

# No.I18Z62307-WMD03

for

# Remote Radio Unit AIR 6488 B41 FCC ID: TA8BKRD901108 In accordance with FCC CFR 47 Part 27 8alssued Date: 2019-02-11



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#### **Test Laboratory:**

#### ISED(IC) accredited test site number: 12389A-1 / 12389B-1

CTTL, Telecommunication Technology Labs, CAICT

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

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

Email: <a href="mailto:cttl\_terminals@caict.ac.cn">cttl\_terminals@caict.ac.cn</a>, website: <a href="mailto:www.caict.ac.cn">www.caict.ac.cn</a>,

# **REPORT HISTORY**

Report Number	Revision	Description	Issue Date
I18Z62307-WMD03	Rev.0	1 <sup>st</sup> edition	2019-02-11



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# 1. Test Laboratory

Address:

## 1.1. Testing Location

Location 1:CTTL(Kangding Road) 12389B-1

No. 18, Kangding Road, Yizhuang, Beijing, P. R. China 100176

Location 2:CTTL(Shouxiang) conducted testing

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

# 1.2. Project data

Testing Start Date:	2018-12-19
Testing End Date:	2019-01-31

### 1.3. Signature



Dong Yuan (Prepared this test report)

卫 气气

Zhou Yu (Reviewed this test report)

12.

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		
Audress / F 051.	100102, P.R.China		
Contact:	Xiaoying Jiang		
Email:	Xiaoying.jiang@ericsson.com		
Telephone:	+86 10 8476 7125		

# 2.2. Manufacturer Information

Ericsson AB
Isafjordsgatan 10, 164 80 Stockholm
Sweden
/
/
/



# 3. Equipment Under Test (EUT)

# 3.1. About EUT

Description	Remote Radio Unit	
Product Name	AIR 6488 B41	
Product Number	KRD 901 108/2, KRD 901 108/21, KRD 901 108/1, KRD 901 108/11 (note)	
FCC ID	TA8BKRD901108	
Antenna	YES	
Antenna Gain	23dBi	
Output power	Maximum 33.98dBm (2.5W) per port for 40MHz channel bandwidth	
	Maximum 30.97dBm (1.25W) per port for 20MHz channel bandwidth	
Power source	-48V DC	
Serial Number	D828356049	
Hardware Version	R1C	
Software Version	UP: CXP2010046/5_R13A70 ; Radio SW: CXP2030020/4_R14A44 for 40MHz channel	
	bandwidth	
	UP: CXP2010046/5_R12A258 ; Radio SW: CXP2030020/4_R13A67 for 20MHz channel	
	bandwidth	
Frequency range	TX/RX: 2496MHz-2690MHz	
Number of Antenna ports	64TX /64 RX ports	
Maximum RF bandwidth (IBW)	100MHz	
Maximum Number of supported		
carriers per port	1 carrier	
Supported modulations	QPSK for 20MHz and 40MHz channel bandwidth,	
Supported modulations	64QAM and 256QAM for 40MHz channel bandwidth	
Supported Channel bandwidth	20MHz and 40MHz	
Date of receipt	2018-12-19	

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

KRD 901 108/2 with un-security software and RDNB board for testing purpose

KRD 901 108/21 with security software and RDNB board for testing purpose

KRD 901 108/1 with un-security software and antenna

KRD 901 108/11 with security software and antenna



# 3.2. General Description

The Equipment Under Test (EUT) AIR 6488 B41 is an Ericsson Radio Unit working in the public mobile service 2496-2690 MHz band which provides communication connections to 2496-2690 MHz network. The AIR 6488 B41 operates from a -48V DC supply.

The EUT includes 64 TX/RX ports and it can be configured to transmit in MIMO mode for NR carriers, and MIMO mode for NR 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 64 antenna ports. By measuring the output power from QPSK, 64QAM and 256QAM 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 64 measured ports on worst case modulation scheme. This antenna port was 25 for 40MHz channel bandwidth, 55 for 20MHz channel bandwidth.

The settings below were used for all measurements unless otherwise noted:  $\ensuremath{\mathsf{NR}}$ 

	Carrier		Carrier Frequency Configuration (MHz)		
Configuration	Carrier	Bandwidth	Bottom	Middle	Тор
		(MHz)	Bollom	Middle	төр
NR-MIMO-1C-20	1 Carrier	20MHz	2506.02	2593.02	2680.02
NR-MIMO-1C-BE-20	1 Carrier	20MHz	2506.02	N/A	2680.02
NR-MIMO-1C-40	1 Carrier	40MHz	2516.01	2593.02	2670.00
NR-MIMO-1C-BE-40	1 Carrier	40MHz	2516.01	N/A	2670.00

N/A – Not Applicable



# 4. <u>Reference Documents</u>

# 4.1. Reference Documents for testing

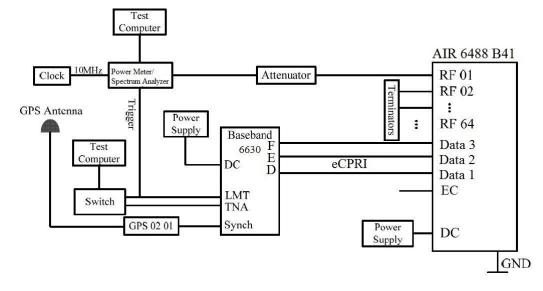
The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS	10-1-18
	SERVICES	Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY	10-1-17
	MATTERS; GENERAL RULES AND REGULATIONS	Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment	2016
	Measurement and Performance Standards	
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from	2014
	Low-Voltage Electrical and Electronic Equipment in the	
	Range of 9 KHz to 40 GHz	
ANSI 63.26	IEEE/ANSI Standard for Compliance Testing of	2015
	Transmitters Used in Licensed Radio Services	
TIA 102.CAAA-E	Project 25 Digital C4FM/CQPSK Transceiver	2016
	Measurement Methods	
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF	v03r01
	LICENSED DIGITAL TRANSMITTERS	
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in	v02r01
	the Same Band	



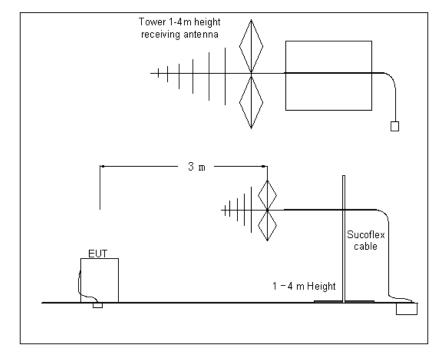
# 5. TEST SETUP

Test Setup, Conducted Measurement:



No.	Auxiliary Equipment	Model Type	Version
1	Test Computer	HP EliteBook 8540w	-
2	Baseband 6630	KDU 137 848/1	R2C
3	Power supply unit	PCR2000M	-
4	Terminator	SHX 6G	-
5	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 $< 0.5 \Omega$	
Normalised site attenuation (NSA) <= ±3.5 dB, 3 m distance	
Site voltage standing-wave ratio (S <sub>VSWR</sub> ) 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	27.50(h), 2.1046	Pass
2	Occupied Bandwidth	27.53(m), 2.1049	Pass
3	Spurious Emissions at Band Edge	27.53(m), 2.1051	Pass
4	Conducted Spurious Emission	27.53(m), 2.1051	Pass
5	Radiated Spurious Emission	27.53(m), 2.1053	Pass
6	Frequency Stability	27.54, 2.1055	Pass



# 8. Test Equipment Utilized

NO.	Description	ТҮРЕ	series number	MANUFACTURE	CAL DUE DATE
1	AC Power Supply	PCR2000M	R2000M PJ000583		2019-02-24
2	40dB Attenuator	66-40-33	CD4019	Aeroflex / Weinschel	-
3	40dB Attenuator	TSG150R-4-40N11	1511040001	Nanjing Jiexi Technologies	-
4	Spectrum Analyzer	N9030	MY53310464	Keysight	2020-01-21
5	Power Sensor	NRP-Z91	101500	Rohde & Schwarz	2019-11-25
6	Power Sensor	NRP-Z21	102432	Rohde & Schwarz	2019-07-31
7	Power Meter	NRVD	102040	Rohde & Schwarz	2019-05-03
8	EMI Antenna	3115	00167250	ETS-LINDGREN	2020-05-21
9	EMI Antenna	3116	2661	ETS-LINDGREN	2020-07-27
10	EMI Antenna	VULB 9163	9163-514	SCHWARZBECK	2021-01-03
11	Test Receiver	ESU26	100376 Rohde & Schwarz		2019-11-27
12	Climate Chamber	KTHG-415TBS	7353K	QINGSHENG	2020-01-14

# 9. MEASUREMENT UNCERTAINTY

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

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



# ANNEX A: MEASUREMENT 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 27, Clause 27.50(h)

### A.1.2 Method of Measurements

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

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

Two polarizations are generated for the beam, 32 ports are used to create each polarization. The antenna gain for each polarization is declared as 23 dBi, therefore the EIRP for each polarization is calculated as the sum of the power over 32 ports plus the antenna gain. This calculation is applied for each polarization and then each polarization EIRP is summed to calculate the overall EIRP.

## A.1.3 Limit

Output Power:

EIRP  $\leq$  33 dBW + 10log(X/Y) dBW + 10 log(360/Beamwidth) dBW = 86 dBm X = 40MHz channel bandwidth Y = 5.5 or 6 MHz Beamwidth = 12°

Peak to Average Ratio:  $\leq$ 13 dB



### A.1.4 Measurement result

Configuration NR-MIMO-1C-20

Maximum Output Power 30.97dBm per port

	Modulation/			Ou	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Cha	Innel position B		Ch	annel position I	N	Cha	annel position T	
	Bandwidth	POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)
1	QPSK/20.0	30.30	17.27	8.84	30.33	17.33	8.83	30.35	17.30	8.86
2	QPSK/20.0	30.06	17.05	8.95	30.24	17.24	8.96	30.26	17.25	8.90
3	QPSK/20.0	30.09	17.05	8.85	30.02	17.01	8.83	30.36	17.35	8.88
4	QPSK/20.0	30.21	17.20	8.90	30.44	17.44	8.81	30.55	17.50	8.85
5	QPSK/20.0	30.43	17.42	8.86	30.53	17.56	8.83	30.65	17.60	8.90
6	QPSK/20.0	30.34	17.31	8.83	30.59	17.59	8.83	30.54	17.53	8.88
7	QPSK/20.0	30.33	17.35	8.88	30.47	17.46	8.86	30.45	17.43	8.87
8	QPSK/20.0	30.36	17.35	8.86	30.53	17.51	8.84	30.54	17.52	8.90
9	QPSK/20.0	30.29	17.28	8.85	30.41	17.36	8.86	30.40	17.35	8.89
10	QPSK/20.0	30.19	17.18	8.85	30.27	17.26	8.85	30.42	17.38	8.88
11	QPSK/20.0	30.14	17.14	8.84	30.33	17.32	8.84	30.23	17.23	8.88
12	QPSK/20.0	30.17	17.16	8.84	30.31	17.30	8.86	30.25	17.19	8.89
13	QPSK/20.0	30.56	17.54	8.85	30.74	17.73	8.82	30.60	17.55	8.88
14	QPSK/20.0	30.65	17.66	8.84	30.76	17.74	8.84	30.75	17.71	8.86
15	QPSK/20.0	30.68	17.62	8.84	30.77	17.76	8.84	30.75	17.74	8.88
16	QPSK/20.0	30.45	17.45	8.84	30.67	17.67	8.83	30.80	17.77	8.86
17	QPSK/20.0	30.55	17.53	8.85	30.63	17.62	8.85	30.61	17.60	8.90
18	QPSK/20.0	30.45	17.41	8.86	30.60	17.59	8.84	30.54	17.53	8.89
19	QPSK/20.0	30.63	17.60	8.86	30.75	17.74	8.85	30.66	17.66	8.89
20	QPSK/20.0	30.62	17.63	8.45	30.76	17.75	8.82	30.74	17.70	8.88
21	QPSK/20.0	30.22	17.17	8.84	30.17	17.19	8.83	30.28	17.25	8.89
22	QPSK/20.0	30.83	17.81	8.85	30.86	17.78	8.83	30.98	17.90	8.88
23	QPSK/20.0	30.56	17.55	8.86	30.55	17.55	8.84	30.55	17.53	8.90
24	QPSK/20.0	30.55	17.56	8.87	30.57	17.52	8.84	30.63	17.57	8.89
25	QPSK/20.0	30.87	17.77	8.86	31.02	18.01	8.84	30.97	17.95	8.88
26	QPSK/20.0	30.39	17.36	8.93	30.53	17.53	8.84	30.40	17.45	8.86
27	QPSK/20.0	30.56	17.54	8.90	30.71	17.72	8.83	30.51	17.47	8.87
28	QPSK/20.0	30.55	17.56	8.86	30.69	17.68	8.84	30.47	17.46	8.88
29	QPSK/20.0	30.50	17.47	8.87	30.64	17.62	8.83	30.64	17.63	8.88
30	QPSK/20.0	30.68	17.67	8.84	30.75	17.71	8.84	30.74	17.74	8.86
31	QPSK/20.0	30.40	17.37	8.86	30.43	17.40	8.83	30.48	17.47	8.89
32	QPSK/20.0	30.24	17.27	8.88	30.48	17.45	8.83	30.39	17.39	8.89
Total F	ower 1-32	45.49	32.47	-	45.61	32.59	-	45.60	32.58	-
Total Powe	er 1-32 +23 dBi	68.49	55.47	-	68.61	55.59	-	68.60	55.58	-
33	QPSK/20.0	30.29	17.27	8.84	30.37	17.37	8.84	30.31	17.30	8.88
34	QPSK/20.0	30.25	17.24	8.83	30.36	17.35	8.82	30.28	17.28	8.87

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	Modulation/			Οι	utput Power /	tput Power / Peak to Average Ratio (PAR)						
	Carrier	Cha	nnel position B		Ch	annel position N	N	Cha	annel position T			
	Bandwidth	POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR		
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)		
35	QPSK/20.0	30.14	17.12	8.87	30.41	17.40	8.87	30.27	17.26	8.89		
36	QPSK/20.0	30.32	17.31	8.85	30.43	17.38	8.81	30.41	17.39	8.90		
37	QPSK/20.0	30.52	17.46	8.85	30.51	17.51	8.85	30.53	17.51	8.89		
38	QPSK/20.0	30.33	17.30	8.81	30.46	17.46	8.80	30.43	17.42	8.90		
39	QPSK/20.0	30.36	17.34	8.85	30.55	17.47	8.84	30.51	17.49	8.89		
40	QPSK/20.0	30.43	17.43	8.86	30.48	17.43	8.88	30.46	17.45	8.90		
41	QPSK/20.0	30.38	17.32	8.86	30.51	17.50	8.83	30.45	17.43	8.90		
42	QPSK/20.0	30.27	17.26	8.90	30.47	17.46	8.79	30.36	17.35	8.87		
43	QPSK/20.0	30.39	17.37	8.85	30.52	17.51	8.83	30.44	17.43	8.87		
44	QPSK/20.0	30.28	17.25	8.91	30.53	17.52	8.91	30.46	17.45	8.88		
45	QPSK/20.0	30.63	17.62	8.87	30.67	17.66	8.83	30.66	17.64	8.87		
46	QPSK/20.0	30.65	17.62	8.80	30.63	17.64	8.79	30.71	17.71	8.88		
47	QPSK/20.0	30.55	17.49	8.86	30.54	17.53	8.84	30.41	17.40	8.90		
48	QPSK/20.0	30.63	17.64	8.83	30.61	17.60	8.83	30.55	17.55	8.89		
49	QPSK/20.0	30.71	17.71	8.84	30.71	17.68	8.86	30.63	17.62	8.86		
50	QPSK/20.0	30.60	17.59	8.89	30.67	17.67	8.82	30.72	17.71	8.89		
51	QPSK/20.0	30.25	17.24	8.85	30.48	17.47	8.87	30.34	17.33	8.85		
52	QPSK/20.0	30.60	17.59	8.88	30.78	17.77	8.85	30.60	17.58	8.86		
53	QPSK/20.0	30.63	17.65	8.85	30.78	17.78	8.83	30.77	17.77	8.85		
54	QPSK/20.0	30.65	17.63	8.83	30.77	17.76	8.83	30.82	17.80	8.86		
55	QPSK/20.0	30.78	17.77	8.87	31.10	18.09	8.83	30.93	17.93	8.88		
56	QPSK/20.0	30.77	17.75	8.88	31.00	17.97	8.88	30.92	17.87	8.87		
57	QPSK/20.0	30.36	17.35	8.85	30.49	17.48	8.84	30.45	17.44	8.88		
58	QPSK/20.0	30.07	17.09	8.85	30.40	17.39	8.83	30.33	17.32	8.87		
59	QPSK/20.0	30.22	17.20	8.86	30.39	17.38	8.84	30.20	17.19	8.88		
60	QPSK/20.0	30.27	17.26	8.84	30.25	17.24	8.80	30.26	17.24	8.88		
61	QPSK/20.0	30.41	17.43	8.85	30.69	17.57	8.85	30.51	17.51	8.87		
62	QPSK/20.0	30.33	17.30	8.91	30.55	17.54	8.80	30.49	17.48	8.88		
63	QPSK/20.0	30.73	17.73	8.85	30.86	17.84	8.83	30.83	17.84	8.87		
64	QPSK/20.0	30.21	17.18	8.86	30.35	17.35	8.78	30.27	17.27	8.88		
Total P	ower 33-64	45.49	32.48	-	45.63	32.61	-	45.57	32.55	-		
Total Pow	ver 33-64 +23 dBi	68.49	55.48	-	68.63	55.61	-	68.57	55.55	-		
I	EIRP	71.50	58.49	-	71.63	58.61	-	71.60	58.58	-		



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### Configuration NR-MIMO-1C-40 Maximum Output Power 33.98dBm per port

	Modulation/				utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Channel position B Channel position M				Cha	annel position T			
	Bandwidth	POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)
1	QPSK/40.0	33.54	17.53	8.26	33.56	17.55	8.30	33.57	17.55	8.29
2	QPSK/40.0	33.52	17.50	8.27	33.52	17.53	8.31	33.56	17.55	8.30
3	QPSK/40.0	33.55	17.53	8.26	33.48	17.47	8.31	33.52	17.50	8.28
4	QPSK/40.0	33.42	17.4	8.28	33.48	17.45	8.32	33.52	17.51	8.29
5	QPSK/40.0	33.66	17.64	8.27	33.58	17.54	8.29	33.69	17.67	8.29
6	QPSK/40.0	33.67	17.66	8.29	33.65	17.61	8.30	33.73	17.71	8.30
7	QPSK/40.0	33.63	17.61	8.26	33.63	17.60	8.31	33.62	17.60	8.30
8	QPSK/40.0	33.64	17.63	8.28	33.59	17.56	8.30	33.71	17.69	8.29
9	QPSK/40.0	33.56	17.54	8.32	33.52	17.50	8.30	33.56	17.57	8.30
10	QPSK/40.0	33.59	17.57	8.31	33.57	17.54	8.31	33.68	17.66	8.29
11	QPSK/40.0	33.40	17.38	8.29	33.40	17.38	8.31	33.43	17.42	8.29
12	QPSK/40.0	33.51	17.50	8.29	33.46	17.45	8.31	33.52	17.50	8.29
13	QPSK/40.0	33.85	17.82	8.28	33.81	17.78	8.30	33.91	17.90	8.29
14	QPSK/40.0	33.86	17.85	8.26	33.90	17.88	8.30	34.01	18.01	8.29
15	QPSK/40.0	33.88	17.85	8.28	33.74	17.72	8.31	33.89	17.86	8.29
16	QPSK/40.0	33.75	17.73	8.28	33.76	17.75	8.31	33.90	17.87	8.30
17	QPSK/40.0	33.89	17.86	8.27	33.70	17.68	8.31	33.75	17.73	8.29
18	QPSK/40.0	33.62	17.60	8.27	33.63	17.57	8.31	33.70	17.69	8.29
19	QPSK/40.0	33.87	17.83	8.27	33.85	17.82	8.31	33.89	17.87	8.29
20	QPSK/40.0	33.90	17.89	8.27	33.75	17.73	8.31	33.90	17.88	8.30
21	QPSK/40.0	33.46	17.44	8.27	33.40	17.26	8.31	33.51	17.52	8.31
22	QPSK/40.0	34.12	18.10	8.28	34.02	18.00	8.31	34.16	18.13	8.31
23	QPSK/40.0	33.83	17.83	8.28	33.72	17.71	8.30	33.87	17.84	8.29
24	QPSK/40.0	33.82	17.79	8.27	33.74	17.73	8.31	33.90	17.88	8.28
25	QPSK/40.0	34.20	18.17	8.27	34.10	18.08	8.31	34.21	18.18	8.28
26	QPSK/40.0	33.67	17.65	8.27	33.66	17.64	8.30	33.75	17.73	8.29
27	QPSK/40.0	33.86	17.84	8.27	33.93	17.91	8.31	33.89	17.88	8.28
28	QPSK/40.0	33.77	17.75	8.27	33.76	17.75	8.31	33.90	17.88	8.28
29	QPSK/40.0	33.84	17.83	8.27	33.75	17.73	8.31	33.95	17.93	8.29
30	QPSK/40.0	33.97	17.95	8.27	33.91	17.88	8.31	34.03	18.01	8.29
31	QPSK/40.0	33.74	17.71	8.27	33.67	17.65	8.31	33.78	17.76	8.29
32	QPSK/40.0	33.67	17.67	8.27	33.77	17.71	8.31	33.81	17.79	8.29
Total Po	ower 1-32	48.78	32.76	-	48.74	32.72	-	48.83	32.81	-
Total Power	1-32 +23 dBi	71.78	55.76	-	71.74	55.72	-	- 71.83 55.81		-
33	QPSK/40.0	33.55	17.52	8.27	33.54	17.53	8.31	33.58	17.57	8.29
34	QPSK/40.0	33.58	17.56	8.27	33.51	17.49	8.31	33.68	17.66	8.30

# No.I18Z62307-WMD03 Page18of57



	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Cha	nnel position B		Ch	annel position I	N	Cha	annel position T	
	Bandwidth	POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)
35	QPSK/40.0	33.59	17.57	8.27	33.43	17.40	8.31	33.58	17.56	8.29
36	QPSK/40.0	33.65	17.64	8.27	33.62	17.60	8.32	33.66	17.64	8.29
37	QPSK/40.0	33.76	17.74	8.27	33.70	17.68	8.33	33.75	17.73	8.29
38	QPSK/40.0	33.72	17.70	8.27	33.67	17.65	8.32	33.69	17.67	8.30
39	QPSK/40.0	33.69	17.64	8.27	33.68	17.66	8.31	33.72	17.70	8.30
40	QPSK/40.0	33.66	17.67	8.27	33.68	17.63	8.31	33.75	17.73	8.30
41	QPSK/40.0	33.80	17.78	8.26	33.75	17.73	8.32	33.65	17.63	8.28
42	QPSK/40.0	33.68	17.65	8.28	33.64	17.62	8.31	33.70	17.68	8.30
43	QPSK/40.0	33.75	17.71	8.28	33.64	17.62	8.31	33.76	17.73	8.29
44	QPSK/40.0	33.55	17.53	8.28	33.59	17.57	8.31	33.73	17.71	8.30
45	QPSK/40.0	33.80	17.76	8.27	33.71	17.71	8.31	33.82	17.80	8.29
46	QPSK/40.0	33.79	17.78	8.27	33.70	17.67	8.31	33.91	17.88	8.29
47	QPSK/40.0	33.76	17.78	8.26	33.70	17.68	8.31	33.81	17.80	8.30
48	QPSK/40.0	33.79	17.77	8.27	33.71	17.69	8.31	33.88	17.88	8.30
49	QPSK/40.0	33.93	17.89	8.27	33.84	17.80	8.31	33.84	17.82	8.29
50	QPSK/40.0	33.78	17.75	8.27	33.60	17.58	8.31	33.75	17.73	8.29
51	QPSK/40.0	33.52	17.50	8.27	33.45	17.42	8.31	33.52	17.50	8.29
52	QPSK/40.0	33.86	17.84	8.27	33.83	17.81	8.31	33.77	17.75	8.29
53	QPSK/40.0	33.86	17.84	8.27	33.78	17.77	8.31	33.90	17.88	8.29
54	QPSK/40.0	33.85	17.82	8.27	33.95	17.93	8.33	34.01	17.99	8.29
55	QPSK/40.0	33.95	17.94	8.26	34.11	18.10	8.32	34.00	17.98	8.29
56	QPSK/40.0	33.89	17.87	8.27	33.96	17.93	8.31	33.89	17.87	8.29
57	QPSK/40.0	33.45	17.43	8.27	33.46	17.44	8.31	33.46	17.43	8.28
58	QPSK/40.0	33.44	17.42	8.26	33.39	17.37	8.31	33.47	17.44	8.29
59	QPSK/40.0	33.36	17.34	8.27	33.43	17.41	8.32	33.33	17.30	8.30
60	QPSK/40.0	33.52	17.49	8.27	33.34	17.32	8.32	33.43	17.41	8.30
61	QPSK/40.0	33.63	17.60	8.26	33.59	17.58	8.33	33.49	17.46	8.28
62	QPSK/40.0	33.50	17.48	8.27	33.49	17.47	8.30	33.50	17.48	8.30
63	QPSK/40.0	33.82	17.80	8.27	33.88	17.85	8.32	33.83	17.81	8.29
64	QPSK/40.0	33.29	17.25	8.27	33.38	17.37	8.31	33.41	17.39	8.31
Total P	ower 33-64	48.73	32.71	-	48.70	32.68	-	48.75	32.73	-
Total Pow	ver 33-64 +23 dBi	71.73	55.71	-	71.70	55.68	-	71.75	55.73	-
I	EIRP	74.77	58.75	-	74.73	58.71	-	74.80	58.78	-



#### Maximum Output Power 33.98dBm per port

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Carrier Channel position B			Channel position M			Channel position T		
Bandwidth		POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)
25	64QAM/40.0	33.98	17.95	8.34	33.88	17.86	8.41	34.00	17.98	8.42

#### Maximum Output Power 33.98dBm per port

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Channel position B			Channel position M			Channel position T		
	Bandwidth	POWER	POWER	PAR	POWER	POWER	PAR	POWER	POWER	PAR
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)
	256QAM/40.									
25	0	33.88	17.83	8.34	33.79	17.77	8.42	33.98	17.96	8.41



### A.2 Occupied Bandwidth

### A.2.1 Reference

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

### A.2.2 Method of Measurements

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

The measurement method is from KDB 971168 4.2:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

d) Set the detection mode to peak, and the trace mode to max hold.

e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.



### A.2.3 Measurement result

```
Configuration NR-MIMO-1C-20
```

-26dBc Occupied Bandwidth

	Modulation (	0	ccupied Bandwidth (MH	z)
Antenna	Modulation / Bandwidth	Channel Position B	Channel Position M	Channel Position T
55	QPSK/			
	20.0 MHz	18.67	18.67	18.67

### 99% Occupied Bandwidth

	Modulation (	0	ccupied Bandwidth (MH	z)
Antenna	Modulation / Bandwidth	Channel Position B	Channel Position M	Channel Position T
55	QPSK/ 20.0 MHz	17.976	18.050	18.059

### Port 55, QPSK 20.0M Channel position B





#### Port 55, QPSK 20.0M Channel position M

Spectrum Analy Occupied BW	zer 1	<b>' +</b>							
Keysight	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corrections: Off Freq Ref: External NFE: Adaptive	Atten: 10 dB Preamp: Off μW Path: Standard	Trig: External 1 Gate: Off #IF Gain: Low	Center Free Avg Hold:>2 Radio Std: I				
1 Graph			F	Ref Lvi Offset	42.42 dB				
Scale/Div 10.0	dB		F	Ref Value 40.00	) dBm				
Log 30.0									
20.0			n n n n	66Å6 0 0.		AA			
10.0		- AY	ՠֈՠ՟ՠՠՠՠՠՠՠՠ	ሳሞአለሳጥ	that have a second s	and parawater of	M		
0.00			· · ·	r	Y				
-10.0							10 00		
	www.anwanha	- W						Whavman	a de Are A
-40.0	end and and provide and the	- where where					t cher d	ቢሶ ካህ <i>የ</i> ግላሪት	tanya a talah si talah 12
-50.0									
Center 2.593 G #Res BW 200.0			#	Video BW 620	).00 kHz		s	weep Time 1.00	Span 40 MHz ) ms (1001 pts)
2 Metrics	•								
	Occupied Ba	nawiath 18.050 MHz				Total Power		32.3 dBm	
	Transmit		i8.453 kHz			% of OBW Power			
	Transmit Free x dB Bandwid		8.453 KHZ 18.67 MHz			% of OBW Power x dB		99.00 % -26.00 dB	
	K db Banama								
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#### Port 55, QPSK 20.0M Channel position T





#### Configuration NR-MIMO-1C-40 -26dBc Occupied Bandwidth

		0	ccupied Bandwidth (MH	z)			
Antenna	Modulation / Bandwidth	Channel Position B Channel Position M Channel Position					
25	QPSK/ 40.0 MHz	38.79	39.06	38.96			

### -26dBc Occupied Bandwidth

		Occupied Ba	ndwidth (MHz)
Antenna	Bandwidth	Modulation 64QAM/	Modulation 256QAM/
		Channel Position M	Channel Position M
25	40.0 MHz	38.80	39.03

### 99% Occupied Bandwidth

	Madulation (	0	Occupied Bandwidth (MHz)							
Antenna	Modulation / Bandwidth	Channel Position B	Channel Position M	Channel Position T						
25	QPSK/ 40.0 MHz	37.769	37.788	37.756						

### 99% Occupied Bandwidth

		Occupied Bandwidth (MHz)								
Antenna	Bandwidth	Modulation 64QAM/ Channel Position M	Modulation 256QAM/ Channel Position M							
25	40.0 MHz	37.447	37.681							



### Port 25, QPSK 40.0M Channel position B

Spectrum Analy Swept SA	zer 1	Spectrum Occupied	n Analyzer 2 I BW	• +						
	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Of Freq Ref: Ext ( NFE: Adaptive		Trig: External 1 Gate: Off rd #IF Gain: Low	Center Free Avg Hold:> Radio Std: I		Hz			
1 Graph				Ref LvI Offset 43	.35 dB					
Scale/Div 10.0	dB			Ref Value 43.35						
Log 33.4										
23.4						antina ht	0-4			
13.4			$d_{\mu}$		<sup>a</sup> ller and		natira			
3.35			* 1 - 1							
-16.7		_						<b>\</b>		
-26.7		. umbre V						Manar	ann	ห้อหาวัสสุโตเป็นเห
-36.7 -46.7	14-04-0749/2444444	NUM HAMANI								
				10.5 L . BIAL 4 000						
Center 2.516 G #Res BW 390.0				#Video BW 1.200	IU MHZ			S	weep Time 1.0	Span 80 MHz 0 ms (1001 pts)
2 Metrics										(111)
	Occupied Ba	ndwidth 37.769 MHz				Total Power			35.4 dBm	
	Transmit Fre x dB Bandwi		21.161 kHz 38.79 MHz			% of OBW Pow x dB	/er		99.00 % -26.00 dB	
	A db Duildin	aan	00.10 11112			A GD			20.00 00	
		_								
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Port 25, QPSK 40.0M Channel position M

Spectru Swept S	m Analyze SA	r 1		Spectru Occupie				• +								
KEYS		put: RF oupling: E ign: Auto	)C C Fi	put Z: 50 Ω orrections: ( req Ref: Ext FE: Adaptiv	off (S)	Atten: 6 dB Preamp: Off µW Path: St		Trig: External 1 Gate: Off J #IF Gain: Low		Center Freq Avg Hold:>1 Radio Std: N	0/10	0000 G	Hz			
	)iv 10.0 dE	v 3						Ref Lvi Offset Ref Value 43.3								
Log 33.4																
23.4 13.4							₩	aral and the structure of the structure	ĥri		W.WW	Y) YI	pi i pina	1		
3.38							-			· · ·		·				
-16.6														<b>\</b>		
-26.6	withhan	Contra la A	anten ale	a marte										An Mar	Jemann	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-36.6				all all a second												
-46.6																
	2.593 GHz W 390.00							#Video BW 1.2	000	MHZ				•	ween Time 1 0	Span 80 MHz 0 ms (1001 pts)
2 Metric		хп2 т													weep nine no	0 IIIS (1001 pts)
		Occupi	ed Bandw	idth												
		Occupi		37.788 MH	z						Total Po	wer			35.2 dBm	
		Transm	nit Freq Er	ror		396 Hz					% of OB	W Pov	ver		99.00 %	
		x dB Ba	andwidth		3	9.06 MHz					x dB				-26.00 dB	
	5			lan 24, 201 12:48:28 Pl												



### Port 25, QPSK 40.0M Channel position T

Spectrum Analy Swept SA	zer 1	Spectrum Ar Occupied B		+						
	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Ext (S) NFE: Adaptive	Atten: 6 dB Preamp: Off µW Path: Standard	Trig: External 1 Gate: Off #IF Gain: Low	Center Free Avg Hold:> Radio Std: I		łz			
1 Graph	•			Ref Lvi Offset 4						
Scale/Div 10.0	dB			Ref Value 45.00	dBm					
Log 35.0										
25.0 15.0			h we have the	ակ <sub>ուտո</sub> ւիցի <sub>երի</sub> ումի	เฟลเลอเ		咃			
5.00					i i i i i i i i	<u>, , , , , , , , , , , , , , , , , , , </u>				
-15.0										
-35.0	and a grand a spectra of the spectra	worknown						have been	Sector of the second second	-Product productions
-45.0 Center 2.67 GH	-			Video BW 1.20	00 MH <del>.</del>					Span 80 MHz
#Res BW 390.0				WILLEU BAY 1.20				Si	weep Time 1.0	0 ms (1001 pts)
2 Metrics	•									
	Occupied Ba	ndwidth 37.756 MHz				Total Power			35.5 dBm	
	Transmit Fre		18.374 kHz			% of OBW Pow	/er		99.00 %	
	x dB Bandwi		38.96 MHz			x dB			-26.00 dB	
<b>ま</b> り(		Jan 24, 2019 12:42:12 PM	ÐA							

Port 25, 64QAM 40.0M Channel Position M

Spectrur Swept S	m Analyzer A	1	Spectrum Occupied	n Analyzer 2 I BW	• +						
KEYSI		ipling: DC n: Auto	Input Z: 50 Ω Corrections: Of Freq Ref: Ext ( NFE: Adaptive		Trig: External 1 Gate: Off andard #IF Gain: Low	Center Free Avg Hold:> Radio Std:		z			
1 Graph Scale/D	iv 10.0 dB	Ţ			Ref LvI Offset Ref Value 43.3						
Log 33.4											
23.4 13.4				uun tu	<sup>p</sup> Yffa <sup>rsty</sup> n <sup>tw</sup> ydawyd	/ hhidrone	al to the state of		<b>h</b>		
3.38			Í								
-16.6									1		
26.6		m Marty Mary	A						a 1 a 24	planchent	ed-ate
-30.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and a low sector of the first	n an							C. 10 CALL & C. 10	a A lud and a state for
-46.6											
	2.593 GHz N 390.00 kl	-			#Video BW 1.2	000 MHz					Span 80 MHz
									5	weep Time 1.0	0 ms (1001 pts)
2 Metrics		v									
	(	Occupied Band	width								
			37.447 MHz				Total Power			35.4 dBm	
		Transmit Freq I	Error	-165.65 kHz			% of OBW Powe	er		99.00 %	
	)	k dB Bandwidth	1 I	38.80 MHz			x dB			-26.00 dB	
	5	2?	Jan 24, 2019 1:05:55 PM								



### Port 25, 256QAM 40.0M Channel Position M

Spectrum Swept SA		zer 1	Spectrum An Occupied BV		• +						
KEYSI		Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Ext (S) NFE: Adaptive	Atten: 6 dB Preamp: Off µW Path: Standard	Trig: External 1 Gate: Off #IF Gain: Low	Center Free Avg Hold:> Radio Std: I		łz			
1 Graph		•			Ref Lvi Offset 43						
Scale/Div	v 10.0	dB		i	Ref Value 43.38 o	lBm					
Log 33.4											
23.4											
13.4			(r	<sup>╋</sup> ╋╋┷╋╱╋┥ <u></u> ╋┍╗ <mark>╞</mark> ┍	Male When the house	inainealth a'	A drahan	ANÍ A			
3.38			(  r	ha - a bhi de	. 110 1	l all all	nd fam. de e	1	k		
-6.62			/								
-16.6											
-26.6	www	and and a second of the	Notice and the						hohand	homen	water la second
-30.0		of all the second s	Contraction of the contraction o							Lined deriv	200 (\$199 (\$10 (\$10 (\$10 (\$10 (\$10 (\$10 (\$10 (\$10
-46.6											
Center 2. #Res BW				#	Video BW 1.200	0 MHz			S	weep Time 1.0	Span 80 MHz 0 ms (1001 pts)
2 Metrics		۲									
		0									
		Occupied B	37.681 MHz				Total Power			35.0 dBm	
		T									
		Transmit Fr x dB Bandw		75.664 kHz 39.03 MHz			% of OBW Pow x dB	er		99.00 % -26.00 dB	
		A OD Dahuw	nuur	55.05 WIL12			X QD			-20.00 UD	
	<u>)</u>		<b>?</b> Jan 24, 2019 1:09:28 PM								



## A.3 Spurious Emissions at Band Edge

A.3.1 Reference FCC CFR 47 Part 2, Clause 2.1051 FCC CFR 47 Part 27, Clause 27.53(m)

#### A.3.2 Method of measurement

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

For MIMO mode configurations, the limit was adjusted with a correction of -18.06dB [10Log(1/64)] by using the Measure and Add 10Log(N) dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports . Then the limit was adjusted to -31.06dBm.

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges.

The limit was adjusted with -13.01dB [10Log(50/1000)] to compensate for the reduced measurement bandwidth 50KHz for emission more than 1MHz away from the band edges. For MIMO mode, the limit of -44.07dBm was used for emission more than 1MHz away from the band edges. 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 + 10log(P) dB.



### A.3.4 Measurement result

Configuration NR-MIMO-1C-BE-20, QPSK

0			
Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B		200	-31.06
2496.0MHz	20.0 MHz	50	-44.07
Channel Position T	20.0 MHz	200	-31.06
2690.0MHz		50	-44.07

#### Port 55, Channel Position B, 20.0MHz





Spectrum Analyzer 1 Swept SA	Spectrum Analyzer Occupied BW	<sup>•2</sup>							
	Input Z: 50 Ω Atten: Corrections: Off Prear			) 1	2	3	4	5	
Coupling: DC Align: Auto		np: Off Gate: Off ath: Standard IF Gain: Low	Avg Hold: 6/100 Trig: External 1	Α					
La l	NFE: Adaptive	Sig Track: Off		A	N	Ν	Ν	N	N
1 Spectrum v		Ref LvI Offset				Mkr		94 91	
Scale/Div 7 dB		Ref Level -9.4	8 dBm				_	47.002	. aBi
			Í I						
16.5									
23.5									
30.5									
30.3									
37.5									
44.5								DL1 -	44.07 c
				~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim\sim$			$\sim$
51.5									
65.5									
05.5									
							_		
Start 2.490000 GHz #Res BW 51 kHz		#Video BW 1	50 kHz*			#	Sto Sweep '	op 2.4950 10.0 s (1	000 GI 001 pt
<b>1</b> 501	P Dec 23, 2018								

Port 55, Channel Position T, 20.0MHz





Coupling: DC	Input Z: 50 Ω #Atter Corrections: Off Pream	n: 0 dB PNO: Best Wide no: Off Gate: Off	#Avg Type: Power (RMS Avg Hold: 5/100	1		3 ₩			
L Align: Auto		ath: Standard IF Gain: High Sig Track: Off	Trig: External 1						
Spectrum v cale/Div 7 dB		Ref LvI Offset 4 Ref Level -6.63				Mkr		91 085 13.494	
og									
0.6									
7.6									
1.6 1								DL1 -44	4.07 dE
8.6			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$	~~~~~		$\sim$		~~
5.6									
9.6									
art 2.691000 GHz Res BW 51 kHz		#Video BW 15	) kHz*			#5		p 2.6960 0.0 s (10	

The channel power of 1MHz for 2691.085MHz is -32.19dBm, which is within the limit of -31.06dBm.

	rum Analy nel Powei				• +										
KEY L	'Sight F	Input: F Couplin Align: A	ig: DC	Co Fre	out Z: 50 Ω prections: Off eq Ref: Int (S) E: Adaptive	Atten: 0 dB Preamp: Off µW Path: Standa #PNO: Fast	Trig: External <sup>.</sup> Gate: Off rd #IF Gain: Low		Center Fred Avg Hold:>1 Radio Std: I		Hz				
1 Gra			۲				Ref Lvl Offset								
Scale Log	/Div 10.0	dB				_	Ref Value 5.36	_	<u> </u>			_			
-4.64							-32.2	2 dBn	1						
-14.6															
-24.6															
-34.6															
-44.6															
-54.6	net shallh	และไปไ	LML III.	الما	Mr. while A	Northern Million	. Another little	Mu	Manak	Allow And Allow	A. In Just Willia	hala	JulWand	din d	hillin
-64.6	(Thull - A	11 · • •	ין איזי	144	φ <sup>η</sup> ι η φη	A fot a to the C.A.S. and P.M. in	al dat atter de	1   N	ի իսկսիս ։	ant de Adrian Ra	n n Affert w	A.N	alah sahita t	1 Aliant	l al situ dal
-74.6															
-84.6															
	er 2.691 C						#Video BW 3.0	0000	kHz*					Span	1.5 MHz
#Res	BW 1.00	00 kHz										Swe	ep Time 1.	85 s (1	001 pts)
2 Met	rics		v												
То	tal Chann	el Powe	ər	-32	.19 dBm / 1.00	MHz									
					-32.19 dBm										
10	tal Power	Spectra	ai Densit	y	-32.19 dBm	/MHZ									
	5	2		<b>?</b> .	ec 24, 2018 1:02:33 PM										X



#### Configuration NR-MIMO-1C-BE-40, QPSK

	,			
Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)	
Channel Position B		400	-31.06	
2496.0MHz	40.0 MHz	50	-44.07	
Channel Position T		400	-31.06	
2690.0MHz	40.0 MHz	50	-44.07	

#### Port 25, Channel Position B, 40.0MHz





The channel power of 400KHz for 2495.8MHz is -39.87dBm, which is within the limit of -31.06dBm.

Spectro Swept	um Analyz SA	zer 1			Spectrum An Channel Pow		+							
KEYS		Input: RF Coupling: Align: Au		Corr Freq		Atten: 6 dB Preamp: Off µW Path: Standar #PNO: Fast	Trig: External f Gate: Off rd #IF Gain: Low	Avg	nter Freq   Hold:>1 dio Std: N		Hz			
1 Grap		,					Ref Lvl Offset		3					
	Div 10.0 (	dB	-				Ref Value 0.00	dBm						
Log							-39.9	dBm						
-10.0														
-20.0														
-30.0														
-40.0														
-50.0 -														
-60.0	. 1.1%	aluhui	ر ان بر ال	h.s.	ML have a	hinter Athlete	ւ լին հմետե	s, ak b	n tak	ունուն, շիչան	Lilian hitter	λŅ	MAW	uuukahkk
-70.0	HAN AN	i kuin ha	1 N WALAN	1 LÎN X	1410-Part W	Aread had to bha an	ntaltati ol hokud	d Maxiel A	MAMA	lithiad bha i staa	MADA HANNEL .	ľ	elendik i	thu d. t
-80.0														
-90.0														
													ļ	
	2.496 G						#Video BW 3.0	)000 kHz	*					Span 600 kHz
#Res E	3W 1.000	0 kHz	_									wee	p Time 740	) ms (1001 pts)
2 Metri	cs	,												
Tel	al Channe	Douron		20	.87 dBm / 400									
TOLA	ar Grianne	Power		-39	.07 ubin / 400	NH2								
Tota	al Power S	Spectral	Density		-95.89 dBr	n/Hz								
	٢ (	2	]?	Jar 12:	n 24, 2019									

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+					
	Input Z: 50 Ω Atten: 6 dB Corrections: Off Preamp: Off	PNO: Best Wide Gate: Off	#Avg Type: Power (RMS Avg Hold: 8/100	1 2		4	
Align: Auto	Freq Ref: Ext (S) µW Path: Standar	d IF Gain: Low	Trig: External 1	A ₩			
Ļa	NFE: Adaptive	Sig Track: Off		A N	N	N	N N
1 Spectrum V		Ref Lvi Offset 43.	35 dB		Mki		94 500 GH
Scale/Div 10 dB		Ref Level 8.35 dE	lm			-4	49.394 dB
Log		Ĭ					
-11.7							
-21.7							
-31.7							
417							) <u>1-44.07 d</u>
51.7							
-61.7							
71.7							
-81.7							
Start 2.490000 GHz #Res BW 51 kHz		#Video BW 150	kHz*		#		op 2.495000 G 10.0 s (1001 p
4 7 C I	<b>?</b> Jan 24, 2019						



Port 25, Channel Position T, 40.0MHz

Spectrum Ar Swept SA	alyzer 1	Spectrum Ar Channel Po	nalyzer 2 wer	+							
KEYSIGI	Input RF	Input Z: 50 Ω Corrections: Off	Atten: 6 dB Preamp: Off	PNO: Best Wide Gate: Off	#Avg Type: Power (R Avg Hold: 9/100	MS 1	2	3	4	5	6
Ģ	Coupling: DC Align: Auto	Freq Ref: Ext (S)	W Path: Standard		Trig: External 1	Α					
NI.		NFE: Adaptive	<u> </u>	Sig Track: Off	Ĵ	A	Ν	Ν	Ν	Ν	Ν
Spectrum	T AB			Ref LvI Offset 43 Ref Level 28.49 (				Mki		90 20 37.549	
	JUB			Kei Level 20.49 (						01.040	
-											
3.49											
1.31											
21.5											
										DI12	31.06 di
31.5											51.00 0
41.5						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u> </u>				
Center 2.69 Res BW 39				#Video BW 1.2	MHz*			#	Sweep	Span 2.0 10.0 s (1	000 ÂN 001 pt
<b>ま</b> り	C [ ?	Jan 24, 2019 12:33:59 PM	ÐA						I R		

The channel power of 400KHz for 2690.2MHz is -40.25dBm, which is within the limit of -31.06dBm.

Spect Swep	trum Analy it SA	yzer 1			Spectrum Ar Channel Pov		· +							
KEY	EYSIGHT Input: RF Coupling: DC Align: Auto Freq Ref. Ext (S) NFE: Adaptive					Atten: 6 dB Preamp: Off µW Path: Standar #PNO: Fast	Trig: External 1 Gate: Off rd #IF Gain: Low		Center Freq: 2.690200000 GHz AvgHeid: >10/10 Radio Std: None					
1 Gra			v				Ref Lvl Offset		dB					
	e/Div 10.0	dB		-			Ref Value 0.14	4 dBm						
Log -9.86							-40.	3 dBm						
-19.9														
-19.9														
-29.9														
-39.9														
-49.9	և սև	la Lea	hine		11.									
-69.9	141111	1141h	N/M/W	W	nt/hwahata	Manharawalda	Ninvihani	hh	hillithe	chemilianeth	whenthe	Wγ	en han	al his and a second second
-79.9														
-89.9														
Cent	er 2.69 GI	Hz					#Video BW 3.0	0000 k	Hz*					Span 600 kHz
#Res	BW 1.00	00 kHz									\$	Swee	p Time 74(	) ms (1001 pts)
2 Met	trics		v											
То	tal Chann	el Powe	er	-4	0.25 dBm / 400	) kHz								
То	tal Power	Spectra	al Density	1	-96.27 dB	m/Hz								
		<u>a</u>		J	an 24, 2019 🗸								<b>H</b>	
					2:36:32 PM 🖇									



Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+						
	Input Z: 50 Ω Atten: 6 dB Corrections: Off Preamp: Off	PNO: Best Wide Gate: Off	#Avg Type: Power (RMS Avg Hold: 3/100	1	2		4	5 6
Align: Auto		ard IF Gain: Low Sig Track: Off	Trig: External 1	A	₩ N		₩ N	₩ ₩ N N
N I Spectrum v Scale/Div 10 dB		Ref LvI Offset 43 Ref Level 8,49 dl					2.69	1 235 GI 9.732 dB
_og								
1.51								
41.5								DL1-44.07 d
51.5								DET HILT
					*********			
Start 2.691000 GHz Res BW 51 kHz		#Video BW 150	kHz*			#Sw		2.696000 G .0 s (1001 p
4 7 C 1	<b>?</b> Jan 24, 2019							



## A.4 Conducted Spurious Emission

A.4.1 Reference

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

### A.4.2 Method of measurement

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

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 3KHz to 27GHz. The resolution bandwidth of 1MHz was employed for frequency band 3KHz to 27GHz. The spectrum analyzer detector was set to RMS.

For MIMO mode configurations, the limit was adjusted with a correction of -18.06dB [10Log(1/64)] by using the Measure and Add 10Log(N) dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports. Then the limit was adjust to -31.06dBm.

### A.4.3 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.4.4 Measurement results

Configuration NR-MIMO-1C-20 QPSK

Channel Bandwidth	RBW	Limit
	(MHz)	(dBm)
20.0 MHz	1.0	-31.06

### Port 55, Channel Position B 20.0 MHz

Swept SA	Input: RF Coupling: DC	Input Z: 50 Ω #Atten: 6 dB Corrections: Off Preamp: Off		PNO: Fast Gate: Off	#Avg Type: Powe Avg Hold: 16/100	#Avg Type: Power (RMS		2	3	4		
	Align: Auto	Freq Ref: Int (S) NFE: Adaptive	µW Path: Standard		Trig: External 1							
1 Spectrum Scale/Div 10 d	T			Ref LvI Offset 4 Ref Level 28.32							2.994 -40.742	
Log	<b></b>			Kei Level 20.32							-40.142	
18.3												
3.32												
1.68												
11.7												
21.7												-31.06 d
31.7											DET	-51.06 U
11.7												
51.7												
61.7												
Start 3 kHz Res BW 1.0 N	IHz			#Video BW 3.0	) MHz*					#Sweer	Stop 3. 0 10.0 s (1	
15		Dec 24, 2018 12:40:21 PM										





Spectrum Analy. Swept SA		<b>'</b> +									
KEYSIGHT	Input: RF Coupling: DC	Input Z: 50 Ω Corrections: Off	#Atten: 14 dB Preamp: 44.0 GHz	PNO: Fast Gate: Off	#Avg Type: Po Avg Hold: 6/10	1					
L L	Align: Auto	Freq Ref: Int (S) NFE: Adaptive	µW Path: Standard		Trig: External 1	A A	₩ N	₩ N	₩ N	₩ N	₩ N
M Spectrum Scale/Div 10 dl	T B	The readers		Ref Lvi Offset 5					Mkr1	26.620 -32.942	6 GI
Log				Ţ							
11.1											
1.06											
8.94											
28.9	~					 				DL1-:	31.06
38.9											
48.9											
Start 10.000 GH Res BW 1.0 M				#Video BW 3.	0 MHz*			:		Stop 27.0 10.0 s (10	
15		Dec 24, 2018 12:47:54 PM	$\Theta \wedge$						H R		

Port 55, Channel Position M 20.0 MHz





Spectrum Anal Swept SA	lyzer 1	• +									
KEYSIGHT	Input: RF Coupling: DC	Input Z: 50 Ω Corrections: Off	#Atten: 6 dB	PNO: Fast Gate: Off	#Avg Type: Power (RMS	1	2	3	4	5	6
L 🖵	Align: Auto	Freq Ref: Int (S)	Preamp: Off µW Path: Standard	d IF Gain: Low	Avg Hold: 4/100 Trig: External 1	A					
L)AI		NFE: Adaptive		Sig Track: Off		A	Ν	Ν	N	Ν	Ν
1 Spectrum	V			Ref LvI Offset	45.04 dB					4.057	
Scale/Div 10	dB			Ref Level 25.04	1 dBm				-	34.238	dBm
Log				ľ							
05.0											
-25.0										DL1-3	31.06 dBn
-35.0		~~~~	$\sim \sim \sim$	$\sim$		~			~~~		<u> </u>
-45.0											
-65.0											
Start 3.000 GH #Res BW 1.0				#Video BW 3.	0 MHz*			;	sweep 1	Stop 10.0 10.0 s (1	
<b>1</b> 5	C [ ] ?	Dec 24, 2018 10:36:03 AM									

1 Spectrum Y Ref Lvi Offset 52.06 dB Mkr1	5 6 ₩ ₩ N N	4 ₩ N	3 ⊮	2 ₩ N	1 A A	RMS	/100	#Avg Type Avg Hold: Trig: Exter	IF Gain: Low	#Atten: 14 dB Preamp: 44.0 GHz µW Path: Standard	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Input: RF Coupling: DC Align: Auto	Ysight F
9.06	26.592 GI 32.876 dB	Mkr1		IN	A						NFE: Adaptive		le/Div 10 (
.30 9    .40 9    .50 9    .60 9													
	DL1 -31.06												
Start 10.000 GHz #Video BW 3.0 MHz*	Stop 27.000 G		#					MHz*	≠Video BW 3.				t 10.000 G



## Port 55, Channel Position T 20.0 MHz

	put: RF pupling: DC ign: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 6 dB Preamp: Off uW Path: Standard	PNO: Fast Gate: Off IE Gain: Low	#Avg Type: F Avg Hold: 14 Trig: Externa	/100	1 A	2 ₩	3 ₩	4 ₩	5 ₩	6 ₩
	igit. Auto	NFE: Adaptive		Sig Track: Off	Thg. Exionic		А	Ν	Ν	Ν	Ν	N
Spectrum	•			Ref Lvi Offset 4							2.997	
cale/Div 10 dB				Ref Level 24.63	dBm						-41.914	ł dB
14.6												
4.63												
5.37												
15.4												
25.4												
											DL1	-31.06 d
35.4												
45.4												
55.4												
65.4												
tart 3 kHz Res BW 1.0 MH;				#Video BW 3.0	) MHz*					fSween	Stop 3. 10.0 s (1	

Spectru Swept	um Analy SA	zer 1	,	+											
KEYS	SIGHT	Input: RF		Z: 50 Ω ctions: Off	#Atten: 6 dB	PNO: Fast			Power (RMS	1	2	3	4	5	6
L	$\mathbf{r}$	Coupling: DC Align: Auto		Ref: Int (S)	Preamp: Off µW Path: Standar	Gate: Off d IF Gain: Low		Hold: 8 Extern		Α					
L)(I			NFE:	Adaptive		Sig Track: Off				A	Ν	Ν	Ν	Ν	N
1 Spect	trum	٧				Ref Lvl Offset	45.04 di	3						4.057	
	Div 10 d	В				Ref Level 27.9	9 dBm						-	34.640	dBm
Log							Ĭ								
18.0															
7.99															
-2.01															
-12.0															
-22.0															
-22.0 -			<u>۱</u>											DIA	31.06 dBm
-32.0			<b>∮</b> ¹=+											UL1 -	51.06 dBm
-42.0			$\sim$		$\sim\sim$	$\sim$	~	~	~~~	$\sim$			~~~	$\sim$	
-52.0															
-62.0															
	.000 GH 3W 1.0 N					#Video BW 3	.0 MHz*					;	s Sweep 1#	Stop 10.0	
	5		<b>?</b> Dec 10:0	24, 2018 6:50 AM	ÐA										X



Spectrum An Swept SA		<b>•</b> +									
KEYSIGH	Coupling: DC	Input Z: 50 Ω Corrections: Off	#Atten: 14 dB Preamp: 44.0 GHz	PNO: Fast Gate: Off	#Avg Type: F Avg Hold: 5/	1					
L 🗣	) Align: Auto	Freq Ref: Int (S)	µW Path: Standard	d IF Gain: Low	Trig: Externa	A					
L)(I		NFE: Adaptive		Sig Track: Off		A	N	Ν	N	N	N
1 Spectrum	۷			Ref Lvl Offset						26.609	
Scale/Div 10	) dB			Ref Level 17.0	6 dBm					33.120	dBr
-12.9											
-12.9											
-22.9											
-32.9										DL1-3	31.06
						~~~~~~					
-42.9											
-52.9											
-62.9											
Start 10.000				#Video BW 3	0.8411-*					Cton 07 (	000 01
start 10.000 #Res BW 1.(				#video Bvv 3				#		Stop 27.0 10.0 s (10	
<b>1</b> 5		Dec 24, 2018 10:16:06 AM	$\square$								X

## Configuration NR-MIMO-1C-40 QPSK

Channel Bandwidth	RBW	Limit
	(MHz)	(dBm)
40.0 MHz	1.0	-31.06

Port 25, Channel Position B 40.0 MHz

Spectrum Anal Swept SA	lyzer 1	Spectrum Ar Swept SA	nalyzer 2	Spectr Swept	rum Ana t SA	lyzer 3	•	+				
KEYSIGHT	Input RF	Input Z: 50 Ω	Atten: 6 dB	PNO: Fast Gate: Off		vg Type: Po	1	2	3	4		
$\Box$	Coupling: DC Align: Auto	Corrections: Off Freq Ref: Ext (S)	Preamp: Off µW Path: Standard			g Hold: 7/10 g: External *	A					
UNI .		NFE: Adaptive		Sig Track: Off			А	Ν	Ν	N	N	N
1 Spectrum	۲			Ref LvI Offset		IB					2.976	
Scale/Div 10	dB			Ref Level 26.8	37 dBm						-41.99	6 aBN
										Π		
										$\left\{ \right\}$		
3.13												
33.1											DL1	-31.06 dBm
											_	1
-43.1						-	 -			3		
-63 1												
Start 3 kHz #Res BW 1.0	MHz			#Video BW 3	.0 MHz	1				#Sweep	Stop 3 10.0 s (1	.000 GH: 1001 pts
<b>4</b>	6	Jan 24, 2019 1:34:10 PM	DA									X



Spectrum Analy Swept SA	yzer 1	Spectrum Ar Swept SA	nalyzer 2	Spectr Swept	um Analyzer 3 SA			+				
KEYSIGHT	Input: RF Coupling: DC	Input Z: 50 Ω Corrections: Off	#Atten: 0 dB Preamp: Off	PNO: Fast Gate: Off	#Avg Type:		1	2	3	4		
$\mathbf{r}$	Align: Auto	Freq Ref: Ext (S)	preamp. Oil µW Path: Standar	d IF Gain: High	Avg Hold: 2/ Trig: Externa		Α					
LXI		NFE: Adaptive		Sig Track: Off			A	N	N	N	N	N
1 Spectrum	•			Ref Lvl Offset							4.057	
Scale/Div 10 d	B			Ref Level 14.9	8 dBm					-	41.112	dB
											DL1-3	31 06 d
-45.0				$\sim$	~~~~	~~~~	$ \$		$ \rightarrow $	$\sim$		
-45.0												
-65.0												
Start 3.000 GH	7			#Video BW 3	0 MHz*						Stop 10.0	00 G
#Res BW 1.0 M				whiteo bir 5.						tSweep 1		
15		Jan 24, 2019 1:31:53 PM	$ \rightarrow $									D

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	• +	
	Input Z: 50 Ω #Atten: 0 dB Corrections: Off Preamp: Off	PNO: Fast #Avg Type: Power ( Gate: Off Avg Hold: 19/100		3 4 5 6
Align: Auto	Freq Ref: Ext (S) µW Path: Standard	IF Gain: High Trig: External 1		₩₩₩₩
LXI	NFE: Adaptive	Sig Track: Off	A N	N N N N
1 Spectrum v	;	Ref LvI Offset 48.82 dB		Mkr1 26.694 GHz
Scale/Div 10 dB		Ref Level 12.82 dBm		-33.568 dBn
Log				
2.82				
17.2				
27.2				DL1-31.06
37.2				m
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
47.2				
57.2				
67.2				
77.2				
Start 10.000 GHz		#Video BW 3.0 MHz*		Stop 27.000 GH
#Res BW 1.0 MHz				#Sweep 10.0 s (1001 pts
4 h c l	<b>?</b> Jan 24, 2019			



## Port 25, Channel Position M 40.0 MHz

Spectrum Analy Swept SA	zer 1	Spectrum Ar Occupied B	nalyzer 2 N	+							
KEYSIGHT	Input: RF Coupling: DC	Input Z: 50 Ω Corrections: Off	Atten: 6 dB Preamp: Off	PNO: Fast Gate: Off	#Avg Type: Pow Avg Hold: 4/100	1	2	3	4	5	6
$\mathbf{F}$	Align: Auto	Freq Ref: Ext (S)	preamp. On µW Path: Standard	IF Gain: Low	Trig: External 1	Α					
UNI		NFE: Adaptive		Sig Track: Off		A	Ν	Ν	Ν	N	N
1 Spectrum	•			Ref Lvi Offset 4						2.981	
Scale/Div 10 d	В			Ref Level 26.87	dBm					-41.93	3 dB
									Л		
3.13											
33.1										DL1	-31.06 d
									Д		
43.1						 					
63.1											
Start 3 kHz				#Video BW 3.	) MHz*					Stop 3.	000 G
Res BW 1.0 N	Hz								fSweep	o 10.0 s (1	001 p
15		Jan 24, 2019 1:15:46 PM									

Spectrum Anal Swept SA	yzer 1	Spectrum Ar Swept SA	nalyzer 2	· +								
KEYSIGHT	Input RF	Input Z: 50 Ω	#Atten: 0 dB	PNO: Fast		Power (RMS	1	2	3	4	5	6
$\Box$	Coupling: DC Align: Auto	Corrections: Off Freq Ref: Ext (S)	Preamp: Off µW Path: Standard	Gate: Off I IF Gain: High	Avg Hold: 5 Trig: Extern		Α					
LXI		NFE: Adaptive		Sig Track: Off			Α	Ν	Ν	Ν	Ν	Ν
1 Spectrum	v			Ref Lvi Offset							4.057	
Scale/Div 10 o	B			Ref Level 14.9	8 dBm					-	41.088	aBl
109					ĺ							
-5.02												
											DL1 -3	31.06 dB
	1											
-45.0		$\sim$	$\sim\sim\sim$	$\sim\sim$	~~~~	~~~	$\sim$			$\sim$	$\rightarrow$	~~~
75.0												
Start 3.000 GH	7			#Video BW 3	0 MHz*						Stop 10.0	100 GH
#Res BW 1.0 /				#Haco DH 5					#		10.0 s (1	
<b>1</b> 5	? 🗖	Jan 24, 2019 1:21:32 PM										X



Spectrum Analyzer 1 Swept SA	Spectrum Ana Swept SA	alyzer 2	Spectru Swept S	m Analyzer 3 SA	۰Ē					
KEYSIGHT Input RF		#Atten: 0 dB	PNO: Fast	#Avg Type: I	1	2	3	4		
Coupling: DC Align: Auto	Freq Ref: Ext (S)	Preamp: Off µW Path: Standard		Avg Hold: 5/ Trig: Externa	A					₩
	NFE: Adaptive		Sig Track: Off		A	Ν	Ν	Ν	Ν	N
1 Spectrum 🔹			Ref LvI Offset 4	8.82 dB					26.69	
Scale/Div 10 dB		I	Ref Level 12.82	dBm					-33.556	6 dE
_og			Ĭ							
7.18										
17.2										
27.2									DL1 -	24.00
							-			<u>31.06</u>
37.2	·····	·			 ~~~					
47.2										
57.2										
01.2										
67.2										
77.2										
tart 10.000 GHz			#Video BW 3.0	) MHz*					Stop 27.	000 (
Res BW 1.0 MHz									10.0 s (1	
	<b>?</b> Jan 24, 2019 1:28:03 PM							H R		



## Port 25, Channel Position T 40.0 MHz

Spectru Swept S	ım Anal <u>ı</u> SA	yzer 1	Spectrum A Swept SA	nalyzer 2	Spectri Swept	um Analyzer 3 SA			ŀ				
KEYS	GIGHT	Input RF	Input Z: 50 Ω	Atten: 6 dB	PNO: Fast	#Avg Type: Power	(RMS	1	2	3	4	5	6
	$\mathbf{r}$	Coupling: DC Align: Auto	Corrections: Off Freq Ref: Ext (S)	Preamp: Off µW Path: Standard	Gate: Off IF Gain: Low	Avg Hold: 3/100 Trig: External 1		Α					
Ņ			NFE: Adaptive	<u> </u>	Sig Track: Off			А	Ν	Ν	Ν	Ν	Ν
I Spect	rum	۳			Ref LvI Offset	41.87 dB					<b>/ikr1</b>	2.976	0 Gł
	Div 10 d	IB			Ref Level 26.8							-42.000	) dB
_og													
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13.1													
13.1													
23.1 -													
33 1 —												DL1 -	-31.06 c
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43.1 -													
53.1													
												· · · · ·	
itart 3 Res B	kHz W 1.0 M	/Hz			#Video BW 3.	0 MHz*					Sweer	Stop 3. 10.0 s (1	
	5		Jan 24, 2019 1:43:25 PM										

Spectrum Analy Swept SA	/zer 1	Spectrum An Swept SA	alyzer 2	Spectr Swept	um Analyzer 3 SA		ł	•				
KEYSIGHT	Input: RF Coupling: DC	Input Z: 50 Ω Corrections: Off	#Atten: 0 dB Preamp: Off	PNO: Fast Gate: Off	#Avg Type: Avg Hold: 3	Power (RMS	1	2	3	4	5	6
$\frown$	Align: Auto	Freq Ref: Ext (S)	µW Path: Standard	d IF Gain: High	Trig: Extern		A					₩
LXI		NFE: Adaptive		Sig Track: Off			A	Ν	N	N	N	N
1 Spectrum	۲			Ref Lvl Offset							4.057	
Scale/Div 10 d	B			Ref Level 14.9	8 dBm					-4	1.186	aBm
4.98												
-5.02												
-15.0												
-25.0											DL1-31	1.06 dBm
-35.0	1											
-45.0		$\sim$	$\sim\sim$	$\sim$	~~~~	~~~~	$\sim$	<u> </u>		~~	~	~
-55.0												
-65.0												
-75.0												
Start 3.000 GH #Res BW 1.0 M				#Video BW 3	.0 MHz*	<b>_</b>			#\$		top 10.00 ).0 s (10	
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Spectrum Analyzer 1 Swept SA	Spectrum An Swept SA	alyzer 2	Spectru Swept S	m Analyzer 3 A		•					
KEYSIGHT Input RF	Input Z: 50 Ω	#Atten: 0 dB	PNO: Fast	#Avg Type: I		1	2	3	4		
Coupling: DC Align: Auto	Corrections: Off Freq Ref: Ext (S)	Preamp: Off µW Path: Standard		Avg Hold: 1/ Trig: Externa		A					
	NFE: Adaptive		Sig Track: Off			A	Ν	Ν	N	N	N
Spectrum v			Ref LvI Offset 4							26.67	
scale/Div 10 dB ₋og			Ref Level 12.82	dBm						-33.722	2 dBr
.09			Ĭ								
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17.2											
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tart 10.000 GHz Res BW 1.0 MHz			#Video BW 3.0	MHz*	^				#Sweep	Stop 27.0 10.0 s (1	
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## A.5 Radiated Spurious Emission

## A.5.1 Reference

FCC CFR 47 Part 2, Clause 2.1053 FCC CFR 47 Part 27, Clause 27.53 (m)

## A.5.2 Method of measurement

The measurements procedures in TIA-603-E: 2016 are used. 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 polarisations.

Emissions identified within the range 30MHz to 27GHz were then formally measured using a peak detector as the worst case.

The limits for outside a licensee's frequency band(s) of operation the power of the spurious emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - (43 + 10Log (P)) dB

Where:

Field Strength is measured in  $dB\mu V\!/m$ 

P is measured Transmitter Power in Watts

The EUT was measured with the antenna height varied between 1 and 4 m with the turntable rotated between 0 and 360 degrees. The emission of any outside a licensee's frequencies within 20dB of the limit were measured with the substitution method used according to the standard. The measurements were performed at a 3m distance unless otherwise stated.

## A.5.3 Measurement 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<sub>(v/m)</sub>=(30 x G<sub>i</sub> x P<sub>o</sub>)<sup>0.5</sup> / d

Where

G<sub>i</sub> is the antenna gain of ideal half-wave dipoles,

 $\mathsf{P}_{o}$  is the power out of the transceiver in W,

d is the measurement distance in meter.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

E<sub>(v/m)</sub>=(30 x 1.64 x 16.56)<sup>0.5</sup> / 3 = 9.51V/m = 139.57 dBµV/m

As per 24.238 (a) the spurious emission must be attenuated by 43 + 10log (Po) dB this gives:

43 + 10log(16.56) = 55.19 dB

Therefore the limit at 3m measurement distance is:

139.57 – 55.19 = 84.4 dBµV/m

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following results.



### A.5.4 Measurement results

Configuration NR-MIMO-1C-20

Maximum Output Power 49.0 dBm

Channel Position	Channel Frequencies
Channel Position B	2506.02MHz

**Channel Position B** 

No emissions were detected within 20dB of the limit.

#### Configuration NR-MIMO-1C-20

Maximum Output Power 49.0 dBm

Channel Position	Channel Frequencies
Channel Position M	2593.02MHz

**Channel Position M** 

No emissions were detected within 20dB of the limit.

Configuration NR-MIMO-1C-20

Maximum Output Power 49.0 dBm

Channel Position	Channel Frequencies
Channel Position T	2680.02MHz

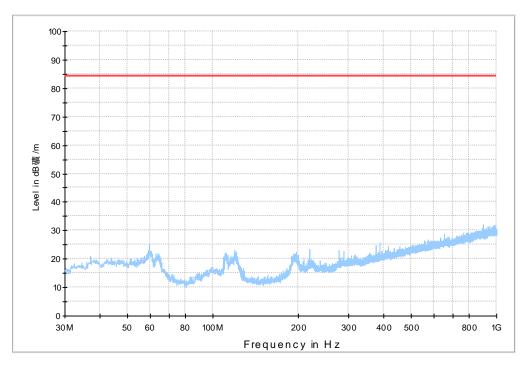
Channel Position T

No emissions were detected within 20dB of the limit.



## **Final Results**

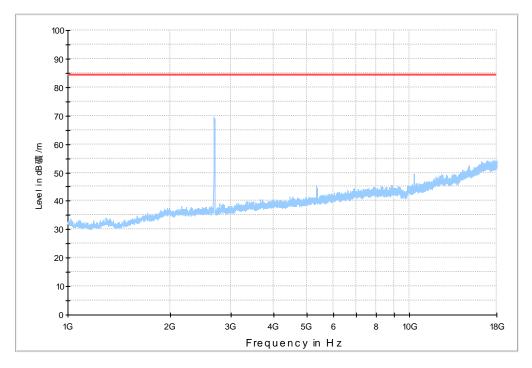
## 1、Channel Position T –30MHz-1GHz



RSE\_Erisson\_30M-1G\_FCC

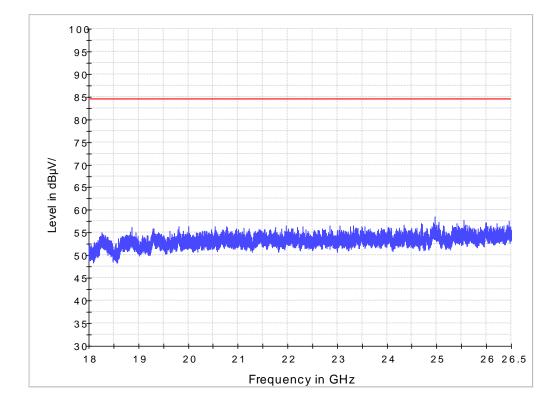
2、Channel Position T -1GHz-18GHz

RSE\_Erisson\_1-18G\_FCC

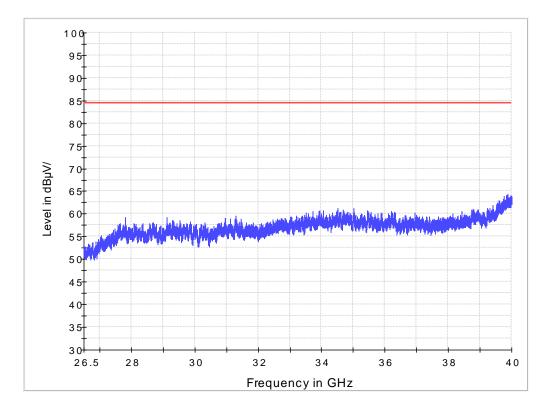




## 3、Channel Position T -18GHz-26.5GHz



4、Channel Position T -26.5GHz-40GHz



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## Configuration NR-MIMO-1C-40, QPSK:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

Channel	Channel Frequencies
Position	
Channel	2516.01MHz
Position B	

Channel Position B

No emissions were detected within 20dB of the limit.

#### Configuration NR-MIMO-1C-40, QPSK:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

Channel	Channel Frequencies
Position	
Channel	2593.02MHz
Position M	

Channel Position M

No emissions were detected within 20dB of the limit.

#### Configuration NR-MIMO-1C-40, QPSK:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

Channel	Channel Frequencies
Position	
Channel	2670.00MHz
Position T	

**Channel Position T** 

No emissions were detected within 20dB of the limit.

#### Configuration NR-MIMO-1C-40, 64QAM:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

Channel	Channel Frequencies
Position	
Channel	2516.01MHz
Position B	

**Channel Position B** 

No emissions were detected within 20dB of the limit.

#### Configuration NR-MIMO-1C-40, 64QAM:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

Channel	Channel Frequencies
Position	
Channel	2593.02MHz
Position M	

**Channel Position M** 



No emissions were detected within 20dB of the limit.

## Configuration NR-MIMO-1C-40, 64QAM:

Maximum Output Power 52dBm, LTE Bandwidth 40MHz;

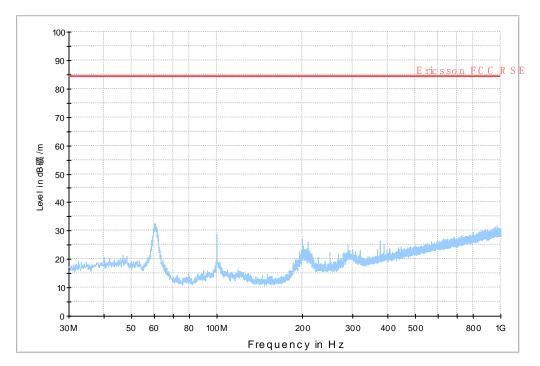
Channel	Channel Frequencies	
Position		
Channel	2670.00MHz	
Position T		

Channel Position T

No emissions were detected within 20dB of the limit.

## Final Results Configuration NR-MIMO-1C-40, QPSK

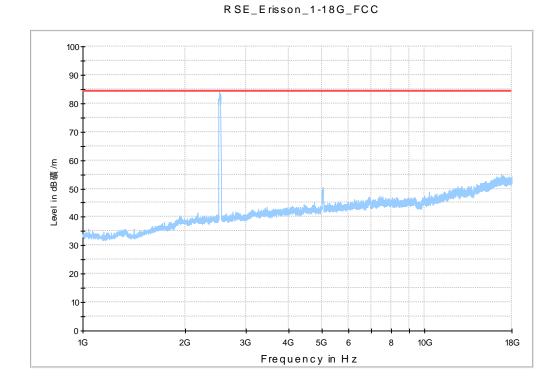
1、Channel Position B –30MHz-1GHz



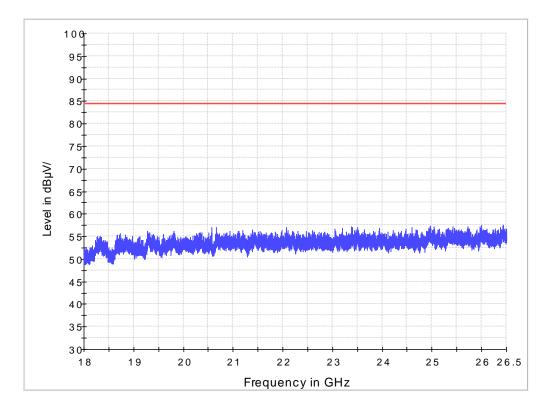
RSE\_Erisson\_30M-1G\_FCC



## 2、Channel Position B -1-18GHz



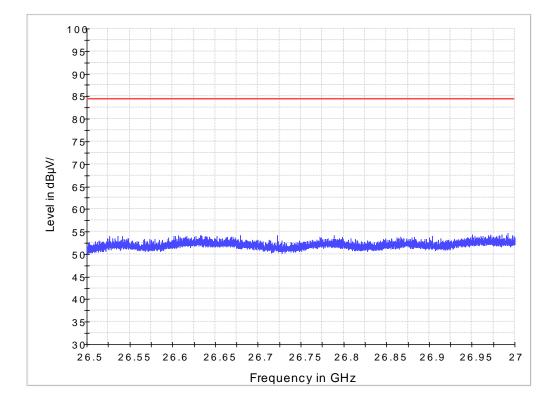
3、Channel Position B -18-26.5GHz



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## 4、Channel Position B -26.5-27GHz





## A.6 Frequency Stability

A.6.1 Reference FCC CFR 47 Part 2, Clause 2.1055 FCC CFR 47 Part 27, Clause 27.54

## A.6.2 Method of measurement

#### **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 a [RAT]\* at maximum power on the bottom, middle and top channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

#### Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal value of -48 VDC. At +20°C, the Base Station was configured to transmit a [RAT]\* at maximum power on the bottom, middle and top channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]\*: NR - QPSK modulation

#### A.6.3 Measurement limit

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



## A.6.4 Measurement results

Frequency Error – Temperature Variation

Configuration NR-MIMO-1C-20

Maximum Output Power 30.97dBm per port, Channel Bandwidth 20MHz

		Frequency Stability (Hz)		
Supply Voltage	Temperature	Channel	Channel	Channel
DC(V)		position B	position M	position T
	-30	-6.32	-5.73	7.67
	-20	-6.93	6.57	7.21
	-10	5.76	-8.23	-7.34
	0	4.36	-7.31	6.54
-48	10	7.89	8.72	7.92
	20	6.72	7.36	8.47
	30	9.06	8.34	-5.32
	40	4.74	-5.82	8.74
	50	-5.31	-7.21	7.46

## Configuration NR-MIMO-1C-40

Maximum Output Power 33.98dBm per port, Channel Bandwidth 40MHz

		Freq	uency Stability (F	łz)
Supply Voltage	Temperature	Channel	Channel	Channel
DC(V)		position B	position M	position T
	-30	-5.83	-5.53	6.17
	-20	4.52	6.72	6.24
	-10	-4.56	-5.76	-6.52
	0	-5.18	-4.76	5.63
-48	10	4.45	-7.21	6.21
	20	-4.79	-6.57	5.92
	30	-5.27	-6.83	6.49
	40	-7.76	-6.58	5.76
	50	6.83	-5.45	6.06

## Frequency Error – Voltage Variation Configuration NR-MIMO-1C-20 Maximum Output Power 30.97dBm per port, Channel Bandwidth 20MHz

	Frequency Stability (Hz)			(Hz)
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
DC(V)		position B	position M	position T
-40.8	20	6.84	-6.71	7.72
-48	20	-4.07	9.23	8.61
-55.2	20	-8.34	7.46	-8.5

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## Configuration NR-MIMO-1C-40 Maximum Output Power 33.98dBm per port, Channel Bandwidth 40MHz

		Frequency Stability (Hz)		(Hz)
Supply Voltage	Temperature(°C)	Channel	Channel	Channel
DC(V)		position B	position M	position T
-40.8	20	5.96	-4.79	4.91
-48	20	6.21	-6.44	6.96
-55.2	20	-5.21	4.87	5.72



# **ANNEX B: Accreditation Certificate**



\*\*\*END OF REPORT\*\*\*