

TEST REPORT

of

FCC Part 2 Subpart J, Part 22 Subpart C/H,
Part 24 Subpart E and Part 27 Subpart C

FCC ID: YZP-VL3020A

Equipment Under Test : Telematics Module
Model Name : LTD-VL3020
Variant Model Name(s) : -
Applicant : LG Innotek Co., Ltd.
Manufacturer : LG Innotek Co., Ltd.
Date of Receipt : 2025.09.11
Date of Test(s) : 2025.10.12 ~ 2025.10.31
Date of Issue : 2025.11.11

In the configuration tested, the EUT complied with the standards specified above.
This test report does not assure KOLAS accreditation.

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Tested by:



Ethan Lim

Technical
Manager:



Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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1.2. Details of Applicant

Applicant : LG Innotek Co., Ltd.

Address : 30, Magokjungang 10-ro, Gangseo-gu, Seoul, South Korea

Contact Person : Jeong, In-Chang

Phone No. : +82 62 950 0332

1.3. Details of Manufacturer

Company : Same as applicant

Address : Same as applicant

1.4. Description of EUT

Kind of Product	Telematics Module
Model Name	LTD-VL3020
Serial Number	Conducted: C-001 Radiated: R-001
Power Supply	DC 4.0 V
Rated Power	LTE Band 2, 4, 5, 13: 23 dB m
Frequency Range	LTE Band 2: 1 850 MHz ~ 1 910 MHz LTE Band 4: 1 710 MHz ~ 1 755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 13: 777 MHz ~ 787 MHz
Modulation Technique	QPSK, 16QAM
Antenna Type	Dipole antenna
Antenna Gain*	777 MHz ~ 787 MHz: -0.24 dB i 824 MHz ~ 849 MHz: 2.18 dB i 1 710 MHz ~ 1 755 MHz: 4.13 dB i 1 850 MHz ~ 1 910 MHz: 5.97 dB i
H/W Version	0.0
S/W Version	01K_DCUSKU1

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Due	Cal. Interval
Spectrum Analyzer	R&S	FSV30	103454	12/06/2026	Annual
Spectrum Analyzer	Agilent	N9020A	MY53421758	09/10/2026	Annual
Signal Generator	R&S	SMA100B	106887	10/20/2026	Annual
DC Power Supply	R&S	HMP2020	022802107	10/24/2026	Annual
DC Power Supply	AGILENT	6674A	MY41000836	06/11/2026	Annual
Communication Analyzer	Anritsu	MT8821C	6262192291	02/19/2026	Annual
Temperature Chamber	ESPEC CORP.	PL-2J	15004184	06/04/2026	Annual
Directional Coupler	KRYTAR	152613	140972	10/24/2026	Annual
BRIDGE Coupler	MARK MICROWAVE INC	CBR16-0012	1542	05/15/2026	Annual
High Pass Filter	Wainwright Instrument GmbH	WHNX10-900-1000-18000-40-SS	7	02/24/2026	Annual
High Pass Filter	Wainwright Instrument GmbH	WHKX3.0/18G-6SS	21	06/17/2026	Annual
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	10/22/2026	Annual
Preamplifier	H.P.	8447F	2944A03909	08/07/2026	Annual
Preamplifier	R&S	SCU 18F	101058	02/27/2026	Annual
Test Receiver	R&S	ESU26	100109	01/13/2026	Annual
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	10/01/2027	Biennial
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	01126	03/05/2027	Biennial
Horn Antenna	R&S	HF906	100326	02/24/2026	Annual
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	9170-540	12/11/2025	Annual
Antenna Master	Innco systems GmbH	MA4640-XP-ET	MA4640/536/38330516/L	N.C.R.	N/A
Turn Table	Innco systems GmbH	DS 1200S	N/A	N.C.R.	N/A
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38330516/L	N.C.R.	N/A
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A
Coaxial Cable	RADIALL	TESTPRO 3	182287	04/10/2026	Semi-Annual
Coaxial Cable	RADIALL	TESTPRO 3	182284	04/10/2026	Semi-Annual
Coaxial Cable	RADIALL	TESTPRO 3	182288	04/10/2026	Semi-Annual
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-5m	TPC2402190004	04/13/2026	Semi-Annual
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-10m	TPC2402190001	04/13/2026	Semi-Annual

Note;

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 2, 22, 24 and 27		
Section(s)	Test Item	Result
§2.1046 §22.913(a)(5) §24.232(c) §27.50(b)(9) §27.50(d)(4)	E.R.P. / E.I.R.P.	Pass
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(h)(1)	Radiated Spurious Emissions	Pass
§2.1046	Conducted Output Power	Pass
§2.1049	Occupied Bandwidth	Pass
§22.913(d) §24.232(d) §27.50(d)(5)	Peak-Average Ratio	Pass
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(h)(1)	Spurious Emission at Antenna Terminal	Pass
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(c)(4) §27.53(h)(1)	Band Edge	Pass
§2.1055 §22.355 §24.235 §27.54	Frequency Stability	Pass

1.7. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

1.7.1. Conducted Test

Offset value (dB) = Directional Coupler (dB) + Cable loss (dB)

1.7.2. Radiation test

- E.I.R.P. (dB m) = Measured level (dB μ V) + Antenna factor (dB/m) + Cable loss (dB) + 20 Log D - 104.8;
where D is the measurement distance in meters.
- E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB)

1.8. Measurement Uncertainty

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

Parameter	Uncertainty	
Conducted Output Power	1.43 dB	
Occupied Bandwidth	0.03 MHz	
Conducted Spurious Emissions	0.86 dB	
Peak to Average Ratio	0.65 dB	
Frequency Stability	110 Hz	
Radiated Emission, 9 kHz to 30 MHz	H	3.60 dB
	V	3.60 dB
Radiated Emission, below 1 GHz	H	5.50 dB
	V	5.10 dB
Radiated Emission, above 1 GHz	H	3.50 dB
	V	3.40 dB

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

1.9. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL006498	2025.11.11	Initial

1.10. Worst Case Configuration and Mode

The worst-case is based on the conducted output power measurement investigation results. All testing was performed using QPSK and 16QAM modulations. However, the spurious radiated emission and spurious at antenna terminal were only performed on bandwidth and RB offset (with RB size 1) with the highest conducted power in QPSK.

The radiation test of the EUT was investigated in three orthogonal orientations X, Y, and Z, and the worst case data is reported.

1.11. Measurement Configuration

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
		Low	Mid	High	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
Conducted Power	2	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	4	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	5	V	V	V	V	V	V	V			V	V	V	V	V
	13	V	V	V			V	V			V	V	V	V	V
Frequency Stability	2	-	V	-	-	-	V	-	-	-	V	-	-	-	V
	4	-	V	-	-	-	V	-	-	-	V	-	-	-	V
	5	-	V	-	-	-	V	-			V	-	-	-	V
	13	-	V	-			V	-			V	-	-	-	V
Occupied Bandwidth	2	V	V	V	V	V	V	V	V	V	V	V	-	-	V
	4	V	V	V	V	V	V	V	V	V	V	V	-	-	V
	5	V	V	V	V	V	V	V			V	V	-	-	V
	13	V	V	V			V	V			V	V	-	-	V
Peak-to-Average Ratio	2	V	V	V	V	V	V	V	V	V	V	V	-	-	V
	4	V	V	V	V	V	V	V	V	V	V	V	-	-	V
	5	V	V	V	V	V	V	V			V	V	-	-	V
	13	V	V	V			V	V			V	V	-	-	V
Band edge	2	V	-	V	V	V	V	V	V	V	V	V	V	-	V
	4	V	-	V	V	V	V	V	V	V	V	V	V	-	V
	5	V	-	V	V	V	V	V			V	V	V	-	V
	13	V	-	V			V	V			V	V	V	-	V
Spurious at antenna terminal & Spurious Radiated Emission	2	V	V	V	worst case										
	4	V	V	V	worst case										
	5	V	V	V	worst case										
	13	V	V	V	worst case										

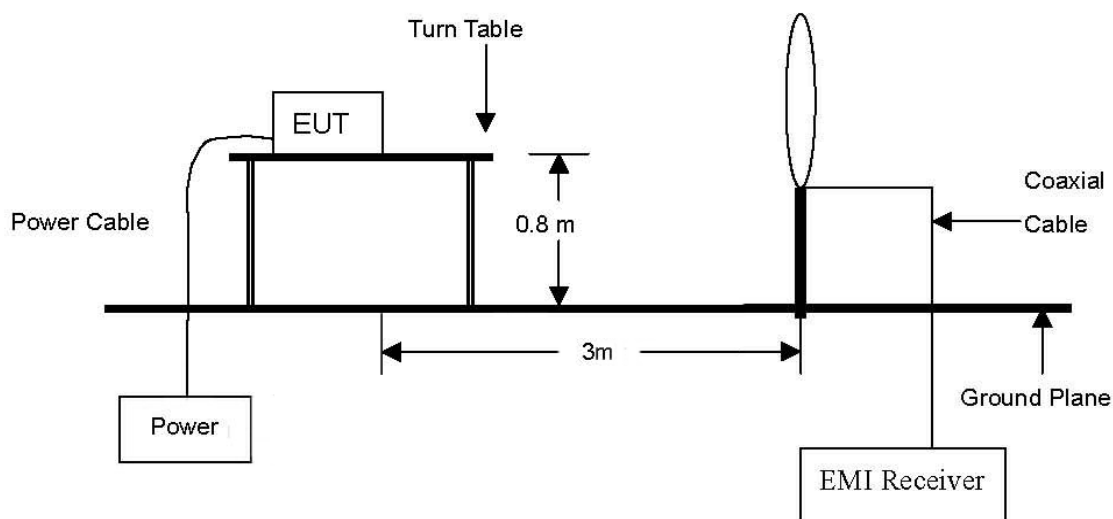
1.12. Emission Designator and Max Power

Band	Band width (MHz)	Modulation	Low Freq. (MHz)	Upper Freq. (MHz)	Conducted Average (dB m)	Ant. Gain (dB i)	E.R.P. / E.I.R.P. Average (dB m)	E.R.P. / E.I.R.P. Average (W)	Emission Designator
2	1.4	QPSK	1 850.7	1 909.3	22.85	5.97	28.82	0.762	1M10G7D
		16QAM			21.79		27.76	0.597	1M10D7D
	3	QPSK	1 851.5	1 908.5	22.96		28.93	0.782	2M69G7D
		16QAM			22.22		28.19	0.659	2M68D7D
	5	QPSK	1 852.5	1 907.5	23.05		29.02	0.798	4M50G7D
		16QAM			21.96		27.93	0.621	4M51D7D
	10	QPSK	1 855.0	1 905.0	23.18		29.15	0.822	8M93G7D
		16QAM			22.10		28.07	0.641	8M93D7D
	15	QPSK	1 857.5	1 902.5	23.11		29.08	0.809	13M5G7D
		16QAM			22.11		28.08	0.643	13M5D7D
	20	QPSK	1 860.0	1 900.0	23.04		29.01	0.796	17M9G7D
		16QAM			22.00		27.97	0.627	17M9D7D
4	1.4	QPSK	1 710.7	1 754.3	22.66	4.13	26.79	0.478	1M10G7D
		16QAM			21.55		25.68	0.370	1M10D7D
	3	QPSK	1 711.5	1 753.5	22.70		26.83	0.482	2M69G7D
		16QAM			21.70		25.83	0.383	2M69D7D
	5	QPSK	1 712.5	1 752.5	22.67		26.80	0.479	4M51G7D
		16QAM			21.79		25.92	0.391	4M51D7D
	10	QPSK	1 715.0	1 750.0	22.75		26.88	0.488	8M93G7D
		16QAM			21.84		25.97	0.395	8M91D7D
	15	QPSK	1 717.5	1 747.5	22.89		27.02	0.504	13M5G7D
		16QAM			21.64		25.77	0.378	13M5D7D
	20	QPSK	1 720.0	1 745.0	22.95		27.08	0.511	17M9G7D
		16QAM			21.84		25.97	0.395	17M9D7D
5	1.4	QPSK	824.7	848.3	22.99	2.18	23.02	0.200	1M10G7D
		16QAM			22.12		22.15	0.164	1M10D7D
	3	QPSK	825.5	847.5	22.98		23.01	0.200	2M68G7D
		16QAM			22.02		22.05	0.160	2M68D7D
	5	QPSK	826.5	846.5	22.91		22.94	0.197	4M50G7D
		16QAM			21.82		21.85	0.153	4M50D7D
	10	QPSK	829.0	844.0	22.96		22.99	0.199	8M93G7D
		16QAM			22.12		22.15	0.164	8M93D7D
13	5	QPSK	779.5	784.5	23.05	-0.24	20.66	0.116	4M50G7D
		16QAM			22.01		19.62	0.092	4M50D7D
	10	QPSK	782.0		23.21		20.82	0.121	8M91G7D
		16QAM			21.98		19.59	0.091	8M89D7D

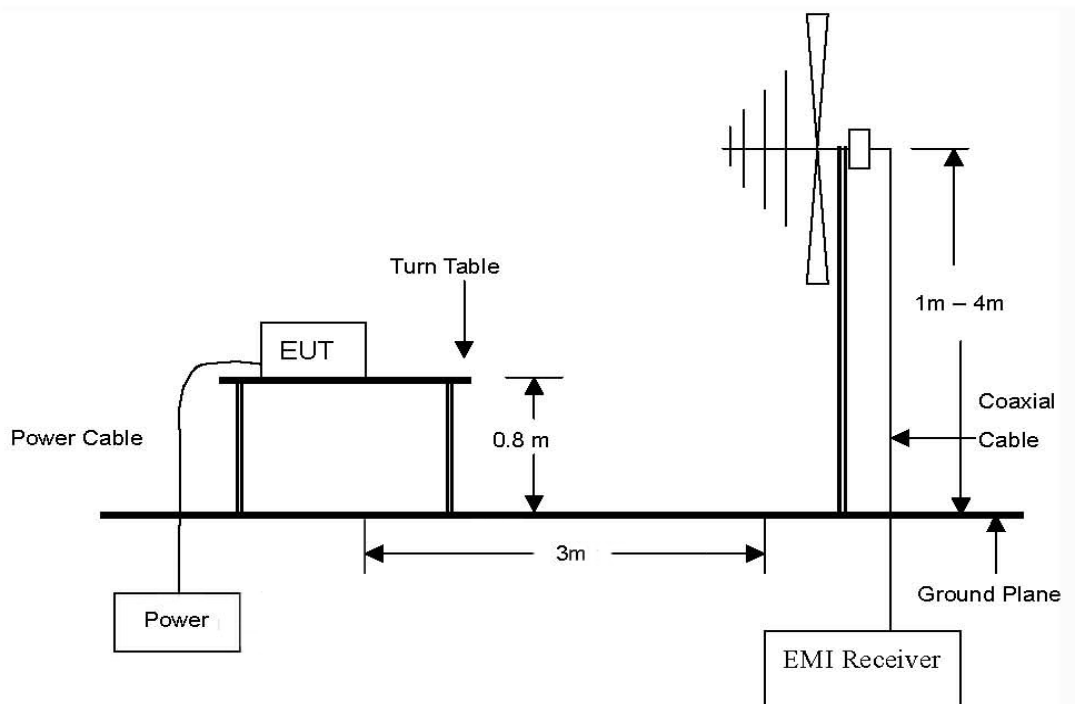
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test setup

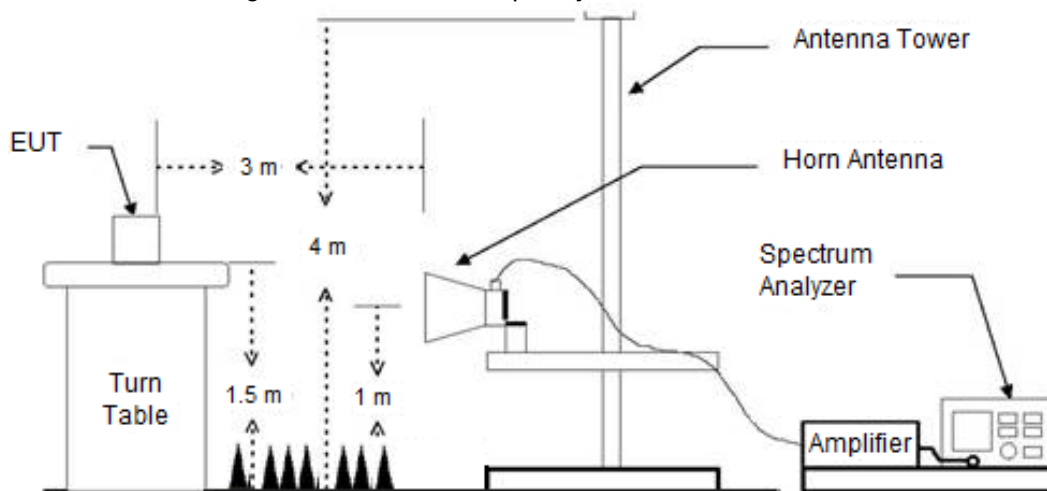
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.



2.2. Limit

2.2.1. Limit of E.R.P. / E.I.R.P.

- §22.913(a)(5), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
- §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means to limiting power to the minimum necessary for successful communications.
- §27.50(b)(9), Control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.
- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP.

2.2.2. Limit of Radiated Spurious Emissions

- §22.917(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.
- §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.
- §27.53(c)(2), On any frequency outside the 776-788 band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.
- §27.53(f), For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1 559-1 610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.
- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

2.3. Test Procedure

2.3.1. E.R.P. or E.I.R.P. from conducted RF output power

According to subclause 5.2.5.5 of ANSI C63.26-2015 E.R.P. and E.I.R.P. are defined as the product of the power supplied to the antenna and its gain.

The relevant equation for determining the E.R.P. or E.I.R.P. from the conducted RF output power measured using the guidance provided above is:

$$\text{E.R.P. or E.I.R.P.} = P_{\text{Meas}} + G_T$$

where:

E.R.P. or E.I.R.P. = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

2.3.2. Radiated Spurious Emissions

The test based on ANSI/TIA 603E: 2016 and ANSI C63.26-2015 and KDB 971168 D01 Power Meas License Digital Systems v03r01.

1. On a test site, the EUT shall be placed at 0.8 m or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. Radiated spurious emissions measurement method was set as follows:
RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, VBW $\geq 3 \times$ RBW,
Detector = RMS, trace mode = max hold, per the guidelines of KDB 971168 D01 Power Meas License Digital Systems v03r01.
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
11. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
12. The measurement shall be repeated with the test antenna orientated for horizontal polarization.

2.4. Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 %

2.4.1. E.R.P. / E.I.R.P.

Band	Frequency (MHz)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Antenna Gain (dB i)	Maximum E.I.R.P. (dB m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dB m)	Maximum E.R.P. (W)	Limit
2	1 850 ~ 1 910	23.18	0.208	5.97	29.15	0.822			2 W E.I.R.P.
4	1 710 ~ 1 755	22.95	0.197	4.13	27.08	0.511			1 W E.I.R.P.
5	824 ~ 849	22.99	0.199	2.18	25.17	0.329	23.02	0.200	7 W E.R.P.
13	777 ~ 787	23.21	0.209	-0.24	22.97	0.198	20.82	0.121	30 W E.R.P.

Remark;

1. E.I.R.P. (dB m) = Maximum Conducted Power (dB m) + Maximum Antenna Gain (dB i)
2. E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.

2.4.2. Radiated spurious emissions

LTE band 2 (10 MHz - QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (1 855.0 MHz)									
3 701.12	50.08	H	32.00	-30.26	51.82	-95.26	-43.44	-13	30.44
3 701.40	47.71	V	32.01	-30.26	49.46	-95.26	-45.80	-13	32.80
5 551.84	46.06	H	34.10	-27.36	52.80	-95.26	-42.46	-13	29.46
5 551.66	42.65	V	34.10	-27.37	49.38	-95.26	-45.88	-13	32.88
7 402.58	43.18	V	36.19	-25.37	54.00	-95.26	-41.26	-13	28.26
Above 7 500.00	Not detected	—	—	—	—	—	—	—	—
Middle Channel (1 880.0 MHz)									
3 750.96	46.73	H	32.20	-30.34	48.59	-95.26	-46.67	-13	33.67
3 751.23	44.58	V	32.20	-30.34	46.44	-95.26	-48.82	-13	35.82
5 626.85	42.68	H	34.10	-27.15	49.63	-95.26	-45.63	-13	32.63
5 626.72	46.18	V	34.10	-27.15	53.13	-95.26	-42.13	-13	29.13
7 502.26	40.85	V	36.10	-25.32	51.63	-95.26	-43.63	-13	30.63
Above 7 600.00	Not detected	—	—	—	—	—	—	—	—
High Channel (1 905.0 MHz)									
3 801.46	44.76	H	32.30	-30.18	46.88	-95.26	-48.38	-13	35.38
3 801.12	50.77	V	32.30	-30.18	52.89	-95.26	-42.37	-13	29.37
5 701.79	36.28	H	34.20	-26.35	44.13	-95.26	-51.13	-13	38.13
5 701.84	44.24	V	34.20	-26.35	52.09	-95.26	-43.17	-13	30.17
7 602.37	41.69	V	36.00	-25.12	52.57	-95.26	-42.69	-13	29.69
Above 7 700.00	Not detected	—	—	—	—	—	—	—	—

LTE band 4 (20 MHz - QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (1 720.0 MHz)									
3 457.81	49.48	H	31.02	-30.48	50.02	-95.26	-45.24	-13	32.24
3 457.81	53.61	V	31.02	-30.48	54.15	-95.26	-41.11	-13	28.11
5 186.81	44.34	H	33.67	-28.07	49.94	-95.26	-45.32	-13	32.32
5 186.71	47.43	V	33.67	-28.07	53.03	-95.26	-42.23	-13	29.23
6 915.45	41.84	V	35.50	-25.38	51.96	-95.26	-43.30	-13	30.30
Above 7 000.00	Not detected	—	—	—	—	—	—	—	—
Middle Channel (1 732.5 MHz)									
3 482.85	48.71	H	31.07	-30.29	49.49	-95.26	-45.77	-13	32.77
3 482.87	50.00	V	31.07	-30.29	50.78	-95.26	-44.48	-13	31.48
5 224.30	44.10	H	33.75	-27.83	50.02	-95.26	-45.24	-13	32.24
5 224.26	49.09	V	33.75	-27.83	55.01	-95.26	-40.25	-13	27.25
6 965.48	40.25	V	35.50	-25.18	50.57	-95.26	-44.69	-13	31.69
Above 7 000.00	Not detected	—	—	—	—	—	—	—	—
High Channel (1 745.0 MHz)									
3 507.95	48.92	H	31.12	-30.44	49.60	-95.26	-45.66	-13	32.66
3 507.97	47.08	V	31.12	-30.44	47.76	-95.26	-47.50	-13	34.50
5 261.95	45.54	H	33.82	-28.55	50.81	-95.26	-44.45	-13	31.45
5 261.69	50.37	V	33.82	-28.55	55.64	-95.26	-39.62	-13	26.62
7 015.63	35.80	H	35.53	-24.74	46.59	-95.26	-48.67	-13	35.67
7 015.50	43.70	V	35.53	-24.74	54.49	-95.26	-40.77	-13	27.77
Above 7 100.00	Not detected	—	—	—	—	—	—	—	—

LTE band 5 (1.4 MHz - QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (824.7 MHz)									
1 649.14	61.51	H	25.69	-34.70	52.50	-97.41	-44.91	-13	31.91
1 649.35	64.05	V	25.70	-34.70	55.05	-97.41	-42.36	-13	29.36
2 473.81	46.63	H	28.24	-33.14	41.73	-97.41	-55.68	-13	42.68
2 473.83	52.77	V	28.24	-33.14	47.87	-97.41	-49.54	-13	36.54
3 298.44	44.82	H	30.70	-31.83	43.69	-97.41	-53.72	-13	40.72
3 298.67	41.70	V	30.70	-31.83	40.57	-97.41	-56.84	-13	43.84
Above 3 300.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (836.5 MHz)									
1 672.84	61.08	H	26.16	-34.62	52.62	-97.41	-44.79	-13	31.79
1 672.84	61.05	V	26.16	-34.62	52.59	-97.41	-44.82	-13	31.82
2 509.21	49.11	H	28.54	-32.99	44.66	-97.41	-52.75	-13	39.75
2 509.21	49.24	V	28.54	-32.99	44.79	-97.41	-52.62	-13	39.62
3 345.71	43.03	H	30.88	-31.97	41.94	-97.41	-55.47	-13	42.47
Above 3 400.00	Not detected	-	-	-	-	-	-	-	-
High Channel (848.3 MHz)									
1 696.41	53.31	H	26.63	-34.49	45.45	-97.41	-51.96	-13	38.96
1 696.43	57.61	V	26.63	-34.49	49.75	-97.41	-47.66	-13	34.66
2 544.58	50.58	V	28.68	-33.10	46.16	-97.41	-51.25	-13	38.25
2 544.76	49.13	H	28.68	-33.10	44.71	-97.41	-52.70	-13	39.70
3 392.69	45.22	V	30.99	-31.84	44.37	-97.41	-53.04	-13	40.04
3 392.90	42.01	V	30.99	-31.84	41.16	-97.41	-56.25	-13	43.25
Above 3 400.00	Not detected	-	-	-	-	-	-	-	-

LTE band 13 (10 MHz - QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Middle Channel (782.0 MHz)									
1 555.08	52.69	H	25.22	-36.56	41.35	-97.41	-56.06	-13	43.06
1 555.09	53.67	V	25.22	-36.56	42.33	-97.41	-55.08	-13	42.08
2 332.87	60.62	H	28.10	-34.68	54.04	-97.41	-43.37	-13	30.37
2 332.80	54.34	V	28.10	-34.68	47.76	-97.41	-49.65	-13	36.65
3 110.34	47.85	H	30.22	-32.66	45.41	-97.41	-52.00	-13	39.00
3 110.25	46.42	V	30.22	-32.66	43.98	-97.41	-53.43	-13	40.43
Above 3 200.00	Not detected	-	-	-	-	-	-	-	-

Remark;

1. AF = Antenna Factor, AMP= Amplifier Gain, CL = Cable Loss, CF = Conversion Factor.
2. E (dBμV/m) = Measured Level (dBμV) + Antenna Factor (dB/m) + AMP (dB) + Cable Loss (dB).
3. E.I.R.P. (dB m) = E (dBμV/m) + CF (dB).
4. E.R.P. (dB m) = E (dBμV/m) + CF (dB) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.
5. CF (dB) = 20 log D - 104.8; where D is the measurement distance in meters, According to KDB 971168 D01 v03r01 5.8.4.
6. The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

3. Conducted Output Power

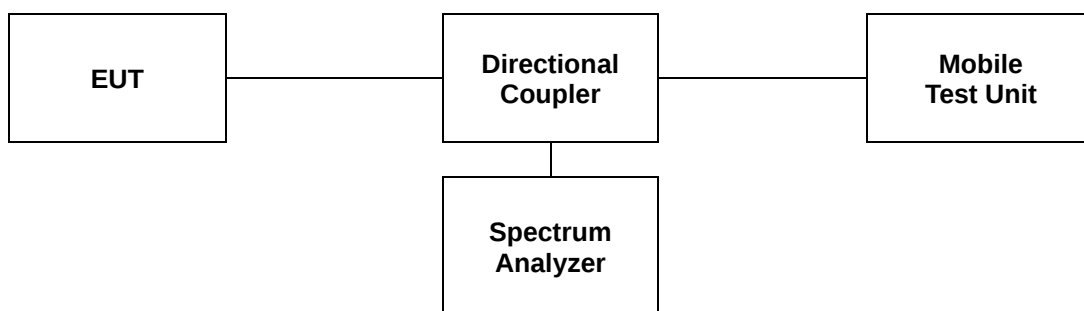
3.1. Limit

CFR 47, Section FCC §2.1046

3.2. Test Procedure

Output power shall be measured at the RF output terminals for all configurations.

1. The RF output of the transmitter was connected to the input of the mobile test unit in order to establish communication with the EUT.
2. The EUT was set up for the max. output power with pseudo random data modulation by using mobile test unit parameters.
3. This EUT was tested under all configurations and the highest power was investigated and reported.



3.3. Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 %

LTE Band 2											
Ant. Gain						5.97 dBi					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18607 (1 850.7 MHz)		18900 (1 880.0 MHz)		19193 (1 909.3 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
1.4	QPSK	1	0	22.20	0.166	22.74	0.188	22.75	0.188	28.82	0.762
		1	3	22.36	0.172	22.85	0.193	22.58	0.181		
		1	5	22.32	0.171	22.81	0.191	22.73	0.187		
		3	0	22.42	0.175	22.83	0.192	22.74	0.188		
		3	2	22.28	0.169	22.76	0.189	22.57	0.181		
		3	3	22.25	0.168	22.79	0.190	22.73	0.187		
		6	0	21.32	0.136	21.54	0.143	21.73	0.149		
	16QAM	1	0	21.22	0.132	21.64	0.146	21.54	0.143	27.76	0.597
		1	3	21.26	0.134	21.57	0.144	21.79	0.151		
		1	5	21.24	0.133	21.67	0.147	21.71	0.148		
		3	0	21.32	0.136	21.68	0.147	21.70	0.148		
		3	2	21.19	0.132	21.63	0.146	21.71	0.148		
		3	3	20.94	0.124	21.60	0.145	21.68	0.147		
		6	0	20.20	0.105	20.66	0.116	20.67	0.117		

LTE Band 2											
Ant. Gain						5.97 dBi					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18615 (1 851.5 MHz)		18900 (1 880.0 MHz)		19185 (1 908.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
3	QPSK	1	0	22.33	0.171	22.80	0.191	22.89	0.195	28.93	0.782
		1	7	22.42	0.175	22.94	0.197	22.96	0.198		
		1	14	22.37	0.173	22.64	0.184	22.78	0.190		
		8	0	21.35	0.136	21.75	0.150	21.76	0.150		
		8	4	21.32	0.136	21.79	0.151	21.84	0.153		
		8	7	21.33	0.136	21.78	0.151	21.67	0.147		
		15	0	21.30	0.135	21.77	0.150	21.76	0.150		
	16QAM	1	0	21.24	0.133	22.06	0.161	21.76	0.150	28.19	0.659
		1	7	21.22	0.132	22.22	0.167	21.73	0.149		
		1	14	21.27	0.134	21.58	0.144	21.75	0.150		
		8	0	20.25	0.106	20.54	0.113	20.54	0.113		
		8	4	20.55	0.114	20.59	0.115	20.76	0.119		
		8	7	20.60	0.115	20.59	0.115	20.80	0.120		
		15	0	20.33	0.108	20.63	0.116	20.67	0.117		

LTE Band 2											
Ant. Gain						5.97 dBi					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18625 (1 852.5 MHz)		18900 (1 880.0 MHz)		19175 (1 907.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.33	0.171	22.72	0.187	22.74	0.188	29.02	0.798
		1	12	22.35	0.172	22.88	0.194	23.05	0.202		
		1	24	22.47	0.177	22.78	0.190	22.66	0.185		
		12	0	21.29	0.135	21.70	0.148	21.79	0.151		
		12	6	21.33	0.136	21.73	0.149	21.70	0.148		
		12	13	21.43	0.139	21.73	0.149	21.85	0.153		
		25	0	21.32	0.136	21.77	0.150	21.69	0.148		
	16QAM	1	0	21.10	0.129	21.96	0.157	21.58	0.144	27.93	0.621
		1	12	21.23	0.133	21.60	0.145	21.38	0.137		
		1	24	21.34	0.136	21.56	0.143	21.75	0.150		
		12	0	20.55	0.114	20.78	0.120	20.73	0.118		
		12	6	20.61	0.115	20.62	0.115	20.87	0.122		
		12	13	20.60	0.115	20.67	0.117	20.68	0.117		
		25	0	20.16	0.104	20.74	0.119	20.69	0.117		

LTE Band 2											
Ant. Gain						5.97 dBi					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18650 (1 855.0 MHz)		18900 (1 880.0 MHz)		19150 (1 905.0 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.61	0.182	22.80	0.191	23.18	0.208	29.15	0.822
		1	25	22.61	0.182	22.74	0.188	23.02	0.200		
		1	49	22.50	0.178	22.98	0.199	23.12	0.205		
		25	0	21.34	0.136	21.77	0.150	21.93	0.156		
		25	12	21.35	0.136	21.74	0.149	21.89	0.155		
		25	25	21.43	0.139	21.72	0.149	21.77	0.150		
		50	0	21.45	0.140	21.78	0.151	21.75	0.150		
	16QAM	1	0	21.21	0.132	21.58	0.144	22.10	0.162	28.07	0.641
		1	25	21.15	0.130	21.56	0.143	21.69	0.148		
		1	49	21.12	0.129	21.67	0.147	21.80	0.151		
		25	0	20.43	0.110	20.90	0.123	20.90	0.123		
		25	12	20.44	0.111	21.09	0.129	20.99	0.126		
		25	25	20.45	0.111	20.94	0.124	20.85	0.122		
		50	0	20.59	0.115	20.82	0.121	20.83	0.121		

LTE Band 2											
Ant. Gain						5.97 dB i					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18675 (1 857.5 MHz)		18900 (1 880.0 MHz)		19125 (1 902.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.47	0.177	22.84	0.192	23.00	0.200	29.08	0.809
		1	36	22.38	0.173	22.81	0.191	23.11	0.205		
		1	74	22.41	0.174	22.99	0.199	23.00	0.200		
		36	0	21.32	0.136	21.62	0.145	21.83	0.152		
		36	18	21.37	0.137	21.63	0.146	21.95	0.157		
		36	37	21.30	0.135	21.70	0.148	22.04	0.160		
		75	0	21.35	0.136	21.56	0.143	22.06	0.161		
	16QAM	1	0	21.55	0.143	21.43	0.139	22.11	0.163	28.08	0.643
		1	36	21.18	0.131	21.41	0.138	21.83	0.152		
		1	74	21.22	0.132	21.63	0.146	21.90	0.155		
		36	0	20.39	0.109	20.40	0.110	20.91	0.123		
		36	18	20.44	0.111	20.91	0.123	20.82	0.121		
		36	37	20.44	0.111	20.79	0.120	20.70	0.117		
		75	0	20.50	0.112	20.26	0.106	20.94	0.124		

LTE Band 2											
Ant. Gain						5.97 dB i					
Limit: 2W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	18700 (1 860.0 MHz)		18900 (1 880.0 MHz)		19100 (1 900.0 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.39	0.173	22.53	0.179	23.03	0.201	29.01	0.796
		1	50	22.50	0.178	22.65	0.184	23.04	0.201		
		1	99	22.47	0.177	22.70	0.186	23.03	0.201		
		50	0	21.36	0.137	21.52	0.142	21.96	0.157		
		50	25	21.32	0.136	21.56	0.143	21.91	0.155		
		50	50	21.34	0.136	21.53	0.142	22.02	0.159		
		100	0	21.30	0.135	21.54	0.143	21.99	0.158		
	16QAM	1	0	21.52	0.142	21.31	0.135	22.00	0.158	27.97	0.627
		1	50	21.19	0.132	21.35	0.136	21.86	0.153		
		1	99	21.11	0.129	21.40	0.138	21.74	0.149		
		50	0	20.43	0.110	20.51	0.112	20.91	0.123		
		50	25	20.37	0.109	20.80	0.120	20.70	0.117		
		50	50	20.40	0.110	20.62	0.115	20.98	0.125		
		100	0	20.31	0.107	20.47	0.111	21.06	0.128		

LTE Band 4											
Ant. Gain						4.13 dBi					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	19957 (1 710.7 MHz)		20175 (1 732.5 MHz)		20393 (1 754.3 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
1.4	QPSK	1	0	22.22	0.167	22.46	0.176	22.46	0.176	26.79	0.478
		1	3	22.34	0.171	22.66	0.185	22.47	0.177		
		1	5	22.46	0.176	22.60	0.182	22.47	0.177		
		3	0	22.30	0.170	22.58	0.181	22.38	0.173		
		3	2	22.35	0.172	22.61	0.182	22.37	0.173		
		3	3	22.33	0.171	22.64	0.184	22.47	0.177		
		6	0	21.16	0.131	21.71	0.148	21.52	0.142		
	16QAM	1	0	21.11	0.129	21.35	0.136	21.16	0.131	25.68	0.370
		1	3	21.55	0.143	21.29	0.135	21.17	0.131		
		1	5	21.08	0.128	21.36	0.137	21.23	0.133		
		3	0	21.10	0.129	21.36	0.137	21.03	0.127		
		3	2	20.99	0.126	21.32	0.136	21.17	0.131		
		3	3	21.50	0.141	21.29	0.135	21.23	0.133		
		6	0	20.31	0.107	20.37	0.109	20.41	0.110		

LTE Band 4											
Ant. Gain						4.13 dBi					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	19965 (1 711.5 MHz)		20175 (1 732.5 MHz)		20385 (1 753.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
3	QPSK	1	0	22.39	0.173	22.48	0.177	22.44	0.175	26.83	0.482
		1	7	22.43	0.175	22.70	0.186	22.39	0.173		
		1	14	22.33	0.171	22.62	0.183	22.50	0.178		
		8	0	21.38	0.137	21.46	0.140	21.31	0.135		
		8	4	21.41	0.138	21.55	0.143	21.21	0.132		
		8	7	21.24	0.133	21.46	0.140	21.22	0.132		
		15	0	21.17	0.131	21.41	0.138	21.23	0.133		
	16QAM	1	0	21.16	0.131	21.67	0.147	20.90	0.123	25.83	0.383
		1	7	21.10	0.129	21.70	0.148	21.15	0.130		
		1	14	20.96	0.125	21.28	0.134	21.13	0.130		
		8	0	20.21	0.105	20.51	0.112	20.06	0.101		
		8	4	20.13	0.103	20.50	0.112	20.06	0.101		
		8	7	20.12	0.103	20.54	0.113	20.07	0.102		
		15	0	19.97	0.099	20.43	0.110	20.06	0.101		

LTE Band 4											
Ant. Gain						4.13 dB i					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	19975 (1 712.5 MHz)		20175 (1 732.5 MHz)		20375 (1 752.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.22	0.167	22.51	0.178	22.44	0.175	26.80	0.479
		1	12	22.44	0.175	22.64	0.184	22.59	0.182		
		1	24	22.38	0.173	22.63	0.183	22.67	0.185		
		12	0	21.00	0.126	21.51	0.142	21.42	0.139		
		12	6	21.11	0.129	21.32	0.136	21.40	0.138		
		12	13	21.14	0.130	21.49	0.141	21.33	0.136		
		25	0	21.18	0.131	21.43	0.139	21.39	0.138		
	16QAM	1	0	20.93	0.124	21.79	0.151	21.30	0.135	25.92	0.391
		1	12	20.94	0.124	21.38	0.137	21.08	0.128		
		1	24	20.97	0.125	21.44	0.139	21.17	0.131		
		12	0	20.08	0.102	20.27	0.106	20.39	0.109		
		12	6	20.07	0.102	20.39	0.109	20.46	0.111		
		12	13	20.03	0.101	20.48	0.112	20.28	0.107		
		25	0	20.09	0.102	20.35	0.108	20.45	0.111		

LTE Band 4											
Ant. Gain						4.13 dBi					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	20000 (1 715.0 MHz)		20175 (1 732.5 MHz)		20350 (1 750.0 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.39	0.173	22.55	0.180	22.54	0.179	26.88	0.488
		1	25	22.47	0.177	22.75	0.188	22.62	0.183		
		1	49	22.51	0.178	22.64	0.184	22.69	0.186		
		25	0	21.28	0.134	21.49	0.141	21.40	0.138		
		25	12	21.39	0.138	21.48	0.141	21.39	0.138		
		25	25	21.44	0.139	21.57	0.144	21.31	0.135		
		50	0	21.36	0.137	21.54	0.143	21.42	0.139		
	16QAM	1	0	21.20	0.132	21.31	0.135	21.24	0.133	25.97	0.395
		1	25	21.11	0.129	21.84	0.153	21.20	0.132		
		1	49	21.03	0.127	21.20	0.132	21.33	0.136		
		25	0	20.39	0.109	20.48	0.112	20.22	0.105		
		25	12	20.30	0.107	20.51	0.112	20.34	0.108		
		25	25	20.45	0.111	20.39	0.109	20.45	0.111		
		50	0	20.36	0.109	20.55	0.114	20.59	0.115		

LTE Band 4											
Ant. Gain						4.13 dB i					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	20025 (1 717.5 MHz)		20175 (1 732.5 MHz)		20325 (1 747.5 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.40	0.174	22.63	0.183	22.89	0.195	27.02	0.504
		1	36	22.49	0.177	22.80	0.191	22.78	0.190		
		1	74	22.42	0.175	22.72	0.187	22.68	0.185		
		36	0	21.28	0.134	21.53	0.142	21.43	0.139		
		36	18	21.27	0.134	21.44	0.139	21.24	0.133		
		36	37	21.30	0.135	21.47	0.140	21.24	0.133		
		75	0	21.24	0.133	21.49	0.141	21.65	0.146		
	16QAM	1	0	21.23	0.133	21.21	0.132	21.64	0.146	25.77	0.378
		1	36	21.04	0.127	21.34	0.136	21.31	0.135		
		1	74	20.95	0.124	21.29	0.135	21.26	0.134		
		36	0	20.08	0.102	20.40	0.110	20.54	0.113		
		36	18	20.08	0.102	20.33	0.108	20.36	0.109		
		36	37	20.02	0.100	20.38	0.109	20.47	0.111		
		75	0	20.03	0.101	20.40	0.110	20.71	0.118		

LTE Band 4											
Ant. Gain						4.13 dB i					
Limit: 1W EIRP											
BW (MHz)	Modulation	RB Size	RB Offset	20050 (1 720.0 MHz)		20175 (1 732.5 MHz)		20300 (1 745.0 MHz)		E.I.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.45	0.176	22.77	0.189	22.83	0.192	27.08	0.511
		1	50	22.51	0.178	22.63	0.183	22.88	0.194		
		1	99	22.37	0.173	22.75	0.188	22.95	0.197		
		50	0	21.41	0.138	21.45	0.140	21.55	0.143		
		50	25	21.42	0.139	21.37	0.137	21.28	0.134		
		50	50	21.40	0.138	21.40	0.138	21.40	0.138		
		100	0	21.41	0.138	21.43	0.139	21.43	0.139		
	16QAM	1	0	21.06	0.128	21.47	0.140	21.53	0.142	25.97	0.395
		1	50	21.13	0.130	21.40	0.138	21.84	0.153		
		1	99	20.88	0.122	21.44	0.139	21.63	0.146		
		50	0	20.16	0.104	20.47	0.111	20.56	0.114		
		50	25	20.20	0.105	20.47	0.111	20.52	0.113		
		50	50	20.22	0.105	20.43	0.110	20.64	0.116		
		100	0	20.13	0.103	20.44	0.111	20.88	0.122		

LTE Band 5											
Ant. Gain						2.18 dBi					
Limit: 7W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	20407 (824.7 MHz)		20525 (836.5 MHz)		20643 (848.3 MHz)		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
1.4	QPSK	1	0	22.73	0.187	22.64	0.184	22.85	0.193	23.02	0.200
		1	3	22.99	0.199	22.62	0.183	22.87	0.194		
		1	5	22.73	0.187	22.70	0.186	22.87	0.194		
		3	0	22.79	0.190	22.69	0.186	22.71	0.187		
		3	2	22.74	0.188	22.68	0.185	22.80	0.191		
		3	3	22.62	0.183	22.69	0.186	22.80	0.191		
		6	0	21.71	0.148	21.58	0.144	21.78	0.151		
	16QAM	1	0	21.64	0.146	21.65	0.146	21.95	0.157	22.15	0.164
		1	3	21.54	0.143	21.59	0.144	21.73	0.149		
		1	5	22.12	0.163	21.67	0.147	21.85	0.153		
		3	0	22.00	0.158	21.61	0.145	21.71	0.148		
		3	2	21.96	0.157	21.69	0.148	21.66	0.147		
		3	3	22.03	0.160	21.53	0.142	21.87	0.154		
		6	0	20.68	0.117	20.68	0.117	20.61	0.115		

LTE Band 5											
Ant. Gain						2.18 dBi					
Limit: 7W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	20415 (825.5 MHz)		20525 (836.5 MHz)		20635 (847.5 MHz)		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
3	QPSK	1	0	22.98	0.199	22.88	0.194	22.62	0.183	23.01	0.200
		1	7	22.69	0.186	22.76	0.189	22.68	0.185		
		1	14	22.61	0.182	22.67	0.185	22.83	0.192		
		8	0	21.84	0.153	21.70	0.148	21.84	0.153		
		8	4	21.93	0.156	21.74	0.149	21.85	0.153		
		8	7	21.71	0.148	21.69	0.148	21.76	0.150		
		15	0	21.78	0.151	21.70	0.148	21.85	0.153		
	16QAM	1	0	22.02	0.159	21.52	0.142	21.71	0.148	22.05	0.160
		1	7	21.74	0.149	21.63	0.146	21.83	0.152		
		1	14	21.48	0.141	21.61	0.145	21.79	0.151		
		8	0	20.58	0.114	20.45	0.111	20.80	0.120		
		8	4	20.78	0.120	20.58	0.114	20.69	0.117		
		8	7	20.75	0.119	20.67	0.117	20.82	0.121		
		15	0	20.63	0.116	20.74	0.119	20.82	0.121		

LTE Band 5											
Ant. Gain						2.18 dB i					
Limit: 7W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	20425 (826.5 MHz)		20525 (836.5 MHz)		20625 (846.5 MHz)		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.82	0.191	22.77	0.189	22.72	0.187	22.94	0.197
		1	12	22.87	0.194	22.87	0.194	22.91	0.195		
		1	24	22.73	0.187	22.71	0.187	22.75	0.188		
		12	0	21.78	0.151	21.73	0.149	21.75	0.150		
		12	6	21.76	0.150	21.81	0.152	21.72	0.149		
		12	13	21.63	0.146	21.63	0.146	21.79	0.151		
		25	0	21.70	0.148	21.78	0.151	21.83	0.152		
	16QAM	1	0	21.82	0.152	21.62	0.145	21.63	0.146	21.85	0.153
		1	12	21.52	0.142	21.75	0.150	21.77	0.150		
		1	24	21.73	0.149	21.44	0.139	21.68	0.147		
		12	0	20.71	0.118	20.61	0.115	20.68	0.117		
		12	6	20.77	0.119	20.65	0.116	20.75	0.119		
		12	13	20.58	0.114	20.64	0.116	20.76	0.119		
		25	0	20.75	0.119	20.82	0.121	20.92	0.124		

LTE Band 5											
Ant. Gain						2.18 dBi					
Limit: 7W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	20450 (829.0 MHz)		20525 (836.5 MHz)		20600 (844.0 MHz)		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.88	0.194	22.87	0.194	22.86	0.193	22.99	0.199
		1	25	22.82	0.191	22.76	0.189	22.87	0.194		
		1	49	22.86	0.193	22.96	0.198	22.64	0.184		
		25	0	21.73	0.149	21.74	0.149	21.78	0.151		
		25	12	21.75	0.150	21.81	0.152	21.69	0.148		
		25	25	21.73	0.149	21.77	0.150	21.80	0.151		
		50	0	21.82	0.152	21.67	0.147	21.73	0.149		
	16QAM	1	0	21.72	0.149	21.43	0.139	21.66	0.147	22.15	0.164
		1	25	21.72	0.149	21.59	0.144	21.70	0.148		
		1	49	22.12	0.163	21.77	0.150	21.68	0.147		
		25	0	20.97	0.125	20.89	0.123	20.74	0.119		
		25	12	20.85	0.122	20.83	0.121	20.79	0.120		
		25	25	21.00	0.126	20.92	0.124	20.70	0.117		
		50	0	20.98	0.125	20.79	0.120	20.64	0.116		

LTE Band 13											
Ant. Gain						-0.24 dB i					
Limit: 30W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	23205 (779.5 MHz)		23230 (782.0 MHz)		23255 (784.5 MHz)		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.79	0.190	22.99	0.199	22.82	0.191	20.66	0.116
		1	12	22.89	0.195	23.05	0.202	22.83	0.192		
		1	24	22.63	0.183	23.04	0.201	22.75	0.188		
		12	0	21.96	0.157	21.98	0.158	21.82	0.152		
		12	6	21.85	0.153	21.98	0.158	21.66	0.147		
		12	13	21.87	0.154	21.98	0.158	21.76	0.150		
		25	0	21.94	0.156	21.98	0.158	21.70	0.148		
	16QAM	1	0	22.01	0.159	21.91	0.155	21.53	0.142	19.62	0.092
		1	12	21.48	0.141	21.85	0.153	21.48	0.141		
		1	24	21.62	0.145	21.85	0.153	21.54	0.143		
		12	0	20.78	0.120	20.82	0.121	20.55	0.114		
		12	6	20.79	0.120	20.91	0.123	20.40	0.110		
		12	13	20.72	0.118	20.81	0.121	20.32	0.108		
		25	0	20.85	0.122	20.82	0.121	20.55	0.114		

LTE Band 13											
Ant. Gain						-0.24 dB i					
Limit: 30W ERP											
BW (MHz)	Modulation	RB Size	RB Offset	-		23230 (782.0 MHz)		-		E.R.P	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	-	-	23.21	0.209	-	-	20.82	0.121
		1	25	-	-	23.08	0.203	-	-		
		1	49	-	-	22.93	0.196	-	-		
		25	0	-	-	22.02	0.159	-	-		
		25	12	-	-	21.98	0.158	-	-		
		25	25	-	-	21.87	0.154	-	-		
		50	0	-	-	21.92	0.156	-	-		
	16QAM	1	0	-	-	21.98	0.158	-	-	19.59	0.091
		1	25	-	-	21.90	0.155	-	-		
		1	49	-	-	21.63	0.146	-	-		
		25	0	-	-	20.90	0.123	-	-		
		25	12	-	-	20.80	0.120	-	-		
		25	25	-	-	20.82	0.121	-	-		
		50	0	-	-	20.90	0.123	-	-		

4. Occupied Bandwidth

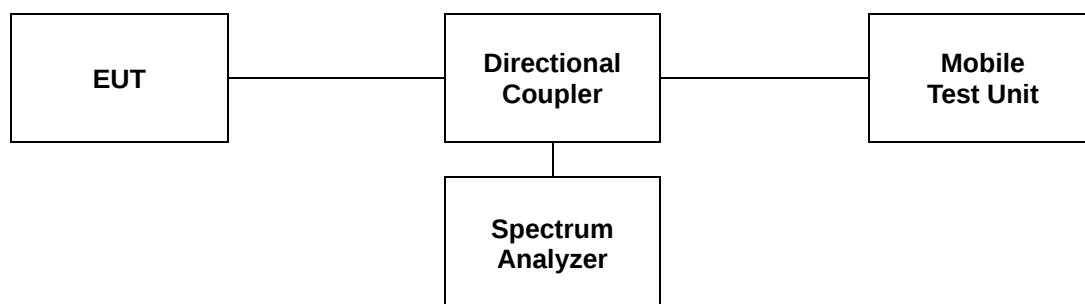
4.1. Limit

CFR 47, Section FCC §2.1049

4.2. Test Procedure

The test follows section 5.4.4 of ANSI C63.26-2015

- 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 (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- 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 $\geq 3 \times \text{RBW}$.
- 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. See guidance provided in 4.2.3.
- d. Set the detection mode to peak, and the trace mode to max-hold.
- e. If the instrument does not have a 99 % OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5 % of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5 % of the total is reached and record that frequency as the upper OBW frequency. The 99 % power OBW can be determined by computing the difference these two frequencies.
- f. The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).



4.3 Test Results

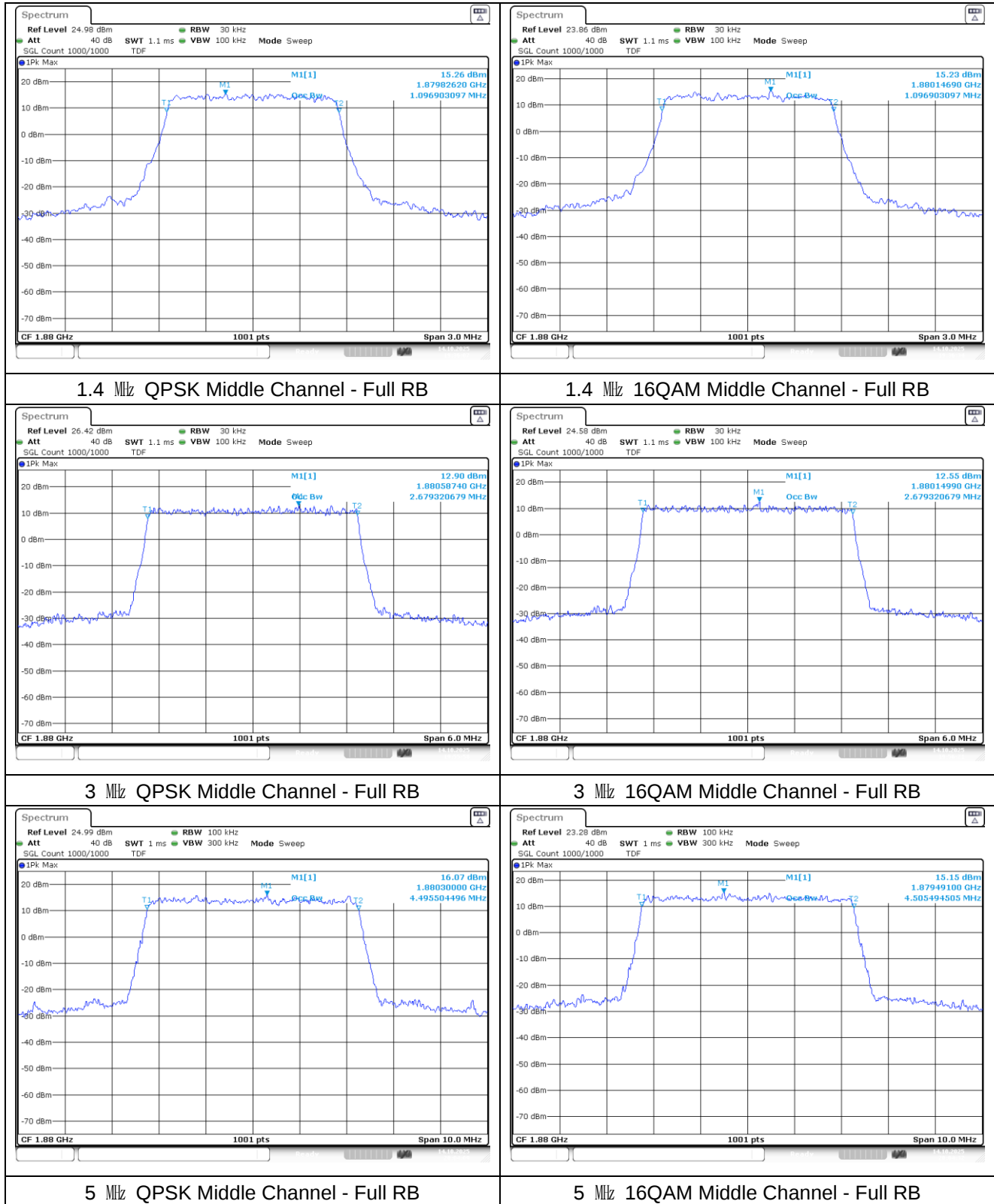
Ambient temperature : (23 ± 1) °C
Relative humidity : 47 %

Band	Bandwidth (MHz)	Frequency (MHz)	Occupied Bandwidth (MHz)	
			QPSK	16QAM
2	1.4	1 850.7	1.100	1.100
		1 880.0	1.097	1.097
		1 909.3	1.097	1.100
	3	1 851.5	2.685	2.679
		1 880.0	2.679	2.679
		1 908.5	2.679	2.679
	5	1 852.5	4.486	4.505
		1 880.0	4.496	4.505
		1 907.5	4.496	4.496
	10	1 855.0	8.911	8.911
		1 880.0	8.931	8.911
		1 905.0	8.931	8.931
	15	1 857.5	13.457	13.457
		1 880.0	13.457	13.427
		1 902.5	13.457	13.457
	20	1 860.0	17.862	17.862
		1 880.0	17.862	17.862
		1 900.0	17.862	17.862
4	1.4	1 710.7	1.094	1.100
		1 732.5	1.097	1.100
		1 754.3	1.094	1.094
	3	1 711.5	2.679	2.685
		1 732.5	2.685	2.679
		1 753.5	2.679	2.679
	5	1 712.5	4.496	4.496
		1 732.5	4.505	4.505
		1 752.5	4.496	4.496
	10	1 715.0	8.911	8.911
		1 732.5	8.931	8.911
		1 750.0	8.911	8.891
	15	1 717.5	13.427	13.427
		1 732.5	13.457	13.457
		1 747.5	13.427	13.427
	20	1 720.0	17.782	17.822
		1 732.5	17.862	17.822
		1 745.0	17.822	17.862

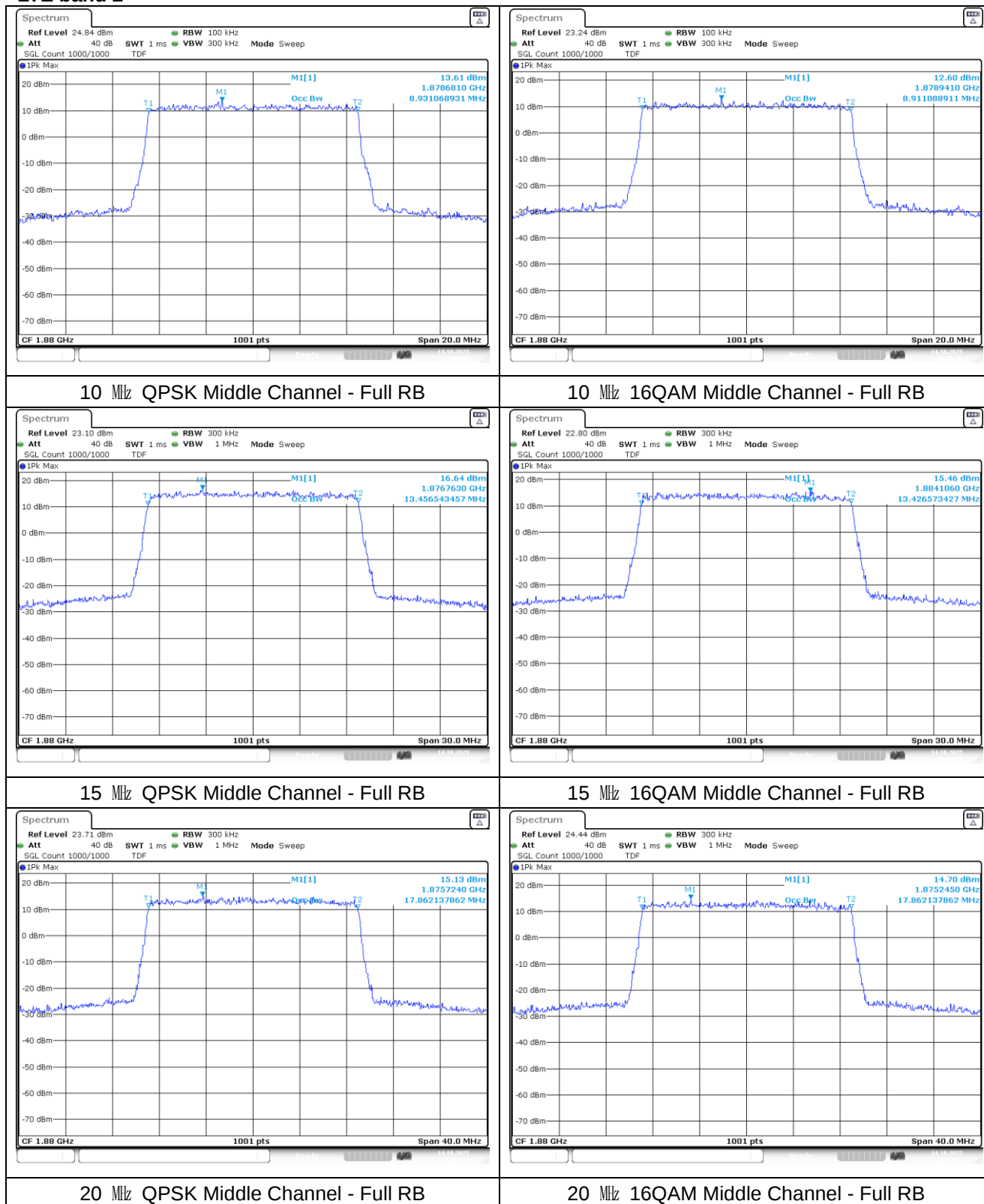
Band	Bandwidth (MHz)	Frequency (MHz)	Occupied Bandwidth (MHz)	
			QPSK	16QAM
5	1.4	824.7	1.097	1.097
		836.5	1.094	1.097
		848.3	1.094	1.100
	3	825.5	2.673	2.679
		836.5	2.673	2.679
		847.5	2.679	2.679
	5	826.5	4.496	4.486
		836.5	4.496	4.496
		846.5	4.496	4.496
	10	829.0	8.931	8.911
		836.5	8.931	8.931
		844.0	8.931	8.911
13	5	779.5	4.476	4.476
		782.0	4.496	4.496
		784.5	4.496	4.496
	10	782.0	8.911	8.891

- Test plots

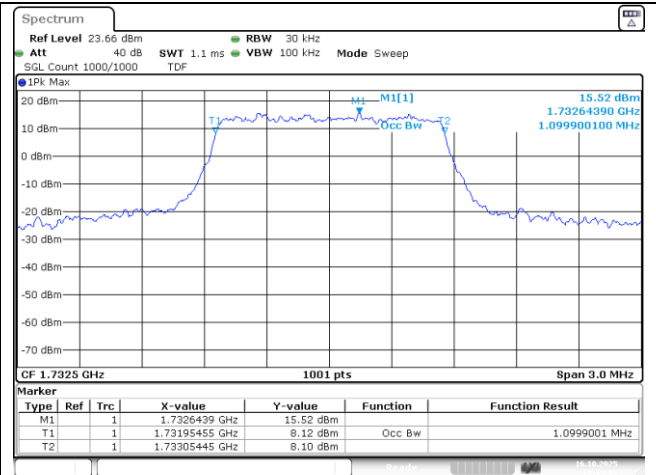
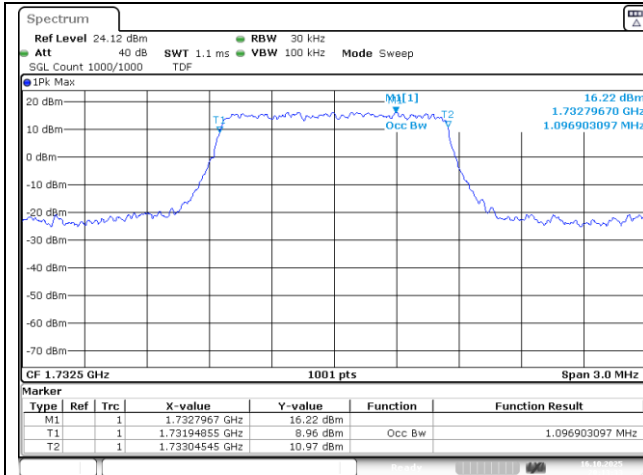
LTE band 2



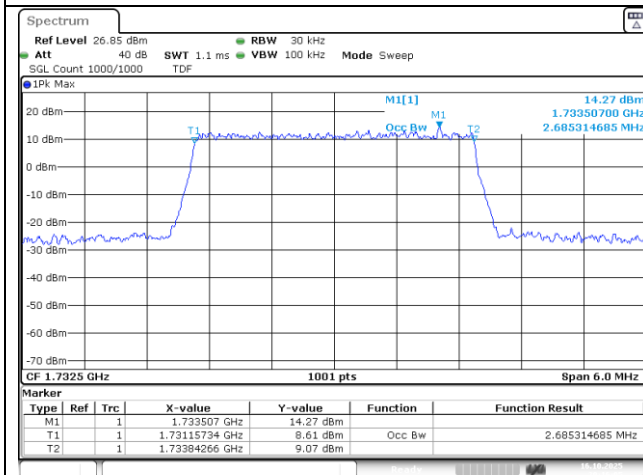
LTE band 2



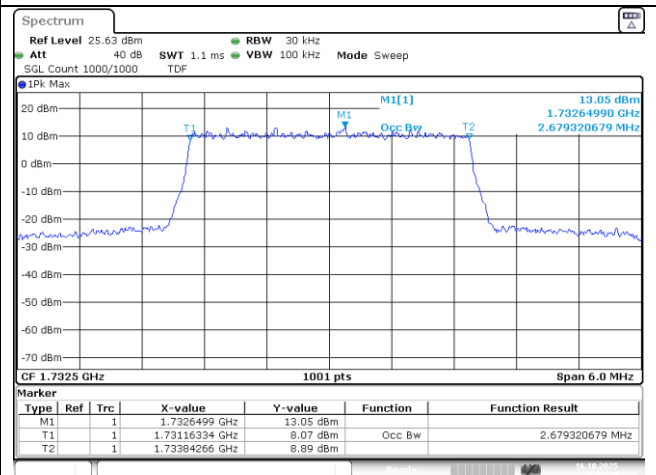
LTE band 4



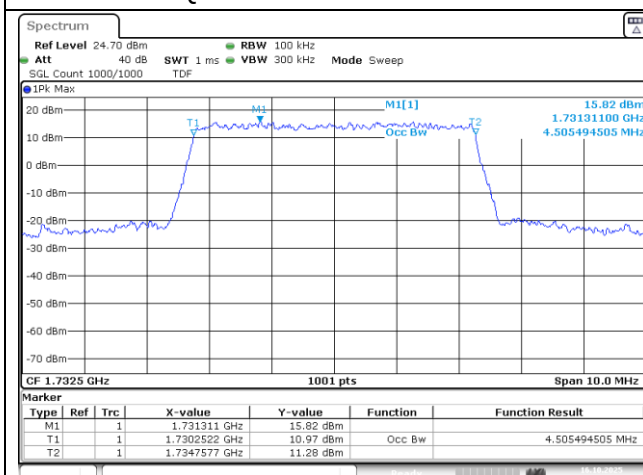
1.4 MHz QPSK Middle Channel - Full RB



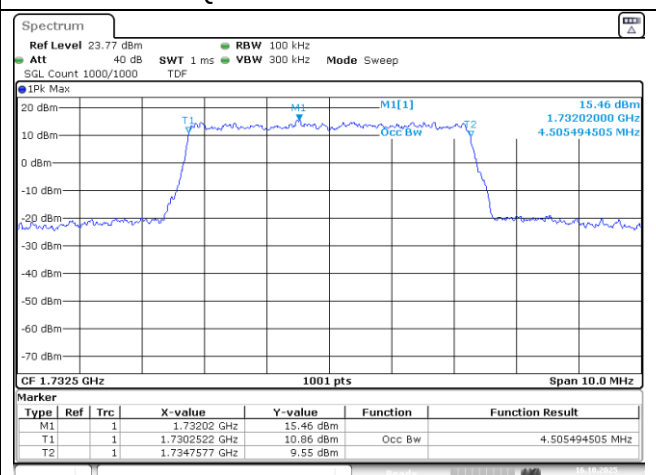
1.4 MHz 16QAM Middle Channel - Full RB



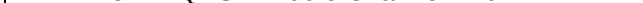
3 MHz QPSK Middle Channel - Full RB



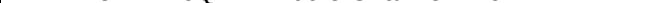
3 MHz 16QAM Middle Channel - Full RB



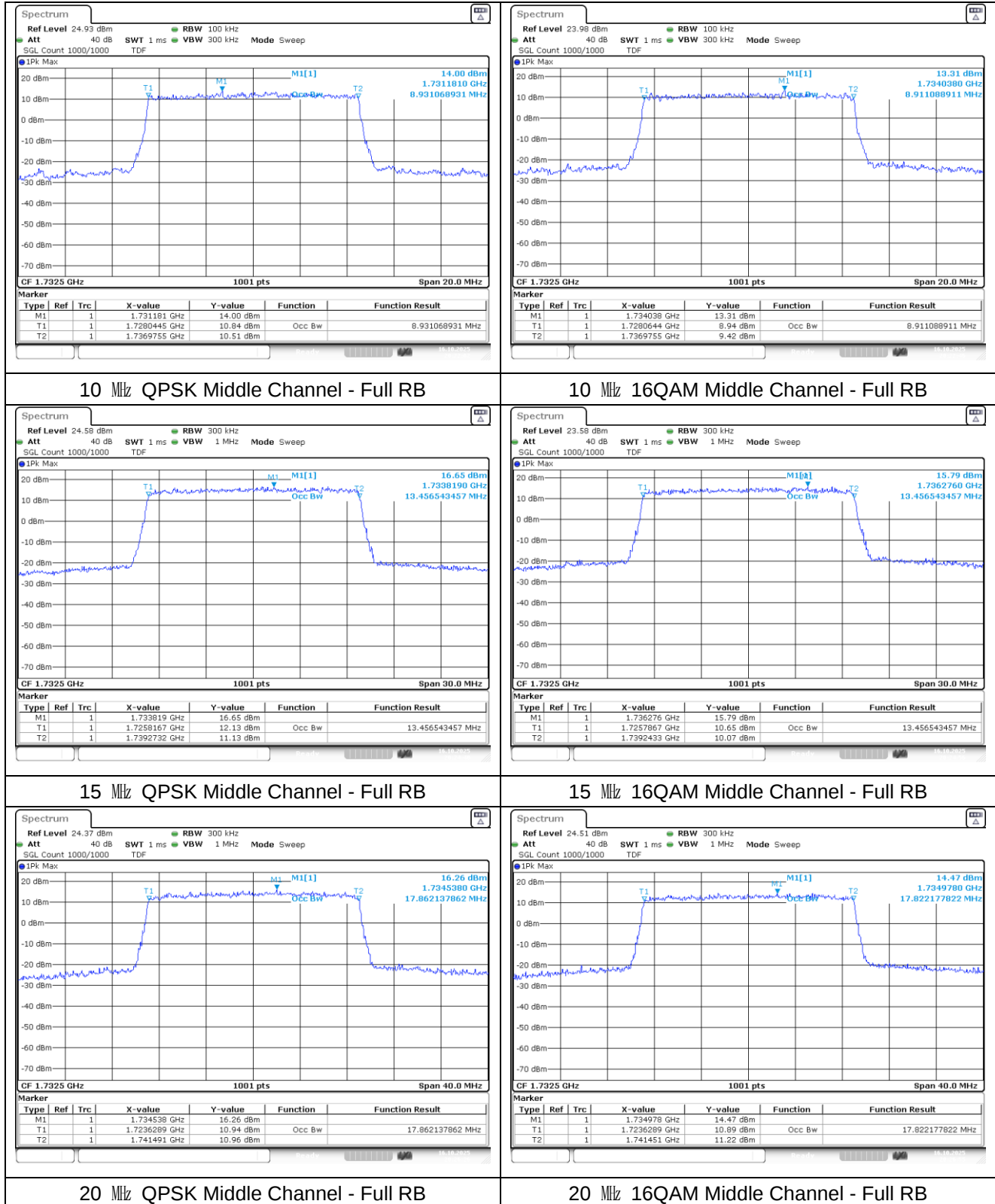
5 MHz QPSK Middle Channel - Full RB



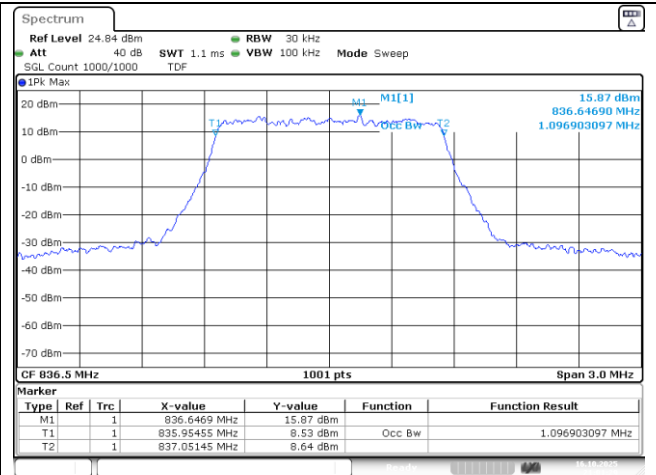
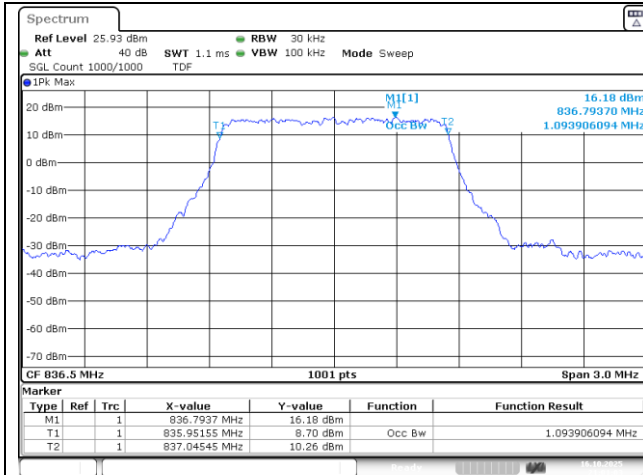
5 MHz 16QAM Middle Channel - Full RB



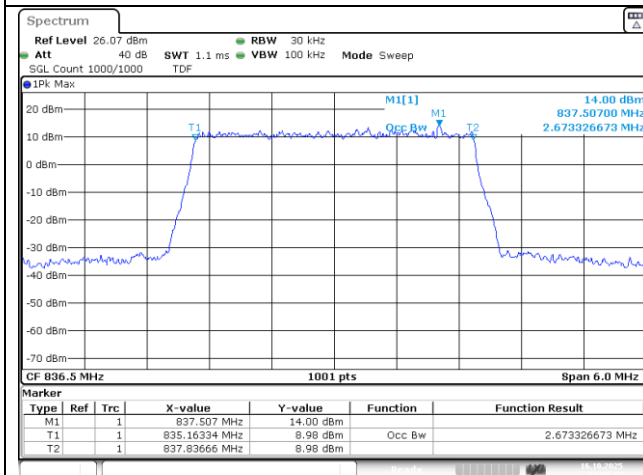
LTE band 4



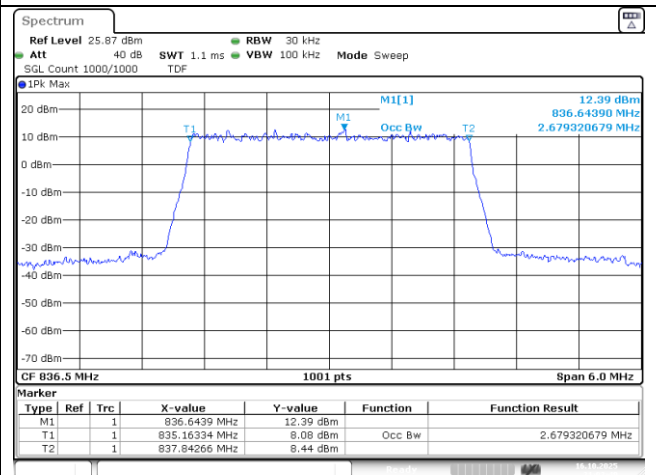
LTE band 5



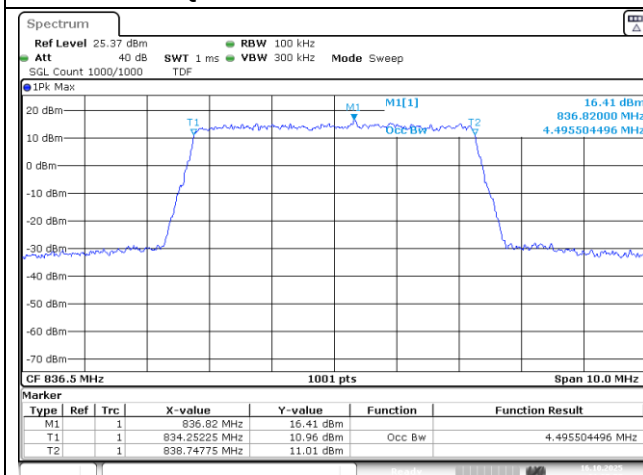
1.4 MHz QPSK Middle Channel - Full RB



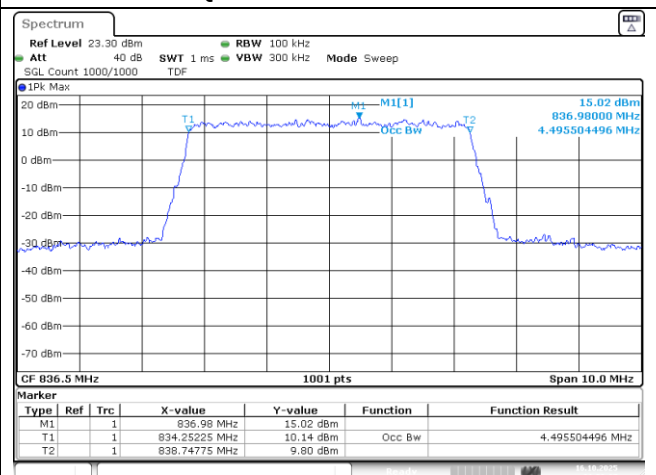
1.4 MHz 16QAM Middle Channel - Full RB



3 MHz QPSK Middle Channel - Full RB



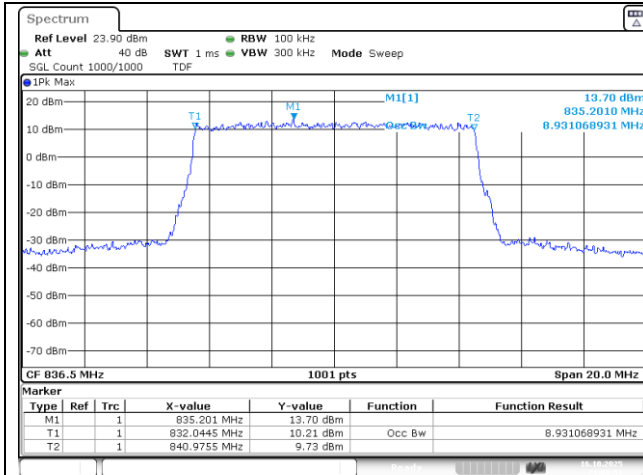
3 MHz 16QAM Middle Channel - Full RB



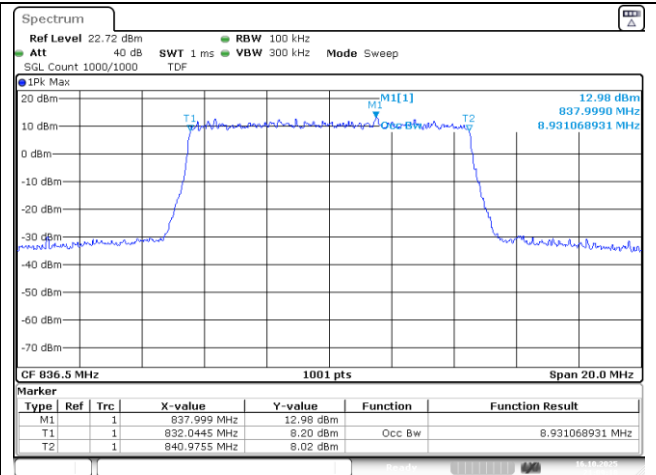
5 MHz QPSK Middle Channel - Full RB

5 MHz 16QAM Middle Channel - Full RB

LTE band 5

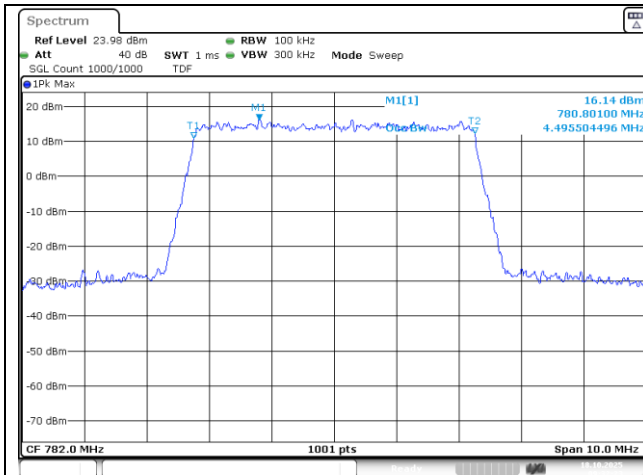


10 MHz QPSK Middle Channel - Full RB

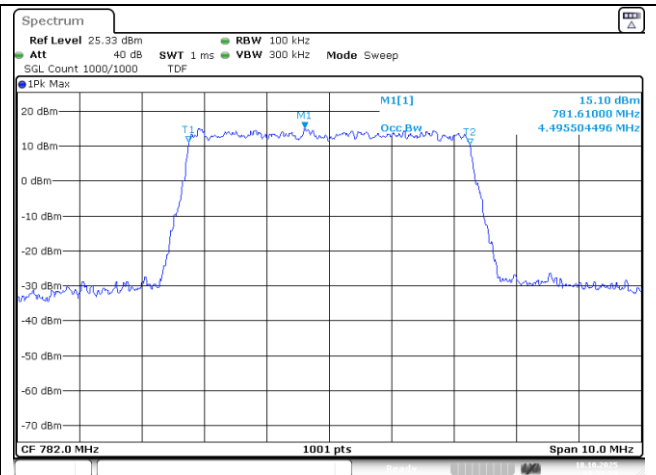


10 MHz 16QAM Middle Channel - Full RB

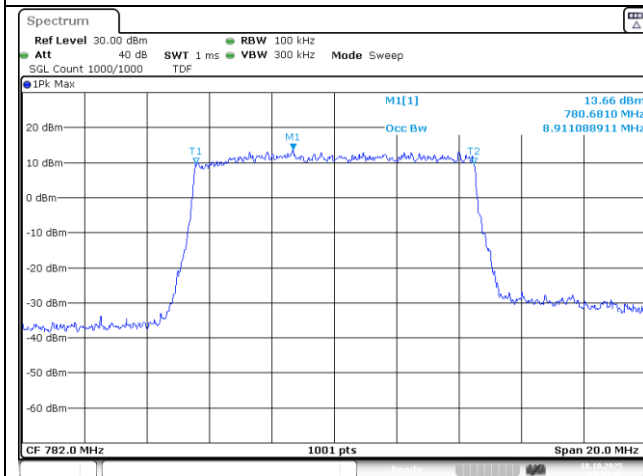
LTE band 13



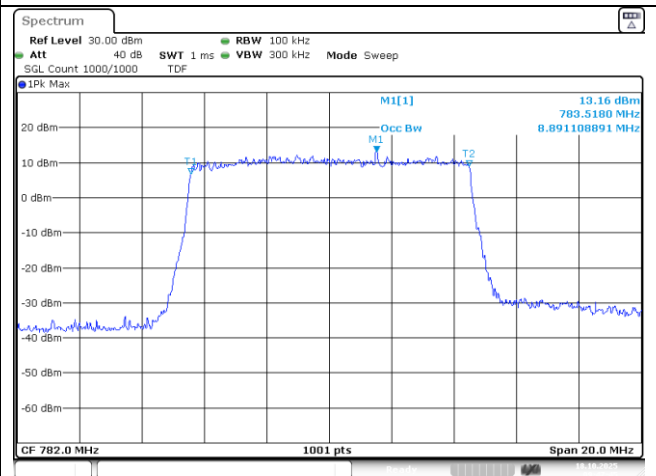
5 MHz QPSK Low Channel - Full RB



5 MHz 16QAM Low Channel - Full RB



10 MHz QPSK Middle Channel - Full RB



10 MHz 16QAM Middle Channel - Full RB

5. Peak-Average Ratio

5.1. Limit

- §22.913(d), Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

- §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

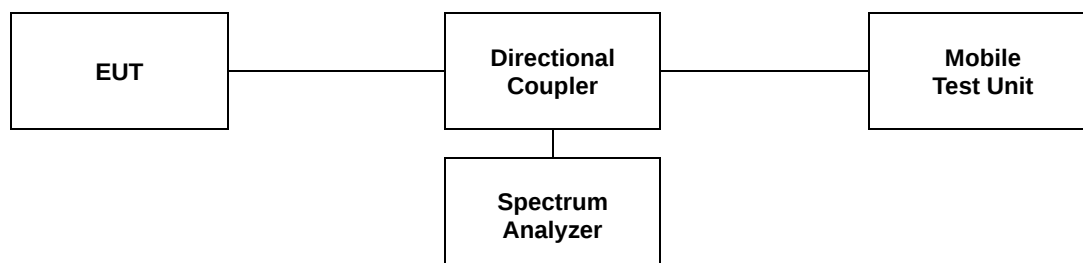
- §27.50(d)(5), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.2. Test Procedure

The test follows section 5.2.3.4 of ANSI C63.26-2015

See instrumentation-specific application literature for further guidance regarding use of the CCDF capability. The following guidelines are offered for performing a CCDF measurement.

- a. Set resolution/measurement bandwidth $\geq$ OBW or specified reference bandwidth.
- b. Set the number of counts to a value that stabilizes the measured CCDF curve.
- c. Set the measurement interval as follows:
 - 1) For continuous transmissions, set to greater of $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ or 1 ms.
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
 - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
- d. Record the maximum PAPR level associated with a probability of 0.1 %.
- e. The peak power level is calculated from the sum of the PAPR value from step d) to the measured average power.



5.3 Test Results

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 %

Band	Bandwidth (MHz)	Frequency (MHz)	PAR (dB)	
			QPSK	16QAM
2	1.4	1 850.7	5.13	5.94
		1 880.0	5.28	6.00
		1 909.3	4.52	5.77
	3	1 851.5	4.96	6.12
		1 880.0	4.99	6.26
		1 908.5	4.61	5.86
	5	1 852.5	4.99	6.03
		1 880.0	5.04	6.06
		1 907.5	4.64	5.74
	10	1 855.0	4.99	6.03
		1 880.0	5.13	5.97
		1 905.0	4.67	5.77
	15	1 857.5	5.01	6.03
		1 880.0	5.13	6.12
		1 902.5	4.78	5.86
	20	1 860.0	4.93	6.03
		1 880.0	4.96	6.09
		1 900.0	4.75	5.77
4	1.4	1 710.7	5.33	5.94
		1 732.5	5.42	6.46
		1 754.3	5.19	6.14
	3	1 711.5	5.19	6.06
		1 732.5	5.07	6.23
		1 753.5	5.04	6.14
	5	1 712.5	5.01	6.06
		1 732.5	4.99	6.09
		1 752.5	4.96	5.91
	10	1 715.0	5.10	6.17
		1 732.5	5.07	6.14
		1 750.0	4.90	5.97
	15	1 717.5	5.25	6.12
		1 732.5	5.16	6.20
		1 747.5	5.10	5.97
	20	1 720.0	5.04	6.12
		1 732.5	4.96	6.17
		1 745.0	4.90	5.94

Band	Bandwidth (MHz)	Frequency (MHz)	PAR (dB)	
			QPSK	16QAM
5	1.4	824.7	5.25	5.97
		836.5	5.16	6.09
		848.3	5.01	5.80
	3	825.5	4.96	5.88
		836.5	4.84	6.03
		847.5	4.81	5.91
	5	826.5	4.93	5.83
		836.5	4.87	5.94
		846.5	4.75	5.74
	10	829.0	5.04	5.80
		836.5	4.99	5.88
		844.0	4.84	5.86
13	5	779.5	4.87	5.74
		782.0	4.81	5.80
		784.5	4.90	5.94
	10	782.0	5.04	6.00

- Test plots

LTE band 2

