



CAICT

No.I20Z60238-WMD01



TEST REPORT

No.I20Z60238-WMD01

for

Ericsson AB Radio 4478 B26 KRC 161 884/1

Remote Radio Unit

FCC ID: TA8AKRC161884-1

In accordance with FCC CFR 47 Part 90

Issued Date: 2020-06-09

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z60238-WMD01	Rev.0	1 st edition	2020-06-09

Note: the latest revision of the test report supersedes all previous version.

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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 (ISED#: 24849). 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 4: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Project date

Testing Start Date: 2020-04-28

Testing End Date: 2020-05-26

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, No.5 Lize East Street, Chaoyang District, Beijing
100102, P.R.China
Contact: Tingting Wang
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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 4478 B26
Product Number	KRC 161 884/1
FCC ID	TA8AKRC161884-1
Antenna	N/A
Output power	Maximum 46.02dBm (40W) per port for all modes. Maximum 43.01dBm (20W) per carrier per port for LTE less than 5MHz and NB-IoT stand alone.
Power source	-48V DC
Serial Number	D829740620
Hardware Version	R5A
Software Version	Radio SW: CXP9017316_7-R81MS
Frequency range	RX: 814MHz-849MHz, TX: 859MHz-894MHz (LTE) RX: 824-849MHz, TX: 869-894MHz (WCDMA)
Number of Antenna ports	4TX /4 RX
Maximum RF bandwidth (IBW)	35MHz (for LTE BW less than 5MHz and NB-IoT standalone, IBW should be 20MHz) 25MHz (for WCDMA)
Maximum Number of supported carriers per port	6 carriers (2 for NB-IoT stand alone)
Supported modulations	WCDMA: QPSK, 16QAM and 64QAM LTE: QPSK, 16QAM, 64QAM and 256QAM NB-IoT: QPSK
Date of receipt	2020-04-28

3.2. General Description

The Equipment Under Test (EUT) Radio 4478 B26 is an Ericsson Remote Radio Unit working in 859-894MHz band which provides communication connections to network. The Radio 4478 B26 operates from a -48V DC 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.

A full technical description can be found in the Manufacturer's documentation.



3.3. Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of all applicable antenna ports. By measuring the output power of QPSK, 16QAM, 64QAM and 256QAM for LTE on one of the antenna ports, it was determined that QPSK was the worst case modulation scheme and was used for all testing.

Complete testing was carried out on the worst case antenna port which was established as being the highest output power from the applicable measured ports on worst case modulation scheme. This antenna port was port A for LTE mode.

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	1.4MHz	859.7	864.0	868.3
		3.0MHz	860.5	864.0	867.5
		5.0MHz	861.5	864.0	866.5
		10.0MHz	-	864.0	-
LTE-MIMO-2C	2 Carriers	1.4MHz	-	859.7+868.3	-
		3.0MHz	-	860.5+867.5	-
		5.0MHz	-	861.5+866.5	-
LTE-MIMO-1C-BE	1 Carriers	1.4MHz	859.7	N/A	868.3
		3.0MHz	860.5	N/A	867.5
		5.0MHz	861.5	N/A	866.5
		10.0MHz	864.0	N/A	864.0
LTE-MIMO-2C-BE	2 Carriers	1.4MHz	859.7+861.1	N/A	866.9+868.3
		3.0MHz	860.5+863.5	N/A	864.5+867.5
		5.0MHz	861.5+866.5	N/A	861.5+866.5

NB-IoT

Configuration	Carrier	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NB-IoT-InBand-1C	1 Carrier	5.0MHz	861.5	864.0	866.5
		10.0MHz	-	864.0	-
NB-IoT-Inband-1C-BE	1 Carrier	5.0MHz	861.5	N/A	866.5
		10.0MHz	864.0	N/A	864.0

Configuration	Carrier	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NB-IoT-GuardBand-1C	1 Carrier	10.0MHz	-	864.0	-
NB-IoT-GuardBand-1C-BE	1 Carrier	10.0MHz	864.0	N/A	864.0

Configuration	Carrier	Carrier Frequency Configuration (MHz)		
		Bottom	Middle	Top
NB-IoT-Standalone-1C	1 Carrier	859.2	864.0	868.8
NB-IoT-Standalone-2C	2 Carrier	-	859.2+868.8	-
NB-IoT-Standalone-1C-BE	1 Carrier	859.2	N/A	868.8
NB-IoT-Standalone-2C-BE	2 Carrier	859.2+860.8	N/A	867.2+868.8

LTE+NB-IoT

Configuration	Carrier	LTE Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE+NB-IoT-MIMO-MC-1	1L+1SA	1.4MHz	-	(L)859.7+(SA)868.8	-
		3.0MHz	-	(L)860.5+(SA)868.8	-
		5.0MHz	-	(L)861.5+(SA)868.8	-
LTE+NB-IoT-MIMO-MC-2	1L+2SA	1.4MHz	-	(SA)859.2+(L)864+(SA)868.8	-
		3.0MHz	-	(SA)859.2+(L)864+(SA)868.8	-
		5.0MHz	-	(SA)859.2+(L)864+(SA)868.8	-

Configuration	Carrier	LTE Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE+NB-IoT-MIMO-MC-5	4L+2SA	1.4MHz	-	(SA)859.2+(L)861.9+863.3+864.7+866.1+(SA)868.8	-
LTE+NB-IoT-MIMO-MC-6	3L+2SA	3.0MHz	-	(SA)859.2+(L)859.5+862.5+865.5+(SA)868.8	-
LTE+NB-IoT-MC-3-BE	1L+1SA	1.4MHz	(SA)859.2 + (L)860.1	N/A	(L)867.9 + (SA)868.8
		3.0MHz	(SA)859.2 + (L)860.9	N/A	(L)867.1 + (SA)868.8
		5.0MHz	(SA)859.2 + (L)861.9	N/A	(L)866.1 + (SA)868.8
LTE+NB-IoT-MC-4-BE	1L+2SA	1.4MHz	(SA)859.2+860.8+(L)861.7	N/A	(L)866.3+(SA)867.2+868.8
		3.0MHz	(SA)859.2+860.8+(L)862.5	N/A	(L)865.5+(SA)867.2+868.8
		5.0MHz	(SA)859.2+860.8+(L)863.5	N/A	(L)864.5+(SA)867.2+868.8

N/A – Not Applicable

4. Reference Documents

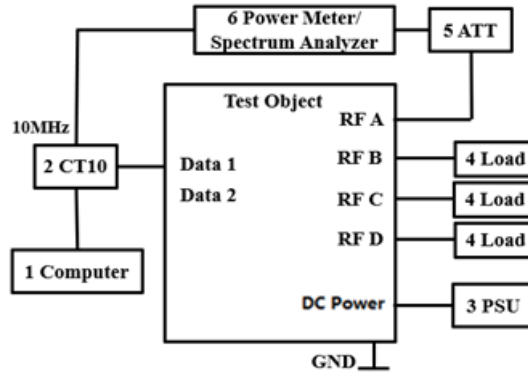
4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 90	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-19 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-19 Edition
ANSI 63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	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

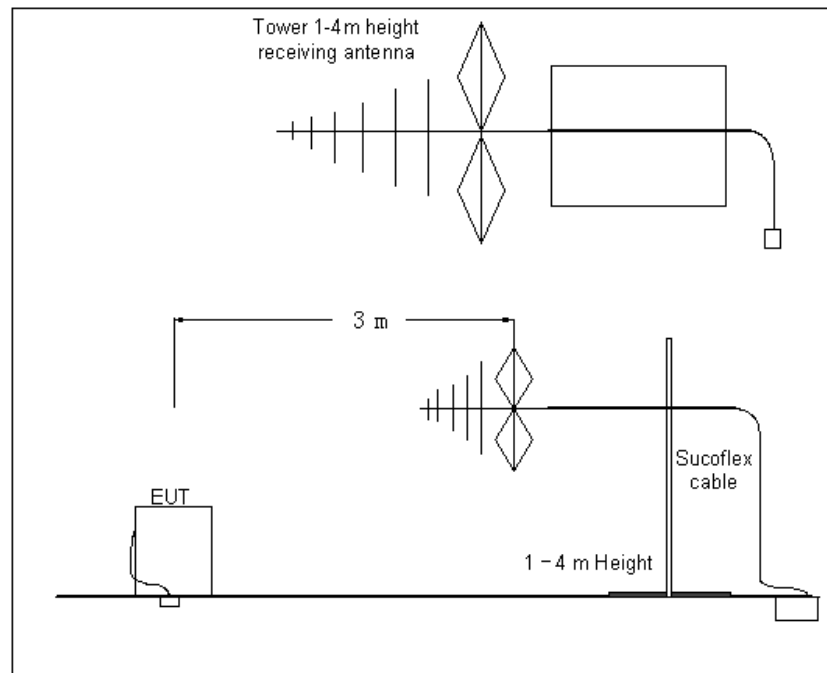
5. TEST SETUP

Test Setup, Conducted Measurement:



No.	Auxiliary Equipment	Model Type	Version
1	Test Computer	HP EliteBook 8540w	-
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 - EIRP calculation	90.635, 2.1046	Pass
2	Occupied Bandwidth	2.1049	Pass
3	Spurious Emissions at Band Edge	90.210, 2.1051	Pass
4	Conducted Spurious Emission	90.210, 2.1051	Pass
5	Radiated Spurious Emission	90.210 2.1051	Pass
6	Frequency Stability	90.213, 2.1055	Pass

8. Test Equipment Utilized

NO.	Description	TYPE	series number	MANUFACTURE	CAL DUE DATE
1	AC Power Supply	PAS20-18	UH000694	Kikusui	2020-07-05
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	2021-02-25
5	Climate Chamber	KTHG-415TBS	7353K	QINGSHENG	2020-08-07
6	Antenna	3117	00139065	ETS	2020-11-10
7	Power Amplifier	MY39500449	83006A	Agilent	-
8	Antenna	VULB9163	9163-482	Schwarzbeck	2020-09-16
9	Power Amplifier	SCU18	102249	R&S	-
10	Test Receiver	ESU26	100376	R&S	2020-10-30
11	Test Receiver	FSV40	101047	R&S	2020-06-16
12	Power Amplifier	SCU40	1707/1708	R&S	-
13	Antenna	3116	2661	ETS	2020-10-08
14	Climate Chamber	FACT-3	Ct000332-1074	ETS	2020-07-19

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 RESULTS

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

A.1.1 Reference

FCC CFR 47 Part 2, Clause 2.1046

FCC CFR 47 Part 90, Clause 90.635

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:

The effective radiated power and antenna height for base stations may not exceed 1 kilowatt and 305m. above average terrain, respectively, or the equivalent thereof as determined from the table. There are maximum values, and applicants will be required to justify power levels and antenna heights requested.

Peak to Average Ratio: 13 dB

A.1.4 Measurement result

Configuration LTE-MIMO-1C

Maximum Output Power 43.01dBm 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/1.4	42.86	41.84	8.37	43.09	42.19	8.37	43.11	42.19	8.35
B		42.60	41.53	8.27	42.91	42.03	8.30	42.92	42.07	8.24
C		42.85	41.83	8.38	43.08	42.17	8.37	43.04	42.15	8.36
D		42.68	41.66	8.27	42.87	42.02	8.24	42.87	42.05	8.26
Total		48.77	47.74	-	49.01	48.12	-	49.01	48.14	-

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/1.4	-	-	-	43.07	42.16	8.35	-	-	-
B		-	-	-	42.95	42.12	8.14	-	-	-
C		-	-	-	43.05	42.13	8.30	-	-	-
D		-	-	-	42.90	42.07	8.47	-	-	-
Total		-	-	-	49.01	48.14	-	-	-	-

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/1.4	-	-	-	43.05	42.17	8.35	-	-	-
B		-	-	-	42.86	42.11	8.27	-	-	-
C		-	-	-	43.02	42.14	8.31	-	-	-
D		-	-	-	42.91	42.14	8.27	-	-	-
Total		-	-	-	48.98	48.16	-	-	-	-

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	256QAM/1.4	-	-	-	43.00	42.18	8.32	-	-	-
B		-	-	-	42.87	42.12	8.15	-	-	-
C		-	-	-	42.97	42.13	8.31	-	-	-
D		-	-	-	42.96	42.07	8.37	-	-	-
Total		-	-	-	48.97	48.15	-	-	-	-

Maximum Output Power 43.01dBm 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/3.0	43.03	39.69	8.40	43.11	39.65	8.41	43.07	39.36	8.40
B		42.80	39.15	8.26	42.91	39.22	8.24	42.87	39.13	8.20
C		42.98	39.36	8.32	43.04	39.43	8.33	43.01	39.28	8.34
D		42.83	39.16	8.33	42.94	39.28	8.32	42.91	39.22	8.35
Total		48.93	45.37	-	49.02	45.42	-	48.99	45.27	-

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/3.0	-	-	-	43.13	39.66	8.40	-	-	-
B		-	-	-	42.86	39.27	8.25	-	-	-
C		-	-	-	43.08	39.50	8.38	-	-	-
D		-	-	-	42.96	39.41	8.33	-	-	-
Total		-	-	-	49.03	45.48	-	-	-	-

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/3.0	-	-	-	43.09	39.56	8.29	-	-	-
B		-	-	-	42.89	39.32	8.41	-	-	-
C		-	-	-	43.02	39.40	8.30	-	-	-
D		-	-	-	42.93	39.30	8.35	-	-	-
Total		-	-	-	49.00	45.42	-	-	-	-

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/3.0	-	-	-	43.06	39.44	8.34	-	-	-
B		-	-	-	42.87	39.29	8.30	-	-	-
C		-	-	-	43.01	39.37	8.32	-	-	-
D		-	-	-	42.91	39.30	8.21	-	-	-
Total		-	-	-	48.98	45.37	-	-	-	-

Maximum Output Power 46.02dBm 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/5.0	45.75	40.45	7.46	45.97	40.48	7.44	46.13	40.68	7.44
B		45.58	40.08	7.49	45.81	40.10	7.47	45.91	40.22	7.45
C		45.69	40.11	7.48	45.92	40.30	7.45	46.01	40.35	7.45
D		45.60	40.09	7.48	45.80	40.11	7.45	45.92	40.19	7.45
Total		51.68	46.21	-	51.90	46.27	-	52.01	46.39	-

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/5.0	-	-	-	45.93	40.41	7.44	-	-	-
B		-	-	-	45.79	40.29	7.45	-	-	-
C		-	-	-	45.93	40.38	7.45	-	-	-
D		-	-	-	45.85	40.35	7.46	-	-	-
Total		-	-	-	51.90	46.38	-	-	-	-

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/5.0	-	-	-	45.97	40.50	7.45	-	-	-
B		-	-	-	45.79	40.33	7.46	-	-	-
C		-	-	-	45.94	40.44	7.45	-	-	-
D		-	-	-	45.84	40.31	7.46	-	-	-
Total		-	-	-	51.91	46.42	-	-	-	-

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/5.0	-	-	-	45.94	40.40	7.47	-	-	-
B		-	-	-	45.76	40.13	7.45	-	-	-
C		-	-	-	45.88	40.21	7.46	-	-	-
D		-	-	-	45.80	40.17	7.44	-	-	-
Total		-	-	-	51.87	46.25	-	-	-	-

Maximum Output Power 46.02dBm 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/10.0	-	-	-	45.93	37.60	7.56	-	-	-
B		-	-	-	45.78	37.25	7.56	-	-	-
C		-	-	-	45.90	37.38	7.57	-	-	-
D		-	-	-	45.80	37.30	7.54	-	-	-
Total		-	-	-	51.87	43.41	-	-	-	-

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/ 10.0	-	-	-	45.94	37.96	7.55	-	-	-
B		-	-	-	45.80	37.27	7.57	-	-	-
C		-	-	-	45.90	37.73	7.56	-	-	-
D		-	-	-	45.82	37.27	7.52	-	-	-
Total		-	-	-	51.89	43.59	-	-	-	-

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/ 10.0	-	-	-	45.95	37.83	7.57	-	-	-
B		-	-	-	45.77	37.26	7.55	-	-	-
C		-	-	-	45.89	37.54	7.60	-	-	-
D		-	-	-	45.78	37.28	7.56	-	-	-
Total		-	-	-	51.87	43.50	-	-	-	-

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/1 0.0	-	-	-	45.88	37.75	7.57	-	-	-
B		-	-	-	45.76	37.27	7.55	-	-	-
C		-	-	-	45.85	37.50	7.57	-	-	-
D		-	-	-	45.74	37.28	7.55	-	-	-
Total		-	-	-	51.83	43.48	-	-	-	-

Configuration LTE-MIMO-2C

Maximum Output Power 46.02dBm 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/1.4	-	-	-	45.68	42.25	-	-	-	-
B		-	-	-	45.53	41.60	-	-	-	-
C		-	-	-	45.56	42.07	-	-	-	-
D		-	-	-	45.51	41.64	-	-	-	-
Total		-	-	-	51.59	47.92	-	-	-	-

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/1.4	-	-	-	45.64	42.22	-	-	-	-
B		-	-	-	45.49	41.63	-	-	-	-
C		-	-	-	45.60	42.11	-	-	-	-
D		-	-	-	45.44	41.63	-	-	-	-
Total		-	-	-	51.56	47.93	-	-	-	-

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/1.4	-	-	-	45.58	42.12	-	-	-	-
B		-	-	-	45.48	41.62	-	-	-	-
C		-	-	-	45.50	41.93	-	-	-	-
D		-	-	-	45.42	41.73	-	-	-	-
Total		-	-	-	51.52	47.87	-	-	-	-

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/1.4	-	-	-	45.56	42.19	-	-	-	-
B		-	-	-	45.45	41.53	-	-	-	-
C		-	-	-	45.55	42.19	-	-	-	-
D		-	-	-	45.44	41.64	-	-	-	-
Total		-	-	-	51.52	47.92	-	-	-	-

Maximum Output Power 46.02dBm 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/3.0	-	-	-	45.65	39.33	-	-	-	-
B		-	-	-	45.46	39.20	-	-	-	-
C		-	-	-	45.60	39.25	-	-	-	-
D		-	-	-	45.51	39.22	-	-	-	-
Total		-	-	-	51.58	45.27	-	-	-	-

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/3.0	-	-	-	45.69	39.37	-	-	-	-
B		-	-	-	45.46	39.20	-	-	-	-
C		-	-	-	45.63	39.33	-	-	-	-
D		-	-	-	45.51	39.26	-	-	-	-
Total		-	-	-	51.59	45.31	-	-	-	-

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/3.0	-	-	-	45.64	39.35	-	-	-	-
B		-	-	-	45.44	39.14	-	-	-	-
C		-	-	-	45.62	39.31	-	-	-	-
D		-	-	-	45.50	39.23	-	-	-	-
Total		-	-	-	51.57	45.28	-	-	-	-

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/3.0	-	-	-	45.67	39.36	-	-	-	-
B		-	-	-	45.44	39.16	-	-	-	-
C		0	-	-	-	45.62	39.21	-	-	-
D		-	-	-	45.49	39.14	-	-	-	-
Total		-	-	-	51.58	45.24	-	-	-	-

Maximum Output Power 46.02dBm 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/ 5.0	-	-	-	45.64	37.14	-	-	-	-
B		-	-	-	45.46	37.08	-	-	-	-
C		-	-	-	45.63	37.10	-	-	-	-
D		-	-	-	45.53	37.11	-	-	-	-
Total		-	-	-	51.59	43.13	-	-	-	-

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/ 5.0	-	-	-	45.65	37.21	-	-	-	-
B		-	-	-	45.46	37.07	-	-	-	-
C		-	-	-	45.62	37.20	-	-	-	-
D		-	-	-	45.52	37.14	-	-	-	-
Total		-	-	-	51.58	43.18	-	-	-	-

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/ 5.0	-	-	-	45.70	37.43	-	-	-	-
B		-	-	-	45.46	37.08	-	-	-	-
C		-	-	-	45.64	37.16	-	-	-	-
D		-	-	-	45.53	37.10	-	-	-	-
Total		-	-	-	51.60	43.22	-	-	-	-

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 /5.0	-	-	-	45.66	37.19	-	-	-	-
B		-	-	-	45.48	37.12	-	-	-	-
C		-	-	-	45.66	37.18	-	-	-	-
D		-	-	-	45.56	37.14	-	-	-	-
Total		-	-	-	51.61	43.18	-	-	-	-

Configuration NB-IoT-InBand-1C

Maximum Output Power 46.02dBm 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/5.0	45.63	40.37	7.46	45.85	40.64	7.45	45.97	40.78	7.44
B		45.46	40.25	7.47	45.63	40.29	7.45	45.81	40.42	7.44
C		45.60	40.32	7.46	45.79	40.56	7.45	45.94	40.60	7.45
D		45.41	40.16	7.46	45.61	40.29	7.45	45.78	40.48	7.44
Total		51.55	46.30	-	51.74	46.47	-	51.90	46.59	-

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/10.0	-	-	-	45.80	38.26	7.57	-	-	-
B		-	-	-	45.65	38.10	7.57	-	-	-
C		-	-	-	45.79	38.20	7.57	-	-	-
D		-	-	-	45.64	38.11	7.56	-	-	-
Total		-	-	-	51.74	44.19	-	-	-	-

Configuration NB-IoT-GuardBand-1C

Maximum Output Power 46.02dBm 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/10.0	-	-	-	45.67	37.48	7.69	-	-	-
B		-	-	-	45.51	37.14	7.70	-	-	-
C		-	-	-	45.68	37.44	7.70	-	-	-
D		-	-	-	45.53	37.13	7.69	-	-	-
Total		-	-	-	51.62	43.32	-	-	-	-

Configuration NB-IoT-StandAlone-1C

Maximum Output Power 43.01dBm per port

Antenna	Modulation/ Carrier Bandwidth (KHz)	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/ 250.0	42.66	42.65	4.96	42.91	42.88	4.99	42.94	42.91	4.96

Configuration NB-IoT-StandAlone-2C

Maximum Output Power 46.02dBm per port

Antenna	Modulation/ Carrier Bandwidth (KHz)	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/ 250.0	-	-	-	45.17	42.29	-	-	-	-

Configuration LTE+NB-IoT-MIMO-MC-1 (1LTE+1SA)

Maximum Output Power 46.02dBm per port

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 1.4 /QPSK	-	-	-	45.67	42.82	-	-	-	-
B	QPSK 1.4 /QPSK	-	-	-	45.51	42.66	-	-	-	-
C	QPSK 1.4 /QPSK	-	-	-	45.56	42.73	-	-	-	-
D	QPSK 1.4 /QPSK	-	-	-	45.54	42.68	-	-	-	-
Total		-	-	-	51.59	48.74	-	-	-	-

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 3.0 /QPSK	-	-	-	45.71	42.61	-	-	-	-
B	QPSK 3.0 /QPSK	-	-	-	45.54	42.32	-	-	-	-
C	QPSK 3.0 /QPSK	-	-	-	45.67	42.46	-	-	-	-
D	QPSK 3.0 /QPSK	-	-	-	45.60	42.42	-	-	-	-
Total		-	-	-	51.65	48.47	-	-	-	-

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 5.0 /QPSK	-	-	-	45.76	42.77	-	-	-	-
B	QPSK 5.0 /QPSK	-	-	-	45.52	42.49	-	-	-	-
C	QPSK 5.0 /QPSK	-	-	-	45.74	42.63	-	-	-	-
D	QPSK 5.0 /QPSK	-	-	-	45.56	42.55	-	-	-	-
Total		-	-	-	51.67	48.63	-	-	-	-

Configuration LTE+NB-IoT-MIMO-MC-2 (1LTE+2SA)

Maximum Output Power 46.02dBm per port

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 1.4 /QPSK	-	-	-	45.28	40.35	-	-	-	-
B	QPSK 1.4 /QPSK	-	-	-	45.03	40.06	-	-	-	-
C	QPSK 1.4 /QPSK	-	-	-	45.15	40.24	-	-	-	-
D	QPSK 1.4 /QPSK	-	-	-	45.06	40.12	-	-	-	-
Total		-	-	-	51.15	46.21	-	-	-	-

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 3.0 /QPSK	-	-	-	45.33	40.57	-	-	-	-
B	QPSK 3.0 /QPSK	-	-	-	45.05	39.89	-	-	-	-
C	QPSK 3.0 /QPSK	-	-	-	45.16	40.15	-	-	-	-
D	QPSK 3.0 /QPSK	-	-	-	45.06	39.97	-	-	-	-
Total		-	-	-	51.17	46.17	-	-	-	-

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 5.0 /QPSK	-	-	-	45.28	40.31	-	-	-	-
B	QPSK 5.0 /QPSK	-	-	-	45.04	39.93	-	-	-	-
C	QPSK 5.0 /QPSK	-	-	-	45.16	40.15	-	-	-	-
D	QPSK 5.0 /QPSK	-	-	-	45.07	40.05	-	-	-	-
Total		-	-	-	51.16	46.13	-	-	-	-

Configuration LTE+NB-IoT-MIMO-MC-5 (4LTE+2SA)

Maximum Output Power 46.02dBm per port

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 1.4 /QPSK	-	-	-	45.61	38.77	-	-	-	-
B	QPSK 1.4 /QPSK	-	-	-	45.46	38.47	-	-	-	-
C	QPSK 1.4 /QPSK	-	-	-	45.50	38.70	-	-	-	-
D	QPSK 1.4 /QPSK	-	-	-	45.41	38.26	-	-	-	-
Total		-	-	-	51.52	44.58	-	-	-	-

Configuration LTE+NB-IoT-MIMO-MC-5 (3LTE+2SA)

Maximum Output Power 46.02dBm per port

Antenna	LTE Mod. Bandwidth (MHz)/ SA Mod.	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 3.0 /QPSK	-	-	-	45.54	38.78	-	-	-	-
B	QPSK 3.0 /QPSK	-	-	-	45.32	38.57	-	-	-	-
C	QPSK 3.0 /QPSK	-	-	-	45.52	38.77	-	-	-	-
D	QPSK 3.0 /QPSK	-	-	-	45.39	38.63	-	-	-	-
Total		-	-	-	51.46	44.71	-	-	-	-

A.2 Occupied Bandwidth

A.2.1 Reference

FCC CFR 47 Part 2, Clause 2.1049

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 analyzer, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The measurement method is from ANSI C63.26:

- 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.
- 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 $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

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
QPSK/ 1.4MHz	1.236	1.234	1.243
QPSK/ 3.0MHz	2.856	2.856	2.857
QPSK/ 5.0MHz	4.733	4.730	4.733
QPSK/ 10.0MHz	-	9.326	-

-26dBc Occupied Bandwidth

Bandwidth	Occupied Bandwidth (MHz)		
	Modulation 16QAM/ Channel position M	Modulation 64QAM/ Channel position M	Modulation 256QAM/ Channel position M
1.4MHz	1.226	1.224	1.228
3.0MHz	2.845	2.851	2.848
5.0MHz	4.703	4.722	4.710
10.0MHz	9.343	9.368	9.363

99% Occupied Bandwidth

Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK/ 1.4MHz	1.0888	1.0893	1.0899
QPSK/ 3.0MHz	2.6918	2.6930	2.6920
QPSK/ 5.0MHz	4.4768	4.4777	4.4780
QPSK/ 10.0MHz	-	8.9393	-

99% Occupied Bandwidth

Bandwidth	Occupied Bandwidth (MHz)		
	Modulation 16QAM/ Channel position M	Modulation 64QAM/ Channel position M	Modulation 256QAM/ Channel position M
1.4MHz	1.0876	1.0877	1.0877
3.0MHz	2.6882	2.6912	2.6917
5.0MHz	4.4582	4.4757	4.4778
10.0MHz	8.9337	8.9348	8.9366

Port A, QPSK/1.4MHz Channel Position B



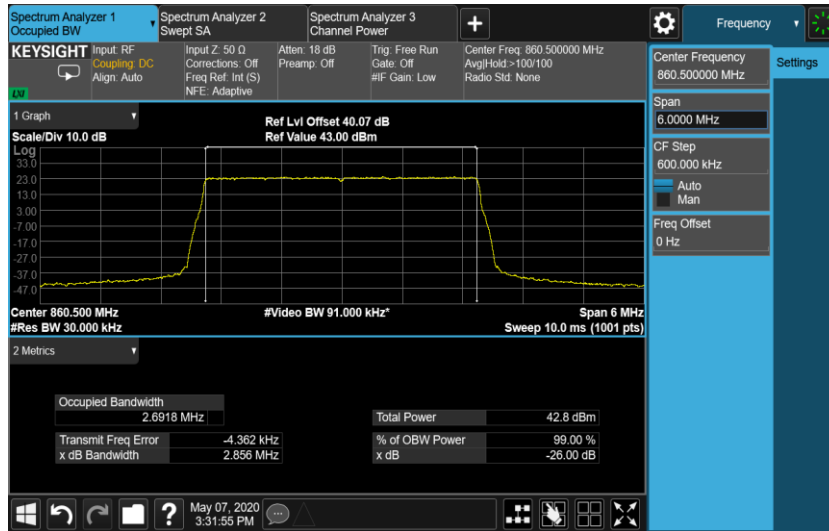
Port A, QPSK/1.4MHz Channel Position M



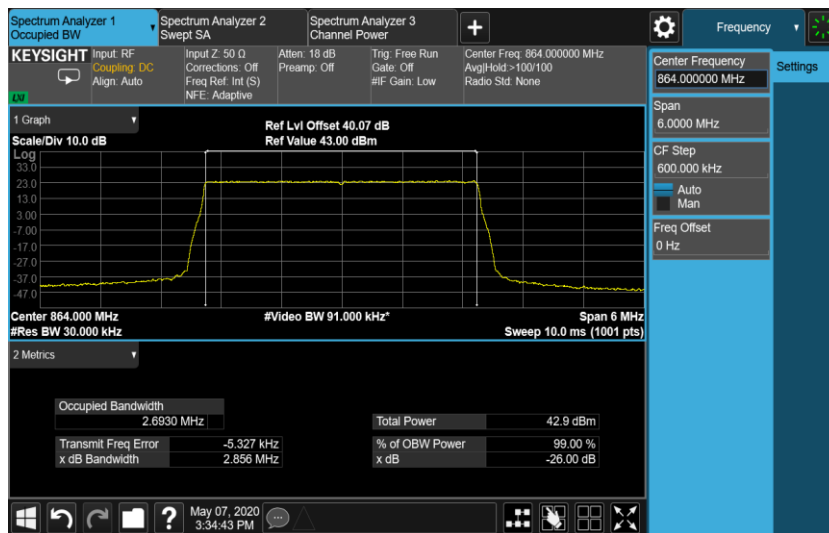
Port A, QPSK/1.4MHz Channel Position T



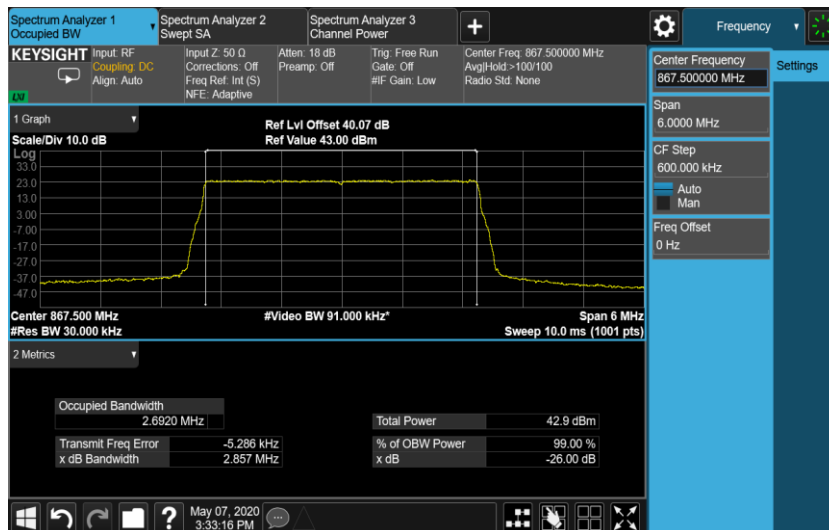
Port A, QPSK/3.0MHz Channel Position B



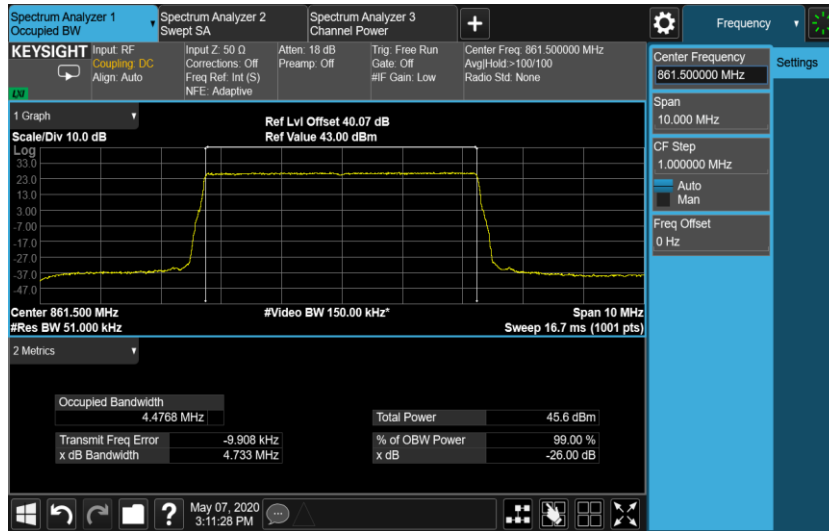
Port A, QPSK/3.0MHz Channel Position M



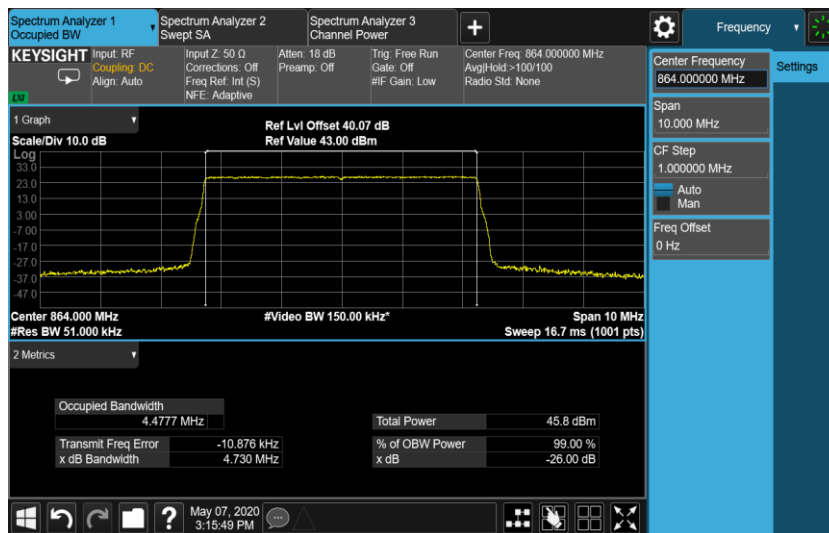
Port A, QPSK/3.0MHz Channel Position T



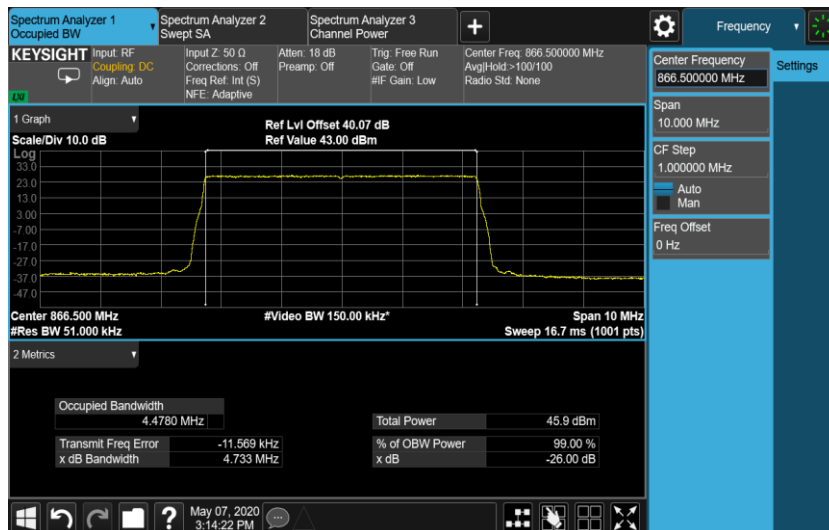
Port A, QPSK/5.0MHz Channel Position B



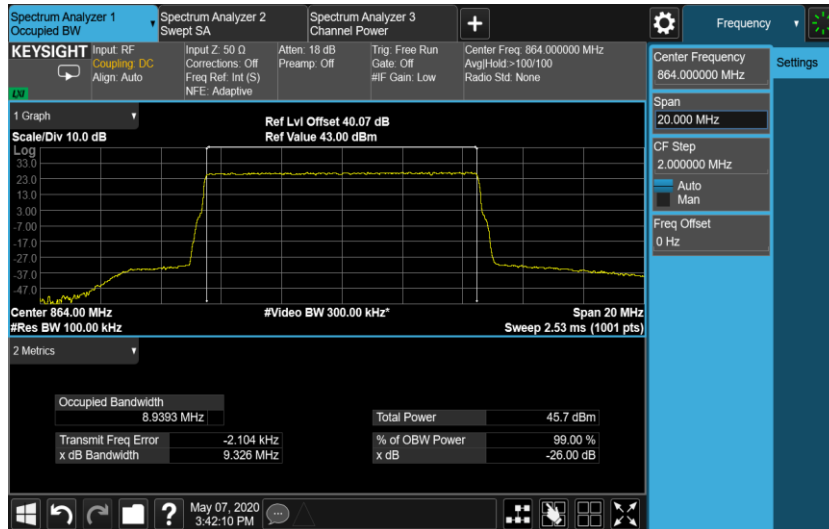
Port A, QPSK/5.0MHz Channel Position M



Port A, QPSK/5.0MHz Channel Position T



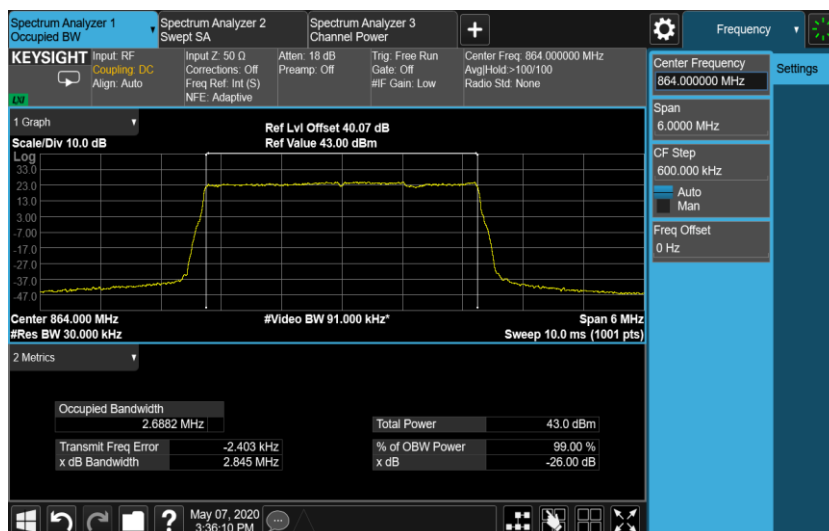
Port A, QPSK/10.0MHz Channel Position M



Port A, 16QAM/1.4MHz Channel Position M



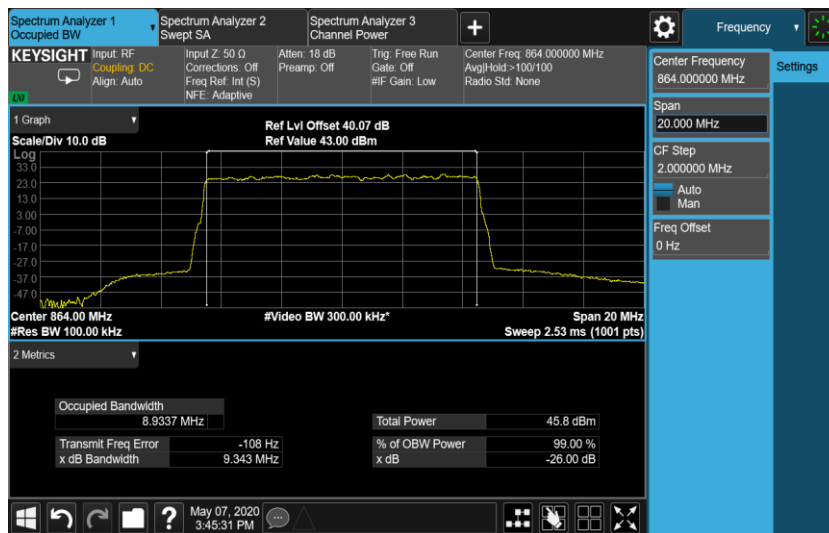
Port A, 16QAM/3.0MHz Channel Position M



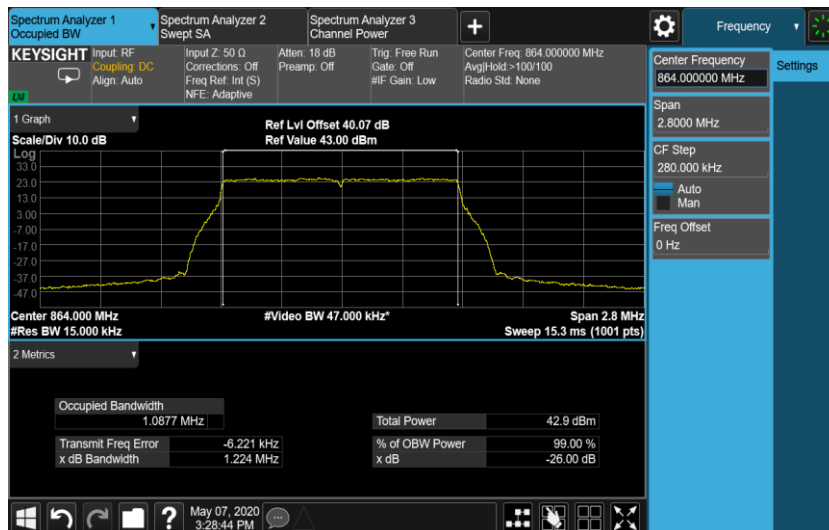
Port A, 16QAM/5.0MHz Channel Position M



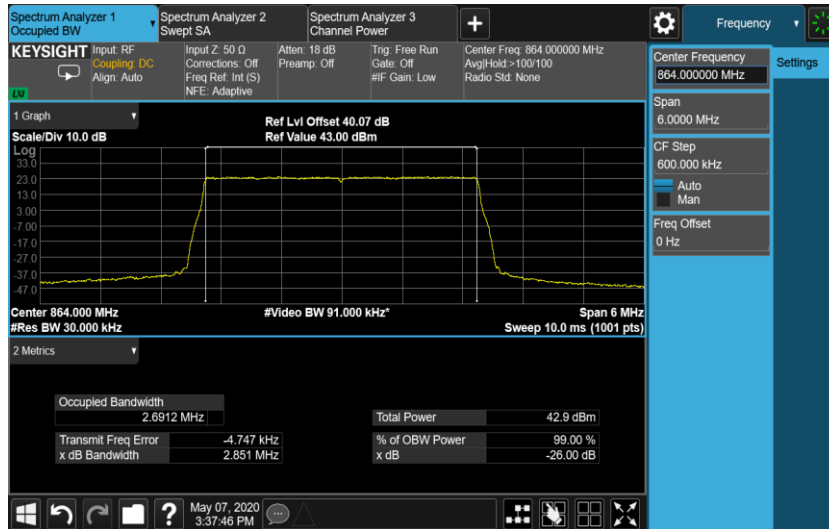
Port A, 16QAM/10.0MHz Channel Position M



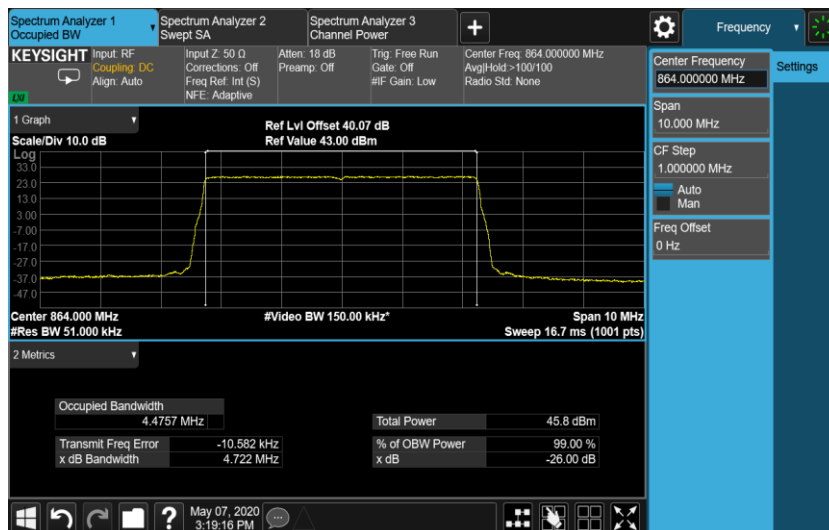
Port A, 64QAM/1.4MHz Channel Position M



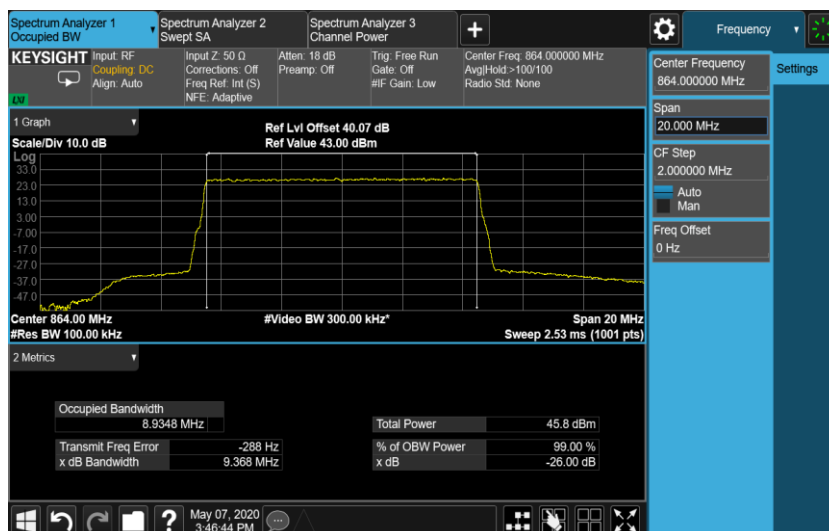
Port A, 64QAM/3.0MHz Channel Position M



Port A, 64QAM/5.0MHz Channel Position M



Port A, 64QAM/10.0MHz Channel Position M



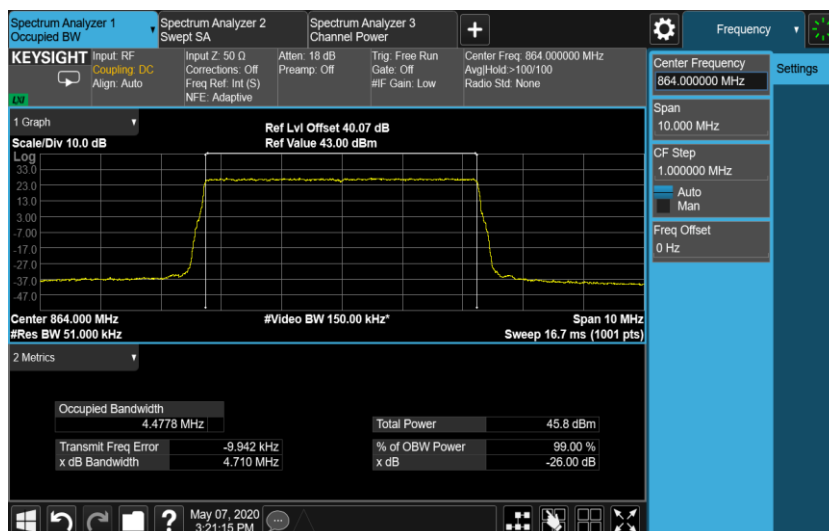
Port A, 256QAM/1.4MHz Channel Position M



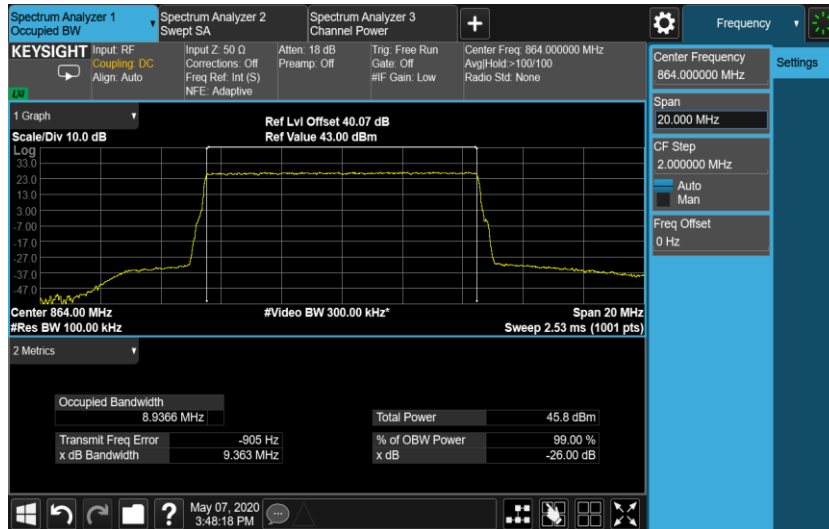
Port A, 256QAM/3.0MHz Channel Position M



Port A, 256QAM/5.0MHz Channel Position M



Port A, 256QAM/10.0MHz Channel Position M



Configuration NB-IoT-Standalone-1C

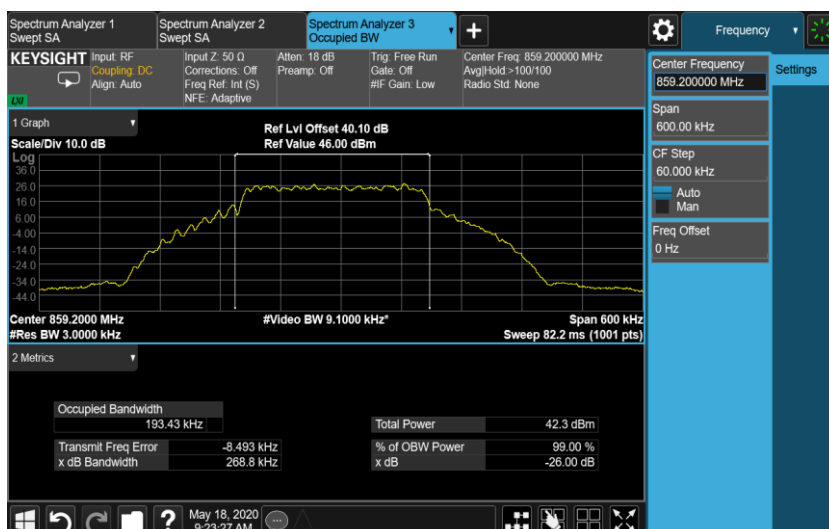
-26dBc Occupied Bandwidth

Modulation	Occupied Bandwidth (KHz)		
	Channel position B	Channel position M	Channel position T
QPSK	268.8	269.2	268.6

99% Occupied Bandwidth

Modulation	Occupied Bandwidth (KHz)		
	Channel position B	Channel position M	Channel position T
QPSK	193.43	193.71	193.03

Port A, QPSK Channel Position B



Port A, QPSK Channel Position M



Port A, QPSK Channel Position T



Configuration NB-IoT-InBand-1C

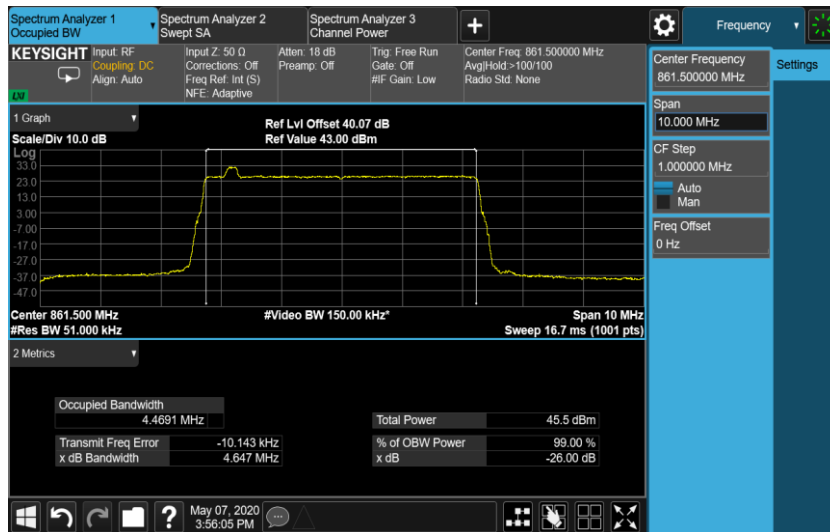
-26dBc Occupied Bandwidth

Modulation	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK	4.647	4.649	4.648

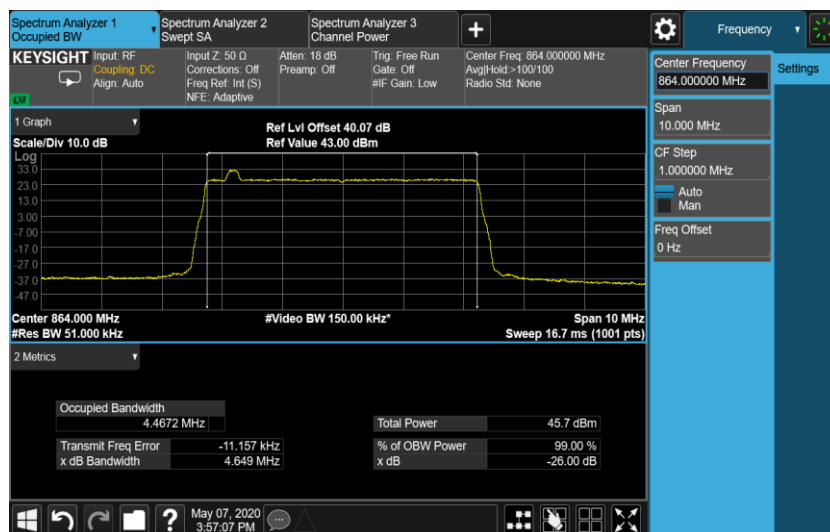
99% Occupied Bandwidth

Modulation	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK	4.4691	4.4672	4.4674

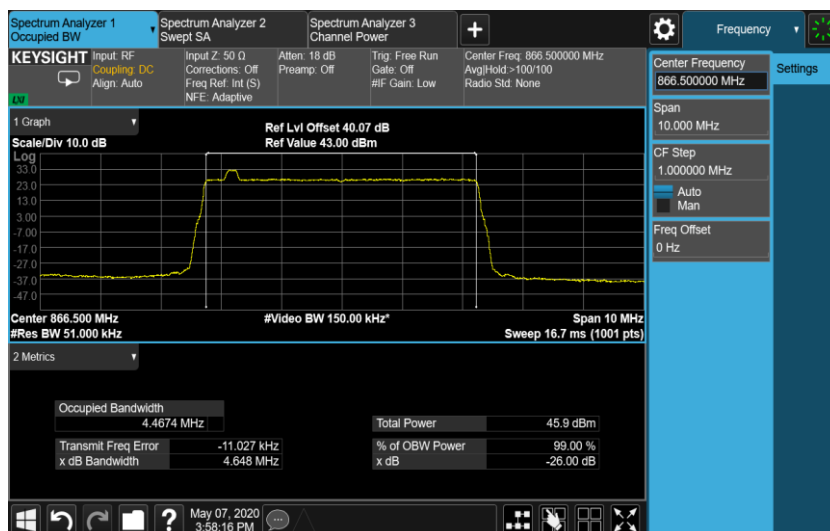
Port A, QPSK/5.0MHz Channel Position B



Port A, QPSK/5.0MHz Channel Position M



Port A, QPSK/5.0MHz Channel Position T



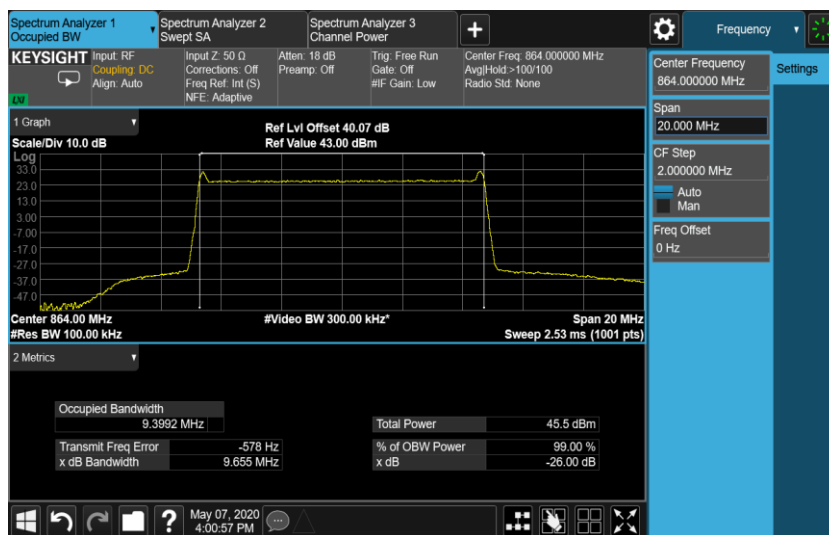
Configuration NB-IoT-GuardBand-1C
-26dBc Occupied Bandwidth

Modulation	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK	-	9.655	-

99% Occupied Bandwidth

Modulation	Occupied Bandwidth (MHz)		
	Channel position B	Channel position M	Channel position T
QPSK	-	9.3992	-

Port A, QPSK/10.0MHz 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 90, Clause 90.210

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 $43 + 10\log(P)$ dB.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [$10\log(1/4)$] by using the Measure and Add $10\log(N)$ dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports . Then the limit was adjusted to -19.02dBm .

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 $> 1\text{MHz}$ away from the band edges.

The limit was adjusted with -13.01dB [$10\log(50/1000)$] to compensate for the reduced measurement bandwidth 50KHz for emission more than 1MHz away from the band edges. For MIMO mode, the limit of -32.03dBm was used.

Spectrum analyzer detector was set as RMS.

A.3.3 Measurement limit

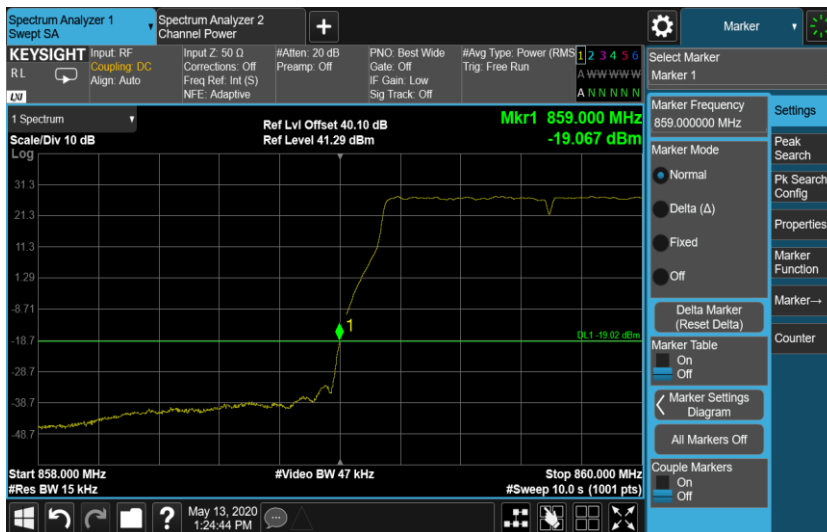
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

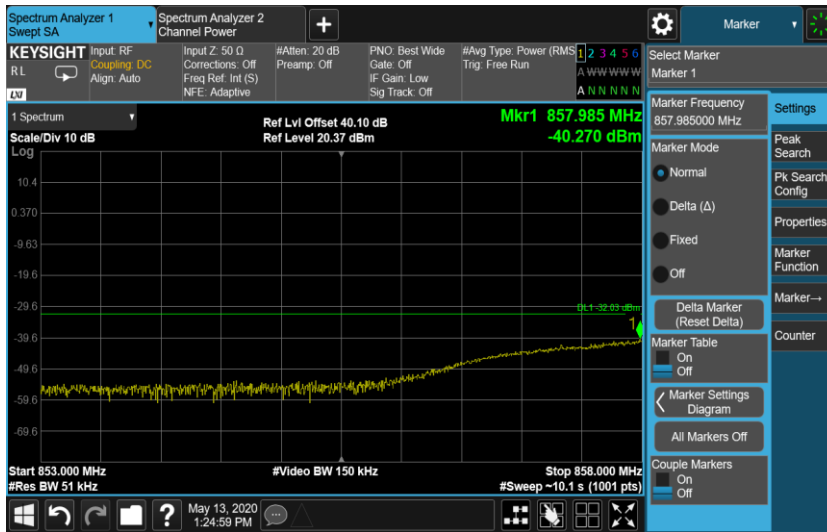
A.3.4 Measurement result

Configuration LTE-MIMO-1C, QPSK

Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B	1.4 MHz	15	-19.02
	3.0MHz	30	-19.02
	5.0 MHz	51	-19.02
	10.0 MHz	100	-19.02
Channel Position T 2180.0MHz	1.4 MHz	15	-19.02
	3.0MHz	30	-19.02
	5.0 MHz	51	-19.02
	10.0 MHz	100	-19.02

Port A , Channel Position B, 1.4MHz





Port A , Channel Position T, 1.4MHz

