

TEST REPORT

Report Number: R15980274-E12c

Applicant : Samsung Electronics Co Ltd
129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea

Model : SC-51G, SCG36

FCC ID : A3LSMS942JPN

EUT Description : GSM/WCDMA/LTE/NR Phone + BT/BLE, DTS/UNII
a/b/g/n/ac/ax/be, WPT and NFC

Test Standard(s) : FCC 47 CFR PART 2, PART 22H, PART 25
ISED RSS-GEN ISSUE 5 + A1 + A2, RSS-132 ISSUE 4

Date Of Issue:
2025-12-27

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2025-12-27	Initial Release	Noah Bennett

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Samsung Electronics Co Ltd
129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea

EUT DESCRIPTION: GSM/WCDMA/LTE/NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax/be, WPT
and NFC

SERIAL NUMBERS: YHI0909M, YHK0046M, YHK0177M, YKA2427M

SAMPLE RECEIVE DATE: 2025-09-11, 2025-10-07, 2025-11-19

DATE TESTED: 2025-09-11 to 2025-12-23

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR PART 2, PART 22H, PART 25	Complies
ISED RSS-GEN ISSUE 5 + A1 + A2, RSS-132 ISSUE 4	

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC By:



Prepared By:



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UL LLC

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for correctly integrating customer-provided data with measurements performed by UL LLC.

Requirement Description	Band	Requirement Clause Number (FCC)	Requirement Clause Number (ISED)	Result	Remarks
Effective Radiated Power	5	22.913 (a)(5)	RSS132§5.4	Complies	None.
Occupied Bandwidth	5	2.1049	RSS132, RSS-GEN§6.7	Complies	None.
Band Edge and Emission Mask	5	2.1051, 22.917 (a)	RSS132§5.5	Complies	None.
Out of Band Emissions	5	2.1051, 22.917 (a)	RSS132§5.5	Complies	None.
Frequency Stability	5	2.1055, 22.355	RSS132§5.3	Complies	None.
Peak-to-Average Ratio	5	22.913 (d)	RSS132§5.4	Complies	None.
Field Strength of Spurious Radiation	5	2.1053, 22.917 (a)	RSS132§5.5	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following.

FCC published lists of [measurement procedures](#) for compliance testing.

ISED published lists of [normative test standards and acceptable alternatives procedures](#).

- ANSI C63.26:2015
- ANSI/TIA-603-E (2016)
- FCC 47 CFR Part 2, Part 22H, Part 25
- [FCC KDB 971168 D01](#): Power Meas License Digital Systems (ISED acceptable alternative procedure)
- [FCC KDB 971168 D02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01](#): Determining ERP and EIRP
- [FCC KDB 273109 D02](#): Part 25 and CMRS-Bands
- ISED RSS-Gen Issue 5 + A1 + A2, RSS-132 Issue 4

4. FACILITIES AND ACCREDITATION

UL LLC. is accredited by A2LA, certification #0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 2800 Suite Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A.	US0067	27265	825374

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB
Occupied Channel Bandwidth	±0.39 %
Temperature	±0.9 °C
Supply voltages	±0.45 %
Time	±0.02 %

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax/be, WPT and NFC.

The EUT supports the following LTE and 5G NR Bands and their antenna configurations:

LTE & 5G NR Bands	Config 0	Config 1
LTE B5 & 5G NR n5	ANT E	ANT A

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

$ERP/EIRP = P_{Meas} + GT - LC$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the tables below contain the highest of all configurations average conducted and peak ERP output powers as follows:

LTE BAND 5 (FCC Part 22)

Part 22/RSS 132								
ERP Limit (W)		7.00						
Bandwidth (MHz)	Modulation	Low Frequency	Upper Frequency	ERP Average	ERP Average	99% BW (MHz)	99% BW (kHz)	Emission Designator
10.0	QPSK	829.0	844.0	17.97	0.063	8.991	8991	8M99G7W
	16QAM			18.19	0.066	8.995	8995	9M00D7W

5G NR n5 (FCC Part 22)

Part 22/RSS 132								
ERP Limit (W)		7.00						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	ERP Average (dBm)	ERP Average (W)	99% BW (MHz)	99% BW (kHz)	Emission Designator
5.0	BPSK	826.5	846.5	19.02	0.080	4.501	4501	4M50G7W
20.0	BPSK	826.5	846.5	18.82	0.076	17.953	17953	18M0G7W
	16QAM			17.90	0.062	17.957	17957	18M0D7W

6.3. MAXIMUM ANTENNA GAIN

The antenna(s) gain as provided by the manufacturer' are as follows:

Frequency Band	ANT E Antenna Gain (dBi)	ANT A Antenna Gain (dBi)
LTE B5 & 5G NR n5 824 – 849 MHz	-3.7	-3.7

6.4. WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based upon an engineering evaluation made on conducted average power provided by the manufacturer. The modulations with the highest output power were selected as worst-case. Conducted tests were performed on the worst-case antenna port per band. Full radiated Emissions Testing on each antenna was performed and reported.

For 5G NRs, conducted spurious emission tests were conducted on wider bandwidth with inner 1RB since this is the worst bandwidth and the highest output power.

For LTE, radiated spurious tests were conducted on wider bandwidth with 1RB to cover the entire 814 – 849 frequency range for 22H.

BPSK modulation applied only for 5G NR frequencies and has the same tune up power as QPSK modulations.

The DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

The following is the worst-case antenna port, and modulation, as tested:

LTE & 5G NR Bands	Worst-Case Antenna Port	Worst-Case Modulation
LTE B5 & 5G NR n5 824 – 849 MHz	ANT A	LTE (QPSK) 5G NR (BPSK)

The EUT was investigated in three orthogonal orientations X/Y/Z on both Low Band (Fundamental Below 1GHz) Mid Band (Fundamental between 1-3GHz) and High Band (Fundamental above 3GHz) over all antennas to find the worst-case orientation. For Simultaneous Tx scans in which there are two or more F_c ranges with different worst-case orientations, scans were performed in the orientation with the highest output power, and sufficient margin was added to cover other orientations. The following are the worst-case orientations:

LTE & 5G NR Bands	Config 0 Orientation	Config 1 Orientation
Low Band ($F_c < 1\text{GHz}$)	Z	Y
Mid Band ($1\text{GHz} < F_c < 3\text{GHz}$)	Z	-
High Band ($F_c > 3\text{GHz}$)	-	-

The EUT was tested while connected to AC Lines via charging cable and brick to represent worst case emissions.

Worst Case emissions from 9kHz-30Mhz, 30-1000MHz, 18-26.5GHz, and 26.5GHz-40GHz were done on the modes with the highest pre-tuned conducted average power per antenna. No emissions within 20dB were observed.

This report covers 2 models, the model differences and the representative model is shown below:

Representative Model	Difference	Derivative Model
		SCG36
SC-51G	Hardware	Same as SC-51G
	Software	Different UI

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Adapter	Flextronics	G-1000-US	Na	na

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	1	USB-C	Shielded	<3m	Phone to power adapter

TEST SETUP

The EUT was connected to a base station simulator and set to transmit at max power for WWAN testing

SETUP DIAGRAM

Please see R15980274-EP1c for Setup Diagrams and Setup Photos.

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Wireless Conducted Measurement Equipment

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
CBL036	N-Male to SMA-Male, 6Ft	Times Microwave	LMR-240 Coax Cable CBL036	2025-01-04	2026-01-04
208721	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2025-09-10	2026-09-10
213025	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2025-01-04	2026-01-04
207726	Temp/Humid Chamber	Thermotron	SM-32-8200	2025-01-15	2026-01-15
179892	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2026-08-05
90416	Spectrum Analyzer	Keysight Technologies	N9030A	2025-07-25	2026-07-25
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
CBL010	Micro-Coax UTiFLEX Cable Assembly, Low Loss	Carlisle Interconnect Technologies	UFB293C-0-2400-300300	2025-06-06	2026-06-06
Pad II	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C27S-10	2025-05-20	2026-05-20

Test Equipment Used – Radiated Disturbance Emissions Morrisville – Chamber 1

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	18-40 GHz				
91186	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2024-05-16	2026-05-16
91187	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2024-05-17	2026-05-17
	Gain-Loss Chains				
135999	Gain-loss string: 18-40GHz	Various	Various	2025-05-31	2026-05-31
	Receiver & Software				
206459	Spectrum Analyzer	Rohde & Schwarz	FSW	2025-09-15	2026-09-15
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241205	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05
212967	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2025-02-07	2026-02-07

Test Equipment Used – Radiated Disturbance Emissions Morrisville – Chamber 4

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-04-09	2026-04-09
	Gain-Loss Chains				
207640	Gain-loss string: 1-18GHz	Various	Various	2025-06-13	2026-06-13
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2025-04-21	2026-04-21
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241204	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05
212967	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2025-02-07	2026-02-07
212166	Wideband Radio Communications Tester	Anritsu	MT8821C	2025-01-20	2026-01-20
198917	1GHz high-pass filter, 2W, Fhigh = 18GHz	Micro-Tronics	HPM18129-02	2025-03-13	2026-03-13
169108 (BRF010)	1.85-1.97GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50714-01	2025-03-13	2026-03-13
169106 (BRF008)	1710-1785MHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50713-01	2025-03-13	2026-03-13
231408 (BRF011)	2.495-2.690GHz notch filter, 2W, Fhigh = 18GHz	Micro-Tronics	BRM50709-01	2025-03-13	2026-03-13

NOTES:

- * Testing is completed before equipment expiration date.
- **Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
ISED: RSS132

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested.

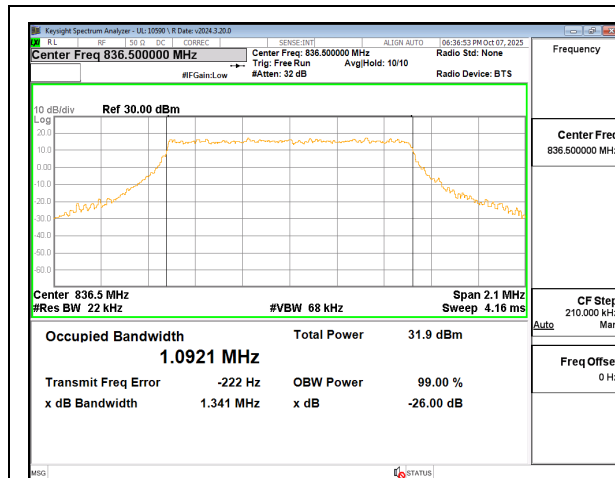
LTE BAND 5 (FCC PART 22)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4MHz, QPSK	6/0	836.5	1.092	1.341
	1.4MHz, 16QAM			1.096	1.340
	3MHz, QPSK	15/0		2.708	3.050
	3MHz, 16QAM			2.707	3.047
	5MHz, QPSK	25/0		4.495	5.067
	5MHz, 16QAM			4.505	5.094
	10MHz, QPSK	50/0		8.991	9.926
	10MHz, 16QAM			8.995	9.940
	10MHz, QPSK	1/0		0.275	0.477

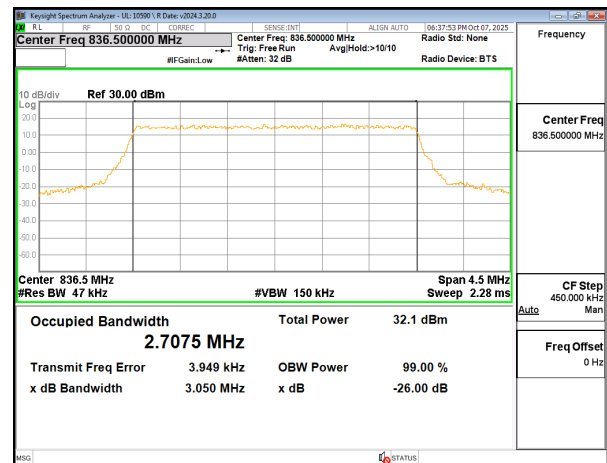
5G NR n5 (FCC PART 22)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n5 (FCC Part 22)	5MHz, BPSK	25/0	836.5	4.501	5.223
	5MHz, 16QAM			4.510	5.159
	10MHz, BPSK	50/0		8.995	9.847
	10MHz, 16QAM			9.009	9.926
	15MHz, BPSK	75/0		13.465	14.49
	15MHz, 16QAM			13.528	14.59
	20MHz, BPSK	100/0		17.953	19.21
	20MHz, 16QAM			17.957	19.11
	20MHz, BPSK	1/1		1.346	1.841

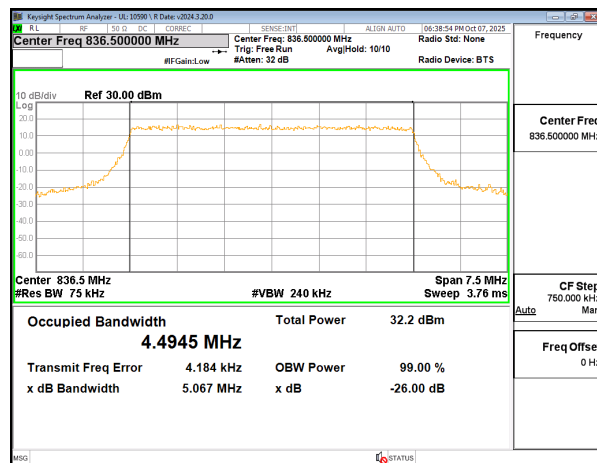
8.1.1. LTE BAND 5 (FCC PART 22)



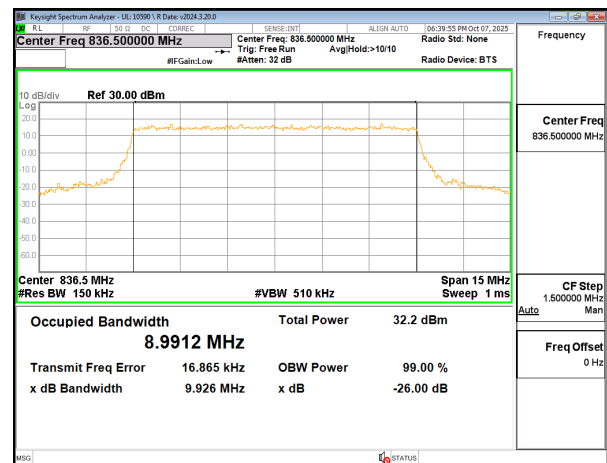
LTE B5 1.4MHz QPSK Middle Channel RB6-0



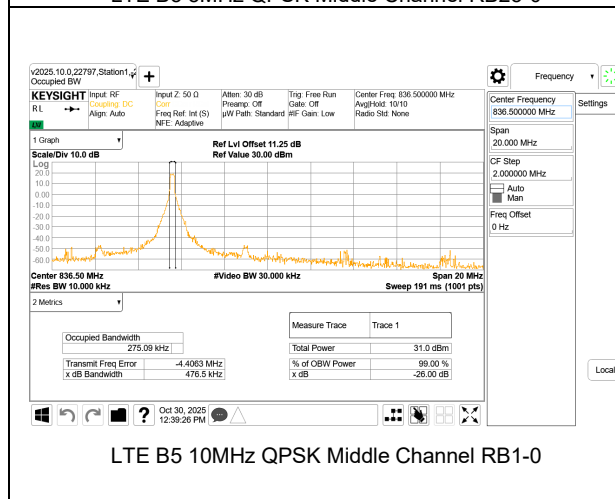
LTE B5 3MHz QPSK Middle Channel RB15-0



LTE B5 5MHz QPSK Middle Channel RB25-0



LTE B5 10MHz QPSK Middle Channel RB50-0



LTE B5 10MHz QPSK Middle Channel RB1-0

8.1.2. 5G NR n5 (FCC PART 22)



8.2. EMISSION MASK AND ADJACENT CHANNEL POWER

LIMITS

FCC: §22.917 (a)

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

FCC: §90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

NOTE: According to 971168 D02 Misc Rev Approv License Devices v02r01, Section VIII (c):

For Section 90.691(a) compliance testing, use RBW = 300 Hz for offsets less than 37.5 kHz from a channel edge; RBW = 100 kHz for offsets greater than 37.5 kHz is allowed.

ISED: RSS132§5.5

Equipment shall meet the unwanted emission limits specified below:

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB.
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

TEST PROCEDURE

For Spectrum Emission Mask plots, the spectrum analyzer is configured to sweep with a moving integration window, the width of which can be adjusted to different sizes across the sweep. The window width is configured to be greater than or equal to the required reference bandwidth. The center frequencies of the integration window for the different integration windows was set such that the upper and lower edges of the windows are aligned with the transition points in the reference bandwidths. This is achieved by setting the start / stop frequencies of the window with an offset equal to the reference bandwidth / 2 from the transition point.

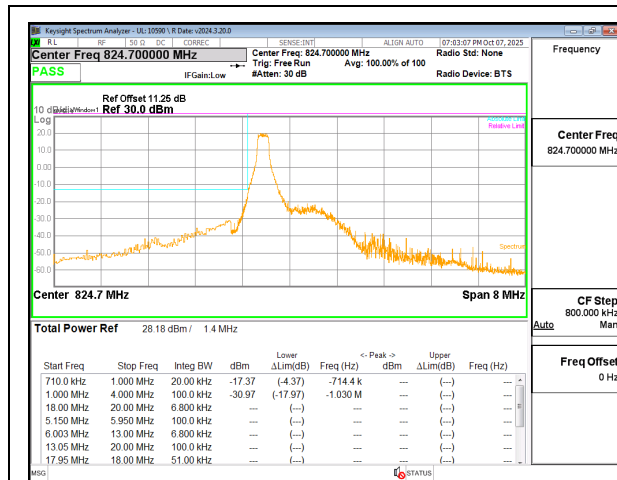
The transmitter output was connected to a base station simulator and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

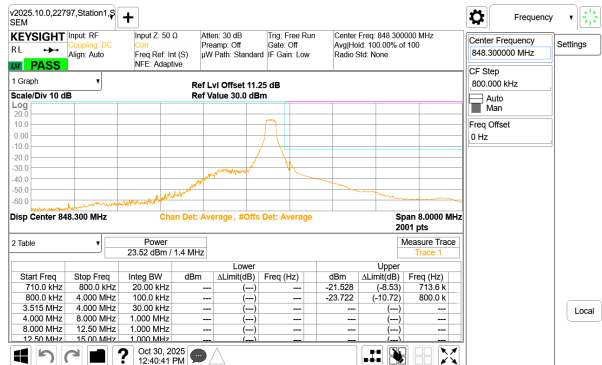
1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

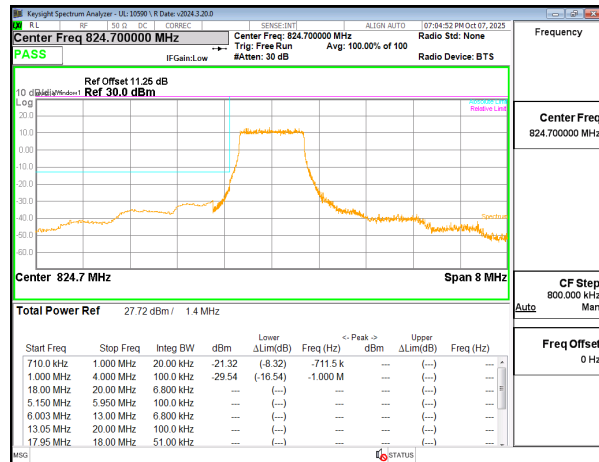
8.2.1. LTE BAND 5 (FCC PART 22)



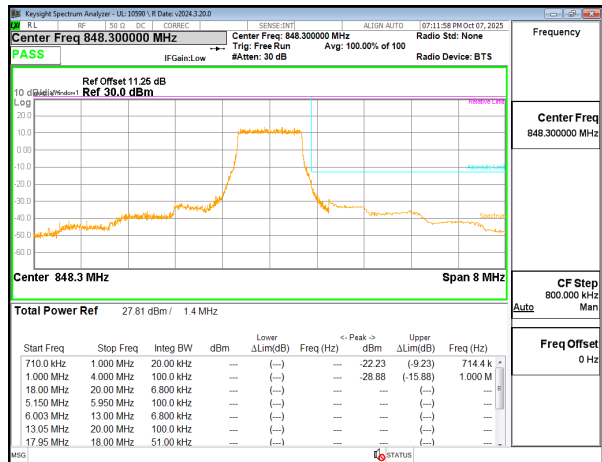
LTE B5 1.4MHz QPSK Low Channel RB1-0



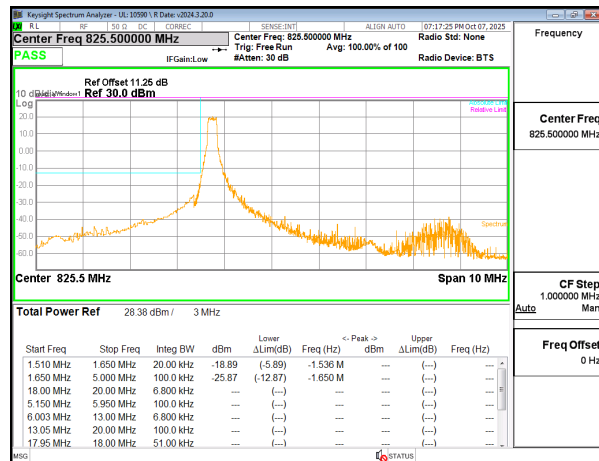
LTE B5 1.4MHz QPSK High Channel RB1-5



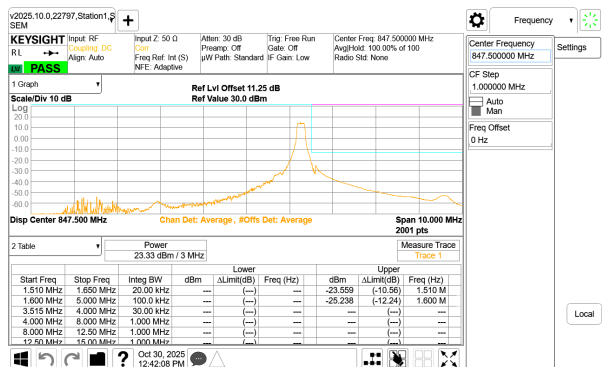
LTE B5 1.4MHz QPSK Low Channel RB6-0



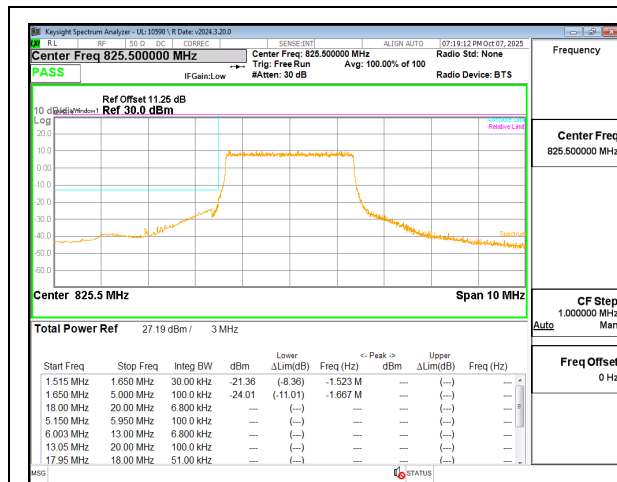
LTE B5 1.4MHz QPSK High Channel RB6-0



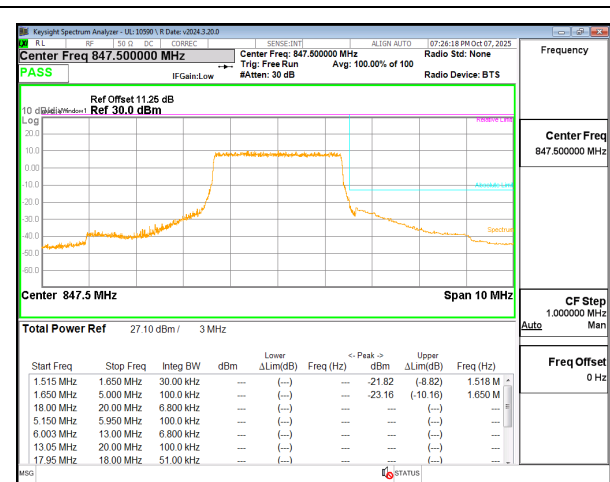
LTE B5 3MHz QPSK Low Channel RB1-0



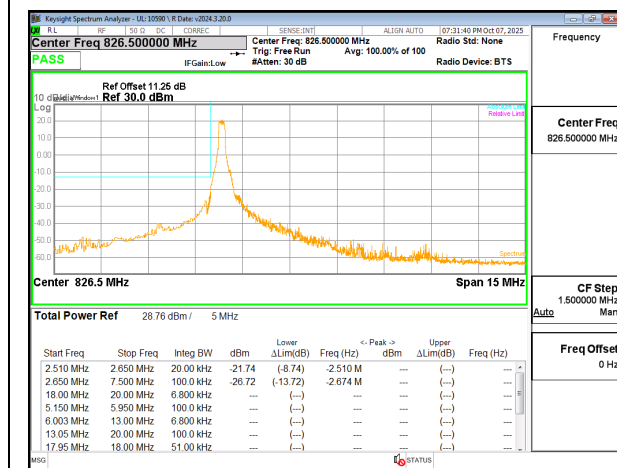
LTE B5 3MHz QPSK High Channel RB1-14



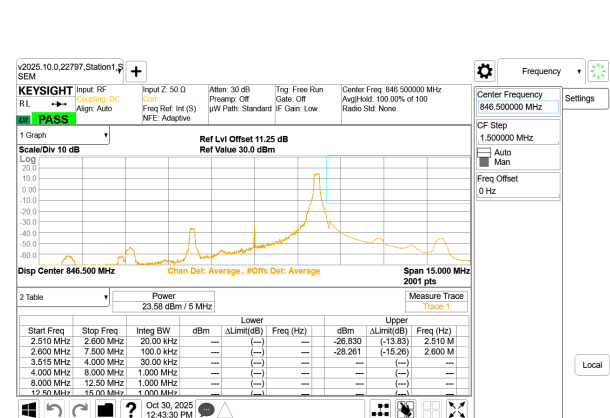
LTE B5 3MHz QPSK Low Channel RB15-0



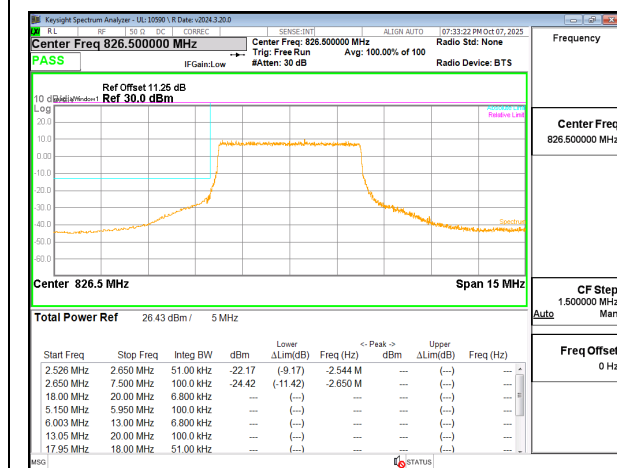
LTE B5 3MHz QPSK High Channel RB15-0



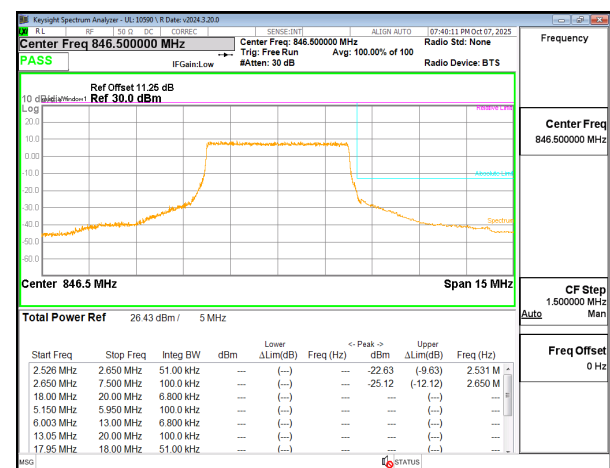
LTE B5 5MHz QPSK Low Channel RB1-0



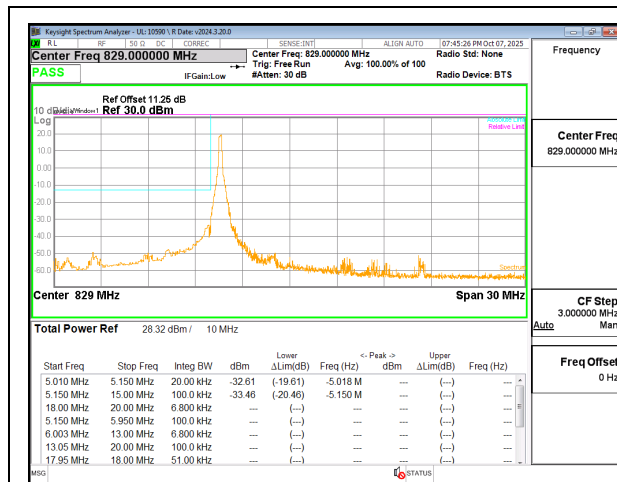
LTE B5 5MHz QPSK High Channel RB1-24



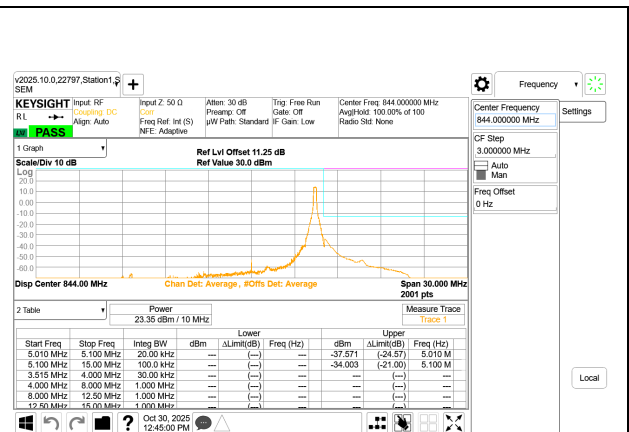
LTE B5 5MHz QPSK Low Channel RB25-0



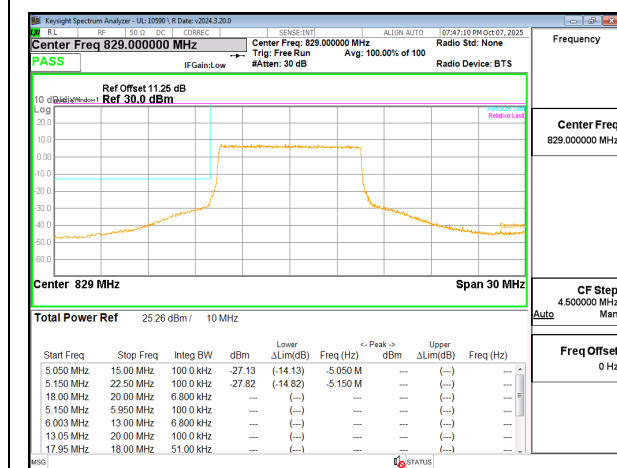
LTE B5 5MHz QPSK High Channel RB25-0



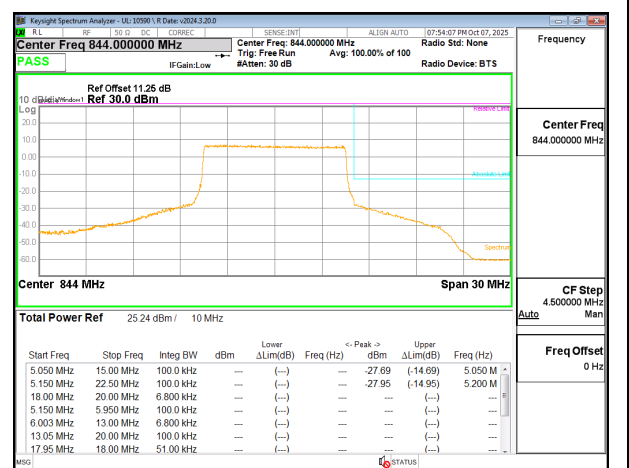
LTE B5 10MHz QPSK Low Channel RB1-0



LTE B5 10MHz QPSK High Channel RB1-49

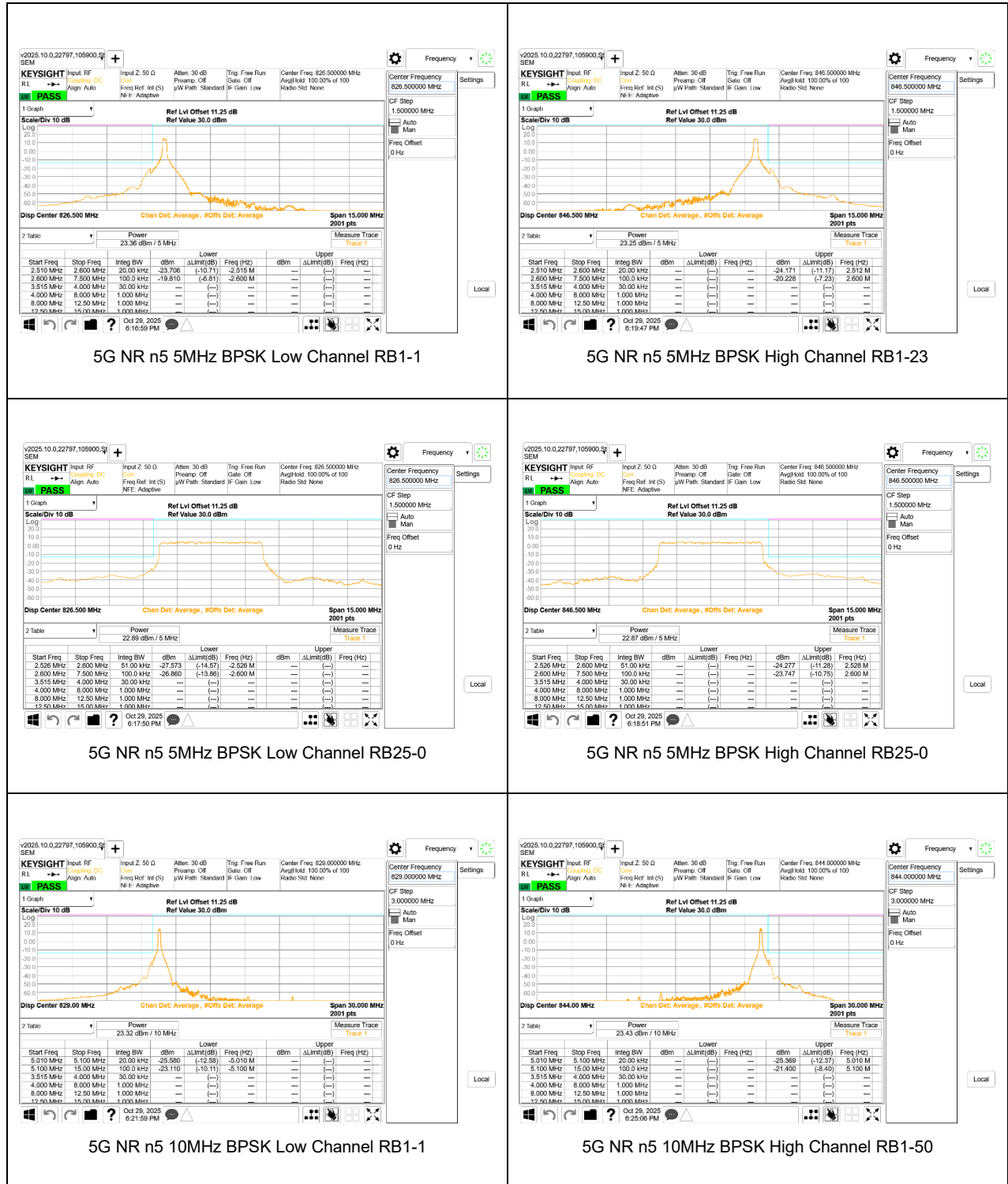


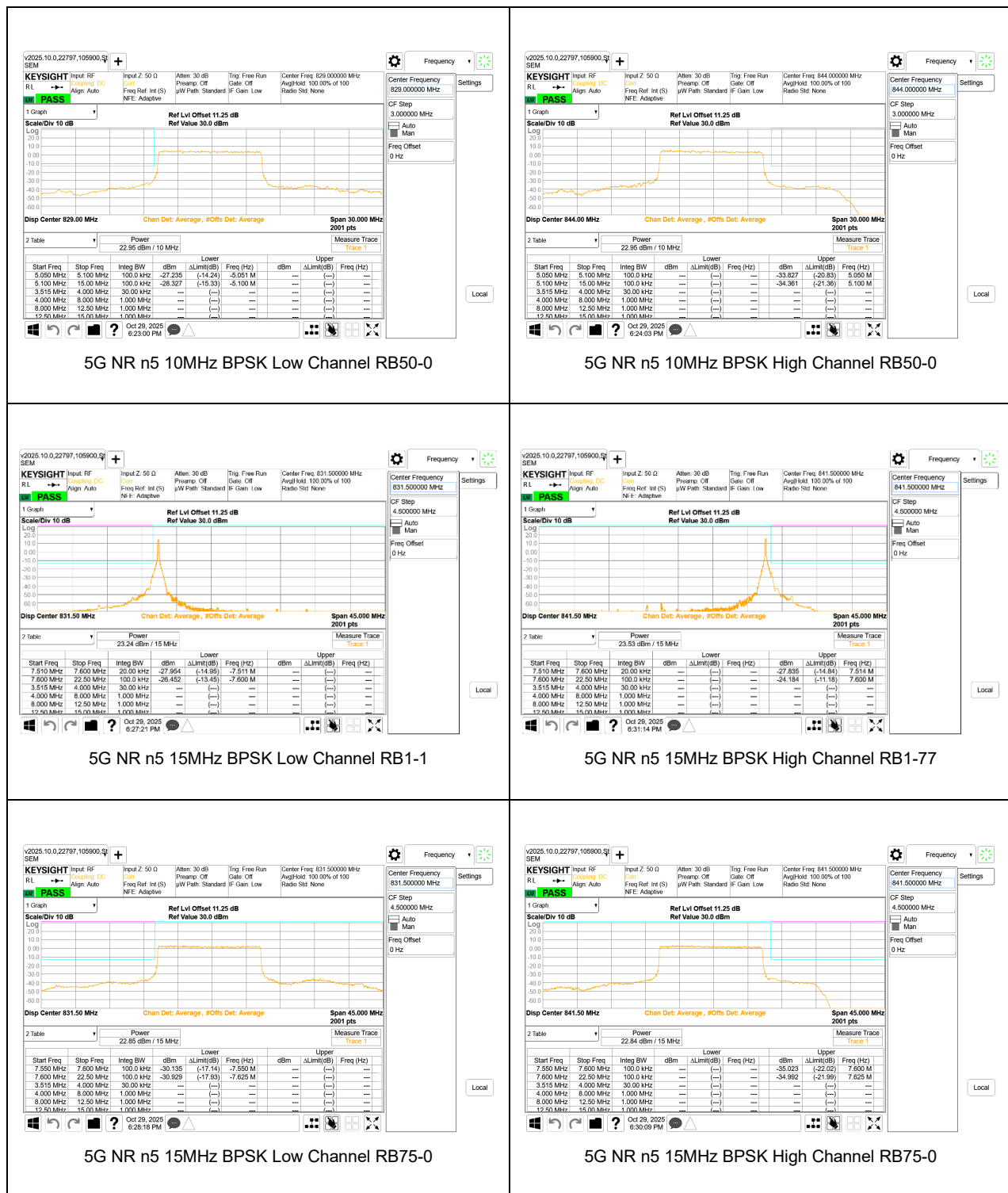
LTE B5 10MHz QPSK Low Channel RB50-0

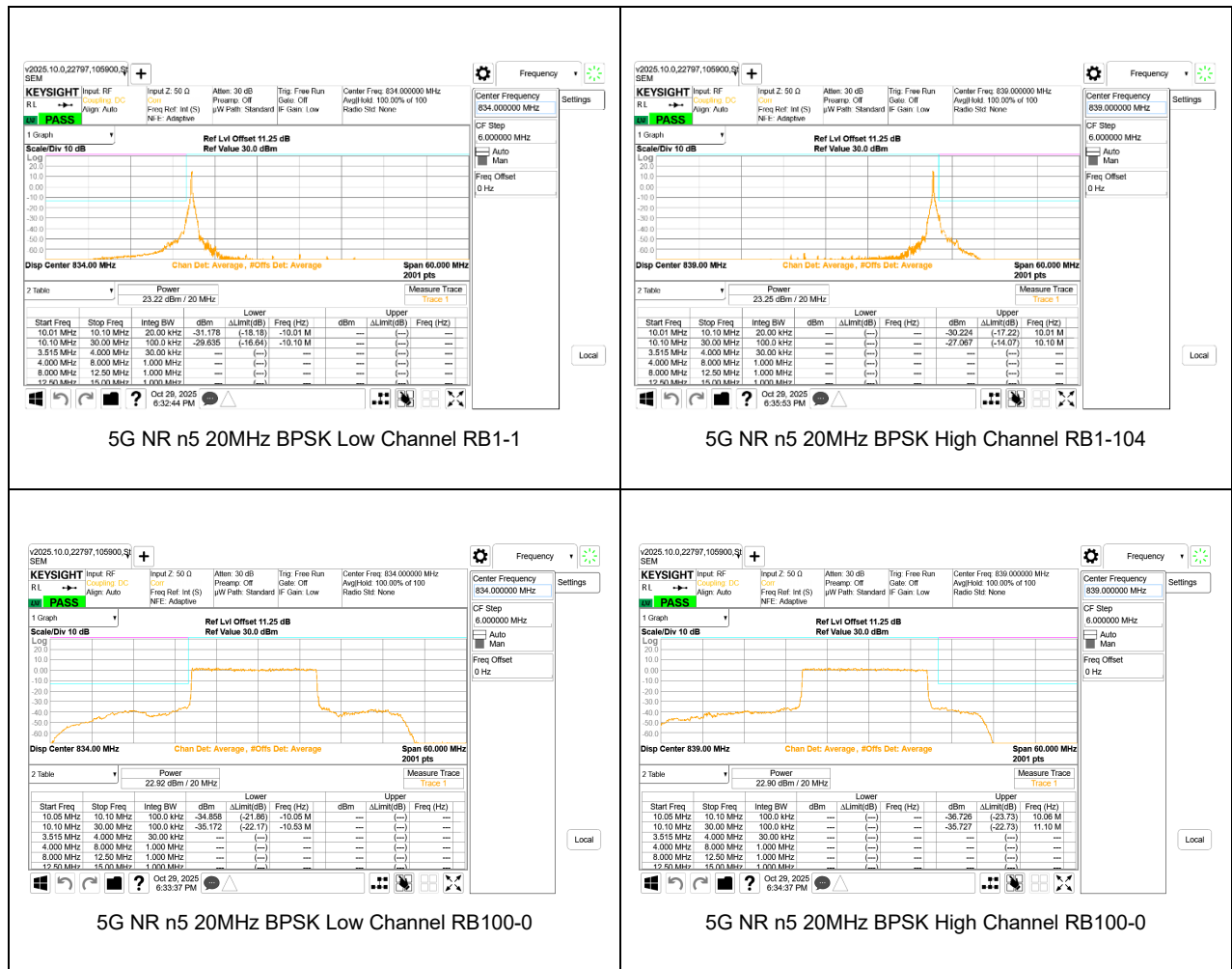


LTE B5 10MHz QPSK High Channel RB50-0

8.2.2. 5G NR n5 (FCC PART 22)







8.3. OUT OF BAND EMISSIONS

LIMITS

FCC: §22.917

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts.

FCC: §90.691

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts.

RSS132§5.5

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts.

TEST PROCEDURE

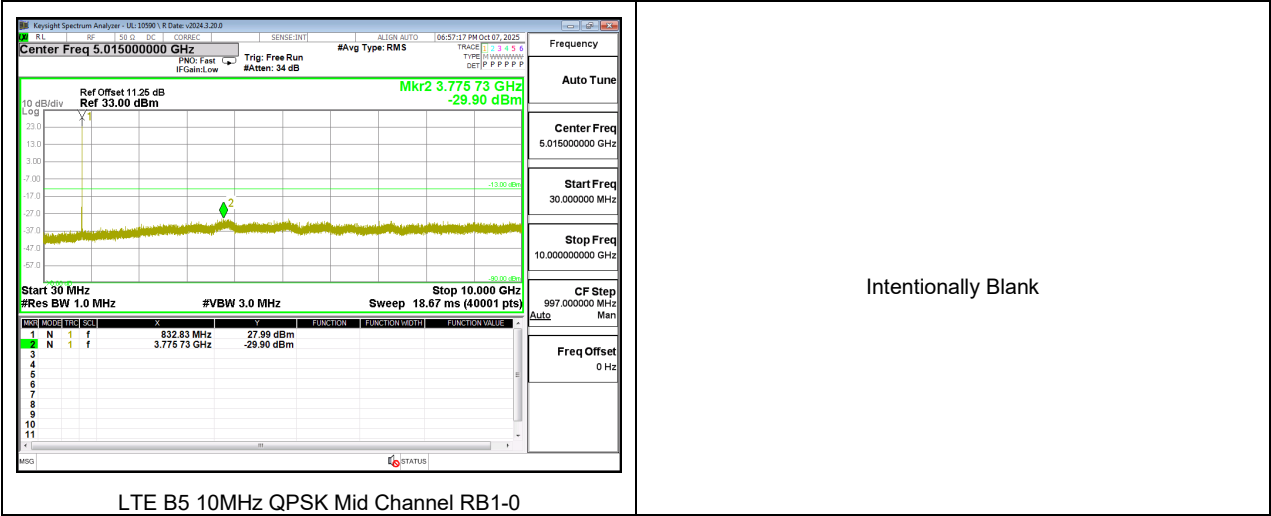
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

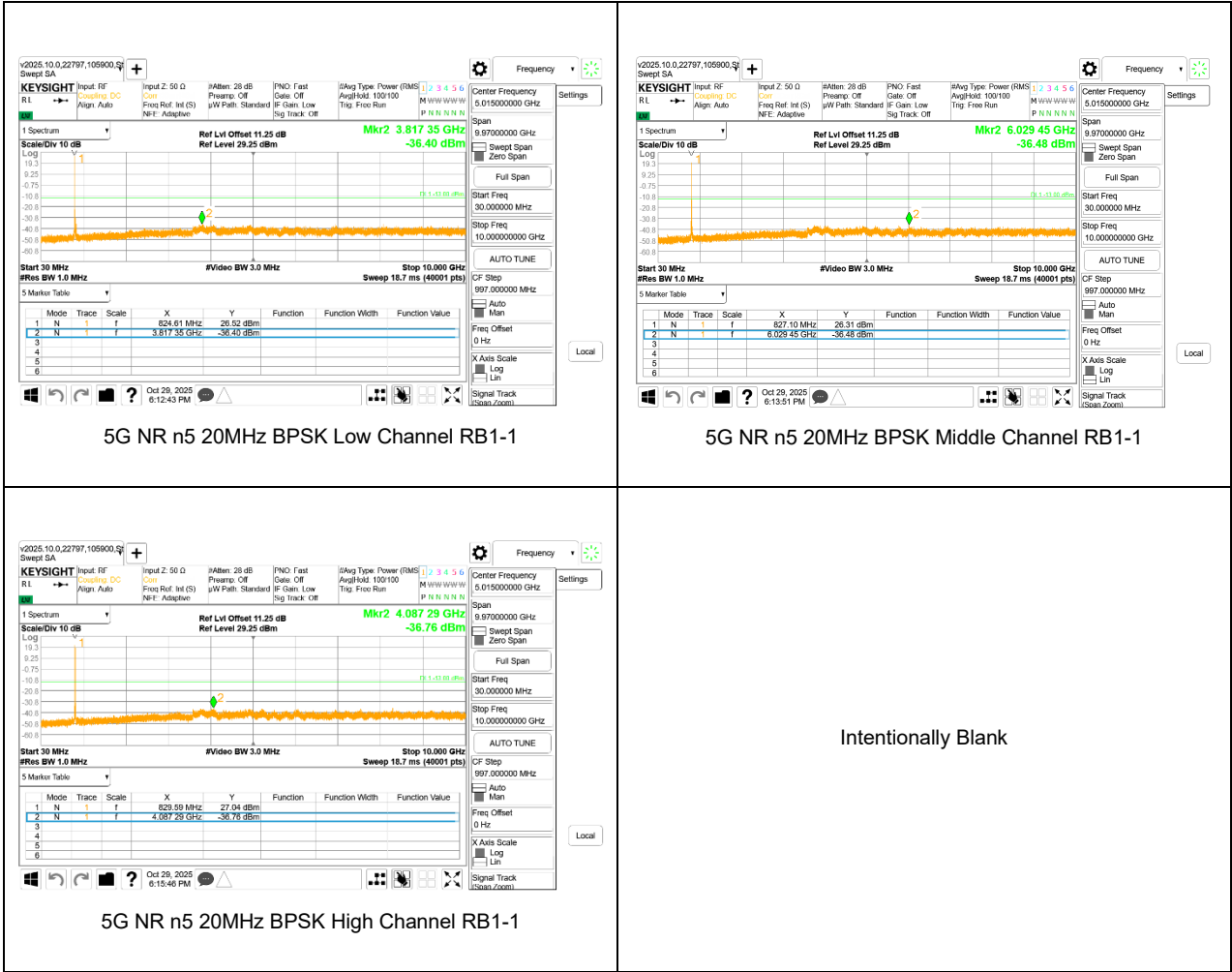
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.
(NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

RESULTS

8.3.1. LTE BAND 5 (FCC PART 22)



8.3.2. 5G NR n5 (FCC PART 22)



8.4. FREQUENCY LIMITS

FCC: §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC: §90.213

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

ISED: RSS132§5.3

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within each of the sub-bands when tested at the temperature and supply voltage variations specified in RSS-Gen.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30°C to $+50^{\circ}\text{C}$
- Voltage = (85% - 100%)

Normal, 3.89VDC

End Voltage, 3.69VDC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

8.4.1. LTE BAND 5 (QPSK 10MHz BANDWIDTH, FCC PART 22)

Test Engineer ID:	33499	Test Date:	2025-10-14
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Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	Within Authorized Frequency Block (Hz)
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	
Temperature	Voltage					
Normal (20°C)	Normal	824.3725	848.3800			
Extreme (50°C)		824.3725	848.3800	3.37	0.004	Yes
Extreme (40°C)		824.3725	848.3800	4.87	0.006	Yes
Extreme (30°C)		824.3725	848.3800	4.23	0.005	Yes
Extreme (10°C)		824.3725	848.3800	4.32	0.005	Yes
Extreme (0°C)		824.3725	848.3800	2.77	0.003	Yes
Extreme (-10°C)		824.3725	848.3800	4.13	0.005	Yes
Extreme (-20°C)		824.3725	848.3800	4.09	0.005	Yes
Extreme (-30°C)		824.3725	848.3800	4.85	0.006	Yes
20°C	End Point Voltage	824.3725	848.3800	2.5	0.003	Yes

8.4.2. 5G NR n5 (BPSK 20MHz BANDWIDTH, FCC PART 22)

Test Engineer ID:	33499	Test Date:	2025-10-07
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Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	824.4312	847.6150			
Extreme (50°C)		824.4312	847.6150	-6.4	-0.008	Yes
Extreme (40°C)		824.4312	847.6150	-3.9	-0.005	Yes
Extreme (30°C)		824.4312	847.6150	-2.8	-0.003	Yes
Extreme (10°C)		824.4312	847.6150	-6.9	-0.008	Yes
Extreme (0°C)		824.4312	847.6150	-5	-0.006	Yes
Extreme (-10°C)		824.4312	847.6150	-3.5	-0.004	Yes
Extreme (-20°C)		824.4312	847.6150	-7.8	-0.009	Yes
Extreme (-30°C)		824.4312	847.6150	-7.2	-0.009	Yes
20°C	End Point Voltage	824.4312	847.6150	3.2	0.004	Yes

8.5. PEAK-TO-AVERAGE POWER RATIO

LIMIT

FCC: §22.913 (d)

The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

ISED: RSS132§5.4

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

Test Procedure

The EUT was connected to a Wideband Power Sensor to measure Peak and Average Output power.

RESULT

Config 0 to measure as the worst case; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

8.5.1. LTE BAND 5 (FCC PART 22)

Test Engineer ID:	33499	Test Date:	2025-10-08
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Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
LTE Band 5 (FCC Part 22)	1.4MHz	836.5	6	0	QPSK	27.73	22.46	5.27
					16QAM	27.80	21.63	6.17
	3MHz		15	0	QPSK	27.19	22.56	4.63
					16QAM	27.09	21.54	5.55
	5MHz		25	0	QPSK	27.24	22.54	4.70
					16QAM	27.36	21.54	5.82
	10MHz		50	0	QPSK	27.14	22.42	4.72
					16QAM	27.49	21.59	5.90
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

8.5.2. 5G NR n5 (FCC PART 22)

Test Engineer ID:	33499	Test Date:	2025-10-21
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Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n5 (FCC Part 22)	5MHz	836.5	25	0	BPSK	26.64	22.31	4.33
					16QAM	26.87	21.32	5.55
	10MHz		50	0	BPSK	26.49	22.63	3.86
					16QAM	26.62	20.93	5.69
	15MHz		75	0	BPSK	26.83	22.65	4.19
					16QAM	26.84	21.06	5.78
	20MHz		100	0	BPSK	26.19	21.92	4.28
					16QAM	26.65	20.72	5.93
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, the radiated emissions is measured directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement.

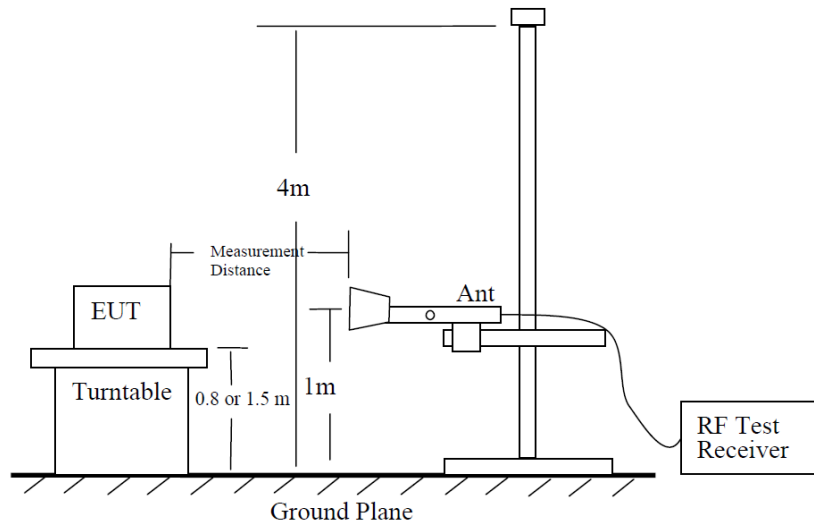


Figure 6—Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

- a) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$.
- b) $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$.
- c) $E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20\log(D) + 104.8$; where D is the measurement distance (in the far field region) in m.
- d) $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then $20 \cdot \log(3) = 9.5424$

Then, $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 9.5424 - 104.8 = E \text{ (dB}\mu\text{V/m)} - 95.2576$

Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

9.1. EFFECTIVE RADIATED POWER ERP/EIRP

RULE PART(S)

FCC: §2.1046, §90.635 (b), §22.913

LIMITS

22.913 (a)(5) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

§90.635 (b) - The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). Power is given in terms of effective radiated power (ERP).

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603-E (2016), Clause 2.2.17; PSA setting reference to 971168 D01

For average power measurements:

- a) Set span to at least 1.5 times the OBW;
- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz;
- c) Set VBW $\geq 3 \times$ RBW;
- d) Set number of points in sweep $\geq 2 \times$ span / RBW;
- e) Sweep time = auto-couple;
- f) Detector = RMS (power averaging);
- g) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- h) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

TEST RESULTS

9.1.1. LTE BAND 5 (FCC PART 22)

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	DCCF (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	26.59	H	7.67	-0.95		17.97	33.01	-15.04	RB1-0

Rev. 10.17.25

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	DCCF (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	26.81	H	7.67	-0.95		18.19	33.01	-14.82	RB1-0

Rev. 10.17.25

CONFIG 0

9.1.2. 5G NR n5 (FCC PART 22)

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	DCCF (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	27.64	V	7.67	-0.95		19.02	38.45	-19.43	RB1-1

Rev. 10.17.25

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	DCCF (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	17.53	H	7.67	-0.95		8.91	38.45	-29.54	RB1-53
836.50	26.52	V	7.67	-0.95		17.90	38.45	-20.55	RB1-53

Rev. 10.17.25

CONFIG 0

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	DCCF (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	25.40	H	7.67	-0.95		16.78	38.45	-21.67	RB1-53

Rev. 10.17.25

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	DCCF (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
836.50	24.11	H	7.67	-0.95		15.49	38.45	-22.96	RB1-53

Rev. 10.17.25

CONFIG 1

9.2. FIELD STRENGTH OF SPURIOUS RADIATION

LIMITS

FCC: §22.917(a)

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

FCC: §90.691

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

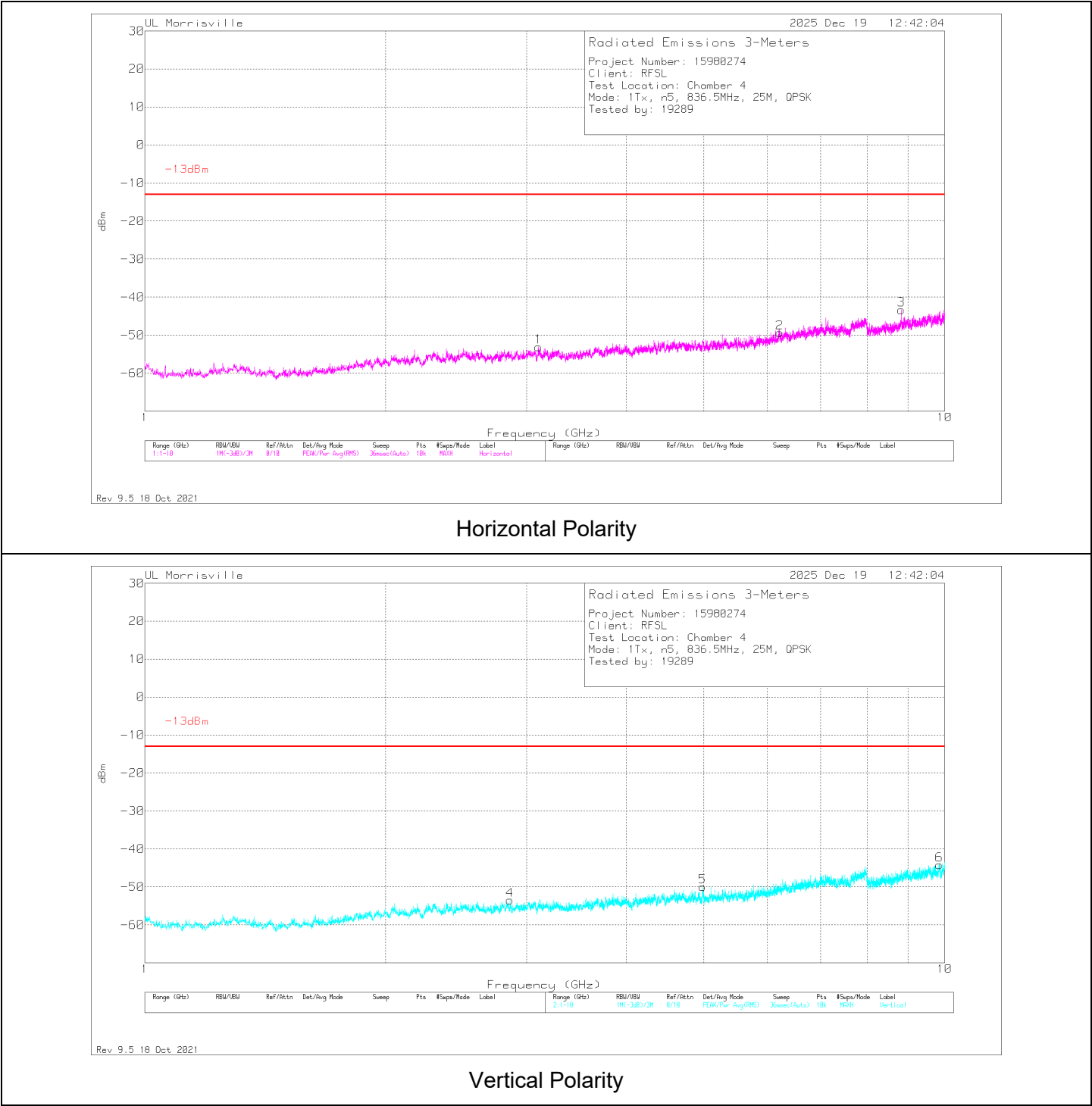
RSS132§5.5

Equipment shall meet the unwanted emission limits specified below:

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB.
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

Example Plot



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degr)	Height (cm)	Polarity
4	2.863	-61.84	Pk	32.3	-36.1	.3	11.8	-53.54	-13	-40.54	0-360	300	V
1	3.1042	-62.64	Pk	33	-35.6	.3	11.8	-53.14	-13	-40.14	0-360	200	H
5	4.9816	-64.12	Pk	33.9	-31.9	.3	11.8	-50.02	-13	-37.02	0-360	300	V
2	6.2245	-66.71	Pk	35.3	-30.1	.3	11.8	-49.41	-13	-36.41	0-360	100	H
3	8.8273	-66.67	Pk	36	-24.9	.4	11.8	-43.37	-13	-30.37	0-360	100	H
6	9.8524	-68.6	Pk	36.8	-24.8	.6	11.8	-44.2	-13	-31.2	0-360	300	V

TEST PROCEDURE

KDB 971168 D01 /D02

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz

RESULTS

9.2.1. LTE BAND 5 (FCC PART 22)

LTE BAND 5 (QPSK 10.0MHZ BANDWIDTH, ANT E (CONFIG 0))

Date:	2025-11-24
Test Engineer:	19289
Configuration:	EUT Only
Mode:	1Tx LTE5 10M QPSK
Chamber #:	Chamber 4

Frequency (MHz)	Meter Reading (dBuV)	Det	88761 ACF (dB/m)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)	Polarity
Low Channel									
2.0449	-62.07	Pk	31.7	-36.7	.5	11.8	-54.77	-13	-41.77
2.1817	-61.7	Pk	31.6	-37	.4	11.8	-54.9	-13	-41.9
4.9204	-63.85	Pk	33.8	-32.6	.3	11.8	-50.55	-13	-37.55
4.9357	-65.02	Pk	33.8	-32.7	.3	11.8	-51.82	-13	-38.82
9.055	-67.19	Pk	36	-25	.4	11.8	-43.99	-13	-30.99
9.1513	-66.31	Pk	36.2	-24.9	.5	11.8	-42.71	-13	-29.71
Mid Channel									
1.342	-57.46	Pk	29.3	-37.2	.6	11.8	-52.96	-13	-39.96
1.3456	-62.47	Pk	29.2	-37	.5	11.8	-57.97	-13	-44.97
3.988	-64.27	Pk	33.4	-33.3	.3	11.8	-52.07	-13	-39.07
3.9898	-65.07	Pk	33.4	-33.3	.2	11.8	-52.97	-13	-39.97
9.0514	-66.27	Pk	36	-25.3	.4	11.8	-43.37	-13	-30.37
9.0676	-65.12	Pk	36	-26	.4	11.8	-42.92	-13	-29.92
High Channel									
a	-61.46	Pk	31.9	-36	.5	11.8	-53.26	-13	-40.26
2.5039	-63.25	Pk	32.4	-35.9	.4	11.8	-54.55	-13	-41.55
4.6603	-63.84	Pk	34.2	-32.8	.3	11.8	-50.34	-13	-37.34
4.8169	-63.35	Pk	33.9	-33.3	.3	11.8	-50.65	-13	-37.65
9.6526	-66.25	Pk	36.6	-25	.4	11.8	-42.45	-13	-29.45
9.6535	-65.89	Pk	36.6	-25	.4	11.8	-42.09	-13	-29.09

9.2.2. 5G NR n5 (FCC PART 22)

5G NR n25 (BPSK 25.0MHZ BANDWIDTH, ANT E (CONFIG 0))

Date:	2025-12-19
Test Engineer:	19289
Configuration:	EUT Only
Mode:	1T, n5 25M, QPSK
Chamber #:	Chamber 4

Frequency (MHz)	Meter Reading (dBuV)	Det	206211 ACF (dB/m)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)	Polarity
Mid Channel, 836.5MHz									
2.863	-61.84	Pk	32.3	-36.1	.3	11.8	-53.54	-13	-40.54
3.1042	-62.64	Pk	33	-35.6	.3	11.8	-53.14	-13	-40.14
4.9816	-64.12	Pk	33.9	-31.9	.3	11.8	-50.02	-13	-37.02
6.2245	-66.71	Pk	35.3	-30.1	.3	11.8	-49.41	-13	-36.41
8.8273	-66.67	Pk	36	-24.9	.4	11.8	-43.37	-13	-30.37
9.8524	-68.6	Pk	36.8	-24.8	.6	11.8	-44.2	-13	-31.2

5G NR n5 (BPSK 25.0MHZ BANDWIDTH, ANT A(CONFIG 1))

Date:	2025-12-19
Test Engineer:	19289
Configuration:	EUT Only
Mode:	1T, n5 25M, QPSK
Chamber #:	Chamber 4

Frequency (MHz)	Meter Reading (dBuV)	Det	206211 ACF (dB/m)	EIRP CF	Gain/Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)	Polarity
Mid Channel, 836.5MHz									
2.3086	-61.54	Pk	31.9	-36.3	.5	11.8	-53.64	-13	-40.64
2.4175	-62.02	Pk	32.1	-36	.5	11.8	-53.62	-13	-40.62
4.5856	-65.13	Pk	34.1	-32.4	.2	11.8	-51.43	-13	-38.43
4.5901	-62.8	Pk	34.2	-32.5	.2	11.8	-49.1	-13	-36.1
9.3133	-67.35	Pk	36.3	-25.3	.5	11.8	-44.05	-13	-31.05
9.5338	-68.19	Pk	36.7	-25.5	.5	11.8	-44.69	-13	-31.69

10. SETUP PHOTOS

Refer to R15980274-EP1c for setup photos.

END OF REPORT