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, Part 22 Subpart C/H,
Part 24 Subpart E and Part 27 Subpart C
IC RSS-Gen Issue 5, RSS-132 Issue 4, RSS-133 Issue 7
and RSS-139 Issue 4

FCC ID: : BEJTM13LNNAJL0
IC Certification: 2703H-TM13LNNAJL0

Equipment Under Test	:	Telematics Module
Model Name	:	TM13LNNAJL0
Applicant	:	FCC: LG Electronics USA, Inc. IC: LG ELECTRONICS INC.
Manufacturer	:	LG Electronics Inc.
Date of Receipt	:	2024.09.13
Date of Test(s)	:	2024.11.08 ~ 2025.02.07
Date of Issue	:	2025.03.14

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.
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Tested by: Youngbin Kim

Technical Manager: Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

INDEX

Table of Contents Page

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, Inc.
FCC Address : 111 Sylvan Avenue,North Building,Englewood Cliff,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 : Cho, Hee-jae
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	TM13LNNAJL0
Serial Number	Conducted: TM13LNNAJL0_1 Radiated: TM13LNNAJL0_2
Power Supply	DC 3.90 V
Rated Power	GSM 850: 33 ㏈m GSM 1900 : 30 ㏈m WCDMA Ⅱ, Ⅳ, Ⅴ : 23 ㏈m
Frequency Range	GSM 850 : 824 ㎒ ~ 849 ㎒ GSM 1900 : 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅱ : 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅳ : 1 710 ㎒ ~ 1 755 ㎒ WCDMA Ⅴ : 824 ㎒ ~ 849 ㎒
Modulation Technique	QPSK, 16QAM, GMSK, 8PSK
Antenna Type	PIFA
Antenna Gain※	824 ㎒ ~ 849 ㎒: -1.12 ㏈i 1 710 ㎒ ~ 1 755 ㎒: 1.25 ㏈i 1 850 ㎒ ~ 1 910 ㎒: 2.51 ㏈i
H/W Version	Rev1.0
S/W Version	JT25XE02
FVIN	N/A

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	101004	Dec. 18, 2024	Annual	Dec. 18, 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	R&S	CMW500	144035	Feb. 06, 2025	Annual	Feb. 06, 2026
Temperature Chamber	ESPEC CORP.	PL-2J	15004184	Jun. 03, 2024	Annual	Jun. 03, 2025
Directional Coupler	KRYTAR	152613	122661	Feb. 24, 2025	Annual	Feb. 24, 2026
BRIDGE Coupler	MARK MICROWAVE INC	CBR16-0012	1542	May 13, 2024	Annual	May 13, 2025
Power Sensor	Anritsu	MA2411B	1207272	May 29, 2024	Annual	May 29, 2025
Power Meter	Anritsu	ML2495A	1223004	May 29, 2024	Annual	May 29, 2025
High Pass Filter	Wainwright Instrument GmbH	WHNX10-900-1000-18000-40-SS	7	Feb. 27, 2024	Annual	Feb. 27, 2025
High Pass Filter	Wainwright Instrument GmbH	WHKX3.0/18G-10SS	21	Jun. 07, 2024	Annual	Jun. 07, 2025
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	Oct. 16, 2024	Annual	Oct. 16, 2025
Preamplifier	H.P.	8447F	2944A03909	Aug. 09, 2024	Annual	Aug. 09, 2025
Preamplifier	R&S	SCU 18F	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	Aug. 21, 2023	Biennial	Aug. 21, 2025
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	9163-396	Apr. 02, 2024	Biennial	Apr. 02, 2026
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	Oct. 11, 2024	Semi-Annual	Apr. 11, 2025
Coaxial Cable	RADIALL	TESTPRO 3	182288	Oct. 11, 2024	Semi-Annual	Apr. 11, 2025
Coaxial Cable	RADIALL	TESTPRO 3	182291	Oct. 11, 2024	Semi-Annual	Apr. 11, 2025
Coaxial Cable	RF ONE	NMST-13A26-NMST-5m	TPC2402190004	Oct. 04, 2024	Semi-Annual	Apr. 04, 2025
Coaxial Cable	RF ONE	NMST-13A26-NMST-10m	TPC2402190001	Oct. 04, 2024	Semi-Annual	Apr. 04, 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 2,22,24 and 27/ IC RSS-Gen Issue 5, RSS-132 Issue 4, RSS-133 Issue 7 and RSS-139 Issue 4			
Section(s) in FCC	**Section(s) in IC**	**Test Item**	**Result**
§2.1046 §22.913(a)(5) §24.232(c) §27.50(d)(4)	RSS-132 Issue 4 5.4 RSS-133 Issue 7 5.5 RSS-139 Issue 4 5.5	E.R.P. / E.I.R.P.	Pass
§2.1053 §22.917(a) §24.238(a) §27.53(h)(1)	RSS-132 Issue 4 5.5 RSS-133 Issue 7 5.6 RSS-139 Issue 4 5.6	Radiated Spurious Emissions	Pass
§2.1046	RSS-Gen Issue 5 6.12	Conducted Output Power	Pass
§2.1049	RSS-Gen Issue 5 6.7	Occupied Bandwidth	Pass
§22.913(d) §24.232(d) §27.50(d)(5)	RSS-132 Issue 4 5.4 RSS-133 Issue 7 5.5 RSS-139 Issue 4 5.5	Peak-Average Ratio	Pass
§2.1051 §22.917(a) §24.238(a) §27.53(h)(1)	RSS-132 Issue 4 5.5 RSS-133 Issue 7 5.6 RSS-139 Issue 4 5.6	Spurious Emission at Antenna Terminal	Pass
§22.917(a) §24.238(a) §27.53(h)(1)	RSS-132 Issue 4 5.5 RSS-133 Issue 7 5.6 RSS-139 Issue 4 5.6	Band Edge and Emission Mask	Pass
§2.1055 §22.355 §24.235 §27.54	RSS-Gen Issue 5 6.11 RSS-132 Issue 4 5.3 RSS-133 Issue 7 5.4 RSS-139 Issue 4 5.4	Frequency Stability	Pass

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. Worst Case Configuration and Mode

GSM

Output power measurements were measured on VOICE, GPRS and EGPRS 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.

1.9. 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
	GSM 1900	V	V	V	V	V	V
Frequency Stability	GSM 850	-	V	-	V	-	-
	GSM 1900	-	V	-	V	-	-
Occupied Bandwidth	GSM 850	V	V	V	V	-	V
	GSM 1900	V	V	V	V	-	V
Peak to Average Ratio	GSM 850	V	V	V	V	-	V
	GSM 1900	V	V	V	V	-	V
Band Edge	GSM 850	V	-	V	V	-	V
	GSM 1900	V	-	V	V	-	V
Spurious Emission at Antenna Terminal & Radiated Spurious Emissions	GSM 850	V	V	V	Worst case		
	GSM 1900	V	V	V	Worst case		

Test Items	Band	Test Channel			Modulation			
		Low	Mid	High	RMC	HSUPA	HSDPA	HSPA+
Conducted Output Power	WCDMA Ⅱ	V	V	V	V	V	V	V
	WCDMA Ⅳ	V	V	V	V	V	V	V
	WCDMA Ⅴ	V	V	V	V	V	V	V
Frequency Stability	WCDMA Ⅱ	-	V	-	V	-	-	-
	WCDMA Ⅳ	-	V	-	V	-	-	-
	WCDMA Ⅴ	-	V	-	V	-	-	-
Occupied Bandwidth	WCDMA Ⅱ	V	V	V	V	-	V	-
	WCDMA Ⅳ	V	V	V	V	-	V	-
	WCDMA Ⅴ	V	V	V	V	-	V	-
Peak to Average Ratio	WCDMA Ⅱ	V	V	V	V	-	V	-
	WCDMA Ⅳ	V	V	V	V	-	V	-
	WCDMA Ⅴ	V	V	V	V	-	V	-
Band Edge	WCDMA Ⅱ	V	-	V	V	-	V	-
	WCDMA Ⅳ	V	-	V	V	-	V	-
	WCDMA Ⅴ	V	-	V	V	-	V	-
Spurious Emission at Antenna Terminal & Radiated Spurious Emissions	WCDMA Ⅱ	V	V	V	Worst case			
	WCDMA Ⅳ	V	V	V	Worst case			
	WCDMA Ⅴ	V	V	V	Worst case			

1.10. 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	3.40 dB
	V	3.40 dB
Radiated Emission, below 1 ㎓	H	4.60 dB
	V	5.00 dB
Radiated Emission, above 1 ㎓	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.

1.11. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL005834	2025.03.14	Initial

1.12. Emission Designator and Max Power

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 Ⅱ	RMC	1 852.4	1 907.6	24.89	2.51	27.40	0.550	4M17F9W
	HSDPA			23.77		26.28	0.425	4M16F9W
WCDMA Ⅳ	RMC	1 712.4	1 752.6	24.87	1.25	26.12	0.409	4M15F9W
	HSDPA			23.91		25.16	0.328	4M14F9W
WCDMA Ⅴ	RMC	826.4	846.6	24.81	-1.12	21.54	0.143	4M15F9W
	HSDPA			23.91		20.64	0.116	4M14F9W

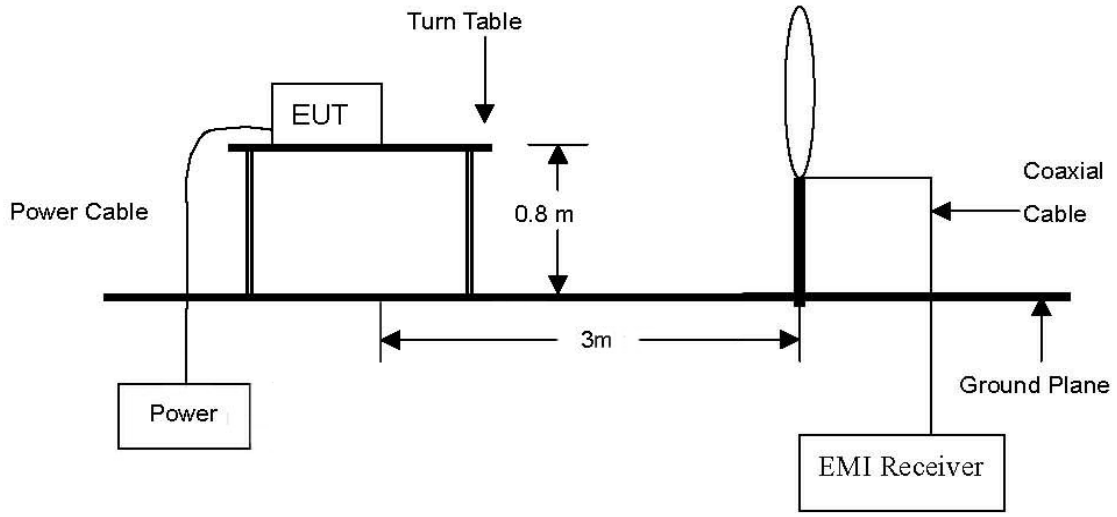
GSM

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	34.10	-1.12	30.83	1.211	243KGXW
	EDGE			27.53		24.26	0.267	248KG7W
GSM 1900	VOICE	1 850.2	1 909.8	30.25	2.51	32.76	1.888	242KGXW
	EDGE			26.73		29.24	0.839	241KG7W

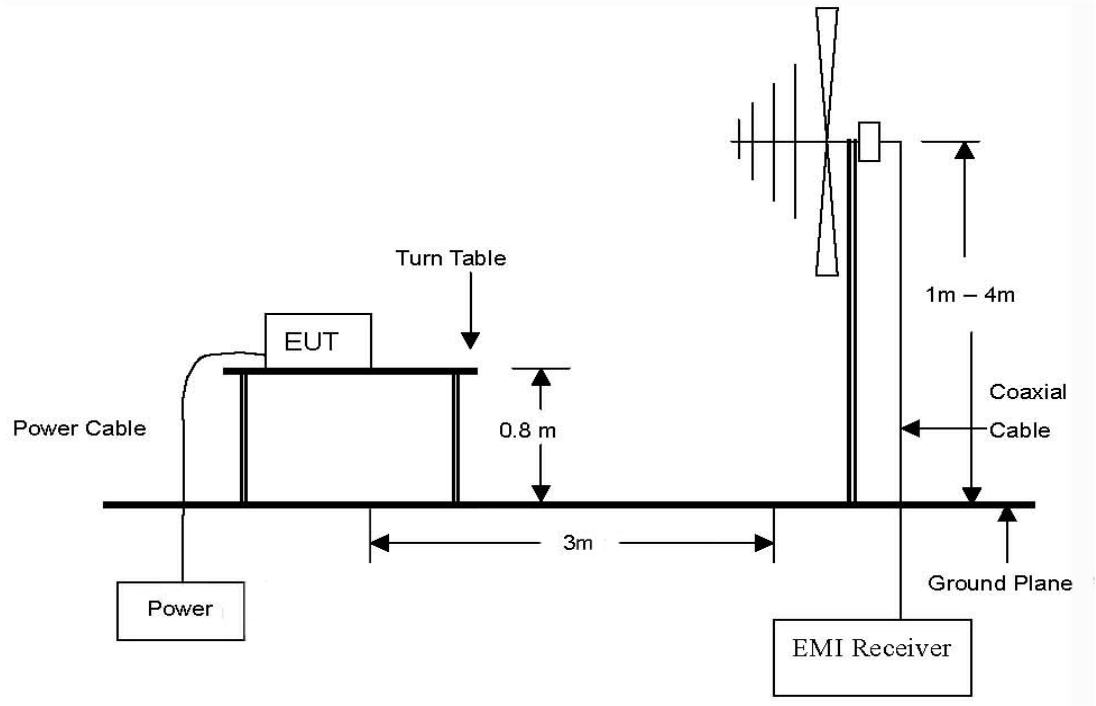
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test setup

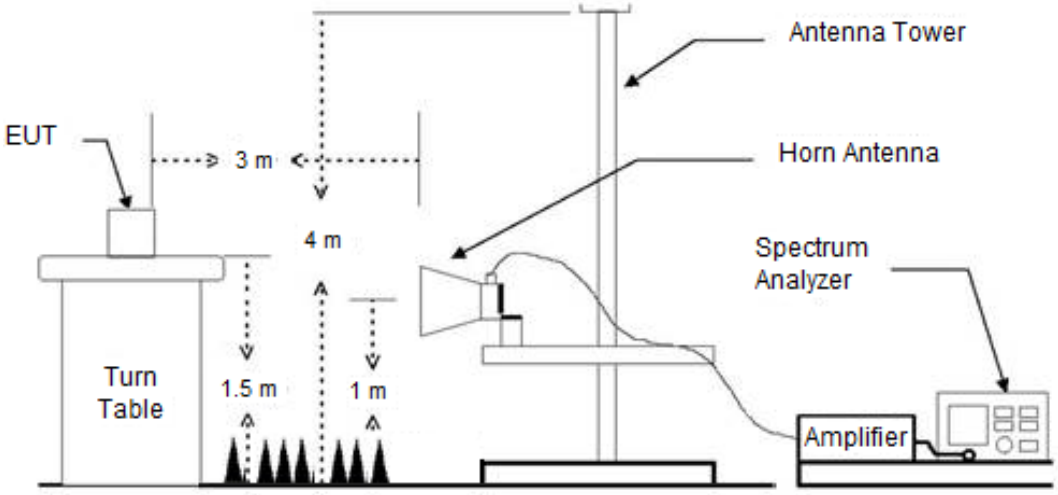
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒.



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.

FCC
- §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 for limiting power to the minimum necessary for successful communications.

- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 ㎒ band and mobile and portable stations operating in the 1 695-1 710 ㎒ and 1 755-1 780 ㎒ bands are limited to 1 watt EIRP.

IC
- RSS-132 Issue 4
5.4, The transmitter output power shall be measured in terms of average power. The equivalent radiated power (e.r.p.) shall not exceed 7 watts for mobile equipment and 3 watts for portable equipment.

- RSS-133 Issue 7
5.5, The maximum power spectral density of the equipment, measured in terms of average values, shall comply with the limits specified in table 2. These limits are either specified in terms of equivalent isotopically radiated power (e.i.r.p.) or TRP for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-510 for more deployment details in the bands 1850-1915 ㎒ and 1930-1995 ㎒.

AAS equipment with eight antenna elements or less can demonstrate compliance with the e.i.r.p limit specified for non-AAS equipment in table 2, instead of the TRP limit.

Table 2: Maximum power spectral density of equipment

Equipment type	Maximum power
Non-AAS fixed station and base station	3 280 W/㎒ e.i.r.p
AAS Fixed station and base station	46 ㏈m/㎒ TRP
Subscriber equipment	2W/channel bandwidth e.i.r.p

- RSS-139 Issue 4
5.5, The maximum output power of the equipment shall comply with the limits specified below. In the tables, maximum power refers to the equivalent isotropically radiated power (e.i.r.p.) or total radiated power (TRP), measured in terms of average values.

Table 3: Maximum power of equipment in the band 1 710-1 780 ㎒

Equipment type	Maximum power
Fixed station and base station	30 ㏈m e.i.r.p./channel bandwidth
Subscriber equipment	30 ㏈m e.i.r.p./channel bandwidth

2.2.2. Limit of Radiated Spurious Emissions

FCC

- §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) ㏈.

- §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) ㏈.

- §27.53(h)(1), for operations in the 1 695-1 710 ㎒, 1 710-1 755 ㎒, 1 755-1 780 ㎒, 1 915-1 920 ㎒, 1 995-2 000 ㎒, 2 000-2 020 ㎒, 2 110-2 155 ㎒, 2 155-2 180 ㎒, 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) ㏈.

IC

- RSS-132 Issue 4

5.5, Equipment shall meet the unwanted emission limits specified below:

(i) In the first 1.0 ㎒ band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p (㏈).

(ii) After the first 1.0 ㎒ immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 ㎑ bandwidth shall be attenuated below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p (㏈). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 ㎑ is required.

- RSS-133 Issue 7

5.6, Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified in table 3, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 ㎒ bands immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 ㎒ bands, a resolution bandwidth of 1 ㎒ shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 ㎒, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the table 3.

Table 3: Unwanted emission limits for all equipment

Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈m/(1% of OBW)
>1 ㎒	-13 ㏈m

- RSS-139 Issue 4

5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈m/(1% of OB)*
>1 ㎒	-13 ㏈m/㎒

* OB is the occupied bandwidth

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 ± 2 %

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

GSM

Band	Frequency (㎒)	Maximum Conducted Average Power (dB m)	Maximum Conducted Average 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
GSM 850	824 ~ 849	34.10	2.570	-1.12	32.98	1.986	30.83	1.211	7 W E.R.P.
GSM 1900	1 850 ~ 1 910	30.25	1.059	2.51	32.76	1.888			2 W E.I.R.P.

WCDMA

Band	Frequency (㎒)	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
WCDMA Ⅱ	1 850 ~ 1 910	24.89	0.308	2.51	27.40	0.550			2 W E.I.R.P.
WCDMA Ⅳ	1 710 ~ 1 750	24.87	0.307	1.25	26.12	0.409			1 W E.I.R.P.
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. (dB m) = Maximum Conducted Power (dB m) + 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

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 ㎒)									
1 648.53	60.06	H	25.79	-39.51	46.34	-97.41	-51.07	-13	38.07
1 648.33	56.52	V	25.79	-39.51	42.80	-97.41	-54.61	-13	41.61
2 472.63	46.76	H	28.29	-37.19	37.86	-97.41	-59.55	-13	46.55
Above 2 500.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (836.6 ㎒)									
1 673.13	59.34	H	26.22	-39.43	46.13	-97.41	-51.28	-13	38.28
1 673.24	58.96	V	26.22	-39.43	45.75	-97.41	-51.66	-13	38.66
2 509.80	47.39	H	28.44	-37.35	38.48	-97.41	-58.93	-13	45.93
Above 2 600.00	Not detected	-	-	-	-	-	-	-	-
High Channel (848.8 ㎒)									
1 697.58	61.43	H	26.66	-39.12	48.97	-97.41	**-48.44**	-13	35.44
1 697.79	58.61	V	26.66	-39.11	46.16	-97.41	-51.25	-13	38.25
2 546.67	49.14	H	28.59	-37.13	40.60	-97.41	-56.81	-13	43.81
2 546.26	52.79	-	28.59	-37.13	44.25	-97.41	-53.16	-13	40.16
Above 2 600.00	Not detected	-	-	-	-	-	-	-	-

GSM 1900

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 (1 850.2 ㎒)									
3 700.46	49.48	H	32.10	-34.43	47.15	-95.26	**-48.11**	-13	35.11
3 700.47	45.95	V	32.10	-34.43	43.62	-95.26	-51.64	-13	38.64
Above 3 800.00	Not detected	–	-	-	-	-	-	-	-
Middle Channel (1 880.0 ㎒)									
3 760.23	48.11	H	32.30	-34.40	46.01	-95.26	-49.25	-13	36.25
3 759.61	45.21	V	32.30	-34.40	43.11	-95.26	-52.15	-13	39.15
Above 3 800.00	Not detected	–	-	-	-	-	-	-	-
High Channel (1 909.8 ㎒)									
3 819.43	45.79	H	32.30	-33.75	44.34	-95.26	-50.92	-13	37.92
3 819.88	45.43	V	32.30	-33.75	43.98	-95.26	-51.28	-13	38.28
Above 3 900.00	Not detected	–	-	-	-	-	-	-	-

WCDMA Ⅱ

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 (1 852.4 ㎒)									
3 703.00	41.91	H	32.11	-34.44	39.58	-95.26	-55.68	-13	42.68
3 703.42	44.19	V	32.11	-34.44	41.86	-95.26	-53.40	-13	40.40
Above 3 800.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (1 880.0 ㎒)									
3 761.50	43.61	H	32.30	-34.38	41.53	-95.26	-53.73	-13	40.73
3 757.46	43.93	V	32.30	-34.42	41.81	-95.26	-53.45	-13	40.45
Above 3 800.00	Not detected	-	-	-	-	-	-	-	-
High Channel (1 907.6 ㎒)									
3 813.98	44.22	H	32.30	-33.69	42.83	-95.26	**-52.43**	-13	39.43
3 817.14	41.78	V	32.30	-33.72	40.36	-95.26	-54.90	-13	41.90
Above 3 900.00	Not detected	-	-	-	-	-	-	-	-

WCDMA Ⅳ

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 (1 712.4 ㎒)									
3 422.30	44.44	H	31.00	-35.30	40.14	-95.26	-55.12	-13	42.12
3 422.78	45.61	V	31.00	-35.30	41.31	-95.26	-53.95	-13	40.95
Above 3 500.00	Not detected	–	-	-	-	-	-	-	-
Middle Channel (1 732.6 ㎒)									
3 463.32	52.34	H	31.03	-34.15	49.22	-95.26	-46.04	-13	33.04
3 462.76	52.49	V	31.03	-34.15	49.37	-95.26	**-45.89**	-13	32.89
Above 3 500.00	Not detected	–	-	-	-	-	-	-	-
High Channel (1 752.6 ㎒)									
3 507.14	47.61	H	31.11	-34.84	43.88	-95.26	-51.38	-13	38.38
3 503.40	47.51	V	31.11	-34.85	43.77	-95.26	-51.49	-13	38.49
Above 3 600.00	Not detected	–	-	-	-	-	-	-	-

WCDMA V

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (826.4 ㎒)									
1 654.36	58.21	H	25.88	-39.50	44.59	-97.41	**-52.82**	-13	39.82
1 651.28	58.27	V	25.82	-39.51	44.58	-97.41	-52.83	-13	39.83
2 476.90	49.97	H	28.31	-37.21	41.07	-97.41	-56.34	-13	43.34
2 475.84	46.42	V	28.30	-37.20	37.52	-97.41	-59.89	-13	46.89
Above 2 500.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (836.6 ㎒)									
1 671.82	55.55	H	26.19	-39.43	42.31	-97.41	-55.10	-13	42.10
1 671.74	54.94	V	26.19	-39.43	41.70	-97.41	-55.71	-13	42.71
2 512.44	52.40	H	28.45	-37.35	43.50	-97.41	-53.91	-13	40.91
2 513.48	48.70	V	28.45	-37.35	39.80	-97.41	-57.61	-13	44.61
Above 2 600.00	Not detected	-	-	-	-	-	-	-	-
High Channel (846.6 ㎒)									
1 691.62	55.28	H	26.55	-39.20	42.63	-97.41	-54.78	-13	41.78
1 691.86	52.48	V	26.55	-39.19	39.84	-97.41	-57.57	-13	44.57
2 543.58	49.15	H	28.57	-37.16	40.56	-97.41	-56.85	-13	43.85
2 543.80	47.45	V	28.58	-37.15	38.88	-97.41	-58.53	-13	45.53
Above 2 600.00	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 ANSI C63.26-2015 5.2.7 and 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

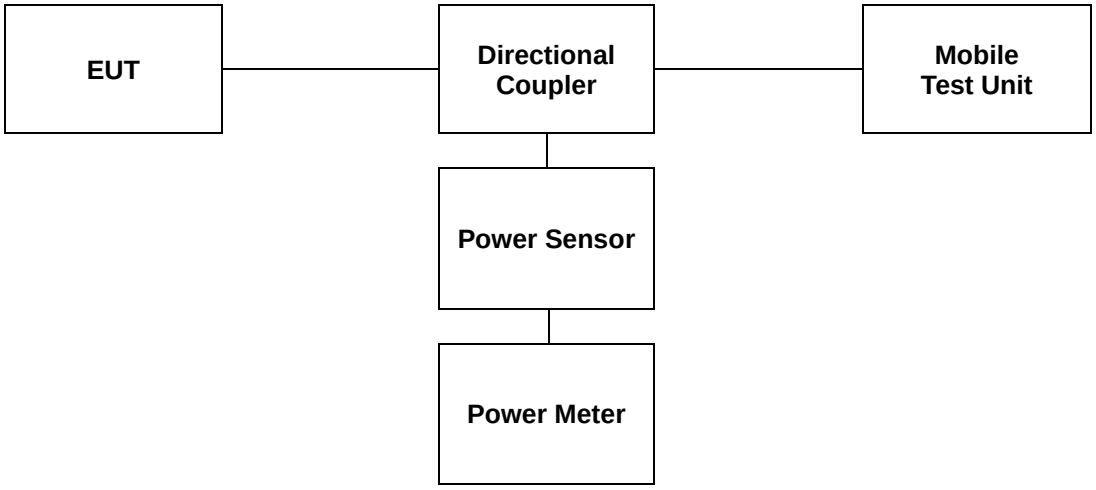
3.1. Limit

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 ± 2 %

GSM 850									
Ant. Gain						-1.12 dBi			
Limit: 7W ERP									
Mode		128 (824.2 ㎒)		190 (836.6 ㎒)		251 (848.8 ㎒)		E.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
VOICE		**34.10**	**2.570**	33.83	2.415	33.82	2.410	30.83	1.211
GPRS	1 Tx slot	**34.06**	**2.547**	33.74	2.366	33.73	2.360	30.79	1.199
	2 Tx slot	31.86	1.535	31.84	1.528	31.53	1.422		
	3 Tx slot	29.54	0.899	29.64	0.920	29.49	0.889		
	4 Tx slot	28.34	0.682	28.55	0.716	28.26	0.670		
EGPRS	1 Tx slot	27.53	0.566	27.47	0.558	27.39	0.548		
	2 Tx slot	26.96	0.497	27.00	0.501	26.90	0.490		
	3 Tx slot	26.41	0.438	26.42	0.439	26.20	0.417		
	4 Tx slot	25.57	0.361	25.57	0.361	25.35	0.343		

GSM 1900									
Ant. Gain						2.51 dBi			
Limit: 2W EIRP									
Mode		512 (1 850.2 ㎒)		661 (1 880.0 ㎒)		810 (1 909.8 ㎒)		E.I.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
VOICE		30.23	1.054	**30.25**	**1.059**	30.21	1.050	32.76	1.888
GPRS	1 Tx slot	30.16	1.038	**30.18**	**1.042**	30.15	1.035	32.69	1.858
	2 Tx slot	29.76	0.946	29.81	0.957	29.75	0.944		
	3 Tx slot	28.20	0.661	28.39	0.690	28.34	0.682		
	4 Tx slot	27.41	0.551	27.47	0.558	27.42	0.552		
EGPRS	1 Tx slot	26.64	0.461	26.67	0.465	26.73	0.471		
	2 Tx slot	25.99	0.397	26.04	0.402	26.11	0.408		
	3 Tx slot	24.94	0.312	24.98	0.315	24.99	0.316		
	4 Tx slot	24.28	0.268	24.30	0.269	24.38	0.274		

WCDMA Ⅱ									
Ant. Gain		2.51 dBi							
Limit: 2W EIRP									
Mode	3GPP 34.121 Subtest	9262 (1 852.4 ㎒)		9400 (1 880.0 ㎒)		9538 (1 907.6 ㎒)		E.I.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
Release 99	12.2 Kbps RMC	24.88	0.308	**24.89**	**0.308**	24.81	0.303	27.40	0.550
HSDPA	Subtest 1	23.72	0.236	**23.77**	**0.238**	23.75	0.237	26.28	0.425
	Subtest 2	23.75	0.237	23.76	0.238	23.72	0.236		
	Subtest 3	23.39	0.218	23.41	0.219	23.44	0.221		
	Subtest 4	23.31	0.214	23.35	0.216	23.39	0.218		
HSUPA	Subtest 1	23.48	0.223	23.53	0.225	23.61	0.230		
	Subtest 2	21.28	0.134	21.68	0.147	21.80	0.151		
	Subtest 3	22.58	0.181	22.69	0.186	22.56	0.180		
	Subtest 4	21.77	0.150	21.96	0.157	21.70	0.148		
	Subtest 5	23.67	0.233	23.64	0.231	23.68	0.233		
DC-HSDPA	Subtest 1	23.41	0.219	23.45	0.221	23.58	0.228		
	Subtest 2	23.65	0.232	23.68	0.233	23.75	0.237		
	Subtest 3	23.07	0.203	23.11	0.205	23.12	0.205		
	Subtest 4	23.05	0.202	23.18	0.208	23.19	0.208		
HSPA+		23.41	0.219	23.57	0.228	23.61	0.230		

WCDMA Ⅳ									
Ant. Gain		1.25 dBi							
Limit: 1W EIRP									
Mode	3GPP 34.121 Subtest	1312 (1 712.4 ㎒)		1413 (1 732.6 ㎒)		1513 (1 752.6 ㎒)		E.I.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
Release 99	12.2 Kbps RMC	**24.87**	**0.307**	24.81	0.303	24.86	0.306	26.12	0.409
HSDPA	Subtest 1	**23.91**	**0.246**	23.87	0.244	23.83	0.242	25.16	0.328
	Subtest 2	23.82	0.241	23.79	0.239	23.86	0.243		
	Subtest 3	23.57	0.228	23.68	0.233	23.38	0.218		
	Subtest 4	23.51	0.224	23.58	0.228	23.39	0.218		
HSUPA	Subtest 1	23.60	0.229	23.72	0.236	23.75	0.237		
	Subtest 2	21.87	0.154	21.91	0.155	21.81	0.152		
	Subtest 3	22.68	0.185	22.45	0.176	22.23	0.167		
	Subtest 4	21.57	0.144	21.95	0.157	21.69	0.148		
	Subtest 5	23.49	0.223	23.65	0.232	23.88	0.244		
DC-HSDPA	Subtest 1	23.25	0.211	23.38	0.218	23.53	0.225		
	Subtest 2	23.41	0.219	23.55	0.226	23.62	0.230		
	Subtest 3	22.95	0.197	22.99	0.199	23.05	0.202		
	Subtest 4	23.09	0.204	23.01	0.200	23.09	0.204		
HSPA+		23.38	0.218	23.51	0.224	23.53	0.225		

WCDMA V									
Ant. Gain		-1.12 dBi							
Limit: 7W ERP									
Mode	3GPP 34.121 Subtest	4132 (826.4 ㎒)		4183 (836.6 ㎒)		4233 (846.6 ㎒)		E.R.P	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
Release 99	12.2 Kbps RMC	24.75	0.299	**24.81**	**0.303**	24.78	0.301	21.54	0.143
HSDPA	Subtest 1	23.85	0.243	**23.91**	**0.246**	23.72	0.236	20.64	0.116
	Subtest 2	23.86	0.243	23.75	0.237	23.81	0.240		
	Subtest 3	23.41	0.219	23.33	0.215	23.39	0.218		
	Subtest 4	23.45	0.221	23.39	0.218	23.33	0.215		
HSUPA	Subtest 1	23.77	0.238	23.78	0.239	23.65	0.232		
	Subtest 2	21.58	0.144	21.81	0.152	21.69	0.148		
	Subtest 3	22.65	0.184	22.67	0.185	22.63	0.183		
	Subtest 4	21.63	0.146	21.66	0.147	21.76	0.150		
	Subtest 5	23.75	0.237	23.81	0.240	23.73	0.236		
DC-HSDPA	Subtest 1	23.39	0.218	23.40	0.219	23.28	0.213		
	Subtest 2	23.65	0.232	23.61	0.230	23.51	0.224		
	Subtest 3	23.02	0.200	23.08	0.203	23.03	0.201		
	Subtest 4	23.15	0.207	23.12	0.205	23.09	0.204		
HSPA+		23.43	0.220	23.45	0.221	23.51	0.224		

4. Occupied Bandwidth

4.1. Limit

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

4.2. Test Procedure

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

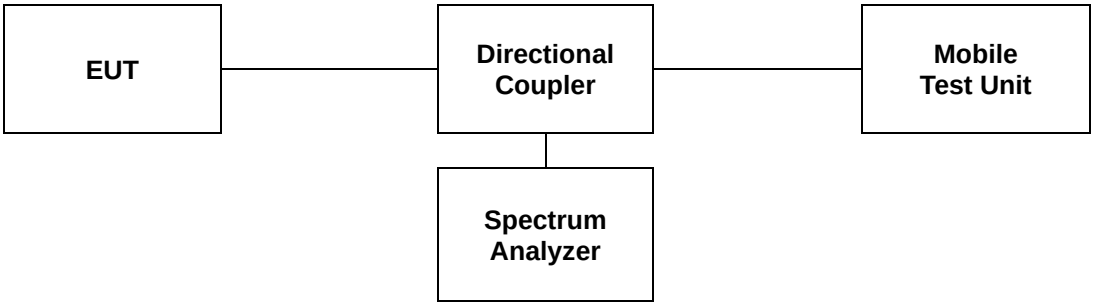
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation. products including the emission skirts (typically a span of 1.5 × OBW is sufficient).
b. The nominal IF filter 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).

IC
The test follows section 6.7 of RSS-Gen Issue 5.
The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
• The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
• The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99 % emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99 % emission bandwidth).



4.3 Test Results

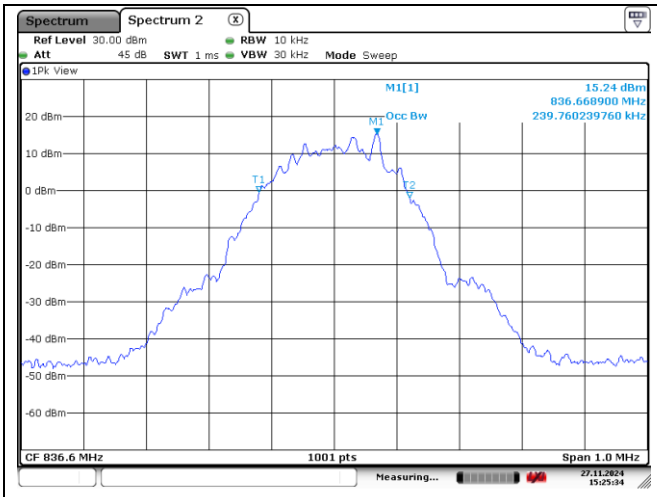
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
GSM 850	VOICE	824.2	0.243
	EDGE		0.243
	VOICE	836.6	0.240
	EDGE		0.248
	VOICE	848.8	0.239
	EDGE		0.245
GSM 1900	VOICE	1 850.2	0.240
	EDGE		0.241
	VOICE	1 880.0	0.239
	EDGE		0.241
	VOICE	1 909.8	0.242
	EDGE		0.240

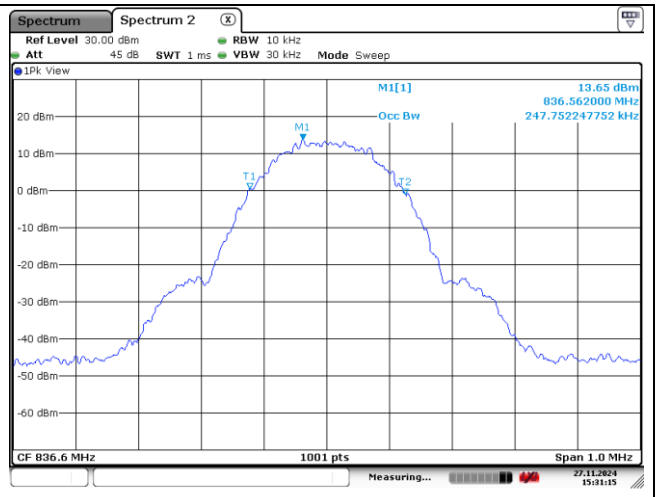
Band	Mode	Frequency (㎒)	Occupied Bandwidth (㎒)
WCDMA Ⅱ	RMC	1 852.4	4.166
	HSDPA		4.136
	RMC	1 880.0	4.146
	HSDPA		4.156
	RMC	1 907.6	4.156
	HSDPA		4.146
WCDMA Ⅳ	RMC	1 712.4	4.146
	HSDPA		4.136
	RMC	1 732.6	4.136
	HSDPA		4.136
	RMC	1 752.6	4.136
	HSDPA		4.126
WCDMA Ⅴ	RMC	826.4	4.136
	HSDPA		4.136
	RMC	836.6	4.146
	HSDPA		4.136
	RMC	846.6	4.126
	HSDPA		4.126

- Test plots

GSM 850



GSM 850 VOICE Middle Channel



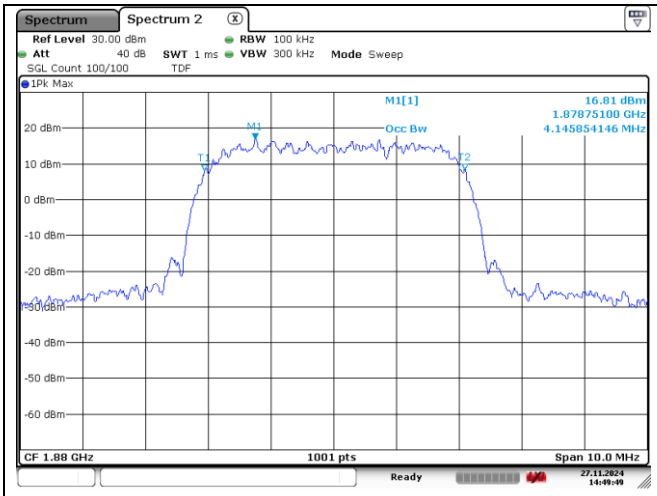
GSM 850 EDGE Middle Channel

GSM 1900

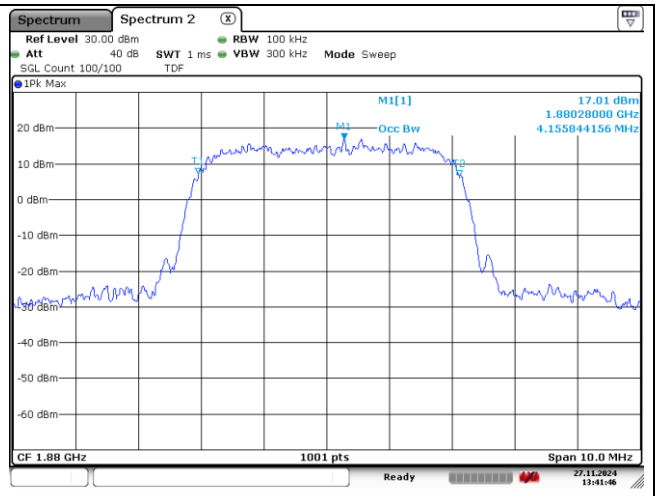
GSM 1900 VOICE Middle Channel

GSM 1900 EDGE Middle Channel

WCDMA Ⅱ

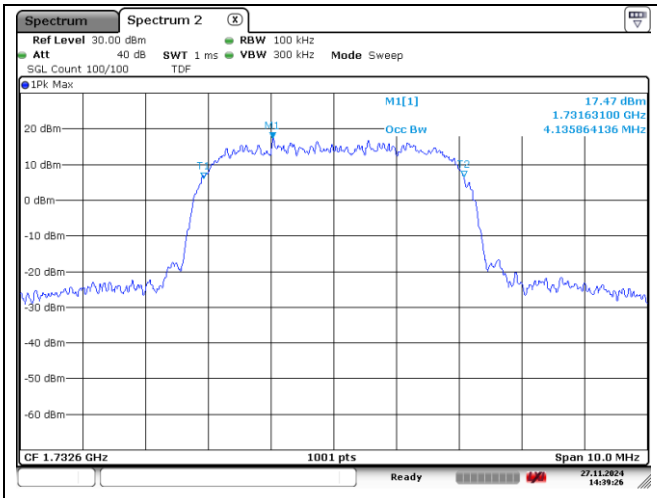


WCDMA Ⅱ RMC Middle Channel

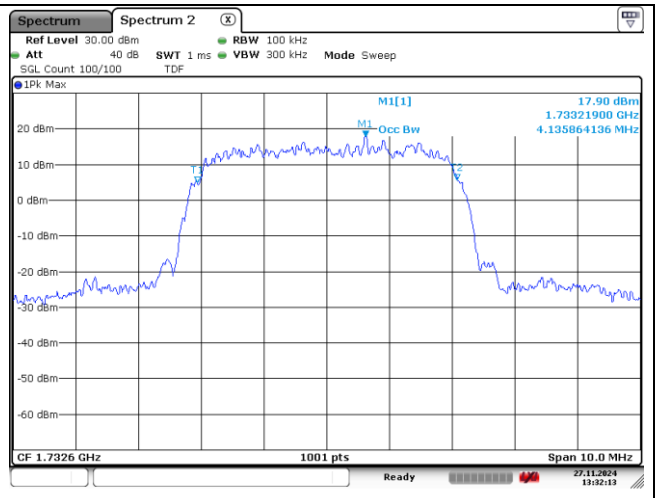


WCDMA Ⅱ HSDPA Middle Channel

WCDMA Ⅳ

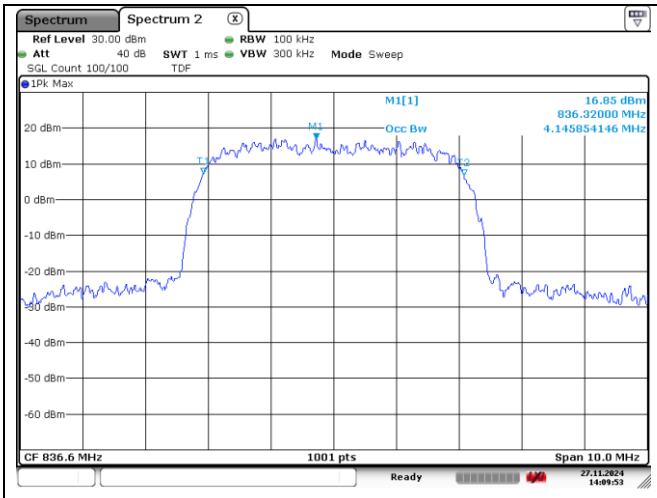


WCDMA Ⅳ RMC Middle Channel

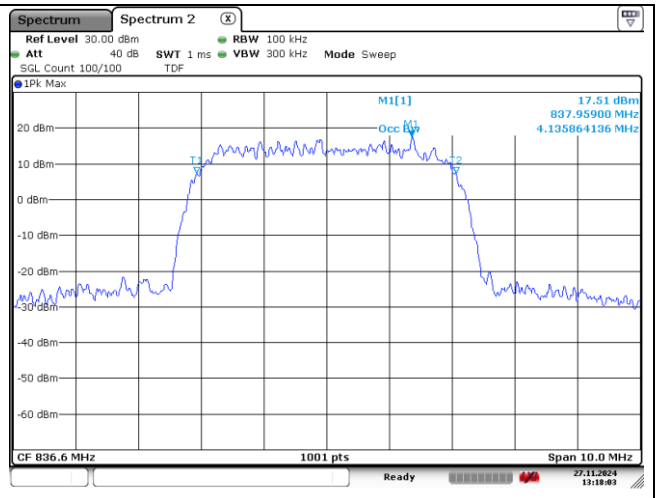


WCDMA Ⅳ HSDPA Middle Channel

WCDMA Ⅴ



WCDMA Ⅴ RMC Middle Channel



WCDMA Ⅴ HSDPA Middle Channel

5. Peak-Average Ratio

5.1. Limit

FCC

- §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 ㏈.

- §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 ㏈.

- §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 ㏈.

IC

- RSS-132 Issue 4

5.4, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 ㏈ for more than 0.1 % of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

- RSS-133 Issue 7

5.5, the peak-to-average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal corresponding to the highest PAPR during periods of continuous transmission.

- RSS-139 Issue 4

5.5, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 ㏈ for more than 0.1 % of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

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:

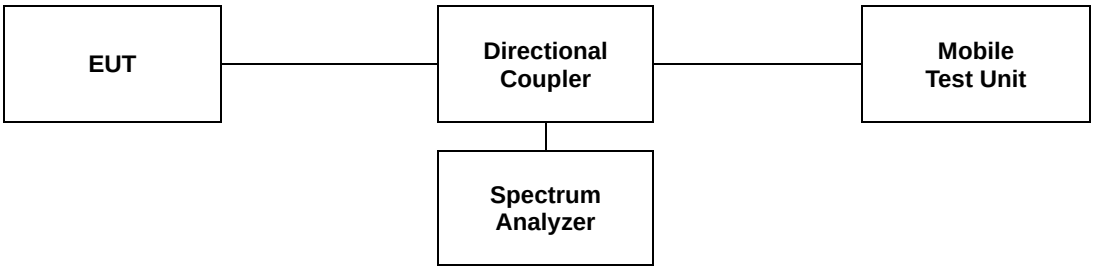
1) For continuous transmissions, set to greater of [10 x (number of points in sweep) x (transmission symbol period)] or 1 ms.

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

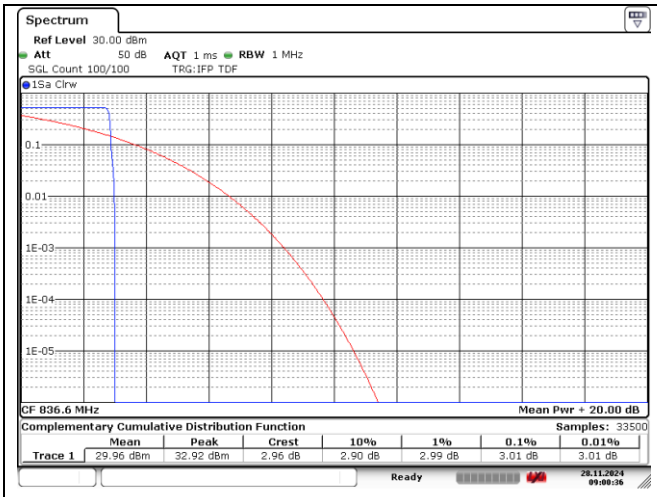
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

Band	Mode	Frequency (㎒)	PAR (㏈)
GSM 850	VOICE	824.2	3.01
		836.6	3.01
		848.8	3.01
	EDGE	824.2	2.96
		836.6	2.99
		848.8	2.99
GSM 1900	VOICE	1 850.2	3.04
		1 880.0	3.04
		1 909.8	3.07
	EDGE	1 850.2	3.04
		1 880.0	3.01
		1 909.8	3.07

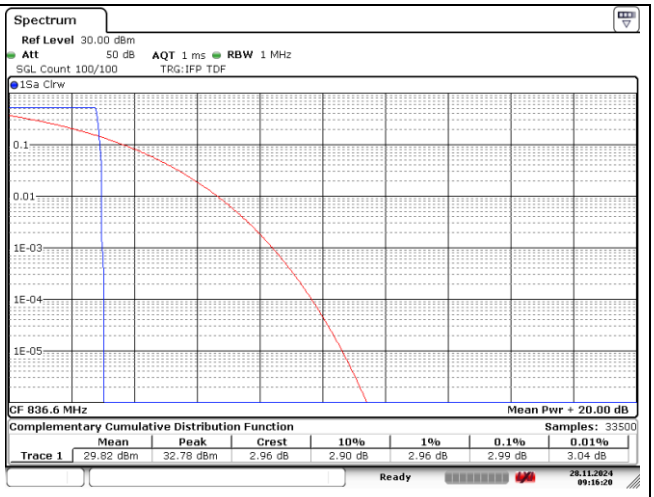
Band	Mode	Frequency (㎒)	PAR (㏈)
WCDMA Ⅱ	RMC	1 852.4	3.13
		1 880.0	3.36
		1 907.6	3.33
	HSDPA	1 852.4	3.13
		1 880.0	3.36
		1 907.6	3.30
WCDMA Ⅳ	RMC	1 712.4	3.39
		1 732.6	3.54
		1 752.6	3.42
	HSDPA	1 712.4	3.45
		1 732.6	3.48
		1 752.6	3.39
WCDMA Ⅴ	RMC	826.4	3.16
		836.6	3.04
		846.6	3.19
	HSDPA	826.4	3.13
		836.6	3.01
		846.6	3.19

- Test plots

GSM 850

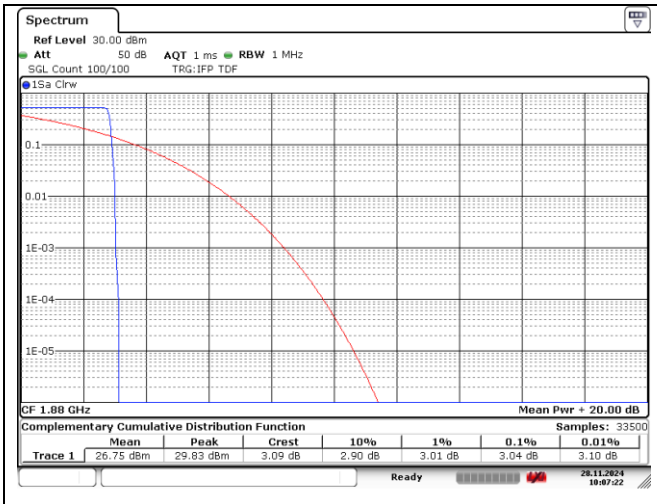


GSM 850 VOICE Middle Channel

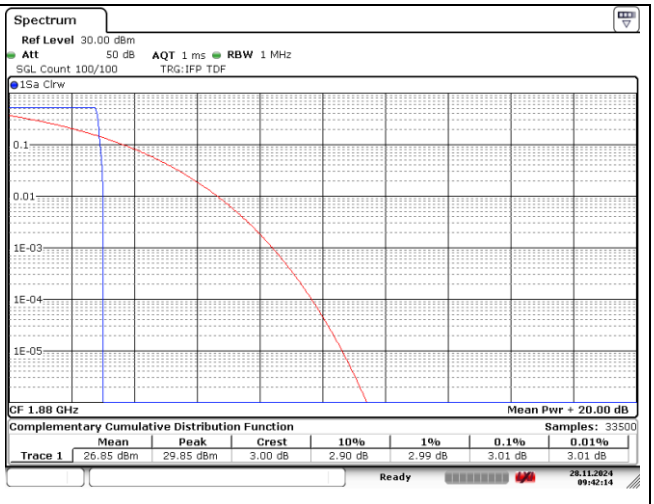


GSM 850 EDGE Middle Channel

GSM 1900

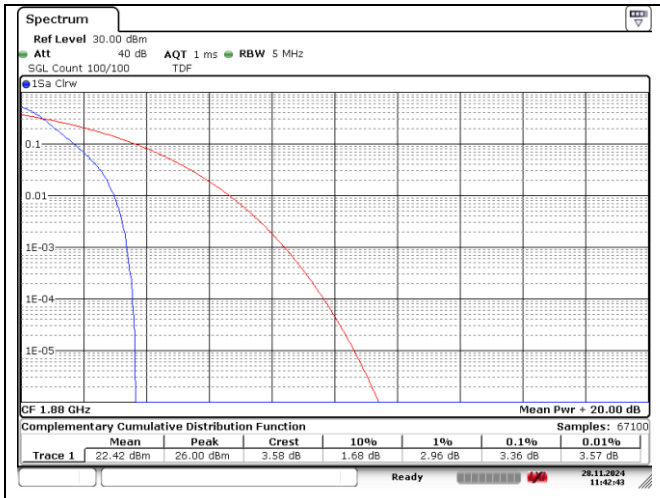


GSM 1900 VOICE Middle Channel

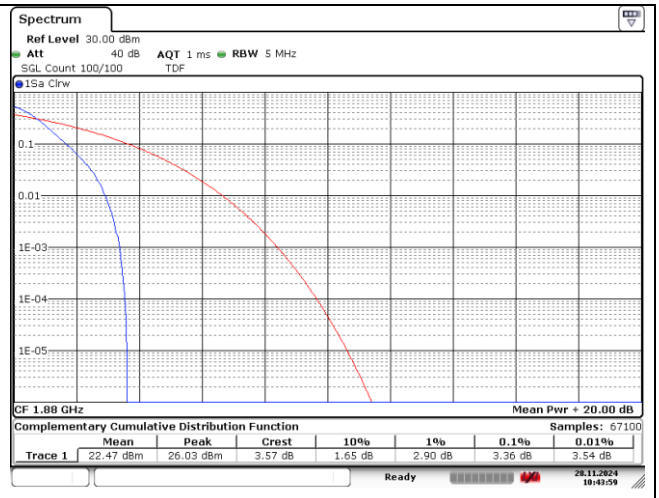


GSM 1900 EDGE Middle Channel

WCDMA Ⅱ

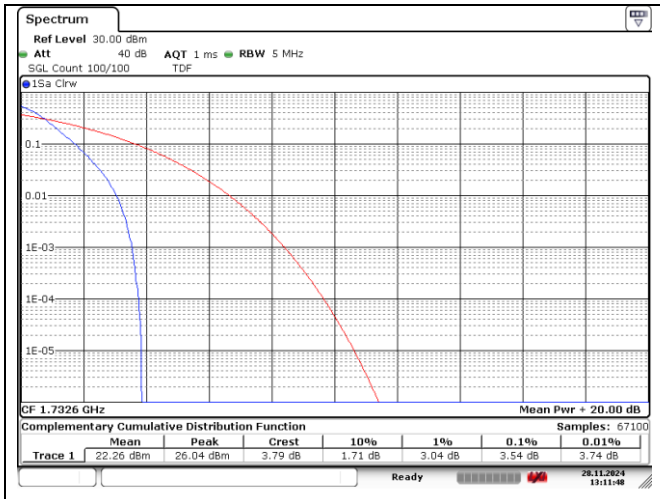


WCDMA Ⅱ RMC Middle Channel

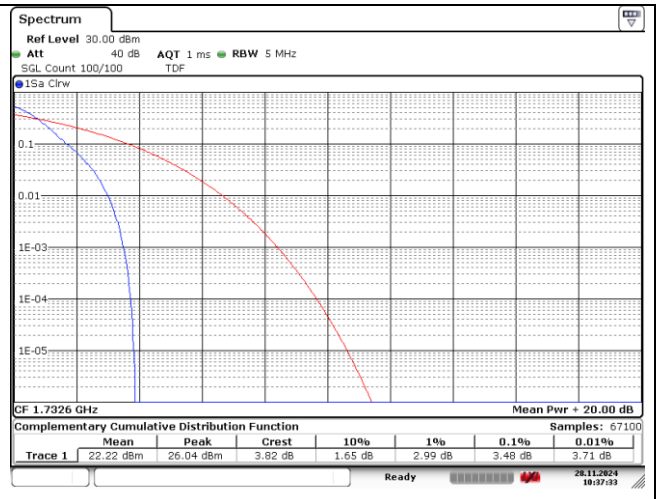


WCDMA Ⅱ HSDPA Middle Channel

WCDMA Ⅳ

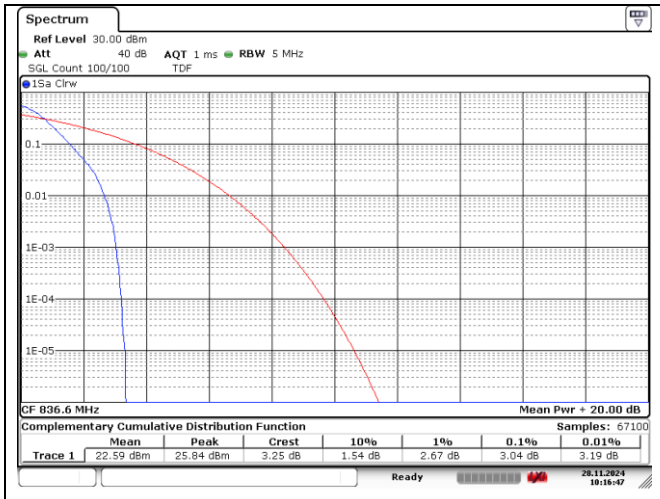


WCDMA Ⅳ RMC Middle Channel

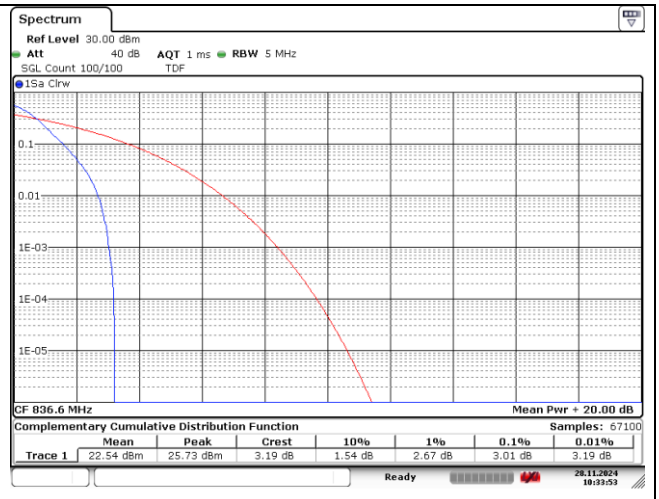


WCDMA Ⅳ HSDPA Middle Channel

WCDMA Ⅴ



WCDMA Ⅴ RMC Middle Channel



WCDMA Ⅴ HSDPA Middle Channel

6. Spurious Emissions at Antenna Terminal

6.1. Limit

FCC

- §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) ㏈.

- §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) ㏈.

- §27.53(h)(1), for operations in the 1 695-1 710 ㎒, 1 710-1 755 ㎒, 1 755-1 780 ㎒, 1 915-1 920 ㎒, 1 995-2 000 ㎒, 2 000-2 020 ㎒, 2 110-2 155 ㎒, 2 155-2 180 ㎒, 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) ㏈.

IC

- RSS-132 Issue 4

5.5, Equipment shall meet the unwanted emission limits specified below:

(i) In the first 1.0 ㎒ band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (㏈W) by at least 43 + 10 log(p) ㏈.

(ii) After the first 1.0 ㎒ immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 ㎑ bandwidth shall be attenuated below the transmitter output power P (dBW) by at least 43 + 10 log(p) ㏈. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 ㎑ is required.

p is the output power specified in watts.

- RSS-133 Issue 7

5.6, Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified in table 3, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 ㎒ bands immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 ㎒ bands, a resolution bandwidth of 1 ㎒ shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 ㎒, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the table 3.

Table 3: Unwanted emission limits for all equipment

Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈m/(1% of OBW)
>1 ㎒	-13 ㏈m

- RSS-139 Issue 4
5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

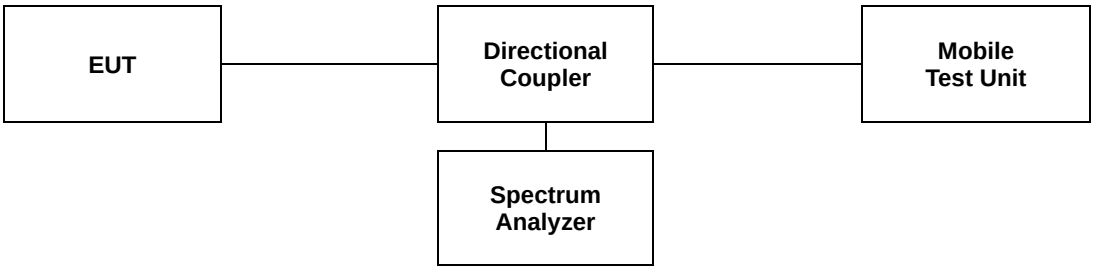
Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈m/(1% of OB)*
>1 ㎒	-13 ㏈m/㎒

* OB is the occupied bandwidth

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



Note;

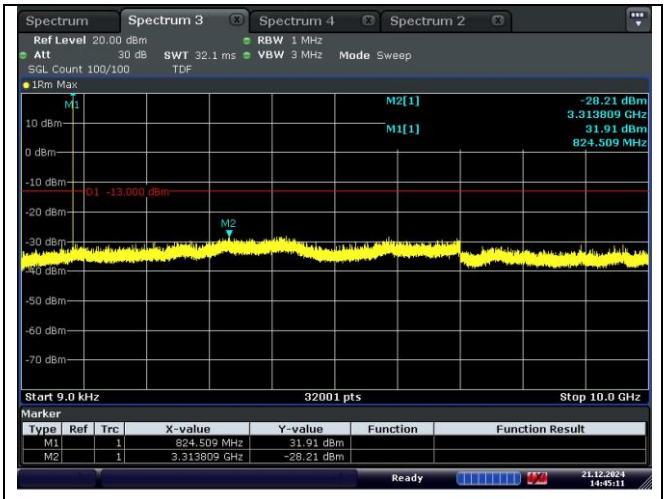
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and frequencies greater than 1 ㎓. However, in the 1 ㎒ bands immediately outside and adjacent to the frequency block a resolution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

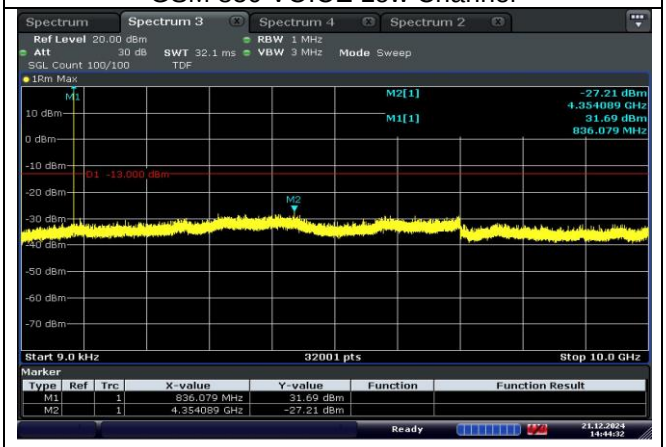
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

- Test plots

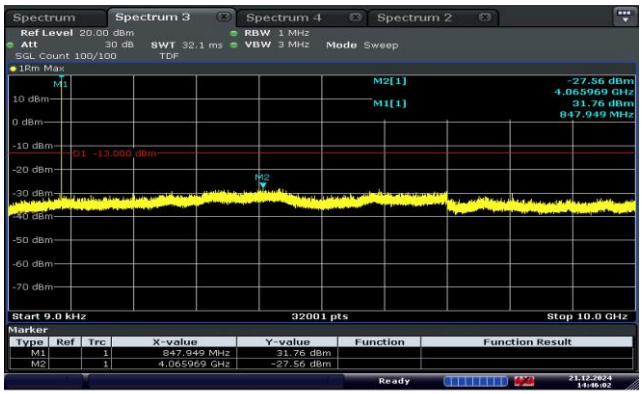
GSM 850



GSM 850 VOICE Low Channel

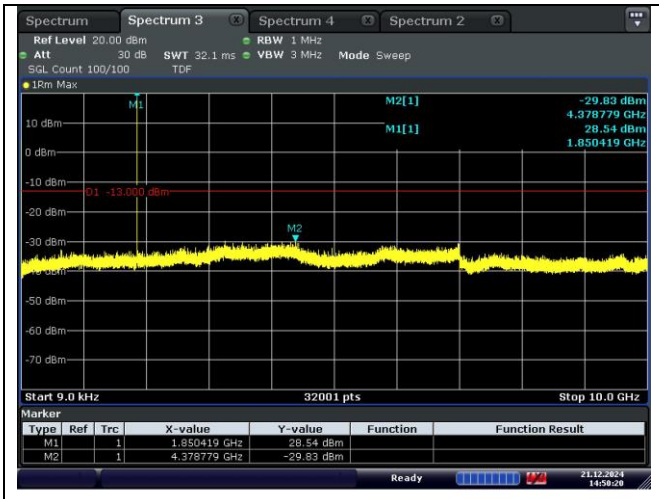


GSM 850 VOICE Middle Channel

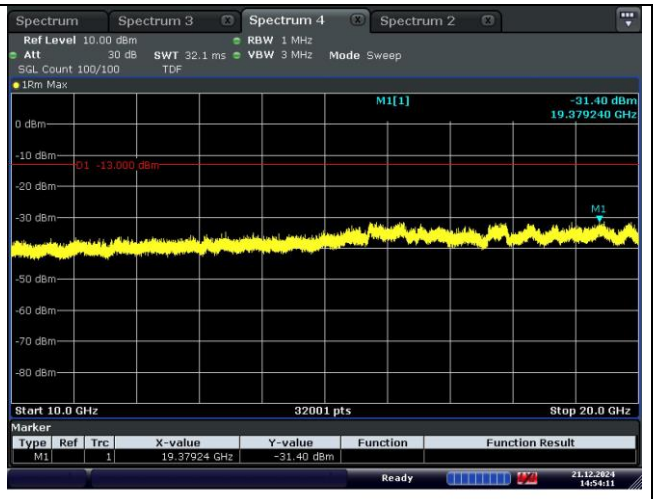


GSM 850 VOICE High Channel

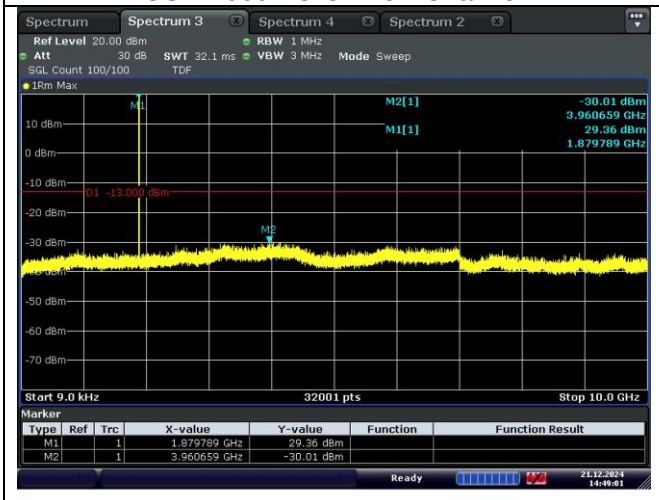
GSM 1900



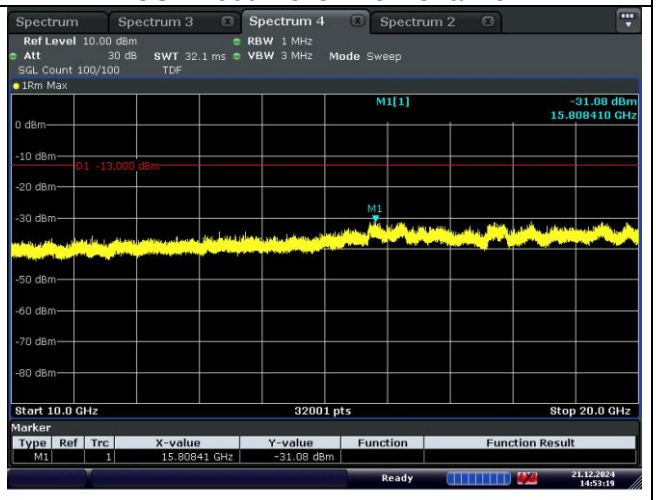
GSM 1900 VOICE Low Channel



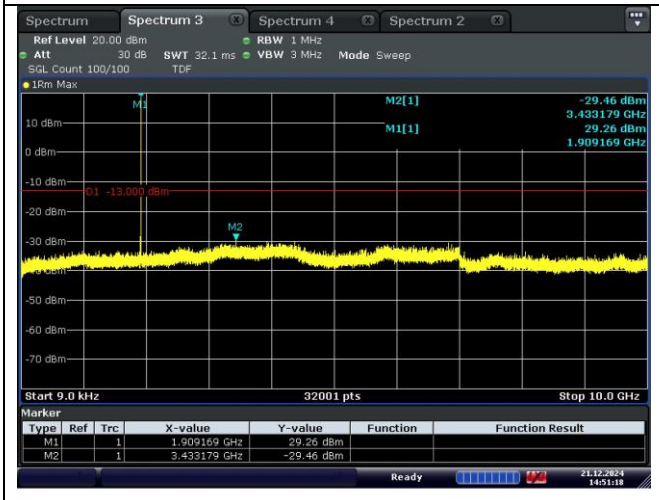
GSM 1900 VOICE Low Channel



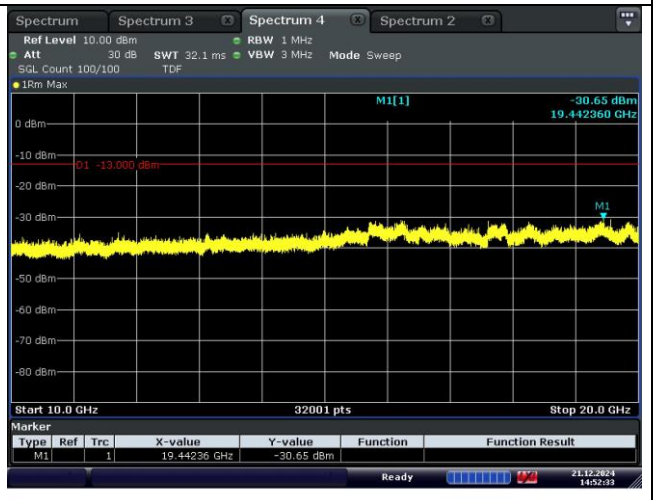
GSM 1900 VOICE Middle Channel



GSM 1900 VOICE Middle Channel

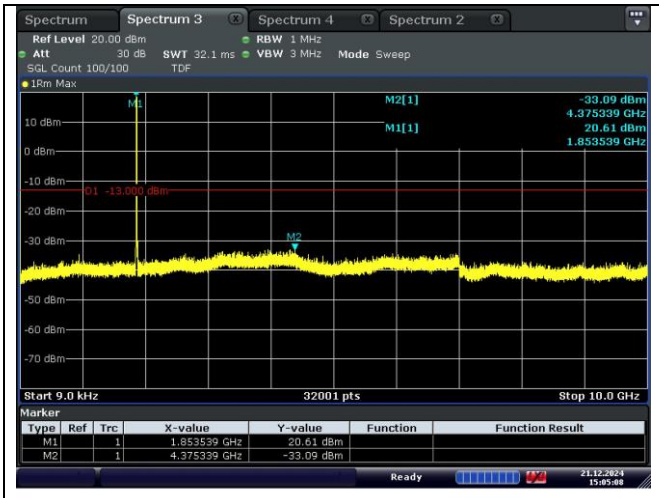


GSM 1900 VOICE High Channel

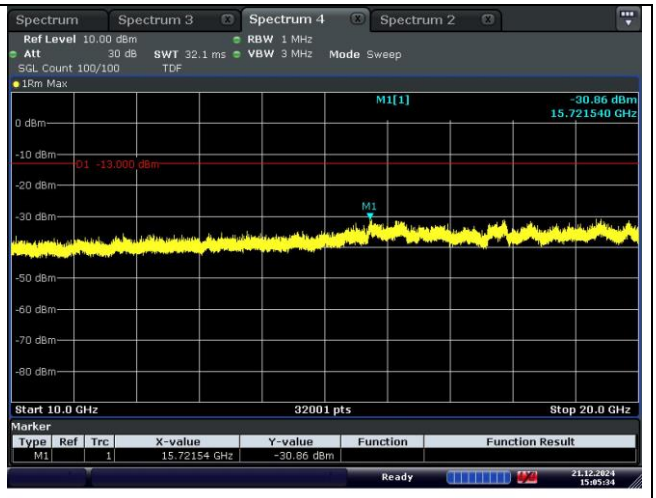


GSM 1900 VOICE High Channel

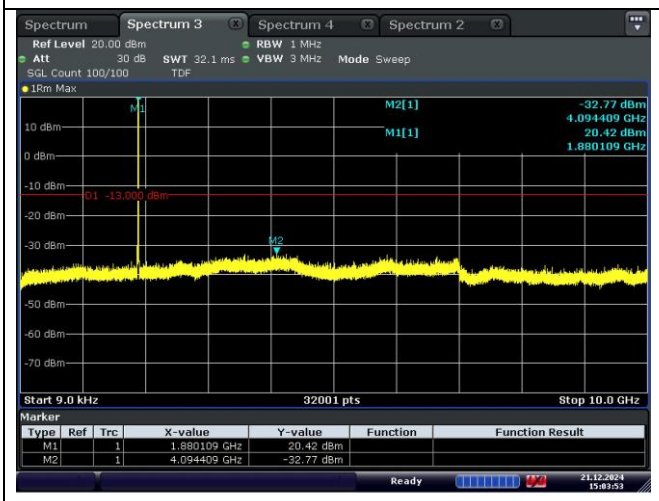
WCDMA Ⅱ



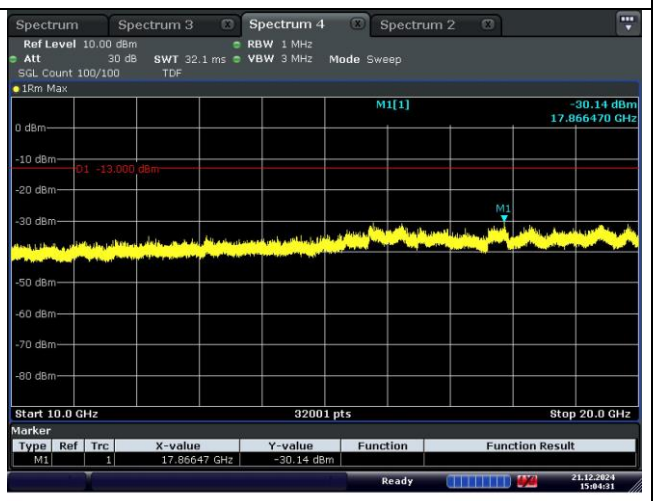
WCDMA Ⅱ RMC Low channel



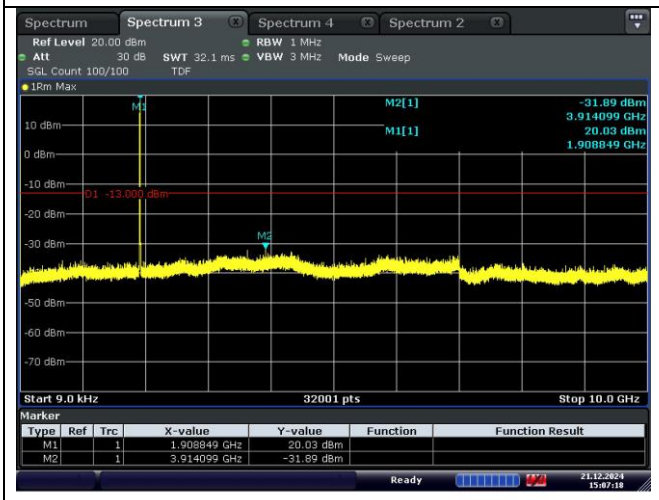
WCDMA Ⅱ RMC Low channel



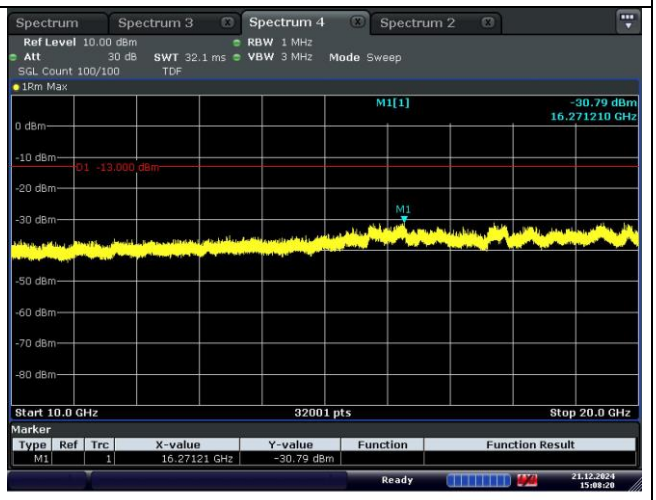
WCDMA Ⅱ RMC Middle channel



WCDMA Ⅱ RMC Middle channel

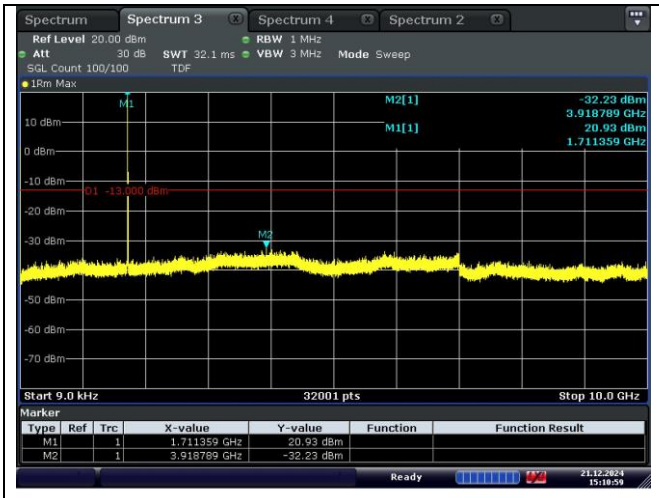


WCDMA Ⅱ RMC High channel

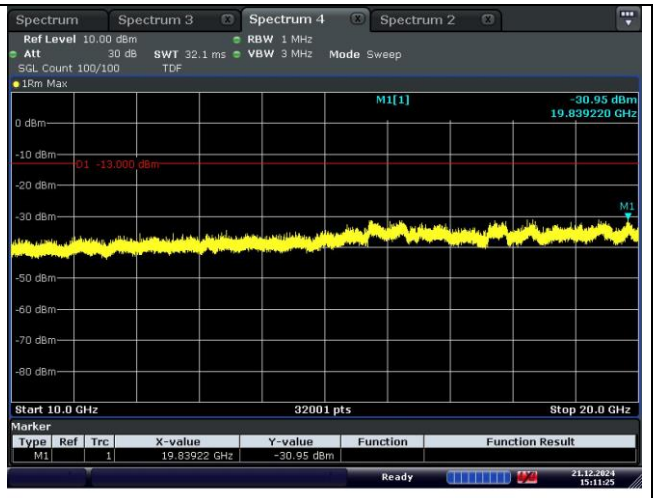


WCDMA Ⅱ RMC High channel

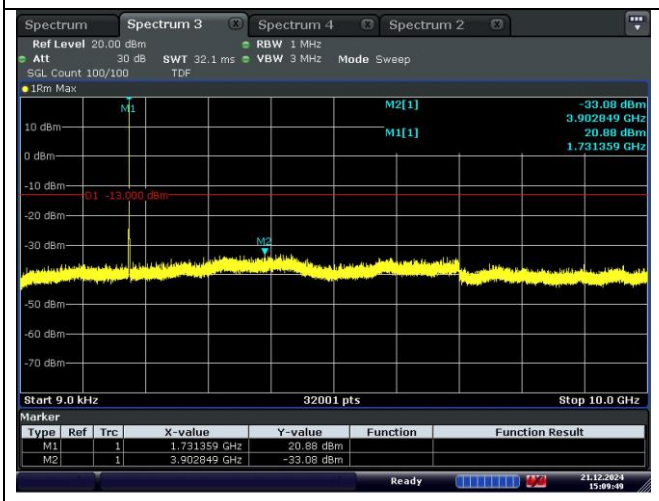
WCDMA Ⅳ



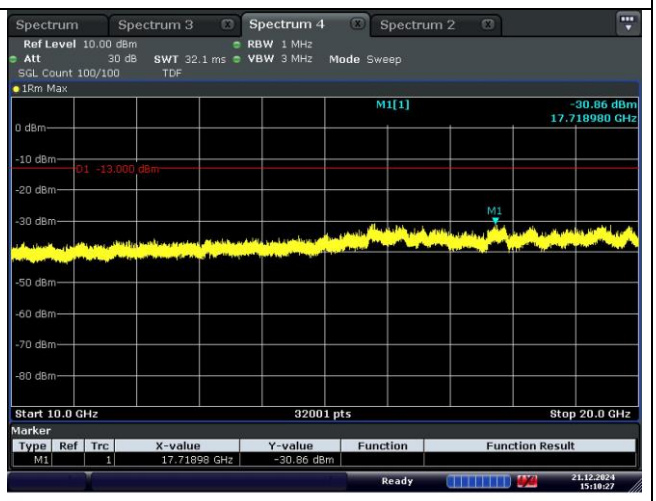
WCDMA Ⅳ RMC Low channel



WCDMA Ⅳ RMC Low channel



WCDMA Ⅳ RMC Middle channel



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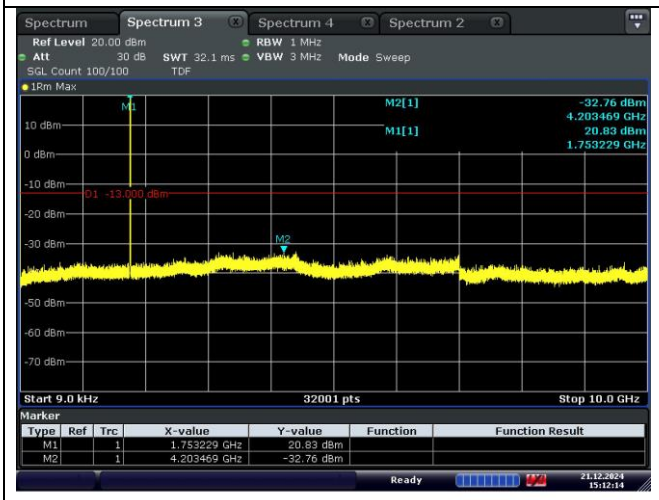
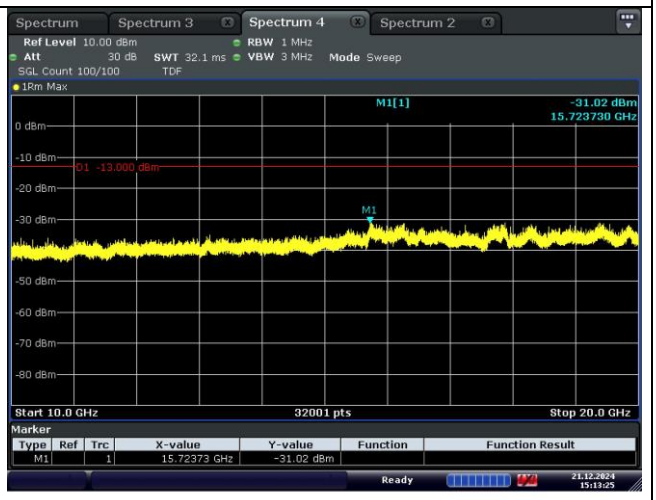
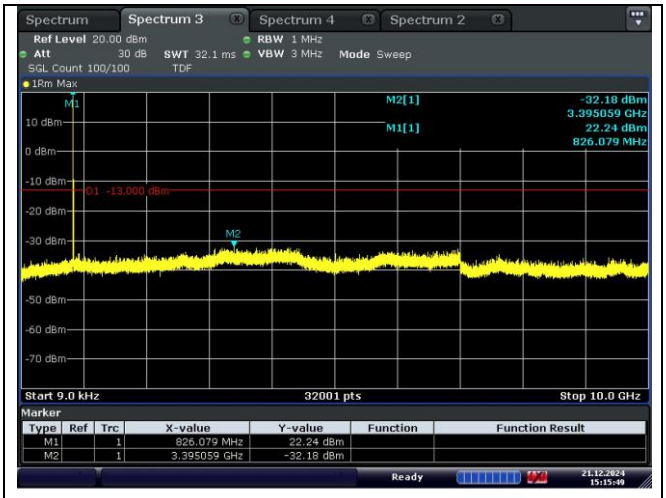


WCDMA Ⅳ RMC High channel

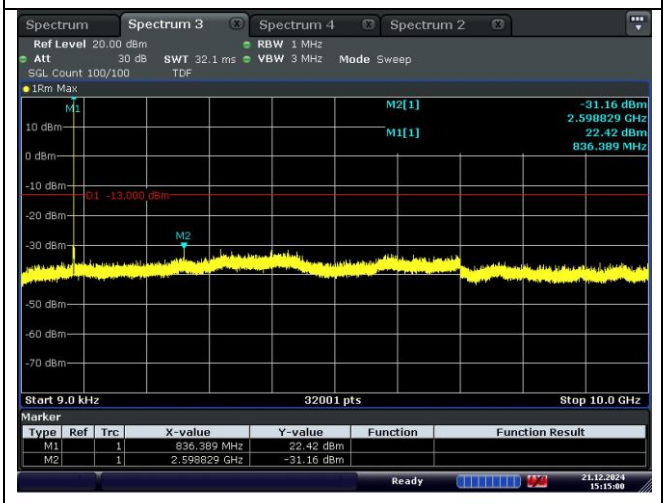


WCDMA Ⅳ RMC High channel

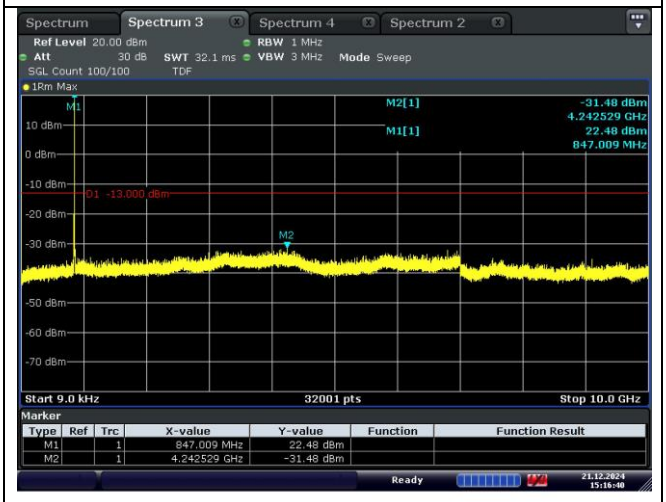
WCDMA Ⅴ



WCDMA Ⅴ RMC Low channel



WCDMA Ⅴ RMC Middle channel



WCDMA Ⅴ RMC High channel

7. Band Edge

7.1. Limit

FCC

- §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) ㏈.

- §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) ㏈.

- §27.53(h)(1), for operations in the 1 695-1 710 ㎒, 1 710-1 755 ㎒, 1 755-1 780 ㎒, 1 915-1 920 ㎒, 1 995-2 000 ㎒, 2 000-2 020 ㎒, 2 110-2 155 ㎒, 2 155-2 180 ㎒, 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) ㏈.

IC

- RSS-132 Issue 4

5.5, Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 ㎒ band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated (in ㏈) below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p (watts).

(ii) After the first 1.0 ㎒ immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 ㎑ bandwidth shall be attenuated (in ㏈) below the transmitter output power P (㏈ W) by at least 43 + 10 $\log_{10}$ p (watts). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 ㎑ is required.

- RSS-133 Issue 7

5.6, Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified in table 3, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 ㎒ bands immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 ㎒ bands, a resolution bandwidth of 1 ㎒ shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 ㎒, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the table 3.

Table 3: Unwanted emission limits for all equipment

Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈m/(1% of OBW)
>1 ㎒	-13 ㏈m

- RSS-139 Issue 4
5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Unwanted emission limits

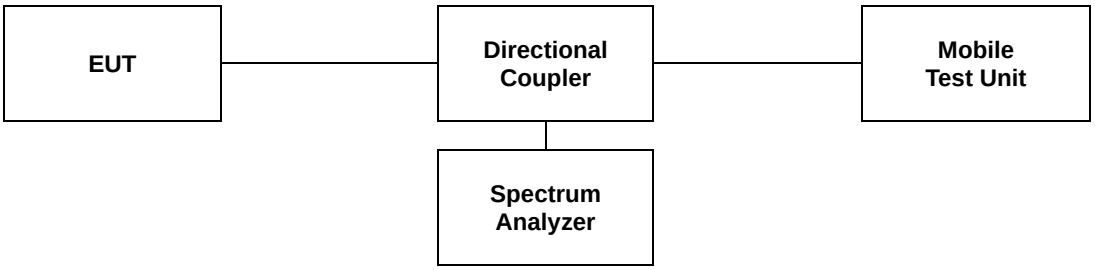
Offset from the edge of the frequency block or frequency block group	Unwanted emission limit
≤1 ㎒	-13 ㏈ m/(1% of OB)*
>1 ㎒	-13 ㏈ m/㎒

* OB is the occupied bandwidth

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.

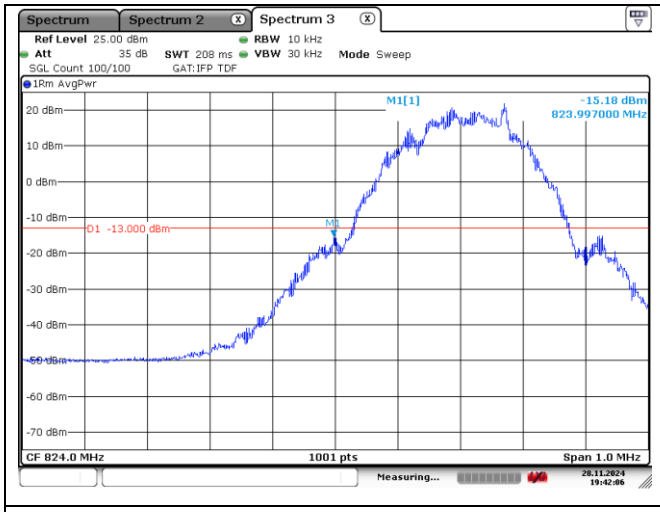


7.3. Test Results

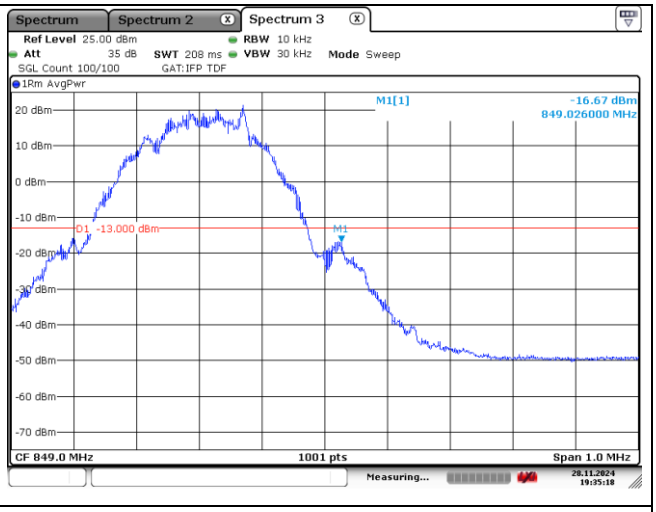
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 ± 2 %

- Test plots

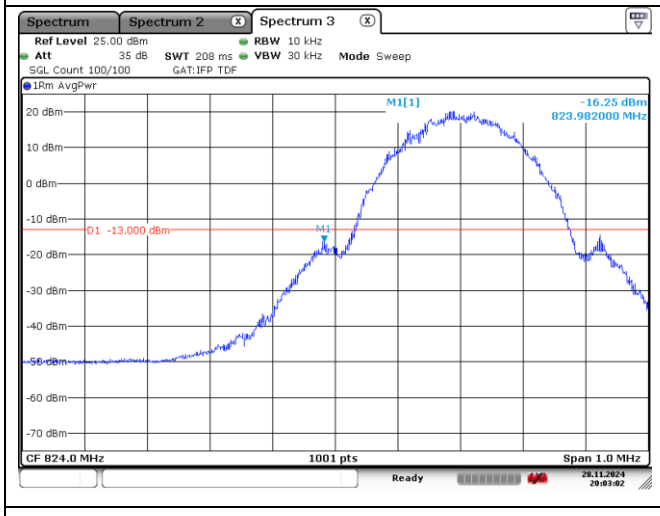
GSM 850



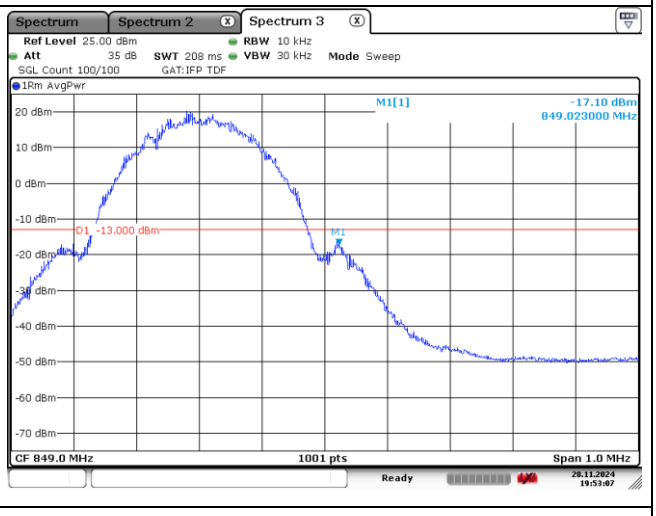
GSM 850 VOICE Low Channel



GSM 850 VOICE High Channel

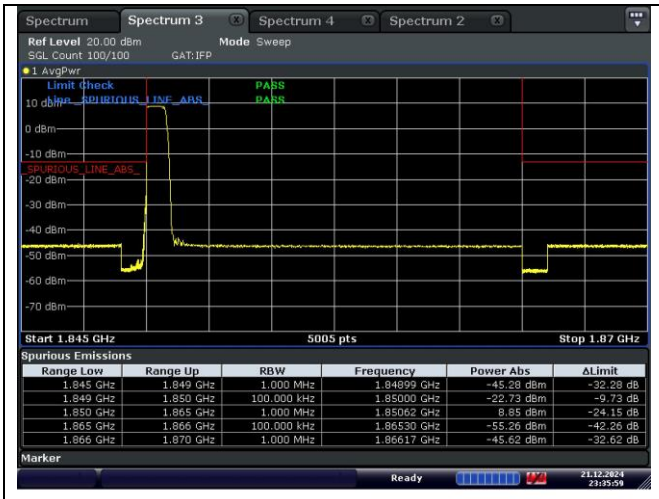


GSM 850 EDGE Low Channel

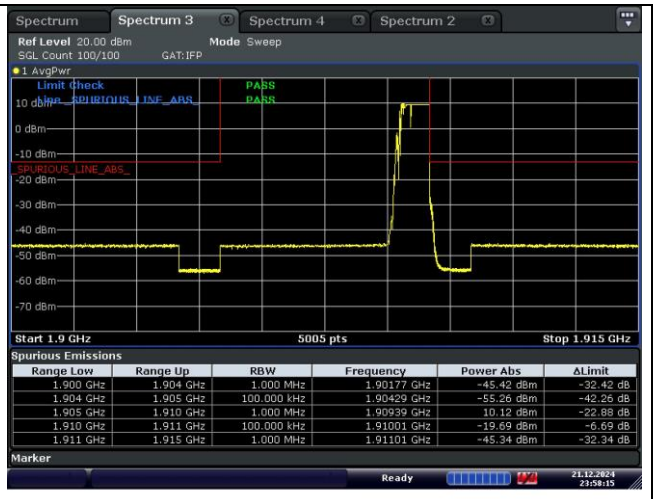


GSM 850 EDGE High Channel

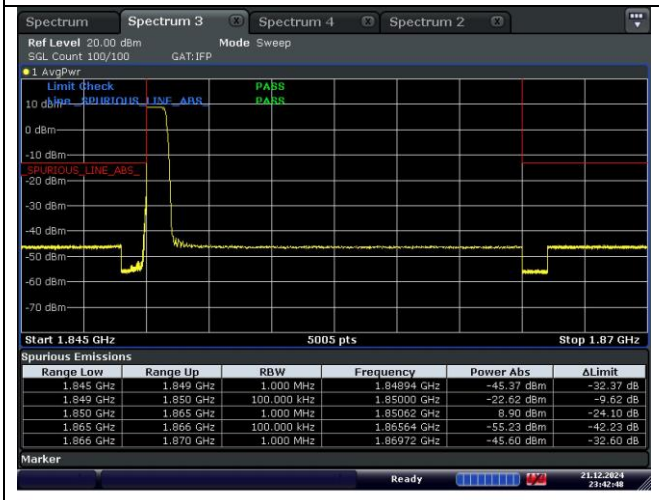
GSM 1900



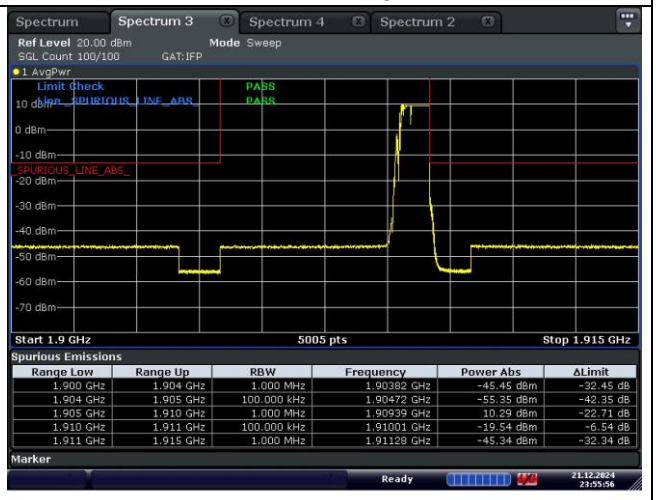
GSM 1900 VOICE Low Channel



GSM 1900 VOICE High Channel



GSM 1900 EDGE Low Channel



GSM 1900 EDGE High Channel