



CERTIFICATION TEST REPORT

Report Number. : 4790558569-E8V2

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

Model : SM-A236V

FCC ID : A3LSMA236V

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

Test Standard(s) : FCC CFR47 PART 96

Date Of Issue:

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2022-11-11	Initial issue	Yeonhee Lim
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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-A236V
SERIAL NUMBER: 664a124cd8347ece (CONDUCTED);
664a124c26347ece (RADIATED);
DATE TESTED: 2022-10-05 – 2022-11-10;

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
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Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Yeonhee Lim
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UL Korea, Ltd.

2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 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

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	
<input checked="" type="checkbox"/>	Chamber 1(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	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:

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

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	3.02 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, Above 18 GHz	5.58 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 Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

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.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

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

LTE Band 48

FCC Part 96							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 48	3560 - 3690	20	QPSK	22.36	172.19	19.87	97.05
			16QAM	21.46	139.96	18.86	76.91
			64QAM	20.72	118.03		
			256QAM	17.73	59.29		
	3557.5 - 3692.5	15	QPSK	22.37	172.58	20.09	102.09
			16QAM	21.37	137.09	19.20	83.18
			64QAM	20.70	117.49		
			256QAM	17.67	58.48		
	3555 - 3695	10	QPSK	22.59	181.55	19.98	99.54
			16QAM	21.62	145.21	19.26	84.33
			64QAM	20.94	124.17		
			256QAM	17.80	60.26		
	3552.5 - 3697.5	5	QPSK	22.59	181.55	20.36	108.64
			16QAM	21.77	150.31	19.50	89.13
			64QAM	21.17	130.92		
			256QAM	17.96	62.52		

LTE Band 48 Uplink CA

Part 96			
EIRP Limit (dBm)	23.0	ANT Gain (dBi)	-0.36

Frequency Range (MHz)	Bandwidth (MHz)	Modulation	Output Power				
			Conducted Average Power (dBm)	Antenna Gain (dBi)	EIRP Average Power		Margin
					dBm	mW	
3550 - 3700	40MHz (20+20)	QPSK	22.33	-0.36	21.97	157.40	-1.03
		16QAM	21.64		21.28	134.28	-1.72
	35MHz (15+20)	QPSK	22.32		21.96	157.04	-1.04
		16QAM	21.62		21.26	133.66	-1.74
	30MHz (10+20)	QPSK	22.32		21.96	157.04	-1.04
		16QAM	21.63		21.27	133.97	-1.73
	25MHz (5+20)	QPSK	22.32		21.96	157.04	-1.04
		16QAM	21.62		21.26	133.66	-1.74

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)	Peak Gain (dBi)
LTE Band 48 3550 ~ 3700 MHz	-0.36

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 that QPSK and 16QAM results were worst case. However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest power in QPSK.

Highest power setting for each bands				
LTE Band	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48	3552.5	5	1	24
	3625.0		1	24
	3697.5		1	24

Highest power setting for each bands					
LTE Band	Component Carrier	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
48 (Uplink CA)	PCC	3560	20	1	99
	SCC	3579.8	20	1	0

The fundamental and radiated spurious emission were investigated in three orthogonal orientations X, Y and Z, it was determined that below orientation was worst-case orientation for each band.

Band	EIRP			RSE		
	X	Y	Z	X	Y	Z
LTE B48	-	O	-	O	-	-
LTE B48 Uplink CA	-	-	-	O	-	-

Note : For EIRP testing, the EUT didn't attached with travel adapter. But 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	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N3MAH988DK3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A BWE	N/A
Earphone	SAMSUNG	GH59-15055A	EHS64AVFWE	N/A

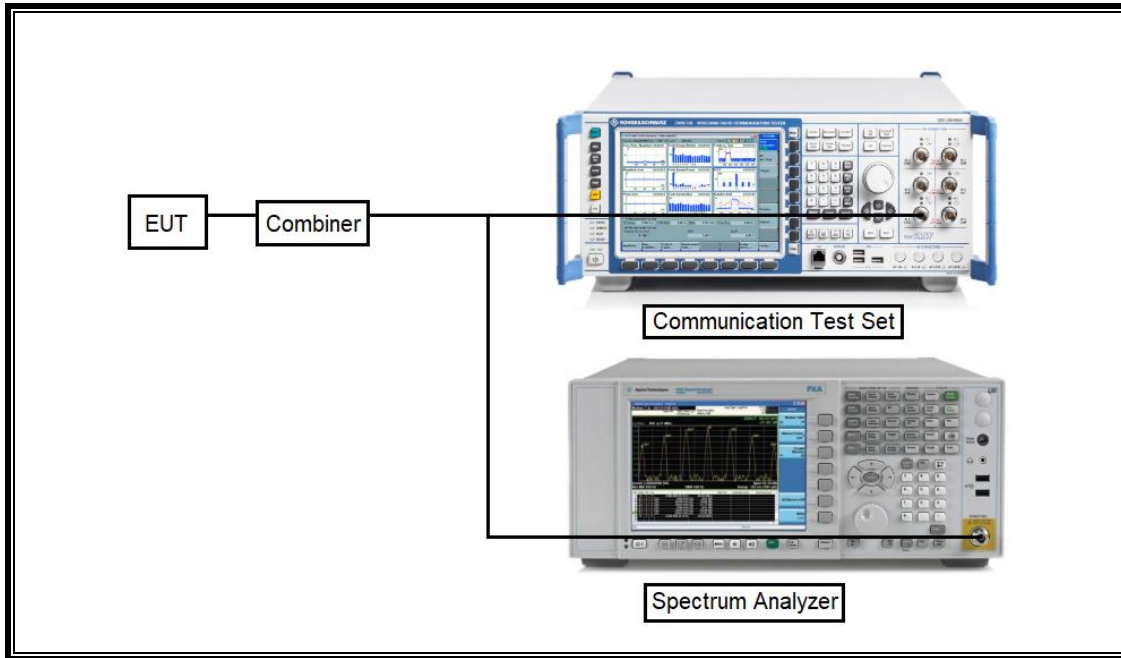
I/O CABLE

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
2	Audio	2	Mini-Jack	Unshielded	0.7 m	N/A

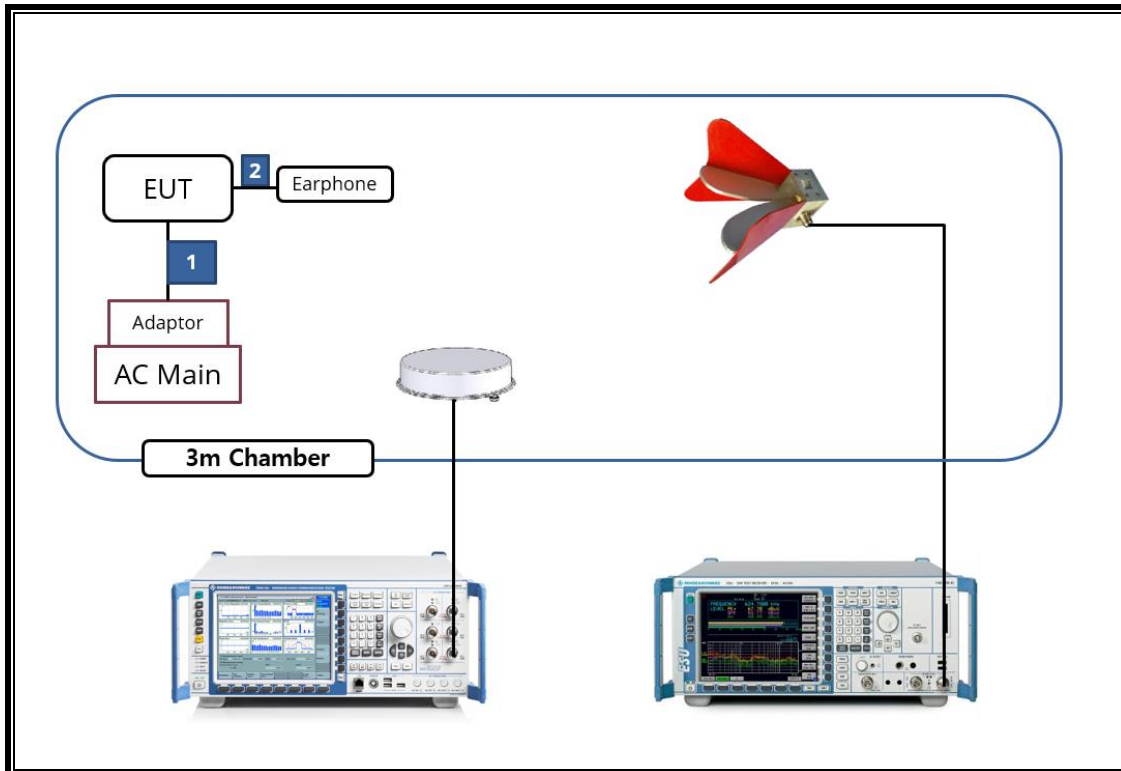
TEST SETUP

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)



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 DB4	00164753	2023-02-08
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	00168645	2023-10-13
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Communications Test Set	R&S	CMW500	169796	2023-01-07
DC Power Supply	Agilent / HP	E3640A	MY54226395	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2023-08-01
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2023-08-01
Attenuator	PASTERNAK	PE7087-10	A009	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNAK	PE7004-10	2	2023-08-01
Attenuator	PASTERNAK	PE7395-10	A011	2023-08-03
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
Temperature Chamber	ESPEC	SH-642	93001109	2023-08-01
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2023-01-11
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2023-01-11
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58010202	2023-01-07
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	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Bandwidth(99%)	N/A	Conducted	Pass
2.1046	Conducted output power	N/A		Pass
2.1051 96.41(e)(ii)	Out of band emissions	Section 9.2 & 9.3		Pass
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		Pass
96.47	End user device additional requirements (CBSD Protocol)	Section 9.5		Not performed ^{Note}
96.41(b)	Equivalent Isotropic Radiated Power	23 dBm/10 MHz	Radiated	Pass
2.1053 96.41(e)	Radiated Spurious Emission	-40 dBm/MHz		Pass

Note. Please refer to CBSD Protocol test report. See the Section 9.5

8. RF OUTPUT POWER

8.1. CONDUCTED OUTPUT POWER

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to CMW500 Test Set and configured to operate at maximum power.

RESULTS

See the following pages.

8.1.1. CONDUCTED AVERAGE OUTPUT POWER

LTE Band 48

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	22.31	22.30	22.33	0.0	23.5
		1	49	22.32	22.28	22.34	0.0	23.5
		1	99	22.36	22.32	22.34	0.0	23.5
		50	0	21.42	21.41	21.43	1.0	22.5
		50	24	21.46	21.45	21.52	1.0	22.5
		50	50	21.39	21.46	21.50	1.0	22.5
	16QAM	100	0	21.41	21.44	21.42	1.0	22.5
		1	0	21.22	21.44	21.39	1.0	22.5
		1	49	21.24	21.42	21.38	1.0	22.5
		1	99	21.26	21.46	21.41	1.0	22.5
		50	0	20.44	20.43	20.43	2.0	21.5
		50	24	20.44	20.48	20.49	2.0	21.5
	64QAM	50	50	20.42	20.53	20.52	2.0	21.5
		100	0	20.37	20.45	20.43	2.0	21.5
		1	0	20.67	20.37	19.93	2.0	21.5
		1	49	20.72	20.37	19.98	2.0	21.5
		1	99	20.69	20.42	20.04	2.0	21.5
		50	0	19.49	19.47	19.51	3.0	20.5
	256QAM	50	24	19.55	19.49	19.60	3.0	20.5
		50	50	19.46	19.51	19.58	3.0	20.5
		100	0	19.48	19.47	19.55	3.0	20.5
		1	0	17.73	17.46	17.51	5.0	18.5
		1	49	17.67	17.31	17.48	5.0	18.5
		1	99	17.73	17.46	17.56	5.0	18.5
15 MHz	QPSK	50	0	17.43	17.43	17.50	5.0	18.5
		50	24	17.54	17.48	17.56	5.0	18.5
		50	50	17.46	17.47	17.57	5.0	18.5
		100	0	17.42	17.46	17.49	5.0	18.5
		1	0	22.32	22.26	22.33	0.0	23.5
		1	37	22.30	22.24	22.34	0.0	23.5
	16QAM	1	74	22.34	22.30	22.37	0.0	23.5
		36	0	21.42	21.39	21.45	1.0	22.5
		36	20	21.43	21.39	21.46	1.0	22.5
		36	39	21.46	21.39	21.48	1.0	22.5
		75	0	21.44	21.39	21.45	1.0	22.5
		1	0	21.26	21.29	21.36	1.0	22.5
	64QAM	1	37	21.34	21.25	21.36	1.0	22.5
		1	74	21.37	21.34	21.37	1.0	22.5
		36	0	20.44	20.45	20.47	2.0	21.5
		36	20	20.42	20.44	20.47	2.0	21.5
		36	39	20.45	20.45	20.46	2.0	21.5
		75	0	20.44	20.44	20.46	2.0	21.5
	256QAM	1	0	20.63	20.46	20.30	2.0	21.5
		1	37	20.62	20.42	20.36	2.0	21.5
		1	74	20.70	20.48	20.37	2.0	21.5
		36	0	19.46	19.44	19.52	3.0	20.5
		36	20	19.50	19.45	19.56	3.0	20.5
		36	39	19.53	19.47	19.57	3.0	20.5
QPSK	75	0	19.50	19.50	19.53	3.0	20.5	
	1	0	17.16	17.39	17.54	5.0	18.5	
	1	37	17.12	17.42	17.56	5.0	18.5	
	1	74	17.29	17.53	17.67	5.0	18.5	
	36	0	17.48	17.40	17.54	5.0	18.5	
	36	20	17.48	17.42	17.55	5.0	18.5	
16QAM	36	39	17.54	17.43	17.54	5.0	18.5	
	75	0	17.46	17.44	17.51	5.0	18.5	

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	22.48	22.42	22.53	0.0	23.5
		1	25	22.49	22.42	22.50	0.0	23.5
		1	49	22.59	22.38	22.54	0.0	23.5
		25	0	21.57	21.51	21.58	1.0	22.5
		25	12	21.62	21.51	21.68	1.0	22.5
		25	25	21.59	21.54	21.67	1.0	22.5
		50	0	21.57	21.53	21.61	1.0	22.5
	16QAM	1	0	21.59	21.55	21.62	1.0	22.5
		1	25	21.47	21.58	21.60	1.0	22.5
		1	49	21.56	21.60	21.56	1.0	22.5
		25	0	20.53	20.51	20.58	2.0	21.5
		25	12	20.63	20.50	20.72	2.0	21.5
		25	25	20.61	20.51	20.64	2.0	21.5
		50	0	20.62	20.57	20.60	2.0	21.5
	64QAM	1	0	20.94	20.50	20.48	2.0	21.5
		1	25	20.84	20.53	20.55	2.0	21.5
		1	49	20.88	20.49	20.52	2.0	21.5
		25	0	19.62	19.55	19.62	3.0	20.5
		25	12	19.61	19.56	19.78	3.0	20.5
		25	25	19.66	19.56	19.72	3.0	20.5
		50	0	19.70	19.49	19.63	3.0	20.5
	256QAM	1	0	17.35	17.55	17.76	5.0	18.5
		1	25	17.38	17.47	17.80	5.0	18.5
		1	49	17.41	17.45	17.78	5.0	18.5
		25	0	17.65	17.50	17.63	5.0	18.5
		25	12	17.73	17.56	17.71	5.0	18.5
		25	25	17.64	17.56	17.72	5.0	18.5
		50	0	17.64	17.53	17.60	5.0	18.5
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	22.55	22.32	22.57	0.0	23.5
		1	12	22.53	22.25	22.54	0.0	23.5
		1	24	22.57	22.40	22.59	0.0	23.5
		12	0	21.65	21.51	21.63	1.0	22.5
		12	7	21.68	21.54	21.73	1.0	22.5
		12	13	21.66	21.53	21.63	1.0	22.5
		25	0	21.61	21.53	21.64	1.0	22.5
	16QAM	1	0	21.64	21.39	21.50	1.0	22.5
		1	12	21.61	21.40	21.61	1.0	22.5
		1	24	21.77	21.38	21.63	1.0	22.5
		12	0	20.64	20.54	20.64	2.0	21.5
		12	7	20.71	20.59	20.64	2.0	21.5
		12	13	20.66	20.53	20.58	2.0	21.5
		25	0	20.63	20.52	20.66	2.0	21.5
	64QAM	1	0	20.56	20.44	21.17	2.0	21.5
		1	12	20.54	20.61	21.16	2.0	21.5
		1	24	20.53	20.49	21.15	2.0	21.5
		12	0	19.74	19.55	19.78	3.0	20.5
		12	7	19.78	19.57	19.78	3.0	20.5
		12	13	19.71	19.57	19.75	3.0	20.5
		25	0	19.67	19.55	19.65	3.0	20.5
	256QAM	1	0	17.86	17.50	17.76	5.0	18.5
		1	12	17.96	17.55	17.86	5.0	18.5
		1	24	17.89	17.57	17.79	5.0	18.5
		12	0	17.61	17.55	17.70	5.0	18.5
		12	7	17.67	17.53	17.69	5.0	18.5
		12	13	17.62	17.54	17.70	5.0	18.5
		25	0	17.67	17.53	17.68	5.0	18.5

LTE Band 48 Uplink CA (20 MHz + 20 MHz)

Antenna Gain (dBi)	-0.36		PCC RB		SCC1 RB		Conducted Average Power (dBm)	
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	Size	Offset	Size	Offset	QPSK	16QAM
40MHz (20MHz / 20MHz)	3560	3579.8	1	99	1	0	22.33	21.64
			1	0	1	99	14.19	14.16
			100	0	100	0	20.66	19.67
	3615.1	3634.9	1	99	1	0	22.30	21.56
			1	0	1	99	14.11	14.07
			100	0	100	0	20.59	19.59
	3670.2	3690	1	99	1	0	22.31	21.55
			1	0	1	99	14.15	14.13
			100	0	100	0	20.70	19.70

LTE Band 48 Uplink CA (15 MHz + 20 MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	Size	Offset	Size	Offset	QPSK	16QAM
35MHz (15MHz / 20MHz)	3557.5	3574.6	1	74	1	0	22.32	21.62
			1	0	1	99	14.11	14.24
			75	0	100	0	20.64	19.63
	3615.2	3632.3	1	74	1	0	22.31	21.62
			1	0	1	99	14.09	14.19
			75	0	100	0	20.60	19.63
	3672.9	3690	1	74	1	0	22.30	21.58
			1	0	1	99	14.30	14.11
			75	0	100	0	20.71	19.69

LTE Band 48 Uplink CA (10 MHz + 20 MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	Size	Offset	Size	Offset	QPSK	16QAM
30MHz (10MHz / 20MHz)	3555	3569.4	1	49	1	0	22.32	21.15
			1	0	1	99	14.14	13.77
			50	0	100	0	20.66	19.63
	3615.4	3629.8	1	49	1	0	22.31	21.63
			1	0	1	99	14.11	14.22
			50	0	100	0	20.63	19.63
	3675.6	3690	1	49	1	0	22.30	21.51
			1	0	1	99	14.09	14.03
			50	0	100	0	20.67	19.69

LTE Band 48 Uplink CA (5 MHz + 20 MHz)

Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	Size	Offset	Size	Offset	QPSK	16QAM
25MHz (5MHz / 20MHz)	3552.5	3564.2	1	24	1	0	22.32	21.62
			1	0	1	99	14.05	14.16
			25	0	100	0	20.64	19.63
	3615.6	3627.3	1	24	1	0	22.31	21.50
			1	0	1	99	13.93	13.97
			25	0	100	0	20.42	19.55
	3678.3	3690	1	24	1	0	22.30	21.47
			1	0	1	99	14.03	14.01
			25	0	100	0	20.68	19.74

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.

RESULTS

See the following pages.

8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE Band 48



9. LIMITS AND CONDUCTED 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 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

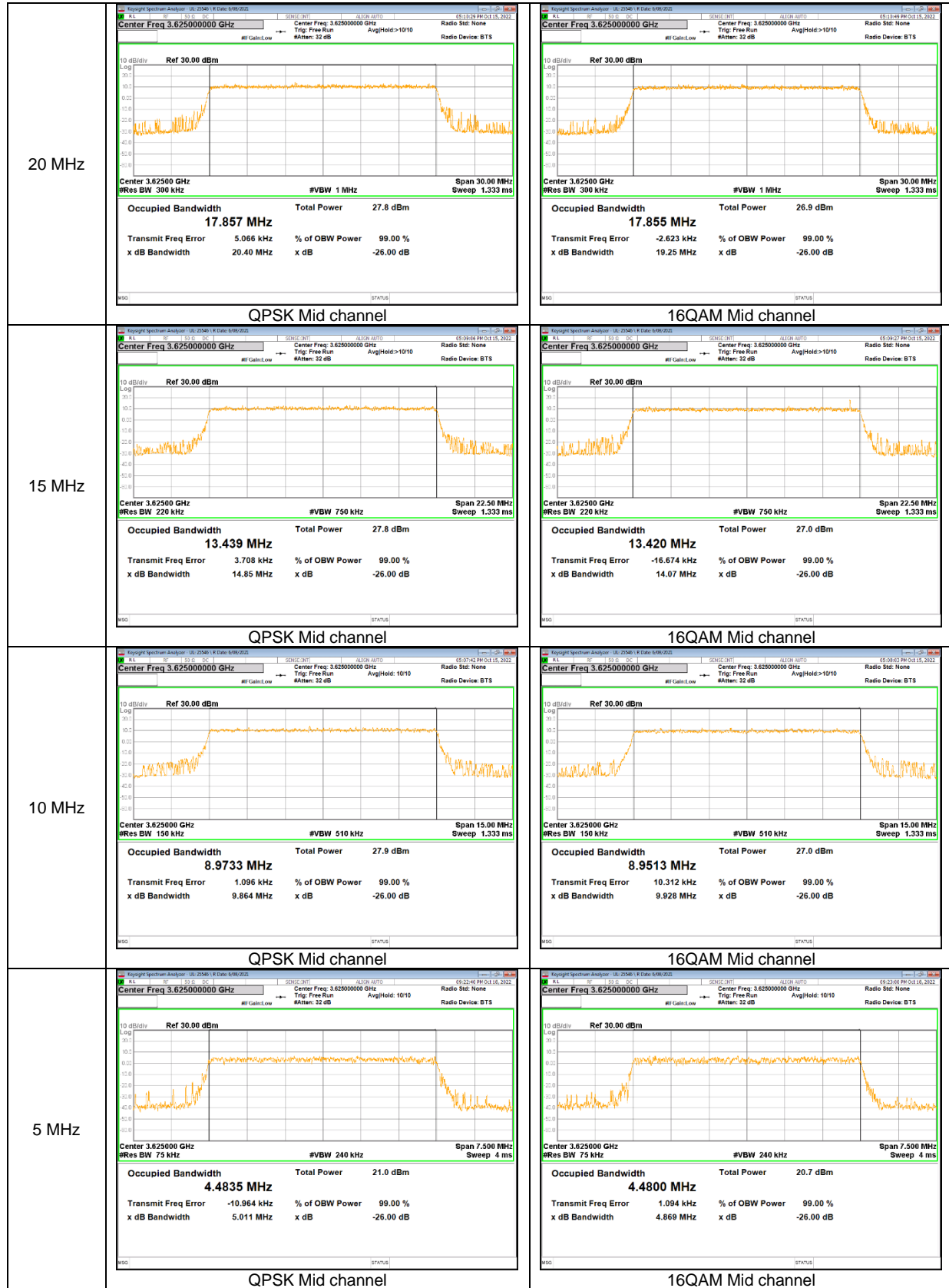
- LTE Band 48

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B48	20M	QPSK	3625.0	17.857	20.40
		16QAM		17.855	19.25
	15M	QPSK		13.439	14.85
		16QAM		13.420	14.07
	10M	QPSK		8.973	9.86
		16QAM		8.951	9.93
	5M	QPSK		4.484	5.01
		16QAM		4.480	4.87

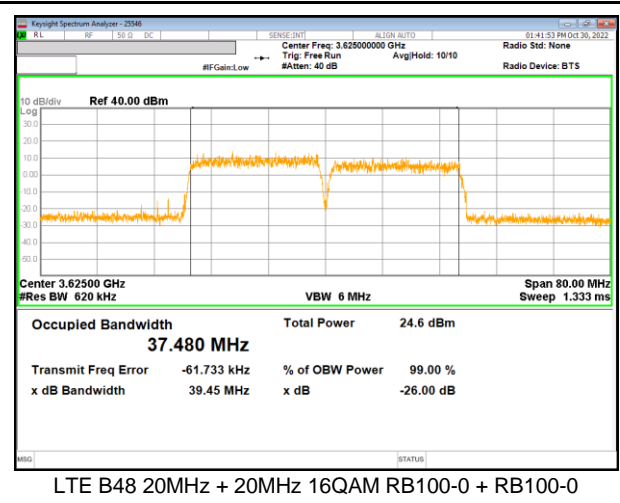
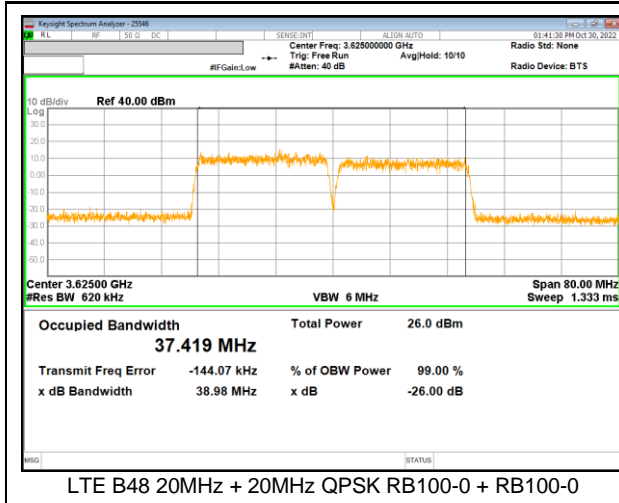
- LTE Band 48 Uplink CA

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B48 Uplink CA	20+20	QPSK	3625.0	37.419	38.98
		16QAM		37.480	39.45

LTE Band 48



LTE Band 48 Uplink CA



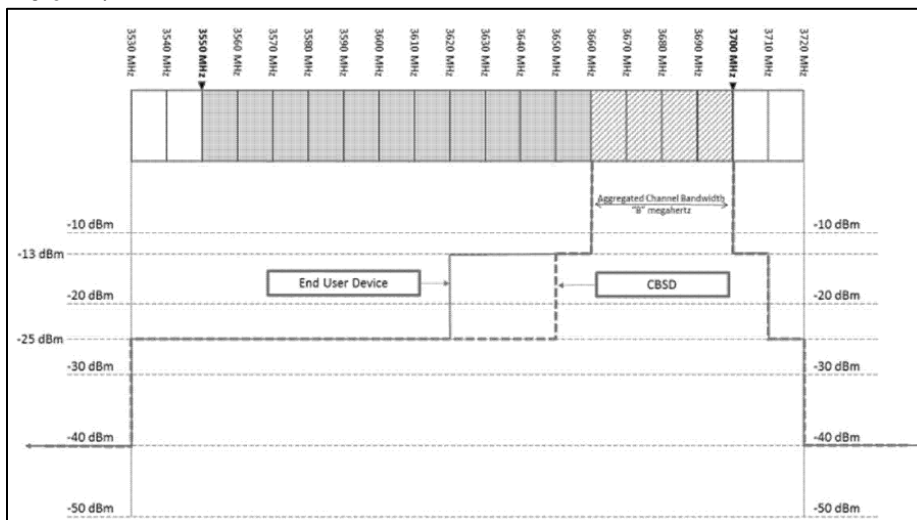
9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §2.1051 and §96.41(e)(ii)

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.

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

NOTE1

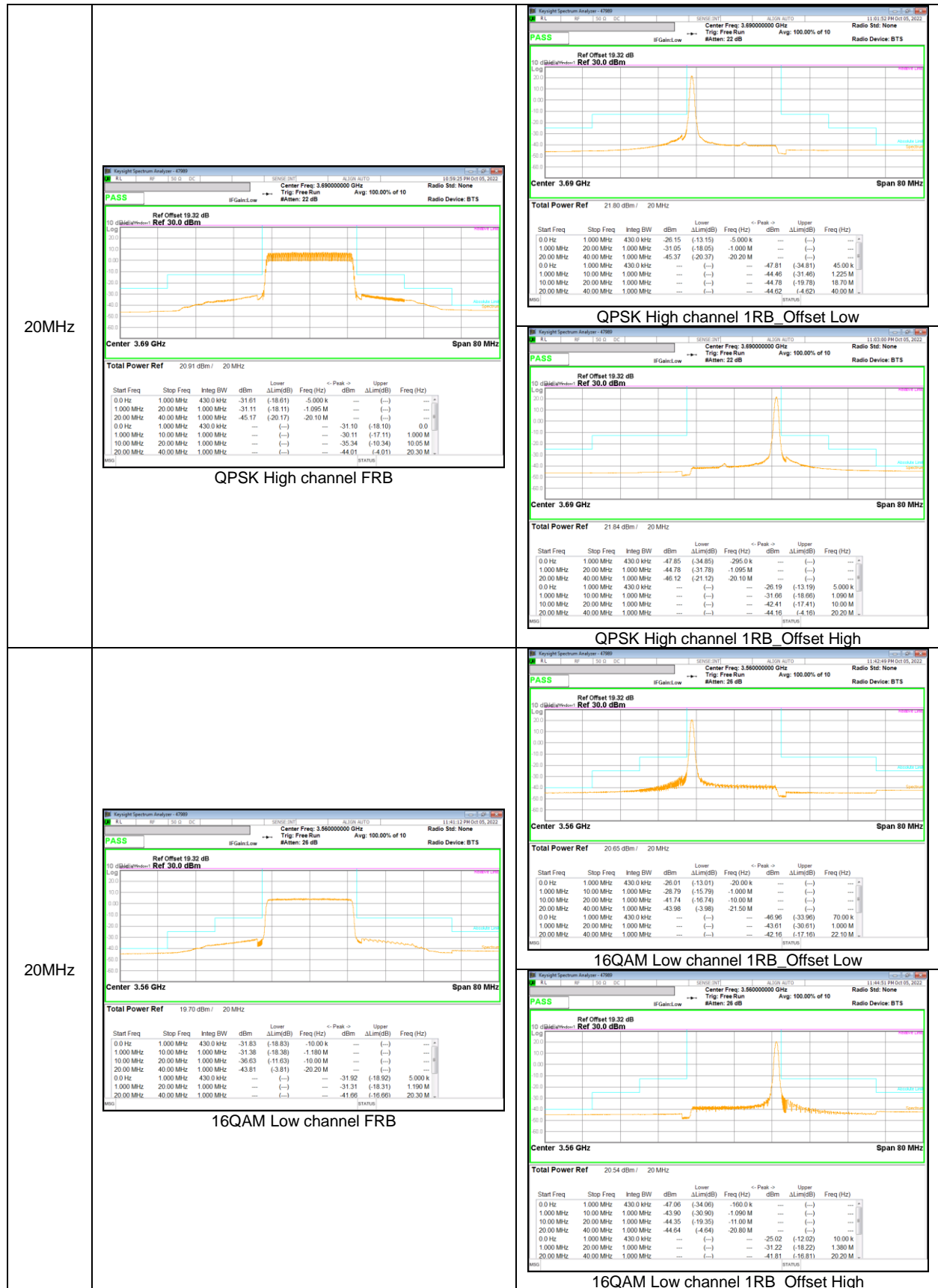
LTE Band 48 Uplink CA A-MPR is implemented in this EUT per the A-MPR specification in 3GPP TS 36.101 (Table 6.2.4A,10-1, Table 6.2.4A,10-2). Conducted output power verification data are shown Appendix A. Also only Emission mask test item were performed A-MPR condition. Also only Emission mask test item were performed A-MPR condition (Especially 15MHz, 20MHz Channel Bandwidth).

RESULTS

See the following pages.

LTE Band 48

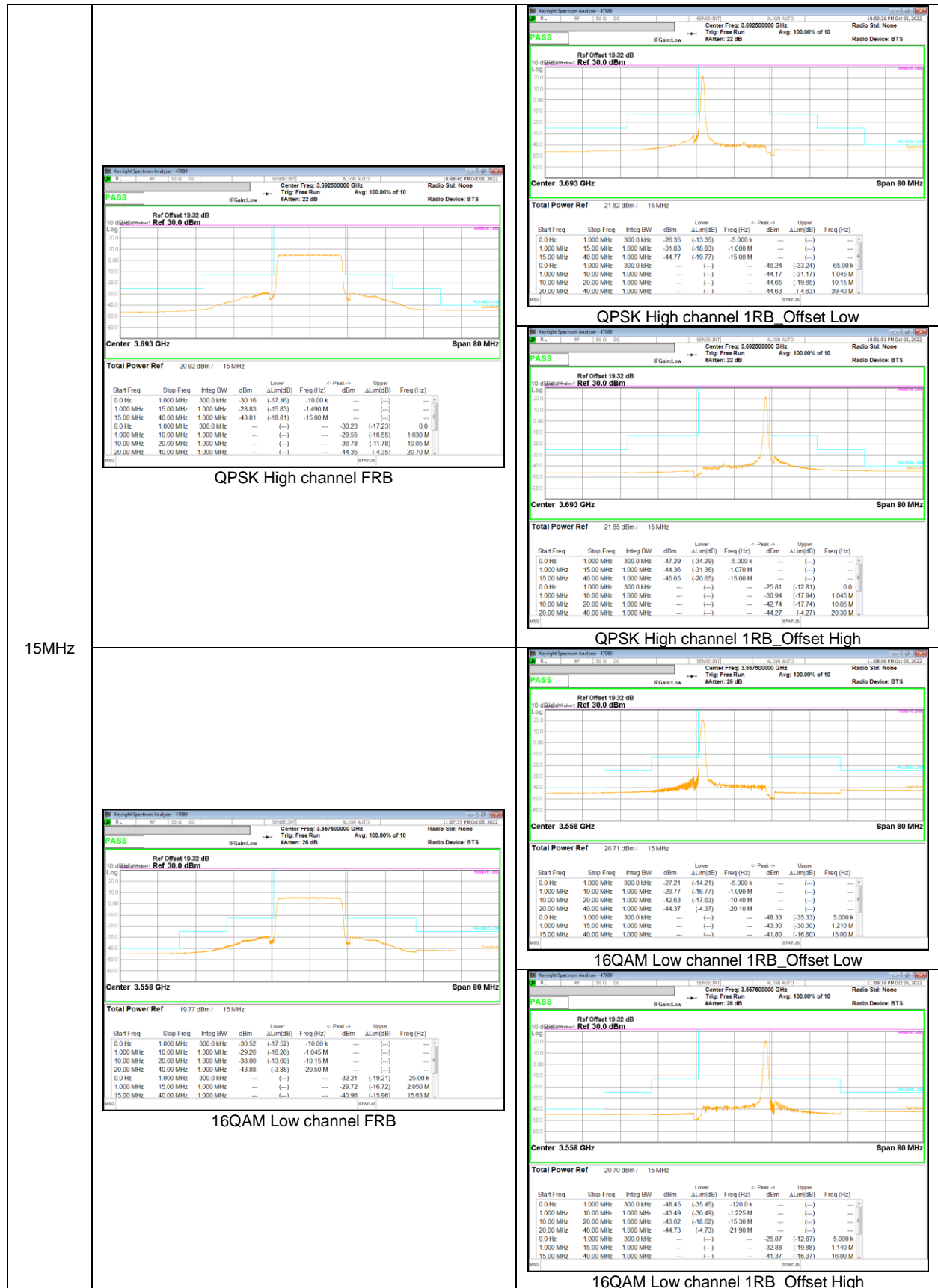








15MHz





15MHz



