

CERTIFICATION TEST REPORT

Report Number. : S-4791440365-E10V3

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-A166U, SM-A166U1, SM-S166V

FCC ID : A3LSMA166U

EUT Description : GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac
and NFC

Test Standard(s) : FCC 47 CFR PART 96

Date Of Issue:

2024-10-23

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-10-15	Initial issue	Yeonghwan Hong
V2	2024-10-18	Updated to address TCB's question	Yeonghwan Hong
V3	2024-10-23	Updated to address TCB's question	Yeonghwan Hong

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.

MODEL NUMBER: SM-A166U, SM-A166U1, SM-S166V

SERIAL NUMBER: R3CX807W0VV, 871321C19E347ECE, 871321BCE6347ECE, 8615eb85da297ece (CONDUCTED);
R3CX807W3KX, R3CX807W5AE, R3CX807W4KW (RADIATED);

DATE TESTED: 2024-08-21 – 2024-10-15;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 96	Complies

UL KOREA LTD. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL KOREA LTD. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Tested By:



Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Yeonghwan Hong
Suwon Lab Engineer
UL KOREA LTD.

2. TEST METHODOLOGY

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

1. FCC 47 CFR Part 2.
2. FCC 47 CFR Part 96.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01
6. KDB 412172 D01 Determining ERP and EIRP v01r01
7. KDB 940660 D01 Part 96 CBRS v03
8. WINNF-TS-0122-v1.0.2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
☒	Chamber 1(3m semi-anechoic chamber)
☒	Chamber 2(3m semi-anechoic chamber)
☐	Chamber 3(3m semi-anechoic chamber)
☒	Chamber 4(3m Full-anechoic chamber)
☐	Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\text{EIRP} = \text{SG reading with EUT worst orientation (dBm)} - \text{cable loss (between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.79 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.07 dB
Radiated Disturbance, 1 GHz to 18 GHz	4.99 dB
Radiated Disturbance, Above 18 GHz	5.96 dB

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

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Clause 4.3.3 in IEC Guide 115:2023.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC..
This test report addresses the WWAN operational mode.

Representative model	Difference	Derivative model
		SM-A166U1, SM-S166V
SM-A166U	Hardware	Same
	Software	The UI has changed according to Service Provider

The model SM-A166U was used for final testing and is representative of the test results in this report.

The test utility software used during testing was WINNF-TS-0122 V1.0.2

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum average radiated EIRP output powers as follows:

LTE Band 48

FCC Part 96								
Band	ANT	Frequency Range [MHz]	Bandwidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 48	E	3560.00 ~ 3690.00	20	QPSK	21.09	128.53	19.87	97.05
				16QAM	20.95	124.45	19.70	93.33
				64QAM	20.91	123.31		
				256QAM	18.85	76.74		
		3557.50 ~ 3692.50	15	QPSK	21.08	128.23	19.67	92.68
				16QAM	20.99	125.60	19.48	88.72
				64QAM	20.92	123.59		
				256QAM	18.91	77.80		
		3555.00 ~ 3695.00	10	QPSK	20.96	124.74	19.63	91.83
				16QAM	20.94	124.17	19.63	91.83
				64QAM	20.86	121.90		
				256QAM	18.65	73.28		
		3552.50 ~ 3697.50	5	QPSK	21.03	126.77	19.65	92.26
				16QAM	20.99	125.60	19.58	90.78
				64QAM	20.97	125.03		
				256QAM	18.60	72.44		

LTE Band 48C (UL CA)

FCC Part 96								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
48C	E	3560.00 ~ 3690.00	40MHz (20MHz / 20MHz)	QPSK	20.82	120.78	14.77	30.02
				16QAM	19.50	89.13	14.67	29.33
		3557.50 ~ 3690.00	35MHz (15MHz / 20MHz)	QPSK	20.03	100.69		
				16QAM	19.38	86.70		
		3555.00 ~ 3690.00	30MHz (10MHz / 20MHz)	QPSK	20.62	115.35		
				16QAM	18.98	79.07		
		3552.50 ~ 3690.00	25MHz (5MHz / 20MHz)	QPSK	20.63	115.61		
				16QAM	19.17	82.60		

NR Band n48

FCC Part 96									
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Mode	Conducted		Radiated	
						Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n48	E	3570.00 ~ 3679.98	40	DFT-s OFDM	$\pi/2$ BPSK	20.87	122.18		
					QPSK	20.82	120.78	21.28	134.28
					16QAM	20.77	119.40	21.11	129.12
					64QAM	19.50	89.13		
				CP-OFDM	256QAM	17.36	54.45		
					QPSK	20.95	124.45		
					16QAM	20.40	109.65		
					64QAM	18.74	74.82		
		3565.02 ~ 3684.99	30	DFT-s OFDM	256QAM	15.51	35.56		
					$\pi/2$ BPSK	20.90	123.03		
					QPSK	21.44	139.32	20.87	122.18
					16QAM	21.42	138.68	20.73	118.30
				CP-OFDM	64QAM	19.83	96.16		
					256QAM	17.84	60.81		
					QPSK	21.00	125.89		
		3624.99 ~ 3690.00	20	DFT-s OFDM	QPSK	20.94	124.17		
					$\pi/2$ BPSK	20.94	124.17		
					QPSK	21.52	141.91	21.05	127.35
					16QAM	21.47	140.28	21.03	126.77
				CP-OFDM	64QAM	19.81	95.72		
					256QAM	17.91	61.80		
		3557.52 ~ 3692.49	15	DFT-s OFDM	QPSK	20.94	124.17		
					$\pi/2$ BPSK	21.24	133.05		
					QPSK	21.26	133.66	20.63	115.61
					16QAM	20.95	124.45	20.46	111.17
				CP-OFDM	64QAM	19.83	96.16		
					256QAM	17.99	62.95		
		3555.00 ~ 3694.98	10	DFT-s OFDM	QPSK	20.97	125.03		
					$\pi/2$ BPSK	21.21	132.13		
					QPSK	20.95	124.45	20.97	125.03
					16QAM	20.98	125.31	20.88	122.46
				CP-OFDM	64QAM	19.94	98.63		
					256QAM	17.91	61.80		
					QPSK	20.93	123.88		

NR Band n48(SRS1)

FCC Part 96							
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n48	G	3570.00 ~ 3679.98	40	20.46	111.17		
		3565.02 ~ 3684.99	30	20.86	121.90		
		3560.00 ~ 3690.00	20	20.88	122.46	21.25	133.35
		3575.52 ~ 3692.49	15	20.72	118.03		
		3555.00 ~ 3694.98	10	20.63	115.61		

NR Band n48(SRS2)

FCC Part 96							
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n48	D	3570.00 ~ 3679.98	40	20.55	113.50		
		3565.02 ~ 3684.99	30	20.97	125.03		
		3560.00 ~ 3690.00	20	20.98	125.31	16.51	44.77
		3575.52 ~ 3692.49	15	20.91	123.31		
		3555.00 ~ 3694.98	10	20.73	118.30		

NR Band n48(SRS3)

FCC Part 96							
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
n48	F	3570.00 ~ 3679.98	40	19.88	97.27		
		3565.02 ~ 3684.99	30	20.02	100.46	17.30	53.70
		3560.00 ~ 3690.00	20	19.77	94.84		
		3575.52 ~ 3692.49	15	19.63	91.83		
		3555.00 ~ 3694.98	10	19.77	94.84		

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a internal antenna for the supported bands with a maximum peak gain as follow:

Frequency (MHz)	Antenna	Peak Gain (dBi)
LTE Band 48 / NR Band n48 3550 ~ 3700 MHz	E	-3.71
	G	-2.84
	D	-7.53
	F	-4.52

5.4. WORST-CASE ORIENTATION

Following modes should be considered as worst-case scenario for all other measurements.

For all LTE Band 48, the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulations. It was found QPSK and 16QAM results were worst case.

For all 5G NR Band n48, the worst-case scenario for all measurements is based on the Average conducted output power measurement investigation results. Output power measurements were measured on $\pi/2$ BPSK, QPSK, 16QAM, 64QAM and 256QAM modulations. It was found that QPSK and 16QAM results were worst case.

This device supports NSA and SA Mode and Worst case reported.
So the test case is as below.

NR Band	NSA	SA
N48	LTE B2, 66	<u>Stand Alone</u>

This device supports SRS (sounding reference signal) 1, 2, 3 Mode for NR TDD bands. For each SRS 1, 2 and 3, Conducted power and radiated measurement were performed through FTM Mode provide by the customer. The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. SRS1,2,3 the worstcase scenario was radiated tested and reported.

● Conducted Spurious Emission

Highest output power setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48	E	3560.00	20	1	49
		3625.00		1	49
		3690.00		1	49
NR Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48	E	3560.00	20	1	1
		3624.99		1	49
		3690.00		1	49

● Uplink CA Conducted Spurious Emission

Highest conducted output power setting for each bands						
LTE Band	ANT	Component Carrier	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48C	E	PCC	3615.10	20	1	99
		SCC	3634.90	20	1	0

● Radiated Spurious Emission

Highest EIRP setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48	E	3560.00	20	1	49
		3625.00		1	0
		3690.00		1	49
NR Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48	E	3555.00	40	1	53
		3625.00		1	1
		3695.00		1	104

● Uplink CA Radiated Spurious Emission

Highest EIRP setting for each bands						
LTE Band	ANT	Component Carrier	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48C	E	PCC	3670.20	20	1	99
		SCC	3690.00	20	1	0

Band	ANT	EIRP			RSE		
		X	Y	Z	X	Y	Z
LTE B48	E	-	O	-	-	-	O
NR n48	E	-	O	-	-	-	O
	G(SRS1)	-	-	O	-	O	-
	D(SRS2)	-	-	O	-	-	O
	F(SRS3)	O	-	-	O	-	-

Note : For the radiated spurious testing, the EUT attached with travel adapter for the worst case condition. The EUT is continuously communicated with the call box during the tests.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacture	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37TC7A00JBDKA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	N/A

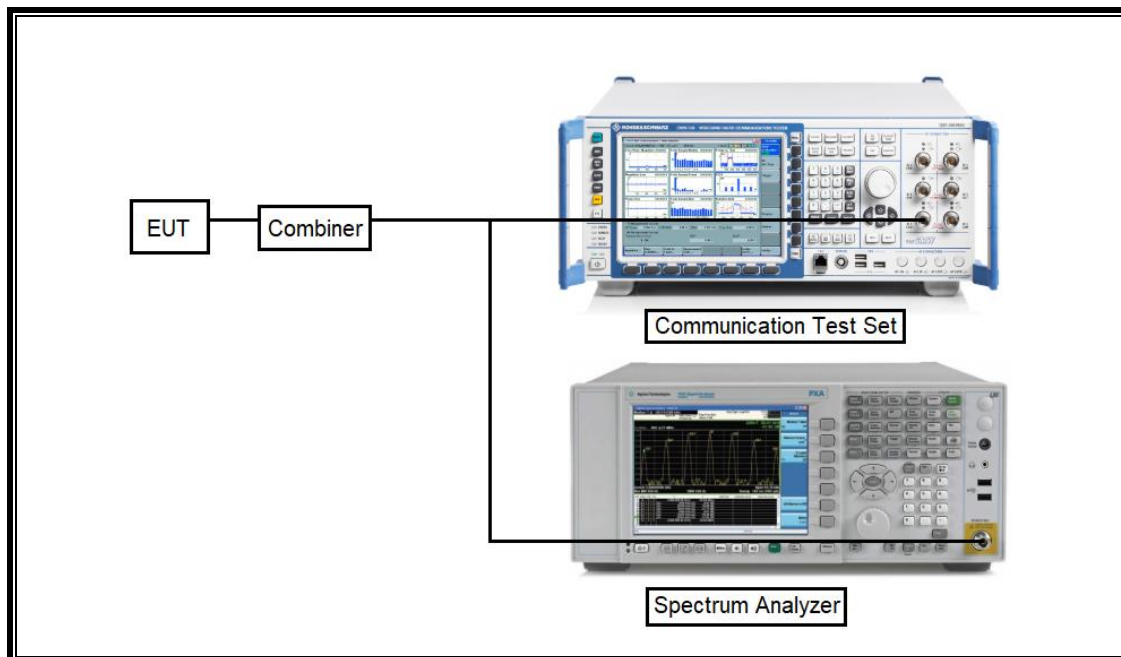
I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A

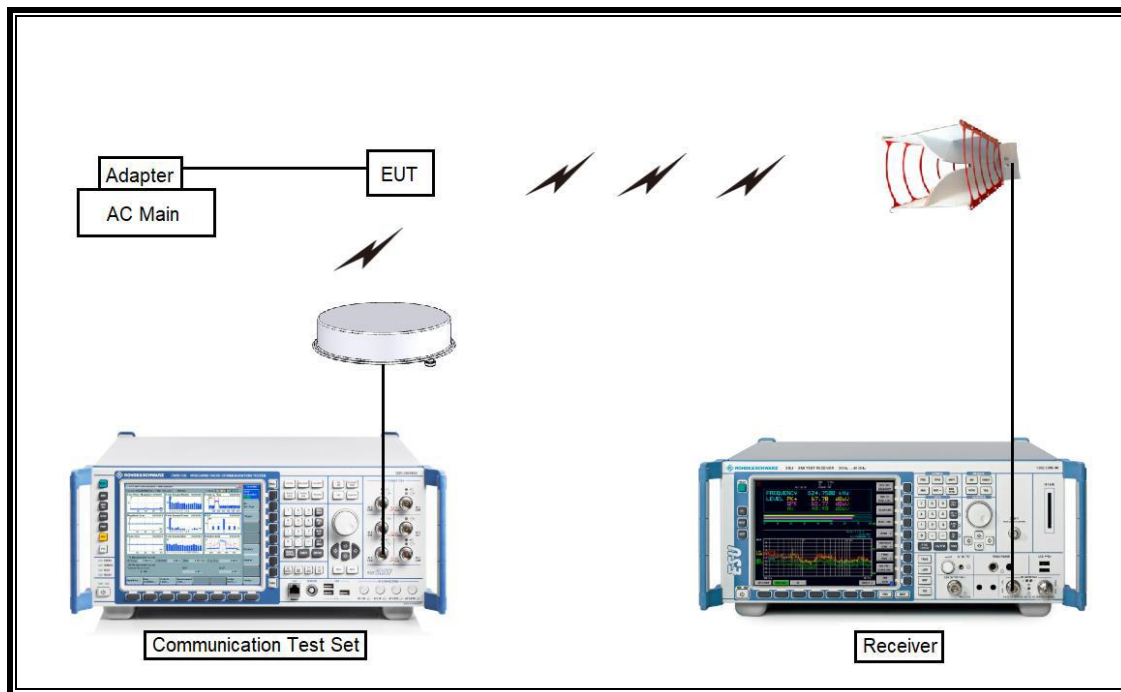
TEST SETUP

The EUT is continuously communicated with the call box during the tests.

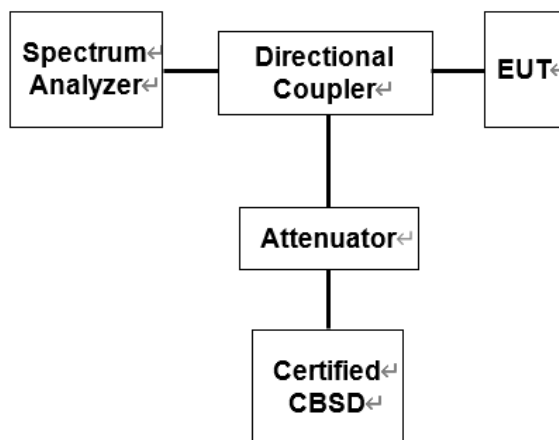
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



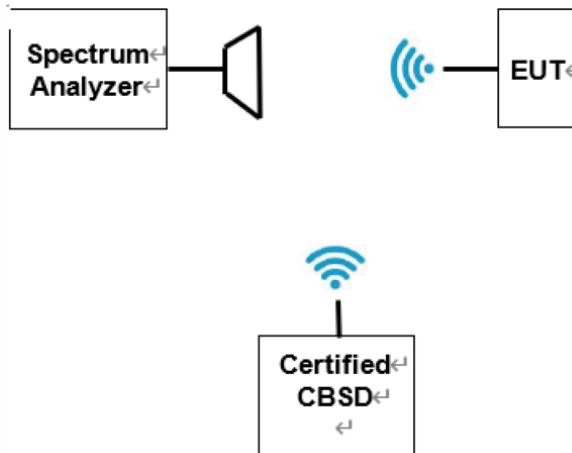
SETUP DIAGRAM FOR TESTS (LTE B48 CBSD TEST SETUP)



Remarks:

Certified CBSD – FCC ID: 2AS48SC-220
Connection between Certified CBSD and EUT is conducted method.
EUT is an End User Device (EUD)

SETUP DIAGRAM FOR TESTS (5G NR n48 CBSD TEST SETUP)



Remarks:

Certified CBSD – FCC ID: PIDAS2900
Connection between Certified CBSD and EUT is radiated method.
EUT is an End User Device (EUD)

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB-4	00164753	2025-01-17
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2026-07-23
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2025-10-06
Preamplifier	ETS	3116C-PA	00168841	2025-07-25
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	750	2026-07-30
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	845	2026-07-30
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	749	2026-08-12
Antenna, Horn, 18 GHz	ETS	3115	00167211	2026-07-17
Antenna, Horn, 18 GHz	ETS	3115	00161451	2026-07-17
Antenna, Horn, 18 GHz	ETS	3117	00168724	2026-07-17
Antenna, Horn, 18 GHz	ETS	3117	00168717	2026-07-17
Communications Test Set	R&S	CMW500	169797	2025-07-23
DC Power Supply	Agilent / HP	E3640A	MY54226395	2025-07-24
Preamplifier, 1000 MHz	Sonoma	310N	341282	2025-07-22
Preamplifier, 1000 MHz	Sonoma	310N	370599	2025-07-22
Preamplifier, 1000 MHz	Sonoma	310N	351741	2025-07-22
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2025-07-23
Preamplifier, 18 GHz	B&Z Technologies, LLC	BZR-01001800-231040-182020	28451	2025-07-22
Preamplifier, 18 GHz	B&Z Technologies, LLC	BZR-01001800-231040-181515	23576	2025-07-25
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2025-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2025-01-03
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY57143717	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2025-07-22
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2025-07-23
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2025-07-23
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2025-07-23
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2025-07-23
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2025-07-23
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2025-07-23
Attenuator	PASTERNAK	PE7087-10	A009	2025-07-23
Attenuator	PASTERNAK	PE7087-10	A001	2025-07-23
Attenuator	PASTERNAK	PE7087-10	A008	2025-07-23
Attenuator	PASTERNAK	PE7004-10	2	2025-07-23
Attenuator	PASTERNAK	PE7395-10	A011	2025-07-25
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-07
Temperature Chamber	ESPEC	SH-642	93001109	2025-07-23
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2025-01-03
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2025-01-03
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510655	2025-01-03
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 3.4	
Radiated software	UL	UL EMC	Ver 9.5	
Antenna port test software (5G NR FR1)	UL	UL iM	Ver 1.06	

CBSD Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Spectrum Analyzer, EXA	Agilent (Keysight) Technologies	N9010A	MY54200580	2025-07-23
Step Attenuator	Keysight	8494B	MY42155321	2025-07-24
Directional Coupler	KRYTAR	1850	164429	2025-07-24

CBSD support software and equipment			
Description	Manufacturer	Model	Version Number
Laptop (SAS – WINNForum Test Harness)	SAMSUNG	NT550XDA-KC58G	2.0
Laptop for n48 CBSD connection	HP	HP EliteBook 830 G5	-
Laptop for n48 CBSD connection	DELL	Latitude 5520	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Bandwidth(99%)	N/A	Conducted	Complies
2.1046	Conducted output power	N/A		Complies
2.1051 96.41(e)(ii)	Out of band emissions	Section 9.2 & 9.3		Complies
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		Complies
96.47	End user device additional requirements (CBSD Protocol)	Section 8.7		Complies
96.41(b)	Equivalent Isotropic Radiated Power	23 dBm/10 MHz	Radiated	Complies
2.1053 96.41(e)	Radiated Spurious Emission	-40 dBm/MHz		Complies

8. CONDUCTED RESULTES

8.1. CONDUCTED AND EIRP VERIFICATION

Test Procedurer

TIA-603-E Clause 2.2.17
KDB 971168 Section 5.6

$$\text{EIRP} = P_{\text{Meas}} + G_{\text{T}} - L_{\text{C}}$$

where:

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;

G_{T} = gain of the transmitting antenna, in dBi (EIRP);

L_{C} = signal attenuation in the connecting cable between the transmitter and antenna, in dB.2

RESULTS

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

LTE Band 48 (ANT E)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				55340 3560 MHz	55990 3625 MHz	56640 3690 MHz		
20 MHz	QPSK	1	0	20.37	20.69	21.03	0.0	21.5
		1	49	20.58	21.02	21.09	0.0	21.5
		1	99	20.44	20.74	20.95	0.0	21.5
		50	0	20.37	20.66	20.99	0.5	21.0
		50	24	20.37	20.76	20.85	0.5	21.0
		50	50	20.38	20.68	20.86	0.5	21.0
		100	0	20.33	20.70	20.84	0.5	21.0
	16QAM	1	0	20.25	20.63	20.93	0.5	21.0
		1	49	20.25	20.61	20.91	0.5	21.0
		1	99	20.25	20.60	20.88	0.5	21.0
		50	0	20.29	20.61	20.90	0.5	21.0
		50	24	20.28	20.64	20.89	0.5	21.0
		50	50	20.23	20.60	20.95	0.5	21.0
		100	0	20.30	20.59	20.91	0.5	21.0
	64QAM	1	0	20.27	20.64	20.87	0.5	21.0
		1	49	20.28	20.65	20.91	0.5	21.0
		1	99	20.27	20.59	20.89	0.5	21.0
		50	0	19.63	20.22	20.48	1.0	20.5
		50	24	19.82	20.11	20.48	1.0	20.5
		50	50	19.85	20.13	20.45	1.0	20.5
		100	0	19.81	20.06	20.48	1.0	20.5
	256QAM	1	0	17.75	18.22	18.59	2.5	19.0
		1	49	17.63	18.26	18.85	2.5	19.0
		1	99	17.96	18.05	18.63	2.5	19.0
		50	0	17.81	18.06	18.66	2.5	19.0
		50	24	17.84	18.23	18.31	2.5	19.0
		50	50	17.85	18.07	18.53	2.5	19.0
		100	0	17.69	18.08	18.49	2.5	19.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				55315 3557.5 MHz	55990 3625 MHz	56665 3692.5 MHz		
15 MHz	QPSK	1	0	20.29	20.56	20.96	0.0	21.5
		1	37	20.14	20.76	21.08	0.0	21.5
		1	74	20.30	20.58	20.89	0.0	21.5
		36	0	20.32	20.69	20.98	0.5	21.0
		36	20	20.37	20.74	20.99	0.5	21.0
		36	39	20.33	20.68	20.98	0.5	21.0
		75	0	20.33	20.69	20.99	0.5	21.0
	16QAM	1	0	20.32	20.99	20.99	0.5	21.0
		1	37	20.53	20.95	20.94	0.5	21.0
		1	74	20.44	20.96	20.92	0.5	21.0
		36	0	20.39	20.67	20.99	0.5	21.0
		36	20	20.37	20.64	20.97	0.5	21.0
		36	39	20.38	20.65	20.87	0.5	21.0
		75	0	20.32	20.71	20.92	0.5	21.0
	64QAM	1	0	20.60	20.64	20.91	0.5	21.0
		1	37	20.70	20.89	20.91	0.5	21.0
		1	74	20.53	20.68	20.92	0.5	21.0
		36	0	19.79	20.18	20.47	1.0	20.5
		36	20	19.89	20.21	20.45	1.0	20.5
		36	39	19.82	20.15	20.48	1.0	20.5
		75	0	19.83	20.19	20.44	1.0	20.5
	256QAM	1	0	17.74	18.16	18.69	2.5	19.0
		1	37	17.73	18.30	18.91	2.5	19.0
		1	74	17.76	18.15	18.75	2.5	19.0
		36	0	17.82	18.17	18.47	2.5	19.0
		36	20	17.85	18.16	18.51	2.5	19.0
		36	39	17.84	18.17	18.46	2.5	19.0
		75	0	17.82	18.18	18.47	2.5	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				55290	55990	56690		
				3555 MHz	3625 MHz	3695 MHz		
10 MHz	QPSK	1	0	20.33	20.60	20.94	0.0	21.5
		1	25	20.27	20.54	20.86	0.0	21.5
		1	49	20.37	20.61	20.84	0.0	21.5
		25	0	20.32	20.63	20.96	0.5	21.0
		25	12	20.27	20.65	20.92	0.5	21.0
		25	25	20.31	20.62	20.96	0.5	21.0
	16QAM	50	0	20.31	20.65	20.94	0.5	21.0
		1	0	20.50	20.80	20.90	0.5	21.0
		1	25	20.48	20.81	20.79	0.5	21.0
		1	49	20.64	20.81	20.85	0.5	21.0
		25	0	20.30	20.60	20.94	0.5	21.0
		25	12	20.31	20.63	20.94	0.5	21.0
	64QAM	25	25	20.31	20.61	20.93	0.5	21.0
		50	0	20.31	20.66	20.92	0.5	21.0
		1	0	20.19	20.65	20.83	0.5	21.0
		1	25	20.17	20.60	20.72	0.5	21.0
		1	49	20.23	20.59	20.86	0.5	21.0
		25	0	19.81	20.12	20.47	1.0	20.5
5 MHz	QPSK	25	12	19.83	20.14	20.45	1.0	20.5
		25	25	19.85	20.16	20.48	1.0	20.5
		50	0	19.80	20.17	20.46	1.0	20.5
	16QAM	1	0	17.87	18.09	18.65	2.5	19.0
		1	25	17.88	18.04	18.52	2.5	19.0
		1	49	17.91	18.12	18.64	2.5	19.0
	256QAM	25	0	17.78	18.15	18.47	2.5	19.0
		25	12	17.79	18.15	18.47	2.5	19.0
		25	25	17.80	18.15	18.46	2.5	19.0
		50	0	17.80	18.12	18.42	2.5	19.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				55265	55990	56715		
				3552.5 MHz	3625 MHz	3697.5 MHz		
5 MHz	QPSK	1	0	20.26	20.73	20.97	0.0	21.5
		1	12	20.24	20.64	21.03	0.0	21.5
		1	24	20.35	20.65	20.90	0.0	21.5
		12	0	20.35	20.64	20.95	0.5	21.0
		12	7	20.31	20.63	20.94	0.5	21.0
		12	13	20.33	20.64	20.97	0.5	21.0
	16QAM	25	0	20.32	20.64	20.92	0.5	21.0
		1	0	20.07	20.86	20.94	0.5	21.0
		1	12	20.24	20.87	20.99	0.5	21.0
		1	24	20.06	20.84	20.93	0.5	21.0
		12	0	20.32	20.68	20.96	0.5	21.0
		12	7	20.32	20.58	20.97	0.5	21.0
	64QAM	12	13	20.36	20.67	20.94	0.5	21.0
		25	0	20.35	20.67	20.87	0.5	21.0
		1	0	20.31	20.90	20.93	0.5	21.0
		1	12	20.34	20.97	20.95	0.5	21.0
		1	24	20.30	20.96	20.97	0.5	21.0
		12	0	19.84	20.04	20.47	1.0	20.5
	256QAM	12	7	19.82	20.09	20.48	1.0	20.5
		12	13	19.82	20.10	20.50	1.0	20.5
		25	0	19.80	20.11	20.40	1.0	20.5
		1	0	18.16	18.57	18.48	2.5	19.0
		1	12	17.96	18.57	18.47	2.5	19.0
		1	24	18.17	18.60	18.47	2.5	19.0
	256QAM	12	0	17.75	18.13	18.46	2.5	19.0
		12	7	17.82	18.15	18.44	2.5	19.0
		12	13	17.78	18.17	18.43	2.5	19.0
		25	0	17.86	18.13	18.37	2.5	19.0

LTE Band 48C (UL CA) (ANT E)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
40MHz (20MHz / 20MHz)	3560.00	3579.80	1	99	1	0	20.18	19.12
			1	0	1	99	11.35	12.13
			100	0	100	0	18.15	16.73
	3615.10	3634.90	1	99	1	0	20.82	19.50
			1	0	1	99	12.29	12.59
			100	0	100	0	18.42	17.30
	3670.20	3690.00	1	99	1	0	19.88	18.81
			1	0	1	99	11.83	11.92
			100	0	100	0	17.89	16.99
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
35MHz (15MHz / 20MHz)	3557.50	3574.60	1	74	1	0	19.70	19.21
			1	0	1	99	11.97	12.11
			75	0	100	0	18.11	17.16
	3615.20	3632.30	1	74	1	0	20.03	19.38
			1	0	1	99	12.21	11.96
			75	0	100	0	18.45	17.67
	3672.90	3690.00	1	74	1	0	19.98	18.99
			1	0	1	99	11.81	11.96
			75	0	100	0	17.94	16.90
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
30MHz (10MHz / 20MHz)	3555.00	3569.40	1	49	1	0	20.08	18.46
			1	0	1	99	10.47	11.04
			50	0	100	0	17.87	16.20
	3615.40	3629.80	1	49	1	0	20.62	18.48
			1	0	1	99	12.47	12.43
			50	0	100	0	18.55	17.46
	3675.60	3690.00	1	49	1	0	19.92	18.98
			1	0	1	99	11.82	11.88
			50	0	100	0	17.89	16.84
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
25MHz (5MHz / 20MHz)	3552.50	3564.20	1	24	1	0	19.99	18.71
			1	0	1	99	11.39	11.61
			25	0	100	0	17.98	16.96
	3615.60	3627.30	1	24	1	0	20.63	19.17
			1	0	1	99	12.43	12.32
			25	0	100	0	18.27	17.46
	3678.30	3690.00	1	24	1	0	19.83	18.88
			1	0	1	99	11.83	11.78
			25	0	100	0	17.88	16.85

NR Band n48 (ANT E)

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
					Measured Pwr (dBm)			MPR	Tune-up Limit
					638000	641666	645332		
					3570.00 MHz	3624.99 MHz	3679.98 MHz		
40 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	0	20.21	20.42	20.37	0.5	24.5
			1	1	20.21	20.40	20.36	0.0	25.0
			1	52	20.14	20.43	20.71	0.0	25.0
			1	104	20.37	20.49	20.78	0.0	25.0
			1	105	20.32	20.55	20.77	0.5	24.5
			50	0	20.13	20.41	20.56	0.5	24.5
			50	28	20.21	20.53	20.77	0.0	25.0
			50	56	20.28	20.61	20.87	0.5	24.5
			100	0	20.12	20.51	20.73	0.5	24.5
		QPSK	1	0	20.13	20.35	20.38	1.0	24.0
			1	1	20.16	20.38	20.47	0.0	25.0
			1	52	20.18	20.56	20.82	0.0	25.0
			1	104	20.31	20.54	20.81	0.0	25.0
			1	105	20.31	20.55	20.80	1.0	24.0
			50	0	20.14	20.45	20.58	1.0	24.0
			50	28	20.18	20.57	20.78	0.0	25.0
			50	56	20.26	20.57	20.82	1.0	24.0
			100	0	20.09	20.52	20.75	1.0	24.0
		16QAM	1	0	19.67	20.02	20.01	2.0	23.0
			1	1	20.09	20.46	20.34	1.0	24.0
			1	52	20.24	20.42	20.76	1.0	24.0
			1	104	20.32	20.60	20.77	1.0	24.0
			1	105	20.00	20.13	20.44	2.0	23.0
			50	0	19.64	19.95	20.10	2.0	23.0
			50	28	20.21	20.57	20.76	1.0	24.0
			50	56	19.79	20.11	20.37	2.0	23.0
			100	0	19.63	20.05	20.25	2.0	23.0
		64QAM	1	1	19.10	19.25	19.50	2.5	22.5
		256QAM	1	1	17.11	17.36	17.29	4.5	20.5
	CP-OFDM	QPSK	1	0	18.71	18.97	18.92	3.0	22.0
			1	1	20.18	20.40	20.45	1.5	23.5
			1	52	20.28	20.63	20.73	1.5	23.5
			1	104	20.41	20.60	20.95	1.5	23.5
			1	105	18.78	19.03	19.35	3.0	22.0
			50	0	18.62	18.92	19.07	3.0	22.0
			50	28	18.72	19.06	19.28	1.5	23.5
			50	56	18.77	19.06	19.36	3.0	22.0
			100	0	18.62	19.00	19.26	3.0	22.0
		16QAM	1	0	18.46	18.75	18.68	3.0	22.0
			1	1	19.67	19.58	19.68	2.0	23.0
			1	52	19.70	19.72	20.40	2.0	23.0
			1	104	19.91	19.77	20.30	2.0	23.0
			1	105	18.97	18.93	19.43	3.0	22.0
			50	0	18.67	18.94	19.07	3.0	22.0
			50	28	18.64	18.98	19.26	2.0	23.0
			50	56	18.73	19.09	19.37	3.0	22.0
			100	0	18.62	18.98	19.26	3.0	22.0
		64QAM	1	1	18.20	18.74	18.24	3.5	21.5
		256QAM	1	1	15.33	15.41	15.51	6.5	18.5

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					637668	641666	645666		
					3565.02 MHz	3624.99 MHz	3684.99 MHz		
30 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	0	20.24	20.65	20.46	0.5	24.5
			1	1	20.31	20.46	20.50	0.0	25.0
			1	39	20.22	20.54	20.85	0.0	25.0
			1	76	20.27	20.63	20.87	0.0	25.0
			1	77	20.36	20.69	20.78	0.5	24.5
			36	0	20.10	20.51	20.80	0.5	24.5
			36	21	20.17	20.55	20.88	0.0	25.0
			36	42	20.33	20.69	20.90	0.5	24.5
			75	0	20.29	20.70	20.88	0.5	24.5
		QPSK	1	0	20.41	20.75	20.92	1.0	24.0
			1	1	20.56	20.79	20.96	0.0	25.0
			1	39	20.46	21.27	21.44	0.0	25.0
			1	76	20.58	21.36	21.33	0.0	25.0
			1	77	20.13	20.89	20.86	1.0	24.0
			36	0	20.44	20.98	21.10	1.0	24.0
			36	21	20.38	21.12	20.99	0.0	25.0
			36	42	20.37	21.22	20.95	1.0	24.0
			75	0	20.36	21.22	21.32	1.0	24.0
		16QAM	1	1	20.06	21.19	20.79	1.0	24.0
			1	39	20.41	21.06	21.34	1.0	24.0
			1	76	20.86	21.41	21.42	1.0	24.0
		64QAM	1	1	19.34	19.58	19.83	2.5	22.5
		256QAM	1	1	17.84	17.81	17.78	4.5	20.5
	CP-OFDM	QPSK	1	1	20.46	20.84	21.00	1.5	23.5
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					637333	641666	646000		
					3560.00 MHz	3624.99 MHz	3690.00 MHz		
20 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	0	20.09	20.52	20.67	0.5	24.5
			1	1	20.27	20.45	20.70	0.0	25.0
			1	26	20.11	20.58	20.89	0.0	25.0
			1	49	20.19	20.57	20.89	0.0	25.0
			1	50	20.45	20.73	20.79	0.5	24.5
			25	0	20.26	20.57	20.86	0.5	24.5
			25	13	20.24	20.60	20.90	0.0	25.0
			25	26	20.33	20.65	20.87	0.5	24.5
			50	0	20.12	20.54	20.94	0.5	24.5
		QPSK	1	0	20.73	21.07	20.66	1.0	24.0
			1	1	20.85	21.07	20.74	0.0	25.0
			1	26	20.60	21.37	20.99	0.0	25.0
			1	49	20.68	21.52	21.12	0.0	25.0
			1	50	20.23	21.15	20.49	1.0	24.0
			25	0	20.59	21.24	20.90	1.0	24.0
			25	13	20.59	21.29	20.72	0.0	25.0
			25	26	20.56	21.35	20.64	1.0	24.0
			50	0	20.52	21.40	20.98	1.0	24.0
		16QAM	1	1	20.74	21.10	20.48	1.0	24.0
			1	26	20.22	21.32	20.91	1.0	24.0
			1	49	20.86	21.47	21.23	1.0	24.0
		64QAM	1	1	19.37	19.81	19.25	2.5	22.5
		256QAM	1	1	17.91	17.89	17.49	4.5	20.5
	CP-OFDM	QPSK	1	1	20.75	20.94	20.70	1.5	23.5

BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					637168	641666	646166		
					3557.52 MHz	3624.99 MHz	3692.49 MHz		
15 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	0	20.34	20.22	21.12	0.5	24.5
			1	1	20.40	20.32	21.05	0.0	25.0
			1	19	20.21	20.38	21.24	0.0	25.0
			1	36	20.30	20.28	21.10	0.0	25.0
			1	37	20.27	20.44	21.13	0.5	24.5
			18	0	20.34	20.45	21.15	0.5	24.5
			18	10	20.32	20.44	21.11	0.0	25.0
			18	20	20.34	20.40	21.18	0.5	24.5
			36	0	20.25	20.36	21.18	0.5	24.5
		QPSK	1	0	20.18	20.44	20.96	1.0	24.0
			1	1	20.22	20.52	20.87	0.0	25.0
			1	19	20.10	20.48	21.26	0.0	25.0
			1	36	20.07	20.52	20.95	0.0	25.0
			1	37	20.03	20.67	20.97	1.0	24.0
			18	0	20.16	20.56	21.04	1.0	24.0
			18	10	20.17	20.57	20.97	0.0	25.0
			18	20	20.16	20.59	21.08	1.0	24.0
			36	0	20.20	20.55	21.00	1.0	24.0
		16QAM	1	1	20.60	20.47	20.93	1.0	24.0
			1	19	20.41	20.56	20.94	1.0	24.0
			1	36	20.16	20.70	20.95	1.0	24.0
		64QAM	1	1	18.86	19.75	19.83	2.5	22.5
		256QAM	1	1	17.48	17.17	17.99	4.5	20.5
	CP-OFDM	QPSK	1	1	20.32	20.54	20.97	1.5	23.5
BW (MHz)	Modulation	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
					637000	641666	646332		
					3555.00 MHz	3624.99 MHz	3694.98 MHz		
10 MHz	DFT-s-OFDM	$\pi/2$ BPSK	1	0	20.30	20.32	21.13	0.5	24.5
			1	1	20.42	20.41	21.05	0.0	25.0
			1	12	20.21	20.45	21.20	0.0	25.0
			1	22	20.29	20.41	21.12	0.0	25.0
			1	23	20.26	20.44	21.09	0.5	24.5
			12	0	20.27	20.49	21.18	0.5	24.5
			12	6	20.33	20.45	21.10	0.0	25.0
			12	12	20.37	20.37	21.21	0.5	24.5
		QPSK	24	0	20.37	20.28	21.13	0.5	24.5
			1	0	20.25	20.49	20.92	1.0	24.0
			1	1	20.28	20.52	20.92	0.0	25.0
			1	12	20.17	20.58	20.95	0.0	25.0
			1	22	20.18	20.52	20.87	0.0	25.0
			1	23	20.14	20.61	20.93	1.0	24.0
			12	0	20.24	20.53	20.93	1.0	24.0
			12	6	20.22	20.56	20.91	0.0	25.0
			12	12	20.21	20.56	20.93	1.0	24.0
		16QAM	24	0	20.22	20.53	20.94	1.0	24.0
			1	1	20.54	20.45	20.89	1.0	24.0
			1	12	20.16	20.53	20.98	1.0	24.0
			1	22	20.27	20.60	20.86	1.0	24.0
		64QAM	1	1	19.26	19.61	19.94	2.5	22.5
		256QAM	1	1	17.09	17.34	17.91	4.5	20.5
	CP-OFDM	QPSK	1	1	20.32	20.49	20.93	1.5	23.5

NR Band n48 SRS (ANT G, ANT D, ANT F)

Maximum Average Power (dBm) SRS1			Tune-up Limit	Maximum Average Power (dBm) SRS2			Tune-up Limit	Maximum Average Power (dBm) SRS3			Tune-up Limit
			21.0				21.0				20.5
40 MHz	638000	641666	645332	40 MHz	638000	641666	645332	40 MHz	638000	641666	645332
	3570 MHz	3624.99 MHz	3679.98 MHz		3570 MHz	3624.99 MHz	3679.98 MHz		3570 MHz	3624.99 MHz	3679.98 MHz
	20.46	19.94	20.24		19.36	19.75	20.55		19.69	19.76	19.88
30 MHz	637668	641666	645666	30 MHz	637668	641666	645666	30 MHz	637668	641666	645666
	3565.02 MHz	3624.99 MHz	3684.99 MHz		3565.02 MHz	3624.99 MHz	3684.99 MHz		3565.02 MHz	3624.99 MHz	3684.99 MHz
	20.86	20.22	20.33		19.72	20.27	20.97		19.82	20.02	19.84
20 MHz	637334	641666	646000	20 MHz	637334	641666	646000	20 MHz	637334	641666	646000
	3560.01 MHz	3624.99 MHz	3690 MHz		3560.01 MHz	3624.99 MHz	3690 MHz		3560.01 MHz	3624.99 MHz	3690 MHz
	20.88	19.91	19.92		19.82	20.11	20.98		19.77	19.72	19.33
15 MHz	637168	641666	646166	15 MHz	637168	641666	646166	15 MHz	637168	641666	646166
	3557.52 MHz	3624.99 MHz	3692.49 MHz		3557.52 MHz	3624.99 MHz	3692.49 MHz		3557.52 MHz	3624.99 MHz	3692.49 MHz
	20.72	19.76	19.80		19.75	20.22	20.91		19.63	19.57	18.62
10 MHz	637000	641666	646332	10 MHz	637000	641666	646332	10 MHz	637000	641666	646332
	3555 MHz	3624.99 MHz	3694.98 MHz		3555 MHz	3624.99 MHz	3694.98 MHz		3555 MHz	3624.99 MHz	3694.98 MHz
	20.63	19.31	19.35		19.52	19.98	20.73		19.77	19.11	18.45

8.2. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

Test Spec

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

NOTE

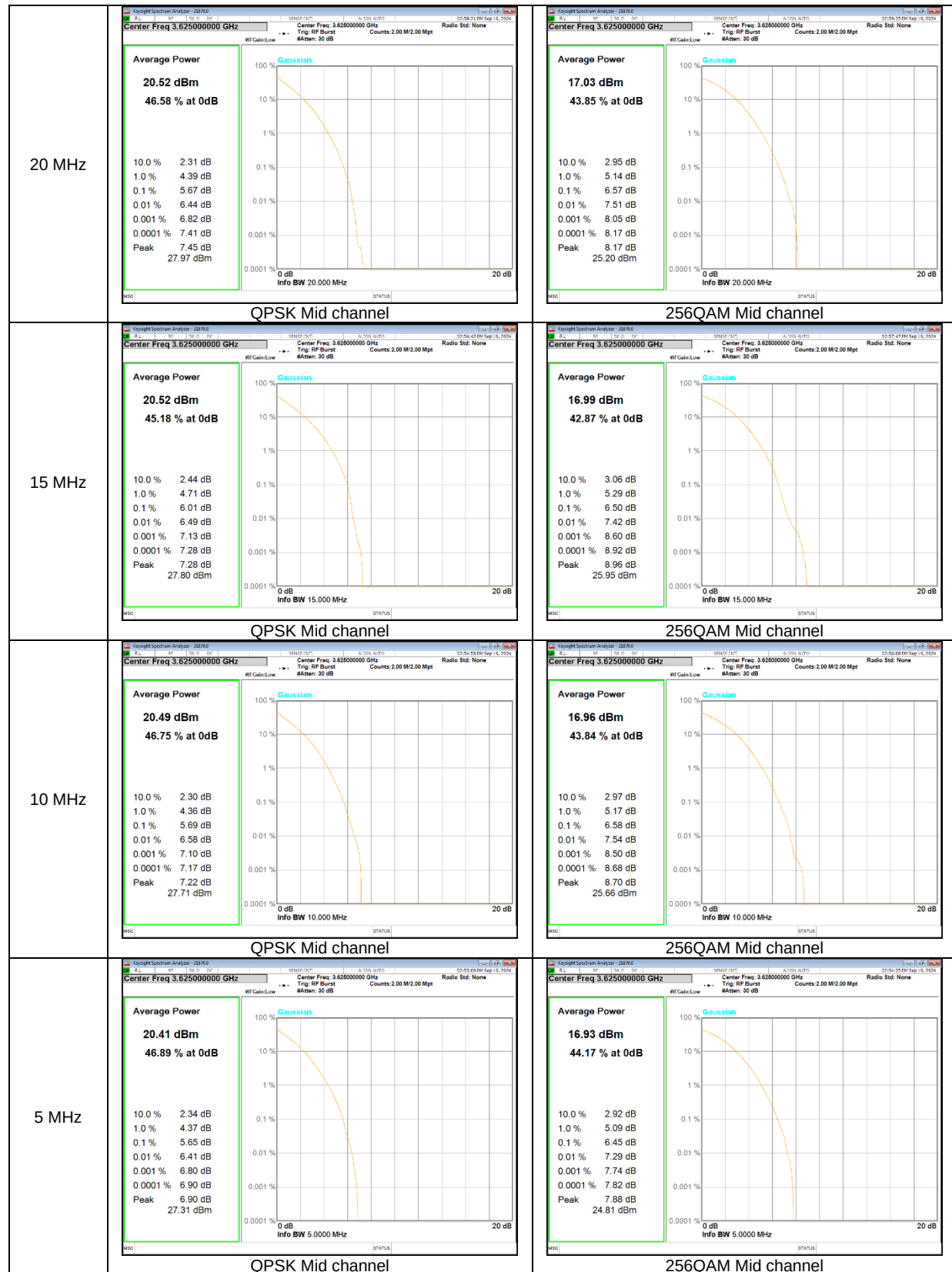
LTE: It was all modulations modulations and worst modulations(QPSK, 256QAM) is reported.
5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

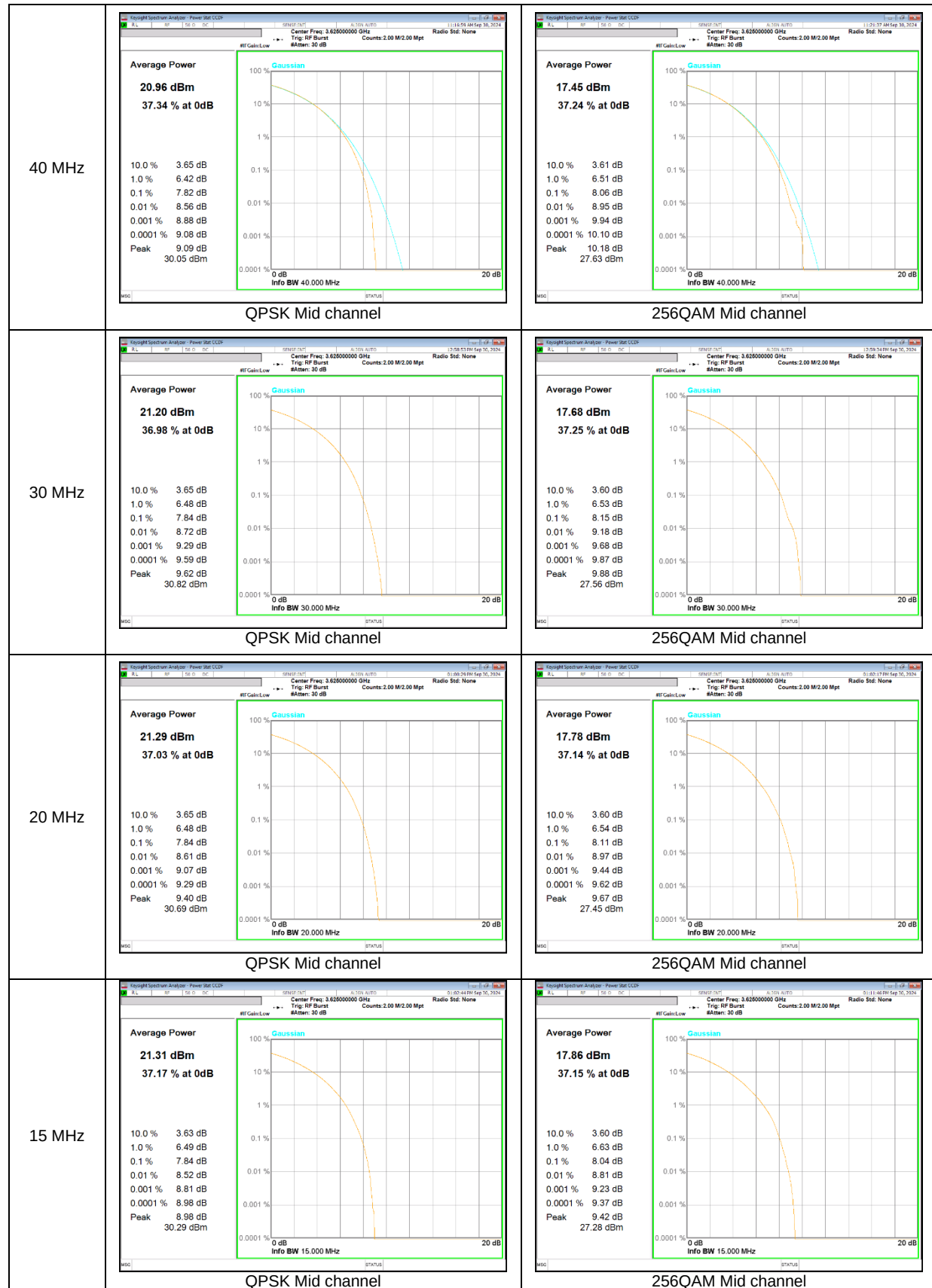
See the following pages.

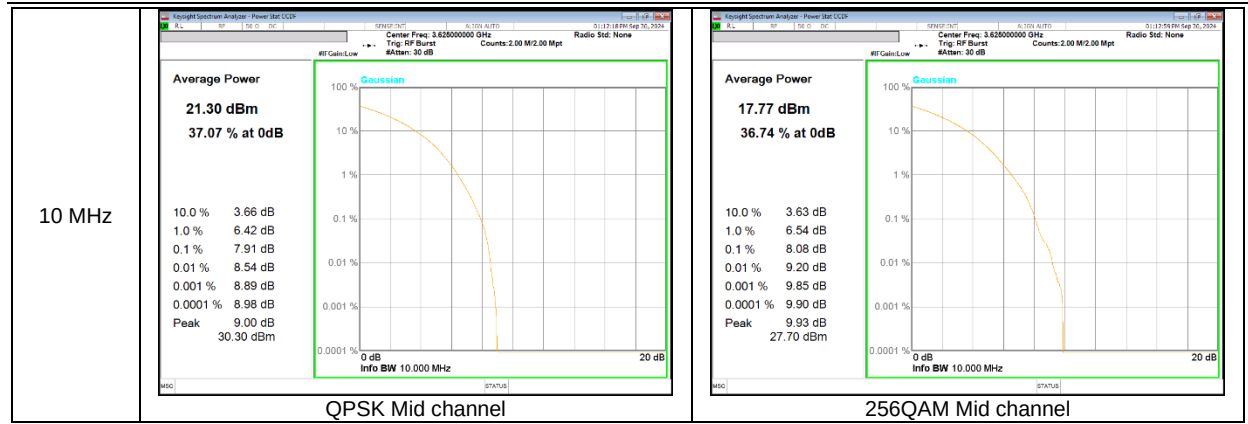
8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE Band 48



NR Band n48 CP-OFDM





8.3. 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 low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

OCCUPIED BANDWIDTH RESULTS

See the following pages.

- LTE Band 48

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B48	20M	QPSK	3625.00	17.905	19.360
		16QAM		17.895	19.420
	15M	QPSK		13.437	14.320
		16QAM		13.417	14.780
	10M	QPSK		8.981	9.808
		16QAM		8.972	10.030
	5M	QPSK		4.507	5.079
		16QAM		4.476	5.234

- LTE Band 48C

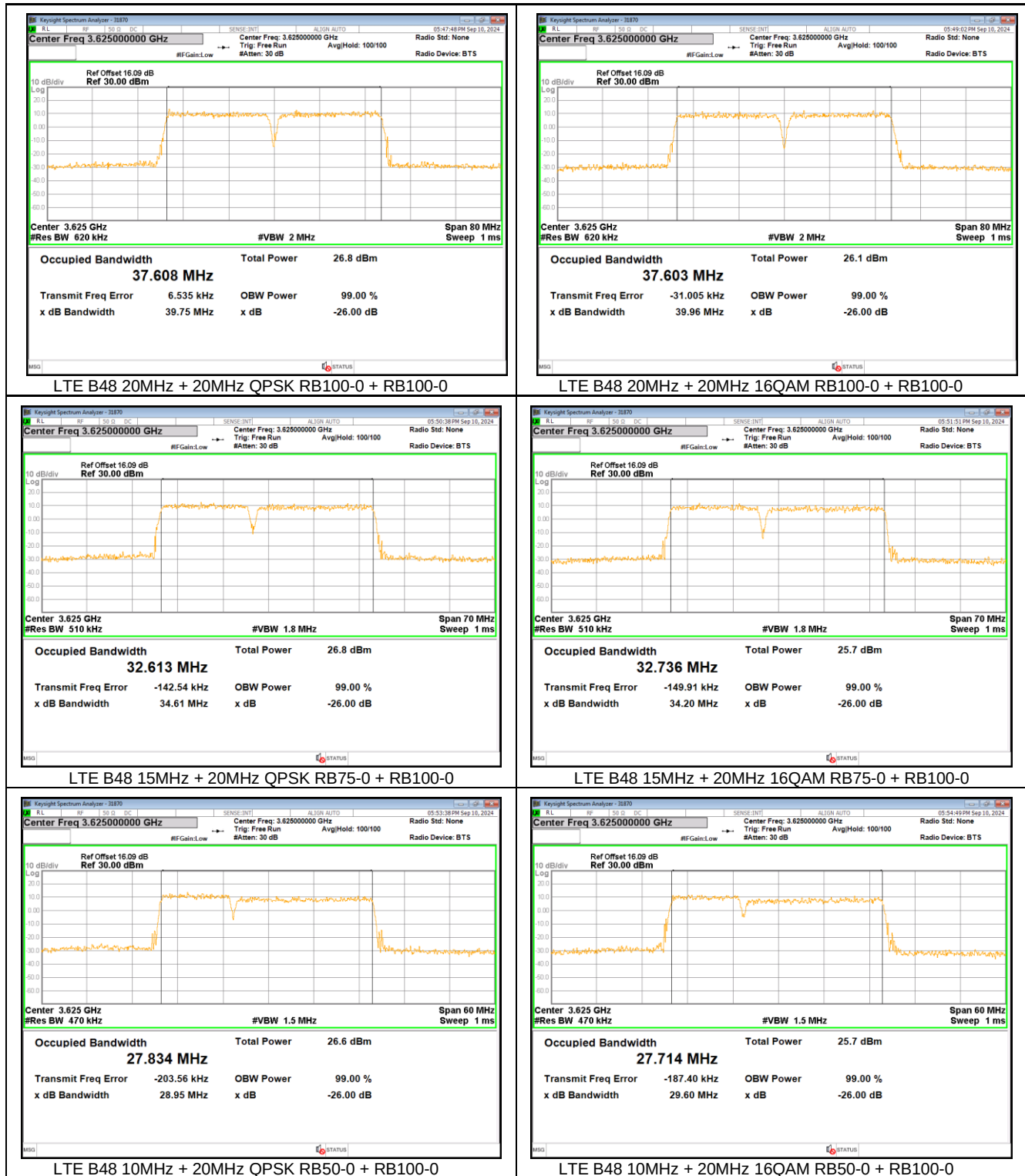
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B48 UL CA	20+20M	QPSK	3625.00	37.608	39.750
		16QAM		37.603	39.960
	15+20M	QPSK		32.613	34.610
		16QAM		32.736	34.200
	10+20M	QPSK		27.834	28.950
		16QAM		27.714	29.600
	5+20M	QPSK		22.890	23.800
		16QAM		22.840	24.100

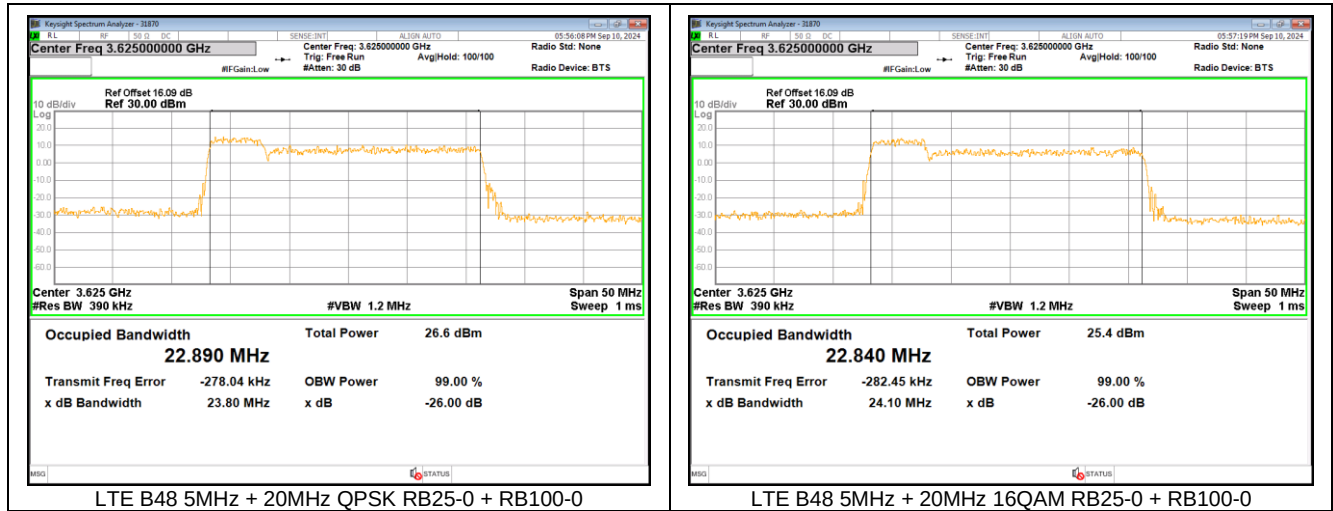
- NR Band n48

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n48	40M	QPSK	3624.99	37.971	40.270
		16QAM		37.952	40.600
	30M	QPSK		27.947	29.500
		16QAM		27.953	29.770
	20M	QPSK		18.256	19.590
		16QAM		18.250	19.910
	15M	QPSK		13.601	15.170
		16QAM		13.635	14.840
	10M	QPSK		8.591	10.050
		16QAM		8.575	9.651

LTE Band 48

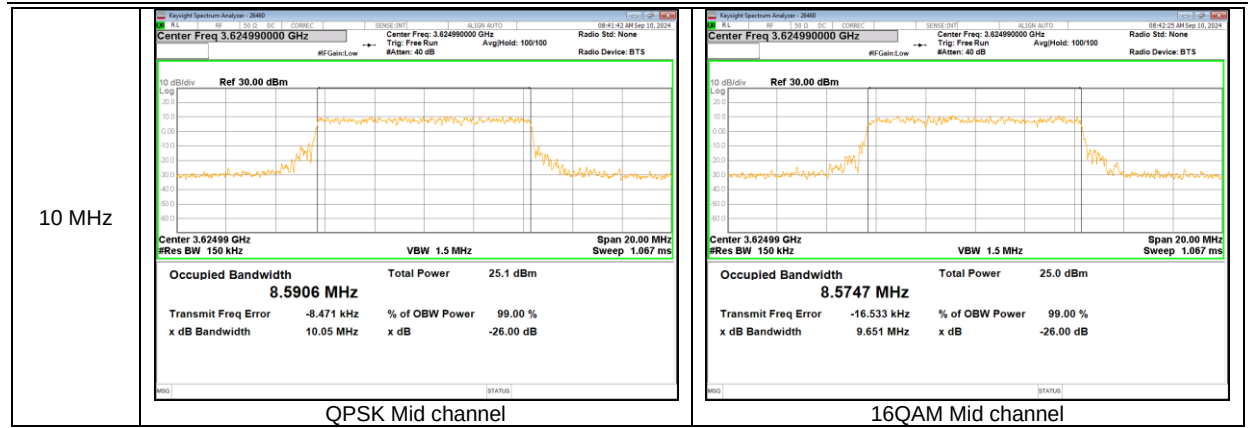


LTE Band 48C (UL CA)



NR Band n48 CP-OFDM





8.4. BAND EDGE EMISSION MASK

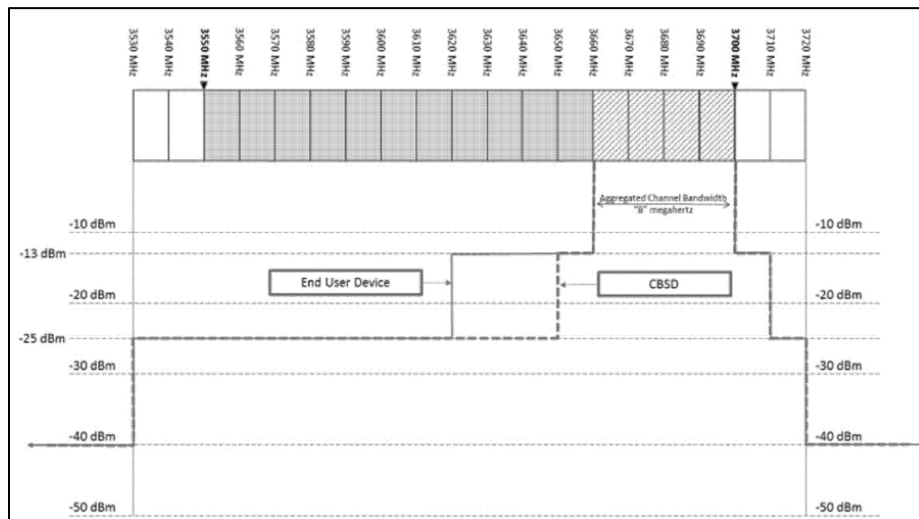
RULE PART(S)

FCC: §2.1051 and §96.41(e)(1) (ii) & (e)(2).

LIMITS

For channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

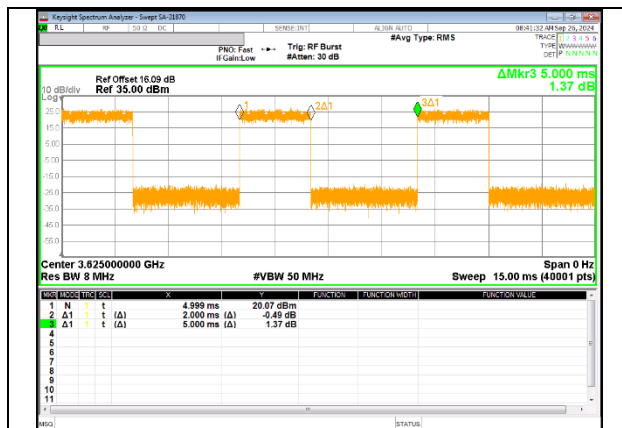


TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The transmitter output was connected to a CMW500 Test Set 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.

- Set the RBW = $1 \sim 1.5$ % of OBW (Typically limited to a minimum RBW of 1% of the OBW)
- Set VBW $\geq 3 \times$ RBW;
- Set span ≥ 1.5 times the OBW;
- Sweep time = Auto;
- Detector = RMS;
- Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- Trace mode = Average (100);



For LTE B48 (Gate trigger off):
 RF Path Loss: 16.09 dB & DCF 4 dB: $10\log(2/5)$
 Measure offset: 16.09 dB + 4 dB = 20.09 dB

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

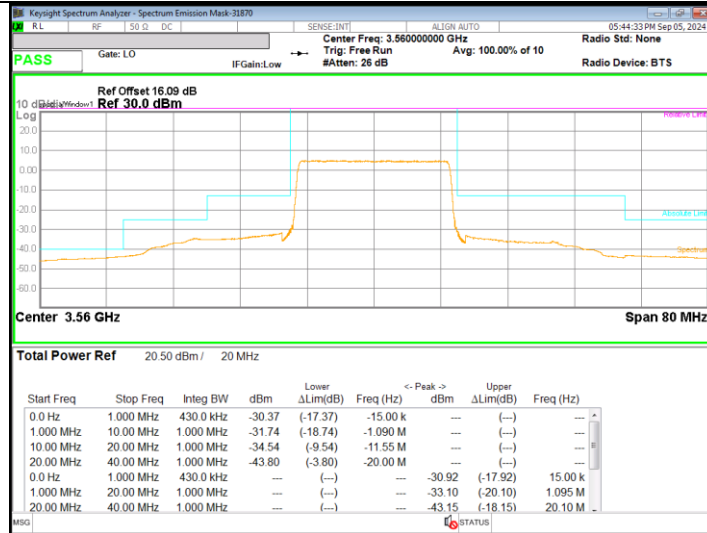
5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Emission Mask: All 1RB Positions (Edge RB, Outer RB, Inner RB) and modulations (QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

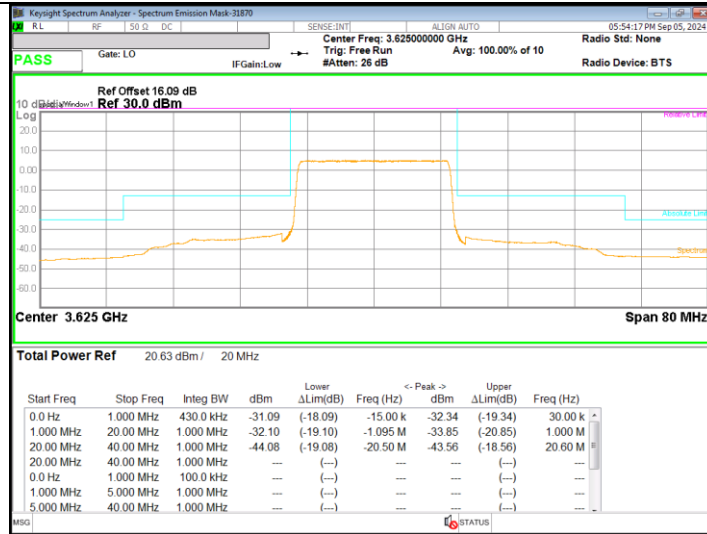
See the following pages.

LTE Band 48

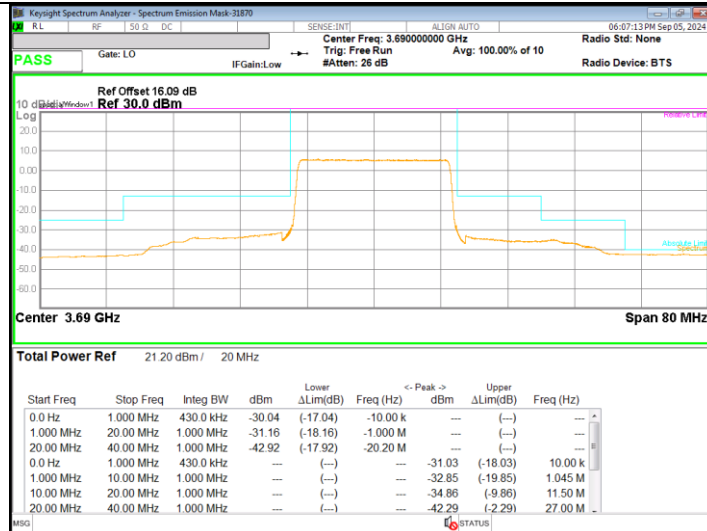
20 MHz
QPSK
FRB



Low channel

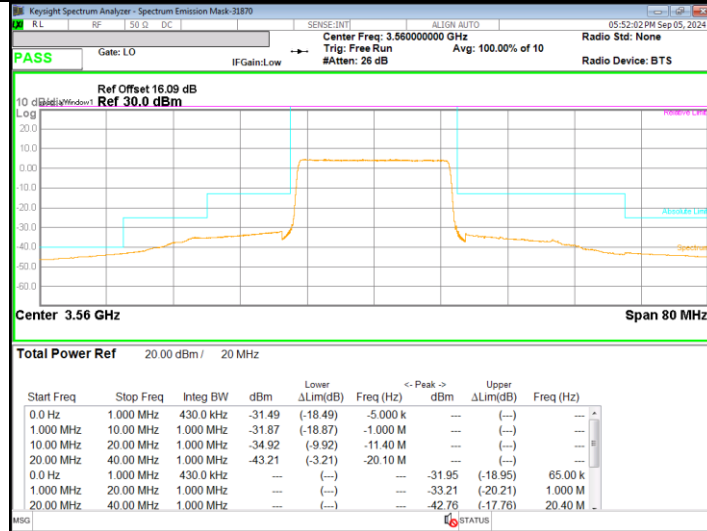


Mid channel

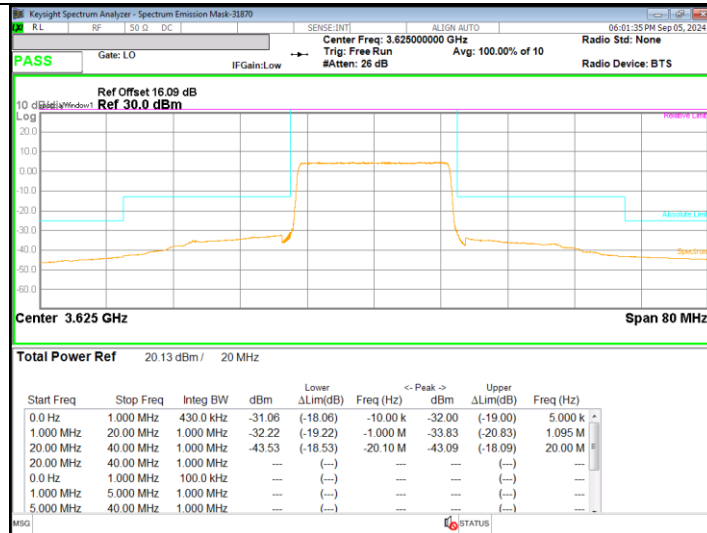


High channel

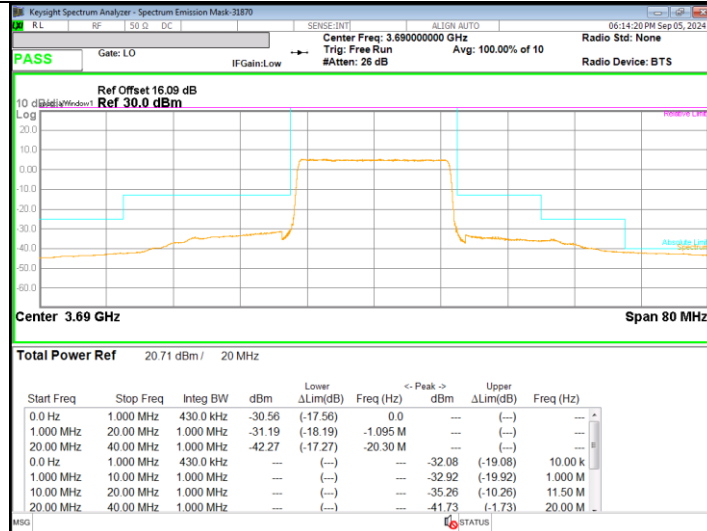
20 MHz
16QAM
FRB



Low channel

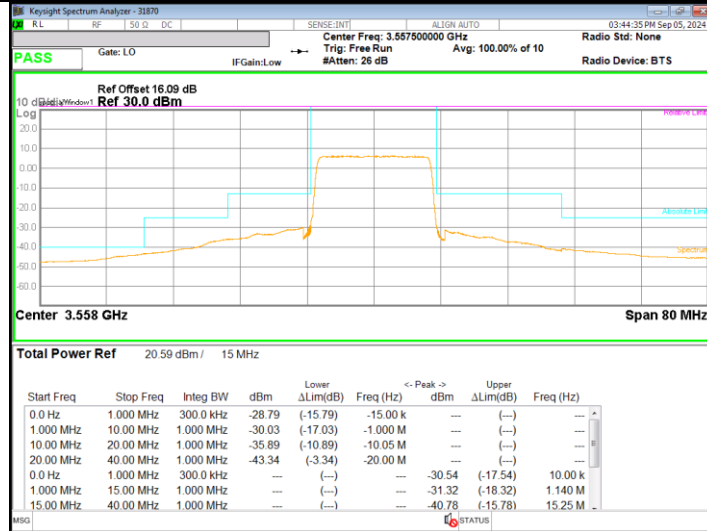


Mid channel



High channel

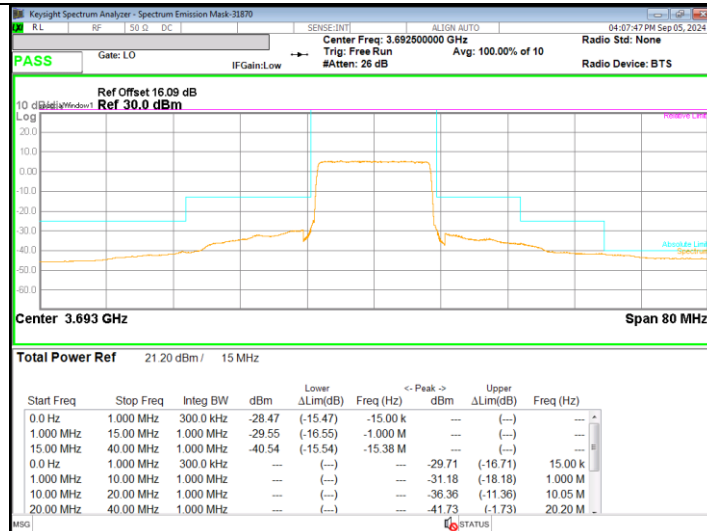
15 MHz
QPSK
FRB



Low channel

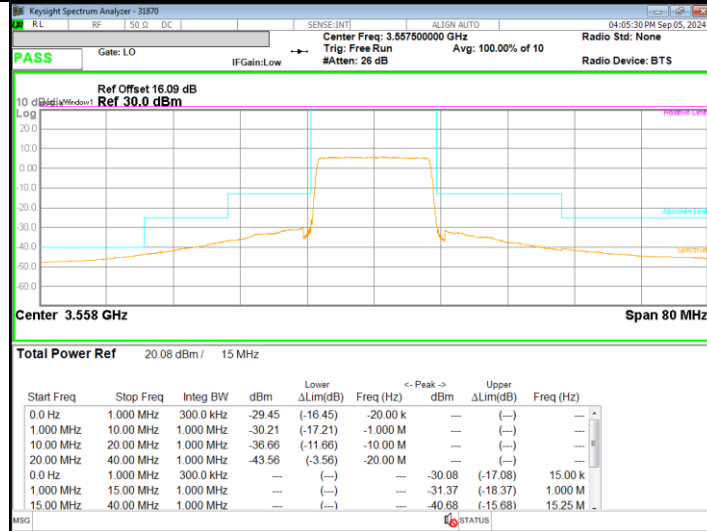


Mid channel

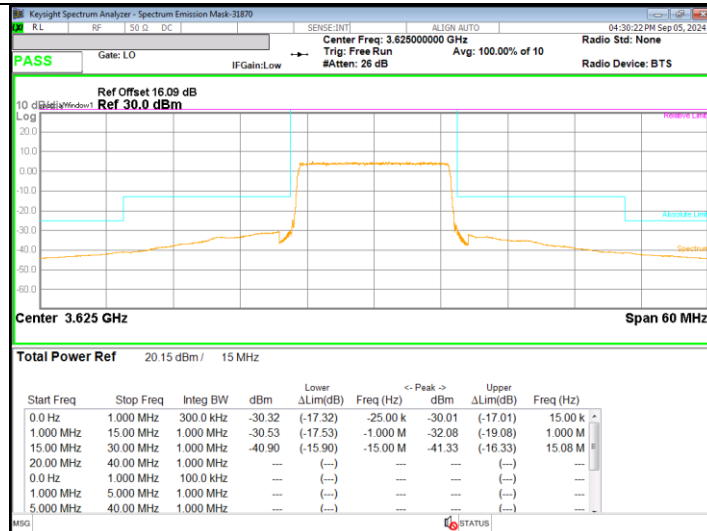


High channel

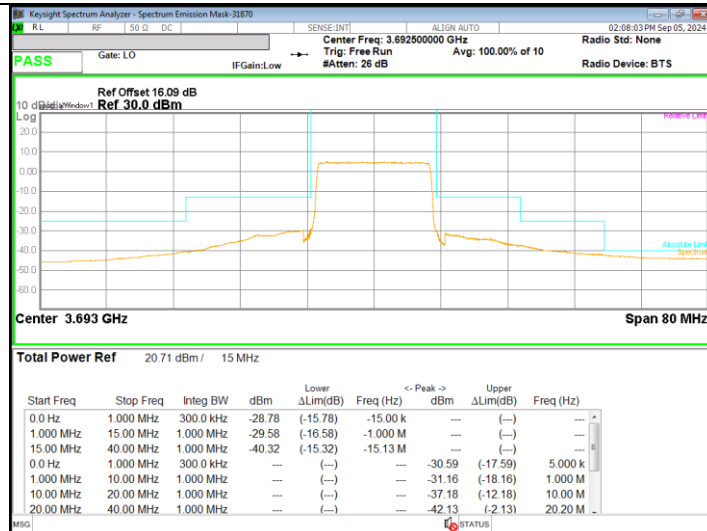
15 MHz
16QAM
FRB



Low channel

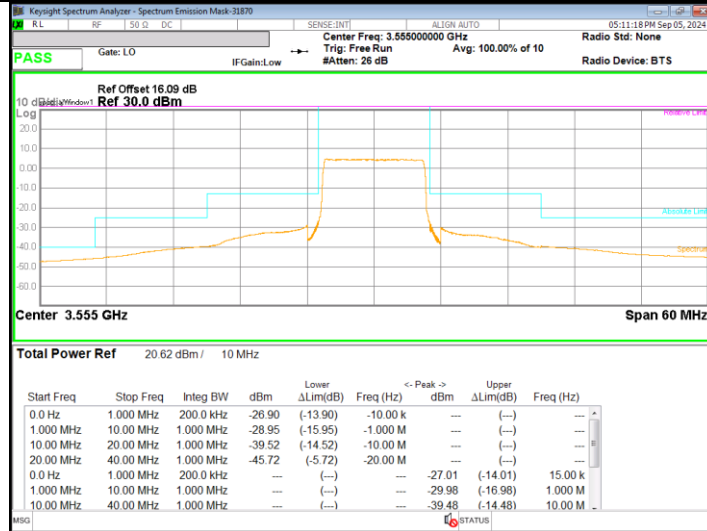


Mid channel

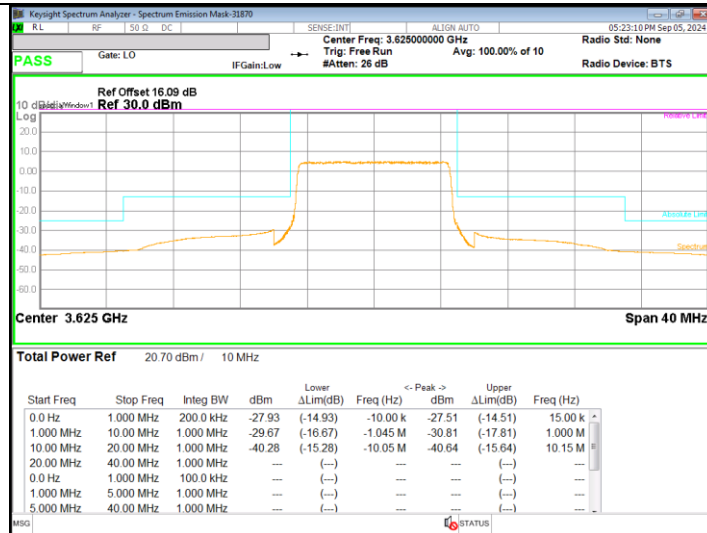


High channel

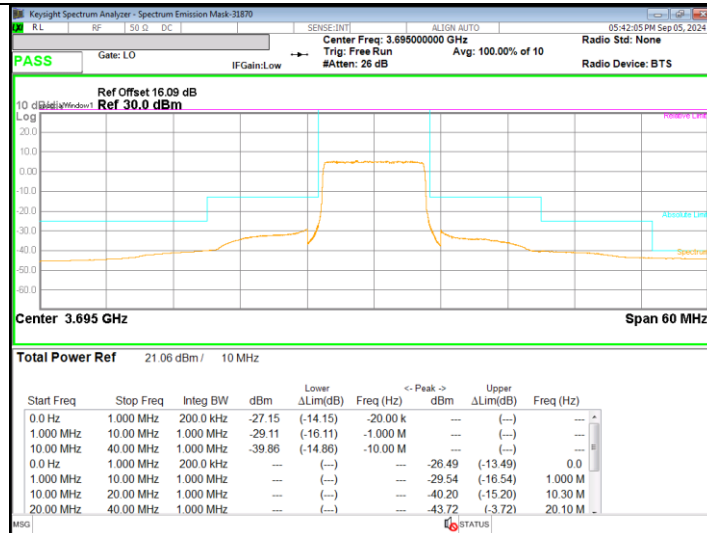
10 MHz
QPSK
FRB



Low channel

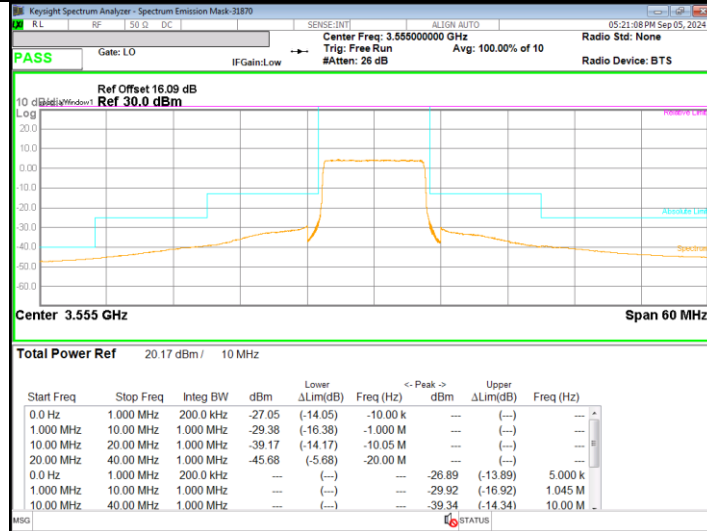


Mid channel

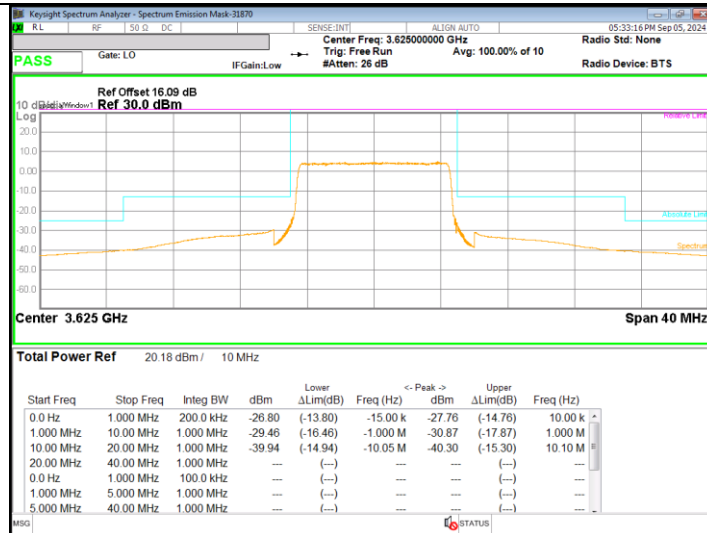


High channel

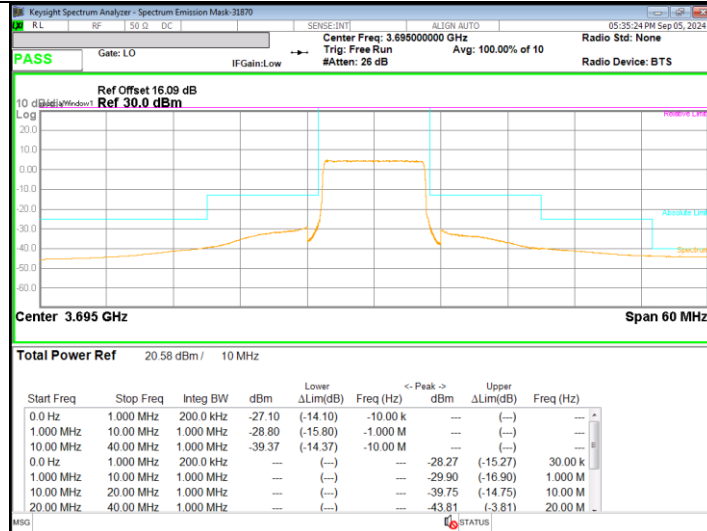
10 MHz
16QAM
FRB



Low channel



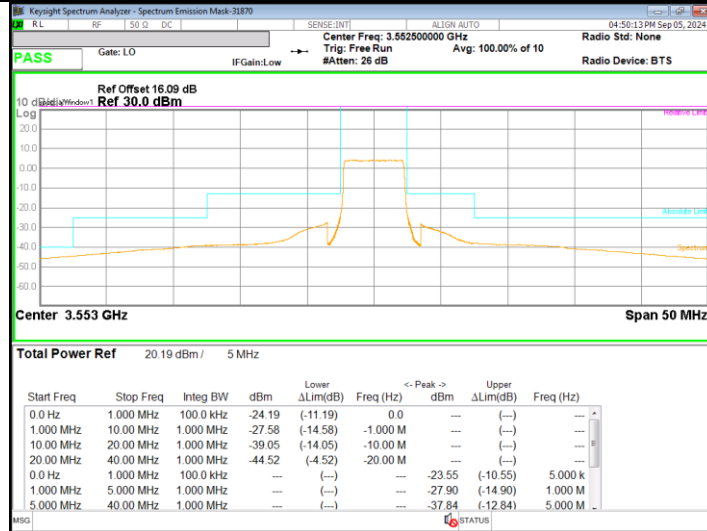
Mid channel



High channel



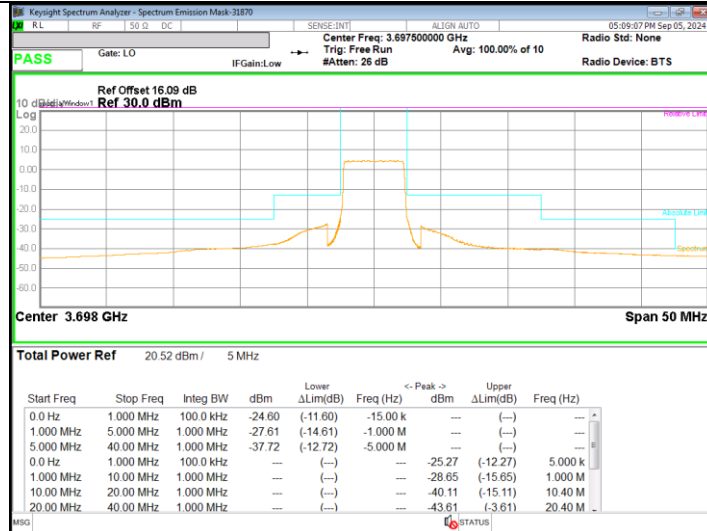
5 MHz
16QAM
FRB



Low channel



Mid channel



High channel

LTE Band 48 1 RB (Worst Case)



5 MHz QPSK 1RB offset 0	High channel
5 MHz QPSK 1RB offset 24	High channel