



TEST REPORT

No. I21Z61172-WMD01

for

Ericsson AB Radio Remote Radio Unit Radio 4418 B41 KRC 161 789/5 FCC ID: TA8AKRC161789-5 In accordance with FCC CFR 47 Part 27 Issued Date: 2021-07-07

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z61172-WMD01	Rev.0	1 st edition	2021-07-07

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





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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

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

1.3. Project date

Testing Start Date:	2021-06-21
Testing End Date:	2021-06-29

1.4. Signature

Dong Yuan (Prepared this test report)



Zhou Yu (Reviewed this test report)

以茶 能+

Zhao Hui Lin (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	
Audiess /1 03i.	100102, P.R.China	
Contact:	Shuang Qi	
Email:	Shuang.qi@ericsson.com	
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2.2. Manufacturer Information

Company Name:	Ericsson AB
Address /Post:	Torshamnsgatan 23 Stockholm, 164 80
Address / F USI.	Sweden
Contact:	/
Email:	/
Telephone:	/





3. Equipment Under Test (EUT)

3.1. About EUT

Description	Remote Radio Unit
Product Name	Radio 4418 B41
Product Number	KRC 161 789/5
FCC ID	TA8AKRC161789-5
Maximum Output Power	Maximum 43.0 dBm(20W) per port
per Port	
Power source	-48V DC
Serial Number	E559307140
Hardware Version	R1A
Software Version	UP: CXP9024418/15_R32A121, PIS: CXP9013268%15_R87BF
Frequency range	TX/RX: 2496MHz-2690MHz
TX/RX configuration	4 TX / RX
Maximum RF bandwidth	100 MHz
(IBW)	
Total number of	SR NR: up to 3 carriers
supported carriers per	SR LTE: up to 6 carriers
port	Mixed mode: up to 6 carriers
Supported modulations	QPSK, 16QAM, 64QAM, 256QAM
Date of receipt	2021-06-21





3.2. <u>General Description</u>

The Equipment Under Test (EUT) is an Ericsson Remote Radio Unit working in the wireless communications services 2496-2690MHz band which provides communication connections to network in LTE, 5G NR and mix mode. The Radio 4418 B41 KRC 161 789/5 operates from a -48V DC power supply.

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

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



Equipment Under Test





3.3. Configuration Description

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

NR

Configuration	Configuration Carrier Bandwidth		Carrier Frequency Configuration (MHz)		
Conliguration			Bottom	Middle	Тор
NR-MIMO-1C 1NR		70MHz	2531.01	2593.02	2655.00
NR-WINO-TC	INK	90MHz	2541.00	2593.02	2645.01

LTE+NR

Configuration	Corrier	Carrier	Carrier Frequency Configuration (MHz)		
Configuration	Carrier	Bandwidth	Bottom	Middle	Тор
LTE+NR-MIMO- MC-1	1L+1NR	10MHz+90MHz	(NR)2541+(L)2591	(NR)2588.01+(L)2638	(NR)2635.02+(L)2685
LTE+NR-MIMO-	3L+1NR	10MHz+70MHz	(NR)2531.01+(L)2571+	(NR)2578.02+(L)2618+	(NR)2625+(L)2665+2675
MC-2	3LT INIX		2581+2591	2628+2638	+2685
LTE+NR-MIMO- MC-1-BE	1L+1NR	10MHz+90MHz	(L)2501+(NR)2551.02	N/A	(NR)2635.02+(L)2685
LTE+NR-MIMO-			(L)2501+2511+2521+		(NR)2625+
MC-2-BE	3L+1NR	10MHz+70MHz	(NR)2561.01	N/A	(L)2665+2675+2685

N/A – Not Applicable





4. <u>Reference Documents</u>

4.1. <u>Reference Documents for testing</u>

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

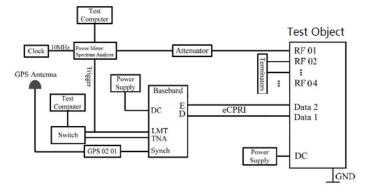
Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS	10-1-20
	SERVICES	Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY	10-1-20
	MATTERS; GENERAL RULES AND REGULATIONS	Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment	2016
	Measurement and Performance Standards	
ANSI 63.26	IEEE/ANSI Standard for Compliance Testing of 2015	
	Transmitters Used in Licensed Radio Services	
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION	v03r01
	OF LICENSED DIGITAL TRANSMITTERS	
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs	v02r01
	in the Same Band	





5. TEST SETUP

Test Setup, Conducted Measurement:



No.	Auxilliary Equipment	Model Type	Version
1	Computer	Dell Optiplex 3050	-
2	Baseband 6630	KDU 137 848/1	R2H
3	Power supply unit	-	-
4	Terminator	SHX 6G	-
5	40dB Attenuator	Aeroflex / Weinschel	-



6. LABORATORY ENVIRONMENT

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

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

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	<±3.5 dB, 3 m distance
Site voltage standing-wave ratio (Svswr)	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	NT
6	Frequency Stability	27.54, 2.1055	Pass

NT - Not tested in this configuration. Passed in an equivalently tested configuration shown in Document: 201101130SHA-001.



	<u>CAICT</u>
No. I21Z61 ²	172-WMD01

8. Test Equipments Utilized

NO.	Description	ТҮРЕ	series number	MANUFACTURE	CAL DUE DATE
1	Power Supply	PCR2000M	PJ000583	Kikusui	2022-05-12
2	40dB Attenuator	66-40-33	CD4019	Aeroflex / Weinschel	-
3	40dB Attenuator	TSG150R-4-40N11	1511040001	Nanjing Jiexi Technologies	-
4	Spectrum Analyzer	N9030	MY54490239	Keysight	2021-08-04
5	Spectrum Analyzer	FSW	104038-dC	Rohde-schwarz	2022-06-24
6	Climate Chamber	GPS-4	0010-003512	Espec	2021-08-02

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
Frequency Stability	$<\pm 1 \times 10^{-7}$





ANNEX A: MEASUREMENT RESULS

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

A.1.1 Reference

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

A.1.2 Method of Measurements

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

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

A.1.3 Limit

Output Power:

$$\label{eq:error} \begin{split} \text{EIRP} &\leqslant 33 \text{ dBW} + 10 \text{log}(\text{X/Y}) \text{ dBW} \\ \text{X is the actual channel width} \\ \text{Y is 5.5 or 6 MHz} \end{split}$$

Peak to Average Ratio: ≤13 dB





A.1.4 Measurement result

Configuration NR-MIMO-1C 70M

Maximum Output Power 43.0dBm per port

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	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)
A		42.41	25.02	7.67	42.77	25.31	6.48	42.61	25.34	7.71
В	QPSK/70	42.43	25.01	7.68	42.66	25.27	6.47	42.53	25.22	7.73
С	QPSN/U	42.56	25.06	7.75	42.74	25.38	6.48	42.66	25.38	7.67
D		42.59	25.46	7.75	42.61	25.27	6.47	42.52	25.42	7.77
Т	otal	48.52	31.16	-	48.72	31.33	-	48.60	31.36	-

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Channel position B			Ch	annel position I	N	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)
А		42.54	26.96	7.79	42.75	27.17	7.03	42.68	27.06	7.75
В	16QAM/70	42.48	27.08	7.78	42.68	27.12	7.04	42.55	27.13	7.78
С	TOQAIM/70	42.63	26.99	7.82	42.68	27.08	7.03	42.74	27.35	7.75
D		42.66	26.99	7.81	42.68	27.03	7.04	42.59	27.11	7.76
Т	otal	48.60	33.03	-	48.72	33.12	-	48.66	33.18	-

	Modulation/			Οι	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)
А		42.63	25.65	7.68	42.73	26.76	6.62	42.61	25.59	7.59
В	040 AN/70	42.47	25.51	7.67	42.56	25.55	6.63	42.55	25.52	7.60
С	64QAM/70	42.57	25.26	7.75	42.64	25.64	6.53	42.64	25.65	7.55
D		42.61	25.55	7.71	42.63	25.44	6.64	42.57	25.82	7.62
Т	otal	48.59	31.52	-	48.66	31.90	-	48.61	31.67	-

	Modulation/		Output Power / Peak to Average Ratio (PAR)								
	Carrier	Channel 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)	
А		42.62	25.59	7.67	42.68	25.82	6.79	42.69	25.54	7.75	
В	2500 AM/70	42.46	25.35	7.76	42.59	25.42	6.78	42.48	25.39	7.63	
С	256QAM/70	42.58	25.58	7.78	42.65	25.39	6.64	42.62	25.56	7.62	
D		42.51	25.35	7.71	42.67	25.49	6.71	42.56	25.52	7.69	
Т	otal	48.56	31.49	-	48.67	31.55	-	48.61	31.52	-	





Configuration NR-MIMO-1C 90M Maximum Output Power 43.0dBm per port

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Cha	innel position B		Ch	annel position I	N	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)
A		42.57	25.59	7.69	42.55	24.38	6.58	42.57	24.83	7.87
В	QPSK/90	42.39	24.31	7.87	42.52	24.58	6.59	42.46	24.48	7.89
С	QP5N90	42.47	25.39	7.79	42.51	24.42	6.57	42.53	25.69	7.79
D		42.49	24.36	7.82	42.42	24.51	6.59	42.51	24.49	7.85
Т	otal	48.50	30.97	-	48.52	30.49	-	48.54	30.92	-

	Modulation/		Output Power / Peak to Average Ratio (PAR)								
	Carrier	Channel position B			Ch	annel position I	N	Cha	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)	
А		42.57	25.59	7.83	42.58	26.77	7.05	42.67	26.62	7.81	
В	400 000/00	42.35	25.65	7.81	42.41	26.73	7.01	42.42	26.73	7.74	
С	16QAM/90	42.65	25.39	7.83	42.52	26.78	7.02	42.61	26.68	7.82	
D		42.59	25.52	7.78	42.49	26.67	7.05	42.52	26.79	7.76	
Total 48.56		31.56	-	48.52	32.76	-	48.58	32.73	-		

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Channel 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)
А		42.48	24.82	7.87	42.57	24.99	6.84	42.63	24.96	7.74
В	C4O AN/00	42.27	24.96	7.86	42.45	24.94	6.81	42.42	24.56	7.77
С	64QAM/90	42.44	24.83	7.87	42.58	24.91	6.78	42.59	24.86	7.71
D		42.57	24.75	7.82	42.51	24.89	6.82	42.47	24.66	7.69
Т	otal	48.46	30.86	-	48.55	30.95	-	48.55	30.78	-

	Modulation/			Οι	utput Power /	Peak to Averag	e Ratio (PA	R)		
	Carrier	Channel 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)
А		42.47	24.72	7.92	42.65	24.63	6.75	42.52	24.87	7.74
В	256QAM/90	42.28	24.46	7.82	42.56	24.69	6.76	42.42	24.62	7.68
С	230QAW/90	42.39	24.71	7.91	42.63	24.73	6.75	42.48	24.77	7.64
D		42.45	24.52	7.89	42.64	24.65	6.77	42.51	24.92	7.78
Т	otal	48.42	30.62	-	48.64	30.70	-	48.50	30.82	-





Configuration LTE+NR-MIMO-MC-1 (1LTE 10M+1NR 90M) Maximum Output Power 43.0dBm per port

	Modulation/		Output Power / Peak to Average Ratio (PAR)								
	Carrier	Cha	Channel position B		Ch	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)	
А	LTE QPSK/	41.96	27.12	-	42.06	27.10	-	42.04	26.90	-	
В	10	41.92	26.91	-	42.00	27.00	-	41.97	26.63	-	
С	NR QPSK/	41.92	26.78	-	41.97	26.64	-	42.05	26.49	-	
D	90	41.86	26.86	-	42.05	27.19	-	42.10	26.63	-	
Т	otal	47.94 32.94 -		-	48.04	33.01	-	48.06	32.69	-	

Configuration LTE+NR-MIMO-MC-2 (3LTE 10M+1NR 70M)

Maximum Output Power 43.0dBm per port

	Modulation/		Output Power / Peak to Average Ratio (PAR)								
	Carrier	Channel position B			Ch	Channel position M			Channel position T		
	Bandwidth	POWER	ER POWER PAR		POWER	POWER	PAR	POWER	POWER	PAR	
Antenna	(MHz)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	(dBm)	(dBm/MHz)	(db)	
A	LTE QPSK/	42.11	27.51	-	42.08	27.36	-	41.97	27.31	-	
В	10	41.99	27.48	-	42.02	27.50	-	41.97	27.38	-	
С	NR QPSK/	41.87	27.31	-	41.88	27.20	-	41.78	27.14	-	
D	70	41.83	27.20	-	41.84	27.17	-	41.81	27.18	-	
Total 47.97 33.40 -		47.98	33.33	-	47.90	33.27	-				





A.2 Occupied Bandwidth

A.2.1 Reference FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 27, Clause 27.53 (m)

A.2.2 Method of Measurements

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

The measurement method is from KDB 971168 4.2:

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

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

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





A.2.3 Measurement result

Configuration NR-MIMO-1C

-26dBc Occupied Bandwidth

Modulation/	Occupied Bandwidth (MHz)							
Bandwidth	Channel position B	Channel position M	Channel position T					
QPSK/								
70MHz	69.67	69.70	69.67					
QPSK/								
90MHz	90.32	90.33	90.33					

-26dBc Occupied Bandwidth

		Occupied Bandwidth (MHz)						
Modulation 16QAM / Modulation 64QAM/ Modulation								
Bandwidth	Channel position M	Channel position M	Channel position M					
70MHz	69.65	69.67	69.65					
90MHz	90.29	90.33	90.33					

99% Occupied Bandwidth

Modulation/	Occupied Bandwidth (MHz)							
Bandwidth	Channel position B	Channel position M	Channel position T					
QPSK/								
70MHz	67.389	67.410	67.400					
QPSK/								
90MHz	87.342	87.485	87.348					

99% Occupied Bandwidth

		Occupied Bandwidth (MHz)							
	Modulation 16QAM / Modulation 64QAM/ Modulation 256Q								
Bandwidth	Channel position M	Channel position M	Channel position M						
70MHz	67.563	67.403	67.395						
90MHz	87.583	87.359	87.365						





Port A, QPSK/70MHz, Channel Position B

Keysight Spectrum Analyzer - Occup		SENSE:INT	ALIGN AUTO 02:29:00 PM	Jun 25, 2021	
Center Freq 2.531010	000 GHz C	enter Freq: 2.531010000 GHz rig: External1 Avg Ho	Radio Std:		Frequency
Gate: LO		Atten: 14 dB	Radio Devi	ce: BTS	
Ref Offset 40 10 dB/div Ref 40.00					
30.0					Center Fred
20.0					2.531010000 GHz
10.0					
-10.0					
-20.0					
-40.0			human	monorpan	
-50.0					
Center 2.531 GHz #Res BW 680 kHz		#VBW 220 kHz		140 MHz 200 ms	CF Step
	.1 -141-	Total Power	42.6 dBm		14.000000 MHz <u>Auto</u> Man
Occupied Bandw	67.389 MHz		42.0 UBIII		
					Freq Offset 0 Hz
Transmit Freq Erro			99.00 %		
x dB Bandwidth	69.67 MHz	x dB	-26.00 dB		
MSG			I STATUS		

Port A, QPSK/70MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied	BW					
Center Freq 2.59302000	0 GHz Cente	sense:INT r Freq: 2.593020000 GHz	ALIGN AUTO 02:21:40 PM Ju Radio Std: No			
Gate: LO	() Irig:	External1 Avg Hol n: 14 dB	d: 8/10 Radio Device	BTS		
Ref Offset 40.1 10 dB/dly Ref 40.00 dE						
_og						
30.0				Center Fr		
20.0				2.593020000 G		
10.0						
10.0						
20.0						
			land on			
10.0				and the second		
50.0						
Center 2.593 GHz #Res BW 680 kHz		VBW 220 kHz	Span 14 #Sweep 1			
Res DW 080 KHZ	, , , , , , , , , , , , , , , , , , , ,		#Sweep	200 ms 14.000000 M Auto N		
Occupied Bandwid	ith	Total Power	42.7 dBm	<u>- 1410</u>		
6	7.410 MHz			Freq Offs		
Transmit Freq Error	-11.083 kHz	OBW Power	99.00 %	0		
x dB Bandwidth	69.70 MHz	x dB	-26.00 dB			
SG			- example			
30	Los STATUS					

Port A, QPSK/70MHz, Channel Position T

Keysight Spectrum Analyzer - Occupied B	w	SENSE:INT	ALIGN AUTO 02:32:501	PM Jun 25, 2021	
Center Freq 2.65500000		r Freq: 2.655000000 GHz External Avg Hold	Radio Sto		Frequency
Gate: LO	#IFGain:Low #Atter	n: 14 dB	Radio De	vice: BTS	
Ref Offset 40.15 10 dB/div Ref 40.00 dB					
Log					
30.0					Center Fre
20.0					2.655000000 GI
0.00					
-10.0					
-20.0					
30.0 anonone anonone from			h h		
-40.0					
60.0					
Center 2.655 GHz #Res BW 680 kHz	· · · · · ·	VBW 220 kHz	Spar "S	140 MHz ס 200 ms	CF Ste
Res BW 080 KHZ	#		#Swee	p 200 ms	14.000000 MI Auto M
Occupied Bandwid	th	Total Power	42.6 dBm		
6	7.400 MHz				Freq Offs
Transmit Freq Error	-45.213 kHz	OBW Power	99.00 %		0
x dB Bandwidth	69.67 MHz	x dB	-26.00 dB		
			_		
15G			STATUS		





Port A, 16QAM/70MHz, Channel Position M

📕 Keysight Spectrum Analyzer - Occupied B						
Center Freq 2.59302000		SENSE:INT r Freq: 2.593020000 GHz	ALIGN AUTO	02:22:40 PM Radio Std:	1Jun 25, 2021	Frequency
Gate: L0	Trig: E	External1 Avg Hol	d: 1/10			
	#IFGain:Low #Atten	n: 14 dB		Radio Devi	ce: BTS	
Ref Offset 40.15						
10 dB/div Ref 40.00 dB	m					
30.0						Center Freq
20.0	$\neg \neg \neg$					2.593020000 GHz
10.0						
0.00						
-10.0						
-20.0						
-30.0			100			
40.0						
-50.0						
-30.0						
Center 2.593 GHz					140 MHz	CF Step
#Res BW 680 kHz	#	VBW 220 kHz		#Sweep	200 ms	14.000000 MHz
Occupied Bandwid	th	Total Power	42	7 dBm		<u>Auto</u> Man
6	7.563 MHz					Freq Offset
Transmit Freq Error	63.899 kHz	OBW Power	99	9.00 %		0 Hz
x dB Bandwidth	69.65 MHz	x dB	-26	.00 dB		
MSG			I statu	s		

Port A, 64QAM/70MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied I	3W			
RF 50 Ω AC Center Freg 2.59302000	0 GHz Cente	SENSE:INT Freq: 2.593020000 GHz	ALIGN AUTO 02:23:37 PM Jun 25, 26 Radio Std: None	Frequency
Gate: LO	Trig:	External1 Avg Hold	d: 1/10 Radio Device: BTS	
	#IFGain:Low #Atte	n: 14 dB	Radio Device: BTS	-
Ref Offset 40.15 10 dB/div Ref 40.00 dB				
Log 30.0				
20.0				Center Fre
				2.593020000 GH
10.0				
0.00				
-10.0				
-30.0			and the second ways	~
-50.0				
Center 2.593 GHz			Span 140 M	
#Res BW 680 kHz	#	¢VBW 220 kHz	#Sweep 200 r	14.000000 MH
Occupied Bandwid	th	Total Power	42.6 dBm	Auto Mar
6	7.403 MHz			Freq Offse
Transmit Freq Error	-14.376 kHz	OBW Power	99.00 %	0 H
x dB Bandwidth	69.67 MHz	x dB	-26.00 dB	
ISG			E STATUS	
			<u> </u>	

Port A, 256QAM/70MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied BW	1	SENSE:INT	ALIGN AUTO 02:	6:20 PM Jun 25, 2021	
Center Freq 2.593020000	GHz Cente	r Freq: 2.593020000 GHz External1 Avg Hole	Radi	o Std: None	Frequency
Gate: LO		n: 14 dB		o Device: BTS	
Ref Offset 40.15 offset 40.00 dBn					
- 0 g 30.0					Center Fre
20.0	~				2.593020000 G
10.0					
0.00					
20.0					
30.0			have		
40.0					
50.0					
Center 2.593 GHz Res BW 680 kHz	#	VBW 220 kHz		an 140 MHz weep 200 ms	CF Sto 14.000000 M
Occupied Bandwidt	h	Total Power	42.7 dB	n	<u>Auto</u> M
67	.395 MHz				Freq Offs
Transmit Freq Error	-33.788 kHz	OBW Power	99.00	%	0
x dB Bandwidth	69.65 MHz	x dB	-26.00 d	в	
5G			STATUS		





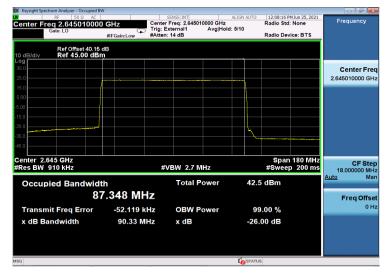
Port A, QPSK/90MHz, Channel Position B

Ref 45.00 dBm Nor 0.6E/div Ref 45.00 dBm 250		- 6									BW		m Analyzer - O	ight Spectru	🎵 Key
Gete: LO IFGeincLow Trig: External1 Avg Hold>10/10 Radio Device: BTS Radio Device: BTS Ref Offset 40.16 dB Ref 45.00 dBm Ref 45.		Detector				Hz		eq: 2.54	Center F	z	0 GH			er Fred	x Cení
Ref 45.00 dBm Nor 0.6E/div Ref 45.00 dBm 250	luto		ce: BTS	Radio Dev	10	Hold:>10	Av			-			ite: LO	G	
350	uto													/div	10 dE
250															
6.00	mal	No					_								25.0
6.0 Aver 15.0 Aver 25.0 Aver 36.0 Aver															15.0
160 150 250 360	age	Ave													
250	RMS)	(l,										
	eak				~~~										-35.0
															-45.0
Center 2.541 GHz Span 180 MHz													1 GHz	er 2.54	Cen
#Res BW 910 kHz #VBW 2.7 MHz #Sweep 200 ms Sam	nple	Sa	200 ms	#Sweep			MHz	W 2.7	#VI				I0 kHz	BW 91	#Res
Occupied Bandwidth Total Power 42.6 dBm				dBm	42.6		Powe	Tota			th	dwid	d Ban	ccupie	0
87.342 MHz	look	Negotivo							Z	42 MI	7.3	8			
Transmit Freq Error 19.821 kHz OBW Power 99.00 %	eak	Negauve		.00 %	99		Powe	OBW	Hz	19.821 k		rror	Freq E	ansmit	Т
x dB Bandwidth 90.32 MHz x dB -26.00 dB				00 dB	-26.			x dB	Hz	90.32 M			dwidth	iB Ban	x
	-				STATUS	Ĺ									MSG

Port A, QPSK/90MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied B	V					- 0 💌
Center Freq 2.593020000	CHIZ	SENSE:INT Freq: 2.593020000 GHz	ALIGN AUTO	02:05:25 P Radio Std	M Jun 25, 2021	Frequency
Gate: LO	Trig:	External1 Avg Ho				
	#IFGain:Low #Atte	n: 14 dB		Radio Dev	rice: BTS	
Ref Offset 40.15	dB					
10 dB/div Ref 45.00 dBr	ņ					
Log 35.0						Center Fre
25.0						2.593020000 GH
15.0						2.595020000 GH
5.00						
-5.00						
-15.0						
-25.0			- h~	- market market	man	
-35.0						
-45.0						
Center 2.593 GHz				Span	180 MHz	
#Res BW 910 kHz	1	VBW 2.7 MHz		#Swee	p 200 ms	CF Stej 18.000000 MH
						Auto Mar
Occupied Bandwidt	h	Total Power	42.	/ dBm		
8	7.385 MHz					Freq Offse
						0 H
Transmit Freq Error	-13.052 kHz	OBW Power	99	0.00 %		UH
x dB Bandwidth	90.33 MHz	x dB	-26	00 dB		
MSG			STATU	p.		

Port A, QPSK/90MHz, Channel Position T







Port A, 16QAM/90MHz, Channel Position M

📕 Keysight Spectrum Analyzer - Occup				_ • • ×
Center Freq 2.593020		SENSE:INT ter Freq: 2.593020000 GHz	ALIGN AUTO 02:11:41 PM Jun 25, 2 Radio Std: None	Frequency
Gate: LO	Trig:	: External1 Avg Hold	1: 2/10	
	#IFGain:Low #Att	en: 14 dB	Radio Device: BTS	_
Ref Offset 40				
10 dB/div Ref 45.00 C	dBm			
35.0				Center Freq
25.0				2.593020000 GHz
15.0				
5.00				
5.00				
-15.0				
-25.0				
-35.0			hunner	••••
-45.0				
-45.0				
Center 2.593 GHz			Span 180 M	
#Res BW 910 kHz		#VBW 2.7 MHz	#Sweep 200	ns 18.000000 MHz
Occupied Bandw	i déla	Total Power	42.7 dBm	<u>Auto</u> Man
		Total Tower	42.7 UDIII	
	87.583 MHz			Freq Offset
Transmit Freq Erro	r 90.059 kHz	OBW Power	99.00 %	0 Hz
x dB Bandwidth	90.29 MHz	x dB	-26.00 dB	
MSG			STATUS	
			~	

Port A, 64QAM/90MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied B	v				
Center Freg 2.59302000	CH7 Cente	SENSE:INT r Freq: 2.593020000 GHz	ALIGN AUTO	02:12:47 PM Jun 25,: Radio Std: None	Frequency
Gate: LO	Trig:	External1 Avg Hol n: 14 dB	ld: 1/10	Radio Device: BT	
	#IFGain:Low #Atter	1: 14 db		Radio Device: B1:	
Ref Offset 40.15					
10 dB/div Ref 45.00 dBr	<u>ņ</u>				
35.0					Center Fre
25.0					2.593020000 GH
15.0					
5.00					
-5.00					_
15.0					_
25.0			- hu		
-35.0					
-45.0					
Center 2.593 GHz				Onen 490 B	a11-
#Res BW 910 kHz	#	VBW 2.7 MHz		Span 180 N #Sweep 200	UF SIE
					18.000000 MH Auto Ma
Occupied Bandwidt	h	Total Power	42.6	dBm	
87	7.359 MHz				Freq Offs
Transmit Freq Error	-20.369 kHz	OBW Power	00	00 %	0+
x dB Bandwidth	90.33 MHz	x dB	-26.0	0 dB	
sg			I STATUS		

Port A, 256QAM/90MHz, Channel Position M

Keysight Spectrum Analyzer - Occupied BV		SENSE:INT	ALIGN AUTO 02:13:28 P	M Jun 25, 2021	
Center Freq 2.593020000	GHz Center	r Freq: 2.593020000 GHz	Radio Std		Frequency
Gate: LO	#IFGain:Low #Atter	External1 Avg Hole h: 14 dB	a: 1/10 Radio Dev	rice: BTS	
Ref Offset 40.15 10 dB/div Ref 45.00 dBn					
35.0					Center Fr
25.0					2.593020000 G
15.0					
5.00					
5.00					
25.0					
5.0			hanne	monor	
45.0					
Center 2.593 GHz Res BW 910 kHz	#	VBW 2.7 MHz		180 MHz 200 ms	CF St 18.000000 M
Occupied Bandwidt	h	Total Power	Auto		
87	7.365 MHz				Freq Offs
Transmit Freq Error	-22.145 kHz	OBW Power	99.00 %		0
x dB Bandwidth	90.33 MHz	x dB	-26.00 dB		
30			STATUS		
			10 annus		





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

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

According to FCC rules, in the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges. The limit was adjusted with -13.01dB [10Log(50/1000)] to compensate for the reduce measurement bandwidth 50KHz for emission more than 1MHz away from the band edges. For MIMO mode, the limit of -32.03dBm was used for emission more than 1MHz away from the band edges. Spectrum analyser detector was set as RMS.

A.3.3 Measurement limit

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





A.3.4 Measurement result

Configuration NR-MIMO-1C, QPSK

Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B 2496MHz	70 MHz	50/50	-30.48/-32.03
	90 MHz	50/50	-31.57/-32.03
Channel Position T	70 MHz	50/50	-30.48/-32.03
2690MHz	90 MHz	50/50	-31.57/-32.03

Port A, Channel Position B, 70MHz



🎉 Keysight Sp	ectrum Analyzer - Swept SA RF 50 Ω AC		05	ISE:INT		ALIGN AUTO	02:00:15 0	M Jun 25, 2021	
Marker 1	2.49417000000 Gate: LO	PNO: Wide G		ernal1	Avg Type Avg Hold	RMS	TRAC	E 1 2 3 4 5 6 E A WWWWWWW T A N N N N N	Peak Search
10 dB/div	Ref Offset 40.15 dB Ref 26.00 dBm					Mkr1	2.494 1 -48.0	70 GHz 69 dBm	NextPeal
16.0									Next Pk Righ
6.00									Next Pk Le
14.0									Marker Delt
-24.0								-32.03 dBm	Mkr→C
-44.0					مر و مدینه مر	man	1	and and a second second	Miki ->C
64.0									Mkr→RefLv
	00000 GHz						Stop 2.49	5000 GHz	Mor 1 of
#Res BW		#VBV	/ 150 kHz	t		#Sweep	3.000 s (1001 pts)	
SG						STATUS	;		





Port A, Channel Position T, 70MHz



						rum Analyzer - Swept SA	📕 Keysight Sp
Peak Search	03:01:10 PM Jun 25, 2021 TRACE 1 2 3 4 5 6 TYPE A	ALIGN AUTO Avg Type: RMS Avg Hold: 2/100	SENSE:INT		GHz	RF 50 Ω AC	<mark>x</mark> Marker 1
NextPea	2.691 105 GHz -40.179 dBm			#Atten: 1	PNO: Wide G	Gate: LO Ref Offset 40.15 dB Ref 26.00 dBm	10 dB/div
Next Pk Righ							16.0
Next Pk Le							-4.00
Marker Del							-14.0
Mkr→C	-32.03 dBm				n		-34.0
Mkr→RefL							-54.0
Mor 1 of	Stop 2.696000 GHz					000 GHz	-64.0
	3.000 s (1001 pts)	#Sweep	Hz*	V 150 kHz	#VBW		#Res BW









	Analyzer - Swept SA					
Marker 1 2.4	F 50 Ω AC 94170000000		SENSE:INT	ALIGN AUTO Avg Type: RMS	03:15:53 PM Jun 25, 2021 TRACE 1 2 3 4 5 6 TYPE A	Peak Search
Re 10 dB/div Re	e: L0 f Offset 40.15 dB ef 26.00 dBm	PNO: Wide IFGain:Low	Trig: External1 #Atten: 14 dB	Avg Hold: 1/100	1 2.494 170 GHz -40.105 dBm	NextPeak
16.0						Next Pk Righ
-4.00						Next Pk Lei
-14.0						Marker Delt
-34.0					-32.03 dBm	Mkr→C
-44.0	and the second	and				Mkr→RefL
54.0 Start 2.49000 #Res BW 51 I	0 ĜHz	#3/15114	450 (4)=1		Stop 2.495000 GHz p 3.000 s (1001 pts)	Mor 1 of
#Res BW 51 I	AHZ	#VBW	150 kHz*	#Swee		

Port A, Channel Position T, 90MHz

(XI)	ectrum Analyzer - Swept SA RF 50 Ω AC		SENSE:IN		ALIGN AUTO	03:20:30 PM	Jun 25, 2021	- 🔊 💌 Marker
Marker 1	2.6900000000 Gate: LO	PNO: Wide IFGain:Low	Trig: External1 #Atten: 14 dB		ld: 1/100	TYPE	A NNNNN A NNNNN	Select Marker
10 dB/div	Ref Offset 40.15 dE Ref 26.00 dBm	3			Mkr1	2.690 00 -40.48	00 GHz 7 dBm	1
16.0								Norma
6.00								
-4.00								Delf
-14.0	how we wanted							
-24.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						Fixed
-34.0							-31.57 dBm	_
-44.0				ana	****	warmer and some and		0
-54.0								Properties
-64.0								·
								Mor 1 of
Center 2. #Res BW	690000 GHz 51 kHz	#VBW	150 kHz*		#Sweep	Span 2.0 3.000 s (1	000 MHz 001 pts)	101
SG					I STATU	s		







0	,		· /	
Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)	
Channel Position B	(L) 10MHz, (NR) 90MHz	100/51	-19.02/-19.02	
2496MHz		100/51	-19.02/-19.02	
Channel Position T	(L) 10MHz, (NR) 90MHz	100/51	-19.02/-19.02	
2690MHz		100/51	-19.02/-19.02	

Configuration LTE+NR-MIMO-MC-1-BE (1LTE 10M QPSK +1NR 90M QPSK)

Port A, Channel Position B,

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum A Swept SA		Spectrum Analyzer 4 Swept SA	+	Frequenc	sy •
EYSIGHT Input RF Coupling DC Align: Off		#Alten: 18 dB Preamp: Off	PNO: Best Wide Gate: LO IF Gain: Low Sig Track: Off	Avg Type: Power (Rf Avg Hold: 1/100 Trig: External 1	4S) 1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 2.496000000 GHz	Setting
Spectrum v	Re	ef Lvi Offset 40.1	5 dB		96 000 GHz	Span 2.00000000 MHz	
cale/Div 10 dB	Re	ef Level 40.15 dB	m	4	33.336 dBm	Swept Span Zero Span	
						Full Span	1
						Start Freq 2.495000000 GHz	1
						Stop Freq 2.497000000 GHz	1
						AUTO TUNE	
		1			DL1 -19.02 dBm	CF Step 200.000 kHz	
39.9						Auto Man	
						Freq Offset 0 Hz	
enter 2.496000 GHz Res BW 100 kHz	*	Video BW 300 k	Hz*		Span 2.000 MHz 5.00 s (1001 pts)	X Axis Scale Log Lin	ſ
1 50	? Jun 29, 2021 9:04:28 AM				H H X	Signal Track (Span Zoom)	

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Sp Swept SA Sw	ectrum Analyzer 3 ept SA	Spectrum Analyzer 4 Swept SA	+ 🕨 🎝 Frequency 🔹
KEYSIGHT Input: RF Coupling: DC Align: Off	Input Z: 50 Ω #Atten: 18 Corrections: Off Preamp: 0 Freq Ref: Internal NFE: Off		Avg Hold: 1/100 Trig: External 1	3 4 5 6 WWWW 2.492500000 GHz Setting
Spectrum v		set 40.15 dB	Mkr1 2.494 36	5 GHz 5.0000000 MHz
icale/Div 10 dB	Ref Level 4	0.15 dBm	-37.828	Swept Span Zero Span
				Full Span
				Start Freq 2.49000000 GHz
				Stop Freq 2.495000000 GHz
				AUTO TUNE
				CF Step 500.000 kHz
			1 1	Auto
-49.9	****			Freq Offset 0 Hz
start 2.490000 GHz Res BW 51 kHz	#Video B\	V 150 kHz*	Stop 2.495 #Sweep ~3.01 s (1	





Port A, Channel Position T,



Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Swept SA	Spectrum Analyze Swept SA	Swept SA	+ >	Frequency	- • 景
KEYSIGHT Input Ri Coupling Align: O	DC Corrections: Off F	Atten: 18 dB PNO: E Preamp. Off Gate: L IF Gair Sig Tra	1: Low Trig: External 1	(S) 1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 2.693500000 GHz Span	Settings
1 Spectrum	• Ref	LvI Offset 40.15 dB		91 045 GHz	5.0000000 MHz	
Scale/Div 10 dB	Ref	Level 40.15 dBm	-3	9.255 dBm	Swept Span Zero Span	
30.2					Full Span	
20.2					Start Freq 2.691000000 GHz	
0.150					Stop Freq 2.696000000 GHz	
-9.85				DL1 -19.02 dBm	AUTO TUNE	
-19.9				DET 113 GE GENT	CF Step 500.000 kHz	
-39.9					Auto Man	
-49.9					Freq Offset 0 Hz	
Start 2.691000 GHz #Res BW 51 kHz	#1	/ideo BW 150 kHz*		p 2.696000 GHz .01 s (1001 pts)	X Axis Scale Log Lin	
まっつ	Jun 29, 2021 9:14:25 AM				Signal Track (Span Zoom)	

Configuration LTE+NR-MIMO-MC-2-BE (3LTE 10M QPSK+1NR 70M QPSK)

Band Edge Frequency	Channel Bandwidth	RBW(KHz)	Limit(dBm)
Channel Position B 2496MHz	(L) 10MHz, (NR) 70MHz	100/51	-19.02/-19.02
Channel Position T 2690MHz	(L) 10MHz, (NR) 70MHz	100/51	-19.02/-19.02





Port A, Channel Position B,

鱦 Keysight Sp	ectrum Analyzer - Swept SA					
Center F	RF 50 Ω AC req 2.496000000	GHz	SENSE:INT	ALIGN AU Avg Type: RMS Avg Hold: 1/100	05:22:50 PM Jun 28, 2021 TRACE 1 2 3 4 5 6 TYPE A	Frequency
10 dB/div	Gate: LO Ref Offset 40.15 dB Ref 40.15 dBm		Atten: 18 dB	-	r1 2.496 000 GHz -33.165 dBm	Auto Tune
30.2						Center Freq 2.496000000 GHz
10.2						Start Fred 2.495000000 GHz
0.150 -9.85						Stop Fred 2.497000000 GHz
-19.9			1		-19.02 dBm	CF Step 200.000 kHz Auto Mar
-39.9						Freq Offse 0 Ha
Center 2.4	496000 GHz				Span 2.000 MHz	
#Res BW		#VBW 30	00 kHz*		Span 2.000 MHz ep 3.000 s (1001 pts)	
MSG				Ц 5 т.	ATUS	

🎉 Keysight Spe	ectrum Analyzer - Swept SA								
Start Fre	q 2.490000000 C	EHz PNO: Wide		SE:INT	Avg Type Avg Hold	RMS	TRAC	4 Jun 28, 2021 E 1 2 3 4 5 6 E A	Frequency
	Gate: LO	IFGain:Low	#Atten: 18	dB	, to give a			ANNNN	Auto Tun
10 dB/div Log	Ref Offset 40.15 dB Ref 40.15 dBm					Mkr1	2.494 3	40 GHz 49 dBm	Auto Turi
									Center Fre
30.2									2.492500000 GH
20.2									Start Fre
10.2									2.490000000 GH
. 150									
									Stop Fre 2.495000000 GH
9.85									
19.9								-19.02 dBm	CF Ste 500.000 ki
29.9							* 1		Auto Ma
39.9									Freq Offs
									01
49.9									
	00000 GHz						stop 2.49	5000 GHz	
#Res BW	51 kHz	#VBW	150 kHz*			#Sweep		1001 pts)	

Port A, Channel Position T,

	m Analyzer - Swept SA RF 50 Q AC		SEA	ISE:INT		ALIGN AUTO	05:27:18.0	4 Jun 28, 2021		_
Center Freq	2.690000000 ite: LO	GHz PNO: Wide G		ernal1	Avg Typ Avg Hold	RMS	TRAC		Frequer	псу
Ri 0 dB/div R	ef Offset 40.15 dB ef 40.15 dBm	In Guilleon				Mkr1	2.690 0 -34.1	00 GHz 23 dBm	Auto	Tun
30.2									Cente 2.6900000	
0.2		\ \							Star 2.6890000	nt Fre
.85									Sto 2.6910000	p Fre 00 GH
9.9								-19.02 dBm	CI 200.0 <u>Auto</u>	F Ste 000 kl Ma
9.9									Freq	Offs 0 I
enter 2.690							0 2			
enter 2.690 Res BW 100		#VBW	300 kHz			#Sweep	3.000 s (.000 MHz 1001 pts)		
na l						I status				





		PNO: V IFGain 5 dB	Wide 🖵 :Low	Trig: Exte #Atten: 1	ise:INT Brnal1 B dB	Avg Type Avg Hold:	RMS 1/100	TRAC	Jun 28, 2021	Fre	quency
10 dB/div	Ref Offset 40.1 Ref 40.15 dE	5 dB	:Low	#Atten: 1	BdB				ANNNN		
203		3m					Mkr1	2.691 2		,	Auto Tur
30.2											e nter Fre 500000 Gi
10.2											Start Fr
.150											Stop Fr 000000 G
29.9									-19.02 dBm	E Auto	CF St 500.000 k M
-39.9			****	****************						F	req Offs 0
Start 2.6910					_		s	top 2.696	000 GHz		
#Res BW 51	KHZ		#VBW	150 kHz'			#Sweep		1001 pts)		





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 20GHz. The resolution bandwidth of 1MHz was employed for frequency band 3KHz to 20GHz. The spectrum analyzer detector was set to RMS.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log4] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports RF A,B,C and D. Then the limit was adjust to -19.02dBm.

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 + 10log(P) dB.





A.4.4 Measurement results

Configuration NR-MIMO-1C QPSK

Channel Bandwidth	RBW	Limit
	(MHz)	(dBm)
70 MHz	1.0	-19.02
90 MHz	1.0	-19.02

Port A, Channel Position B 70 MHz

Spectrum Analyze Swept SA	8	wept SA	Swept	SA	Swept SA				
(EVSIGHT I	1put: RF	Input Z: 50 Ω Corrections: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO	Avg Type: Power (RMS) Avg Hold: 1/100		Center F	requency	Settings
	oupling: DC lign: Off	Freq Ref: Intern NFE: Off	al	IF Gain: Low Sig Track: Off	Trig: External 1	A W W W W A N N N N N		1500 GHz	Jetungs
1 Spectrum		Nrt. Ol		-	Mkr1_2 f	96 0 GHz	Span	9700 GHz	
Scale/Div 10 dB			Ref LvI Offset Ref Level 40.0			.832 dBm		ept Span	
Log								o Span	
							FL	ull Span	
					ſ <u>1</u>		Start Fre		
							3.000 kl		
							Stop Fre .3.00000	9 00000 GHz	
								TO TUNE	
						DL1 -19.02 dBm	CF Step		
								700 MHz	
							Auto Mar		
-39.9							Freq Off		
							0 Hz		
						op 3.000 GHz	X Axis S		
Start 3 kHz			#Video BW 3.	U MHZ*	St				
Res BW 1.0 MH		2 Jun 29, 2021 9:40:48 AM			#Sweep ~3.01		Log Lin Signal Tr (Span Zor	rack om)	
Res BW 1.0 MH	er 2 S	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω	3 Spectr 3// Swept #Atten: 10 dB	um Analyzer 4 SA PNO: Fast	#Sweep ~3.01 Spectrum Analyzer 5 Swept SA Avg Type: Power (RMS)	1 s (1001 pts)	Signal Tr (Span Zor Select M:	rack om) Marker arker	•
Res BW 1.0 MH	er 2 S	9:40:48 AM pectrum Analyzer wept SA	3 Spectr Swept #Atten: 10 dB Preamp. Off	um Analyzer 4 SA	#Sweep ~3.01	1 s (1001 pts)	Lin Signal Ti (Span Zor Select Ma Marker 1	rack om) Marker arker	
Res BW 1.0 MH	er 2 S	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Atten: 10 dB Preamp. Off	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 1 2 3 4 5 6 A WW WWW	Lin Signal Tri (Span Zoo Select Marker 1 Marker F	rack om) Marker arker	Settings
Rees BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Tr (Soan Zoo Select Ma Marker 1 Marker 1 4.96000	rack om) Marker arker	Peak Search
Rees BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Th (Span Zoo Select Marker 1 Marker P 4.96000 Pea	mack om) Marker arker Frequency 0000 GHz	Peak Search
Spectrum Analyze Spectrum Analyze Swept SA KEYSIGHT I Scale/Div 10 dB	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Th Soan Zod Select Marker 1 Marker 1 Marker P 4.96000 Pea Ne	Marker mi arker Frequency 0000 GHz ik Search	Peak Search Pk Searc
Res BW 1.0 WH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Ti (Span Zor Select Ma Marker P 4.96000 Pea Ne Nex	mack om) Marker arker Frequency 0000 GHz ik Search ak Search	Peak Search Pk Searc Config
IRes BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Tr (Soan Zor Select M: Marker 1 4.96000 Pea Ne Nex Nex	rack miniminiar Marker arker Frequency 0000 GHz ak Search ak Search axt Peak t Pk Right	Peak Search Pk Searc Config Propertie Marker Function
1 Spectrum Scale/Div 10 dB Log 2.86 7.14 17.1 27.1	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA Input Ζ: 50 Ω Corrections: Off Freq Ref: Interna	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Tr (Span Zor Select M. Marker 1 4.95000 Pea Nex Nex Minin	rack mm Marker arker Frequency 0000 GHz kk Search kk Search kk Search kk Search kk Search kk Search kk Search kk Search kk Search	Peak Search Pk Searc Config Propertie Marker Function Marker
Res BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA input 2:50 0 Corrections: 01 Freq Ret: Intern NFE: 01	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Tri (Span Zoo Select Mi Marker 1 Marker 1 4.96000 Pea Nex Nex Nex	rack mmi Marker requency 0000 GHz ik Search axt Peak t Pk Right kt Pk Left mum Peak	Peak Search Pk Searc Config Propertie Marker Function
IRes BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA input 2:50 0 Corrections: 01 Freq Ret: Intern NFE: 01	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Ti Sagnal Ti Sana Zoo Select M Marker F 4 660000 Pea Net Net Net Net Marker Net Marker Ma	Marker arker Trequency 0000 GHz ik Search tr Right tr Right tr Right tr Reak Pk Search	Peak Search Pk Searc Config Propertie Marker Function Marker
Res BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA input 2:50 0 Corrections: 01 Freq Ret: Intern NFE: 01	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 SA PNO: Fast Gate: LO IF Gain: Low Sig Track: Off 40.86 dB	#Sweep -3.0f	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal Ti Yi Select M. Marker 1 Marker 1 Marker 1 Nex Nex Nex Minir Pk-R	Marker arker Trequency 0000 GHz ik Search ext Peak t Pk Right kt Pk Left mum Peak *Pk Search ter Delta	Peak Search Pk Searc Config Propertie Marker Function Marker
Res BW 1.0 MH	er 2 S nput RF Soupling DC lign: Of	9:40:48 AM pectrum Analyzer wept SA input 2:50 0 Corrections: 01 Freq Ret: Intern NFE: 01	3 Spectr Swept #Alten 10 dB Preamp. Off al Ref Lvi Offset.	um Analyzer 4 PHO Fast Cato LO IF Gain Low Sg Track Off 3 dBm	#Sweep-3.0"	+ 12 3 4 5 6 A WW WW W A N N N N 960 GHz	Lin Signal TX Select M. Marker F 4.50000 Ped Net Net Net Marker Net Marker Net Marker	Marker Marker arker requency 6000 GHz ik Search axt Peak t Pk Right t Rk Right kk Pk Left mum Peak ker Delta ker Delta ker Delta	Peak Search Pk Searc Config Propertie Marker Function Marker





Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrun Swept S/	n Analyzer 4 A	Spectrum Analyzer 5 Swept SA	• +	Frequenc	y 1 🕌
KEYSIGHT Input RF Coupling Align: Off	DC Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	#Atten: 10 dB Preamp: Off	PNO:Fast Gate:LO IF Gain:Low Sig Track:Off	Ing: External 1	23456 WWWWW NNNNN	Center Frequency 18.500000000 GHz Span	Settings
1 Spectrum		Ref LvI Offset 43		Mkr1 26.5		span 17.0000000 GHz	
Scale/Div 10 dB	F	Ref Level 25.32 c	1Bm	-28.8	97 dBm	Swept Span Zero Span	
						Full Span	
						Start Freq 10.000000000 GHz	
					.1 -19 02 dBm	Stop Freq 27.000000000 GHz	1
					1	AUTO TUNE	
34.7	~~		~~~~~	~~~~~~	/	CF Step 1.700000000 GHz	1
-44.7						Auto Man	
						Freq Offset 0 Hz	1
Start 10.000 GHz #Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 2 #Sweep ~3.01 s	7.000 GHz (1001 pts)	X Axis Scale Log	
1 57	Jun 29, 2021 9:43:01 AM				8 🗙	Signal Track (Span Zoom)	

Port A, Channel Position M 70 MHz



Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept S/	Analyzer 4	Spectrum Analyzer 5 Swept SA	+	Q	Marker	
KEYSIGHT Input: RF Coupling Align: Of	DC Corrections: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Ing: External 1	3 4 5 6	Select Ma Marker 1	arker	
		Ref Lvi Offset 40	-	Mkr1 4.96	0 GHz		requency 0000 GHz	Settings
cale/Div 10 dB		Ref Level 22.86 c	IBm	-36.414	dBm	Pea	k Search	Peak Search
						Ne	xt Peak	Pk Sear Config
						Next	: Pk Right	Properti
7.14						Nex	t Pk Left	Marker Functior
27.1					19.02 dBm	Minir	num Peak	Marker-
17.1					~	Pk-F	k Search	Counter
17.1						Mar	ker Delta	
						м	kr→CF	
							-→Ref Lvi	
tart 3.000 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 10. #Sweep ~3.01 s (1		- On	us Peak	
150	Jun 29, 2021 9:46:37 AM	$\Theta \wedge$				Off		



CAICT No. I21Z61172-WMD01

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Analyz Swept SA	Swept SA		Frequency	(• • 🛃
KEYSIGHT Input: RI Coupling Align: O	DC Corrections: Off	Preamp: Off Gate	East Avg Type: Po LO Avg[Hold: 1/1 ain: Low Trig: External 'rack: Off		Center Frequency 18.500000000 GHz	Settings
opecaum		Ref Lvi Offset 43.32 dB	м	kr1 26.473 GHz	Span 17.0000000 GHz	
Scale/Div 10 dB		Ref Level 25.32 dBm		-28.891 dBm	Swept Span Zero Span	
					Full Span	
					Start Freq 10.000000000 GHz	
				DL1 -19 02 dBm	Stop Freq 27.000000000 GHz	
24.7				≬ 1	AUTO TUNE	
34.7	~~				CF Step 1.700000000 GHz	
					Auto Man	
					Freq Offset 0 Hz	
tart 10.000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz*	#Sw	Stop 27.000 GHz eep ~3.01 s (1001 pts)	X Axis Scale Log Lin	
1 50	Jun 29, 2021 9:47:49 AM	PA			Signal Track (Span Zoom)	

Port A, Channel Position T 70 MHz



Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Analyzer Swept SA	4 Spectrum Analyzer 5 Swept SA	+	Marker	• 尜
KEYSIGHT Input: RF Coupling Align: Of	DC Corrections: Off	#Atten: 10 dB PNO: Fi Preamp. Off Gate: L/ IF Gain. Sig Trac	D Avg Hold: 1/100 Avg Low Trig: External 1	3456 ////////////////////////////////////	Select Marker Marker 1	
1 Spectrum	•	Ref LvI Offset 40.86 dB	Mkr1 4.95 -36.53		Marker Frequency 4.953000000 GHz	Settings
Scale/Div 10 dB		Ref Level 22.86 dBm	-30.33	o ubili	Peak Search	Peak Search
					Next Peak	Pk Search Config
					Next Pk Right	Properties
-7.14				-10.02 dBm	Next Pk Left	Marker Function
.27.1					Minimum Peak	Marker→
-37.1	1 1		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~	Pk-Pk Search	Counter
-47.1					Marker Delta	
					Mkr→CF	
					Mkr→Ref Lvi	
Start 3.000 GHz #Res BW 1.0 MHz		#Video BW 3.0 MHz*	Stop 10 #Sweep ~3.01 s (*	.000 GHz 1001 pts)	Continuous Peak Search On	
4 50	Jun 29, 2021 9:51:18 AM	\mathbf{P}		X	Off	





Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrun Swept S/	n Analyzer 4 A	Spectrum Analyzer 5 Swept SA	• +	Ç	Frequency	- *
KEYSIGHT Input RF Couping Align: Off	DC Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Trig: External 1	2 3 4 5 6 WWWWW N N N N N	Center Fro 18.50000 Span	equency 00000 GHz	Settings
1 Spectrum		Ref Lvi Offset 43		Mkr1 26.5		17.00000	00 GHz	
Scale/Div 10 dB	F	Ref Level 25.32 c	1Bm	-28.8	58 dBm	Swc.	ot Span Span	
						Ful	I Span	
						Start Freq 10.00000	 00000 GHz	
					L1 -19 02 dBm	Stop Freq 27.00000)0000 GHz	
						AUT	0 TUNE	
-34.7	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~			CF Step 1.700000	0000 GHz	
-44.7						Auto Man		
						Freq Offse 0 Hz	et	
Start 10.000 GHz #Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 2 #Sweep ~3.01 s	7.000 GHz (1001 pts)		ale	
1 50	Jun 29, 2021 9:52:18 AM					Signal Tra		

Port A, Channel Position B 90 MHz



ipectrum Analyzer 2 wept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept SA	Analyzer 4 ,	Spectrum Analyzer 5 Swept SA	+	Ç	Marker	- • ;
CEYSIGHT Input: RF Coupling: Align: Off	DC Corrections: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Ing: External 1	3456 /wwww	Select Ma Marker 1	rker	
Spectrum v		Ref LvI Offset 40	-	Mkr1 4.96	0 GHz	Marker Fi 4.960000		Settings
cale/Div 10 dB		Ref Level 22.86 d	IBm	-36.44	8 dBm	Peak	Search	Peak Search
						Ne	t Peak	Pk Sear Config
						Next	Pk Right	Properti
17.1					-19 02 dBm	Nex	Pk Left	Marker Function
7.1					-19.02 dBm	Minim	um Peak	Marker-
37.1			~~~~		\sim	Pk-P	k Search	Counter
17.1						Mark	er Delta	
						Mł	r→CF	
							→Ref Lvi	
tart 3.000 GHz Res BW 1.0 MHz		#Video BŴ 3.0	MHz*	Stop 10 #Sweep ~3.01 s (.000 GHz 1001 pts)	On	is Peak	
150	Jun 29, 2021 9:55:55 AM				- 52	Off		



CAICT No. I21Z61172-WMD01

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Analy Swept SA	Swe	ctrum Analyzer 5 ept SA	• +	Frequen	y 1
KEYSIGHT Input RF Coupling Align: Off	DC Corrections: Off	Preamp: Off Gat IF C	ie:LO Avg	g Type: Power (RMS) g Hold: 1/100 g: External 1	123456 AWWWWW ANNNN	Center Frequency 18.500000000 GHz	Settings
1 Spectrum		Ref LvI Offset 43.32 dE			6.524 GHz	Span 17.0000000 GHz	
Scale/Div 10 dB		Ref Level 25.32 dBm		-28	.977 dBm	Swept Span Zero Span	
						Full Span	
						Start Freq 10.000000000 GHz	
					DL1 -19 02 dBm	Stop Freq 27.000000000 GHz	1
					¹	AUTO TUNE	
34.7	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~		~	CF Step 1.700000000 GHz	
						Auto Man	
						Freq Offset 0 Hz	
tart 10.000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz*		Sto #Sweep ~3.0	p 27.000 GHz 1 s (1001 pts)	X Axis Scale Log Lin	1
1 1	Jun 29, 2021 9:57:00 AM					Signal Track (Span Zoom)	

Port A, Channel Position M 90 MHz



Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Ana Swept SA	iyzer 4 💡	Spectrum Analyzer 5 Swept SA	+	Ö	Frequency	🕄
KEYSIGHT Input: RF Coupling: I Align: Off	Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	Preamp: Off Gi	VO:Fast ate:LO Gain:Low g Track:Off	Ing: External 1	3456 WWWW NNNN		requency 0000 GHz	Settings
Spectrum v		ef Lvi Offset 40.86 d	в	Mkr1 4.96			000 GHz	
Scale/Div 10 dB	R	ef Level 22.86 dBm		-36.566	6 dBm		pt Span Span	
						FL	ıll Span	
2.86						Start Fre 3.00000	q 0000 GHz	
17.1				OL1-	19.02 dBm	Stop Fre 10.0000	9 00000 GHz	
	<u> </u>					AU	TO TUNE	
37.1	\sim	~~~~~	~~~~	~~~~~~	~~~~	CF Step 700.000	000 MHz	
57.1						Auto Mar		
						Freq Off: 0 Hz	set	
tart 3.000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz*		Stop 10. #Sweep ~3.01 s (1		X Axis S Log Lin		
1 7 7 1	Jun 29, 2021				X	Signal Tr		





Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept SA	Analyzer 4	Spectrum Analyzer 5 Swept SA	• +	Frequenc	y 👎
KEYSIGHT Input: RF Coupling: DC Align: Off		Atten: 10 dB ²reamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Avg Type: Power (RMS) Avg Hold: 1/100 Trig: External 1	1 2 3 4 5 6 A WW WW W A N N N N N	Center Frequency 18.500000000 GHz Span	Settings
1 Spectrum Scale/Div 10 dB Log		LvI Offset 43.3 Level 25.32 dE			.507 GHz .999 dBm	17.0000000 GHz Swept Span Zero Span	
						Full Span	
						Start Freq 10.000000000 GHz	
					DL1 -19 02 dBm	Stop Freq 27.000000000 GHz	
34.7						AUTO TUNE	
44.7	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					1.70000000 GHz	
						Man Freq Offset 0 Hz	
tart 10.000 GHz Res BW 1.0 MHz	÷.	/ideo BW 3.0 M	Hz*	Sto #Sweep ~3.01	o 27.000 GHz	X Axis Scale	
	Jun 29, 2021					Signal Track (Span Zoom)	

Port A, Channel Position T 90 MHz







CAICT No. I21Z61172-WMD01

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Analyz Swept SA	Swept SA	· · ·	Frequency	
KEYSIGHT Input	ing: DC Corrections: Off	Preamp: Off Gate	East Avg Type: Pov LO Avg[Hold: 1/10 ain: Low Trig: External rack: Off		Center Frequency 18.50000000 GHz	Settings
Spectrum cale/Div 10 dB		Ref Lvi Offset 43.32 dB Ref Level 25.32 dBm	M	(r1 26.507 GHz -28.935 dBm	17.0000000 0112	
_og		Rer Level 25.32 dBm		-20.935 UDII	Swept Span Zero Span	
					Full Span	
4.68					Start Freq 10.000000000 GHz	
14.7				DL1 -19.02 dBm	Stop Freq 27.000000000 GHz	
					AUTO TUNE	
14.7 14.7 	~~~				CF Step 1.700000000 GHz Auto	
					Man Freq Offset	
					0 Hz	
tart 10.000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz*	#Swe	Stop 27.000 GHz ep ~3.01 s (1001 pts)	X Axis Scale Log Lin	
1 5 C	Jun 29, 2021 10:05:52 AM				Signal Track (Span Zoom)	

Configuration LTE+NR-MIMO-MC-1 (1LTE 10M QPSK+1NR 90M QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
(L) 10MHz,	1.0	-19.02	
(NR) 90MHz	1.0	-19.02	

Port A, Channel Position M

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept SA	Analyzer 4	Spectrum Analyzer 5 Swept SA	+	₽	Frequency	
KEYSIGHT Input: RF Coupling: DO Align: Of	Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Ing: External 1	3456 WWWW NNNN		requency 1500 GHz	Settings
1 Spectrum 🔹	F	tef Lvi Offset 40.	19 dB	Mkr1 2.696			700 GHz	
Scale/Div 10 dB	F	tef Level 40.09 d	Bm	-39.84	0 dBm		pt Span Span	
						FL	ıll Span	
						Start Fre 3.000 kl		
						Stop Fre 3.00000	9 0000 GHz	
						AU"	TO TUNE	
				0L1	-19.02 dBm	CF Step 299.999	700 MHz	
-29.9				1		Auto Mar		
-49.9						Freq Off 0 Hz	set	
Start 3 kHz Res BW 1.0 MHz		#Video BW 3.0 I	MHz*	Stop 3 #Sweep ~3.01 s (*	.000 GHz 1001 pts)	X Axis S Log Lin		
1 7 7 1	Jun 29, 2021 9:36:21 AM	ÐA			X	Signal Tr (Span Zoo	ack om)	

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Analyzer Swept SA	Swept SA	+	Marker	· 🛞
KEYSIGHT Input RF Coupling: Align: Off	Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	#Atten: 10 dB PNO: F Preamp: Off Gate: L IF Gain Sig Tra	O Avg[Hold: 1/100	1 2 3 4 5 6 A WWWWW A N N N N N	Select Marker Marker 1	
1 Spectrum 🔹		ef Lvi Offset 40.86 dB	Mkr1_4.		Marker Frequency 4.960000000 GHz	Settings
Scale/Div 10 dB	R	ef Level 22.86 dBm	-36.1	84 dBm	Peak Search	Peak Search
					Next Peak	Pk Search Config
					Next Pk Right	Properties
-7.14				1 1-19 02 dBm	Next Pk Left	Marker Function
.27.1					Minimum Peak	Marker→
-37.1		~~~~~		~~~	Pk-Pk Search	Counter
-47.1					Marker Delta	
					Mkr→CF	
					Mkr→Ref Lvi	
Start 3.000 GHz #Res BW 1.0 MHz		#Video BW 3.0 MHz*	Stop #Sweep ~3.01 s	10.000 GHz s (1001 pts)		
1 7 7	Jun 29, 2021 9:23:23 AM			HX	Un	



CAICT No. I21Z61172-WMD01

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept SA	n Analyzer 4	Spectrum Analyzer 5 Swept SA	• +	‡	Display	- ' 宗
KEYSIGHT Input: RF Coupling: D Align: Off	Input Z: 50 Ω Corrections: Off Freq Ref: Internal NFE: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Avg Type: Power (RMS Avg Hold: 1/100 Trig: External 1	123456 Awwwww ANNNN	Select Displa Line Display Line		Meas Display
1 Spectrum v Scale/Div 10 dB		tef Lvi Offset 43 tef Level 25.32 d			.524 GHz .675 dBm	-19.02 dBm		View Annotation
						Off Select Freq Line Freq Line 1		
					DL1 -19 02 dBm	Freq Line 1.0000 GHz On		
.24.7	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~		¹	Off		
-64.7		#Video BW 3.01	MH2 ⁸	Sto	p 27.000 GHz			
#Res BW 1.0 MHz	hun 20, 2024			#Sweep ~3.0				

Configuration LTE+NR-MIMO-MC-2 (3LTE 10M QPSK+1NR 70M QPSK)

Channel Bandwidth	RBW	Limit	
	(MHz)	(dBm)	
(L) 10MHz,	1.0	-19.02	
(NR) 70MHz	1.0	-19.02	

Port A, Channel Position M

Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum / Swept SA	Analyzer 4	Spectrum Analyzer 5 Swept SA	+	Frequency	- * 景
KEYSIGHT Input RF Coupling Align: Off	: DC Corrections: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Ing: External 1	3 4 5 6 / W W W	Center Frequency 1.500001500 GHz Span	Settings
1 Spectrum Scale/Div 10 dB		tef Lvi Offset 40.1 tef Level 40.09 dE		Mkr1 2.696 0 -39.966		2.99999700 GHz Swept Span Zero Span	
30.1				1		Full Span	
						3.000 kHz Stop Freq 3.00000000 GHz	
				0L1-1	9.02 dBm	AUTO TUNE	
						CF Step 299.999700 MHz Auto Man	
-39.9						Freq Offset 0 Hz	
Start 3 kHz #Res BW 1.0 MHz		#Video BW 3.0 M	Hz*	Stop 3.0 #Sweep ~3.01 s (10		X Axis Scale Log Lin	
1 7 7	Jun 29, 2021 9:30:31 AM	$\square \triangle$			X	Signal Track (Span Zoom)	





Spectrum Analyzer 2 Swept SA	Spectrum Analyzer 3 Swept SA	Spectrum Swept SA	Analyzer 4	Spectrum Analyzer 5 Swept SA	+	Q	Marker	
KEYSIGHT Input: RF Coupling Align: Off	DC Corrections: Off	#Atten: 10 dB Preamp: Off	PNO: Fast Gate: LO IF Gain: Low Sig Track: Off	Avg Type: Power (RM: Avg Hold: 1/100 Trig: External 1	5) 1 2 3 4 5 6 A WWWWW A N N N N N	Select Ma Marker 1	arker	
NT Spectrum N		ef Lvi Offset 40	-	Mkr1	4.960 GHz		requency 0000 GHz	Settings
cale/Div 10 dB		ef Level 22.86 d		-3	6.289 dBm	Pea	k Search	Peak Search
						Ne	xt Peak	Pk Searc Config
						Next	Pk Right	Propertie
						Nex	t Pk Left	Marker Function
27.1					DL1-19.02 dBm	Minir	num Peak	Marker-
37.1	<u>_</u> 1					Pk-F	k Search	Counter
47.1		$\sim \sim \sim$				Mar	ker Delta	
						м	kr→CF	
						Mkr	→Ref Lvi	
Start 3.000 GHz Res BW 1.0 MHz		#Video BW 3.0 I	MHz*		op 10.000 GHz 01 s (1001 pts)	- On	us Peak	
1 7 7	Jun 29, 2021 9:31:31 AM	ÐA				Off		

Spectrum Analyze Swept SA	r 2 Spectrun Swept S	n Analyzer 3 A	Spectrum Ana Swept SA		Spectrum Analyzer 5 Swept SA	• +	Display	- 湯
	oupling: DC Con ign: Off Free		amp: Off G	NO: Fast iate: LO Gain: Low ig Track: Off	Avg Type: Power (RMS Avg Hold: 1/100 Trig: External 1	1 2 3 4 5 6 AWWWWW ANNNNN	Select Display Line Display Line 1 🔹	Meas Display View
1 Spectrum	•		vl Offset 43.32 d	íB		6.524 GHz		
Scale/Div 10 dB		RefL	evel 25.32 dBm		-28	.762 dBm	-19.02 dBm On Off	Annotation
							Select Freq Line	
							Freq Line 1 • Freq Line	
-14.7						DL1 -19 02 dBm	1.0000 GHz On Off	
-34.7		~~~~····						
-44.7								
-64.7								
Start 10.000 GHz #Res BW 1.0 MHz	2	#Vic	leo BW 3.0 MHz	•	Sto #Sweep ~3.0*	p 27.000 GHz 1 s (1001 pts)		
100	Ju	1 29, 2021 32:33 AM	Δ					





A.6 Frequency Stability

A.6.1 Reference 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 -48V DC Power Supply. At each temperature step, the Base Station was configured to transmit an [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 values of -48V DC. At +20°C, the Base Station was configured to transmit an [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 - Single Carrier with 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, QPSK, Port A, Channel Bandwidth 70MHz Maximum Output Power 43.0dBm per port

		Frequency Stability (Hz)					
Supply Voltage	Temperature	Channel	Channel	Channel			
DC(V)		position B	position M	position T			
	-30	7.99	4.04	6.18			
	-20	9.71	4.96	9.93			
	-10	9.54	3.97	8.54			
	0	7.28	6.58	4.29			
-48	10	2.88	2.59	7.22			
	20	2.47	3.35	8.26			
	30	5.61	9.71	7.75			
	40	2.62	7.11	4.86			
	50	7.65	2.87	6.12			

Configuration NR-MIMO-1C, QPSK, Port A, Channel Bandwidth 90MHz Maximum Output Power 43.0dBm per port

		Frequency Stability (Hz)				
Supply Voltage	Temperature	Channel	Channel	Channel		
DC(V)		position B	position M	position T		
	-30	8.55	8.62	6.75		
	-20	6.25	6.85	6.59		
	-10	8.76	2.22	4.25		
	0	2.99	7.92	8.46		
-48	10	5.04	7.12	3.34		
	20	7.23	6.19	8.11		
	30	9.41	7.21	3.43		
	40	4.58	8.72	6.99		
	50	4.61	5.17	7.40		





Frequency Error – Voltage Variation Configuration NR-MIMO-1C, QPSK, Port A, Channel Bandwidth 70MHz Maximum Output Power 43.0dBm per port

		Frequency Stability (Hz)			
Supply Voltage	Temperature(°C)	Channel	Channel	Channel	
DC(V)		position B	position M	position T	
-40.8	20	6.54	6.75	3.42	
-55.2	20	8.46	4.47	5.71	

Configuration NR-MIMO-1C, QPSK, Port A, Channel Bandwidth 90MHz Maximum Output Power 43.0dBm per port

		Frequency Stability (Hz)			
Supply Voltage	Temperature(°C)	Channel	Channel	Channel	
DC(V)		position B	position M	position T	
-40.8	20	2.11	8.61	8.55	
-55.2	20	8.42	9.05	5.15	





ANNEX B: Accreditation Certificate



END OF REPORT