FCC Test Report

FCC ID	:	**N7NHL7519**
Equipment	:	**Wireless Module**
Model No.	:	**HL7519**
Brand Name	:	**AirPrime**
Applicant	:	**Sierra Wireless Inc.**
Address	:	**13811 Wireless Way Richmond, BC, V6V 3A4 Canada**
Standard	:	**47 CFR FCC Part 27**
Received Date	:	**Aug. 18, 2015**
Tested Date	:	**Aug. 23 ~ Sep. 02, 2015**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

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Release Record

Report No.	Version	Description	Issued Date
FG581801P27	Rev. 01	Initial issue	Sep. 16, 2015

Summary of Test Results

FCC Rules	Test Items	Measured	Result
2.1046 27.50(b)(10) 27.50(c)(10)	Effective Radiated Power	Power[dBm]: 22.23	Pass
2.1053 27.53(c) 27.53(g)	Radiated Emissions	Meet the requirement of limit	Pass
2.1053 / 27.53(f)	Radiated Spurious Emission in the 1559-1610MHz band	Meet the requirement of limit	Pass
2.1051 27.53(c) 27.53(g)	Conducted Emissions	Meet the requirement of limit	Pass
2.1051 27.53(c) 27.53(g)	Band Edge	Meet the requirement of limit	Pass
2.1049	Occupied Bandwidth	Meet the requirement of limit	Pass
2.1055 / 27.54	Frequency Stability	Meet the requirement of limit	Pass
27.50(d)(5)	Peak to Average Ratio	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency (MHz)	Channel Bandwidth: 5MHz: 779.5 ~ 784.5 Channel Bandwidth: 10MHz: 782
Modulation Type	QPSK, 16QAM (Uplink)
Release Version	9
Duplex Mode	FDD
UE category	4
H/W Version	1
S/W Version	V.3.2

1.1.2 Maximum ERP and Emission Designator

Mode	Modulation	Maximum ERP (W)	Emission Designator
LTE Band 13, CB: 5MHz	QPSK	0.167	4M50G7D
LTE Band 13, CB: 5MHz	16QAM	0.157	4M52W7D
LTE Band 13, CB: 10MHz	QPSK	0.161	9M06G7D
LTE Band 13, CB: 10MHz	16QAM	0.132	9M00W7D

1.1.3 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	Dipole	2	R-SMA	---

Note: The antenna is for testing use only.

1.1.4 EUT Operational Condition

Supply Voltage	3.7 Vdc from host		
Operational Voltage	☒ Vnom (3.7 V)	☒ Vmax (4.5 V)	☒ Vmin (3.2 V)
Operational Climatic	☒ Tnom (20°C)	☒ Tmax (55°C)	☒ Tmin (-20°C)

1.1.5 Operating Channel List

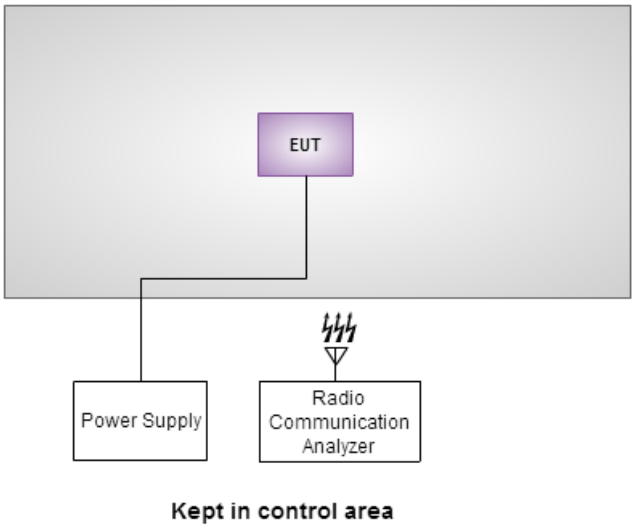
LTE Band 13		
Channel Bandwidth (MHz)	**Channel**	**Frequency (MHz)**
5	23205	779.5
5	23230	782.0
5	23255	784.5
10	23230	782.0

1.2 Local Support Equipment List

Support Equipment List						
No.	**Equipment**	**Brand**	**Model**	**S/N**	**FCC ID**	**Signal cable / Length (m)**
1	Power Supply	GWINSTEK	GPC-60300	EM884797	---	---

1.3 Test Setup Chart

Test Setup Diagram



1.4 The Equipment List

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Dec. 03, 2014	Dec. 02, 2015
Power Meter	Anritsu	ML2495A	1241002	Sep. 29, 2014	Sep. 28, 2015
Power Sensor	Anritsu	MA2411B	1207366	Sep. 29, 2014	Sep. 28, 2015
Radio Communication Analyzer	Anritsu	MT8820C	6201240341	Mar. 19, 2015	Mar. 17, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 16, 2014	Sep. 15, 2015
Receiver	Agilent	N9038A	MY53290044	Oct. 21, 2014	Oct. 20, 2015
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-562	Jan. 19, 2015	Jan. 18, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 03, 2015	Feb. 02, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 10, 2014	Nov. 09, 2015
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 10, 2014	Nov. 09, 2015
Preamplifier	EMC	EMC02325	980187	Sep. 26, 2014	Sep. 25, 2015
Preamplifier	Agilent	83017A	MY53270014	Sep. 17, 2014	Sep. 16, 2015
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 09, 2015	Feb. 08, 2016
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22601/4	Feb. 09, 2015	Feb. 08, 2016
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 09, 2015	Feb. 08, 2016
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 09, 2015	Feb. 08, 2016
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 09, 2015	Feb. 08, 2016
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 09, 2015	Feb. 08, 2016
Radio Communication Analyzer	Anritsu	MT8820C	6201240341	Mar. 19, 2015	Mar. 17, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards.

47 CFR FCC Part 27
47 CFR FCC Part 2
ANSI C63.4-2003
ANSI / TIA / EIA-603-D -2010
FCC KDB 971168 D01 Power Meas License Digital Systems v02r02
FCC KDB 971168 D02 Misc OOBE License Digital Systems v01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Frequency error	±34.134 Hz
Temperature	±0.6 ^{o}C
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.99 dB
Radiated emission > 1GHz	±5.52 dB

2 Test Configuration

2.1 Testing Condition and Location Information

Test Item	Test Site	Ambient Condition	Tested By
RF conducted	TH01-WS	23°C / 64%	Felix Sung
Radiated Emissions	03CH03-WS	23°C / 66%	Anderson Hung

- FCC site registration No.: 390588
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

LTE Band 13

Test item	Channel Bandwidth	Modulation	Test channel
E.R.P Conducted Emissions Occupied Bandwidth Peak to Average Ratio	5 MHz 10 MHz	QPSK / 16QAM QPSK / 16QAM	23205, 23230, 23255 23230
Radiated Emission ≤ 1GHz	5 MHz 10 MHz	QPSK QPSK	23230 23230
Radiated Emission > 1GHz	5 MHz 10 MHz	QPSK QPSK	23205, 23230, 23255 23230
Band Edge	5 MHz 10 MHz	QPSK / 16QAM QPSK / 16QAM	23205, 23255 23230
Frequency Stability	5 MHz 10 MHz	QPSK QPSK	23230 23230

Note:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.

3 Test Results

3.1 Effective Radiated Power

3.1.1 Limit of Effective Radiated Power

Portable stations (hand-held devices) are limited to 3 watts ERP.

3.1.2 Test Procedures

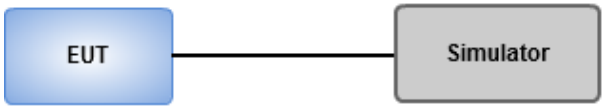
For Conducted power measurement:

1. The EUT links up with simulator and is set to maximum output power level at low / middel / high channel.
2. Measure the output power of low / middle / high channel of the EUT.

For ERP measurement:
EPR can be calculated by below formula from KDB 412172 D01.

1. EIRP = $P_T + G_T - L_C$
   P_T = transmitter output power, in dBm.
   G_T = gain of the transmitting antenna, in dBi (EIRP).
   L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.
2. ERP = EIRP – 2.15 dB.

3.1.3 Test Setup



3.1.4 Test Result of Conducted power (dBm)

Band / Channel Bandwidth			LTE Band 13 / CB: 5MHz		
Channel			23205	23230	23255
Frequency (MHz)			779.5	782.0	784.5
Mode	RB	RB Offset	Maximum AV Power (dBm)		
QPSK	1	0	22.32	**22.38**	22.33
	1	12	22.20	22.35	22.32
	1	24	22.24	22.32	22.18
	12	0	21.48	21.47	21.47
	12	6	21.42	21.48	21.46
	12	11	21.41	21.46	21.42
	25	0	21.39	21.47	21.44
16QAM	1	0	22.11	21.91	21.60
	1	12	21.73	21.52	21.72
	1	24	21.94	21.82	21.56
	12	0	20.60	20.54	20.60
	12	6	20.55	20.48	20.51
	12	11	20.52	20.68	20.45
	25	0	20.54	20.66	20.50

Band / Channel Bandwidth			LTE Band 13 / CB: 10MHz
Channel			23230
Frequency (MHz)			782.0
Mode	RB	RB Offset	Maximum AV Power (dBm)
QPSK	1	0	**22.21**
	1	24	22.19
	1	49	21.76
	25	0	21.45
	25	12	21.40
	25	24	21.28
	50	0	21.44
16QAM	1	0	21.36
	1	24	21.27
	1	49	21.30
	25	0	20.58
	25	12	20.43
	25	24	20.47
	50	0	20.49

3.1.5 Test Result of Effective Radiated Power (dBm)

Mode	LTE Band 13, CB: 5MHz, QPSK						
Channel	**Frequency (MHz)**	**Max. Conducted Output Power (dBm)**	**Max. Antenna Gain(dBi)**	**EIRP (dBm)**	**ERP (dBm)**	**ERP (W)**	**Limit (W)**
23205	779.5	22.32	2	24.32	22.17	0.165	3
23230	782.0	22.38	2	24.38	**22.23**	0.167	3
23255	784.5	22.33	2	24.33	22.18	0.165	3

Mode	LTE Band 13, CB: 5MHz, 16QAM						
Channel	**Frequency (MHz)**	**Max. Conducted Output Power (dBm)**	**Max. Antenna Gain(dBi)**	**EIRP (dBm)**	**ERP (dBm)**	**ERP (W)**	**Limit (W)**
23205	779.5	22.11	2	24.11	21.96	0.157	3
23230	782.0	21.91	2	23.91	21.76	0.150	3
23255	784.5	21.72	2	23.72	21.57	0.144	3

Mode	LTE Band 13, CB: 10MHz, QPSK						
Channel	**Frequency (MHz)**	**Max. Conducted Output Power (dBm)**	**Max. Antenna Gain(dBi)**	**EIRP (dBm)**	**ERP (dBm)**	**ERP (W)**	**Limit (W)**
23230	782.0	22.21	2	24.21	**22.06**	0.161	3

Mode	LTE Band 13, CB: 10MHz, 16QAM						
Channel	**Frequency (MHz)**	**Max. Conducted Output Power (dBm)**	**Max. Antenna Gain(dBi)**	**EIRP (dBm)**	**ERP (dBm)**	**ERP (W)**	**Limit (W)**
23230	782.0	21.36	2	23.36	21.21	0.132	3

3.2 Radiated Emissions

3.2.1 Limit of Radiated Emissions

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 equal to -13dBm.

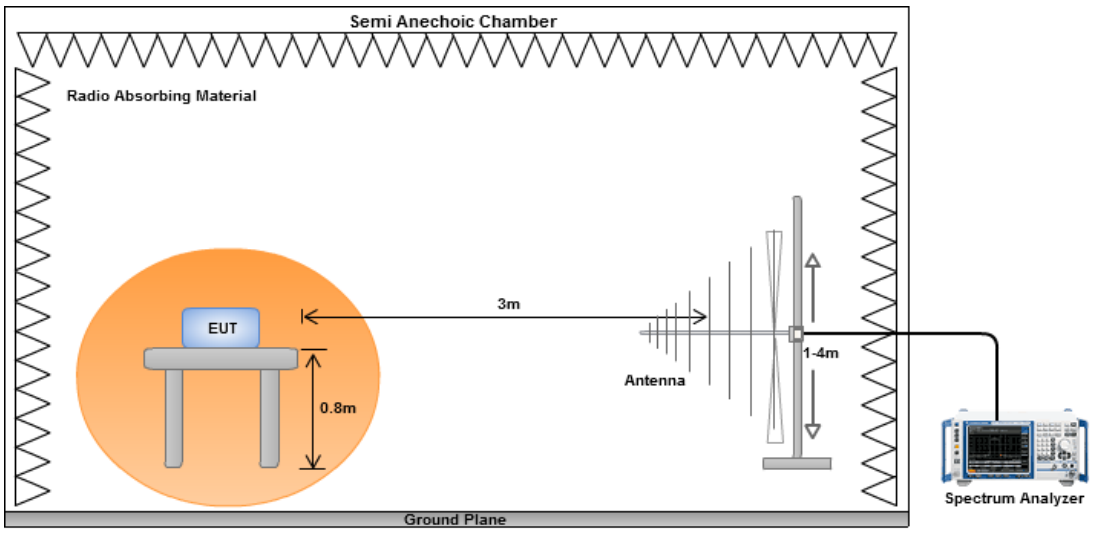
For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

3.2.2 Test Procedures

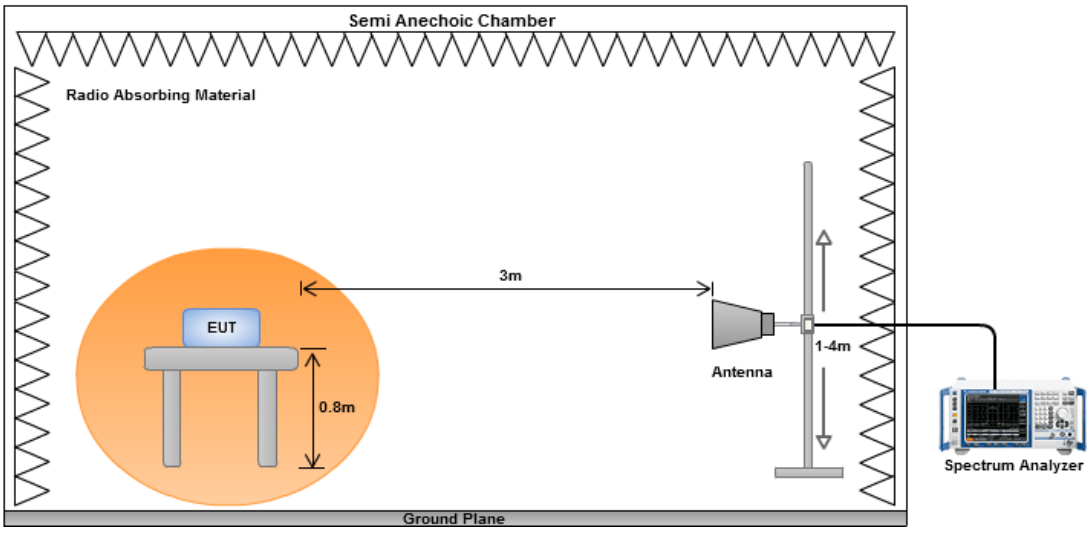
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
4. After finding the max radiated emission, substitution method will be used for getting effective radiated power. EUT will be removed and substitution antenna will be placed at same position. Signal generator will output CW signal to substitution antenna through a RF cable. Rotate turntable and move antenna to find maximum radiated emission. Adjust output power of signal generator to let the maximum radiated emission is same as step 3. Record the output power level.
5. E.I.R.P = output power of step 4 + gain of substitution antenna – cable loss of RF cable. ERP can be calculated by below formula:
   E.R.P = E.I.R.P –2.15dB.

3.2.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.2.4 Test Result of Radiated Emissions below 1GHz

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
36.79	H	-60.06	-13	-47.06	-60.24	-45.16	-12.75
142.52	H	-69.99	-13	-56.99	-61.65	-66.55	-1.29
186.17	H	-70.37	-13	-57.37	-60	-71.04	2.82
287.05	H	-70.6	-13	-57.6	-61.31	-72.69	4.24
418.00	H	-49.45	-13	-36.45	-44.62	-51.52	4.22
614.91	H	-64.29	-13	-51.29	-62.12	-65.97	3.83
30.00	V	-60.33	-13	-47.33	-51.81	-43.8	-14.38
101.78	V	-63.08	-13	-50.08	-55.1	-61.11	0.18
147.37	V	-67.51	-13	-54.51	-62.35	-64.19	-1.17
268.62	V	-67.54	-13	-54.54	-62.21	-69.7	4.31
295.78	V	-62.75	-13	-49.75	-57.18	-64.81	4.21
683.78	V	-66.91	-13	-53.91	-68.47	-68.58	3.82

Mode	LTE Band 13, CB: 10MHz, 1RB, Offset 49, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
37.76	H	-63.49	-13	-50.49	-63.65	-48.73	-12.61
101.78	H	-60.84	-13	-47.84	-51.62	-58.87	0.18
143.49	H	-69.92	-13	-56.92	-61.58	-66.51	-1.26
199.75	H	-63.55	-13	-50.55	-51.96	-65.76	4.36
433.52	H	-66.45	-13	-53.45	-61.9	-68.46	4.16
662.44	H	-70.28	-13	-57.28	-68.84	-72.01	3.88
37.76	V	-63.07	-13	-50.07	-52.64	-48.31	-12.61
66.86	V	-61.52	-13	-48.52	-51.67	-52.91	-6.46
148.34	V	-66.78	-13	-53.78	-61.54	-63.48	-1.15
325.85	V	-64.18	-13	-51.18	-58.87	-66.34	4.31
382.11	V	-62.81	-13	-49.81	-58.04	-65	4.34
434.49	V	-69.21	-13	-56.21	-65.15	-71.21	4.15

NOTE: ERP = S.G power value + correction factor - 2.15.

3.2.5 Test Result of Radiated Emissions above 1GHz

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23205						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
2331.86	H	-61.65	-13	-48.65	-66.18	-65.62	6.12
3109.24	H	-44.71	-13	-31.71	-52.42	-48.68	6.12
3886.62	H	-59.13	-13	-46.13	-68.75	-63.49	6.51
2331.86	V	-60.11	-13	-47.11	-65.83	-64.08	6.12
3109.24	V	-45.66	-13	-32.66	-53.1	-49.63	6.12
3886.62	V	-58.36	-13	-45.36	-67.81	-62.72	6.51

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
2339.53	H	-61.57	-13	-48.57	-66.12	-65.54	6.12
3119.33	H	-39.76	-13	-26.76	-47.46	-43.74	6.13
3899.16	H	-59.32	-13	-46.32	-68.95	-63.67	6.50
2339.53	V	-60.65	-13	-47.65	-66.32	-64.62	6.12
3119.33	V	-39.74	-13	-26.74	-47.2	-43.72	6.13
3899.16	V	-59.24	-13	-46.24	-68.7	-63.59	6.5

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23255						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
2346.94	H	-61.94	-13	-48.94	-66.5	-65.91	6.12
3129.31	H	-41.05	-13	-28.05	-48.74	-45.05	6.15
3911.65	H	-58.61	-13	-45.61	-68.25	-62.95	6.49
2346.94	V	-60.22	-13	-47.22	-65.84	-64.19	6.12
3129.31	V	-41.23	-13	-28.23	-48.72	-45.23	6.15
3911.65	V	-59.63	-13	-46.63	-69.11	-63.97	6.49

NOTE: ERP = S.G power value + correction factor - 2.15.

Mode	LTE Band 13, CB: 10MHz, 1RB, Offset 49, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
2332.85	H	-61.26	-13	-48.26	-65.79	-65.23	6.12
3110.25	H	-39.41	-13	-26.41	-47.12	-43.4	6.14
3887.9	H	-59.02	-13	-46.02	-68.64	-63.37	6.5
2332.85	V	-60.27	-13	-47.27	-65.99	-64.24	6.12
3110.25	V	-40.11	-13	-27.11	-47.55	-44.1	6.14
3887.9	V	-58.78	-13	-45.78	-68.23	-63.13	6.50

NOTE: ERP = S.G power value + correction factor - 2.15.

3.2.6 Test Result of Radiated Emissions in the 1559-1610MHz band

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23205						
Frequency (MHz)	**Antenna Polarity**	**E.I.R.P. (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
1563.2	H	-60.41	-40	-20.41	-64.38	-65.17	4.76
1563.2	V	-53.97	-40	-13.97	-57.22	-58.73	4.76

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.I.R.P. (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
1559.73	H	-60.67	-40	-20.67	-64.05	-65.42	4.75
1559.73	V	-53.41	-40	-13.41	-56.22	-58.16	4.75

Mode	LTE Band 13, CB: 5MHz, 1RB, Offset 24, Channel : 23255						
Frequency (MHz)	**Antenna Polarity**	**E.I.R.P. (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
1573.3	H	-59.86	-40	-19.86	-63.23	-64.62	4.76
1573.3	V	-53.76	-40	-13.76	-56.56	-58.52	4.76

Mode	LTE Band 13, CB: 10MHz, 1RB, Offset 49, Channel : 23230						
Frequency (MHz)	**Antenna Polarity**	**E.I.R.P. (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Vaule (dBm)**	**Correction Factor (dB)**
1564.19	H	-58.99	-40	-18.99	-62.36	-63.75	4.76
1564.19	V	-53	-40	-13	-55.8	-57.76	4.76

Note: EIRP = S.G Power value + Correction factor.

3.3 Conducted Emissions

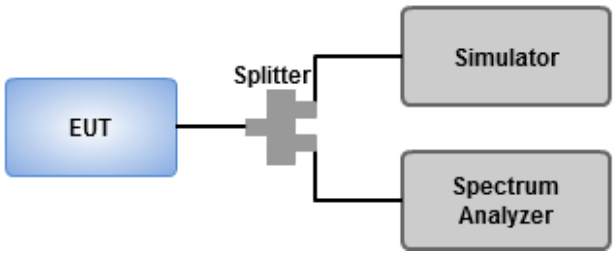
3.3.1 Limit of Conducted Emissions

On any frequency outside the the licensed band, the power of any emission shall be attenuatedoutside the band below the transmitter power (P) by at least 43 + 10 log (P) dB equal to -13dBm.

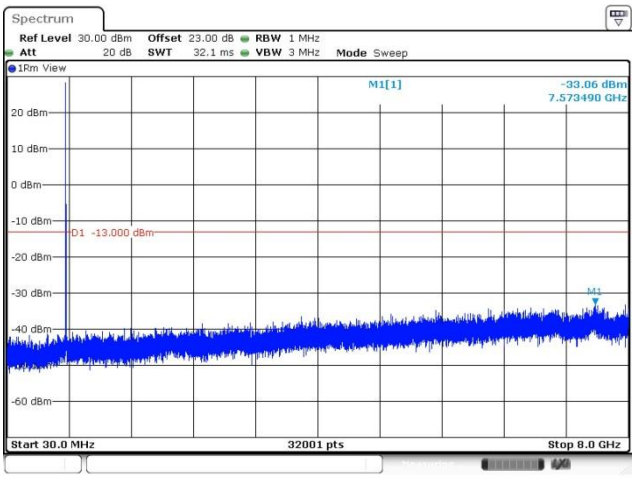
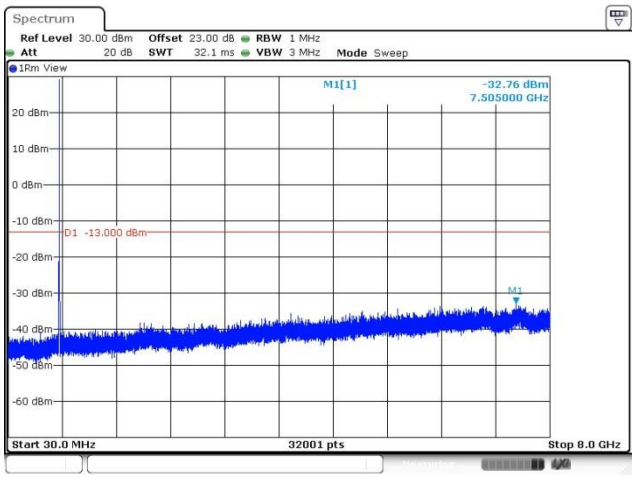
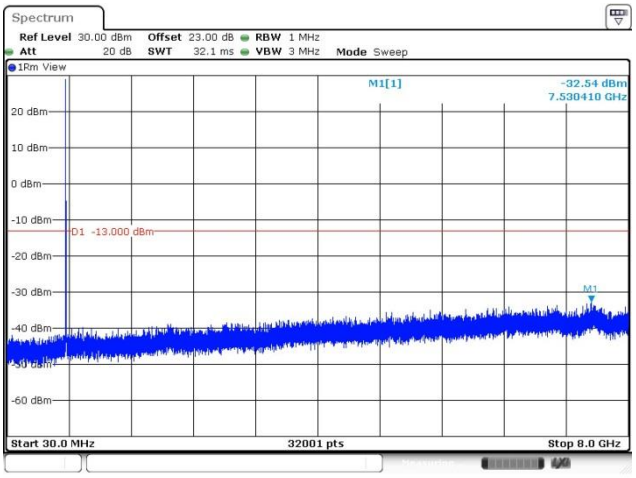
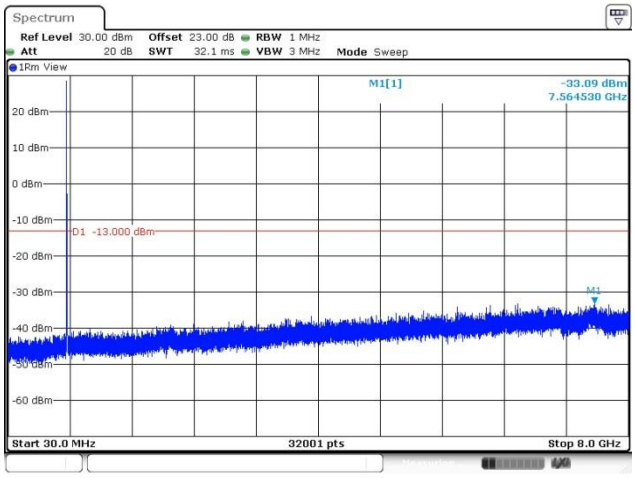
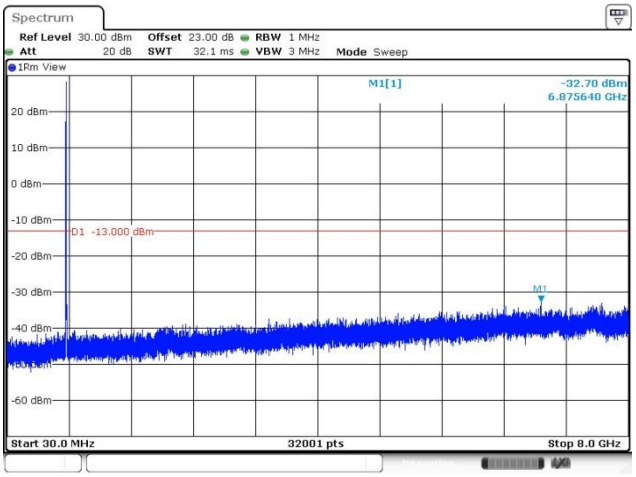
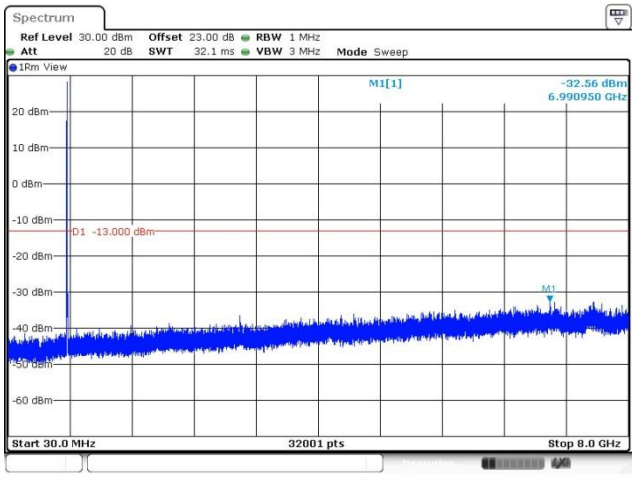
3.3.2 Test Procedures

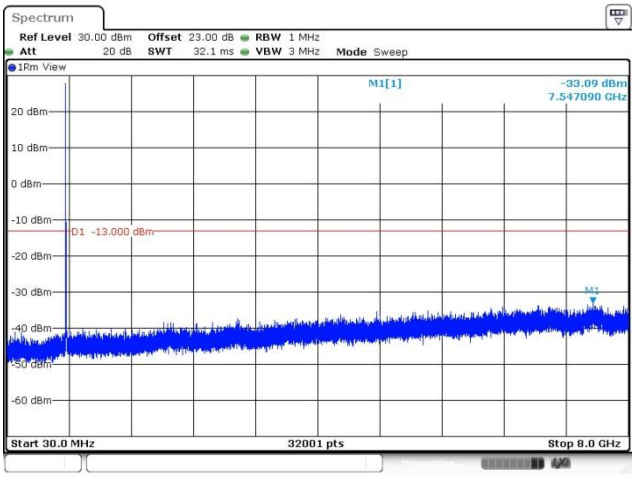
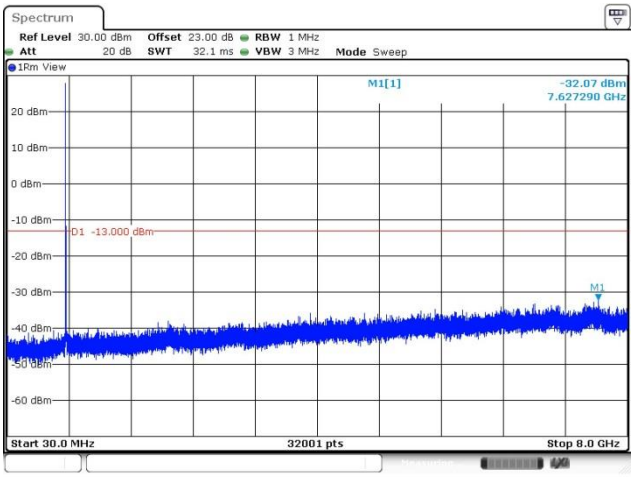
1. Lowestand highest operating channels are tested for this item.
2. Scan frequency range is from 30 MHz ~ 9 GHz.
3. Set RBW = 1MHz, VBW = 3MHz, detector = RMS, sweep time = auto.
4. Record the max trace value and capture the test plot of each sub frequency band.

3.3.3 Test Setup



3.3.4 Test Result of Conducted Emissions

Mode	LTE Band 13, CB: 5MHz, QPSK	Mode	LTE Band 13, CB: 5MHz, 16QAM
Channel	23205	Channel	23205
			
Channel	23230	Channel	23230
			
Channel	23255	Channel	23255
			

Mode	LTE Band 13, CB: 10MHz, QPSK	Mode	LTE Band 13, CB: 10MHz, 16QAM
Channel	23230	Channel	23230
			

3.4 Band Edge

3.4.1 Limit of Band Edge

On any frequency outside the licensed band, the power of any emission shall be attenuatedoutside the band below the transmitter power (P) by at least 43 + 10 log (P) dB equal to -13dBm.

For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

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.

3.4.2 Test Procedures

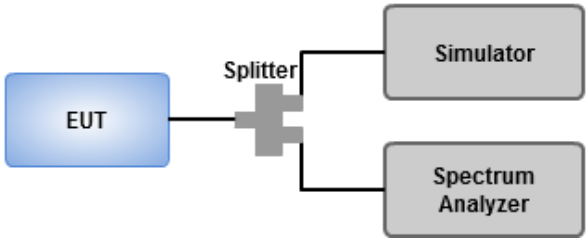
For frequency range out of 763~775 and 793~805 MHz.

1. Set RBW = 56kHz, VBW = 180kHz, detector = RMS, sweep time = auto for 5MHz channel bandwidth. Set RBW = 110kHz, VBW = 330kHz, detector = RMS, sweep time = auto for 10 MHz channel bandwidth.
2. Record the max trace value and capture the test plot.
3. Set RBW = 100 / 200kHz, VBW = 300 /1000 kHz for channel bandwidth 5 / 10 MHz, detector = RMS and use channel power measurement function of spectrum analyze to integrate power over 1MHz.

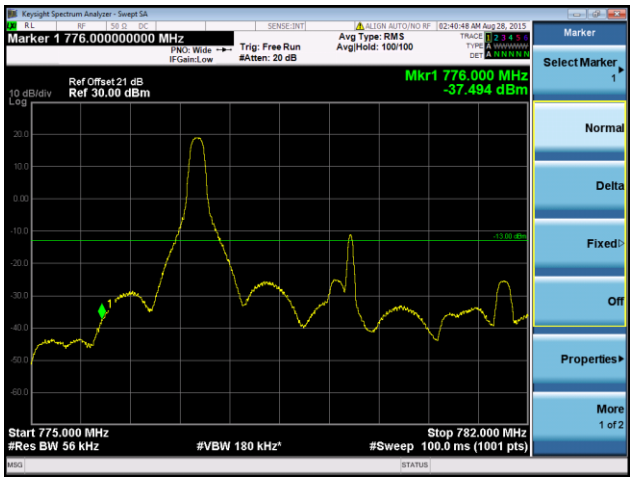
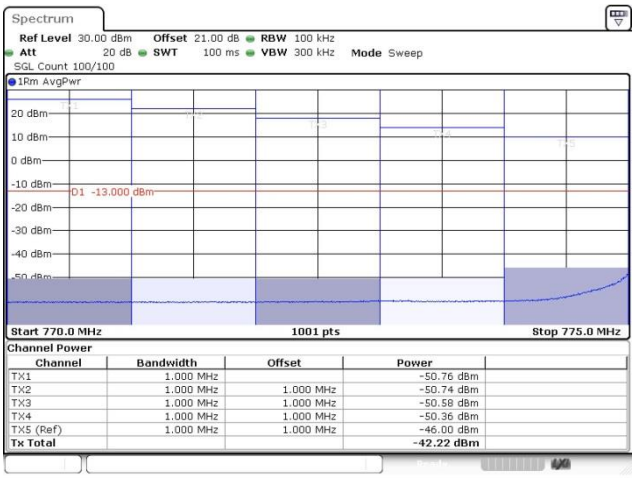
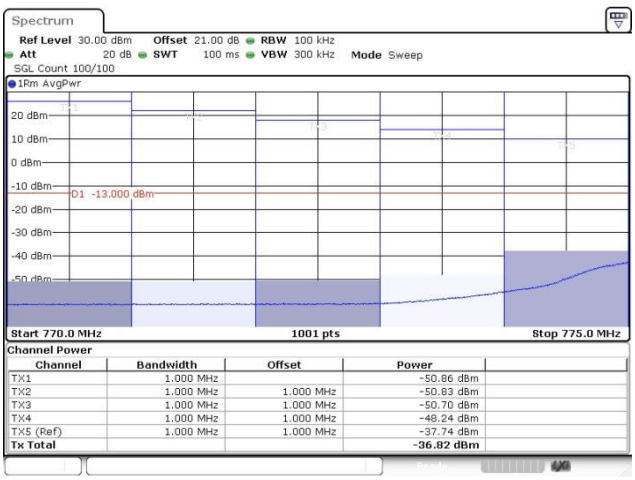
For frequency range 763~775 and 793~805 MHz.

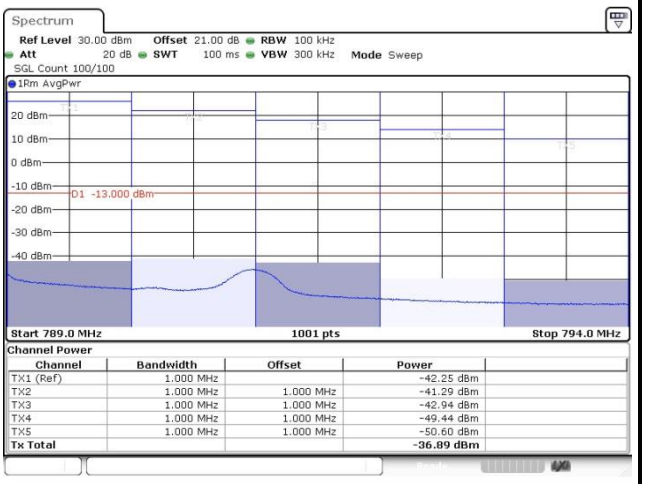
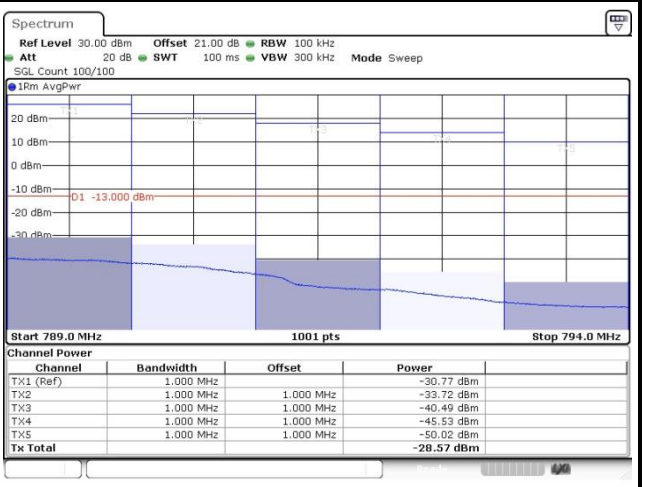
1. Set RBW = 10kHz, VBW = 30kHz, detector = RMS, sweep time = auto.
2. Record the max trace value and capture the test plot.

3.4.3 Test Setup

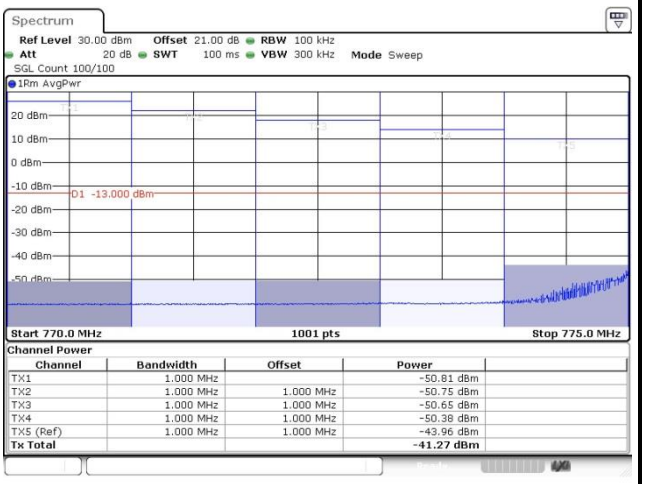


3.4.4 Test Result of Band Edge

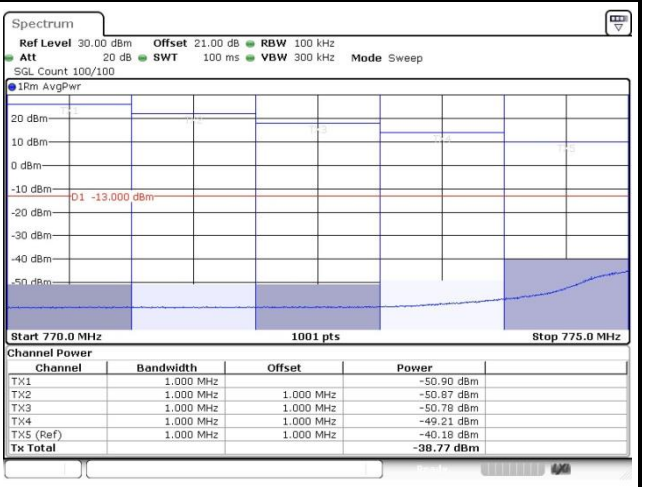
Mode	LTE Band 13, CB: 5 MHz / QPSK				
Channel	23205	1 RB Lower / Offset 0	**Channel**	23205	1 RB Lower / Offset 0
					
Channel	23205	100% RB / Offset 0	**Channel**	23205	100% RB / Offset 0
					

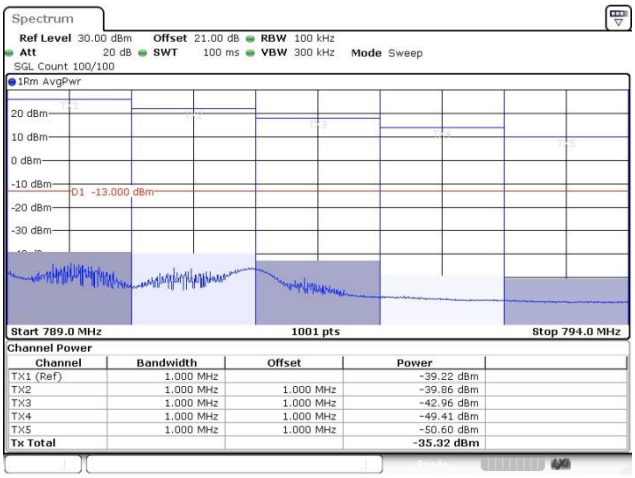
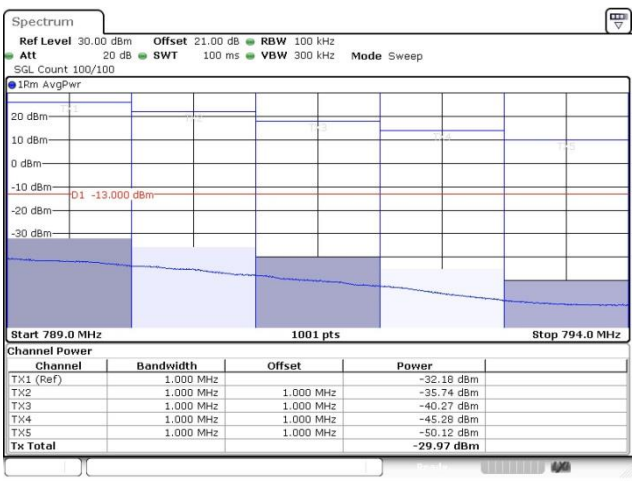
Mode	LTE Band 13, CB: 5 MHz / QPSK				
Channel	23255	1 RB upper / Offset 0	**Channel**	23255	1 RB upper / Offset 0
					
Channel	23255	100% RB / Offset 0	**Channel**	23255	100% RB / Offset 0
					

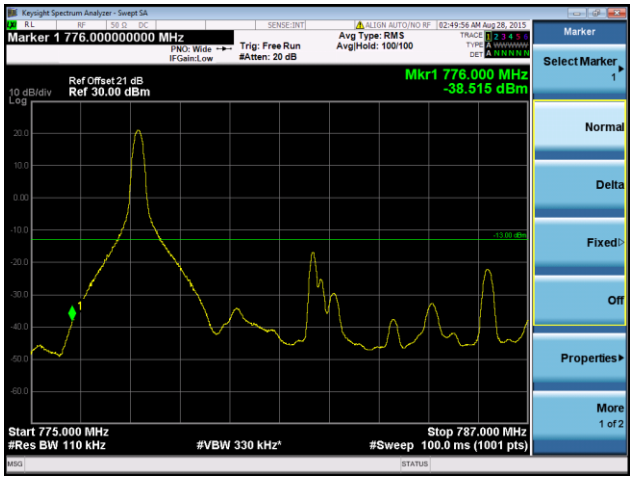
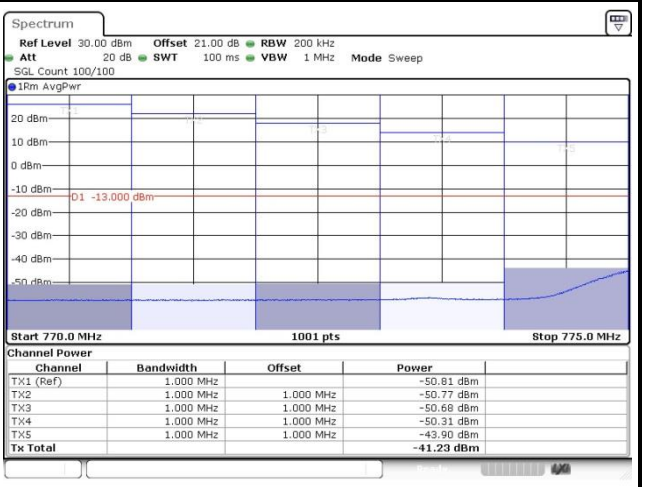
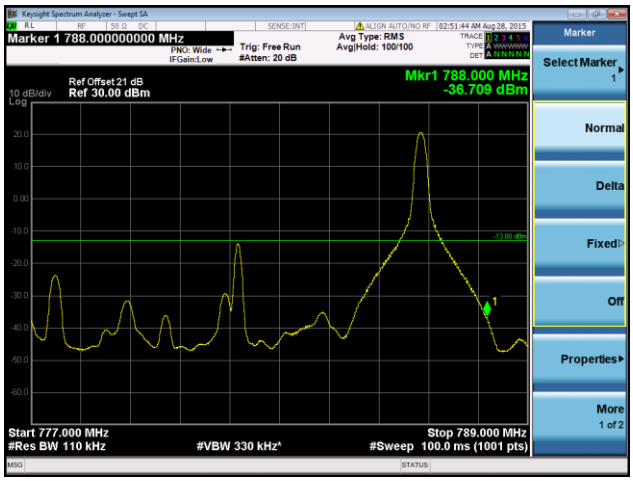
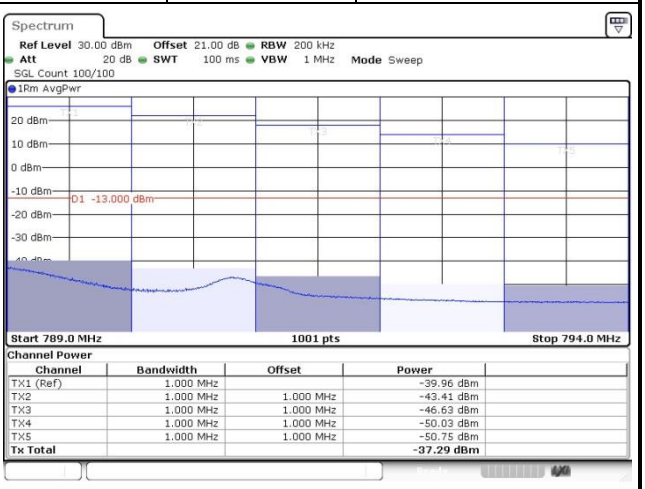
Mode	LTE Band 13, CB: 5 MHz / 16QAM				
Channel	23205	1 RB Lower / Offset 0	**Channel**	23205	1 RB Lower / Offset 0

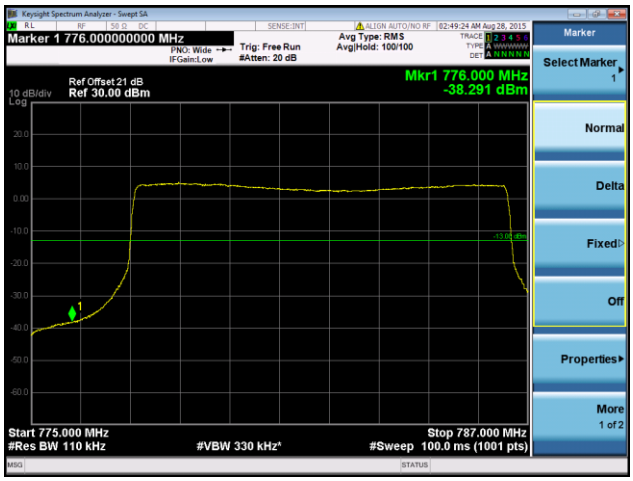
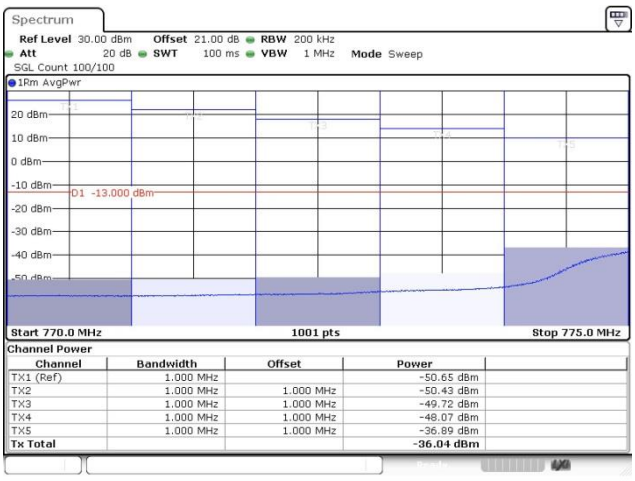
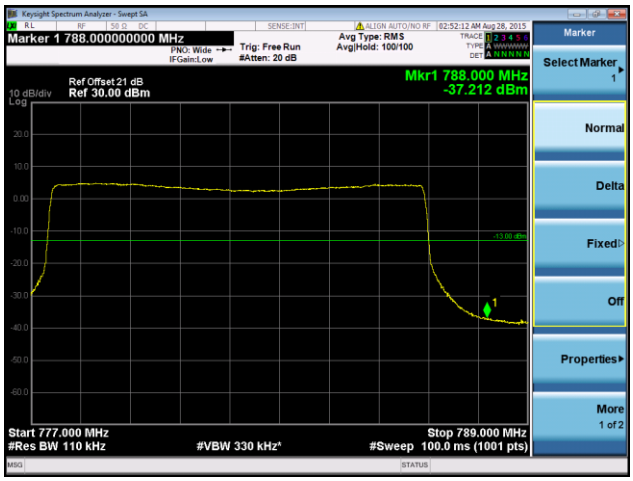
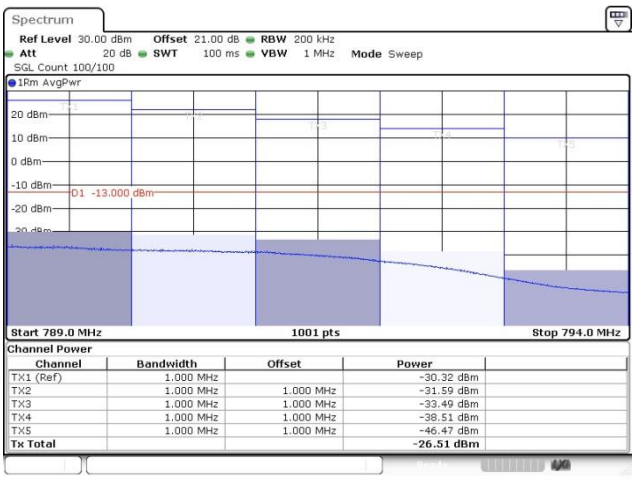


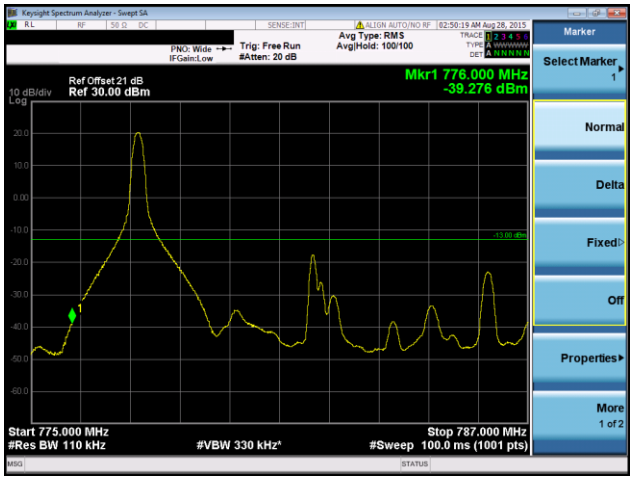
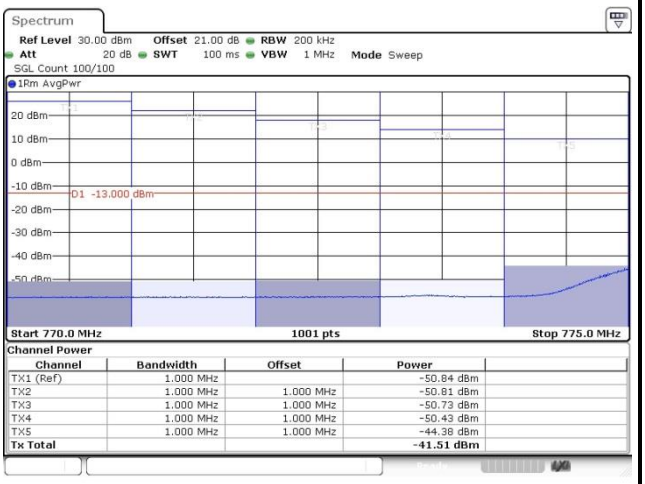
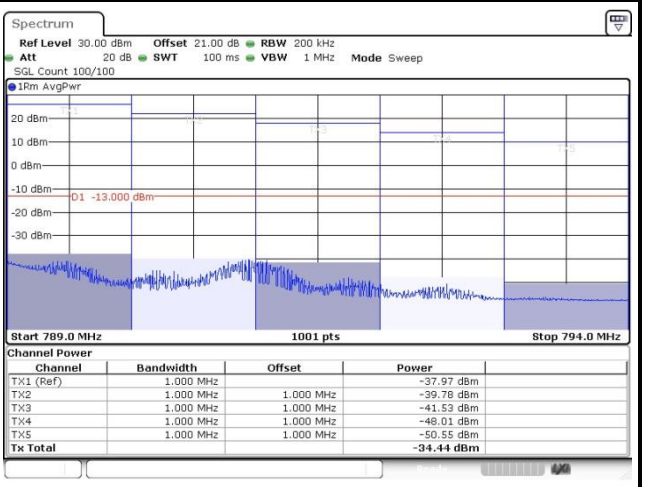
Channel	23205	100% RB / Offset 0	Channel	23205	100% RB / Offset 0

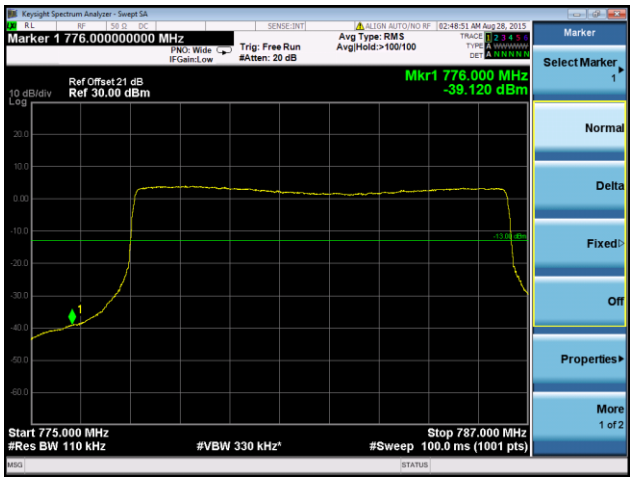
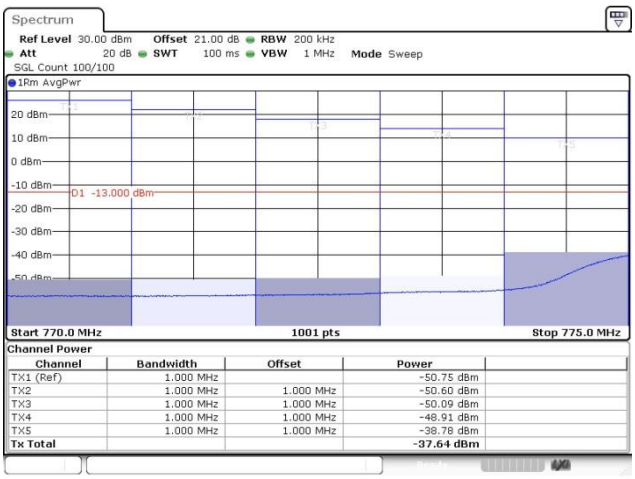
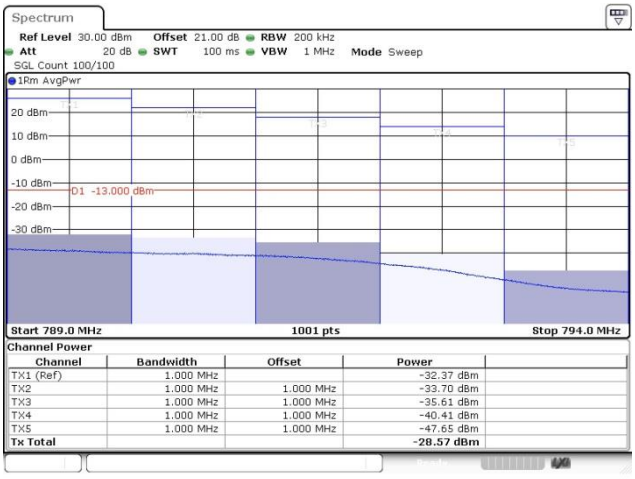


Mode	LTE Band 13, CB: 5 MHz / 16QAM				
Channel	23255	1 RB Upper / Offset 0	**Channel**	23255	1 RB Upper / Offset 0
					
Channel	23255	100% RB / Offset 0	**Channel**	23255	100% RB / Offset 0
					

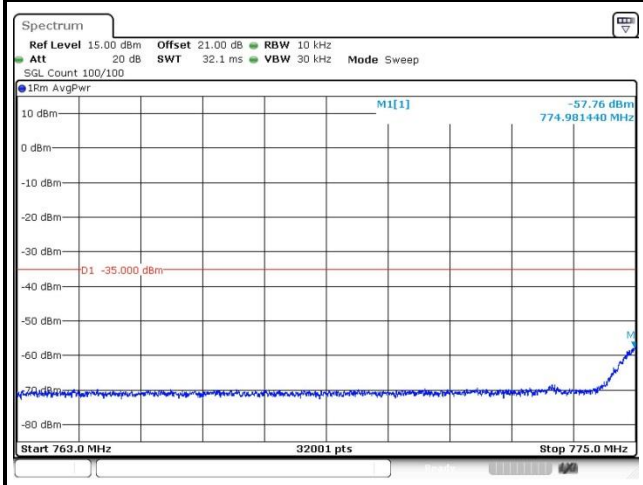
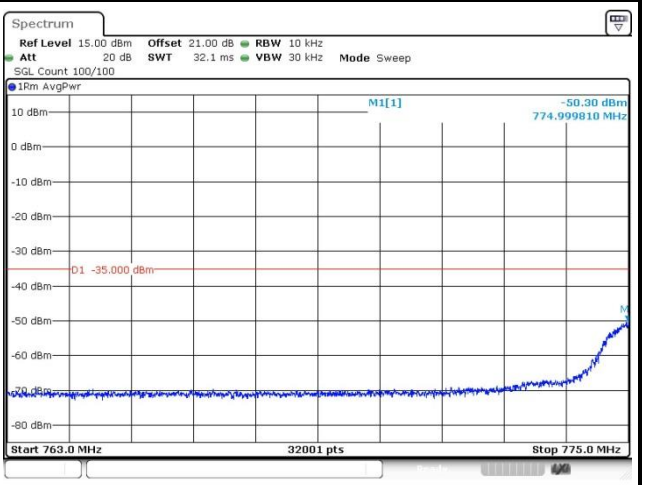
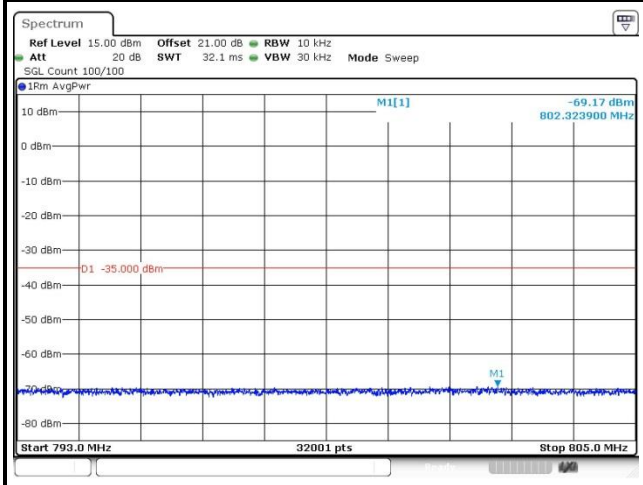
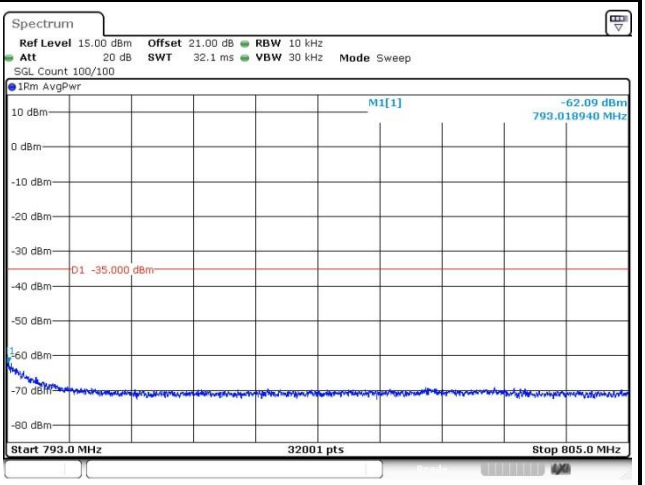
Mode	LTE Band 13, CB: 10 MHz / QPSK				
Channel	23230	1 RB Lower / Offset 0	**Channel**	23230	1 RB Lower / Offset 0
					
Channel	23230	1 RB Upper / Offset 0	**Channel**	23230	1 RB Upper / Offset 0
					

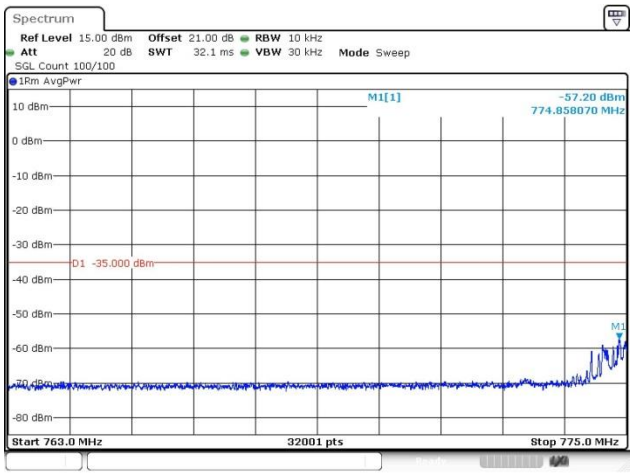
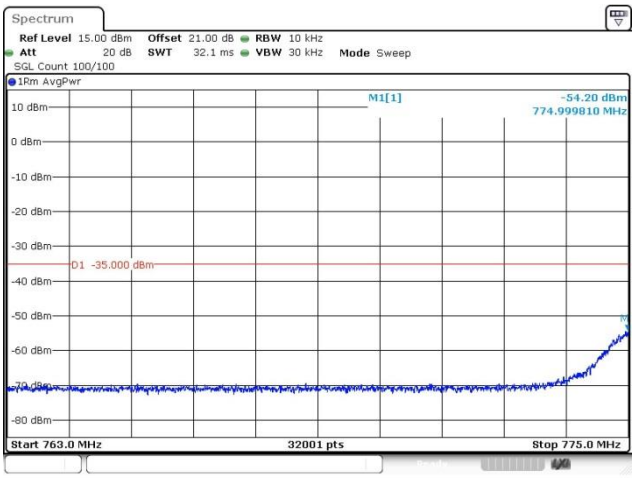
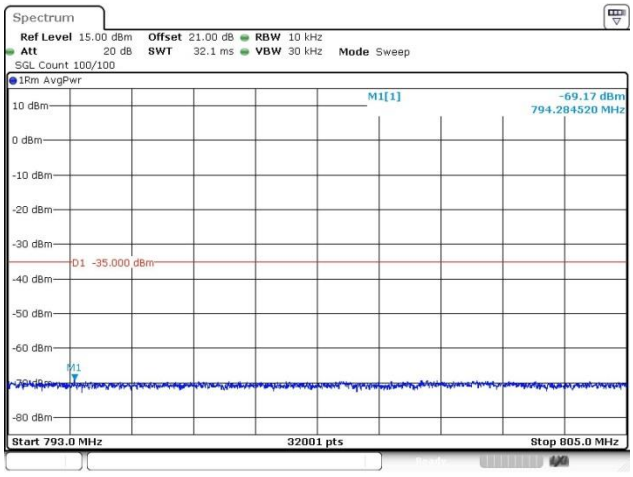
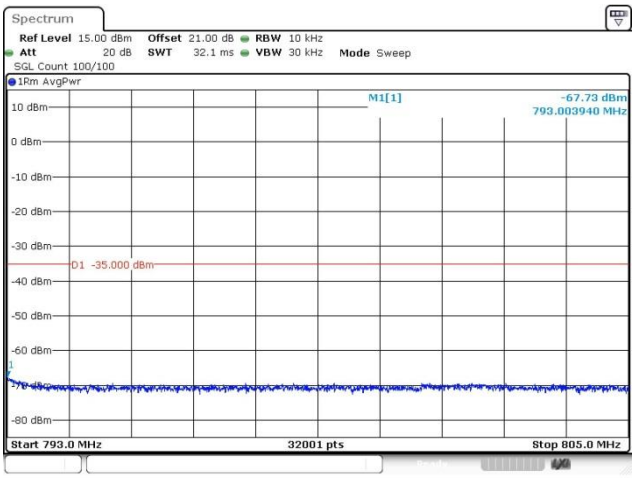
Mode	LTE Band 13, CB: 10 MHz / QPSK				
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
					
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
					

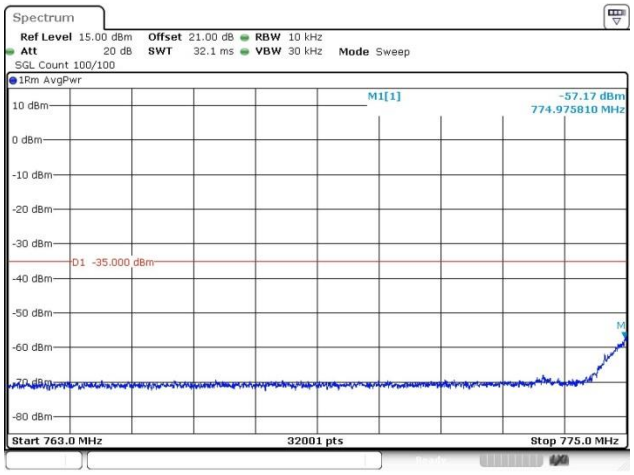
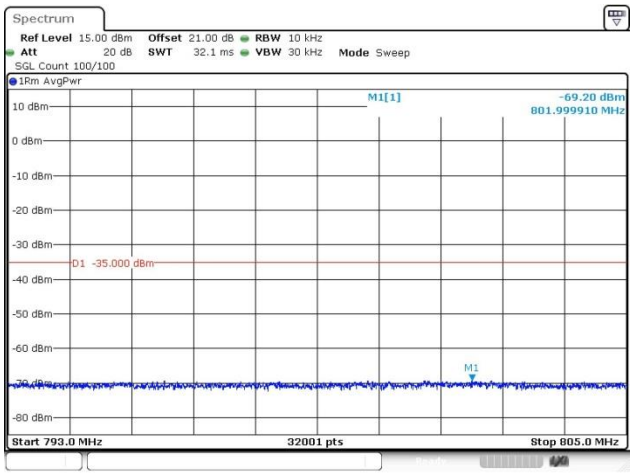
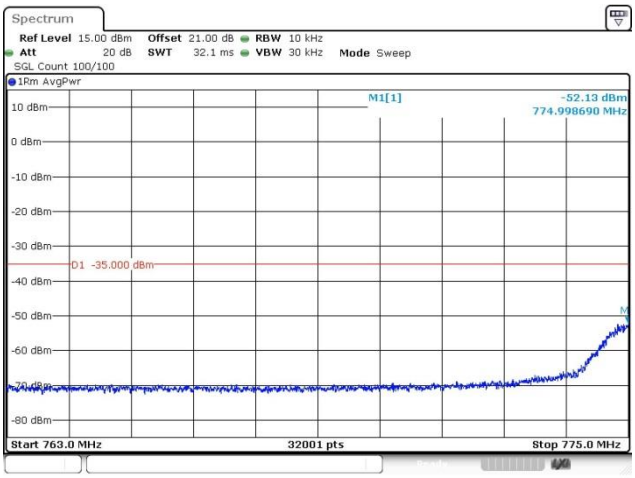
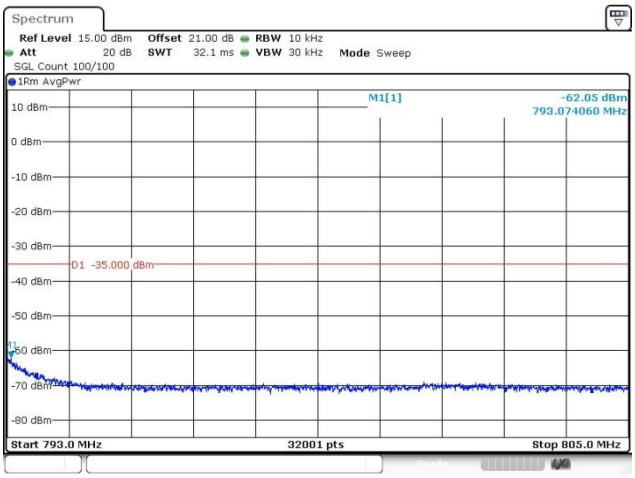
Mode	LTE Band 13, CB: 10 MHz / 16QAM				
Channel	23230	1 RB Lower / Offset 0	**Channel**	23230	1 RB Lower / Offset 0
					
Channel	23230	1 RB Upper / Offset 0	**Channel**	23230	1 RB Upper / Offset 0
					

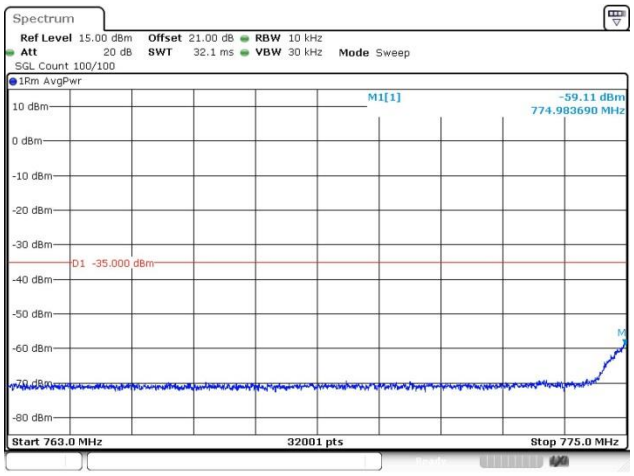
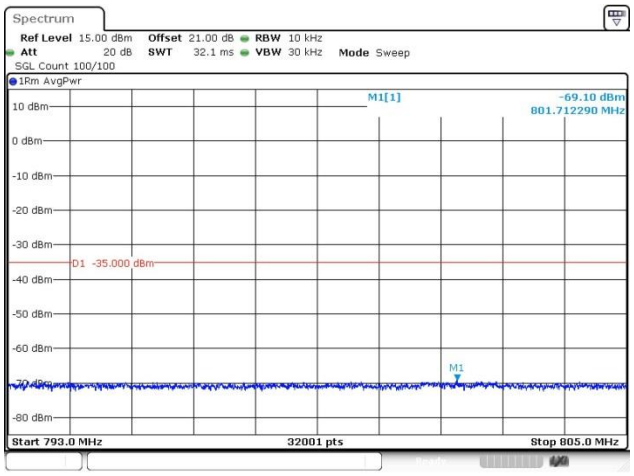
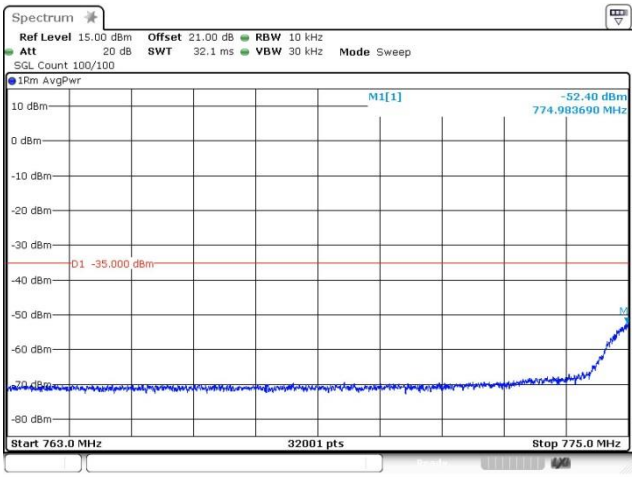
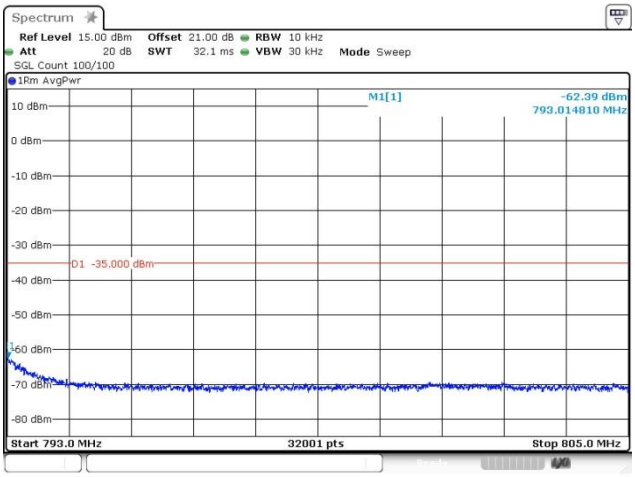
Mode	LTE Band 13, CB: 10 MHz / 16QAM				
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
					
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
					

Test result of 763~775 MHz and 793~805 MHz

Mode	LTE Band 13, CB: 5 MHz / QPSK				
Channel	23205	1 RB Lower / Offset 0	**Channel**	23205	100% RB / Offset 0
					
Channel	23255	1 RB Upper / Offset 0	**Channel**	23255	100% RB / Offset 0
					

Mode	LTE Band 13, CB: 5 MHz / 16QAM				
Channel	23205	1 RB Lower / Offset 0	**Channel**	23205	100% RB / Offset 0
					
Channel	23255	1 RB Upper / Offset 0	**Channel**	23255	100% RB / Offset 0
					

Mode	LTE Band 13, CB: 10 MHz / QPSK				
Channel	23230	1 RB Lower / Offset 0	**Channel**	23230	1 RB Upper / Offset 0
					
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
					

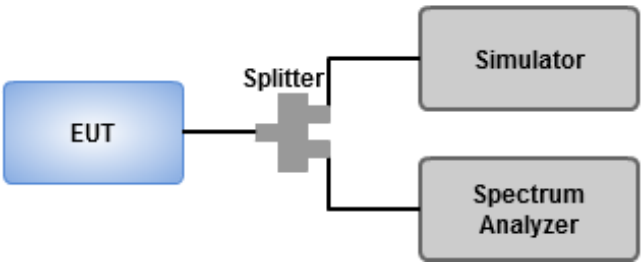
Mode	LTE Band 13, CB: 10 MHz / 16QAM				
Channel	23230	1 RB Lower / Offset 0	**Channel**	23230	1 RB Upper / Offset 0
						
Channel	23230	100% RB / Offset 0	**Channel**	23230	100% RB / Offset 0
						

3.5 Occupied Bandwidth and 26dB Bandwidth

3.5.1 Test Procedures

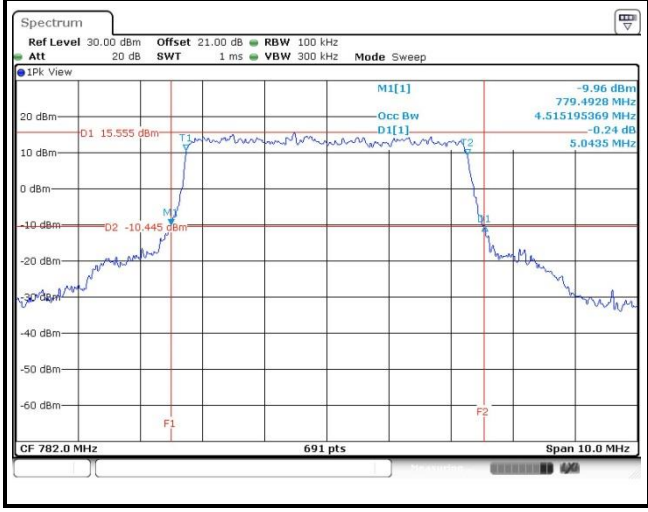
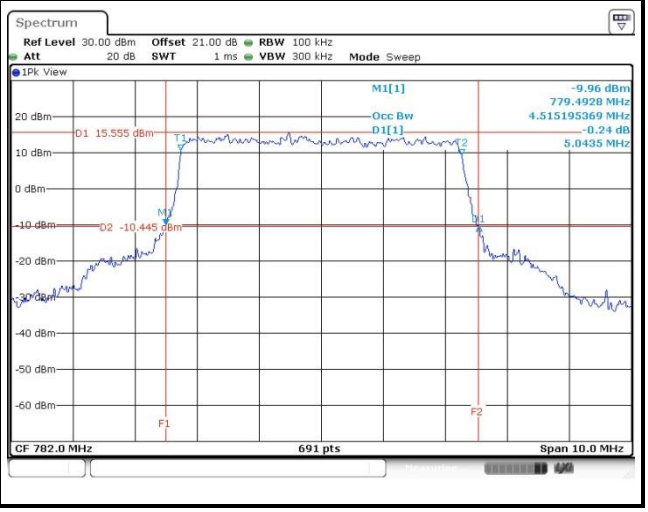
1. Set RBW = 100 kHz, VBW = 300kHz for 5 MHz channel bandwidth.
   Set RBW = 200 kHz, VBW = 1MHz for 10 MHz channel bandwidth.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Using occupied bandwidth measurement function of spectrum analyzer to measure occupied bandwidth.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 26dB relative to the maximum level measured in the fundamental emission.

3.5.2 Test Setup



3.5.3 Test Result of Occupied Bandwidth

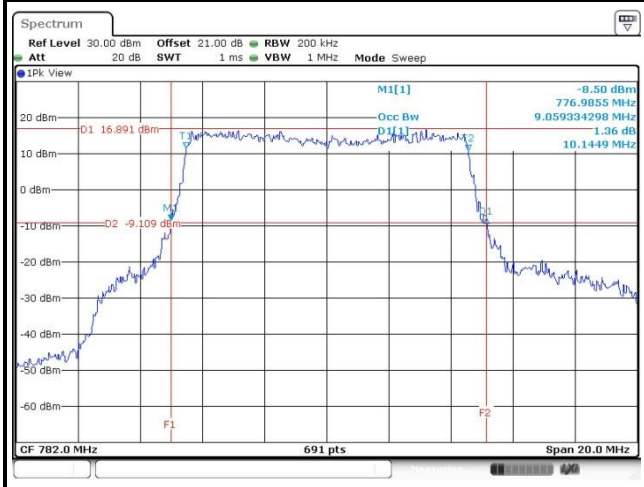
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 13	5	QPSK	23205	779.5	4.9855	4.4862
LTE Band 13	5	QPSK	23230	782.0	5.0290	4.5007
LTE Band 13	5	QPSK	23255	784.5	4.9855	4.5007
LTE Band 13	5	16QAM	23205	779.5	4.9420	4.4860
LTE Band 13	5	16QAM	23230	782.0	5.0435	4.5151
LTE Band 13	5	16QAM	23255	784.5	4.9855	4.5007

Worst plots	
26dB bandwidth	**OBW**
	

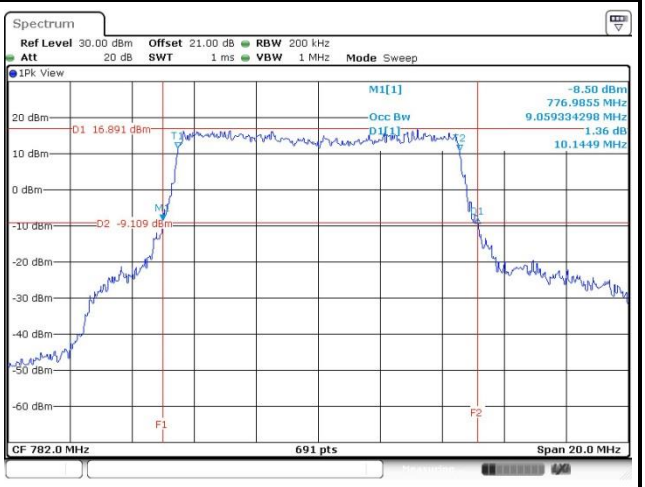
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	26dB BW (MHz)	99% OBW (MHz)
LTE Band 13	10	QPSK	23230	782.0	10.1449	9.0593
LTE Band 13	10	16QAM	23230	782.0	10.0290	9.0014

Worst plots

26dB bandwidth



OBW



3.6 Peak to Average Ratio

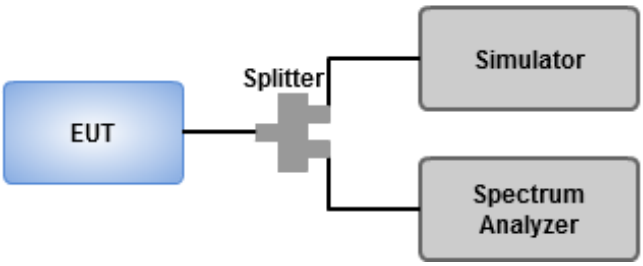
3.6.1 Limit of Peak to Average Ratio

The Peakto-average ratio (PAR) of the transmiss ion may not exceed 13 dB.

3.6.2 Test Procedures

1. Set the number of counts to a value that stabilizes the measured CCDF curve.
2. Set the measurement interval to 1 ms.
3. Record the maximum PAPR level associated with a probability of 0.1%.

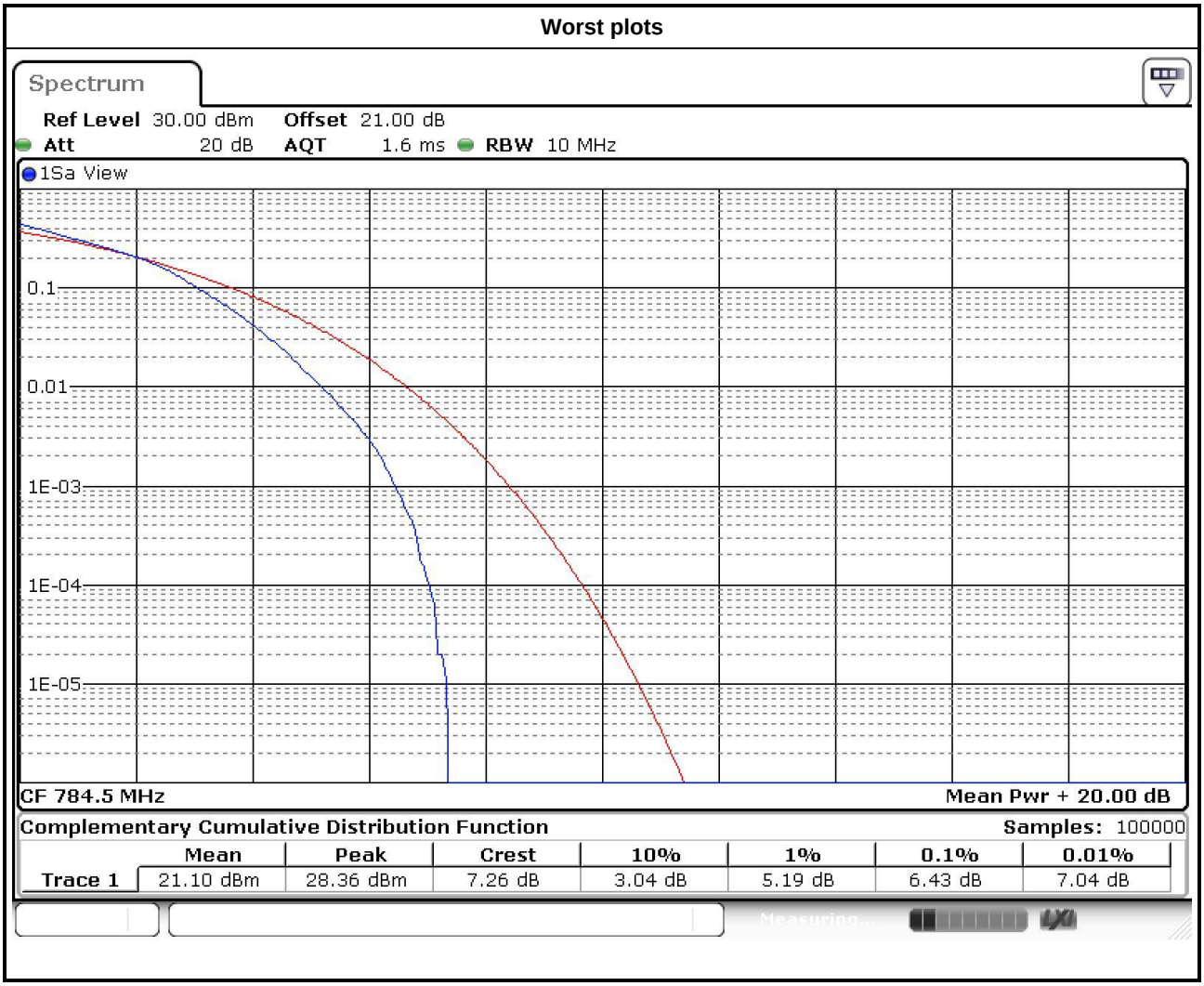
3.6.3 Test Setup



3.6.4 Test Result of Peak to Average Ratio

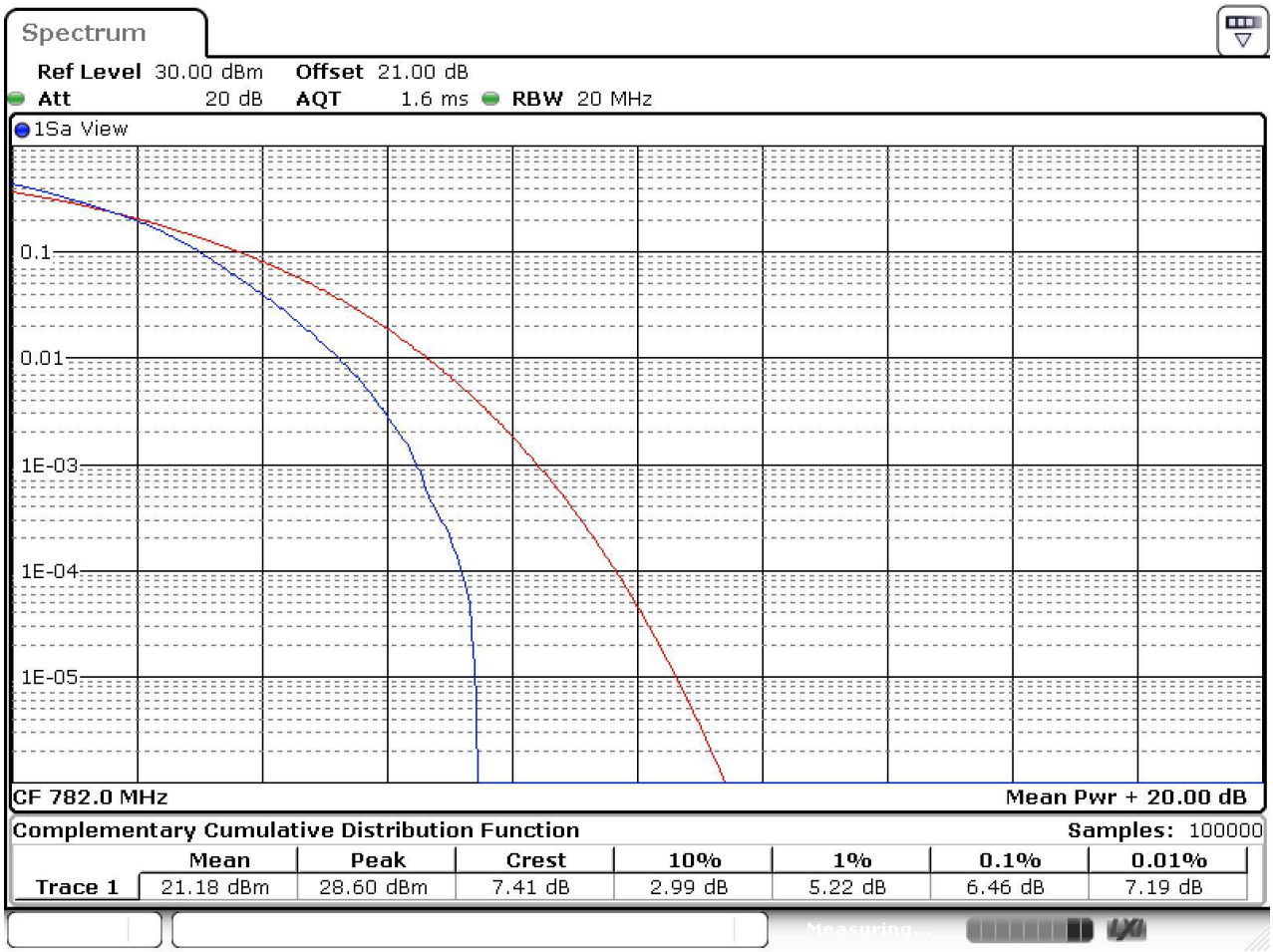
Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 13	5	QPSK	23205	779.5	5.62
LTE Band 13	5	QPSK	23230	782.0	5.74
LTE Band 13	5	QPSK	23255	784.5	5.80
LTE Band 13	5	16QAM	23205	779.5	6.32
LTE Band 13	5	16QAM	23230	782.0	6.35
LTE Band 13	5	16QAM	23255	784.5	6.43

Worst plots



Mode	CB (MHz)	Modulation	Channel	Frequency (MHz)	Peak to Average ratio (dB)
LTE Band 13	10	QPSK	23230	782.0	5.83
LTE Band 13	10	16QAM	23230	782.0	6.46

Worst plots



3.7 Frequency Stability

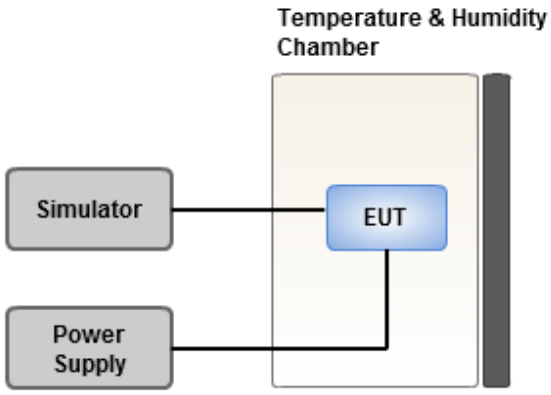
3.7.1 Limit of Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.7.2 Test Procedures

1. EUT was placed at temperature chamber and connected to an external power supply.
2. Temperature and voltage condition shall be tested to confirm frequency stability.
3. Temperature range is from -30~55°C and voltage range is from lowest to highest working voltage.
4. Tem Link up EUT and simulator. Confirm frequency drift value of simulator and record it.

3.7.3 Test Setup



3.7.4 Test Result of Frequency Stability

Temperature (°C)	Voltage (dc)	Frequency Drift (ppm)	
		CB: 5MHz	CB: 10MHz
55	3.7	0.022	0.024
50	3.7	0.020	0.023
40	3.7	0.020	0.022
30	3.7	0.019	0.020
20	3.7	0.017	0.019
10	3.7	0.018	0.019
0	3.7	0.017	0.024
-10	3.7	0.023	0.026
-20	3.7	0.022	0.027
-30	3.7	0.020	0.023
20	4.5	0.026	0.027
20	3.2	0.020	0.023

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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