TEST REPORT

No. I19Z61663-WMD01

for

Ericsson AB Radio 4418 B41 KRC 161 789/1

Remote Radio Unit

FCC ID: TA8AKRC161789-1

In accordance with FCC CFR 47 Part 27

Issued Date: 2019-09-26

TESTING
NVLAP LAB CODE 600118-0

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z61663-WMD01	Rev.0	1st edition	2019-09-26

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

1.3. Project date

Testing Start Date: 2019-09-17

Testing End Date: 2019-09-26

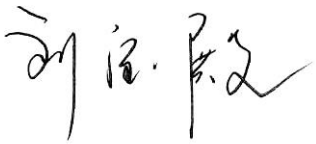
1.4. Signature

Dong Yuan

(Prepared this test report)

Zhou Yu

(Reviewed this test report)



Liu Baodian

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Ericsson (China) Communications Company Ltd.
Address /Post:	Ericsson Tower, Lize East Street, Chaoyang District, Beijing 100102, P.R.China
Contact:	Hua Yang
Email:	Hua.yang@ericsson.com
Telephone:	+86 10 8476 7133

2.2. Manufacturer Information

Company Name:	Ericsson AB
Address /Post:	Isafjordsgatan 10, 164 80 Stockholm Sweden
Contact:	/
Email:	/
Telephone:	/

3. Equipment Under Test (EUT)

3.1. About EUT

Description	Remote Radio Unit
Product Name	Radio 4418 B41
Product Number	KRC 161 789/1
FCC ID	TA8AKRC161789-1
Maximum Output Power per Port	Maximum 40.0 dBm(10W) per port for LTE 5MHz Maximum 43.0 dBm(20W) per port for others
Power source	-48V DC
Serial Number	D829058540
Hardware Version	R1C
Software Version	CXP9017316%7 R79HS
Frequency range	TX/RX: 2496MHz-2690MHz
TX/RX configuration	4 TX / RX
Maximum RF bandwidth (IBW)	90 MHz
Total number of supported carriers per port	Maximum 2 carriers
Supported modulations	QPSK, 16QAM, 64QAM, 256QAM
Date of receipt	2019-09-17

3.2. General Description

The Equipment Under Test (EUT) is an Ericsson Remote Radio Unit working in the wireless communications services 2496-2690MHz band which provides communication connections to network in LTE mode. The Radio 4418 B41 KRC 161 789/1 operates from a -48V DC power supply.

The EUT includes 4 TX/RX ports and it can be configured to transmit in MIMO mode for LTE carriers, and MIMO mode was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.

Equipment Under Test

3.3. Configuration Description

The following settings were used to representative for all traffic scenarios when settings with different modulations, channel bandwidths, number for carriers and RF configurations have been tested to find the worst case setting. The settings below were used for all measurements unless otherwise noted:

LTE

Configuration	Carrier	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE-MIMO-1C	1 Carrier	5MHz	2498.5	2593.0	2687.5
		15MHz	2503.5	2593.0	2682.5
		20MHz	2506.0	2593.0	2680.0
LTE-MIMO-2C	2 Carrier	5MHz	2498.5+2583.5	2550.5+2635.5	2602.5+2687.5
		15MHz	2503.5+2578.5	2555.5+2630.5	2607.5+2682.5
		20MHz	2506+2576	2558+2628	2610+2680
LTE-MIMO-1C-BE	1 Carrier	5MHz	2498.5	N/A	2687.5
		15MHz	2503.5	N/A	2682.5
		20MHz	2506.0	N/A	2680.0
LTE-MIMO-2C-BE	2 Carrier	5MHz	2498.5+2503.5	N/A	2682.5+2687.5
		15MHz	2503.5+2518.5	N/A	2667.5+2682.5
		20MHz	2506+2526	N/A	2660+2680

N/A – Not Applicable

4. Reference Documents

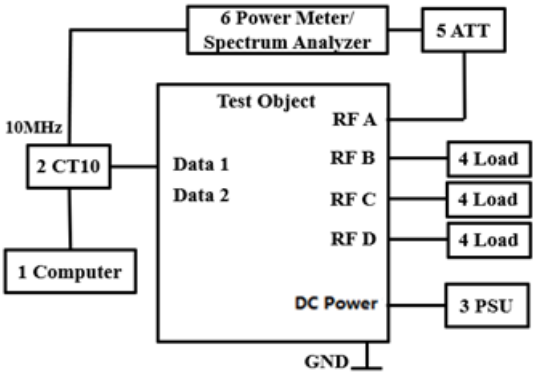
4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-18 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-18 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz	2014
ANSI 63.26	IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
TIA 102.CAAA-E	Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods	2016
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band	v02r01

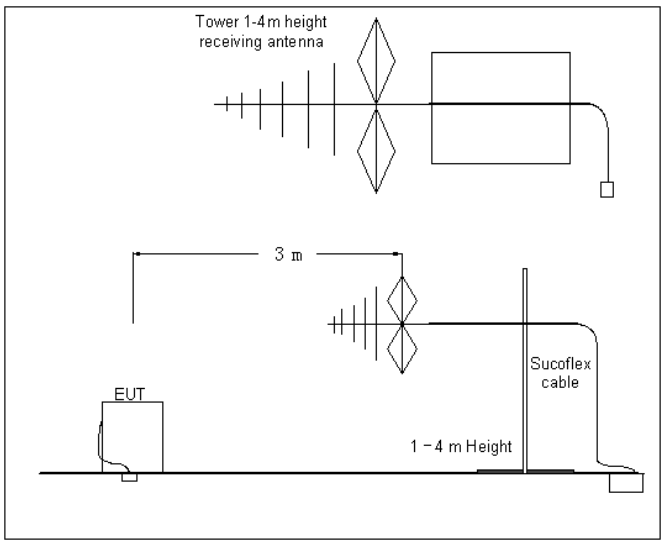
5. TEST SETUP

Test Setup, Conducted Measurement:



No.	Auxilliary Equipment	Model Type	Version
1	Computer	Dell Optiplex 3050	-
2	CT10	LPC 102 487/1	R1C
3	Power supply unit	-	-
4	Load	TF150	-
5	40dB Attenuator	Aeroflex / Weinschel	-

Test Setup, Radiated Measurement:



6. LABORATORY ENVIRONMENT

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 0.5 Ω

Semi-anechoic chamber (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	<±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

7. SUMMARY OF TEST RESULTS

Items	Test Name	Clause in FCC rules	Verdict
1	Maximum Output Power and Peak-to-Average Power Ratio	27.50(h)	Pass
2	Equivalent Isotropically Radiated Power (EIRP)	27.50(h)	Pass
3	Occupied Bandwidth	27.53(m), 2.1049	Pass
4	Spurious Emissions at Band Edge	27.53(m)	Pass
5	Conducted Spurious Emission	27.53(m)	Pass
6	Radiated Spurious Emission	27.53(m)	Pass
7	Frequency Stability	27.54	Pass
8	Receiver Spurious Emission	-	N/A

N/A – Not Applicable

8. Test Equipments Utilized

NO.	Description	TYPE	series number	MANUFACTURE	CAL DUE DATE
1	Power Supply	PCR2000M	PJ000583	Kikusui	2020-02-22
2	40dB Attenuator	66-40-33	CD4019	Aeroflex / Weinschel	-
3	40dB Attenuator	TSG150R-4-40N11	1511040001	Nanjing Jiexi Technologies	-
4	Spectrum Analyzer	N9030	MY57142378	Keysight	2020-02-02
5	EMI Antenna	3115	00167250	ETS-LINDGREN	2020-05-21
6	EMI Antenna	3116	2661	ETS-LINDGREN	2020-07-27
7	EMI Antenna	VULB 9163	9163-514	SCHWARZBECK	2021-01-03
8	Test Receiver	ESU26	100376	Rohde & Schwarz	2019-11-27
9	Climate Chamber	KTHG-415TBS	7353K	QINGSHENG	2020-01-14

9. MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Measurement Uncertainty
Conducted Maximum Peak Output Power	0.5dB
Occupied Bandwidth	1.1Hz
Conducted Spurious Emissions	2.3dB
Band Edge	2.3dB
Radiated Spurious Emissions	5.4dB
Frequency Stability	$<\pm 1 \times 10^{-7}$

ANNEX A: MEASUREMENT RESULS

A.1 Maximum Output Power and Peak-to-Average Power Ratio

A.1.1 Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 27, Clause 27.50(h)

A.1.2 Method of Measurements

During the process of testing, the EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at all antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

A.1.3 Limit

Output Power:

EIRP $\leqslant$ 33 dBW + 10log(X/Y) dBW
X is the actual channel width
Y is 5.5 or 6 MHz

Peak to Average Ratio: $\leqslant$13 dB

A.1.4 Measurement result

Configuration LTE-MIMO-1C

Maximum Output Power 40.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK/5M	40.13	34.35	8.60	40.09	34.30	8.60	39.98	34.17	8.55
B		39.77	35.76	8.24	39.68	33.86	8.25	39.52	33.79	8.24
C		40.04	34.10	8.51	40.14	34.21	8.51	40.15	34.29	8.50
D		39.87	33.65	8.33	39.97	33.75	8.34	40.04	33.77	8.38
Total		45.98	40.56	-	45.99	40.06	-	45.95	40.03	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM/5M	39.87	35.85	8.34	39.78	36.00	8.31	39.65	35.15	8.30
B		40.12	35.50	8.20	39.49	35.94	8.20	39.77	35.44	8.22
C		39.82	35.81	8.37	40.22	35.95	8.30	39.89	36.12	8.31
D		39.54	35.17	8.32	39.70	35.32	8.36	39.79	35.42	8.37
Total		45.86	41.61	-	45.83	41.83	-	45.80	41.57	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM/5M	40.03	34.46	8.37	40.20	34.63	8.41	40.03	33.90	8.43
B		39.95	35.24	8.01	39.70	34.02	7.95	40.09	34.36	7.96
C		39.96	34.60	8.19	40.04	34.65	8.22	40.06	34.64	8.24
D		39.88	33.72	8.48	39.99	33.91	8.46	40.09	34.10	8.49
Total		45.98	40.56	-	46.01	40.34	-	46.09	40.28	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /5M	39.92	34.44	8.26	40.11	34.58	8.26	39.90	34.57	8.38
B		39.78	35.19	8.22	39.69	34.24	8.36	40.04	33.80	8.24
C		40.01	34.39	8.51	40.06	34.39	8.50	40.09	34.44	8.51
D		39.82	33.67	8.37	39.90	33.68	8.38	40.02	33.83	8.41
Total		45.90	40.48	-	45.96	40.26	-	46.03	40.19	-

Maximum Output Power 43.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK/15M	42.83	32.22	8.44	43.13	32.44	8.49	43.01	31.99	8.53
B		42.70	36.26	8.25	42.68	32.22	8.29	43.16	32.79	8.33
C		42.96	32.52	8.33	43.18	32.75	8.33	43.16	32.81	8.35
D		42.89	31.80	8.31	43.09	31.86	8.31	43.14	32.03	8.31
Total		48.87	39.64	-	49.05	38.35	-	49.14	38.44	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM /15M	42.46	34.62	8.24	43.06	34.80	8.30	43.00	35.15	8.25
B		42.83	38.66	8.23	42.62	34.68	8.24	43.14	34.41	8.31
C		42.94	34.90	8.26	43.10	35.07	8.26	43.03	35.07	8.34
D		42.88	34.30	8.28	43.02	34.41	8.27	43.10	34.64	8.29
Total		48.80	42.05	-	48.97	40.77	-	49.09	40.85	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM /15M	42.87	32.64	8.20	43.07	32.70	8.34	43.02	32.21	8.37
B		42.55	32.52	8.13	42.48	32.54	8.09	43.14	33.00	8.17
C		42.96	32.68	8.13	43.11	32.83	8.19	43.09	32.94	8.28
D		42.87	32.04	8.33	43.00	32.07	8.35	43.05	32.22	8.40
Total		48.84	38.50	-	48.94	38.56	-	49.10	38.63	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /15M	42.84	32.62	8.16	42.97	32.72	8.12	42.91	32.26	8.21
B		42.70	32.64	8.34	42.66	32.28	8.37	43.12	32.80	8.40
C		42.93	32.61	8.22	43.09	32.69	8.23	43.14	32.78	8.29
D		42.84	32.17	8.21	42.96	32.21	8.20	43.11	31.85	8.19
Total		48.85	38.53	-	48.94	38.50	-	49.09	38.46	-

Maximum Output Power 43.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK/20M	42.89	31.12	8.46	43.09	30.55	8.49	43.07	30.94	8.51
B		42.73	31.20	8.32	42.76	31.74	8.33	43.13	31.43	8.37
C		42.86	31.20	8.24	43.05	31.34	8.21	43.17	31.45	8.21
D		42.81	31.11	8.17	42.90	30.55	8.16	43.13	30.86	8.16
Total		48.84	37.18	-	48.97	37.10	-	49.15	37.20	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM /20M	43.11	33.23	8.46	43.18	33.32	8.50	43.14	33.30	8.50
B		42.41	33.07	8.32	42.82	32.89	8.29	43.17	32.77	8.30
C		43.26	33.28	8.28	43.26	33.28	8.26	43.38	33.43	8.24
D		43.05	33.04	8.33	43.12	32.75	8.34	43.36	32.68	8.37
Total		48.99	39.18	-	49.12	39.09	-	49.28	39.08	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM /20M	43.05	30.92	8.30	42.91	31.46	8.32	43.02	31.52	8.36
B		42.34	31.51	8.21	42.21	30.71	8.21	43.12	31.13	8.22
C		42.99	31.37	8.25	43.07	31.45	8.36	43.11	31.63	8.41
D		42.75	31.36	8.28	42.95	30.86	8.28	43.06	31.00	8.27
Total		48.81	37.32	-	48.82	37.15	-	49.10	37.35	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /20M	42.80	30.98	8.42	42.95	31.30	8.42	43.03	31.39	8.44
B		42.37	31.47	8.27	42.26	30.73	8.34	43.15	31.00	8.38
C		43.06	31.36	8.29	43.08	31.37	8.23	43.18	31.53	8.38
D		41.28	31.30	8.19	42.95	30.86	8.33	43.13	31.22	8.25
Total		48.45	37.30	-	48.84	37.09	-	49.14	37.31	-

Configuration LTE-MIMO-2C

Maximum Output Power 40.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK/5M	39.88	31.11	-	40.11	31.20	-	39.84	31.25	-
B		39.66	31.07	-	40.09	31.17	-	39.82	31.06	-
C		39.90	31.06	-	40.09	31.05	-	39.99	31.23	-
D		39.66	31.19	-	40.13	31.21	-	39.86	31.01	-
Total		45.80	37.13	-	46.13	37.18	-	45.90	37.16	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM/5M	39.77	32.85	-	40.01	32.79	-	39.72	32.18	-
B		39.48	32.79	-	39.92	32.98	-	39.64	31.84	-
C		39.78	32.89	-	39.97	32.84	-	39.88	32.40	-
D		39.42	33.00	-	40.01	33.09	-	39.73	32.57	-
Total		45.64	38.90	-	46.00	38.95	-	45.76	38.28	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM /5M	39.88	31.23	-	40.12	31.19	-	39.89	31.24	-
B		39.62	30.92	-	40.06	31.15	-	39.81	31.19	-
C		39.83	31.25	-	40.02	31.25	-	40.05	31.57	-
D		39.51	31.27	-	40.12	31.26	-	39.99	31.36	-
Total		45.73	37.19	-	46.10	37.23	-	45.96	37.36	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /5M	39.94	31.18	-	40.18	31.48	-	39.92	31.51	-
B		39.66	30.89	-	40.10	31.21	-	39.85	31.31	-
C		39.93	31.19	-	40.04	31.16	-	40.06	31.47	-
D		39.78	31.38	-	40.13	31.30	-	39.98	31.38	-
Total		45.85	37.18	-	46.13	37.31	-	45.97	37.44	-

Maximum Output Power 43.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK /15M	42.92	29.49	-	43.14	29.53	-	42.92	29.50	-
B		42.72	29.21	-	43.06	29.58	-	42.90	29.44	-
C		42.92	29.41	-	43.06	29.50	-	43.08	29.68	-
D		42.90	29.42	-	43.10	29.46	-	43.07	29.63	-
Total		48.89	35.40	-	49.11	35.54	-	49.01	35.58	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM /15M	42.94	31.47	-	43.10	31.89	-	42.96	31.58	-
B		42.69	31.20	-	43.09	31.67	-	42.90	31.25	-
C		42.88	31.46	-	43.13	31.70	-	43.11	31.84	-
D		42.66	31.55	-	43.20	31.89	-	42.99	31.35	-
Total		48.81	37.44	-	49.15	37.81	-	49.01	37.53	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM /15M	42.96	29.93	-	43.13	29.90	-	42.94	29.69	-
B		42.74	29.45	-	43.02	29.69	-	42.91	29.69	-
C		42.92	29.49	-	43.20	29.67	-	43.11	29.82	-
D		42.87	29.83	-	43.19	29.96	-	43.07	29.71	-
Total		48.89	35.70	-	49.16	35.83	-	49.03	35.75	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /15M	43.01	29.71	-	43.16	29.75	-	43.00	29.75	-
B		42.73	29.65	-	43.04	29.69	-	42.85	29.56	-
C		42.91	29.56	-	43.09	29.64	-	43.12	29.84	-
D		42.92	29.55	-	43.10	29.60	-	43.11	29.72	-
Total		48.91	35.64	-	49.12	35.69	-	49.04	35.74	-

Maximum Output Power 43.0dBm per port

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	QPSK /20M	43.03	28.39	-	43.18	28.36	-	43.01	28.34	-
B		42.81	28.17	-	43.10	28.33	-	42.92	28.23	-
C		42.95	28.33	-	43.08	28.47	-	43.13	28.69	-
D		42.93	28.26	-	43.07	28.30	-	43.13	28.37	-
Total		48.95	34.31	-	49.13	34.39	-	49.07	34.43	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	16QAM /20M	43.00	29.29	-	43.07	29.28	-	43.03	29.19	-
B		42.79	29.30	-	43.00	29.52	-	42.92	29.21	-
C		42.94	29.41	-	43.03	29.81	-	43.04	30.03	-
D		42.90	29.66	-	43.01	29.32	-	43.08	29.58	-
Total		48.93	35.44	-	49.05	35.51	-	49.04	35.54	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	64QAM /20M	43.05	28.43	-	43.10	28.33	-	42.96	28.32	-
B		42.84	28.17	-	43.03	28.37	-	42.85	28.29	-
C		42.99	28.59	-	43.08	28.48	-	43.14	28.67	-
D		42.93	28.60	-	43.04	28.57	-	43.10	28.64	-
Total		48.97	34.47	-	49.08	34.46	-	49.03	34.50	-

Antenna	Modulation/ Carrier Bandwidth (MHz)	Output Power / Peak to Average Ratio (PAR)								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)	POWER (dBm)	POWER (dBm/MHz)	PAR (db)
A	256QAM /20M	43.00	28.46	-	43.19	28.50	-	43.05	28.37	-
B		42.78	28.33	-	43.03	28.46	-	42.90	28.34	-
C		43.02	28.49	-	43.11	28.41	-	43.17	28.62	-
D		42.97	28.57	-	43.07	28.51	-	43.14	28.42	-
Total		48.96	34.48	-	49.12	34.49	-	49.09	34.46	-

A.2 Occupied Bandwidth

A.2.1 Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 27, Clause 27.53 (m)

A.2.2 Method of Measurements

The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyser, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The measurement method is from KDB 971168 4.2:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

A.2.3 Measurement result

Configuration LTE-MIMO-1C

-26dBc Occupied Bandwidth

Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
16QAM/ 5.0MHz	4.688	4.689	4.696
16QAM/ 15.0MHz	13.90	13.90	13.90
16QAM/ 20.0MHz	18.53	18.53	18.52

-26dBc Occupied Bandwidth

Bandwidth	Occupied Bandwidth (MHz)		
	Modulation QPSK / Channel position M	Modulation 64QAM/ Channel position M	Modulation 256QAM/ Channel position M
5.0MHz	4.724	4.731	4.720
15.0MHz	13.97	13.94	13.97
20.0MHz	18.60	18.59	18.57

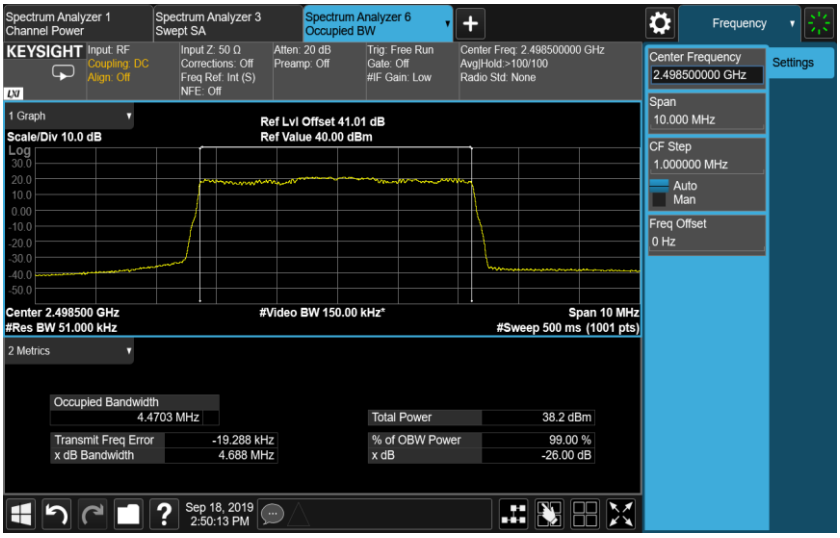
99% Occupied Bandwidth

Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK/ 5.0MHz	4.4703	4.4685	4.4732
QPSK/ 15.0MHz	13.378	13.378	13.384
QPSK/ 20.0MHz	17.826	17.814	17.825

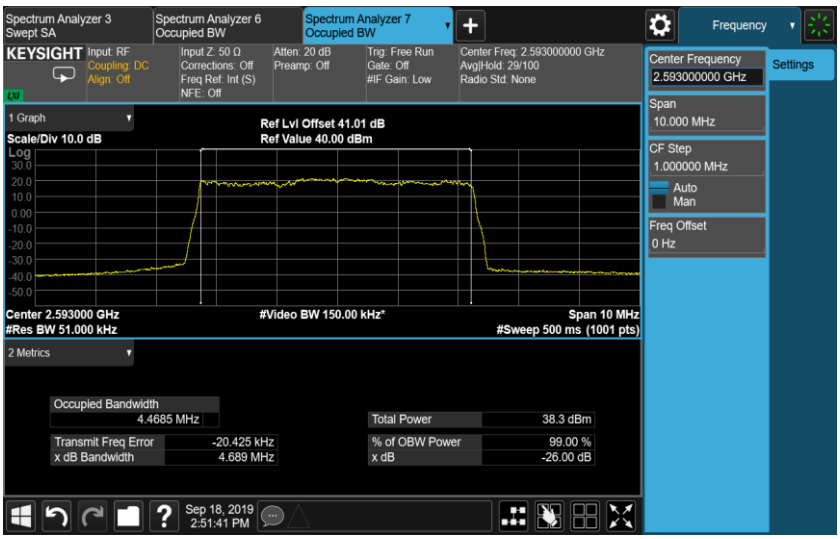
99% Occupied Bandwidth

Bandwidth	Occupied Bandwidth (MHz)		
	Modulation 16QAM/ Channel position M	Modulation 64QAM/ Channel position M	Modulation 256QAM/ Channel position M
5.0MHz	4.4772	4.4805	4.4756
15.0MHz	13.395	13.394	13.395
20.0MHz	17.854	17.850	17.849

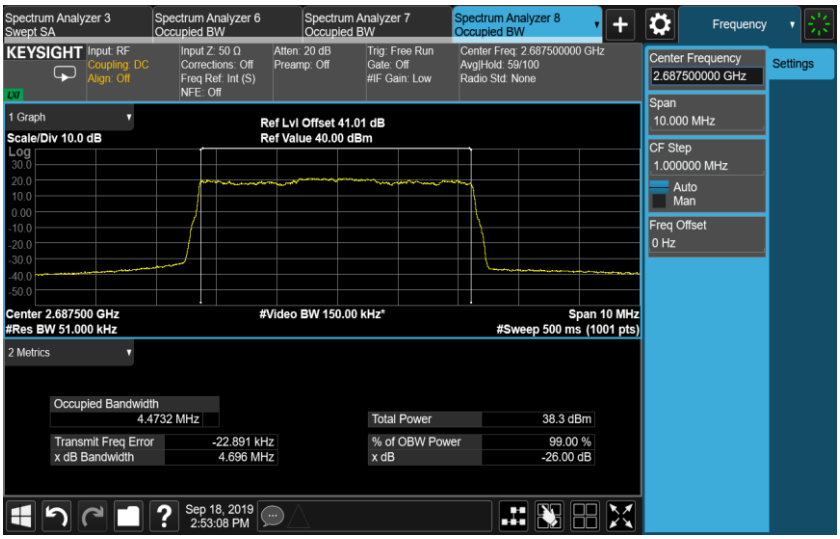
Port C, 16QAM/5.0MHz Channel Position B



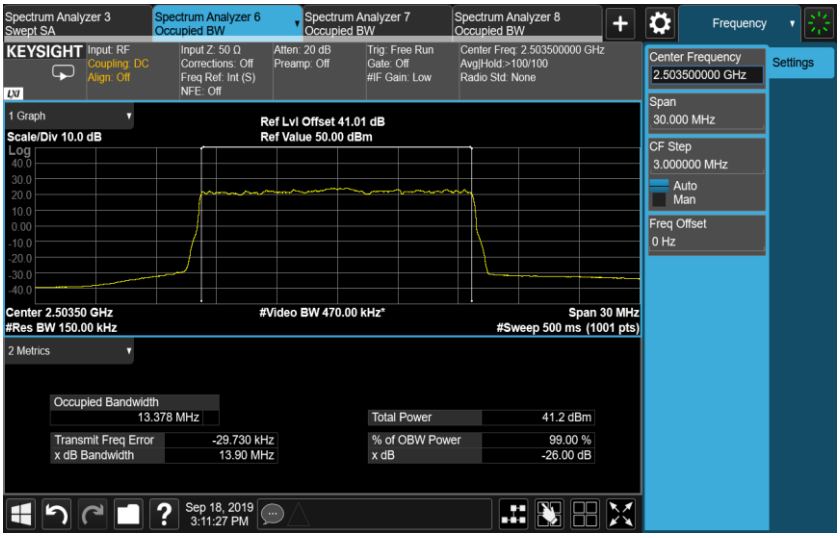
Port C, 16QAM/5.0MHz Channel Position M



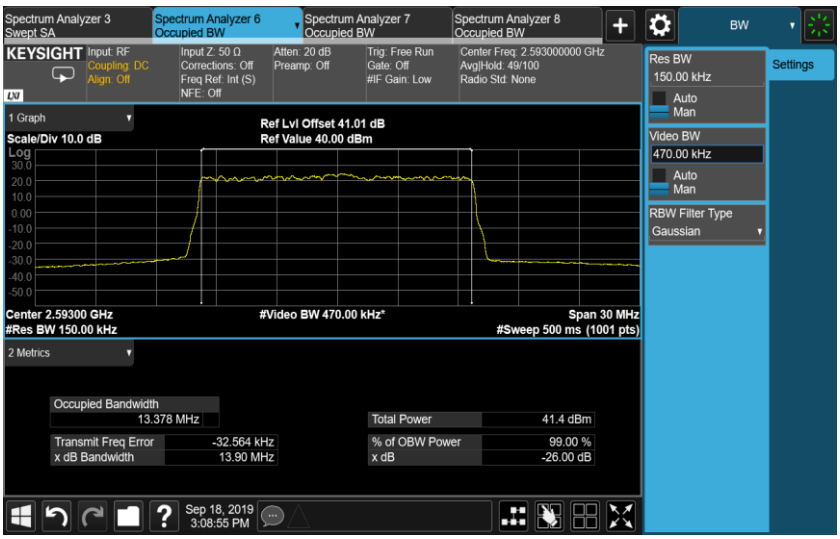
Port C, 16QAM/5.0MHz Channel Position T



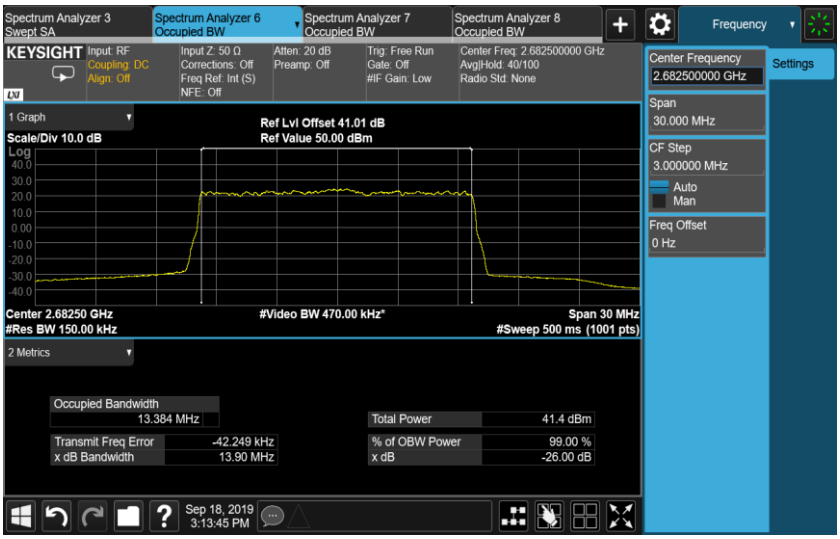
Port C, 16QAM/15.0MHz Channel Position B



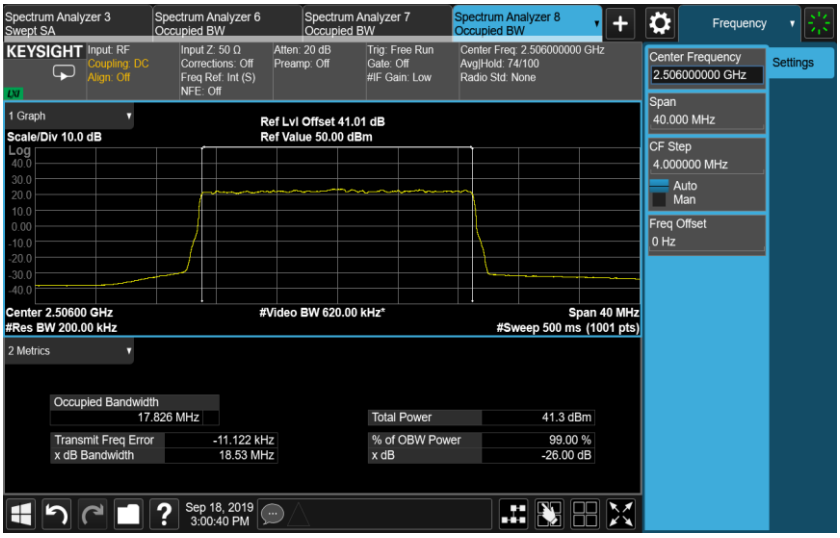
Port C, 16QAM/15.0MHz Channel Position M



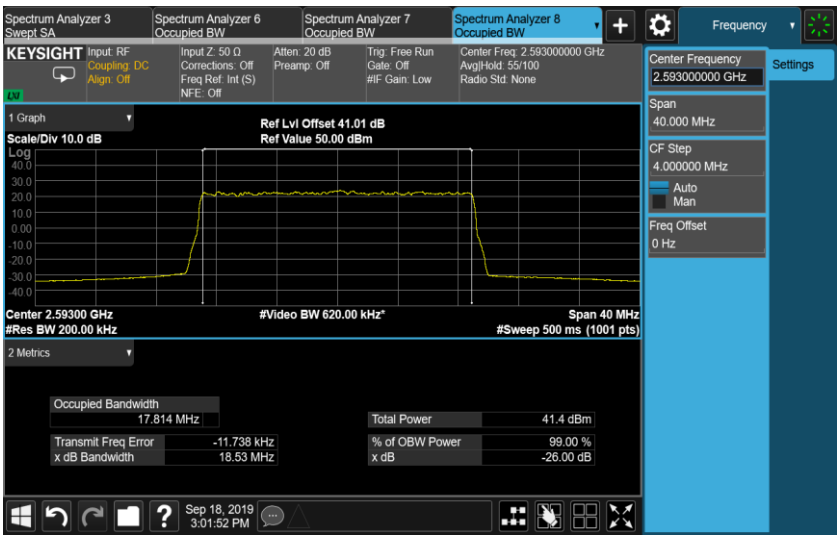
Port C, 16QAM/15.0MHz Channel Position T



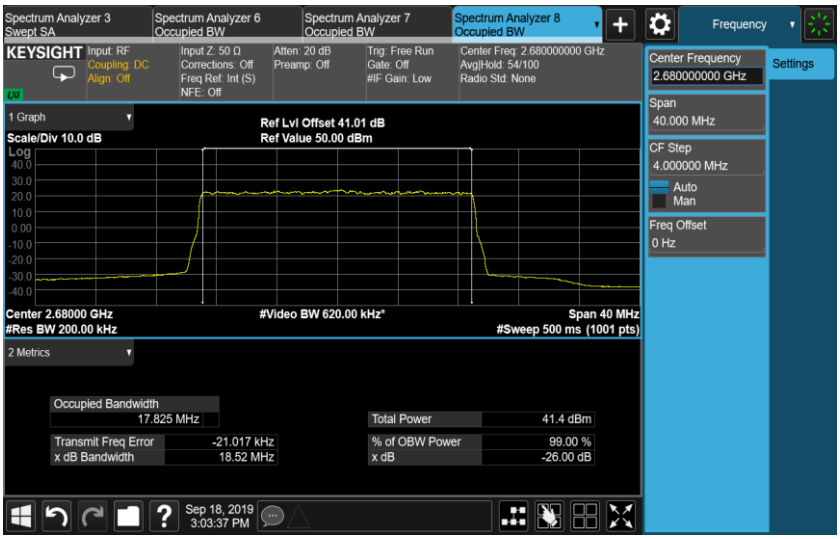
Port C, 16QAM/20.0MHz Channel Position B



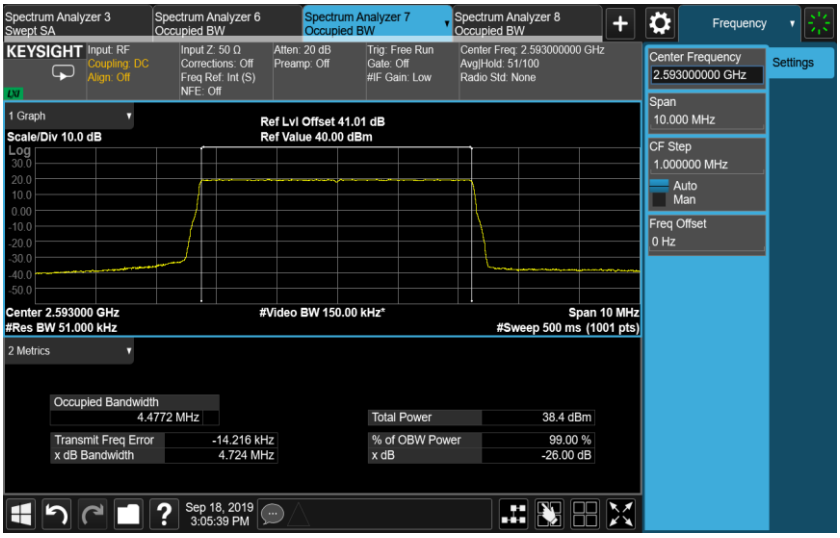
Port C, 16QAM/20.0MHz Channel Position M



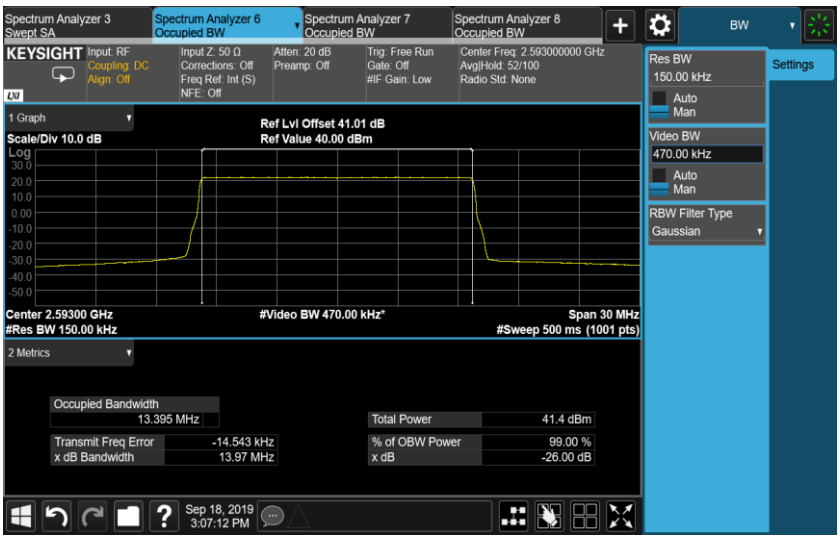
Port C, 16QAM/20.0MHz Channel Position T



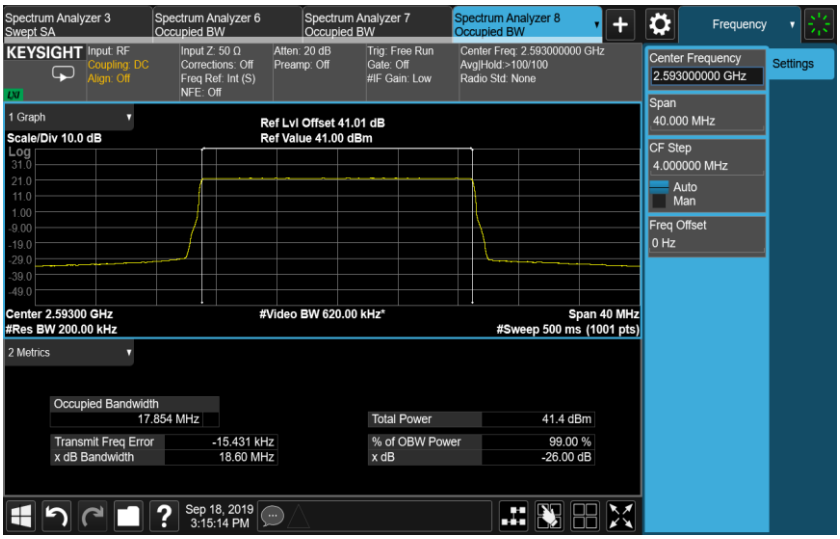
Port C, QPSK/5.0MHz Channel Position M



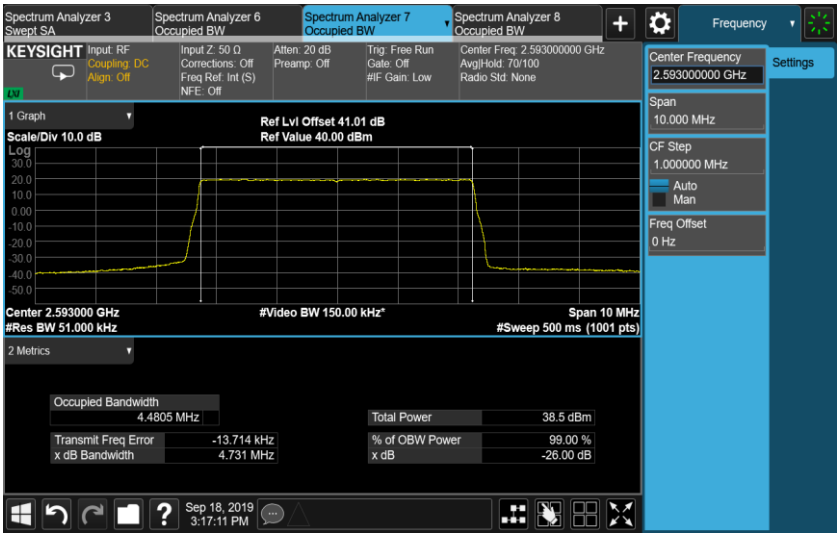
Port C, QPSK/15.0MHz Channel Position M



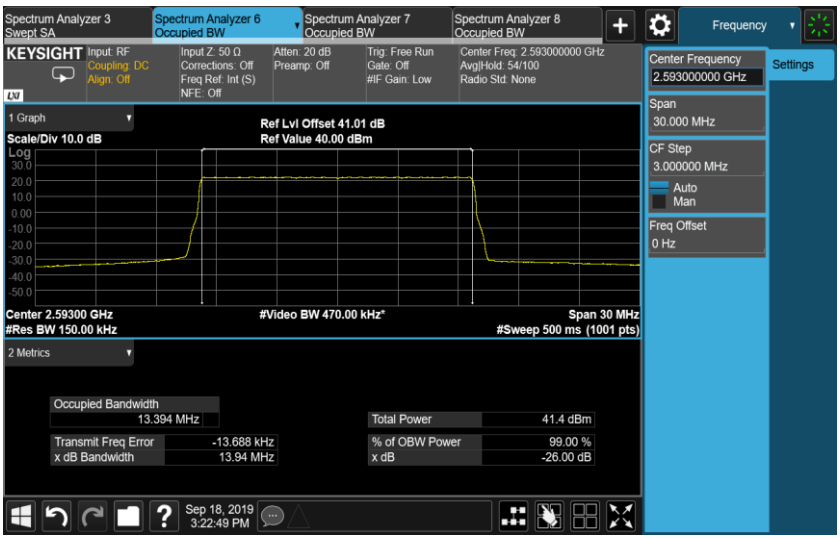
Port C, QPSK/20.0MHz Channel Position M



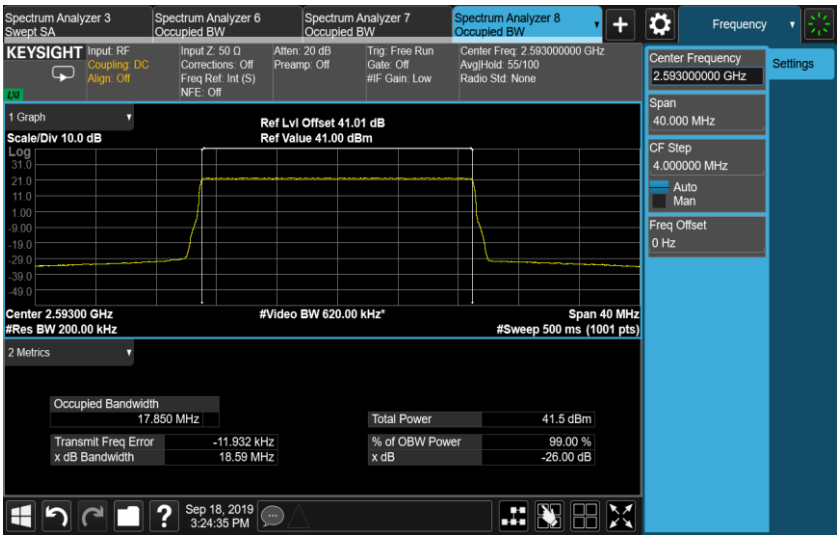
Port C, 64QAM/5.0MHz Channel Position M



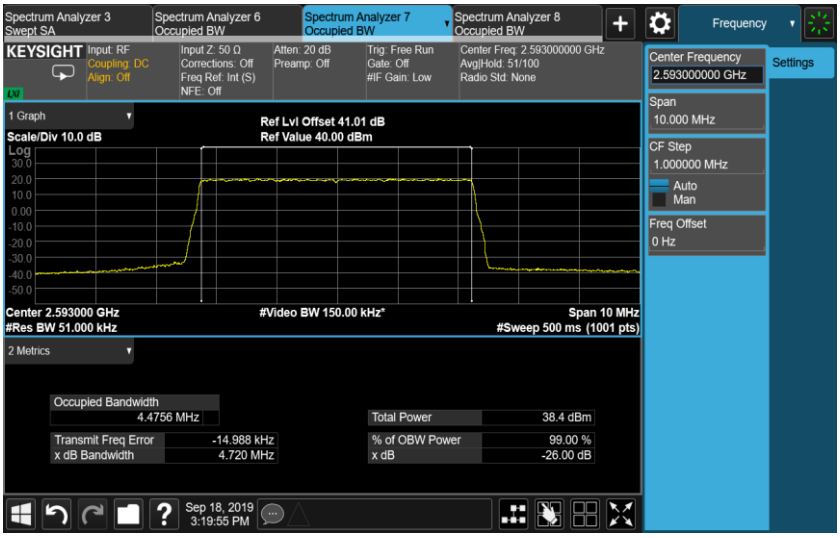
Port C, 64QAM/15.0MHz Channel Position M



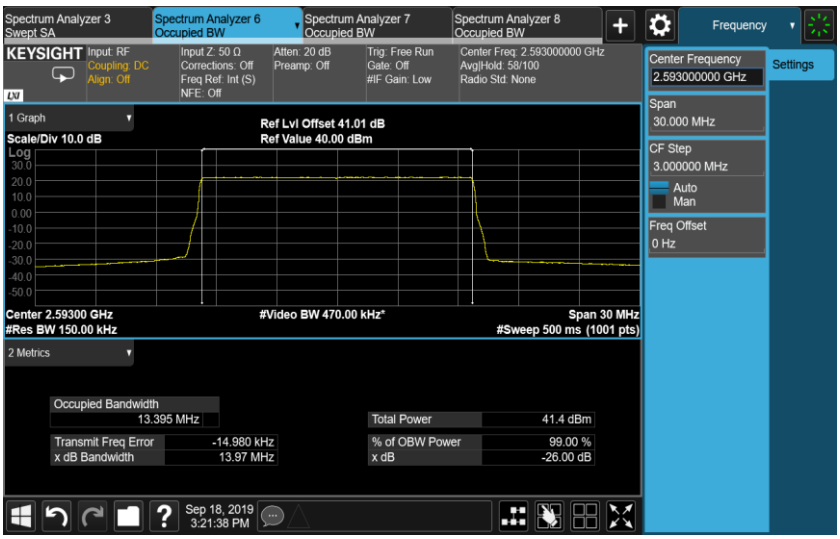
Port C, 64QAM/20.0MHz Channel Position M



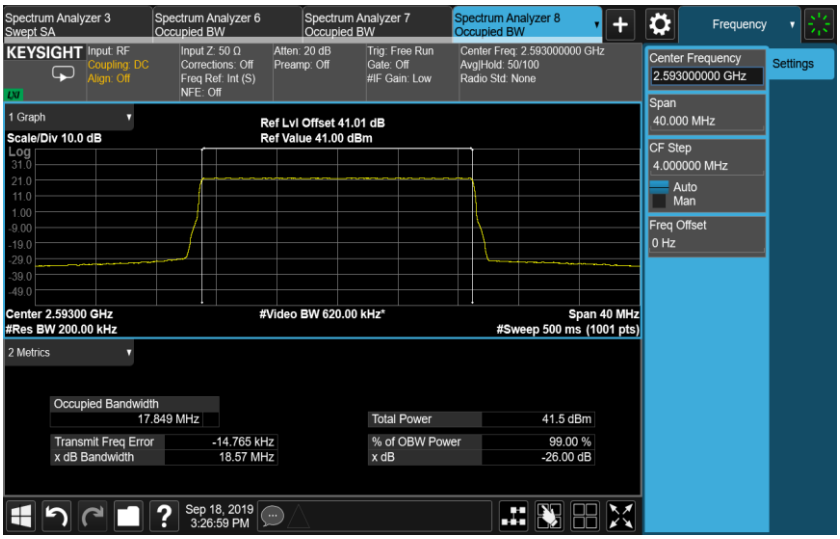
Port C, 256QAM/5.0MHz Channel Position M



Port C, 256QAM/15.0MHz Channel Position M



Port C, 256QAM/20.0MHz Channel Position M



A.3 Spurious Emissions at Band Edge

A.3.1 Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53(m)

A.3.2 Method of 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 + 10log(P) dB.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log4] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports RF A,B,C and D.

According to FCC rules, 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 and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges. The limit was adjusted with -13.01dB [10Log(50/1000)] to compensate for the reduce measurement bandwidth 50KHz for emission more than 1MHz away from the band edges. For MIMO mode, the limit of -32.03dBm was used for emission more than 1MHz away from the band edges. Spectrum analyser detector was set as RMS.

A.3.3 Measurement limit

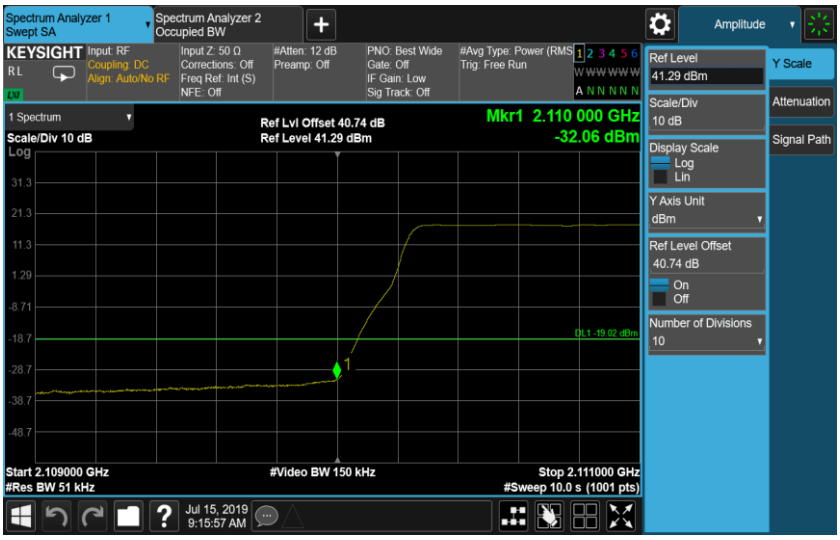
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

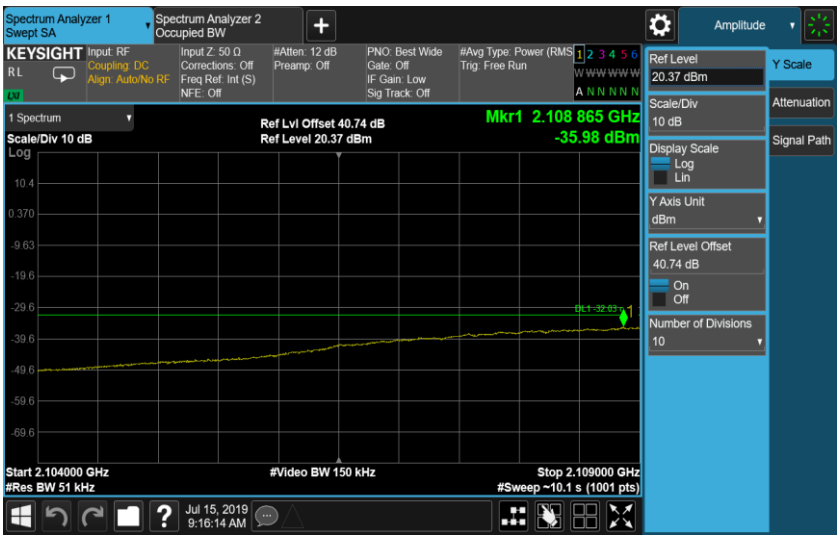
A.3.4 Measurement result

Configuration LTE-MIMO-1C, QPSK

Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B 2496MHz	5.0 MHz	51	-19.02
	15.0 MHz	150	-19.02
	20.0 MHz	200	-19.02
Channel Position T 2690MHz	5.0 MHz	51	-19.02
	15.0 MHz	150	-19.02
	20.0 MHz	200	-19.02

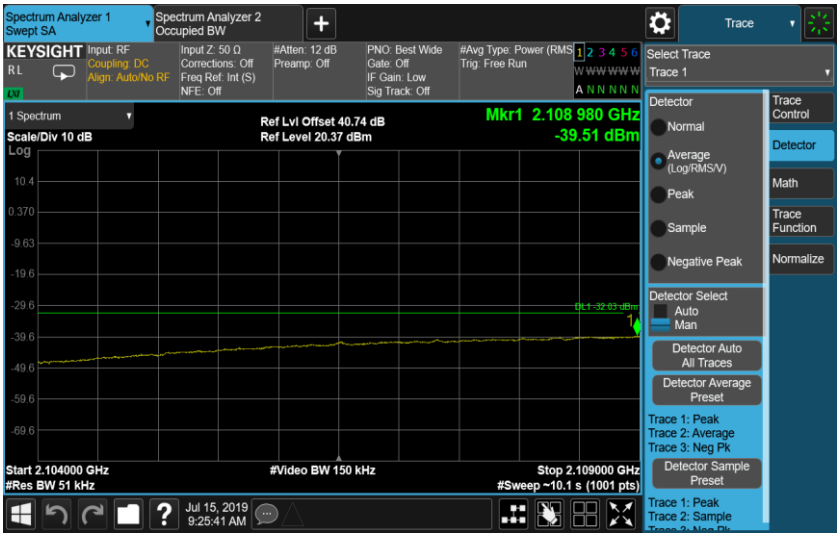
Port C, Channel Position B, 5.0MHz





Port C, Channel Position T, 5.0MHz

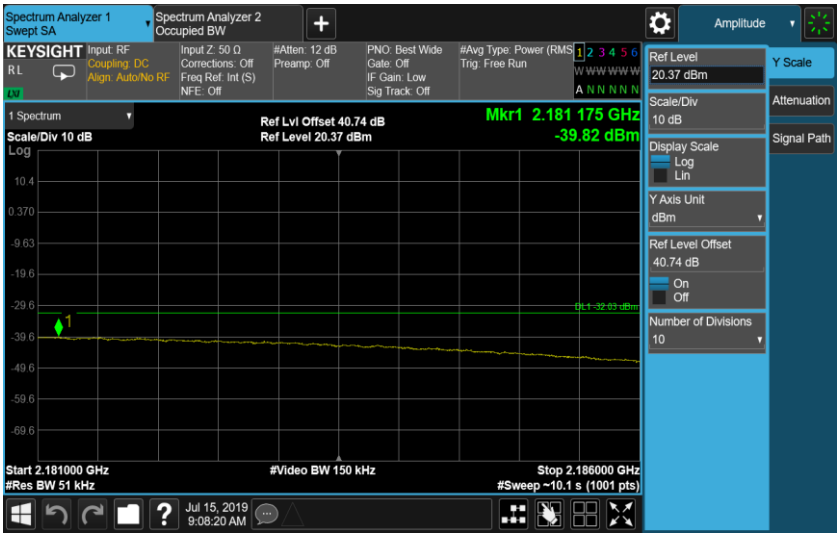
Port C, Channel Position B, 15.0MHz



Port C, Channel Position T, 15.0MHz

Port C, Channel Position B, 20.0MHz

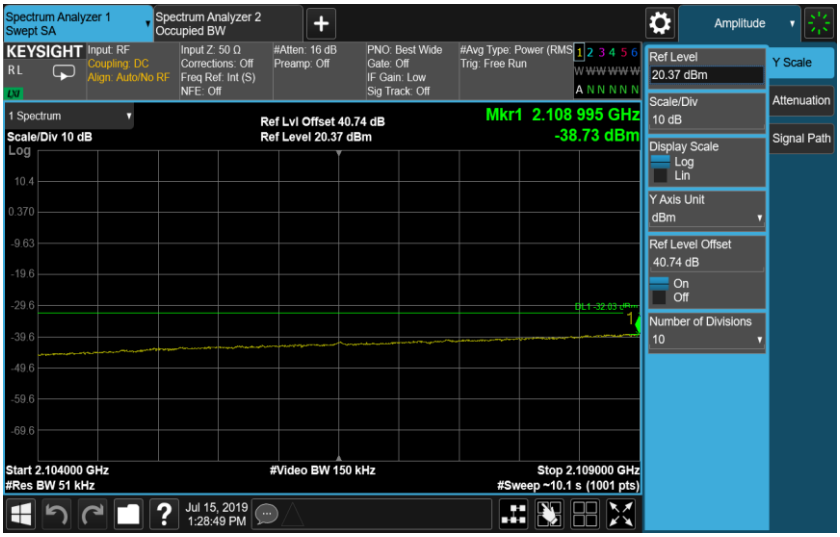
Port C, Channel Position T, 20.0MHz



Configuration LTE-MIMO-2C-BE, QPSK

Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B 2496MHz	5.0 MHz	51	-19.02
	15.0 MHz	150	-19.02
	20.0 MHz	200	-19.02
Channel Position T 2690MHz	5.0 MHz	51	-19.02
	15.0 MHz	150	-19.02
	20.0 MHz	200	-19.02

Port C, Channel Position B, 5.0MHz



Port C, Channel Position T, 5.0MHz