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TEST REPORT

FCC Test for SLS-BD10JQ
Class II Permissive Change

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2009-FC002

DATE OF ISSUE
9 September 2020

Tested by
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TEST REPORT
FCC Test for SLS-BD10JQ

REPORT NO.
HCT-RF-2009-FC002

DATE OF ISSUE
September 09, 2020

Additional Model
-

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
EUT Type	RRU(Remote Radio Unit)
Model Name	SLS-BD10JQ
FCC ID	A3LSLS-BD10JQ
Date of Test	September 3, 2020 ~ September 9, 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 09, 2020	Initial Release

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.

CONTENTS

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>RRU(Remote Radio Unit)</td></tr>
<tr><td>EUT Serial Number</td><td>S613500468</td></tr>
<tr><td>Power Supply</td><td>-48 VDC</td></tr>
<tr><td>Channel Bandwidths&
Output Power</td><td>Port 2, 3, 6, 7: 5G NR 40 MHz
<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>13.33 W/path, Total: 53.33 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] / path</th><th>16QAM/64QAM
/256QAM
(W7D)</th><th>16QAM/64QAM
/256QAM
Max
Conducted
Output
Power
[W] / path</th></tr>
<tr><td>5G NR</td><td>1</td><td>40 MHz</td><td>38M0G7D</td><td>15.01</td><td>38M2W7D</td><td>15.19</td></tr>
</table></td></tr>
<tr><td>Channel Bandwidths</td><td>Port 2, 3, 6, 7 : 5G NR 40 MHz</td></tr>
<tr><td>Modulation Type</td><td>QPSK, 16QAM, 64QAM, 256QAM</td></tr>
<tr><td>Antenna Specification</td><td>Manufacturer does not provide an antenna.</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, KDB 935210 D05 v01r04
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	Compliant Note
Occupied Bandwidth	§ 2.1049	Compliant Note
Unwanted Conducted Emissions	§ 2.1051, § 27.53	Compliant Note
Radiated Emissions	§ 2.1053, § 27.53	Compliant Note
Frequency Stability	§ 2.1055, § 27.54	Compliant Note

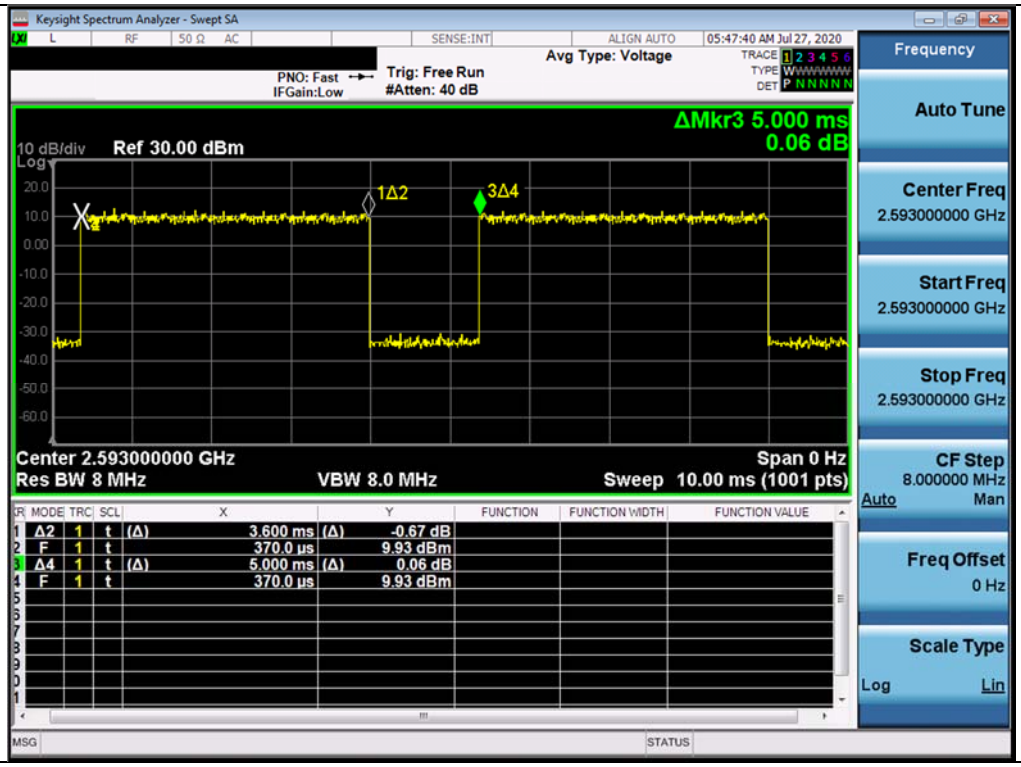
Note:
All of the 5G NR 50 MHz , 5G NR 60 MHz data contained herein is tested from the reference FCC ID: A3LSLS-BD10JQ report. (Report No. HCT-RF-2008-FC001-R1)

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.
- The dummy loads were connected to the RF output ports for radiated spurious emission testing.
- 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	30.301	2200	31.534
600	30.055	2300	31.409
700	30.184	2400	31.480
800	30.243	2500	31.368
900	30.567	2600	31.277
1000	30.647	2700	31.278
1100	30.746	2800	31.676
1200	30.801	2900	31.683
1300	30.832	3000	32.035
1400	30.888	4000	32.115
1500	30.921	5000	32.789
1600	31.101	6000	33.052
1700	31.280	7000	33.739
1800	31.498	8000	34.338
1900	31.599	9000	34.731
2000	31.707	10000	35.406
2100	31.783	-	-

- 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 SLS-BD10JQ 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 = 3.600 ms / 5.000 ms = 0.72

Duty Correction = 10 log (1/duty cycle) = 10 log (1/0.72) = 1.389 dB

3.3. MAXIMUM MEASUREMENTUNCERTAINTY

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

Coverage factor k = 2, Confidence levels of 95 %

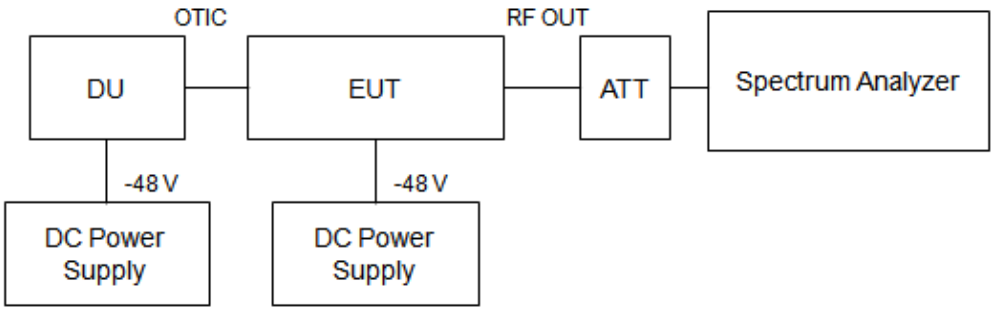
Description	Condition	Uncertainty
RF Output Power	-	± 0.72 dB
Occupied Bandwidth	OBW ≤ 20 MHz	± 52 kHz
Unwanted Conducted Emissions	-	± 1.08 dB
Radiated Emissions	f ≤ 1 GHz f > 1 GHz	± 4.80 dB ± 6.07 dB
Frequency Stability	-	± 1.22 x 10^{-6}

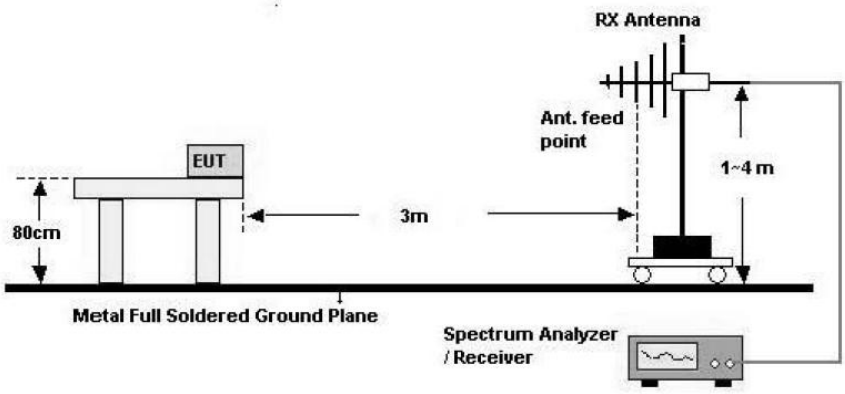
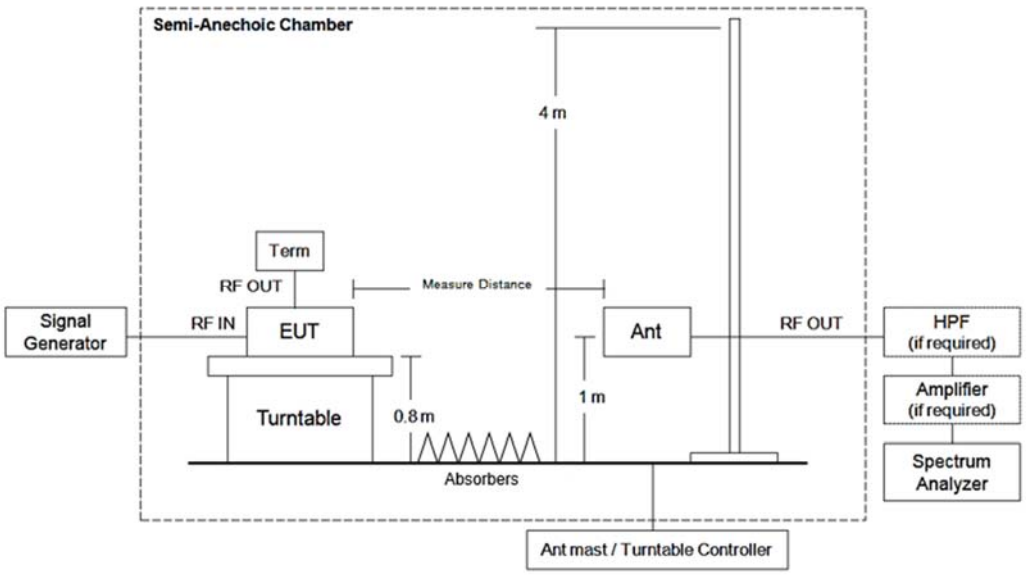
3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

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

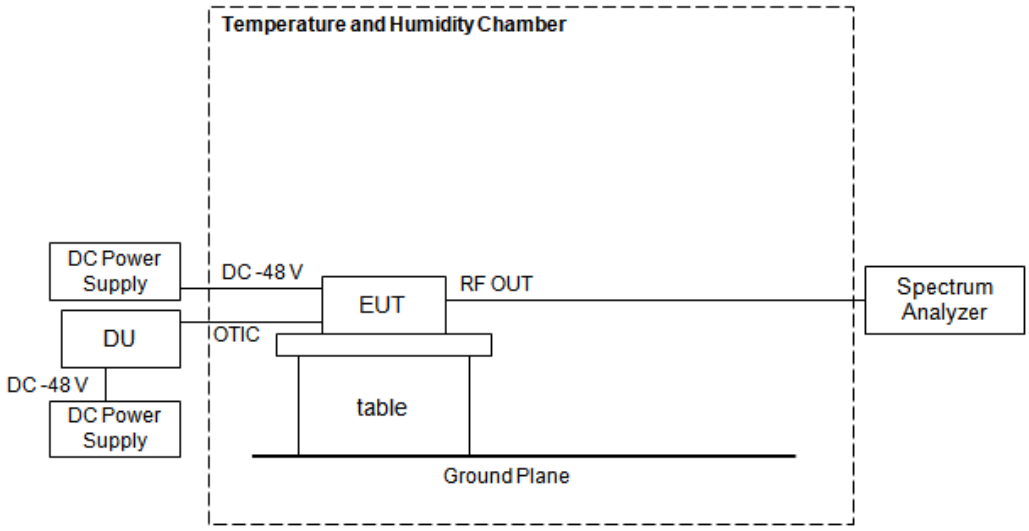


Radiated Test
30 MHz ~ 1 GHz 
Above 1 GHz 
※ EUT position is adopted by placement of floor-standing refer to section 5.5.2.3.2 of ANSI C63.26-2015

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
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	WHK3.0/18G-10EF / High Pass Filter	2020-03-02	Annual	8
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.
3) The results of the RF output power 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 RF output power

5G NR 40 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
2	QPSK	Low	2516.00	41.65	14.63
		Middle	2593.00	41.75	14.95
		High	2670.00	41.72	14.87
	16QAM	Low	2516.00	41.39	13.76
		Middle	2593.00	41.67	14.68
		High	2670.00	41.57	14.37
	64QAM	Low	2516.00	41.82	15.19
		Middle	2593.00	41.74	14.92
		High	2670.00	41.58	14.40
	256QAM	Low	2516.00	41.69	14.75
		Middle	2593.00	41.71	14.81
		High	2670.00	41.70	14.77
3	QPSK	Low	2516.00	41.62	14.51
		Middle	2593.00	41.74	14.94
		High	2670.00	41.53	14.24
	16QAM	Low	2516.00	41.80	15.13
		Middle	2593.00	41.78	15.06
		High	2670.00	41.67	14.68
	64QAM	Low	2516.00	41.67	14.70
		Middle	2593.00	41.77	15.04
		High	2670.00	41.62	14.52
	256QAM	Low	2516.00	41.58	14.40
		Middle	2593.00	41.67	14.69
		High	2670.00	41.63	14.56

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
6	QPSK	Low	2516.00	41.64	14.59
		Middle	2593.00	41.70	14.78
		High	2670.00	41.57	14.37
	16QAM	Low	2516.00	41.55	14.29
		Middle	2593.00	41.69	14.77
		High	2670.00	41.65	14.63
	64QAM	Low	2516.00	41.56	14.33
		Middle	2593.00	41.75	14.97
		High	2670.00	41.63	14.57
	256QAM	Low	2516.00	41.50	14.14
		Middle	2593.00	41.80	15.15
		High	2670.00	41.69	14.75
7	QPSK	Low	2516.00	41.62	14.52
		Middle	2593.00	41.77	15.01
		High	2670.00	41.55	14.30
	16QAM	Low	2516.00	41.48	14.07
		Middle	2593.00	41.69	14.74
		High	2670.00	41.64	14.60
	64QAM	Low	2516.00	41.61	14.49
		Middle	2593.00	41.71	14.84
		High	2670.00	41.60	14.46
	256QAM	Low	2516.00	41.56	14.33
		Middle	2593.00	41.72	14.86
		High	2670.00	41.67	14.68

Sum Data of Port 2, Port 3, Port 6 and Port 7

Frequency (MHz)	Output Power			
	QPSK	16QAM	64QAM	256QAM
	W			
2516.00	58.25	57.25	58.72	57.62
2593.00	59.68	59.25	59.76	59.51
2670.00	57.77	58.27	57.95	58.77

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(360/65) dBW	78.673
Total power	Sum all measured power value of W units	47.764
Final Calculated EIRP	Total power + Antenna gain = 47.764 dBm + 18 dBi	65.764

* EIRP Limit was described only for the worst case.

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

  - Port 2, 64QAM, Low channel.

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

  - Antenna gain = Maximum service beam gain = 18 dBi

  - Total horizontal plane beamwidth (maximum) = 65°

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 following conditions as applicable:

(g) Transmitters in which the modulating baseband comprises not more than three independent channels—when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

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:

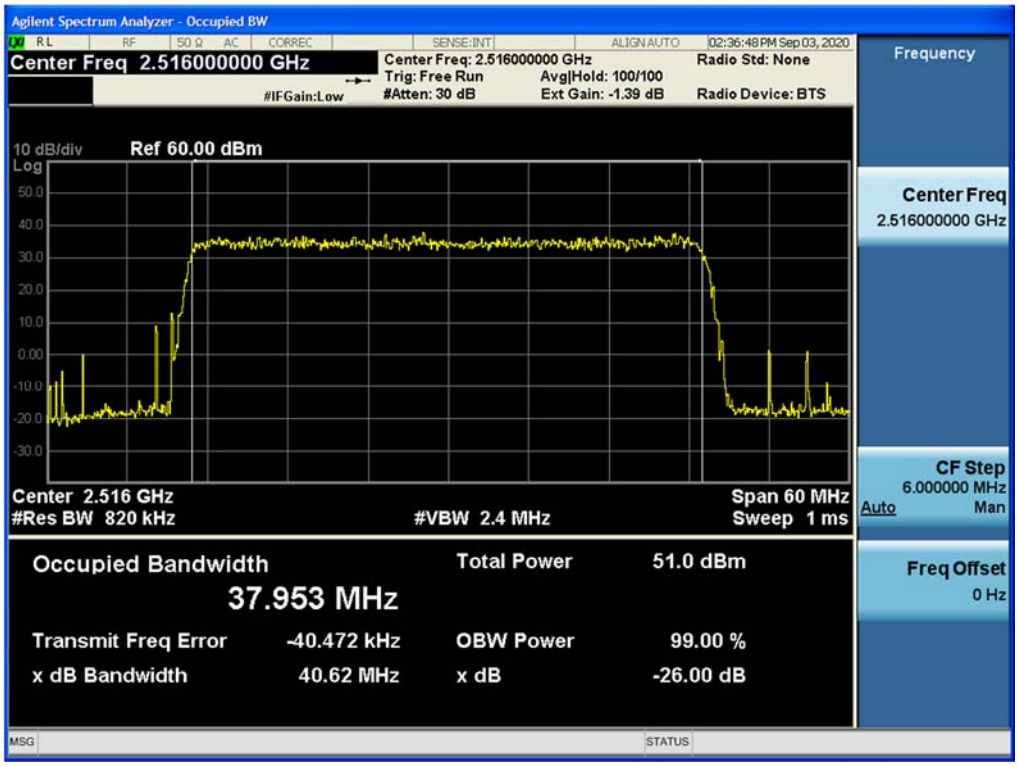
The results of the Occupied Bandwidth test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular Data of Occupied Bandwidth
5G NR 40 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
2	QPSK	Low	2516.00	37.919
		Middle	2593.00	37.929
		High	2670.00	37.926
	16QAM	Low	2516.00	38.080
		Middle	2593.00	38.165
		High	2670.00	38.091
	64QAM	Low	2516.00	37.953
		Middle	2593.00	37.940
		High	2670.00	37.930
	256QAM	Low	2516.00	37.961
		Middle	2593.00	37.954
		High	2670.00	37.923
3	QPSK	Low	2516.00	37.898
		Middle	2593.00	37.915
		High	2670.00	37.915
	16QAM	Low	2516.00	38.047
		Middle	2593.00	38.124
		High	2670.00	38.097
	64QAM	Low	2516.00	37.902
		Middle	2593.00	37.920
		High	2670.00	37.937
	256QAM	Low	2516.00	37.949
		Middle	2593.00	37.918
		High	2670.00	37.932
6	QPSK	Low	2516.00	37.933
		Middle	2593.00	37.961
		High	2670.00	37.906
	16QAM	Low	2516.00	37.999
		Middle	2593.00	38.158
		High	2670.00	38.109
	64QAM	Low	2516.00	37.994
		Middle	2593.00	37.938
		High	2670.00	37.906

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
	256QAM	Low	2516.00	37.921
		Middle	2593.00	37.893
		High	2670.00	37.918
7	QPSK	Low	2516.00	37.950
		Middle	2593.00	37.945
		High	2670.00	37.978
	16QAM	Low	2516.00	38.070
		Middle	2593.00	38.108
		High	2670.00	38.134
	64QAM	Low	2516.00	37.897
		Middle	2593.00	37.909
		High	2670.00	37.872
	256QAM	Low	2516.00	37.948
		Middle	2593.00	37.903
		High	2670.00	37.895

Plot Data of Occupied bandwidth

Antenna 2 / 5G NR 40 MHz 1 Carrier / 64QAM / Low


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 / 100 kHz) = - 20 dB

10 log (1 kHz / 1 MHz) = - 30 dB

- 150 kHz to 30 MHz applied 10 kHz RBW, 10 log (10 kHz / 100 kHz) = - 10 dB

10 log (10 kHz / 1 MHz) = - 20 dB

Note:

The results of the Band Edge 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 Radiated Spurious Emissions

5G NR 40 MHz 1 Carrier

Test Result for Output Port 2

Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge -100	Low Edge-100 ~ Low Edge	High Edge ~ High Edge +100	High Edge+100 ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-25.255	-37.286	-32.885	-26.430	-25.530	-27.114	-24.312
	Middle	-23.012	-30.829	-32.235	-26.116	-25.402	-26.988	-24.865
	High	-24.069	-36.373	-32.632	-26.303	-26.099	-27.227	-25.231
16QAM	Low	-25.130	-37.383	-31.881	-26.416	-25.623	-26.583	-24.359
	Middle	-23.102	-28.826	-32.602	-26.150	-25.603	-26.305	-24.183
	High	-24.732	-36.943	-33.142	-26.198	-26.410	-26.670	-24.382
64QAM	Low	-23.396	-39.388	-32.503	-26.454	-25.325	-26.670	-25.151
	Middle	-23.730	-30.032	-33.001	-25.958	-25.657	-27.256	-24.768
	High	-24.538	-37.112	-32.539	-26.239	-26.255	-26.845	-24.266
256QAM	Low	-27.738	-36.856	-32.304	-26.286	-25.673	-27.352	-24.307
	Middle	-23.473	-30.518	-33.056	-26.102	-25.610	-26.892	-24.830
	High	-22.832	-37.470	-32.273	-26.325	-26.313	-26.772	-24.939

Test Result for Output Port 3

Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge -100	Low Edge-100 ~ Low Edge	High Edge ~ High Edge +100	High Edge+100 ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-25.582	-38.288	-33.094	-26.376	-25.385	-26.679	-24.260
	Middle	-24.415	-29.505	-32.090	-25.900	-25.457	-27.031	-24.001
	High	-23.657	-36.674	-32.156	-26.200	-26.228	-26.567	-24.696
16QAM	Low	-25.572	-39.458	-32.100	-26.327	-25.189	-27.070	-25.094
	Middle	-24.732	-29.282	-32.578	-25.668	-25.333	-26.907	-23.957
	High	-26.144	-37.104	-32.775	-26.116	-26.109	-27.054	-23.837
64QAM	Low	-24.566	-38.852	-32.446	-26.392	-25.709	-26.888	-24.410
	Middle	-24.180	-31.438	-32.443	-25.233	-25.462	-27.007	-23.328
	High	-25.417	-37.202	-32.536	-26.138	-25.859	-27.234	-24.909
256QAM	Low	-24.909	-36.599	-32.214	-26.183	-25.505	-27.056	-24.273
	Middle	-24.819	-30.614	-32.616	-26.044	-25.649	-26.374	-24.230
	High	-24.123	-36.660	-32.769	-26.092	-26.161	-26.484	-24.167

Test Result for Output Port 6

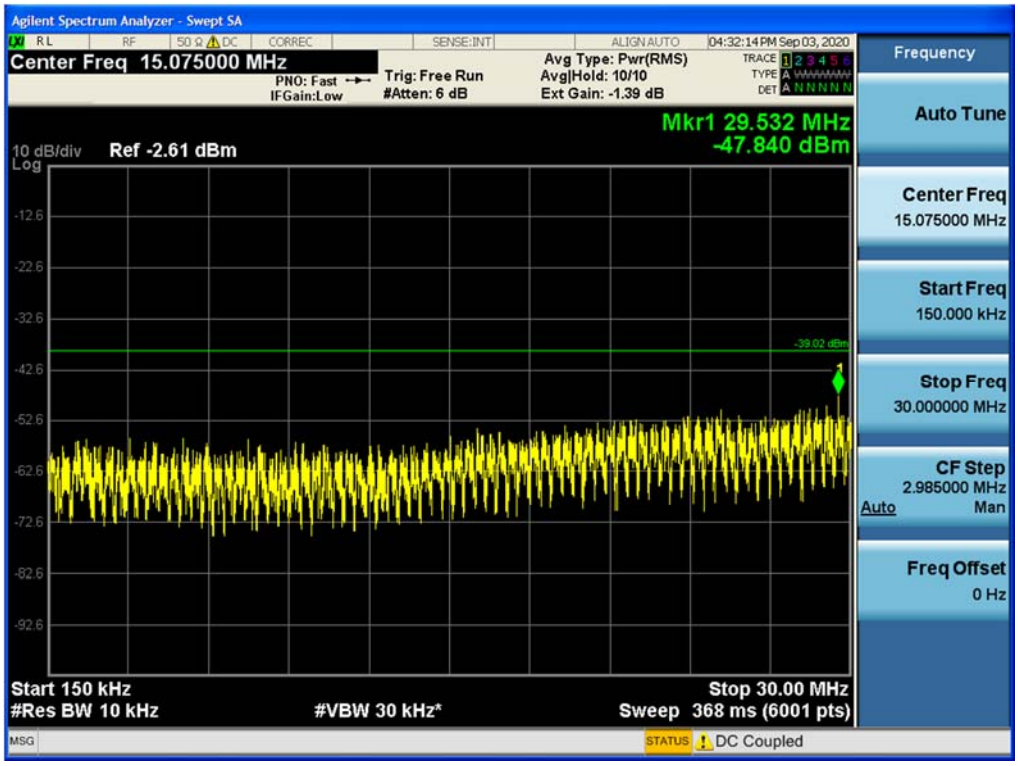
Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge -100	Low Edge-100 ~ Low Edge	High Edge ~ High Edge +100	High Edge+100 ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-23.885	-37.297	-32.341	-26.514	-25.722	-27.339	-24.217
	Middle	-26.050	-31.662	-32.399	-26.116	-25.629	-26.379	-24.505
	High	-25.444	-35.623	-33.057	-26.106	-25.981	-26.912	-24.565
16QAM	Low	-25.068	-39.370	-32.529	-26.492	-25.570	-27.245	-24.582
	Middle	-24.301	-29.840	-32.594	-26.246	-25.635	-27.118	-24.814
	High	-24.875	-36.663	-32.511	-26.092	-26.079	-27.077	-24.670
64QAM	Low	-23.228	-39.554	-32.411	-26.148	-25.854	-27.039	-24.061
	Middle	-23.633	-29.766	-32.908	-25.938	-25.544	-26.720	-24.625
	High	-26.130	-37.087	-32.463	-26.197	-25.979	-26.677	-24.477
256QAM	Low	-24.145	-38.719	-32.789	-26.325	-25.529	-26.024	-24.748
	Middle	-24.304	-27.840	-32.046	-26.153	-25.307	-26.815	-24.810
	High	-26.310	-36.388	-32.806	-26.224	-26.211	-26.987	-24.466

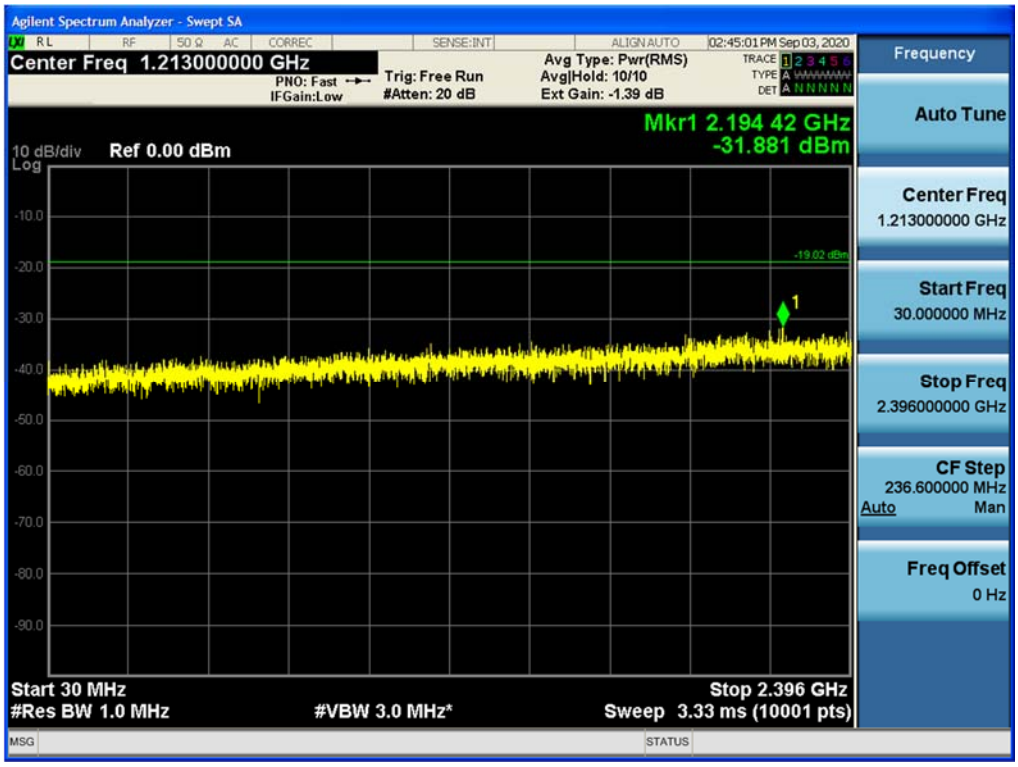
Test Result for Output Port 7

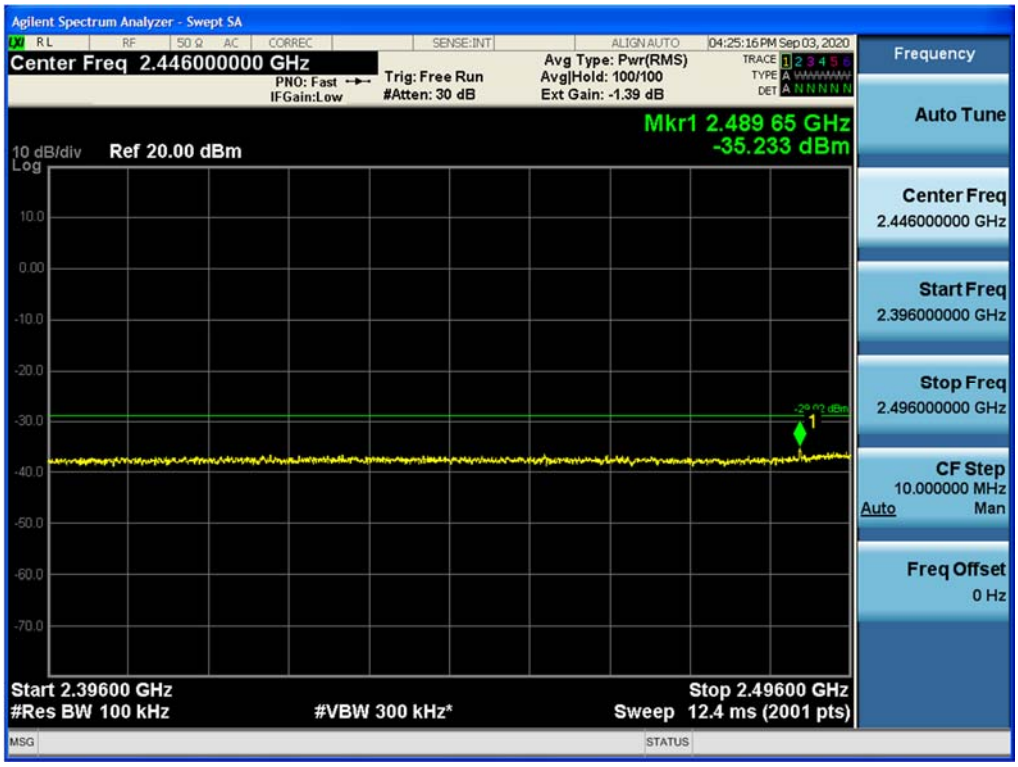
Mod.	Channel	Measured Level (dBm)						
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge -100	Low Edge-100 ~ Low Edge	High Edge ~ High Edge +100	High Edge+100 ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	Low	-24.693	-38.470	-32.800	-26.147	-25.245	-25.435	-23.026
	Middle	-25.839	-29.790	-32.315	-26.090	-25.665	-26.861	-25.042
	High	-22.894	-36.458	-32.593	-25.848	-26.080	-26.637	-24.762
16QAM	Low	-24.940	-38.237	-32.414	-26.432	-25.571	-26.927	-24.474
	Middle	-25.213	-31.063	-32.932	-25.928	-25.278	-26.941	-24.446
	High	-23.090	-36.142	-32.238	-26.313	-26.042	-27.192	-25.371
64QAM	Low	-24.060	-39.261	-32.410	-26.406	-25.487	-27.166	-24.774
	Middle	-24.793	-29.223	-32.417	-25.962	-25.120	-26.969	-24.969
	High	-24.889	-35.550	-32.520	-25.864	-25.888	-27.054	-24.863
256QAM	Low	-25.640	-39.061	-32.147	-26.285	-25.486	-26.948	-24.471
	Middle	-25.414	-31.222	-32.559	-25.995	-25.675	-27.085	-23.949
	High	-26.089	-37.475	-32.877	-26.214	-26.244	-26.971	-23.526

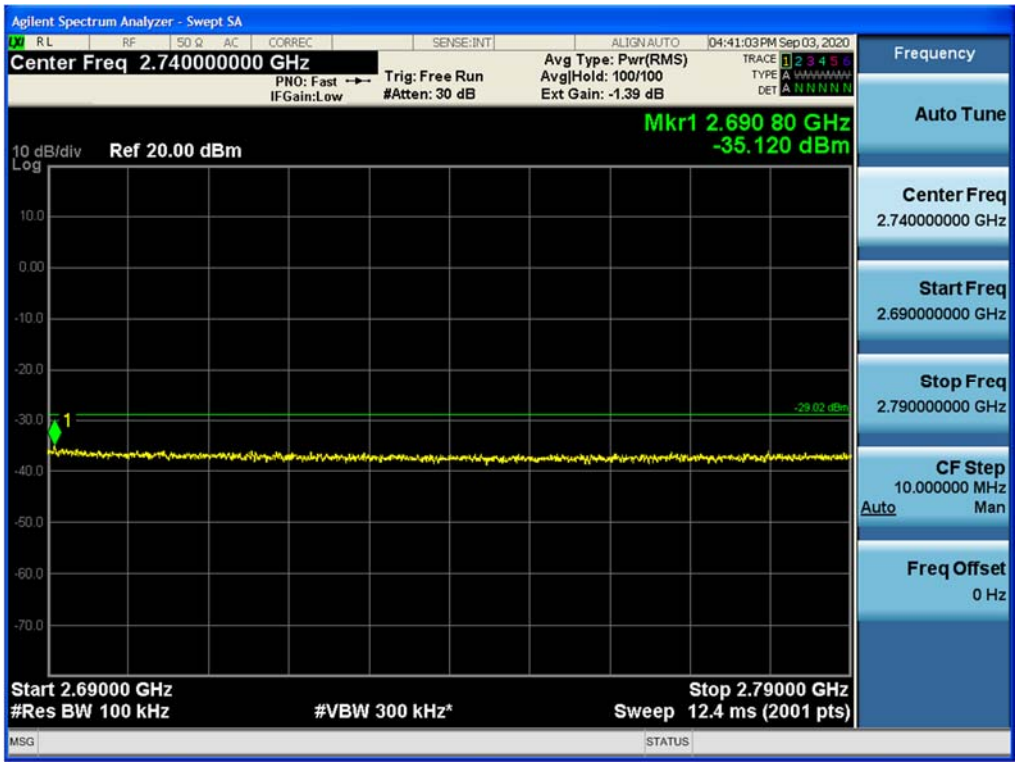
Plot Data of Conducted Spurious Emissions

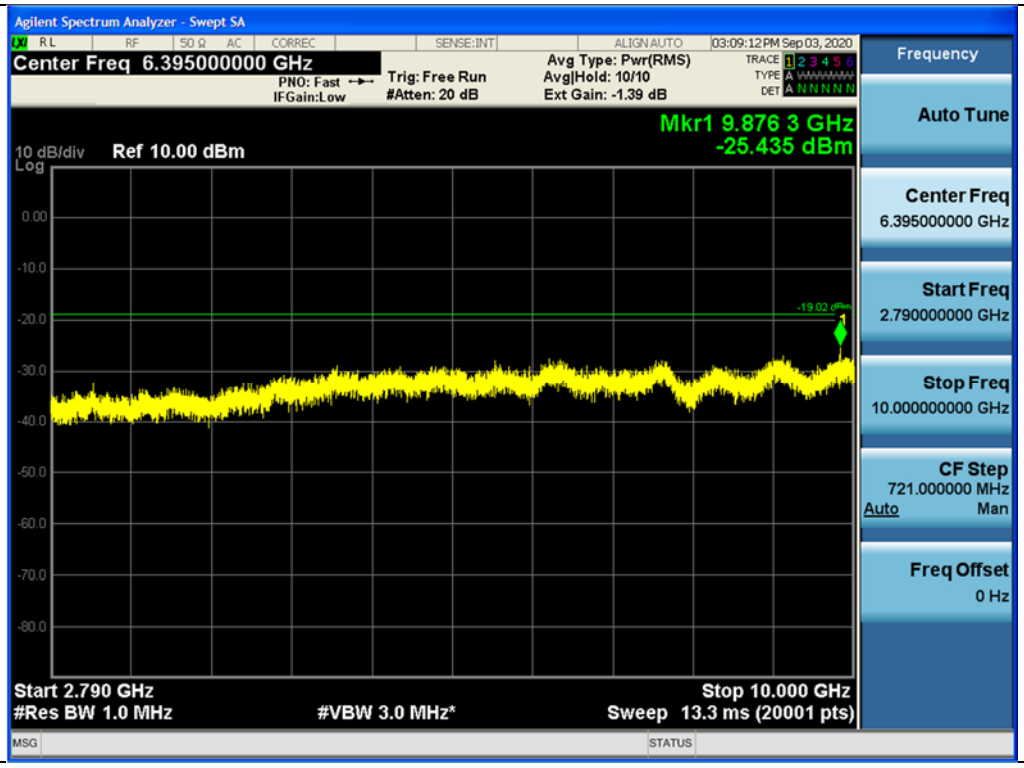
Antenna 2 / 9 kHz ~ 150 kHz / 5G NR 40 MHz 1 Carrier / 256QAM / High

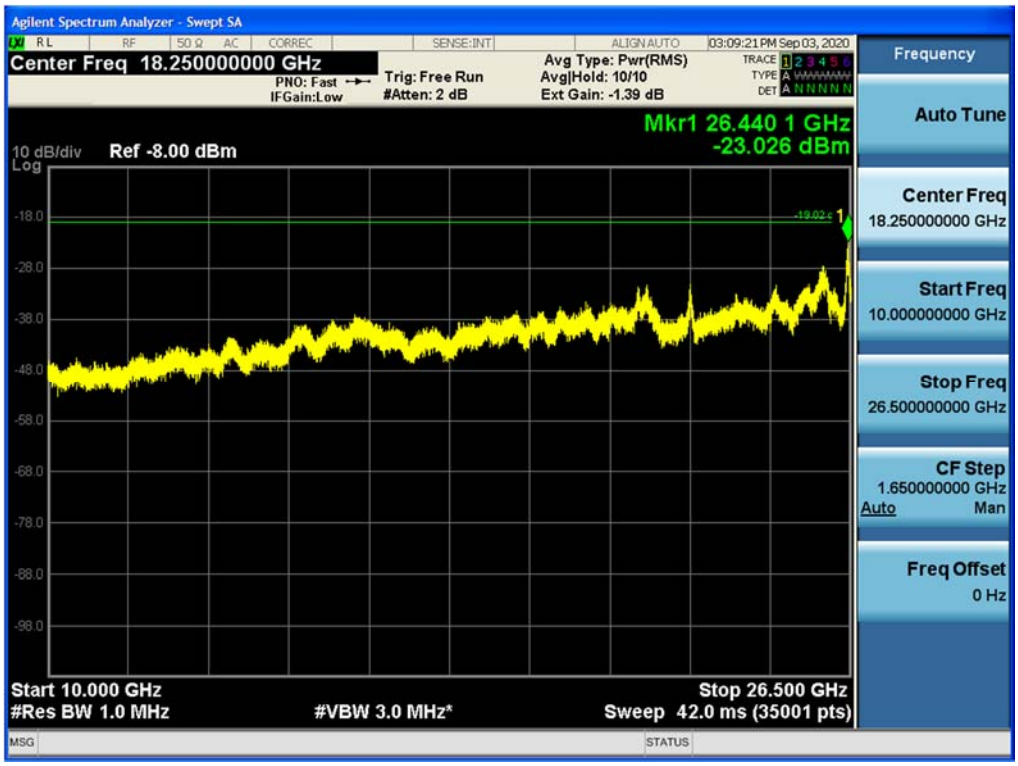

Antenna 6 / 150 kHz ~ 30 MHz / 5G NR 40 MHz 1 Carrier / 256QAM / Middle


Antenna 2 / 30 MHz ~ Low Edge-100 / 5G NR 40 MHz 1 Carrier / 16QAM / Low


Antenna 3 / Low Edge-100 ~ Low Edge / 5G NR 40 MHz 1 Carrier / 64QAM / Middle


Antenna 7 / High Edge ~ High Edge+100 / 5G NR 40 MHz 1 Carrier / 64QAM / Middle


Antenna 7 / High Edge+100 ~ 10 GHz / 5G NR 40 MHz 1 Carrier / QPSK / Low


Antenna 7 / 10 GHz ~ 26.5 GHz/ 5G NR 40 MHz 1 Carrier / QPSK / Low


5.4. BAND EDGE

Test Results:

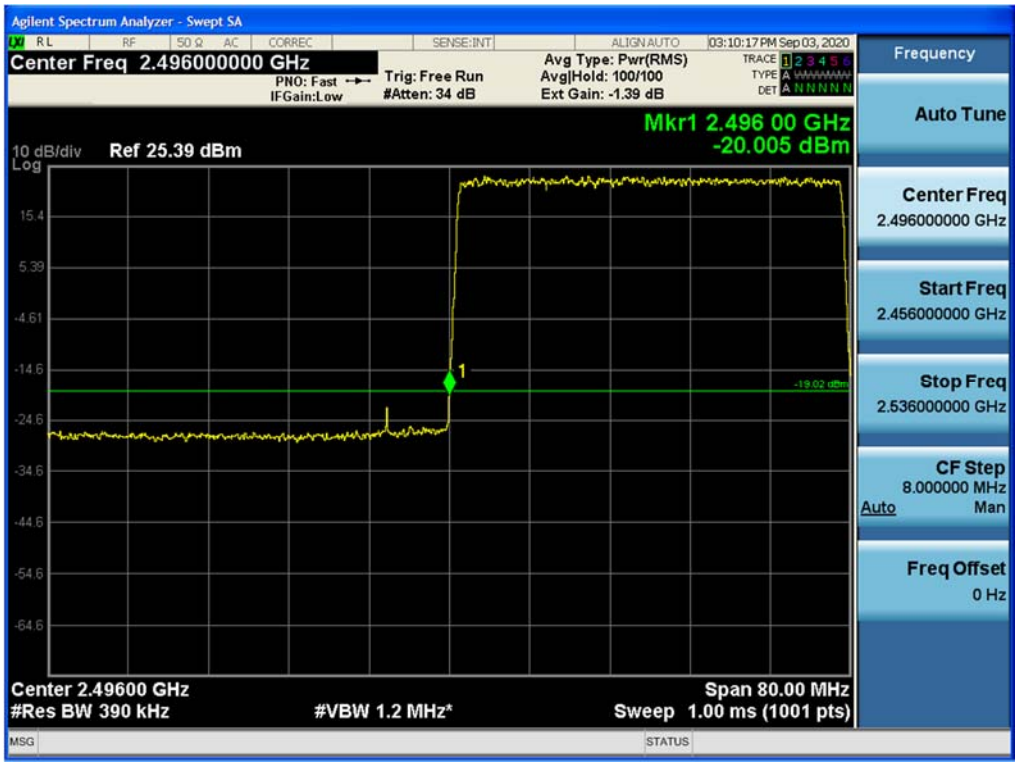
Tabular Data of Band Edge

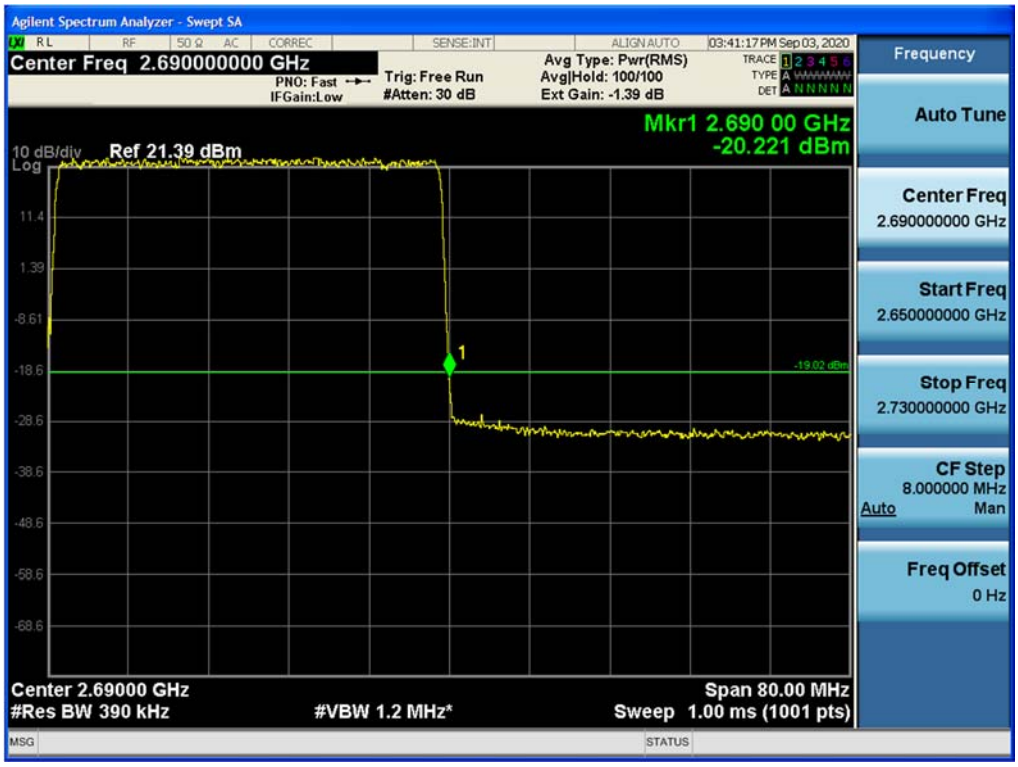
5G NR 40 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
2	QPSK	Low	2496.00	-22.06
		High	2690.00	-20.48
	16QAM	Low	2496.00	-20.63
		High	2690.00	-20.32
	64QAM	Low	2496.00	-20.87
		High	2690.00	-21.25
	256QAM	Low	2496.00	-20.37
		High	2690.00	-20.24
3	QPSK	Low	2496.00	-20.78
		High	2690.00	-20.52
	16QAM	Low	2496.00	-20.40
		High	2690.00	-21.36
	64QAM	Low	2496.00	-21.70
		High	2690.00	-20.58
	256QAM	Low	2496.00	-20.54
		High	2690.00	-20.30

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
6	QPSK	Low	2496.00	-20.38
		High	2690.00	-22.13
	16QAM	Low	2496.00	-21.65
		High	2690.00	-20.27
	64QAM	Low	2496.00	-21.67
		High	2690.00	-20.22
	256QAM	Low	2496.00	-22.22
		High	2690.00	-21.50
7	QPSK	Low	2496.00	-20.05
		High	2690.00	-20.93
	16QAM	Low	2496.00	-20.33
		High	2690.00	-20.65
	64QAM	Low	2496.00	-20.01
		High	2690.00	-20.46
	256QAM	Low	2496.00	-21.20
		High	2690.00	-20.84

Plot Data of Band Edge

Antenna 7 / 5G NR 40 MHz 1 Carrier / 64QAM / Low


Antenna 6 / 5G NR 40 MHz 1 Carrier / 64QAM / 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

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

Note:

1) Measure distance: 3 m
2) Transmitting 4 ports and terminating 4 ports.

5G NR 40 MHz 1 Carrier_QPSK

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 3G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
13,762.79	40.99	40.000	17.01	33.97	H	-54.21	-31.170
13,762.79	43.48	40.000	17.01	33.97	V	-51.72	-28.680

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

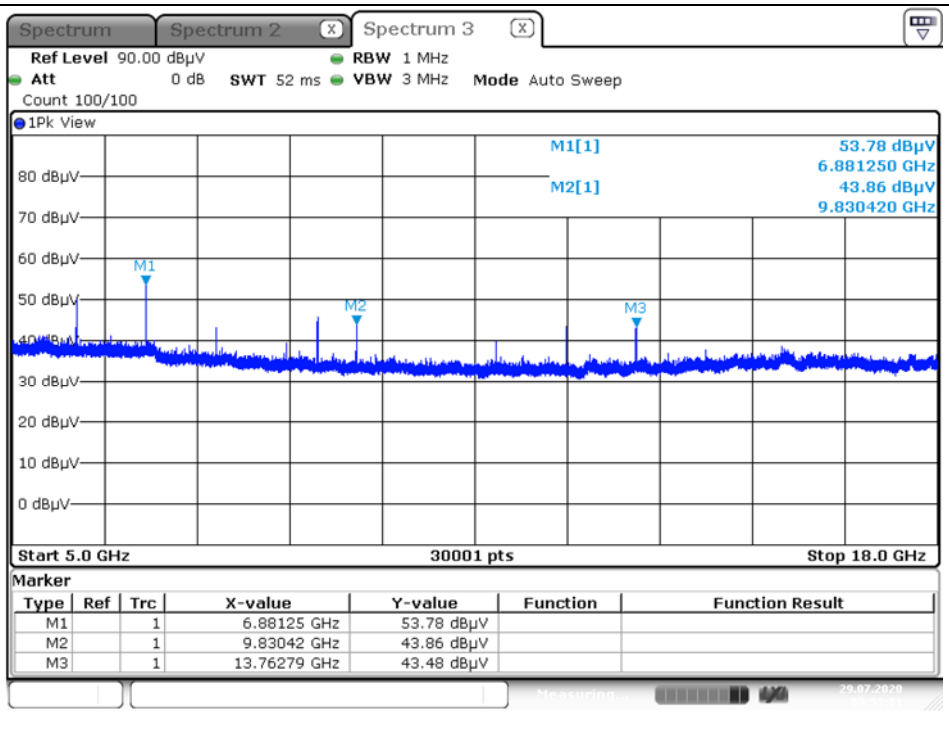
5G NR 40 MHz 1 Carrier_QAM

Freq.(MHz)	Measured Level [dBuV]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain (+ 3G H.P.F.) [dB]	Pol.	Measured Power [dBm]	Result [dBm/m]
13,762.79	41.66	40.000	17.01	33.97	H	-53.54	-30.500
6,881.25	54.85	34.860	11.37	35.88	V	-40.35	-30.000

* 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 40 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.

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 000 009	9.233	0.000	0.00000
	-30	2593 000 006	5.668	-3.565	-0.00137
	-20	2593 000 005	4.502	-4.731	-0.00182
	-10	2593 000 003	2.547	-6.686	-0.00258
	0	2593 000 006	5.507	-3.726	-0.00144
	+10	2593 000 004	3.580	-5.653	-0.00218
	+30	2593 000 002	2.415	-6.818	-0.00263
	+40	2593 000 009	8.936	-0.297	-0.00011
	+50	2593 000 006	6.429	-2.804	-0.00108
115%	+20	2593 000 002	2.451	-6.782	-0.00262
85%	+20	2593 000 001	1.035	-8.198	-0.00316

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 datas were only the port 2.

6. Annex B_EUT AND TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2009-FC002-P