

CERTIFICATION TEST REPORT

Report Number. : S-4791655852-E3V1

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

Model : SM-L335U, SM-L335F

FCC ID : A3LSML335

EUT Description : WCDMA/LTE Smart Wearable + BT/BLE, DTS/UNII a/b/g/n

Test Standard(s) : FCC 47 CFR PART 24 SUBPART E

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: WCDMA/LTE Smart Wearable + BT/BLE, DTS/UNII a/b/g/n.

MODEL NUMBER: SM-L335U, SM-L335F

SERIAL NUMBER: R3AY1007ZQJ, R3AY1007ZXR (CONDUCTED);
R3AY3006Y6B, R3AY3006XFX, R3AY3006YFF, R3AY3006YGE
(RADIATED);

DATE TESTED: 2025-04-07 – 2025-04-18;

APPLICABLE STANDARD	
STANDARD	TEST RESULTS
FCC PART 24E	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:



Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:



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 24.
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:

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

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	1.84 dB
Radiated Disturbance, 9 kHz to 30 MHz	2.41 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.69 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.18 dB
Radiated Disturbance, Above 18 GHz	5.07 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 WCDMA/LTE Smart Wearable + BT/BLE, DTS/UNII a/b/g/n.
This test report addresses the WWAN operational mode.

Representative model	Difference	Derivative model
		SM-L335F
SM-L335U	Hardware	Same
	Software	The UI has changed according to Service Provider

The model SM-L335U 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 EIRP output powers as follows:

WCDMA

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1852.40 ~ 1907.60	Rel. 99	22.88	194.09	12.78	18.97
		HSDPA	22.43	174.98	11.54	14.26

LTE Band 25

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 25	1860.00 ~ 1905.00	20	QPSK	22.74	187.93	14.28	26.79
			16QAM	21.86	153.46	13.01	20.00
	1857.50 ~ 1907.50	15	QPSK	22.59	181.55	14.18	26.18
			16QAM	21.83	152.41	13.36	21.68
	1855.00 ~ 1910.00	10	QPSK	23.09	203.70	14.60	28.84
			16QAM	22.20	165.96	13.69	23.39
	1852.50 ~ 1912.50	5	QPSK	23.00	199.53	14.96	31.33
			16QAM	21.92	155.60	14.09	25.64
	1851.50 ~ 1913.50	3	QPSK	22.92	195.88	15.07	32.14
			16QAM	21.92	155.60	14.13	25.88
	1850.70 ~ 1914.30	1.4	QPSK	22.95	197.24	14.75	29.85
			16QAM	22.18	165.20	13.66	23.23

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)
WCDMA Band 2/ LTE Band 25 1850 - 1915 MHz	-10.6

5.4. WORST-CASE ORIENTATION

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

- UMTS REL 99/HSDPA
The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on REL 99 and HSDPA modulations. It was found REL 99 results were worst case.
- LTE Band 25
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 modulations.

LTE Band 2

LTE Band 2 (Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

• Conducted Spurious Emission

Highest conducted output power setting for each bands					
LTE Band	Frequency (MHz)	Bandwidth (MHz)	Modulation	RB size	RB offset
25	1855.00	10	QPSK	1	0
	1882.50			1	0
	1910.00			1	0

• Radiated Spurious Emission

Highest EIRP setting for each bands					
LTE Band	Frequency (MHz)	Bandwidth (MHz)	Modulation	RB size	RB offset
25	1851.50	3	QPSK	1	0
	1882.50			1	0
	1913.50			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
WCDMA B2	-	-	O	O	-	-
LTE B25	-	-	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
Adapter	SAMSUNG	EP-TA800	R37XBMJF8FBDKA	N/A
Wireless Charger	SAMSUNG	EP-OL300	-	-

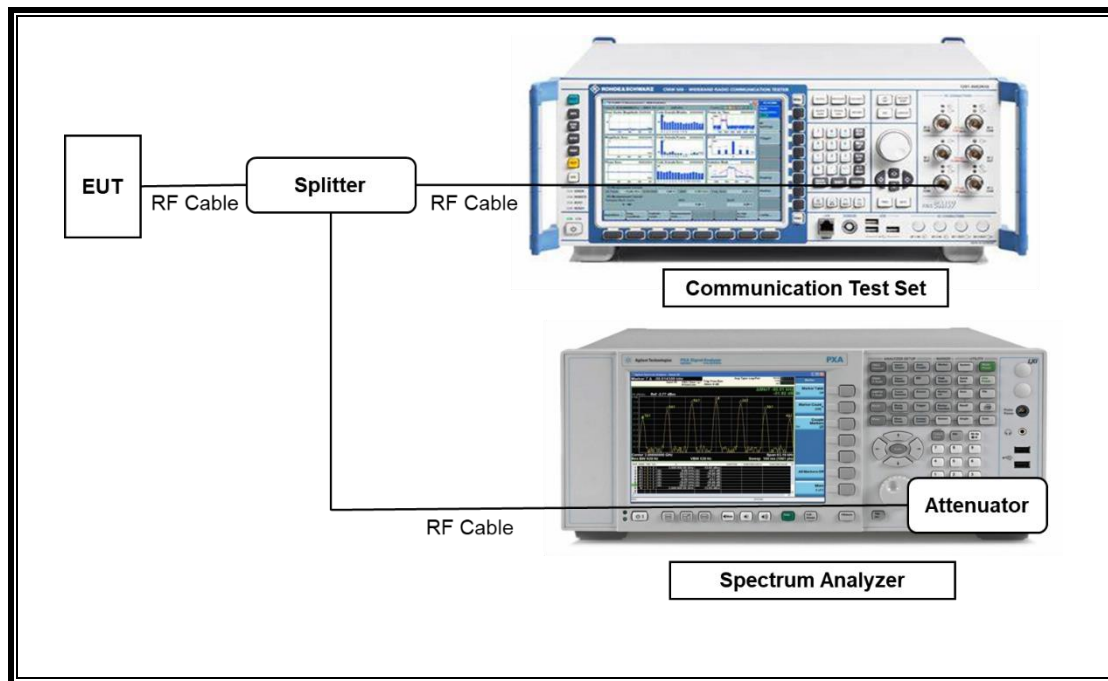
I/O CABLE

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	0.8 m	N/A

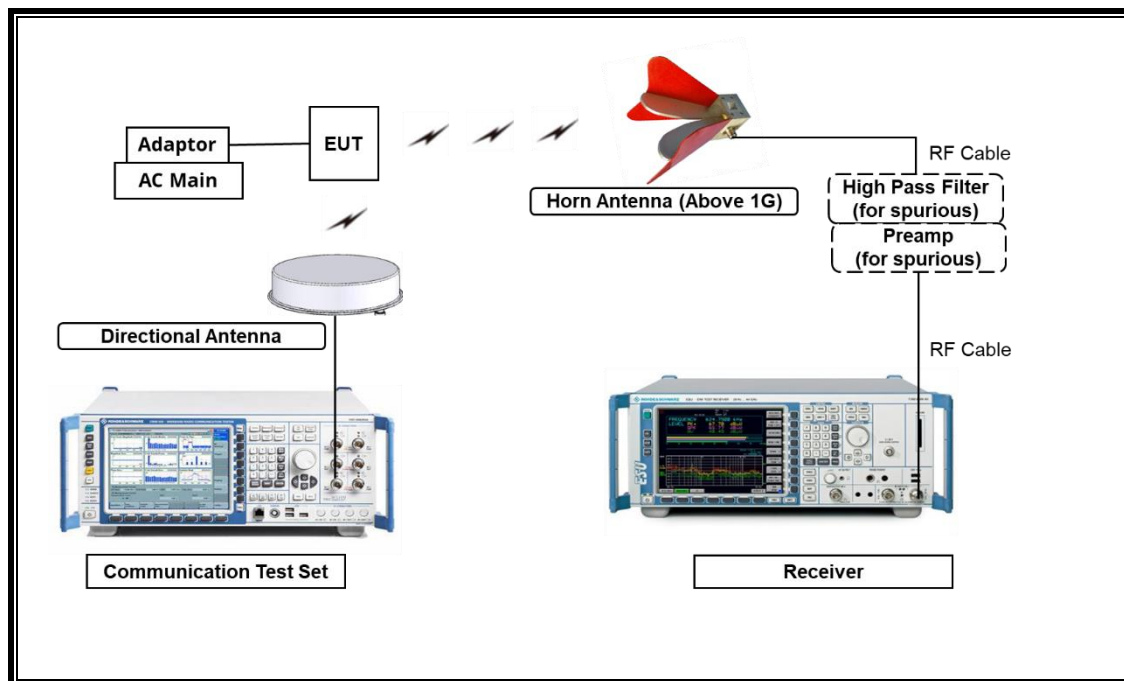
TEST SETUP

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	2027-01-08
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	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	2026-01-02
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	2026-01-03
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2026-01-03
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510655	2026-01-03
Notch Filter	MICRO-TRONICS	BRC50705-02	G024	2025-07-24
Notch Filter	MICRO-TRONICS	BRM50702-02	G036	2025-07-23
Notch Filter	MICRO-TRONICS	BRM50707-02	G002	2025-07-23
Notch Filter	MICRO-TRONICS	BRM50709-02	G001	2025-07-23
Notch Filter	MICRO-TRONICS	BRM50713-02	G001	2025-07-24
Notch Filter	MICRO-TRONICS	BRM50716-2	006	2025-07-23
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
24.238(a)	Conducted Band Edge / Conducted Spurious Emission	-13 dBm		Complies
24.235	Frequency Stability	2.5 ppm		Complies
24.232(c)	Effective Isotropic Radiated Power	33 dBm	Radiated	Complies
24.238(a)	Radiated Spurious Emission	-13 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

WCDMA B2

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.88	N/A	23.5
		9400	1880.0	22.80		
		9538	1907.6	22.86		
HSDPA	Subtest 1	9262	1852.4	22.35	0	23.5
		9400	1880.0	22.20		
		9538	1907.6	22.32		
	Subtest 2	9262	1852.4	22.40	0	23.5
		9400	1880.0	22.20		
		9538	1907.6	22.30		
	Subtest 3	9262	1852.4	22.36	0.5	23.0
		9400	1880.0	22.20		
		9538	1907.6	22.30		
	Subtest 4	9262	1852.4	22.43	0.5	23.0
		9400	1880.0	22.25		
		9538	1907.6	22.26		
HSUPA	Subtest 1	9262	1852.4	23.15	0	23.5
		9400	1880.0	23.03		
		9538	1907.6	22.97		
	Subtest 2	9262	1852.4	20.00	2	21.5
		9400	1880.0	19.80		
		9538	1907.6	19.92		
	Subtest 3	9262	1852.4	22.37	1	22.5
		9400	1880.0	22.24		
		9538	1907.6	22.30		
	Subtest 4	9262	1852.4	19.88	2	21.5
		9400	1880.0	19.76		
		9538	1907.6	19.83		
	Subtest 5	9262	1852.4	22.22	0	23.5
		9400	1880.0	22.36		
		9538	1907.6	22.26		
DC-HSDPA	Subtest 1	9262	1852.4	21.87	0	23.5
		9400	1880.0	21.62		
		9538	1907.6	22.00		
	Subtest 2	9262	1852.4	22.22	0	23.5
		9400	1880.0	21.55		
		9538	1907.6	21.82		
	Subtest 3	9262	1852.4	21.93	0.5	23.0
		9400	1880.0	21.62		
		9538	1907.6	21.71		
	Subtest 4	9262	1852.4	21.75	0.5	23.0
		9400	1880.0	21.64		
		9538	1907.6	21.70		

LTE Band 25

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				26140	26365	26590		
				1860.00 MHz	1882.50 MHz	1905.00 MHz		
20 MHz	QPSK	1	0	22.70	22.55	22.74	0.0	24.0
		1	49	22.26	22.11	22.27	0.0	24.0
		1	99	22.12	21.95	22.08	0.0	24.0
		50	0	21.54	21.39	21.50	1.0	23.0
		50	24	21.37	21.20	21.31	1.0	23.0
		50	50	21.24	21.10	21.12	1.0	23.0
	16QAM	100	0	21.39	21.25	21.28	1.0	23.0
		1	0	21.86	21.83	21.81	1.0	23.0
		1	49	21.43	21.28	21.32	1.0	23.0
		1	99	21.29	21.10	21.15	1.0	23.0
		50	0	20.50	20.38	20.47	2.0	22.0
		50	24	20.33	20.21	20.26	2.0	22.0
15 MHz	QPSK	50	50	20.24	20.09	20.14	2.0	22.0
		100	0	20.37	20.22	20.32	2.0	22.0
	16QAM	1	0	22.59	22.49	22.47	0.0	24.0
		1	37	22.28	22.17	22.14	0.0	24.0
		1	74	22.16	22.03	22.00	0.0	24.0
		36	0	21.47	21.36	21.36	1.0	23.0
10 MHz	QPSK	36	20	21.33	21.24	21.23	1.0	23.0
		36	39	21.26	21.15	21.14	1.0	23.0
		75	0	21.34	21.25	21.20	1.0	23.0
	16QAM	1	0	21.83	21.27	21.73	1.0	23.0
		1	37	21.00	20.94	21.36	1.0	23.0
		1	74	20.88	21.24	21.22	1.0	23.0
10 MHz	QPSK	36	0	20.45	20.31	20.41	2.0	22.0
		36	20	20.31	20.17	20.26	2.0	22.0
		36	39	20.18	20.09	20.15	2.0	22.0
		75	0	20.34	20.24	20.21	2.0	22.0
	16QAM	1	0	22.95	22.96	23.09	0.0	24.0
		1	25	22.75	22.77	22.88	0.0	24.0
10 MHz	QPSK	1	49	22.67	22.68	22.76	0.0	24.0
		25	0	21.89	21.80	21.89	1.0	23.0
		25	12	21.82	21.69	21.81	1.0	23.0
		25	25	21.74	21.64	21.75	1.0	23.0
		50	0	21.82	21.72	21.83	1.0	23.0
	16QAM	1	0	22.20	22.10	21.76	1.0	23.0
10 MHz	QPSK	1	25	22.00	21.91	21.57	1.0	23.0
		1	49	21.91	21.79	21.44	1.0	23.0
		25	0	20.84	20.84	20.92	2.0	22.0
		25	12	20.76	20.71	20.87	2.0	22.0
		25	25	20.73	20.66	20.81	2.0	22.0
		50	0	20.76	20.71	20.86	2.0	22.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26065	26365	26665		
				1852.50 MHz	1882.50 MHz	1912.50 MHz		
5 MHz	QPSK	1	0	22.92	22.79	23.00	0.0	24.0
		1	12	22.85	22.70	22.91	0.0	24.0
		1	24	22.79	22.65	22.86	0.0	24.0
		12	0	21.81	21.75	21.93	1.0	23.0
		12	7	21.79	21.70	21.89	1.0	23.0
		12	13	21.71	21.67	21.86	1.0	23.0
	16QAM	25	0	21.75	21.71	21.85	1.0	23.0
		1	0	21.79	21.89	21.92	1.0	23.0
		1	12	21.71	21.81	21.83	1.0	23.0
		1	24	21.65	21.75	21.77	1.0	23.0
		12	0	20.75	20.84	20.91	2.0	22.0
		12	7	20.72	20.80	20.86	2.0	22.0
3 MHz	QPSK	12	13	20.71	20.78	20.90	2.0	22.0
		25	0	20.71	20.74	20.88	2.0	22.0
	16QAM	1	0	21.94	21.96	22.19	1.0	23.0
		1	8	21.90	21.92	22.14	1.0	23.0
		1	14	21.86	21.90	21.60	1.0	23.0
		8	0	20.76	20.75	20.98	2.0	22.0
1.4 MHz	QPSK	8	4	20.73	20.74	20.96	2.0	22.0
		8	7	20.71	20.74	20.95	2.0	22.0
		15	0	20.69	20.73	20.94	2.0	22.0
	16QAM	1	0	21.60	21.70	21.95	1.0	23.0
		1	3	21.57	21.86	21.91	1.0	23.0
		1	5	21.59	21.87	21.92	1.0	23.0
1.4 MHz	QPSK	3	0	21.61	21.68	21.96	2.0	22.0
		3	1	21.61	21.65	21.95	2.0	22.0
		3	3	21.61	21.62	21.96	2.0	22.0
		6	0	20.71	20.52	21.07	2.0	22.0
	16QAM	1	0	22.61	22.76	22.94	0.0	24.0
		1	3	22.58	22.73	22.94	0.0	24.0
		1	5	22.60	22.74	22.94	0.0	24.0
		3	0	22.56	22.72	22.94	1.0	23.0
		3	1	22.56	22.72	22.95	1.0	23.0
		3	3	22.58	22.69	22.95	1.0	23.0

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

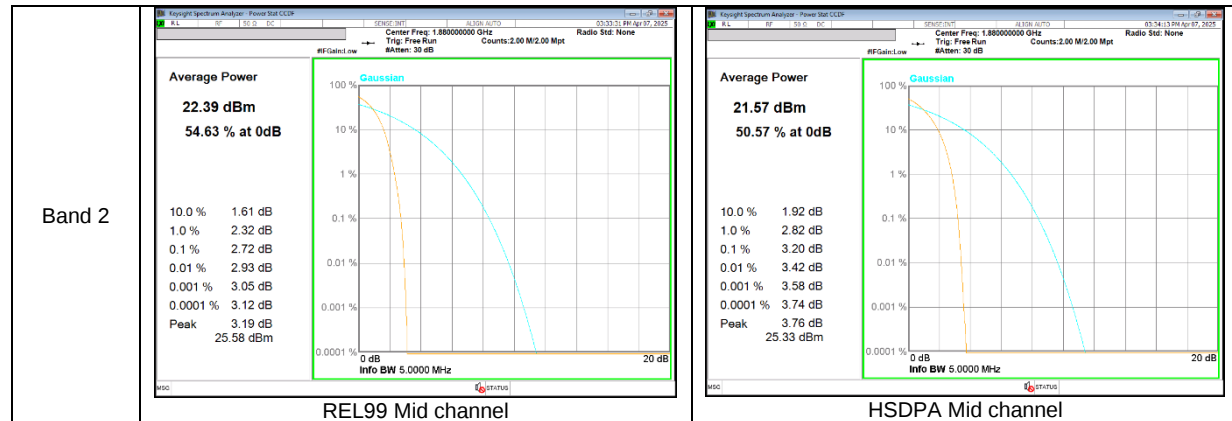
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

RESULTS

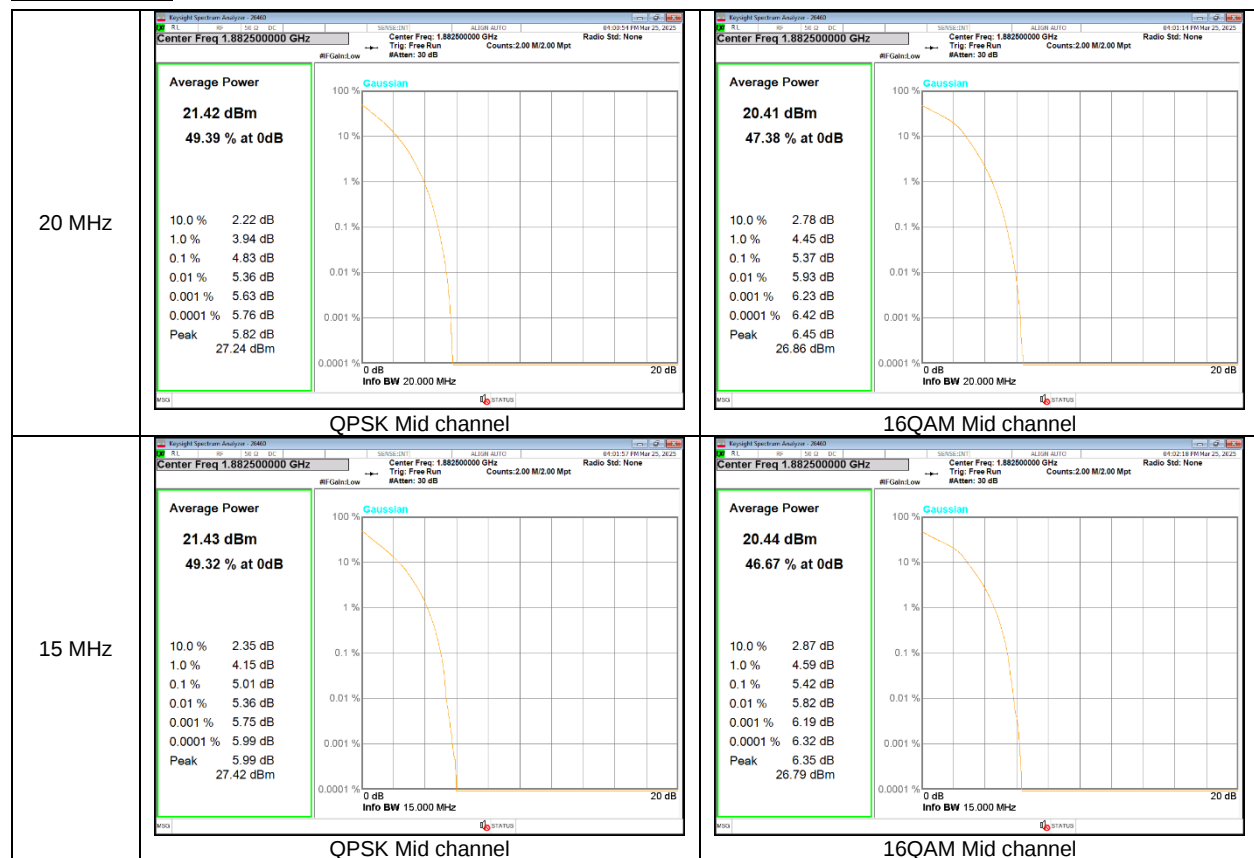
See the following pages.

8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

WCDMA



LTE Band 25





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.

- WCDMA

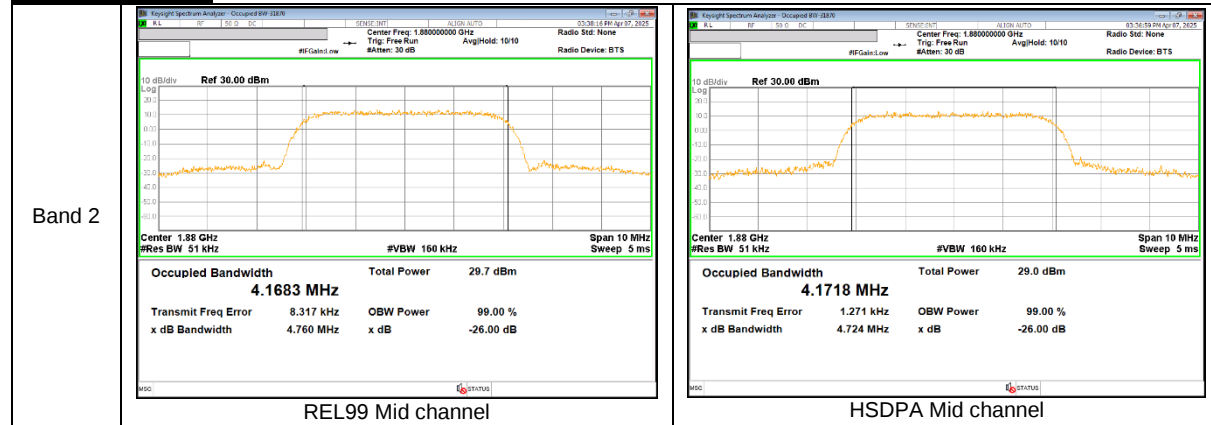
Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B2	Rel.99	1880.00	4.168	4.760
	HSDPA		4.172	4.724

- LTE Band 25

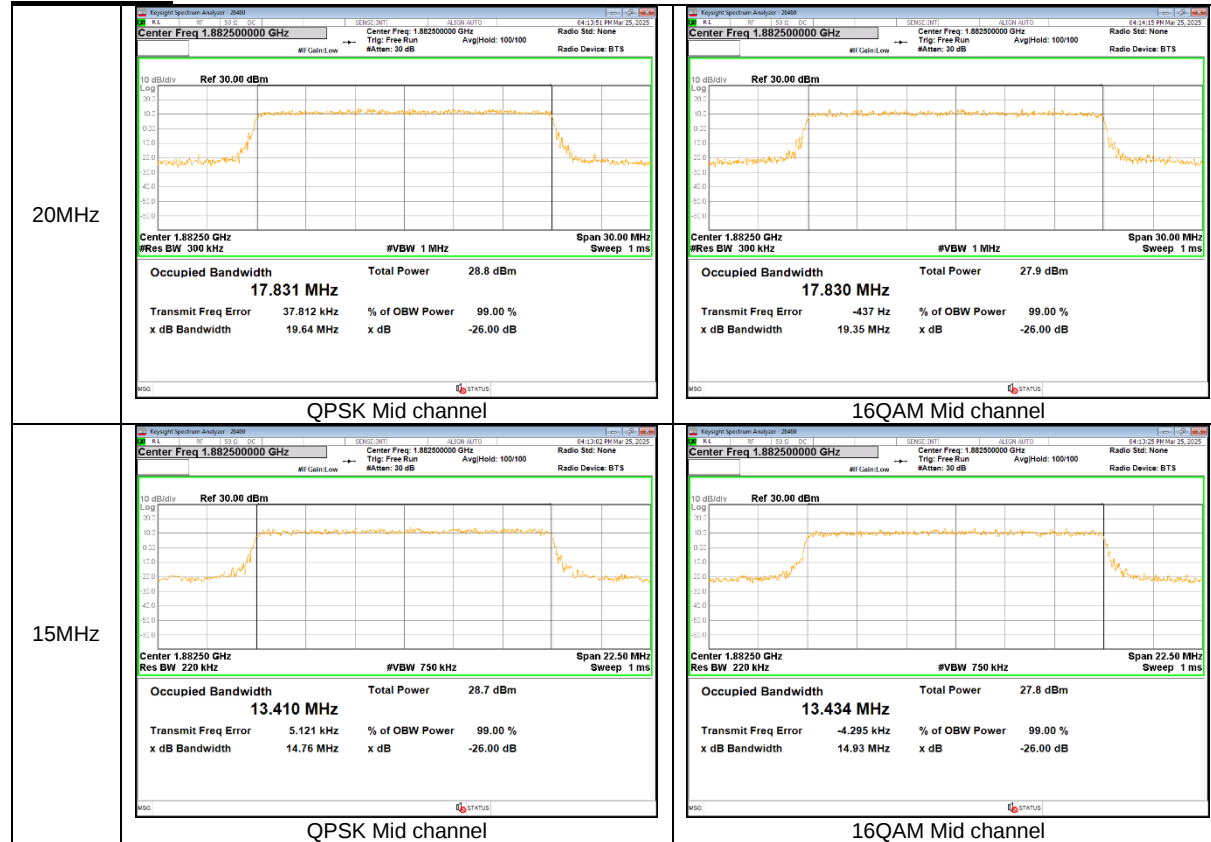
Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B25	20M	QPSK	1882.50	17.831	19.640
		16QAM		17.830	19.350
	15M	QPSK		13.410	14.760
		16QAM		13.434	14.930
	10M	QPSK		8.963	10.080
		16QAM		8.977	10.110
	5M	QPSK		4.495	5.301
		16QAM		4.513	5.295
	3M	QPSK		2.697	3.044
		16QAM		2.700	3.126
	1.4M	QPSK		1.083	1.320
		16QAM		1.093	1.316

8.3.1. OCCUPIED BANDWIDTH RESULT

WCDMA Band 2



LTE Band 25





8.4. BAND EDGE EMISSIONS

RULE PART

FCC: §24.238

LIMITS

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

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.

WCDMA/LTE

- 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

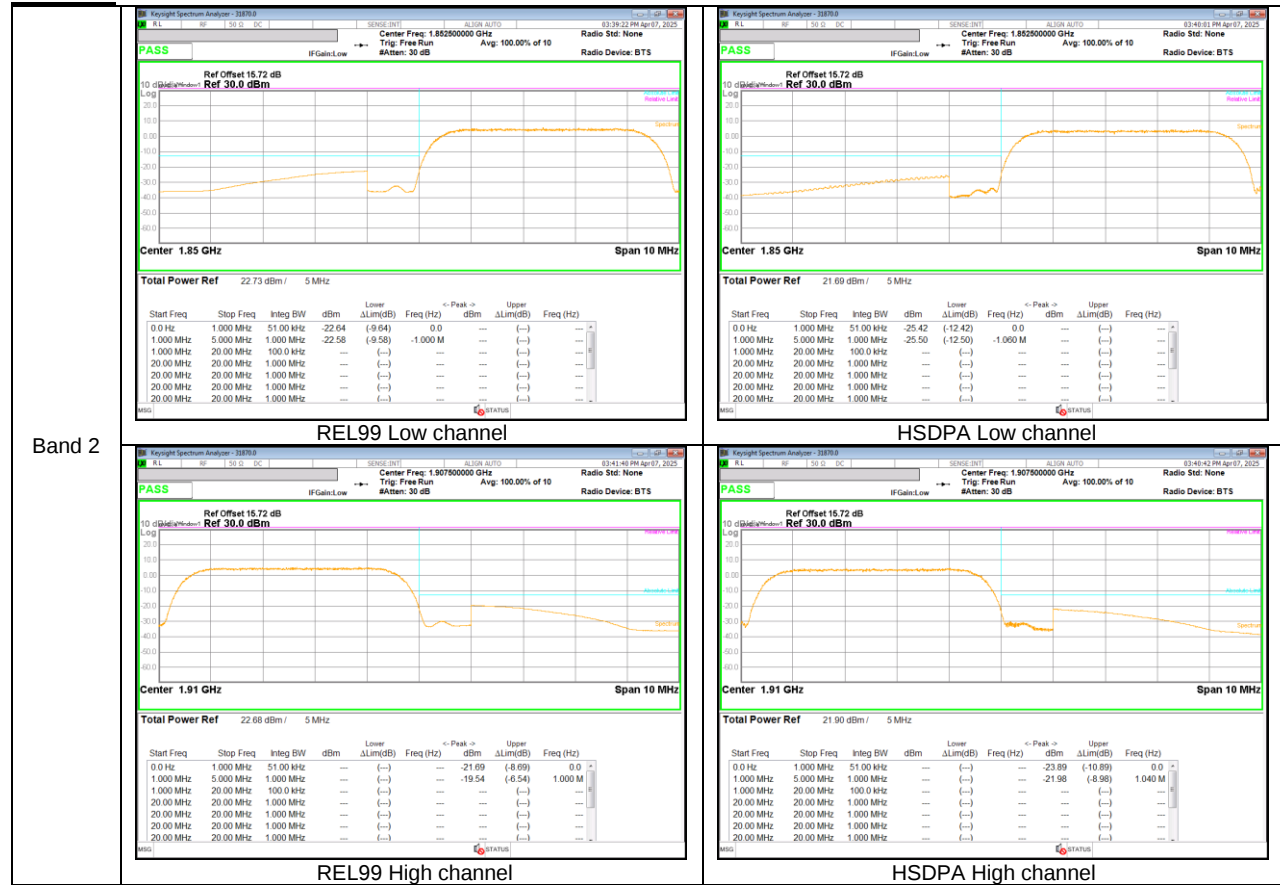
Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm limits. Although the measurement bandwidth is less than the reference bandwidth of 1MHz no addental correction is applied as ANSI C63.26 section 4.2.3 only requires the correction 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.

RESULTS

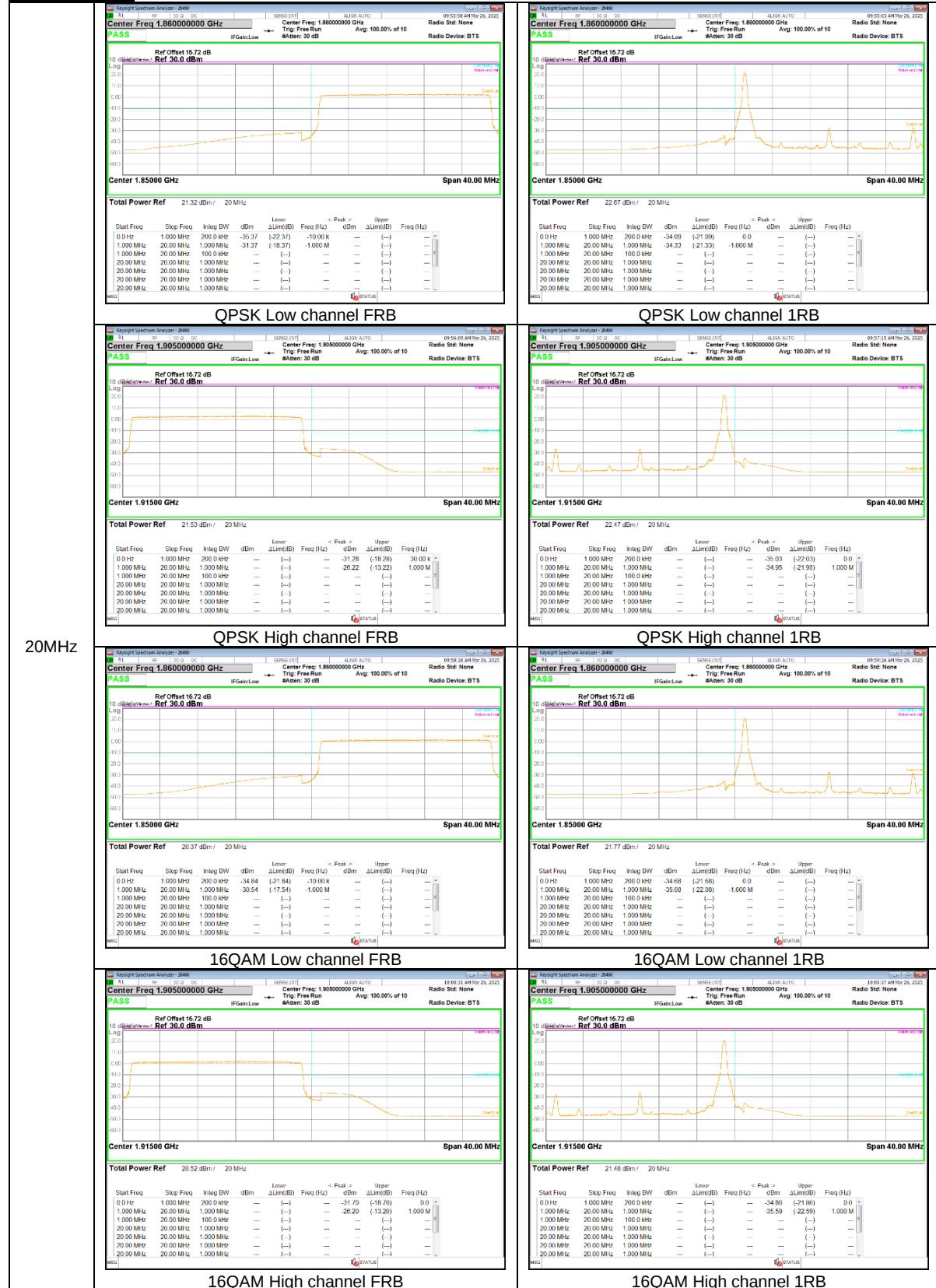
See the following pages.

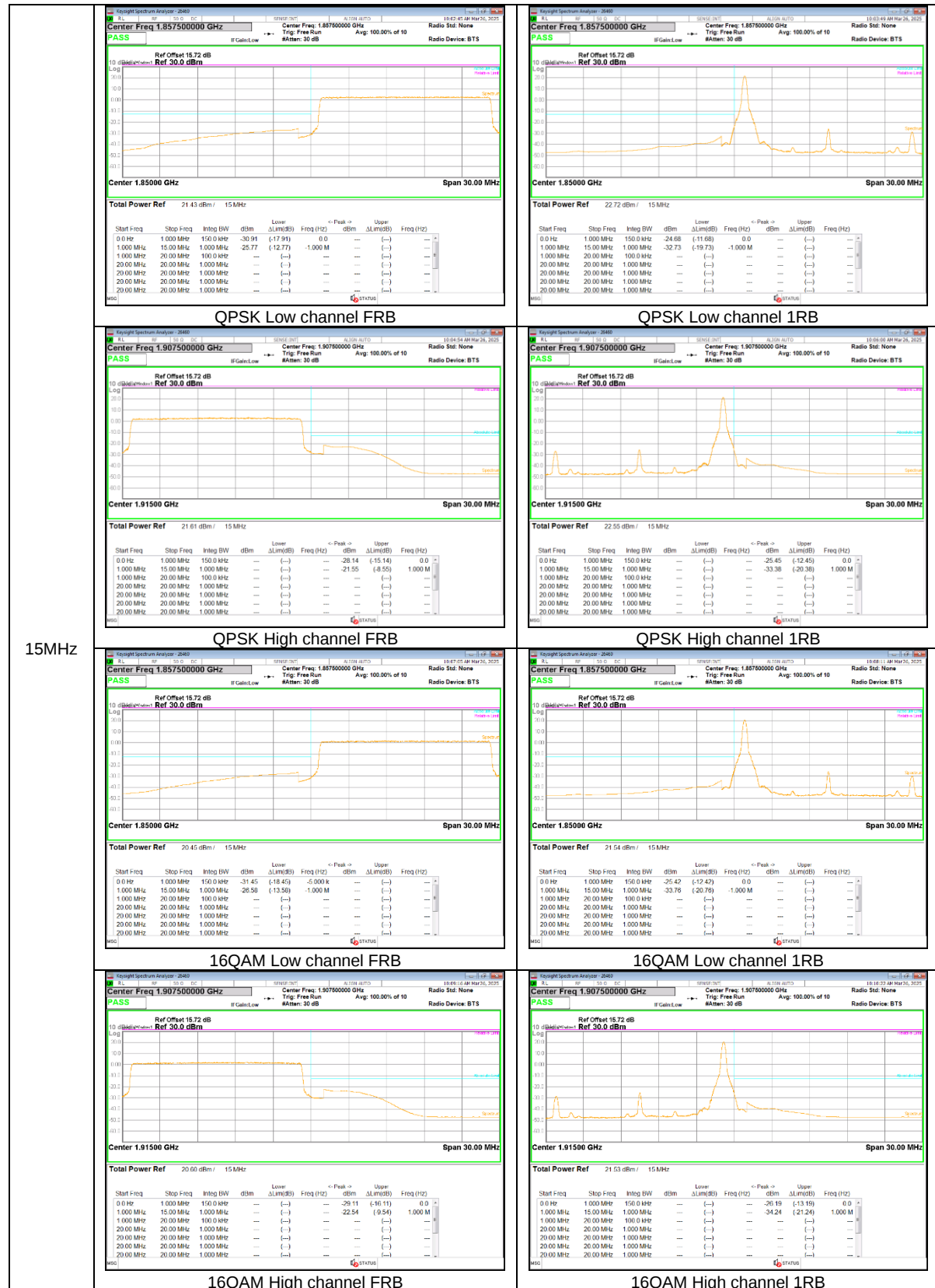
8.4.1. BAND EDGE RESULT

WCDMA



LTE Band 25

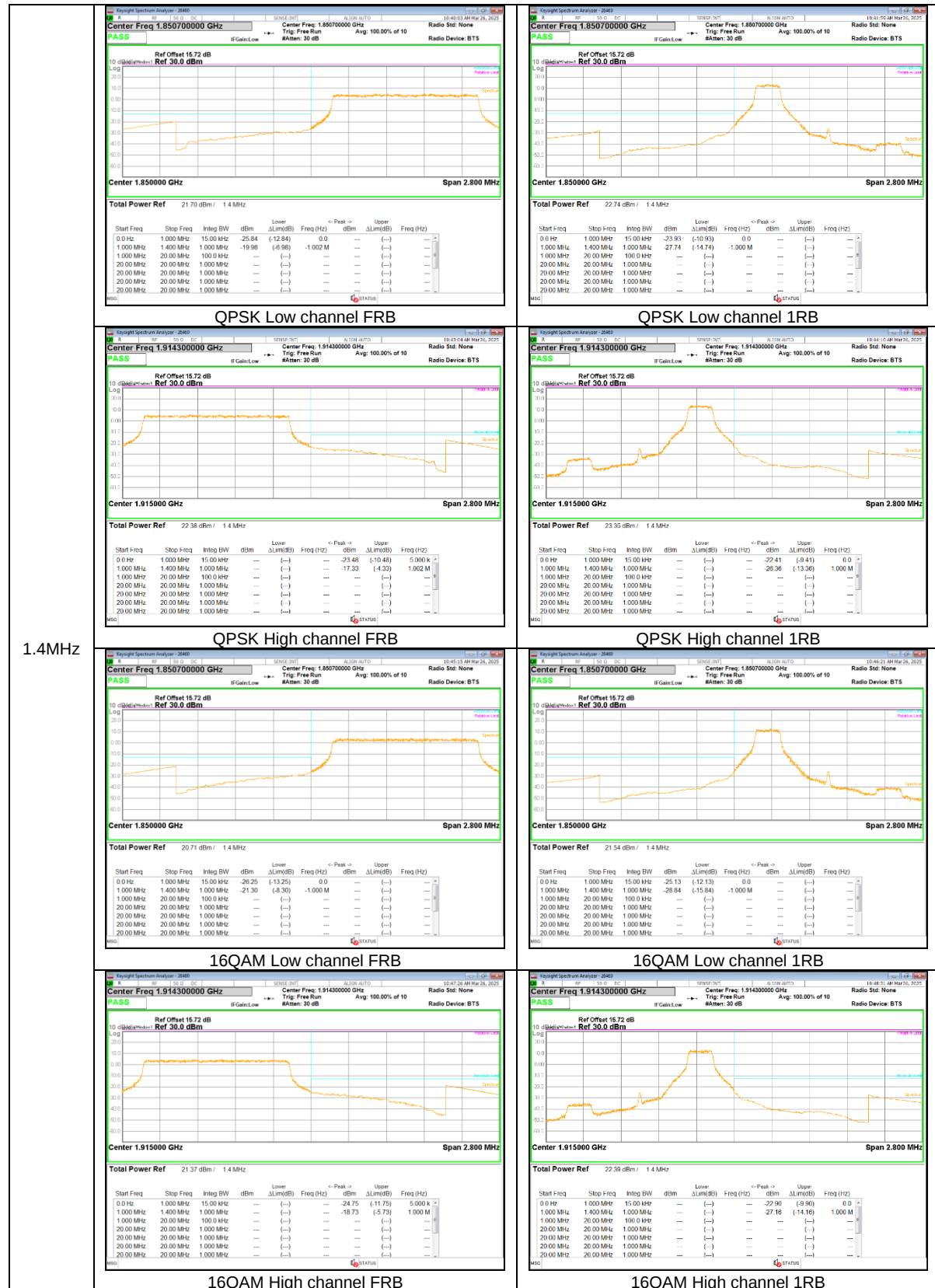












8.5. CONDUCTED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §24.238

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

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

WCDMA/LTE

- a) Set the RBW = 100 kHz for emission below 1 GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average;

NOTE1

UMTS: It was tested at REL 99 as worst case (the highest output power and density).

LTE: It was tested at 1RB QPSK as worst case (the highest output power and density).

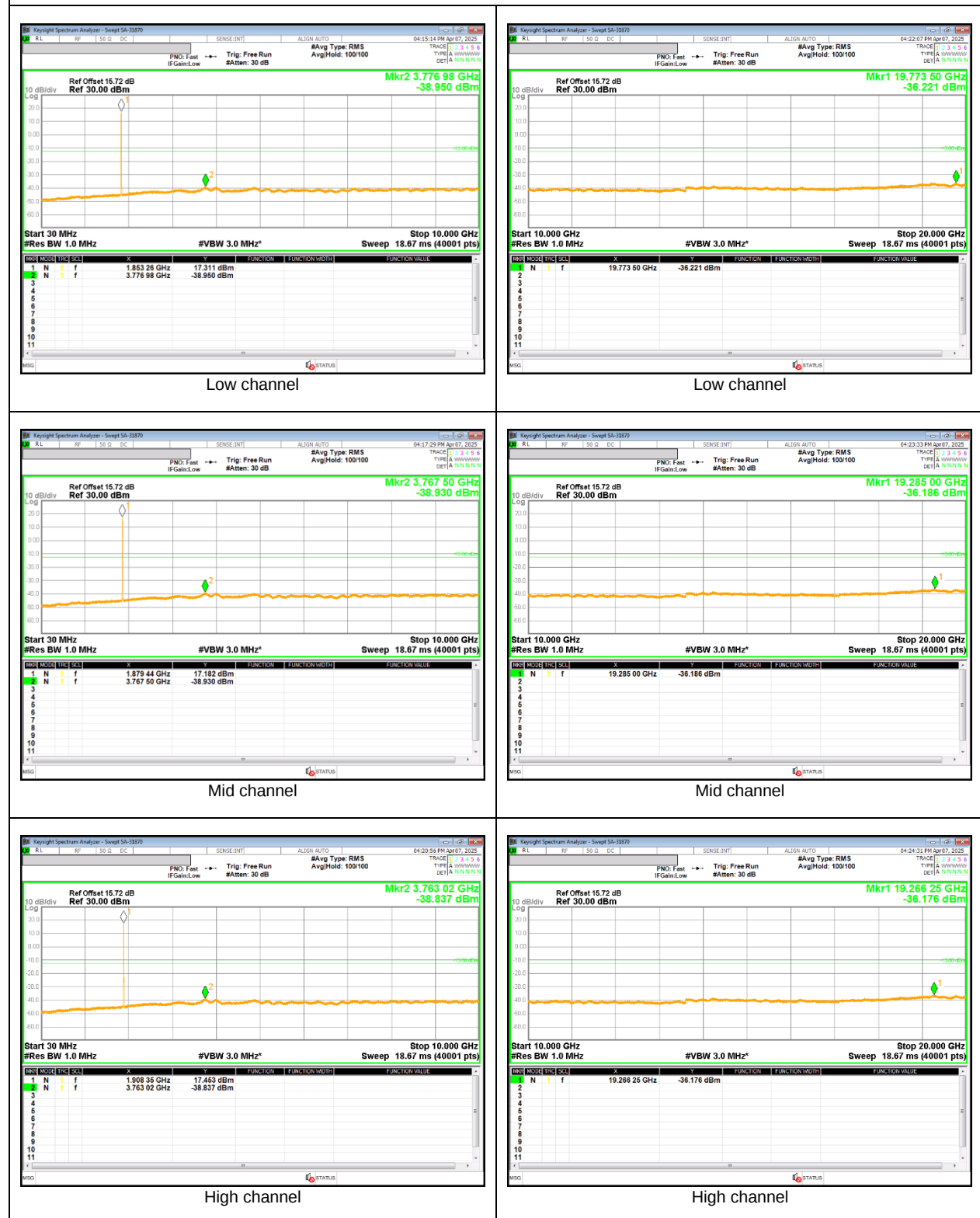
NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

8.5.1. OUT OF BAND EMISSIONS RESULT

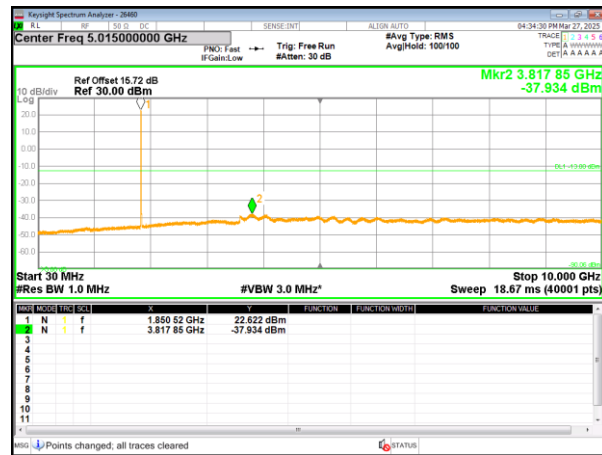
WCDMA B2

REL 99

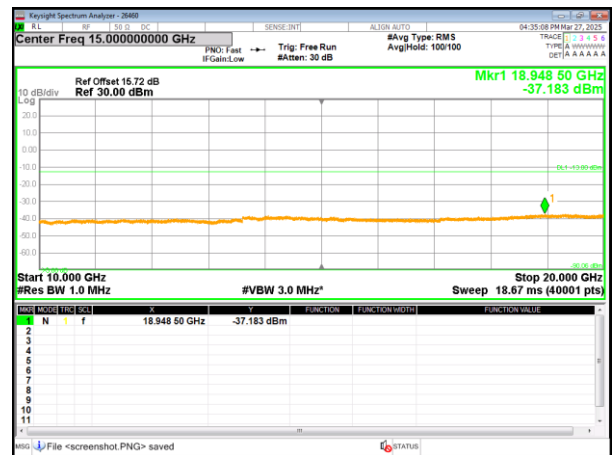


LTE Band 25

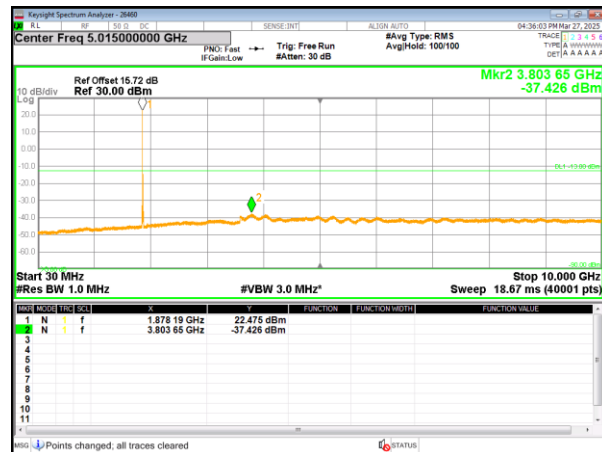
10 MHz QPSK



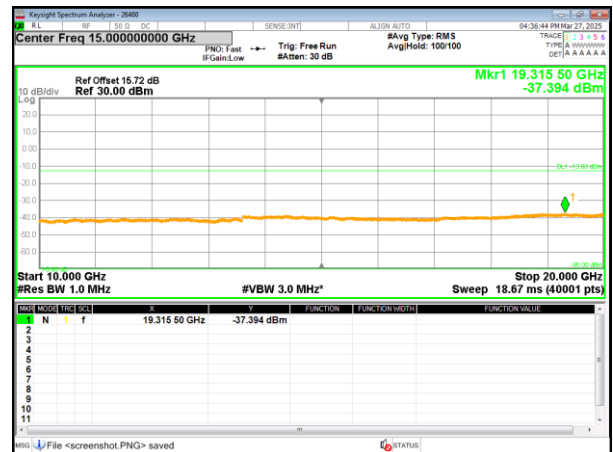
Low channel



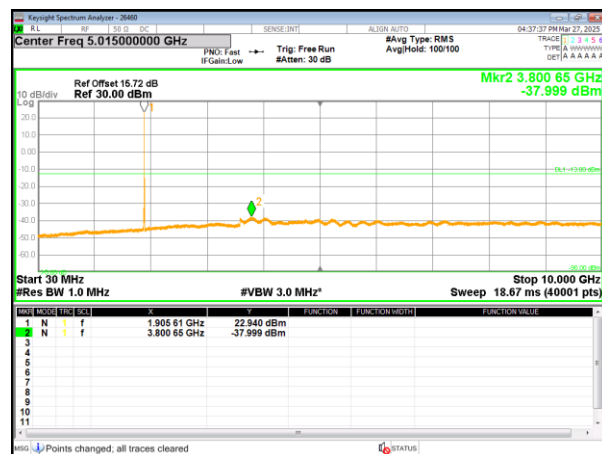
Low channel



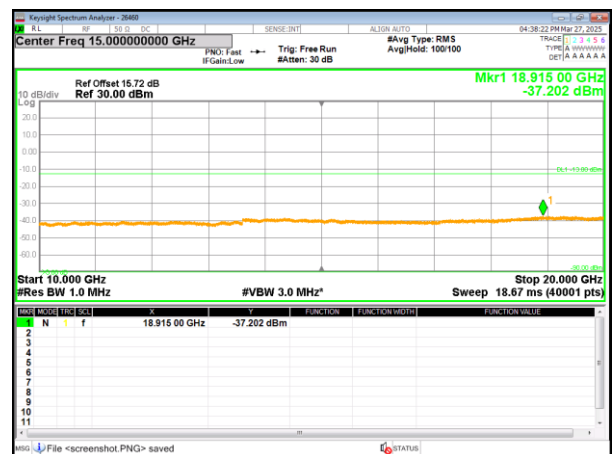
Mid channel



Mid channel



High channel



High channel

8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §24.235

LIMITS

§24.235

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

NOTE

Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to OBW results)

RESULTS

See the following pages.

8.6.1. FREQUENCY STABILITY RESULT

WCDMA B2 (Lowest Frequency: HSDPA / Highest Frequency: HSDPA)

Test Date	2025-04-10
Test Engineer	26460

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3079	1909.6878		
Extreme (50C)		1850.3079	1909.6878	41.8	0.022
Extreme (40C)		1850.3079	1909.6878	39.5	0.021
Extreme (30C)		1850.3079	1909.6878	33.1	0.018
Extreme (10C)		1850.3079	1909.6878	25.6	0.014
Extreme (0C)		1850.3079	1909.6878	28.4	0.015
Extreme (-10C)		1850.3079	1909.6878	24.3	0.013
Extreme (-20C)		1850.3079	1909.6878	23.4	0.012
Extreme (-30C)		1850.3079	1909.6878	21.5	0.011
20C	15%	1850.3079	1909.6878	29.4	0.016
	-15%	1850.3079	1909.6878	13.6	0.007
	End Point	1850.3079	1909.6878	15.1	0.008

LTE Band 25 (Lowest Frequency: QPSK / Highest Frequency: 16QAM)

Test Date	2025-04-10
Test Engineer	26460

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1509	1914.8471		
Extreme (50C)		1850.1509	1914.8471	48.6	0.026
Extreme (40C)		1850.1509	1914.8471	45.2	0.024
Extreme (30C)		1850.1509	1914.8471	41.6	0.022
Extreme (10C)		1850.1509	1914.8471	38.5	0.020
Extreme (0C)		1850.1509	1914.8471	33.7	0.018
Extreme (-10C)		1850.1509	1914.8471	34.2	0.018
Extreme (-20C)		1850.1509	1914.8471	30.6	0.016
Extreme (-30C)		1850.1509	1914.8471	29.5	0.016
20C	15%	1850.1509	1914.8471	40.8	0.022
	-15%	1850.1509	1914.8471	22.3	0.012
	End Point	1850.1509	1914.8471	18.5	0.010

9. RADIATED RESULTS

9.1. RADIATED POWER (EIRP)

RULE PART(S)

FCC: §2.1046, §24.232

LIMITS

§24.232(c)

Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW $\geq 1\%$ to 5% of the OBW;
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span $\geq 2 \times$ to $3 \times$ the OBW.;
- d) Sweep time = auto couple or Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq 2 \times$ span/RBW;
- g) Trace mode = average;
- h) If the EUT can be configured to transmit continuously, then set the trigger to free run.
- i) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
- j) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.
- k) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

NOTE

LTE: The OBW value corresponding to the total channel bandwidth is the OBW of FullRB.
Measurements were made with a 1RB configuration (Worst case) over the entire channel bandwidth, and
FRB configurations were also reported for the worst BW.

TEST RESULTS

See the following pages.

9.1.1. EIRP RESULT

WCDMA

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
Band 2	REL99	1852.40	7.82	H	4.50	9.46	12.78	18.97	33.00	-20.22
		1880.00	7.22	H	4.53	9.20	11.89	15.45	33.00	-21.11
		1907.60	8.09	H	4.56	8.89	12.42	17.46	33.00	-20.58
	HSDPA	1852.40	6.58	H	4.50	9.46	11.54	14.26	33.00	-21.46
		1880.00	5.63	H	4.53	9.20	10.30	10.72	33.00	-22.70
		1907.60	6.31	H	4.56	8.89	10.64	11.59	33.00	-22.36

LTE Band 25

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	9.00	H	4.51	9.39	13.89	24.49	33.00	-19.11	1/0
		1882.50	9.44	H	4.53	9.17	14.09	25.64	33.00	-18.91	1/0
		1905.00	9.91	H	4.56	8.93	14.28	26.79	33.00	-18.72	1/0
	16-QAM	1860.00	8.13	H	4.51	9.39	13.01	20.00	33.00	-19.99	1/0
		1882.50	8.03	H	4.53	9.17	12.67	18.49	33.00	-20.33	1/0
		1905.00	8.51	H	4.56	8.93	12.88	19.41	33.00	-20.12	1/0
15	QPSK	1882.50	9.27	H	4.50	9.41	14.18	26.18	33.00	-18.82	1/0
		1882.50	9.14	H	4.53	9.17	13.79	23.93	33.00	-19.21	1/0
		1907.50	9.57	H	4.56	8.89	13.89	24.49	33.00	-19.11	1/0
	16-QAM	1857.50	8.45	H	4.50	9.41	13.36	21.68	33.00	-19.64	1/0
		1882.50	8.37	H	4.53	9.17	13.01	20.00	33.00	-19.99	1/0
		1907.50	8.75	H	4.56	8.89	13.08	20.32	33.00	-19.92	1/0
10	QPSK	1855.00	9.63	H	4.50	9.43	14.57	28.64	33.00	-18.43	1/0
		1882.50	9.91	H	4.53	9.17	14.55	28.51	33.00	-18.45	1/0
		1910.00	10.32	H	4.57	8.85	14.60	28.84	33.00	-18.40	1/0
	16-QAM	1855.00	8.67	H	4.50	9.43	13.61	22.96	33.00	-19.39	1/0
		1882.50	8.78	H	4.53	9.17	13.42	21.98	33.00	-19.58	1/0
		1910.00	9.40	H	4.57	8.85	13.69	23.39	33.00	-19.31	1/0
5	QPSK	1852.50	9.51	H	4.50	9.46	14.47	27.99	33.00	-18.53	1/0
		1882.50	10.04	H	4.53	9.17	14.69	29.44	33.00	-18.31	1/0
		1912.50	10.72	H	4.57	8.82	14.96	31.33	33.00	-18.04	1/0
	16-QAM	1852.50	8.51	H	4.50	9.46	13.47	22.23	33.00	-19.53	1/0
		1882.50	9.17	H	4.53	9.17	13.81	24.04	33.00	-19.19	1/0
		1912.50	9.85	H	4.57	8.82	14.09	25.64	33.00	-18.91	1/0
3	QPSK	1851.50	9.70	H	4.50	9.47	14.67	29.31	33.00	-18.33	1/0
		1882.50	10.03	H	4.53	9.17	14.68	29.38	33.00	-18.32	1/0
		1913.50	10.83	H	4.57	8.80	15.07	32.14	33.00	-17.93	1/0
	16-QAM	1851.50	8.78	H	4.50	9.47	13.75	23.71	33.00	-19.25	1/0
		1882.50	8.94	H	4.53	9.17	13.58	22.80	33.00	-19.42	1/0
		1913.50	9.90	H	4.57	8.80	14.13	25.88	33.00	-18.87	1/0
1.4	QPSK	1850.70	9.51	H	4.50	9.48	14.49	28.12	33.00	-18.51	1/0
		1882.50	10.11	H	4.53	9.17	14.75	29.85	33.00	-18.25	1/0
		1914.30	10.35	H	4.57	8.79	14.57	28.64	33.00	-18.43	1/0
	16-QAM	1850.70	8.57	H	4.50	9.48	13.54	22.59	33.00	-19.46	1/0
		1882.50	9.01	H	4.53	9.17	13.66	23.23	33.00	-19.34	1/0
		1914.30	9.45	H	4.57	8.79	13.66	23.23	33.00	-19.34	1/0
3	QPSK	1851.50	9.19	H	4.50	9.47	14.16	26.06	33.00	-18.84	15/0
		1882.50	8.76	H	4.53	9.17	13.40	21.88	33.00	-19.60	15/0
		1913.50	9.99	H	4.57	8.80	14.22	26.42	33.00	-18.78	15/0
	16-QAM	1851.50	7.62	H	4.50	9.47	12.59	18.16	33.00	-20.41	15/0
		1882.50	8.04	H	4.53	9.17	12.68	18.54	33.00	-20.32	15/0
		1913.50	8.97	H	4.57	8.80	13.20	20.89	33.00	-19.80	15/0

9.2. RADIATED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1053, §24.238

LIMIT

24.238(a)

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

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 1 MHz for emissions above 1 GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq 2 \times$ span/RBW;
- g) Trace Mode = average(WCDMA, LTE);

NOTE1

UMTS: It was tested at REL 99 as worst case (the highest output power and density).

LTE: It was tested at 1RB QPSK as worst case (the highest output power and density).

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

RESULTS

See the following pages.

9.2.1. SPURIOUS RADIATION RESULT

WCDMA Band 2

REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4791706372 Date: 2025-04-10 Test Engineer: 24542 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: Rel99 Band 2 Harmonics Test Votage: AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1852.4MHz									
	3704.80	-9.0	V	3.0	44.2	1.0	-52.3	-13.0	-39.3	
	5557.20	-6.7	V	3.0	44.6	1.0	-50.4	-13.0	-37.4	
	7409.60	-3.8	V	3.0	44.8	1.0	-47.6	-13.0	-34.6	
	3704.80	-8.9	H	3.0	44.2	1.0	-52.2	-13.0	-39.2	
	5557.20	-6.6	H	3.0	44.6	1.0	-50.2	-13.0	-37.2	
	7409.60	-3.6	H	3.0	44.8	1.0	-47.4	-13.0	-34.4	
	Mid Ch, 1880MHz									
	3760.00	-8.7	V	3.0	44.3	1.0	-52.1	-13.0	-39.1	
	5640.00	-6.4	V	3.0	44.7	1.0	-50.0	-13.0	-37.0	
	7520.00	-3.9	V	3.0	44.7	1.0	-47.7	-13.0	-34.7	
	3760.00	-8.6	H	3.0	44.3	1.0	-51.9	-13.0	-38.9	
	5640.00	-6.2	H	3.0	44.7	1.0	-49.8	-13.0	-36.8	
	7520.00	-3.7	H	3.0	44.7	1.0	-47.5	-13.0	-34.5	
	High Ch, 1907.6MHz									
	3815.20	-8.7	V	3.0	44.4	1.0	-52.1	-13.0	-39.1	
	5722.80	-6.4	V	3.0	44.7	1.0	-50.1	-13.0	-37.1	
	7630.40	-3.4	V	3.0	44.6	1.0	-47.0	-13.0	-34.0	
	3815.20	-8.6	H	3.0	44.4	1.0	-52.0	-13.0	-39.0	
	5722.80	-6.5	H	3.0	44.7	1.0	-50.2	-13.0	-37.2	
	7630.40	-3.4	H	3.0	44.6	1.0	-47.1	-13.0	-34.1	

LTE Band 25

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
3 MHz QPSK	Company: Samsung Project #: 4791706372 Date: 2025-04-07 Test Engineer: 26087 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 25 Harmonics, 3MHz Bandwidth Test Votage: AC 120 V, 60 Hz									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamplifier (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1851.5MHz									
	3703.00	-9.0	V	3.0	44.2	1.0	-52.3	-13.0	-39.3	
	5554.50	-6.4	V	3.0	44.6	1.0	-50.1	-13.0	-37.1	
	7406.00	-4.0	V	3.0	44.8	1.0	-47.8	-13.0	-34.8	
	3703.00	-8.9	H	3.0	44.2	1.0	-52.1	-13.0	-39.1	
	5554.50	-6.6	H	3.0	44.6	1.0	-50.3	-13.0	-37.3	
	7406.00	-4.0	H	3.0	44.8	1.0	-47.8	-13.0	-34.8	
	Mid Ch, 1882.5MHz									
	3765.00	-8.5	V	3.0	44.3	1.0	-51.8	-13.0	-38.8	
	5647.50	-6.8	V	3.0	44.7	1.0	-50.5	-13.0	-37.5	
	7530.00	-3.9	V	3.0	44.7	1.0	-47.6	-13.0	-34.6	
	3765.00	-8.4	H	3.0	44.3	1.0	-51.7	-13.0	-38.7	
	5647.50	-6.8	H	3.0	44.7	1.0	-50.5	-13.0	-37.5	
	7530.00	-4.0	H	3.0	44.7	1.0	-47.7	-13.0	-34.7	
	High Ch, 1913.5MHz									
	3827.00	-8.6	V	3.0	44.4	1.0	-52.0	-13.0	-39.0	
	5740.50	-6.7	V	3.0	44.7	1.0	-50.4	-13.0	-37.4	
	7654.00	-3.8	V	3.0	44.6	1.0	-47.5	-13.0	-34.5	
	3827.00	-8.1	H	3.0	44.4	1.0	-51.5	-13.0	-38.5	
	5740.50	-6.7	H	3.0	44.7	1.0	-50.4	-13.0	-37.4	
	7654.00	-3.8	H	3.0	44.6	1.0	-47.4	-13.0	-34.4	

END OF REPORT