

TEST REPORT

FCC 3G Test for TM18FNNABM0
Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2506-FC052

DATE OF ISSUE
June 17, 2025

Tested by
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Accredited by KOLAS, Republic of KOREA

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TEST REPORT

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HCT-RF-2506-FC052

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June 17, 2025

Applicant	LG Electronics Inc. 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
Product Name	Telematics
Model Name	TM18FNNABM0
Date of Test	February 08, 2025 ~ June 17, 2025
Location of Test	<input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC ID	2BO3LTM18FNNABM0
FCC Classification:	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part: § 22, § 24
Test Results	PASS

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	June 17, 2025	Initial Release

Notice

Content

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section § 2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA.

(KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

CONTENTS

1. GENERAL INFORMATION	5
1.1. SUPPORTED BANDS PER ANTENNA PORT	6
1.2 MAXIMUM OUTPUT POWER.....	7
2. INTRODUCTION.....	8
2.1 DESCRIPTION OF EUT	8
2.2 MEASURING INSTRUMENT CALIBRATION.....	8
2.3 TEST FACILITY	8
3. DESCRIPTION OF TESTS.....	9
3.1 TEST PROCEDURE.....	9
3.2 RADIATED POWER.....	10
3.3 RADIATED SPURIOUS EMISSIONS.....	12
3.3.1 WCDMA 1900	12
3.3.2 WCDMA 850	13
3.4 PEAK- TO- AVERAGE RATIO	14
3.5 OCCUPIED BANDWIDTH.....	15
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	16
3.7 BAND EDGE	17
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	19
3.9 WORST CASE(CONDUCTED TEST).....	20
3.10 WORST CASE(RADIATED TEST)	21
4. LIST OF TEST EQUIPMENT.....	22
5. MEASUREMENT UNCERTAINTY	25
6. SUMMARY OF TEST RESULTS	26
7. SAMPLE CALCULATION.....	27
8. TEST DATA(MIMO1)	29
8.1 EFFECTIVE RADIATED POWER.....	29
8.2 EQUIVALENT ISOTROPIC RADIATED POWER.....	29
8.3 RADIATED SPURIOUS EMISSIONS.....	30
8.4 PEAK-TO-AVERAGE RATIO	32
8.5 OCCUPIED BANDWIDTH.....	33
8.6 CONDUCTED SPURIOUS EMISSIONS	34
8.7 BAND EDGE	34
8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	35
9. TEST DATA(Internal(BUA))	39
9.1 EFFECTIVE RADIATED POWER.....	39
9.2 EQUIVALENT ISOTROPIC RADIATED POWER.....	39
9.3 RADIATED SPURIOUS EMISSIONS.....	40
10. TEST PLOTS.....	42
11. ANNEX A_ TEST SETUP PHOTO	68

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics Inc.
Address:	128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
FCC ID:	2B03LTM18FNNABM0
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 22, § 24
EUT Type:	Telematics
Model(s):	TM18FNNABM0
Voltage:	4.2V
Tx Frequency:	826.40 - 846.60 MHz (WCDMA850) 1 852.4 – 1 907.6 MHz (WCDMA1900)
Rx Frequency:	871.40 - 891.60 MHz (WCDMA850) 1 932.4 – 1 987.6 MHz (WCDMA1900)
Date(s) of Tests:	February 08, 2025 ~ June 17, 2025
EUT Serial number:	Radiated : BMW ICON-25SF Radiated #1(WCDMA B2), BMW ICON - 25SF Radiated #6(WCDMA B5) Conducted : BMW ICON-25SF Conducted #3(WCDMA B2), BMW ICON - 25SF Conducted #5(WCDMA B5)
Antenna Information	Please refer to the Antenna Specification document.

1.1. SUPPORTED BANDS PER ANTENNA PORT

Antenna Port	Supported bands
MIMO 1	<ul style="list-style-type: none">- WCDMA: B2, 5- LTE: B2, 4, 5, 7, 12, 13, 17, 25, 66, 26, 38, 42, 48, 71- NR: n2, 5, 7, 12, 25, 41, 48, 66, 71, 77, 78
MIMO 2	<ul style="list-style-type: none">- LTE: B42, 48- NR: n48, 77, 78
MIMO 3	Only RX
MIMO 4	Only RX
Int. BUA (Back Up Antenna)	<ul style="list-style-type: none">- WCDMA: B2, 5- LTE: B2, 4, 5, 7, 25, 26, 38, 66- NR: n2, 5, 7, 25, 41, 66

Note:

1. Since the Int. BUA uses the same antenna port as MIMO1, only radiated testing was performed.

1.2 MAXIMUM OUTPUT POWER

Mode	Tx Frequency (MHz)	Rx Frequency (MHz)	Emission Designator	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
WCDMA850	826.4 – 846.6	871.4 – 891.6	4M15F9W	0.226	23.55
Mode	Tx Frequency (MHz)	Rx Frequency (MHz)	Emission Designator	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
WCDMA1900	1852.4 – 1907.6	1932.4 – 1987.6	4M15F9W	0.214	23.31

2. INTRODUCTION

2.1 DESCRIPTION OF EUT

The EUT was a Telematics with UMTS, LTE and 5GNR(Sub 6).

2.2 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3 TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

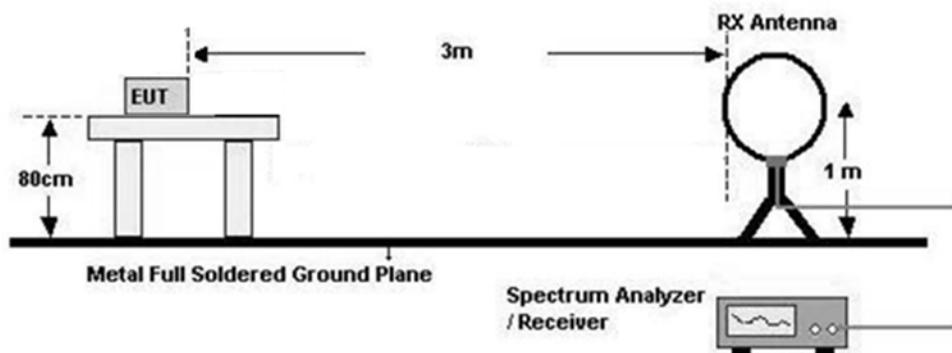
3.2 RADIATED POWER

Test Overview

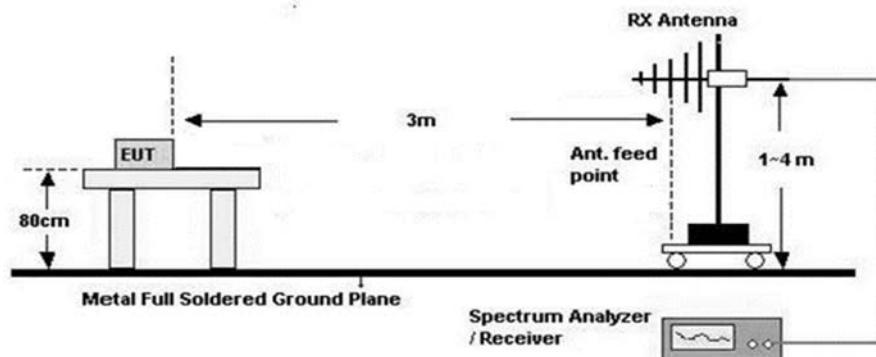
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Configuration

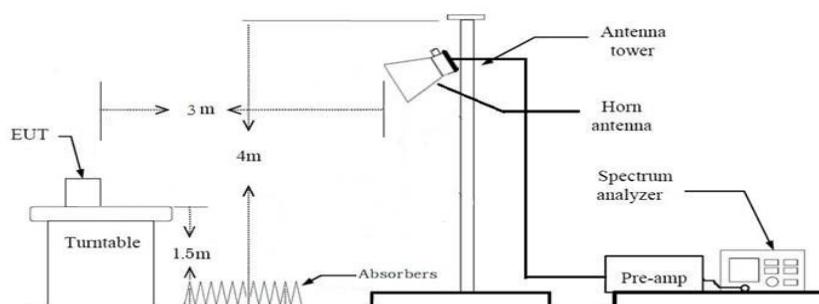
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $>$ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The EUT is placed on a turntable, which is 0.8 m above ground plane. (Below 1 GHz)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane. (Above 1 GHz)
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
6. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.
7. Total(dB μ V/m) = Measured Value(dB μ V) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
8. EIRP (dBm)
= Total (dB μ V/m) + 20 log D – 104.8 (where D is the measurement distance in meters. D=3)
= Total (dB μ V/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

3.3 RADIATED SPURIOUS EMISSIONS

3.3.1 WCDMA 1900

Test Overview

Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW \geq 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

1. The EUT is placed on a turntable, which is 0.8 m above ground plane. (Below 1 GHz)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane. (Above 1 GHz)
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
6. Total(dB μ V/m) = Measured Value(dB μ V) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
+ H.P.F(dB) - Amp Gain(dB)
7. EIRP (dBm)
= Total (dB μ V/m) + 20 log D - 104.8 (where D is the measurement distance in meters. D=3)
= Total (dB μ V/m) - 95.2(dB)
8. ERP(dBm) = EIRP(dBm) - 2.15(dB)

3.3.2 WCDMA 850

Test Overview(WCDMA 850)

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method.

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW \geq 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

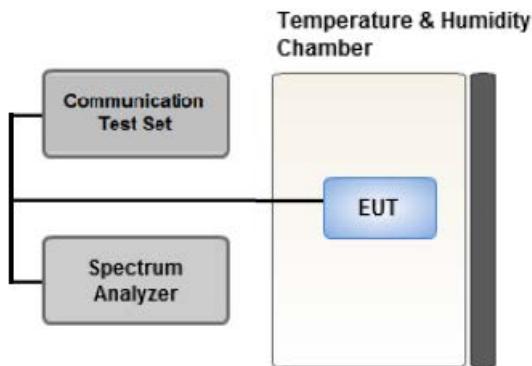
$$\text{Result (dBm)} = \text{Pg (dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

Where: Pg is the generator output power into the substitution antenna.

If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



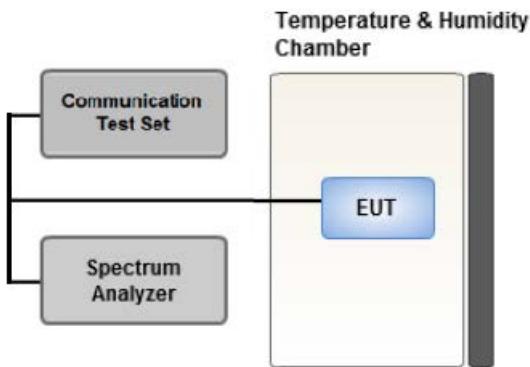
Test setup

CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
 - .- for continuous transmissions, set to 1 ms,
 - .- or 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 and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1 %.

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

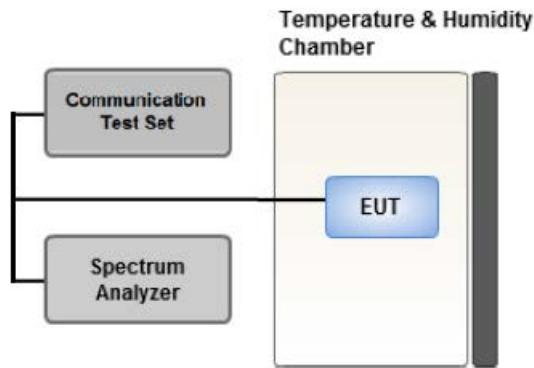
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5 % of the expected OBW
3. VBW \geq 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

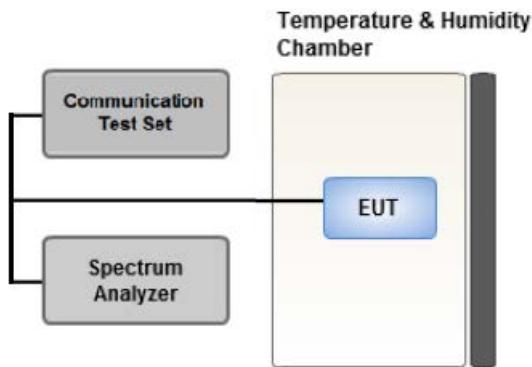
Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. RBW = 1 MHz
2. VBW \geq 3 MHz
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep time = auto
6. Number of points in sweep \geq 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span}/\text{RBW}$
7. Trace mode = trace average
8. Sweep time > Number of points in sweep \times Symbol period
9. The trace was allowed to stabilize

Test Notes

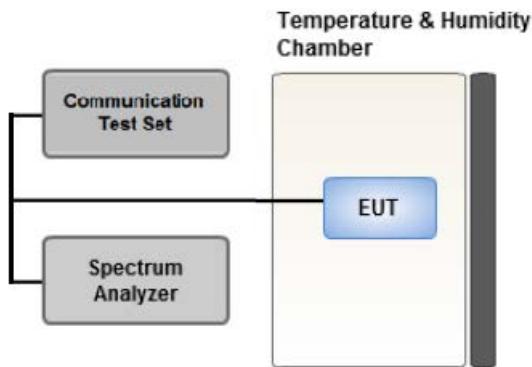
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \times \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

All measurements were done at 2 channels (low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

Where Margin < 1 dB the emission level is either corrected by $10 \log(1 \text{ MHz} / \text{RB})$ or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

2. Primary Supply Voltage:

.- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.

.- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).

2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter.

Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.9 WORST CASE (CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
- Both 85% and 115% conditions were measured for the Frequency Stability test, and results for the worst-case configuration (85%) were reported.
- In accordance with the customer's specification of 3.7V as the lowest operating voltage, testing was performed at 3.7V instead of 85% (3.57V).

[Worst case]

Test Description	Modulation	Test Channel
Occupied Bandwidth	WCDMA : QPSK(RMC)	Low, Mid, High
Band Edge	WCDMA : QPSK(RMC)	Low, High
Peak-To-Average Ratio	WCDMA : QPSK(RMC)	Mid
Spurious and Harmonic Emissions at Antenna Terminal	WCDMA : QPSK(RMC)	Low, Mid, High

[Test Channel]

	Uplink Channel	
	3G (WCDMA B2)	3G (WCDMA B5)
Low	9262	4132
Mid	9400	4183
High	9538	4233

3.10 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data. Please refer to the table below.
- MIMO3 and MIMO4 have three types of Rx antennas. Operating modes were investigated for all Rx antennas, and the worst-case configuration results were reported.

(Worst-case: HKL antenna(Maximum gain: 5dBi))

[External(MIMO1) Worst case_3G]

Test Description	Modulation	Paging Service	Axis	Test Channel
Effective Radiated Power, Effective Isotropic Radiated Power	QPSK (WCDMA)	12.2 kbps RMC	WCDMA B2 : Z WCDMA B5 : Z	Low, Mid, High
Radiated Spurious and Harmonic Emissions	QPSK (WCDMA)	12.2 kbps RMC	WCDMA B2 : Z WCDMA B5 : Y	Low, Mid, High

[Internal(BUA) Worst case_3G]

Test Description	Modulation	Paging Service	Axis	Test Channel
Effective Radiated Power, Effective Isotropic Radiated Power	QPSK (WCDMA)	12.2 kbps RMC	WCDMA B2 : Z WCDMA B5 : Y	Low, Mid, High
Radiated Spurious and Harmonic Emissions	QPSK (WCDMA)	12.2 kbps RMC	WCDMA B2 : Z WCDMA B5 : Y	Low, Mid, High

[Test Channel]

	UplinkChannel	
	3G (WCDMA B2)	3G (WCDMA B5)
Low	9262	4132
Mid	9400	4183
High	9538	4233

4. LIST OF TEST EQUIPMENT

[Radiated]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switch System	FBSR-04C(3G HPF+LNA)	TNM System	S4L1	03/12/2026	Annual
RF Switch System	FBSR-04C(7G HPF+LNA)	TNM System	S4L5	03/12/2026	Annual
RF Switch System	FBSR-04C(LNA)	TNM System	S4L4	03/12/2026	Annual
RF Switch System	FBSR-04C(Thru)	TNM System	S4L6	03/12/2026	Annual
Antenna Position Tower	MA4640	Innco systems	S4AM	08/07/2025	Annual
Turn Table	DS2000-S	Innco systems	N/A	N/A	-
Controller (Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/489 20320/P	N/A	-
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	-
RF Switching System	Switch box(1G HPF+LNA)	HCT CO., LTD.,	F2L2	12/12/2025	Annual
RF Switching System	Switch box(3G HPF+LNA)	HCT CO., LTD.,	F2L3	12/12/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F2L5	12/12/2025	Annual
RF Switching System	Switch box(6G HPF+LNA)	HCT CO., LTD.,	F2L14	12/12/2025	Annual
HIGHPASS FILTER	WHKX10-900-1000-15000-40SS	WAINWRIGHT INSTRUMENTS	16	07/24/2025	Annual
LOW NOISE AMPLIFIER	310N	SONOMA Instrument	186169	02/05/2026	Annual
LOW NOISE AMPLIFIER	TK-PA1840H	TESTEK	170011-L	10/11/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/10/2026	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA9120D	Schwarzbeck	03197	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA9120D	Schwarzbeck	03201	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA9120	Schwarzbeck	937	02/07/2027	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/23/2027	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	ROHDE & SCHWARZ	101733	09/19/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/04/2026	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/27/2026	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/14/2026	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/26/2025	Annual
Automation Software	FCC LTE Radiated	HCT CO., LTD	-	-	-
Automation Software	FCC NR Radiated	HCT CO., LTD	-	-	-

[Conducted]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Power Splitter (DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/10/2026	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Chamber	SU-642	ESPEC	93008124	02/11/2026	Annual
ATTENUATOR (20 dB)	8493C	Hewlett Packard	17280	04/10/2026	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/13/2025	Annual
UXM 5G Wireless Test Platform	E7515B	KEYSIGHT	MY60101126	02/10/2026	Annual
Signal Analyzer (2 Hz ~ 50.0 GHz)	N9030B	KEYSIGHT	MY56320554	02/03/2026	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.	-	-	-
Automation Software	FCC 2G/3G/4G Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC NR Conducted	HCT CO., LTD	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (\pm kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty (\pm dB)
Block Edge	0.70 (Confidence level about 95 %, $k=2$)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, $k=2$)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, $k=2$)
Radiated Power	4.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, $k=2$)

6. SUMMARY OF TEST RESULTS

- The decision rule applies 'simple acceptance'

6.1 Test Condition: Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§ 2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 22.917(a), § 24.238(a),	< 43 + 10 x log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	Note ¹
Peak- to- Average Ratio	§ 22.913(d), § 24.232(d),	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 22.355 § 24.235	< 2.5 ppm Emission must remain in band	PASS

Note:

1. Refer to the SAR report.

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§ 22.913(a)(5)	< 7 Watts max. ERP	PASS
Equivalent Isotropic Radiated Power	§ 24.232(c)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 22.917(a), § 24.238(a),	< 43 + 10 x log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

$$\text{ERP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

$$\text{EIRP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA(MIMO1)

8.1 EFFECTIVE RADIATED POWER

Mode	Ch./ Freq.		Measured (dB μ V/m)	Ant. Factor + Distance Factor (dB)	C.L + Thru(dB)	Total (dB μ V/m)	Pol.	Limit	ERP	
	channel	Freq.(MHz)						W	W	dBm
WCDMA850	4132	826.4	89.24	30.04	2.62	121.90	H	< 7.00	0.285	24.55
	4183	836.6	91.10	30.04	2.62	123.76	H		0.438	26.41
	4233	846.6	90.28	30.04	2.62	122.94	H		0.362	25.59

8.2 EQUIVALENT ISOTROPIC RADIATED POWER

Mode	Ch./ Freq.		Measured (dB μ V/m)	Ant. Factor + Distance Factor (dB)	C.L + Thru(dB)	Total (dB μ V/m)	Pol.	Limit	EIRP	
	channel	Freq.(MHz)						W	W	dBm
WCDMA1900	9262	1852.4	87.59	27.70	3.95	119.23	H	< 2.00	0.253	24.03
	9400	1880.0	87.72	27.70	3.95	119.36	H		0.261	24.16
	9538	1907.6	87.18	28.00	3.95	119.12	H		0.247	23.92

8.3 RADIATED SPURIOUS EMISSIONS

 MODULATION SIGNAL: WCDMA850 DISTANCE: 3 meters

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit
4132 (826.4)	1 652.80	-51.41	9.47	-66.44	2.02	V	-58.99	-13.00
	2 479.20	-46.93	10.32	-58.07	2.55	V	-50.30	-13.00
	3 305.60	-54.41	11.09	-62.67	2.97	H	-54.55	-13.00
	4 132.00	-54.96	11.68	-61.24	3.33	V	-52.89	-13.00
	4 958.40	-56.23	11.25	-57.83	3.69	V	-50.27	-13.00
4183 (836.6)	1 673.20	-52.25	9.60	-67.52	2.05	V	-59.97	-13.00
	2 509.80	-53.03	10.26	-64.31	2.51	V	-56.56	-13.00
	3 346.40	-54.61	11.10	-63.27	2.96	V	-55.13	-13.00
	4 183.00	-54.76	11.72	-60.42	3.40	H	-52.10	-13.00
	5 019.60	-55.56	11.15	-56.66	3.69	H	-49.20	-13.00
4233 (846.6)	1 693.20	-51.85	9.73	-67.07	2.07	H	-59.41	-13.00
	2 539.80	-52.80	10.25	-63.90	2.53	V	-56.18	-13.00
	3 386.40	-53.57	11.18	-62.52	2.99	V	-54.33	-13.00
	4 233.00	-54.08	11.69	-59.87	3.36	V	-51.54	-13.00
	5 079.60	-54.78	11.15	-56.16	3.81	V	-48.82	-13.00

MODULATION SIGNAL: WCDMA1900 DISTANCE: 3 meters

Ch.	Freq.(MHz)	Measured Level (dB μ V)	Ant. Factor + Distance Factor (dB)	C.L+ H.P.F + Amp Gain (dB)	Total (dB μ V/m)	Pol.	Result (dBm)	Limit
9262 (1852.4)	3 704.80	45.58	31.40	33.87	43.11	H	-52.09	-13.00
	5 557.20	46.58	34.00	34.54	46.04	H	-49.16	-13.00
	7 409.60	46.18	38.90	33.92	51.16	H	-44.04	-13.00
	9 262.00	44.78	41.10	32.32	53.56	V	-41.64	-13.00
	11 114.40	43.72	42.60	30.65	55.67	V	-39.53	-13.00
9400 (1880.0)	3 760.00	47.60	31.40	33.87	45.13	V	-50.07	-13.00
	5 640.00	46.22	34.00	34.14	46.08	V	-49.12	-13.00
	7 520.00	45.89	38.90	34.01	50.78	V	-44.42	-13.00
	9 400.00	44.61	41.20	31.50	54.31	H	-40.89	-13.00
	11 280.00	42.79	42.40	30.48	54.70	V	-40.50	-13.00
9538 (1907.6)	3 815.20	47.88	31.70	34.09	45.49	V	-49.71	-13.00
	5 722.80	45.71	34.10	33.88	45.93	V	-49.27	-13.00
	7 630.40	45.12	38.70	33.85	49.97	V	-45.23	-13.00
	9 538.00	44.57	41.00	32.05	53.52	H	-41.68	-13.00
	11 445.60	42.17	42.60	29.94	54.82	H	-40.38	-13.00

8.4 PEAK-TO-AVERAGE RATIO

Band	Ch.	Data (dB)	Limit (dB)	Pass / Fail
WCDMA850	4408	3.00	13	Pass
WCDMA1900	9400	2.97		

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 49 ~ 50.

8.5 OCCUPIED BANDWIDTH

Band	Channel	Frequency (MHz)	Data (GSM: kHz / WCDMA : MHz)
WCDMA850	4132	826.40	4.1535
	4183	836.60	4.1457
	4233	846.60	4.1324
WCDMA1900	9262	1852.40	4.1416
	9400	1880.00	4.1443
	9538	1907.60	4.1508

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 43 ~ 48.

8.6 CONDUCTED SPURIOUS EMISSIONS

Band	Channel	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result	Limit (dBm)
WCDMA850	4132	4.0479	29.320	-66.893	-37.573	-13.00
	4183	4.9452	29.320	-65.342	-36.022	
	4233	7.1885	29.910	-66.612	-36.702	
WCDMA1900	9262	19.6000	30.840	-63.988	-33.148	-13.00
	9400	19.8200	30.840	-64.417	-33.577	
	9538	19.0200	30.840	-64.122	-33.282	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 59 ~ 67.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor (dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.250
1 – 5	29.320
5 – 10	29.910
10 – 15	30.530
15 – 20	31.840
Above 20(26.5)	32.520

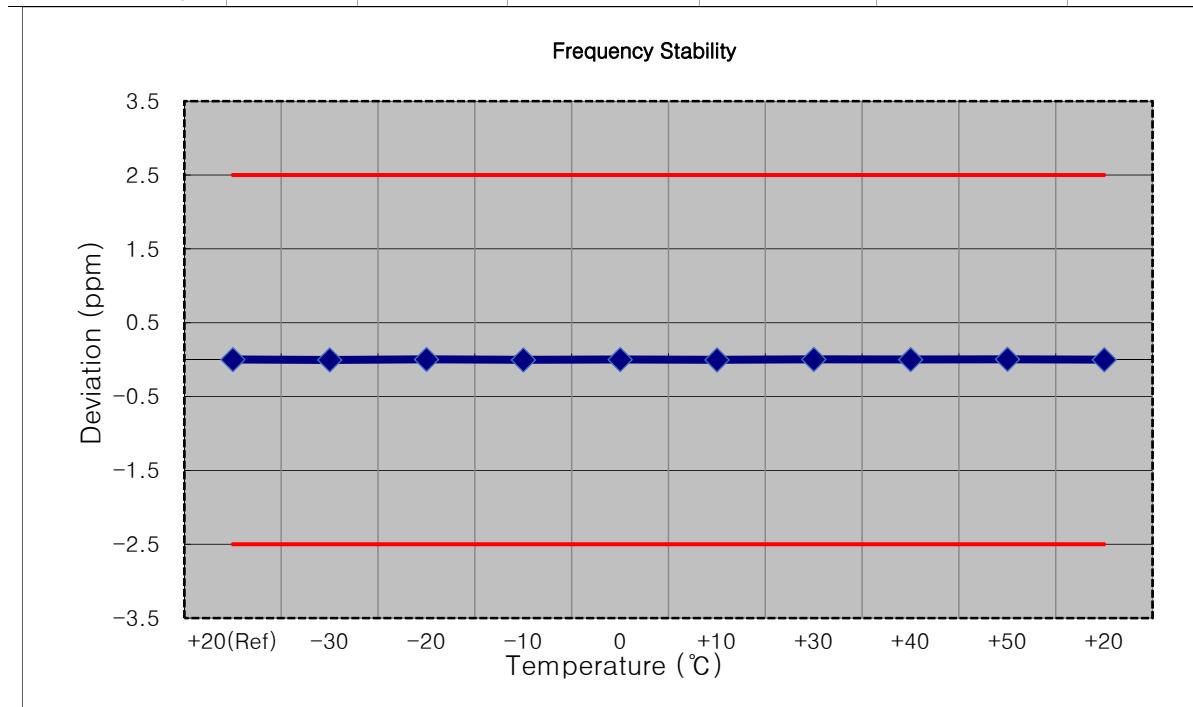
8.7 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 51 ~ 58.

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

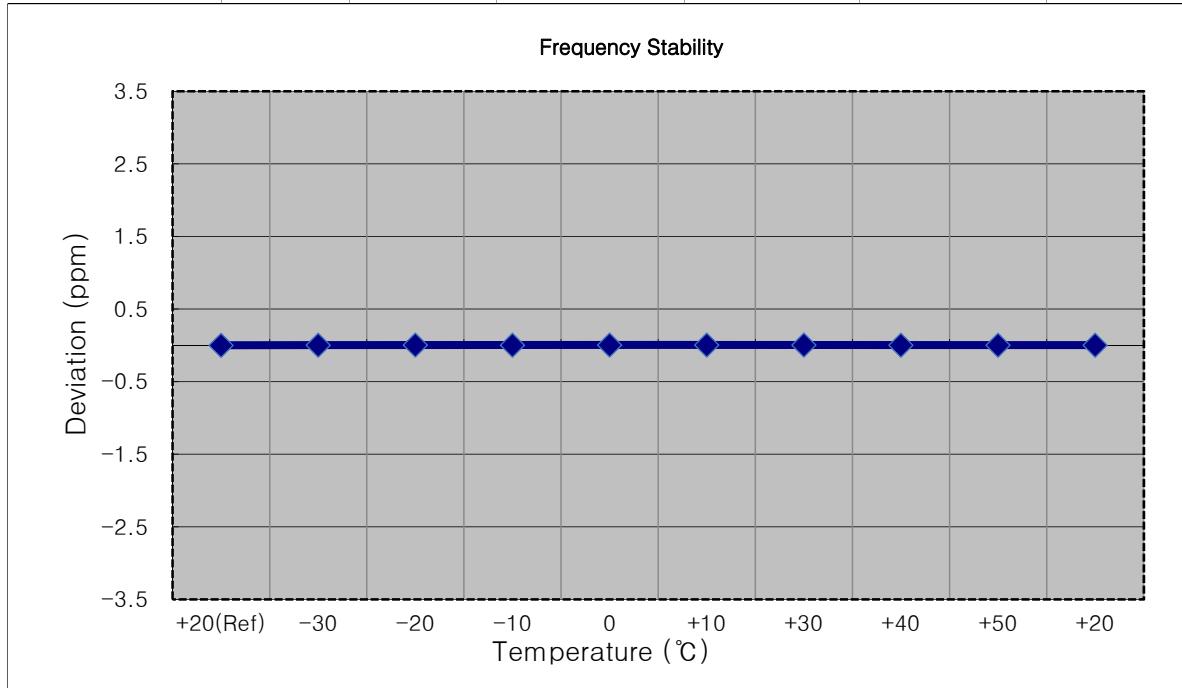
Mode: WCDMA850
 OPERATING FREQUENCY: 836,600,000 Hz
 CHANNEL: 4183
 REFERENCE VOLTAGE: 4.200 VDC
 DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	4.200	+20(Ref)	836 599 998	0.0	0.000 000	0.0000
100 %		-30	836 599 995	-3.2	0.000 000	-0.0038
100 %		-20	836 600 000	1.7	0.000 000	0.0021
100 %		-10	836 599 996	-2.6	0.000 000	-0.0031
100 %		0	836 600 000	1.5	0.000 000	0.0018
100 %		+10	836 599 996	-2.4	0.000 000	-0.0029
100 %		+30	836 600 000	2.3	0.000 000	0.0027
100 %		+40	836 600 000	1.6	0.000 000	0.0019
100 %		+50	836 600 002	3.4	0.000 000	0.0041
Lowest voltage	3.700	+20	836 599 996	-1.7	0.000 000	-0.0021



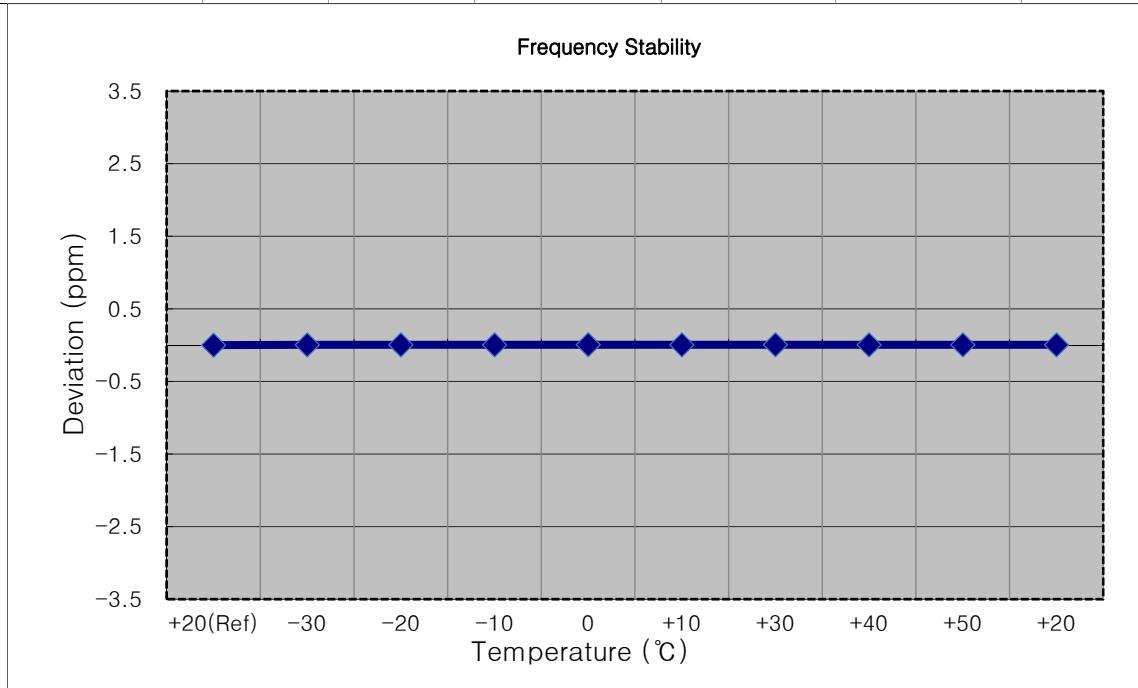
Mode: WCDMA1900
 OPERATING FREQUENCY: 1,842,400,000 Hz
 CHANNEL: 9262
 REFERENCE VOLTAGE: 4.200 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	4.200	+20(Ref)	1852 400 007	0.0	0.000 000	0.0000
100 %		-30	1852 400 011	3.7	0.000 000	0.0020
100 %		-20	1852 400 016	8.6	0.000 000	0.0046
100 %		-10	1852 400 013	5.7	0.000 000	0.0031
100 %		0	1852 400 014	6.2	0.000 000	0.0034
100 %		+10	1852 400 015	8.1	0.000 000	0.0044
100 %		+30	1852 400 015	7.6	0.000 000	0.0041
100 %		+40	1852 400 011	3.7	0.000 000	0.0020
100 %		+50	1852 400 013	5.6	0.000 000	0.0030
Lowest voltage	3.700	+20	1852 400 013	5.7	0.000 000	0.0031



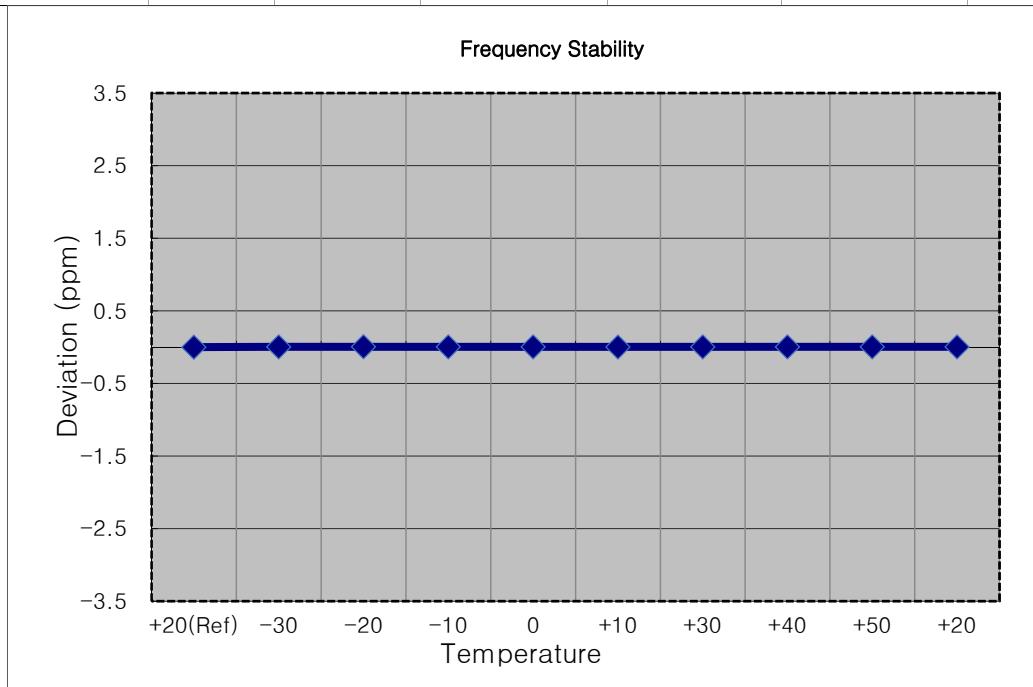
Mode: WCDMA1900
 OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 9400
 REFERENCE VOLTAGE: 4.200 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	4.200	+20(Ref)	1880 000 006	0.0	0.000 000	0.0000
100 %		-30	1880 000 014	8.1	0.000 000	0.0043
100 %		-20	1880 000 015	8.8	0.000 000	0.0047
100 %		-10	1880 000 013	7.7	0.000 000	0.0041
100 %		0	1880 000 015	9.5	0.000 001	0.0050
100 %		+10	1880 000 013	7.3	0.000 000	0.0039
100 %		+30	1880 000 015	9.4	0.000 001	0.0050
100 %		+40	1880 000 014	8.6	0.000 000	0.0046
100 %		+50	1880 000 011	5.6	0.000 000	0.0030
Lowest voltage	3.700	+20	1880 000 014	8.2	0.000 000	0.0044



Mode: WCDMA1900
 OPERATING FREQUENCY: 1,907,600,000 Hz
 CHANNEL: 9538
 REFERENCE VOLTAGE: 4.200 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	4.200	+20(Ref)	1907 600 006	0.0	0.000 000	0.0000
100 %		-30	1907 600 013	7.6	0.000 000	0.0040
100 %		-20	1907 600 015	9.7	0.000 001	0.0051
100 %		-10	1907 600 011	5.7	0.000 000	0.0030
100 %		0	1907 600 013	7.6	0.000 000	0.0040
100 %		+10	1907 600 010	4.8	0.000 000	0.0025
100 %		+30	1907 600 011	5.6	0.000 000	0.0029
100 %		+40	1907 600 012	6.3	0.000 000	0.0033
100 %		+50	1907 600 014	8.5	0.000 000	0.0045
Lowest voltage	3.700	+20	1907 600 011	5.8	0.000 000	0.0030



9. TEST DATA(Internal(BUA))

9.1 EFFECTIVE RADIATED POWER

Mode	Ch./ Freq.		Measured (dB μ V/m)	Ant. Factor + Distance Factor (dB)	C.L + Thru(dB)	Total (dB μ V/m)	Pol.	Limit	ERP	
	channel	Freq.(MHz)						W	W	dBm
WCDMA850	4132	826.4	90.14	30.04	2.62	122.80	H	< 7.00	0.351	25.45
	4183	836.6	91.58	30.04	2.62	124.24	H		0.489	26.89
	4233	846.6	92.50	30.04	2.62	125.16	H		0.604	27.81

9.2 EQUIVALENT ISOTROPIC RADIATED POWER

Mode	Ch./ Freq.		Measured (dB μ V/m)	Ant. Factor + Distance Factor (dB)	C.L + Thru(dB)	Total (dB μ V/m)	Pol.	Limit	EIRP	
	channel	Freq.(MHz)						W	W	dBm
WCDMA1900	9262	1852.4	85.65	27.70	3.95	117.29	H	< 2.00	0.162	22.09
	9400	1880.0	86.46	27.70	3.95	118.10	H		0.195	22.90
	9538	1907.6	87.32	28.00	3.95	119.26	H		0.255	24.06

9.3 RADIATED SPURIOUS EMISSIONS

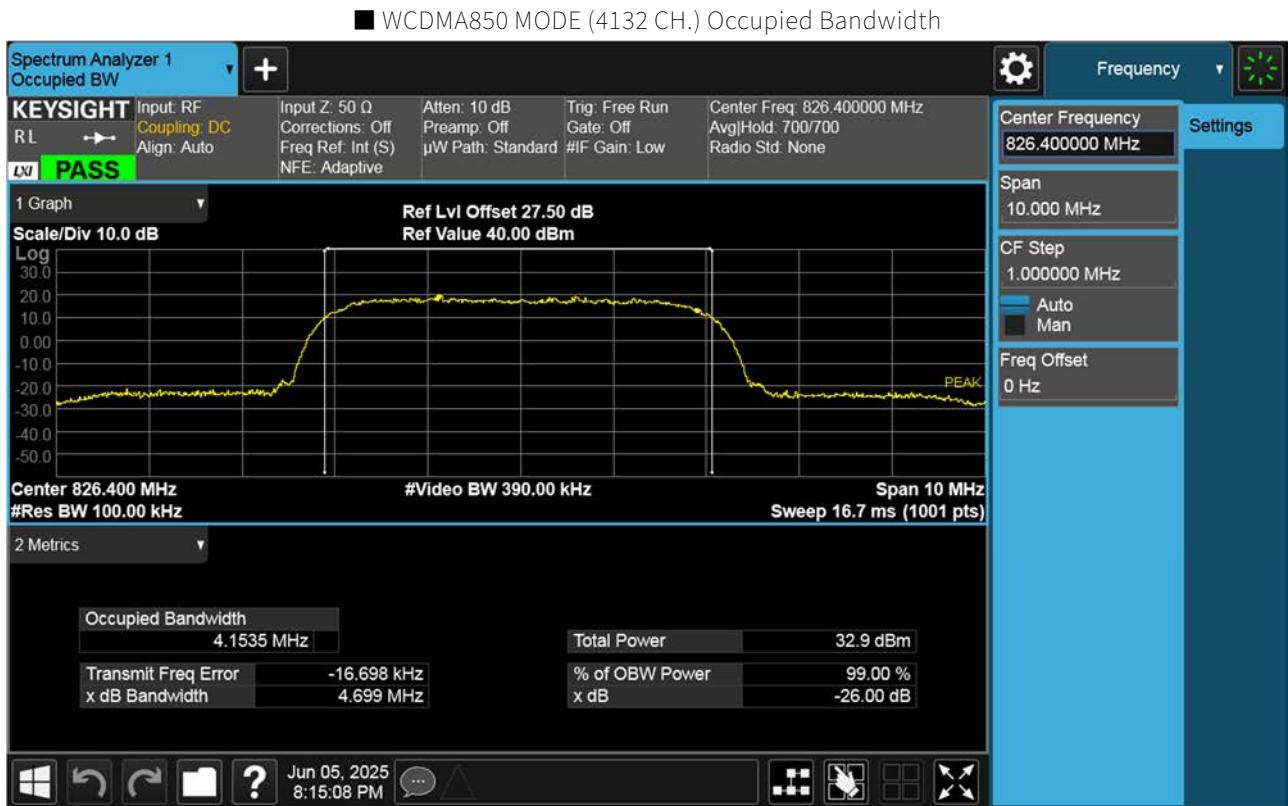
 MODULATION SIGNAL: WCDMA850 DISTANCE: 3 meters

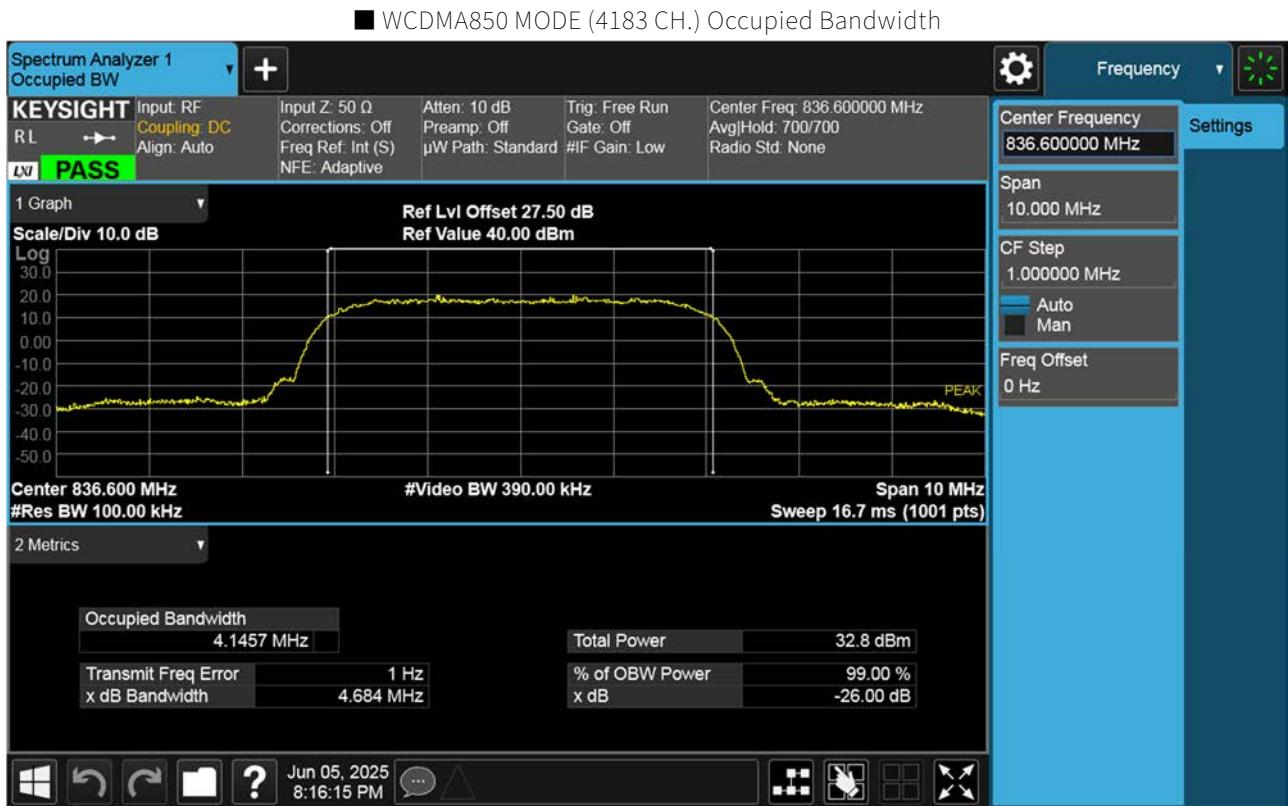
Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit
4132 (826.4)	1 652.80	-51.93	9.47	-66.96	2.02	H	-59.51	-13.00
	2 479.20	-53.37	10.32	-64.51	2.55	V	-56.74	-13.00
	3 305.60	-53.44	11.09	-61.70	2.97	V	-53.58	-13.00
	4 132.00	-54.35	11.68	-60.63	3.33	V	-52.28	-13.00
	4 958.40	-55.54	11.25	-57.14	3.69	H	-49.58	-13.00
4183 (836.6)	1 673.20	-52.03	9.60	-67.30	2.05	H	-59.75	-13.00
	2 509.80	-52.97	10.26	-64.25	2.51	H	-56.50	-13.00
	3 346.40	-54.63	11.10	-63.29	2.96	V	-55.15	-13.00
	4 183.00	-54.60	11.72	-60.26	3.40	V	-51.94	-13.00
	5 019.60	-55.78	11.15	-56.88	3.69	H	-49.42	-13.00
4233 (846.6)	1 693.20	-52.17	9.73	-67.39	2.07	V	-59.73	-13.00
	2 539.80	-52.45	10.25	-63.55	2.53	V	-55.83	-13.00
	3 386.40	-54.76	11.18	-63.71	2.99	H	-55.52	-13.00
	4 233.00	-54.64	11.69	-60.43	3.36	H	-52.10	-13.00
	5 079.60	-54.94	11.15	-56.32	3.81	V	-48.98	-13.00

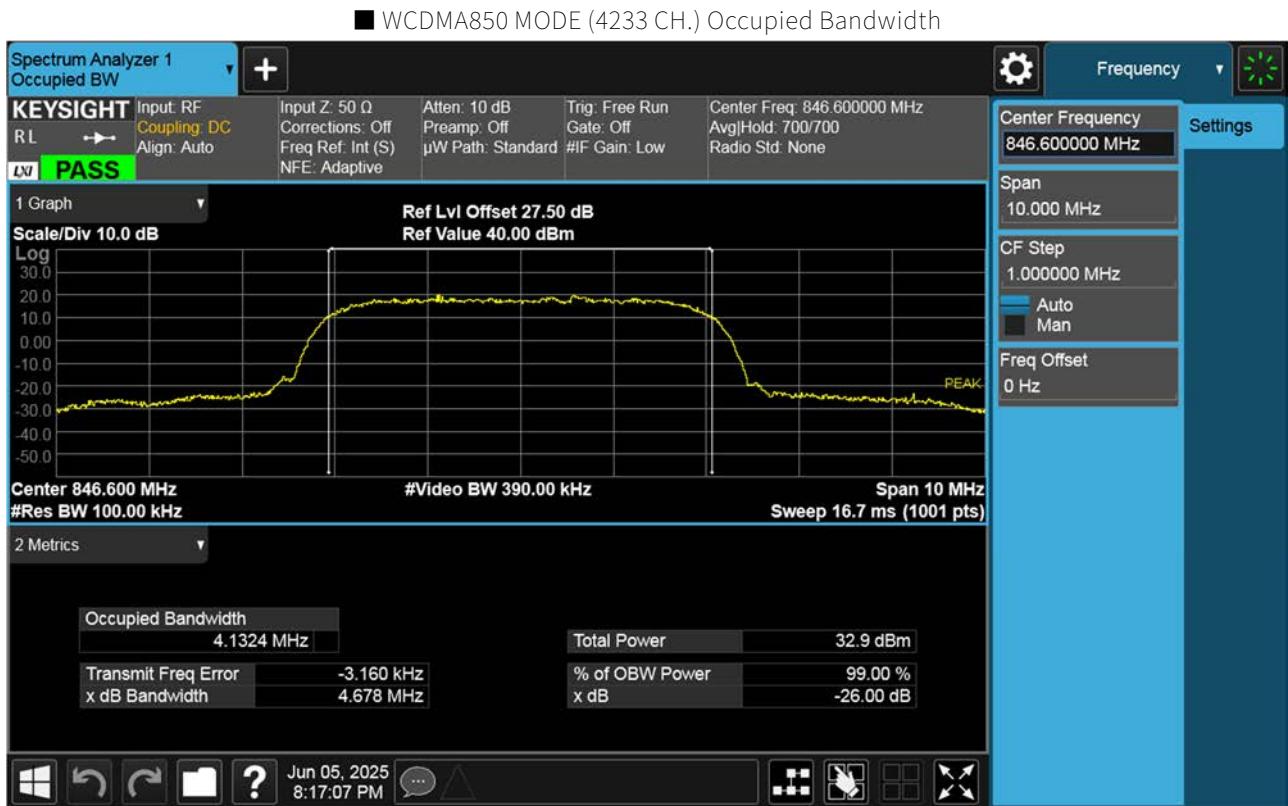
MODULATION SIGNAL: WCDMA1900 DISTANCE: 3 meters

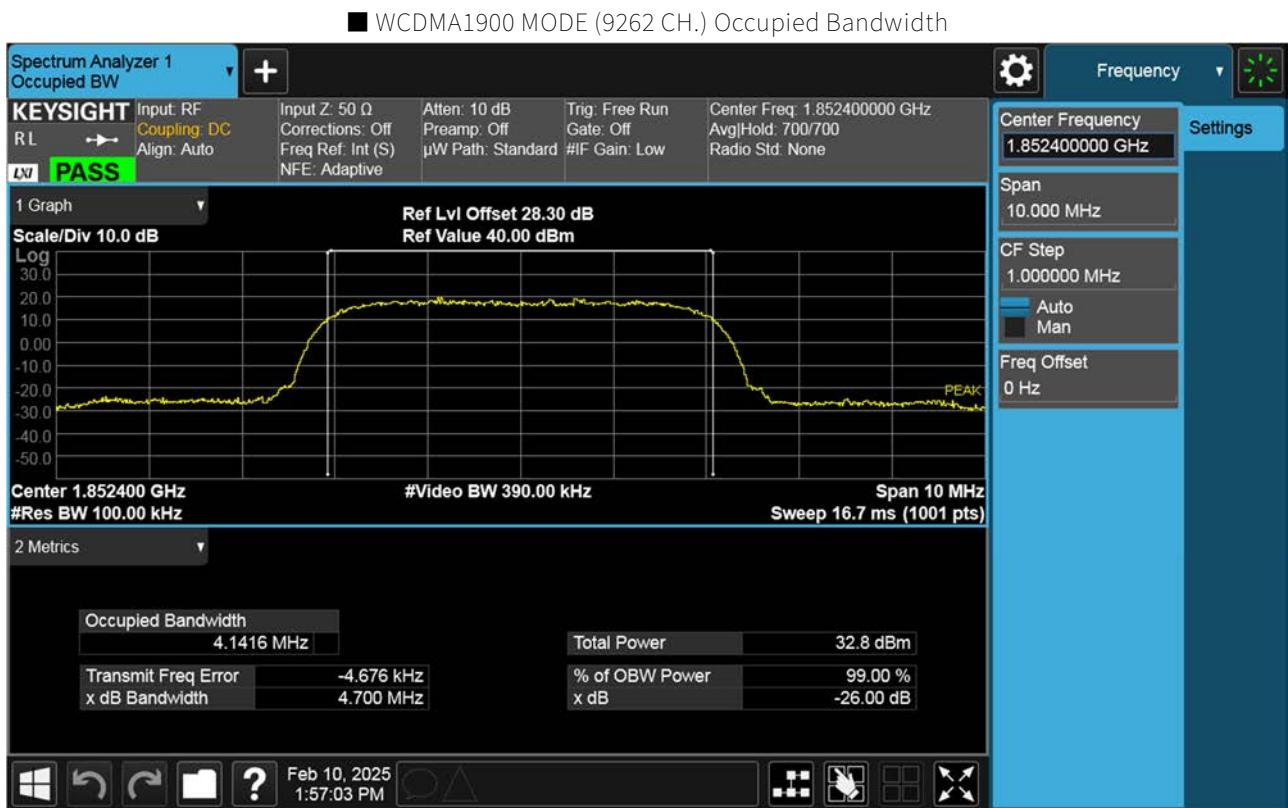
Ch.	Freq.(MHz)	Measured Level (dB μ V)	Ant. Factor + Distance Factor (dB)	C.L+ H.P.F + Amp Gain (dB)	Total (dB μ V/m)	Pol.	Result (dBm)	Limit
9262 (1852.4)	3 704.80	45.69	31.40	33.87	43.22	H	-51.98	-13.00
	5 557.20	46.70	34.00	34.54	46.16	H	-49.04	-13.00
	7 409.60	45.55	38.90	33.92	50.53	V	-44.67	-13.00
	9 262.00	45.51	41.10	32.32	54.29	H	-40.91	-13.00
	11 114.40	43.71	42.60	30.65	55.66	H	-39.54	-13.00
9400 (1880.0)	3 760.00	48.67	31.40	33.87	46.20	V	-49.00	-13.00
	5 640.00	45.99	34.00	34.14	45.85	V	-49.35	-13.00
	7 520.00	45.77	38.90	34.01	50.66	V	-44.54	-13.00
	9 400.00	44.32	41.20	31.50	54.02	V	-41.18	-13.00
	11 280.00	43.19	42.40	30.48	55.10	H	-40.10	-13.00
9538 (1907.6)	3 815.20	46.01	31.70	34.09	43.62	V	-51.58	-13.00
	5 722.80	45.52	34.10	33.88	45.74	V	-49.46	-13.00
	7 630.40	45.07	38.70	33.85	49.92	V	-45.28	-13.00
	9 538.00	44.56	41.00	32.05	53.51	H	-41.69	-13.00
	11 445.60	42.19	42.60	29.94	54.84	V	-40.36	-13.00

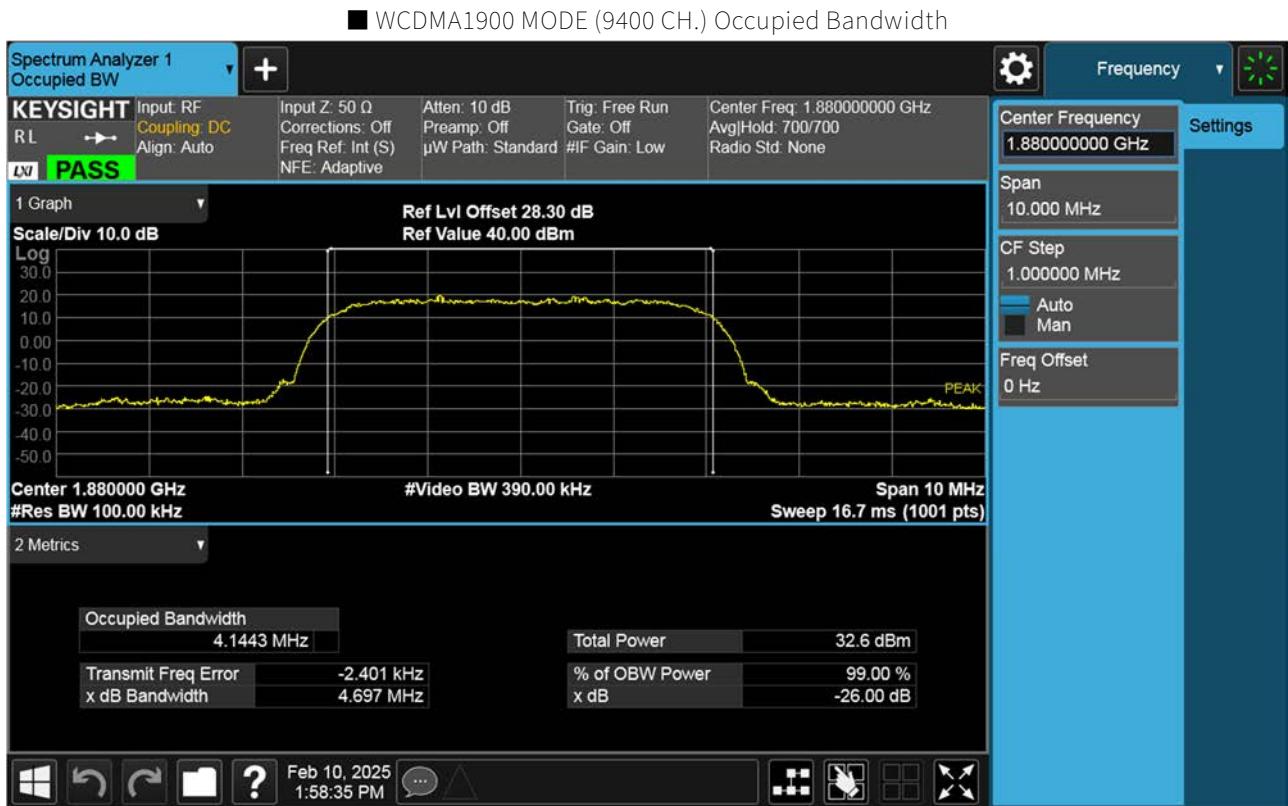
10. TEST PLOTS

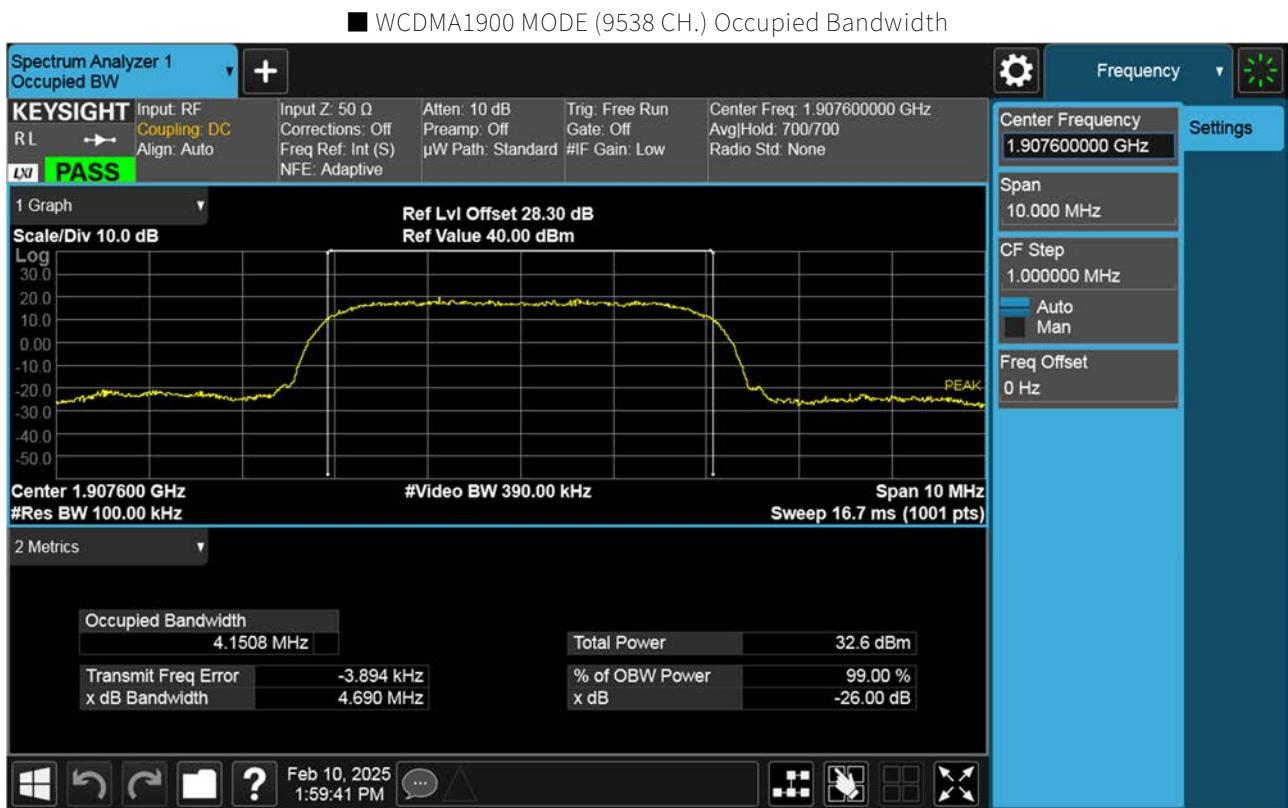












■ WCDMA850 MODE (4408 CH.) Peak-to-Average Ratio





■ WCDMA850 MODE (4132 CH.) Block Edge



■ WCDMA850 MODE (4132 CH.) – 4 MHz Span





■ WCDMA850 MODE (4233 CH.) – 4 MHz Span



■ WCDMA1900 MODE (9262 CH.) Block Edge

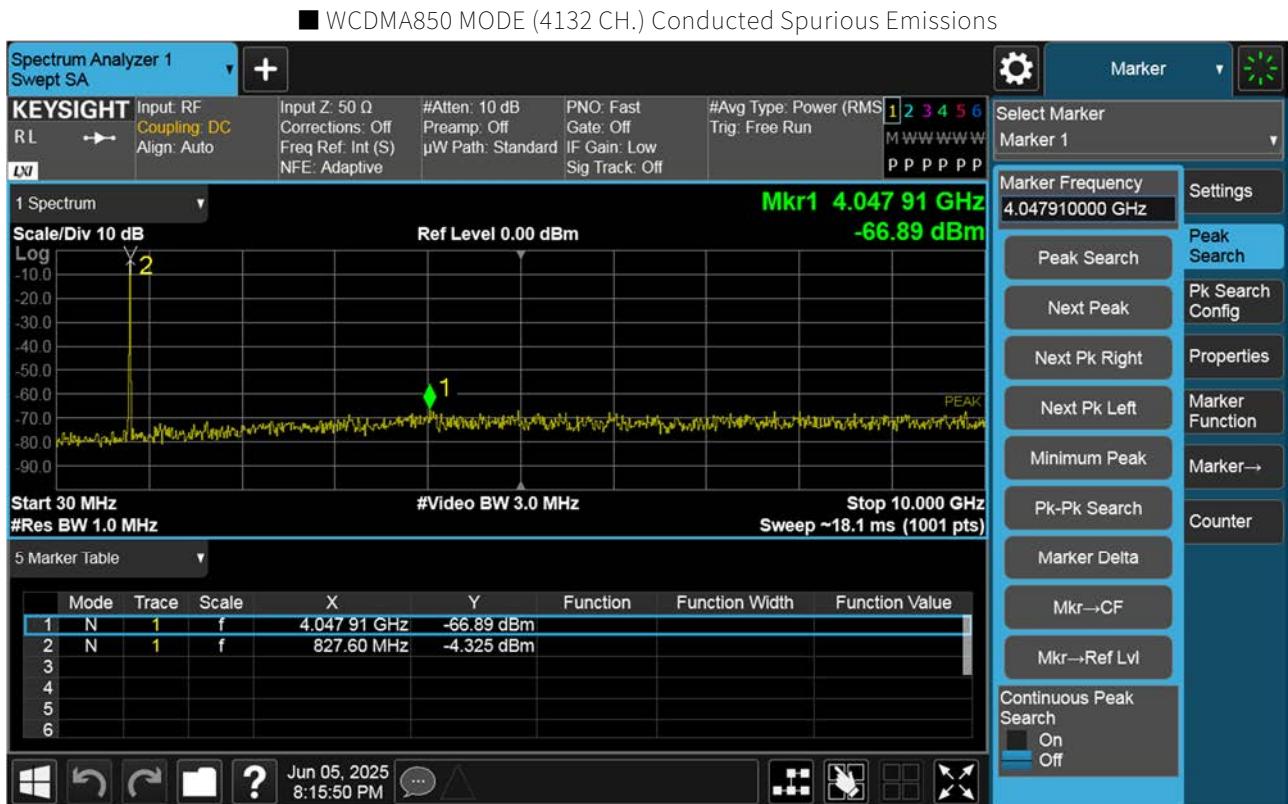


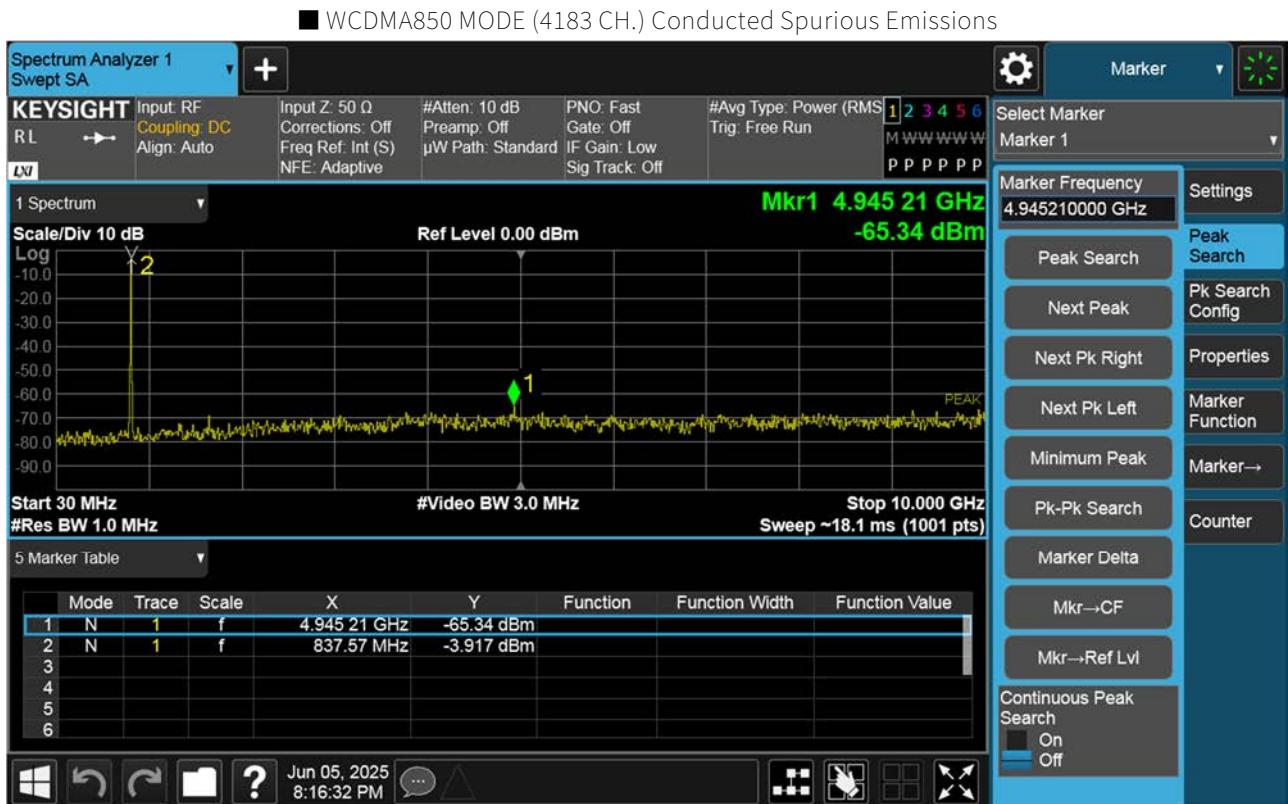


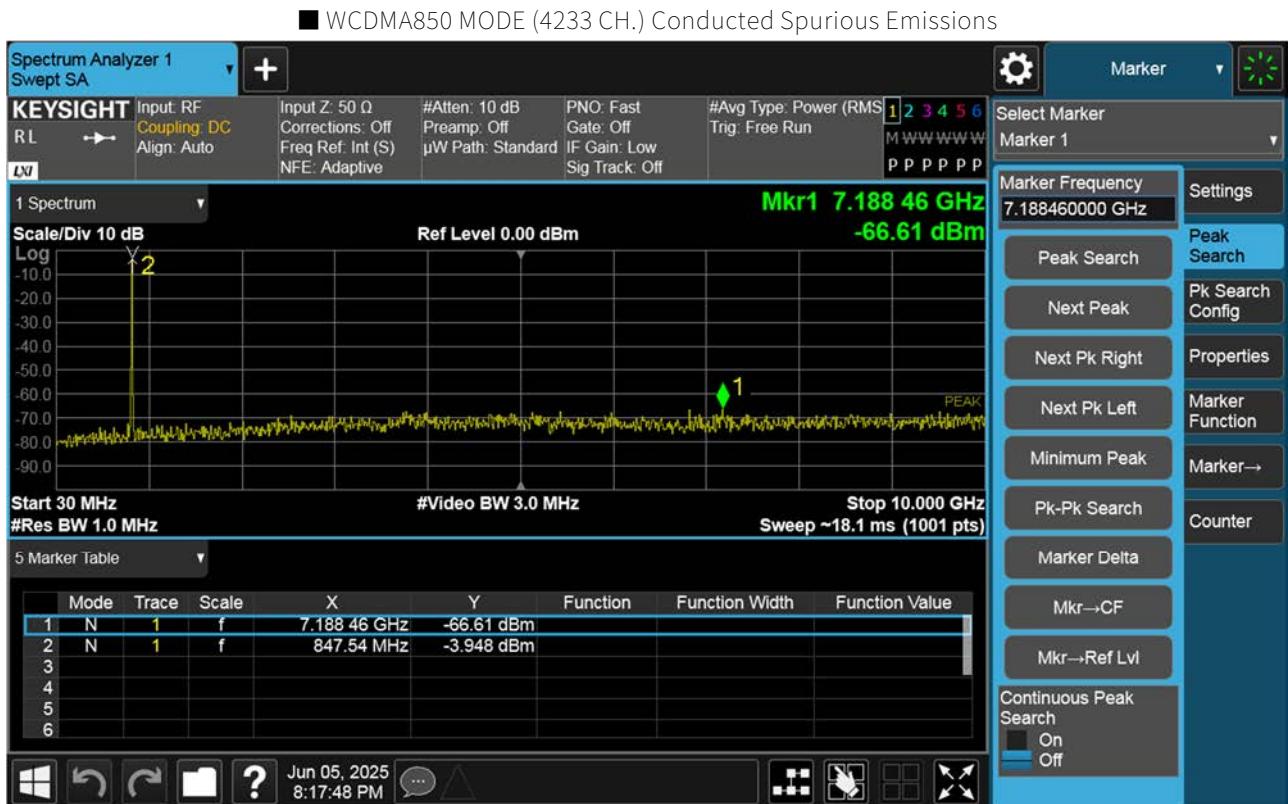
■ WCDMA1900 MODE (9538 CH.) Block Edge



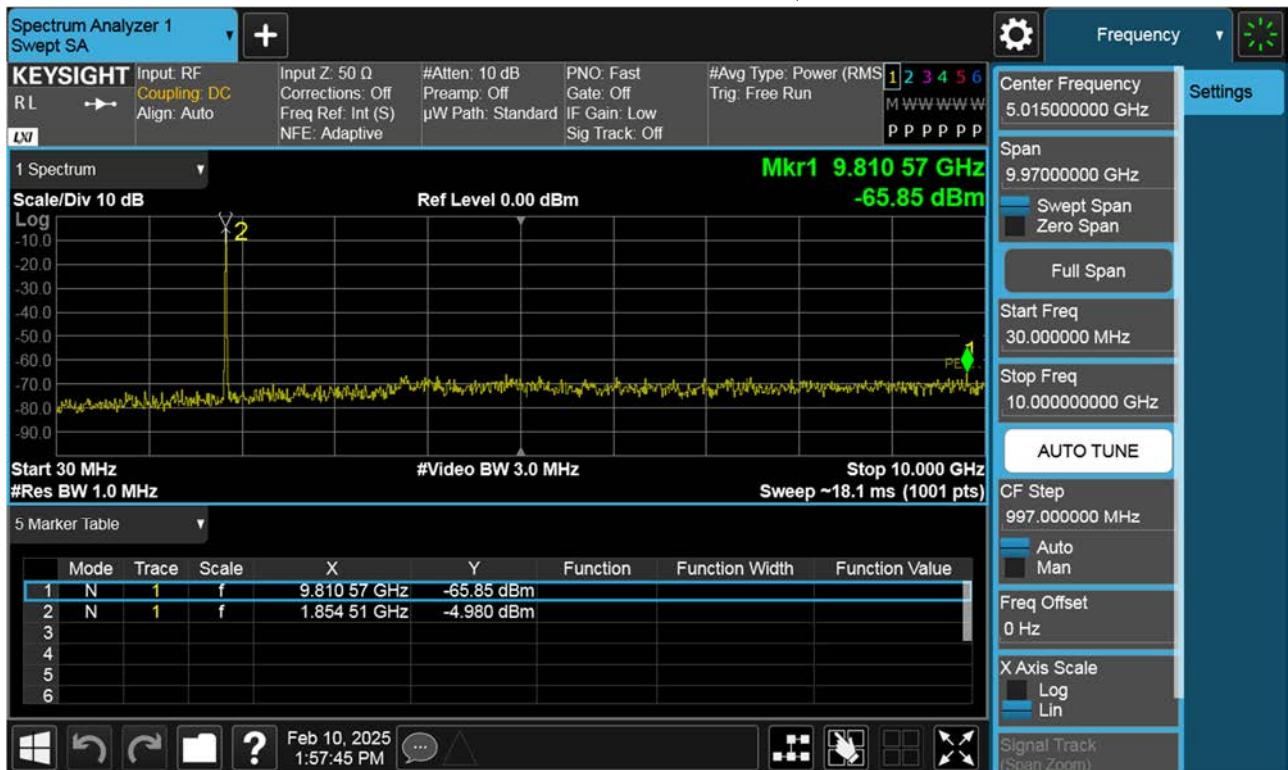




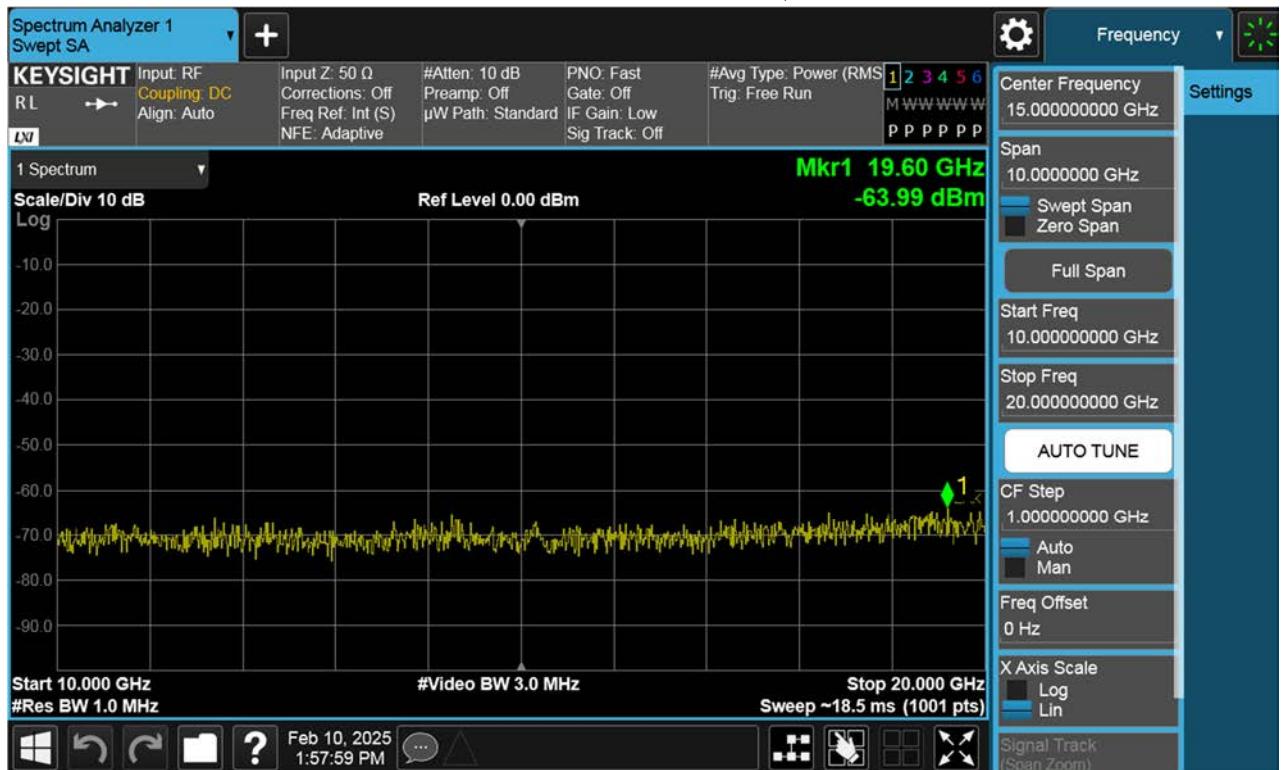




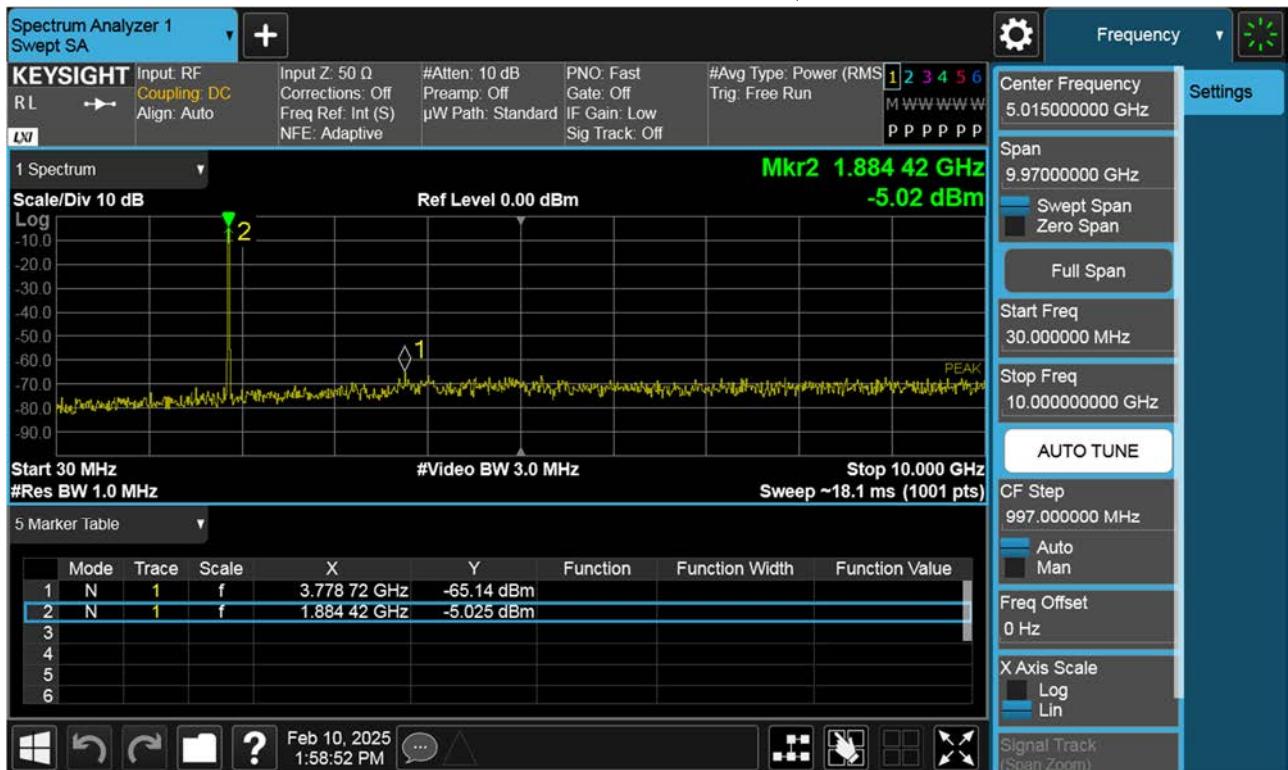
■ WCDMA1900 MODE (9262 CH.) Conducted Spurious Emissions1



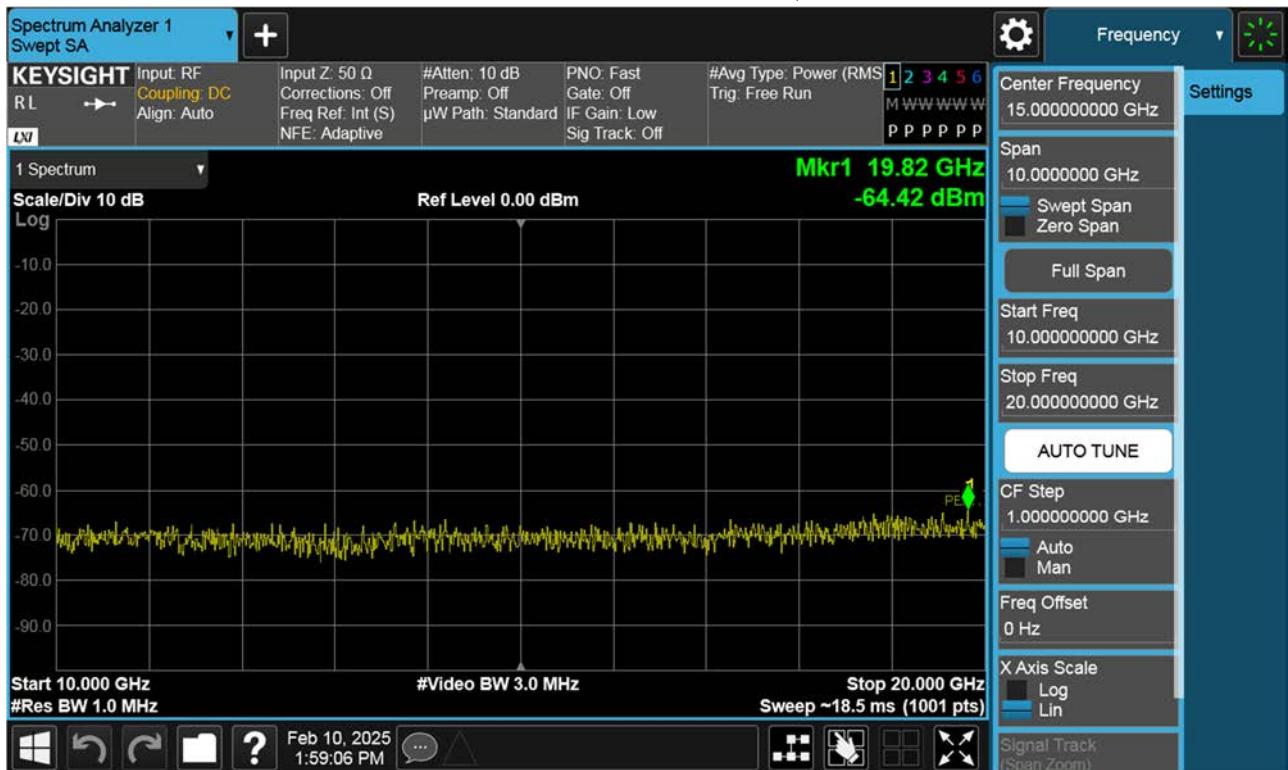
■ WCDMA1900 MODE (9262 CH.) Conducted Spurious Emissions2



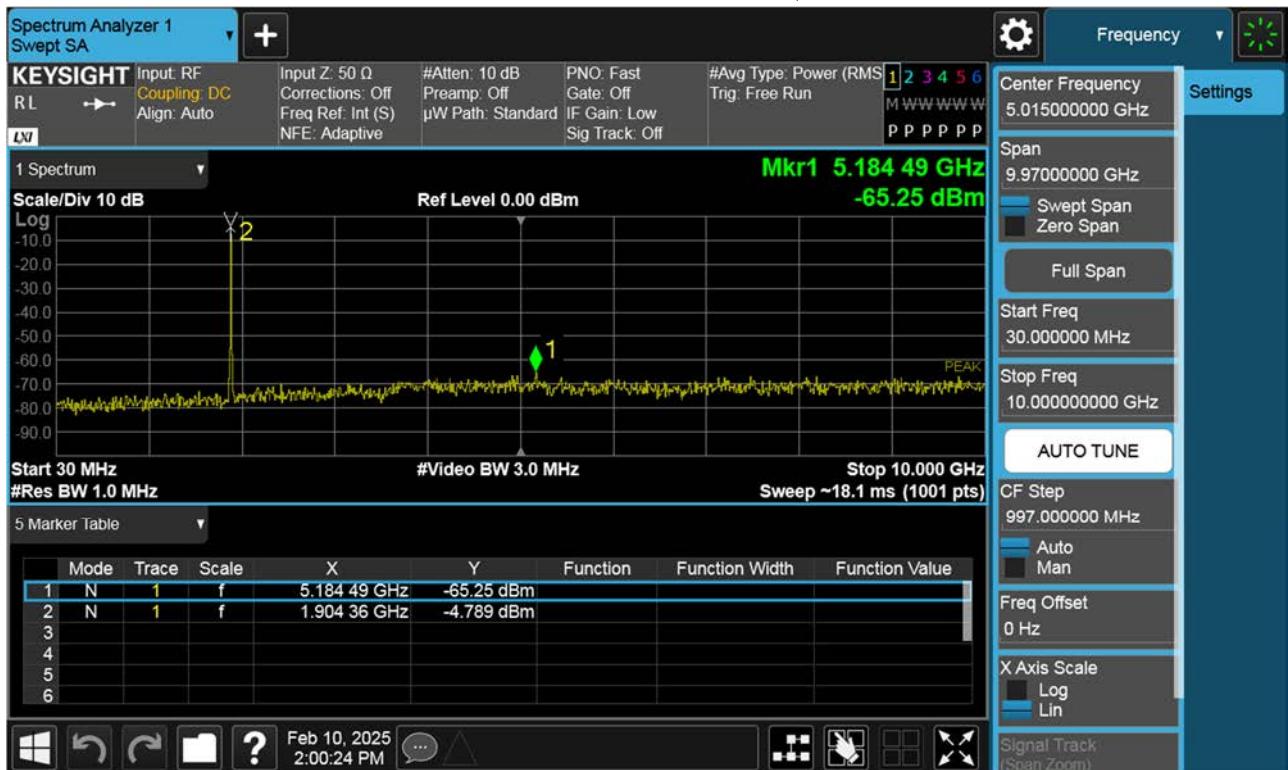
■ WCDMA1900 MODE (9400 CH.) Conducted Spurious Emissions1



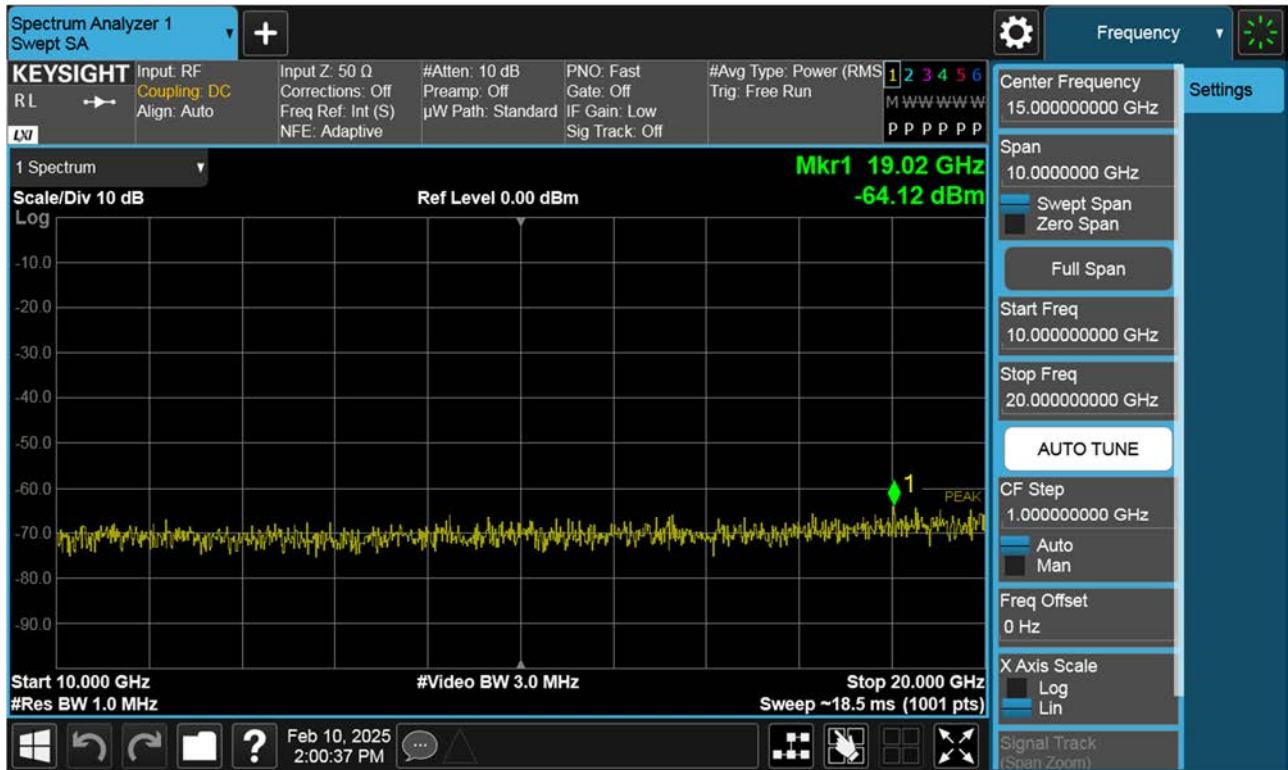
■ WCDMA1900 MODE (9400 CH.) Conducted Spurious Emissions2



■ WCDMA1900 MODE (9538 CH.) Conducted Spurious Emissions1



■ WCDMA1900 MODE (9538 CH.) Conducted Spurious Emissions2



11. ANNEX A _ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2506-FC052-P