

FCC TEST REPORT (PART 24)

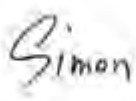

Applicant:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer or Supplier:	Lenovo PC HK Limited
Address:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, P.R.China
Product:	Portable Tablet Computer
Brand Name:	Lenovo
Model Name:	Lenovo TB-7306X
FCC ID:	O57TB7306X
Date of tests:	Jan. 05, 2021 ~ Jan. 18, 2021

The tests have been carried out according to the requirements of the following standard:

- FCC PART 24, Subpart E**
 FCC PART 2
 ANSI/TIA/EIA-603-D
 ANSI/TIA/EIA-603-E
 ANSI C63.26-2015

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Jan. 19, 2021	 Date: Jan. 19, 2021

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4 INFORMATION ON THE TESTING LABORATORIES..... 122

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 123



BUREAU
VERITAS

Test Report No.: RFA20210104W001-5

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RFA20210104W001-5	Original release	Jan. 19, 2021



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
2.1046 24.232	Equivalent Isotropic Radiated Power	Compliance
2.1055 24.235	Frequency Stability	Compliance
2.1049 24.238(b)	Occupied Bandwidth	Compliance
24.232(d)	Peak to average ratio	Compliance
24.238(b)	Band Edge Measurements	Compliance
2.1051 24.238	Conducted Spurious Emissions	Compliance
2.1053 24.238	Radiated Spurious Emissions	Compliance

1.1 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	UNCERTAINTY
Frequency Stability	± 76.97Hz
Radiated emissions & Radiated Power (30MHz~1GMHz)	±4.98dB
Radiated emissions & Radiated Power (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,20	Apr. 26,21
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,20	Feb. 25,21
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 27,20	Mar. 26,21
Horn Antenna (1GHz-18GHz)	ETS-LINDGREN	3117	00168692	Mar. 27,20	Mar. 26,21
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 24, 20	Nov. 23, 21
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 27,20	Feb. 26,21
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,20	Jun. 01,21
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,20	Jun. 01,21
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,20	Apr. 29,21
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,20	Jun. 02,21
Power Meter	Anritsu	ML2495A	1506002	Feb. 26,20	Feb. 25,21
Power Sensor	Anritsu	MA2411B	1339352	Feb. 26,20	Feb. 25,21
Humid & Temp Programmable Tester	Juyi	ITH-120-45-CP-AR	IAA1504-001	Jun. 02,20	Jun. 01,21
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 11,20	Mar. 10,21
Power Divider	MCLI/USA	PS2-15	24880	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
 3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Portable Tablet Computer	
BRAND NAME	Lenovo	
MODEL NAME	Lenovo TB-7306X	
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.86Vdc (Li-ion, battery)	
MODULATION TYPE	GSM, GPRS: GMSK EDGE: 8PSK LTE Band 2: QPSK, 16QAM, 64QAM	
FREQUENCY RANGE	GSM, GPRS, EDGE	1850.2MHz ~ 1909.8MHz
	LTE Band 2 Channel Bandwidth: 1.4MHz	1850.7MHz ~ 1909.3MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
	MAX. EIRP POWER	GSM
EDGE		181mW
LTE Band 2 Channel Bandwidth: 1.4MHz		117mW
LTE Band 2 Channel Bandwidth: 3MHz		108mW
LTE Band 2 Channel Bandwidth: 5MHz		109mW
LTE Band 2 Channel Bandwidth: 10MHz		109mW
LTE Band 2 Channel Bandwidth: 15MHz		109mW
LTE Band 2 Channel Bandwidth: 20MHz		109mW



EMISSION DESIGNATOR	GSM	240KGXW
	EDGE	250KG7W
	LTE Band 2 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D
		16QAM: 1M09W7D
		64QAM: 1M09W7D
	LTE Band 2 Channel Bandwidth: 3MHz	QPSK: 2M68G7D
		16QAM: 2M68W7D
		64QAM: 2M67W7D
	LTE Band 2 Channel Bandwidth: 5MHz	QPSK: 4M47G7D
		16QAM: 4M47W7D
		64QAM: 4M46W7D
	LTE Band 2 Channel Bandwidth: 10MHz	QPSK: 8M95G7D
		16QAM: 8M94W7D
64QAM: 8M95W7D		
LTE Band 2 Channel Bandwidth: 15MHz	QPSK: 13M4G7D	
	16QAM: 13M4W7D	
	64QAM: 13M4W7D	
LTE Band 2 Channel Bandwidth: 20MHz	QPSK: 17M9G7D	
	16QAM: 17M9W7D	
	64QAM: 17M9W7D	
ANTENNA TYPE	PIFA Antenna with -2.1dBi gain for GSM 1900/ LTE Band 2	
HW VERSION	Lenovo Tablet TB-7306X	
SW VERSION	TB-7306X_RF01_201218	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB cable: shielded, detachable, 1meter	



NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
GSM/GPRS/EDGE	1TX/1RX
LTE	1TX/1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

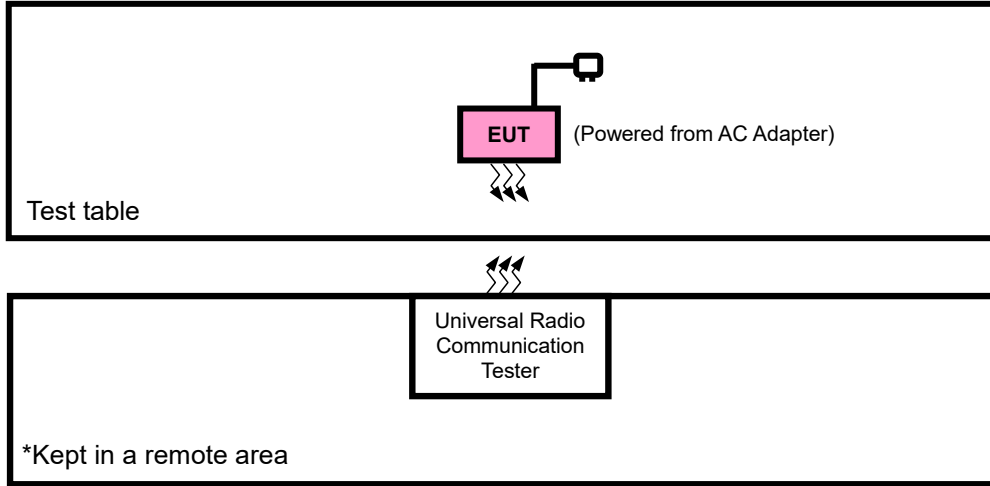
List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Sunwoda	L20D1P32	Capacity : 3.86vdc 3750mAh
Battery 2	NAT	L20D1P32	Capacity : 3.86vdc 3750mAh
AC Adapter 1	Acbel	SC-41	I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A
AC Adapter 2	Salom	SC-41	I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A
USB Cable 1	liqi	L62B-052000100	Shielded, 1.0meter
USB Cable 2	saibao	S62B-052000100	Shielded, 1.0meter



2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST





2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.8m

2.4 TEST ITEM AND TEST CONFIGURATION

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 in EIRP and radiated emission was found when positioned on X-plane for GSM/EDGE/ LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter + USB Cable with GSM or LTE link
B	EUT + Battery with GSM or LTE link

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	EIRP	512 to 810	512, 661, 810	GSM, EDGE
B	FREQUENCY STABILITY	512 to 810	512, 810	GSM, EDGE
B	OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM, EDGE
B	PEAK TO AVERAGE RATIO	512 to 810	512, 661, 810	GSM, EDGE
B	BAND EDGE	512 to 810	512, 810	GSM, EDGE
B	CONDCUDED EMISSION	512 to 810	512, 661, 810	GSM, EDGE
A	RADIATED EMISSION	512 to 810	512, 661, 810	GSM, EDGE



LTE BAND 2

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	18607 to 19193	18607, 19193	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615, 19185	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625, 19175	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18650, 19150	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 19125	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700, 19100	20MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM, 64QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM, 64QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM, 64QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM, 64QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM, 64QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM, 64QAM	100 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset



B	BAND EDGE	18607 to 19193	18607	1.4MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset		
			19193	1.4MHz	QPSK,16QAM, 64QAM	6 RB / 0 RB Offset		
		18615 to 19185	18615	3MHz	QPSK,16QAM, 64QAM	1 RB / 5 RB Offset		
			19185	3MHz	QPSK,16QAM, 64QAM	6 RB / 0 RB Offset		
		18625 to 19175	18625	5MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset		
			19175	5MHz	QPSK,16QAM, 64QAM	15 RB / 0 RB Offset		
		18650 to 19150	18650	10MHz	QPSK,16QAM, 64QAM	1 RB / 14 RB Offset		
			19150	10MHz	QPSK,16QAM, 64QAM	15 RB / 0 RB Offset		
		18675 to 19125	18675	15MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset		
			19125	15MHz	QPSK,16QAM, 64QAM	25 RB / 0 RB Offset		
		18700 to 19100	18700	20MHz	QPSK,16QAM, 64QAM	1 RB / 24 RB Offset		
			19100	20MHz	QPSK,16QAM, 64QAM	25 RB / 0 RB Offset		
		B	CONDCUDETED EMISSION	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK	1 RB / 0 RB Offset
				18615 to 19185	18615, 18900, 19185	3MHz	QPSK	50 RB / 0 RB Offset
				18625 to 19175	18625, 18900, 19175	5MHz	QPSK	1 RB / 49 RB Offset
				18650 to 19150	18650, 18900, 19150	10MHz	QPSK	50 RB / 0 RB Offset
				18675 to 19125	18675, 18900, 19125	15MHz	QPSK	1 RB / 0 RB Offset
				18700 to 19100	18700, 18900, 19100	20MHz	QPSK	75 RB / 0 RB Offset
A	RADIATED EMISSION	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK	1 RB / 0 RB Offset		
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset		
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset		
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset		
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset		
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset		

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 57%RH	DC 3.7V By Battery	Jace Hu
FREQUENCY STABILITY	23deg. C, 61%RH	DC 3.6V/3.7V/4.2V	Chase Zhou
OCCUPIED BANDWIDTH	23deg. C, 61%RH	DC 3.7V By Battery	Chase Zhou
PEAK TO AVERAGE RATIO	23deg. C, 61%RH	DC 3.7V By Battery	Chase Zhou
BAND EDGE	23deg. C, 61%RH	DC 3.7V By Battery	Chase Zhou
CONDCUDETED EMISSION	23deg. C, 61%RH	DC 3.7V By Battery	Chase Zhou
RADIATED EMISSION	23deg. C, 70%RH	DC 5V By Adapter	Jace Hu



2.5 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

2.6 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-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

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



3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP.

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}} - L_{\text{C}}$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_{T} = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_{C} = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA 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.



3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900			Max. Tune-up Power
	Channel	512	661	
Frequency	1850.2	1880	1909.8	
GSM (GMSK, 1Tx-slot)	29.39	29.49	29.72	31.0
GPRS (GMSK, 1Tx-slot)	29.37	29.51	29.67	31.0
GPRS (GMSK, 2Tx-slot)	25.96	26.04	26.26	27.5
GPRS (GMSK, 3Tx-slot)	24.51	24.65	24.83	26.0
GPRS (GMSK, 4Tx-slot)	23.45	23.71	23.85	25.0
EDGE (8PSK, 1Tx-slot)	24.61	24.67	24.54	26.5
EDGE (8PSK, 2Tx-slot)	22.44	22.03	21.91	23.5
EDGE (8PSK, 3Tx-slot)	21.22	21.06	20.98	22.5
EDGE (8PSK, 4Tx-slot)	19.98	19.79	19.72	21.5



LTE BAND 2

Band/BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193	MPR
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz	
2/ 1.4	QPSK	1	0	22.14	21.89	22.03	0
		1	2	22.48	22.16	22.35	0
		1	5	22.07	21.73	21.90	0
		3	0	22.73	22.42	22.63	0
		3	1	22.80	22.50	22.59	0
		3	3	22.75	22.43	22.60	0
		6	0	21.87	21.53	21.72	1
	16QAM	1	0	21.66	21.35	21.52	1
		1	2	22.02	21.67	21.88	1
		1	5	21.86	21.54	21.76	1
		3	0	22.28	21.98	22.13	1
		3	1	22.27	22.05	22.16	1
		3	3	22.43	22.13	22.32	1
		6	0	21.32	21.07	21.19	2
	64QAM	1	0	20.08	19.81	19.99	2
		1	2	20.36	20.13	20.25	2
		1	5	19.99	19.64	19.85	2
		3	0	20.22	19.95	20.08	2
		3	1	20.22	19.97	20.08	2
		3	3	20.36	20.04	20.26	2
		6	0	19.33	19.03	19.18	3



Band/BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185	MPR
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz	
2/3	QPSK	1	0	22.16	21.91	22.02	0
		1	7	22.44	22.17	22.35	0
		1	14	22.03	21.73	21.90	0
		8	0	21.72	21.45	21.63	1
		8	3	21.73	21.50	21.61	1
		8	7	21.72	21.50	21.64	1
		15	0	21.84	21.54	21.66	1
	16QAM	1	0	21.63	21.41	21.55	1
		1	7	21.99	21.70	21.86	1
		1	14	21.89	21.54	21.76	1
		8	0	21.24	20.99	21.13	2
		8	3	21.32	21.00	21.19	2
		8	7	21.45	21.11	21.28	2
		15	0	21.32	21.01	21.22	2
	64QAM	1	0	20.14	19.84	19.93	2
		1	7	20.39	20.07	20.24	2
		1	14	20.00	19.66	19.85	2
		8	0	19.25	18.99	19.09	3
		8	3	19.26	18.91	19.13	3
		8	7	19.33	19.08	19.22	3
		15	0	19.35	19.00	19.22	3



Band/BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175	MPR
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz	
2/5	QPSK	1	0	22.17	21.86	22.03	0
		1	12	22.49	22.14	22.35	0
		1	24	22.04	21.72	21.94	0
		12	0	21.75	21.45	21.60	1
		12	6	21.73	21.51	21.62	1
		12	13	21.76	21.46	21.65	1
		25	0	21.82	21.57	21.69	1
	16QAM	1	0	21.64	21.37	21.55	1
		1	12	21.96	21.73	21.85	1
		1	24	21.89	21.54	21.75	1
		12	0	21.24	20.97	21.10	2
		12	6	21.29	21.04	21.15	2
		12	13	21.40	21.13	21.31	2
		25	0	21.32	21.02	21.19	2
	64QAM	1	0	20.08	19.81	19.99	2
		1	12	20.36	20.13	20.24	2
		1	24	19.93	19.71	19.85	2
		12	0	19.26	18.96	19.08	3
		12	6	19.20	18.98	19.12	3
		12	13	19.37	19.07	19.19	3
		25	0	19.31	19.06	19.20	3



Band/BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150	MPR
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz	
2/ 10	QPSK	1	0	22.14	21.89	22.03	0
		1	24	22.49	22.14	22.36	0
		1	49	22.01	21.76	21.90	0
		25	0	21.76	21.44	21.63	1
		25	12	21.79	21.45	21.62	1
		25	25	21.74	21.43	21.64	1
		50	0	21.87	21.57	21.66	1
	16QAM	1	0	21.64	21.34	21.51	1
		1	24	22.01	21.69	21.88	1
		1	49	21.89	21.55	21.72	1
		25	0	21.26	20.95	21.16	2
		25	12	21.33	20.98	21.20	2
		25	25	21.39	21.14	21.28	2
		50	0	21.36	21.01	21.23	2
	64QAM	1	0	20.07	19.82	19.96	2
		1	24	20.41	20.09	20.28	2
		1	49	19.99	19.65	19.82	2
		25	0	19.24	18.93	19.14	3
		25	12	19.27	18.97	19.06	3
		25	25	19.36	19.04	19.21	3
		50	0	19.36	19.02	19.21	3



Band/BW	Modulation	RB Size	RB Offset	Low CH 18675	Mid CH 18900	High CH 19125	MPR
				Frequency 1857.5 MHz	Frequency 1880 MHz	Frequency 1902.5 MHz	
2/ 15	QPSK	1	0	22.21	21.89	22.00	0
		1	37	22.47	22.19	22.31	0
		1	74	22.07	21.79	21.91	0
		36	0	21.73	21.45	21.64	1
		36	19	21.80	21.50	21.62	1
		36	39	21.72	21.44	21.64	1
		75	0	21.87	21.55	21.71	1
	16QAM	1	0	21.68	21.41	21.51	1
		1	37	22.00	21.70	21.88	1
		1	74	21.85	21.60	21.74	1
		36	0	21.30	20.95	21.17	2
		36	19	21.27	21.02	21.16	2
		36	39	21.44	21.12	21.31	2
		75	0	21.37	21.04	21.16	2
	64QAM	1	0	20.09	19.83	19.97	2
		1	37	20.42	20.08	20.25	2
		1	74	19.95	19.64	19.85	2
		36	0	19.29	18.99	19.08	3
		36	19	19.21	18.91	19.08	3
		36	39	19.39	19.11	19.23	3
		75	0	19.35	19.00	19.22	3



Band/BW	Modulation	RB Size	RB Offset	Low CH 18700	Mid CH 18900	High CH 19100	MPR
				Frequency 1860 MHz	Frequency 1880 MHz	Frequency 1900 MHz	
2/ 20	QPSK	1	0	22.22	21.93	22.08	0
		1	50	22.51	22.22	22.37	0
		1	99	22.09	21.80	21.95	0
		50	0	21.79	21.50	21.65	1
		50	25	21.81	21.52	21.67	1
		50	50	21.80	21.51	21.66	1
		100	0	21.88	21.59	21.74	1
	16QAM	1	0	21.71	21.42	21.57	1
		1	50	22.04	21.75	21.90	1
		1	99	21.91	21.62	21.77	1
		50	0	21.32	21.03	21.18	2
		50	25	21.35	21.06	21.21	2
		50	50	21.47	21.18	21.33	2
		100	0	21.38	21.09	21.24	2
	64QAM	1	0	20.15	19.86	20.01	2
		1	50	20.44	20.15	20.30	2
		1	99	20.01	19.72	19.87	2
		50	0	19.30	19.01	19.16	3
		50	25	19.28	18.99	19.14	3
		50	50	19.41	19.12	19.27	3
		100	0	19.37	19.08	19.23	3



EIRP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
512	1850.2	29.39	-2.10	27.29	535.8	2
661	1880.0	29.49	-2.10	27.39	548.28	2
810	1909.8	29.72	-2.10	27.62	578.1	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

EDGE

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
512	1850.2	24.61	-2.10	22.51	178.24	2
661	1880.0	24.67	-2.10	22.57	180.72	2
810	1909.8	24.54	-2.10	22.44	175.39	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).



LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18607	1850.7	22.80	-2.10	20.70	117.49	2
18900	1880.0	22.50	-2.10	20.40	109.65	2
19193	1908.3	22.59	-2.10	20.49	111.94	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18607	1850.7	22.43	-2.10	20.33	107.89	2
18900	1880.0	22.13	-2.10	20.03	100.69	2
19193	1908.3	22.32	-2.10	20.22	105.2	2

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18607	1850.7	20.36	-2.10	18.26	66.99	2
18900	1880.0	20.13	-2.10	18.03	63.53	2
19193	1908.3	21.35	-2.10	19.25	84.14	2



CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18615	1851.5	22.44	-2.10	20.34	108.14	2
18900	1880.0	22.17	-2.10	20.07	101.62	2
19185	1908.5	22.35	-2.10	20.25	105.93	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18615	1851.5	21.99	-2.10	19.89	97.5	2
18900	1880.0	21.70	-2.10	19.60	91.2	2
19185	1908.5	21.86	-2.10	19.76	94.62	2

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18615	1851.5	20.39	-2.10	18.29	67.45	2
18900	1880.0	20.07	-2.10	17.97	62.66	2
19185	1908.5	21.37	-2.10	19.27	84.53	2



CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18625	1852.5	22.49	-2.10	20.39	109.4	2
18900	1880.0	22.14	-2.10	20.04	100.93	2
19175	1907.5	22.35	-2.10	20.25	105.93	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18625	1852.5	21.96	-2.10	19.86	96.83	2
18900	1880.0	21.73	-2.10	19.63	91.83	2
19175	1907.5	21.85	-2.10	19.75	94.41	2

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18625	1852.5	20.36	-2.10	18.26	66.99	2
18900	1880.0	20.13	-2.10	18.03	63.53	2
19175	1907.5	20.24	-2.10	18.14	65.16	2



CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18650	1855.0	22.49	-2.10	20.39	109.4	2
18900	1880.0	22.14	-2.10	20.04	100.93	2
19150	1905.0	22.36	-2.10	20.26	106.17	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18650	1855.0	22.01	-2.10	19.91	97.95	2
18900	1880.0	21.69	-2.10	19.59	90.99	2
19150	1905.0	21.88	-2.10	19.78	95.06	2

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18650	1855.0	20.41	-2.10	18.31	67.76	2
18900	1880.0	20.09	-2.10	17.99	62.95	2
19150	1905.0	20.28	-2.10	18.18	65.77	2



CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18675	1857.5	22.47	-2.10	20.37	108.89	2
18900	1880.0	22.19	-2.10	20.09	102.09	2
19125	1902.5	22.31	-2.10	20.21	104.95	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18675	1857.5	22.00	-2.10	19.90	97.72	2
18900	1880.0	21.70	-2.10	19.60	91.2	2
19125	1902.5	21.88	-2.10	19.78	95.06	2

CHANNEL BANDWIDTH: 15MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18675	1857.5	20.42	-2.10	18.32	67.92	2
18900	1880.0	20.08	-2.10	17.98	62.81	2
19125	1902.5	20.25	-2.10	18.15	65.31	2



CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18700	1860	22.51	-2.10	20.41	109.9	2
18900	1880	22.22	-2.10	20.12	102.8	2
19100	1900	22.37	-2.10	20.27	106.41	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18700	1860	22.04	-2.10	19.94	98.63	2
18900	1880	21.75	-2.10	19.65	92.26	2
19100	1900	21.90	-2.10	19.80	95.5	2

CHANNEL BANDWIDTH: 20MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _{T-Lc} (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18700	1860	20.44	-2.10	18.34	68.23	2
18900	1880	20.15	-2.10	18.05	63.83	2
19100	1900	20.30	-2.10	18.20	66.07	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).



3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

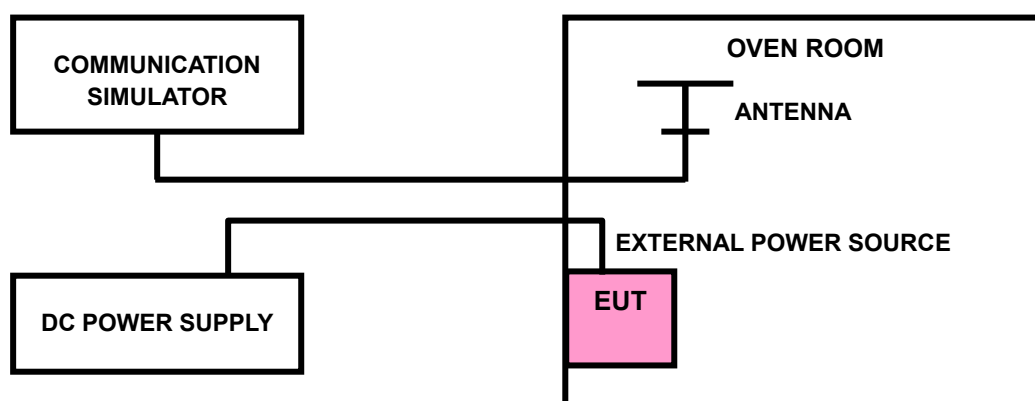
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.2.2 TEST PROCEDURE

- 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.
- 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.
- 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.

3.2.3 TEST SETUP





3.2.4 TEST RESULTS

GSM1900

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.001	0.0009	2.5
V_{min}	-0.001	-0.0011	2.5
V_{max}	0.0008	0.0008	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0053	-0.0051	2.5
-20	-0.0049	-0.0047	2.5
-10	-0.0037	-0.0035	2.5
0	-0.0033	-0.0031	2.5
10	-0.0024	-0.0022	2.5
20	-0.0017	-0.0015	2.5
30	-0.0012	-0.001	2.5
40	-0.0008	-0.0006	2.5
50	-0.0002	0	2.5



EDGE 1900

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0009	0.0011	2.5
V_{min}	-0.0014	-0.0013	2.5
V_{max}	0.001	0.0009	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0055	-0.0051	2.5
-20	-0.0049	-0.0046	2.5
-10	-0.0037	-0.0035	2.5
0	-0.0035	-0.0032	2.5
10	-0.0024	-0.0023	2.5
20	-0.0019	-0.0018	2.5
30	-0.0013	-0.0012	2.5
40	-0.001	-0.0009	2.5
50	-0.0001	-0.0001	2.5



LTE BAND 2

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0021	0.0024	2.5
V _{min}	-0.0031	-0.003	2.5
V _{max}	0.0021	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0122	-0.0119	2.5
-20	-0.0107	-0.0108	2.5
-10	-0.0081	-0.0081	2.5
0	-0.0078	-0.0076	2.5
10	-0.005	-0.0046	2.5
20	-0.0038	-0.0038	2.5
30	-0.0042	-0.0039	2.5
40	-0.0022	-0.0022	2.5
50	-0.0002	-0.0003	2.5



FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0021	0.002	2.5
V _{min}	-0.0021	-0.0025	2.5
V _{max}	0.0018	0.0018	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0123	-0.0118	2.5
-20	-0.0101	-0.0103	2.5
-10	-0.0084	-0.0081	2.5
0	-0.0077	-0.0074	2.5
10	-0.0047	-0.005	2.5
20	-0.0041	-0.0041	2.5
30	-0.0036	-0.0039	2.5
40	-0.0019	-0.0018	2.5
50	-0.0004	-0.0003	2.5



FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0022	0.0025	2.5
V _{min}	-0.0023	-0.003	2.5
V _{max}	0.0021	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0118	-0.0117	2.5
-20	-0.0098	-0.0097	2.5
-10	-0.0083	-0.0081	2.5
0	-0.0074	-0.0072	2.5
10	-0.0051	-0.0055	2.5
20	-0.0045	-0.0043	2.5
30	-0.0041	-0.0029	2.5
40	-0.002	-0.0016	2.5
50	-0.0004	-0.0002	2.5



FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0026	0.0024	2.5
V _{min}	-0.0031	-0.003	2.5
V _{max}	0.0026	0.0025	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0115	-0.0111	2.5
-20	-0.0101	-0.0103	2.5
-10	-0.0084	-0.0082	2.5
0	-0.0075	-0.0073	2.5
10	-0.0046	-0.0044	2.5
20	-0.0043	-0.004	2.5
30	-0.0036	-0.0026	2.5
40	-0.0022	-0.0017	2.5
50	-0.0002	-0.0004	2.5



FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0025	0.0025	2.5
V _{min}	-0.003	-0.003	2.5
V _{max}	0.0026	0.0025	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0118	-0.0113	2.5
-20	-0.0104	-0.0099	2.5
-10	-0.0084	-0.0083	2.5
0	-0.0075	-0.0075	2.5
10	-0.005	-0.0055	2.5
20	-0.0038	-0.0038	2.5
30	-0.0031	-0.0029	2.5
40	-0.0019	-0.0017	2.5
50	-0.0002	-0.0002	2.5



FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0026	0.0026	2.5
V _{min}	-0.0031	-0.003	2.5
V _{max}	0.0025	0.0025	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max}.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0122	-0.0119	2.5
-20	-0.0107	-0.01	2.5
-10	-0.0083	-0.008	2.5
0	-0.0077	-0.0074	2.5
10	-0.0047	-0.0054	2.5
20	-0.0041	-0.0041	2.5
30	-0.0025	-0.0029	2.5
40	-0.0021	-0.0015	2.5
50	-0.0005	-0.0002	2.5

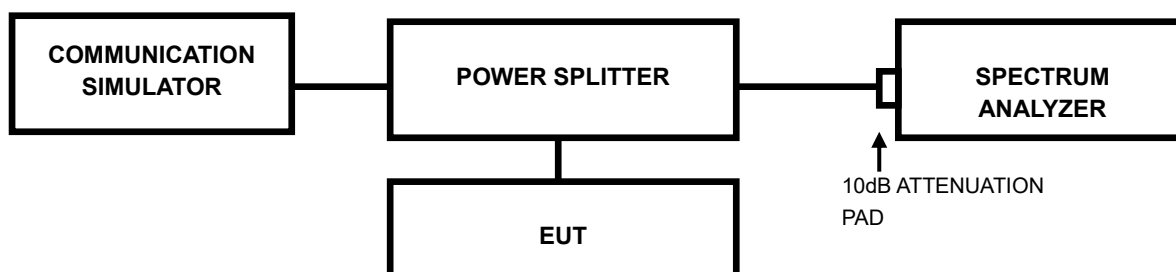


3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

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.

3.3.2 TEST SETUP



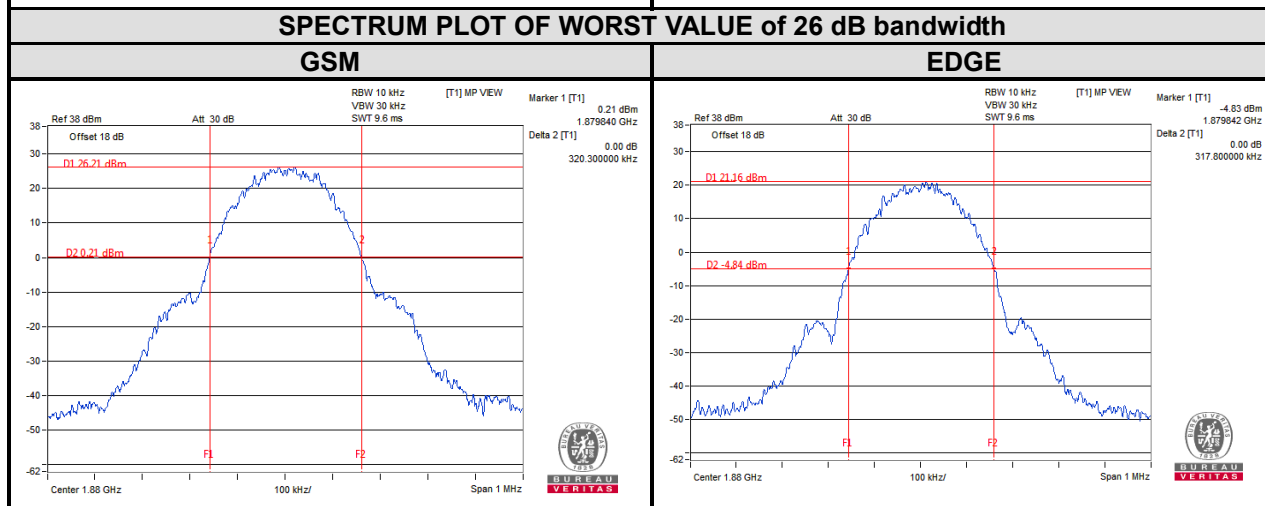
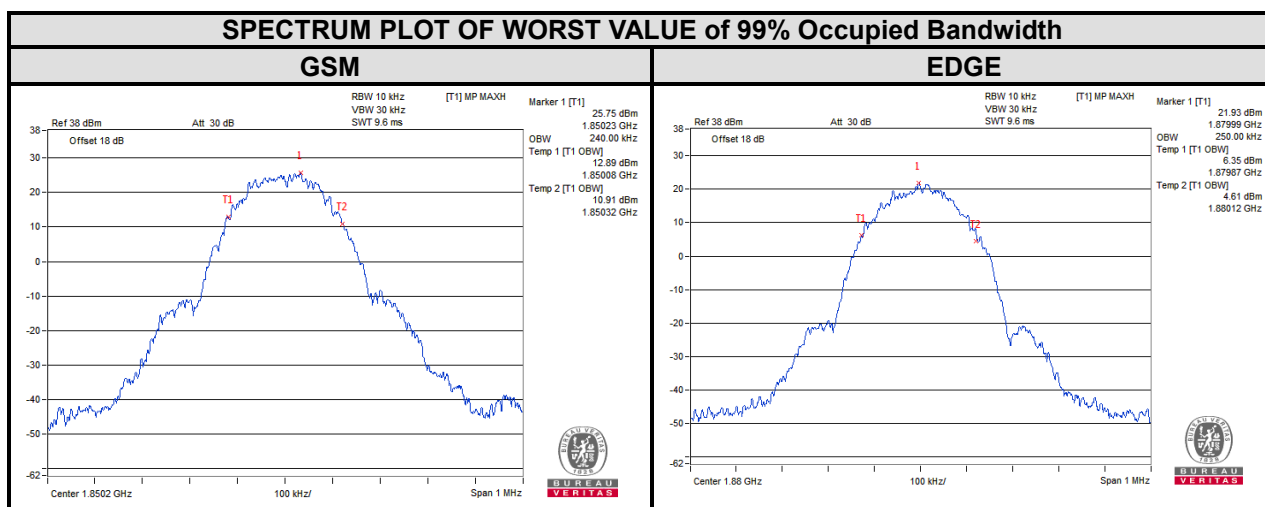


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Test Report No.: RFA20210104W001-5

3.3.3 TEST RESULTS

Channel	Frequency (MHz)	99% Occupied bandwidth (kHz)		Channel	Frequency (MHz)	26dB bandwidth (kHz)	
		GSM	EDGE			GSM	EDGE
512	1850.2	240.0	240.0	512	1850.2	313.7	309.7
661	1880.0	240.0	250.0	661	1880.0	320.3	317.8
810	1909.8	240.0	240.0	810	1909.8	314.3	314.4





LTE BAND 2

LTE band 2							
CHANNEL BANDWIDTH: 1.4MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18607	1850.7	1.08	1.08	1.08	1.27	1.25	1.26
18900	1880	1.09	1.09	1.08	1.26	1.28	1.24
19193	1909.3	1.08	1.08	1.09	1.24	1.29	1.28





CHANNEL BANDWIDTH: 3MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18615	1851.5	2.67	2.67	2.67	2.85	2.86	2.86
18900	1880	2.68	2.68	2.67	2.86	2.85	2.87
19185	1908.5	2.68	2.67	2.67	2.87	2.84	2.85





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Test Report No.: RFA20210104W001-5

CHANNEL BANDWIDTH: 5MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18625	1852.5	4.47	4.46	4.46	4.82	4.76	4.84
18900	1880	4.47	4.47	4.46	4.81	4.82	4.78
19175	1907.5	4.45	4.46	4.46	4.76	4.85	4.82



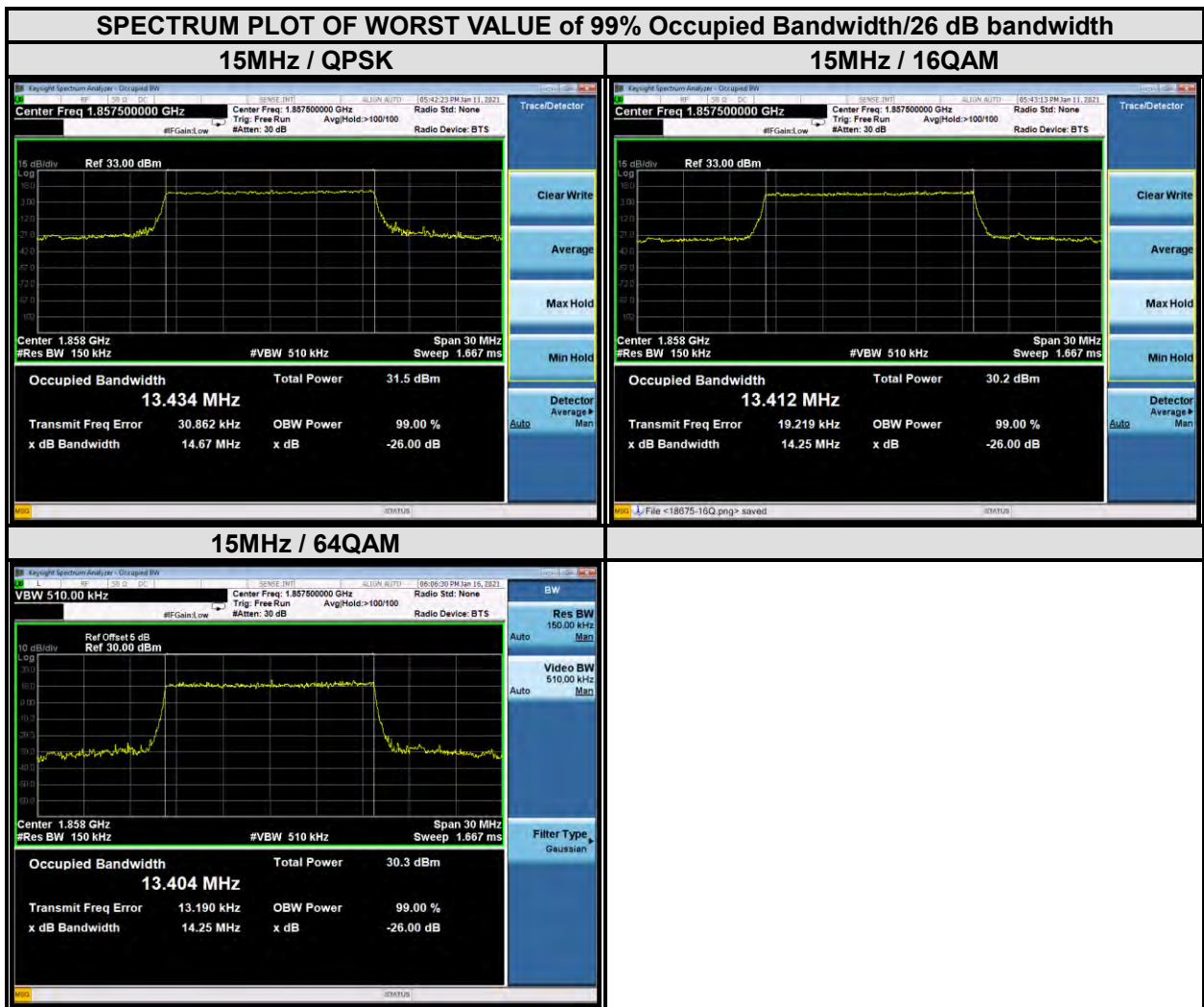


CHANNEL BANDWIDTH: 10MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18650	1855	8.95	8.94	8.95	9.54	9.51	9.53
18900	1880	8.94	8.93	8.93	9.59	9.57	9.56
19150	1905	8.90	8.91	8.92	9.48	9.49	9.45





CHANNEL BANDWIDTH: 15MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18675	1857.5	13.43	13.41	13.40	14.67	14.25	14.25
18900	1880	13.37	13.38	13.38	14.27	14.25	14.18
19125	1902.5	13.37	13.38	13.34	14.19	14.26	14.13





CHANNEL BANDWIDTH: 20MHz							
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)			26 dB bandwidth (MHz)		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
18700	1860	17.88	17.87	17.93	19.04	19.05	18.90
18900	1880	17.84	17.89	17.86	18.82	18.86	18.74
19100	1900	17.82	17.83	17.79	18.87	19.22	18.74



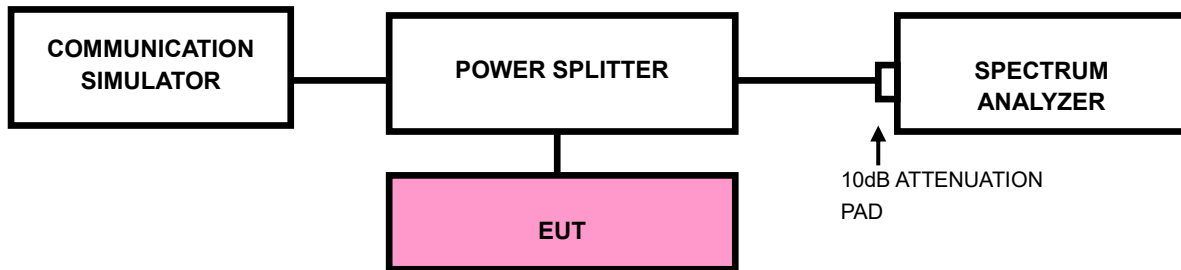


3.4 BAND EDGE MEASUREMENT

3.4.1 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.

3.4.2 TEST SETUP



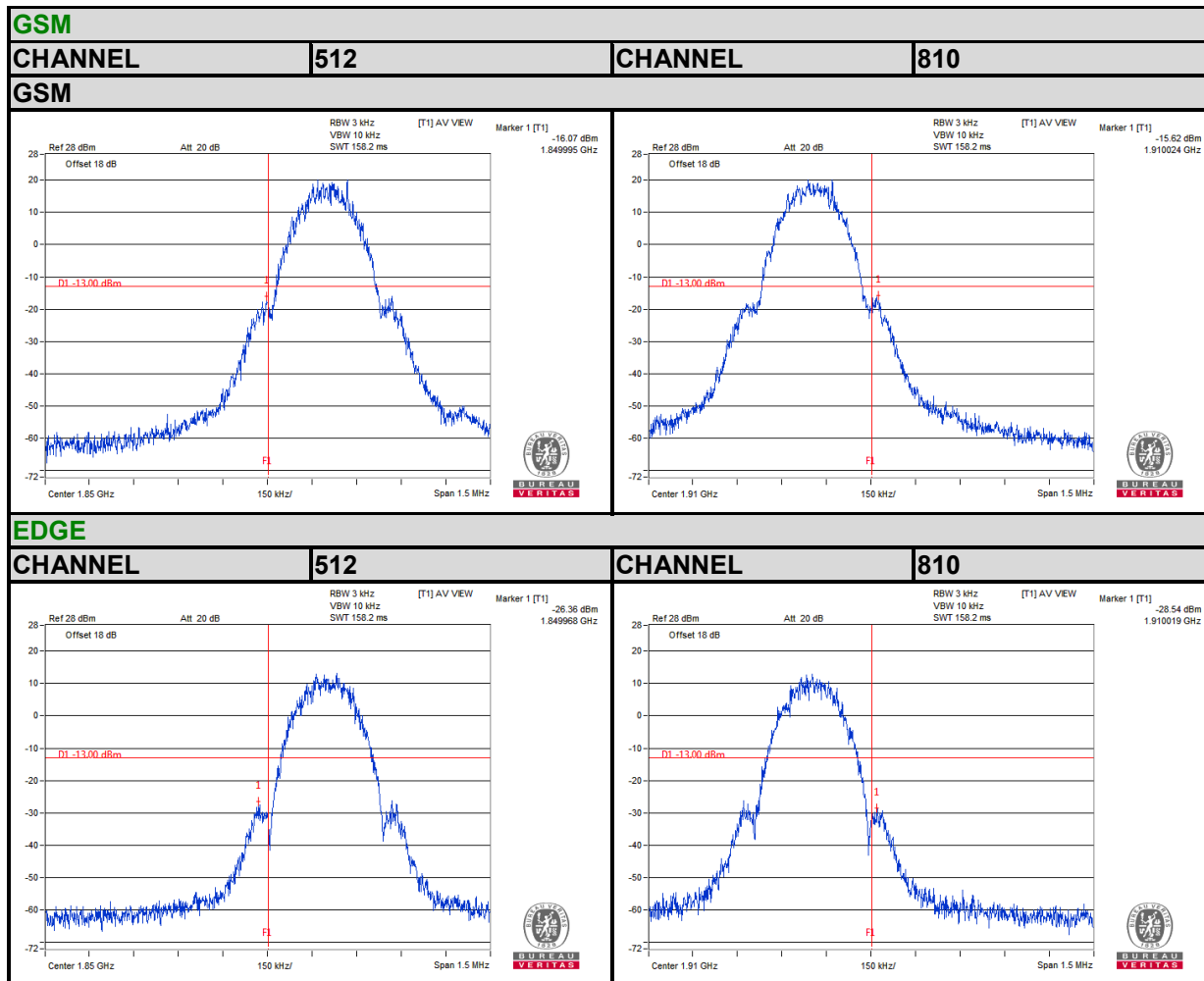


3.4.3 TEST PROCEDURES

- 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 1.5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)
- h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)
- i. Record the max trace plot into the test report.



3.4.4. TEST RESULTS





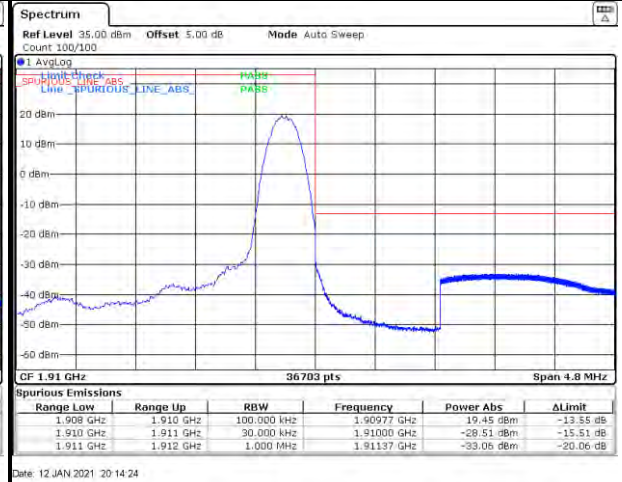
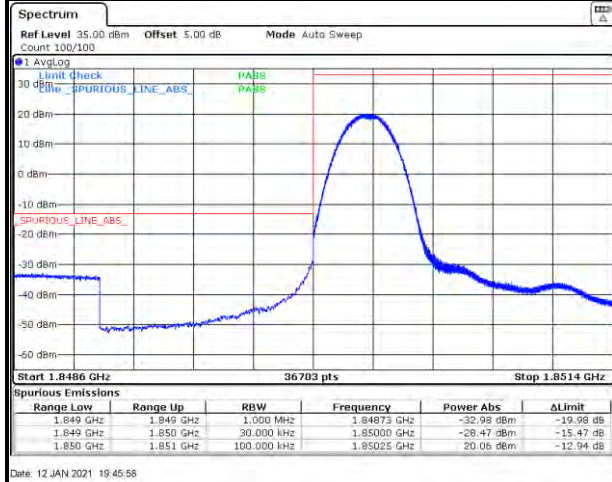
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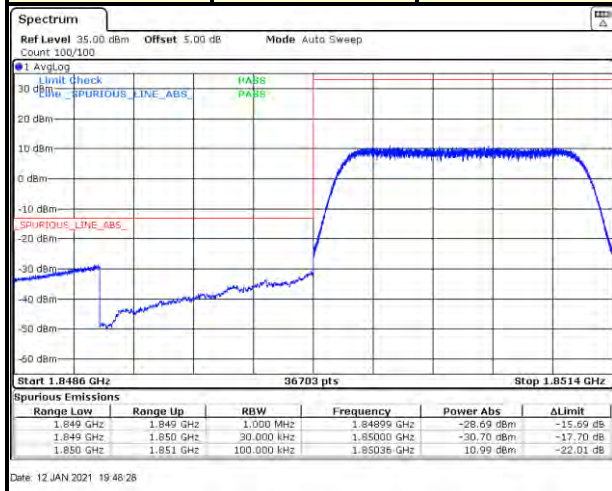
LTE BAND 2

Channel Bandwidth: 1.4MHz QPSK

CHANNEL 18607 1 RB CHANNEL 19193 1 RB



CHANNEL 18607 Full RB



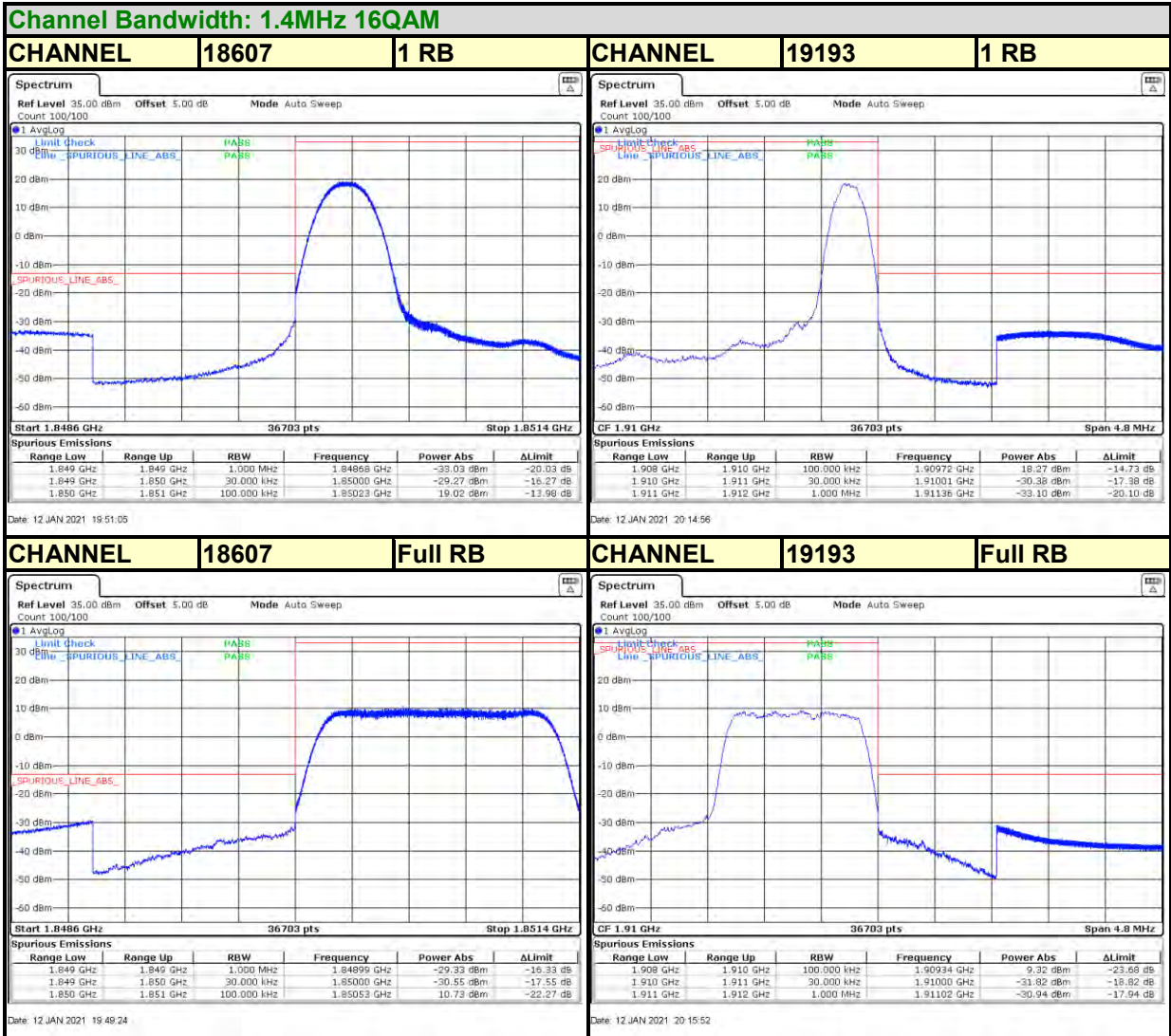
CHANNEL 19193 Full RB





BUREAU VERITAS

Test Report No.: RFA20210104W001-5



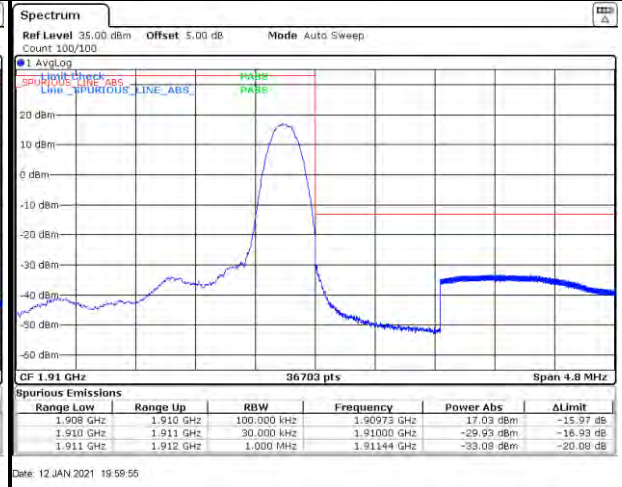
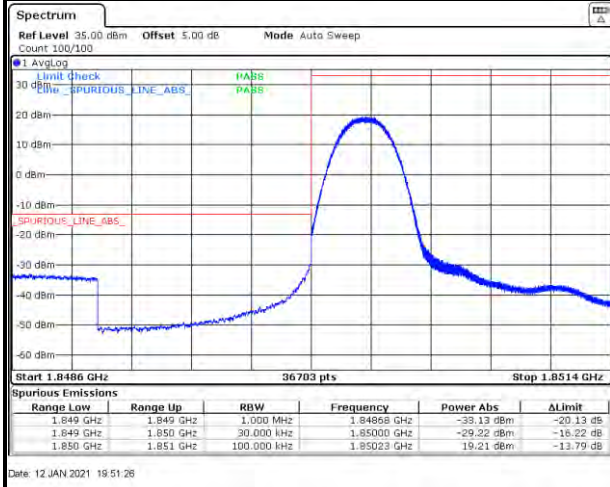


BUREAU VERITAS

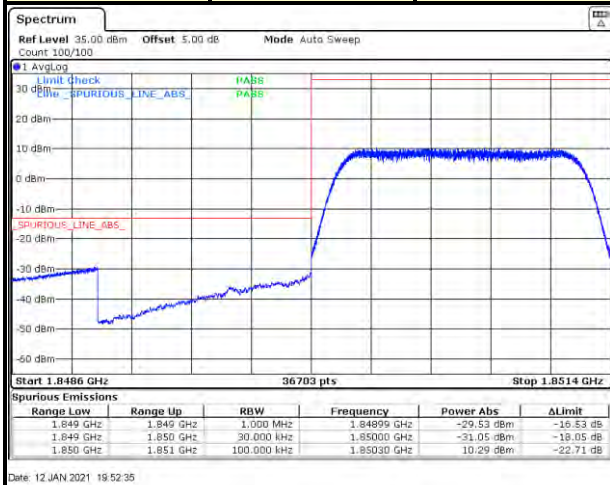
Test Report No.: RFA20210104W001-5

Channel Bandwidth: 1.4MHz 64QAM

CHANNEL 18607 1 RB CHANNEL 19193 1 RB



CHANNEL 18607 Full RB



CHANNEL 19193 Full RB

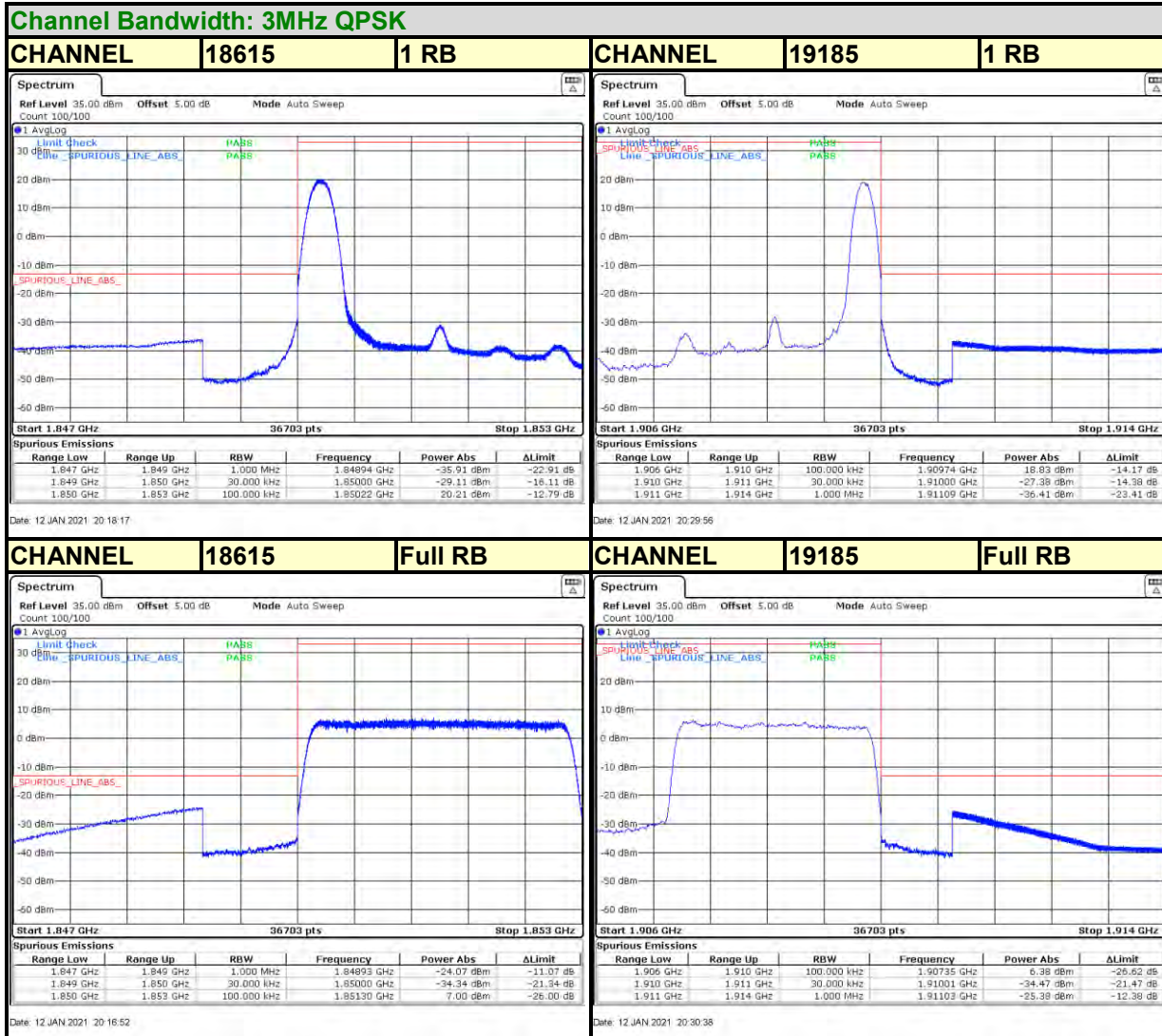




BUREAU VERITAS

Test Report No.: RFA20210104W001-5

LTE BAND 2



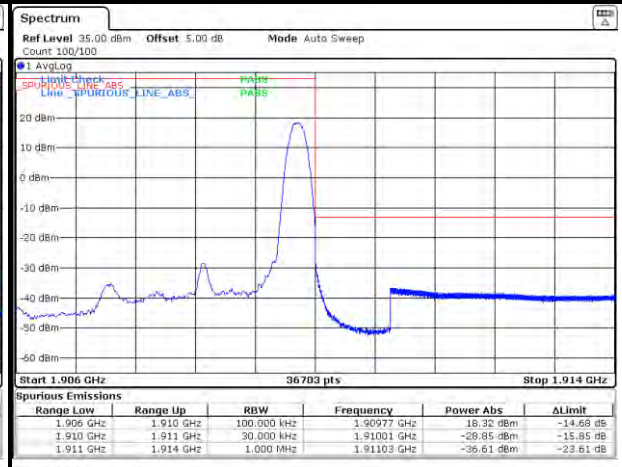
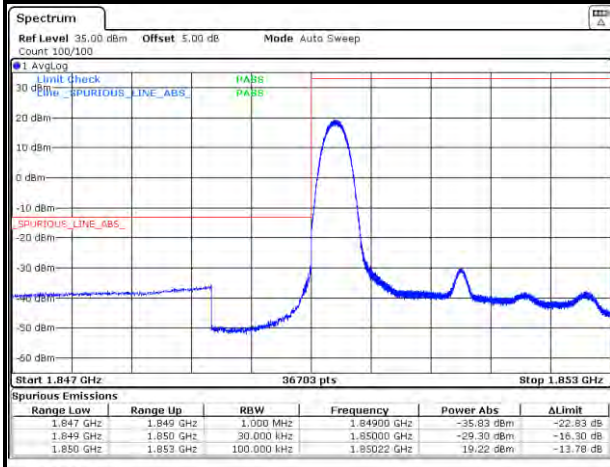


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 3MHz 16QAM

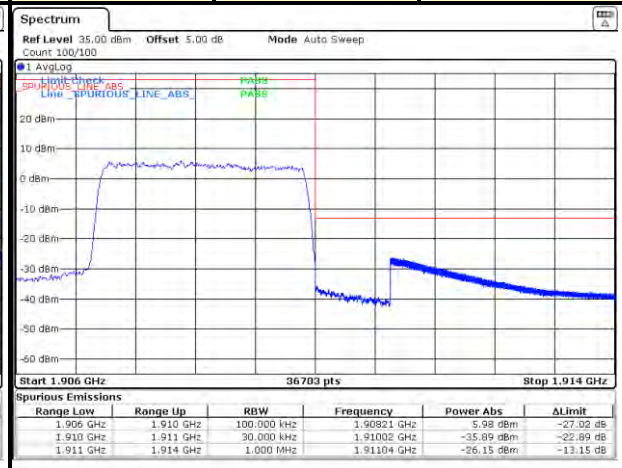
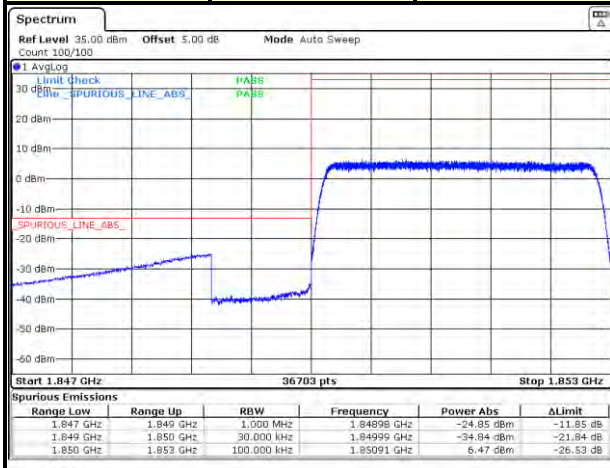
CHANNEL 18615 1 RB CHANNEL 19185 1 RB



Date: 12 JAN 2021 20:19:17

Date: 12 JAN 2021 20:29:17

CHANNEL 18615 Full RB CHANNEL 19185 Full RB



Date: 12 JAN 2021 20:20:07

Date: 12 JAN 2021 20:28:04

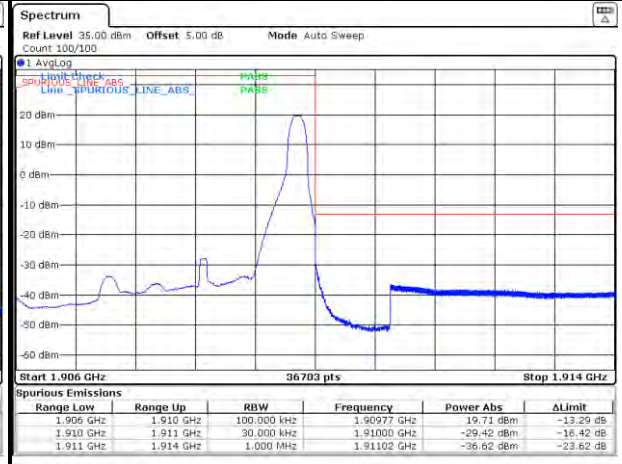
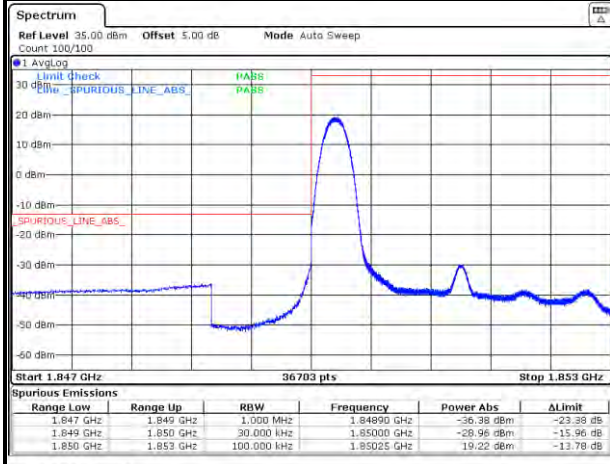


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 3MHz 64QAM

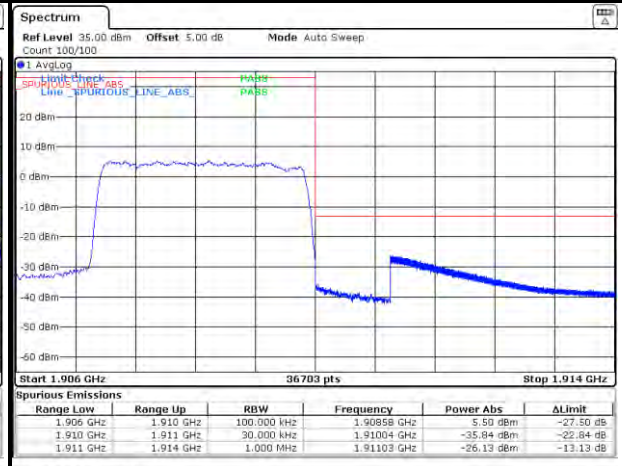
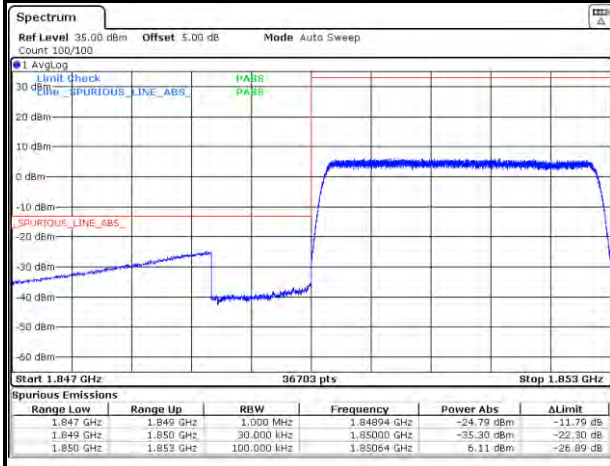
CHANNEL 18615 1 RB CHANNEL 19185 1 RB



Date: 12 JAN 2021 20:21:46

Date: 12 JAN 2021 20:25:39

CHANNEL 18615 Full RB CHANNEL 19185 Full RB



Date: 12 JAN 2021 20:20:59

Date: 12 JAN 2021 20:27:29

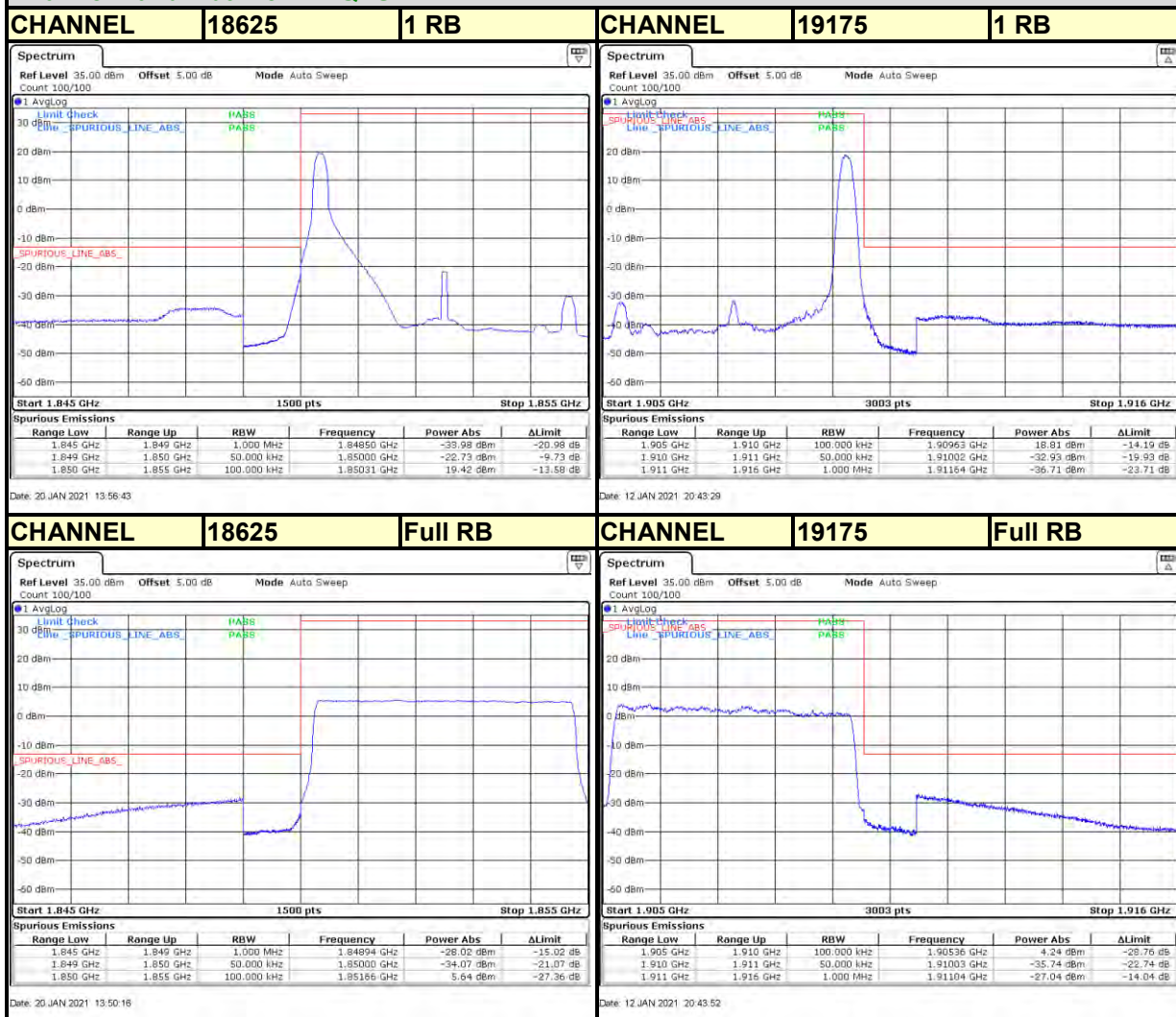


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

LTE BAND 2

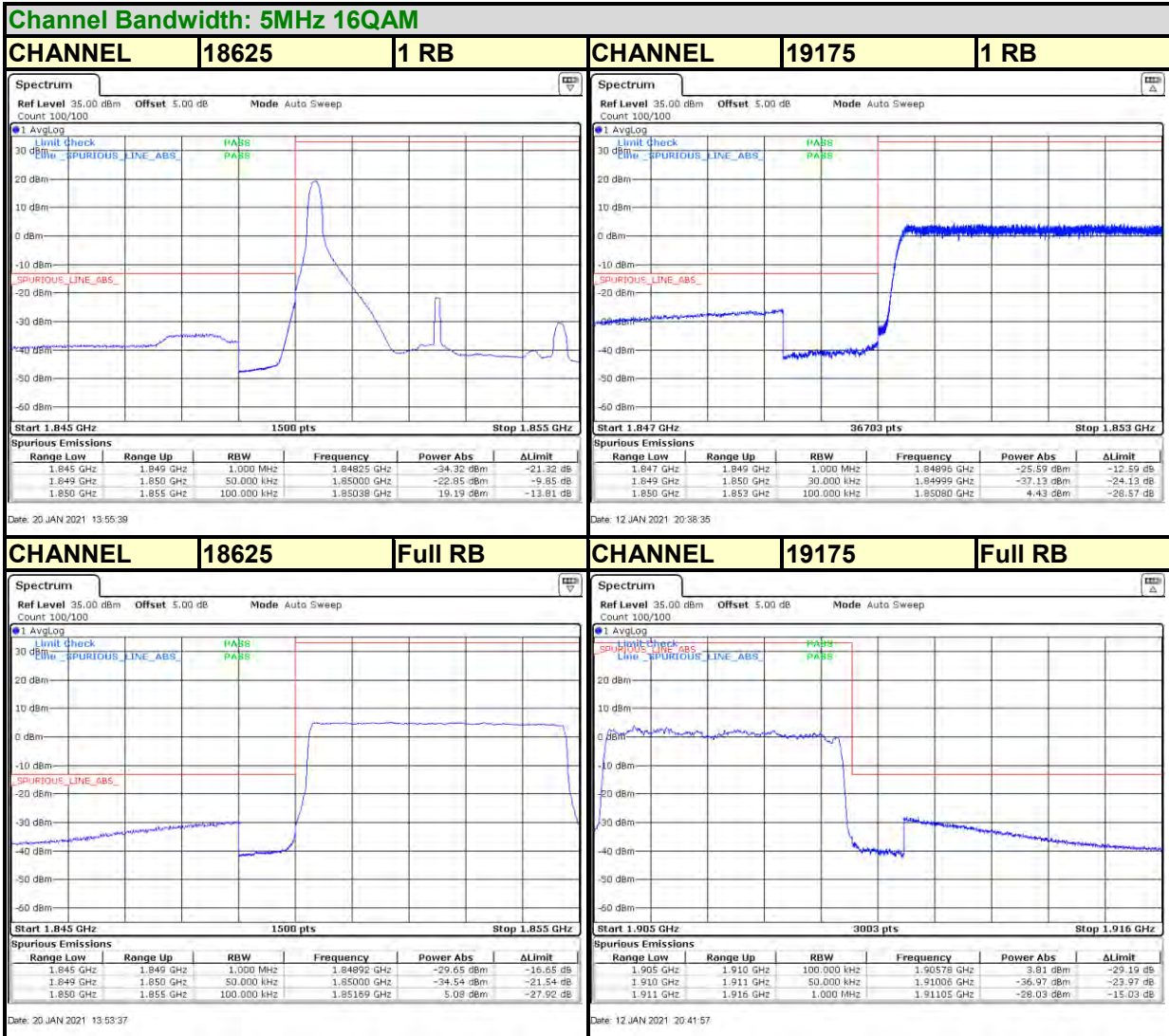
Channel Bandwidth: 5MHz QPSK





BUREAU VERITAS

Test Report No.: RFA20210104W001-5



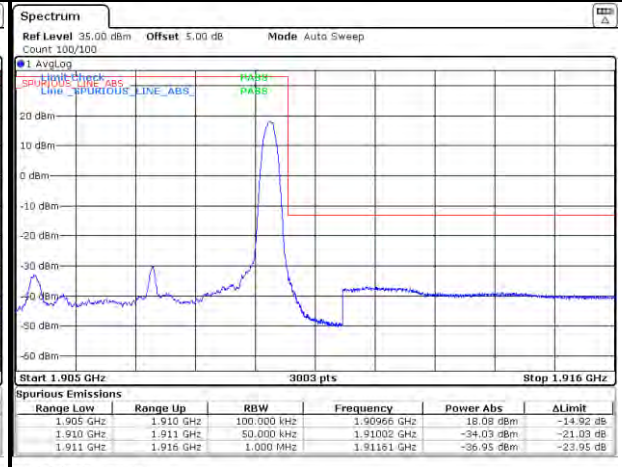
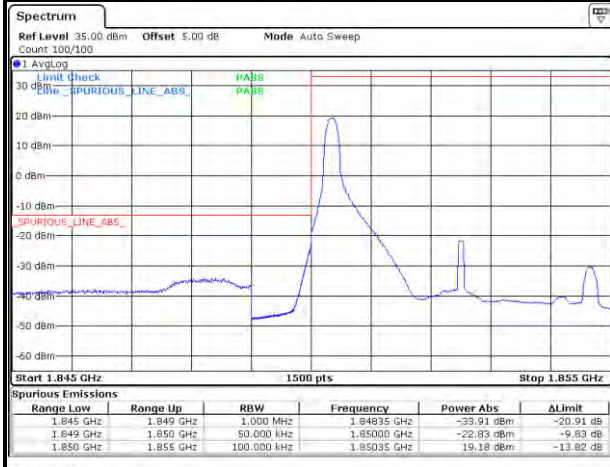


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 5MHz 64QAM

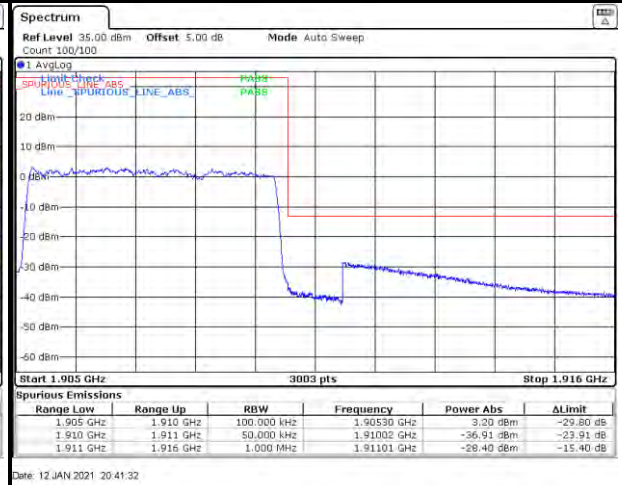
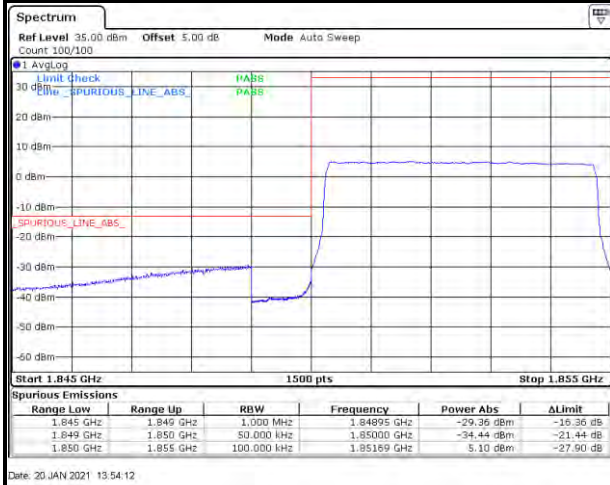
CHANNEL 18625 1 RB CHANNEL 19175 1 RB



Date: 20 JAN 2021 13:54:56

Date: 12 JAN 2021 20:40:55

CHANNEL 18625 Full RB CHANNEL 19175 Full RB



Date: 20 JAN 2021 13:54:12

Date: 12 JAN 2021 20:41:32

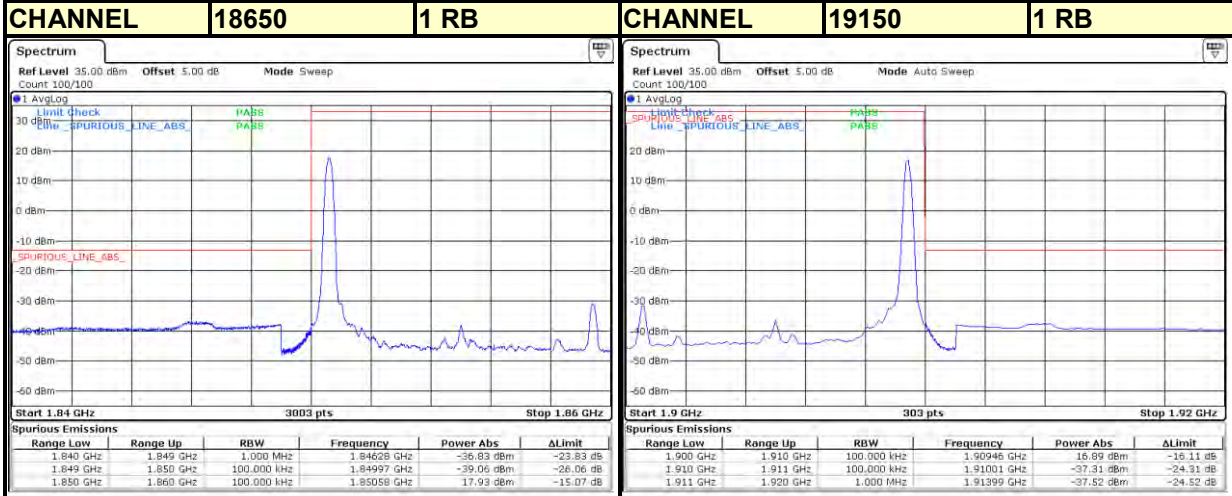


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

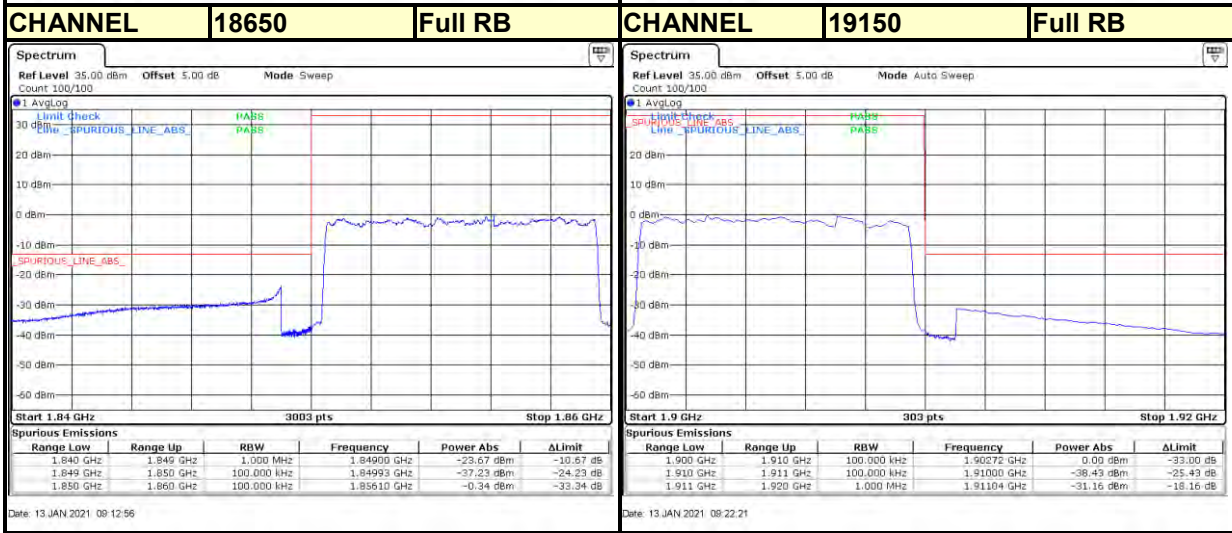
LTE BAND 2

Channel Bandwidth: 10MHz QPSK



Date: 13 JAN 2021 09:14:30

Date: 13 JAN 2021 08:22:02



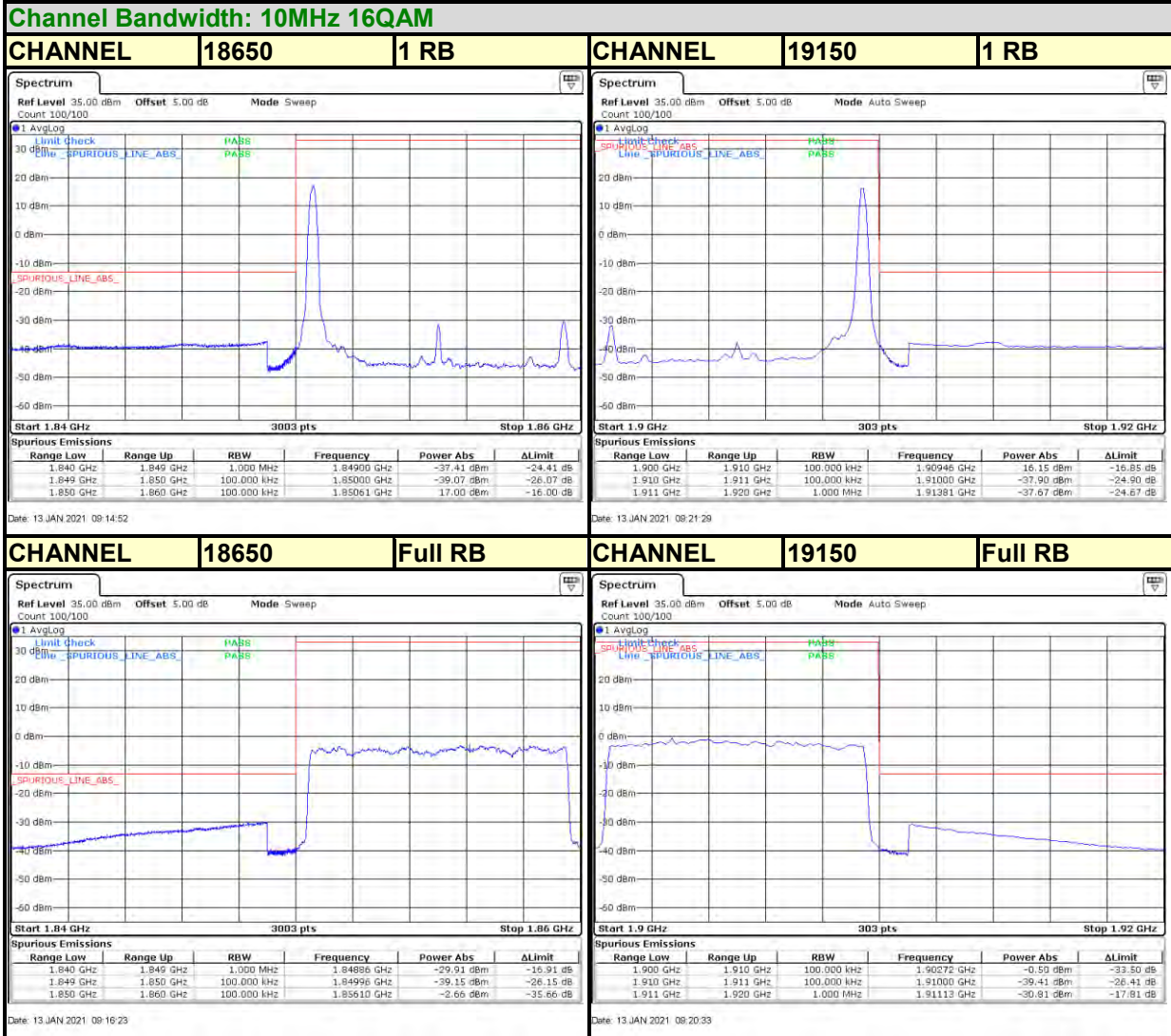
Date: 13 JAN 2021 08:12:56

Date: 13 JAN 2021 08:22:21



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Test Report No.: RFA20210104W001-5



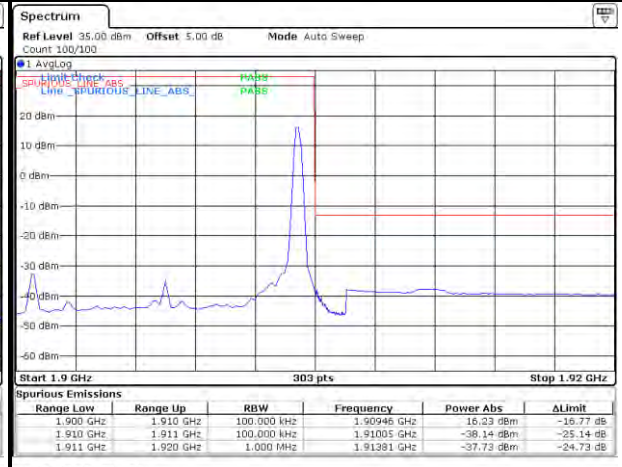
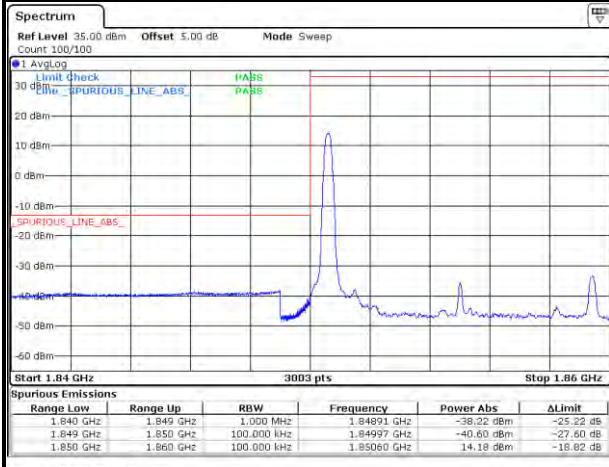


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 10MHz 64QAM

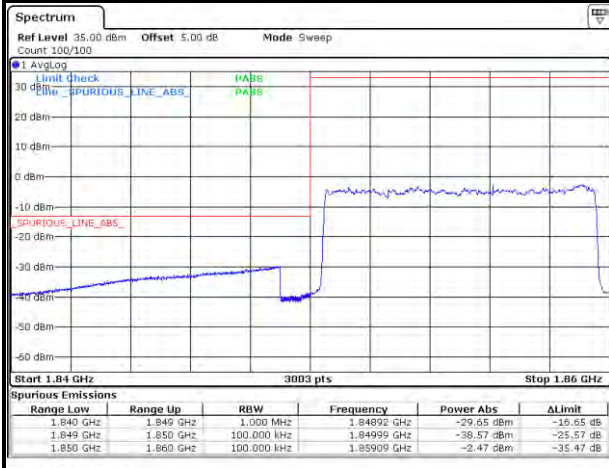
CHANNEL 18650 1 RB CHANNEL 19150 1 RB



Date: 13 JAN 2021 09:17:10

Date: 13 JAN 2021 09:18:43

CHANNEL 18650 Full RB CHANNEL 19150 Full RB



Date: 13 JAN 2021 09:16:42

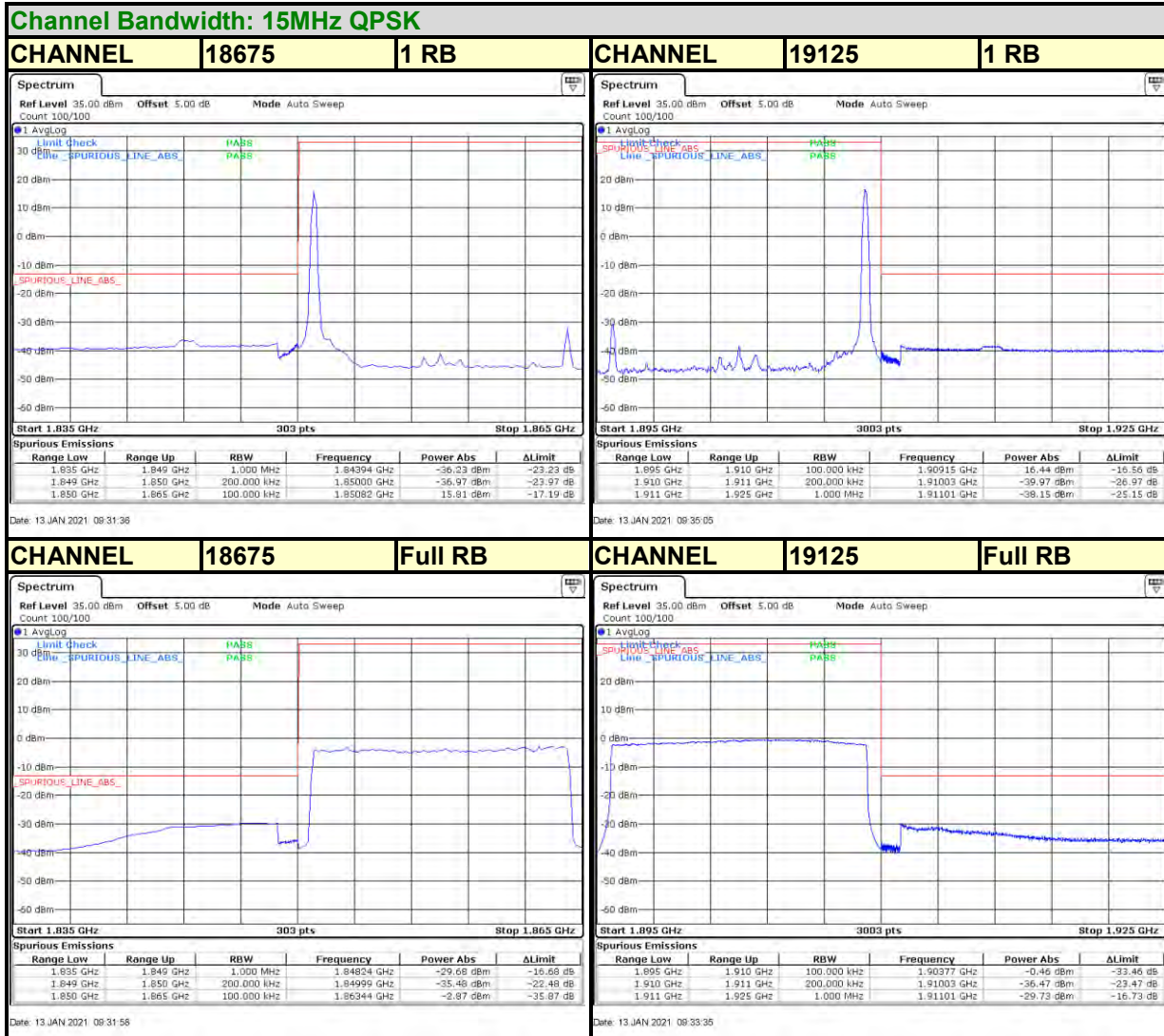
Date: 13 JAN 2021 09:20:14



BUREAU VERITAS

Test Report No.: RFA20210104W001-5

LTE BAND 2



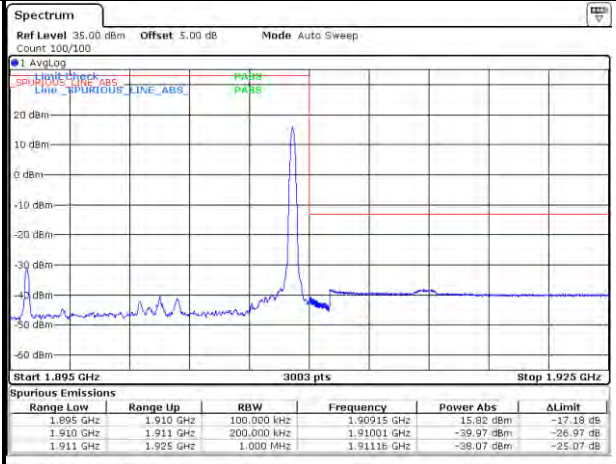
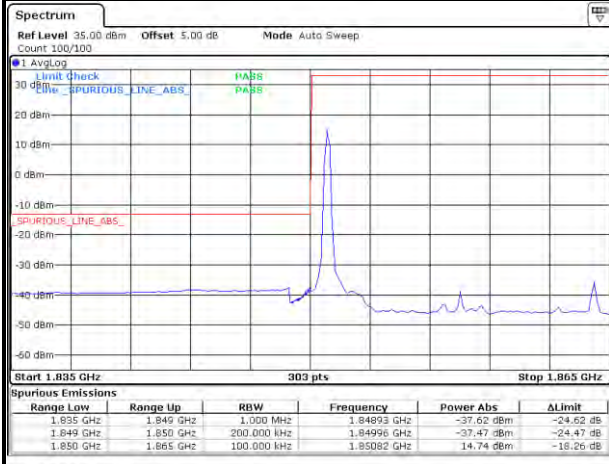


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 15MHz 16QAM

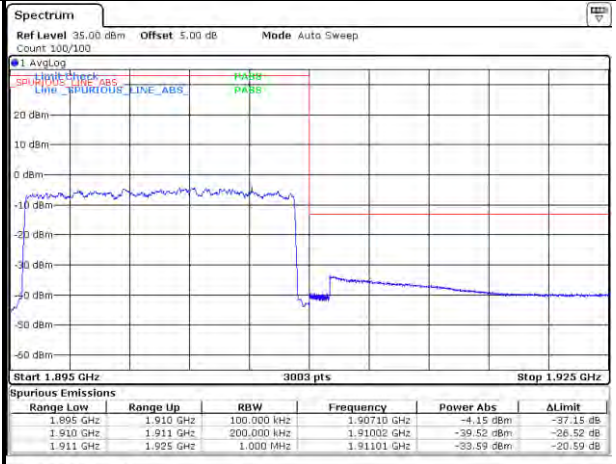
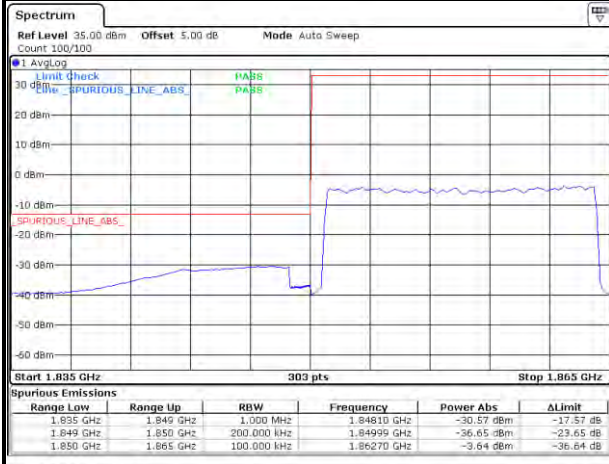
CHANNEL 18675 1 RB CHANNEL 19125 1 RB



Date: 13 JAN 2021 08:29:09

Date: 13 JAN 2021 08:35:22

CHANNEL 18675 Full RB CHANNEL 19125 Full RB



Date: 13 JAN 2021 08:29:57

Date: 13 JAN 2021 08:35:47

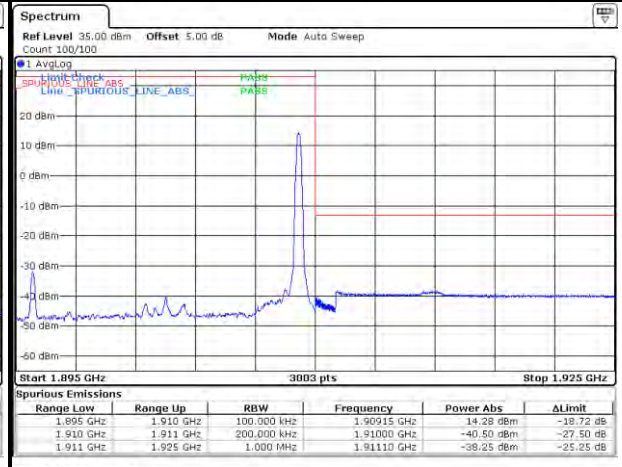
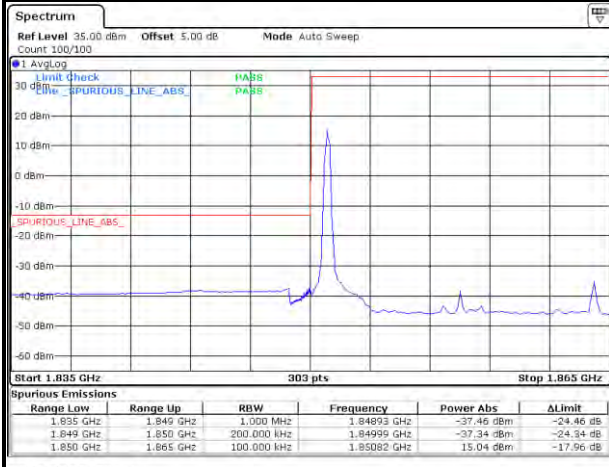


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

Channel Bandwidth: 15MHz 64QAM

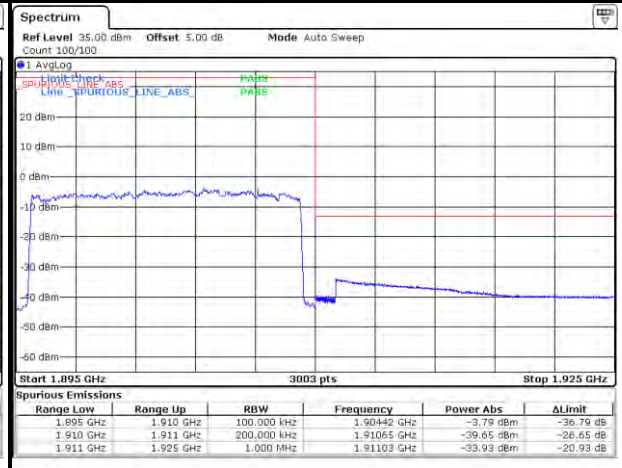
CHANNEL 18675 1 RB CHANNEL 19125 1 RB



Date: 13 JAN 2021 09:30:57

Date: 13 JAN 2021 09:36:30

CHANNEL 18675 Full RB CHANNEL 19125 Full RB



Date: 13 JAN 2021 09:30:12

Date: 13 JAN 2021 09:36:10



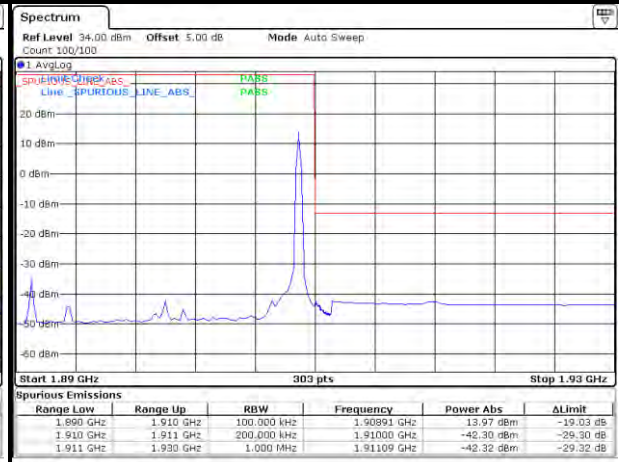
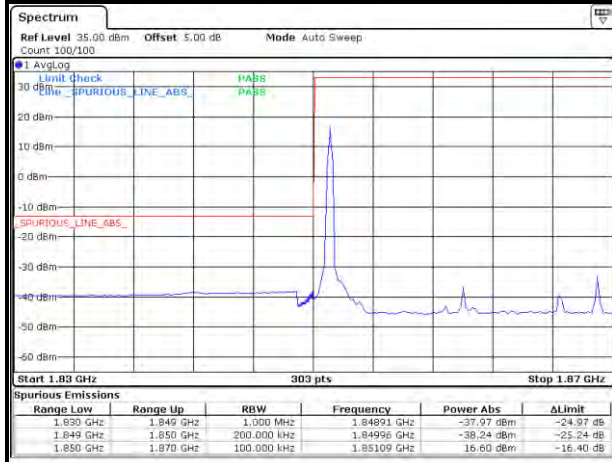
BUREAU VERITAS

Test Report No.: RFA20210104W001-5

LTE BAND 2

Channel Bandwidth: 20MHz QPSK

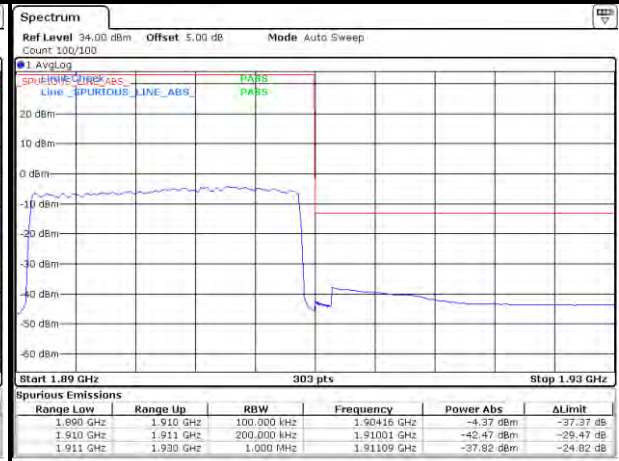
CHANNEL 18700 1 RB CHANNEL 19100 1 RB



Date: 13 JAN 2021 08:40:19

Date: 13 JAN 2021 08:46:38

CHANNEL 18700 Full RB CHANNEL 19100 Full RB



Date: 13 JAN 2021 08:39:38

Date: 13 JAN 2021 08:47:14

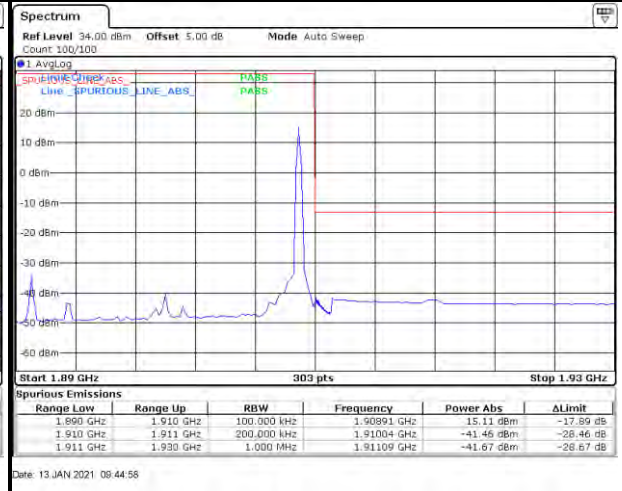
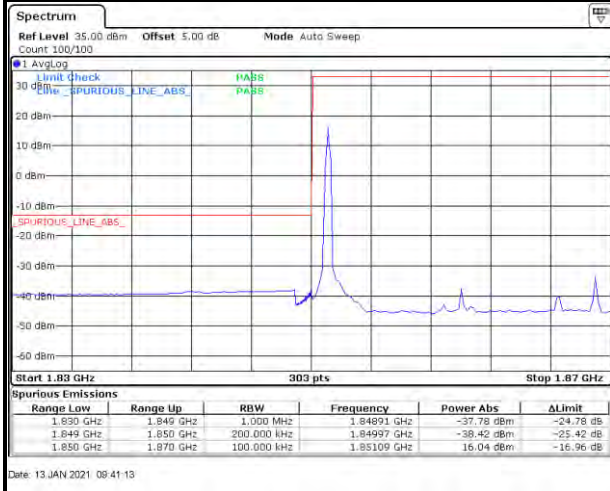


BUREAU VERITAS

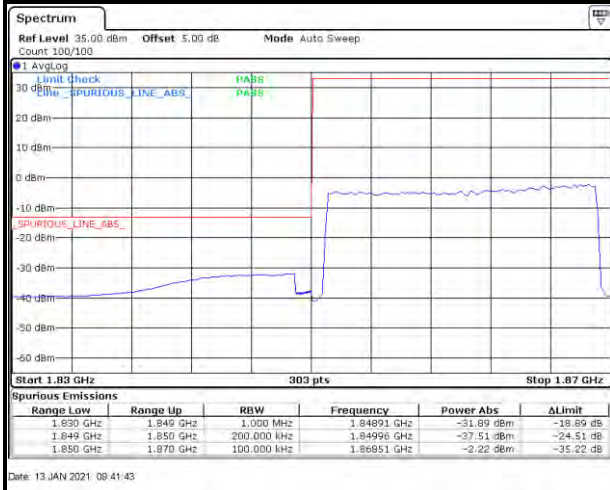
Test Report No.: RFA20210104W001-5

Channel Bandwidth: 20MHz 16QAM

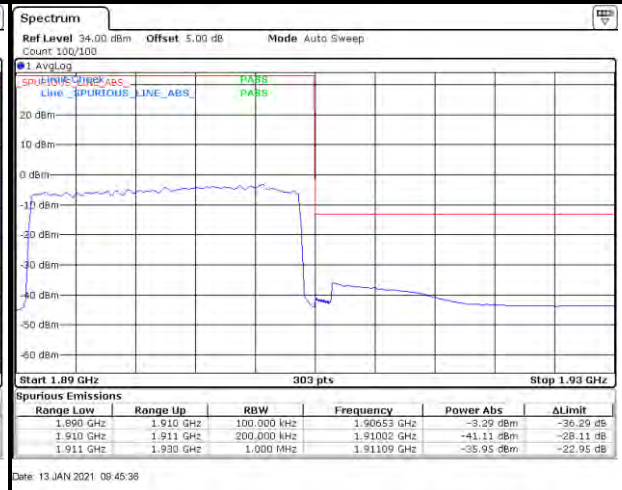
CHANNEL 18700 1 RB CHANNEL 19100 1 RB



CHANNEL 18700 Full RB



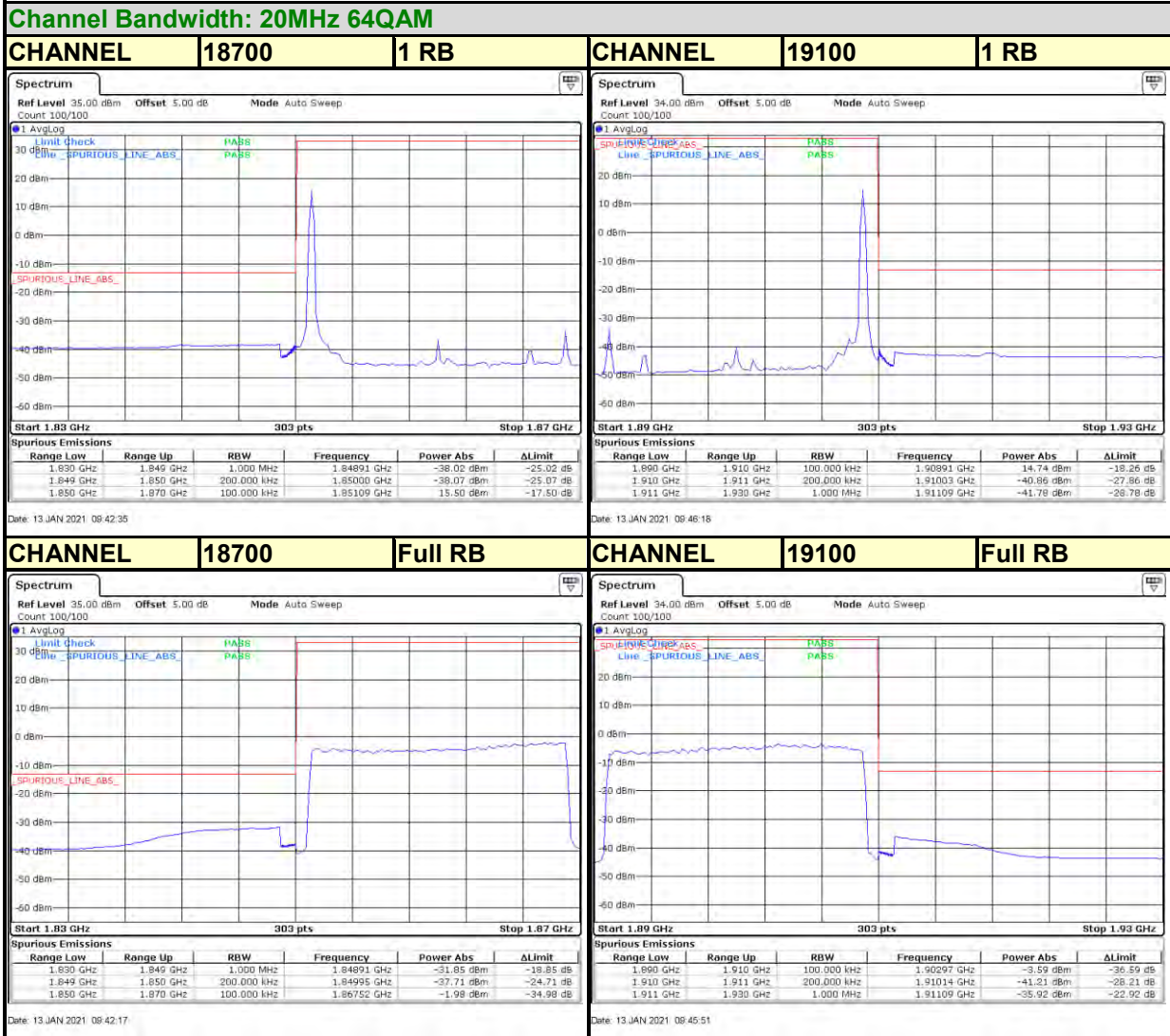
CHANNEL 19100 Full RB





BUREAU VERITAS

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3.5 CONDUCTED SPURIOUS EMISSIONS

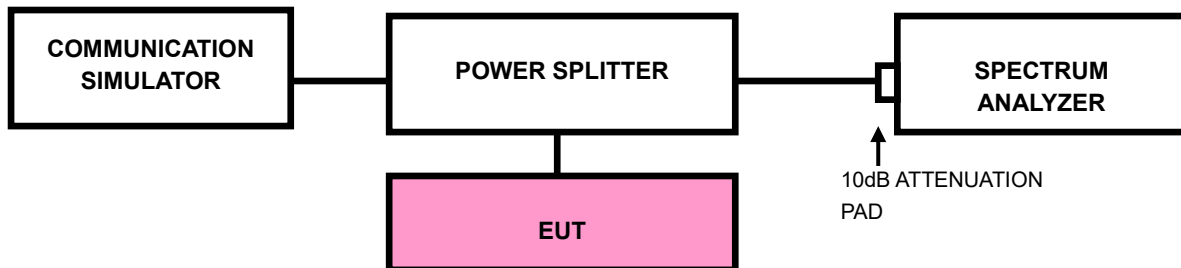
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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.

3.5.2 TEST PROCEDURE

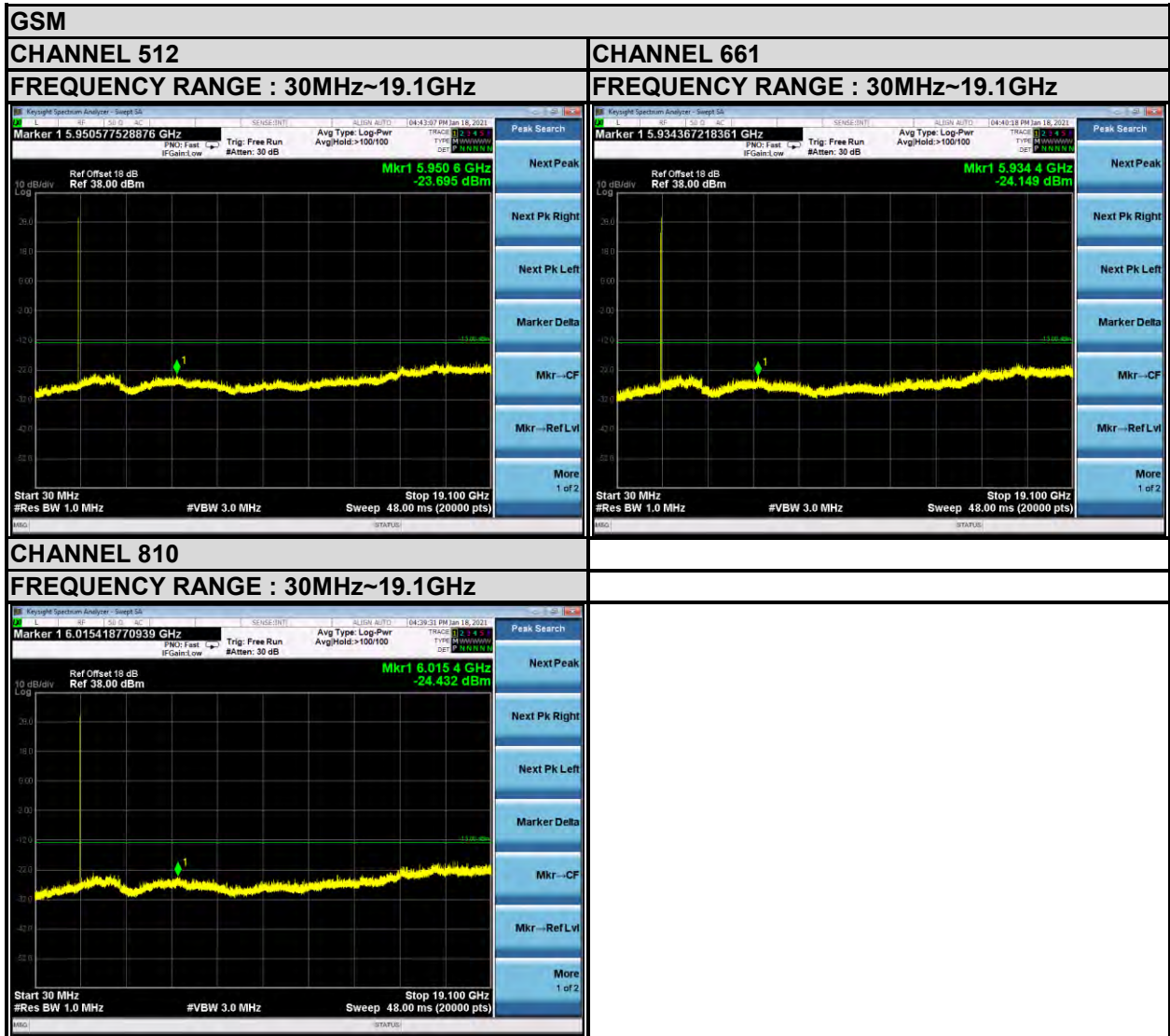
- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30 MHz to 19.1GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP





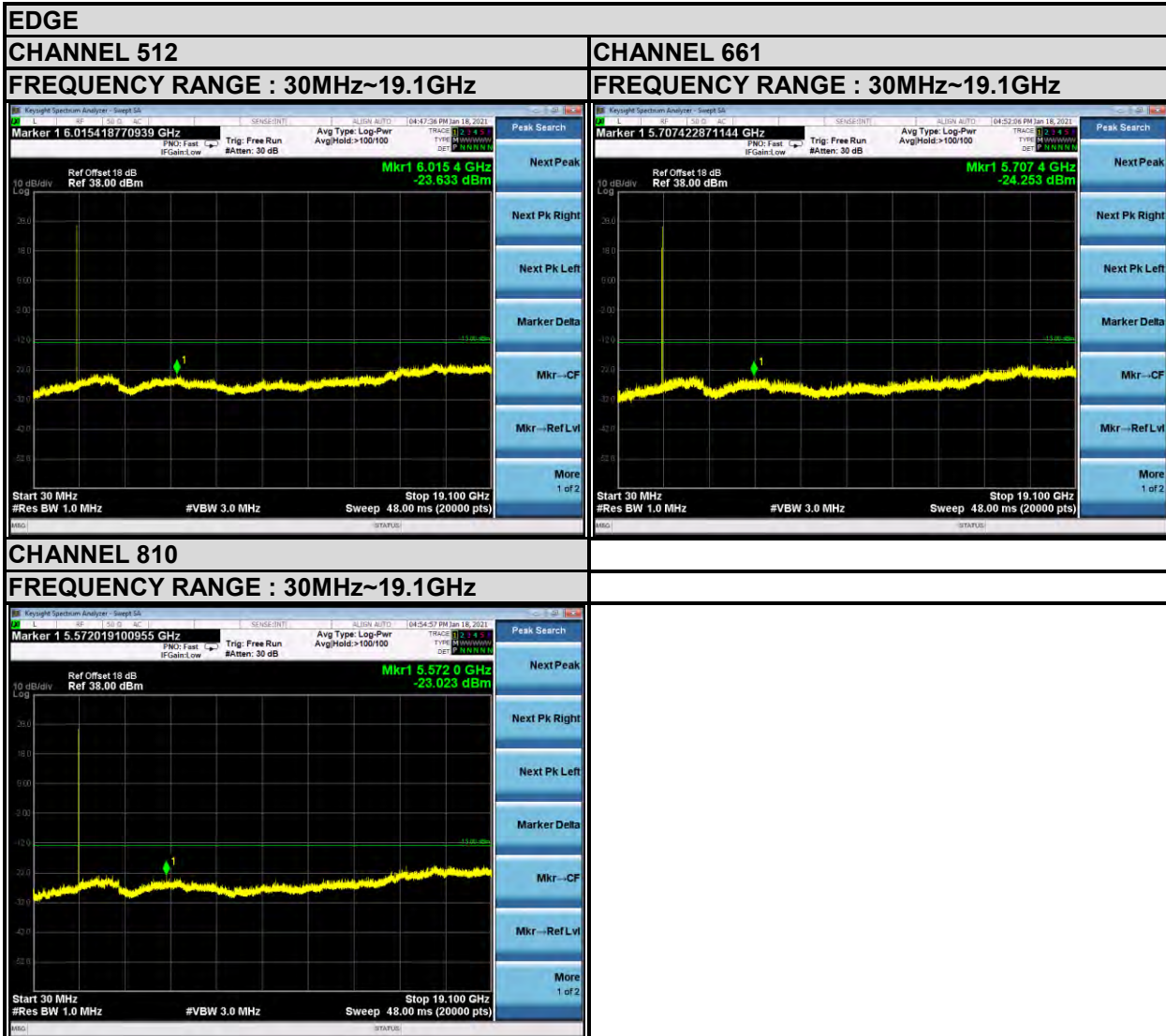
3.5.4 TEST RESULTS





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Test Report No.: RFA20210104W001-5





LTE BAND 2





BUREAU VERITAS

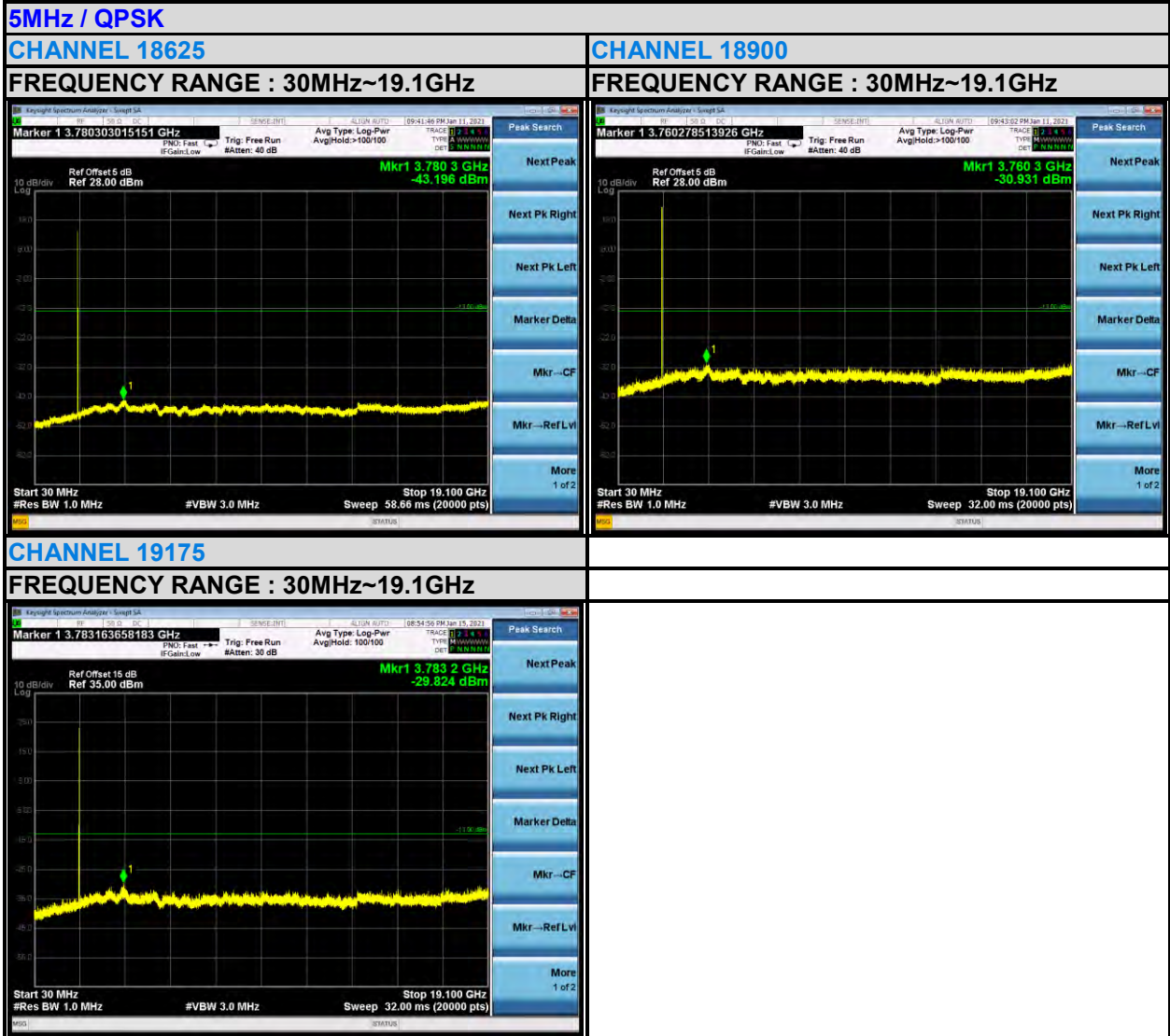
Test Report No.: RFA20210104W001-5





BUREAU VERITAS

Test Report No.: RFA20210104W001-5





BUREAU VERITAS

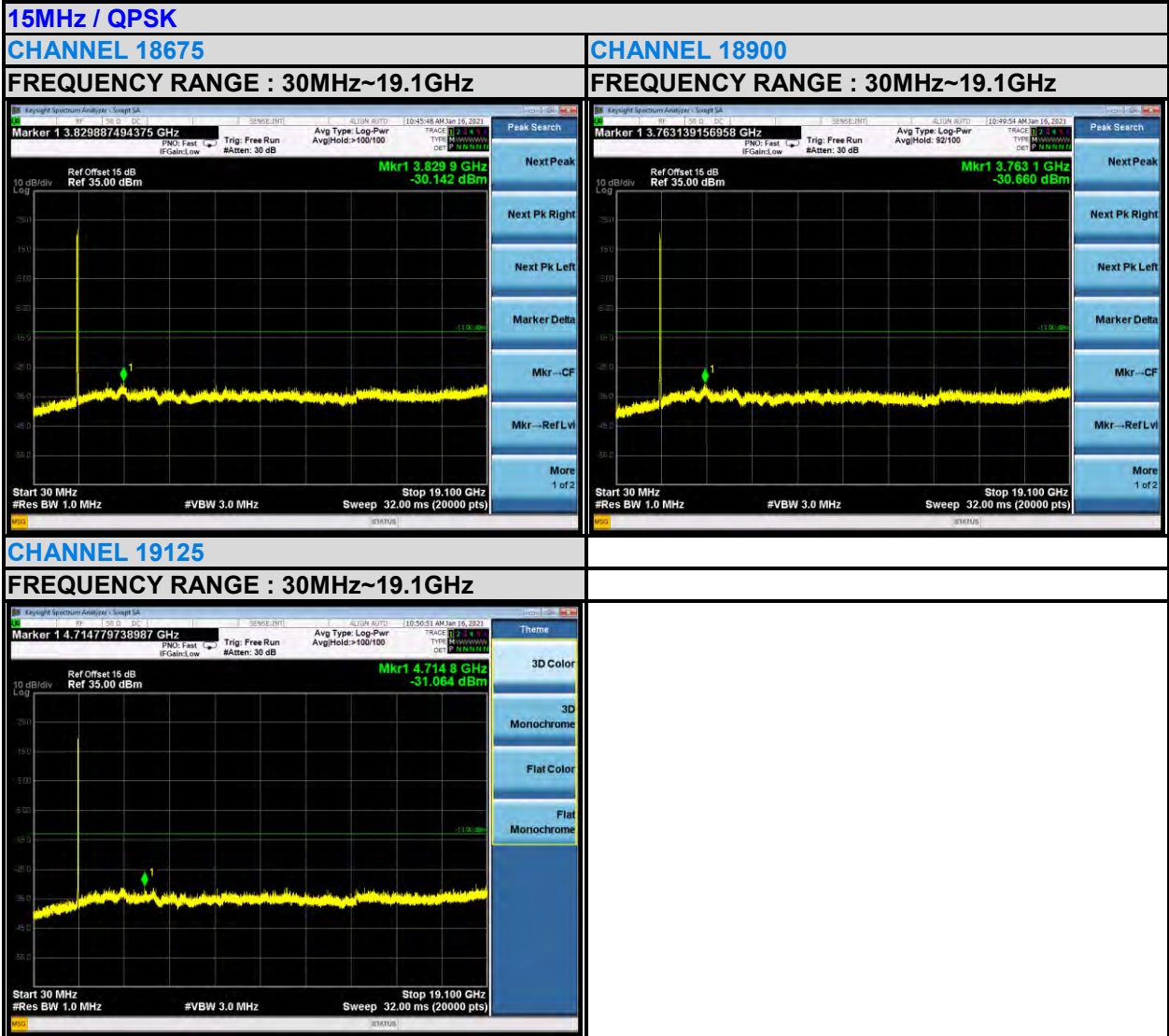
Test Report No.: RFA20210104W001-5





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Test Report No.: RFA20210104W001-5





BUREAU VERITAS

Test Report No.: RFA20210104W001-5



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3.6 RADIATED EMISSION MEASUREMENT

3.6.1 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 equal to -13dBm .

3.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- 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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.

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

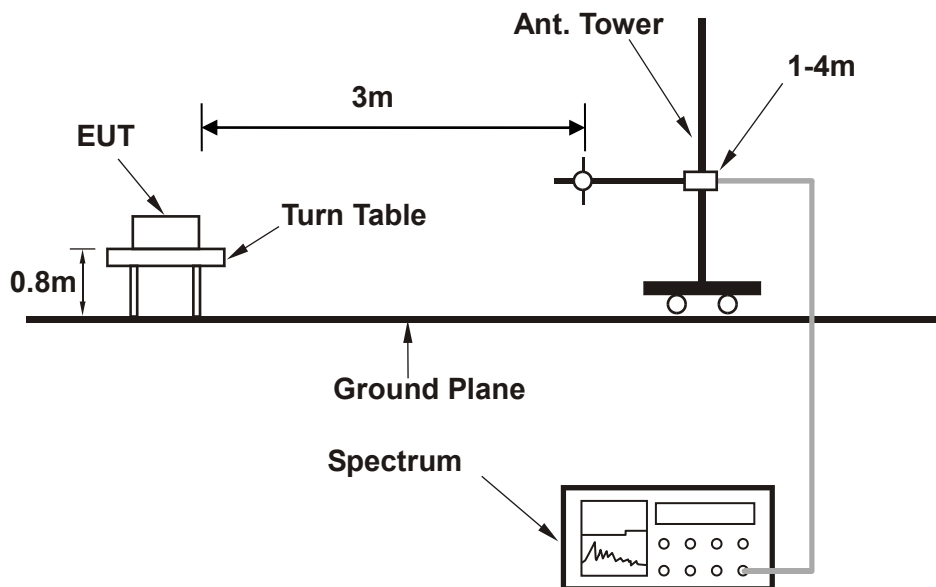
3.6.3 DEVIATION FROM TEST STANDARD

No deviation

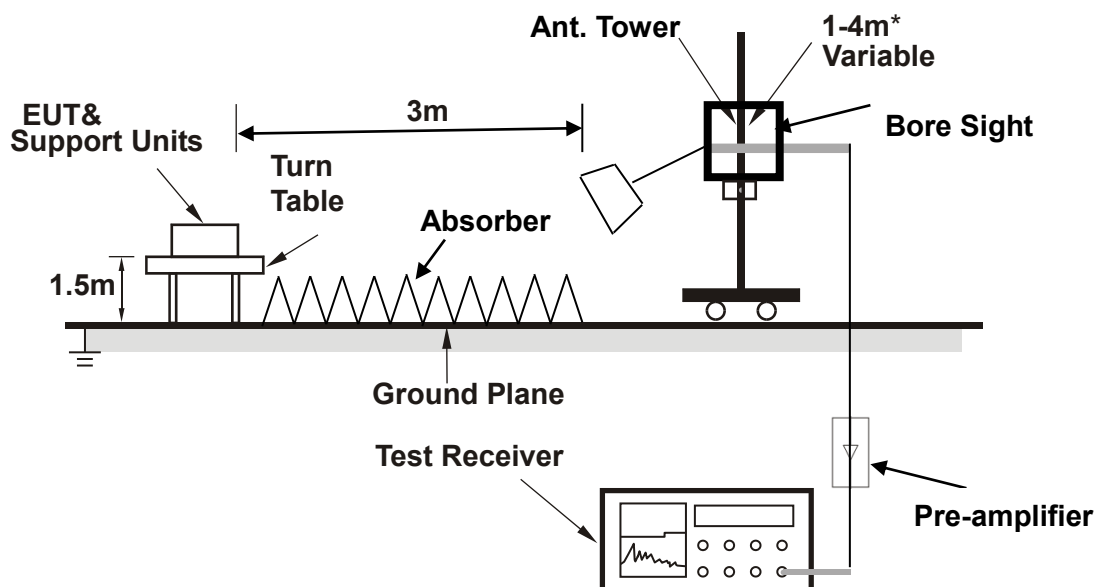


3.6.4 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

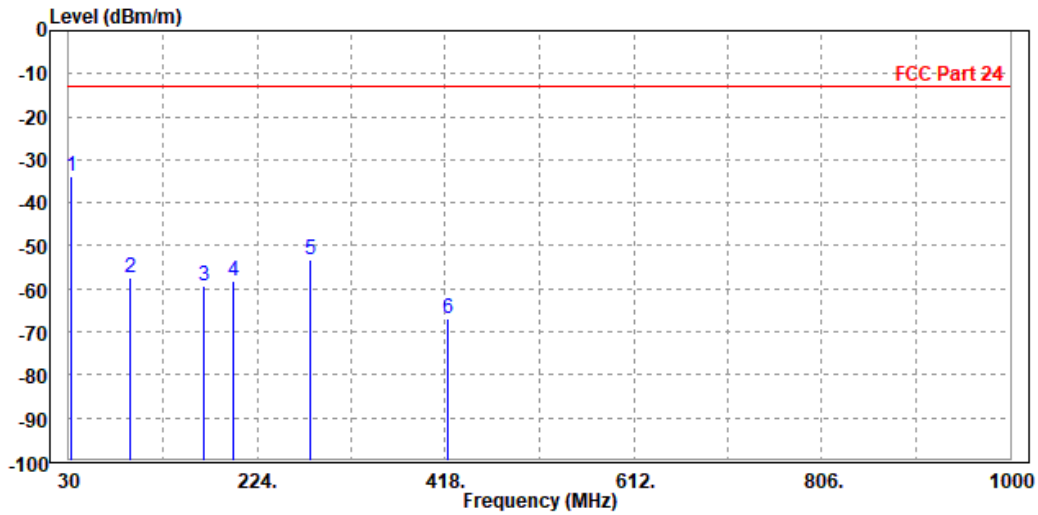
30 MHz – 1GHz data:

LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase	
	MHz	dBm/m	dBm	dBm/m	dB	dB/m			
1	PP	31.940	-34.01	-50.68	-13.00	-21.01	16.67	Peak	Horizontal
2		93.050	-57.51	-47.82	-13.00	-44.51	-9.69	Peak	Horizontal
3		168.710	-59.33	-41.17	-13.00	-46.33	-18.16	Peak	Horizontal
4		199.750	-58.16	-40.92	-13.00	-45.16	-17.24	Peak	Horizontal
5		279.290	-53.37	-38.54	-13.00	-40.37	-14.83	Peak	Horizontal
6		420.910	-67.04	-56.60	-13.00	-54.04	-10.44	Peak	Horizontal



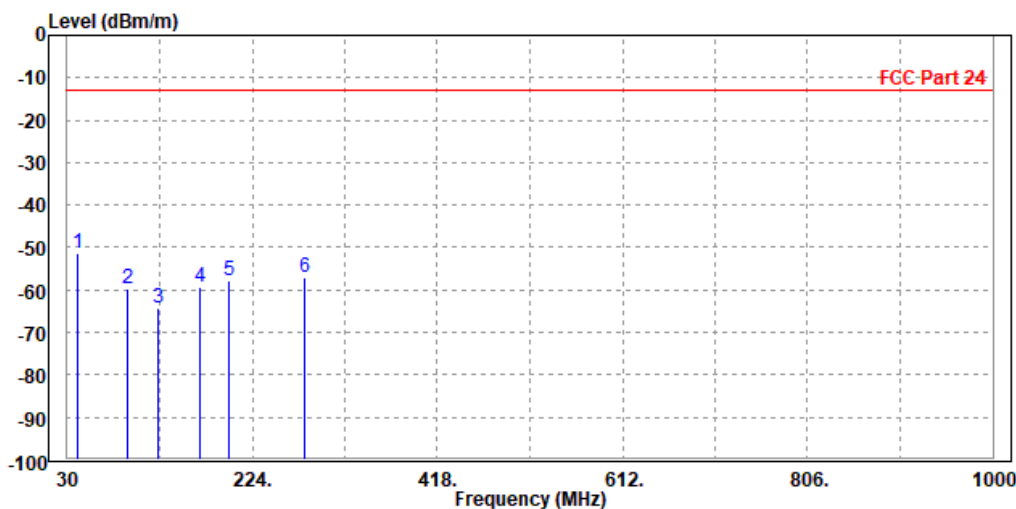


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase	
	MHz	dBm/m	dBm	dBm/m	dB	dB/m			
1	PP	41.640	-51.34	-49.44	-13.00	-38.34	-1.90	Peak	Vertical
2		93.050	-59.73	-49.15	-13.00	-46.73	-10.58	Peak	Vertical
3		125.060	-64.12	-51.91	-13.00	-51.12	-12.21	Peak	Vertical
4		168.710	-59.26	-44.91	-13.00	-46.26	-14.35	Peak	Vertical
5		198.780	-57.73	-46.94	-13.00	-44.73	-10.79	Peak	Vertical
6		279.290	-56.90	-45.51	-13.00	-43.90	-11.39	Peak	Vertical





ABOVE 1GHz DATA

Note: For higher frequency, the emission is too low to be detected.

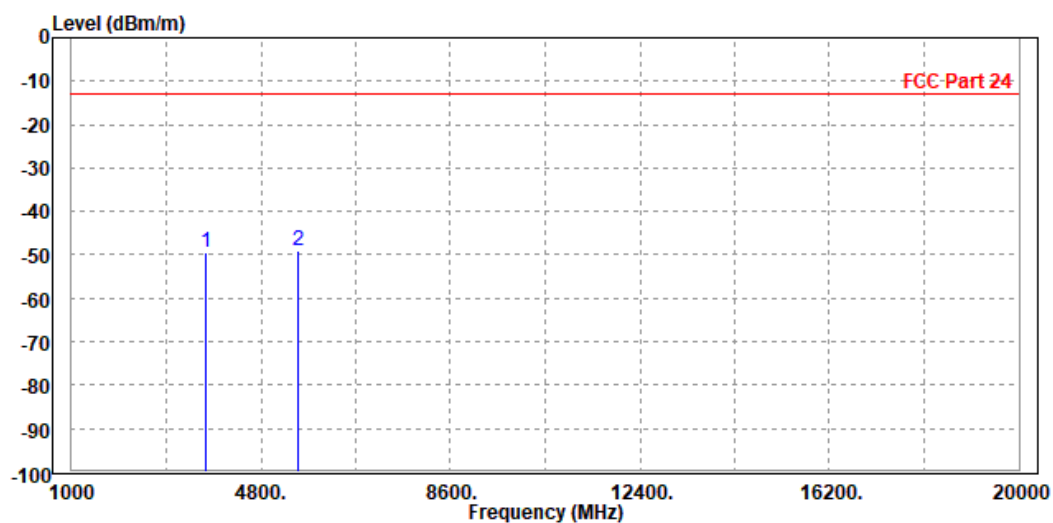
WORST-CASE DATA

PCS 1900:

CH 512

MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3698.000	-49.25	-58.03	-13.00	-36.25	8.78	Peak	Horizontal
2 PP	5550.600	-49.05	-59.24	-13.00	-36.05	10.19	Peak	Horizontal



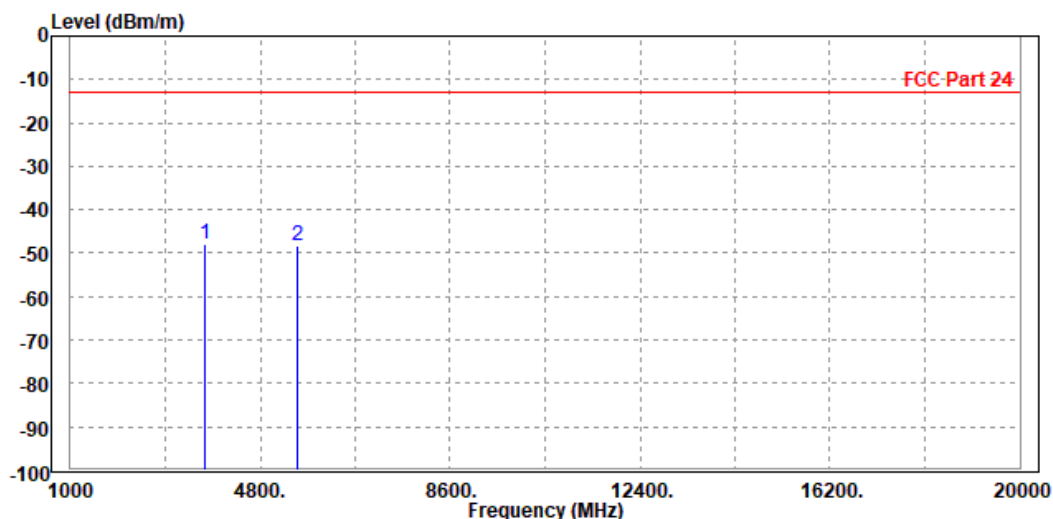


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3698.000	-48.03	-57.28	-13.00	-35.03	9.25	Peak	Vertical
2	5550.600	-48.33	-58.23	-13.00	-35.33	9.90	Peak	Vertical

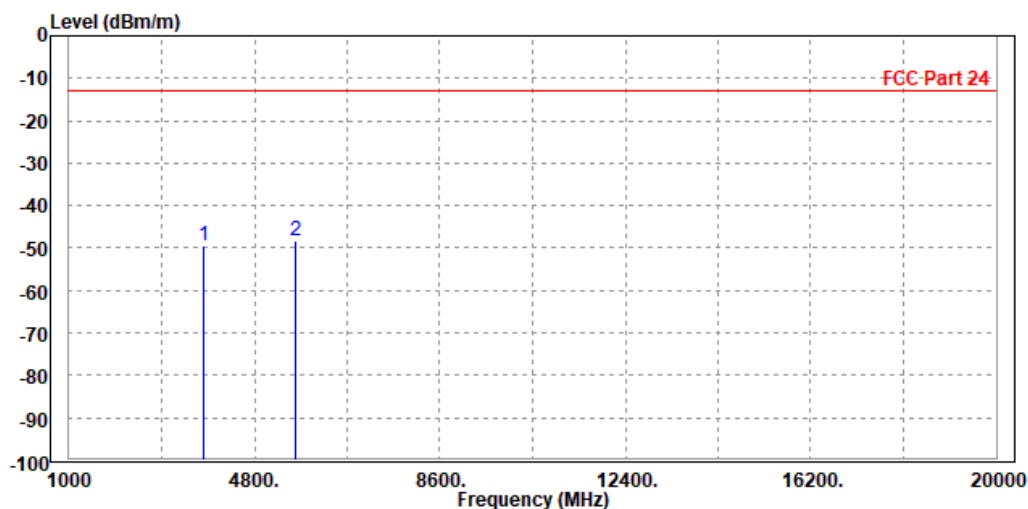




CH 661

MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-49.44	-58.29	-13.00	-36.44	8.85	Peak	Horizontal
2 PP	5640.000	-48.22	-58.70	-13.00	-35.22	10.48	Peak	Horizontal



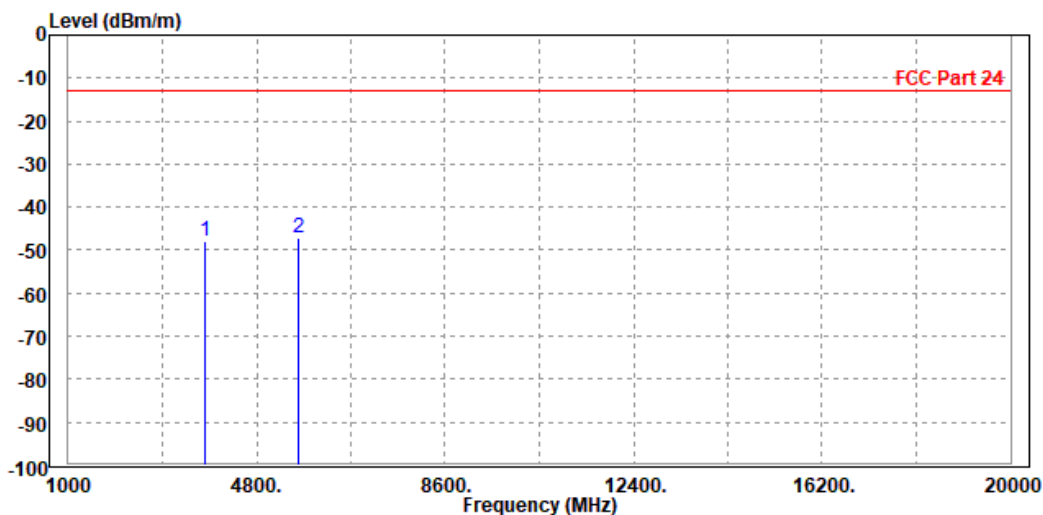


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-47.74	-57.01	-13.00	-34.74	9.27	Peak	Vertical
2 PP	5640.000	-47.21	-57.46	-13.00	-34.21	10.25	Peak	Vertical

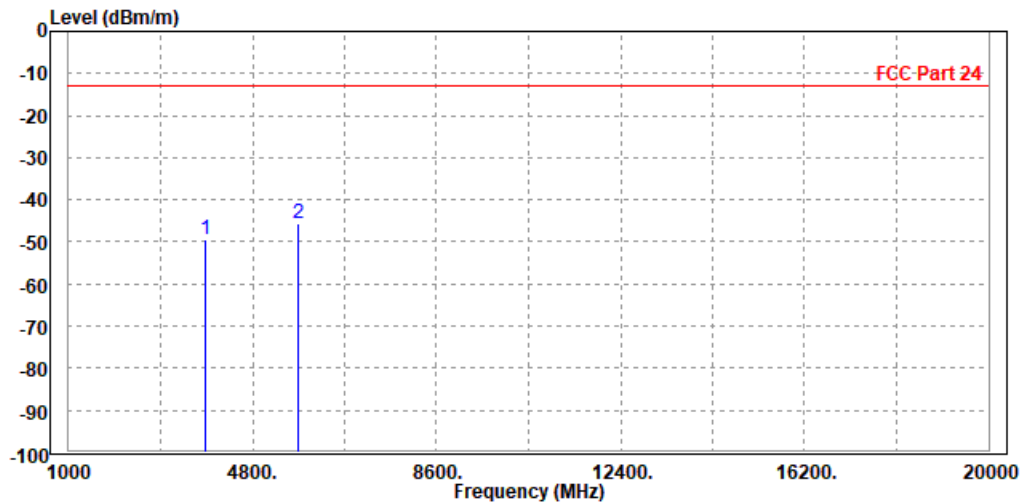




CH 810

MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812.000	-49.41	-58.32	-13.00	-36.41	8.91	Peak	Horizontal
2 PP	5729.400	-45.80	-56.58	-13.00	-32.80	10.78	Peak	Horizontal



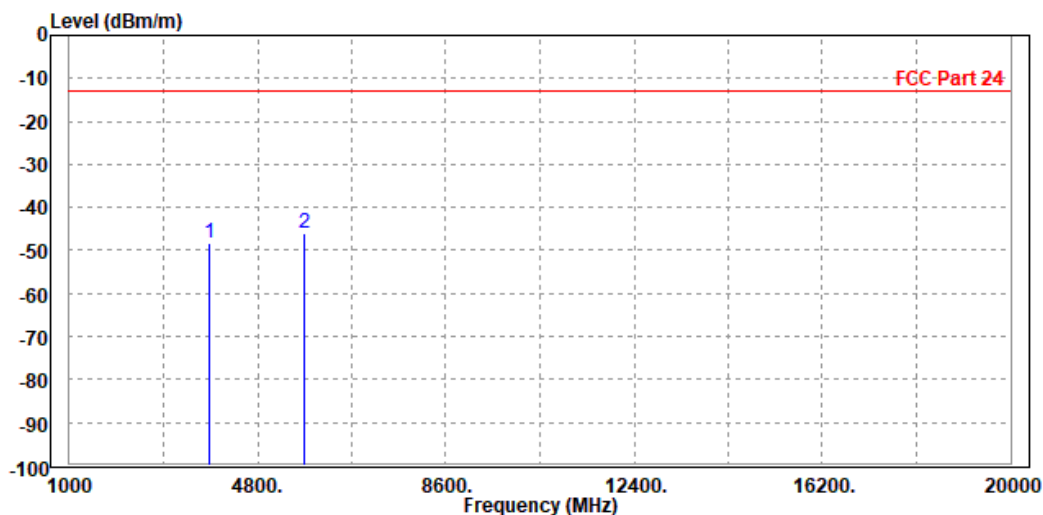


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812.000	-48.10	-57.39	-13.00	-35.10	9.29	Peak	Vertical
2 PP	5729.400	-46.04	-56.63	-13.00	-33.04	10.59	Peak	Vertical



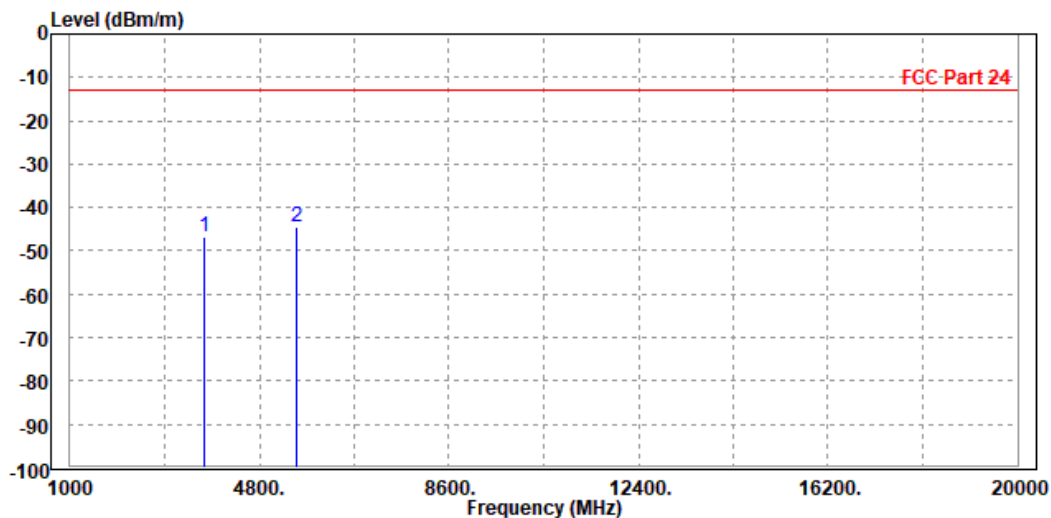


EDGE 1900:

CH 512

MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3698.000	-46.65	-55.43	-13.00	-33.65	8.78	Peak	Horizontal
2 PP	5550.600	-44.37	-54.56	-13.00	-31.37	10.19	Peak	Horizontal



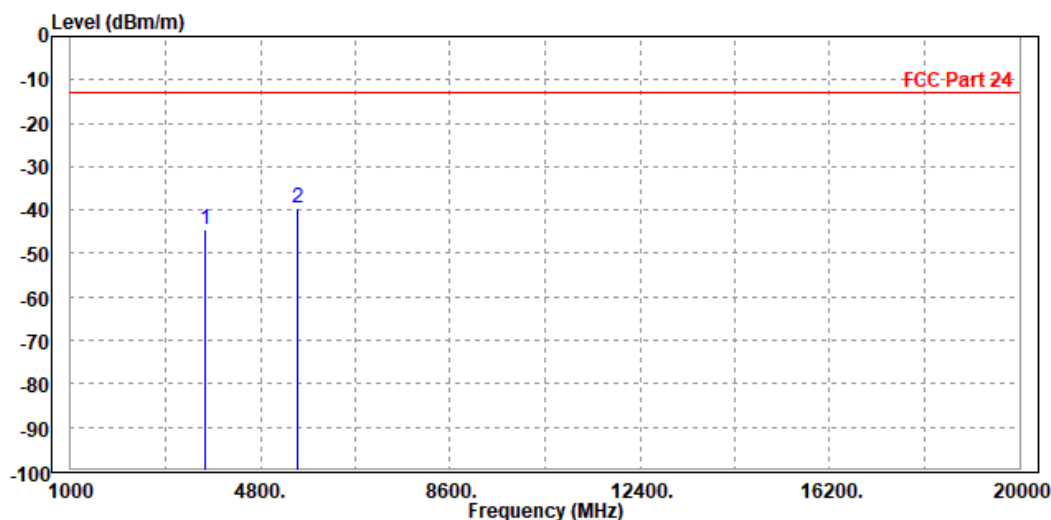


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3700.400	-44.64	-53.89	-13.00	-31.64	9.25	Peak	Vertical
2 PP	5550.600	-39.47	-49.37	-13.00	-26.47	9.90	Peak	Vertical

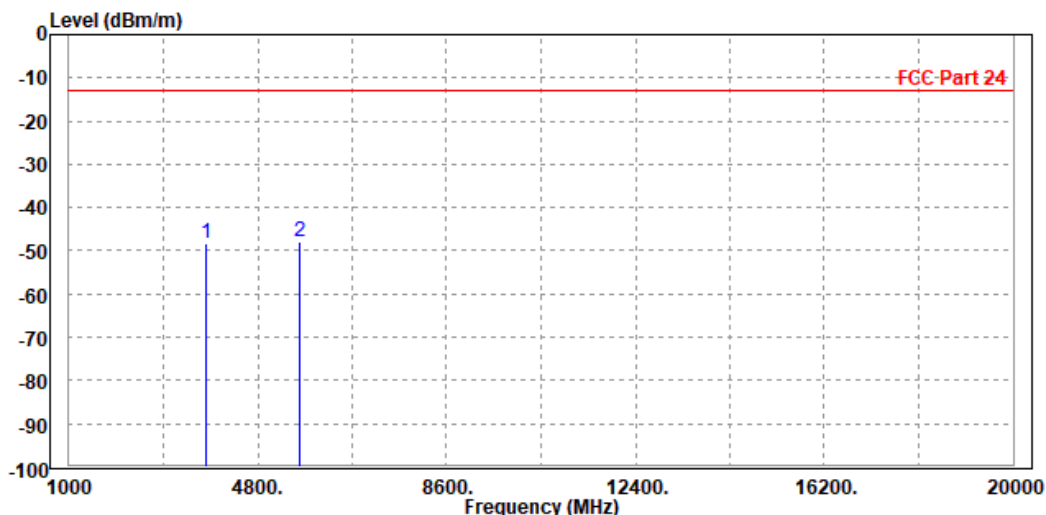




CH 661

MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-48.16	-57.01	-13.00	-35.16	8.85	Peak	Horizontal
2 PP	5640.000	-48.03	-58.51	-13.00	-35.03	10.48	Peak	Horizontal



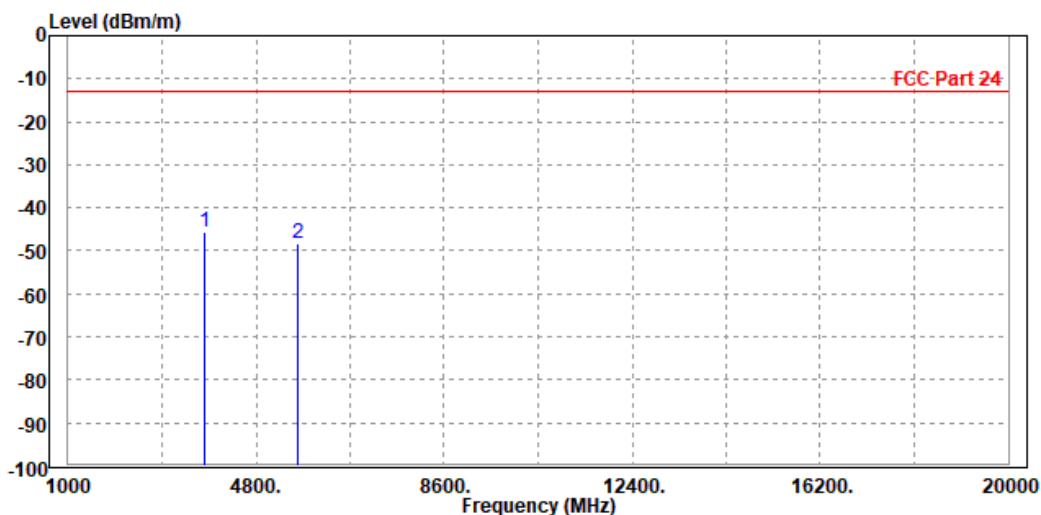


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3755.000	-45.67	-54.94	-13.00	-32.67	9.27	Peak	Vertical
2	5640.000	-48.26	-58.51	-13.00	-35.26	10.25	Peak	Vertical

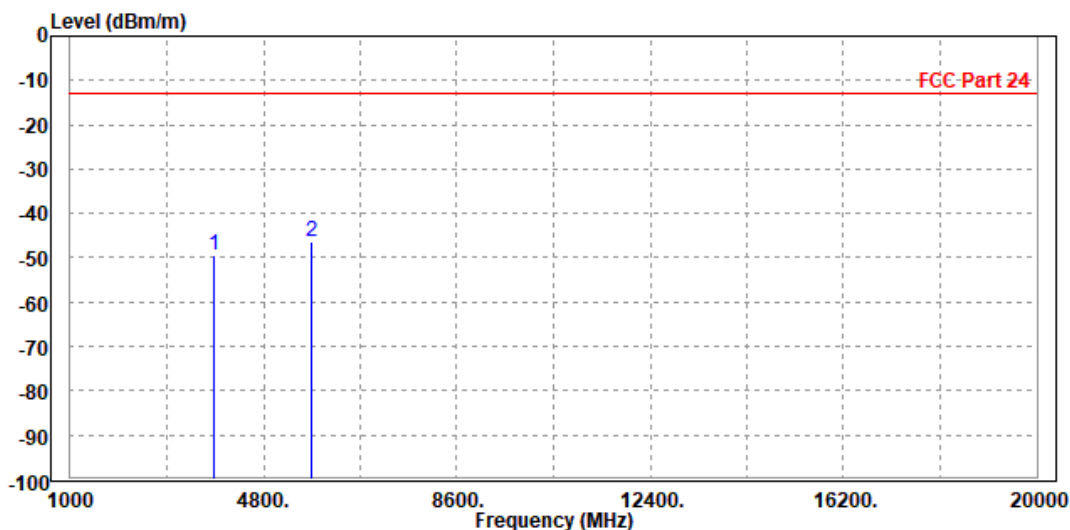




CH 810

MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812.000	-49.37	-58.28	-13.00	-36.37	8.91	Peak	Horizontal
2 PP	5729.400	-46.24	-57.02	-13.00	-33.24	10.78	Peak	Horizontal



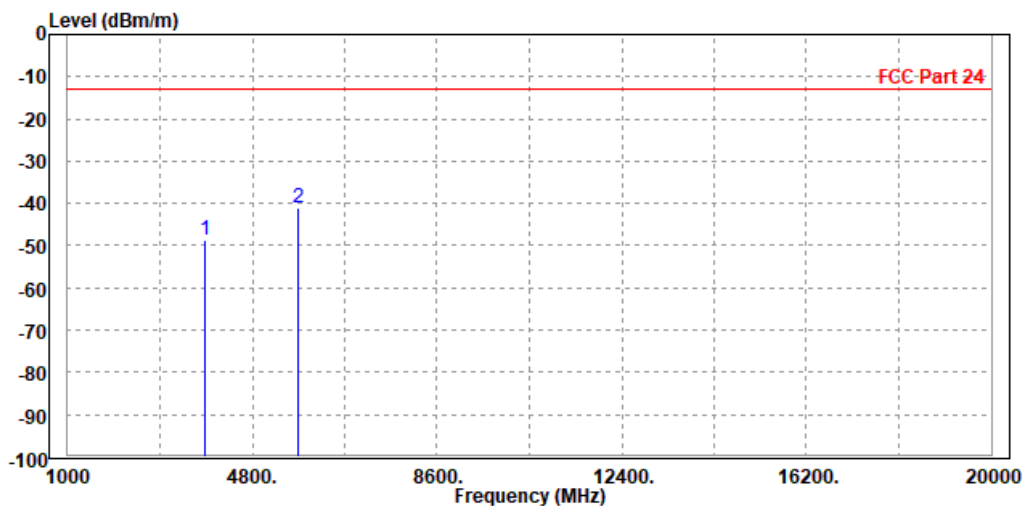


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812.000	-48.61	-57.90	-13.00	-35.61	9.29	Peak	Vertical
2 PP	5729.400	-41.13	-51.72	-13.00	-28.13	10.59	Peak	Vertical





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Test Report No.: RFA20210104W001-5

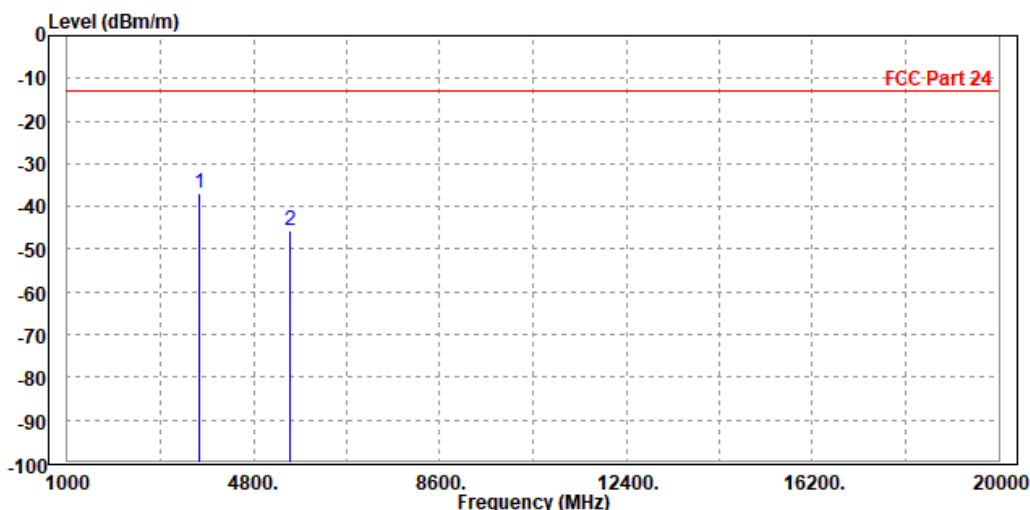
LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH 18607

MODE	TX channel 18607	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3698.000	-36.88	-45.66	-13.00	-23.88	8.78	Peak	Horizontal
2	5552.100	-45.64	-55.83	-13.00	-32.64	10.19	Peak	Horizontal



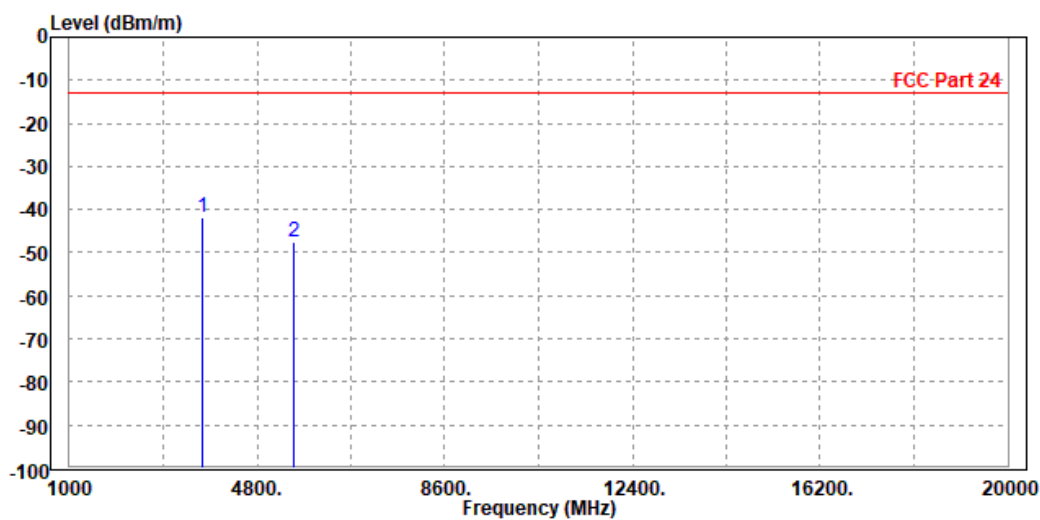


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18607	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3698.000	-41.86	-51.11	-13.00	-28.86	9.25	Peak	Vertical
2	5552.100	-47.42	-57.33	-13.00	-34.42	9.91	Peak	Vertical





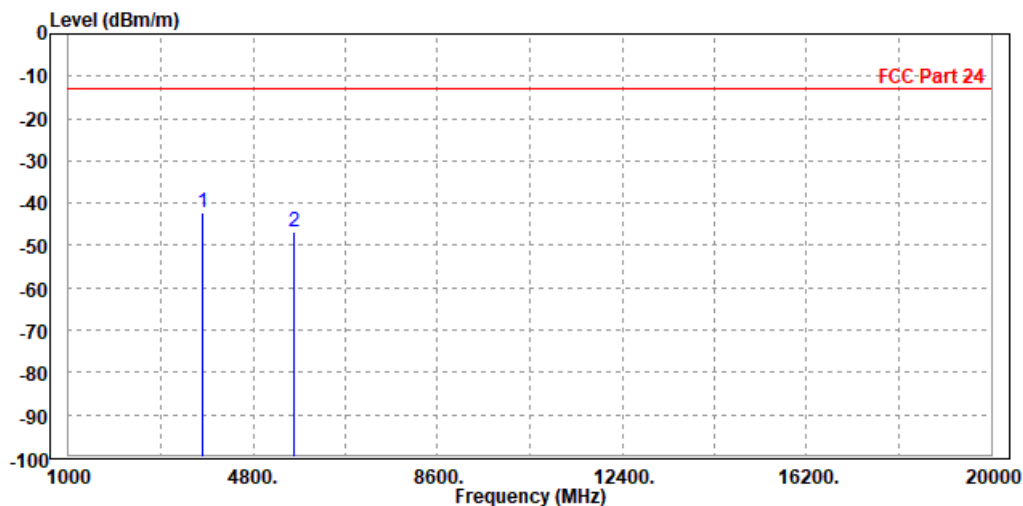
BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CH 18900

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3760.000	-42.28	-51.13	-13.00	-29.28	8.85	Peak	Horizontal
2	5640.000	-46.73	-57.21	-13.00	-33.73	10.48	Peak	Horizontal



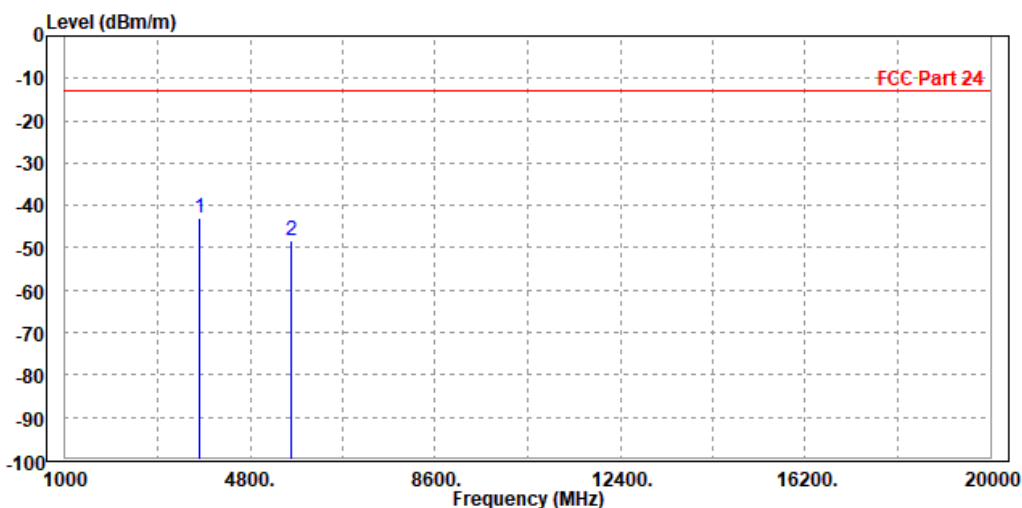


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3760.000	-43.11	-52.38	-13.00	-30.11	9.27	Peak	Vertical
2	5640.000	-48.18	-58.43	-13.00	-35.18	10.25	Peak	Vertical





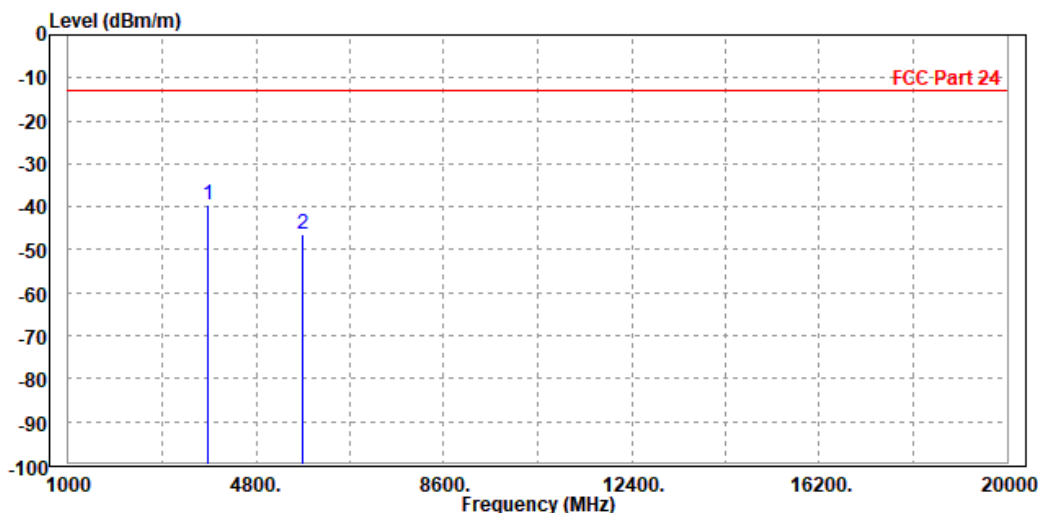
BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CH 19193

MODE	TX channel 19193	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3812.000	-39.41	-48.32	-13.00	-26.41	8.91	Peak	Horizontal
2	5727.900	-46.36	-57.13	-13.00	-33.36	10.77	Peak	Horizontal



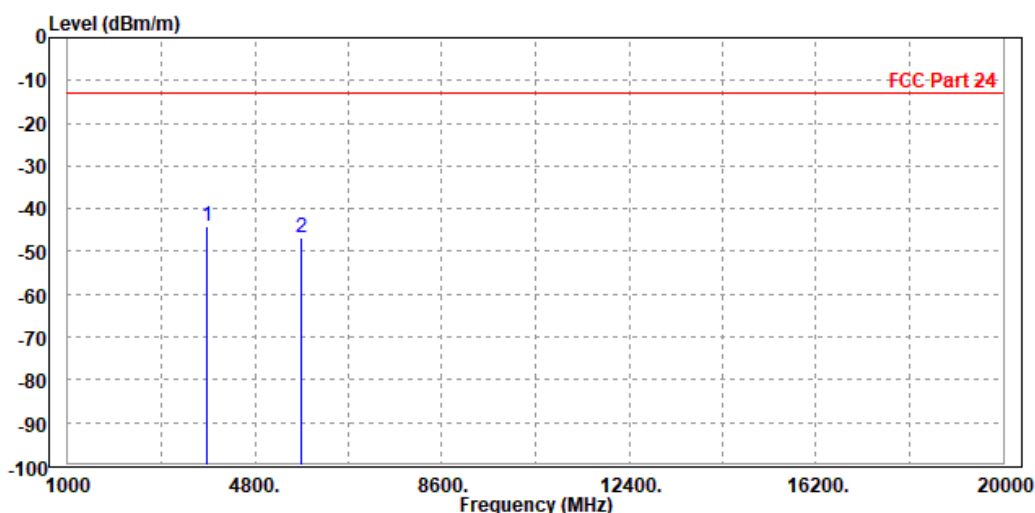


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 19193	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3812.000	-44.24	-53.53	-13.00	-31.24	9.29	Peak	Vertical
2	5727.900	-46.74	-57.33	-13.00	-33.74	10.59	Peak	Vertical

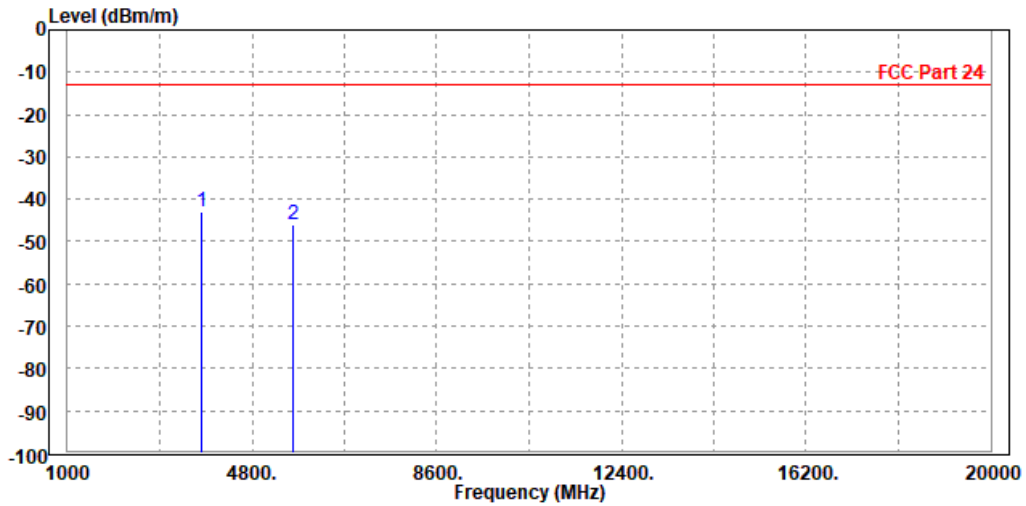




CHANNEL BANDWIDTH: 3MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3760.000	-43.05	-51.90	-13.00	-30.05	8.85	Peak	Horizontal
2	5640.000	-46.18	-56.66	-13.00	-33.18	10.48	Peak	Horizontal



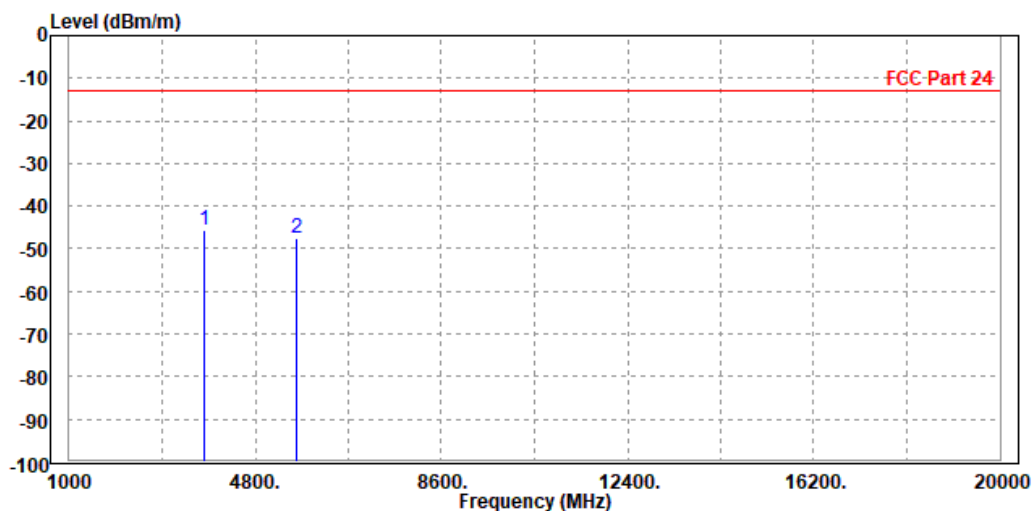


**BUREAU
VERITAS**

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3760.000	-45.74	-55.01	-13.00	-32.74	9.27	Peak	Vertical
2	5640.000	-47.63	-57.88	-13.00	-34.63	10.25	Peak	Vertical





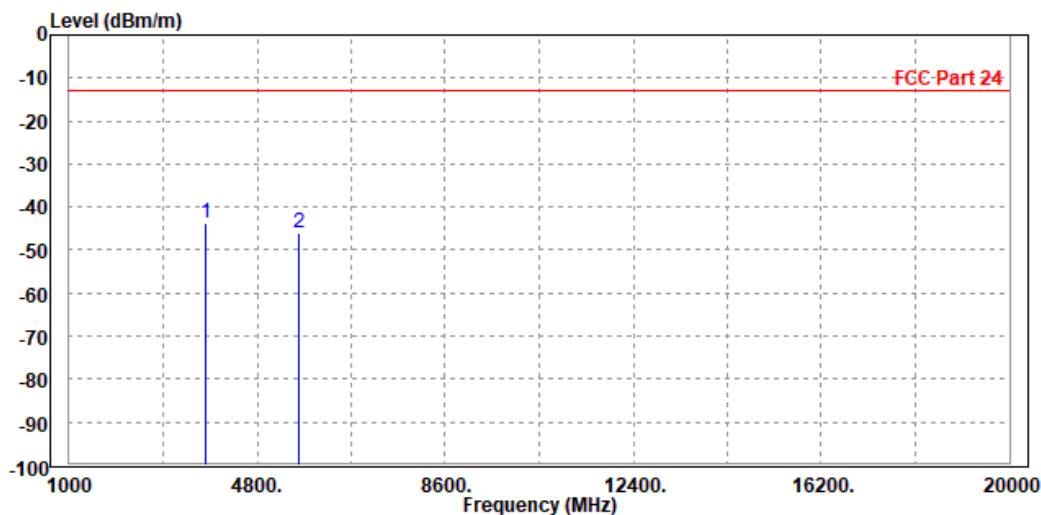
**BUREAU
VERITAS**

Test Report No.: RFA20210104W001-5

CHANNEL BANDWIDTH: 5MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3760.000	-43.74	-52.59	-13.00	-30.74	8.85	Peak	Horizontal
2	5640.000	-45.88	-56.36	-13.00	-32.88	10.48	Peak	Horizontal



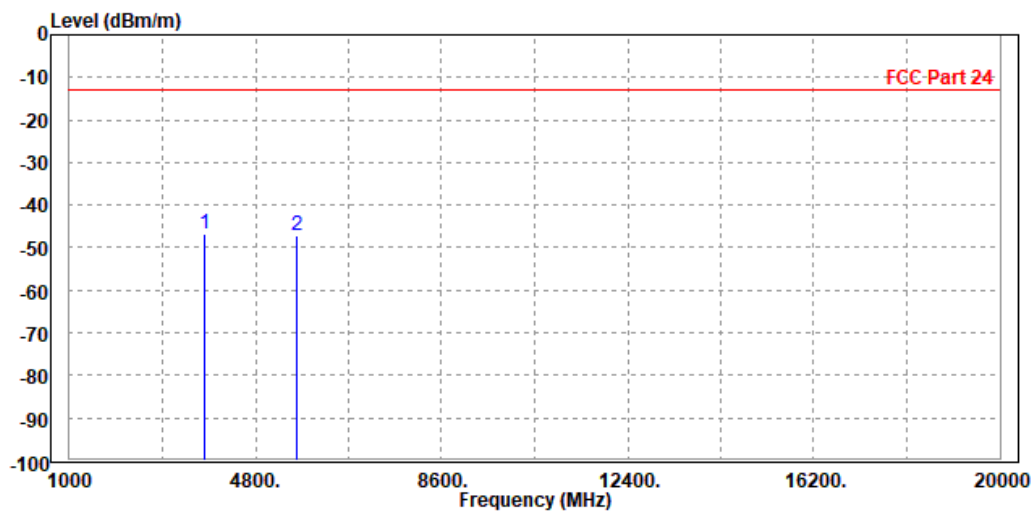


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3760.000	-46.75	-56.02	-13.00	-33.75	9.27	Peak	Vertical
2	5640.000	-47.24	-57.49	-13.00	-34.24	10.25	Peak	Vertical

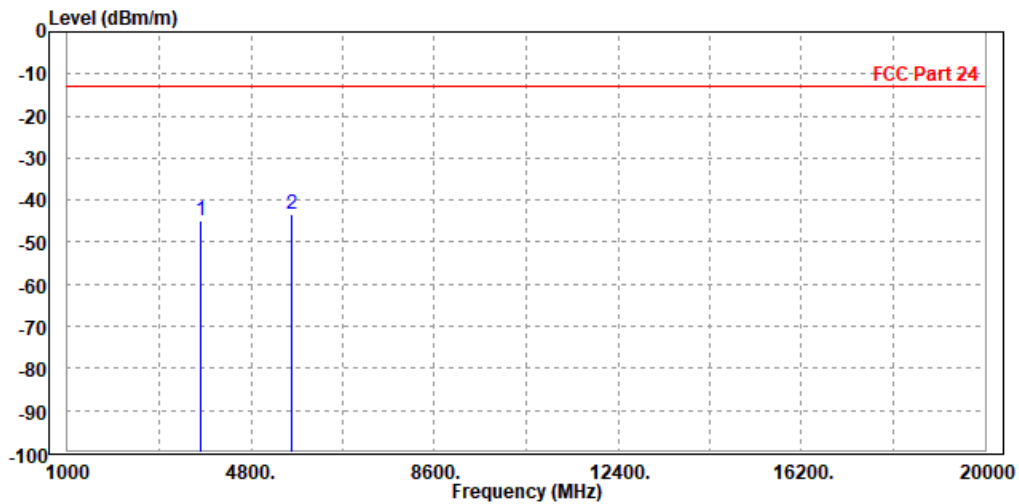




CHANNEL BANDWIDTH: 10MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-44.99	-53.84	-13.00	-31.99	8.85	Peak	Horizontal
2 PP	5640.000	-43.22	-53.70	-13.00	-30.22	10.48	Peak	Horizontal



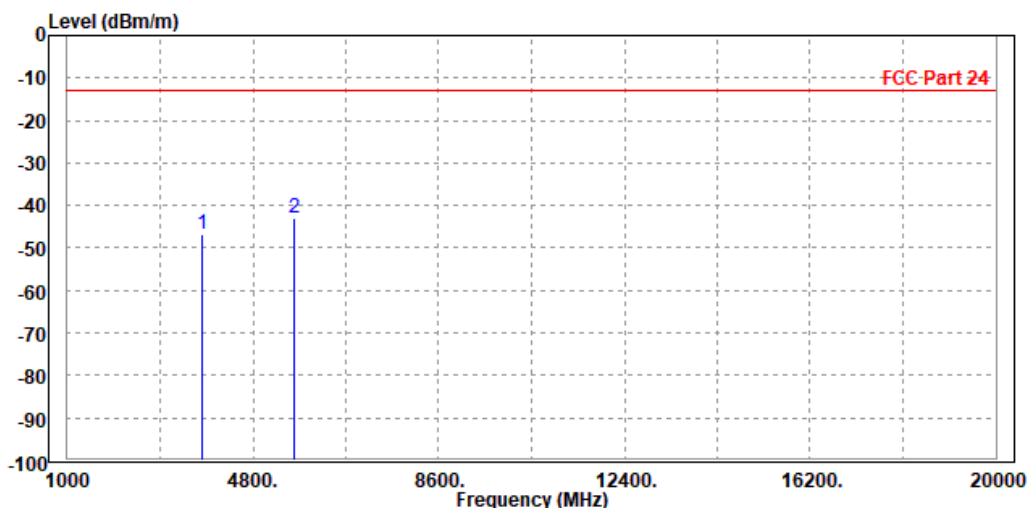


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-46.70	-55.97	-13.00	-33.70	9.27	Peak	Vertical
2 PP	5640.000	-42.98	-53.23	-13.00	-29.98	10.25	Peak	Vertical





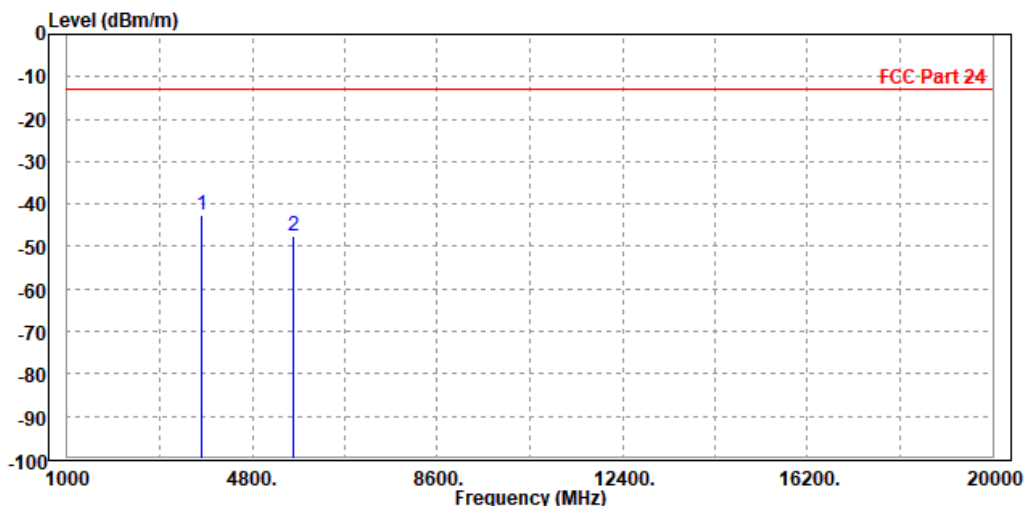
BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CHANNEL BANDWIDTH: 15MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3760.000	-42.63	-51.48	-13.00	-29.63	8.85	Peak	Horizontal
2	5640.000	-47.50	-57.98	-13.00	-34.50	10.48	Peak	Horizontal



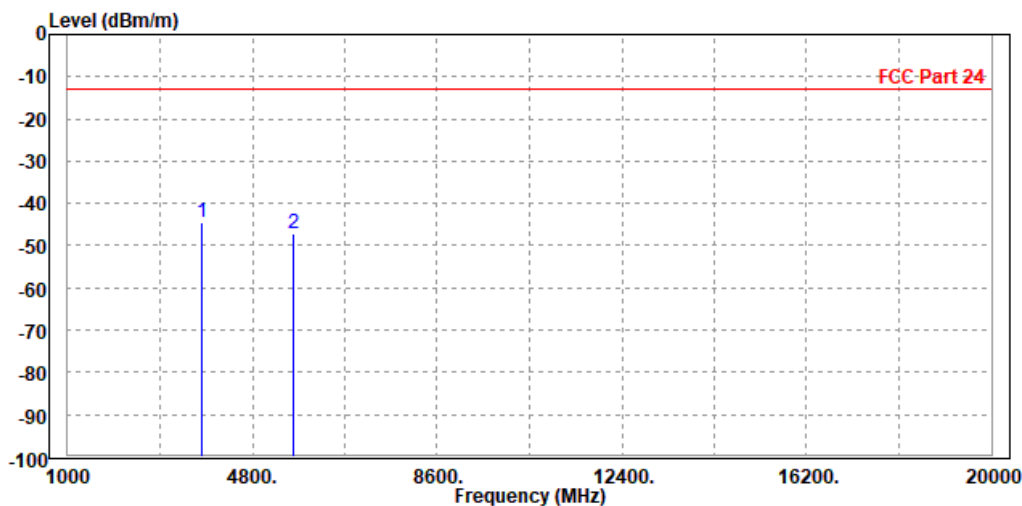


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3760.000	-44.67	-53.94	-13.00	-31.67	9.27	Peak	Vertical
2	5640.000	-47.05	-57.30	-13.00	-34.05	10.25	Peak	Vertical





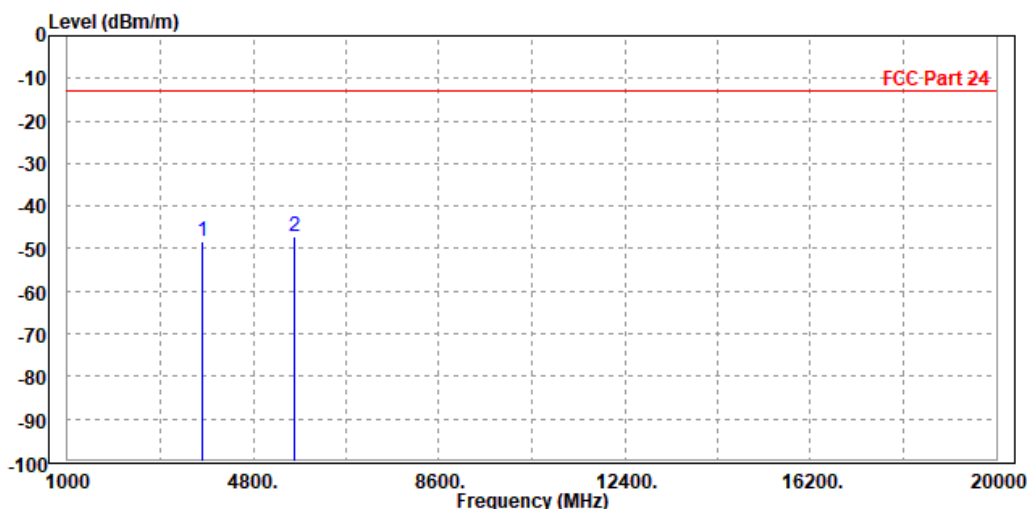
BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CHANNEL BANDWIDTH: 20MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

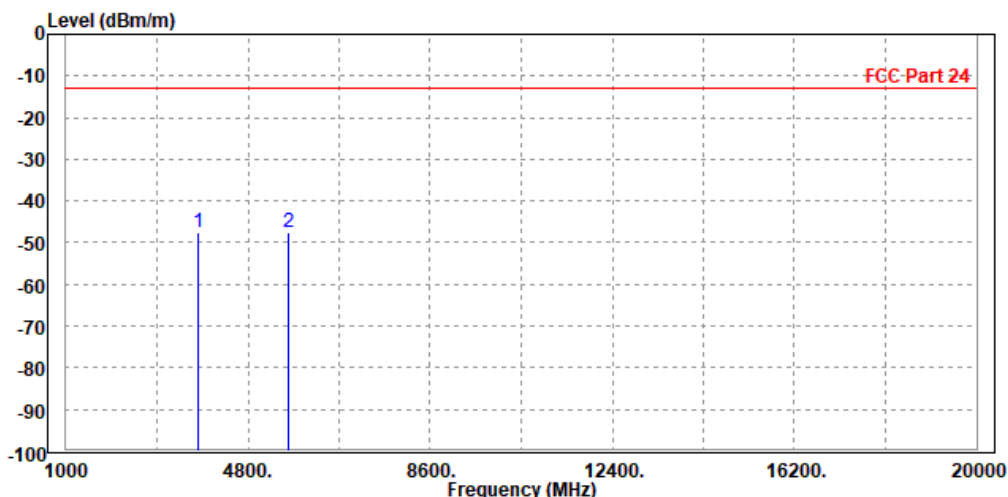
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-48.12	-56.97	-13.00	-35.12	8.85	Peak	Horizontal
2	PP 5640.000	-47.09	-57.57	-13.00	-34.09	10.48	Peak	Horizontal





MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Read	Limit	Over			
Freq	Level	Line	Limit	Factor	Remark	Pol/Phase
MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 PP 3760.000	-47.62	-56.89	-13.00	-34.62	9.27 Peak	Vertical
2 5640.000	-47.71	-57.96	-13.00	-34.71	10.25 Peak	Vertical



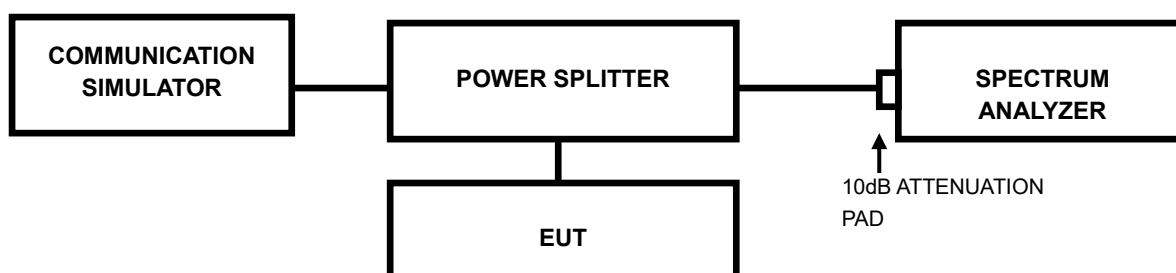


3.7 PEAK TO AVERAGE RATIO

3.7.1 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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

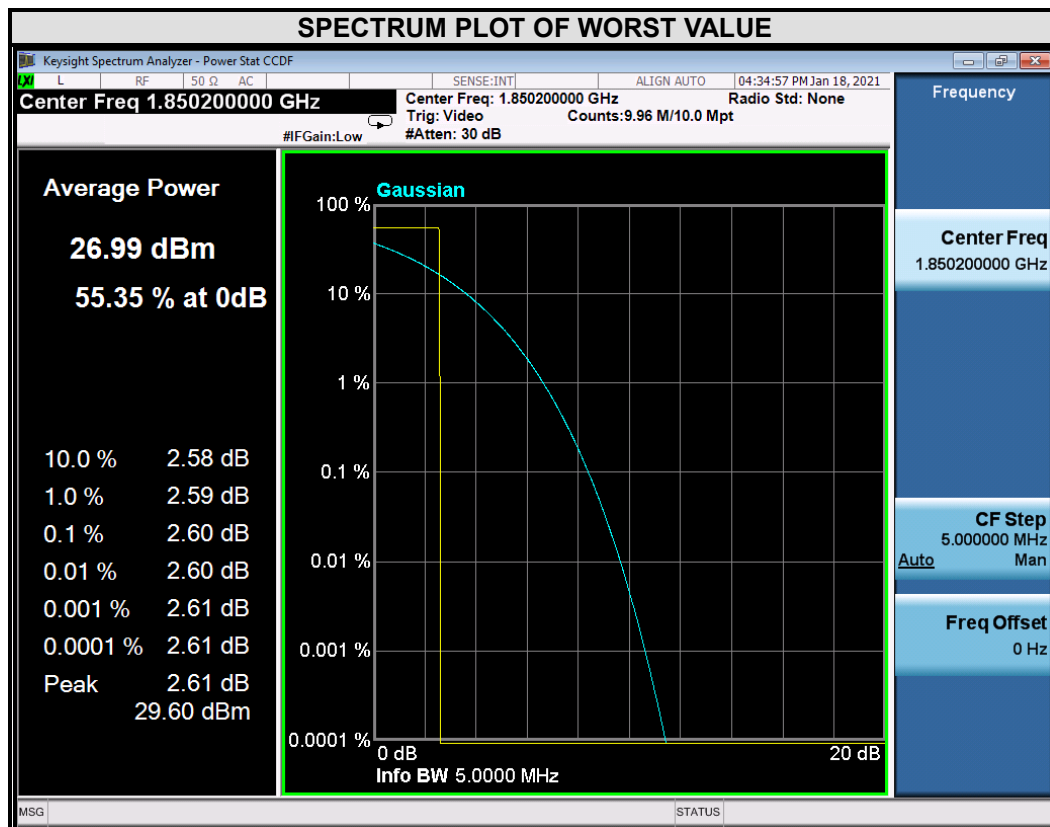
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.



3.7.4 TEST RESULTS

GSM

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
512	1850.2	2.60

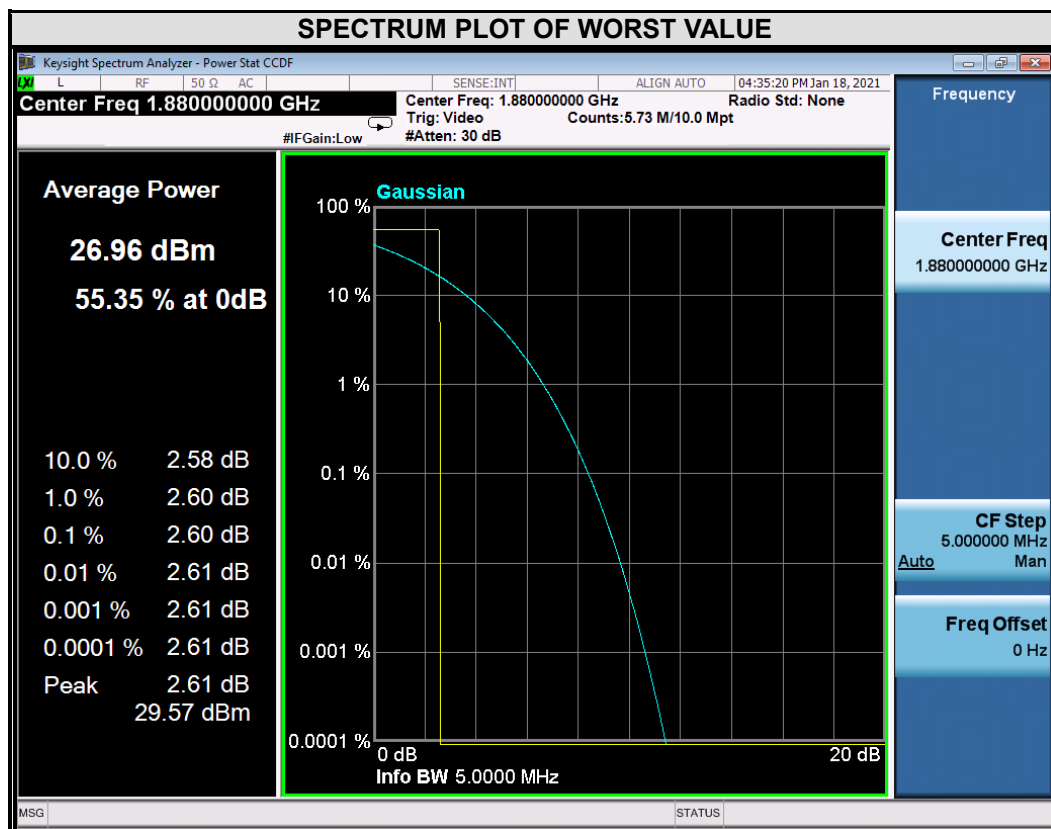




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Test Report No.: RFA20210104W001-5

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
661	1880	2.60

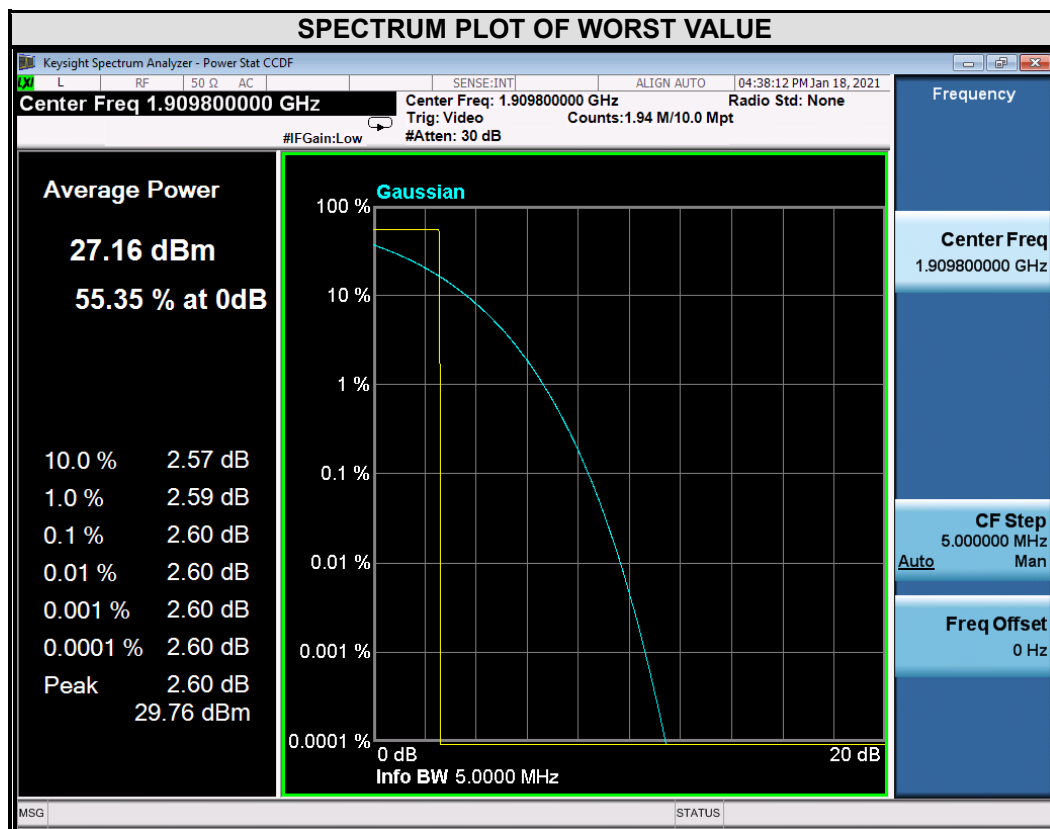




BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
810	1909.8	2.60



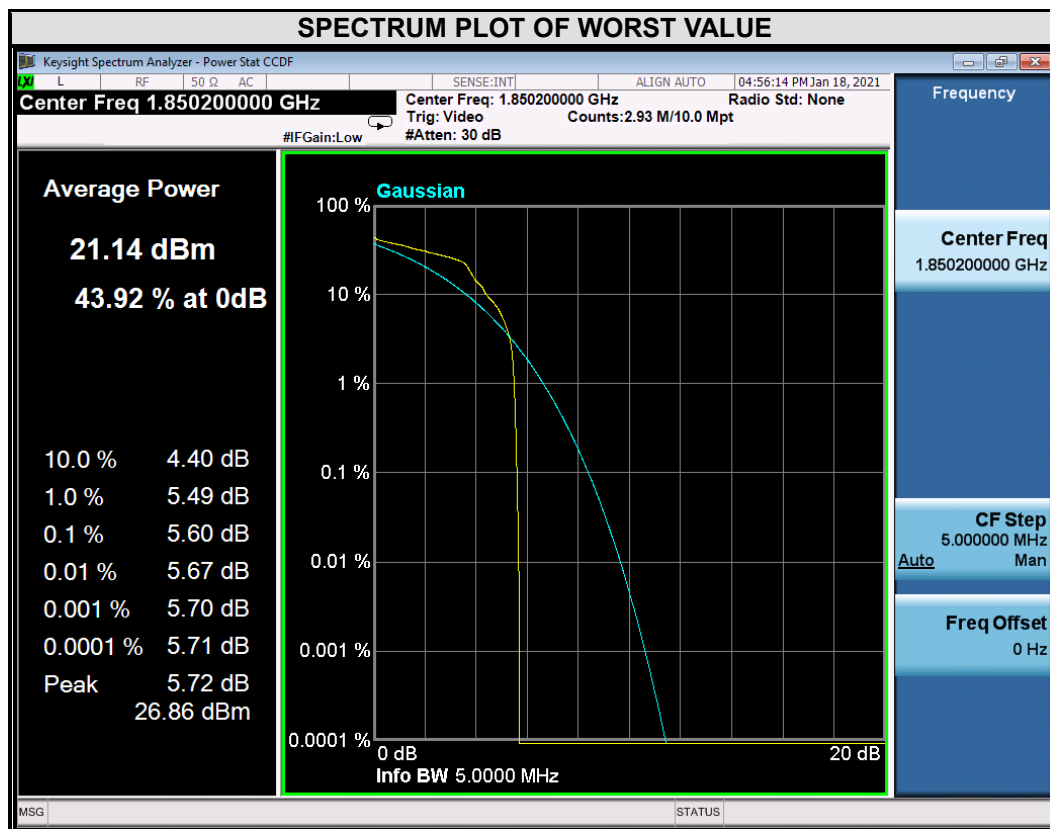


BUREAU VERITAS

Test Report No.: RFA20210104W001-5

EDGE

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
512	1850.2	5.60

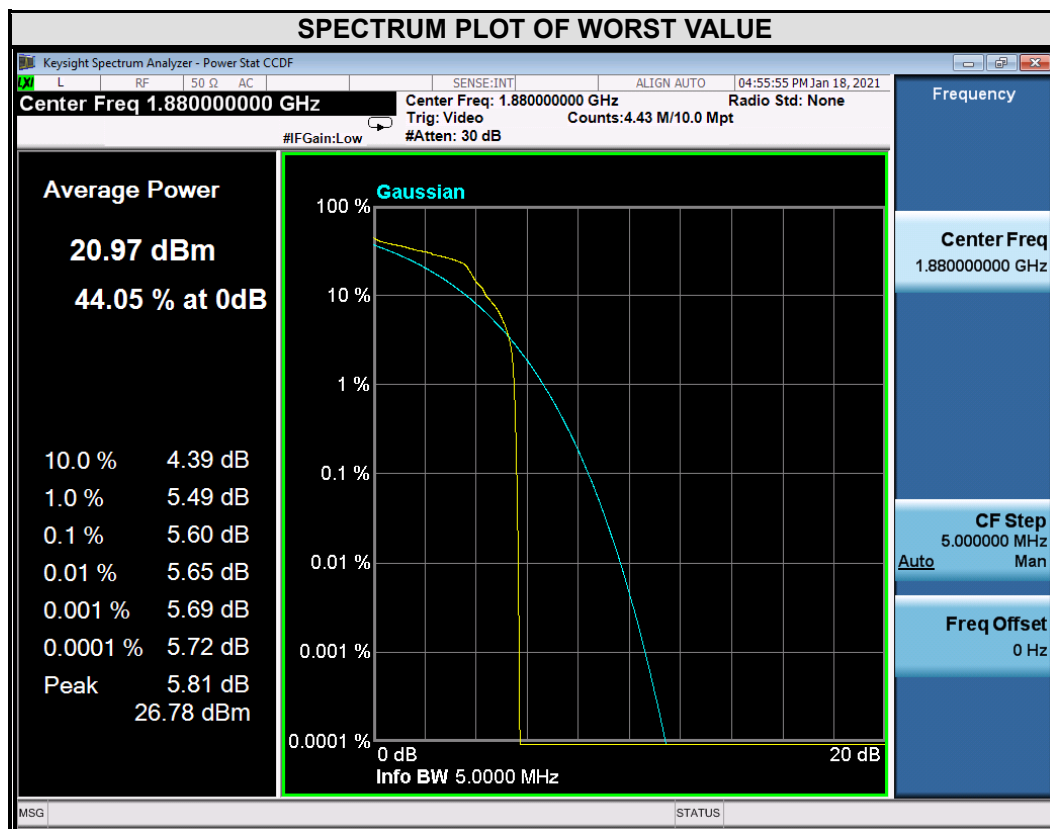




BUREAU VERITAS

Test Report No.: RFA20210104W001-5

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
661	1880	5.60

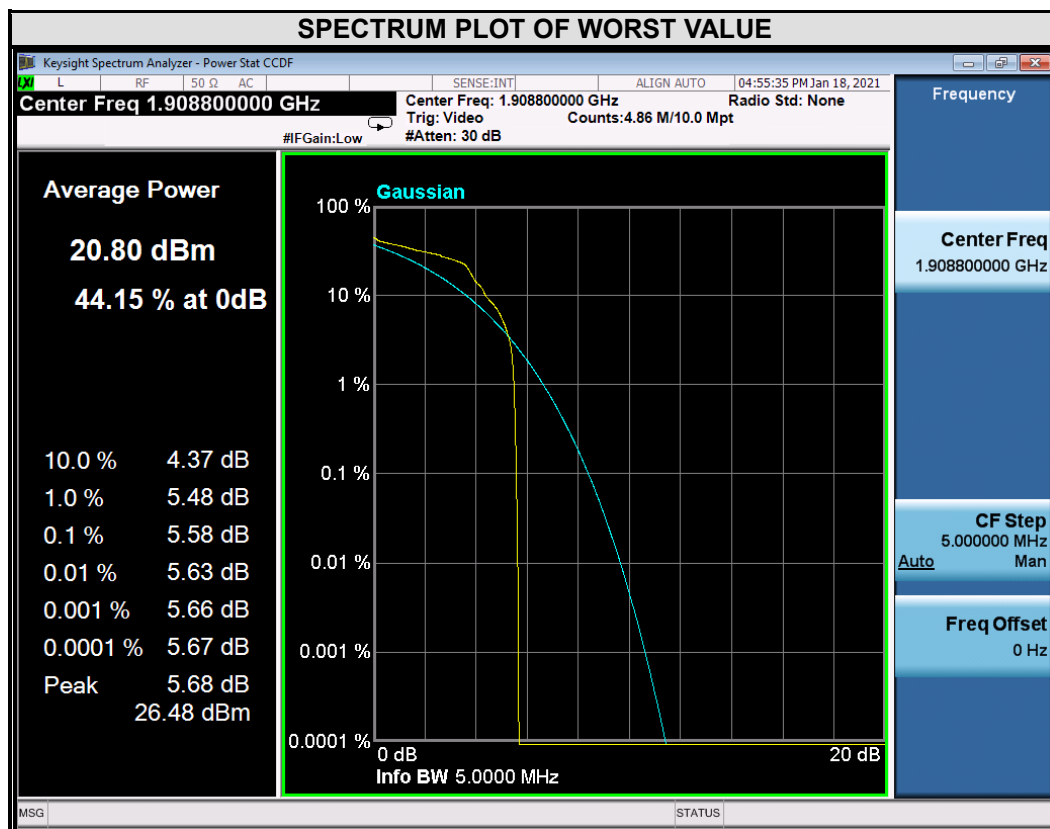




BUREAU VERITAS

Test Report No.: RFA20210104W001-5

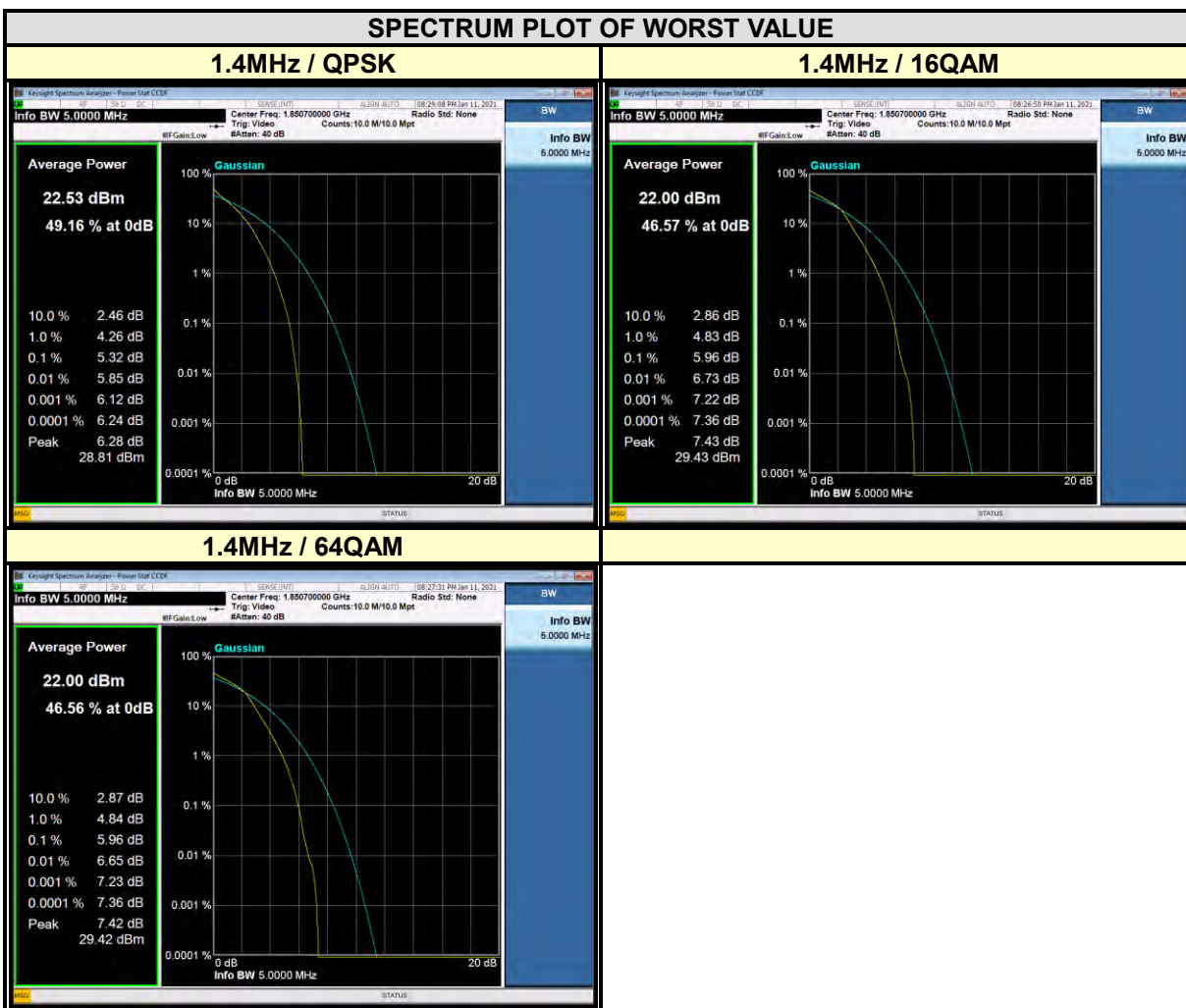
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
810	1909.8	5.58





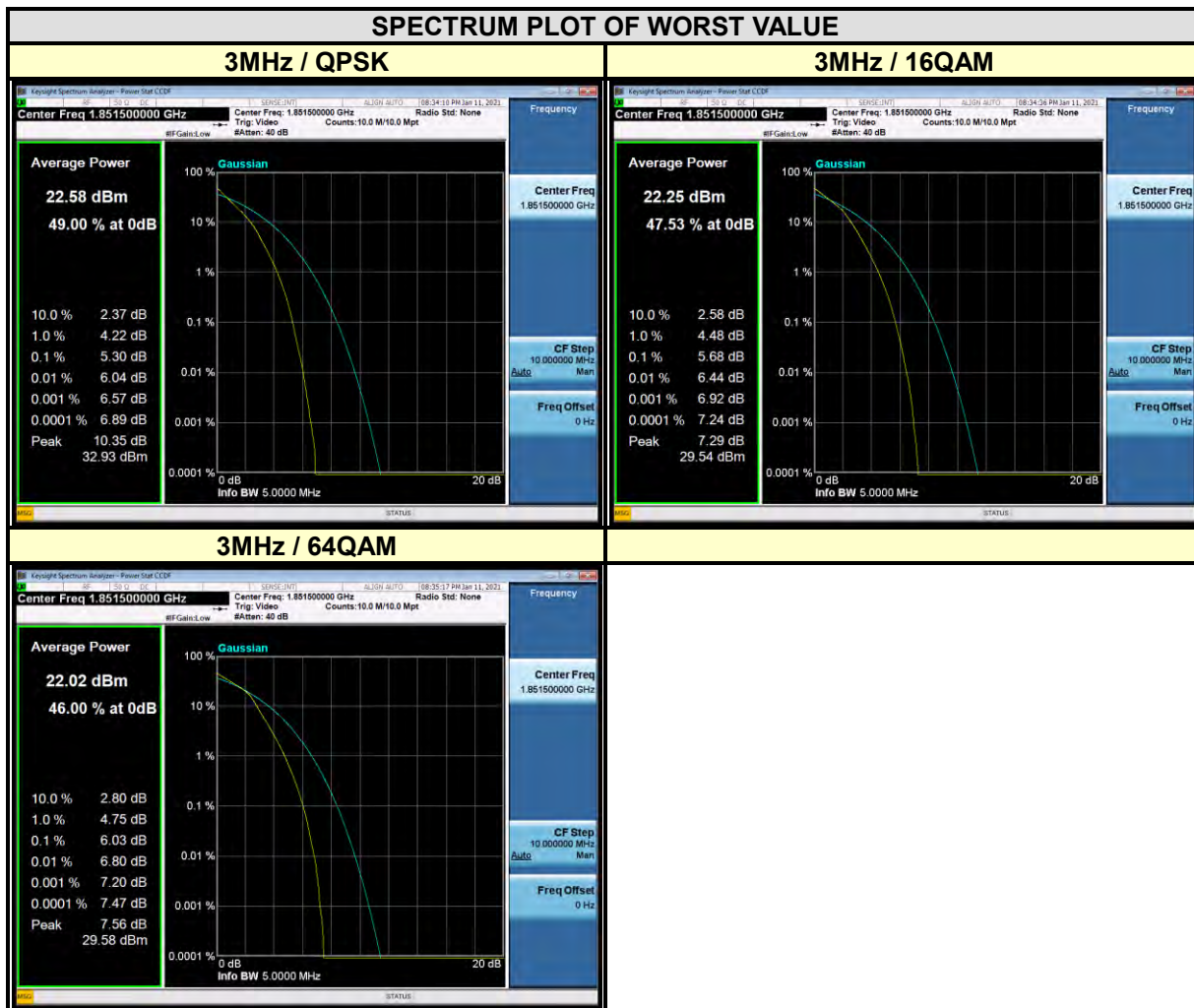
LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18607	1850.7	5.32	5.96	5.96
18900	1880	4.89	5.49	5.49
19193	1909.3	4.83	5.44	5.43





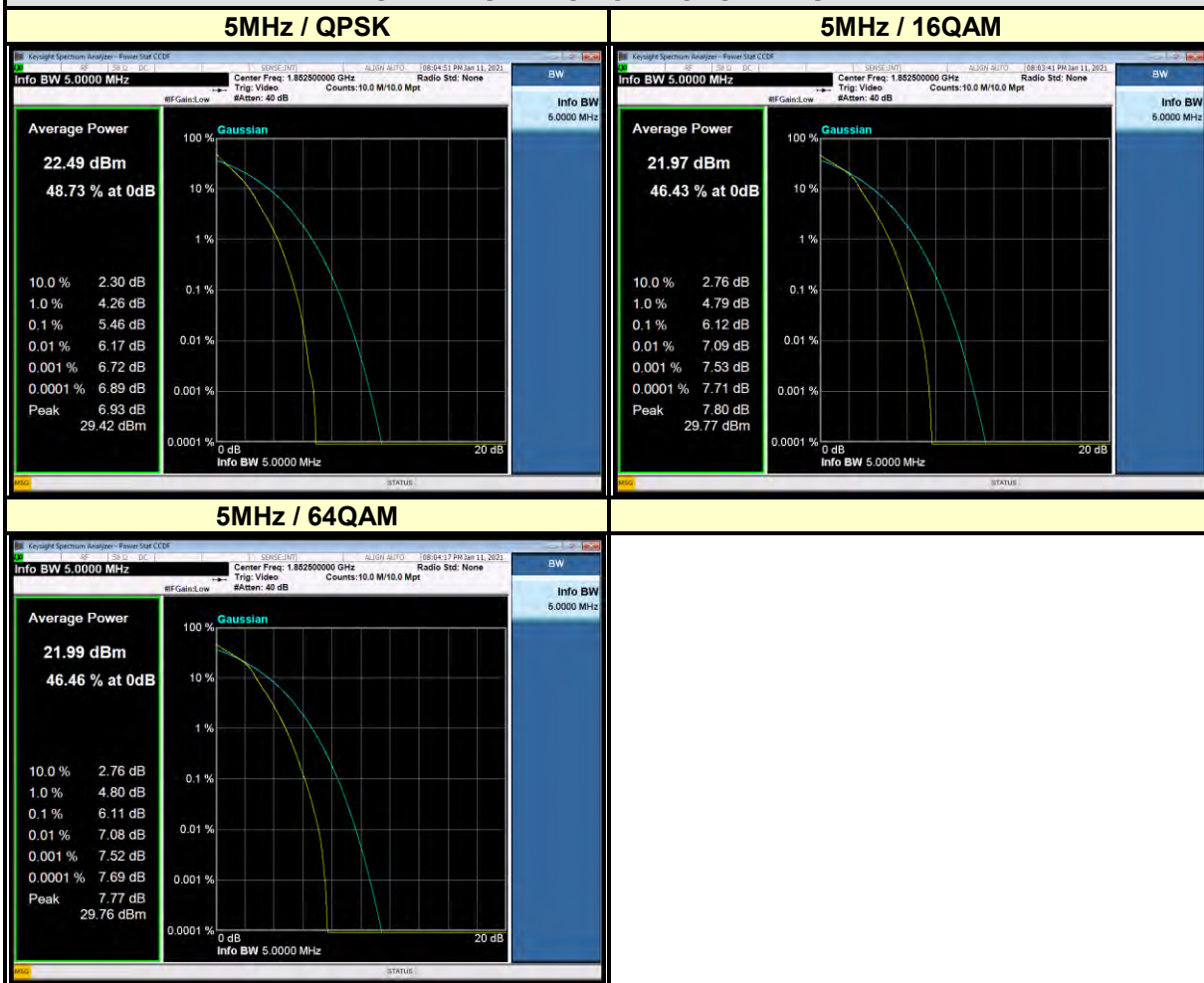
CHANNEL BANDWIDTH: 3MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18615	1851.5	5.30	5.68	6.03
18900	1880	5.06	5.66	5.65
19185	1908.5	4.76	5.44	5.43





CHANNEL BANDWIDTH: 5MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18625	1852.5	5.46	6.12	6.11
18900	1880	5.31	5.84	5.84
19175	1907.5	5.11	5.70	5.70

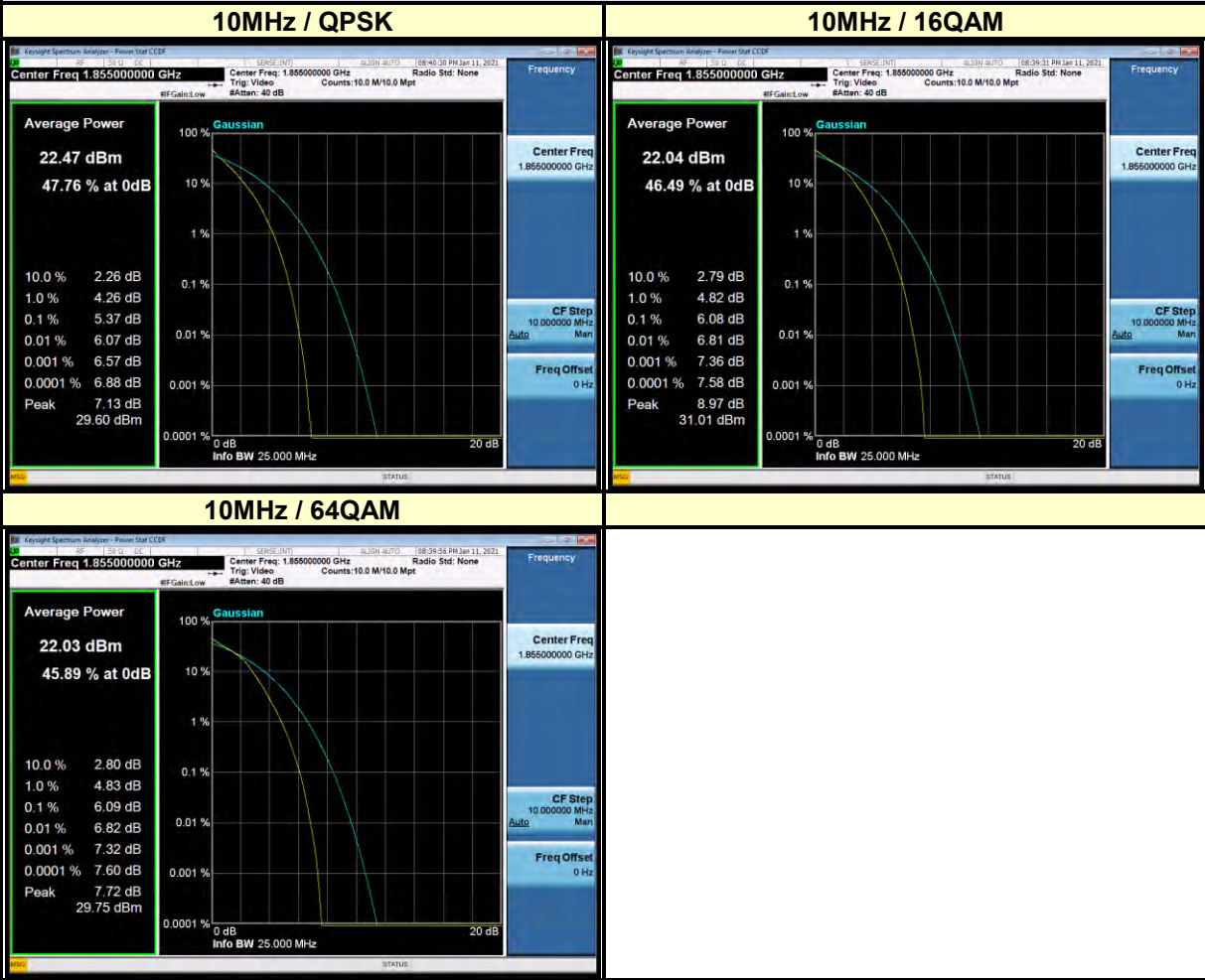
SPECTRUM PLOT OF WORST VALUE





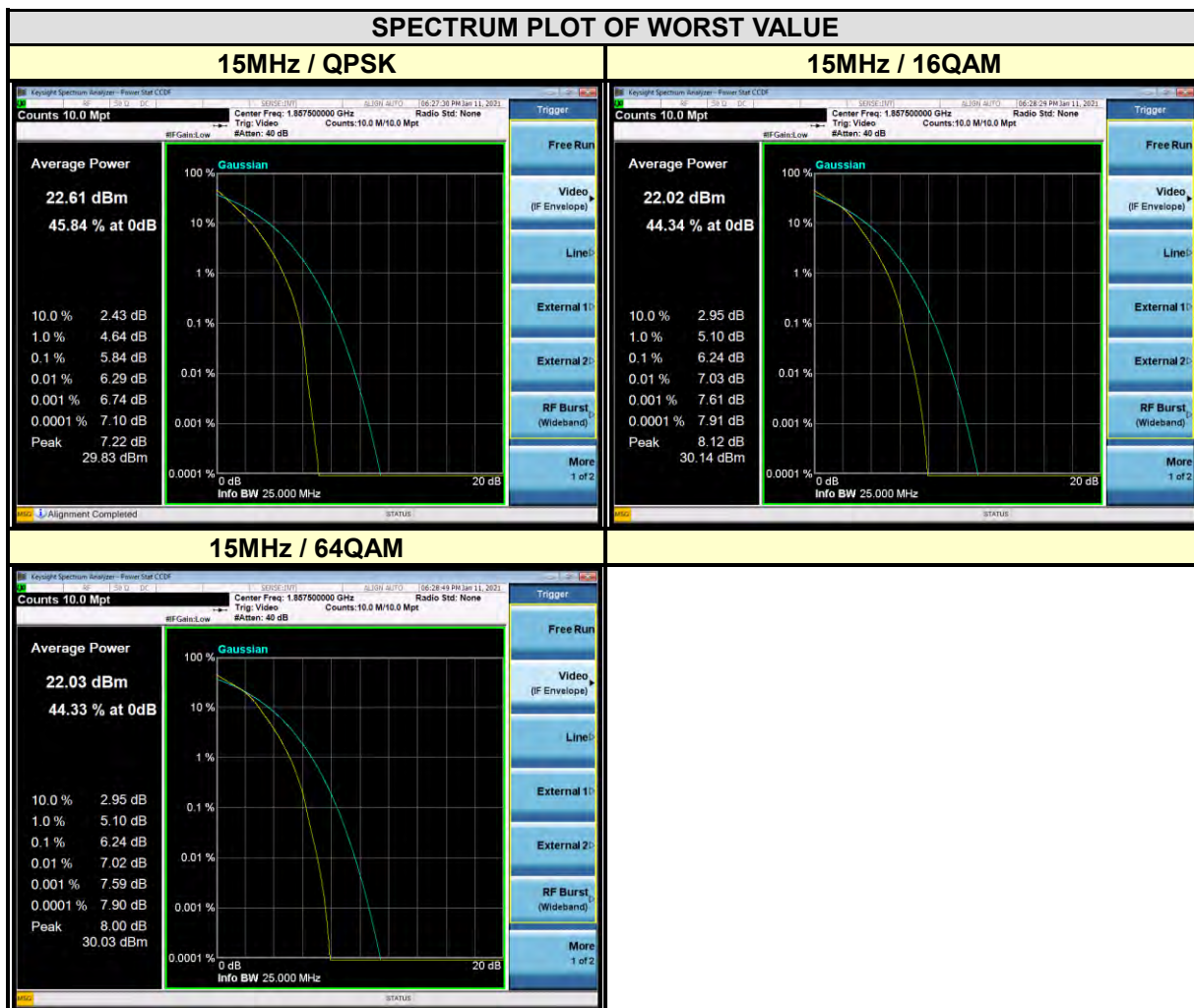
CHANNEL BANDWIDTH: 10MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18650	1855	5.37	6.08	6.09
18900	1880	5.03	5.61	5.61
19150	1905	4.91	5.60	5.61

SPECTRUM PLOT OF WORST VALUE





CHANNEL BANDWIDTH: 15MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18675	1857.5	5.84	6.24	6.24
18900	1880	5.43	5.86	5.87
19125	1902.5	5.39	5.86	5.85

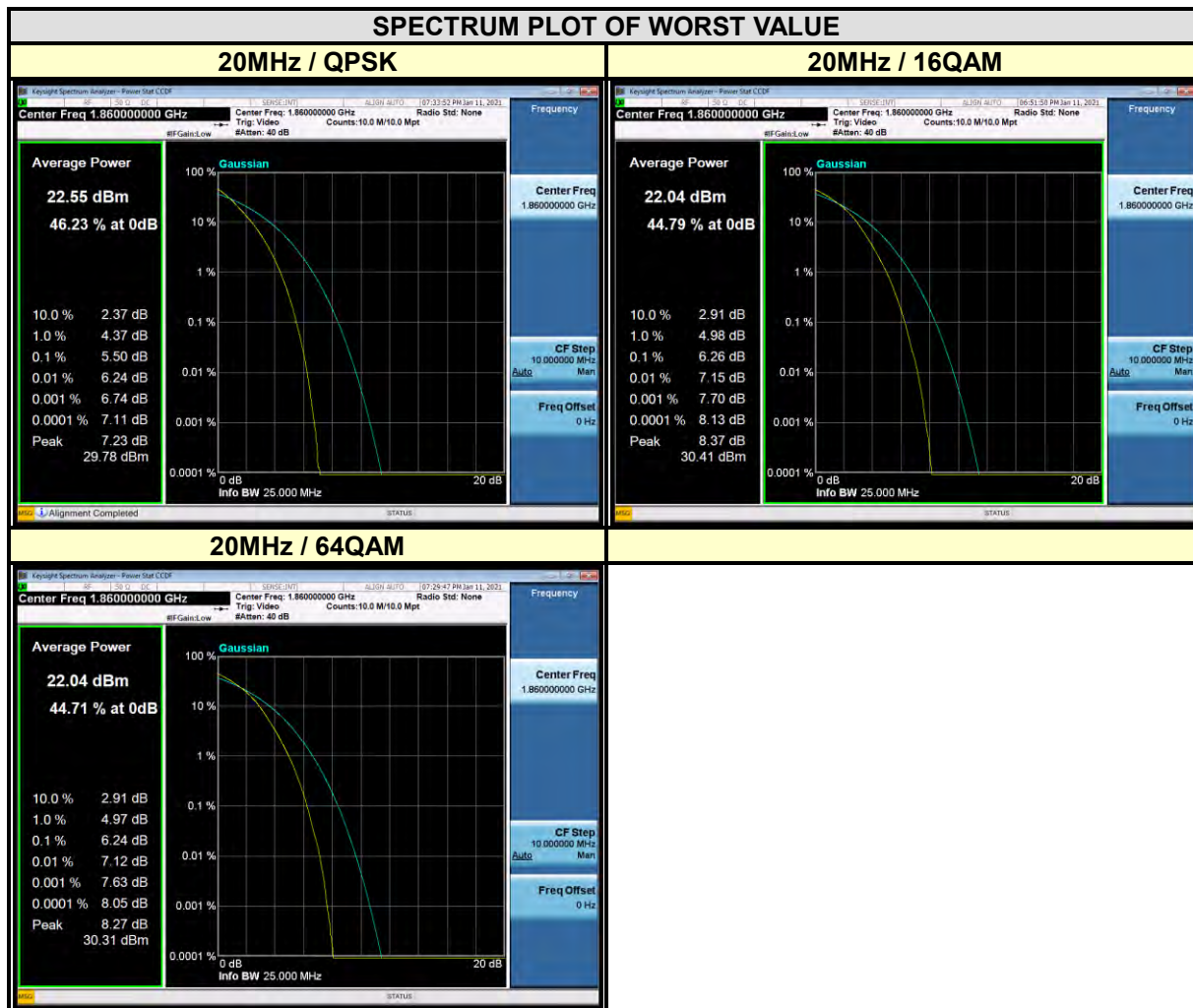




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CHANNEL BANDWIDTH: 20MHz				
CHANNEL	Frequency (MHz)	PEAK TO AVERAGE RATIO (dB)		
		QPSK	16QAM	64QAM
18700	1860	5.50	6.26	6.24
18900	1880	5.38	5.95	5.95
19100	1900	5.36	6.04	6.02





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4 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

Shenzhen EMC/RF Lab:

Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.dg@cn.bureauveritas.com

Web Site: www.adt.com.tw

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



BUREAU VERITAS Test Report No.: RFA20210104W001-5

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---