LTE TEST REPORT

No. 24T04Z102392-017

for

BLU Products,Inc.

Smart phone

Model Name: B1660V

FCC ID: YHLBLUB1660V

with

Hardware Version: V1.0

Software Version: BLU_B1660V_V15.0.01.05.01.05_FSec

Issued Date: 2025-02-20

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z102392-017	Rev.0	1st edition	2025-02-17
24T04Z102392-017	Rev.1	Updated the results in chapter A.8	2025-02-20

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃

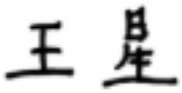
Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2024-12-11

Testing End Date: 2025-02-14

1.5. Signature



Wang Xing

(Prepared this test report)

Zhou Yu

(Reviewed this test report)

Zhao Hui Lin

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	BLU Products,Inc.
Address /Post:	8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact:	Zeng wei
Email:	zwei@ctasiasz.com
Telephone:	305.715.7171
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2.2. Manufacturer Information

Company Name:	BLU Products,Inc.
Address /Post:	8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact:	Zeng wei
Email:	zwei@ctasiasz.com
Telephone:	305.715.7171
Fax:	305.436.8819

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Smart phone
Model Name	B1660V
FCC ID	YHLBLUB1660V
Antenna	Embedded
Output power	23.01 dBm maximum EIRP measured for LTE B66
Extreme Voltage	3.45VDC to 4.45VDC (nominal: 3.87VDC)
Extreme Temperature	0°C to +45°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT60a	354154670009932	V1.0	BLU_B1660V_ V15.0.01.05.01.05_FSec	2024-12-11
UT98a	354154670012142	V1.0	BLU_B1660V_ V15.0.01.05.01.05_FSec	2025-01-17

UT98a was used for emission limit test and UT60a was used for other testing cases.
*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery

AE1

Model	C906548500PTF
Manufacturer	Guangdong Highpower New Energy Technology Co., Ltd.
Capacitance	4900mAh, typ 5000mAh

*AE ID: is used to identify the test sample in the lab internally.

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4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the customer, which are the bases of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-23 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-23 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-23 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01

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5. Summary of Test Result

LTE Band 2

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	24.232	P
2	Emission Limit	2.1051/24.238	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	24.238	P
6	Band Edge Compliance	24.238	P
7	Conducted Spurious Emission	24.238	P
8	Peak-to-Average Power Ratio	24.232	P

LTE Band 5

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	22.913	P
2	Emission Limit	2.1051/22.917	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	22.917	P
6	Band Edge Compliance	22.917	P
7	Conducted Spurious Emission	22.917	P

LTE Band 12

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

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LTE Band 13

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 66 (4)

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable.The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

All the test results are based on normal power.

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, test data provided in this report covers Band 4 as well as Band 66.

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK, 16QAM, 64QAM and 256QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

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6. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Wideband Radio Communication Tester	CMW500	159082	R&S	2025-12-03	1 year
Spectrum Analyzer	FSV	101576	R&S	2025-05-08	1 year
Climate chamber	SH-241	92004642	ESPEC	2025-10-29	1 year
Test Receiver	FSV30	101525	R&S	2025-01-18	1 year
EMI Antenna	VULB 9163	9163-482	Schwarzbeck	2025-05-19	1 year
EMI Antenna	9117	167	Schwarzbeck	2025-10-15	1 year
EMI Antenna	LB-7180-NF	J2030013000005	A-INFO	2025-05-16	1 year
EMI Antenna	3115	00146404	ETS-Lindgren	2025-05-16	1 year
Signal Generator	SMF100A	101295	R&S	2025-02-04	1 year
Universal Radio Communication Tester	CMW500	143008	R&S	2025-01-18	1 year

Note: All equipment are in valid calibration period when used.

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7. Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.26. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

Test item		Measurement uncertainty
Output Power(dB)		1.90
Emission Limit(dB)		3.44
Frequency Stability	FE(ppm)	1.16
	F_LF_H(kHz)	173.51
Occupied Bandwidth(%)		0.72
Emission Bandwidth(%)		0.75
Band Edge Compliance(dB)		1.94
Conducted Spurious Emission(dB)		4.77(0-20GHz)
		6.27(20-30GHz)
Peak-to-Average Power Ratio(dB)		2.10

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Annex A: Measurement Results

A.1 Output Power

A.1.1 Summary

During the process of testing, the EUT was controlled via communication tester to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

The results below include a correction factor for cable loss that is provided by the customer.

A.1.2.2 Measurement Result

LTE band 2

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)			
			QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	1909.3	23.00	22.29	21.20	18.28
		1880.0	23.09	22.33	21.29	18.00
		1850.7	23.15	22.31	21.21	18.37
	1 RB low	1909.3	23.08	22.32	21.24	18.26
		1880.0	23.10	22.31	21.25	17.98
		1850.7	23.16	22.30	21.13	18.37
	50% RB mid	1909.3	23.15	22.13	21.20	17.98
		1880.0	23.05	21.97	21.13	17.99
		1850.7	23.04	21.98	21.07	18.19
	100% RB	1909.3	22.08	21.19	20.04	18.16
		1880.0	22.09	21.18	19.95	18.04
		1850.7	22.06	21.13	20.01	18.13
3MHz	1 RB high	1908.5	23.10	22.40	21.23	18.22
		1880.0	23.11	22.35	21.21	17.99
		1851.5	22.98	22.39	21.17	18.37
	1 RB low	1908.5	23.03	22.40	21.18	18.30
		1880.0	23.09	22.34	21.30	17.96
		1851.5	23.00	22.33	21.17	18.40
	50% RB mid	1908.5	22.06	21.13	20.08	18.07
		1880.0	22.10	21.15	20.13	18.09
		1851.5	22.06	21.13	20.07	18.19
	100% RB	1908.5	22.06	21.06	20.03	18.06

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		1880.0	22.05	21.05	19.97	18.04
		1851.5	22.01	21.04	19.98	18.20
5MHz	1 RB high	1907.5	23.10	22.28	21.28	18.41
		1880.0	23.09	22.30	21.15	18.40
		1852.5	23.13	22.40	21.22	18.56
	1 RB low	1907.5	23.10	22.30	21.30	18.44
		1880.0	23.12	22.26	21.24	18.36
		1852.5	23.12	22.38	21.24	18.61
	50% RB mid	1907.5	22.14	21.05	20.17	18.15
		1880.0	22.15	21.12	20.10	18.11
		1852.5	22.11	21.10	20.13	18.23
	100% RB	1907.5	22.16	21.10	20.10	18.13
		1880.0	22.12	21.12	20.08	18.13
		1852.5	22.10	21.08	20.08	18.23
10MHz	1 RB high	1905.0	23.11	22.31	21.23	18.31
		1880.0	23.00	22.29	21.14	18.12
		1855.0	23.12	22.30	21.16	18.33
	1 RB low	1905.0	23.11	22.35	21.28	18.38
		1880.0	23.12	22.42	21.34	18.00
		1855.0	23.09	22.42	21.23	18.44
	50% RB mid	1905.0	22.12	21.11	20.09	18.16
		1880.0	22.12	21.06	20.11	18.15
		1855.0	22.08	21.07	20.09	18.17
	100% RB	1905.0	22.10	21.13	20.14	18.12
		1880.0	22.10	21.06	20.08	18.10
		1855.0	22.07	21.07	20.05	18.20
15MHz	1 RB high	1902.5	23.13	22.41	21.30	18.48
		1880.0	23.08	22.34	21.24	18.09
		1857.5	23.10	22.35	21.22	18.25
	1 RB low	1902.5	23.14	22.39	21.31	18.57
		1880.0	23.14	22.24	21.22	17.92
		1857.5	23.16	22.39	21.23	18.40
	50% RB mid	1902.5	22.10	21.06	20.11	18.18
		1880.0	22.07	21.07	20.05	18.14
		1857.5	22.06	21.03	20.05	18.18
	100% RB	1902.5	22.13	21.07	20.10	18.21
		1880.0	22.09	21.09	20.07	18.13
		1857.5	22.06	21.09	20.06	18.20
20MHz	1 RB high	1900.0	23.18	22.40	21.20	18.69
		1880.0	23.20	22.41	21.27	18.47
		1860.0	23.14	22.32	21.25	18.31
	1 RB low	1900.0	23.19	22.49	21.27	18.77
		1880.0	23.14	22.35	21.30	18.26

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		1860.0	23.11	22.24	21.23	18.43
	50% RB mid	1900.0	22.14	21.16	20.14	18.25
		1880.0	22.10	21.13	20.13	18.20
		1860.0	22.11	21.13	20.12	18.15
	100% RB	1900.0	22.18	21.14	20.13	18.26
		1880.0	22.16	21.12	20.07	18.19
		1860.0	22.10	21.11	20.11	18.16

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LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)			
			QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	848.3	23.36	22.90	21.77	18.90
		836.5	23.62	22.98	21.99	19.05
		824.7	23.55	23.00	21.88	18.67
	1 RB low	848.3	23.48	22.95	21.82	18.96
		836.5	23.60	22.96	21.91	19.01
		824.7	23.58	22.97	21.85	18.69
	50% RB mid	848.3	23.44	22.62	21.73	18.79
		836.5	23.51	22.81	21.75	18.76
		824.7	23.56	22.74	21.88	18.70
	100% RB	848.3	22.66	21.74	20.61	18.75
		836.5	22.65	21.70	20.70	18.94
		824.7	22.74	21.79	20.71	18.79
3MHz	1 RB high	847.5	23.49	22.74	21.84	18.90
		836.5	23.59	22.99	21.83	18.76
		825.5	23.60	22.93	21.91	18.98
	1 RB low	847.5	23.47	22.90	21.74	18.94
		836.5	23.58	22.96	21.88	18.76
		825.5	23.49	22.94	21.92	18.99
	50% RB mid	847.5	22.63	21.73	20.67	18.80
		836.5	22.69	21.72	20.75	18.84
		825.5	22.75	21.78	20.80	18.80
	100% RB	847.5	22.65	21.62	20.64	18.82
		836.5	22.68	21.68	20.67	18.81
		825.5	22.74	21.72	20.70	18.82
5MHz	1 RB high	846.5	23.58	22.94	21.83	19.09
		836.5	23.63	23.01	21.89	19.14
		826.5	23.68	22.94	21.93	19.20
	1 RB low	846.5	23.57	22.97	21.82	19.07
		836.5	23.62	23.03	21.92	19.15
		826.5	23.63	22.90	21.95	19.18
	50% RB mid	846.5	22.69	21.75	20.72	18.83
		836.5	22.73	21.80	20.75	18.89
		826.5	22.78	21.74	20.79	18.81
	100% RB	846.5	22.74	21.69	20.69	18.83
		836.5	22.80	21.74	20.75	18.91
		826.5	22.80	21.78	20.78	18.87
10MHz	1 RB high	844.0	23.62	22.90	21.77	19.01
		836.5	23.65	22.96	21.82	18.82
		829.0	23.69	22.92	21.76	19.07
	1 RB low	844.0	23.75	23.09	21.90	19.08

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		836.5	23.73	23.02	21.91	18.81
		829.0	23.69	22.94	21.93	18.99
	50% RB mid	844.0	22.72	21.73	20.69	18.85
		836.5	22.74	21.76	20.71	18.92
		829.0	22.79	21.78	20.76	18.86
	100% RB	844.0	22.74	21.75	20.70	18.88
		836.5	22.73	21.72	20.73	18.84
		829.0	22.79	21.78	20.75	18.88

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LTE band 12

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)			
			QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	715.3	23.50	22.83	21.73	18.80
		707.5	23.60	22.85	21.81	18.51
		699.7	23.60	22.91	21.79	18.83
	1 RB low	715.3	23.52	22.76	21.73	18.78
		707.5	23.63	22.91	21.88	18.56
		699.7	23.64	22.86	21.81	18.90
	50% RB mid	715.3	23.64	22.53	21.62	18.53
		707.5	23.57	22.56	21.66	18.57
		699.7	23.60	22.72	21.70	18.67
	100% RB	715.3	22.62	21.63	20.52	18.67
		707.5	22.65	21.66	20.59	18.66
		699.7	22.62	21.69	20.53	18.70
3MHz	1 RB high	714.5	23.53	22.84	21.73	18.73
		707.5	23.65	22.73	21.84	18.47
		700.5	23.59	22.81	21.88	18.86
	1 RB low	714.5	23.51	22.90	21.73	18.81
		707.5	23.68	22.91	21.86	18.54
		700.5	23.63	22.91	21.68	18.92
	50% RB mid	714.5	22.55	21.63	20.55	18.57
		707.5	22.62	21.69	20.71	18.64
		700.5	22.61	21.68	20.68	18.77
	100% RB	714.5	22.57	21.54	20.55	18.57
		707.5	22.61	21.62	20.59	18.62
		700.5	22.61	21.61	20.60	18.77
5MHz	1 RB high	713.5	23.67	22.86	21.80	19.01
		707.5	23.66	22.88	21.87	18.89
		701.5	23.72	22.75	21.77	19.11
	1 RB low	713.5	23.72	22.99	21.94	18.94
		707.5	23.70	22.86	21.86	19.02
		701.5	23.67	22.93	21.81	19.18
	50% RB mid	713.5	22.65	21.65	20.63	18.67
		707.5	22.64	21.63	20.67	18.68
		701.5	22.67	21.69	20.68	18.81
	100% RB	713.5	22.64	21.59	20.61	18.64
		707.5	22.69	21.64	20.71	18.70
		701.5	22.68	21.66	20.67	18.79
10MHz	1 RB high	711.0	23.54	22.85	21.73	18.87
		707.5	23.69	22.91	21.76	18.55
		704.0	23.64	22.92	21.76	18.83
	1 RB low	711.0	23.75	22.99	21.79	18.95

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		707.5	23.71	23.01	21.83	18.62
		704.0	23.74	22.89	21.75	18.89
	50% RB mid	711.0	22.63	21.63	20.64	18.68
		707.5	22.67	21.66	20.65	18.73
		704.0	22.70	21.67	20.64	18.76
	100% RB	711.0	22.61	21.59	20.60	18.65
		707.5	22.65	21.67	20.66	18.67
		704.0	22.65	21.64	20.65	18.82

LTE band 13

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)			
			QPSK	16QAM	64QAM	256QAM
5MHz	1 RB high	784.5	23.72	23.19	22.15	19.35
		782.0	23.84	23.05	22.00	19.25
		779.5	23.72	23.07	21.98	19.40
	1 RB low	784.5	23.89	23.14	22.06	19.36
		782.0	23.79	23.22	21.99	19.23
		779.5	23.68	23.04	21.92	19.37
	50% RB mid	784.5	22.87	21.91	20.90	19.03
		782.0	22.90	21.91	20.91	18.99
		779.5	22.90	21.93	20.90	18.94
	100% RB	784.5	22.88	21.88	20.91	19.00
		782.0	22.90	21.94	20.89	19.01
		779.5	22.89	21.85	20.84	18.99
10MHz	1 RB high	782.0	23.75	23.23	22.01	19.24
	1 RB low	782.0	23.76	23.16	21.99	19.21
	50% RB mid	782.0	22.91	21.89	20.88	19.06
	100% RB	782.0	22.84	21.81	20.80	18.99

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LTE band 66

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)			
			QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	1779.3	22.88	22.21	21.10	18.40
		1745.0	22.86	22.05	21.07	17.97
		1710.7	22.96	22.34	21.17	18.11
	1 RB low	1779.3	22.84	22.16	20.92	18.37
		1745.0	22.88	22.17	21.06	18.00
		1710.7	22.97	22.20	21.32	18.08
	50% RB mid	1779.3	22.83	21.73	20.84	18.13
		1745.0	22.85	21.85	20.98	17.98
		1710.7	22.99	21.99	21.00	17.95
	100% RB	1779.3	21.79	20.91	19.81	18.27
		1745.0	21.84	20.91	19.83	18.05
		1710.7	22.01	21.02	19.83	17.89
3MHz	1 RB high	1778.5	22.81	21.99	21.07	18.32
		1745.0	22.87	22.15	20.98	17.96
		1711.5	22.92	22.21	21.09	18.12
	1 RB low	1778.5	22.89	22.05	21.08	18.41
		1745.0	22.91	22.20	21.06	17.97
		1711.5	23.07	22.32	21.10	18.14
	50% RB mid	1778.5	21.83	20.84	19.84	18.21
		1745.0	21.89	20.90	19.91	18.08
		1711.5	21.95	21.01	20.01	17.98
	100% RB	1778.5	21.85	20.81	19.74	18.22
		1745.0	21.84	20.88	19.83	18.10
		1711.5	21.96	20.98	19.96	17.99
5MHz	1 RB high	1777.5	22.91	22.05	21.08	18.63
		1745.0	22.94	22.25	21.03	18.40
		1712.5	22.96	22.19	21.14	18.27
	1 RB low	1777.5	22.91	22.11	20.98	18.64
		1745.0	22.90	22.16	21.09	18.43
		1712.5	23.00	22.20	21.22	18.25
	50% RB mid	1777.5	21.90	20.84	19.88	18.25
		1745.0	21.90	20.96	19.90	18.15
		1712.5	21.99	21.00	19.98	17.99
	100% RB	1777.5	21.91	20.86	19.87	18.33
		1745.0	21.96	20.93	19.89	18.19
		1712.5	22.03	21.03	19.97	18.01
10MHz	1 RB high	1775.0	22.89	22.23	21.01	18.42
		1745.0	22.95	22.31	21.00	18.30
		1715.0	23.00	22.20	21.10	18.04
	1 RB low	1775.0	22.87	22.25	21.06	18.26

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		1745.0	23.00	22.21	21.11	18.43
		1715.0	23.05	22.18	21.21	17.88
	50% RB mid	1775.0	21.84	20.86	19.80	18.25
		1745.0	21.89	20.88	19.86	18.17
		1715.0	21.98	20.96	19.94	18.04
	100% RB	1775.0	21.87	20.86	19.82	18.26
		1745.0	21.92	20.89	19.89	18.14
		1715.0	22.03	20.97	19.97	18.00
15MHz	1 RB high	1772.5	22.92	22.33	21.12	18.53
		1745.0	22.98	22.22	21.11	17.90
		1717.5	23.02	22.33	21.14	18.37
	1 RB low	1772.5	22.95	22.21	21.13	18.29
		1745.0	23.03	22.16	21.25	18.02
		1717.5	23.06	22.27	21.18	18.11
	50% RB mid	1772.5	21.87	20.84	19.86	18.14
		1745.0	21.90	20.90	19.90	18.13
		1717.5	21.96	20.93	19.95	18.07
	100% RB	1772.5	21.88	20.90	19.87	18.17
		1745.0	21.93	20.91	19.90	18.10
		1717.5	22.00	20.96	19.96	18.09
20MHz	1 RB high	1770.0	22.92	22.07	21.12	18.76
		1745.0	22.98	22.09	21.14	18.23
		1720.0	23.04	22.37	21.17	18.46
	1 RB low	1770.0	22.96	22.19	21.15	18.44
		1745.0	23.04	22.40	21.13	18.36
		1720.0	23.09	22.45	21.27	18.18
	50% RB mid	1770.0	21.94	20.93	19.88	18.11
		1745.0	21.98	20.96	19.93	18.18
		1720.0	22.03	21.02	20.01	18.15
	100% RB	1770.0	21.92	20.90	19.89	18.08
		1745.0	21.96	20.92	19.94	18.16
		1720.0	21.97	21.00	19.96	18.12

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A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

FDD Band 2: Part 24.232(c) specifies "Mobile and portable stations are limited to 2 watts EIRP".

FDD Band 66: Part 27.50(d)(4) specifies "Fixed, mobile, and portable(handheld) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695–1710 MHz and 1755–1780 MHz bands are limited to 1 watt EIRP".

FDD Band 5: Part 22.913(a) specifies "The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts".

FDD Band 12: Part 27.50(c)(10) specifies "Portable stations(hand-held devices) in the 600 MHz uplink band and the 698–746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP".

FDD Band 13: Part 27.50(b) specifies "Portable stations(hand-held devices) transmitting in the 746–757 MHz, 776–788 MHz, and 805–806 MHz bands are limited to 3 watts ERP".

A.1.3.2 Method of Measurement

According to KDB 412172 D01 and ANSI C63.26 the relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$$\mathbf{ERP\ or\ EIRP} = \mathbf{P_T} + \mathbf{G_T} - \mathbf{L_C}$$

where;

- $\mathbf{ERP\ or\ EIRP} =$ effective radiated power or equivalent isotropically radiated power(expressed in the same units as P_T.
- $\mathbf{P_T} =$ transmitter output power, in this report the unit express as dBm;
- $\mathbf{G_T} =$ gain of the transmitting antenna, in dBd(ERP) or dBi(EIRP);
- $\mathbf{L_C} =$ signal attenuation in the connecting cable between the transmitter and antenna, in dB.

Alternatively, the EIRP can be determined from Equation above and then converted to ERP based on the maximum antenna gain relationship by applying the following equation:

$$\mathbf{ERP} = \mathbf{EIRP} - \mathbf{2.15dB}$$

Note: The antenna gain information was provided by the client. The laboratory is not responsible for identifying its authenticity during the test.

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A.1.3.3 Limits and Measurement Results

LTE Band 2-EIRP

Limits: ≤33dBm(2W)

Band-width	RB size/offset	Frequency (MHz)	Conducted Power(dBm)				EIRP(dBm)(Gt-Lc =-2.38)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	1909.3	23.00	22.29	21.20	18.28	20.62	19.91	18.82	15.90
		1880.0	23.09	22.33	21.29	18.00	20.71	19.95	18.91	15.62
		1850.7	23.15	22.31	21.21	18.37	20.77	19.93	18.83	15.99
	1 RB low	1909.3	23.08	22.32	21.24	18.26	20.70	19.94	18.86	15.88
		1880.0	23.10	22.31	21.25	17.98	20.72	19.93	18.87	15.60
		1850.7	23.16	22.30	21.13	18.37	20.78	19.92	18.75	15.99
	50% RB mid	1909.3	23.15	22.13	21.20	17.98	20.77	19.75	18.82	15.60
		1880.0	23.05	21.97	21.13	17.99	20.67	19.59	18.75	15.61
		1850.7	23.04	21.98	21.07	18.19	20.66	19.60	18.69	15.81
	100% RB	1909.3	22.08	21.19	20.04	18.16	19.70	18.81	17.66	15.78
		1880.0	22.09	21.18	19.95	18.04	19.71	18.80	17.57	15.66
		1850.7	22.06	21.13	20.01	18.13	19.68	18.75	17.63	15.75
3MHz	1 RB high	1908.5	23.10	22.40	21.23	18.22	20.72	20.02	18.85	15.84
		1880.0	23.11	22.35	21.21	17.99	20.73	19.97	18.83	15.61
		1851.5	22.98	22.39	21.17	18.37	20.60	20.01	18.79	15.99
	1 RB low	1908.5	23.03	22.40	21.18	18.30	20.65	20.02	18.80	15.92
		1880.0	23.09	22.34	21.30	17.96	20.71	19.96	18.92	15.58
		1851.5	23.00	22.33	21.17	18.40	20.62	19.95	18.79	16.02
	50% RB mid	1908.5	22.06	21.13	20.08	18.07	19.68	18.75	17.70	15.69
		1880.0	22.10	21.15	20.13	18.09	19.72	18.77	17.75	15.71
		1851.5	22.06	21.13	20.07	18.19	19.68	18.75	17.69	15.81
	100% RB	1908.5	22.06	21.06	20.03	18.06	19.68	18.68	17.65	15.68
		1880.0	22.05	21.05	19.97	18.04	19.67	18.67	17.59	15.66
		1851.5	22.01	21.04	19.98	18.20	19.63	18.66	17.60	15.82
5MHz	1 RB high	1907.5	23.10	22.28	21.28	18.41	20.72	19.90	18.90	16.03
		1880.0	23.09	22.30	21.15	18.40	20.71	19.92	18.77	16.02
		1852.5	23.13	22.40	21.22	18.56	20.75	20.02	18.84	16.18
	1 RB low	1907.5	23.10	22.30	21.30	18.44	20.72	19.92	18.92	16.06
		1880.0	23.12	22.26	21.24	18.36	20.74	19.88	18.86	15.98
		1852.5	23.12	22.38	21.24	18.61	20.74	20.00	18.86	16.23
	50% RB mid	1907.5	22.14	21.05	20.17	18.15	19.76	18.67	17.79	15.77
		1880.0	22.15	21.12	20.10	18.11	19.77	18.74	17.72	15.73
		1852.5	22.11	21.10	20.13	18.23	19.73	18.72	17.75	15.85
	100% RB	1907.5	22.16	21.10	20.10	18.13	19.78	18.72	17.72	15.75
		1880.0	22.12	21.12	20.08	18.13	19.74	18.74	17.70	15.75
		1852.5	22.10	21.08	20.08	18.23	19.72	18.70	17.70	15.85
10MHz	1 RB high	1905.0	23.11	22.31	21.23	18.31	20.73	19.93	18.85	15.93
		1880.0	23.00	22.29	21.14	18.12	20.62	19.91	18.76	15.74

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		1855.0	23.12	22.30	21.16	18.33	20.74	19.92	18.78	15.95
	1 RB low	1905.0	23.11	22.35	21.28	18.38	20.73	19.97	18.90	16.00
		1880.0	23.12	22.42	21.34	18.00	20.74	20.04	18.96	15.62
		1855.0	23.09	22.42	21.23	18.44	20.71	20.04	18.85	16.06
	50% RB mid	1905.0	22.12	21.11	20.09	18.16	19.74	18.73	17.71	15.78
		1880.0	22.12	21.06	20.11	18.15	19.74	18.68	17.73	15.77
		1855.0	22.08	21.07	20.09	18.17	19.70	18.69	17.71	15.79
	100% RB	1905.0	22.10	21.13	20.14	18.12	19.72	18.75	17.76	15.74
		1880.0	22.10	21.06	20.08	18.10	19.72	18.68	17.70	15.72
		1855.0	22.07	21.07	20.05	18.20	19.69	18.69	17.67	15.82
15MHz	1 RB high	1902.5	23.13	22.41	21.30	18.48	20.75	20.03	18.92	16.10
		1880.0	23.08	22.34	21.24	18.09	20.70	19.96	18.86	15.71
		1857.5	23.10	22.35	21.22	18.25	20.72	19.97	18.84	15.87
	1 RB low	1902.5	23.14	22.39	21.31	18.57	20.76	20.01	18.93	16.19
		1880.0	23.14	22.24	21.22	17.92	20.76	19.86	18.84	15.54
		1857.5	23.16	22.39	21.23	18.40	20.78	20.01	18.85	16.02
	50% RB mid	1902.5	22.10	21.06	20.11	18.18	19.72	18.68	17.73	15.80
		1880.0	22.07	21.07	20.05	18.14	19.69	18.69	17.67	15.76
		1857.5	22.06	21.03	20.05	18.18	19.68	18.65	17.67	15.80
	100% RB	1902.5	22.13	21.07	20.10	18.21	19.75	18.69	17.72	15.83
		1880.0	22.09	21.09	20.07	18.13	19.71	18.71	17.69	15.75
		1857.5	22.06	21.09	20.06	18.20	19.68	18.71	17.68	15.82
20MHz	1 RB high	1900.0	23.18	22.40	21.20	18.69	20.80	20.02	18.82	16.31
		1880.0	23.20	22.41	21.27	18.47	20.82	20.03	18.89	16.09
		1860.0	23.14	22.32	21.25	18.31	20.76	19.94	18.87	15.93
	1 RB low	1900.0	23.19	22.49	21.27	18.77	20.81	20.11	18.89	16.39
		1880.0	23.14	22.35	21.30	18.26	20.76	19.97	18.92	15.88
		1860.0	23.11	22.24	21.23	18.43	20.73	19.86	18.85	16.05
	50% RB mid	1900.0	22.14	21.16	20.14	18.25	19.76	18.78	17.76	15.87
		1880.0	22.10	21.13	20.13	18.20	19.72	18.75	17.75	15.82
		1860.0	22.11	21.13	20.12	18.15	19.73	18.75	17.74	15.77
	100% RB	1900.0	22.18	21.14	20.13	18.26	19.80	18.76	17.75	15.88
		1880.0	22.16	21.12	20.07	18.19	19.78	18.74	17.69	15.81
		1860.0	22.10	21.11	20.11	18.16	19.72	18.73	17.73	15.78

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LTE B5 ERP

Limits: ≤38.45dBm(7W)

Band-width	RB size/offset	Frequency (MHz)	Conducted Power(dBm)				EIRP(dBm)(Gt-Lc =-2.05)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	848.3	23.36	22.90	21.77	18.90	19.16	18.70	17.57	14.70
		836.5	23.62	22.98	21.99	19.05	19.42	18.78	17.79	14.85
		824.7	23.55	23.00	21.88	18.67	19.35	18.80	17.68	14.47
	1 RB low	848.3	23.48	22.95	21.82	18.96	19.28	18.75	17.62	14.76
		836.5	23.60	22.96	21.91	19.01	19.40	18.76	17.71	14.81
		824.7	23.58	22.97	21.85	18.69	19.38	18.77	17.65	14.49
	50% RB mid	848.3	23.44	22.62	21.73	18.79	19.24	18.42	17.53	14.59
		836.5	23.51	22.81	21.75	18.76	19.31	18.61	17.55	14.56
		824.7	23.56	22.74	21.88	18.70	19.36	18.54	17.68	14.50
	100% RB	848.3	22.66	21.74	20.61	18.75	18.46	17.54	16.41	14.55
		836.5	22.65	21.70	20.70	18.94	18.45	17.50	16.50	14.74
		824.7	22.74	21.79	20.71	18.79	18.54	17.59	16.51	14.59
3MHz	1 RB high	847.5	23.49	22.74	21.84	18.90	19.29	18.54	17.64	14.70
		836.5	23.59	22.99	21.83	18.76	19.39	18.79	17.63	14.56
		825.5	23.60	22.93	21.91	18.98	19.40	18.73	17.71	14.78
	1 RB low	847.5	23.47	22.90	21.74	18.94	19.27	18.70	17.54	14.74
		836.5	23.58	22.96	21.88	18.76	19.38	18.76	17.68	14.56
		825.5	23.49	22.94	21.92	18.99	19.29	18.74	17.72	14.79
	50% RB mid	847.5	22.63	21.73	20.67	18.80	18.43	17.53	16.47	14.60
		836.5	22.69	21.72	20.75	18.84	18.49	17.52	16.55	14.64
		825.5	22.75	21.78	20.80	18.80	18.55	17.58	16.60	14.60
	100% RB	847.5	22.65	21.62	20.64	18.82	18.45	17.42	16.44	14.62
		836.5	22.68	21.68	20.67	18.81	18.48	17.48	16.47	14.61
		825.5	22.74	21.72	20.70	18.82	18.54	17.52	16.50	14.62
5MHz	1 RB high	846.5	23.58	22.94	21.83	19.09	19.38	18.74	17.63	14.89
		836.5	23.63	23.01	21.89	19.14	19.43	18.81	17.69	14.94
		826.5	23.68	22.94	21.93	19.20	19.48	18.74	17.73	15.00
	1 RB low	846.5	23.57	22.97	21.82	19.07	19.37	18.77	17.62	14.87
		836.5	23.62	23.03	21.92	19.15	19.42	18.83	17.72	14.95
		826.5	23.63	22.90	21.95	19.18	19.43	18.70	17.75	14.98
	50% RB mid	846.5	22.69	21.75	20.72	18.83	18.49	17.55	16.52	14.63
		836.5	22.73	21.80	20.75	18.89	18.53	17.60	16.55	14.69
		826.5	22.78	21.74	20.79	18.81	18.58	17.54	16.59	14.61
	100% RB	846.5	22.74	21.69	20.69	18.83	18.54	17.49	16.49	14.63
		836.5	22.80	21.74	20.75	18.91	18.60	17.54	16.55	14.71
		826.5	22.80	21.78	20.78	18.87	18.60	17.58	16.58	14.67
10MHz	1 RB high	844	23.62	22.90	21.77	19.01	19.42	18.70	17.57	14.81
		836.5	23.65	22.96	21.82	18.82	19.45	18.76	17.62	14.62
		829	23.69	22.92	21.76	19.07	19.49	18.72	17.56	14.87

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	1 RB low	844	23.75	23.09	21.90	19.08	19.55	18.89	17.70	14.88
		836.5	23.73	23.02	21.91	18.81	19.53	18.82	17.71	14.61
		829	23.69	22.94	21.93	18.99	19.49	18.74	17.73	14.79
	50% RB mid	844	22.72	21.73	20.69	18.85	18.52	17.53	16.49	14.65
		836.5	22.74	21.76	20.71	18.92	18.54	17.56	16.51	14.72
		829	22.79	21.78	20.76	18.86	18.59	17.58	16.56	14.66
	100% RB	844	22.74	21.75	20.70	18.88	18.54	17.55	16.50	14.68
		836.5	22.73	21.72	20.73	18.84	18.53	17.52	16.53	14.64
		829	22.79	21.78	20.75	18.88	18.59	17.58	16.55	14.68

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LTE Band 12-ERP

Limits: ≤34.77dBm(3W)

Band-width	RB size/offset	Frequency (MHz)	Conducted Power(dBm)				EIRP(dBm)(Gt-Lc =-2.58)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	715.3	23.50	22.83	21.73	18.80	18.77	18.10	17.00	14.07
		707.5	23.60	22.85	21.81	18.51	18.87	18.12	17.08	13.78
		699.7	23.60	22.91	21.79	18.83	18.87	18.18	17.06	14.10
	1 RB low	715.3	23.52	22.76	21.73	18.78	18.79	18.03	17.00	14.05
		707.5	23.63	22.91	21.88	18.56	18.90	18.18	17.15	13.83
		699.7	23.64	22.86	21.81	18.90	18.91	18.13	17.08	14.17
	50% RB mid	715.3	23.64	22.53	21.62	18.53	18.91	17.80	16.89	13.80
		707.5	23.57	22.56	21.66	18.57	18.84	17.83	16.93	13.84
		699.7	23.60	22.72	21.70	18.67	18.87	17.99	16.97	13.94
	100% RB	715.3	22.62	21.63	20.52	18.67	17.89	16.90	15.79	13.94
		707.5	22.65	21.66	20.59	18.66	17.92	16.93	15.86	13.93
		699.7	22.62	21.69	20.53	18.70	17.89	16.96	15.80	13.97
3MHz	1 RB high	714.5	23.53	22.84	21.73	18.73	18.80	18.11	17.00	14.00
		707.5	23.65	22.73	21.84	18.47	18.92	18.00	17.11	13.74
		700.5	23.59	22.81	21.88	18.86	18.86	18.08	17.15	14.13
	1 RB low	714.5	23.51	22.90	21.73	18.81	18.78	18.17	17.00	14.08
		707.5	23.68	22.91	21.86	18.54	18.95	18.18	17.13	13.81
		700.5	23.63	22.91	21.68	18.92	18.90	18.18	16.95	14.19
	50% RB mid	714.5	22.55	21.63	20.55	18.57	17.82	16.90	15.82	13.84
		707.5	22.62	21.69	20.71	18.64	17.89	16.96	15.98	13.91
		700.5	22.61	21.68	20.68	18.77	17.88	16.95	15.95	14.04
	100% RB	714.5	22.57	21.54	20.55	18.57	17.84	16.81	15.82	13.84
		707.5	22.61	21.62	20.59	18.62	17.88	16.89	15.86	13.89
		700.5	22.61	21.61	20.60	18.77	17.88	16.88	15.87	14.04
5MHz	1 RB high	713.5	23.67	22.86	21.80	19.01	18.94	18.13	17.07	14.28
		707.5	23.66	22.88	21.87	18.89	18.93	18.15	17.14	14.16
		701.5	23.72	22.75	21.77	19.11	18.99	18.02	17.04	14.38
	1 RB low	713.5	23.72	22.99	21.94	18.94	18.99	18.26	17.21	14.21
		707.5	23.70	22.86	21.86	19.02	18.97	18.13	17.13	14.29
		701.5	23.67	22.93	21.81	19.18	18.94	18.20	17.08	14.45
	50% RB mid	713.5	22.65	21.65	20.63	18.67	17.92	16.92	15.90	13.94
		707.5	22.64	21.63	20.67	18.68	17.91	16.90	15.94	13.95
		701.5	22.67	21.69	20.68	18.81	17.94	16.96	15.95	14.08
	100% RB	713.5	22.64	21.59	20.61	18.64	17.91	16.86	15.88	13.91
		707.5	22.69	21.64	20.71	18.70	17.96	16.91	15.98	13.97
		701.5	22.68	21.66	20.67	18.79	17.95	16.93	15.94	14.06
10MHz	1 RB high	711.0	23.54	22.85	21.73	18.87	18.81	18.12	17.00	14.14
		707.5	23.69	22.91	21.76	18.55	18.96	18.18	17.03	13.82
		704.0	23.64	22.92	21.76	18.83	18.91	18.19	17.03	14.10

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	1 RB low	711.0	23.75	22.99	21.79	18.95	19.02	18.26	17.06	14.22
		707.5	23.71	23.01	21.83	18.62	18.98	18.28	17.10	13.89
		704.0	23.74	22.89	21.75	18.89	19.01	18.16	17.02	14.16
	50% RB mid	711.0	22.63	21.63	20.64	18.68	17.90	16.90	15.91	13.95
		707.5	22.67	21.66	20.65	18.73	17.94	16.93	15.92	14.00
		704.0	22.70	21.67	20.64	18.76	17.97	16.94	15.91	14.03
	100% RB	711.0	22.61	21.59	20.60	18.65	17.88	16.86	15.87	13.92
		707.5	22.65	21.67	20.66	18.67	17.92	16.94	15.93	13.94
		704.0	22.65	21.64	20.65	18.82	17.92	16.91	15.92	14.09

LTE Band 13-ERP

Limits: ≤34.77dBm(3W)

Band-width	RB size/offset	Frequency (MHz)	Conducted Power(dBm)				EIRP(dBm)(Gt-Lc =-2.45)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz	1 RB high	784.5	23.72	23.19	22.15	19.35	19.12	18.59	17.55	14.75
		782	23.84	23.05	22.00	19.25	19.24	18.45	17.40	14.65
		779.5	23.72	23.07	21.98	19.40	19.12	18.47	17.38	14.80
	1 RB low	784.5	23.89	23.14	22.06	19.36	19.29	18.54	17.46	14.76
		782	23.79	23.22	21.99	19.23	19.19	18.62	17.39	14.63
		779.5	23.68	23.04	21.92	19.37	19.08	18.44	17.32	14.77
	50% RB mid	784.5	22.87	21.91	20.90	19.03	18.27	17.31	16.30	14.43
		782	22.90	21.91	20.91	18.99	18.30	17.31	16.31	14.39
		779.5	22.90	21.93	20.90	18.94	18.30	17.33	16.30	14.34
	100% RB	784.5	22.88	21.88	20.91	19.00	18.28	17.28	16.31	14.40
		782	22.90	21.94	20.89	19.01	18.30	17.34	16.29	14.41
		779.5	22.89	21.85	20.84	18.99	18.29	17.25	16.24	14.39
10MHz	1 RB high	782	23.75	23.23	22.01	19.24	19.15	18.63	17.41	14.64
	1 RB low	782	23.76	23.16	21.99	19.21	19.16	18.56	17.39	14.61
	50% RB mid	782	22.91	21.89	20.88	19.06	18.31	17.29	16.28	14.46
	100% RB	782	22.84	21.81	20.80	18.99	18.24	17.21	16.20	14.39

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LTE Band 66-EIRP

Limits: ≤30dBm(1W)

Band-width	RB size/offset	Frequency (MHz)	Conducted Power(dBm)				EIRP(dBm)(Gt-Lc =-0.08)			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	1779.3	22.88	22.21	21.10	18.40	22.80	22.13	21.02	18.32
		1745	22.86	22.05	21.07	17.97	22.78	21.97	20.99	17.89
		1710.7	22.96	22.34	21.17	18.11	22.88	22.26	21.09	18.03
	1 RB low	1779.3	22.84	22.16	20.92	18.37	22.76	22.08	20.84	18.29
		1745	22.88	22.17	21.06	18.00	22.80	22.09	20.98	17.92
		1710.7	22.97	22.20	21.32	18.08	22.89	22.12	21.24	18.00
	50% RB mid	1779.3	22.83	21.73	20.84	18.13	22.75	21.65	20.76	18.05
		1745	22.85	21.85	20.98	17.98	22.77	21.77	20.90	17.90
		1710.7	22.99	21.99	21.00	17.95	22.91	21.91	20.92	17.87
	100% RB	1779.3	21.79	20.91	19.81	18.27	21.71	20.83	19.73	18.19
		1745	21.84	20.91	19.83	18.05	21.76	20.83	19.75	17.97
		1710.7	22.01	21.02	19.83	17.89	21.93	20.94	19.75	17.81
3MHz	1 RB high	1778.5	22.81	21.99	21.07	18.32	22.73	21.91	20.99	18.24
		1745	22.87	22.15	20.98	17.96	22.79	22.07	20.90	17.88
		1711.5	22.92	22.21	21.09	18.12	22.84	22.13	21.01	18.04
	1 RB low	1778.5	22.89	22.05	21.08	18.41	22.81	21.97	21.00	18.33
		1745	22.91	22.20	21.06	17.97	22.83	22.12	20.98	17.89
		1711.5	23.07	22.32	21.10	18.14	22.99	22.24	21.02	18.06
	50% RB mid	1778.5	21.83	20.84	19.84	18.21	21.75	20.76	19.76	18.13
		1745	21.89	20.90	19.91	18.08	21.81	20.82	19.83	18.00
		1711.5	21.95	21.01	20.01	17.98	21.87	20.93	19.93	17.90
	100% RB	1778.5	21.85	20.81	19.74	18.22	21.77	20.73	19.66	18.14
		1745	21.84	20.88	19.83	18.10	21.76	20.80	19.75	18.02
		1711.5	21.96	20.98	19.96	17.99	21.88	20.90	19.88	17.91
5MHz	1 RB high	1777.5	22.91	22.05	21.08	18.63	22.83	21.97	21.00	18.55
		1745	22.94	22.25	21.03	18.40	22.86	22.17	20.95	18.32
		1712.5	22.96	22.19	21.14	18.27	22.88	22.11	21.06	18.19
	1 RB low	1777.5	22.91	22.11	20.98	18.64	22.83	22.03	20.90	18.56
		1745	22.90	22.16	21.09	18.43	22.82	22.08	21.01	18.35
		1712.5	23.00	22.20	21.22	18.25	22.92	22.12	21.14	18.17
	50% RB mid	1777.5	21.90	20.84	19.88	18.25	21.82	20.76	19.80	18.17
		1745	21.90	20.96	19.90	18.15	21.82	20.88	19.82	18.07
		1712.5	21.99	21.00	19.98	17.99	21.91	20.92	19.90	17.91
	100% RB	1777.5	21.91	20.86	19.87	18.33	21.83	20.78	19.79	18.25
		1745	21.96	20.93	19.89	18.19	21.88	20.85	19.81	18.11
		1712.5	22.03	21.03	19.97	18.01	21.95	20.95	19.89	17.93
10MHz	1 RB high	1775	22.89	22.23	21.01	18.42	22.81	22.15	20.93	18.34
		1745	22.95	22.31	21.00	18.30	22.87	22.23	20.92	18.22
		1715	23.00	22.20	21.10	18.04	22.92	22.12	21.02	17.96

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	1 RB low	1775	22.87	22.25	21.06	18.26	22.79	22.17	20.98	18.18
		1745	23.00	22.21	21.11	18.43	22.92	22.13	21.03	18.35
		1715	23.05	22.18	21.21	17.88	22.97	22.10	21.13	17.80
	50% RB mid	1775	21.84	20.86	19.80	18.25	21.76	20.78	19.72	18.17
		1745	21.89	20.88	19.86	18.17	21.81	20.80	19.78	18.09
		1715	21.98	20.96	19.94	18.04	21.90	20.88	19.86	17.96
	100% RB	1775	21.87	20.86	19.82	18.26	21.79	20.78	19.74	18.18
		1745	21.92	20.89	19.89	18.14	21.84	20.81	19.81	18.06
		1715	22.03	20.97	19.97	18.00	21.95	20.89	19.89	17.92
15MHz	1 RB high	1772.5	22.92	22.33	21.12	18.53	22.84	22.25	21.04	18.45
		1745	22.98	22.22	21.11	17.90	22.90	22.14	21.03	17.82
		1717.5	23.02	22.33	21.14	18.37	22.94	22.25	21.06	18.29
	1 RB low	1772.5	22.95	22.21	21.13	18.29	22.87	22.13	21.05	18.21
		1745	23.03	22.16	21.25	18.02	22.95	22.08	21.17	17.94
		1717.5	23.06	22.27	21.18	18.11	22.98	22.19	21.10	18.03
	50% RB mid	1772.5	21.87	20.84	19.86	18.14	21.79	20.76	19.78	18.06
		1745	21.90	20.90	19.90	18.13	21.82	20.82	19.82	18.05
		1717.5	21.96	20.93	19.95	18.07	21.88	20.85	19.87	17.99
	100% RB	1772.5	21.88	20.90	19.87	18.17	21.80	20.82	19.79	18.09
		1745	21.93	20.91	19.90	18.10	21.85	20.83	19.82	18.02
		1717.5	22.00	20.96	19.96	18.09	21.92	20.88	19.88	18.01
20MHz	1 RB high	1770	22.92	22.07	21.12	18.76	22.84	21.99	21.04	18.68
		1745	22.98	22.09	21.14	18.23	22.90	22.01	21.06	18.15
		1720	23.04	22.37	21.17	18.46	22.96	22.29	21.09	18.38
	1 RB low	1770	22.96	22.19	21.15	18.44	22.88	22.11	21.07	18.36
		1745	23.04	22.40	21.13	18.36	22.96	22.32	21.05	18.28
		1720	23.09	22.45	21.27	18.18	23.01	22.37	21.19	18.10
	50% RB mid	1770	21.94	20.93	19.88	18.11	21.86	20.85	19.80	18.03
		1745	21.98	20.96	19.93	18.18	21.90	20.88	19.85	18.10
		1720	22.03	21.02	20.01	18.15	21.95	20.94	19.93	18.07
	100% RB	1770	21.92	20.90	19.89	18.08	21.84	20.82	19.81	18.00
		1745	21.96	20.92	19.94	18.16	21.88	20.84	19.86	18.08
		1720	21.97	21.00	19.96	18.12	21.89	20.92	19.88	18.04

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A.2 Emission Limit

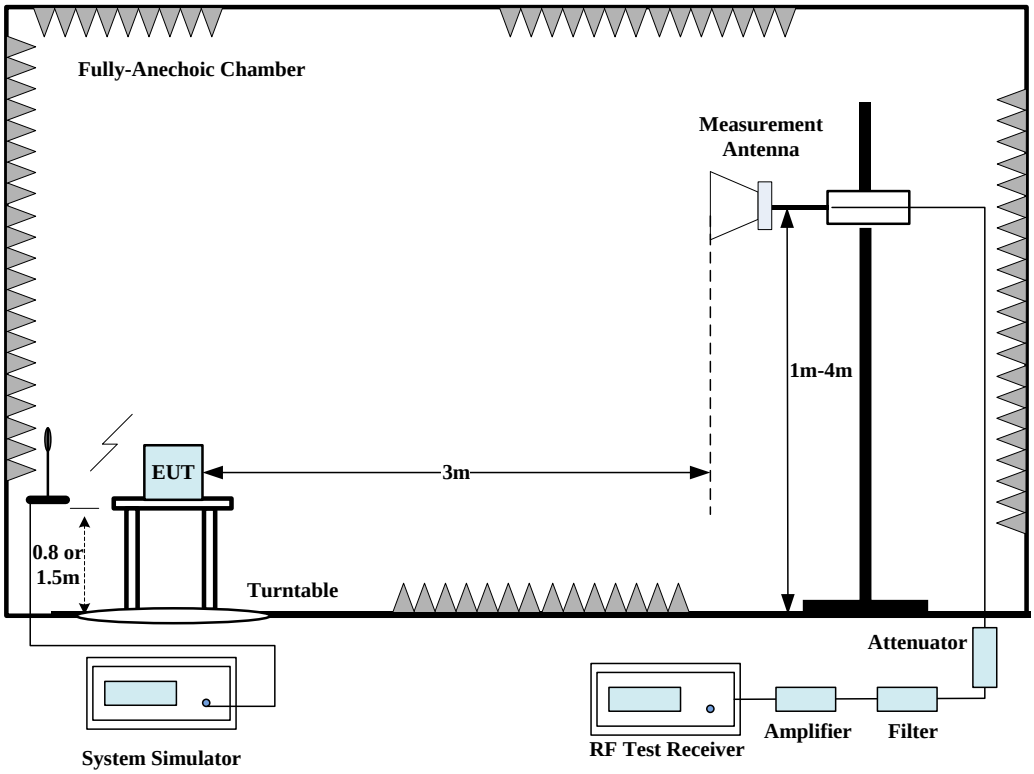
A.2.1 Measurement Method

The measurement procedures in TIA-603E-2016 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of each LTE Band.

The procedure of radiated spurious emissions is as follows:

For measurements performed at frequencies less than or equal to 1 GHz, the EUT was placed on a 80cm-high non-conductive support; For measurements performed at frequencies above 1GHz,EUT was placed on a 1.5-meter-high non-conductive support. A measurement antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. In the initial test, the height of the measurement antenna was varied from 1 m to 4 m for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



1. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
2. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.

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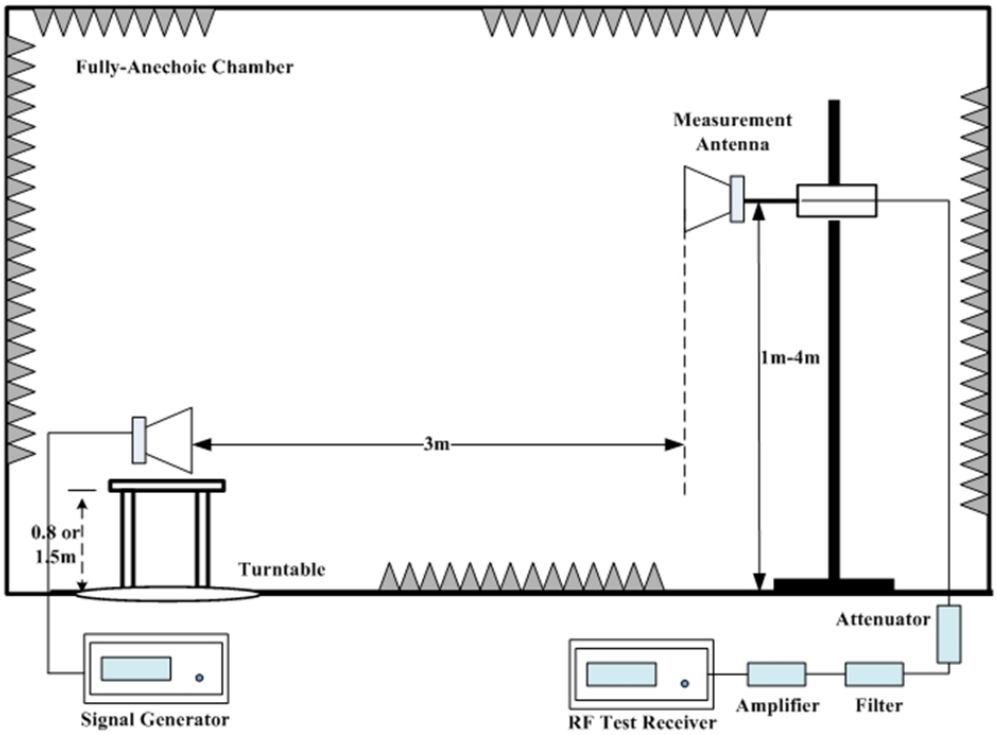

In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. The height of measurement antenna varied between 1 m to 4 m to maximize the received signal amplitude for each emission that was detected and measured in the initial test. A power (P_{Mea}) is applied to the input of the substitution antenna and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test was performed with the measurement antenna in both vertical and horizontal polarization.

3. The Path loss (P_{pl}) between the Signal Source and the Substitution Antenna and the Substitution Antenna Gain (G_a) were recorded after test.A amplifier was connected in for the test. The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
4. The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{pl} + G_a$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

A.2.2 Measurement Limit

FDD Band 2: Part 24.238 specifies that 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.

FDD Band 12/13: Part 27.53(g) states 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

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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.

FDD Band 5: Part 22.917 specifies that 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.

FDD Band 66: Part 27.53(h) specifies that 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.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of each LTE Band. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of each LTE Band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 30MHz to 26GHz.

Note 1: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
LTE Bands	Low	9kHz-26GHz	Pass
	Middle	9kHz-26GHz	Pass
	High	9kHz-26GHz	Pass

A.2.5 Sweep Table

Subrange	RBW	VBW
9~150 kHz	0.2kHz	0.6kHz
150kHz~30MHz	9kHz	27kHz
30MHz~1 GHz	100KHz	300KHz
1~20 GHz	1 MHz	3 MHz

A.2.6 Measurement Result

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LTE Band 2, 1.4MHz,CH18607,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3701.50	-37.88	3.47	10.39	-30.96	-13.00	17.96	V
5552.00	-41.82	5.32	11.20	-35.94	-13.00	22.94	H
7403.00	-37.45	8.08	10.10	-35.43	-13.00	22.43	H
9254.00	-51.19	8.85	11.70	-48.34	-13.00	35.34	H
11103.50	-51.98	9.74	12.60	-49.12	-13.00	36.12	V
12946.00	-47.41	12.48	12.75	-47.14	-13.00	34.14	H

LTE Band 2, 1.4MHz,CH18900,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-37.54	3.81	10.16	-31.19	-13.00	18.19	V
5640.00	-41.52	5.61	11.38	-35.75	-13.00	22.75	H
7520.00	-38.54	7.71	10.24	-36.01	-13.00	23.01	H
9400.50	-50.31	9.10	11.50	-47.91	-13.00	34.91	H
11285.00	-49.74	10.63	12.62	-47.75	-13.00	34.75	V
13160.00	-45.75	13.21	12.54	-46.42	-13.00	33.42	V

LTE Band 2, 1.4MHz,CH19193,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3818.50	-34.72	3.94	9.96	-28.70	-13.00	15.70	V
5728.00	-41.12	5.89	11.34	-35.67	-13.00	22.67	H
7637.50	-42.29	6.77	10.38	-38.68	-13.00	25.68	H
9547.00	-52.09	9.11	11.89	-49.31	-13.00	36.31	H
11466.00	-47.68	12.34	12.53	-47.49	-13.00	34.49	V
13375.00	-44.72	13.09	12.42	-45.39	-13.00	32.39	V

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LTE Band 5, 1.4MHz,CH20407,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.50	-60.39	2.60	9.50	2.15	-55.64	-13.00	42.64	H
2474.50	-54.62	4.33	10.35	2.15	-50.75	-13.00	37.75	V
5765.50	-60.11	5.80	11.21	2.15	-56.85	-13.00	43.85	H
6599.00	-55.55	7.10	10.31	2.15	-54.49	-13.00	41.49	V
7435.00	-53.14	7.89	10.10	2.15	-53.08	-13.00	40.08	V
8260.00	-55.33	7.60	11.20	2.15	-53.88	-13.00	40.88	V

LTE Band 5, 1.4MHz,CH20525,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-57.16	2.78	9.45	2.15	-52.64	-13.00	39.64	H
2505.00	-54.65	4.43	10.30	2.15	-50.93	-13.00	37.93	V
3346.00	-57.31	3.46	10.22	2.15	-52.70	-13.00	39.70	H
6701.50	-55.81	6.21	10.49	2.15	-53.68	-13.00	40.68	H
7538.00	-53.93	7.46	10.28	2.15	-53.26	-13.00	40.26	V
8355.00	-53.16	8.26	11.30	2.15	-52.27	-13.00	39.27	V

LTE Band 5, 1.4MHz,CH20643,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.00	-52.11	2.92	9.41	2.15	-47.77	-13.00	34.77	V
2553.50	-52.92	4.56	10.30	2.15	-49.33	-13.00	36.33	H
3393.50	-59.52	3.53	10.03	2.15	-55.17	-13.00	42.17	H
6782.00	-55.96	6.40	10.36	2.15	-54.15	-13.00	41.15	H
7632.00	-55.50	6.73	10.36	2.15	-54.02	-13.00	41.02	H
8472.50	-54.24	8.03	11.30	2.15	-53.12	-13.00	40.12	H

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LTE Band 12, 1.4MHz,CH23017,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2099.50	-55.47	3.52	7.80	2.15	-53.34	-13.00	40.34	H
2802.00	-51.09	5.25	10.40	2.15	-48.09	-13.00	35.09	V
3498.50	-55.39	2.98	10.10	2.15	-50.42	-13.00	37.42	H
4912.50	-60.77	4.94	11.05	2.15	-56.81	-13.00	43.81	V
6291.50	-58.43	6.08	10.80	2.15	-55.86	-13.00	42.86	H
6998.00	-53.35	7.82	10.40	2.15	-52.92	-13.00	39.92	V

LTE Band 12, 1.4MHz,CH23095,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2136.00	-55.95	3.69	8.38	2.15	-53.41	-13.00	40.41	H
2827.50	-51.92	5.03	10.46	2.15	-48.64	-13.00	35.64	V
3538.00	-58.09	3.28	10.25	2.15	-53.27	-13.00	40.27	H
5652.00	-60.25	5.59	11.40	2.15	-56.59	-13.00	43.59	H
6371.50	-58.06	5.76	10.94	2.15	-55.03	-13.00	42.03	H
7068.00	-57.13	6.85	10.43	2.15	-55.70	-13.00	42.70	H

LTE Band 12, 1.4MHz,CH23173,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2146.50	-54.41	3.71	8.54	2.15	-51.73	-13.00	38.73	H
2864.50	-50.29	5.49	10.59	2.15	-47.34	-13.00	34.34	H
3577.00	-56.77	3.07	10.41	2.15	-51.58	-13.00	38.58	H
5723.00	-60.22	5.90	11.35	2.15	-56.92	-13.00	43.92	H
6441.00	-56.87	6.85	10.84	2.15	-55.03	-13.00	42.03	V
7151.00	-56.49	6.69	10.19	2.15	-55.14	-13.00	42.14	H

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LTE Band 13, 5MHz,CH23205,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1559.26	-57.02	6.94	8.77	0.00	-55.19	-40.00	15.19	H
2338.80	-54.04	8.56	10.20	2.15	-54.54	-13.00	41.54	H
3117.50	-59.33	9.20	10.07	2.15	-60.62	-13.00	47.62	V
3897.50	-56.98	10.07	10.14	2.15	-59.06	-13.00	46.06	V
4677.60	-59.40	11.10	11.25	2.15	-61.41	-13.00	48.41	H
5457.20	-57.82	11.68	11.22	2.15	-60.43	-13.00	47.43	V

LTE Band 13, 5MHz,CH23230,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.36	-59.66	6.94	8.81	0.00	-57.79	-40.00	17.79	H
2346.60	-53.42	8.51	10.26	2.15	-53.83	-13.00	40.83	H
3127.50	-56.24	9.47	10.05	2.15	-57.81	-13.00	44.81	V
3910.00	-55.52	10.10	10.22	2.15	-57.55	-13.00	44.55	V
4693.00	-59.99	11.10	11.30	2.15	-61.94	-13.00	48.94	H
5475.40	-57.00	11.26	11.18	2.15	-59.23	-13.00	46.23	H

LTE Band 13, 5MHz,CH23255,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1569.20	-63.43	6.94	8.85	0.00	-61.51	-40.00	21.51	V
2354.10	-51.76	8.54	10.17	2.15	-52.29	-13.00	39.29	H
3138.00	-59.68	9.47	10.02	2.15	-61.27	-13.00	48.27	V
3922.50	-57.31	10.10	10.25	2.15	-59.32	-13.00	46.32	V
4708.00	-58.40	11.44	11.19	2.15	-60.80	-13.00	47.80	V
5493.00	-57.48	11.26	11.15	2.15	-59.75	-13.00	46.75	V

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LTE Band 66, 1.4MHz,CH131979,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3421.50	-43.05	3.24	10.04	-36.25	-13.00	23.25	H
5132.00	-50.15	5.56	11.60	-44.11	-13.00	31.11	H
6843.00	-51.79	6.54	10.31	-48.02	-13.00	35.02	H
13690.00	-54.95	13.02	12.20	-55.77	-13.00	42.77	H
15402.00	-57.02	14.89	15.40	-56.51	-13.00	43.51	H
17112.00	-48.20	18.45	13.49	-53.16	-13.00	40.16	H

LTE Band 66, 1.4MHz,CH132322,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3489.50	-42.88	2.85	10.10	-35.63	-13.00	22.63	V
5234.50	-52.28	4.69	11.70	-45.27	-13.00	32.27	H
6980.00	-51.47	8.06	10.40	-49.13	-13.00	36.13	H
13958.50	-53.35	14.64	12.16	-55.83	-13.00	42.83	H
15692.50	-54.70	16.67	15.51	-55.86	-13.00	42.86	H
17450.50	-45.20	19.26	13.05	-51.41	-13.00	38.41	V

LTE Band 66, 1.4MHz,CH132665,QPSK

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3558.50	-40.98	2.98	10.33	-33.63	-13.00	20.63	V
5338.00	-53.16	6.18	11.72	-47.62	-13.00	34.62	H
7117.50	-45.15	6.56	10.26	-41.45	-13.00	28.45	H
8897.00	-59.50	8.04	11.59	-55.95	-13.00	42.95	H
16009.50	-53.59	17.49	15.37	-55.71	-13.00	42.71	V
17798.00	-45.86	19.55	13.50	-51.91	-13.00	38.91	H

Note: Peak EIRP (dBm) = PMea(dBm) - Path Loss(dB) + Antenna Gain(dBi)

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A.3 Frequency Stability

A.3.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for each LTE band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ decrements from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

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A.3.2 Measurement results

LTE band 2, 20MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	1850.860	1909.140		
50				-0.53	0.0003
40				-3.83	0.0020
30				3.55	0.0019
10				-0.03	0.0000
0				-2.28	0.0012
-10				-3.56	0.0019
-20				-3.39	0.0018
-30				2.36	0.0013

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	1850.860	1909.140	1.27	0.0007
4.45				-2.58	0.0014

LTE band 5, 10MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	824.420	848.570		
50				-1.50	0.0018
40				-0.10	0.0001
30				0.04	0.0001
10				0.09	0.0001
0				-1.17	0.0014
-10				-1.29	0.0015
-20				-0.11	0.0001
-30				-0.70	0.0008

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	824.420	848.570	-1.93	0.0023
4.45				0.36	0.0004

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LTE band 12, 10MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	699.490	715.510		
50				0.87	0.0012
40				3.28	0.0046
30				-0.27	0.0004
10				-2.20	0.0031
0				-1.63	0.0023
-10				-2.13	0.0030
-20				0.06	0.0001
-30				-1.29	0.0018

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	699.490	715.510	-1.06	0.0015
4.45				-2.13	0.0030

LTE band 13, 10MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	777.490	786.520		
50				0.57	0.0007
40				1.17	0.0015
30				0.90	0.0012
10				-0.04	0.0001
0				1.12	0.0014
-10				0.30	0.0004
-20				0.94	0.0012
-30				-0.93	0.0012

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	777.490	786.520	0.27	0.0003
4.45				-1.92	0.0025

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LTE band 66, 20MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	1710.860	1779.140		
50				-0.87	0.0005
40				0.63	0.0004
30				-2.06	0.0012
10				-0.29	0.0002
0				-2.29	0.0013
-10				-1.75	0.0010
-20				-1.66	0.0010
-30				-2.22	0.0013

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	1710.860	1779.140	-2.16	0.0012
4.45				-1.27	0.0007

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A.4 Occupied Bandwidth

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) Set the detection mode to peak, and the trace mode to max-hold.

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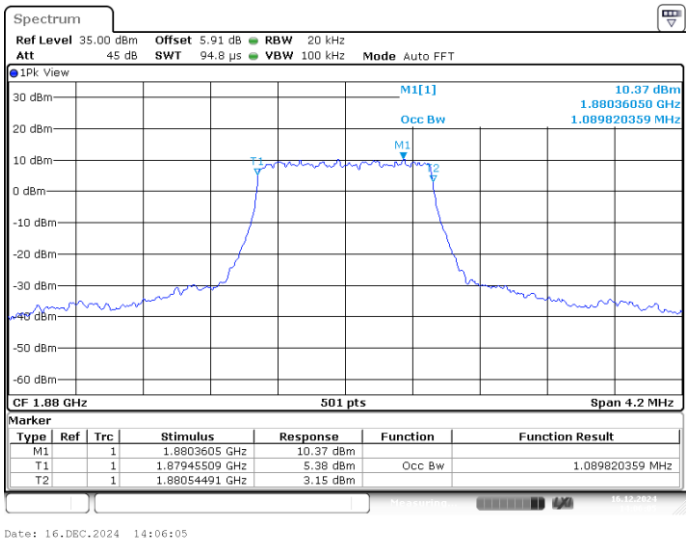
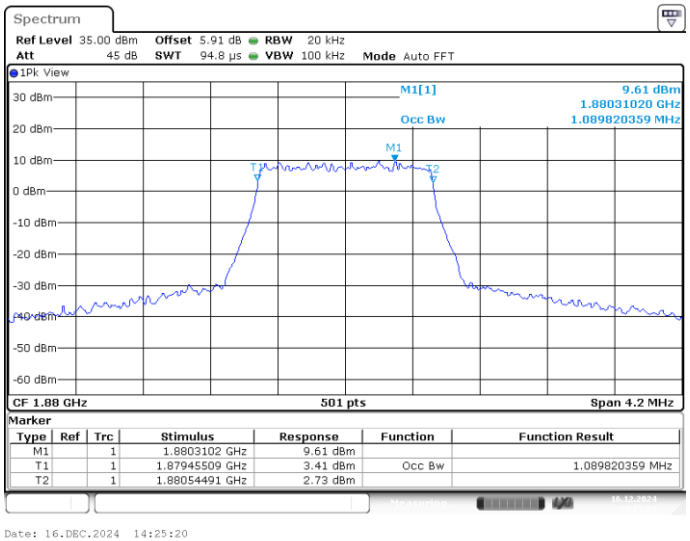
LTE band 2,1.4MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	1.090	1.090

LTE band 2 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 1.4MHz Bandwidth,MID,16QAM (99% BW)



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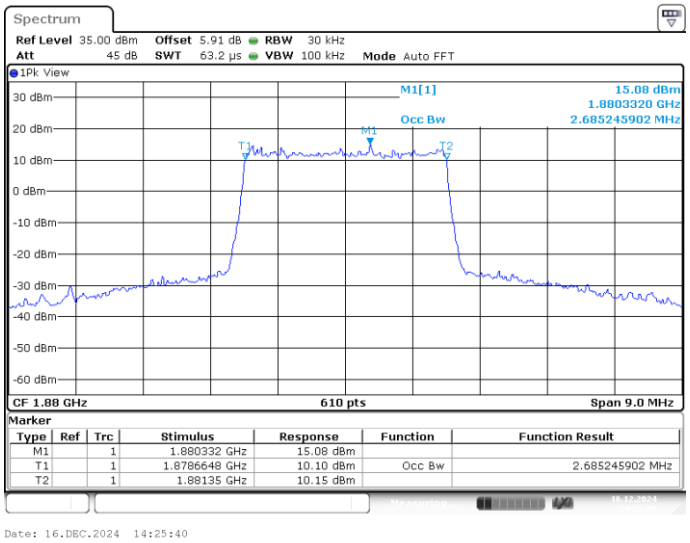
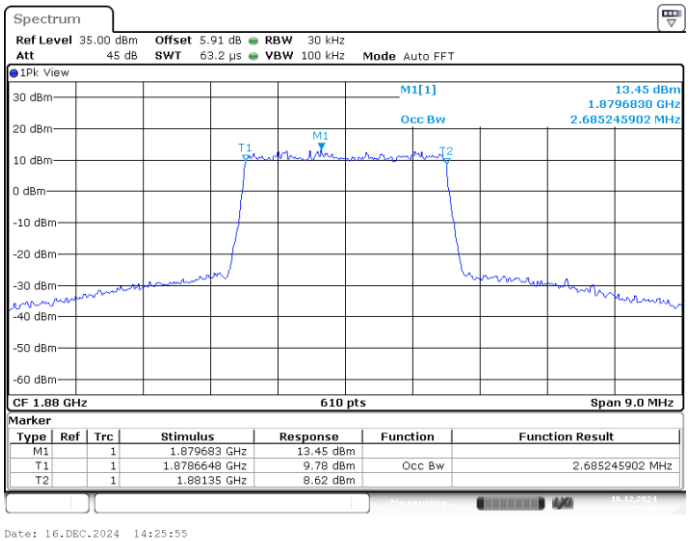
LTE band 2,3MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	2.685	2.685

LTE band 2 , 3MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 3MHz Bandwidth,MID,16QAM (99% BW)



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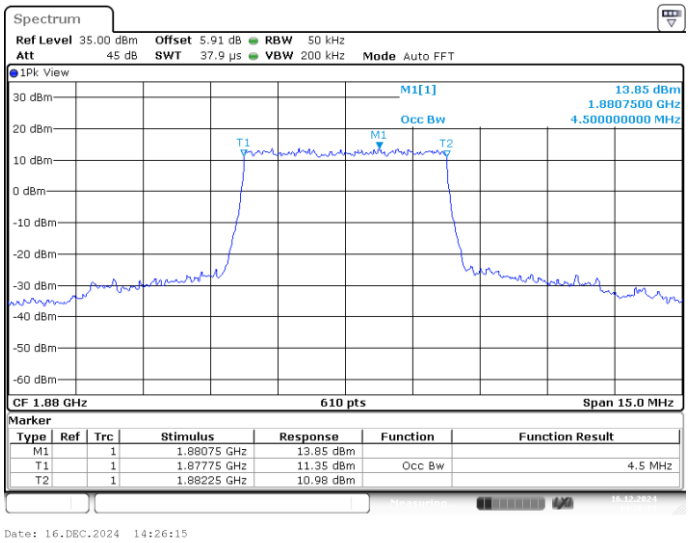
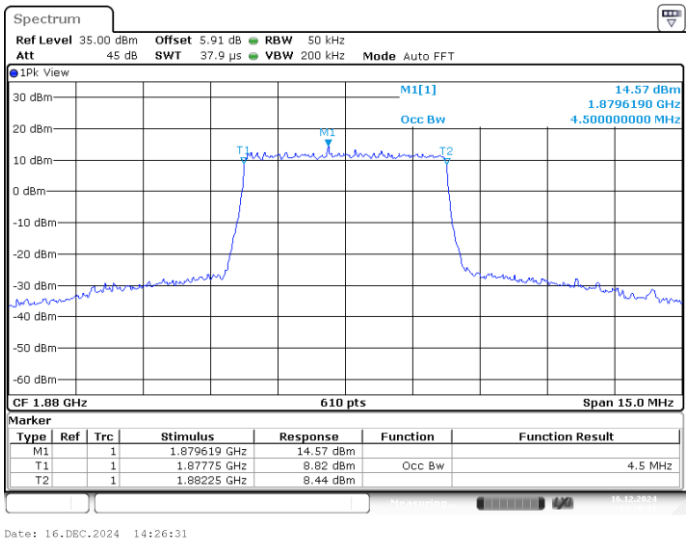
LTE band 2,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	4.500	4.500

LTE band 2 , 5MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 5MHz Bandwidth,MID,16QAM (99% BW)



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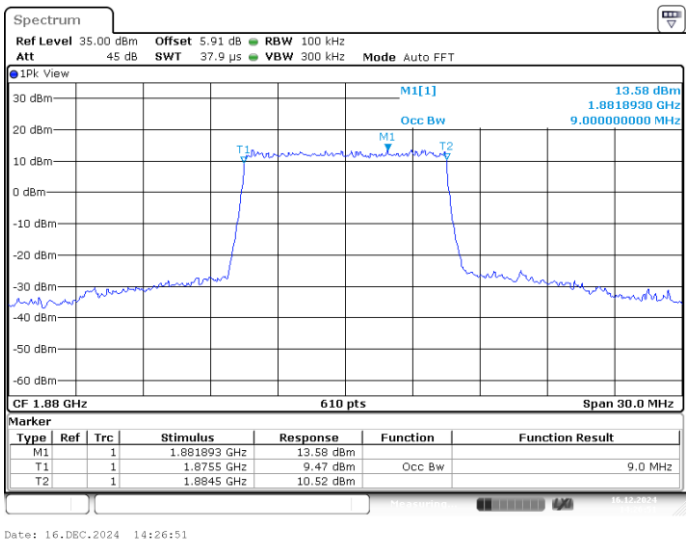
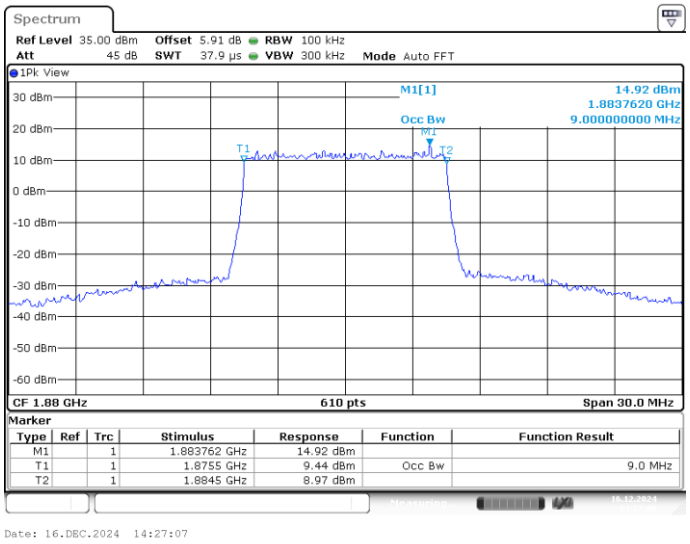
LTE band 2,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	9.000	9.000

LTE band 2 , 10MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 10MHz Bandwidth,MID,16QAM (99% BW)



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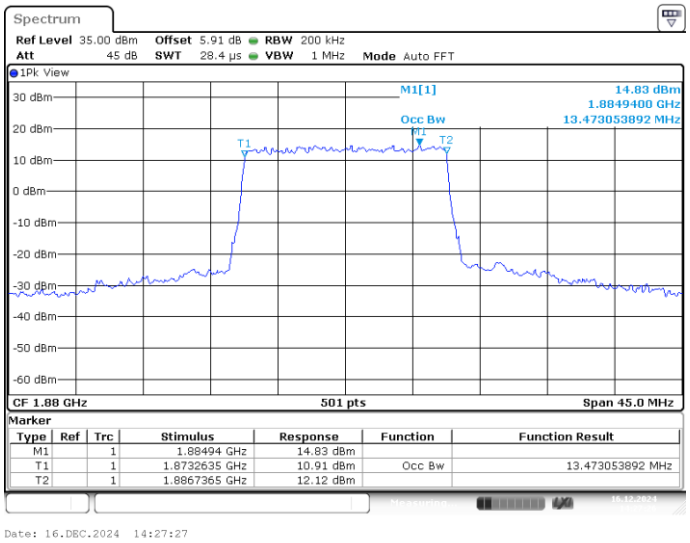
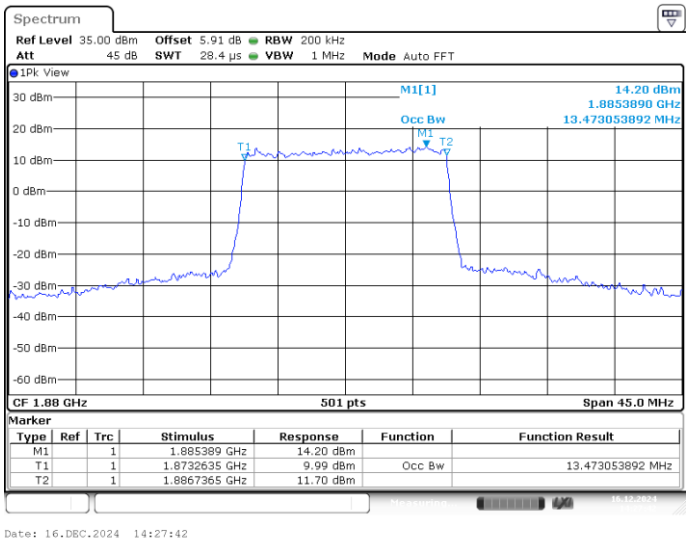
LTE band 2,15MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	13.473	13.473

LTE band 2 , 15MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 15MHz Bandwidth,MID,16QAM (99% BW)



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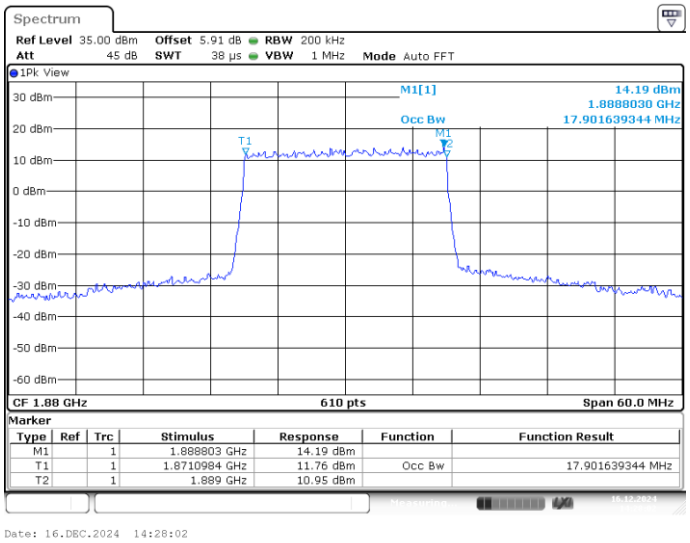
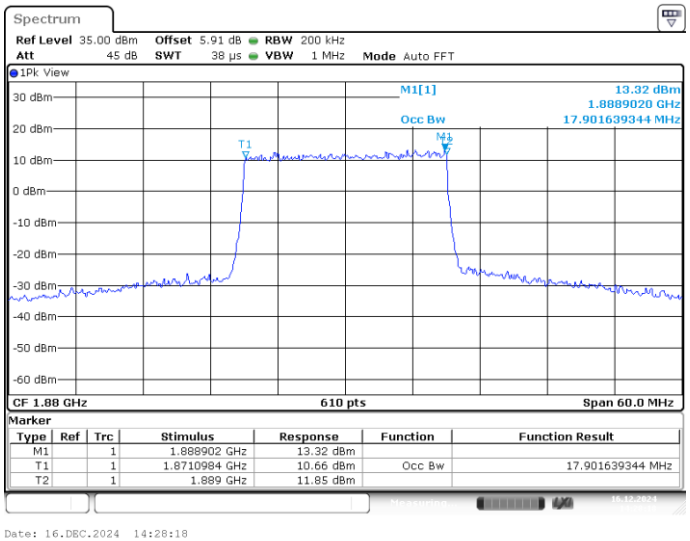
LTE band 2,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1880	17.902	17.902

LTE band 2 , 20MHz Bandwidth,MID,QPSK (99% BW)



LTE band 2 , 20MHz Bandwidth,MID,16QAM (99% BW)



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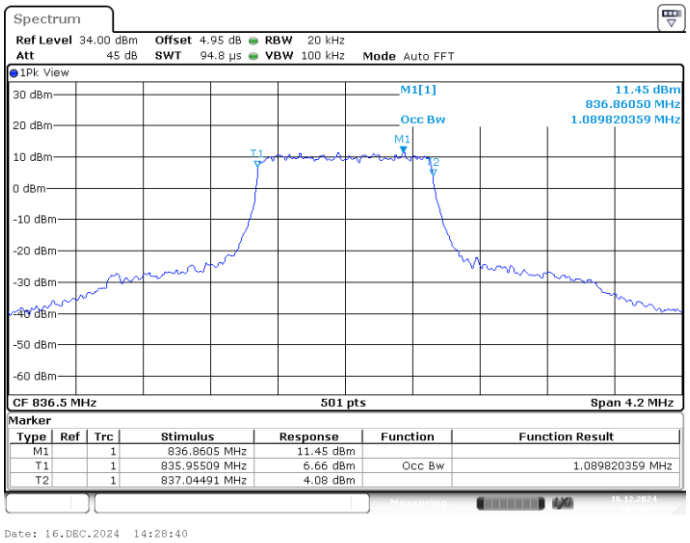
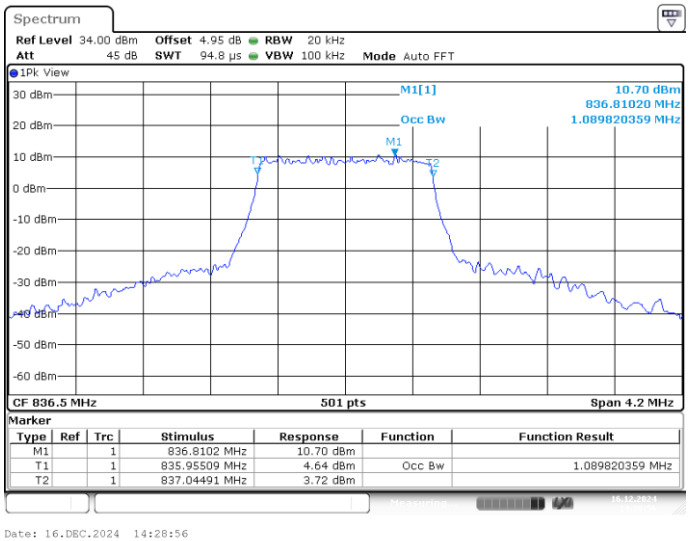
LTE band 5,1.4MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	1.090	1.090

LTE band 5 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



LTE band 5 , 1.4MHz Bandwidth,MID,16QAM (99% BW)



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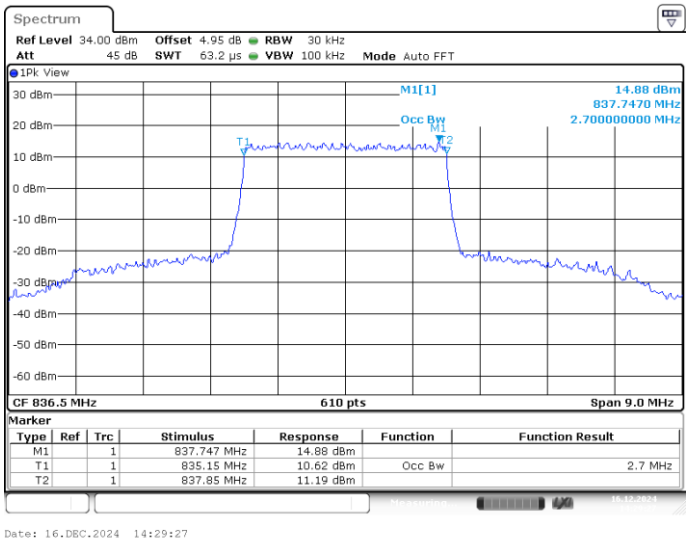
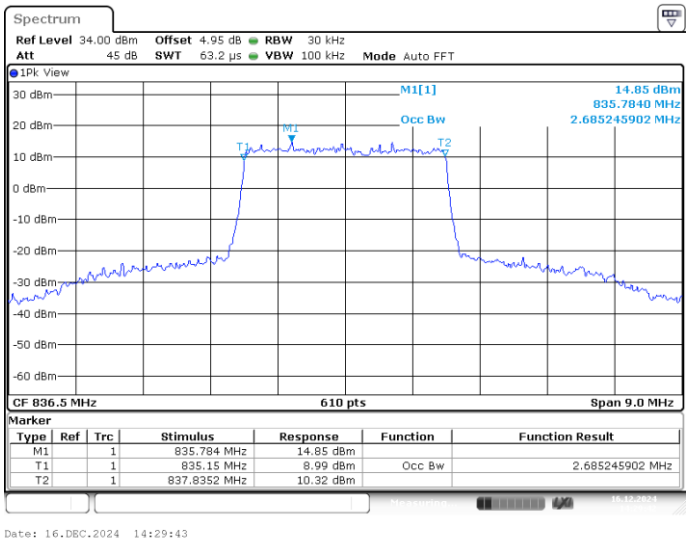
LTE band 5,3MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	2.700	2.685

LTE band 5 , 3MHz Bandwidth,MID,QPSK (99% BW)



LTE band 5 , 3MHz Bandwidth,MID,16QAM (99% BW)



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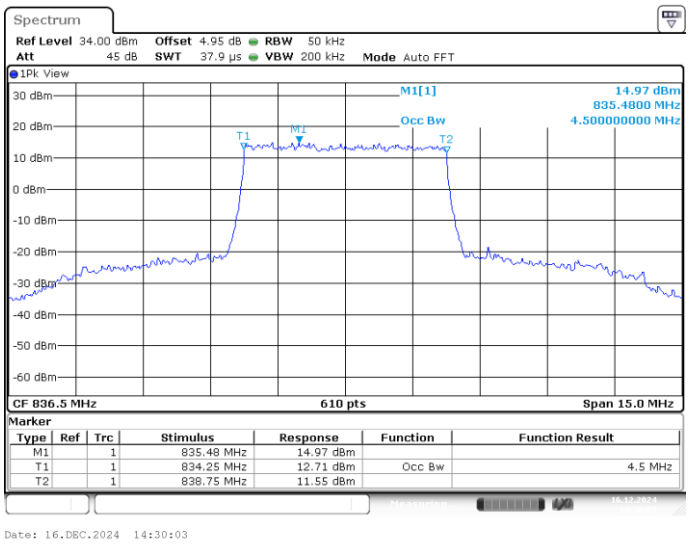
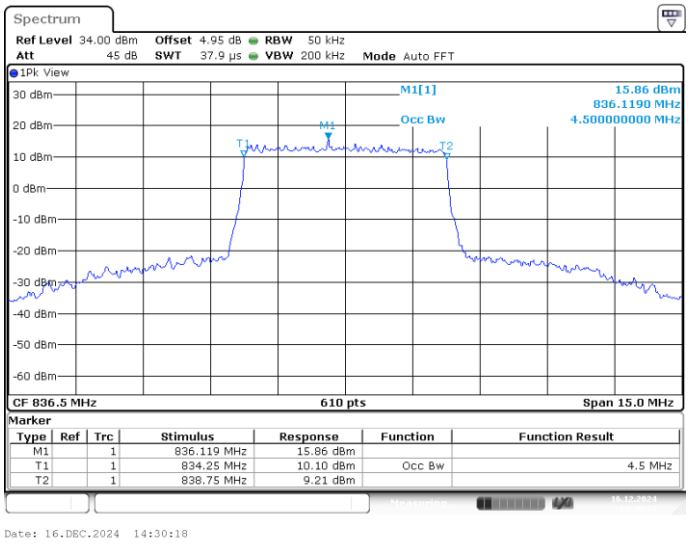
LTE band 5,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	4.500	4.500

LTE band 5 , 5MHz Bandwidth,MID,QPSK (99% BW)



LTE band 5 , 5MHz Bandwidth,MID,16QAM (99% BW)



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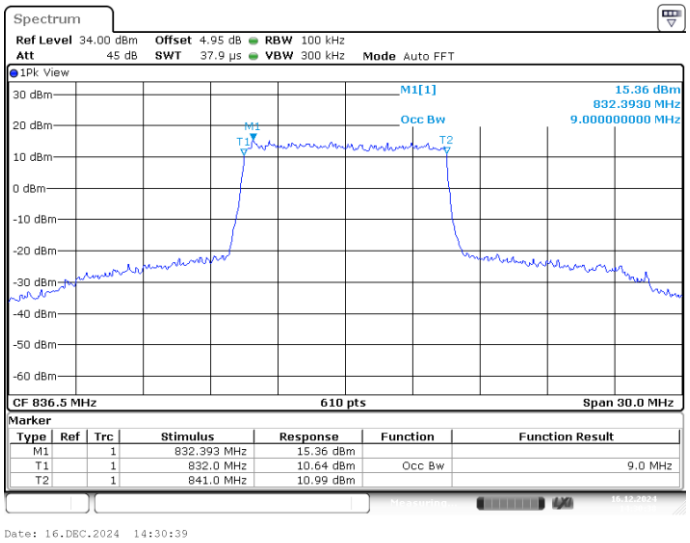
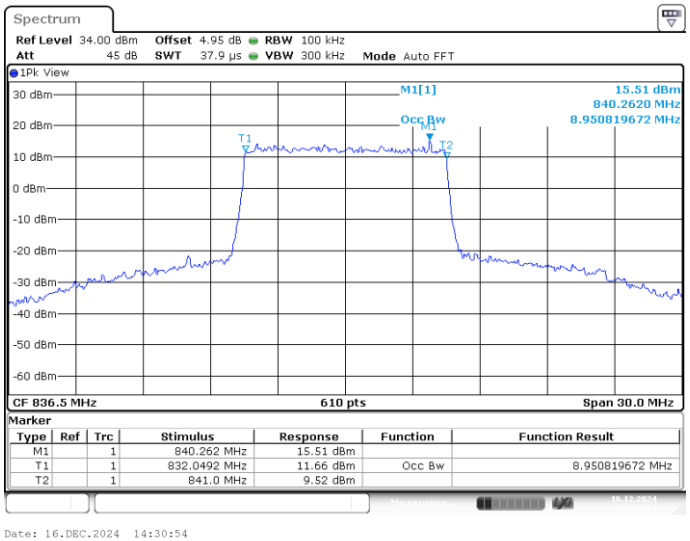
LTE band 5,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	9.000	8.951

LTE band 5 , 10MHz Bandwidth,MID,QPSK (99% BW)



LTE band 5 , 10MHz Bandwidth,MID,16QAM (99% BW)



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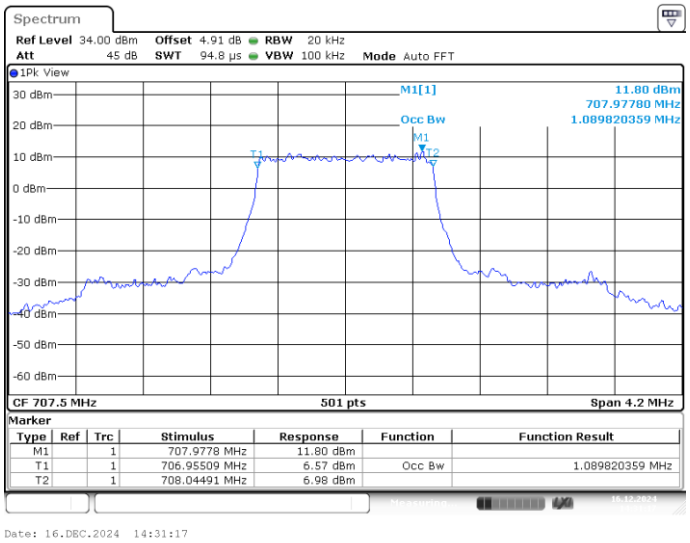
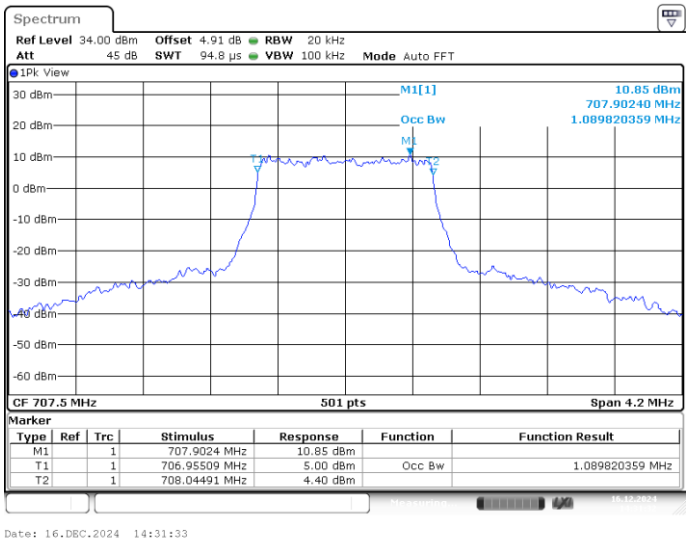
LTE band 12,1.4MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
707.5	1.090	1.090

LTE band 12 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



LTE band 12 , 1.4MHz Bandwidth,MID,16QAM (99% BW)



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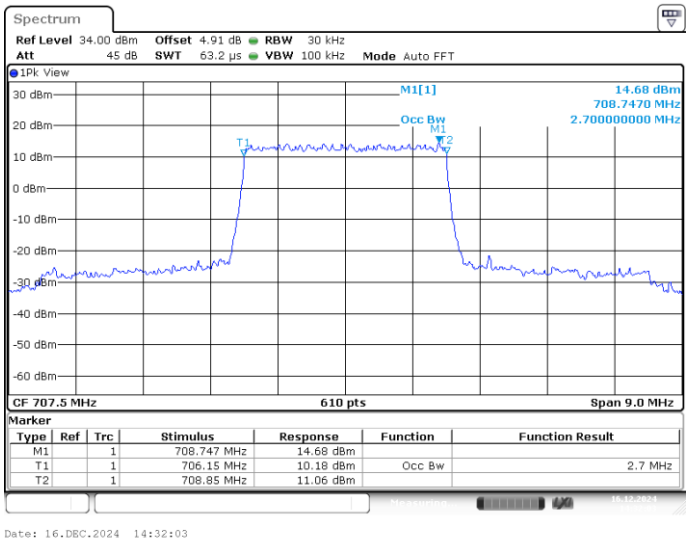
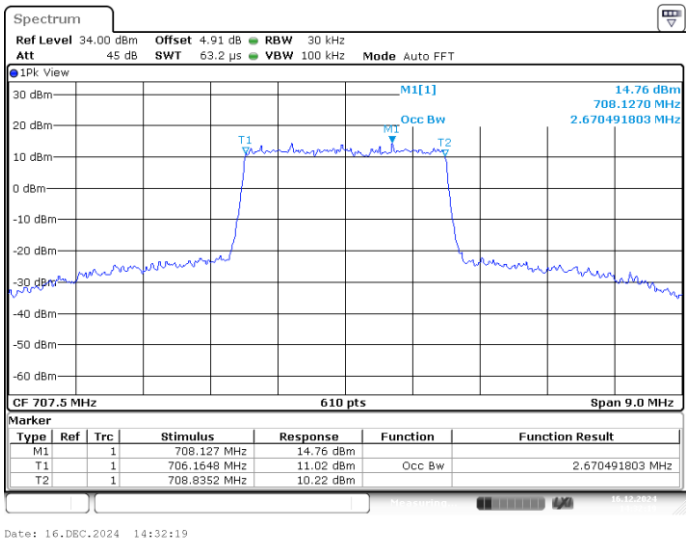
LTE band 12,3MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
707.5	2.700	2.670

LTE band 12 , 3MHz Bandwidth,MID,QPSK (99% BW)



LTE band 12 , 3MHz Bandwidth,MID,16QAM (99% BW)



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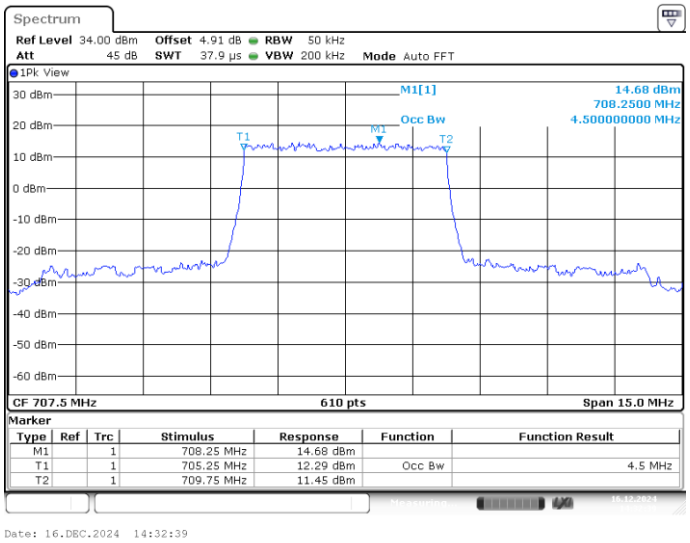
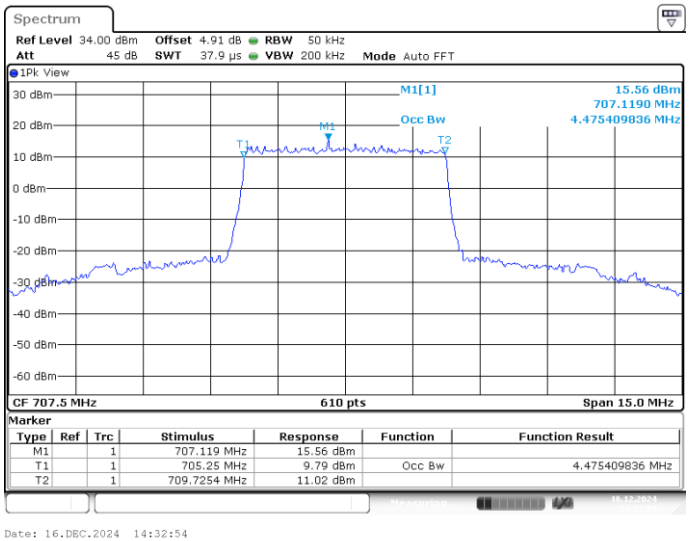
LTE band 12,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
707.5	4.500	4.475

LTE band 12 , 5MHz Bandwidth,MID,QPSK (99% BW)



LTE band 12 , 5MHz Bandwidth,MID,16QAM (99% BW)



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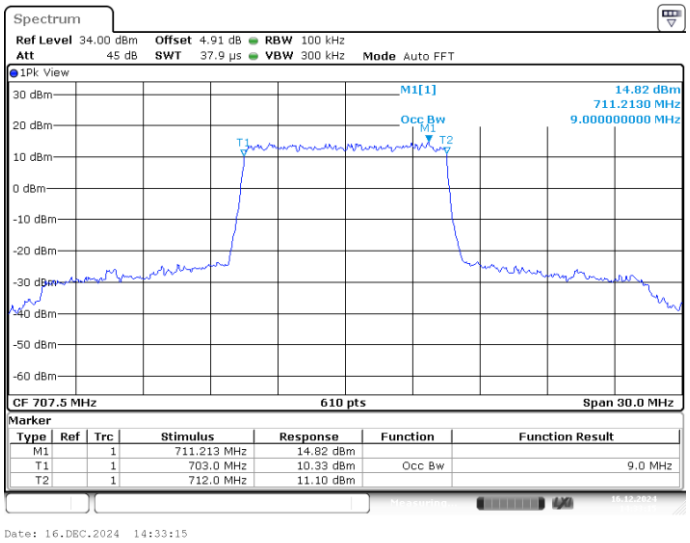
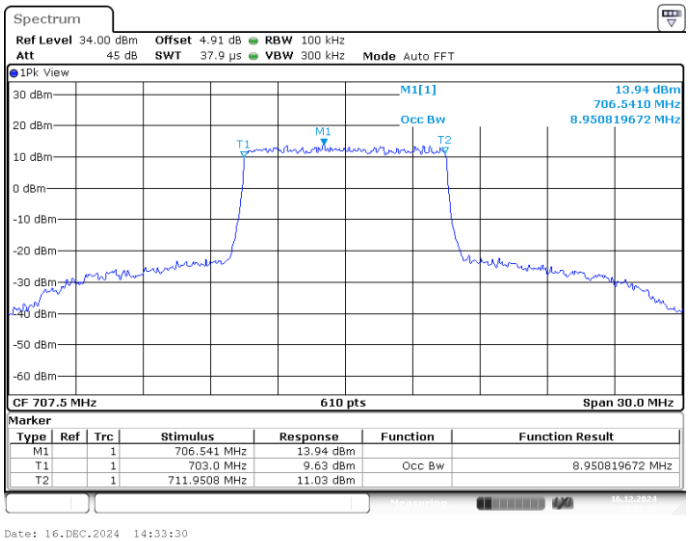
LTE band 12,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
707.5	9.000	8.951

LTE band 12 , 10MHz Bandwidth,MID,QPSK (99% BW)



LTE band 12 , 10MHz Bandwidth,MID,16QAM (99% BW)



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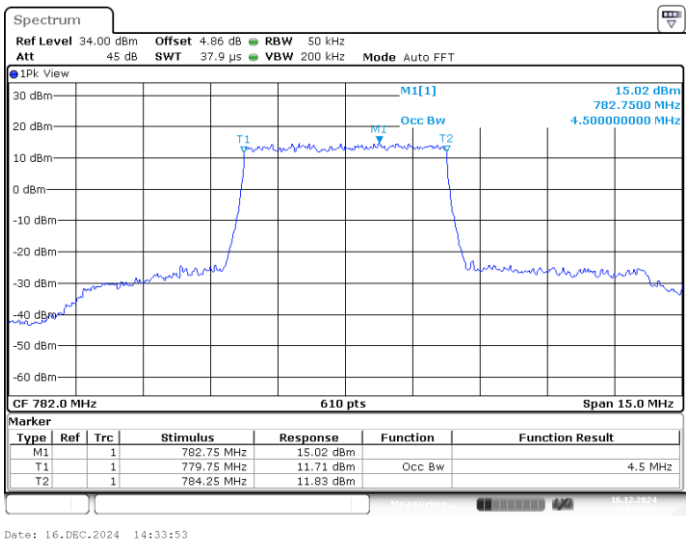
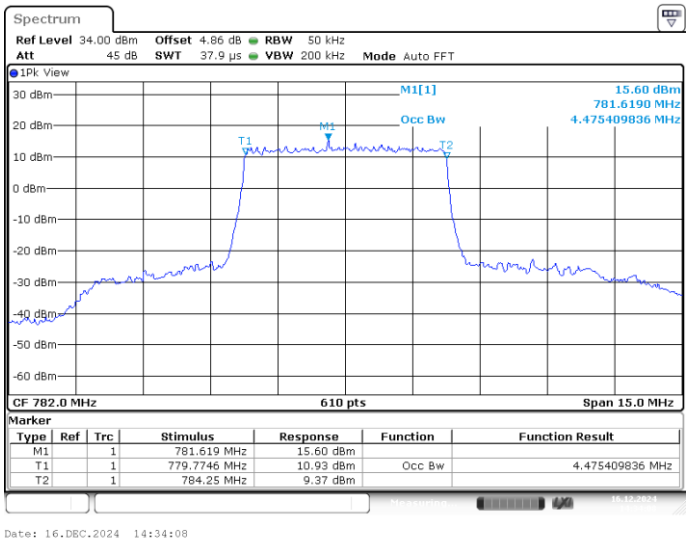
LTE band 13,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
782	4.500	4.475

LTE band 13 , 5MHz Bandwidth,MID,QPSK (99% BW)



LTE band 13 , 5MHz Bandwidth,MID,16QAM (99% BW)



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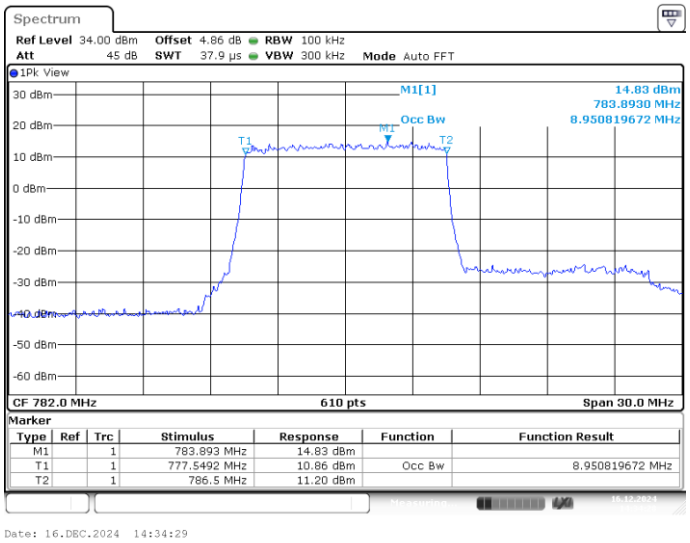
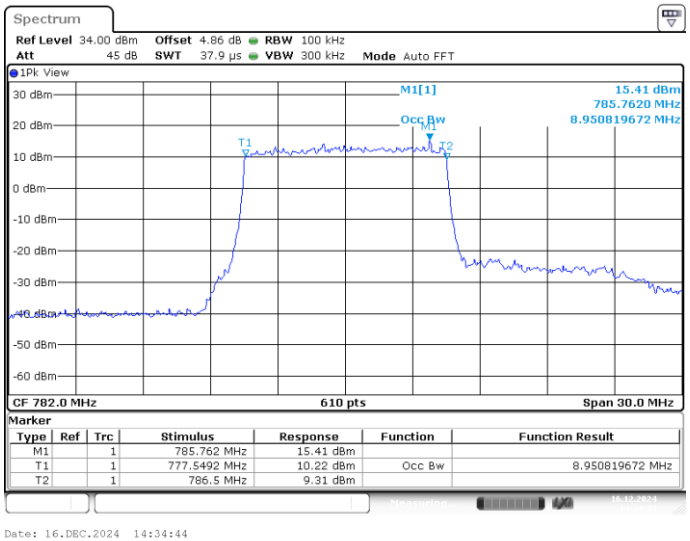
LTE band 13,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
782	8.951	8.951

LTE band 13 , 10MHz Bandwidth,MID,QPSK (99% BW)



LTE band 13 , 10MHz Bandwidth,MID,16QAM (99% BW)



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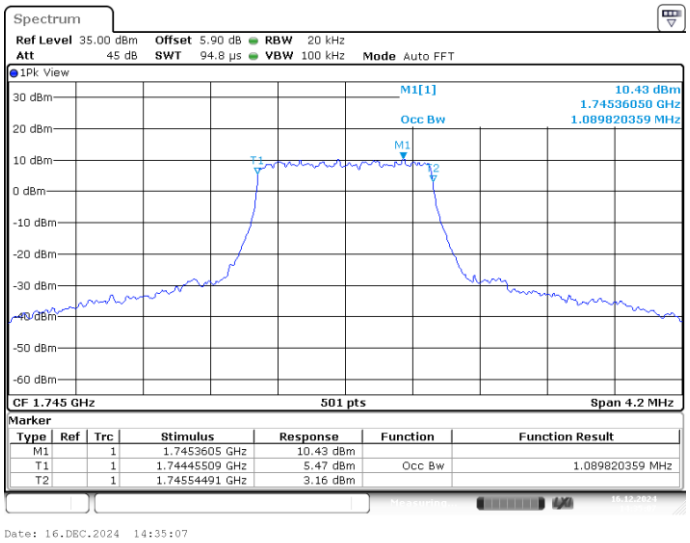
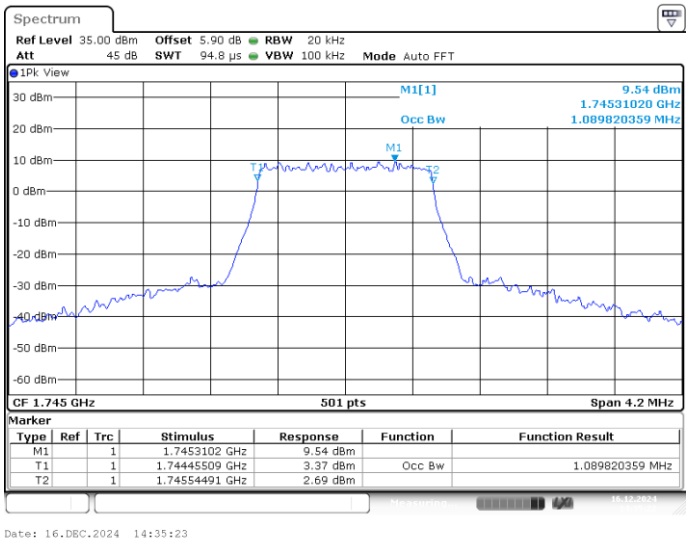
LTE band 66,1.4MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	1.090	1.090

LTE band 66 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 1.4MHz Bandwidth,MID,16QAM (99% BW)



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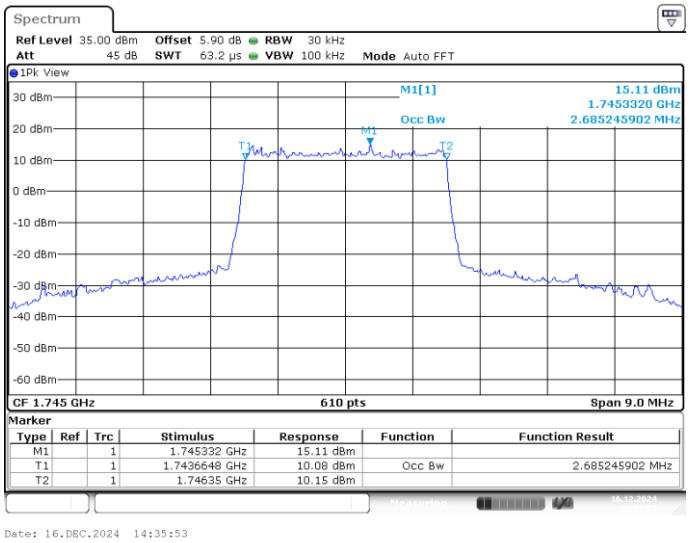
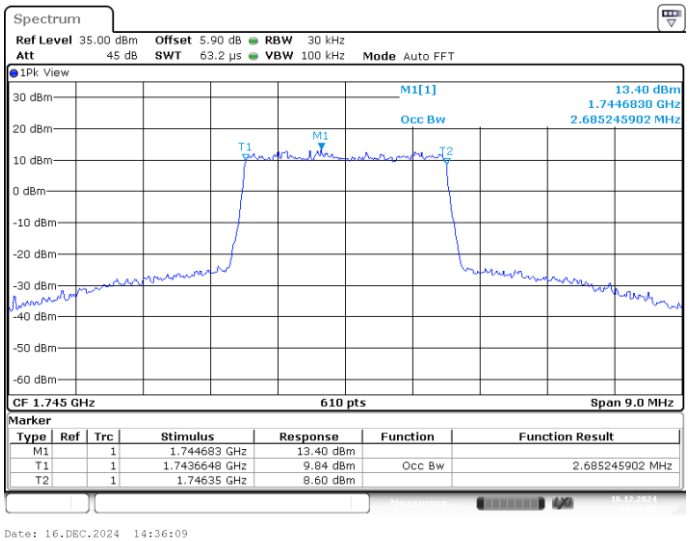
LTE band 66,3MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	2.685	2.685

LTE band 66 , 3MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 3MHz Bandwidth,MID,16QAM (99% BW)



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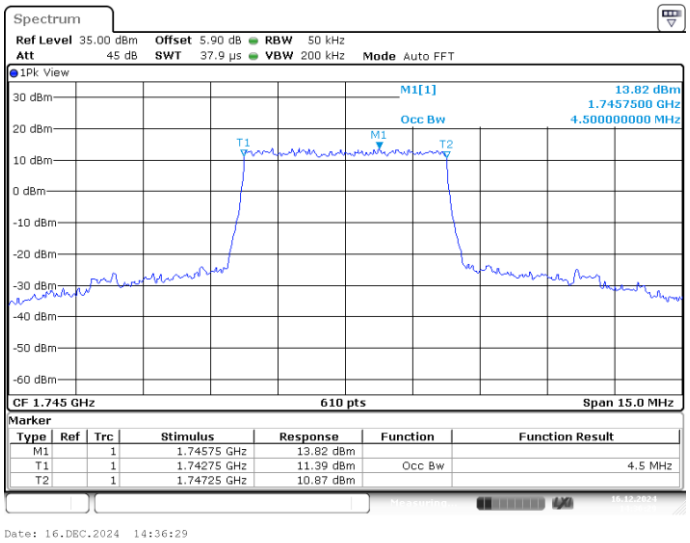
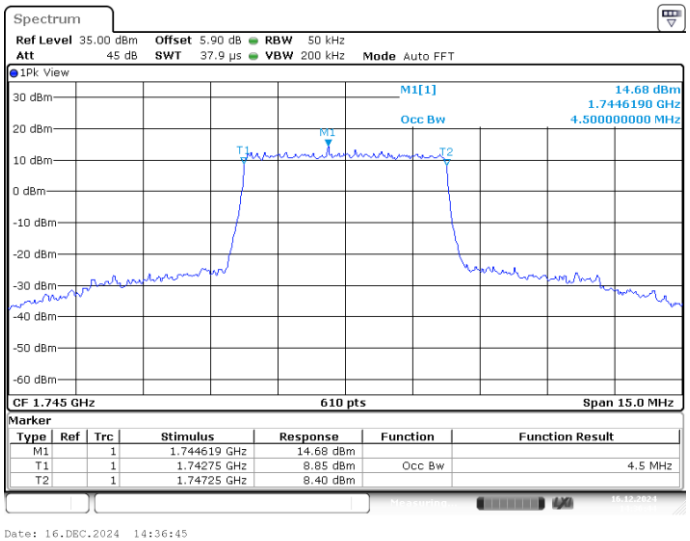
LTE band 66,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	4.500	4.500

LTE band 66 , 5MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 5MHz Bandwidth,MID,16QAM (99% BW)



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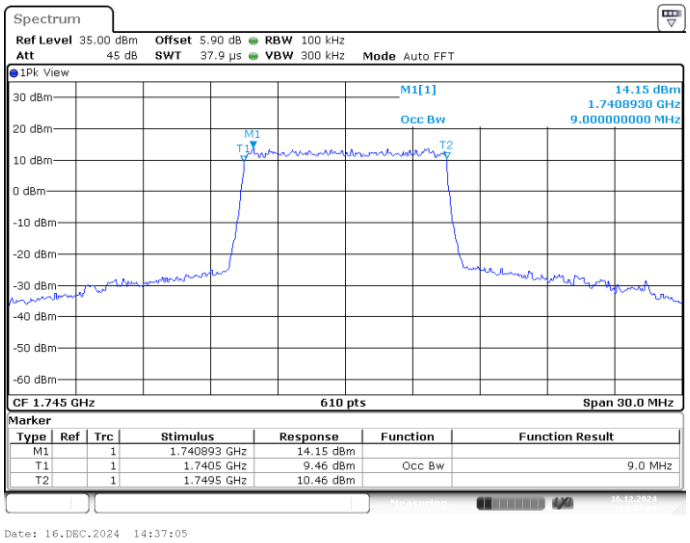
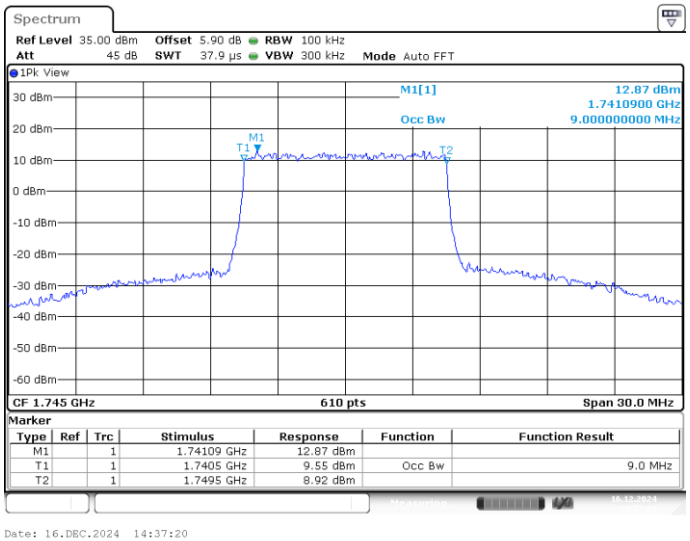
LTE band 66,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	9.000	9.000

LTE band 66 , 10MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 10MHz Bandwidth,MID,16QAM (99% BW)



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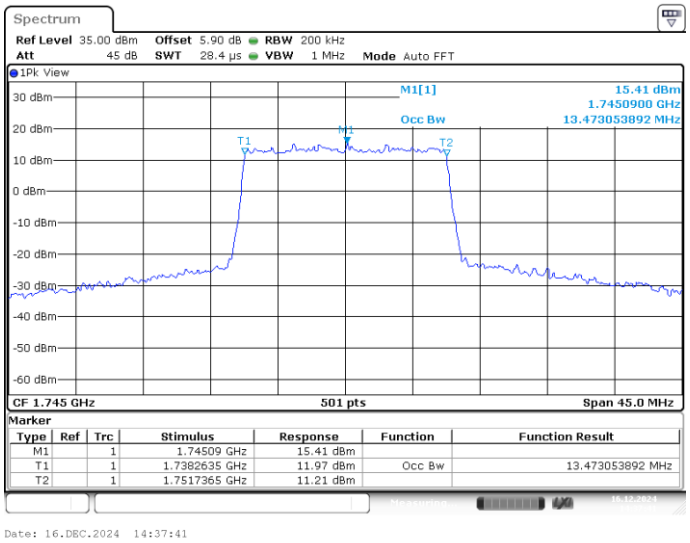
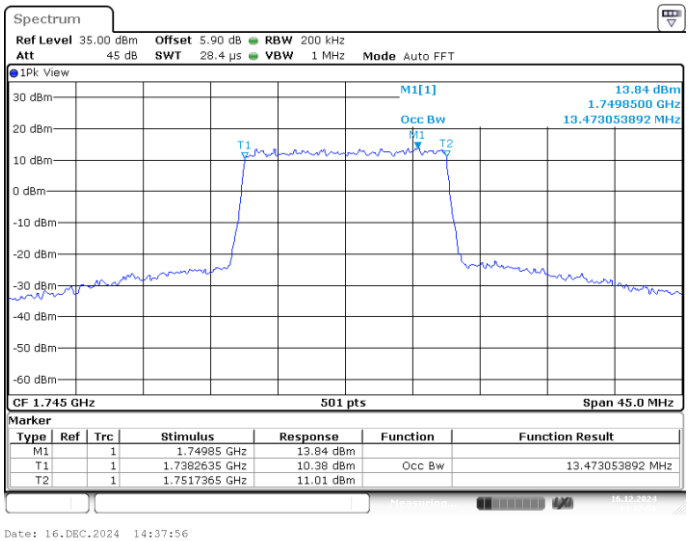
LTE band 66,15MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	13.473	13.473

LTE band 66 , 15MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 15MHz Bandwidth,MID,16QAM (99% BW)



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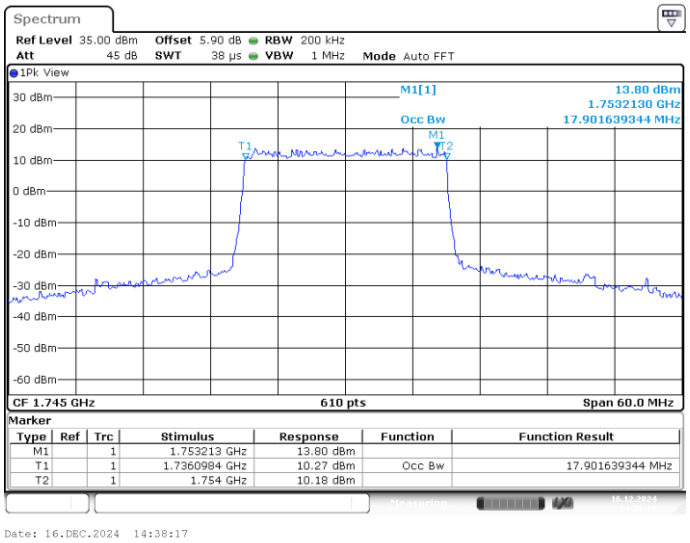
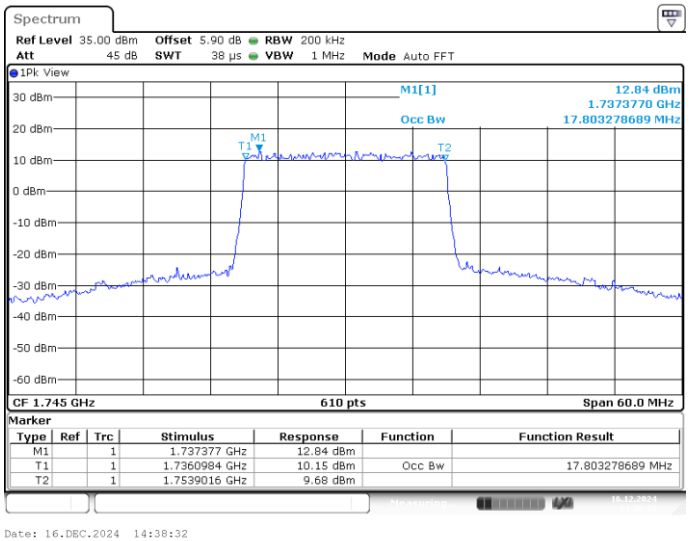
LTE band 66,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
1745	17.902	17.803

LTE band 66 , 20MHz Bandwidth,MID,QPSK (99% BW)



LTE band 66 , 20MHz Bandwidth,MID,16QAM (99% BW)



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A.5 Emission Bandwidth

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

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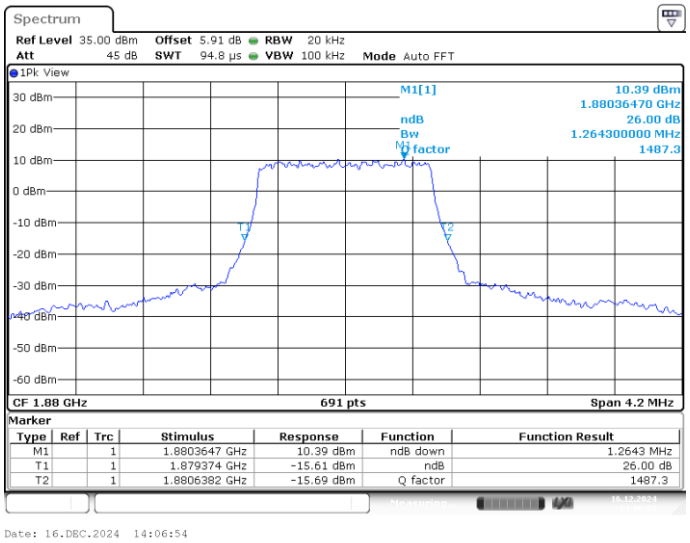
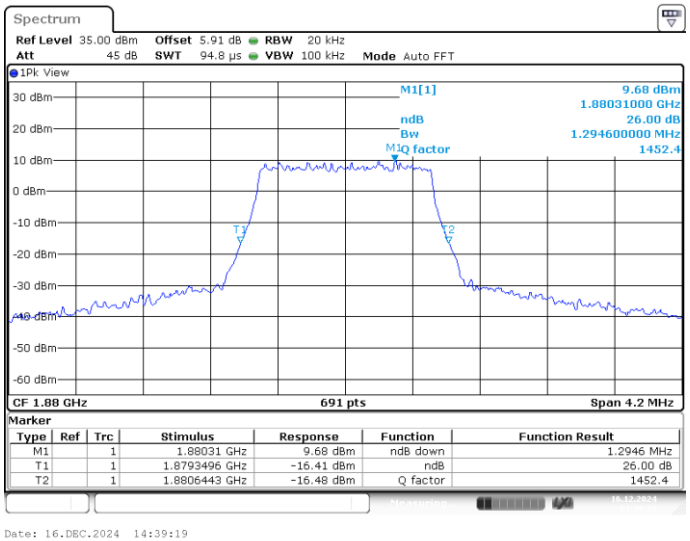
LTE band 2,1.4MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	1.264	1.295

LTE band 2 , 1.4MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 1.4MHz Bandwidth,MID,16QAM (-26dBc BW)



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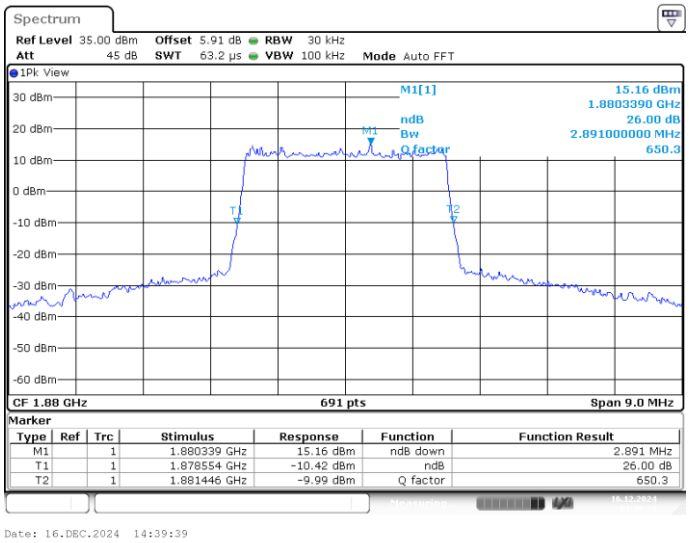
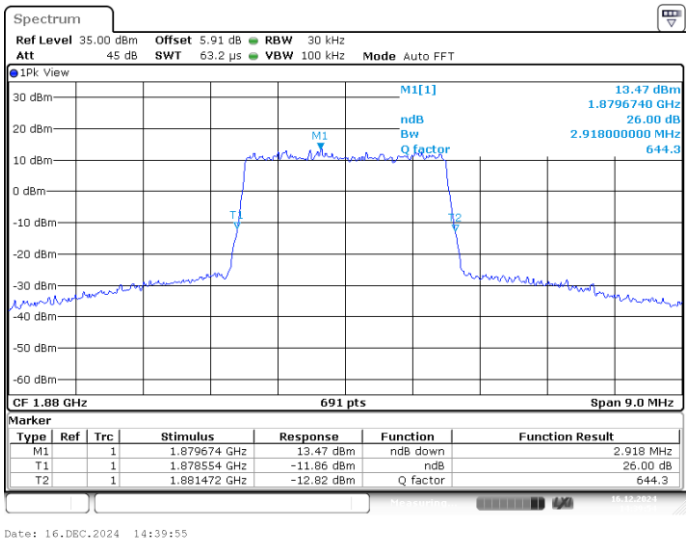
LTE band 2,3MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	2.891	2.918

LTE band 2 , 3MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 3MHz Bandwidth,MID,16QAM (-26dBc BW)



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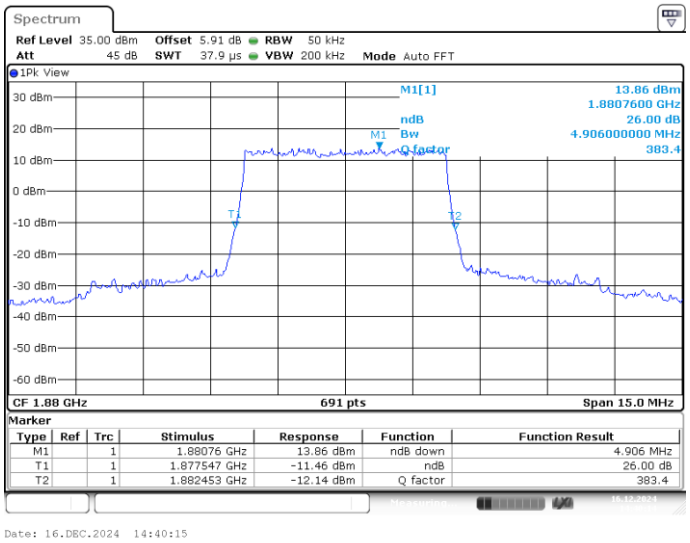
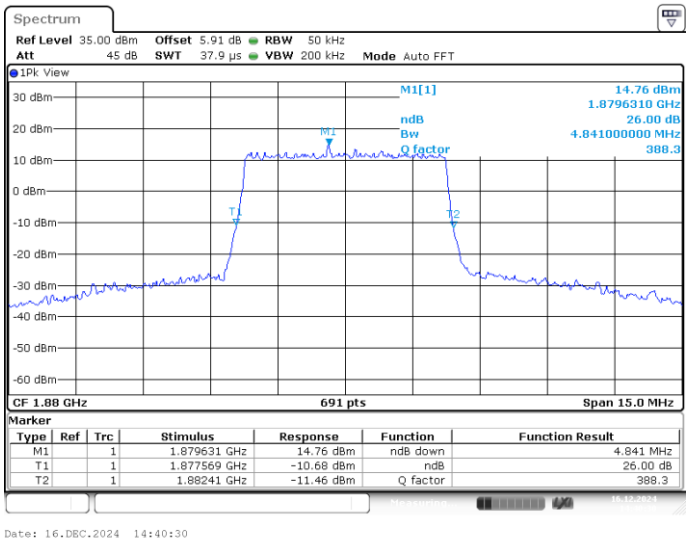
LTE band 2,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	4.906	4.841

LTE band 2 , 5MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 5MHz Bandwidth,MID,16QAM (-26dBc BW)



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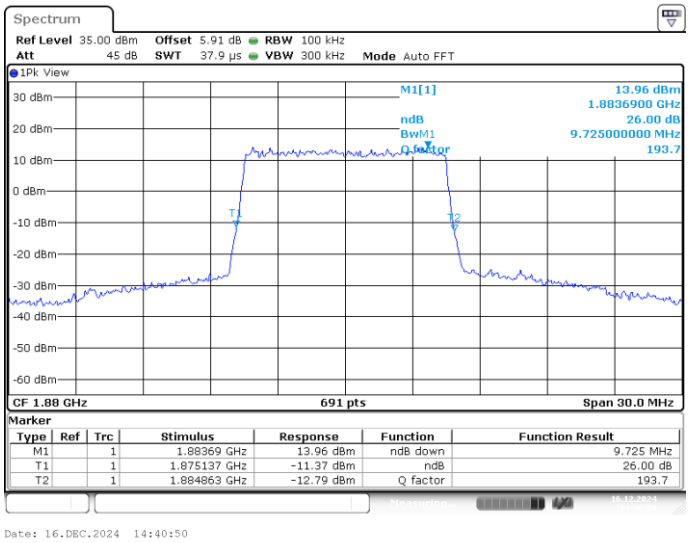
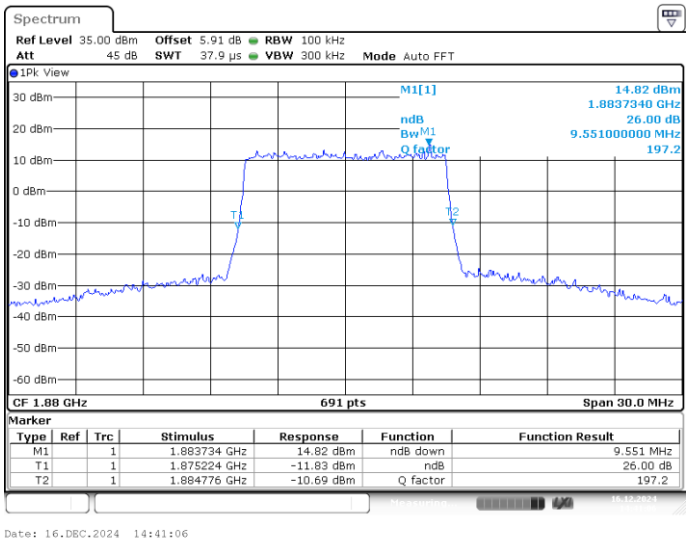
LTE band 2,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	9.725	9.551

LTE band 2 , 10MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 10MHz Bandwidth,MID,16QAM (-26dBc BW)



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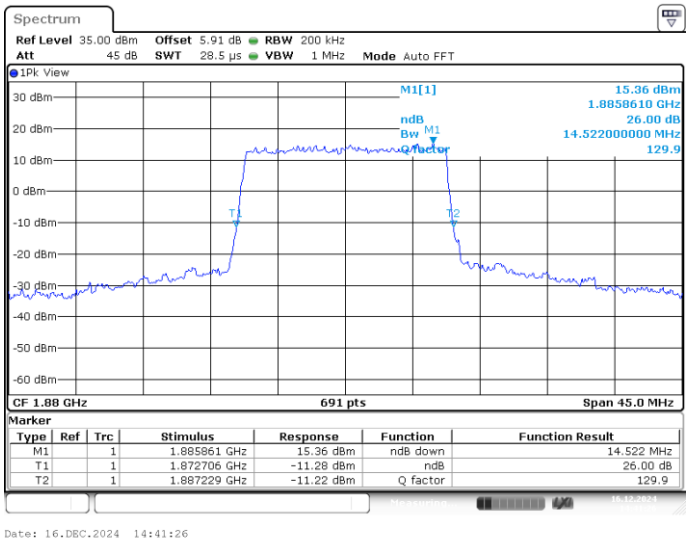
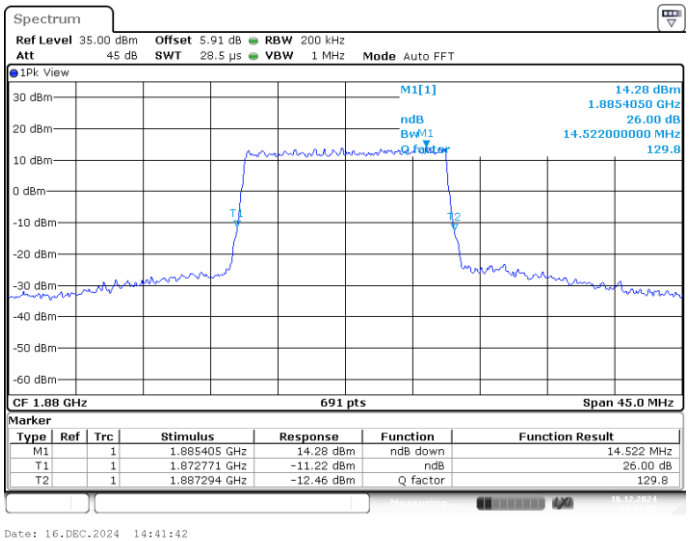
LTE band 2,15MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	14.522	14.522

LTE band 2 , 15MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 15MHz Bandwidth,MID,16QAM (-26dBc BW)



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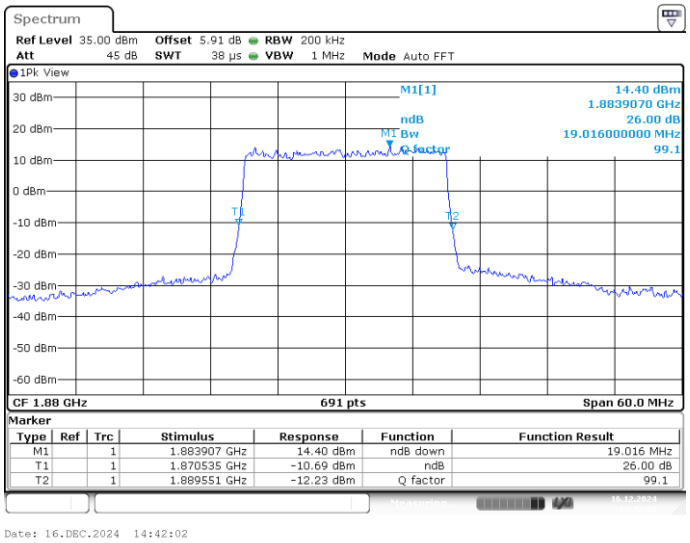
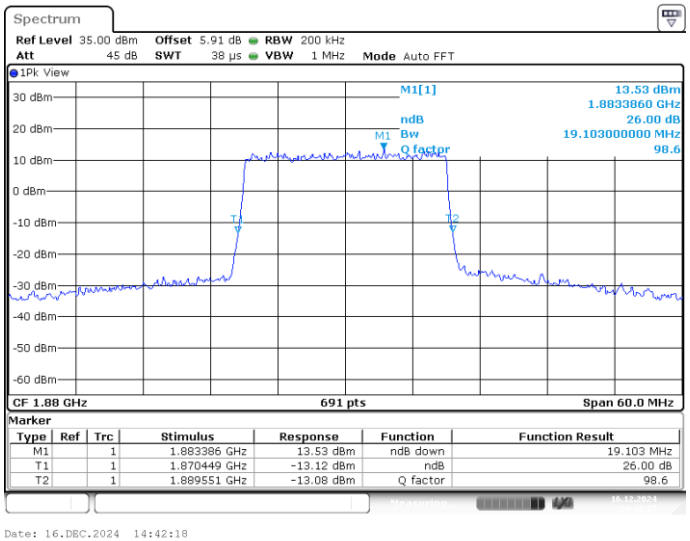
LTE band 2,20MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
1880	19.016	19.103

LTE band 2 , 20MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 2 , 20MHz Bandwidth,MID,16QAM (-26dBc BW)



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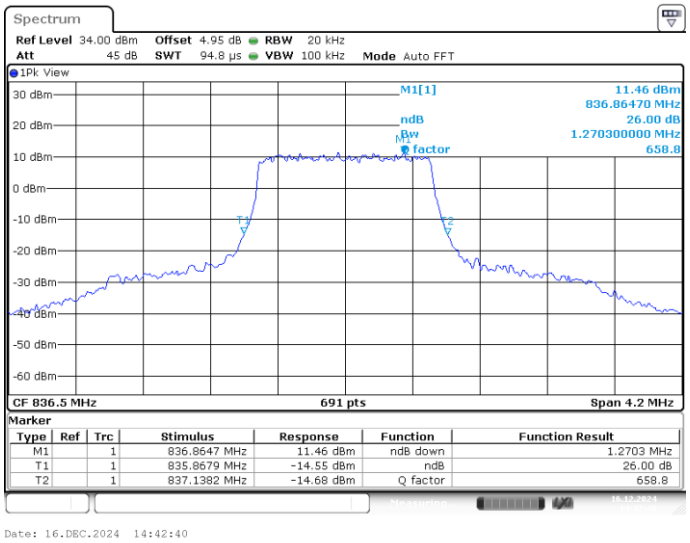
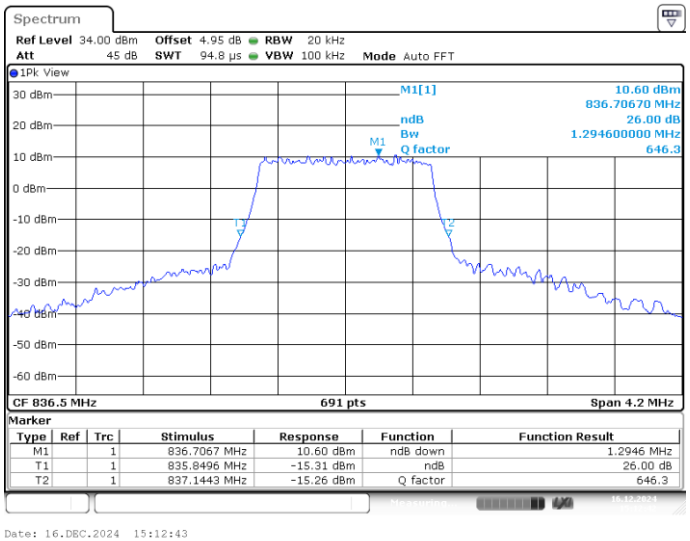
LTE band 5,1.4MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	1.270	1.295

LTE band 5 , 1.4MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 5 , 1.4MHz Bandwidth,MID,16QAM (-26dBc BW)



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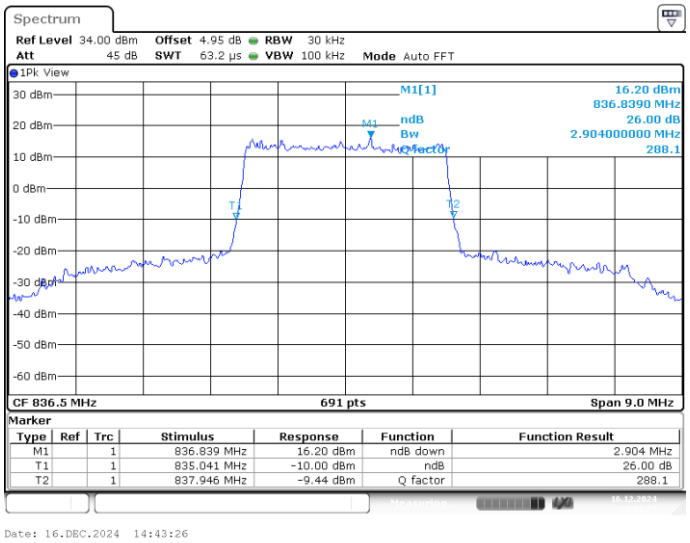
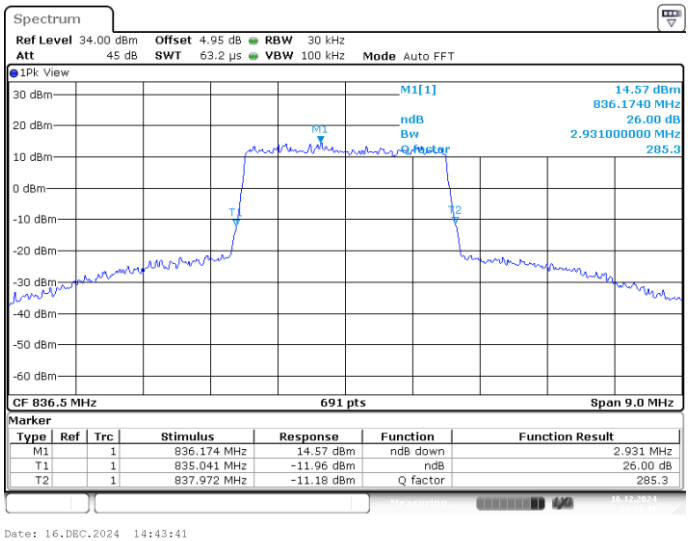
LTE band 5,3MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	2.904	2.931

LTE band 5 , 3MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 5 , 3MHz Bandwidth,MID,16QAM (-26dBc BW)



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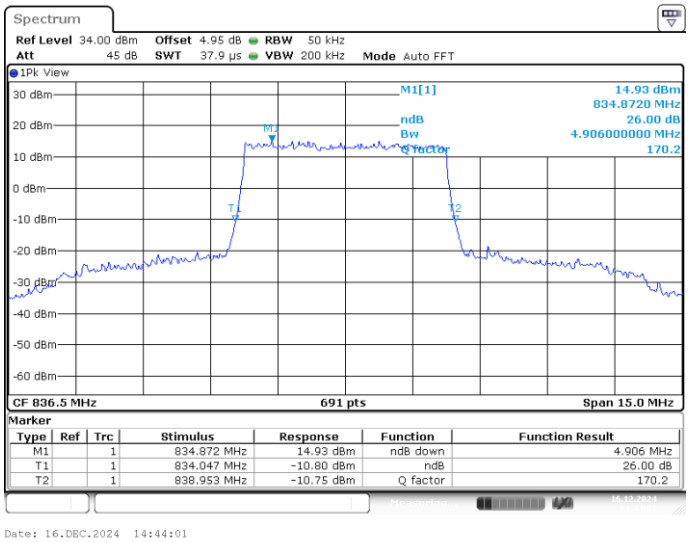
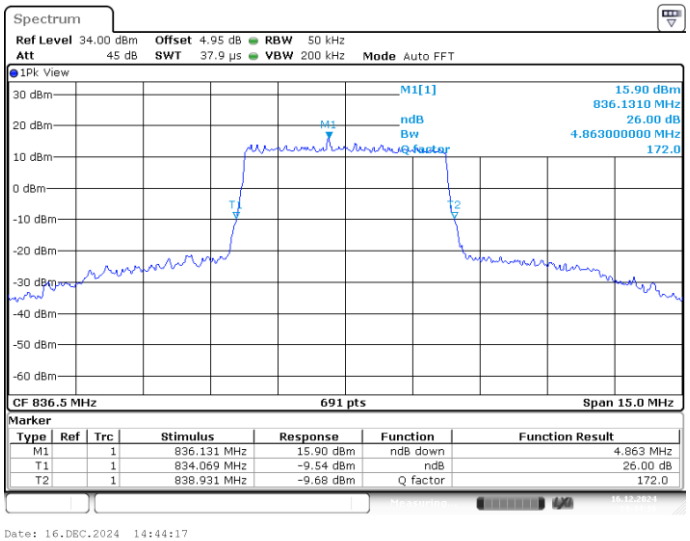
LTE band 5,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	4.906	4.863

LTE band 5 , 5MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 5 , 5MHz Bandwidth,MID,16QAM (-26dBc BW)



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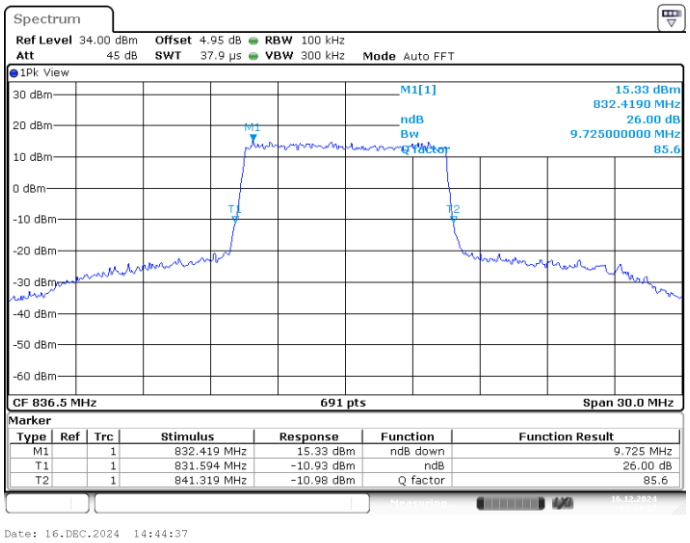
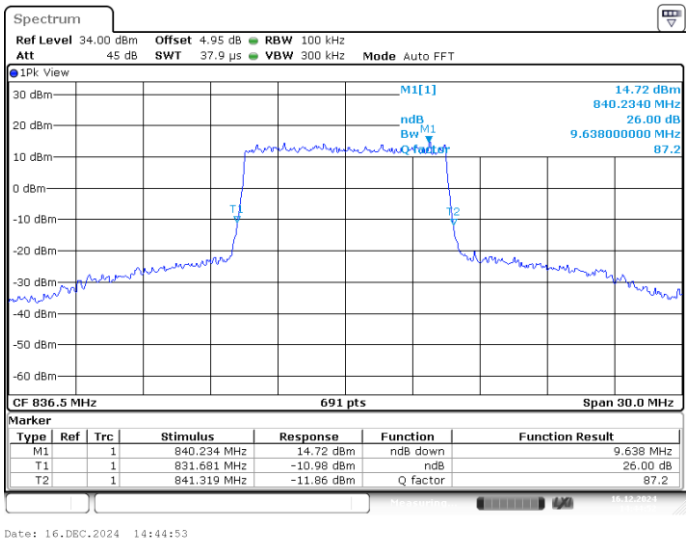
LTE band 5,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	9.725	9.638

LTE band 5 , 10MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 5 , 10MHz Bandwidth,MID,16QAM (-26dBc BW)



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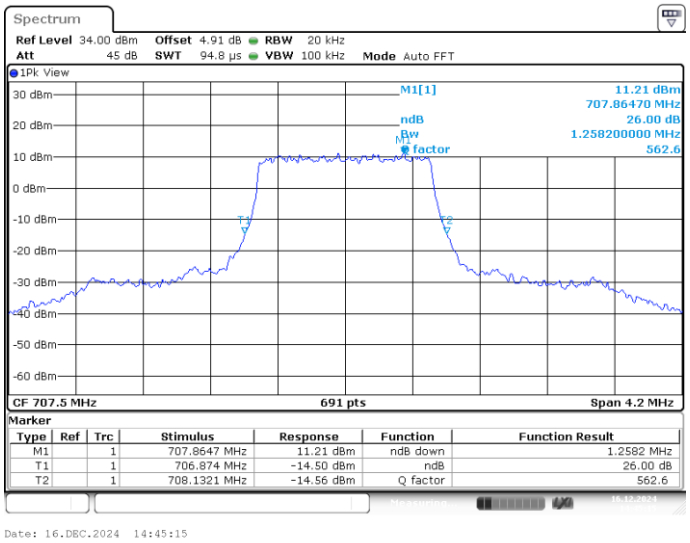
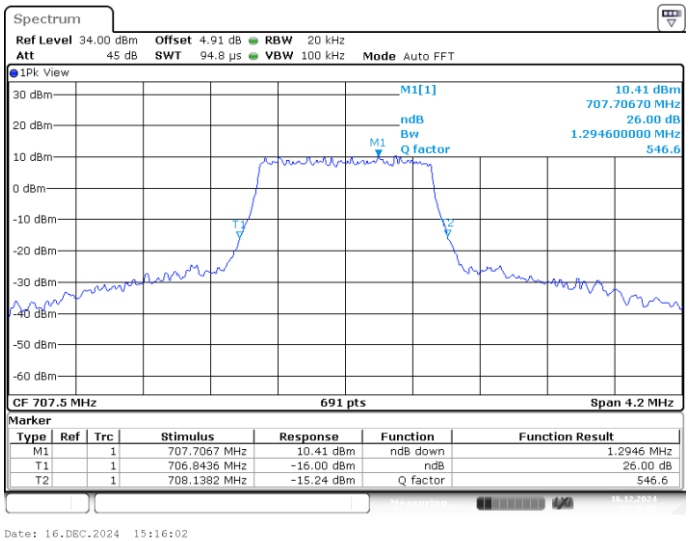
LTE band 12,1.4MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
707.5	1.258	1.295

LTE band 12 , 1.4MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 12 , 1.4MHz Bandwidth,MID,16QAM (-26dBc BW)



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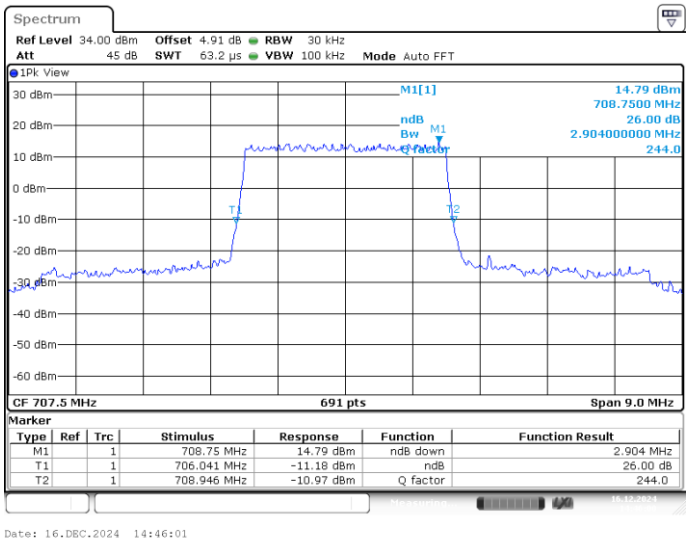
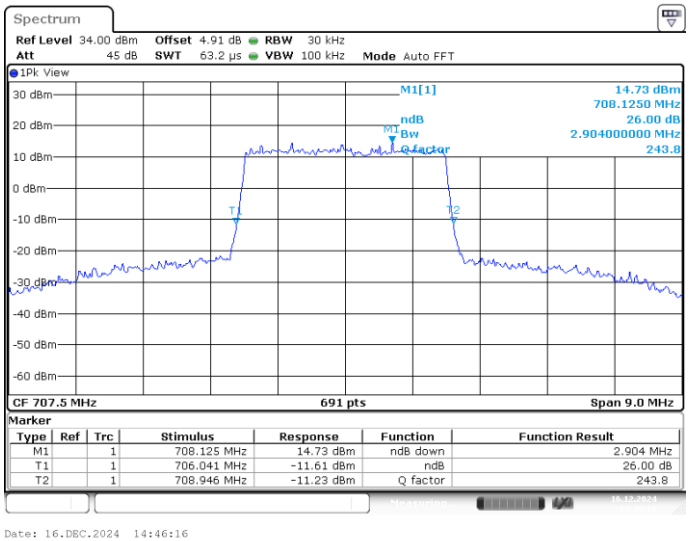
LTE band 12,3MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
707.5	2.904	2.904

LTE band 12 , 3MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 12 , 3MHz Bandwidth,MID,16QAM (-26dBc BW)



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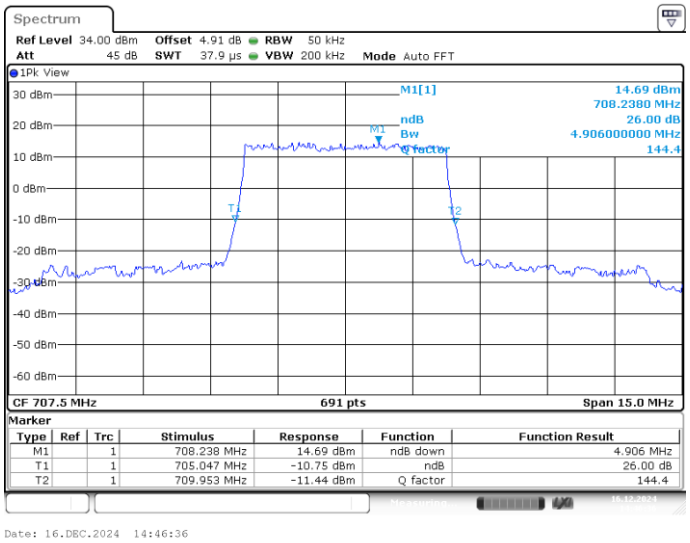
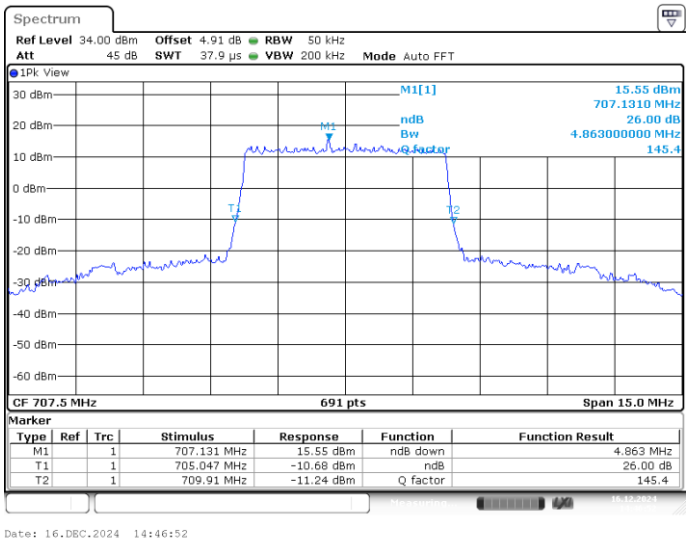
LTE band 12,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
707.5	4.906	4.863

LTE band 12 , 5MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 12 , 5MHz Bandwidth,MID,16QAM (-26dBc BW)



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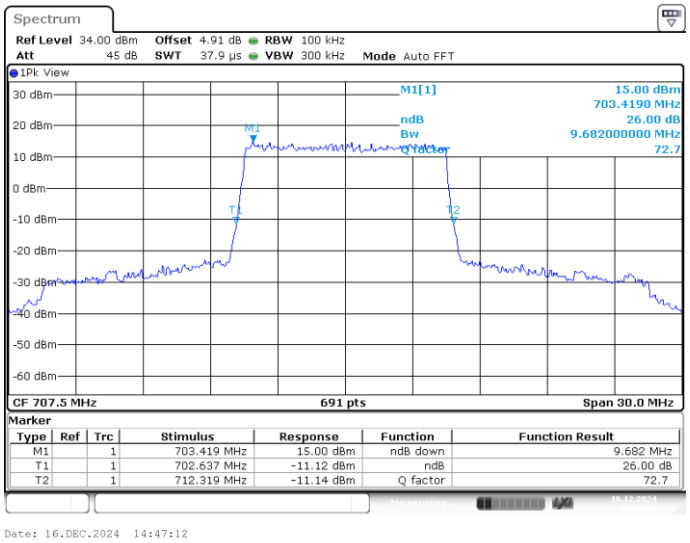
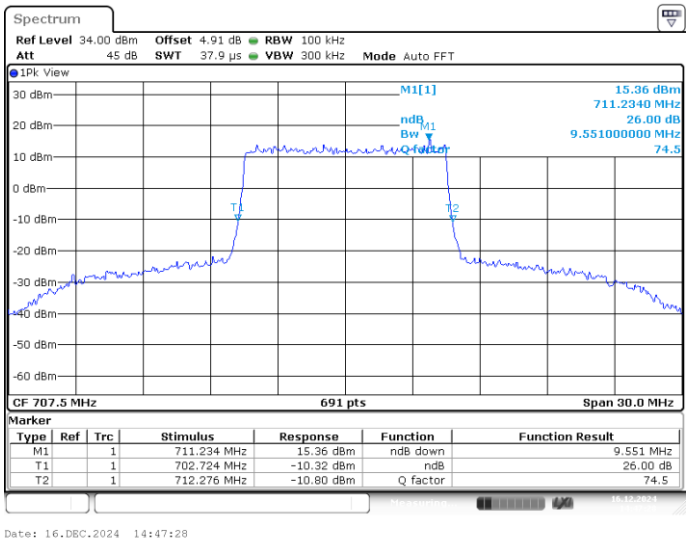
LTE band 12,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
707.5	9.682	9.551

LTE band 12 , 10MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 12 , 10MHz Bandwidth,MID,16QAM (-26dBc BW)



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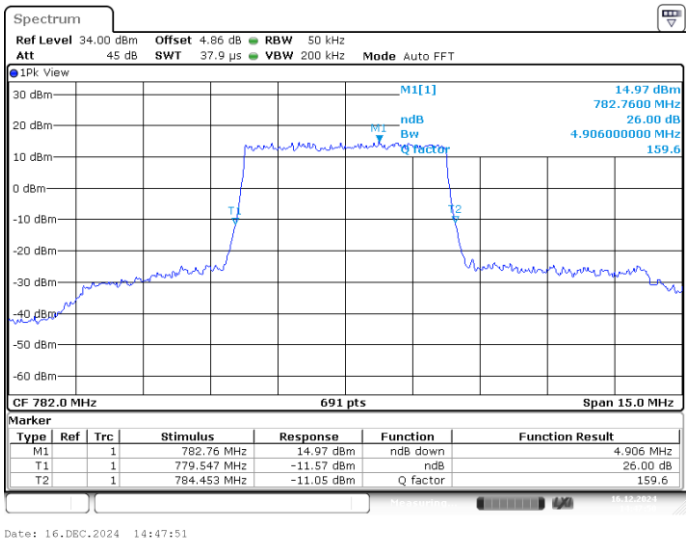
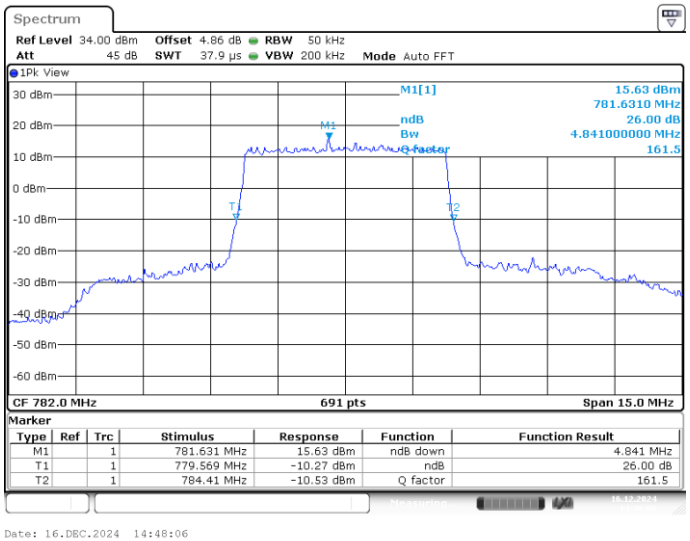
LTE band 13,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
782	4.906	4.841

LTE band 13 , 5MHz Bandwidth,MID,QPSK (-26dBc BW)



LTE band 13 , 5MHz Bandwidth,MID,16QAM (-26dBc BW)



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