SGS Korea Co., Ltd.
4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
Tel. +82 31 428 5700 / Fax. +82 31 427 2370
http://www.sgsgroup.kr

TEST REPORT

of

FCC Part 2 Subpart J and Part 96 Subpart E

FCC ID: BEJTM16FNNABM0

Equipment Under Test	:	Telematics Module
Model Name	:	TM16FNNABM0
Variant Model Name(s)	:	-
Applicant	:	LG Electronics USA
Manufacturer	:	LG Electronics Inc.
Date of Receipt	:	2023.12.13
Date of Test(s)	:	2023.12.13 ~ 2024.04.01
Date of Issue	:	2024.04.01

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

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2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by: Murphy Kim

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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Phone No. : +82 31 688 0901
Fax No. : +82 31 688 0921

1.2. Details of Applicant

FCC Applicant : LG Electronics USA
FCC Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States, 07632
IC Applicant : LG ELECTRONICS INC.
IC Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea (Republic of), 451-713
Contact Person : Kim, David
Phone No. : +1 201 470 2696

1.3. Details of Manufacturer

Company : LG Electronics Inc.
Address : 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea, 07336

1.4. Description of EUT

Kind of Product	Telematics Module		
Model Name	TM16FNNABM0		
Serial Number	Conducted: FCC_04 Radiated: FCC Rad_02		
Power Supply	DC 3.90 V		
Rated Power	LTE Band 48: 22 ㏈m NR Band 48: 22 ㏈m		
Frequency Range	LTE Band 48: 3 550 ~ 3 700 ㎒ NR Band 48: 3 550 ~ 3 700 ㎒		
Modulation Technique	QPSK, 16QAM, 64QAM, 256QAM		
Antenna Type	Ant. 1: PIFA Antenna	Ant. 2: PIFA Antenna	Ant. 3: PIFA Antenna
Antenna Gain※	Refer to the clause 1.13		
H/W Version	Rev.D		
S/W Version	IN25XA03		

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMA100B	106887	Oct. 06, 2023	Annual	Oct. 06, 2024
Spectrum Analyzer	R&S	FSV30	103453	Oct. 31, 2023	Annual	Oct. 31, 2024
Spectrum Analyzer	R&S	FSW43	100637	Apr. 06, 2023	Annual	Apr. 06, 2024
Spectrum Analyzer	Agilent	N9020A	MY53421758	Sep. 01, 2023	Annual	Sep. 01, 2024
Spectrum Analyzer	Agilent	N9030A	US51350132	Nov. 27, 2023	Annual	Nov. 27, 2024
Communication test station	Anritsu	MT8000A	6261949671	Oct. 06, 2023	Annual	Oct. 06, 2024
Communication Analyzer	Anritsu	MT8821C	6262192291	Feb. 08, 2024	Annual	Feb. 08, 2025
Power Meter	Anritsu	ML2495A	1223004	May 30, 2023	Annual	May 30, 2024
Power Sensor	Anritsu	MA2411B	1207272	May 30, 2023	Annual	May 30, 2024
Temperature Chamber	ESPEC CORP.	SH-662	93000533	Jun. 02, 2023	Annual	Jun. 02, 2024
Low Pass Filter	Mini-Circuits	NLP-1200+	V 8979400903-1	May 16, 2023	Annual	May 16, 2024
High Pass Filter	Wainwright Instrument GmbH	WHKX10-900-1000-18000-40SS	7	Feb. 27, 2024	Annual	Feb. 27, 2025
High Pass Filter	Wainwright Instrument GmbH	WHKX3.0/18G-6SS	21	Jun. 01, 2023	Annual	Jun. 01, 2024
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	Oct. 17, 2023	Annual	Oct. 17, 2024
Power Splitter	Weinschel	1534	499	Nov, 03, 2023	Annual	Nov, 03, 2024
BRIDGE COUPLER	MARKI MICROWAVE INC	CBR16-0012	1542	May 16, 2023	Annual	May 16, 2024
Directional Coupler	KRYTAR	152613	122660	Jul. 13, 2023	Annual	Jul. 13, 2024
Directional Coupler	KRYTAR	152613	122661	Feb. 27, 2024	Annual	Feb. 27, 2025
DC Power Supply	Agilent	U8002A	MY49030063	Jan. 17, 2024	Annual	Jan. 17, 2025
Preamplifier	H.P.	8447F	2944A03909	Aug. 04, 2023	Annual	Aug. 04, 2024
Preamplifier	R&S	SCU 18F	101058	Dec. 07, 2023	Annual	Dec. 07, 2024
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Oct. 06, 2023	Annual	Oct. 06, 2024
Test Receiver	R&S	ESU26	100109	Jan. 16, 2024	Annual	Jan. 16, 2025
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 21, 2023	Biennial	Aug. 21, 2025
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	9163-437	May 31, 2023	Biennial	May 31, 2025
Horn Antenna	R&S	HF906	100326	Feb. 19, 2024	Annual	Feb. 19, 2025
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	9170-540	Dec. 05, 2023	Annual	Dec. 05, 2024
Antenna Master	Innco systems GmbH	MA4640-XP-ET	MA4640/536/383 30516/L	N.C.R.	N/A	N.C.R.
Turn Table	Innco systems GmbH	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/383 30516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Oct. 04, 2023	Semi-Annual	Apr. 04, 2024
Coaxial Cable	Qualwave Inc.	QA500-18-NN-10 (10 m)	22200114	Oct. 04, 2023	Semi-Annual	Apr. 04, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182287	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182288	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182291	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024

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 and 96		
Section in FCC	**Test Item(s)**	**Result**
§2.1046 §96.41(b)	E.I.R.P.	Complied
§96.41(e)(ii)	Radiated Spurious Emissions	Complied
§2.1046	Conducted Output Power	Complied
§2.1049	Occupied Bandwidth	Complied
§96.41(e)(ii)	Spurious Emission at Antenna Terminal	Complied
§96.41(e)(ii)	Band Edge and Adjacent Channel Leakage Ratio	Complied
§2.1055	Frequency Stability	Complied

1.7. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

1.7.1. Conducted Test

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

1.7.2. Radiation test

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

1.8. Manufacturer Declaration

The EUT has three antennas, antennas 1 and 2 are the main antennas, and antenna 3 can be switched to the main antenna. Each antenna can’t transmit simultaneously.

1.9. Worst Case Configuration and Mode

The worst-case is based on the conducted output power measurement investigation results. All testing was performed using QPSK, 16QAM, 64QAM and 256QAM 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 peak to average ratio were tested only 256QAM modulation as worst case.

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

1.10. Measurement Configuration

Test Items	Band	Test Channel			Bandwidth (㎒)				Modulation				RB #		
		Low	Mid	High	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full
Conducted Output Power	LTE 48	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Frequency Stability	LTE 48	-	V	-	V	-	-	-	V	-	-	-	-	-	V
Occupied Bandwidth	LTE 48	-	V	-	V	V	V	V	V	V	-	-	-	-	V
Band edge	LTE 48	V	V	V	V	V	V	V	V	V	-	-	V	-	V
Spurious at antenna terminal & Radiated Spurious Emissions	LTE 48	V	V	V	Worst case										

Test Items	Band	Test Channel			Bandwidth (㎒)												Modulation DFTS-OFDM					Modulation CP-OFDM				RB #		
		Low	Mid	High	5	10	15	20	25	30	40	50	60	70	80	90	100	BPSK	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	1	Half	Full
Conducted Output Power	n48	V	V	V				V		V	V							V	V	V	V	V	V	V	V	V	V	V	V
Frequency Stability	n48	-	V	-				V		-	-							-	V	-	-	-	-	-	-	-	-	-	V
Occupied Bandwidth	n48	-	V	-				V		V	V							V	V	V	-	-	V	V	-	-	-	-	V
Peak-to-Average Ratio	n48	V	V	V				V		V	V							-	-	-	-	V	-	-	-	V	-	-	V
Band edge	n48	V	-	V				V		V	V							-	V	V	-	-	V	V	-	-	V	-	V
Spurious at antenna terminal & Radiated Spurious Emissions	n48	V	V	V	Worst case																								

1.11. Measurement Uncertainty

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

Parameter	Uncertainty	
Conducted Output Power	0.33 dB	
Occupied Bandwidth	0.05 ㎒	
Conducted Spurious Emissions	0.99 dB	
Peak to Average Ratio	0.66 dB	
Frequency Stability	116 ㎐	
Radiated Emission, 9 ㎑ to 30 ㎒	H	3.60 dB
	V	3.60 dB
Radiated Emission, below 1 ㎓	H	4.60 dB
	V	4.90 dB
Radiated Emission, above 1 ㎓	H	3.90 dB
	V	3.80 dB

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

1.12. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL004927	2024.04.01	Initial

1.13. Antenna Information

Ant. No.	Ant. Type	Frequency Range	Support Band		
			LTE	NR	WCDMA
Ant. 1	PIFA	Below 3 ㎓	2, 4, 5, 7, 12, 13, 17, 25, 26, 38, 66, 71	2, 5, 7, 12, 25, 41, 66, 71	Ⅱ, Ⅴ
Ant. 2	PIFA	Above 3 ㎓	42, 48	48, 77, 78	
Ant. 3	PIFA	Below 3 ㎓	2, 4, 5, 7, 12, 13, 17, 25, 26, 38, 66, 71	2, 5, 7, 12, 25, 41, 66, 71	Ⅱ, Ⅴ

Band	Operating Frequency (㎒)	Antenna Peak Gain (dBi)		
		Ant. 1	Ant. 2	Ant. 3
LTE 25/2 WCDMA Ⅱ NR 25/2	1 850 ~ 1 915	**1.86**		-0.32
LTE 66/4 NR 66	1 710 ~ 1 780	**1.37**		-0.03
LTE 26/5 WCDMA Ⅴ NR 5	824 ~ 849	**-2.43**		-3.16
LTE 7 NR 7	2 500 ~ 2 570	0.92		**2.79**
LTE 12/17 NR 12	699 ~ 716	-3.98		**-1.20**
LTE 13	777 ~ 787	-4.60		**-3.16**
LTE 26	814 ~ 824	**-2.43**		-3.16
LTE 38	2 570 ~ 2 620	0.92		**2.79**
LTE 42	3 450 ~ 3 600		**-1.37**	
LTE 48 NR 48	3 550 ~ 3 700		**-1.37**	
LTE 71 NR 71	663 ~ 698	-2.45		**-1.60**
NR 41	2 496 ~ 2 690	0.92		**2.79**
NR 77	3 450 ~ 3 550		**0.12**	
	3 700 ~ 3 980		**0.12**	
NR 78	3 450 ~ 3 550		**0.12**	
	3 700 ~ 3 800		**0.12**	

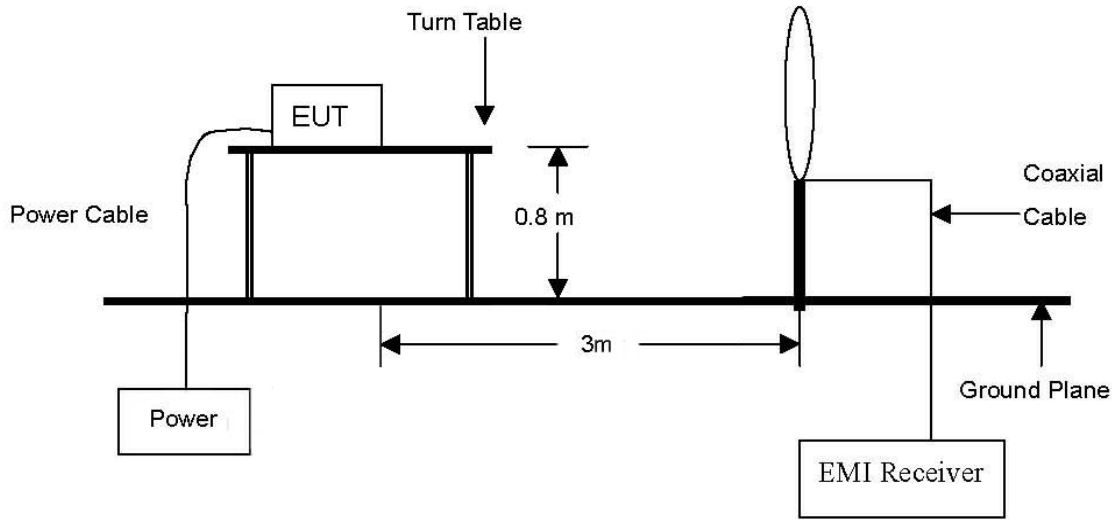
1.14. Emission Designator and Max Power

Band	Band width (㎒)	Modulation		Low Freq. (㎒)	Upper Freq. (㎒)	Conducted Average (dB m)	Worst Ant. Gain (dB i)	E.I.R.P. Average (dB m)	E.I.R.P. Average (W)	Emission Designator
LTE 48	5	QPSK		3 552.5	3 697.5	22.58	-1.37	21.01	0.126	4M53G7D
		16QAM				21.76		20.19	0.104	4M53D7D
	10	QPSK		3 555.0	3 695.0	22.85		21.28	0.134	8M97G7D
		16QAM				21.69		20.12	0.103	8M97D7D
	15	QPSK		3 557.5	3 692.5	22.85		21.28	0.134	13M5G7D
		16QAM				21.70		20.13	0.103	13M5D7D
	20	QPSK		3 560.0	3 690.0	22.87		21.30	0.135	18M0G7D
		16QAM				22.02		20.45	0.111	17M9D7D
NR Band	**Band width (㎒)**	**Modulation**		**Low Freq. (㎒)**	**Upper Freq. (㎒)**	**Conducted Average (dB m)**	**Worst Ant. Gain (dB i)**	**E.I.R.P. Average (dB m)**	**E.I.R.P. Average (W)**	**Emission Designator**
n48	20	DFTS-OFDM	BPSK	3 560.01	3 690.00	21.59	-1.37	20.02	0.100	18M0G7D
			QPSK			21.52		19.95	0.099	17M9G7D
			16QAM			20.02		18.45	0.070	17M9D7D
		CP-OFDM	QPSK			20.15		18.58	0.072	18M3G7D
			16QAM			19.36		17.79	0.060	18M3D7D
	30	DFTS-OFDM	BPSK	3 565.02	3 684.99	21.54		19.97	0.099	26M8G7D
			QPSK			21.35		19.78	0.095	26M9G7D
			16QAM			19.91		18.34	0.068	26M9D7D
		CP-OFDM	QPSK			19.75		18.18	0.066	27M9G7D
			16QAM			19.08		17.51	0.056	27M9D7D
	40	DFTS-OFDM	BPSK	3 570.00	3 679.98	21.69		20.12	0.103	36M0G7D
			QPSK			21.53		19.96	0.099	35M8G7D
			16QAM			19.99		18.42	0.070	35M8D7D
		CP-OFDM	QPSK			20.29		18.72	0.074	38M0G7D
			16QAM			19.47		17.90	0.062	37M9D7D

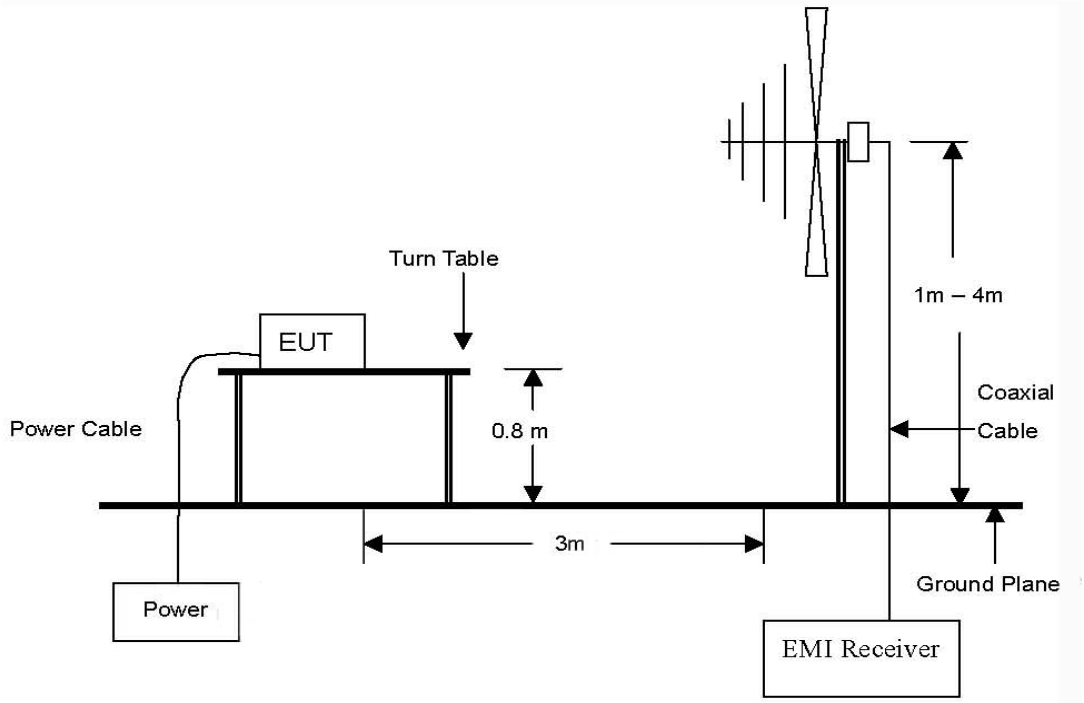
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test setup

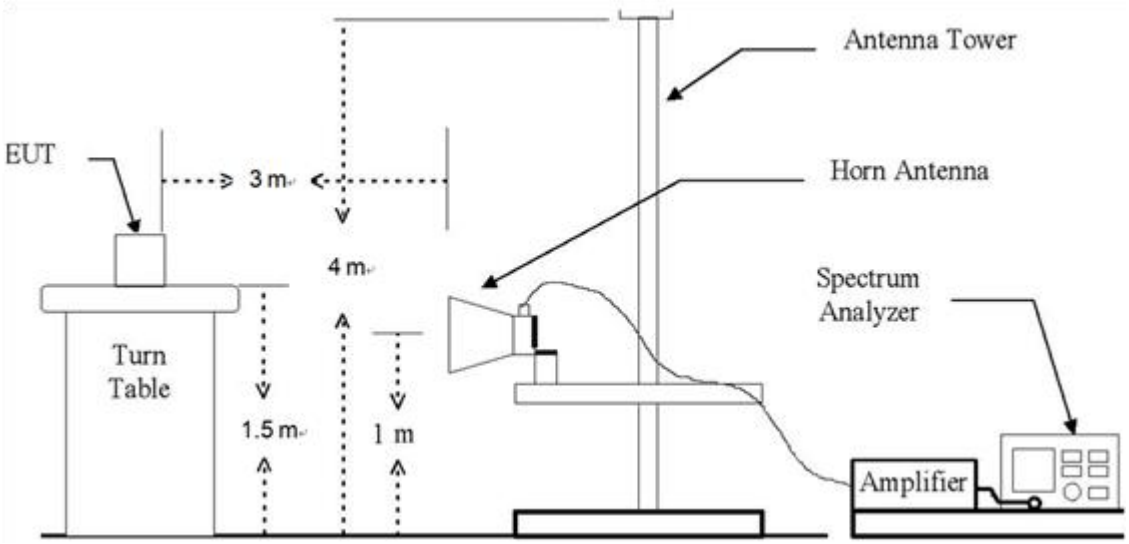
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒.



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



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to 40 ㎓ Emissions.



2.2. Lim7it

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

- §96.41(b), unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph (b):

Device	Maximum ERP (㏈m/10megahertz)	Maximum PSD (㏈m/㎒)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD[1]	47	37

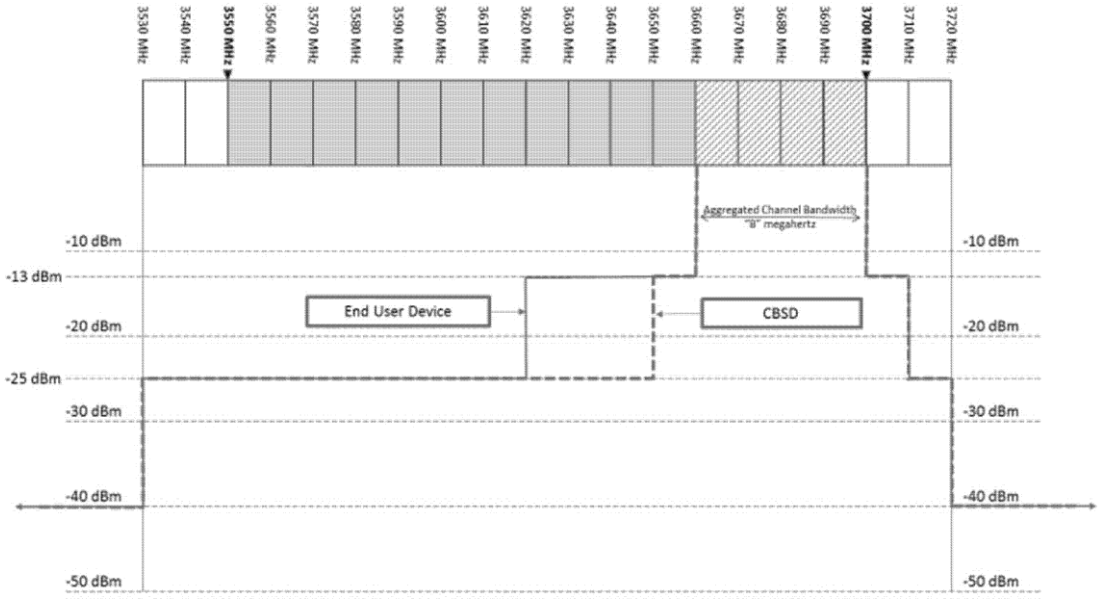
[1]Category B CBSDs will only be authorized for use after an ESC is approved and commercially deployed consistent with §§ 96.15 and 96.67.

2.2.2. Limit of Radiated Spurious Emissions

- §96.41(e), 3.5㎓ Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 ㏈m/㎒ within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 ㎒ below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 ㏈m/㎒. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 ㏈m/㎒ within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 ㏈m/㎒. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 ㏈.

(2) ***Additional protection levels.*** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 ㎒ or above 3 710 ㎒ shall not exceed -25 ㏈m/㎒, and the conducted power of emissions below 3 530 ㎒ or above 3 720 ㎒ shall not exceed -40 ㏈m/㎒.

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:

E.R.P. or E.I.R.P. = P_{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 ≥ 3 x 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) ℃
Relative humidity : 47 % R.H.

2.4.1. E.I.R.P.

Band	Band width	Frequency (㎒)	Modulation	Conducted Power (㏈ m/10 ㎒)	Antenna Gain (㏈ i)	Maximum E.I.R.P. (㏈ m/10 ㎒)	Limit
LTE 48	5	3 552.5	QPSK	21.08	-1.37	19.71	23 (㏈ m/10 ㎒)
			16QAM	19.66		18.29	
		3 625.0	QPSK	20.99		19.62	
			16QAM	19.80		18.43	
		3 697.5	QPSK	19.28		17.91	
			16QAM	18.70		17.33	
	10	3 555.0	QPSK	21.11		19.74	
			16QAM	20.14		18.77	
		3 625.0	QPSK	21.25		19.88	
			16QAM	20.19		18.82	
		3 697.5	QPSK	21.38		20.01	
			16QAM	20.27		18.90	
	15	3 557.5	QPSK	20.44		19.07	
			16QAM	19.65		18.28	
		3 625.0	QPSK	21.25		19.88	
			16QAM	20.05		18.68	
		3 692.5	QPSK	21.11		19.74	
			16QAM	20.07		18.70	
	20	3 560.0	QPSK	20.73		19.36	
			16QAM	19.76		18.39	
		3 625.0	QPSK	21.17		19.80	
			16QAM	20.04		18.67	
		3 690.0	QPSK	21.13		19.76	
			16QAM	20.16		18.79	

Band	Band Width	Frequency (㎒)	Modulation		Conducted Power (㏈ m/10 ㎒)	Antenna Gain (㏈ i)	Maximum E.I.R.P. (㏈ m/10 ㎒)	Limit
NR 48	20	3 560.01	DFTS-OFDM	BPSK	19.47	-1.37	18.10	23 (㏈ m/10 ㎒)
				QPSK	19.46		18.09	
			CP-OFDM	QPSK	17.53		16.16	
		3 624.99	DFTS-OFDM	BPSK	19.47		18.10	
				QPSK	19.35		17.98	
			CP-OFDM	QPSK	17.89		16.52	
		3 690.00	DFTS-OFDM	BPSK	19.16		17.79	
				QPSK	19.13		17.76	
			CP-OFDM	QPSK	17.66		16.29	
	30	3 565.02	DFTS-OFDM	BPSK	19.83		18.46	
				QPSK	19.79		18.42	
			CP-OFDM	QPSK	17.50		16.13	
		3 624.99	DFTS-OFDM	BPSK	19.92		18.55	
				QPSK	19.76		18.39	
			CP-OFDM	QPSK	18.48		17.11	
		3 684.99	DFTS-OFDM	BPSK	19.63		18.26	
				QPSK	19.64		18.27	
			CP-OFDM	QPSK	18.16		16.79	
	40	3 570.00	DFTS-OFDM	BPSK	19.70		18.33	
				QPSK	19.67		18.30	
			CP-OFDM	QPSK	17.61		16.24	
		3 624.99	DFTS-OFDM	BPSK	19.62		18.25	
				QPSK	19.63		18.26	
			CP-OFDM	QPSK	17.77		16.40	
		3 679.98	DFTS-OFDM	BPSK	19.36		17.99	
				QPSK	19.31		17.94	
			CP-OFDM	QPSK	17.96		16.59	

Remark;

1. E.I.R.P. (㏈ m/10 ㎒) = Maximum Conducted Power (㏈ m/10 ㎒) + Antenna Gain (㏈ i)

2.4.2. Radiated spurious emissions

- Ant. 2_Above 3 ㎓

LTE band 48 (20 ㎒ - QPSK)

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (3 560.0 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–
Middle Channel (3 625.0 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–
High Channel (3 690.0 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–

NR band 48 (40 ㎒ - DFT-OFDM BPSK)

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (3 570.00 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–
Middle Channel (3 624.99 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–
High Channel (3 679.98 ㎒)									
Below 1 000.00	Not detected	–	–	–	–	–	–	–	–
Above 1 000.00	Not detected	–	–	–	–	–	–	–	–

Remark;

1. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.
2. E (dB㎶/m) = Measured Level (dB㎶) + Antenna Factor (dB/m) + AMP (dB) + Cable Loss (dB).
3. E.I.R.P. (dB m) = E (dB㎶/m) + CF (dB).
4. E.R.P. (dB m) = E (dB㎶/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 ㎑ 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

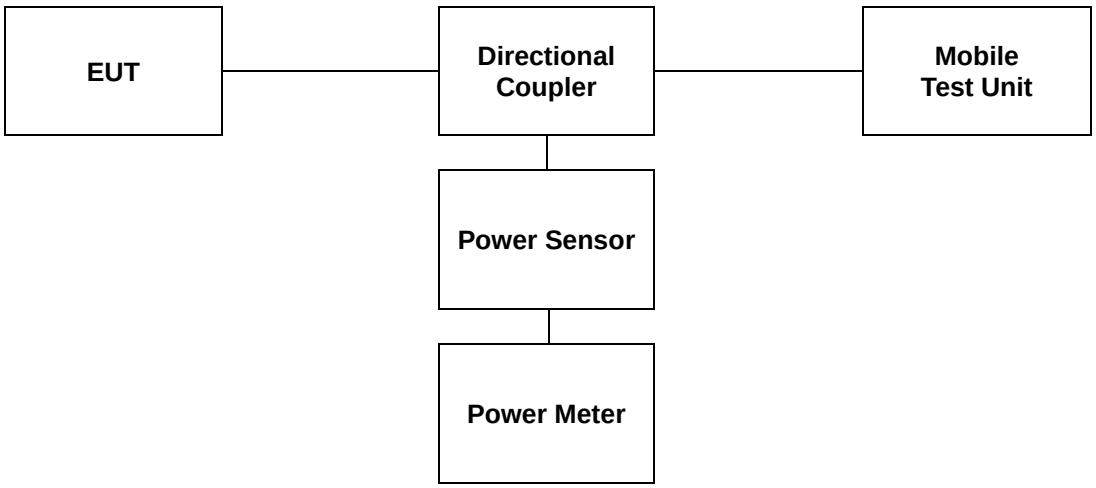
3.1. Limit

CFR 47, Section FCC §2.1046 and IC RSS-Gen Issue 5 6.12.

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. The measurement performed using a wideband RF power meter.
4. This EUT was tested under all configurations and the highest power was investigated and reported.



3.3. Test Result

Ambient temperature : (23 ± 1) ℃

Relative humidity : 47 % R.H.

LTE Band 48									
Bandwidth (㎒)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55265 (3 552.5 ㎒)		55990 (3 625.0 ㎒)		56715 (3 697.5 ㎒)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	**22.58**	**0.181**	22.52	0.179	22.50	0.178
		1	12	22.28	0.169	22.20	0.166	22.20	0.166
		1	24	22.25	0.168	22.17	0.165	22.27	0.169
		12	0	21.38	0.137	21.44	0.139	21.30	0.135
		12	6	21.39	0.138	21.29	0.135	21.42	0.139
		12	13	21.29	0.135	21.36	0.137	21.28	0.134
		25	0	21.19	0.132	21.24	0.133	21.30	0.135
	16QAM	1	0	21.51	0.142	21.49	0.141	21.50	0.141
		1	12	**21.76**	**0.150**	21.62	0.145	21.58	0.144
		1	24	21.18	0.131	21.15	0.130	21.10	0.129
		12	0	20.29	0.107	20.26	0.106	20.44	0.111
		12	6	20.41	0.110	20.36	0.109	20.28	0.107
		12	13	20.18	0.104	20.18	0.104	20.36	0.109
		25	0	20.20	0.105	20.22	0.105	20.34	0.108
	64QAM	1	0	**20.30**	**0.107**	20.26	0.106	20.22	0.105
		1	12	20.18	0.104	20.14	0.103	20.03	0.101
		1	24	20.12	0.103	20.11	0.103	20.00	0.100
		12	0	19.18	0.083	19.19	0.083	19.17	0.083
		12	6	19.27	0.085	19.37	0.086	19.21	0.083
		12	13	19.28	0.085	19.39	0.087	19.34	0.086
		25	0	19.38	0.087	19.37	0.086	19.36	0.086
	256QAM	1	0	18.03	0.064	18.00	0.063	**18.13**	**0.065**
		1	12	17.82	0.061	17.75	0.060	17.84	0.061
		1	24	17.67	0.058	17.66	0.058	17.61	0.058
		12	0	16.84	0.048	16.90	0.049	16.82	0.048
		12	6	16.93	0.049	16.84	0.048	16.79	0.048
		12	13	16.91	0.049	16.91	0.049	16.73	0.047
		25	0	16.73	0.047	16.88	0.049	16.78	0.048

LTE Band 48									
Bandwidth (㎒)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55290 (3 555.0 ㎒)		55990 (3 625.0 ㎒)		56690 (3 695.0 ㎒)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.35	0.172	22.78	0.190	22.79	0.190
		1	25	22.32	0.171	**22.85**	**0.193**	22.81	0.191
		1	49	22.35	0.172	22.81	0.191	22.82	0.191
		25	0	21.50	0.141	21.79	0.151	21.78	0.151
		25	12	21.45	0.140	21.82	0.152	21.87	0.154
		25	25	21.45	0.140	21.73	0.149	21.28	0.134
		50	0	21.19	0.132	21.21	0.132	21.28	0.134
	16QAM	1	0	21.46	0.140	21.48	0.141	21.47	0.140
		1	25	21.64	0.146	21.68	0.147	**21.69**	**0.148**
		1	49	21.12	0.129	21.15	0.130	21.20	0.132
		25	0	20.42	0.110	20.39	0.109	20.34	0.108
		25	12	20.42	0.110	20.25	0.106	20.33	0.108
		25	25	20.20	0.105	20.34	0.108	20.20	0.105
		50	0	20.37	0.109	20.26	0.106	20.22	0.105
	64QAM	1	0	20.31	0.107	20.30	0.107	**20.34**	**0.108**
		1	25	20.06	0.101	20.04	0.101	20.16	0.104
		1	49	20.11	0.103	19.95	0.099	20.05	0.101
		25	0	19.25	0.084	19.25	0.084	19.23	0.084
		25	12	19.33	0.086	19.30	0.085	19.18	0.083
		25	25	19.45	0.088	19.32	0.086	19.29	0.085
		50	0	19.35	0.086	19.42	0.087	19.46	0.088
	256QAM	1	0	18.15	0.065	18.12	0.065	**18.16**	**0.065**
		1	25	17.80	0.060	17.88	0.061	17.84	0.061
		1	49	17.76	0.060	17.65	0.058	17.70	0.059
		25	0	16.83	0.048	17.00	0.050	17.00	0.050
		25	12	16.81	0.048	16.79	0.048	16.88	0.049
		25	25	16.88	0.049	16.85	0.048	16.89	0.049
		50	0	16.73	0.047	16.81	0.048	16.78	0.048

LTE Band 48									
Bandwidth (㎒)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55315 (3 557.5 ㎒)		55990 (3 625.0 ㎒)		56665 (3 692.5 ㎒)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.30	0.170	22.56	0.180	22.71	0.187
		1	36	22.24	0.167	22.22	0.167	**22.85**	**0.193**
		1	74	22.27	0.169	22.34	0.171	22.82	0.191
		36	0	21.39	0.138	21.31	0.135	21.73	0.149
		36	18	21.37	0.137	21.35	0.136	21.79	0.151
		36	37	21.44	0.139	21.33	0.136	21.76	0.150
		75	0	21.27	0.134	21.18	0.131	21.24	0.133
	16QAM	1	0	21.43	0.139	21.33	0.136	21.41	0.138
		1	36	21.67	0.147	**21.70**	**0.148**	21.70	0.148
		1	74	21.15	0.130	21.16	0.131	21.05	0.127
		36	0	20.43	0.110	20.28	0.107	20.30	0.107
		36	18	20.33	0.108	20.26	0.106	20.35	0.108
		36	37	20.31	0.107	20.36	0.109	20.19	0.104
		75	0	20.38	0.109	20.28	0.107	20.34	0.108
	64QAM	1	0	20.19	0.104	**20.24**	**0.106**	20.20	0.105
		1	36	20.19	0.104	20.16	0.104	20.16	0.104
		1	74	20.05	0.101	19.97	0.099	20.11	0.103
		36	0	19.32	0.086	19.23	0.084	19.30	0.085
		36	18	19.31	0.085	19.31	0.085	19.29	0.085
		36	37	19.44	0.088	19.29	0.085	19.42	0.087
		75	0	19.43	0.088	19.43	0.088	19.36	0.086
	256QAM	1	0	**18.12**	**0.065**	18.05	0.064	18.01	0.063
		1	36	17.79	0.060	17.72	0.059	17.81	0.060
		1	74	17.66	0.058	17.64	0.058	17.65	0.058
		36	0	16.90	0.049	16.81	0.048	16.81	0.048
		36	18	16.82	0.048	16.85	0.048	16.77	0.048
		36	37	16.89	0.049	16.82	0.048	16.85	0.048
		75	0	16.85	0.048	16.83	0.048	16.76	0.047

LTE Band 48									
Bandwidth (㎒)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55340 (3 560.0 ㎒)		55990 (3 625.0 ㎒)		56640 (3 690.0 ㎒)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.61	0.182	22.63	0.183	22.72	0.187
		1	50	22.56	0.180	**22.87**	**0.194**	22.86	0.193
		1	99	22.35	0.172	22.71	0.187	22.78	0.190
		50	0	21.48	0.141	21.80	0.151	21.71	0.148
		50	25	21.53	0.142	21.89	0.155	21.88	0.154
		50	50	21.43	0.139	21.75	0.150	21.78	0.151
		100	0	21.37	0.137	21.72	0.149	21.69	0.148
	16QAM	1	0	21.52	0.142	21.90	0.155	21.64	0.146
		1	50	21.77	0.150	**22.02**	**0.159**	21.81	0.152
		1	99	21.24	0.133	21.77	0.150	21.77	0.150
		50	0	20.45	0.111	20.77	0.119	20.82	0.121
		50	25	20.45	0.111	20.72	0.118	20.87	0.122
		50	50	20.37	0.109	20.65	0.116	20.75	0.119
		100	0	20.39	0.109	20.67	0.117	20.81	0.121
	64QAM	1	0	20.34	0.108	20.59	0.115	20.76	0.119
		1	50	20.20	0.105	20.59	0.115	20.75	0.119
		1	99	20.13	0.103	20.66	0.116	**20.83**	**0.121**
		50	0	19.36	0.086	19.77	0.095	19.76	0.095
		50	25	19.38	0.087	19.71	0.094	19.87	0.097
		50	50	19.46	0.088	19.72	0.094	19.84	0.096
		100	0	19.51	0.089	19.71	0.094	19.75	0.094
	256QAM	1	0	**18.16**	**0.065**	18.08	0.064	18.15	0.065
		1	50	17.90	0.062	17.77	0.060	17.90	0.062
		1	99	17.78	0.060	17.76	0.060	17.80	0.060
		50	0	17.01	0.050	16.94	0.049	16.96	0.050
		50	25	16.96	0.050	17.01	0.050	16.85	0.048
		50	50	16.93	0.049	16.94	0.049	16.86	0.049
		100	0	16.89	0.049	16.87	0.049	16.89	0.049

NR Band 48												
BW (㎒)	SCS (㎑)	Modulation		RB allocation	RB Size	RB Offset	Conducted Output Power					
							637334 (3 560.01 ㎒)		641666 (3 624.99 ㎒)		646000 (3 690.00 ㎒)	
							(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	30	DFT-S OFDM	BPSK	Inner_1RB Left	1	1	21.33	0.136	**21.59**	**0.144**	21.45	0.140
			QPSK		1	1	21.28	0.134	**21.52**	**0.142**	21.38	0.137
			16QAM		1	1	19.80	0.095	**20.02**	**0.100**	19.91	0.098
			64QAM		1	1	18.66	0.073	18.90	0.078	18.79	0.076
			256QAM		1	1	16.49	0.045	16.54	0.045	16.41	0.044
			BPSK	Inner_1RB Right	1	49	21.39	0.138	21.35	0.136	21.58	0.144
			QPSK		1	49	21.37	0.137	21.28	0.134	21.40	0.138
			BPSK	Inner_Full	25	12	21.33	0.136	21.41	0.138	21.43	0.139
			QPSK		25	12	21.35	0.136	21.52	0.142	21.42	0.139
			BPSK	Outer_Full	50	0	20.43	0.110	20.76	0.119	20.77	0.119
			QPSK		50	0	20.45	0.111	20.55	0.114	20.45	0.111
			BPSK	Edge_1RB Left	1	0	20.14	0.103	20.54	0.113	20.35	0.108
			QPSK		1	0	20.19	0.104	20.43	0.110	20.26	0.106
			BPSK	Edge_Full Left	2	0	20.27	0.106	20.52	0.113	20.40	0.110
			QPSK		2	0	20.27	0.106	20.54	0.113	20.33	0.108
			BPSK	Edge_1RB Right	1	50	20.26	0.106	20.71	0.118	20.76	0.119
			QPSK		1	50	20.28	0.107	20.21	0.105	20.25	0.106
			BPSK	Edge_Full Right	2	49	20.36	0.109	20.51	0.112	20.48	0.112
			QPSK		2	49	20.37	0.109	20.30	0.107	20.34	0.108
		CP OFDM	QPSK	Inner_1RB Left	1	1	19.90	0.098	**20.15**	**0.104**	19.92	0.098
			16QAM		1	1	19.21	0.083	**19.36**	**0.086**	19.15	0.082

NR Band 48												
BW (㎒)	SCS (㎑)	Modulation		RB allocation	RB Size	RB Offset	Conducted Output Power					
							637668 (3 565.02 ㎒)		641666 (3 624.99 ㎒)		645666 (3 684.99 ㎒)	
							(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
30	30	DFT-S OFDM	BPSK	Inner_1RB Left	1	1	20.79	0.120	21.23	0.133	21.25	0.133
			QPSK		1	1	20.68	0.117	21.12	0.129	21.20	0.132
			16QAM		1	1	19.56	0.090	19.66	0.092	**19.91**	**0.098**
			64QAM		1	1	18.05	0.064	18.56	0.072	18.72	0.074
			256QAM		1	1	16.17	0.041	16.21	0.042	16.21	0.042
			BPSK	Inner_1RB Right	1	76	20.87	0.122	21.02	0.126	**21.54**	**0.143**
			QPSK		1	76	20.85	0.122	20.79	0.120	**21.35**	**0.136**
			BPSK	Inner_Full	36	18	20.80	0.120	20.96	0.125	21.30	0.135
			QPSK		36	18	20.83	0.121	21.12	0.129	21.28	0.134
			BPSK	Outer_Full	75	0	20.01	0.100	20.27	0.106	20.64	0.116
			QPSK		75	0	19.87	0.097	20.08	0.102	20.38	0.109
			BPSK	Edge_1RB Left	1	0	20.17	0.104	20.18	0.104	20.28	0.107
			QPSK		1	0	19.57	0.091	20.05	0.101	20.13	0.103
			BPSK	Edge_Full Left	2	0	20.11	0.103	20.10	0.102	20.24	0.106
			QPSK		2	0	19.63	0.092	20.11	0.103	20.28	0.107
			BPSK	Edge_1RB Right	1	77	20.12	0.103	20.35	0.108	20.70	0.117
			QPSK		1	77	19.66	0.092	19.88	0.097	20.15	0.104
			BPSK	Edge_Full Right	2	76	20.05	0.101	20.04	0.101	20.36	0.109
			QPSK		2	76	19.67	0.093	19.93	0.098	20.22	0.105
		CP OFDM	QPSK	Inner_1RB Left	1	1	19.26	0.084	19.68	0.093	**19.75**	**0.094**
			16QAM		1	1	18.70	0.074	19.04	0.080	**19.08**	**0.081**

NR Band 48												
BW (㎒)	SCS (㎑)	Modulation		RB allocation	RB Size	RB Offset	Conducted Output Power					
							638000 (3 570.00 ㎒)		641666 (3 624.99 ㎒)		645332 (3 679.98 ㎒)	
							(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
40	30	DFT-S OFDM	BPSK	Inner_1RB Left	1	1	21.48	0.141	**21.69**	**0.148**	21.65	0.146
			QPSK		1	1	21.39	0.138	21.49	0.141	**21.53**	**0.142**
			16QAM		1	1	19.78	0.095	**19.99**	**0.100**	19.82	0.096
			64QAM		1	1	18.63	0.073	18.83	0.076	18.71	0.074
			256QAM		1	1	16.40	0.044	16.73	0.047	16.43	0.044
			BPSK	Inner_1RB Right	1	104	21.15	0.130	21.17	0.131	21.33	0.136
			QPSK		1	104	21.17	0.131	21.16	0.131	21.30	0.135
			BPSK	Inner_Full	50	25	21.42	0.139	21.57	0.144	21.44	0.139
			QPSK		50	25	21.41	0.138	21.45	0.140	21.43	0.139
			BPSK	Outer_Full	100	0	20.49	0.112	20.70	0.117	20.48	0.112
			QPSK		100	0	20.43	0.110	20.57	0.114	20.44	0.111
			BPSK	Edge_1RB Left	1	0	20.21	0.105	20.41	0.110	20.28	0.107
			QPSK		1	0	20.14	0.103	20.38	0.109	20.22	0.105
			BPSK	Edge_Full Left	2	0	20.25	0.106	20.54	0.113	20.32	0.108
			QPSK		2	0	20.23	0.105	20.52	0.113	20.30	0.107
			BPSK	Edge_1RB Right	1	105	20.11	0.103	20.08	0.102	20.17	0.104
			QPSK		1	105	20.08	0.102	20.04	0.101	20.18	0.104
			BPSK	Edge_Full Right	2	104	20.21	0.105	20.15	0.104	20.26	0.106
			QPSK		2	104	20.17	0.104	20.14	0.103	20.29	0.107
		CP OFDM	QPSK	Inner_1RB Left	1	1	19.96	0.099	**20.29**	**0.107**	19.86	0.097
			16QAM		1	1	19.20	0.083	**19.47**	**0.089**	19.19	0.083

4. Occupied Bandwidth

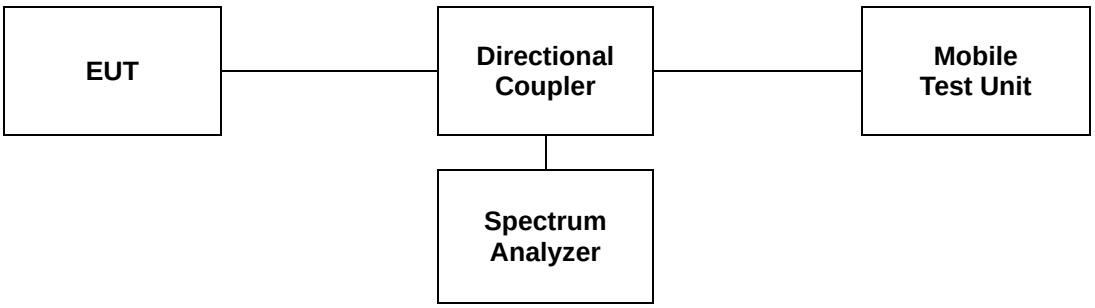
4.1. Limit

CFR 47, Section FCC §2.1049 and IC RSS-Gen Issue 5 6.7.

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 × 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 ≥ 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. 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

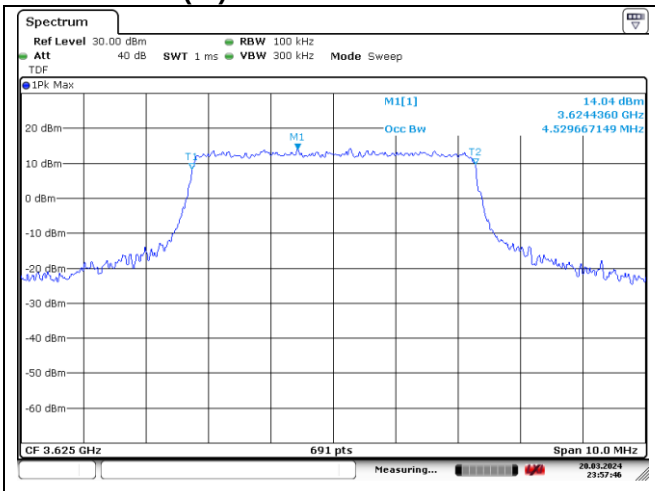
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Band	Bandwidth (㎒)	Frequency (㎒)	Occupied Bandwidth (㎒)	
			QPSK	16QAM
LTE 48	5	3 625	4.530	4.530
	10		8.973	8.973
	15		13.502	13.546
	20		18.003	17.945

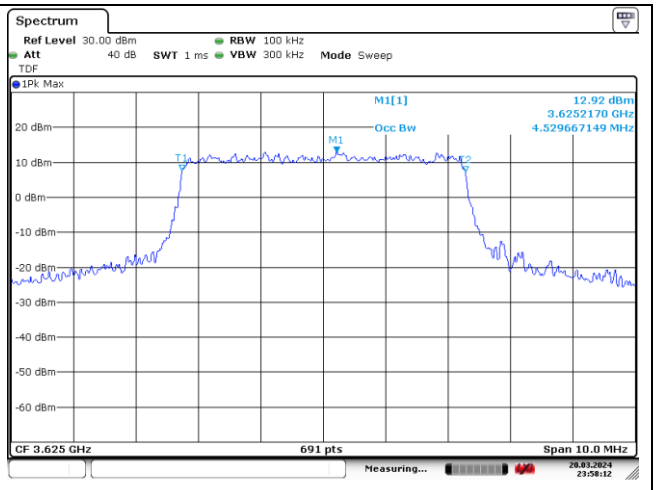
Band	SCS (㎑)	BW (㎒)	Frequency (㎒)	Occupied Bandwidth (㎒)				
				DFT-S-OFDM BPSK	DFT-S-OFDM QPSK	DFT-S-OFDM 16QAM	CP-OFDM QPSK	CP-OFDM 16QAM
NR 48	30	20	3 624.99	17.982	17.942	17.942	18.262	18.302
		30		26.793	26.853	26.853	27.932	27.872
		40		35.964	35.804	35.804	38.042	37.882

- Test plots

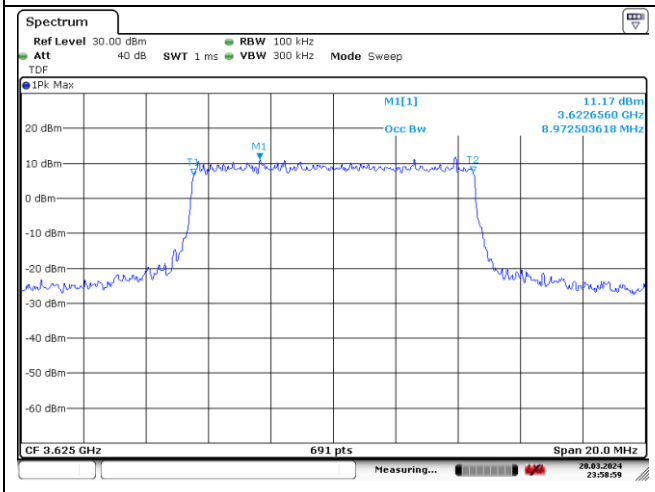
LTE band 48 (IC)



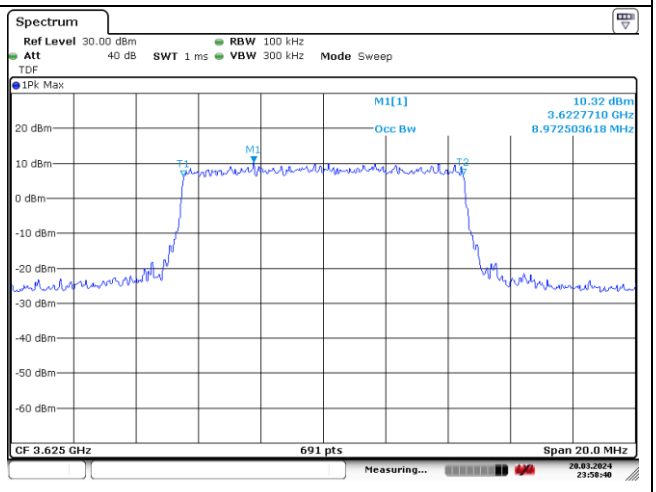
5 ㎒ QPSK Middle Channel - Full RB



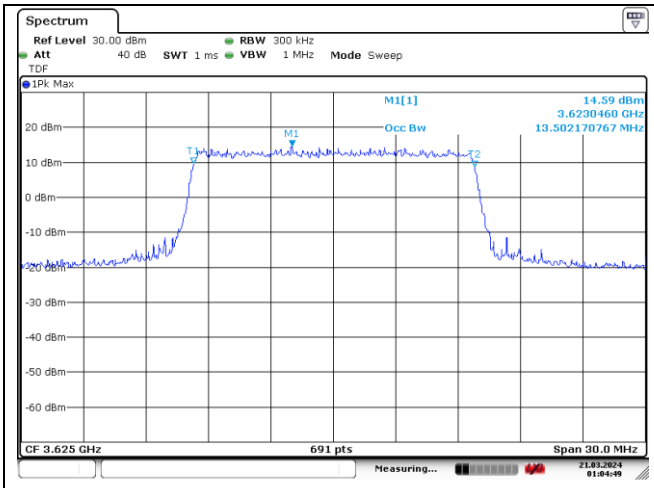
5 ㎒ 16QAM Middle Channel - Full RB



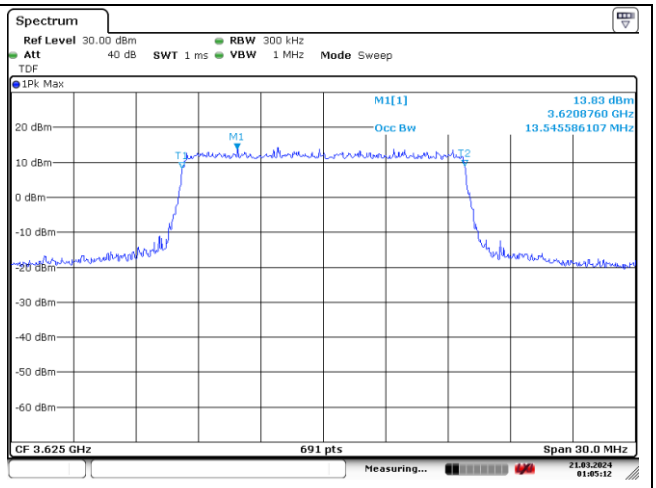
10 ㎒ QPSK Middle Channel - Full RB



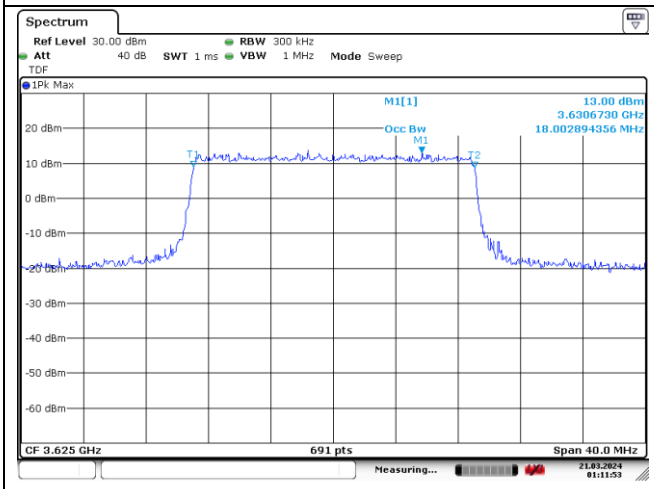
10 ㎒ 16QAM Middle Channel - Full RB



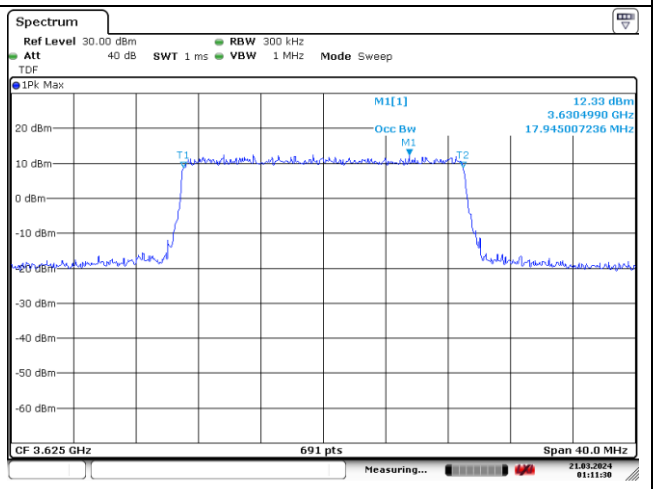
15 ㎒ QPSK Middle Channel - Full RB



15 ㎒ 16QAM Middle Channel - Full RB

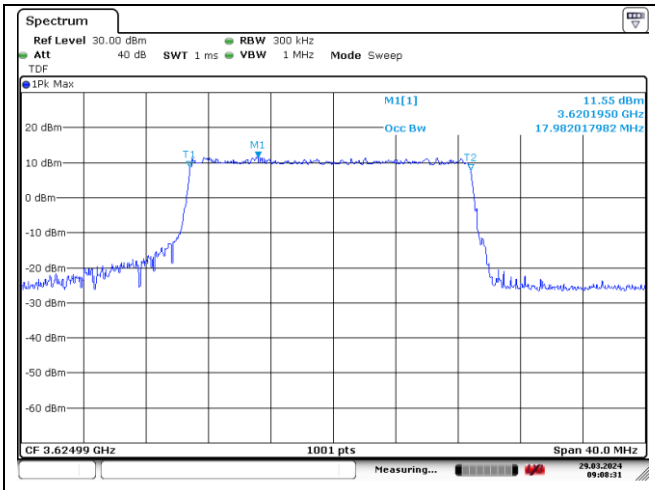


20 ㎒ QPSK Middle Channel - Full RB

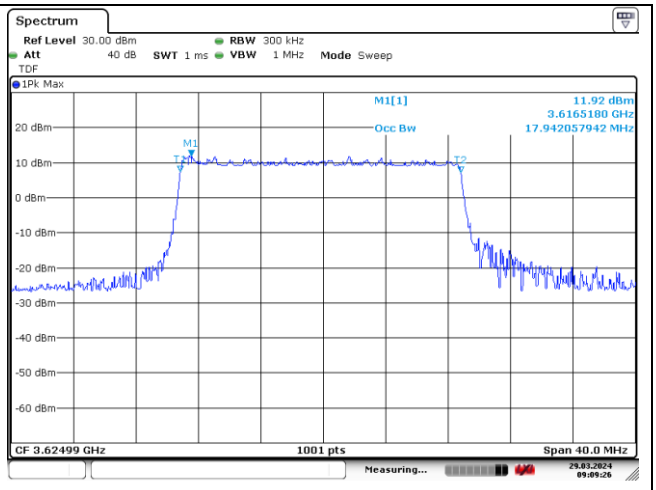


20 ㎒ 16QAM Middle Channel - Full RB

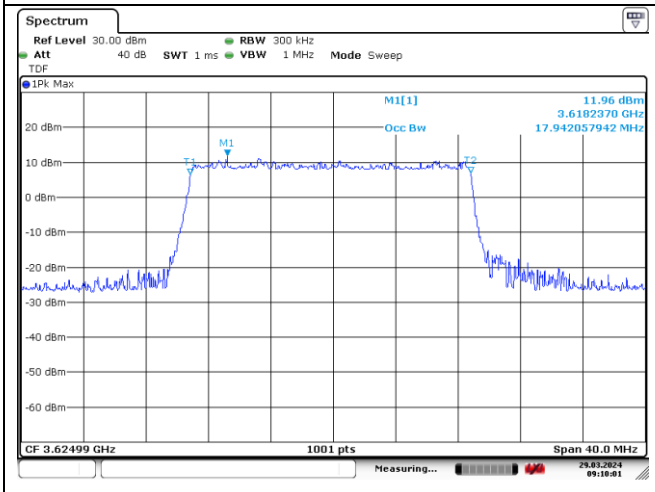
NR band 48



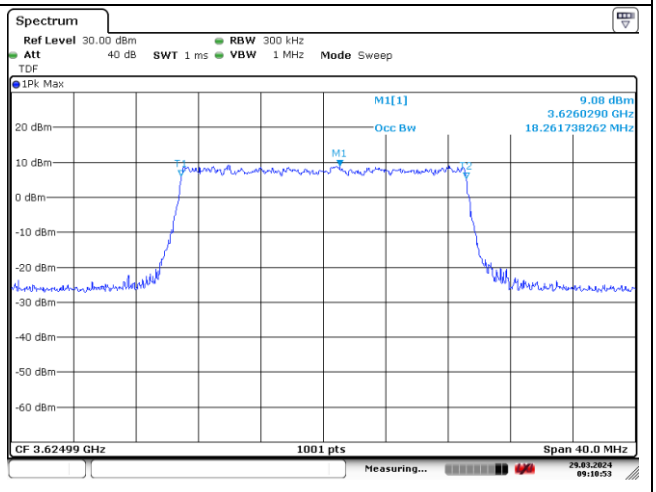
20 ㎒ DFT-S-OFDM BPSK



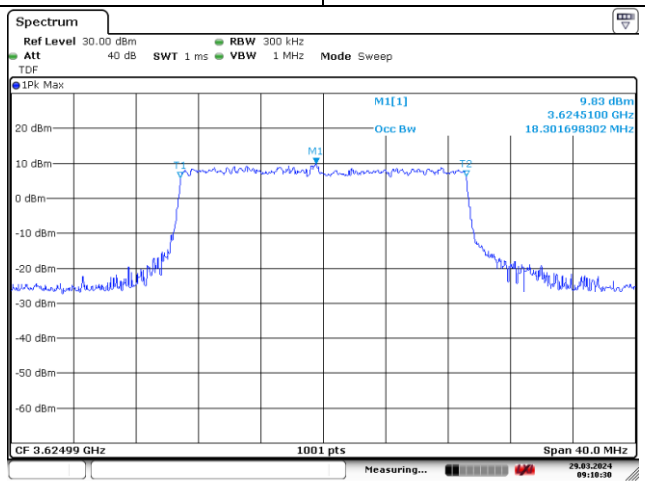
20 ㎒ DFT-S-OFDM QPSK



20 ㎒ DFT-S-OFDM 16QAM

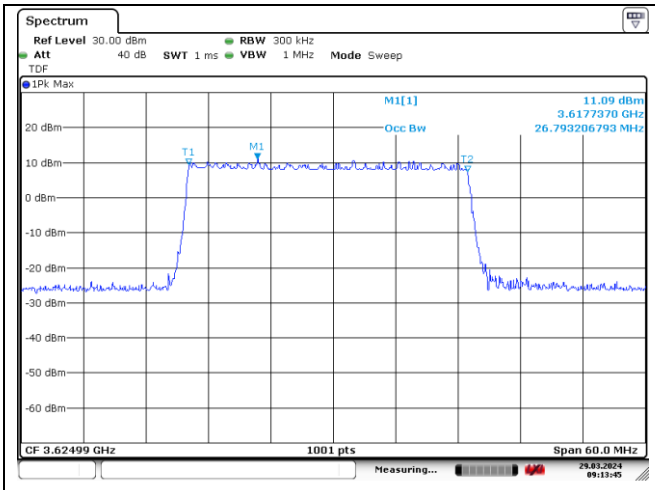


20 ㎒ CP-OFDM QPSK

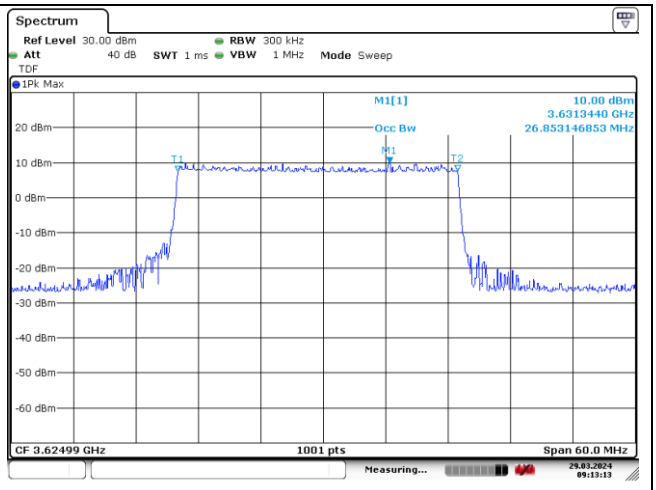


20 ㎒ CP-OFDM 16QAM

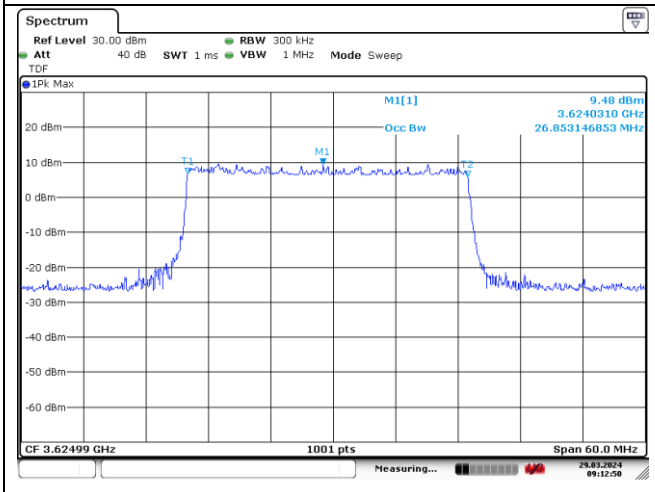
NR band 48



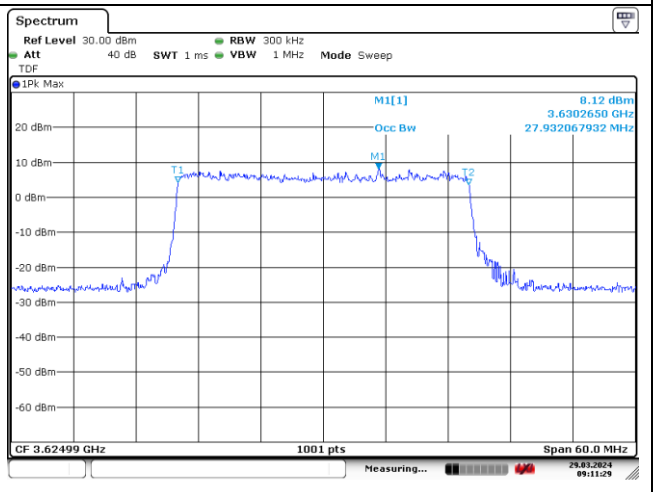
30 ㎒ DFT-S-OFDM BPSK



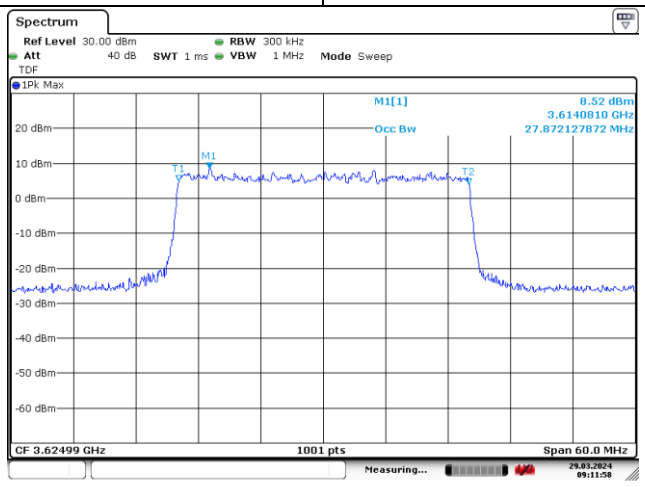
30 ㎒ DFT-S-OFDM QPSK



30 ㎒ DFT-S-OFDM 16QAM

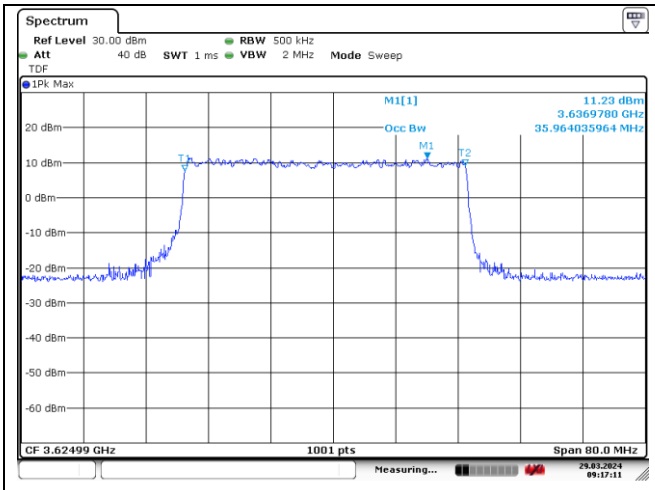


30 ㎒ CP-OFDM QPSK

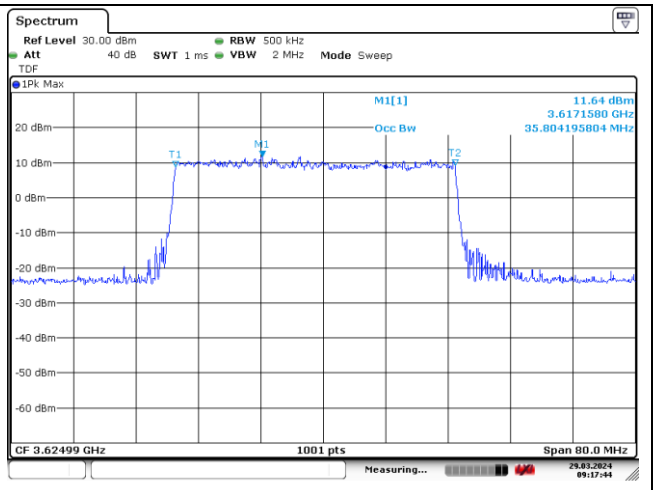


30 ㎒ CP-OFDM 16QAM

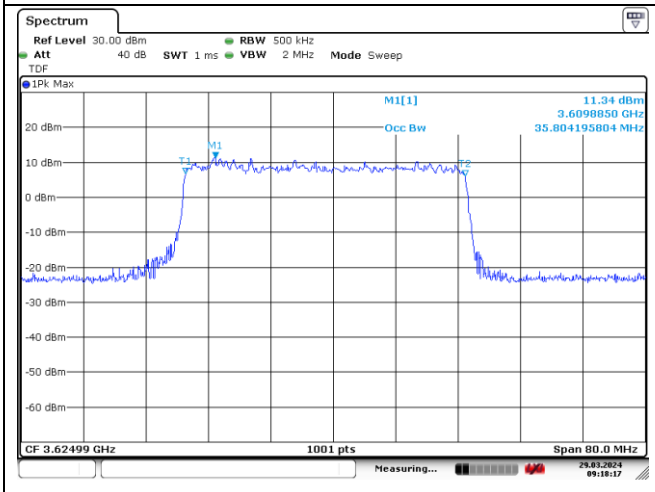
NR band 48



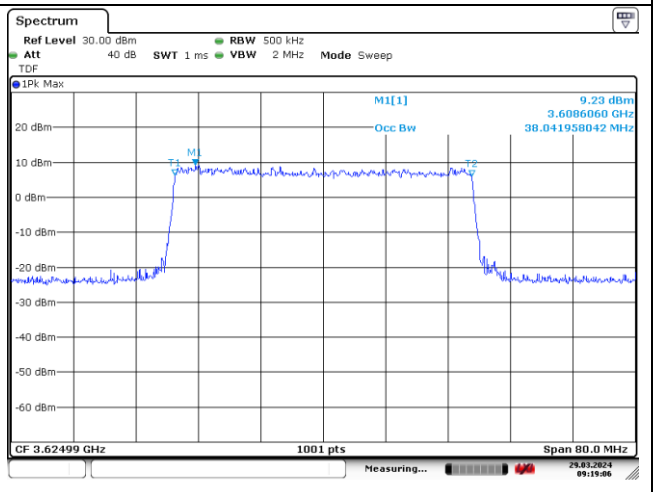
40 ㎒ DFT-S-OFDM BPSK



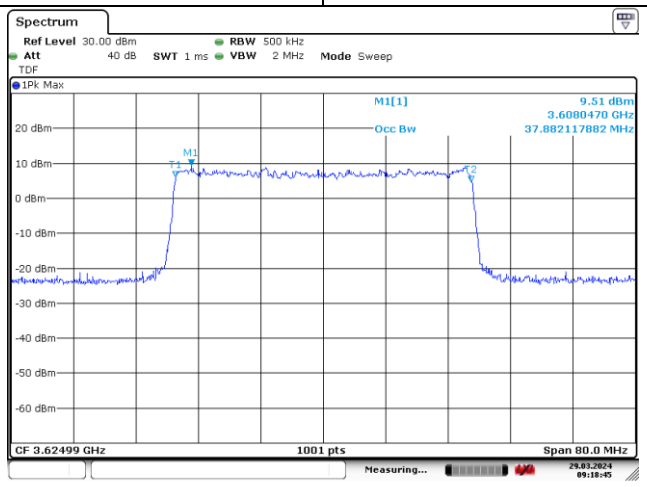
40 ㎒ DFT-S-OFDM QPSK



40 ㎒ DFT-S-OFDM 16QAM



40 ㎒ CP-OFDM QPSK



40 ㎒ CP-OFDM 16QAM

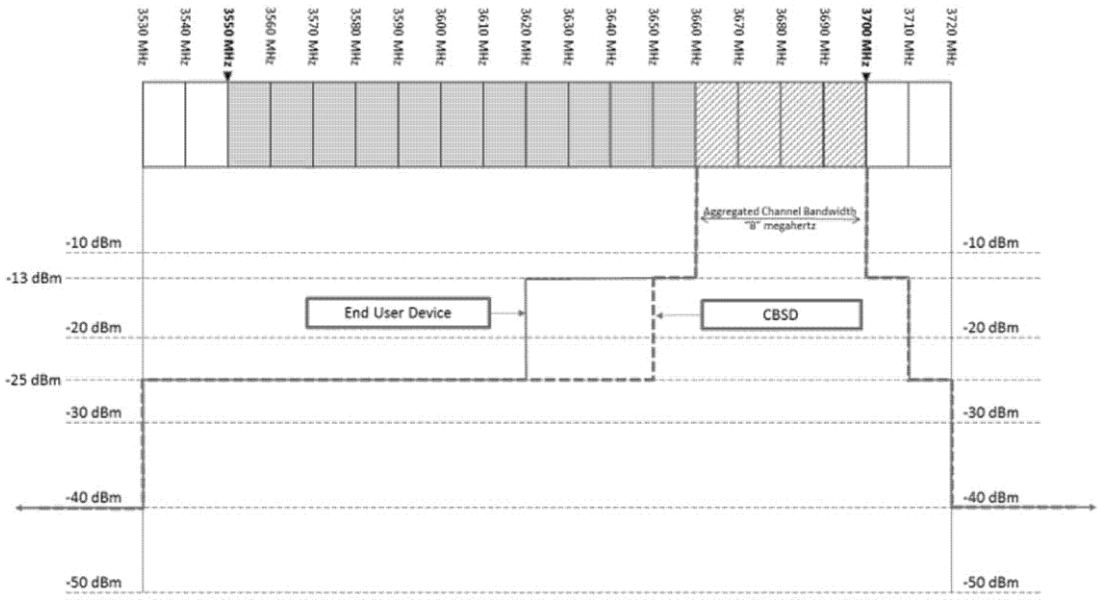
5. Spurious Emissions at Antenna Terminal

5.1. Limit

- §96.41(e), 3.5㎓ Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 ㏈m/㎒ within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 ㎒ below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 ㏈m/㎒. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

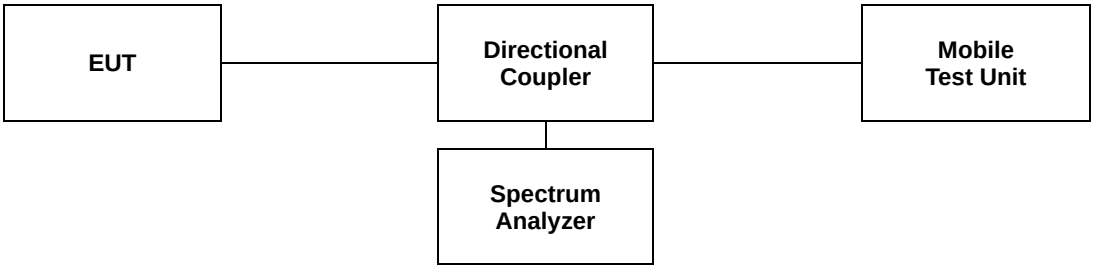
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 ㏈m/㎒ within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 ㏈m/㎒. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 ㏈.

(2) ***Additional protection levels.*** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 ㎒ or above 3 710 ㎒ shall not exceed -25 ㏈m/㎒, and the conducted power of emissions below 3 530 ㎒ or above 3 720 ㎒ shall not exceed -40 ㏈m/㎒.

5.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 ㎑ and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 ㎑ to 40 ㎓, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

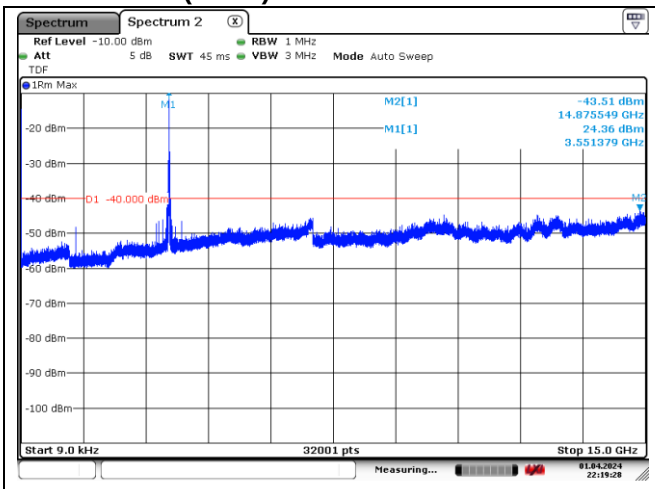
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and frequencies greater than 1 ㎓. However, in the 1 ㎒ bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 ㏈ below the transmitter power.

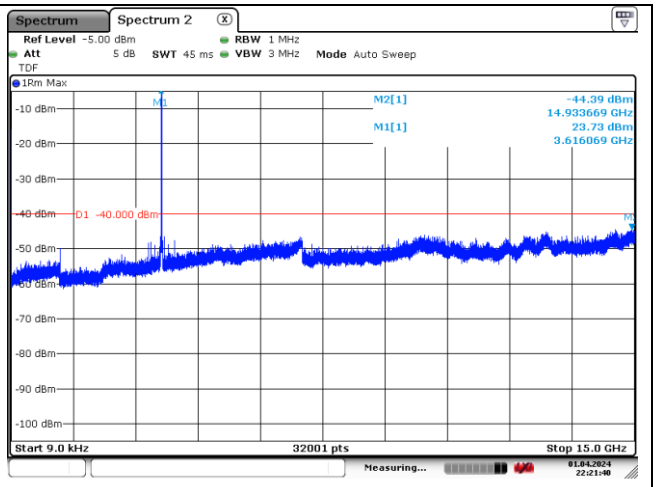
6.3. Test Results

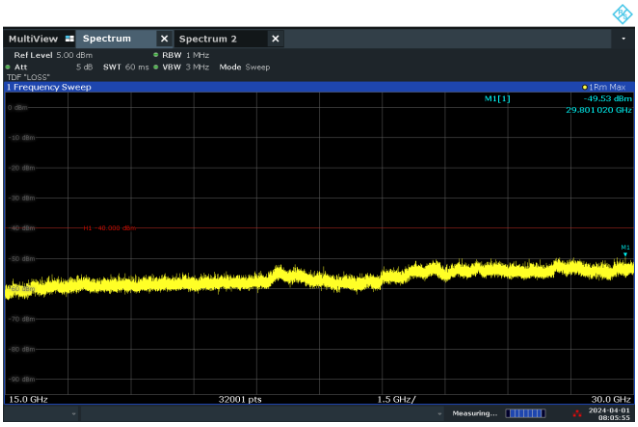
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

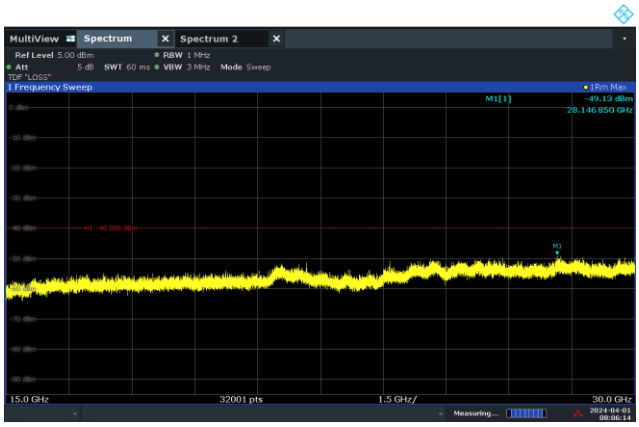
- Test plots

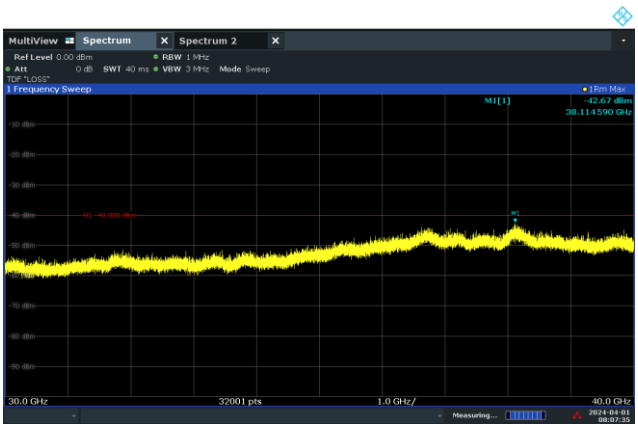
LTE band 48 (20 ㎒)

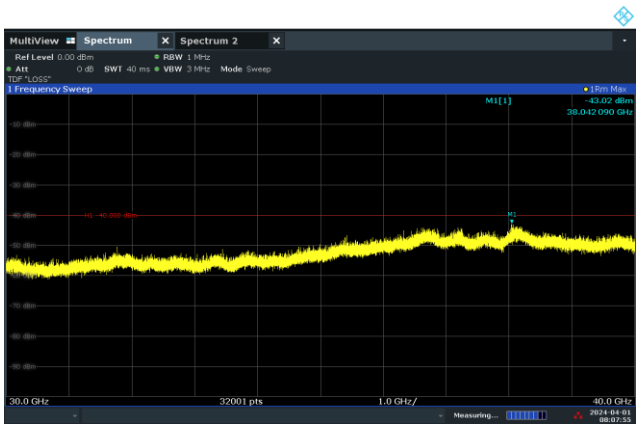






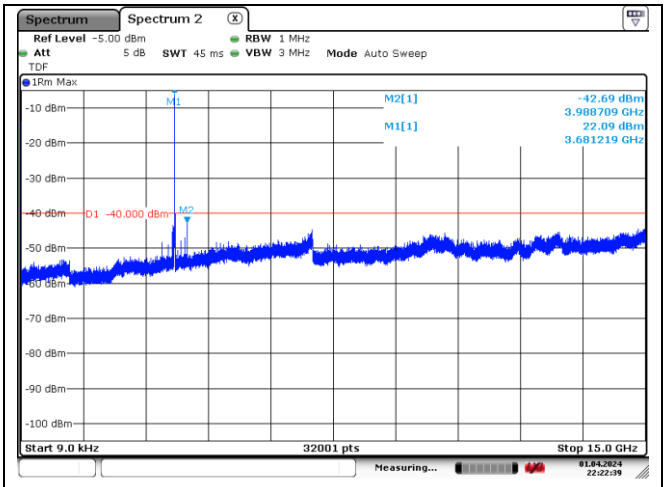


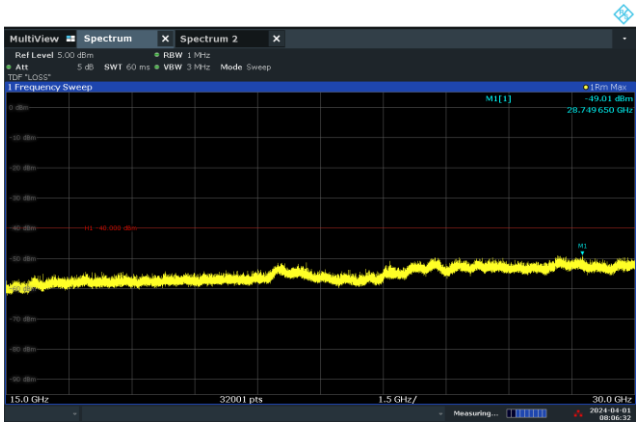


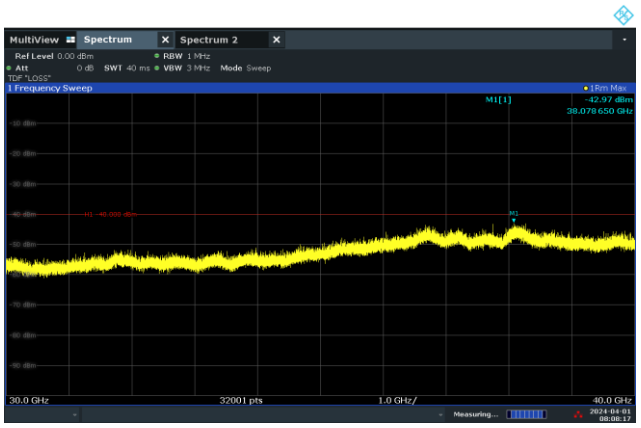


QPSK Low Channel - 1 RB	QPSK Middle Channel - 1 RB

LTE band 48 (20 ㎒)

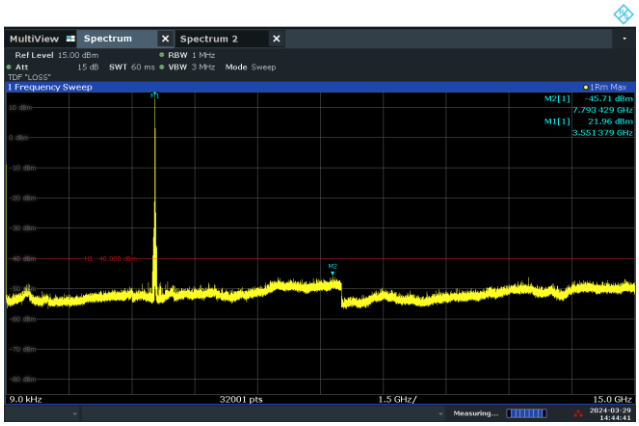


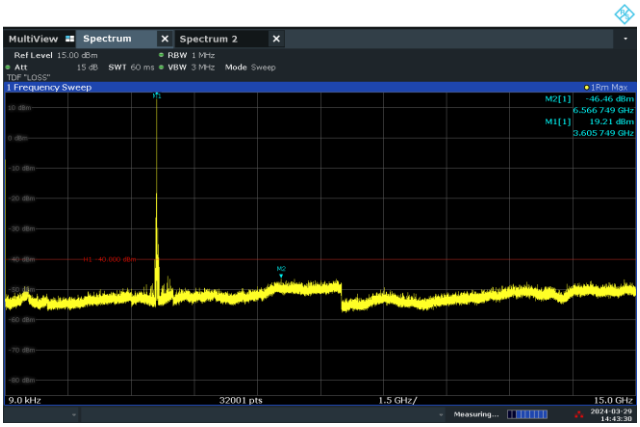


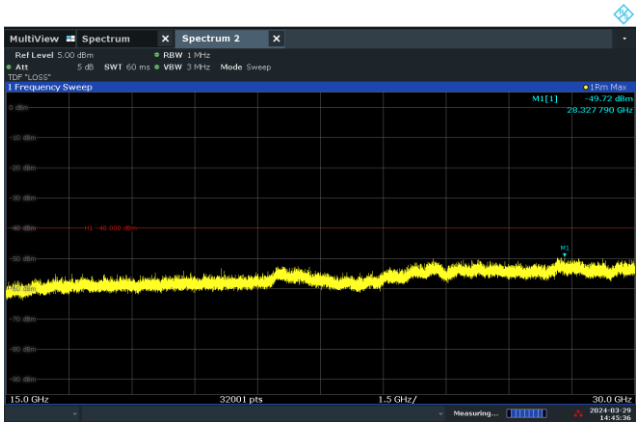


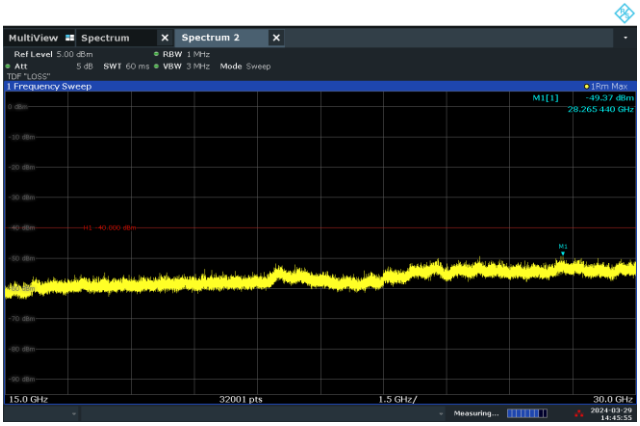
QPSK High Channel - 1 RB

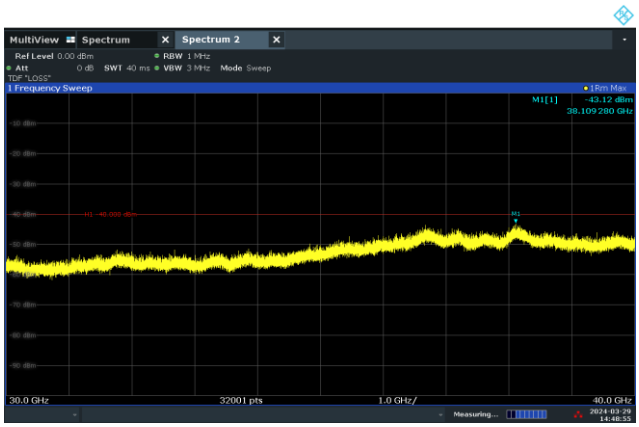
NR band 48

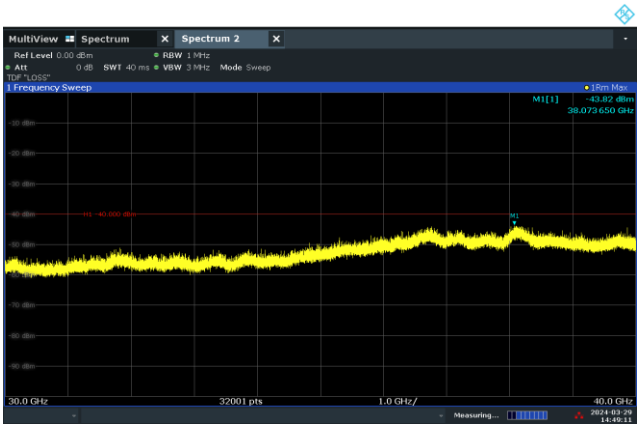






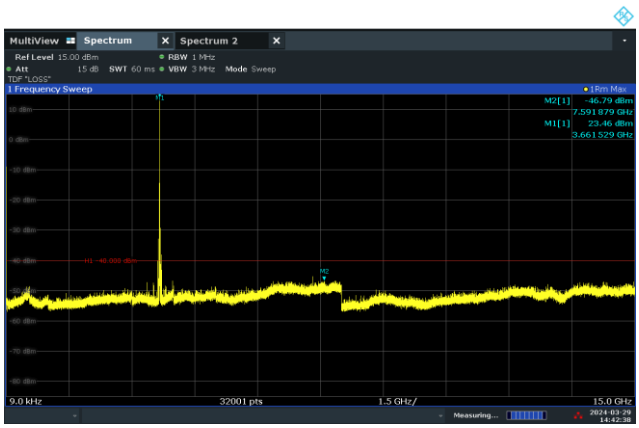


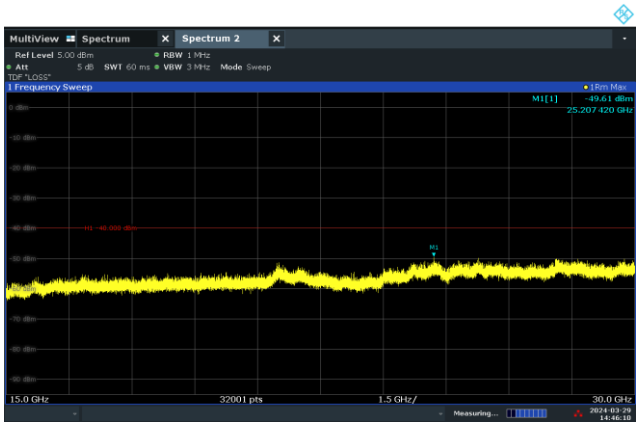


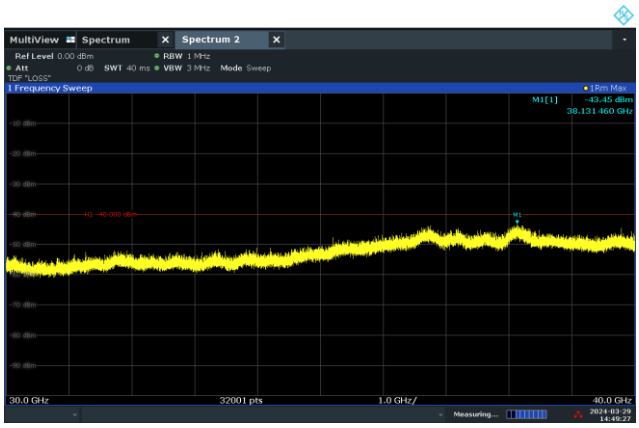


DFT-S-OFDM BPSK - 40 ㎒ Low Channel - 1 RB	DFT-S-OFDM BPSK - 40 ㎒ Middle Channel - 1 RB

NR band 48







DFT-S-OFDM BPSK - 40 ㎒ High Channel - 1 RB