

# **TEST REPORT**

FCC Sub6 n66 Test for SM-S721B/DS

Certification

**APPLICANT** SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2407-FC064

**DATE OF ISSUE** July 24, 2024

**Tested by** Jae Mun Do

**Technical Manager**Jong Seok Lee

EMPT.

HCT CO., LTD.

Bongjai Huh / CEO



## HCT CO.,LTD.

2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401

## TEST REPORT

REPORT NO. HCT-RF-2407-FC064

DATE OF ISSUE July 24, 2024

Additional Model SM-S721B

Applicant	SAMSUNG Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name	Mobile Phone
Model Name	SM-S721B/DS
Date of Test	May 21, 2024 ~ July 24, 2024
FCC ID	A3LSMS721B
Location of Test	■ Permanent Testing Lab □ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggido, 17383 Republic of Korea)
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Test Standard Used	FCC Rule Part: § 27
Test Results	PASS

F-TP22-03 (Rev. 06) Page 2 of 228



#### **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	July 24, 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 Fs 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).

F-TP22-03 (Rev. 06) Page 3 of 228



## **CONTENTS**

1. GENERAL INFORMATION	5
1.1. MAXIMUM OUTPUT POWER	6
2. INTRODUCTION	8
2.1. DESCRIPTION OF EUT	8
2.2. MEASURING INSTRUMENT CALIBRATION	8
2.3. TEST FACILITY	8
3. DESCRIPTION OF TESTS	
3.1 TEST PROCEDURE	9
3.2 RADIATED POWER	
3.3 RADIATED SPURIOUS EMISSIONS	11
3.4 PEAK- TO- AVERAGE RATIO	
3.5 OCCUPIED BANDWIDTH	
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	
3.7 BAND EDGE	
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	
3.9 WORST CASE(RADIATED TEST)	
3.10 WORST CASE(CONDUCTED TEST)	
4. LIST OF TEST EQUIPMENT	
5. MEASUREMENT UNCERTAINTY	
6. SUMMARY OF TEST RESULTS	
7. SAMPLE CALCULATION	
8. TEST DATA (ANT A)	
8.1 EQUIVALENT ISOTROPIC RADIATED POWER	
8.2 RADIATED SPURIOUS EMISSIONS	
8.3 PEAK-TO-AVERAGE RATIO	
8.4 OCCUPIED BANDWIDTH	
8.5 CONDUCTED SPURIOUS EMISSIONS	
8.6 BAND EDGE	
8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	
9. TEST DATA (ANT F)	
9.1 EQUIVALENT ISOTROPIC RADIATED POWER	
9.2 RADIATED SPURIOUS EMISSIONS	
9.3 PEAK-TO-AVERAGE RATIO	43
9.4 OCCUPIED BANDWIDTH	
9.5 CONDUCTED SPURIOUS EMISSIONS	
8.6 BAND EDGE	
9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	
10. TEST PLOTS (ANT A)	
11. TEST PLOTS (ANT F)	
12 ANNEY A TEST SETUD DUOTO	220



## **MEASUREMENT REPORT**

## 1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Applicant Name.	
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.
	of Korea
FCC ID:	A3LSMS721B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-S721B/DS
Additional Model(s)	SM-S721B
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15, 20
Waveform:	CP-OFDM, DFT-S-OFDM
Madulatian.	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
Modulation:	CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
	1712.5 MHz – 1777.5 MHz (Sub6 n66(5 MHz))
T. F	1715.0 MHz - 1775.0 MHz (Sub6 n66(10 MHz))
Tx Frequency:	1717.5 MHz - 1772.5 MHz (Sub6 n66(15 MHz))
	1720.0 MHz - 1770.0 MHz (Sub6 n66(20 MHz))
Date(s) of Tests:	May 21, 2024 ~ July 24, 2024
Serial number:	Radiated: R3CX40LGCGM
	Conducted: R3CX503EC4V

F-TP22-03 (Rev. 06) Page 5 of 228



#### 1.1. MAXIMUM OUTPUT POWER

## ANT A

Mada	Ty Fraguency	Emission		EI	EIRP		
Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Max. Power (W)	Max. Power (dBm)		
		4M52G7D	PI/2 BPSK	0.171	22.32		
		4M51G7D	QPSK	0.168	22.26		
Sub6 n66 (5)	1712.5 - 1777.5	4M53W7D	16QAM	0.135	21.29		
		4M50W7D	64QAM	0.095	19.79		
		4M50W7D	256QAM	0.060	17.80		
		9M03G7D	PI/2 BPSK	0.170	22.30		
		9M01G7D	QPSK	0.168	22.26		
Sub6 n66 (10)	1715.0 - 1775.0	8M99W7D	16QAM	0.134	21.26		
		9M00W7D	64QAM	0.095	19.76		
		8M99W7D	256QAM	0.061	17.83		
		13M5G7D	PI/2 BPSK	0.168	22.26		
		13M5G7D	QPSK	0.166	22.19		
Sub6 n66 (15)	1717.5 - 1772.5	13M5W7D	16QAM	0.134	21.28		
		13M5W7D	64QAM	0.093	19.70		
		13M4W7D	256QAM	0.059	17.71		
		17M9G7D	PI/2 BPSK	0.169	22.28		
		18M0G7D	QPSK	0.164	22.14		
Sub6 n66 (20)	1720.0 - 1770.0	17M9W7D	16QAM	0.135	21.29		
		18M0W7D	64QAM	0.094	19.72		
		17M9W7D	256QAM	0.060	17.80		

F-TP22-03 (Rev. 06) Page 6 of 228



## **ANT F**

Mada	Ty Fragues ::	Emission		EIRP		
Mode (MHz)	•		Modulation	Max. Power	Max. Power	
				(W)	(dBm)	
		4M55G7D	PI/2 BPSK	0.115	20.61	
		4M52G7D	QPSK	0.114	20.56	
Sub6 n66 (5)	1712.5 - 1777.5	4M56W7D	16QAM	0.094	19.72	
		4M52W7D	64QAM	0.065	18.13	
		4M53W7D	256QAM	0.040	16.07	
		9M02G7D	PI/2 BPSK	0.119	20.77	
		9M00G7D	QPSK	0.118	20.72	
Sub6 n66 (10)	1715.0 - 1775.0	9M02W7D	16QAM	0.094	19.75	
		8M99W7D	64QAM	0.065	18.15	
		8M99W7D	256QAM	0.042	16.28	
		13M5G7D	PI/2 BPSK	0.119	20.75	
		13M5G7D	QPSK	0.118	20.72	
Sub6 n66 (15)	1717.5 - 1772.5	13M5W7D	16QAM	0.094	19.71	
		13M5W7D	64QAM	0.065	18.12	
		13M5W7D	256QAM	0.041	16.15	
		17M9G7D	PI/2 BPSK	0.119	20.75	
		17M9G7D	QPSK	0.118	20.72	
Sub6 n66 (20)	1720.0 - 1770.0	17M9W7D	16QAM	0.094	19.75	
,		17M9W7D	64QAM	0.067	18.23	
		17M9W7D	256QAM	0.043	16.33	

F-TP22-03 (Rev. 06) Page 7 of 228



## 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(ePA), BT LE(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.

F-TP22-03 (Rev. 06) Page 8 of 228



## 3. DESCRIPTION OF TESTS

## **3.1 TEST PROCEDURE**

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

F-TP22-03 (Rev. 06) Page 9 of 228



#### 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
- $3. VBW \ge 3 \times RBW$
- 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<sub>d</sub> is the dipole equivalent power and P<sub>g</sub> 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.

F-TP22-03 (Rev. 06) Page 10 of 228



#### 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 10th harmonics from 9 kHz.

#### **Test Note**

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

The spurious emissions is calculated by the following formula;

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

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

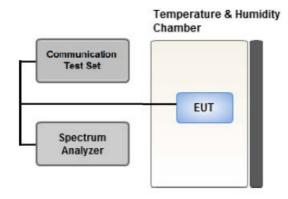
If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

EIRP (dBm) = ERP (dBm) + 2.15

F-TP22-03 (Rev. 06) Page 11 of 228



#### 3.4 PEAK- TO- AVERAGE RATIO



#### **Test setup**

#### ① CCDF Procedure for PAPR

#### **Test Settings**

- 1. Set resolution/measurement bandwidth ≥ 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  $_{(dB)} = P_{Pk}$   $_{(dBm)} - P_{Avg(dBm)}$  ( $P_{Avg} = Average Power + Duty cycle Factor)$ 

F-TP22-03 (Rev. 06) Page 12 of 228



## **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  $\geq 3 \times RBW$ .
- 3. Set span  $\geq 2 \times OBW$ .
- 4. Sweep time  $\geq 10 \times \text{(number of points in sweep)} \times \text{(transmission symbol period)}$ .
- 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.

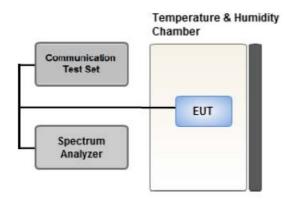
## **Test Settings(Average Power)**

- 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  $\geq [10 \times (number of points in sweep) \times (transmission period)]$  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 %.

F-TP22-03 (Rev. 06) Page 13 of 228



#### 3.5 OCCUPIED BANDWIDTH.



#### **Test setup**

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

The EUT makes a call to the communication simulator.

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

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

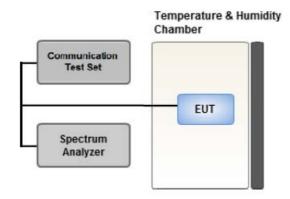
#### **Test Settings**

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

F-TP22-03 (Rev. 06) Page 14 of 228



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



**Test setup** 

#### **Test Overview**

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

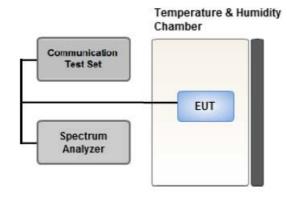
## **Test Settings**

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

F-TP22-03 (Rev. 06) Page 15 of 228



#### 3.7 BAND EDGE



#### **Test setup**

#### **Test Overview**

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

operation were investigated and the worst case configuration results are reported in this section.

## **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1 % of the emission bandwidth
- 4.  $VBW > 3 \times RBW$
- 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

F-TP22-03 (Rev. 06) Page 16 of 228



#### **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.

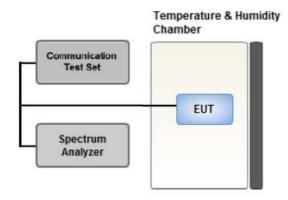
All measurements were done at 2 channels(low and high operational frequency range.) The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

Where Margin < 1 dB the emission level is either corrected by  $10 \log(1 \text{ MHz/ RB})$  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.

F-TP22-03 (Rev. 06) Page 17 of 228



#### 3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

#### **Test Overview**

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30  $\,^{\circ}\text{C}$  to +50  $\,^{\circ}\text{C}$  in 10  $\,^{\circ}\text{C}$  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.

F-TP22-03 (Rev. 06) Page 18 of 228



#### 3.9 WORST CASE(RADIATED TEST)

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

(Worst case: DFT-S-OFDM)

- 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: NSA. SA Worst case: SA

Mode: Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case: Stand alone

- 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.

- 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 was investigated and the worst case bandwidth results are reported. (Worst case : 5 MHz(ANT A), 10 MHz(ANT F))
- SM-S721B/DS & additional models were tested and the worst case results are reported. (Worst case : SM-S721B/DS)

[ ANT A Worst case ]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See See	ction 8.1	Z
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See See	ction 8.2	Z

[ ANT F Worst case ]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Seo	ction 8.1	Υ
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See See	ction 8.2	Υ

F-TP22-03 (Rev. 06) Page 19 of 228



## 3.10 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: NSA, SA 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.

- SM-S721B/DS & additional models were tested and the worst case results are reported.

(Worst case: SM-S721B/DS)

#### [Worst case]

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
		5	Low	1	0
	PI/2 BPSK	3	High	1	24
		10	Low	1	0
			High	1	51
Dand Edge		15	Low	1	0
Band Edge			High	1	78
		20	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

F-TP22-03 (Rev. 06) Page 20 of 228



## 4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	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	09/29/2024	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
RF Switching System	FBSR-06B (1G HPF + LNA)	T&M SYSTEM	F3L1	05/14/2025	Annual
RF Switching System	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/14/2025	Annual
RF Switching System	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/14/2025	Annual
RF Switching System	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/14/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/25/2024	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
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	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	09/19/2024	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).

F-TP22-03 (Rev. 06) Page 21 of 228



## **5. MEASUREMENT UNCERTAINTY**

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

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

Parameter	Expanded Uncertainty ( $\pm$ 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)

F-TP22-03 (Rev. 06) Page 22 of 228



## **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(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Peak- to- Average Ratio	§ 27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

## Note:

- 1. See SAR Report
- 2. All conducted tests were tested using 5G Wireless Tester.

## **6.2 Test Condition: Radiated Test**

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and	§ 2.1053,	<43 + 10log10 (P[Watts]) for	DACC
Harmonic Emissions	§ 27.53(h)	all out-of band emissions	PASS

## Note:

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

F-TP22-03 (Rev. 06) Page 23 of 228



## 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

Ch.	/ Freq.	req. Measured		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.		n./ Freq. Measured		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.

F-TP22-03 (Rev. 06) Page 24 of 228



#### 7.3. Emission Designator

#### GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

#### **EDGE Emission Designator**

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

#### WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

#### **QPSK Modulation**

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

#### **QAM Modulation**

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

F-TP22-03 (Rev. 06) Page 25 of 228



## 8. TEST DATA (ANT A)

## **8.1 EQUIVALENT ISOTROPIC RADIATED POWER**

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBi)	C.L	Pol	Limit	EI	RP	RB	
(141112)	[SCS (kHz)]		(dBm)	(dBm)	(ubi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-18.64	14.72	9.60	2.00	V		0.171	22.32		
		QPSK	-18.70	14.66	9.60	2.00	V		0.168	22.26		
1712.5	1712.5	16-QAM	-19.67	13.69	9.60	2.00	V		0.135	21.29	1	12
		64-QAM	-21.17	12.19	9.60	2.00	V		0.095	19.79		
		256-QAM	-23.16	10.20	9.60	2.00	V		0.060	17.80		
		PI/2 BPSK	-19.83	13.77	9.75	2.04	V		0.141	21.48		
	Sub6 n66/	QPSK	-19.84	13.76	9.75	2.04	V		0.140	21.47	1	
1745.0	5 MHz	16-QAM	-20.84	12.76	9.75	2.04	V	< 1.00 0.1	0.111	20.47		1
	[15 kHz]	64-QAM	-22.29	11.31	9.75	2.04	V		0.080	19.02		
		256-QAM	-24.26	9.34	9.75	2.04	V		0.051	17.05		
		PI/2 BPSK	-20.59	12.95	9.90	2.08	V		0.119	20.77		
		QPSK	-20.68	12.86	9.90	2.08	V		0.117	20.68		
1777.5		16-QAM	-21.65	11.89	9.90	2.08	V		0.094	19.71	1	12
		64-QAM	-23.12	10.42	9.90	2.08	V		0.067	18.24		
		256-QAM	-24.98	8.56	9.90	2.08	V		0.044	16.38		

F-TP22-03 (Rev. 06) Page 26 of 228



Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBi)	C.L	Pol	Limit	EI	RP	RB	
(MПZ)	[SCS (kHz)]		(dBm)	(dBm)	(UDI)			W	W	dBm	Size	Offset
		PI/2 BPSK	-18.66	14.70	9.60	2.00	V		0.170	22.30		
	1715.0	QPSK	-18.70	14.66	9.60	2.00	V		0.168	22.26		
1715.0		16-QAM	-19.70	13.66	9.60	2.00	V		0.134	21.26	1	26
		64-QAM	-21.20	12.16	9.60	2.00	V		0.095	19.76		
		256-QAM	-23.13	10.23	9.60	2.00	V		0.061	17.83		
		PI/2 BPSK	-19.66	13.94	9.75	2.04	V		0.146	21.65		
	Sub6 n66/	QPSK	-19.70	13.90	9.75	2.04	V		0.145	21.61	1	
1745.0	10 MHz	16-QAM	-20.67	12.93	9.75	2.04	V		0.116	20.64		1
	[15 kHz]	64-QAM	-22.10	11.50	9.75	2.04	V		0.083	19.21		
		256-QAM	-24.11	9.49	9.75	2.04	V		0.053	17.20		
		PI/2 BPSK	-20.54	13.00	9.90	2.08	V		0.121	20.82		
		QPSK	-20.55	12.99	9.90	2.08	V		0.121	20.81		
1775.0		16-QAM	-21.56	11.98	9.90	2.08	V		0.096	19.80	1	50
		64-QAM	-23.06	10.48	9.90	2.08	V		0.068	18.30		
		256-QAM	-24.93	8.61	9.90	2.08	V		0.044	16.43		

F-TP22-03 (Rev. 06) Page 27 of 228



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			w	W	dBm	Size	Offset
		PI/2 BPSK	-18.70	14.66	9.60	2.00	V		0.168	22.26		
		QPSK	-18.77	14.59	9.60	2.00	V		0.166	22.19		
1717.5		16-QAM	-19.68	13.68	9.60	2.00	V		0.134	21.28	1	39
		64-QAM	-21.26	12.10	9.60	2.00	V		0.093	19.70		
		256-QAM	-23.25	10.11	9.60	2.00	V		0.059	17.71		
		PI/2 BPSK	-19.65	13.95	9.75	2.04	V		0.147	21.66		
	Sub6 n66/	QPSK	-19.68	13.92	9.75	2.04	V		0.146	21.63		
1745.0	15 MHz	16-QAM	-20.75	12.85	9.75	2.04	V	< 1.00	0.114	20.56	1	1
	[15 kHz]	64-QAM	-22.13	11.47	9.75	2.04	V		0.083	19.18		
		256-QAM	-24.06	9.54	9.75	2.04	V		0.053	17.25		
		PI/2 BPSK	-20.52	13.02	9.90	2.08	V		0.121	20.84		
		QPSK	-20.53	13.01	9.90	2.08	V		0.121	20.83		
1772.5		16-QAM	-21.52	12.02	9.90	2.08	V		0.096	19.84	1	77
		64-QAM	-22.99	10.55	9.90	2.08	V	V 0.06	0.069	18.37		
		256-QAM	-24.91	8.63	9.90	2.08	V		0.044	16.45		

F-TP22-03 (Rev. 06) Page 28 of 228



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			w	w	dBm	Size	Offset
		PI/2 BPSK	-18.82	14.68	9.60	2.00	V		0.169	22.28		
		QPSK	-18.96	14.54	9.60	2.00	V		0.164	22.14		
1720.0	1720.0	16-QAM	-19.81	13.69	9.60	2.00	V		0.135	21.29	1	53
		64-QAM	-21.38	12.12	9.60	2.00	V		0.094	19.72		
		256-QAM	-23.30	10.20	9.60	2.00	V		0.060	17.80		
		PI/2 BPSK	-19.61	13.99	9.75	2.04	V		0.148	21.70		
	Sub6 n66/	QPSK	-19.62	13.98	9.75	2.04	V	_	0.148	21.69	1	
1745.0	20 MHz	16-QAM	-20.64	12.96	9.75	2.04	V		0.117	20.67 1 19.19		1
	[15 kHz]	64-QAM	-22.12	11.48	9.75	2.04	V		0.083			
		256-QAM	-24.00	9.60	9.75	2.04	V		0.054	17.31		
		PI/2 BPSK	-20.52	13.12	9.90	2.09	V		0.124	20.93		
		QPSK	-20.53	13.11	9.90	2.09	V		0.124	20.92		
1770.0		16-QAM	-21.48	12.16	9.90	2.09	V	V 0.099	0.099	19.97	1	104
		64-QAM	-23.00	10.64	9.90	2.09	V		0.070	18.45		
		256-QAM	-24.90	8.74	9.90	2.09	V		0.045	16.55		

F-TP22-03 (Rev. 06) Page 29 of 228



#### **8.2 RADIATED SPURIOUS EMISSIONS**

■ NR Band: N66
 ■ Bandwidth: 5 MHz
 ■ Modulation: PI/2 BPSK
 ■ Distance: 3 meters
 ■ SCS: 15 kHz

		Measured	Ant. Gain	Substitute			Result	Limit		RB
Ch	Freq (MHz)	Level (dBm)	(dBi)	Level (dBm)	C.L	Pol	(dBm)	(dBm)	Size	Offset
242500	3,425.00	-52.16	11.10	-53.11	2.96	Н	-44.97	-13.00		
342500 (1712.5)	5,137.50	-58.30	10.80	-53.03	3.62	Н	-45.85	-13.00	1	12
(1712.5)	6,850.00	-64.02	10.80	-53.07	4.32	V	-46.59	-13.00		
349000	3,490.00	-57.52	11.20	-58.96	3.00	Н	-50.76	-13.00		
	5,235.00	-58.86	11.10	-53.93	3.70	V	-46.53	-13.00	1	1
(1745.0)	6,980.00	-64.29	10.90	-51.58	4.30	V	-44.98	-13.00		
255500	3,555.00	-60.58	11.40	-62.55	3.02	V	-54.17	-13.00		
355500	5,332.50	-62.33	11.40	-57.28	3.73	V	-49.61	-13.00	1	12
(1777.5)	7,110.00	-63.24	10.50	-49.30	4.36	V	-43.16	-13.00		

F-TP22-03 (Rev. 06) Page 30 of 228



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

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB )		
			BPSK			4.34		
			QPSK			5.57		
	5 MHz		16-QAM	25		6.15		
			64-QAM				6.25	
	10 MHz		256-QAM			6.40		
		1745.0	BPSK	50				4.42
			QPSK			5.61		
			16-QAM			6.19		
			64-QAM			6.25		
Sub6			256-QAM		0	6.72		
n66		1145.0	BPSK		U	4.30		
			QPSK			5.53		
	15 MHz		16-QAM	75		6.15		
			64-QAM			6.13		
			256-QAM			6.57		
			BPSK			4.74		
			QPSK			5.54		
	20 MHz		16-QAM	100		6.09		
			64-QAM			6.22		
			256-QAM			6.45		

## Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page  $53 \sim 72$ .

F-TP22-03 (Rev. 06) Page 31 of 228



#### **8.4 OCCUPIED BANDWIDTH**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)	
			BPSK			4.5210	
			QPSK			4.5123	
	5 MHz		16-QAM	25		4.5318	
			64-QAM			4.5017	
		1745.0	256-QAM			4.5035	
			BPSK	50			9.0263
			QPSK			9.0056	
	10 MHz		16-QAM			8.9868	
			64-QAM			9.0011	
Sub6			256-QAM		0	8.9852	
n66		1745.0	BPSK			13.491	
			QPSK			13.471	
	15 MHz		16-QAM	75		13.465	
			64-QAM			13.467	
			256-QAM			13.426	
			BPSK			17.878	
			QPSK			17.954	
	20 MHz		16-QAM	100		17.860	
			64-QAM			17.971	
			256-QAM			17.866	

## Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 73  $\sim$  92.

F-TP22-03 (Rev. 06) Page 32 of 228



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

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		1712.5	3.7613	30.200	-65.434	-35.234	
	5	1745.0	3.7707	30.200	-65.592	-35.392	
		1777.5	3.8036	30.200	-65.398	-35.198	
		1715.0	3.7862	30.200	-65.366	-35.166	
	10	1745.0	3.7523	30.200	-65.185	-34.985	
Sub6		1775.0	3.8041	30.200	-65.585	-35.385	-13.00
n66		1717.5	3.7957	30.200	-65.351	-35.151	-13.00
	15	1745.0	3.7792	30.200	-65.376	-35.176	
		1772.5	3.8051	30.200	-65.348	-35.148	
		1720.0	4.0494	30.200	-65.367	-35.167	
	20	1745.0	3.8041	30.200	-65.300	-35.100	
		1770.0	4.0280	30.200	-65.510	-35.310	

## Note:

- 1. Plots of the EUT's Conducted Spurious Emissions are shown Page 93 ~ 116.
- 2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
- 3. Factor(dB) = Cable Loss + Ext. 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		

## **8.6 BAND EDGE**

- Plots of the EUT's Band Edge are shown Page 117  $^{\sim}$  140.

F-TP22-03 (Rev. 06) Page 33 of 228



## 8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

■ BandWidth: <u>5 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test.	Voltage	Temp.	Frequency	Frequency	Deviation	
Frequncy	(0.1)	(0.5)		- 4	(0/)	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1712 499 997	0.0	0.000 000	0.000
	100 %	-30	1712 499 994	-2.6	0.000 000	-0.002
	100 %	-20	1712 499 994	-3.0	0.000 000	-0.002
	100 %	-10	1712 499 994	-2.9	0.000 000	-0.002
1712.5	100 %	0	1712 499 994	-2.3	0.000 000	-0.001
1112.5	100 %	+10	1712 499 994	-2.3	0.000 000	-0.001
	100 %	+30	1712 499 994	-2.9	0.000 000	-0.002
	100 %	+40	1712 499 994	-2.6	0.000 000	-0.002
	100 %	+50	1712 499 994	-2.5	0.000 000	-0.001
	Batt. Endpoint	+20	1712 499 994	-2.9	0.000 000	-0.002
	100 %	+20(Ref)	1777 499 997	0.0	0.000 000	0.000
	100 %	-30	1777 499 994	-2.9	0.000 000	-0.002
	100 %	-20	1777 499 994	-3.3	0.000 000	-0.002
	100 %	-10	1777 499 994	-2.7	0.000 000	-0.002
1777.5	100 %	0	1777 499 994	-3.2	0.000 000	-0.002
	100 %	+10	1777 499 994	-2.7	0.000 000	-0.002
	100 %	+30	1777 499 994	-2.8	0.000 000	-0.002
	100 %	+40	1777 499 995	-2.1	0.000 000	-0.001
	100 %	+50	1777 499 994	-2.4	0.000 000	-0.001
	Batt. Endpoint	+20	1777 499 994	-2.5	0.000 000	-0.001

F-TP22-03 (Rev. 06) Page 34 of 228



■ BandWidth: <u>10 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: <u>3.300 VDC</u>

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1715 000 000	0.0	0.000 000	0.000
	100 %	-30	1714 999 998	-1.5	0.000 000	-0.001
	100 %	-20	1714 999 999	-0.9	0.000 000	-0.001
	100 %	-10	1714 999 998	-1.2	0.000 000	-0.001
1715.0	100 %	0	1714 999 998	-2.1	0.000 000	-0.001
1715.0	100 %	+10	1714 999 998	-1.5	0.000 000	-0.001
	100 %	+30	1714 999 999	-0.8	0.000 000	0.000
	100 %	+40	1714 999 998	-1.7	0.000 000	-0.001
	100 %	+50	1714 999 998	-1.2	0.000 000	-0.001
	Batt. Endpoint	+20	1714 999 999	-0.7	0.000 000	0.000
	100 %	+20(Ref)	1774 999 999	0.0	0.000 000	0.000
	100 %	-30	1774 999 997	-1.4	0.000 000	-0.001
	100 %	-20	1774 999 998	-1.1	0.000 000	-0.001
	100 %	-10	1774 999 997	-1.5	0.000 000	-0.001
	100 %	0	1774 999 998	-0.6	0.000 000	0.000
1775.0	100 %	+10	1774 999 998	-0.6	0.000 000	0.000
	100 %	+30	1774 999 997	-2.1	0.000 000	-0.001
	100 %	+40	1774 999 997	-1.8	0.000 000	-0.001
	100 %	+50	1774 999 997	-1.3	0.000 000	-0.001
	Batt. Endpoint	+20	1774 999 997	-1.4	0.000 000	-0.001

F-TP22-03 (Rev. 06) Page 35 of 228



■ BandWidth: <u>15 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1717 499 998	0.0	0.000 000	0.000
	100 %	-30	1717 499 996	-2.0	0.000 000	-0.001
	100 %	-20	1717 499 996	-2.1	0.000 000	-0.001
	100 %	-10	1717 499 996	-1.7	0.000 000	-0.001
1717 5	100 %	0	1717 499 996	-2.5	0.000 000	-0.001
1717.5	100 %	+10	1717 499 996	-2.1	0.000 000	-0.001
	100 %	+30	1717 499 996	-1.7	0.000 000	-0.001
	100 %	+40	1717 499 996	-2.1	0.000 000	-0.001
	100 %	+50	1717 499 996	-1.9	0.000 000	-0.001
	Batt. Endpoint	+20	1717 499 996	-1.6	0.000 000	-0.001
	100 %	+20(Ref)	1772 499 999	0.0	0.000 000	0.000
	100 %	-30	1772 499 998	-0.6	0.000 000	0.000
	100 %	-20	1772 499 997	-1.7	0.000 000	-0.001
1772.5	100 %	-10	1772 499 998	-0.7	0.000 000	0.000
	100 %	0	1772 499 998	-1.2	0.000 000	-0.001
	100 %	+10	1772 499 998	-0.7	0.000 000	0.000
	100 %	+30	1772 499 998	-1.2	0.000 000	-0.001
	100 %	+40	1772 499 997	-1.6	0.000 000	-0.001
	100 %	+50	1772 499 998	-1.1	0.000 000	-0.001
	Batt. Endpoint	+20	1772 499 998	-1.1	0.000 000	-0.001

F-TP22-03 (Rev. 06) Page 36 of 228



■ BandWidth: <u>20 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1719 999 998	0.0	0.000 000	0.000
	100 %	-30	1719 999 999	0.1	0.000 000	0.000
	100 %	-20	1719 999 997	-1.4	0.000 000	-0.001
	100 %	-10	1719 999 997	-1.1	0.000 000	-0.001
1720.0	100 %	0	1719 999 998	-0.8	0.000 000	0.000
1720.0	100 %	+10	1719 999 997	-1.0	0.000 000	-0.001
	100 %	+30	1719 999 998	-0.7	0.000 000	0.000
	100 %	+40	1719 999 998	-0.5	0.000 000	0.000
	100 %	+50	1719 999 998	-0.6	0.000 000	0.000
	Batt. Endpoint	+20	1719 999 998	-0.2	0.000 000	0.000
	100 %	+20(Ref)	1769 999 998	0.0	0.000 000	0.000
	100 %	-30	1769 999 996	-1.9	0.000 000	-0.001
	100 %	-20	1769 999 996	-1.8	0.000 000	-0.001
	100 %	-10	1769 999 996	-2.5	0.000 000	-0.001
1770.0	100 %	0	1769 999 996	-1.8	0.000 000	-0.001
1770.0	100 %	+10	1769 999 996	-2.4	0.000 000	-0.001
	100 %	+30	1769 999 996	-2.5	0.000 000	-0.001
	100 %	+40	1769 999 997	-1.4	0.000 000	-0.001
	100 %	+50	1769 999 996	-2.4	0.000 000	-0.001
	Batt. Endpoint	+20	1769 999 996	-2.4	0.000 000	-0.001

F-TP22-03 (Rev. 06) Page 37 of 228



# 9. TEST DATA (ANT F)

## 9.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-20.75	12.61	9.60	2.00	Н		0.105	20.21		
		QPSK	-20.81	12.55	9.60	2.00	Н		0.104	20.15		12
1712.5		16-QAM	-21.78	11.58	9.60	2.00	Н		0.083	19.18	1	
		64-QAM	-23.36	10.00	9.60	2.00	Н		0.058	17.60		
		256-QAM	-25.23	8.13	9.60	2.00	Н		0.037	15.73		
		PI/2 BPSK	-20.70	12.90	9.75	2.04	Н		0.115	20.61		
	Sub6 n66/	QPSK	-20.75	12.85	9.75	2.04	Н		0.114	20.56		
1745.0	5 MHz	16-QAM	-21.59	12.01	9.75	2.04	Н	< 1.00 0.094	19.72	1	1	
	[15 kHz]	64-QAM	-23.18	10.42	9.75	2.04	Н		0.065	18.13		
		256-QAM	-25.24	8.36	9.75	2.04	Н		0.040	16.07		
		PI/2 BPSK	-21.98	11.56	9.90	2.08	Н		0.087	19.38		
		QPSK	-22.02	11.52	9.90	2.08	Н		0.086	19.34		
1777.5	1777.5	16-QAM	-22.95	10.59	9.90	2.08	Н		0.069	18.41	1	12
		64-QAM	-24.56	8.98	9.90	2.08	Н		0.048	16.80		
		256-QAM	-26.32	7.22	9.90	2.08	Н		0.032	15.04		

F-TP22-03 (Rev. 06) Page 38 of 228



Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBi)	C.L	Pol	Limit	EI	RP		RB
(MHZ)	[SCS (kHz)]		(dBm)	(dBm)	(abi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-20.78	12.58	9.60	2.00	Н		0.104	20.18		
		QPSK	-20.85	12.51	9.60	2.00	Н		0.103	20.11		
1715.0		16-QAM	-21.78	11.58	9.60	2.00	Н		0.083	19.18	1	50
		64-QAM	-23.40	9.96	9.60	2.00	Н		0.057	17.56		
		256-QAM	-25.29	8.07	9.60	2.00	Н		0.037	15.67		
		PI/2 BPSK	-20.54	13.06	9.75	2.04	Н		0.119	20.77		
	Sub6 n66/	QPSK	-20.59	13.01	9.75	2.04	Н		0.118	20.72		
1745.0	10 MHz	16-QAM	-21.56	12.04	9.75	2.04	Н	< 1.00	0.094	19.75	1	1
	[15 kHz]	64-QAM	-23.16	10.44	9.75	2.04	Н		0.065	18.15		
		256-QAM	-25.03	8.57	9.75	2.04	Н		0.042	16.28		
		PI/2 BPSK	-21.89	11.65	9.90	2.08	Н		0.089	19.47		
		QPSK	-21.80	11.74	9.90	2.08	Н		0.090	19.56		
1775.0		16-QAM	-22.90	10.64	9.90	2.08	Н		18.46	1	1	
		64-QAM	-24.43	9.11	9.90	2.08		0.049	16.93			
		256-QAM	-26.25	7.29	9.90	2.08	Н		0.032	032 15.11		

F-TP22-03 (Rev. 06) Page 39 of 228



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			w	W	dBm	Size	Offset
		PI/2 BPSK	-20.72	12.64	9.60	2.00	Н		0.106	20.24		
		QPSK	-20.81	12.55	9.60	2.00	Н		0.104	20.15		
1717.5		16-QAM	-21.68	11.68	9.60	2.00	Н		0.085	19.28	1	77
		64-QAM	-23.30	10.06	9.60	2.00	Н		0.058	17.66		
		256-QAM	-25.19	8.17	9.60	2.00	Н		0.038	15.77		
		PI/2 BPSK	-20.56	13.04	9.75	2.04	Н		0.119	20.75		
	Sub6 n66/	QPSK	-20.59	13.01	9.75	2.04	Н		0.118	20.72		
1745.0	15 MHz	16-QAM	-21.60	12.00	9.75	2.04	Н	< 1.00	0.094	19.71	1	1
	[15 kHz]	64-QAM	-23.19	10.41	9.75	2.04	Н		0.065	18.12		
		256-QAM	-25.16	8.44	9.75	2.04	Н	-	0.041	16.15		
		PI/2 BPSK	-21.56	11.98	9.90	2.08	Н		0.096	19.80		
		QPSK	-21.61	11.93	9.90	2.08	Н		0.094	19.75		
1772.5		16-QAM	-22.53	11.01	9.90	2.08	Н	-	0.076	18.83		1
		64-QAM	-24.04	9.50	9.90	2.08		0.054	17.32			
		256-QAM	-26.95	6.59	9.90	2.08	Н	-	0.028	14.41		

F-TP22-03 (Rev. 06) Page 40 of 228



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EIRP		RB	
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)	(UDI)		w	W	dBm	Size	Offset
		PI/2 BPSK	-20.58	12.92	9.60	2.00	Н		0.113	20.52		
		QPSK	-20.62	12.88	9.60	2.00	Н		0.112	20.48		
1720.0		16-QAM	-21.67	11.83	9.60	2.00	Н		0.088	19.43	1	104
		64-QAM	-23.27	10.23	9.60	2.00	Н		0.061	17.83		
		256-QAM	-25.31	8.19	9.60	2.00	Н		0.038	15.79		
		PI/2 BPSK	-20.56	13.04	9.75	2.04	Н		0.119	20.75		
	Sub6 n66/	QPSK	-20.59	13.01	9.75	2.04	Н		0.118	20.72		
1745.0	20 MHz	16-QAM	-21.56	12.04	9.75	2.04	Н	< 1.00	0.094	19.75	1	1
	[15 kHz]	64-QAM	-23.08	10.52	9.75	2.04	Н		0.067	18.23		
		256-QAM	-24.98	8.62	9.75	2.04	Н		0.043	16.33		
		PI/2 BPSK	-21.62	12.02	9.90	2.09	Н		0.096	19.83		
		QPSK	-21.65	11.99	9.90	2.09	Н		0.096	19.80		
1770.0		16-QAM	-22.63	11.01	9.90	2.09	Н		0.076	76 18.82 1	1	1
		64-QAM	-24.10	9.54	9.90	2.09		0.054	17.35			
		256-QAM	-26.02	7.62	9.90	2.09	Н		0.035	15.43		

F-TP22-03 (Rev. 06) Page 41 of 228



#### 9.2 RADIATED SPURIOUS EMISSIONS

■ NR Band: N66
 ■ Bandwidth: 10 MHz
 ■ Modulation: PI/2 BPSK
 ■ Distance: 3 meters
 ■ SCS: 15 kHz

		Manageral	Ant Cain	Substitute			Dogula	l imaia	1	RB
Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Level	C.L	Pol	Result (dBm)	Limit (dBm)	Siz	Offse
		Level (abiii)	(abi)	(dBm)			(abiii)	(dDill)	е	t
343000	3,430.00	-60.74	11.10	-61.46	2.97	V	-53.33	-13.00		
(1715.0)	5,145.00	-62.19	10.90	-57.37	3.63	V	-50.10	-13.00	1	50
(1715.0)	6,860.00	-64.79	10.80	-53.44	4.31	V	-46.95	-13.00		
349000	3,490.00	-61.90	11.20	-63.34	3.00	V	-55.14	-13.00		
	5,235.00	-62.47	11.10	-57.54	3.70	V	-50.14	-13.00	1	1
(1745.0)	6,980.00	-65.36	10.90	-52.65	4.30	V	-46.05	-13.00		
355000	3,550.00	-61.16	11.40	-62.97	3.02	V	-54.59	-13.00		
355000	5,325.00	-62.39	11.40	-57.70	3.69	V	-49.99	-13.00	1	1
(1775.0)	7,100.00	-64.18	10.50	-50.02	4.35	٧	-43.87	-13.00		

F-TP22-03 (Rev. 06) Page 42 of 228



#### 9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequenc y (MHz)	Modulatio n	Resource Block Size	Resource Block Offset	Data (dB )
			BPSK		4.55	
			QPSK			5.73
	5 MHz		16-QAM	25		6.42
			64-QAM			6.65
			256-QAM			6.83
			BPSK	50		4.54
			QPSK			5.74
	10 MHz		16-QAM			6.49
		1745.0	64-QAM			6.54
Sub6			256-QAM		0	6.56
n66		1745.0	BPSK			4.47
			QPSK			5.65
	15 MHz		16-QAM	75		6.42
			64-QAM			6.73
			256-QAM			6.60
			BPSK			5.08
	20 MHz		QPSK			5.68
			16-QAM	100		6.36
			64-QAM			6.61
			256-QAM			6.51

## Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 141  $\sim$  160.

F-TP22-03 (Rev. 06) Page 43 of 228



#### 9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequenc y (MHz)	Modulatio n	Resource Block Size	Resource Block Offset	Data (MHz)
			BPSK			4.5543
			QPSK			4.5196
	5 MHz		16-QAM	25		4.5570
			64-QAM			4.5182
			256-QAM			4.5303
	10 MHz		BPSK	50		9.0161
			QPSK			9.0010
		- 1745.0	16-QAM			9.0209
			64-QAM			8.9868
Sub6			256-QAM		0 -	8.9898
n66		1145.0	BPSK		0	13.452
			QPSK			13.482
	15 MHz		16-QAM	75		13.475
			64-QAM			13.445
			256-QAM			13.446
			BPSK			17.944
	20 MHz		QPSK			17.934
			16-QAM	100		17.922
			64-QAM			17.864
			256-QAM			17.894

## Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 161  $^{\sim}$  180.

F-TP22-03 (Rev. 06) Page 44 of 228



#### 9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequenc y (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measuremen t Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		1712.5	8.8819	30.815	-70.189	-39.374	
	5	1745.0	4.0753	30.200	-70.713	-40.513	
		1777.5	9.4053	30.815	-70.471	-39.656	
		1715.0	3.8141	30.200	-70.490	-40.290	
	10	1745.0	8.0499	30.815	-70.258	-39.443	
Sub6		1775.0	3.8256	30.200	-69.779	-39.579	-13.00
n66		1717.5	8.8998	30.815	-70.186	-39.371	-13.00
	15	1745.0	8.0389	30.815	-69.844	-39.029	
		1772.5	8.6456	30.815	-71.056	-40.241	
		1720.0	5.2862	30.815	-70.769	-39.954	
	20	1745.0	3.7767	30.200	-70.693	-40.493	
		1770.0	6.0225	30.815	-70.871	-40.056	

### Note:

- 1. Plots of the EUT's Conducted Spurious Emissions are shown Page 181 ~ 204.
- 2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
- 3. Factor(dB) = Cable Loss + Ext. 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

### 8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 205 ~ 228.

F-TP22-03 (Rev. 06) Page 45 of 228



## 9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

■ BandWidth: <u>5 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1712 500 000	0.0	0.000 000	0.000
	100 %	-30	1712 500 000	0.0	0.000 000	0.000
	100 %	-20	1712 500 000	0.1	0.000 000	0.000
	100 %	-10	1712 500 001	0.9	0.000 000	0.001
1710 F	100 %	0	1712 500 000	-0.3	0.000 000	0.000
1712.5	100 %	+10	1712 500 000	-0.3	0.000 000	0.000
	100 %	+30	1712 500 000	0.1	0.000 000	0.000
	100 %	+40	1712 500 000	-0.4	0.000 000	0.000
	100 %	+50	1712 499 999	-0.9	0.000 000	-0.001
	Batt. Endpoint	+20	1712 499 999	-0.9	0.000 000	-0.001
	100 %	+20(Ref)	1777 499 999	0.0	0.000 000	0.000
	100 %	-30	1777 499 998	-0.6	0.000 000	0.000
	100 %	-20	1777 499 998	-0.8	0.000 000	0.000
	100 %	-10	1777 499 998	-1.0	0.000 000	-0.001
1777 5	100 %	0	1777 499 998	-0.7	0.000 000	0.000
1777.5	100 %	+10	1777 499 997	-1.3	0.000 000	-0.001
	100 %	+30	1777 499 997	-1.5	0.000 000	-0.001
	100 %	+40	1777 499 998	-0.6	0.000 000	0.000
	100 %	+50	1777 499 997	-1.9	0.000 000	-0.001
	Batt. Endpoint	+20	1777 499 997	-1.2	0.000 000	-0.001

F-TP22-03 (Rev. 06) Page 46 of 228



■ BandWidth: 10 MHz

■ Voltage(100 %): <u>3.880 VDC</u>

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1715 000 001	0.0	0.000 000	0.000
	100 %	-30	1715 000 001	0.3	0.000 000	0.000
	100 %	-20	1715 000 001	0.5	0.000 000	0.000
	100 %	-10	1715 000 001	-0.2	0.000 000	0.000
1715.0	100 %	0	1715 000 001	-0.3	0.000 000	0.000
1715.0	100 %	+10	1715 000 001	-0.2	0.000 000	0.000
	100 %	+30	1715 000 000	-0.8	0.000 000	0.000
	100 %	+40	1715 000 001	0.1	0.000 000	0.000
	100 %	+50	1715 000 001	-0.1	0.000 000	0.000
	Batt. Endpoint	+20	1715 000 001	0.1	0.000 000	0.000
	100 %	+20(Ref)	1775 000 001	0.0	0.000 000	0.000
	100 %	-30	1775 000 001	0.3	0.000 000	0.000
	100 %	-20	1775 000 002	1.1	0.000 000	0.001
	100 %	-10	1775 000 001	0.8	0.000 000	0.000
1775.0	100 %	0	1775 000 001	0.2	0.000 000	0.000
1775.0	100 %	+10	1775 000 001	0.7	0.000 000	0.000
	100 %	+30	1775 000 001	0.4	0.000 000	0.000
	100 %	+40	1775 000 001	0.2	0.000 000	0.000
	100 %	+50	1775 000 001	0.2	0.000 000	0.000
	Batt. Endpoint	+20	1775 000 001	0.8	0.000 000	0.000

F-TP22-03 (Rev. 06) Page 47 of 228



■ BandWidth: <u>15 MHz</u>

■ Voltage(100 %): <u>3.880 VDC</u>

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	1717 499 999	0.0	0.000 000	0.000
	100 %	-30	1717 499 998	-0.7	0.000 000	0.000
	100 %	-20	1717 499 998	-1.1	0.000 000	-0.001
	100 %	-10	1717 499 997	-1.2	0.000 000	-0.001
1717 5	100 %	0	1717 499 999	0.3	0.000 000	0.000
1717.5	100 %	+10	1717 499 998	-0.9	0.000 000	-0.001
	100 %	+30	1717 499 998	-0.6	0.000 000	0.000
	100 %	+40	1717 499 997	-1.3	0.000 000	-0.001
	100 %	+50	1717 499 997	-1.5	0.000 000	-0.001
	Batt. Endpoint	+20	1717 499 998	-0.8	0.000 000	0.000
	100 %	+20(Ref)	1772 499 999	0.0	0.000 000	0.000
1772.5	100 %	-30	1772 499 999	-0.2	0.000 000	0.000
	100 %	-20	1772 499 999	-0.1	0.000 000	0.000
	100 %	-10	1772 499 999	0.3	0.000 000	0.000
	100 %	0	1772 499 999	0.3	0.000 000	0.000
	100 %	+10	1772 499 999	0.2	0.000 000	0.000
	100 %	+30	1772 500 001	1.5	0.000 000	0.001
	100 %	+40	1772 499 999	0.2	0.000 000	0.000
	100 %	+50	1772 499 999	0.3	0.000 000	0.000
	Batt. Endpoint	+20	1772 500 000	0.8	0.000 000	0.000

F-TP22-03 (Rev. 06) Page 48 of 228



■ BandWidth: <u>20 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
1720.0	100 %	+20(Ref)	1720 000 000	0.0	0.000 000	0.000
	100 %	-30	1720 000 000	-0.2	0.000 000	0.000
	100 %	-20	1720 000 000	-0.1	0.000 000	0.000
	100 %	-10	1720 000 000	-0.1	0.000 000	0.000
	100 %	0	1720 000 000	0.2	0.000 000	0.000
	100 %	+10	1720 000 000	-0.1	0.000 000	0.000
	100 %	+30	1720 000 000	0.2	0.000 000	0.000
	100 %	+40	1720 000 001	1.3	0.000 000	0.001
	100 %	+50	1720 000 000	0.3	0.000 000	0.000
	Batt. Endpoint	+20	1720 000 001	0.5	0.000 000	0.000
1770.0	100 %	+20(Ref)	1769 999 995	0.0	0.000 000	0.000
	100 %	-30	1769 999 995	0.0	0.000 000	0.000
	100 %	-20	1769 999 994	-1.0	0.000 000	-0.001
	100 %	-10	1769 999 995	-0.7	0.000 000	0.000
	100 %	0	1769 999 996	0.9	0.000 000	0.000
	100 %	+10	1769 999 994	-1.6	0.000 000	-0.001
	100 %	+30	1769 999 993	-1.8	0.000 000	-0.001
	100 %	+40	1769 999 993	-1.9	0.000 000	-0.001
	100 %	+50	1769 999 996	1.2	0.000 000	0.001
	Batt. Endpoint	+20	1769 999 996	1.1	0.000 000	0.001

F-TP22-03 (Rev. 06) Page 49 of 228



# 10. TEST PLOTS (ANT A)

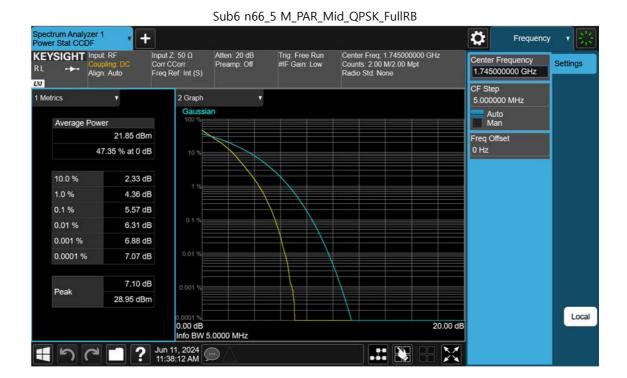
F-TP22-03 (Rev. 06) Page 50 of 228





F-TP22-03 (Rev. 06) Page 51 of 228





F-TP22-03 (Rev. 06) Page 52 of 228





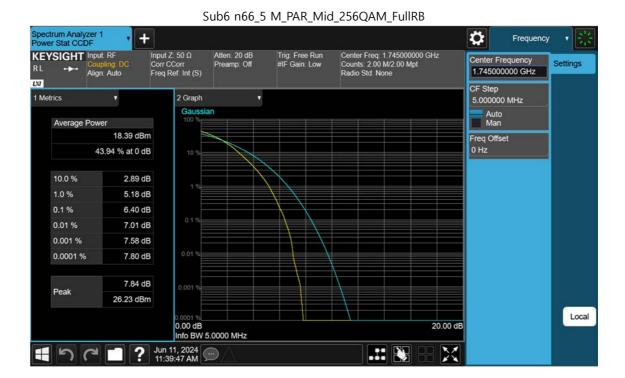
F-TP22-03 (Rev. 06) Page 53 of 228





F-TP22-03 (Rev. 06) Page 54 of 228





F-TP22-03 (Rev. 06) Page 55 of 228





F-TP22-03 (Rev. 06) Page 56 of 228





F-TP22-03 (Rev. 06) Page 57 of 228





F-TP22-03 (Rev. 06) Page 58 of 228





F-TP22-03 (Rev. 06) Page 59 of 228





F-TP22-03 (Rev. 06) Page 60 of 228





F-TP22-03 (Rev. 06) Page 61 of 228





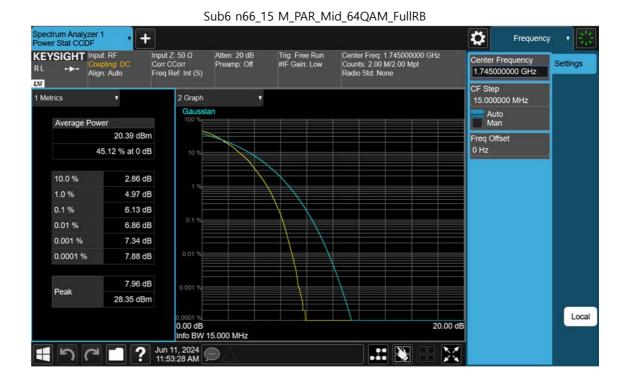
F-TP22-03 (Rev. 06) Page 62 of 228





F-TP22-03 (Rev. 06) Page 63 of 228





F-TP22-03 (Rev. 06) Page 64 of 228





F-TP22-03 (Rev. 06) Page 65 of 228





F-TP22-03 (Rev. 06) Page 66 of 228





F-TP22-03 (Rev. 06) Page 67 of 228





F-TP22-03 (Rev. 06) Page 68 of 228





F-TP22-03 (Rev. 06) Page 69 of 228





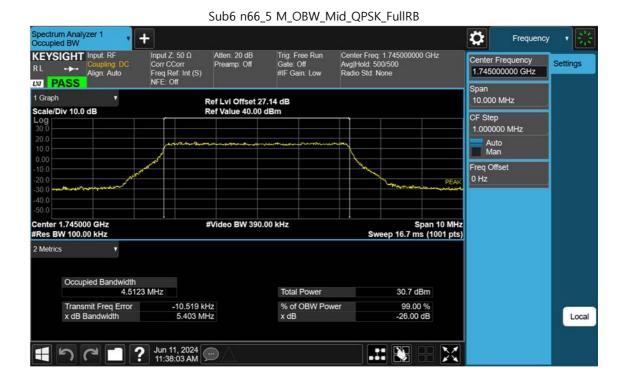
F-TP22-03 (Rev. 06) Page 70 of 228





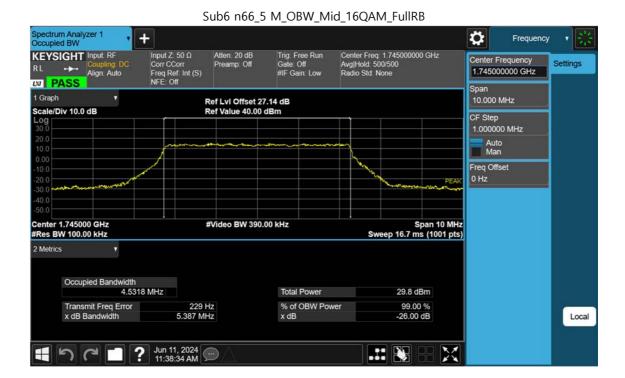
F-TP22-03 (Rev. 06) Page 71 of 228





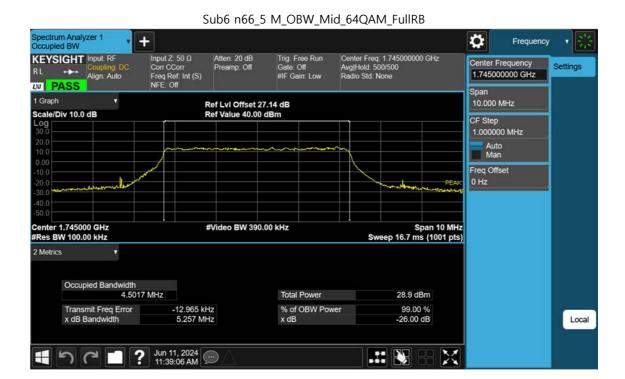
F-TP22-03 (Rev. 06) Page 72 of 228





F-TP22-03 (Rev. 06) Page 73 of 228





F-TP22-03 (Rev. 06) Page 74 of 228





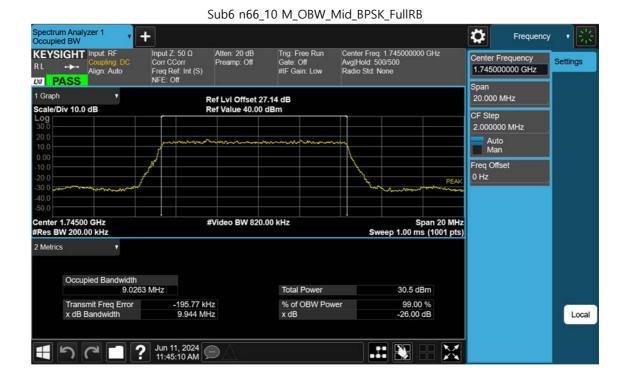
Sub6 n66\_5 M\_OBW\_Mid\_256QAM\_FullRB

F-TP22-03 (Rev. 06) Page 75 of 228

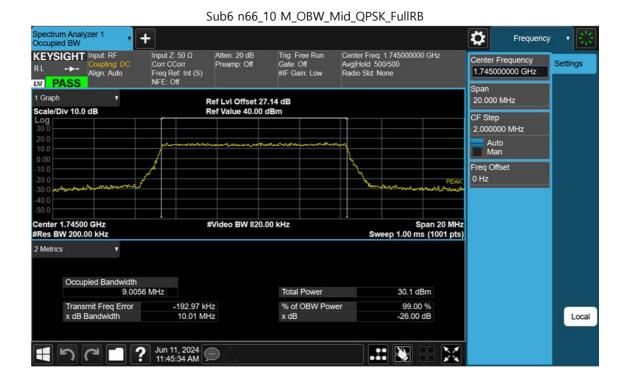
Page 76 of 228



F-TP22-03 (Rev. 06)

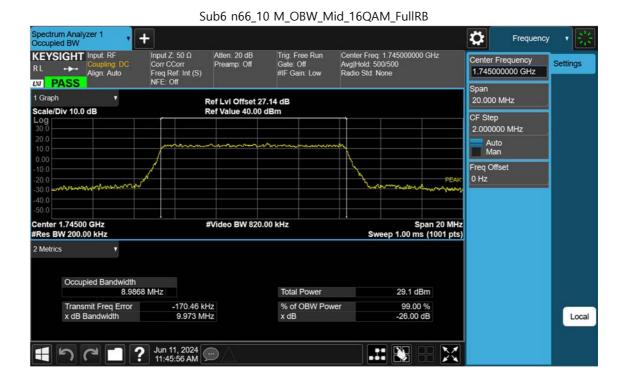






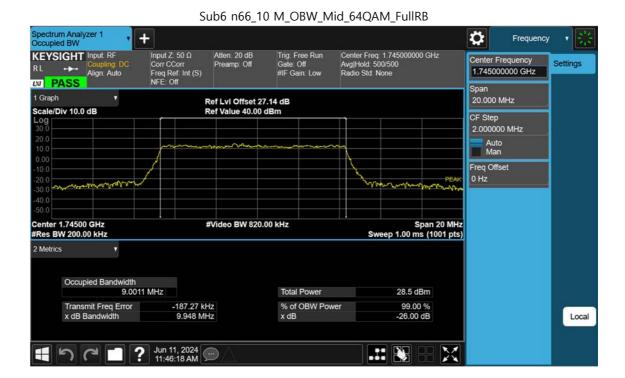
F-TP22-03 (Rev. 06) Page 77 of 228





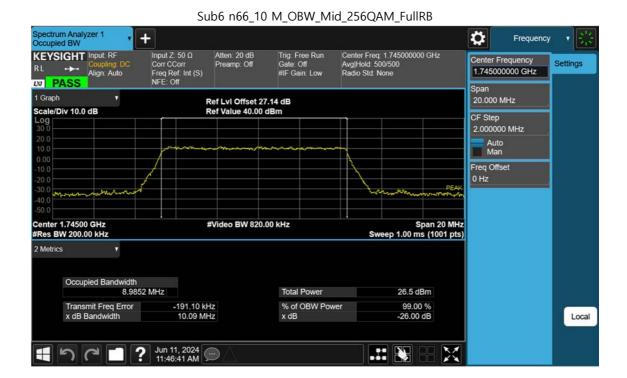
F-TP22-03 (Rev. 06) Page 78 of 228





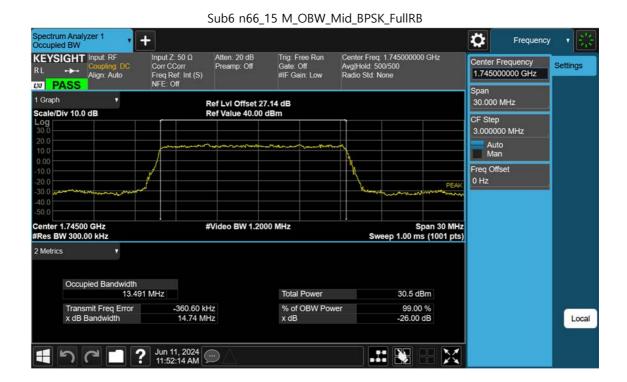
F-TP22-03 (Rev. 06) Page 79 of 228





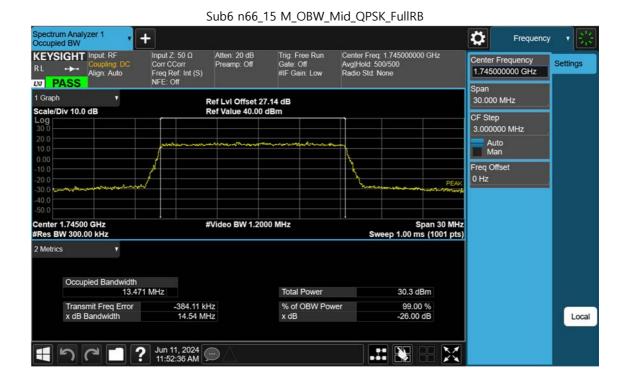
F-TP22-03 (Rev. 06) Page 80 of 228





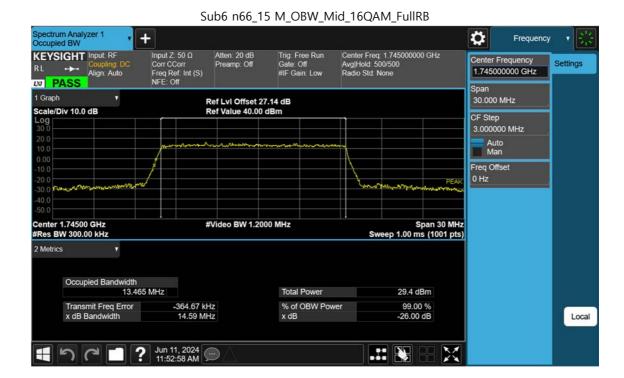
F-TP22-03 (Rev. 06) Page 81 of 228





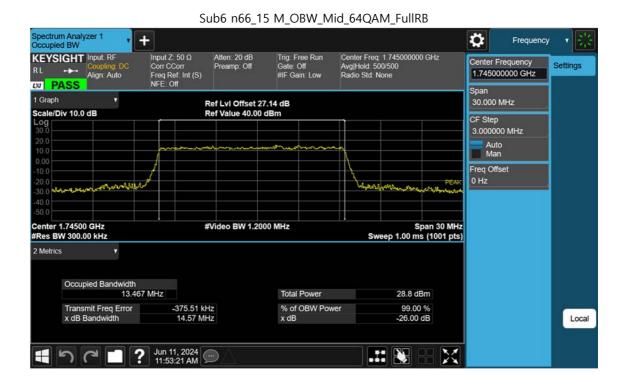
F-TP22-03 (Rev. 06) Page 82 of 228





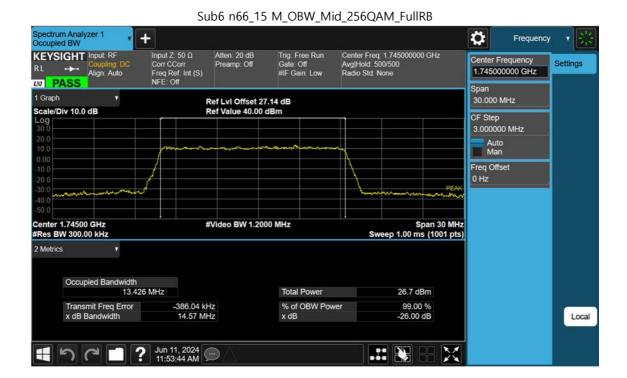
F-TP22-03 (Rev. 06) Page 83 of 228





F-TP22-03 (Rev. 06) Page 84 of 228



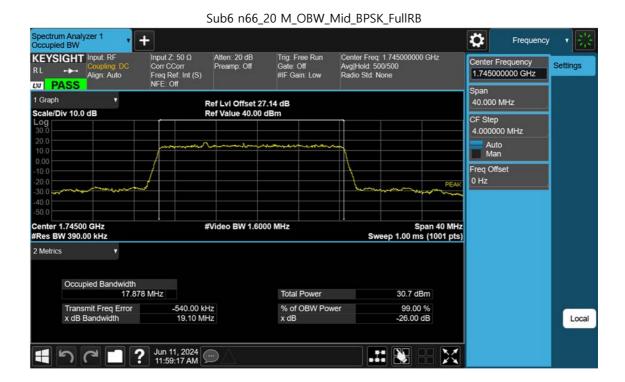


F-TP22-03 (Rev. 06) Page 85 of 228

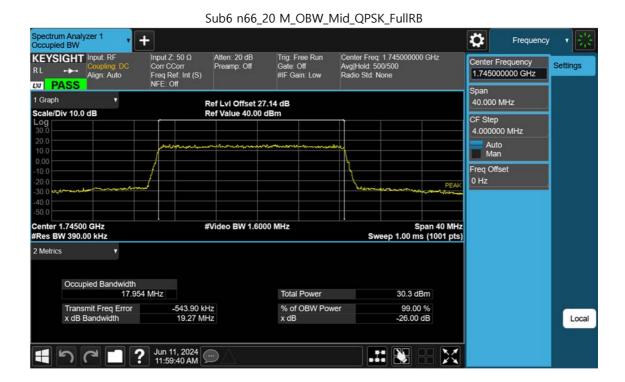
Page 86 of 228



F-TP22-03 (Rev. 06)

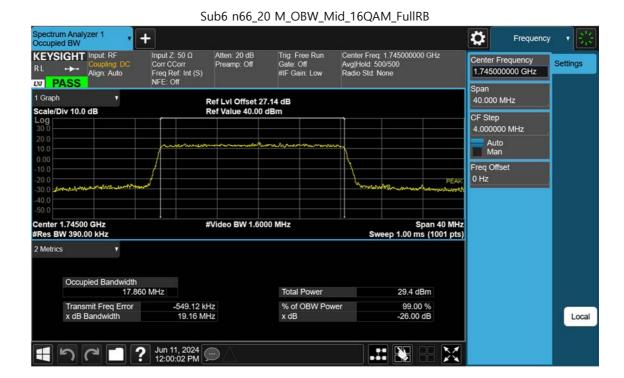






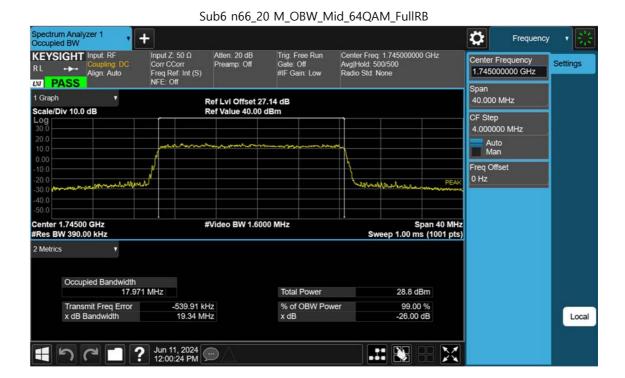
F-TP22-03 (Rev. 06) Page 87 of 228





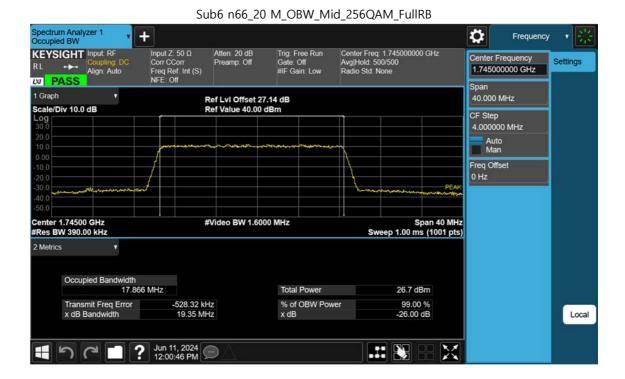
F-TP22-03 (Rev. 06) Page 88 of 228





F-TP22-03 (Rev. 06) Page 89 of 228





F-TP22-03 (Rev. 06) Page 90 of 228





Sub6 n66\_5 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 91 of 228





Sub6 n66\_5 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 92 of 228





F-TP22-03 (Rev. 06) Page 93 of 228

Page 94 of 228



F-TP22-03 (Rev. 06)







F-TP22-03 (Rev. 06) Page 95 of 228





F-TP22-03 (Rev. 06) Page 96 of 228





Sub6 n66\_15 M\_Conducted Spurious(30 M-10 G)\_Low\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 97 of 228





Sub6 n66\_15 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 98 of 228

Page 99 of 228



F-TP22-03 (Rev. 06)



Page 100 of 228



F-TP22-03 (Rev. 06)



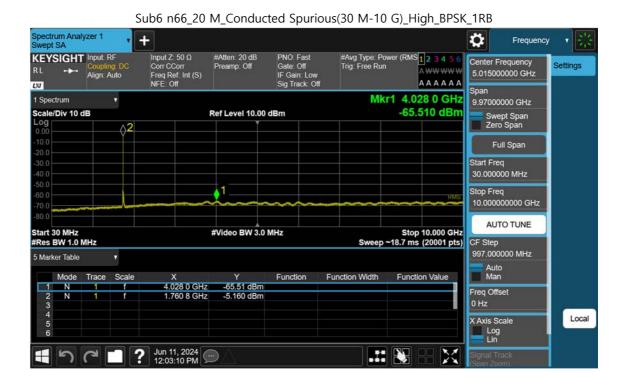




Sub6 n66\_20 M\_Conducted Spurious(30 M-10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 101 of 228





F-TP22-03 (Rev. 06) Page 102 of 228





Sub6 n66\_5 M\_Conducted Spurious(Above10 G)\_Low\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 103 of 228





Sub6 n66\_5 M\_Conducted Spurious(Above10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 104 of 228





F-TP22-03 (Rev. 06) Page 105 of 228





F-TP22-03 (Rev. 06) Page 106 of 228





Sub6 n66\_10 M\_Conducted Spurious(Above10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 107 of 228





F-TP22-03 (Rev. 06) Page 108 of 228





Sub6 n66\_15 M\_Conducted Spurious(Above10 G)\_Low\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 109 of 228





Sub6 n66\_15 M\_Conducted Spurious(Above10 G)\_Mid\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 110 of 228





Sub6 n66\_15 M\_Conducted Spurious(Above10 G)\_High\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 111 of 228





F-TP22-03 (Rev. 06) Page 112 of 228





F-TP22-03 (Rev. 06) Page 113 of 228





Sub6 n66\_20 M\_Conducted Spurious(Above10 G)\_High\_BPSK\_1RB

F-TP22-03 (Rev. 06) Page 114 of 228