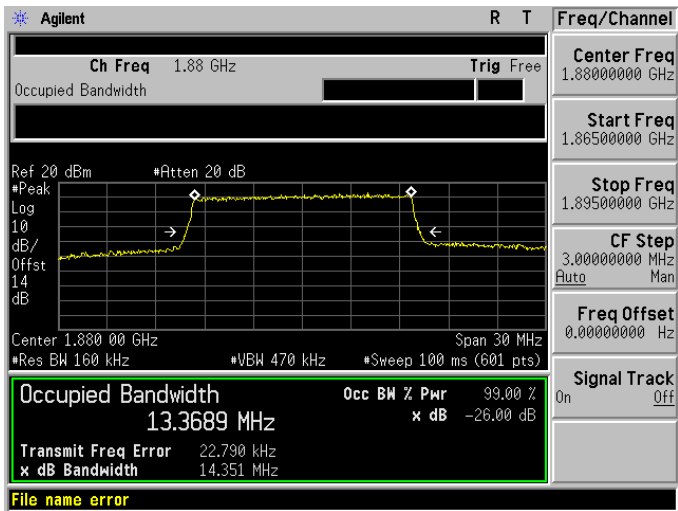
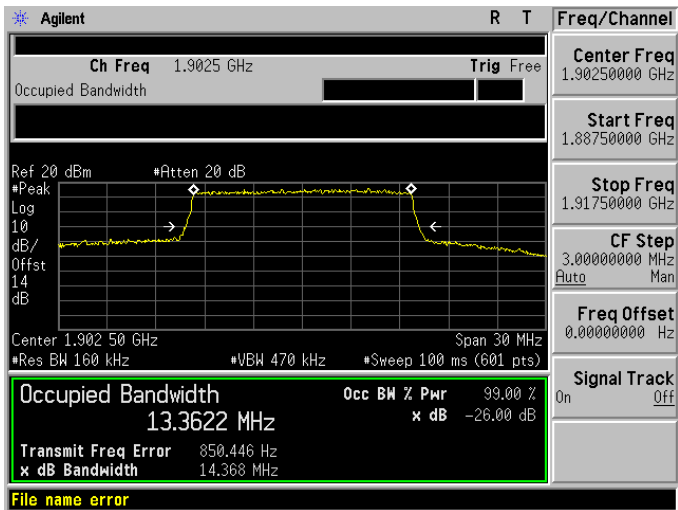
LTE Band 2 (Channel Bandwidth: 15 MHz) _ QPSK	
1857.5 MHz	
1880.0 MHz	
1902.5 MHz	

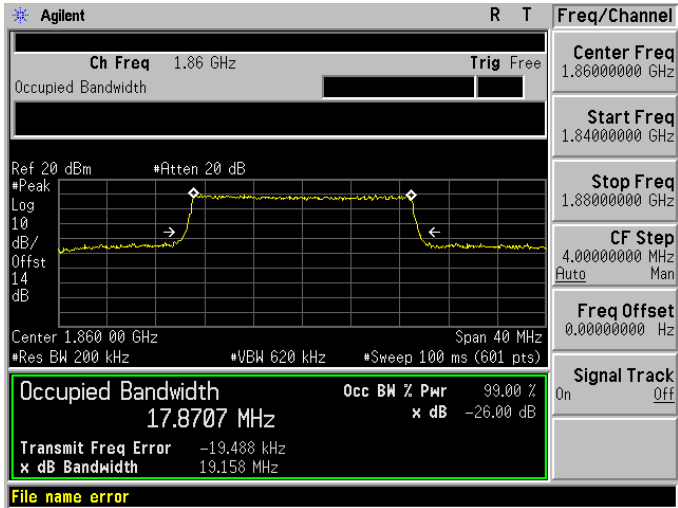
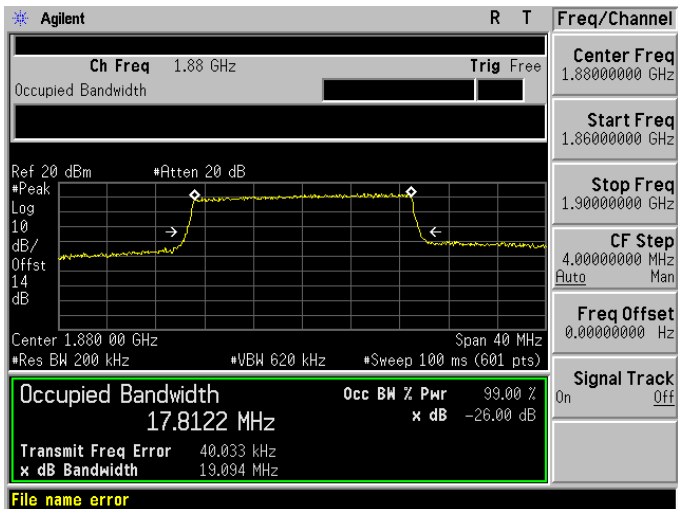
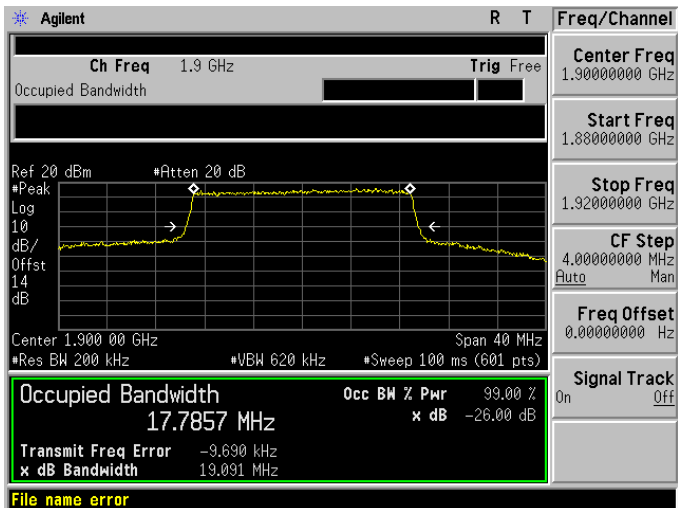
LTE Band 2 (Channel Bandwidth: 20 MHz) _ QPSK	
1860.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.86 GHz Trig Free Center Freq 1.86000000 GHz Start Freq 1.84000000 GHz Stop Freq 1.88000000 GHz CF Step 4.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.860 00 GHz Span 40 MHz *Res BW 200 kHz *VBW 620 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 17.8813 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -2.364 kHz x dB Bandwidth 19.312 MHz File name error
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Center Freq 1.88000000 GHz Start Freq 1.86000000 GHz Stop Freq 1.90000000 GHz CF Step 4.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.880 00 GHz Span 40 MHz *Res BW 200 kHz *VBW 620 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 17.8214 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 59.787 kHz x dB Bandwidth 19.308 MHz File name error
1900.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.9 GHz Trig Free Center Freq 1.90000000 GHz Start Freq 1.88000000 GHz Stop Freq 1.92000000 GHz CF Step 4.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.900 00 GHz Span 40 MHz *Res BW 200 kHz *VBW 620 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 17.8262 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 31.047 kHz x dB Bandwidth 19.074 MHz File name error



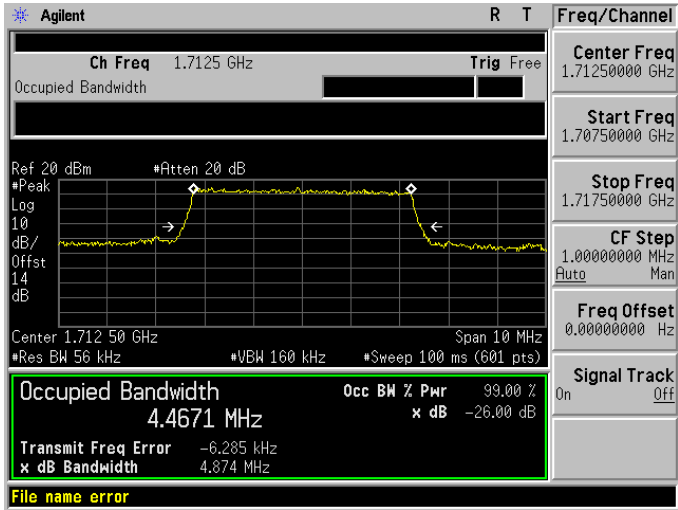
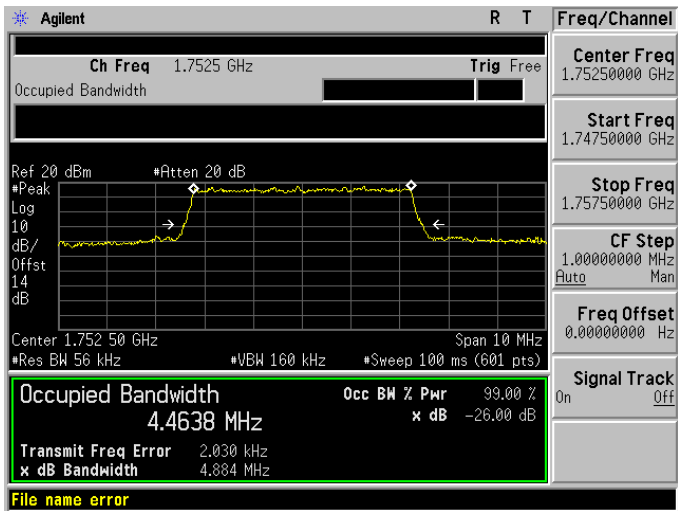
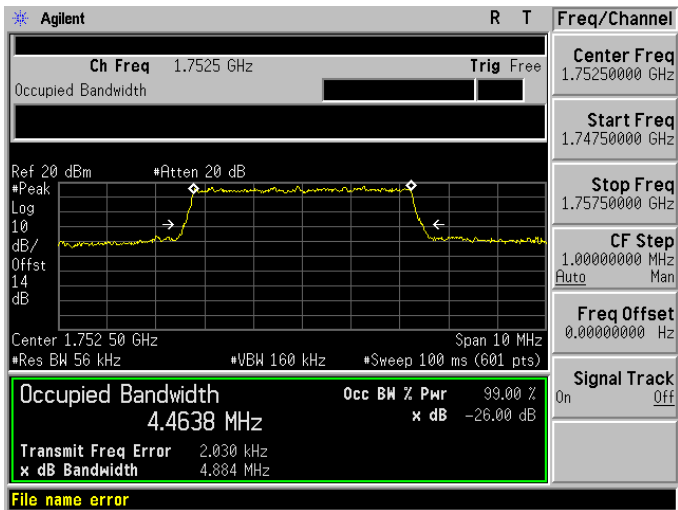
LTE Band 2 (Channel Bandwidth: 5 MHz) _ 16QAM	
1852.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.8525 GHz Trig Free Center Freq 1.85250000 GHz Start Freq 1.84750000 GHz Stop Freq 1.85750000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.852 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4954 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -7.100 kHz x dB Bandwidth 4.918 MHz File name error
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Center Freq 1.88000000 GHz Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.880 00 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4924 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 371.221 Hz x dB Bandwidth 4.914 MHz File name error
1907.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.9075 GHz Trig Free Center Freq 1.90750000 GHz Start Freq 1.90250000 GHz Stop Freq 1.91250000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.907 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4900 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -9.161 kHz x dB Bandwidth 4.874 MHz File name error

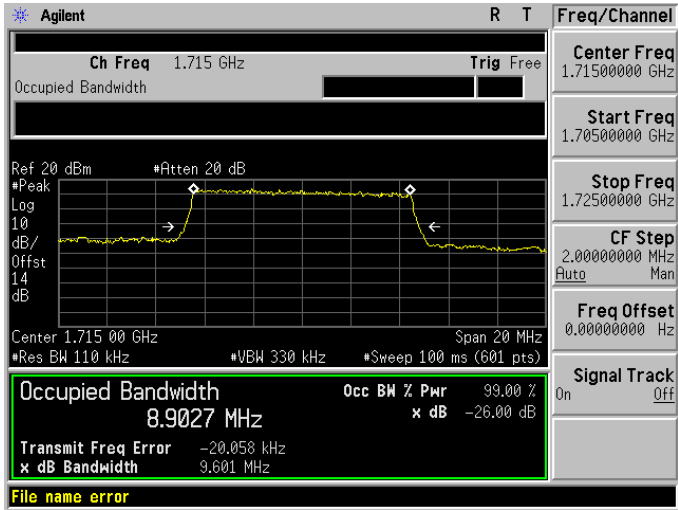
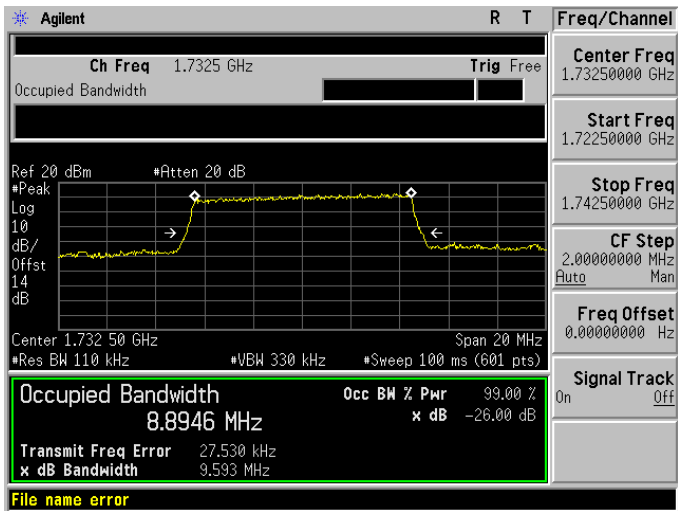
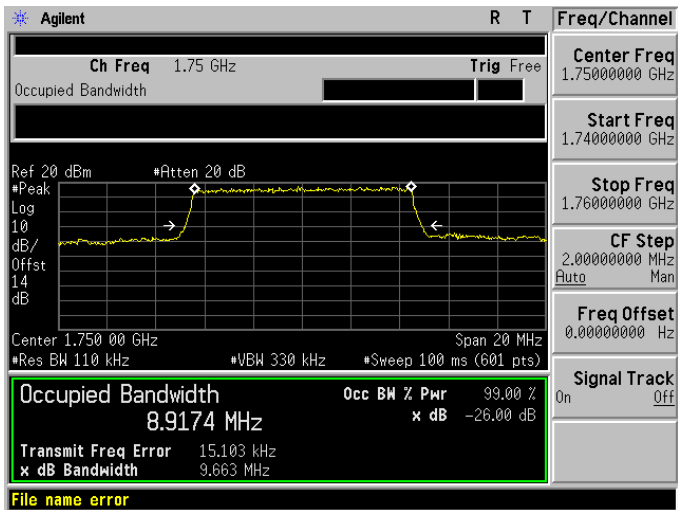
LTE Band 2 (Channel Bandwidth: 10 MHz) _ 16QAM	
1855.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.855 GHz Trig Free Center Freq 1.85500000 GHz Start Freq 1.84500000 GHz Stop Freq 1.86500000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.855 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9175 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -15.174 kHz x dB Bandwidth 9.702 MHz File name error
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Center Freq 1.88000000 GHz Start Freq 1.87000000 GHz Stop Freq 1.89000000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.880 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9151 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 20.378 kHz x dB Bandwidth 9.683 MHz File name error
1905.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.905 GHz Trig Free Center Freq 1.90500000 GHz Start Freq 1.89500000 GHz Stop Freq 1.91500000 GHz CF Step 2.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.905 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9006 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -12.542 kHz x dB Bandwidth 9.690 MHz File name error

LTE Band 2 (Channel Bandwidth: 15 MHz) _ 16QAM	
1857.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.8575 GHz Trig Free Center Freq 1.85750000 GHz Start Freq 1.84250000 GHz Stop Freq 1.87250000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.857 50 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3879 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -17.334 kHz x dB Bandwidth 14.392 MHz File name error
1880.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Center Freq 1.88000000 GHz Start Freq 1.86500000 GHz Stop Freq 1.89500000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.880 00 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3689 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 22.790 kHz x dB Bandwidth 14.351 MHz File name error
1902.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.9025 GHz Trig Free Center Freq 1.90250000 GHz Start Freq 1.88750000 GHz Stop Freq 1.91750000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.902 50 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3622 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 850.446 Hz x dB Bandwidth 14.368 MHz File name error

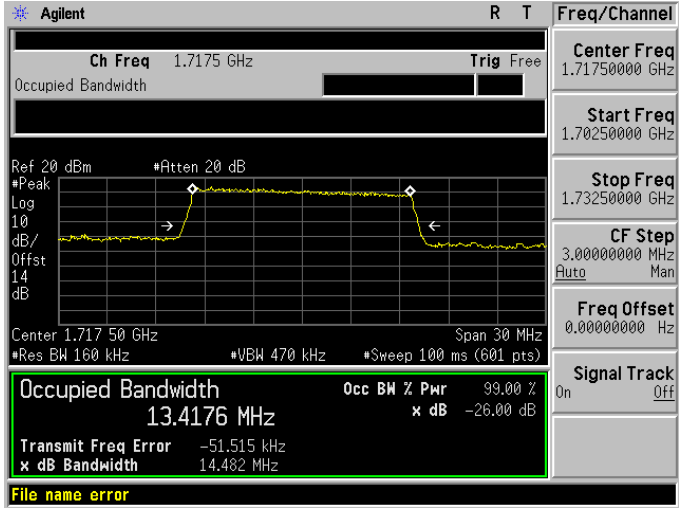
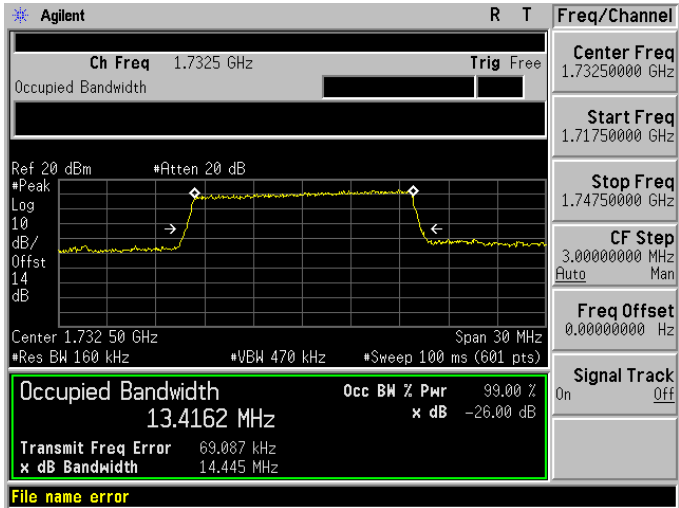
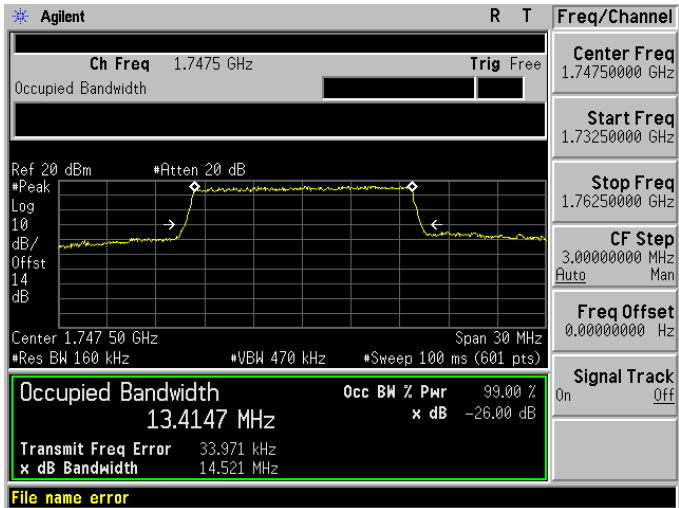
LTE Band 2 (Channel Bandwidth: 20 MHz) _ 16QAM	
1860.0 MHz	 Agilent Spectrum Analyzer screenshot for 1860.0 MHz. The display shows a signal with a peak at 1860.0 MHz. The occupied bandwidth is 17.8707 MHz. The transmit frequency error is -19.488 kHz. The x dB bandwidth is 19.158 MHz. The signal track is on.
1880.0 MHz	 Agilent Spectrum Analyzer screenshot for 1880.0 MHz. The display shows a signal with a peak at 1880.0 MHz. The occupied bandwidth is 17.8122 MHz. The transmit frequency error is 40.033 kHz. The x dB bandwidth is 19.094 MHz. The signal track is on.
1900.0 MHz	 Agilent Spectrum Analyzer screenshot for 1900.0 MHz. The display shows a signal with a peak at 1900.0 MHz. The occupied bandwidth is 17.7857 MHz. The transmit frequency error is -9.690 kHz. The x dB bandwidth is 19.091 MHz. The signal track is on.



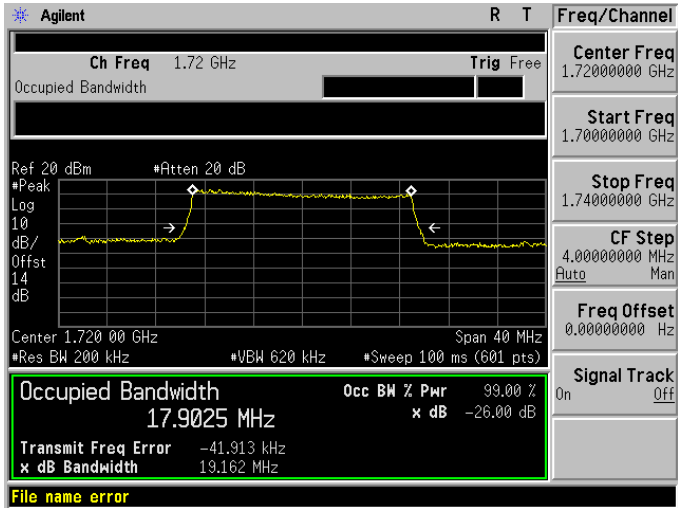
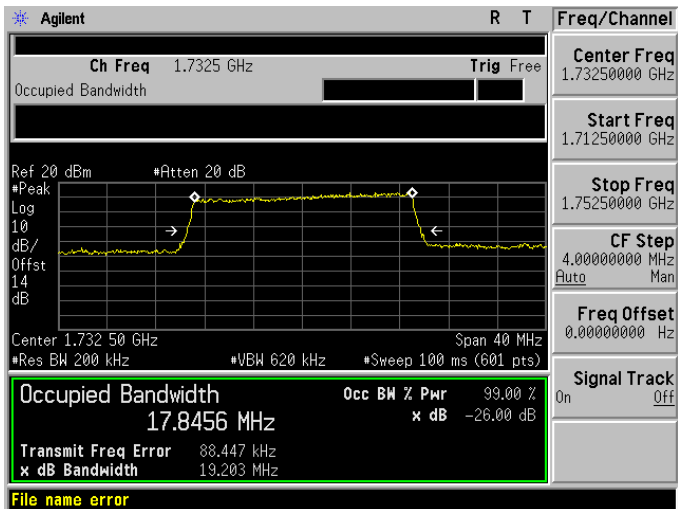
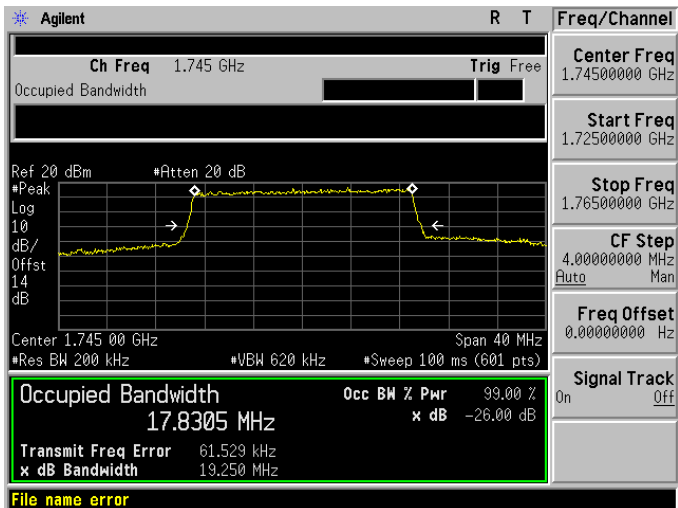
LTE Band 4 (Channel Bandwidth: 5 MHz) _ QPSK	
1712.5 MHz	
1732.5 MHz	
1752.5 MHz	

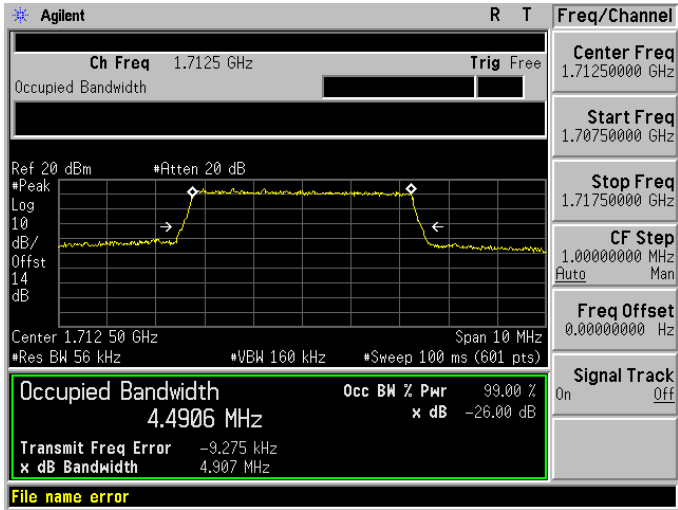
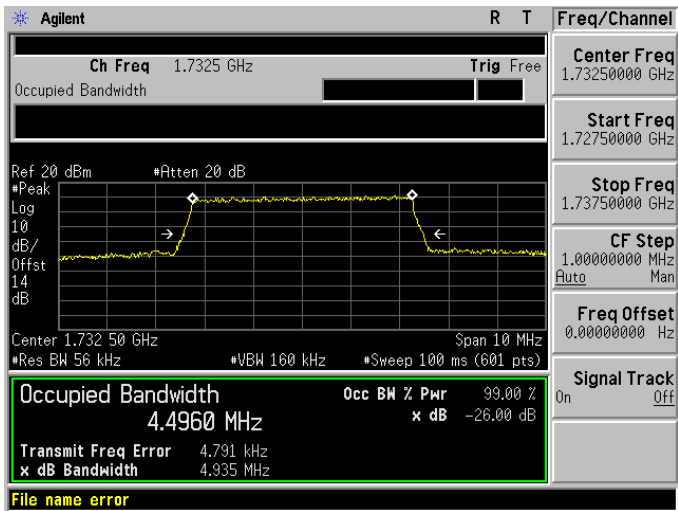
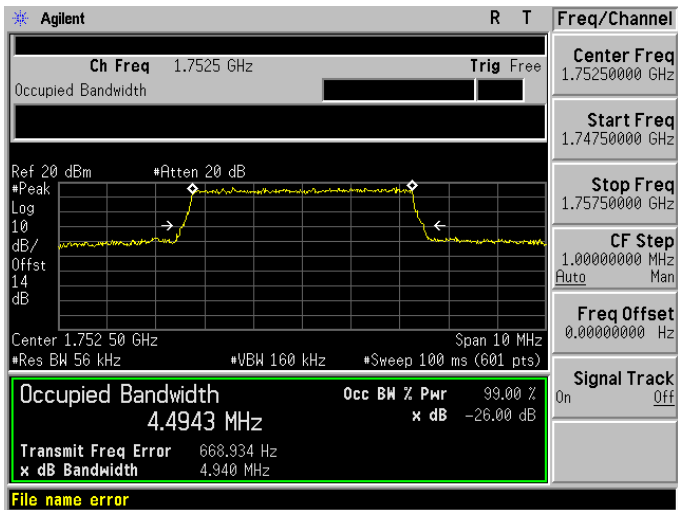
LTE Band 4 (Channel Bandwidth: 10 MHz) _ QPSK	
1715.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.715 GHz Trig Free Center Freq 1.7150000 GHz Start Freq 1.7050000 GHz Stop Freq 1.7250000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.715 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9027 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -20.058 kHz x dB Bandwidth 9.601 MHz File name error
1732.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7325 GHz Trig Free Center Freq 1.7325000 GHz Start Freq 1.7225000 GHz Stop Freq 1.7425000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.732 50 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.8946 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 27.530 kHz x dB Bandwidth 9.593 MHz File name error
1750.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.75 GHz Trig Free Center Freq 1.7500000 GHz Start Freq 1.7400000 GHz Stop Freq 1.7600000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.750 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9174 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 15.103 kHz x dB Bandwidth 9.663 MHz File name error

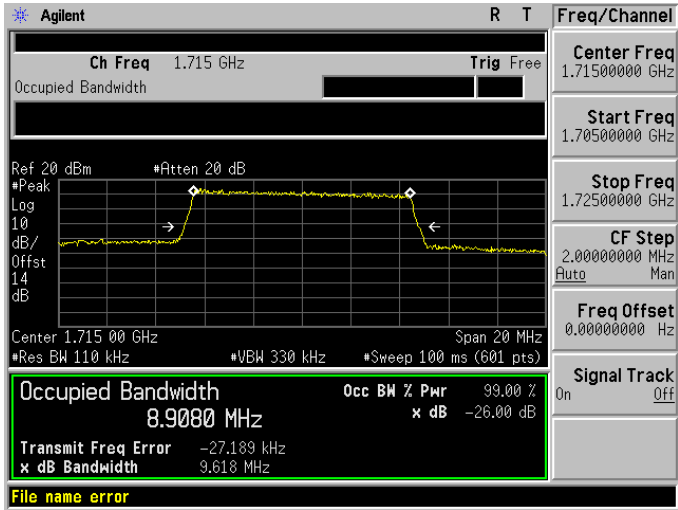
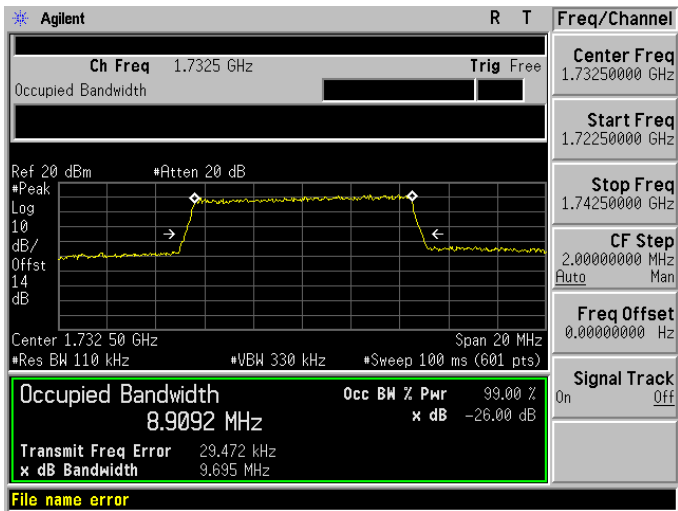
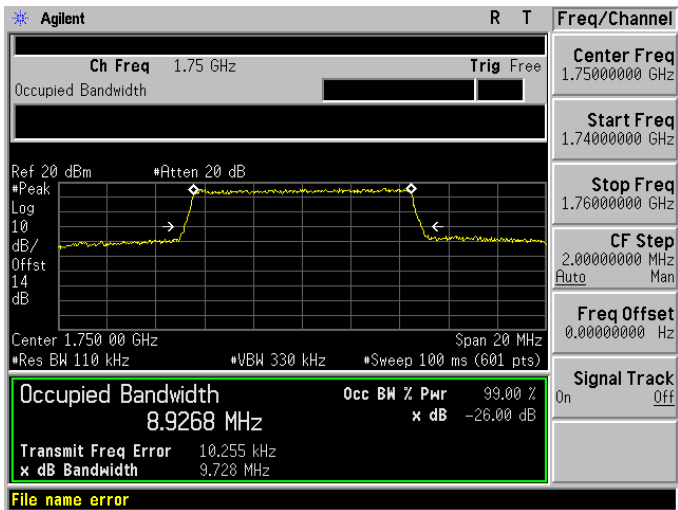


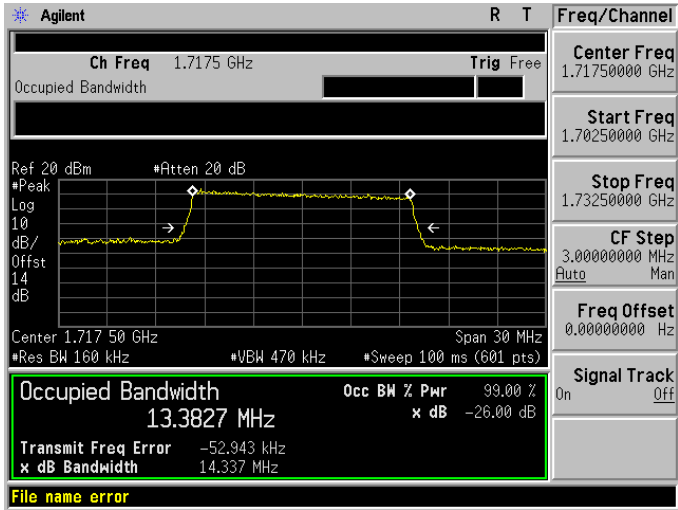
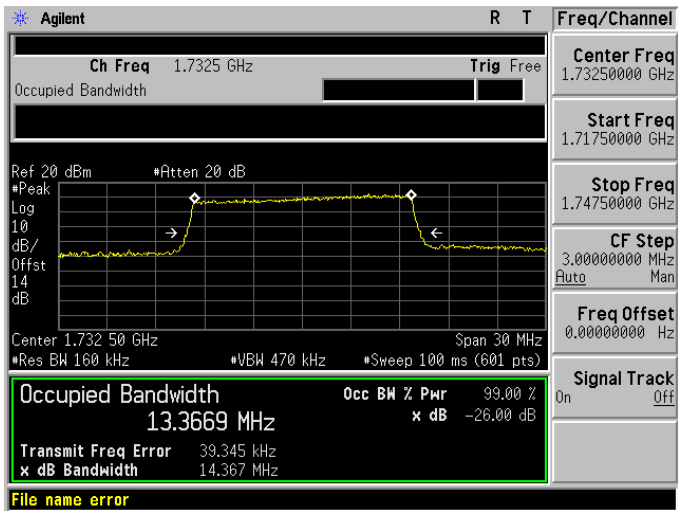
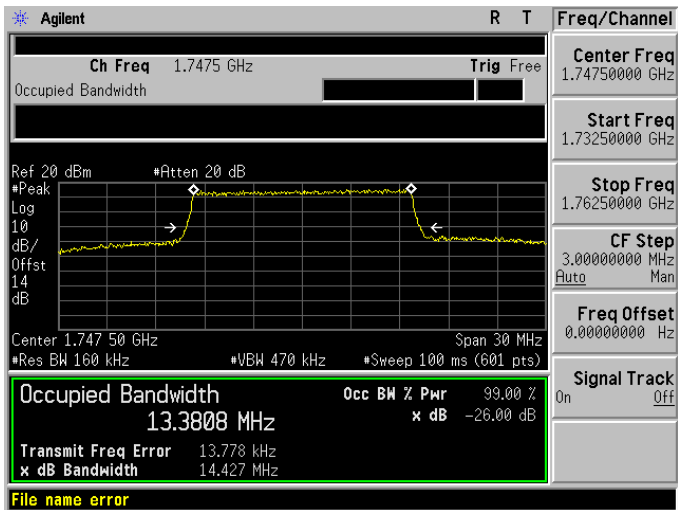
LTE Band 4 (Channel Bandwidth: 15 MHz) _ QPSK	
1717.5 MHz	
1732.5 MHz	
1747.5 MHz	

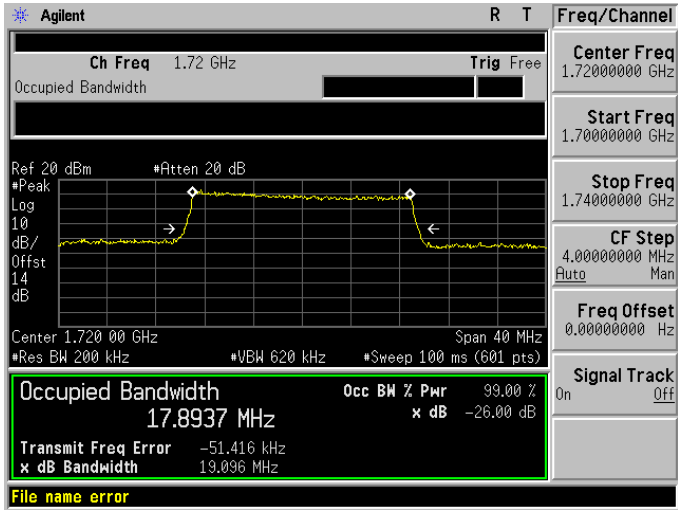
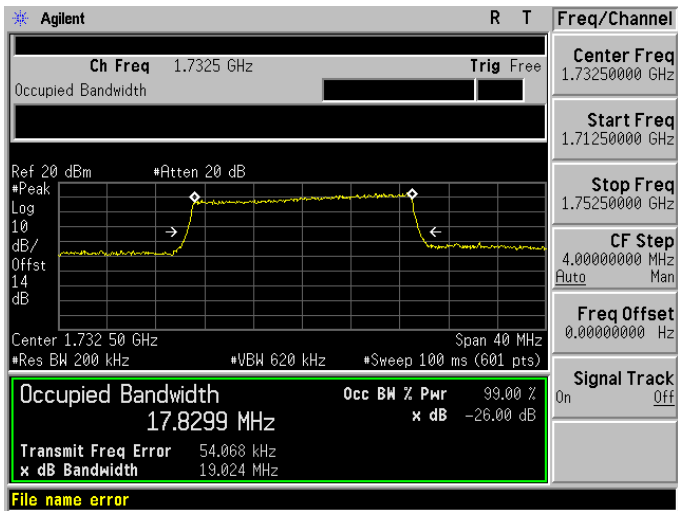
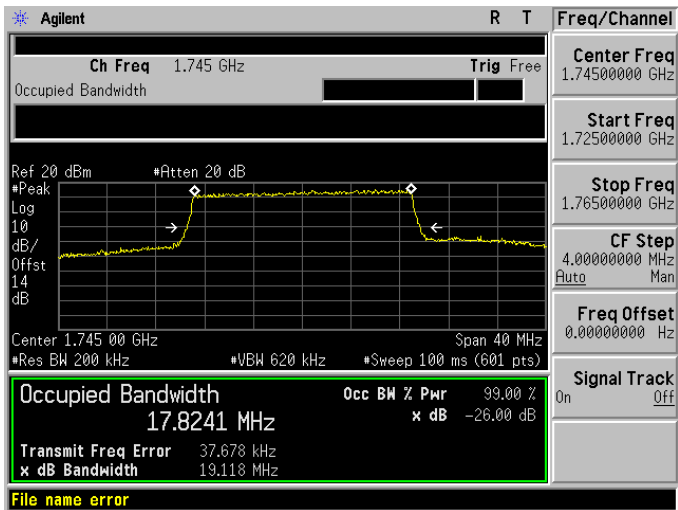


LTE Band 4 (Channel Bandwidth: 20 MHz) _ QPSK	
1720.0 MHz	
1732.5 MHz	
1745.0 MHz	

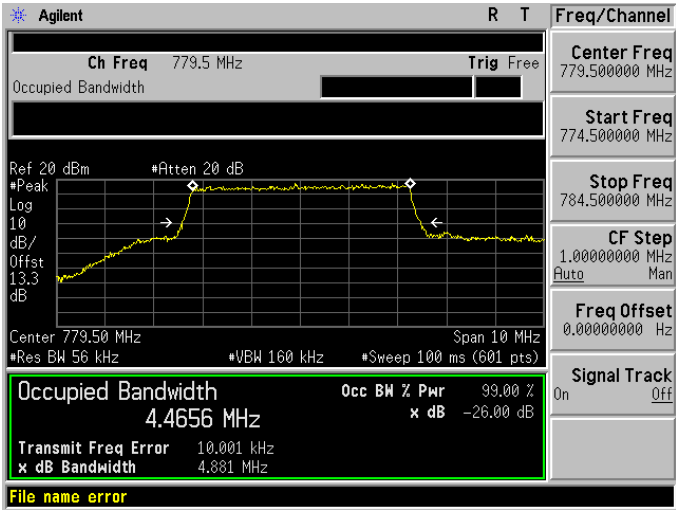
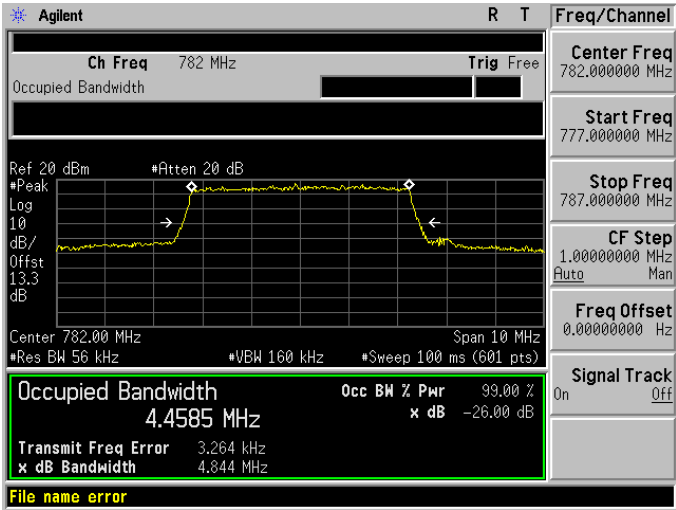
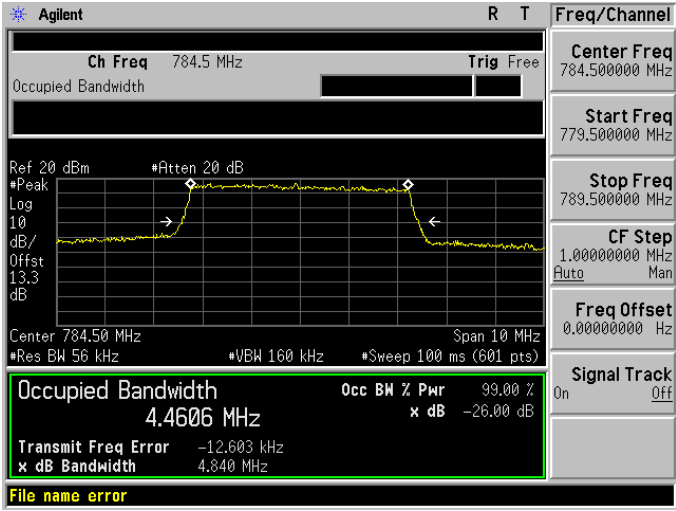
LTE Band 4 (Channel Bandwidth: 5 MHz) _ 16QAM	
1712.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7125 GHz Trig Free Center Freq 1.71250000 GHz Start Freq 1.70750000 GHz Stop Freq 1.71750000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.712 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4906 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -9.275 kHz x dB Bandwidth 4.907 MHz File name error
1732.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7325 GHz Trig Free Center Freq 1.73250000 GHz Start Freq 1.72750000 GHz Stop Freq 1.73750000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.732 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4960 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 4.791 kHz x dB Bandwidth 4.935 MHz File name error
1752.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7525 GHz Trig Free Center Freq 1.75250000 GHz Start Freq 1.74750000 GHz Stop Freq 1.75750000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/ Offst 14 dB Center 1.752 50 GHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4943 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 668.934 Hz x dB Bandwidth 4.940 MHz File name error

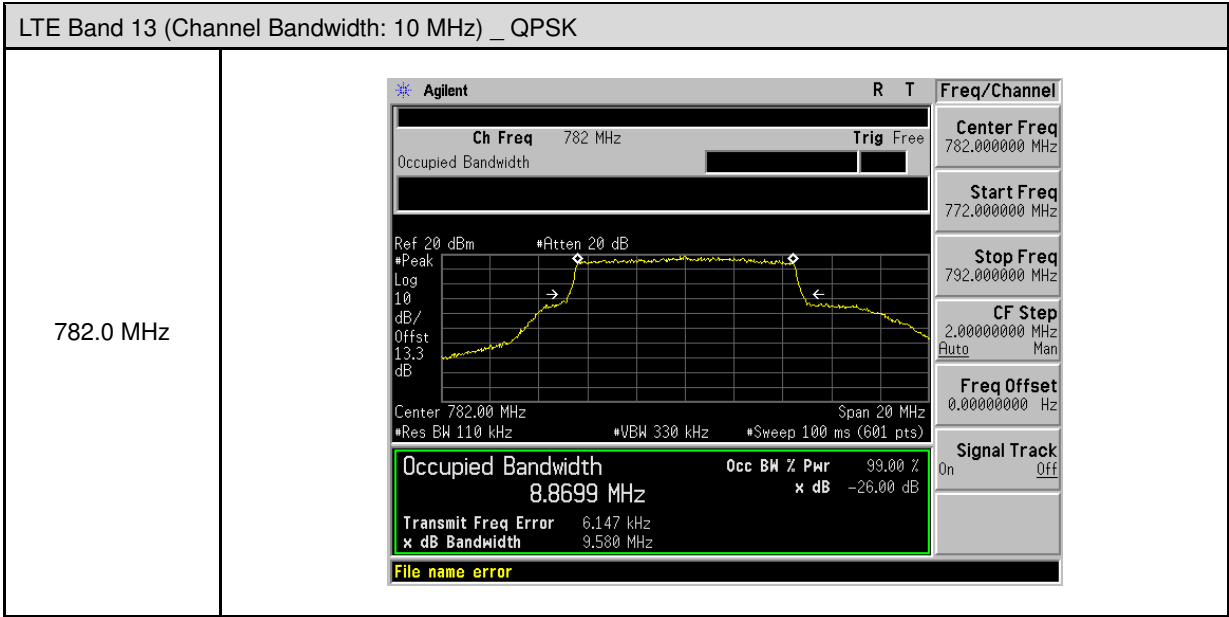
LTE Band 4 (Channel Bandwidth: 10 MHz) _ 16QAM	
1715.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.715 GHz Trig Free Center Freq 1.7150000 GHz Start Freq 1.7050000 GHz Stop Freq 1.7250000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.715 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9080 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -27.189 kHz x dB Bandwidth 9.618 MHz File name error
1732.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7325 GHz Trig Free Center Freq 1.7325000 GHz Start Freq 1.7225000 GHz Stop Freq 1.7425000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.732 50 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9092 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 29.472 kHz x dB Bandwidth 9.695 MHz File name error
1750.0 MHz	 Agilent R T Freq/Channel Ch Freq 1.75 GHz Trig Free Center Freq 1.7500000 GHz Start Freq 1.7400000 GHz Stop Freq 1.7600000 GHz CF Step 2.0000000 MHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.750 00 GHz Span 20 MHz *Res BW 110 kHz *VBW 330 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 8.9268 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 10.255 kHz x dB Bandwidth 9.728 MHz File name error

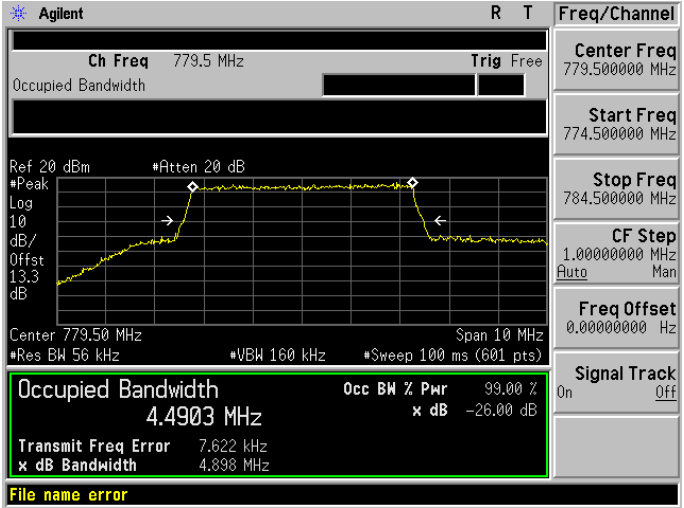
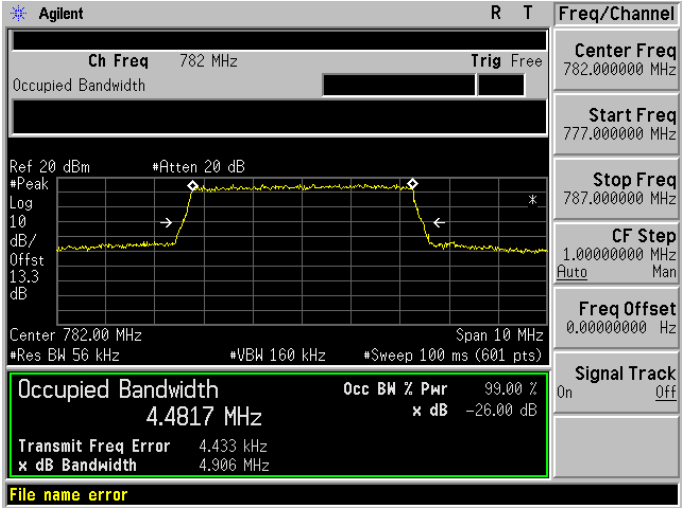
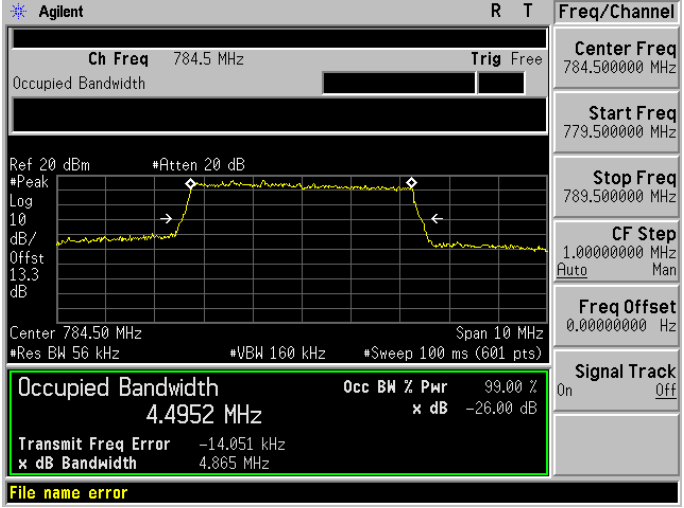
LTE Band 4 (Channel Bandwidth: 15 MHz) _ 16QAM	
1717.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7175 GHz Trig Free Center Freq 1.71750000 GHz Start Freq 1.70250000 GHz Stop Freq 1.73250000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.717 50 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3827 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -52.943 kHz x dB Bandwidth 14.337 MHz File name error
1732.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7325 GHz Trig Free Center Freq 1.73250000 GHz Start Freq 1.71750000 GHz Stop Freq 1.74750000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.732 50 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3669 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 39.345 kHz x dB Bandwidth 14.367 MHz File name error
1747.5 MHz	 Agilent R T Freq/Channel Ch Freq 1.7475 GHz Trig Free Center Freq 1.74750000 GHz Start Freq 1.73250000 GHz Stop Freq 1.76250000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 14 dB Center 1.747 50 GHz Span 30 MHz *Res BW 160 kHz *VBW 470 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 13.3808 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 13.778 kHz x dB Bandwidth 14.427 MHz File name error

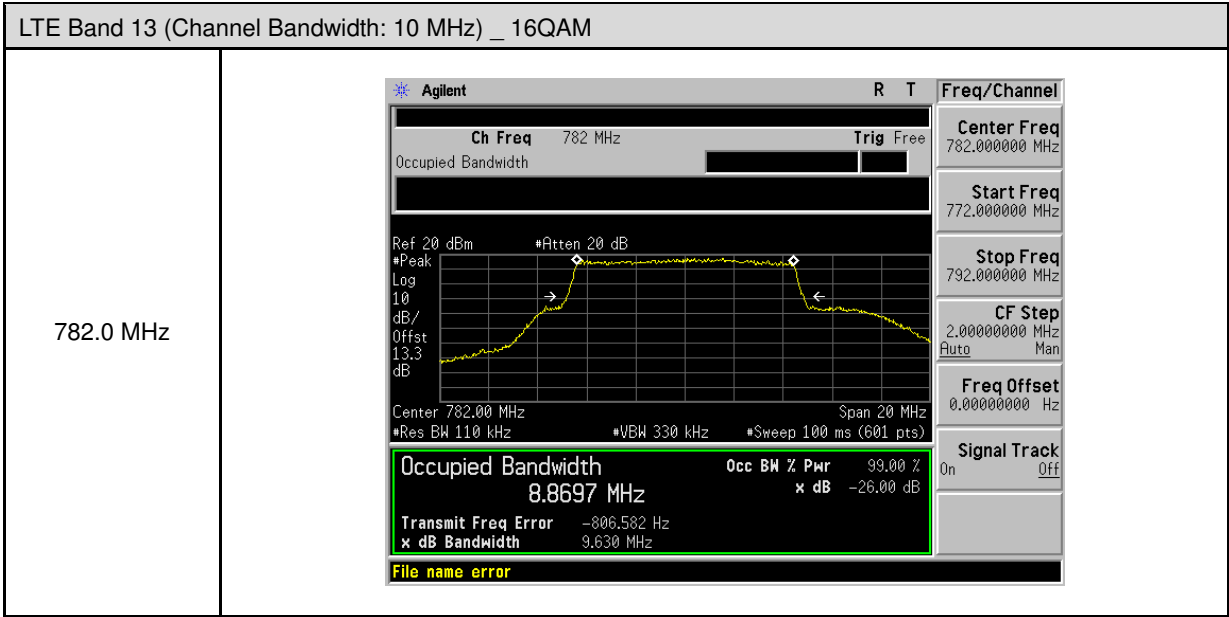
LTE Band 4 (Channel Bandwidth: 20 MHz) _ 16QAM	
1720.0 MHz	
1732.5 MHz	
1745.0 MHz	



LTE Band 13 (Channel Bandwidth: 5 MHz) _ QPSK	
779.5 MHz	
782.0 MHz	
784.5 MHz	



LTE Band 13 (Channel Bandwidth: 5 MHz) _ 16QAM	
779.5 MHz	 Agilent R T Freq/Channel Ch Freq 779.5 MHz Trig Free Center Freq 779.500000 MHz Start Freq 774.500000 MHz Stop Freq 784.500000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 13.3 dB Center 779.50 MHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4903 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 7.622 kHz x dB Bandwidth 4.898 MHz File name error
782.0 MHz	 Agilent R T Freq/Channel Ch Freq 782 MHz Trig Free Center Freq 782.000000 MHz Start Freq 777.000000 MHz Stop Freq 787.000000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 13.3 dB Center 782.00 MHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4817 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 4.433 kHz x dB Bandwidth 4.906 MHz File name error
784.5 MHz	 Agilent R T Freq/Channel Ch Freq 784.5 MHz Trig Free Center Freq 784.500000 MHz Start Freq 779.500000 MHz Stop Freq 789.500000 MHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 20 dBm *Atten 20 dB *Peak Log 10 dB/Offst 13.3 dB Center 784.50 MHz Span 10 MHz *Res BW 56 kHz *VBW 160 kHz *Sweep 100 ms (601 pts) Occupied Bandwidth 4.4952 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -14.051 kHz x dB Bandwidth 4.865 MHz File name error



6 Peak to Average Ratio Test

6.1. Limit

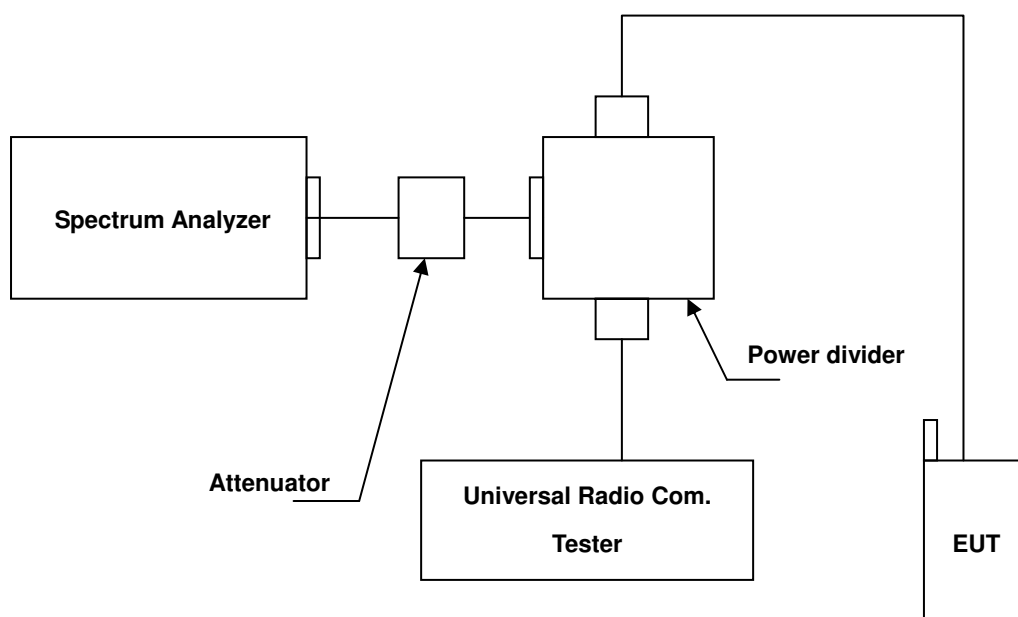
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

6.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Spectrum Analyzer	Agilent	N9030A	MY53120541	12/14/2015	1 year
Wideband Radio Communication Test	R & S	CMW500	103168	10/30/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

6.3. Setup





6.4. Test Procedure

The measurement is made according to FCC rules:

- 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%.

6.5. Uncertainty

The measurement uncertainty is defined as for Conducted Power measurement is 1.2 dB.



6.6. Test Result

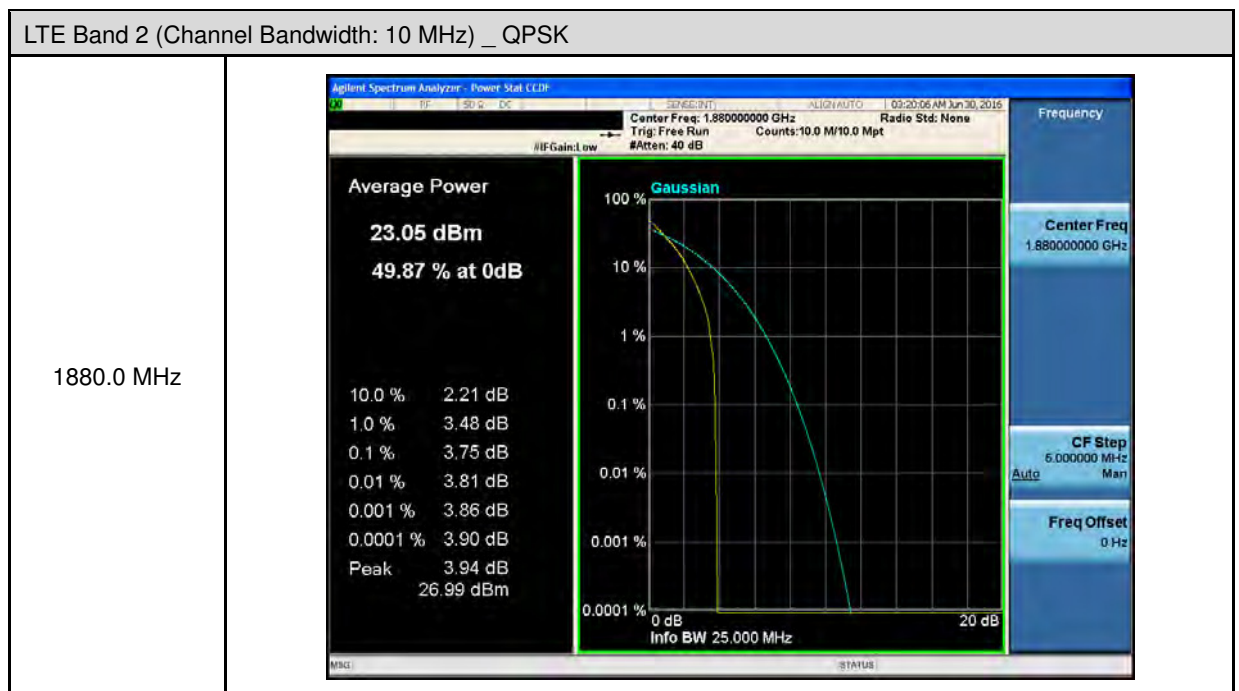
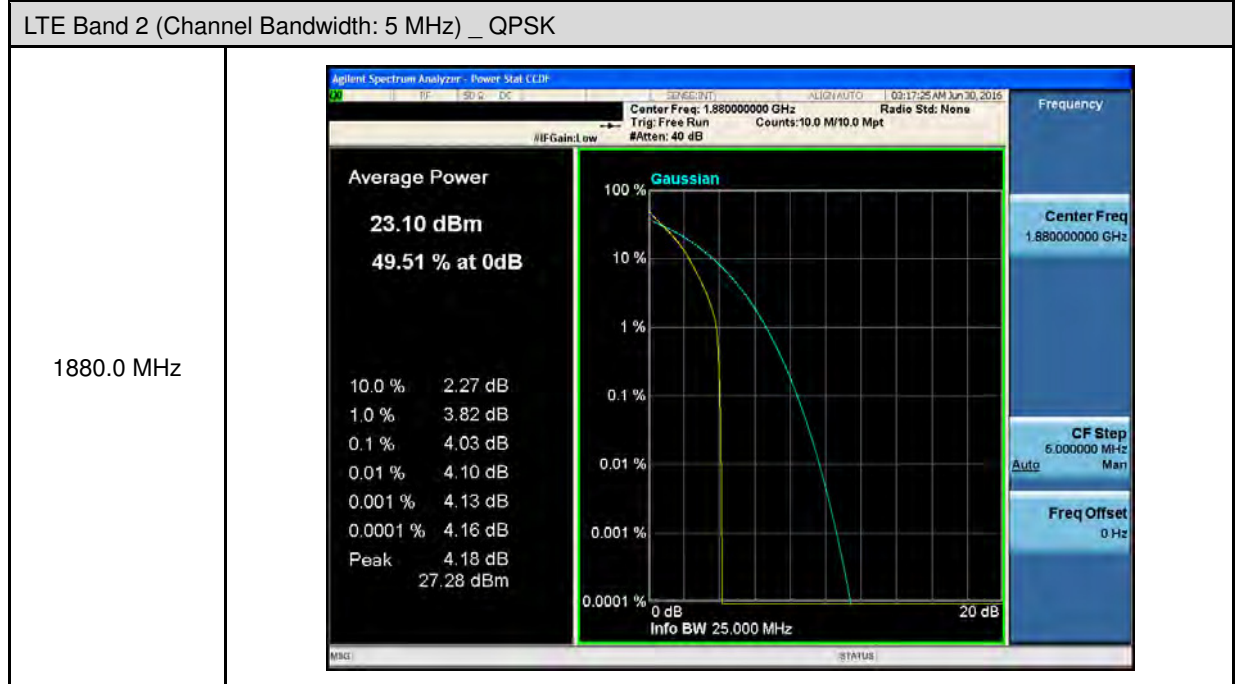
Test Item	Peak to Average Ratio		
Date of Test	06/30/2016	Test Site	TE05

LTE Band 2				
Modulation	Channel Bandwidth	Frequency (MHz)	Peak to Average Ratio (dB)	Limit (dB)
QPSK	5 MHz	1880.0	4.03	< 13
	10 MHz	1880.0	3.75	< 13
	15 MHz	1880.0	3.24	< 13
	20 MHz	1880.0	2.97	< 13
16QAM	5 MHz	1880.0	4.93	< 13
	10 MHz	1880.0	4.69	< 13
	15 MHz	1880.0	4.31	< 13
	20 MHz	1880.0	3.73	< 13

LTE Band 4				
Modulation	Channel Bandwidth	Frequency (MHz)	Peak to Average Ratio (dB)	Limit (dB)
QPSK	5 MHz	1732.5	4.04	< 13
	10 MHz	1732.5	3.79	< 13
	15 MHz	1732.5	3.58	< 13
	20 MHz	1732.5	3.27	< 13
16QAM	5 MHz	1732.5	4.17	< 13
	10 MHz	1732.5	3.67	< 13
	15 MHz	1732.5	3.62	< 13
	20 MHz	1732.5	3.46	< 13

LTE Band 13				
Modulation	Channel Bandwidth	Frequency (MHz)	Peak to Average Ratio (dB)	Limit (dB)
QPSK	5 MHz	782.0	3.67	< 13
	10 MHz	782.0	3.02	< 13
16QAM	5 MHz	782.0	4.38	< 13
	10 MHz	782.0	3.88	< 13

6.7. Test Graphs



LTE Band 2 (Channel Bandwidth: 15 MHz) _ QPSK

1880.0 MHz



LTE Band 2 (Channel Bandwidth: 20 MHz) _ QPSK

1880.0 MHz



LTE Band 2 (Channel Bandwidth: 5 MHz) _ 16QAM

1880.0 MHz



LTE Band 2 (Channel Bandwidth: 10 MHz) _ 16QAM

1880.0 MHz



LTE Band 2 (Channel Bandwidth: 15 MHz) _ 16QAM

1880.0 MHz



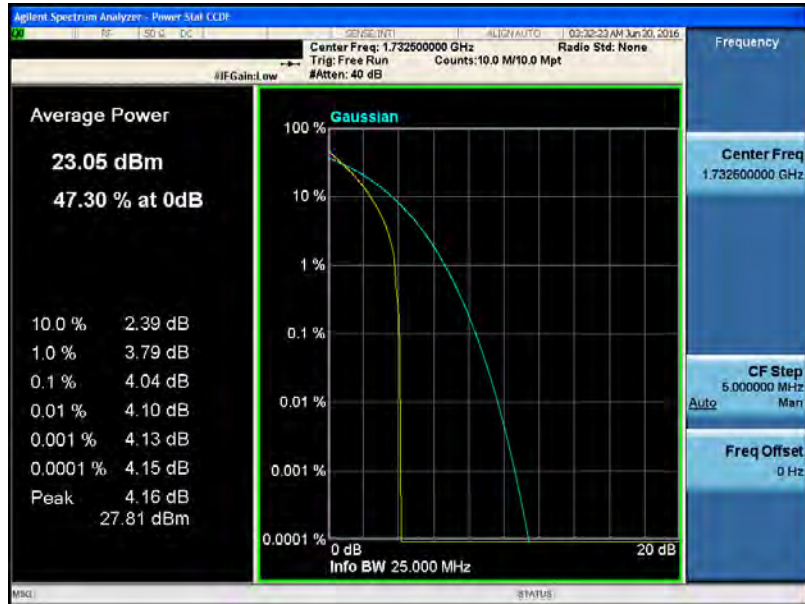
LTE Band 2 (Channel Bandwidth: 20 MHz) _ 16QAM

1880.0 MHz



LTE Band 4 (Channel Bandwidth: 5 MHz) _ QPSK

1732.5 MHz



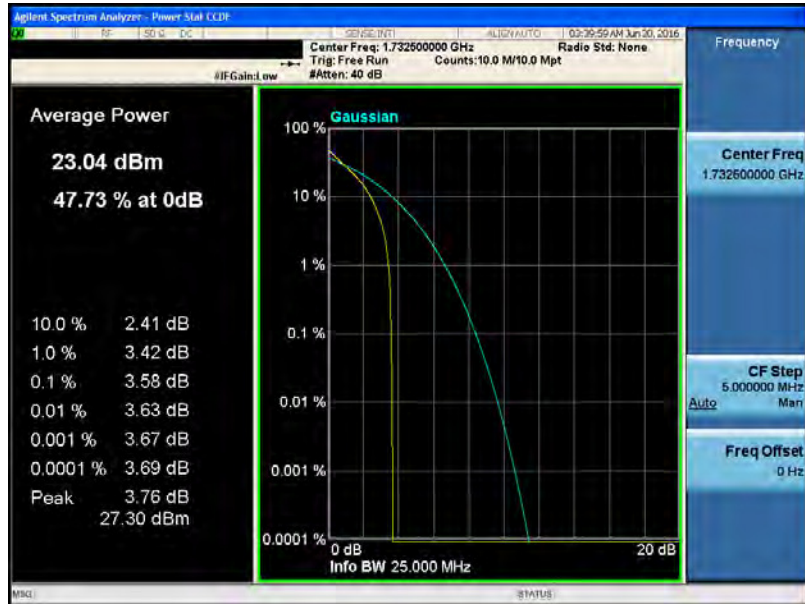
LTE Band 4 (Channel Bandwidth: 10 MHz) _ QPSK

1732.5 MHz



LTE Band 4 (Channel Bandwidth: 15 MHz) _ QPSK

1732.5 MHz



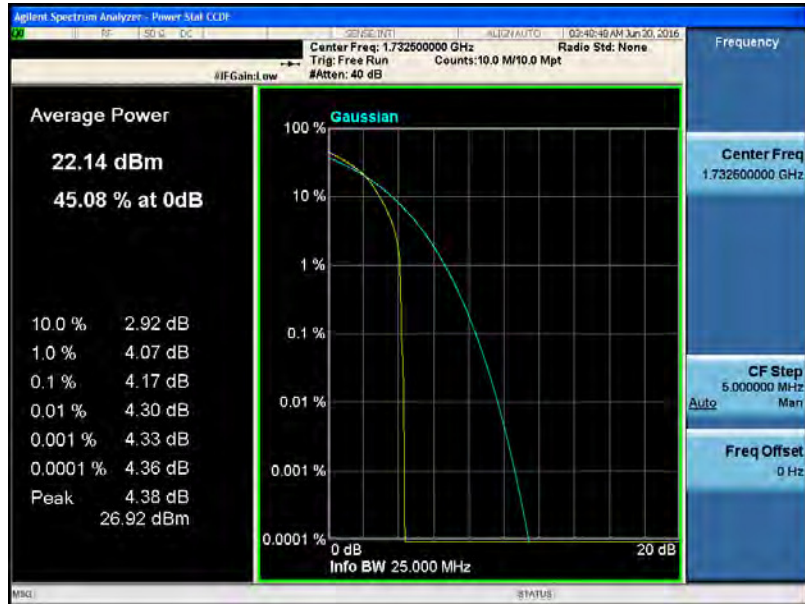
LTE Band 4 (Channel Bandwidth: 20 MHz) _ QPSK

1732.5 MHz



LTE Band 4 (Channel Bandwidth: 5 MHz) _ 16QAM

1732.5 MHz



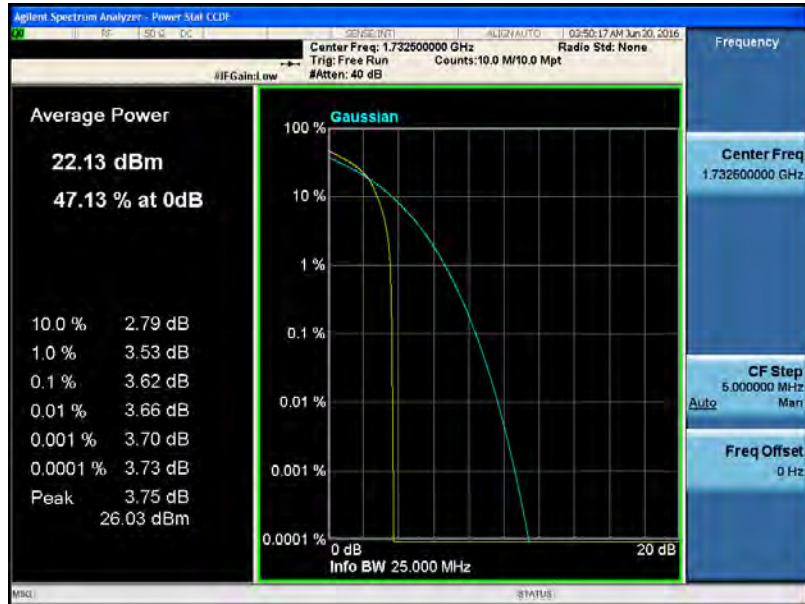
LTE Band 4 (Channel Bandwidth: 10 MHz) _ 16QAM

1732.5 MHz



LTE Band 4 (Channel Bandwidth: 15 MHz) _ 16QAM

1732.5 MHz



LTE Band 4 (Channel Bandwidth: 20 MHz) _ 16QAM

1732.5 MHz



LTE Band 13 (Channel Bandwidth: 5 MHz) _ QPSK

782.0 MHz



LTE Band 13 (Channel Bandwidth: 10 MHz) _ QPSK

782.0 MHz



LTE Band 13 (Channel Bandwidth: 5 MHz) _ 16QAM

782.0 MHz



LTE Band 13 (Channel Bandwidth: 10 MHz) _ 16QAM

782.0 MHz



7 Band Edge Test

7.1. Limit

The Band Edge Limit:

§24.238(a), §27.53(h)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

§27.53(c)(2)

On any frequency outside the 777-787 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

§27.53(c)(4)

On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

LTE Band 13_BW=5M				
Frequency (MHz)	RBW=10kHz Measurement (dBm)	RBW=6.25kHz Measurement (dBm)	Limit -35dBm/6.25kHz	Result
763 ~ 775	-37.62	-39.66	-35	PASS
793 ~ 805	-56.23	-58.27	-35	PASS

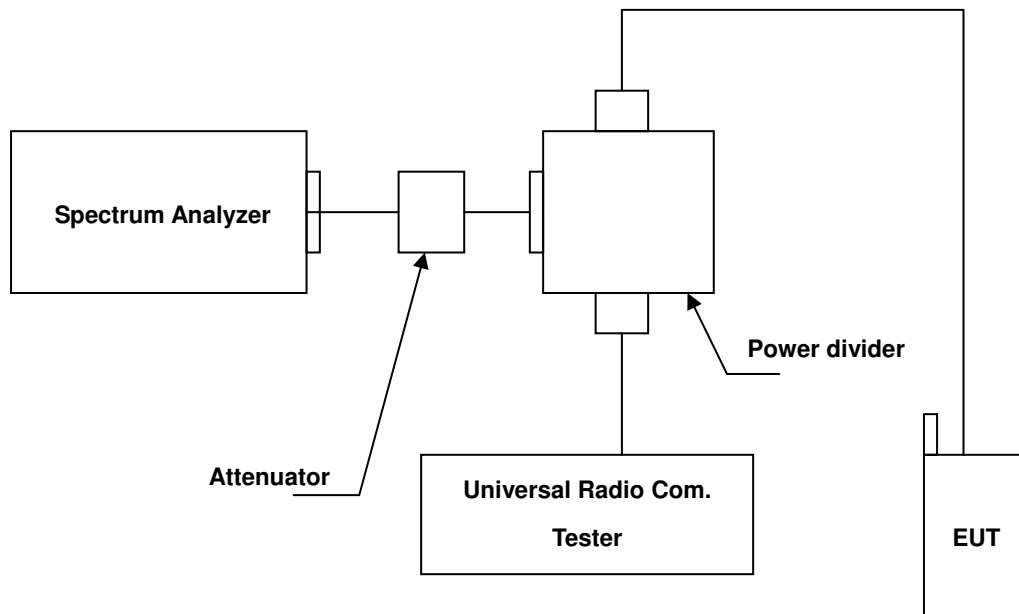
LTE Band 13_BW=10M				
Frequency (MHz)	RBW=10kHz Measurement (dBm)	RBW=6.25kHz Measurement (dBm)	Limit -35dBm/6.25kHz	Result
763 ~775	-38.71	-40.75	-35	PASS
793 ~805	-50.24	-52.28	-35	PASS

7.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Spectrum Analyzer	Agilent	N9030A	MY53120541	12/14/2015	1 year
Wideband Radio Communication Test	R & S	CMW500	103168	10/30/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

7.3. Setup



7.4. Test Procedure

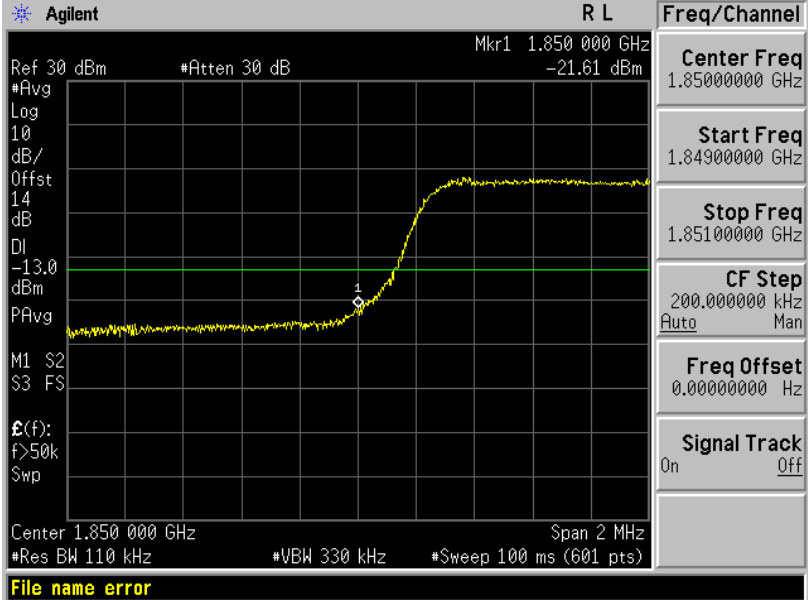
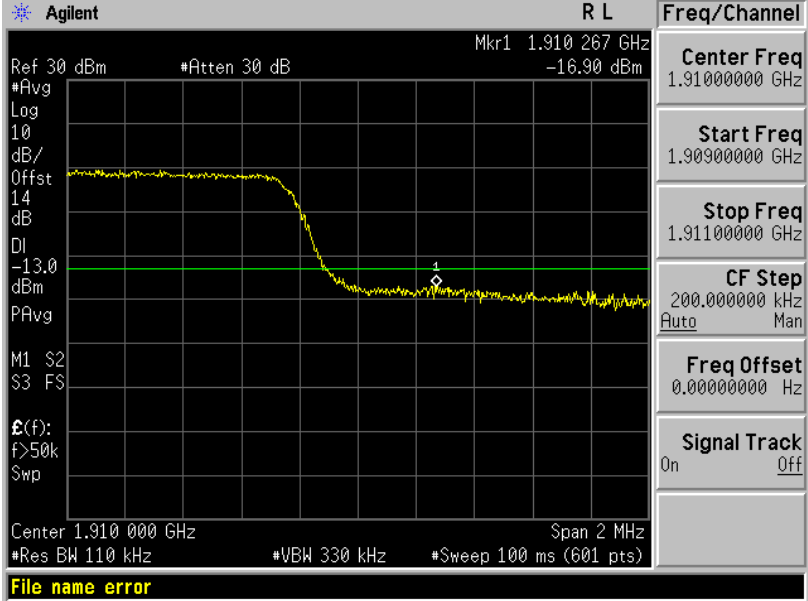
The measurement is made according to FCC rules:

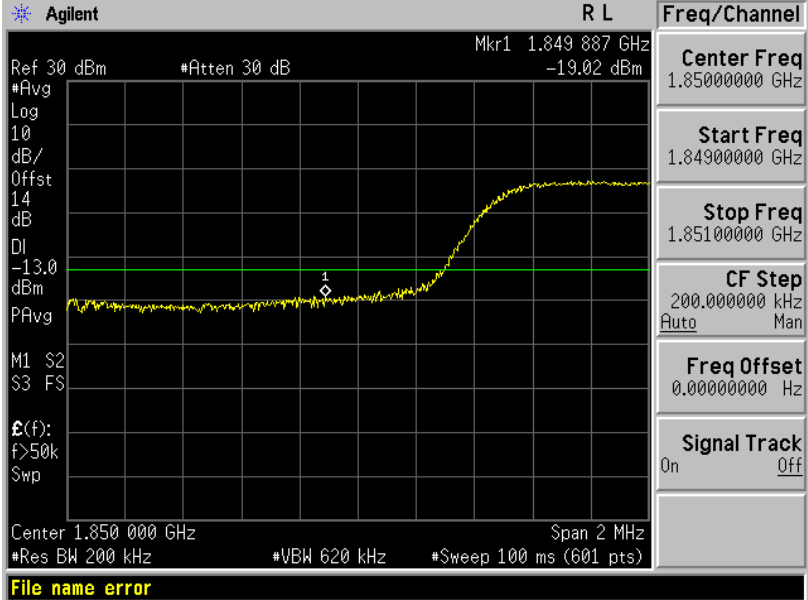
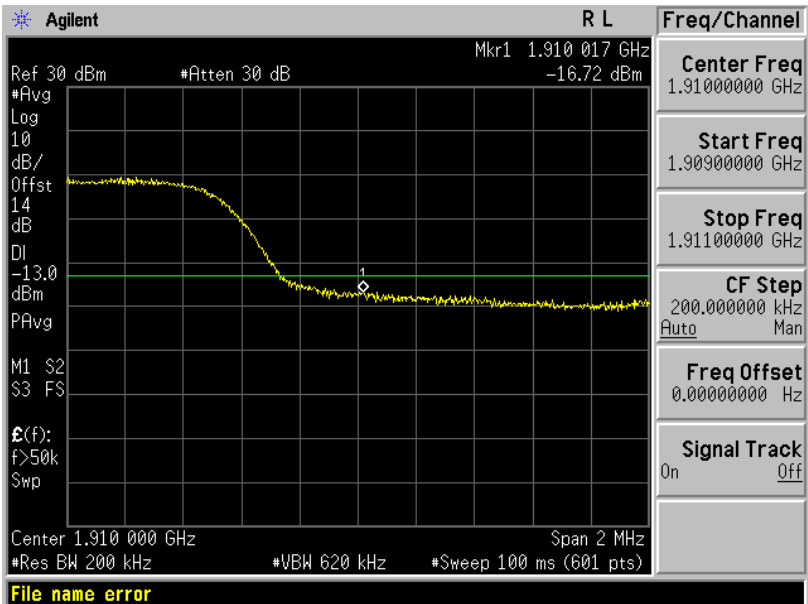
- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.)
- The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss in the transmitted path track.
- The center frequency of spectrum is the band edge frequency and span is 10 MHz. RB of the resolution bandwidth of at least one percent of the emission bandwidth.
- Record the max trace plot into the test report.

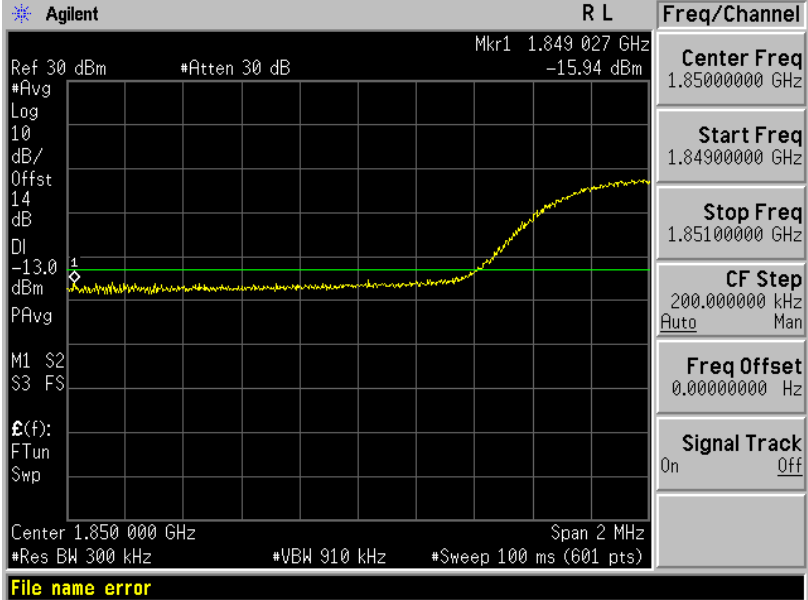
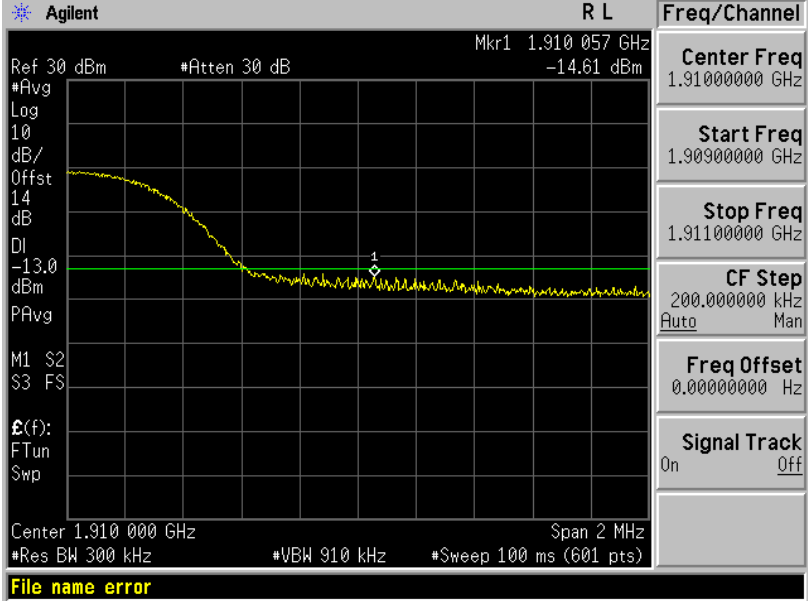
7.5. Uncertainty

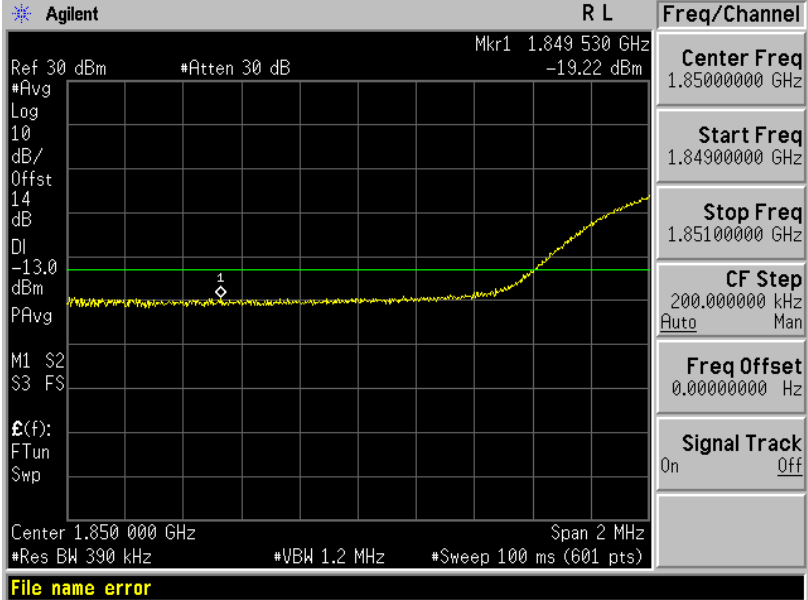
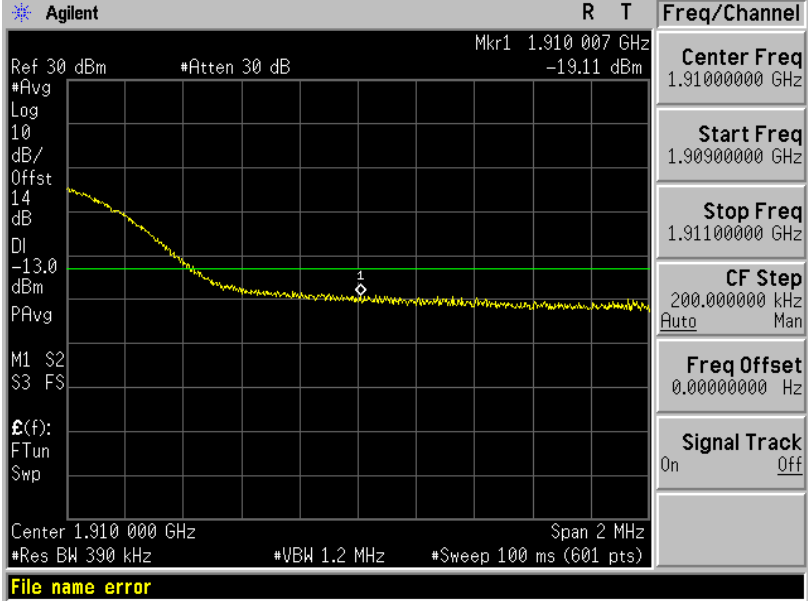
The measurement uncertainty is defined as for Conducted Power measurement is 1.2 dB.

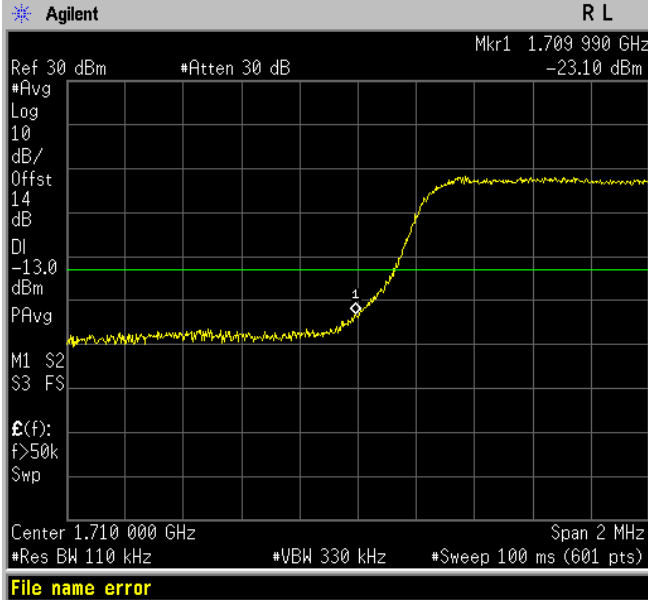
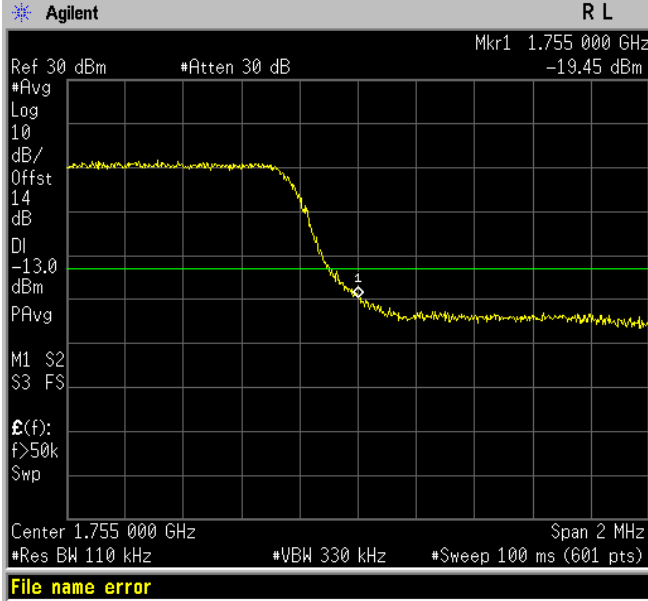
7.6. Test Result

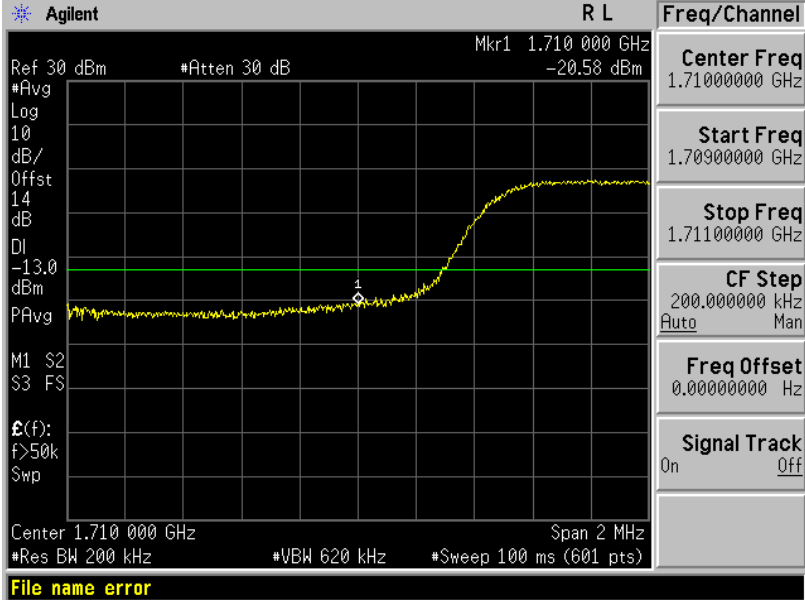
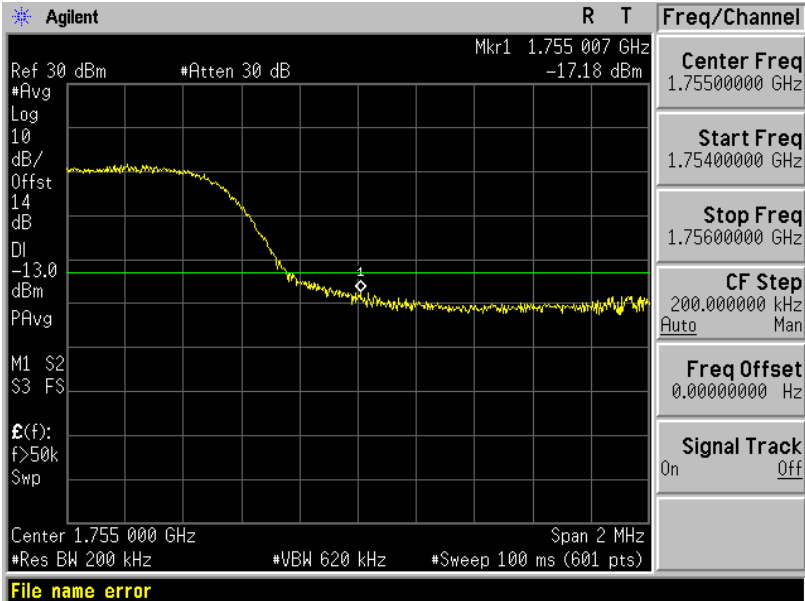
Frequency	LTE Band 2	Channel Bandwidth	5 MHz	RB Allocated	25
Lower Band Edge					
Higher Band Edge					

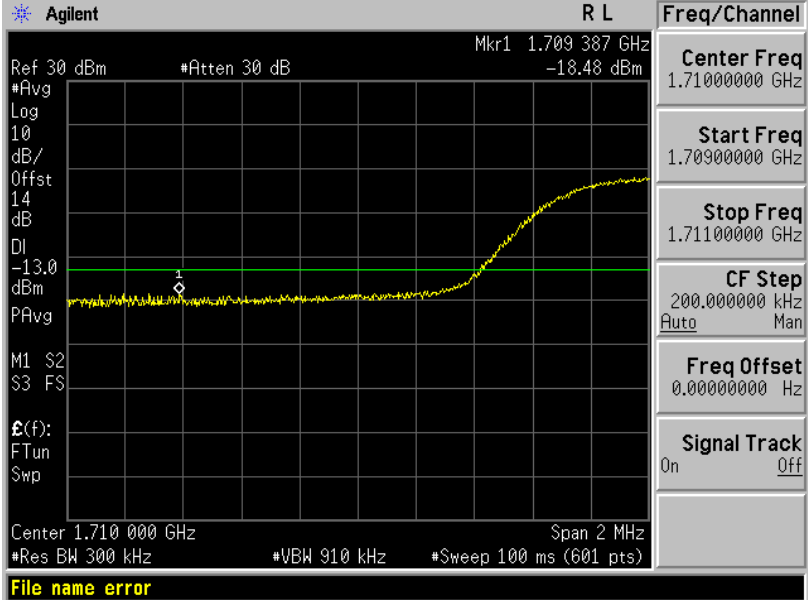
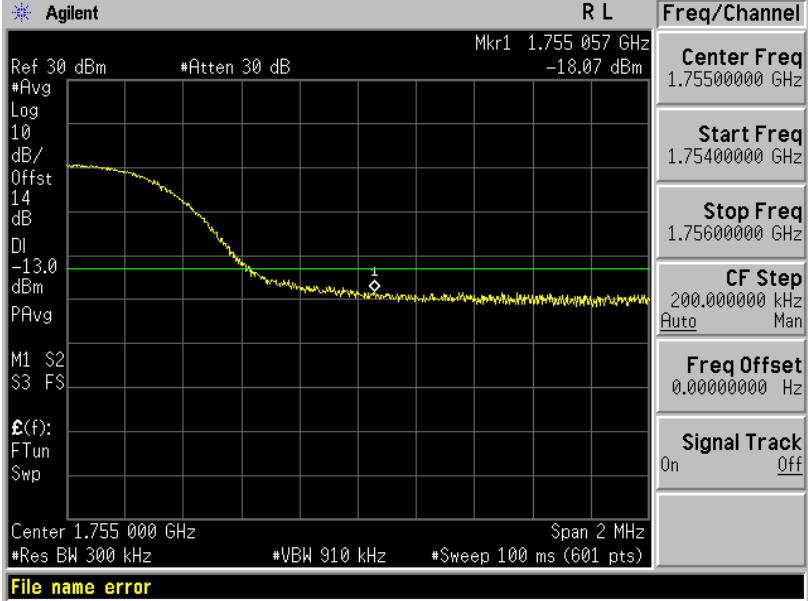
Frequency	LTE Band 2	Channel Bandwidth	10 MHz	RB Allocated	50
Lower Band Edge					
Higher Band Edge					

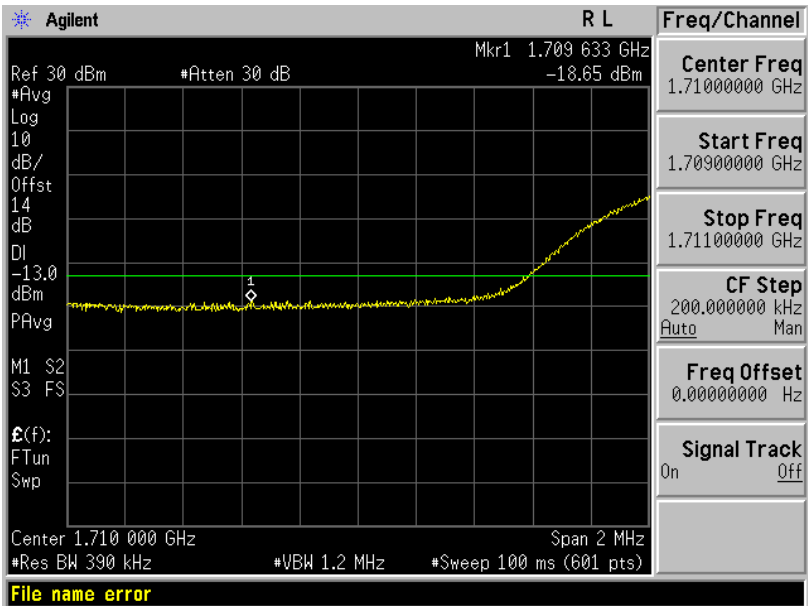
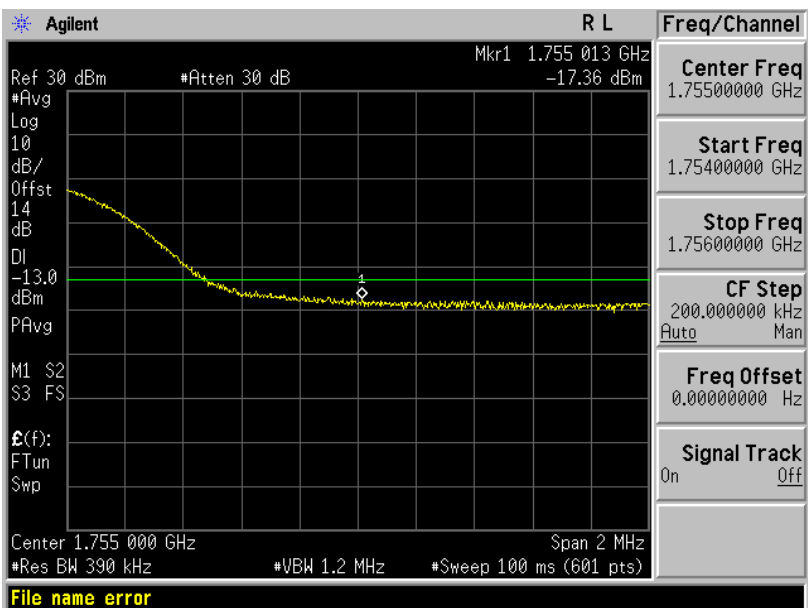
Frequency	LTE Band 2	Channel Bandwidth	15 MHz	RB Allocated	75
Lower Band Edge					
Higher Band Edge					

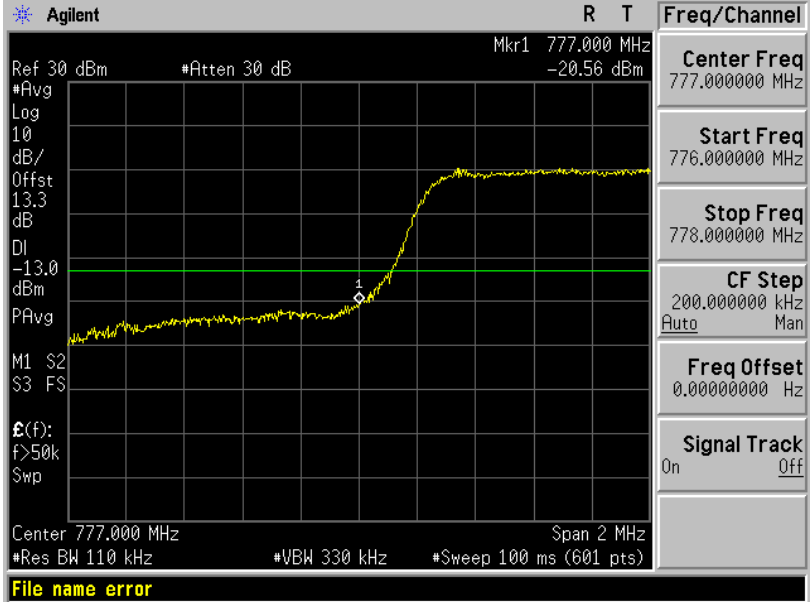
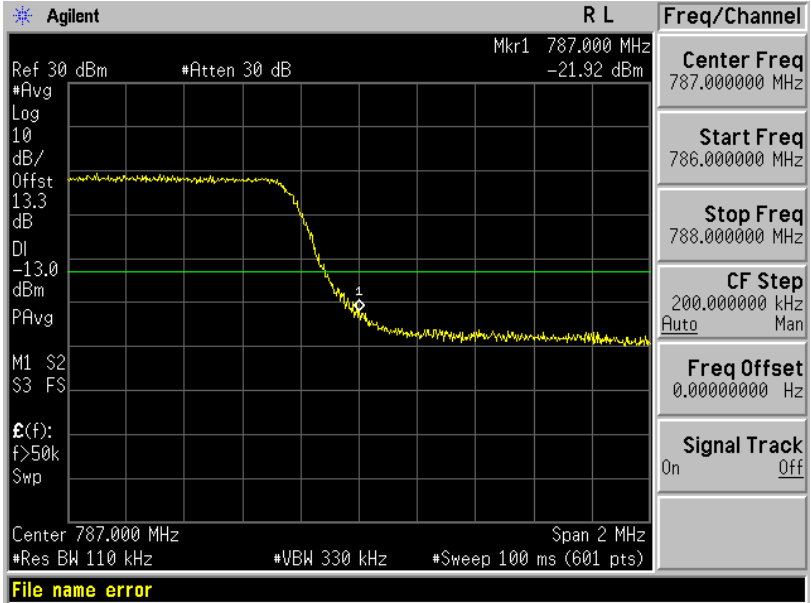
Frequency	LTE Band 2	Channel Bandwidth	20 MHz	RB Allocated	100
Lower Band Edge	 Agilent Spectrum Analyzer screenshot showing the Lower Band Edge. The display shows a signal rising from -13.0 dBm to -19.22 dBm. The center frequency is 1.850 000 GHz, and the span is 2 MHz. The resolution bandwidth is 390 kHz, and the video bandwidth is 1.2 MHz. The sweep rate is 100 ms (601 pts). The signal track is set to 'Off'. File name error				
Higher Band Edge	 Agilent Spectrum Analyzer screenshot showing the Higher Band Edge. The display shows a signal falling from -13.0 dBm to -19.11 dBm. The center frequency is 1.910 000 GHz, and the span is 2 MHz. The resolution bandwidth is 390 kHz, and the video bandwidth is 1.2 MHz. The sweep rate is 100 ms (601 pts). The signal track is set to 'Off'. File name error				

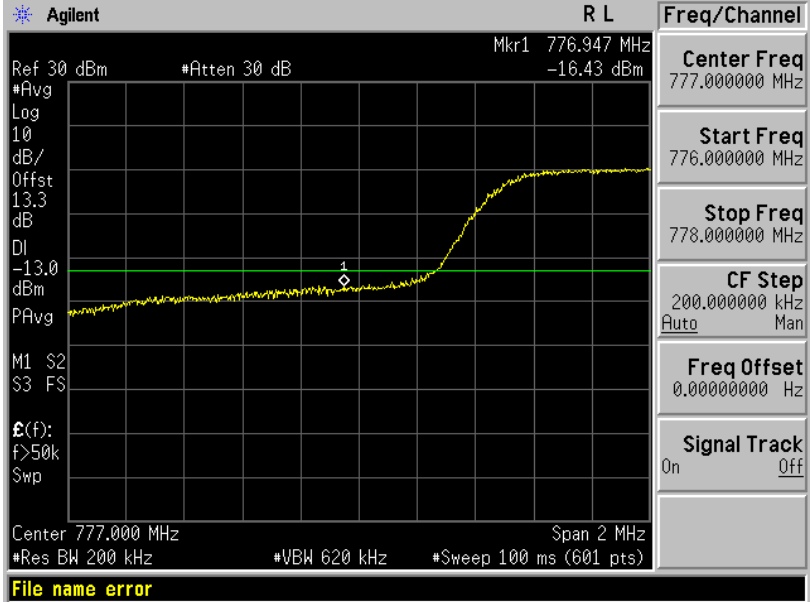
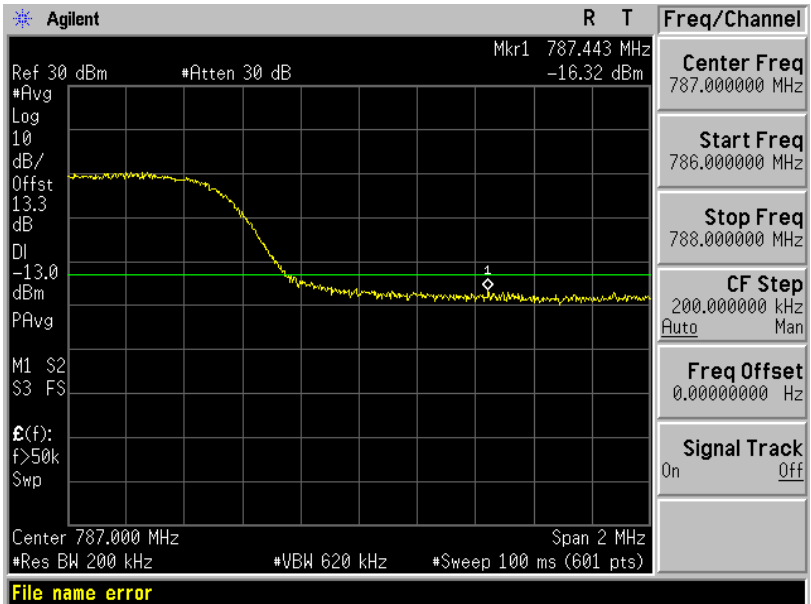
Frequency	LTE Band 4	Channel Bandwidth	5 MHz	RB Allocated	25
Lower Band Edge	 Agilent R L Mkr1 1.709 990 GHz -23.10 dBm Ref 30 dBm #Atten 30 dB #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PPAvg M1 S2 S3 FS $\mathcal{E}(f)$: f>50k Swp Center 1.710 000 GHz Span 2 MHz #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) File name error Freq/Channel Center Freq 1.71000000 GHz Start Freq 1.70900000 GHz Stop Freq 1.71100000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				
Higher Band Edge	 Agilent R L Mkr1 1.755 000 GHz -19.45 dBm Ref 30 dBm #Atten 30 dB #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PPAvg M1 S2 S3 FS $\mathcal{E}(f)$: f>50k Swp Center 1.755 000 GHz Span 2 MHz #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) File name error Freq/Channel Center Freq 1.75500000 GHz Start Freq 1.75400000 GHz Stop Freq 1.75600000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				

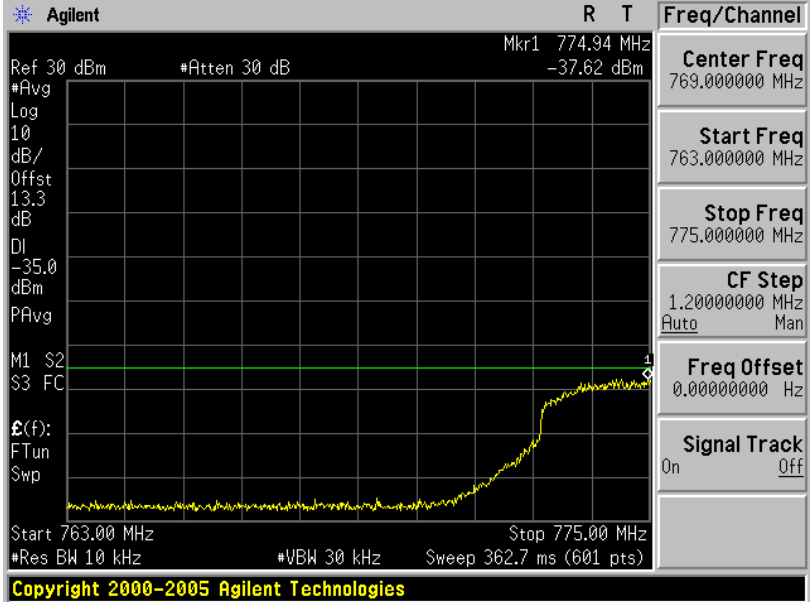
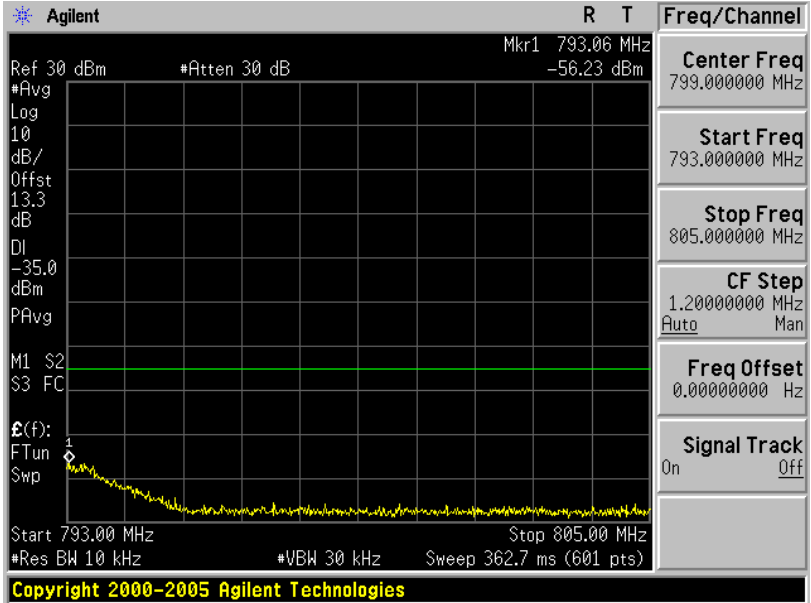
Frequency	LTE Band 4	Channel Bandwidth	10 MHz	RB Allocated	50
Lower Band Edge					
Higher Band Edge					

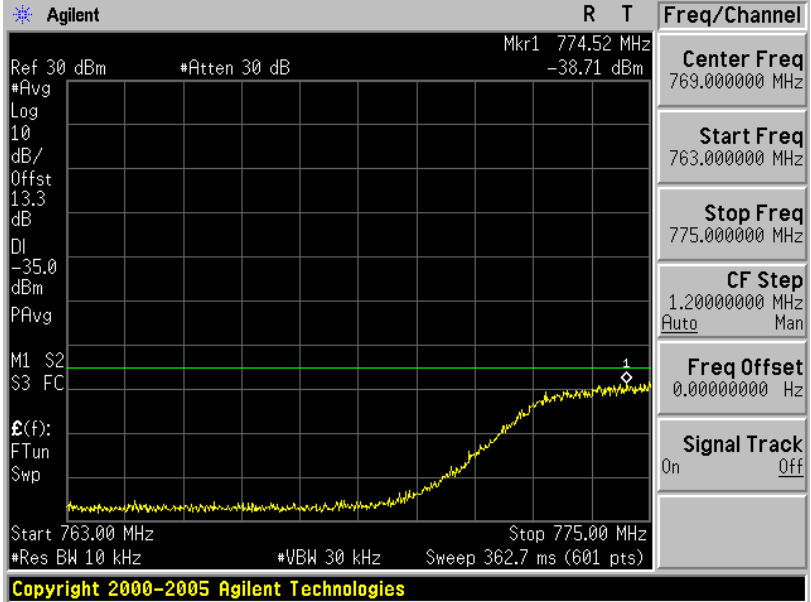
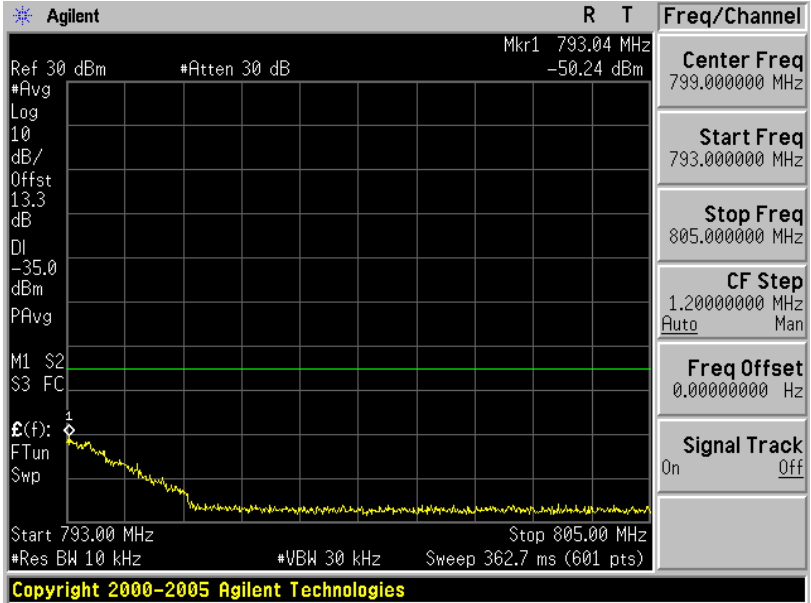
Frequency	LTE Band 4	Channel Bandwidth	15 MHz	RB Allocated	75
Lower Band Edge	 Agilent R L Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 1.709 387 GHz -18.48 dBm #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PAVg M1 S2 S3 FS E(f): FTun Swp Center 1.710 000 GHz Span 2 MHz #Res BW 300 kHz #VBW 910 kHz #Sweep 100 ms (601 pts) File name error Center Freq 1.71000000 GHz Start Freq 1.70900000 GHz Stop Freq 1.71100000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				
Higher Band Edge	 Agilent R L Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 1.755 057 GHz -18.07 dBm #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PAVg M1 S2 S3 FS E(f): FTun Swp Center 1.755 000 GHz Span 2 MHz #Res BW 300 kHz #VBW 910 kHz #Sweep 100 ms (601 pts) File name error Center Freq 1.75500000 GHz Start Freq 1.75400000 GHz Stop Freq 1.75600000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				

Frequency	LTE Band 4	Channel Bandwidth	20 MHz	RB Allocated	100
Lower Band Edge	 Agilent R L Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 1.709 633 GHz -18.65 dBm #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PAvg M1 S2 S3 FS E(f): FTun Swp Center 1.710 000 GHz Span 2 MHz #Res BW 390 kHz #VBW 1.2 MHz #Sweep 100 ms (601 pts) File name error Center Freq 1.71000000 GHz Start Freq 1.70900000 GHz Stop Freq 1.71100000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				
Higher Band Edge	 Agilent R L Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 1.755 013 GHz -17.36 dBm #Avg Log 10 dB/ Offst 14 dB DI -13.0 dBm PAvg M1 S2 S3 FS E(f): FTun Swp Center 1.755 000 GHz Span 2 MHz #Res BW 390 kHz #VBW 1.2 MHz #Sweep 100 ms (601 pts) File name error Center Freq 1.75500000 GHz Start Freq 1.75400000 GHz Stop Freq 1.75600000 GHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				

Frequency	LTE Band 13	Channel Bandwidth	5 MHz	RB Allocated	25
Res BW	100kHz				
Lower Band Edge	 Agilent R T Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 777.000 MHz -20.56 dBm #Avg Log 10 dB/ Offst 13.3 dB DI -13.0 dBm PAvg M1 S2 S3 FS Ⓔ(f): f>50k Swp Center 777.000 MHz Span 2 MHz #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) File name error Center Freq 777.000000 MHz Start Freq 776.000000 MHz Stop Freq 778.000000 MHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				
Higher Band Edge	 Agilent R L Freq/Channel Ref 30 dBm #Atten 30 dB Mkr1 787.000 MHz -21.92 dBm #Avg Log 10 dB/ Offst 13.3 dB DI -13.0 dBm PAvg M1 S2 S3 FS Ⓔ(f): f>50k Swp Center 787.000 MHz Span 2 MHz #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) File name error Center Freq 787.000000 MHz Start Freq 786.000000 MHz Stop Freq 788.000000 MHz CF Step 200.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off				

Frequency	LTE Band 13	Channel Bandwidth	10 MHz	RB Allocated	50
Res BW	100kHz				
Lower Band Edge					
Higher Band Edge					

Frequency	LTE Band 13	Channel Bandwidth	5 MHz	RB Allocated	25
Res BW	10kHz				
Lower Band Edge					
Higher Band Edge					

Frequency	LTE Band 13	Channel Bandwidth	10 MHz	RB Allocated	50
Res BW	10kHz				
Lower Band Edge					
Higher Band Edge					

8 Conducted Spurious Emission Test

8.1. Limit

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

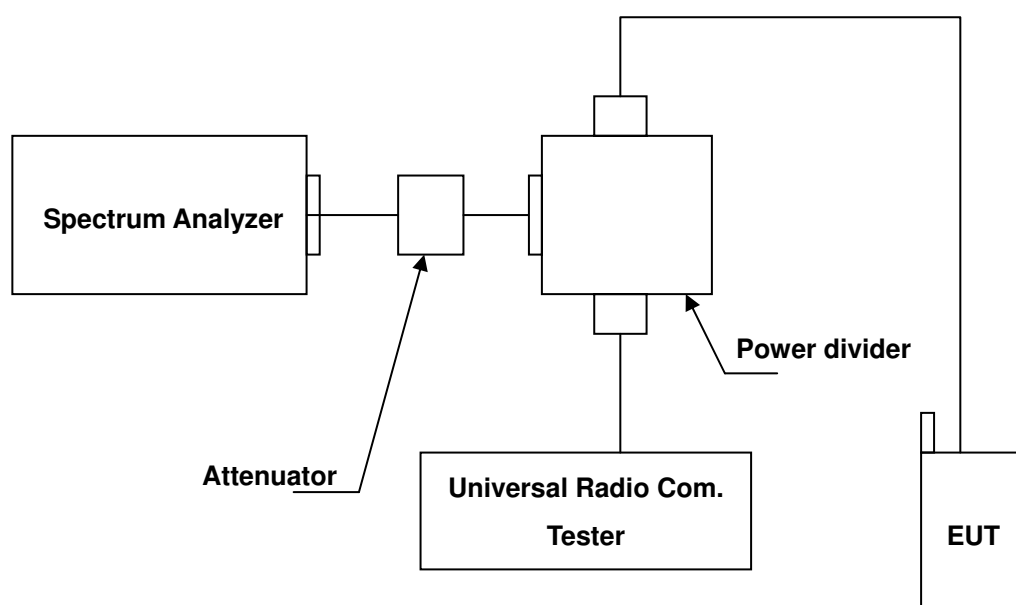
8.2. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Spectrum Analyzer	Agilent	N9030A	MY53120541	12/14/2015	1 year
Wideband Radio Communication Test	R & S	CMW500	103168	10/30/2015	1 year
Test Site	ATL	TE02	TE02	N.C.R.	-----

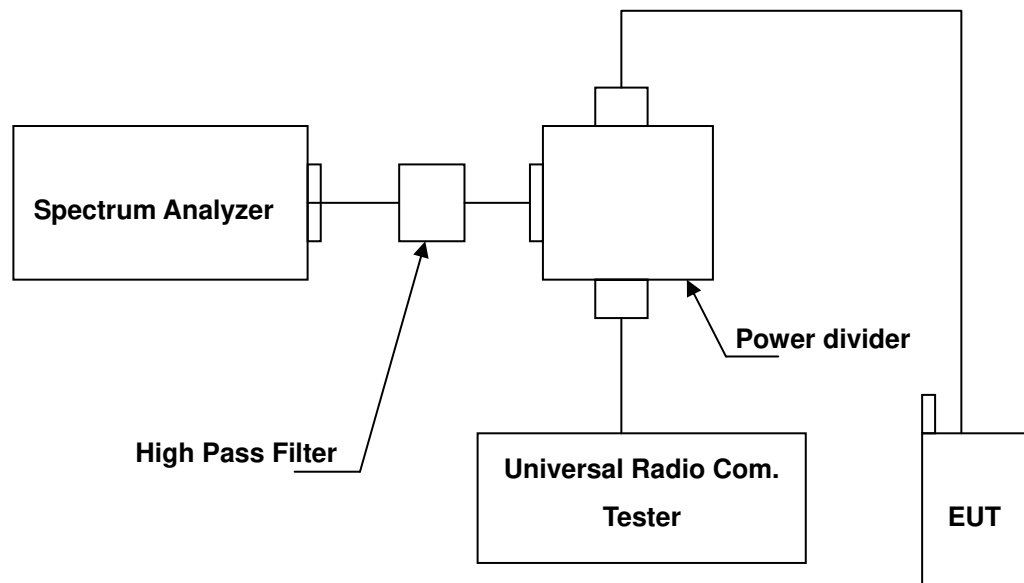
Note: N.C.R. = No Calibration Request.

8.3. Setup

Below 2.8GHz



Above 2.8GHz



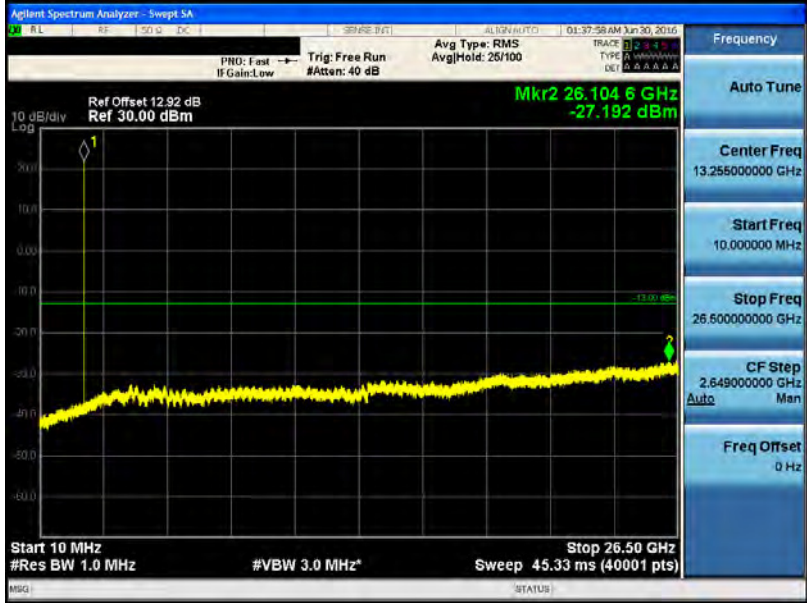
8.4. Test Procedure

- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range.).
- The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- When the spectrum scanned from 10MHz to 2.5GHz (Band 7 and Band 41: scanned from 10MHz to 4GHz), it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=1MHz.
- When the spectrum scanned from 2.5GHz to 10th harmonic (Band 7 and Band 41: scanned from 4GHz to 10th harmonic), it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=1MHz.

8.5. Uncertainty

The measurement uncertainty is evaluated as ± 2.24 dB.

8.6. Test Graphs

LTE Band 2 (Channel Bandwidth: 5 MHz) _ QPSK	
1852.5 MHz	
1880.0 MHz	



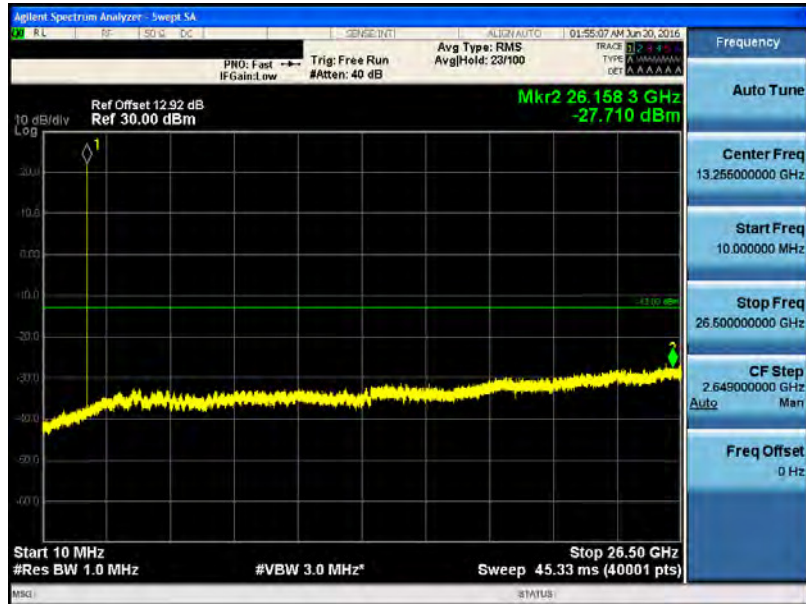
LTE Band 2 (Channel Bandwidth: 5 MHz) _ QPSK

1907.5 MHz



LTE Band 2 (Channel Bandwidth: 10 MHz) _ QPSK

1855.0 MHz



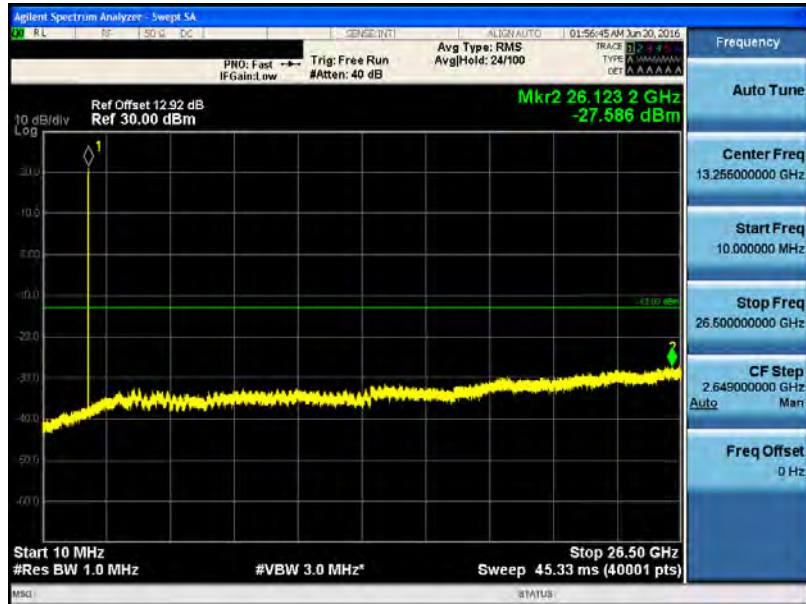
1880.0 MHz





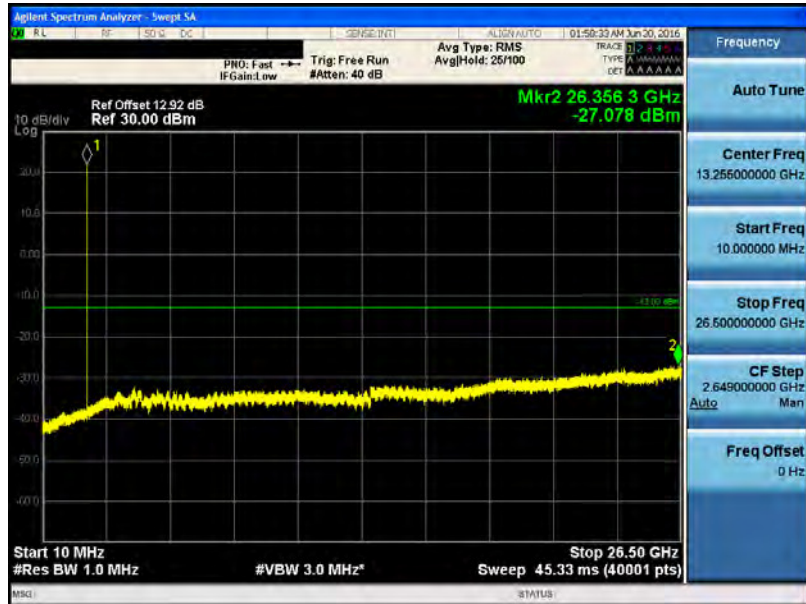
LTE Band 2 (Channel Bandwidth: 10 MHz) _ QPSK

1905.0 MHz



LTE Band 2 (Channel Bandwidth: 15 MHz) _ QPSK

1857.5 MHz



1880.0 MHz





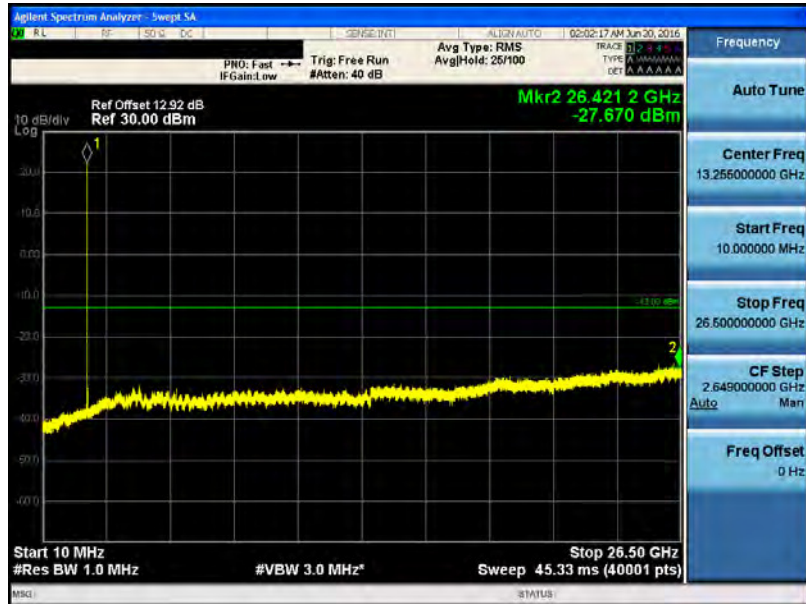
LTE Band 2 (Channel Bandwidth: 15 MHz) _ QPSK

1902.5 MHz



LTE Band 2 (Channel Bandwidth: 20 MHz) _ QPSK

1860.0 MHz



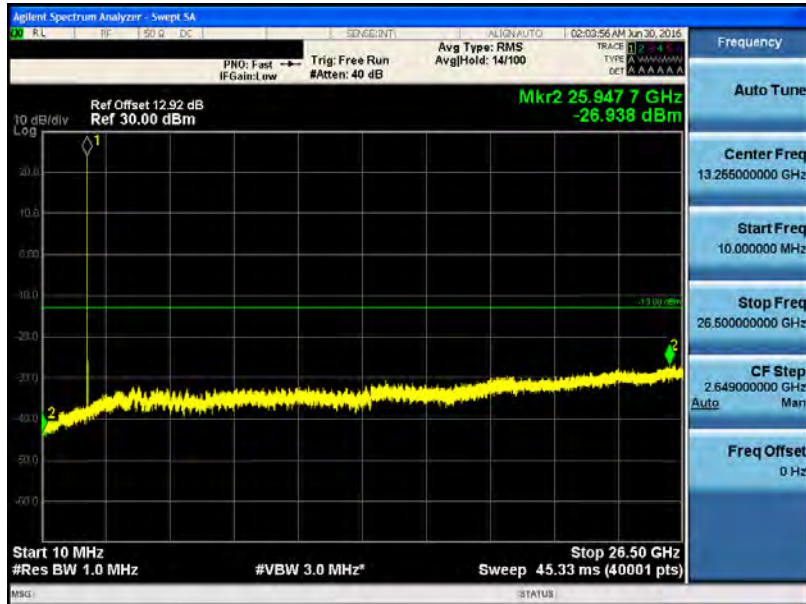
1880.0 MHz





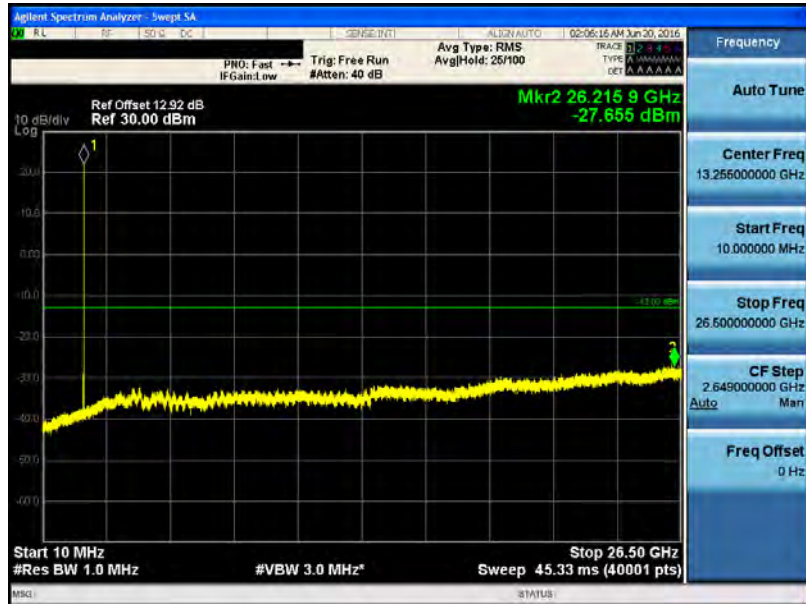
LTE Band 2 (Channel Bandwidth: 20 MHz) _ QPSK

1900.0 MHz

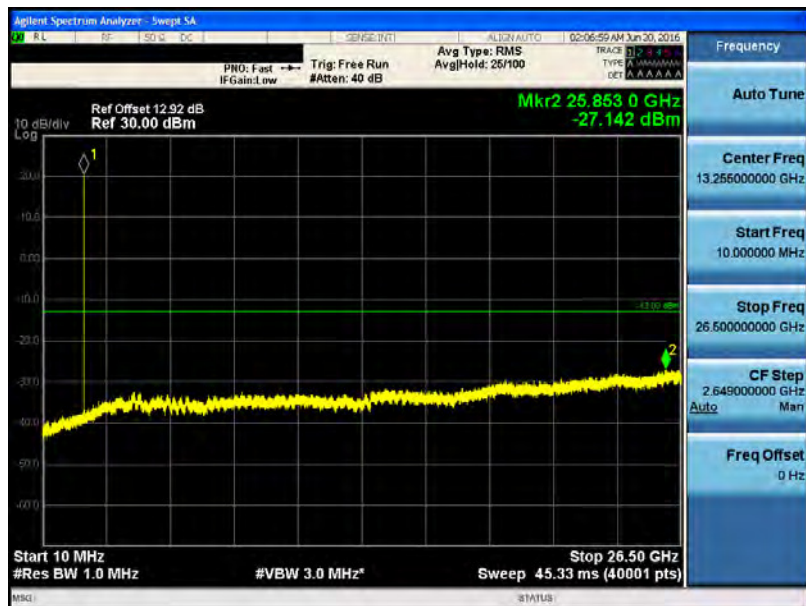


LTE Band 4 (Channel Bandwidth: 5 MHz) _ QPSK

1712.5 MHz



1732.5 MHz





LTE Band 4 (Channel Bandwidth: 5 MHz) _ QPSK

1752.5 MHz

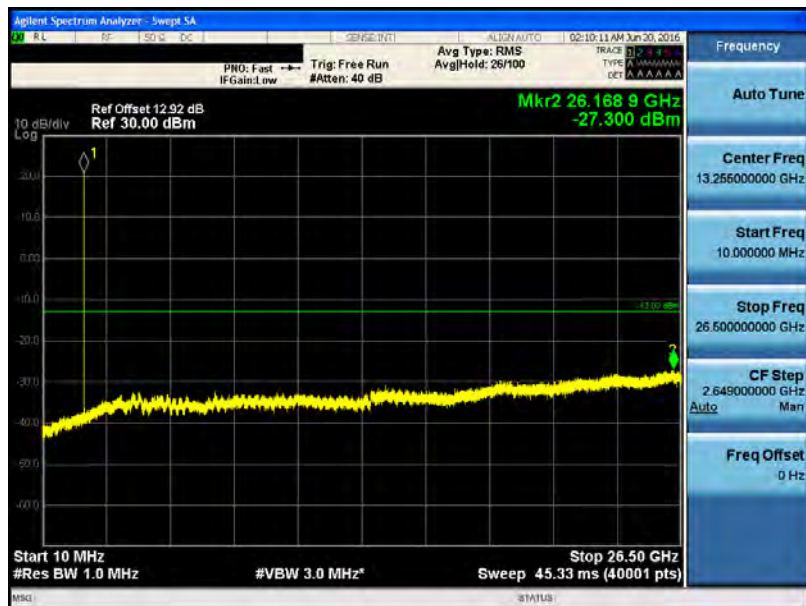


LTE Band 4 (Channel Bandwidth: 10 MHz) _ QPSK

1715.0 MHz



11732.5 MHz





LTE Band 4 (Channel Bandwidth: 10 MHz) _ QPSK

1750.0 MHz



LTE Band 4 (Channel Bandwidth: 15 MHz) _ QPSK

1717.5 MHz



1732.5 MHz



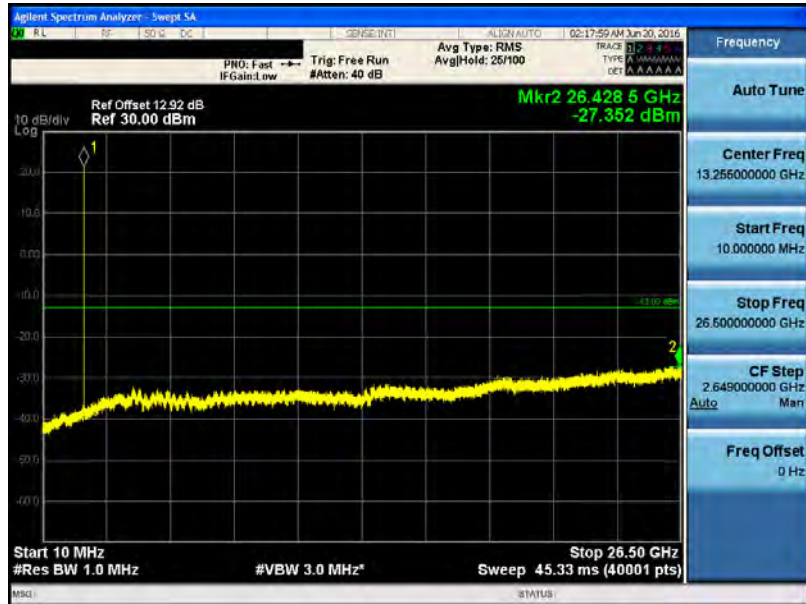


1747.5 MHz



LTE Band 4 (Channel Bandwidth: 20 MHz) _ QPSK

1720.0 MHz



1732.5 MHz





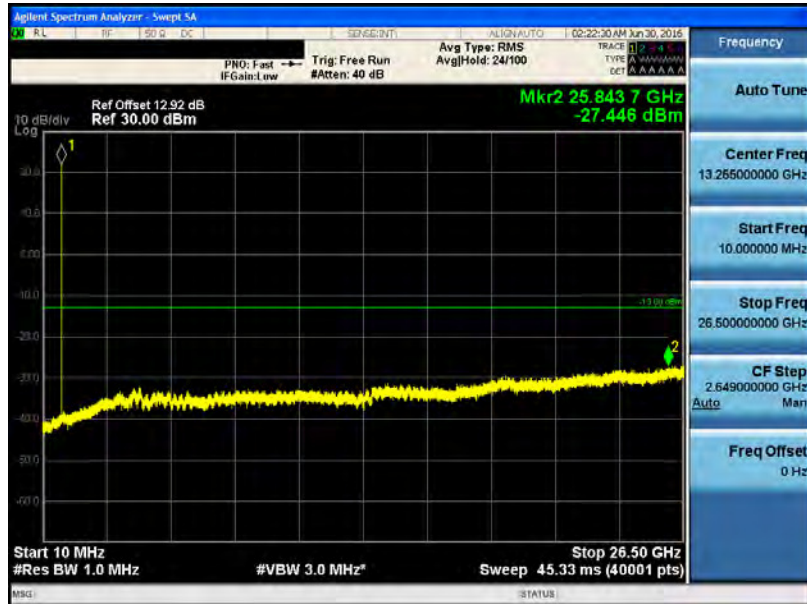
LTE Band 4 (Channel Bandwidth: 20 MHz) _ QPSK

1745.0 MHz

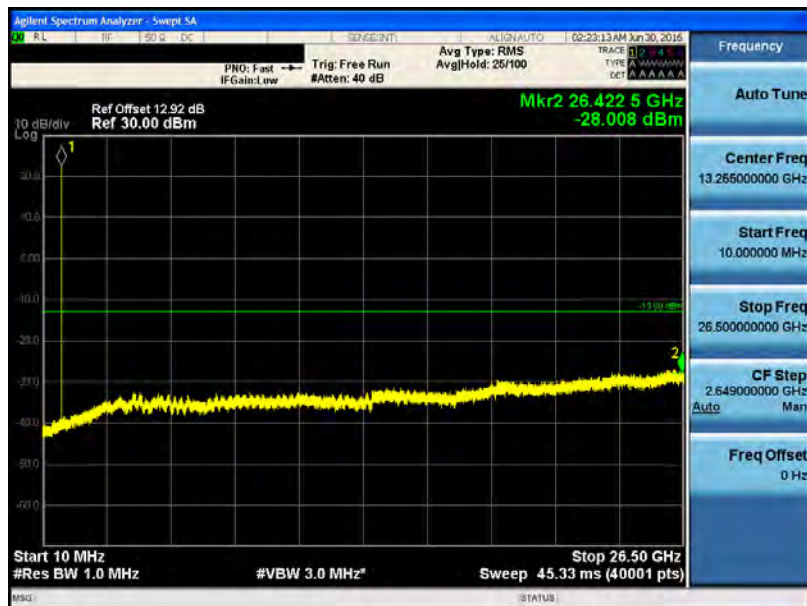


LTE Band 13 (Channel Bandwidth: 5 MHz) _ QPSK

779.5 MHz



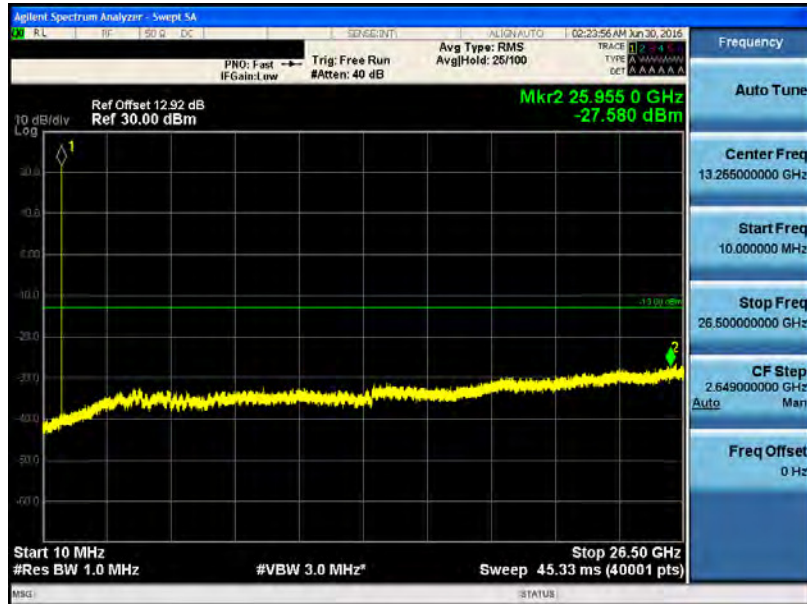
782.0 MHz





LTE Band 13 (Channel Bandwidth: 5 MHz) _ QPSK

784.5 MHz



LTE Band 13 (Channel Bandwidth: 10 MHz) _ QPSK

782.0 MHz





9 Radiated Emission Test

9.1. Limit

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.

Additional, for operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz (-40dBm/MHz) equivalent isotropically radiated power (EIRP) for wideband signals.

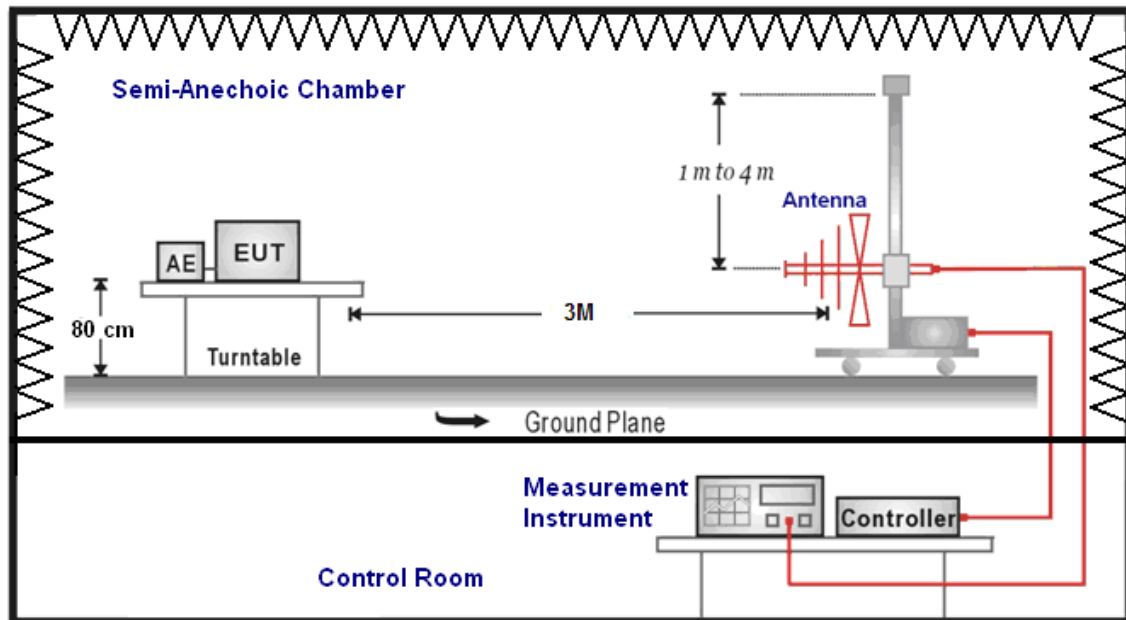
9.2. Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/08/2016	1 year
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/08/2016	1 year
Pre Amplifier	Agilent	8449B	3008A02237	10/07/2015	1 year
Pre Amplifier	Agilent	8447D	2944A11119	01/11/2016	1 year
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	416	09/25/2015	1 year
Sleeve Dipole(CF880) (780-980MHz)	ETS	3126-880	00064344	10/06/2014	2 years
Sleeve Dipole(CF1845) (1695-1995MHz)	ETS	3126-1845	00083335	10/06/2014	2 years
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/06/2016	1 year
Horn Antenna (18~40GHz)	ETS	3116	00086467	09/01/2015	1 year
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	1 year
Microwave Cable	EMCI	EMC102-KM-KM-1 4000	151001	10/15/2015	1 year
Microwave Cable	EMCI	EMC-104-SM-SM-1 4000	140202	10/15/2015	1 year
Microwave Cable	EMCI	EMC104-SM-SM-6 00	140301	10/15/2015	1 year
Test Site	ATL	TE01	888001	08/27/2015	1 year

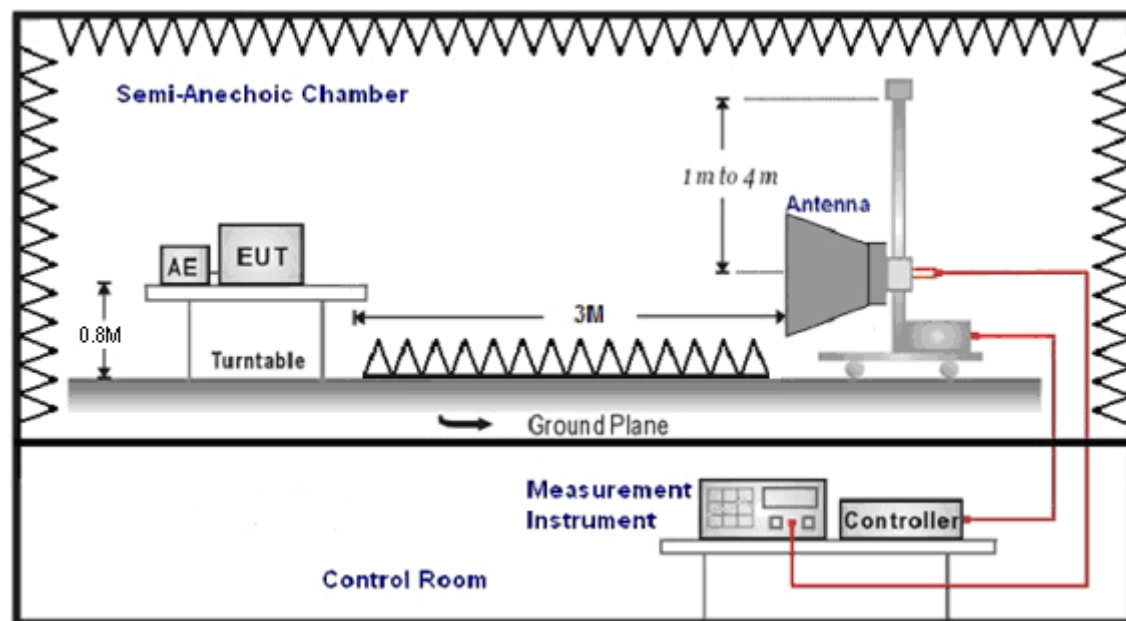
Note: N.C.R. = No Calibration Request.

9.3. Setup

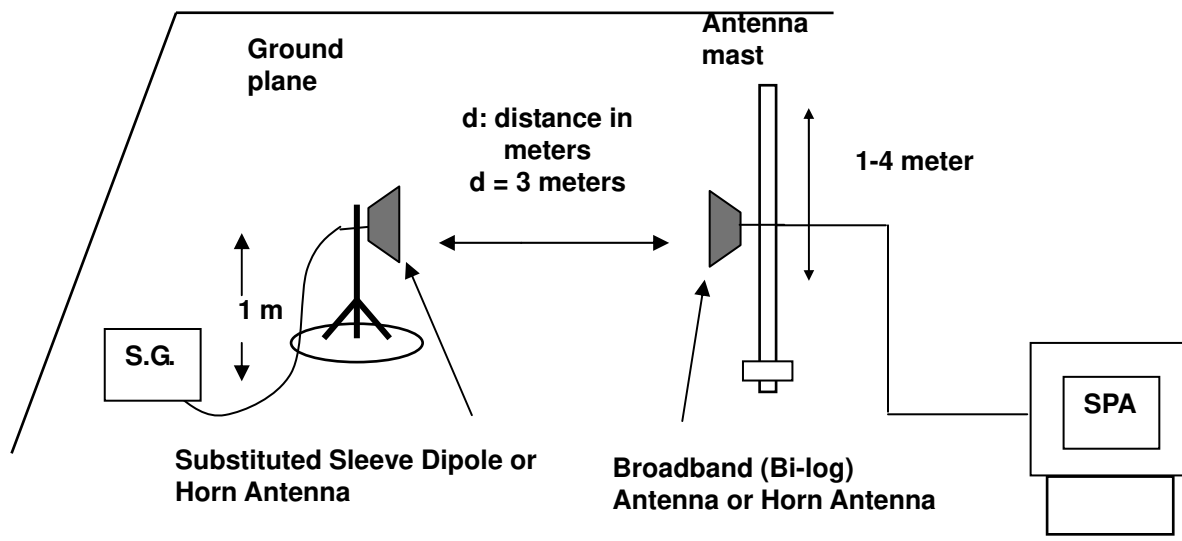
Below 1GHz



Above 1GHz



For Substituted Method Test Set-UP



9.4. Test Procedure

- The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RWB and VBW is 1MHz.
- Radiation Emission 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.
- The substitution antenna (Note:1 & 2) 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.
- $E.I.R.P. = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- $E.R.P. = E.I.R.P. - 2.15 \text{ dB}$

Note: 1. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

2. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenn

9.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is $\pm 3.072 \text{ dB}$.

9.6. Test Result

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1852.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	3856.000	-57.04	1.65	-55.39	-13.00	-42.39	peak	H
1	3232.000	-54.98	-0.11	-55.09	-13.00	-42.09	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4060.000	-58.67	2.00	-56.67	-13.00	-43.67	peak	H
1	3424.000	-55.60	0.74	-54.86	-13.00	-41.86	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1907.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4060.000	-56.03	2.00	-54.03	-13.00	-41.03	peak	H
1	6688.000	-60.91	8.89	-52.02	-13.00	-39.02	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1855.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4036.000	-56.90	1.95	-54.95	-13.00	-41.95	peak	H
1	4852.000	-59.38	4.05	-55.33	-13.00	-42.33	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4048.000	-58.09	1.99	-56.10	-13.00	-43.10	peak	H
1	5296.000	-59.17	4.79	-54.38	-13.00	-41.38	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1905.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	7420.000	-61.02	11.59	-49.43	-13.00	-36.43	peak	H
1	6676.000	-59.03	8.86	-50.17	-13.00	-37.17	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1857.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6556.000	-58.11	8.49	-49.62	-13.00	-36.62	peak	H
1	5152.000	-60.43	4.66	-55.77	-13.00	-42.77	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4228.000	-57.54	2.36	-55.18	-13.00	-42.18	peak	H
1	6256.000	-59.71	7.33	-52.38	-13.00	-39.38	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1902.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6484.000	-58.56	8.25	-50.31	-13.00	-37.31	peak	H
1	5236.000	-60.17	4.73	-55.44	-13.00	-42.44	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1860.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5284.000	-59.44	4.78	-54.66	-13.00	-41.66	peak	H
1	4960.000	-59.03	4.40	-54.63	-13.00	-41.63	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5296.000	-59.76	4.79	-54.97	-13.00	-41.97	peak	H
1	5068.000	-60.07	4.58	-55.49	-13.00	-42.49	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1900.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6352.000	-59.46	7.72	-51.74	-13.00	-38.74	peak	H
1	5488.000	-59.72	4.96	-54.76	-13.00	-41.76	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6340.000	-60.00	7.67	-52.33	-13.00	-39.33	peak	H
1	3856.000	-59.75	1.65	-58.10	-13.00	-45.10	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6832.000	-59.17	9.32	-49.85	-13.00	-36.85	peak	H
1	6796.000	-60.96	9.22	-51.74	-13.00	-38.74	peak	V



Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6448.000	-59.18	8.12	-51.06	-13.00	-38.06	peak	H
1	5308.000	-60.39	4.80	-55.59	-13.00	-42.59	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 2	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1880.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5068.000	-58.52	4.58	-53.94	-13.00	-40.94	peak	H
1	5884.000	-60.24	5.99	-54.25	-13.00	-41.25	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1712.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5524.000	-59.93	5.05	-54.88	-13.00	-41.88	peak	H
1	6208.000	-60.80	7.14	-53.66	-13.00	-40.66	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4924.000	-58.90	4.27	-54.63	-13.00	-41.63	peak	H
1	6292.000	-58.63	7.48	-51.15	-13.00	-38.15	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1752.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4828.000	-60.23	3.98	-56.25	-13.00	-43.25	peak	H
1	6208.000	-59.02	7.14	-51.88	-13.00	-38.88	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1715.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6556.000	-59.17	8.49	-50.68	-13.00	-37.68	peak	H
1	6820.000	-59.81	9.29	-50.52	-13.00	-37.52	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6484.000	-58.44	8.25	-50.19	-13.00	-37.19	peak	H
1	6172.000	-60.17	7.00	-53.17	-13.00	-40.17	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1750.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6532.000	-58.66	8.42	-50.24	-13.00	-37.24	peak	H
1	7504.000	-58.39	11.94	-46.45	-13.00	-33.45	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1717.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6292.000	-57.41	7.48	-49.93	-13.00	-36.93	peak	H
1	5152.000	-59.32	4.66	-54.66	-13.00	-41.66	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6628.000	-59.02	8.71	-50.31	-13.00	-37.31	peak	H
1	4912.000	-58.08	4.24	-53.84	-13.00	-40.84	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1747.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6004.000	-59.41	6.32	-53.09	-13.00	-40.09	peak	H
1	7360.000	-61.28	11.35	-49.93	-13.00	-36.93	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1720.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	7372.000	-61.19	11.41	-49.78	-13.00	-36.78	peak	H
1	6148.000	-59.23	6.90	-52.33	-13.00	-39.33	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6628.000	-59.96	8.71	-51.25	-13.00	-38.25	peak	H
1	5476.000	-59.93	4.95	-54.98	-13.00	-41.98	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	1745.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5968.000	-59.51	6.21	-53.30	-13.00	-40.30	peak	H
1	5380.000	-59.40	4.87	-54.53	-13.00	-41.53	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5296.000	-57.84	4.79	-53.05	-13.00	-40.05	peak	H
1	6220.000	-58.36	7.19	-51.17	-13.00	-38.17	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6028.000	-60.72	6.41	-54.31	-13.00	-41.31	peak	H
1	4972.000	-58.41	4.44	-53.97	-13.00	-40.97	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	15 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4960.000	-58.92	4.40	-54.52	-13.00	-41.52	peak	H
1	6676.000	-59.78	8.86	-50.92	-13.00	-37.92	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 4	Date:	06/29/2016
Channel Bandwidth:	20 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	1732.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5236.000	-58.84	4.73	-54.11	-13.00	-41.11	peak	H
1	6352.000	-57.14	7.72	-49.42	-13.00	-36.42	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	779.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6316.000	-57.70	7.58	-50.12	-13.00	-37.12	peak	H
1	5068.000	-58.78	4.58	-54.20	-13.00	-41.20	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5476.000	-58.92	4.95	-53.97	-13.00	-40.97	peak	H
1	5308.000	-59.83	4.80	-55.03	-13.00	-42.03	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	784.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	4804.000	-59.42	3.90	-55.52	-13.00	-42.52	peak	H
1	6736.000	-59.78	9.03	-50.75	-13.00	-37.75	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5044.000	-57.58	4.56	-53.02	-13.00	-40.02	peak	H
1	5572.000	-58.64	5.17	-53.47	-13.00	-40.47	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	6064.000	-58.89	6.57	-52.32	-13.00	-39.32	peak	H
1	7684.000	-59.60	12.44	-47.16	-13.00	-34.16	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	5164.000	-60.59	4.67	-55.92	-13.00	-42.92	peak	H
1	4852.000	-58.78	4.05	-54.73	-13.00	-41.73	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	779.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1575.779	-56.50	-5.68	-62.18	-40.00	-22.18	peak	H
1	1584.806	-55.72	-5.66	-61.38	-40.00	-21.38	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1588.070	-56.30	-5.64	-61.94	-40.00	-21.94	peak	H
1	1577.258	-55.99	-5.68	-61.67	-40.00	-21.67	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	784.5 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1580.522	-55.56	-5.67	-61.23	-40.00	-21.23	peak	H
1	1583.327	-54.78	-5.66	-60.44	-40.00	-20.44	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	QPSK		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1587.509	-55.61	-5.64	-61.25	-40.00	-21.25	peak	H
1	1591.895	-56.62	-5.63	-62.25	-40.00	-22.25	peak	V



Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	5 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1576.493	-54.17	-5.68	-59.85	-40.00	-19.85	peak	H
1	1583.123	-54.29	-5.66	-59.95	-40.00	-19.95	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	DWM-311	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Band:	LTE Band 13	Date:	06/29/2016
Channel Bandwidth:	10 MHz	Test By:	Eric Ou Yang
Modulation Technology:	16QAM		
Frequency:	782.0 MHz		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
1	1584.602	-56.17	-5.66	-61.83	-40.00	-21.83	peak	H
1	1592.201	-52.85	-5.64	-58.49	-40.00	-18.49	peak	V