

TEST REPORT

FCC Sub6 n30 Test for SM-S721U

Certification

APPLICANT SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2407-FC031

DATE OF ISSUE July 19, 2024

> **Tested by** Jin Woo Yu

유객

Technical ManagerJong Seok Lee

HCT CO., LTD. Bongsai 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-FC031

DATE OF ISSUE July 19, 2024

Additional Model SM-S721U1

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-S721U
Date of Test	May 21, 2024 ~ July 19, 2024
FCC ID	A3LSMS721U
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

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REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	July 19, 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).

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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:	A3LSMS721U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-S721U
Additional Model(s)	SM-S721U1
SCS(kHz):	15
Bandwidth(MHz):	5, 10
Waveform:	CP-OFDM, DFT-S-OFDM
Marila Lathar	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
Modulation:	CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
To Francisco	2307.5 MHz – 2312.5 MHz (Sub6 n30 (5 MHz))
Tx Frequency:	2310.0 MHz (Sub6 n30 (10 MHz))
Date(s) of Tests:	May 21, 2024 ~ July 19, 2024
Serial number:	Radiated: 67d50ecc63197ece
	Conducted: R3CX40SV7PD

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1.1. MAXIMUM OUTPUT POWER

ANT A

Mode To	Ty Fraguency	Emission Designator		EIRP		
(MHz)	Tx Frequency (MHz)		Modulation	Max. Power (W)	Max. Power (dBm)	
		4M53G7D	PI/2 BPSK	0.128	21.08	
		4M53G7D	QPSK	0.127	21.03	
Sub6 n30 (5)	Sub6 n30 (5) 2307.5 – 2312.5	4M51W7D	16QAM	0.102	20.07	
		4M51W7D	64QAM	0.071	18.49	
	4M52W7D	256QAM	0.045	16.51		
		9M00G7D	PI/2 BPSK	0.128	21.07	
		9M01G7D	QPSK	0.126	21.02	
Sub6 n30 (10) 23	2310.0	8M98W7D	16QAM	0.102	20.07	
		8M97W7D	64QAM	0.071	18.50	
		8M96W7D	256QAM	0.045	16.56	

ANT F

Mada T	T., F., a., a., a., a.,	Fii		EIRP		
Mode (MHz)	Tx Frequency Emission (MHz) Designator	Modulation	Max. Power (W)	Max. Power (dBm)		
		4M68G7D	PI/2 BPSK	0.070	18.46	
		4M66G7D	QPSK	0.069	18.37	
Sub6 n30 (5)	2307.5 – 2312.5	4M68W7D	16QAM	0.055	17.40	
		4M68W7D	64QAM	0.040	16.05	
	4M75W7D	256QAM	0.025	13.94		
		9M00G7D	PI/2 BPSK	0.071	18.49	
		9M00G7D	QPSK	0.070	18.46	
Sub6 n30 (10) 23	2310.0	9M01W7D	16QAM	0.056	17.51	
		9M03W7D	64QAM	0.040	15.99	
		8M99W7D	256QAM	0.024	13.88	

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2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6, mmWave. 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.

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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
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at	- KDB 971168 D01 v03r01 – Section 6.0
Antenna Terminal	- 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/	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8
Effective Isotropic Radiated Power	- 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

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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;

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.

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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.

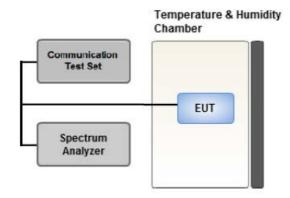
If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

EIRP (dBm) = ERP (dBm) + 2.15

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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:

 $P.A.R_{(dB)} = P_{Pk}_{(dBm)} - P_{Avg_{(dBm)}} (P_{Avg} = Average Power + Duty cycle Factor)$

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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.

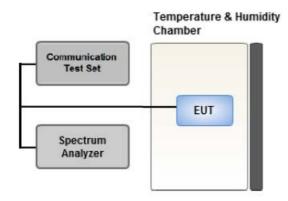
Test Settings(Average Power)

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

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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

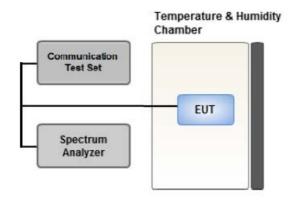
Test Settings

- 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

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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.

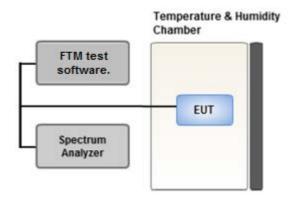
Test Settings

- 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 $\geq 2 \times \text{Span} / \text{RBW}$

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3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

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Test Limit

§ 27.53(a)

- (4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:
- (i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;
- (ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;
- (iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz

Test Notes

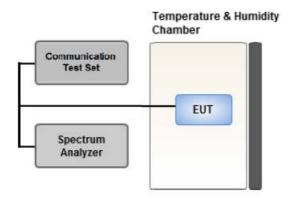
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a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

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3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

- 2. Primary Supply Voltage:
 - .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.
 - .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20 $\,^{\circ}$ 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.

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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.

- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported.

(Worst case: Open mode)

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

Mode: SA Only

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.

- 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)
- SM-S721U & additional models were tested and the worst case results are reported.

(Worst case: SM-S721U)

[ANT A Worst case]

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

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[ANT F Worst case]

Modulation	RB size	RB offset	Axis
PI/2 BPSK,	See Section 8.1		
QPSK,			
16QAM,			Х
64QAM,			
256QAM			
PI/2 BPSK	See Sec	ction 8.1	Z
	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	PI/2 BPSK, QPSK, 16QAM, See Sec 64QAM, 256QAM	PI/2 BPSK, QPSK, 16QAM, See Section 8.1 64QAM, 256QAM

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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: SA Only

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

- SM-S721U & additional models were tested and the worst case results are reported.

(Worst case: SM-S721U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
	PI/2 BPSK,				
Occupied Bandwidth	QPSK,				
Occupied Bandwidth,	16QAM,	5, 10	Mid	Full RB	0
Peak-To-Average Radio	64QAM,				
	256QAM				
			Low,		
	PI/2 BPSK	5	Mid,	1	0, 24
			High		
David Edge		10	Mid	1	0,51
Band Edge			Low,		
		5	Mid,	Full RB	0
			High		
		10	Mid	Full RB	0
			Low,		
Spurious and Harmonic Emissions at	DI/O DDCI	5	Mid,	1	1
Antenna Terminal	PI/2 BPSK		High		
		10	Mid	1	1

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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).

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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)

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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(a)	Section 3.7	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. 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(a)(3)	< 0.25 Watts max. EIRP	PASS
Radiated Spurious and	§ 2.1053,	< 70 + 10log10 (P[Watts])	PASS
Harmonic Emissions	§ 27.53(a)		

Note:

 ${\bf 1.}~{\bf Radiateded}~{\bf tests}~{\bf were}~{\bf tested}~{\bf using}~{\bf 5G}~{\bf Wireless}~{\bf Tester}$

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7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

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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)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/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

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8. TEST DATA(ANT A)

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP	I	RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-23.00	13.37	10.00	2.30	Н		0.128	21.07		
		QPSK	-23.18	13.19	10.00	2.30	Н		0.123	20.89		
2307.5		16-QAM	-24.00	12.37	10.00	2.30	Н		0.102	20.07	1	12
		64-QAM	-25.58	10.79	10.00	2.30	Н		0.071	18.49		
		256-QAM	-27.56	8.81	10.00	2.30	Н		0.045	16.51		
		PI/2 BPSK	-22.99	13.38	10.00	2.30	Н		0.128	21.08		
	Sub6 n30/	QPSK	-23.04	13.33	10.00	2.30	Н		0.127	21.03		
2310.0	5 MHz	16-QAM	-24.12	12.25	10.00	2.30	Н	< 0.25	0.099	19.95	1	12
	[15 kHz]	64-QAM	-25.60	10.77	10.00	2.30	Н		0.070	18.47		
		256-QAM	-27.58	8.79	10.00	2.30	Н		0.045	16.49		
		PI/2 BPSK	-23.09	13.28	10.00	2.30	Н		0.125	20.98		
		QPSK	-23.17	13.20	10.00	2.30	Н		0.123	20.90		
2312.5		16-QAM	-24.17	12.20	10.00	2.30	Н		0.098	19.90	1	1
		64-QAM	-25.70	10.67	10.00	2.30	Н		18.37	7		
		256-QAM	-27.61	8.76	10.00	2.30	Н		0.044	16.46		

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Freq	Mod/ Bandwidth	Modulation		Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP	I	RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-23.00	13.37	10.00	2.30	Н		0.128	21.07		
	Sub6 n30/	QPSK	-23.05	13.32	10.00	2.30	Н		0.126	21.02		
2310.0	10 MHz	16-QAM	-24.00	12.37	10.00	2.30	Н	< 0.25	0.102	20.07	1	26
	[15 kHz]	64-QAM	-25.57	10.80	10.00	2.30	Н		0.071	18.50		
		256-QAM	-27.51	8.86	10.00	2.30	Н		0.045	16.56		

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8.2 RADIATED SPURIOUS EMISSIONS

■ NR Band: <u>N30</u>

■ Bandwidth: <u>5 MHz</u>

■ Modulation: PI/2 BPSK

■ Distance: <u>1 meters</u>

■ SCS: 15 kHz

		Measured	Ant. Gain	Substitute			Result	Limit		F	RB
Ch	Freq (MHz)	Level (dBm)	(dBi)	Level (dBm)	C.L	C.L Pol	(dBm)	(dBm)	Detector	Size	Offset
461500	4615.00	-62.16	11.50	-65.93	3.43	V	-57.86	-40.00	Peak		
461500 (2307.5)	6922.50	-64.52	10.90	-59.32	4.32	V	-52.74	-40.00	Peak	1	12
(2301.3)	9230.00	-62.31	10.80	-54.84	5.02	V	-49.06	-40.00	Peak		
	4620.00	-61.33	11.50	-65.18	3.43	V	-57.11	-40.00	Peak		
462000 (2310.0)	6930.00	-64.06	10.90	-58.82	4.32	V	-52.24	-40.00	Peak	1	12
(2310.0)	9240.00	-60.60	10.80	-52.52	5.06	V	-46.78	-40.00	Peak		
	4625.00	-62.80	11.50	-66.81	3.44	V	-58.75	-40.00	Peak		
462500	6937.50	-65.46	10.90	-60.34	4.32	V	-53.76	-40.00	Peak	1	1
(2312.5)	9250.00	-61.90	10.80	-54.18	5.10	V	-48.48	-40.00	Peak		

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■ NR Band: N30

■ Bandwidth: <u>10 MHz</u>

■ Modulation: PI/2 BPSK

■ Distance: <u>1 meters</u>

■ SCS: <u>15 kHz</u>

			Ant. Gain	Substitute			Result	Limit		RB	
Ch	Freq (MHz)	Level (dBm)	(dBi)	Level (dBm)	C.L	Pol	(dBm)	(dBm)	Detector	Size	Offset
462000	4620.00	-62.08	11.50	-65.93	3.43	V	-57.86	-40.00	Peak		
462000 (2310.0)	6930.00	-63.53	10.90	-58.29	4.32	٧	-51.71	-40.00	Peak	1	26
(2310.0)	9240.00	-61.20	10.80	-53.12	5.06	٧	-47.38	-40.00	Peak		

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8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
			BPSK			3.95
			QPSK			4.97
	5 MHz		16-QAM	25		5.35
			64-QAM			5.33
0.1.0.00			256-QAM			5.69
Sub6 n30		2310.0	BPSK		0	4.90
			QPSK			5.23
	10 MHz		16-QAM	50		5.54
			64-QAM			5.58
			256-QAM			5.91

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 54 \sim 63.

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8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			BPSK			4.5249
			QPSK			4.5333
	5 MHz		16-QAM	25		4.5137
			64-QAM			4.5077
6 1 6 20		2210.0	256-QAM			4.5177
Sub6 n30		2310.0	BPSK		0	9.0004
			QPSK			9.0107
	10 MHz		16-QAM	50		8.9801
			64-QAM			8.9648
			256-QAM			8.9576

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 64 ~ 73.

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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)
		2307.5	9.2218	30.015	-71.871	-41.856	
Sub6 n30	5	2310.0	9.2318	30.015	-71.714	-41.699	-40.00
3000 H30		2312.5	9.2418	30.015	-76.118	-46.103	-40.00
	10	2310.0	9.2223	30.015	-71.426	-41.411	

Note:

- 1. Plots of the EUT's Conducted Spurious Emissions are shown Page 74 ~ 81.
- 2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
- 3. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 - 1	26.694
1 - 5	29.400
5 - 10	30.015
10 - 15	30.540
15 - 20	30.913
Above 20	31.555

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8.6 BAND EDGE

Band Width (MHz)	Frequency (MHz)	Modulation	RB (Size/ Offset)	Frequency Range (MHz)	Maximum Data (dBm)	Limit (dBm)
			25 (0	Below 2288	-65.571	-40
		DDC//		2288 - 2292	-55.256	-37
				2292 - 2296	-42.856	-31
				2296 - 2300	-32.272	-25
				2300 - 2304	-18.397	-13
				2304 - 2305	-18.159	-13
	2307.5			2315 - 2320	-32.434	-13
	2307.5	BPSK	25/0	2320 - 2324	-51.309 -59.175	-25
				2324 - 2328		-31
				2328 - 2337		-37
				2337 - 2341		-31
			2341 - 2345 -65.702	-65.702	-25	
				2345 - 2365	-64.343	-13
				Above 2365	-65.834	-40
	2310.0			Below 2288	2288 - 2292 -59.437 -3	-40
5				2288 - 2292		-37
				2292 - 2296		-31
				2296 - 2300 -40.423	-25	
			2300 - 2305 -26.301	-26.301	-13	
				2315 - 2320 -28.340	-13	
		BPSK	25/0	2320 - 2324	-41.218	-25
				2324 - 2328	-47.709	-31
				2328 - 2337	-56.621	-37
				2337 - 2341	-65.686	-31
				2341 - 2345	-65.593	-25
				2345 - 2365	-64.464	-13
				Above 2365	-65.668	-40
	2312.5			Below 2288	-66.044	-40
		BPSK	25/0	2288 - 2292	-62.330	-37
				2292 - 2296	-52.326	-31
				2296 - 2300	-45.448	-25

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2300 - 2305 -36.813 -13							
2316 - 2320					2300 - 2305	-36.813	-13
2320 - 2324					2315 - 2316	-24.619	-13
2324 - 2328					2316 - 2320	-28.024	-13
2328 - 2337					2320 - 2324	-38.771	-25
2337 - 2341					2324 - 2328	-44.875	-31
10 2310.0 BPSK 50/0 2316 - 2320 -23.771 -13 2320 - 2324 - 30.377 -25 2324 - 2328 - 36.613 -31 2326 - 2337 - 45.067 -37 2337 - 2341 - 64.718 -31 2341 - 2345 - 65.638 -25 2345 - 2365 - 64.320 - 13					2328 - 2337	-53.502	-37
2345 - 2365					2337 - 2341	-65.553	-31
Above 2365 -65.798 -40 Below 2288 -59.374 -40 2288 - 2292 -45.943 -37 2292 - 2296 -33.730 -31 2296 - 2300 -28.102 -25 2300 - 2304 -21.858 -13 2304 - 2305 -24.848 -13 2315 - 2316 -31.770 -13 10 2310.0 BPSK 50/0 2316 - 2320 -23.771 -13 2320 - 2324 -30.377 -25 2324 - 2328 -36.613 -31 2328 - 2337 -45.067 -37 2337 - 2341 -64.718 -31 2341 - 2345 -65.638 -25 2345 - 2365 -64.320 -13					2341 - 2345	-65.623	-25
Below 2288 -59.374 -40 2288 - 2292 -45.943 -37 2292 - 2296 -33.730 -31 2296 - 2300 -28.102 -25 2300 - 2304 -21.858 -13 2304 - 2305 -24.848 -13 2315 - 2316 -31.770 -13 2316 - 2320 -23.771 -13 2320 - 2324 -30.377 -25 2324 - 2328 -36.613 -31 2328 - 2337 -45.067 -37 2337 - 2341 -64.718 -31 2341 - 2345 -65.638 -25 2345 - 2365 -64.320 -13					2345 - 2365	-64.733	-13
2288 - 2292					Above 2365	-65.798	-40
2292 - 2296					Below 2288	-59.374	-40
2296 - 2300					2288 - 2292	-45.943	-37 -31
2300 - 2304					2292 - 2296	-33.730	
2304 - 2305					2296 - 2300	-28.102	-25
2315 - 2316					2300 - 2304	-21.858	-13
10 2310.0 BPSK 50/0 2316 - 2320 -23.771 -13 2320 - 2324 -30.377 -25 2324 - 2328 -36.613 -31 2328 - 2337 -45.067 -37 2337 - 2341 -64.718 -31 2341 - 2345 -65.638 -25 2345 - 2365 -64.320 -13					2304 - 2305	-24.848	-13
2320 - 2324 - 30.377 - 25 2324 - 2328 - 36.613 - 31 2328 - 2337 - 45.067 - 37 2337 - 2341 - 64.718 - 31 2341 - 2345 - 65.638 - 25 2345 - 2365 - 64.320 - 13		2310.0	BPSK	50/0	2315 - 2316	-31.770	-13
2324 - 2328 -36.613 -31 2328 - 2337 -45.067 -37 2337 - 2341 -64.718 -31 2341 - 2345 -65.638 -25 2345 - 2365 -64.320 -13	10				2316 - 2320	-23.771	-13
2328 - 2337 -45.067 -37 2337 - 2341 -64.718 -31 2341 - 2345 -65.638 -25 2345 - 2365 -64.320 -13					2320 - 2324	-30.377	-25
2337 - 2341					2324 - 2328	-36.613	-31
2341 - 2345					2328 - 2337	-45.067	-37
2345 - 2365 -64.320 -13					2337 - 2341	-64.718	-31
					2341 - 2345	-65.638	-25
Above 2365 -65.682 -40					2345 - 2365	-64.320	-13
					Above 2365	-65.682	-40

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and Width (MHz)	Frequency (MHz)	Modulation	RB (Size/ Offset)	Frequency Range (MHz)	Maximum Data (dBm)	Limit (dBm)
			2288 - 2292 -54. 2292 - 2296 -43. 2296 - 2300 -41.	-65.553	-40	
				2288 - 2292	-54.810	-37
				-43.715	-31	
				-41.135	-25	
				-26.440	-13	
				2304 - 2305	-22.360	-13
	2207.5	DDCIA		2315 - 2320	-39.907	-13
	2307.5	BPSK		2320 - 2324	-45.204	-25
			2324 - 2328 -51.563	-51.563	-31	
			1/2/	2328 - 2337	-59.466	-37
				-65.549	-31	
				-65.648	-25	
				2345 - 2365	-64.362	-13
				Above 2365	-65.777	-40
	2310.0		Below 2288 -65.933	-65.933	-40	
E				2288 - 2292 -59.806	-37	
5			1/0 2292 - 229	2292 - 2296	-46.678	-31
				2296 - 2300	-42.785	-25
				2300 - 2305		-13
				2315 - 2320 -37.657	-37.657	-13
		BPSK	2320 - 2324 -41.016	-41.016	-25	
				2324 - 2328		-31
			1/24	2328 - 2337		-37
			1/24	2337 - 2341	-65.667	-31
				-65.725	-25	
				-64.430	-13	
				Above 2365	-65.740	-40
	2312.5			Below 2288	-66.071	-40
				2288 - 2292	-62.011	-37
		BPSK	1/0	2292 - 2296	-52.154	-31
				2296 - 2300	-44.439	-25

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			1/24	2315 - 2316	-27.751	-13
				2316 - 2320	-30.351	-13
				2320 - 2324	-40.016	-25
				2324 - 2328	-44.874	-31
				2328 - 2337	-52.988	-37
				2337 - 2341	-65.618	-31
				2341 - 2345	-65.703	-25
				2345 - 2365	-64.604	-13
				Above 2365	-65.755	-40
				Below 2288	-65.773	-40
	2310.0			2288 - 2292	-59.488	-37
			1/0	2292 - 2296	-47.410	-31
			1/0	2296 - 2300	-38.178	-25
10			2300 - 2304 -26.165	-26.165	-13	
				2304 - 2305 -29.593	-13	
		BPSK		2315 - 2316	-32.308	-13
				2316 - 2320	-26.346	-13
				2320 - 2324	-39.310	-25
				2324 - 2328 -47.174	-47.174	-31
				-56.453	-37	
				2337 - 2341	-65.534	-31
				2341 - 2345	-65.343	-25
				2345 - 2365	-64.334	-13
				Above 2365	-65.546	-40

Note:

- Plots of the EUT's Band Edge are shown Page 82 ~ 193.

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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. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	2307 500 000	0.0	0.000 000	0.000
	100 %	-30	2307 500 000	-0.1	0.000 000	0.000
	100 %	-20	2307 500 002	1.2	0.000 000	0.001
	100 %	-10	2307 500 001	0.4	0.000 000	0.000
2207.5	100 %	0	2307 500 001	0.6	0.000 000	0.000
2307.5	100 %	+10	2307 500 001	0.7	0.000 000	0.000
	100 %	+30	2307 500 001	0.5	0.000 000	0.000
	100 %	+40	2307 500 001	0.6	0.000 000	0.000
	100 %	+50	2307 500 001	0.7	0.000 000	0.000
	Batt. Endpoint	+20	2307 500 000	0.0	0.000 000	0.000
	100 %	+20(Ref)	2312 500 001	0.0	0.000 000	0.000
	100 %	-30	2312 500 003	2.0	0.000 000	0.001
	100 %	-20	2312 500 002	0.8	0.000 000	0.000
	100 %	-10	2312 500 002	1.4	0.000 000	0.001
2212.5	100 %	0	2312 500 002	1.0	0.000 000	0.000
2312.5	100 %	+10	2312 500 002	1.4	0.000 000	0.001
	100 %	+30	2312 500 002	0.9	0.000 000	0.000
	100 %	+40	2312 500 003	2.0	0.000 000	0.001
	100 %	+50	2312 500 003	1.6	0.000 000	0.001
	Batt. Endpoint	+20	2312 500 003	1.9	0.000 000	0.001

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■ BandWidth: <u>10 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	2310 000 000	0.0	0.000 000	0.000
	100 %	-30	2310 000 001	0.4	0.000 000	0.000
	100 %	-20	2310 000 000	0.0	0.000 000	0.000
	100 %	-10	2309 999 999	-1.1	0.000 000	0.000
2210.0	100 %	0	2309 999 999	-1.5	0.000 000	-0.001
2310.0	100 %	+10	2310 000 000	-0.2	0.000 000	0.000
	100 %	+30	2310 000 000	-0.6	0.000 000	0.000
	100 %	+40	2310 000 000	-0.7	0.000 000	0.000
	100 %	+50	2309 999 999	-1.0	0.000 000	0.000
	Batt. Endpoint	+20	2310 000 000	-0.5	0.000 000	0.000

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9. TEST DATA(ANT F)

9.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq	Mod/ Bandwidth	Modulation		Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP	ı	RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-25.68	10.69	10.00	2.30	Н		0.069	18.39		
		QPSK	-25.72	10.65	10.00	2.30	Н		0.068	18.35		
2307.5		16-QAM	-26.69	9.68	10.00	2.30	Н		0.055	17.38	1	1
		64-QAM	-28.25	8.12	10.00	2.30	Н		0.038	15.82		
		256-QAM	-30.17	6.20	10.00	2.30	Н		0.025	13.90		
		PI/2 BPSK	-25.64	10.73	10.00	2.30	Н		0.070	18.43		
	Sub6 n30/	QPSK	-25.71	10.66	10.00	2.30	Н		0.069	18.36		
2310.0	5 MHz	16-QAM	-26.68	9.69	10.00	2.30	Н	< 0.25	0.055	17.39	1	23
	[15 kHz]	64-QAM	-28.16	8.21	10.00	2.30	Н		0.039	15.91		
		256-QAM	-30.13	6.24	10.00	2.30	Н		0.025	13.94		
		PI/2 BPSK	-25.61	10.76	10.00	2.30	Н		0.070	18.46		
		QPSK	-25.70	10.67	10.00	2.30	Н		0.069	18.37		
2312.5		16-QAM	-26.67	9.70	10.00	2.30	Н		0.055	17.40	1	23
		64-QAM	-28.02	8.35	10.00	2.30	Н		0.040	16.05		
		256-QAM	-30.16	6.21	10.00	2.30	Н		0.025	13.91		

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Freq	Mod/ Bandwidth	Modulation		Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm) (d	(dBm)	(dBi)			W	W	dBm	Size	Offset
		PI/2 BPSK	-25.58	10.79	10.00	2.30	Н		0.071	18.49		
	Sub6 n30/	QPSK	-25.61	10.76	10.00	2.30	Н		0.070	18.46		
2310.0	10 MHz	16-QAM	-26.56	9.81	10.00	2.30	Н	< 0.25	0.056	17.51	1	50
	[15 kHz]	64-QAM	-28.08	8.29	10.00	2.30	Н		0.040	15.99		
		256-QAM	-30.19	6.18	10.00	2.30	Н		0.024	13.88		

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9.2 RADIATED SPURIOUS EMISSIONS

■ NR Band: <u>N30</u>

■ Bandwidth: <u>5 MHz</u>

■ Modulation: PI/2 BPSK

■ Distance: <u>1 meters</u>

■ SCS: <u>15 kHz</u>

- Ch	F (MII-)	Measured	Ant. Gain	Substitute	6.1	D. I	Result	Limit	Datasta	RB	
Ch	Freq (MHz)	Level (dBm)	(dBi)	Level (dBm)	C.L	Pol	(dBm)	(dBm)	Detector	Size	Offset
	4615.00	-60.87	11.50	-64.64	3.43	V	-56.57	-40.00	Peak		
461500 (2307.5)	6922.50	-61.17	10.90	-55.97	4.32	Н	-49.39	-40.00	Peak	1	1
(2301.3)	9230.00	-62.41	10.80	-54.94	5.02	Н	-49.16	-40.00	Average		
	4620.00	-61.96	11.50	-65.81	3.43	Н	-57.74	-40.00	Peak		
462000 (2310.0)	6930.00	-61.49	10.90	-56.25	4.32	Н	-49.67	-40.00	Peak	1	23
(2310.0)	9240.00	-59.85	10.80	-51.77	5.06	Н	-46.03	-40.00	Average		
	4625.00	-59.01	11.50	-63.02	3.44	Н	-54.96	-40.00	Peak		
462500 (2312.5)	6937.50	-59.80	10.90	-54.68	4.32	Н	-48.10	-40.00	Peak	1	23
(2312.3)	9250.00	-59.03	10.80	-51.31	5.10	Н	-45.61	-40.00	Average		

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■ NR Band: <u>N30</u>

■ Bandwidth: <u>10 MHz</u>

■ Modulation: PI/2 BPSK

■ Distance: 1 meters

■ SCS: <u>15 kHz</u>

Ch	Freq (MHz)	Measured Level	Ant. Gain (dBi)	Substitute Level	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
		(dBm)	, ,	(dBm)			,	,		Size	Offset
	4620.00	-59.73	11.50	-63.58	3.43	Н	-55.51	-40.00	Peak		
462000 (2310.0)	6930.00	-62.26	10.90	-57.02	4.32	Н	-50.44	-40.00	Peak	1	50
	9240.00	-58.72	10.80	-50.64	5.06	Н	-44.90	-40.00	Average		

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9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
			BPSK			4.42
			QPSK			5.58
	5 MHz		16-QAM	25		6.23
			64-QAM			6.23 6.27 6.08 4.56
6 1 6 20		0010.0	256-QAM			
Sub6 n30		2310.0	BPSK		0	4.56
			QPSK			5.64
	10 MHz		16-QAM	50		6.40
			64-QAM			6.49
			256-QAM			6.48

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 195 \sim 204.

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9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			BPSK			4.6809
			QPSK			4.6560
	5 MHz		16-QAM	25		4.6784
			64-QAM			4.6784
		2212.2	256-QAM			4.7468
Sub6 n30		2310.0	BPSK		0	4.7468 9.0022
			QPSK			8.9998
	10 MHz		16-QAM	50		9.0075
			64-QAM			9.0275
			256-QAM			8.9909

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 205 ~ 214.

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9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		2307.5	8.2832	30.815	-80.639	-49.824	
Sub6 n30	5	2310.0	4.6162	30.200	-80.459	-50.259	-40.00
3000 1130		2312.5	8.3196	30.815	-80.682	-49.867	-40.00
	10	2310.0	8.8679	30.815	-80.166	-49.351	

Note:

- 1. Plots of the EUT's Conducted Spurious Emissions are shown Page 215 ~ 218.
- 2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
- 3. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 - 1	27.494
1 - 5	30.200
5 - 10	30.815
10 - 15	31.340
15 - 20	31.713
Above 20	32.355

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9.6 BAND EDGE

and Width (MHz)	Frequency (MHz)	Modulation	RB (Size/ Offset)	Frequency Range (MHz)	Maximum Data (dBm)	Limit (dBm)
				Below 2288	-65.301	-40
				2288 - 2292	-52.333	-37
				2292 - 2296	-43.938	-31
				2296 - 2300	-34.575	-25
				2300 - 2304	-24.664	-13
				2304 - 2305	-25.460	-13
				2315 - 2320	-36.094	-13
	2307.5	BPSK	25/0	2320 - 2324	-45.315	-25
				2324 - 2328	-50.327	-31
				2328 - 2337	-54.469	-37
				2337 - 2341	-65.621	-31
				2341 - 2345	-65.626	-25
				2345 - 2365	-64.372	-13
				Above 2365	-65.562	-40
				Below 2288	-65.780	-40
5				2288 - 2292	-55.561	-37
				2292 - 2296	-47.103	-31
				2296 - 2300	-40.640	-25
				2300 - 2305	-26.476	-13
				2315 - 2320	-27.149	-13
	2310.0	BPSK	25/0	2320 - 2324	-42.320	-25
				2324 - 2328	-47.128	-31
				2328 - 2337	-51.529	-37
				2337 - 2341	-65.674	-31
				2341 - 2345	-65.528	-25
				2345 - 2365	-64.142	-13
				Above 2365	-65.766	-40
				Below 2288	-65.965	-40
				2288 - 2292	-58.487	-37
	2312.5	BPSK	25/0	2292 - 2296	-50.422	-31
				2296 - 2300	-43.900	-25

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2300 - 2305 -31.249 -13							
2316 - 2320					2300 - 2305	-31.249	-13
2320 - 2324					2315 - 2316	-26.600	-13
2324 - 2328					2316 - 2320	-22.516	-13
2328 - 2337					2320 - 2324	-34.055	-25
2337 - 2341					2324 - 2328	-43.691	-31
2341 - 2345					2328 - 2337	-48.575	-37
2345 - 2365					2337 - 2341	-65.628	-31
Above 2365 -65.707 -40 Below 2288 -65.286 -40 2288 - 2292 -46.564 -37 2292 - 2296 -38.066 -31 2296 - 2300 -32.550 -25 2300 - 2304 -27.544 -13 2304 - 2305 -27.419 -13 2315 - 2316 -33.935 -13 10 2310.0 BPSK 50/0 2316 - 2320 -28.830 -13 2320 - 2324 -31.033 -25 2324 - 2328 -41.765 -31 2328 - 2337 -43.935 -37 2337 - 2341 -65.653 -31 2341 - 2345 -65.684 -25 2345 - 2365 -64.220 -13					2341 - 2345	-65.725	-25
Below 2288					2345 - 2365	-64.411	-13
2288 - 2292					Above 2365	-65.707	-40
2292 - 2296					Below 2288	-65.286	-40
2296 - 2300					2288 - 2292	-46.564	-37
2300 - 2304					2292 - 2296	-38.066	-31
2304 - 2305					2296 - 2300	-32.550	-25
2315 - 2316					2300 - 2304	-27.544	-13
10 2310.0 BPSK 50/0 2316 - 2320 -28.830 -13 2320 - 2324 -31.033 -25 2324 - 2328 -41.765 -31 2328 - 2337 -43.935 -37 2337 - 2341 -65.653 -31 2341 - 2345 -65.684 -25 2345 - 2365 -64.220 -13					2304 - 2305	-27.419	-13
2320 - 2324 - 31.033 - 25 2324 - 2328 - 41.765 - 31 2328 - 2337 - 43.935 - 37 2337 - 2341 - 65.653 - 31 2341 - 2345 - 65.684 - 25 2345 - 2365 - 64.220 - 13					2315 - 2316	-33.935	-13
2324 - 2328 -41.765 -31 2328 - 2337 -43.935 -37 2337 - 2341 -65.653 -31 2341 - 2345 -65.684 -25 2345 - 2365 -64.220 -13	10	2310.0	BPSK	50/0	2316 - 2320	-28.830	-13
2328 - 2337 -43.935 -37 2337 - 2341 -65.653 -31 2341 - 2345 -65.684 -25 2345 - 2365 -64.220 -13					2320 - 2324	-31.033	-25
2337 - 2341					2324 - 2328	-41.765	-31
2341 - 2345 -65.684 -25 2345 - 2365 -64.220 -13					2328 - 2337	-43.935	-37
2345 - 2365 -64.220 -13					2337 - 2341	-65.653	-31
					2341 - 2345	-65.684	-25
Above 2365 -65.711 -40					2345 - 2365	-64.220	-13
					Above 2365	-65.711	-40

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Band Width (MHz)	Frequency (MHz)	Modulation	RB (Size/ Offset)	Frequency Range (MHz)	Maximum Data (dBm)	Limit (dBm)
				Below 2288	-65.349	-40
				2288 - 2292	-51.857	-37
			1/0	2292 - 2296	-43.627	-31
			1/0	2296 - 2300	-40.837	-25
				2300 - 2304	-28.709	-13
				2304 - 2305	-27.027	-13
	2207.5	DDCIA		2315 - 2320	-40.914	-13
	2307.5	BPSK		2320 - 2324	-45.400	-25
				2324 - 2328	-50.697	-31
			1/24	2328 - 2337	-54.711	-37
				2337 - 2341	-65.639	-31
				2341 - 2345	-65.656	-25
				2345 - 2365	-64.405	-13
				Above 2365	-65.703	-40
	2310.0	BPSK	1/0	Below 2288	-65.838	-40
				2288 - 2292	-55.582	-37
5				2292 - 2296	-46.579	-31
				2296 - 2300	-41.725	-25
				2300 - 2305	-35.062	-13
			1/24	2315 - 2320	-37.341	-13
				2320 - 2324	-41.442	-25
				2324 - 2328	-47.076	-31
				2328 - 2337	-51.851	-37
			1/24	2337 - 2341	-65.726	-31
				2341 - 2345	-65.685	-25
				2345 - 2365	-64.351	-13
				Above 2365	-65.701	-40
				Below 2288	-66.030	-40
		BPSK	1/0	2288 - 2292	-58.857	-37
	2312.5			2292 - 2296	-50.639	-31
				2296 - 2300	-44.227	-25
				2300 - 2305	-40.585	-13

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				2315 - 2316	-32.410	-13
				2316 - 2320	-33.099	-13
				2320 - 2324	-41.812	-25
			1/24	2324 - 2328	-44.493	-31
				2328 - 2337	-48.764	-37
				2337 - 2341	-65.622	-31
				2341 - 2345	-65.555	-25
				2345 - 2365	-64.422	-13
				Above 2365	-65.666	-40
		BPSK	1/0	Below 2288	-65.555	-40
				2288 - 2292	-55.094	-37
				2292 - 2296	-46.857	-31
				2296 - 2300	-39.039	-25
				2300 - 2304	-27.810	-13
				2304 - 2305	-30.738	-13
			1/49	2315 - 2316	-34.452	-13
10	2310.0			2316 - 2320	-31.116	-13
				2320 - 2324	-41.783	-25
				2324 - 2328	-47.204	-31
				2328 - 2337	-51.630	-37
				2337 - 2341	-65.703	-31
				2341 - 2345	-65.733	-25
				2345 - 2365	-64.544	-13
				Above 2365	-65.818	-40

Note:

- Plots of the EUT's Band Edge are shown Page 219 ~ 334.

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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 Error	Deviation	ppm	
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)		
	100 %	+20(Ref)	2307 500 001	0.0	0.000 000	0.000	
	100 %	-30	2307 500 002	0.5	0.000 000	0.000	
	100 %	-20	2307 500 002	1.4	0.000 000	0.001	
	100 %	-10	2307 500 002	0.7	0.000 000	0.000	
2207.5	100 %	0	2307 500 002	0.8	0.000 000	0.000	
2307.5	100 %	+10	2307 500 002	0.7	0.000 000	0.000	
	100 %	+30	2307 500 000	-0.7	0.000 000	0.000	
	100 %	+40	2307 500 002	1.1	0.000 000	0.000	
	100 %	+50	2307 500 002	1.4	0.000 000	0.001	
	Batt. Endpoint	+20	2307 500 002	1.0	0.000 000	0.000	
	100 %	+20(Ref)	2312 500 000	0.0	0.000 000	0.000	
	100 %	-30	2312 500 000	0.1	0.000 000	0.000	
	100 %	-20	2312 500 000	-0.5	0.000 000	0.000	
	100 %	-10	2312 500 001	0.6	0.000 000	0.000	
2312.5	100 %	0	2312 500 000	-0.1	0.000 000	0.000	
2312.5	100 %	+10	2312 499 998	-2.0	0.000 000	-0.001	
	100 %	+30	2312 500 000	0.3	0.000 000	0.000	
	100 %	+40	2312 500 000	-0.3	0.000 000	0.000	
	100 %	+50	2312 500 000	-0.5	0.000 000	0.000	
	Batt. Endpoint	+20	2312 500 001	0.6	0.000 000	0.000	

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■ BandWidth: <u>10 MHz</u>

■ Voltage(100 %): 3.880 VDC

■ Batt. Endpoint: 3.300 VDC

■ LIMIT: Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm	
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)		
	100 %	+20(Ref)	2309 999 998	0.0	0.000 000	0.000	
	100 %	-30	2309 999 999	0.9	0.000 000	0.000	
	100 %	-20	2309 999 998	-0.2	0.000 000	0.000	
	100 %	-10	2309 999 997	-1.0	0.000 000	0.000	
2210.0	100 %	0	2309 999 998	-0.6	0.000 000	0.000	
2310.0	100 %	+10	2309 999 996	-2.3	0.000 000	-0.001	
	100 %	+30	2309 999 997	-1.2	0.000 000	-0.001	
	100 %	+40	2309 999 997	-1.6	0.000 000	-0.001	
	100 %	+50	2309 999 997	-1.4	0.000 000	-0.001	
	Batt. Endpoint	+20	2309 999 996	-1.9	0.000 000	-0.001	

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10. TEST DATA (ANT A, Ant A)

10.1 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.
 - N30A(ANT A)-N66A(ANT A)

(PCC - Modulation: BPSK, RB: 1, RB Offset: 12, SCC - Modulation: BPSK, RB: 1, RB Offset: 12)

Radiated Spurious Emissions

PCC	scc	P	СС	SCC		
	SCC	BW(MHz)	Channel	BW(MHz)	Channel	
N30A(ANT A)	N66A(ANT A)	5	462000	5	355500	

10.1.1 RADIATED SPURIOUS EMISSIONS

N30A(ANT A)(PCC)- N66A(ANT A)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
4 620.00	-61.96	11.50	-65.81	3.43	V	-57.74	-40.00
6 930.00	-64.91	10.90	-59.67	4.32	V	-53.09	-40.00
9 240.00	-61.86	10.80	-53.78	5.06	V	-48.04	-40.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 555.00	-60.08	11.40	-62.05	3.02	V	-53.67	-13.00
5 332.50	-61.77	11.40	-56.72	3.73	V	-49.05	-13.00
7 110.00	-62.76	10.50	-48.82	4.36	V	-42.68	-13.00

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11. TEST PLOTS(ANT A)

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5 M_PAR_Mid_BPSK_FullRB Spectrum Analyzer Power Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None Atten: 10 dB Preamp: Off Trig: Free Run #IF Gain: Low KEYSIGHT Input. RF Center Frequency Align: Auto 2.310000000 GHz L)(I 1 Metrics 2 Graph 10.000000 MHz Auto Man Average Power Freq Offset 0 Hz 23.48 dBm 49.84 % at 0 dB 10.0 % 1.89 dB 1.0 % 3.17 dB 0.1 % 3.95 dB 4.44 dB 0.01 % 4.76 dB 0.001 % 4.86 dB 0.0001 % 4.88 dB 28.36 dBm Local 0.00 dB Info BW 5.0000 MHz 20.00 dB

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5 M_PAR_Mid_QPSK_FullRB



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1 5 C Jun 03, 2024 Siz9:36 PM

ectrum Analyzer 1 ower Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None KEYSIGHT Input RF Atten: 10 dB Preamp: Off Center Frequency 2.310000000 GHz Settings R L Align: Auto CF Step 5.000000 MHz 2 Graph 1 Metrics Auto Man Average Power 22.24 dBm Freq Offset 0 Hz 47.36 % at 0 dB 10.0 % 2.77 dB 1.0 % 4.47 dB 0.1 % 5.35 dB 0.01 % 5.90 dB 0.001 % 6.22 dB 0.0001 % 6.45 dB 6.45 dB Peak 28.69 dBm Local 0.00 dB Info BW 5.0000 MHz 20.00 dB

5 M_PAR_Mid_16QAM_FullRB

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Frequency



ø Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None Atten: 10 dB Preamp: Off

5 M_PAR_Mid_64QAM_FullRB

ectrum Analyzer 1 ower Stat CCDF Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input RF Settings R L Align: Auto 2.310000000 GHz CF Step 5.000000 MHz 1 Metrics 2 Graph Auto Man Average Power 21.87 dBm Freq Offset 0 Hz 46.37 % at 0 dB 10.0 % 2.81 dB 1.0 % 4.47 dB 0.1 % 5.33 dB 0.01 % 5.83 dB 0.001 % 6.23 dB 0.0001 % 6.60 dB 6.61 dB Peak 28.48 dBm Local 0.00 dB Info BW 5.0000 MHz 20.00 dB

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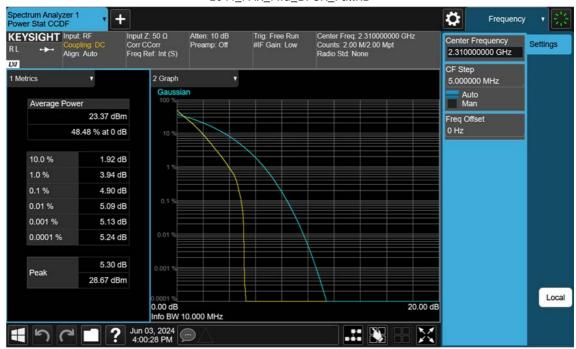
ectrum Analyzer 1 ower Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None KEYSIGHT Input RF Atten: 10 dB Preamp: Off Center Frequency 2.310000000 GHz Settings R L Align: Auto CF Step 5.000000 MHz 1 Metrics 2 Graph Auto Man Average Power 20.08 dBm Freq Offset 0 Hz 44.90 % at 0 dB 10.0 % 2.94 dB 1.0 % 4.79 dB 0.1 % 5.69 dB 0.01 % 6.11 dB 0.001 % 6.51 dB 0.0001 % 6.84 dB 6.86 dB Peak 26.94 dBm Local 0.00 dB Info BW 5.0000 MHz 20.00 dB

5 M_PAR_Mid_256QAM_FullRB

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10 M_PAR_Mid_BPSK_FullRB



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10 M_PAR_Mid_QPSK_FullRB



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ectrum Analyzer 1 ower Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None KEYSIGHT Input RF Atten: 10 dB Preamp: Off Center Frequency 2.310000000 GHz Settings R L Align: Auto CF Step 10.000000 MHz 1 Metrics 2 Graph Auto Man Average Power 22.09 dBm Freq Offset 0 Hz 45.70 % at 0 dB 10.0 % 2.92 dB 1.0 % 4.78 dB 0.1 % 5.54 dB 0.01 % 6.10 dB 0.001 % 6.52 dB 0.0001 % 6.67 dB 6.77 dB Peak 28.86 dBm Local 0.00 dB Info BW 10.000 MHz 20.00 dB Jun 03, 2024 (201:13 PM)

10 M_PAR_Mid_16QAM_FullRB

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10 M_PAR_Mid_64QAM_FullRB ectrum Analyzer 1 ower Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None KEYSIGHT Input RF Atten: 10 dB Preamp: Off Center Frequency 2.310000000 GHz Settings R L Align: Auto CF Step 10.000000 MHz 1 Metrics 2 Graph Auto Man Average Power 21.72 dBm Freq Offset 0 Hz 44.13 % at 0 dB 10.0 % 3.02 dB 1.0 % 4.82 dB 0.1 % 5.58 dB 0.01 % 6.07 dB 0.001 % 6.51 dB 0.0001 % 6.76 dB 6.93 dB Peak 28.65 dBm Local 0.00 dB Info BW 10.000 MHz 20.00 dB

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Jun 03, 2024 9:01:58 PM

ectrum Analyzer 1 ower Stat CCDF ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Center Freq: 2.310000000 GHz Counts: 2.00 M/2.00 Mpt Radio Std: None KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings R L Align: Auto 2.310000000 GHz CF Step 10.000000 MHz 1 Metrics 2 Graph Auto Man Average Power 20.02 dBm Freq Offset 0 Hz 43.28 % at 0 dB 10.0 % 3.12 dB 1.0 % 5.09 dB 0.1 % 5.91 dB 0.01 % 6.44 dB 0.001 % 6.61 dB 0.0001 % 6.66 dB 6.78 dB Peak 26.80 dBm Local 0.00 dB Info BW 10.000 MHz 20.00 dB

10 M_PAR_Mid_256QAM_FullRB

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5 M_OBW_Mid_BPSK_FullRB



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1 5 C 1 ? Jun 03, 2024 5 3:28:55 PM

pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph Ref LvI Offset 27.16 dB Ref Value 40.00 dBm 10.000 MHz Scale/Div 10.0 dB CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz Center 2.310000 GHz #Res BW 100.00 kHz Span 10 MHz Sweep 16.7 ms (1001 pts) #Video BW 390.00 kHz 2 Metrics Occupied Bandwidth 4.5333 MHz Total Power 32.0 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -11.268 kHz 5.398 MHz 99.00 % -26.00 dB Local

III 🐺

5 M_OBW_Mid_QPSK_FullRB

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5 M_OBW_Mid_16QAM_FullRB pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph Ref LvI Offset 27.16 dB Ref Value 40.00 dBm 10.000 MHz Scale/Div 10.0 dB CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz Center 2.310000 GHz #Res BW 100.00 kHz Span 10 MHz Sweep 16.7 ms (1001 pts) #Video BW 390.00 kHz 2 Metrics Occupied Bandwidth 4.5137 MHz Total Power 31.2 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -2.193 kHz 5.449 MHz 99.00 % -26.00 dB Local

III 🐺

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pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph 10.000 MHz Ref LvI Offset 27.16 dB Ref Value 40.00 dBm Scale/Div 10.0 dB CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz Center 2.310000 GHz #Res BW 100.00 kHz Span 10 MHz Sweep 16.7 ms (1001 pts) #Video BW 390.00 kHz 2 Metrics Occupied Bandwidth 4.5077 MHz 30.7 dBm Total Power % of OBW Power x dB Transmit Freq Error x dB Bandwidth -6.208 kHz 5.314 MHz 99.00 % -26.00 dB Local 1 5 C 1 ? Jun 03, 2024 5 3:29:58 PM III 🐺

5 M_OBW_Mid_64QAM_FullRB

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1 5 C 7 Jun 03, 2024 3:30:31 PM

pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph Ref LvI Offset 27.16 dB Ref Value 40.00 dBm 10.000 MHz Scale/Div 10.0 dB CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz Center 2.310000 GHz #Res BW 100.00 kHz Span 10 MHz Sweep 16.7 ms (1001 pts) #Video BW 390.00 kHz 2 Metrics Occupied Bandwidth 4.5177 MHz 28.7 dBm Total Power % of OBW Power x dB Transmit Freq Error x dB Bandwidth -12.282 kHz 5.280 MHz 99.00 % -26.00 dB Local

III 🐺

5 M_OBW_Mid_256QAM_FullRB

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10 M_OBW_Mid_BPSK_FullRB



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pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph 20.000 MHz Ref LvI Offset 27.16 dB Ref Value 40.00 dBm Scale/Div 10.0 dB CF Step 2.000000 MHz Auto Man Freq Offset 0 Hz Center 2.31000 GHz #Res BW 200.00 kHz Span 20 MHz Sweep 1.00 ms (1001 pts) #Video BW 820.00 kHz 2 Metrics Occupied Bandwidth 9.0107 MHz Total Power 31.2 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -203.04 kHz 10.08 MHz 99.00 % -26.00 dB Local

III 🐺

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10 M_OBW_Mid_QPSK_FullRB

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10 M_OBW_Mid_16QAM_FullRB



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pectrum Analyzer 1 ccupied BW ø Frequency Center Freq. 2.310000000 GHz Avg|Hold: 500/500 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF Atten: 10 dB Preamp: Off Settings RL Coupling: CAlign: Auto 2.310000000 GHz 1 Graph 20.000 MHz Ref LvI Offset 27.16 dB Ref Value 40.00 dBm Scale/Div 10.0 dB CF Step 2.000000 MHz Auto Man Freq Offset 0 Hz Center 2.31000 GHz #Res BW 200.00 kHz Span 20 MHz Sweep 1.00 ms (1001 pts) #Video BW 820.00 kHz 2 Metrics Occupied Bandwidth 8.9648 MHz Total Power 29.8 dBm % of OBW Power x dB Transmit Freq Error x dB Bandwidth -201.66 kHz 10.00 MHz 99.00 % -26.00 dB Local

III 🐺

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10 M_OBW_Mid_64QAM_FullRB

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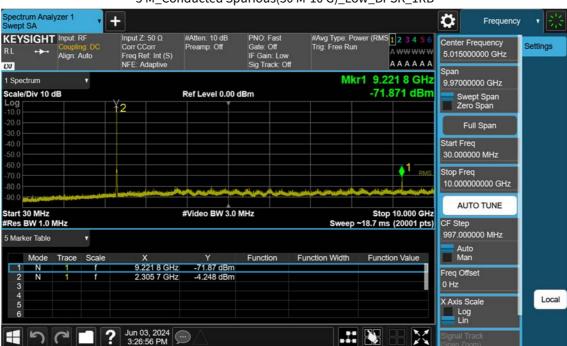


10 M_OBW_Mid_256QAM_FullRB



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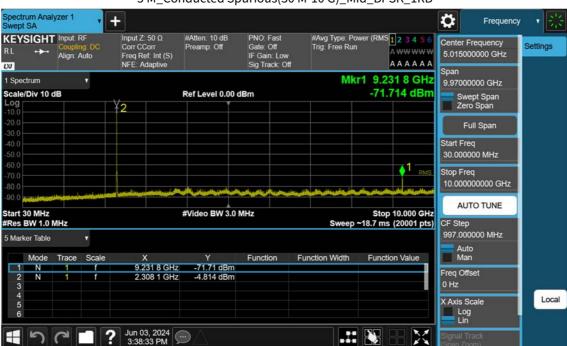




5 M_Conducted Spurious(30 M-10 G)_Low_BPSK_1RB

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5 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB

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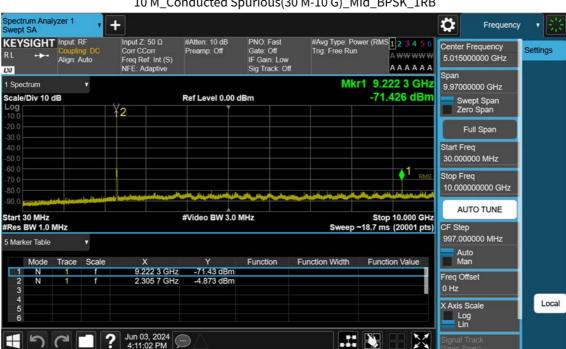




5 M_Conducted Spurious(30 M-10 G)_High_BPSK_1RB

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10 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB

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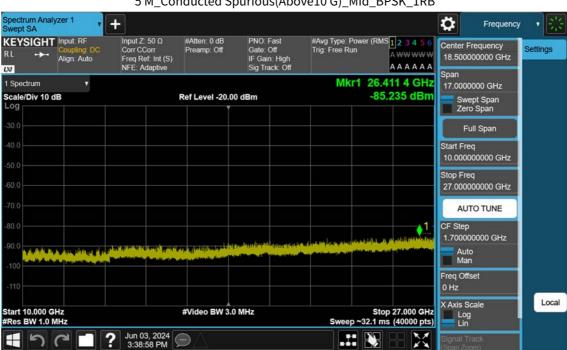


ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run KEYSIGHT Input RF Settings Align: Auto 18.500000000 GHz AAAAAA ĻΧI Mkr1 26.280 0 GHz 1 Spectrum 17.0000000 GHz -85.051 dBm Scale/Div 10 dB Ref Level -20.00 dBm Swept Span Zero Span Full Span Start Freq 10.000000000 GHz Stop Freq 27.000000000 GHz AUTO TUNE 1.700000000 GHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 10.000 GHz #Res BW 1.0 MHz Stop 27.000 GHz Sweep ~32.1 ms (40000 pts) #Video BW 3.0 MHz Log Lin ? Jun 03, 2024 III 🐺

5 M_Conducted Spurious(Above10 G)_Low_BPSK_1RB

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5 M_Conducted Spurious(Above10 G)_Mid_BPSK_1RB

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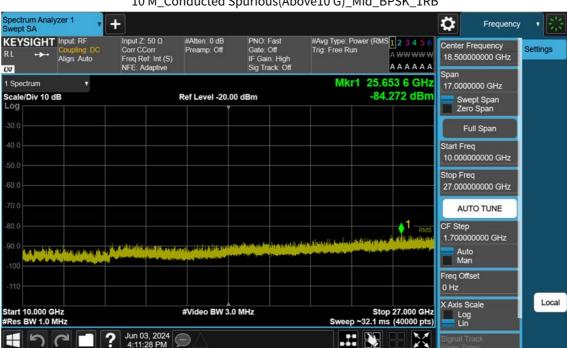




5 M_Conducted Spurious(Above10 G)_High_BPSK_1RB

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10 M_Conducted Spurious(Above10 G)_Mid_BPSK_1RB

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5 M_Band Edge(2280MHz-2288MHz)_Low_BPSK_1RB

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5 M_Band Edge(2288MHz-2292MHz)_Low_BPSK_1RB ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Atten: 10 dB Preamp: Off PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run KEYSIGHT Input RF Center Frequency Settings Align: Auto 2.290000000 GHz AAAAAA ĻΧI Mkr1 2.291 988 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -54.810 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.288000000 GHz Stop Freq 2.292000000 GHz DL1 -37.00 dB AUTO TUNE 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.288000 GHz #Res BW 1.0 MHz Stop 2.292000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2292MHz-2296MHz)_Low_BPSK_1RB

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5 M_Band Edge(2296MHz-2300MHz)_Low_BPSK_1RB

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5 M_Band Edge(2300MHz-2304MHz)_Low_BPSK_1RB

Note: We used a narrower RBW in order to increase accuracy.

Calculation = Reading Value + $10 \times \log(1 \text{ MHz}/100 \text{ kHz})$ dB = -36.440 dBm + $10 \times dB$ = -26.440 dBm

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5 M_Band Edge(2304MHz-2305MHz)_Low_BPSK_1RB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run #Atten: 10 dB Preamp: Off PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings Align: Auto 2.317500000 GHz AAAAAA ĻΧI Mkr1 2.317 260 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 5.00000000 MHz -39.907 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.315000000 GHz Stop Freq 2.320000000 GHz •1 AUTO TUNE 500.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.315000 GHz #Res BW 1.0 MHz Stop 2.320000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2315MHz-2320MHz)_Low_BPSK_1RB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run #Atten: 10 dB Preamp: Off PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings Align: Auto 2.322000000 GHz AAAAAA ĻΧI Mkr1 2.320 012 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -45.204 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.320000000 GHz Stop Freq 2.324000000 GHz AUTO TUNE 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.320000 GHz #Res BW 1.0 MHz Stop 2.324000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2320MHz-2324MHz)_Low_BPSK_1RB

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5 M_Band Edge(2324MHz-2328MHz)_Low_BPSK_1RB

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5 M_Band Edge(2328MHz-2337MHz)_Low_BPSK_1RB ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run #Atten: 10 dB Preamp: Off PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings Align: Auto 2.332500000 GHz AAAAAA ĻΧI Mkr1 2.328 000 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 9.00000000 MHz -59.466 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.328000000 GHz Stop Freq 2.337000000 GHz DL1 -37.00 dB AUTO TUNE 900.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.328000 GHz #Res BW 1.0 MHz Stop 2.337000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2337MHz-2341MHz)_Low_BPSK_1RB

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5 M_Band Edge(2341MHz-2345MHz)_Low_BPSK_1RB



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5 M_Band Edge(2345MHz-2365MHz)_Low_BPSK_1RB ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run #Atten: 10 dB Preamp: Off PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Center Frequency Settings Align: Auto 2.355000000 GHz AAAAAA ĻΧI Mkr1 2.351 24 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 20.0000000 MHz -64.362 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.345000000 GHz Stop Freq 2.365000000 GHz AUTO TUNE **1**-CF Step 2.000000 MHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.34500 GHz #Res BW 1.0 MHz Stop 2.36500 GHz #Sweep 1.00 s (1001 pts) #Video BW 3.0 MHz Log Lin

? Jun 03, 2024

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5 M_Band Edge(2365MHz-2400MHz)_Low_BPSK_1RB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.284000000 GHz AAAAAA ĻΧI Mkr1 2.287 952 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 8.00000000 MHz -65.571 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.280000000 GHz Stop Freq 2.288000000 GHz DL1-40.00 dB AUTO TUNE 800.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.280000 GHz #Res BW 1.0 MHz Stop 2.288000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2280MHz-2288MHz)_Low_BPSK_FullRB

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400.000 kHz Auto Man Freq Offset 0 Hz

X Axis Scale

Log Lin

Stop 2.292000 GHz #Sweep ~1.01 s (1001 pts)

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Local



ĻΧI

Start 2.288000 GHz #Res BW 1.0 MHz

ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.290000000 GHz AAAAAA Mkr1 2.292 000 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -55.256 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.288000000 GHz Stop Freq 2.292000000 GHz DL1 -37.00 dB AUTO TUNE

#Video BW 3.0 MHz

? Jun 03, 2024

5 M_Band Edge(2288MHz-2292MHz)_Low_BPSK_FullRB

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Freq Offset 0 Hz

X Axis Scale

Log Lin

Stop 2.296000 GHz #Sweep ~1.01 s (1001 pts)

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Local



Start 2.292000 GHz #Res BW 1.0 MHz

ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.294000000 GHz AAAAAA ĻΧI Mkr1 2.296 000 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -42.856 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.292000000 GHz Stop Freq 2.296000000 GHz AUTO TUNE 400.000 kHz Auto Man

#Video BW 3.0 MHz

5 M_Band Edge(2292MHz-2296MHz)_Low_BPSK_FullRB

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5 M_Band Edge(2296MHz-2300MHz)_Low_BPSK_FullRB



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5 M_Band Edge(2300MHz-2304MHz)_Low_BPSK_FullRB

Note: We used a narrower RBW in order to increase accuracy.

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Calculation = Reading Value + $10 \times \log(1 \text{ MHz}/100 \text{ kHz})$ dB = -28.397 dBm + 10 dB = -18.397 dBm

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5 M_Band Edge(2304MHz-2305MHz)_Low_BPSK_FullRB

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Log Lin

III 🐺



ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.317500000 GHz AAAAAA ĻΧI Mkr1 2.315 030 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 5.00000000 MHz -32.434 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.315000000 GHz 30.0 Stop Freq 2.320000000 GHz AUTO TUNE 500.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.315000 GHz #Res BW 1.0 MHz Stop 2.320000 GHz #Sweep ~1.01 s (1001 pts)

#Video BW 3.0 MHz

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5 M_Band Edge(2315MHz-2320MHz)_Low_BPSK_FullRB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.322000000 GHz AAAAAA ĻΧI Mkr1 2.320 008 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -43.816 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.320000000 GHz Stop Freq 2.324000000 GHz AUTO TUNE 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.320000 GHz #Res BW 1.0 MHz Stop 2.324000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin ? Jun 03, 2024

5 M_Band Edge(2320MHz-2324MHz)_Low_BPSK_FullRB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.326000000 GHz AAAAAA ĻΧI Mkr1 2.324 004 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -51.309 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.324000000 GHz Stop Freq 2.328000000 GHz AUTO TUNE 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.324000 GHz #Res BW 1.0 MHz Stop 2.328000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2324MHz-2328MHz)_Low_BPSK_FullRB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.332500000 GHz AAAAAA ĻΧI Mkr1 2.328 036 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 9.00000000 MHz -59.175 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.328000000 GHz Stop Freq 2.337000000 GHz DL1 -37.00 dB AUTO TUNE 900.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.328000 GHz #Res BW 1.0 MHz Stop 2.337000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2328MHz-2337MHz)_Low_BPSK_FullRB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.339000000 GHz AAAAAA ĻΧI Mkr1 2.337 264 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -65.642 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.337000000 GHz Stop Freq 2.341000000 GHz AUTO TUNE 71 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.337000 GHz #Res BW 1.0 MHz Stop 2.341000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2337MHz-2341MHz)_Low_BPSK_FullRB

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5 M_Band Edge(2341MHz-2345MHz)_Low_BPSK_FullRB ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.343000000 GHz AAAAAA ĻΧI Mkr1 2.342 148 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 4.00000000 MHz -65.702 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.341000000 GHz Stop Freq 2.345000000 GHz AUTO TUNE 400.000 kHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.341000 GHz #Res BW 1.0 MHz Stop 2.345000 GHz #Sweep ~1.01 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2345MHz-2365MHz)_Low_BPSK_FullRB

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ø Frequency Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive #Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 10 dB Preamp: Off Center Frequency Settings Align: Auto 2.382500000 GHz AAAAAA ĻΧI Mkr1 2.368 920 GHz 1 Spectrum Ref LvI Offset 27.16 dB Ref Level 0.00 dBm 35.0000000 MHz -65.834 dBm Scale/Div 10 dB Swept Span Zero Span Full Span Start Freq 2.365000000 GHz Stop Freq 2.400000000 GHz DL1-40.00 dB AUTO TUNE CF Step 3.500000 MHz Auto Man Freq Offset 0 Hz Local X Axis Scale Start 2.36500 GHz #Res BW 1.0 MHz Stop 2.40000 GHz #Sweep 1.00 s (1001 pts) #Video BW 3.0 MHz Log Lin

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5 M_Band Edge(2365MHz-2400MHz)_Low_BPSK_FullRB

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5 M_Band Edge(2280MHz-2288MHz)_Mid_BPSK_1RB

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5 M_Band Edge(2288MHz-2292MHz)_Mid_BPSK_1RB

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5 M_Band Edge(2292MHz-2296MHz)_Mid_BPSK_1RB

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5 M_Band Edge(2296MHz-2300MHz)_Mid_BPSK_1RB

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5 M_Band Edge(2300MHz-2305MHz)_Mid_BPSK_1RB

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