FCC Test Report

(PART 24)

Report No.:	RF190524D09-1
FCC ID:	P27BC950NA4
Test Model:	BC950NA4
Series Model:	BC950NA4yxxxxxxx, BC950NA4Cyxxxxxxx (y should be "blank" or "-"; x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose) (See section 3.2.1 for more details)
Received Date:	May 24, 2019
Test Date:	May 31, 2019 ~ Jun. 11, 2019 (for RSE for mode A, Conducted tests, and EIRP) Sep. 04, 2019 (for RSE for mode B)
Issued Date:	Sep. 05, 2019
Applicant:	Sercomm Corp.
Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C. (NanKang Software Park)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
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)
Test Location (2):	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C
FCC Registration / Designation Number:	427177 / TW0011

Testing Laboratory
2021

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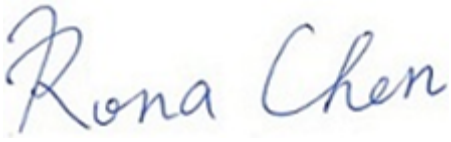
Release Control Record

Issue No.	Description	Date Issued
RF190524D09-1	Original Release	Sep. 05, 2019

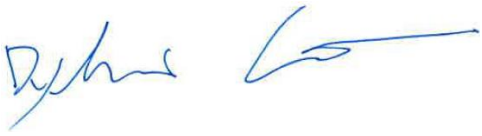
1 Certificate of Conformity

Product:	LTE Battery Camera
Brand:	Sercomm
Test Model:	BC950NA4
Series Model:	BC950NA4yxxxxxxx, BC950NA4Cyxxxxxxx (y should be "blank" or "-"; x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose) (See section 3.2.1 for more details)
Sample Status:	Engineering Sample
Applicant:	Sercomm Corp.
Test Date:	May 31, 2019 ~ Jun. 11, 2019 (for RSE for mode A, Conducted tests, and EIRP) Sep. 04, 2019 (for RSE for mode B)
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:** Sep. 05, 2019

Rona Chen / Specialist

Approved by :  , **Date:** Sep. 05, 2019

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	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238	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 -16.69 dB at 13300.00 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.0400 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Test Duration:

May 31, 2019 ~ Jun. 11, 2019 (for RSE for mode A, Conducted tests, and EIRP)
Sep. 04, 2019 (for RSE for mode B)

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
			Aug. 26, 2019	Aug. 25, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-631	Nov. 26, 2018	Nov. 25, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 19, 2018	Nov. 18, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
			Jul. 01, 2019	Jun. 30, 2020
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 2019
			Jun. 19, 2019	Jun. 18, 2020
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 HsinTien Chamber 1.

3 General Information

3.1 General Description of EUT

Product	LTE Battery Camera	
Brand	Sercomm	
Test Model	BC950NA4	
Series Model	BC950NA4yxxxxxxx, BC950NA4Cyxxxxxxx (y should be "blank" or "-"; x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose)	
Status of EUT	Engineering Sample	
Power Supply Rating	5.0 Vdc (Adapter) 3.6 Vdc (Li-ion battery)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA	1852.4 ~ 1907.6 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
Max. EIRP Power	WCDMA	431.52 mW
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	330.37 mW
	LTE Band 2 (Channel Bandwidth: 3 MHz)	335.74 mW
	LTE Band 2 (Channel Bandwidth: 5 MHz)	335.74 mW
	LTE Band 2 (Channel Bandwidth: 10 MHz)	338.84 mW
	LTE Band 2 (Channel Bandwidth: 15 MHz)	341.98 mW
	LTE Band 2 (Channel Bandwidth: 20 MHz)	345.14 mW
Emission Designator	WCDMA	4M08F9W
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	1M09D7W
	LTE Band 2 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 2 (Channel Bandwidth: 5 MHz)	4M49D7W
	LTE Band 2 (Channel Bandwidth: 10 MHz)	8M98D7W
	LTE Band 2 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 2 (Channel Bandwidth: 20 MHz)	18M0D7W
Antenna Type	PIFA Antenna with 2.94 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. All models are listed as below. Model : BC950NA4 is the representative for final test.

Product	Brand	Model	Difference
LTE Battery Camera	Sercomm	BC950NA4yxxxxxxx	With GPS function
		BC950NA4Cyxxxxxxx	Without GPS function
(y should be "blank" or "-"; x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose)			

2. The EUT contains following accessory devices.

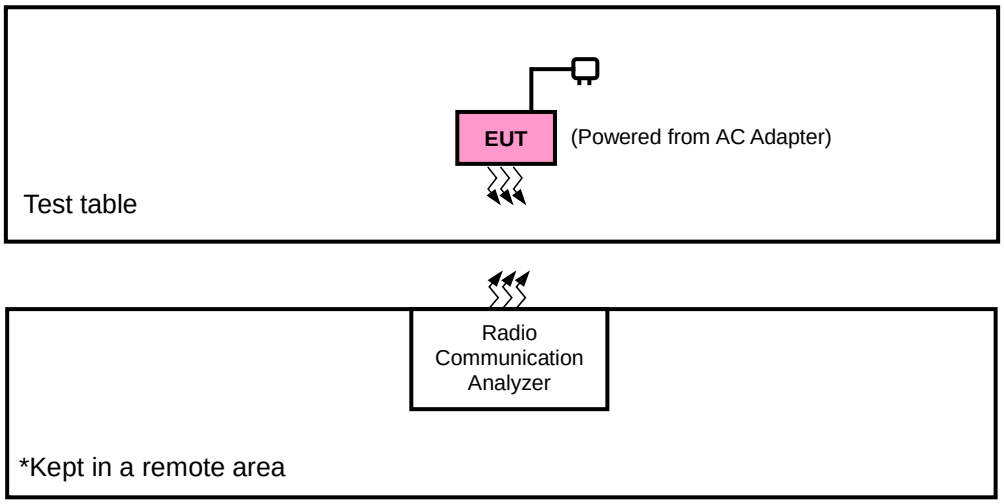
Product	Brand	Model	Description
Adapter 1	Lucent Trans	1A52-UB52A	I/P: 100-240 Vac, 50-60 Hz, 0.3 A O/P: 5 Vdc, 2 A
Adapter 2	PHIHONG	PSAF10A-050Q	I/P: 100-240 Vac, 50/60 Hz, 0.28 A O/P: 5 Vdc, 2 A
Battery	Sercomm	P2-01	Rating: 3.6 Vdc, 31.68 Wh Capacity: 8800 mAh Charging voltage: 4.2 A
BC950 Battery Charging Station	Sercomm	BCSP2-01	I/P: 5Vdc, 2 A
USB Cable 1	N/A	N/A	5 m shielded cable w/o core
USB Cable 2	N/A	N/A	1 m shielded cable w/o core

*** We had pre-test on Adapter 1 and Adapter 2. The worst case was found on Adapter 1. Therefore, only Adapter 1 was as representative for final test.**

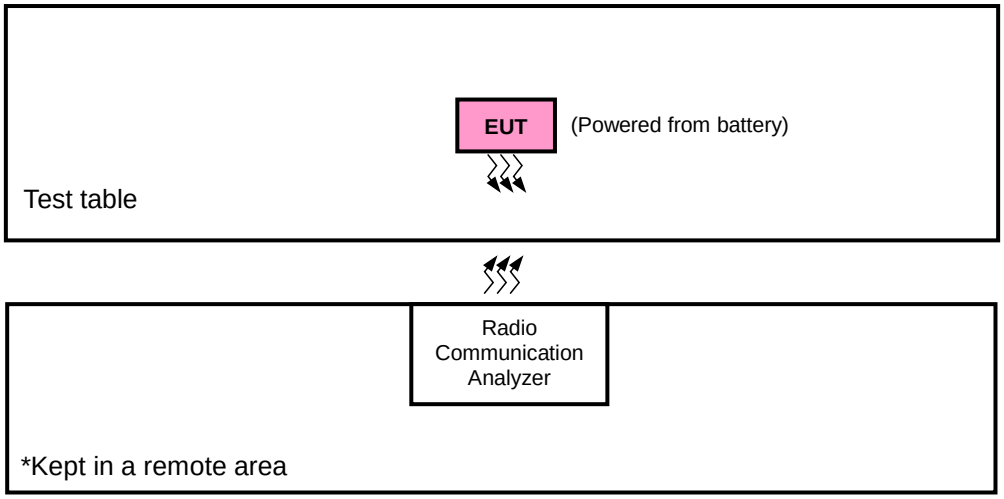
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

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, 0 & 90 degree, 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:

EUT Configure Mode	Description
A	EUT + USB Cable 1
B	EUT + USB Cable 2

Band	EIRP	Radiated Emission
WCDMA	90 degree	90 degree
LTE Band 2	90 degree	90 degree

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
A	Radiated Emission	9262 to 9538	9262, 9400, 9538	WCDMA
B			9262	

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	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	18700 to 19100	18900	20 MHz	QPSK, 16QAM	100 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	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	18607 to 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	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
A	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
B		18700 to 19100	19100	20 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	26 deg. C, 58 % RH	3.6 Vdc	Karl Lee
Modulation Characteristics	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Frequency Stability	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Occupied Bandwidth	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Band Edge	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Peak to Average Ratio	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Conducted Emission	26 deg. C, 58 % RH	3.6 Vdc	Gavin Wu
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

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:

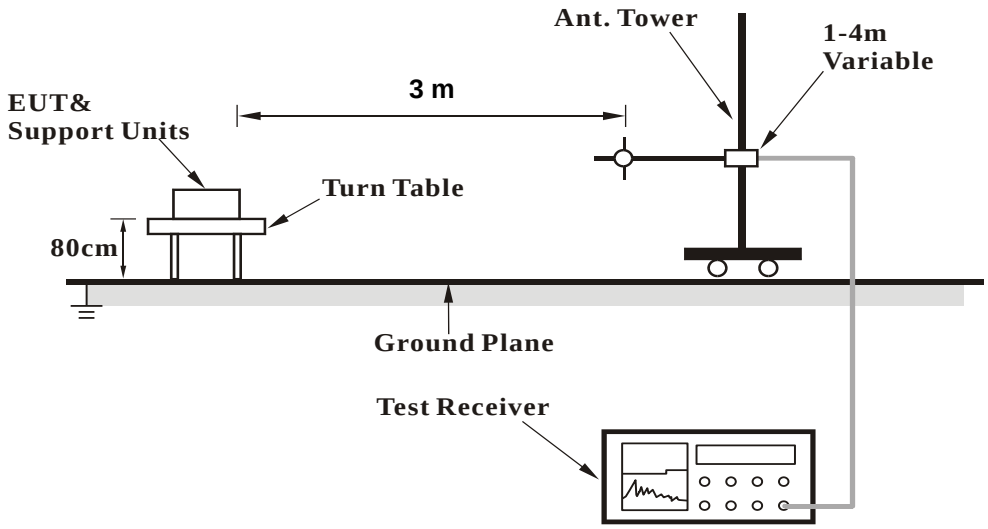
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height 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:

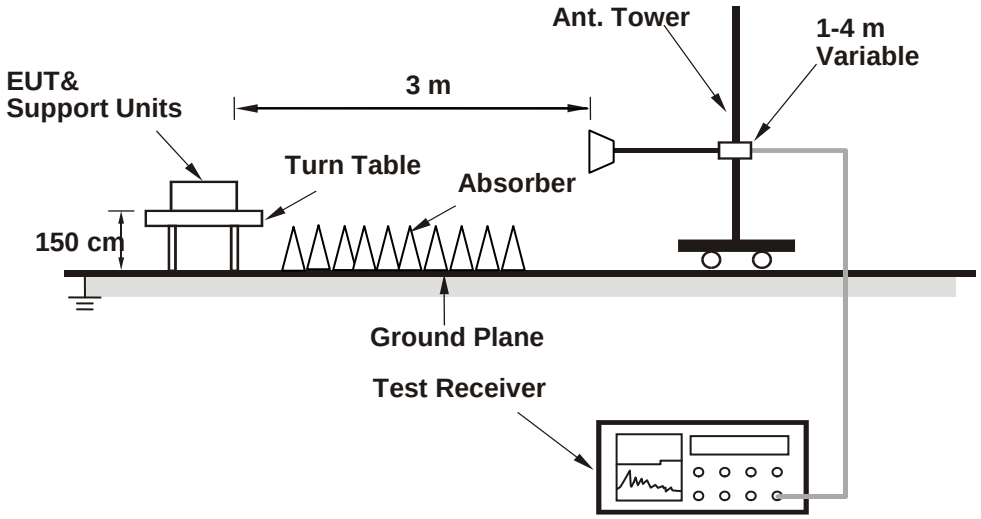
The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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

Conducted Output Power (dBm)

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	23.39	23.45	23.52

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18607	Mid Ch 18900	High Ch 19193		Low Ch 18607	Mid Ch 18900	High Ch 19193	
			1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz	
2 / 1.4M	1	0	22.36	22.49	22.49	0	21.41	21.47	21.41	1
	1	2	22.27	22.31	22.36	0	21.23	21.32	21.19	1
	1	5	22.06	22.12	22.06	0	21.01	21.04	21.06	1
	3	0	21.31	21.39	21.29	0	20.23	20.18	20.22	1
	3	1	21.14	21.14	21.12	0	20.02	20.09	20.03	1
	3	3	20.93	21.13	21.02	0	19.86	19.93	19.85	1
	6	0	21.29	21.21	21.31	1	20.28	20.39	20.15	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18615	Mid Ch 18900	High Ch 19185		Low Ch 18615	Mid Ch 18900	High Ch 19185	
			1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz	
2 / 3M	1	0	22.47	22.53	22.47	0	21.11	21.28	21.06	1
	1	7	22.35	22.48	22.35	0	21.26	21.30	21.22	1
	1	14	22.14	22.30	22.07	0	21.01	21.26	21.18	1
	8	0	21.32	21.36	21.39	1	20.27	20.24	20.24	2
	8	3	21.16	21.29	21.20	1	20.14	20.11	20.15	2
	8	7	21.06	21.08	21.17	1	20.08	20.05	20.02	2
	15	0	21.33	21.37	21.40	1	20.26	20.35	20.29	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18625	Mid Ch 18900	High Ch 19175		Low Ch 18625	Mid Ch 18900	High Ch 19175	
			1852.5 MHz	1880.0 MHz	1907.5 MHz		1852.5 MHz	1880.0 MHz	1907.5 MHz	
2 / 5M	1	0	22.54	22.53	22.53	0	21.30	21.38	21.36	1
	1	12	22.36	22.41	22.45	0	21.28	21.41	21.33	1
	1	24	22.29	22.25	22.19	0	21.15	21.37	21.05	1
	12	0	21.35	21.46	21.36	1	20.28	20.29	20.23	2
	12	6	21.18	21.31	21.15	1	20.17	20.14	20.13	2
	12	13	21.00	21.28	21.10	1	20.05	20.15	20.09	2
	25	0	21.44	21.45	21.41	1	20.38	20.31	20.26	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18650	Mid Ch 18900	High Ch 19150		Low Ch 18650	Mid Ch 18900	High Ch 19150	
			1855.0 MHz	1880.0 MHz	1905.0 MHz		1855.0 MHz	1880.0 MHz	1905.0 MHz	
2 / 10M	1	0	22.54	22.67	22.58	0	21.41	21.44	21.41	1
	1	24	22.40	22.48	22.50	0	21.34	21.48	21.48	1
	1	49	22.31	22.41	22.41	0	21.27	21.22	21.26	1
	25	0	21.45	21.52	21.48	1	20.34	20.32	20.42	2
	25	12	21.32	21.30	21.20	1	20.30	20.26	20.26	2
	25	25	21.27	21.13	21.09	1	20.13	20.26	20.12	2
	50	0	21.44	21.45	21.53	1	20.46	20.45	20.39	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18675	Mid Ch 18900	High Ch 19125		Low Ch 18675	Mid Ch 18900	High Ch 19125	
			1857.5 MHz	1880.0 MHz	1902.5 MHz		1857.5 MHz	1880.0 MHz	1902.5 MHz	
2 / 15M	1	0	22.62	22.68	22.66	0	21.47	21.58	21.51	1
	1	37	22.52	22.59	22.52	0	21.47	21.49	21.47	1
	1	74	22.25	22.40	22.44	0	21.34	21.33	21.37	1
	36	0	21.47	21.53	21.55	1	20.45	20.57	20.40	2
	36	19	21.28	21.38	21.32	1	20.21	20.33	20.23	2
	36	39	21.18	21.27	21.22	1	20.09	20.24	20.13	2
	75	0	21.47	21.45	21.47	1	20.49	20.56	20.46	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 18700	Mid Ch 18900	High Ch 19100		Low Ch 18700	Mid Ch 18900	High Ch 19100	
			1860.0 MHz	1880.0 MHz	1900.0 MHz		1860.0 MHz	1880.0 MHz	1900.0 MHz	
2 / 20M	1	0	22.67	22.75	22.71	0	21.63	21.70	21.63	1
	1	50	22.52	22.59	22.62	0	21.49	21.56	21.47	1
	1	99	22.46	22.42	22.48	0	21.35	21.40	21.35	1
	50	0	21.55	21.66	21.59	1	20.43	20.52	20.37	2
	50	25	21.38	21.48	21.42	1	20.31	20.35	20.27	2
	50	50	21.31	21.43	21.32	1	20.16	20.36	20.23	2
	100	0	21.48	21.56	21.49	1	20.55	20.50	20.46	2

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
90°	9262	1852.4	-12.00	38.19	26.19	415.91	H
	9400	1880.0	-12.46	38.70	26.24	420.73	
	9538	1907.6	-13.00	39.35	26.35	**431.52**	
	9262	1852.4	-14.27	38.48	24.21	263.63	V
	9400	1880.0	-14.32	38.59	24.27	267.30	
	9538	1907.6	-14.54	38.87	24.33	271.02	

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)**
90°	18607	1850.7	-19.66	44.70	25.04	319.15	H
	18900	1880.0	-19.51	44.70	25.19	**330.37**	
	19193	1909.3	-19.47	44.57	25.10	323.82	
	18607	1850.7	-21.27	44.27	23.00	199.53	V
	18900	1880.0	-21.68	44.87	23.19	208.45	
	19193	1909.3	-21.55	44.61	23.06	202.44	
Channel Bandwidth: 1.4 MHz / 16QAM							
90°	18607	1850.7	-20.67	44.70	24.03	252.93	H
	18900	1880.0	-20.51	44.70	24.19	262.42	
	19193	1909.3	-20.47	44.57	24.10	257.22	
	18607	1850.7	-22.27	44.27	22.00	158.49	V
	18900	1880.0	-22.68	44.87	22.19	165.58	
	19193	1909.3	-22.56	44.61	22.05	160.44	

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)**
90°	18615	1851.5	-19.59	44.70	25.11	324.34	H
	18900	1880.0	-19.44	44.70	25.26	**335.74**	
	19185	1908.5	-19.40	44.57	25.17	329.08	
	18615	1851.5	-21.20	44.27	23.07	202.77	V
	18900	1880.0	-21.64	44.87	23.23	210.38	
	19185	1908.5	-21.47	44.61	23.14	206.21	
Channel Bandwidth: 3 MHz / 16QAM							
90°	18615	1851.5	-20.62	44.70	24.08	255.86	H
	18900	1880.0	-20.48	44.70	24.22	264.24	
	19185	1908.5	-20.44	44.57	24.13	259.00	
	18615	1851.5	-22.24	44.27	22.03	159.59	V
	18900	1880.0	-22.67	44.87	22.20	165.96	
	19185	1908.5	-22.52	44.61	22.09	161.92	

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)**
90°	18625	1852.5	-19.59	44.70	25.11	324.34	H
	18900	1880.0	-19.44	44.70	25.26	**335.74**	
	19175	1907.5	-19.40	44.57	25.17	329.08	
	18625	1852.5	-21.20	44.27	23.07	202.77	V
	18900	1880.0	-21.64	44.87	23.23	210.38	
	19175	1907.5	-21.47	44.61	23.14	206.21	
Channel Bandwidth: 5 MHz / 16QAM							
90°	18625	1852.5	-20.59	44.70	24.11	257.63	H
	18900	1880.0	-20.44	44.70	24.26	266.69	
	19175	1907.5	-20.41	44.57	24.16	260.80	
	18625	1852.5	-22.21	44.27	22.06	160.69	V
	18900	1880.0	-22.64	44.87	22.23	167.11	
	19175	1907.5	-22.47	44.61	22.14	163.79	

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)
90°	18650	1855.0	-19.55	44.70	25.15	327.34	H
	18900	1880.0	-19.40	44.70	25.30	**338.84**	
	19150	1905.0	-19.36	44.57	25.21	332.12	
	18650	1855.0	-21.16	44.27	23.11	204.64	V
	18900	1880.0	-21.60	44.87	23.27	212.32	
	19150	1905.0	-21.44	44.61	23.17	207.63	
Channel Bandwidth: 10 MHz / 16QAM							
90°	18650	1855.0	-20.55	44.70	24.15	260.02	H
	18900	1880.0	-20.41	44.70	24.29	268.53	
	19150	1905.0	-20.36	44.57	24.21	263.82	
	18650	1855.0	-22.16	44.27	22.11	162.55	V
	18900	1880.0	-22.61	44.87	22.26	168.27	
	19150	1905.0	-22.44	44.61	22.17	164.93	

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)
90°	18675	1857.5	-19.51	44.70	25.19	330.37	H
	18900	1880.0	-19.36	44.70	25.34	**341.98**	
	19125	1902.5	-19.32	44.57	25.25	335.20	
	18675	1857.5	-21.12	44.27	23.15	206.54	V
	18900	1880.0	-21.56	44.87	23.31	214.29	
	19125	1902.5	-21.40	44.61	23.21	209.56	
Channel Bandwidth: 15 MHz / 16QAM							
90°	18675	1857.5	-20.51	44.70	24.19	262.42	H
	18900	1880.0	-20.36	44.70	24.34	271.64	
	19125	1902.5	-20.33	44.57	24.24	265.64	
	18675	1857.5	-22.13	44.27	22.14	163.68	V
	18900	1880.0	-22.56	44.87	22.31	170.22	
	19125	1902.5	-22.40	44.61	22.21	166.46	

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)**
90°	18700	1860.0	-19.47	44.70	25.23	333.43	H
	18900	1880.0	-19.32	44.70	25.38	**345.14**	
	19100	1900.0	-19.28	44.57	25.29	338.30	
	18700	1860.0	-21.08	44.27	23.19	208.45	V
	18900	1880.0	-21.52	44.87	23.35	216.27	
	19100	1900.0	-21.36	44.61	23.25	211.49	
Channel Bandwidth: 20 MHz / 16QAM							
90°	18700	1860.0	-20.47	44.70	24.23	264.85	H
	18900	1880.0	-20.32	44.70	24.38	274.16	
	19100	1900.0	-20.28	44.57	24.29	268.72	
	18700	1860.0	-22.08	44.27	22.19	165.58	V
	18900	1880.0	-22.53	44.87	22.34	171.40	
	19100	1900.0	-22.36	44.61	22.25	168.00	

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

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

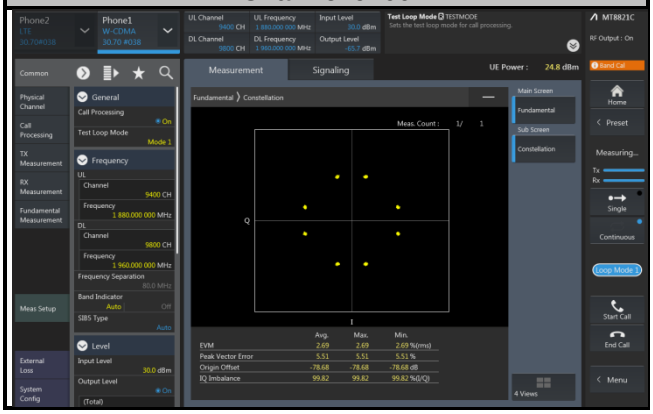
N/A

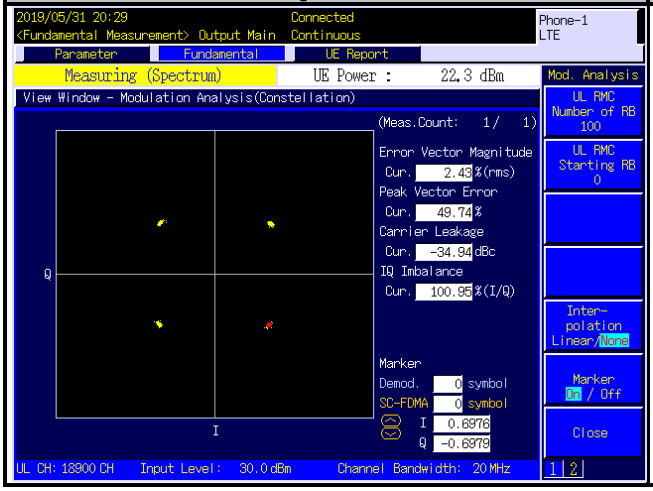
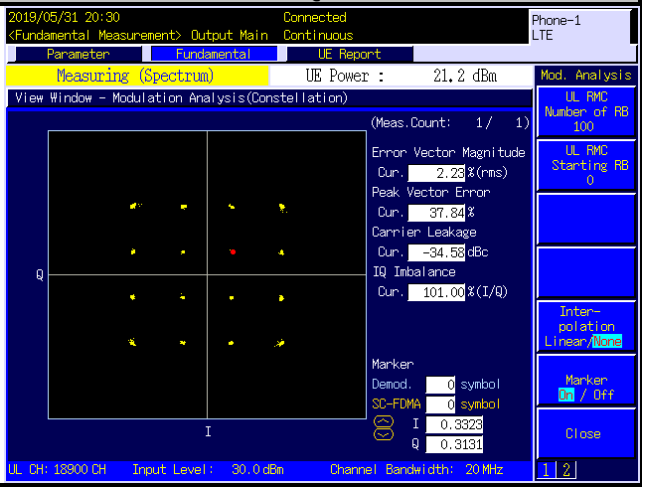
4.2.2 Test Setup

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
WCDMA
Channel 9400


Spectrum Plot of Measurement	
LTE Band 2	
Channel 18900	
QPSK	16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

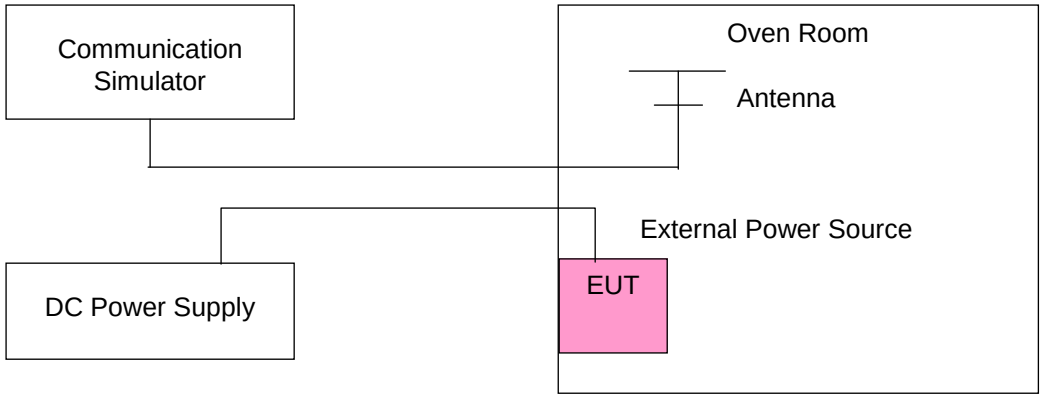
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1852.400001	0.001	1907.600001	0.001
3.06	1852.400004	0.002	1907.600002	0.001
4.14	1852.400003	0.002	1907.600003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-10	1852.400003	0.002	1907.600002	0.001
0	1852.400001	0.001	1907.600002	0.001
10	1852.399997	-0.002	1907.599998	-0.001
20	1852.399998	-0.001	1907.599996	-0.002
30	1852.399999	-0.001	1907.599996	-0.002
40	1852.399997	-0.002	1907.599997	-0.002
50	1852.399998	-0.001	1907.599998	-0.001

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -10˚C to 50˚C.
2. The EUT would shut down automatically as below -10˚C.

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)
3.6	1850.700003	0.002	1909.300000	0.001
3.06	1850.700002	0.001	1909.300002	0.001
4.14	1850.700003	0.001	1909.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 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)
-10	1850.700002	0.001	1909.300001	0.001
0	1850.700003	0.001	1909.300004	0.002
10	1850.699998	-0.001	1909.300002	0.001
20	1850.699997	-0.002	1909.299998	-0.001
30	1850.699998	-0.001	1909.299998	-0.001
40	1850.699997	-0.002	1909.299997	-0.002
50	1850.699997	-0.002	1909.299997	-0.001

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)
3.6	1850.700001	0.001	1909.300000	0.001
3.06	1850.700003	0.001	1909.300001	0.001
4.14	1850.700004	0.002	1909.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 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)
-10	1850.700002	0.001	1909.300003	0.001
0	1850.700004	0.002	1909.300004	0.002
10	1850.699999	-0.001	1909.300003	0.001
20	1850.699998	-0.001	1909.299996	-0.002
30	1850.699997	-0.002	1909.299999	-0.001
40	1850.699998	-0.001	1909.299997	-0.002
50	1850.699998	-0.001	1909.299998	-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)
3.6	1850.700001	0.001	1909.300000	0.001
3.06	1850.700003	0.002	1909.300004	0.002
4.14	1850.700003	0.002	1909.300004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 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)
-10	1850.700002	0.001	1909.300003	0.002
0	1850.700002	0.001	1909.300002	0.001
10	1850.699997	-0.002	1909.300001	0.001
20	1850.699997	-0.002	1909.299997	-0.001
30	1850.699997	-0.002	1909.299996	-0.002
40	1850.699997	-0.002	1909.299996	-0.002
50	1850.699997	-0.001	1909.299997	-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)
3.6	1850.700004	0.002	1909.300000	0.001
3.06	1850.700001	0.001	1909.300002	0.001
4.14	1850.700004	0.002	1909.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 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)
-10	1850.700004	0.002	1909.300001	0.001
0	1850.700002	0.001	1909.300004	0.002
10	1850.699997	-0.002	1909.300002	0.001
20	1850.699996	-0.002	1909.299997	-0.001
30	1850.699999	-0.001	1909.299999	-0.001
40	1850.699997	-0.002	1909.299999	-0.001
50	1850.699999	-0.001	1909.299997	-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)
3.6	1850.700002	0.001	1909.300000	0.001
3.06	1850.700003	0.002	1909.300004	0.002
4.14	1850.700001	0.001	1909.300004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 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)
-10	1850.700002	0.001	1909.300002	0.001
0	1850.700002	0.001	1909.300002	0.001
10	1850.699998	-0.001	1909.300002	0.001
20	1850.699998	-0.001	1909.299997	-0.002
30	1850.699997	-0.002	1909.299998	-0.001
40	1850.699998	-0.001	1909.299998	-0.001
50	1850.699998	-0.001	1909.299999	-0.001

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)
3.6	1850.700003	0.002	1909.300000	0.002
3.06	1850.700003	0.002	1909.300001	0.001
4.14	1850.700001	0.001	1909.300003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.06 Vdc to 4.14 Vdc.

Frequency Error vs. Temperature

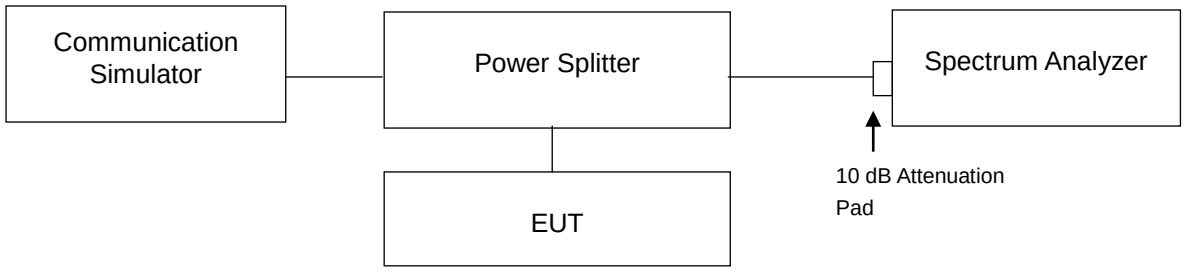
Temp. (℃)	LTE Band 2			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-10	1850.700002	0.001	1909.300004	0.002
0	1850.700004	0.002	1909.300004	0.002
10	1850.699996	-0.002	1909.300001	0.001
20	1850.699997	-0.002	1909.299999	-0.001
30	1850.699998	-0.001	1909.299999	-0.001
40	1850.699997	-0.002	1909.299999	-0.001
50	1850.699996	-0.002	1909.299998	-0.001

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.

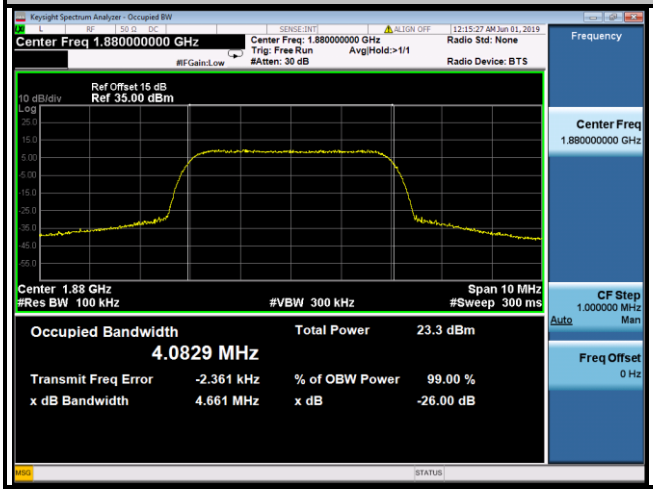
4.4.2 Test Setup



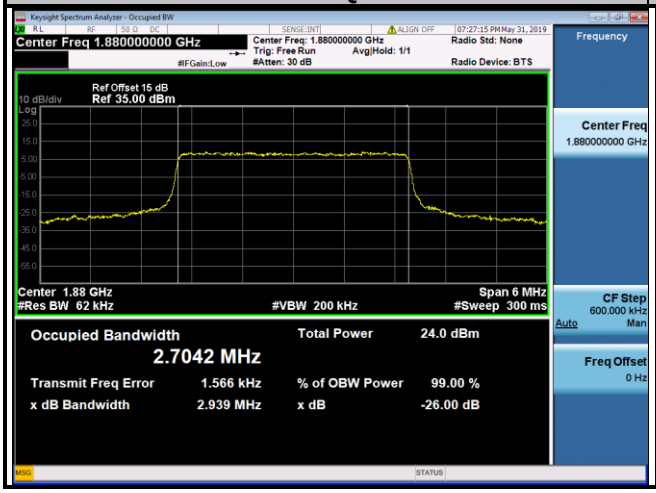
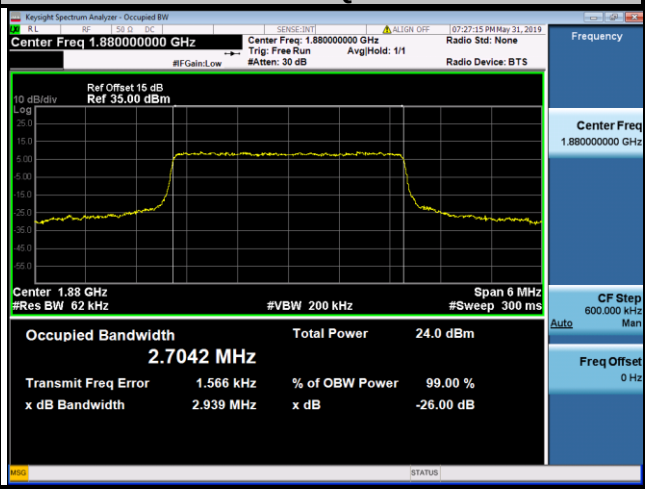
4.4.3 Test Result

WCDMA			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.0779	4.652
9400	1880.0	4.0829	4.661
9538	1907.6	4.0755	4.635

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
WCDMA	



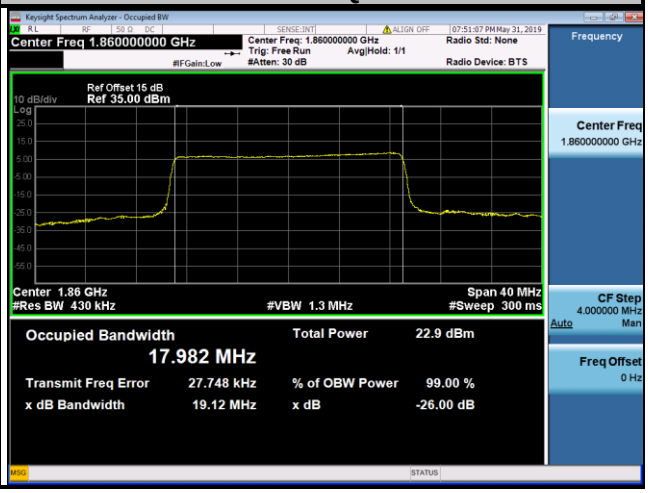
LTE Band 2					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18607	1850.7	1.0878	1.0888	1.298	1.275
18900	1880.0	1.0888	1.0882	1.297	1.288
19193	1909.3	1.0897	1.0918	1.289	1.289
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18615	1851.5	2.6998	2.6982	2.924	2.937
18900	1880.0	2.7042	2.6973	2.939	2.939
19185	1908.5	2.7012	2.6966	2.922	2.931

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
1.4 MHz / 16QAM	1.4 MHz / QPSK
	
3 MHz / QPSK	3 MHz / QPSK
	

LTE Band 2					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18625	1852.5	4.4840	4.4870	4.810	4.829
18900	1880.0	4.4857	4.4869	4.819	4.825
19175	1907.5	4.4813	4.4827	4.798	4.810
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18650	1855.0	8.9768	8.9818	9.572	9.596
18900	1880.0	8.9703	8.9705	9.537	9.548
19150	1905.0	8.9488	8.9471	9.493	9.535

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
5 MHz / 16QAM	5 MHz / 16QAM
	
10 MHz / 16QAM	10 MHz / 16QAM
	

LTE Band 2					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18675	1857.5	13.492	13.484	14.35	14.38
18900	1880.0	13.456	13.445	14.26	14.36
19125	1902.5	13.419	13.401	14.25	14.26
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
18700	1860.0	17.982	17.991	19.12	19.07
18900	1880.0	17.907	17.927	19.03	19.05
19100	1900.0	17.878	17.906	19.06	19.05

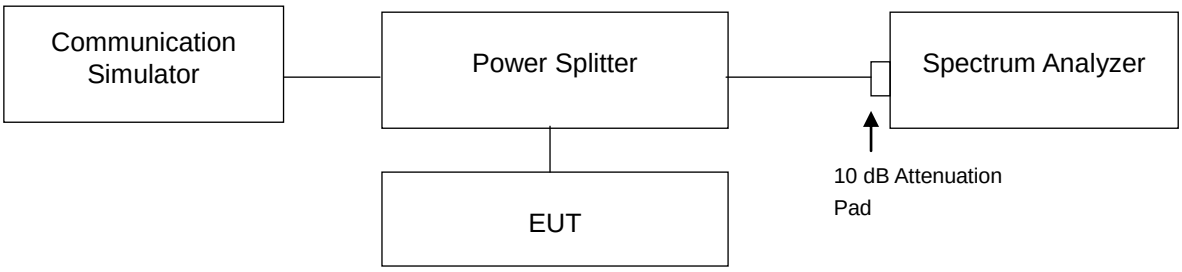
Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
15 MHz / QPSK	15 MHz / 16QAM
	
20 MHz / 16QAM	20 MHz / QPSK
	

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

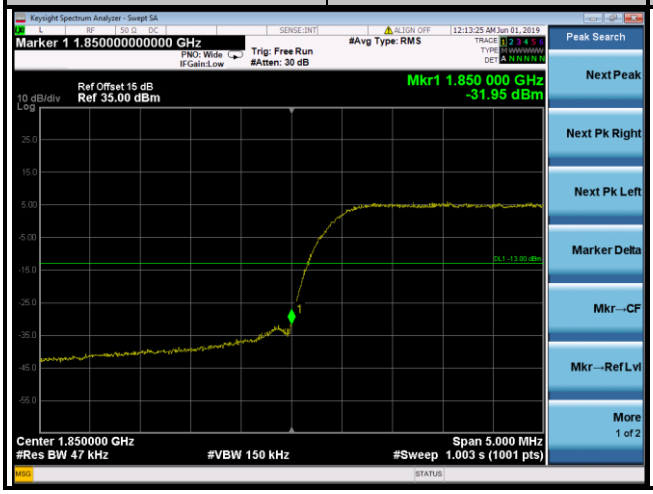


4.5.3 Test Procedures

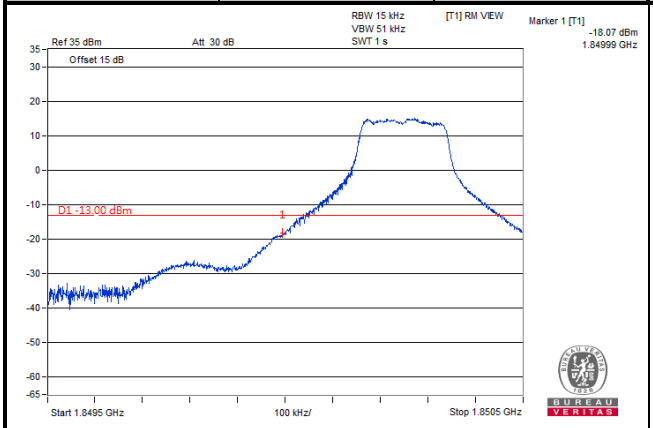
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 47 kHz and VB of the spectrum is 150 kHz (WCDMA).
c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
d. 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).
e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (LTE Bandwidth 5 MHz).
f. 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).
g. 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).
h. 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).
i. Record the max trace plot into the test report.

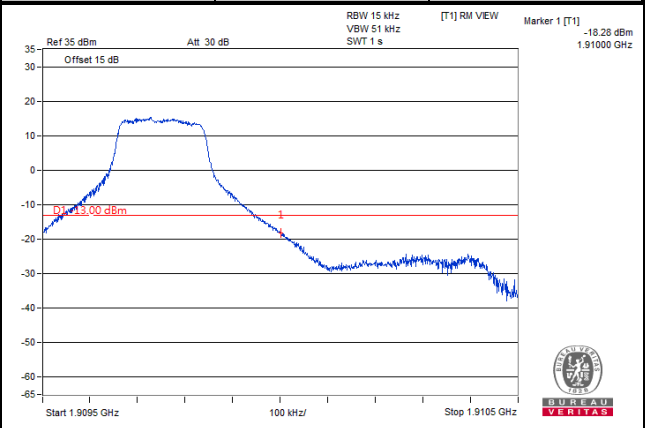
4.5.4 Test Results

WCDMA			
Channel	9262	Channel	9538

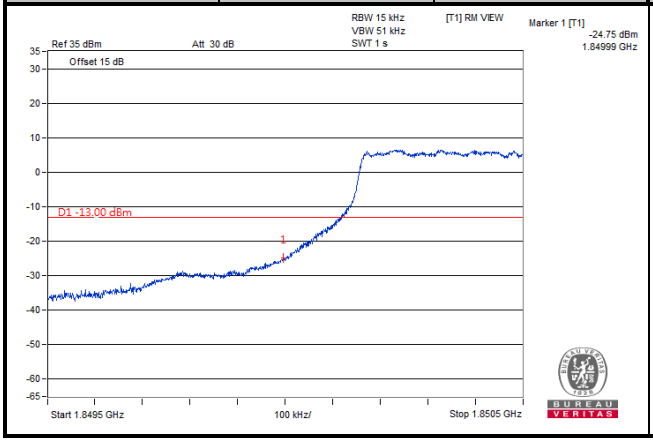


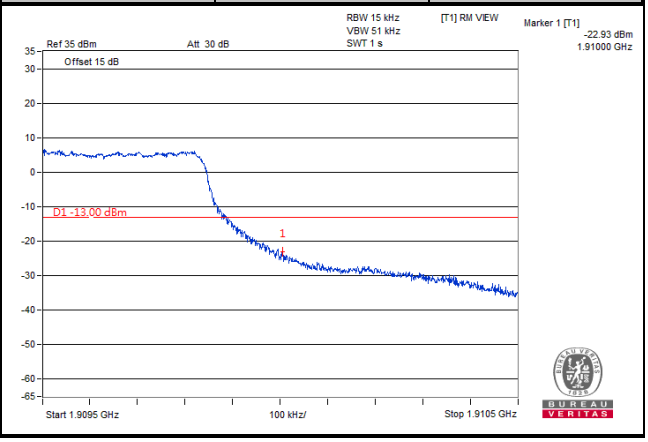
LTE Band 2					
Channel Bandwidth: 1.4 MHz					
Channel	18607	1 RB	Channel	19193	1 RB

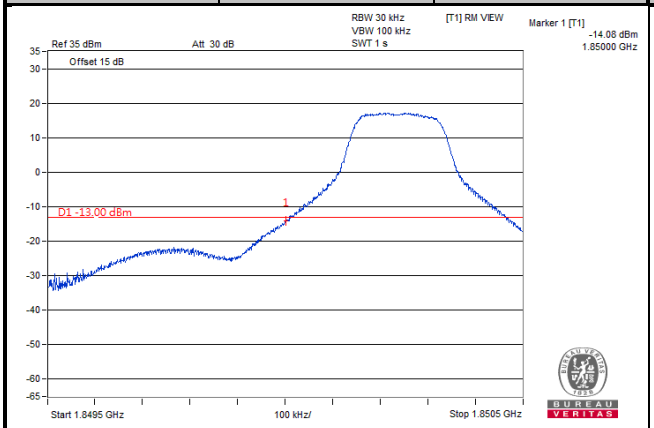
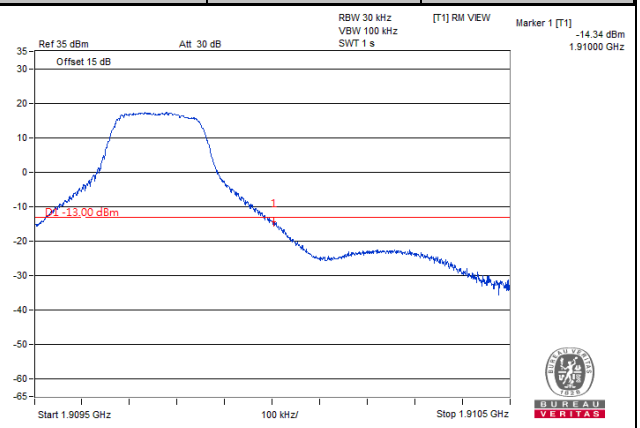
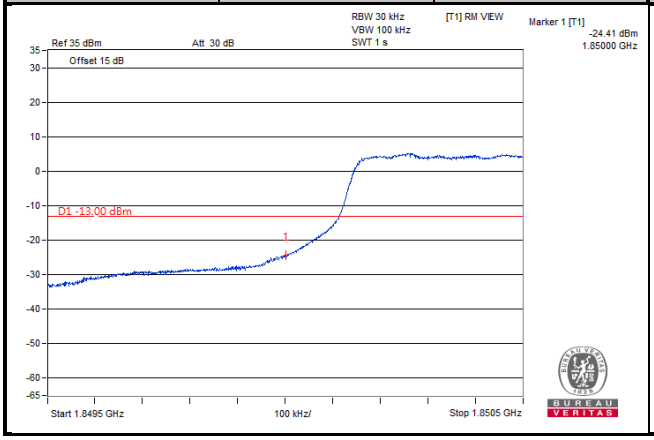
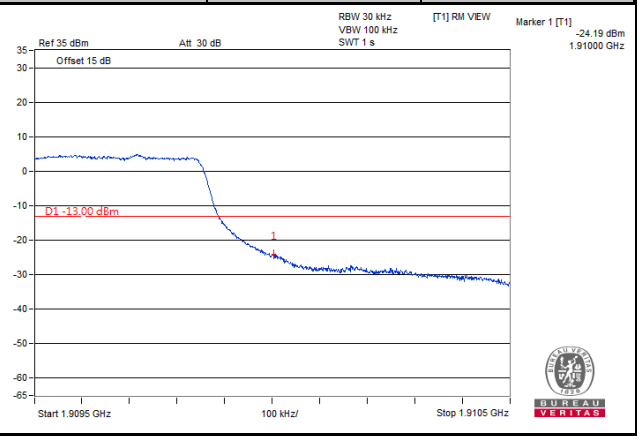


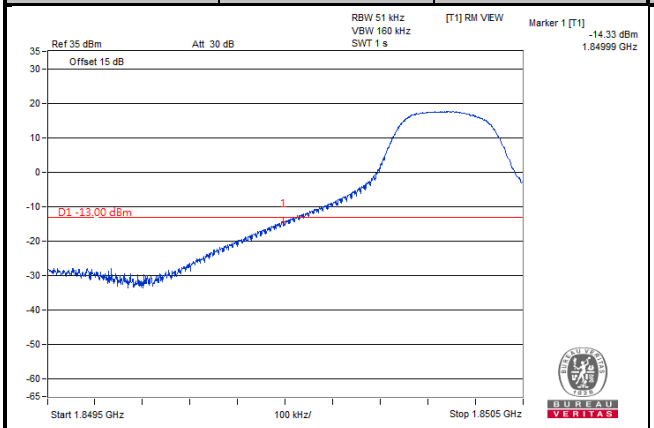
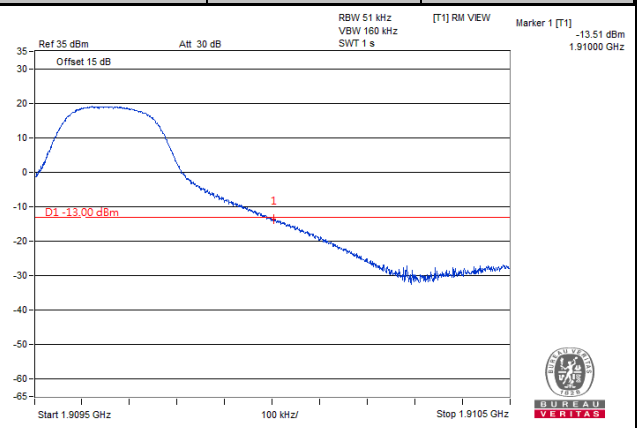
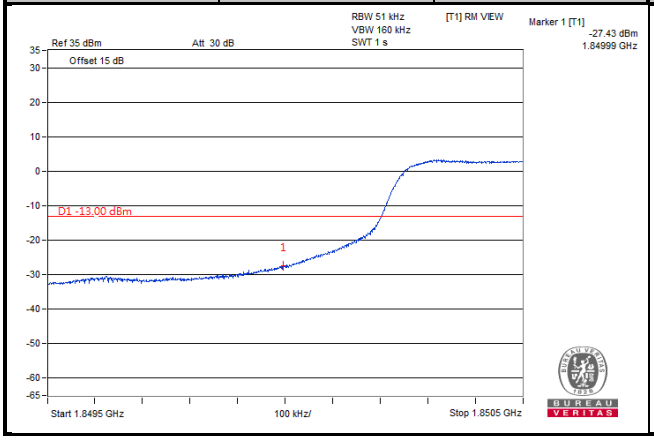
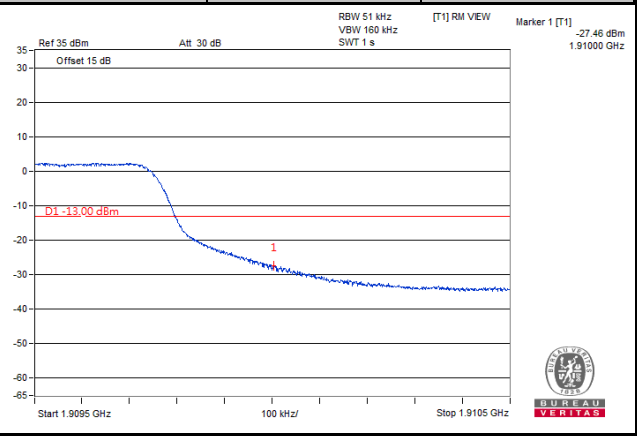


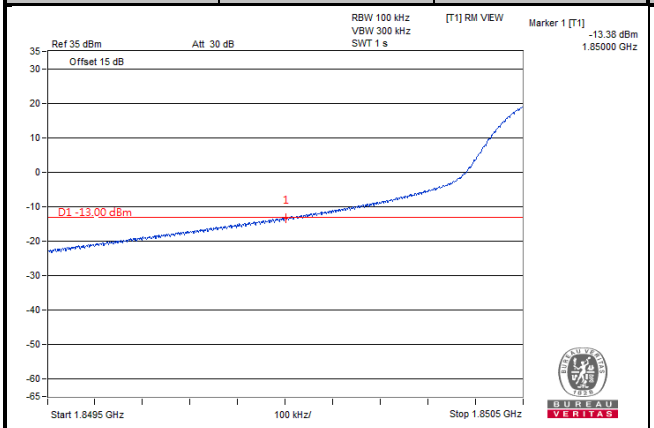
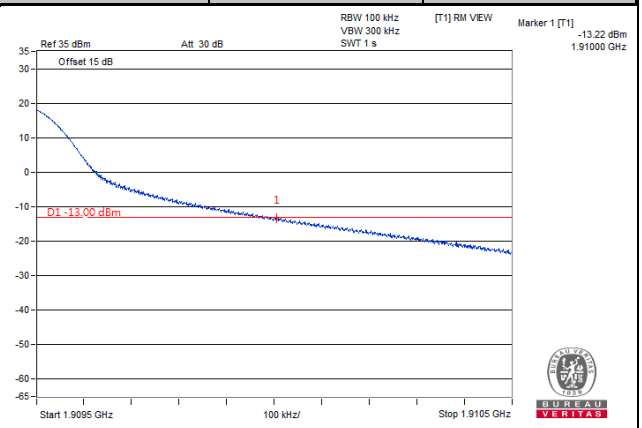
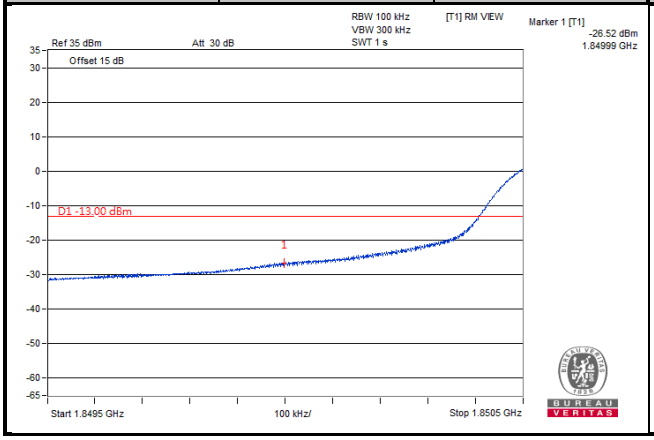
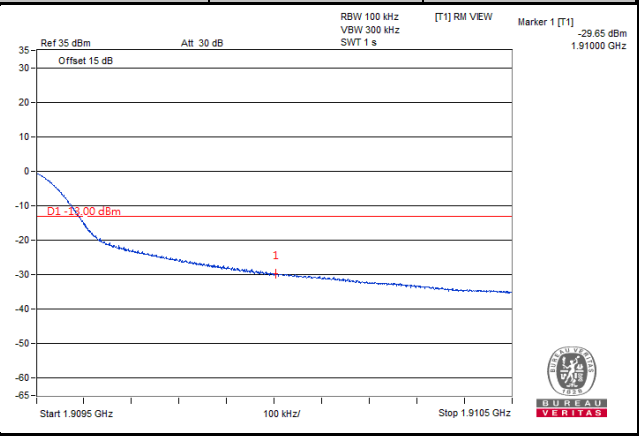
Channel	18607	6 RB	Channel	19193	6 RB

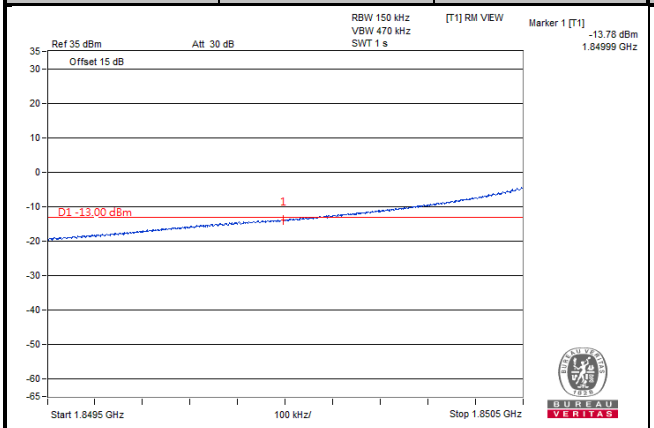
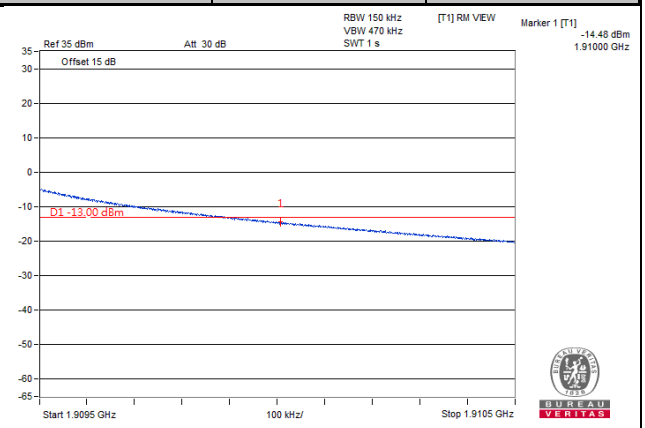
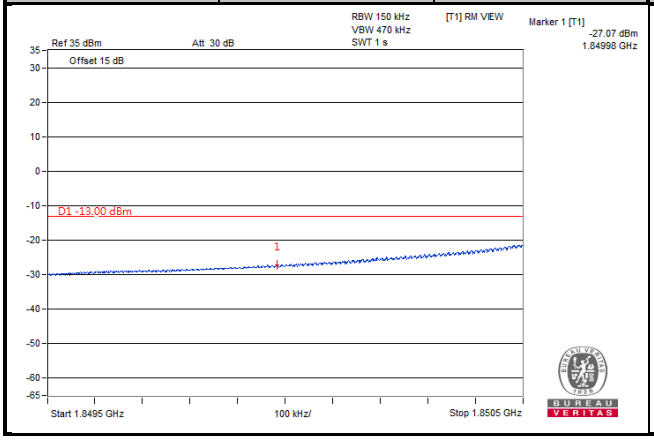
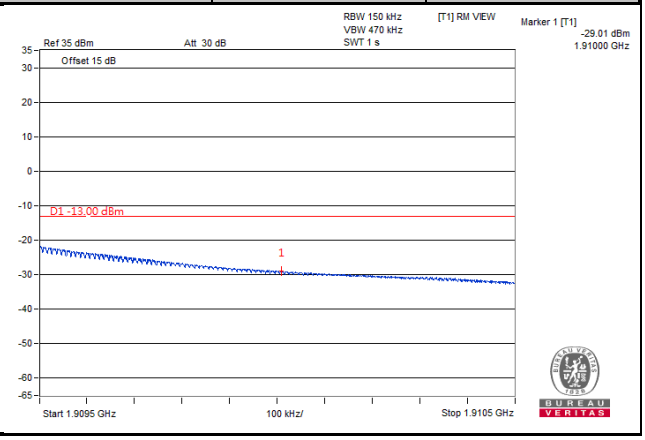


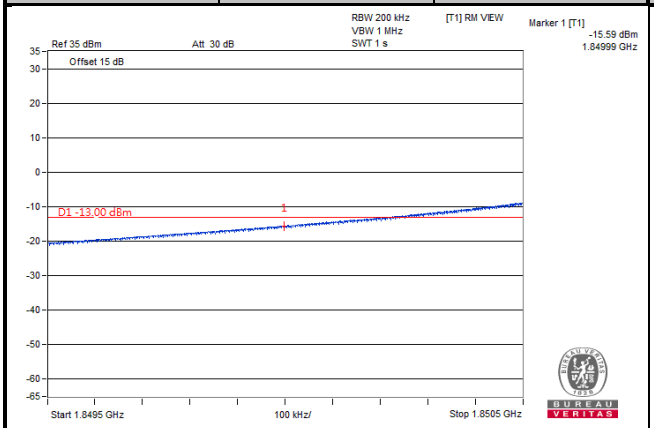
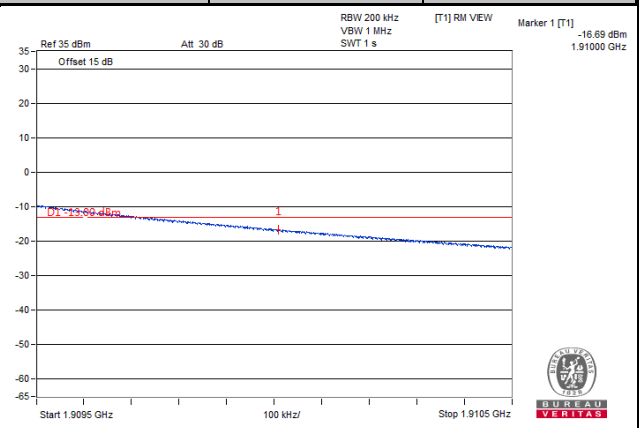
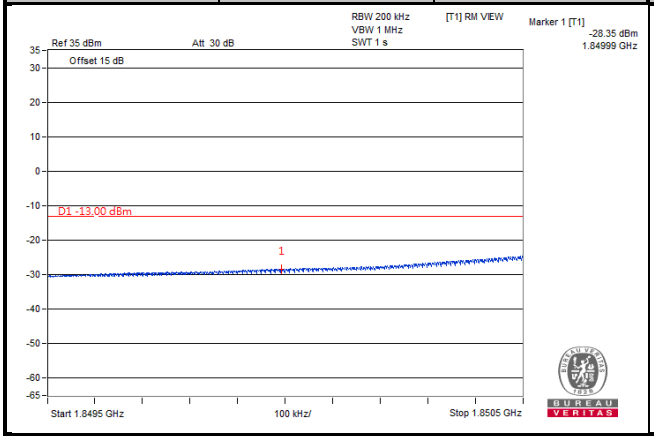
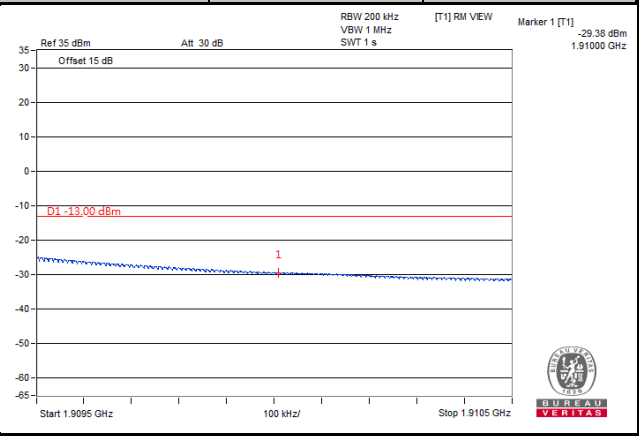


LTE Band 2					
Channel Bandwidth: 3 MHz					
Channel	18615	1 RB	Channel	19185	1 RB
					
Channel	18615	15 RB	Channel	19185	15 RB
					

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
					

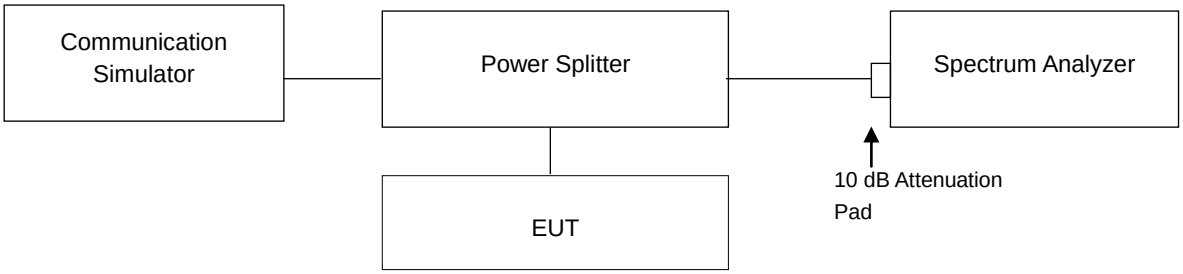
LTE Band 2					
Channel Bandwidth: 20 MHz					
Channel	18700	1 RB	Channel	19100	1 RB
					
Channel	18700	100 RB	Channel	19100	100 RB
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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

4.6.2 Test Setup



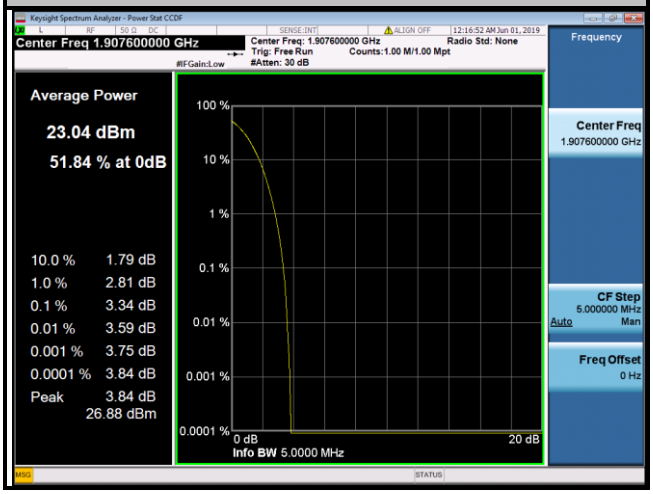
4.6.3 Test Procedures

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

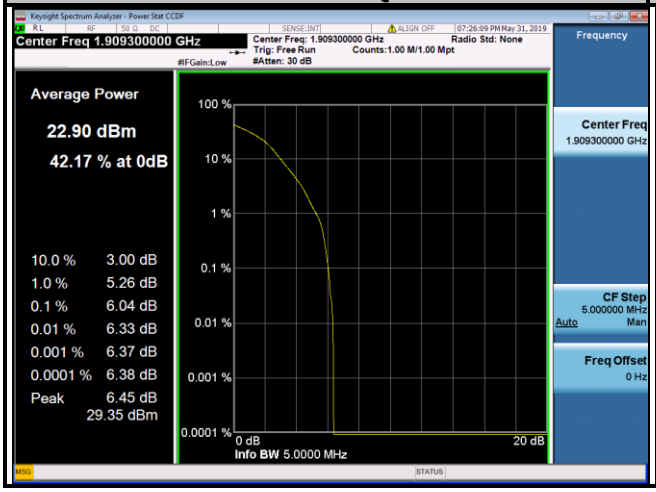
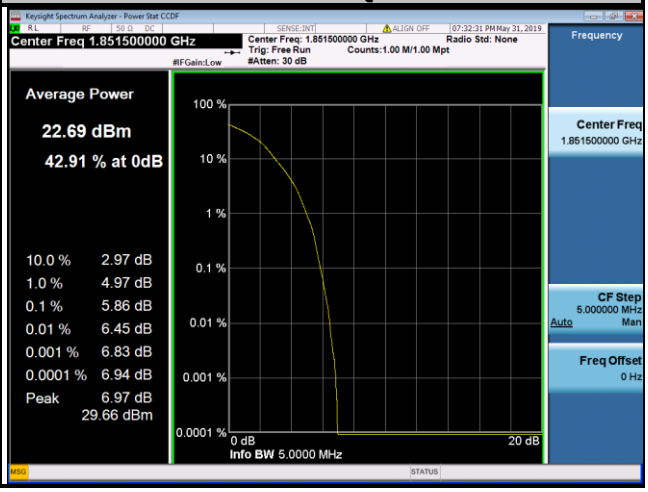
4.6.4 Test Results

Channel	Frequency (MHz)	Peak to Average Ratio (dB)
		WCDMA
9262	1852.4	3.33
9400	1880.0	3.18
9538	1907.6	3.34

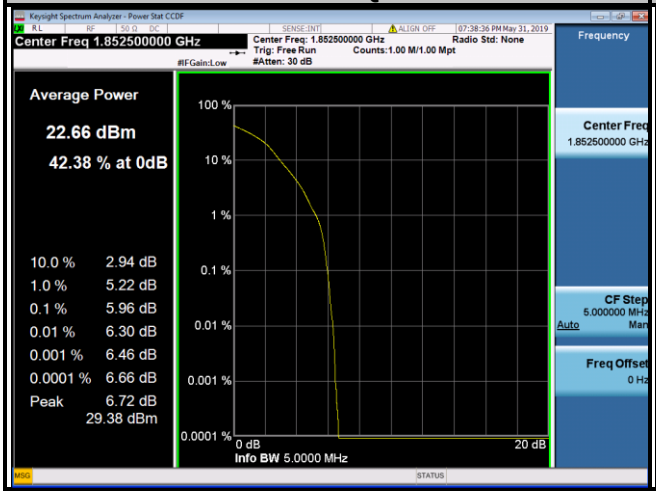
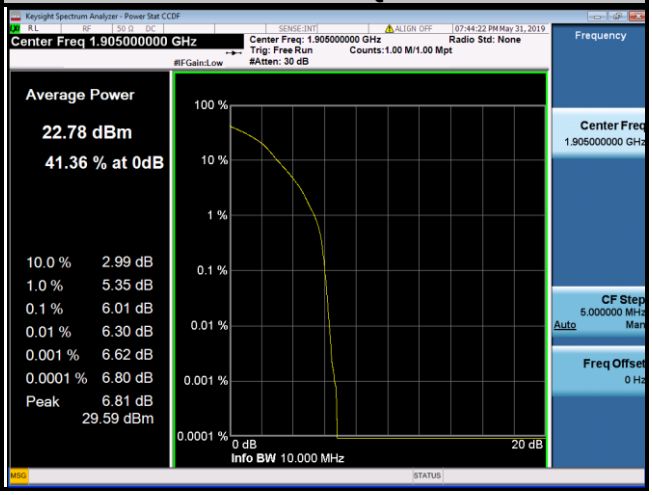
Spectrum Plot of Worst Value
WCDMA



LTE Band 2							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	5.18	6.03	18615	1851.5	5.01	5.86
18900	1880.0	4.41	5.27	18900	1880.0	4.37	5.14
19193	1909.3	5.15	6.04	19185	1908.5	4.98	5.73

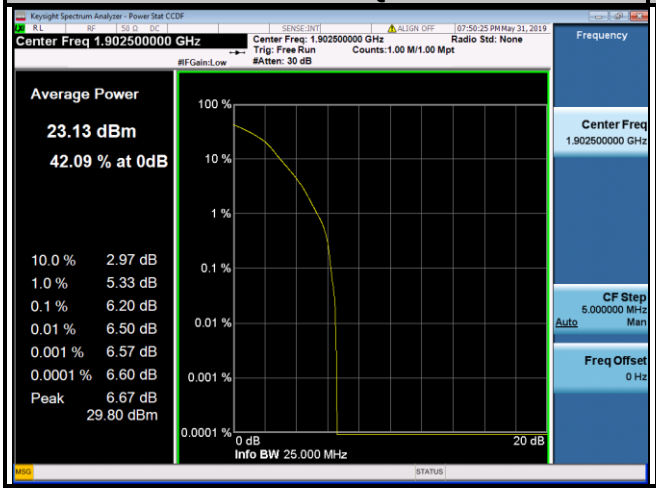
Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / 16QAM
	

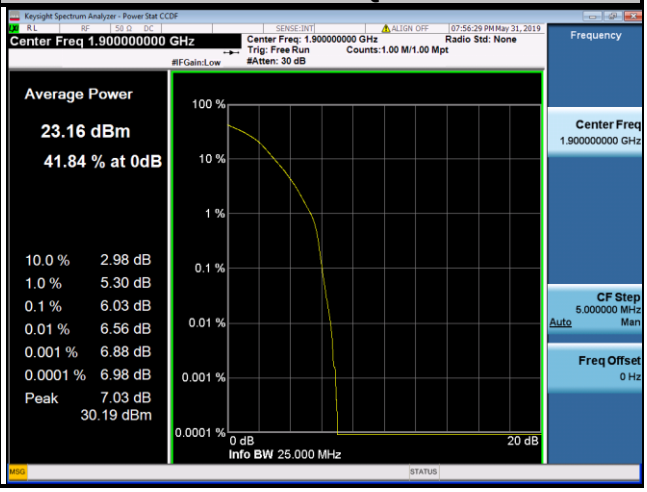
LTE Band 2							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	5.12	5.96	18650	1855.0	5.09	5.88
18900	1880.0	4.47	5.24	18900	1880.0	4.41	5.20
19175	1907.5	4.96	5.77	19150	1905.0	5.19	6.01

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

LTE Band 2							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	4.98	5.80	18700	1860.0	5.14	5.88
18900	1880.0	4.54	5.32	18900	1880.0	4.82	5.47
19125	1902.5	5.40	6.20	19100	1900.0	5.32	6.03

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



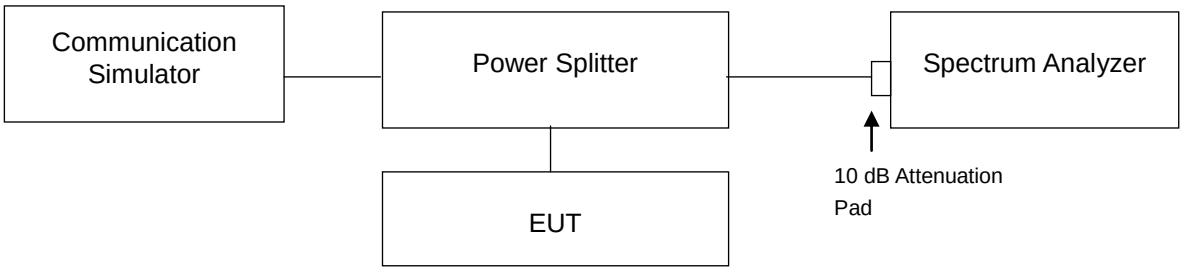


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13 dBm.

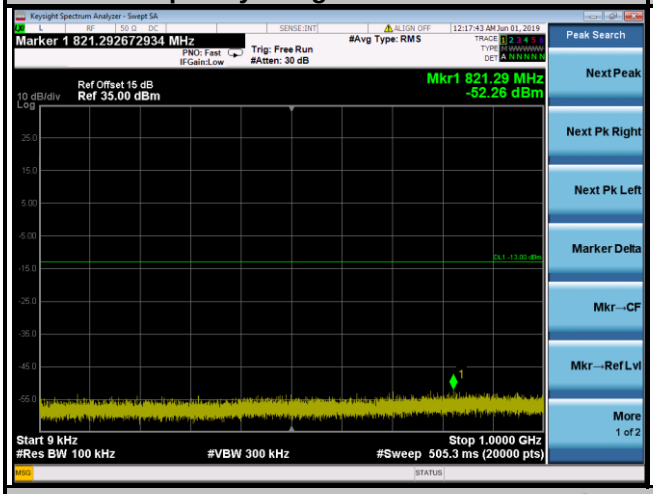
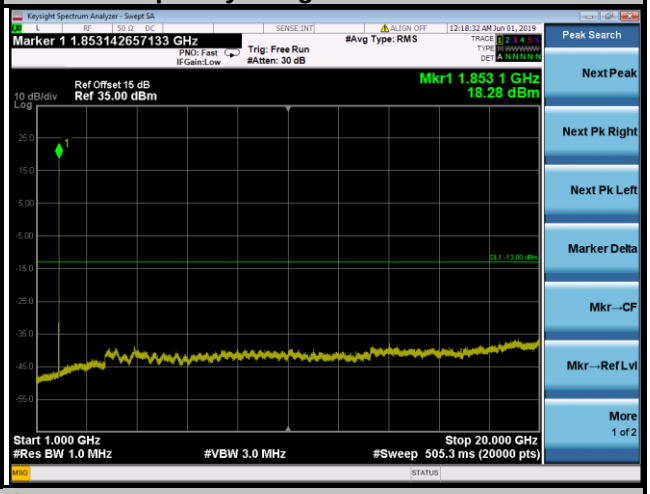
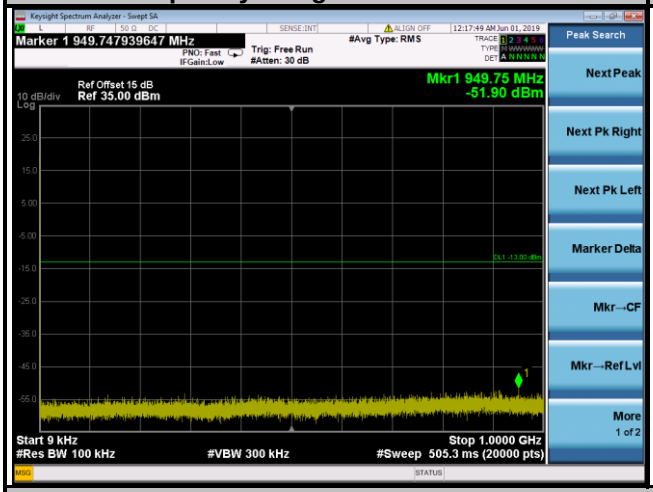
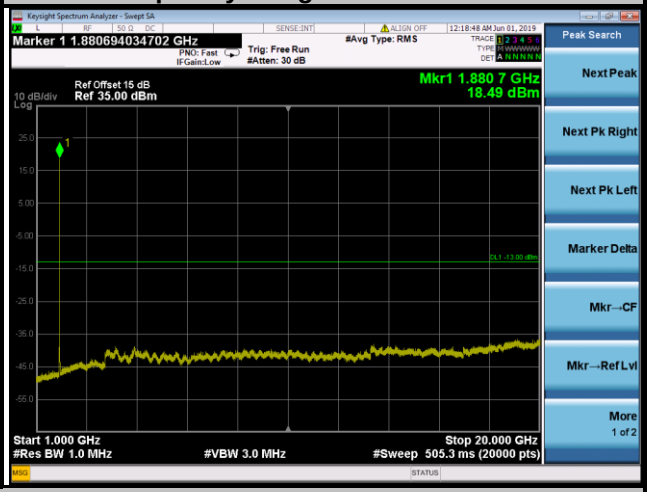
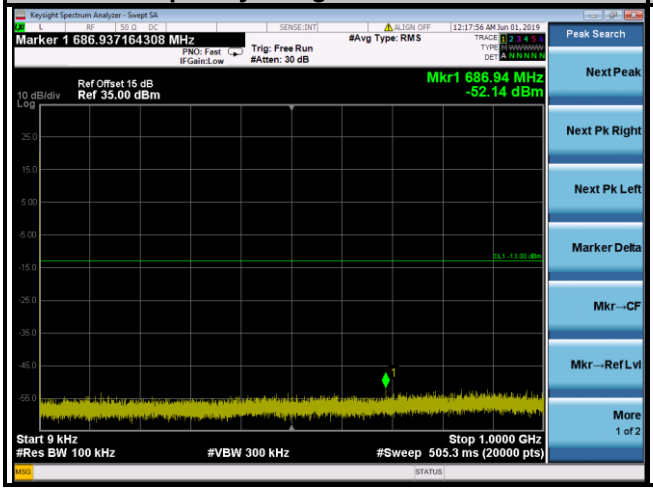
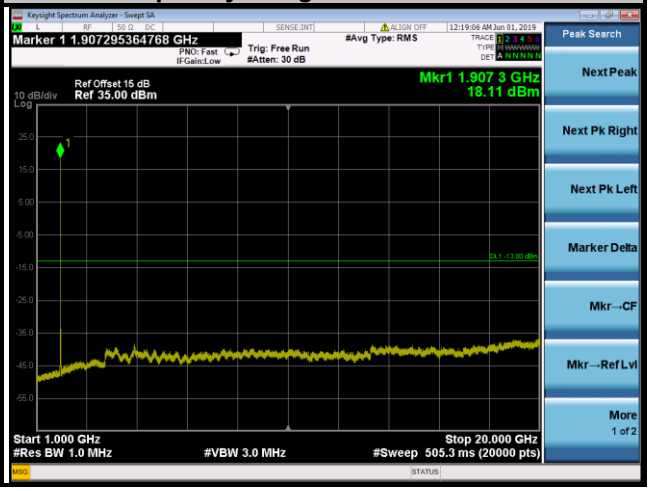
4.7.2 Test Setup



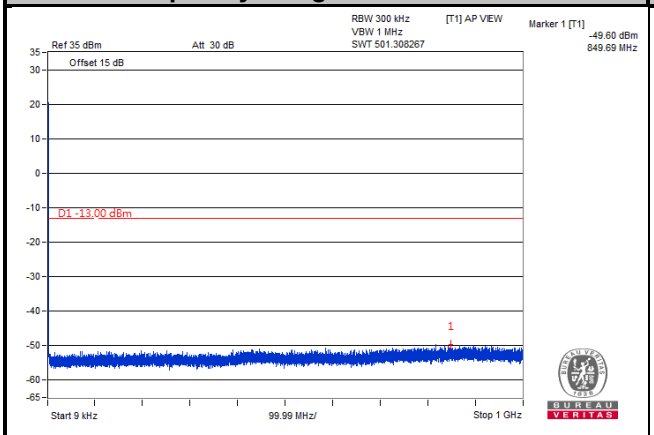
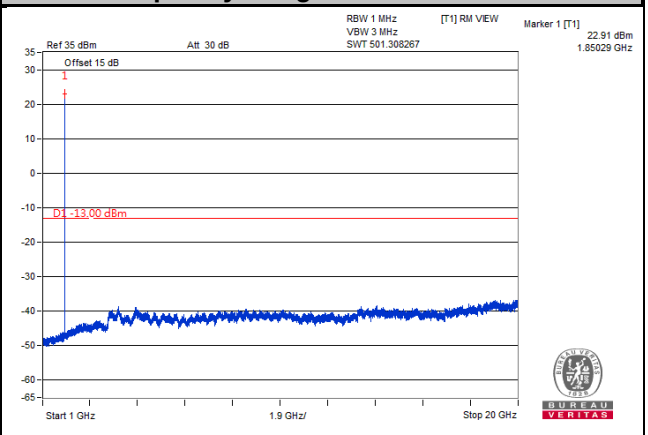
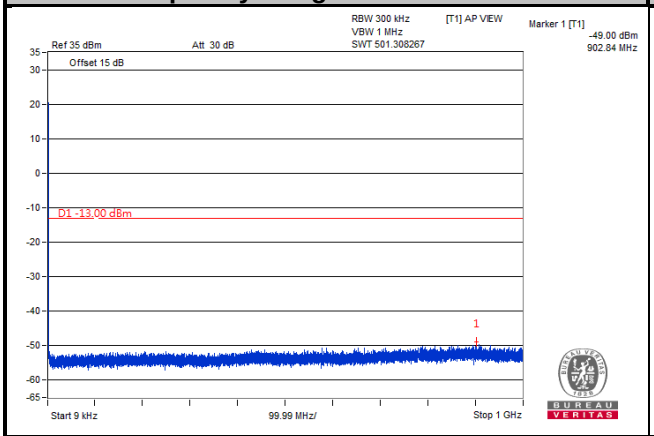
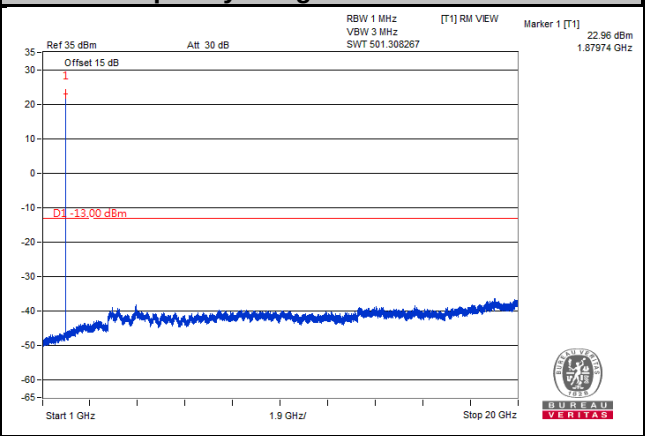
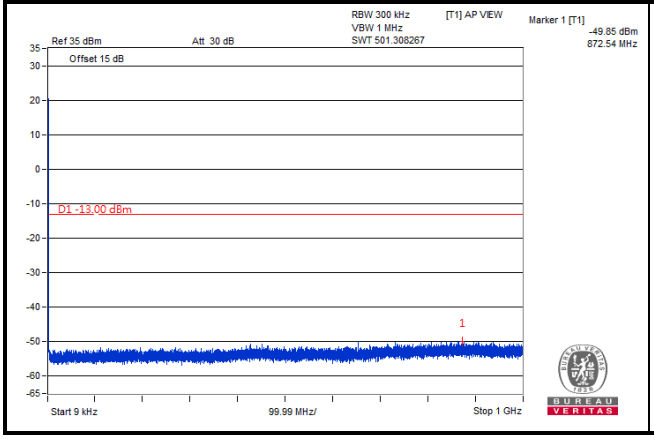
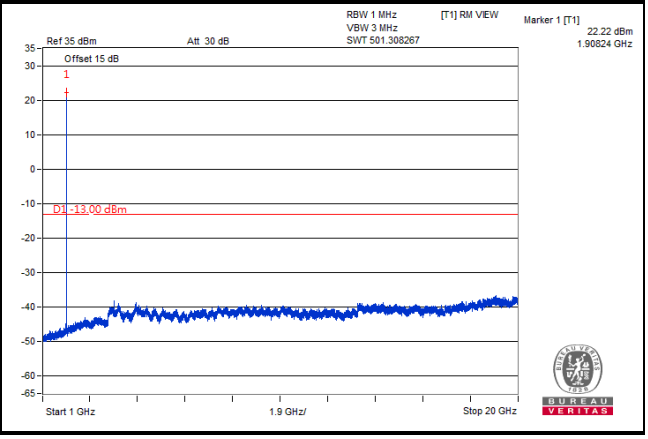
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz is used for WCDMA conducted emission measurement. RBW = 300 kHz and VBW = 1 MHz is used for LTE conducted emission measurement.
c. Measuring frequency range is from 1 GHz to 20 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.
d. Spectrum RBW settings are referenced to ANSI 63.26 section 5.7.2.

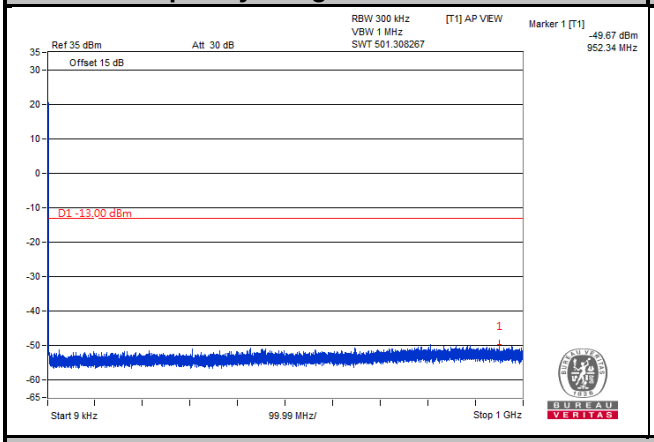
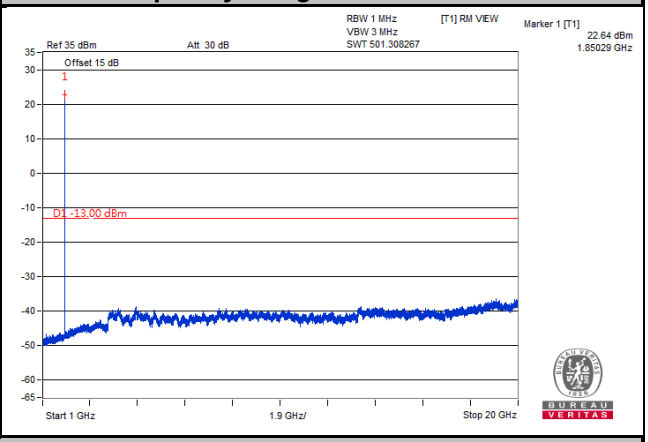
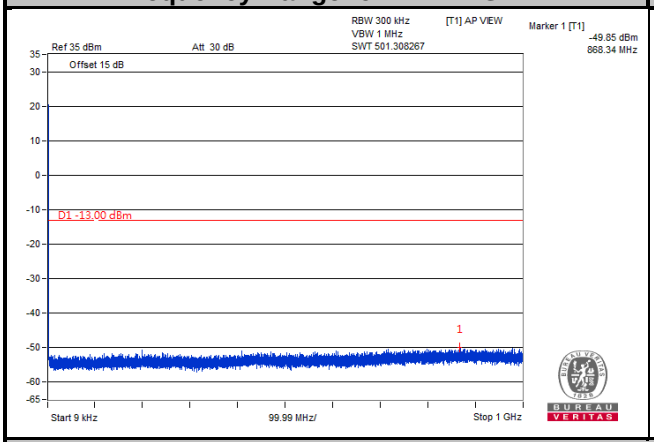
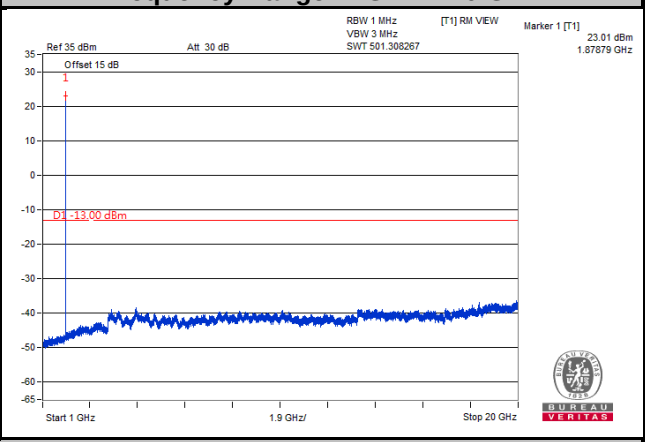
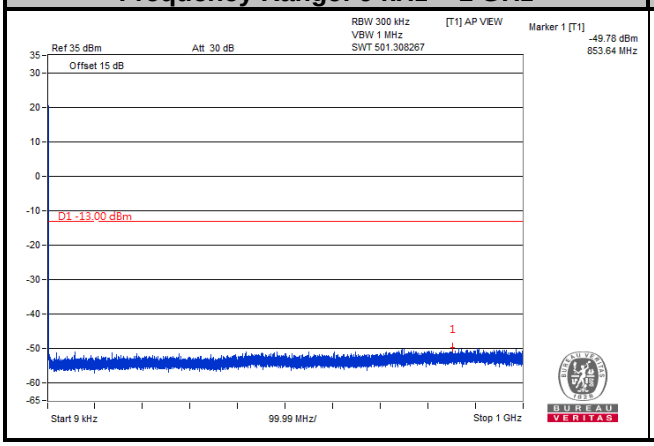
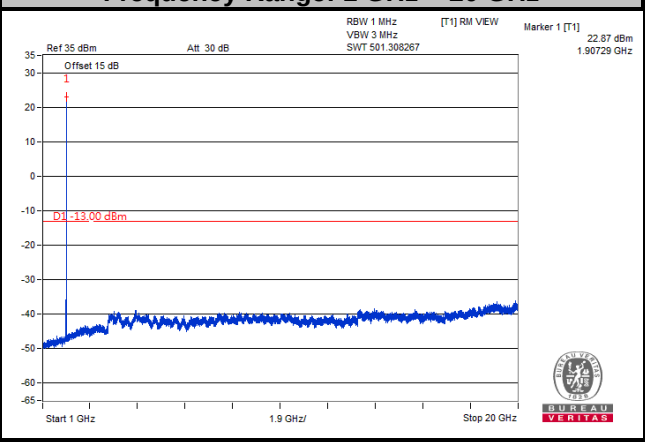
4.7.4 Test Results

WCDMA	
Channel 9262	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 9400	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 9538	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

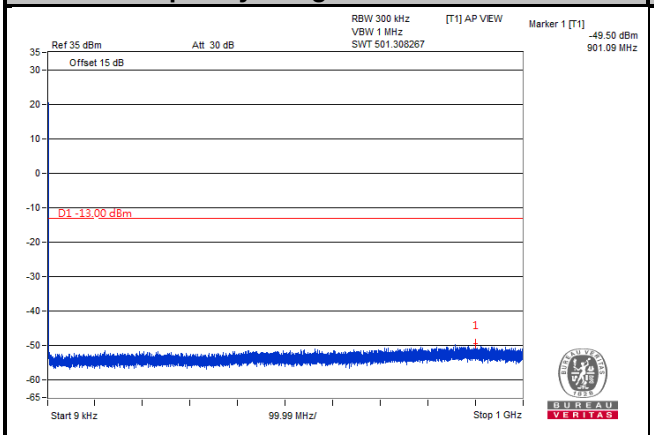
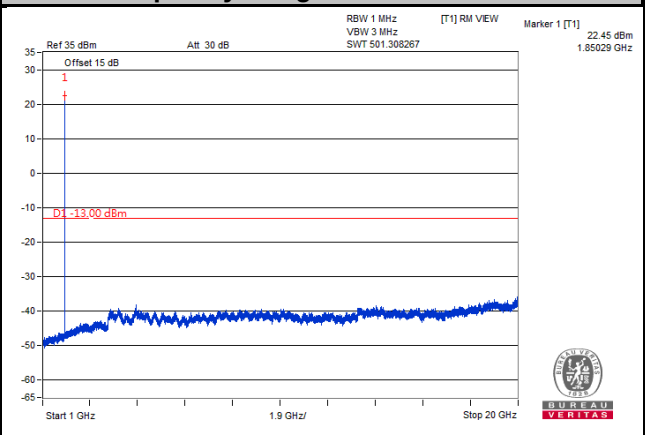
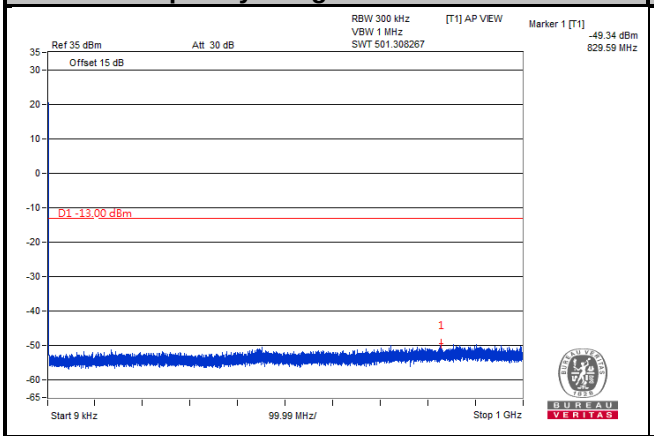
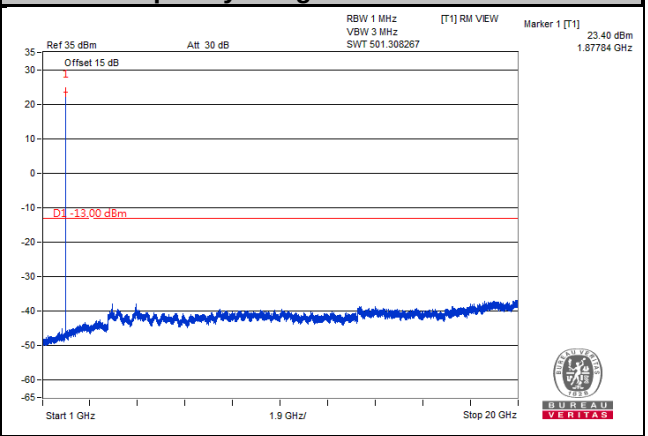
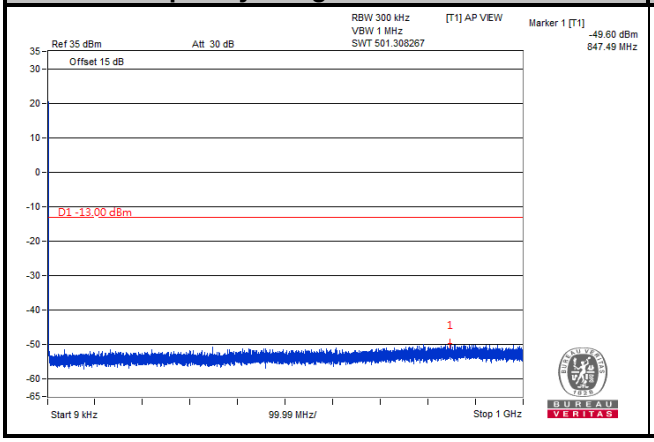
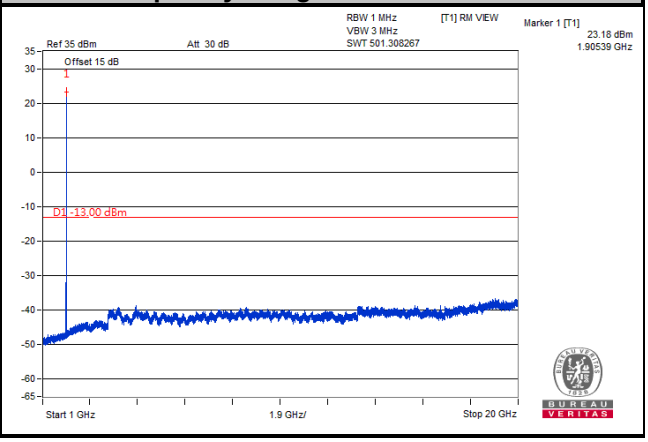
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 1.4 MHz	
Channel 18607	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19193	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

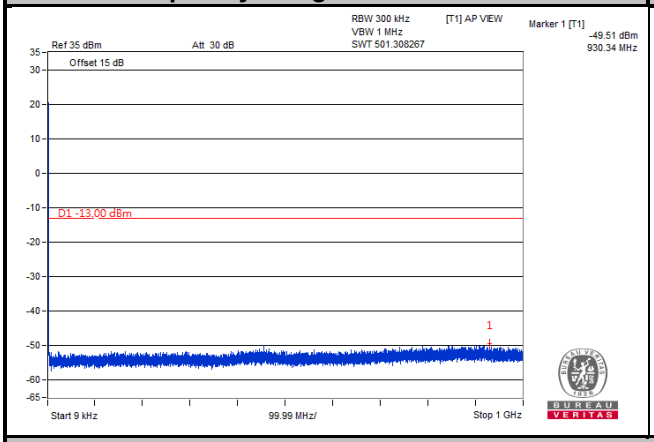
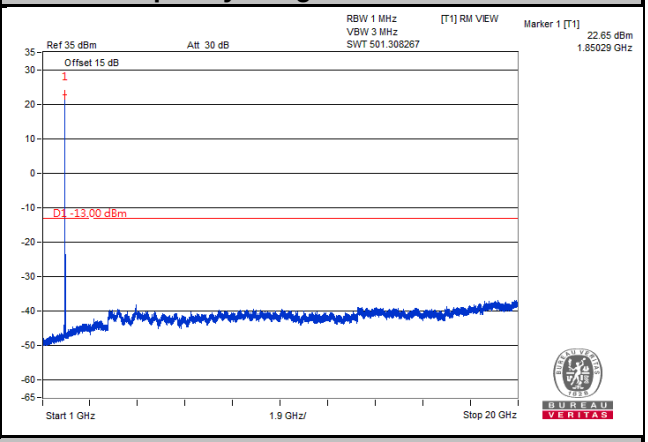
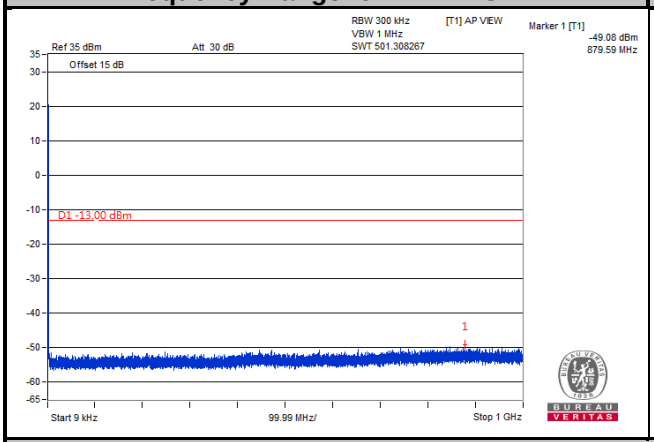
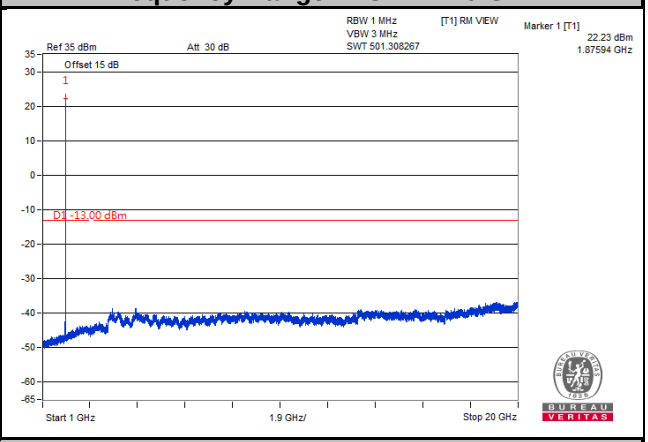
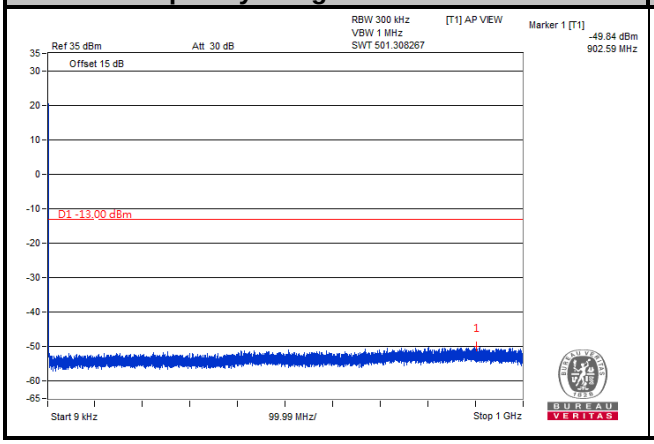
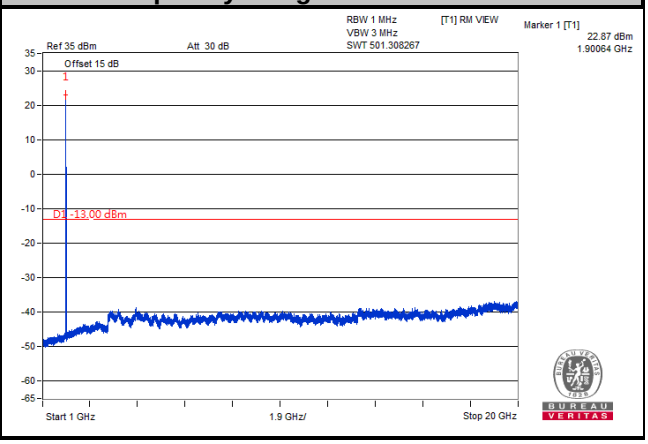
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 3 MHz	
Channel 18615	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19185	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

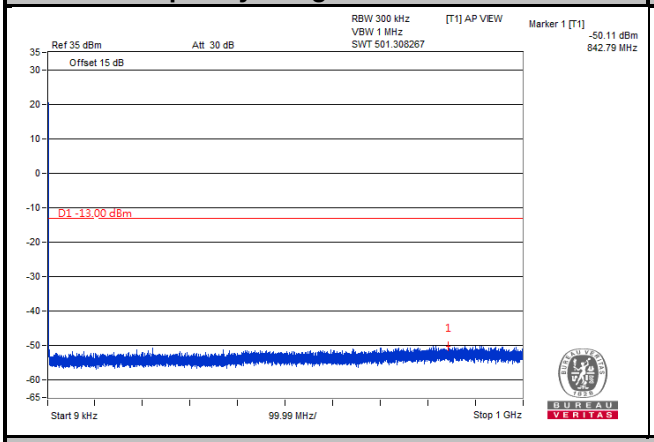
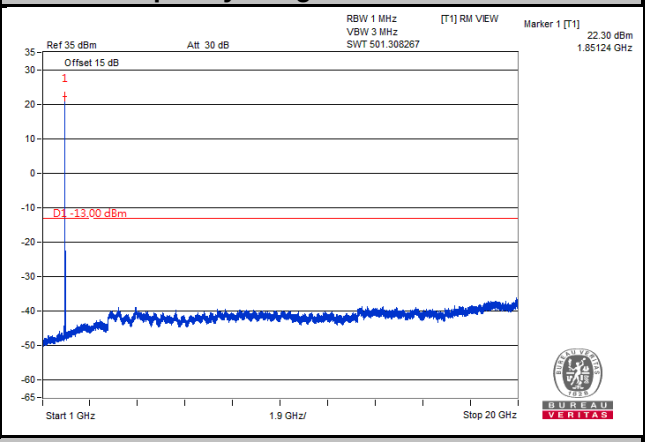
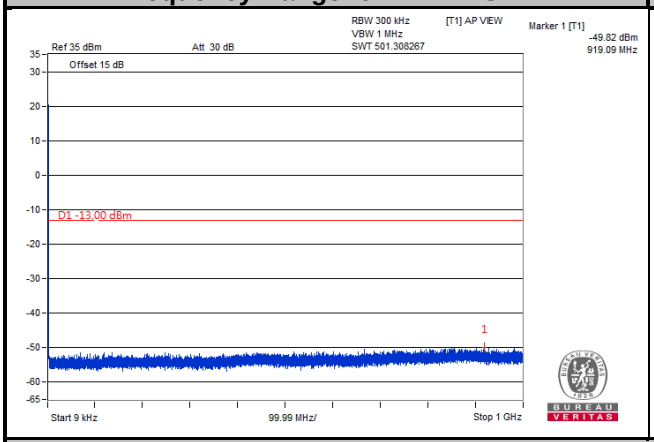
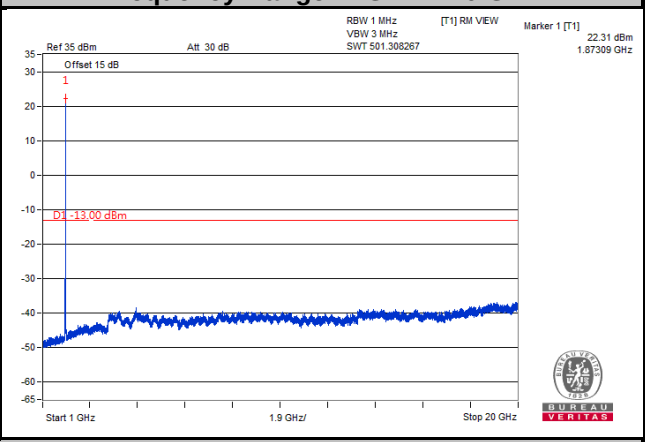
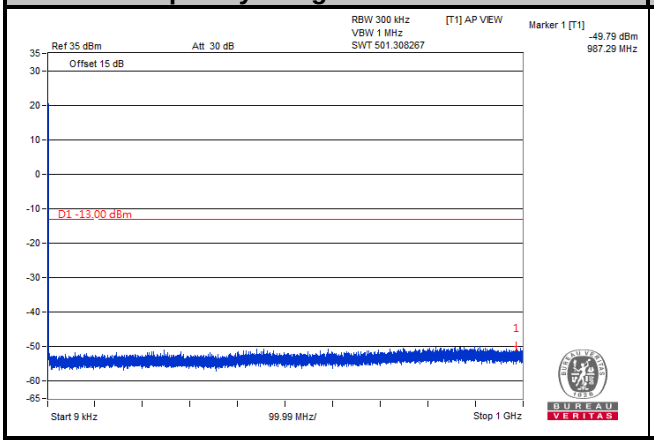
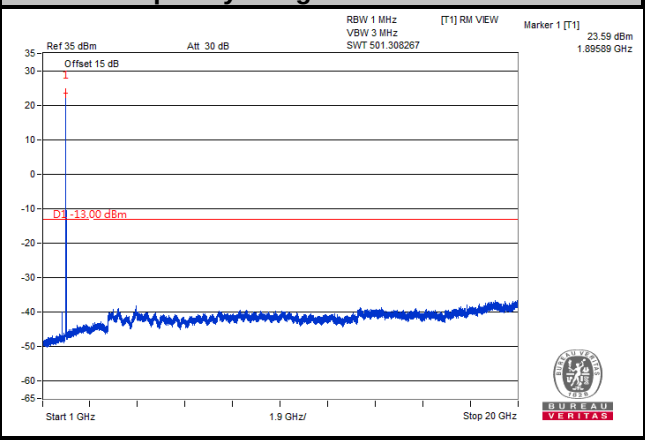
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 5 MHz	
Channel 18625	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

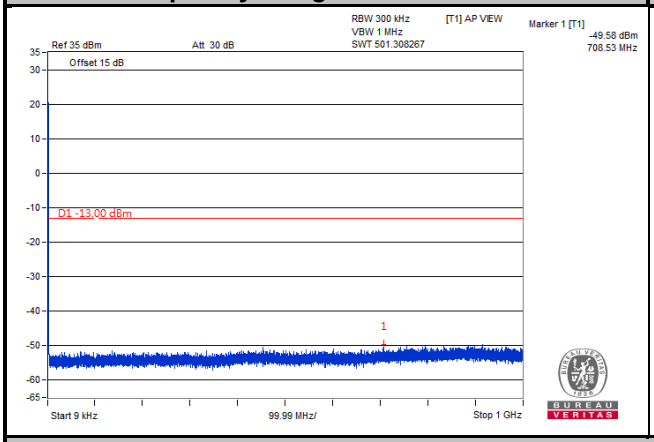
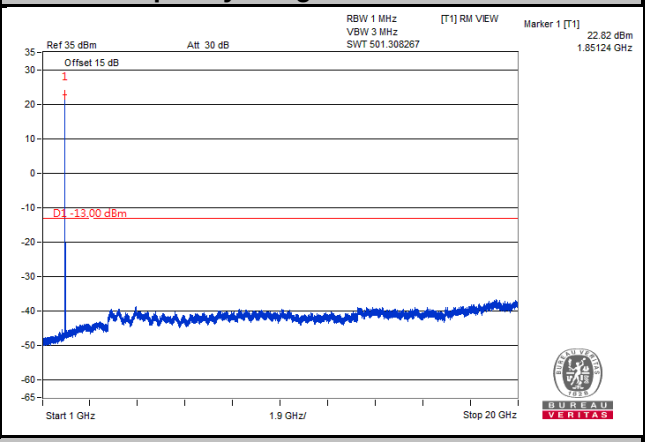
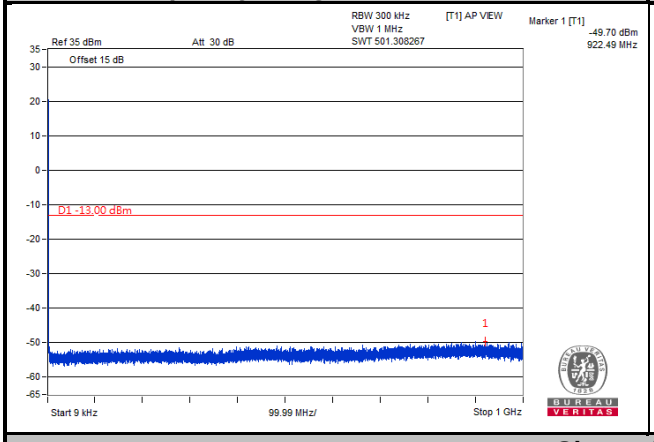
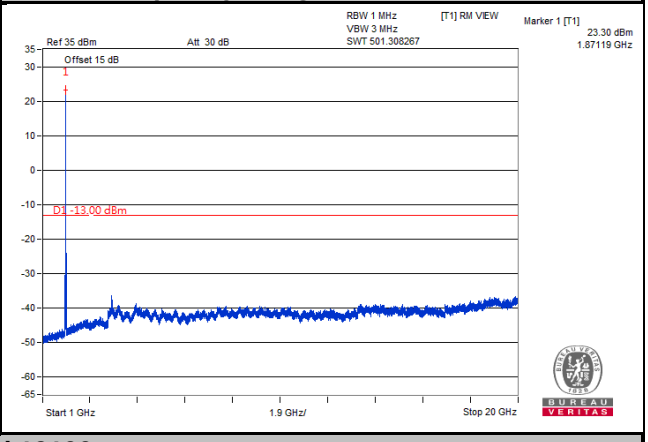
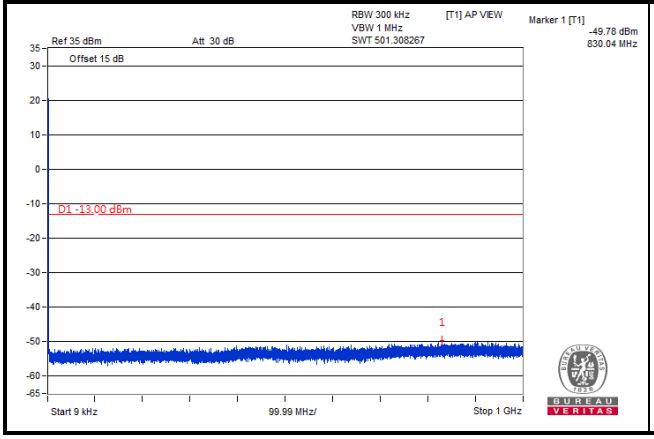
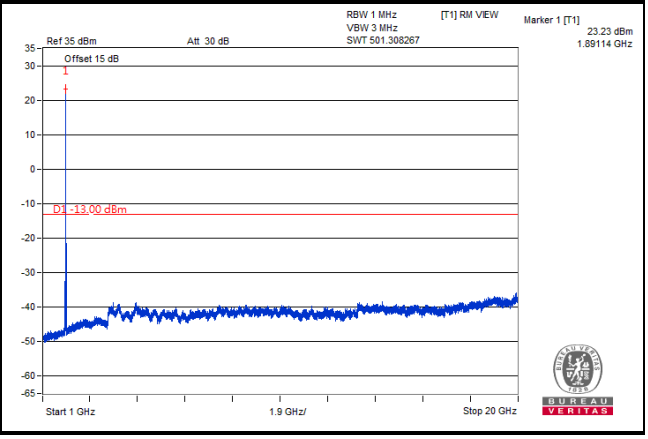
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 10 MHz	
Channel 18650	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19150	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 15 MHz	
Channel 18675	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19125	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 2	
Channel Bandwidth: 20 MHz	
Channel 18700	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 18900	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	
Channel 19100	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 20 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit is equal to -13 dBm.

4.8.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 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.
b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

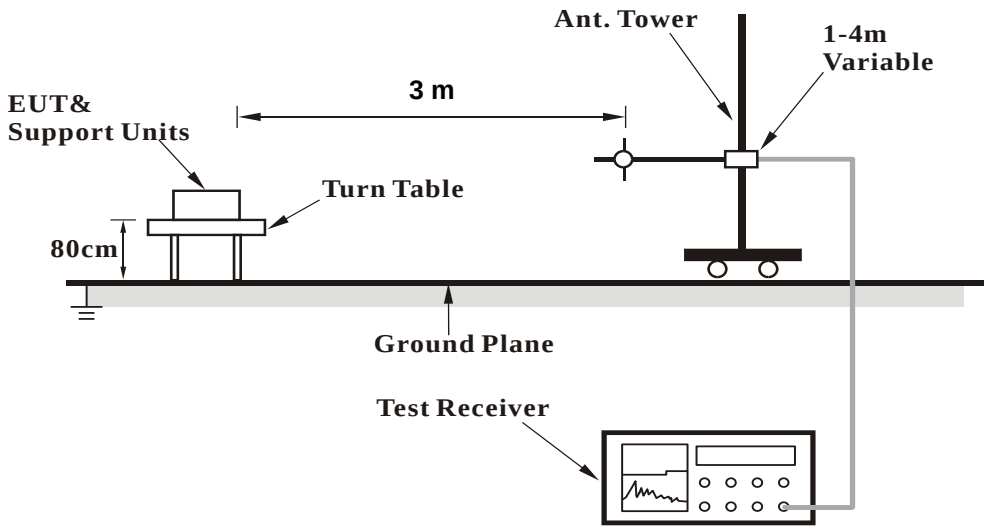
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.8.3 Deviation from Test Standard

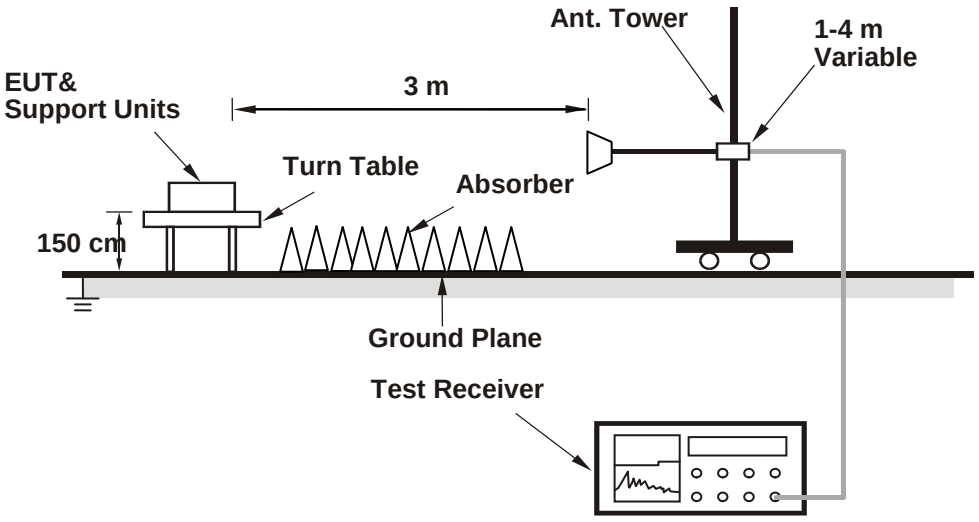
No deviation.

4.8.4 Test Setup

<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).

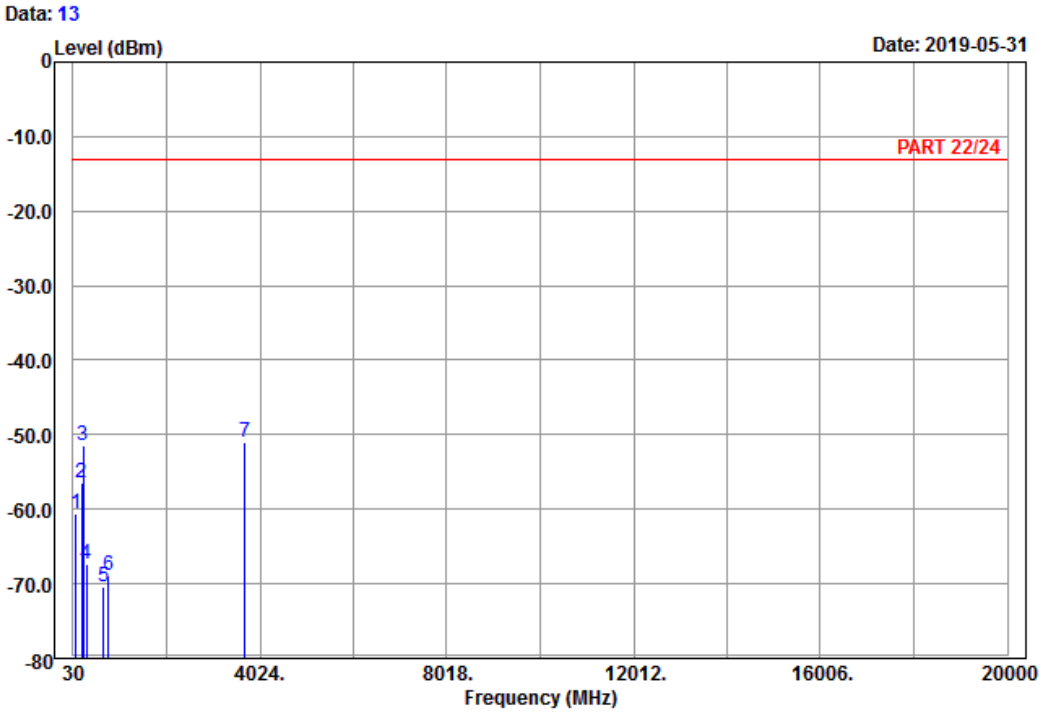
4.8.5 Test Results

Mode A

WCDMA:

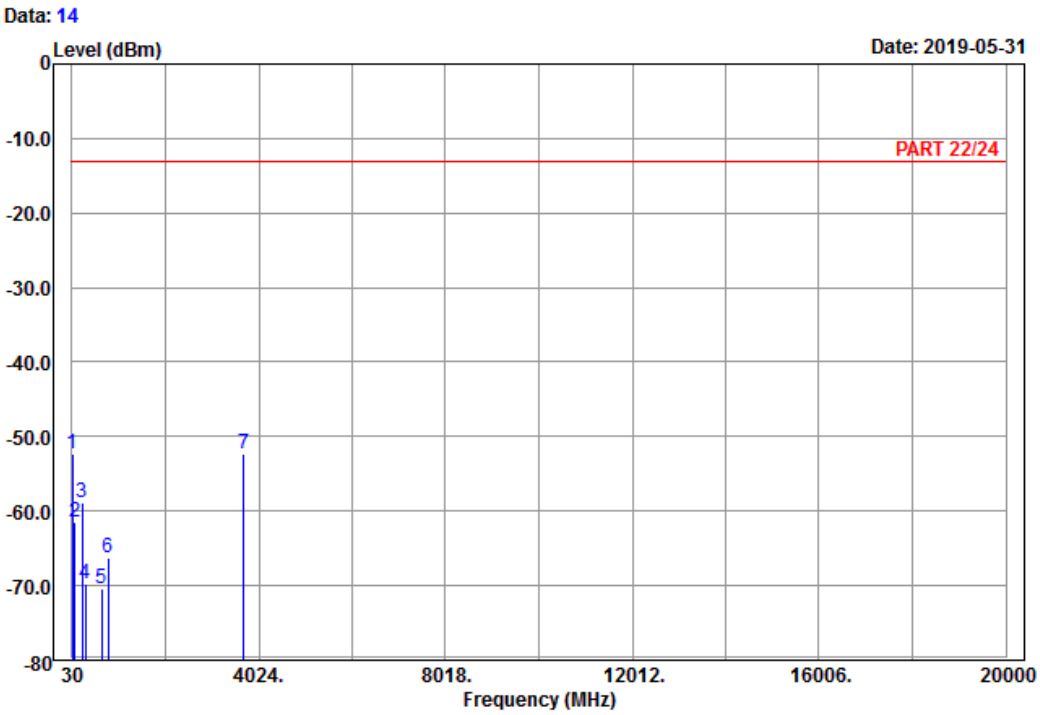
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9262
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	91.02	-60.53	-49.91	-10.62	-13.00	-47.53	Peak
2	214.14	-56.53	-50.54	-5.99	-13.00	-43.53	Peak
3	248.70	-51.52	-45.99	-5.53	-13.00	-38.52	Peak
4	313.30	-67.27	-61.47	-5.80	-13.00	-54.27	Peak
5	673.80	-70.44	-70.19	-0.25	-13.00	-57.44	Peak
6	784.40	-68.95	-69.94	0.99	-13.00	-55.95	Peak
7 pp	3704.80	-51.03	-66.91	15.88	-13.00	-38.03	Peak

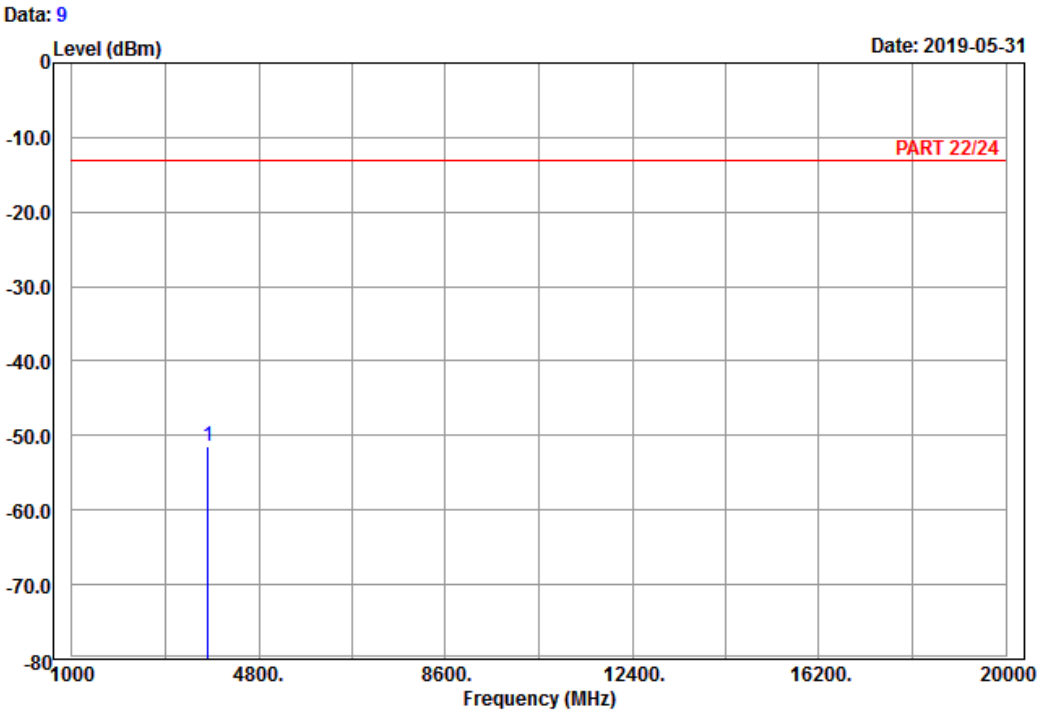


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9262
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	32.43	-52.35	-41.48	-10.87	-13.00	-39.35	Peak
2	90.21	-61.40	-50.73	-10.67	-13.00	-48.40	Peak
3	255.72	-58.75	-53.19	-5.56	-13.00	-45.75	Peak
4	310.50	-69.71	-63.87	-5.84	-13.00	-56.71	Peak
5	661.90	-70.50	-70.31	-0.19	-13.00	-57.50	Peak
6	804.70	-66.19	-68.15	1.96	-13.00	-53.19	Peak
7	3704.80	-52.40	-68.28	15.88	-13.00	-39.40	Peak

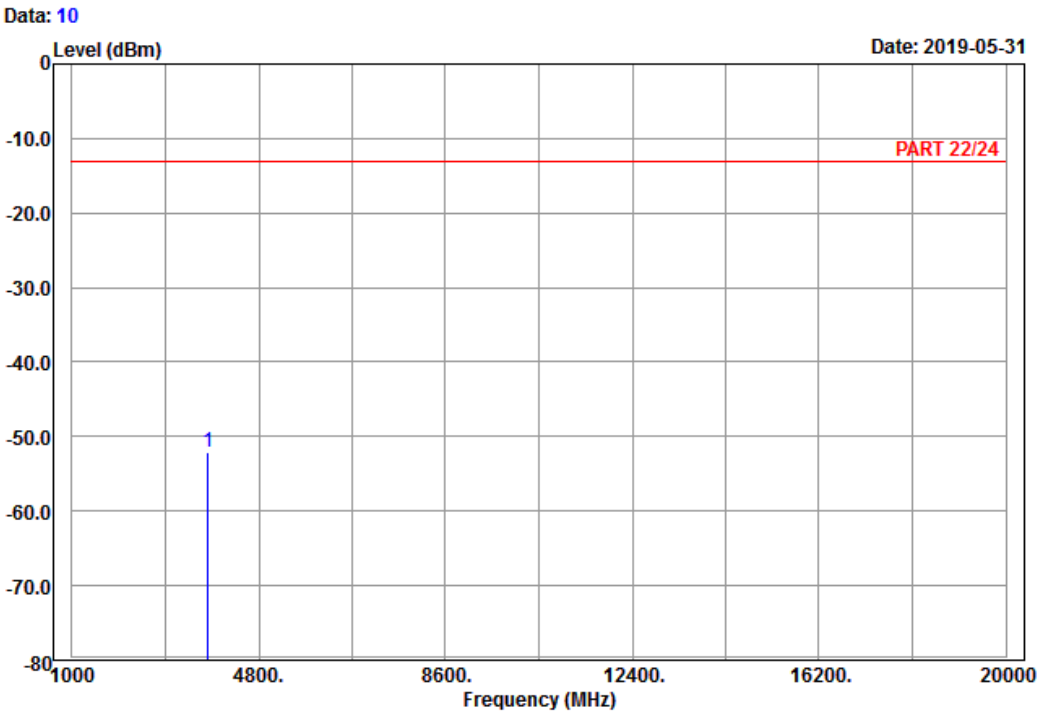
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9400
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3760.00	-51.55	-67.69	16.14	-13.00	-38.55	Peak

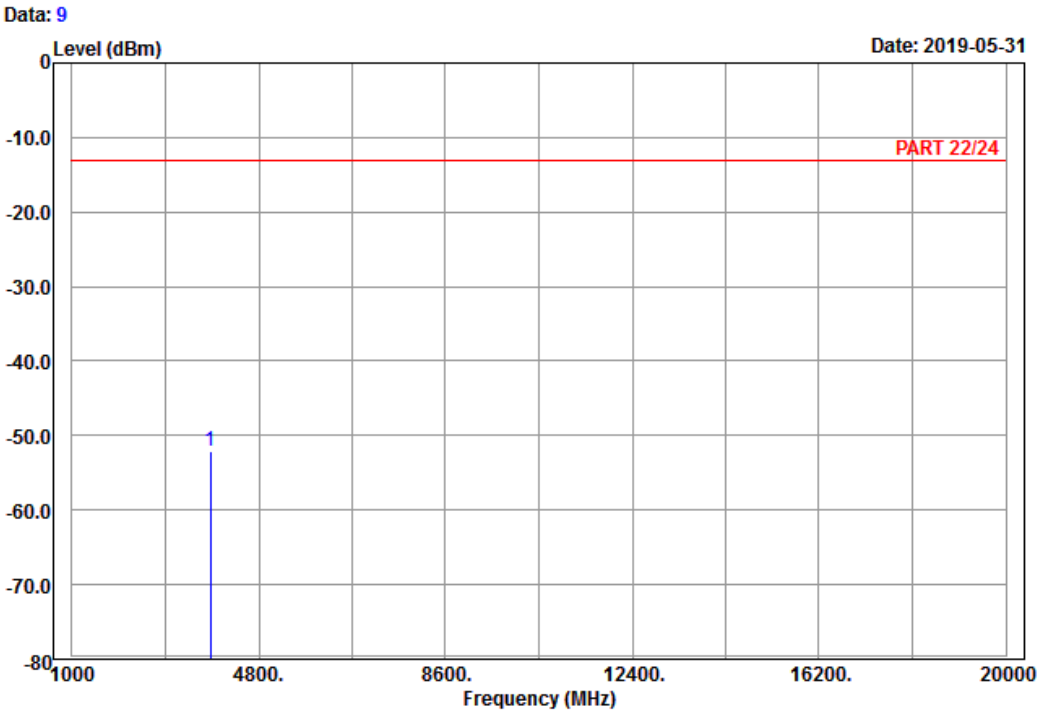


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9400
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3760.00	-52.02	-68.16	16.14	-13.00	-39.02	Peak

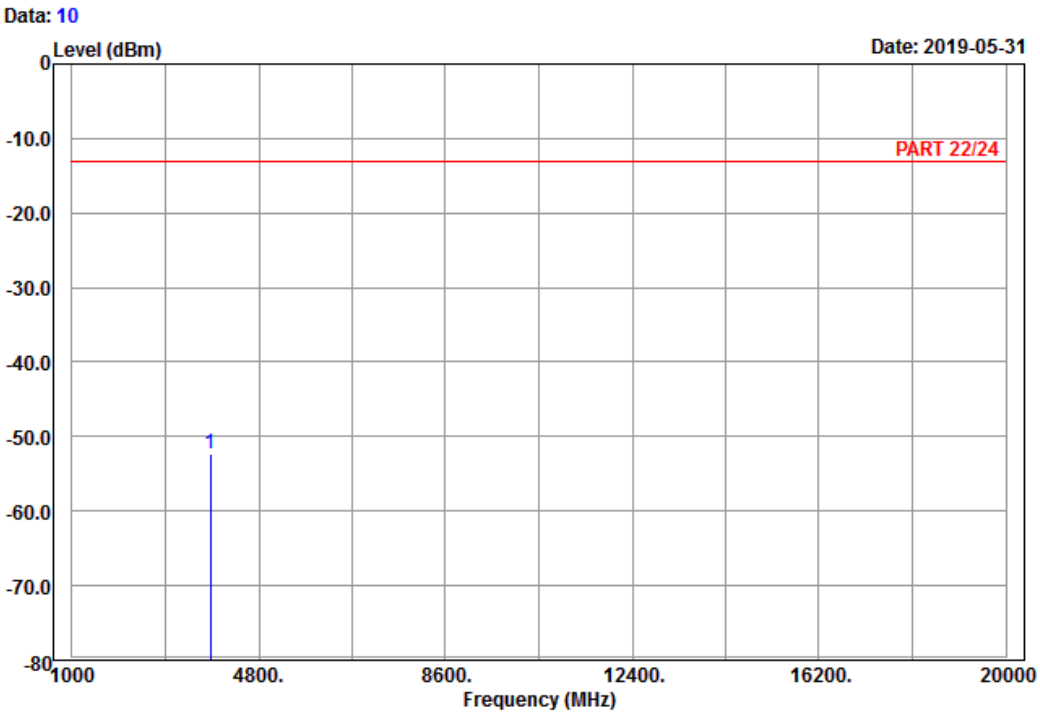
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9538
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3815.20	-52.03	-68.44	16.41	-13.00	-39.03	Peak

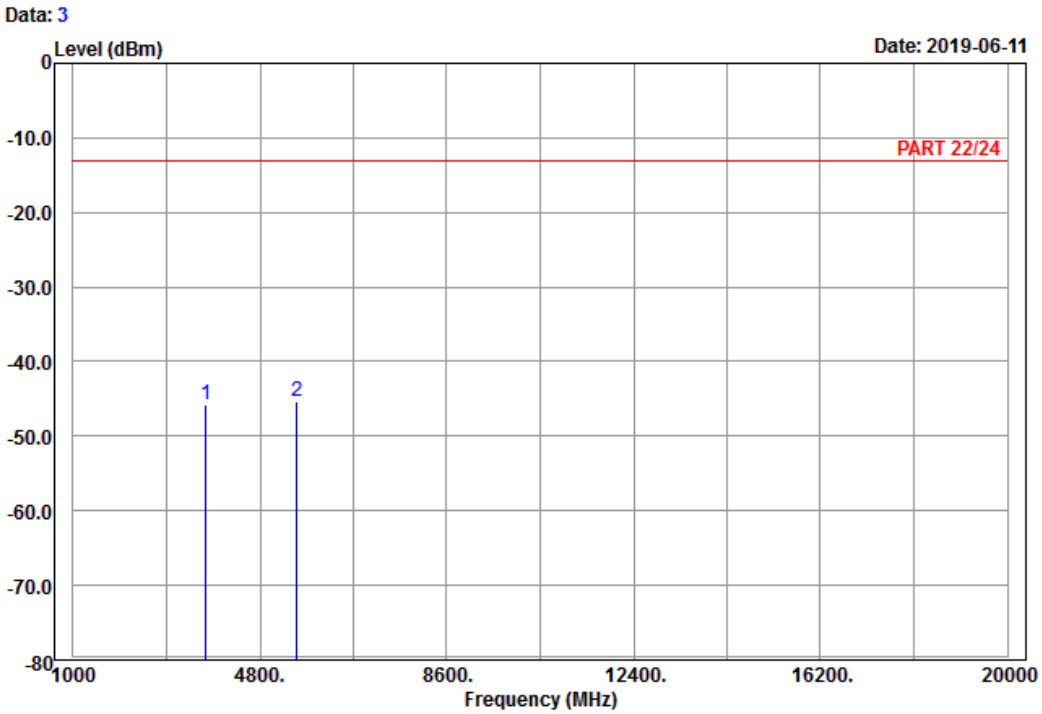


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9538
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3815.20	-52.28	-68.69	16.41	-13.00	-39.28	Peak

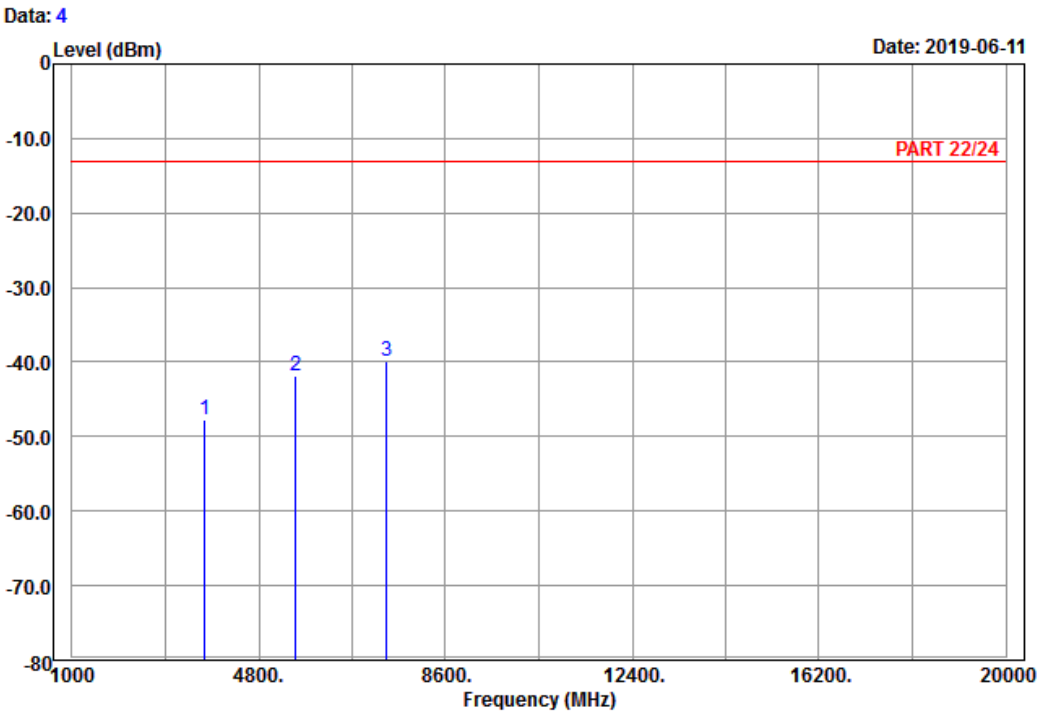
LTE Band 2
Channel Bandwidth: 1.4 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




```
Site      : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark    : LTE_Band 2_Link_CH18607
Tested by: Karl Lee
                          Read          Limit   Over
           Freq  Level  Level Factor   Line  Limit Remark
          _____ _____ _____ _____ _____ _____ _____
            MHz   dBm   dBm    dB    dBm    dB

  1     3701.40 -45.73 -61.61  15.88 -13.00 -32.73 Peak
  2 pp  5552.10 -45.33 -65.67  20.34 -13.00 -32.33 Peak
```

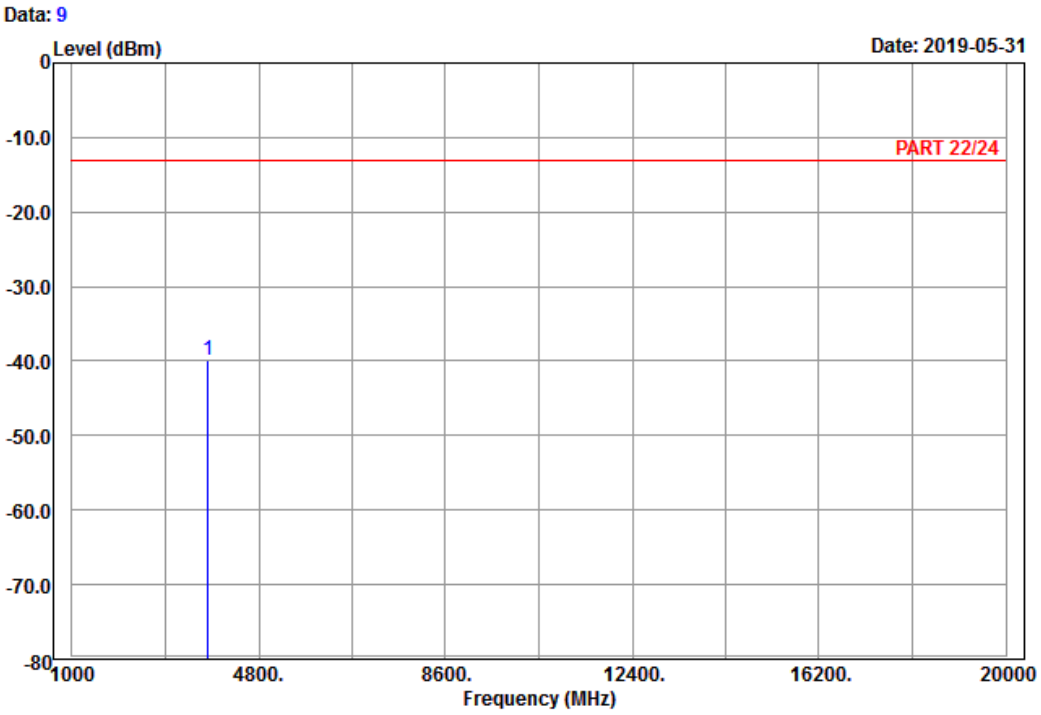


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18607
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3701.40	-47.64	-63.52	15.88	-13.00	-34.64	Peak
2	5552.10	-41.77	-62.11	20.34	-13.00	-28.77	Peak
3 pp	7402.80	-39.89	-62.17	22.28	-13.00	-26.89	Peak

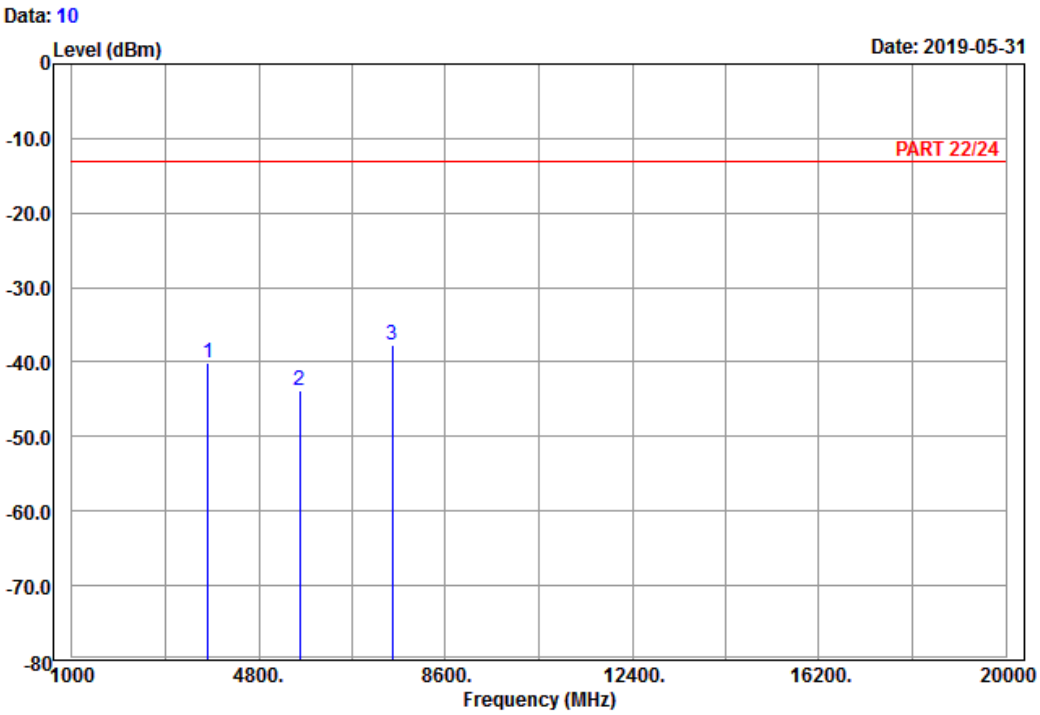
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3760.00	-39.84	-55.98	16.14	-13.00	-26.84	Peak

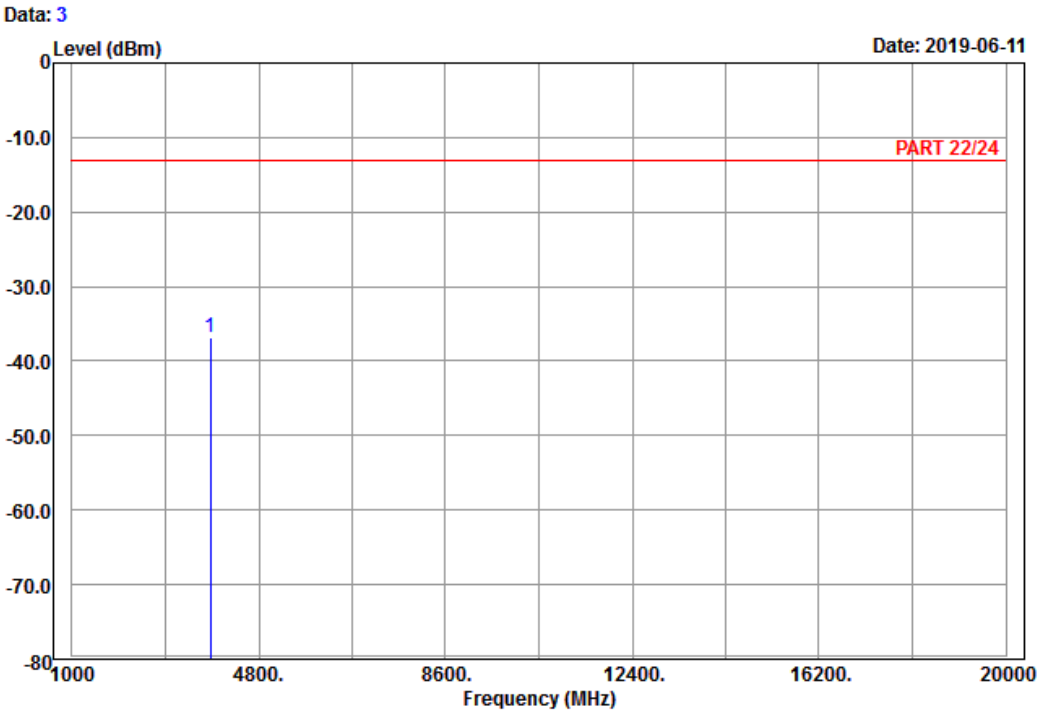


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3760.00	-40.01	-56.15	16.14	-13.00	-27.01	Peak
2	5640.00	-43.88	-64.35	20.47	-13.00	-30.88	Peak
3 pp	7520.00	-37.63	-60.31	22.68	-13.00	-24.63	Peak

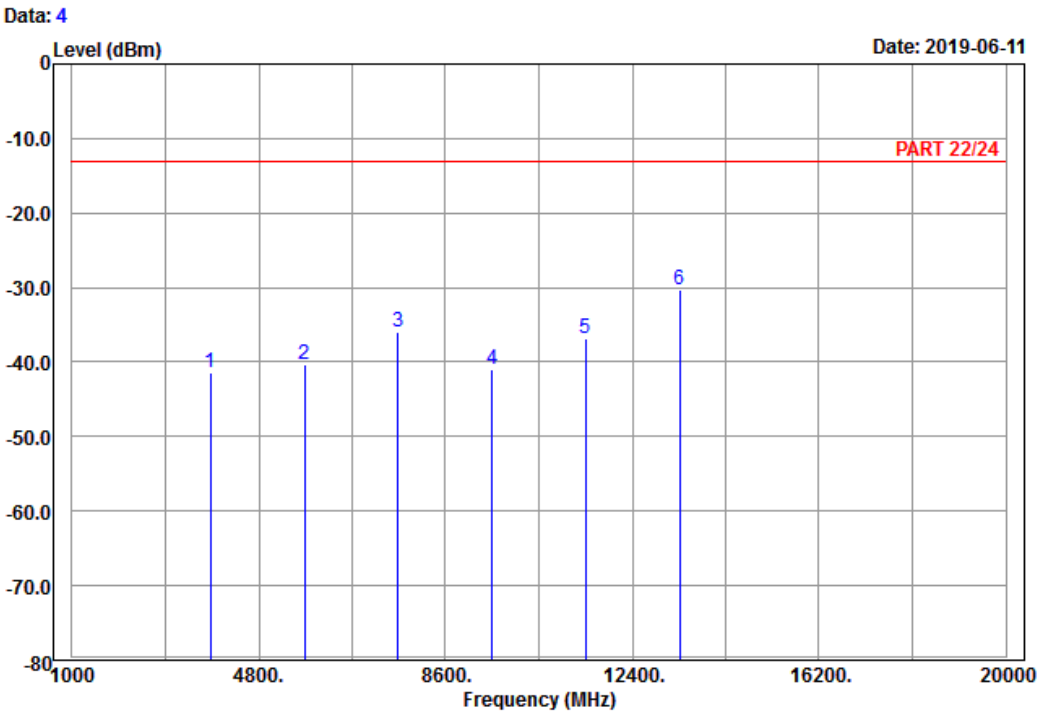
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19193
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3818.60	-36.89	-53.39	16.50	-13.00	-23.89	Peak

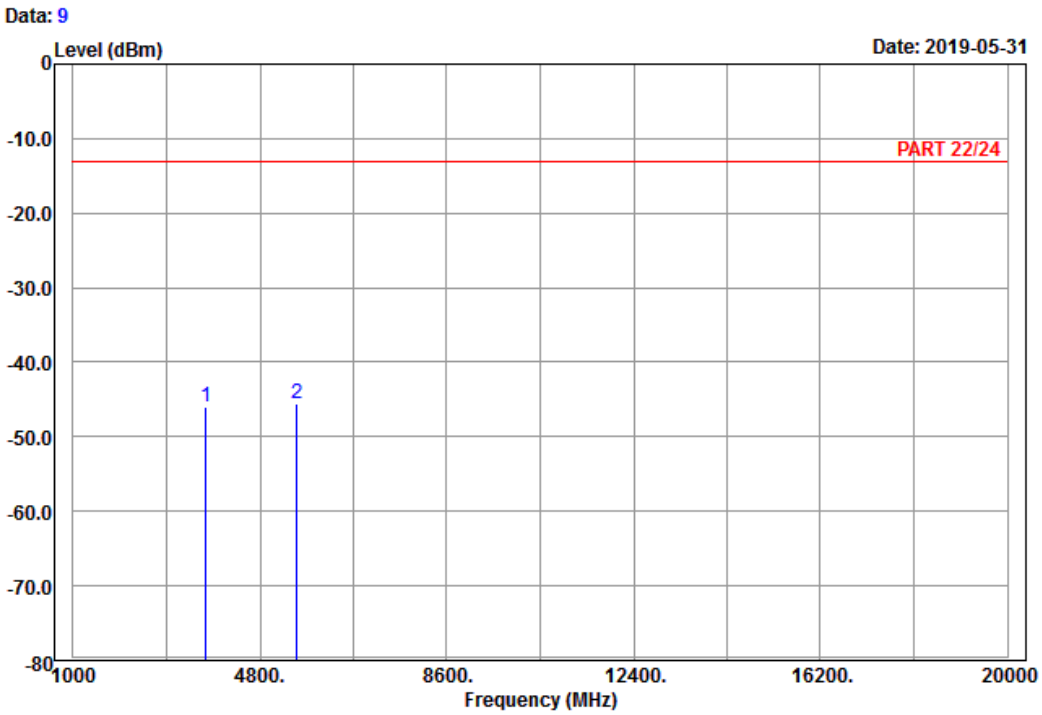


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19193
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3818.60	-41.32	-57.82	16.50	-13.00	-28.32	Peak
2	5727.90	-40.39	-60.73	20.34	-13.00	-27.39	Peak
3	7637.20	-36.06	-59.12	23.06	-13.00	-23.06	Peak
4	9546.50	-40.89	-66.93	26.04	-13.00	-27.89	Peak
5	11455.80	-36.80	-64.62	27.82	-13.00	-23.80	Peak
6 pp	13365.10	-30.32	-61.60	31.28	-13.00	-17.32	Peak

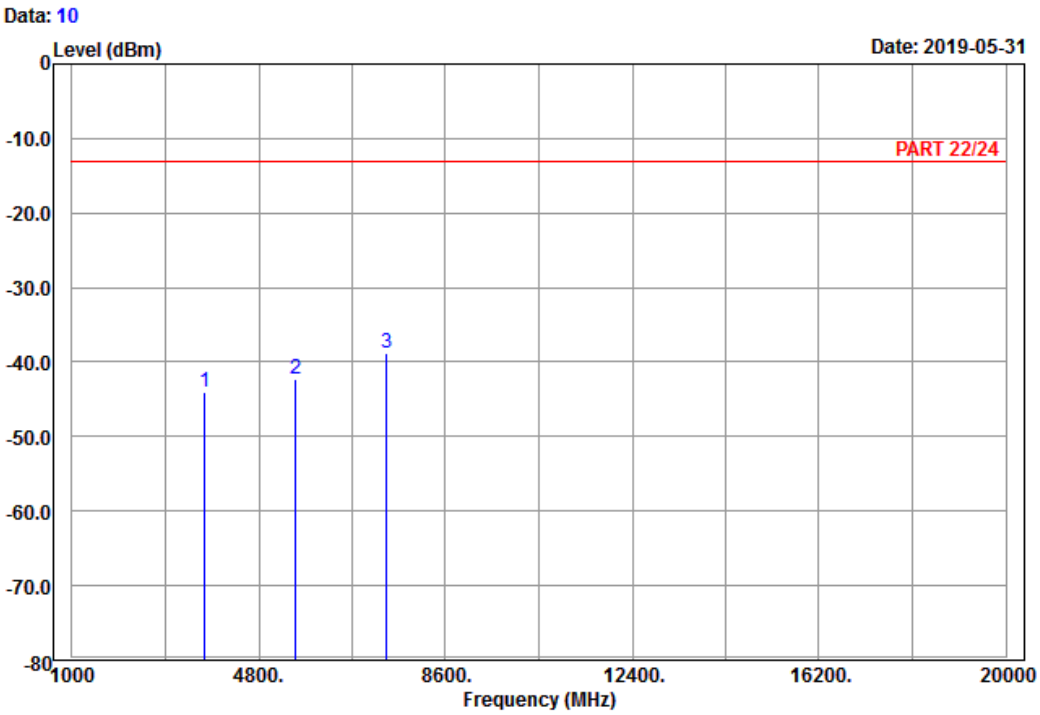
Channel Bandwidth: 5 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18625
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3705.00	-46.10	-61.98	15.88	-13.00	-33.10	Peak
2 pp	5557.50	-45.46	-65.80	20.34	-13.00	-32.46	Peak

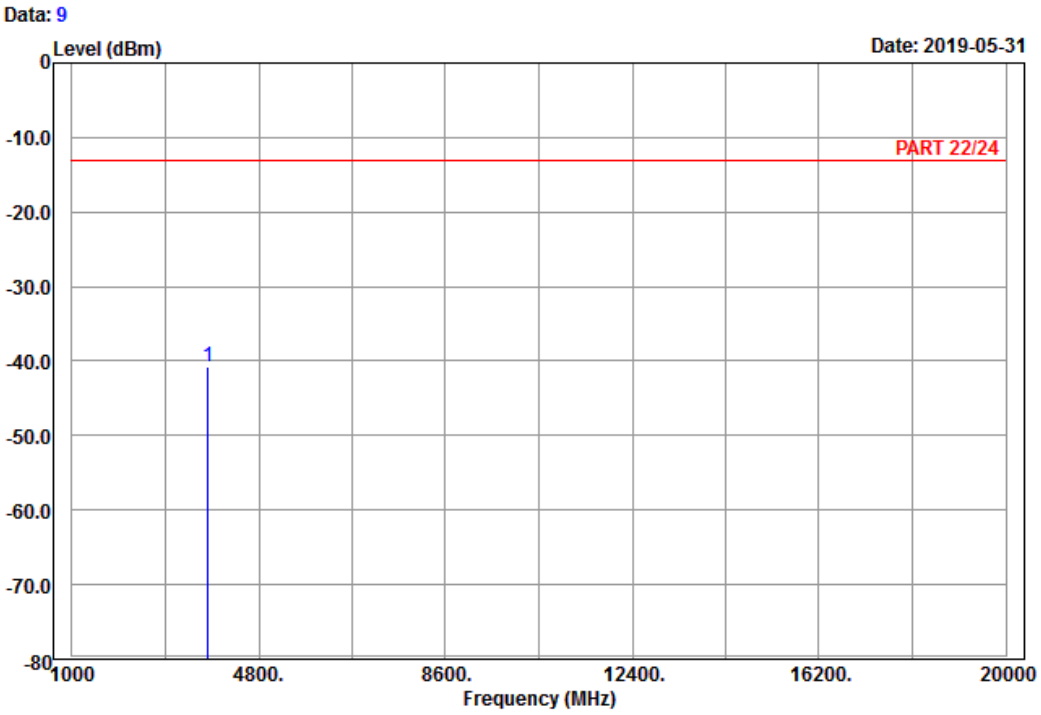


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18625
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3705.00	-43.98	-59.86	15.88	-13.00	-30.98	Peak
2	5557.50	-42.24	-62.58	20.34	-13.00	-29.24	Peak
3 pp	7410.00	-38.84	-61.12	22.28	-13.00	-25.84	Peak

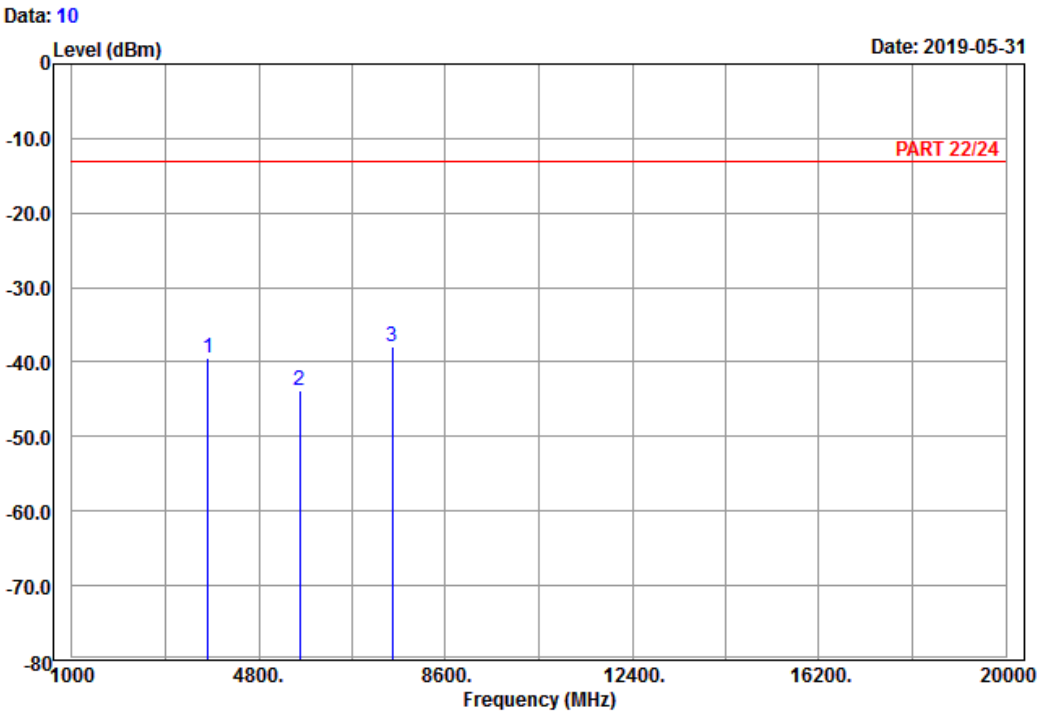
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3760.00	-40.78	-56.92	16.14	-13.00	-27.78	Peak

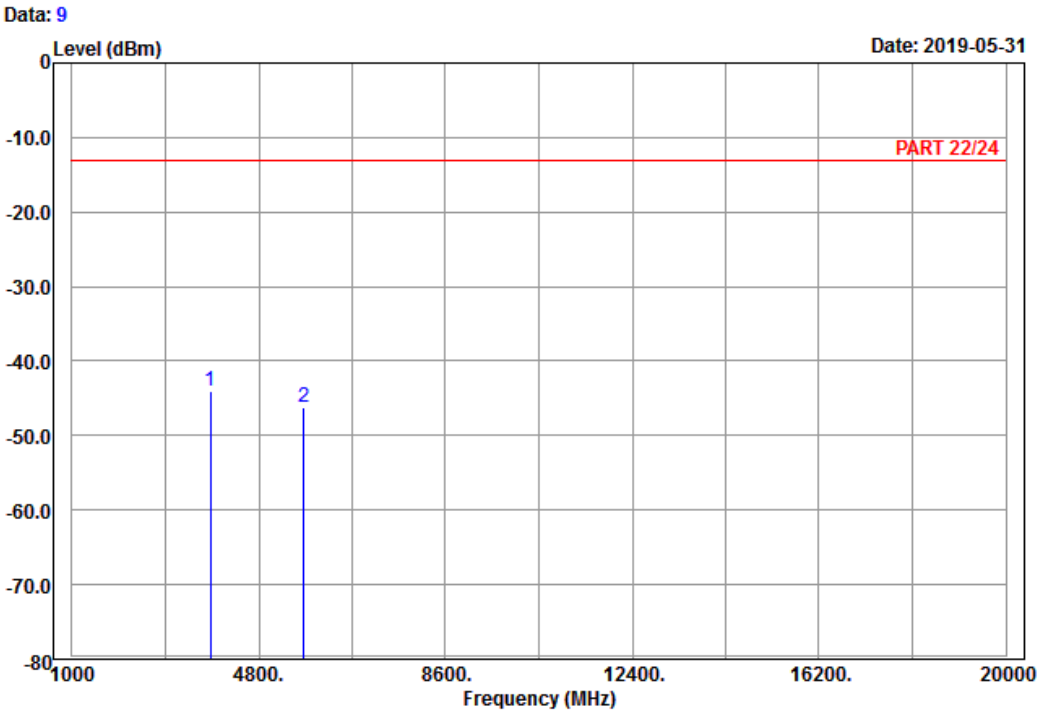


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3760.00	-39.40	-55.54	16.14	-13.00	-26.40	Peak
2	5640.00	-43.78	-64.25	20.47	-13.00	-30.78	Peak
3 pp	7520.00	-37.94	-60.62	22.68	-13.00	-24.94	Peak

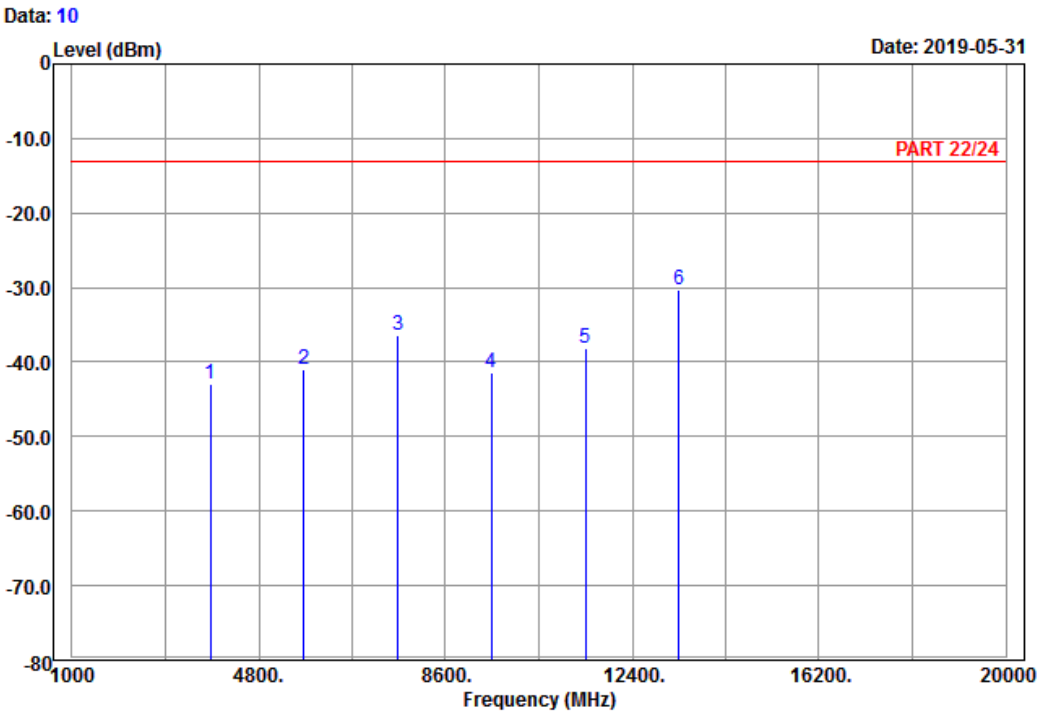
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19175
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3815.00	-44.14	-60.55	16.41	-13.00	-31.14	Peak
2	5722.50	-46.13	-66.40	20.27	-13.00	-33.13	Peak

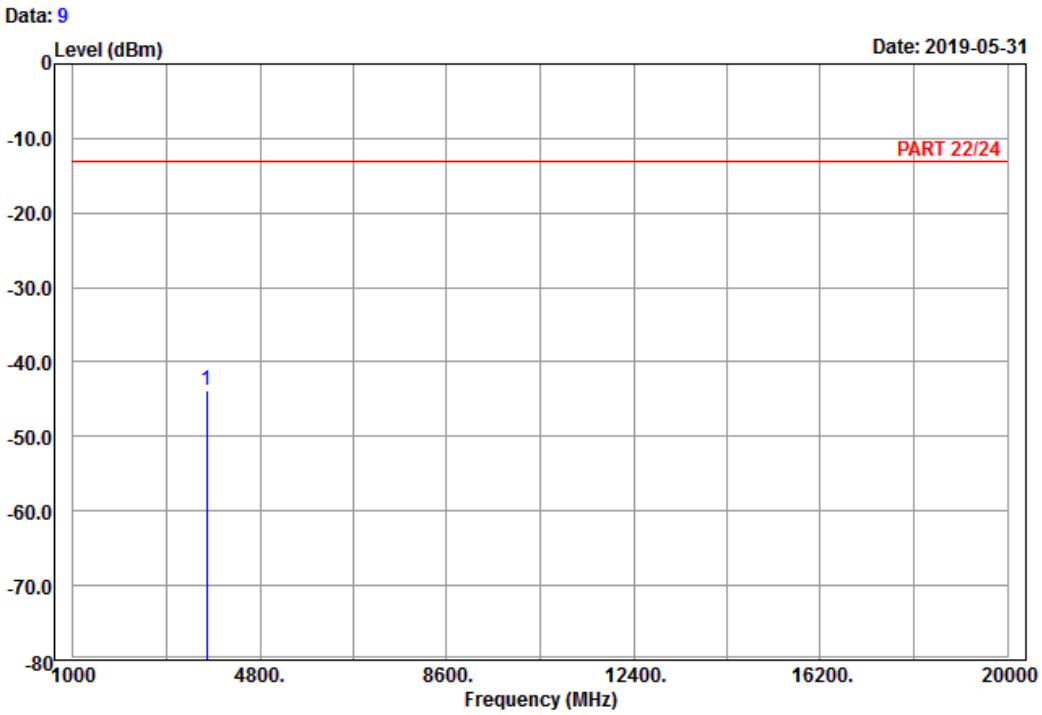


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19175
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3815.00	-42.90	-59.31	16.41	-13.00	-29.90	Peak
2	5722.50	-40.95	-61.22	20.27	-13.00	-27.95	Peak
3	7630.00	-36.44	-59.46	23.02	-13.00	-23.44	Peak
4	9537.50	-41.33	-67.37	26.04	-13.00	-28.33	Peak
5	11445.00	-38.23	-66.05	27.82	-13.00	-25.23	Peak
6 pp	13352.50	-30.22	-61.48	31.26	-13.00	-17.22	Peak

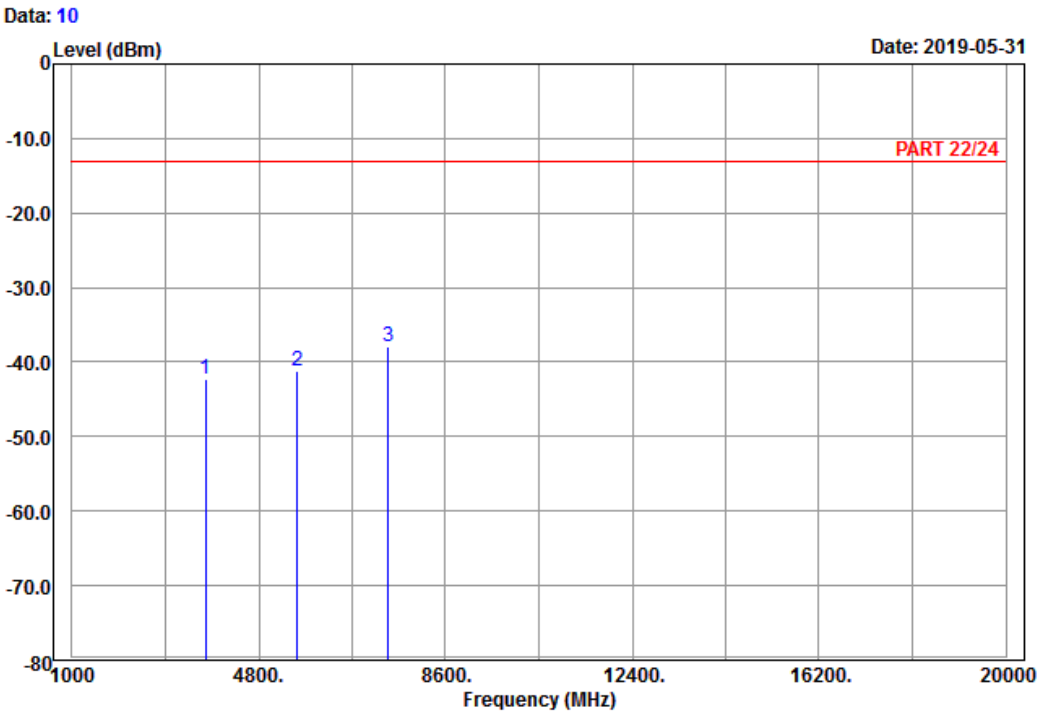
Channel Bandwidth: 20 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH18700
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3720.00	-43.84	-59.81	15.97	-13.00	-30.84	Peak

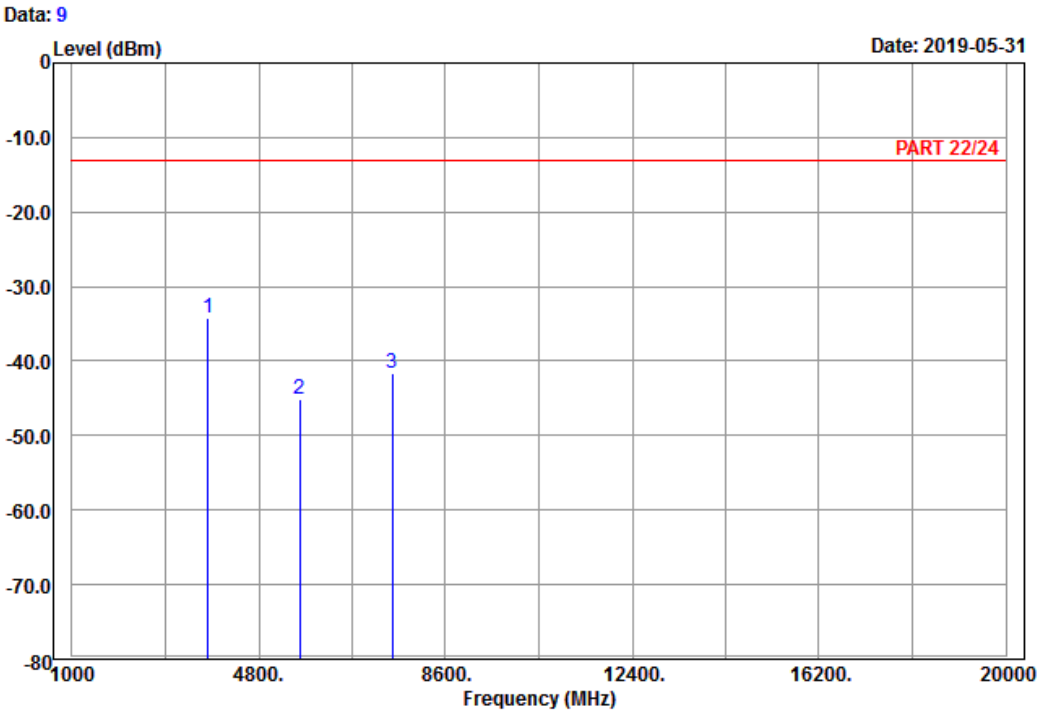


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18700
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3720.00	-42.29	-58.26	15.97	-13.00	-29.29	Peak
2	5580.00	-41.10	-61.47	20.37	-13.00	-28.10	Peak
3 pp	7440.00	-37.86	-60.11	22.25	-13.00	-24.86	Peak

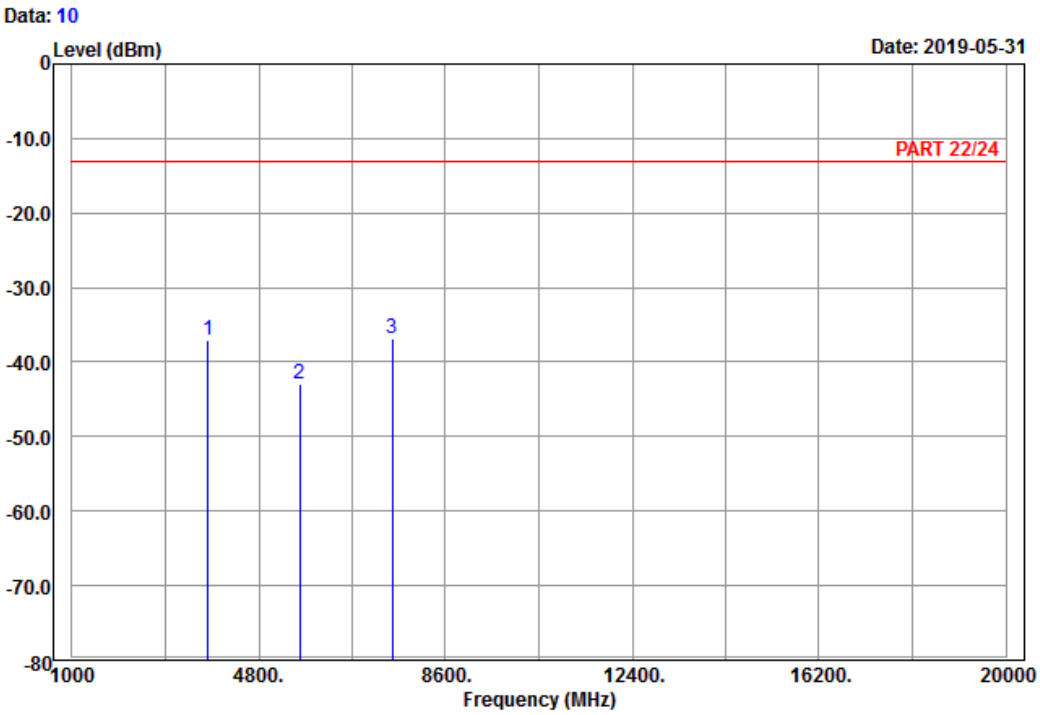
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	3760.00	-34.25	-50.39	16.14	-13.00	-21.25	Peak
2	5640.00	-45.16	-65.63	20.47	-13.00	-32.16	Peak
3	7520.00	-41.66	-64.34	22.68	-13.00	-28.66	Peak

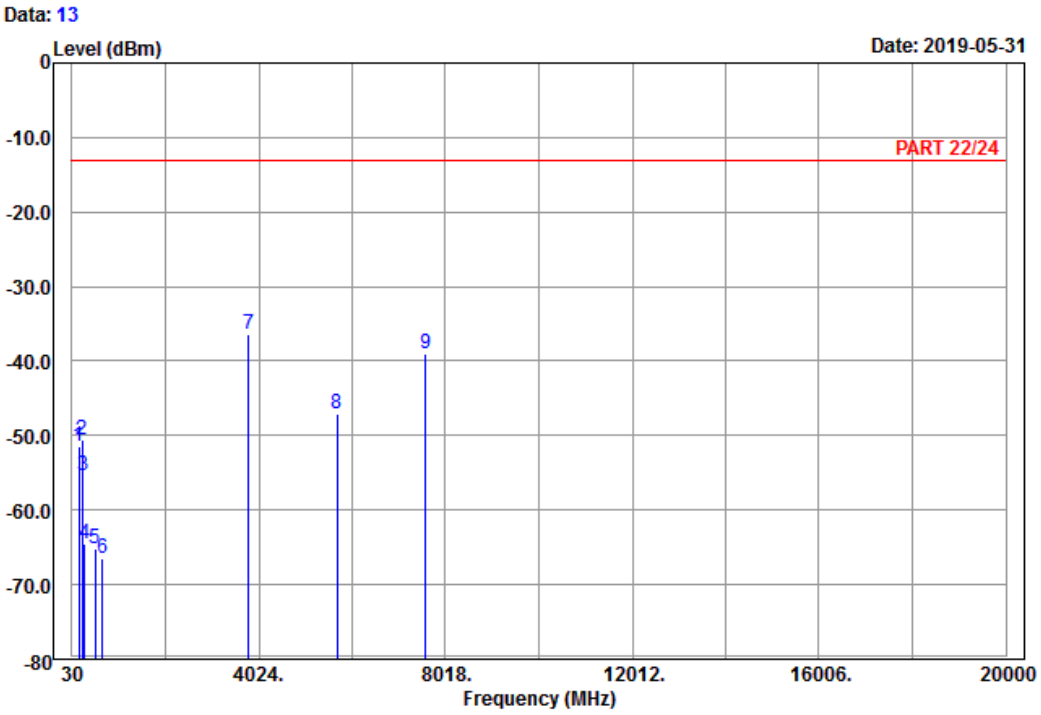


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH18900
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	3760.00	-36.97	-53.11	16.14	-13.00	-23.97	Peak
2	5640.00	-42.96	-63.43	20.47	-13.00	-29.96	Peak
3 pp	7520.00	-36.86	-59.54	22.68	-13.00	-23.86	Peak

High Channel

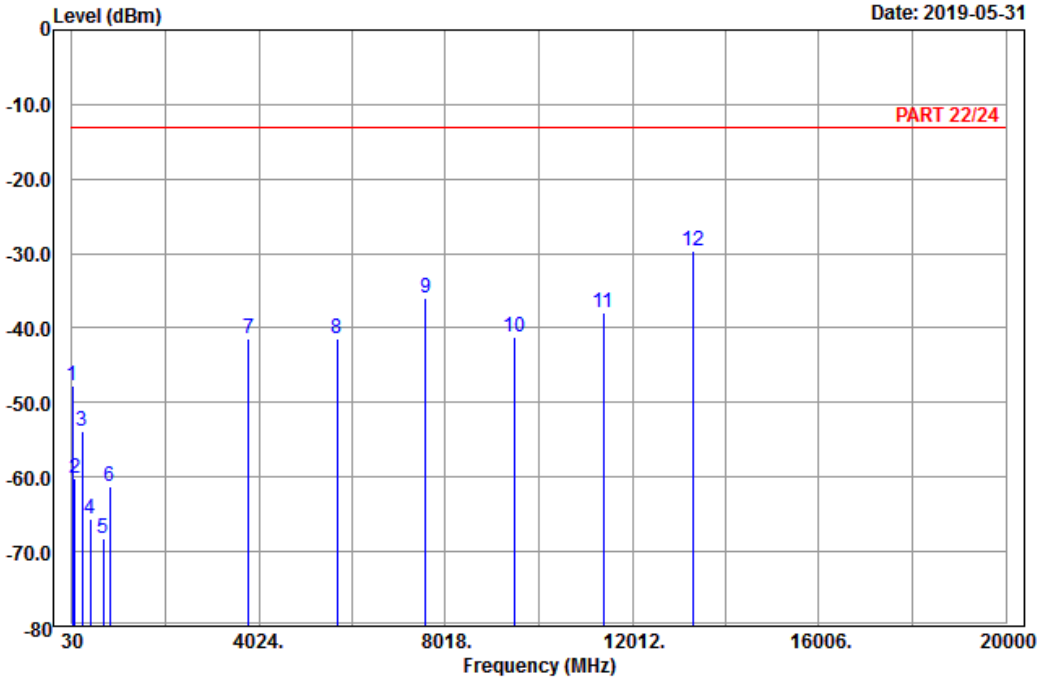
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	176.61	-51.37	-45.38	-5.99	-13.00	-38.37	Peak
2	239.79	-50.68	-45.03	-5.65	-13.00	-37.68	Peak
3	268.41	-55.47	-49.79	-5.68	-13.00	-42.47	Peak
4	307.00	-64.49	-58.62	-5.87	-13.00	-51.49	Peak
5	517.00	-65.12	-61.04	-4.08	-13.00	-52.12	Peak
6	673.10	-66.53	-66.28	-0.25	-13.00	-53.53	Peak
7 pp	3800.00	-36.33	-52.74	16.41	-13.00	-23.33	Peak
8	5700.00	-46.99	-67.20	20.21	-13.00	-33.99	Peak
9	7600.00	-39.10	-62.09	22.99	-13.00	-26.10	Peak

Data: 14



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

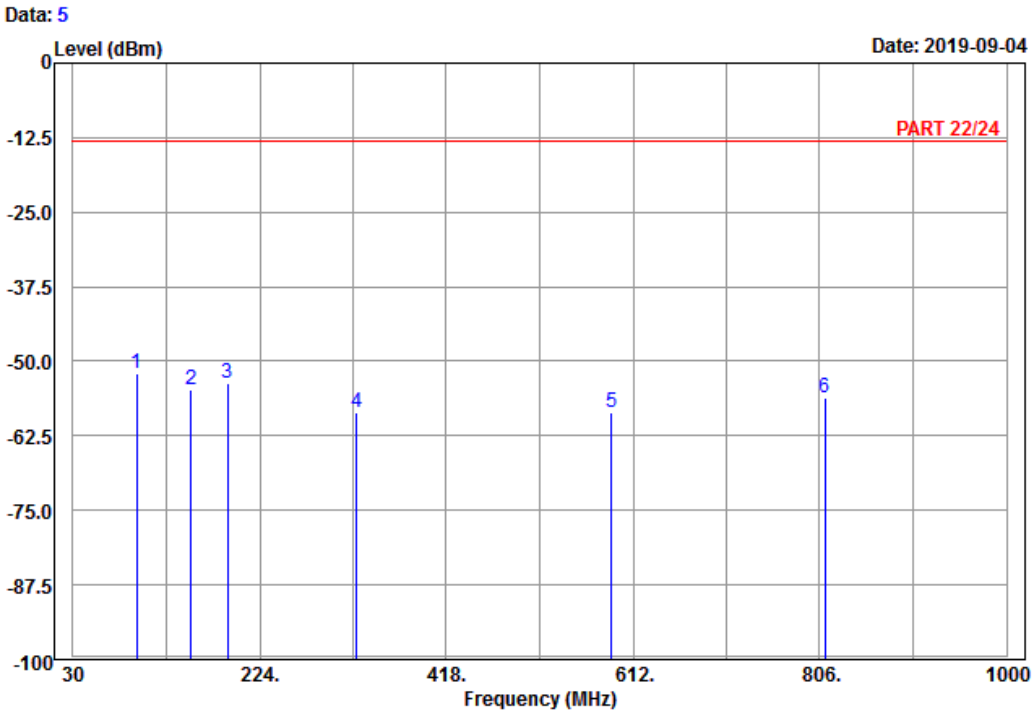
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	34.32	-47.76	-36.78	-10.98	-13.00	-34.76	Peak
2	88.86	-60.24	-49.46	-10.78	-13.00	-47.24	Peak
3	239.52	-53.88	-48.23	-5.65	-13.00	-40.88	Peak
4	419.70	-65.52	-62.33	-3.19	-13.00	-52.52	Peak
5	692.00	-68.21	-67.87	-0.34	-13.00	-55.21	Peak
6	844.60	-61.25	-62.75	1.50	-13.00	-48.25	Peak
7	3800.00	-41.45	-57.86	16.41	-13.00	-28.45	Peak
8	5700.00	-41.41	-61.62	20.21	-13.00	-28.41	Peak
9	7600.00	-35.93	-58.92	22.99	-13.00	-22.93	Peak
10	9500.00	-41.24	-67.26	26.02	-13.00	-28.24	Peak
11	11400.00	-37.94	-65.76	27.82	-13.00	-24.94	Peak
12 pp	13300.00	-29.69	-60.87	31.18	-13.00	-16.69	Peak

Mode B

WCDMA:

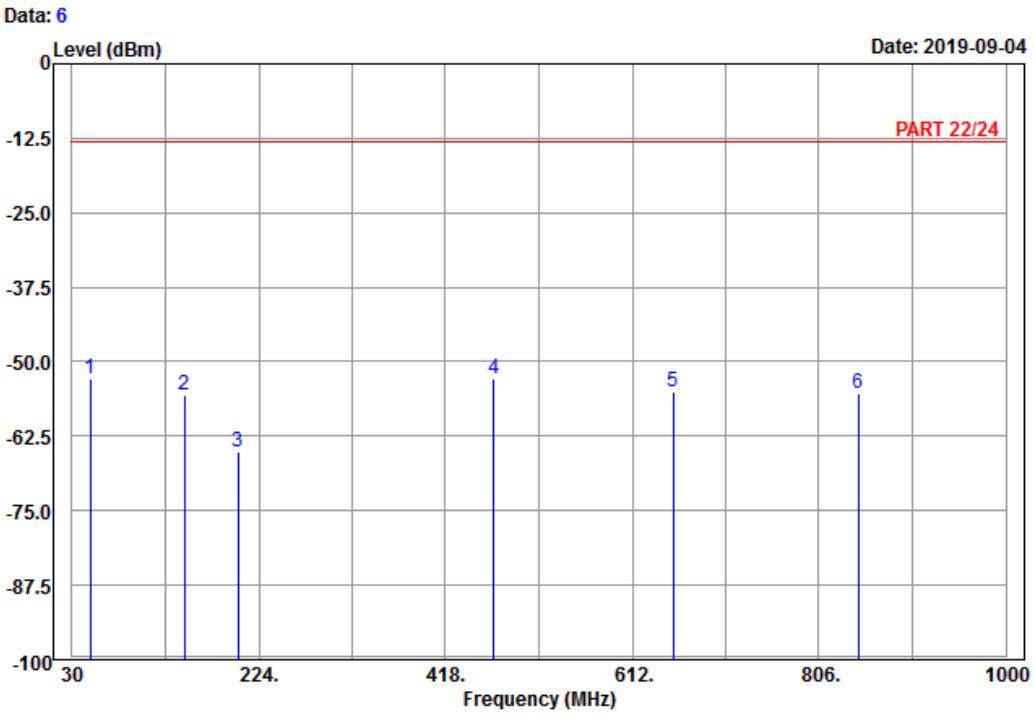
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : Band II_Link_CH9262
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	96.42	-52.18	-41.84	-13.00	-39.18	-10.34	Peak
2	152.31	-54.88	-46.99	-13.00	-41.88	-7.89	Peak
3	190.38	-53.71	-47.98	-13.00	-40.71	-5.73	Peak
4	324.50	-58.52	-52.85	-13.00	-45.52	-5.67	Peak
5	589.80	-58.65	-58.64	-13.00	-45.65	-0.01	Peak
6	811.70	-56.27	-58.15	-13.00	-43.27	1.88	Peak

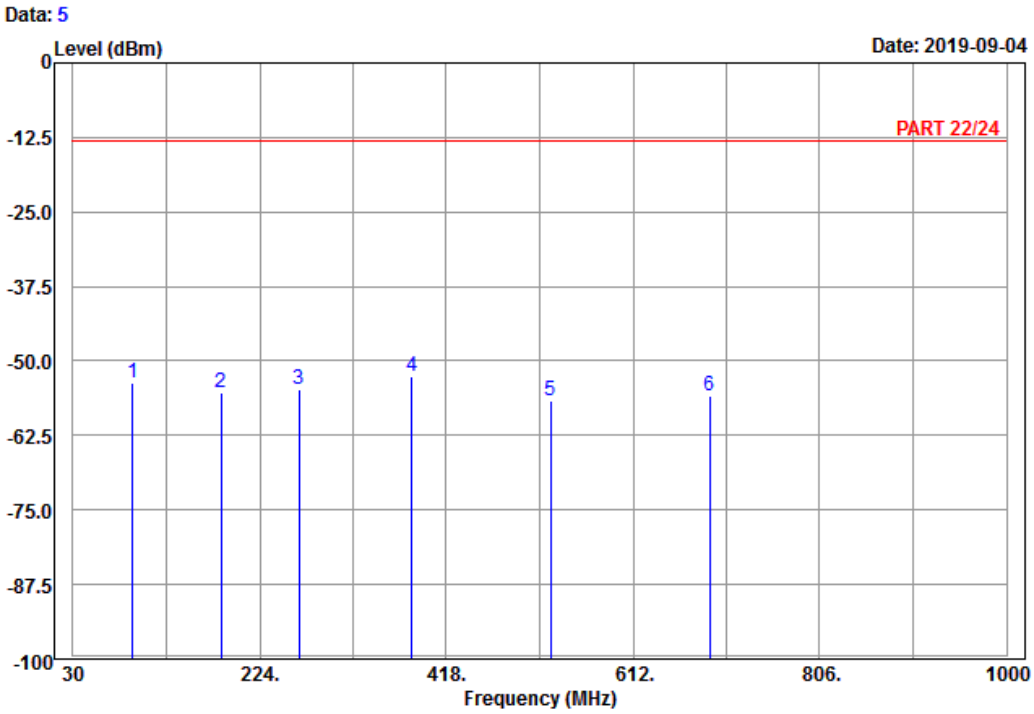


Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : Band II_Link_CH9262
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	48.90	-52.93	-39.50	-13.00	-39.93	-13.43	Peak
2	146.64	-55.69	-47.83	-13.00	-42.69	-7.86	Peak
3	202.26	-65.10	-58.96	-13.00	-52.10	-6.14	Peak
4 pp	468.00	-52.76	-48.39	-13.00	-39.76	-4.37	Peak
5	654.20	-54.93	-54.77	-13.00	-41.93	-0.16	Peak
6	846.70	-55.18	-56.66	-13.00	-42.18	1.48	Peak

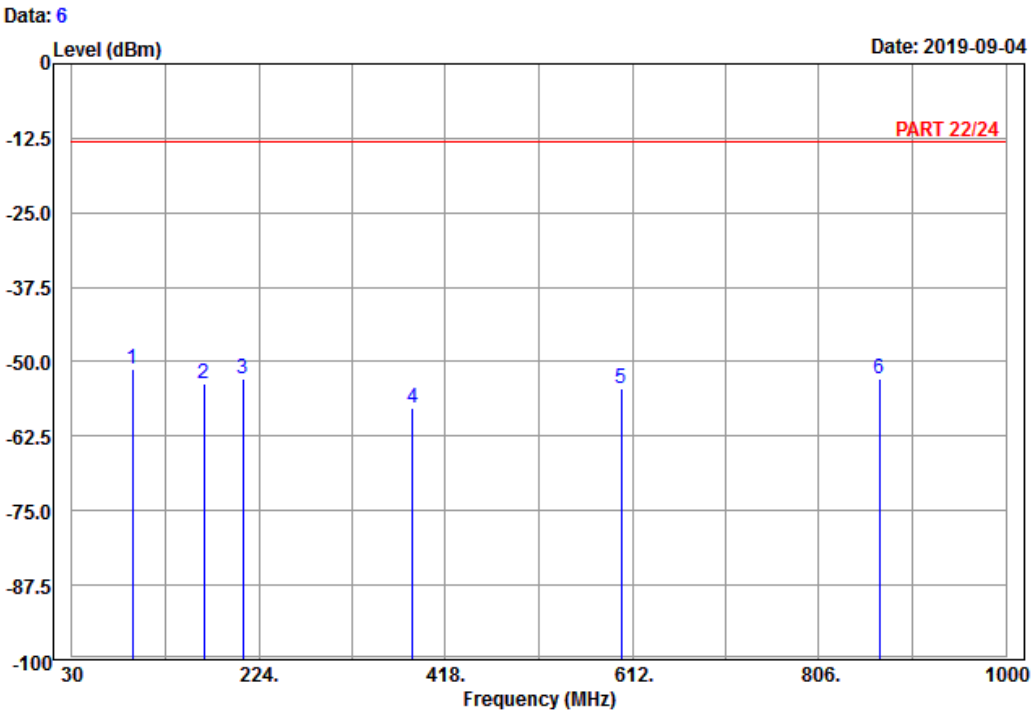
LTE Band 2
Channel Bandwidth: 20 MHz / QPSK
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	92.10	-53.65	-43.09	-13.00	-40.65	-10.56	Peak
2	183.90	-55.36	-49.72	-13.00	-42.36	-5.64	Peak
3	264.63	-54.72	-49.08	-13.00	-41.72	-5.64	Peak
4 pp	381.90	-52.52	-48.85	-13.00	-39.52	-3.67	Peak
5	526.10	-56.65	-53.21	-13.00	-43.65	-3.44	Peak
6	691.30	-55.79	-55.45	-13.00	-42.79	-0.34	Peak



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : LTE_Band 2_Link_CH19100
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	93.18	-51.24	-40.73	-13.00	-38.24	-10.51	Peak
2	167.16	-53.81	-46.82	-13.00	-40.81	-6.99	Peak
3	207.66	-52.73	-46.65	-13.00	-39.73	-6.08	Peak
4	384.00	-57.83	-54.26	-13.00	-44.83	-3.57	Peak
5	601.00	-54.48	-54.90	-13.00	-41.48	0.42	Peak
6	869.10	-52.95	-54.95	-13.00	-39.95	2.00	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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

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