

Ericsson AB

RF TEST REPORT

Report Type:
FCC Part 96 RF report

PRODUCT NAME:
AIR 6488 B48

REPORT NUMBER:
200100100SHA-001

ISSUE DATE:
December 7, 2021

DOCUMENT CONTROL NUMBER:
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Manufacturer: Ericsson AB
Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden

FCC ID: TA8BKRD901160

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

FCC CFR 47 Part 96: CITIZENS BROADBAND RADIO SERVICE

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
200100100SHA-001	Rev. 01	Initial issue of report	January 6, 2020
200100100SHA-001	Rev. 01	This report is an amendment report of 200100100SHA-001, new antenna was added and tested.	December 7, 2021

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Power, PSD and Peak to Average Power Ratio	96.41(b)(c)(g) 2.1046	Pass
Occupied Bandwidth	96.41(e)(3) 2.1049	Pass
Unwanted Emissions at Band Edge	96.41(e)(1) 2.1051	NA ¹
Conducted Unwanted Emission	96.41(e)(2) 2.1051	NA ¹
Radiated Unwanted Emissions	96.41(e)(1)(2) 2.1053	NA ¹
Frequency Stability	- 2.1055	NA ¹

Note 1: There is no test needed for adding new antenna.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Description:	Remote Radio Unit
Product name:	AIR 6488 B48
Product number:	KRD 901 160/1, KRD 901 160/11, KRD 901 160/2, KRD 901 160/21
Serial Number(s)	CF89393564
Rating:	-48V DC
Software Version:	PIS: N/A, UP: CXP2030020/5_R63B21
Hardware Version:	R2A
Sample received date:	November 21, 2021
Date of test:	November 21, 2021 ~ November 29, 2021

Note: The differences between the 4 variants are as below, and others are same.

KRD 901 160/2 (with un-security software and RDNB board for testing purpose).

KRD 901 160/21 (with security software and RDNB board for testing purpose).

KRD 901 160/1 (with un-security software and antenna).

KRD 901 160/11 (with security software and antenna).

1.2 Technical Specification

Frequency Range:	3550MHz - 3700MHz
Number of Antenna ports:	64 TX/RX
Supported RAT:	TDD LTE
Max RF bandwidth (IBW):	100MHz
Supported Number of Carriers:	Maximum 3 carriers
Supported modulation:	QPSK, 16QAM, 64QAM, 256QAM
Supported Channel Bandwidth:	10MHz, 20MHz
ITU Designation of Emission:	10M0F9W, 20M0F9W
Output Power:	For antenna 22.5dBi Maximum 20dBm (100mW) per port for 20MHz channel bandwidth, Maximum 17dBm (50mW) per port for 10MHz channel bandwidth. For antenna 23.2dBi Maximum 19.25dBm (84mW) per port for 20MHz channel bandwidth, Maximum 16.25dBm (42mW) per port for 10MHz channel bandwidth.
Antenna Gain:	22.5dBi & 23.2dBi

TEST REPORT**1.3 Description of Test Facility**

Name:	Intertek Testing Services Shanghai
Address 1:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Address 2:	No. 5 Lize East Street, Ericsson Tower, Chaoyang District, Beijing 100102 P.R.C.
Telephone:	+86 21 61278200
Telefax:	+86 21 54262353
The test facility is recognized, certified, or accredited by these organizations:	FCC Accredited Lab Designation Number: CN1175, CN1258
	IC Registration Lab CAB identifier.: CN0051
	A2LA Accreditation Lab Certificate Number: 3309.02, 3309.04

2 TEST SPECIFICATIONS

2.1 Related documents

FCC Part 96 (2019)

FCC Part 2 (2019)

ANSI C63.26:2015

KDB 971168 D01 v03r01

KDB 662911 D01 v02r01

KDB 940660 D01 v02

2.2 Product Information

The Equipment Under Test (EUT) AIR 6488 B48 is an Ericsson Radio Unit working in the public mobile services 3550-3700MHz band which provides communication connections to 3550-3700MHz network. The Radio AIR 6488 B48 operates from a -48V DC power supply.

The EUT includes 64 TX/RX ports. It can be configured to transmit in MU-MIMO mode with up to a maximum of 16 beams, and the MU-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.

2.3 Configuration Description

All of the configurations from single user beam to 16 users beam were checked, the 16 users beam power was found to be higher than any other number of user beam configurations, and hence was tested and reported.

Initial pre-testing was carried out to determine the worst modulation scheme by measuring the output power from QPSK, 16QAM, 64QAM and 256QAM on the middle channel of one antenna port. From these tests, it was determined that QPSK was the worst modulation scheme and was used for all testing.

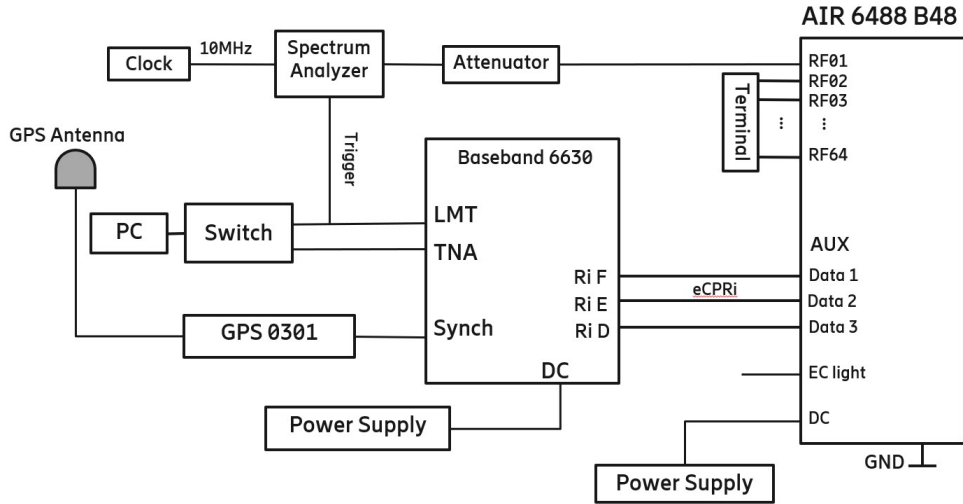
Complete testing was carried out on the worst antenna port which was determined by the highest output power from the 64 measured ports on worst case modulation scheme and worst bandwidth. The worst antenna port was antenna port 42.

The settings below were used for all measurements unless otherwise noted:

Configuration	Carrier	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE-MIMO-1C-10	1C	10MHz	3555	3625	3695
LTE-MIMO-1C-20	1C	20MHz	3560	3625	3690
LTE-MIMO-2C-10-1	2C	10MHz	3685 + 3695		
LTE-MIMO-2C-10-2	2C	10MHz	3605 + 3695		
LTE-MIMO-2C-20-1	2C	20MHz	3670 + 3690		
LTE-MIMO-2C-20-2	2C	20MHz	3610 + 3690		
LTE-MIMO-3C-10-1	3C	10MHz	3675 + 3685 + 3695		
LTE-MIMO-3C-10-2	3C	10MHz	3605 + 3615 + 3695		
LTE-MIMO-3C-20-1	3C	20MHz	3650 + 3670 + 3690		
LTE-MIMO-3C-20-2	3C	20MHz	3610 + 3630 + 3690		

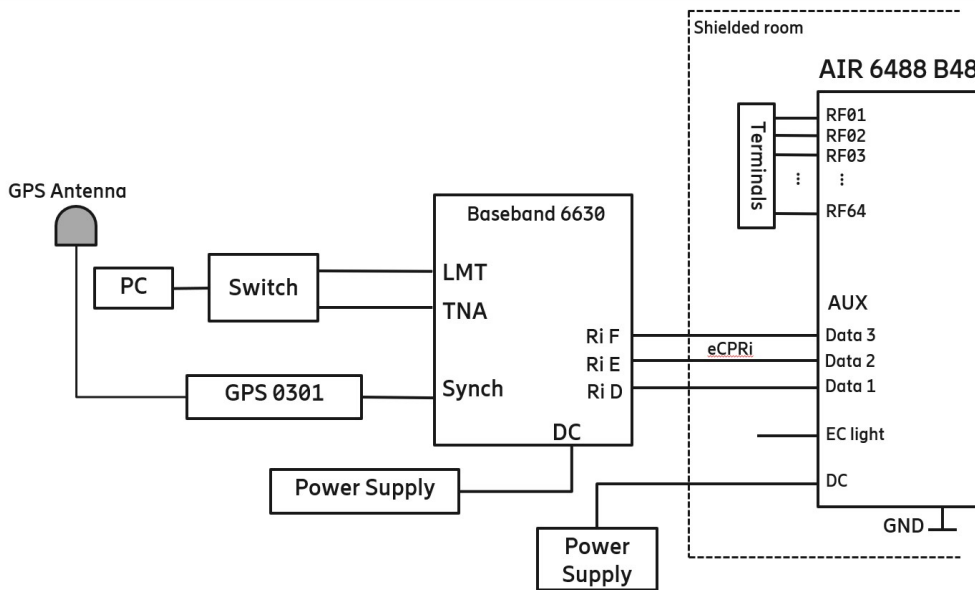
2.4 Test Setup

Conducted Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	DELL PowerEdge R220	-
2	Baseband 6648	KDU 1370015/1	R3D
3	Power supply	N5768A	-
4	Terminator	AETFZ-10W-SMAM	-

Radiated Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	DELL PowerEdge R220	-
2	Baseband 6648	KDU 1370015/1	R3D
3	Power supply	N5768A	-
4	Terminator	AETFZ-10W-SMAM	-

TEST REPORT**2.5 Test environment condition:**

Test items	Temperature	Humidity
Power, PSD and Peak to Average Power Ratio	19°C	52% RH
Occupied Bandwidth		
Unwanted Emissions at Band Edge		
Conducted Unwanted Emission		
Radiated Unwanted Emissions	18°C	51% RH
Frequency Stability	Please refer to clause 8	

2.6 Instrument list

RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2022-03-15
<input checked="" type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC1046	2022-04-04
<input type="checkbox"/>	Power sensor	R&S	NRP-Z11	EC1111	2022-08-09
<input type="checkbox"/>	Power sensor	R&S	NRP-Z21	EC1112	2022-08-09
<input type="checkbox"/>	Signal Generator	R&S	SMU200A	EC1050	2022-08-14
<input type="checkbox"/>	Multi-meter	Fluke	117	EC1051	2022-03-08
<input checked="" type="checkbox"/>	Climatic Chamber	GWS	CEEC-WR16H-50W	EC1052	2022-09-20
<input type="checkbox"/>	Humiture meter	TP	TPJ-20	EC1053	2022-01-14
<input type="checkbox"/>	Power meter	R&S	NRX	EC1113	2022-08-09

2.7 Measurement uncertainty

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

Test item	Measurement uncertainty
Maximum output power	0.73dB
Occupied Bandwidth	0.88%
Unwanted Emissions at Band Edge	3.03dB
Conducted Unwanted Emission	3.03dB
Radiated Unwanted Emissions below 1GHz	4.90dB
Radiated Unwanted Emissions above 1GHz	5.02dB
Frequency stability	0.77×10^{-7}

3 Power, PSD and Peak to Average Power Ratio

Test result: Pass

3.1 Limit

Power limits:

Maximum effective isotropic radiated power (EIRP): 47dBm/10MHz

Maximum Power Spectral Density (PSD): 37dBm/MHz

Peak to Average Ratio: ≤ 13 dB

3.2 Measurement Procedure

The EUT was configured to transmit on maximum power and proper modulation. Measurements were performed with a Spectrum Analyzer using the Band Power measurement function. The detector was set to RMS with an RBW of at least 1% of the carrier bandwidth and a VBW of at least 3 times the RBW. The integration bandwidth was configured to be 10MHz as defined in 96.41(b). Where the carrier width was greater than 10MHz, the integration bandwidth was moved to the region with the highest PSD to find the maximum band power.

For PSD measurements in a 1MHz bandwidth, an RMS detector was used with a single sweep. The highest PSD was established over the entire emission bandwidth and the result recorded.

CCDF measurements were carried out in accordance with ANSI C63.26 Clause 5.2.3.4.

3.3 Test Notes

1. All of the configurations from single user beam to 16 users beam were checked, the 16 users beam power was found to be higher than any other number of user beam configurations, and hence was tested and reported.
2. The MIMO conducted power is measured for signal with respect to the Occupied Bandwidth (OBW) in MHz. The value has to be scaled to per 10MHz in order to compare it with the FCC EIRP Limit defined in units dBm/10MHz. Scaling Factor (dB) = $10 \cdot \log(10\text{MHz} / \text{Occupied Bandwidth in MHz})$

Sample Calculation for an Occupied Bandwidth = 20MHz is shown as follows:

$$\text{Scaling Factor} = 10 \cdot \log(10\text{MHz} / 20\text{MHz}) = 10 \cdot \log(0.5) = -3.01\text{dB}$$

3. 16-beam reduction:
The 16-beam reduction is applicable in the 16-User Beam operating mode of the EUT. It is a logarithmic factor applied to account for maximum 16 spatially separated beams operate simultaneously.
16-beam power reduction factor (dB) = $10 \cdot \log(1/16) = -12.04 \text{ dB}$
4. Antenna Gains (dBi) are provided by the client.
5. Sample Calculation:
Let us assume the following numbers:
 - a. MIMO Conducted Power for Port 0 to 63 as 6400mW.
 - b. Occupied Bandwidth = 20MHz
 - c. Antenna Gain = 22.5dBi

Factors	Value	Unit
MIMO Conducted Power (linear sum) for Port 0-63	6400	mW
MIMO Conducted Power (dBm) for Port 0-63	= $10 \cdot \log(6400)$ = 38.06	dBm
Scaling Factor (OBW = 20MHz)	= $10 \cdot \log(10 / 20)$ = -3.01	dB
Applying Reductions:		
Antenna Gain	22.5	dBi
16-Beam Reduction	= $10 \cdot \log(1 / 16)$ = -12.04	dB
MIMO EIRP =	45.51	dBm/ 10MHz
MIMO Conducted Power for Port 0-63 + Scaling Factor + Antenna Gain + 16-Beam Reduction	=	47
FCC EIRP Limit	=	47
Margin = MIMO EIRP - FCC EIRP Limit	=	1.49
		dB

3.4 Measurement result

LTE-MIMO-1C-10:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position B			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	10	15.52	15.52	6.29	8.50
1	16QAM	10	15.68	15.68	6.67	8.54
2	16QAM	10	15.46	15.46	6.44	8.54
3	16QAM	10	15.23	15.23	6.09	8.57
4	16QAM	10	15.69	15.69	6.72	8.48
5	16QAM	10	15.86	15.86	6.75	8.44
6	16QAM	10	15.82	15.82	6.79	8.50
7	16QAM	10	15.67	15.67	6.48	8.50
8	16QAM	10	15.67	15.67	6.31	8.51
9	16QAM	10	16.30	16.30	7.18	8.51
10	16QAM	10	15.12	15.12	5.93	8.51
11	16QAM	10	15.30	15.30	6.15	8.52
12	16QAM	10	14.91	14.91	6.53	8.50
13	16QAM	10	16.74	16.74	7.65	8.49
14	16QAM	10	16.10	16.10	6.96	8.43
15	16QAM	10	16.20	16.20	7.03	8.46
16	16QAM	10	15.17	15.17	6.55	8.58
17	16QAM	10	15.88	15.88	6.63	8.60
18	16QAM	10	15.70	15.70	6.62	8.53
19	16QAM	10	16.69	16.69	7.50	8.55
20	16QAM	10	15.45	15.45	6.11	8.70
21	16QAM	10	15.15	15.15	6.15	8.70
22	16QAM	10	15.29	15.29	6.06	8.60
23	16QAM	10	15.28	15.28	6.06	8.70
24	16QAM	10	15.12	15.12	6.42	8.59
25	16QAM	10	16.16	16.16	7.12	8.52
26	16QAM	10	15.82	15.82	6.75	8.65
27	16QAM	10	15.93	15.93	6.85	8.50
28	16QAM	10	15.60	15.60	6.38	8.58
29	16QAM	10	15.90	15.90	6.48	8.63
30	16QAM	10	15.45	15.45	6.37	8.65
31	16QAM	10	15.10	15.10	5.85	8.75
32	16QAM	10	15.77	15.77	6.54	8.50
33	16QAM	10	15.99	15.99	6.98	8.41
34	16QAM	10	15.49	15.49	6.38	8.48
35	16QAM	10	15.18	15.18	6.28	8.45
36	16QAM	10	15.28	15.28	6.02	8.62
37	16QAM	10	15.05	15.05	5.95	8.58

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38	16QAM	10	14.82	14.82	5.76	8.57
39	16QAM	10	15.14	15.14	5.91	8.61
40	16QAM	10	16.21	16.21	7.01	8.44
41	16QAM	10	16.71	16.71	7.55	8.49
42	16QAM	10	15.59	15.59	6.49	8.47
43	16QAM	10	15.88	15.88	6.70	8.44
44	16QAM	10	15.27	15.27	5.83	8.57
45	16QAM	10	15.80	15.80	6.66	8.59
46	16QAM	10	15.07	15.07	5.88	8.61
47	16QAM	10	15.23	15.23	6.07	8.57
48	16QAM	10	14.90	14.90	5.69	8.70
49	16QAM	10	15.16	15.16	6.00	8.80
50	16QAM	10	15.12	15.12	6.00	8.68
51	16QAM	10	15.84	15.84	6.61	8.79
52	16QAM	10	14.88	14.88	6.98	8.48
53	16QAM	10	15.93	15.93	6.84	8.48
54	16QAM	10	15.99	15.99	6.78	8.62
55	16QAM	10	16.01	16.01	6.85	8.50
56	16QAM	10	15.72	15.72	5.60	8.77
57	16QAM	10	15.45	15.45	6.40	8.80
58	16QAM	10	15.09	15.09	6.01	8.84
59	16QAM	10	15.11	15.11	5.93	8.65
60	16QAM	10	16.14	16.14	6.97	8.50
61	16QAM	10	15.94	15.94	6.86	8.69
62	16QAM	10	15.95	15.95	6.93	8.63
63	16QAM	10	15.65	15.65	6.46	8.64

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position M			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	64QAM	10	15.81	15.81	6.59	8.54
1	64QAM	10	15.54	15.54	6.30	8.55
2	64QAM	10	15.46	15.46	6.18	8.54
3	64QAM	10	15.46	15.46	6.22	8.54
4	64QAM	10	15.34	15.34	6.83	8.52
5	64QAM	10	16.00	16.00	6.73	8.43
6	64QAM	10	16.75	16.75	7.46	8.48
7	64QAM	10	16.03	16.03	6.82	8.50
8	64QAM	10	15.90	15.90	6.62	8.54
9	64QAM	10	16.38	16.38	7.14	8.55
10	64QAM	10	15.42	15.42	6.14	8.57
11	64QAM	10	15.55	15.55	6.36	8.52
12	64QAM	10	15.11	15.11	6.93	8.46
13	64QAM	10	16.90	16.90	7.69	8.51
14	64QAM	10	16.15	16.15	6.96	8.43
15	64QAM	10	16.39	16.39	7.22	8.44
16	64QAM	10	15.35	15.35	6.63	8.47
17	64QAM	10	16.04	16.04	6.83	8.52
18	64QAM	10	15.96	15.96	6.87	8.50
19	64QAM	10	16.91	16.91	7.76	8.60
20	64QAM	10	15.78	15.78	6.54	8.58
21	64QAM	10	15.39	15.39	6.13	8.62
22	64QAM	10	15.62	15.62	6.40	8.67
23	64QAM	10	15.63	15.63	6.50	8.64
24	64QAM	10	16.01	16.01	6.83	8.62
25	64QAM	10	16.61	16.61	7.35	8.46
26	64QAM	10	15.98	15.98	6.73	8.61
27	64QAM	10	16.22	16.22	7.00	8.48
28	64QAM	10	16.29	16.29	6.73	8.57
29	64QAM	10	16.32	16.32	6.43	8.57
30	64QAM	10	15.73	15.73	6.46	8.56
31	64QAM	10	15.47	15.47	6.27	8.68
32	64QAM	10	16.30	16.30	7.13	8.52
33	64QAM	10	16.59	16.59	7.37	8.50
34	64QAM	10	16.03	16.03	6.88	8.42
35	64QAM	10	16.10	16.10	6.90	8.48
36	64QAM	10	15.94	15.94	6.44	8.61
37	64QAM	10	15.48	15.48	6.22	8.63
38	64QAM	10	16.44	16.44	7.22	8.62
39	64QAM	10	15.75	15.75	6.55	8.62
40	64QAM	10	15.69	15.69	7.49	8.41
41	64QAM	10	17.16	17.16	7.97	8.48

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42	64QAM	10	16.12	16.12	6.89	8.49
43	64QAM	10	16.31	16.31	7.13	8.53
44	64QAM	10	15.75	15.75	6.47	8.62
45	64QAM	10	16.45	16.45	7.20	8.64
46	64QAM	10	15.67	15.67	6.47	8.63
47	64QAM	10	15.89	15.89	6.69	8.62
48	64QAM	10	14.87	14.87	5.92	8.67
49	64QAM	10	15.41	15.41	6.15	8.81
50	64QAM	10	15.35	15.35	6.10	8.83
51	64QAM	10	16.09	16.09	6.91	8.63
52	64QAM	10	16.48	16.48	7.23	8.66
53	64QAM	10	16.26	16.26	6.99	8.49
54	64QAM	10	16.39	16.39	7.15	8.46
55	64QAM	10	16.49	16.49	7.25	8.50
56	64QAM	10	16.08	16.08	6.02	8.81
57	64QAM	10	15.90	15.90	6.64	8.64
58	64QAM	10	15.48	15.48	6.20	8.67
59	64QAM	10	15.49	15.49	6.25	8.74
60	64QAM	10	15.73	15.73	7.46	8.50
61	64QAM	10	16.39	16.39	7.13	8.57
62	64QAM	10	16.32	16.32	7.09	8.60
63	64QAM	10	16.29	16.29	7.09	8.64

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Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	64QAM	10	16.14	16.14	6.86	8.57
1	64QAM	10	16.25	16.25	6.72	8.56
2	64QAM	10	15.41	15.41	6.44	8.54
3	64QAM	10	15.44	15.44	6.41	8.58
4	64QAM	10	15.43	15.43	6.94	8.48
5	64QAM	10	15.91	15.91	6.90	8.48
6	64QAM	10	16.67	16.67	7.76	8.45
7	64QAM	10	15.97	15.97	6.90	8.52
8	64QAM	10	15.83	15.83	6.79	8.55
9	64QAM	10	16.35	16.35	7.41	8.58
10	64QAM	10	15.29	15.29	6.34	8.58
11	64QAM	10	15.59	15.59	6.60	8.56
12	64QAM	10	15.22	15.22	7.33	8.53
13	64QAM	10	17.21	17.21	8.19	8.53
14	64QAM	10	16.31	16.31	7.39	8.46
15	64QAM	10	16.60	16.60	7.58	8.52
16	64QAM	10	15.94	15.94	6.91	8.52
17	64QAM	10	16.19	16.19	7.18	8.47
18	64QAM	10	16.15	16.15	7.16	8.47
19	64QAM	10	16.94	16.94	7.81	8.47
20	64QAM	10	15.83	15.83	6.78	8.59
21	64QAM	10	15.45	15.45	6.49	8.68
22	64QAM	10	15.79	15.79	6.80	8.74
23	64QAM	10	15.67	15.67	6.61	8.72
24	64QAM	10	15.53	15.53	6.99	8.48
25	64QAM	10	16.70	16.70	7.71	8.45
26	64QAM	10	16.03	16.03	7.08	8.62
27	64QAM	10	16.12	16.12	7.04	8.56
28	64QAM	10	16.26	16.26	6.91	8.65
29	64QAM	10	15.86	15.86	6.89	8.58
30	64QAM	10	15.89	15.89	6.95	8.68
31	64QAM	10	15.52	15.52	6.48	8.57
32	64QAM	10	16.25	16.25	7.21	8.53
33	64QAM	10	16.36	16.36	7.47	8.43
34	64QAM	10	15.98	15.98	6.97	8.47
35	64QAM	10	15.86	15.86	6.82	8.47
36	64QAM	10	15.74	15.74	6.28	8.66
37	64QAM	10	15.40	15.40	6.35	8.66
38	64QAM	10	16.14	16.14	7.15	8.66
39	64QAM	10	15.44	15.44	6.39	8.63
40	64QAM	10	16.47	16.47	7.45	8.47
41	64QAM	10	17.11	17.11	8.14	8.53

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42	64QAM	10	16.08	16.08	7.07	8.48
43	64QAM	10	16.16	16.16	7.13	8.53
44	64QAM	10	15.40	15.40	6.34	8.66
45	64QAM	10	16.35	16.35	7.35	8.64
46	64QAM	10	15.50	15.50	6.54	8.65
47	64QAM	10	15.57	15.57	6.56	8.65
48	64QAM	10	14.63	14.63	5.96	8.67
49	64QAM	10	15.26	15.26	6.23	8.78
50	64QAM	10	15.32	15.32	6.29	8.67
51	64QAM	10	15.91	15.91	6.85	8.68
52	64QAM	10	16.38	16.38	7.35	8.49
53	64QAM	10	15.99	15.99	6.97	8.64
54	64QAM	10	16.22	16.22	7.17	8.60
55	64QAM	10	16.24	16.24	7.22	8.62
56	64QAM	10	15.98	15.98	6.01	8.75
57	64QAM	10	15.82	15.82	6.80	8.65
58	64QAM	10	15.21	15.21	6.16	8.67
59	64QAM	10	15.14	15.14	6.09	8.74
60	64QAM	10	15.34	15.34	7.38	8.48
61	64QAM	10	16.14	16.14	7.19	8.53
62	64QAM	10	16.08	16.08	7.09	8.46
63	64QAM	10	16.08	16.08	7.02	8.62

TEST REPORT

LTE-MIMO-1C-10:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	2336.04	2545.92	2518.92
MIMO Conducted Power for Port 0-63 (dBm)	33.68	34.06	34.01
Antenna Gain (dBi)	23.2	23.2	23.2
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP (dBm/10MHz)	44.84	45.22	45.17
FCC EIRP Limit (dBm/10MHz)	47	47	47
Margin (dB)	2.16	1.78	1.83

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	286.27	307.02	317.44
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	24.57	24.87	25.02
Antenna Gain (dBi)	23.2	23.2	23.2
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP PSD (dBm/MHz)	35.73	36.03	36.18
FCC EIRP PSD Limit (dBm/MHz)	37	37	37
Margin (dB)	1.27	0.97	0.82

TEST REPORT

LTE-MIMO-1C-20:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position B			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	20	18.41	-	6.51	8.75
1	16QAM	20	18.62	-	6.59	8.59
2	16QAM	20	18.42	-	6.46	8.54
3	16QAM	20	18.17	-	6.07	8.56
4	16QAM	20	18.28	-	6.82	8.63
5	16QAM	20	18.92	-	6.94	8.54
6	16QAM	20	18.91	-	6.94	8.64
7	16QAM	20	18.70	-	6.71	8.63
8	16QAM	20	18.63	-	6.63	8.68
9	16QAM	20	19.25	-	7.29	8.65
10	16QAM	20	18.22	-	6.25	8.62
11	16QAM	20	18.39	-	6.39	8.55
12	16QAM	20	18.50	-	6.92	8.50
13	16QAM	20	19.78	-	7.76	8.51
14	16QAM	20	19.07	-	7.12	8.63
15	16QAM	20	19.27	-	7.30	8.50
16	16QAM	20	18.24	-	6.77	8.54
17	16QAM	20	18.94	-	7.04	8.52
18	16QAM	20	18.87	-	6.91	8.53
19	16QAM	20	19.76	-	7.79	8.56
20	16QAM	20	18.69	-	6.58	8.62
21	16QAM	20	18.33	-	6.30	8.66
22	16QAM	20	18.40	-	6.55	8.62
23	16QAM	20	18.38	-	6.49	8.65
24	16QAM	20	18.18	-	6.69	8.52
25	16QAM	20	19.27	-	7.22	8.52
26	16QAM	20	18.13	-	6.87	8.54
27	16QAM	20	18.78	-	6.70	8.56
28	16QAM	20	18.58	-	6.67	8.61
29	16QAM	20	18.64	-	6.60	8.62
30	16QAM	20	18.48	-	6.41	8.64
31	16QAM	20	18.10	-	6.17	8.62
32	16QAM	20	18.82	-	6.75	8.49
33	16QAM	20	18.52	-	6.57	8.54
34	16QAM	20	18.64	-	6.65	8.61
35	16QAM	20	18.46	-	6.22	8.66
36	16QAM	20	17.99	-	5.96	8.75
37	16QAM	20	18.09	-	6.10	8.59
38	16QAM	20	17.58	-	5.57	8.71
39	16QAM	20	17.99	-	6.00	8.74

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40	16QAM	20	19.02	-	7.01	8.63
41	16QAM	20	19.54	-	7.59	8.63
42	16QAM	20	18.56	-	6.61	8.68
43	16QAM	20	18.62	-	6.61	8.50
44	16QAM	20	18.24	-	6.16	8.62
45	16QAM	20	18.92	-	6.93	8.77
46	16QAM	20	18.02	-	6.07	8.76
47	16QAM	20	18.36	-	6.40	8.70
48	16QAM	20	17.49	-	5.99	8.70
49	16QAM	20	18.23	-	6.33	8.66
50	16QAM	20	18.08	-	5.98	8.68
51	16QAM	20	18.77	-	6.78	8.71
52	16QAM	20	19.10	-	7.19	8.53
53	16QAM	20	18.80	-	6.76	8.53
54	16QAM	20	18.81	-	6.90	8.52
55	16QAM	20	18.92	-	6.99	8.53
56	16QAM	20	18.43	-	5.72	8.66
57	16QAM	20	18.46	-	6.41	8.67
58	16QAM	20	17.88	-	5.86	8.68
59	16QAM	20	17.85	-	5.86	8.69
60	16QAM	20	17.92	-	6.99	8.54
61	16QAM	20	18.78	-	6.83	8.55
62	16QAM	20	18.86	-	6.82	8.52
63	16QAM	20	18.73	-	6.83	8.54

TEST REPORT

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position M			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	20	18.69	-	6.58	8.54
1	16QAM	20	18.63	-	6.42	8.73
2	16QAM	20	18.48	-	6.24	8.73
3	16QAM	20	18.43	-	6.27	8.69
4	16QAM	20	19.09	-	6.95	8.55
5	16QAM	20	19.05	-	6.84	8.57
6	16QAM	20	19.78	-	7.63	8.52
7	16QAM	20	19.05	-	6.91	8.54
8	16QAM	20	18.97	-	6.81	8.72
9	16QAM	20	19.46	-	7.34	8.75
10	16QAM	20	18.52	-	6.31	8.58
11	16QAM	20	18.66	-	6.55	8.75
12	16QAM	20	18.36	-	7.13	8.54
13	16QAM	20	20.03	-	7.85	8.65
14	16QAM	20	19.24	-	7.10	8.65
15	16QAM	20	19.43	-	7.29	8.54
16	16QAM	20	18.38	-	6.84	8.50
17	16QAM	20	19.16	-	7.08	8.47
18	16QAM	20	19.12	-	6.92	8.50
19	16QAM	20	19.97	-	7.84	8.51
20	16QAM	20	18.72	-	6.62	8.59
21	16QAM	20	18.41	-	6.17	8.60
22	16QAM	20	18.65	-	6.54	8.58
23	16QAM	20	18.67	-	6.53	8.57
24	16QAM	20	19.01	-	6.87	8.50
25	16QAM	20	19.63	-	7.39	8.50
26	16QAM	20	19.03	-	6.81	8.49
27	16QAM	20	19.21	-	6.99	8.51
28	16QAM	20	19.28	-	6.84	8.59
29	16QAM	20	18.75	-	6.50	8.60
30	16QAM	20	18.77	-	6.53	8.59
31	16QAM	20	18.46	-	6.32	8.57
32	16QAM	20	19.17	-	6.90	8.62
33	16QAM	20	18.94	-	6.72	8.53
34	16QAM	20	18.89	-	6.76	8.65
35	16QAM	20	18.89	-	6.73	8.60
36	16QAM	20	18.75	-	6.20	8.61
37	16QAM	20	18.29	-	6.10	8.79
38	16QAM	20	18.82	-	6.62	8.62
39	16QAM	20	18.54	-	6.44	8.63
40	16QAM	20	18.65	-	7.45	8.62
41	16QAM	20	19.96	-	7.75	8.56

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42	16QAM	20	19.09	-	6.88	8.57
43	16QAM	20	19.15	-	6.98	8.61
44	16QAM	20	18.57	-	6.44	8.63
45	16QAM	20	19.27	-	7.05	8.64
46	16QAM	20	18.47	-	6.30	8.72
47	16QAM	20	18.71	-	6.50	8.76
48	16QAM	20	17.68	-	5.88	8.63
49	16QAM	20	18.31	-	6.12	8.60
50	16QAM	20	18.31	-	6.10	8.66
51	16QAM	20	19.05	-	6.91	8.63
52	16QAM	20	18.36	-	7.33	8.50
53	16QAM	20	19.32	-	7.07	8.51
54	16QAM	20	19.36	-	7.13	8.50
55	16QAM	20	19.49	-	7.27	8.49
56	16QAM	20	18.08	-	5.94	8.63
57	16QAM	20	18.63	-	6.49	8.64
58	16QAM	20	18.35	-	6.13	8.64
59	16QAM	20	18.36	-	6.20	8.65
60	16QAM	20	18.43	-	7.46	8.52
61	16QAM	20	19.40	-	7.18	8.49
62	16QAM	20	19.34	-	7.13	8.52
63	16QAM	20	19.30	-	7.14	8.50

TEST REPORT

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	20	18.63	-	6.69	8.79
1	16QAM	20	18.72	-	6.81	8.56
2	16QAM	20	18.50	-	6.67	8.58
3	16QAM	20	18.43	-	6.42	8.79
4	16QAM	20	18.36	-	6.93	8.54
5	16QAM	20	19.05	-	7.13	8.49
6	16QAM	20	19.84	-	7.94	8.62
7	16QAM	20	19.04	-	6.98	8.68
8	16QAM	20	19.00	-	6.83	8.66
9	16QAM	20	19.43	-	7.51	8.76
10	16QAM	20	18.52	-	6.62	8.68
11	16QAM	20	18.65	-	6.63	8.78
12	16QAM	20	18.28	-	7.21	8.70
13	16QAM	20	20.18	-	8.28	8.72
14	16QAM	20	19.28	-	7.26	8.69
15	16QAM	20	19.52	-	7.44	8.49
16	16QAM	20	18.53	-	6.90	8.51
17	16QAM	20	19.11	-	7.08	8.44
18	16QAM	20	19.01	-	7.03	8.47
19	16QAM	20	19.60	-	7.53	8.50
20	16QAM	20	18.69	-	6.56	8.57
21	16QAM	20	18.48	-	6.58	8.55
22	16QAM	20	18.66	-	6.64	8.57
23	16QAM	20	18.50	-	6.46	8.58
24	16QAM	20	18.28	-	6.68	8.51
25	16QAM	20	19.58	-	7.65	8.44
26	16QAM	20	19.08	-	7.06	8.48
27	16QAM	20	19.00	-	7.08	8.49
28	16QAM	20	18.87	-	6.94	8.59
29	16QAM	20	18.84	-	6.91	8.58
30	16QAM	20	18.85	-	6.97	8.54
31	16QAM	20	18.42	-	6.51	8.57
32	16QAM	20	19.10	-	7.04	8.53
33	16QAM	20	19.00	-	7.17	8.50
34	16QAM	20	19.06	-	6.90	8.56
35	16QAM	20	18.73	-	6.71	8.68
36	16QAM	20	18.35	-	6.38	8.80
37	16QAM	20	18.43	-	6.42	8.79
38	16QAM	20	18.90	-	6.84	8.64
39	16QAM	20	18.36	-	6.27	8.82
40	16QAM	20	18.28	-	7.28	8.55
41	16QAM	20	19.81	-	7.89	8.55

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42	16QAM	20	18.96	-	6.93	8.57
43	16QAM	20	18.92	-	6.94	8.53
44	16QAM	20	18.33	-	6.12	8.82
45	16QAM	20	19.13	-	7.15	8.88
46	16QAM	20	18.36	-	6.41	8.68
47	16QAM	20	18.52	-	6.50	8.79
48	16QAM	20	17.66	-	6.17	8.60
49	16QAM	20	18.79	-	6.40	8.61
50	16QAM	20	18.33	-	6.33	8.59
51	16QAM	20	18.78	-	6.69	8.61
52	16QAM	20	18.06	-	7.28	8.49
53	16QAM	20	18.98	-	7.02	8.48
54	16QAM	20	19.08	-	7.06	8.48
55	16QAM	20	19.12	-	7.15	8.50
56	16QAM	20	18.45	-	5.96	8.62
57	16QAM	20	18.69	-	6.74	8.60
58	16QAM	20	18.32	-	6.24	8.58
59	16QAM	20	18.25	-	6.23	8.60
60	16QAM	20	19.39	-	7.35	8.52
61	16QAM	20	19.20	-	7.27	8.46
62	16QAM	20	19.09	-	7.22	8.48
63	16QAM	20	19.05	-	7.02	8.49

TEST REPORT

LTE-MIMO-1C-20:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	4619.58	4987.92	4904.08
MIMO Conducted Power for Port 0-63 (dBm)	36.65	36.98	36.91
OBW (MHz)	17.914	17.964	17.934
Scaling Factor (dB)	-2.53	-2.54	-2.54
Antenna Gain (dBi)	23.2	23.2	23.2
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP (dBm/10MHz)	45.27	45.60	45.53
FCC EIRP Limit (dBm/10MHz)	47	47	47
Margin (dB)	1.73	1.40	1.47

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	295.80	307.14	314.52
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	24.71	24.87	24.98
Antenna Gain (dBi)	23.2	23.2	23.2
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP PSD (dBm/MHz)	35.87	36.03	36.14
FCC EIRP PSD Limit (dBm/MHz)	37	37	37
Margin (dB)	1.13	0.97	0.86

TEST REPORT

LTE-MIMO-2C-10-1:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	10	18.77	-	6.80	-
1	16QAM	10	19.14	-	6.65	-
2	16QAM	10	18.61	-	6.78	-
3	16QAM	10	18.51	-	6.50	-
4	16QAM	10	18.57	-	7.07	-
5	16QAM	10	19.14	-	7.30	-
6	16QAM	10	20.10	-	7.94	-
7	16QAM	10	19.07	-	7.04	-
8	16QAM	10	19.03	-	6.91	-
9	16QAM	10	19.45	-	7.50	-
10	16QAM	10	18.56	-	6.65	-
11	16QAM	10	18.64	-	6.66	-
12	16QAM	10	18.08	-	7.19	-
13	16QAM	10	20.14	-	8.26	-
14	16QAM	10	19.34	-	7.39	-
15	16QAM	10	19.57	-	7.56	-
16	16QAM	10	18.59	-	6.96	-
17	16QAM	10	19.30	-	7.22	-
18	16QAM	10	19.28	-	7.33	-
19	16QAM	10	19.90	-	7.81	-
20	16QAM	10	18.90	-	6.81	-
21	16QAM	10	18.74	-	6.84	-
22	16QAM	10	18.87	-	6.86	-
23	16QAM	10	18.73	-	6.74	-
24	16QAM	10	18.58	-	6.98	-
25	16QAM	10	19.89	-	7.96	-
26	16QAM	10	19.28	-	7.38	-
27	16QAM	10	19.27	-	7.33	-
28	16QAM	10	19.37	-	7.22	-
29	16QAM	10	19.05	-	7.13	-
30	16QAM	10	19.01	-	7.20	-
31	16QAM	10	18.54	-	6.58	-
32	16QAM	10	19.14	-	7.12	-
33	16QAM	10	19.36	-	7.56	-
34	16QAM	10	18.99	-	7.06	-
35	16QAM	10	18.77	-	6.79	-
36	16QAM	10	18.39	-	6.46	-
37	16QAM	10	18.62	-	6.62	-
38	16QAM	10	19.32	-	7.36	-
39	16QAM	10	18.59	-	6.52	-

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40	16QAM	10	18.99	-	7.54	-
41	16QAM	10	20.22	-	8.31	-
42	16QAM	10	19.17	-	7.19	-
43	16QAM	10	19.16	-	7.22	-
44	16QAM	10	18.42	-	6.40	-
45	16QAM	10	19.47	-	7.49	-
46	16QAM	10	18.68	-	6.85	-
47	16QAM	10	18.78	-	6.78	-
48	16QAM	10	17.84	-	6.36	-
49	16QAM	10	18.51	-	6.62	-
50	16QAM	10	18.64	-	6.59	-
51	16QAM	10	19.12	-	7.02	-
52	16QAM	10	19.60	-	7.51	-
53	16QAM	10	19.21	-	7.17	-
54	16QAM	10	19.27	-	7.27	-
55	16QAM	10	19.23	-	7.23	-
56	16QAM	10	18.07	-	6.12	-
57	16QAM	10	18.83	-	6.93	-
58	16QAM	10	18.31	-	6.35	-
59	16QAM	10	18.25	-	6.30	-
60	16QAM	10	19.49	-	7.50	-
61	16QAM	10	19.30	-	7.35	-
62	16QAM	10	19.21	-	7.32	-
63	16QAM	10	18.63	-	6.70	-

TEST REPORT

LTE-MIMO-2C-10-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	5109.89
MIMO Conducted Power for Port 0-63 (dBm)	-	-	37.08
OBW (MHz)	-	-	18.97
Scaling Factor (dB)	-	-	-2.78
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	45.46
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	1.54

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	327.45
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.15
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.31
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.69

TEST REPORT

LTE-MIMO-2C-20-1:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	20	21.49	-	6.70	-
1	16QAM	20	21.59	-	6.66	-
2	16QAM	20	21.59	-	6.38	-
3	16QAM	20	21.28	-	6.40	-
4	16QAM	20	21.22	-	7.01	-
5	16QAM	20	21.91	-	6.98	-
6	16QAM	20	22.77	-	7.77	-
7	16QAM	20	21.95	-	7.12	-
8	16QAM	20	21.94	-	7.01	-
9	16QAM	20	22.46	-	7.53	-
10	16QAM	20	21.56	-	6.56	-
11	16QAM	20	21.56	-	6.75	-
12	16QAM	20	21.11	-	7.28	-
13	16QAM	20	23.09	-	8.10	-
14	16QAM	20	22.12	-	7.24	-
15	16QAM	20	22.02	-	7.13	-
16	16QAM	20	21.27	-	6.90	-
17	16QAM	20	22.30	-	7.11	-
18	16QAM	20	21.92	-	7.07	-
19	16QAM	20	22.74	-	7.98	-
20	16QAM	20	21.72	-	6.81	-
21	16QAM	20	21.54	-	6.54	-
22	16QAM	20	21.68	-	6.75	-
23	16QAM	20	21.59	-	6.67	-
24	16QAM	20	21.32	-	7.04	-
25	16QAM	20	22.63	-	7.61	-
26	16QAM	20	21.93	-	6.95	-
27	16QAM	20	22.01	-	7.08	-
28	16QAM	20	22.09	-	6.91	-
29	16QAM	20	21.69	-	6.70	-
30	16QAM	20	21.76	-	6.82	-
31	16QAM	20	21.38	-	6.48	-
32	16QAM	20	21.97	-	7.18	-
33	16QAM	20	22.32	-	7.37	-
34	16QAM	20	21.71	-	6.79	-
35	16QAM	20	21.60	-	6.78	-
36	16QAM	20	21.38	-	6.41	-
37	16QAM	20	21.27	-	6.37	-
38	16QAM	20	22.06	-	7.09	-
39	16QAM	20	21.30	-	6.52	-

TEST REPORT

40	16QAM	20	21.69	-	7.32	-
41	16QAM	20	22.96	-	8.07	-
42	16QAM	20	21.87	-	6.96	-
43	16QAM	20	21.94	-	7.11	-
44	16QAM	20	21.39	-	6.39	-
45	16QAM	20	22.22	-	7.27	-
46	16QAM	20	21.38	-	6.52	-
47	16QAM	20	21.06	-	6.28	-
48	16QAM	20	20.44	-	5.91	-
49	16QAM	20	21.17	-	6.25	-
50	16QAM	20	21.20	-	6.27	-
51	16QAM	20	21.77	-	6.99	-
52	16QAM	20	22.22	-	7.40	-
53	16QAM	20	21.97	-	7.04	-
54	16QAM	20	22.06	-	7.18	-
55	16QAM	20	21.64	-	7.19	-
56	16QAM	20	20.92	-	6.10	-
57	16QAM	20	21.69	-	6.65	-
58	16QAM	20	21.04	-	6.05	-
59	16QAM	20	21.05	-	6.20	-
60	16QAM	20	21.15	-	7.40	-
61	16QAM	20	22.07	-	7.11	-
62	16QAM	20	22.01	-	7.00	-
63	16QAM	20	21.39	-	6.57	-

TEST REPORT

LTE-MIMO-2C-20-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	9611.97
MIMO Conducted Power for Port 0-63 (dBm)	-	-	39.83
OBW (MHz)	-	-	38.467
Scaling Factor (dB)	-	-	-5.85
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	45.14
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	1.86

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	315.52
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	24.99
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.15
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.85

TEST REPORT

LTE-MIMO-3C-10-1:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	10	20.27	-	6.69	-
1	16QAM	10	20.39	-	6.78	-
2	16QAM	10	20.35	-	6.61	-
3	16QAM	10	20.26	-	6.63	-
4	16QAM	10	20.33	-	7.22	-
5	16QAM	10	20.93	-	7.25	-
6	16QAM	10	21.60	-	7.86	-
7	16QAM	10	20.69	-	7.05	-
8	16QAM	10	20.68	-	6.96	-
9	16QAM	10	21.21	-	7.46	-
10	16QAM	10	20.32	-	6.62	-
11	16QAM	10	20.29	-	6.58	-
12	16QAM	10	20.95	-	7.25	-
13	16QAM	10	21.83	-	8.11	-
14	16QAM	10	20.89	-	7.16	-
15	16QAM	10	21.07	-	7.35	-
16	16QAM	10	20.29	-	6.88	-
17	16QAM	10	20.81	-	7.12	-
18	16QAM	10	20.69	-	6.95	-
19	16QAM	10	21.37	-	7.72	-
20	16QAM	10	20.35	-	6.63	-
21	16QAM	10	20.12	-	6.36	-
22	16QAM	10	20.31	-	6.64	-
23	16QAM	10	20.28	-	6.63	-
24	16QAM	10	20.20	-	6.98	-
25	16QAM	10	21.51	-	7.81	-
26	16QAM	10	20.88	-	7.18	-
27	16QAM	10	20.91	-	7.25	-
28	16QAM	10	20.95	-	7.08	-
29	16QAM	10	20.61	-	6.86	-
30	16QAM	10	20.65	-	6.96	-
31	16QAM	10	20.80	-	6.61	-
32	16QAM	10	20.91	-	7.15	-
33	16QAM	10	21.06	-	7.36	-
34	16QAM	10	20.72	-	7.00	-
35	16QAM	10	20.45	-	6.77	-
36	16QAM	10	20.38	-	6.47	-
37	16QAM	10	20.11	-	6.32	-
38	16QAM	10	20.83	-	7.07	-
39	16QAM	10	20.07	-	6.44	-

TEST REPORT

40	16QAM	10	20.24	-	7.41	-
41	16QAM	10	21.82	-	8.10	-
42	16QAM	10	20.81	-	7.02	-
43	16QAM	10	20.79	-	7.12	-
44	16QAM	10	20.29	-	6.37	-
45	16QAM	10	21.00	-	7.24	-
46	16QAM	10	20.16	-	6.49	-
47	16QAM	10	20.11	-	6.46	-
48	16QAM	10	19.23	-	5.96	-
49	16QAM	10	20.01	-	6.29	-
50	16QAM	10	20.00	-	6.28	-
51	16QAM	10	20.58	-	6.90	-
52	16QAM	10	20.09	-	7.39	-
53	16QAM	10	20.75	-	7.04	-
54	16QAM	10	20.89	-	7.19	-
55	16QAM	10	20.95	-	7.21	-
56	16QAM	10	20.65	-	6.05	-
57	16QAM	10	20.52	-	6.75	-
58	16QAM	10	19.93	-	6.17	-
59	16QAM	10	19.85	-	6.23	-
60	16QAM	10	20.01	-	7.33	-
61	16QAM	10	20.90	-	7.17	-
62	16QAM	10	20.85	-	7.19	-
63	16QAM	10	20.60	-	7.02	-

TEST REPORT

LTE-MIMO-3C-10-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	7391.59
MIMO Conducted Power for Port 0-63 (dBm)	-	-	38.69
OBW (MHz)	-	-	29.029
Scaling Factor (dB)	-	-	-4.63
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	45.22
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	1.78

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	318.23
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.03
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.19
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.81

TEST REPORT

LTE-MIMO-3C-20-1:

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Power / PSD / Peak-to-Average Ratio (PAR)			
			Channel position T			
			Power (dBm)	Power (dBm/10MHz)	PSD (dBm/MHz)	PAR (dB)
0	16QAM	20	22.68	-	6.61	-
1	16QAM	20	22.77	-	6.66	-
2	16QAM	20	22.66	-	6.61	-
3	16QAM	20	22.52	-	6.37	-
4	16QAM	20	22.40	-	6.94	-
5	16QAM	20	23.11	-	7.04	-
6	16QAM	20	23.93	-	7.81	-
7	16QAM	20	22.96	-	6.87	-
8	16QAM	20	22.90	-	6.85	-
9	16QAM	20	23.61	-	7.70	-
10	16QAM	20	22.85	-	6.83	-
11	16QAM	20	22.80	-	6.77	-
12	16QAM	20	22.29	-	7.32	-
13	16QAM	20	24.36	-	8.28	-
14	16QAM	20	23.51	-	7.43	-
15	16QAM	20	23.73	-	7.55	-
16	16QAM	20	22.66	-	6.98	-
17	16QAM	20	23.33	-	7.18	-
18	16QAM	20	23.19	-	7.13	-
19	16QAM	20	23.96	-	7.90	-
20	16QAM	20	22.90	-	6.61	-
21	16QAM	20	22.59	-	6.57	-
22	16QAM	20	22.70	-	6.60	-
23	16QAM	20	22.63	-	6.44	-
24	16QAM	20	22.34	-	6.90	-
25	16QAM	20	23.77	-	7.73	-
26	16QAM	20	23.16	-	7.13	-
27	16QAM	20	23.16	-	7.06	-
28	16QAM	20	23.24	-	6.93	-
29	16QAM	20	22.91	-	6.85	-
30	16QAM	20	22.91	-	6.83	-
31	16QAM	20	22.52	-	6.32	-
32	16QAM	20	23.25	-	7.22	-
33	16QAM	20	23.53	-	7.56	-
34	16QAM	20	23.18	-	7.05	-
35	16QAM	20	22.98	-	6.84	-
36	16QAM	20	22.76	-	6.35	-
37	16QAM	20	22.60	-	6.51	-
38	16QAM	20	23.39	-	7.40	-
39	16QAM	20	22.54	-	6.40	-

TEST REPORT

40	16QAM	20	23.46	-	7.35	-
41	16QAM	20	24.47	-	8.37	-
42	16QAM	20	23.18	-	7.15	-
43	16QAM	20	23.22	-	7.09	-
44	16QAM	20	22.66	-	6.33	-
45	16QAM	20	23.49	-	7.43	-
46	16QAM	20	22.70	-	6.55	-
47	16QAM	20	22.74	-	6.60	-
48	16QAM	20	21.69	-	6.11	-
49	16QAM	20	22.47	-	6.40	-
50	16QAM	20	22.50	-	6.45	-
51	16QAM	20	23.05	-	6.89	-
52	16QAM	20	23.50	-	7.41	-
53	16QAM	20	23.32	-	7.24	-
54	16QAM	20	23.39	-	7.29	-
55	16QAM	20	23.39	-	7.27	-
56	16QAM	20	22.22	-	6.16	-
57	16QAM	20	23.02	-	7.11	-
58	16QAM	20	22.43	-	6.49	-
59	16QAM	20	22.33	-	6.15	-
60	16QAM	20	22.59	-	7.51	-
61	16QAM	20	23.44	-	7.45	-
62	16QAM	20	23.32	-	7.32	-
63	16QAM	20	22.67	-	6.50	-

TEST REPORT

LTE-MIMO-3C-20-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	12886.53
MIMO Conducted Power for Port 0-63 (dBm)	-	-	41.10
OBW (MHz)	-	-	58.107
Scaling Factor (dB)	-	-	-7.64
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	44.62
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	2.38

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	321.48
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.07
Antenna Gain (dBi)	-	-	23.2
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.23
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.77

4 Occupied Bandwidth

Test result: Pass

4.1 Measurement Procedure

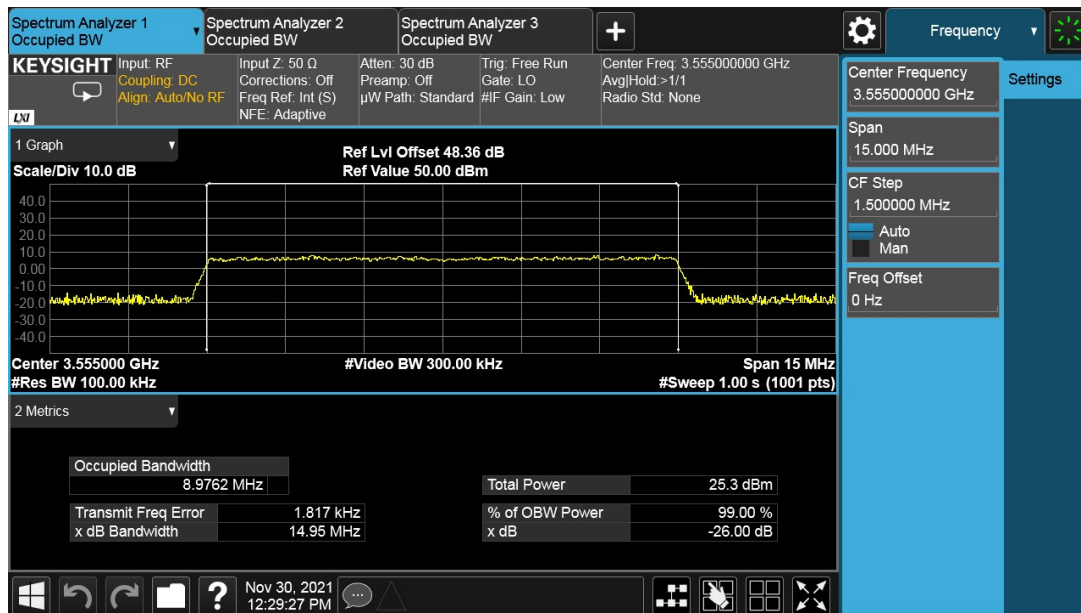
The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 99% and 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

4.2 Measurement result

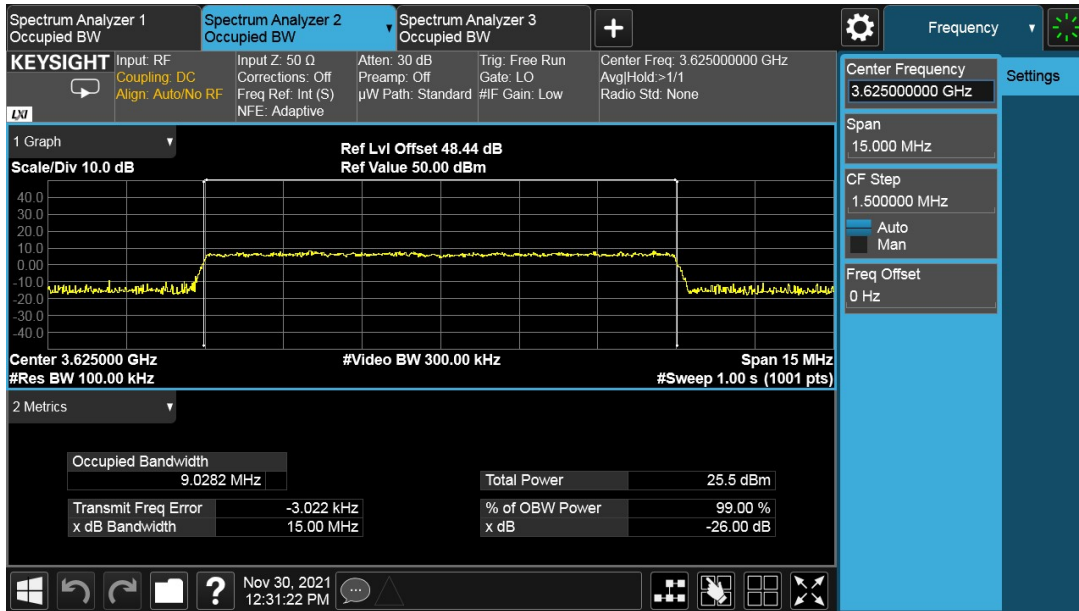
LTE-MIMO-1C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	10MHz	99% Occupied Bandwidth (MHz)		
			8.9762	9.0282	8.9898
			26dB Occupied Bandwidth (MHz)		
			14.95	15.00	15.00

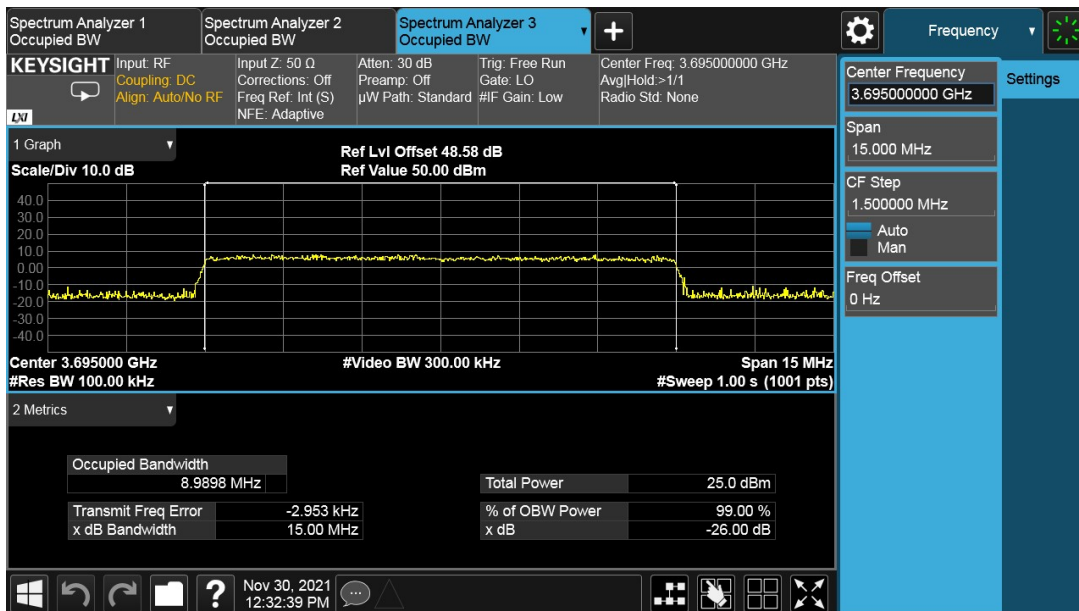
Channel Position B



Channel Position M



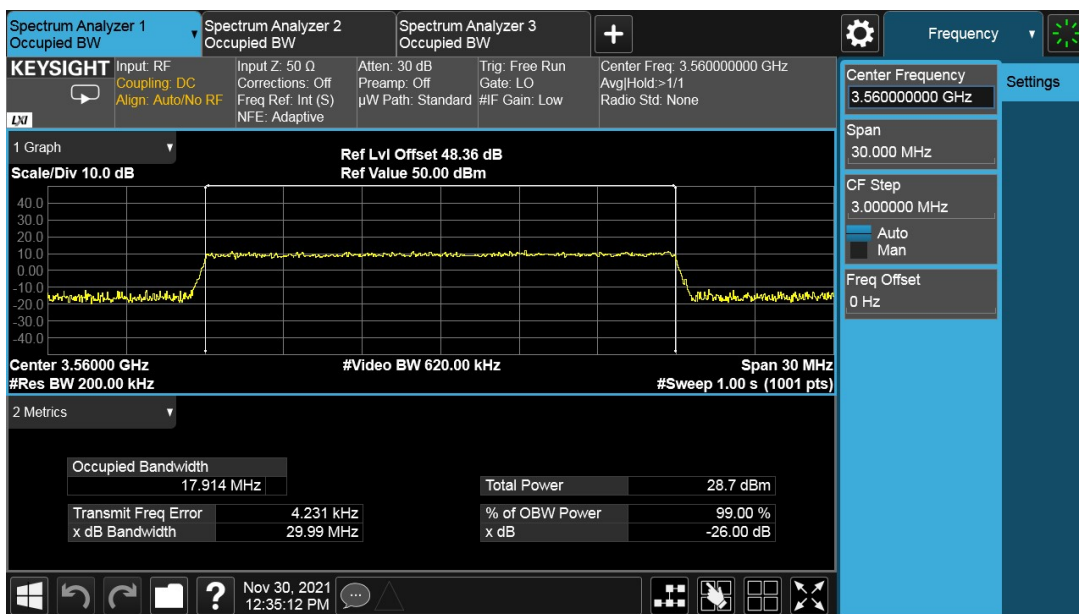
Channel Position T



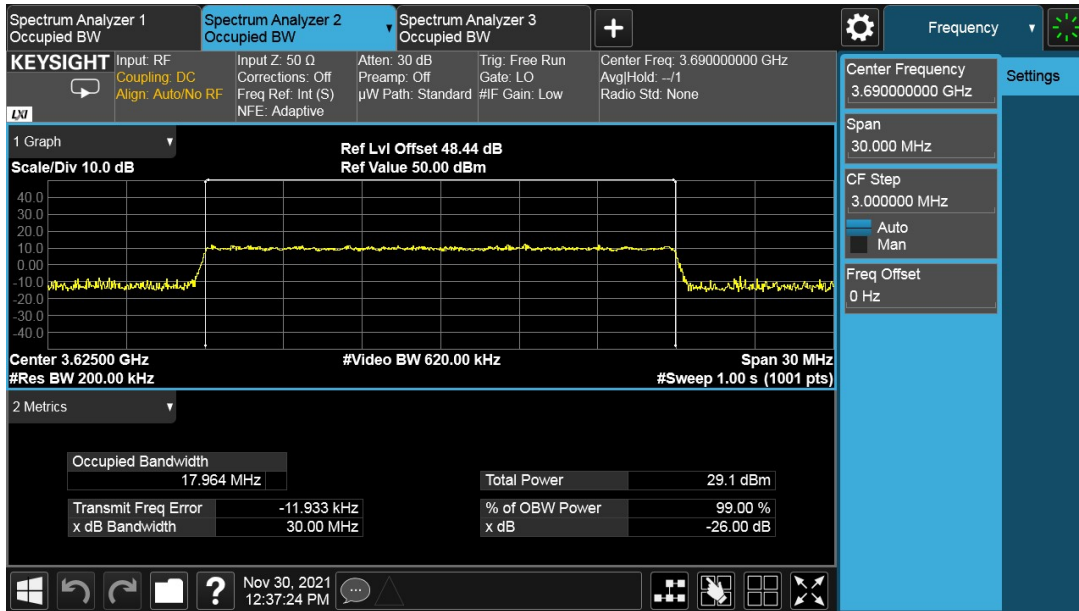
LTE-MIMO-1C-20:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	20MHz	99% Occupied Bandwidth (MHz)		
			17.914	17.964	17.934
			26dB Occupied Bandwidth (MHz)		
			29.99	30.00	29.90

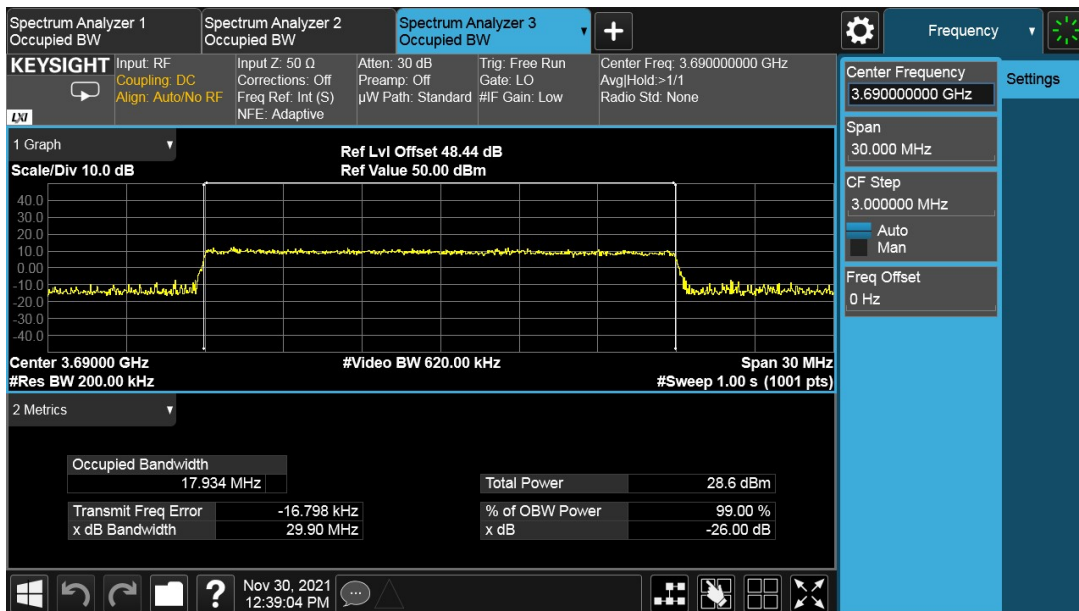
Channel Position B



Channel Position M



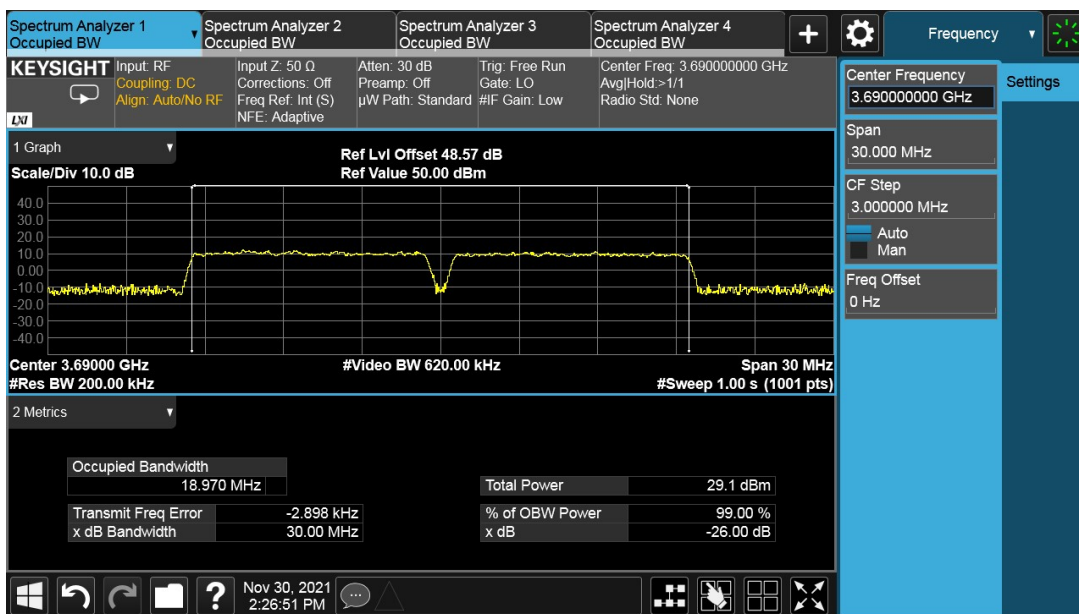
Channel Position T



LTE-MIMO-2C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	10MHz	99% Occupied Bandwidth (MHz)		
			-	-	18.970
			26dB Occupied Bandwidth (MHz)		
			-	-	30.00

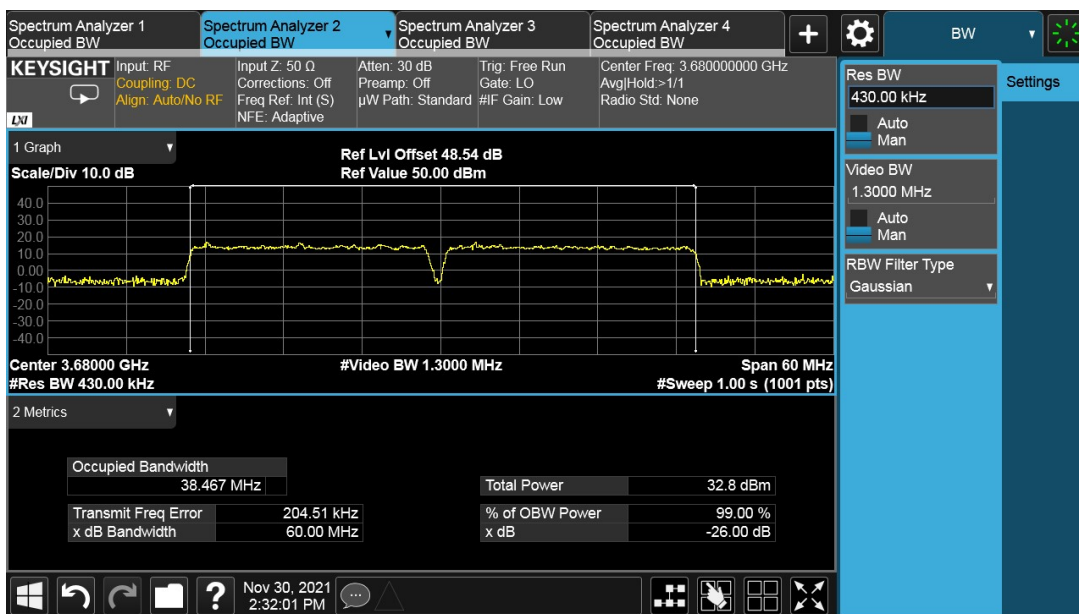
Channel Position T



LTE-MIMO-2C-20:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	20MHz	99% Occupied Bandwidth (MHz)		
			-	-	38.467
			26dB Occupied Bandwidth (MHz)		
			-	-	60.00

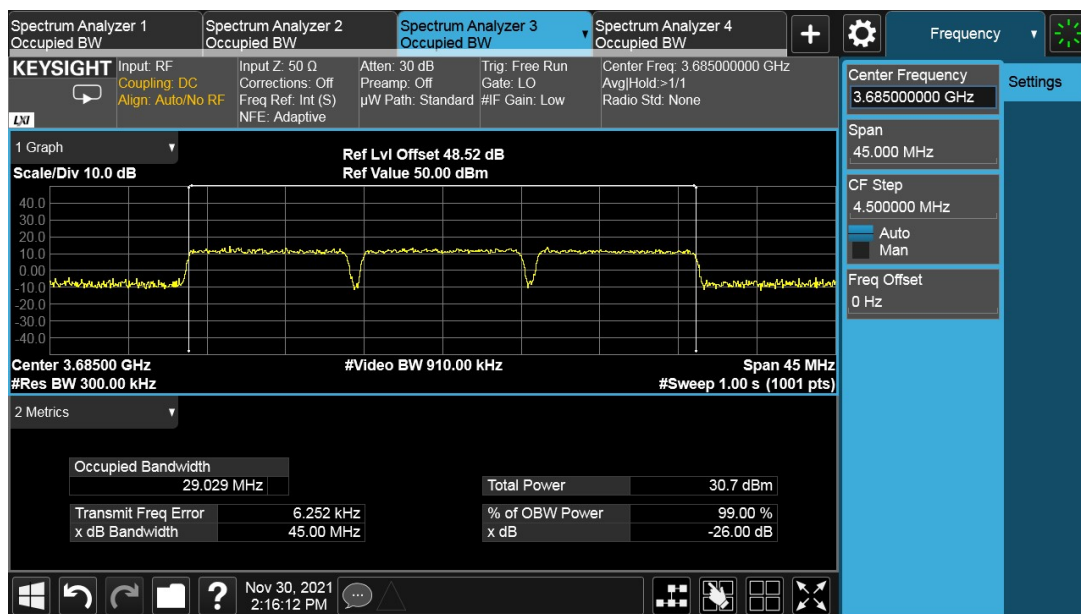
Channel Position T



LTE-MIMO-3C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	10MHz	99% Occupied Bandwidth (MHz)		
			-	-	29.029
			26dB Occupied Bandwidth (MHz)		
			-	-	45.00

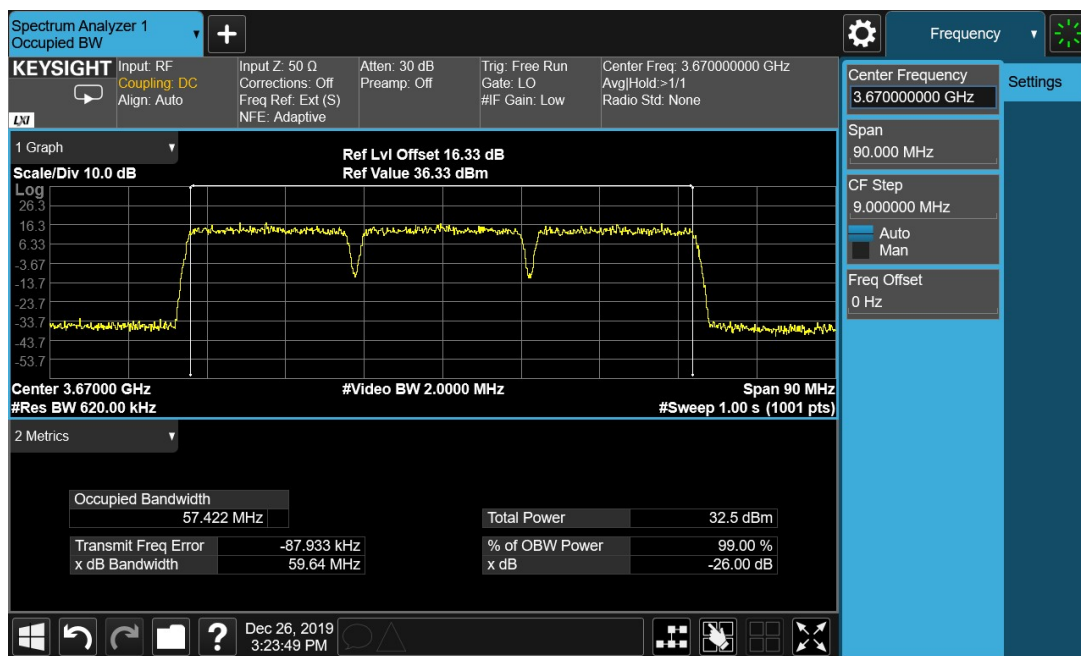
Channel Position T



LTE-MIMO-3C-20:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
42	QPSK	20MHz	99% Occupied Bandwidth (MHz)		
			-	-	58.107
			26dB Occupied Bandwidth (MHz)		
			-	-	90.00

Channel Position T



5 Unwanted Emissions at Band Edge

Test result: NA

5.1 Limit

Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz.

5.2 Measurement Procedure

All measurements were made according with KDB 971168 D01.

For MIMO mode configurations, the limit was adjusted with a correction of -18.06 dB [$10\log(1/64)$] 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 .

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 MHz away from the band edges.

Spectrum analyzer detector was set as RMS.

5.3 Measurement result

6 Conducted Unwanted Emission

Test result: NA

6.1 Limit

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz .

6.2 Measurement Procedure

All measurements were made according with KDB 971168 D01.

For MIMO mode configurations, the limit was adjusted with a correction of -18.06dB [$10\text{Log}(1/64)$] by using the Measure and Add $10\text{Log}(N)$ dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports .

The detector of the Spectrum analyzer was set as RMS, the RBW was set as 1MHz, the VBW was set as 3MHz.

6.3 Measurement result

7 Radiated Unwanted Emission

Test result: NA

7.1 Limit

The field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipoles as per 2.1053 (a).

$$E(V/m) = (30 \times G_i \times P_o)^{0.5} / d$$

Where

G_i is the antenna gain of ideal half-wave dipoles,

P_o is the power out of the transceiver in W,

d is the measurement distance in meter.

As per FCC Part 96, at all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz. In addition, the power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

Therefore, the limit at 3m measurement distance is:

$E(V/m) = 72.4$ dB μ V/m for the emissions of frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge.

$E(V/m) = 57.4$ dB μ V/m for the emissions below 3530 MHz or above 3720 MHz.

7.2 Measurement Procedure

This measurement is carried out in semi-anechoic chamber.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the measurement antenna in both horizontal and vertical polarizations.

Emissions identified within the range 30MHz to 40GHz were then formally measured using a peak detector as the worst case.

The EUT was measured with the antenna height varied between 1 and 4 m with the turntable rotated between 0 and 360 degrees.

7.3 Measurement result

8 Frequency Stability

Test result: NA

8.1 Limit

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.2 Measurement Procedure

Temperature Variation

The EUT was tested over the temperature range -30°C to +50°C in 10°C steps with -48 VDC Power Supply. At each temperature step, the Base Station was configured to transmit at maximum power on the middle channel of the operating band.

Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal values of -48 VDC. At +20°C, the Base Station was configured to transmit at maximum power on the middle channel of the frequency block.

8.3 Measurement result

***** END *****