

CERTIFICATION TEST REPORT

Report Number. : S-4791511838-E4V1

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

Model : SC-53F, SCG33

FCC ID : A3LSMA253JPN

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 27 SUBPART H,L,M

Date Of Issue:
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Revision History

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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: SC-53F, SCG33

SERIAL NUMBER: R3CX90B4MYB, R3CX90B502Z, R3CX90B51SW (CONDUCTED); R3CX90B4JDN, R3CX90B4JWL, R3CX90B503T (RADIATED);

DATE TESTED: 2024-10-30 – 2024-11-27;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 27H,L,M	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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Tested By:



Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.



Yeonhee Lim
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 27.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01
6. KDB 971168 D02 Misc Rev Approv License Devices v02r02
7. 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	
☒	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:

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

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

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
		SCG33
SC-53F	Hardware	Same
	Software	The UI has changed according to Service Provider

The model SC-53F was used for final testing and is representative of the test results in this report.

5.2. MAXIMUM OUTPUT POWER

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

LTE Band 12

FCC Part 27								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 12	A	704.00 ~ 711.00	10	QPSK	24.72	296.48	17.09	51.17
				16QAM	24.15	260.02	15.24	33.42
				64QAM	22.97	198.15		
		701.50 ~ 713.50	5	QPSK	24.77	299.92	16.29	42.56
				16QAM	24.10	257.04	15.13	32.58
				64QAM	23.08	203.24		
		700.50 ~ 714.50	3	QPSK	24.64	291.07	16.56	45.29
				16QAM	24.22	264.24	15.47	35.24
				64QAM	23.14	206.06		
		699.70 ~ 715.30	1.4	QPSK	24.68	293.76	16.98	49.89
				16QAM	24.23	264.85	15.83	38.28
				64QAM	23.09	203.70		

LTE Band 41

FCC Part 27								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 41	B	2506.00 ~ 2680.00	20	QPSK	24.54	284.45	24.04	253.51
				16QAM	23.42	219.79	23.59	228.56
				64QAM	22.58	181.13		
		2503.50 ~ 2682.50	15	QPSK	24.55	285.10	24.03	252.93
				16QAM	23.47	222.33	23.50	223.87
				64QAM	22.89	194.54		
		2501.00 ~ 2685.00	10	QPSK	24.50	281.84	23.90	245.47
				16QAM	23.38	217.77	23.36	216.77
				64QAM	22.79	190.11		
		2498.50 ~ 2687.50	5	QPSK	24.39	274.79	23.85	242.66
				16QAM	23.52	224.91	23.21	209.41
				64QAM	22.70	186.21		

LTE Band 66

FCC Part 27								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 66	B	1720.00 ~ 1770.00	20	QPSK	23.32	214.78	22.79	190.11
				16QAM	22.78	189.67	21.82	152.05
				64QAM	21.39	137.72		
		1717.50 ~ 1772.50	15	QPSK	23.25	211.35	23.03	200.91
				16QAM	22.60	181.97	22.03	159.59
				64QAM	21.45	139.64		
		1715.00 ~ 1775.00	10	QPSK	23.20	208.93	23.03	200.91
				16QAM	22.58	181.13	22.08	161.44
				64QAM	21.35	136.46		
		1712.50 ~ 1777.50	5	QPSK	23.22	209.89	22.29	169.43
				16QAM	22.59	181.55	21.40	138.04
				64QAM	21.39	137.72		
		1711.50 ~ 1778.50	3	QPSK	23.07	202.77	22.09	161.81
				16QAM	22.46	176.20	21.10	128.82
				64QAM	21.34	136.14		
		1710.70 ~ 1779.30	1.4	QPSK	23.10	204.17	22.10	162.18
				16QAM	22.46	176.20	21.13	129.72
				64QAM	21.39	137.72		

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)	ANT	Peak Gain (dBi/dBd)
LTE Band 12 699 - 716 MHz	A	-4.0
LTE Band 41 2496 - 2690 MHz	B	-3.0
LTE Band 66 1710 - 1780 MHz	B	-2.4

5.4. WORST-CASE ORIENTATION

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

- LTE Bands

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, and 64QAM modulations. It was found QPSK and 16QAM results were worst case.

- Conducted Spurious Emission

Highest conducted output power setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
12	A	701.50	5	1	0
		707.50		1	12
		713.50		1	12
41	B	2503.50	15	1	37
		2593.00		1	37
		2682.50		1	0
66	B	1720.00	20	1	99
		1745.00		1	99
		1770.00		1	99

- Radiated Spurious Emission

Highest ERP/ EIRP setting for each bands					
LTE Band	ANT	Frequency (MHz)	Bandwidth (MHz)	RB size	RB offset
12	A	704.00	10	1	49
		707.50		1	49
		711.00		1	49
41	B	2506.00	20	1	0
		2593.00		1	49
		2680.00		1	49
66	B	1717.50	15	1	37
		1745.00		1	37
		1772.50		1	37

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	ANT	ERP/EIRP			RSE		
		X	Y	Z	X	Y	Z
LTE B12	A	O	-	-	-	O	-
LTE B41	B	O	-	-	-	-	O
LTE B66	B	-	O	-	O	-	-

Note1 : 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	R37W75RPPJASEB	N/A
Data Cable	SAMSUNG	EP-DA705	N/A	N/A

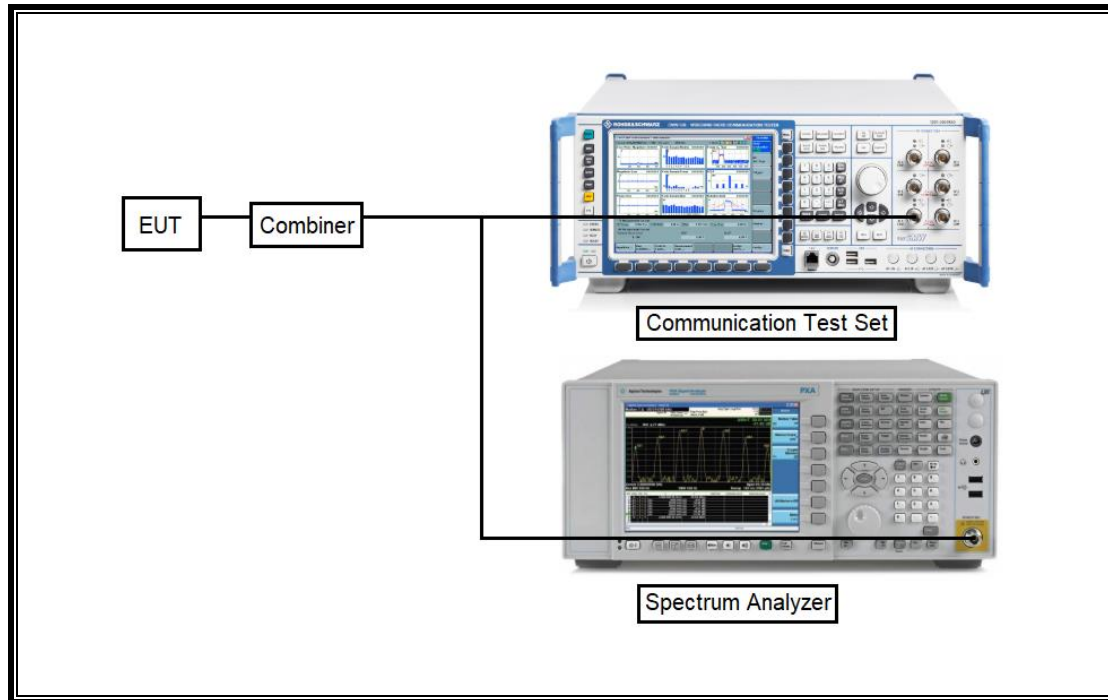
I/O CABLE

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

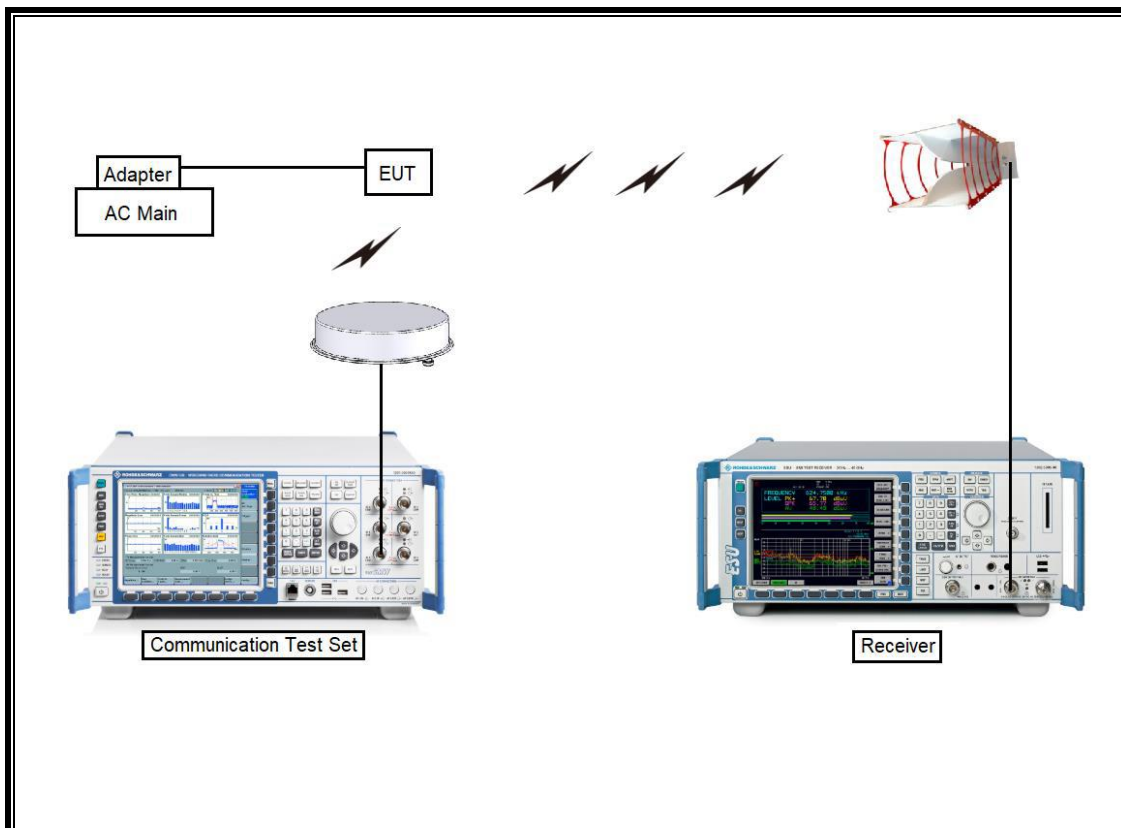
TEST SETUP

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)



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	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Results
2.1046	Conducted Output Power	N/A	Conducted	Complies
2.1049	Occupied Bandwidth (99%)	N/A		Complies
27.53(g), 27.53(h)	Conducted Band Edge / Conducted Spurious Emission	-13 dBm		Complies
27.53(m)		-25 dBm		Complies
27.53(m)	Emission Mask	Section 8.4.2		Complies
27.54	Frequency Stability	2.5 ppm		Complies
27.50(c)(10)	Effective Radiated Power	34.77 dBm	Radiated	Complies
27.50(h)(2)	Effective Isotropic Radiated Power	33 dBm		Complies
27.50(d)(4)		30 dBm		Complies
27.53(g) 27.53(h)	Radiated Spurious Emission	-13 dBm		Complies
27.53(m)		-25 dBm		Complies

8. CONDUCTED RESULTS

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 12

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				23060	23095	23130		
				704.00 MHz	707.50 MHz	711.00 MHz		
10 MHz	QPSK	1	0	24.48	24.49	24.61	0.0	25.5
		1	25	24.41	24.64	24.56	0.0	25.5
		1	49	24.50	24.72	24.64	0.0	25.5
		25	0	23.42	23.51	23.61	1.0	24.5
		25	12	23.46	23.62	23.59	1.0	24.5
		25	25	23.47	23.51	23.60	1.0	24.5
		50	0	23.44	23.45	23.63	1.0	24.5
	16QAM	1	0	23.95	23.83	24.15	1.0	24.5
		1	25	23.50	23.89	23.81	1.0	24.5
		1	49	23.81	24.02	23.67	1.0	24.5
		25	0	22.52	22.56	22.70	2.0	23.5
		25	12	22.52	22.68	22.71	2.0	23.5
		25	25	22.61	22.56	22.75	2.0	23.5
		50	0	22.51	22.55	22.70	2.0	23.5
	64QAM	1	0	22.97	22.83	22.96	2.0	23.5
		1	25	22.44	22.93	22.82	2.0	23.5
		1	49	22.49	22.65	22.74	2.0	23.5
		25	0	21.45	21.60	21.72	3.0	22.5
		25	12	21.40	21.49	21.55	3.0	22.5
		25	25	21.62	21.59	21.66	3.0	22.5
		50	0	21.54	21.55	21.68	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.50 MHz	707.50 MHz	713.50 MHz		
5 MHz	QPSK	1	0	24.46	24.45	24.67	0.0	25.5
		1	12	24.44	24.77	24.77	0.0	25.5
		1	24	24.39	24.47	24.67	0.0	25.5
		12	0	23.41	23.52	23.73	1.0	24.5
		12	7	23.45	23.56	23.65	1.0	24.5
		12	13	23.37	23.48	23.73	1.0	24.5
		25	0	23.47	23.58	23.71	1.0	24.5
	16QAM	1	0	24.10	24.04	24.04	1.0	24.5
		1	12	23.54	23.63	23.91	1.0	24.5
		1	24	23.54	23.83	23.63	1.0	24.5
		12	0	22.48	22.65	22.79	2.0	23.5
		12	7	22.57	22.58	22.84	2.0	23.5
		12	13	22.60	22.54	22.68	2.0	23.5
		25	0	22.58	22.60	22.75	2.0	23.5
	64QAM	1	0	22.69	22.54	22.71	2.0	23.5
		1	12	22.99	22.52	23.08	2.0	23.5
		1	24	22.61	22.74	22.95	2.0	23.5
		12	0	21.55	21.65	21.62	3.0	22.5
		12	7	21.56	21.78	21.67	3.0	22.5
		12	13	21.48	21.72	21.69	3.0	22.5
		25	0	21.55	21.56	21.70	3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.50 MHz	707.50 MHz	714.50 MHz		
3 MHz	QPSK	1	0	24.35	24.52	24.64	0.0	25.5
		1	8	24.22	24.48	24.52	0.0	25.5
		1	14	24.29	24.50	24.54	0.0	25.5
		8	0	23.34	23.55	23.56	1.0	24.5
		8	4	23.33	23.49	23.68	1.0	24.5
		8	7	23.35	23.43	23.70	1.0	24.5
	16QAM	15	0	23.39	23.50	23.64	1.0	24.5
		1	0	23.83	24.14	23.71	1.0	24.5
		1	8	23.45	24.22	23.96	1.0	24.5
		1	14	23.65	23.74	23.74	1.0	24.5
		8	0	22.45	22.70	22.82	2.0	23.5
		8	4	22.38	22.64	22.62	2.0	23.5
	64QAM	8	7	22.45	22.62	22.78	2.0	23.5
		15	0	22.44	22.56	22.61	2.0	23.5
		1	0	22.59	22.68	22.86	2.0	23.5
		1	8	22.33	22.77	22.97	2.0	23.5
		1	14	22.87	22.48	23.14	2.0	23.5
		8	0	21.43	21.68	21.75	3.0	22.5
1.4 MHz	QPSK	8	4	21.34	21.52	21.61	3.0	22.5
		8	7	21.54	21.54	21.69	3.0	22.5
		15	0	21.46	21.52	21.72	3.0	22.5
	16QAM	1	0	24.26	24.57	24.60	0.0	25.5
		1	3	24.35	24.55	24.68	0.0	25.5
		1	5	24.23	24.41	24.54	0.0	25.5
	64QAM	3	0	24.29	24.49	24.61	0.0	25.5
		3	1	24.26	24.45	24.57	0.0	25.5
		3	3	24.35	24.47	24.65	0.0	25.5
	16QAM	6	0	23.17	23.52	23.61	1.0	24.5
		1	0	23.58	24.23	24.11	1.0	24.5
		1	3	23.91	23.52	24.12	1.0	24.5
		1	5	23.77	23.76	23.52	1.0	24.5
		3	0	23.27	23.44	23.59	1.0	24.5
		3	1	23.37	23.37	23.47	1.0	24.5
	64QAM	3	3	23.26	23.33	23.50	1.0	24.5
		6	0	22.58	22.67	22.88	2.0	23.5
		1	0	22.52	22.90	23.04	2.0	23.5
		1	3	22.69	23.09	22.95	2.0	23.5
		1	5	22.34	22.74	22.87	2.0	23.5
		3	0	22.60	22.68	22.84	2.0	23.5
	16QAM	3	1	22.51	22.86	22.64	2.0	23.5
		3	3	22.25	22.74	23.06	2.0	23.5
		6	0	21.44	21.42	21.63	3.0	22.5

LTE Band 41

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				39750	40620	41490		
				2506.00 MHz	2593.00 MHz	2680.00 MHz		
20 MHz	QPSK	1	0	24.24	24.25	23.92	0.0	25.5
		1	49	24.22	24.54	24.02	0.0	25.5
		1	99	24.05	24.35	23.94	0.0	25.5
		50	0	23.27	23.40	22.96	1.0	24.5
		50	24	23.20	23.40	22.89	1.0	24.5
		50	50	23.13	23.43	22.88	1.0	24.5
		100	0	23.17	23.38	22.89	1.0	24.5
	16QAM	1	0	23.26	23.14	23.10	1.0	24.5
		1	49	23.27	23.42	23.10	1.0	24.5
		1	99	23.14	23.33	23.03	1.0	24.5
		50	0	22.16	22.40	21.91	2.0	23.5
		50	24	22.09	22.46	21.84	2.0	23.5
		50	50	22.01	22.47	21.85	2.0	23.5
		100	0	22.16	22.42	21.87	2.0	23.5
	64QAM	1	0	22.58	22.26	21.98	2.0	23.5
		1	49	22.48	22.47	22.17	2.0	23.5
		1	99	22.46	22.39	22.00	2.0	23.5
		50	0	21.06	21.31	20.93	3.0	22.5
		50	24	21.02	21.39	20.89	3.0	22.5
		50	50	20.98	21.44	20.83	3.0	22.5
		100	0	21.03	21.42	20.78	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				39725	40620	41515		
				2503.50 MHz	2593.00 MHz	2682.50 MHz		
15 MHz	QPSK	1	0	24.06	24.27	23.97	0.0	25.5
		1	37	24.20	24.55	23.90	0.0	25.5
		1	74	24.00	24.41	23.91	0.0	25.5
		36	0	23.12	23.24	22.84	1.0	24.5
		36	20	23.18	23.44	22.81	1.0	24.5
		36	39	23.10	23.46	22.80	1.0	24.5
		75	0	23.07	23.39	22.79	1.0	24.5
	16QAM	1	0	23.13	23.29	22.92	1.0	24.5
		1	37	23.26	23.47	22.97	1.0	24.5
		1	74	23.22	23.39	22.84	1.0	24.5
		36	0	22.18	22.34	21.90	2.0	23.5
		36	20	22.10	22.35	21.81	2.0	23.5
		36	39	22.08	22.38	21.78	2.0	23.5
		75	0	22.10	22.39	21.83	2.0	23.5
	64QAM	1	0	21.92	22.72	21.82	2.0	23.5
		1	37	21.96	22.89	21.87	2.0	23.5
		1	74	21.85	22.83	21.72	2.0	23.5
		36	0	21.07	21.39	20.86	3.0	22.5
		36	20	21.12	21.43	20.78	3.0	22.5
		36	39	21.05	21.43	20.78	3.0	22.5
		75	0	21.04	21.43	20.82	3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				39700	40620	41540		
				2501.00 MHz	2593.00 MHz	2685.00 MHz		
10 MHz	QPSK	1	0	24.13	24.35	23.78	0.0	25.5
		1	25	24.15	24.50	23.79	0.0	25.5
		1	49	24.05	24.42	23.76	0.0	25.5
		25	0	23.10	23.32	22.81	1.0	24.5
		25	12	23.07	23.33	22.75	1.0	24.5
		25	25	23.05	23.39	22.76	1.0	24.5
	16QAM	50	0	23.11	23.37	22.80	1.0	24.5
		1	0	23.21	23.31	22.94	1.0	24.5
		1	25	23.09	23.37	22.97	1.0	24.5
		1	49	23.14	23.38	22.81	1.0	24.5
		25	0	22.09	22.29	21.71	2.0	23.5
		25	12	21.98	22.27	21.70	2.0	23.5
	64QAM	25	25	21.97	22.38	21.66	2.0	23.5
		50	0	22.06	22.27	21.71	2.0	23.5
		1	0	21.94	22.77	21.99	2.0	23.5
		1	25	21.86	22.76	21.96	2.0	23.5
		1	49	21.90	22.79	21.93	2.0	23.5
		25	0	21.14	21.34	20.68	3.0	22.5
		25	12	21.05	21.24	20.70	3.0	22.5
		25	25	20.96	21.30	20.63	3.0	22.5
		50	0	20.97	21.29	20.72	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				39675	40620	41565		
				2498.50 MHz	2593.00 MHz	2687.50 MHz		
5 MHz	QPSK	1	0	24.21	24.21	23.80	0.0	25.5
		1	12	24.24	24.39	23.80	0.0	25.5
		1	24	24.25	24.37	23.75	0.0	25.5
		12	0	23.27	23.36	22.84	1.0	24.5
		12	7	23.17	23.38	22.74	1.0	24.5
		12	13	23.15	23.34	22.69	1.0	24.5
	16QAM	25	0	23.19	23.45	22.75	1.0	24.5
		1	0	23.23	23.36	22.99	1.0	24.5
		1	12	23.25	23.52	22.96	1.0	24.5
		1	24	23.28	23.41	22.91	1.0	24.5
		12	0	22.18	22.41	21.75	2.0	23.5
		12	7	22.25	22.42	21.72	2.0	23.5
	64QAM	12	13	22.18	22.39	21.75	2.0	23.5
		25	0	22.17	22.41	21.70	2.0	23.5
		1	0	22.53	22.49	22.19	2.0	23.5
		1	12	22.57	22.70	22.21	2.0	23.5
		1	24	22.54	22.58	22.01	2.0	23.5
		12	0	21.07	21.37	20.67	3.0	22.5
		12	7	21.10	21.38	20.68	3.0	22.5
		12	13	21.01	21.38	20.69	3.0	22.5
		25	0	21.00	21.40	20.64	3.0	22.5

LTE Band 66

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				132072	132322	132572		
				1720.00 MHz	1745.00 MHz	1770.00 MHz		
20 MHz	QPSK	1	0	22.79	23.03	22.96	0.0	24.0
		1	49	23.06	23.10	22.91	0.0	24.0
		1	99	23.32	23.22	23.02	0.0	24.0
		50	0	21.99	22.05	21.92	1.0	23.0
		50	24	22.10	22.10	21.97	1.0	23.0
		50	50	22.22	22.21	22.03	1.0	23.0
	16QAM	100	0	22.10	22.08	21.93	1.0	23.0
		1	0	22.16	22.43	22.05	1.0	23.0
		1	49	22.46	22.78	22.13	1.0	23.0
		1	99	22.33	22.58	22.13	1.0	23.0
		50	0	20.94	21.02	20.90	2.0	22.0
		50	24	21.10	21.13	20.98	2.0	22.0
	64QAM	50	50	21.16	21.15	20.99	2.0	22.0
		100	0	21.04	21.10	20.95	2.0	22.0
		1	0	21.20	21.09	21.13	2.0	22.0
		1	49	20.96	20.99	20.97	2.0	22.0
		1	99	21.10	21.39	21.04	2.0	22.0
		50	0	19.92	20.00	19.86	3.0	21.0
15 MHz	QPSK	50	24	20.01	20.07	19.93	3.0	21.0
		50	50	20.17	20.15	19.97	3.0	21.0
		100	0	20.08	20.06	19.88	3.0	21.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132047	132322	132597		
				1717.50 MHz	1745.00 MHz	1772.50 MHz		
15 MHz	QPSK	1	0	22.81	22.95	22.78	0.0	24.0
		1	37	23.25	23.13	22.99	0.0	24.0
		1	74	23.08	23.08	22.97	0.0	24.0
		36	0	21.95	21.97	21.92	1.0	23.0
		36	20	22.00	22.08	22.01	1.0	23.0
		36	39	22.06	22.14	21.94	1.0	23.0
	16QAM	75	0	21.99	22.08	21.95	1.0	23.0
		1	0	22.01	22.05	22.08	1.0	23.0
		1	37	22.27	22.31	22.35	1.0	23.0
		1	74	22.23	22.60	21.77	1.0	23.0
		36	0	20.92	21.01	20.90	2.0	22.0
		36	20	20.94	21.17	20.98	2.0	22.0
	64QAM	36	39	21.07	21.13	20.97	2.0	22.0
		75	0	21.02	21.10	20.98	2.0	22.0
		1	0	20.91	21.11	20.90	2.0	22.0
		1	37	21.14	21.12	21.45	2.0	22.0
		1	74	21.39	21.43	21.18	2.0	22.0
		36	0	19.93	20.00	19.87	3.0	21.0
15 MHz	QPSK	36	20	19.98	20.10	19.97	3.0	21.0
		36	39	20.15	20.17	19.99	3.0	21.0
		75	0	19.97	20.05	20.02	3.0	21.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132022	132322	132622		
				1715.00 MHz	1745.00 MHz	1775.00 MHz		
10 MHz	QPSK	1	0	23.12	23.14	22.87	0.0	24.0
		1	25	22.88	23.20	22.96	0.0	24.0
		1	49	22.98	23.06	22.89	0.0	24.0
		25	0	21.91	22.02	21.98	1.0	23.0
		25	12	21.97	22.09	21.98	1.0	23.0
		25	25	22.03	22.12	21.97	1.0	23.0
	16QAM	50	0	22.01	22.07	22.00	1.0	23.0
		1	0	22.18	21.93	21.99	1.0	23.0
		1	25	22.09	22.33	22.09	1.0	23.0
		1	49	22.23	22.58	21.89	1.0	23.0
		25	0	20.90	21.02	20.97	2.0	22.0
		25	12	20.89	21.13	20.97	2.0	22.0
	64QAM	25	25	20.96	21.06	20.93	2.0	22.0
		50	0	20.97	21.07	20.99	2.0	22.0
		1	0	20.85	21.04	21.07	2.0	22.0
		1	25	21.19	21.04	21.02	2.0	22.0
		1	49	21.20	21.35	21.23	2.0	22.0
		25	0	19.88	19.95	19.95	3.0	21.0
5 MHz	QPSK	25	12	19.86	20.01	19.89	3.0	21.0
		25	25	20.01	20.03	19.93	3.0	21.0
		50	0	19.95	20.04	19.97	3.0	21.0
	16QAM	1	0	22.85	22.98	23.22	0.0	24.0
		1	12	22.91	23.03	22.94	0.0	24.0
		1	24	22.85	23.15	22.83	0.0	24.0
		12	0	21.93	22.03	22.00	1.0	23.0
		12	7	21.91	22.07	21.94	1.0	23.0
		12	13	21.95	22.09	21.93	1.0	23.0
	64QAM	25	0	21.97	22.11	21.99	1.0	23.0
		1	0	22.26	21.99	22.59	1.0	23.0
		1	12	22.09	22.26	22.31	1.0	23.0
		1	24	21.95	22.19	22.10	1.0	23.0
		12	0	20.98	21.04	21.08	2.0	22.0
		12	7	20.95	21.03	20.89	2.0	22.0
	16QAM	12	13	21.01	21.11	21.02	2.0	22.0
		25	0	20.97	21.02	20.97	2.0	22.0
	64QAM	1	0	21.26	21.39	21.16	2.0	22.0
		1	12	21.30	21.05	21.11	2.0	22.0
		1	24	21.31	21.37	20.75	2.0	22.0
		12	0	19.86	20.13	20.14	3.0	21.0
	64QAM	12	7	19.93	20.08	19.86	3.0	21.0
		12	13	19.93	20.07	20.04	3.0	21.0
		25	0	19.95	20.05	20.00	3.0	21.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				131987	132322	132657		
				1711.50 MHz	1745.00 MHz	1778.50 MHz		
3 MHz	QPSK	1	0	22.83	22.96	22.86	0.0	24.0
		1	8	22.77	22.97	22.83	0.0	24.0
		1	14	22.86	23.07	22.81	0.0	24.0
		8	0	21.89	22.02	21.88	1.0	23.0
		8	4	21.92	22.06	21.87	1.0	23.0
		8	7	21.96	22.05	21.89	1.0	23.0
	16QAM	15	0	21.89	22.01	21.85	1.0	23.0
		1	0	22.46	22.19	21.95	1.0	23.0
		1	8	22.14	22.22	21.95	1.0	23.0
		1	14	21.84	22.43	21.91	1.0	23.0
		8	0	20.93	21.02	20.98	2.0	22.0
		8	4	20.87	21.06	20.99	2.0	22.0
	64QAM	8	7	20.92	21.08	20.90	2.0	22.0
		15	0	20.84	21.13	20.82	2.0	22.0
		1	0	20.90	21.06	20.99	2.0	22.0
		1	8	21.07	21.17	21.14	2.0	22.0
		1	14	21.07	21.34	20.81	2.0	22.0
		8	0	19.82	20.04	20.05	3.0	21.0
1.4 MHz	QPSK	8	4	19.77	20.12	20.03	3.0	21.0
		8	7	19.81	20.12	19.96	3.0	21.0
		15	0	19.85	20.01	19.93	3.0	21.0
	16QAM	1	0	22.88	23.07	22.88	0.0	24.0
		1	3	22.91	23.04	22.87	0.0	24.0
		1	5	22.83	23.09	22.85	0.0	24.0
	64QAM	3	0	22.85	23.10	22.89	0.0	24.0
		3	1	22.95	23.06	22.90	0.0	24.0
		3	3	22.90	22.99	22.91	0.0	24.0
	16QAM	6	0	21.87	22.07	21.88	1.0	23.0
		1	0	22.25	22.39	22.19	1.0	23.0
		1	3	22.30	22.03	21.90	1.0	23.0
		1	5	22.46	22.41	21.95	1.0	23.0
		3	0	21.84	21.93	21.79	1.0	23.0
		3	1	21.87	21.98	21.82	1.0	23.0
	64QAM	3	3	21.89	21.96	21.87	1.0	23.0
		6	0	20.80	21.04	20.95	2.0	22.0
		1	0	20.98	21.34	21.27	2.0	22.0
		1	3	20.88	21.28	21.03	2.0	22.0
		1	5	21.00	21.36	21.39	2.0	22.0
		3	0	20.89	21.22	20.98	2.0	22.0
	64QAM	3	1	21.11	20.91	20.84	2.0	22.0
		3	3	20.72	20.97	21.02	2.0	22.0
		6	0	19.82	19.87	19.77	3.0	21.0

8.2. PEAK TO AVERAGE RATIO

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. 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

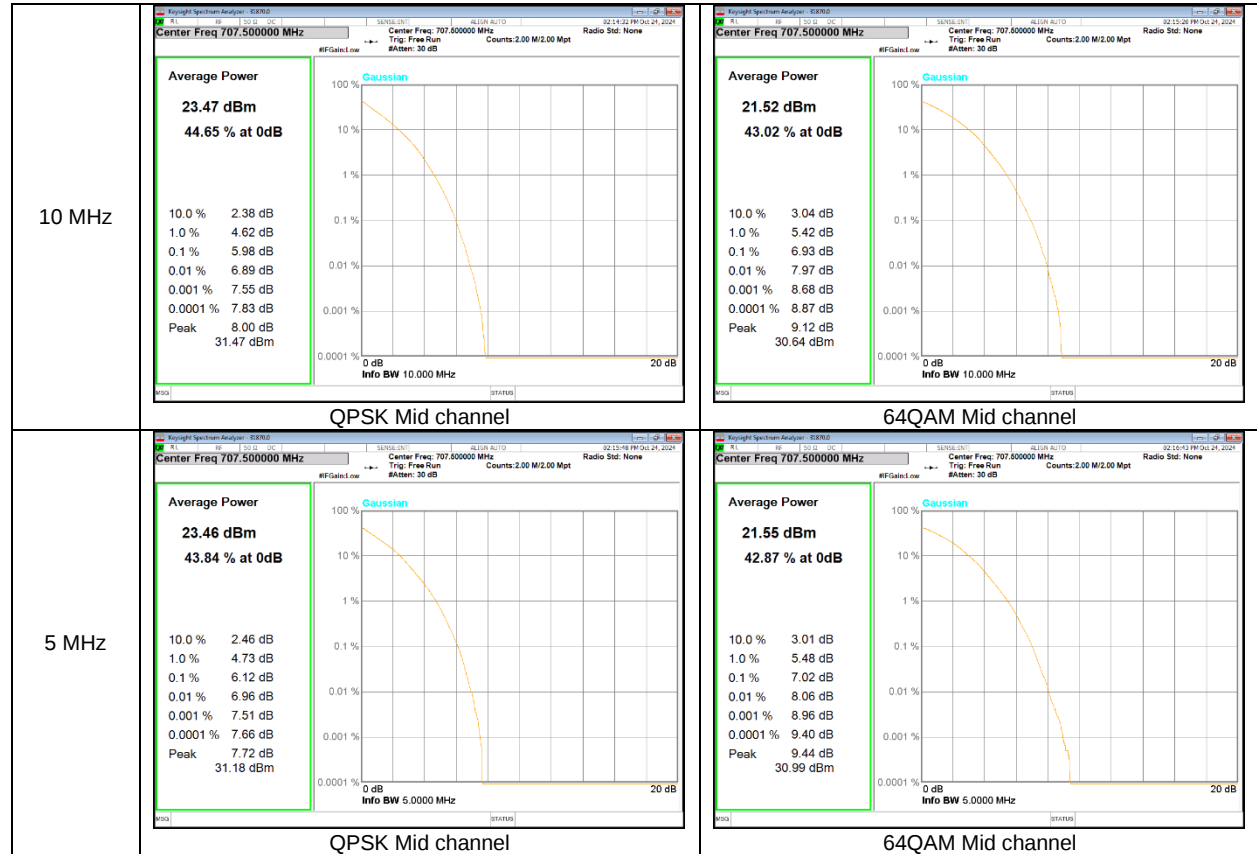
LTE: It was all modulations modulations and worst modulations(QPSK, 64QAM) is reported.

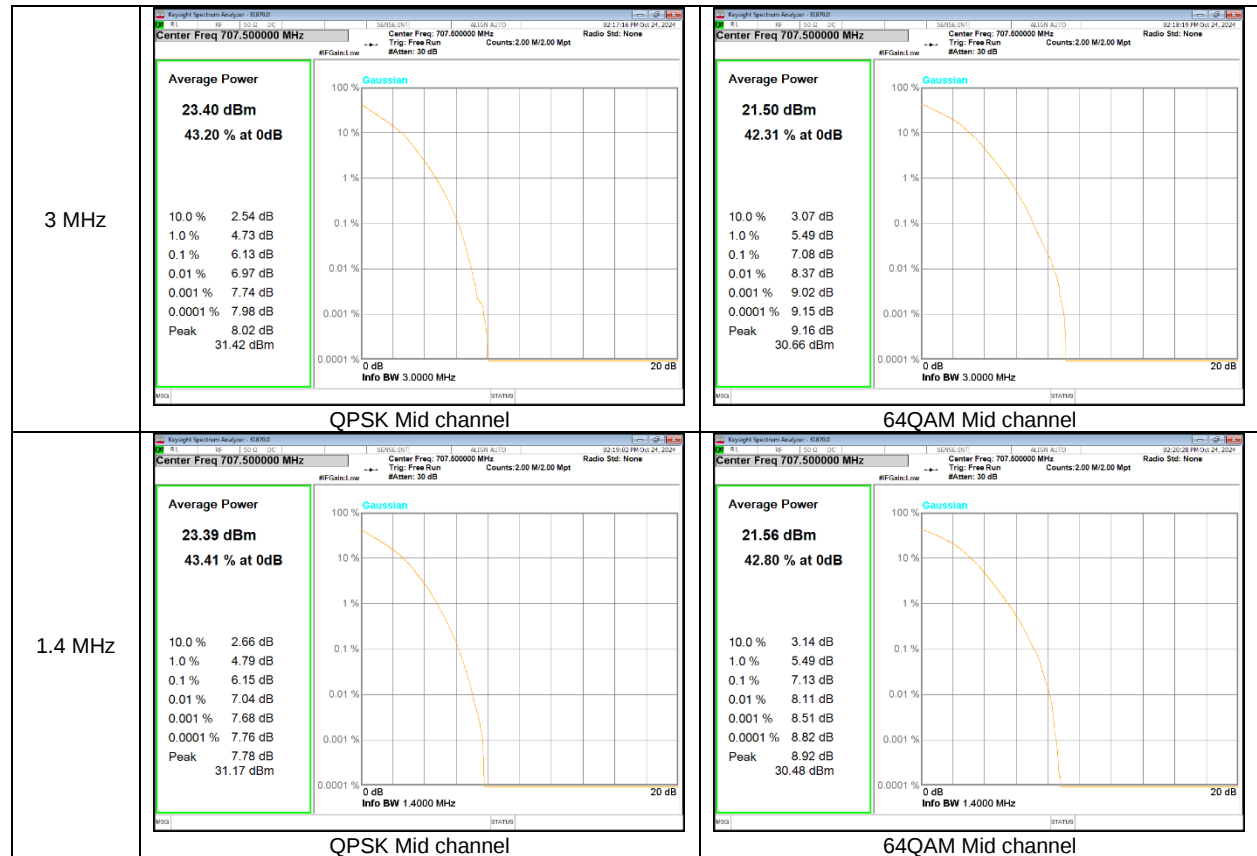
RESULTS

See the following pages.

8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE Band 12



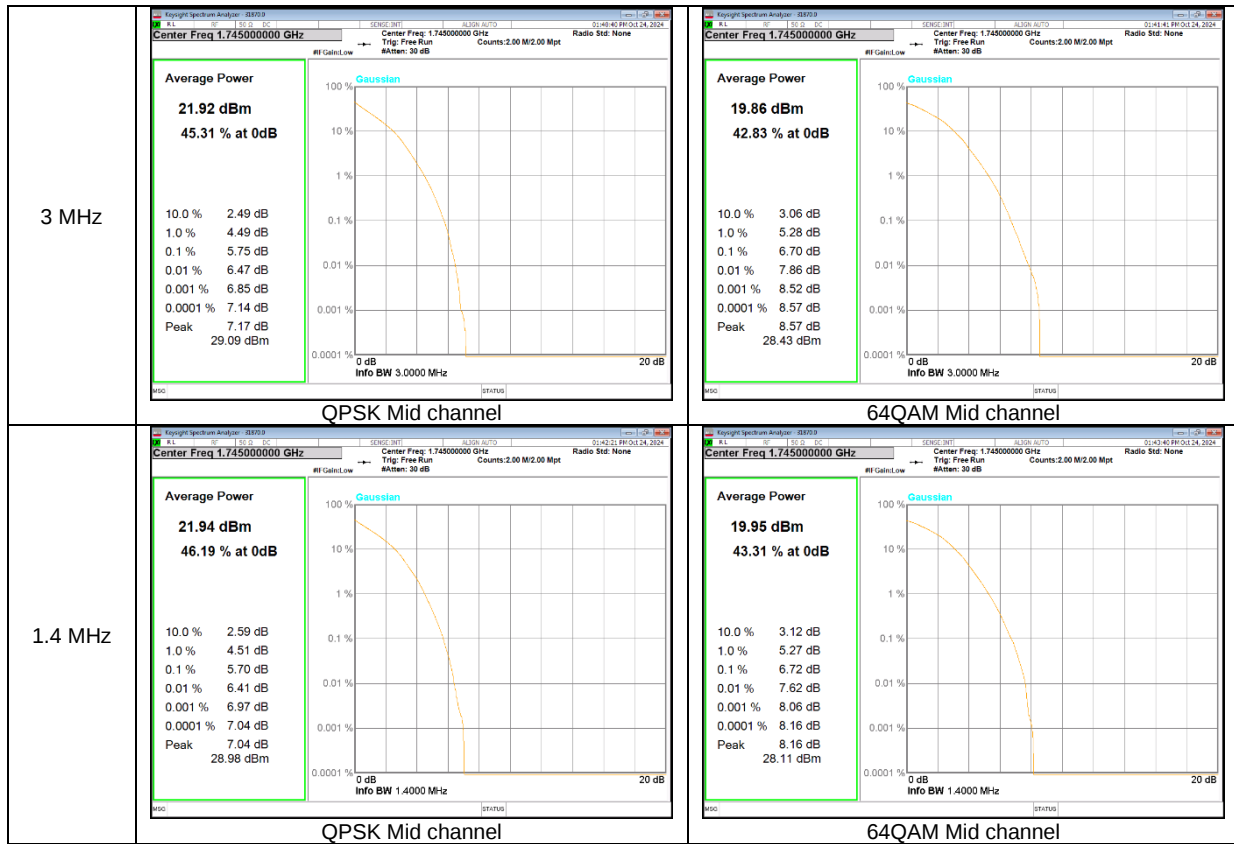


LTE Band 41



LTE Band 66





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

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

RESULTS

See the following pages.

- LTE Band 12

Band	BW	Modulation	Frequency [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B12	10M	QPSK	707.50	8.943	9.505
		16QAM		8.964	9.415
	5M	QPSK		4.480	4.922
		16QAM		4.480	4.891
	3M	QPSK		2.683	2.906
		16QAM		2.688	2.908
	1.4M	QPSK		1.085	1.270
		16QAM		1.089	1.292

- LTE Band 41

Band	BW	Modulation	Frequency [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B41	20M	QPSK	2593.00	17.903	18.940
		16QAM		17.901	18.900
	15M	QPSK		13.453	14.670
		16QAM		13.432	15.220
	10M	QPSK		8.990	9.790
		16QAM		8.964	9.412
	5M	QPSK		4.486	5.502
		16QAM		4.489	5.341

- LTE Band 66

Band	BW	Modulation	Frequency [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B66	20M	QPSK	1745.00	17.923	19.210
		16QAM		17.911	19.060
	15M	QPSK		13.464	14.260
		16QAM		13.432	14.480
	10M	QPSK		8.960	9.609
		16QAM		8.952	9.598
	5M	QPSK		4.484	4.967
		16QAM		4.478	4.875
	3M	QPSK		2.689	2.921
		16QAM		2.682	2.910
	1.4M	QPSK		1.088	1.274
		16QAM		1.082	1.248

8.3.1. OCCUPIED BANDWIDTH RESULT

LTE Band 12



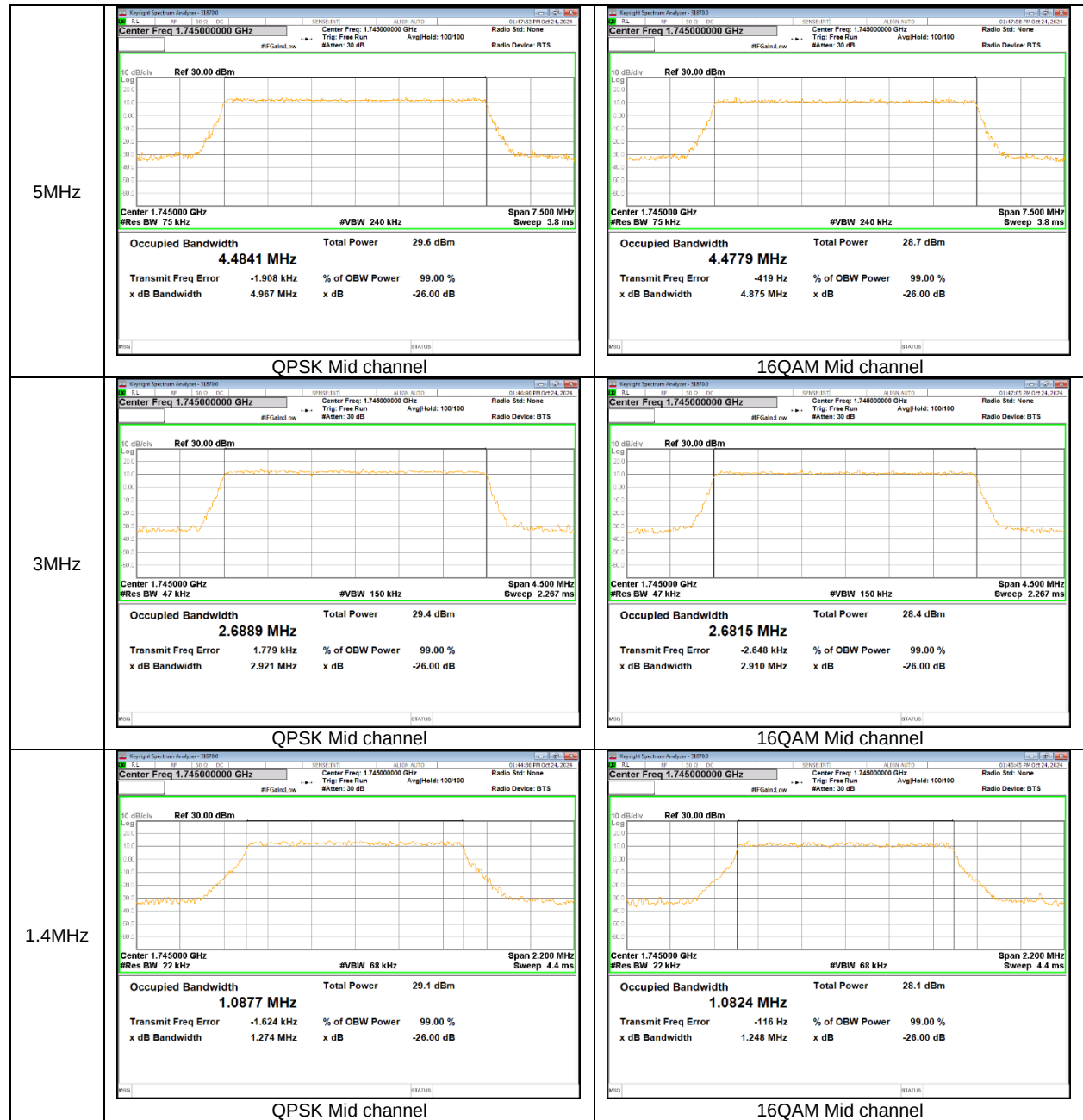


LTE Band 41



LTE Band 66





8.4. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §27.53

LIMITS

§27.53:

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) 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.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

LTE Band 12

- a) Set the RBW = 1 - 5% of OBW(GSM1900 – 9.1kHz)
/ within 100 kHz from the edge of the authorized frequency block/band.
- b) Set the RBW = 100 kHz / above 100 kHz from the edge of the authorized frequency block/band.
- c) Set VBW $\geq 3 \times$ RBW;
- d) Set span $\geq 2 \times$ OBW;
- e) Sweep time = Auto;
- f) Detector = RMS;
- g) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- h) Trace Mode = Average (100);

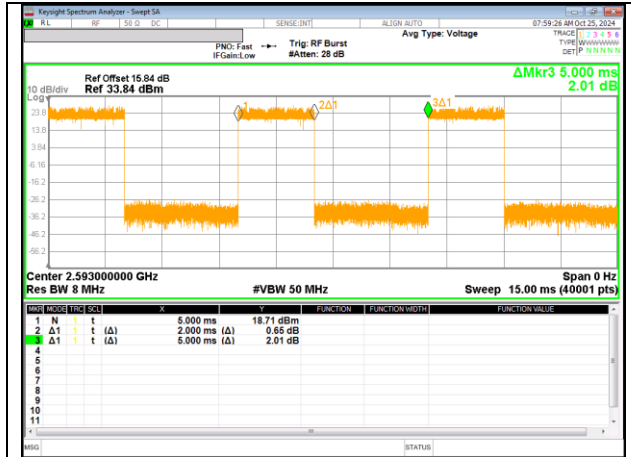
LTE Band 41,66

- a) Set the RBW = 1 - 1.5 % of OBW (Typically limited to a minimum RBW of 1% of the OBW)
/ within 1 MHz from the edge of the authorized frequency block/band.
- b) Set the RBW = 1 MHz / above 1 MHz from the edge of the authorized frequency block/band.
- c) Set VBW $\geq 3 \times$ RBW;
- d) Set span $\geq 2 \times$ OBW;
- e) Sweep time = Auto;
- f) Detector = RMS;
- g) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- h) Trace Mode = Average (100);

NOTE1

Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm / -25dBm limits. Although the measurement bandwidth is less than the reference bandwidth of 1MHz no addtional correction is applied as ANSI C63.26 section 4.2.3 only requires the correction to be applied when the OBW of the emission being measured is wider than the measurement bandwidth (Where the OBW of the signal under measurement is less than the RBW of the measuring instrument, no bandwidth correction or integration will be required.) Plots for low and high channels show the level of the emission measured with the reduced bandwidth and the level of the same emission measured using the integration method over the 1MHz reference bandwidth are very close, indicating the emissions are narrowband.

NOTE2



For LTE Band 41 (Gate trigger off):
RF Path Loss: 15.84 dB & DCF 4 dB: $10\log(2/5)$
Measure offset: 15.84 dB+4 dB = **19.84 dB**

NOTE3

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.

RESULTS

See the following pages.

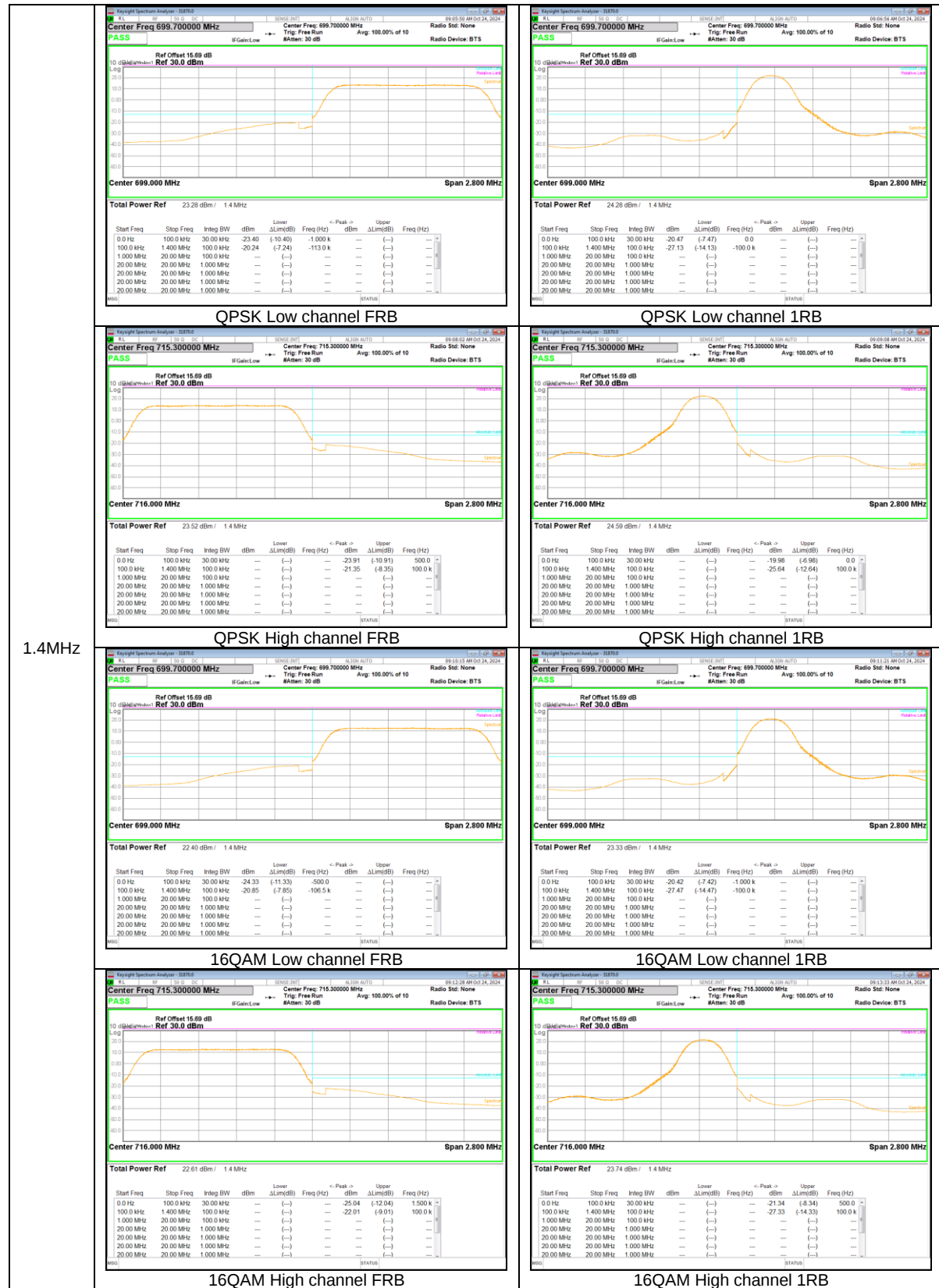
8.4.1. BAND EDGE RESULT

LTE Band 12









LTE Band 66

