FCC Test Report

(PART 24)

Report No.:	RF181001C06-8
FCC ID:	A4RG020A
Model Name:	G020A
Received Date:	Oct. 01, 2018
Test Date:	Oct. 16, 2018 ~ Oct. 19, 2018
Issued Date:	Dec. 27, 2018
Applicant:	Google LLC
Address:	1600 Amphitheatre Parkway, Mountain View, CA 94043, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location (1):	No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF181001C06-8	Original Release	Dec. 27, 2018

1 Certificate of Conformity

Product:	Smartphone
Model Name:	G020A
Sample Status:	Identical Prototype
Applicant:	Google LLC
Test Date:	Oct. 16, 2018 ~ Oct. 19, 2018
Standards:	FCC Part 24, Subpart E

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

Prepared by : _____ , **Date:** Dec. 27, 2018

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** Dec. 27, 2018

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 24.232	Effective Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1046 24.232(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 24.238(b)	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238(a)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -28.21 dB at 7600.00 MHz.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer Keysight	N9010A	MY56070348	Sep. 06, 2018	Sep. 05, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	148	Dec. 13, 2017	Dec. 12, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53052658	May 24, 2018	May 23, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Universal Radio Communication Tester R&S	CMU200	123112	Dec. 28, 2017	Dec. 27, 2018
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is 7450F-10.

3 General Information

3.1 General Description of EUT

Product	Smartphone	
Model Name	G020A	
Status of EUT	Identical Prototype	
Power Supply Rating	3.85 Vdc (Li-ion battery) 5.0 Vdc or 9 Vdc (adapter) 5.0 Vdc (host equipment)	
Modulation Type	GSM/GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	QPSK
	CDMA	QPSK, OQPSK, HPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	GSM/GPRS/EDGE	1850.2 ~ 1909.8 MHz
	WCDMA	1852.4 ~ 1907.6 MHz
	CDMA	1851.25 ~ 1908.75 MHz
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1850.7 ~ 1909.3 MHz
	LTE Band 2 (Channel Bandwidth: 3 MHz)	1851.5 ~ 1908.5 MHz
	LTE Band 2 (Channel Bandwidth: 5 MHz)	1852.5 ~ 1907.5 MHz
	LTE Band 2 (Channel Bandwidth: 10 MHz)	1855.0 ~ 1905.0 MHz
	LTE Band 2 (Channel Bandwidth: 15 MHz)	1857.5 ~ 1902.5 MHz
	LTE Band 2 (Channel Bandwidth: 20 MHz)	1860.0 ~ 1900.0 MHz
	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	1850.7 ~ 1914.3 MHz
	LTE Band 25 (Channel Bandwidth: 3 MHz)	1851.5 ~ 1913.5 MHz
	LTE Band 25 (Channel Bandwidth: 5 MHz)	1852.5 ~ 1912.5 MHz
	LTE Band 25 (Channel Bandwidth: 10 MHz)	1855.0 ~ 1910.0 MHz
	LTE Band 25 (Channel Bandwidth: 15 MHz)	1857.5 ~ 1907.5 MHz
	LTE Band 25 (Channel Bandwidth: 20 MHz)	1860.0 ~ 1905.0 MHz

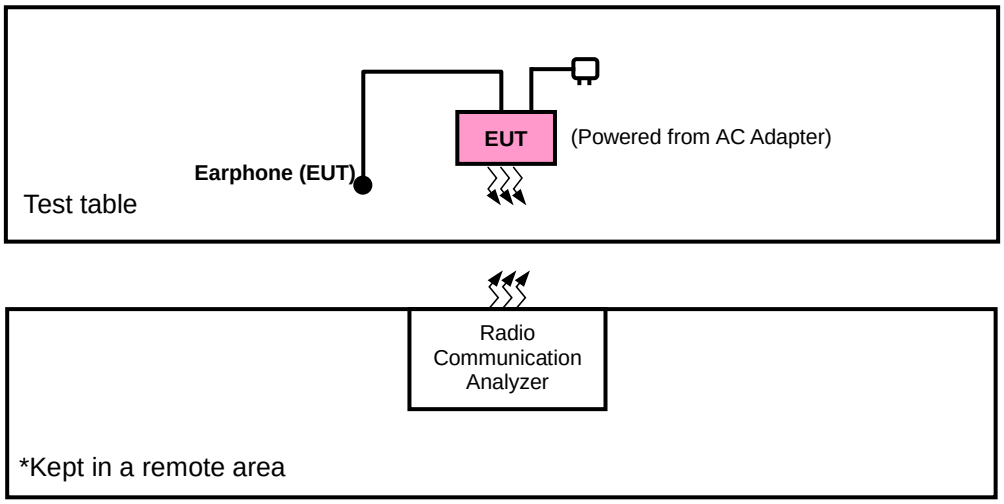
Max. EIRP Power	GSM/GPRS	796.16 mW
	EDGE	306.20 mW
	WCDMA	238.78 mW
	CDMA	211.84 mW
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	162.55 mW
	LTE Band 2 (Channel Bandwidth: 3 MHz)	171.40 mW
	LTE Band 2 (Channel Bandwidth: 5 MHz)	179.89 mW
	LTE Band 2 (Channel Bandwidth: 10 MHz)	190.11 mW
	LTE Band 2 (Channel Bandwidth: 15 MHz)	200.45 mW
	LTE Band 2 (Channel Bandwidth: 20 MHz)	211.35 mW
	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	151.71 mW
	LTE Band 25 (Channel Bandwidth: 3 MHz)	159.59 mW
	LTE Band 25 (Channel Bandwidth: 5 MHz)	169.43 mW
	LTE Band 25 (Channel Bandwidth: 10 MHz)	179.06 mW
	LTE Band 25 (Channel Bandwidth: 15 MHz)	188.80 mW
	LTE Band 25 (Channel Bandwidth: 20 MHz)	199.99 mW
Emission Designator	GSM/GPRS	249KGXW
	EDGE	247KG7W
	WCDMA	4M15F9W
	CDMA	1M28F9W
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 2 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 2 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 2 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 2 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 2 (Channel Bandwidth: 20 MHz)	18M0W7D
	LTE Band 25 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 25 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 25 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 25 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 25 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 25 (Channel Bandwidth: 20 MHz)	17M9W7D
Antenna Type	PIFA Antenna with -1 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

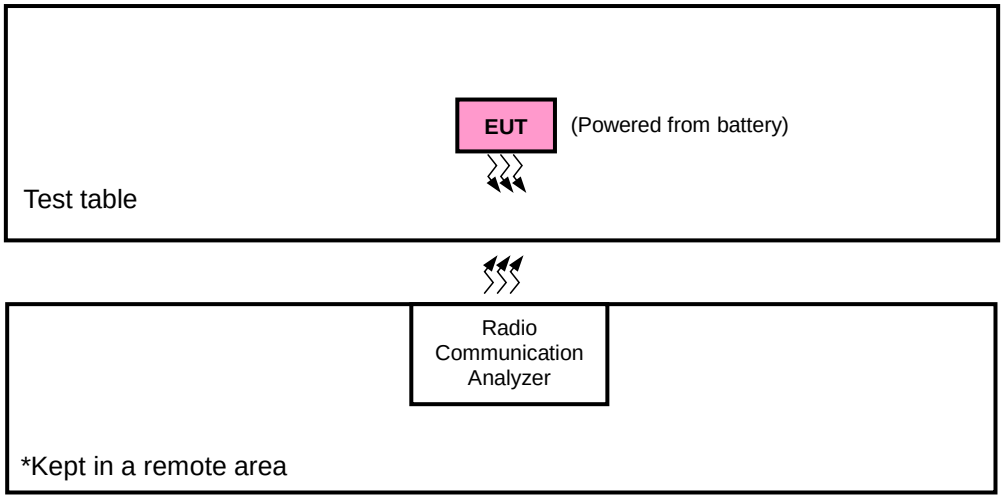
1. There're 2 configurations for the EUT listed as below.
   Main Sample: EUT + Battery 1
   2nd Sample: EUT + Battery 2
   - ✧ After pre-tested with the EUT, only the worst configuration (main sample) was chosen for the final test.
2. The EUT's accessories list refers to Ext. Pho.
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.I.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.
The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	EIRP	Radiated Emission
GSM	Y-plane	X-axis
EDGE	Y-plane	X-axis
WCDMA	Y-plane	X-axis
CDMA	Y-plane	X-axis
LTE Band 2	X-plane	X-axis
LTE Band 25	X-plane	X-axis

GSM

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	512 to 810	512, 661, 810	GSM, EDGE
-	Modulation Characteristics	512 to 810	661	GSM, EDGE
-	Frequency Stability	512 to 810	512, 810	GSM, EDGE
-	Occupied Bandwidth	512 to 810	512, 661, 810	GSM, EDGE
-	Band Edge	512 to 810	512, 810	GSM, EDGE
-	Peak to Average Ratio	512 to 810	512, 661, 810	GSM, EDGE
-	Conducted Emission	512 to 810	512, 661, 810	GSM, EDGE
-	Radiated Emission	512 to 810	512, 661, 810	GSM, EDGE

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
-	Modulation Characteristics	9262 to 9538	9400	WCDMA
-	Frequency Stability	9262 to 9538	9262, 9538	WCDMA
-	Occupied Bandwidth	9262 to 9538	9262, 9400, 9538	WCDMA
-	Band Edge	9262 to 9538	9262, 9538	WCDMA
-	Peak to Average Ratio	9262 to 9538	9262, 9400, 9538	WCDMA
-	Conducted Emission	9262 to 9538	9262, 9400, 9538	WCDMA
-	Radiated Emission	9262 to 9538	9262, 9400, 9538	WCDMA

CDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	25 to 1175	25, 600, 1175	1xRTT
-	Modulation Characteristics	25 to 1175	600	1xRTT
-	Frequency Stability	25 to 1175	25, 1175	1xRTT
-	Occupied Bandwidth	25 to 1175	25, 600, 1175	1xRTT
-	Band Edge	25 to 1175	25, 600, 1175	1xRTT
-	Peak to Average Ratio	25 to 1175	25, 1175	1xRTT
-	Conducted Emission	25 to 1175	25, 600, 1175	1xRTT
-	Radiated Emission	25 to 1175	25, 600, 1175	1xRTT

LTE Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	18650 to 19150	18900	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Frequency Stability	18607 to 19193	18607, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 19185	3 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 19150	10 MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 19125	15 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 19100	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	18607 to 19193	18607	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			19193	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		18615 to 19185	18615	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			19185	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		18625 to 19175	18625	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			19175	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		18650 to 19150	18650	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			19150	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		18675 to 19125	18675	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			19125	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		18700 to 19100	18700	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			19100	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	Conducted Emission	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE Band 25

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 2 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 7 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 37 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	26090 to 26640	26365	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Frequency Stability	26047 to 26683	26047, 26683	1.4 MHz	QPSK	1 RB / 0 RB Offset
		26055 to 26675	26055, 26675	3 MHz	QPSK	1 RB / 0 RB Offset
		26065 to 26665	26065, 26665	5 MHz	QPSK	1 RB / 0 RB Offset
		26090 to 26640	26090, 26640	10 MHz	QPSK	1 RB / 0 RB Offset
		26115 to 26615	26115, 26615	15 MHz	QPSK	1 RB / 0 RB Offset
		26140 to 26590	26140, 26590	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 7 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	26047 to 26683	26047	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			26683	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		26055 to 26675	26055	3 MHz	QPSK	1 RB / 0 RB Offset
						1 RB / 0 RB Offset
			26675	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		26065 to 26665	26065	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			26665	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		26090 to 26640	26090	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			26640	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		26115 to 26615	26115	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			26615	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		26140 to 26590	26140	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			26590	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	Conducted Emission	26047 to 26683	26047, 26365, 26683	1.4 MHz	QPSK	1 RB / 2 RB Offset
		26055 to 26675	26055, 26365, 26675	3 MHz	QPSK	1 RB / 7 RB Offset
		26065 to 26665	26065, 26365, 26665	5 MHz	QPSK	1 RB / 12 RB Offset
		26090 to 26640	26090, 26365, 26640	10 MHz	QPSK	1 RB / 24 RB Offset
		26115 to 26615	26115, 26365, 26615	15 MHz	QPSK	1 RB / 37 RB Offset
		26140 to 26590	26140, 26365, 26590	20 MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 2 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK	1 RB / 12 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK	1 RB / 50 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	26 deg. C, 58 % RH	3.85 Vdc	Thomas Wei
Modulation Characteristics	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Frequency Stability	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Occupied Bandwidth	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Band Edge	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Peak to Average Ratio	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Conducted Emission	26 deg. C, 58 % RH	3.85 Vdc	Wayne Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2
FCC 47 CFR Part 24
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 2 watts e.i.r.p.

4.1.2 Test Procedures

EIRP / ERP Measurement:

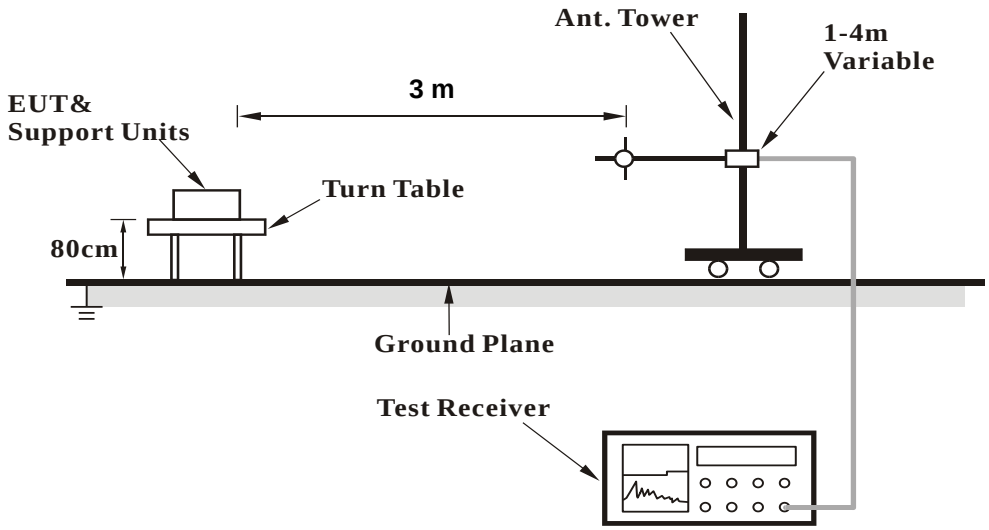
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

Conducted Power Measurement:

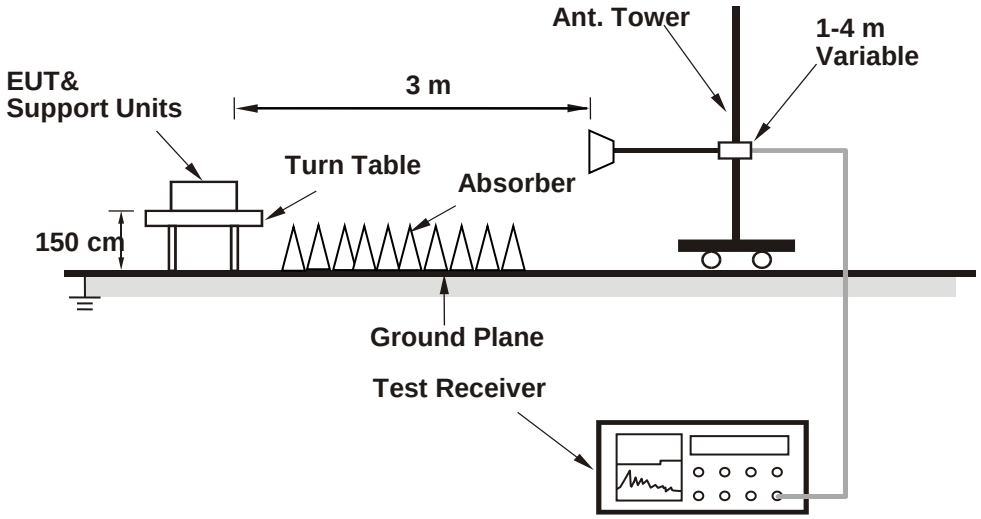
The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

EIRP / ERP Measurement:
<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:

4.1.4 Test Results

The worst configuration mode is presented in the report as below. Please refer to SAR test report for more detail test mode.

Band		TX Antenna	WLAN Function	Body-Worn/Hotspot
GSM	1900	Ant 0	WLAN-Off	Body-Worn/Hotspot
WCDMA	B2	Ant 0	WLAN-Off	Body-Worn/Hotspot
CDMA	BC1	Ant 0	WLAN-Off	Body-Worn/Hotspot
LTE	B2	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B25	Ant 0	WLAN-Off	Body-Worn/Hotspot

Conducted Output Power (dBm)

Band	**GSM1900**		
Mode	**Body-Worn / Hotspot**		
Tx Antenna	**Ant-0**		
Channel	**512**	**661**	**810**
Frequency (MHz)	**1850.2**	**1880.0**	**1909.8**
GSM (GMSK, 1Tx-slot)	30.32	30.28	30.22
GPRS (GMSK, 1Tx-slot)	30.31	30.27	30.21
GPRS (GMSK, 2Tx-slot)	28.46	28.42	28.36
GPRS (GMSK, 3Tx-slot)	26.51	26.47	26.41
GPRS (GMSK, 4Tx-slot)	25.31	25.27	25.21
DTM (GMSK, 2Tx-slot)	28.40	28.36	28.30
DTM (GMSK, 3Tx-slot)	26.42	26.38	26.32
EDGE (8PSK, 1Tx-slot)	25.89	25.85	25.79
EDGE (8PSK, 2Tx-slot)	24.73	24.69	24.63
EDGE (8PSK, 3Tx-slot)	23.72	23.68	23.62
EDGE (8PSK, 4Tx-slot)	22.83	22.79	22.73
DTM (8PSK, 2Tx-slot)	24.71	24.67	24.61
DTM (8PSK, 3Tx-slot)	23.70	23.66	23.60

Band	WCDMA II		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	24.66	24.76	24.79
HSDPA Subtest-1	23.85	23.75	23.78
HSDPA Subtest-2	23.86	23.76	23.79
HSDPA Subtest-3	23.42	23.32	23.35
HSDPA Subtest-4	23.37	23.27	23.30
DC-HSDPA Subtest-1	23.80	23.70	23.73
DC-HSDPA Subtest-2	23.81	23.71	23.74
DC-HSDPA Subtest-3	23.37	23.27	23.30
DC-HSDPA Subtest-4	23.32	23.22	23.25
HSUPA Subtest-1	23.61	23.51	23.54
HSUPA Subtest-2	21.65	21.55	21.58
HSUPA Subtest-3	22.63	22.53	22.56
HSUPA Subtest-4	21.68	21.58	21.61
HSUPA Subtest-5	23.71	23.61	23.64

Band	CDMA BC1		
Mode	Body-Worn / Hotspot		
Tx Antenna	Ant-0		
Channel	25	600	1175
Frequency (MHz)	1851.25	1880	1908.75
RC1+SO55	24.19	24.21	24.29
RC3+SO55	24.23	24.25	24.33
RC3+SO32 (+F-SCH)	24.18	24.20	24.28
RC3+SO32 (+SCH)	24.21	24.23	24.31
RTAP 153.6	24.22	24.24	24.32
RETAP 4096	24.20	24.22	24.30

LTE Band 2
Body-Worn / Hotspot
Ant-0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100				Channel		18675	18900	19125	
		Frequency (MHz)		1860.0	1880.0	1900.0				Frequency (MHz)		1857.5	1880.0	1902.5	
20M	QPSK	1	0	24.68	24.63	24.65	0	15M	QPSK	1	0	24.63	24.58	24.60	0
		1	50	24.67	24.62	24.64	0			1	37	24.62	24.57	24.59	0
		1	99	24.63	24.58	24.60	0			1	74	24.58	24.53	24.55	0
		50	0	23.73	23.68	23.70	1			36	0	23.68	23.63	23.65	1
		50	25	23.70	23.65	23.67	1			36	19	23.65	23.60	23.62	1
		50	50	23.63	23.58	23.60	1			36	39	23.58	23.53	23.55	1
		100	0	23.66	23.61	23.63	1			75	0	23.61	23.56	23.58	1
	16QAM	1	0	23.66	23.61	23.63	1		16QAM	1	0	23.61	23.56	23.58	1
		1	50	23.65	23.60	23.62	1			1	37	23.60	23.55	23.57	1
		1	99	23.61	23.56	23.58	1			1	74	23.56	23.51	23.53	1
		50	0	22.71	22.66	22.68	2			36	0	22.66	22.61	22.63	2
		50	25	22.68	22.63	22.65	2			36	19	22.63	22.58	22.60	2
		50	50	22.61	22.56	22.58	2			36	39	22.56	22.51	22.53	2
		100	0	22.64	22.59	22.61	2			75	0	22.59	22.54	22.56	2
	64QAM	1	0	22.61	22.56	22.58	2		64QAM	1	0	22.56	22.51	22.53	2
		1	50	22.60	22.55	22.57	2			1	37	22.55	22.50	22.52	2
		1	99	22.56	22.51	22.53	2			1	74	22.51	22.46	22.48	2
		50	0	21.66	21.61	21.63	3			36	0	21.61	21.56	21.58	3
		50	25	21.63	21.58	21.60	3			36	19	21.58	21.53	21.55	3
		50	50	21.56	21.51	21.53	3			36	39	21.51	21.46	21.48	3
		100	0	21.59	21.54	21.56	3			75	0	21.54	21.49	21.51	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18650	18900	19150				Channel		18625	18900	19175	
		Frequency (MHz)		1855.0	1880.0	1905.0				Frequency (MHz)		1852.5	1880.0	1907.5	
10M	QPSK	1	0	24.55	24.50	24.52	0	5M	QPSK	1	0	24.49	24.44	24.46	0
		1	24	24.54	24.49	24.51	0			1	12	24.48	24.43	24.45	0
		1	49	24.50	24.45	24.47	0			1	24	24.44	24.39	24.41	0
		25	0	23.60	23.55	23.57	1			12	0	23.54	23.49	23.51	1
		25	12	23.57	23.52	23.54	1			12	6	23.51	23.46	23.48	1
		25	25	23.50	23.45	23.47	1			12	13	23.44	23.39	23.41	1
		50	0	23.53	23.48	23.50	1			25	0	23.47	23.42	23.44	1
	16QAM	1	0	23.53	23.48	23.50	1		16QAM	1	0	23.47	23.42	23.44	1
		1	24	23.52	23.47	23.49	1			1	12	23.46	23.41	23.43	1
		1	49	23.48	23.43	23.45	1			1	24	23.42	23.37	23.39	1
		25	0	22.58	22.53	22.55	2			12	0	22.52	22.47	22.49	2
		25	12	22.55	22.50	22.52	2			12	6	22.49	22.44	22.46	2
		25	25	22.48	22.43	22.45	2			12	13	22.42	22.37	22.39	2
		50	0	22.51	22.46	22.48	2			25	0	22.45	22.40	22.42	2
	64QAM	1	0	22.48	22.43	22.45	2		64QAM	1	0	22.42	22.37	22.39	2
		1	24	22.47	22.42	22.44	2			1	12	22.41	22.36	22.38	2
		1	49	22.43	22.38	22.40	2			1	24	22.37	22.32	22.34	2
		25	0	21.53	21.48	21.50	3			12	0	21.47	21.42	21.44	3
		25	12	21.50	21.45	21.47	3			12	6	21.44	21.39	21.41	3
		25	25	21.43	21.38	21.40	3			12	13	21.37	21.32	21.34	3
		50	0	21.46	21.41	21.43	3			25	0	21.40	21.35	21.37	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18615	18900	19185				Channel		18607	18900	19193	
		Frequency (MHz)		1851.5	1880.0	1908.5				Frequency (MHz)		1850.7	1880.0	1909.3	
3M	QPSK	1	0	24.42	24.37	24.39	0	1.4M	QPSK	1	0	24.39	24.34	24.36	0
		1	7	24.41	24.36	24.38	0			1	2	24.38	24.33	24.35	0
		1	14	24.37	24.32	24.34	0			1	5	24.34	24.29	24.31	0
		8	0	23.47	23.42	23.44	1			3	0	24.24	24.19	24.21	0
		8	3	23.44	23.39	23.41	1			3	1	24.21	24.16	24.18	0
		8	7	23.37	23.32	23.34	1			3	3	24.14	24.09	24.11	0
		15	0	23.40	23.35	23.37	1			6	0	23.37	23.32	23.34	1
	16QAM	1	0	23.40	23.35	23.37	1		16QAM	1	0	23.37	23.32	23.34	1
		1	7	23.39	23.34	23.36	1			1	2	23.36	23.31	23.33	1
		1	14	23.35	23.30	23.32	1			1	5	23.32	23.27	23.29	1
		8	0	22.45	22.40	22.42	2			3	0	23.22	23.17	23.19	1
		8	3	22.42	22.37	22.39	2			3	1	23.19	23.14	23.16	1
		8	7	22.35	22.30	22.32	2			3	3	23.12	23.07	23.09	1
		15	0	22.38	22.33	22.35	2			6	0	22.35	22.30	22.32	2
	64QAM	1	0	22.35	22.30	22.32	2		64QAM	1	0	22.32	22.27	22.29	2
		1	7	22.34	22.29	22.31	2			1	2	22.31	22.26	22.28	2
		1	14	22.30	22.25	22.27	2			1	5	22.27	22.22	22.24	2
		8	0	21.40	21.35	21.37	3			3	0	22.17	22.12	22.14	2
		8	3	21.37	21.32	21.34	3			3	1	22.14	22.09	22.11	2
		8	7	21.30	21.25	21.27	3			3	3	22.07	22.02	22.04	2
		15	0	21.33	21.28	21.30	3			6	0	21.30	21.25	21.27	3

LTE Band 25
Body-Worn / Hotspot
Ant-0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26140	26365	26590				Channel		26115	26365	26615	
		Frequency (MHz)		1860.0	1882.5	1905.0				Frequency (MHz)		1857.5	1882.5	1907.5	
20M	QPSK	1	0	24.55	24.37	24.61	0	15M	QPSK	1	0	24.48	24.30	24.54	0
		1	50	24.89	24.71	24.95	0			1	37	24.82	24.64	24.88	0
		1	99	24.86	24.68	24.92	0			1	74	24.79	24.61	24.85	0
		50	0	23.75	23.57	23.81	1			36	0	23.68	23.50	23.74	1
		50	25	23.93	23.75	23.99	1			36	19	23.86	23.68	23.92	1
		50	50	23.84	23.66	23.90	1			36	39	23.77	23.59	23.83	1
		100	0	23.89	23.71	23.95	1			75	0	23.82	23.64	23.88	1
	16QAM	1	0	23.53	23.35	23.59	1		16QAM	1	0	23.46	23.28	23.52	1
		1	50	23.87	23.69	23.93	1			1	37	23.80	23.62	23.86	1
		1	99	23.84	23.66	23.90	1			1	74	23.77	23.59	23.83	1
		50	0	22.73	22.55	22.79	2			36	0	22.66	22.48	22.72	2
		50	25	22.91	22.73	22.97	2			36	19	22.84	22.66	22.90	2
		50	50	22.82	22.64	22.88	2			36	39	22.75	22.57	22.81	2
		100	0	22.87	22.69	22.93	2			75	0	22.80	22.62	22.86	2
	64QAM	1	0	22.52	22.34	22.58	2		64QAM	1	0	22.45	22.27	22.51	2
		1	50	22.86	22.68	22.92	2			1	37	22.79	22.61	22.85	2
		1	99	22.83	22.65	22.89	2			1	74	22.76	22.58	22.82	2
		50	0	21.72	21.54	21.78	3			36	0	21.65	21.47	21.71	3
		50	25	21.90	21.72	21.96	3			36	19	21.83	21.65	21.89	3
		50	50	21.81	21.63	21.87	3			36	39	21.74	21.56	21.80	3
		100	0	21.86	21.68	21.92	3			75	0	21.79	21.61	21.85	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26090	26365	26640				Channel		26065	26365	26665	
		Frequency (MHz)		2855.0	1882.5	1910.0				Frequency (MHz)		1852.5	1882.5	1912.5	
10M	QPSK	1	0	24.39	24.21	24.45	0	5M	QPSK	1	0	24.32	24.14	24.38	0
		1	24	24.73	24.55	24.79	0			1	12	24.66	24.48	24.72	0
		1	49	24.70	24.52	24.76	0			1	24	24.63	24.45	24.69	0
		25	0	23.59	23.41	23.65	1			12	0	23.52	23.34	23.58	1
		25	12	23.77	23.59	23.83	1			12	6	23.70	23.52	23.76	1
		25	25	23.68	23.50	23.74	1			12	13	23.61	23.43	23.67	1
		50	0	23.73	23.55	23.79	1			25	0	23.66	23.48	23.72	1
	16QAM	1	0	23.37	23.19	23.43	1		16QAM	1	0	23.30	23.12	23.36	1
		1	24	23.71	23.53	23.77	1			1	12	23.64	23.46	23.70	1
		1	49	23.68	23.50	23.74	1			1	24	23.61	23.43	23.67	1
		25	0	22.57	22.39	22.63	2			12	0	22.50	22.32	22.56	2
		25	12	22.75	22.57	22.81	2			12	6	22.68	22.50	22.74	2
		25	25	22.66	22.48	22.72	2			12	13	22.59	22.41	22.65	2
		50	0	22.71	22.53	22.77	2			25	0	22.64	22.46	22.70	2
	64QAM	1	0	22.36	22.18	22.42	2		64QAM	1	0	22.29	22.11	22.35	2
		1	24	22.70	22.52	22.76	2			1	12	22.63	22.45	22.69	2
		1	49	22.67	22.49	22.73	2			1	24	22.60	22.42	22.66	2
		25	0	21.56	21.38	21.62	3			12	0	21.49	21.31	21.55	3
		25	12	21.74	21.56	21.80	3			12	6	21.67	21.49	21.73	3
		25	25	21.65	21.47	21.71	3			12	13	21.58	21.40	21.64	3
		50	0	21.70	21.52	21.76	3			25	0	21.63	21.45	21.69	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26055	26365	26675				Channel		26047	26365	26683	
		Frequency (MHz)		1851.5	1882.5	1913.5				Frequency (MHz)		1850.7	1882.5	1914.3	
3M	QPSK	1	0	24.27	24.09	24.33	0	1.4M	QPSK	1	0	24.21	24.03	24.27	0
		1	7	24.61	24.43	24.67	0			1	2	24.55	24.37	24.61	0
		1	14	24.58	24.40	24.64	0			1	5	24.52	24.34	24.58	0
		8	0	23.47	23.29	23.53	1			3	0	24.11	23.93	24.17	0
		8	3	23.65	23.47	23.71	1			3	1	24.29	24.11	24.35	0
		8	7	23.56	23.38	23.62	1			3	3	24.20	24.02	24.26	0
		15	0	23.61	23.43	23.67	1			6	0	23.55	23.37	23.61	1
	16QAM	1	0	23.25	23.07	23.31	1		16QAM	1	0	23.19	23.01	23.25	1
		1	7	23.59	23.41	23.65	1			1	2	23.53	23.35	23.59	1
		1	14	23.56	23.38	23.62	1			1	5	23.50	23.32	23.56	1
		8	0	22.45	22.27	22.51	2			3	0	23.09	22.91	23.15	1
		8	3	22.63	22.45	22.69	2			3	1	23.27	23.09	23.33	1
		8	7	22.54	22.36	22.60	2			3	3	23.18	23.00	23.24	1
		15	0	22.59	22.41	22.65	2			6	0	22.53	22.35	22.59	2
	64QAM	1	0	22.24	22.06	22.30	2		64QAM	1	0	22.18	22.00	22.24	2
		1	7	22.58	22.40	22.64	2			1	2	22.52	22.34	22.58	2
		1	14	22.55	22.37	22.61	2			1	5	22.49	22.31	22.55	2
		8	0	21.44	21.26	21.50	3			3	0	22.08	21.90	22.14	2
		8	3	21.62	21.44	21.68	3			3	1	22.26	22.08	22.32	2
		8	7	21.53	21.35	21.59	3			3	3	22.17	21.99	22.23	2
		15	0	21.58	21.40	21.64	3			6	0	21.52	21.34	21.58	3

EIRP Power (dBm)

GSM							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	512	1850.2	-12.66	36.57	23.91	246.04	H
	661	1880.0	-13.37	37.22	23.85	242.66	
	810	1909.8	-13.17	37.18	24.01	251.77	
	512	1850.2	-8.82	37.65	28.83	763.84	V
	661	1880.0	-8.95	37.58	28.63	729.46	
	810	1909.8	-8.47	37.48	29.01	796.16	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

EDGE							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	512	1850.2	-16.66	36.57	19.91	97.95	H
	661	1880.0	-17.37	37.22	19.85	96.61	
	810	1909.8	-17.17	37.18	20.01	100.23	
	512	1850.2	-13.02	37.65	24.63	290.40	V
	661	1880.0	-13.12	37.58	24.46	279.25	
	810	1909.8	-12.62	37.48	24.86	306.20	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	9262	1852.4	-17.95	36.57	18.62	72.78	H
	9400	1880.0	-18.53	37.22	18.69	73.96	
	9538	1907.6	-18.33	37.18	18.85	76.74	
	9262	1852.4	-14.26	37.65	23.39	218.27	V
	9400	1880.0	-14.06	37.58	23.52	224.91	
	9538	1907.6	-13.70	37.48	23.78	238.78	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

CDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	25	1851.25	-18.47	36.57	18.10	64.57	H
	600	1880.00	-19.05	37.22	18.17	65.61	
	1175	1908.75	-18.85	37.18	18.33	68.08	
	25	1851.25	-14.78	37.65	22.87	193.64	V
	600	1880.00	-14.58	37.58	23.00	199.53	
	1175	1908.75	-14.22	37.48	23.26	211.84	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18607	1850.7	-14.46	36.57	22.11	162.55	H
	18900	1880.0	-15.35	37.22	21.87	153.82	
	19193	1909.3	-15.21	37.18	21.97	157.40	
	18607	1850.7	-21.10	37.65	16.55	45.19	V
	18900	1880.0	-21.20	37.58	16.38	43.45	
	19193	1909.3	-20.99	37.48	16.49	44.57	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	18607	1850.7	-15.53	36.57	21.04	127.06	H
	18900	1880.0	-16.42	37.22	20.80	120.23	
	19193	1909.3	-16.28	37.18	20.90	123.03	
	18607	1850.7	-22.17	37.65	15.48	35.32	V
	18900	1880.0	-22.27	37.58	15.31	33.96	
	19193	1909.3	-22.06	37.48	15.42	34.83	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	18607	1850.7	-16.48	36.57	20.09	102.09	H
	18900	1880.0	-17.37	37.22	19.85	96.61	
	19193	1909.3	-17.23	37.18	19.95	98.86	
	18607	1850.7	-23.12	37.65	14.53	28.38	V
	18900	1880.0	-23.22	37.58	14.36	27.29	
	19193	1909.3	-23.01	37.48	14.47	27.99	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18615	1851.5	-14.23	36.57	22.34	171.40	H
	18900	1880.0	-15.12	37.22	22.10	162.18	
	19185	1908.5	-14.98	37.18	22.20	165.96	
	18615	1851.5	-20.87	37.65	16.78	47.64	V
	18900	1880.0	-20.97	37.58	16.61	45.81	
	19185	1908.5	-20.76	37.48	16.72	46.99	
Channel Bandwidth: 3 MHz / 16QAM							
X	18615	1851.5	-15.27	36.57	21.30	134.90	H
	18900	1880.0	-16.16	37.22	21.06	127.64	
	19185	1908.5	-16.02	37.18	21.16	130.62	
	18615	1851.5	-21.91	37.65	15.74	37.50	V
	18900	1880.0	-22.01	37.58	15.57	36.06	
	19185	1908.5	-21.80	37.48	15.68	36.98	
Channel Bandwidth: 3 MHz / 64QAM							
X	18615	1851.5	-16.24	36.57	20.33	107.89	H
	18900	1880.0	-17.13	37.22	20.09	102.09	
	19185	1908.5	-16.99	37.18	20.19	104.47	
	18615	1851.5	-22.88	37.65	14.77	29.99	V
	18900	1880.0	-22.98	37.58	14.60	28.84	
	19185	1908.5	-22.77	37.48	14.71	29.58	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18625	1852.5	-14.02	36.57	22.55	179.89	H
	18900	1880.0	-14.91	37.22	22.31	170.22	
	19175	1907.5	-14.77	37.18	22.41	174.18	
	18625	1852.5	-20.66	37.65	16.99	50.00	V
	18900	1880.0	-20.76	37.58	16.82	48.08	
	19175	1907.5	-20.55	37.48	16.93	49.32	
Channel Bandwidth: 5 MHz / 16QAM							
X	18625	1852.5	-15.05	36.57	21.52	141.91	H
	18900	1880.0	-15.94	37.22	21.28	134.28	
	19175	1907.5	-15.80	37.18	21.38	137.40	
	18625	1852.5	-21.69	37.65	15.96	39.45	V
	18900	1880.0	-21.79	37.58	15.79	37.93	
	19175	1907.5	-21.58	37.48	15.90	38.90	
Channel Bandwidth: 5 MHz / 64QAM							
X	18625	1852.5	-16.01	36.57	20.56	113.76	H
	18900	1880.0	-16.90	37.22	20.32	107.65	
	19175	1907.5	-16.76	37.18	20.42	110.15	
	18625	1852.5	-22.65	37.65	15.00	31.62	V
	18900	1880.0	-22.75	37.58	14.83	30.41	
	19175	1907.5	-22.54	37.48	14.94	31.19	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18650	1855.0	-13.78	36.57	22.79	190.11	H
	18900	1880.0	-14.67	37.22	22.55	179.89	
	19150	1905.0	-14.53	37.18	22.65	184.08	
	18650	1855.0	-20.42	37.65	17.23	52.84	V
	18900	1880.0	-20.52	37.58	17.06	50.82	
	19150	1905.0	-20.31	37.48	17.17	52.12	
Channel Bandwidth: 10 MHz / 16QAM							
X	18650	1855.0	-14.81	36.57	21.76	149.97	H
	18900	1880.0	-15.70	37.22	21.52	141.91	
	19150	1905.0	-15.56	37.18	21.62	145.21	
	18650	1855.0	-21.45	37.65	16.20	41.69	V
	18900	1880.0	-21.55	37.58	16.03	40.09	
	19150	1905.0	-21.34	37.48	16.14	41.11	
Channel Bandwidth: 10 MHz / 64QAM							
X	18650	1855.0	-15.79	36.57	20.78	119.67	H
	18900	1880.0	-16.68	37.22	20.54	113.24	
	19150	1905.0	-16.54	37.18	20.64	115.88	
	18650	1855.0	-22.43	37.65	15.22	33.27	V
	18900	1880.0	-22.53	37.58	15.05	31.99	
	19150	1905.0	-22.32	37.48	15.16	32.81	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18675	1857.5	-13.55	36.57	23.02	200.45	H
	18900	1880.0	-14.44	37.22	22.78	189.67	
	19125	1902.5	-14.30	37.18	22.88	194.09	
	18675	1857.5	-20.19	37.65	17.46	55.72	V
	18900	1880.0	-20.29	37.58	17.29	53.58	
	19125	1902.5	-20.08	37.48	17.40	54.95	
Channel Bandwidth: 15 MHz / 16QAM							
X	18675	1857.5	-14.58	36.57	21.99	158.12	H
	18900	1880.0	-15.47	37.22	21.75	149.62	
	19125	1902.5	-15.33	37.18	21.85	153.11	
	18675	1857.5	-21.22	37.65	16.43	43.95	V
	18900	1880.0	-21.32	37.58	16.26	42.27	
	19125	1902.5	-21.11	37.48	16.37	43.35	
Channel Bandwidth: 15 MHz / 64QAM							
X	18675	1857.5	-15.56	36.57	21.01	126.18	H
	18900	1880.0	-16.45	37.22	20.77	119.40	
	19125	1902.5	-16.31	37.18	20.87	122.18	
	18675	1857.5	-22.20	37.65	15.45	35.08	V
	18900	1880.0	-22.30	37.58	15.28	33.73	
	19125	1902.5	-22.09	37.48	15.39	34.59	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 2							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	18700	1860.0	-13.32	36.57	23.25	211.35	H
	18900	1880.0	-14.21	37.22	23.01	199.99	
	19100	1900.0	-14.07	37.18	23.11	204.64	
	18700	1860.0	-19.96	37.65	17.69	58.75	V
	18900	1880.0	-20.06	37.58	17.52	56.49	
	19100	1900.0	-19.85	37.48	17.63	57.94	
Channel Bandwidth: 20 MHz / 16QAM							
X	18700	1860.0	-14.34	36.57	22.23	167.11	H
	18900	1880.0	-15.23	37.22	21.99	158.12	
	19100	1900.0	-15.09	37.18	22.09	161.81	
	18700	1860.0	-20.98	37.65	16.67	46.45	V
	18900	1880.0	-21.08	37.58	16.50	44.67	
	19100	1900.0	-20.87	37.48	16.61	45.81	
Channel Bandwidth: 20 MHz / 64QAM							
X	18700	1860.0	-15.32	36.57	21.25	133.35	H
	18900	1880.0	-16.21	37.22	21.01	126.18	
	19100	1900.0	-16.07	37.18	21.11	129.12	
	18700	1860.0	-21.96	37.65	15.69	37.07	V
	18900	1880.0	-22.06	37.58	15.52	35.65	
	19100	1900.0	-21.85	37.48	15.63	36.56	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26047	1850.7	-15.04	36.57	21.53	142.23	H
	26365	1882.5	-15.41	37.22	21.81	151.71	
	26683	1914.3	-17.44	39.09	21.65	146.22	
	26047	1850.7	-22.26	37.65	15.39	34.59	V
	26365	1882.5	-21.93	37.58	15.65	36.73	
	26683	1914.3	-22.40	37.92	15.52	35.65	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	26047	1850.7	-16.03	36.57	20.54	113.24	H
	26365	1882.5	-16.40	37.22	20.82	120.78	
	26683	1914.3	-18.43	39.09	20.66	116.41	
	26047	1850.7	-23.25	37.65	14.40	27.54	V
	26365	1882.5	-22.92	37.58	14.66	29.24	
	26683	1914.3	-23.39	37.92	14.53	28.38	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	26047	1850.7	-17.10	36.57	19.47	88.51	H
	26365	1882.5	-17.47	37.22	19.75	94.41	
	26683	1914.3	-19.50	39.09	19.59	90.99	
	26047	1850.7	-24.32	37.65	13.33	21.53	V
	26365	1882.5	-23.99	37.58	13.59	22.86	
	26683	1914.3	-24.46	37.92	13.46	22.18	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26055	1851.5	-14.82	36.57	21.75	149.62	H
	26365	1882.5	-15.19	37.22	22.03	159.59	
	26675	1913.5	-17.24	39.11	21.87	153.82	
	26055	1851.5	-22.04	37.65	15.61	36.39	V
	26365	1882.5	-21.71	37.58	15.87	38.64	
	26675	1913.5	-22.19	37.93	15.74	37.50	
Channel Bandwidth: 3 MHz / 16QAM							
X	26055	1851.5	-15.77	36.57	20.80	120.23	H
	26365	1882.5	-16.14	37.22	21.08	128.23	
	26675	1913.5	-18.19	39.11	20.92	123.59	
	26055	1851.5	-22.99	37.65	14.66	29.24	V
	26365	1882.5	-22.66	37.58	14.92	31.05	
	26675	1913.5	-23.14	37.93	14.79	30.13	
Channel Bandwidth: 3 MHz / 64QAM							
X	26055	1851.5	-16.87	36.57	19.70	93.33	H
	26365	1882.5	-17.24	37.22	19.98	99.54	
	26675	1913.5	-19.29	39.11	19.82	95.94	
	26055	1851.5	-24.09	37.65	13.56	22.70	V
	26365	1882.5	-23.76	37.58	13.82	24.10	
	26675	1913.5	-24.24	37.93	13.69	23.39	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26065	1852.5	-14.56	36.57	22.01	158.85	H
	26365	1882.5	-14.93	37.22	22.29	169.43	
	26665	1912.5	-15.98	38.11	22.13	163.31	
	26065	1852.5	-21.78	37.65	15.87	38.64	V
	26365	1882.5	-21.45	37.58	16.13	41.02	
	26665	1912.5	-21.96	37.96	16.00	39.81	
Channel Bandwidth: 5 MHz / 16QAM							
X	26065	1852.5	-15.54	36.57	21.03	126.77	H
	26365	1882.5	-15.91	37.22	21.31	135.21	
	26665	1912.5	-16.96	38.11	21.15	130.32	
	26065	1852.5	-22.76	37.65	14.89	30.83	V
	26365	1882.5	-22.43	37.58	15.15	32.73	
	26665	1912.5	-22.94	37.96	15.02	31.77	
Channel Bandwidth: 5 MHz / 64QAM							
X	26065	1852.5	-16.62	36.57	19.95	98.86	H
	26365	1882.5	-16.99	37.22	20.23	105.44	
	26665	1912.5	-18.04	38.11	20.07	101.62	
	26065	1852.5	-23.84	37.65	13.81	24.04	V
	26365	1882.5	-23.51	37.58	14.07	25.53	
	26665	1912.5	-24.02	37.96	13.94	24.77	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26090	1855.0	-14.32	36.57	22.25	167.88	H
	26365	1882.5	-14.69	37.22	22.53	179.06	
	26640	1910.0	-15.82	38.19	22.37	172.58	
	26090	1855.0	-21.54	37.65	16.11	40.83	V
	26365	1882.5	-21.21	37.58	16.37	43.35	
	26640	1910.0	-21.91	38.15	16.24	42.07	
Channel Bandwidth: 10 MHz / 16QAM							
X	26090	1855.0	-15.31	36.57	21.26	133.66	H
	26365	1882.5	-15.68	37.22	21.54	142.56	
	26640	1910.0	-16.81	38.19	21.38	137.40	
	26090	1855.0	-22.53	37.65	15.12	32.51	V
	26365	1882.5	-22.20	37.58	15.38	34.51	
	26640	1910.0	-22.90	38.15	15.25	33.50	
Channel Bandwidth: 10 MHz / 64QAM							
X	26090	1855.0	-16.36	36.57	20.21	104.95	H
	26365	1882.5	-16.73	37.22	20.49	111.94	
	26640	1910.0	-17.86	38.19	20.33	107.89	
	26090	1855.0	-23.58	37.65	14.07	25.53	V
	26365	1882.5	-23.25	37.58	14.33	27.10	
	26640	1910.0	-23.95	38.15	14.20	26.30	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26115	1857.5	-14.09	36.57	22.48	177.01	H
	26365	1882.5	-14.46	37.22	22.76	188.80	
	26615	1907.5	-15.63	38.23	22.60	181.97	
	26115	1857.5	-21.31	37.65	16.34	43.05	V
	26365	1882.5	-20.98	37.58	16.60	45.71	
	26615	1907.5	-21.75	38.22	16.47	44.36	
Channel Bandwidth: 15 MHz / 16QAM							
X	26115	1857.5	-15.07	36.57	21.50	141.25	H
	26365	1882.5	-15.44	37.22	21.78	150.66	
	26615	1907.5	-16.61	38.23	21.62	145.21	
	26115	1857.5	-22.29	37.65	15.36	34.36	V
	26365	1882.5	-21.96	37.58	15.62	36.48	
	26615	1907.5	-22.73	38.22	15.49	35.40	
Channel Bandwidth: 15 MHz / 64QAM							
X	26115	1857.5	-16.10	36.57	20.47	111.43	H
	26365	1882.5	-16.47	37.22	20.75	118.85	
	26615	1907.5	-17.64	38.23	20.59	114.55	
	26115	1857.5	-23.32	37.65	14.33	27.10	V
	26365	1882.5	-22.99	37.58	14.59	28.77	
	26615	1907.5	-23.76	38.22	14.46	27.93	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 25							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	26140	1860.0	-13.84	36.57	22.73	187.50	H
	26365	1882.5	-14.21	37.22	23.01	199.99	
	26590	1905.0	-15.87	38.72	22.85	192.75	
	26140	1860.0	-21.06	37.65	16.59	45.60	V
	26365	1882.5	-20.73	37.58	16.85	48.42	
	26590	1905.0	-20.84	37.56	16.72	46.99	
Channel Bandwidth: 20 MHz / 16QAM							
X	26140	1860.0	-14.83	36.57	21.74	149.28	H
	26365	1882.5	-15.20	37.22	22.02	159.22	
	26590	1905.0	-16.86	38.72	21.86	153.46	
	26140	1860.0	-22.05	37.65	15.60	36.31	V
	26365	1882.5	-21.72	37.58	15.86	38.55	
	26590	1905.0	-21.83	37.56	15.73	37.41	
Channel Bandwidth: 20 MHz / 64QAM							
X	26140	1860.0	-15.85	36.57	20.72	118.03	H
	26365	1882.5	-16.22	37.22	21.00	125.89	
	26590	1905.0	-17.88	38.72	20.84	121.34	
	26140	1860.0	-23.07	37.65	14.58	28.71	V
	26365	1882.5	-22.74	37.58	14.84	30.48	
	26590	1905.0	-22.85	37.56	14.71	29.58	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

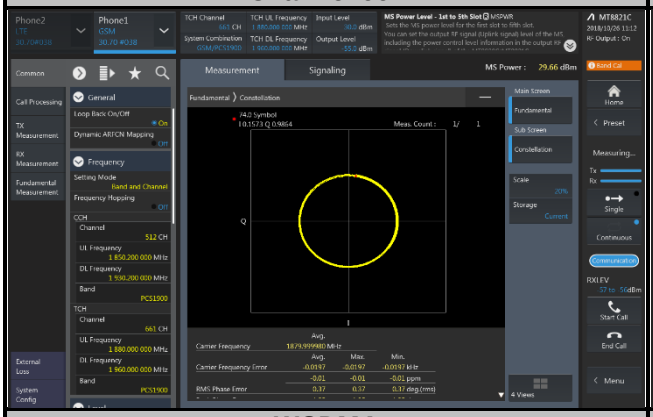
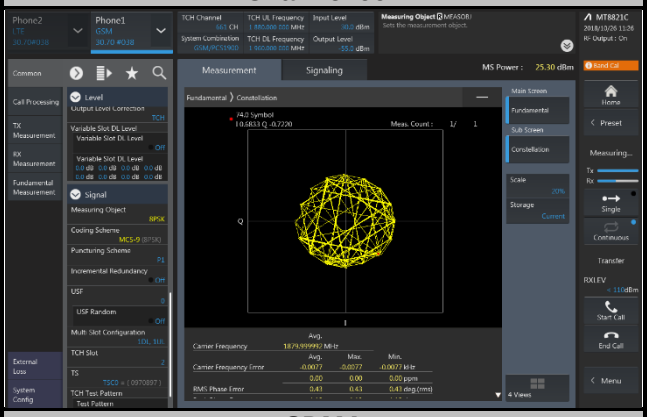
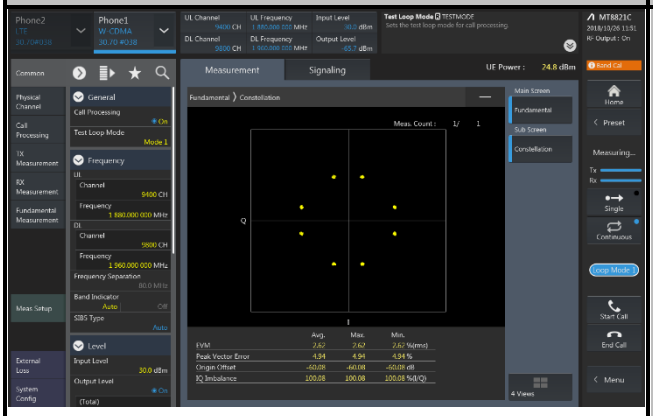
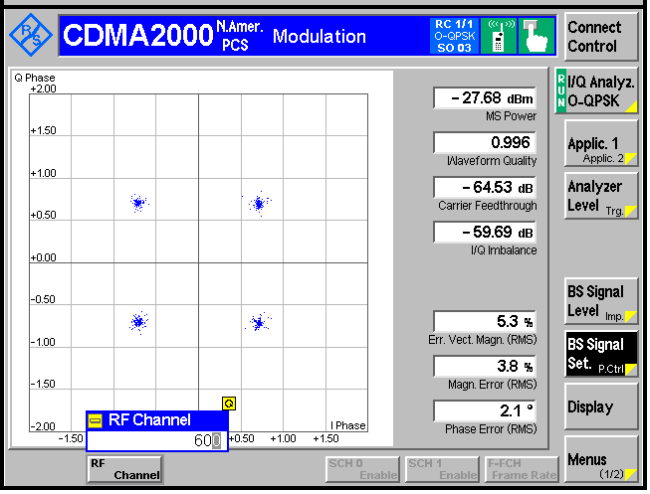
N/A

4.2.2 Test Setup

4.2.3 Test Procedure

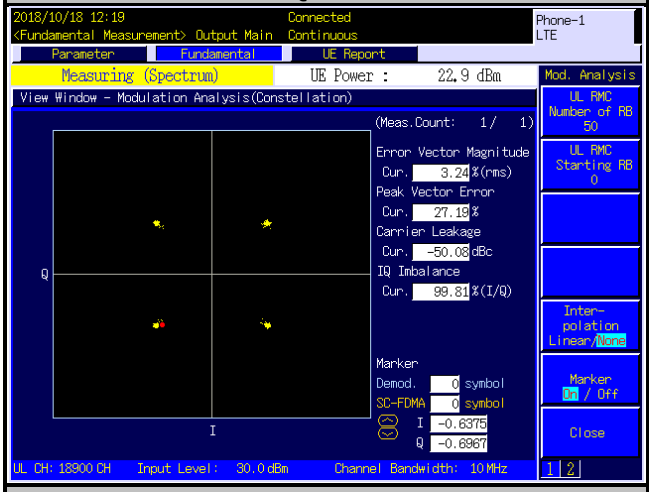
Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.4 Test Results

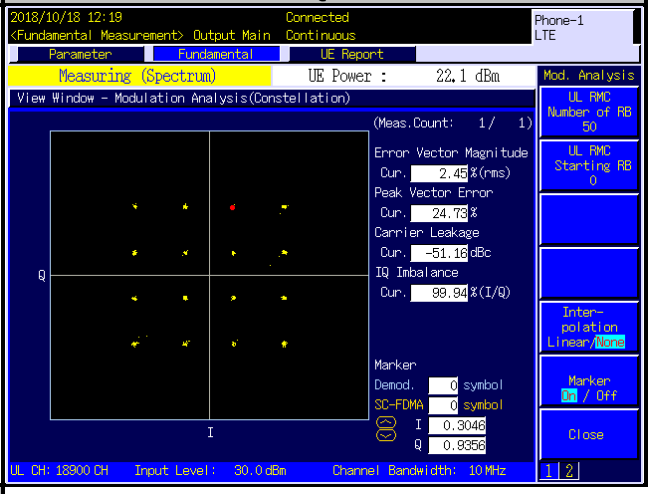
Spectrum Plot of Measurement	
GSM	**EDGE**
Channel 661	**Channel 661**
	
WCDMA	**CDMA**
Channel 9400	**Channel 600**
	

Spectrum Plot of Measurement
LTE Band 2
Channel 18900

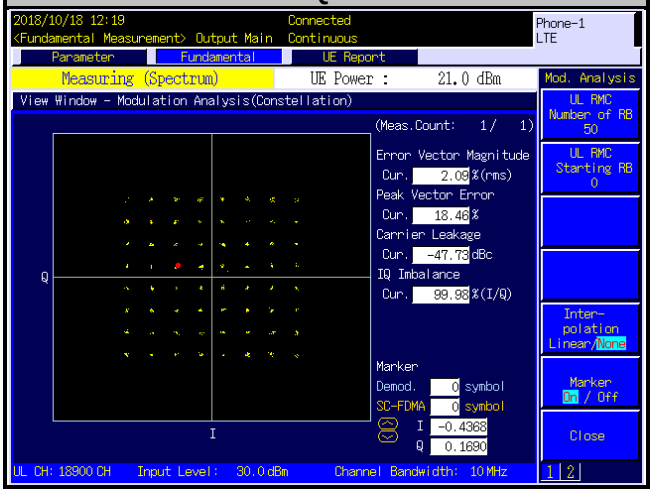
QPSK



16QAM

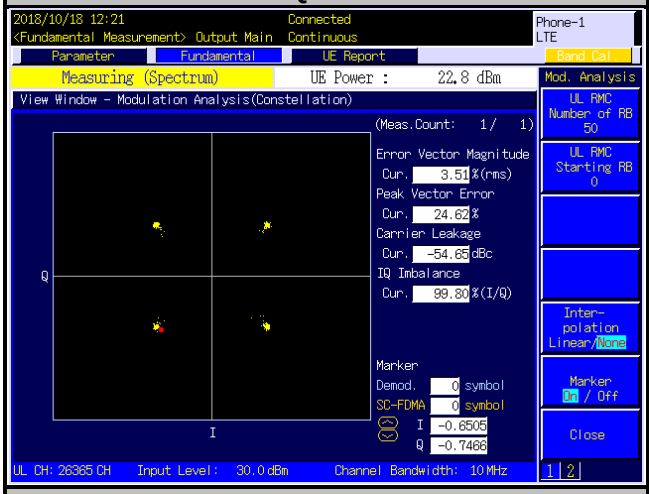


64QAM

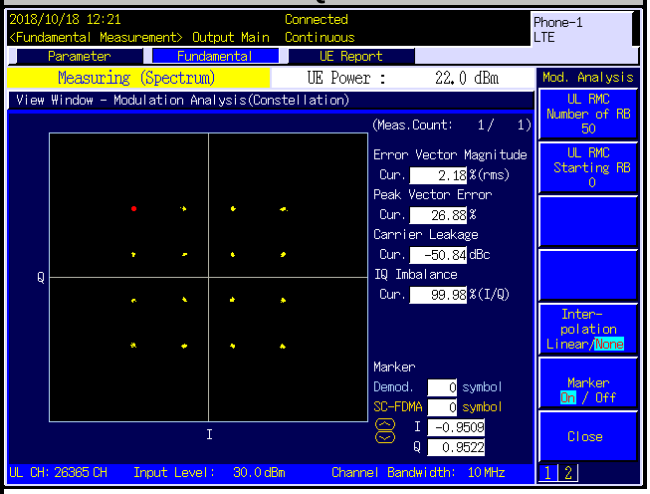


Spectrum Plot of Measurement
LTE Band 25
Channel 26365

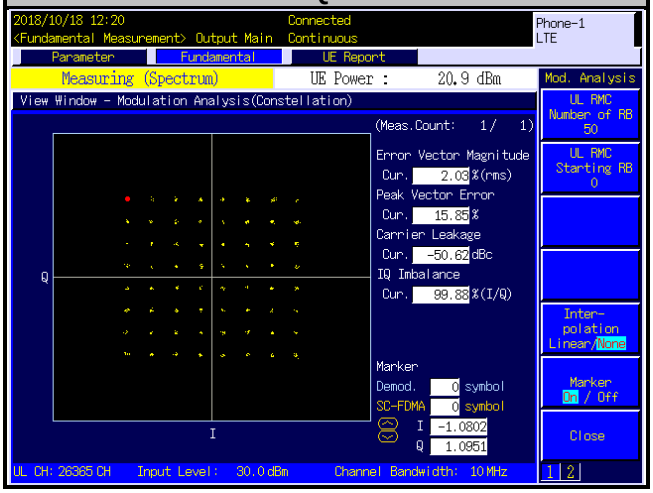
QPSK



16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

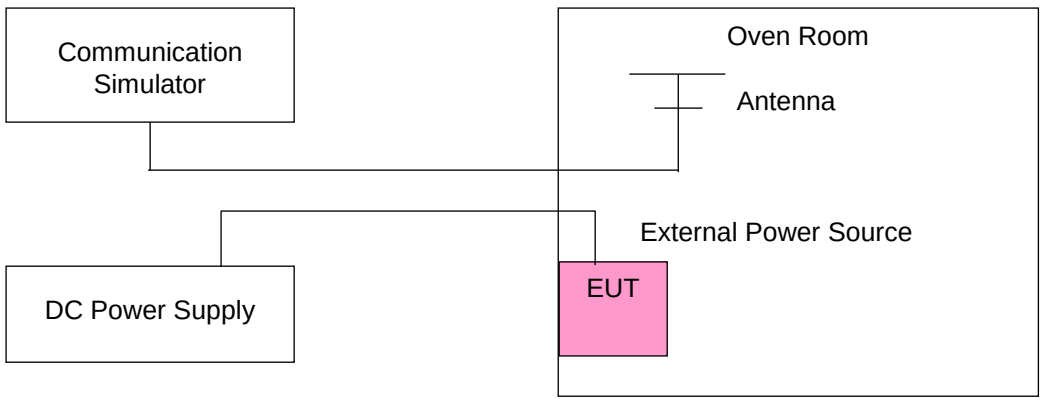
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.3.2 Test Procedure

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

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	GSM			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1850.200001	0.001	1909.800002	0.001
3.6	1850.200002	0.001	1909.800003	0.001
4.4	1850.200002	0.001	1909.800001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	GSM			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.200002	0.001	1909.800004	0.002
-20	1850.200002	0.001	1909.800001	0.001
-10	1850.200004	0.002	1909.800001	0.001
0	1850.200003	0.001	1909.800004	0.002
10	1850.200004	0.002	1909.800003	0.001
20	1850.199997	-0.002	1909.799997	-0.002
30	1850.199999	-0.001	1909.799997	-0.002
40	1850.199999	-0.001	1909.799999	-0.001
50	1850.199999	-0.001	1909.799999	-0.001
55	1850.199999	-0.001	1909.799996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	EDGE			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1850.200003	0.002	1909.800003	0.002
3.6	1850.200003	0.001	1909.800001	0.001
4.4	1850.200003	0.002	1909.800003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	EDGE			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.200002	0.001	1909.800003	0.001
-20	1850.200002	0.001	1909.800003	0.001
-10	1850.200002	0.001	1909.800003	0.001
0	1850.200003	0.002	1909.800002	0.001
10	1850.200002	0.001	1909.800004	0.002
20	1850.199996	-0.002	1909.799996	-0.002
30	1850.199998	-0.001	1909.799999	-0.001
40	1850.199998	-0.001	1909.799998	-0.001
50	1850.199998	-0.001	1909.799998	-0.001
55	1850.199999	-0.001	1909.799997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1852.400004	0.002	1907.600001	0.001
3.6	1852.400002	0.001	1907.600001	0.001
4.4	1852.400002	0.001	1907.600002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.400001	0.001	1907.600002	0.001
-20	1852.400003	0.002	1907.600003	0.002
-10	1852.400003	0.002	1907.600002	0.001
0	1852.400002	0.001	1907.600003	0.002
10	1852.400004	0.002	1907.600002	0.001
20	1852.399998	-0.001	1907.599998	-0.001
30	1852.399997	-0.002	1907.599997	-0.002
40	1852.399997	-0.002	1907.599999	-0.001
50	1852.399997	-0.002	1907.599997	-0.002
55	1852.399997	-0.001	1907.599998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	CDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1851.250001	0.001	1908.750003	0.002
3.6	1851.250001	0.001	1908.750003	0.002
4.4	1851.250003	0.002	1908.750004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	CDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.250003	0.002	1908.750002	0.001
-20	1851.250002	0.001	1908.750003	0.002
-10	1851.250003	0.002	1908.750003	0.002
0	1851.250003	0.002	1908.750002	0.001
10	1851.250003	0.001	1908.750003	0.002
20	1851.249997	-0.002	1908.749999	-0.001
30	1851.249999	-0.001	1908.749996	-0.002
40	1851.249998	-0.001	1908.749998	-0.001
50	1851.249998	-0.001	1908.749996	-0.002
55	1851.249999	-0.001	1908.749997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1850.700004	0.002	1909.300000	0.002
3.6	1850.700001	0.001	1909.300003	0.002
4.4	1850.700002	0.001	1909.300001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700003	0.002	1909.300002	0.001
-20	1850.700004	0.002	1909.300002	0.001
-10	1850.700004	0.002	1909.300002	0.001
0	1850.700002	0.001	1909.300002	0.001
10	1850.700003	0.002	1909.300004	0.002
20	1850.699996	-0.002	1909.299997	-0.002
30	1850.699997	-0.002	1909.299996	-0.002
40	1850.699997	-0.002	1909.299997	-0.002
50	1850.699996	-0.002	1909.299997	-0.001
55	1850.699999	-0.001	1909.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1851.500004	0.002	1907.500002	0.001
3.6	1851.500004	0.002	1907.500004	0.002
4.4	1851.500002	0.001	1907.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500002	0.001	1907.500003	0.002
-20	1851.500001	0.001	1907.500001	0.001
-10	1851.500001	0.001	1907.500004	0.002
0	1851.500003	0.002	1907.500002	0.001
10	1851.500003	0.001	1907.500001	0.001
20	1851.499998	-0.001	1907.499998	-0.001
30	1851.499997	-0.002	1907.499998	-0.001
40	1851.499999	-0.001	1907.499998	-0.001
50	1851.499999	-0.001	1907.499996	-0.002
55	1851.499999	-0.001	1907.499997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1852.500002	0.001	1907.500003	0.001
3.6	1852.500002	0.001	1907.500003	0.002
4.4	1852.500003	0.001	1907.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500002	0.001	1907.500004	0.002
-20	1852.500002	0.001	1907.500003	0.002
-10	1852.500002	0.001	1907.500003	0.002
0	1852.500002	0.001	1907.500001	0.001
10	1852.500004	0.002	1907.500004	0.002
20	1852.499997	-0.002	1907.499997	-0.002
30	1852.499997	-0.002	1907.499997	-0.002
40	1852.499997	-0.002	1907.499997	-0.002
50	1852.499997	-0.001	1907.499999	-0.001
55	1852.499996	-0.002	1907.499996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1855.000003	0.002	1905.000002	0.001
3.6	1855.000001	0.001	1905.000002	0.001
4.4	1855.000003	0.001	1905.000002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000003	0.002	1905.000004	0.002
-20	1855.000001	0.001	1905.000003	0.001
-10	1855.000004	0.002	1905.000004	0.002
0	1855.000004	0.002	1905.000004	0.002
10	1855.000002	0.001	1905.000003	0.002
20	1854.999997	-0.002	1904.999997	-0.002
30	1854.999999	-0.001	1904.999997	-0.002
40	1854.999996	-0.002	1904.999998	-0.001
50	1854.999996	-0.002	1904.999999	-0.001
55	1854.999999	-0.001	1904.999997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1857.500002	0.001	1902.500003	0.002
3.6	1857.500003	0.001	1902.500003	0.002
4.4	1857.500002	0.001	1902.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500002	0.001	1902.500003	0.002
-20	1857.500002	0.001	1902.500004	0.002
-10	1857.500001	0.001	1902.500002	0.001
0	1857.500002	0.001	1902.500004	0.002
10	1857.500003	0.002	1902.500002	0.001
20	1857.499999	-0.001	1902.499996	-0.002
30	1857.499998	-0.001	1902.499999	-0.001
40	1857.499999	-0.001	1902.499996	-0.002
50	1857.499999	-0.001	1902.499998	-0.001
55	1857.499998	-0.001	1902.499996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1860.000002	0.001	1900.000002	0.001
3.6	1860.000002	0.001	1900.000003	0.002
4.4	1860.000002	0.001	1900.000002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000002	0.001	1900.000003	0.002
-20	1860.000002	0.001	1900.000003	0.001
-10	1860.000002	0.001	1900.000003	0.001
0	1860.000002	0.001	1900.000003	0.001
10	1860.000003	0.001	1900.000002	0.001
20	1859.999998	-0.001	1899.999999	-0.001
30	1859.999998	-0.001	1899.999999	-0.001
40	1859.999996	-0.002	1899.999997	-0.001
50	1859.999998	-0.001	1899.999998	-0.001
55	1859.999998	-0.001	1899.999996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1850.700003	0.002	1914.300002	0.001
3.6	1850.700002	0.001	1914.300001	0.001
4.4	1850.700001	0.001	1914.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700001	0.001	1914.300002	0.001
-20	1850.700004	0.002	1914.300002	0.001
-10	1850.700002	0.001	1914.300003	0.002
0	1850.700002	0.001	1914.300004	0.002
10	1850.700003	0.001	1914.300004	0.002
20	1850.699997	-0.002	1914.299998	-0.001
30	1850.699998	-0.001	1914.299998	-0.001
40	1850.699996	-0.002	1914.299999	-0.001
50	1850.699999	-0.001	1914.299999	-0.001
55	1850.699997	-0.002	1914.299999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1851.500002	0.001	1913.500003	0.001
3.6	1851.500001	0.001	1913.500003	0.001
4.4	1851.500002	0.001	1913.500003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500001	0.001	1913.500003	0.002
-20	1851.500003	0.002	1913.500003	0.001
-10	1851.500001	0.001	1913.500001	0.001
0	1851.500004	0.002	1913.500001	0.001
10	1851.500002	0.001	1913.500003	0.002
20	1851.499997	-0.002	1913.499997	-0.001
30	1851.499997	-0.002	1913.499996	-0.002
40	1851.499998	-0.001	1913.499997	-0.001
50	1851.499997	-0.002	1913.499996	-0.002
55	1851.499998	-0.001	1913.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1852.500002	0.001	1912.500001	0.001
3.6	1852.500004	0.002	1912.500002	0.001
4.4	1852.500001	0.001	1912.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500002	0.001	1912.500003	0.002
-20	1852.500002	0.001	1912.500001	0.001
-10	1852.500002	0.001	1912.500003	0.001
0	1852.500003	0.001	1912.500004	0.002
10	1852.500002	0.001	1912.500003	0.001
20	1852.499996	-0.002	1912.499998	-0.001
30	1852.499998	-0.001	1912.499998	-0.001
40	1852.499996	-0.002	1912.499997	-0.001
50	1852.499998	-0.001	1912.499996	-0.002
55	1852.499999	-0.001	1912.499996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1855.000003	0.002	1910.000003	0.002
3.6	1855.000003	0.001	1910.000003	0.002
4.4	1855.000003	0.002	1910.000003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000003	0.002	1910.000002	0.001
-20	1855.000002	0.001	1910.000003	0.002
-10	1855.000002	0.001	1910.000003	0.002
0	1855.000004	0.002	1910.000003	0.001
10	1855.000002	0.001	1910.000003	0.001
20	1854.999999	-0.001	1909.999997	-0.002
30	1854.999997	-0.002	1909.999999	-0.001
40	1854.999998	-0.001	1909.999999	-0.001
50	1854.999998	-0.001	1909.999999	-0.001
55	1854.999996	-0.002	1909.999997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1857.500004	0.002	1907.500004	0.002
3.6	1857.500004	0.002	1907.500001	0.001
4.4	1857.500002	0.001	1907.500004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500002	0.001	1907.500004	0.002
-20	1857.500003	0.002	1907.500003	0.001
-10	1857.500004	0.002	1907.500002	0.001
0	1857.500003	0.002	1907.500003	0.002
10	1857.500003	0.001	1907.500001	0.001
20	1857.499996	-0.002	1907.499998	-0.001
30	1857.499998	-0.001	1907.499998	-0.001
40	1857.499997	-0.002	1907.499996	-0.002
50	1857.499998	-0.001	1907.499998	-0.001
55	1857.499996	-0.002	1907.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 25			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1860.000003	0.002	1905.000002	0.001
3.6	1860.000003	0.002	1905.000002	0.001
4.4	1860.000002	0.001	1905.000003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

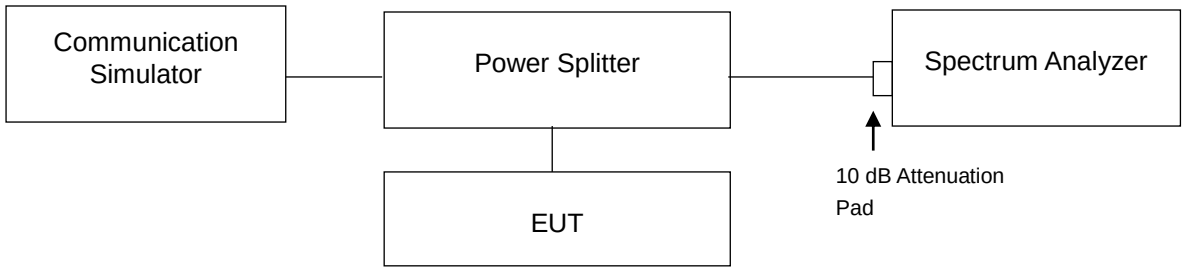
Temp. (℃)	LTE Band 25			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000003	0.002	1905.000004	0.002
-20	1860.000003	0.002	1905.000001	0.001
-10	1860.000001	0.001	1905.000002	0.001
0	1860.000002	0.001	1905.000003	0.002
10	1860.000004	0.002	1905.000001	0.001
20	1859.999997	-0.002	1904.999999	-0.001
30	1859.999999	-0.001	1904.999997	-0.001
40	1859.999998	-0.001	1904.999997	-0.002
50	1859.999998	-0.001	1904.999999	-0.001
55	1859.999997	-0.002	1904.999996	-0.002

4.4 Occupied Bandwidth Measurement

4.4.1 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. 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.

4.4.2 Test Setup



4.4.3 Test Result

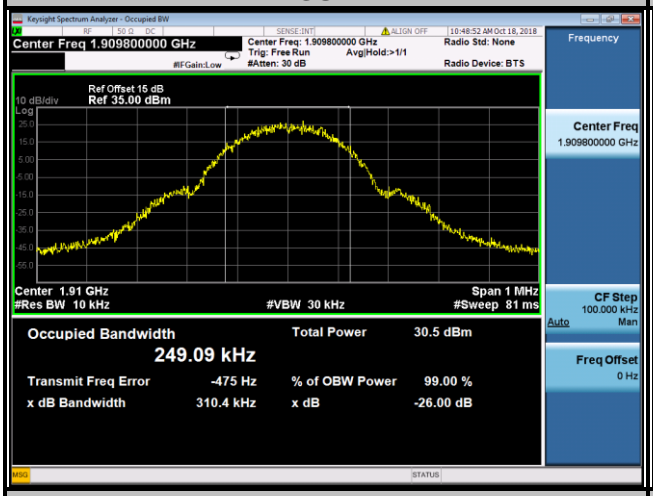
<99 % Occupied Bandwidth>

Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)
		GSM	EDGE			WCDMA
512	1850.2	247.97	246.52	9262	1852.4	4.1506
661	1880.0	247.28	245.11	9400	1880.0	4.1503
810	1909.8	249.09	245.52	9538	1907.6	4.1485

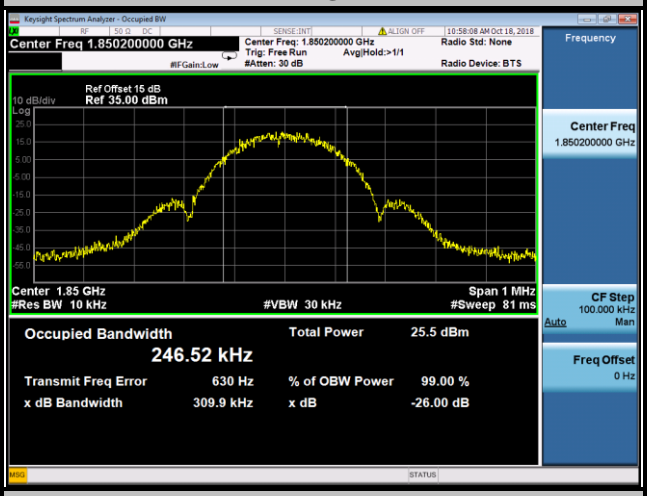
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)
		CDMA
25	1851.25	1.2703
600	1880.00	1.2748
1175	1908.75	1.2775

Spectrum Plot of Worst Value

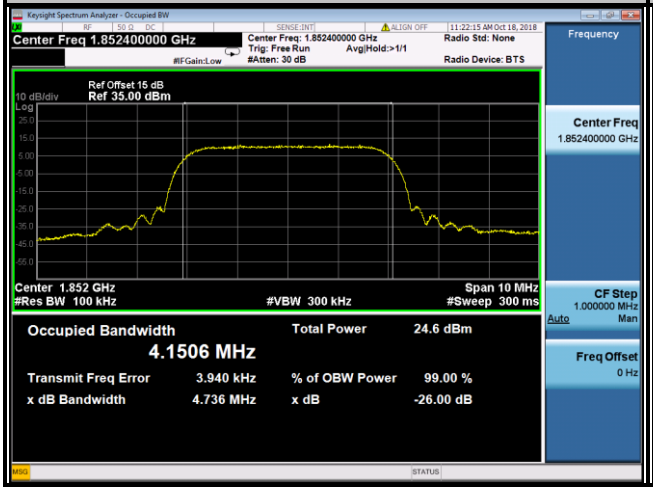
GSM



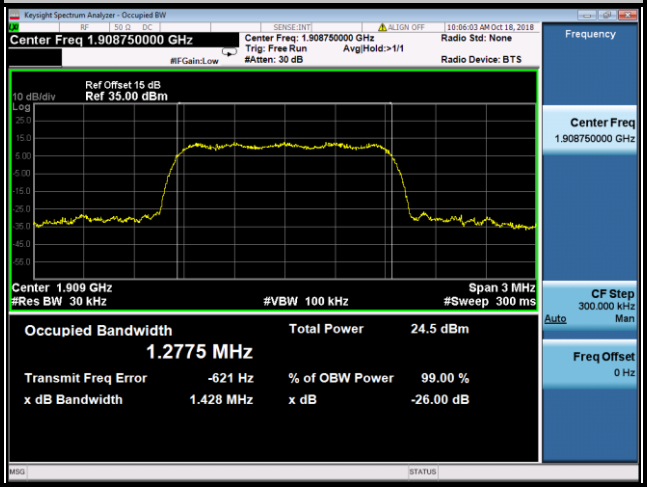
EDGE



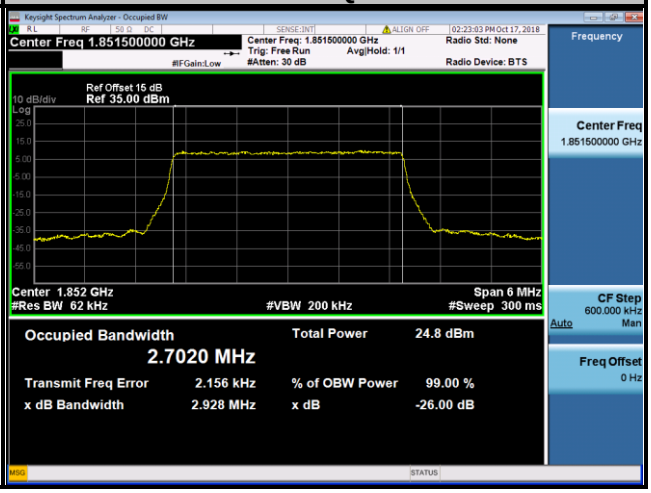
WCDMA



CDMA

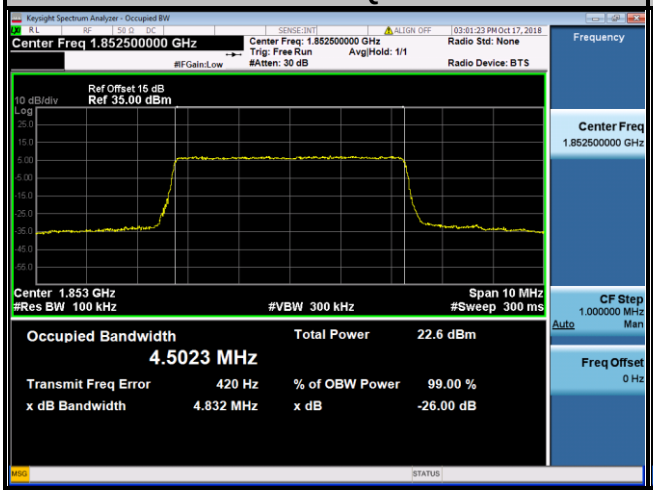


LTE Band 2									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18607	1850.7	1.0878	1.0887	1.0897	18615	1851.5	2.7020	2.6960	2.6974
18900	1880.0	1.0860	1.0870	1.0875	18900	1880.0	2.7011	2.6954	2.6998
19193	1909.3	1.0865	1.0908	1.0885	19185	1908.5	2.7013	2.6969	2.6975

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / QPSK
	

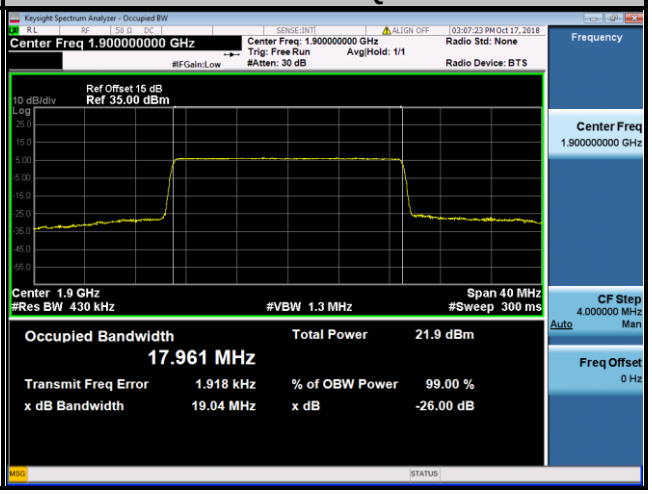
LTE Band 2									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18625	1852.5	4.4876	4.4911	4.5023	18650	1855.0	8.9665	8.9706	8.9718
18900	1880.0	4.4911	4.4933	4.4990	18900	1880.0	8.9687	8.9771	8.9756
19175	1907.5	4.4924	4.4939	4.5005	19150	1905.0	8.9695	8.9659	8.9748

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 16QAM



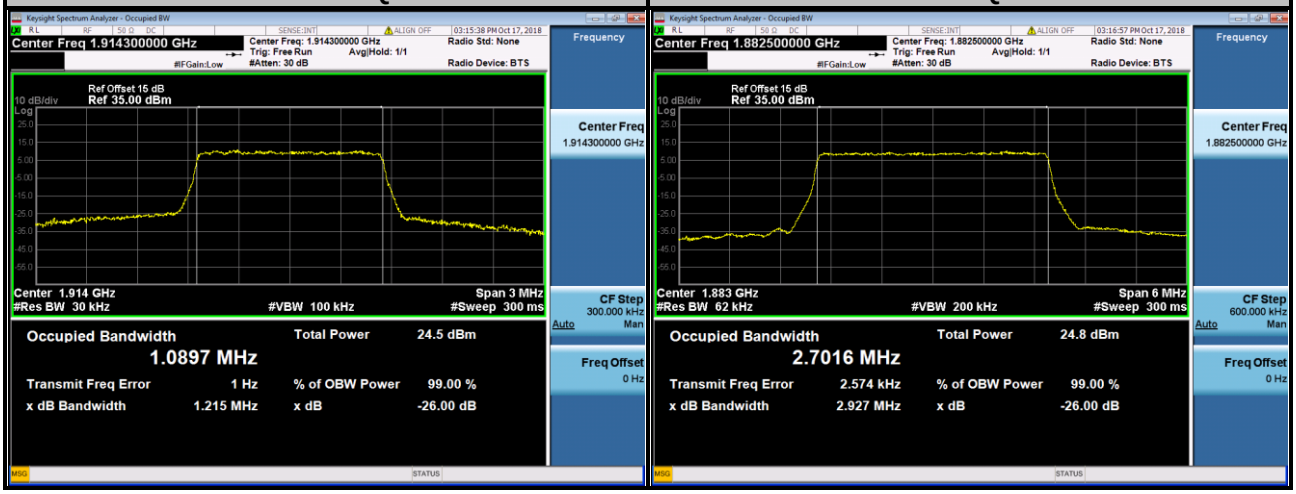
LTE Band 2									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18675	1857.5	13.447	13.436	13.431	18700	1860.0	17.910	17.924	17.927
18900	1880.0	13.463	13.450	13.444	18900	1880.0	17.934	17.954	17.951
19125	1902.5	13.457	13.454	13.443	19100	1900.0	17.936	17.958	17.961

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / 64QAM

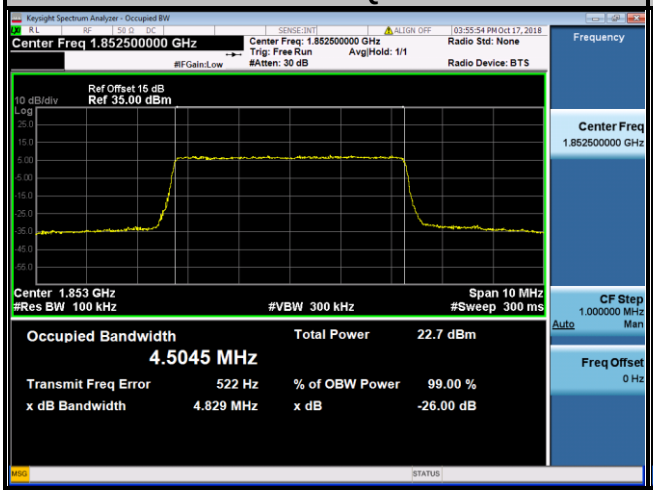
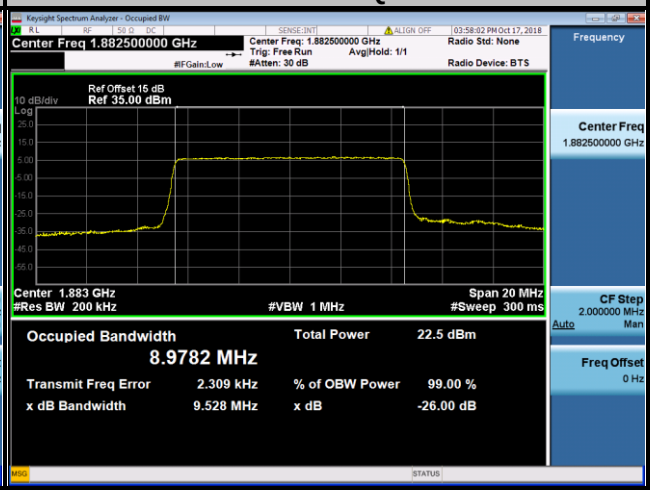


LTE Band 25									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26047	1850.7	1.0866	1.0893	1.0869	26055	1851.5	2.7002	2.6981	2.6981
26365	1882.5	1.0870	1.0895	1.0886	26365	1882.5	2.7016	2.6954	2.6998
26683	1914.3	1.0872	1.0897	1.0897	26675	1913.5	2.7011	2.6966	2.6974

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / QPSK

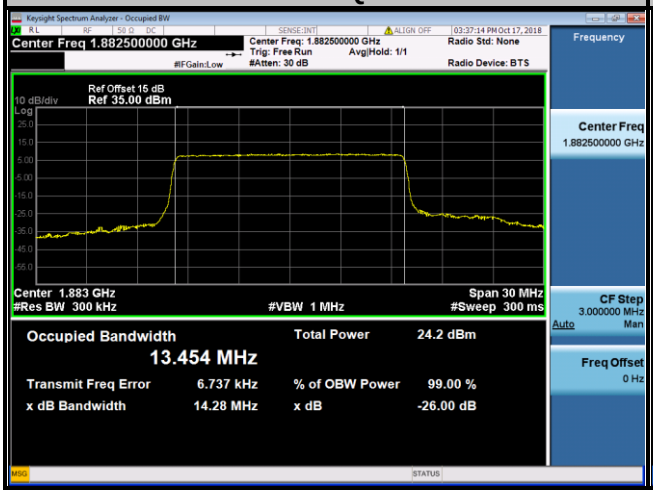


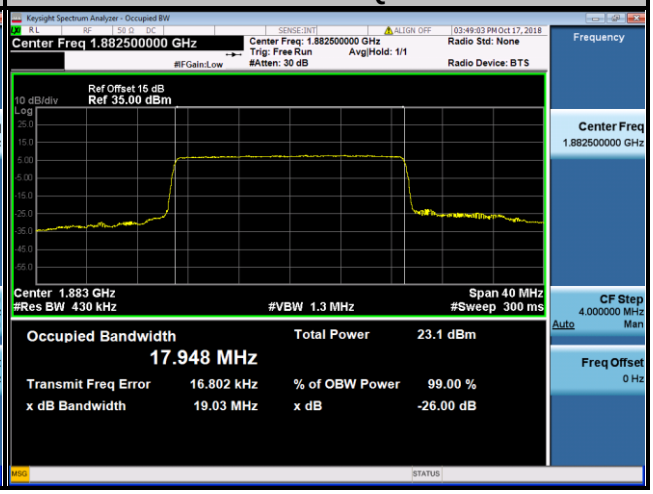
LTE Band 25									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26065	1852.5	4.4899	4.4925	4.5045	26090	1855.0	8.9658	8.9718	8.9756
26365	1882.5	4.4908	4.4932	4.5010	26365	1882.5	8.9697	8.9732	8.9782
26665	1912.5	4.4925	4.4933	4.5018	26640	1910.0	8.9615	8.9625	8.9737

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM
	

LTE Band 25									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26115	1857.5	13.447	13.438	13.435	26140	1860.0	17.907	17.941	17.929
26365	1882.5	13.454	13.441	13.442	26365	1882.5	17.920	17.948	17.943
26615	1907.5	13.445	13.435	13.433	26590	1905.0	17.917	17.938	17.930

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / 16QAM





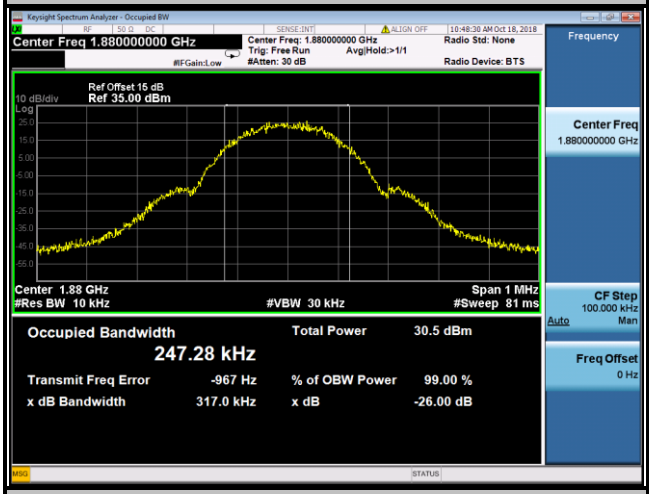
<26 dB Bandwidth>

Channel	Frequency (MHz)	26 dB Bandwidth (kHz)		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
		GSM	EDGE			WCDMA
512	1850.2	315.9	309.9	9262	1852.4	4.736
661	1880.0	317.0	313.7	9400	1880.0	4.729
810	1909.8	310.4	314.9	9538	1907.6	4.718

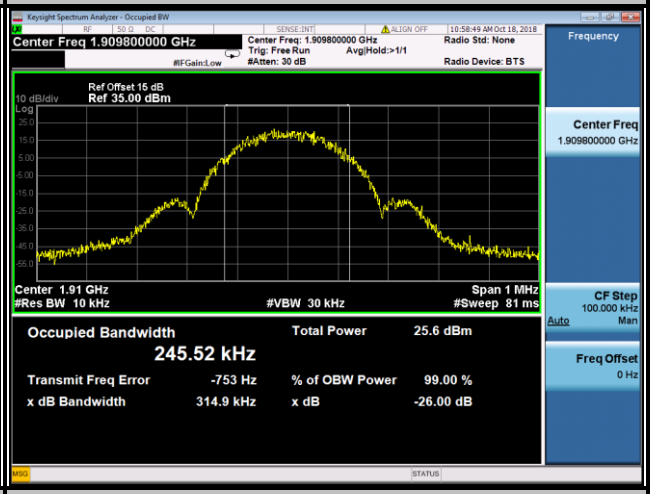
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
		CDMA
25	1851.25	1.423
600	1880.00	1.422
1175	1908.75	1.428

Spectrum Plot of Worst Value

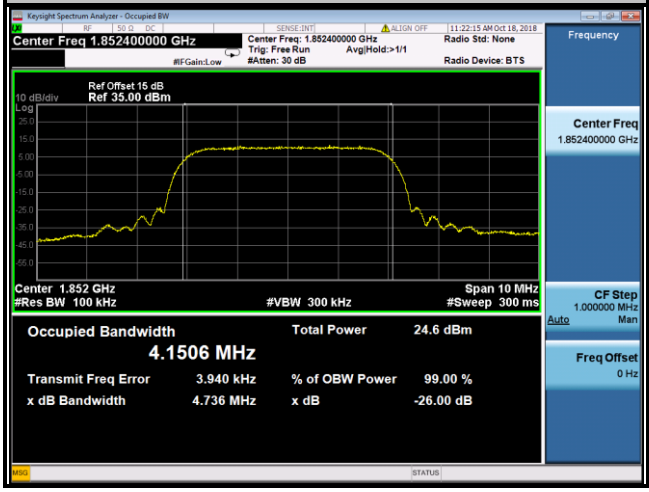
GSM



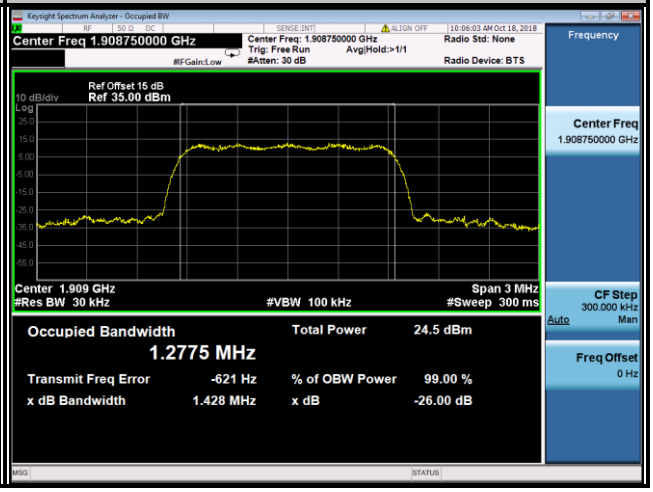
EDGE



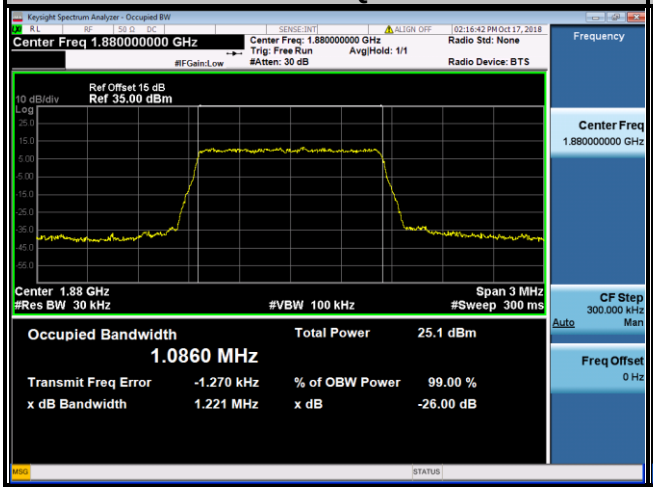
WCDMA



CDMA



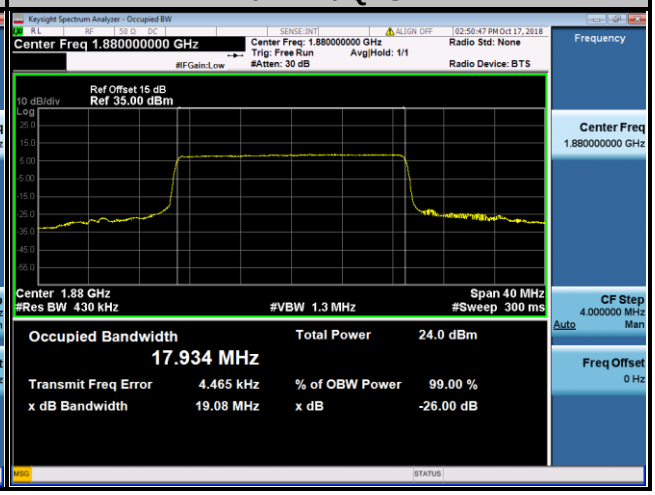
LTE Band 2									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18607	1850.7	1.215	1.212	1.213	18615	1851.5	2.928	2.927	2.904
18900	1880.0	1.221	1.214	1.217	18900	1880.0	2.932	2.930	2.902
19193	1909.3	1.221	1.219	1.214	19185	1908.5	2.939	2.920	2.908

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

LTE Band 2									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18625	1852.5	4.816	4.803	4.832	18650	1855.0	9.531	9.511	9.528
18900	1880.0	4.825	4.806	4.823	18900	1880.0	9.535	9.520	9.524
19175	1907.5	4.819	4.807	4.831	19150	1905.0	9.531	9.512	9.523

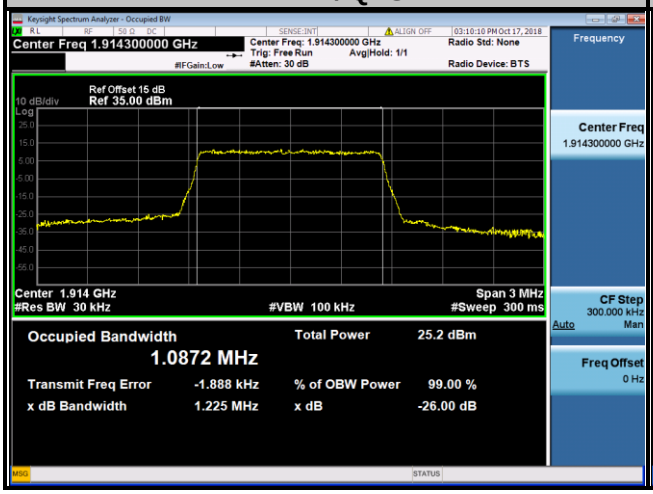
Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / QPSK

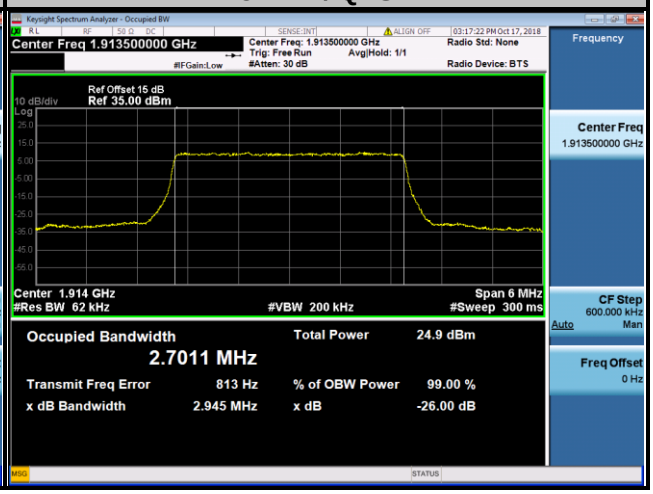
LTE Band 2									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18675	1857.5	14.27	14.24	14.24	18700	1860.0	19.05	19.04	19.03
18900	1880.0	14.31	14.27	14.24	18900	1880.0	19.08	19.05	19.04
19125	1902.5	14.27	14.25	14.24	19100	1900.0	19.08	19.03	19.04

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / QPSK
	

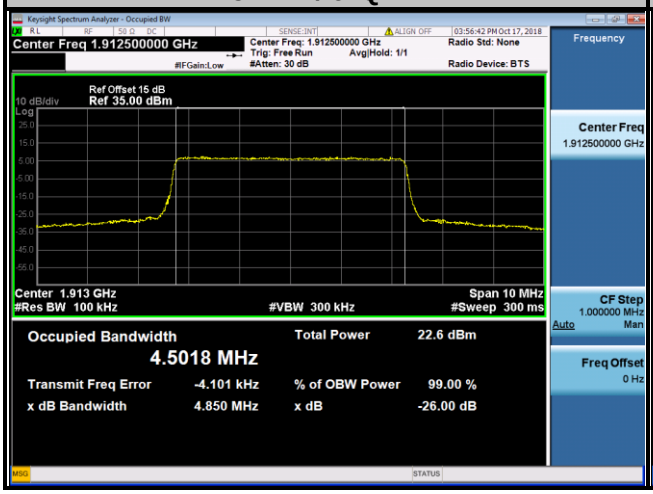
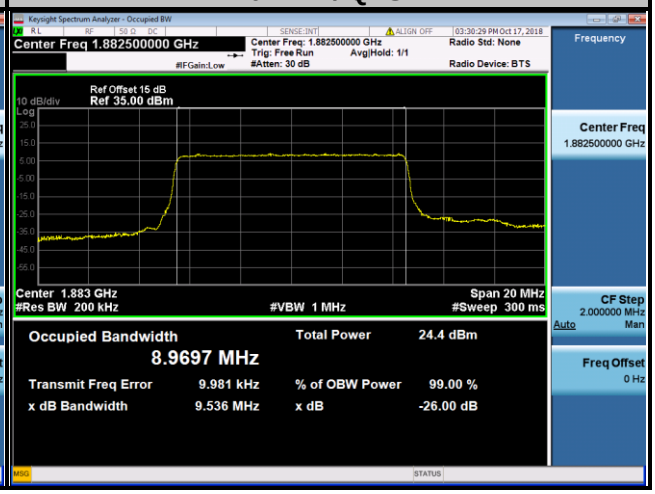
LTE Band 25									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26047	1850.7	1.218	1.216	1.216	26055	1851.5	2.934	2.927	2.906
26365	1882.5	1.220	1.213	1.219	26365	1882.5	2.927	2.933	2.915
26683	1914.3	1.225	1.215	1.217	26675	1913.5	2.945	2.929	2.918

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

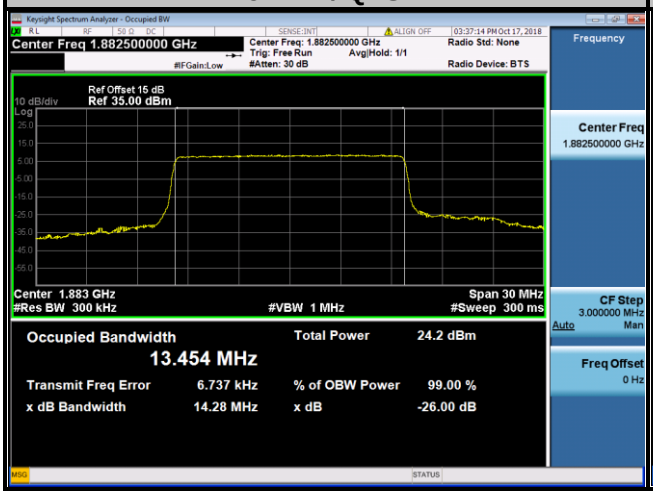




LTE Band 25									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26065	1852.5	4.816	4.804	4.829	26090	1855.0	9.535	9.508	9.525
26365	1882.5	4.829	4.811	4.827	26365	1882.5	9.536	9.513	9.528
26665	1912.5	4.826	4.830	4.850	26640	1910.0	9.526	9.519	9.534

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / QPSK
	

LTE Band 25									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
26115	1857.5	14.26	14.26	14.25	26140	1860.0	19.05	19.04	19.04
26365	1882.5	14.28	14.25	14.25	26365	1882.5	19.07	19.03	19.03
26615	1907.5	14.27	14.23	14.24	26590	1905.0	19.09	19.03	19.03

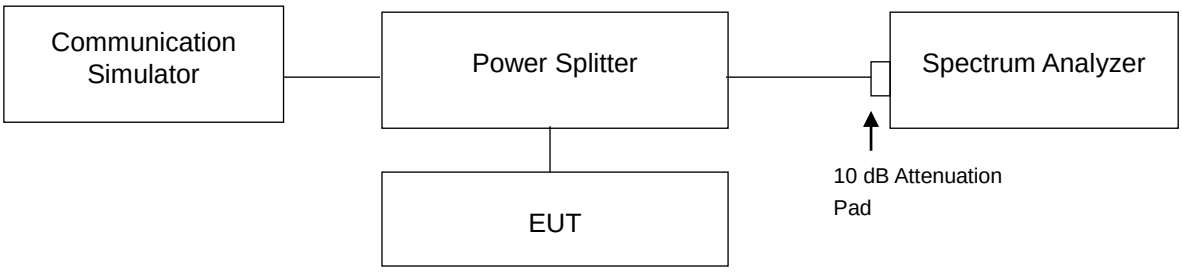
Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / QPSK
	

4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

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

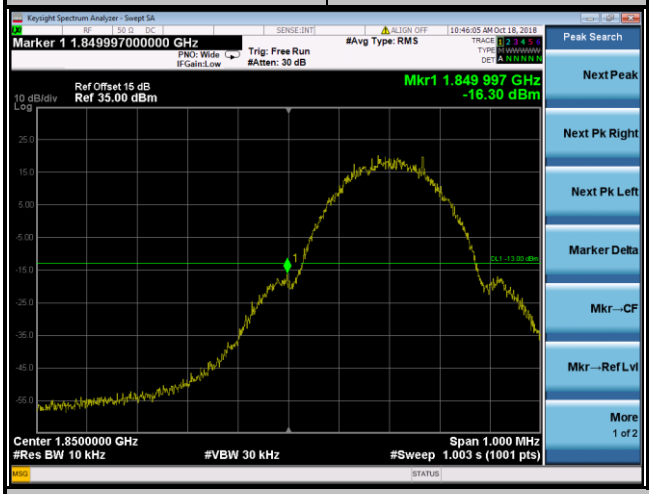
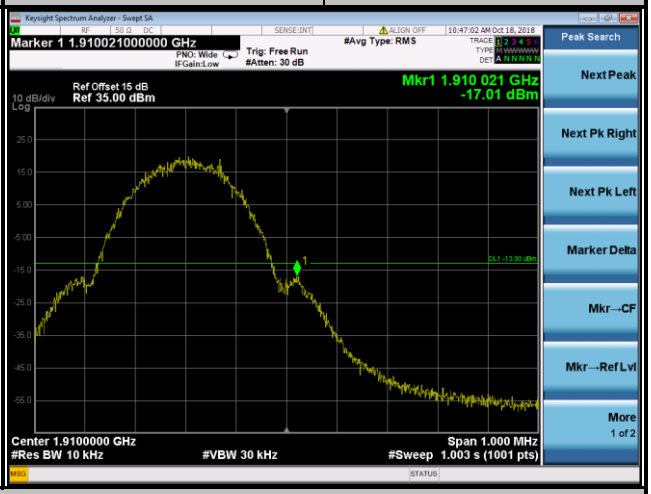
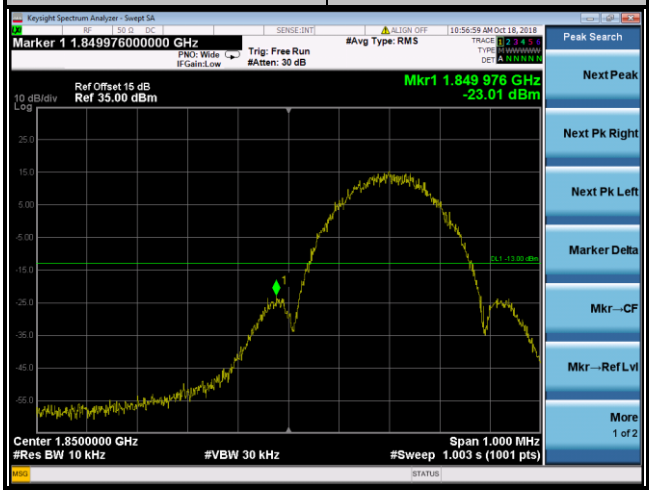
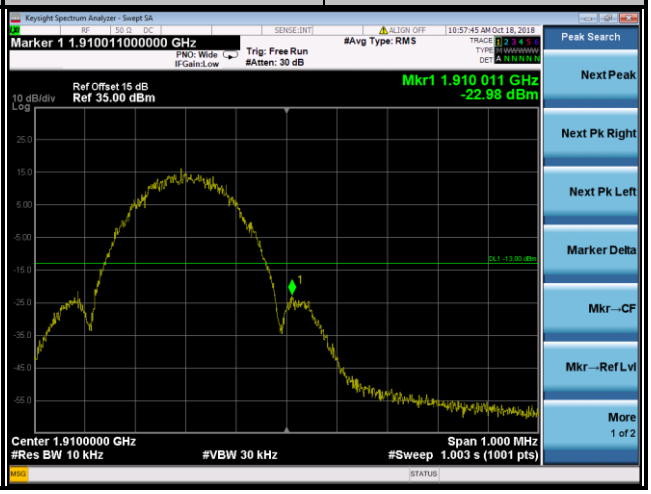
4.5.2 Test Setup

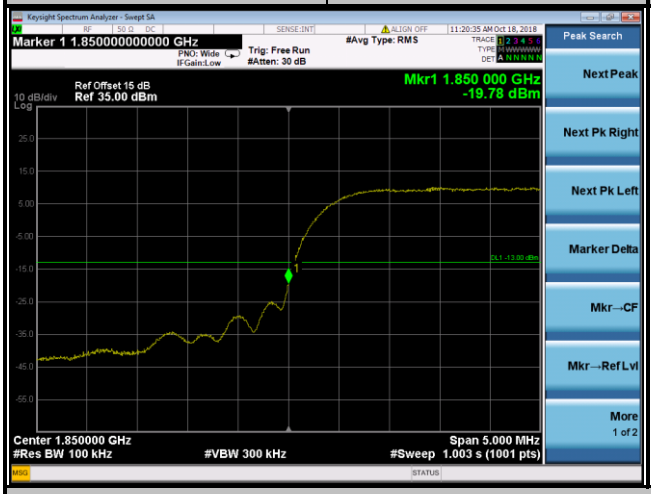


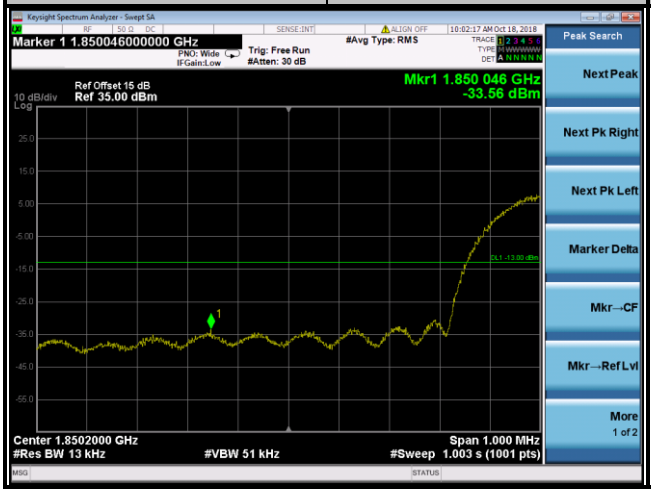
4.5.3 Test Procedures

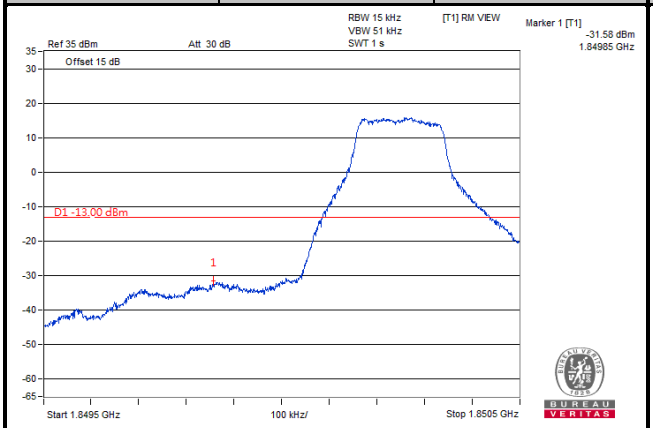
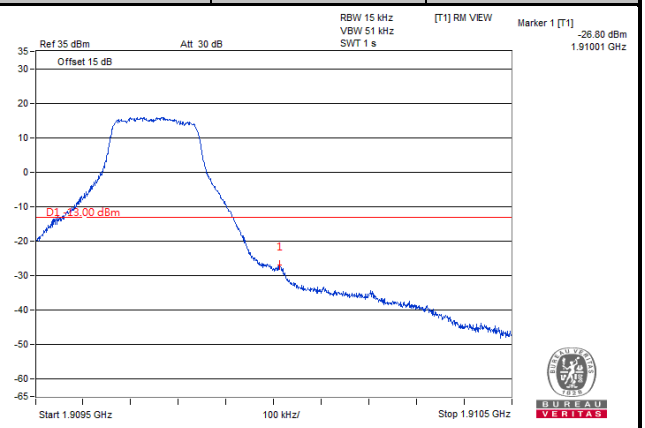
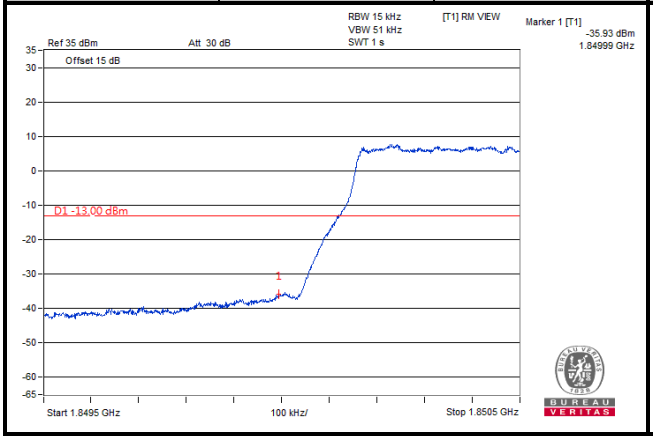
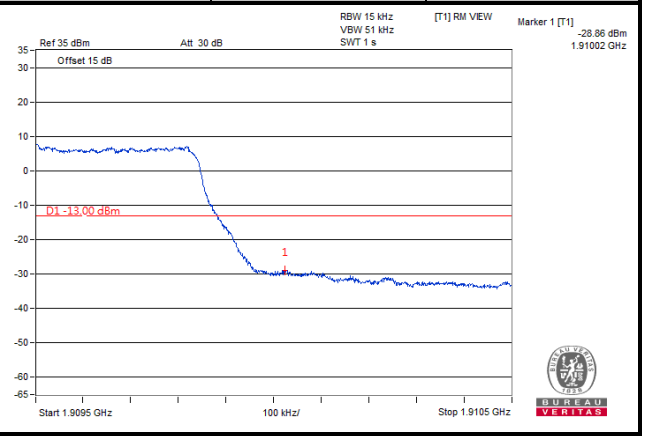
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GSM/GPRS/EDGE).
c. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 13 kHz and VB of the spectrum is 51 kHz (CDMA).
e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 62 kHz and VB of the spectrum is 200 kHz (LTE Bandwidth 5 MHz).
h. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
i. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
j. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
k. Record the max trace plot into the test report.

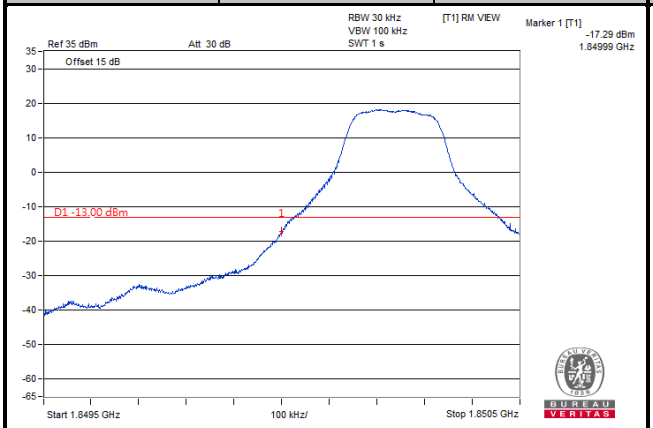
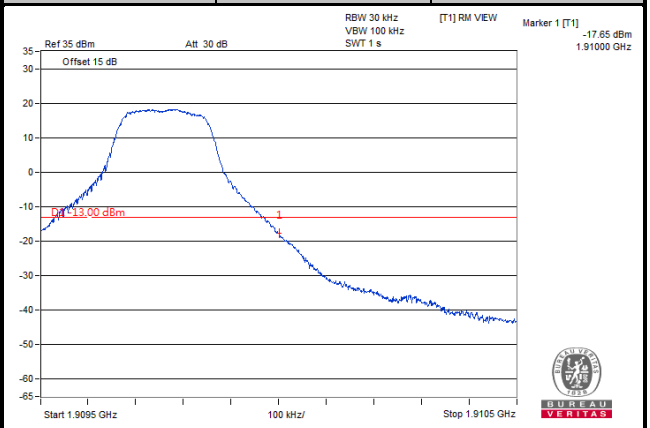
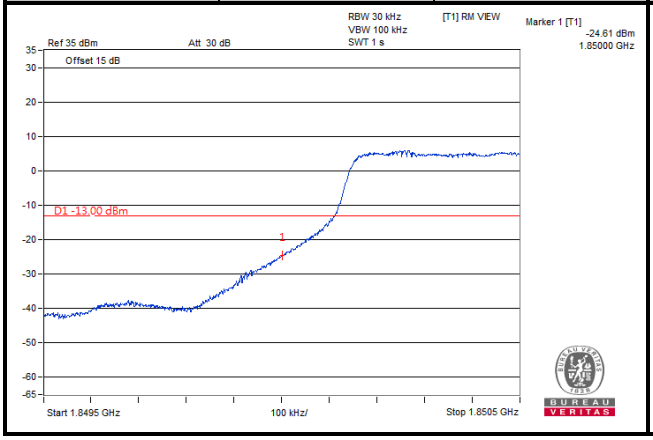
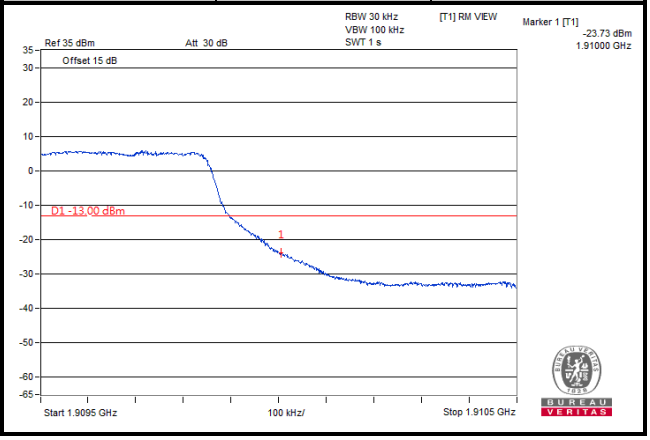
4.5.4 Test Results

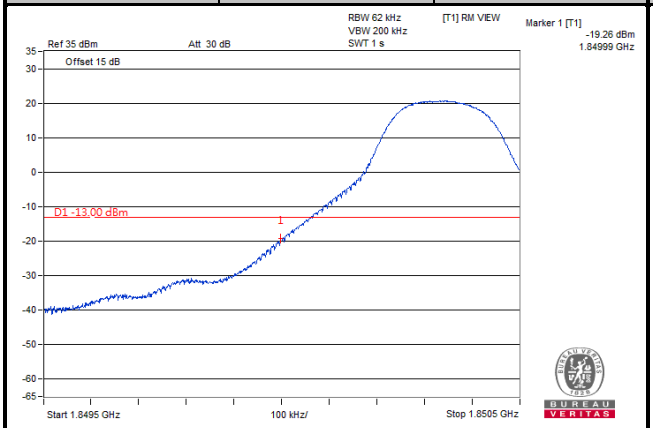
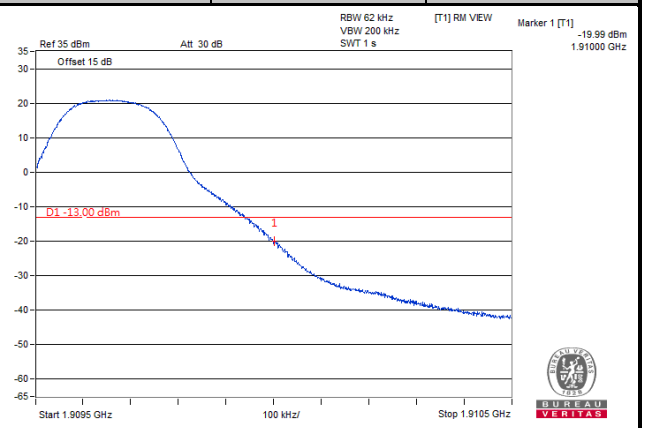
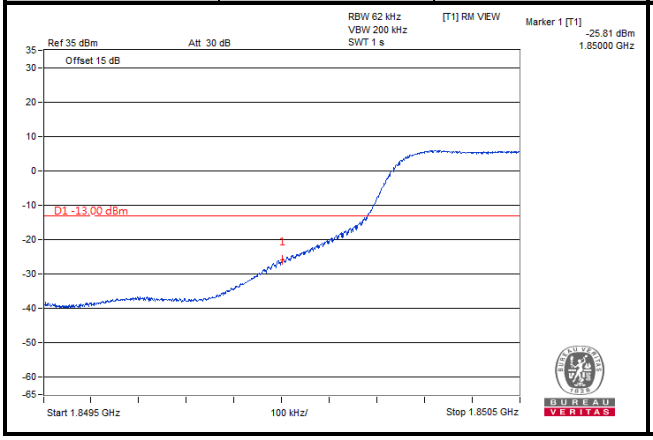
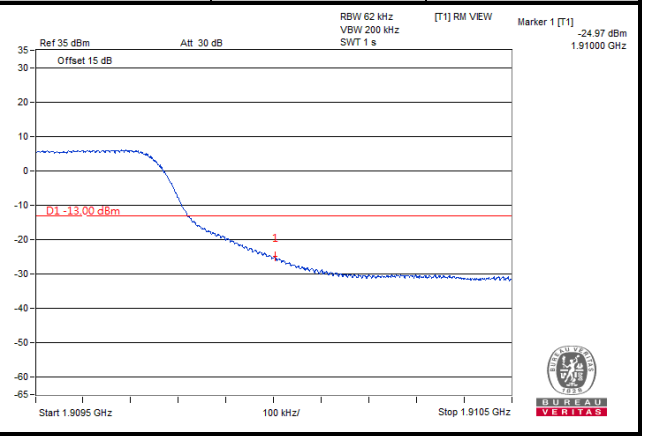
GSM			
Channel	512	Channel	810
			
EDGE			
Channel	512	Channel	810
			

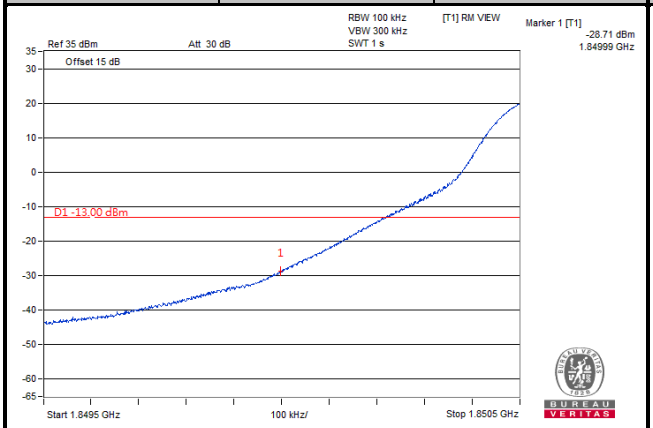
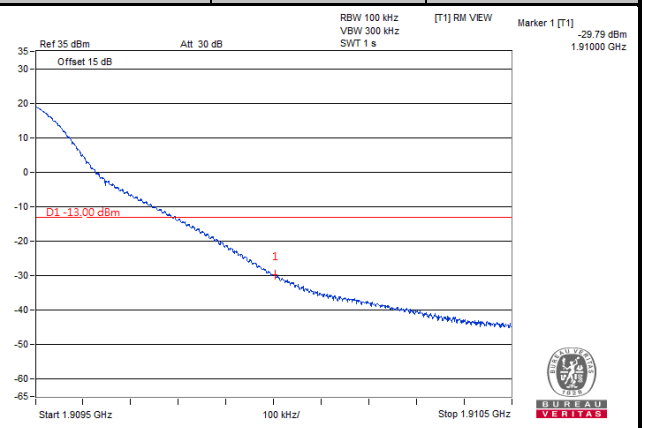
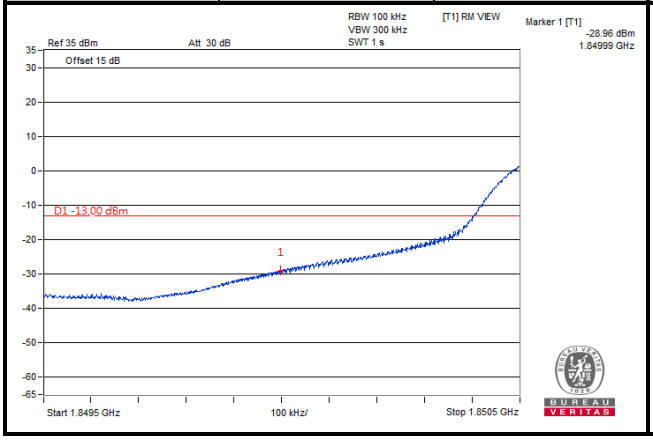
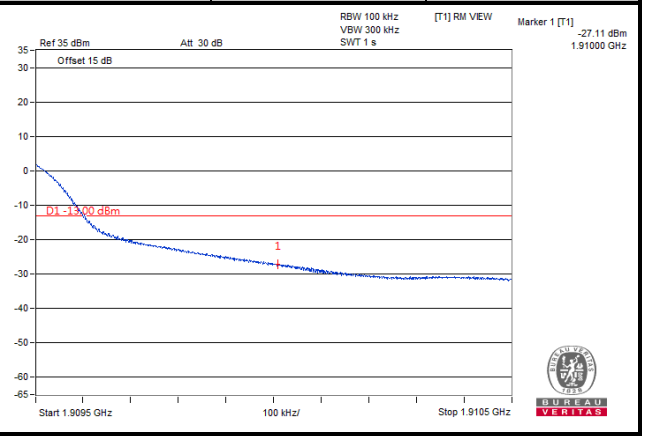
WCDMA			
Channel	9262	Channel	9538
			

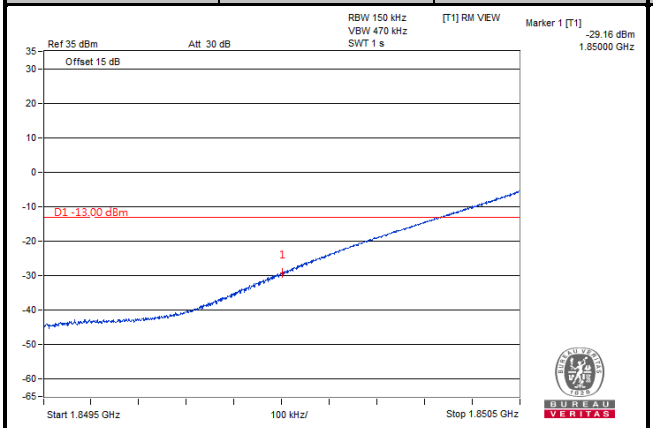
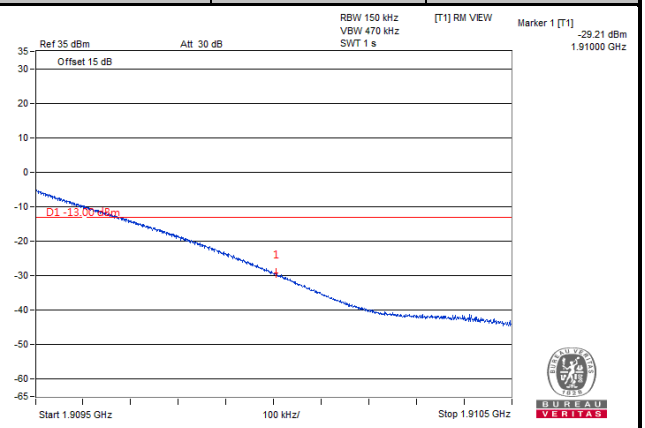
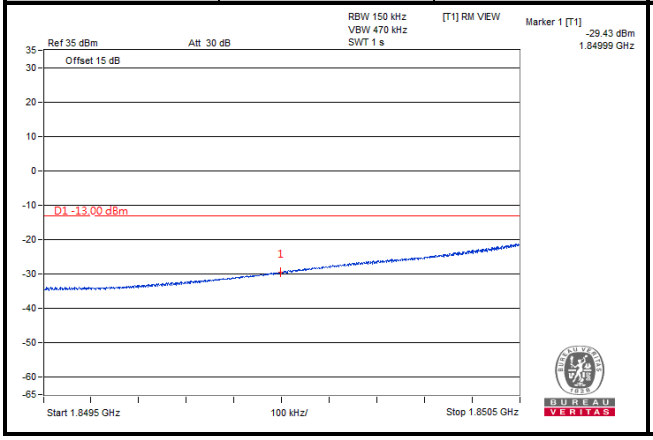
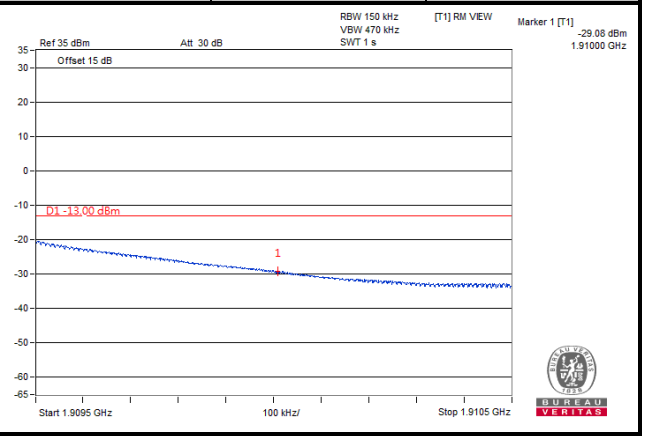
CDMA			
Channel	25	Channel	1175
			

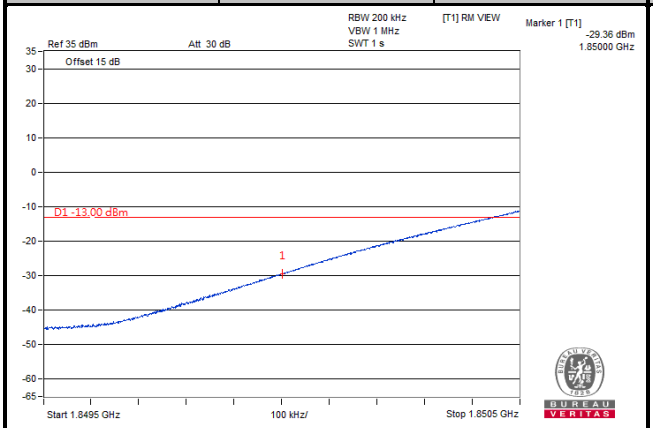
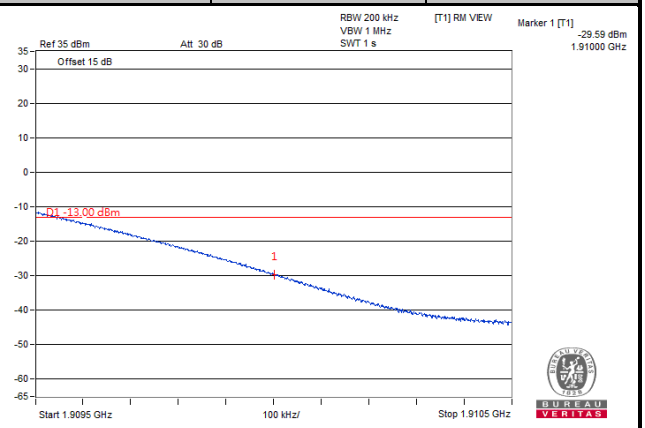
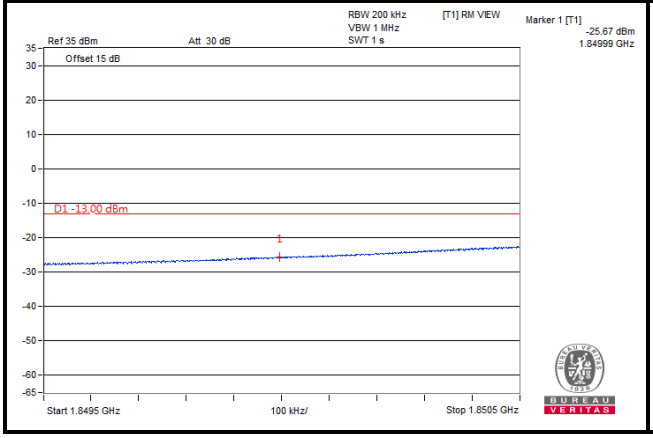
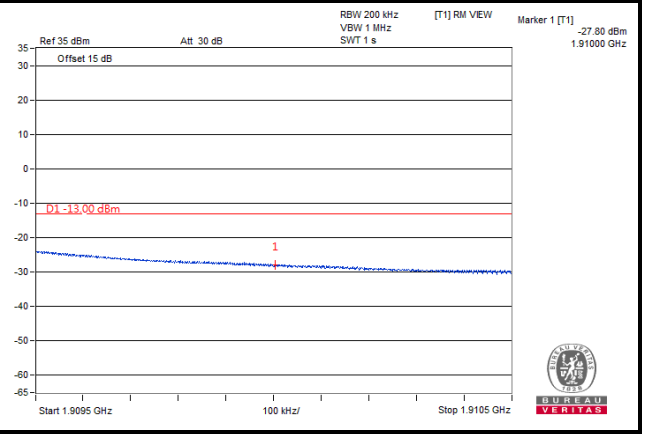
LTE Band 2					
Channel Bandwidth: 1.4 MHz					
Channel	18607	1 RB	Channel	19193	1 RB
					
Channel	18607	6 RB	Channel	19193	6 RB
					

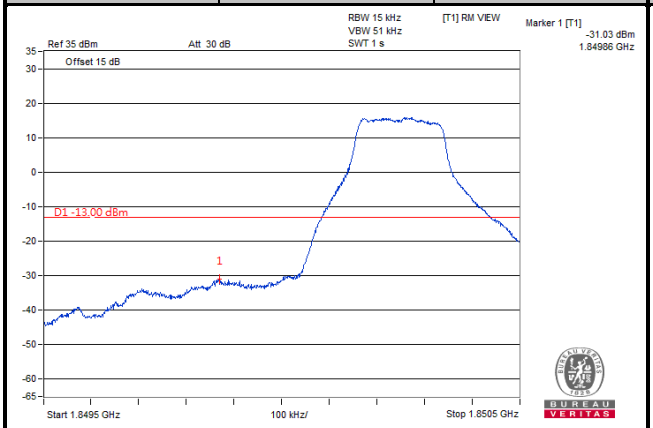
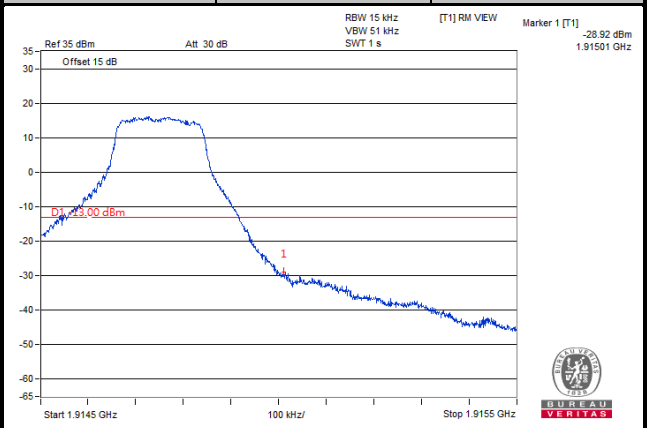
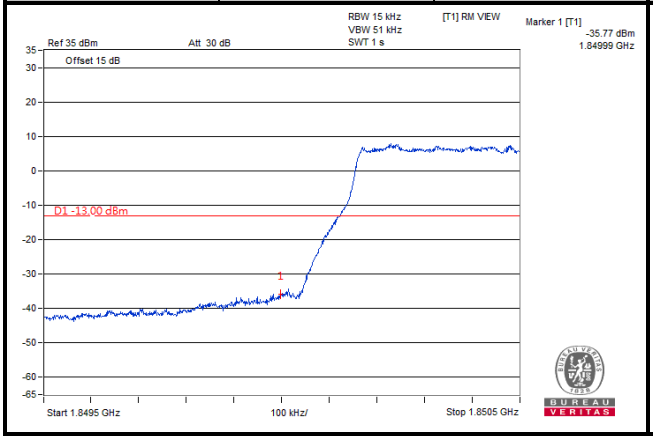
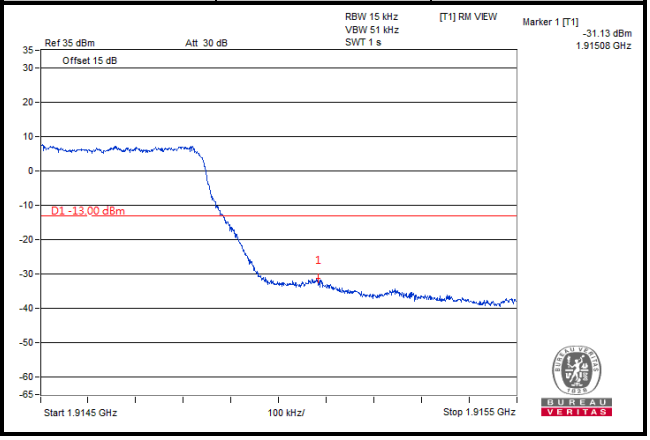
LTE Band 2					
Channel Bandwidth: 3 MHz					
Channel	18615	1 RB	Channel	19185	1 RB
					
Channel	18615	15 RB	Channel	19185	15 RB
					

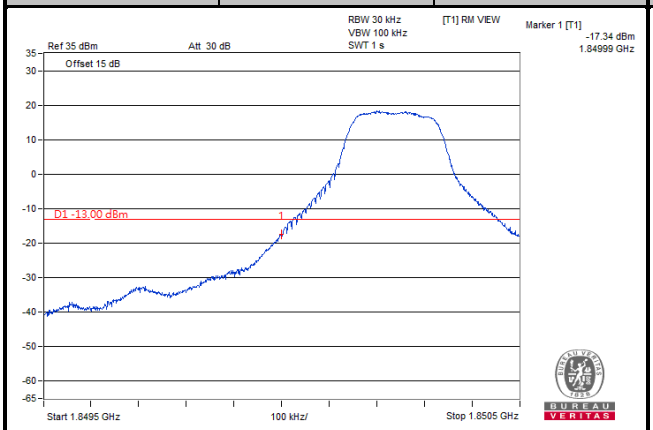
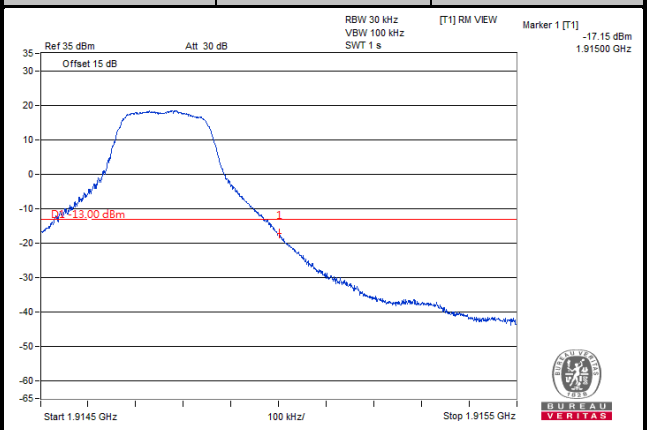
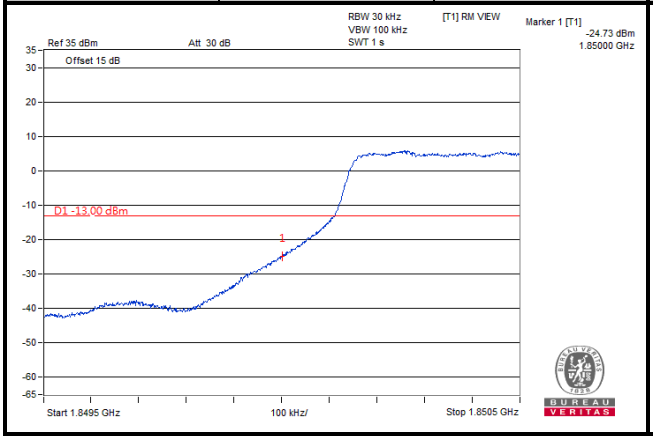
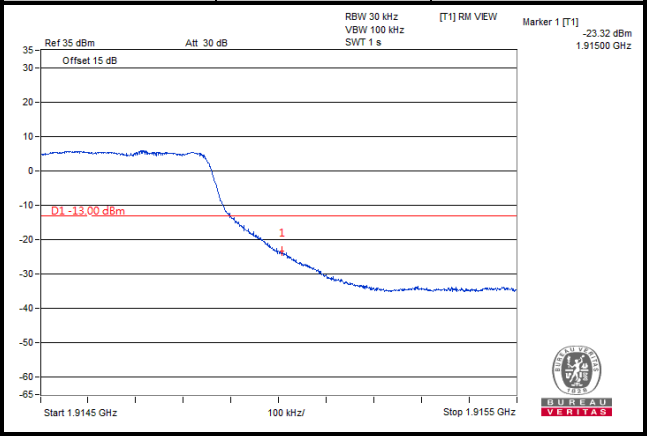
LTE Band 2					
Channel Bandwidth: 5 MHz					
Channel	18625	1 RB	Channel	19175	1 RB
					
Channel	18625	25 RB	Channel	19175	25 RB
					

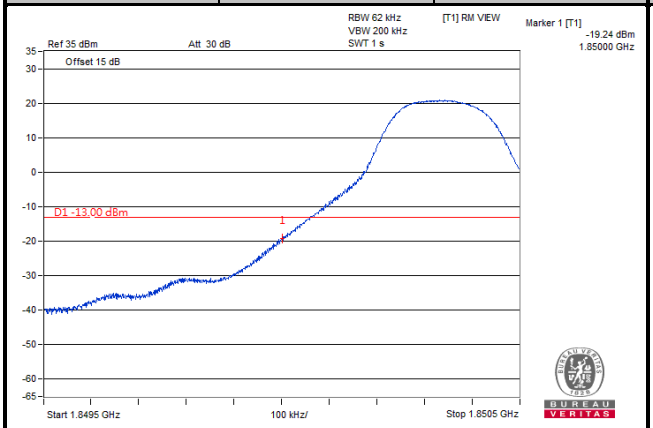
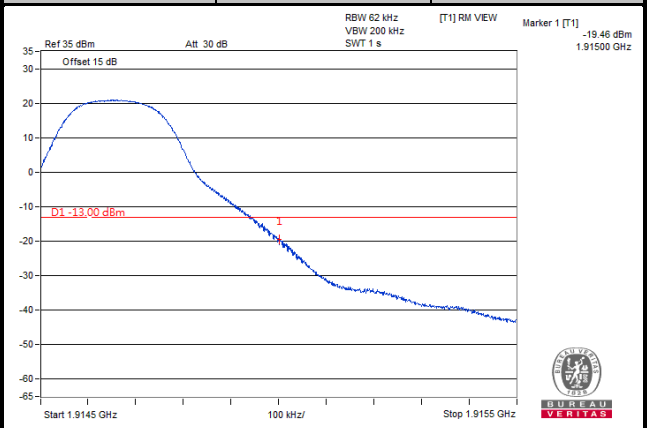
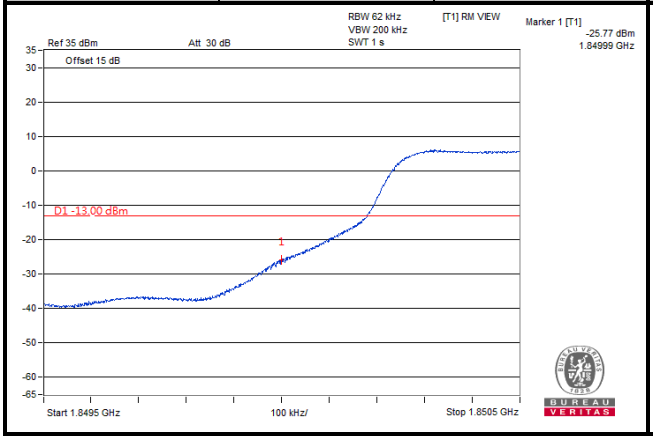
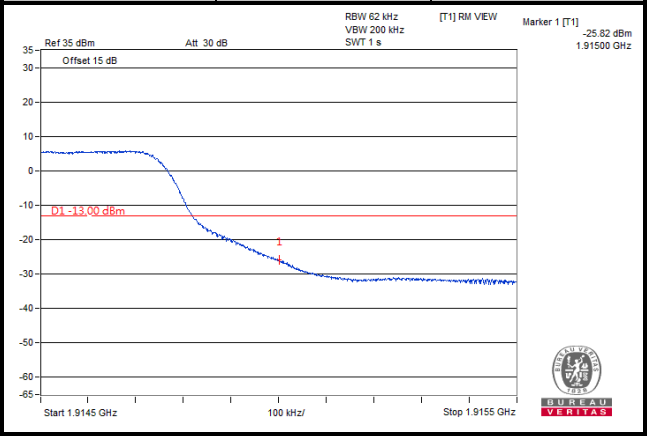
LTE Band 2					
Channel Bandwidth: 10 MHz					
Channel	18650	1 RB	Channel	19150	1 RB
					
Channel	18650	50 RB	Channel	19150	50 RB
					

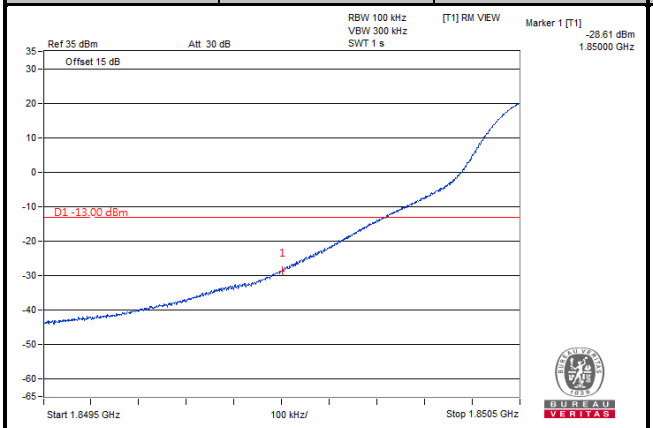
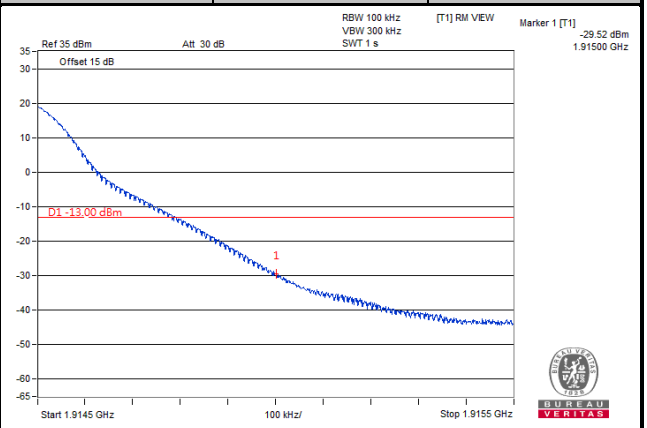
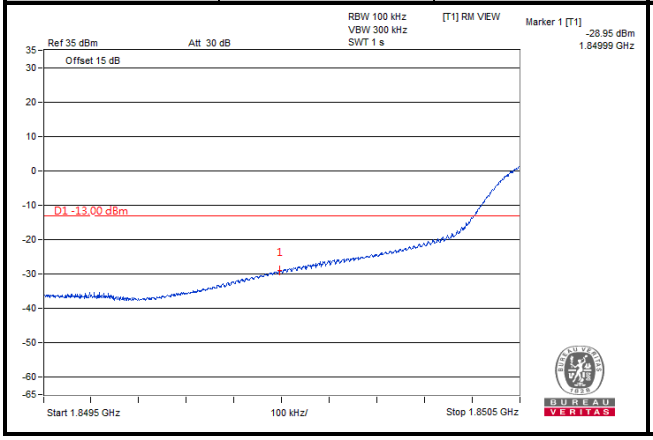
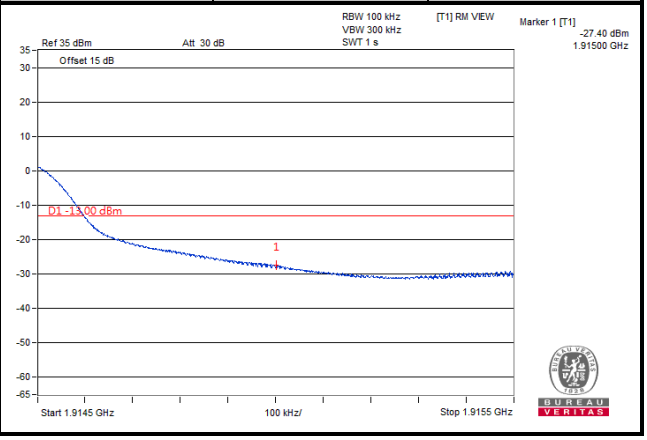
LTE Band 2					
Channel Bandwidth: 15 MHz					
Channel	18675	1 RB	Channel	19125	1 RB
					
Channel	18675	75 RB	Channel	19125	75 RB
					

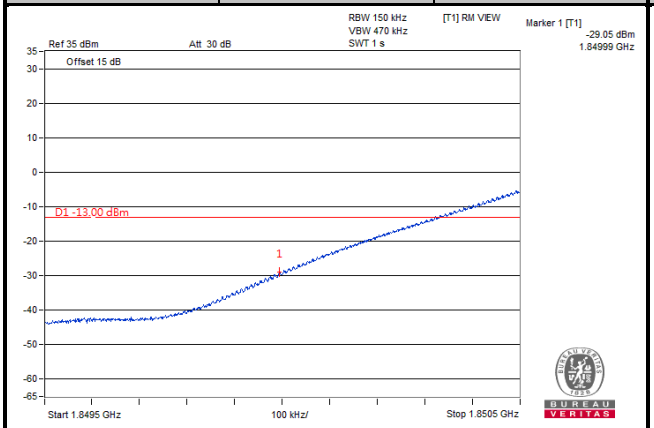
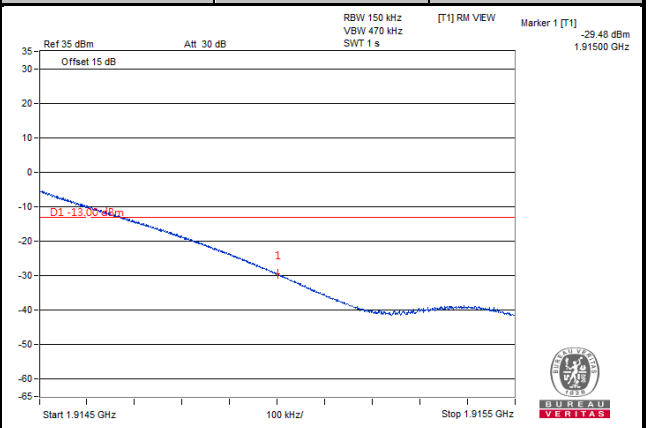
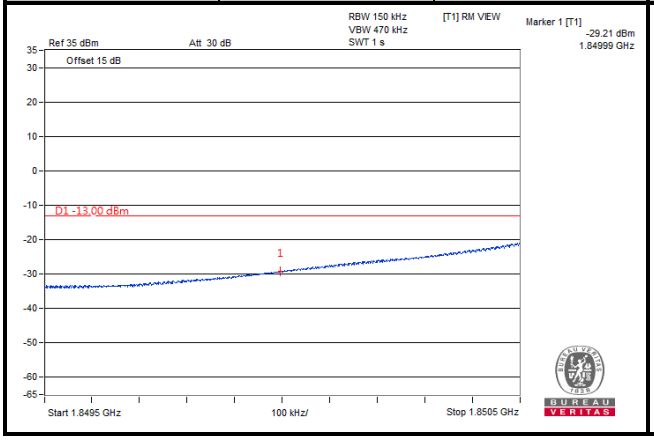
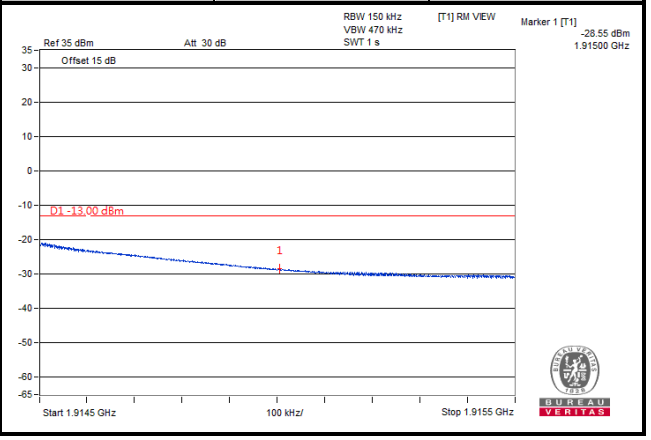
LTE Band 2					
Channel Bandwidth: 20 MHz					
Channel	18700	1 RB	Channel	19100	1 RB
					
Channel	18700	100 RB	Channel	19100	100 RB
					

LTE Band 25					
Channel Bandwidth: 1.4 MHz					
Channel	26047	1 RB	Channel	26683	1 RB
					
Channel	26047	6 RB	Channel	26683	6 RB
					

LTE Band 25					
Channel Bandwidth: 3 MHz					
Channel	26055	1 RB	Channel	26675	1 RB
					
Channel	26055	15 RB	Channel	26675	15 RB
					

LTE Band 25					
Channel Bandwidth: 5 MHz					
Channel	26065	1 RB	Channel	26665	1 RB
					
Channel	26065	25 RB	Channel	26665	25 RB
					

LTE Band 25					
Channel Bandwidth: 10 MHz					
Channel	26090	1 RB	Channel	26640	1 RB
					
Channel	26090	50 RB	Channel	26640	50 RB
					

LTE Band 25					
Channel Bandwidth: 15 MHz					
Channel	26115	1 RB	Channel	26615	1 RB
					
Channel	26115	75 RB	Channel	26615	75 RB