

FCC Test Report

(PART 24)

Report No.: RF170808C06-9

FCC ID: 2AJOTTA-1005

Test Model: TA-1005

Received Date: Aug. 08, 2017

Test Date: Sep. 07, 2017 ~ Oct. 25, 2017

Issued Date: Nov. 16, 2017

Applicant: HMD Global Oy

Address: Karaportti 2, 02610 Espoo, Finland

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 Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Test Location (2): No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

**FCC Registration /
Designation Number:**
427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RF170808C06-9	Original Release	Nov. 16, 2017

1 Certificate of Conformity

Product: Smart Phone

Brand: Nokia

Test Model: TA-1005

Sample Status: Identical Prototype

Applicant: HMD Global Oy

Test Date: Sep. 07, 2017 ~ Oct. 25, 2017

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 EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Nov. 16, 2017

Ivonne Wu / Supervisor

Approved by :  , **Date:** Nov. 16, 2017

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.
2.1046 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(b)	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 -35.98 dB at 3800.00 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) (\pm)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	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

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Jul. 05, 2017	Jul. 04, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 13, 2016	Dec. 12, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Jun. 26, 2017	Jun. 25, 2018
Double Ridge Guide Horn Antenna EMCO	3115	5619	Dec. 15, 2016	Dec. 14, 2017
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 13, 2016	Dec. 12, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 07, 2017	Jul. 06, 2018
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 19, 2016	Oct. 18, 2017
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier Agilent	310N	187226	Jun. 23, 2017	Jun. 22, 2018
Preamplifier Agilent	83017A	MY39501357	Jun. 23, 2017	Jun. 22, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 26, 2017	Jun. 25, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 26, 2017	Jun. 25, 2018
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
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Nov. 30, 2016	Nov. 29, 2017

- 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. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is IC7450I-1.

3 General Information

3.1 General Description of EUT

Product	Smart Phone	
Brand	Nokia	
Test Model	TA-1005	
Status of EUT	Identical Prototype	
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (adapter) 5 Vdc (host equipment) 3.85 Vdc (battery)	
Modulation Type	GSM/GPRS	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	GSM/GPRS/EDGE	1850.2 ~ 1909.8 MHz
	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	GSM/GPRS	644.17 mW
	EDGE	255.27 mW
	WCDMA	143.55 mW
	LTE Band 2 (Channel Bandwidth: 1.4 MHz)	143.55 mW
	LTE Band 2 (Channel Bandwidth: 3 MHz)	143.55 mW
	LTE Band 2 (Channel Bandwidth: 5 MHz)	142.27 mW
	LTE Band 2 (Channel Bandwidth: 10 MHz)	141.03 mW
	LTE Band 2 (Channel Bandwidth: 15 MHz)	142.33 mW
	LTE Band 2 (Channel Bandwidth: 20 MHz)	145.31 mW
Emission Designator	GSM/GPRS	244KGXW
	EDGE	247KG7W
	WCDMA	4M14F9W
	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)	8M97W7D
	LTE Band 2 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 2 (Channel Bandwidth: 20 MHz)	18M0W7D
Antenna Type	Fixed Internal Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

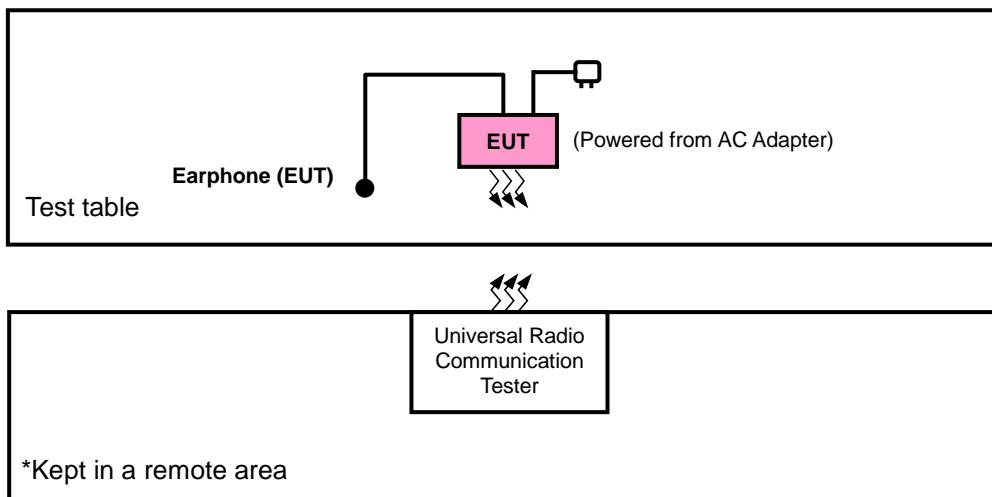
1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Salcomp	FC0302	I/P: 100-240 Vac, 0.5 A O/P: 5 Vdc, 2.5 A or 9 Vdc, 2 A or 12 Vdc, 1.5 A
Adapter 2	DVE	AD-18WU	I/P: 100-240 Vac, 0.5 A O/P: 5 Vdc, 3 A or 9 Vdc, 2 A or 12 Vdc, 1.5 A
Battery	SCUD	HE333	3.85 Vdc, 3250 mAh
Earphone 1	NOKIA	HS-A01	1.15 meter
Earphone 2	NOKIA	HS-A01C	1.15 meter
USB Cable 1	Foxconn	CUDT01E-FA210-EH	0.95 meter Manufacturer: FIT
USB Cable 2	Foxconn	CA-18W	0.95 meter Manufacturer: YinRun
LCD Panel	LG Display	LH546QH1-EDD1-QG1	5.5" OLED
Front Camera	Chicony	CBFH51020005020LH	5M
Main Camera	Primay	FCDC1N	12+13M
eMMC 1 (=ROM 1)	SAMSUNG	IC_UFS2.1_128G	128G
Main Board	AT&S	FIH1883	--
BT/WLAN Module	murata	LBDD5QA1MS-119	--
WWAN Module	Qualcomm	MSM8998	--

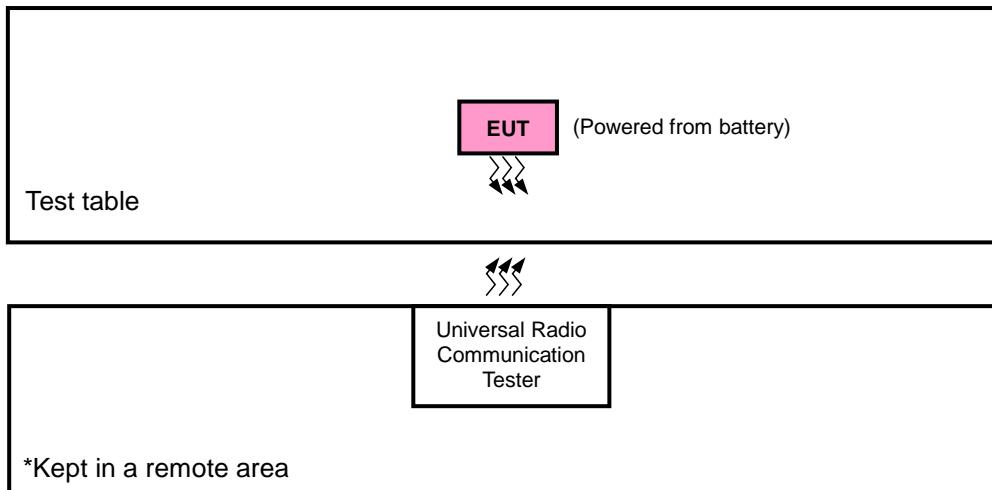
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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:

Antenna	Band	EIRP	Radiated Emission
0	GSM	X-plane	Y-axis
	EDGE	X-plane	Y-axis
	WCDMA	X-plane	Y-axis
	LTE Band 2	X-plane	X-axis

Note: The EUT incorporates WWAN diversity antenna.

GSM

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	512 to 810	512, 661, 810	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
-	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

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
-	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
			19193	1.4 MHz		6 RB / 0 RB Offset
		18615 to 19185	18615	3 MHz	QPSK	1 RB / 5 RB Offset
			19185	3 MHz		6 RB / 0 RB Offset
		18625 to 19175	18625	5 MHz	QPSK	1 RB / 0 RB Offset
			19175	5 MHz		25 RB / 0 RB Offset
		18650 to 19150	18650	10 MHz	QPSK	1 RB / 24 RB Offset
			19150	10 MHz		25 RB / 0 RB Offset
		18675 to 19125	18675	15 MHz	QPSK	1 RB / 0 RB Offset
			19125	15 MHz		75 RB / 0 RB Offset
		18700 to 19100	18700	20 MHz	QPSK	1 RB / 74 RB Offset
			19100	20 MHz		75 RB / 0 RB Offset
		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	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.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	26 deg. C, 58 % RH	3.85 Vdc	Charles Hsiao
Frequency Stability	26 deg. C, 58 % RH	3.85 Vdc	Carlos Chen
Occupied Bandwidth	26 deg. C, 58 % RH	3.85 Vdc	Carlos Chen
Band Edge	26 deg. C, 58 % RH	3.85 Vdc	Carlos Chen
Peak to Average Ratio	26 deg. C, 58 % RH	3.85 Vdc	Carlos Chen
Conducted Emission	26 deg. C, 58 % RH	3.85 Vdc	Carlos Chen
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao / Harry Hsueh

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 v02r02

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 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 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. 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.P.R power - 2.15 dBi.

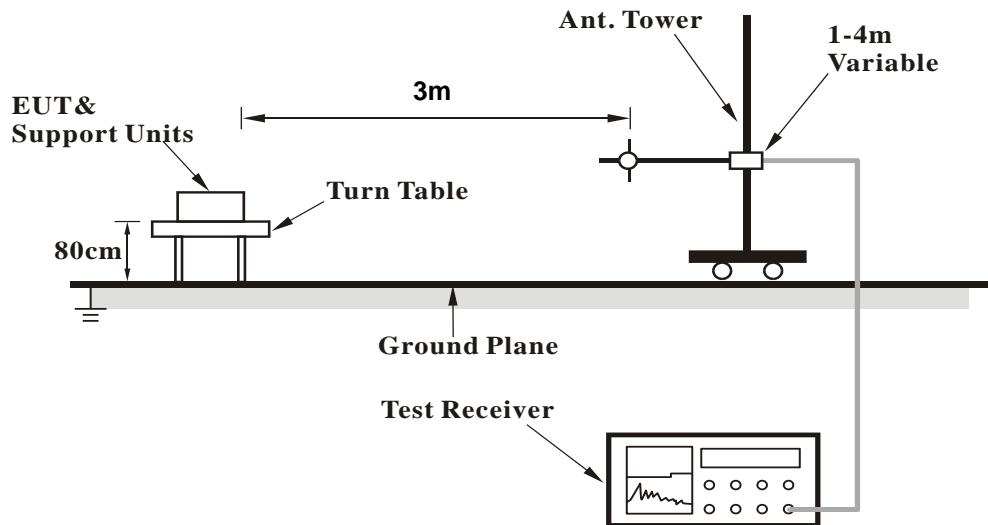
Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, 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.

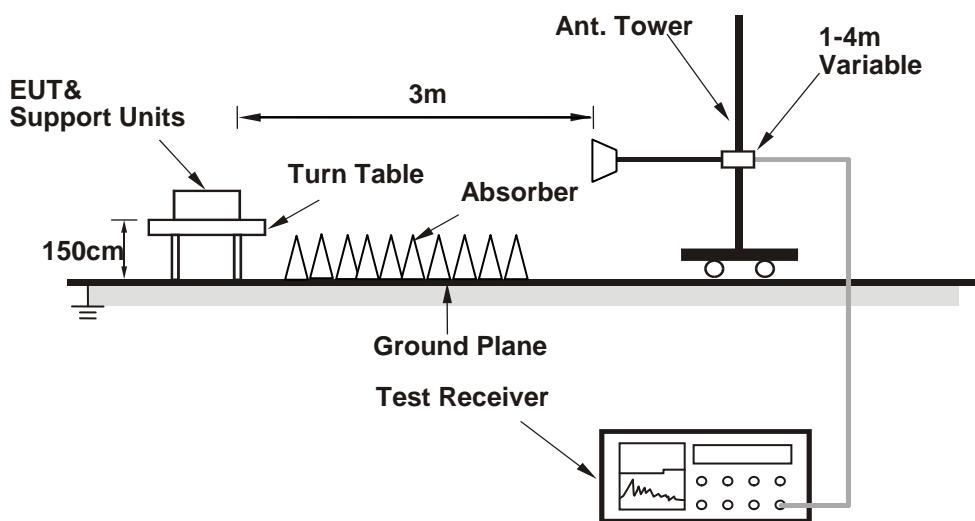
4.1.3 Test Setup

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	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
GSM (GMSK, 1Tx-slot)	29.83	29.80	29.63
GPRS (GMSK, 1Tx-slot)	29.81	29.78	29.66
GPRS (GMSK, 2Tx-slot)	26.72	26.60	26.59
GPRS (GMSK, 3Tx-slot)	24.47	24.32	24.28
GPRS (GMSK, 4Tx-slot)	23.24	23.04	22.64
EDGE (8PSK, 1Tx-slot)	25.87	25.75	25.66
EDGE (8PSK, 2Tx-slot)	23.31	23.19	23.10
EDGE (8PSK, 3Tx-slot)	21.14	21.02	20.93
EDGE (8PSK, 4Tx-slot)	19.94	19.82	19.73

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	23.37	23.36	23.38
HSDPA Subtest-1	22.60	22.59	22.61
HSDPA Subtest-2	22.64	22.63	22.65
HSDPA Subtest-3	22.12	22.11	22.13
HSDPA Subtest-4	22.11	22.10	22.12
HSUPA Subtest-1	22.63	22.62	22.64
HSUPA Subtest-2	20.62	20.61	20.63
HSUPA Subtest-3	21.64	21.63	21.65
HSUPA Subtest-4	20.63	20.62	20.64
HSUPA Subtest-5	22.71	22.70	22.72

LTE Band 2															
BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM				
			Low CH 18700 MHz	Mid CH 18900 MHz	High CH 19100 MHz	3GPP MPR (dB)	Low CH 18607 MHz	Mid CH 18900 MHz	High CH 19193 MHz	3GPP MPR (dB)	Low CH 18607 MHz	Mid CH 18900 MHz	High CH 19193 MHz	3GPP MPR (dB)	
			1860.0 MHz	1880.0 MHz	1900.0 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz		
20	1	0	23.28	23.26	23.25	0	22.26	22.24	22.23	1	21.11	21.13	21.25	2	
	1	50	22.95	22.93	22.92	0	21.93	21.91	21.90	1	20.81	20.89	20.90	2	
	1	99	23.05	23.03	23.02	0	22.03	22.01	22.00	1	20.94	20.93	20.92	2	
	50	0	22.11	22.09	22.08	1	21.09	21.07	21.06	2	20.20	20.20	20.11	3	
	50	25	22.01	21.99	21.98	1	20.99	20.97	20.96	2	19.78	19.93	19.87	3	
	50	50	21.89	21.87	21.86	1	20.87	20.85	20.84	2	19.92	19.92	19.96	3	
	100	0	22.05	22.03	22.02	1	21.03	21.01	21.00	2	20.00	19.87	19.86	3	
15	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 18675 MHz	Mid CH 18900 MHz	High CH 19125 MHz	3GPP MPR (dB)	Low CH 18675 MHz	Mid CH 18900 MHz	High CH 19125 MHz	3GPP MPR (dB)	Low CH 18675 MHz	Mid CH 18900 MHz	High CH 19125 MHz	3GPP MPR (dB)
				1857.5 MHz	1880.0 MHz	1902.5 MHz		1857.5 MHz	1880.0 MHz	1902.5 MHz		1857.5 MHz	1880.0 MHz	1902.5 MHz	
	1	0	23.22	23.20	23.19	0	22.20	22.18	22.17	1	21.15	21.12	21.09	2	
	1	37	22.89	22.87	22.86	0	21.87	21.85	21.84	1	20.77	20.77	20.78	2	
	1	74	22.99	22.97	22.96	0	21.97	21.95	21.94	1	20.89	21.04	20.86	2	
	36	0	22.05	22.03	22.02	1	21.03	21.01	21.00	2	20.10	20.15	20.15	3	
10	36	19	21.95	21.93	21.92	1	20.93	20.91	20.90	2	19.83	19.78	19.80	3	
	36	39	21.83	21.81	21.80	1	20.81	20.79	20.78	2	20.03	19.96	19.88	3	
	75	0	21.99	21.97	21.96	1	20.97	20.95	20.94	2	19.97	20.04	19.93	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 18650 MHz	Mid CH 18900 MHz	High CH 19150 MHz	3GPP MPR (dB)	Low CH 18650 MHz	Mid CH 18900 MHz	High CH 19150 MHz	3GPP MPR (dB)	Low CH 18650 MHz	Mid CH 18900 MHz	High CH 19150 MHz	3GPP MPR (dB)
				1855.0 MHz	1880.0 MHz	1905.0 MHz		1855.0 MHz	1880.0 MHz	1905.0 MHz		1855.0 MHz	1880.0 MHz	1905.0 MHz	
	1	0	23.18	23.16	23.15	0	22.16	22.14	22.13	1	21.27	21.23	21.15	2	
	1	24	22.85	22.83	22.82	0	21.83	21.81	21.80	1	20.85	20.87	20.82	2	
	1	49	22.95	22.93	22.92	0	21.93	21.91	21.90	1	20.91	20.95	20.94	2	
	25	0	22.01	21.99	21.98	1	20.99	20.97	20.96	2	20.25	20.21	20.24	3	
5	25	12	21.91	21.89	21.88	1	20.89	20.87	20.86	2	19.94	19.85	19.85	3	
	25	25	21.79	21.77	21.76	1	20.77	20.75	20.74	2	19.88	20.04	19.85	3	
	50	0	21.95	21.93	21.92	1	20.93	20.91	20.90	2	19.98	20.00	20.03	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 18625 MHz	Mid CH 18900 MHz	High CH 19175 MHz	3GPP MPR (dB)	Low CH 18625 MHz	Mid CH 18900 MHz	High CH 19175 MHz	3GPP MPR (dB)	Low CH 18625 MHz	Mid CH 18900 MHz	High CH 19175 MHz	3GPP MPR (dB)
				1852.5 MHz	1880.0 MHz	1907.5 MHz		1852.5 MHz	1880.0 MHz	1907.5 MHz		1852.5 MHz	1880.0 MHz	1907.5 MHz	
	1	0	23.16	23.14	23.13	0	22.14	22.12	22.11	1	21.22	21.15	21.08	2	
	1	12	22.83	22.81	22.80	0	21.81	21.79	21.78	1	20.82	20.94	20.88	2	
	1	24	22.93	22.91	22.90	0	21.91	21.89	21.88	1	20.89	20.99	20.99	2	
	12	0	21.99	21.97	21.96	1	20.97	20.95	20.94	2	20.17	20.13	20.15	3	
3	12	6	21.89	21.87	21.86	1	20.87	20.85	20.84	2	19.89	19.93	19.80	3	
	12	13	21.77	21.75	21.74	1	20.75	20.73	20.72	2	20.05	20.02	20.01	3	
	25	0	21.93	21.91	21.90	1	20.91	20.89	20.88	2	20.04	20.02	19.83	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 18615 MHz	Mid CH 18900 MHz	High CH 19185 MHz	3GPP MPR (dB)	Low CH 18615 MHz	Mid CH 18900 MHz	High CH 19185 MHz	3GPP MPR (dB)	Low CH 18615 MHz	Mid CH 18900 MHz	High CH 19185 MHz	3GPP MPR (dB)
				1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz	
	1	0	23.14	23.12	23.11	0	22.12	22.10	22.09	1	21.09	21.19	21.15	2	
	1	7	22.81	22.79	22.78	0	21.79	21.77	21.76	1	20.84	20.74	20.81	2	
	1	14	22.91	22.89	22.88	0	21.89	21.87	21.86	1	20.92	21.02	20.93	2	
	8	0	21.97	21.95	21.94	1	20.95	20.93	20.92	2	20.09	20.21	20.17	3	
1.4	8	3	21.87	21.85	21.84	1	20.85	20.83	20.82	2	19.79	19.88	19.85	3	
	8	7	21.75	21.73	21.72	1	20.73	20.71	20.70	2	19.93	19.97	19.95	3	
	15	0	21.91	21.89	21.88	1	20.89	20.87	20.86	2	19.88	19.85	19.90	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 18607 MHz	Mid CH 18900 MHz	High CH 19193 MHz	3GPP MPR (dB)	Low CH 18607 MHz	Mid CH 18900 MHz	High CH 19193 MHz	3GPP MPR (dB)	Low CH 18607 MHz	Mid CH 18900 MHz	High CH 19193 MHz	3GPP MPR (dB)
				1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz	
	1	0	23.13	23.11	23.10	0	22.11	22.09	22.08	1	21.25	21.23	21.07	2	
	1	2	22.80	22.78	22.77	0	21.78	21.76	21.75	1	20.85	20.83	20.83	2	
	1	5	22.90	22.88	22.87	0	21.88	21.86	21.85	1	21.00	21.02	20.89	2	
	3	0	23.12	23.10	23.09	0	22.11	22.09	22.08	1	21.23	21.15	21.09	2	
	3	1	22.79	22.77	22.76	0	21.78	21.76	21.75	1	20.89	20.83	20.80	2	
	3	3	22.89	22.87	22.86	0	21.88	21.86	21.85	1	20.89	21.00	20.85	2	
	6	0	21.90	21.88	21.87	1	20.88	20.86	20.85	2	19.92	19.87	19.84	3	

EIRP Power (dBm)

GSM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	512	1850.2	-10.16	38.19	28.03	635.33	H
	661	1880.0	-10.65	38.70	28.05	638.26	
	810	1909.8	-11.26	39.35	28.09	644.17	
	512	1850.2	-15.48	38.48	23.00	199.53	V
	661	1880.0	-15.57	38.59	23.02	200.45	
	810	1909.8	-15.74	38.87	23.13	205.59	

EDGE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	512	1850.2	-14.12	38.19	24.07	255.27	H
	661	1880.0	-14.68	38.70	24.02	252.35	
	810	1909.8	-15.30	39.35	24.05	254.10	
	512	1850.2	-19.43	38.48	19.05	80.35	V
	661	1880.0	-19.57	38.59	19.02	79.80	
	810	1909.8	-19.70	38.87	19.17	82.60	

WCDMA

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	9262	1852.4	-16.62	38.19	21.57	143.55	H
	9400	1880.0	-17.18	38.70	21.52	141.91	
	9538	1907.6	-17.82	39.35	21.53	142.23	
	9262	1852.4	-21.97	38.48	16.51	44.77	V
	9400	1880.0	-22.10	38.59	16.49	44.57	
	9538	1907.6	-22.32	38.87	16.55	45.19	

LTE Band 2							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18607	1850.7	-23.18	44.70	21.52	141.91	H
	18900	1880.0	-23.13	44.70	21.57	143.55	
	19193	1909.3	-23.08	44.57	21.49	141.03	
	18607	1850.7	-27.74	44.27	16.53	44.98	V
	18900	1880.0	-28.36	44.87	16.51	44.77	
	19193	1909.3	-28.14	44.61	16.47	44.39	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	18607	1850.7	-24.19	44.70	20.51	112.46	H
	18900	1880.0	-24.21	44.70	20.49	111.94	
	19193	1909.3	-24.09	44.57	20.48	111.76	
	18607	1850.7	-28.81	44.27	15.46	35.16	V
	18900	1880.0	-29.32	44.87	15.55	35.89	
	19193	1909.3	-29.04	44.61	15.57	36.08	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	18607	1850.7	-24.85	44.70	19.85	96.61	H
	18900	1880.0	-24.96	44.70	19.74	94.19	
	19193	1909.3	-25.12	44.57	19.45	88.17	
	18607	1850.7	-29.52	44.27	14.75	29.85	V
	18900	1880.0	-29.89	44.87	14.98	31.48	
	19193	1909.3	-30.26	44.61	14.35	27.25	

LTE Band 2							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18615	1851.5	-23.13	44.70	21.57	143.55	H
	18900	1880.0	-23.17	44.70	21.53	142.23	
	19185	1908.5	-23.05	44.57	21.52	142.00	
	18615	1851.5	-27.72	44.27	16.55	45.19	V
	18900	1880.0	-28.32	44.87	16.55	45.19	
	19185	1908.5	-28.09	44.61	16.52	44.91	
Channel Bandwidth: 3 MHz / 16QAM							
X	18615	1851.5	-24.15	44.70	20.55	113.50	H
	18900	1880.0	-24.29	44.70	20.41	109.90	
	19185	1908.5	-24.02	44.57	20.55	113.58	
	18615	1851.5	-28.70	44.27	15.57	36.06	V
	18900	1880.0	-29.37	44.87	15.50	35.48	
	19185	1908.5	-29.10	44.61	15.51	35.59	
Channel Bandwidth: 3 MHz / 64QAM							
X	18615	1851.5	-24.88	44.70	19.82	95.94	H
	18900	1880.0	-25.23	44.70	19.47	88.51	
	19185	1908.5	-24.96	44.57	19.61	91.47	
	18615	1851.5	-29.65	44.27	14.62	28.97	V
	18900	1880.0	-30.23	44.87	14.64	29.11	
	19185	1908.5	-30.56	44.61	14.05	25.42	

LTE Band 2							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18625	1852.5	-23.17	44.70	21.53	142.27	H
	18900	1880.0	-23.28	44.70	21.42	138.68	
	19175	1907.5	-23.08	44.57	21.49	141.03	
	18625	1852.5	-27.80	44.27	16.47	44.36	V
	18900	1880.0	-28.36	44.87	16.51	44.77	
	19175	1907.5	-28.17	44.61	16.44	44.09	
Channel Bandwidth: 5 MHz / 16QAM							
X	18625	1852.5	-24.12	44.70	20.58	114.29	H
	18900	1880.0	-24.18	44.70	20.52	112.72	
	19175	1907.5	-24.10	44.57	20.47	111.51	
	18625	1852.5	-28.76	44.27	15.51	35.56	V
	18900	1880.0	-29.40	44.87	15.47	35.24	
	19175	1907.5	-29.13	44.61	15.48	35.34	
Channel Bandwidth: 5 MHz / 64QAM							
X	18625	1852.5	-24.95	44.70	19.75	94.41	H
	18900	1880.0	-24.76	44.70	19.94	98.63	
	19175	1907.5	-24.82	44.57	19.75	94.47	
	18625	1852.5	-29.62	44.27	14.65	29.17	V
	18900	1880.0	-30.26	44.87	14.61	28.91	
	19175	1907.5	-30.58	44.61	14.03	25.31	

LTE Band 2							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18650	1855.0	-23.22	44.70	21.48	140.60	H
	18900	1880.0	-23.21	44.70	21.49	140.93	
	19150	1905.0	-23.08	44.57	21.49	141.03	
	18650	1855.0	-27.70	44.27	16.57	45.39	V
	18900	1880.0	-28.31	44.87	16.56	45.29	
	19150	1905.0	-28.16	44.61	16.45	44.19	
Channel Bandwidth: 10 MHz / 16QAM							
X	18650	1855.0	-24.16	44.70	20.54	113.24	H
	18900	1880.0	-24.25	44.70	20.45	110.92	
	19150	1905.0	-24.00	44.57	20.57	114.10	
	18650	1855.0	-28.75	44.27	15.52	35.65	V
	18900	1880.0	-29.29	44.87	15.58	36.14	
	19150	1905.0	-29.08	44.61	15.53	35.75	
Channel Bandwidth: 10 MHz / 64QAM							
X	18650	1855.0	-25.23	44.70	19.47	88.51	H
	18900	1880.0	-25.14	44.70	19.56	90.36	
	19150	1905.0	-24.96	44.57	19.61	91.47	
	18650	1855.0	-29.62	44.27	14.65	29.17	V
	18900	1880.0	-30.21	44.87	14.66	29.24	
	19150	1905.0	-30.36	44.61	14.25	26.63	

LTE Band 2							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18675	1857.5	-23.18	44.70	21.52	141.91	H
	18900	1880.0	-23.20	44.70	21.50	141.25	
	19125	1902.5	-23.04	44.57	21.53	142.33	
	18675	1857.5	-27.84	44.27	16.43	43.99	V
	18900	1880.0	-28.40	44.87	16.47	44.36	
	19125	1902.5	-28.12	44.61	16.49	44.60	
Channel Bandwidth: 15 MHz / 16QAM							
X	18675	1857.5	-24.16	44.70	20.54	113.24	H
	18900	1880.0	-24.15	44.70	20.55	113.50	
	19125	1902.5	-24.08	44.57	20.49	112.02	
	18675	1857.5	-28.70	44.27	15.57	36.06	V
	18900	1880.0	-29.32	44.87	15.55	35.89	
	19125	1902.5	-29.14	44.61	15.47	35.26	
Channel Bandwidth: 15 MHz / 64QAM							
X	18675	1857.5	-24.96	44.70	19.74	94.19	H
	18900	1880.0	-24.85	44.70	19.85	96.61	
	19125	1902.5	-24.76	44.57	19.81	95.79	
	18675	1857.5	-29.52	44.27	14.75	29.85	V
	18900	1880.0	-29.89	44.87	14.98	31.48	
	19125	1902.5	-30.14	44.61	14.47	28.01	

LTE Band 2							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	18700	1860.0	-23.16	44.70	21.54	142.56	H
	18900	1880.0	-23.10	44.70	21.60	144.54	
	19100	1900.0	-22.95	44.57	21.62	145.31	
	18700	1860.0	-27.72	44.27	16.55	45.19	V
	18900	1880.0	-28.30	44.87	16.57	45.39	
	19100	1900.0	-28.11	44.61	16.50	44.70	
Channel Bandwidth: 20 MHz / 16QAM							
X	18700	1860.0	-24.06	44.70	20.64	115.88	H
	18900	1880.0	-24.16	44.70	20.54	113.24	
	19100	1900.0	-24.07	44.57	20.50	112.28	
	18700	1860.0	-28.70	44.27	15.57	36.06	V
	18900	1880.0	-29.32	44.87	15.55	35.89	
	19100	1900.0	-29.13	44.61	15.48	35.34	
Channel Bandwidth: 20 MHz / 64QAM							
X	18700	1860.0	-25.33	44.70	19.37	86.50	H
	18900	1880.0	-24.98	44.70	19.72	93.76	
	19100	1900.0	-24.87	44.57	19.70	93.39	
	18700	1860.0	-29.62	44.27	14.65	29.17	V
	18900	1880.0	-29.87	44.87	15.00	31.62	
	19100	1900.0	-30.22	44.61	14.39	27.50	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

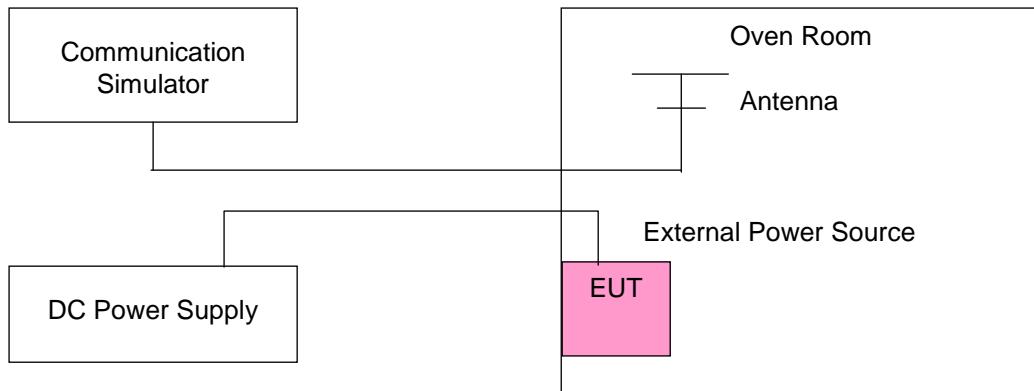
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 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 $\pm 0.5^{\circ}\text{C}$ 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.

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	GSM				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1850.200002	0.001	1909.800001	0.001	2.5	
3.85	1850.200004	0.002	1909.800003	0.002	2.5	
4.3	1850.200003	0.002	1909.800004	0.002	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	GSM				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1850.200003	0.002	1909.800003	0.002	2.5	
-20	1850.200004	0.002	1909.800001	0.001	2.5	
-10	1850.200001	0.001	1909.800002	0.001	2.5	
0	1850.200003	0.002	1909.800002	0.001	2.5	
10	1850.200002	0.001	1909.800002	0.001	2.5	
20	1850.199998	-0.001	1909.799998	-0.001	2.5	
30	1850.199997	-0.001	1909.799999	-0.001	2.5	
40	1850.199997	-0.002	1909.799999	-0.001	2.5	
50	1850.199996	-0.002	1909.799999	-0.001	2.5	
55	1850.199997	-0.002	1909.799997	-0.002	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	EDGE				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1850.200001	0.001	1909.800002	0.001	2.5	
3.85	1850.200003	0.001	1909.800001	0.001	2.5	
4.3	1850.200002	0.001	1909.800003	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	EDGE				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1850.200003	0.001	1909.800003	0.001	2.5	
-20	1850.200003	0.002	1909.800003	0.002	2.5	
-10	1850.200004	0.002	1909.800003	0.002	2.5	
0	1850.200003	0.002	1909.800002	0.001	2.5	
10	1850.200002	0.001	1909.800002	0.001	2.5	
20	1850.199998	-0.001	1909.799999	-0.001	2.5	
30	1850.199996	-0.002	1909.799996	-0.002	2.5	
40	1850.199997	-0.002	1909.799997	-0.002	2.5	
50	1850.199998	-0.001	1909.799997	-0.002	2.5	
55	1850.199996	-0.002	1909.799996	-0.002	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1852.400001	0.001	1907.600003	0.002	2.5	
3.85	1852.400003	0.002	1907.600001	0.001	2.5	
4.3	1852.400002	0.001	1907.600004	0.002	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA				Limit (ppm)	
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1852.400002	0.001	1907.600001	0.001	2.5	
-20	1852.400002	0.001	1907.600003	0.001	2.5	
-10	1852.400002	0.001	1907.600003	0.002	2.5	
0	1852.400001	0.001	1907.600002	0.001	2.5	
10	1852.400001	0.001	1907.600002	0.001	2.5	
20	1852.399997	-0.002	1907.599997	-0.001	2.5	
30	1852.399999	-0.001	1907.599997	-0.002	2.5	
40	1852.399998	-0.001	1907.599997	-0.001	2.5	
50	1852.399998	-0.001	1907.599997	-0.002	2.5	
55	1852.399998	-0.001	1907.599997	-0.001	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 1.4 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1850.700003	0.002	1909.300002	0.001	2.5	
3.85	1850.700004	0.002	1909.300001	0.001	2.5	
4.3	1850.700004	0.002	1909.300002	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 1.4 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1850.700004	0.002	1909.300003	0.002	2.5	
-20	1850.700002	0.001	1909.300003	0.002	2.5	
-10	1850.700002	0.001	1909.300001	0.001	2.5	
0	1850.700003	0.002	1909.300003	0.001	2.5	
10	1850.700003	0.001	1909.300004	0.002	2.5	
20	1850.699997	-0.002	1909.299998	-0.001	2.5	
30	1850.699996	-0.002	1909.299998	-0.001	2.5	
40	1850.699996	-0.002	1909.299999	-0.001	2.5	
50	1850.699997	-0.002	1909.299999	-0.001	2.5	
55	1850.699998	-0.001	1909.299996	-0.002	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 3 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1851.500003	0.002	1907.500003	0.002	2.5	
3.85	1851.500004	0.002	1907.500003	0.001	2.5	
4.3	1851.500002	0.001	1907.500001	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 3 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1851.500003	0.001	1907.500002	0.001	2.5	
-20	1851.500003	0.002	1907.500004	0.002	2.5	
-10	1851.500002	0.001	1907.500003	0.002	2.5	
0	1851.500003	0.002	1907.500003	0.001	2.5	
10	1851.500004	0.002	1907.500003	0.002	2.5	
20	1851.499999	-0.001	1907.499996	-0.002	2.5	
30	1851.499997	-0.002	1907.499998	-0.001	2.5	
40	1851.499997	-0.002	1907.499999	-0.001	2.5	
50	1851.499996	-0.002	1907.499997	-0.002	2.5	
55	1851.499997	-0.002	1907.499998	-0.001	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1852.500002	0.001	1907.500001	0.001	2.5	
3.85	1852.500002	0.001	1907.500003	0.002	2.5	
4.3	1852.500003	0.002	1907.500003	0.002	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1852.500001	0.001	1907.500002	0.001	2.5	
-20	1852.500003	0.002	1907.500002	0.001	2.5	
-10	1852.500003	0.001	1907.500002	0.001	2.5	
0	1852.500001	0.001	1907.500003	0.002	2.5	
10	1852.500002	0.001	1907.500004	0.002	2.5	
20	1852.499996	-0.002	1907.499999	-0.001	2.5	
30	1852.499998	-0.001	1907.499997	-0.002	2.5	
40	1852.499998	-0.001	1907.499997	-0.002	2.5	
50	1852.499998	-0.001	1907.499998	-0.001	2.5	
55	1852.499998	-0.001	1907.499998	-0.001	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1855.000003	0.002	1905.000002	0.001	2.5	
3.85	1855.000002	0.001	1905.000004	0.002	2.5	
4.3	1855.000004	0.002	1905.000003	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1855.000001	0.001	1905.000002	0.001	2.5	
-20	1855.000002	0.001	1905.000002	0.001	2.5	
-10	1855.000003	0.001	1905.000003	0.002	2.5	
0	1855.000001	0.001	1905.000002	0.001	2.5	
10	1855.000002	0.001	1905.000004	0.002	2.5	
20	1854.999998	-0.001	1904.999996	-0.002	2.5	
30	1854.999998	-0.001	1904.999998	-0.001	2.5	
40	1854.999999	-0.001	1904.999997	-0.002	2.5	
50	1854.999998	-0.001	1904.999998	-0.001	2.5	
55	1854.999998	-0.001	1904.999997	-0.002	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1857.500003	0.002	1902.500002	0.001	2.5	
3.85	1857.500003	0.001	1902.500004	0.002	2.5	
4.3	1857.500003	0.002	1902.500002	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1857.500004	0.002	1902.500004	0.002	2.5	
-20	1857.500003	0.002	1902.500002	0.001	2.5	
-10	1857.500002	0.001	1902.500003	0.002	2.5	
0	1857.500004	0.002	1902.500002	0.001	2.5	
10	1857.500003	0.001	1902.500003	0.001	2.5	
20	1857.499997	-0.002	1902.499996	-0.002	2.5	
30	1857.499997	-0.002	1902.499999	-0.001	2.5	
40	1857.499997	-0.002	1902.499998	-0.001	2.5	
50	1857.499997	-0.001	1902.499997	-0.002	2.5	
55	1857.499999	-0.001	1902.499999	-0.001	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	1860.000003	0.002	1900.000001	0.001	2.5	
3.85	1860.000004	0.002	1900.000003	0.002	2.5	
4.3	1860.000002	0.001	1900.000001	0.001	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

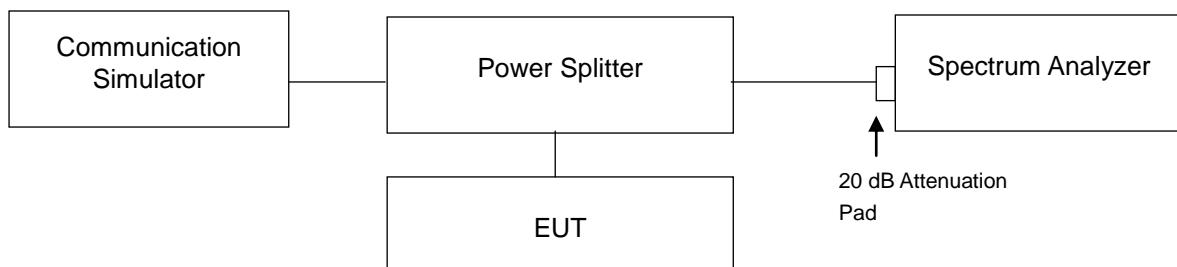
Temp. (°C)	LTE Band 2				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	1860.000002	0.001	1900.000003	0.002	2.5	
-20	1860.000002	0.001	1900.000001	0.001	2.5	
-10	1860.000001	0.001	1900.000004	0.002	2.5	
0	1860.000003	0.001	1900.000003	0.002	2.5	
10	1860.000001	0.001	1900.000003	0.001	2.5	
20	1859.999996	-0.002	1899.999999	-0.001	2.5	
30	1859.999997	-0.001	1899.999997	-0.002	2.5	
40	1859.999998	-0.001	1899.999998	-0.001	2.5	
50	1859.999999	-0.001	1899.999997	-0.001	2.5	
55	1859.999997	-0.001	1899.999997	-0.002	2.5	

4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

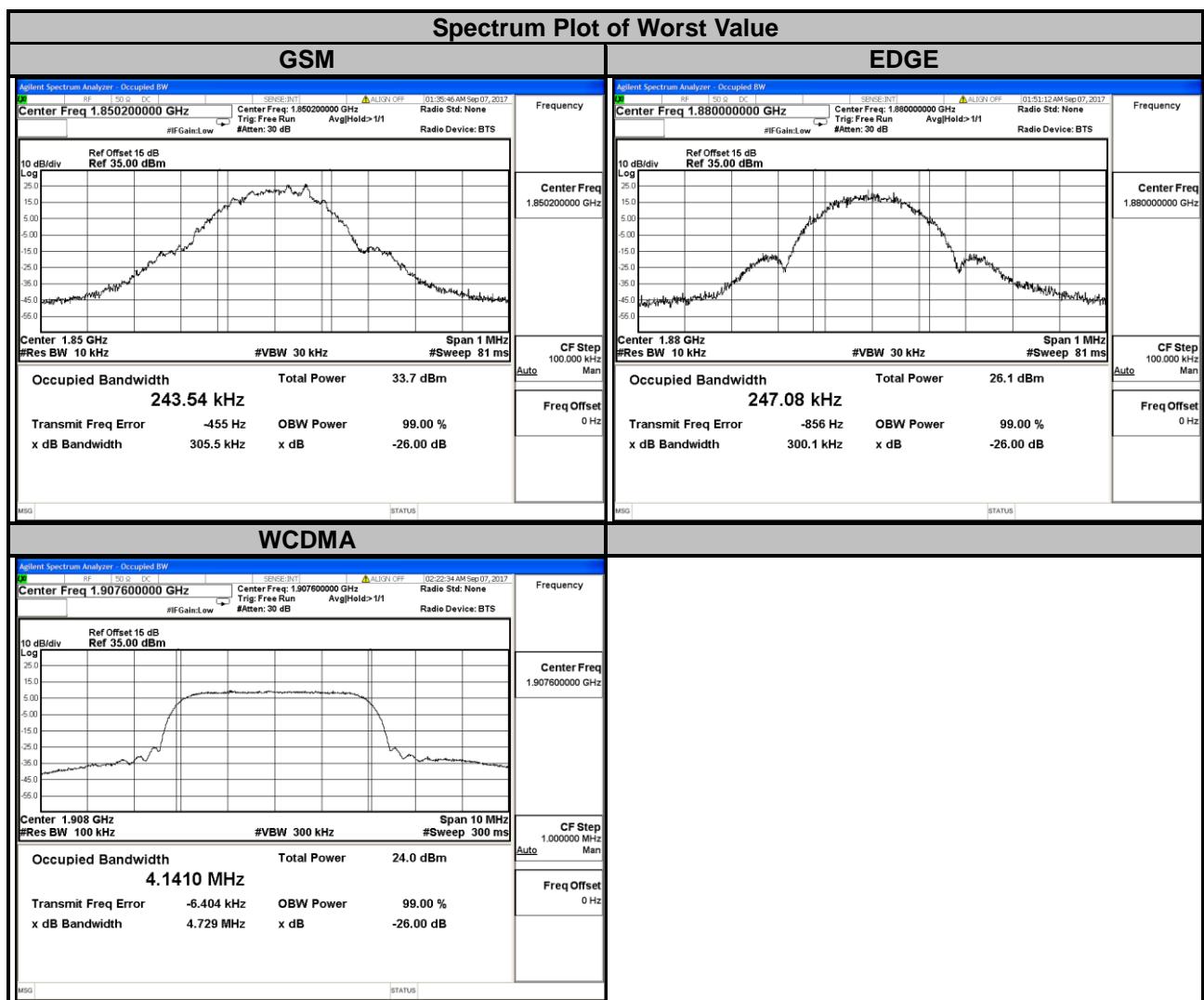
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.2 Test Setup

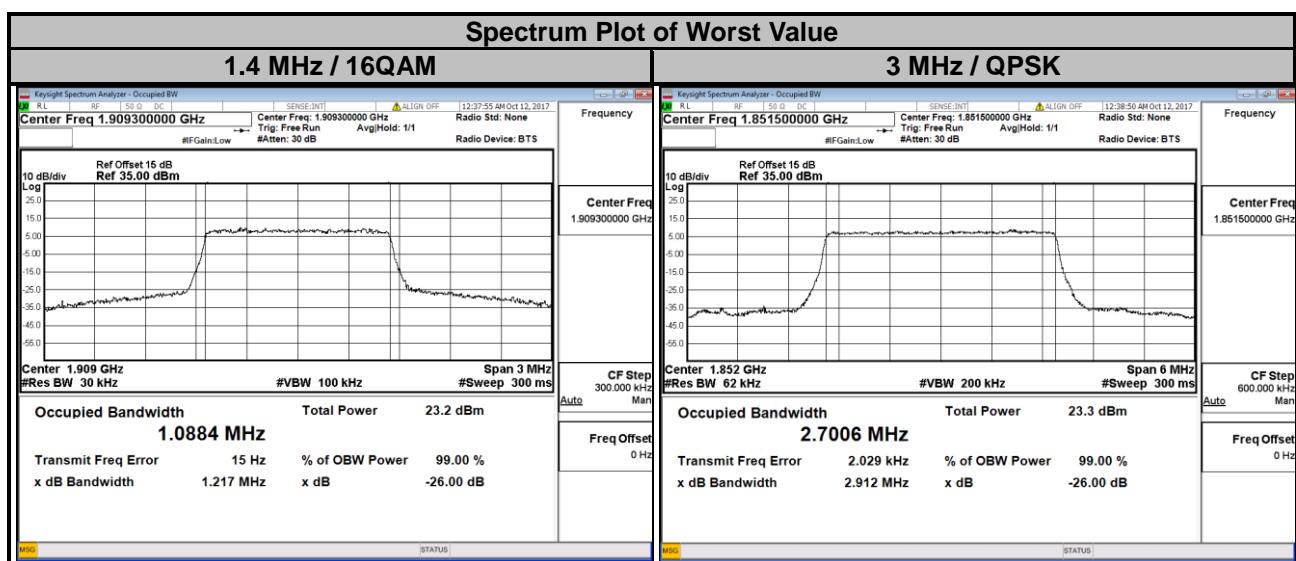


4.3.3 Test Result

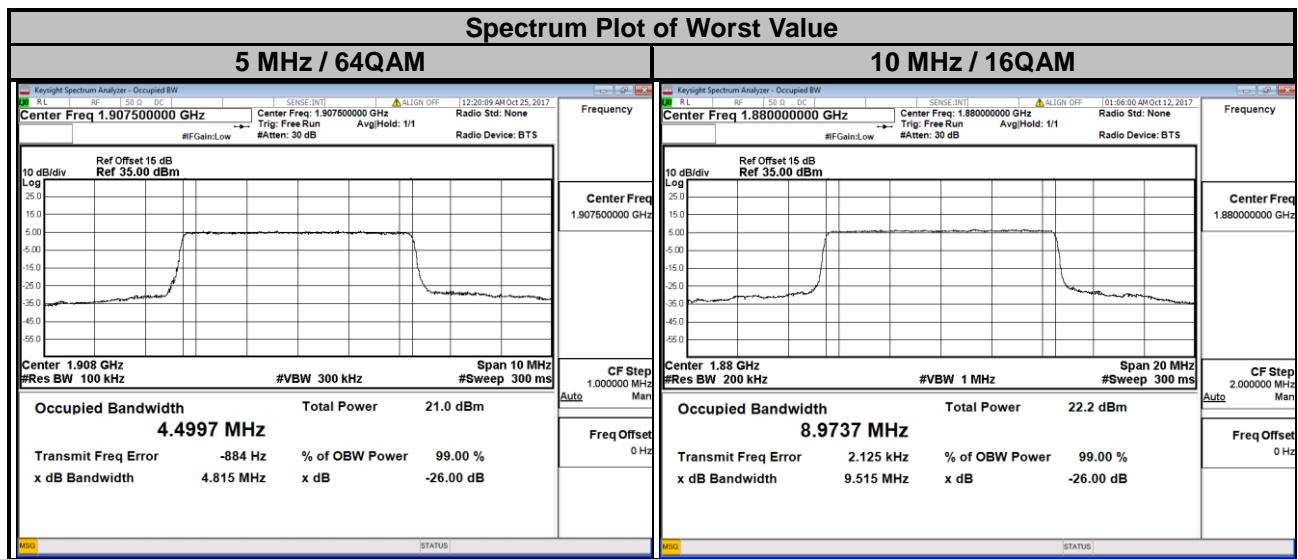
Channel	Frequency (MHz)	99 % Occupied Bandwidth (kHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		GSM	EDGE			WCDMA	
512	1850.2	243.54	240.44	9262	1852.4	4.1358	
661	1880.0	242.09	247.08	9400	1880.0	4.1379	
810	1909.8	241.48	245.38	9538	1907.6	4.1410	



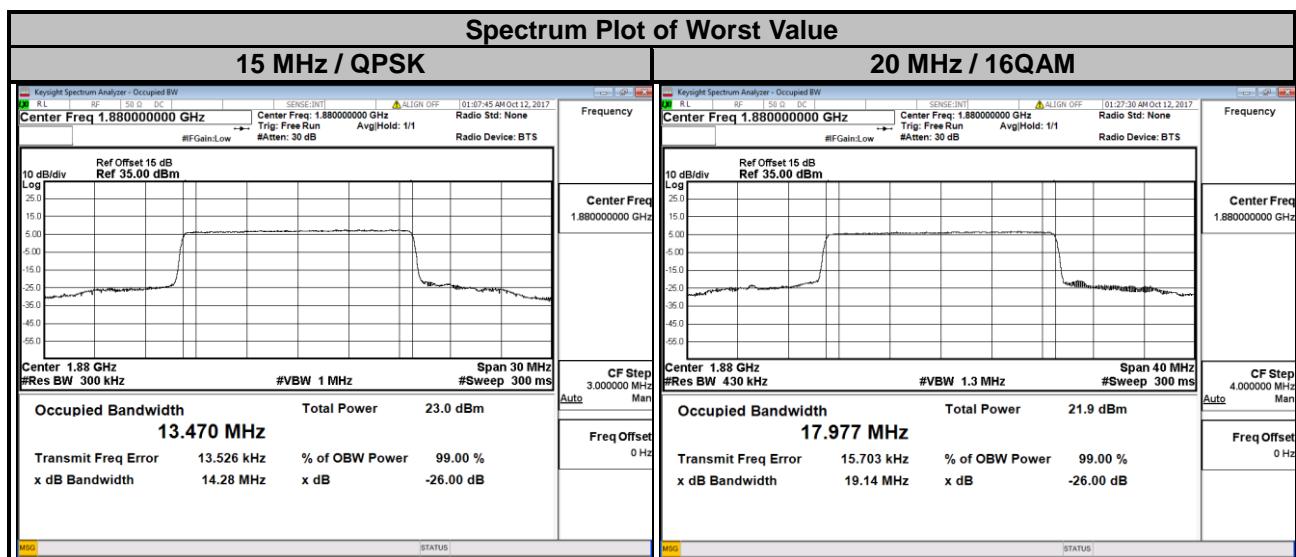
LTE Band 2									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18607	1850.7	1.0861	1.0880	1.0877	18615	1851.5	2.7006	2.6954	2.6994
18900	1880.0	1.0867	1.0856	1.0867	18900	1880.0	2.6990	2.6948	2.6970
19193	1909.3	1.0872	1.0884	1.0874	19185	1908.5	2.7002	2.6950	2.6957



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	4.4862	4.4875	4.4981	18650	1855.0	8.9624	8.9672	8.9625
18900	1880.0	4.4876	4.4856	4.4997	18900	1880.0	8.9662	8.9737	8.9719
19175	1907.5	4.4878	4.4892	4.4997	19150	1905.0	8.9642	8.9717	8.9713



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	13.452	13.442	13.435	18700	1860.0	17.912	17.936	17.912
18900	1880.0	13.470	13.462	13.459	18900	1880.0	17.962	17.977	17.971
19125	1902.5	13.464	13.461	13.449	19100	1900.0	17.947	17.956	17.954

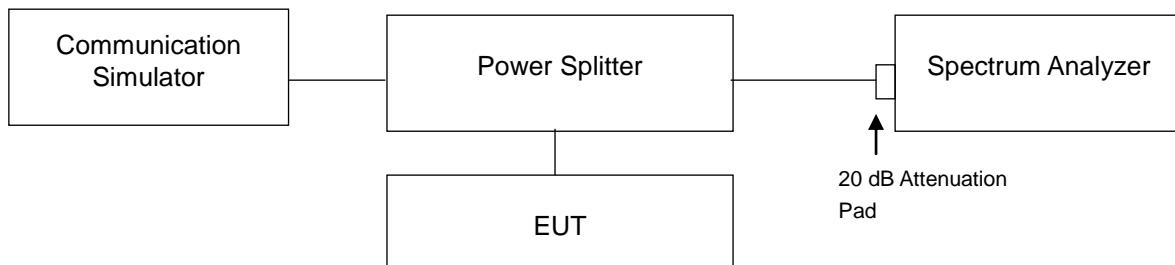


4.4 Band Edge Measurement

4.4.1 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.

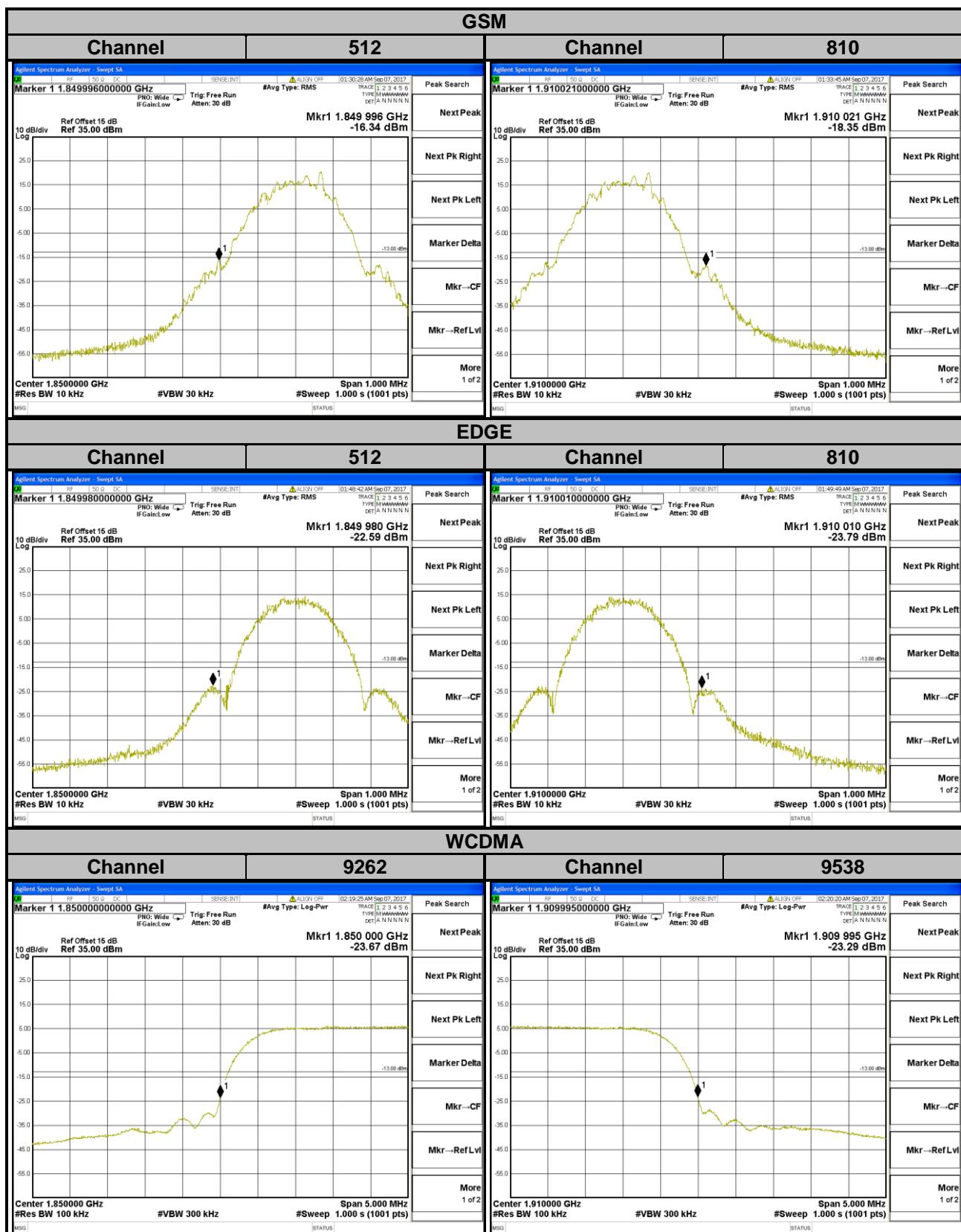
4.4.2 Test Setup

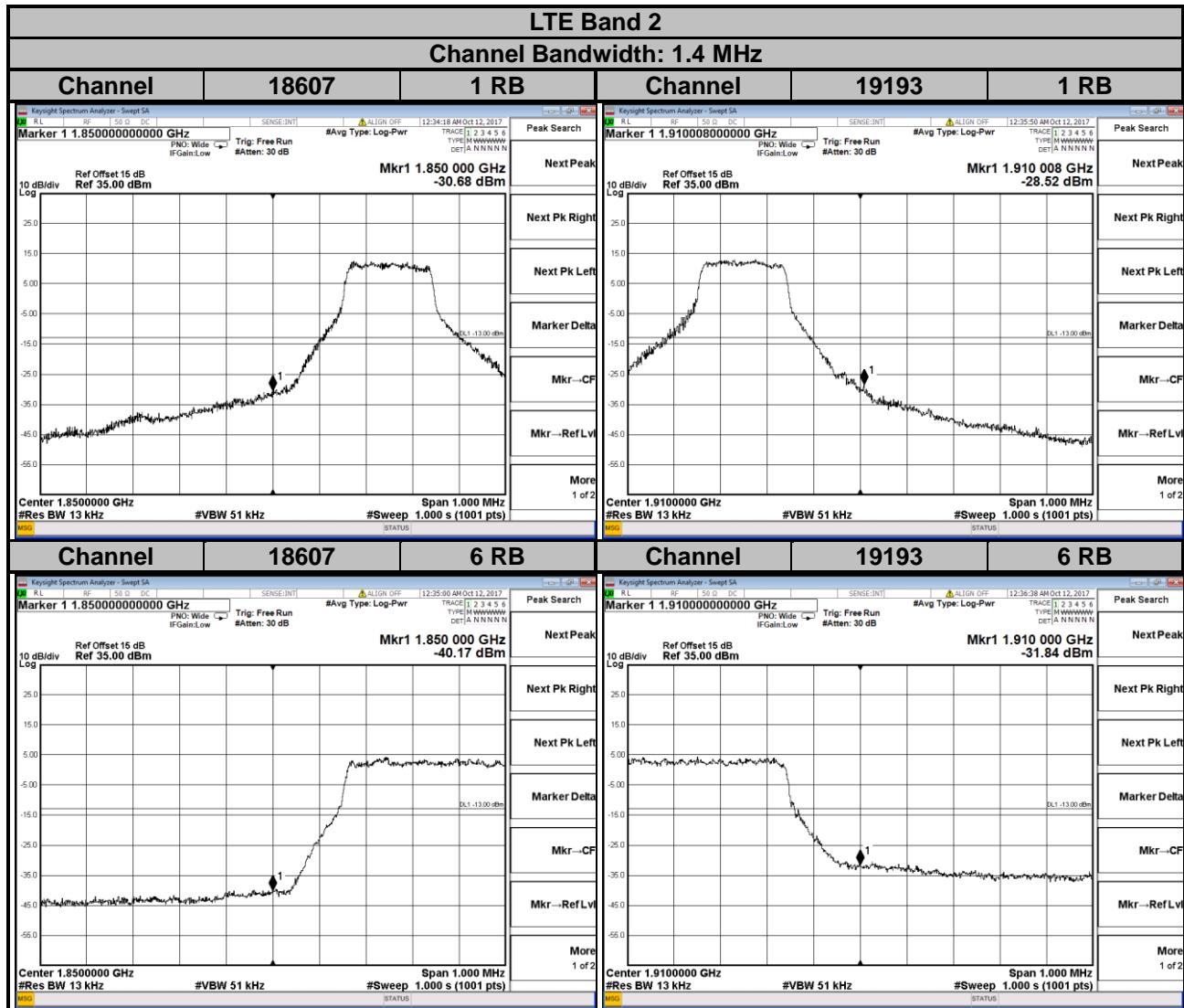


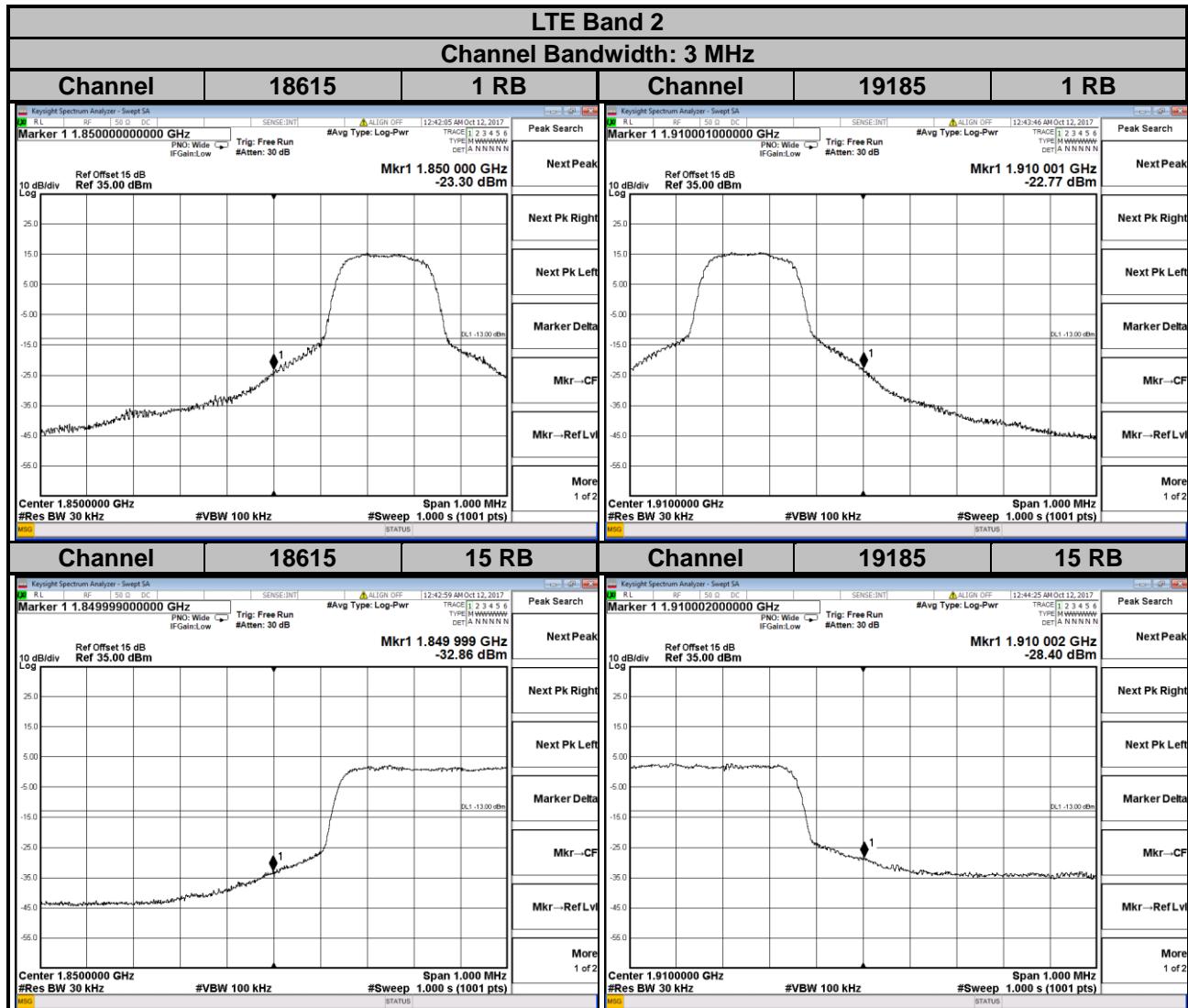
4.4.3 Test Procedures

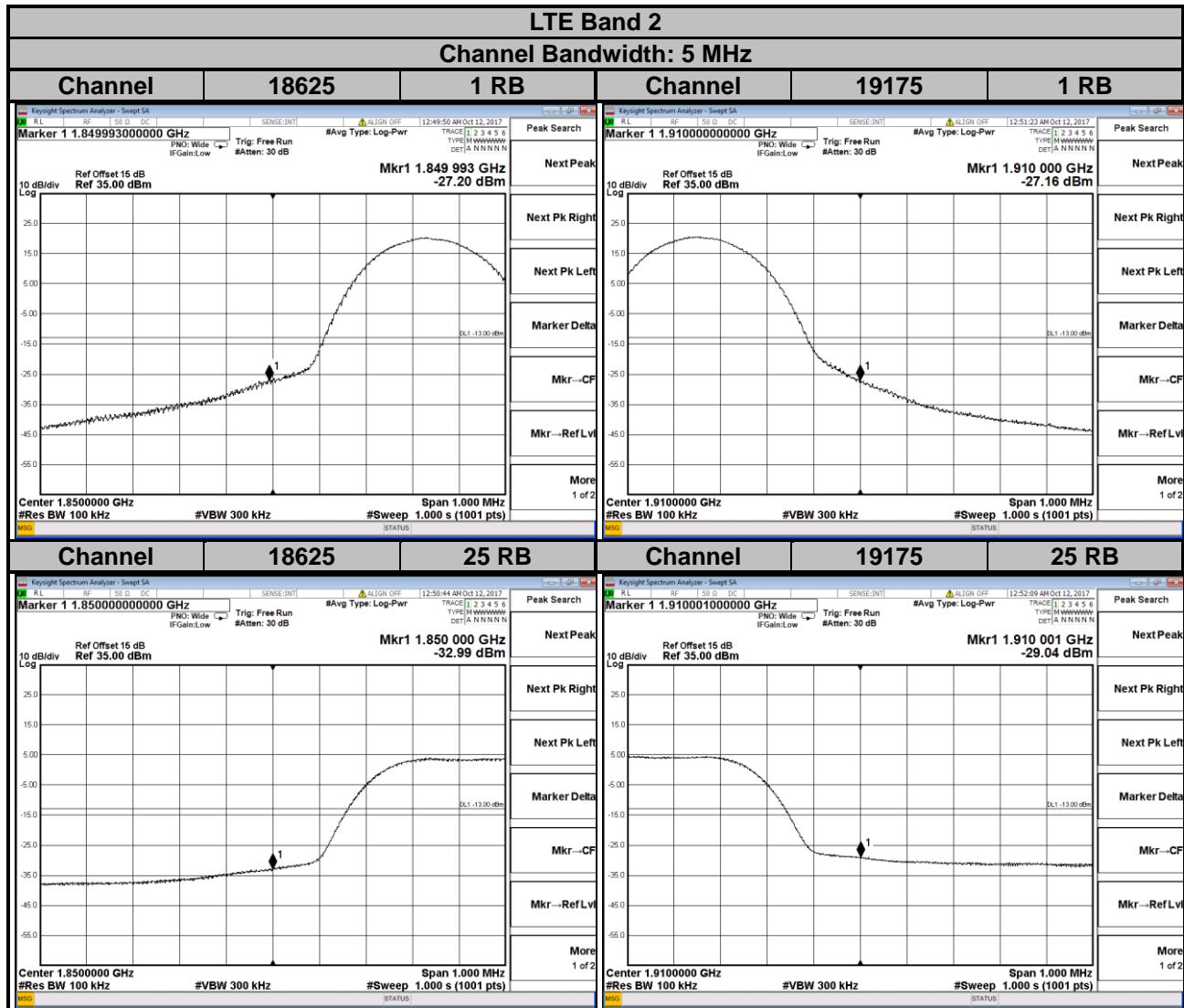
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GSM/GPRS/EDGE).
- c. The center frequency of spectrum is the band edge frequency 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 (LTE Bandwidth 1.4 MHz).
- e. 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).
- 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 5 MHz/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 180 kHz and VB of the spectrum is 560 kHz (LTE Bandwidth 20 MHz).
- i. Record the max trace plot into the test report.

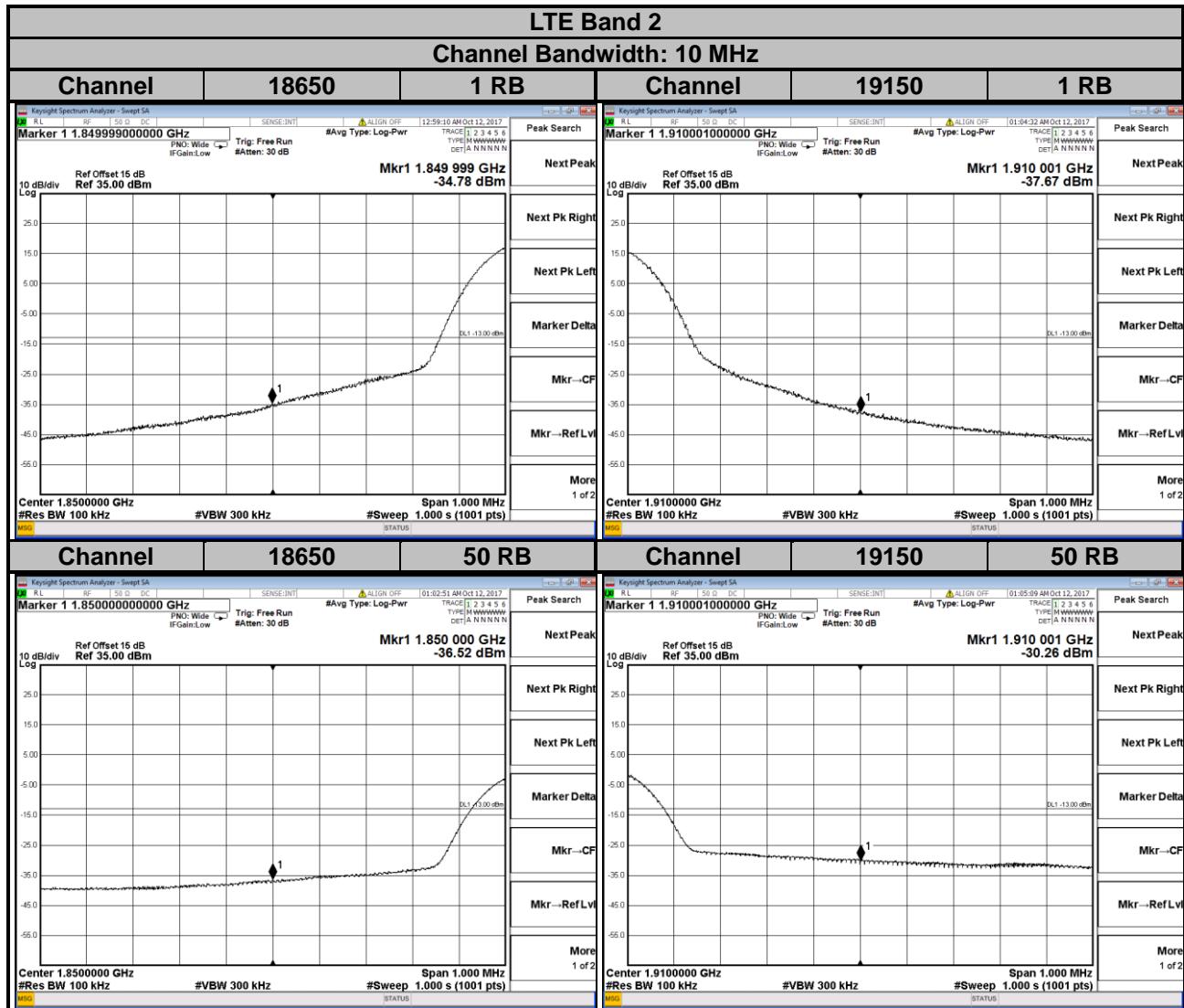
4.4.4 Test Results

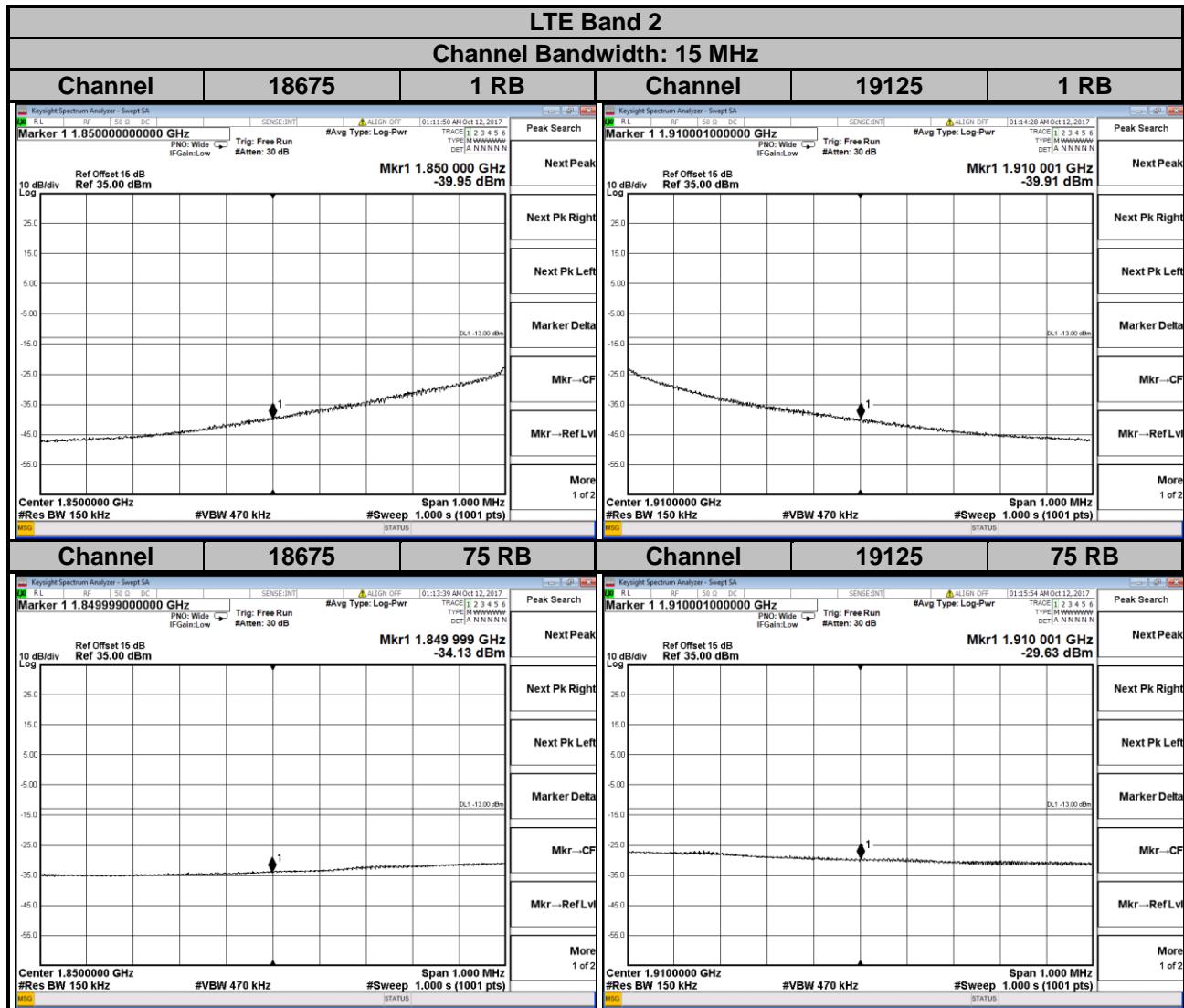


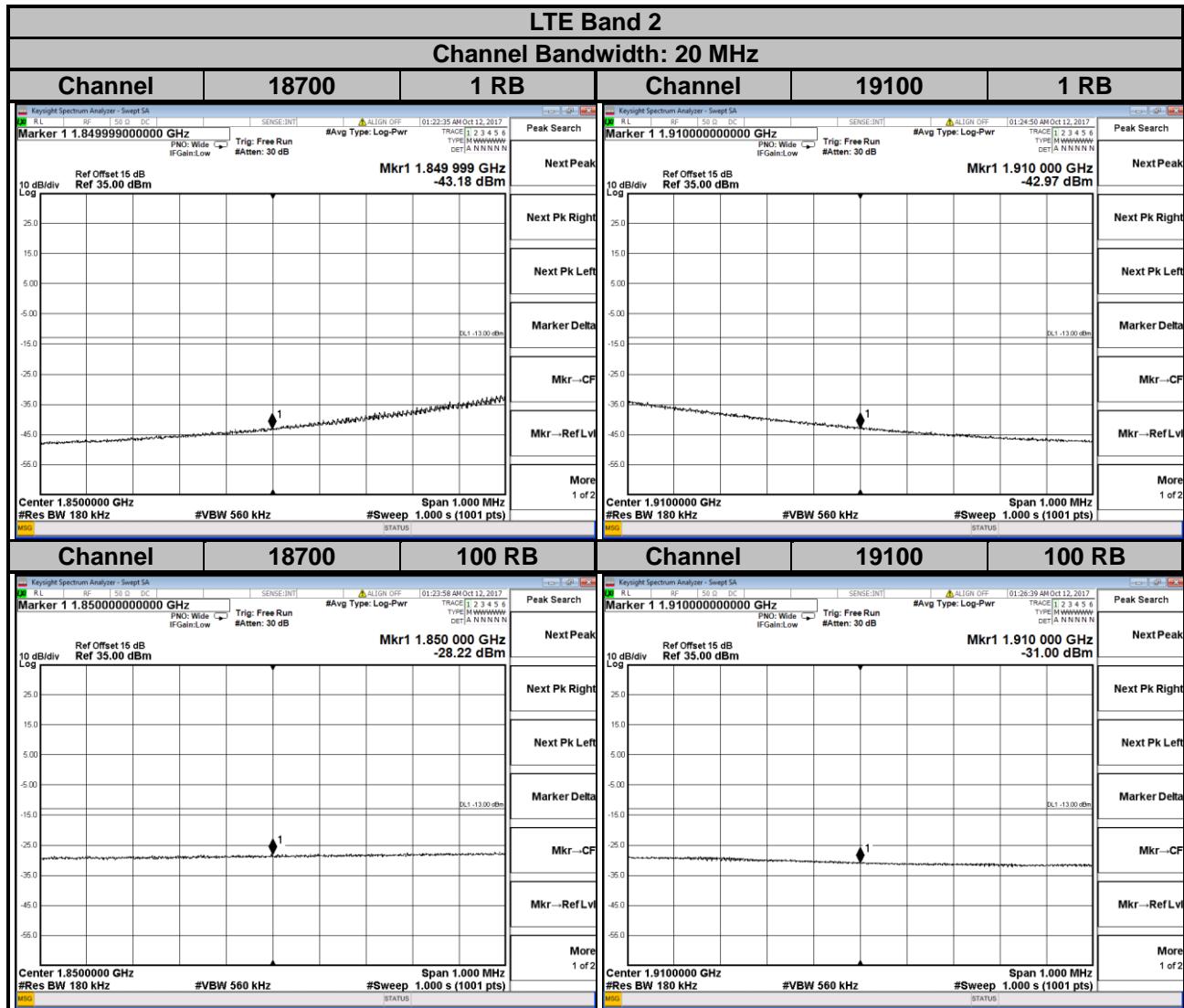










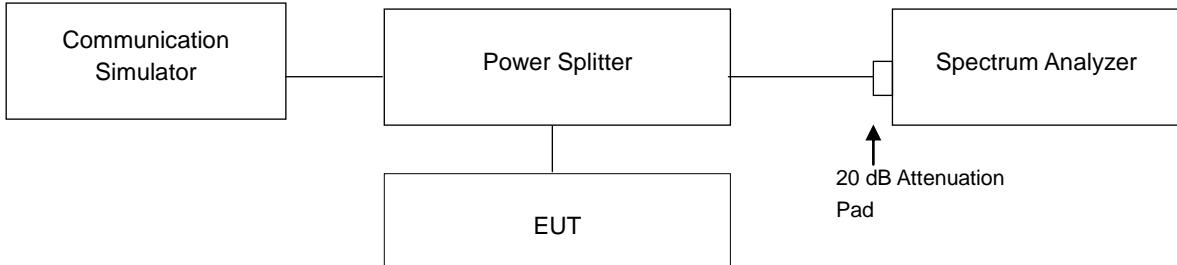


4.5 Peak to Average Ratio

4.5.1 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.

4.5.2 Test Setup

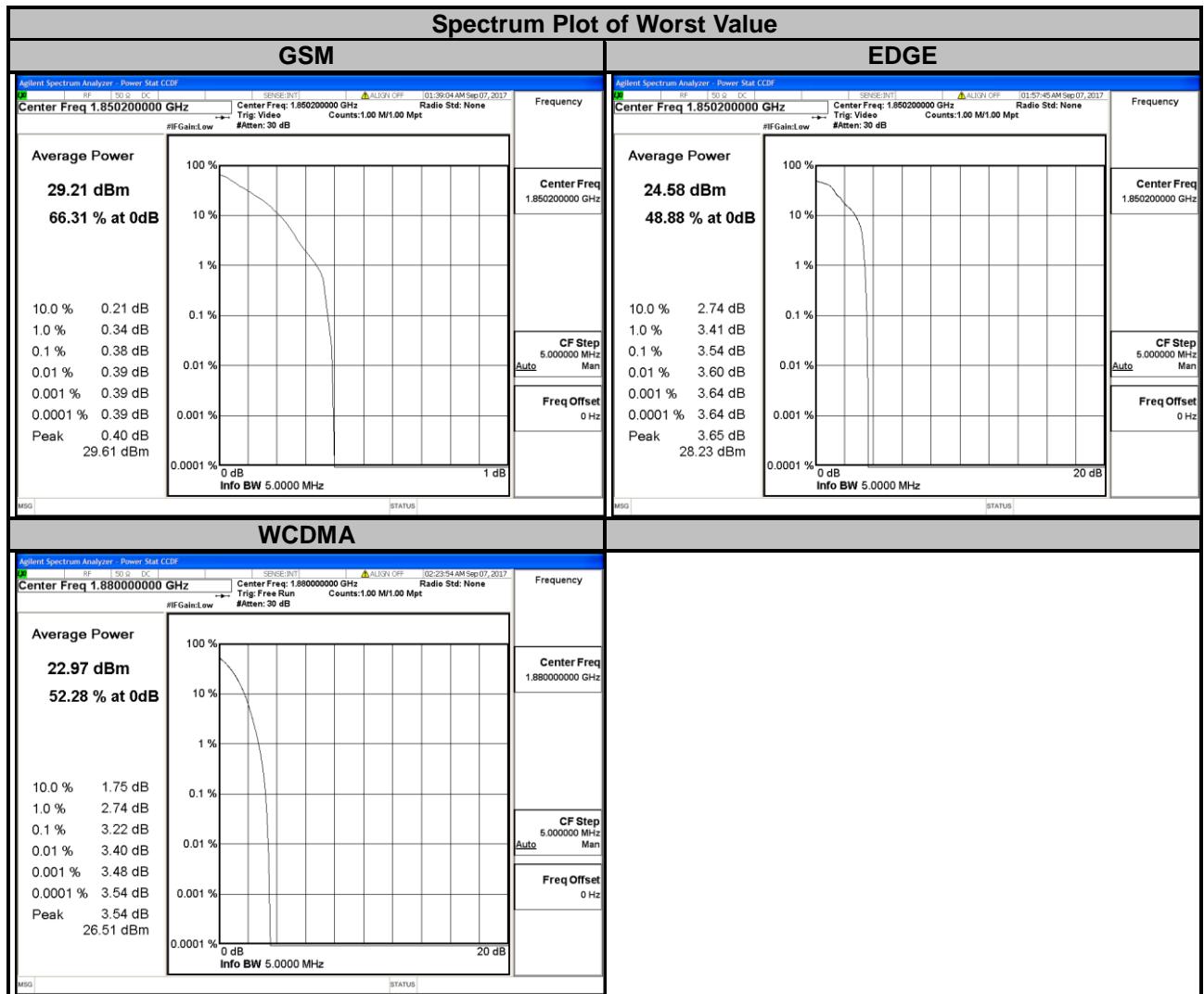


4.5.3 Test Procedures

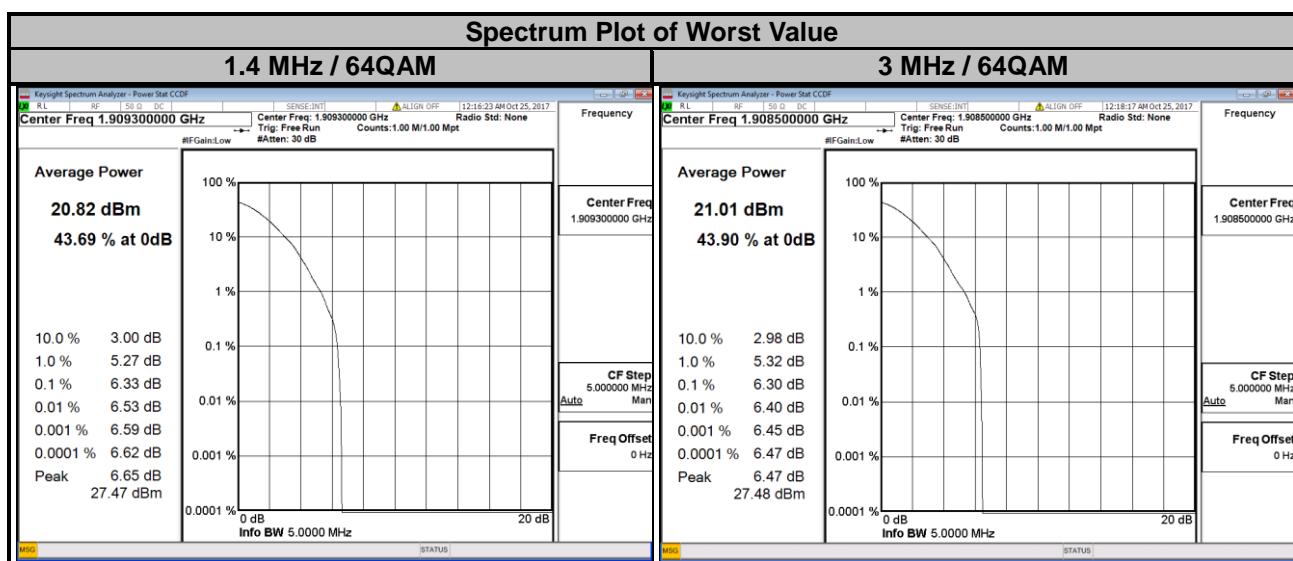
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.5.4 Test Results

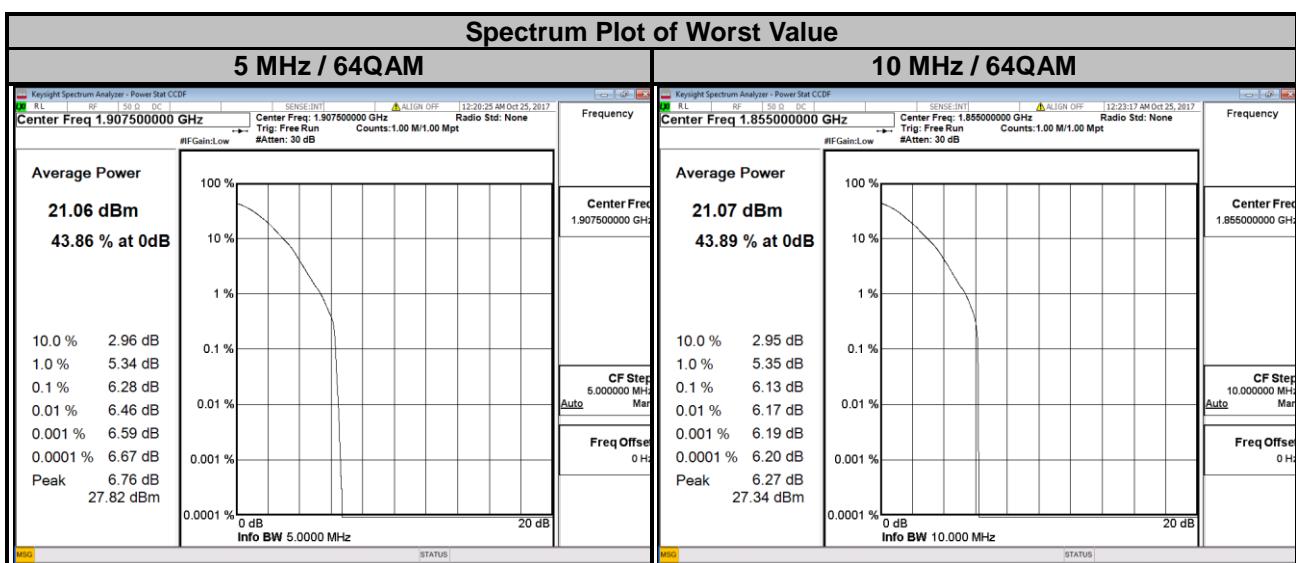
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		GSM	EDGE			WCDMA	
512	1850.2	0.38	3.54	9262	1852.4	3.03	
661	1880.0	0.37	3.45	9400	1880.0	3.22	
810	1909.8	0.33	3.41	9538	1907.6	3.12	



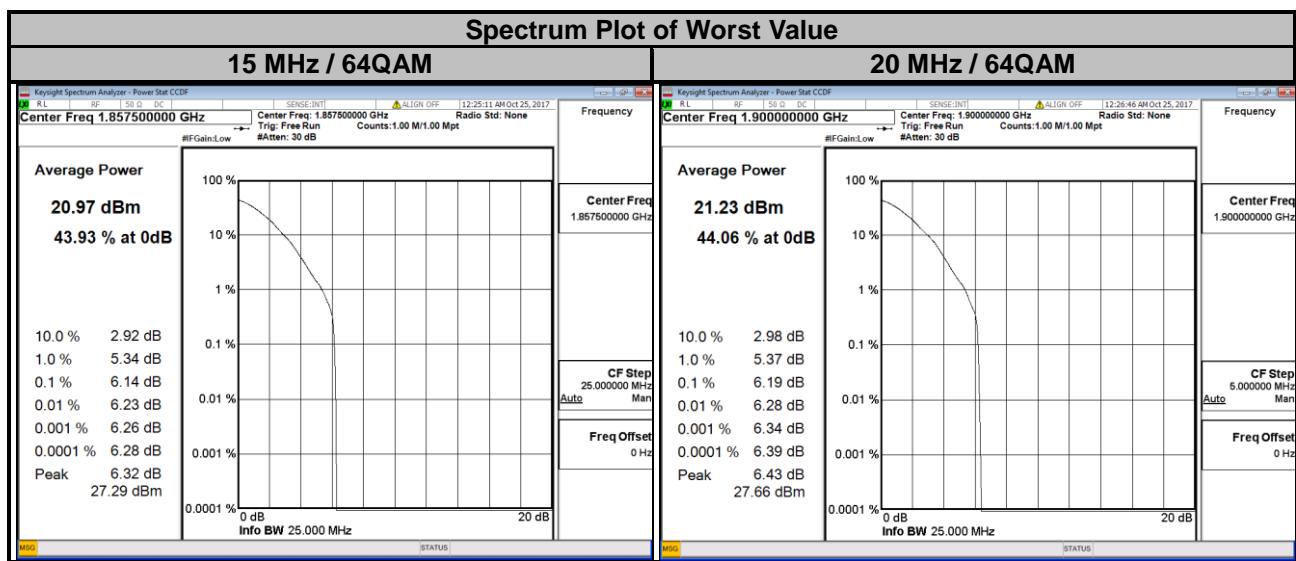
LTE Band 2									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
18607	1850.7	3.74	4.55	6.25	18615	1851.5	3.58	4.46	6.18
18900	1880.0	4.55	4.23	6.24	18900	1880.0	4.33	5.15	5.96
19193	1909.3	4.44	5.25	6.33	19185	1908.5	4.47	5.25	6.30



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	64QAM			QPSK	16QAM	64QAM
18625	1852.5	3.62	4.38	6.17	18650	1855.0	4.43	4.26	6.13
18900	1880.0	4.11	4.90	5.82	18900	1880.0	3.36	4.14	5.86
19175	1907.5	4.03	4.78	6.28	19150	1905.0	3.87	4.68	5.60



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	64QAM			QPSK	16QAM	64QAM
18675	1857.5	3.58	4.35	6.14	18700	1860.0	3.56	4.32	6.15
18900	1880.0	3.42	4.14	5.88	18900	1880.0	3.75	4.43	5.84
19125	1902.5	3.91	4.75	5.99	19100	1900.0	4.21	4.99	6.19

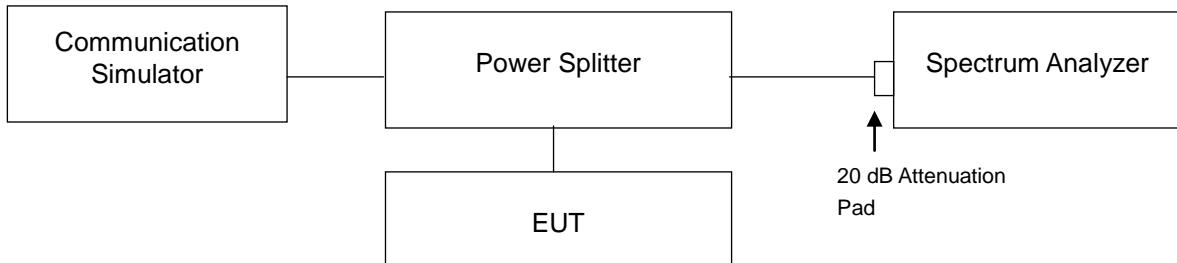


4.6 Conducted Spurious Emissions

4.6.1 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.

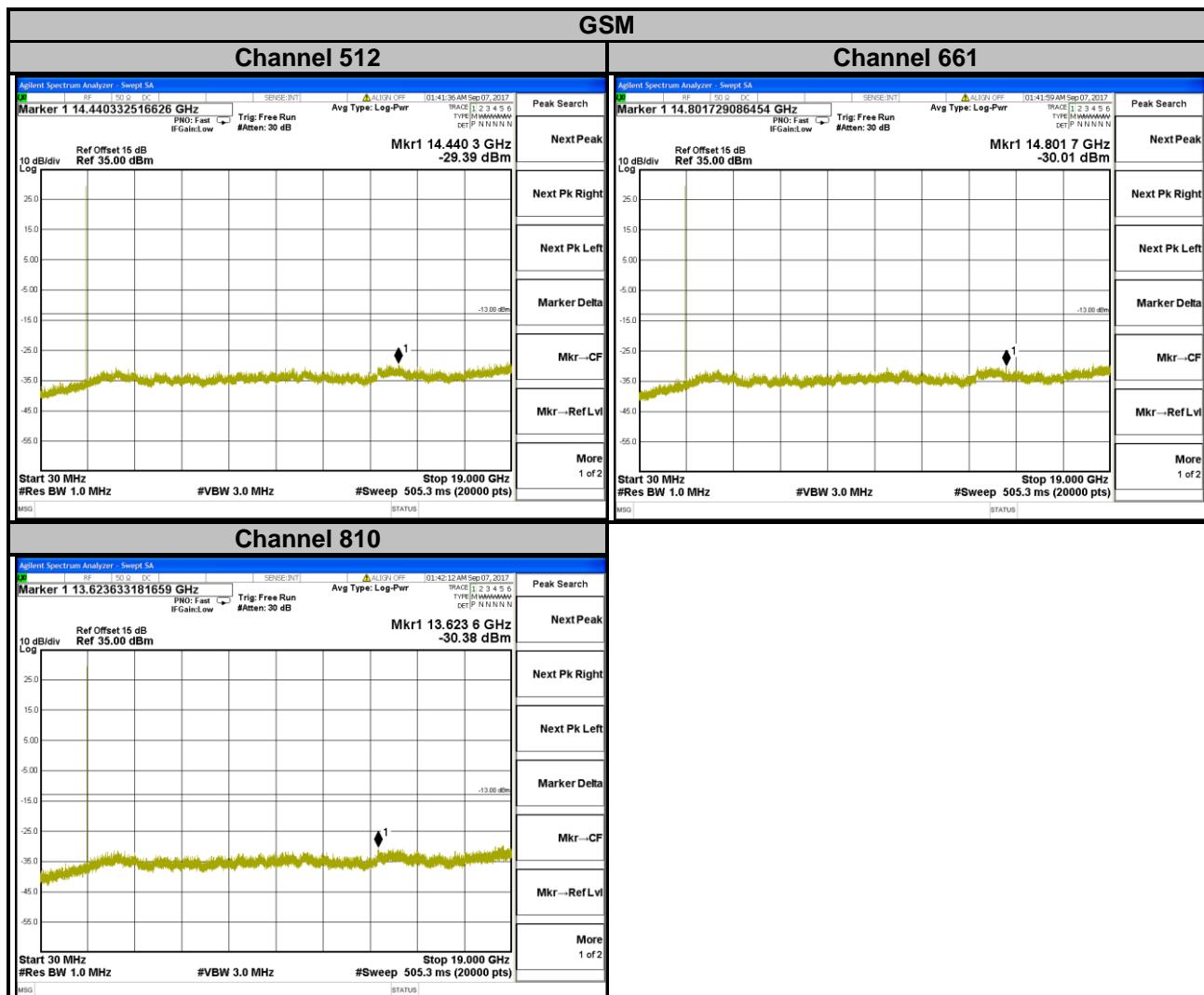
4.6.2 Test Setup

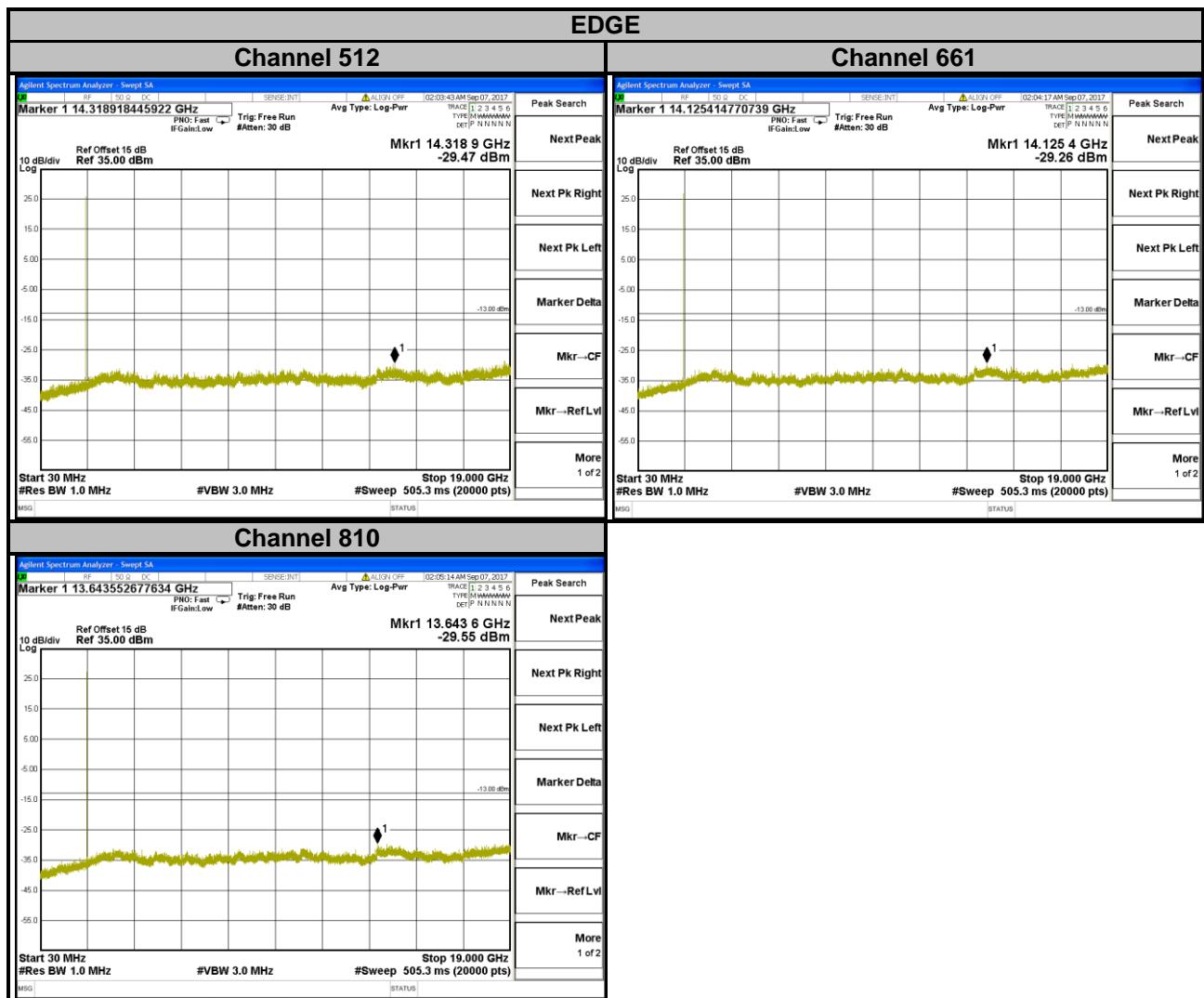


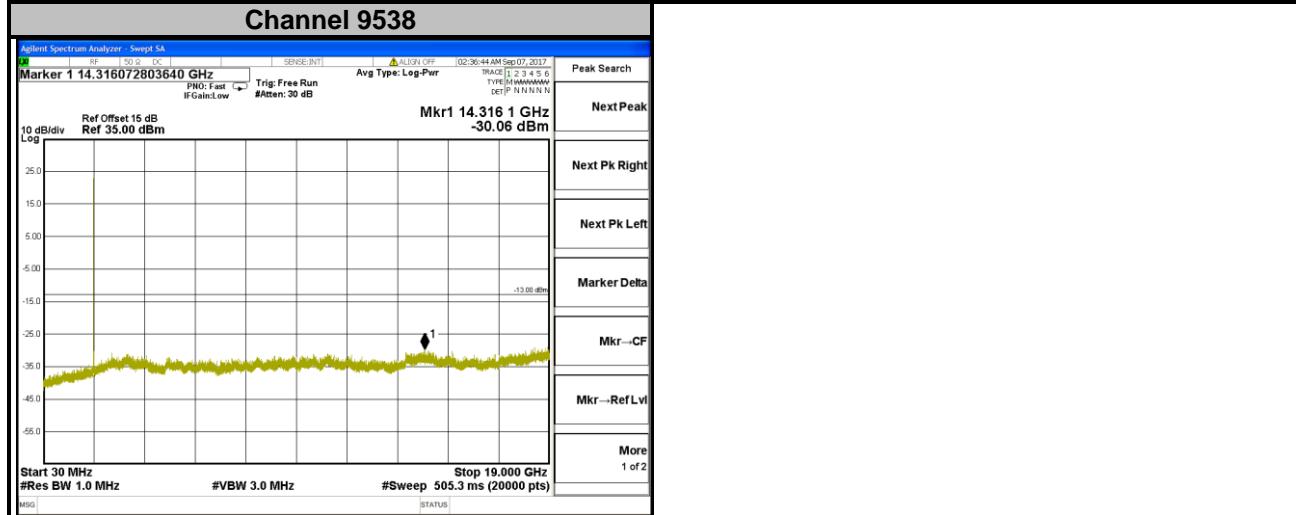
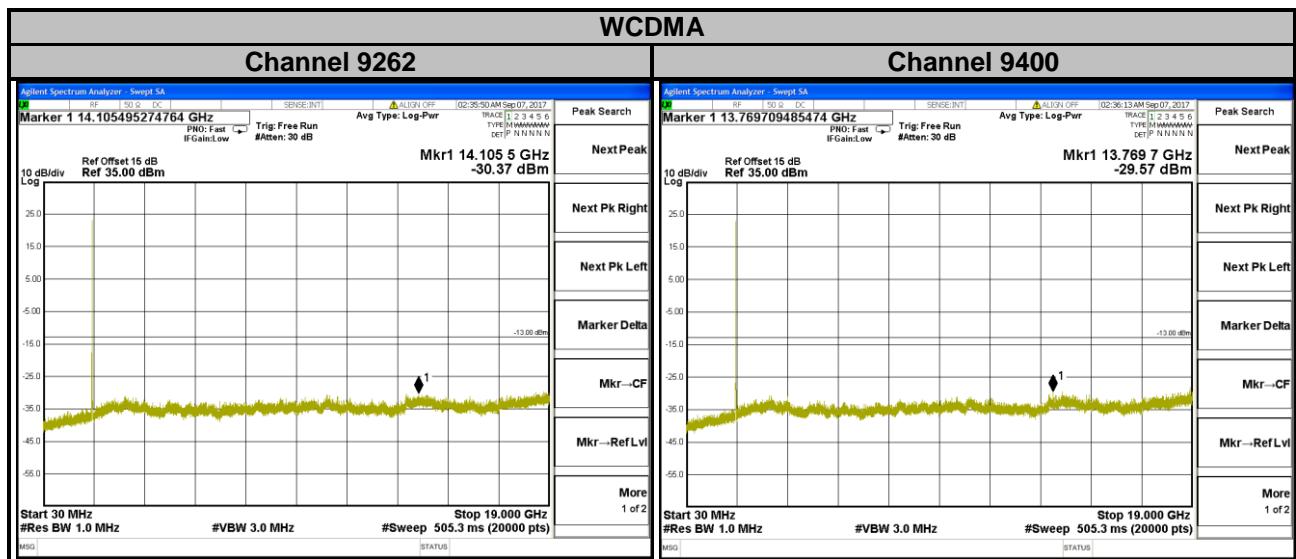
4.6.3 Test Procedure

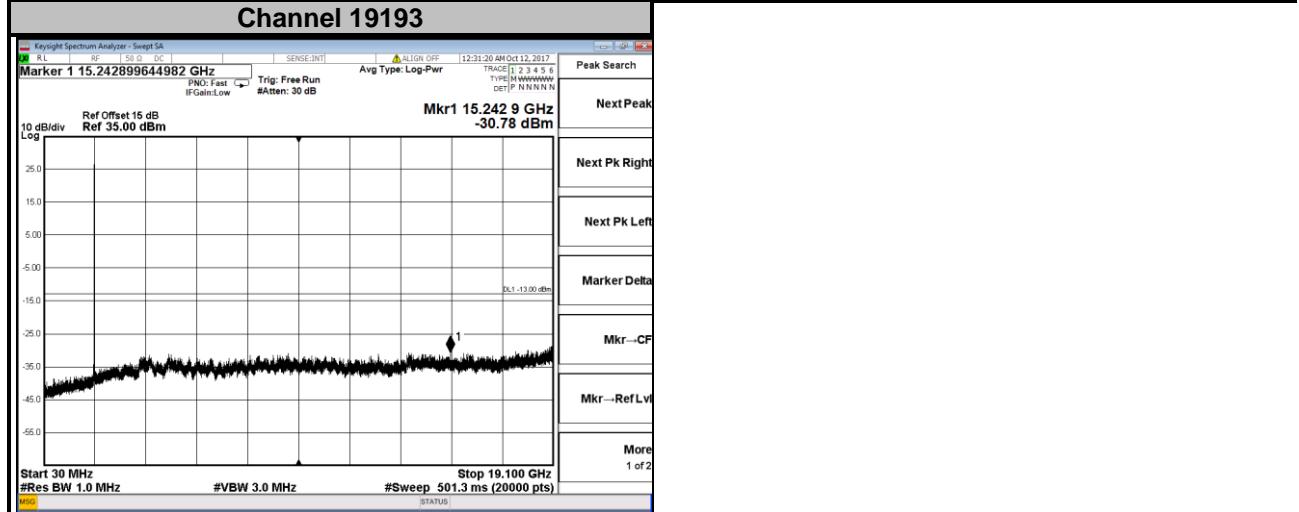
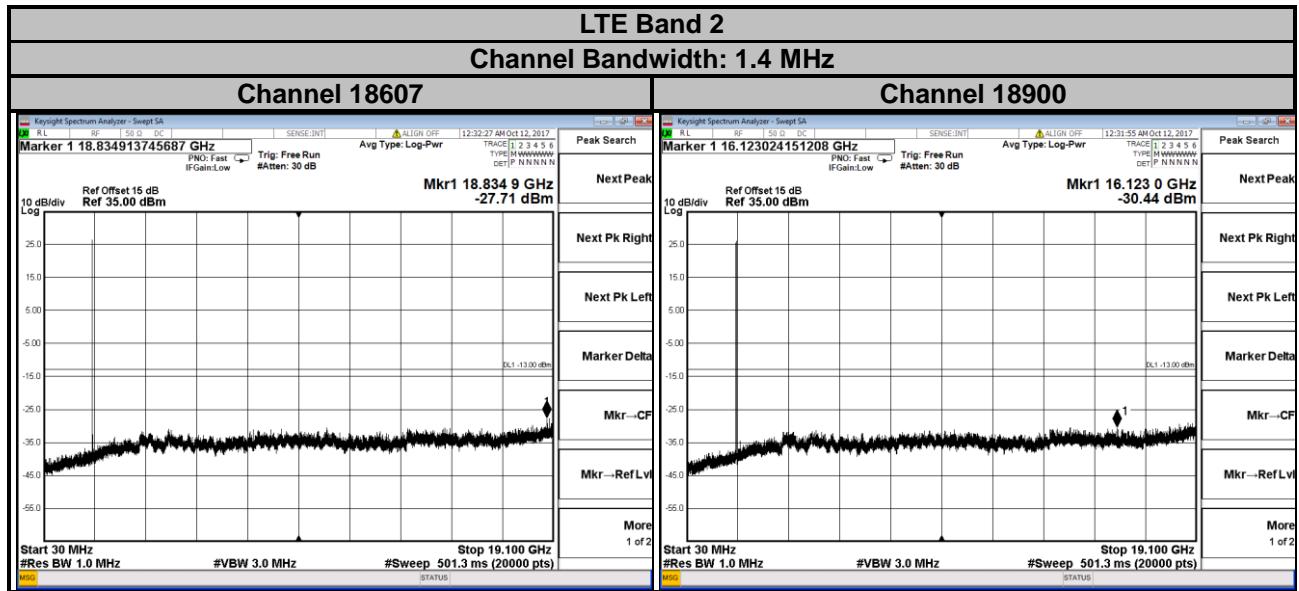
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9 GHz. 20 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

4.6.4 Test Results







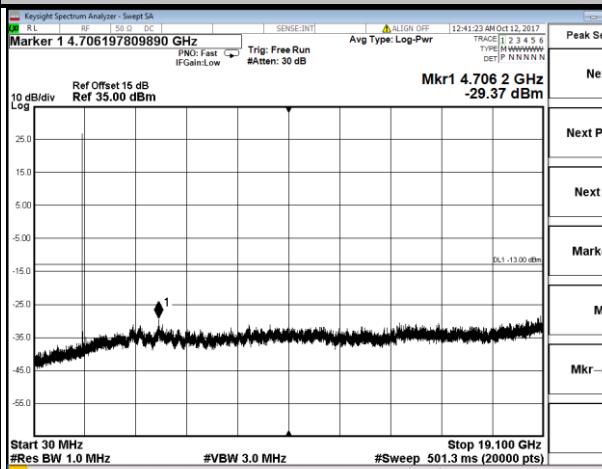




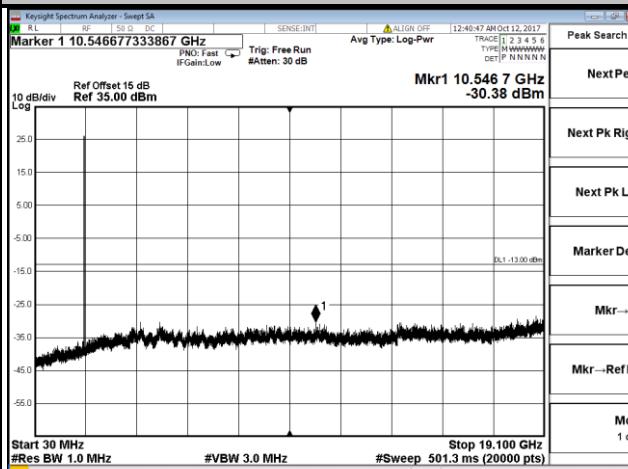
LTE Band 2

Channel Bandwidth: 3 MHz

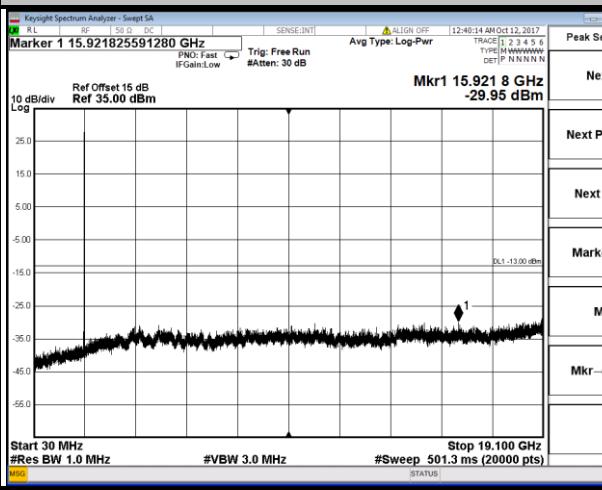
Channel 18615

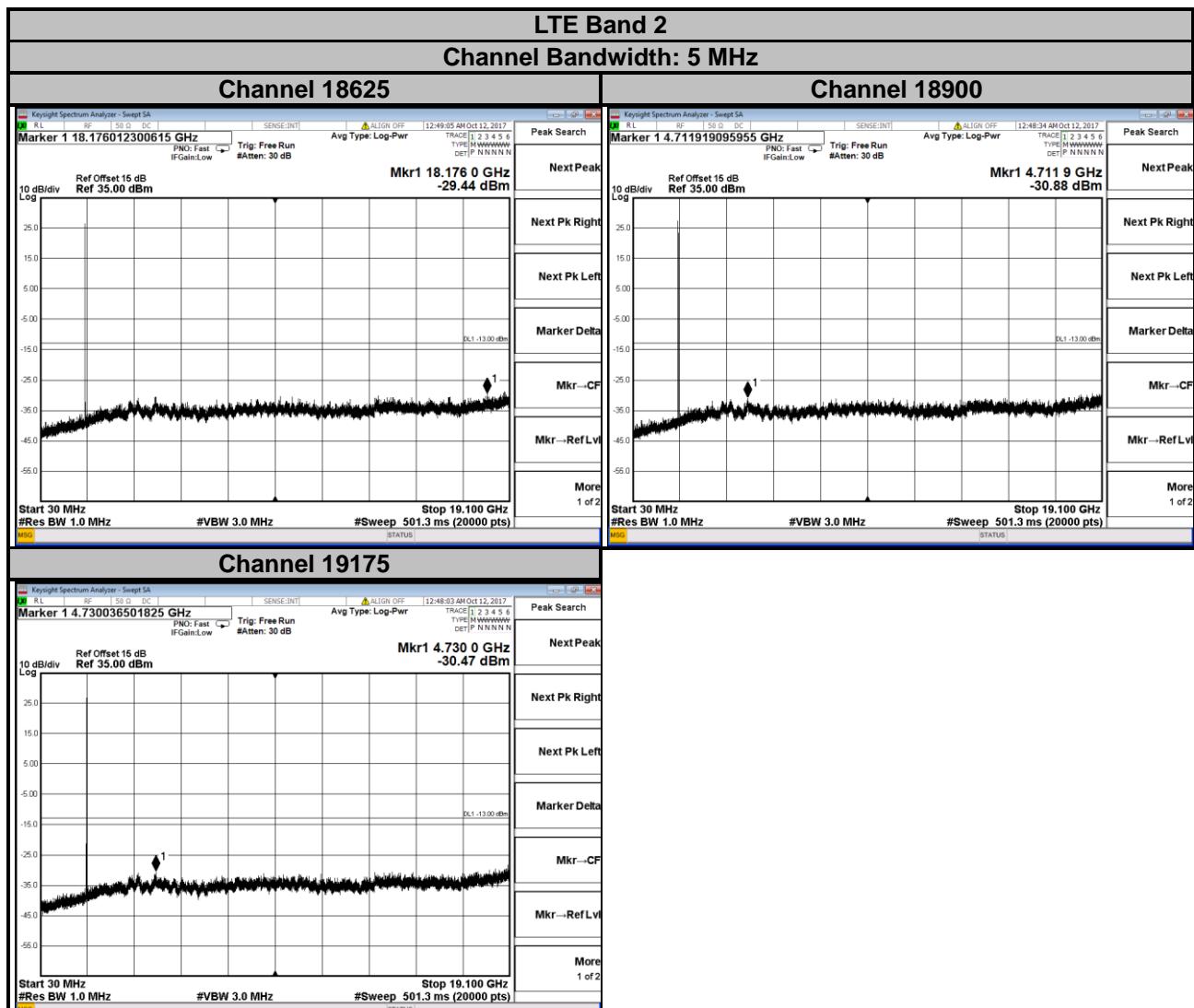


Channel 18900



Channel 19185



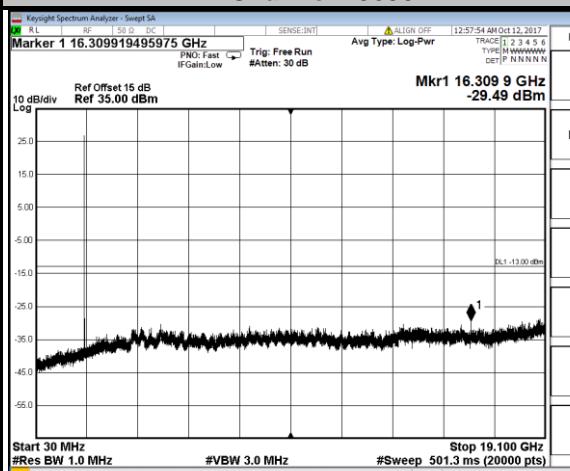




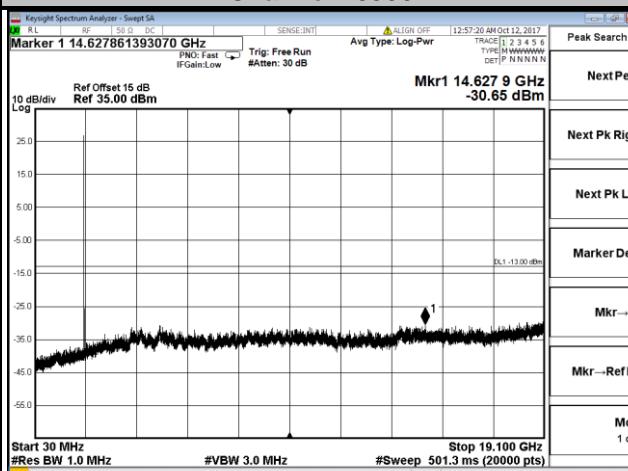
LTE Band 2

Channel Bandwidth: 10 MHz

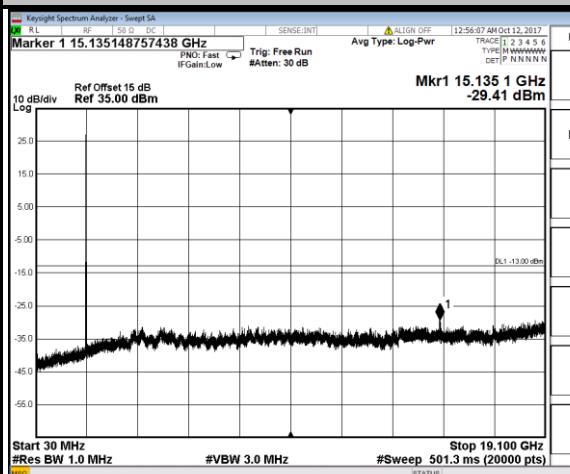
Channel 18650

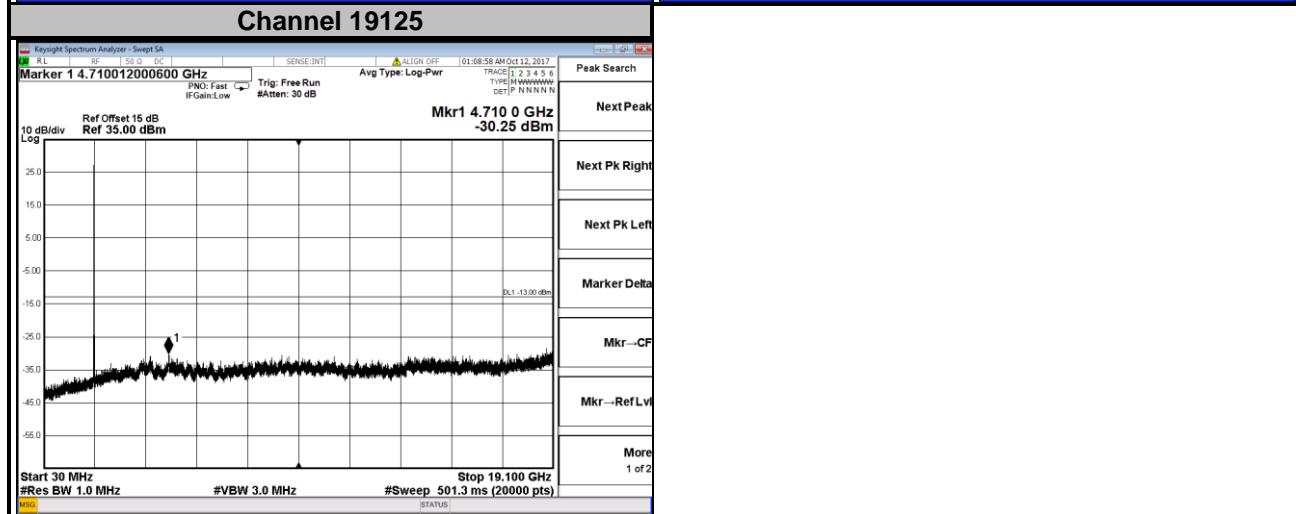
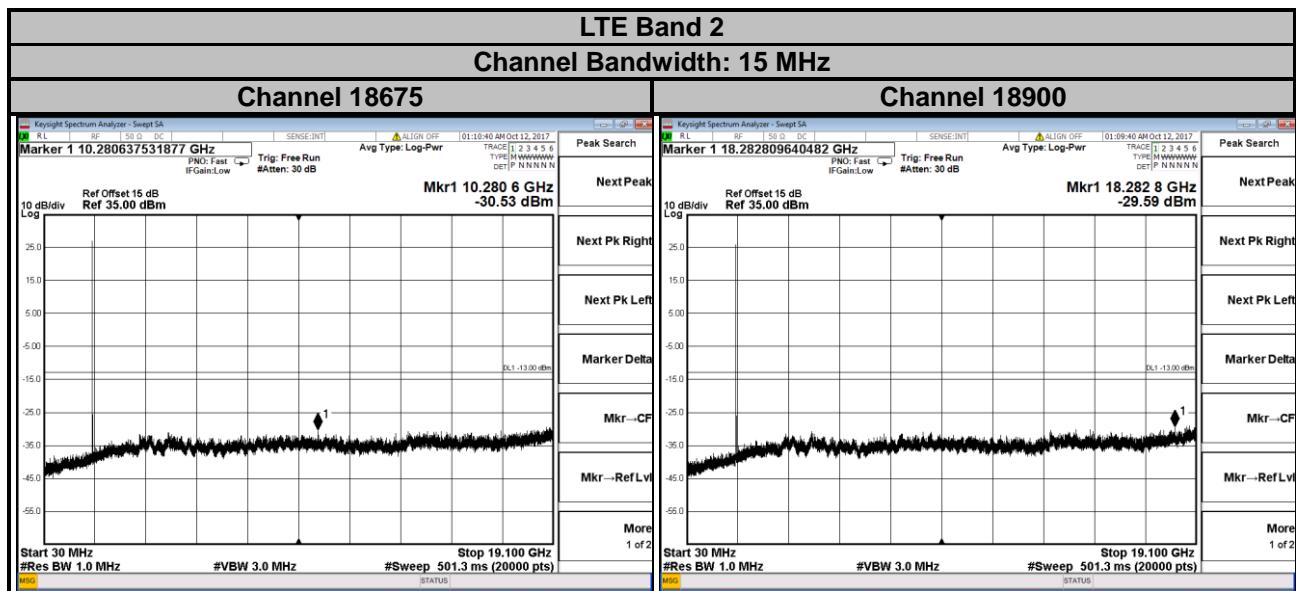


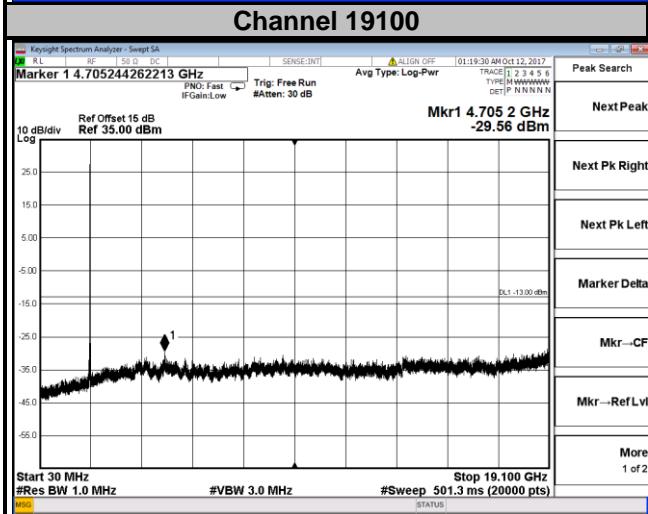
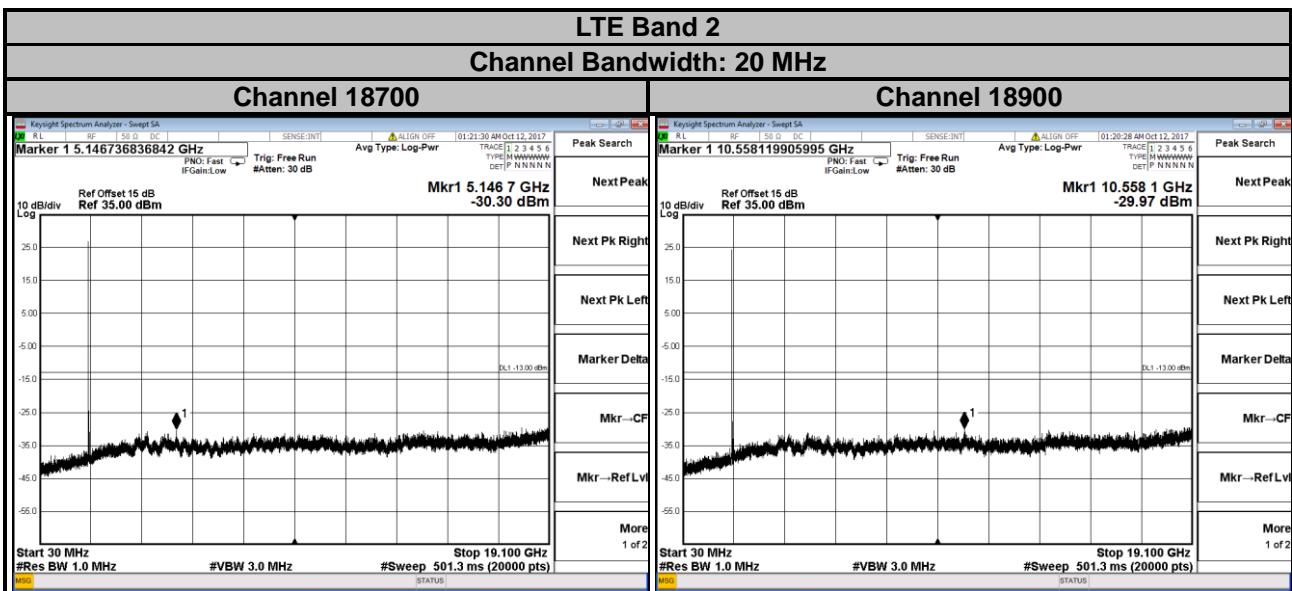
Channel 18900



Channel 19150







4.7 Radiated Emission Measurement

4.7.1 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.

4.7.2 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.P.R power - 2.15 dBi.

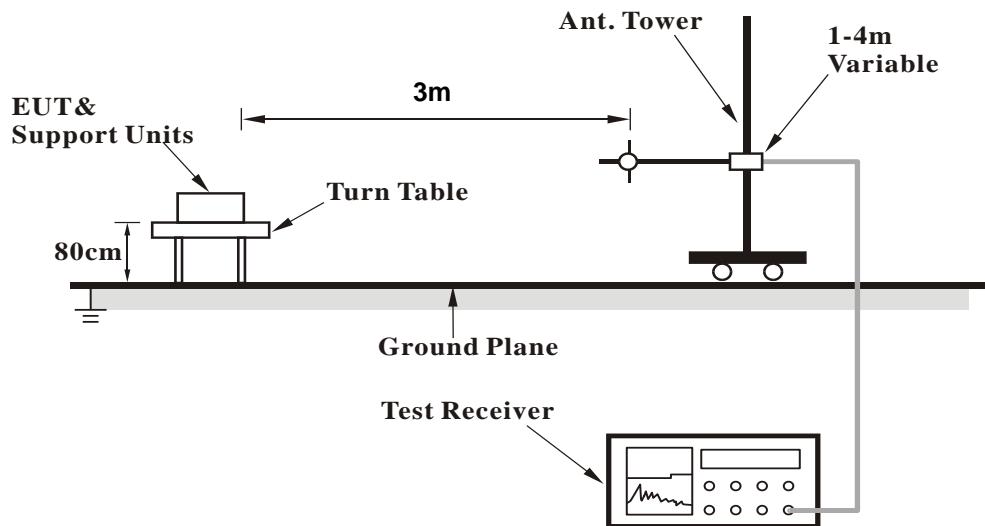
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.7.3 Deviation from Test Standard

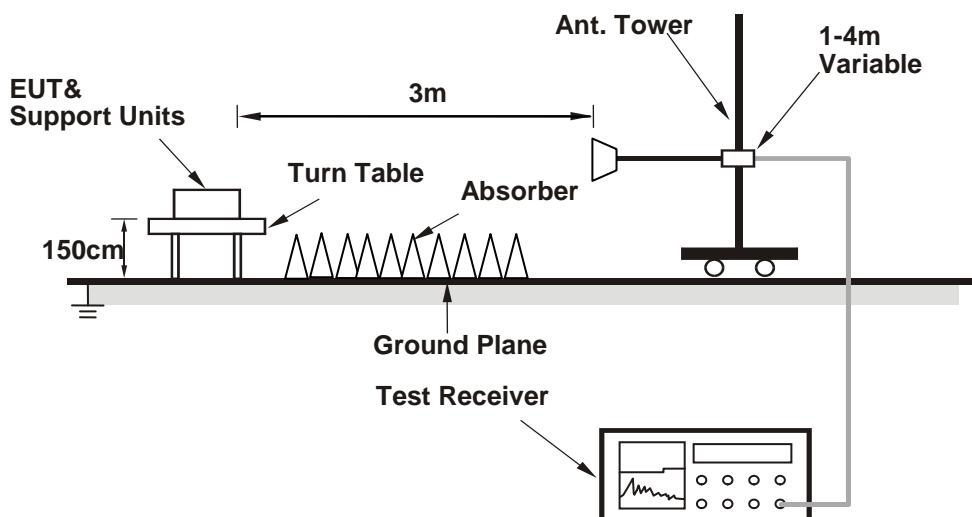
No deviation.

4.7.4 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).

4.7.5 Test Results

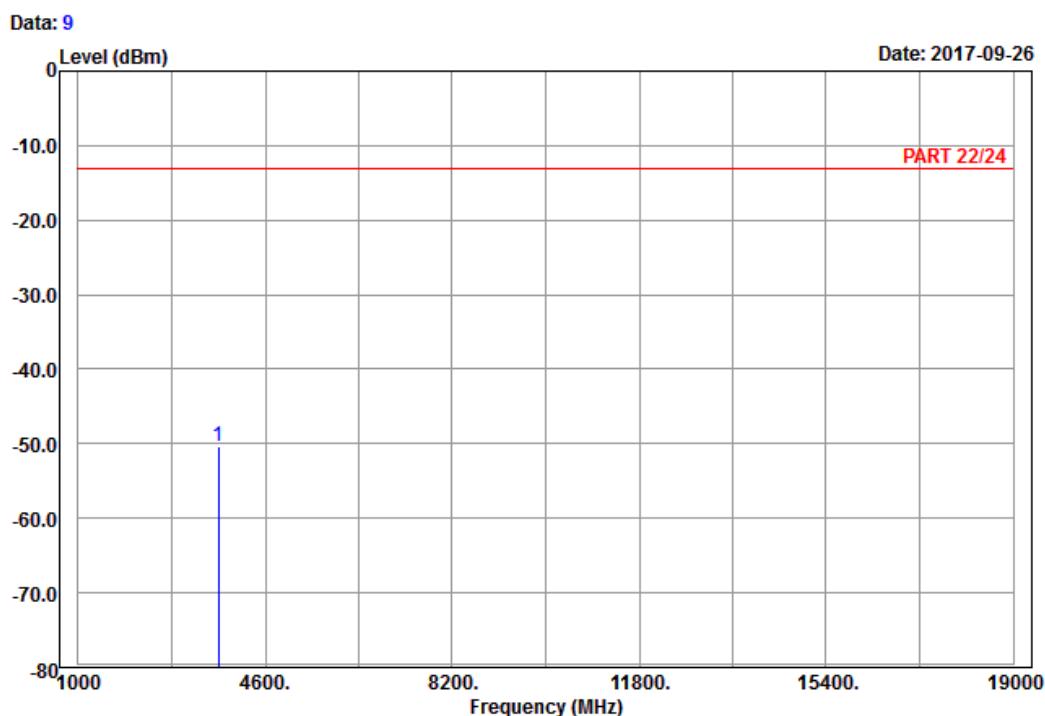
GSM:

Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : PCS 1900_Link_CH512
Tested by: Charles Hsiao

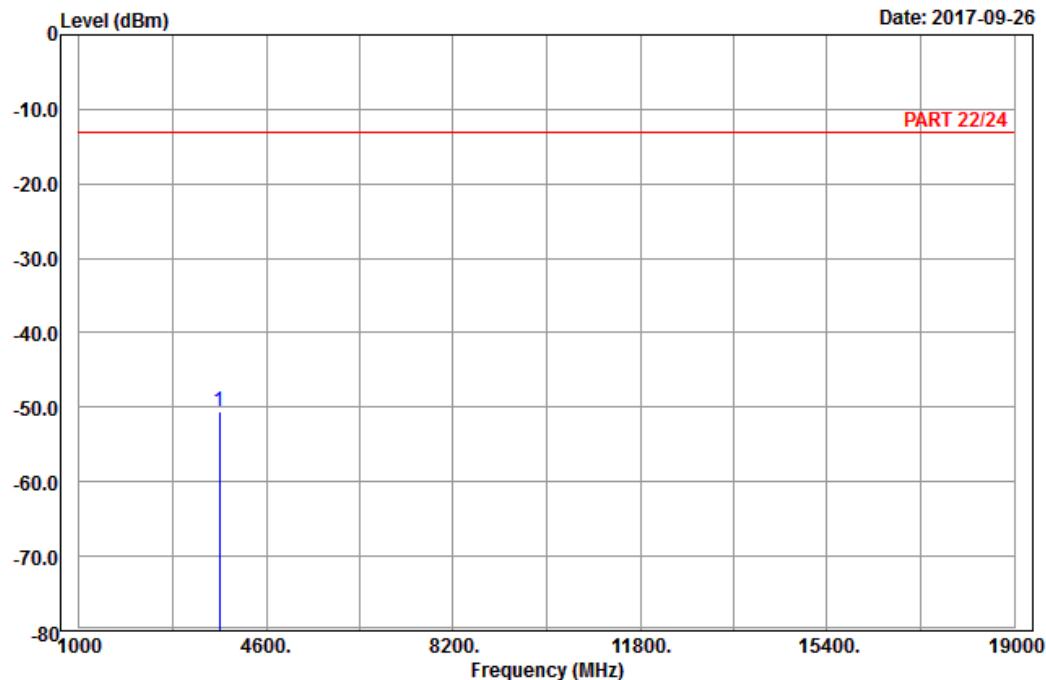
Freq	Level	Read	Limit	Over	Factor	Remark
		MHz	dBm	dBm	Line	Limit
1 pp	3700.40	-50.40	-66.28	-13.00	-37.40	15.88 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : PCS 1900_Link_CH512

Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3700.40	-50.56	-66.44	-13.00	-37.56	15.88 Peak

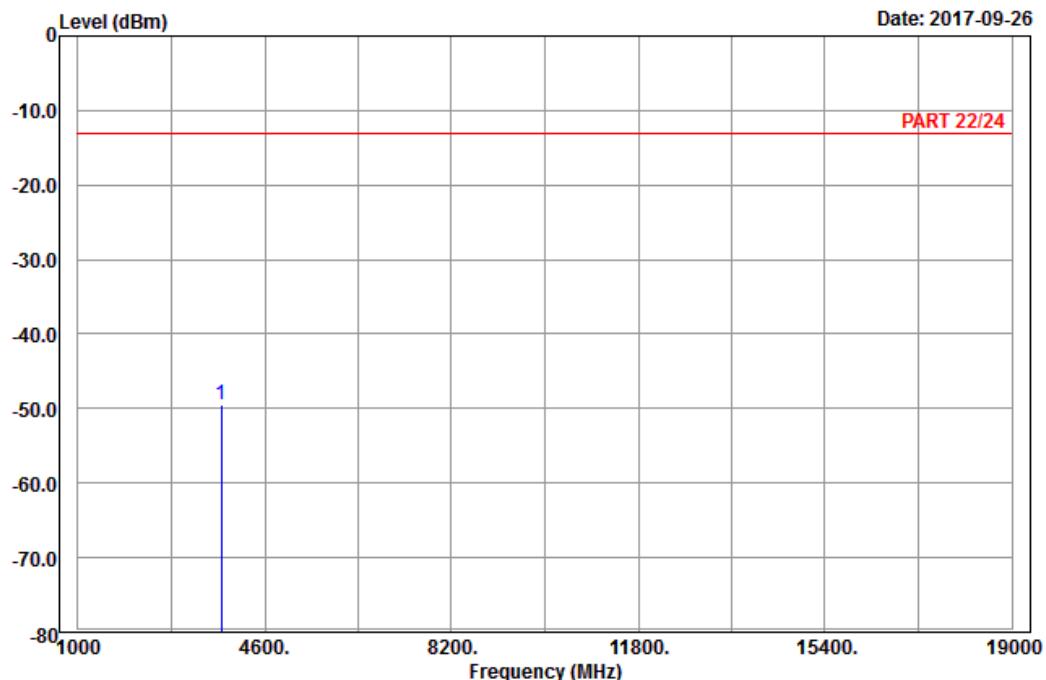
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : PCS 1900_Link_CH661
Tested by: Charles Hsiao

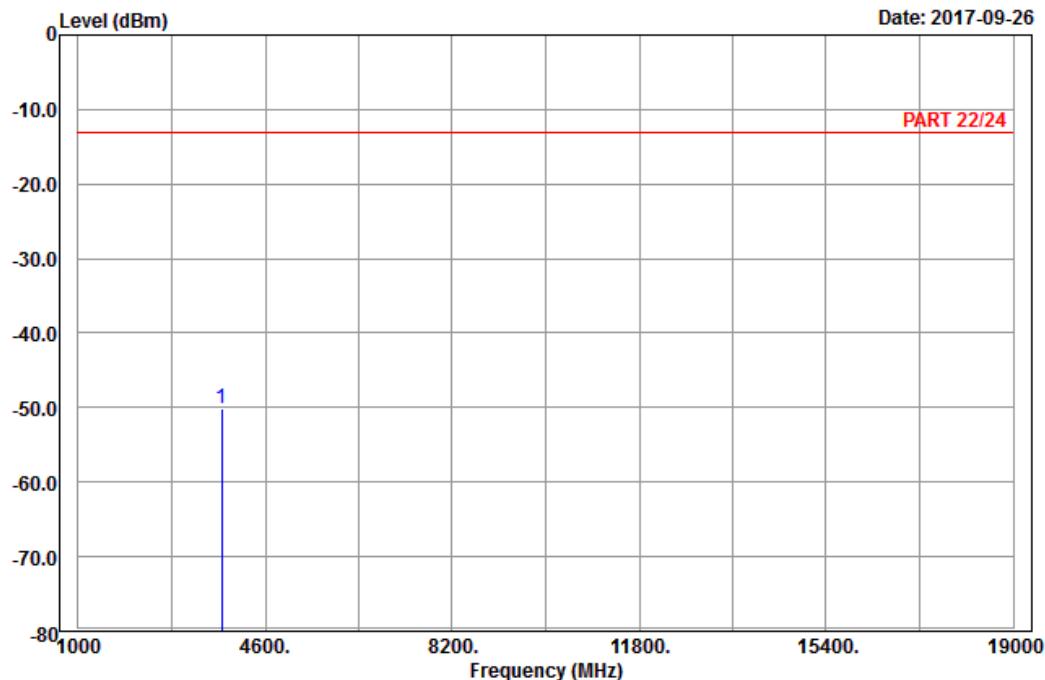
Freq	Read	Limit	Over	Factor	Remark
	Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB
1 pp	3760.00	-49.52	-65.66	-13.00	-36.52 16.14 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : PCS 1900_Link_CH661
Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3760.00	-50.07	-66.21	-13.00	-37.07	16.14 Peak

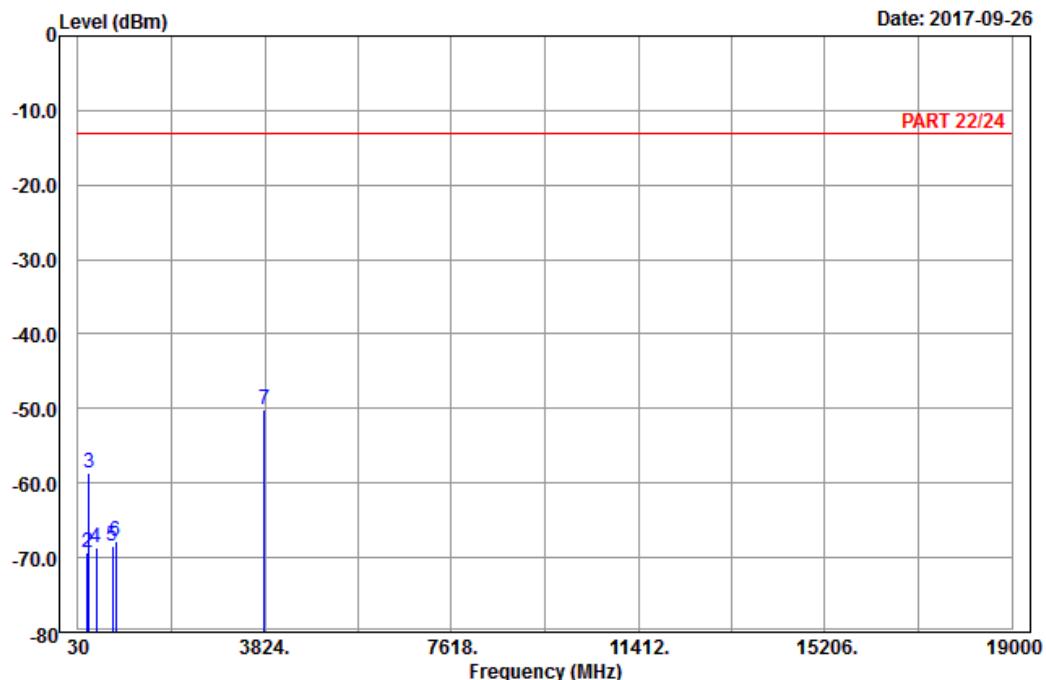
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1
 Condition: PART 22/24 Horizontal
 Remark : PCS 1900_Link_CH810
 Tested by: Charles Hsiao

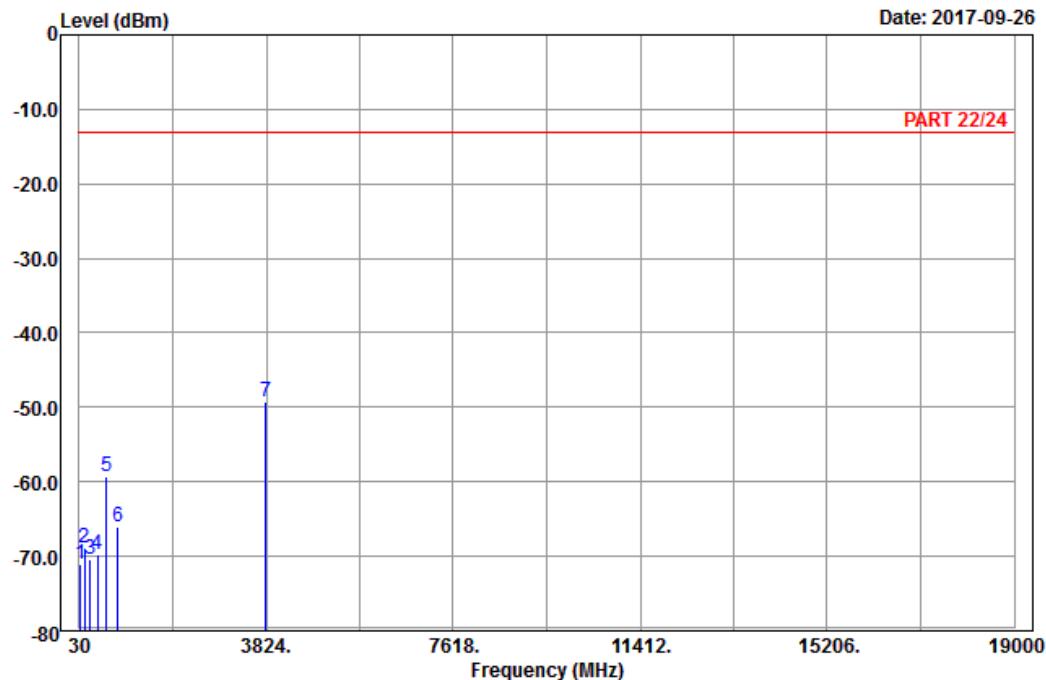
	Read	Limit	Over			
Freq	Level	Level	Line	Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB
1	50.52	-85.54	-71.49	-13.00	-72.54	-14.05 Peak
2	216.03	-69.34	-63.38	-13.00	-56.34	-5.96 Peak
3	258.96	-58.61	-53.02	-13.00	-45.61	-5.59 Peak
4	403.60	-68.72	-65.89	-13.00	-55.72	-2.83 Peak
5	729.80	-68.53	-67.60	-13.00	-55.53	-0.93 Peak
6	795.60	-67.71	-69.40	-13.00	-54.71	1.69 Peak
7 pp	3819.60	-50.23	-66.73	-13.00	-37.23	16.50 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : PCS 1900_Link_CH810

Tested by: Charles Hsiao

	Freq	Read Level	Limit Level	Over Line	Limit Factor	Remark
	MHz	dBm	dBm	dBm	dB	
1	49.17	-70.96	-57.22	-13.00	-57.96	-13.74 Peak
2	136.65	-68.88	-61.20	-13.00	-55.88	-7.68 Peak
3	246.27	-70.34	-64.78	-13.00	-57.34	-5.56 Peak
4	396.60	-69.81	-66.91	-13.00	-56.81	-2.90 Peak
5	580.70	-59.39	-59.01	-13.00	-46.39	-0.38 Peak
6	810.30	-66.07	-67.97	-13.00	-53.07	1.90 Peak
7 pp	3819.60	-49.20	-65.70	-13.00	-36.20	16.50 Peak

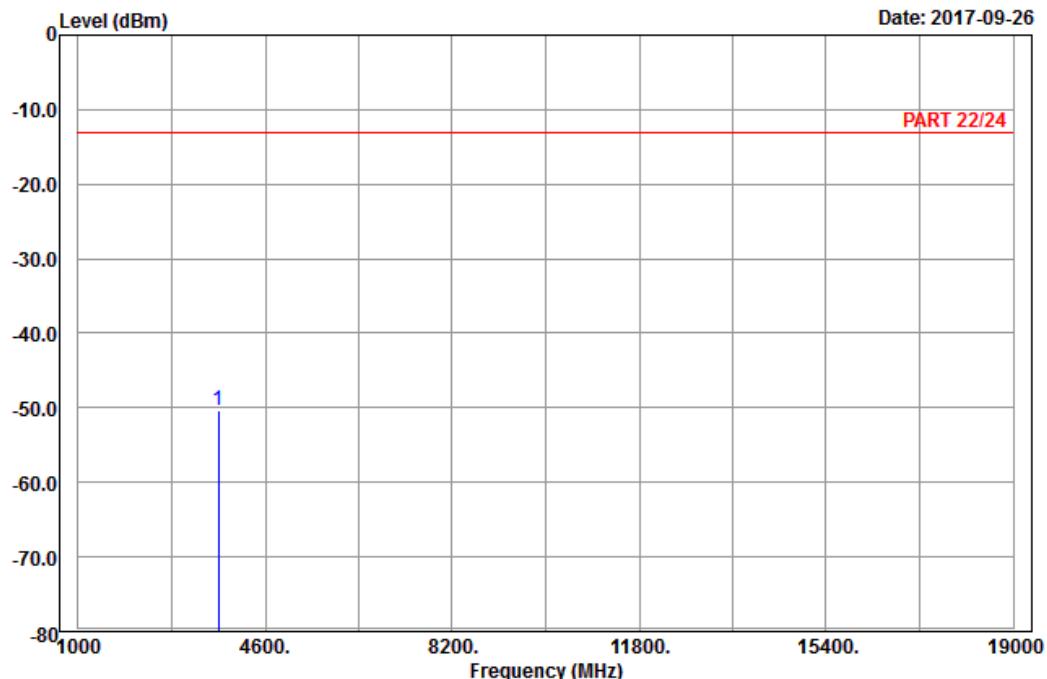
EDGE:
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : EDGE 1900_Link_CH512
Tested by: Charles Hsiao

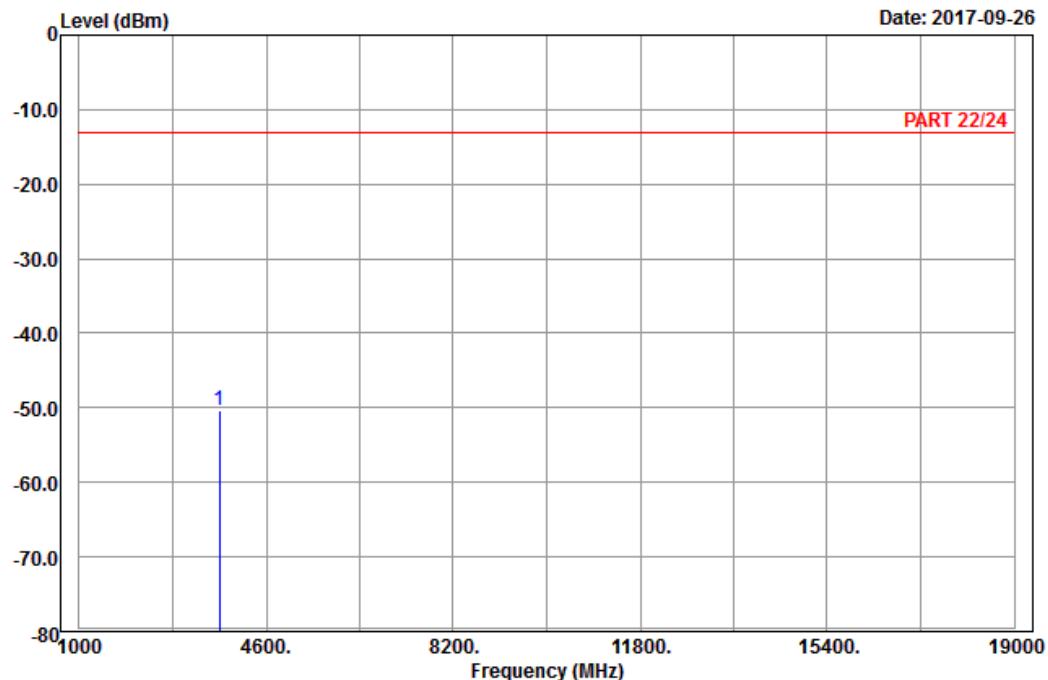
Freq	Read		Limit	Over	Factor	Remark
	Level	Line	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3700.40	-50.29	-66.17	-13.00	-37.29	15.88 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : EDGE 1900_Link_CH512

Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3700.40	-50.27	-66.15	-13.00	-37.27	15.88 Peak

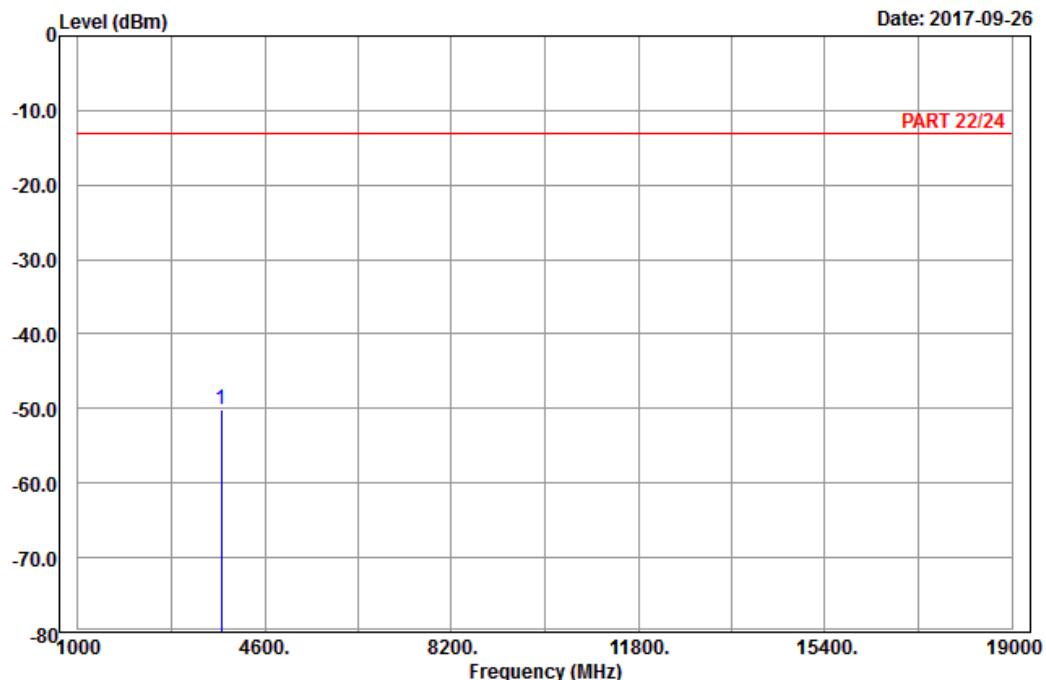
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : EDGE 1900_Link_CH661
Tested by: Charles Hsiao

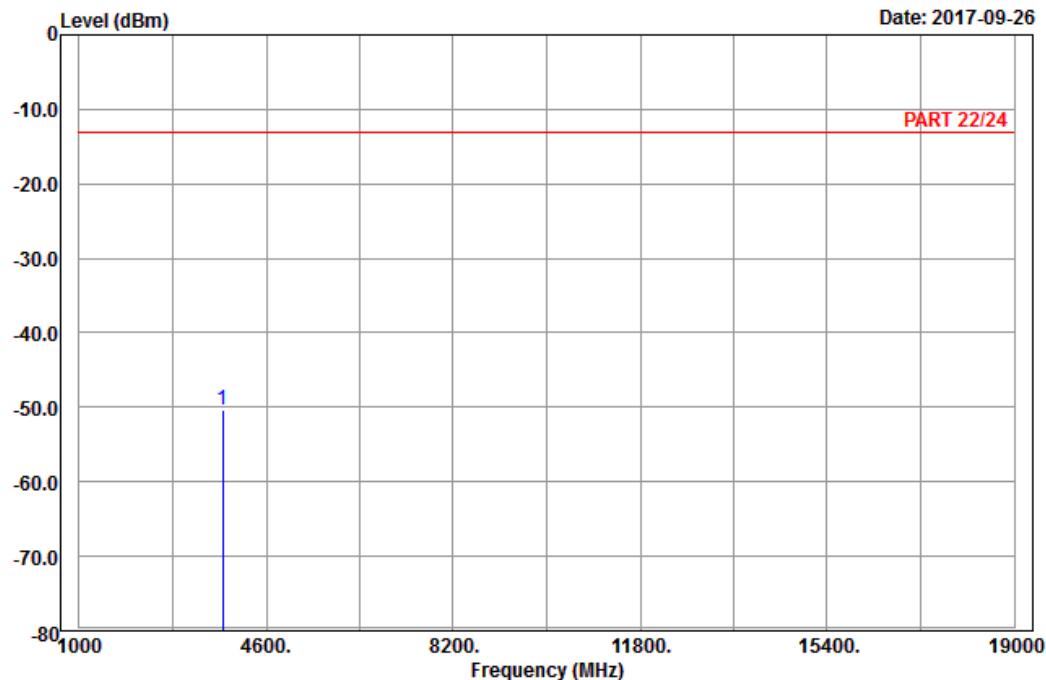
Freq	Read	Limit	Over	Factor	Remark
	Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB
1 pp	3760.00	-50.09	-66.23	-13.00	-37.09
					16.14 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : EDGE 1900_Link_CH661

Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3760.00	-50.46	-66.60	-13.00	-37.46	16.14 Peak

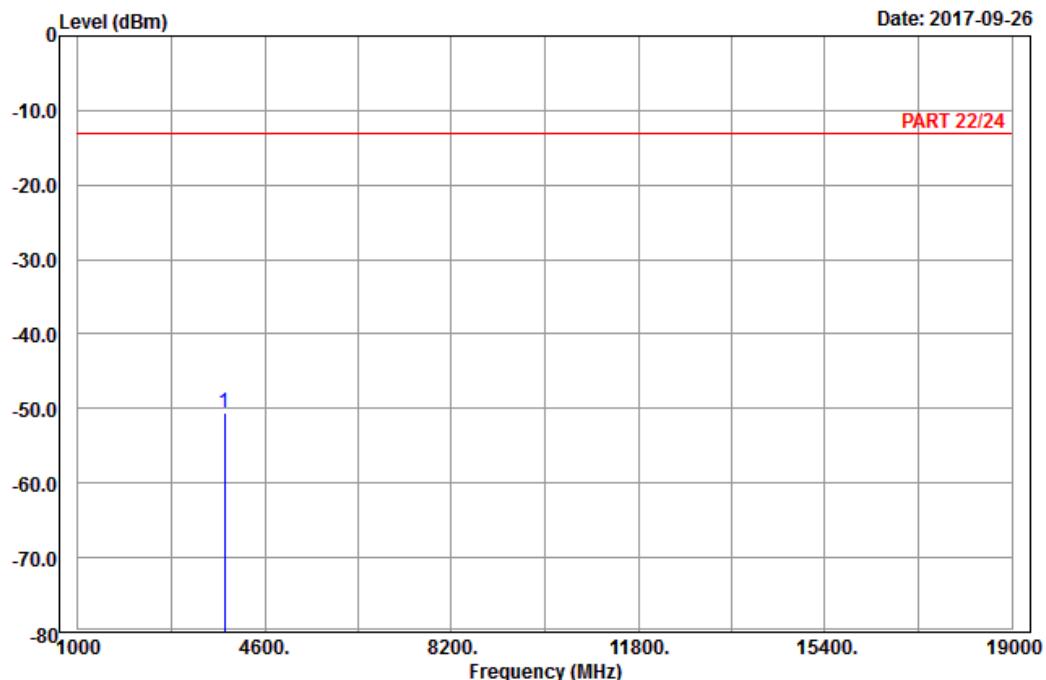
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1
Condition: PART 22/24 Horizontal
Remark : EDGE 1900_Link_CH810
Tested by: Charles Hsiao

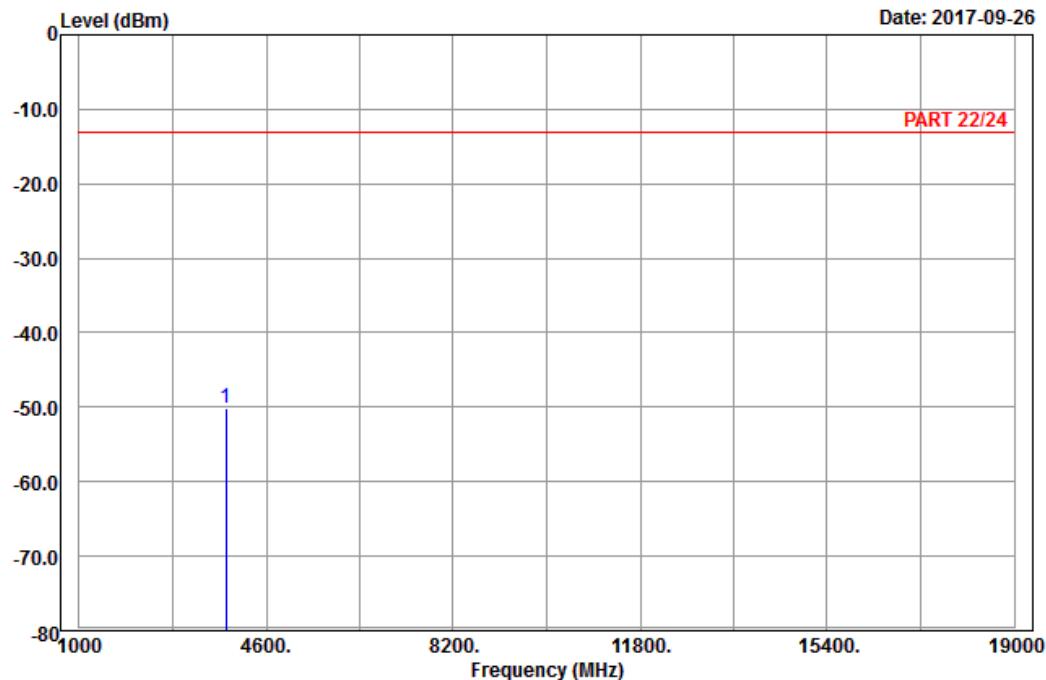
Freq	Read	Limit	Over	Factor	Remark	
	Level	Line	Limit			
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3819.60	-50.57	-67.07	-13.00	-37.57	16.50 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 22/24 Vertical
Remark : EDGE 1900_Link_CH810
Tested by: Charles Hsiao

Freq	Read		Limit		Over	Factor	Remark
	Level	Level	Line	Limit			
MHz	dBm	dBm	dBm	dBm	dB	dB	
1 pp	3819.60	-50.05	-66.55	-13.00	-37.05	16.50	Peak

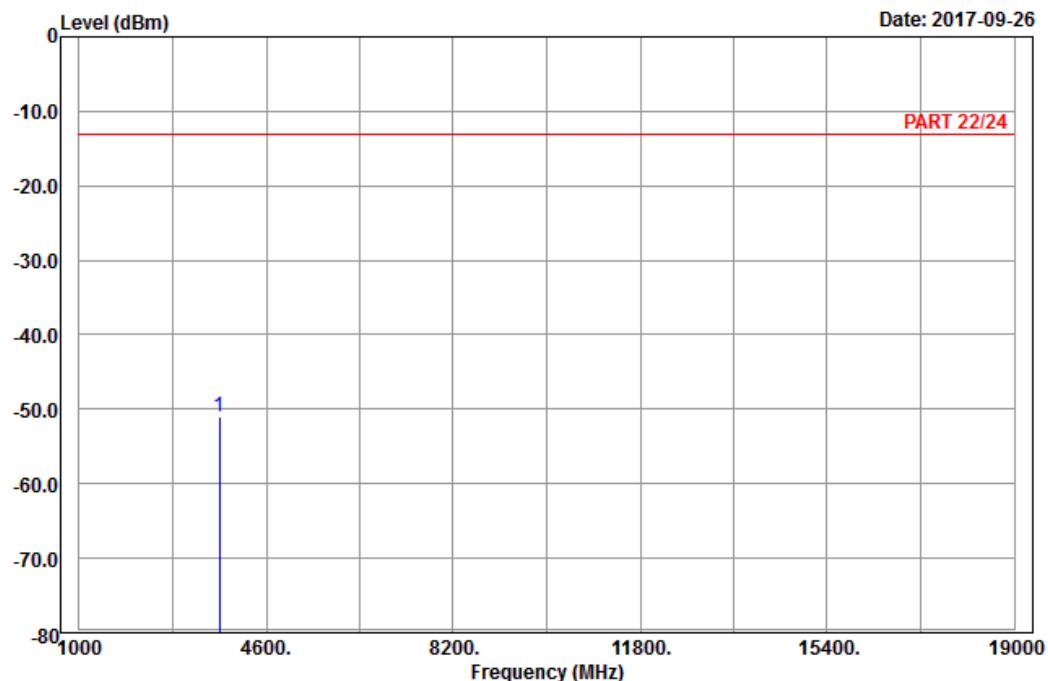
WCDMA:
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



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

Freq	Read Level	Limit Level	Over Line	Limit Factor	Remark
MHz	dBm	dBm	dBm	dB	dB

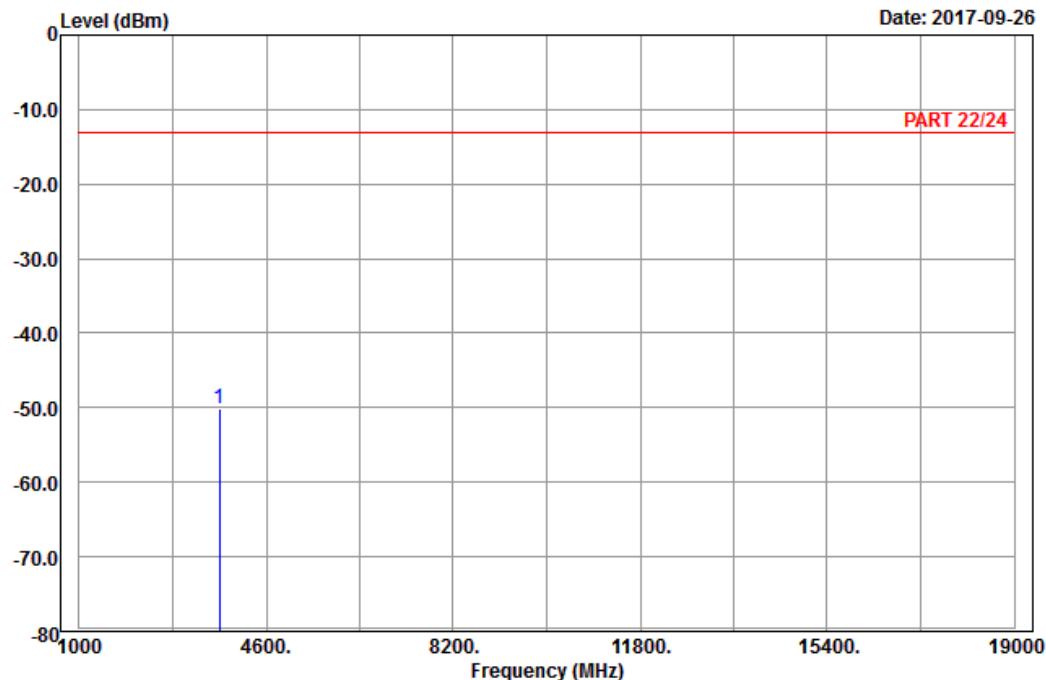
1 pp 3704.80 -51.07 -66.95 -13.00 -38.07 15.88 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



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

Freq	Read		Limit	Over	Factor	Remark
	Level	Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3704.80	-50.22	-66.10	-13.00	-37.22	15.88 Peak

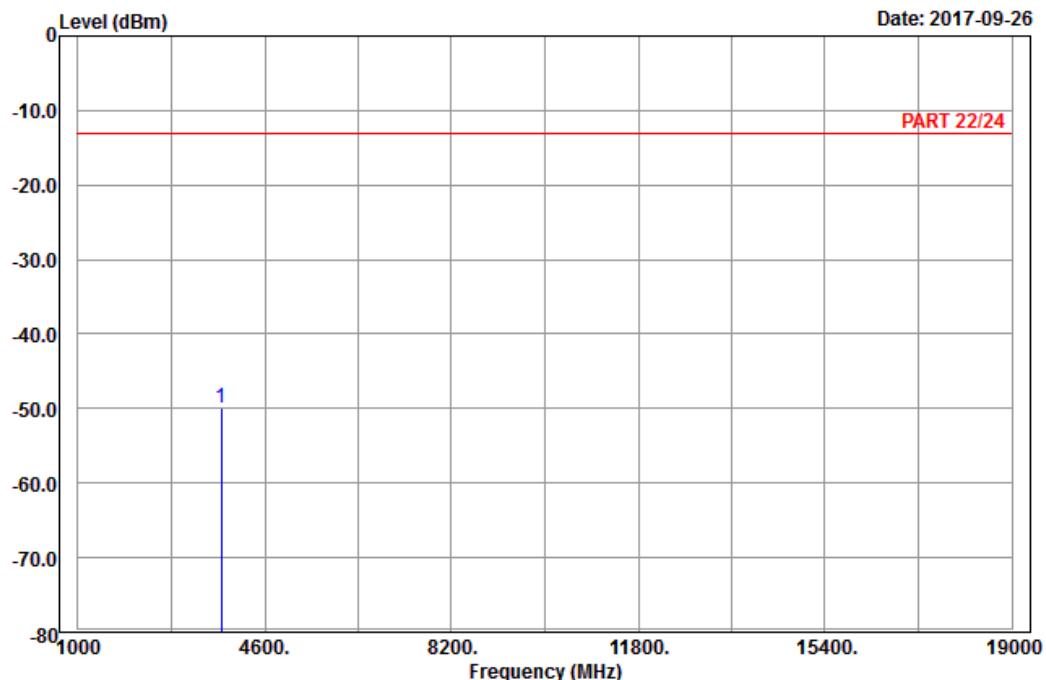
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



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

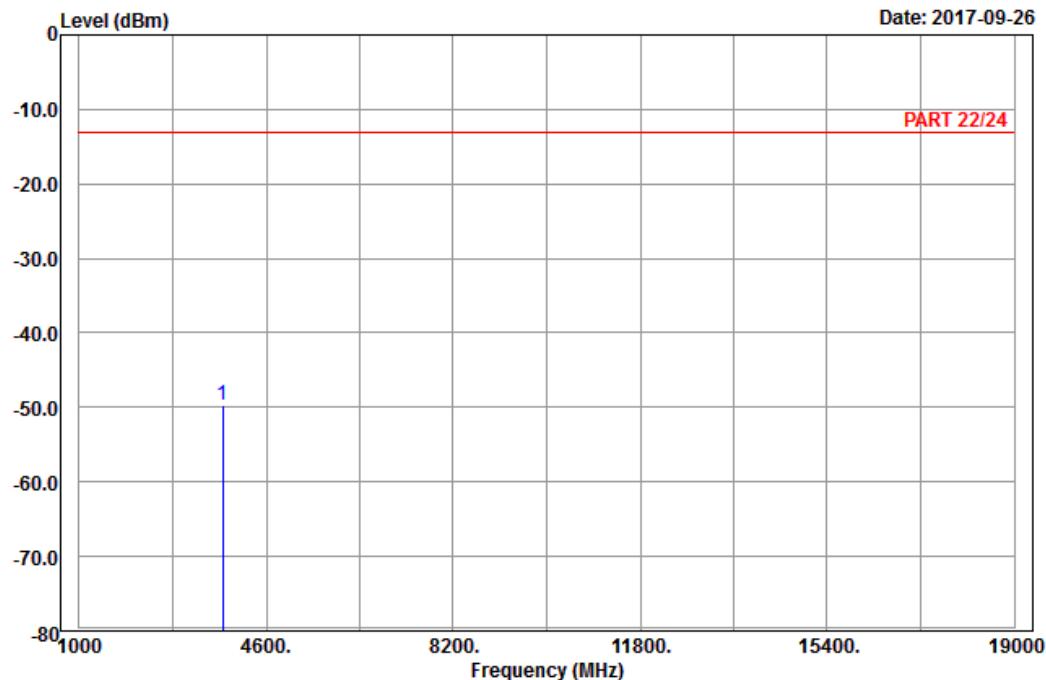
Freq	Read	Limit	Over	Factor	Remark
	Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB
1 pp	3760.00	-49.93	-66.07	-13.00	-36.93 16.14 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



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

Freq	Level	Read	Limit	Over	Factor	Remark
		MHz	dBm	dBm	Line	Limit
1 pp	3760.00	-49.76	-65.90	-13.00	-36.76	16.14 Peak

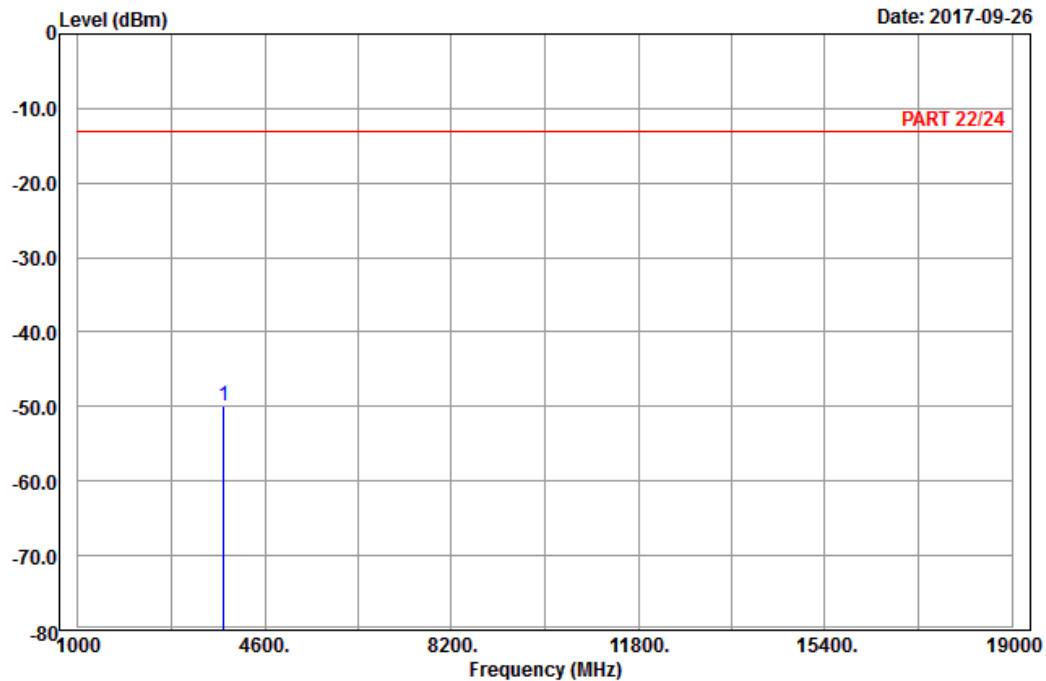
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



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

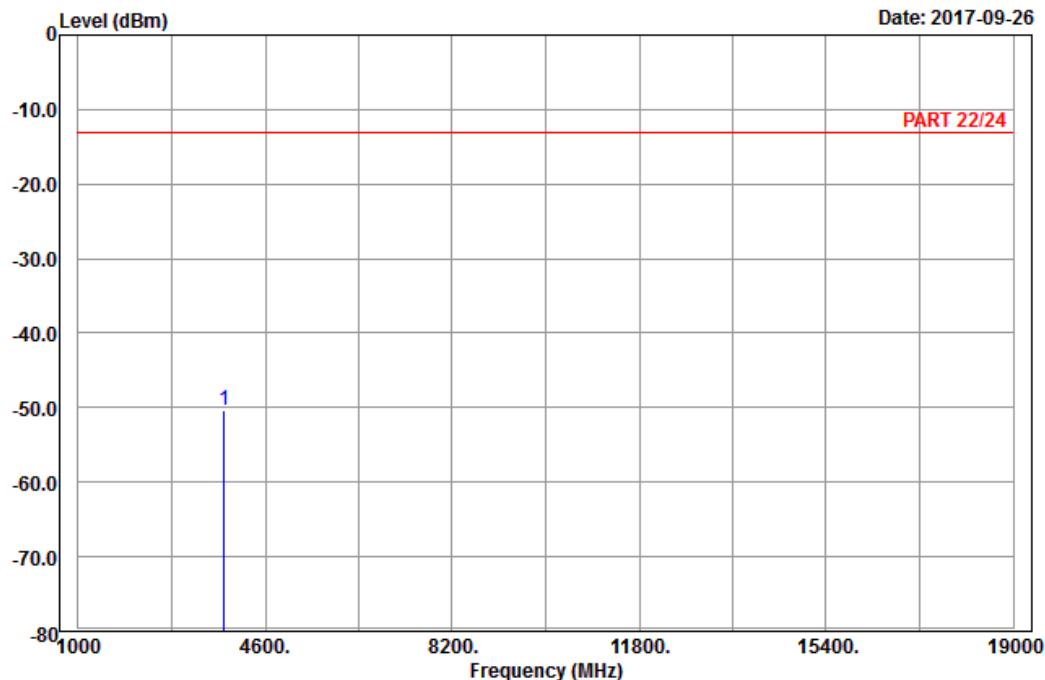
Freq	Read	Limit	Over	Factor	Remark	
	Level	Line	Limit			
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3815.20	-49.81	-66.22	-13.00	-36.81	16.41 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : Band II_Link_CH9538

Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3815.20	-50.41	-66.82	-13.00	-37.41	16.41 Peak

LTE Band 2

Channel Bandwidth: 20 MHz / QPSK

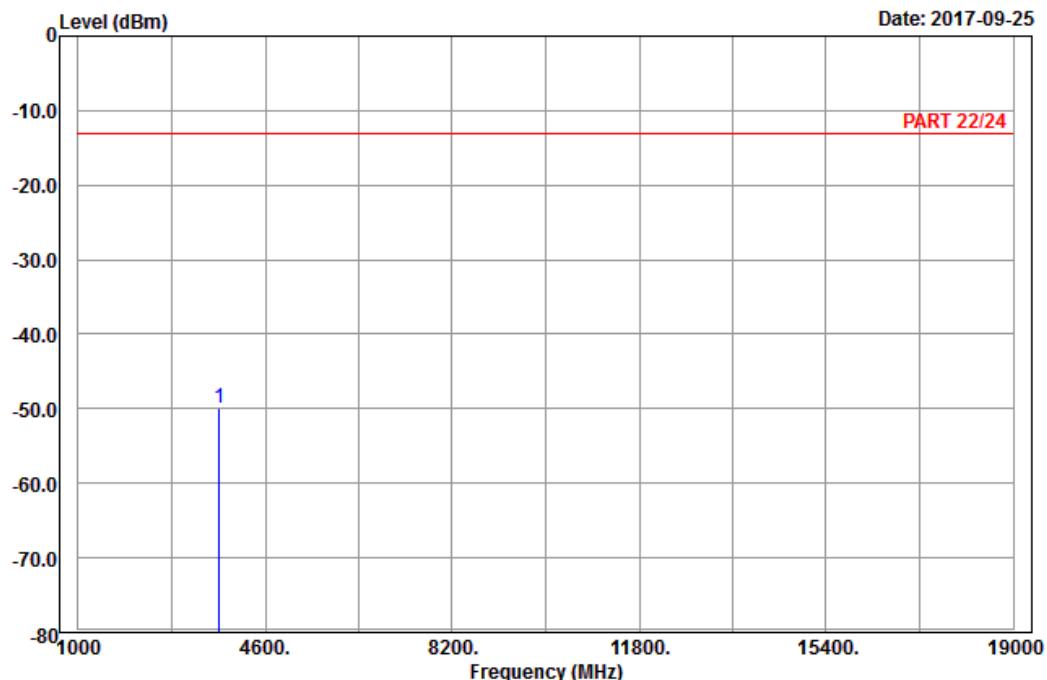
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 22/24 Horizontal

Remark : LTE_Band 2_Link_CH18700

Tested by: Harry Hsueh

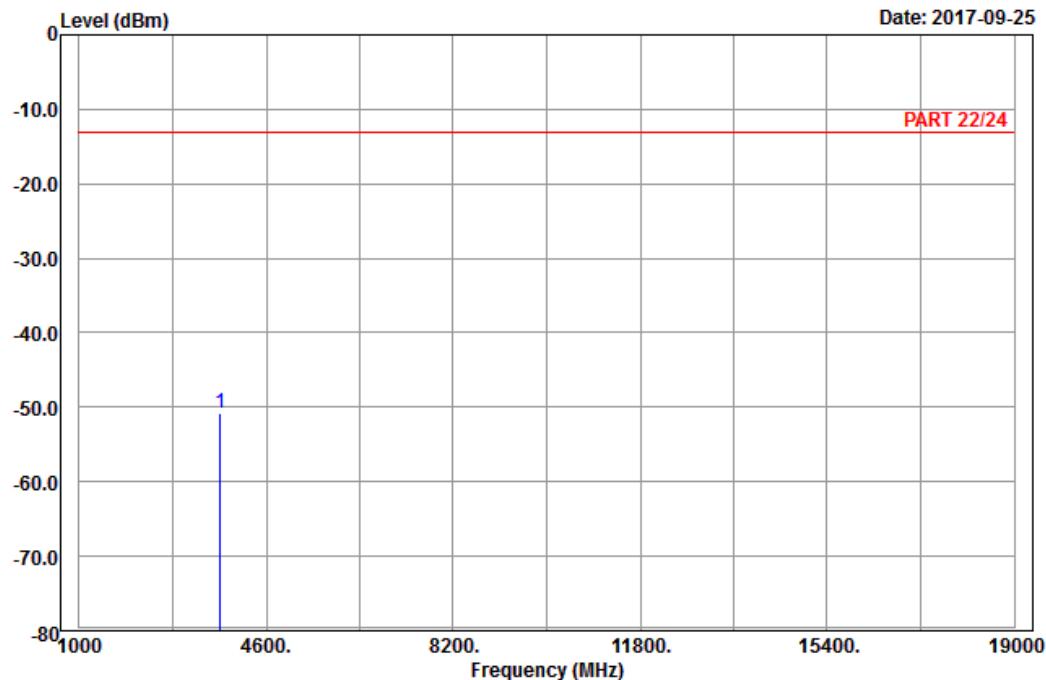
Freq	Read Level	Limit Level	Over Line	Over Limit	Factor	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp	3720.00	-50.01	-65.98	-13.00	-37.01	15.97 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : LTE_Band 2_Link_CH18700

Tested by: Harry Hsueh

Freq	Level	Read	Limit	Over	Remark
		MHz	dBm	dBm	
1 pp	3720.00	-50.70	-66.67	-13.00	-37.70 15.97 Peak

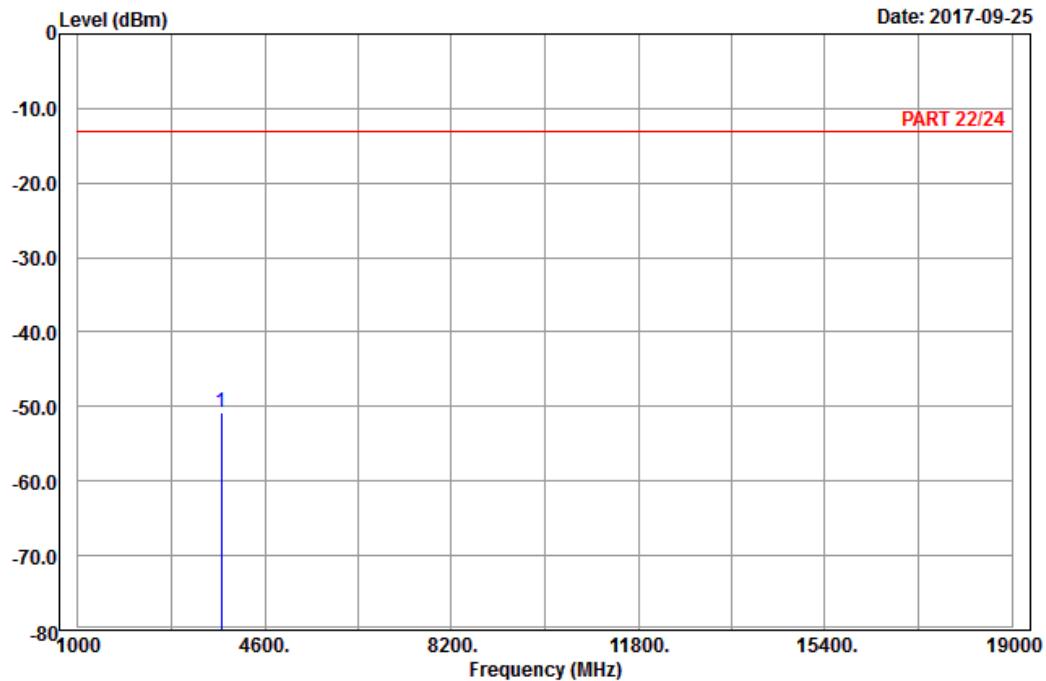
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 22/24 Horizontal

Remark : LTE_Band_2_Link_CH18900

Tested by: Harry Hsueh

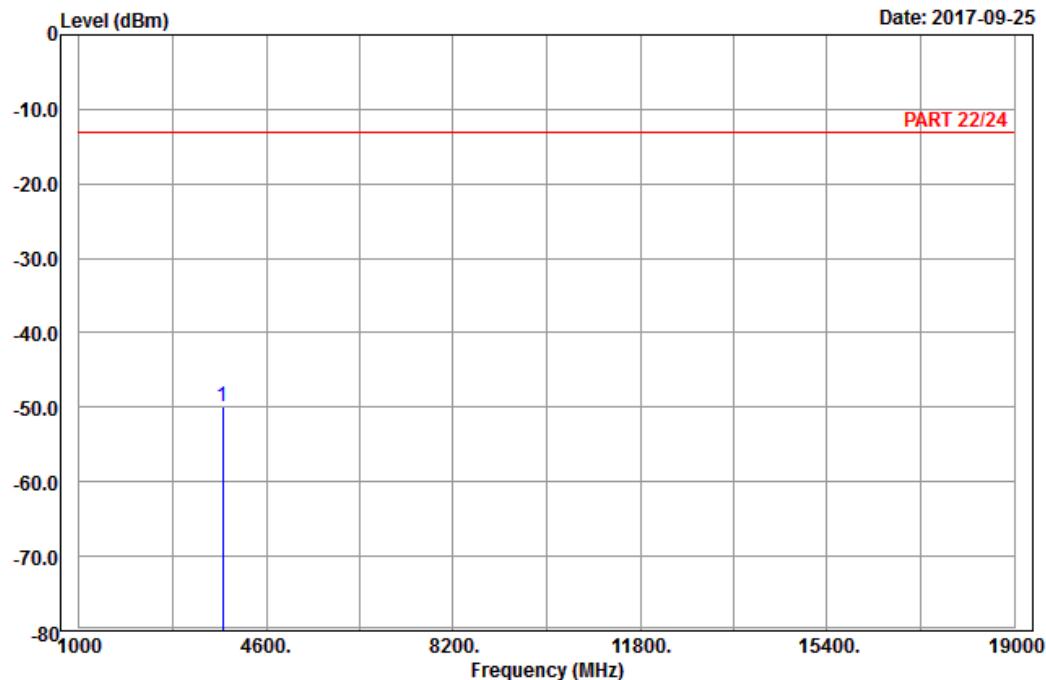
Freq	Read	Limit	Over	Factor	Remark
	Level	Level	Line		
MHz	dBm	dBm	dBm	dB	dB
1 pp	3760.00	-50.73	-66.87	-13.00	-37.73 16.14 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : LTE_Band 2_Link_CH18900

Tested by: Harry Hsueh

Freq	Level	Read	Limit	Over	Remark
		Level	Line	Limit Factor	
MHz	dBm	dBm	dBm	dB	dB
1 pp	3760.00	-49.87	-66.01	-13.00	-36.87 16.14 Peak

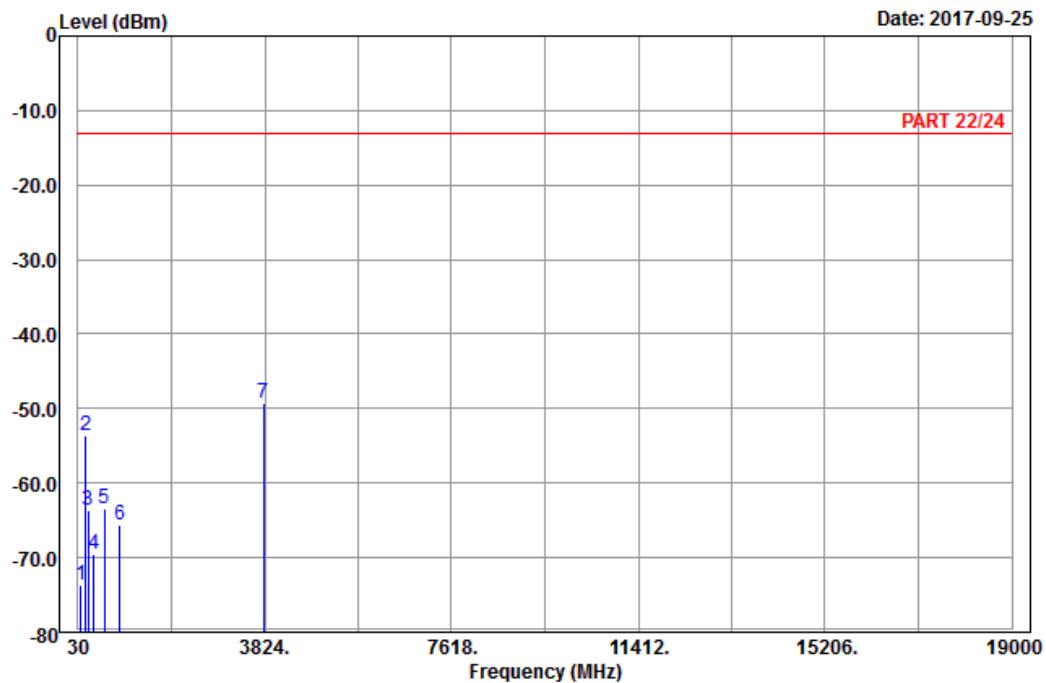
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1

Condition: PART 22/24 Horizontal

Remark : LTE_Band_2_Link_CH19100

Tested by: Harry Hsueh

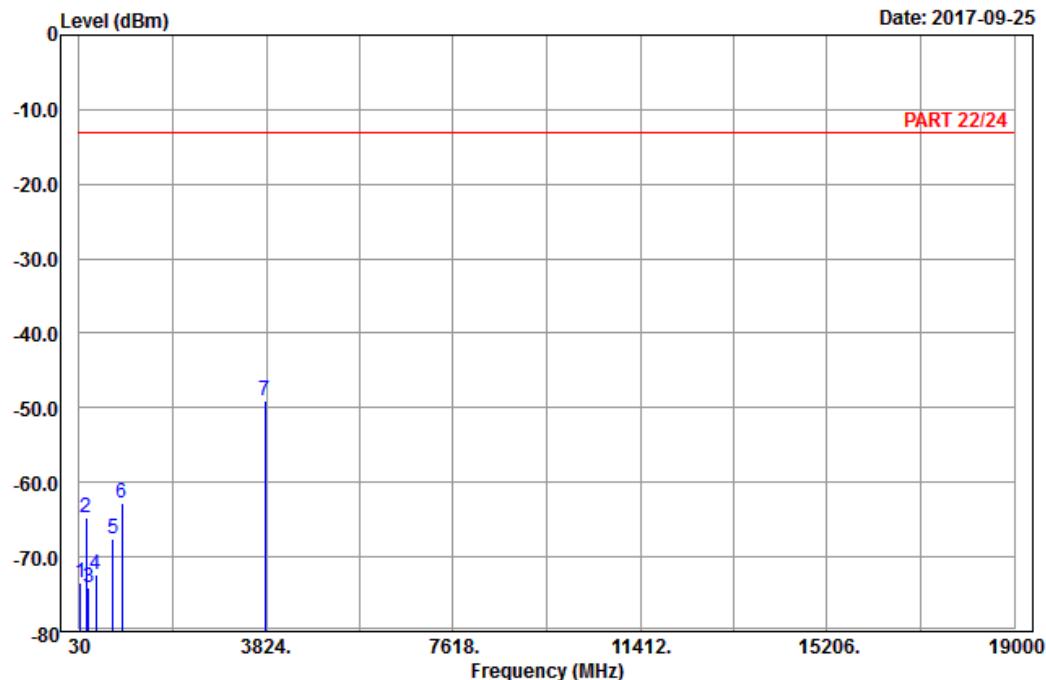
	Freq	Read Level	Limit Level	Over Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	79.68	-73.68	-61.83	-13.00	-60.68	-11.85	Peak
2	181.20	-53.59	-48.00	-13.00	-40.59	-5.59	Peak
3	244.11	-63.71	-58.12	-13.00	-50.71	-5.59	Peak
4	355.30	-69.50	-64.38	-13.00	-56.50	-5.12	Peak
5	558.30	-63.51	-62.21	-13.00	-50.51	-1.30	Peak
6	871.90	-65.58	-67.66	-13.00	-52.58	2.08	Peak
7 pp	3800.00	-49.33	-65.74	-13.00	-36.33	16.41	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

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Data: 14



Site : 966 chamber 1

Condition: PART 22/24 Vertical

Remark : LTE_Band 2_Link_CH19100

Tested by: Harry Hsueh

Freq	Level	Read	Limit	Over	Remark
		MHz	dBm	dBm	
1	58.62	-73.55	-59.49	-13.00	-60.55 -14.06 Peak
2	163.92	-64.82	-57.54	-13.00	-51.82 -7.28 Peak
3	212.52	-74.19	-68.18	-13.00	-61.19 -6.01 Peak
4	375.60	-72.42	-68.39	-13.00	-59.42 -4.03 Peak
5	706.70	-67.56	-67.05	-13.00	-54.56 -0.51 Peak
6	888.00	-62.72	-65.27	-13.00	-49.72 2.55 Peak
7 pp	3800.00	-48.98	-65.39	-13.00	-35.98 16.41 Peak

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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