FCC RADIO TEST REPORT

FCC ID	:	**HD5-CT30PL1N**
Equipment	:	**Mobile computer**
Brand Name	:	**Honeywell**
Model Name	:	**CT30PL1N**
Applicant	:	**Honeywell International Inc. 9680 Old Bailes Road, Fort Mill, SC 29707 USA**
Manufacturer	:	**Honeywell International Inc. 9680 Old Bailes Road, Fort Mill, SC 29707 USA**
Standard	:	**FCC 47 CFR Part 2, Part 27(D)**

The product was received on Feb. 14, 2022 and testing was performed from Feb. 25, 2022 to Apr. 13, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

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History of this test report

Report No.	Version	Description	Issued Date
FG1N0508D	01	Initial issue of report	Apr. 22, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§27.50 (a)(3)	Effective Isotropic Radiated Power	Pass	-
3.5	§2.1049	Occupied Bandwidth	Reporting only	-
3.6	§2.1051 §27.53 (a)(4)	Conducted Band Edge Measurement	Pass	-
3.7	§2.1051 §27.53 (a)(4)	Conducted Spurious Emission	Pass	-
3.8	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §27.53 (a)(4)	Radiated Spurious Emission	Pass	Under limit 7.24 dB at 11538.000 MHz

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
   It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Wei Chen

Report Producer: Cindy Liu

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac, Wi-Fi 5GHz 802.11a/n/ac, NFC, and GNSS.

Product Feature	
HW Version	v1.0
SW Version	OS.11.003-HON.11.003
Sample	Scanner S0703
Antenna Type	WWAN <Ant. 1>: Loop Antenna <Ant. 2>: PIFA Antenna <Ant. 3>: Monopole Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS / Glonass / BDS / Galileo: PIFA Antenna NFC: Loop Antenna

Antenna Information	
Antenna Gain	**<Ant. 1>:**-1.0 dBi

Remark:

1. The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.
2. Internal tracking board version is DVT1 and SW PN is 311.C0.00.0838-G-DEBUG.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Site

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY
Test Engineer	Bryant Liu
Temperature (℃)	22.5~24.4
Relative Humidity (%)	52~58

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH15-HY (TAF Code: 3786)
Test Engineer	Leo Li, Mancy Chou and Bigshow Wang
Temperature (℃)	22.5~24.5
Relative Humidity (%)	40~60
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

ISED Company Number: 4086B and 4086H

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- FCC 47 CFR Part 2, Part 27(D)
- ANSI / TIA-603-E
- FCC KDB 971168 Power Meas License Digital Systems D01 v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

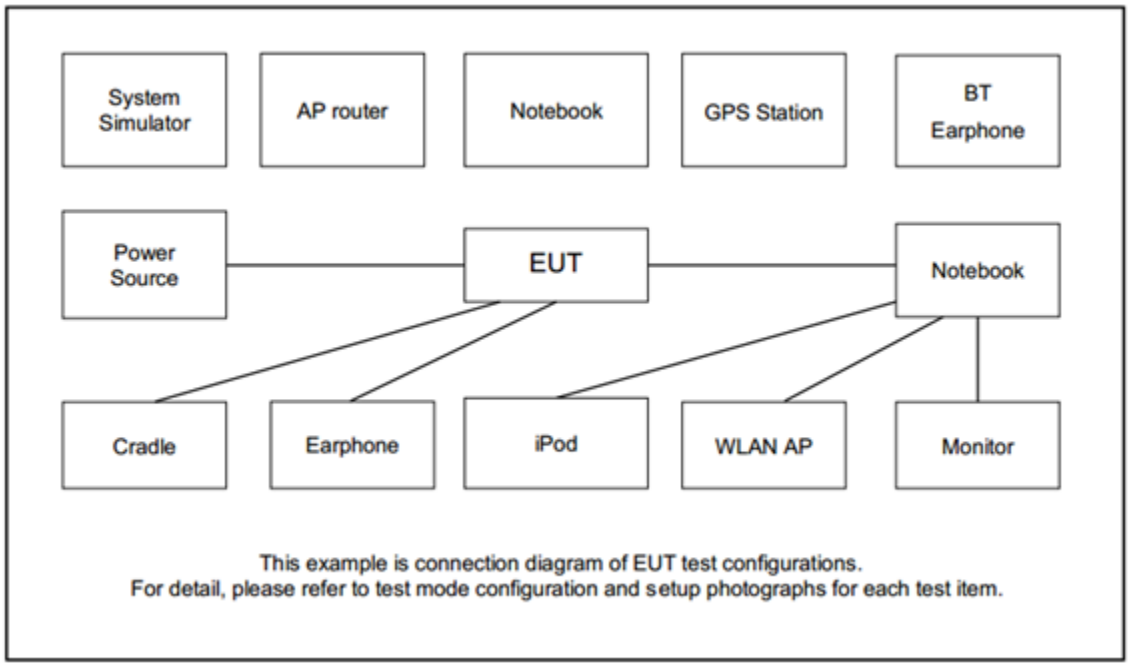
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find X plane as worst plane.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	30	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	30	-	-		v	-	-	v	v	v			v		v	
E.I.R.P	30	-	-	v	v	-	-	v	v	v	Max. Power					
26dB and 99% Bandwidth	30	-	-	v	v	-	-	v	v	v			v		v	
Conducted Band Edge	30	-	-	v	v	-	-	v	v	v	v		v	v		v
Conducted Spurious Emission	30	-	-	v	v	-	-	v			v			v	v	v
Frequency Stability	30	-	-		v	-	-	v					v		v	
Radiated Spurious Emission	30	Worst Case												v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 30 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	-	27710	-
	Frequency	-	2310	-
5	Channel	27685	27710	27735
	Frequency	2307.5	2310	2312.5

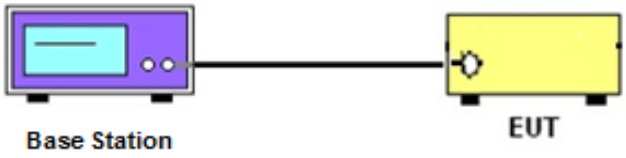
3 Conducted Test Items

3.1 Measuring Instruments

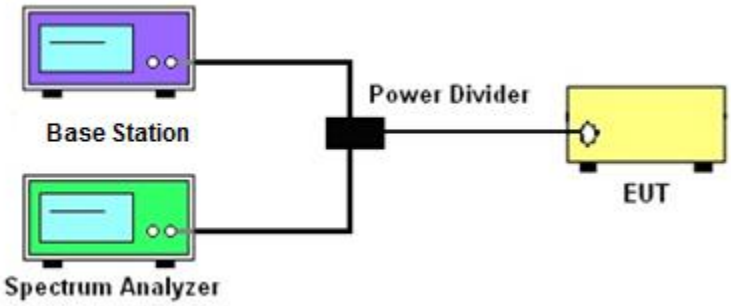
See list of measuring instruments of this test report.

3.1.1 Test Setup

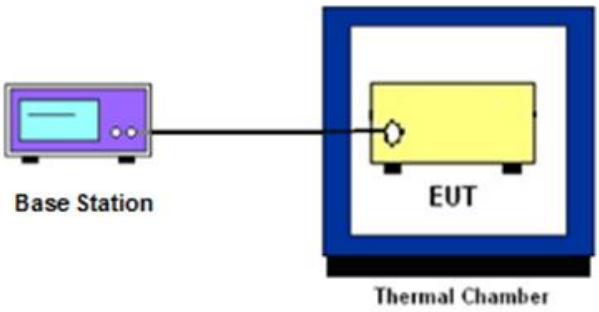
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, 26dB Bandwidth ,Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power Measurement

3.2.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Effective Isotropic Radiated Power

3.4.1 Description of EIRP Power

For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, *except that* for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

Remark: EIRP use worst case measure the total power to cover per 5MHz Power.
According to KDB 412172 D01 Power Approach,
EIRP = $P_T + G_T – L_C$, where
P_T = transmitter output power in dBm
G_T = gain of the transmitting antenna in dBi
L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.4.5

1. Determine the EIRP by adding the effective antenna gain to the adjusted power level

3.5 Occupied Bandwidth

3.5.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is 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 transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.5.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.6 Conducted Band Edge

3.6.1 Description of Conducted Band Edge Measurement

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.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

3.7 Conducted Spurious Emission

3.7.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 70 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 9 kHz up to a frequency including its 10th harmonic.

3.7.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
   The limit line is derived from 70 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [70 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [70 + 10log(P)] (dB)
   = -40dBm.

3.8 Frequency Stability

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.8.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

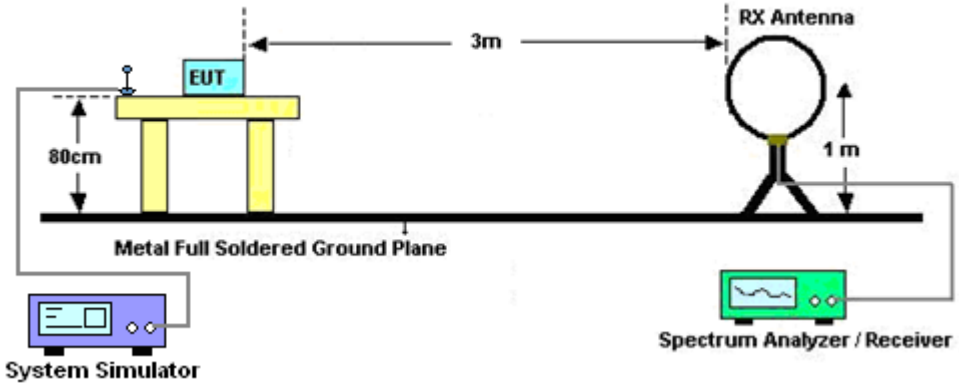
4 Radiated Test Items

4.1 Measuring Instruments

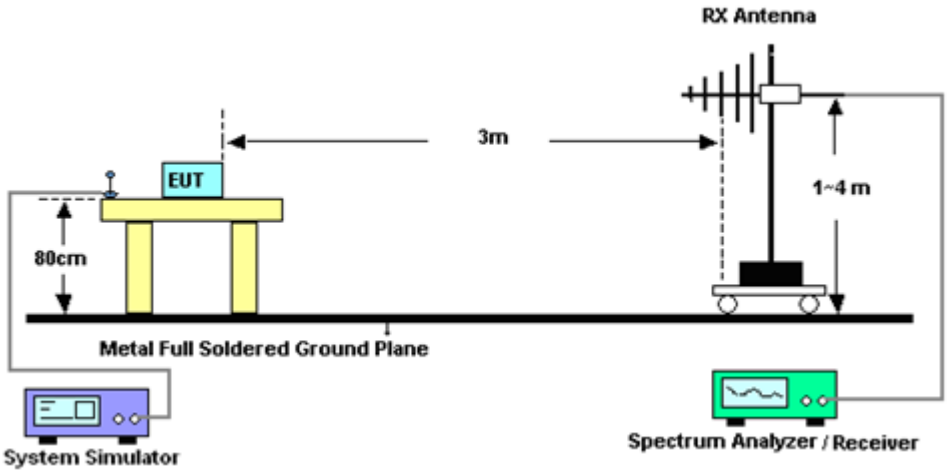
See list of measuring instruments of this test report.

4.1.1 Test Setup

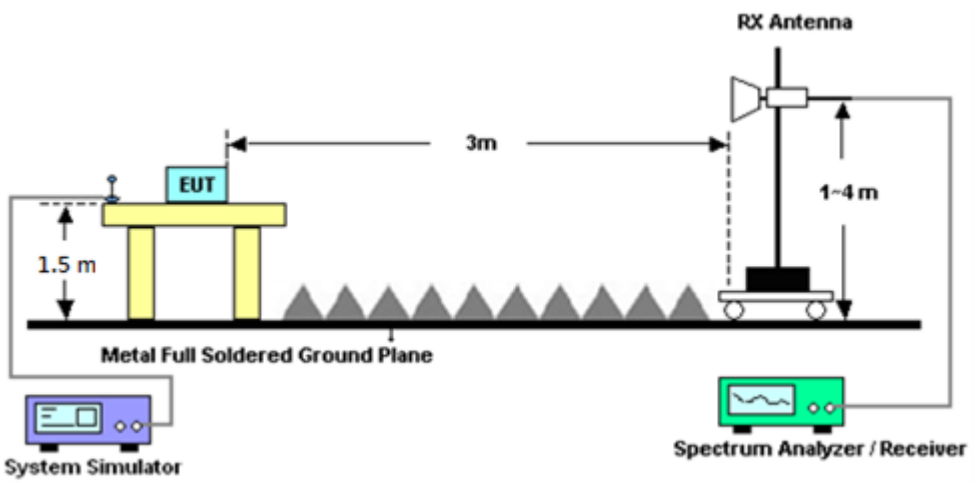
For radiated test below 30MHz



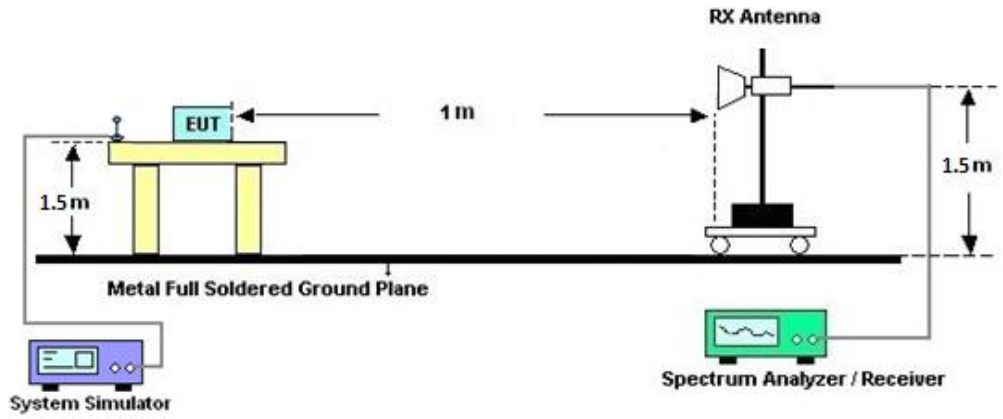
For radiated test from 30MHz to 1GHz



For radiated test above 1GHz to 18GHz



For radiated test above 18GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 70 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
   The limit line is derived from 70 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [70 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [70 + 10log(P)] (dB)
   = -40dBm.

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 07, 2021	Feb. 26, 2022~ Apr. 13, 2022	Sep. 06, 2022	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	37059 & 01	30MHz~1GHz	Oct. 09, 2021	Feb. 26, 2022~ Apr. 13, 2022	Oct. 08, 2022	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	40103 & 07	30MHz to 1GHz	Apr. 28, 2021	Feb. 26, 2022~ Apr. 13, 2022	Apr. 27, 2022	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 30, 2021	Feb. 26, 2022~ Apr. 13, 2022	Dec. 29, 2022	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-01620	1-18GHz	Oct. 25, 2021	Feb. 26, 2022~ Apr. 13, 2022	Oct. 24, 2022	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Oct. 25, 2021	Feb. 26, 2022~ Apr. 13, 2022	Oct. 24, 2022	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00991	18GHz- 40GHz	May 11, 2021	Feb. 26, 2022~ Apr. 13, 2022	May 10, 2022	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	17100018000 55006	1GHz~18GHz	May 06, 2021	Feb. 26, 2022~ Apr. 13, 2022	May 05, 2022	Radiation (03CH15-HY)
Amplifier	E-INSTRUMENT TECH LTD	ERA-10M-7000-MR	EC1900247	10MHz-7GHz	Dec. 03, 2021	Feb. 26, 2022~ Apr. 13, 2022	Dec. 02, 2022	Radiation (03CH15-HY)
Preamplifier	EM Electronics	EM01G18G	060803	1GHz-18GHz	Dec. 16, 2021	Feb. 26, 2022~ Apr. 13, 2022	Dec. 15, 2022	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060801	18-40GHz	Jun. 22, 2021	Feb. 26, 2022~ Apr. 13, 2022	Jun. 21, 2022	Radiation (03CH15-HY)
Spectrum Analyzer	Keysight	N9038A	MY54130085	20MHz~8.4GHz	Oct. 21, 2021	Feb. 26, 2022~ Apr. 13, 2022	Oct. 20, 2022	Radiation (03CH15-HY
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May 07, 2021	Feb. 26, 2022~ Apr. 13, 2022	May 06, 2022	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Feb. 26, 2022~ Apr. 13, 2022	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Feb. 26, 2022~ Apr. 13, 2022	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Feb. 26, 2022~ Apr. 13, 2022	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104, 102E	MY36980/4,MY9838/4PE,508405/2E	30MHz~18G	Nov. 15, 2021	Feb. 26, 2022~ Apr. 13, 2022	Nov. 14, 2022	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104, 102E	MY36980/4,MY9838/4PE,508405/2E	30MHz~18G	Nov. 15, 2021	Feb. 26, 2022~ Apr. 13, 2022	Nov. 14, 2022	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104, 102E	MY36980/4,MY9838/4PE,508405/2E	30MHz~18G	Nov. 15, 2021	Feb. 26, 2022~ Apr. 13, 2022	Nov. 14, 2022	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804011/2,804012/2	30MHz-40GHz	Jan. 04, 2022	Feb. 26, 2022~ Apr. 13, 2022	Jan. 03, 2023	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Feb. 26, 2022~ Mar. 09, 2022	Mar. 10, 2022	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 10, 2022	Mar. 10, 2022~ Apr. 13, 2022	Mar. 09, 2023	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN12	1.53GHz Low Pass Filter	Jul. 02, 2021	Feb. 26, 2022~ Apr. 13, 2022	Jul. 01, 2022	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-935-1000-15000-40ST	SN1	1GHz High Pass Filter	Apr. 29, 2021	Feb. 26, 2022~ Apr. 13, 2022	Apr. 28, 2022	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN4	3GHz High Pass Filter	Sep. 15, 2021	Feb. 26, 2022~ Apr. 13, 2022	Sep. 14, 2022	Radiation (03CH15-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	0.1Hz~40GHz	Dec. 08, 2021	Feb. 26, 2022~ Apr. 13, 2022	Dec. 07, 2022	Radiation (03CH15-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Radio Communication Analyzer	Anritsu	MT8821C	6201664755	2/3/4G/LTE FDD/TDD with44)/LTE-3CC DLCA/2CC ULCA, CatM1/NB1/NB2	Jul. 21, 2021	Feb. 25, 2022~ Mar. 23, 2022	Jul. 20, 2022	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101908	10Hz~40GHz	Oct. 01, 2021	Feb. 25, 2022~ Mar. 23, 2022	Sep. 30, 2022	Conducted (TH03-HY)
Thermal Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 09, 2021	Feb. 25, 2022~ Mar. 23, 2022	Sep. 08, 2022	Conducted (TH03-HY)
DC Power Supply	GW Instek	GPP-2323	GES906037	0V~64V；0A~6A	Jan. 06, 2022	Feb. 25, 2022~ Mar. 23, 2022	Jan. 05, 2023	Conducted (TH03-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#B	1-18GHz	Jan. 07, 2022	Feb. 25, 2022~ Mar. 23, 2022	Jan. 06, 2023	Conducted (TH03-HY)

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.92 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.72 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.94 dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power & EIRP)

LTE Band 30 Maximum Average Power [dBm] (GT - LC = -1 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
10	1	0	QPSK	-	23.98	-	22.98	0.1986
10	1	25			23.55			
10	1	49			23.79			
10	25	0			22.47			
10	25	12			22.45			
10	25	25			22.42			
10	50	0			22.45			
10	1	0	16-QAM		22.77		21.89	0.1545
10	1	25			22.73			
10	1	49			22.89			
10	25	0			21.47			
10	25	12			21.48			
10	25	25			21.41			
10	50	0			21.44			
10	1	0	64-QAM		21.70		20.81	0.1205
10	1	25			21.56			
10	1	49			21.81			
10	25	0			20.44			
10	25	12			20.48			
10	25	25			20.42			
10	50	0			20.44			
Limit	EIRP < 250mW/5MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 250 mW/5MHz.

LTE Band 30 Maximum Average Power [dBm] (GT - LC = -1 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
5	1	0	QPSK	23.81	23.85	23.68	22.85	0.1928
5	1	12		23.37	23.39	23.23		
5	1	24		23.69	23.78	23.50		
5	12	0		22.19	22.34	22.04		
5	12	7		22.28	22.34	22.26		
5	12	13		22.19	22.38	22.05		
5	25	0		22.27	22.32	22.08		
5	1	0	16-QAM	22.67	22.74	22.48	21.85	0.1531
5	1	12		22.51	22.60	22.44		
5	1	24		22.72	22.85	22.68		
5	12	0		21.22	21.33	21.08		
5	12	7		21.17	21.36	21.05		
5	12	13		21.22	21.35	21.02		
5	25	0		21.06	21.26	21.02		
5	1	0	64-QAM	21.50	21.67	21.46	20.69	0.1172
5	1	12		21.37	21.40	21.22		
5	1	24		21.65	21.69	21.49		
5	12	0		20.32	20.34	20.14		
5	12	7		20.36	20.40	20.35		
5	12	13		20.27	20.40	20.21		
5	25	0		20.19	20.28	20.05		
Limit	EIRP < 250mW/5MHz			Result			Pass	

Total EIRP power is less than partial EIRP limit 250 mW/5MHz.

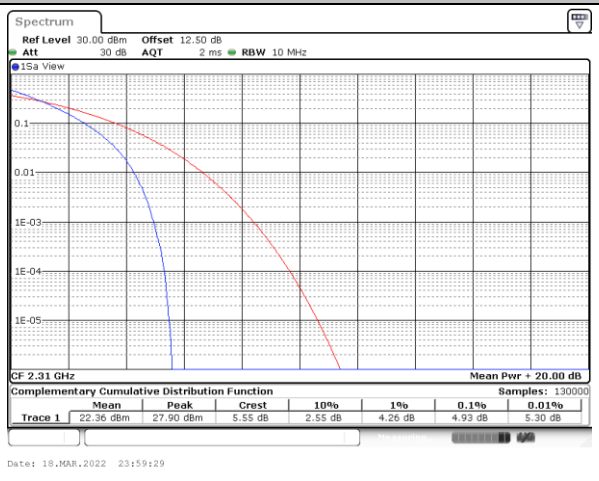
LTE Band 30

Peak-to-Average Ratio

Mode	LTE Band 30 / 10MHz				
Mod.	QPSK	16QAM	64QAM	256QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
Middle CH	4.93	5.91	6.38	-	PASS

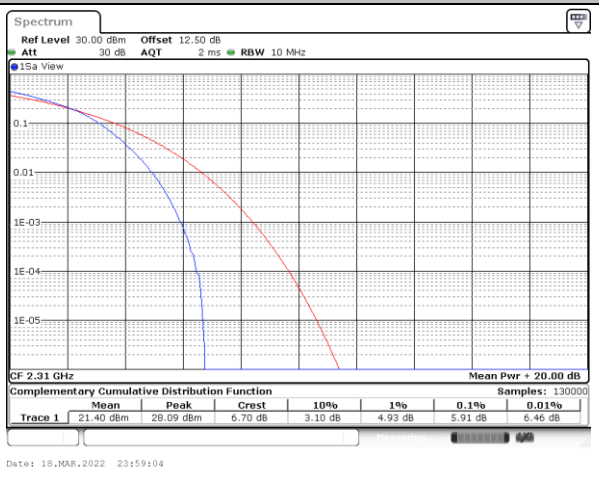
LTE Band 30 / 10MHz / QPSK

Middle Channel / Full RB



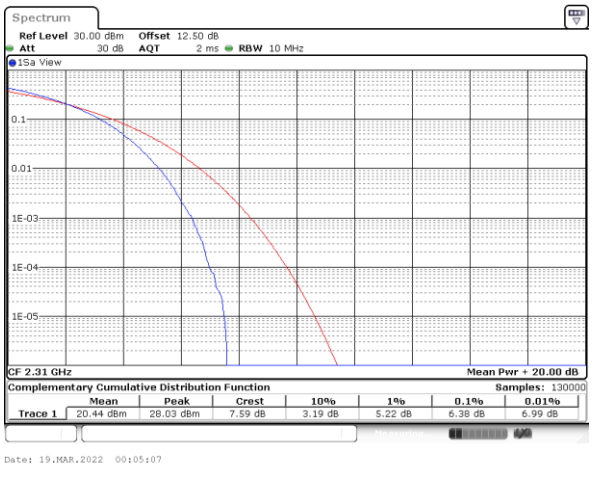
LTE Band 30 / 10MHz / 16QAM

Middle Channel / Full RB



LTE Band 30 / 10MHz / 64QAM

Middle Channel / Full RB

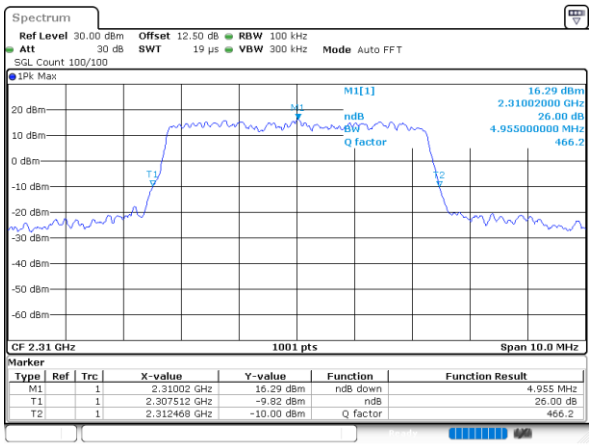


26dB Bandwidth

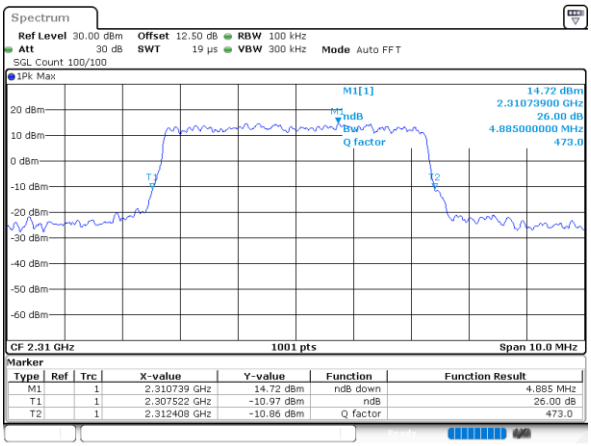
Mode	LTE Band 30 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	4.96	4.89	9.75	9.75	-	-	-	-
Mode	LTE Band 30 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM
Middle CH	-	-	-	-	4.94	-	9.87	-	-	-	-	-

LTE Band 30

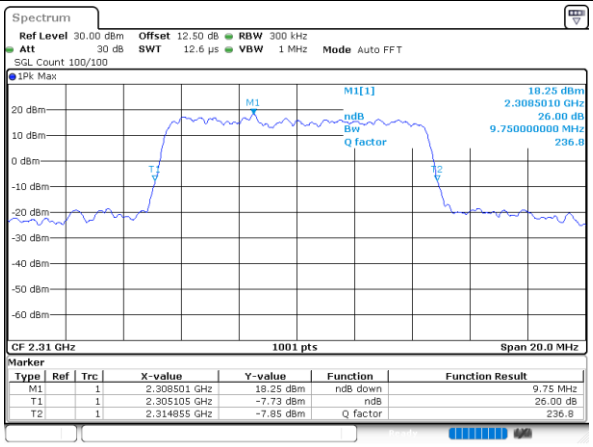
Middle Channel / 5MHz / QPSK



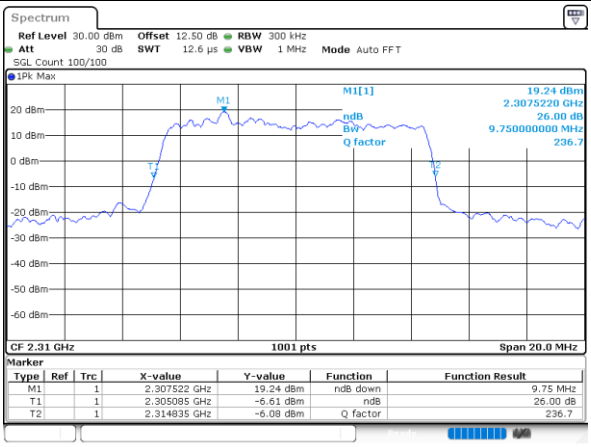
Middle Channel / 5MHz / 16QAM



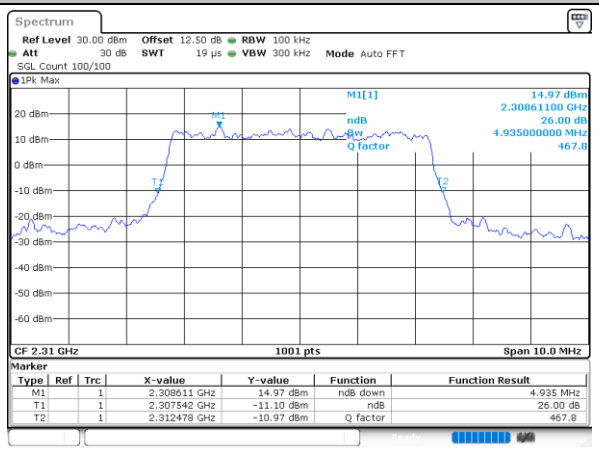
Middle Channel / 10MHz / QPSK



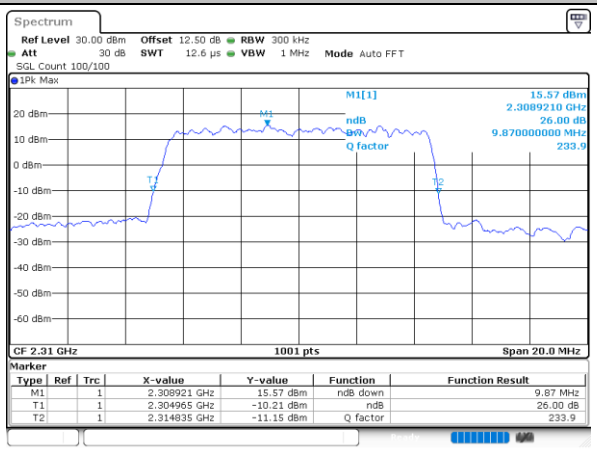
Middle Channel / 10MHz / 16QAM



Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM

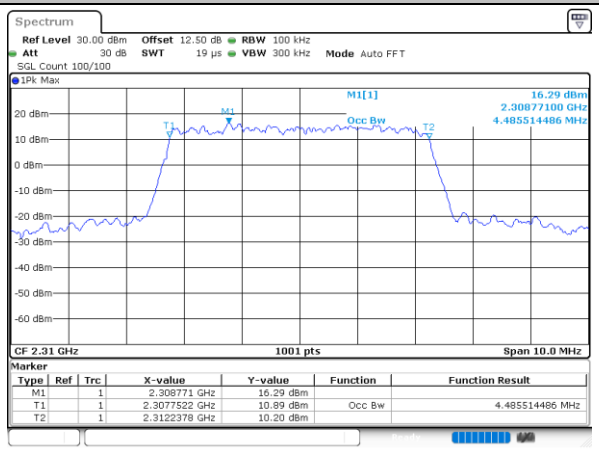


Occupied Bandwidth

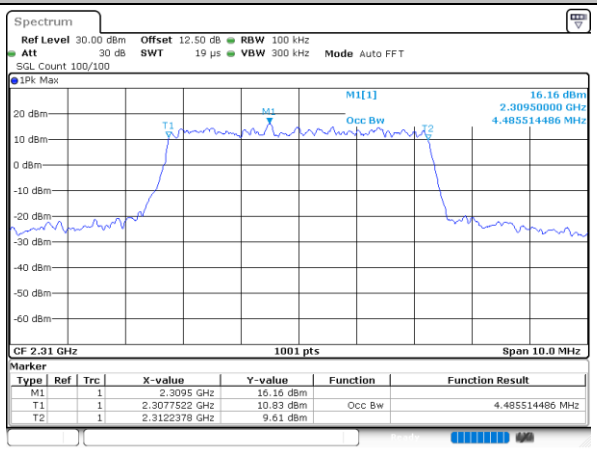
Mode	LTE Band 30 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	4.49	4.49	9.05	9.05	-	-	-	-
Mode	LTE Band 30 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM
Middle CH	-	-	-	-	4.51	-	9.05	-	-	-	-	-

LTE Band 30

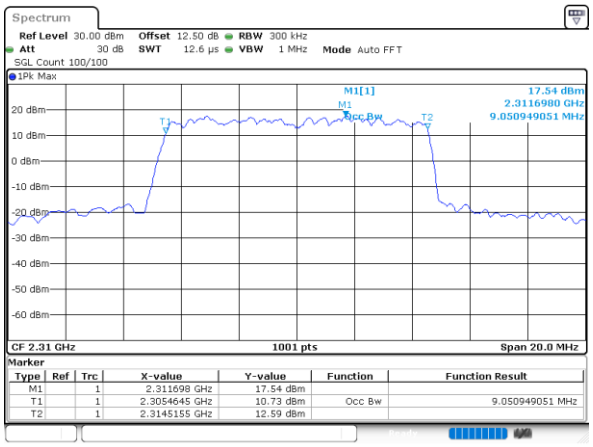
Middle Channel / 5MHz / QPSK



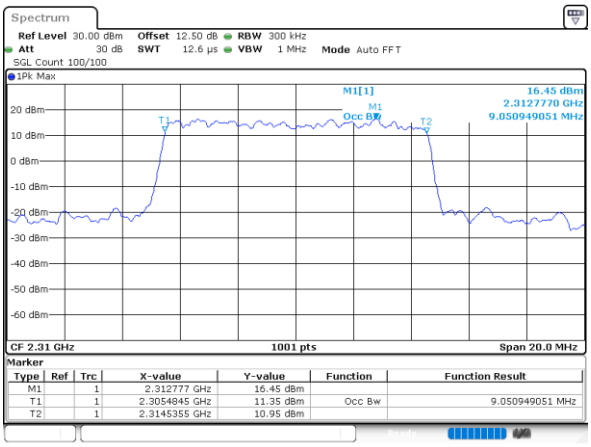
Middle Channel / 5MHz / 16QAM



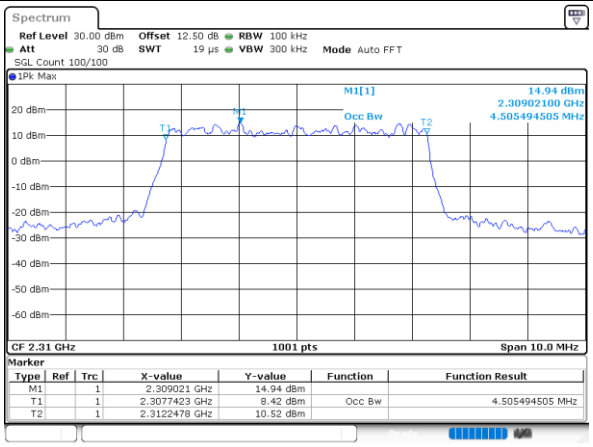
Middle Channel / 10MHz / QPSK



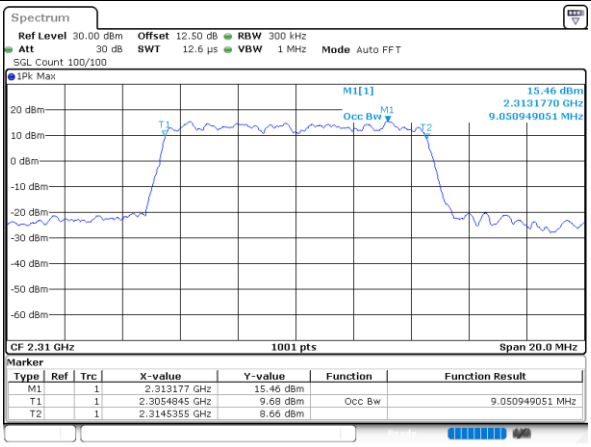
Middle Channel / 10MHz / 16QAM



Middle Channel / 5MHz / 64QAM



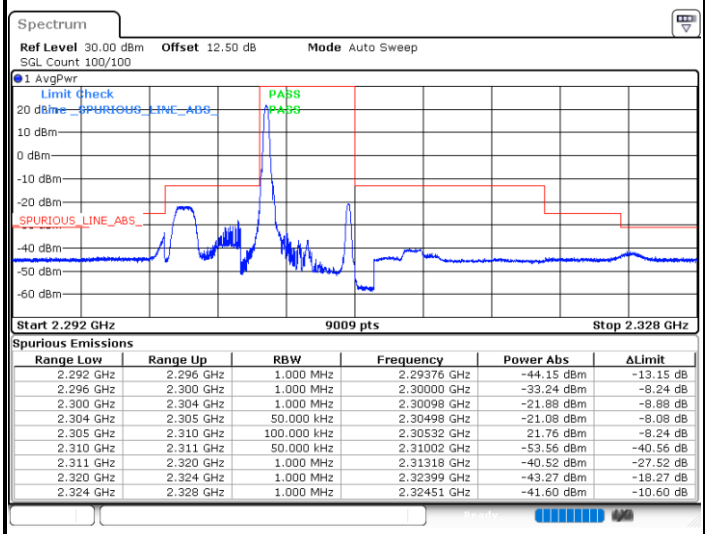
Middle Channel / 10MHz / 64QAM



Conducted Band Edge

LTE Band 30 / 5MHz / QPSK

Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29376 GHz	-44.15 dBm	-13.15 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.30000 GHz	-33.24 dBm	-8.24 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30098 GHz	-21.88 dBm	-8.88 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30498 GHz	-21.08 dBm	-8.08 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30532 GHz	21.76 dBm	-8.24 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31002 GHz	-53.56 dBm	-40.56 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31318 GHz	-40.52 dBm	-27.52 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32399 GHz	-43.27 dBm	-18.27 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32451 GHz	-41.60 dBm	-10.60 dB

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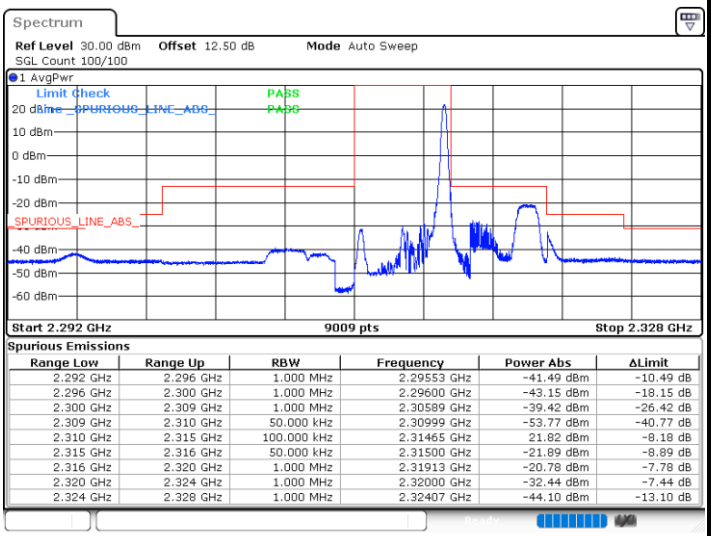
Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29553 GHz	-41.49 dBm	-10.49 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29600 GHz	-43.15 dBm	-18.15 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30589 GHz	-39.42 dBm	-26.42 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.30999 GHz	-53.77 dBm	-40.77 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31465 GHz	21.82 dBm	-8.18 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31500 GHz	-21.89 dBm	-8.89 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31913 GHz	-20.78 dBm	-7.78 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32000 GHz	-32.44 dBm	-7.44 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32407 GHz	-44.10 dBm	-13.10 dB

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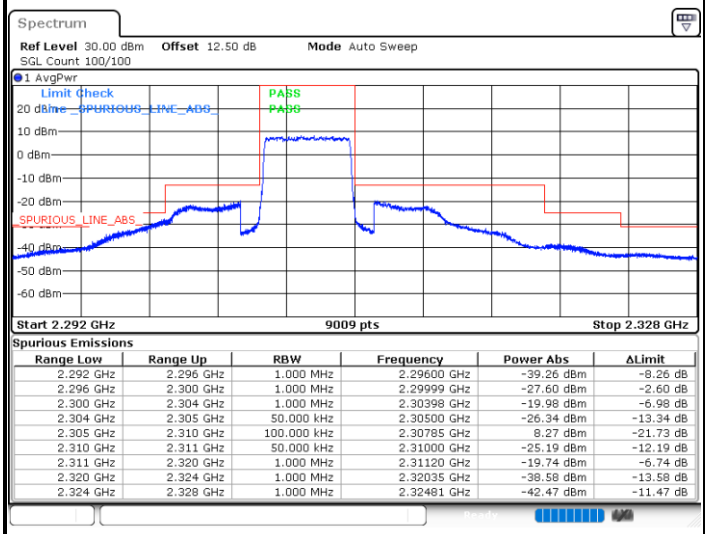
Lowest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29600 GHz	-39.26 dBm	-8.26 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29999 GHz	-27.60 dBm	-2.60 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30398 GHz	-19.98 dBm	-6.98 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30500 GHz	-26.34 dBm	-13.34 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30785 GHz	8.27 dBm	-21.73 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31000 GHz	-25.19 dBm	-12.19 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31120 GHz	-19.74 dBm	-6.74 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32035 GHz	-38.58 dBm	-13.58 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32481 GHz	-42.47 dBm	-11.47 dB

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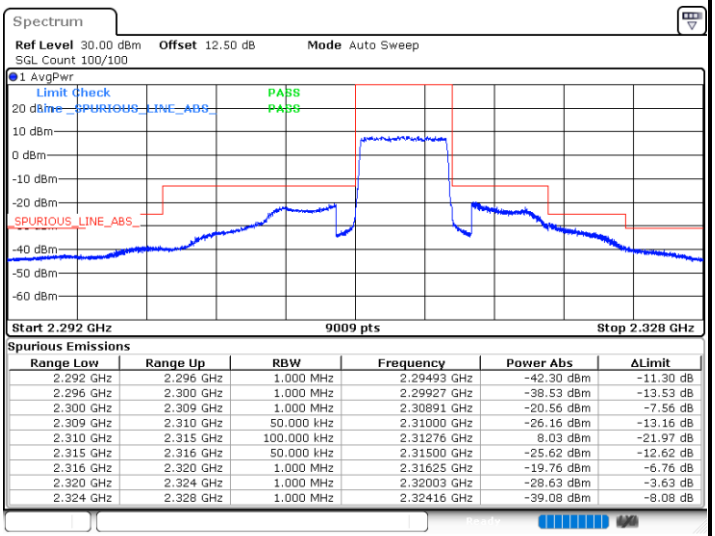
Highest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29493 GHz	-42.30 dBm	-11.30 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29927 GHz	-38.53 dBm	-13.53 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30891 GHz	-20.56 dBm	-7.56 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.31000 GHz	-26.16 dBm	-13.16 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31276 GHz	8.03 dBm	-21.97 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31500 GHz	-25.62 dBm	-12.62 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31625 GHz	-19.76 dBm	-6.76 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32003 GHz	-28.63 dBm	-3.63 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32416 GHz	-39.08 dBm	-8.08 dB

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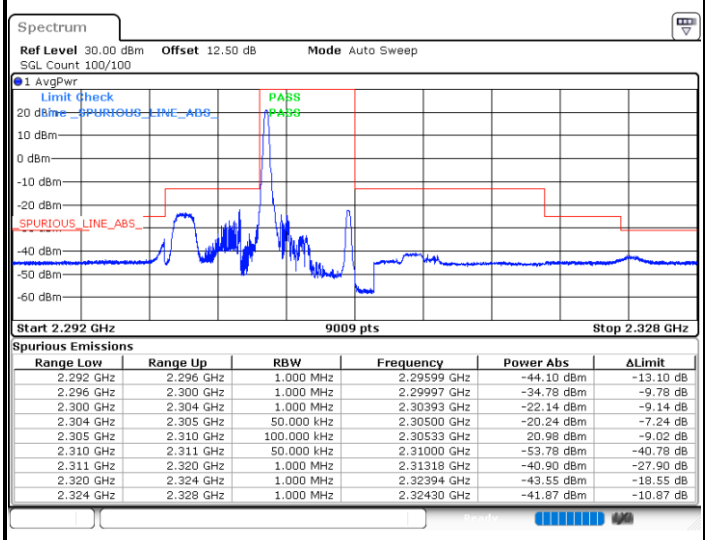
LTE Band 30 / 5MHz / 16QAM

Lowest Band Edge / 1 RB

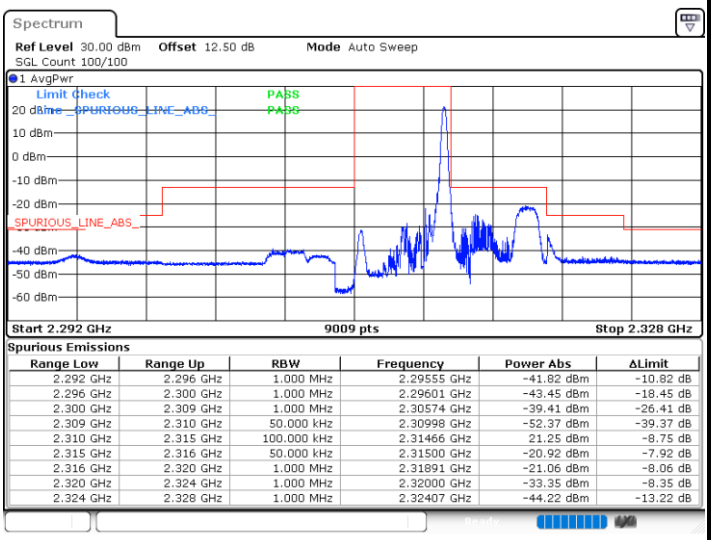


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29599 GHz	-44.10 dBm	-13.10 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29997 GHz	-34.78 dBm	-9.78 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30393 GHz	-22.14 dBm	-9.14 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30500 GHz	-20.24 dBm	-7.24 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30533 GHz	20.98 dBm	-9.02 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31000 GHz	-53.78 dBm	-40.78 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31318 GHz	-40.90 dBm	-27.90 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32394 GHz	-43.55 dBm	-18.55 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32430 GHz	-41.87 dBm	-10.87 dB

Date: 19.MAR.2022 01:06:50

Highest Band Edge / 1 RB

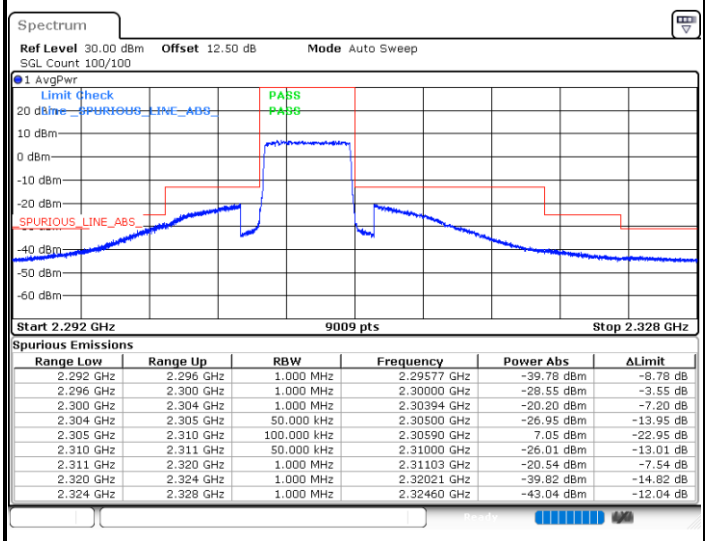


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29555 GHz	-41.82 dBm	-10.82 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29601 GHz	-43.45 dBm	-18.45 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30574 GHz	-39.41 dBm	-26.41 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.30998 GHz	-52.37 dBm	-39.37 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31466 GHz	21.25 dBm	-8.75 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31500 GHz	-20.92 dBm	-7.92 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31891 GHz	-21.06 dBm	-8.06 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32000 GHz	-33.35 dBm	-8.35 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32407 GHz	-44.22 dBm	-13.22 dB

Date: 18.MAR.2022 23:37:42

Lowest Band Edge / Full RB

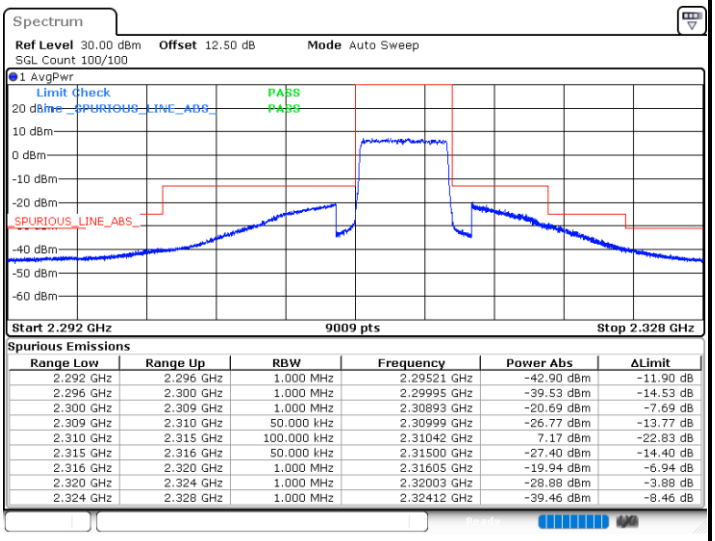


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29577 GHz	-39.78 dBm	-8.78 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.30000 GHz	-28.55 dBm	-3.55 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30394 GHz	-20.20 dBm	-7.20 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30500 GHz	-26.95 dBm	-13.95 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30590 GHz	7.05 dBm	-22.95 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31000 GHz	-26.01 dBm	-13.01 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31103 GHz	-20.54 dBm	-7.54 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32021 GHz	-39.82 dBm	-14.82 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32460 GHz	-43.04 dBm	-12.04 dB

Date: 18.MAR.2022 23:35:00

Highest Band Edge / Full RB



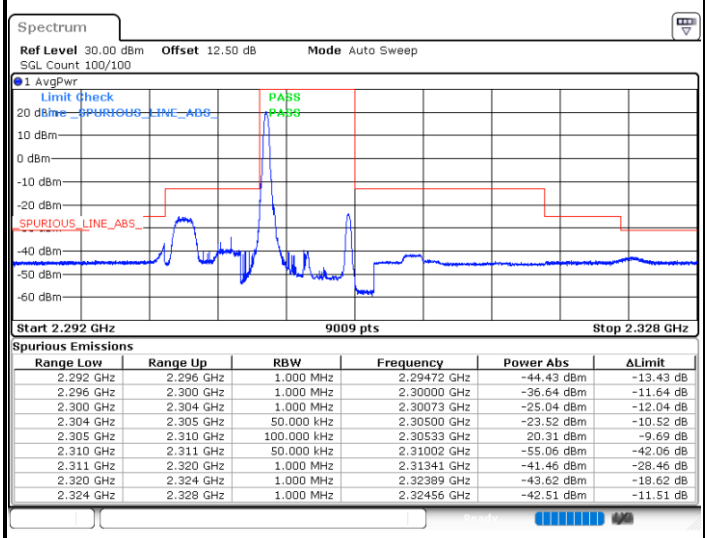
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29521 GHz	-42.90 dBm	-11.90 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29995 GHz	-39.53 dBm	-14.53 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30893 GHz	-20.69 dBm	-7.69 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.30999 GHz	-26.77 dBm	-13.77 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31042 GHz	7.17 dBm	-22.83 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31500 GHz	-27.40 dBm	-14.40 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31605 GHz	-19.94 dBm	-6.94 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32003 GHz	-28.88 dBm	-3.88 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32412 GHz	-39.46 dBm	-8.46 dB

Date: 18.MAR.2022 23:40:22

LTE Band 30 / 5MHz / 64QAM

Lowest Band Edge / 1 RB

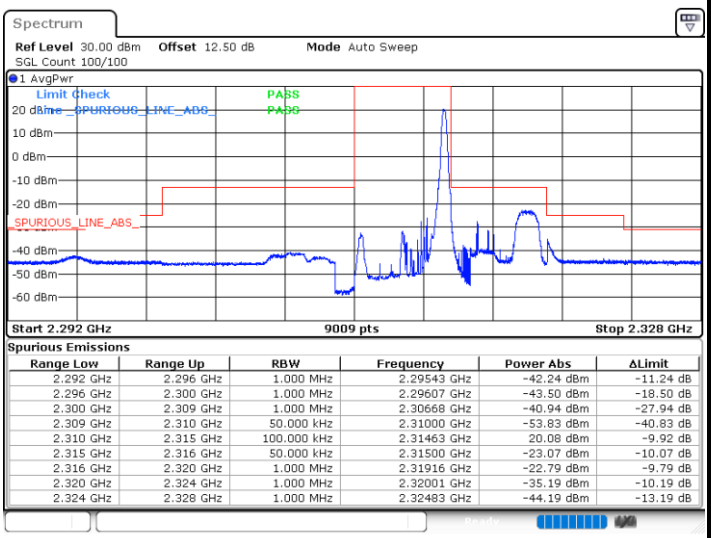


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29472 GHz	-44.43 dBm	-13.43 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.30000 GHz	-36.64 dBm	-11.64 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30073 GHz	-25.04 dBm	-12.04 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30500 GHz	-23.52 dBm	-10.52 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30533 GHz	20.31 dBm	-9.69 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31002 GHz	-55.06 dBm	-42.06 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31341 GHz	-41.46 dBm	-28.46 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32389 GHz	-43.62 dBm	-18.62 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32456 GHz	-42.51 dBm	-11.51 dB

Date: 19.MAR.2022 01:07:45

Highest Band Edge / 1 RB

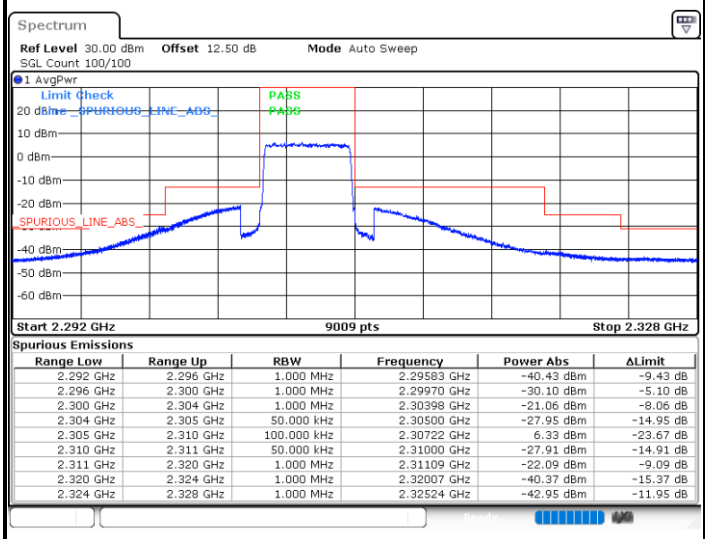


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29543 GHz	-42.24 dBm	-11.24 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29607 GHz	-43.50 dBm	-18.50 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30668 GHz	-40.94 dBm	-27.94 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.31000 GHz	-53.83 dBm	-40.83 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31463 GHz	20.08 dBm	-9.92 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31500 GHz	-23.07 dBm	-10.07 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31916 GHz	-22.79 dBm	-9.79 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32001 GHz	-35.19 dBm	-10.19 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32483 GHz	-44.19 dBm	-13.19 dB

Date: 18.MAR.2022 23:38:35

Lowest Band Edge / Full RB

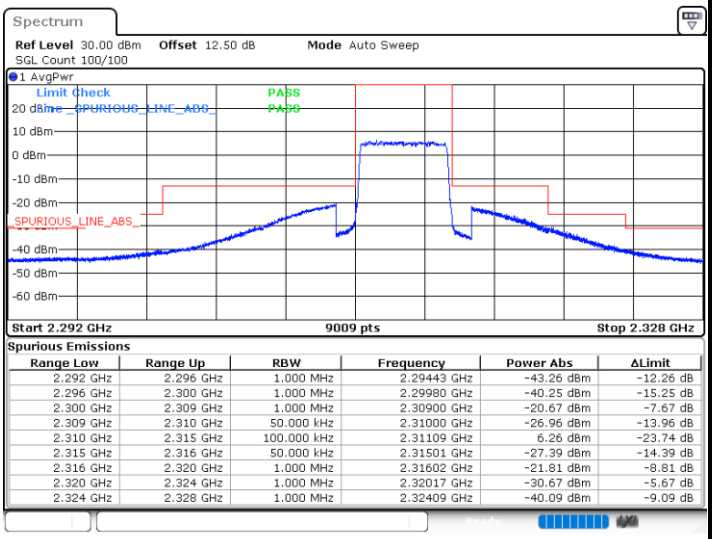


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29583 GHz	-40.43 dBm	-9.43 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29970 GHz	-30.10 dBm	-5.10 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30398 GHz	-21.06 dBm	-8.06 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30500 GHz	-27.95 dBm	-14.95 dB
2.305 GHz	2.310 GHz	100.000 kHz	2.30722 GHz	6.33 dBm	-23.67 dB
2.310 GHz	2.311 GHz	50.000 kHz	2.31000 GHz	-27.91 dBm	-14.91 dB
2.311 GHz	2.320 GHz	1.000 MHz	2.31109 GHz	-22.09 dBm	-9.09 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32007 GHz	-40.37 dBm	-15.37 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32524 GHz	-42.95 dBm	-11.95 dB

Date: 18.MAR.2022 23:35:54

Highest Band Edge / Full RB



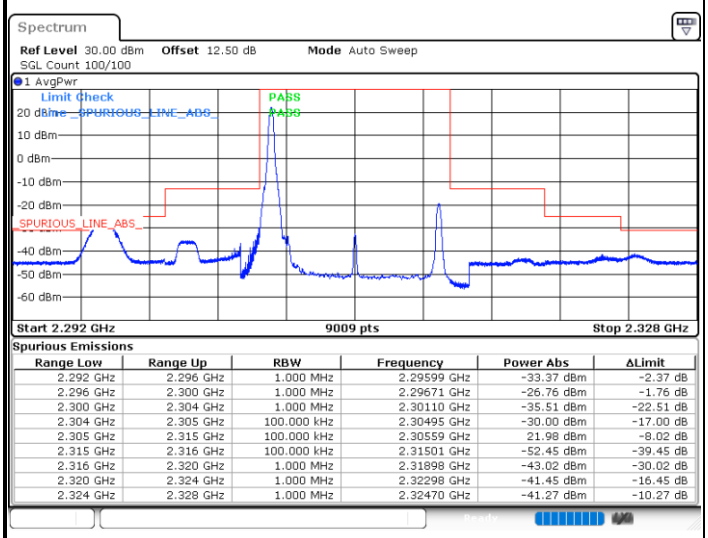
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29443 GHz	-43.26 dBm	-12.26 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29980 GHz	-40.25 dBm	-15.25 dB
2.300 GHz	2.309 GHz	1.000 MHz	2.30900 GHz	-20.67 dBm	-7.67 dB
2.309 GHz	2.310 GHz	50.000 kHz	2.31000 GHz	-26.96 dBm	-13.96 dB
2.310 GHz	2.315 GHz	100.000 kHz	2.31109 GHz	6.26 dBm	-23.74 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31501 GHz	-27.39 dBm	-14.39 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31602 GHz	-21.81 dBm	-8.81 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32017 GHz	-30.67 dBm	-5.67 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32409 GHz	-40.09 dBm	-9.09 dB

Date: 18.MAR.2022 23:41:16

LTE Band 30 / 10MHz / QPSK

Lowest Band Edge / 1 RB

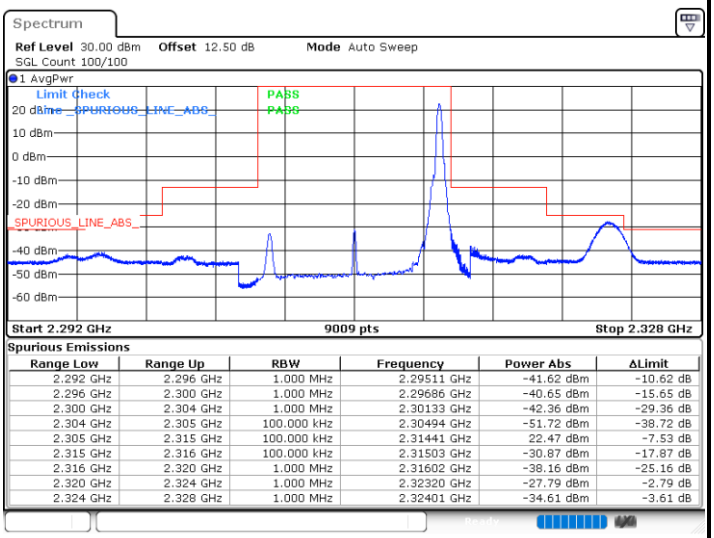


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29599 GHz	-33.37 dBm	-2.37 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29671 GHz	-26.76 dBm	-1.76 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30110 GHz	-35.51 dBm	-22.51 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30495 GHz	-30.00 dBm	-17.00 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30559 GHz	21.98 dBm	-8.02 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31501 GHz	-52.45 dBm	-39.45 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31898 GHz	-43.02 dBm	-30.02 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32298 GHz	-41.45 dBm	-16.45 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32470 GHz	-41.27 dBm	-10.27 dB

Date: 18.MAR.2022 23:42:11

Highest Band Edge / 1 RB

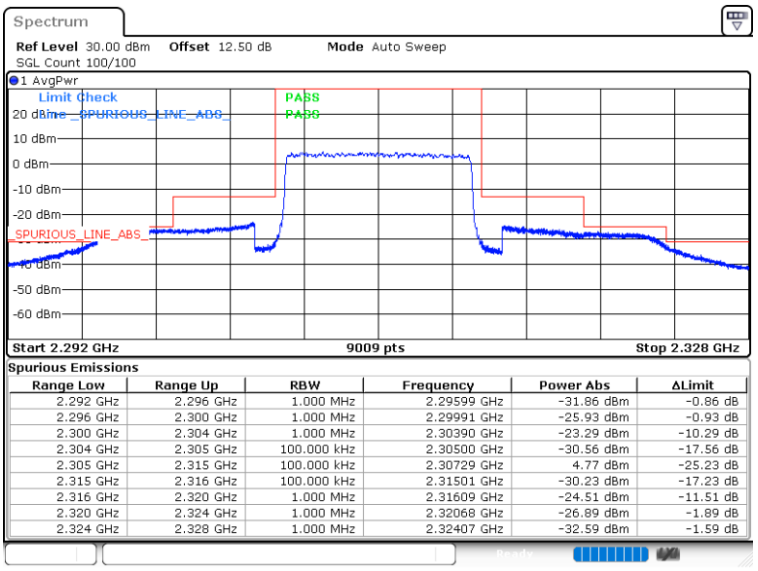


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29511 GHz	-41.62 dBm	-10.62 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29686 GHz	-40.65 dBm	-15.65 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30133 GHz	-42.36 dBm	-29.36 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30494 GHz	-51.72 dBm	-38.72 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.31441 GHz	22.47 dBm	-7.53 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31503 GHz	-30.87 dBm	-17.87 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31602 GHz	-38.16 dBm	-25.16 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32320 GHz	-27.79 dBm	-2.79 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32401 GHz	-34.61 dBm	-3.61 dB

Date: 18.MAR.2022 23:44:49

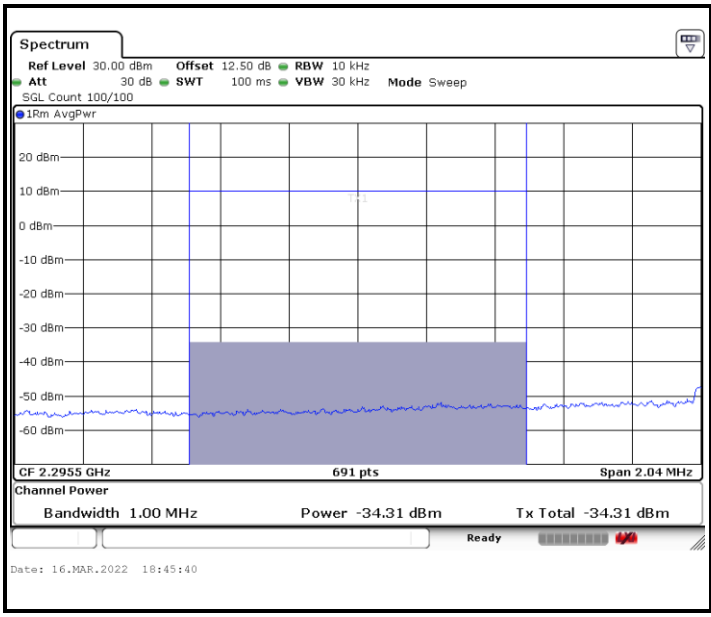
Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29599 GHz	-31.86 dBm	-0.86 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29991 GHz	-25.93 dBm	-0.93 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30390 GHz	-23.29 dBm	-10.29 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30500 GHz	-30.56 dBm	-17.56 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30729 GHz	4.77 dBm	-25.23 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31501 GHz	-30.23 dBm	-17.23 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31609 GHz	-24.51 dBm	-11.51 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32068 GHz	-26.89 dBm	-1.89 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32407 GHz	-32.59 dBm	-1.59 dB

Date: 16.MAR.2022 17:44:46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SGL Count 100/100
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20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.2955 GHz
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Span 2.04 MHz
Channel Power
Bandwidth 1.00 MHz
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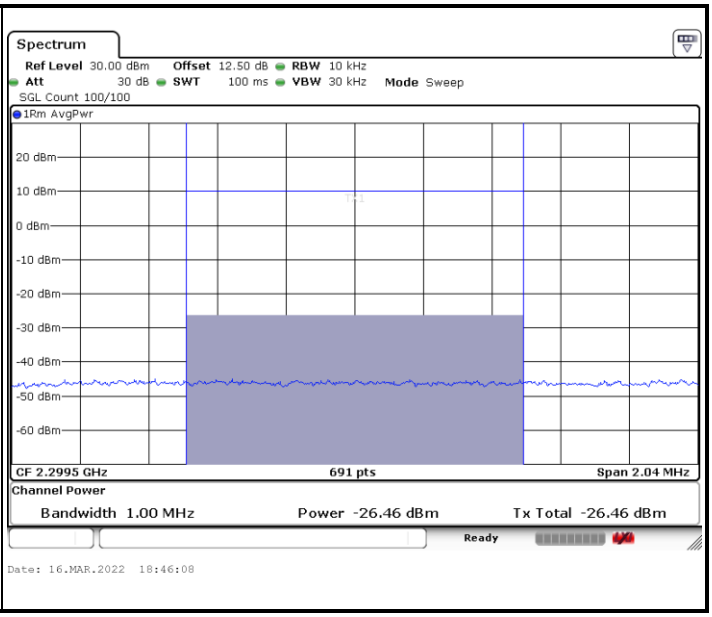
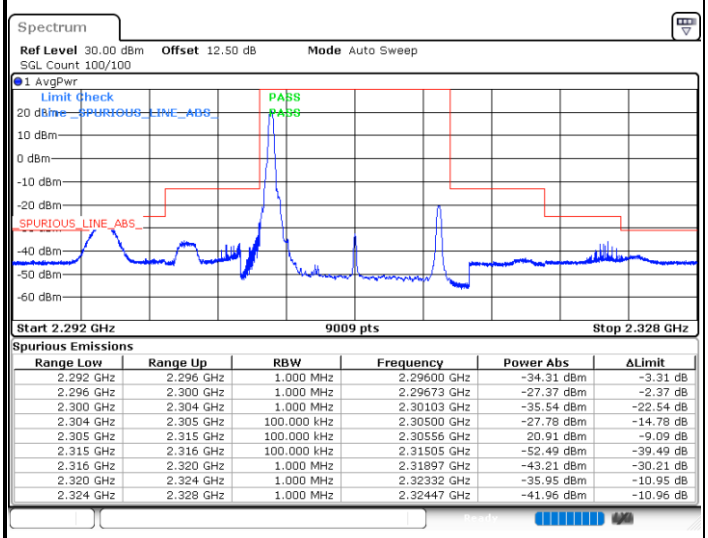
Date: 16.MAR.2022 18:45:40


Spectrum
Ref Level 30.00 dBm Offset 12.50 dB RBW 10 kHz
Att 30 dB SWT 100 ms VBW 30 kHz Mode Sweep
SGL Count 100/100
1Rm AvgPwr
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.2995 GHz
691 pts
Span 2.04 MHz
Channel Power
Bandwidth 1.00 MHz
Power -26.46 dBm
Tx Total -26.46 dBm
Ready
Date: 16.MAR.2022 18:46:08

LTE Band 30 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

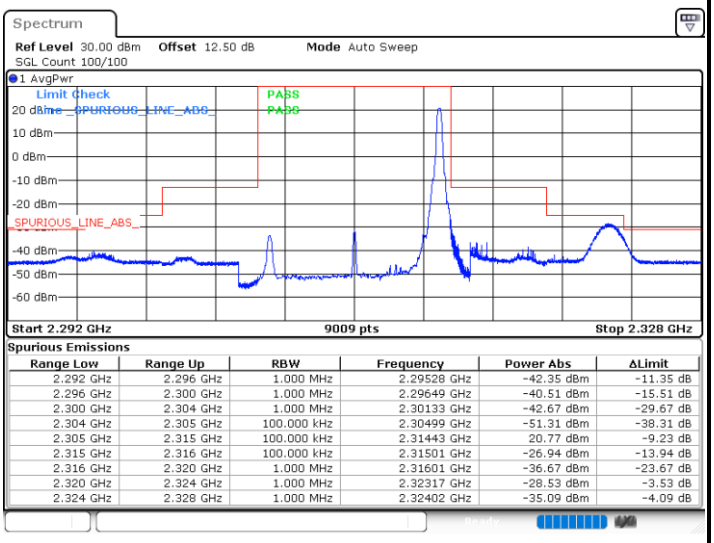


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29600 GHz	-34.31 dBm	-3.31 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29673 GHz	-27.37 dBm	-2.37 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30103 GHz	-35.54 dBm	-22.54 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30500 GHz	-27.78 dBm	-14.78 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30556 GHz	20.91 dBm	-9.09 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31505 GHz	-52.49 dBm	-39.49 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31897 GHz	-43.21 dBm	-30.21 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32332 GHz	-35.95 dBm	-10.95 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32447 GHz	-41.96 dBm	-10.96 dB

Date: 18.MAR.2022 23:43:03

Highest Band Edge / 1 RB

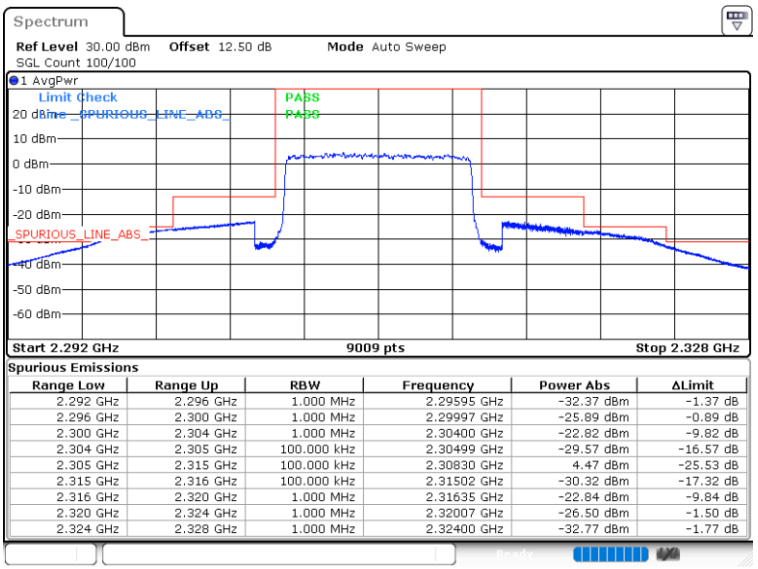


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29528 GHz	-42.35 dBm	-11.35 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29649 GHz	-40.51 dBm	-15.51 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30133 GHz	-42.67 dBm	-29.67 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30499 GHz	-51.31 dBm	-38.31 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.31443 GHz	20.77 dBm	-9.23 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31501 GHz	-26.94 dBm	-13.94 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31601 GHz	-36.67 dBm	-23.67 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32317 GHz	-28.53 dBm	-3.53 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32402 GHz	-35.09 dBm	-4.09 dB

Date: 18.MAR.2022 23:45:42

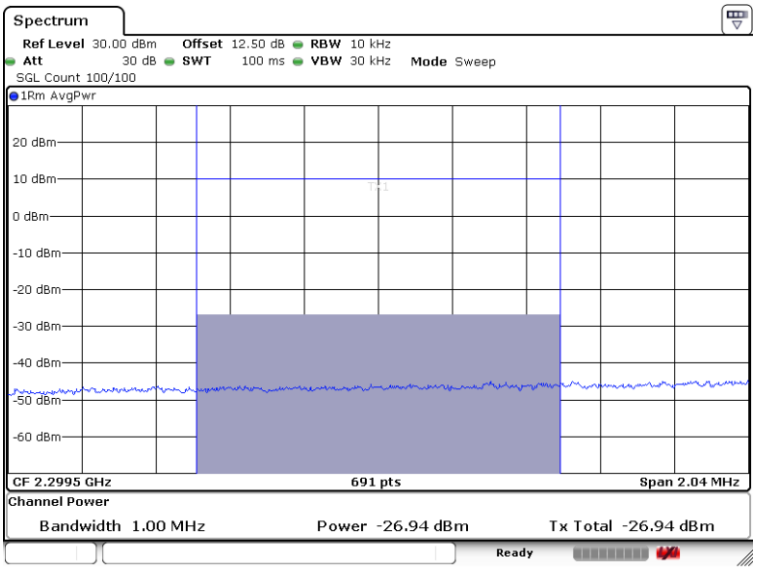
Band Edge / Full RB



Spurious Emissions

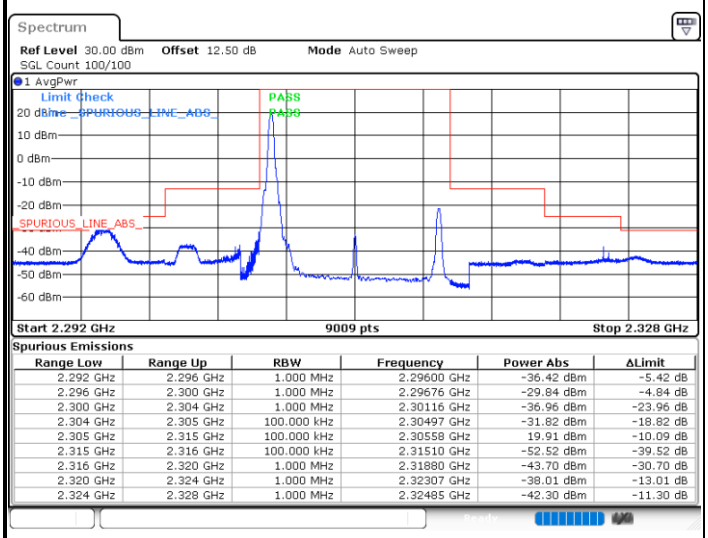
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29595 GHz	-32.37 dBm	-1.37 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29997 GHz	-25.89 dBm	-0.89 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30400 GHz	-22.82 dBm	-9.82 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30499 GHz	-29.57 dBm	-16.57 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30830 GHz	4.47 dBm	-25.53 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31502 GHz	-30.32 dBm	-17.32 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31635 GHz	-22.84 dBm	-9.84 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32007 GHz	-26.50 dBm	-1.50 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32400 GHz	-32.77 dBm	-1.77 dB

Date: 19.MAR.2022 00:11:14


Spectrum
Ref Level 30.00 dBm Offset 12.50 dB RBW 10 kHz
Att 30 dB SWT 100 ms VBW 30 kHz Mode Sweep
SGL Count 100/100
1Rm AvgPwr
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.2995 GHz
691 pts
Span 2.04 MHz
Channel Power
Bandwidth 1.00 MHz
Power -26.94 dBm
Tx Total -26.94 dBm
Ready
Date: 19.MAR.2022 00:14:50

LTE Band 30 / 10MHz / 64QAM

Lowest Band Edge / 1 RB

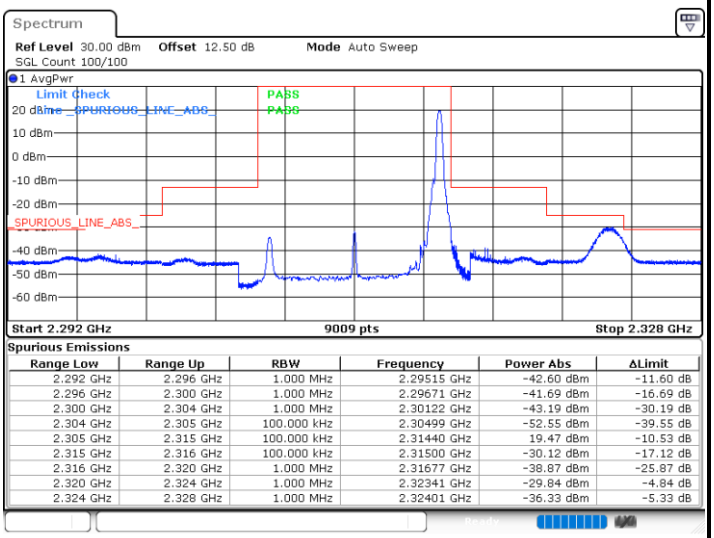


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29600 GHz	-36.42 dBm	-5.42 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29676 GHz	-29.84 dBm	-4.84 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30116 GHz	-36.96 dBm	-23.96 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30497 GHz	-31.82 dBm	-18.82 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30558 GHz	19.91 dBm	-10.09 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31510 GHz	-52.52 dBm	-39.52 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31880 GHz	-43.70 dBm	-30.70 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32307 GHz	-38.01 dBm	-13.01 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32485 GHz	-42.30 dBm	-11.30 dB

Date: 18.MAR.2022 23:43:56

Highest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29515 GHz	-42.60 dBm	-11.60 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29671 GHz	-41.69 dBm	-16.69 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30122 GHz	-43.19 dBm	-30.19 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30499 GHz	-52.55 dBm	-39.55 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.31440 GHz	19.47 dBm	-10.53 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31500 GHz	-30.12 dBm	-17.12 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31677 GHz	-38.87 dBm	-25.87 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32341 GHz	-29.84 dBm	-4.84 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32401 GHz	-36.33 dBm	-5.33 dB

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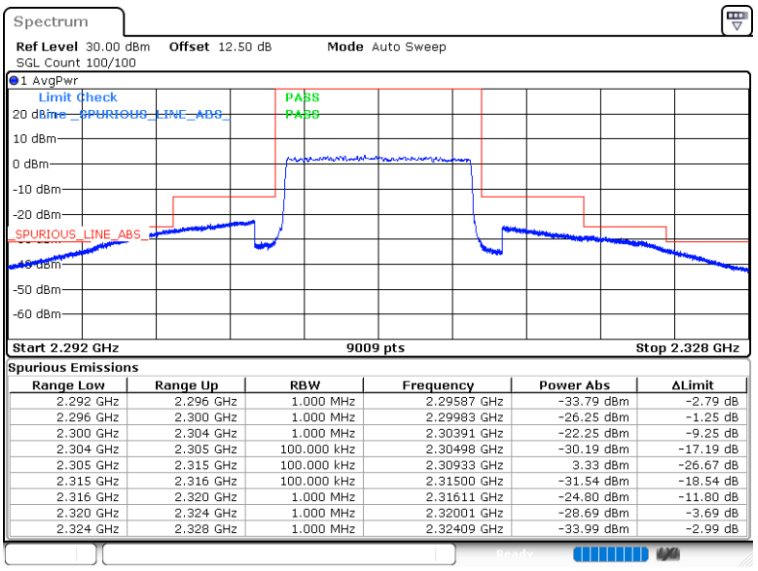
Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.292 GHz	2.296 GHz	1.000 MHz	2.29587 GHz	-33.79 dBm	-2.79 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29983 GHz	-26.25 dBm	-1.25 dB
2.300 GHz	2.304 GHz	1.000 MHz	2.30391 GHz	-22.25 dBm	-9.25 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30498 GHz	-30.19 dBm	-17.19 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30933 GHz	3.33 dBm	-26.67 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31500 GHz	-31.54 dBm	-18.54 dB
2.316 GHz	2.320 GHz	1.000 MHz	2.31611 GHz	-24.80 dBm	-11.80 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32001 GHz	-28.69 dBm	-3.69 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32409 GHz	-33.99 dBm	-2.99 dB

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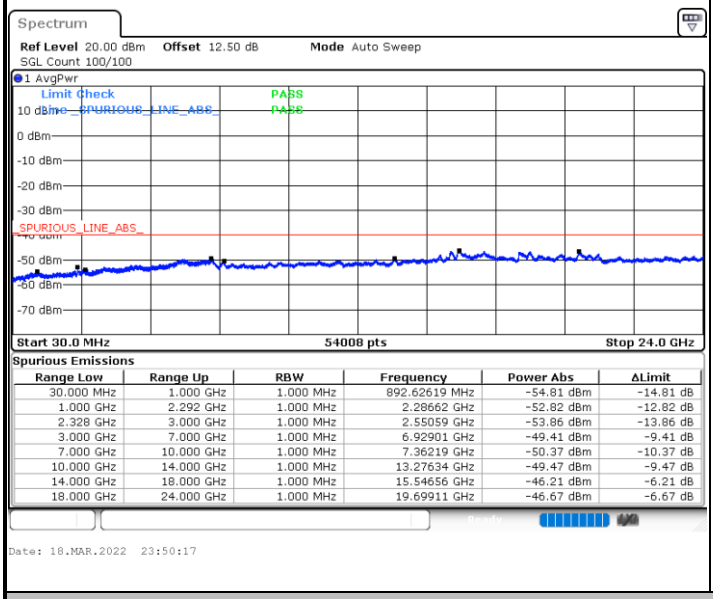
Conducted Spurious Emission

LTE Band 30 / 5MHz

Lowest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	892.62619 MHz	-54.81 dBm	-14.81 dB
1.000 GHz	2.292 GHz	1.000 MHz	2.28662 GHz	-52.82 dBm	-12.82 dB
2.328 GHz	3.000 GHz	1.000 MHz	2.55059 GHz	-53.86 dBm	-13.86 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.92901 GHz	-49.41 dBm	-9.41 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.36219 GHz	-50.37 dBm	-10.37 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.27634 GHz	-49.47 dBm	-9.47 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.54656 GHz	-46.21 dBm	-6.21 dB
18.000 GHz	24.000 GHz	1.000 MHz	19.69911 GHz	-46.67 dBm	-6.67 dB

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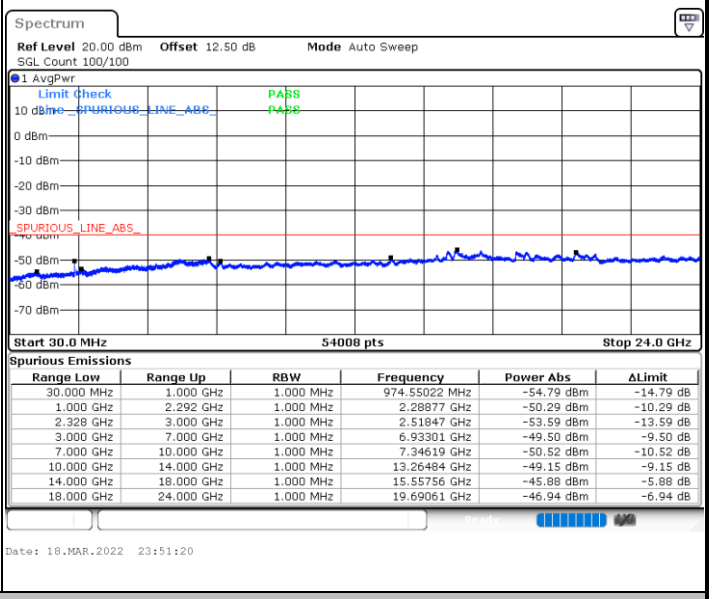
Middle Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	974.55022 MHz	-54.79 dBm	-14.79 dB
1.000 GHz	2.292 GHz	1.000 MHz	2.28877 GHz	-50.29 dBm	-10.29 dB
2.328 GHz	3.000 GHz	1.000 MHz	2.51847 GHz	-53.59 dBm	-13.59 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.93301 GHz	-49.50 dBm	-9.50 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.34619 GHz	-50.52 dBm	-10.52 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.26484 GHz	-49.15 dBm	-9.15 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.55756 GHz	-45.88 dBm	-5.88 dB
18.000 GHz	24.000 GHz	1.000 MHz	19.69061 GHz	-46.94 dBm	-6.94 dB

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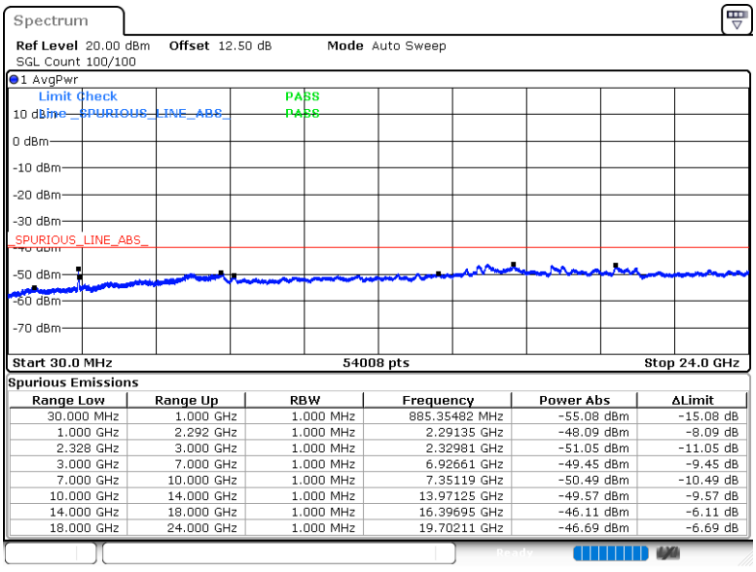
Highest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	885.35482 MHz	-55.08 dBm	-15.08 dB
1.000 GHz	2.292 GHz	1.000 MHz	2.29135 GHz	-48.09 dBm	-8.09 dB
2.328 GHz	3.000 GHz	1.000 MHz	2.32981 GHz	-51.05 dBm	-11.05 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.92661 GHz	-49.45 dBm	-9.45 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.35119 GHz	-50.49 dBm	-10.49 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.97125 GHz	-49.57 dBm	-9.57 dB
14.000 GHz	18.000 GHz	1.000 MHz	16.39695 GHz	-46.11 dBm	-6.11 dB
18.000 GHz	24.000 GHz	1.000 MHz	19.70211 GHz	-46.69 dBm	-6.69 dB

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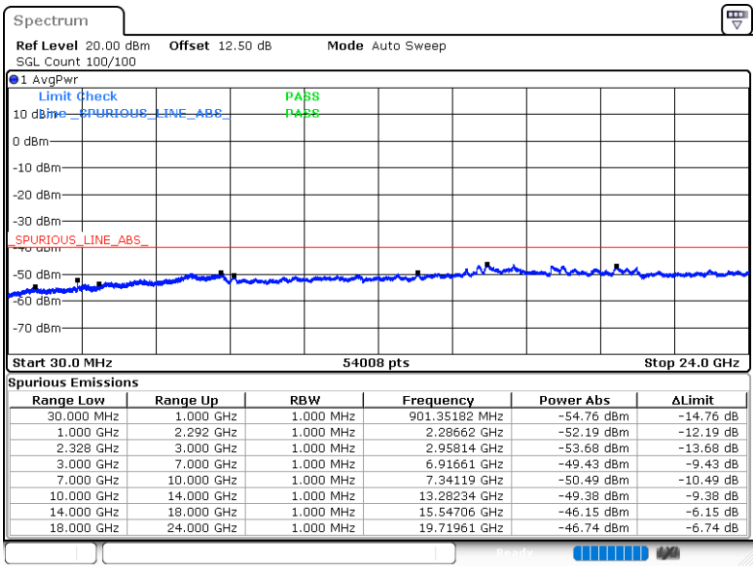
LTE Band 30 / 10MHz
Middle Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	901.35182 MHz	-54.76 dBm	-14.76 dB
1.000 GHz	2.292 GHz	1.000 MHz	2.28662 GHz	-52.19 dBm	-12.19 dB
2.328 GHz	3.000 GHz	1.000 MHz	2.95814 GHz	-53.68 dBm	-13.68 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.91661 GHz	-49.43 dBm	-9.43 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.34119 GHz	-50.49 dBm	-10.49 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.28234 GHz	-49.38 dBm	-9.38 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.54706 GHz	-46.15 dBm	-6.15 dB
18.000 GHz	24.000 GHz	1.000 MHz	19.71961 GHz	-46.74 dBm	-6.74 dB

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Frequency Stability

Test Conditions		LTE Band 30 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0010	PASS
40	Normal Voltage	0.0003	
30	Normal Voltage	0.0011	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0011	
0	Normal Voltage	0.0011	
-10	Normal Voltage	0.0021	
-20	Normal Voltage	0.0006	
-30	Normal Voltage	0.0005	
20	Maximum Voltage	0.0062	
20	Normal Voltage	0.0044	
20	Battery End Point	0.0009	

Note:

1. Normal Voltage =4 V.；Battery End Point (BEP) =3.8 V.；Maximum Voltage =4.4 V.
2. The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of Radiated Test

LTE Band 30

LTE Band 30 / 5MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	4608	-52.59	-40	-12.59	-47.08	-62.12	3.14	12.67	H
	6918	-53.12	-40	-13.12	-53.61	-61.24	3.88	12.00	H
	9216	-56.62	-40	-16.62	-61.18	-63.09	4.46	10.94	H
	11529	-54.07	-40	-14.07	-59.5	-60.26	4.99	11.19	H
									H
									H
	4608	-51.15	-40	-11.15	-46.08	-60.68	3.14	12.67	V
	6918	-50.32	-40	-10.32	-50.93	-58.44	3.88	12.00	V
	9216	-52.86	-40	-12.86	-56.94	-59.33	4.46	10.94	V
	11529	-50.58	-40	-10.58	-56.32	-56.77	4.99	11.19	V
									V
									V
Middle	4614	-52.75	-40	-12.75	-47.25	-62.26	3.14	12.64	H
	6924	-53.81	-40	-13.81	-54.32	-61.92	3.89	12.00	H
	9234	-55.59	-40	-15.59	-60.19	-61.99	4.47	10.86	H
	11538	-52.10	-40	-12.10	-57.53	-58.32	5.00	11.21	H
									H
									H
	4614	-50.90	-40	-10.90	-45.84	-60.41	3.14	12.64	V
	6924	-52.95	-40	-12.95	-53.57	-61.06	3.89	12.00	V
	9234	-53.97	-40	-13.97	-58.05	-60.37	4.47	10.86	V
	11538	-47.24	-40	-7.24	-52.97	-53.46	5.00	11.21	V
									V
									V

Highest	4620	-54.21	-40	-14.21	-48.73	-63.69	3.14	12.62	H
	6930	-55.00	-40	-15.00	-55.54	-63.11	3.89	12.00	H
	9243	-52.98	-40	-12.98	-57.6	-59.34	4.47	10.83	H
	11547	-53.40	-40	-13.40	-58.83	-59.64	5.00	11.24	H
									H
									H
									H
	4620	-50.49	-40	-10.49	-45.45	-59.97	3.14	12.62	V
	6930	-51.76	-40	-11.76	-52.39	-59.87	3.89	12.00	V
	9243	-55.51	-40	-15.51	-59.59	-61.87	4.47	10.83	V
	11547	-48.78	-40	-8.78	-54.49	-55.02	5.00	11.24	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 30 / 10MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	4608	-52.33	-40	-12.33	-46.82	-61.86	3.14	12.67	H
	6918	-50.28	-40	-10.28	-50.77	-58.40	3.88	12.00	H
	9225	-54.01	-40	-14.01	-58.59	-60.45	4.46	10.90	H
	11529	-54.38	-40	-14.38	-59.81	-60.57	4.99	11.19	H
									H
									H
									H
	4608	-52.54	-40	-12.54	-47.47	-62.07	3.14	12.67	V
	6918	-53.33	-40	-13.33	-53.94	-61.45	3.88	12.00	V
	9225	-52.50	-40	-12.50	-56.58	-58.94	4.46	10.90	V
	11529	-50.77	-40	-10.77	-56.51	-56.96	4.99	11.19	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.