

Ericsson AB

RF TEST REPORT

Report Type:

FCC Part 96 RF report

PRODUCT NAME:

AIR 6488 B48

REPORT NUMBER:

200100100SHA-001

ISSUE DATE:

January 6, 2020

DOCUMENT CONTROL NUMBER:

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TEST REPORT

Applicant: Ericsson AB
Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden

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

PREPARED BY:



Project Engineer
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REVIEWED BY:



Reviewer
Daniel Zhao

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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

Measurement result summary

TEST ITEM	FCC REFERENCE	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	Pass
Conducted Unwanted Emission	96.41(e)(2) 2.1051	Pass
Radiated Unwanted Emissions	96.41(e)(1)(2) 2.1053	Pass
Frequency Stability	- 2.1055	Pass

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)	D829305451
Rating:	-48V DC
Software Version:	PIS: N/A, UP: CXP2010053/1_R53B30
Hardware Version:	R1B
Sample received date:	December 4, 2019
Date of test:	December 4, 2019 ~ December 30, 2019

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:	Maximum 20dBm (100mW) per port for 20MHz channel bandwidth, Maximum 17dBm (50mW) per port for 10MHz channel bandwidth.
Antenna Gain:	22.5dBi

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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

This testing was performed in accordance with Part 96 PAG, as submitted to the FCC Tracking Number 699766.

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 16QAM was the worst modulation scheme and was used for all testing.

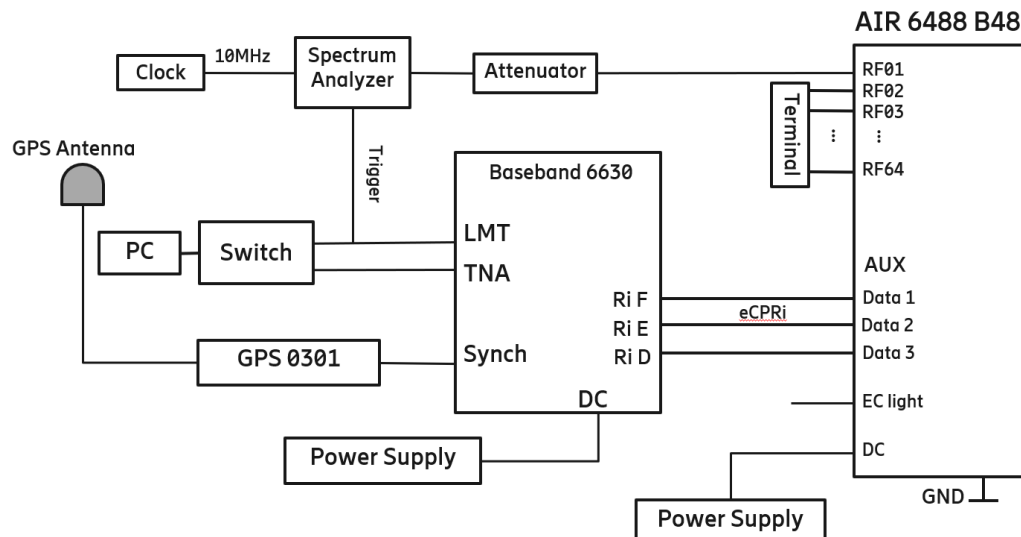
Complete testing was carried out on the worst antenna port which was determined by the highest output power from the 64 measured ports on worst case modulation scheme and worst bandwidth. The worst antenna port was antenna port 26.

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		

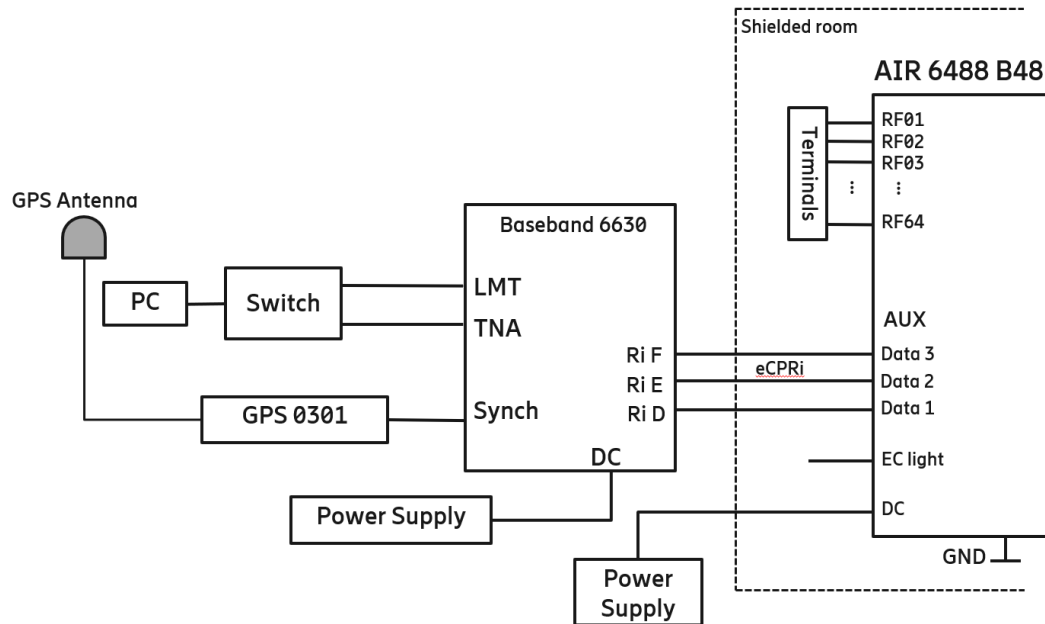
2.4 Test Setup

Conducted Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	HP Probook 430 G3	-
2	Baseband 6630	KDU 137 848/1	R2F
3	Power supply	N8737A	-
4	Power supply	N8737A	-
5	Terminator	AETFZ-10W-SMAM	-

Radiated Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	HP Probook 430 G3	-
2	Baseband 6630	KDU 137 848/1	R2F
3	Power supply	N8737A	-
4	Power supply	N8737A	-
6	Terminator	AETFZ-10W-SMAM	-

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

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Test Receiver	R&S	ESCS 30	EC 2107	2020-07-14
☐	A.M.N.	R&S	ESH2-Z5	EC 3119	2020-11-29
☐	A.M.N.	R&S	ENV 216	EC 3393	2020-07-14
☐	A.M.N.	R&S	ENV4200	EC 3558	2020-06-11
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2020-09-16
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2020-12-10
☒	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC5262	2020-06-11
☒	Horn antenna	R&S	HF 906	EC 3049	2020-11-16
☐	Horn antenna	ETS	3117	EC 4792-1	2020-02-25
☐	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2020-07-09
☐	Horn antenna	ETS	3116C	EC 5954	2020-01-04
☒	Horn antenna	ETS	3116C	EC 5955	2020-01-04
☐	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2020-03-14
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2020-03-04
☒	PXA Signal Analyzer	Keysight	N9030B	EC 6078	2020-06-11
☐	Power sensor	Agilent	U2021XA	EC 5338-1	2020-03-04
☐	Vector Signal Generator	Agilent	N5182B	EC 5175	2020-03-04
☐	Universal Radio Communication Tester	R&S	CMW500	EC5944	2020-12-22
☐	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2020-03-04
☐	Mobile Test System	Litepoint	lqxel	EC 5176	2020-01-08
☐	Test Receiver	R&S	ESCI 7	EC 4501	2020-09-16
☐	Climate chamber	GWS	MT3065	EC 6021	2020-07-04
☒	Climate chamber	ESQEC	SETH-Z-102U	EC 4315	2020-05-14

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Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Shielded room	Zhongyu	-	EC 2838	2020-01-13
☐	Shielded room	Zhongyu	-	EC 2839	2020-01-13
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2020-06-31
☐	Fully-anechoic chamber	Albatross project	-	EC 3047	2020-06-31
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2020-03-10
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3481	2020-12-22
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 5198	2020-02-27
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2020-04-07
☐	Pressure meter	YM3	Shanghai Mengde	EC 3320	2020-07-14

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}

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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.

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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:

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			
FCC EIRP Limit	=	47	dBm/ 10MHz
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	15.40	15.40	7.20	8.47
1	16QAM	10	15.55	15.55	7.47	8.44
2	16QAM	10	16.56	16.56	7.41	8.47
3	16QAM	10	15.35	15.35	7.17	8.46
4	16QAM	10	15.93	15.93	7.77	8.44
5	16QAM	10	16.20	16.20	8.13	8.43
6	16QAM	10	16.07	16.07	8.00	8.44
7	16QAM	10	15.99	15.99	7.89	8.44
8	16QAM	10	15.52	15.52	7.35	8.45
9	16QAM	10	15.61	15.61	7.49	8.43
10	16QAM	10	15.64	15.64	7.48	8.46
11	16QAM	10	15.50	15.50	7.32	8.48
12	16QAM	10	16.15	16.15	8.04	8.45
13	16QAM	10	16.00	16.00	7.83	8.43
14	16QAM	10	16.06	16.06	7.95	8.41
15	16QAM	10	16.05	16.05	7.93	8.41
16	16QAM	10	16.21	16.21	8.06	8.54
17	16QAM	10	16.00	16.00	7.85	8.56
18	16QAM	10	15.98	15.98	7.84	8.58
19	16QAM	10	15.95	15.95	7.78	8.55
20	16QAM	10	15.41	15.41	7.22	8.59
21	16QAM	10	15.46	15.46	7.31	8.60
22	16QAM	10	15.62	15.62	7.54	8.61
23	16QAM	10	15.52	15.52	7.44	8.60
24	16QAM	10	16.24	16.24	8.06	8.58
25	16QAM	10	16.19	16.19	8.11	8.58
26	16QAM	10	16.37	16.37	8.21	8.56
27	16QAM	10	16.19	16.19	8.00	8.56
28	16QAM	10	15.58	15.58	7.40	8.61
29	16QAM	10	15.80	15.80	7.61	8.61
30	16QAM	10	15.79	15.79	7.72	8.60
31	16QAM	10	15.66	15.66	7.62	8.57
32	16QAM	10	15.63	15.63	7.43	8.46
33	16QAM	10	15.71	15.71	7.54	8.42
34	16QAM	10	15.84	15.84	7.73	8.43
35	16QAM	10	15.50	15.50	7.32	8.42
36	16QAM	10	15.15	15.15	6.98	8.52
37	16QAM	10	15.54	15.54	7.38	8.49

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38	16QAM	10	15.22	15.22	7.09	8.48
39	16QAM	10	15.04	15.04	6.86	8.47
40	16QAM	10	15.91	15.91	7.82	8.43
41	16QAM	10	15.78	15.78	7.59	8.41
42	16QAM	10	15.95	15.95	7.77	8.40
43	16QAM	10	15.76	15.76	7.56	8.46
44	16QAM	10	15.20	15.20	7.74	8.48
45	16QAM	10	15.22	15.22	7.12	8.54
46	16QAM	10	15.05	15.05	6.88	8.52
47	16QAM	10	15.18	15.18	7.04	8.50
48	16QAM	10	15.09	15.09	6.94	8.58
49	16QAM	10	15.12	15.12	6.99	8.58
50	16QAM	10	15.09	15.09	7.73	8.59
51	16QAM	10	14.98	14.98	6.80	8.59
52	16QAM	10	15.70	15.70	7.51	8.56
53	16QAM	10	16.02	16.02	7.95	8.56
54	16QAM	10	15.86	15.86	7.67	8.58
55	16QAM	10	15.82	15.82	7.66	8.58
56	16QAM	10	14.99	14.99	6.92	8.59
57	16QAM	10	15.17	15.17	7.09	8.61
58	16QAM	10	15.33	15.33	7.18	8.59
59	16QAM	10	15.09	15.09	6.95	8.60
60	16QAM	10	15.78	15.78	7.70	8.57
61	16QAM	10	16.17	16.17	8.10	8.58
62	16QAM	10	16.24	16.24	8.16	8.57
63	16QAM	10	15.81	15.81	7.73	8.57

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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	15.53	15.53	7.36	8.44
1	64QAM	10	15.56	15.56	7.45	8.45
2	64QAM	10	15.59	15.59	7.40	8.46
3	64QAM	10	15.54	15.54	7.43	8.45
4	64QAM	10	15.97	15.97	7.79	8.42
5	64QAM	10	16.10	16.10	7.99	8.43
6	64QAM	10	16.01	16.01	7.91	8.41
7	64QAM	10	16.09	16.09	7.91	8.43
8	64QAM	10	15.65	15.65	7.48	8.45
9	64QAM	10	15.61	15.61	7.50	8.45
10	64QAM	10	15.74	15.74	7.63	8.46
11	64QAM	10	15.58	15.58	7.47	8.44
12	64QAM	10	16.06	16.06	7.88	8.43
13	64QAM	10	15.96	15.96	7.77	8.42
14	64QAM	10	16.08	16.08	7.90	8.43
15	64QAM	10	16.10	16.10	7.92	8.41
16	64QAM	10	16.23	16.23	8.06	8.58
17	64QAM	10	16.11	16.11	8.02	8.56
18	64QAM	10	16.10	16.10	7.94	8.57
19	64QAM	10	16.06	16.06	7.98	8.53
20	64QAM	10	15.37	15.37	7.29	8.59
21	64QAM	10	15.59	15.59	7.51	8.55
22	64QAM	10	15.52	15.52	7.44	8.57
23	64QAM	10	15.42	15.42	7.33	8.56
24	64QAM	10	16.22	16.22	8.06	8.56
25	64QAM	10	16.23	16.23	8.14	8.55
26	64QAM	10	16.25	16.25	8.06	8.56
27	64QAM	10	16.19	16.19	8.11	8.55
28	64QAM	10	15.60	15.60	7.41	8.56
29	64QAM	10	15.73	15.73	7.65	8.60
30	64QAM	10	15.72	15.72	7.62	8.60
31	64QAM	10	15.62	15.62	7.54	8.58
32	64QAM	10	15.77	15.77	7.65	8.44
33	64QAM	10	15.75	15.75	7.63	8.41
34	64QAM	10	15.84	15.84	7.68	8.42
35	64QAM	10	15.63	15.63	7.51	8.43
36	64QAM	10	15.19	15.19	7.02	8.48
37	64QAM	10	15.42	15.42	7.25	8.46
38	64QAM	10	15.13	15.13	6.95	8.49
39	64QAM	10	15.14	15.14	7.02	8.47
40	64QAM	10	15.69	15.69	7.58	8.44
41	64QAM	10	15.84	15.84	7.68	8.44

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42	64QAM	10	15.82	15.82	7.65	8.44
43	64QAM	10	15.85	15.85	7.75	8.46
44	64QAM	10	15.09	15.09	6.99	8.48
45	64QAM	10	15.01	15.01	6.84	8.46
46	64QAM	10	15.05	15.05	6.95	8.49
47	64QAM	10	15.07	15.07	6.98	8.46
48	64QAM	10	15.04	15.04	6.95	8.61
49	64QAM	10	15.11	15.11	6.94	8.58
50	64QAM	10	14.94	14.94	6.83	8.58
51	64QAM	10	14.98	14.98	6.82	8.60
52	64QAM	10	15.64	15.64	7.47	8.55
53	64QAM	10	15.84	15.84	7.66	8.55
54	64QAM	10	15.76	15.76	7.58	8.53
55	64QAM	10	15.81	15.81	7.71	8.58
56	64QAM	10	14.99	14.99	6.83	8.58
57	64QAM	10	15.10	15.10	6.94	8.60
58	64QAM	10	15.26	15.26	7.09	8.59
59	64QAM	10	15.14	15.14	6.94	8.62
60	64QAM	10	15.79	15.79	7.70	8.53
61	64QAM	10	15.86	15.86	7.69	8.54
62	64QAM	10	15.99	15.99	7.88	8.53
63	64QAM	10	15.72	15.72	7.63	8.55

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	64QAM	10	15.49	15.49	7.39	8.46
1	64QAM	10	15.49	15.49	7.36	8.42
2	64QAM	10	15.62	15.62	7.52	8.47
3	64QAM	10	15.99	15.99	7.90	8.44
4	64QAM	10	16.08	16.08	7.89	8.42
5	64QAM	10	16.22	16.22	8.13	8.40
6	64QAM	10	16.02	16.02	7.95	8.40
7	64QAM	10	16.01	16.01	7.86	8.41
8	64QAM	10	15.53	15.53	7.39	8.43
9	64QAM	10	15.67	15.67	7.51	8.43
10	64QAM	10	15.58	15.58	7.53	8.44
11	64QAM	10	15.52	15.52	7.46	8.43
12	64QAM	10	16.16	16.16	8.00	8.43
13	64QAM	10	16.22	16.22	8.15	8.41
14	64QAM	10	16.22	16.22	8.06	8.42
15	64QAM	10	16.10	16.10	8.03	8.41
16	64QAM	10	16.15	16.15	7.98	8.57
17	64QAM	10	16.09	16.09	8.05	8.49
18	64QAM	10	16.18	16.18	8.39	8.50
19	64QAM	10	16.08	16.08	7.94	8.53
20	64QAM	10	15.51	15.51	7.47	8.54
21	64QAM	10	15.63	15.63	7.56	8.58
22	64QAM	10	15.49	15.49	7.35	8.56
23	64QAM	10	15.60	15.60	7.55	8.53
24	64QAM	10	16.15	16.15	8.01	8.51
25	64QAM	10	16.20	16.20	8.07	8.53
26	64QAM	10	16.34	16.34	8.31	8.52
27	64QAM	10	16.14	16.14	8.00	8.51
28	64QAM	10	15.68	15.68	7.54	8.58
29	64QAM	10	15.85	15.85	7.71	8.58
30	64QAM	10	15.80	15.80	7.76	8.58
31	64QAM	10	15.62	15.62	7.56	8.53
32	64QAM	10	15.76	15.76	8.16	8.41
33	64QAM	10	15.80	15.80	7.68	8.41
34	64QAM	10	15.87	15.87	7.73	8.38
35	64QAM	10	15.70	15.70	7.63	8.42
36	64QAM	10	15.25	15.25	7.19	8.45
37	64QAM	10	15.41	15.41	7.35	8.45
38	64QAM	10	15.23	15.23	7.12	8.43
39	64QAM	10	15.30	15.30	7.25	8.46
40	64QAM	10	15.90	15.90	7.75	8.42
41	64QAM	10	15.94	15.94	7.82	8.42

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42	64QAM	10	15.91	15.91	7.84	8.42
43	64QAM	10	15.95	15.95	7.91	8.41
44	64QAM	10	15.21	15.21	7.16	8.45
45	64QAM	10	15.16	15.16	7.11	8.51
46	64QAM	10	15.26	15.26	7.21	8.45
47	64QAM	10	15.28	15.28	6.93	8.49
48	64QAM	10	15.16	15.16	7.11	8.55
49	64QAM	10	15.13	15.13	7.07	8.56
50	64QAM	10	15.01	15.01	6.98	8.56
51	64QAM	10	15.06	15.06	7.02	8.57
52	64QAM	10	15.71	15.71	7.56	8.52
53	64QAM	10	15.98	15.98	7.93	8.52
54	64QAM	10	15.85	15.85	7.71	8.56
55	64QAM	10	15.85	15.85	7.81	8.53
56	64QAM	10	15.00	15.00	6.96	8.56
57	64QAM	10	15.16	15.16	7.12	8.55
58	64QAM	10	15.36	15.36	7.31	8.57
59	64QAM	10	15.12	15.12	7.10	8.56
60	64QAM	10	15.91	15.91	7.77	8.51
61	64QAM	10	16.07	16.07	8.01	8.52
62	64QAM	10	16.19	16.19	8.06	8.55
63	64QAM	10	15.89	15.89	7.85	8.56

TEST REPORT

LTE-MIMO-1C-10:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	2376.38	2357.65	2395.13
MIMO Conducted Power for Port 0-63 (dBm)	33.76	33.72	33.79
Antenna Gain (dBi)	22.5	22.5	22.5
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP (dBm/10MHz)	44.22	44.18	44.25
FCC EIRP Limit (dBm/10MHz)	47	47	47
Margin (dB)	2.78	2.82	2.75

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	365.30	362.17	372.54
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	25.63	25.59	25.71
Antenna Gain (dBi)	22.5	22.5	22.5
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP PSD (dBm/MHz)	36.09	36.05	36.17
FCC EIRP PSD Limit (dBm/MHz)	37	37	37
Margin (dB)	0.91	0.95	0.83

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	18.49	-	7.29	8.58
1	16QAM	20	18.51	-	7.36	8.59
2	16QAM	20	18.53	-	7.36	8.62
3	16QAM	20	18.42	-	7.15	8.61
4	16QAM	20	18.95	-	7.75	8.56
5	16QAM	20	19.15	-	7.97	8.55
6	16QAM	20	18.99	-	7.79	8.53
7	16QAM	20	19.05	-	7.82	8.52
8	16QAM	20	18.58	-	7.42	8.63
9	16QAM	20	18.72	-	7.53	8.62
10	16QAM	20	18.60	-	7.45	8.59
11	16QAM	20	18.68	-	7.59	8.63
12	16QAM	20	19.19	-	8.05	8.54
13	16QAM	20	19.05	-	7.87	8.59
14	16QAM	20	19.12	-	7.94	8.53
15	16QAM	20	19.14	-	7.91	8.53
16	16QAM	20	19.24	-	8.04	8.44
17	16QAM	20	19.11	-	8.31	8.46
18	16QAM	20	19.13	-	7.66	8.56
19	16QAM	20	19.01	-	7.79	8.54
20	16QAM	20	18.41	-	7.22	8.50
21	16QAM	20	18.39	-	7.15	8.49
22	16QAM	20	18.56	-	7.48	8.52
23	16QAM	20	18.50	-	7.32	8.59
24	16QAM	20	19.16	-	7.96	8.45
25	16QAM	20	19.17	-	8.05	8.46
26	16QAM	20	19.28	-	8.12	8.45
27	16QAM	20	19.12	-	7.96	8.55
28	16QAM	20	18.64	-	7.43	8.60
29	16QAM	20	18.80	-	7.63	8.57
30	16QAM	20	18.77	-	7.57	8.54
31	16QAM	20	18.73	-	7.54	8.51
32	16QAM	20	18.70	-	7.51	8.54
33	16QAM	20	18.69	-	7.51	8.56
34	16QAM	20	18.84	-	7.68	8.55
35	16QAM	20	18.60	-	7.29	8.58
36	16QAM	20	18.17	-	6.99	8.67
37	16QAM	20	18.52	-	7.34	8.63
38	16QAM	20	18.13	-	6.97	8.67
39	16QAM	20	18.09	-	6.93	8.60

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40	16QAM	20	18.88	-	7.72	8.55
41	16QAM	20	18.84	-	7.73	8.54
42	16QAM	20	18.95	-	7.72	8.58
43	16QAM	20	18.89	-	7.67	8.55
44	16QAM	20	18.24	-	7.03	8.62
45	16QAM	20	18.20	-	7.06	8.65
46	16QAM	20	18.07	-	6.94	8.64
47	16QAM	20	18.24	-	7.04	8.62
48	16QAM	20	18.05	-	6.85	8.54
49	16QAM	20	18.17	-	6.99	8.55
50	16QAM	20	18.10	-	6.96	8.59
51	16QAM	20	17.97	-	6.81	8.56
52	16QAM	20	18.74	-	7.57	8.52
53	16QAM	20	18.95	-	7.82	8.49
54	16QAM	20	18.97	-	7.83	8.48
55	16QAM	20	18.83	-	7.64	8.51
56	16QAM	20	18.02	-	6.84	8.56
57	16QAM	20	18.17	-	7.01	8.59
58	16QAM	20	18.39	-	7.20	8.60
59	16QAM	20	18.07	-	6.88	8.55
60	16QAM	20	18.82	-	7.59	8.53
61	16QAM	20	19.21	-	8.07	8.55
62	16QAM	20	19.17	-	8.04	8.53
63	16QAM	20	18.85	-	7.64	8.45

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	18.51	-	7.23	8.63
1	16QAM	20	18.57	-	7.33	8.63
2	16QAM	20	18.54	-	7.36	8.64
3	16QAM	20	18.42	-	7.19	8.61
4	16QAM	20	18.88	-	7.61	8.56
5	16QAM	20	19.02	-	7.76	8.56
6	16QAM	20	18.90	-	7.64	8.55
7	16QAM	20	18.97	-	7.70	8.55
8	16QAM	20	18.60	-	7.35	8.57
9	16QAM	20	18.59	-	7.32	8.66
10	16QAM	20	18.63	-	7.41	8.65
11	16QAM	20	18.54	-	7.26	8.67
12	16QAM	20	19.04	-	7.78	8.64
13	16QAM	20	18.95	-	7.69	8.59
14	16QAM	20	19.07	-	7.81	8.59
15	16QAM	20	19.08	-	7.83	8.59
16	16QAM	20	19.22	-	8.00	8.51
17	16QAM	20	19.02	-	7.81	8.52
18	16QAM	20	19.12	-	7.92	8.52
19	16QAM	20	19.00	-	7.79	8.59
20	16QAM	20	18.34	-	7.11	8.62
21	16QAM	20	18.59	-	7.37	8.65
22	16QAM	20	18.43	-	7.19	8.63
23	16QAM	20	18.43	-	7.16	8.56
24	16QAM	20	19.18	-	7.97	8.58
25	16QAM	20	19.20	-	7.97	8.49
26	16QAM	20	19.17	-	7.96	8.59
27	16QAM	20	19.11	-	7.89	8.50
28	16QAM	20	18.64	-	7.38	8.56
29	16QAM	20	18.72	-	7.48	8.62
30	16QAM	20	18.73	-	7.45	8.63
31	16QAM	20	18.61	-	7.40	8.57
32	16QAM	20	18.76	-	7.51	8.60
33	16QAM	20	18.65	-	7.38	8.61
34	16QAM	20	18.79	-	7.56	8.54
35	16QAM	20	18.63	-	7.37	8.60
36	16QAM	20	18.18	-	6.90	8.65
37	16QAM	20	18.41	-	7.20	8.65
38	16QAM	20	18.04	-	6.81	8.64
39	16QAM	20	18.08	-	6.79	8.66
40	16QAM	20	18.74	-	7.52	8.59
41	16QAM	20	18.83	-	7.62	8.59

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42	16QAM	20	18.81	-	7.57	8.60
43	16QAM	20	18.87	-	7.61	8.57
44	16QAM	20	18.13	-	6.85	8.64
45	16QAM	20	18.10	-	6.80	8.64
46	16QAM	20	18.11	-	6.89	8.65
47	16QAM	20	18.08	-	6.86	8.66
48	16QAM	20	18.05	-	6.83	8.61
49	16QAM	20	18.09	-	6.86	8.63
50	16QAM	20	17.92	-	6.68	8.62
51	16QAM	20	17.99	-	6.76	8.52
52	16QAM	20	18.66	-	7.42	8.58
53	16QAM	20	18.85	-	7.60	8.55
54	16QAM	20	18.77	-	7.51	8.59
55	16QAM	20	18.79	-	7.55	8.50
56	16QAM	20	17.97	-	6.76	8.64
57	16QAM	20	17.98	-	6.81	8.56
58	16QAM	20	18.23	-	7.01	8.57
59	16QAM	20	18.09	-	6.84	8.62
60	16QAM	20	18.82	-	7.54	8.59
61	16QAM	20	18.88	-	7.69	8.51
62	16QAM	20	19.00	-	7.73	8.54
63	16QAM	20	18.73	-	7.53	8.58

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	18.60	-	7.41	8.69
1	16QAM	20	18.66	-	7.52	8.65
2	16QAM	20	18.64	-	7.46	8.65
3	16QAM	20	18.61	-	7.31	8.60
4	16QAM	20	19.00	-	7.76	8.61
5	16QAM	20	19.07	-	7.88	8.61
6	16QAM	20	18.99	-	7.80	8.57
7	16QAM	20	19.00	-	7.77	8.60
8	16QAM	20	18.62	-	7.47	8.61
9	16QAM	20	18.53	-	7.37	8.63
10	16QAM	20	18.69	-	7.56	8.63
11	16QAM	20	18.66	-	7.41	8.68
12	16QAM	20	19.14	-	7.98	8.60
13	16QAM	20	19.10	-	7.95	8.60
14	16QAM	20	19.20	-	8.05	8.60
15	16QAM	20	19.07	-	7.83	8.53
16	16QAM	20	19.16	-	8.01	8.58
17	16QAM	20	19.08	-	7.95	8.59
18	16QAM	20	19.09	-	7.88	8.58
19	16QAM	20	19.13	-	7.99	8.60
20	16QAM	20	18.50	-	7.27	8.60
21	16QAM	20	18.63	-	7.37	8.62
22	16QAM	20	18.53	-	7.29	8.62
23	16QAM	20	18.53	-	7.39	8.58
24	16QAM	20	19.18	-	8.01	8.60
25	16QAM	20	19.24	-	8.09	8.54
26	16QAM	20	19.29	-	8.11	8.54
27	16QAM	20	19.17	-	7.92	8.56
28	16QAM	20	18.71	-	7.57	8.65
29	16QAM	20	18.81	-	7.66	8.64
30	16QAM	20	18.87	-	7.72	8.61
31	16QAM	20	18.66	-	7.52	8.59
32	16QAM	20	18.70	-	7.52	8.55
33	16QAM	20	18.71	-	7.56	8.49
34	16QAM	20	18.81	-	7.61	8.58
35	16QAM	20	18.65	-	7.51	8.51
36	16QAM	20	18.25	-	7.11	8.68
37	16QAM	20	18.41	-	7.25	8.61
38	16QAM	20	18.17	-	7.01	8.65
39	16QAM	20	18.23	-	7.01	8.64
40	16QAM	20	18.85	-	7.64	8.56
41	16QAM	20	18.86	-	7.62	8.55

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42	16QAM	20	18.92	-	7.75	8.58
43	16QAM	20	18.93	-	7.73	8.62
44	16QAM	20	18.21	-	6.97	8.67
45	16QAM	20	18.19	-	7.06	8.68
46	16QAM	20	18.28	-	7.12	8.65
47	16QAM	20	18.02	-	6.73	8.63
48	16QAM	20	18.09	-	6.96	8.56
49	16QAM	20	18.04	-	6.81	8.60
50	16QAM	20	18.02	-	6.88	8.64
51	16QAM	20	17.94	-	6.73	8.64
52	16QAM	20	18.63	-	7.21	8.57
53	16QAM	20	18.92	-	7.69	8.53
54	16QAM	20	18.88	-	7.63	8.56
55	16QAM	20	18.83	-	7.60	8.59
56	16QAM	20	17.94	-	6.72	8.60
57	16QAM	20	18.13	-	6.98	8.64
58	16QAM	20	18.27	-	7.02	8.59
59	16QAM	20	18.03	-	6.85	8.65
60	16QAM	20	18.78	-	7.54	8.60
61	16QAM	20	19.00	-	7.77	8.53
62	16QAM	20	19.05	-	7.84	8.60
63	16QAM	20	18.80	-	7.63	8.60

TEST REPORT

LTE-MIMO-1C-20:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	4743.70	4677.37	4742.92
MIMO Conducted Power for Port 0-63 (dBm)	36.76	36.70	36.76
OBW (MHz)	17.822	17.847	17.834
Scaling Factor (dB)	-2.51	-2.52	-2.51
Antenna Gain (dBi)	22.5	22.5	22.5
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP (dBm/10MHz)	44.71	44.64	44.71
FCC EIRP Limit (dBm/10MHz)	47	47	47
Margin (dB)	2.29	2.36	2.29

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	361.73	351.50	360.38
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	25.58	25.46	25.57
Antenna Gain (dBi)	22.5	22.5	22.5
16-Beam Reduction (dB)	-12.04	-12.04	-12.04
MIMO EIRP PSD (dBm/MHz)	36.04	35.92	36.03
FCC EIRP PSD Limit (dBm/MHz)	37	37	37
Margin (dB)	0.96	1.08	0.97

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	18.65	-	7.75	-
1	16QAM	10	18.62	-	7.66	-
2	16QAM	10	18.69	-	7.70	-
3	16QAM	10	18.68	-	7.65	-
4	16QAM	10	18.98	-	8.03	-
5	16QAM	10	19.08	-	8.11	-
6	16QAM	10	19.04	-	8.03	-
7	16QAM	10	18.96	-	8.05	-
8	16QAM	10	18.65	-	7.70	-
9	16QAM	10	18.54	-	7.52	-
10	16QAM	10	18.70	-	7.82	-
11	16QAM	10	18.65	-	7.75	-
12	16QAM	10	19.11	-	8.15	-
13	16QAM	10	19.15	-	8.16	-
14	16QAM	10	19.23	-	8.30	-
15	16QAM	10	19.09	-	8.18	-
16	16QAM	10	19.17	-	8.32	-
17	16QAM	10	19.04	-	8.05	-
18	16QAM	10	19.16	-	8.20	-
19	16QAM	10	19.18	-	8.30	-
20	16QAM	10	18.52	-	7.62	-
21	16QAM	10	18.66	-	7.71	-
22	16QAM	10	18.56	-	7.67	-
23	16QAM	10	18.55	-	7.71	-
24	16QAM	10	19.19	-	8.22	-
25	16QAM	10	19.24	-	8.36	-
26	16QAM	10	19.33	-	8.43	-
27	16QAM	10	19.15	-	8.15	-
28	16QAM	10	18.72	-	7.72	-
29	16QAM	10	18.81	-	7.81	-
30	16QAM	10	18.82	-	7.83	-
31	16QAM	10	18.66	-	7.81	-
32	16QAM	10	18.69	-	7.83	-
33	16QAM	10	18.79	-	7.82	-
34	16QAM	10	18.91	-	8.02	-
35	16QAM	10	18.72	-	7.79	-
36	16QAM	10	18.35	-	7.46	-
37	16QAM	10	18.52	-	7.59	-
38	16QAM	10	18.26	-	7.38	-
39	16QAM	10	18.27	-	7.36	-

TEST REPORT

40	16QAM	10	18.92	-	8.02	-
41	16QAM	10	18.94	-	8.02	-
42	16QAM	10	18.96	-	8.03	-
43	16QAM	10	18.97	-	8.10	-
44	16QAM	10	18.31	-	7.35	-
45	16QAM	10	18.30	-	7.42	-
46	16QAM	10	18.30	-	7.36	-
47	16QAM	10	18.13	-	7.19	-
48	16QAM	10	18.15	-	7.26	-
49	16QAM	10	18.08	-	7.08	-
50	16QAM	10	18.08	-	7.19	-
51	16QAM	10	18.00	-	7.02	-
52	16QAM	10	18.68	-	7.69	-
53	16QAM	10	18.98	-	8.08	-
54	16QAM	10	18.87	-	7.86	-
55	16QAM	10	18.86	-	7.92	-
56	16QAM	10	18.03	-	7.14	-
57	16QAM	10	18.23	-	7.35	-
58	16QAM	10	18.31	-	7.32	-
59	16QAM	10	18.11	-	7.21	-
60	16QAM	10	18.80	-	7.93	-
61	16QAM	10	19.00	-	8.13	-
62	16QAM	10	19.11	-	8.26	-
63	16QAM	10	18.81	-	7.83	-

TEST REPORT

LTE-MIMO-2C-10-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	4780.94
MIMO Conducted Power for Port 0-63 (dBm)	-	-	36.80
OBW (MHz)	-	-	18.820
Scaling Factor (dB)	-	-	-2.75
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	44.51
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	2.49

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	385.85
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.86
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.32
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.68

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	21.34	-	7.32	-
1	16QAM	20	21.37	-	7.38	-
2	16QAM	20	21.32	-	7.34	-
3	16QAM	20	21.34	-	7.43	-
4	16QAM	20	21.80	-	7.39	-
5	16QAM	20	21.89	-	7.84	-
6	16QAM	20	21.85	-	7.93	-
7	16QAM	20	21.89	-	7.91	-
8	16QAM	20	21.43	-	7.40	-
9	16QAM	20	21.33	-	7.55	-
10	16QAM	20	21.56	-	7.54	-
11	16QAM	20	21.45	-	7.43	-
12	16QAM	20	21.91	-	7.94	-
13	16QAM	20	21.94	-	7.93	-
14	16QAM	20	22.03	-	8.02	-
15	16QAM	20	21.88	-	7.79	-
16	16QAM	20	21.91	-	7.89	-
17	16QAM	20	21.90	-	7.91	-
18	16QAM	20	21.94	-	7.94	-
19	16QAM	20	21.92	-	7.90	-
20	16QAM	20	21.34	-	7.38	-
21	16QAM	20	21.47	-	7.47	-
22	16QAM	20	21.36	-	7.36	-
23	16QAM	20	21.46	-	7.48	-
24	16QAM	20	22.01	-	7.98	-
25	16QAM	20	22.06	-	8.08	-
26	16QAM	20	22.22	-	8.25	-
27	16QAM	20	22.01	-	7.97	-
28	16QAM	20	21.60	-	7.62	-
29	16QAM	20	21.68	-	7.71	-
30	16QAM	20	21.81	-	7.85	-
31	16QAM	20	21.56	-	7.50	-
32	16QAM	20	21.59	-	7.58	-
33	16QAM	20	21.67	-	7.62	-
34	16QAM	20	21.72	-	7.67	-
35	16QAM	20	21.49	-	7.47	-
36	16QAM	20	21.15	-	7.13	-
37	16QAM	20	21.33	-	7.32	-
38	16QAM	20	21.12	-	7.16	-
39	16QAM	20	21.16	-	7.20	-

TEST REPORT

40	16QAM	20	21.72	-	7.75	-
41	16QAM	20	21.82	-	7.87	-
42	16QAM	20	21.75	-	7.78	-
43	16QAM	20	21.80	-	7.85	-
44	16QAM	20	21.16	-	7.18	-
45	16QAM	20	21.12	-	7.16	-
46	16QAM	20	21.16	-	7.19	-
47	16QAM	20	21.04	-	7.11	-
48	16QAM	20	21.05	-	7.10	-
49	16QAM	20	20.96	-	6.95	-
50	16QAM	20	20.96	-	6.97	-
51	16QAM	20	20.92	-	6.92	-
52	16QAM	20	21.55	-	7.58	-
53	16QAM	20	21.87	-	7.89	-
54	16QAM	20	21.73	-	7.76	-
55	16QAM	20	21.83	-	7.83	-
56	16QAM	20	20.91	-	6.91	-
57	16QAM	20	21.08	-	7.05	-
58	16QAM	20	21.28	-	7.30	-
59	16QAM	20	21.11	-	7.15	-
60	16QAM	20	21.70	-	7.71	-
61	16QAM	20	21.88	-	7.92	-
62	16QAM	20	21.97	-	7.97	-
63	16QAM	20	21.71	-	7.73	-

TEST REPORT

LTE-MIMO-2C-20-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	9195.71
MIMO Conducted Power for Port 0-63 (dBm)	-	-	39.64
OBW (MHz)	-	-	37.657
Scaling Factor (dB)	-	-	-5.76
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	44.34
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	2.66

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	366.41
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.64
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.10
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.90

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	20.24	-	7.71	-
1	16QAM	10	20.26	-	7.60	-
2	16QAM	10	20.29	-	7.70	-
3	16QAM	10	20.35	-	7.77	-
4	16QAM	10	20.70	-	8.05	-
5	16QAM	10	20.82	-	8.20	-
6	16QAM	10	20.74	-	8.06	-
7	16QAM	10	20.68	-	8.06	-
8	16QAM	10	20.28	-	7.67	-
9	16QAM	10	20.27	-	7.66	-
10	16QAM	10	20.39	-	7.79	-
11	16QAM	10	20.33	-	7.72	-
12	16QAM	10	20.90	-	8.16	-
13	16QAM	10	20.91	-	8.29	-
14	16QAM	10	20.95	-	8.30	-
15	16QAM	10	20.83	-	8.07	-
16	16QAM	10	20.85	-	8.15	-
17	16QAM	10	20.84	-	8.27	-
18	16QAM	10	20.81	-	8.16	-
19	16QAM	10	20.87	-	8.24	-
20	16QAM	10	20.25	-	7.67	-
21	16QAM	10	20.41	-	7.78	-
22	16QAM	10	20.22	-	7.66	-
23	16QAM	10	20.32	-	7.76	-
24	16QAM	10	20.91	-	8.32	-
25	16QAM	10	21.05	-	8.39	-
26	16QAM	10	21.02	-	8.46	-
27	16QAM	10	20.89	-	8.21	-
28	16QAM	10	20.40	-	7.78	-
29	16QAM	10	20.58	-	7.92	-
30	16QAM	10	20.60	-	8.05	-
31	16QAM	10	20.36	-	7.67	-
32	16QAM	10	20.51	-	7.93	-
33	16QAM	10	20.46	-	7.73	-
34	16QAM	10	20.63	-	8.02	-
35	16QAM	10	20.42	-	7.66	-
36	16QAM	10	20.00	-	7.26	-
37	16QAM	10	20.17	-	7.48	-
38	16QAM	10	20.00	-	7.42	-
39	16QAM	10	19.95	-	7.26	-

TEST REPORT

40	16QAM	10	20.51	-	7.84	-
41	16QAM	10	20.64	-	8.01	-
42	16QAM	10	20.59	-	8.01	-
43	16QAM	10	20.60	-	7.96	-
44	16QAM	10	19.92	-	7.25	-
45	16QAM	10	19.85	-	7.23	-
46	16QAM	10	19.90	-	7.19	-
47	16QAM	10	19.77	-	7.24	-
48	16QAM	10	19.78	-	7.09	-
49	16QAM	10	19.80	-	7.20	-
50	16QAM	10	19.70	-	7.06	-
51	16QAM	10	19.70	-	7.09	-
52	16QAM	10	20.43	-	7.86	-
53	16QAM	10	20.69	-	8.09	-
54	16QAM	10	20.57	-	7.95	-
55	16QAM	10	20.61	-	8.04	-
56	16QAM	10	19.76	-	7.12	-
57	16QAM	10	19.90	-	7.31	-
58	16QAM	10	20.10	-	7.51	-
59	16QAM	10	19.89	-	7.26	-
60	16QAM	10	20.52	-	7.88	-
61	16QAM	10	20.74	-	8.15	-
62	16QAM	10	20.81	-	8.25	-
63	16QAM	10	20.55	-	7.96	-

TEST REPORT

LTE-MIMO-3C-10-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	7073.46
MIMO Conducted Power for Port 0-63 (dBm)	-	-	38.50
OBW (MHz)	-	-	28.675
Scaling Factor (dB)	-	-	-4.58
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	44.38
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	2.62

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	386.15
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	25.87
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	36.33
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	0.67

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	22.50	-	6.78	-
1	16QAM	20	22.40	-	6.59	-
2	16QAM	20	22.42	-	6.65	-
3	16QAM	20	22.42	-	6.72	-
4	16QAM	20	22.87	-	7.17	-
5	16QAM	20	23.00	-	7.30	-
6	16QAM	20	22.93	-	7.14	-
7	16QAM	20	22.92	-	7.21	-
8	16QAM	20	22.43	-	6.68	-
9	16QAM	20	22.39	-	6.59	-
10	16QAM	20	22.56	-	6.79	-
11	16QAM	20	22.45	-	6.71	-
12	16QAM	20	22.94	-	7.23	-
13	16QAM	20	22.86	-	7.13	-
14	16QAM	20	22.99	-	7.26	-
15	16QAM	20	22.91	-	7.13	-
16	16QAM	20	22.95	-	7.22	-
17	16QAM	20	22.89	-	7.20	-
18	16QAM	20	22.98	-	7.20	-
19	16QAM	20	22.90	-	7.23	-
20	16QAM	20	22.41	-	6.71	-
21	16QAM	20	22.51	-	6.78	-
22	16QAM	20	22.28	-	6.49	-
23	16QAM	20	22.48	-	6.71	-
24	16QAM	20	22.96	-	7.18	-
25	16QAM	20	23.04	-	7.34	-
26	16QAM	20	23.13	-	7.39	-
27	16QAM	20	22.91	-	7.19	-
28	16QAM	20	22.47	-	6.77	-
29	16QAM	20	22.57	-	6.89	-
30	16QAM	20	22.69	-	6.92	-
31	16QAM	20	22.43	-	6.75	-
32	16QAM	20	22.47	-	6.83	-
33	16QAM	20	22.51	-	6.68	-
34	16QAM	20	22.63	-	6.78	-
35	16QAM	20	22.42	-	6.68	-
36	16QAM	20	22.06	-	6.33	-
37	16QAM	20	22.22	-	6.47	-
38	16QAM	20	22.04	-	6.32	-
39	16QAM	20	22.01	-	6.23	-

TEST REPORT

40	16QAM	20	22.67	-	7.03	-
41	16QAM	20	22.69	-	6.94	-
42	16QAM	20	22.72	-	7.02	-
43	16QAM	20	22.78	-	7.13	-
44	16QAM	20	22.05	-	6.39	-
45	16QAM	20	22.06	-	6.23	-
46	16QAM	20	22.11	-	6.31	-
47	16QAM	20	21.94	-	6.23	-
48	16QAM	20	22.00	-	6.32	-
49	16QAM	20	21.89	-	6.03	-
50	16QAM	20	21.85	-	6.02	-
51	16QAM	20	21.90	-	6.14	-
52	16QAM	20	22.56	-	7.05	-
53	16QAM	20	22.72	-	6.96	-
54	16QAM	20	22.71	-	6.95	-
55	16QAM	20	22.75	-	6.95	-
56	16QAM	20	21.84	-	6.04	-
57	16QAM	20	21.92	-	6.05	-
58	16QAM	20	22.20	-	6.34	-
59	16QAM	20	21.99	-	6.23	-
60	16QAM	20	22.67	-	6.98	-
61	16QAM	20	22.86	-	7.11	-
62	16QAM	20	22.89	-	7.13	-
63	16QAM	20	22.66	-	6.99	-

TEST REPORT

LTE-MIMO-3C-20-1:

MIMO EIRP:

Channel	Channel B	Channel M	Channel T
MIMO Conducted Power for Port 0-63 (mW)	-	-	11476.33
MIMO Conducted Power for Port 0-63 (dBm)	-	-	40.60
OBW (MHz)	-	-	57.422
Scaling Factor (dB)	-	-	-7.59
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP (dBm/10MHz)	-	-	43.47
FCC EIRP Limit (dBm/10MHz)	-	-	47
Margin (dB)	-	-	3.53

MIMO EIRP PSD:

Channel	Channel B	Channel M	Channel T
MIMO Conducted PSD for Port 0-63 (mW/MHz)	-	-	306.07
MIMO Conducted PSD for Port 0-63 (dBm/MHz)	-	-	24.86
Antenna Gain (dBi)	-	-	22.5
16-Beam Reduction (dB)	-	-	-12.04
MIMO EIRP PSD (dBm/MHz)	-	-	35.32
FCC EIRP PSD Limit (dBm/MHz)	-	-	37
Margin (dB)	-	-	1.68

TEST REPORT

EIRP Compliance

The radio unit has an integrated antenna, it doesn't support external antennas. The EIRP is calculated as the table below, it can comply with the EIRP requirements in Part 96.41.

LTE Carrier Bandwidth (MHz)	Antenna gain (dBi)	Maximum EIRP PSD (dBm/MHz)	Maximum EIRP (dBm/10MHz)	Maximum EIRP per Bandwidth (dBm)	Maximum EIRP per Bandwidth (W)
10	22.5	36.33	44.51	48.96	78.70
20	22.5	36.32	44.71	51.06	127.64

4 Occupied Bandwidth

Test result: Pass

4.1 Measurement Procedure

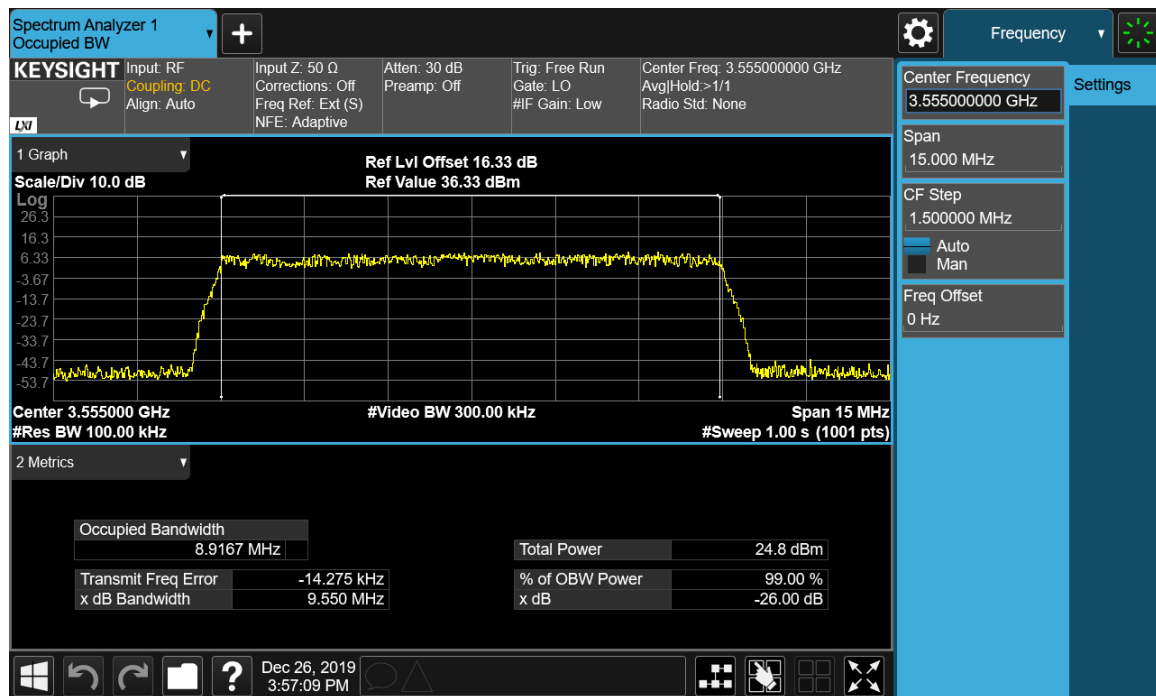
The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 99% and 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

4.2 Measurement result

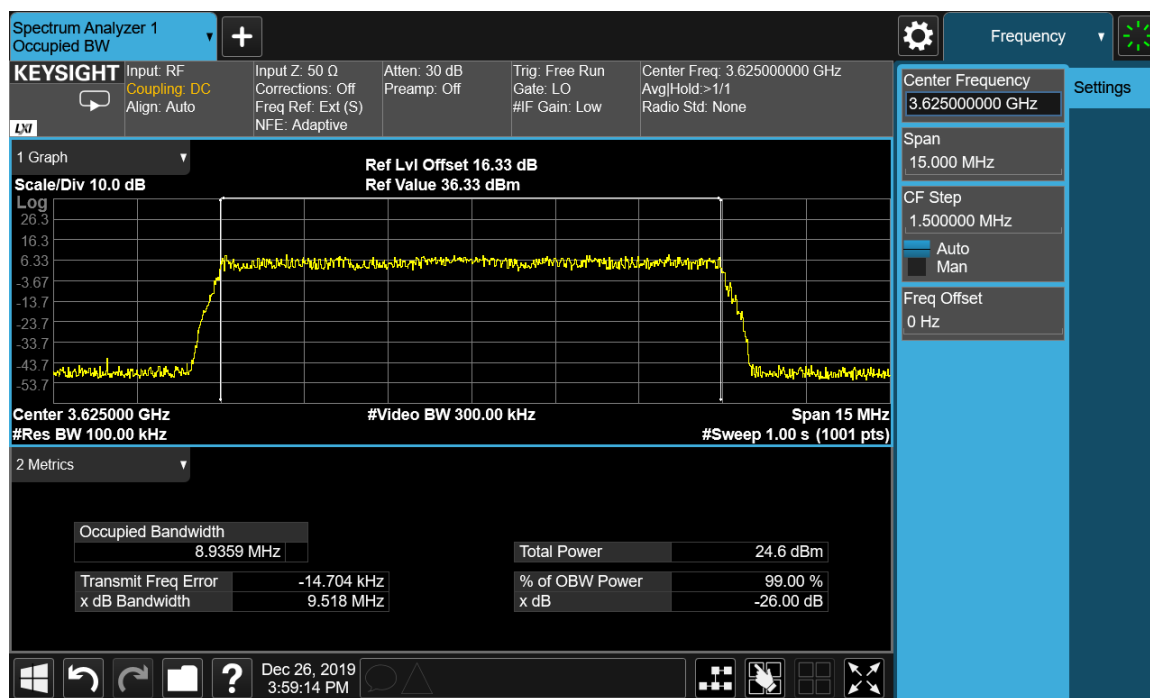
LTE-MIMO-1C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	10MHz	99% Occupied Bandwidth (MHz)		
			8.9167	8.9359	8.9138
			26dB Occupied Bandwidth (MHz)		
			9.550	9.518	9.553

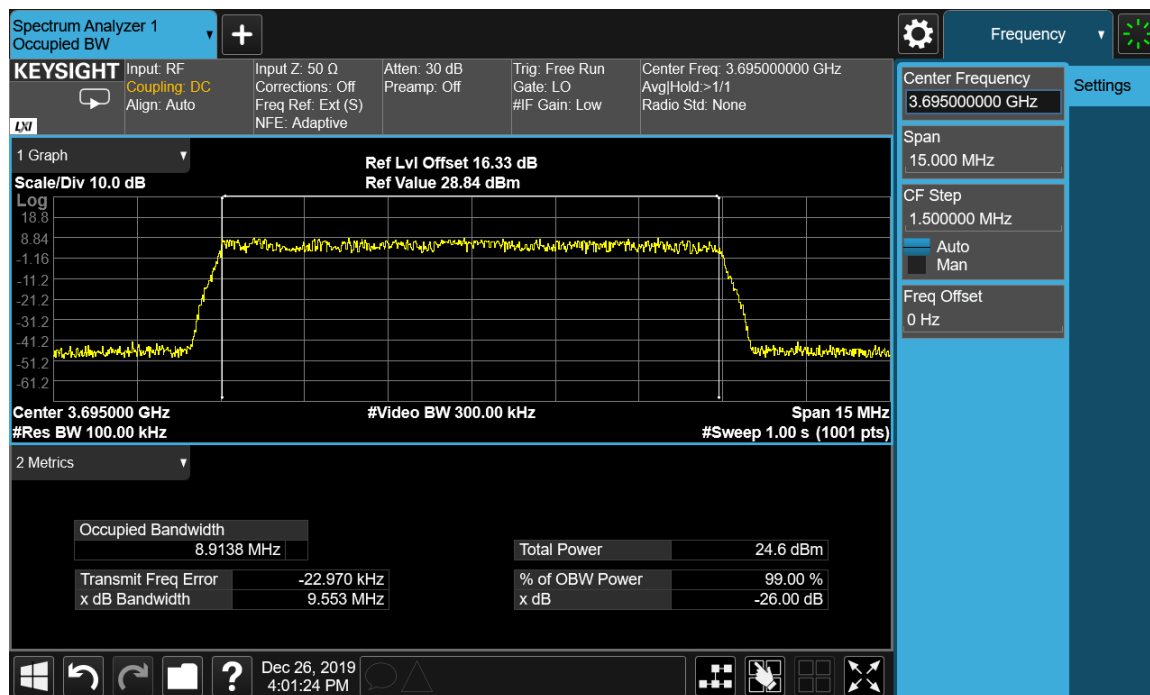
Channel Position B



Channel Position M



Channel Position T

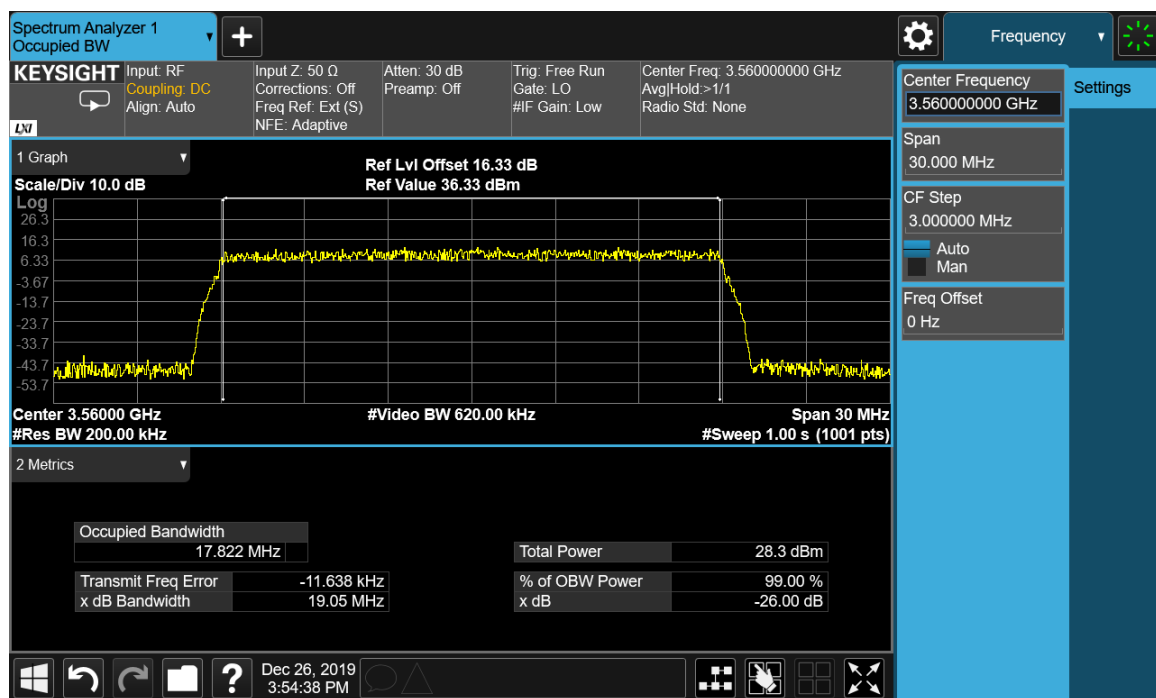


TEST REPORT

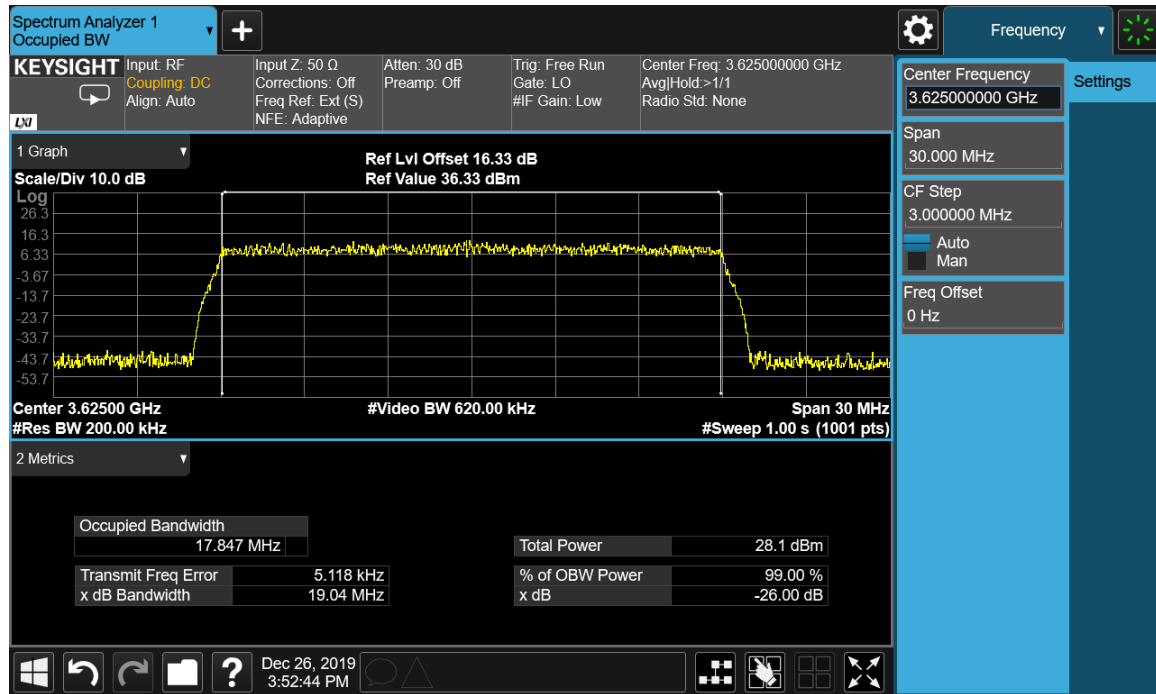
LTE-MIMO-1C-20:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	20MHz	99% Occupied Bandwidth (MHz)		
			17.822	17.847	17.834
			26dB Occupied Bandwidth (MHz)		
			19.05	19.04	19.04

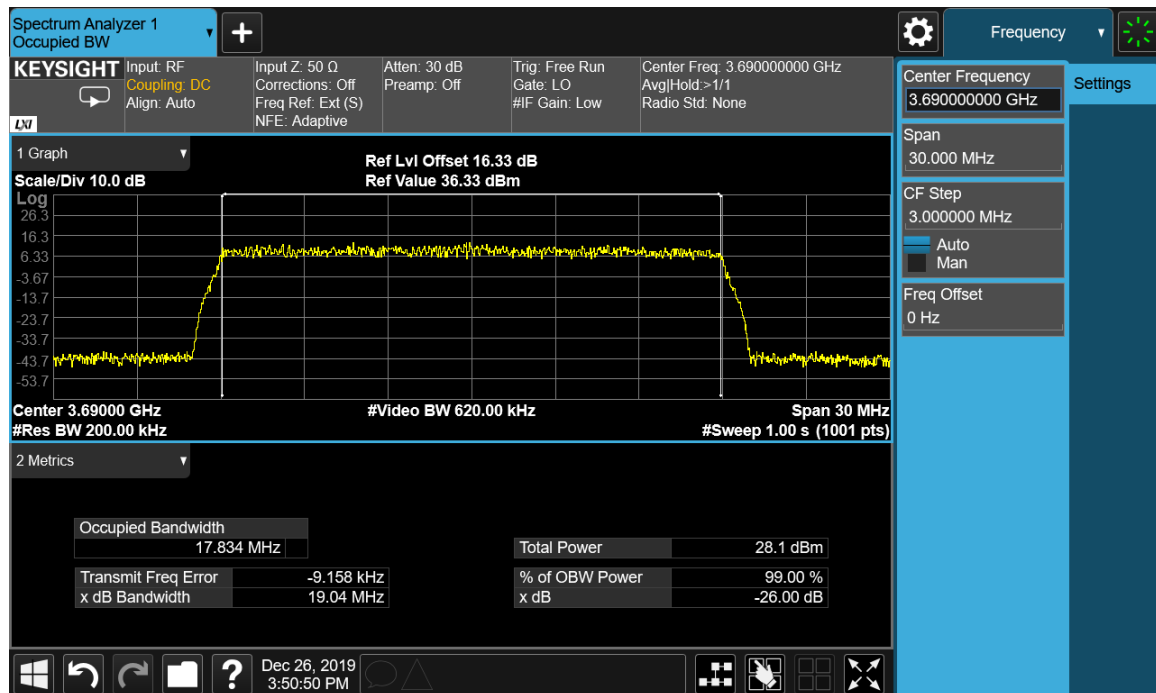
Channel Position B



Channel Position M



Channel Position T

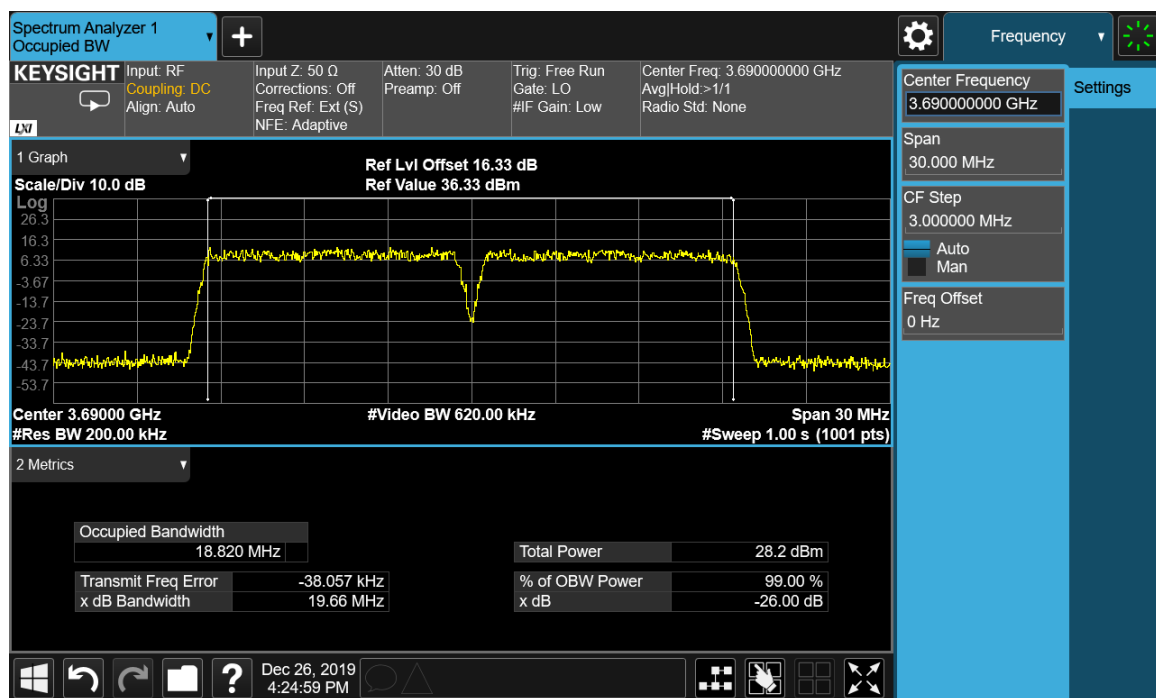


TEST REPORT

LTE-MIMO-2C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	10MHz	99% Occupied Bandwidth (MHz)		
			-	-	18.820
			26dB Occupied Bandwidth (MHz)		
			-	-	19.66

Channel Position T

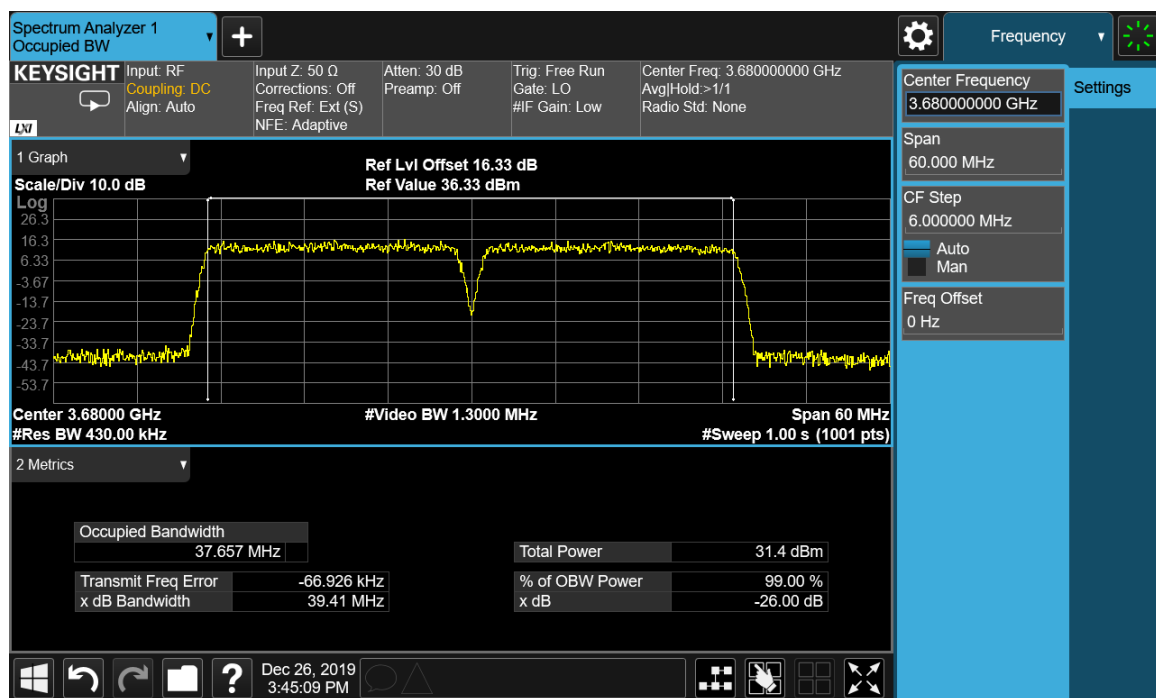


TEST REPORT

LTE-MIMO-2C-20:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	20MHz	99% Occupied Bandwidth (MHz)		
			-	-	37.657
			26dB Occupied Bandwidth (MHz)		
			-	-	39.41

Channel Position T

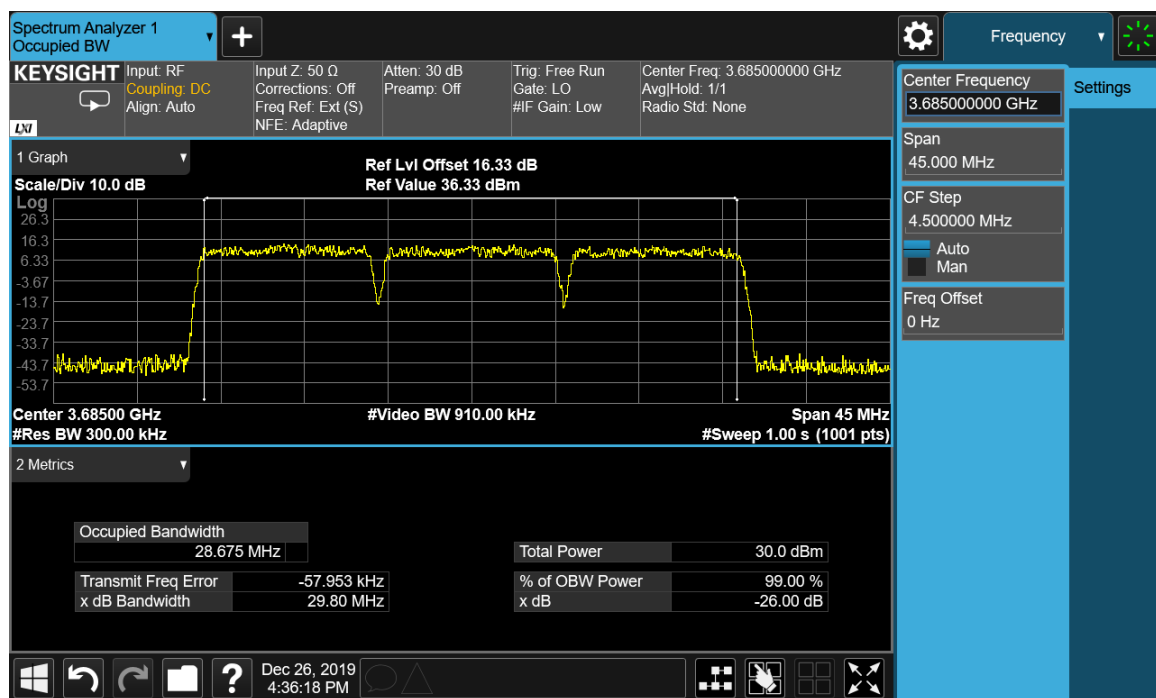


TEST REPORT

LTE-MIMO-3C-10:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	10MHz	99% Occupied Bandwidth (MHz)		
			-	-	28.675
			26dB Occupied Bandwidth (MHz)		
			-	-	29.80

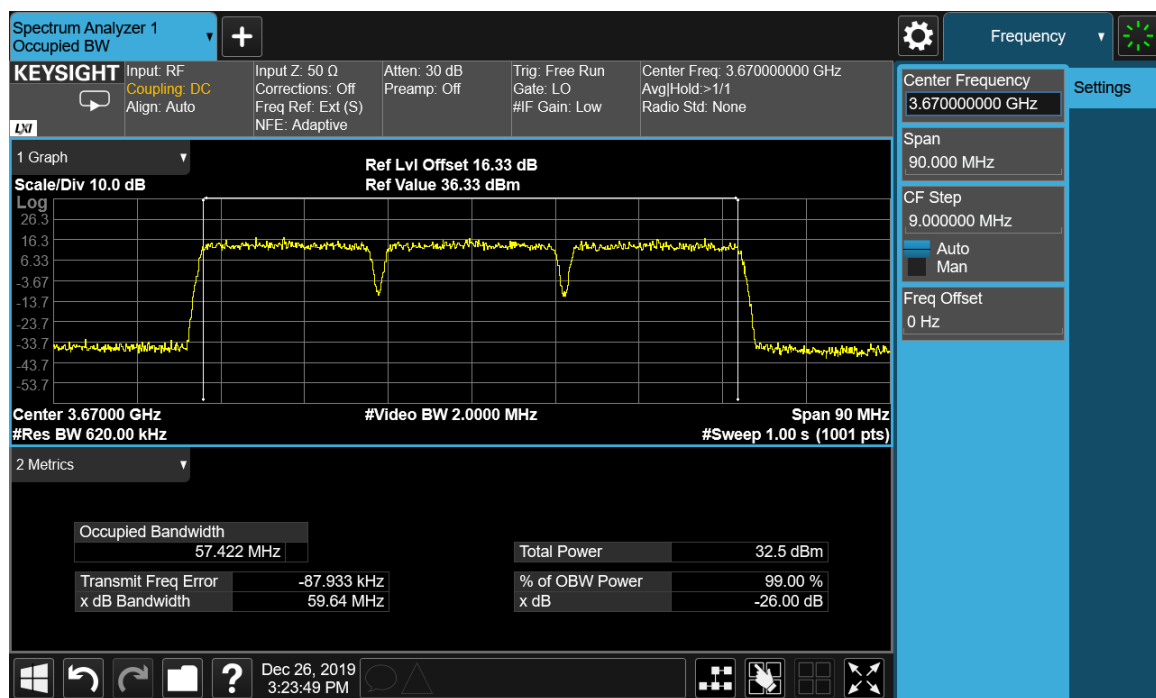
Channel Position T



LTE-MIMO-2C-30:

Antenna Port	Modulation	Bandwidth	Channel Position B	Channel Position M	Channel Position T
26	16QAM	20MHz	99% Occupied Bandwidth (MHz)		
			-	-	57.422
			26dB Occupied Bandwidth (MHz)		
			-	-	59.64

Channel Position T



TEST REPORT

5 Unwanted Emissions at Band Edge

Test result: Pass

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.

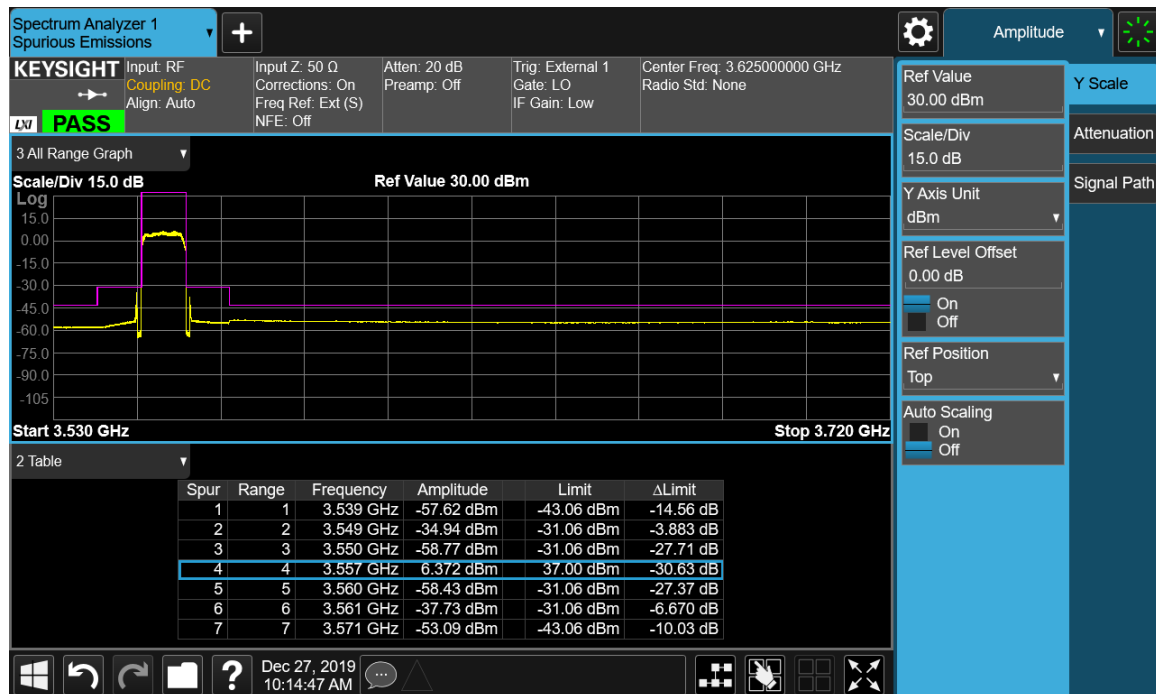
Spectrum analyzer detector was set as RMS.

5.3 Measurement result

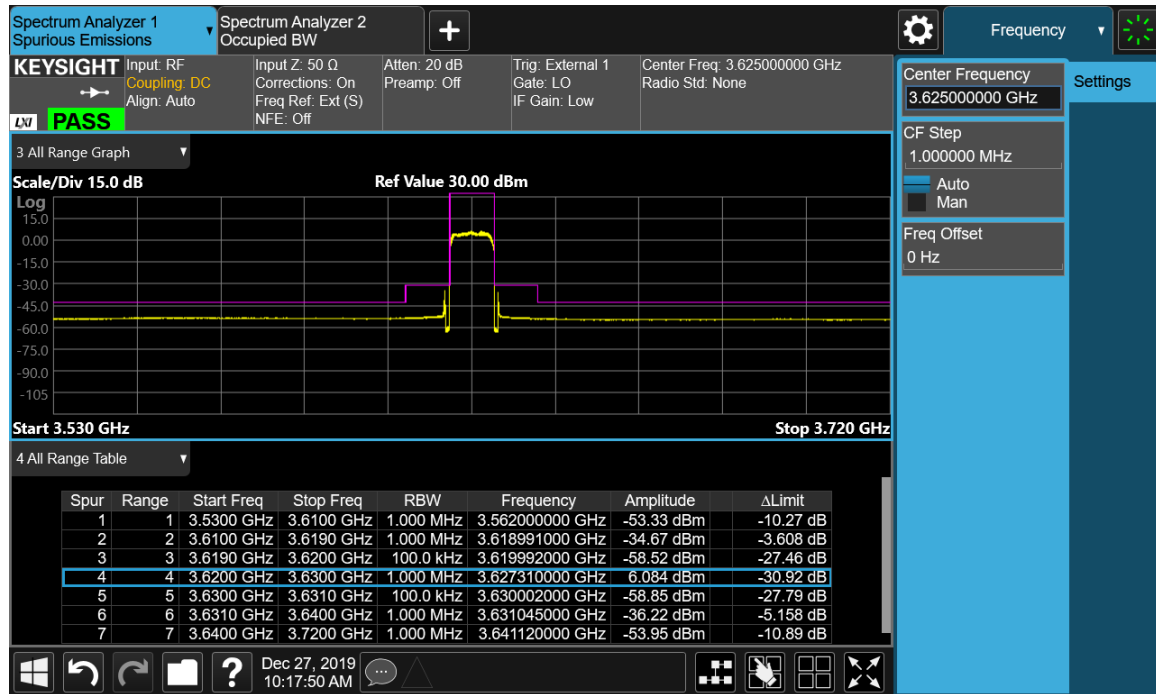
LTE-MIMO-1C-10:

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)
26	B	16QAM	10
26	M	16QAM	10
26	T	16QAM	10

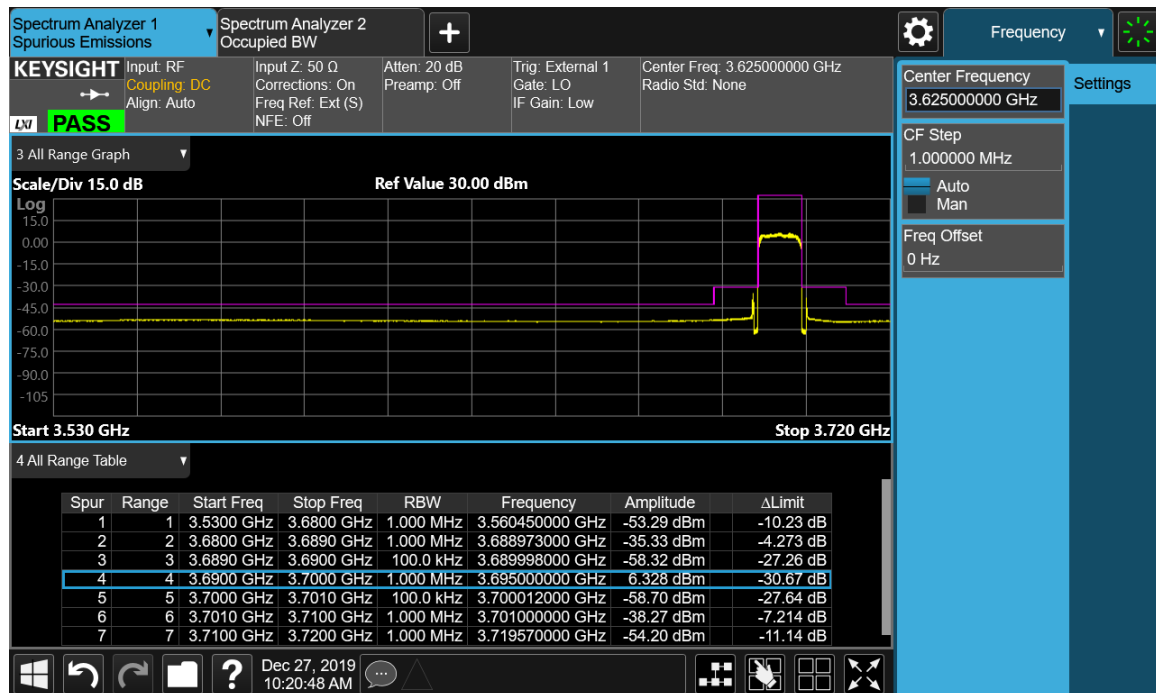
Channel Position B



Channel Position M



Channel Position T

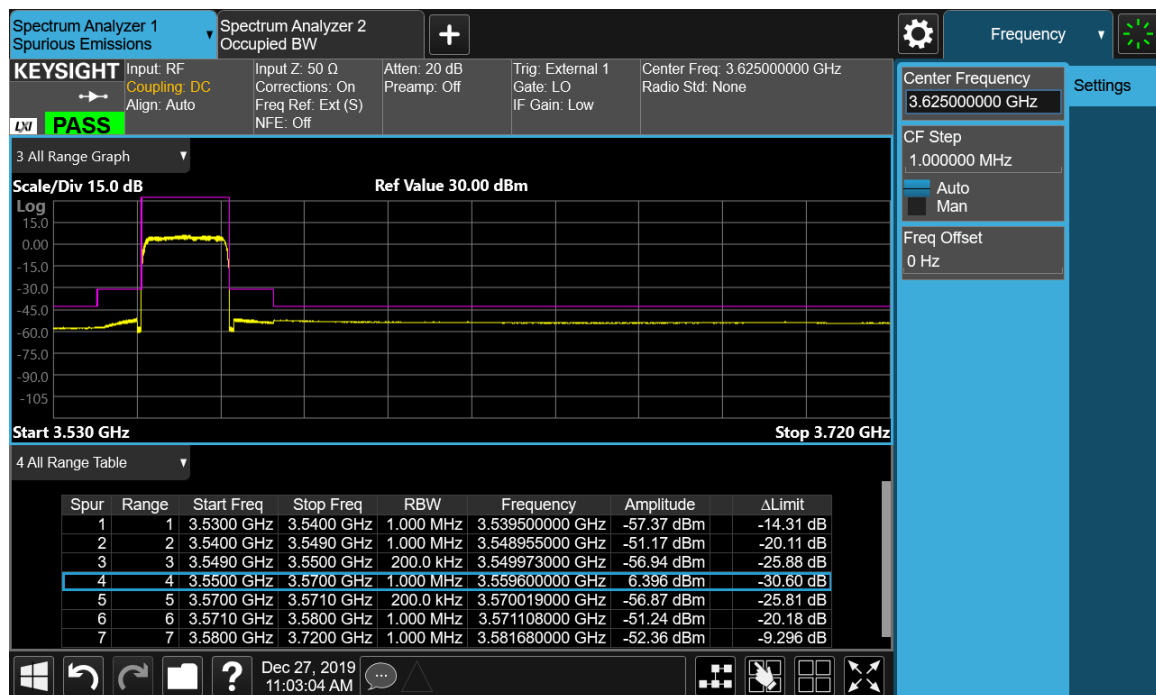


TEST REPORT

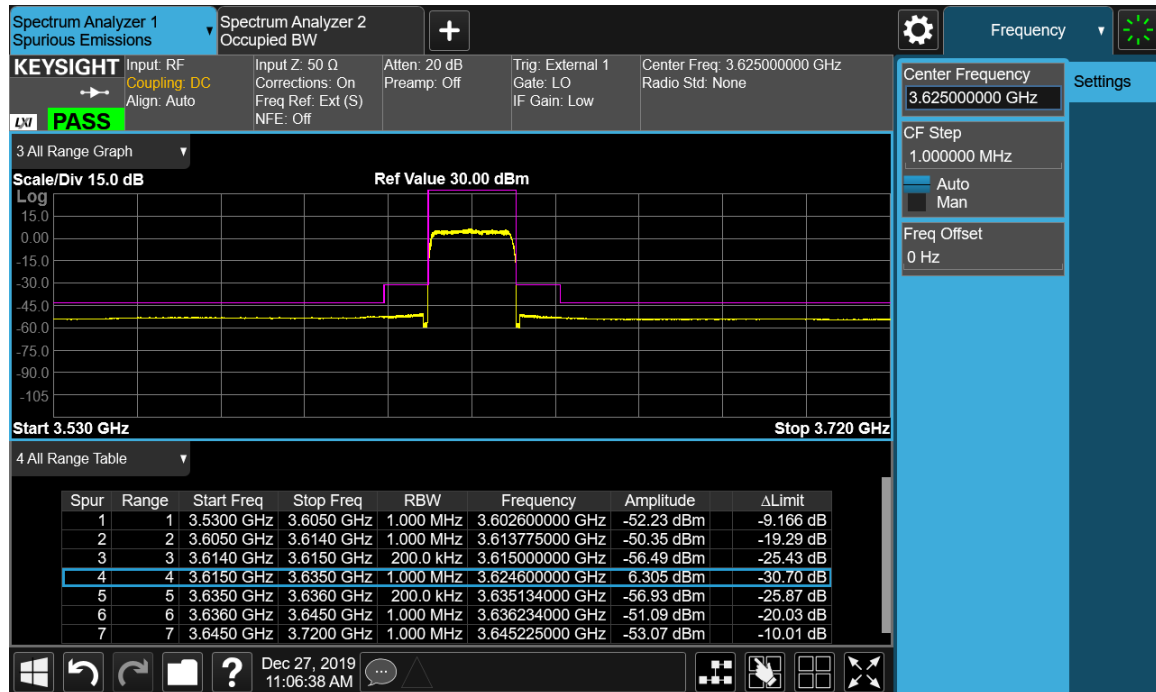
LTE-MIMO-1C-20:

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)
26	B	16QAM	20
26	M	16QAM	20
26	T	16QAM	20

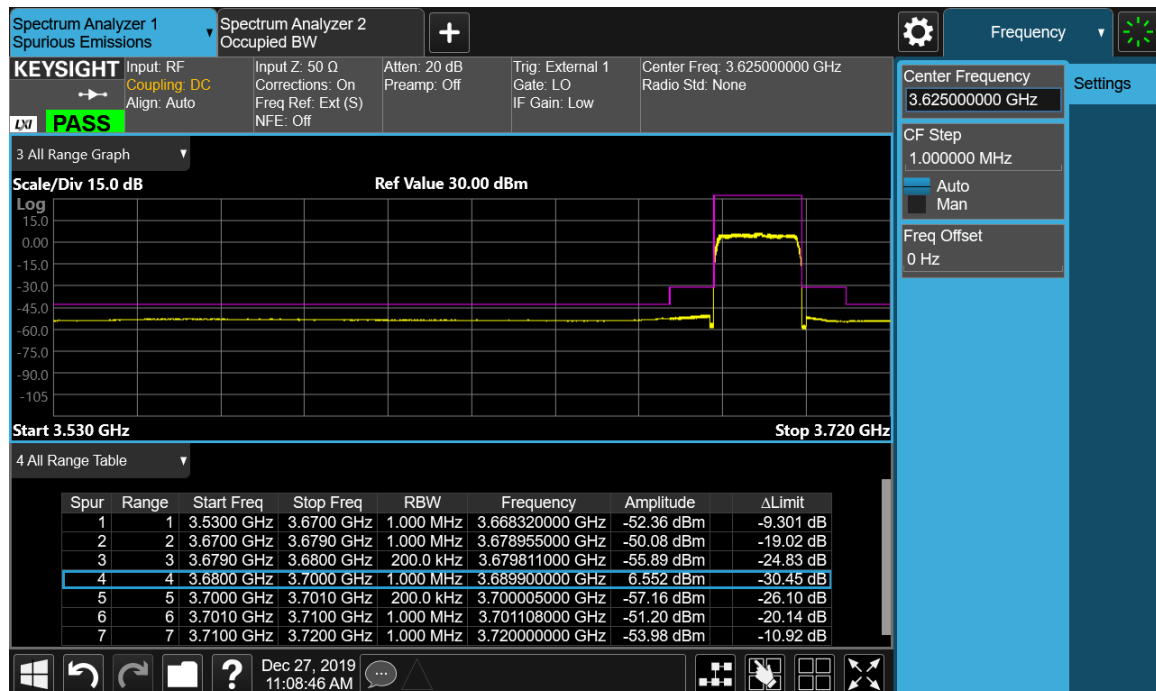
Channel Position B



Channel Position M



Channel Position T

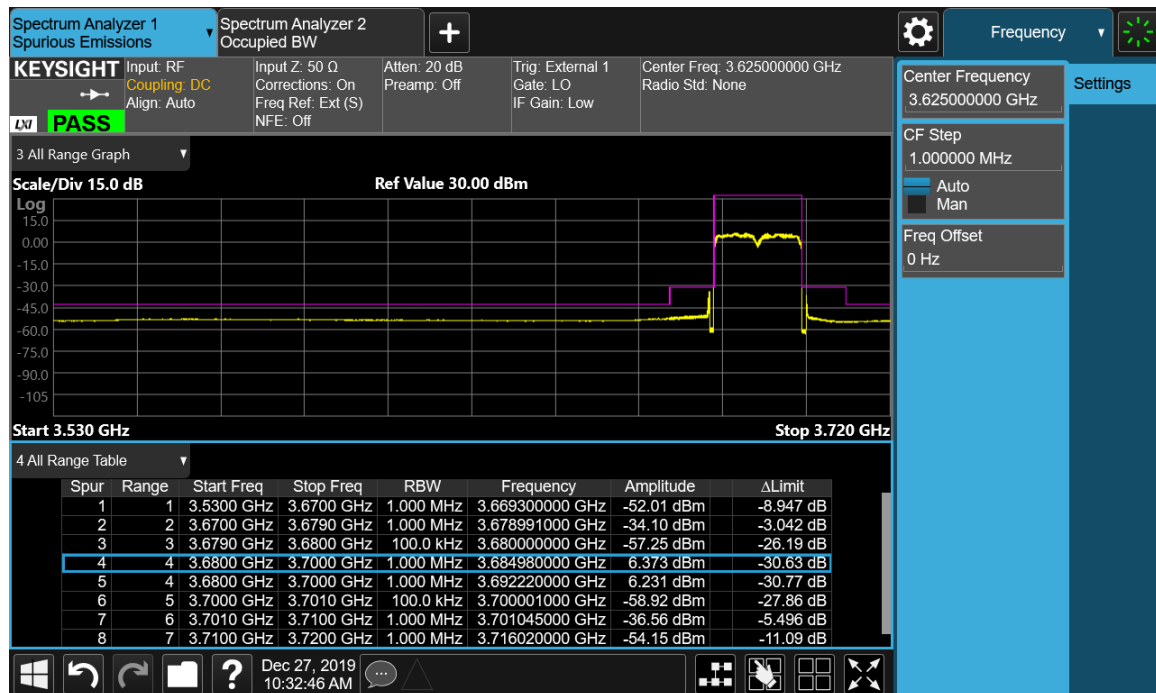


TEST REPORT

LTE-MIMO-2C-10-1:

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)
26	T	16QAM	10

Channel Position T

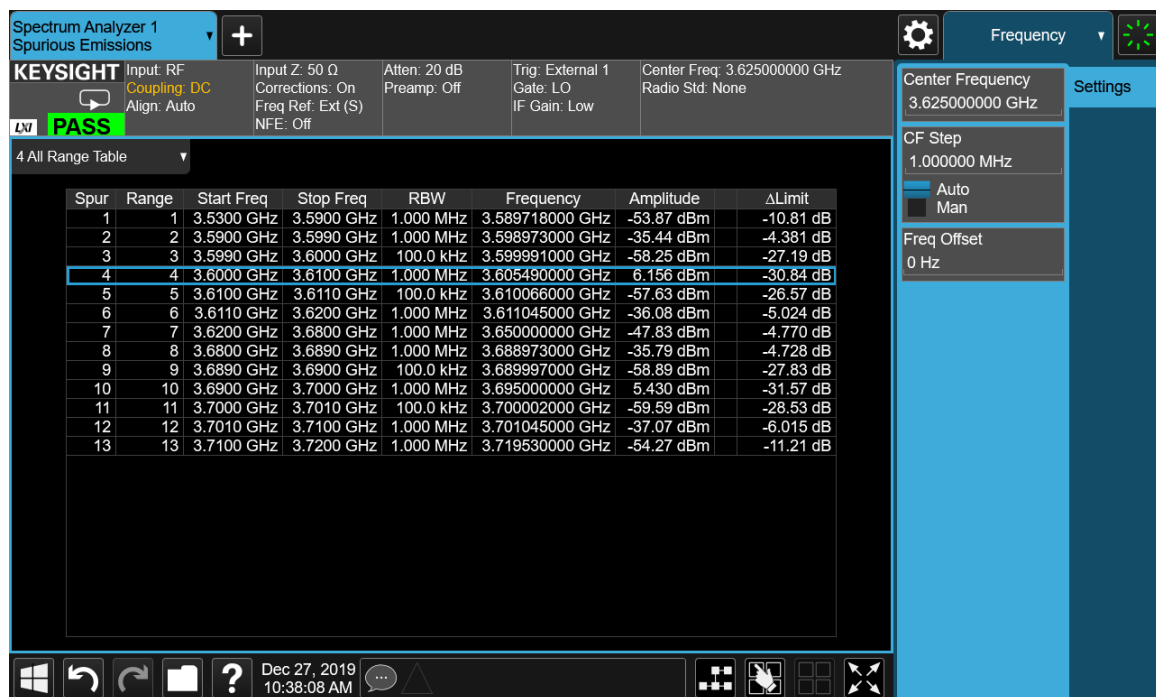
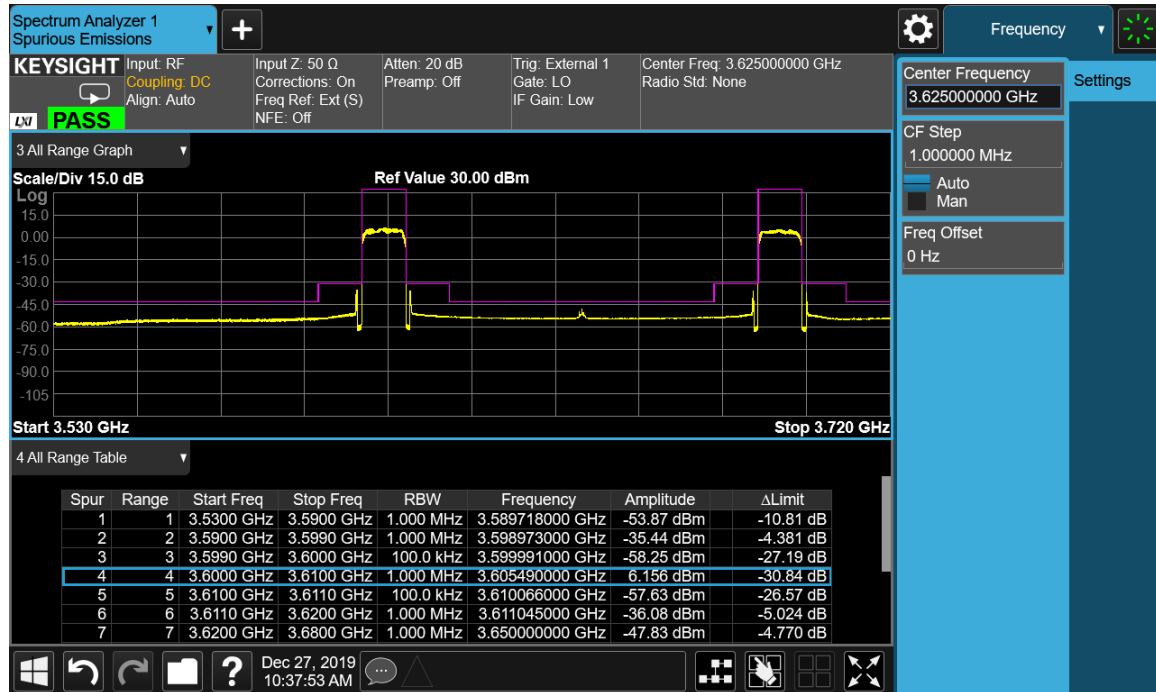


TEST REPORT

LTE-MIMO-2C-10-2:

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)
26	T	16QAM	10

Channel Position T



TEST REPORT

LTE-MIMO-2C-20-1:

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)
26	T	16QAM	20

Channel Position T

