TEST REPORT

Report Number. : R15343302-E1

Applicant	:	COGNYTE Software LP 35 Pinelawn Road, Suite 204, Melville, NY, 11747 USA
Model	:	FalcoNET
FCC ID	:	2A7A2-FNV1
EUT Description	:	GI2S/FalcoNet
Test Standard(s)	:	FCC CFR 47 PART 27A, 27C

Date Of Issue:
2024-11-11

Prepared by:
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ACCREDITED
CERT #0751.06

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-11-11	Initial Review	Noah Bennett

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: COGNYTE Software LP
35 Pinelawn Road, Suite 204,
Melville, NY, 11747 USA

EUT DESCRIPTION: GI2S/FalcoNet

SERIAL NUMBER: 22CU037710556

FCC ID: 2A7A2-FNV1

SAMPLE RECEIPT DATE: 2024-10-07

DATE TESTED: 2024-10-07 thru 2024-10-18

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 2	Complies
CFR 47 Part 27	Compiles

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:

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UL Verification Services Inc.

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 the validity of results after the integration of the data provided by the customer. Below is a list of data provided by the customer:

1. Worst-Case Antenna Gain (section 6.4)
2. EUT Cable Loss (used in section 8/9 data)
3. EUT Supported Bands, Modes, Modulations and Power Settings. (section 6.1, 6.5)
4. Software and Firmware Versions (section 6.3)

Requirement Description	Band	Requirement Clause Number (FCC)	Result	Remarks
Equivalent Isotropic Radiated Power	70	27.50 (d) (2)	Complies	
	30	27.50 (a) (1)	Complies	

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Complies	See Note 1
Band Edge and Emission Mask	2.1051, 27.53 (a) (h)	Complies	
Out of Band Emissions		Complies	
Field Strength of Spurious Radiation		Complies	
Frequency Stability	2.1055, 27.54,	Complies	
Peak-to-Average Ratio	27.50 (a) (1)	Complies	

Note 1: The objective of this report is to add support for LTE and 5G NR bands via a C2PC submission to an already existing host. This test report covers the RF testing of the additional bands added. Refer to section 6.1 for bands added.

3. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 27.
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r02: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01. Determining ERP and EIRP

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 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}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power conducted	1.3 dB (PK) 0.45 dB (AV)
Unwanted Emissions, conducted	1.94 dB
All emissions radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Power Spectral Density	2.46 dB

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/

6. DESCRIPTION OF EUT

6.1. DESCRIPTION OF EUT

The EUT is a base station simulator, GI2S/FalcoNet that supports the following WWAN Bands and modes.

Wireless technologies	Frequency bands	Operating mode	Supported Bandwidths	Additional Configurations
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EDGE (8PSK)	-	Does this device support DTM (Dual Transfer Mode)? ☒No
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6)	-	-
LTE	FDD Band 2/25 FDD Band 4/66 FDD Band 5/26(90S)/26(22H) FDD Band 12/17 FDD Band 13 FDD Band 14 FDD Band 30 FDD Band 70 FDD Band 71	QPSK Rel. 15 Does not support Carrier Aggregation (CA)	5MHz 10MHz (B30)	
5G NR (FR1)	FDD 5G NR N71 FDD 5G NR N30 FDD 5G NR N70	CP-OFDM: QPSK	5MHz 20MHz (n71)	SCS: 15kHz
Notes:				

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = 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.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

LTE Band 30

Part 27(a)(1)								
EIRP Limit (W/MHz)	400.00							
Antenna Gain (dBi)	3.00							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2350.0	2360.0	16.99	19.99	0.100	4484.5	4M48G7D
10.0	QPSK	2350.0	2360.0	15.70	18.70	0.074	8931.3	8M93G7D

5G NR N30

Part 27(a)(1)								
EIRP Limit (W/MHz)	400.00							
Antenna Gain (dBi)	3.00							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2350.0	2360.0	13.92	16.92	0.049	4490.7	4M49G7D

LTE BAND 70

Part 27(d)(2)								
EIRP Limit (W/MHz)	1640.00							
Antenna Gain (dBi)	4.00							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	1995.0	2020.0	13.00	17.00	0.050	4486.8	4M49G7D
10.0	QPSK	1995.0	2020.0	12.99	16.99	0.050	8952.9	8M95G7D

5G NR N70

Part 27(d)(2)								
EIRP Limit (W/MHz)	1640.00							
Antenna Gain (dBi)	4.00							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	1995.0	2020.0	15.97	19.97	0.099	4484.9	4M48G7D

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version v60.2.89

The EUT hardware version used during testing was: Falconet

6.4. MAXIMUM ANTENNA GAIN

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

Chain	Designation in Documentation	Type	Frequency Range (MHz)	Maximum Gain (dBi)
RF1-9	TRA6927M3NB-001	External Shot glass style	2350 – 2360	3.0
			1995 - 2020	4.0

6.5. WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for conducted measurements is based on an engineering evaluation made on conducted average power found during pretesting. Output power measurements were measured on each BTS unit, 1-9 on all 3 TX Ports, on all channels, and bands supported by the EUT at max power. Only the worst-case conducted antenna port band data per BTS is reported.
For Radiated Emissions testing, the worst case BTS unit per Tx port on each antenna was performed. For testing purposes, data in section 9 and 10 was set at or above the certification target power as worst-case.

The following is the worst-case BTS unit per antenna port, for Conducted Output Power:

Worst Case BTS per RF Port	Tx1	Tx2	Tx3
LTE30	BTS-7	BTS-9	BTS-2
N30	BTS-5	BTS-9	BTS-2
LTE70	BTS-3	No Support	BTS-7
N70	BTS-3	No Support	BTS-8

Worst Case emissions from 9kHz-30Mhz, 30-1000MHz, 18-26.5GHz, and 26.5GHz-40GHz were done on the modes with the highest conducted average power. This test data is reported in section 10.2, which shows worst case emissions for all antennas.

Per customer declarations, both the EUT, associated support equipment and external antenna pucks are only meant to be installed in one orientation. Therefore, all radiated testing was only performed in this orientation.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
40dB Attenuator	Mini-Circuits	BW-40N100W+	N953400814	N/A
20dB Attenuator	Mini-Circuits	BW-S20W5+	N/A	N/A
EUT Power Supply	TE Connectivity	46-140-0109	22CU027710689	N/A
Support Laptop	Lenovo	T14s Gen2	PF-3KPAS1	N/A
Receive Amplifier	Amphenol	46-140-0244	234A127100007	N/A

I/O CABLES

/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	NEMA 5-15R	1	NEMA 5-15P	Shielded	<3m	Connects AC Mains to PSU
2	36V DC (S1)	1	3 Pin	Shielded	<1m	Connects PSU to EUT
3-1 3-2	RJ45	2	RJ45	3-1 Shielded 3-2 Unshielded	3-1: >3m 3-2: <3m	3-1: Used to configure the EUT 3-2: Connects to Rx Amp
4	GPS	1	3 pin wiring harness	Shielded	<1m	Cable Assembly Terminated w/ SMA Loads.
5-1 5-2 5-3	N-Male	3	N-Male	Shielded	<3m	Connects EUT ports to External Puck Antennas.
6	NWL	1	SMA	N/A	N/A	Terminated w/ SMA Load.

**Not Subject to test

TEST SETUP

The EUT was configured to transmit at max power for the duration of the test via customer-controlled firmware. Customer provided loads were used to terminate active EUT I/O ports.

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Common Equipment				
	Conducted Room 1				
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2024-06-14	2025-06-14
90411	Spectrum Analyzer	Keysight Technologies	N9030A	2024-08-01	2025-08-01
207726	Temp/Humid Chamber	Thermotron	SM-32-8200	2024-01-12	2025-01-12
248881	Environmental Meter	Control Company	06-662-4	2024-04-10	2026-04-10
245765	Environmental Meter	Control Company	06-662-4	2024-01-24	2026-01-24
209010 (PS216)	Variable Voltage Power Source	Elgar	CW2501M-1	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
ETSI Power Software	EMPower ETSI Burst Measurement System	ETS-Lindgren	Version 1.0.3.18	NA	NA
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	NA	NA
	Additional Equipment used				
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01
211055	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01
211057	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01
211058	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Attenuators				
226551	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2024-03-19	2025-03-19
226552	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2024-04-04	2025-04-04
226559	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-02-29	2025-02-28
226562	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-04-11	2025-04-11
226564	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-04-04	2025-04-04
	Cables				
89245 (CBL012)	Micro-Coax UTiFLEX Cable Assembly, Low Loss	Carlisle Interconnect Technologies	UFB293C-0-2400-300300	2024-02-29	2025-02-28
171695	SMA Cable, 30 Feet	Pasternack	PE341-360	2024-03-07	2025-03-07
89245 (CBL013)	SMA Cable	Micro-coax	UFB293C-0-1440-300300	2024-03-21	2025-03-21
245309 (CBL010)	SMA Cable	Huber + Suhner	104PEA	2024-03-01	2025-03-01
89312 (CBL036)	N-Male to SMA Cable, 6FT	Times Microwave Systems	LMR-240	2023-11-29	2024-11-29
89313 (CBL037)	N-Male to SMA Cable, 6FT	Times Microwave Systems	LMR-240	2023-11-29	2024-11-29
	High-Pass Filters				
92494 (HPF015)	4GHz high-pass filter, 2W, Fhigh =18GHz	Micro-Tronics	HPM13351	2024-03-01	2025-03-01

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
8939	Passive Loop Antenna	EMCO	EM-6872	2023-10-19	2024-10-19
8940	Passive Loop Antenna	EMCO	EM-6871	2023-10-19	2024-10-19
	30-1000 MHz				
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-03-05	2026-03-05
	1-18 GHz				
86408	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-06-19	2025-06-19
	18-40 GHz				
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
204705	Horn Antenna, 26-40GHz	Com-Power	AH-640	2023-07-20	2025-07-20
	Gain-Loss Chains				
91975	Gain-loss string: 0.009-30MHz	Various	Various	2024-05-10	2025-05-10
91978	Gain-loss string: 25-1000MHz	Various	Various	2024-05-10	2025-05-10
91977	Gain-loss string: 1-18GHz	Various	Various	2024-07-17	2025-07-17
136042	Gain-loss string: 18-40GHz	Various	Various	2024-05-10	2025-05-10
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2024-08-29	2025-08-29
81018	Spectrum Analyzer	Agilent	E4446A	2024-07-31	2025-07-31
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200540	Environmental Meter	Fisher Scientific	15-077-963	2023-07-19	2025-07-19
183309 BRF017	2.4GHz Band Reject Filter	Micro-Tronics	-	2024-04-10	2025-04-10
169108 (BRF010)	1.85-1.97GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50714-01	2024-03-01	2025-03-01
150716 (LPF008)	DC-1000MHz low-pass filter	Pasternack	PE8720	2024-03-04	2025-03-04

8. RF OUTPUT POWER VERIFICATION

8.1. CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS 38.521-1 specification.

The allowed MPR for SRS, PUCCH formats 0, 1, 3 and 4, and PRACH shall be as specified for QPSK modulated DFTs-OFDM of equivalent RB allocation. The allowed MPR for PUCCH format 2 shall be as specified for QPSK modulated CP-OFDM of equivalent RB allocation.

Table 6.2.2.3-1: Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5[1]	≤ 1.2[1]	≤ 0.2[1]
		≤ 0.5[2]		0[2]
	Pi/2 BPSK w Pi/2 BPSK DMRS	≤ 0.5[2]	0[2]	
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

Table 6.2.2.3-2: Maximum power reduction (MPR) for power class 2

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5	≤ 0.5	0
	QPSK	≤ 3.5	≤ 1	0
	16 QAM	≤ 3.5	≤ 2	≤ 1
	64 QAM	≤ 3.5	≤ 2.5	
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3.5	≤ 3	≤ 1.5
	16 QAM	≤ 3.5	≤ 3	≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS 36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	

The allowed A-MPR values specified below in Table 6.2.3.3.1-1 of 3GPP TS 38.521-1 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.3.3.1-1: Additional maximum power reduction (A-MPR)

Network signalling label	Requirements (subclause)	NR Band	Channel bandwidth (MHz)	Resources blocks (N_{RB})	A-MPR (dB)
NS_01		Table 5.2-1	5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 90, 100	Table 5.3.2-1	N/A
NS_03	6.5.2.3.3.3	n2, n25, n66, n70, n86			Clause 6.2.3.3.7
NS_03U	6.5.2.3.3.3, 6.5.2.4.2.3	n2, n25, n66, n86			Clause 6.2.3.3.7
NS_04	6.5.2.3.3.2, 6.5.3.3.3.1	n41	10, 15, 20, 40, 50, 60, 80, 90, 100		Clause 6.2.3.3.2

AVERAGE OUTPUT POWER TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

PEAK OUTPUT POWER TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable connected to a power meter via wideband peak power sensor. Peak output power was read directly from power meter.

LIMIT

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 and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

PAPR was calculated by subtracting the peak measured power by the average measured power.

RESULT

Test Engineer ID:	22797/46722	**Test Date:**	10-07-2024

8.1.1. LTE BAND 30

LTE Band	Bandwidth (MHz)	Modulation	DL Channel	DL Frequency (MHz)	BTS1 Measured Avg Power (dBm)	BTS2 Measured Avg Power (dBm)	BTS3 Measured Avg Power (dBm)	BTS4 Measured Avg Power (dBm)	BTS5 Measured Avg Power (dBm)	BTS6 Measured Avg Power (dBm)	BTS7 Measured Avg Power (dBm)	BTS8 Measured Avg Power (dBm)	BTS9 Measured Avg Power (dBm)
30	5	QPSK	9795	2352.5	16.81	16.08	16.33	16.55	16.78	16.57	**16.89**	16.40	**16.76**
			9820	2355	16.36	**16.99**	16.60	16.99	16.59	16.47	16.75	16.29	16.74
			9845	2357.5	16.89	16.45	16.28	16.73	16.32	16.31	16.28	16.78	16.14
30	10	QPSK	9820	2355	15.19	14.94	15.39	15.66	15.53	15.40	15.70	15.27	15.57

LTE Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	BTS1 Measured Peak Power (dBm)	BTS2 Measured Peak Power (dBm)	BTS3 Measured Peak Power (dBm)	BTS4 Measured Peak Power (dBm)	BTS5 Measured Peak Power (dBm)	BTS6 Measured Peak Power (dBm)	BTS7 Measured Peak Power (dBm)	BTS8 Measured Peak Power (dBm)	BTS9 Measured Peak Power (dBm)
30	5	QPSK	9795	2352.5	27.26	26.57	26.83	27.02	27.21	26.96	27.33	26.79	27.18
			9820	2355	26.86	27.30	27.08	27.57	26.96	26.92	27.16	26.73	27.22
			9845	2357.5	27.41	26.96	26.76	27.21	26.67	26.80	26.70	27.11	26.62
30	10	QPSK	9820	2355	26.53	26.21	26.71	27.02	26.82	26.60	26.93	26.52	26.87

LTE Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	BTS1 Peak to Average Ratio (dB)	BTS2 Peak to Average Ratio (dB)	BTS3 Peak to Average Ratio (dB)	BTS4 Peak to Average Ratio (dB)	BTS5 Peak to Average Ratio (dB)	BTS6 Peak to Average Ratio (dB)	BTS7 Peak to Average Ratio (dB)	BTS8 Peak to Average Ratio (dB)	BTS9 Peak to Average Ratio (dB)
30	5	QPSK	9795	2352.5	10.44	10.49	10.50	10.47	10.44	10.39	10.44	10.39	10.42
			9820	2355	10.50	10.31	10.48	10.58	10.37	10.45	10.41	10.44	10.48
			9845	2357.5	10.52	10.51	10.48	10.48	10.35	10.49	10.43	10.33	10.47
30	10	QPSK	9820	2355	11.34	11.27	11.33	11.37	11.30	11.20	11.23	11.25	11.30

8.1.2. 5G NR N30

5G NR Band	Bandwidth (MHz)	Modulation	DL Channel	DL Frequency (MHz)	BTS1 Measured Avg Power (dBm)	BTS2 Measured Avg Power (dBm)	BTS3 Measured Avg Power (dBm)	BTS4 Measured Avg Power (dBm)	BTS5 Measured Avg Power (dBm)	BTS6 Measured Avg Power (dBm)	BTS7 Measured Avg Power (dBm)	BTS8 Measured Avg Power (dBm)	BTS9 Measured Avg Power (dBm)
N30	5	QPSK	470500	2352.5	13.30	**13.82**	13.78	13.53	**13.92**	13.55	13.86	13.43	**13.53**
			471100	2355.5	13.43	13.16	13.18	13.37	13.65	13.43	13.62	13.25	13.50
			471380	2356.9	13.69	13.06	13.05	13.40	13.43	13.15	13.53	13.11	13.41

5G NR Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	BTS1 Measured Peak Power (dBm)	BTS2 Measured Peak Power (dBm)	BTS3 Measured Peak Power (dBm)	BTS4 Measured Peak Power (dBm)	BTS5 Measured Peak Power (dBm)	BTS6 Measured Peak Power (dBm)	BTS7 Measured Peak Power (dBm)	BTS8 Measured Peak Power (dBm)	BTS9 Measured Peak Power (dBm)
N30	5	QPSK	470500	2352.5	24.71	25.12	25.09	25.24	24.80	24.81	25.17	24.71	24.88
			471100	2355.5	24.95	24.51	24.61	24.80	24.94	24.67	24.94	24.54	24.80
			471380	2356.9	25.05	24.55	24.42	24.88	24.85	24.51	24.92	24.45	24.77

5G NR Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	BTS1 Peak to Average Ratio (dB)	BTS2 Peak to Average Ratio (dB)	BTS3 Peak to Average Ratio (dB)	BTS4 Peak to Average Ratio (dB)	BTS5 Peak to Average Ratio (dB)	BTS6 Peak to Average Ratio (dB)	BTS7 Peak to Average Ratio (dB)	BTS8 Peak to Average Ratio (dB)	BTS9 Peak to Average Ratio (dB)
N30	5	QPSK	470500	2352.5	11.41	11.30	11.31	11.71	10.88	11.26	11.31	11.29	11.35
			471100	2355.5	11.52	11.35	11.43	11.43	11.29	11.25	11.32	11.29	11.29
			471380	2356.9	11.36	11.49	11.37	11.47	11.41	11.37	11.39	11.34	11.36

8.1.3. LTE BAND 70

LTE Band	Bandwidth (MHz)	Modulation	DL Channel	DL Frequency (MHz)	BTS1 Measured Avg Power (dBm)	BTS2 Measured Avg Power (dBm)	BTS3 Measured Avg Power (dBm)	BTS4 Measured Avg Power (dBm)	BTS5 Measured Avg Power (dBm)	BTS6 Measured Avg Power (dBm)	BTS7 Measured Avg Power (dBm)	BTS8 Measured Avg Power (dBm)
70	5	QPSK	68361	1997.5	12.75	12.41	12.61	12.58	12.62	12.35	**13.00**	12.35
			68411	2002.5	12.70	12.37	**12.95**	12.43	12.30	12.99	12.79	12.82
			68461	2007.5	12.61	12.33	12.79	12.23	12.01	12.69	12.64	12.87
70	10	QPSK	68386	2000	12.38	12.49	12.71	12.15	12.28	12.98	12.68	12.99
			68411	2002.5	12.60	11.97	12.61	12.51	12.17	12.85	12.61	12.94
			68436	2005	12.32	12.45	12.57	12.34	12.91	12.61	12.47	12.79

LTE Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	RF1 Port 1 Measured Peak Power (dBm)	RF1 Port 2 Measured Peak Power (dBm)	RF1 Port 3 Measured Peak Power (dBm)	RF1 Port 4 Measured Peak Power (dBm)	RF1 Port 5 Measured Peak Power (dBm)	RF1 Port 6 Measured Peak Power (dBm)	RF1 Port 7 Measured Peak Power (dBm)	RF1 Port 8 Measured Peak Power (dBm)
70	5	QPSK	68361	1997.5	23.22	22.87	23.09	23.04	23.11	22.94	23.52	22.95
			68411	2002.5	23.17	22.83	23.47	23.04	22.89	23.74	23.33	24.13
			68461	2007.5	23.04	22.80	23.32	22.78	22.51	23.24	23.13	23.32
70	10	QPSK	68386	2000	23.65	23.79	24.03	23.99	23.74	24.34	24.10	24.40
			68411	2002.5	23.94	23.16	23.94	23.83	23.48	24.29	24.01	24.33
			68436	2005	23.62	23.84	23.87	23.69	24.23	23.95	23.78	24.10

LTE Band	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	RF1 Port 1 Peak to Average Ratio (dB)	RF1 Port 2 Peak to Average Ratio (dB)	RF1 Port 3 Peak to Average Ratio (dB)	RF1 Port 4 Peak to Average Ratio (dB)	RF1 Port 5 Peak to Average Ratio (dB)	RF1 Port 6 Peak to Average Ratio (dB)	RF1 Port 7 Peak to Average Ratio (dB)	RF1 Port 8 Peak to Average Ratio (dB)
70	5	QPSK	68361	1997.5	10.48	10.46	10.49	10.47	10.49	10.59	10.53	10.60
			68411	2002.5	10.47	10.47	10.52	10.61	10.59	10.75	10.55	11.31
			68461	2007.5	10.42	10.47	10.52	10.55	10.50	10.54	10.50	10.44
70	10	QPSK	68386	2000	11.26	11.30	11.32	11.84	11.46	11.36	11.41	11.40
			68411	2002.5	11.34	11.19	11.34	11.32	11.31	11.44	11.40	11.39
			68436	2005	11.30	11.39	11.31	11.35	11.32	11.34	11.32	11.31

8.1.4. 5G NR N70

5G NR BAND	Bandwidth (MHz)	Modulation	DL Channel	DL Frequency (MHz)	BTS1 Measured Avg Power (dBm)	BTS2 Measured Avg Power (dBm)	BTS3 Measured Avg Power (dBm)	BTS4 Measured Avg Power (dBm)	BTS5 Measured Avg Power (dBm)	BTS6 Measured Avg Power (dBm)	BTS7 Measured Avg Power (dBm)	BTS8 Measured Avg Power (dBm)
N70	5	QPSK	399500	1997.5	15.59	15.26	**15.97**	15.43	15.33	15.52	15.67	15.55
			400540	2002.7	15.48	15.19	15.80	15.25	15.45	15.65	15.42	**15.82**
			401500	2007.5	15.47	15.18	15.68	15.10	15.73	15.42	15.33	15.73

5G NR BAND	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	RF1 Port 1 Measured Peak Power (dBm)	RF1 Port 2 Measured Peak Power (dBm)	RF1 Port 3 Measured Peak Power (dBm)	RF1 Port 4 Measured Peak Power (dBm)	RF1 Port 5 Measured Peak Power (dBm)	RF1 Port 6 Measured Peak Power (dBm)	RF1 Port 7 Measured Peak Power (dBm)	RF1 Port 8 Measured Peak Power (dBm)
N70	5	QPSK	399500	1997.5	26.87	26.62	27.17	26.62	26.70	26.84	26.96	26.88
			400540	2002.7	26.80	26.51	27.06	26.48	26.79	27.04	26.84	27.19
			401500	2007.5	26.79	26.49	27.17	26.57	27.10	26.86	26.77	27.17

5G NR BAND	Bandwidth (MHz)	Modulation	Channel	Frequency (MHz)	RF1 Port 1 Peak to Average Ratio (dB)	RF1 Port 2 Peak to Average Ratio (dB)	RF1 Port 3 Peak to Average Ratio (dB)	RF1 Port 4 Peak to Average Ratio (dB)	RF1 Port 5 Peak to Average Ratio (dB)	RF1 Port 6 Peak to Average Ratio (dB)	RF1 Port 7 Peak to Average Ratio (dB)	RF1 Port 8 Peak to Average Ratio (dB)
N70	5	QPSK	399500	1997.5	11.28	11.36	11.21	11.20	11.37	11.31	11.29	11.33
			400540	2002.7	11.32	11.31	11.26	11.22	11.34	11.39	11.42	11.36
			401500	2007.5	11.32	11.31	11.49	11.47	11.37	11.45	11.44	11.43

9. CONDUCTED TEST RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

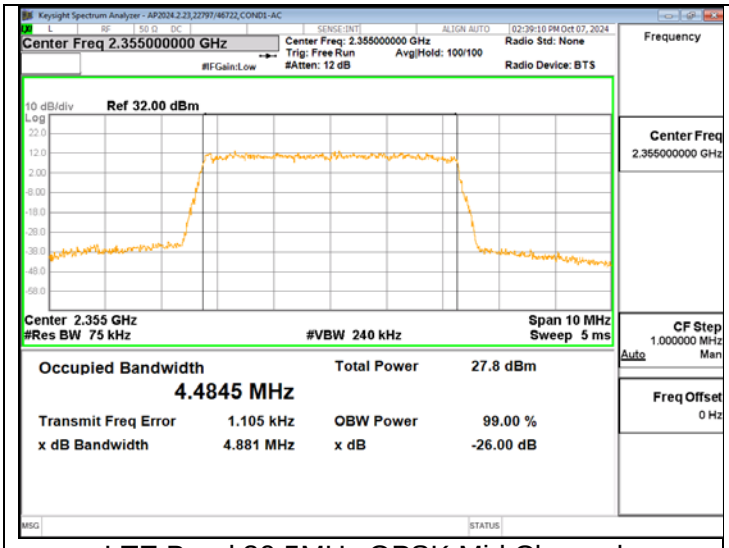
TEST PROCEDURE

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.

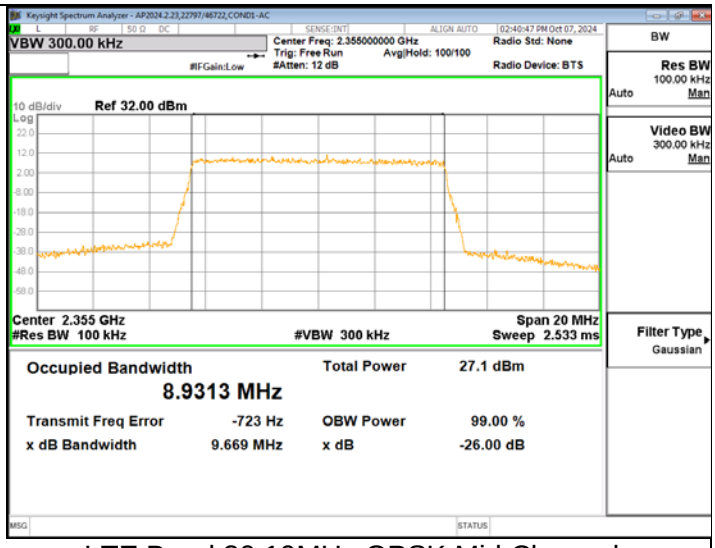
RESULTS

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

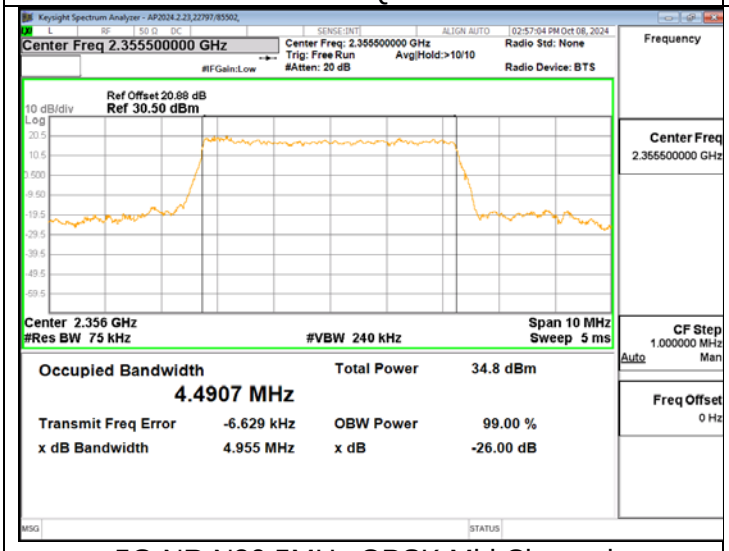
Band	Mode	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE Band 30	5MHz, QPSK, RB25-0	2355.0	4.4845	4.881
	10MHz, QPSK, RB50-0	2355.0	8.9313	9.669
5G NR N30	5MHz, QPSK, RB25-0	2355.5	4.4907	4.955
LTE Band 70	5MHz, QPSK, RB25-0	2002.5	4.4868	4.873
	10MHz, QPSK, RB50-0	2002.5	8.9529	9.730
5G NR N70	5MHz, QPSK, RB25-0	2002.7	4.4849	4.944



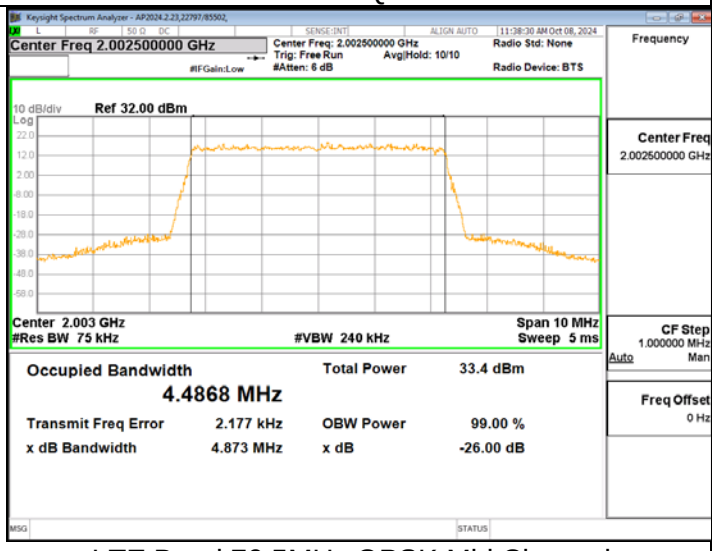
LTE Band 30 5MHz QPSK Mid Channel



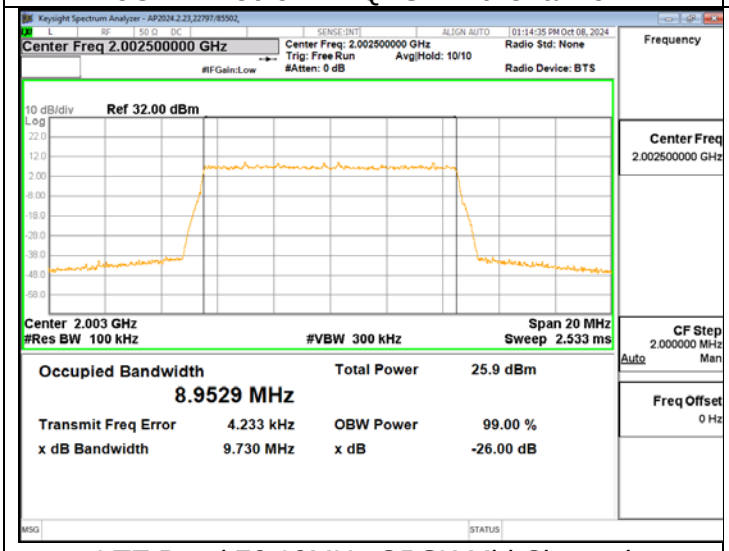
LTE Band 30 10MHz QPSK Mid Channel



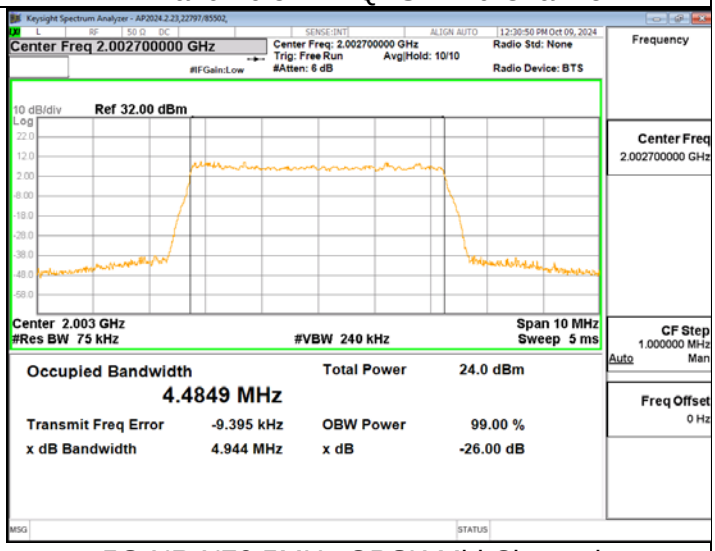
5G NR N30 5MHz QPSK Mid Channel



LTE Band 70 5MHz QPSK Mid Channel



LTE Band 70 10MHz QPSK Mid Channel



5G NR N70 5MHz QPSK Mid Channel

9.2. EMISSION MASK

For Spectrum Emission Mask plots, the SA 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.

RULE PART(S)

FCC: 27.53 (a), 27.53 (h)

TEST PROCEDURE

ANSI C63.26-2015, Section 5.7

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, -20, -25, -40, -42, -45, and -46dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC BAND 30)

(5) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.,* 1 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

TEST PROCEDURE (FCC BAND 70)

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(iii) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

RESULTS

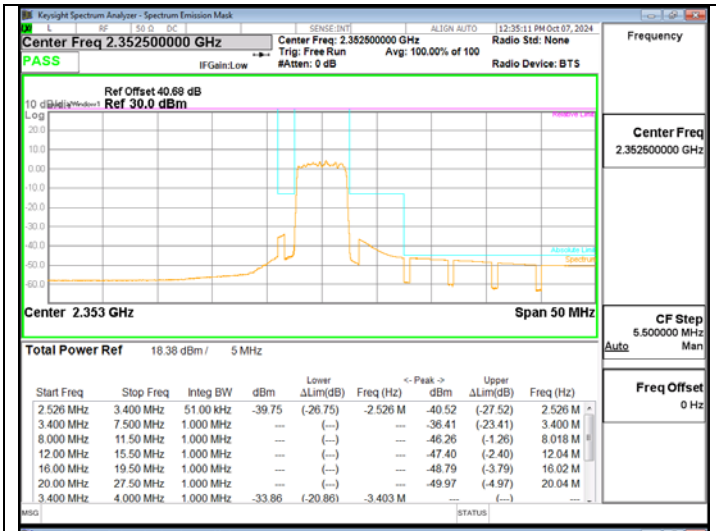
9.2.1. LTE BAND 30 & 5G NR N30

LIMITS

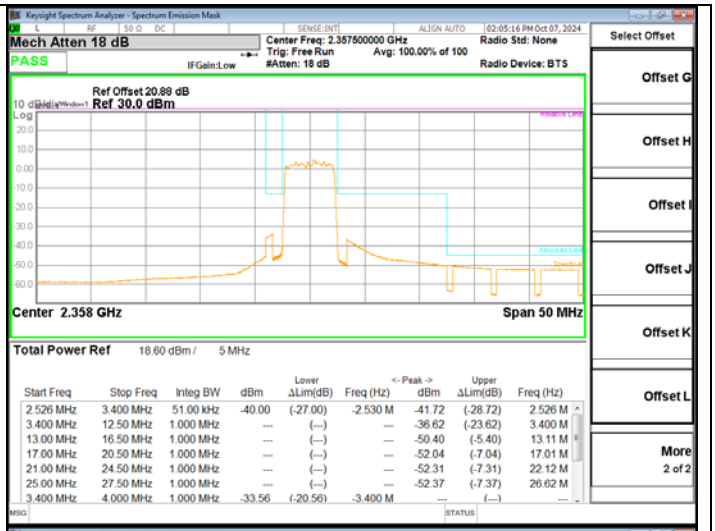
FCC: §27.53
(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:
(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;
(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;
(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

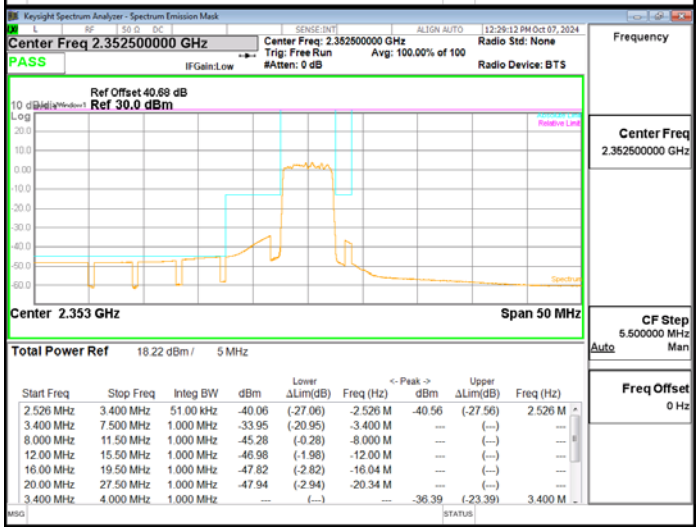
LTE BAND 30 EMISSION MASK



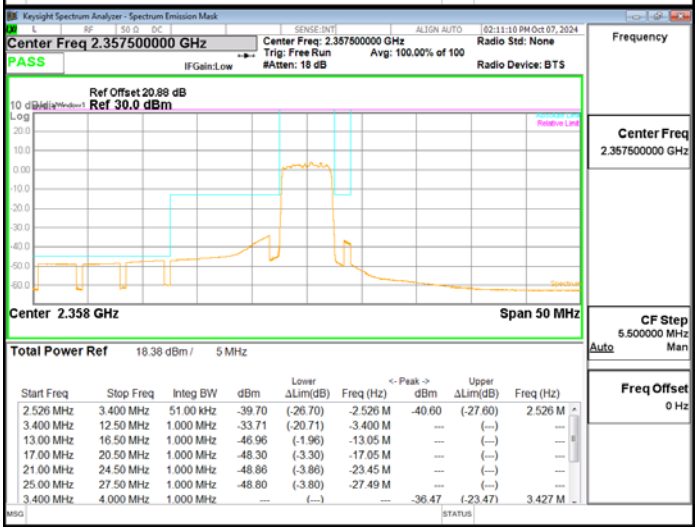
LTE BAND 30 QPSK 5M RB25-0 Low Ch



LTE BAND 30 QPSK 5M RB25-0 High Ch



LTE BAND 30 QPSK 10M RB25-0 Mid Ch



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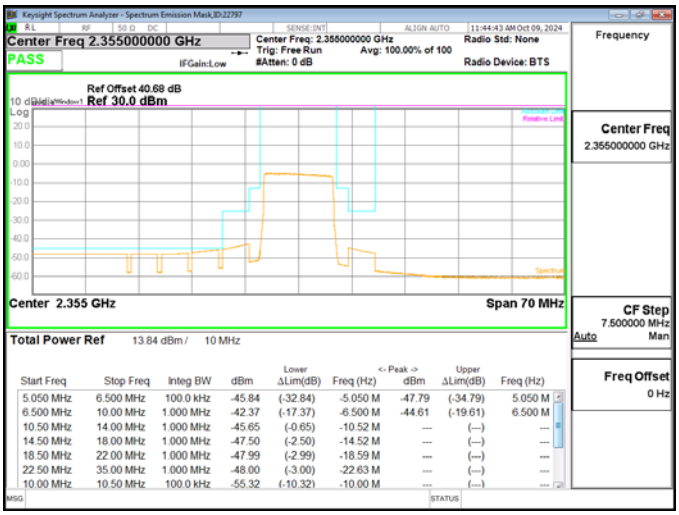
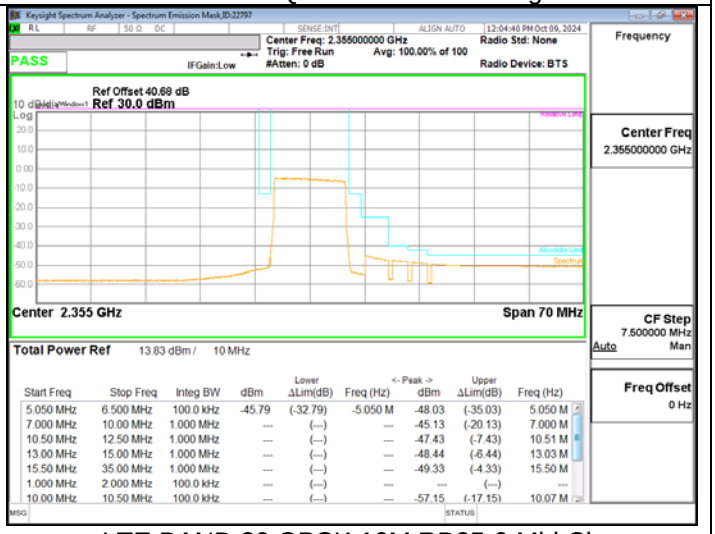
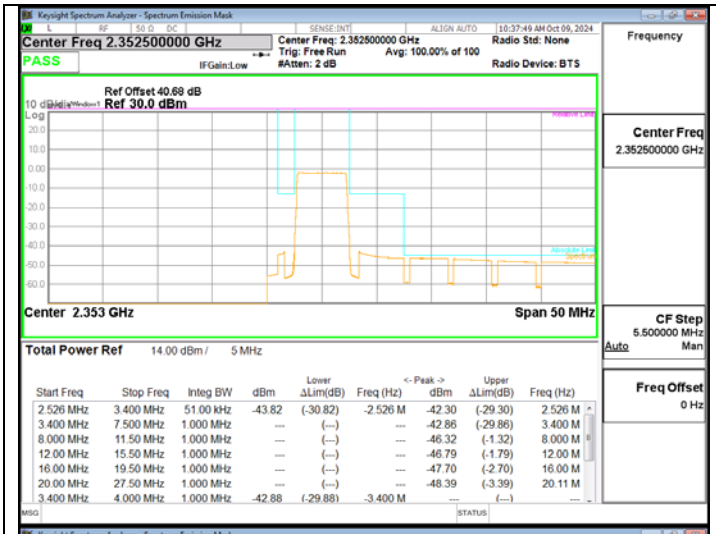
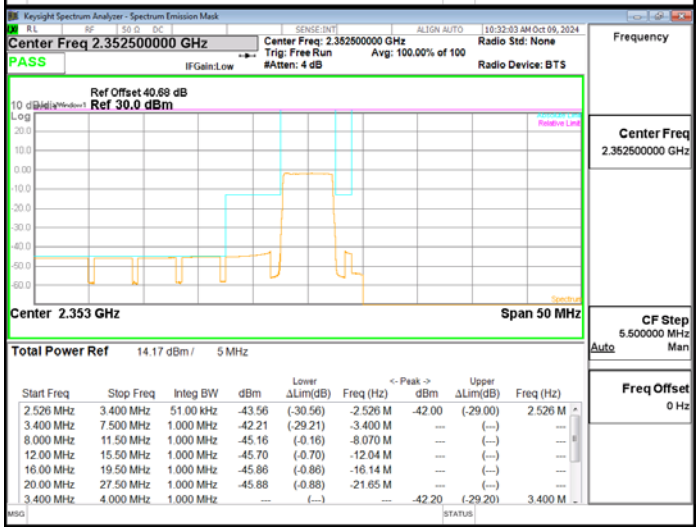


LTE BAND 30 QPSK 10M RB25-0 Mid Ch

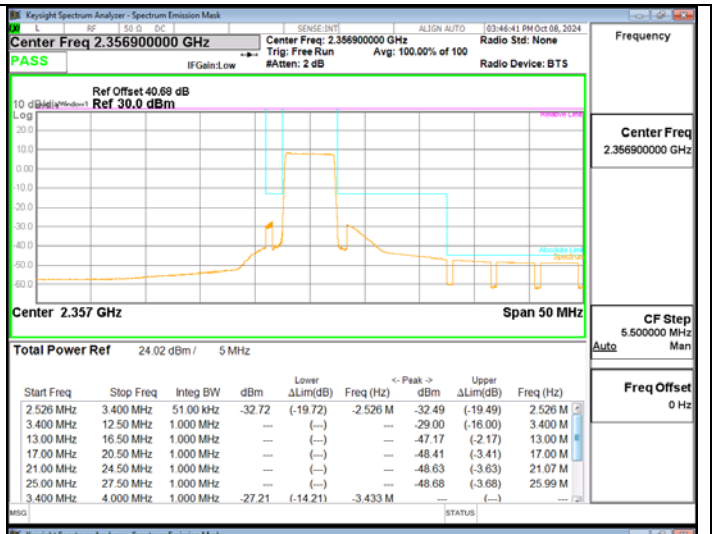


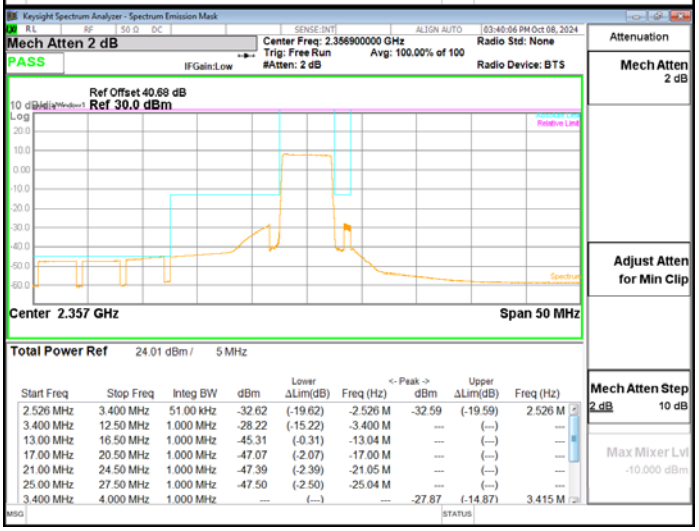
5G NR N30 EMISSION MASK





5G NR N30 QPSK 5M RB25-0 Low Ch





5G NR N30 QPSK 5M RB25-0 High Ch

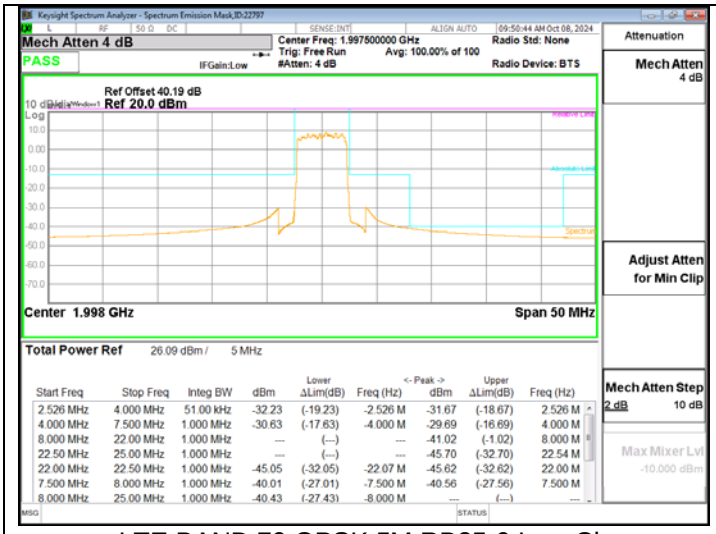
9.2.2. LTE BAND 70 & 5G NR N70

LIMITS

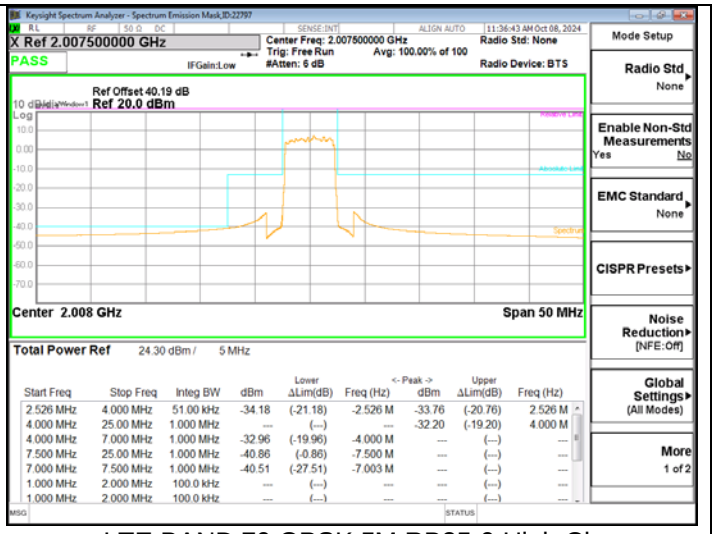
FCC: 27.53
(h)(1) ***General protection levels.*** Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}$ (P) dB.

(2) ***Additional protection levels.*** Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.
(ii) For operations in the 2000-2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}$(P) dB.
(iii) For operations in the 1915-1920 MHz band, the power of any emission between 1930-1995 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}$(P) dB.
(iv) For operations in the 1995-2000 MHz band, the power of any emission between 2005-2020 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}$(P) dB.

LTE BAND 70 EMISSION MASK



LTE BAND 70 QPSK 5M RB25-0 Low Ch



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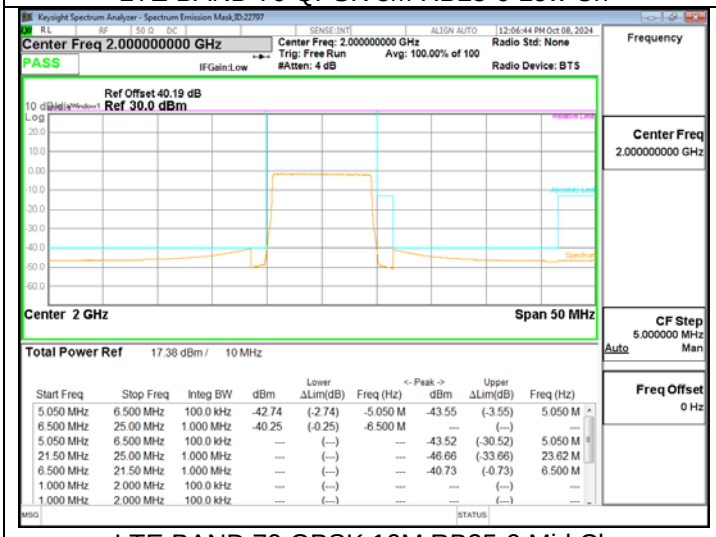
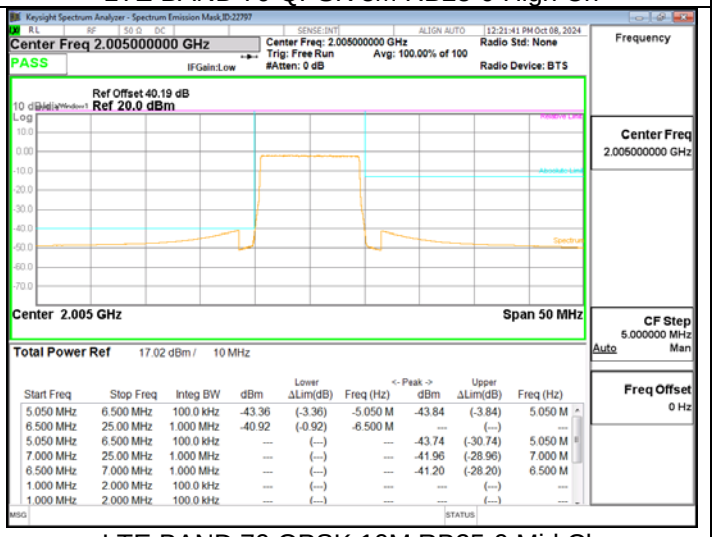
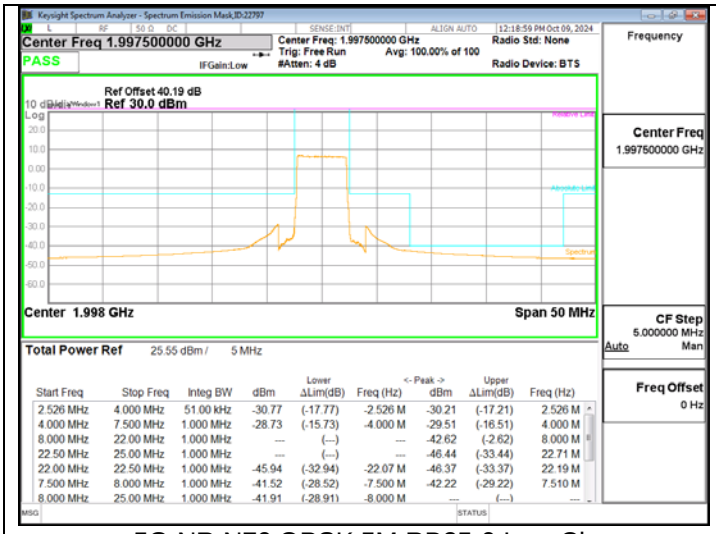


LTE BAND 70 QPSK 10M RB25-0 Mid Ch

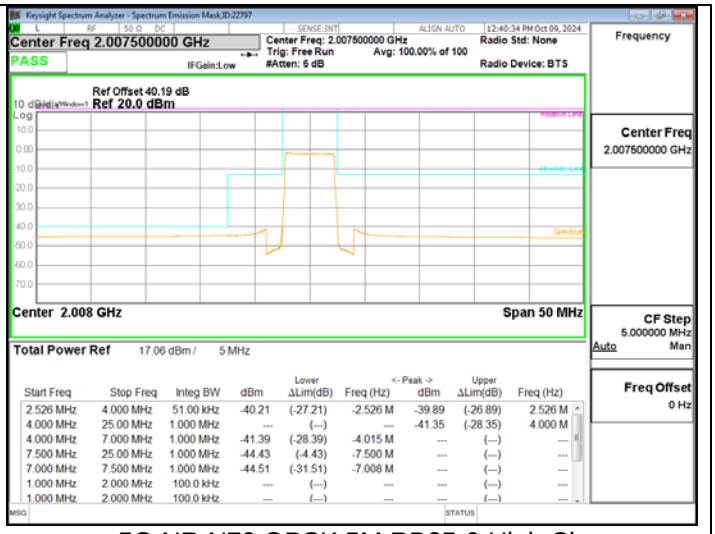


LTE BAND 70 QPSK 10M RB25-0 Mid Ch

5G NR N70 EMISSION MASK



5G NR N70 QPSK 5M RB25-0 Low Ch



5G NR N70 QPSK 5M RB25-0 High Ch

9.3. OUT OF BAND EMISSIONS

TEST PROCEDURE

ANSI C63.26-2015, Section 5.7.3

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 using an RMS detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -40dBm and -45dBm according to the band Limit
- 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)
- The Sweep time was set to > T_{sp} * Sweep Points for Max Hold mode or set to auto for trace averaging mode to sufficiently measure maximum power.
- The number of sweep points was set to > 2 * Span/RBW.

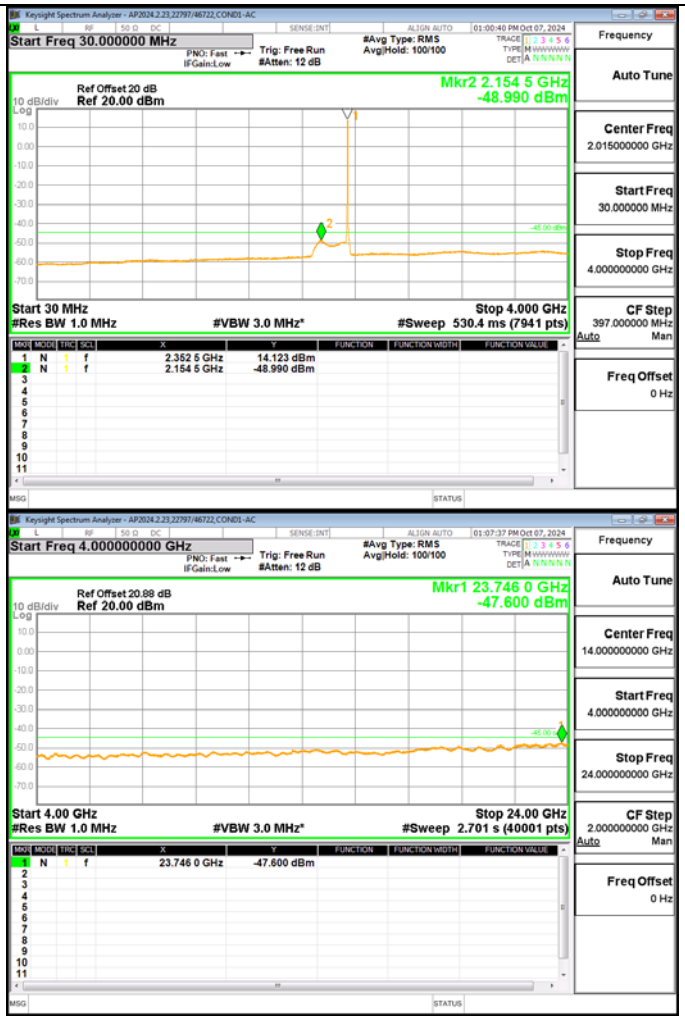
RESULTS

9.3.1. LTE BAND 30 & 5G NR N30

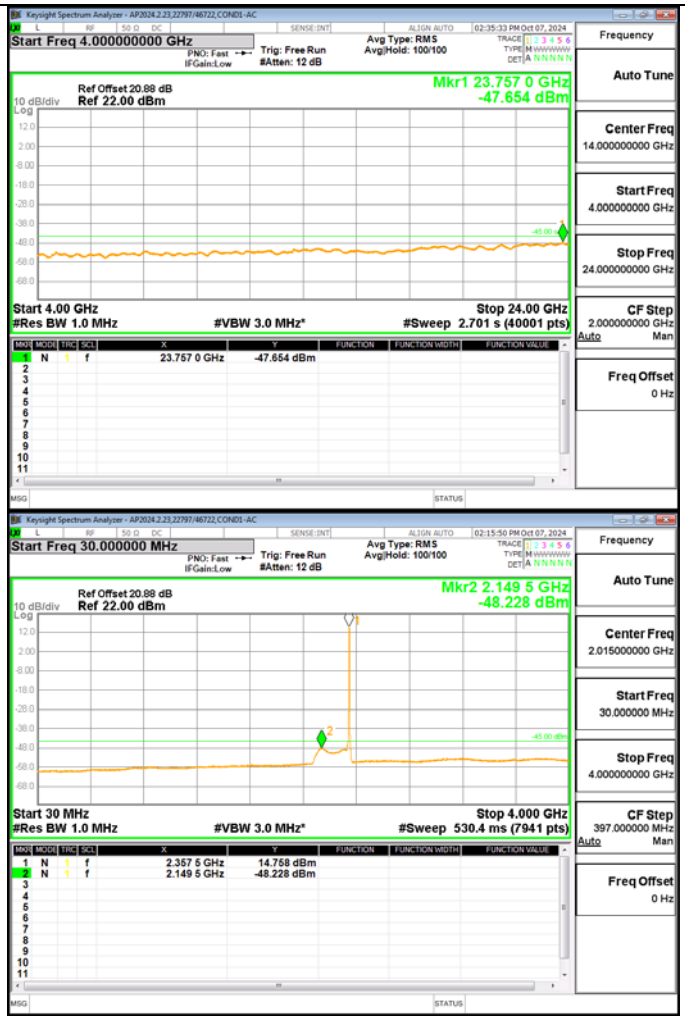
LIMITS

FCC: §27.53 (a)
The minimum permissible attenuation level of any spurious emissions is 75 + 10 log (P) dB where transmitting power (P) in Watts.

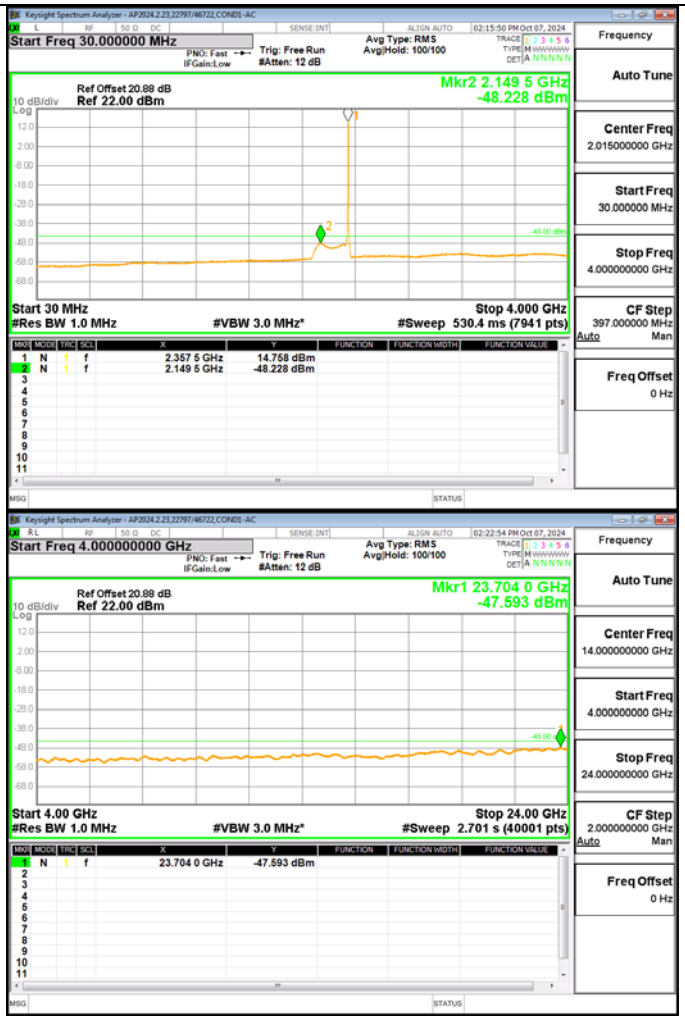
LTE BAND 30



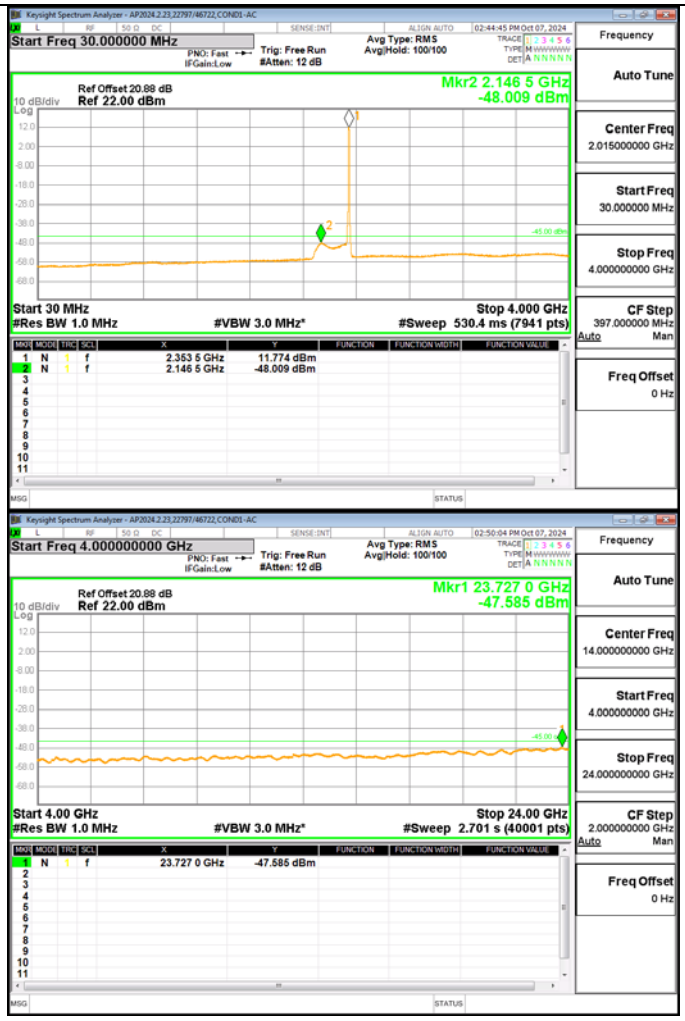
LTE BAND 30 QPSK 5M RB25-0 Low Ch



LTE BAND 30 QPSK 5M RB25-0 Mid Ch

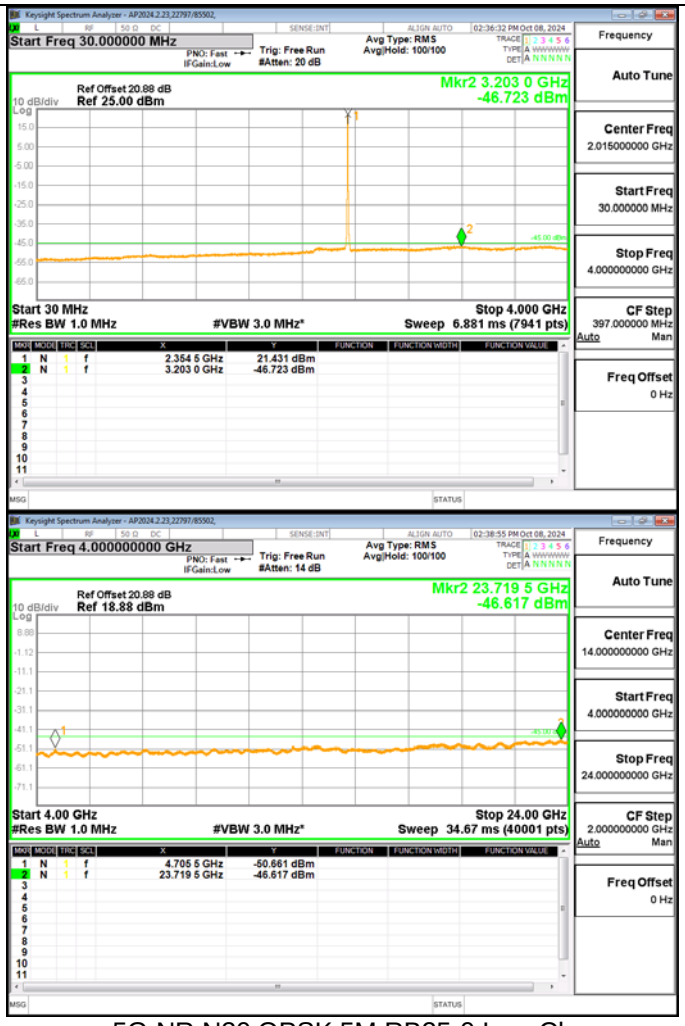


LTE BAND 30 QPSK 5M RB25-0 High Ch

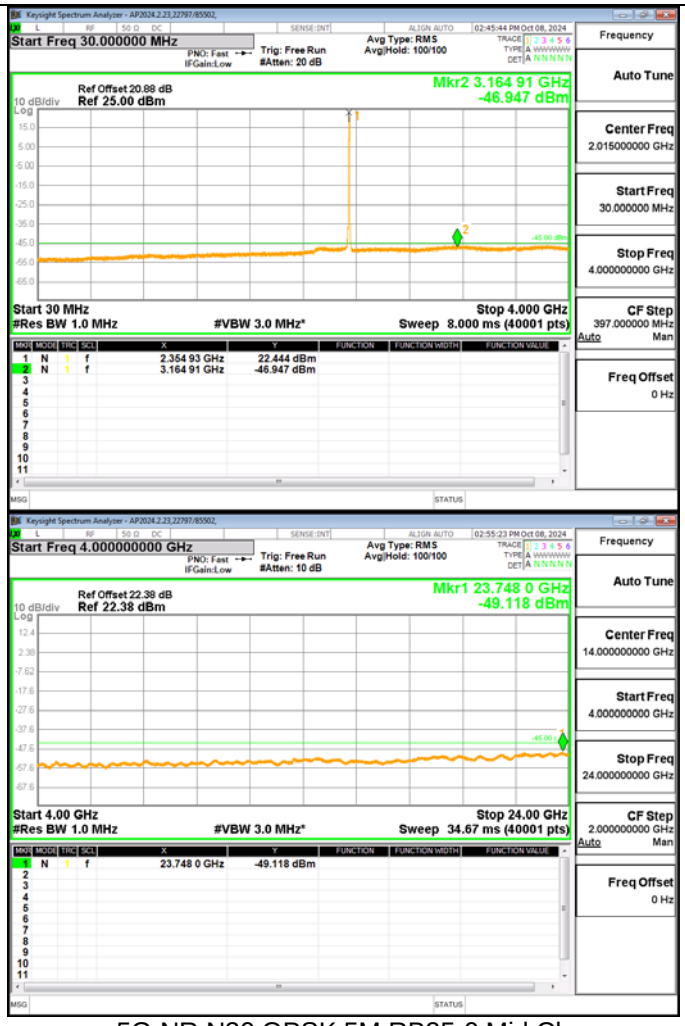


LTE BAND 30 QPSK 10M RB25-0 Mid Ch

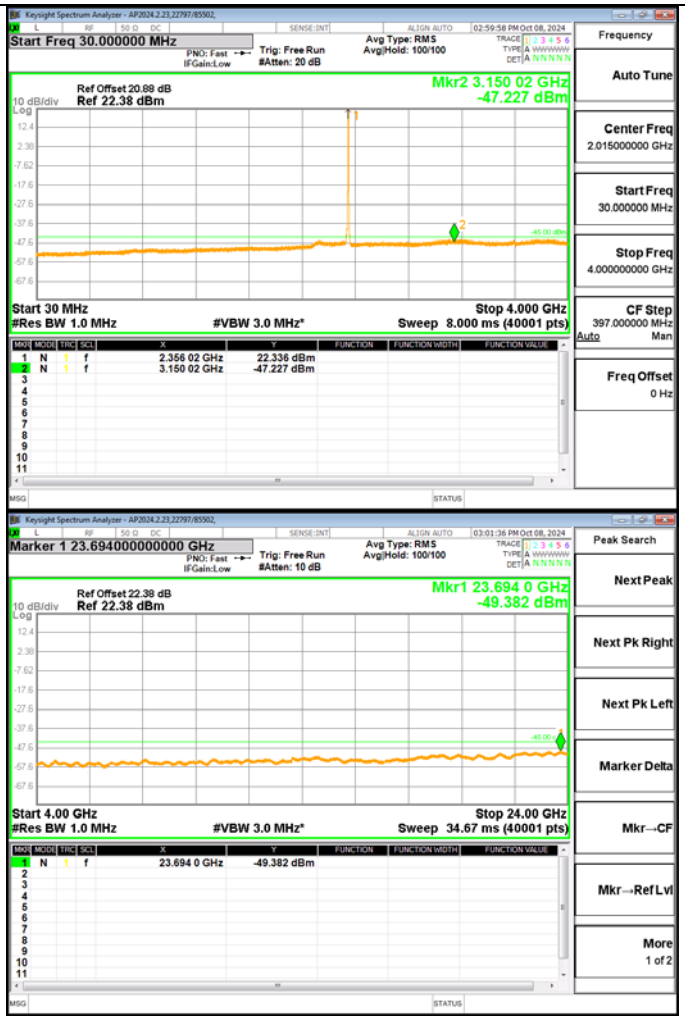
5G NR N30



5G NR N30 QPSK 5M RB25-0 Low Ch



5G NR N30 QPSK 5M RB25-0 Mid Ch



5G NR N30 QPSK 5M RB25-0 High Ch

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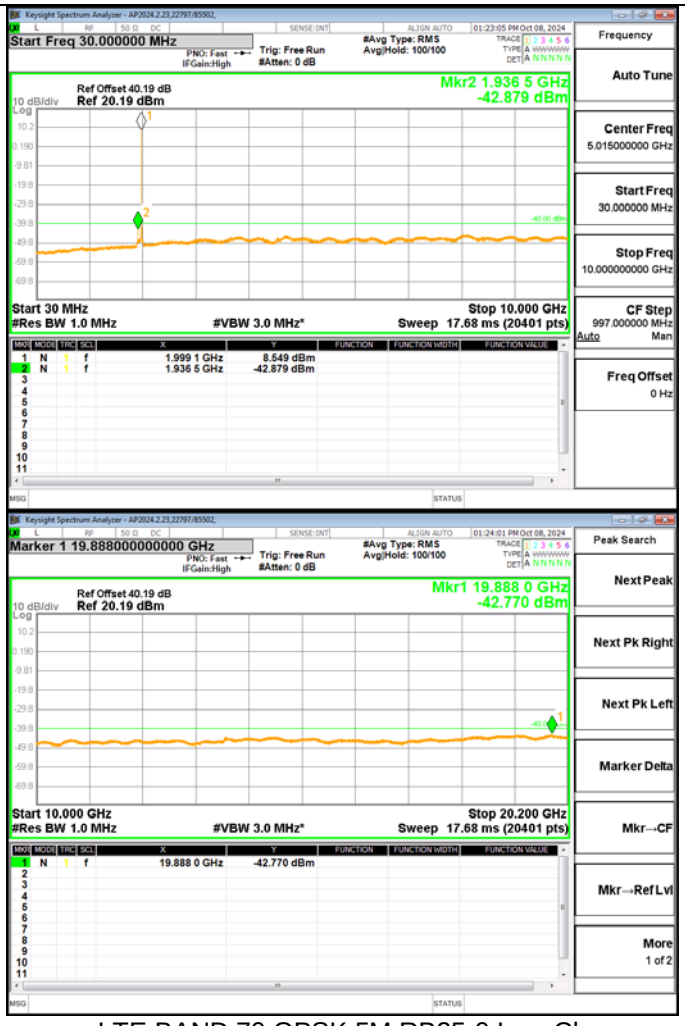
9.3.2. LTE BAND 70 & 5G NR N70

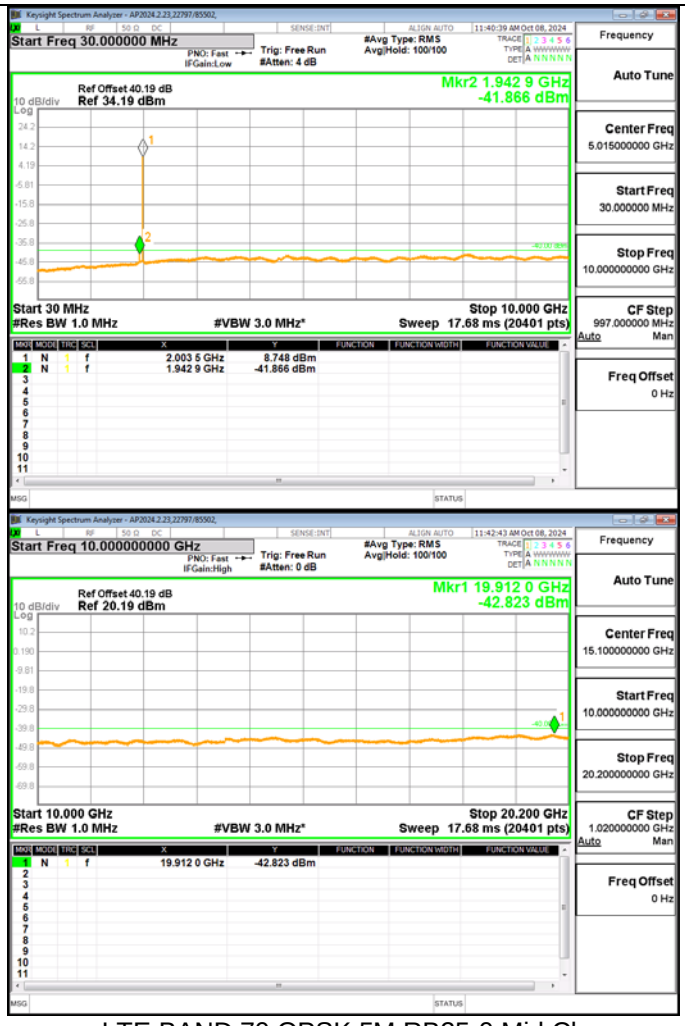
LIMITS

FCC: §27.53 (h)
The minimum permissible attenuation level of any spurious emissions is 70 + 10 log (P) dB where transmitting power (P) in Watts.

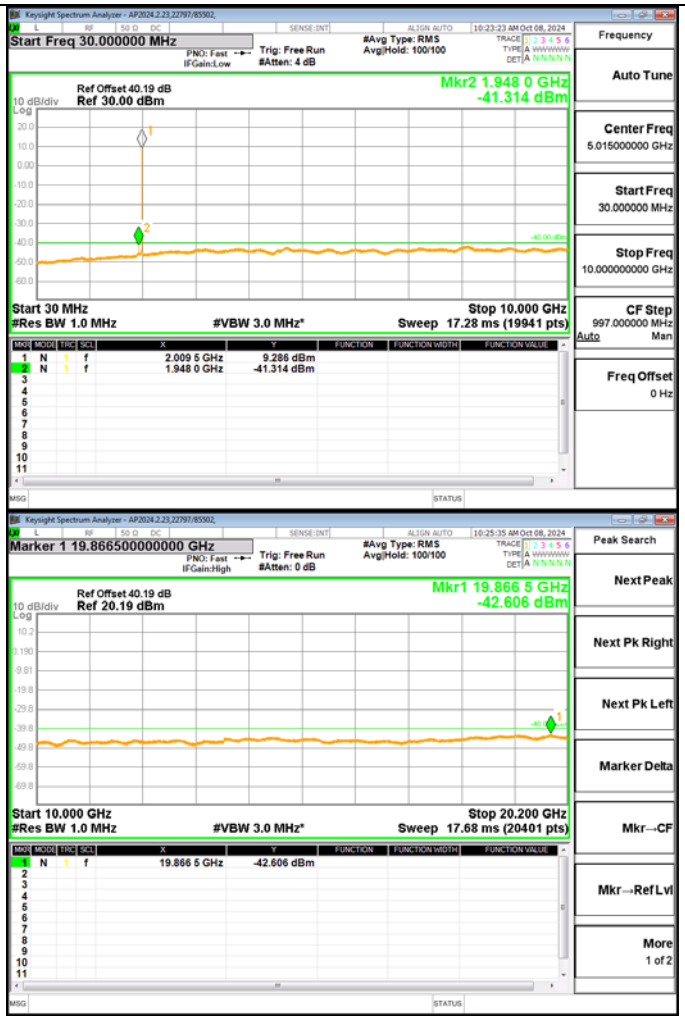
LTE BAND 70



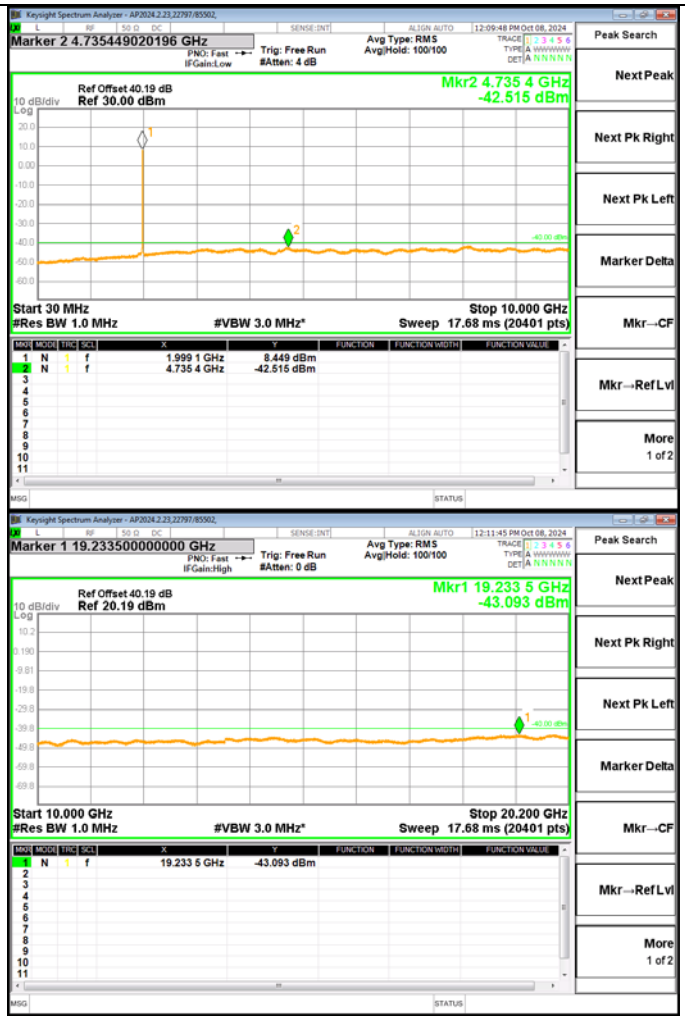
LTE BAND 70 QPSK 5M RB25-0 Low Ch



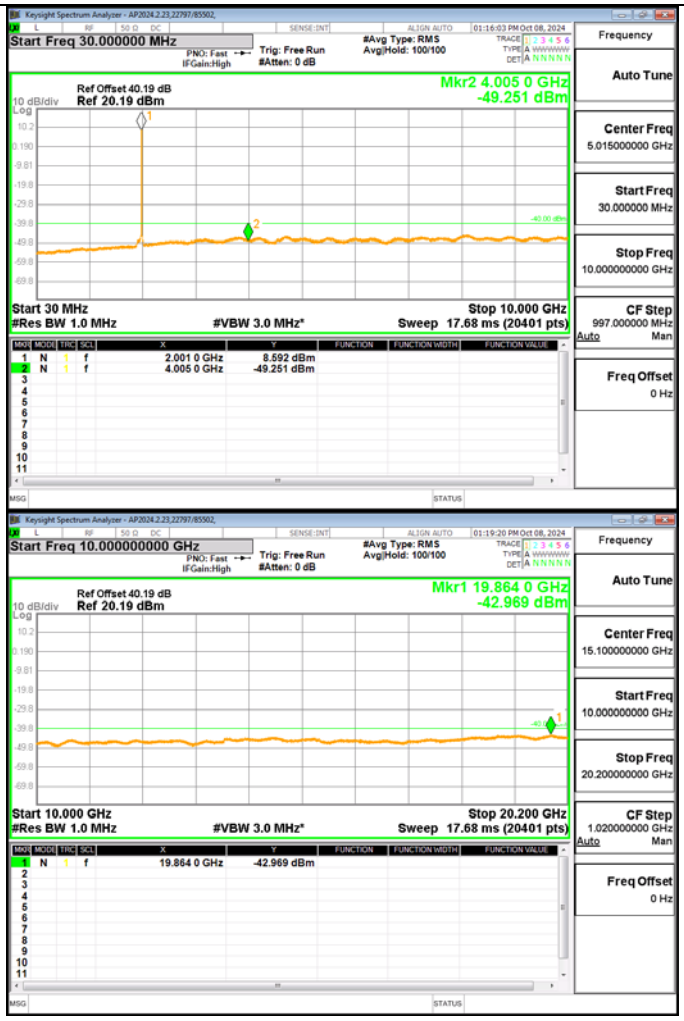
LTE BAND 70 QPSK 5M RB25-0 Mid Ch



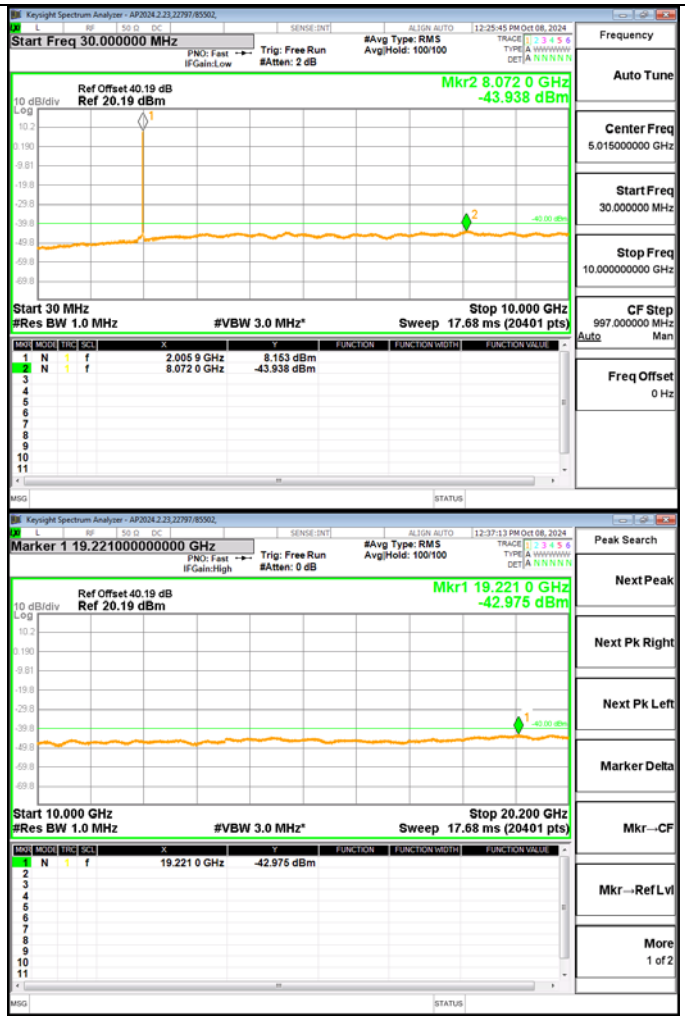
LTE BAND 70 QPSK 5M RB25-0 High Ch



LTE BAND 70 QPSK 10M RB25-0 Low Ch

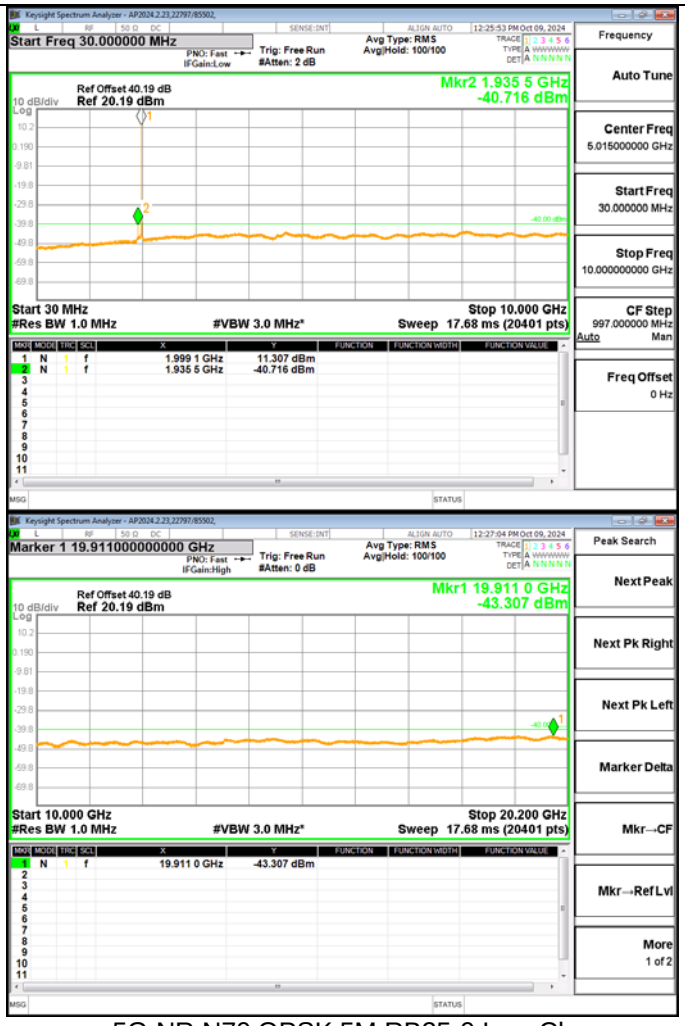


LTE BAND 70 QPSK 10M RB25-0 Mid Ch

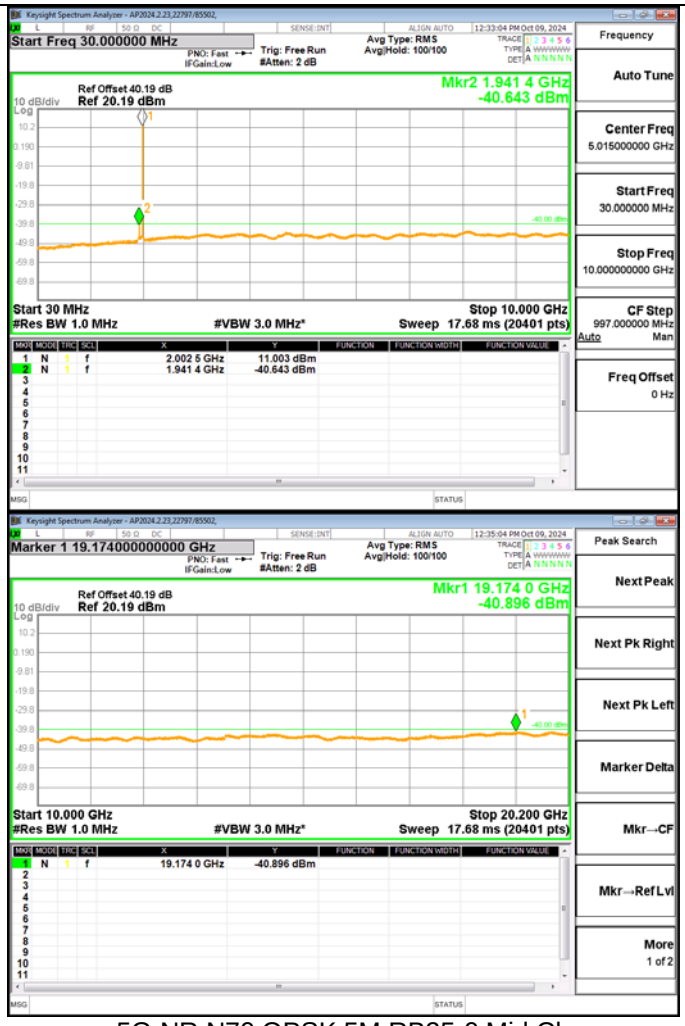


LTE BAND 70 QPSK 10M RB25-0 High Ch

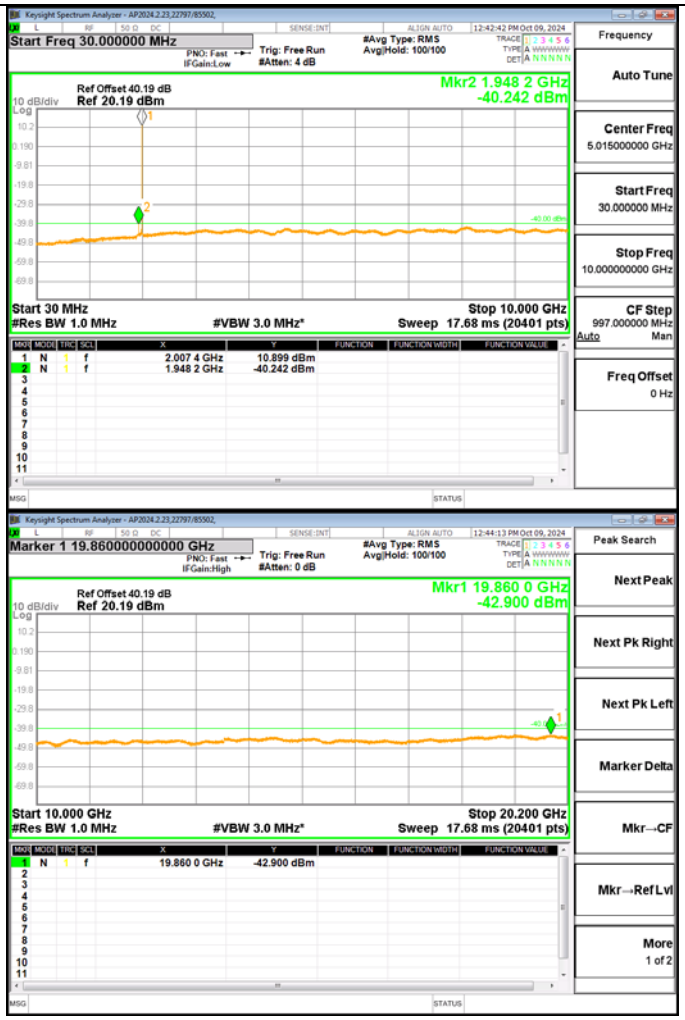
5G NR N70



5G NR N70 QPSK 5M RB25-0 Low Ch



5G NR N70 QPSK 5M RB25-0 Mid Ch



5G NR N70 QPSK 5M RB25-0 High Ch

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9.4. FREQUENCY STABILITY

TEST PROCEDURE

ANSI C63.26:2015 Section 5.6

- Temp. = 0°C to +50°C
- Voltage = (85% - 115%)

  Low voltage, 102VDC, Normal, 120VAC and High voltage, 138VAC.

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

Test Engineer ID:	22797/85502	Test Date:	2024-10-09; 2024-10-10

9.4.1. LTE BAND 30 & 5G NR N30

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

LTE BAND 30 QPSK (10MHz BANDWIDTH)

Band	30	Frequency Range		Frequency Error Reading (Hz)	Limit
Condition		2350	2360		
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2350.1941	2359.8059	1187	Yes
Extreme (50°C)		2350.1953	2359.8071	-1227	Yes
Extreme (40°C)		2350.1929	2359.8047	2227	Yes
Extreme (30°C)		2350.1963	2359.8081	2461	Yes
Extreme (10°C)		2350.1966	2359.8084	1926	Yes
Extreme (0°C)		2350.1960	2359.8078	-1269	Yes
20°C	15%	2350.1928	2359.8046	1324	Yes
	-15%	2350.1954	2359.8072		Yes

5G NR N30 QPSK (5MHz BANDWIDTH)

Band	30	Frequency Range		Frequency Error Reading (Hz)	Limit
Condition		2350	2360		
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Within Authorized Frequency Block (Hz)
Temperature	Voltage				
Normal (20°C)	Normal	2350.2255	2359.1725		
Extreme (50°C)		2350.2221	2359.1691	-3384	Yes
Extreme (40°C)		2350.2204	2359.1674	-5066	Yes
Extreme (30°C)		2350.2214	2359.1684	-4119	Yes
Extreme (10°C)		2350.2213	2359.1683	-4169	Yes
Extreme (0°C)		2350.2211	2359.1681	-4429	Yes
20°C	15%	2350.2179	2359.1649	-7564	Yes
	-15%	2350.2203	2359.1673	-5185	Yes

9.4.2. LTE BAND 70 & 5G NR N70

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block

LTE BAND 70 QPSK (10MHz BANDWIDTH)

Band	70	Frequency Range		Frequency Error Reading (Hz)	Limit
Condition		1995	2020		
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1995.2284	2009.7784		
Extreme (50°C)		1995.2327	2009.7827	4267	Yes
Extreme (40°C)		1995.2268	2009.7768	-1646	Yes
Extreme (30°C)		1995.2295	2009.7795	1050	Yes
Extreme (10°C)		1995.2287	2009.7787	286	Yes
Extreme (0°C)		1995.2316	2009.7816	3169	Yes
20°C	15%	1995.2299	2009.7799	1523	Yes
	-15%	1995.2357	2009.7857	7348	Yes

5G NR N70 QPSK (5MHz BANDWIDTH)

Band	70	Frequency Range		Frequency Error Reading (Hz)	Limit
Condition		1995	2020		
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Within Authorized Frequency Block (Hz)
Temperature	Voltage				
Normal (20°C)	Normal	1995.2147	2009.7824		
Extreme (50°C)		1995.2042	2009.7719	-10482	Yes
Extreme (40°C)		1995.2039	2009.7716	-10794	Yes
Extreme (30°C)		1995.2071	2009.7748	-7645	Yes
Extreme (10°C)		1995.2065	2009.7742	-8178	Yes
Extreme (0°C)		1995.2061	2009.7738	-8649	Yes
20°C	15%	1995.2065	2009.7742	-8196	Yes
	-15%	1995.2070	2009.7747	-7734	Yes

10. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, We measure the radiated emissions 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 method.

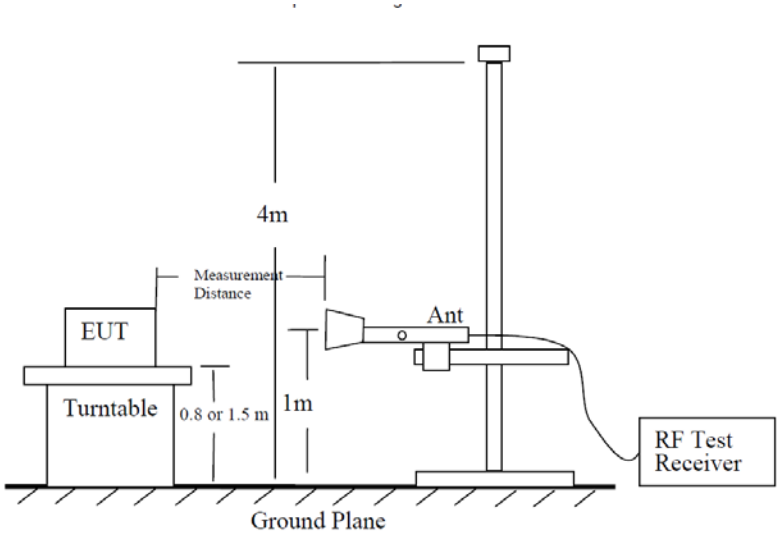


Figure 6—Test site-up for radiated ERP and/or EIRP measurements

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

a) E (dBμV/m) = Measured amplitude level (dBμV) + Cable Loss (dB) + Antenna Factor (dB/m).

b) E (dBμV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).

c) E (dBμV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.

d) EIRP (dBm) = E (dBμV/m) + 20log(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*Log(3)=9.5424

Then, EIRP (dBm) = E (dBμV/m) + 9.5424 − 104.8 = E (dBμV/m) – 95.2576

10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

TEST PROCEDURE

FCC KDB 971168 D01 /D02

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

RESULTS

10.1.1. LTE BAND 30 & 5G NR N30

LIMITS

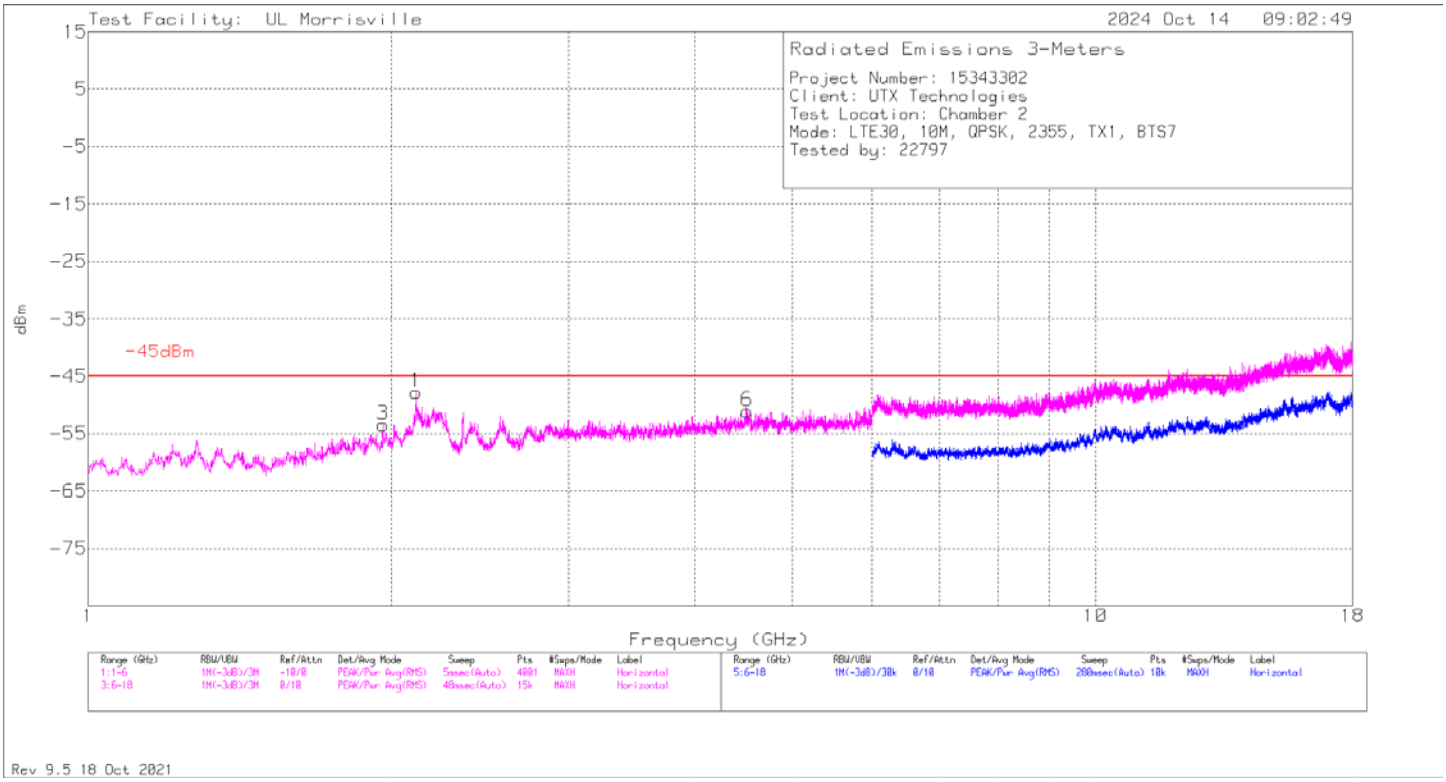
FCC: §27.53 (a)
By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz.

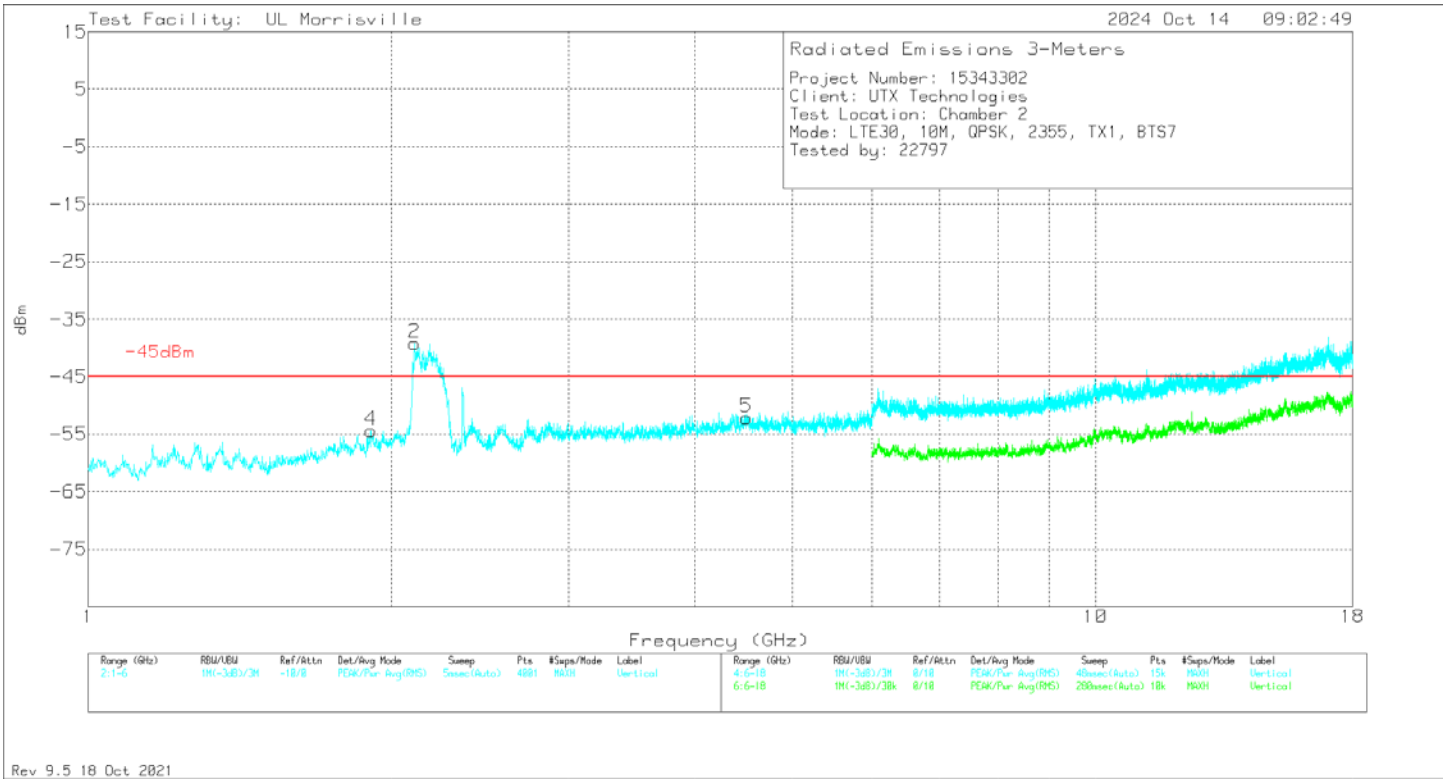
Note: Due to proximity of the emission limit to the noise floor, A Reduced Video Bandwidth range was run at >6GHz to confirm no emissions were visible.

RESULTS

LTE Band 30

Tx Port 1

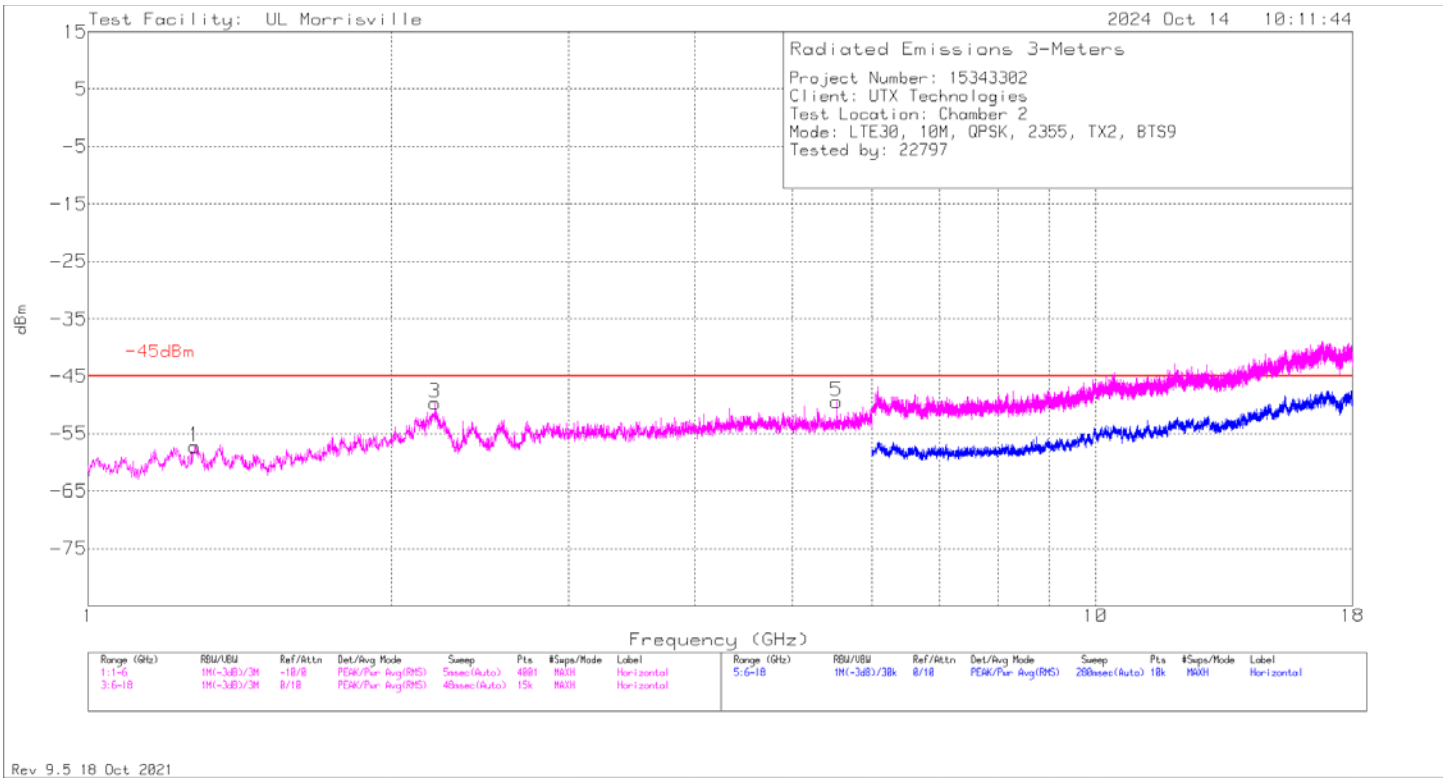


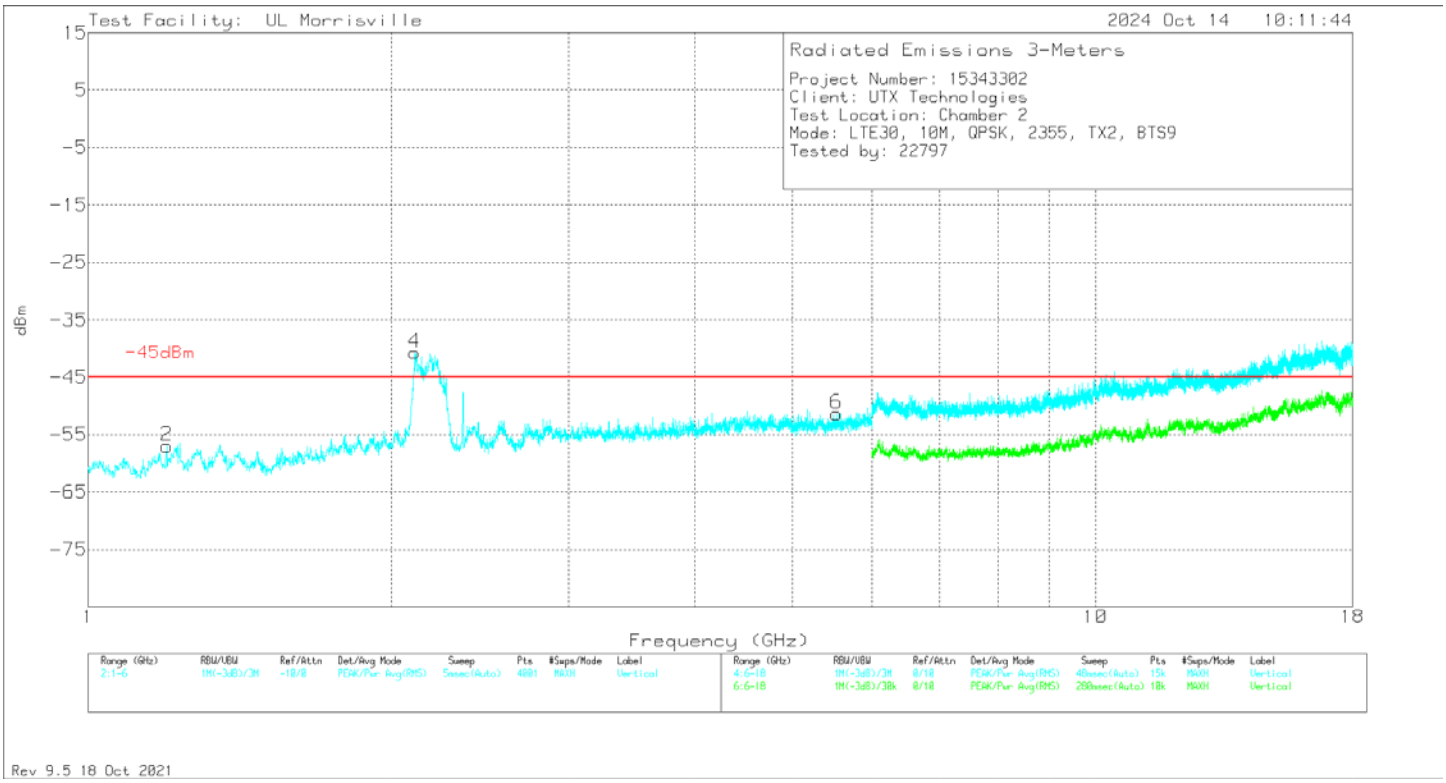


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	CF (dB)	Gain/Loss (dB)	Corrected Reading dBm	-45dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.90875	-75.79	Pk	31	-22.3	11.8	.9	-54.39	-45	-9.39	0-360	299	V
3	1.96125	-75.35	Pk	31.3	-22.3	11.8	1.1	-53.45	-45	-8.45	0-360	100	H
2	2.13119	-77.2	RMS	32	-22.9	11.8	1.5	-54.8	-45	-9.8	360	166	V
1	2.2141	-84.09	RMS	32	-23	11.8	1.9	-61.39	-45	-16.39	157	323	H
5	4.50375	-78.5	Pk	33.9	-20.1	11.8	.7	-52.2	-45	-7.2	0-360	299	V
6	4.51375	-77.1	Pk	33.9	-20.4	11.8	.7	-51.1	-45	-6.1	0-360	199	H

Pk - Peak detector
RMS - RMS detection

Tx Port 2

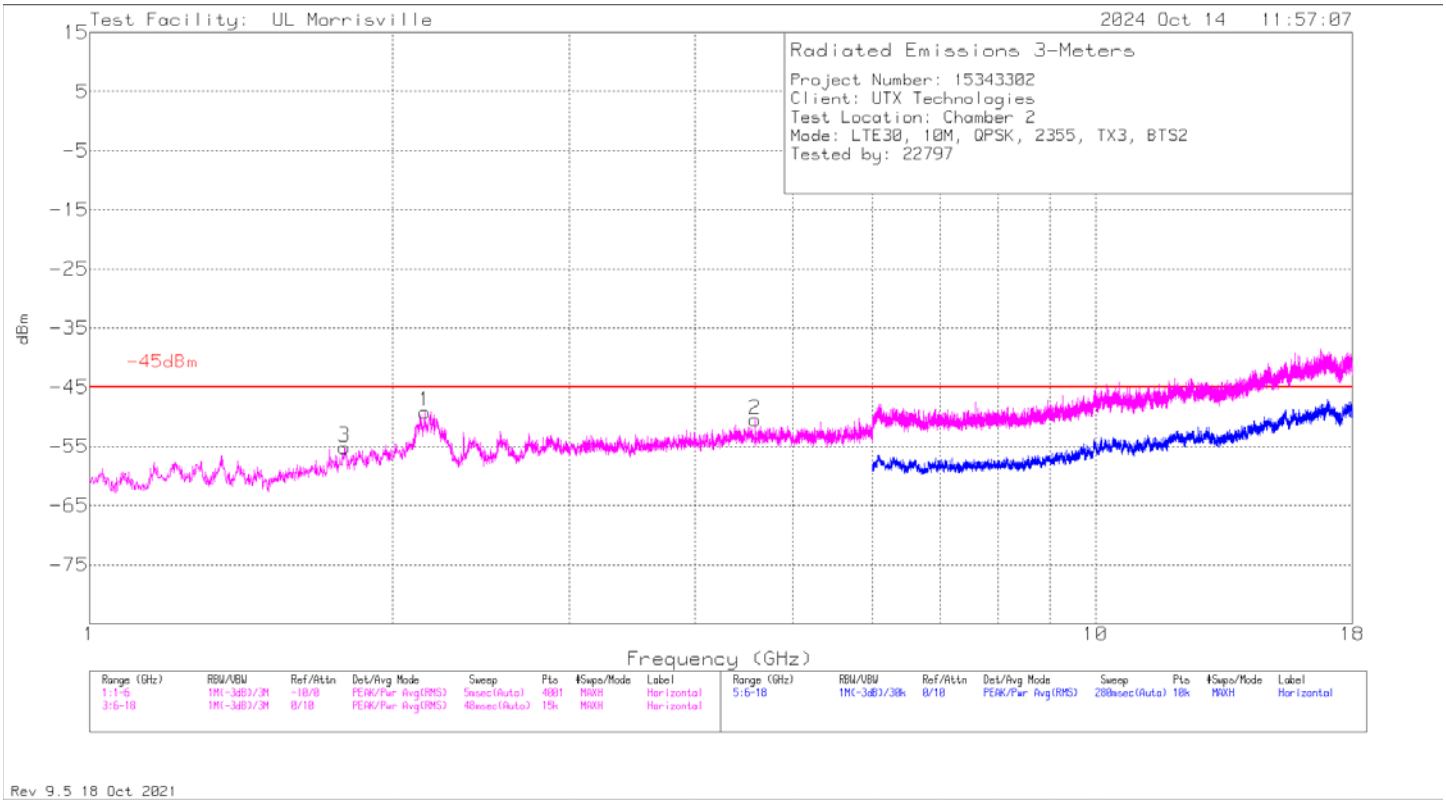


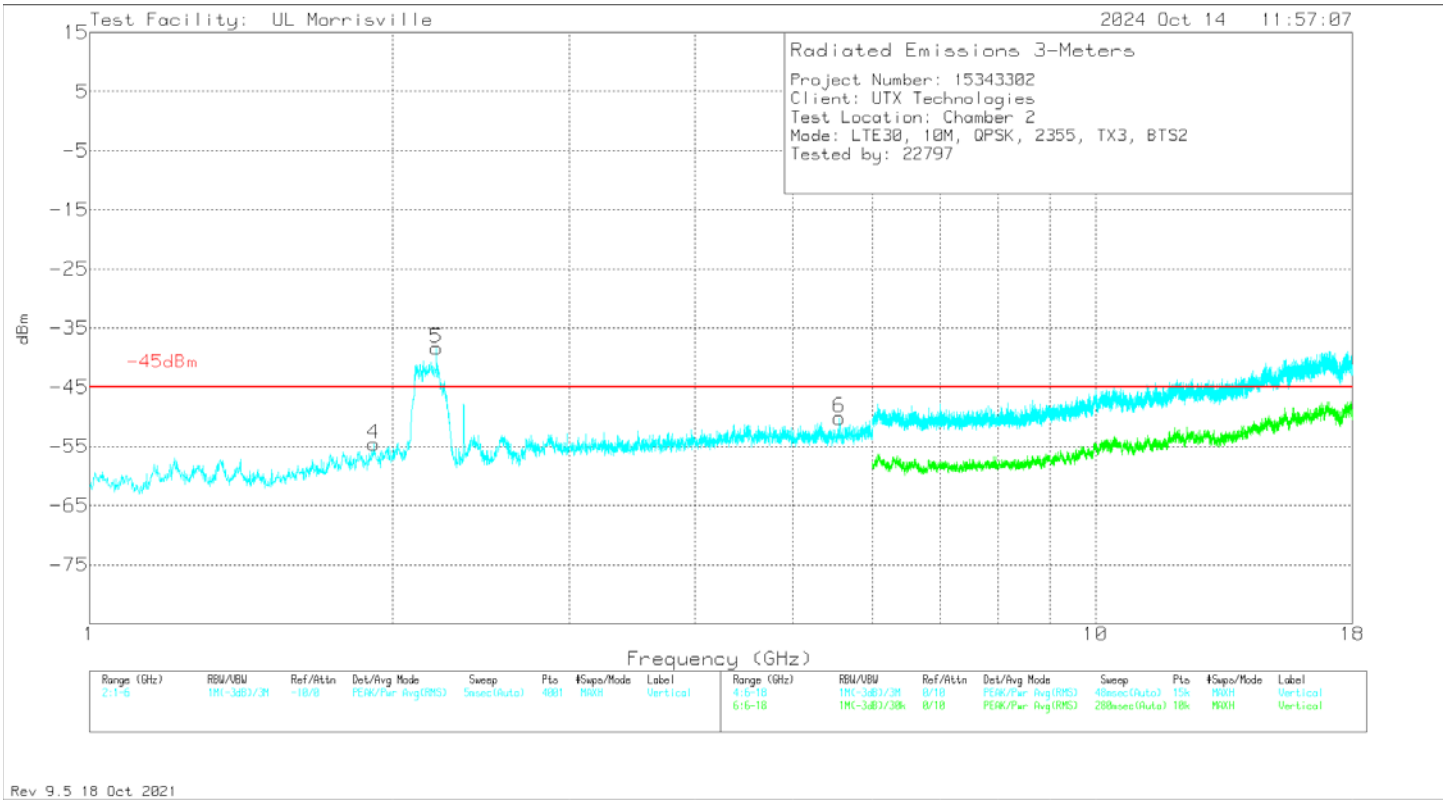


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	CF (dB)	Gain/Loss (dB)	Corrected Reading dBm	-45dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	1.19625	-74.74	Pk	28.7	-23.4	11.8	.7	-56.94	-45	-11.94	0-360	199	V
1	1.27625	-76.04	Pk	29.4	-23.1	11.8	.7	-57.24	-45	-12.24	0-360	200	H
4	2.22204	-78.55	RMS	32	-23	11.8	1.9	-55.85	-45	-10.85	0	231	V
3	2.21774	-80.36	RMS	32	-23	11.8	1.9	-57.66	-45	-12.66	352	321	H
6	5.53625	-75.12	Pk	34.6	-23.1	11.8	.5	-51.32	-45	-6.32	0-360	299	V
5	5.50194	-84.8	RMS	34.5	-23.3	11.8	.5	-61.3	-45	-16.3	311	367	H

Pk - Peak detector
RMS - RMS detection

Tx Port 3



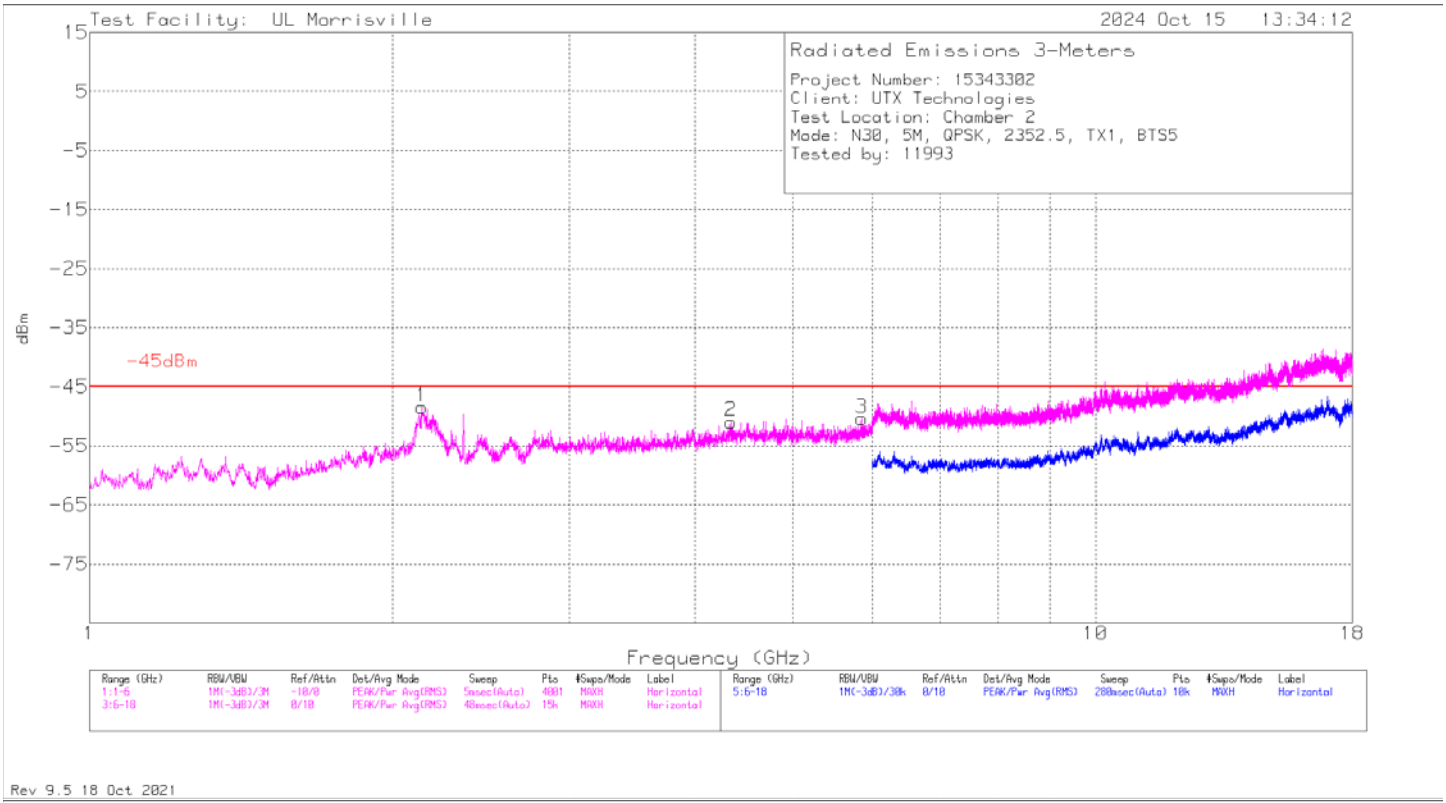


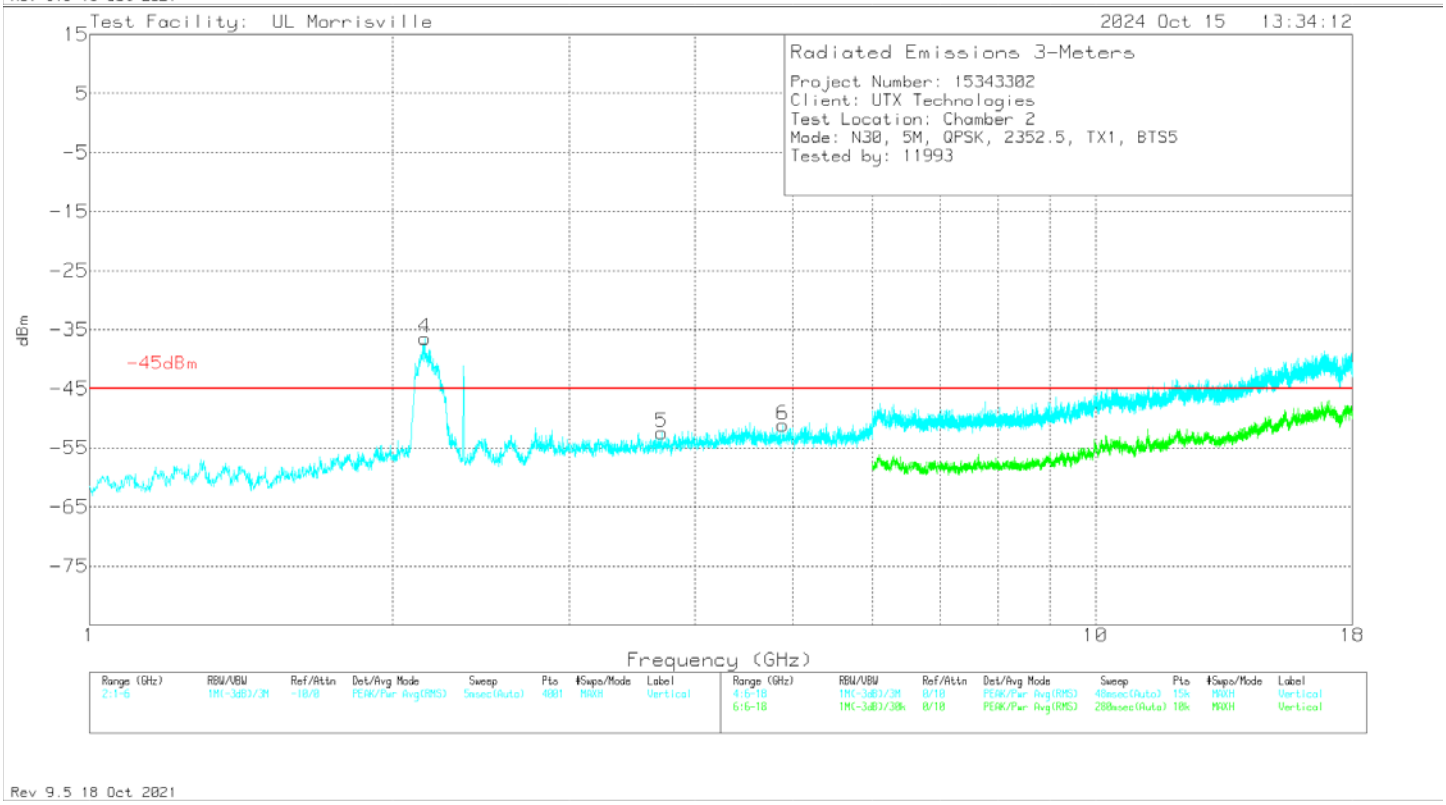
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	CF (dB)	Gain/Loss (dB)	Corrected Reading dBm	-45dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	1.7925	-75.96	Pk	30.4	-22.1	11.8	.7	-55.16	-45	-10.16	0-360	201	H
4	1.91625	-76.29	Pk	31.1	-22.1	11.8	.9	-54.59	-45	-9.59	0-360	300	V
1	2.20871	-80.46	RMS	32	-23	11.8	1.9	-57.76	-45	-12.76	326	104	H
5	2.17785	-71.52	RMS	32	-23.1	11.8	1.9	-48.92	-45	-3.92	5	133	V
2	4.67383	-88.2	RMS	34.1	-21	11.8	.6	-62.7	-45	-17.7	208	325	H
6	5.56738	-85.96	RMS	34.6	-23.2	11.8	.5	-62.26	-45	-17.26	351	188	V

Pk - Peak detector, RMS - RMS detection

5G NR N30

TX Port 1





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	CF (dB)	Gain/Loss (dB)	Corrected Reading dBm	-45dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.15509	-79.08	RMS	32	-22.5	11.8	1.8	-55.98	-45	-10.98	162	106	H
4	2.13833	-69.17	RMS	32	-22.7	11.8	1.6	-46.47	-45	-1.47	358	128	V
5	3.705	-75.7	Pk	33.1	-22.1	11.8	.5	-52.4	-45	-7.4	0-360	199	V
2	4.32181	-85.47	RMS	33.5	-20.5	11.8	.4	-60.27	-45	-15.27	90	133	H
6	4.88875	-76.34	Pk	34.1	-21.2	11.8	.5	-51.14	-45	-6.14	0-360	199	V
3	5.85575	-83.57	RMS	34.9	-23	11.8	.5	-59.37	-45	-14.37	333	148	H

Pk - Peak detector

RMS - RMS detection