

# **TEST REPORT**

FCC Sub6 n5 Test for TM19FNNAHD2 Certification

APPLICANT LG Electronics Inc.

REPORT NO. HCT-RF-2412-FC030

DATE OF ISSUE December 13, 2024

> **Tested by** Jung Ki Lim

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Technical Manager Jong Seok Lee

HCT CO., LTD. Bonejai Huh BongJai Huh T CEO

F-TP22-03(Rev.06)

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HCT CO.,LTD. 2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea Tel. +82 31 645 6300 Fax. +82 31 645 6401

T E S T R E P O R T	REPORT NO. HCT-RF-2412-FC030 DATE OF ISSUE December 13, 2024
Applicant	<b>LG Electronics Inc.</b> 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
Product Name Model Name	Telematics TM19FNNAHD2
Date of Test	September 30, 2024 ~ December 10, 2024
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	BEJTM19FNNAHD2
FCC Classification	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part(s) : § 22
Test Results	PASS





## **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	December 13, 2024	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

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).



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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:	BEJTM19FNNAHD2
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 22
EUT Type:	Telematics
Model(s):	TM19FNNAHD2
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15, 20
Waveform:	CP-OFDM, DFT-S-OFDM
Modulation:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
	CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
	826.5 MHz – 846.5 MHz : 5 MHz
Ty Frequency	829.0 MHz – 844.0 MHz : 10 MHz
Tx Frequency:	831.5 MHz – 841.5 MHz : 15 MHz
	834.0 MHz – 839.0 MHz : 20 MHz
Date(s) of Tests:	September 30, 2024 ~ December 10, 2024
EUT Serial number:	Radiated : Honda MY26 #02
EUT Senat number:	Conducted : Honda MY26 #01
Antenna Information	Please refer to the Antenna Approval Specification document.



#### **1.1. MAXIMUM OUTPUT POWER**

Mode		Emission		<b>Conducted Output Power</b>		
(MHz)	Tx Frequency (MHz)	Designator	Modulation	Max. Power (W)	Max. Power (dBm)	
		4M50G7D	PI/2 BPSK	0.233	23.67	
		4M50G7D	QPSK	0.231	23.64	
Sub6 n5 (5)	826.5 - 846.5	4M50W7D	16QAM	0.181	22.57	
		4M50W7D	64QAM	0.131	21.17	
		4M50W7D	256QAM	0.086	19.33	
		8M97G7D	PI/2 BPSK	0.233	23.67	
		9M98G7D	QPSK	0.230	23.61	
Sub6 n5 (10)	829.0 - 844.0	8M95W7D	16QAM	0.186	22.70	
		8M96W7D	64QAM	0.130	21.14	
		8M99W7D	256QAM	0.085	19.31	
Sub6 n5 (15) 831.5 – 841.		13M5G7D	PI/2 BPSK	0.243	23.86	
		13M4G7D	QPSK	0.237	23.74	
	831.5 - 841.5	13M4W7D	16QAM	0.189	22.76	
		13M5W7D	64QAM	0.135	21.31	
		13M4W7D	256QAM	0.086	19.36	
		17M9G7D	PI/2 BPSK	0.239	23.78	
		17M9G7D	QPSK	0.235	23.71	
Sub6 n5 (20)	834.0 - 839.0	17M9W7D	16QAM	0.187	22.71	
		17M9W7D	64QAM	0.132	21.21	
	-	17M9W7D	256QAM	0.085	19.30	





## 2. INTRODUCTION

## **2.1. DESCRIPTION OF EUT**

The EUT was a Telematics with LTE, 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** 





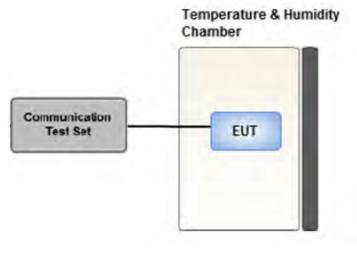
## **3. DESCRIPTION OF TESTS**

#### **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	- KDB 971168 D01 v03r01 – Section 5.2
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	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8



## **3.2 CONDUCTED OUTPUT POWER**



#### Test setup

#### **Test Overview**

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurements be performed only over durations of active transmissions at maximum output power level applies.

Conducted Output Power was tested in accordance with KDB971168 D01 Power Meas License Digital Systems v03r01, Section 5.2.



#### **3.3 RADIATED POWER**

#### **Test Overview**

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna.

#### **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 turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
- 2. A half wave dipole is then substituted in place of the EUT. For 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 power is calculated by the following formula;

 $P_{d}$  (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dB)

Where:  $P_d$  is the dipole equivalent power and  $P_g$  is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

- 4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- 5. 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.



#### **3.4 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)

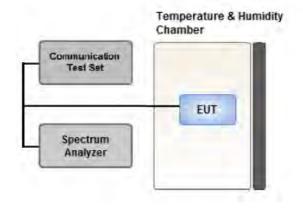
Where:  $\mathsf{P}_{\mathsf{g}}$  is the generator output power into the substitution antenna.

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

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



#### 3.5 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  $P_{Pk}$ .

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<sub>Pk</sub> (dBm) - P<sub>Avg</sub> (dBm) (P<sub>Avg</sub> = 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  $\geq 3 \times$  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  $2 \times to 3 \times the OBW$ .
- 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:

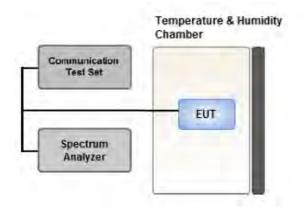
Set  $\geq$  [10 × (number of points in sweep) × (transmission period)] for single sweep

(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 %.



#### **3.6 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



## Communication Test Set EUT Spectrum Analyzer

#### 3.7 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

#### Test setup

#### **Test Overview**

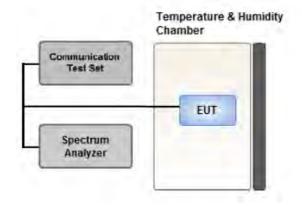
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured 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  $\geq 2 \times \text{Span} / \text{RBW}$



#### 3.8 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  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize



#### **Test Notes**

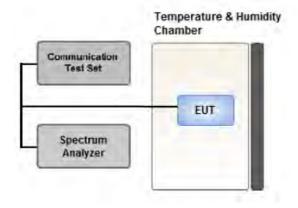
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a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



## 3.9 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.





## 3.10 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. Mode : SA, NSA

Worst case : SA

- 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.

- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).

All EN-DC mode of operation (=anchor) were investigated and the test results were measured No Peak Found.

The test results which are attenuated more than 20 dB below the permissible value, so it was not reported.

- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 15 MHz)

[ Worst case ]						
Test Description	Modulation	RB size	RB offset	Axis		
Effective Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Sec	ction 8.2	Х		
Radiated Spurious Emissions	PI/2 BPSK	See Sec	ction 8.3	Х		



## 3.11 WORST CASE (CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported. (Worst case: DFT-S-OFDM)
- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported. (Worst case: PI/2 BPSK)
- All modes of operation were investigated and the worst case configuration results are reported.

Mode: SA, NSA

Worst case: SA

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported. Please refer to the table below.

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth Peak- to- Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
			Low	1	0
		5	High	1	24
	PI/2 BPSK	10	Low	1	0
			High	1	51
Band Edge			Low	1	0
Ū			High	1	78
			Low	1	0
		20	High	1	105
		5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15, 20	Low, Mid, High	1	1

[Worst case]





Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	03/10/2026	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	02289	02/14/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	04/27/2025	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
Loop Antenna(9 kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	01/16/2025	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
<b>RF Switching System</b>	FBSR-06B (1G HPF + LNA)	T&M SYSTEM	F3L1	05/14/2025	Annual
<b>RF Switching System</b>	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/14/2025	Annual
<b>RF Switching System</b>	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/14/2025	Annual
<b>RF Switching System</b>	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/14/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/22/2025	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	02/29/2025	Annual
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Signal Analyzer(10 Hz~26.5 GHz)	N9020A	Agilent	MY51110063	04/04/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer (10 Hz~40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/13/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	23/05/2025	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.	6262302511	05/14/2025	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/10/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

#### **4. LIST OF TEST EQUIPMENT**

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 (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (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 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, <i>k</i> =2)



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

#### 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)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	PASS
Frequency stability / variation of ambient temperature	§2.1055, §22.355	< 2.5 ppm	PASS

#### Note:

1. Conducted tests were tested using 5G Wireless Tester.

#### 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
Radiated Spurious and	§2.1053,	< 43 + 10log10 (P[Watts]) for	PASS
Harmonic Emissions	§22.917(a)	all out-of band emissions	FA00

#### Note:

1. Radiated tests were tested using 5G Wireless Tester.

#### 6.3. Data Referencing

Rule Part	Test item	Data Referencing	Comments
§2.1049	Occupied Bandwidth	Y	-
§2.1051, §22.917(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal	Y	-
§22.913(d)	Peak- to- Average Ratio	Y	-
§2.1055, §22.355	Frequency stability / variation of ambient temperature	Y	-
§22.913(a)(5)	Effective Radiated Power	Y	Spot-check
§2.1053, §22.917(a)	Radiated Spurious and Harmonic Emissions	Ν	Test
§2.1046	Conducted Output Power	Y	-

#### Spot-Check Result

1. Data was leveraged from model TM19FNNAHD4 for the certification of TM19FNNAHD2.

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



## 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

Ch.	/ Freq.	Measured	Substitute	Ant. Gain	<u> </u>	Pol.	ERP		
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)	C.L	P01.	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	<u> </u>	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 Conducted Output Power

Davadu i dth		OFDM	Madulation	RB	RB	Max.Average Power (dBm)														
Bandwidth	SCS(kHz)		modulation	Modulation	Modulation	Modulation	Modulation	MOUUIALION	MOUULALION	MODULATION	Modulation	Modulation	modulation	Modulation	Modulation	Size	Offset	165300	167300	169300
						826.5 MHz	836.5 MHz	846.5 MHz												
				1	1	23.67	23.60	23.64												
		DFT-s		1	13	23.65	23.56	23.46												
				1	23	23.59	23.53	23.54												
			pi/2 BPSK	12	0	23.12	23.15	23.08												
				12	7	23.67	23.58	23.42												
<b>5</b> • 41 •	15			12	13	23.07	23.04	22.90												
5 MHz	15			25	0	23.11	23.07	23.01												
			QPSK	1	1	23.62	23.52	23.64												
			16QAM	1	1	22.57	22.53	22.53												
			64QAM	1	1	21.13	21.10	21.17												
			256QAM	1	1	19.33	19.30	19.27												
		СР	QPSK	1	1	22.20	22.00	22.13												

De e la childe		OEDM Modulation		OFDM Modulation		RB F		Max.Average Power (dBm)			
Bandwidth	SCS(kHz)	OFDM	Modulation	Modulation	Size	Offset	165800	167300	168800		
						829 MHz	836.5 MHz	844 MHz			
				1	1	23.64	23.67	23.65			
		DFT-s		1	26	23.61	23.64	23.62			
			pi/2 BPSK	1	50	23.58	23.62	23.61			
				25	0	23.19	23.10	23.08			
				25	14	23.60	23.59	23.63			
10.141	15			25	27	23.16	23.06	23.03			
10 MHz	15			50	0	23.12	23.13	23.14			
			QPSK	1	1	23.50	23.61	23.61			
			16QAM	1	1	22.54	22.64	22.70			
			64QAM	1	1	21.14	21.06	21.10			
			256QAM	1	1	19.13	19.31	19.24			
		СР	QPSK	1	1	22.20	22.05	22.02			



5 1		OFDM	RB		RB	Max.A	Max.Average Power (dBm)			
Bandwidth	SCS(kHz)	OFDM	Modulation	Modulation	Modulation	Size	Offset	166300	167300	168300
						831.5 MHz	836.5 MHz	841.5 MHz		
				1	1	23.86	23.70	23.63		
		DFT-s	pi/2 BPSK	1	40	23.82	23.68	23.62		
				1	77	23.64	23.58	23.59		
				36	0	23.32	23.26	23.13		
				36	22	23.81	23.69	23.63		
	15			36	43	23.27	23.24	23.17		
15 MHz	15			75	0	23.24	23.13	23.15		
			QPSK	1	1	23.74	23.59	23.59		
			16QAM	1	1	22.76	22.67	22.60		
			64QAM	1	1	21.31	21.13	21.20		
			256QAM	1	1	19.33	19.36	19.28		
		СР	QPSK	1	1	22.27	22.11	22.26		

Decide Mile		05014	RB		RB	Max.A	Average Power	(dBm)
Bandwidth	SCS(kHz)	OFDM	I Modulation	Size	Offset	166800	167300	167800
						834 MHz	836.5 MHz	839 MHz
				1	1	23.75	23.69	23.72
				1	53	23.74	23.66	23.58
		DFT-s	pi/2 BPSK	1	104	23.60	23.58	23.56
				50	0	23.21	23.27	23.19
				50	28	23.78	23.67	23.60
20.1411	15			50	56	23.16	23.12	23.09
20 MHz	15			100	0	23.24	23.17	23.06
			QPSK	1	1	23.71	23.69	23.59
			16QAM	1	1	22.67	22.71	22.55
			64QAM	1	1	21.11	21.21	21.20
		-	256QAM	1	1	19.30	19.27	19.25
		СР	QPSK	1	1	22.21	22.24	22.21



Freq	Mod/	Modulation	Measured	Substitute	Ant.			Limit	EF	RP	F	RB
(MHz)	Bandwidth [SCS (kHz)]	Modulation	Level (dBm)	Level (dBm)		C.L	Pol	W	W	dBm	Size	Offset
		PI/2 BPSK	-26.92	33.26	-9.90	1.44	Н		0.156	21.92		
		QPSK	-26.95	33.23	-9.90	1.44	Н		0.155	21.89		
826.5		16-QAM	-28.08	32.10	-9.90	1.44	Н		0.119	20.76	1	23
		64-QAM	-29.55	30.63	-9.90	1.44	Н		0.085	19.29		
		256-QAM	-31.55	28.63	-9.90	1.44	Н		0.054	17.29		
		PI/2 BPSK	-26.49	33.73	-9.90	1.45	Н		0.173	22.38		
	Sub6 n5/	QPSK	-26.56	33.66	-9.90	1.45	Н	<	0.170	22.31		
836.5	5 MHz	16-QAM	-27.72	32.50	-9.90	1.45	Н		0.130	21.15	1	1
	[15 kHz]	64-QAM	-29.19	31.03	-9.90	1.45	Н	7.00	0.093	19.68		
		256-QAM	-31.19	29.03	-9.90	1.45	Н		0.059	17.68		
		PI/2 BPSK	-26.74	33.73	-9.90	1.45	Н		0.173	22.38		
		QPSK	-26.76	33.71	-9.90	1.45	Н		0.172	22.36		
846.5		16-QAM	-27.74	32.73	-9.90	1.45	Н		0.137	21.38	1	1
		64-QAM	-29.22	31.25	-9.90	1.45	Н		0.098	19.90		
		256-QAM	-31.20	29.27	-9.90	1.45	Н		0.062	17.92		

#### **8.2 EFFECTIVE RADIATED POWER**



Freq	Mod/		Measured	Substitute	Ant.			Limit	E	RP	F	RB
(MHz)	Bandwidth [SCS (kHz)]	Modulation	Level (dBm)	/el Level (dBm) Ga		C.L	Pol	W	W	dBm	Size	Offset
		PI/2 BPSK	-26.78	33.36	-9.90	1.44	Н		0.159	22.02		
		QPSK	-26.82	33.32	-9.90	1.44	Н		0.158	21.98		
829.0		16-QAM	-27.82	32.32	-9.90	1.44	Н		0.125	20.98	1	50
		64-QAM	-29.28	30.86	-9.90	1.44	Н		0.090	19.52		
		256-QAM	-31.25	28.89	-9.90	1.44	Н		0.057	17.55		
		PI/2 BPSK	-26.70	33.52	-9.90	1.45	Н		0.165	22.17		
	Sub6 n5/	QPSK	-26.75	33.47	-9.90	1.45	Н	<	0.163	22.12		
836.5	10 MHz	16-QAM	-27.77	32.45	-9.90	1.45	Н	7.00	0.129	21.10	1	50
	[15 kHz]	64-QAM	-29.25	30.97	-9.90	1.45	Н	1.00	0.092	19.62		
		256-QAM	-31.22	29.00	-9.90	1.45	Н		0.058	17.65		
		PI/2 BPSK	-26.71	33.63	-9.90	1.45	Н		0.169	22.28		
		QPSK	-26.79	33.55	-9.90	1.45	Н		0.166	22.20		
844.0		16-QAM	-27.79	32.55	-9.90	1.45	Н		0.132	21.20	1	50
		64-QAM	-29.25	31.09	-9.90	1.45	Н		0.094	19.74		
		256-QAM	-31.27	29.07	-9.90	1.45	Н		0.059	17.72		



Freq	Mod/		Measured	Substitute	Ant.			Limit	El	RP	F	RB
(MHz)	Bandwidth [SCS (kHz)]	Modulation	Level (dBm)	Level (dBm)		C.L	Pol	W	W	dBm	Size	Offset
		PI/2 BPSK	-26.66	33.54	-9.90	1.45	Н		0.166	22.19		
		QPSK	-26.75	33.45	-9.90	1.45	Н		0.162	22.10		
831.5		16-QAM	-27.74	32.46	-9.90	1.45	Н		0.129	21.11	1	77
		64-QAM	-29.21	30.99	-9.90	1.45	Н		0.092	19.64		
		256-QAM	-31.20	29.00	-9.90	1.45	Н		0.058	17.65		
		PI/2 BPSK	-26.61	33.61	-9.90	1.45	Н		0.168	22.26		
	Sub6 n5/	QPSK	-26.72	33.50	-9.90	1.45	Н	<	0.164	22.15		
836.5	15 MHz	16-QAM	-27.70	32.52	-9.90	1.45	Н	7.00	0.131	21.17	1	39
	[15 kHz]	64-QAM	-29.18	31.04	-9.90	1.45	Н	1.00	0.093	19.69		
		256-QAM	-31.17	29.05	-9.90	1.45	Н		0.059	17.70		
		PI/2 BPSK	-26.59	33.78	-9.90	1.45	Н		0.175	22.43		
		QPSK	-26.69	33.68	-9.90	1.45	Н		0.171	22.33		
841.5		16-QAM	-27.66	32.71	-9.90	1.45	Н		0.137	21.36	1	1
		64-QAM	-29.14	31.23	-9.90	1.45	Н		0.097	19.88		
		256-QAM	-31.10	29.27	-9.90	1.45	Н		0.062	17.92		



Freq	Mod/		Measured	Substitute	Ant.			Limit	E	RP	F	RB
(MHz)	Bandwidth [SCS (kHz)]	Modulation	Level (dBm)	Level (dBm)		C.L	Pol	W	W	dBm	Size	Offset
		PI/2 BPSK	-26.60	33.72	-9.90	1.45	Н		0.173	22.37		
		QPSK	-26.63	33.69	-9.90	1.45	Н		0.171	22.34		
834.0		16-QAM	-27.59	32.73	-9.90	1.45	Н		0.137	21.38	1	53
		64-QAM	-29.07	31.25	-9.90	1.45	Н		0.098	19.90		
		256-QAM	-31.52	28.80	-9.90	1.45	Н		0.056	17.45		
		PI/2 BPSK	-26.59	33.63	-9.90	1.45	Н		0.169	22.28		
	Sub6 n5/	QPSK	-26.62	33.60	-9.90	1.45	Н	<	0.168	22.25		
836.5	20 MHz	16-QAM	-27.71	32.51	-9.90	1.45	Н	7.00	0.131	21.16	1	53
	[15 kHz]	64-QAM	-29.19	31.03	-9.90	1.45	Н	1.00	0.093	19.68		
		256-QAM	-31.20	29.02	-9.90	1.45	Н		0.059	17.67		
		PI/2 BPSK	-26.70	33.67	-9.90	1.45	Н		0.171	22.32		
		QPSK	-26.84	33.53	-9.90	1.45	Н		0.165	22.18		
839.0		16-QAM	-27.75	32.62	-9.90	1.45	Н		0.134	21.27	1	104
		64-QAM	-29.21	31.16	-9.90	1.45	Н		0.096	19.81		
		256-QAM	-31.21	29.16	-9.90	1.45	Н		0.060	17.81		



#### **8.3 RADIATED SPURIOUS EMISSIONS**

NR Band:	<u>N5</u>
Bandwidth:	15 MHz
Modulation:	PI/2 BPSK
Distance:	3 meters
SCS:	15 kHz

Ch	Freq (MHz)	Measured	Ant. Gain	Substitute	C.L	. Pol	Result (dBm)	Limit (dBm)	RB	
Cir		Level (dBm)	(dBi)	Level (dBm)	C.L				Size	Offset
100000	1 663.00	-38.26	9.58	-47.33	2.04	V	-39.79	-13.00		
166300	2 494.50	-58.34	10.65	-62.81	2.50	V	-54.66	-13.00	1	73
(831.5)	3 326.00	-58.46	11.57	-60.01	2.99	V	-51.43	-13.00		
107000	1 673.00	-37.85	9.69	-47.23	2.05	Н	-39.59	-13.00		
167300	2 509.50	-58.60	10.55	-63.33	2.51	V	-55.29	-13.00	1	39
(836.5)	3 346.00	-58.57	11.53	-61.09	2.96	V	-52.52	-13.00		
100000	1 683.00	-37.72	9.80	-46.83	2.06	Н	-39.09	-13.00		
168300	2 524.50	-59.00	10.52	-63.27	2.54	V	-55.29	-13.00	1	1
(841.5)	3 366.00	-60.56	11.49	-62.99	2.96	V	-54.46	-13.00		



#### 8.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
			BPSK			4.13
			QPSK			4.60
	5 MHz		16-QAM	25		5.82
			64-QAM			6.27
			256-QAM			6.90
		_	BPSK			4.05
			QPSK			4.60
	10 MHz		16-QAM	.6-QAM 50		5.59
	64-QAM 256-QAM 836.5 BPSK		6.11			
Sub6		- 836.5	256-QAM		75	6.66
n5			BPSK			3.90
			QPSK			4.58
	15 MHz		16-QAM	75		5.49
			64-QAM		5.97	
			256-QAM			6.63
		-	BPSK			3.82
			QPSK			4.61
	20 MHz		16-QAM	100		5.58
			64-QAM			6.01
			256-QAM			6.59

## Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 41  $\sim$  61.

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#### 8.5 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			BPSK			4.5016
			QPSK			4.5028
	5 MHz		16-QAM	25		4.4993
			64-QAM			4.4967
			256-QAM			4.4959
		_	BPSK			8.9684
			QPSK			8.9822
	10 MHz	10 MHz   16-QAM 50 64-QAM 256-QAM 256-QAM 836.5 BPSK QPSK 15 MHz 16-QAM 75 64-QAM		8.9488		
					8.9592	
Sub6			256-QAM		_	8.9935
n5			BPSK	5K AM 75	0	13.454
			QPSK		_	13.434
	15 MHz		16-QAM			13.423
			64-QAM			13.491
			256-QAM			13.421
			BPSK			17.863
			QPSK	100		17.870
	20 MHz		16-QAM			17.860
			64-QAM			17.882
			256-QAM			17.869

## Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 62  $\sim$  81.

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Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)	
		826.5	9.9402	30.815	-62.164	-31.349		
	5	836.5	6.0020	30.815	-62.772	-31.957		
		846.5	4.9851	30.200	-63.215	-33.015		
	10	829.0	5.7528	30.815	-62.672	-31.857		
		10	836.5	8.5843	30.815	-63.432	-32.617	
Sub6		844.0	9.6511	30.815	-63.430	-32.615	12.00	
n5		831.5	9.5813	30.815	-63.091	-32.276	-13.00	
	15	836.5	9.7009	30.815	-61.843	-31.028		
		841.5	3.8286	30.200	-60.977	-30.777		
		834.0	3.1107	30.200	-63.257	-33.057		
		836.5	9.1526	30.815	-62.979	-32.164		
		839.0	9.9701	30.815	-62.003	-31.188		

#### **8.6 CONDUCTED SPURIOUS EMISSIONS**

#### Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 82 ~ 93.

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	27.494
1 - 5	30.200
5 - 10	30.815
10 - 15	31.340
15 - 20	31.713
Above 20	32.355

#### 8.7 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 94 ~ 117.



## 8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

BandWidth:
------------

Voltage(100 %):Deviation Limit:

<u>5 MHz</u>	
13.200 VDC	
$\pm 0.00025\%{ m or}2.5{ m ppm}$	

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm	
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)		
	100 %	+20(Ref)	836 500 003	0.0	0.000 000	0.000	
	100 %	-30	836 500 005	1.9	0.000 000	0.002	
	100 %	-20	836 500 004	0.5	0.000 000	0.001	
	100 %	-10	836 500 002	-1.0	0.000 000	-0.001	
	100 %	0	836 500 001	-2.1	0.000 000	-0.002	
836.5	100 %	+10	836 500 000	-3.4	0.000 000	-0.004	
	100 %	+30	836 499 998	-4.7	-0.000 001	-0.006	
	100 %	+40	836 499 997	-6.1	-0.000 001	-0.007	
	100 %	+50	836 499 996	-7.2	-0.000 001	-0.009	
	85 %	+20	836 499 998	-4.8	-0.000 001	-0.006	
	115 %	+20	836 499 998	-5.2	-0.000 001	-0.006	



BandWidth:	10 MHz
Voltage(100 %):	13.200 VDC
Deviation Limit:	$\pm 0.00025\%{ m or}2.5{ m ppm}$

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	
(MHz)	(%)	(%) (°C)	(Hz)	Error (Hz)	(%)	ppm
	100 %	+20(Ref)	836 499 998	0.0	0.000 000	0.000
	100 %	-30	836 499 995	-2.8	0.000 000	-0.003
	100 %	-20	836 499 994	-4.0	0.000 000	-0.005
	100 %	-10	836 499 993	-5.1	-0.000 001	-0.006
	100 %	0	836 499 992	-6.3	-0.000 001	-0.007
836.5	100 %	+10	836 500 002	3.4	0.000 000	0.004
	100 %	+30	836 500 001	2.6	0.000 000	0.003
	100 %	+40	836 500 000	1.6	0.000 000	0.002
	100 %	+50	836 499 999	0.7	0.000 000	0.001
	85 %	+20	836 499 999	0.8	0.000 000	0.001
	115 %	+20	836 499 999	1.1	0.000 000	0.001



BandWidth:	15 MHz
Voltage(100 %):	13.200 VDC
Deviation Limit:	$\pm 0.00025\%{ m or}2.5{ m ppm}$

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	<b>PP</b>
	100 %	+20(Ref)	836 500 002	0.0	0.000 000	0.000
	100 %	-30	836 500 003	1.2	0.000 000	0.001
	100 %	-20	836 500 003	0.6	0.000 000	0.001
	100 %	-10	836 500 002	-0.1	0.000 000	0.000
	100 %	0	836 500 001	-0.9	0.000 000	-0.001
836.5	100 %	+10	836 500 000	-1.9	0.000 000	-0.002
	100 %	+30	836 500 000	-2.4	0.000 000	-0.003
	100 %	+40	836 499 999	-3.0	0.000 000	-0.004
	100 %	+50	836 499 998	-3.9	0.000 000	-0.005
	85 %	+20	836 500 001	-1.4	0.000 000	-0.002
	115 %	+20	836 499 998	-3.8	0.000 000	-0.005



BandWidth:	<u>20 MHz</u>	
Voltage(100 %):	13.200 VDC	
Deviation Limit:	$\pm 0.00025\%{ m or}2.5{ m ppm}$	

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	836 500 003	0.0	0.000 000	0.000
	100 %	-30	836 500 005	2.4	0.000 000	0.003
	100 %	-20	836 500 004	1.2	0.000 000	0.001
	100 %	-10	836 500 004	0.7	0.000 000	0.001
	100 %	0	836 500 003	0.2	0.000 000	0.000
836.5	100 %	+10	836 500 002	-0.8	0.000 000	-0.001
	100 %	+30	836 500 002	-1.2	0.000 000	-0.001
-	100 %	+40	836 500 001	-2.0	0.000 000	-0.002
	100 %	+50	836 500 001	-2.2	0.000 000	-0.003
	85 %	+20	836 500 004	0.8	0.000 000	0.001
	115 %	+20	836 500 005	2.2	0.000 000	0.003



Report No. HCT-RF-2412-FC030

## 9. TEST PLOTS



All	upling DC Cor		14 dB np Off	Trig. Free Run #IF Gain: Low		eq: 836.500000 MHz 00 M/2 00 Mpt I Nona		requency 000 MHz	Settings
letrics		2 Graph			- Providence		CF Step 5.00000	0 MHz	
Average Por	wer	Gaussian					Auto		
	22.40 dBm 53.42 % at 0 dB						Freq Offs 0 Hz	_	
	00,12 ,0 0 0 00		$\langle \rangle$						
10.0 %	2.06 dB	1							
1.0 %	3.72 dB								
0.1 %	4.13 dB								
0.01 %	4.23 dB	р ( %		$\lambda$					
0.001 %	4.28 dB								
0.0001 %	4.33 dB	a a1 %			V I				
Peak	4.59 dB	0.001 70							
PCak	26.99 dBm								
		0.000 dB 0.00 dB Info BW 5.0000	MHz			20.00	dB		Loc

# NR5\_5 M\_PAR\_Mid\_BPSK\_FullRB



YSIGHT Inp	uplina DG Con	ut Z 50 Ω Atten: 14 dE r CCorr Preamp Off q Ret Int (S)		Center Freq. 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Frequency 836.500000 MHz	
etrics	*	2 Graph	•	A DESCRIPTION OF THE OWNER OF THE	CF Step 5.000000 MHz	
Average Pov	ver	Gaussian			Auto Man	
, norego r or	21.97 dBm				Freq Offset	
	50,96 % at 0 dB	10 5			0 Hz	
10.0 %	2.43 dB					
1.0 %	4.33 dB	18				
0.1 %	4.60 dB					
0.01 %	4.67 dB	01%	$  \rangle$			
0.001 %	4.74 dB					
0.0001 %	4,84 dB	0.01 %				
	5.08 dB	0.001 %				
Peak	27.05 dBm					
		0.000 dB Info BW 5.0000 MHz		20.00	dB	Lo

## NR5\_5 M\_PAR\_Mid\_QPSK\_FullRB





#### NR5\_5 M\_PAR\_Mid\_16QAM\_FullRB



	iplina DG Con	ut Z 50 Ω Atten 14 r CCorr Preamp ( g Ret. Int (S)		Center Freq. 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Fr 836.5000	
etrics		2 Graph Gaussian	*		CF Step 5.000000 Auto	MHz
Average Pov	20.37 dBm				Man Freq Offsi	et
4	15.14 % at 0 dB	10 %			0 Hz	
10.0 %	3.05 dB					
1.0 %	5.30 dB					
0.1 %	6.27 dB					
0.01 %	6.40 dB	01%				
0.001 %	6.52 dB					
0.0001 %	6.79 dB	0.01 %				
Peak	6.88 dB	0.001 %				
гсак	27.25 dBm					
		0.00 dB 0.00 dB Info BW 5.0000 MH:	2	20	00 dB	Lo

## NR5\_5 M\_PAR\_Mid\_64QAM\_FullRB



	iplina DG Cor	ut Z 50 Ω Atten: 14 c r CCorr Preamp C q Ret Int (S)	Center Freq: 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Frequent 836.500000 MF	Sciulty
trics		2 Graph	A DECEMBER OF THE OWNER	CF Step 5.000000 MHz	
Average Pov	ver	Gaussian		Auto Man	
4	18.37 dBm 44.96 % at 0 dB	10 5		Freq Offset 0 Hz	
10.0 % 1.0 %	3.09 dB	1 -			
0.1 % 0.01 %	6.90 dB 7.87 dB	a) es	د الدر الي نظر الي الي مركد الي الي الي الي		
0.001 %	8.16 dB				
0.0001 %	8.26 dB	0.07 %			
Peak	8.29 dB 26.66 dBm	0.001 %			
		0.0001 s 0.00 dB Info BW 5.0000 MHz	20.0	0 dB	La

### NR5\_5 M\_PAR\_Mid\_256QAM\_FullRB



	uplina DG Con	ut Z:50 Ω Atten: 14 α τ CCorr Preamp C q Ref. Int (S)		Center Freq: 836.500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Frequency 836.500000 MHz	
etrics		2 Graph Gaussian			CF Step 10.000000 MHz Auto Man	
Average Pov	22.63 dBm				Freq Offset	
đ	48.24 % at 0 dB	10 5	$\times$		0 Hz	
10.0 %	2.10 dB					
1.0 %	3.76 dB	1				
0.1 %	4.05 dB					
0.01 %	4.19 dB	01%	$\sim$			
0.001 %	4.30 dB					
0.0001 %	4,38 dB	0.01%				
	4.41 dB	0.001 34				
Peak	27.04 dBm					
		0.000 dB Info BW 10.000 MHz		20.00	) dB	Lo

### NR5\_10 M\_PAR\_Mid\_BPSK\_FullRB



	uplina DG Con	ut Z:50 Ω Atten: 14 dž r CCorr Preamp Of q Ret Int (S)		Center Freq. 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Frequency 836.500000 MHz	Setting
atrics		2 Graph Gaussian	•		CF Step 10.000000 MHz	
Average Pov	22.18 dBm 46.70 % at 0 dB	10 %			Man Freq Olfset 0 Hz	
10.0 % 1.0 %	2.56 dB 4.27 dB					
0.1 % 0.01 %	4.60 dB 4.73 dB	D) =				
0.001 % 0.0001 %	4.85 dB 5.03 dB	0.01 %				
Peak	5.05 dB 27.23 dBm	0.001 34				
		0.0001 4 0.00 dB Info BW 10.000 MHz		20.00	dB	L

## NR5\_10 M\_PAR\_Mid\_QPSK\_FullRB



	upuna DG Cor	ut Z 50 Q Atten 14 c r CCorr Preamp C q Ret Int (S)	Center Freq. 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Frequency 836.500000 MHz	Setting
etrics	*	2 Graph	- Internet and	CF Step 10.000000 MHz	
		Gaussian		Auto	
Average Por	21.16 dBm			Man	
	44.62 % at 0 dB	10 5		Freq Offset 0 Hz	
	THOE TO BLU UD				
10.0 %	3.01 dB				
1.0 %	4.93 dB	1%			
0.1 %	5.59 dB		و الد الد الد الد		
0.01 %	5.77 dB	D.) %			
0.001 %	5.88 dB				
0.0001 %	6.01 dB	0.01 %			
	6.07 dB	ບໍ່ເປັ <mark>ດ</mark> ກ່າງ			
Peak	27.23 dBm				
		0.0001 sl	20.00	dB	Lo
		Info BW 10.000 MHz			

## NR5\_10 M\_PAR\_Mid\_16QAM\_FullRB





#### NR5\_10 M\_PAR\_Mid\_64QAM\_FullRB





#### NR5\_10 M\_PAR\_Mid\_256QAM\_FullRB



	iplina DG Con	ut Z 50 Ω Atten: 14 dt r CCorr Preamp Of q Ref. Int (S)		Center Freq: 836.500000 MHz Counts: 2:00 M/2:00 Mpt Radio Std: None	Center Frequency 836.500000 MHz	Setting
etrics		2 Graph Gaussian	•		CF Step 10.000000 MHz Auto Man	
Average Pov	22.64 dBm 7.69 % at 0 dB	10 5			Freq Offset 0 Hz	
10.0 % 1.0 %	1.97 dB 3.60 dB					
0.1 % 0.01 %	3.90 dB 4.06 dB	0.)%				
0.001 % 0.0001 %	4.27 dB 4.42 dB	0.01 %				
Peak	4.42 dB 27.06 dBm	0.001 %				
		0.0001 40 0.00 dB Info BW 15.000 MHz		20.00	) dB	La

### NR5\_15 M\_PAR\_Mid\_BPSK\_FullRB



	uplina DG Cor	ut Z:50 Ω Atten r CCorr Pream q Ret. Int (S)		g Free Run Gain Low	Center Freq. 836 500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None		r Frequency 500000 MHz	Setting
etrics	*	2 Graph			Landon Mr. Commercial	CF St 15.00	ep 00000 MHz	1
Average Pov	ver	Gaussian					Auto Man	
	22.18 dBm						Offset	
	10,1 1 40 BL 0 GE							
10.0 %	2.52 dB	1.0						
1.0 %	4.22 dB							
0.1 %	4.58 dB				ويتبع المتبا المتبا			
0.01 %	4.80 dB	0.1%		$\rightarrow$				
0.001 %	4.93 dB							
0.0001 %	5.03 dB	0.01 %						
Peak	5.07 dB	0.001 %						
r cak	27.25 dBm							-
		0.000 dB 0.00 dB Info BW 15.000 M	AHz		20	).00 dB		Lo

## NR5\_15 M\_PAR\_Mid\_QPSK\_FullRB





#### NR5\_15 M\_PAR\_Mid\_16QAM\_FullRB





#### NR5\_15 M\_PAR\_Mid\_64QAM\_FullRB





#### NR5\_15 M\_PAR\_Mid\_256QAM\_FullRB



2 Graph Gaussian	•		CF Step 15.000000 MHz Auto	
X			Man	
			Freq Offset	
10 5			0 Hz	
1=				
0.1%				
0.01 %				
0.001 34				
0.0001 s 0.00 dB Info BW 20.000 f		20.0	0 dB	La
	0.07 S	0 () () () () () () () () () () () () ()	0.1 *2 0.67 *2 0.001 *2	

### NR5\_20 M\_PAR\_Mid\_BPSK\_FullRB



	uplini DG Cor	ut Z:50 Ω Atten r CCorr Pream g Ret. Int (S)	14 dB Trig. Free Rui p. Off #IF Gain: Low		Center Freque 836.500000 I	
etrics		2 Graph		The second s	CF Step 20.000000 M	IHz
		Gaussian			Auto	
Average Pov	22.22 dBm				Man	
	48,98 % at 0 dB	10			Freq Offset 0 Hz	
10.0 %	2.27 dB					
1.0 %	4.02 dB					
0.1 %	4.61 dB					
0.01 %	4.91 dB	0.1%				
0.001 %	5.13 dB					
0.0001 %	5,23 dB	0.01 %		X		
	5.27 dB	0.001 %				
Peak	27.49 dBm					
		0.000 dB Info BW 20.000 M	AH2		20.00 dB	La

## NR5\_20 M\_PAR\_Mid\_QPSK\_FullRB



	upling DG Con	r CCorr Prea 1 Ref. Int (S)	mp Off	Trig: Free Run #IF Gain: Low	Center Freq. 836 Counts 2 00 M/2 Radio Std. None		Center Frequence 836.500000 MH	
atrics		2 Graph			Product and	-	CF Step 20.000000 MHz	
		Gaussian					Auto	
Average Pov							Man	
	21.21 dBm						Freq Offset	
	46.84 % at 0 dB	10 5					0 Hz	
10.0 %	2.86 dB							
1.0 %	4.81 dB	1		1				
0.1 %	5,58 dB							
0.01 %	5.94 dB	0.1 %						
0.001 %	6.20 dB							
0.0001 %	6.32 dB	0.01 %						
	6.35 dB	0.001 34						
Peak	27.56 dBm							
		0.00 dB Info BW 20.000	MHZ			20.00 dB		Lo

### NR5\_20 M\_PAR\_Mid\_16QAM\_FullRB





#### NR5\_20 M\_PAR\_Mid\_64QAM\_FullRB



	iplina DG Con	ut Z:50 Ω Atten: 14 α r CCorr Preamp C q Ret-Int (S)	Center Freq: 836.500000 MHz Counts: 2 00 M/2 00 Mpt Radio Std: None	Center Fr 836.5000	and the second state of th	Setting
trics		2 Graph	- Include -	CF Step 20.00000	0 MHz	
Average Pov	ver	Gaussian		Auto Man		
	18.71 dBm 5.43 % at 0 dB	10 5		Freq Offse 0 Hz	et	
10.0 % 1.0 %	2.93 dB	15				
0.1 % 0.01 %	6.59 dB 7.59 dB	0.1%				
0.001 %	8.10 dB					
0.0001 %	8.36 dB	0.07 %				
Peak	8.46 dB	0.001 %				
Peak	27.17 dBm					-
		0.000 dB 0.00 dB Info BW 20.000 MHz	20.00	) dB		La

### NR5\_20 M\_PAR\_Mid\_256QAM\_FullRB





Spectrum Analyzer 1	+					Q	Frequenc	y + 3,
RL Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Atten: 14 dB Preamp: Off	Trig: Free Run Gate: Otf #IF Gain: Low	Centér Freq Avg(Hold: 5 Radio Std: 1			Frequency 00000 MHz	Settings
Graph T	1	Ref LvI Offset 27 Ref Value 40.00				Span 10.000	) MHz	
20.0 20.0 20.0 20.0 10.0		Ret Value 40.00	aem.			CF Ste 1.0000 Au	00 MHz Ito	
0.00 10.0 20.0 30.0 Her Million William and 40.0	M			1	Hundert leght month and the	Freq O		
-50.0 Center 836.500 MHz #Res BW 100.00 kHz		#Video BW 390.	00 kHz	Sw	Span 10 / /eep 16.7 ms (1001			
Metrics Occupied Bandwidth 4.50	16 MHz		Total Power		31.6 dBm			
Transmit Freq Error x dB Bandwidth	-7.766 ki 4.998 Mi		% of OBW Pov x dB	wer	99.00 % -26.00 dB			Loc
501	Nov 05, 2024 9:14:42 AM					<u>र</u>		

## NR5\_5 M\_OBW\_Mid\_BPSK\_FullRB





Spectrum Analyzer 1 Occupied BW	+					Ö	Frequenc	y + 🕄
RL Align Auto	Input Z: 50 Q Corr CCorr Freq Ret: Int (S) NFE: Adaptive	Atten: 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Fre AvgiHold Radio Std			Frequency 0000 MHz	Settings
DZ PASS		Ref LvI Offset 27 Ref Value 40.00				Span 10.000	MHz	
20.0		Rei Value 40.00				Contract of the local division of the local	00 MHz	
10.0		ware sold of the second second	n na an	my		Au Ma		
10 0 20 0 30 9 11 10 1000 10 1000 1000	pullip				piters	Freq Of 0 Hz	fset	
50.0 Center 836.500 MHz Res BW 100.00 kHz		#Video BW 390.	00 kHz	s	Span 10 N weep 16.7 ms (1001 )			
Metrics	dth .5028 MHz		Total Power		31.2 dBm			
Transmit Freq Em x dB Bandwidth	or -1.808 k 4.992 M		% of OBW Pov x dB	wer	99.00 % -26.00 dB			Loca
1501	<b>Nov 05, 2024</b> 9:15:12 AM	0			II 🔛 — 🕻	<		

## NR5\_5 M\_OBW\_Mid\_QPSK\_FullRB





RL     Augn Auto     Freq Ref. Int (S)     #IF-Gain Low     Radio Std Norie     B36.500000 MHz       1Graph     Ref Lvi Offset 27.52 dB     Ref Value 40.00 dBm     CF Step     10.000 MHz       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     CF Step     1.000000 MHz       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset       200     Ref Value 40.00 dBm     Ref Value 40.00 dBm     Freq Offset     Hz       200     Ref Value 40.00 dBm     Span 10 MHz     Freq Offset     Hz       200     Ref Value 40.00 kHz     Syseep 16.7 ms (1001 pts)     Hz       2 Metrics     Streep Transmit Freq Error     A.699 kHz     % of OBW Power     99.00 %	Spectrum Analyze Occupied BW KEYSIGHT		hput Z: 50 Ω: Corr CCorr	Atten: 14 dB Preamp Off	Trig: Free Run Gate: Off	Center Fre AvgiHold	eq: 836-500000	MHZ	Center F	Frequenc	Settings
Scale/Div 10.0 dB       Ref Lvi Offset 27.52 dB       Span         Scale/Div 10.0 dB       Ref Value 40.00 dBm       CF Step         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         000       000       000       000         200       000       000       000         200       000       000       000         200       000       000       000         200       000       000       000         200       000       000       000         200       000       0000       0000 <t< th=""><th>NL -</th><th></th><th>Freq Ref. Int (</th><th>5)</th><th></th><th></th><th></th><th></th><th>836.50</th><th>0000 MHz</th><th></th></t<>	NL -		Freq Ref. Int (	5)					836.50	0000 MHz	
Log       CF Step         200       CF Step         20	1 Graph		NFE Adaptive	Ref LvI Offset 2					and the second second	MHz	
Allo Allo Allo Man Freq Offset Decenter 836.500 MHz #Video BW 390.00 kHz Sweep 16.7 ms (1001 pts) 2 Metrics Occupied Bandwidth 4.4993 MHz Transmit Freq Error 4.699 kHz % of OBW Power 99.00 %	Log 30.0	B		Ref Value 40.00	dBm				100 0 000		1
100     100 <td>10.0</td> <td></td> <td>and the second</td> <td>مولل طور ومن معن من العاملية الما</td> <td>⊷مەھلەرىسىم<sup>4</sup>دې ئوتىمدىغىن<sup>ىرى</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	10.0		and the second	مولل طور ومن معن من العاملية الما	⊷مەھلەرىسىم <sup>4</sup> دې ئوتىمدىغىن <sup>ىرى</sup>						
-50.0 Center 836.500 MHz #Video BW 390.00 kHz Span 10 MHz #Res BW 100.00 kHz Sweep 16.7 ms (1001 pts) 2 Metrics • Occupied Bandwidth 4.4993 MHz Total Power 30.3 dBm Transmit Freq Error 4.699 kHz % of OBW Power 99.00 %	-10.0 -20.0 -30-0	eronde politi	wont			k	Walker Busslerph	PEAK		set	
2 Metrics Occupied Bandwidth 4.4993 MHz Transmit Freq Error -4.699 kHz % of OBW Power 99.00 %	-50.0 Center 836.500 I			#Video BW 390.	00 kHz						
4.4993 MHz         Total Power         30.3 dBm           Transmit Freq Error         -4.699 kHz         % of OBW Power         99.00 %	2 Metrics	+									
	Occupie				Total Power		30.3 dE	Brn			
						wer					Local
目う C* □ ? Nov 05, 2024 💬 📰 🕃 🔣 🛛 🔀			Nov 05, 202	4			-	R.A.			

#### NR5\_5 M\_OBW\_Mid\_16QAM\_FullRB





Spectrum Analyzer 1 Occupied BW	+						Ø	Frequency	• • 蒜
	Input Z: 50 Ω Corr CCorr Freq Ret. Int (S) NFE Adaptive	Atten: 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low		req: 836.500 d: 500/500 ld: None	000 MHz		requency 1000 MHz	Settings
1 Graph	F	Ref LvI Offset 27					Span 10.000	MHz	
Scale/Div 10.0 dB Log 30.0 20.0		Ref Value 40.00	dBm	seren (			CF Step 1.00000 Auto Mar	0	
000 105 200 300 at 10 and 1					him-allani	PEAK Withalowiching	Freq Off 0 Hz		
-50.0 Center 836.500 MHz #Res BW 100.00 kHz	,	≠Video BW 390.	00 kHz		Sweep 16.7	Span 10 MHz 7 ms (1001 pts)			
2 Metrics						0.45-			
4.490 Transmit Freq Error x dB Bandwidth	67 MHz -9.258 kH 4.987 MH		Total Power % of OBW Pow x dB	ver	99	8 dBm 9.00 % .00 dB			Local
500	Nov 05, 2024 9:16:12 AM								

#### NR5\_5 M\_OBW\_Mid\_64QAM\_FullRB



Spectrum Analyzer 1 Occupied BW	+					Ö	Frequenc	1 1 5%
RL Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	Atten: 14 dB Preamp: Off	Trig: Free Run Gate: Ott #IF Gain: Low	Center Free Avg/Hold 5 Radio Std 1			Frequency 0000 MHz	Settings
DO PASS		Ref LvI Offset 27				Span 10.000	MHz	
Scale/Div 10.0 dB		Ref Value 40.00	dBm			CF Ster 1.0000	00 MHz	
10.0 0.00 -10.0			**************************************			Ma Freq Of	n	
-20.0 -30-0 -40.0 -50.0	Ŵ			W.	PEA John Marynia	N O H2		
Center 836.500 MHz #Res BW 100.00 kHz		#Video BW 390.	00 kHz	Sw	Span 10 MH veep 16.7 ms (1001 pts			
2 Metrics								
Occupied Bandwidth 4.49	59 MHz		Total Power		27.8 dBm			
Transmit Freq Error x dB Bandwidth	-7.727 kl 5.018 M		% of OBW Pov x dB	ver	99.00 % -26.00 dB			Local
	<b>Nov 05, 2024</b> 9:16:44 AM	Ø						

#### NR5\_5 M\_OBW\_Mid\_256QAM\_FullRB





Spectrum Analy Occupied BW	rzer 1 +	+					Ö	Frequency	1 1 5%
	Input RF Coupling DG Align Auto	Input Z 50 Q Corr CCorr Freq Ref. Int (S) NFE_Adaptive	Atten 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq. 836 500000 ( Avg Hold: 500/500 Radio Std: None	VIHZ		requency 0000 MHz	Settings
1 Graph	*		Ref Lvi Offset 27				Span 20.000	MHz	
Scale/Div 10.0	dB		Ref Value 40.00	dBm			CF Step 2.00000	10 MHz	1
20.0		Januar	Nertonennennen	alama lana panganganganganganganganganganganganganga	~		Aut Mar		
-10.0					turn		Freq Off 0 Hz	set	
-30-0									
Center 836.50 #Res BW 200.0			#Video BW 820.	00 kHz	Sweep 1.00 ms	an 20 MHz (1001 pts)			
2 Metrics						·			
Occup	pied Bandwidth								
		584 MHz		Total Power	31.0 dB				
	mit Freq Error 3andwidth	-192.70 k 9.579 M		% of OBW Pov x dB	ver 99.00 -26.00 c				Local
10		Nov 05, 2024 9:32:14 AM	0						
		9:32:14 AM							

## NR5\_10 M\_OBW\_Mid\_BPSK\_FullRB





Spectrum Analyze Occupied BW	r1 +	+						¢	Frequenc	w • 👫
KL AI	put RF oupling DG Ign Auto	Input Z 50 Q Corr CCorr Freq Ret Int (S) NFE Adaptive	Atten 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg/Hold 50 Radio Std No		Hz	and the second se	Frequency 1000 MHz	Settings
DO PASS			Ref Lvi Offset 27	A set that a set the set of the s				Span 20.000	MHz	
Scale/Div 10.0 de			Ref Value 40.00	dBm			1	CF Step 2.0000		
20.0		Jorum	mannen	and and a second se				Aut Ma		
10.0 20.0 30.0 mp/m/g 40.0	mennelium	north and a second s			Immanal	mallion	PEAK Annon Ann	Freq Off 0 Hz	set	
-50.0 Center 836.50 MH #Res BW 200.00			#Video BW 820.	00 kHz	Swe	Spa ep 1.00 ms	an 20 MHz (1001 pts)			
2 Metrics										
Occupier	d Bandwidth 8.98	22 MHz		Total Power		30.4 dBn	ń			
Transmit x dB Bar	t Freq Error ndwidth	-180.74 k 9.730 M		% of OBW Pov x dB	ver	99.00 % -26.00 df				Local
100		Nov 05, 2024 9:32:36 AM								
		9:32:36 AM	@			6.2	× *	-		

## NR5\_10 M\_OBW\_Mid\_QPSK\_FullRB



Spectrum Analyzer 1 Occupied BW	ŧ			C Freque	ency + 💥
RL Align Auto	Input Z 50 Ω Atten: 14 d Corr CCorr Preamp O Freq Ref. Int (S) NFE Adaptive	fi Gate Off	Center Freq. 836 500000 MHz AvgiHold: 500/500 Radio Std. None	Center Frequency 836.500000 MHz	Settings
1 Graph	Ref LvI Offs			Span 20.000 MHz	
Scale/Div 10.0 dB	Ref Value 40	0.00 dBm		CF Step 2.000000 MHz	
10.0	minimum			Auto Man	
-10.0 -20.0 -30.0 Nethan malet the	and		Mennon Willellelleller PEAIC	Freq Offset 0 Hz	
40.0					
Center 836.50 MHz #Res BW 200.00 kHz	#Video BW	820.00 kHz	Span 20 MHz Sweep 1.00 ms (1001 pts)		
2 Metrics					
Occupied Bandwidth	8 MHz	Total Power	29.5 dBm		
Transmit Freq Error x dB Bandwidth	-195.55 kHz 9.663 MHz	% of OBW Power x dB			Local
50	Nov 05, 2024 9:32:58 AM				

#### NR5\_10 M\_OBW\_Mid\_16QAM\_FullRB



Spectrum Analyzer 1  Occupied BW	+			Frequer	ncy v Sid
		en: 14 dB Trig: Free Run samp Off Gate Off #IF Gain Low	Center Freq: 836.500000 MHz AvgiHold: 500/500 Radio Std: None	Center Frequency 836.500000 MHz	Settings
1 Graph	Ref L	vi Offset 27.52 dB		Span 20.000 MHz	
Scale/Div 10.0 dB	Ref	/alue 40.00 dBm		CF Step 2.000000 MHz Auto	
10.0	J	ware and the provide the second states		Freq Offset	-
-20.0 -30.0 Marsh Marsh Marsh 40.0	yurd		Marandon April PEAK	0 Hz	
50.0 Center 836.50 MHz #Res BW 200.00 kHz	#Vid	eo BW 820.00 kHz	Span 20 MHz Sweep 1.00 ms (1001 pts		
2 Metrics T					
Occupied Bandwidth 8.95	92 MHz	Total Power	29.1 dBm		
Transmit Freq Error x dB Bandwidth	-198.05 kHz 9.645 MHz	% of OBW Po x dB	ower 99.00 % -26.00 dB		Local
16 4 1	? Nov 05, 2024 9:33:20 AM	-			

#### NR5\_10 M\_OBW\_Mid\_64QAM\_FullRB



Spectrum Analyzer 1	+				¢	Frequenc	y • 5,
	Input Z 50 Q Corr CCorr Freq Ret: Int (S) NFE: Adaptive	Atten: 14 dB Preamp: Off	Trig: Free Run Gate: Off #IF Gain: Low	Centér Freq. 836 500000 MH AvgiHold: 500/500 Radio Std: None	Ce	nter Frequency 6.500000 MHz	Settings
or PASS Graph		Ref LvI Offset 27			Spa 20	an 1.000 MHz	
cale/Div 10.0 dB		Ref Value 40.00	dBm			Step 000000 MHz	1
20.0	Juin	was made and		~~		Auto Man	
20.0					01	nq Offset Hz	
30-0 40.0 50:0	wind			Un Monorman	-		
enter 836.50 MHz Res BW 200.00 kHz		#Video BW 820.	00 kHz	Span Sweep 1.00 ms (1	20 MHz 001 pts)		
Metrics •							
Occupied Bandwidtl							
8.9	935 MHz		Total Power	27.0 dBm			
Transmit Freq Error x dB Bandwidth	-183.13 k 9.564 M		% of OBW Pov x dB	wer 99.00 % -26.00 dB			Loca
	Nov 05 2024	~			X		
(a)	? Nov 05, 2024 9:33:42 AM						

## NR5\_10 M\_OBW\_Mid\_256QAM\_FullRB





Coupled BW CEYSIGHT Input RF Coupling DC Align Auto		n 14 dB Trig Free Run amp Off Gate Off #1F Gain Low	Center Freq. 836 500000 MHz AvgiHold: 500/500 Radio Std. None	Center Frequency 836.50000 MHz	Settings
Graph	NFE Adaptive	/I Offset 27.52 dB		Span 30.000 MHz	
Cale/Div 10.0 dB	Ref Vi	lue 40.00 dBm		CF Step 3.000000 MHz Auto	1
0.00 10.0 20.0 30.0	w		РЕАК	Man Freq Offset 0 Hz	
40.0 50.0 Center 836,50 MHz Res BW 300.00 kHz	#Vide	o BW 1.2000 MHz	Span 30 MHz Sweep 1.00 ms (1001 pts)		
Metrics	h 454 MHz	Total Power	31.0 dBm		
Transmit Freq Error x dB Bandwidth		% of OBW Pov x dB			Loca
	? Nov 05, 2024 9:38:17 AM	_			

## NR5\_15 M\_OBW\_Mid\_BPSK\_FullRB





Spectrum Analyzer 1 Occupied BW	+						Ö	Frequency	· · \$
RL + Align Auto		Atten 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Fre Avg/Hold 5 Radio Std		MHz		Frequency 0000 MHz	Settings
PASS	Re	ef LvI Offset 27					Span 30.000	MHz	
Scale/Div 10.0 dB	R	of Value 40.00	dBm	1			CF Step 3.00000		
20.0	freesander	to-sometries		m			Aut Mai		
10.0 20.0 30.9 Jahand Malandon				hanna	monorth	PEAK	Freq Off 0 Hz	set	
50.0 Center 836,50 MHz Res BW 300,00 kHz	#\	/ideo BW 1.200	00 MHz	)  	Sp weep 1.00 ms	oan 30 MHz 5 (1001 pts)			
Metrics	34 MHz		Total Power		30.6 dE	3m			
Transmit Freq Error x dB Bandwidth	-375.20 kHz 14.36 MHz		% of OBW Pow x dB	ver	99.00 -26.00				Loca
	Nov 05, 2024 9:38:39 AM	0							

## NR5\_15 M\_OBW\_Mid\_QPSK\_FullRB



Spectrum Analyzer 1  Occupied BW	+					Ö	Frequenc	y +
		Atten: 14 dB Preamp: Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq. 836.500000 Avg Hold: 500/500 Radio Std: None	MHZ		Frequency 0000 MHz	Settings
1 Graph T	Ret	Lvi Offset 27				Span 30.000	MHz	
Log 30 0 20.0		Value 40.00				Contraction of the local division of the loc	00 MHz	1
10.0	murrhoven	مت مشبو یس می بسندین	himaniture there are	~		Au Ma	n	
100 200 300 pm 4 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	mí			Inner makenet	PEAK	Freq Of 0 Hz	fset	
-50.0 Center 836.50 MHz #Res BW 300.00 kHz	#Vi	deo BW 1.200	00 MHz	Sweep 1.00 ms	pan 30 MHz s (1001 pts)			
2 Metrics 🔹								
Occupied Bandwidth 13.4	23 MHz		Total Power	29.7 dE	3m			
Transmit Freq Error x dB Bandwidth	-373.82 kHz 14.38 MHz		% of OBW Pow x dB	ver 99.00 -26.00				Local
<b>1</b> 50	? Nov 05, 2024 9:39:00 AM	)						

#### NR5\_15 M\_OBW\_Mid\_16QAM\_FullRB



RL Align Auto F	nput Z 50 Ω Atten 14 dB corr CCorr Preamp Off req ReF Int (S)	Gate Off Avg/Ho	Freq: 836 500000 MHz d: 500/500 ild: None	Center Frequency 836.500000 MHz	Settings
Graph	IFE Adaptive Ref LvI Offset			Span 30.000 MHz	
cale/Div 10.0 dB	Ref Value 40.0	00 dBm		CF Step 3.000000 MHz	1
20.0	for an and the second	man providence of the second s		Auto Man	
100 200 300 www.hl. m.h. M. M.		- Wig	may human Huran PEAK	Freq Offset 0 Hz	
40.0 50.0 Center 836,50 MHz Res BW 300,00 kHz	#Video BW 1.	2000 MHz	Span 30 MHz Sweep 1.00 ms (1001 pts)		
Metrics					
Occupied Bandwidth 13.491 Mi	Hz	Total Power	29.2 dBm		
Transmit Freq Error x dB Bandwidth	-354.90 kHz 14.34 MHz	% of OBW Power x dB	99.00 % -26.00 dB		Loca
	Nov 05, 2024 9:39:22 AM				

#### NR5\_15 M\_OBW\_Mid\_64QAM\_FullRB



Graph       Ref Lvi Offset 27.52 dB       30.000 MHz         Graph       Ref Value 40.00 dBm       Graph       Graph         300       Ref Value 40.00 dBm       Graph       Graph         300       Graph       Ref Value 40.00 dBm       Graph         300       Graph       Ref Value 40.00 dBm       Graph         300       Graph       Ref Value 40.00 dBm       Graph         300       Graph       Graph       Graph         300       Graph       Ref Value 40.00 dBm       Graph         300       Graph       Graph       Graph         Graph       Graph       Graph       Graph         Graph       Wideo BW 1.2000 MHz       Span 30 MHz         Sweep 1.00 ms (1001 pts)       Hz         Metrics       Grap		Input Z: 50 Ω Corr CCorr Freq Ret. Int (S) NFE: Adaptive	Atten 14 dB Preamp Off					Center Frequen 836.500000 MH	Seamos
CF Step 3.000000 MHz Auto Main Freq Offset 0 Hz CF Step 3.000000 MHz Main Freq Offset 0 Hz CF Step 3.000000 MHz Main Freq Offset 0 Hz Span 30 MHz Sweep 1.00 ms (1001 pts) Metrics	Graph T								
Auto Man Freq Offset 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			Ref Value 40.00	asm					
Provide a state of the state of	0.0		enson miner	municourses	~			Auto	
One of the state of the sta	0.0	f							
enter 836.50 MHz Span 30 MHz Res BW 300.00 kHz Sweep 1.00 ms (1001 pts) Metrics T Occupied Bandwidth 13.421 MHz Total Power 27.2 dBm Transmit Freq Error -380.18 kHz % of OBW Power 99.00 %	0.0	urll <sup>y</sup>			Volor	man	and a		
Metrics Occupied Bandwidth 13.421 MHz Total Power 27.2 dBm Transmit Freq Error -380.18 kHz % of OBW Power 99.00 %	enter 836.50 MHz		#Video BW 1.200	00 MHz	Sv				
13.421 MHz         Total Power         27.2 dBm           Transmit Freq Error         -380.18 kHz         % of OBW Power         99.00 %	Metrics •								
Transmit Freq Error -380.18 kHz % of OBW Power 99.00 %									
					er				Lo

#### NR5\_15 M\_OBW\_Mid\_256QAM\_FullRB





Spectrum Analyzer 1 Occupied BW KEYSIGHT Input F	+ RF Input Ζ: 50 Ω	Atten 14 dB	Trig: Free Run	Center Freq: 836-500	0000 MHz	0	Frequency	· • 53
Align /	DC Corr CCorr	Preamp Off	Gate: Off #IF Gain: Low	AvgiHold 500/500 Radio Std None			Frequency 1000 MHz	Settings
Graph	T T	Ref LvI Offset 27	A second second			Span 40.000	MHz	
Scale/Div 10.0 dB		Ref Value 40.00	dBm			GF Step 4.00000		
20.0		reserver	and the state of the	$\sim$		Aut Mai		
10.0 20.0	and when the second			human	PEAK	Freq Off 0 Hz	set	
30-0 40.0 50.0					- And			
enter 836.50 MHz Res BW 390.00 kHz		#Video BW 1.600	00 MHz	Sweep 1.0	Span 40 MHz 0 ms (1001 pts)			
2 Metrics	•							
Occupied Ba								
Transmit Fre			Total Power % of OBW Pow	ver 9	.1 dBm 9,00 %			-
x dB Bandwi	dth 19.00 r	ИНZ	x dB	-26	5.00 dB			Local
	Nov 05, 2024 9:44:21 AM	Ø						

#### NR5\_20 M\_OBW\_Mid\_BPSK\_FullRB





Spectrum Analy Occupied BW	rzer 1	+						Ö	Frequency	y + 5,2
	Input_RF Coupling DIC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int ( NFE: Adaptive		Trig: Free Run Gate: Ott #IF Gain: Low	Center Fre AvgiHold 5 Radio Std		WHZ		Frequency 0000 MHz	Settings
1 Graph		MAL MUAPING	Ref LvI Offset 27					Span 40.000	MHz	
Scale/Div 10.0 Log 30.0 20.0 10.0	dB		Ref Value 40.00	dBm	ini			CF Step 4.0000	0 MHz	
0.00 -10.0 -20.0 -30.0 pm/where		mal			hours	Monte Martin	PEAK	Ma Freq Off 0 Hz		
40.0 -50.0 Center 836.50	MHz		#Video BW 1.60	D0 MHz		Sp	peak ban 40 MHz			
#Res BW 390.0 2 Metrics	JU KHZ				51	weep 1.00 ms	(1001 pts)			
Occup	bied Bandwidt	h 870 MHz		Total Power		30.9 dE	im			
	mit Freq Error 3andwidth		4 kHz MHz	% of OBW Pow x dB	wer	99,00 -26.00 d				Local
15		? Nov 05, 202 9:44:43 AM	24 💬				$-\mathbf{X}$			

## NR5\_20 M\_OBW\_Mid\_QPSK\_FullRB



Spectrum Analy Occupied BW	rzer 1	+						0	Frequenc	y 🔹 👬
	Input_RF Coupling DC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE Adaptive	Atten 14 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg/Hold 50 Radio Std N	00/500	) MHZ		Frequency 0000 MHz	Settings
1 Graph	*	исс маршие	Ref LvI Offset 2					Span 40.000	MHz	
Scale/Div 10.0	dB	and the second s	Ref Value 40.00					Au	00 MHz to	
10 0 0.00 -10 0 -20 0	Annihim	Kaland			human	Unalina	PEAK	Ma Freq Of 0 Hz		
-50.0							the line			
Center 836.50 #Res BW 390.0			#Video BW 1.60	00 MHz	Sw		Span 40 MHz Is (1001 pts)			
2 Metrics	n Died Bandwidt	b								
Occu		860 MHz		Total Power	-	29.8 d	Bm			
	mit Freq Error 3andwidth	-568.95 19.02		% of OBW Pov x dB	ver	99.0 -26.00				Local
15	2	<b>?</b> Nov 05, 2024 9:45:05 AM	Đ							

#### NR5\_20 M\_OBW\_Mid\_16QAM\_FullRB



		Gate: Off / #IF Gain Low F	Center Freq. 836 50000 Avg Hold: 500/500 Radio Std: None	0 MHZ	Center Frequency 836.500000 MHz Span	
1 Graph Scale/Div 10.0 dB Log 30 0	Ref LvI Offset 27.5	2 dB			Span	
<b>.0</b> g 30.0	Ref Value 40.00 dE				40.000 MHz	
20.0		m			CF Step 4.000000 MHz	
10.0	and the second				Auto Man	
10.0 20.0			homentan	PEAK	Freq Offset 0 Hz	
30°0				and man and		
Center 836.50 MHz #Res BW 390.00 kHz	#Video BW 1.6000	MHz	Sweep 1.00 n	Span 40 MHz ns (1001 pts)		
? Metrics						
17.882 MHz Transmit Freq Error x dB Bandwidth	-570.18 kHz 18.95 MHz	Total Power % of OBW Power x dB	29.3 c 99.0 -26.00	0 %		Loc

#### NR5\_20 M\_OBW\_Mid\_64QAM\_FullRB



	Input Z 50 Q Corr CCorr Freq Ref. Int (S)	Atten 14 dB Preamp Off	Trig: Free Run Gate: Ott #IF Gain: Low	B Off AvgiHold 500/500			equency 000 MHz	Settings
Graph		Ref Lvi Offset 27				Span 40.000 M	lHz.	
cale/Div 10.0 dB		Ref Value 40.00	dBm			CF Step 4.00000	MH2	1
20.0		- Antonin and the second		~		Auto		
0.00 10.0 20.0						Freq Offs 0 Hz	et	1
10.0	rndd			What	PE	***		
50.0 enter 836.50 MHz Res BW 390.00 kHz		#Video BW 1.600	00 MHz		Span 40 Mi p 1.00 ms (1001 pt	Hz		
Metrics T								
Occupied Bandwidth			THE		27.4 dBm			
Transmit Freq Error	69 MHz -566.67 k	Hz	Total Power % of OBW Pov	ver	27.4 dBm 99.00 %			-
x dB Bandwidth	18.93 M	Hz	x dB		-26.00 dB			Loc

#### NR5\_20 M\_OBW\_Mid\_256QAM\_FullRB



Spectrum Analy Swept SA KEYSIGHT R.L		+ Input Ζ' 50 Ω' Corr CCorr Freq Ret: Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer (RMS 1 2 3 4 5 6 M WW WW W P P P P P P P	5.0150	Frequency Frequency 00000 GHz	Settings
Spectrum Scale/Div 10 d	в 2		Ref Level 4.00 (	1Bm	Mkr	1 9.940 18 GHz -62.16 dBm	Sw	0000 GHz rept Span ro Span	
16 0 26 0							F	ull Span	
36.0 16 0						1	Start Fr 30,000	eq 000 MHz	
14 10	ang with the second second	and for the state of the sector	internation of the second s	chertrant information	سيجادين ومرور و	angenetation and a second	Stop Fre 10.000	eq 000000 GHz	
tart 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz	AU	TO TUNE	
Res BW 1.0 M Marker Table Mode	Trace Scale	e X	Y		Sweep	~18.1 ms (1001 pts) Function Value	CF Step 997.00 Au Ma	0000 MHz to	
1 N 2 N 3	1 f 1 f	9.940 18 GHz 827.60 MHz					Freq Of 0 Hz	fset	
4 5 6							X Axis S Lo Lin		Loc
5	2	? Dec 05, 2024 12:07:32 PM	9						

#### NR5\_5 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB



Spectrum Analy Swept SA	/zer 1	+					ø	Frequency	
	Input RF Coupling DG Align Auto	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type. Pa Trig. Free Run	wer (RMS 1 2 3 4 3 6 M WW WW W P P P P P P	5.01500	requency 00000 GHz	Settings
Spectrum cale/Div 10 d	в 2		Ref Level 4.00 c	1Bm	Mkr	1 6.002 03 GHz -62.77 dBm	Sw	0000 GHz ept Span o Span	
16 Q							F	ull Span	
6.0 6 0				1			Start Fre 30,0000	q 000 MHz	
54 BC	hour shall the shall	gutinflyton and a second	int Shankaranan Shana	ten and a second and a second	anatalinationality	งจัดสูงรายเป็นหลัง	Stop Fre 10.0000	9 000000 GHz	
art 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz		TO TUNE	
Res BW 1.0 N Marker Table	IHz Trace Scale		Y		Sweep Function Width	• ~18.1 ms (1001 pts) Function Value	CF Step	0000 MHz p	
1 N 2 N 3	1 f	6.002 03 GHz 837.57 MHz					Freq Off 0 Hz	set	
4 5 6							X Axis S Log Lin		Loc
5	C 🗌	? Dec 05, 2024 12:08:22 PM	9				S1		

#### NR5\_5 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB



EYSIGHT Input RF Coupling, DG Align: Auto	Input Z: 50 Q #Atten, 14 dB Corr CCorr Preamp Off Freq Ref: Int (S) NFE Adaptive	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 3 4 Trig. Free Run M WWW P P P P	5.015000000 GHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 4.00	) dBm	Mkr1 4.985 09 G -63.22 dl	olor coode of it	
				Full Span	
5.0				Start Freq 30,000000 MHz	
	ويسألم ورفعه جرجا وبالمالحية المراجب والمالا ومراجعه وجما ويهمو	والمحاور ويروا المحاول والمحاور المحاور	tertetente sont ser antisent ser ser antisent ser	Stop Freq 10.00000000 GHz	
art 30 MHz	#Video BW 3.0	DMHz	Stop 10.000	GHZ AUTO TUNE	
es BW 1.0 MHz Marker Table • Mode Trace Scale	x y	Function Fi	Sweep ~18.1 ms (1001 unction Width Function Value	pts) CF Step 997.000000 MHz Auto	
1 N 1 F 2 N 1 F 3 4	4.985 09 GHz -63.22 dBm 847.54 MHz -0.7290 dBm			Freq Offset 0 Hz	Loc
5 6				X Axis Scale Log Lin	Lo

#### NR5\_5 M\_Conducted Spurious(30 M-10 G)\_High\_BPSK\_1RB



1 Spectrum       Mikr1 5.752 78 GHz       9.97000000 GHz         Scale/Div 10 dB       Ref Level 4.00 dBm       -62.67 dBm         C00       -62.67 dBm       Swept Span         260       -62.67 dBm       Swept Span         270       -62.67 dBm       Full Span         360       -62.67 dBm       Start Freq         360       -76 p       -76 p         560       -76 p       -76 p         561       -76 p       -76 p         562       -76 p       -76 p         564       -76 p       -76 p         564       -76 p       -76 p         565       -76 p       -76 p         566       -76 p       -76 p         567       -76 p       -76 p         568       -76 p       -76 p         578       -76 p       -77 p         58       -76 p       -77 p         59       -77 p	EYSIGHT	Input RF Coupling DC Align Auto	Input Z 50 D Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig. Free Run	wer (RMS 1 2 3 4 3 6 M WW WW W P P P P P P	5.01500	requency 00000 GHz	Settings
60       1       50       1       50       5	cale/Div 10 c	1		Ref Level 4.00 d	18m	Mkr		Swe	ept Span	
Auto TUNE         Auto TUNE         Auto TUNE         Auto TUNE         Auto TUNE         Auto TUNE         Auto Man         Freq Offset         Auto Man         Auto Man         Freq Offset         Auto Man	8.0							FI	ull Span	
Stop       Image: Stop       <	6.0 6 0				41			the state of the s	And and a second se	
Auto Tune art 30 MHz Stop 10.000 GHz Sweep ~18.1 ms (1001 pts) Marker Table Mode Trace Scale X Y Function Function Width Function Value 1 N 1 f 5.752 78 GHz -62.67 dBm 3 1 f 827.60 MHz -0.7174 dBm 3 4	i D Manualarian	Warman	shaddalararadi ar af stradici ar a	Alexandration and the	And the second second second	farmer anote	are the second second	California California	And and a state of the local division of the local division of the local division of the local division of the	
Marker Table         Sweep ~18.1 ms (1001 pts)         CF Step           Marker Table         997.000000 MHz           Mode         Trace         Scale         X         Y         Function         Function Vidth         Function Value           1         1         1         5.752.78 GHz         -82.67 dBm         Freq Offset         0 Hz           2         N         1         f         827.60 MHz         -0.7174 dBm         0 Hz				#Video BW 3.0	MHz		Stop 10.000 GHz	AUT		
2 N 1 f 827.60 MHz -0.7174 dBm 3 0 Hz 0 Hz	Marker Table			Y			o ~18.1 ms (1001 pts)	997.000 Auto	D	
	2 N 3								set	
5 XAxis Scale	5							Log	Arrest and a	Los

#### NR5\_10 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB



( and the second s	to Corr CCorr Nuto Freq Ref. Int (S) NFE Adaptive	Preamp Off	Gate Off IF Gain Low Sig Track Off	Trig. Free Run	wer (RMS 1 2 3 4 5 6 M WW WW W P P P P P P	Center Freque	
Spectrum sale/Div 10 dB	•	Ref Level 4.00 c	dBm	Mkr1	8.584 26 GHz -63.43 dBm	Span 9.97000000 C Swept Sp Zero Spar	an
						Full Spa	an
5.0 5 0						Start Freq 30,000000 MI	Hż
	an sealan watal and a sealar seal	-unical constraints	KBUTWAN KATAN PANAN PA	ter from the surface of the surface		Stop Freq 10.00000000	0 GHz
art 30 MHz		#Video BW 3.01	MHz		Stop 10.000 GHz	AUTO TU	JNE
es BW 1.0 MHz Marker Table Mode Trace	• Scale X	Y		Sweep unction Width	- ~18.1 ms (1001 pts) Function Value		лнz
1 N 1 2 N 1 3 4	f 8.584 26 GH f 827.60 MH					Freq Offset 0 Hz	
4 5 6						X Axis Scale Log Lin	Loc

#### NR5\_10 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB



KEYSIGHT	Input RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type, Po Trig: Free Run	wer (RMS 1 2 3 4 3 6 M WW WW W P P P P P P	Center Frequency 5.015000000 GHz	Setting
Spectrum cale/Div 10 d	т 18 2		Ref Level 4.00 c	18m	Mkr	1 9.651 05 GHz -63.43 dBm	C.C. COUCCO OT IL	
6.00 16 0 26 0							Full Span	
36.0 46 0							Start Freq 30,000000 MHz	1
	besieven and an experimental states	and the state of the	and and an	lotentertant	anione magazina ani	lannal tanan sa	Stop Freq 10.000000000 GHz	
ac o start 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz	AUTO TUNE	
Res BW 1.0 M 5 Marker Table	/Hz				Swee	p ~18.1 ms (1001 pts)	CF Step 997.000000 MHz	
Mode	Trace Scale	X 9.651 05 GHz	Y -63.43 dBm	Function F	Function Width	Function Value	Auto Man	
1 N 2 N 3	1 1	837.57 MHz					Freq Offset 0 Hz	
4 5 6							X Axis Scale Log Lin	1.
15	2	2 Dec 05, 2024 12:11:39 PM	9				Ser Tec	1

# NR5\_10 M\_Conducted Spurious(30 M-10 G)\_High\_BPSK\_1RB



KEYSIGHT	Input RF Coupling DC Align Auto	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE_Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer(RMS <mark>123436)</mark> MWWWWW PPPPP	Center Frequency 5.015000000 GHz	Settings
Spectrum cale/Div 10 d	в 2		Ref Level 4.00 d	dBm	Mkr	9.581 26 GHz -63.09 dBm	0.0700000000112	
6 0							Full Span	
6.0 6 0						- 1	Start Freq 30,000000 MHz	
6.0 6.0 6.0	Virgilianagharantha	distribution of the state of th	en an	har af filler and a start of the	ninstandersensen and	and the state of the	Stop Freq 10.000000000 GHz	
art 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz	AUTO TUNE	
Res BW 1.0 M Marker Table						~18.1 ms (1001 pts)	CF Step 997.000000 MHz Auto	
Mode 1 N	Trace Scale	X 9.581 26 GHz	Y -63.09 dBm	Function F	Function Width	Function Value	Man	
2 N 3 4	1 f	827.60 MHz	-0.8348 dBm	_			Freq Offset 0 Hz	
4 5 6							X Axis Scale Log Lin	Lor
15	0	? Dec 05, 2024 12:12:30 PM	9				Source Page	

# NR5\_15 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB



	Input RE Coupling Align Au	I DC	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S)	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low	#Avg Type: Por Trig: Free Run	war (RMS 1 2 3 4 5 6 M WW WW W		Frequency 00000 GHz	Settings
Spectrum Scale/Div 10 c	B		NFE Adaptive	Ref Level 4.00 c	Sig Track Off	Mkr1	9.700 90 GHz -61.84 dBm	Swe	0000 GHz ept Span o Span	
6.00 16.0 26.0								_	ull Span	
36.0 -46 0 -56 0								and the second second	000 MHz	
-56 0 -76 0	national solution	aprille and a set	elsenterenter alle setter a	n and the state of	we wante theman was	Muther Auger - 146	hay an a hadanaa hada darar	Stop Fre 10.0000	9 000000 GHz	
Start 30 MHz				#Video BW 3.0	MHz		Stop 10.000 GHz	1.17	TO TUNE	
Res BW 1.0 M 5 Marker Table		•				Sweep	~18.1 ms (1001 pts)	the state of the s	0000 MHz	
Mode	Trace	Scale	X 9.700 90 GHz	Y -61.84 dBm	Function F	Function Width	Function Value	Mar		
1 N 2 N 3	1	ſ	827.60 MHz		_			Freq Off 0 Hz	set	
4 5 6								X Axis S Log Lin	None at	Lo
15	a	12	Dec 05, 2024 12:13:21 PM	3				Series D		

#### NR5\_15 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB



Swept SA KEYSIGHT RL ++-	Input RF Coupling DG Align Auto	input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Pol Trig: Free Run	мег (RMS <mark>123450</mark> М WW WW W Р Р Р Р Р Р Р	5.0150	Frequency 00000 GHz	Settings
1 Spectrum Scale/Div 10 c Log	т В 2		Ref Level 4.00 d	dBm	Mkr1	3.828 57 GHz -60.98 dBm	Sw	0000 GHz ept Span o Span	
16.0							F	ull Span	
36.0 46 0			-				Start Fr 30,000	eq DOO MHz	
(N.M.).	waya bela a yeeka yeeka	united and the stand of the sta		halma have have have	an again go la an	n Mayon di managipa	Stop Fre 10.000	eq 000000 GHz	
ac o tart 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz	AU	TO TUNE	
Res BW 1.0 M Marker Table Mode	MHz Trace Scale	x	Y		Sweep Function Width	~18.1 ms (1001 pts) Function Value	CF Step 997.00 Aut Ma	0000 MHz o	
1 N 2 N 3	1 f	3.828 57 GHz 837.57 MHz					Freq Of 0 Hz	lset	
4 5 6							X Axis S Lo Lin		Lo
15	2	2 Dec 05, 2024 12:14:09 PM	9			N X		10	

#### NR5\_15 M\_Conducted Spurious(30 M-10 G)\_High\_BPSK\_1RB



,	Coupling (DC) Align Auto	Corr CCorr Freq Ref: Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	Trig. Free Run	wer (RMS 1 2 3 4 3 6 M WW WW W P P P P P P	Center Frequency 5.015000000 GHz Span	Settings
Spectrum cale/Div 10 dB	• 3 2		Ref Level 4.00 d	íBm	Mkr	1 3.110 73 GHz -63.26 dBm	9.97000000 GHz Swept Span Zero Span	
6 0							Full Span	
6.0 6 0							Start Freq 30,000000 MHz	
60 60	Antotally My Antora St	adanthe south for the stage	nen eksenstaan kan taa kan taa	ومسابعه والمنافع والمراجع والمستعود المنعا	nonskalastationaarts	and for some fatter of the areas	Stop Freq 10.000000000 GHz	
art 30 MHz			#Video BW 3.0 !	MHz		Stop 10.000 GHz	AUTO TUNE	
Res BW 1.0 MH Marker Table Mode T	Hz Trace Scale	x	Y	Function F	Sweep Sweep	o ~18.1 ms (1001 pts) Function Value	CF Step 997.000000 MHz Auto Man	
1 N 2 N 3	1 F 1 F	3.110 73 GHz 827.60 MHz					Freq Offset 0 Hz	
4 5 6							X Axis Scale Log Lin	Lo

## NR5\_20 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB



Swept SA. KEYSIGHT RL	Input_RF Coupling_DG Align_Auto	input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer (RMS 1 2 3 4 3 6 M WW WW W P P P P P P	5.01500	requency 0000 GHz	Settings
Spectrum scale/Div 10 c	г 18 2		Ref Level 4.00 d	1Bm	Mkr	1 9.152 55 GHz -62.98 dBm	Swe	000 GHz pt Span Span	
6.00 18.0 26.0							FI	III Span	
16.0 16.0							Start Fre	q 00 MHz	
	W. H. Brilling and	and the second of the second	and a stand of the second s	نسل سعيرة فجار حوا ومالا كم يوادا	Auronamerantistan	and the state of t	Stop Fre 10.0000	9 00000 GHz	
tart 30 MHz			#Video BW 3.0	MHz		Stop 10.000 GHz	AU	TO TUNE	
Res BW 1.0 Marker Table	//Hz				Swee	o ~18.1 ms (1001 pts)	the state of the s	000 MHz	
Mode	Trace Scale		Ŷ	Function F	unction Width	Function Value	Aute Mar		
1 N 2 N 3	1 f	9.152 55 GHz 827.60 MHz					Freq Off 0 Hz	set	
4 5 6							X Axis S Log Lin		Lo
15	2	P Dec 05, 2024 12:15:50 PM	Ð				Servert		

#### NR5\_20 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB



KEYSIGHT	Input RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 14 dB Preamp: Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: P Trig: Free Ru	ower (RMS 1 2 3 4 5 0 M WW WW W P P P P P P P	Center Frequency 5.015000000 GHz	Settings
Spectrum cale/Div 10 c	ів 2	1	Ref Level 4.00 d	1Bm	Mkr	1 9.970 09 GHz -62.00 dBm	0.0100000000112	
6 0							Full Span	
36.0 16 D						1	Start Freq 30,000000 MHz	
0.0	angentalenada	all your production of the party has a set of the	And Black and David Party		after all have all and the	ser-gradererstelle-readersterd	Stop Freq 10.000000000 GHz	
ac o tart 30 MHz			#Video BW 3.0	MH2		Stop 10.000 GHz	AUTO TUNE	
Res BW 1.0 I Marker Table	MHz. V				Swee	p ~18.1 ms (1001 pts)	CF Step 997.000000 MHz	
Mode	Trace Scale		Y	Function F	unction Width	Function Value	Auto Man	
1 N 2 N 3	1 f	9.970 09 GHz 827.60 MHz				_	Freq Offset 0 Hz	
4 5 6							X Axis Scale Log Lin	Lo
15	C	? Dec 05, 2024 12:16:37 PM	9				Series Taxo	

# NR5\_20 M\_Conducted Spurious(30 M-10 G)\_High\_BPSK\_1RB



Spectrum Analy Swept SA KEYSIGHT RL		+ Input 2: 50 Ω Corr CCorr Freq Ret. Int (S) NFE. Adaptive	#Atten: 14 dB Preamp Off	PNO Be Gate Of IF Gain Sig Trac	t Low	#Avg Type: F Trig: Free RL	Power (RMS12345)	Avg Ho	Meas Setu	up • 🛃
37 I Spectrum Scale/Div 10 d Log	B	and a prostant service	Ref Lvi Offset 27 Ref Level 27.52 d	.52 dB	c on	Mk	r1 824.000 MHz -21.011 dBm	Avg Typ Power Au Ma	(RMS) to	Limits Meas Standard
17.5				m					as Setup mary Table	Legacy Compat
								A	ito Couple	Advanced
2.48							Đị 1 - 13 10 dĐm	M	as Preset	Global
22:5			1		f					
32.5			-/-			$\left\langle \cdot \right\rangle$				
42.5 52.5 AM		a hat a shall be				him	man and a fle the fle the fle the			
62.6	AR REAL POPULATION	diana.								Loca
enter 824.000 Res BW 30 ki			#Video BW 100	kHz		#Sw	Span 4.000 MHz eep ~1.01 s (1001 pts)			LOCA
5		Nov 05, 2024 9:13:38 AM	9							

#### NR5\_5 M\_Band Edge\_Low\_BPSK\_1RB



L Align Auto	Input Z 50 Q #Atten 14 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO Best Wide # Gate: Off 1 IF Gain: Low Sig Track: Off	Avg Type: Power (RMS 1 2 3 4 5 ing: Free Run A WW WW W A A A A A A	10	Settings
Spectrum v cale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.52	7.52 dB	Mkr1 824.000 MH: -29.775 dBn		Limits Meas Standard
17.5				K Meas Setup Summary Table	Legacy Compat
7.52			and the second	Auto Couple	Advance
2 48 12 5 22 5 32 5 47 5		1	DLi-13.00 x⊕n	Meas Preset	Global
2.5 2.5 enter 824.000 MHz Res BW 51 kHz	#Video BW 16	0 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts		Loc

#### NR5\_5 M\_Band Edge\_Low\_BPSK\_FullRB



Align Auto	Input Z 50 Ω #Atten 14 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO: Best Wide #Av Gate: Off Trig IF Gain: Low Sig Track: Off	g Type: Power (RMS12345 Free Run AWWWWW A A A A A A	10	Settings
Spectrum v cale/Div 10 dB	Ref Lvi Offset 2 Ref Level 27.52	27.52 dB	Mkr1 821.004 MH: -41.676 dBm	Avg Type Power (RMS)	Limits Meas Standard
17.5				K Meas Setup Summary Table	Legacy Compat
/ 52				Auto Couple	Advanced
2.48 12.5 			DL1-13.00 dBn	Meas Preset	Global
12.5 12.5	and where we wanted the second se	1 marine in the second and a second	walation and the second se	-	
12.6 enter 821.000 MHz Res BW 100 kHz	#Video BW 3	00 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts		Loca

#### NR5\_5 M\_Extended Band Edge\_Low\_BPSK\_FullRB



KEYSIGHT Input. RF R L +- Coupling IDG Align Auto	Input 2: 50 Ω Corr CCorr Freq Ret. Int (S) NFE: Adaptive	#Atten: 14 dB Preamp: Otf	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pow Trig: Free Run	rer (RMS <mark>12345</mark> A WWWWW A A A A A A	Meas Set Avg Hold Number 10	Settings
1 Spectrum	1	Ref LvI Offset 27. Ref Level 27.52 d	52 dB	Mkr1	849.000 MHz -19.056 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
17 5		m				K Meas Setup Summary Table	Legacy Compat
7.52						Auto Couple	Advanced
12.5	1		-		DL-1 -13 10 dBm	Meas Preset	Global
22.5							
32.5							
52.5				-	HMS A		
52.6				- Com	- John J		
enter 849,000 MHz Res BW 30 kHz		#Video BW 100	kHz	#Swee	Span 4.000 MHz p ~1.01 s (1001 pts)		Loca
501	? Nov 05, 2024 9:18:50 AM	0			<b>X</b> X		

#### NR5\_5 M\_Band Edge\_High\_BPSK\_1RB



Spectrum Analy Swept SA KEYSIGHT RL	+ Input Z: 50 Ω Corr CCorr	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low	#Avg Type: Powe Tng: Free Run	ar (RMS <mark>12345)</mark> A WWWWW	Avg Ho	Meas Setu Id Number	settings
x Spectrum Scale/Div 10 d		Ref Lvi Offset 27 Ref Level 27.52 d	Sig Track: Off	Mkr1	AAAAAA 849.000 MHz -28.222 dBm	Avg Typ Power Au Ma	(RMS) to	Limits Meas Standard
17.5						Z Me	as Setup mary Table	Legacy Compat
7 52	 	-				AL	ito Couple	Advanced
2 48 12.5 22.5					DL1-13 thể ciĐra,	Me	as Preset	Global
32.5 42.5 52.6				\$~~				
82.6								Loca
enter 849.000 Res BW 51 ki		#Video BW 160	kHz	#Sweep	Span 4.000 MHz ~1.01 s (1001 pts)			
15	Nov 05, 2024 9:18:10 AM	©						

#### NR5\_5 M\_Band Edge\_High\_BPSK\_FullRB



L Coupling DC Align Auto	Input Z: 50 Q #Atten: 14 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE: Adaptive	PNO Best Wide #Avg Gate Off Trig IF Gain Low Sig Track Off	Type: Power (RMS 1 2 3 4 5 Free Run A WW WW A A A A A	10	Settings
Spectrum + cale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.52 (	.52 dB	Mkr1 850.008 MH -31.641 dBr	Avg Type Z. Power (RMS)	Limits Meas Standard
7.5				Meas Setup Summary Table	Legacy Compat
				Auto Couple	Advanced
2.5			EL1-13-00 dB	Meas Preset	Global
25	~~~~		RM	5	
2.5 enter 852.000 MHz tes BW 100 kHz	#Video BW 300	) kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pt		Loca

#### NR5\_5 M\_Extended Band Edge\_High\_BPSK\_FullRB



Spectrum Analy Swept SA		+					ø	Meas Setu	n v St
KEYSIGHT	Input RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten: 14 dB Preamp: Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Run	wer (RMS 1 2 3 4 5 A A WW WW W A A A A A A	Avg Hol 10	d Nümber	Settings
Spectrum cale/Div 10 d	B		Ref Lvi Offset 27 Ref Level 27.52 c	.52 dB	Mkr	1 824.000 MHz -21.786 dBm	Avg Typ Power Aut Ma	(RMS)	Limits Meas Standard
17 5				m				as Setup mary Table	Legacy Compat
7 52							Au	to Couple	Advanced
2.48						DL1 -13.00 dBm	Me	as Preset	Global
12.5			<b>1</b>						
32.5									
		/	$\checkmark$			RMS			
62.6	Not prover of the deliver					have			
enter 824.000 Res BW 30 kH	MHz		#Video BW 100	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)			Loca
5		Nov 05, 2024 9:31:21 AM	0						

#### NR5\_10 M\_Band Edge\_Low\_BPSK\_1RB



EYSIGHT Input RF Coupling DC Algin Auto	Input Z 50 Ω Corr CCorr Freq Ref. Int (S)	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low	#Avg Type: P Trig: Free Ru	ower (RMS 1 2 3 4 5 A WWWWW A A A A A A	Avg Ho	ld Number	Settings
Spectrum v icale/Div 10 dB		Ref LvI Offset 27 Ref Level 27.52 d		Mk	r1 823.996 MHz -30.085 dBm	i circi	(RMS)	Limits Meas Standard
17 5							eas Sétup nmary Table	Legacy Compat
7.52					RMS	A	ito Couple	Advance
12.5			1		(D): İ - 13 (Ü dBm	M	eas Preset	Global
22.5								
32.5								
\$2.5 52.5								
62.6								-
enter 824.000 MHz Res BW 100 kHz		#Video BW 300	kHz	#Sw	Span 4.000 MHz eep ~1.01 s (1001 pts)			Loca
1501	? Nov 05, 2024 9:30:43 AM	$\odot$						

#### NR5\_10 M\_Band Edge\_Low\_BPSK\_FullRB



Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF RL Coupling BC Alian Auto	H Input 2: 50 Ω Corr CCorr Freg Ref. Int (S)	#Atten: 14 dB Preamp: Off	PNO: Best Wide Gate: Off IF Gain: Low	#Avg Type: P Trig: Free Ru	ower (RMS <mark>12345</mark> n .AWWWWW	Meas Se Avg Hold Number 10	stup v 👬
1 Spectrum V Scale/Div 10 dB	NFE Adaptive	Ref Lvi Offset 27. Ref Level 27.52 d	Sig Track: Off	Mk	AAAAAA 1 819.916 MHz -38.152 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
17.5						K Meas Setup Summary Table	Legacy Compat
						Auto Couple	Advanced
2.48					- ÐL1 - 13 0Ó d⊟m	Meas Preset	Global
32.5 42.5	1				ARAS		
62 6 Center 821.000 MHz		#Video BW 300	kHz		Span 4.000 MHz		Loca
Res BW 100 kHz	<b>?</b> Nov 05, 2024 9:31:00 AM	<u></u>		#Sw	eep ~1.01 s (1001 pts)		

#### NR5\_10 M\_Extended Band Edge\_Low\_BPSK\_FullRB



Swept SA KEYSIGHT Input RF RL +- Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	ar (RMS 1 2 3 4 5 AWWWWW A A A A A A A	Meas Sett Avg Hold Number 10	Settings
Spectrum v cale/Div 10 dB		Ref LvI Offset 27. Ref Level 27.52 d	.52 dB	Mkr1	849.000 MHz -21.863 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
17.5		~				K Meas Setup Summary Table	Legacy Compat
7.52						Auto Couple	Advance
2.48		5			DL1-13.00 dBm	Meas Preset	Global
22.5		1					
32.5	/						
12.5			1				
12.5							
					FIMS		Loca
enter 849.000 MHz Res BW 30 kHz		#Video BW 100	kHz	#Sweep	Span 4.000 MHz ~1.01 s (1001 pts)		Loca
50	? Nov 05, 2024 9:35:46 AM	Ø					

#### NR5\_10 M\_Band Edge\_High\_BPSK\_1RB



EYSIGHT Input RF Coupling DC- Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	r (RMS 1 2 3 4 5 6 A WWWWW A A A A A A A	10	d Number	Settings
Spectrum v cale/Div 10 dB		Ref LvI Offset 27 Ref Level 27.52 d		Mkr1	849.124 MHz -24.655 dBm	Avg Typ Power Aut Ma	(RMS)	Limits Meas Standard
17.5							as Setup mary Table	Legacy Compat
7.52						Au	to Couple	Advance
12.5					Ð). Í -13 00 d⊟m.	Me	as Preset	Global
22.5	6		1					
32.5					RMS			
(2.5								
52.5								
								Loca
enter 849.000 MHz Res BW 100 kHz		#Video BW 300	kHz	#Sweep	Span 4.000 MHz ~1.01 s (1001 pts)			LOCA

#### NR5\_10 M\_Band Edge\_High\_BPSK\_FullRB



Spectrum Analy Swept SA	rzer 1	+					Ö	Meas Setu	ip 🔹 💥
KEYSIGHT	Input_RF Coupling BC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Trig: Free R	Power (RMS12345) un AWWWWW AAAAAA	10	d Number	Settings
1 Spectrum Scale/Div 10 d	B		Ref LvI Offset 27 Ref Level 27.52 d	.52 dB	MI	kr1 850.004 MHz -32.367 dBm	Avg Typ Power Au Ma	(RMS)	Limits Meas Standard
17.5								as Setup mary Table	Legacy Compat
							Au	to Couple	Advanced
12.5						19), i - 13, 110 eBm,	Me	as Preset	Global
-22.5									
42.5						R/S			
52.5									
-82.6									
Center 852.000 Res BW 100 F			#Video BW 300	kHz	#S\	Span 4.000 MHz weep ~1.01 s (1001 pts)			Local
15		Nov 05, 2024 9:35:24 AM	0						

#### NR5\_10 M\_Extended Band Edge\_High\_BPSK\_FullRB



RL Coupling BG C Align Auto F	nput Z 50 Ω #Atten 14 dB corr Corr Preamp Off Freq Ref. Int (S) #FE Adaptive	PNO Best Wide # Gate: Off T IF Gain: Low Sig Track: Off	Avg Type: Power (RMS 1 2 3 4 5 ng: Free Run A www.ww A A A A A A	Meas Setu Avg Hold Number 10	Settings
M Spectrum ▼ Scale/Div 10 dB	Ref Lvi Offset 2 Ref Level 27.52	27.52 dB	Mkr1 824.000 MHz -25.845 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
17.5		m		K Meas Setup Summary Table	Legacy Compat
				Auto Couple	Advanced
2.48			DL1-13.00 «@m	Meas Preset	Global
12.5 22.5 32.5		1			
62 5 52.5			HMB		
62.6 Internet and a state of the open of					Loca
enter 824.000 MHz Res BW 30 kHz	#Video BW 1	00 kHz	Span 4.000 MHz #Sweep ~1.01 s (1001 pts)		Loca
500?	Nov 05, 2024 9:37:24 AM				

#### NR5\_15 M\_Band Edge\_Low\_BPSK\_1RB



Swept SA. KEYSIGHT RL ——		+ Input 2: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer (RMS12345) A WW WW W A A A A A A	10	Meas Setu I Number	Settings
Spectrum Scale/Div 10 d	F		Ref Lvi Offset 27 Ref Level 27.52 d	.52 dB	Mkr	1 824.000 MHz -31.031 dBm	Avg Type Power ( Aut Mar	RMS)	Limits Meas Standard
17.5								as Setup mary Table	Legacy Compat
						RMS	Aut	o Couple	Advanced
2 48						01-1-13.00 dBm	Me	as Preset	Global
32.5			1	1					
12.5									
									Loca
enter 824.000 Res BW 150 I			#Video BW 470	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)			LOCA
5	C* 1	Nov 05, 2024 9:36:46 AM	©						

#### NR5\_15 M\_Band Edge\_Low\_BPSK\_FullRB



L Coupling BC C Align Auto F	input Z 50 Ω #Atten: 14 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO Best Wide # Gate: Off T IF Gain: Low Sig Track: Off	Avg Type: Power (RMS 1 2 3 4 5 ng: Free Run A WWWW A A A A A A	A 10	Settings
Spectrum v cale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.52 d	.52 dB	Mkr1 821.296 MH -39.392 dBr	Avg Type Z Power (RMS)	Limits Meas Standard
7.5				K Meas Setup Summary Table	Legacy Compat
				Auto Couple	Advanced
48 2.5 2.5			DL1-13.00 dB	Meas Preset	Global
2.5		<u></u>	Film		
2.6					Loca
enter 821.000 MHz Res BW 100 kHz	#Video BW 300	kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts		Contraction of the local division of the loc

#### NR5\_15 M\_Extended Band Edge\_Low\_BPSK\_FullRB



Swept SA KEYSIGHT Input RF RL ++ Coupling BC Align Auto	+ Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE. Adaptive	#Atten: 14 dB Preamp Off	PNO. Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	ar (RMS <mark>12345)</mark> A WWWWW A A A A A A	Meas Séte Avg Hold Number 10	Settings
Spectrum v cale/Div 10 dB		Ref LvI Offset 27 Ref Level 27.52 d	.52 dB	Mkr1	849.000 MHz -23.676 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
17.5	r	~				K Meas Setup Summary Table	Legacy Compat
/ 52						Auto Couple	Advanced
2.5					ĐL1 -13 00 dBm	Meas Preset	Global
32.5		1					
25					RMS		
enter 849.000 MHz Res BW 30 kHz		#Video BW 100	kHz	#Sweep	Span 4.000 MHz 2 ~1.01 s (1001 pts)		Loca
1501	? Nov 05, 2024 9:41:48 AM						

#### NR5\_15 M\_Band Edge\_High\_BPSK\_1RB



Spectrum Analy Swept SA		+					ø	Meas Set	nb 🔺 👬
	Align Auto	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Run	wer (RMS 1 2 3 4 5 ) A WW WW W A A A A A A A	10	ld Number	Settings
Spectrum cale/Div 10 d	B		Ref Lvi Offset 27 Ref Level 27.52 d		Mkr	1 849.000 MHz -35.901 dBm	Avg Ty Power Au Ma	(RMS)	Limits Meas Standard
17.5								eas Sétup nmary Table	Legacy Compat
7 52							A	ito Couple	Advanced
12.5						D). 1 - 13 110 dBm	M	as Preset	Global
22.5									
32.5			1			RMS			
42.5									
82.6									
enter 849.000 Res BW 150 k			#Video BW 470	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)			Loca
15		Nov 05, 2024 9:41:08 AM	9						

#### NR5\_15 M\_Band Edge\_High\_BPSK\_FullRB



EYSIGHT Input RF Coupling BC Align Auto		en: 14 dB PNO: Best Wide amp: Off Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 5 Trig: Free Run A WW WW W A A A A A A	Avg Hold Number 10	Settings
Spectrum	Ref Lv	/I Offset 27.52 dB wel 27.52 dBm	Mkr1 851.100 MHz -40.475 dBm		Limits Meas Standard
17.5				K Meas Setup Summary Table	Legacy Compat
7.52				Auto Couple	Advanced
12.5 			DL ( -13.00 dBm)	Meas Preset	Global
12.5	•1		RHS		
32.6					Cier
enter 852.000 MHz Res BW 100 kHz	#Vid	eo BW 300 kHz	Span 4.000 MHz #Sweep ~1.01 s (1001 pts)		Loca

#### NR5\_15 M\_Extended Band Edge\_High\_BPSK\_FullRB



L Coupling BC Ce Align Auto Fr	put Z 50 Ω #Atten 14 dB orr CCorr Preamp Off eq Ref. Int (S) "E Adaptive	PNO. Best Wide #Avg Typ Gate: Off Trig: Free IF Gain: Low Sig Track: Off	e: Power (RMS 1 2 3 4 5 ) Run A WW WW W A A A A A A	Meas Setu Avg[Hold Number 10	Settings
Spectrum v sale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.52	7.52 dB	4kr1 824.000 MHz -27.024 dBm	Avg Type Power (RMS) Auto Man	Limits Meas Standard
75				Meas Setup Summary Table	Legacy Compat
				Auto Couple	Advanced
48			DL1-13 00 dBm	Meas Preset	Global
2.5	1				
2.5			RME		
2.6 Important and					
enter 824.000 MHz Res BW 30 kHz	#Video BW 100		Span 4.000 MHz Sweep ~1.01 s (1001 pts)		Loca

#### NR5\_20 M\_Band Edge\_Low\_BPSK\_1RB



KEYSIGHT Input RF RL + Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Alten: 14 dB Preamp: Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power Tng: Free Run	(RMS 1 2 3 4 5 1 A WWWWW A A A A A A A	Avg Hok 10	d Number	Settings
Spectrum v icale/Div 10 dB		Ref LvI Offset 27 Ref Level 27.52 d	.52 dB		823.168 MHz -29.338 dBm	Avg Typ Power ( Aut Mar	RMS)	Limits Meas Standard
17.5							as Setup mary Table	Legacy Compat
7.52			-		RMS	Au	to Couple	Advanced
12.5			1		01.1 -13.00 dBm	Me	as Preset	Global
32.5	1							
12.5								
32.6								-
enter 824.000 MHz Res BW 200 kHz		#Video BW 620	kHz	#Sweep ~	Span 4.000 MHz 1.01 s (1001 pts)			Loca
Center 824.000 MHz #Res BW 200 kHz	<b>?</b> Nov 05, 2024 9:42:48 AM	#Video BW 620	kHz	#Sweep ~	Span 4.000 MHz -1.01 s (1001 pts)			

#### NR5\_20 M\_Band Edge\_Low\_BPSK\_FullRB



Spectrum Analy Swept SA	zer 1	+					Ö	Meas Setu	up v Sie
	Input_RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Run	ver (RMS12345) A WWWWW A A A A A A	10	d Number	Settings
1 Spectrum Scale/Div 10 d	B		Ref LvI Offset 27 Ref Level 27.52 d		Mkr	1 823.000 MHz -33.438 dBm		(RMS)	Limits Meas Standard
17.5								as Setup mary Table	Legacy Compat
							AL	to Couple	Advanced
-2.48						DL i -13.00 «Bm,	Me	as Preset	Global
-22.5						1/			
-32.5		-				RA			
-52.5									
-62.6									
Center 821.000 #Res BW 100 k			#Video BW 300	kHz	#Swee	Span 4.000 MHz ep ~1.01 s (1001 pts)			Local
15		Nov 05, 2024 9:43:05 AM							

#### NR5\_20 M\_Extended Band Edge\_Low\_BPSK\_FullRB



Spectrum Analy Swept SA	zer 1	t					0	Meas Set	10 × 25
KEYSIGHT RL	Input RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Powe Trig: Free Run	ar (RMS 1 2 3 4 5 1 A WW WW W A A A A A A A	10	ld Number	Settings
1 Spectrum Scale/Div 10 d	в		Ref LvI Offset 27 Ref Level 27.52 c	.52 dB	Mkr1	849.000 MHz -29.656 dBm	Avg Tyj Power Au Ma	(RMS)	Limits Meas Standard
17.5		m						eas Setup nmary Table	Legacy Compat
							A	ito Couple	Advanced
12.5			X			(Đ) 1 -13 00 dĐm	M	eas Preset	Global
32.5			1						
42.5 52.5	$\sim$			L					
62.6						RMS			
Center 849.000 Res BW 30 kH			#Video BW 100	kHz	#Sweep	Span 4.000 MHz >~1.01 s (1001 pts)			Local
150		Nov 05, 2024 9:47:54 AM							

## NR5\_20 M\_Band Edge\_High\_BPSK\_1RB



KEYSIGHT RL	Input_RF Coupling DC Align Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 14 dB Preamp Off	PNO Best Wide Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: F Thg: Free Ru	in jA	2 3 4 5 WWWWW	10	ld Number	Settings
Spectrum cale/Div 10 d	r IB		Ref LvI Offset 27 Ref Level 27.52 d	.52 dB	Mk	r1 850.9 -30.1	04 MHz 76 dBm	Avg Typ Power Au Ma	(RMS) to	Limits Meas Standard
17.5									eas Setup Imary Table	Legacy Compat
7 52								AL	ito Couple	Advanced
12.5						Ð	1 <u>-13 00 dBm</u>	Me	as Preset	Global
22.5										
32.5			-							
(2.5										
52.5										
										Loca
enter 849.000 Res BW 200 1			#Video BW 620	kHz	#Sw		4.000 MHz (1001 pts)			LOCA
15	6-17	Nov 05, 2024 9:47:14 AM	0							

#### NR5\_20 M\_Band Edge\_High\_BPSK\_FullRB



Spectrum Analy Swept SA		+ Input Ζ: 50 Ω	#Atten 14 dB	PNO Best Wide	data Tupo: De		٥	Meas Setu	nb 🖌 😴
EYSIGHT	Coupling DG Align Auto	Freq Ref. Int (S)	Preamp Off	Gate Off IF Gain Low Sig Track Off	Trig: Free Run	wer (RMS 1 2 3 4 5 1 A WW WW W A A A A A A	10	ld Number	Settings
Spectrum cale/Div 10 dl	B		Ref Lvi Offset 27. Ref Level 27.52 d	.52 dB	Mkr	1 850.660 MHz -32.934 dBm	Avg Ty Power Au Ma	(RMS)	Limits Meas Standard
17.5								eas Setup nmary Table	Legacy Compat
7.52							A	Ito Couple	Advanced
2.5						01-1-13 TÚ eBm.	M	eas Preset	Global
2.5	<b>1</b>	~_~				Ablis			
12.5									
									Loca
enter 852.000 Res BW 100 k			#Video BW 300	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)			
150		Nov 05, 2024 9:47:32 AM	9						

#### NR5\_20 M\_Extended Band Edge\_High\_BPSK\_FullRB



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

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

No.	Description
1	HCT-RF-2412-FC030-P