



# **TEST REPORT**

FCC LTE B13 Test for TM15FNEUJL1 Certification

**APPLICANT** LG Electronics Inc.

REPORT NO. HCT-RF-2502-FC105-R1

**DATE OF ISSUE** April 8, 2025

> Tested by Beom Jin Cho

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Technical Manager Jong Seok Lee

Accredited by KOLAS, Republic of KOREA

HCT CO., LTD. Bongjai Huh Bongjai Huh 7 CEO

F-TP22-03(Rev.06)

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T E S T R E P O R T	REPORT NO. HCT-RF-2502-FC105-R1 DATE OF ISSUE April 08, 2025
Applicant	<b>LG Electronics Inc.</b> 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
Product Name Model Name	Telematics TM15FNEUJL1
Date of Test	December 9, 2024 ~ February 24, 2025
Location of Test	■ Permanent Testing Lab □ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC ID	BEJTM15FNEUJL1
FCC Classification:	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part: § 27
Test Results	PASS



## **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	February 24, 2025	Initial Release
1	April 08, 2025	Revised the Product Name.

## 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)



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## MEASUREMENT REPORT

## **1. GENERAL INFORMATION**

Applicant Name:	LG Electronics Inc.
Address:	128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
FCC ID:	BEJTM15FNEUJL1
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	Telematics
Model(s):	TM15FNEUJL1
	779.5 MHz –784.5 MHz (LTE – Band 13 (5 MHz))
Tx Frequency:	782 MHz (LTE – Band 13 (10 MHz))
Date(s) of Tests:	December 9, 2024 ~ February 24, 2025
	Radiated : 410VIXV000304(NAD)
EUT Serial number:	Conducted : 410VIXV000305(NAD)
Antenna Information	Please refer to the Antenna Specification document.



## **1.1 MAXIMUM OUTPUT POWER**

Mode		Emissian		Conducted o	Conducted output power		
(MHz)	Tx Frequency (MHz)	Designator	Modulation	Max. Power (W)	Max. Power (dBm)		
		4M51G7D	QPSK	0.233	23.67		
LTE Dand 12 (E)	770 5 794 5	4M49W7D	Ssion gnator         Modulation         Max. Power (W)         Max. Power (W)           01G7D         QPSK         0.233           9W7D         16QAM         0.199           1W7D         64QAM         0.157           1W7D         256QAM         0.078           4G7D         QPSK         0.237           7W7D         16QAM         0.205           5W7D         64QAM         0.150	22.98			
LTE – Band13 (5)	779.5 –784.5	4M51W7D		0.157	21.97		
		4M51W7D	256QAM	Max. Power (W)           0.233           0.199           0.157           0.078           0.237           0.205	18.93		
		8M94G7D	QPSK	0.237	23.74		
LTE Dand 12(10)	702.0	8M97W7D	16QAM	0.205	23.12		
LTE – Band13 (10)	782.0	8M95W7D	64QAM	0.150	21.77		
		8M96W7D	256QAM	0.079	18.99		



## 2. INTRODUCTION

#### **2.1 DESCRIPTION OF EUT**

Please refer to the [2G3G] Test Report.

#### 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
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Conducted Output Power	- N/A (See SAR Report)
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	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8



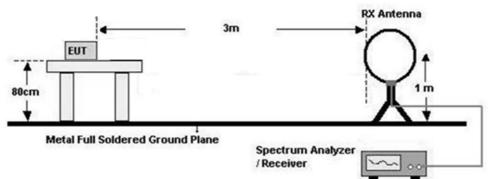
#### **3.2 RADIATED POWER**

#### **Test Overview**

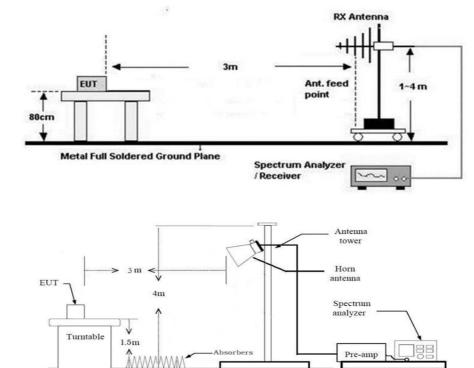
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a nonconductive table on semi-anechoic chamber.

#### **Test Configuration**

Below 30 MHz



#### 30 MHz - 1 GHz



Above 1 GHz

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#### **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( $dB\mu V/m$ ) = Measured Value( $dB\mu V$ ) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
- 8. EIRP (dBm)
  - = Total (dB $\mu$ V/m) + 20 log D 104.8 (where D is the measurement distance in meters. D=3)
  - = Total (dBμV/m) 95.2(dB)
- 9. ERP(dBm) = EIRP(dBm) 2.15(dB)



#### **3.3 RADIATED SPURIOUS EMISSIONS**

#### **Test Overview**

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 10<sup>th</sup> harmonics from 9 kHz.

#### **Test Note**

- 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;

Result (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dBi)

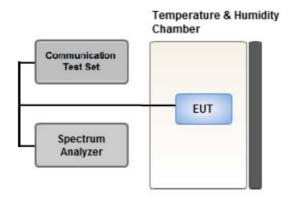
Where:  $P_g$  is the generator output power into the substitution antenna.

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

EIRP  $_{(dBm)}$  = ERP  $_{(dBm)}$  + 2.15



#### **3.4 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

- 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



## Communication Test Set EUT Spectrum Analyzer

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

## Test setup

#### **Test Overview**

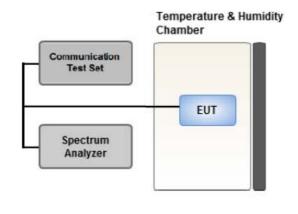
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

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.

- 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



#### **3.6 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.

- 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  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 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 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 MHz/ 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.



## Communication Test Set EUT Spectrum Analyzer

#### Test setup

#### **Test Overview**

 $\label{eq:Frequency} Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.$ 

**3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE** 

The frequency stability of the transmitter is measured by:

1. Temperature:

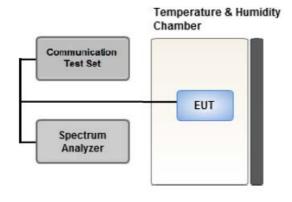
The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

- 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.

- 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.



#### 3.8 PEAK- TO- AVERAGE RATIO



#### Test setup

#### ① 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 %.

#### **②** Alternate Procedure for PAPR

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as as P  $_{Pk}$ .

Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as  $P_{Avg}$ . Determine the P.A.R. from:

P.A.R (dB) = P Pk (dBm) - P Avg (dBm) (P Avg = Average Power + Duty cycle Factor)



#### Test Settings(Peak Power)

The measurement instrument must have a RBW that is greater than or equal to the OBW of the

signal to be measured and a VBW  $\geq$  3 × RBW.

- 1. Set the RBW  $\geq$  OBW.
- 2. Set VBW  $\geq$  3 × RBW.
- 3. Set span  $\geq 2 \times OBW$ .
- 4. Sweep time  $\geq 10 \times (number of points in sweep) \times (transmission symbol period).$
- 5. Detector = peak.
- 6. Trace mode = max hold.
- 7. Allow trace to fully stabilize.
- 8. Use the peak marker function to determine the peak amplitude level.

#### **Test Settings(Average Power)**

- 1. Set span to 2 × to 3 × the OBW.
- 2. Set RBW  $\geq$  OBW.
- 3. Set VBW  $\geq$  3 × RBW.
- 4. Set number of measurement points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- 5. Sweep time:
  - Set  $\geq$  [10 × (number of points in sweep) × (transmission period)] for single sweep

(automation-compatible) measurement. The transmission period is the (on + off) time.

- 6. Detector = power averaging (rms).
- 7. Set sweep trigger to "free run."
- 8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25 %.



#### 3.9 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.
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 10 MHz)
- All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed.
- Therefore, only the worst case(stand-alone) results were 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.
- JIG was used to test the EUT. (EUT + JIG)

Test Description	Modulation	RB size	RB offset	Axis
	QPSK,	See Section 8.1		Y
	16QAM,			
Effective Radiated Power	64QAM,	See See		
	256QAM			
Radiated Spurious and Harmonic Emissions	QPSK	See See	ction 8.2	Y





## 3.10 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.

- JIG was used to test the EUT. (EUT + JIG)

	[ Woi	rst case ]			
Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
	QPSK,				
Occupied Bandwidth	16QAM,	5, 10	Mid	Full RB	0
•	64QAM,				
	256QAM				
	QPSK,			Full RB	
	16QAM,	5, 10	Mid		0
PEAK- TO- AVERAGE RATIO	64QAM,				
	256QAM				
		5	Low	1	0
			High	1	24
Band Edge	QPSK	10	Low	1	0
Dana Luge	QUSIC		High	1	49
		F 10	Low,	Full RB	0
		5, 10	High		
Spurious and Harmonic Emissions at			Low,	1	
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10	Mid,		0
Antenna Terminat			High		





## 4. LIST OF TEST EQUIPMENT

## [Fully-anechoic chamber]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1 G HPF+LNA)	HCT CO., LTD.,	F2L2	12/12/2025	Annual
RF Switching System	Switch box(3 G 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(6 G HPF+LNA)	HCT CO., LTD.,	F2L14	12/12/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	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
Chamber	SU-642	ESPEC	93022487	06/27/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03197	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03201	11/28/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	ROHDE & SCHWARZ	101733	09/19/2025	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	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	Biennial
Radio Communication Test Station	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/23/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-



#### [Semi-anechoic chamber]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Antenna Position Tower	MA4640	Innco systems	S4AM	08/07/2025	Annual
Turn Table	DS2000-S	Innco systems	N/A	N/A	-
Turn Table	Turn Table	Ets	N/A	N/A	-
Controller (Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/48920320/P	N/A	-
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	-
RF Switch System	FBSR-04C(3G HPF+LNA)	TNM System	S4L1	04/11/2025	Annual
RF Switch System	FBSR-04C(7G HPF+LNA)	TNM System	S4L5	04/11/2025	Annual
RF Switch System	FBSR-04C(LNA)	TNM System	S4L4	04/11/2025	Annual
RF Switch System	FBSR-04C(Thru)	TNM System	S4L6	04/11/2025	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
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120	Schwarzbeck	937	02/07/2027	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/04/2026	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/16/2025	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
Signal Analyzer(3 Hz ~ 50 GHz)	N9030A	Agilent	MY49430478	02/12/2026	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	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 (±kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, <i>k</i> =2)
Frequency stability	28 (Confidence level about 95 %, <i>k</i> =2)
Parameter	Expanded Uncertainty (±dB)
Block Edge	0.70 (Confidence level about 95 %, <i>k</i> =2)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, <i>k</i> =2)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, <i>k</i> =2)
Radiated Power	4.74 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, <i>k</i> =2)



## **6. SUMMARY OF TEST RESULTS**

Note. 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	§ 2.1051,	< 43 + 10log10 (P[Watts]) at Band Edge	PASS	
Emissions at Antenna Terminal.	§ 27.53(c)	and for all out-of-band emissions		
On all frequencies between 763-775	S 27 F2(-)(4)		PASS	
MHz and 793-805 MHz.	§ 27.53(c)(4)	<65 + 10log10 (P[Watts])	(See Note2)	
Conducted Output Power	§ 2.1046	N/A	See Note1	
Frequency stability / variation of	§ 2.1055,		DACC	
ambient temperature	§ 27.54	Emission must remain in band	PASS	

#### Note:

1. See SAR Report

2. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance.

#### 6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result	
Effective Radiated Power	§ 27.50(b)(10)	< 3 Watts max. ERP	PASS	
Radiated Spurious and Harmonic	§ 2.1053,	< 43 + 10log10 (P[Watts]) for	DACC	
Emissions	§ 27.53(c)	all out-of band emissions	PASS	
Undesirable Emissions in	S 2 1052 27 52/5	< -70dBW/MHz EIRP (wideband)	DACC	
the 1559 – 1610 MHz band	§ 2.1053, 27.53(f)	< -80dBW EIRP (narrowband)	PASS	

#### 6.3. Data Referencing

Rule Part	Test item	Data Referencing	Comments
§ 2.1049	Occupied Bandwidth	Y	-
§ 2.1051,	Band Edge / Spurious and Harmonic Emissions	V	
§ 27.53(c)	at Antenna Terminal	ř	-
§2.1055, §27.54	2.1055, § 27.54 Frequency stability / variation of ambient temperature		-
§ 27.50(h)(2)	Effective Radiated Power	Y	Spot-check
§ 2.1053, § 27.53(c)	§ 2.1053, § 27.53(c) Radiated Spurious and Harmonic Emissions		Spot-check
§ 2.1046	Conducted Output Power	Y	-

#### Spot-Check Result

1. Data was leveraged from model TM15FNEUJL0 for the certification of TM15FNEUJL1.

2. Please refer to the [FCC Evaluation] Report.





## 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

Ch.	/ Freq.	Measured	Substitute	Ant. Gain	<b>C</b> 1	Dal	EF	RP
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol.	W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	Н	0.483	26.84

#### ERP = Substitute LEVEL(dBm) + Ant. Gain – 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	Substitute Ant. Gain		<b>C</b> 1	Del	EI	RP
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBi)	C.L	Pol.	w	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	Н	0.456	26.59

#### EIRP = Substitute LEVEL(dBm) + Ant. Gain – 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

<u>QAM Modulation</u> Emission Designator = 4M48W7D LTE BW = 4.48 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission; telemetry; telecommand



## 8. TEST DATA

## **8.1 EFFECTIVE RADIATED POWER**

Freq	Dan duui dah		Measured	Ant.	C.L	Total	Del	Limit	ERP		RB	
(MHz)	Bandwidth	Modulation	(dBµV/m)	Factor	(dB)	(dBµV/m)	Pol.	W	w	dBm	Size	Offset
	QPSK	93.70	28.10	1.10	122.90	Н		0.359	25.55			
770 5		16-QAM	92.97	28.10	1.10	122.17	Н		0.304	24.82	-	
779.5		64-QAM	91.85	28.10	1.10	121.05	Н	(	0.235	23.70	1	24
		256-QAM	88.88	28.10	1.10	118.08	Н		0.118	20.73		
		QPSK	93.55	28.10	1.10	122.75	Н		0.347	25.40 24.68		24
702.0	LTE B13	16-QAM	92.83	28.10	1.10	122.03	Н		0.294		- 1	
782.0	(5 MHz)	64-QAM	91.79	28.10	1.10	120.99	Н	< 3.00	0.231	23.64		
		256-QAM	88.87	28.10	1.10	118.07	Н		0.118	20.72		
		QPSK	93.60	28.20	1.10	122.90	Н		0.359	25.55		
704 5		16-QAM	92.87	28.20	1.10	122.17	Н	0.304	24.82	-		
784.5		64-QAM	91.46	28.20	1.10	120.76	Н		0.219	23.41	- 1	12
		256-QAM	88.69	28.20	1.10	117.99	Н		0.116 20.			

Freq	Bandwidth	Modulation	Measured	Ant.	C.L	Total	Pol.		Limit	EI	RP	F	₿
(MHz)	Bandwidth	Modulation	(dBµV/m)	Factor	(dB)	(dBµV/m)		W	w	dBm	Size	Offset	
		QPSK	93.83	28.10	1.10	123.03	Н		0.370	25.68			
702.0	LTE B13	16-QAM	93.36	28.10	1.10	122.56	Н	- < 3.00	0.332	25.21	1	0	
782.0	(10 MHz)	64-QAM	92.10	28.10	1.10	121.30	Н		0.249	23.95		0	
		256-QAM	89.01	28.10	1.10	118.21	Н		0.122	20.86			



## **8.2 RADIATED SPURIOUS EMISSIONS**

MODE:	LTE B13
MODULATION SIGNAL:	10 MHz QPSK
DISTANCE:	3 meters

Ch	Freq	Measured	Ant. Gain	Substitute Level	<b>C</b> 1	Pol	Result	Limit	RB	
Ch	(MHz)	Level (dBm)	(dBi)	(dBm)	C.L	POI	(dBm)	(dBm)	Size	Offset
	1 564.0	-52.47	8.63	-65.74	1.95	Н	-59.06	-13.00		
	2 346.0	-52.46	10.41	-64.98	2.45	Н	-57.02	-13.00		
23230 (782.0)	3 128.0	-53.08	10.49	-60.92	2.86	Н	-53.29	-13.00	1	0
(102.0)	3 910.0	-52.63	11.11	-58.87	3.29	Н	-51.05	-13.00		
	4 692.0	-53.70	11.85	-57.67	3.59	V	-49.41	-13.00		

#### 1559 MHz ~ 1610 MHz BAND

OPERATING FREQUENCY:	782.0 MHz
MEASURED OUTPUT POWER:	10 MHz QPSK
DISTANCE:	3 meters
WIDEBAND EMISSION LIMIT:	-70 dBW/ MHz (= -40 dBm/ MHz)

Operating Frequency	Measured	EMISSION	Measured Level	Ant. Gain	Substitute Level	C.L	Pol	Result	Margin
(MHz)	Frequency (MHz)	TYPE	(dBm)	(dBi)	(dBm)			(dBm)	(dB)
782.0	1560.6	Wide Band	-52.00	8.63	-65.27	1.95	Н	-58.59	18.59

Note:

Since the bandwidth of that Spurious emission is greater than 700 Hz, we applied -70 dBW/MHz according to § 27.53(f).

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#### **8.3 PEAK-TO-AVERAGE RATIO**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data ( dB )
			QPSK			4.64
			16-QAM	25		6.29
	5 MHz	702.0	64-QAM	25	0	6.87
10			256-QAM			6.76
13		- 782.0	QPSK			4.84
	10 MUL		16-QAM	50		5.54
	10 MHz		64-QAM	50		5.79
			256-QAM			6.59

Note:

1. Plots of the EUT's P.A.P.R are shown Page 37 ~ 44.

2. P.A.P.R is not required. These values are reported for information only.





#### **8.4 OCCUPIED BANDWIDTH**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data ( MHz )
			QPSK			4.5094
			16-QAM	25		4.4864
	5 MHz	- 782.0	64-QAM	25	0	4.5045
10			256-QAM			4.5057
13			QPSK			8.9434
	10 MUL		16-QAM	50		8.9741
	10 MHz		64-QAM	50		8.9524
			256-QAM			8.9571

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 45 ~ 52.





#### **8.5 CONDUCTED SPURIOUS EMISSIONS**

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
	5	779.5	4.9951	26.600	-55.777	-29.177	
12		782.0	3.7688	26.600	-56.930	-30.330	12.00
13		784.5	4.0180	26.600	-55.360	-28.760	-13.00
	10	782.0	5.9921	27.520	-56.317	-28.797	

#### Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 53 ~ 56.

2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0

3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)

#### 4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 - 1	26.08
1 – 5	26.60
5 - 10	27.52
10 - 15	29.12
15 - 20	31.71
Above 20(26.5)	32.35

#### 8.6 BAND EDGE

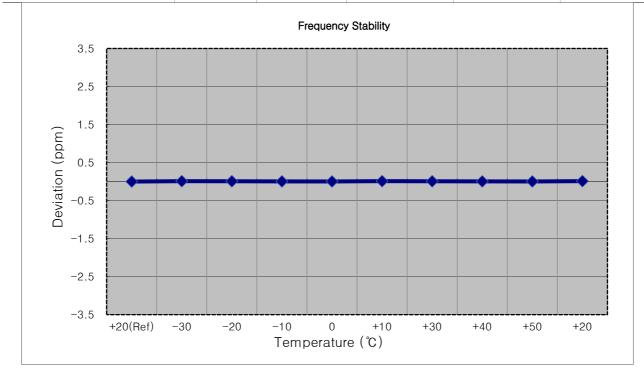
- Plots of the EUT's Band Edge are shown Page 57 ~ 68.



## 8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

MODE:	LTE 13
OPERATING FREQUENCY:	779,500,000 Hz
CHANNEL:	23205 (5 MHz)
REFERENCE VOLTAGE:	12.000 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation		
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm	
100 %		+20(Ref)	779 500 002	0.00	0.000 000	0.0000	
100 %		-30	779 500 010	7.90	0.000 001	0.0101	
100 %		-20	779 500 008	6.40	0.000 001	0.0082	
100 %		-10	779 500 005	3.30	0.000 000	0.0042	
100 %	12.000	0	779 500 004	2.30	0.000 000	0.0030	
100 %		+10	779 500 011	8.50	0.000 001	0.0109	
100 %		+30	779 500 008	5.70	0.000 001	0.0073	
100 %		+40	779 500 006	3.70	0.000 000	0.0047	
100 %	_	+50	779 500 004	2.20	0.000 000	0.0028	
115	%	+20	779 500 004	1.70	0.000 000	0.0022	
85%	85%		779 500 006	3.60	0.000 000	0.0046	

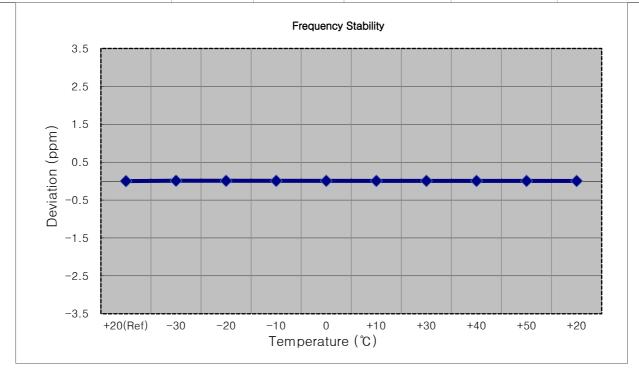


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MODE:	LTE 13
OPERATING FREQUENCY:	782,000,000 Hz
CHANNEL:	23230 (5 MHz)
REFERENCE VOLTAGE:	12.000 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %		+20(Ref)	781 999 998	0.00	0.000 000	0.0000
100 %		-30	782 000 005	7.80	0.000 001	0.0100
100 %		-20	782 000 004	6.10	0.000 001	0.0078
100 %		-10	782 000 003	5.80	0.000 001	0.0074
100 %	12.000	0	782 000 003	5.30	0.000 001	0.0068
100 %		+10	782 000 003	5.10	0.000 001	0.0065
100 %		+30	782 000 003	4.90	0.000 001	0.0063
100 %		+40	782 000 002	4.50	0.000 001	0.0058
100 %	=	+50	782 000 002	4.10	0.000 001	0.0052
115	115%		782 000 002	4.20	0.000 001	0.0054
85%		+20	782 000 001	3.80	0.000 000	0.0049



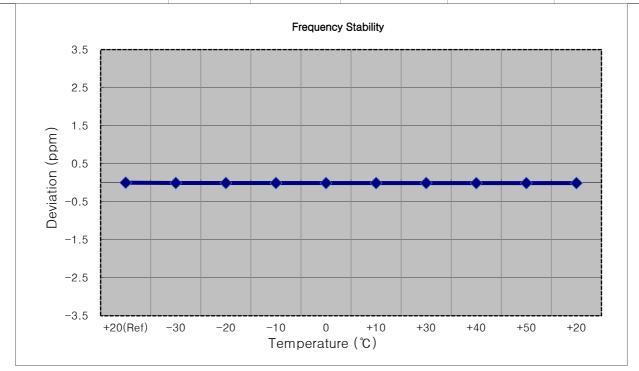
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MODE:	LTE 13
OPERATING FREQUENCY:	784,500,000 Hz
CHANNEL:	23255 (5 MHz)
REFERENCE VOLTAGE:	12.000 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	784 499 994	0.00	0.000 000	0.0000
100 %		-30	784 499 988	-6.30	-0.000 001	-0.0080
100 %		-20	784 499 987	-6.90	-0.000 001	-0.0088
100 %		-10	784 499 988	-6.50	-0.000 001	-0.0083
100 %	12.000	0	784 499 986	-7.60	-0.000 001	-0.0097
100 %		+10	784 499 987	-7.30	-0.000 001	-0.0093
100 %		+30	784 499 987	-7.20	-0.000 001	-0.0092
100 %		+40	784 499 986	-8.00	-0.000 001	-0.0102
100 %	_	+50	784 499 986	-8.40	-0.000 001	-0.0107
115	%	+20	784 499 998	3.60	0.000 000	0.0046
85%		+20	784 499 992	-1.70	0.000 000	-0.0022

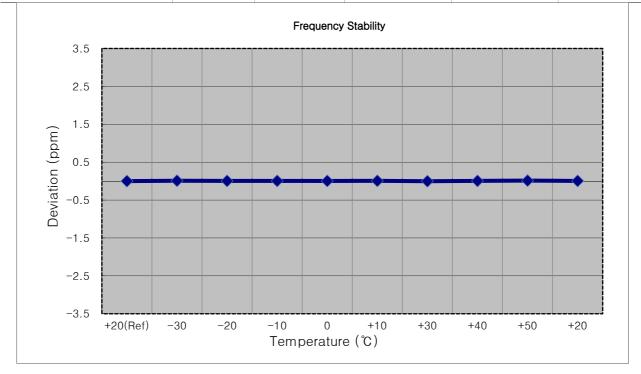


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MODE:	LTE 13
OPERATING FREQUENCY:	782,000,000 Hz
CHANNEL:	23230 (10 MHz)
REFERENCE VOLTAGE:	12.000 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	782 000 003	0.00	0.000 000	0.0000
100 %		-30	782 000 010	7.60	0.000 001	0.0097
100 %		-20	782 000 007	4.10	0.000 001	0.0052
100 %		-10	782 000 007	4.20	0.000 001	0.0054
100 %	12.000	0	782 000 006	3.10	0.000 000	0.0040
100 %		+10	782 000 008	5.70	0.000 001	0.0073
100 %		+30	782 000 000	-2.40	0.000 000	-0.0031
100 %		+40	782 000 007	4.60	0.000 001	0.0059
100 %	=	+50	782 000 013	10.60	0.000 001	0.0136
115	115%		782 000 007	4.50	0.000 001	0.0058
85%	85%		782 000 009	6.10	0.000 001	0.0078



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## 9. TEST PLOTS







#### LTE B13\_5 M\_PAR\_Mid\_QPSK\_FullRB





	pling: DC Co	out Ζ: 50 Ω prrections: Off eq Ref: Int (S)	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Frequency 782.000000 MHz	Settings
etrics	•	2 Graph	•			CF Step 5.000000 MHz	
Average Pov	/or	Gaussian 100 %	n			Auto Man	
Average Pov	21.53 dBm					Freq Offset	
4	2.47 % at 0 dB	10 %				0 Hz	
10.0 %	3.05 dB						
1.0 %	5.20 dB	1%		$\backslash$			
0.1 %	6.29 dB						
0.01 %	6.84 dB	0,1 %					
0.001 %	7.39 dB						
0.0001 %	7.44 dB	0.01%					
	7.44 dB	0.001 %					
Peak	28.97 dBm						
		0.0001 % 0.00 dB Info BW 5.	0000 MHz		20.00	dB	

# LTE B13\_5 M\_PAR\_Mid\_16QAM\_FullRB





	upling: DC C	nput Ζ: 50 Ω Corrections: Off Freq Ref: Int (S)	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Frequency 782.000000 MHz	Settings
etrics	•	2 Graph	•			CF Step 5.000000 MHz	
Average Pov	ver	Gaussia	n			Auto Man	
, werage i e.	20.56 dBm					Freq Offset	
- 4	12.08 % at 0 dB	10 %				0 Hz	
10.0 %	3.18 dB						
1.0 %	5.44 dB	1%					
0.1 %	6.87 dB			$\langle \rangle$			
0.01 %	7.96 dB	0,1 %					
0.001 %	8.15 dB						
0.0001 %	8.22 dB	0.01 %					
	8.24 dB	0.001 %					
Peak	28.80 dBm						
		0.0001 % 0.00 dB Info BW 5	.0000 MHz		20.00	) dB	

#### LTE B13\_5 M\_PAR\_Mid\_64QAM\_FullRB





	pling DC Co	rrections: Off P	tten: 20 dB reamp: Off W Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	201003000000000000000000000000000000000	Frequency 10000 MHz	Setting
ətrics	•	2 Graph Gaussian	·			Au	100 MHz to	
Average Pov	18.56 dBm					Freq Of		
10.0 %	2.15 % at 0 dB 3.16 dB	10 %				0 Hz		
1.0 %	5.39 dB	1%		$\backslash$				
0.1 % 0.01 %	6.76 dB 7.79 dB	0.1 %						
0.001 %	8.25 dB							
0.0001 %	8.31 dB	0.01 %						
Peak	8.32 dB	0.001 %						
	26.88 dBm							
		0.0001 % 0.00 dB Info BW 5.00	00 MHz		20.00	) dB		

#### LTE B13\_5 M\_PAR\_Mid\_256QAM\_FullRB





	upling: DC C	put Ζ: 50 Ω orrections: Off eq Ref: Int (S)	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Freque 782.000000 f	Settings
etrics	•	2 Graph	•			CF Step 5.000000 MH	z
A		Gaussia	n			Auto Man	
Average Pov	22.60 dBm	N.				Freq Offset	
	48.70 % at 0 dB	10 %				0 Hz	
10.0 %	2.28 dB						
1.0 %	4.02 dB	1 %					
0.1 %	4.84 dB						
0.01 %	5.29 dB	0,1 %					
0.001 %	5.60 dB						
0.0001 %	5.69 dB	0.01 %					
	5.72 dB	0.001 %					
Peak	28.32 dBm						
		0.0001 % 0.00 dB Info BW 1	0.000 MHz		20.00	dB	

#### LTE B13\_10 M\_PAR\_Mid\_QPSK\_FullRB





	Ipling: DC Co	rrections: Off P	ten: 20 dB eamp: Off V Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Frequency 782.000000 MHz	Settings
etrics	•	2 Graph	÷			CF Step 10.000000 MHz	
Average Pov	/er	Gaussian				Auto Man	
	21.63 dBm	/				Freq Offset	
4	6.20 % at 0 dB	10 %				0 Hz	
10.0 %	2.88 dB						
1.0 %	4.66 dB	1%		$\backslash$			
0.1 %	5.54 dB						
0.01 %	6.06 dB	0.1 %					
0.001 %	6.38 dB						
0.0001 %	6.47 dB	0.01 %					
	6.47 dB	0.001 %					
Peak	28.10 dBm						
		0.0001 % 0.00 dB Info BW 10.0	00 MHz		20.00	dB	

# LTE B13\_10 M\_PAR\_Mid\_16QAM\_FullRB





	ipling: DC Co	rrections: Off	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run #IF Gain: Low	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Fre 782.0000		Setting
etrics	×	2 Graph Gaussian				CF Step 10.00000 Auto	) MHz	
Average Pov		100 %				Man Man		
4	20.66 dBm 5.41 % at 0 dB	10 %				Freq Offse 0 Hz	t	
10.0 %	2.91 dB	1%						
1.0 %	4.67 dB	1.70						
0.1 %	5.79 dB							
0.01 %	6.53 dB	0,1 %						
0.001 %	6.83 dB							
0.0001 %	6.92 dB	0.01 %						
Peak	6.97 dB	0.001 %						
reak	27.63 dBm							
		0.0001 % 0.00 dB Info BW 10	000 MHz		20.0	0 dB		

#### LTE B13\_10 M\_PAR\_Mid\_64QAM\_FullRB





	pling DC Co	prrections: Off P	tten: 20 dB reamp: Off W Path: Standard	Trig: Free Run #IF Gain: Low I	Center Freq: 782.000000 MHz Counts: 2.00 M/2.00 Mpt Radio Std: None	Center Frequency 782.000000 MHz	Settings
etrics	*	2 Graph Gaussian	×			CF Step 10.000000 MHz	
Average Pov	/er	100 %				Auto Man	
	18.64 dBm					Freq Offset	
4	2.24 % at 0 dB	10 %				0 Hz	
10.0 %	3.16 dB						
1.0 %	5.37 dB	1 %					
0.1 %	6.59 dB						
0.01 %	7.43 dB	0.1 %					
0.001 %	7.81 dB						
0.0001 %	8.12 dB	0.01 %					
_	8.13 dB	0.001 %					
Peak	26.77 dBm						
		0.0001 % 0.00 dB Info BW 10.0	00 MHz		20.	00 dB	

# LTE B13\_10 M\_PAR\_Mid\_256QAM\_FullRB





#### LTE B13\_5 M\_OBW\_Mid\_QPSK\_FullRB





#### LTE B13\_5 M\_OBW\_Mid\_16QAM\_FullRB





Spectrum	n Analyzer 1 🔹	+					•	Frequency	· · · ] 😤
RL	GHT Input: RF ← Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run Gate: Off d #IF Gain: Low	Center Freq: 782.00 Avg Hold: 700/700 Radio Std: None	00000 MHz	Center F 782.000	requency 000 MHz	Settings
1 Graph	iv 10.0 dB	HALL BROM BROTHER BRE HAND	Ref LvI Offset 26.5 Ref Value 40.00 dE				Span 10.000 I	ИНz	
Log 30.0 20.0							CF Step 1.00000 Auto		
10.0 0.00 -10.0							Mar Freq Offs	i.	
-20.0 -30.0 -40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					PEAK	0 Hz		
	782.000 MHz N 100.00 kHz		#Video BW 390.00	) kHz	<b>6</b>	Span 10 MHz			
2 Metrics					Sweep 10	5.7 ms (1001 pts)			
	Occupied Bandwidth	45 MHz		Total Power	2	9.7 dBm			
	Transmit Freq Error x dB Bandwidth	-204 4.963 M		% of OBW Pov x dB	ver	99.00 % 86.00 dB			
		Dec 18, 2024							
		10:44:04 AM	$\square$						

### LTE B13\_5 M\_OBW\_Mid\_64QAM\_FullRB



EYSIGHT Input: RF L + Align: Auto	Input Z: 50 Ω Atten: Corrections: Off Pream Freq Ref: Int (S) μW Pa NFE: Adaptive		Center Freq: 782.000000 MHz Avg Hold: 700/700 Radio Std: None	782.000000 MHz	Settings
Graph v cale/Div 10.0 dB		Offset 26.50 dB le 40.00 dBm		Span 10.000 MHz CF Step	
og 0.0 0.0 0.0		••••••••••••••••••••••••••••••••••••••		1.000000 MHz Auto Man	-
	~			PEAK Authorities	
0.0 enter 782.000 MHz Res BW 100.00 kHz	#Video	BW 390.00 kHz	Span Sweep 16.7 ms (1	10 MHz 001 pts)	
Occupied Bandwidth	57 MHz	Total Power	27.6 dBm		
	-752 Hz	% of OBW Pov	wer 99.00 %		

### LTE B13\_5 M\_OBW\_Mid\_256QAM\_FullRB



	nput: RF Coupling: DC Nign: Auto	Input Z: 50 Ω Corrections: 0 Freq Ref. Int NFE: Adaptiv	(S) µW Path: S		Center Fre Avg Hold Radio Std		MHz	Center Frequer 782.000000 M Span	Setunds
Graph cale/Div 10.0 c	T IB		Ref LvI Offs Ref Value 4					20.000 MHz	
<b>og</b> 0.0								CF Step 2.000000 MHz	8
0.0			man		mm			Auto Man	
0.0	-	1			- h	······	PEAK	Freq Offset 0 Hz	
0.0	monet								
enter 782.00 N Res BW 200.00			#Video BW	820.00 kHz	·	Sp weep 1.00 ms	oan 20 MHz s (1001 pts)		
Metrics Occupi	▼ ed Bandwidth								
	8.9434			Total Power	1	31.1 dE			
	hit Freq Error Andwidth		9 MHz	% of OBW Po x dB	wer	99.00 -26.00 d			

### LTE B13\_10 M\_OBW\_Mid\_QPSK\_FullRB



EYSIGHT Input: RF Coupling: I Align: Auto	C Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 20 dB Preamp: Off µW Path: Standa	Trig: Free Run Gate: Off rd #IF Gain: Low	Avg Ho	Freq: 782.000000 ld: 700/700 Std: None	MHz	Center Frequency 782.000000 MHz Span	Settings
Graph 🔹 🔻		Ref LvI Offset 26. Ref Value 40.00 d					20.000 MHz	
<b>DD</b> D D D D							CF Step 2.000000 MHz	
0.0	Jum	amet man mark	Red and the second second	m			Auto Man	
D.0 D.0 D.0	hand			- X.	m	PEAK	Freq Offset 0 Hz	
0.0 mmananana								
nter 782.00 MHz es BW 200.00 kHz		#Video BW 820.0	0 kHz		Sweep 1.00 m	pan 20 MHz s (1001 pts)		
Metrics •	idth 8.9741 MHz		Total Power		30.3 d	Bm		
Transmit Freq E			% of OBW Pov x dB	ver	99.00 -26.00	0 %		

#### LTE B13\_10 M\_OBW\_Mid\_16QAM\_FullRB





Spectrum Analy: Occupied BW	zer 1	F					₽	Frequency	· · 】 蒜
	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run Gate: Off #IF Gain: Low	Center Fred Avg Hold: 7 Radio Std: 1		and the second sec	Frequency 0000 MHz	Settings
1 Graph Scale/Div 10.0	₹ dB	R	tef LvI Offset 26.5 tef Value 40.00 dB				Span 20.000		
30.0 20.0 10.0		مىسىرىمى بىرى بىرى بىرى بىرى بىرى بىرى بىرى	mmmmm	manna			CF Step 2.0000 Aut	00 MHz	
-10.0		$\bigwedge$				P	Freq Of EAK 0 Hz	20 	
-30.0 -40.0 -50.0	-								
Center 782.00 M #Res BW 200.0			Video BW 820.00	kHz	⊥ . Sv	Span 20 f veep 1.00 ms (1001			
2 Metrics	v								
Occup	ied Bandwidth 8.9524	MHz		Total Power		29.2 dBm			
	nit Freq Error andwidth	10.761 kH 9.705 MH		% of OBW Pow x dB	er	99.00 % -26.00 dB			
<b>ま</b> り(	<u>؟</u> 📘 اد	Dec 18, 2024 10:50:21 AM					<		

### LTE B13\_10 M\_OBW\_Mid\_64QAM\_FullRB





Spectrun Occupied	n Analyzer 1 d BW	+						\$	Frequency	- <b>*</b>
RL	GHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Atten: 20 dB Preamp: Off µW Path: Standard	Trig: Free Run Gate: Off I #IF Gain: Low	Avg Ho	Freq: 782.00000 ld: 700/700 std: None	00 MHz	provide the second seco	requency 0000 MHz	Settings
1 Graph	V 10.0 dB		Ref LvI Offset 26.5 Ref Value 40.00 dB					Span 20.000		
Log 30.0 20.0								CF Step 2.00000 Auto	0 MHz	
10.0 0.00 -10.0 -20.0								Mar Freq Off 0 Hz		
-30.0		du -			N N		PEAK	U HZ		
Center 7	82.00 MHz V 200.00 kHz		#Video BW 820.00	kHz			Span 20 MHz ms (1001 pts)			
2 Metrics	N.									
	Occupied Bandwidth 8.95	71 MHz		Total Power	4	27.2	dBm			
	Transmit Freq Error x dB Bandwidth	22.919 k 9.670 M		% of OBW Pow x dB	er	99.0 -26.0	00 % 0 dB			
	n a 🗖 .	Pec 18, 2024 10:50:40 AM	$\Theta \triangle$							

### LTE B13\_10 M\_OBW\_Mid\_256QAM\_FullRB



YSIGH	T Input F	RE	- Input Ζ: 50 Ω	#Atten: 20 dB	PNO: Fast	#Ava Type: Pr	ower (RMS 1 2 3 4 5 6			
	Couplin Align: /	ng: DC	Corrections: Off Freq Ref: Int (S) NFE: Adaptive	Preamp: Off µW Path: Standar	Gate: Off	Trig: Free Rur	MWWWWW PPPPPP		Frequency 000000 GHz	Setting
	_		NFE. Adaptive		SIG TRACK. OI			Span		
ectrum		•				MKL	1 4.995 06 GHz		00000 GHz	
e/Div 10				Ref Level 10.00 o	dBm		-55.78 dBm	- 31	vept Span	
	Ŷ2			Ť				Ze	ro Span	
									<sup>=</sup> ull Span	
								Start F	req	
								30.000	0000 MHz	
)							PEAK	Stop Fr	200	
			and the second sec	Merry Marsher Millian	the state of the second	and the second states of the second	and a state of the second	Slop FI	eu	
	mound	Call Supplement	Brown and the state of the stat	A DESCRIPTION OF THE OWNER	An divida utilativ	Mad the state of the state of the	Anterfactor and a second and a leader	10 000	Contraction of the second second second	
	mound	hallopoplariant	angenerienden bekelner der volgen in so		Andreithe abilinativ	Verd Contract Control American	PEAK Nanatrational Angel Partage	10.000	0000000 GHz	
	draman	1,281)perpelar 1,24				Var Andrea an Anal Anal Anal Anal			Contraction and a second state of the	
t 30 MHz		haniloppylar is a'i		#Video BW 3.0 M			Stop 10.000 GHz	Al	UTO TUNE	
t 30 MHz s BW 1.0	MHz							Al CF Ste	DOOODOO GHZ UTO TUNE	
t 30 MHz s BW 1.0	MHz	in in the second se					Stop 10.000 GHz	AL CF Ste 997.00	DOOOOOO GHZ UTO TUNE P DOOOO MHZ	
t 30 MHz s BW 1.0	MHz			#Video BW 3.0 M			Stop 10.000 GHz	Al CF Ste	DOOOOOOO GHZ UTO TUNE P DOOOOO MHz Ito	
t 30 MHz s BW 1.0 arker Table Mode 1 N	MHz Trace	▼ Scale f	X 4.995 06 GHz	#Video BW 3.0 M Y -55.78 dBm	MHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	Al CF Ste 997.00 AL Ma	DOOOOOO GHZ UTO TUNE P DOOOO MHz Ito an	
t 30 MHz s BW 1.0 arker Table Mode 1 N 2 N	MHz	•	x	#Video BW 3.0 M	MHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	CF Ste 997.00 AL Ma Freq O	DOOOOOO GHZ UTO TUNE P DOOOO MHz Ito an	
t 30 MHz s BW 1.0 arker Table Mode 1 N 2 N 3	MHz Trace	▼ Scale f	X 4.995 06 GHz	#Video BW 3.0 M Y -55.78 dBm	MHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	CF Ste 997.00 Au Ma Freq O 0 Hz	DOOODOO GHZ UTO TUNE P DOOOO MHZ Ito an ffset	
30 MHz 3 BW 1.0 arker Table Mode 1 N 2 N 3 4 5	MHz Trace	▼ Scale f	X 4.995 06 GHz	#Video BW 3.0 M Y -55.78 dBm	MHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	AL CF Ste 997.00 AL Ma Freq O 0 Hz X Axis	DODODOD GHZ UTO TUNE p DODOD MHZ to an ffset Scale	
t 30 MHz s BW 1.0 arker Table Mode 1 N 2 N 3 4	MHz Trace	▼ Scale f	X 4.995 06 GHz	#Video BW 3.0 M Y -55.78 dBm	MHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	All CF Ste 997.00 AL Ma Freq O 0 Hz X Axis Lc	000000 GHz JTO TUNE p 00000 MHz to an ffset Scale g	
t 30 MHz s BW 1.0 arker Table Mode 1 N	MHz Trace	▼ Scale f	X 4.995 06 GHz 777.75 MHz	#Video BW 3.0 M Y -55.78 dBm	MHz	Sweej	Stop 10.000 GHz > ~18.1 ms (1001 pts) Function Value	AL CF Ste 997.00 AL Ma Freq O 0 Hz X Axis	DODODOO GHZ DTO TUNE DODOO MHZ to an ffset Scale Scale	

# LTE B13\_5 M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB



YSIGH ↔	T Input F Couplin Align: A	ng: DC	Input Ζ: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 20 dB Preamp: Off µW Path: Standa		Ing: Free Rui	S M WW WW A	5.0150	Frequency 000000 GHz	Setting
	1.5		NFE: Adaptive		Sig Track: O	ff	PPPPI	Span		
ectrum		•				Mkr	1 3.768 75 GH	9.9700	00000 GHz	
e/Div 10				Ref Level 10.00	dBm		-56.93 dBn		vept Span	
	Ŷ2			ĭ				Ze	ro Span	
									⁼ull Span	
				4				Start Fr 30.000	req 1000 MHz	
			A							
	bursonshi	hargongikerinakti	orectionship received	yallan oo aadal watalayaa	with disputations	intogrampht for dispersion	PEAI http://decologicalistics/http:// http://decologicalistics/http://	Stop Fr 10.000	eq 0000000 GHz	
	lon in alte	huronymetinukle				achyanyatika-kaasatinko	holethanonlagaradisgeringatikasisan.	10.000	Contraction of the second s	
30 MHz		hurynyheriaulu		to BW 3.0			۲۳۵۹ ۲۰۰۹ ۲۰۰۹ ۲۰۰۹ ۲۰۰۹ ۲۰۰۹ ۲۰۰۹ ۲۰۰۹ ۲۰	10.000	UTO TUNE	
30 MHz BW 1.0	MHz	hutyospherinu.Nr					Stop 10.000 GH	AL CF Ste	UTO TUNE	
30 MHz BW 1.0	MHz			#Video BW 3.0			Stop 10.000 GH	AL CF Ste	DOOOOOOO GHz DTO TUNE P DOOOOO MHz Ito	
30 MHz BW 1.0 rker Table Mode N	MHz Trace	▼ Scale f	X 3.768 75 GHz	#Video BW 3.0   Y -56.93 dBm	MHz	Swee	top 10.000 GH p ~18.1 ms (1001 pts	z CF Ste 997.00 Au	DOOODOO GHZ UTO TUNE P DOOOO MHZ Ito an	
30 MHz BW 1.0 rker Table Mode N	MHz	•	x	#Video BW 3.0	MHz	Swee	top 10.000 GH p ~18.1 ms (1001 pts	CF Ste 997.00	DOOODOO GHZ UTO TUNE P DOOOO MHZ Ito an	
t 30 MHz s BW 1.0 Irker Table Mode	MHz Trace	▼ Scale f	X 3.768 75 GHz	#Video BW 3.0   Y -56.93 dBm	MHz	Swee	top 10.000 GH p ~18.1 ms (1001 pts	z CF Ste 997.00 Freq O	p000000 GHz JTO TUNE p 100000 MHz 100 100 100 100 100 100 100 10	

# LTE B13\_5 M\_Conducted Spurious(30 M-10 G)\_Mid\_QPSK\_1RB



YSIGH <sup>-</sup> • <b>→</b> •	<b>F</b> Input F Couplin Align: A	ig: DC	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standar	PNO: Fast Gate: Off I IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Rur	wer (RMS <mark>123456</mark> MWWWWW PPPPPP	5.0150	Frequency 00000 GHz	Setting
ectrum le/Div 10	dB	•		Ref Level 10.00 c	Bm	Mkr	1 4.018 00 GHz -55.36 dBm	Sv	0000 GHz rept Span ro Span	
									full Span	
				1				Start Fr 30.000	eq 000 MHz	
)				the stand and	I In I		PEAK	Stop Fr	ea	
	highter	wanneknelk	allalleraryinderations <sup>erv</sup>	ut MARinkaterologian.A	L. F. M. P. M. P. M.	Hallowicz and a standard and a standard and a standard and a standard a standard a standard a standard a standa	PEAK Langertand Method Market		000000 GHz	
t 30 MHz		eenneteelk	all silvery barrainer <sup>rer</sup>	#Video BW 3.0 M			Stop 10.000 GHz	10.000 AL	000000 GHz	
t 30 MHz s BW 1.0	MHz	eutresensels v	dinikon yaka ana ku					10.000 AL	000000 GHz	
30 MHz BW 1.0 Irker Table Mode	MHz		×	#Video BW 3.0 M			Stop 10.000 GHz	10.000 AL	000000 GHz ITO TUNE 00000 MHz to	
30 MHz BW 1.0 rker Table Mode N 2 N	MHz	•	X 4.018 00 GHz	#Video BW 3.0 M	IHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	10.000 AL CF Ste 997.00	000000 GHz ITO TUNE 0 00000 MHz to in	
t 30 MHz s BW 1.0 arker Table Mode 1 N	MHz Trace 1	▼ Scale f	X 4.018 00 GHz	#Video BW 3.0 M Y -55.36 dBm	IHz	Sweej	Stop 10.000 GHz o ~18.1 ms (1001 pts)	10.000 AU CF Stel 997.00 Au Ma	000000 GHz ITO TUNE 0 0000 MHz to in fiset 5 5 5 5 5 5 5 5 5 5 5 5 5	

# LTE B13\_5 M\_Conducted Spurious(30 M-10 G)\_High\_QPSK\_1RB



YSIGH <sup>™</sup>	Input: RF Coupling: Align: Aut	DC Co o Fre	out Z: 50 Ω prrections: Off eq Ref: Int (S) Έ: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Rur	wer (RMS <mark>123456</mark> М <del>WWWW</del> Р Р Р Р Р Р	5.0150	Frequency 100000 GHz	Setting
ectrum le/Div 10	dB ∕2			Ref Level 10.00 c	IBm	Mkr	1 5.992 06 GHz -56.32 dBm	Sw	00000 GHz vept Span ro Span	
									Full Span	
					1			Start Fr 30.000	req 1000 MHz	
	htsportable	gan was an and	ANANARAYAN	hydrollon antig alleyd	rman tore types by	poptanton Merculato	PEAK Handolitan dan dipana da kana d Handri da kana d	Stop Fr 10.000	eq 1000000 GHz	
t 30 MHz				#Video BW 3.0 N	1Hz		Stop 10.000 GHz		JTO TUNE	
t 30 MHz s BW 1.0	MHz			#Video BW 3.0 M	1Hz	Sweej	Stop 10.000 GHz p ~18.1 ms (1001 pts)	CF Step		
30 MHz BW 1.0 Irker Table Mode	•	Scale	x	Y	1Hz Function	Sweej Function Width		CF Step	p 10000 MHz to	
30 MHz BW 1.0 Irker Table Mode N 2 N 3	•		X 5.992 06 GHz				p ~18.1 ms (1001 pts)	CF Step 997.00	p 10000 MHz to an	
1 N	Trace S	f	X 5.992 06 GHz	Y -56.32 dBm			p ~18.1 ms (1001 pts)	CF Step 997.00 Au Ma	p 10000 MHz to an ffset Scale g	

# LTE B13\_10 M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB





Spectrum Analyzer 1	+				\$	Frequency	- 湯
KEYSIGHT       Input: RF         R L       How State         Align: Auto       Align: Auto	Input Z: 50 Ω #Atten: 20 dB Corrections: Off Preamp: Off Freq Ref: Int (S) μW Path: Standar NFE: Adaptive	PNO: Best Wide Gate: Off d IF Gain: Low Sig Track: Off	#Avg Type: Power (F Trig: Free Run	RMS123456 AWWWWW AAAAAA	Center Fre 776.0000		Settings
1 Spectrum	Ref Lvi Offset 26. Ref Level 26.50 d			76.000 MHz 55.568 dBm	Span 8.000000 Swep Zero	t Span	
16.5		$ \land$			Ful	Span	
3.50					Start Freq 772.0000		
13.5				DL1 -13.00 dBm	Stop Freq 780.0000	And a second second	
23.5					AUT	DTUNE	
33.5					CF Step 800.000	κHz	
53.5		/		RMS	Auto Man	1	
63.5	No. More and an and a start of the start of			The second	Freq Offse 0 Hz	ət	
enter 776.000 MHz Res BW 100 kHz	#Video BW 300	kHz		Span 8.000 MHz 2.01 s (1001 pts)	X Axis Sci Log Lin	ale	_
1 7 7 1	P Dec 18, 2024				Signal Tra (Span Zoor		

# LTE B13\_5 M\_Band Edge\_Low\_QPSK\_1RB



L	+				₽	Frequency	1
CEYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 Trig: Free Run A www A A A A	A A 776.00	Frequency 00000 MHz	Settings
Spectrum v cale/Div 10 dB		Ref LvI Offset 26.50 Ref Level 26.50 dB		Mkr1 775.992 M -28.016 dE	Sm Sv	00000 MHz vept Span ero Span	
6.5						Full Span	
.50			1		Start F	req 00000 MHz	
3.5				DL1 -13.00	dBm Stop Fi 780.00	req 00000 MHz	
3.5		1-			AI	JTO TUNE	
3.5					CF Ste 800.00	p )0 kHz	
3.5						ito an	
13.5	Well-alton				Freq O 0 Hz	ffset	
enter 776.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Span 8.000   #Sweep ~2.01 s (1001		g	
- n c - i	Dec 18, 2024 10:40:41 AM	$\square \triangle$			Signal (Span Z	Track oom)	

# LTE B13\_5 M\_Band Edge\_Low\_QPSK\_FullRB



Spectrum Analy Swept SA	yzer 1 🗸	+					\$	Frequency	•	쓿
KEYSIGHT RL +→- ₩	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off μW Path: Standard	PNO: Best Wide Gate: Off I IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456) A WW WW W</mark> A A A A A A A	Center Fre 769.0000		Settings	5
Spectrum Scale/Div 10 c	T IB		Ref LvI Offset 26.5 Ref Level -10.00 dE		Mkr1	774.976 MHz -58.317 dBm		00 MHz It Span Span		
20.0							Ful	Span		
40.0						DL1 -35.00 dBm	Start Freq 763.0000			
50.0						1	Stop Freq 775.0000	And an an and so that a		
60.0 70.0						- Alford Walt - Carter	AUTO CF Step	DTUNE		
	(กได้ไปไหว้จากคราป-จะจากไรร่	unnonaninana	bath have the second	ed all the many second at the second	helistan and a start of the second	anangayata .	1.200000 Auto Man	MHz		
100							Freq Offse 0 Hz	ət		
tart 763.000 l Res BW 10 k			#Video BW 30 kł	Hz	#Swee	Stop 775.000 MHz p 2.00 s (1001 pts)	X Axis Sca Log Lin	ale		
ר <del> </del>		Dec 18, 2024 10:40:58 AM					Signal Tra			

# LTE B13\_5 M\_Extended Band Edge\_Low\_QPSK\_FullRB



Spectrum Analy Swept SA		+						Frequency	v <mark>- 2</mark> 1
KEYSIGHT RL +→-•	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: 0 Freq Ref: Int ( NFE: Adaptive	5) µW Path: Standa	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	er (RMS <mark>123456</mark> A <del>WWWWW</del> A A A A A A A	788.000	requency 0000 MHz	Settings
1 Spectrum Scale/Div 10 di	B		Ref LvI Offset 26 Ref Level 26.50 d		Mkr1	788.000 MHz -54.965 dBm	Sw	0000 MHz ept Span o Span	
16.5		$ \land$					F	ull Span	
6.50							Start Fre 784.000	iq 0000 MHz	
13.5						DL1 -13.00 dBm	Stop Fre 792.000	9 0000 MHz	
							AU	TO TUNE	
33.5 43.5							CF Step 800.000	Constant of the second s	
53.5			1				Aut Mai		
63.5				and and the second states and the second	NEW CONTRACTOR	martin RMS	Freq Off 0 Hz	set	
enter 788.000 Res BW 100 k			#Video BW 300	kHz		Span 8.000 MHz 5 ~2.01 s (1001 pts)	X Axis S Log Lin		
<b>キ</b> ょ		Dec 18, 202 10:46:55 AM					Signal T (Span Zo		

# LTE B13\_5 M\_Band Edge\_High\_QPSK\_1RB



Spectrum Analyzer 1 Swept SA KEYSIGHT RL ++ Coupling: DC Align: Auto	H Input Ζ: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 20 dB Preamp: Off µW Path: Standard		#Avg Type: Power (RM Trig: Free Run	AWWWW	Record and the second	Frequency Frequency 2000 MHz	Settings
Spectrum v scale/Div 10 dB		Ref LvI Offset 26.5 Ref Level 26.50 dB			8.000 MHz 8.342 dBm	Sw	0000 MHz ept Span o Span	
16.5						F	ull Span	
3.50						Start Fre 784.00	eq 0000 MHz	
13.5					DL1 -13.00 dBm	Stop Fre 792.00	9 0000 MHz	
		1-				AU	TO TUNE	
					RMS	CF Step 800.000	for an	
53.5					hand	Aut Ma		
53.5						Freq Off 0 Hz	set	
enter 788.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz		pan 8.000 MHz 01 s (1001 pts)	X Axis S Log Lin		_
- n C -	Pec 18, 2024 10:46:17 AM	$\square \triangle$				Signal T (Span Zo		

# LTE B13\_5 M\_Band Edge\_High\_QPSK\_FullRB



Spectrum Analy Swept SA	vzer 1 🔹	+					₽	Frequency	1
KEYSIGHT ≀L +→ ⊠	Input: RF Coupling: DC Align: Auto	Input Z: 50 Q Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456</mark> A <del>WW WW W</del> A A A A A A A	Center Frequ 799.000000		Settings
Spectrum cale/Div 10 d	B		Ref LvI Offset 26.50 Ref Level -10.00 dE		Mkr1	793.048 MHz -63.556 dBm	Span 12.0000000 Swept S Zero Sp	Span	
							Full S	pan	
10.0						DL1 -35.00 dBm	Start Freq 793.000000	MHz	
50.0							Stop Freq 805.000000	MHz	
50.0 1 70.0	WHINTHE					RMS-	AUTO 1	UNE	
	Tradition	nethernynynynynynynynynynynynynynynynynynyny	Aburraniasinganianahi	dintennessanteen	cherter-engenalisten-enge	\$14000000 million and the	1.200000 M	Hz	
90.0 100							Man Freq Offset 0 Hz		
tart 793.000 I Res BW 10 kl			#Video BW 30 kH	łz		Stop 805.000 MHz p 2.00 s (1001 pts)	X Axis Scale Log Lin		
15		Dec 18, 2024 10:46:34 AM	$\Box$			¥ = X	Signal Track (Span Zoom)		

# LTE B13\_5 M\_Extended Band Edge\_High\_QPSK\_FullRB



Spectrum Analyze Swept SA	er 1	ŀ						Frequency	• •
	nput: RF Coupling: DC Nign: Auto	Input Ζ: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456</mark> A <del>WW WW W</del> A A A A A A A	776.000	requency 1000 MHz	Settings
1 Spectrum Scale/Div 10 dB	•		Ref Lvi Offset 26.5 Ref Level 26.50 dB		Mkr1	776.000 MHz -58.707 dBm	Swe	000 MHz ept Span o Span	
16.5					$\cap$		Fi	ıll Span	
6.50 3.50							Start Fre 772.000	9 1000 MHz	_
13.5						DL1 -13.00 dBm	Stop Fre 780.000	9 1000 MHz	
23.5							AU		
33.5 43.5							CF Step 800.000	l kHz	
53.5			1			RMS	Auto Mar		
63.5	-unapaptation	WWW.aust-atthesessment					Freq Off 0 Hz	set	
center 776.000 l Res BW 100 kH	MHz		#Video BW 300 k	Hz	#Sweep	Span 8.000 MHz ~2.01 s (1001 pts)	X Axis S Log Lin		_
  	2 🗋 ?	Dec 18, 2024 10:49:07 AM	$\mathbb{D}$				Signal Ti (Span Zo		

### LTE B13\_10 M\_Band Edge\_Low\_QPSK\_1RB



Spectrum Analy Swept SA	/zer 1						0	Frequency	1 😤
KEYSIGHT	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456</mark> A WW WW W A A A A A A A	Center Fr 776.0000		Settings
1 Spectrum Scale/Div 10 d	B	F	Ref LvI Offset 26.5 Ref Level 26.50 dB	0 dB	Mkr1	775.992 MHz -29.963 dBm		000 MHz ot Span Span	
16.5							Ful	ll Span	
6.50						RMS	Start Free 772.0000		
-13.5						DL1 -13.00 dBm	Stop Fred 780.0000	and the second second	
			1-				AUT	O TUNE	
							CF Step 800.000	kHz	
-43.5							Auto Man		
	1	Walter of the ast of the second second					Freq Offs 0 Hz	et	
Center 776.000 #Res BW 100 P			#Video BW 300 k	Hz	#Sweep	Span 8.000 MHz ~2.01 s (1001 pts)	X Axis Sc Log Lin	ale	
15	?	Dec 18, 2024 10:48:29 AM	$\Box$				Signal Tra (Span Zoo		

# LTE B13\_10 M\_Band Edge\_Low\_QPSK\_FullRB



Spectrum Analy Swept SA	zer 1 💡	+						Frequency	1 7 🕄
KEYSIGHT RL +→-• ₩	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Best Wide Gate: Off I IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456</mark> A WW WW W A A A A A A A	769.000	requency 1000 MHz	Settings
1 Spectrum Scale/Div 10 dl	T B		Ref LvI Offset 26.5 Ref Level -10.00 dl		Mkr1	774.928 MHz -63.425 dBm	Swe	0000 MHz ept Span o Span	
20.0							FI	ull Span	
						DL1 -35.00 dBm	Start Fre 763.000	q 1000 MHz	
40.0 50.0							Stop Fre 775.000	9 0000 MHz	
50.0						R. L			
10.0 Unveloirew 30.0	raantidasNichanastr	tenternen pegeliktrationsu	iconfil (1964) all more independent	www.andabr.ytyaa	al magness he diamatic	retraction of the state of the	CF Step 1.20000	0 MHz	
90.0							Aut Mar		
							Freq Off 0 Hz	set	
tart 763.000 N Res BW 10 kH			#Video BW 30 kl	Hz	#Swee	Stop 775.000 MHz p 2.00 s (1001 pts)			
<b>エ</b> ッ (		Dec 18, 2024 10:48:47 AM	$\bigcirc \triangle$				Signal Ti (Span Zo		

#### LTE B13\_10 M\_Extended Band Edge\_Low\_QPSK\_FullRB



Spectrum Analy Swept SA		+					₽	Frequency	- 1 E
KEYSIGHT	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) NFE: Adaptive	#Atten: 20 dB Preamp: Off µW Path: Standard	PNO: Best Wide Gate: Off I IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS <mark>123456</mark> A <del>WW WW W</del> A A A A A A A	Center Fre 788.00000		Settings
Spectrum cale/Div 10 d	IB		Ref LvI Offset 26.5 Ref Level 26.50 dB		Mkr1	788.016 MHz -55.746 dBm	8.000000	t Span	
16.5		-					Full	Span	
6.50 3.50							Start Freq 784.0000	00 MHz	
13.5						DL1 -13.00 dBm	Stop Freq 792.0000	00 MHz	
								TUNE	
43.5							CF Step 800.000 k	Hz	
53.5			1				Auto Man		
53.5				and and the second of the second of the	nauto alaritan atomas	RMS.	Freq Offse 0 Hz		
enter 788.000 Res BW 100 I			#Video BW 300 k	Hz	#Sweep	Span 8.000 MHz ~2.01 s (1001 pts)	X Axis Sca Log Lin	le	
15	C 🗌	Dec 18, 2024 10:52:39 AM					Signal Trad (Span Zoom		

#### LTE B13\_10 M\_Band Edge\_High\_QPSK\_1RB



Spectrum Analyzer 1 Swept SA	+				🛟 Freque	ency 🔻 🚉
KEYSIGHT Input: RF R L + Align: Auto			#Avg Type: Power Trig: Free Run	(RMS <mark>123456</mark> AWWWWW AAAAAA	Center Frequency 788.000000 MHz	Settings
1 Spectrum v Scale/Div 10 dB	Ref Lvi Offs Ref Level 26	et 26.50 dB	Mkr1	788.008 MHz -34.505 dBm	Span 8.00000000 MHz Swept Span Zero Span	
16.5					Full Span	
6.50					Start Freq 784.000000 MHz	
13.5				DL1 -13.00 dBm	Stop Freq 792.000000 MHz	
23.5		1			AUTO TUNE	
43.5				RMS	CF Step 800.000 kHz	
53.5					Auto Man	
63.5					Freq Offset 0 Hz	
Center 788.000 MHz #Res BW 100 kHz	#Video BV	V 300 kHz	#Sweep	Span 8.000 MHz ∼2.01 s (1001 pts)	X Axis Scale Log Lin	
<b>1</b> 7 7 <b>1</b>	Pec 18, 2024 C				Signal Track (Span Zoom)	

### LTE B13\_10 M\_Band Edge\_High\_QPSK\_FullRB



Spectrum Analyzer 1 Swept SA	• +				<b>ť</b> ,	Frequency	- * 😤
RL +++ Align: Aut	DC Corrections: Off Pre	eamp: Off Gate / Path: Standard IF G	e: Off	#Avg Type: Power (RMS 1 2 3 4 Trig: Free Run	VWW 79	enter Frequency 99.000000 MHz	Settings
1 Spectrum v Scale/Div 10 dB		vi Offset 26.50 dB evel -10.00 dBm		Mkr1 793.000   -60.397 d	MHZ 1	oan 2.0000000 MHz Swept Span Zero Span	
						Full Span	
40.0				DL1-35.0	0 dBm	art Freq 93.000000 MHz	
50.0						op Freq 05.000000 MHz	
60.0 the stand the stand						AUTO TUNE	
70.0 80.0	<sup>gas</sup> terkenten seinen statuter son statuter son son statuter son	Mayolli palaneses	witnesslaveness	un nan an a	RMS CF	<sup>=</sup> Step .200000 MHz	
						Auto Man eq Offset	
					0	Hz Axis Scale	
Start 793.000 MHz #Res BW 10 kHz		ideo BW 30 kHz		Stop 805.000 #Sweep 2.00 s (100	MHz	Log	
ר <b>ה</b>	Pec 18, 2024 10:52:18 AM	$\Delta$				gnal Track pan Zoom)	

# LTE B13\_10 M\_Extended Band Edge\_High\_QPSK\_FullRB



# **10. ANNEX A\_ TEST SETUP PHOTO**

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

No.	Description
1	HCT-RF-2502-FC105-P