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TEST REPORT

FCC Test for MTP02P-41A
Class II Permissive Change

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2009-FC001-R1

DATE OF ISSUE
16 September 2020

Tested by
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REPORT NO.
HCT-RF-2009-FC001-R1

DATE OF ISSUE
September 16, 2020

Additional Model
-

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
EUT Type	MMU(MTP02P)
Model Name	MTP02P-41A
FCC ID	A3LMTP02P-41A
Date of Test	August 19, 2020 ~ September 02, 2020
FCC Rule Parts:	FCC CFR 47 Part 2, Part 27

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	September 03, 2020	Initial Release
1	September 16, 2020	- Revised the note on section 5.1. - Revised the note on section 5.3. - Added the note on section 5.4.

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

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1. GENERAL INFORMATION

1.1. APPLICANT INFORMATION

Company Name	Samsung Electronics Co., Ltd.
Company Address	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

1.2. PRODUCT INFORMATION

<table>
<tr><td>EUT Type</td><td>MMU(MTP02P)</td></tr>
<tr><td>EUT Serial Number</td><td>S614821672</td></tr>
<tr><td>Power Supply</td><td>-48 VDC, 27 A</td></tr>
<tr><td>Output Power</td><td>
<table>
<tr><th>Band</th><th>Carrier</th><th>Bandwidth</th><th>Power</th></tr>
<tr><td>5G NR</td><td>1</td><td>40 MHz</td><td>1.67 W/path, Total: 53.3 W</td></tr>
<tr><td>5G NR</td><td>1</td><td>50 MHz</td><td>2.08 W/path, Total: 66.7 W</td></tr>
<tr><td>5G NR</td><td>1</td><td>80 MHz</td><td>2.50 W/path, Total: 80.0 W</td></tr>
</table>
</td></tr>
<tr><td>Frequency Range</td><td>2 496 MHz ~ 2 690 MHz</td></tr>
<tr><td>Emission Designator</td><td>
<table>
<tr><th rowspan="2">Mode</th><th rowspan="2">Carrier</th><th rowspan="2">Bandwidth</th><th colspan="4">Emission Designator</th></tr>
<tr><th>QPSK
(G7D)</th><th>QPSK
Max
Conducted
Output
Power
[W]</th><th>16QAM/64QAM
/256QAM
(W7D)</th><th>16QAM/64QAM
/256QAM
Max
Conducted
Output
Power
[W]</th></tr>
<tr><td>5G NR</td><td>1</td><td>40 MHz</td><td>38M0G7D</td><td>52.059</td><td>38M2W7D</td><td>52.203</td></tr>
<tr><td>5G NR</td><td>1</td><td>50 MHz</td><td>47M6G7D</td><td>64.781</td><td>47M8W7D</td><td>65.308</td></tr>
<tr><td>5G NR</td><td>1</td><td>80 MHz</td><td>77M5G7D</td><td>75.352</td><td>77M9W7D</td><td>75.555</td></tr>
</table>
</td></tr>
<tr><td>Channel Bandwidths</td><td>Port 1 ~ Port 32 : 5G NR 40 MHz, 5G NR 50 MHz, 5G NR 80 MHz</td></tr>
<tr><td>Modulation Type</td><td>QPSK, 16QAM, 64QAM, 256QAM</td></tr>
<tr><td>Antenna Specification</td><td>Service Beam Gain: 23 ± 0.5 dBi (16 Tx maximum gain condition)</td></tr>
</table>

1.3. TEST INFORMATION

FCC Rule Parts	FCC CFR 47 Part 2, Part 27
Measurement Standards	ANSI C63.26-2015, KDB 971168 D01 v03r01
Place of Test	HCT CO., LTD. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.
The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3. TEST SPECIFICATIONS

3.1. STANDARDS

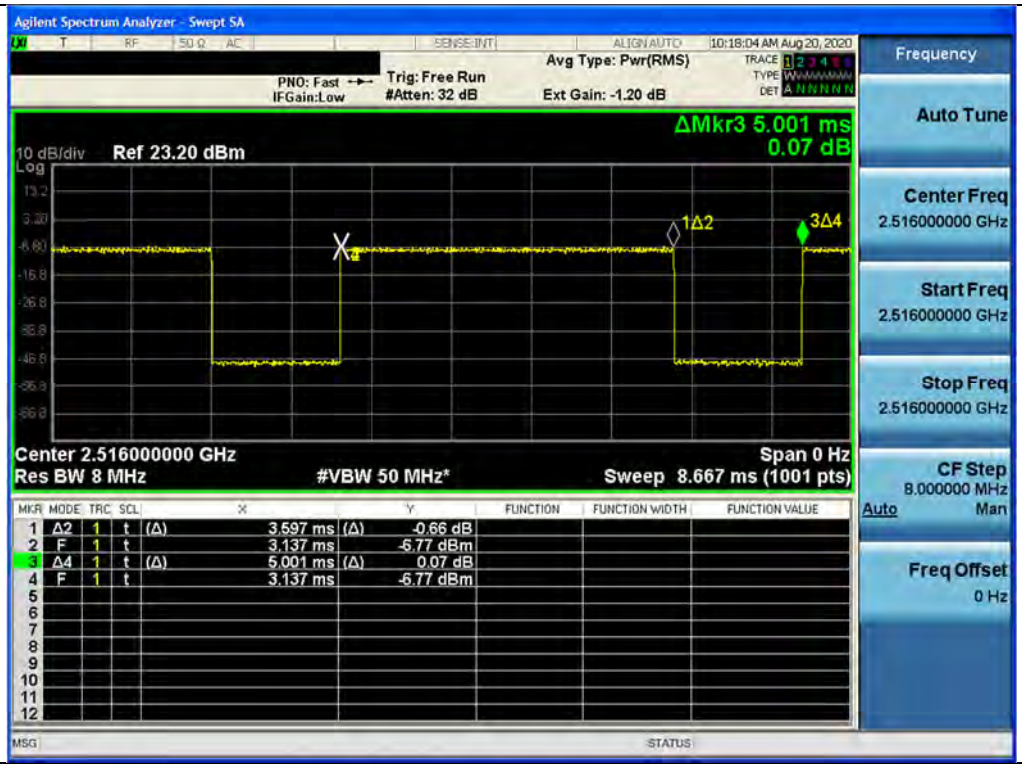
The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 27

Description	Reference	Results
RF Output Power	§ 2.1046, § 27.50(h)	Compliant
Occupied Bandwidth	§ 2.1049	Compliant
Unwanted Conducted Emissions	§ 2.1051, § 27.53(m)	Compliant
Radiated Emissions	§ 2.1053, § 27.53	Compliant
Frequency Stability	§ 2.1055, § 27.54	Compliant

3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST

- The EUT was operated in a manner representative of the typical usage of the equipment.
- During all testing, system components were manipulated within the confines of typical usage to maximize each emission.
- All NR modulation types (QPSK, 16QAM, 64QAM, 256QAM) supported by the EUT have been tested.
- Unwanted conducted emissions were performed on one port with a maximum output power level.
- The dummy loads were connected to the RF output ports for radiated spurious emission testing.
- The 'Ext. Gain' contains additional 1.2 dB correction for test jig provide by applicant.
- Because of the EUT using TDD technology, it cannot be configured to transmit continuously and measurement instrument cannot be configured to measure only during active transmissions. So we perform the measurement using duty cycle method.

Measurement Result of MTP02P-41A Transmit On/Off Timing



- The EUT duty cycle is calculated according to ANSI C63.26 - 5.2.4.3.4.

Duty Cycle = On-time / Transmitter period = 3.597 ms / 5.000 ms = 0.72

Duty Correction = 10 log (1/duty cycle) = 10 log (1/0.72) = 1.431 dB

The 'Ext. Gain' contains duty correction factor that is applied to output power measurement and unwanted conducted emissions.

- The tests results in plots are already including the actual value of loss for the attenuator and cable combination. Please check correction factors below table.

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
500	31.962	2 200	33.772
600	31.789	2 300	33.673
700	31.943	2 400	33.641
800	32.040	2 500	33.655
900	32.414	2 600	33.493
1 000	32.611	2 700	33.468
1 100	32.660	2 800	33.952
1 200	32.779	2 900	33.942
1 300	32.817	3 000	34.303
1 400	32.909	4 000	34.041
1 500	33.018	5 000	34.711
1 600	33.225	6 000	35.030
1 700	33.419	7 000	35.658
1 800	33.657	8 000	36.626
1 900	33.745	9 000	36.207
2 000	33.836	10 000	35.598
2 100	33.917	-	-

3.3. MAXIMUM MEASUREMENTUNCERTAINTY

The value of the measurement uncertainty for the measurement of each parameter.

Coverage factor k = 2, Confidence levels of 95 %

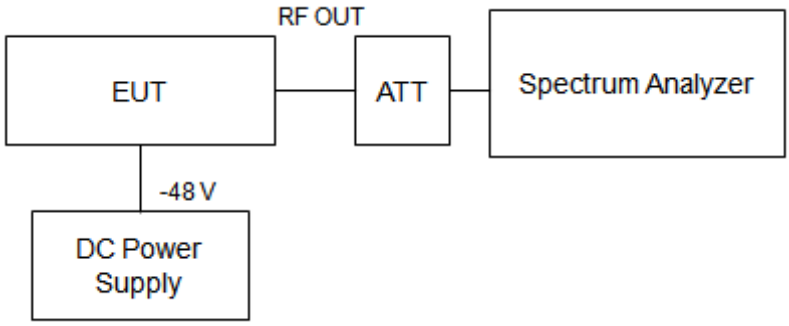
Description	Condition	Uncertainty
RF Output Power	-	± 0.72 dB
Occupied Bandwidth	OBW ≤ 20 MHz	± 52 kHz
Unwanted Conducted Emissions	-	± 1.08 dB
Radiated Emissions	f ≤ 1 GHz f > 1 GHz	± 4.80 dB ± 6.07 dB
Frequency Stability	-	± 1.22 x 10^{-6}

3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	+15 °C to +35 °C
Relative humidity:	30 % to 60 %
Air pressure	860 mbar to 1 060 mbar

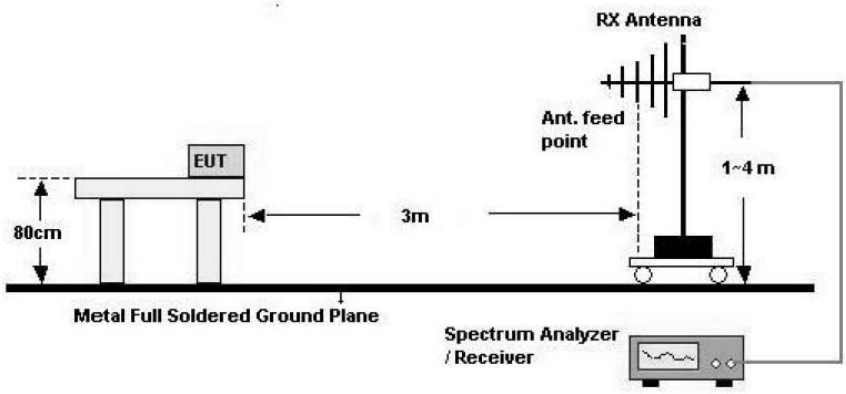
3.5. TEST DIAGRAMS

Conducted Test

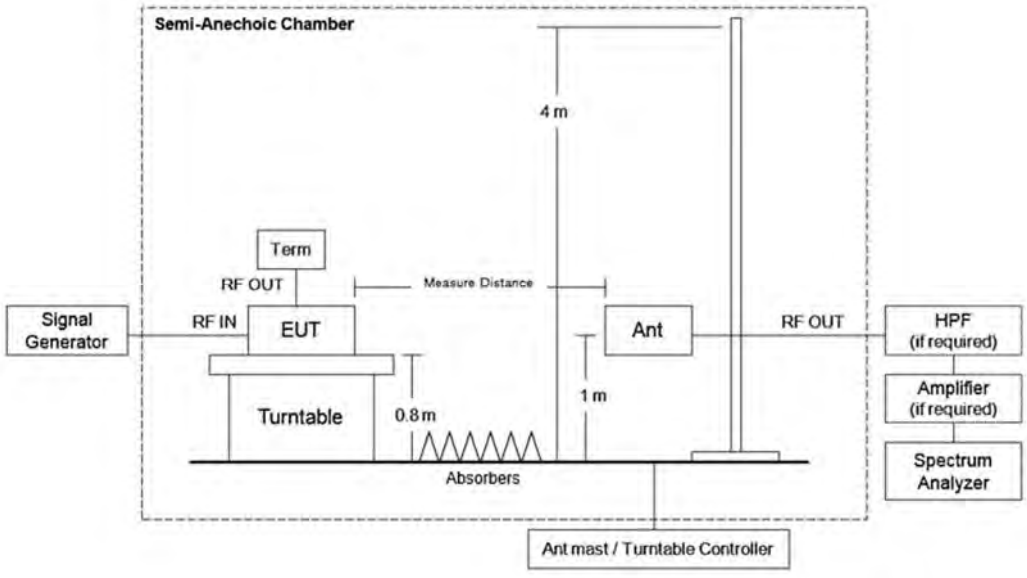


Radiated Test

30 MHz ~ 1 GHz



Above 1 GHz

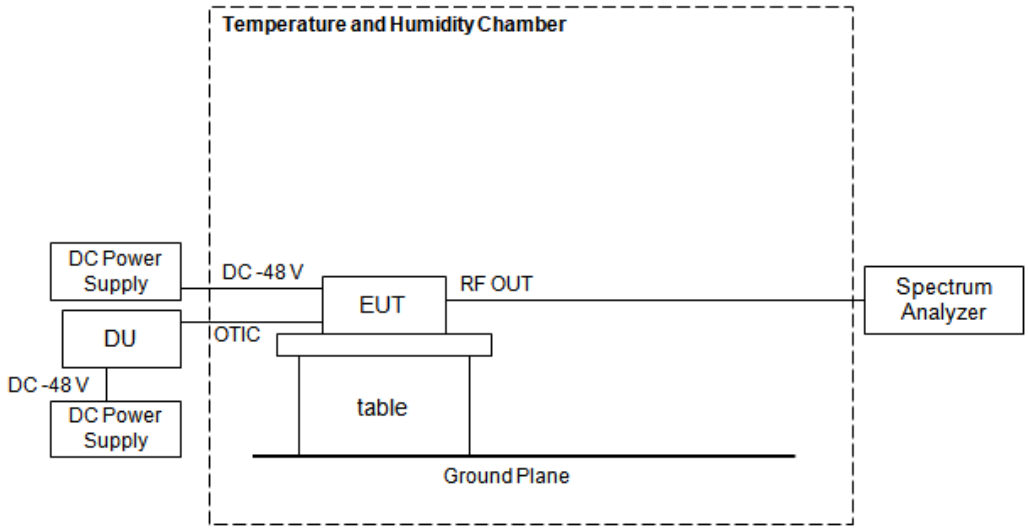


※ EUT position is adopted by placement of floor-standing refer to section 5.5.2.3.2 of ANSI C63.26-2015

Note

- Test distance for Above 1 GHz: 3 m

Frequency Stability



Note

- All modulations(QPSK, 16QAM, 64QAM, 256QAM) were investigated and the worst case configuration channel results are reported.

4. TEST EQUIPMENTS

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Agilent	N9020A / Spectrum Analyzer	2020-04-10	Annual	US46220219
Keysight	N9030B / PXA Spectrum Analyzer	2020-06-04	Annual	MY55480167
MCLI	FAS-23-20 / Attenuator	2020-01-22	Annual	103756
AGILENT	WA67-30-33 / 30 dB ATTENUATOR	2020-08-25	Annual	WA67-30-33-2
AGILENT	E3632A / DC Power Supply	2020-06-05	Annual	MY40010967
KIKUSUI	PWR800L / DC Power Supply	2020-02-19	Annual	RE001149
Koreae ngineering	KR-1005L / Temperature and Humidity Chamber	2019-11-07	Annual	KRAC05063-3
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Emco	2090 / Controller	N/A	N/A	060520
Ets	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	2020-05-12	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	2019-08-02	Biennial	9168-1039
Schwarzbeck	BBHA 9120D / Horn Antenna	2019-06-28	Biennial	9120D-1300
Rohde & Schwarz	FSP / Spectrum Analyzer	2019-09-11	Annual	836650/016
Wainwright Instruments	WHKX10-900-1000-15000-40SS /High Pass Filter	2020-06-24	Annual	5
CERNEX	CBLU1183540B-01 / LOW NOISE AMP	2020-01-21	Annual	25539

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

5. TEST RESULT

5.1. RF OUTPUT POWER

Test Requirements:

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle

(h) The following power limits shall apply in the BRS and EBS:

(1) Main, booster and base stations.

(i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula: EIRP = 33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW, where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

Test Procedures:

The measurement is performed in accordance with Section 5.2.4.4.1 of ANSI C63.26.

a) Set span to 2 × to 3 × the OBW.

b) Set RBW = 1 % to 5 % of the OBW.

c) Set VBW ≥ 3 × RBW.

d) Set number of measurement points in sweep ≥ 2 × span / RBW.

e) Sweep time:

1) Set = auto-couple, or

2) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.

f) Detector = power averaging (rms).

g) If the EUT can be configured to transmit continuously, then set the trigger to free run.

h) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).

i) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

Note:

1) The conducted emission level is measured at each antenna port and then summed mathematically to determine the total emission level from the device.

2) Sum data is in a tolerance of specification provided from manufacturer.

Test Results:
Tabular Data of RF output power

5G NR 40 MHz 1 Carrier

Port	Modulation	Channel	Frequency (MHz)	Measured Output Power	
				(dBm)	(W)
Port 1	QPSK	Low	2516.00	32.09	1.618
		Middle	2593.00	31.71	1.482
		High	2670.00	32.14	1.639
	16QAM	Low	2516.00	31.78	1.506
		Middle	2593.00	31.65	1.461
		High	2670.00	32.11	1.626
	64QAM	Low	2516.00	32.04	1.601
		Middle	2593.00	31.69	1.475
		High	2670.00	32.23	1.671
	256QAM	Low	2516.00	31.80	1.512
		Middle	2593.00	31.59	1.441
		High	2670.00	32.35	1.716
Port 2	QPSK	Low	2516.00	32.06	1.607
		Middle	2593.00	32.06	1.609
		High	2670.00	31.92	1.555
	16QAM	Low	2516.00	31.87	1.540
		Middle	2593.00	31.85	1.533
		High	2670.00	31.79	1.509
	64QAM	Low	2516.00	31.70	1.479
		Middle	2593.00	32.09	1.618
		High	2670.00	32.33	1.711
	256QAM	Low	2516.00	31.81	1.517
		Middle	2593.00	32.07	1.610
		High	2670.00	31.92	1.558

Port 3	QPSK	Low	2516.00	31.74	1.491
		Middle	2593.00	32.15	1.641
		High	2670.00	31.88	1.541
	16QAM	Low	2516.00	31.68	1.472
		Middle	2593.00	32.06	1.605
		High	2670.00	32.12	1.629
	64QAM	Low	2516.00	31.72	1.485
		Middle	2593.00	32.04	1.600
		High	2670.00	32.12	1.629
	256QAM	Low	2516.00	31.41	1.384
		Middle	2593.00	32.22	1.665
		High	2670.00	31.99	1.580
Port 4	QPSK	Low	2516.00	31.81	1.517
		Middle	2593.00	31.93	1.559
		High	2670.00	32.35	1.718
	16QAM	Low	2516.00	31.69	1.475
		Middle	2593.00	31.90	1.550
		High	2670.00	32.36	1.721
	64QAM	Low	2516.00	31.78	1.507
		Middle	2593.00	31.97	1.573
		High	2670.00	31.99	1.582
	256QAM	Low	2516.00	31.70	1.480
		Middle	2593.00	31.98	1.578
		High	2670.00	32.01	1.590
Port 5	QPSK	Low	2516.00	31.43	1.391
		Middle	2593.00	31.76	1.501
		High	2670.00	32.22	1.668
	16QAM	Low	2516.00	31.56	1.431
		Middle	2593.00	31.56	1.432
		High	2670.00	32.02	1.592
	64QAM	Low	2516.00	31.50	1.413
		Middle	2593.00	31.64	1.460
		High	2670.00	32.36	1.720
	256QAM	Low	2516.00	31.53	1.422
		Middle	2593.00	31.57	1.435
		High	2670.00	32.20	1.659

Port 6	QPSK	Low	2516.00	31.65	1.463
		Middle	2593.00	31.55	1.430
		High	2670.00	32.16	1.644
	16QAM	Low	2516.00	31.49	1.409
		Middle	2593.00	31.88	1.541
		High	2670.00	32.38	1.728
	64QAM	Low	2516.00	31.46	1.401
		Middle	2593.00	31.57	1.437
		High	2670.00	31.97	1.572
	256QAM	Low	2516.00	31.57	1.435
		Middle	2593.00	31.52	1.419
		High	2670.00	32.20	1.661
Port 7	QPSK	Low	2516.00	31.94	1.565
		Middle	2593.00	31.79	1.509
		High	2670.00	32.08	1.615
	16QAM	Low	2516.00	31.63	1.456
		Middle	2593.00	31.73	1.491
		High	2670.00	31.97	1.573
	64QAM	Low	2516.00	31.80	1.515
		Middle	2593.00	31.78	1.507
		High	2670.00	31.95	1.565
	256QAM	Low	2516.00	31.60	1.445
		Middle	2593.00	31.69	1.476
		High	2670.00	31.89	1.544
Port 8	QPSK	Low	2516.00	31.52	1.418
		Middle	2593.00	32.29	1.692
		High	2670.00	32.00	1.584
	16QAM	Low	2516.00	31.74	1.494
		Middle	2593.00	32.31	1.703
		High	2670.00	31.68	1.471
	64QAM	Low	2516.00	31.67	1.469
		Middle	2593.00	32.06	1.606
		High	2670.00	31.69	1.475
	256QAM	Low	2516.00	31.61	1.448
		Middle	2593.00	32.29	1.693
		High	2670.00	31.82	1.520

Port 9	QPSK	Low	2516.00	31.49	1.409
		Middle	2593.00	31.78	1.508
		High	2670.00	31.80	1.515
	16QAM	Low	2516.00	31.36	1.367
		Middle	2593.00	31.58	1.437
		High	2670.00	31.76	1.498
	64QAM	Low	2516.00	31.63	1.456
		Middle	2593.00	31.82	1.521
		High	2670.00	31.71	1.482
	256QAM	Low	2516.00	31.69	1.477
		Middle	2593.00	31.79	1.509
		High	2670.00	31.84	1.527
Port 10	QPSK	Low	2516.00	31.36	1.367
		Middle	2593.00	31.63	1.457
		High	2670.00	32.29	1.696
	16QAM	Low	2516.00	31.51	1.415
		Middle	2593.00	31.66	1.466
		High	2670.00	31.95	1.566
	64QAM	Low	2516.00	31.27	1.341
		Middle	2593.00	31.81	1.517
		High	2670.00	32.01	1.588
	256QAM	Low	2516.00	31.58	1.437
		Middle	2593.00	31.76	1.499
		High	2670.00	32.17	1.647
Port 11	QPSK	Low	2516.00	31.53	1.421
		Middle	2593.00	31.52	1.418
		High	2670.00	32.13	1.632
	16QAM	Low	2516.00	31.62	1.451
		Middle	2593.00	31.51	1.414
		High	2670.00	32.07	1.610
	64QAM	Low	2516.00	31.60	1.446
		Middle	2593.00	31.54	1.425
		High	2670.00	32.09	1.617
	256QAM	Low	2516.00	31.80	1.513
		Middle	2593.00	31.57	1.434
		High	2670.00	32.11	1.626

Port 12	QPSK	Low	2516.00	31.53	1.424
		Middle	2593.00	31.70	1.479
		High	2670.00	31.82	1.520
	16QAM	Low	2516.00	31.47	1.402
		Middle	2593.00	31.46	1.400
		High	2670.00	31.83	1.524
	64QAM	Low	2516.00	31.53	1.423
		Middle	2593.00	31.51	1.415
		High	2670.00	31.80	1.512
	256QAM	Low	2516.00	31.34	1.362
		Middle	2593.00	31.65	1.462
		High	2670.00	31.81	1.518
Port 13	QPSK	Low	2516.00	31.51	1.414
		Middle	2593.00	31.44	1.393
		High	2670.00	31.97	1.574
	16QAM	Low	2516.00	31.50	1.412
		Middle	2593.00	31.53	1.423
		High	2670.00	32.27	1.685
	64QAM	Low	2516.00	31.55	1.427
		Middle	2593.00	31.57	1.435
		High	2670.00	32.17	1.649
	256QAM	Low	2516.00	31.57	1.435
		Middle	2593.00	31.40	1.380
		High	2670.00	31.94	1.564
Port 14	QPSK	Low	2516.00	31.52	1.418
		Middle	2593.00	31.92	1.555
		High	2670.00	32.36	1.722
	16QAM	Low	2516.00	31.46	1.400
		Middle	2593.00	31.85	1.530
		High	2670.00	32.32	1.707
	64QAM	Low	2516.00	31.66	1.466
		Middle	2593.00	32.05	1.602
		High	2670.00	32.27	1.688
	256QAM	Low	2516.00	31.39	1.377
		Middle	2593.00	32.15	1.639
		High	2670.00	32.29	1.694

Port 15	QPSK	Low	2516.00	31.85	1.531
		Middle	2593.00	31.57	1.437
		High	2670.00	31.86	1.535
	16QAM	Low	2516.00	31.87	1.537
		Middle	2593.00	31.58	1.440
		High	2670.00	31.94	1.564
	64QAM	Low	2516.00	31.82	1.522
		Middle	2593.00	31.50	1.414
		High	2670.00	32.19	1.655
	256QAM	Low	2516.00	31.79	1.510
		Middle	2593.00	31.59	1.441
		High	2670.00	31.97	1.575
Port 16	QPSK	Low	2516.00	31.77	1.502
		Middle	2593.00	31.64	1.458
		High	2670.00	32.37	1.727
	16QAM	Low	2516.00	31.45	1.398
		Middle	2593.00	31.59	1.441
		High	2670.00	32.35	1.719
	64QAM	Low	2516.00	31.64	1.460
		Middle	2593.00	31.77	1.502
		High	2670.00	32.31	1.701
	256QAM	Low	2516.00	31.69	1.476
		Middle	2593.00	31.70	1.480
		High	2670.00	32.14	1.636
Port 17	QPSK	Low	2516.00	31.55	1.431
		Middle	2593.00	32.10	1.621
		High	2670.00	32.27	1.685
	16QAM	Low	2516.00	31.65	1.460
		Middle	2593.00	31.73	1.489
		High	2670.00	32.08	1.615
	64QAM	Low	2516.00	31.63	1.455
		Middle	2593.00	31.80	1.515
		High	2670.00	31.89	1.546
	256QAM	Low	2516.00	31.80	1.512
		Middle	2593.00	31.91	1.553
		High	2670.00	32.22	1.667

Port 18	QPSK	Low	2516.00	31.82	1.519
		Middle	2593.00	31.93	1.561
		High	2670.00	32.00	1.586
	16QAM	Low	2516.00	31.57	1.436
		Middle	2593.00	31.73	1.489
		High	2670.00	32.03	1.597
	64QAM	Low	2516.00	31.63	1.456
		Middle	2593.00	31.90	1.550
		High	2670.00	32.10	1.622
	256QAM	Low	2516.00	31.59	1.443
		Middle	2593.00	31.91	1.552
		High	2670.00	32.46	1.764
Port 19	QPSK	Low	2516.00	31.53	1.423
		Middle	2593.00	31.72	1.485
		High	2670.00	32.09	1.619
	16QAM	Low	2516.00	31.60	1.445
		Middle	2593.00	31.66	1.466
		High	2670.00	32.15	1.642
	64QAM	Low	2516.00	31.40	1.380
		Middle	2593.00	31.89	1.544
		High	2670.00	32.44	1.755
	256QAM	Low	2516.00	31.51	1.414
		Middle	2593.00	31.84	1.527
		High	2670.00	32.01	1.587
Port 20	QPSK	Low	2516.00	31.56	1.433
		Middle	2593.00	32.09	1.616
		High	2670.00	32.37	1.725
	16QAM	Low	2516.00	31.64	1.457
		Middle	2593.00	31.84	1.528
		High	2670.00	32.28	1.690
	64QAM	Low	2516.00	31.52	1.419
		Middle	2593.00	31.86	1.535
		High	2670.00	32.36	1.721
	256QAM	Low	2516.00	31.79	1.511
		Middle	2593.00	31.97	1.573
		High	2670.00	32.38	1.730

Port 21	QPSK	Low	2516.00	31.83	1.522
		Middle	2593.00	31.92	1.556
		High	2670.00	31.90	1.548
	16QAM	Low	2516.00	31.70	1.480
		Middle	2593.00	31.80	1.515
		High	2670.00	32.27	1.687
	64QAM	Low	2516.00	31.64	1.459
		Middle	2593.00	31.78	1.507
		High	2670.00	31.93	1.560
	256QAM	Low	2516.00	31.63	1.455
		Middle	2593.00	31.72	1.488
		High	2670.00	31.83	1.524
Port 22	QPSK	Low	2516.00	31.47	1.402
		Middle	2593.00	31.81	1.516
		High	2670.00	32.04	1.601
	16QAM	Low	2516.00	31.47	1.402
		Middle	2593.00	31.62	1.450
		High	2670.00	31.76	1.500
	64QAM	Low	2516.00	31.69	1.476
		Middle	2593.00	32.12	1.631
		High	2670.00	31.75	1.496
	256QAM	Low	2516.00	31.43	1.389
		Middle	2593.00	31.98	1.576
		High	2670.00	31.79	1.511
Port 23	QPSK	Low	2516.00	31.75	1.496
		Middle	2593.00	31.73	1.490
		High	2670.00	32.12	1.629
	16QAM	Low	2516.00	31.89	1.544
		Middle	2593.00	31.89	1.544
		High	2670.00	31.97	1.575
	64QAM	Low	2516.00	31.63	1.454
		Middle	2593.00	31.87	1.536
		High	2670.00	32.09	1.618
	256QAM	Low	2516.00	31.87	1.538
		Middle	2593.00	31.82	1.522
		High	2670.00	32.20	1.658

Port 24	QPSK	Low	2516.00	31.53	1.421
		Middle	2593.00	31.64	1.459
		High	2670.00	32.04	1.598
	16QAM	Low	2516.00	31.72	1.486
		Middle	2593.00	31.81	1.515
		High	2670.00	32.18	1.650
	64QAM	Low	2516.00	31.60	1.447
		Middle	2593.00	31.83	1.524
		High	2670.00	32.00	1.585
	256QAM	Low	2516.00	31.47	1.403
		Middle	2593.00	31.68	1.471
		High	2670.00	32.40	1.737
Port 25	QPSK	Low	2516.00	31.29	1.345
		Middle	2593.00	31.78	1.508
		High	2670.00	32.14	1.638
	16QAM	Low	2516.00	31.54	1.425
		Middle	2593.00	31.61	1.449
		High	2670.00	32.18	1.653
	64QAM	Low	2516.00	31.27	1.338
		Middle	2593.00	31.97	1.575
		High	2670.00	32.18	1.653
	256QAM	Low	2516.00	31.64	1.459
		Middle	2593.00	31.92	1.556
		High	2670.00	32.23	1.672
Port 26	QPSK	Low	2516.00	31.68	1.471
		Middle	2593.00	31.63	1.457
		High	2670.00	32.03	1.597
	16QAM	Low	2516.00	31.86	1.536
		Middle	2593.00	31.85	1.530
		High	2670.00	32.35	1.716
	64QAM	Low	2516.00	31.79	1.511
		Middle	2593.00	31.79	1.511
		High	2670.00	32.24	1.674
	256QAM	Low	2516.00	31.73	1.489
		Middle	2593.00	31.67	1.468
		High	2670.00	31.93	1.560

Port 27	QPSK	Low	2516.00	31.60	1.446
		Middle	2593.00	32.07	1.610
		High	2670.00	32.48	1.768
	16QAM	Low	2516.00	31.81	1.516
		Middle	2593.00	31.80	1.513
		High	2670.00	32.69	1.857
	64QAM	Low	2516.00	31.55	1.428
		Middle	2593.00	32.08	1.614
		High	2670.00	32.52	1.788
	256QAM	Low	2516.00	31.77	1.503
		Middle	2593.00	31.94	1.562
		High	2670.00	32.62	1.826
Port 28	QPSK	Low	2516.00	31.69	1.477
		Middle	2593.00	31.72	1.485
		High	2670.00	32.10	1.622
	16QAM	Low	2516.00	31.50	1.411
		Middle	2593.00	31.85	1.531
		High	2670.00	32.19	1.656
	64QAM	Low	2516.00	31.36	1.368
		Middle	2593.00	31.91	1.552
		High	2670.00	32.47	1.766
	256QAM	Low	2516.00	31.32	1.355
		Middle	2593.00	31.72	1.487
		High	2670.00	32.04	1.598
Port 29	QPSK	Low	2516.00	32.01	1.589
		Middle	2593.00	31.69	1.476
		High	2670.00	32.59	1.817
	16QAM	Low	2516.00	31.90	1.550
		Middle	2593.00	31.61	1.448
		High	2670.00	32.47	1.767
	64QAM	Low	2516.00	31.80	1.512
		Middle	2593.00	31.77	1.505
		High	2670.00	32.40	1.739
	256QAM	Low	2516.00	31.69	1.476
		Middle	2593.00	31.83	1.523
		High	2670.00	32.43	1.751

Port 30	QPSK	Low	2516.00	31.61	1.449
		Middle	2593.00	31.96	1.571
		High	2670.00	32.08	1.614
	16QAM	Low	2516.00	31.84	1.529
		Middle	2593.00	31.97	1.574
		High	2670.00	32.24	1.675
	64QAM	Low	2516.00	31.76	1.500
		Middle	2593.00	31.68	1.474
		High	2670.00	32.14	1.637
	256QAM	Low	2516.00	31.90	1.551
		Middle	2593.00	31.87	1.539
		High	2670.00	32.26	1.683
Port 31	QPSK	Low	2516.00	31.87	1.539
		Middle	2593.00	31.61	1.448
		High	2670.00	31.99	1.581
	16QAM	Low	2516.00	31.76	1.498
		Middle	2593.00	31.81	1.517
		High	2670.00	32.09	1.619
	64QAM	Low	2516.00	31.68	1.471
		Middle	2593.00	31.64	1.457
		High	2670.00	32.17	1.647
	256QAM	Low	2516.00	31.68	1.471
		Middle	2593.00	31.60	1.447
		High	2670.00	32.07	1.610
Port 32	QPSK	Low	2516.00	31.62	1.452
		Middle	2593.00	31.99	1.582
		High	2670.00	31.89	1.545
	16QAM	Low	2516.00	31.97	1.576
		Middle	2593.00	32.14	1.636
		High	2670.00	31.93	1.561
	64QAM	Low	2516.00	31.88	1.541
		Middle	2593.00	31.93	1.560
		High	2670.00	31.97	1.575
	256QAM	Low	2516.00	31.71	1.484
		Middle	2593.00	32.13	1.633
		High	2670.00	32.11	1.624

Sum Data of Port 1 ~ Port32

Frequency (MHz)	Output Power			
	QPSK	16QAM	64QAM	256QAM
	W			
2516.00	46.97	46.92	46.63	46.68
2593.00	48.57	48.06	48.70	48.64
2670.00	52.06	52.18	52.20	52.12

EIRP Calculation

Item	Formula	Value (dBm)
27.50(h)(1)(ii) Limit	33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW = 33 dBW + 10 log(40/6) dBW + 10log(360/14) dBW	85.341
Total power of port 0 to 15	Sum all measured power value of W units	43.001
Sum ANT gain port 0 to 15	Total power + Antenna gain = 43.001 dBm + 23.5 dBi	66.501
Total power of port 16 to 31	Sum all measured power value of W units	43.143
Sum ANT gain port 16 to 31	Total power + Antenna gain = 43.143 dBm + 23.5 dBi	66.643
Final Calculated EIRP	Sum port 0 to 31 (with Antenna gain)	69.583

* EIRP Limit was described only for the worst case.

* EIRP Calculation was performed for point of having maximum output power.

  - Port 27, 16QAM, High channel.

* Antenna gain and horizontal beamwidth were quoted from manufacturer's specification

  - Antenna gain (16 port) = Maximum service beam gain = 23.5 dBi

  - Total horizontal plane beamwidth (maximum) = 14°

5G NR 50 MHz 1 Carrier

Port	Modulation	Channel	Frequency (MHz)	Measured Output Power	
				(dBm)	(W)
Port 1	QPSK	Low	2521.00	33.06	2.024
		Middle	2593.00	32.86	1.931
		High	2665.00	33.51	2.245
	16QAM	Low	2521.00	32.70	1.861
		Middle	2593.00	32.61	1.824
		High	2665.00	33.32	2.145
	64QAM	Low	2521.00	33.14	2.061
		Middle	2593.00	32.82	1.912
		High	2665.00	33.30	2.139
	256QAM	Low	2521.00	33.13	2.057
		Middle	2593.00	32.92	1.959
		High	2665.00	33.27	2.123
Port 2	QPSK	Low	2521.00	33.03	2.010
		Middle	2593.00	33.03	2.009
		High	2665.00	32.92	1.959
	16QAM	Low	2521.00	32.86	1.932
		Middle	2593.00	32.96	1.978
		High	2665.00	32.81	1.909
	64QAM	Low	2521.00	32.86	1.932
		Middle	2593.00	33.09	2.038
		High	2665.00	32.96	1.975
	256QAM	Low	2521.00	32.88	1.942
		Middle	2593.00	33.14	2.062
		High	2665.00	32.80	1.903

Port 3	QPSK	Low	2521.00	32.84	1.921
		Middle	2593.00	33.09	2.039
		High	2665.00	33.21	2.096
	16QAM	Low	2521.00	32.55	1.798
		Middle	2593.00	33.00	1.995
		High	2665.00	33.16	2.072
	64QAM	Low	2521.00	33.08	2.031
		Middle	2593.00	33.30	2.138
		High	2665.00	33.11	2.045
	256QAM	Low	2521.00	32.96	1.977
		Middle	2593.00	33.06	2.021
		High	2665.00	33.13	2.054
Port 4	QPSK	Low	2521.00	32.83	1.920
		Middle	2593.00	32.87	1.936
		High	2665.00	33.01	2.002
	16QAM	Low	2521.00	32.97	1.981
		Middle	2593.00	33.03	2.009
		High	2665.00	33.37	2.175
	64QAM	Low	2521.00	32.79	1.901
		Middle	2593.00	33.07	2.026
		High	2665.00	32.85	1.929
	256QAM	Low	2521.00	32.82	1.914
		Middle	2593.00	32.93	1.963
		High	2665.00	33.06	2.024
Port 5	QPSK	Low	2521.00	32.58	1.811
		Middle	2593.00	32.57	1.808
		High	2665.00	33.14	2.059
	16QAM	Low	2521.00	32.65	1.843
		Middle	2593.00	32.44	1.754
		High	2665.00	33.13	2.056
	64QAM	Low	2521.00	32.78	1.899
		Middle	2593.00	32.46	1.764
		High	2665.00	33.14	2.060
	256QAM	Low	2521.00	32.85	1.927
		Middle	2593.00	32.56	1.805
		High	2665.00	33.32	2.149

Port 6	QPSK	Low	2521.00	32.72	1.869
		Middle	2593.00	32.62	1.826
		High	2665.00	33.36	2.168
	16QAM	Low	2521.00	32.88	1.942
		Middle	2593.00	32.64	1.838
		High	2665.00	33.23	2.103
	64QAM	Low	2521.00	32.70	1.863
		Middle	2593.00	32.84	1.924
		High	2665.00	33.42	2.197
	256QAM	Low	2521.00	32.70	1.860
		Middle	2593.00	32.73	1.873
		High	2665.00	33.54	2.257
Port 7	QPSK	Low	2521.00	32.67	1.851
		Middle	2593.00	32.89	1.945
		High	2665.00	33.22	2.099
	16QAM	Low	2521.00	33.14	2.062
		Middle	2593.00	32.86	1.933
		High	2665.00	32.98	1.987
	64QAM	Low	2521.00	32.80	1.904
		Middle	2593.00	33.09	2.035
		High	2665.00	33.17	2.074
	256QAM	Low	2521.00	32.96	1.976
		Middle	2593.00	32.90	1.949
		High	2665.00	33.35	2.164
Port 8	QPSK	Low	2521.00	32.91	1.952
		Middle	2593.00	33.05	2.019
		High	2665.00	32.60	1.820
	16QAM	Low	2521.00	32.67	1.849
		Middle	2593.00	33.33	2.151
		High	2665.00	32.74	1.880
	64QAM	Low	2521.00	32.65	1.840
		Middle	2593.00	33.37	2.173
		High	2665.00	32.38	1.731
	256QAM	Low	2521.00	32.79	1.901
		Middle	2593.00	33.17	2.073
		High	2665.00	32.50	1.777

Port 9	QPSK	Low	2521.00	32.70	1.863
		Middle	2593.00	32.76	1.887
		High	2665.00	33.01	2.000
	16QAM	Low	2521.00	33.10	2.040
		Middle	2593.00	32.71	1.866
		High	2665.00	32.75	1.884
	64QAM	Low	2521.00	32.64	1.835
		Middle	2593.00	32.91	1.957
		High	2665.00	32.88	1.941
	256QAM	Low	2521.00	32.55	1.799
		Middle	2593.00	33.03	2.007
		High	2665.00	32.78	1.895
Port 10	QPSK	Low	2521.00	32.66	1.845
		Middle	2593.00	32.69	1.860
		High	2665.00	33.03	2.008
	16QAM	Low	2521.00	32.50	1.780
		Middle	2593.00	33.03	2.009
		High	2665.00	33.06	2.021
	64QAM	Low	2521.00	32.40	1.739
		Middle	2593.00	33.06	2.024
		High	2665.00	33.33	2.155
	256QAM	Low	2521.00	32.52	1.784
		Middle	2593.00	33.03	2.008
		High	2665.00	33.04	2.013
Port 11	QPSK	Low	2521.00	32.75	1.885
		Middle	2593.00	32.53	1.790
		High	2665.00	32.86	1.933
	16QAM	Low	2521.00	32.94	1.967
		Middle	2593.00	32.75	1.884
		High	2665.00	33.02	2.002
	64QAM	Low	2521.00	32.78	1.898
		Middle	2593.00	32.35	1.719
		High	2665.00	33.25	2.112
	256QAM	Low	2521.00	32.91	1.956
		Middle	2593.00	32.66	1.845
		High	2665.00	32.89	1.944

Port 12	QPSK	Low	2521.00	32.80	1.905
		Middle	2593.00	32.86	1.932
		High	2665.00	32.46	1.761
	16QAM	Low	2521.00	32.67	1.848
		Middle	2593.00	32.60	1.820
		High	2665.00	32.79	1.901
	64QAM	Low	2521.00	32.59	1.814
		Middle	2593.00	32.70	1.860
		High	2665.00	32.80	1.907
	256QAM	Low	2521.00	32.57	1.807
		Middle	2593.00	32.92	1.960
		High	2665.00	32.62	1.826
Port 13	QPSK	Low	2521.00	32.52	1.788
		Middle	2593.00	32.81	1.910
		High	2665.00	33.24	2.110
	16QAM	Low	2521.00	32.78	1.895
		Middle	2593.00	32.62	1.828
		High	2665.00	32.85	1.928
	64QAM	Low	2521.00	32.85	1.926
		Middle	2593.00	32.68	1.854
		High	2665.00	32.96	1.977
	256QAM	Low	2521.00	32.58	1.813
		Middle	2593.00	32.69	1.859
		High	2665.00	32.98	1.986
Port 14	QPSK	Low	2521.00	32.64	1.835
		Middle	2593.00	33.30	2.137
		High	2665.00	32.99	1.993
	16QAM	Low	2521.00	32.95	1.971
		Middle	2593.00	32.91	1.956
		High	2665.00	33.06	2.023
	64QAM	Low	2521.00	32.61	1.823
		Middle	2593.00	33.17	2.076
		High	2665.00	33.00	1.996
	256QAM	Low	2521.00	32.56	1.801
		Middle	2593.00	32.90	1.949
		High	2665.00	33.02	2.006

Port 15	QPSK	Low	2521.00	32.95	1.971
		Middle	2593.00	33.02	2.004
		High	2665.00	32.96	1.977
	16QAM	Low	2521.00	32.91	1.953
		Middle	2593.00	32.51	1.784
		High	2665.00	32.98	1.986
	64QAM	Low	2521.00	32.99	1.989
		Middle	2593.00	32.88	1.940
		High	2665.00	32.91	1.953
	256QAM	Low	2521.00	32.88	1.939
		Middle	2593.00	33.05	2.017
		High	2665.00	32.93	1.965
Port 16	QPSK	Low	2521.00	32.49	1.773
		Middle	2593.00	32.99	1.990
		High	2665.00	33.32	2.150
	16QAM	Low	2521.00	32.65	1.842
		Middle	2593.00	33.13	2.057
		High	2665.00	33.27	2.122
	64QAM	Low	2521.00	32.48	1.769
		Middle	2593.00	32.75	1.883
		High	2665.00	33.04	2.012
	256QAM	Low	2521.00	32.50	1.780
		Middle	2593.00	32.96	1.977
		High	2665.00	32.95	1.974
Port 17	QPSK	Low	2521.00	32.93	1.963
		Middle	2593.00	32.58	1.810
		High	2665.00	32.89	1.947
	16QAM	Low	2521.00	32.90	1.952
		Middle	2593.00	32.77	1.891
		High	2665.00	33.16	2.071
	64QAM	Low	2521.00	32.89	1.945
		Middle	2593.00	32.76	1.886
		High	2665.00	33.07	2.029
	256QAM	Low	2521.00	32.95	1.973
		Middle	2593.00	32.86	1.932
		High	2665.00	32.67	1.851

Port 18	QPSK	Low	2521.00	32.71	1.865
		Middle	2593.00	33.04	2.014
		High	2665.00	32.83	1.918
	16QAM	Low	2521.00	32.82	1.914
		Middle	2593.00	33.03	2.008
		High	2665.00	33.21	2.096
	64QAM	Low	2521.00	33.00	1.998
		Middle	2593.00	32.89	1.947
		High	2665.00	33.05	2.021
	256QAM	Low	2521.00	32.93	1.962
		Middle	2593.00	32.76	1.890
		High	2665.00	33.07	2.029
Port 19	QPSK	Low	2521.00	32.81	1.909
		Middle	2593.00	32.82	1.913
		High	2665.00	33.36	2.170
	16QAM	Low	2521.00	32.67	1.851
		Middle	2593.00	33.17	2.074
		High	2665.00	33.16	2.068
	64QAM	Low	2521.00	32.54	1.796
		Middle	2593.00	33.11	2.048
		High	2665.00	33.23	2.104
	256QAM	Low	2521.00	32.58	1.812
		Middle	2593.00	32.87	1.935
		High	2665.00	33.48	2.228
Port 20	QPSK	Low	2521.00	32.79	1.902
		Middle	2593.00	32.93	1.963
		High	2665.00	33.17	2.076
	16QAM	Low	2521.00	32.98	1.987
		Middle	2593.00	33.06	2.024
		High	2665.00	33.02	2.004
	64QAM	Low	2521.00	32.52	1.787
		Middle	2593.00	33.14	2.062
		High	2665.00	33.45	2.215
	256QAM	Low	2521.00	32.76	1.889
		Middle	2593.00	32.98	1.984
		High	2665.00	33.37	2.172

Port 21	QPSK	Low	2521.00	32.92	1.957
		Middle	2593.00	32.72	1.869
		High	2665.00	32.96	1.978
	16QAM	Low	2521.00	33.07	2.027
		Middle	2593.00	32.72	1.872
		High	2665.00	33.06	2.023
	64QAM	Low	2521.00	32.89	1.944
		Middle	2593.00	32.78	1.897
		High	2665.00	33.11	2.046
	256QAM	Low	2521.00	33.01	2.002
		Middle	2593.00	32.68	1.854
		High	2665.00	33.09	2.038
Port 22	QPSK	Low	2521.00	32.74	1.881
		Middle	2593.00	32.95	1.972
		High	2665.00	32.69	1.860
	16QAM	Low	2521.00	32.79	1.903
		Middle	2593.00	32.82	1.912
		High	2665.00	33.15	2.067
	64QAM	Low	2521.00	32.56	1.802
		Middle	2593.00	32.63	1.833
		High	2665.00	32.79	1.901
	256QAM	Low	2521.00	32.60	1.820
		Middle	2593.00	32.98	1.987
		High	2665.00	32.68	1.853
Port 23	QPSK	Low	2521.00	33.18	2.081
		Middle	2593.00	32.71	1.865
		High	2665.00	32.79	1.903
	16QAM	Low	2521.00	32.78	1.896
		Middle	2593.00	32.95	1.971
		High	2665.00	33.01	2.000
	64QAM	Low	2521.00	33.21	2.095
		Middle	2593.00	32.79	1.901
		High	2665.00	33.23	2.103
	256QAM	Low	2521.00	33.16	2.072
		Middle	2593.00	32.79	1.901
		High	2665.00	33.10	2.039

Port 24	QPSK	Low	2521.00	32.52	1.786
		Middle	2593.00	32.99	1.989
		High	2665.00	33.33	2.152
	16QAM	Low	2521.00	32.74	1.881
		Middle	2593.00	32.91	1.955
		High	2665.00	32.65	1.843
	64QAM	Low	2521.00	32.66	1.847
		Middle	2593.00	32.86	1.934
		High	2665.00	33.16	2.070
	256QAM	Low	2521.00	32.86	1.934
		Middle	2593.00	33.09	2.039
		High	2665.00	32.99	1.989
Port 25	QPSK	Low	2521.00	32.56	1.802
		Middle	2593.00	33.10	2.042
		High	2665.00	33.32	2.148
	16QAM	Low	2521.00	32.83	1.917
		Middle	2593.00	33.33	2.153
		High	2665.00	33.41	2.191
	64QAM	Low	2521.00	32.57	1.809
		Middle	2593.00	33.14	2.061
		High	2665.00	33.14	2.063
	256QAM	Low	2521.00	32.54	1.796
		Middle	2593.00	33.01	1.998
		High	2665.00	33.30	2.137
Port 26	QPSK	Low	2521.00	32.81	1.910
		Middle	2593.00	33.04	2.014
		High	2665.00	32.78	1.896
	16QAM	Low	2521.00	32.91	1.955
		Middle	2593.00	33.00	1.995
		High	2665.00	33.24	2.108
	64QAM	Low	2521.00	32.79	1.903
		Middle	2593.00	32.79	1.900
		High	2665.00	33.03	2.007
	256QAM	Low	2521.00	32.84	1.922
		Middle	2593.00	32.74	1.879
		High	2665.00	32.96	1.979

Port 27	QPSK	Low	2521.00	32.99	1.990
		Middle	2593.00	33.31	2.142
		High	2665.00	33.14	2.063
	16QAM	Low	2521.00	32.85	1.927
		Middle	2593.00	33.09	2.035
		High	2665.00	33.19	2.085
	64QAM	Low	2521.00	33.11	2.048
		Middle	2593.00	33.12	2.049
		High	2665.00	33.29	2.134
	256QAM	Low	2521.00	32.71	1.866
		Middle	2593.00	33.33	2.151
		High	2665.00	33.48	2.229
Port 28	QPSK	Low	2521.00	33.03	2.010
		Middle	2593.00	33.09	2.038
		High	2665.00	33.05	2.016
	16QAM	Low	2521.00	33.03	2.010
		Middle	2593.00	33.02	2.004
		High	2665.00	32.91	1.952
	64QAM	Low	2521.00	32.85	1.930
		Middle	2593.00	33.18	2.078
		High	2665.00	33.21	2.093
	256QAM	Low	2521.00	32.97	1.981
		Middle	2593.00	33.24	2.110
		High	2665.00	33.03	2.010
Port 29	QPSK	Low	2521.00	32.90	1.948
		Middle	2593.00	33.12	2.052
		High	2665.00	33.47	2.223
	16QAM	Low	2521.00	32.88	1.940
		Middle	2593.00	33.18	2.079
		High	2665.00	33.51	2.243
	64QAM	Low	2521.00	32.94	1.967
		Middle	2593.00	32.71	1.866
		High	2665.00	33.54	2.258
	256QAM	Low	2521.00	32.84	1.924
		Middle	2593.00	33.03	2.008
		High	2665.00	33.57	2.272

Port 30	QPSK	Low	2521.00	33.08	2.030
		Middle	2593.00	33.18	2.079
		High	2665.00	32.89	1.947
	16QAM	Low	2521.00	32.87	1.938
		Middle	2593.00	32.97	1.982
		High	2665.00	33.25	2.116
	64QAM	Low	2521.00	32.86	1.930
		Middle	2593.00	33.05	2.017
		High	2665.00	33.18	2.080
	256QAM	Low	2521.00	32.97	1.981
		Middle	2593.00	32.99	1.990
		High	2665.00	32.95	1.971
Port 31	QPSK	Low	2521.00	32.56	1.805
		Middle	2593.00	32.73	1.877
		High	2665.00	33.08	2.035
	16QAM	Low	2521.00	32.95	1.972
		Middle	2593.00	33.00	1.995
		High	2665.00	32.99	1.989
	64QAM	Low	2521.00	32.98	1.985
		Middle	2593.00	32.75	1.883
		High	2665.00	32.81	1.909
	256QAM	Low	2521.00	33.04	2.013
		Middle	2593.00	32.83	1.920
		High	2665.00	32.78	1.895
Port 32	QPSK	Low	2521.00	32.77	1.893
		Middle	2593.00	33.13	2.055
		High	2665.00	33.16	2.071
	16QAM	Low	2521.00	32.95	1.973
		Middle	2593.00	33.02	2.004
		High	2665.00	32.98	1.986
	64QAM	Low	2521.00	33.10	2.042
		Middle	2593.00	32.86	1.930
		High	2665.00	33.17	2.074
	256QAM	Low	2521.00	33.20	2.090
		Middle	2593.00	33.11	2.047
		High	2665.00	33.06	2.025

Sum Data of Port 1 ~ Port32

Frequency (MHz)	Output Power			
	QPSK	16QAM	64QAM	256QAM
	W			
2521.00	60.96	61.60	61.05	61.27
2593.00	62.72	62.64	62.62	62.95
2665.00	64.78	65.04	65.31	64.78

EIRP Calculation

Item	Formula	Value (dBm)
27.50(h)(1)(ii) Limit	33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW = 33 dBW + 10 log(50/6) dBW + 10log(360/14) dBW	86.310
Total power of port 0 to 15	Sum all measured power value of W units	44.087
Sum ANT gain port 0 to 15	Total power + Antenna gain = 44.087 dBm + 23.5 dBi	67.587
Total power of port 16 to 31	Sum all measured power value of W units	44.092
Sum ANT gain port 16 to 31	Total power + Antenna gain = 44.092 dBm + 23.5 dBi	67.592
Final Calculated EIRP	Sum port 0 to 31 (with Antenna gain)	70.600

* EIRP Limit was described only for the worst case.

* EIRP Calculation was performed for point of having maximum output power.

  - Port 29, 256QAM, High channel.

* Antenna gain and horizontal beamwidth were quoted from manufacturer's specification

  - Antenna gain (16 port) = Maximum service beam gain = 23.5 dBi

  - Total horizontal plane beamwidth (maximum) = 14°

5G NR 80 MHz 1 Carrier

Port	Modulation	Channel	Frequency (MHz)	Measured Output Power	
				(dBm)	(W)
Port 1	QPSK	Low	2536.00	33.77	2.380
		Middle	2593.00	33.75	2.371
		High	2650.00	34.13	2.589
	16QAM	Low	2536.00	33.91	2.460
		Middle	2593.00	33.19	2.083
		High	2650.00	33.21	2.094
	64QAM	Low	2536.00	33.95	2.481
		Middle	2593.00	33.56	2.268
		High	2650.00	33.62	2.300
	256QAM	Low	2536.00	33.49	2.232
		Middle	2593.00	33.60	2.293
		High	2650.00	33.81	2.404
Port 2	QPSK	Low	2536.00	34.07	2.556
		Middle	2593.00	33.72	2.357
		High	2650.00	33.71	2.349
	16QAM	Low	2536.00	33.44	2.205
		Middle	2593.00	34.18	2.618
		High	2650.00	33.32	2.146
	64QAM	Low	2536.00	33.52	2.250
		Middle	2593.00	34.06	2.549
		High	2650.00	33.41	2.194
	256QAM	Low	2536.00	34.05	2.542
		Middle	2593.00	33.42	2.198
		High	2650.00	33.74	2.368

Port 3	QPSK	Low	2536.00	33.56	2.270
		Middle	2593.00	33.83	2.415
		High	2650.00	33.68	2.336
	16QAM	Low	2536.00	33.31	2.145
		Middle	2593.00	33.87	2.439
		High	2650.00	33.33	2.152
	64QAM	Low	2536.00	33.86	2.432
		Middle	2593.00	33.70	2.345
		High	2650.00	33.97	2.497
	256QAM	Low	2536.00	33.35	2.163
		Middle	2593.00	33.69	2.338
		High	2650.00	33.61	2.298
Port 4	QPSK	Low	2536.00	33.87	2.436
		Middle	2593.00	33.40	2.190
		High	2650.00	34.01	2.520
	16QAM	Low	2536.00	34.02	2.523
		Middle	2593.00	33.78	2.387
		High	2650.00	33.79	2.394
	64QAM	Low	2536.00	34.03	2.529
		Middle	2593.00	33.91	2.458
		High	2650.00	34.10	2.573
	256QAM	Low	2536.00	34.06	2.549
		Middle	2593.00	33.58	2.280
		High	2650.00	34.24	2.655
Port 5	QPSK	Low	2536.00	33.91	2.460
		Middle	2593.00	33.36	2.168
		High	2650.00	33.49	2.236
	16QAM	Low	2536.00	33.62	2.303
		Middle	2593.00	33.17	2.077
		High	2650.00	33.52	2.251
	64QAM	Low	2536.00	33.90	2.454
		Middle	2593.00	33.29	2.132
		High	2650.00	33.73	2.363
	256QAM	Low	2536.00	33.62	2.303
		Middle	2593.00	33.47	2.225
		High	2650.00	33.76	2.380

Port 6	QPSK	Low	2536.00	33.11	2.048
		Middle	2593.00	33.64	2.314
		High	2650.00	33.72	2.353
	16QAM	Low	2536.00	33.66	2.323
		Middle	2593.00	33.43	2.205
		High	2650.00	33.80	2.399
	64QAM	Low	2536.00	33.38	2.175
		Middle	2593.00	33.81	2.402
		High	2650.00	33.49	2.232
	256QAM	Low	2536.00	33.65	2.318
		Middle	2593.00	33.54	2.262
		High	2650.00	33.45	2.212
Port 7	QPSK	Low	2536.00	33.50	2.237
		Middle	2593.00	33.83	2.418
		High	2650.00	33.37	2.171
	16QAM	Low	2536.00	33.44	2.209
		Middle	2593.00	33.55	2.265
		High	2650.00	33.09	2.035
	64QAM	Low	2536.00	33.73	2.363
		Middle	2593.00	33.12	2.051
		High	2650.00	33.58	2.281
	256QAM	Low	2536.00	33.51	2.246
		Middle	2593.00	33.03	2.008
		High	2650.00	33.40	2.188
Port 8	QPSK	Low	2536.00	33.46	2.217
		Middle	2593.00	34.03	2.528
		High	2650.00	33.83	2.416
	16QAM	Low	2536.00	34.05	2.541
		Middle	2593.00	34.14	2.596
		High	2650.00	33.59	2.288
	64QAM	Low	2536.00	33.58	2.283
		Middle	2593.00	33.99	2.506
		High	2650.00	34.19	2.624
	256QAM	Low	2536.00	33.55	2.263
		Middle	2593.00	34.13	2.591
		High	2650.00	34.05	2.540

Port 9	QPSK	Low	2536.00	33.46	2.217
		Middle	2593.00	33.61	2.294
		High	2650.00	33.35	2.161
	16QAM	Low	2536.00	33.74	2.366
		Middle	2593.00	33.73	2.359
		High	2650.00	33.20	2.090
	64QAM	Low	2536.00	33.45	2.213
		Middle	2593.00	33.36	2.168
		High	2650.00	33.19	2.084
	256QAM	Low	2536.00	33.40	2.189
		Middle	2593.00	33.39	2.185
		High	2650.00	33.46	2.217
Port 10	QPSK	Low	2536.00	33.16	2.071
		Middle	2593.00	33.78	2.387
		High	2650.00	34.04	2.537
	16QAM	Low	2536.00	33.34	2.159
		Middle	2593.00	33.59	2.288
		High	2650.00	33.91	2.463
	64QAM	Low	2536.00	33.42	2.197
		Middle	2593.00	33.84	2.423
		High	2650.00	33.82	2.410
	256QAM	Low	2536.00	33.39	2.180
		Middle	2593.00	34.08	2.560
		High	2650.00	33.59	2.283
Port 11	QPSK	Low	2536.00	33.65	2.320
		Middle	2593.00	33.32	2.145
		High	2650.00	33.10	2.042
	16QAM	Low	2536.00	34.00	2.510
		Middle	2593.00	33.60	2.290
		High	2650.00	33.20	2.092
	64QAM	Low	2536.00	33.37	2.174
		Middle	2593.00	33.38	2.179
		High	2650.00	33.51	2.243
	256QAM	Low	2536.00	33.83	2.418
		Middle	2593.00	33.35	2.164
		High	2650.00	33.64	2.314

Port 12	QPSK	Low	2536.00	34.03	2.529
		Middle	2593.00	33.92	2.468
		High	2650.00	33.48	2.229
	16QAM	Low	2536.00	33.92	2.464
		Middle	2593.00	33.31	2.144
		High	2650.00	33.33	2.151
	64QAM	Low	2536.00	33.38	2.178
		Middle	2593.00	33.33	2.155
		High	2650.00	33.45	2.213
	256QAM	Low	2536.00	33.41	2.192
		Middle	2593.00	33.23	2.104
		High	2650.00	33.44	2.206
Port 13	QPSK	Low	2536.00	33.22	2.100
		Middle	2593.00	33.83	2.415
		High	2650.00	33.32	2.146
	16QAM	Low	2536.00	33.57	2.277
		Middle	2593.00	33.25	2.114
		High	2650.00	33.32	2.150
	64QAM	Low	2536.00	33.40	2.188
		Middle	2593.00	33.31	2.141
		High	2650.00	33.73	2.359
	256QAM	Low	2536.00	33.75	2.372
		Middle	2593.00	33.28	2.129
		High	2650.00	33.67	2.330
Port 14	QPSK	Low	2536.00	33.12	2.051
		Middle	2593.00	33.72	2.356
		High	2650.00	33.46	2.218
	16QAM	Low	2536.00	33.51	2.243
		Middle	2593.00	33.62	2.300
		High	2650.00	33.57	2.275
	64QAM	Low	2536.00	33.65	2.317
		Middle	2593.00	33.92	2.466
		High	2650.00	33.72	2.356
	256QAM	Low	2536.00	33.38	2.179
		Middle	2593.00	33.81	2.405
		High	2650.00	33.72	2.353

Port 15	QPSK	Low	2536.00	33.25	2.113
		Middle	2593.00	33.28	2.128
		High	2650.00	33.43	2.204
	16QAM	Low	2536.00	33.75	2.369
		Middle	2593.00	33.73	2.360
		High	2650.00	33.30	2.136
	64QAM	Low	2536.00	33.40	2.189
		Middle	2593.00	33.31	2.143
		High	2650.00	33.09	2.038
	256QAM	Low	2536.00	33.50	2.240
		Middle	2593.00	33.29	2.131
		High	2650.00	33.39	2.181
Port 16	QPSK	Low	2536.00	33.85	2.427
		Middle	2593.00	33.60	2.289
		High	2650.00	33.92	2.464
	16QAM	Low	2536.00	33.60	2.290
		Middle	2593.00	33.88	2.442
		High	2650.00	33.17	2.073
	64QAM	Low	2536.00	33.72	2.353
		Middle	2593.00	33.51	2.242
		High	2650.00	33.93	2.472
	256QAM	Low	2536.00	33.36	2.165
		Middle	2593.00	33.55	2.267
		High	2650.00	33.89	2.447
Port 17	QPSK	Low	2536.00	33.21	2.096
		Middle	2593.00	33.63	2.306
		High	2650.00	33.62	2.302
	16QAM	Low	2536.00	33.55	2.263
		Middle	2593.00	34.16	2.607
		High	2650.00	33.59	2.284
	64QAM	Low	2536.00	33.54	2.257
		Middle	2593.00	33.37	2.171
		High	2650.00	33.55	2.266
	256QAM	Low	2536.00	33.35	2.161
		Middle	2593.00	33.93	2.473
		High	2650.00	33.47	2.225

Port 18	QPSK	Low	2536.00	33.85	2.429
		Middle	2593.00	33.94	2.480
		High	2650.00	33.65	2.317
	16QAM	Low	2536.00	33.40	2.190
		Middle	2593.00	33.65	2.316
		High	2650.00	33.84	2.423
	64QAM	Low	2536.00	33.82	2.410
		Middle	2593.00	33.54	2.258
		High	2650.00	33.75	2.372
	256QAM	Low	2536.00	33.71	2.348
		Middle	2593.00	33.81	2.403
		High	2650.00	33.59	2.283
Port 19	QPSK	Low	2536.00	33.85	2.424
		Middle	2593.00	33.61	2.295
		High	2650.00	33.32	2.149
	16QAM	Low	2536.00	33.19	2.087
		Middle	2593.00	33.48	2.228
		High	2650.00	33.35	2.161
	64QAM	Low	2536.00	33.47	2.222
		Middle	2593.00	33.38	2.178
		High	2650.00	33.45	2.211
	256QAM	Low	2536.00	33.43	2.201
		Middle	2593.00	33.55	2.265
		High	2650.00	33.53	2.254
Port 20	QPSK	Low	2536.00	33.86	2.434
		Middle	2593.00	33.53	2.256
		High	2650.00	33.98	2.499
	16QAM	Low	2536.00	33.75	2.369
		Middle	2593.00	33.08	2.033
		High	2650.00	34.04	2.536
	64QAM	Low	2536.00	33.52	2.250
		Middle	2593.00	34.10	2.569
		High	2650.00	33.51	2.246
	256QAM	Low	2536.00	33.74	2.365
		Middle	2593.00	33.75	2.371
		High	2650.00	33.85	2.428

Port 21	QPSK	Low	2536.00	33.61	2.296
		Middle	2593.00	33.13	2.054
		High	2650.00	34.16	2.604
	16QAM	Low	2536.00	33.32	2.146
		Middle	2593.00	33.49	2.236
		High	2650.00	33.72	2.356
	64QAM	Low	2536.00	33.71	2.349
		Middle	2593.00	33.44	2.207
		High	2650.00	33.65	2.318
	256QAM	Low	2536.00	33.68	2.332
		Middle	2593.00	33.36	2.170
		High	2650.00	33.80	2.401
Port 22	QPSK	Low	2536.00	34.13	2.587
		Middle	2593.00	33.96	2.491
		High	2650.00	33.72	2.353
	16QAM	Low	2536.00	33.94	2.478
		Middle	2593.00	33.49	2.236
		High	2650.00	33.90	2.455
	64QAM	Low	2536.00	34.00	2.511
		Middle	2593.00	33.76	2.377
		High	2650.00	33.80	2.398
	256QAM	Low	2536.00	33.81	2.404
		Middle	2593.00	33.75	2.374
		High	2650.00	33.52	2.248
Port 23	QPSK	Low	2536.00	33.48	2.227
		Middle	2593.00	33.60	2.291
		High	2650.00	33.11	2.047
	16QAM	Low	2536.00	33.70	2.345
		Middle	2593.00	33.53	2.255
		High	2650.00	33.65	2.316
	64QAM	Low	2536.00	33.99	2.509
		Middle	2593.00	33.34	2.157
		High	2650.00	33.69	2.338
	256QAM	Low	2536.00	33.61	2.297
		Middle	2593.00	33.76	2.376
		High	2650.00	33.88	2.443

Port 24	QPSK	Low	2536.00	33.70	2.347
		Middle	2593.00	33.36	2.168
		High	2650.00	34.22	2.642
	16QAM	Low	2536.00	33.64	2.312
		Middle	2593.00	33.84	2.422
		High	2650.00	33.88	2.442
	64QAM	Low	2536.00	33.54	2.257
		Middle	2593.00	33.46	2.219
		High	2650.00	33.94	2.478
	256QAM	Low	2536.00	33.75	2.373
		Middle	2593.00	33.23	2.103
		High	2650.00	34.14	2.597
Port 25	QPSK	Low	2536.00	33.87	2.436
		Middle	2593.00	33.71	2.349
		High	2650.00	33.88	2.443
	16QAM	Low	2536.00	33.49	2.233
		Middle	2593.00	33.48	2.227
		High	2650.00	34.06	2.547
	64QAM	Low	2536.00	33.21	2.095
		Middle	2593.00	33.38	2.176
		High	2650.00	33.85	2.428
	256QAM	Low	2536.00	33.21	2.094
		Middle	2593.00	33.53	2.256
		High	2650.00	33.85	2.424
Port 26	QPSK	Low	2536.00	34.19	2.627
		Middle	2593.00	33.57	2.272
		High	2650.00	33.91	2.461
	16QAM	Low	2536.00	34.00	2.510
		Middle	2593.00	33.48	2.227
		High	2650.00	33.61	2.297
	64QAM	Low	2536.00	33.86	2.434
		Middle	2593.00	33.44	2.207
		High	2650.00	33.96	2.488
	256QAM	Low	2536.00	33.87	2.438
		Middle	2593.00	33.53	2.252
		High	2650.00	33.70	2.342

Port 27	QPSK	Low	2536.00	33.69	2.336
		Middle	2593.00	33.39	2.180
		High	2650.00	33.69	2.341
	16QAM	Low	2536.00	33.85	2.429
		Middle	2593.00	33.76	2.377
		High	2650.00	33.84	2.420
	64QAM	Low	2536.00	33.90	2.455
		Middle	2593.00	33.69	2.339
		High	2650.00	33.79	2.394
	256QAM	Low	2536.00	33.81	2.404
		Middle	2593.00	33.75	2.370
		High	2650.00	34.10	2.568
Port 28	QPSK	Low	2536.00	33.25	2.113
		Middle	2593.00	33.69	2.337
		High	2650.00	33.80	2.398
	16QAM	Low	2536.00	33.57	2.277
		Middle	2593.00	33.39	2.183
		High	2650.00	33.63	2.308
	64QAM	Low	2536.00	33.73	2.363
		Middle	2593.00	34.02	2.522
		High	2650.00	33.68	2.336
	256QAM	Low	2536.00	33.66	2.322
		Middle	2593.00	34.16	2.604
		High	2650.00	34.09	2.563
Port 29	QPSK	Low	2536.00	33.35	2.161
		Middle	2593.00	34.06	2.548
		High	2650.00	34.31	2.696
	16QAM	Low	2536.00	33.60	2.291
		Middle	2593.00	33.51	2.246
		High	2650.00	33.71	2.349
	64QAM	Low	2536.00	33.57	2.275
		Middle	2593.00	33.67	2.330
		High	2650.00	34.28	2.682
	256QAM	Low	2536.00	33.76	2.378
		Middle	2593.00	33.65	2.320
		High	2650.00	33.69	2.337

Port 30	QPSK	Low	2536.00	34.14	2.597
		Middle	2593.00	34.07	2.551
		High	2650.00	33.67	2.327
	16QAM	Low	2536.00	33.68	2.334
		Middle	2593.00	33.37	2.174
		High	2650.00	33.75	2.374
	64QAM	Low	2536.00	33.73	2.363
		Middle	2593.00	34.41	2.759
		High	2650.00	33.90	2.455
	256QAM	Low	2536.00	33.74	2.366
		Middle	2593.00	33.86	2.433
		High	2650.00	33.67	2.325
Port 31	QPSK	Low	2536.00	33.28	2.130
		Middle	2593.00	34.13	2.590
		High	2650.00	33.55	2.264
	16QAM	Low	2536.00	33.94	2.477
		Middle	2593.00	33.89	2.451
		High	2650.00	33.76	2.375
	64QAM	Low	2536.00	33.50	2.240
		Middle	2593.00	33.57	2.277
		High	2650.00	33.62	2.303
	256QAM	Low	2536.00	33.35	2.164
		Middle	2593.00	33.49	2.233
		High	2650.00	33.71	2.348
Port 32	QPSK	Low	2536.00	33.52	2.251
		Middle	2593.00	34.14	2.594
		High	2650.00	34.04	2.537
	16QAM	Low	2536.00	34.16	2.609
		Middle	2593.00	33.93	2.472
		High	2650.00	33.87	2.438
	64QAM	Low	2536.00	33.46	2.218
		Middle	2593.00	34.35	2.722
		High	2650.00	34.16	2.604
	256QAM	Low	2536.00	34.07	2.554
		Middle	2593.00	33.92	2.467
		High	2650.00	33.54	2.260

Sum Data of Port 1 ~ Port32

Frequency (MHz)	Output Power			
	QPSK	16QAM	64QAM	256QAM
	W			
2536.00	73.92	74.74	73.98	73.75
2593.00	75.01	73.66	74.10	73.61
2650.00	75.35	73.27	75.55	75.42

EIRP Calculation

Item	Formula	Value (dBm)
27.50(h)(1)(ii) Limit	33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW = 33 dBW + 10 log(80/6) dBW + 10log(360/14) dBW	88.351
Total power of port 0 to 15	Sum all measured power value of W units	44.804
Sum ANT gain port 0 to 15	Total power + Antenna gain = 44.804 dBm + 23.5 dBi	68.304
Total power of port 16 to 31	Sum all measured power value of W units	44.862
Sum ANT gain port 16 to 31	Total power + Antenna gain = 43.143 dBm + 23.5 dBi	68.362
Final Calculated EIRP	Sum port 0 to 31 (with Antenna gain)	71.344

* EIRP Limit was described only for the worst case.

* EIRP Calculation was performed for point of having maximum output power.

  - Port 30, 64QAM, Middle channel.

* Antenna gain and horizontal beamwidth were quoted from manufacturer's specification

  - Antenna gain (16 port) = Maximum service beam gain = 23.5 dBi

  - Total horizontal plane beamwidth (maximum) = 14°

5.2. OCCUPIED BANDWIDTH

Test Requirements:

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

The measurement is performed in accordance with Section 5.4.3 and 5.4.4 of ANSI C63.26.

5.4.3 Occupied bandwidth—Relative measurement procedure

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.

b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.

e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

f) Determine the reference value by either of the following:

1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the Highest level of the displayed trace (this is the reference value).

2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.

g) Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.

h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).

i) Place two markers, one at the lowest and the other at the Highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the "−X dB amplitude" at multiple points. The lowest or Highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."

j) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be

clearly labeled. Tabular data may be reported in addition to the plot(s).

5.4.4 Occupied bandwidth—Power bandwidth (99%) measurement procedure

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 (typically a span of 1.5 × OBW is sufficient).

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

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

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

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Note:

The results of the Occupied Bandwidth test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular Data of Occupied Bandwidth

5G NR 40 MHz 1 Carrier

Port	Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
Port 1	QPSK	Low	2516.00	37.891
		Middle	2593.00	37.925
		High	2670.00	37.918
	16QAM	Low	2516.00	38.056
		Middle	2593.00	38.099
		High	2670.00	38.057
	64QAM	Low	2516.00	37.922
		Middle	2593.00	37.910
		High	2670.00	37.881
	256QAM	Low	2516.00	37.898
		Middle	2593.00	37.933
		High	2670.00	37.910
Port 2	QPSK	Low	2516.00	37.944
		Middle	2593.00	37.972
		High	2670.00	37.880
	16QAM	Low	2516.00	38.056
		Middle	2593.00	38.059
		High	2670.00	38.048
	64QAM	Low	2516.00	37.966
		Middle	2593.00	37.872
		High	2670.00	37.896
	256QAM	Low	2516.00	37.861
		Middle	2593.00	37.938
		High	2670.00	37.886

Port 3	QPSK	Low	2516.00	37.943
		Middle	2593.00	37.966
		High	2670.00	37.901
	16QAM	Low	2516.00	38.070
		Middle	2593.00	38.081
		High	2670.00	38.036
	64QAM	Low	2516.00	37.880
		Middle	2593.00	37.932
		High	2670.00	37.875
	256QAM	Low	2516.00	37.936
		Middle	2593.00	37.952
		High	2670.00	37.934
Port 4	QPSK	Low	2516.00	37.820
		Middle	2593.00	37.964
		High	2670.00	37.882
	16QAM	Low	2516.00	38.116
		Middle	2593.00	38.136
		High	2670.00	38.096
	64QAM	Low	2516.00	37.956
		Middle	2593.00	38.010
		High	2670.00	37.895
	256QAM	Low	2516.00	37.920
		Middle	2593.00	37.927
		High	2670.00	37.877
Port 5	QPSK	Low	2516.00	37.897
		Middle	2593.00	37.873
		High	2670.00	37.889
	16QAM	Low	2516.00	38.019
		Middle	2593.00	38.055
		High	2670.00	38.015
	64QAM	Low	2516.00	37.927
		Middle	2593.00	37.862
		High	2670.00	37.863
	256QAM	Low	2516.00	37.908
		Middle	2593.00	37.933
		High	2670.00	37.881

Port 6	QPSK	Low	2516.00	37.947
		Middle	2593.00	37.900
		High	2670.00	37.900
	16QAM	Low	2516.00	38.022
		Middle	2593.00	38.063
		High	2670.00	38.064
	64QAM	Low	2516.00	37.891
		Middle	2593.00	37.897
		High	2670.00	37.892
	256QAM	Low	2516.00	37.955
		Middle	2593.00	37.853
		High	2670.00	37.938
Port 7	QPSK	Low	2516.00	37.960
		Middle	2593.00	37.908
		High	2670.00	37.900
	16QAM	Low	2516.00	38.076
		Middle	2593.00	38.129
		High	2670.00	38.051
	64QAM	Low	2516.00	37.896
		Middle	2593.00	37.848
		High	2670.00	37.888
	256QAM	Low	2516.00	37.824
		Middle	2593.00	37.890
		High	2670.00	37.887
Port 8	QPSK	Low	2516.00	37.943
		Middle	2593.00	37.864
		High	2670.00	37.931
	16QAM	Low	2516.00	38.045
		Middle	2593.00	38.073
		High	2670.00	38.051
	64QAM	Low	2516.00	37.878
		Middle	2593.00	37.942
		High	2670.00	37.895
	256QAM	Low	2516.00	37.907
		Middle	2593.00	38.004
		High	2670.00	37.860

Port 9	QPSK	Low	2516.00	37.968
		Middle	2593.00	37.953
		High	2670.00	37.869
	16QAM	Low	2516.00	38.081
		Middle	2593.00	38.065
		High	2670.00	38.078
	64QAM	Low	2516.00	37.890
		Middle	2593.00	37.840
		High	2670.00	37.895
	256QAM	Low	2516.00	37.897
		Middle	2593.00	37.848
		High	2670.00	37.860
Port 10	QPSK	Low	2516.00	37.946
		Middle	2593.00	37.974
		High	2670.00	37.889
	16QAM	Low	2516.00	38.107
		Middle	2593.00	38.102
		High	2670.00	38.076
	64QAM	Low	2516.00	37.912
		Middle	2593.00	37.919
		High	2670.00	37.861
	256QAM	Low	2516.00	37.871
		Middle	2593.00	37.944
		High	2670.00	37.878
Port 11	QPSK	Low	2516.00	37.926
		Middle	2593.00	37.922
		High	2670.00	37.892
	16QAM	Low	2516.00	38.082
		Middle	2593.00	38.066
		High	2670.00	38.079
	64QAM	Low	2516.00	37.898
		Middle	2593.00	37.884
		High	2670.00	37.898
	256QAM	Low	2516.00	37.920
		Middle	2593.00	37.916
		High	2670.00	37.868

Port 12	QPSK	Low	2516.00	37.892
		Middle	2593.00	37.918
		High	2670.00	37.872
	16QAM	Low	2516.00	38.051
		Middle	2593.00	38.035
		High	2670.00	38.066
	64QAM	Low	2516.00	37.900
		Middle	2593.00	37.943
		High	2670.00	37.831
	256QAM	Low	2516.00	37.865
		Middle	2593.00	37.977
		High	2670.00	37.882
Port 13	QPSK	Low	2516.00	37.930
		Middle	2593.00	37.901
		High	2670.00	37.905
	16QAM	Low	2516.00	38.002
		Middle	2593.00	38.107
		High	2670.00	38.080
	64QAM	Low	2516.00	37.982
		Middle	2593.00	37.934
		High	2670.00	37.875
	256QAM	Low	2516.00	37.885
		Middle	2593.00	37.892
		High	2670.00	37.895
Port 14	QPSK	Low	2516.00	37.853
		Middle	2593.00	37.922
		High	2670.00	37.866
	16QAM	Low	2516.00	38.080
		Middle	2593.00	38.165
		High	2670.00	38.110
	64QAM	Low	2516.00	37.885
		Middle	2593.00	37.962
		High	2670.00	37.818
	256QAM	Low	2516.00	37.939
		Middle	2593.00	37.966
		High	2670.00	37.878

Port 15	QPSK	Low	2516.00	37.906
		Middle	2593.00	37.892
		High	2670.00	37.876
	16QAM	Low	2516.00	38.072
		Middle	2593.00	38.093
		High	2670.00	38.148
	64QAM	Low	2516.00	38.000
		Middle	2593.00	37.921
		High	2670.00	37.928
	256QAM	Low	2516.00	37.841
		Middle	2593.00	37.894
		High	2670.00	37.851
Port 16	QPSK	Low	2516.00	37.931
		Middle	2593.00	37.958
		High	2670.00	37.922
	16QAM	Low	2516.00	38.099
		Middle	2593.00	38.118
		High	2670.00	38.086
	64QAM	Low	2516.00	37.877
		Middle	2593.00	37.874
		High	2670.00	37.930
	256QAM	Low	2516.00	37.937
		Middle	2593.00	37.899
		High	2670.00	37.893
Port 17	QPSK	Low	2516.00	37.885
		Middle	2593.00	37.880
		High	2670.00	37.869
	16QAM	Low	2516.00	38.100
		Middle	2593.00	38.127
		High	2670.00	38.152
	64QAM	Low	2516.00	37.883
		Middle	2593.00	37.919
		High	2670.00	37.870
	256QAM	Low	2516.00	37.905
		Middle	2593.00	37.936
		High	2670.00	37.886

Port 18	QPSK	Low	2516.00	37.894
		Middle	2593.00	37.968
		High	2670.00	37.848
	16QAM	Low	2516.00	38.138
		Middle	2593.00	38.050
		High	2670.00	38.078
	64QAM	Low	2516.00	37.831
		Middle	2593.00	37.951
		High	2670.00	37.931
	256QAM	Low	2516.00	37.856
		Middle	2593.00	37.919
		High	2670.00	37.849
Port 19	QPSK	Low	2516.00	37.882
		Middle	2593.00	37.893
		High	2670.00	37.926
	16QAM	Low	2516.00	38.056
		Middle	2593.00	38.078
		High	2670.00	38.149
	64QAM	Low	2516.00	37.903
		Middle	2593.00	38.000
		High	2670.00	37.859
	256QAM	Low	2516.00	37.961
		Middle	2593.00	37.933
		High	2670.00	37.903
Port 20	QPSK	Low	2516.00	37.892
		Middle	2593.00	37.933
		High	2670.00	37.897
	16QAM	Low	2516.00	38.105
		Middle	2593.00	38.072
		High	2670.00	38.138
	64QAM	Low	2516.00	37.871
		Middle	2593.00	37.939
		High	2670.00	37.868
	256QAM	Low	2516.00	37.818
		Middle	2593.00	37.911
		High	2670.00	37.921

Port 21	QPSK	Low	2516.00	37.887
		Middle	2593.00	37.873
		High	2670.00	37.901
	16QAM	Low	2516.00	38.016
		Middle	2593.00	38.090
		High	2670.00	38.076
	64QAM	Low	2516.00	37.899
		Middle	2593.00	37.904
		High	2670.00	37.867
	256QAM	Low	2516.00	37.850
		Middle	2593.00	37.890
		High	2670.00	37.910
Port 22	QPSK	Low	2516.00	37.915
		Middle	2593.00	37.877
		High	2670.00	37.839
	16QAM	Low	2516.00	38.079
		Middle	2593.00	38.138
		High	2670.00	38.119
	64QAM	Low	2516.00	37.932
		Middle	2593.00	37.894
		High	2670.00	37.922
	256QAM	Low	2516.00	37.909
		Middle	2593.00	37.942
		High	2670.00	37.903
Port 23	QPSK	Low	2516.00	37.959
		Middle	2593.00	37.956
		High	2670.00	37.910
	16QAM	Low	2516.00	38.036
		Middle	2593.00	38.123
		High	2670.00	38.097
	64QAM	Low	2516.00	37.874
		Middle	2593.00	37.851
		High	2670.00	37.887
	256QAM	Low	2516.00	37.869
		Middle	2593.00	37.938
		High	2670.00	37.875

Port 24	QPSK	Low	2516.00	37.820
		Middle	2593.00	37.946
		High	2670.00	37.892
	16QAM	Low	2516.00	38.064
		Middle	2593.00	38.091
		High	2670.00	38.063
	64QAM	Low	2516.00	37.970
		Middle	2593.00	37.969
		High	2670.00	37.917
	256QAM	Low	2516.00	37.882
		Middle	2593.00	37.881
		High	2670.00	37.837
Port 25	QPSK	Low	2516.00	37.873
		Middle	2593.00	37.914
		High	2670.00	37.857
	16QAM	Low	2516.00	38.048
		Middle	2593.00	38.147
		High	2670.00	38.015
	64QAM	Low	2516.00	37.882
		Middle	2593.00	37.975
		High	2670.00	37.914
	256QAM	Low	2516.00	37.881
		Middle	2593.00	37.975
		High	2670.00	37.849
Port 26	QPSK	Low	2516.00	37.926
		Middle	2593.00	37.949
		High	2670.00	37.953
	16QAM	Low	2516.00	38.028
		Middle	2593.00	38.079
		High	2670.00	38.065
	64QAM	Low	2516.00	37.900
		Middle	2593.00	37.909
		High	2670.00	37.919
	256QAM	Low	2516.00	37.904
		Middle	2593.00	37.902
		High	2670.00	37.899

Port 27	QPSK	Low	2516.00	37.940
		Middle	2593.00	37.926
		High	2670.00	37.867
	16QAM	Low	2516.00	38.122
		Middle	2593.00	38.062
		High	2670.00	38.047
	64QAM	Low	2516.00	37.913
		Middle	2593.00	37.954
		High	2670.00	37.899
	256QAM	Low	2516.00	37.911
		Middle	2593.00	37.902
		High	2670.00	37.868
Port 28	QPSK	Low	2516.00	37.884
		Middle	2593.00	37.950
		High	2670.00	37.907
	16QAM	Low	2516.00	38.051
		Middle	2593.00	38.141
		High	2670.00	38.025
	64QAM	Low	2516.00	37.936
		Middle	2593.00	37.889
		High	2670.00	37.882
	256QAM	Low	2516.00	37.941
		Middle	2593.00	37.934
		High	2670.00	37.903
Port 29	QPSK	Low	2516.00	37.868
		Middle	2593.00	37.910
		High	2670.00	37.872
	16QAM	Low	2516.00	38.098
		Middle	2593.00	38.162
		High	2670.00	38.099
	64QAM	Low	2516.00	37.880
		Middle	2593.00	37.917
		High	2670.00	37.954
	256QAM	Low	2516.00	37.870
		Middle	2593.00	37.903
		High	2670.00	37.873

Port 30	QPSK	Low	2516.00	37.877
		Middle	2593.00	37.905
		High	2670.00	37.881
	16QAM	Low	2516.00	38.133
		Middle	2593.00	38.090
		High	2670.00	38.075
	64QAM	Low	2516.00	37.932
		Middle	2593.00	37.934
		High	2670.00	37.889
	256QAM	Low	2516.00	37.907
		Middle	2593.00	37.953
		High	2670.00	37.877
Port 31	QPSK	Low	2516.00	37.906
		Middle	2593.00	37.919
		High	2670.00	37.866
	16QAM	Low	2516.00	38.061
		Middle	2593.00	38.105
		High	2670.00	38.039
	64QAM	Low	2516.00	37.897
		Middle	2593.00	37.933
		High	2670.00	37.827
	256QAM	Low	2516.00	37.897
		Middle	2593.00	37.874
		High	2670.00	37.862
Port 32	QPSK	Low	2516.00	37.918
		Middle	2593.00	37.943
		High	2670.00	37.868
	16QAM	Low	2516.00	38.047
		Middle	2593.00	38.075
		High	2670.00	38.071
	64QAM	Low	2516.00	37.930
		Middle	2593.00	37.919
		High	2670.00	37.860
	256QAM	Low	2516.00	37.845
		Middle	2593.00	37.895
		High	2670.00	37.864

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Port	Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
Port 1	QPSK	Low	2521.00	47.532
		Middle	2593.00	47.538
		High	2665.00	47.599
	16QAM	Low	2521.00	47.715
		Middle	2593.00	47.734
		High	2665.00	47.686
	64QAM	Low	2521.00	47.570
		Middle	2593.00	47.599
		High	2665.00	47.469
	256QAM	Low	2521.00	47.510
		Middle	2593.00	47.594
		High	2665.00	47.583
Port 2	QPSK	Low	2521.00	47.552
		Middle	2593.00	47.508
		High	2665.00	47.526
	16QAM	Low	2521.00	47.763
		Middle	2593.00	47.735
		High	2665.00	47.693
	64QAM	Low	2521.00	47.557
		Middle	2593.00	47.538
		High	2665.00	47.528
	256QAM	Low	2521.00	47.469
		Middle	2593.00	47.529
		High	2665.00	47.518

Port 3	QPSK	Low	2521.00	47.499
		Middle	2593.00	47.531
		High	2665.00	47.508
	16QAM	Low	2521.00	47.799
		Middle	2593.00	47.792
		High	2665.00	47.726
	64QAM	Low	2521.00	47.497
		Middle	2593.00	47.574
		High	2665.00	47.517
	256QAM	Low	2521.00	47.475
		Middle	2593.00	47.515
		High	2665.00	47.551
Port 4	QPSK	Low	2521.00	47.547
		Middle	2593.00	47.546
		High	2665.00	47.550
	16QAM	Low	2521.00	47.710
		Middle	2593.00	47.796
		High	2665.00	47.651
	64QAM	Low	2521.00	47.537
		Middle	2593.00	47.592
		High	2665.00	47.484
	256QAM	Low	2521.00	47.560
		Middle	2593.00	47.587
		High	2665.00	47.520
Port 5	QPSK	Low	2521.00	47.566
		Middle	2593.00	47.495
		High	2665.00	47.580
	16QAM	Low	2521.00	47.770
		Middle	2593.00	47.685
		High	2665.00	47.761
	64QAM	Low	2521.00	47.585
		Middle	2593.00	47.469
		High	2665.00	47.566
	256QAM	Low	2521.00	47.538
		Middle	2593.00	47.506
		High	2665.00	47.563

Port 6	QPSK	Low	2521.00	47.554
		Middle	2593.00	47.553
		High	2665.00	47.598
	16QAM	Low	2521.00	47.653
		Middle	2593.00	47.730
		High	2665.00	47.725
	64QAM	Low	2521.00	47.557
		Middle	2593.00	47.580
		High	2665.00	47.577
	256QAM	Low	2521.00	47.513
		Middle	2593.00	47.590
		High	2665.00	47.550
Port 7	QPSK	Low	2521.00	47.477
		Middle	2593.00	47.547
		High	2665.00	47.566
	16QAM	Low	2521.00	47.754
		Middle	2593.00	47.726
		High	2665.00	47.649
	64QAM	Low	2521.00	47.462
		Middle	2593.00	47.553
		High	2665.00	47.484
	256QAM	Low	2521.00	47.607
		Middle	2593.00	47.496
		High	2665.00	47.524
Port 8	QPSK	Low	2521.00	47.578
		Middle	2593.00	47.538
		High	2665.00	47.455
	16QAM	Low	2521.00	47.732
		Middle	2593.00	47.734
		High	2665.00	47.710
	64QAM	Low	2521.00	47.555
		Middle	2593.00	47.560
		High	2665.00	47.505
	256QAM	Low	2521.00	47.522
		Middle	2593.00	47.582
		High	2665.00	47.542

Port 9	QPSK	Low	2521.00	47.528
		Middle	2593.00	47.510
		High	2665.00	47.506
	16QAM	Low	2521.00	47.825
		Middle	2593.00	47.764
		High	2665.00	47.685
	64QAM	Low	2521.00	47.478
		Middle	2593.00	47.563
		High	2665.00	47.512
	256QAM	Low	2521.00	47.529
		Middle	2593.00	47.550
		High	2665.00	47.525
Port 10	QPSK	Low	2521.00	47.579
		Middle	2593.00	47.566
		High	2665.00	47.509
	16QAM	Low	2521.00	47.746
		Middle	2593.00	47.721
		High	2665.00	47.722
	64QAM	Low	2521.00	47.555
		Middle	2593.00	47.557
		High	2665.00	47.490
	256QAM	Low	2521.00	47.479
		Middle	2593.00	47.562
		High	2665.00	47.503
Port 11	QPSK	Low	2521.00	47.558
		Middle	2593.00	47.596
		High	2665.00	47.477
	16QAM	Low	2521.00	47.805
		Middle	2593.00	47.775
		High	2665.00	47.682
	64QAM	Low	2521.00	47.562
		Middle	2593.00	47.556
		High	2665.00	47.535
	256QAM	Low	2521.00	47.552
		Middle	2593.00	47.570
		High	2665.00	47.559

Port 12	QPSK	Low	2521.00	47.583
		Middle	2593.00	47.560
		High	2665.00	47.514
	16QAM	Low	2521.00	47.724
		Middle	2593.00	47.795
		High	2665.00	47.746
	64QAM	Low	2521.00	47.607
		Middle	2593.00	47.525
		High	2665.00	47.505
	256QAM	Low	2521.00	47.506
		Middle	2593.00	47.513
		High	2665.00	47.586
Port 13	QPSK	Low	2521.00	47.585
		Middle	2593.00	47.505
		High	2665.00	47.547
	16QAM	Low	2521.00	47.741
		Middle	2593.00	47.790
		High	2665.00	47.685
	64QAM	Low	2521.00	47.567
		Middle	2593.00	47.524
		High	2665.00	47.565
	256QAM	Low	2521.00	47.512
		Middle	2593.00	47.520
		High	2665.00	47.527
Port 14	QPSK	Low	2521.00	47.551
		Middle	2593.00	47.558
		High	2665.00	47.511
	16QAM	Low	2521.00	47.738
		Middle	2593.00	47.775
		High	2665.00	47.762
	64QAM	Low	2521.00	47.570
		Middle	2593.00	47.550
		High	2665.00	47.544
	256QAM	Low	2521.00	47.525
		Middle	2593.00	47.531
		High	2665.00	47.530

Port 15	QPSK	Low	2521.00	47.605
		Middle	2593.00	47.599
		High	2665.00	47.544
	16QAM	Low	2521.00	47.717
		Middle	2593.00	47.731
		High	2665.00	47.697
	64QAM	Low	2521.00	47.582
		Middle	2593.00	47.504
		High	2665.00	47.497
	256QAM	Low	2521.00	47.572
		Middle	2593.00	47.550
		High	2665.00	47.514
Port 16	QPSK	Low	2521.00	47.583
		Middle	2593.00	47.533
		High	2665.00	47.525
	16QAM	Low	2521.00	47.700
		Middle	2593.00	47.737
		High	2665.00	47.692
	64QAM	Low	2521.00	47.535
		Middle	2593.00	47.540
		High	2665.00	47.521
	256QAM	Low	2521.00	47.576
		Middle	2593.00	47.520
		High	2665.00	47.567
Port 17	QPSK	Low	2521.00	47.547
		Middle	2593.00	47.566
		High	2665.00	47.513
	16QAM	Low	2521.00	47.687
		Middle	2593.00	47.742
		High	2665.00	47.669
	64QAM	Low	2521.00	47.518
		Middle	2593.00	47.575
		High	2665.00	47.487
	256QAM	Low	2521.00	47.545
		Middle	2593.00	47.590
		High	2665.00	47.549

Port 18	QPSK	Low	2521.00	47.456
		Middle	2593.00	47.524
		High	2665.00	47.557
	16QAM	Low	2521.00	47.734
		Middle	2593.00	47.763
		High	2665.00	47.683
	64QAM	Low	2521.00	47.511
		Middle	2593.00	47.614
		High	2665.00	47.541
	256QAM	Low	2521.00	47.537
		Middle	2593.00	47.559
		High	2665.00	47.472
Port 19	QPSK	Low	2521.00	47.520
		Middle	2593.00	47.525
		High	2665.00	47.501
	16QAM	Low	2521.00	47.743
		Middle	2593.00	47.793
		High	2665.00	47.748
	64QAM	Low	2521.00	47.544
		Middle	2593.00	47.549
		High	2665.00	47.530
	256QAM	Low	2521.00	47.579
		Middle	2593.00	47.573
		High	2665.00	47.518
Port 20	QPSK	Low	2521.00	47.498
		Middle	2593.00	47.549
		High	2665.00	47.499
	16QAM	Low	2521.00	47.777
		Middle	2593.00	47.754
		High	2665.00	47.709
	64QAM	Low	2521.00	47.560
		Middle	2593.00	47.504
		High	2665.00	47.570
	256QAM	Low	2521.00	47.596
		Middle	2593.00	47.587
		High	2665.00	47.531

Port 21	QPSK	Low	2521.00	47.517
		Middle	2593.00	47.553
		High	2665.00	47.582
	16QAM	Low	2521.00	47.767
		Middle	2593.00	47.685
		High	2665.00	47.782
	64QAM	Low	2521.00	47.586
		Middle	2593.00	47.554
		High	2665.00	47.507
	256QAM	Low	2521.00	47.510
		Middle	2593.00	47.539
		High	2665.00	47.564
Port 22	QPSK	Low	2521.00	47.518
		Middle	2593.00	47.541
		High	2665.00	47.543
	16QAM	Low	2521.00	47.714
		Middle	2593.00	47.785
		High	2665.00	47.713
	64QAM	Low	2521.00	47.624
		Middle	2593.00	47.589
		High	2665.00	47.538
	256QAM	Low	2521.00	47.569
		Middle	2593.00	47.606
		High	2665.00	47.592
Port 23	QPSK	Low	2521.00	47.566
		Middle	2593.00	47.519
		High	2665.00	47.523
	16QAM	Low	2521.00	47.703
		Middle	2593.00	47.739
		High	2665.00	47.755
	64QAM	Low	2521.00	47.509
		Middle	2593.00	47.538
		High	2665.00	47.533
	256QAM	Low	2521.00	47.581
		Middle	2593.00	47.561
		High	2665.00	47.514

Port 24	QPSK	Low	2521.00	47.551
		Middle	2593.00	47.539
		High	2665.00	47.563
	16QAM	Low	2521.00	47.725
		Middle	2593.00	47.728
		High	2665.00	47.700
	64QAM	Low	2521.00	47.595
		Middle	2593.00	47.580
		High	2665.00	47.560
	256QAM	Low	2521.00	47.567
		Middle	2593.00	47.538
		High	2665.00	47.503
Port 25	QPSK	Low	2521.00	47.550
		Middle	2593.00	47.566
		High	2665.00	47.540
	16QAM	Low	2521.00	47.737
		Middle	2593.00	47.757
		High	2665.00	47.690
	64QAM	Low	2521.00	47.525
		Middle	2593.00	47.522
		High	2665.00	47.510
	256QAM	Low	2521.00	47.566
		Middle	2593.00	47.524
		High	2665.00	47.618
Port 26	QPSK	Low	2521.00	47.523
		Middle	2593.00	47.601
		High	2665.00	47.512
	16QAM	Low	2521.00	47.722
		Middle	2593.00	47.803
		High	2665.00	47.778
	64QAM	Low	2521.00	47.503
		Middle	2593.00	47.515
		High	2665.00	47.520
	256QAM	Low	2521.00	47.498
		Middle	2593.00	47.610
		High	2665.00	47.460

Port 27	QPSK	Low	2521.00	47.588
		Middle	2593.00	47.595
		High	2665.00	47.491
	16QAM	Low	2521.00	47.839
		Middle	2593.00	47.737
		High	2665.00	47.675
	64QAM	Low	2521.00	47.555
		Middle	2593.00	47.559
		High	2665.00	47.515
	256QAM	Low	2521.00	47.541
		Middle	2593.00	47.524
		High	2665.00	47.542
Port 28	QPSK	Low	2521.00	47.573
		Middle	2593.00	47.559
		High	2665.00	47.510
	16QAM	Low	2521.00	47.768
		Middle	2593.00	47.709
		High	2665.00	47.718
	64QAM	Low	2521.00	47.550
		Middle	2593.00	47.558
		High	2665.00	47.544
	256QAM	Low	2521.00	47.458
		Middle	2593.00	47.616
		High	2665.00	47.503
Port 29	QPSK	Low	2521.00	47.578
		Middle	2593.00	47.527
		High	2665.00	47.574
	16QAM	Low	2521.00	47.706
		Middle	2593.00	47.814
		High	2665.00	47.697
	64QAM	Low	2521.00	47.575
		Middle	2593.00	47.554
		High	2665.00	47.553
	256QAM	Low	2521.00	47.540
		Middle	2593.00	47.537
		High	2665.00	47.524

Port 30	QPSK	Low	2521.00	47.510
		Middle	2593.00	47.489
		High	2665.00	47.521
	16QAM	Low	2521.00	47.694
		Middle	2593.00	47.739
		High	2665.00	47.715
	64QAM	Low	2521.00	47.512
		Middle	2593.00	47.575
		High	2665.00	47.537
	256QAM	Low	2521.00	47.538
		Middle	2593.00	47.591
		High	2665.00	47.583
Port 31	QPSK	Low	2521.00	47.523
		Middle	2593.00	47.543
		High	2665.00	47.595
	16QAM	Low	2521.00	47.774
		Middle	2593.00	47.697
		High	2665.00	47.667
	64QAM	Low	2521.00	47.610
		Middle	2593.00	47.595
		High	2665.00	47.586
	256QAM	Low	2521.00	47.534
		Middle	2593.00	47.595
		High	2665.00	47.546
Port 32	QPSK	Low	2521.00	47.542
		Middle	2593.00	47.552
		High	2665.00	47.484
	16QAM	Low	2521.00	47.750
		Middle	2593.00	47.717
		High	2665.00	47.693
	64QAM	Low	2521.00	47.577
		Middle	2593.00	47.549
		High	2665.00	47.587
	256QAM	Low	2521.00	47.583
		Middle	2593.00	47.512
		High	2665.00	47.568

5G NR 80 MHz 1 Carrier

Port	Modulation	Channel	Frequency (MHz)	Measured Bandwidth (MHz)
Port 1	QPSK	Low	2536.00	77.383
		Middle	2593.00	77.424
		High	2650.00	77.409
	16QAM	Low	2536.00	77.818
		Middle	2593.00	77.791
		High	2650.00	77.645
	64QAM	Low	2536.00	77.419
		Middle	2593.00	77.437
		High	2650.00	77.347
	256QAM	Low	2536.00	77.446
		Middle	2593.00	77.342
		High	2650.00	77.369
Port 2	QPSK	Low	2536.00	77.439
		Middle	2593.00	77.417
		High	2650.00	77.359
	16QAM	Low	2536.00	77.690
		Middle	2593.00	77.788
		High	2650.00	77.753
	64QAM	Low	2536.00	77.449
		Middle	2593.00	77.492
		High	2650.00	77.395
	256QAM	Low	2536.00	77.450
		Middle	2593.00	77.395
		High	2650.00	77.341

Port 3	QPSK	Low	2536.00	77.379
		Middle	2593.00	77.424
		High	2650.00	77.286
	16QAM	Low	2536.00	77.714
		Middle	2593.00	77.634
		High	2650.00	77.725
	64QAM	Low	2536.00	77.335
		Middle	2593.00	77.443
		High	2650.00	77.349
	256QAM	Low	2536.00	77.282
		Middle	2593.00	77.361
		High	2650.00	77.395
Port 4	QPSK	Low	2536.00	77.417
		Middle	2593.00	77.516
		High	2650.00	77.422
	16QAM	Low	2536.00	77.730
		Middle	2593.00	77.790
		High	2650.00	77.719
	64QAM	Low	2536.00	77.408
		Middle	2593.00	77.417
		High	2650.00	77.397
	256QAM	Low	2536.00	77.384
		Middle	2593.00	77.434
		High	2650.00	77.336
Port 5	QPSK	Low	2536.00	77.438
		Middle	2593.00	77.467
		High	2650.00	77.214
	16QAM	Low	2536.00	77.763
		Middle	2593.00	77.801
		High	2650.00	77.733
	64QAM	Low	2536.00	77.386
		Middle	2593.00	77.492
		High	2650.00	77.366
	256QAM	Low	2536.00	77.444
		Middle	2593.00	77.452
		High	2650.00	77.305

Port 6	QPSK	Low	2536.00	77.374
		Middle	2593.00	77.416
		High	2650.00	77.323
	16QAM	Low	2536.00	77.723
		Middle	2593.00	77.793
		High	2650.00	77.707
	64QAM	Low	2536.00	77.486
		Middle	2593.00	77.385
		High	2650.00	77.416
	256QAM	Low	2536.00	77.399
		Middle	2593.00	77.388
		High	2650.00	77.314
Port 7	QPSK	Low	2536.00	77.392
		Middle	2593.00	77.422
		High	2650.00	77.289
	16QAM	Low	2536.00	77.702
		Middle	2593.00	77.707
		High	2650.00	77.760
	64QAM	Low	2536.00	77.364
		Middle	2593.00	77.544
		High	2650.00	77.423
	256QAM	Low	2536.00	77.457
		Middle	2593.00	77.401
		High	2650.00	77.452
Port 8	QPSK	Low	2536.00	77.355
		Middle	2593.00	77.379
		High	2650.00	77.320
	16QAM	Low	2536.00	77.696
		Middle	2593.00	77.701
		High	2650.00	77.653
	64QAM	Low	2536.00	77.335
		Middle	2593.00	77.364
		High	2650.00	77.291
	256QAM	Low	2536.00	77.472
		Middle	2593.00	77.373
		High	2650.00	77.436

Port 9	QPSK	Low	2536.00	77.444
		Middle	2593.00	77.448
		High	2650.00	77.426
	16QAM	Low	2536.00	77.748
		Middle	2593.00	77.734
		High	2650.00	77.731
	64QAM	Low	2536.00	77.342
		Middle	2593.00	77.462
		High	2650.00	77.338
	256QAM	Low	2536.00	77.292
		Middle	2593.00	77.491
		High	2650.00	77.403
Port 10	QPSK	Low	2536.00	77.340
		Middle	2593.00	77.455
		High	2650.00	77.432
	16QAM	Low	2536.00	77.733
		Middle	2593.00	77.723
		High	2650.00	77.586
	64QAM	Low	2536.00	77.396
		Middle	2593.00	77.365
		High	2650.00	77.349
	256QAM	Low	2536.00	77.318
		Middle	2593.00	77.411
		High	2650.00	77.476
Port 11	QPSK	Low	2536.00	77.448
		Middle	2593.00	77.322
		High	2650.00	77.365
	16QAM	Low	2536.00	77.704
		Middle	2593.00	77.847
		High	2650.00	77.710
	64QAM	Low	2536.00	77.384
		Middle	2593.00	77.383
		High	2650.00	77.346
	256QAM	Low	2536.00	77.332
		Middle	2593.00	77.462
		High	2650.00	77.357

Port 12	QPSK	Low	2536.00	77.268
		Middle	2593.00	77.321
		High	2650.00	77.320
	16QAM	Low	2536.00	77.734
		Middle	2593.00	77.784
		High	2650.00	77.674
	64QAM	Low	2536.00	77.409
		Middle	2593.00	77.342
		High	2650.00	77.353
	256QAM	Low	2536.00	77.331
		Middle	2593.00	77.341
		High	2650.00	77.310
Port 13	QPSK	Low	2536.00	77.328
		Middle	2593.00	77.387
		High	2650.00	77.329
	16QAM	Low	2536.00	77.711
		Middle	2593.00	77.675
		High	2650.00	77.708
	64QAM	Low	2536.00	77.382
		Middle	2593.00	77.385
		High	2650.00	77.360
	256QAM	Low	2536.00	77.379
		Middle	2593.00	77.490
		High	2650.00	77.299
Port 14	QPSK	Low	2536.00	77.396
		Middle	2593.00	77.392
		High	2650.00	77.359
	16QAM	Low	2536.00	77.684
		Middle	2593.00	77.832
		High	2650.00	77.728
	64QAM	Low	2536.00	77.351
		Middle	2593.00	77.345
		High	2650.00	77.349
	256QAM	Low	2536.00	77.417
		Middle	2593.00	77.414
		High	2650.00	77.309

Port 15	QPSK	Low	2536.00	77.367
		Middle	2593.00	77.343
		High	2650.00	77.393
	16QAM	Low	2536.00	77.736
		Middle	2593.00	77.753
		High	2650.00	77.803
	64QAM	Low	2536.00	77.348
		Middle	2593.00	77.376
		High	2650.00	77.375
	256QAM	Low	2536.00	77.456
		Middle	2593.00	77.375
		High	2650.00	77.354
Port 16	QPSK	Low	2536.00	77.462
		Middle	2593.00	77.423
		High	2650.00	77.355
	16QAM	Low	2536.00	77.748
		Middle	2593.00	77.746
		High	2650.00	77.581
	64QAM	Low	2536.00	77.407
		Middle	2593.00	77.514
		High	2650.00	77.300
	256QAM	Low	2536.00	77.440
		Middle	2593.00	77.558
		High	2650.00	77.346
Port 17	QPSK	Low	2536.00	77.386
		Middle	2593.00	77.403
		High	2650.00	77.316
	16QAM	Low	2536.00	77.816
		Middle	2593.00	77.755
		High	2650.00	77.686
	64QAM	Low	2536.00	77.402
		Middle	2593.00	77.430
		High	2650.00	77.348
	256QAM	Low	2536.00	77.308
		Middle	2593.00	77.460
		High	2650.00	77.346

Port 18	QPSK	Low	2536.00	77.499
		Middle	2593.00	77.438
		High	2650.00	77.395
	16QAM	Low	2536.00	77.658
		Middle	2593.00	77.814
		High	2650.00	77.641
	64QAM	Low	2536.00	77.388
		Middle	2593.00	77.432
		High	2650.00	77.385
	256QAM	Low	2536.00	77.466
		Middle	2593.00	77.468
		High	2650.00	77.350
Port 19	QPSK	Low	2536.00	77.404
		Middle	2593.00	77.427
		High	2650.00	77.346
	16QAM	Low	2536.00	77.742
		Middle	2593.00	77.713
		High	2650.00	77.672
	64QAM	Low	2536.00	77.417
		Middle	2593.00	77.362
		High	2650.00	77.303
	256QAM	Low	2536.00	77.421
		Middle	2593.00	77.339
		High	2650.00	77.349
Port 20	QPSK	Low	2536.00	77.419
		Middle	2593.00	77.424
		High	2650.00	77.361
	16QAM	Low	2536.00	77.616
		Middle	2593.00	77.780
		High	2650.00	77.716
	64QAM	Low	2536.00	77.374
		Middle	2593.00	77.417
		High	2650.00	77.308
	256QAM	Low	2536.00	77.426
		Middle	2593.00	77.373
		High	2650.00	77.309

Port 21	QPSK	Low	2536.00	77.434
		Middle	2593.00	77.432
		High	2650.00	77.319
	16QAM	Low	2536.00	77.797
		Middle	2593.00	77.704
		High	2650.00	77.760
	64QAM	Low	2536.00	77.393
		Middle	2593.00	77.400
		High	2650.00	77.283
	256QAM	Low	2536.00	77.391
		Middle	2593.00	77.404
		High	2650.00	77.305
Port 22	QPSK	Low	2536.00	77.320
		Middle	2593.00	77.402
		High	2650.00	77.264
	16QAM	Low	2536.00	77.771
		Middle	2593.00	77.799
		High	2650.00	77.682
	64QAM	Low	2536.00	77.452
		Middle	2593.00	77.436
		High	2650.00	77.339
	256QAM	Low	2536.00	77.380
		Middle	2593.00	77.296
		High	2650.00	77.408
Port 23	QPSK	Low	2536.00	77.435
		Middle	2593.00	77.429
		High	2650.00	77.309
	16QAM	Low	2536.00	77.730
		Middle	2593.00	77.789
		High	2650.00	77.675
	64QAM	Low	2536.00	77.331
		Middle	2593.00	77.451
		High	2650.00	77.325
	256QAM	Low	2536.00	77.319
		Middle	2593.00	77.490
		High	2650.00	77.264

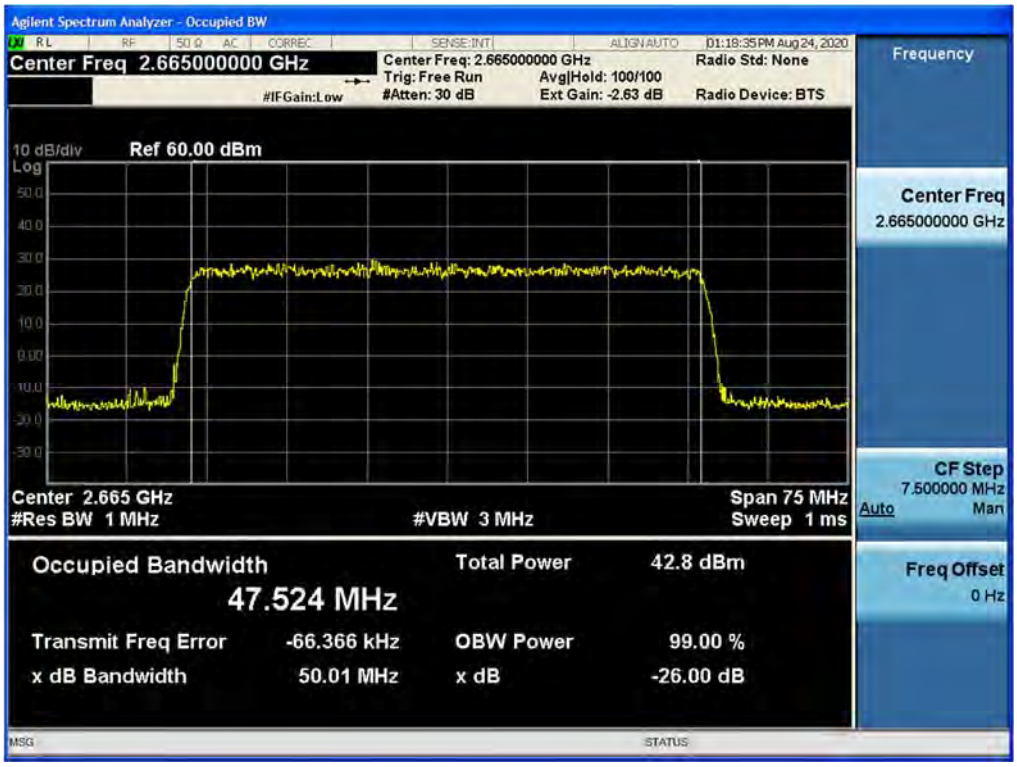
Port 24	QPSK	Low	2536.00	77.429
		Middle	2593.00	77.418
		High	2650.00	77.349
	16QAM	Low	2536.00	77.779
		Middle	2593.00	77.723
		High	2650.00	77.688
	64QAM	Low	2536.00	77.425
		Middle	2593.00	77.451
		High	2650.00	77.428
	256QAM	Low	2536.00	77.360
		Middle	2593.00	77.433
		High	2650.00	77.319
Port 25	QPSK	Low	2536.00	77.501
		Middle	2593.00	77.363
		High	2650.00	77.255
	16QAM	Low	2536.00	77.833
		Middle	2593.00	77.721
		High	2650.00	77.658
	64QAM	Low	2536.00	77.431
		Middle	2593.00	77.437
		High	2650.00	77.234
	256QAM	Low	2536.00	77.295
		Middle	2593.00	77.419
		High	2650.00	77.351
Port 26	QPSK	Low	2536.00	77.403
		Middle	2593.00	77.451
		High	2650.00	77.316
	16QAM	Low	2536.00	77.745
		Middle	2593.00	77.659
		High	2650.00	77.708
	64QAM	Low	2536.00	77.417
		Middle	2593.00	77.332
		High	2650.00	77.379
	256QAM	Low	2536.00	77.395
		Middle	2593.00	77.487
		High	2650.00	77.453

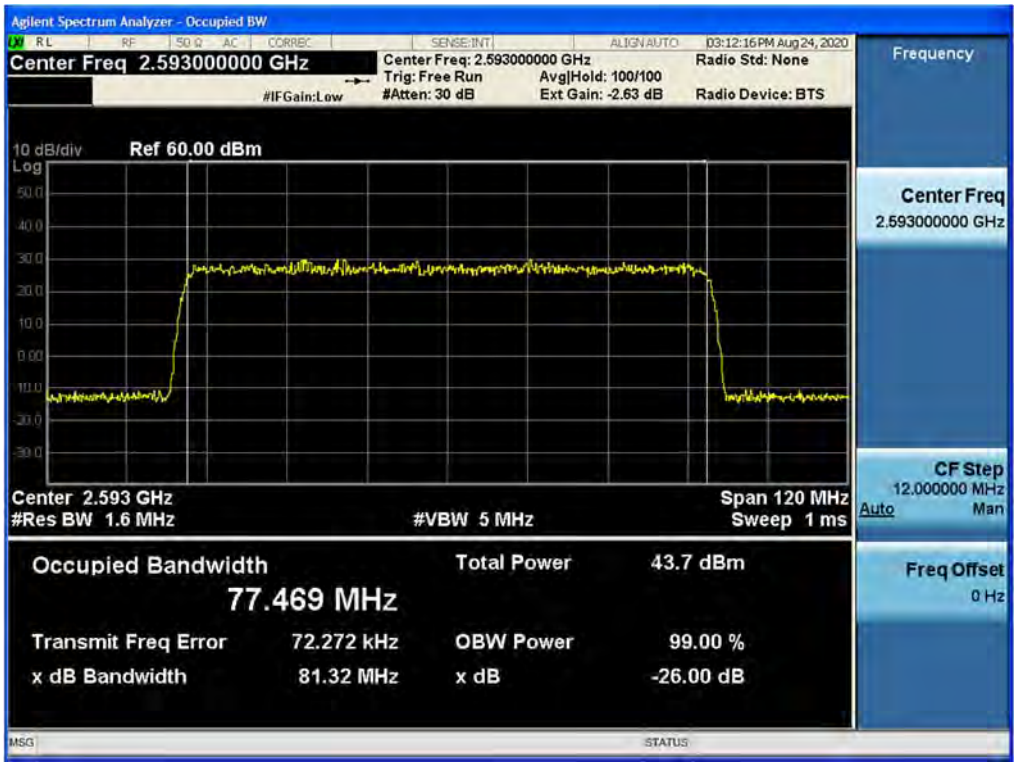
Port 27	QPSK	Low	2536.00	77.449
		Middle	2593.00	77.481
		High	2650.00	77.442
	16QAM	Low	2536.00	77.742
		Middle	2593.00	77.762
		High	2650.00	77.653
	64QAM	Low	2536.00	77.348
		Middle	2593.00	77.435
		High	2650.00	77.392
	256QAM	Low	2536.00	77.384
		Middle	2593.00	77.376
		High	2650.00	77.356
Port 28	QPSK	Low	2536.00	77.448
		Middle	2593.00	77.408
		High	2650.00	77.366
	16QAM	Low	2536.00	77.686
		Middle	2593.00	77.733
		High	2650.00	77.660
	64QAM	Low	2536.00	77.474
		Middle	2593.00	77.455
		High	2650.00	77.429
	256QAM	Low	2536.00	77.262
		Middle	2593.00	77.443
		High	2650.00	77.320
Port 29	QPSK	Low	2536.00	77.418
		Middle	2593.00	77.435
		High	2650.00	77.332
	16QAM	Low	2536.00	77.775
		Middle	2593.00	77.826
		High	2650.00	77.631
	64QAM	Low	2536.00	77.426
		Middle	2593.00	77.409
		High	2650.00	77.356
	256QAM	Low	2536.00	77.321
		Middle	2593.00	77.339
		High	2650.00	77.351

Port 30	QPSK	Low	2536.00	77.479
		Middle	2593.00	77.433
		High	2650.00	77.360
	16QAM	Low	2536.00	77.693
		Middle	2593.00	77.742
		High	2650.00	77.724
	64QAM	Low	2536.00	77.335
		Middle	2593.00	77.469
		High	2650.00	77.342
	256QAM	Low	2536.00	77.392
		Middle	2593.00	77.444
		High	2650.00	77.322
Port 31	QPSK	Low	2536.00	77.435
		Middle	2593.00	77.408
		High	2650.00	77.292
	16QAM	Low	2536.00	77.675
		Middle	2593.00	77.734
		High	2650.00	77.671
	64QAM	Low	2536.00	77.378
		Middle	2593.00	77.497
		High	2650.00	77.302
	256QAM	Low	2536.00	77.423
		Middle	2593.00	77.507
		High	2650.00	77.382
Port 32	QPSK	Low	2536.00	77.408
		Middle	2593.00	77.502
		High	2650.00	77.309
	16QAM	Low	2536.00	77.792
		Middle	2593.00	77.787
		High	2650.00	77.788
	64QAM	Low	2536.00	77.479
		Middle	2593.00	77.388
		High	2650.00	77.448
	256QAM	Low	2536.00	77.437
		Middle	2593.00	77.447
		High	2650.00	77.371

Plot Data of Occupied bandwidth

Antenna 27 / 5G NR 40 MHz 1 Carrier / 16QAM / High

Antenna 29 / 5G NR 50 MHz 1 Carrier / 256QAM / High


Antenna 30 / 5G NR 80 MHz 1 Carrier / 64QAM / Middle


5.3. UNWANTED CONDUCTED EMISSIONS

Test Requirements:

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 27.53 Emission limits.

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(1) Prior to the transition, and thereafter, solely within the MBS, for analog operations with an EIRP in excess of −9 dBW, the signal shall be attenuated at the channel edges by at least 38 dB relative to the peak visual carrier, then linearly sloping from that level to at least 60 dB of attenuation at 1 MHz below the lower band edge and 0.5 MHz above the upper band edge, and attenuated at least 60 dB at all other frequencies.

(2) For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline, then the following additional attenuation requirements shall apply:

Test Procedures:

The measurement is performed in accordance with Section 5.7.3 and 5.7.4 of ANSI C63.26.

5.7.3 Out-of-band unwanted emissions measurements

a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency.

b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained.

c) Set the number of points in sweep ≥ 2 × span / RBW.

d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows:

   1) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols

   2) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

   3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

   4) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured.

e) The test report shall include the plots of the measuring instrument display and the measured data.

f) See Annex I for example emission mask plots.

5.7.4 Spurious unwanted emission measurements

a) Set the spectrum analyzer start frequency to the lowest frequency generated by the EUT, without going below 9 kHz, and the stop frequency to the lower frequency covered by the measurements previously performed in 5.7.3. As an alternative, the stop frequency can be set to the value specified in 5.1.1, depending on the EUT operating range, if the resulting plot can

clearly demonstrate compliance for all frequencies not addressed by the out-of-band emissions measurements performed as per 5.7.3.

b) When using an average power (rms) detector, ensure that the number of points in the sweep ≥ 2 × (span / RBW). This may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the spectrum analyzer capabilities. This requirement does not apply to peak-detected power measurements. When average power is specified by the applicable regulation, a peak-detector can be utilized for preliminary measurements to accommodate wider frequency spans. Any emissions found in the preliminary measurement to exceed the applicable limit(s) shall be further examined using a power averaging (rms) detector with the minimum number of measurement points as defined above.

c) The sweep time should be set to auto-couple for performing peak-detector measurements. For measurements that use a power averaging (rms) detector, the sweep time shall be set as described for out-of-band emissions measurements in item d) of 5.7.3.

d) Identify and measure the Highest spurious emission levels in each frequency range. It is not necessary to re-measure the out-of-band emissions as a part of this test. Record the frequencies and amplitudes corresponding to the measured emissions and capture the data plots.

e) Repeat step b) through step d) for the upper spurious emission frequency range if not already captured by a wide span measurement performed as per the alternative provided in step a). The upper frequency for this measurement is defined in 5.1.1 as a function of the EUT operating range.

f) Compare the results with the corresponding limit in the applicable regulation.

g) The test report shall include the data plots of the measuring instrument display and the measured data.

Note:

1) In 9 kHz to 30 MHz band, RBW narrower than reference bandwidth is used. So following correction factor is applied.
   10 log [(reference bandwidth)/(resolution bandwidth)]
   : 9 kHz to 150 kHz applied 1 kHz RBW, 10 log (1 kHz / 1 MHz) = - 30 dB
   : 150 kHz to 30 MHz applied 10 kHz RBW, 10 log (10 kHz / 1 MHz) = - 20 dB
2) Due to 64x64 MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
   - MIMO correction: 10 log(NANT) = 10 log(32) = 15.052 dB
3) Only MIMO correction was applied to the result table limit.
   - Limit = 10 log [(reference bandwidth)/(resolution bandwidth)] – MIMO Correction value
   = -13 dB -15.052 dB = -28.052 dB
4) All corrections including RBW and MIMO were applied to limit shown in plot.
   - Limit for 9 kHz to 150 kHz = -13 dB -15.052 dB - 30 dB = -58.052 dB
   - Limit for 150 kHz to 30 MHz = -13 dB -15.052 dB - 20 dB = -48.052 dB
   - Limit for other bands = -13 dB -15.052 dB - 1.427 dB = -28.052 dB
5) The results of Unwanted Conducted Emissions test shown the measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:

Tabular Data of Unwanted Conducted Emissions

5G NR 40 MHz 1 Carrier

Test Result for Output Port 27

Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge – 100 MHz	Low Edge – 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-30.870	-43.967	-41.806	-36.674	-42.474	-36.190	-35.547
	Middle	-29.633	-45.077	-41.409	-42.239	-41.750	-35.308	-34.577
	High	-30.058	-44.448	-41.230	-42.693	-32.290	-35.853	-34.818
16QAM	Low	-29.790	-42.520	-41.799	-33.073	-42.837	-36.073	-35.647
	Middle	-31.028	-44.115	-41.577	-42.068	-42.438	-36.056	-35.350
	High	-31.158	-44.989	-41.478	-42.568	-33.058	-36.012	-34.937
64QAM	Low	-30.280	-43.128	-40.774	-34.187	-42.993	-34.844	-35.101
	Middle	-30.081	-44.588	-41.174	-42.820	-42.346	-35.761	-35.621
	High	-29.861	-44.023	-41.091	-42.853	-36.359	-35.943	-35.416
256QAM	Low	-29.960	-42.853	-41.554	-34.237	-43.094	-35.687	-35.268
	Middle	-31.239	-43.544	-41.593	-42.655	-42.331	-35.877	-35.260
	High	-30.232	-44.571	-41.678	-43.095	-34.751	-35.442	-35.422

5G NR 50 MHz 1 Carrier

Test Result for Output Port 29

Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge – 100 MHz	Low Edge – 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-31.111	-44.242	-41.403	-34.380	-41.902	-36.031	-35.263
	Middle	-30.761	-43.203	-41.520	-42.330	-40.135	-35.932	-35.260
	High	-30.797	-44.343	-41.904	-42.192	-33.724	-35.714	-35.225
16QAM	Low	-30.435	-43.785	-41.673	-31.312	-42.168	-35.522	-35.323
	Middle	-30.572	-41.770	-41.877	-42.189	-39.436	-35.936	-34.952
	High	-29.559	-44.897	-41.367	-42.210	-33.876	-35.689	-35.466
64QAM	Low	-31.722	-43.921	-41.548	-32.313	-42.353	-35.995	-35.237
	Middle	-30.103	-44.295	-41.718	-42.388	-41.729	-35.977	-35.199
	High	-30.288	-43.390	-41.272	-42.425	-33.375	-35.909	-34.874
256QAM	Low	-30.730	-45.318	-41.981	-33.126	-42.460	-36.167	-35.334
	Middle	-30.257	-43.908	-41.730	-42.077	-42.461	-35.390	-35.646
	High	-30.903	-44.751	-40.924	-42.252	-32.999	-36.026	-35.521

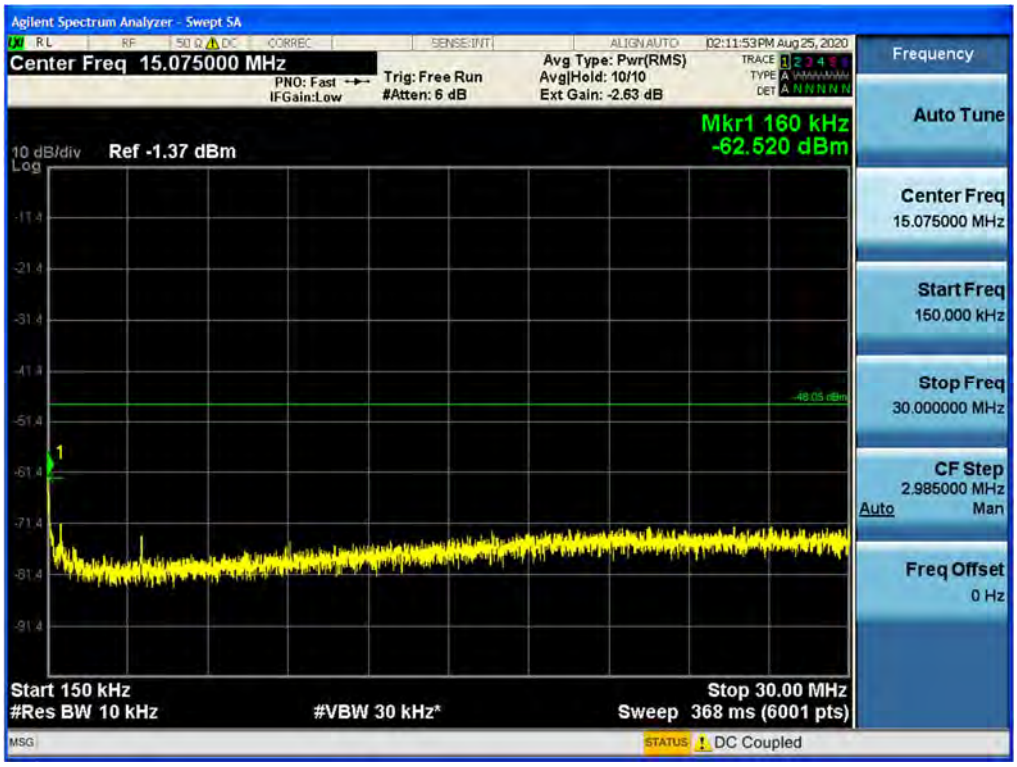
5G NR 80 MHz 1 Carrier

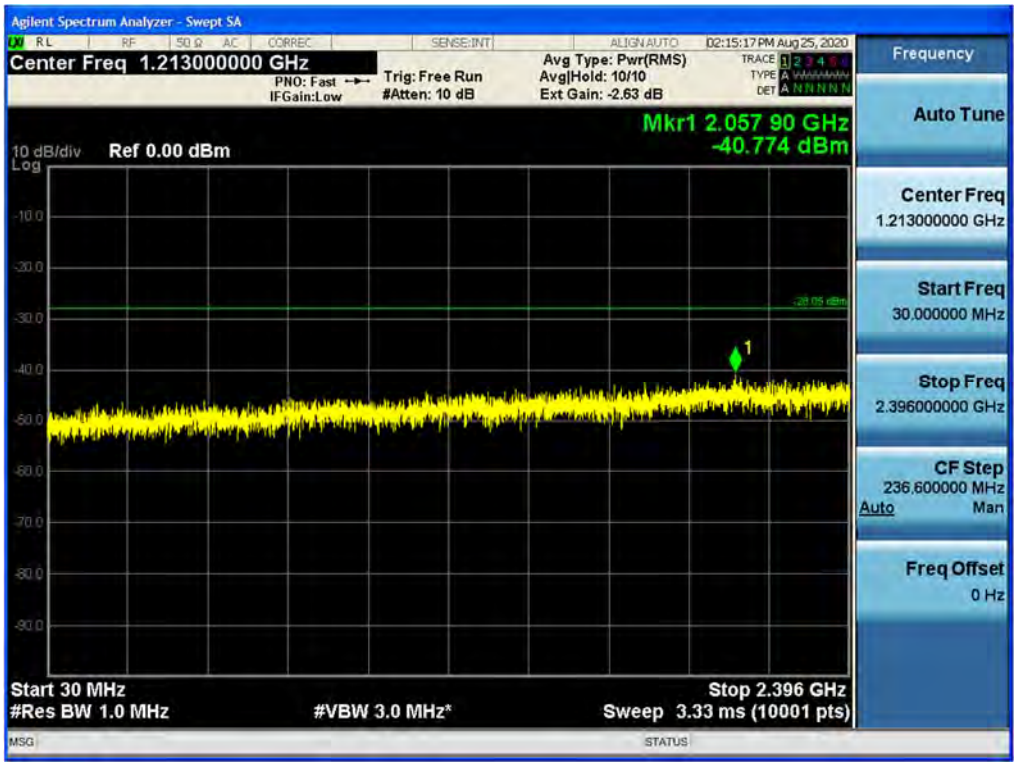
Test Result for Output Port 30

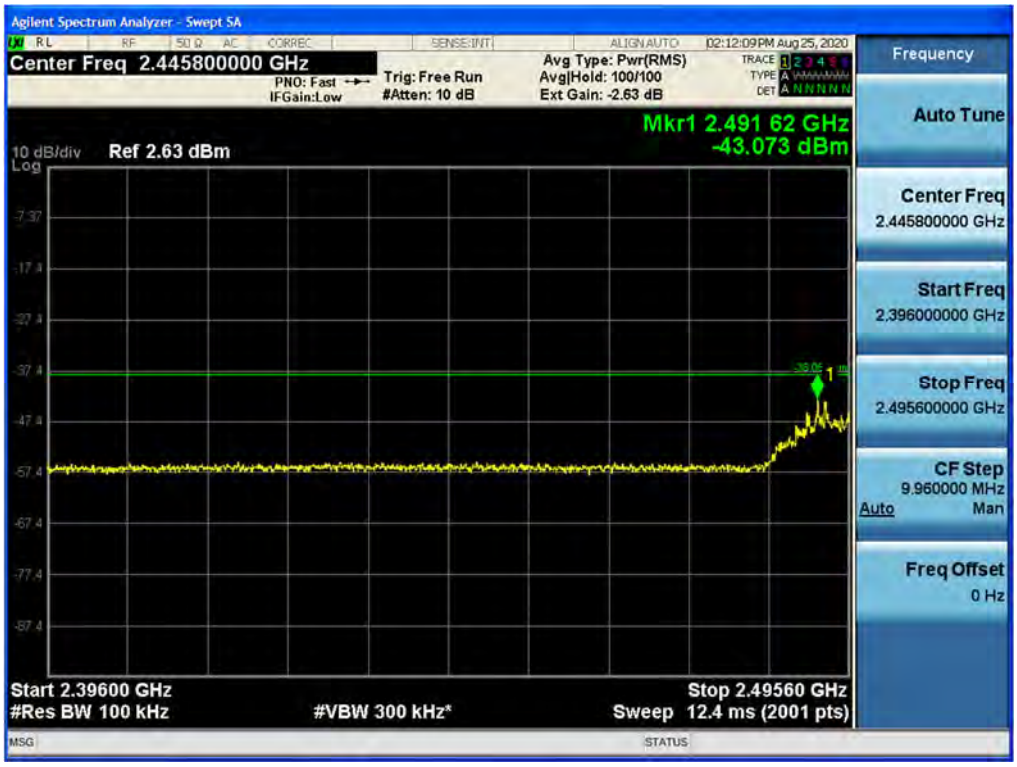
Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge – 100 MHz	Low Edge – 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-31.299	-44.246	-41.602	-36.928	-40.621	-35.812	-35.375
	Middle	-29.990	-43.430	-41.493	-34.489	-35.986	-36.064	-35.490
	High	-29.212	-45.038	-41.513	-40.887	-33.093	-35.900	-35.372
16QAM	Low	-29.965	-45.151	-41.185	-35.115	-40.530	-35.338	-35.198
	Middle	-30.023	-43.494	-41.633	-36.062	-38.305	-34.391	-35.334
	High	-29.365	-44.369	-41.152	-41.178	-35.585	-35.736	-35.582
64QAM	Low	-29.371	-44.481	-41.226	-35.962	-40.717	-36.148	-35.422
	Middle	-29.066	-44.688	-41.822	-38.765	-38.338	-35.694	-35.103
	High	-29.489	-44.353	-41.820	-40.691	-34.306	-35.924	-35.484
256QAM	Low	-30.256	-43.766	-41.620	-34.838	-40.685	-36.179	-35.103
	Middle	-30.266	-44.334	-42.015	-38.364	-39.005	-35.975	-35.222
	High	-29.655	-42.397	-41.960	-40.687	-33.767	-36.340	-35.089

Plot Data of Conducted Spurious Emissions

Antenna 27 / 9 kHz ~ 150 kHz / 5G NR 40 MHz 1 Carrier / QPSK / Middle

Antenna 27 / 150 kHz ~ 30 MHz / 5G NR 40 MHz 1 Carrier / 16QAM / Low


Antenna 27 / 30 MHz ~ Low Edge-100 / 5G NR 40 MHz 1 Carrier / 64QAM / Low


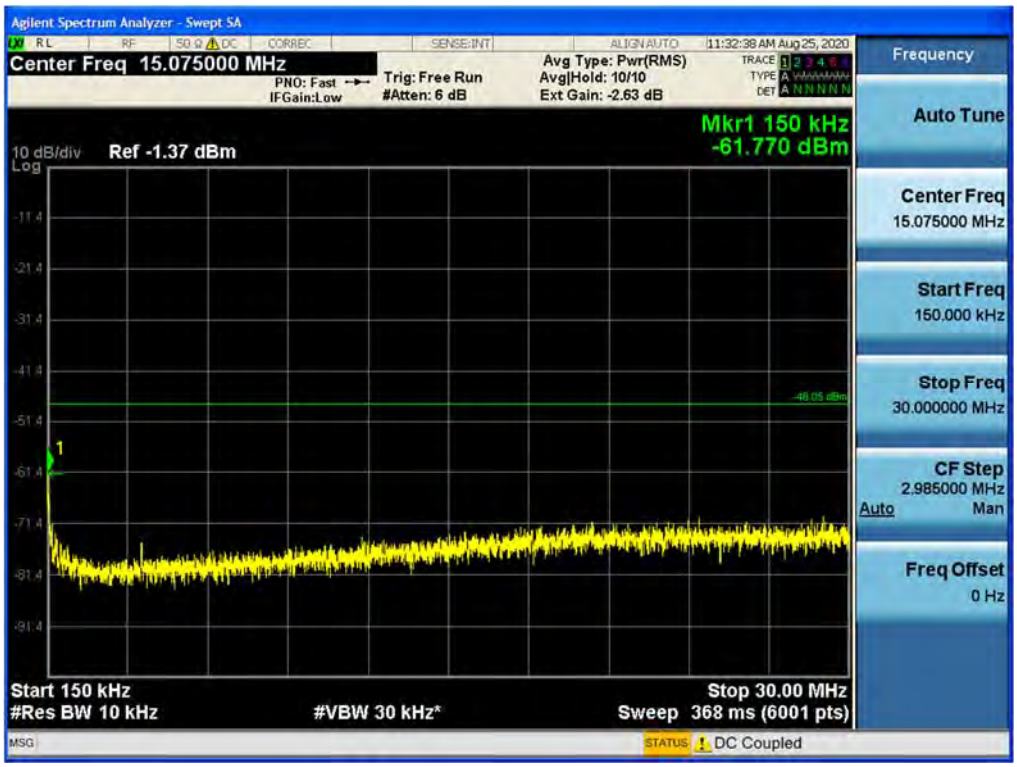
Antenna 27 / Low Edge-100 ~ Low Edge / 5G NR 40 MHz 1 Carrier / 16QAM / Low


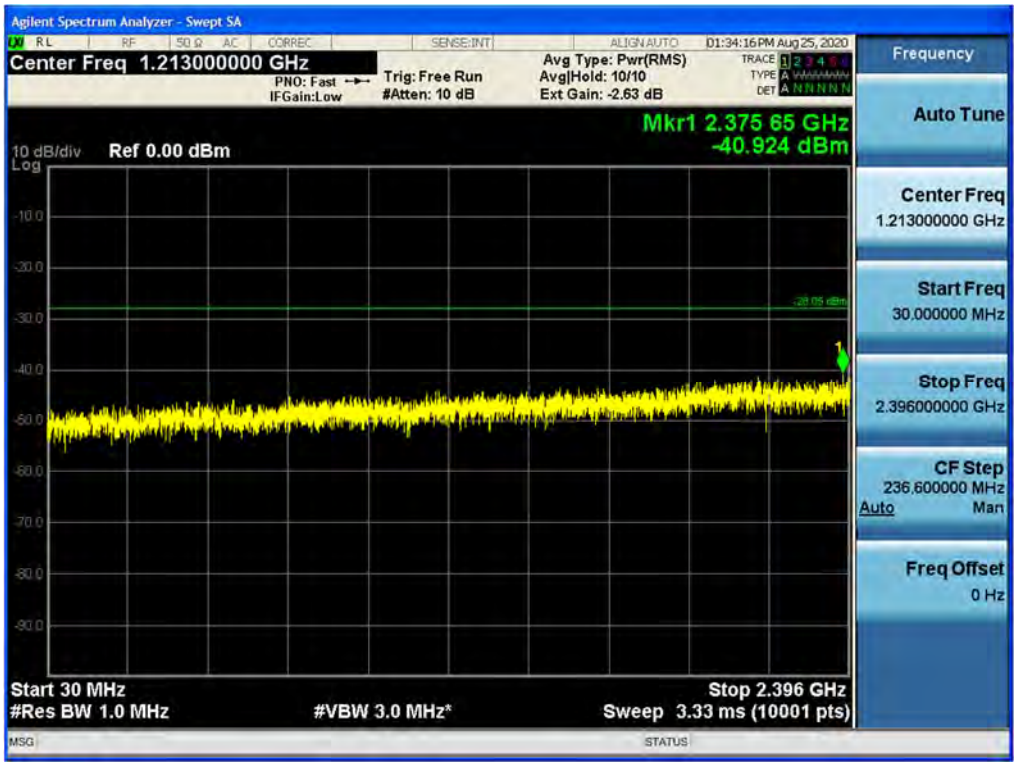
Antenna 27 / High Edge ~ High Edge+100 / 5G NR 40 MHz 1 Carrier / QPSK / High

Antenna 27 / High Edge+100 ~ 10 GHz / 5G NR 40 MHz 1 Carrier / 64QAM / Low

Antenna 27 / 10 GHz ~ 26.5 GHz/ 5G NR 40 MHz 1 Carrier / QPSK / Middle

Antenna 29 / 9 kHz ~ 150 kHz / 5G NR 50 MHz 1 Carrier / 16QAM / High

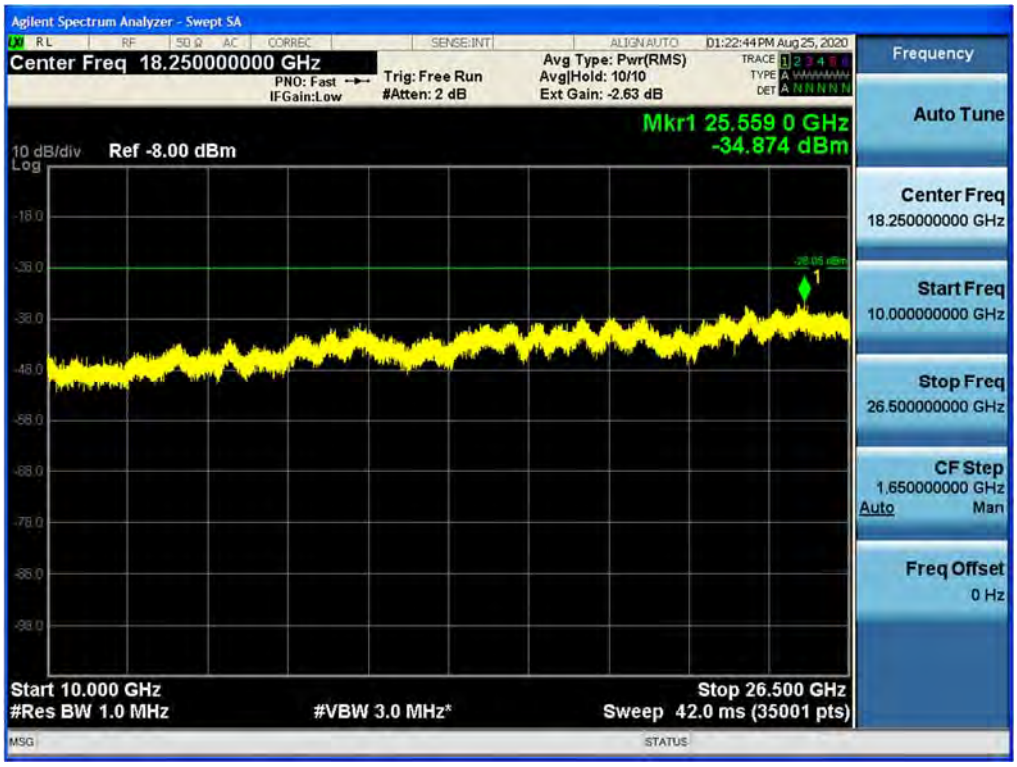
Antenna 29 / 150 kHz ~ 30 MHz / 5G NR 50 MHz 1 Carrier / 16QAM / Middle


Antenna 29 / 30 MHz ~ Low Edge-100 / 5G NR 50 MHz 1 Carrier / 256QAM / High


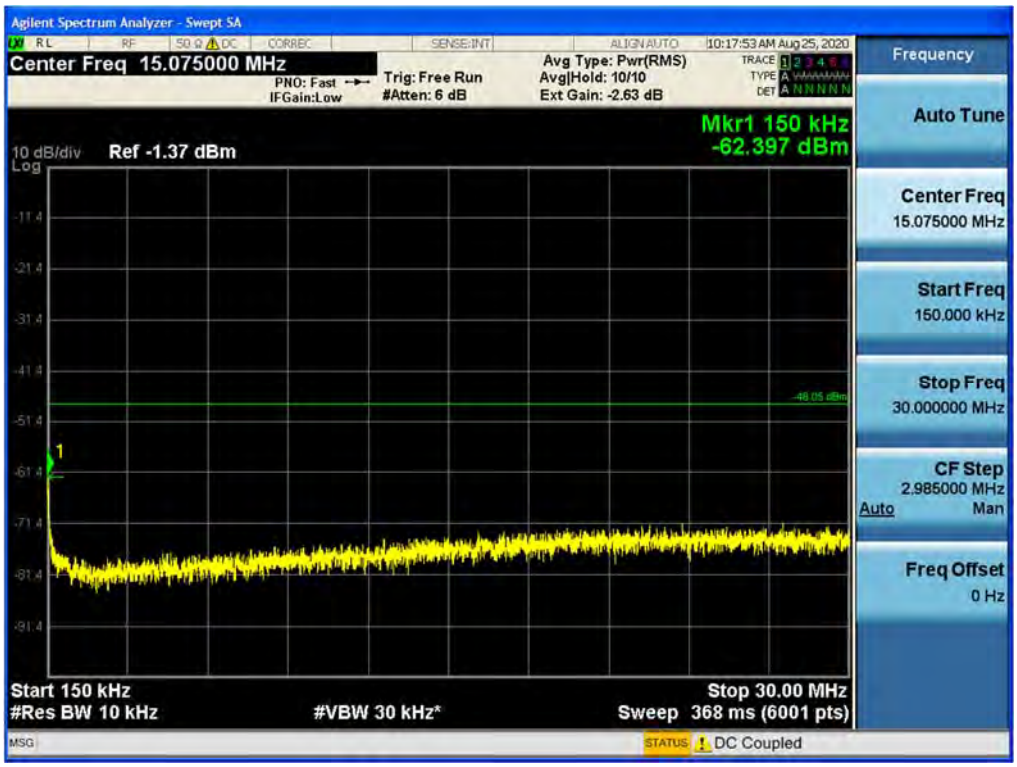
Antenna 29 / Low Edge-100 ~ Low Edge / 5G NR 50 MHz 1 Carrier / 16QAM / Low

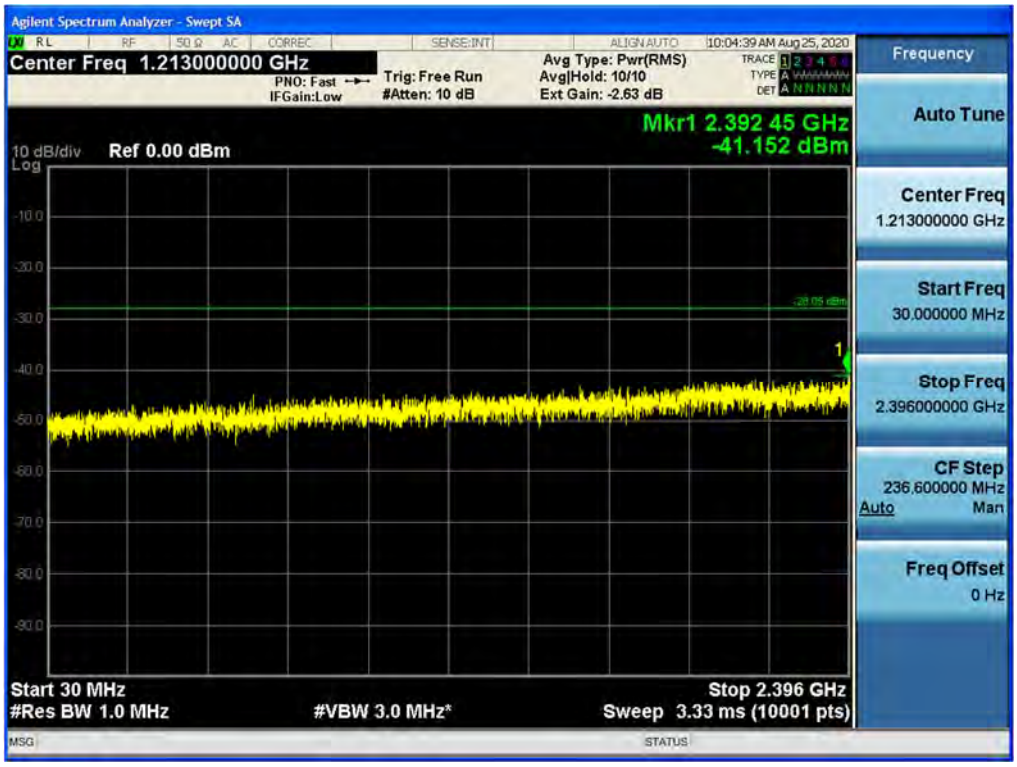
Antenna 29 / High Edge ~ High Edge+100 / 5G NR 50 MHz 1 Carrier / 256QAM / High

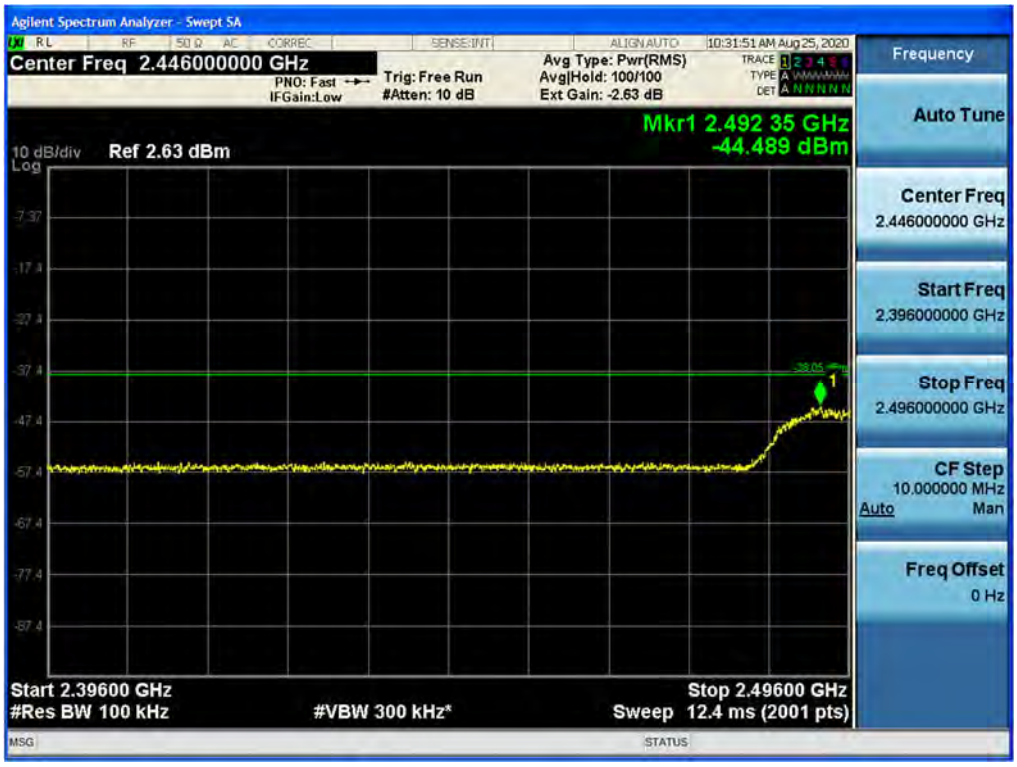
Antenna 29 / High Edge+100 ~ 10 GHz / 5G NR 50 MHz 1 Carrier / 256QAM / Middle

Antenna 29 / 10 GHz ~ 26.5 GHz/ 5G NR 50 MHz 1 Carrier / 64QAM / High


Antenna 30 / 9 kHz ~ 150 kHz / 5G NR 80 MHz 1 Carrier / 64QAM / Middle

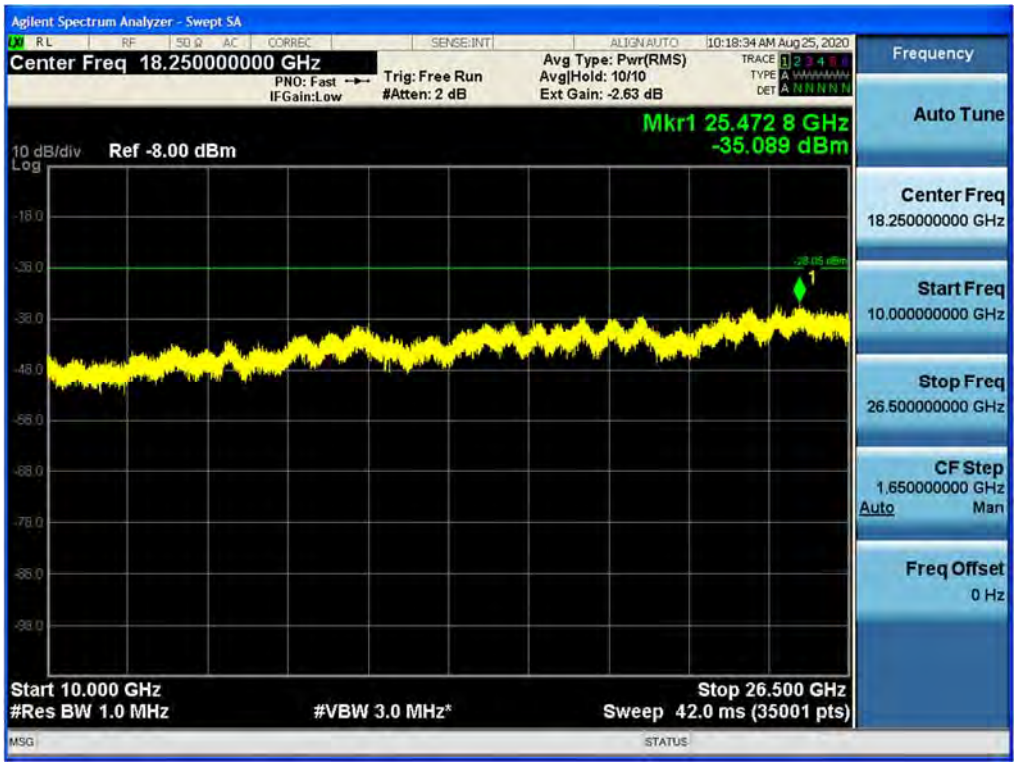
Antenna 30 / 150 kHz ~ 30 MHz / 5G NR 80 MHz 1 Carrier / 256QAM / High


Antenna 30 / 30 MHz ~ Low Edge-100 / 5G NR 80 MHz 1 Carrier / 16QAM / High


Antenna 30 / Low Edge-100 ~ Low Edge / 5G NR 80 MHz 1 Carrier / QPSK / Middle


Antenna 30 / High Edge ~ High Edge+100 / 5G NR 80 MHz 1 Carrier / QPSK / High

Antenna 30 / High Edge+100 ~ 10 GHz / 5G NR 80 MHz 1 Carrier / 16QAM / Middle

Antenna 30 / 10 GHz ~ 26.5 GHz/ 5G NR 80 MHz 1 Carrier / 256QAM / High


5.4. BAND EDGE

Test Results:

Tabular Data of Band Edge

5G NR 40 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
27	QPSK	Low	2496.00	-38.58
		High	2690.00	-37.13
	16QAM	Low	2496.00	-39.74
		High	2690.00	-37.41
	64QAM	Low	2496.00	-41.26
		High	2690.00	-41.12
	256QAM	Low	2496.00	-41.53
		High	2690.00	-40.66

5G NR 50 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
29	QPSK	Low	2496.00	-38.42
		High	2690.00	-36.78
	16QAM	Low	2496.00	-38.75
		High	2690.00	-38.67
	64QAM	Low	2496.00	-39.41
		High	2690.00	-37.28
	256QAM	Low	2496.00	-40.29
		High	2690.00	-39.55

5G NR 80 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
30	QPSK	Low	2496.00	-36.51
		High	2690.00	-36.48
	16QAM	Low	2496.00	-34.69
		High	2690.00	-36.42
	64QAM	Low	2496.00	-35.92
		High	2690.00	-36.61
	256QAM	Low	2496.00	-36.82
		High	2690.00	-36.66

* Note:

1) Limit for unwanted emissions in band edge is described in Section 5.2 Note 1) to 4)
2) The results of Band Edge test shown the measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Plot Data of Band Edge

Antenna 27 / 5G NR 40 MHz 1 Carrier / QPSK / Low

Antenna 27 / 5G NR 40 MHz 1 Carrier / QPSK / High

Antenna 29 / 5G NR 50 MHz 1 Carrier / QPSK / Low

Antenna 29 / 5G NR 50 MHz 1 Carrier / QPSK / High

Antenna 30 / 5G NR 80 MHz 1 Carrier / 16QAM / Low

Antenna 30 / 5G NR 80 MHz 1 Carrier / 16QAM / High

5.5. RADIATED EMISSIONS

Test Requirements:

§ 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

Test Procedures:

The measurement is performed in accordance with Section 5.5.3.2 of ANSI C63.26.

a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:

   1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.

   2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.

   3) Return the turntable to the azimuth where the highest emission amplitude level was observed.

   4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.

   5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

d) ~ j) Omitted

e) Provide the complete measurement results as a part of the test report.

Note:

1) Measure distance: 3 m

2) Transmitting 32 ports and terminating 32 ports.

Test Results:

Tabular Data of Radiated Emissions

5G NR 40 MHz 1 Carrier_ QPSK

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.898.49	48.05	32.40	10.50	36.06	H	-47.15	-40.310
5.898.49	48.27	32.40	10.50	36.06	V	-46.93	-40.090

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

5G NR 50 MHz 1 Carrier_ QPSK

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.162.28	48.12	31.50	9.93	35.77	V	-47.08	-41.420
5.898.49	47.37	32.40	10.50	36.06	V	-47.83	-40.990
5.898.49	50.47	32.40	10.50	36.06	H	-44.73	-37.890

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

5G NR 80 MHz 1 Carrier_ QPSK

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.898.49	49.95	32.40	10.50	36.06	H	-45.25	-38.410
5.149.71	44.30	31.70	9.87	35.85	V	-50.90	-45.180
5.898.49	47.18	32.40	10.50	36.06	V	-48.02	-41.180

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

5G NR 40 MHz 1 Carrier_ QAM

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.155.34	46.27	31.50	9.93	35.77	V	-48.93	-43.270
5.898.49	47.35	32.40	10.50	36.06	V	-47.85	-41.010
5.898.49	46.96	32.40	10.50	36.06	H	-48.24	-41.400

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

5G NR 50 MHz 1 Carrier_ QAM

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.898.49	49.72	32.40	10.50	36.06	H	-45.48	-38.640
5.156.64	46.52	31.50	9.93	35.77	V	-48.68	-43.020
5.898.49	46.71	32.40	10.50	36.06	V	-48.49	-41.650

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

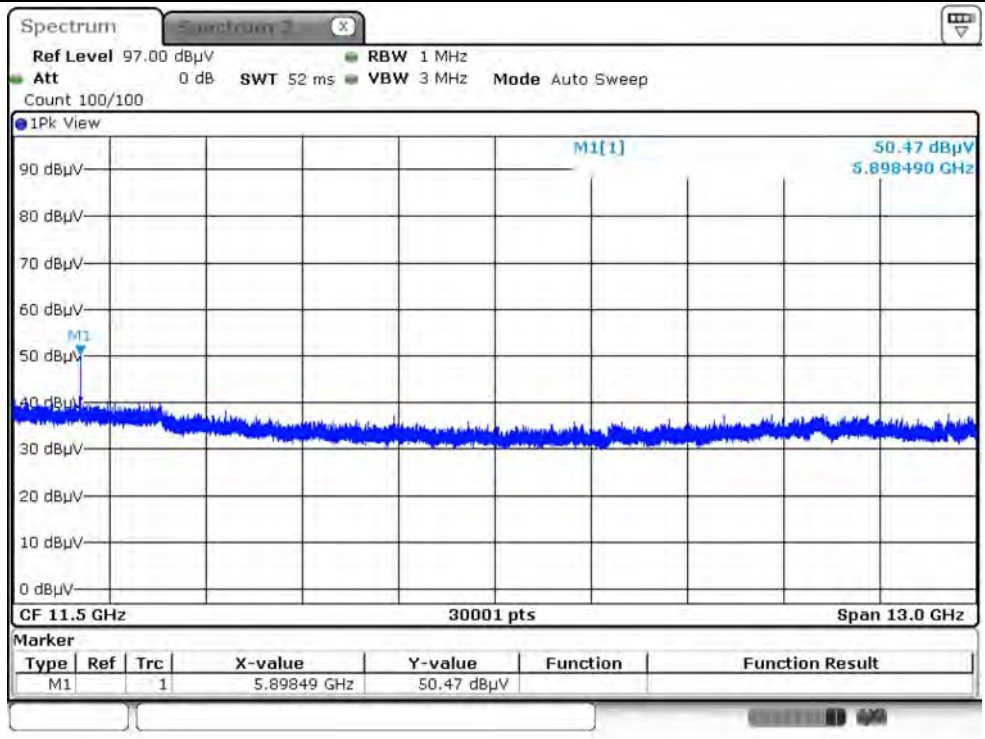
5G NR 80 MHz 1 Carrier_ QAM

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 1G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
5.162.71	44.61	31.50	9.93	35.77	V	-50.59	-44.930
5.898.49	45.48	32.40	10.50	36.06	V	-49.72	-42.880
5.898.49	47.52	32.40	10.50	36.06	H	-47.68	-40.840

* C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter / Measure distance : 3 m

Plot data of radiated spurious emissions

5G NR 50 MHz 1 Carrier_QPSK



Note : Only the worst case plots for Radiated Spurious Emissions.

5.6. FREQUENCY STABILITY

Test Requirements:

§ 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

§ 27.54 Frequency stability.

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

Test Procedures:

The measurement is performed in accordance with Section 5.6.4 and 5.6.5 of ANSI C63.26.

5.6.4 Frequency stability over variations in temperature

a) Supply the EUT with a nominal 60 Hz ac voltage, dc voltage, or install a new or fully charged battery in the EUT.

b) If possible a dummy load should be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible.

c) Turn on the EUT, and tune it to the center frequency of the operating band.

d) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible, make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away).

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

f) Turn the EUT off, and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

g) Set the temperature control on the chamber to the Highest temperature specified in the regulatory requirements for the type of device, and allow the oscillator heater and the chamber temperature to stabilize. Unless otherwise instructed by the regulatory authority, this temperature should be 50 °C.

h) While maintaining a constant temperature inside the environmental chamber, turn on the EUT and allow sufficient time for the EUT temperature to stabilize.

i) Measure the frequency.

j) Switch off the EUT, but do not switch off the oscillator heater.

k) Lower the chamber temperature to the next level that is required by the standard and allow the temperature inside the chamber to stabilize. Unless otherwise instructed by the regulators, this temperature step should be 10 °C.

l) Repeat step h) through step k) down to the lowest specified temperature. Unless otherwise instructed by the regulators, this temperature should be −30 °C. When the frequency stability limit is stated as being sufficient such that the fundamental emissions stay within the authorized bands of operation, a reference point shall be established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and Highest channel of operation shall be identified as f_L and f_H respectively. The worst-case frequency offset determined in the above methods shall be added or subtracted from the values of f_L and f_H and the resulting frequencies must remain within the band.

m) Omitted

5.6.5 Frequency stability when varying supply voltage

a) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away)

b) Supply the EUT with nominal ac or dc voltage. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

c) Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring instrument.

d) Tune the EUT to the center frequency of the operating band. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

   NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Measure the frequency.

f) Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.

g) For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

h) Repeat the frequency measurement.

   NOTE—For band-edge compliance, it can be required to make these measurements at the low and High channel of the operating band.

Note:

The results of the frequency stability test shown above the frequency deviation measured values are very small and similar

trend for each port, so we are attached only the worst case data.

Test Results:

Tabular Data of Frequency Stability.

Reference: - 48 Vdc at 20°C **Freq.** = 2,593,000,000 Hz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	2593 000 011	11.153	0.000	0.00000
	-30	2593 000 009	9.195	-1.958	-0.00076
	-20	2593 000 009	8.631	-2.522	-0.00097
	-10	2593 000 009	9.221	-1.932	-0.00075
	0	2593 000 002	2.273	-8.880	-0.00342
	+10	2593 000 007	6.888	-4.265	-0.00164
	+30	2593 000 006	5.781	-5.372	-0.00207
	+40	2593 000 006	6.140	-5.013	-0.00193
	+50	2593 000 004	4.034	-7.119	-0.00275
115%	+20	2593 000 008	7.617	-3.536	-0.00136
85%	+20	2593 000 004	4.142	-7.011	-0.00270

Note:

The results of the frequency stability test shown above the frequency deviation measured values are very small and similer trend for each port, so attached data was only the worst port.

6. Annex B_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2009-FC001-P