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TEST REPORT

of

FCC Part 2 Subpart J and Part 22 Subpart C/H

FCC ID: : 2BO3LTLJLNIBN5E6

Equipment Under Test	:	Telematics
Model Name	:	TLJLNIBN5E6
Variant Model Name(s)	:	-
Applicant	:	LG Electronics Inc.
Manufacturer	:	LG Electronics Inc.
Date of Receipt	:	2024.09.13
Date of Test(s)	:	2024.10.21 ~ 2025.02.11
Date of Issue	:	2025.04.23

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

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by: **Technical Manager:**

Ethan Lim **Jinhyoung Cho**

SGS Korea Co., Ltd. Gunpo Laboratory

INDEX

Table of Contents Page

1. General Information ---------- 3

2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions ---------- 10

3. Conducted Output Power ---------- 17

4. Occupied Bandwidth ---------- 19

5. Peak-Average Ratio ---------- 23

6. Spurious Emissions at Antenna Terminal ---------- 27

7. Band Edge ---------- 30

8. Frequency Stability ---------- 33

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

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

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1.2. Details of Applicant

Applicant : LG Electronics Inc.
Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Republic of Korea, 17709
Contact Person : Kwon, Yong-deok
Phone No. : +82 10 4752 3957

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
Model Name	TLJLNIBN5E6
Serial Number	Conducted:502VIVA000318 Radiated: 407VIVA000500
Power Supply	DC 12 V
Rated Power	GSM 850: 33 ㏈m WCDMA Ⅴ : 23 ㏈m
Frequency Range	GSM 850 : 824 ㎒ ~ 849 ㎒ WCDMA Ⅴ : 824 ㎒ ~ 849 ㎒
Modulation Technique	GMSK, 8PSK, QPSK, 16QAM
Antenna Type	PIFA
Antenna Gain	-1.12 ㏈i
H/W Version	REV.1.0
S/W Version	E2517

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	103453	Oct. 29, 2024	Annual	Oct. 29, 2025
Spectrum Analyzer	Agilent	N9020A	MY53421758	Sep. 10, 2024	Annual	Sep. 10, 2025
Signal Generator	R&S	SMA100B	106887	Oct. 11, 2024	Annual	Oct. 11, 2025
DC Power Supply	R&S	HMP2020	102133	Apr. 23, 2024	Annual	Apr. 23, 2025
Communication Analyzer	Anritsu	MT8821C	6262094325	Mar. 04, 2025	Annual	Mar. 04, 2026
Temperature Chamber	ESPEC CORP.	PL-2J	15004184	Jun. 03, 2024	Annual	Jun. 03, 2025
BRIDGE COUPLER	MARKI MICROWAVE INC	CBR16-0012	1542	May 13, 2024	Annual	May 13, 2025
Directional Coupler	KRYTAR	152613	122661	Feb. 24, 2025	Annual	Feb. 26, 2026
High Pass Filter	Wainwright Instrument GmbH	WHKX10-900-1000-1800 0-40SS	7	Feb. 24, 2025	Annual	Feb. 24, 2026
Preamplifier	H.P.	8447F	2944A03909	Aug. 09, 2024	Annual	Aug. 09, 2025
Preamplifier	R&S	SCU 18	102218	Mar. 08, 2024	Annual	Mar. 08, 2025
Test Receiver	R&S	ESU26	100109	Jan. 13, 2025	Annual	Jan. 13, 2026
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Mar. 25, 2025	Biennial	Mar. 25, 2027
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	01126	Mar. 05, 2025	Biennial	Mar. 05, 2027
Horn Antenna	R&S	HF906	100326	Feb. 24, 2025	Annual	Feb. 24, 2026
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	RADIALL	TESTPRO 3	182287	Apr. 11, 2025	Semi-Annual	Oct. 11, 2025
Coaxial Cable	RADIALL	TESTPRO 3	182288	Apr. 11, 2025	Semi-Annual	Oct. 11, 2025
Coaxial Cable	RADIALL	TESTPRO 3	182291	Apr. 11, 2025	Semi-Annual	Oct. 11, 2025
Coaxial Cable	RF ONE	NMST-13A26-NMST-5m	TPC2402190004	Apr. 08, 2025	Semi-Annual	Oct. 08, 2025
Coaxial Cable	RF ONE	NMST-13A26-NMST-10m	TPC2402190001	Apr. 08, 2025	Semi-Annual	Oct. 08, 2025

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 22		
Section(s) in FCC	**Test Item**	**Result**
§2.1046 §22.913(a)(5)	E.R.P. / E.I.R.P.	Pass
§2.1053 §22.917(a)	Radiated Spurious Emissions	Pass
§2.1046	Conducted Output Power	Pass
§2.1049	Occupied Bandwidth	Pass
§22.913(d)	Peak-Average Ratio	Pass
§2.1051 §22.917(a)	Spurious Emission at Antenna Terminal	Pass
§22.917(a)	Band Edge	Pass
§2.1055 §22.355	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 (dBμV) + 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. Worst Case Configuration and Mode

GSM

Output power measurements were measured on GSM, GPRS, EDGE Mode. All testing was performed using GSM and EDGE mode, except frequency stability, spurious radiated emission spurious and emission at antenna terminal were tested only GSM mode as worst case. The worst-case is based on the average conducted output power measurement investigation results.

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

WCDMA

WCDMA mode, Output power measurements were measured on RMC, HSDPA, HSUPA, DC-HSDPA and HSPA+ Modulation. All testing was performed using RMC and HSDPA modulations, except radiated spurious emission and emission at antenna terminal were tested only RMC modulation as worst case. The worst-case is based on the average conducted output power measurement investigation results.

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			Modulation		
		Low	Mid	High	VOICE	GPRS	EGPRS
Conducted Output Power	GSM 850	V	V	V	V	V	V
Frequency Stability		-	V	-	V	-	-
Occupied Bandwidth		V	V	V	V	-	V
Peak to Average Ratio		V	V	V	V	-	V
Band Edge		V	-	V	V	-	V
Spurious Emission at Antenna Terminal & Radiated Spurious Emissions		V	V	V	Worst case		

Test Items	Band	Test Channel			Modulation			
		Low	Mid	High	RMC	HSUPA	HSDPA	HSPA+
Conducted Output Power	WCDMA V	V	V	V	V	V	V	V
Frequency Stability		-	V	-	V	-	-	-
Occupied Bandwidth		V	V	V	V	-	V	-
Peak to Average Ratio		V	V	V	V	-	V	-
Band Edge		V	-	V	V	-	V	-
Spurious Emission at Antenna Terminal & Radiated Spurious Emissions		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	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	3.40 dB
	V	3.40 dB
Radiated Emission, below 1 GHz	H	4.60 dB
	V	5.00 dB
Radiated Emission, above 1 GHz	H	3.60 dB
	V	3.60 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-RTL005959	2025.04.23	Initial

1.13. Emission Designator and Max Power

GSM

Band	Modulation	Low Freq. (㎒)	Upper Freq. (㎒)	Conducted Power (㏈m)	Ant. Gain (㏈i)	E.R.P. / E.I.R.P. Average (㏈m)	E.R.P. / E.I.R.P. Average (W)	Emission Designator
GSM 850	VOICE	824.2	848.8	34.72	-1.12	31.45	1.396	246KGXW
	EDGE			28.57		25.30	0.339	245KG7W

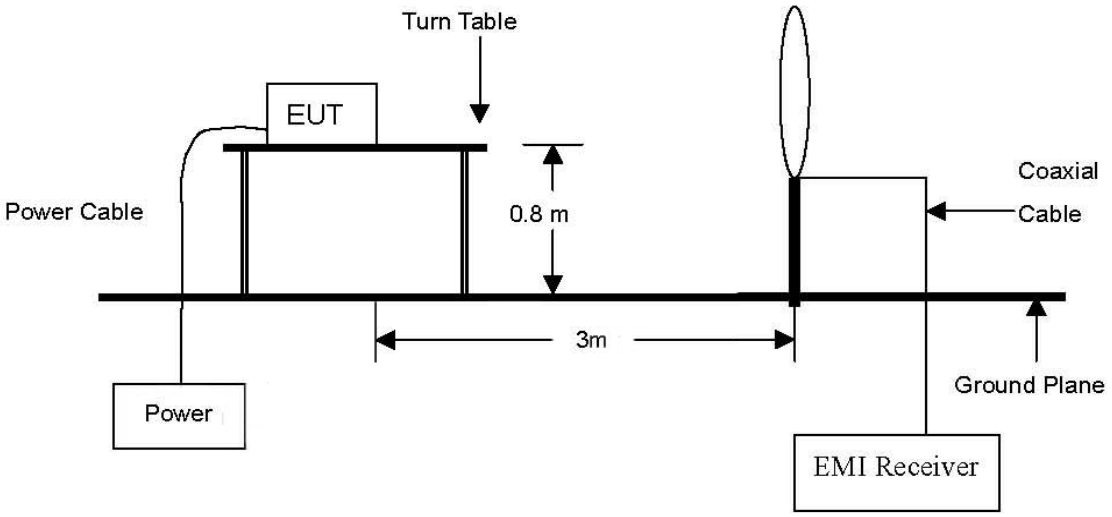
WCDMA

Band	Modulation	Low Freq. (㎒)	Upper Freq. (㎒)	Conducted Power (㏈m)	Ant. Gain (㏈i)	E.R.P. / E.I.R.P. Average (㏈m)	E.R.P. / E.I.R.P. Average (W)	Emission Designator
WCDMA Ⅴ	RMC	826.4	846.6	24.81	-1.12	21.54	0.143	4M16F9W
	HSDPA			23.81		20.54	0.113	4M16F9W

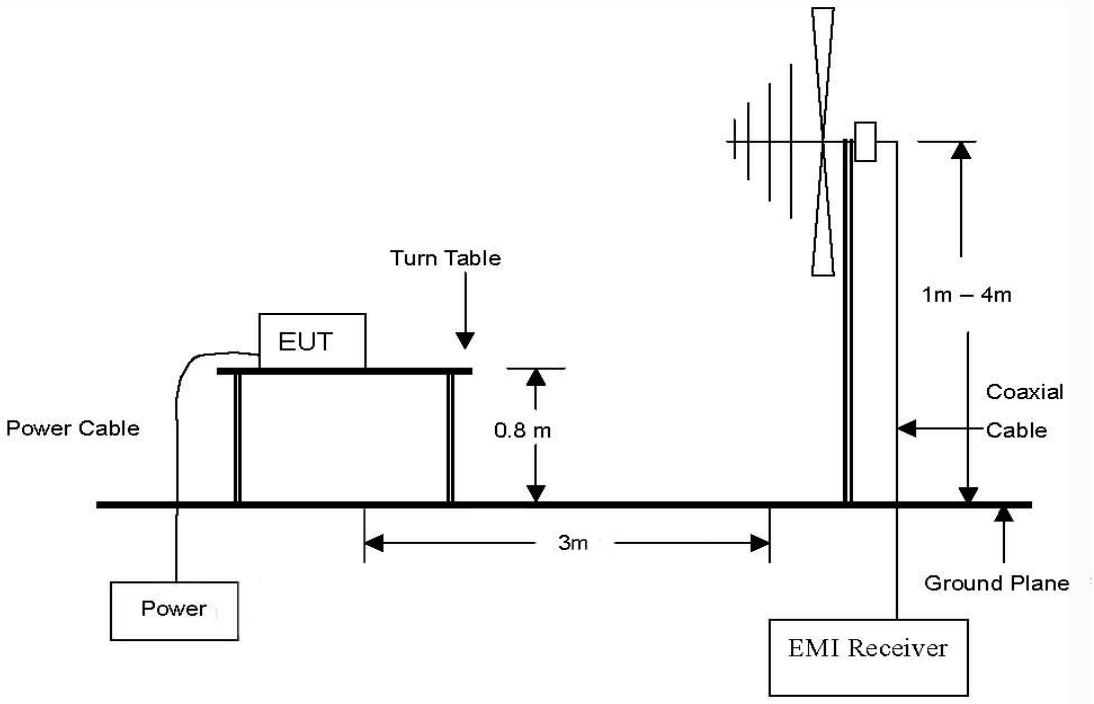
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test setup

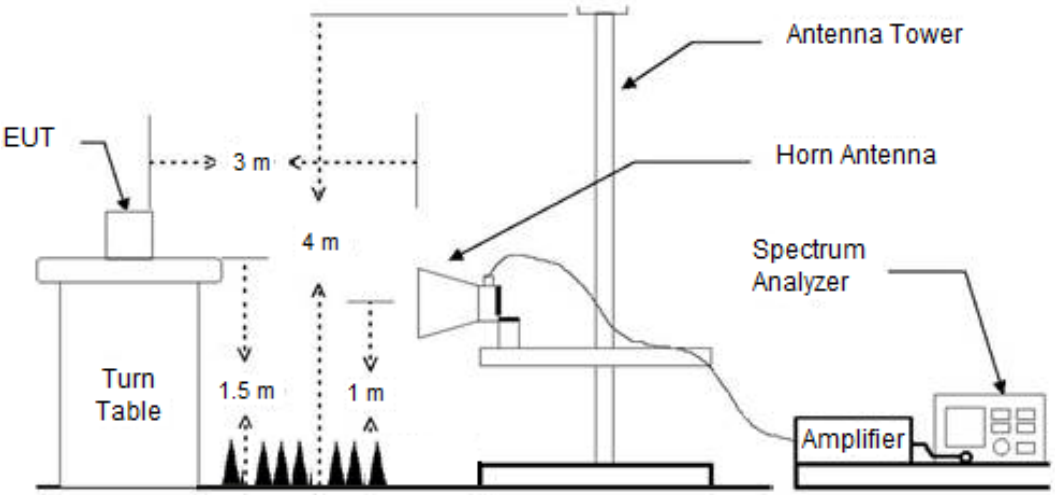
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒.



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 the tenth harmonic of the highest fundamental frequency or to 40 ㎓, 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.

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 + 10log(P) ㏈.

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 ㏈W or ㏈m);
P_{Meas} = measured transmitter output power or PSD, in ㏈m or ㏈W;
G_T = gain of the transmitting antenna, in ㏈d (ERP) or ㏈i (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 ㎑ for emissions below 1 ㎓ and 1 ㎒ for emissions above 1 ㎓, 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 ± 2 %

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

GSM

Band	Frequency (㎒)	Maximum Conducted Average Power (㏈m)	Maximum Conducted Average Power (W)	Antenna Gain (㏈i)	Maximum E.I.R.P. (㏈m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (㏈m)	Maximum E.R.P. (W)	Limit
GSM 850	824 ~ 849	34.72	2.965	-1.12	33.60	2.291	31.45	1.396	7 W E.R.P.

WCDMA

Band	Frequency (㎒)	Maximum Conducted Power (㏈m)	Maximum Conducted Power (W)	Antenna Gain (㏈i)	Maximum E.I.R.P. (㏈m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (㏈m)	Maximum E.R.P. (W)	Limit
WCDMA Ⅴ	824 ~ 849	24.81	0.303	-1.12	23.69	0.234	21.54	0.143	7 W E.R.P

Remark;

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

2.4.2. Radiated Spurious Emissions

GSM 850

Frequency (㎒)	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 (824.2 ㎒)									
1 648.49	63.79	H	25.79	-39.51	50.07	-97.41	**-47.34**	-13	34.34
1 648.46	58.30	V	25.79	-39.51	44.58	-97.41	-52.83	-13	39.83
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (836.6 ㎒)									
1 673.34	61.29	H	26.22	-39.43	48.08	-97.41	-49.33	-13	36.33
1 673.21	58.26	V	26.22	-39.43	45.05	-97.41	-52.36	-13	39.36
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-
High Channel (848.8 ㎒)									
1 697.79	58.98	H	26.66	-39.11	46.53	-97.41	-50.88	-13	37.88
1 697.74	56.82	V	26.66	-39.11	44.37	-97.41	-53.04	-13	40.04
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-

WCDMA V

Frequency (㎒)	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 (826.4 ㎒)									
1 651.00	53.72	H	25.82	-39.51	40.03	-97.41	**-57.38**	-13	44.38
1 650.48	48.99	V	25.81	-39.51	35.29	-97.41	-62.12	-13	49.12
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (836.6 ㎒)									
1 675.10	52.37	H	26.25	-39.41	39.21	-97.41	-58.20	-13	45.20
1 674.86	49.27	V	26.25	-39.42	36.10	-97.41	-61.31	-13	48.31
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-
High Channel (846.6 ㎒)									
1 695.60	49.83	H	26.62	-39.14	37.31	-97.41	-60.10	-13	47.10
1 694.52	49.52	V	26.60	-39.16	36.96	-97.41	-60.45	-13	47.45
Above 1 700.00	Not detected	-	-	-	-	-	-	-	-

Remark;

1. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.
2. E (dBμV/m) = Measured Level (dBμV) + Antenna Factor (dB/m) + AMP (dB) + Cable Loss (dB).
3.. 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.
4. CF (dB) = 20 log D - 104.8; where D is the measurement distance in meters, According to ANSI C63.26-2015 5.2.7 and KDB 971168 D01 v03r01 5.8.4.
5. 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

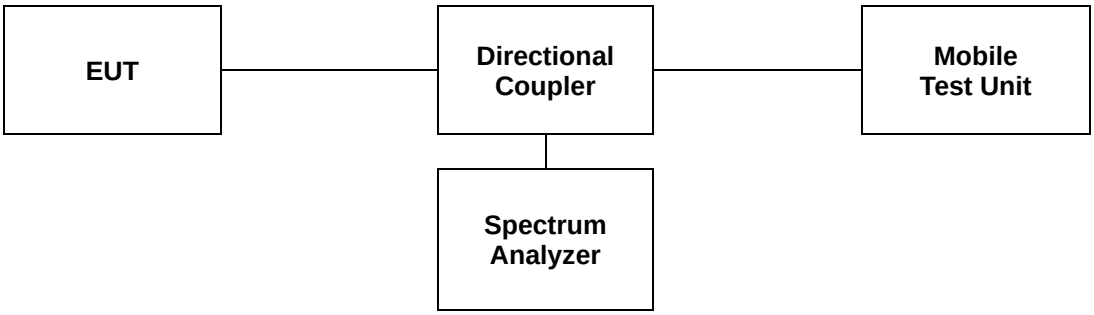
3.1. Limit

CFR 47, Section FCC §2.1046.

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 of each 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 Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

GSM 850									
Ant. Gain					-1.12 dBi				
Limit: 7W ERP									
Mode		128 (824.2 MHz)		190 (836.6 MHz)		251 (848.8 MHz)		E.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
VOICE		**34.72**	**2.965**	34.67	2.931	34.31	2.698	31.45	1.396
GPRS	1 Tx slot	**34.66**	**2.924**	34.56	2.858	34.31	2.698	31.39	1.377
	2 Tx slot	32.56	1.803	32.32	1.706	32.30	1.698		
	3 Tx slot	30.29	1.069	30.11	1.026	30.17	1.040		
	4 Tx slot	29.18	0.828	28.92	0.780	28.85	0.767		
EGPRS	1 Tx slot	28.57	0.719	28.35	0.684	28.15	0.653		
	2 Tx slot	27.99	0.630	27.74	0.594	27.47	0.558		
	3 Tx slot	27.31	0.538	27.11	0.514	27.08	0.511		
	4 Tx slot	26.35	0.432	26.13	0.410	26.02	0.400		

WCDMA V									
Ant. Gain				-1.12 dBi					
Limit: 7W ERP									
Mode	3GPP 34.121 Subtest	4132 (826.4 MHz)		4183 (836.6 MHz)		4233 (846.6 MHz)		E.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
Release 99	12.2 Kbps RMC	24.70	0.295	**24.81**	**0.303**	24.75	0.299	21.54	0.143
HSDPA	Subtest 1	23.63	0.231	23.67	0.233	**23.81**	**0.240**	20.54	0.113
	Subtest 2	23.66	0.232	23.66	0.232	23.73	0.236		
	Subtest 3	23.11	0.205	23.15	0.207	23.11	0.205		
	Subtest 4	23.16	0.207	23.06	0.202	23.08	0.203		
HSUPA	Subtest 1	23.78	0.239	23.53	0.225	23.33	0.215		
	Subtest 2	21.25	0.133	21.71	0.148	21.64	0.146		
	Subtest 3	22.63	0.183	22.67	0.185	22.57	0.181		
	Subtest 4	21.56	0.143	21.54	0.143	21.63	0.146		
	Subtest 5	23.63	0.231	23.64	0.231	23.51	0.224		
DC-HSDPA	Subtest 1	23.63	0.231	23.65	0.232	23.29	0.213		
	Subtest 2	23.51	0.224	23.43	0.220	23.35	0.216		
	Subtest 3	23.13	0.206	23.05	0.202	23.11	0.205		
	Subtest 4	23.12	0.205	23.09	0.204	23.09	0.204		
HSPA+		23.36	0.217	23.45	0.221	23.29	0.213		

4. Occupied Bandwidth

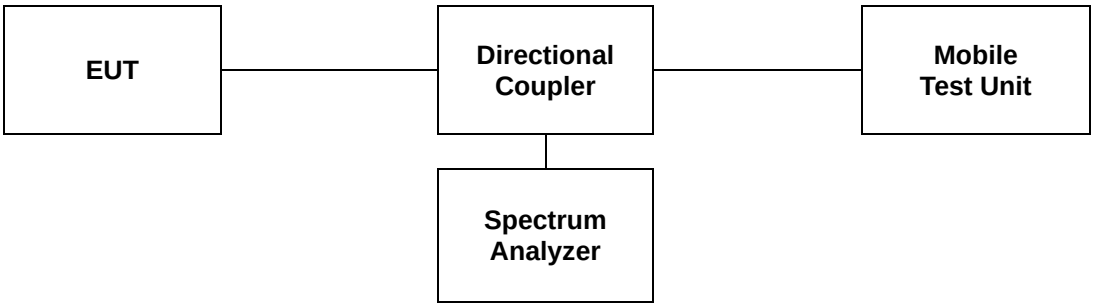
4.1. Limit

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 × 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

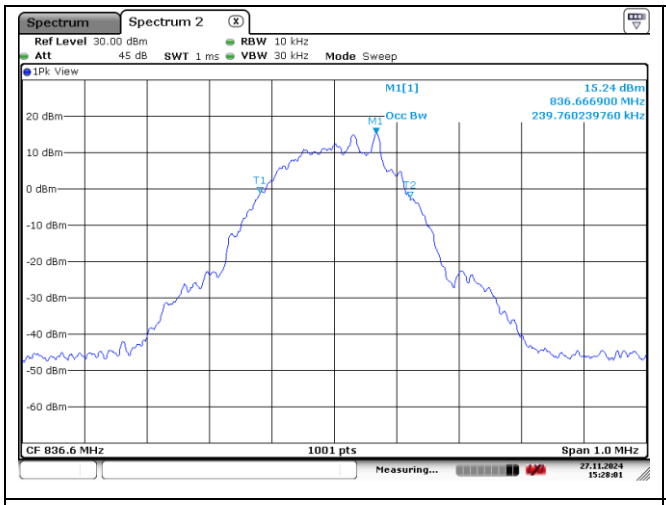
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
GSM 850	VOICE	824.2	0.246
	EDGE		0.245
	VOICE	836.6	0.240
	EDGE		0.240
	VOICE	848.8	0.246
	EDGE		0.245

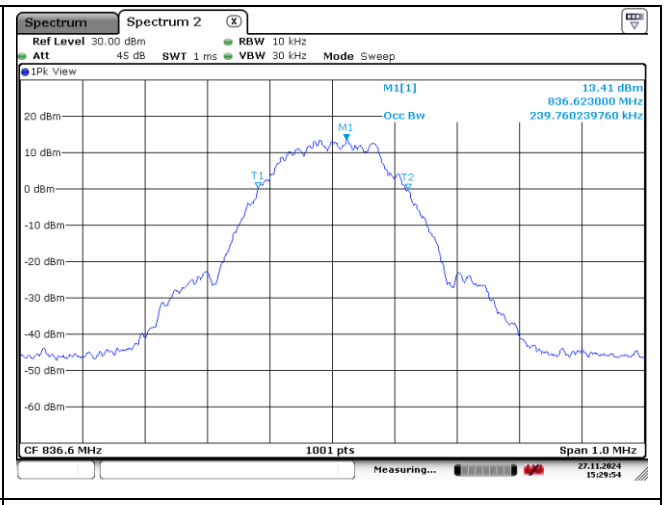
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
WCDMA Ⅴ	RMC	826.4	4.156
	HSDPA		4.156
	RMC	836.6	4.146
	HSDPA		4.146
	RMC	846.6	4.146
	HSDPA		4.146

- Test plots

GSM 850

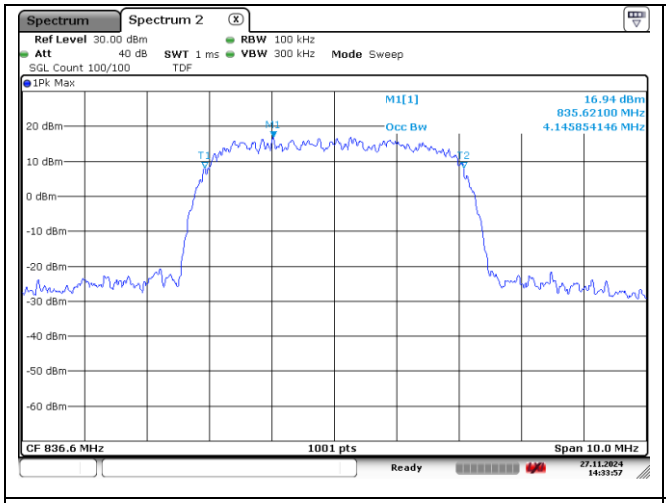


GSM 850 VOICE Middle Channel

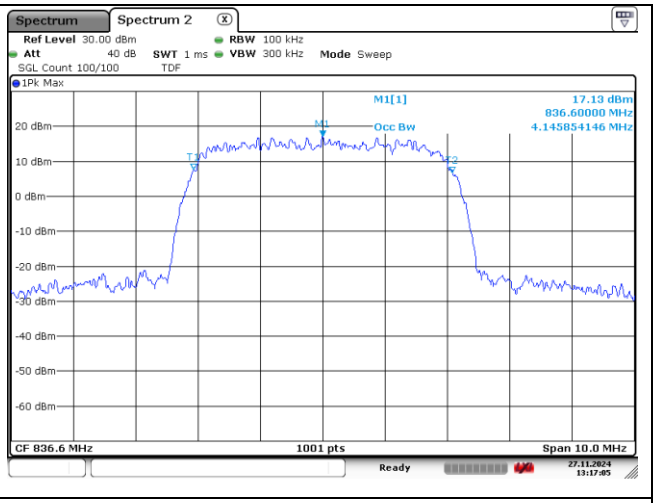


GSM 850 EDGE Middle Channel

WCDMA Ⅴ



WCDMA Ⅴ RMC Middle Channel



WCDMA Ⅴ HSDPA Middle Channel

5. Peak-Average Ratio

5.1. Limit

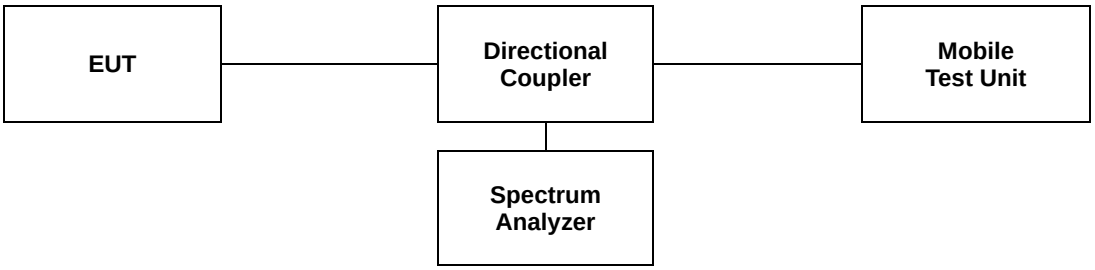
- §22.913(d) measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

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 ≥ 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 x (number of points in sweep) x (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 form the sum of the PAPR value from step d) to the measured average power.



5.3 Test Results

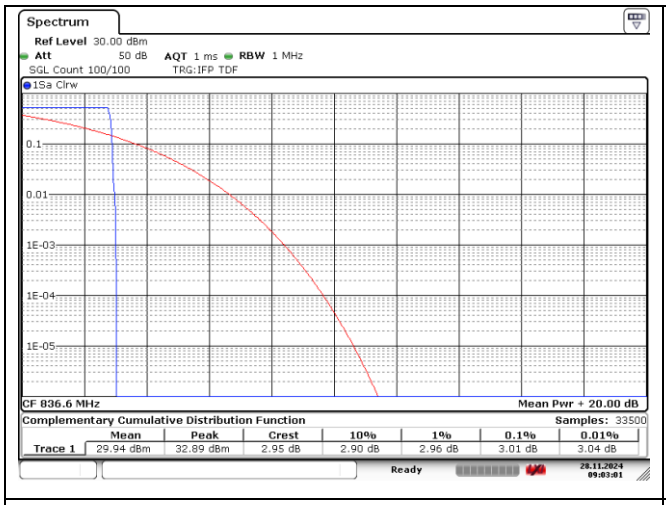
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

Band	Mode	Frequency (㎒)	PAR (㏈)
GSM 850	VOICE	824.2	2.99
		836.6	3.01
		848.8	2.99
	EDGE	824.2	3.01
		836.6	3.01
		848.8	3.01

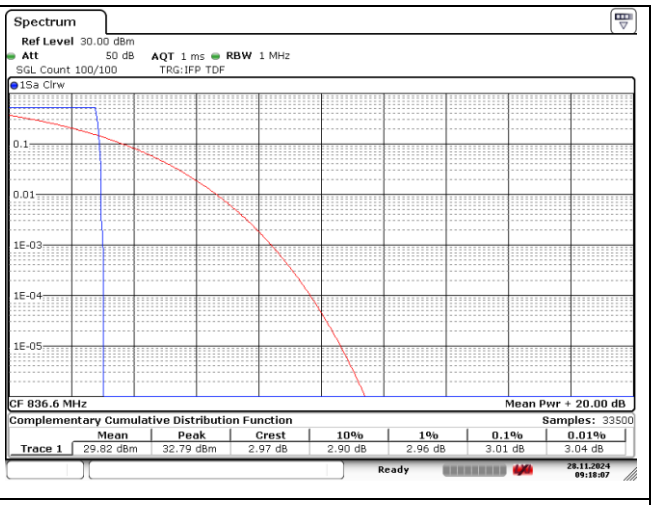
Band	Mode	Frequency (㎒)	PAR (㏈)
WCDMA Ⅴ	RMC	826.4	3.16
		836.6	3.04
		846.6	3.16
	HSDPA	826.4	3.13
		836.6	3.04
		846.6	3.19

- Test plots

GSM 850

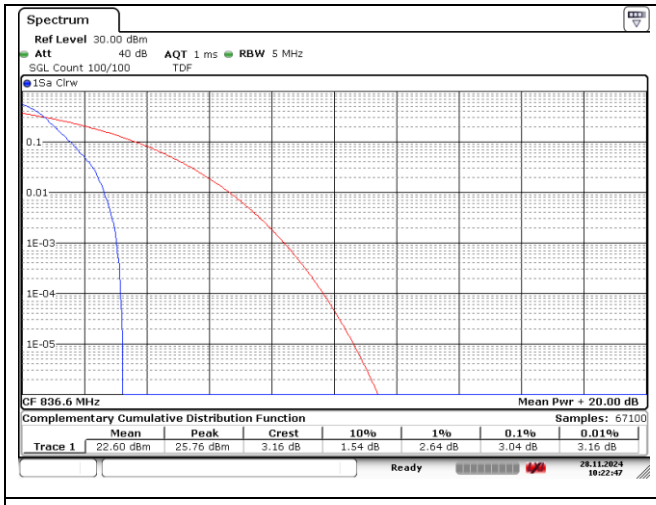


GSM 850 VOICE Middle Channel

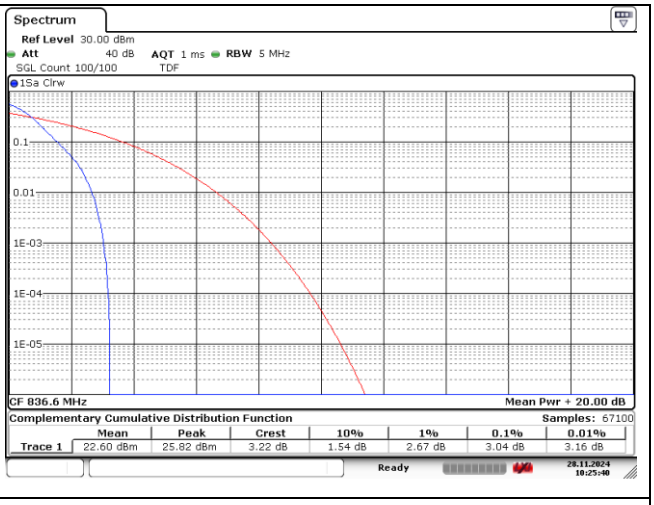


GSM 850 EDGE Middle Channel

WCDMA Ⅴ



WCDMA Ⅴ RMC Middle Channel



WCDMA Ⅴ HSDPA Middle Channel

6. Spurious Emissions at Antenna Terminal

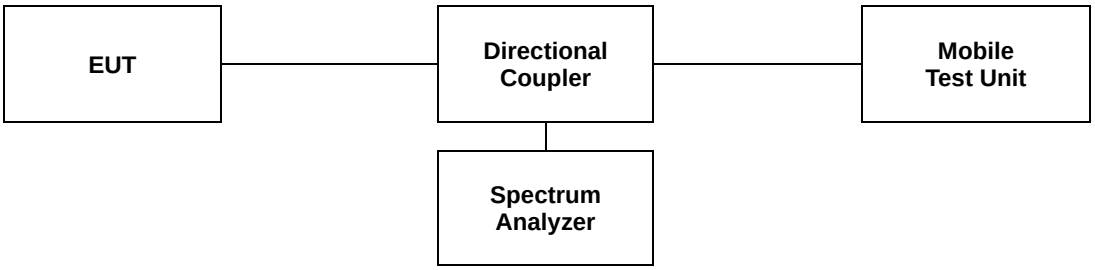
6.1. Limit

- §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 + 10log(P) ㎤.

6.2. 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 10 ㎓, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

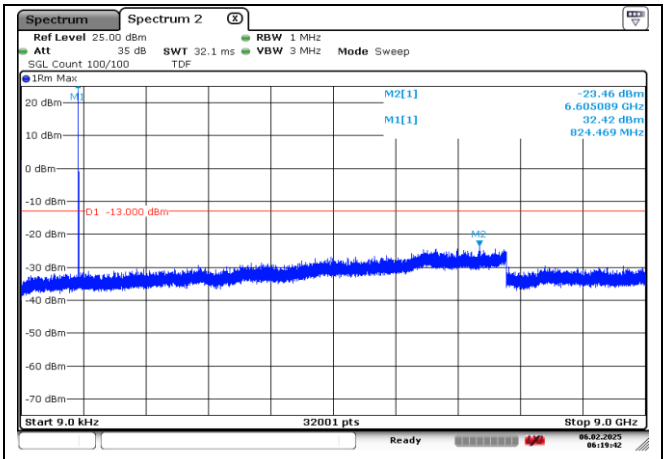
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and frequencies greater than 1 ㎓. However, in the 1 ㎒ bands immediately outside and adjacent to the frequency block a resolution 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

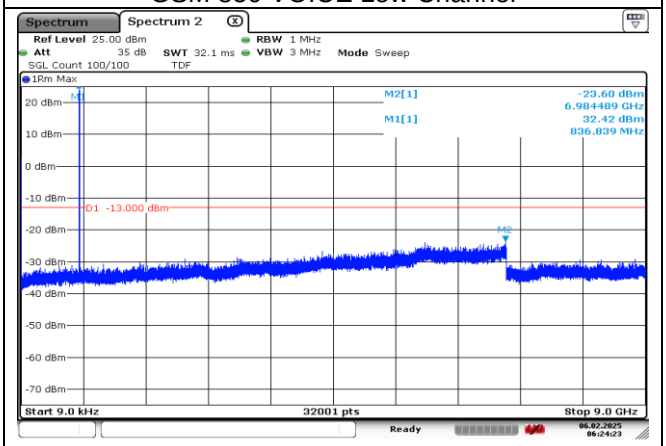
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

- Test plots

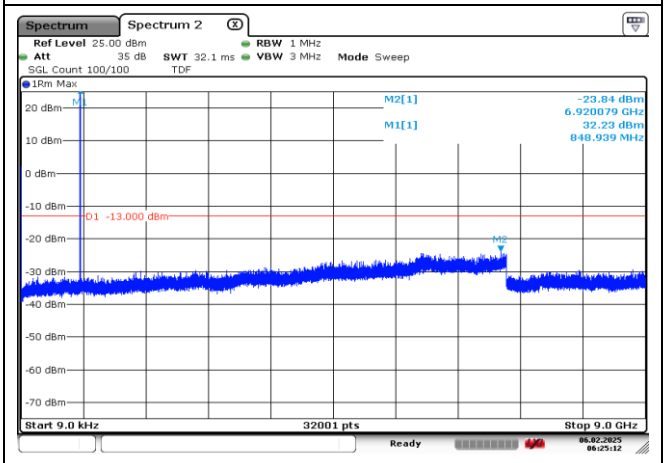
GSM 850



GSM 850 VOICE Low Channel

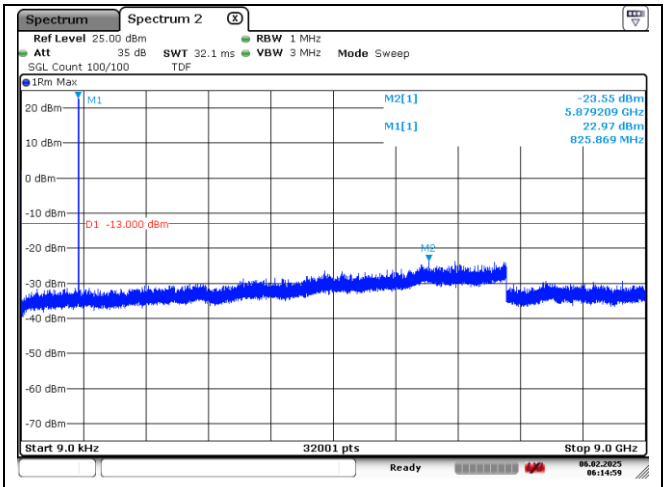


GSM 850 VOICE Middle Channel

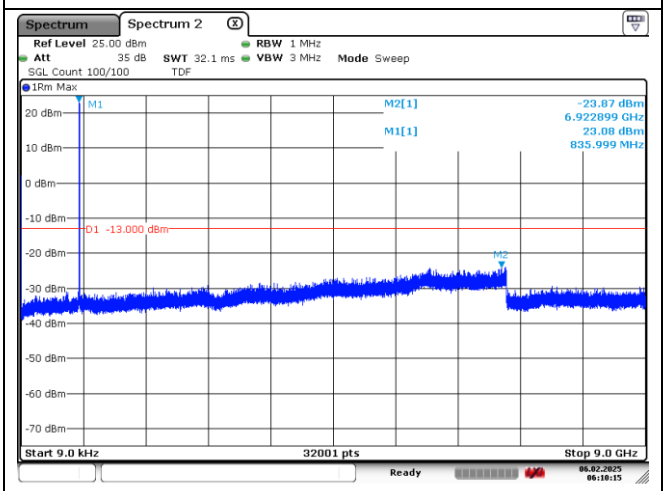


GSM 850 VOICE High Channel

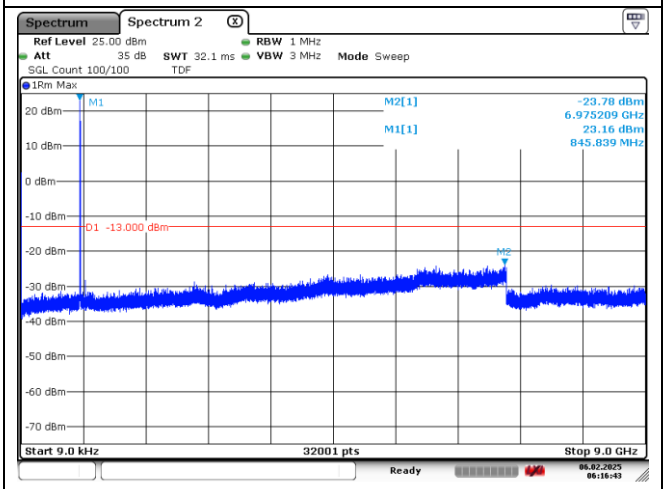
WCDMA Ⅴ



WCDMA Ⅴ RMC Low channel



WCDMA Ⅴ RMC Middle channel



WCDMA Ⅴ RMC High channel

7. Band Edge

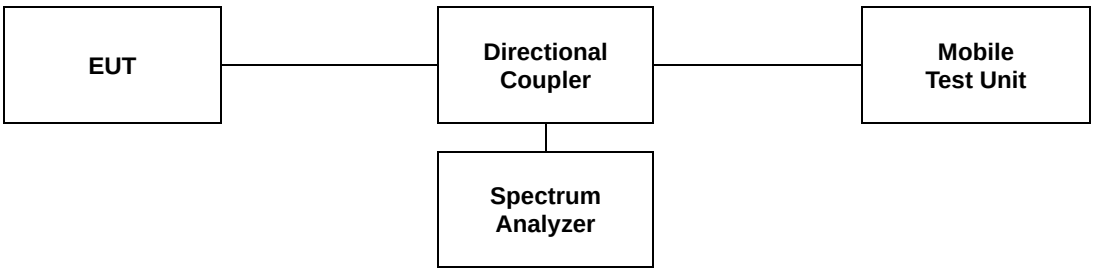
7.1. Limit

- §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 + 10log(P) ㎧.

7.2. Test Procedure

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

a. Span was set large enough so as to capture all out of band emissions near the band edge.
b. RBW ≥ 1 % of OBW
c. VBW ≥ 3 x RBW.
d. Detector = RMS.
e. Trace mode = Average.
f. Sweep time = Auto.
g. The trace was allowed to stabilize.
h. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.

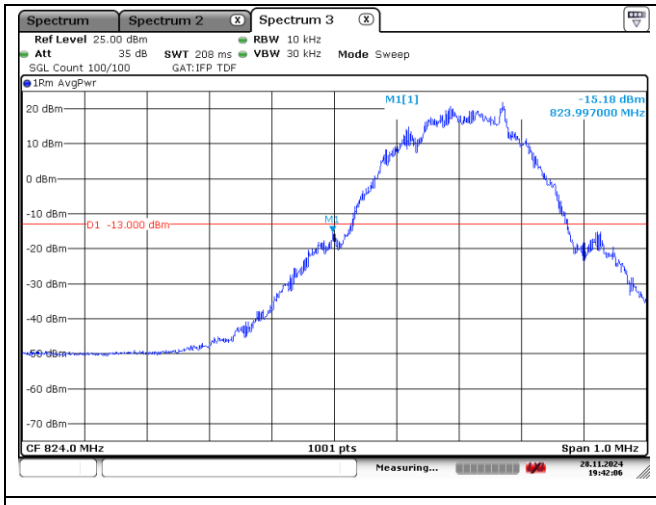


7.3. Test Results

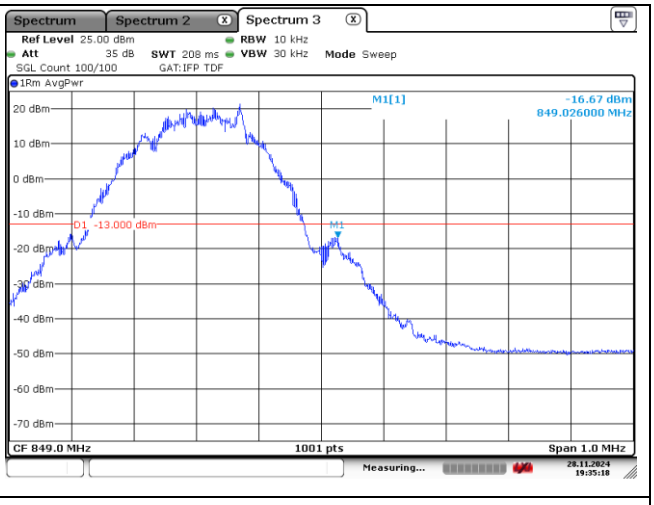
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

- Test plots

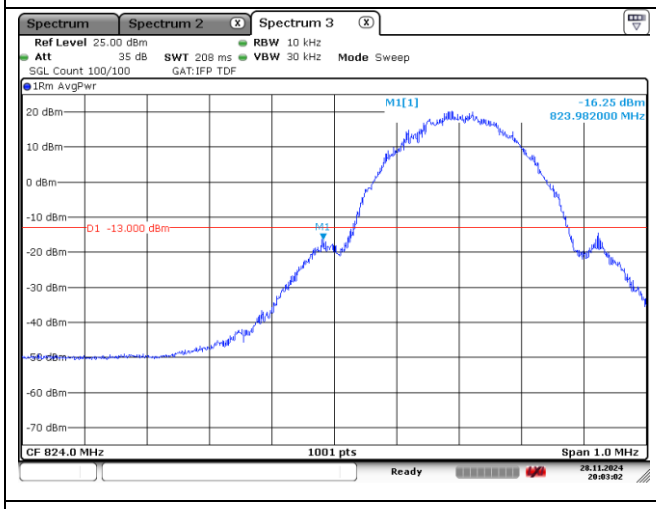
GSM 850



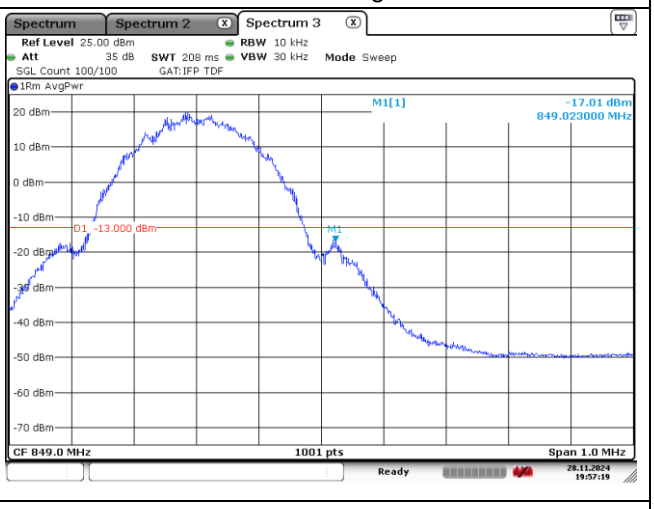
GSM 850 VOICE Low Channel



GSM 850 VOICE High Channel

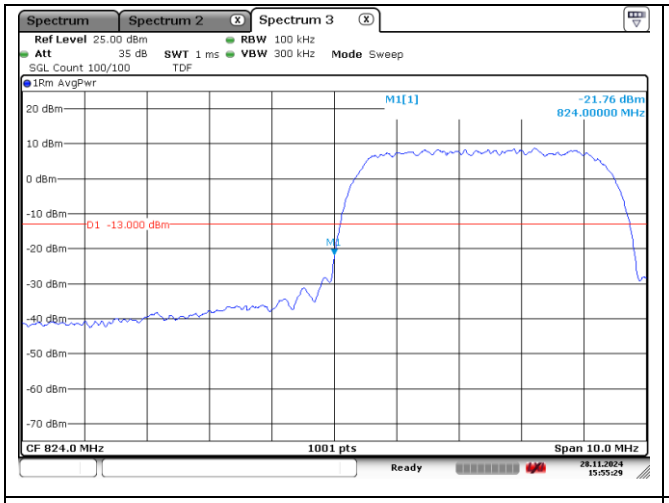


GSM 850 EDGE Low Channel

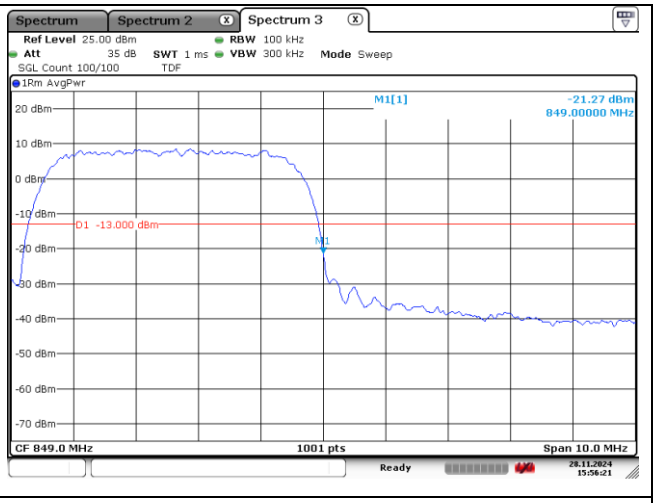


GSM 850 EDGE High Channel

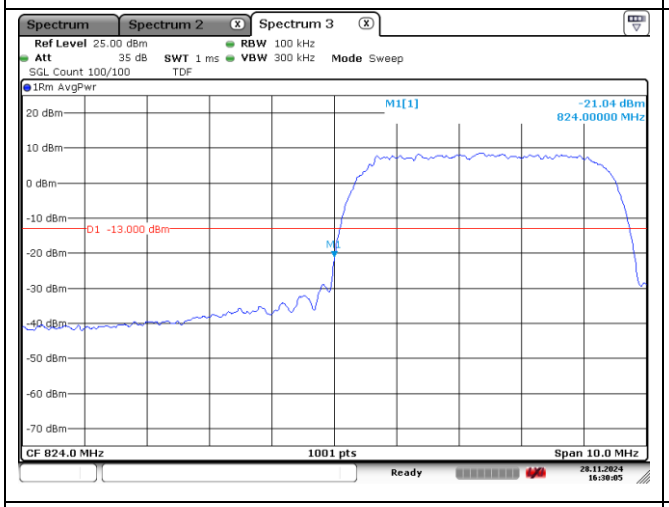
WCDMA Ⅴ



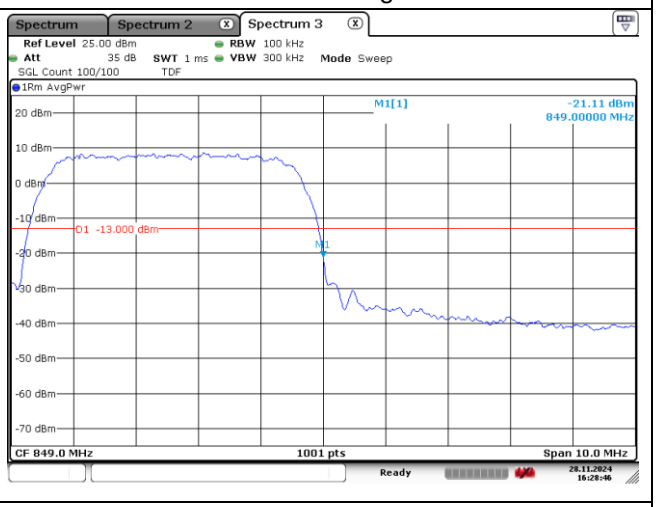
WCDMA Ⅴ RMC Low Channel



WCDMA Ⅴ RMC High Channel



WCDMA Ⅴ HSDPA Low Channel



WCDMA Ⅴ HSDPA High Channel

8. Frequency Stability

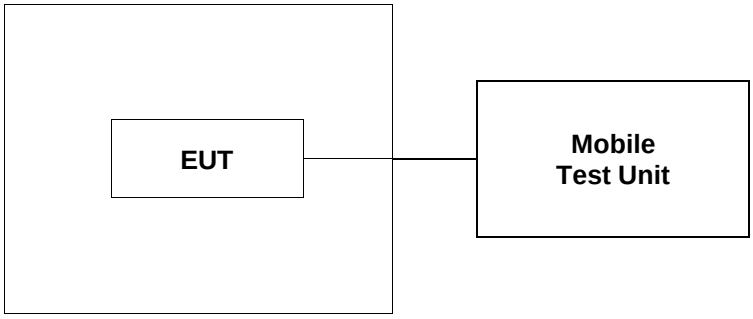
8.1. Limit

- § 2.1055 (a), § 2.1055 (d) & following:

- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.
For Mobile devices operating in the 824 to 849 ㎒ band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



8.3. Test Results

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

GSM 850 mode at middle channel

Reference Frequency: 836.6 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	12.00	-2.50	-0.004 54
40		-1.40	-0.003 23
30		-1.70	-0.003 59
23(Ref.)		1.30	-
10		2.30	0.001 20
0		0.80	-0.000 60
-10		1.50	0.000 24
-20		1.00	-0.000 36
-30		1.80	0.000 60
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	10.20 (85%)	1.10	-0.000 24
	13.80 (115%)	1.60	0.000 36

WCDMA Ⅴ mode at middle channel

Reference Frequency: 836.6 ㎒			
Frequency Stability versus Temperature			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
50	12.00	-1.90	-0.002 99
40		-1.40	-0.002 39
30		-0.80	-0.001 67
20(Ref.)		0.60	-
10		1.30	0.000 84
0		1.60	0.001 20
-10		-1.10	-0.002 03
-20		-2.30	-0.003 47
-30		-1.90	-0.002 99
Frequency Stability versus Power Supply			
Environment Temperature (℃)	**Power Supplied (V)**	**Frequency Measure with Time Elapse**	
		Frequency Error (㎐)	**ppm**
20	10.20 (85%)	1.00	0.000 48
	13.80 (115%)	0.80	0.000 24

- End of the Test Report -