

# **TEST REPORT**

FCC LTE B12(17) Test for SM-F741B Certification

APPLICANT SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2405-FC004

DATE OF ISSUE May 3, 2024

> **Tested by** Jae Mun Do

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F-TP22-03(Rev.06)

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T E S T R E P O R T	REPORT NO. HCT-RF-2405-FC004 DATE OF ISSUE May 03, 2024 Additional Model -
Applicant	<b>SAMSUNG Electronics Co., Ltd.</b> 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-F741B
Date of Test	February 22, 2024 ~ April 23, 2024
FCC ID	A3LSMF741B
Location of Test	■ Permanent Testing Lab □ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi- do, 17383 Republic of Korea)
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27





## **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	May 03, 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).

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).

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMF741U report.

Note:

Additional testing on Uplink-CA, the results were added and reported.



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## **MEASUREMENT REPORT**

## **1. GENERAL INFORMATION**

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMF741B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-F741B
Additional Model(s)	-
	699.7 MHz – 715.3 MHz (LTE – Band 12 (1.4 MHz))
T	700.5 MHz – 714.5 MHz (LTE – Band 12 (3 MHz))
Tx Frequency:	701.5 MHz – 713.5 MHz (LTE – Band 12/17 (5 MHz))
	704.0 MHz - 711.0 MHz (LTE - Band 12/17 (10 MHz))
Date(s) of Tests:	February 22, 2024 ~ April 23, 2024
a · · · ·	Radiated : R3CX20KJSJW, R3CX30N98SV(Uplink-CA)
Serial number:	Conducted : 7b5599bdac507ece



## **1.1. MAXIMUM OUTPUT POWER**

				ERP	
Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Max. Power (W)	Max. Power (dBm)
		1M10G7D	QPSK	0.089	19.49
LTC D and 12/14	699.7 – 715.3	1M10W7D	16QAM	0.069	18.37
LTE – Band12 (1.4)	699.7 - 715.3	1M10W7D	64QAM	0.055	17.44
		1M10W7D	256QAM	0.028	14.42
	700.5 – 714.5	2M71G7D	QPSK	0.087	19.38
LTC Dand 12/2		2M73W7D	16QAM	0.066	18.22
LTE – Band12 (3)		2M73W7D	64QAM	0.054	17.35
		2M72W7D	256QAM	0.027	14.31
		4M52G7D	QPSK	0.085	19.29
LTE Dand 12/17 (E)	701.5 - 713.5	4M51W7D	16QAM	0.066	18.17
LTE – Band12/17 (5)		4M51W7D	64QAM	0.052	17.19
		4M51W7D	256QAM	0.026	14.19
		8M96G7D	QPSK	0.086	19.33
	704 0 711 0	8M97W7D	16QAM	0.066	18.18
LTE – Band12/17 (10)	704.0 – 711.0	8M98W7D	64QAM	0.052	17.19
		8M96W7D	256QAM	0.025	14.04





## 2. INTRODUCTION

## **2.1. DESCRIPTION OF EUT**

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6. It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80/160 MHz), Bluetooth(iPA, ePA), BT LE(iPA, ePA), NFC, WPT, WIFI 6E.

## 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**, **17383**, **Rep. of KOREA**.





## **3. DESCRIPTION OF TESTS**

## **3.1 TEST PROCEDURE**

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12



## **3.2 RADIATED POWER**

#### **Test Overview**

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

#### **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;

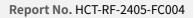
 $P_{d}$  (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dB)

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.





## **3.3 RADIATED SPURIOUS EMISSIONS**

#### **Test Overview**

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

#### **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

- 1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.

The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data

3. For spurious emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

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

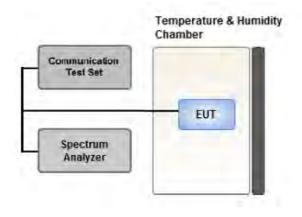
Where:  $\mathsf{P}_{\mathsf{g}}$  is the generator output power into the substitution antenna.

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

EIRP (dBm) = ERP (dBm) + 2.15



## **3.4 OCCUPIED BANDWIDTH.**



#### **Test setup**

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

The EUT makes a call to the communication simulator.

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

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

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



## Communication Test Set EUT Spectrum Analyzer

## 3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

#### Test setup

#### **Test Overview**

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

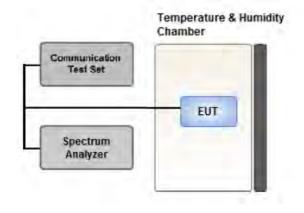
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

- 1. RBW = 1 MHz
- 2. VBW  $\geq$  3 MHz
- 3. Detector = RMS
- 4. Trace Mode = trace average
- 5. Sweep time = auto
- 6. Number of points in sweep  $\geq$  2 x Span / RBW



#### 3.6 BAND EDGE



#### Test setup

#### **Test Overview**

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

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



## **Test Notes**

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

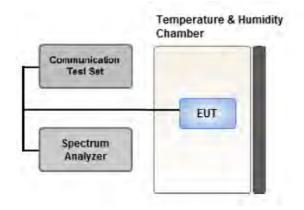
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

All measurements were done at 2 channels(low and high operational frequency range.) The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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



## 3.7 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.

- 1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.





## 3.8 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 : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)
  Worst case : Stand alone
- We were performed the RSE test in condition of co-location.
- Mode : Stand alone, Simultaneous transmission scenarios
- Worst case : Stand alone
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 1.4 MHz)
- The EUT was tested in three modes (Open, Half-open, Closed), the worst case configuration results are reported.

Worst case: Open mode.

- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data
- LTE Band 12 (699 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 716 MHz) and they have the same Tune-up power.

Therefore, test data provided in this report covers Band 17 as well as Band 12.

- Please refer to the table below.

[ Worst case ]					
Test Description	Modulation	RB size	RB offset	Axis	
Effective Radiated Power	QPSK,	See Section 8.1			
	16QAM,			х	
	64QAM,			^	
	256QAM				
Radiated Spurious and Harmonic Emissions	QPSK	See See	ction 8.2	Х	



## 3.9 WORST CASE(CONDUCTED TEST)

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

- LTE Band 12 (699 – 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz) and they have the same Tune-up power.

Therefore, test data provided in this report covers Band 17 as well as Band 12.

	[Wor	st case ]			
Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10	Mid	Full RB	0
		1.4	Low	1	0
		1.4	High	1	5
	QPSK	3	Low	1	0
			High	1	14
Pand Edga			Low	1	0
Band Edge			High	1	24
		10 1.4, 3, 5, 10	Low	1	0
			High	1	49
			Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10	Low, Mid, High	1	0



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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibratior Interval
RF Switching System	FBSR-02B(1.2G HPF+LNA)	T&M SYSTEM	F1L1	12/11/2024	Annual
RF Switching System	FBSR-02B(3.3G HPF+LNA)	T&M SYSTEM	F1L2	12/11/2024	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/23/2024	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	03/09/2025	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	03/09/2025	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/17/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	09/16/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	09/16/2024	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

## Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).





## **5. MEASUREMENT UNCERTAINTY**

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

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

Parameter	Expanded Uncertainty (±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 %, <i>k</i> =2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, <i>k</i> =2)



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

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, § 27.53(g)	<43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

Note:

1. See SAR Report

## 6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§ 27.50(c)(10)	< 3 Watts max. ERP	PASS
Radiated Spurious and	§ 2.1053,	<43 + 10log10 (P[Watts]) for	DACC
Harmonic Emissions	§ 27.53(g)	all out-of band emissions	PASS



## 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

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

#### ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test, the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

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

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test, the turn table is rotated until the maximum signal is found.

- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.



7.3. Emission Designator

#### **GSM Emission Designator**

Emission Designator = 249KGXW GSM BW = 249 kHz G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)

#### **EDGE Emission Designator**

Emission Designator = 249KG7W GSM BW = 249 kHz G = Phase Modulation 7 = Quantized/Digital Info W = Combination (Audio/Data)

#### WCDMA Emission Designator

Emission Designator = 4M17F9W WCDMA BW = 4.17 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

#### **QPSK Modulation**

Emission Designator = 4M48G7D LTE BW = 4.48 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Data transmission; telemetry; telecommand

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



## 8. TEST DATA

## **8.1 EFFECTIVE RADIATED POWER**

Frog	Mod/		Measured	Substitute	Ant. Gain			Limit	EI	RP	I	RB
Freq (MHz)	Bandwidth	Modulation	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol	w	W	dBm	Size	Offset
		QPSK	-28.80	30.32	-9.55	1.28	Н		0.089	19.49		
COO 7		16-QAM	-29.92	29.20	-9.55	1.28	Н		0.069	18.37		0
699.7		64-QAM	-30.85	28.27	-9.55	1.28	Н		0.055	17.44	1	0
		256-QAM	-33.87	25.25	-9.55	1.28	Н		0.028	14.42		
		QPSK	-29.28	29.56	-9.55	1.28	Н		0.075	18.73		
707 F	LTE B12	16-QAM	-30.37	28.47	-9.55	1.28	Н	- 2 00	0.058	17.64	1	0
707.5	(1.4 MHz)	64-QAM	-31.40	27.44	-9.55	1.28	Н	< 3.00	0.046	16.61	1	0
		256-QAM	-34.30	24.54	-9.55	1.28	Н		0.024	13.71		
		QPSK	-30.39	28.86	-9.55	1.28	Н		0.064	18.03		
715.2		16-QAM	-31.43	27.82	-9.55	1.28	Н		0.050	16.99	1	0
715.3		64-QAM	-32.39	26.86	-9.55	1.28	Н		0.040	16.03	1	0
		256-QAM	-35.44	23.81	-9.55	1.28	Н		0.020	12.98		

Eroa	Mod/		Measured	Substitute	Ant. Gain			Limit	El	RP		RB
Freq (MHz)	Bandwidth	Modulation	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol	w	W	dBm	Size	Offset
		QPSK	-28.84	30.21	-9.55	1.28	Н		0.087	19.38		
700.5		16-QAM	-30.00	29.05	-9.55	1.28	Н		0.066	18.22	1	8
100.5		64-QAM	-30.87	28.18	-9.55	1.28	Н		0.054	17.35	L	0
		256-QAM	-33.91	25.14	-9.55	1.28	Н		0.027	14.31		
		QPSK	-29.30	29.54	-9.55	1.28	Н		0.074	18.71		
707 F	LTE B12	16-QAM	-30.36	28.48	-9.55	1.28	Н	< 2.00	0.058	17.65	1	0
707.5	(3 MHz)	64-QAM	-31.36	27.48	-9.55	1.28	Н	< 3.00	0.046	16.65	1	0
		256-QAM	-34.39	24.45	-9.55	1.28	Н		0.023	13.62		
		QPSK	-30.24	28.97	-9.55	1.28	Н		0.065	18.14		
714 5		16-QAM	-31.25	27.96	-9.55	1.28	Н		0.052	17.13	1	0
714.5		64-QAM	-32.26	26.95	-9.55	1.28	Н		0.041	16.12	1	0
		256-QAM	-35.23	23.98	-9.55	1.28	Н		0.021	13.15		



Freq	Mod/		Measured	Substitute	Ant. Gain			Limit	El	RP	l	RB
(MHz)	Bandwidth	Modulation	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol	w	W	dBm	Size	Offset
		QPSK	-28.83	30.12	-9.55	1.28	Н		0.085	19.29		
701.5		16-QAM	-29.95	29.00	-9.55	1.28	Н		0.066	18.17	1	13
701.5		64-QAM	-30.93	28.02	-9.55	1.28	Н		0.052	17.19	L	15
		256-QAM	-33.93	25.02	-9.55	1.28	Н		0.026	14.19		
		QPSK	-29.23	29.61	-9.55	1.28	Н		0.076	18.78		
707.5	LTE B12/17	16-QAM	-30.24	28.60	-9.55	1.28	Н	< 3.00	0.060	17.77	1	0
101.5	(5 MHz)	64-QAM	-31.27	27.57	-9.55	1.28	Н	< 3.00	0.047	16.74	L	0
		256-QAM	-34.32	24.52	-9.55	1.28	Н		0.023	13.69		
		QPSK	-30.04	29.09	-9.55	1.28	Н		0.067	18.26		
710 F		16-QAM	-31.05	28.08	-9.55	1.28	Н		0.053	17.25	1	0
713.5		64-QAM	-32.09	27.04	-9.55	1.28	Н		0.042	42 16.21	- 1	0
		256-QAM	-34.94	24.19	-9.55	1.28	Н		0.022	13.36		

Frog	Mod/		Measured	Substitute	Ant Cain			Limit	El	RP		RB
Freq (MHz)	Mod/ Bandwidth	Modulation	Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	w	W	dBm	Size	Offset
		QPSK	-28.75	30.16	-9.55	1.28	Н		0.086	19.33		
704.0		16-QAM	-29.90	29.01	-9.55	1.28	Н		0.066	18.18	1	0
704.0		64-QAM	-30.89	28.02	-9.55	1.28	Н		0.052	17.19	1	0
		256-QAM	-34.04	24.87	-9.55	1.28	Н		0.025	14.04		
		QPSK	-29.07	29.77	-9.55	1.28	Н		0.078	18.94		
707.5	LTE B12/17	16-QAM	-30.11	28.73	-9.55	1.28	Н	< 3.00	0.062	17.90	1	0
101.5	(10 MHz)	64-QAM	-31.15	27.69	-9.55	1.28	Н	< 3.00	0.049	16.86	L	0
		256-QAM	-34.20	24.64	-9.55	1.28	Н		0.024	13.81		
		QPSK	-29.79	29.26	-9.55	1.28	Н		0.070	18.43		
711.0		16-QAM	-30.80	28.25	-9.55	1.28	Н		0.055	17.42	1	0
711.0		64-QAM	-31.90	27.15	-9.55	1.28	Н		0.043	16.32	2 1	0
		256-QAM	-34.95	24.10	-9.55	1.28	Н		0.021	13.27		



## **8.2 RADIATED SPURIOUS EMISSIONS**

MODE:	
MODULATION SIGNAL:	

LTE B12 1.4 MHz QPSK

3 meters

DISTANCE:

Ch		Measured	Ant.	Substitute	<u> </u>	Pol	Result	Limit	F	RB
Ch	Freq (MHz)	Level (dBm)	Gain (dBd)	Level (dBm)	C.L	POL	(dBm)	(dBm)	Size	Offset
	1 399.40	-59.55	7.40	-64.95	1.80	V	-59.35	-13.00		
	2 099.10	-59.87	9.10	-65.23	2.28	V	-58.41	-13.00		
23017 (699.7)	2 798.80	-60.96	10.30	-64.83	2.68	V	-57.21	-13.00	1	0
, , ,	3 498.50	-60.96	11.30	-63.61	3.00	V	-55.31	-13.00		
	4 198.20	-61.08	11.20	-60.72	3.30	V	-52.82	-13.00		
	1 415.00	-59.83	7.40	-66.28	1.80	V	-60.68	-13.00		
	2 122.50	-60.18	9.10	-65.38	2.28	V	-58.56	-13.00		
23095 (707.5)	2 830.00	-59.96	10.30	-64.39	2.69	V	-56.78	-13.00	1	0
· · · ·	3 537.50	-60.65	11.30	-62.92	3.00	V	-54.62	-13.00		
	4 245.00	-60.91	11.20	-60.46	3.31	V	-52.57	-13.00		
	1 430.60	-58.13	7.40	-64.65	1.81	V	-59.06	-13.00		
	2 145.90	-60.08	9.05	-65.10	2.33	V	-58.38	-13.00		
23173 (715.3)	2 861.20	-60.70	10.30	-64.15	2.72	V	-56.57	-13.00	1	0
, <i>,</i> ,	3 576.50	-59.73	11.40	-61.79	3.00	V	-53.39	-13.00		
	4 291.80	-61.48	11.20	-60.24	3.33	V	-52.37	-13.00		



## 8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			QPSK			1.0967
	1 4 1411-		16-QAM	6		1.1005
	1.4 MHz		64-QAM	6		1.0998
10			256-QAM			1.0965
12			QPSK			2.7065
	2.141		16-QAM			2.7254
	3 MHz		64-QAM	- 15		2.7288
		- 707.5	256-QAM		_	2.7182
			QPSK		0	4.5151
			16-QAM			4.5103
	5 MHz		64-QAM	25		4.5086
			256-QAM			4.5111
12(17)			QPSK			8.9589
			16-QAM			8.9744
	10 MHz	-	64-QAM	50		8.9843
			256-QAM			8.9562

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 43 ~ 58.



Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)	
		699.7	3.7000	27.976	-67.008	-39.032		
	1.4	707.5	3.7020	27.976	-67.158	-39.182		
10		715.3	3.7109	27.976	-66.982	-39.006		
12		700.5	3.7124	27.976	-66.948	-38.972		
	3	707.5	3.6870	27.976	-66.909	-38.933		
			714.5	3.7039	27.976	-67.126	-39.150	12.00
		701.5	3.6965	27.976	-67.043	-39.067	-13.00	
	5	707.5	3.7363	27.976	-67.314	-39.338		
12/17)		713.5	3.6735	27.976	-67.225	-39.249		
12(17)		704.0	3.7089	27.976	-66.917	-38.941		
	10	707.5	3.7049	27.976	-67.178	-39.202		
		711.0	3.6980	27.976	-67.103	-39.127		

#### 8.4 CONDUCTED SPURIOUS EMISSIONS

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 59 ~ 70.

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

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

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

Frequency Range (GHz)	Factor [dB]
0.03 - 1	25.270
1 – 5	27.976
5 - 10	28.591
10 - 15	29.116
15 - 20	29.489
Above 20(26.5)	30.131

## 8.5 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 71 ~ 98.



## 8.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

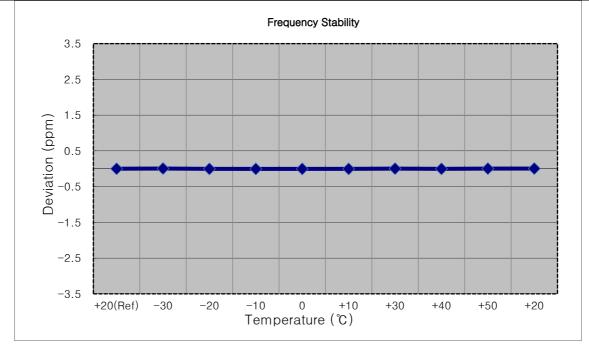
_		
	MODE:	

- OPERATING FREQUENCY:
- CHANNEL:
- REFERENCE VOLTAGE:

DEVIATION LIMIT:

LTE B12 699,700,000 Hz 23017 (1.4 MHz) 3.880 VDC Emission must remain in band

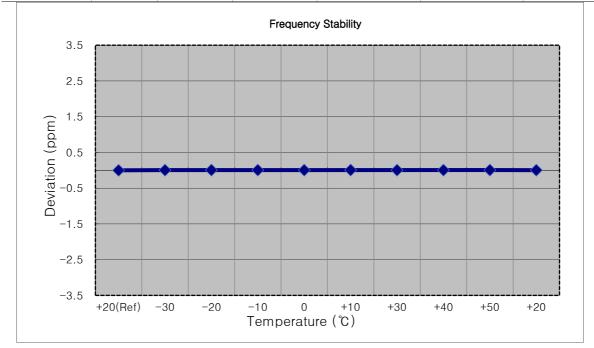
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	- ppm
100 %		+20(Ref)	699 700 003	0.0	0.000 000	0.000
100 %		-30	699 700 006	3.8	0.000 001	0.005
100 %	3.880	-20	699 700 000	-2.5	0.000 000	-0.004
100 %		-10	699 700 000	-3.1	0.000 000	-0.004
100 %		0	699 700 000	-3.0	0.000 000	-0.004
100 %		+10	699 700 000	-2.7	0.000 000	-0.004
100 %		+30	699 700 005	2.1	0.000 000	0.003
100 %		+40	699 700 000	-2.3	0.000 000	-0.003
100 %		+50	699 700 005	2.6	0.000 000	0.004
Batt. Endpoint	3.300	+20	699 700 006	3.3	0.000 000	0.005





MODE:	LTE B12
OPERATING FREQUENCY:	700,500,000 Hz
CHANNEL:	<u>23025 (3 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

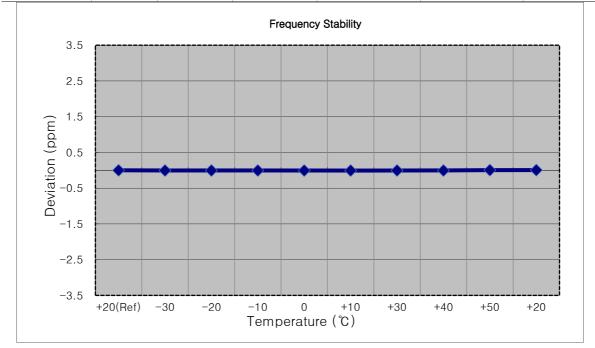
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	700 500 004	0.0	0.000 000	0.000
100 %		-30	700 500 008	3.6	0.000 001	0.005
100 %	3.880	-20	700 500 009	4.8	0.000 001	0.007
100 %		-10	700 500 009	4.5	0.000 001	0.006
100 %		0	700 500 008	3.3	0.000 000	0.005
100 %		+10	700 500 009	5.1	0.000 001	0.007
100 %		+30	700 500 008	3.4	0.000 000	0.005
100 %		+40	700 500 008	3.6	0.000 001	0.005
100 %		+50	700 500 009	4.7	0.000 001	0.007
Batt. Endpoint	3.300	+20	700 500 007	2.4	0.000 000	0.003





MODE:	LTE B12(17)
OPERATING FREQUENCY:	701,500,000 Hz
CHANNEL:	23035 (5 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

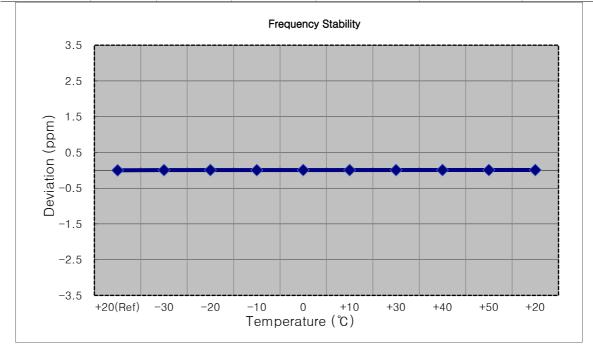
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	701 499 996	0.0	0.000 000	0.000
100 %		-30	701 499 992	-3.7	-0.000 001	-0.005
100 %	3.880	-20	701 499 992	-3.7	-0.000 001	-0.005
100 %		-10	701 499 992	-4.0	-0.000 001	-0.006
100 %		0	701 499 992	-4.2	-0.000 001	-0.006
100 %		+10	701 499 991	-4.6	-0.000 001	-0.007
100 %		+30	701 499 993	-3.4	0.000 000	-0.005
100 %		+40	701 499 992	-4.3	-0.000 001	-0.006
100 %		+50	701 499 999	3.3	0.000 000	0.005
Batt. Endpoint	3.300	+20	701 500 000	3.9	0.000 001	0.006





MODE:	LTE B12(17)
OPERATING FREQUENCY:	704,000,000 Hz
CHANNEL:	23060 (10 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

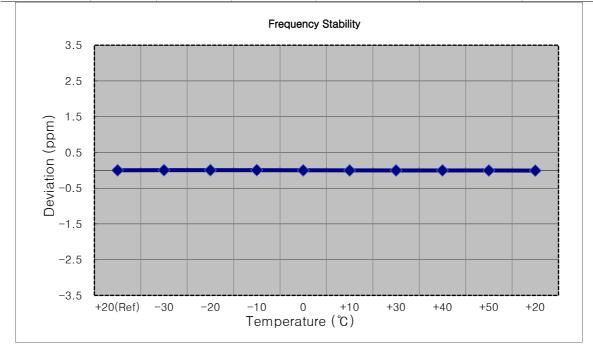
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	- ppm
100 %		+20(Ref)	704 000 004	0.0	0.000 000	0.000
100 %		-30	704 000 008	4.3	0.000 001	0.006
100 %	3.880	-20	704 000 009	4.9	0.000 001	0.007
100 %		-10	704 000 008	3.8	0.000 001	0.005
100 %		0	704 000 009	4.9	0.000 001	0.007
100 %		+10	704 000 009	4.7	0.000 001	0.007
100 %		+30	704 000 009	5.3	0.000 001	0.008
100 %		+40	704 000 009	5.3	0.000 001	0.008
100 %		+50	704 000 010	5.7	0.000 001	0.008
Batt. Endpoint	3.300	+20	704 000 010	5.9	0.000 001	0.008





MODE:	LTE B12
OPERATING FREQUENCY:	707,500,000 Hz
CHANNEL:	<u>23095 (1.4 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

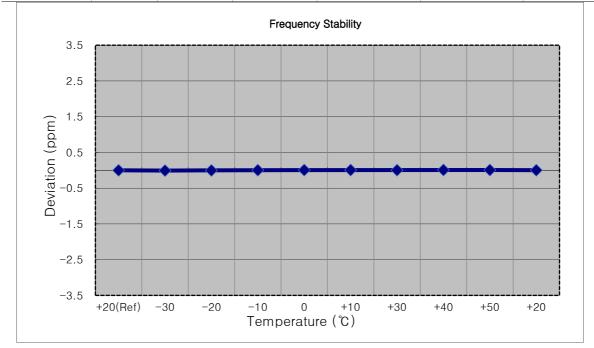
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	- ppm
100 %		+20(Ref)	707 500 003	0.0	0.000 000	0.000
100 %		-30	707 500 005	2.9	0.000 000	0.004
100 %	3.880	-20	707 500 005	2.7	0.000 000	0.004
100 %		-10	707 500 007	4.1	0.000 001	0.006
100 %		0	707 500 001	-1.7	0.000 000	-0.002
100 %		+10	707 500 000	-2.8	0.000 000	-0.004
100 %		+30	707 500 000	-2.2	0.000 000	-0.003
100 %		+40	707 500 001	-1.9	0.000 000	-0.003
100 %		+50	707 499 999	-3.1	0.000 000	-0.004
Batt. Endpoint	3.300	+20	707 499 997	-5.9	-0.000 001	-0.008





MODE:	LTE B12
OPERATING FREQUENCY:	707,500,000 Hz
CHANNEL:	<u>23095 (3 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

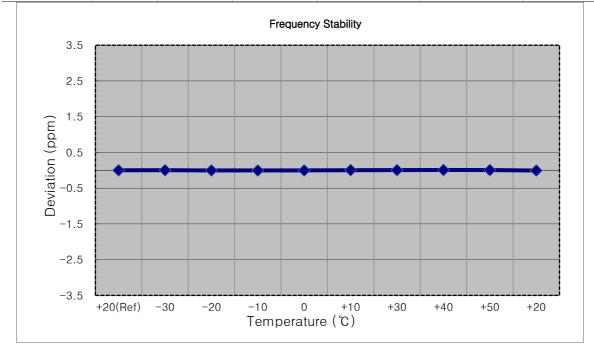
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	- ppm
100 %		+20(Ref)	707 500 003	0.0	0.000 000	0.000
100 %		-30	707 499 998	-5.2	-0.000 001	-0.007
100 %	3.880	-20	707 500 000	-2.6	0.000 000	-0.004
100 %		-10	707 500 005	2.3	0.000 000	0.003
100 %		0	707 500 007	4.5	0.000 001	0.006
100 %		+10	707 500 008	5.1	0.000 001	0.007
100 %		+30	707 500 006	2.8	0.000 000	0.004
100 %		+40	707 500 009	6.3	0.000 001	0.009
100 %		+50	707 500 008	5.5	0.000 001	0.008
Batt. Endpoint	3.300	+20	707 500 005	2.0	0.000 000	0.003





LTE B12(17)
707,500,000 Hz
23095 (5 MHz)
3.880 VDC
Emission must remain in band

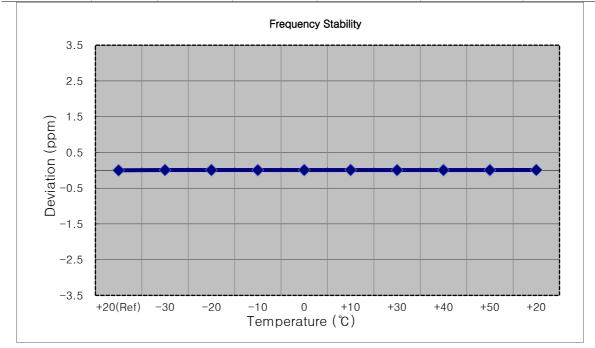
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 002	0.0	0.000 000	0.000
100 %		-30	707 500 004	2.0	0.000 000	0.003
100 %		-20	707 499 999	-2.3	0.000 000	-0.003
100 %		-10	707 499 998	-4.0	-0.000 001	-0.006
100 %		0	707 499 999	-2.5	0.000 000	-0.004
100 %		+10	707 500 005	3.7	0.000 001	0.005
100 %		+30	707 500 005	3.4	0.000 000	0.005
100 %		+40	707 500 007	5.3	0.000 001	0.007
100 %		+50	707 500 006	4.2	0.000 001	0.006
Batt. Endpoint	3.300	+20	707 499 997	-4.5	-0.000 001	-0.006





MODE:	LTE B12(17)
OPERATING FREQUENCY:	707,500,000 Hz
CHANNEL:	23095 (10 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

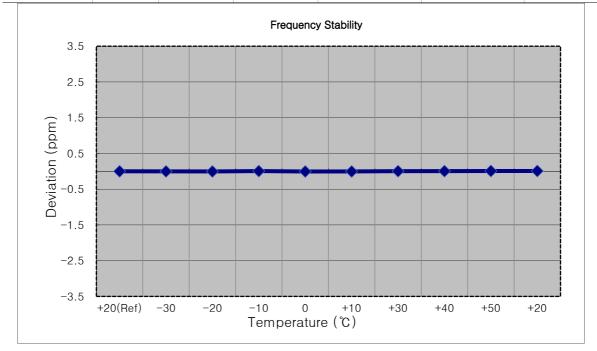
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 005	0.0	0.000 000	0.000
100 %		-30	707 500 011	5.6	0.000 001	0.008
100 %		-20	707 500 010	5.4	0.000 001	0.008
100 %		-10	707 500 010	4.8	0.000 001	0.007
100 %		0	707 500 009	4.4	0.000 001	0.006
100 %		+10	707 500 011	6.1	0.000 001	0.009
100 %		+30	707 500 010	4.6	0.000 001	0.007
100 %		+40	707 500 009	4.2	0.000 001	0.006
100 %		+50	707 500 010	4.7	0.000 001	0.007
Batt. Endpoint	3.300	+20	707 500 011	6.1	0.000 001	0.009





MODE:	LTE B12
OPERATING FREQUENCY:	715,300,000 Hz
CHANNEL:	<u>23173 (1.4 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

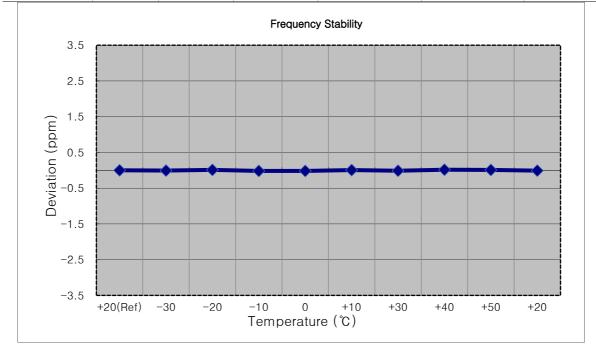
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	715 299 994	0.0	0.000 000	0.000
100 %		-30	715 299 992	-1.7	0.000 000	-0.002
100 %		-20	715 299 991	-3.1	0.000 000	-0.004
100 %		-10	715 299 998	4.6	0.000 001	0.006
100 %		0	715 299 990	-4.1	-0.000 001	-0.006
100 %		+10	715 299 990	-3.2	0.000 000	-0.004
100 %		+30	715 299 996	2.7	0.000 000	0.004
100 %		+40	715 299 997	3.3	0.000 000	0.005
100 %		+50	715 299 999	5.5	0.000 001	0.008
Batt. Endpoint	3.300	+20	715 300 000	6.3	0.000 001	0.009





MODE:	LTE B12
OPERATING FREQUENCY:	714,500,000 Hz
CHANNEL:	<u>23165 (3 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

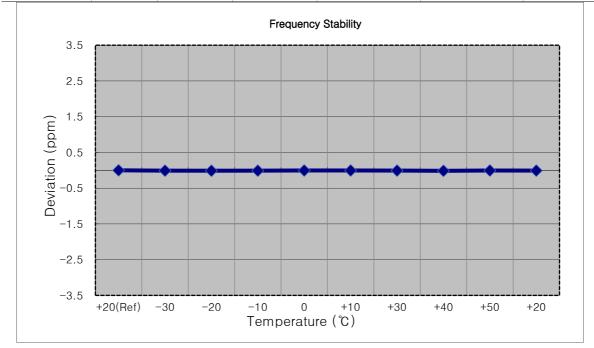
Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	- ppm
100 %		+20(Ref)	714 499 988	0.0	0.000 000	0.000
100 %		-30	714 499 983	-5.3	-0.000 001	-0.007
100 %		-20	714 499 996	7.9	0.000 001	0.011
100 %		-10	714 499 976	-12.4	-0.000 002	-0.017
100 %	3.880	0	714 499 976	-12.5	-0.000 002	-0.017
100 %		+10	714 499 992	4.3	0.000 001	0.006
100 %		+30	714 499 979	-8.8	-0.000 001	-0.012
100 %		+40	714 500 000	11.6	0.000 002	0.016
100 %		+50	714 499 995	6.9	0.000 001	0.010
Batt. Endpoint	3.300	+20	714 499 981	-6.7	-0.000 001	-0.009





MODE:	LTE B12(17)
OPERATING FREQUENCY:	713,500,000 Hz
CHANNEL:	<u>23155 (5 MHz)</u>
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	713 499 995	0.0	0.000 000	0.000
100 %		-30	713 499 988	-7.2	-0.000 001	-0.010
100 %		-20	713 499 987	-8.4	-0.000 001	-0.012
100 %		-10	713 499 988	-7.2	-0.000 001	-0.010
100 %	3.880	0	713 499 992	-3.8	-0.000 001	-0.005
100 %		+10	713 499 992	-3.6	-0.000 001	-0.005
100 %		+30	713 499 990	-5.5	-0.000 001	-0.008
100 %		+40	713 499 985	-10.4	-0.000 001	-0.015
100 %		+50	713 499 991	-4.1	-0.000 001	-0.006
Batt. Endpoint	3.300	+20	713 499 989	-6.1	-0.000 001	-0.009

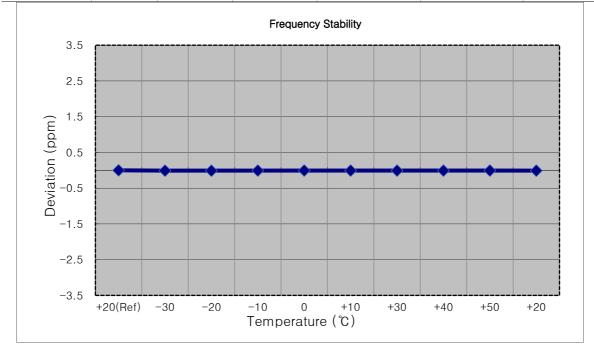


F-TP22-03 (Rev. 06)



MODE:	LTE B12(17)
OPERATING FREQUENCY:	711,000,000 Hz
CHANNEL:	23130 (10 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	710 999 994	0.0	0.000 000	0.000
100 %		-30	710 999 987	-6.9	-0.000 001	-0.010
100 %		-20	710 999 986	-8.0	-0.000 001	-0.011
100 %		-10	710 999 989	-5.7	-0.000 001	-0.008
100 %	3.880	0	710 999 990	-4.3	-0.000 001	-0.006
100 %		+10	710 999 989	-5.2	-0.000 001	-0.007
100 %		+30	710 999 989	-5.7	-0.000 001	-0.008
100 %		+40	710 999 988	-6.2	-0.000 001	-0.009
100 %		+50	710 999 989	-5.0	-0.000 001	-0.007
Batt. Endpoint	3.300	+20	710 999 988	-6.6	-0.000 001	-0.009



F-TP22-03 (Rev. 06)



### 8.7 UPLINK CARRIER AGGREGATION

#### Test Note

1. All tests were evaluated for the two bands using various combinations of RB size, RB offset,

modulation, and channel bandwidth.

2. All modes of operation were investigated and the worst case configuration results are reported in this section.

Please refer to the table below.

3. The worst case is reported with the modulations, RB sizes and offsets.

- 12A(ANT A)-66A(ANT A)

(PCC - Modulation: QPSK, RB: 1, RB Offset: 49, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

- 12A(ANT A)-4A(ANT A)

(PCC - Modulation: QPSK, RB: 1, RB Offset: 49, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

### Radiated Spurious Emissions

PCC	SCC	P	cc	SCC		
	SCC	BW(MHz)	Channel	BW(MHz)	Channel	
12A(ANT I)	66A(ANT A)	10	23060	15	132322	
12A(ANT I)	4A(ANT A)	10	23060	15	20325	



#### 8.7.1 RADIATED SPURIOUS EMISSIONS

### 12A(ANT A)(PCC)- 66A(ANT A)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
1 408.00	-53.59	7.68	-62.84	2.00	V	-57.16	-13.00
2 112.00	-58.26	9.45	-62.85	2.44	V	-55.84	-13.00
2 816.00	-58.50	10.80	-59.80	2.80	V	-51.80	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 490.00	-55.83	12.34	-61.84	3.08	V	-52.58	-13.00
5 235.00	-58.07	12.84	-57.15	3.95	V	-48.26	-13.00
6 980.00	-58.51	11.40	-50.90	4.56	V	-44.06	-13.00

#### 12A(ANT A)(PCC)- 4A(ANT A)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
1 408.00	-54.53	7.68	-63.78	2.00	V	-58.10	-13.00
2 112.00	-57.60	9.45	-62.19	2.44	V	-55.18	-13.00
2 816.00	-56.64	10.80	-57.94	2.80	V	-49.94	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 495.00	-56.75	12.34	-62.82	3.09	V	-53.57	-13.00
5 242.50	-57.86	12.87	-57.01	3.95	V	-48.09	-13.00
6 990.00	-59.25	11.36	-51.04	4.58	V	-44.26	-13.00



Report No. HCT-RF-2405-FC004

## 9. TEST PLOTS



Agilent Spectrum Analyzer - Occupied BW					- 3
RL      RF      50 Ω      AC        Center Freq 707.500000      ASS		SENSE:INT Center Freq: 707.500000 N Trig: Free Run Av #Atten: 20 dB	ALIGN AUTO Hz g Hold: 500/500	12:39:02 PM Mar 04, 202 Radio Std: None Radio Device: BTS	<sup>4</sup> Frequency
Ref Offset 26.6 d Ref 40.00 dBr					
-og 30,0 20.0					Center Free 707.500000 MH
10.0		,			
10.0	m		Mr. Mar		
20.0 30.0				mmun	
40.0					CF Ster 280,000 kH
Center 707.5 MHz Res BW 27 kHz		#VBW 110 kHz		Span 2.8 MH Sweep 3.667 m	Z Auto Mar
Occupied Bandwidt		Total Powe	r 31.	6 dBm	Freq Offse
	0967 MH				
Transmit Freq Error	1.204 kH			9.00 %	
x dB Bandwidth	1.364 MH	z xdB	-26	.00 dB	
ISG			STATL	IS	

### LTE B12\_1.4M\_OBW\_Mid\_QPSK\_FullRB



Agilent Spectrum Analyzer - Oo	Carl Contraction of the second s				- 6 -
RL RF 50 Center Freq 707.50	and the second se	Center Freq: 707.5000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 000 MHz Avg Hold: 500/500	12:37:52 PM Mar 04, 2024 Radio Std: None Radio Device: BTS	Frequency
Ref Offso 0 dB/div Ref 40.	#IFGain:Low et 26.6 dB 00 dBm	#Atten: 20 dB		Radio Device: B 13	
og 000					Center Fre 707.500000 MH
0.0	- Jan	man har			
10.0 10.0	- North -			Monter	
0.0					CF Ste 280.000 kH
enter 707.5 MHz es BW 27 kHz		#VBW 110 k	Hz	Span 2.8 MHz Sweep 3.667 ms	
Occupied Ban	dwidth 1.1005 N	Total Po MHZ	ower 30.	6 dBm	Freq Offse 0 H
Transmit Freq E x dB Bandwidth	rror 2.133 1.340	8 kHz OBW Po MHz x dB		9.00 % .00 dB	
SG			STAT	US	

### LTE B12\_1.4M\_OBW\_Mid\_16QAM\_FullRB



	Analyzer - Occupied BW					- 3
Center Freq	F 50 Ω AC 707.500000 Γ	MHz #IFGain:Low	SENSE:INT Center Freq: 707.5000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 00 MHz Avg Hold: 500/500	12:38:23 PM Mar 04, 2024 Radio Std: None Radio Device: BTS	Frequency
0 dB/div	Ref Offset 26.6 df Ref 40.00 dBn					
.og 30.0 20.0						Center Fre 707.500000 MH
10.0		J	······	mony		
10.0 20.0 30.0 <b>/ / / / / / / / /</b>	mmm			Monor	Mr. Marana	
40.0 50.0						CF Ste 280.000 kH
enter 707.5 tes BW 27 k			#VBW 110 kH	Iz	Span 2.8 MHz Sweep 3.667 ms	
Occupied	d Bandwidt 1.	h 0998 MH	Total Po	wer 29.	7 dBm	Freq Offse 0 H
Transmit I x dB Band	Freq Error	4.933 k 1.368 M	Hz OBW Po		9.00 % .00 dB	
SG				STAT	US	

### LTE B12\_1.4M\_OBW\_Mid\_64QAM\_FullRB



	m Analyzer - Occupied BW		_							5 ×
Center Free PASS	RF 50 Ω AC Q 707.500000 Γ	MHz #IFGain:Low	Center Trig: F	SENSE:INT Freq: 707.50 Free Run : 20 dB		ALIGN AUTO	Radio Ste	PM Feb 29, 2024 d: None vice: BTS	Frequen	icy
10 dB/div	Ref Offset 26.6 dE Ref 40.00 dBm					-1				
30:0 20.0									Cente 707.50000	
10.0		mm	minin	www.	imm	n				
0.00		/				Jul Mary				
20.0 30.0 ~~~~~	mmmm					لسر	howwww	mmm		
40.0									CI	Step
Center 707 Res BW 27			#	VBW 110	kHz			in 2.8 MHz 3.667 ms	280.0	00 kH: Mar
Occupi	ed Bandwidt			Total	Power	27.	6 dBm		Freq	Offse 0 H:
	1.	0965 M	ΗZ							
Transmi	t Freq Error	1.588	kHz	OBW	Power	9	9.00 %			
x dB Bar	ndwidth	1.356 M	MHz	x dB		-26	.00 dB			
ISG						STATU	IS			

#### LTE B12\_1.4M\_OBW\_Mid\_256QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BW					- 3 2
RL      RF      50 Ω      AC        enter Freq 707.500000 Γ      ASS      ASS	//Hz #IFGain:Low	SENSE:INT Center Freq: 707.500000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO O MHz Avg Hold: 500/500	12:41:10 PM Mar 04, 2 Radio Std: None Radio Device: BTS	Frequency
Ref Offset 26.6 dB dB/div Ref 40.00 dBm					
00 00 00					Center Fre 707.500000 MH
0.0	from	mmmmmm.hell	mont		
0.0			- A		
0.0 mmmmmmm				Manhummen	~
0.0					CF Ste 600.000 kH
enter 707.5 MHz Res BW 62 kHz		#VBW 240 kH	z	Span 6 M Sweep 1.533	Hz Auto Ma
Occupied Bandwidt 2.	հ 7065 MH	Total Pov	ver 31.	6 dBm	Freq Offso 0 H
Transmit Freq Error	6.979 k	Hz OBW Pov	ver 9	9.00 %	
x dB Bandwidth	3.069 M	Hz x dB	-26	.00 dB	
G			STATU	IS	

### LTE B12\_3 M\_OBW\_Mid\_QPSK\_FullRB



Agilent Spectrum Analyzer - Occupied BW							- 6 ×
RL      RF      50 Ω      AC        Center Freq 707.500000      ASS      ASS      ASS      ASS	MHz #IFGain:Low	SENSE:INT Center Freq: 707. Trig: Free Run #Atten: 20 dB	500000 MHz Avg Hold	ALIGN AUTO	Radio De		Frequency
Ref Offset 26.6 d 0 dB/div Ref 40.00 dBr							
30.0 20.0							Center Free 707.500000 MH
	mon	~m~~m~~~~	mm				
10.0 20.0	/			- A	Mr. A.	round	
20.0 30.0 40.0						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
0.0							CF Ster 600.000 kH
enter  707.5 MHz Res BW  62 kHz		#VBW 24	0 kHz		Sweep	oan 6 MHz 1.533 ms	<u>Auto</u> Ma
Occupied Bandwidt	<sup>th</sup> 7254 MH		Power	30.	5 dBm		Freq Offse 0 H
 Transmit Freq Error	1.117 k		Power	99	9.00 %		
x dB Bandwidth	3.043 M	Hz x dB		-26	.00 dB		
SG				STATU	IS		

### LTE B12\_3 M\_OBW\_Mid\_16QAM\_FullRB



	um Analyzer - Occupied			-					a x
Center Fre	RF 50 Ω A) eq 707.50000		Center Freq: 7 Trig: Free Run #Atten: 20 dB	07.500000 MHz	align Auto	Radio Sto		Frequen	icy
10 dB/div	Ref Offset 26.6 Ref 40.00 d								
Log 30.0 20.0								Cente 707.50000	
10.0		Junio	<b>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</b>	w.m.m.shing					
-10.0		<i>f</i>			h h				
-30.0 mm	h.m.m.m.				<u>,</u>	man	mmm		
-40.0									Step
Center 707 #Res BW			#VBW 2	240 kHz			oan 6 MHz 1.533 ms		Mar
Occup	ied Bandwi	dth 2.7288 MI		al Power	29.	5 dBm		Freq	Offset 0 Hz
	it Freq Error			W Power		9.00 %			
x dB Ba	Indwidth	3.046 N	1Hz xd	В	-26.	.00 dB			
ISG					STATU	s			

#### LTE B12\_3 M\_OBW\_Mid\_64QAM\_FullRB



Agilent Spectrum Analyzer - Occupie			-				
Center Freq 707.5000 PASS		SENSE:INT Center Freq: 707. Trig: Free Run #Atten: 20 dB	500000 MHz Avg Hold	ALIGN AUTO	03:15:19 Radio Sto Radio De		Frequency
Ref Offset 26							
20.0							Center Free 707.500000 MH
10.0 D.00	forman		w.h.w.	$\gamma$			
10.0 20.0 30.0	no Maria			- John		mm	
Center 707.5 MHz Res BW 62 kHz		#VBW 24	0 kHz		SI Sweep	oan 6 MHz 1.533 ms	CF Stej 600.000 kH Auto Mai
Occupied Bandw	<sup>idth</sup> 2.7182 <b>M</b> I		Power	27.0	6 dBm		Freq Offse 0 H
Transmit Freq Error x dB Bandwidth	6.203 I 3.069 N		Power		9.00 % .00 dB		
sG				STATU	15		

#### LTE B12\_3 M\_OBW\_Mid\_256QAM\_FullRB



Agilent Spectrum Analyz	and the second sec							
Center Freq 707	and the second	Hz #FGain:Low	SENSE:INT Center Freq: 70 Trig: Free Run #Atten: 20 dB		ALIGN AUTO	Radio Std Radio Dev		Frequency
0 dB/div Ref	Offset 26.6 dB 40.00 dBm							
.og 30.0 20.0								Center Fre 707.500000 MH
10,0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man	m			
0.00	State of the second sec				Nr.			
20.0 30.0	man					m	mmy	
0.0								CF Ste 1.000000 MH
enter 707.5 MH Res BW 100 kH			#VBW 3	90 kHz			ep 1 ms	<u>Auto</u> Ma
Occupied B		151 MF		l Power	31.5	ō dBm		Freq Offse
Transmit Fre		8.772 k		Power	99	0.00 %		
x dB Bandwid	dth	5.190 M	Hz x dE		-26.	00 dB		
SG					STATUS	S		

### LTE B12(17)\_5 M\_OBW\_Mid\_QPSK\_FullRB



Agilent Spectrum Analyzer - Occupied BW							
RL      RF      50 Ω      AC        Center Freq 707.500000 I      AC      AC      AC        ASS      AC      AC      AC      AC	MHz #IFGain:Low	SENSE:INT Center Freq: 707.5 Trig: Free Run #Atten: 20 dB	00000 MHz Avg Hold	ALIGN AUTO	Radio De		Frequency
0 dB/div Ref 0ffset 26.6 df							
• <b>0</b> 30.0 20.0							Center Free 707.500000 MH
10.0	minim	mmmm	www.	-~~ }			
لىر	d			- Vor			
20.0					to man was	mm	
i0.0							CF Ste 1.000000 MH
Center 707.5 MHz Res BW 100 kHz		#VBW 390	) kHz			an 10 MHz eep 1 ms	Auto Mar
Occupied Bandwidt	հ 5103 MH		Power	30.4	4 dBm		Freq Offse 0 Hi
Transmit Freq Error	17.288 k		Power	99	9.00 %		
x dB Bandwidth	5.162 M	Hz x dB		-26	.00 dB		
ISG				STATU	IS		

# LTE B12(17)\_5 M\_OBW\_Mid\_16QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BV	/					
RL      RF      50 Ω      Ac        Senter Freq 707.500000      ASS      ASS	MHz #IFGain:Low	SENSE:INT Center Freq: 707.5 Trig: Free Run #Atten: 20 dB		: 500/500	12:42:38 PM Mar 04, 2024 Radio Std: None Radio Device: BTS	Frequency
Ref Offset 26.6 c 0 dB/div Ref 40.00 dB						į
000 20.0						Center Fre 707.500000 MH
0.0	mmum	man	mmm	m		
0.00 10.0	{			1 North		
20.0				huy h	mmmmm	
i0.0						CF Ste 1.000000 MH
enter 707.5 MHz Res BW 100 kHz		#VBW 390	kHz		Span 10 MHz Sweep 1 ms	Auto Ma
Occupied Bandwid	<sup>th</sup> 5086 MH		Power	29.6 0	IBm	Freq Offse 0 H
Transmit Freq Error	18.897 k		Power	99.0	0 %	
x dB Bandwidth	5.080 M	Hz x dB		-26.00	) dB	
SG				STATUS		

# LTE B12(17)\_5 M\_OBW\_Mid\_64QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BW					
RL      RF      50 Ω      AC        Center Freq 707.500000      PASS      PASS	MHz #IFGain:Low	SENSE:INT Center Freq: 707.500000 M Trig: Free Run Avg #Atten: 20 dB	ALIGN AUTO Hz  Hold: 500/500	03:22:43 PM Feb 29, 2024 Radio Std: None Radio Device: BTS	Frequency
Ref Offset 26.6 d Ref 40.00 dBr					
-og 30.0 20.0					Center Free 707.500000 MH
0.0	Jamman	mannana	m		
20.0 30.0 mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm			- Vr	and the second	
40.0					
Center 707.5 MHz Res BW 100 kHz		#VBW 390 kHz		Span 10 MHz Sweep 1 ms	CF Step 1.000000 MH <u>Auto</u> Mar
Occupied Bandwidt 4.	տ 5111 MH	Total Powe	r 27.5	ō dBm	Freq Offse 0 H
Transmit Freq Error	19.547 kł	Hz OBW Powe	r 99	0.00 %	
x dB Bandwidth	5.140 MH	Hz xdB	-26.	00 dB	
SĞ			STATU		

### LTE B12(17)\_5 M\_OBW\_Mid\_256QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BV	/						
RL      RF      50 Ω      Ac        Center Freq 707.500000      Ac      A	MHz #IFGain:Low	SENSE:INT Center Freq: 707.6 Trig: Free Run #Atten: 20 dB		ALIGN AUTO	Radio Sto	PMMar 04, 2024 d: None vice: BTS	Frequency
Ref Offset 26.6 c 0 dB/div Ref 40.00 dB				_			
og 30.0							Center Fre 707.500000 MH
0.0	minim	when when a second	willing	m			
0.00	/			- L			
0.0 mither war war war when a co					Marlinhow	menne	
enter 707.5 MHz					Spa	an 20 MHz	CF Ste 2.000000 MH Auto Ma
Res BW 200 kHz		#VBW 820	) kHz			eep 1 ms	
Occupied Bandwid	<sup>th</sup> .9589 MH		Power	31.	5 dBm		Freq Offse 0 H
Transmit Freq Error x dB Bandwidth	14.788 k 9.964 M		Power		9.00 % .00 dB		
SG				STATU	JS		

### LTE B12(17)\_10 M\_OBW\_Mid\_QPSK\_FullRB



Agilent Spectrum Analyzer - Occupied BW	1			1			- 6
RL      RF      50 Ω      AC        Center Freq 707.500000      ASS      ASS	MHz #IFGain:Low		707.500000 MHz un Avg H	ALIGN AUTO Z łold: 500/500	Radio Der		Frequency
Ref Offset 26.6 d 0 dB/div Ref 40.00 dBn							
000 20.0							Center Fre 707.500000 MH
10.0	partition	man man	Langenty	rmany			
10.0	/			- hay	1.0x848		
20.0 30.0					whitness	a man	
50.0							CF Ste 2.000000 MH
Center 707.5 MHz Res BW 200 kHz		#VBW	#VBW 820 kHz			an 20 MHz eep 1 ms	<u>Auto</u> Mar
Occupied Bandwidt 8.	T. Iz	otal Power	30.4	4 dBm		Freq Offset 0 Ha	
Transmit Freq Error	40.005 k		BW Power	99	99.00 %		
x dB Bandwidth	9.885 M	Hz x	dB	-26.	.00 dB		
SG				STATU	-		

### LTE B12(17)\_10 M\_OBW\_Mid\_16QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BW							
RL      RF      50 Ω      AC        Center Freq 707.500000      A      A      A        PASS      A      A      A      A	MHz #IFGain:Low		07.500000 MHz	align Auto	Radio Std: Radio Devi		Frequency
Ref Offset 26.6 d 10 dB/div Ref 40.00 dBr							
20.0							Center Free 707.500000 MH
10.0	minim	mohan	Ar Manman	nh. ]			
10.0				4			
20.0 30.0 40.0				- VY	hataman	whilming	
50.0							CF Ster 2.000000 MH
Center 707.5 MHz #Res BW 200 kHz		#VBW 820 kHz			Span 20 MHz Sweep 1 ms		
Occupied Bandwidt 8.	<sup>h</sup> 9843 MI		Total Power				Freq Offset 0 Hz
Transmit Freq Error	25.103 k		W Power	99	99.00 %		
x dB Bandwidth	9.923 N	lHz x d	В	-26.	00 dB		
ISG				STATU	S		

### LTE B12(17)\_10 M\_OBW\_Mid\_64QAM\_FullRB



Agilent Spectrum Analyzer - Occupied BV	V							
RL      RF      50 R      AC        Center Freq 707.500000      AC      AC <thac<< th=""><th>MHz #IFGain:Low</th><th>Center</th><th>Freq: 707.50 ree Run : 20 dB</th><th>0000 MHz Avg Hold</th><th>ALIGN AUTO</th><th>Radio Std: Radio Devi</th><th></th><th>Frequency</th></thac<<>	MHz #IFGain:Low	Center	Freq: 707.50 ree Run : 20 dB	0000 MHz Avg Hold	ALIGN AUTO	Radio Std: Radio Devi		Frequency
Ref Offset 26.6 of 10 dB/div Ref 40.00 dB								l
20.0								Center Free 707.500000 MH
10.0	manan	n Then and	leve Markener	mennes	M			
0.00	d				1 h			
20.0 30.0 autorson autorson 40.0					Ju.	mmmhene	manhanna	
00								CF Ste 2.000000 MH
Center 707.5 MHz Res BW 200 kHz		#\	#VBW 820 kHz				n 20 MHz ep 1 ms	<u>Auto</u> Mai
Occupied Bandwid 8	Hz	Total F	ower	27.5 dBm			Freq Offset 0 Hz	
Transmit Freq Error	28.155	kHz	OBW F	ower	9	9.00 %		
x dB Bandwidth	9.990 N	<b>/Hz</b>	x dB		-26	.00 dB		
SG					STATL	IS		

## LTE B12(17)\_10 M\_OBW\_Mid\_256QAM\_FullRB



RL RF 50 Ω AC		SENSE:INT	ALIGN AUTO	03:06:07 PM Feb 29, 2024	and the second sec
enter Freq 5.01500000	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TYPE A WATCH A A A A A A	Frequency
dB/div Ref 10.00 dBm			Mk	r1 3.700 0 GHz -67.008 dBm	Auto Tun
°g2 0.002					Center Fre 5.015000000 GH
					Start Fre 30.000000 MH
0.0				RMS	Stop Fre 10.000000000 GH
tart 30 MHz Res BW 1.0 MHz	#VBV	V 3.0 MHz	Sweep 17	Stop 10.000 GHz .33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
	.700 0 GHz 700.0 MHz	-67.008 dBm -3.381 dBm	NCTION FORCION WIDTH		Freq Offso 0 H
6 7 8 9 9					
		-111-		+	

# LTE B12\_1.4M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB



	50 Ω AC	011-	SENSE:IN		ALIGN AUTO	03:09:02 PMF	eb 29, 2024	Frequency
enter Freq 5.01	5000000	PNO: Fast + IFGain:Low	Trig: Free Run #Atten: 20 dB	*****	rype. Kino	TYPE		
dB/div Ref 10.	00 dBm				Mł	r1 3.702 -67.158	0 GHz 8 dBm	Auto Tun
								Center Fre 5.015000000 GH
0.0 0.0 0.0								Start Fre 30.000000 Mi
0.0							RMS	Stop Fre 10.00000000 GF
tart 30 MHz Res BW 1.0 MHz		#VB	W 3.0 MHz	FUNCTION	Sweep 17	Stop 10.0 .33 ms (200	001 pts)	CF Ste 997.000000 MH Auto Ma
1 N 1 f 2 N 1 f	× 3.	702 0 GHz 707.5 MHz	-67.158 dBm -3.239 dBm	FUNCTION	FUNCTION WIDTH	PONCTION	E	Freq Offs 0 H
5								
4 5 6 7 8 9 9 0 0								

# LTE B12\_1.4M\_Conducted Spurious(30 M-10 G)\_Mid\_QPSK\_1RB



Frequency	03:11:36 PM Feb 29, 2024	ALIGN AUTO		SENSE:IN				RF	RL
	TRACE 23450 TYPE A WAYNAND DET A A A A A A	Type: RMS		Trig: Free Run #Atten: 20 dB	NO: Fast	1.00	5.01500	Freq 5	ente
Auto Tur	3.710 9 GHz -66.982 dBm	Mk				Bm	f 10.00 d		dB/d
Center Fre 5.015000000 GF								<sup>2</sup>	<b>99</b> 1.00 0.0
Start Fre 30.000000 MH									0.0 — 0.0 —
Stop Fre 10.000000000 GF	RMS	~~~~~						an a	0.0 0.0 0.0
CF Ste 997.000000 MH Auto Ma	top 10.000 GHz 3 ms (20001 pts)			3.0 MHz	#VBW			0 MHz W 1.0 N	Res
Freq Offse 0 H	FUNCTION VALUE	FUNCTION WIDTH	FUNCTION	¥ 66.982 dBm -3.400 dBm	9 GHz .4 MHz	× 3.71 71		TRC SCL 1 f 1 f	
								لل ک ک ک ک ک ک ک	6 7 8 9 0
-									1
		STATUS							G

## LTE B12\_1.4M\_Conducted Spurious(30 M-10 G)\_High\_QPSK\_1RB



RL   RF   50 Ω AC		SENSE:INT	ALIGN AUTO	03:13:52 PM Feb 29, 2024	Frequency
enter Freq 5.0150000	00 GHZ PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARKAN DET A A A A A A	
0 dB/div Ref 10.00 dBn	n		Mł	r1 3.712 4 GHz -66.948 dBm	Auto Tun
					Center Fre 5.015000000 GH
40.0 50.0					Start Fre 30.000000 MH
50.0 70.0 80.0				FMS	Stop Fre 10.000000000 GH
Res BW 1.0 MHz		V 3.0 MHz	Sweep 17	Stop 10.000 GHz .33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
1 N 1 f 2 N 1 f 3 4 5	X 3.712 4 GHz 700.0 MHz	-66.948 dBm -3.059 dBm			Freq Offse 0 H
6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					
		-111 -			

### LTE B12\_3 M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB



Agilent Spectrum Analyzer - Swept SA        RL      RF      50 Ω      AC		SENSE:INT	ALIGN AUTO	03:16:27 PM Feb 29, 2024	
enter Freq 5.01500000	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WAAAAAA DET A A A A A A	Frequency
0 dB/div Ref 10.00 dBm			Mk	r1 3.687 0 GHz -66.909 dBm	Auto Tun
og 					Center Fre 5.015000000 GH
					Start Fre 30.000000 MH
				RMS	Stop Fre 10.000000000 GF
tart 30 MHz Res BW 1.0 MHz		V 3.0 MHz		Stop 10.000 GHz 33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
KR MODE TRC SCL X 1 N 1 f 2 N 1 f 3 4 4 5 6	3.687 0 GHz 707.0 MHz	Y FU -66.909 dBm -3.550 dBm	INCTION FUNCTION WDTH	FUNCTION VALUE	Freq Offs 0 F

## LTE B12\_3 M\_Conducted Spurious(30 M-10 G)\_Mid\_QPSK\_1RB



RL RF 50 Ω A		SENSE:INT	ALIGN AUTO	03:19:01 PM Feb 29, 2024	Frequency
enter Freq 5.0150000	PNO: Fast ++ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWWWW DET A A A A A A	
dB/div Ref 10.00 dB	m		Mk	r1 3.703 9 GHz -67.126 dBm	Auto Tun
2 0 0 0 0 0 0 0 0 0 0 0 0 0					Center Fre 5.015000000 GH
0.0					Start Fre 30.000000 MH
				RMS	Stop Fre 10.000000000 GH
art 30 MHz tes BW 1.0 MHz		3.0 MHz		Stop 10.000 GHz .33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
R MODE TRC SCL N 1 f N 1 f A 1 f	X 3.703 9 GHz 716.4 MHz	-67.126 dBm -3.735 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offs
5 6 7 8 9 9 9 9 0					
a		111 -	STATU	· · · ·	

## LTE B12\_3 M\_Conducted Spurious(30 M-10 G)\_High\_QPSK\_1RB



RL RF	50 Ω AC		SENSE:INT	ALIGN AUTO	03:21:17 PM Feb 29, 2024	Frequency
enter Freq 5.0	15000000	CHZ PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARAAAA DET A A A A A A A	
dB/div Ref 10	0.00 dBm			M	r1 3.696 5 GHz -67.043 dBm	Auto Tun
•g 0.00 0.0						Center Fre 5.015000000 GF
0.0						Start Fre 30.000000 MH
0.0	ومرود والمرود و	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			RMS	Stop Fre 10.000000000 GF
tart 30 MHz Res BW 1.0 MH		#VB\	W 3.0 MHz		Stop 10.000 GHz 33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
KR MODE TRC SCL 1 N 1 f 2 N 1 f 3 4	× 3.	696 5 GHz 700.0 MHz	F -67.043 dBm -3.499 dBm	UNCTION FUNCTION WIDTH	PUNCTION VALUE	Freq Offs
5 6 7 8 9 9						
			m			

### LTE B12(17)\_5 M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB



		2 AC			SENSE:INT		ALIGN AUTO		4 Feb 29, 2024	Frequency
enter Fred	5.0150	00000	PNO: Fast IFGain:Low		Free Run n: 20 dB	#Avg Typ	be: RMS	TYP	<b>1 2 3 4 5 6</b> A <b>WANNANA</b> T A A A A A A A	
0 dB/div R	ef 10.00	dBm					M	(r1 3.736 -67.31	3 GHz 4 dBm	Auto Tun
og 0.00 ↓2 10.0										Center Fre 5.015000000 GF
10.0 10.0 10.0										Start Fre 30.000000 MF
50.0 70.0 50.0	-			1			-		RMS	Stop Fre 10.000000000 GF
tart 30 MH: Res BW 1.0	) MHz		#VB	W 3.0 M				Stop 10. .33 ms (20	0001 pts)	CF Ste 997,000000 MH Auto Ma
KR MODE TRC S	f	× 3.	736 3 GHz 706.0 MHz	-67.314 -3.44		INCTION FO	NCTION WIDTH	FUNCTIO	N VALUE	Freq Offs 0 H
6 7 8 9										
11 <b></b>							STATU	51	- <b>,</b> 7	

### LTE B12(17)\_5 M\_Conducted Spurious(30 M-10 G)\_Mid\_QPSK\_1RB



RL RF 50 Ω A		SENSE:INT	ALIGN AUTO	03:26:21 PM Feb 29, 2024	Frequency
enter Freq 5.0150000	OO GHz PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 123450 TYPE A WARMAN DET A A A A A A	
0 dB/div Ref 10.00 dBr	n		M	kr1 3.673 5 GHz -67.225 dBm	Auto Tun
					Center Fre 5.015000000 GH
					Start Fre 30.000000 MH
50.0 70.0 50.0				RMS	Stop Fre 10.000000000 GH
tart 30 MHz Res BW 1.0 MHz		V 3.0 MHz		Stop 10.000 GHz 7.33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
1 N 1 f 2 N 1 f 3 4	X 3.673 5 GHz 716.4 MHz	-67.225 dBm -3.371 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offso 0 F
5 6 7 8 9 9					
		m	STATL		

## LTE B12(17)\_5 M\_Conducted Spurious(30 M-10 G)\_High\_QPSK\_1RB



RL RF 50 Ω AC		SENSE:INT	ALIGN AUTO	03:28:37 PM Feb 29, 2024	Frequency
enter Freq 5.0150000	DO GHZ PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARKEN DET A A A A A A	
0 dB/div Ref 10.00 dBm			M	r1 3.708 9 GHz -66.917 dBm	Auto Tun
• <b>9</b> 0.00 10.0 20.0					Center Fre 5.015000000 GH
40.0 50.0					Start Fre 30.000000 MH
50.0 70.0 80.0				FMS	Stop Fre 10.000000000 GH
tart 30 MHz Res BW 1.0 MHz		V 3.0 MHz		Stop 10.000 GHz /.33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
MKR MODE TRC SCL 3	3.708 9 GHz 700.0 MHz	Y FU -66.917 dBm -3.189 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse
6 7 8 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					
11 sg		m	STATU		

### LTE B12(17)\_10 M\_Conducted Spurious(30 M-10 G)\_Low\_QPSK\_1RB



RL RF 50 Ω AC		SENSE:INT	ALIGN AUTO	03:31:03 PM Feb 29, 2024	Frequency
enter Freq 5.01500000	O GHz PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARMAN DET A A A A A A	
dB/div Ref 10.00 dBm			M	(r1 3.704 9 GHz -67.178 dBm	Auto Tun
					Center Fre 5.015000000 GH
0.0 0.0 0.0					Start Fre 30.000000 MH
				FMS	Stop Fre 10.000000000 GF
art 30 MHz Res BW 1.0 MHz	#VBW	/ 3.0 MHz		Stop 10.000 GHz .33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
R MODE TRC SCL X	8.704 9 GHz 703.5 MHz	Y F -67.178 dBm -3.487 dBm	UNCTION FUNCTION WDTH	FUNCTION VALUE	Freq Offs
		111		, *	

# LTE B12(17)\_10 M\_Conducted Spurious(30 M-10 G)\_Mid\_QPSK\_1RB



Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC		SENSE:INT	ALIGN AUTO	03:33:38 PM Feb 29, 2024	
enter Freq 5.01500000	CHZ PNO: Fast ↔ IFGain:Low		#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARMAN DET A A A A A A	Frequency
0 dB/div Ref 10.00 dBm			Mk	r1 3.698 0 GHz -67.103 dBm	Auto Tun
•9 0.00 00.00					Center Fre 5.015000000 GH
					Start Fre 30.000000 MH
				FMS	Stop Fre 10.000000000 GF
tart 30 MHz Res BW 1.0 MHz	#VBV	/ 3.0 MHz		Stop 10.000 GHz 33 ms (20001 pts)	CF Ste 997.000000 MH Auto Ma
IN      I      f      3.        2      N      1      f      3.        3	698 0 GHz 715.9 MHz	Y FU -67.103 dBm -3.309 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse 0 H
5 6 7 8 9 9					
		- 111 -	STATUS	<b>,</b> ,	

## LTE B12(17)\_10 M\_Conducted Spurious(30 M-10 G)\_High\_QPSK\_1RB



0 0		Station Station			ctrum Analyzer - Swept SA	
Frequency	03:05:54 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WARANA A DET A A A A A A A	ALIGN AUTO #Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB	PNO: Wide	RF 50 Ω AC req 698.000000 N	Center F
Auto Tun	1 697.964 MHz -47.856 dBm	Mkr			Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 698.000000 MH						16.6
Start Fre 696.000000 MH						6,60 -3.40
Stop Fre 700.000000 MH	-13.00 dBm					-13.4
CF Stej 400.000 kH Auto Ma	Note Carlos Contraction					-33.4
Freq Offse 0 H			WWWWWWWWWW	www.www.www.www.	and the state of the	-53.4
	Span 4.000 MHz				98.000 MHz	-63.4
	1.000 s (1001 pts)	#Sweep	300 kHz	#VBW 3		#Res BW
		STATUS				ASG

## LTE B12\_1.4M\_Band Edge\_Low\_QPSK\_1RB



					Agilent Spectrum Analyzer - Swept S
Frequency	03:05:10 PM Feb 29, 2024 TRACE 1 2 3 4 5 6 TYPE A 40000000 DET A A A A A A	ALIGN AUTO #Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB		x RL RF 50 Ω Center Freq 698.0000
Auto Tun	1 698.000 MHz -35.356 dBm	Mkr		.6 dB	Ref Offset 26.6 IO dB/div Ref 26.60 dB
Center Fre 698.000000 MH	RMS				16.6
Start Fre 696.000000 MH					3.40
Stop Fre 700.000000 MH	-13.00 dBm				13.4
CF Ste 400.000 kH <u>Auto</u> Ma			1		33.4
Freq Offse 0 H					53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sweep	300 kHz	#VBW :	63.4 Center 698.000 MHz #Res BW 100 kHz
		STATUS			ISG

### LTE B12\_1.4M\_Band Edge\_Low\_QPSK\_FullRB



	120000000000000000000000000000000000000	the second second			trum Analyzer - Swept SA	
Frequency	03:05:29 PM Feb 29, 2024 TRACE 2 3 4 5 0 TYPE A WAYNOW DET A A A A A A	ALIGN AUTO #Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB	NHZ PNO: Wide ↔→ IFGain:Low	RF 50 Ω AC req 692.000000 N	Center F
Auto Tun	1 695.584 MHz -53.532 dBm	Mk			Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 692.000000 MH						16.6
Start Fre 688.000000 MH						6,60 3.40
Stop Fre 696.000000 MH	-13.00 dBm					13.4 23.4
CF Ste 800.000 kH Auto Ma						33.4
Freq Offse 0 H	1 RMS		an an an air an	erer	ana da ana ana ana da ana ana	53.4
	Stop 696.000 MHz 1.000 s (1001 pts)	#Sween	300 kHz	#VBW	000 MHz 100 kHz	
		STATUS				ISG

#### LTE B12\_1.4M\_Extended Band Edge\_Low\_QPSK\_FullRB



0 0	03:11:02 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	rum Analyzer - Swept SA RF 50 Ω AC	RL RL
Frequency	TYPE A AAAAA	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	eq 716.050000 MHz PNO: Wide ++- IFGain:Low	Center Fr
Auto Tur	716.001 7 MHz -17.118 dBm	Mkr1		Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 716.050000 MH					16.6
Start Fre 716.000000 MH					5,60 3:40
Stop Fre 716.100000 MH			المتعاصين المحافظ والمحافظ والمحافظ	Not many the post of the many the second second	13.4
CF Ste 10.000 kF Auto Ma	RMS anti-anti-anti-anti-anti-anti-anti-anti-	fanden of fan it nam fille fan weigen oer fielde fi			i3.4
Freq Offs 0 F					3.4
	op 716.10000 MHz 1.000 s (1001 pts)	Sto #Sween	100 kHz	10000 MHz 10 kHz #VBW	63.4 Start 716.0
		STATUS			SG

## LTE B12\_1.4M\_Band Edge\_High\_QPSK\_1RB(1)



0 8 🐱		1110110100	orace rare		RE 50 Q AC	RL RL
Frequency	03:11:22 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WAYNEW DET A A A A A A	#Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB	PNO: Wide	RF 50 Ω AC eq 717.050000 M	
Auto Tune	716.101 9 MHz -22.036 dBm	Mkr1			Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Free 717.050000 MH						16.6
Start Free 716.100000 MH						6,60 3.40
Stop Free 718.000000 MH	-13.00 dBm					13.4
CF Stej 190.000 kH Auto Ma					Non a standard and a standard as	33.4
Freq Offse 0 H	RMS BAS	en en rectratide de la televisie p	however in the state of the second second	manager was the fight of the		-43.4
	top 718.0000 MHz	s			000 MHz	63.4 Start 716.
	1.000 s (1001 pts)	#Sweep	300 kHz	#VBW 3	00 kHz	Res BW

## LTE B12\_1.4M\_Band Edge\_High\_QPSK\_1RB(2)



0 0 2	03:10:15 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	7 1 3	RF 50 Ω AC	RL
Frequency	TYPE A WAAAAAA	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	PNO: Wide +++ IFGain:Low	req 716.000000 N	Center F
Auto Tun	1 716.000 MHz -16.336 dBm	Mkr			Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 716.000000 MH			~			16.6
Start Fre 714.000000 MF						5,60 3.40
Stop Fre 718.000000 MH	-13.00 d9m		1			13.4
CF Ste 400.000 kH Auto Ma	RMS					13.4
Freq Offs 0 F						53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sween	800 kHz	#VBW:	6.000 MHz 100 kHz	
	note S (1001 prs)	STATUS		<i></i>		SG

# LTE B12\_1.4M\_Band Edge\_High\_QPSK\_FullRB



				trum Analyzer - Swept SA	
Frequency	03:10:34 PM Feb 29, 2024	#Avg Type: RMS	SENSE:INT	RF 50 Ω AC req 722.000000 MHz	
	TRACE 123456 TYPE A WANNALD DET A A A A A A A		Trig: Free Run #Atten: 20 dB	PNO: Wide IFGain:Low	senter rreq
Auto Tun	1 718.016 MHz -49.404 dBm	Mkr		Ref Offset 26.6 dB Ref 26.60 dBm	Ref 0 dB/div Ref
Center Fre 722.000000 MH					16.6
Start Fre 718.000000 MH					3,40
Stop Fre 726.000000 MH	-13.00 dBm				13.4
CF Ste 800.000 kH Auto Ma					43.4
Freq Offse 0 H	RMS	de la constance	ana	al fange fan en skielen en ander an skielen en ander andere andere andere andere andere andere andere andere an	53.4
	Stop 726.000 MHz		200 111-		63.4 Start 718.000
	1.000 s (1001 pts)	#Sweep	300 kHz	100 KHZ #VBW	Res BW 100

## LTE B12\_1.4M\_Extended Band Edge\_High\_QPSK\_FullRB



				n Analyzer - Swept SA	
Frequency	03:13:37 PM Feb 29, 2024 TRACE 2 3 4 5 6 TYPE A WARNAW DET A A A A A A	ALIGN AUTO #Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB	RF 50 Ω AC q 698.000000 MHz PNO: Wide → IFGain:Low	enter Fi
Auto Tur	1 697.976 MHz -43.177 dBm	Mki		tef Offset 26.6 dB tef 26.60 dBm	0 dB/div
Center Fre 698.000000 MH					16.6
Start Fre 696.000000 MF					5.60 1.40
Stop Fre 700.000000 MH	-13.00 dBm				13.4 <del></del> 23.4
CF Ste 400.000 kF Auto Ma	North Party		<b>↓</b> 1		i3.4
Freq Offs 0 F			and the second s	u	53.4 
	Span 4.000 MHz 1.000 s (1001 pts)	#Sweep	300 kHz		enter 69
		STATUS			SG

#### LTE B12\_3 M\_Band Edge\_Low\_QPSK\_1RB



	03:12:54 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	ctrum Analyzer - Swept SA RF 50 Ω AC	
Frequency	TYPE A WAAAAAA	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	req 698.000000 MHz PNO: Wide IFGain:Low	Center Freq 6
Auto Tun	1 697.984 MHz -30.577 dBm	Mkr		Ref Offset 26.6 dB Ref 26.60 dBm	
Center Fre 698.000000 MH	RMS				16.6
Start Fre 696.000000 MH					3.40
Stop Fre 700.000000 MH	-13.00 dBm				13.4
CF Ste 400.000 kH Auto Ma			Northeast and the state of the		43.4
Freq Offso 0 H					53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sweep	300 kHz		63.4 Center 698.000 #Res BW 100 I
		STATUS			ISG

#### LTE B12\_3 M\_Band Edge\_Low\_QPSK\_FullRB



0.0	03:13:13 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	trum Analyzer - Swept SA RF 50 Ω AC
Frequency	TRACE 1 2 3 4 5 0 TYPE A WWWWWW DET A A A A A A	#Avg Type: RMS		req 692.000000 MHz PNO: Wide IFGain:Low
Auto Tun	r1 696.000 MHz -40.364 dBm	Mk		Ref Offset 26.6 dB Ref 26.60 dBm
Center Fre 692.000000 MH				
Start Fre 688.000000 MH				
Stop Fre 696.000000 MH	-13.00 dBm			
CF Ste 800.000 kH Auto Ma	1 RM			
Freq Offso 0 H				
	Stop 696.000 MHz			000 MHz
	1.000 s (1001 pts)	#Sweep	300 kHz	
		STATUS		

#### LTE B12\_3 M\_Extended Band Edge\_Low\_QPSK\_FullRB



	03:18:27 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	2 1 2	trum Analyzer - Swept SA RF 50 Ω AC	RL
Frequency	TRACE 123450 TYPE A WARKANN DET A A A A A A A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	PNO: Wide +++ IFGain:Low	req 716.050000 M	Center F
Auto Tun	716.001 1 MHz -20.357 dBm	Mkr1			Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 716.050000 MH						16.6
Start Fre 716.000000 MH						6,60 3:40
Stop Fre 716.100000 MH	-13.00 dBm			Norther angeland the states of the	Matsdameter	13.4 23.4
CF Stej 10.000 kH Auto Ma	RMS	New of the second state and the second state of the second state of the second state of the second state of the	HAT-Shallon gord Sala and the	and the second sec		33.4
Freq Offse 0 H						53.4 ——
	op 716.10000 MHz 1.000 s (1001 pts)	Sto #Sweep	100 kHz	#VBW	00000 MHz 30 KHz	63 4 Start 716 #Res BW
-		STATUS				ISG

## LTE B12\_3 M\_Band Edge\_High\_QPSK\_1RB(1)



- 8 2					trum Analyzer - Swept SA	
Frequency	03:18:48 PM Feb 29, 2024 TRACE 1 2 3 4 5 6 TYPE A WATTER	#Avg Type: RMS	SENSE:INT	NHZ PNO: Wide	RF 50 Ω AC req 717.050000 N	Center F
Auto Tun	716.101 9 MHz -24.973 dBm	Mkr1	#Atten: 20 dB	IFGain:Low	Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 717.050000 MH						16.6
Start Fre 716.100000 MH						6,60 3.40
Stop Fre 718.000000 MH	-13.00 dBm					13.4
CF Ste 190.000 kH Auto Ma					hard the second	33.4
Freq Offso 0 H	RMS	hales loten la stranger		manand an owner with		53.4
	Stop 718.0000 MHz 1.000 s (1001 pts)	S #Sweep	300 kHz	#VBW (	1000 MHz 100 kHz	63.4 Start 716. #Res BW
		STATUS				ISG

## LTE B12\_3 M\_Band Edge\_High\_QPSK\_1RB(2)



- 6	03:17:40 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	nalyzer - Swept SA 50 Ω AC	RL RL
Frequency	TYPE A WAAAAAA	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	716.000000 MHz PNO: Wide IFGain:Low	Center Fr
Auto Tur	1 716.000 MHz -18.357 dBm	Mkı		Ref Offset 26.6 dB v Ref 26.60 dBm	
Center Fre 716.000000 MH					16.6
Start Fre 714.000000 MH					6,60 3.40
Stop Fre 718.000000 M⊦	-13.00 dBm		1-		13.4
CF Ste 400.000 kH Auto Ma	FMS				33.4
Freq Offs 0 F					53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sweep	300 kHz	0 MHz kHz #VBW	Center 71
		STATUS			ISG

## LTE B12\_3 M\_Band Edge\_High\_QPSK\_FullRB



				m Analyzer - Swept SA	
Frequency	03:18:00 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WAYNE	#Avg Type: RMS	SENSE:INT	RF 50 Ω AC q 722.000000 MHz PNO: Wide ↔	
Auto Tune	1 718.312 MHz -34.456 dBm	Mk	#Atten: 20 dB	IFGain:Low Ref Offset 26.6 dB Ref 26.60 dBm	Re 10 dB/div Re
Center Free 722.000000 MH					16.6
Start Free 718.000000 MH					6.60 3.40
Stop Free 726.000000 MH	-13.00 dBm				13.4
CF Step 800.000 kH Auto Mar					33.4
Freq Offso 0 H	RMS				53.4
	Stop 726.000 MHz 1.000 s (1001 pts)	#Sween	300 kHz		534 Start 718.000 #Res BW 100
-		STATUS			ISG

## LTE B12\_3 M\_Extended Band Edge\_High\_QPSK\_FullRB



Frequency	03:21:04 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	1 1	ctrum Analyzer - Swept SA RF 50 Ω AC	RL
	TRACE 23450 TYPE A WARAAAA DET A A A A A A A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	NHZ PNO: Wide ↔ IFGain:Low	req 698.000000 N	Center F
Auto Tun	1 697.184 MHz -43.320 dBm	Mki			Ref Offset 26.6 dB Ref 26.60 dBm	I0 dB/div
Center Fre 698.000000 MH	$\bigcirc -$					16.6
Start Fre 696.000000 MH	FIMS					6,60 3:40
Stop Fre 700.000000 MH	-113.00 dBm					13.4
CF Ste 400.000 kH Auto Ma				<b>↓</b> 1		33.4
Freq Offse 0 H		Landan	and an and a second descent descent descent descent descent descent descent descent descent des des des des des			53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#6₩200	300 kHz	#\/B\A(	98.000 MHz	Center 69
-		#Sweep	500 KH2	#VDVV	100 KH2	ISG

#### LTE B12(17)\_5 M\_Band Edge\_Low\_QPSK\_1RB



						trum Analyzer - Swept SA	
Frequency	20:19 PM Feb 29, 2024 TRACE 1 2 3 4 5 6 TYPE A WATTERN DET A A A A A A A	LIGN AUTO	#Avg Typ	SENSE:INT Trig: Free Run #Atten: 20 dB	PNO: Wide	RF 50 Ω AC req 698.000000 N	Center F
Auto Tun	98.000 MHz 31.155 dBm	Mkr				Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 698.000000 MH							16.6
Start Fre 696.000000 MH	RUNS - Arrow -						6,60 3.40
Stop Fre 700.000000 MH	-13.00 dBm						13.4
CF Ste 400.000 kH <u>Auto</u> Ma				1	and the simple control of		33.4
Freq Offse 0 H							53.4 ——
	oan 4.000 MHz 00 s (1001 pts)	#Sweep		300 kHz	#VBW:	8.000 MHz 100 kHz	Center 69
		STATUS					ISG

## LTE B12(17)\_5 M\_Band Edge\_Low\_QPSK\_FullRB



- 6				ctrum Analyzer - Swept SA	
Frequency	03:20:38 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WAXAAN DET A A A A A A A	#Avg Type: RMS	SENSE:INT	RF      50 Ω      AC        req 692.000000 MHz      PNO: Wide ↔	enter Fr
Auto Tun	1 695.976 MHz -33.986 dBm	Mki	#Atten: 20 dB	Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 692.000000 MH					16.6
Start Fre 688.000000 MH					i,60 .40
Stop Fre 696.000000 MH	-13.00 dBm				23.4
CF Ste 800.000 kH Auto Ma	1 RMA				13.4
Freq Offso 0 F					i3.4
	Stop 696.000 MHz 1.000 s (1001 pts)	#Sween	300 kHz	.000 MHz 100 kHz #VBW	53.4 tart 688.0 Res BW
	note sitter pis)	STATUS	000 KH12	100 Mile #VDVV	SG

#### LTE B12(17)\_5 M\_Extended Band Edge\_Low\_QPSK\_FullRB



0		-		trum Analyzer - Swept SA	
Frequency	03:25:48 PM Feb 29, 2024 TRACE 2 3 4 5 6 TYPE A WHAT	#Avg Type: RMS	SENSE:INT	RF 50 Ω AC req 716.050000 MHz PNO: Wide ↔	Center F
Auto Tur	716.001 9 MHz -23.659 dBm	Mkr1	#Atten: 20 dB	IFGain:Low Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 716.050000 MH					16.6
Start Fre 716.000000 MF					40
Stop Fre 716.100000 MH	-13.00 dBm				13.4 1 23.4 Whowneys
CF Ste 10.000 kH Auto Ma	RMS	nananananaka jartenain askanja	marian and a second and a second and a second a	an a	i3.4
Freq Offs 0 F					i3.4
	op 716.10000 MHz 1.000 s (1001 pts)	St #Sweep	100 kHz	00000 MHz 30 kHz #VBW	53.4 Start 716. Res BW
		STATUS		-	SG

## LTE B12(17)\_5 M\_Band Edge\_High\_QPSK\_1RB(1)



0 6 2	03:26:07 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT		ctrum Analyzer - Swept SA RF 50 Ω AC	Agilent Spe
Frequency	TRACE 1 2 3 4 5 6 TYPE A WARMAN DET A A A A A A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB		req 717.050000 M	
Auto Tur	716.101 9 MHz -28.067 dBm	Mkr1		dB 3m	Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 717.050000 MH						16.6
Start Fre 716.100000 MF						5.60 3.40
Stop Fre 718.000000 M⊦	-13.00 dBm					13.4 23.4 <b>1</b> —
CF Ste 190.000 kH Auto Ma					Non and a second second	33.4 43.4
Freq Offse 0 H	RMS	alamaterinden manastereideligen	h phaisparket addentionally	mark of mark in the second	and the second second	53.4
	top 718.0000 MHz	S			1000 MHz	
	1.000 s (1001 pts)	#Sweep	300 kHz	#VBW	100 kHz	Res BW

## LTE B12(17)\_5 M\_Band Edge\_High\_QPSK\_1RB(2)



Frequency	03:25:00 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	7. 1. 2	trum Analyzer - Swept SA RF 50 Ω AC	RL
	TRACE 1 2 3 4 5 6 TYPE A WARKANN DET A A A A A A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	PNO: Wide	req 716.000000 N	Center F
Auto Tur	1 716.012 MHz -23.069 dBm	Mki			Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 716.000000 MF						16.6
Start Fre 714.000000 MF						5.60 3.40
Stop Fre 718.000000 MH	-13.00 dBm		1			13.4
CF Ste 400.000 kH Auto Ma	RME	and the second				3.4
Freq Offs 0 H						i3.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Swoon	300 KH2	#VBW 3	6.000 MHz 100 kHz	
-		STATUS	500 KHZ	<b>77 D 44</b>	100 112	SG

## LTE B12(17)\_5 M\_Band Edge\_High\_QPSK\_FullRB



			I in the second second	Agilent Spectrum Analyzer - Swept SA
Frequency	03:25:20 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WAYNOW DET A A A A A A	#Avg Type: RMS	Z NO: Wide Trig: Free Run Gain:Low #Atten: 20 dB	x RL RF 50 Ω AC Center Freq 722.000000 M
Auto Tune	1 718.024 MHz -35.877 dBm	Mk		Ref Offset 26.6 dB
Center Free 722.000000 MH				16.6
Start Free 718.000000 MH				3.40
Stop Free 726.000000 MH:	-13.00 dBm			13.4
CF Step 800.000 kH Auto Mar				33 4
Freq Offse 0 H	RMS			53.4
	Stop 726.000 MHz 1.000 s (1001 pts)	#Sweep	#VBW 300 kHz	63 4 Start 718.000 MHz #Res BW 100 kHz
		STATUS		ISG

## LTE B12(17)\_5 M\_Extended Band Edge\_High\_QPSK\_FullRB



Agilent Spectrum Analyzer - Swep RL RF 50 Ω	AC	SENSE:INT	ALIGN AUTO	03:28:23 PM Feb 29, 2024	Frequency
Center Freq 698.000	PNO: Wide +++ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WARKANN DET A A A A A A	
Ref Offset 26 0 dB/div Ref 26.60 c	6 dB IBm		Mk	1 697.968 MHz -52.682 dBm	Auto Tun
16.6				RMS	Center Fre 698.000000 MH
3.40					Start Fre 696.000000 MH
23.4			/	-13.00 abr	Stop Fre 700.000000 MH
43.4					CF Ste 400.000 kH Auto Ma
53.4	hanna an Indiana an	1			Freq Offse 0 H
63.4 Center 698.000 MHz				Span 4.000 MHz	
Res BW 100 kHz	#VBW	300 kHz	#Sweep	1.000 s (1001 pts)	

## LTE B12(17)\_10 M\_Band Edge\_Low\_QPSK\_1RB



- 6	03:27:39 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	trum Analyzer - Swept SA RF 50 Ω AC	RL
Frequency	TYPE A WARAAAAA	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	req 698.000000 MHz PNO: Wide ++- IFGain:Low	Center Fr
Auto Tun	1 697.872 MHz -30.800 dBm	Mki		Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Fre 698.000000 MH					16.6
Start Fre 696.000000 MH	RMS				6,60 3.40
Stop Fre 700.000000 M⊦	13.00 dBm				13.4
CF Ste 400.000 kH Auto Ma			<u> </u>	an a	33 4 <b></b>
Freq Offs 0 F					53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sween	300 kHz	8.000 MHz	63.4 Center 69 #Res BW
-		#Sweep	500 KH2	#VBW	ISG

#### LTE B12(17)\_10 M\_Band Edge\_Low\_QPSK\_FullRB



- 6 2	03:27:58 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	rtrum Analyzer - Swept SA RF 50 Ω AC	Agilent Spectr
Frequency	TRACE 1 2 3 4 5 0 TYPE A WARMAN	#Avg Type: RMS		req 692.000000 MHz PNO: Wide ↔ IFGain:Low	
Auto Tun	1 696.000 MHz -34.139 dBm	Mk		Ref Offset 26.6 dB Ref 26.60 dBm	10 dB/div
Center Free 692.000000 MH					16.6
Start Free 688.000000 MH					3.40
Stop Free 696.000000 MH	-13.00 dSm				13.4
CF Ste 800.000 kH Auto Ma	1 EM	and the second and the second s			33.4
Freq Offso 0 H					53.4
	Stop 696.000 MHz 1.000 s (1001 pts)	#Sween	300 kHz		63.4 Start 688.0 #Res BW 1
		STATUS			ISG

## LTE B12(17)\_10 M\_Extended Band Edge\_Low\_QPSK\_FullRB



- 5 - 2	in the second			trum Analyzer - Swept SA	
Frequency	03:33:05 PM Feb 29, 2024 TRACE 1 2 3 4 5 0 TYPE A WARKAN DET A A A A A A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	RF 50 Ω AC req 716.050000 MHz PNO: Wide ↔ IFGain:Low	Center Fi
Auto Tun	716.001 9 MHz -36.143 dBm	Mkr1		Ref Offset 26.6 dB (div Ref 26.60 dBm	
Center Fre 716.050000 MH					-og 16.6
Start Fre 716.000000 MH					6,60 3.40
Stop Fre 716.100000 MH	-13.00 dBm				3.4 <b></b> 23.4 <b></b>
CF Ste 10.000 kH Auto Ma	RMS	and the sector of the sector o	Protoning for the log of the life of the l	Propert Byttom in provide and and a standard and a	13.4 13.4
Freq Offse 0 F					53.4
	op 716.10000 MHz 1.000 s (1001 pts)	Ste #Sweep	100 kHz	00000 MHz 30 kHz #VBW	
		STATUS			SG

## LTE B12(17)\_10 M\_Band Edge\_High\_QPSK\_1RB(1)



0	03:33:24 PM Feb 29, 2024	ALIGN AUTO	SENSE:INT	Analyzer - Swept SA RF 50 Ω AC	Agilent Spectr
Frequency	TRACE 1 2 3 4 5 0 TYPE A WARANA A	#Avg Type: RMS	Trig: Free Run #Atten: 20 dB	717.050000 MHz PNO: Wide + IFGain:Low	
Auto Tun	716.105 7 MHz -37.203 dBm	Mkr1		Ref Offset 26.6 dB (div Ref 26.60 dBm	
Center Fre 717.050000 MH					-og 16.6
Start Fre 716.100000 MH					6,60 3.40
<b>Stop Fre</b> 718.000000 MH	-13.00 dBm				13.4
CF Ste 190.000 kH Auto Ma					33.4 <b>1</b>
Freq Offse 0 H	RMS	مەر ئىرىمىلىرىلىرىكى بىرىكى بىرىكى بىرىكى بىرىكى بىرىكى قۇرىيى بىرىكى قۇرىيى بىرىكى بىرىكى بىرىكى قۇرىكى قۇرىكى يېرىلىرىكى بىرىكى بىر	******		53.4
	top 718.0000 MHz 1.000 s (1001 pts)	s #Sweep	300 kHz		63 4 Start 716.1 #Res BW 1
		STATUS			SG

## LTE B12(17)\_10 M\_Band Edge\_High\_QPSK\_1RB(2)



					ctrum Analyzer - Swept SA	
Frequency	03:32:17 PM Feb 29, 2024 TRACE 1 2 3 4 5 6 TYPE A WAYNEW DET A A A A A A	ALIGN AUTO #Avg Type: RMS	SENSE:INT Trig: Free Run #Atten: 20 dB	PNO: Wide	RF 50 Ω AC req 716.000000 N	Center F
Auto Tun	1 716.008 MHz -28.623 dBm	Mki			Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Fre 716.000000 MH						16.6
Start Fre 714.000000 MH						5,60 3,40
Stop Fre 718.000000 MH	-13.00 dBm		1-			13.4
CF Ste 400.000 kH Auto Ma	RMS	Yan ang mang dalaman yang mang mang mang mang kang dalaman yang mang mang mang mang mang mang mang m				33.4
Freq Offso 0 H						53.4
	Span 4.000 MHz 1.000 s (1001 pts)	#Sweep	300 kHz	#VBW 3	16.000 MHz 100 kHz	
		STATUS				ISG

## LTE B12(17)\_10 M\_Band Edge\_High\_QPSK\_FullRB



		and the second second		ctrum Analyzer - Swept SA	
Frequency	03:32:36 PM Feb 29, 2024 TRACE 1 2 3 4 5 0	#Avg Type: RMS	SENSE:INT	RF 50 Ω AC req 722.000000 MHz	enter Fi
				PNO: Wide +++ IFGain:Low	
Auto Tun	1 718.032 MHz -34.310 dBm	Mk		Ref Offset 26.6 dB Ref 26.60 dBm	0 dB/div
Center Free 722.000000 MH					16.6
Start Fre 718.000000 MH					6,60 3.40
Stop Fre 726.000000 MH	-13.00 dBm				13.4
CF Ste 800.000 kH Auto Ma			~		43.4
Freq Offso 0 H	RMS				i3.4 ———
	Stop 726.000 MHz 1.000 s (1001 pts)	#Sweep	/BW 300 kHz	000 MHz 100 kHz #VBW	tart 718.
		STATUS			SG

# LTE B12(17)\_10 M\_Extended Band Edge\_High\_QPSK\_FullRB



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

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

No.	Description
1	HCT-RF-2405-FC004-P