

# TEST REPORT

Product Name: Smart POS Terminal  
FCC ID: 2ALKI-P40  
Trademark: N/A  
Model Number: P40  
Prepared For: Wuhan Tianyu Information Industry Co., Ltd.  
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Sample Received Date: Jan. 30, 2024  
Sample tested Date: Jan. 30, 2024 to Mar. 11, 2024  
Issue Date: Mar. 11, 2024  
Report No.: CTB240312056RFX  
Test Standards: FCC Part 2, 22, 24E, 27  
Test Results: PASS  
Remark: This is LTE radio test report.

Compiled by:

Reviewed by:

Approved by:

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Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "\*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)



1. VERSION

Report No.	Issue Date	Description	Approved
CTB240312056RFX	Mar. 11, 2024	Original	Valid

## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v03r01	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m chamber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10 <sup>-7</sup>

#### 4. PRODUCT INFORMATION AND TEST SETUP

##### 4.1 Product Information

Model(s):	P40
Model Description:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 2:1850-1910MHz FDD-LTE BAND 4:1710-1755MHz FDD-LTE BAND 5:824-849MHz FDD-LTE BAND 7:2500-2570MHz TDD-LTE BAND 41: 2555-2655MHz
Max. RF output power:	FDD-LTE BAND 2: 23.14dBm FDD-LTE BAND 4: 23.41dBm FDD-LTE BAND 5: 23.83dBm FDD-LTE BAND 7: 22.04dBm TDD-LTE BAND 41: 22.17dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	FPC Antenna
Antenna Gain:	FDD-LTE BAND 2:0.89dBi FDD-LTE BAND 4: 0.8dBi FDD-LTE BAND 5: -4.3dBi FDD-LTE BAND 7: -2.08dBi TDD-LTE BAND 41:-0.8dBi
Ratings:	DC 5V charging from adapter DC 3.7V from battery

#### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

#### 4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4 Test Mode

Test Mode List		
Test Mode	Description	Remark
TM1	FDD-LTE BAND 2	Low, Middle, High Channels
TM2	FDD-LTE BAND 4	Low, Middle, High Channels
TM3	FDD-LTE BAND 5	Low, Middle, High Channels
TM4	FDD-LTE BAND 7	Low, Middle, High Channels
TM5	FDD-LTE BAND 41	Low, Middle, High Channels

#### 4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.7
Normal Temperature(°C)	23
Low Temperature(°C)	0
High Temperature(°C)	40

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinh Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2024.07.05
4	Communication test set	R&S	CMW500	108058	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2024.07.06
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2024.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2024.07.05
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2024.07.05
18	Amplifier	HP	8447E	2945A02747	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2024.07.08



21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2024.07.08
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.07.05

## 6. RF EXPOSURE

### 6.1 Standard Applicable

According to §1.1307 and §2.1091, §2.1093, the portable transmitter must comply the RF exposure requirements.

### 6.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

## 7. RF OUTPUT POWER

### 7.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

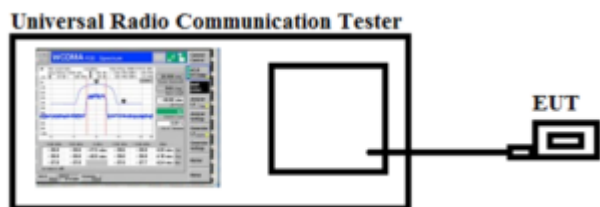
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(c)(10), portable stations (hand-held devices) in the 698-746 MHz band are limited to 3 watts ERP.

### 7.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

## 7.3 Summary of Test Results/Plots

 Max. Radiated Power:  
 FDD-LTE Band 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.18	<33.00	PASS
		H	22.08		
	MCH	V	21.07		PASS
		H	21.16		
	HCH	V	21.44		PASS
		H	20.81		
16QAM	LCH	V	21.92	<33.00	PASS
		H	22.26		
	MCH	V	21.26		PASS
		H	20.92		
	HCH	V	21.20		PASS
		H	22.12		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.42	<33.00	PASS
		H	21.75		
	MCH	V	21.12		PASS
		H	20.54		
	HCH	V	22.11		PASS
		H	21.47		
16QAM	LCH	V	22.04	<33.00	PASS
		H	21.31		
	MCH	V	20.89		PASS
		H	21.03		
	HCH	V	20.54		PASS
		H	21.42		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.67	<33.00	PASS
		H	21.03		
	MCH	V	21.48		PASS
		H	20.98		

	HCH	V	22.15		PASS
		H	20.54		
16QAM	LCH	V	21.30	<33.00	PASS
		H	21.61		
	MCH	V	20.63		PASS
		H	20.54		
	HCH	V	20.79		PASS
		H	20.98		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.16	<33.00	PASS
		H	20.56		
	MCH	V	21.82		PASS
		H	22.35		
	HCH	V	21.21		PASS
		H	20.87		
16QAM	LCH	V	21.77	<33.00	PASS
		H	21.55		
	MCH	V	21.94		PASS
		H	22.41		
	HCH	V	22.05		PASS
		H	21.00		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.32	<33.00	PASS
		H	20.94		
	MCH	V	20.70		PASS
		H	21.99		
	HCH	V	21.02		PASS
		H	21.24		
16QAM	LCH	V	21.45	<33.00	PASS
		H	22.46		
	MCH	V	21.99		PASS
		H	22.30		
	HCH	V	20.80		PASS
		H	20.89		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.14	<33.00	PASS
		H	21.48		
	MCH	V	21.84		PASS
		H	22.11		
	HCH	V	22.17		PASS
		H	21.68		
16QAM	LCH	V	23.12	<33.00	PASS
		H	20.67		
	MCH	V	21.39		PASS
		H	21.83		
	HCH	V	20.87		PASS
		H	21.48		

## FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.48	<30.00	PASS
		H	21.40		
	MCH	V	21.80		PASS
		H	22.01		
	HCH	V	22.07		PASS
		H	21.89		
16QAM	LCH	V	22.67	<30.00	PASS
		H	20.76		
	MCH	V	21.16		PASS
		H	21.53		
	HCH	V	20.93		PASS
		H	20.86		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.28	<30.00	PASS
		H	21.33		
	MCH	V	21.63		PASS
		H	21.78		

	HCH	V	21.66		PASS
		H	20.76		
16QAM	LCH	V	21.55	<30.00	PASS
		H	21.91		
	MCH	V	20.87		PASS
		H	21.83		
	HCH	V	21.45		PASS
		H	20.74		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.72	<30.00	PASS
		H	20.73		
	MCH	V	21.20		PASS
		H	21.41		
	HCH	V	21.21		PASS
		H	21.60		
16QAM	LCH	V	21.38	<30.00	PASS
		H	21.55		
	MCH	V	21.57		PASS
		H	21.47		
	HCH	V	20.69		PASS
		H	22.09		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.97	<30.00	PASS
		H	21.98		
	MCH	V	22.31		PASS
		H	20.51		
	HCH	V	21.78		PASS
		H	21.60		
16QAM	LCH	V	22.36	<30.00	PASS
		H	22.39		
	MCH	V	22.34		PASS
		H	21.52		
	HCH	V	21.87		PASS
		H	22.25		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.82	<30.00	PASS
		H	21.45		
	MCH	V	22.43		PASS
		H	22.10		
	HCH	V	22.17		PASS
		H	20.85		
16QAM	LCH	V	22.55	<30.00	PASS
		H	21.07		
	MCH	V	20.89		PASS
		H	20.92		
	HCH	V	22.16		PASS
		H	21.64		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.41	<30.00	PASS
		H	21.85		
	MCH	V	22.34		PASS
		H	20.93		
	HCH	V	20.96		PASS
		H	21.42		
16QAM	LCH	V	23.39	<30.00	PASS
		H	21.10		
	MCH	V	21.34		PASS
		H	21.00		
	HCH	V	20.63		PASS
		H	20.63		

## FDD-LTE Band 5

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.43	<34.77	PASS
		H	22.64		
	MCH	V	21.95		PASS
		H	21.84		
	HCH	V	22.53		PASS



		H	23.37		
16QAM	LCH	V	21.54	<34.77	PASS
		H	21.70		
	MCH	V	22.45		PASS
		H	22.40		
	HCH	V	22.78		PASS
		H	23.02		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.94	<34.77	PASS
		H	23.07		
	MCH	V	22.83		PASS
		H	22.37		
	HCH	V	23.22		PASS
		H	22.49		
16QAM	LCH	V	21.69	<34.77	PASS
		H	21.80		
	MCH	V	23.13		PASS
		H	23.30		
	HCH	V	22.14		PASS
		H	22.19		
Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.86	<34.77	PASS
		H	22.31		
	MCH	V	23.24		PASS
		H	22.58		
	HCH	V	23.36		PASS
		H	21.95		
16QAM	LCH	V	22.70	<34.77	PASS
		H	21.79		
	MCH	V	21.61		PASS
		H	23.50		
	HCH	V	22.35		PASS
		H	22.12		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	23.83	<34.77	PASS
		H	22.50		
	MCH	V	22.40		PASS
		H	21.95		
	HCH	V	21.60		PASS
		H	21.98		
16QAM	LCH	V	23.79	<34.77	PASS
		H	22.00		
	MCH	V	22.23		PASS
		H	22.16		
	HCH	V	22.62		PASS
		H	23.04		

## FDD-LTE Band 7

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.63	<33	PASS
		H	19.10		
	MCH	V	19.63		PASS
		H	20.95		
	HCH	V	20.16		PASS
		H	20.13		
16QAM	LCH	V	20.70	<33	PASS
		H	19.21		
	MCH	V	20.74		PASS
		H	20.07		
	HCH	V	20.25		PASS
		H	20.04		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.81	<33	PASS
		H	21.11		
	MCH	V	19.50		PASS
		H	20.73		
	HCH	V	19.72		PASS

		H	20.36		
16QAM	LCH	V	20.49	<33	PASS
		H	20.28		
	MCH	V	21.10		PASS
		H	21.33		
	HCH	V	19.99		PASS
		H	21.16		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.81	<33	PASS
		H	21.11		
	MCH	V	19.50		PASS
		H	20.73		
	HCH	V	19.72		PASS
		H	20.36		
16QAM	LCH	V	20.49	<33	PASS
		H	20.28		
	MCH	V	21.10		PASS
		H	21.33		
	HCH	V	19.99		PASS
		H	21.16		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	EIRP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.17	<33	PASS
		H	20.45		
	MCH	V	20.50		PASS
		H	21.08		
	HCH	V	19.85		PASS
		H	19.85		
16QAM	LCH	V	22.15	<33	PASS
		H	19.51		
	MCH	V	20.77		PASS
		H	19.97		
	HCH	V	20.15		PASS
		H	20.88		

## TDD-LTE Band 41

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.63	<33.00	PASS
		H	20.03		
	MCH	V	20.58		PASS
		H	20.46		
	HCH	V	21.06		PASS
		H	20.48		
16QAM	LCH	V	19.59	<33.00	PASS
		H	20.23		
	MCH	V	19.64		PASS
		H	20.22		
	HCH	V	20.64		PASS
		H	21.49		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.68	<33.00	PASS
		H	19.61		
	MCH	V	21.48		PASS
		H	20.17		
	HCH	V	20.68		PASS

		H	19.57		
16QAM	LCH	V	21.44	<33.00	PASS
		H	21.41		
	MCH	V	20.28		PASS
		H	20.77		
	HCH	V	21.49		PASS
		H	20.19		
Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.80	<33.00	PASS
		H	20.89		
	MCH	V	21.94		PASS
		H	20.25		
	HCH	V	21.44		PASS
		H	21.11		
16QAM	LCH	V	21.96	<33.00	PASS
		H	21.82		
	MCH	V	20.89		PASS
		H	21.98		
	HCH	V	20.40		PASS
		H	20.66		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.17	<33.00	PASS
		H	19.61		
	MCH	V	20.90		PASS
		H	19.53		
	HCH	V	20.33		PASS
		H	20.62		
16QAM	LCH	V	22.15	<33.00	PASS
		H	21.16		
	MCH	V	21.49		PASS
		H	19.76		
	HCH	V	20.48		PASS
		H	21.08		

Max. Conducted Output Power

Please refer to Appendix A: Average Power Output Data

Test result: Pass

## 8. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER

### 8.1 Standard Applicable

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, 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.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal

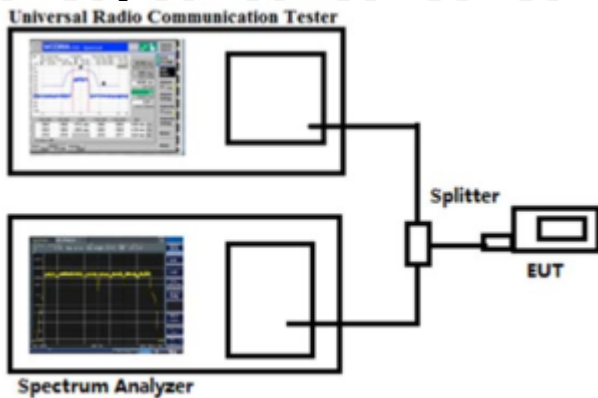
corresponding to the highest PAPR expected during periods of continuous transmission.

### 8.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Configuration for the emission bandwidth testing:



### 8.3 Summary of Test Results

Please refer to Appendix 3: Peak-to-Average Ratio

Test result: Pass

**9. EMISSION BANDWIDTH**

**9.1 Standard Applicable**

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

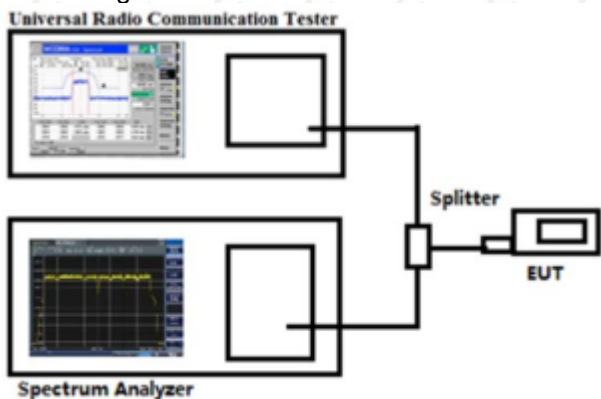
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**9.2 Test Procedure**

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Configuration for the emission bandwidth testing:



**9.3 Summary of Test Results/Plots**

Please refer to Appendix 4: 26dB Bandwidth and Occupied Bandwidth  
 Test result: Pass

## 10. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

### 10.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the 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.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB.

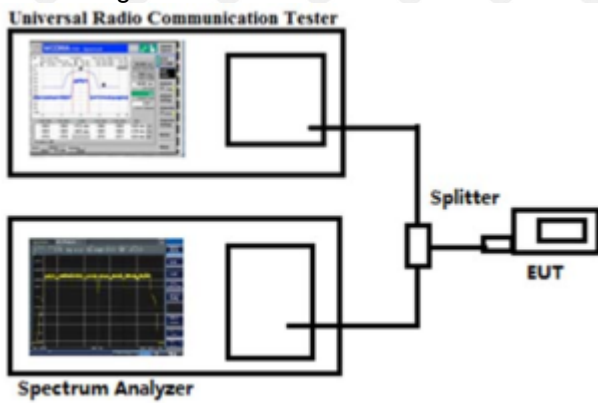
According to §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz.

### 10.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10 th harmonic.



Test Configuration for the out of band emissions testing:



### 10.3 Summary of Test Results/Plots

Please refer to Appendix 5 & 6: Band Edge & Conducted Spurious Emission  
Test result: Pass

## 11. SPURIOUS RADIATED EMISSIONS

### 11.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the 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.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

According to §27.53(g) the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB.

## 11.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-E and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.  
Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

## 11.3 Summary of Test Results/Plots

Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

**Test Data:  
QPSK**

Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1401.97	148	351	-57.67	-13	-44.67	Pass	H
1722.93	159	290	-48.66	-13	-35.66	Pass	H
3918.07	158	255	-44.89	-13	-31.89	Pass	H
5902.57	147	72	-42.28	-13	-29.28	Pass	H
6528.89	149	244	-45.10	-13	-32.10	Pass	H
8117.65	146	249	-43.02	-13	-30.02	Pass	H
1248.84	153	277	-56.02	-13	-43.02	Pass	V
1456.87	160	277	-57.95	-13	-44.95	Pass	V
3491.05	152	104	-51.04	-13	-38.04	Pass	V
3857.41	156	286	-49.12	-13	-36.12	Pass	V
5776.03	145	13	-47.36	-13	-34.36	Pass	V
6496.90	147	215	-45.89	-13	-32.89	Pass	V
Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1308.38	150	155	-57.45	-13	-44.45	Pass	H
1634.31	146	209	-51.88	-13	-38.88	Pass	H
3925.04	150	284	-49.35	-13	-36.35	Pass	H
5877.95	146	357	-45.25	-13	-32.25	Pass	H
6471.24	149	53	-47.91	-13	-34.91	Pass	H
8014.67	151	276	-50.71	-13	-37.71	Pass	H
1234.37	149	2	-55.43	-13	-42.43	Pass	V
1367.07	148	263	-58.31	-13	-45.31	Pass	V
3676.96	147	233	-50.87	-13	-37.87	Pass	V
3879.15	148	245	-48.06	-13	-35.06	Pass	V
5767.58	150	278	-48.13	-13	-35.13	Pass	V
6441.55	150	149	-48.39	-13	-35.39	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1398.35	152	312	-54.79	-13	-41.79	Pass	H
1579.28	154	170	-52.78	-13	-39.78	Pass	H
3840.17	150	54	-47.01	-13	-34.01	Pass	H
5917.30	153	215	-39.14	-13	-26.14	Pass	H
6481.70	153	143	-42.28	-13	-29.28	Pass	H
7943.58	150	169	-46.10	-13	-33.10	Pass	H
1320.92	145	92	-57.86	-13	-44.86	Pass	V
1311.08	147	346	-59.56	-13	-46.56	Pass	V
3474.55	152	216	-51.14	-13	-38.14	Pass	V
3837.60	149	280	-48.52	-13	-35.52	Pass	V
5843.10	146	294	-43.06	-13	-30.06	Pass	V
6657.48	149	266	-46.98	-13	-33.98	Pass	V

**16QAM**

Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1370.36	148	2	-56.07	-13	-43.07	Pass	H
1747.25	153	44	-47.88	-13	-34.88	Pass	H
3799.25	148	80	-50.38	-13	-37.38	Pass	H
5991.63	146	293	-42.18	-13	-29.18	Pass	H
6474.22	151	98	-41.52	-13	-28.52	Pass	H
7957.47	148	316	-40.53	-13	-27.53	Pass	H
1157.48	147	115	-55.37	-13	-42.37	Pass	V
1406.88	154	206	-55.45	-13	-42.45	Pass	V
3642.51	148	252	-52.34	-13	-39.34	Pass	V
3917.56	154	238	-53.84	-13	-40.84	Pass	V
5854.83	152	63	-46.68	-13	-33.68	Pass	V
6589.01	154	126	-48.47	-13	-35.47	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1257.20	151	223	-56.09	-13	-41.45	Pass	H
1779.02	154	220	-53.79	-13	-37.85	Pass	H
3766.11	147	237	-46.82	-13	-35.2	Pass	H
5963.12	153	315	-45.04	-13	-30.39	Pass	H
6478.36	151	218	-45.73	-13	-32.24	Pass	H
8104.55	147	39	-41.56	-13	-30.22	Pass	H
1269.47	152	106	-60.19	-13	-44.9	Pass	V
1315.25	149	242	-55.27	-13	-43.63	Pass	V
3606.42	151	320	-46.01	-13	-35.94	Pass	V
3823.29	147	326	-47.10	-13	-36.01	Pass	V
5776.35	151	192	-48.83	-13	-33.75	Pass	V
6540.72	151	63	-42.64	-13	-32.41	Pass	V
Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1245.08	150	20	-59.22	-13	-46.22	Pass	H
1637.97	148	315	-50.46	-13	-37.46	Pass	H
3825.39	150	317	-46.66	-13	-33.66	Pass	H
5858.76	145	168	-39.51	-13	-26.51	Pass	H
6586.24	153	348	-39.15	-13	-26.15	Pass	H
8099.07	149	315	-42.77	-13	-29.77	Pass	H
1123.21	146	316	-57.53	-13	-44.53	Pass	V
1557.27	148	242	-58.68	-13	-45.68	Pass	V
3618.33	155	356	-48.13	-13	-35.13	Pass	V
3834.22	151	354	-52.71	-13	-39.71	Pass	V
5795.53	146	357	-50.37	-13	-37.37	Pass	V
6539.73	149	112	-42.49	-13	-29.49	Pass	V

Note:

- 1) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

**QPSK**

Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1290.55	152	255	-55.11	-13	-42.11	Pass	H
1639.21	152	89	-47.91	-13	-34.91	Pass	H
3949.65	143	215	-47.82	-13	-34.82	Pass	H
5877.51	160	130	-45.60	-13	-32.60	Pass	H
6554.21	156	241	-45.44	-13	-32.44	Pass	H
7991.96	159	97	-45.05	-13	-32.05	Pass	H
1137.88	149	37	-53.78	-13	-40.78	Pass	V
1481.28	144	249	-59.10	-13	-46.10	Pass	V
3515.38	141	180	-52.58	-13	-39.58	Pass	V
3878.04	150	286	-50.84	-13	-37.84	Pass	V
5877.47	147	344	-48.73	-13	-35.73	Pass	V
6490.07	147	0	-46.55	-13	-33.55	Pass	V
Band 4 20175 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1337.89	150	40	-55.67	-13	-42.67	Pass	H
1658.02	146	310	-52.19	-13	-39.19	Pass	H
3924.82	150	154	-49.99	-13	-36.99	Pass	H
5851.79	146	290	-42.40	-13	-29.40	Pass	H
6369.60	149	25	-48.71	-13	-35.71	Pass	H
8029.83	151	331	-50.20	-13	-37.20	Pass	H
1233.01	149	329	-53.21	-13	-40.21	Pass	V
1472.69	148	63	-58.37	-13	-45.37	Pass	V
3533.74	147	36	-53.37	-13	-40.37	Pass	V
3828.77	148	294	-49.80	-13	-36.80	Pass	V
5800.95	150	42	-47.63	-13	-34.63	Pass	V
6542.68	150	255	-47.30	-13	-34.30	Pass	V

Band 4 20393 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1432.37	150	335	-59.02	-13	-46.02	Pass	H
1648.39	145	13	-54.54	-13	-41.54	Pass	H
3756.00	146	142	-48.38	-13	-35.38	Pass	H
5830.66	151	242	-39.04	-13	-26.04	Pass	H
6609.59	155	57	-44.98	-13	-31.98	Pass	H
7946.78	152	190	-43.11	-13	-30.11	Pass	H
1199.80	147	33	-55.90	-13	-42.90	Pass	V
1486.74	148	143	-54.68	-13	-41.68	Pass	V
3493.90	146	172	-54.30	-13	-41.30	Pass	V
3821.93	152	24	-47.25	-13	-34.25	Pass	V
5732.75	153	30	-45.09	-13	-32.09	Pass	V
6534.88	148	17	-44.87	-13	-31.87	Pass	V

**16QAM**

Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1383.40	154	172	-59.51	-13	-46.51	Pass	H
1757.92	153	274	-45.60	-13	-32.60	Pass	H
3802.93	149	207	-48.09	-13	-35.09	Pass	H
5907.72	154	148	-46.83	-13	-33.83	Pass	H
6647.09	145	347	-44.15	-13	-31.15	Pass	H
8001.07	150	120	-44.80	-13	-31.80	Pass	H
1145.62	153	119	-52.20	-13	-39.20	Pass	V
1467.97	145	93	-52.66	-13	-39.66	Pass	V
3574.06	149	29	-53.04	-13	-40.04	Pass	V
3975.21	147	214	-49.55	-13	-36.55	Pass	V
5776.96	151	100	-46.18	-13	-33.18	Pass	V
6581.41	148	78	-52.09	-13	-39.09	Pass	V



Band 4 20175 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1409.72	153	318	-51.37	-13	-41.45	Pass	H
1745.37	154	84	-49.12	-13	-37.85	Pass	H
3952.06	151	39	-45.78	-13	-35.2	Pass	H
5981.18	154	293	-41.22	-13	-30.39	Pass	H
6495.31	148	261	-45.59	-13	-32.24	Pass	H
8007.11	153	54	-41.95	-13	-30.22	Pass	H
1092.28	147	82	-60.85	-13	-44.9	Pass	V
1318.40	154	22	-55.69	-13	-43.63	Pass	V
3482.43	154	289	-47.93	-13	-35.94	Pass	V
3794.83	147	210	-51.46	-13	-36.01	Pass	V
5803.02	150	294	-47.85	-13	-33.75	Pass	V
6471.08	153	107	-47.36	-13	-32.41	Pass	V
Band 4 20393 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1284.73	154	316	-59.27	-13	-46.27	Pass	H
1630.99	153	119	-51.66	-13	-38.66	Pass	H
3961.09	153	144	-43.13	-13	-30.13	Pass	H
5896.30	151	4	-41.72	-13	-28.72	Pass	H
6583.69	150	54	-43.26	-13	-30.26	Pass	H
7999.10	150	101	-42.95	-13	-29.95	Pass	H
1158.48	147	173	-55.72	-13	-42.72	Pass	V
1406.37	151	237	-61.95	-13	-48.95	Pass	V
3555.37	146	99	-48.90	-13	-35.90	Pass	V
3859.82	149	112	-53.18	-13	-40.18	Pass	V
5814.30	154	50	-51.40	-13	-38.40	Pass	V
6641.67	152	43	-45.86	-13	-32.86	Pass	V

Note:

3) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

4) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

**QPSK**

Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1282.06	149	155	-56.80	-13	-43.80	Pass	H
1674.51	144	229	-46.73	-13	-33.73	Pass	H
3804.65	154	203	-49.18	-13	-36.18	Pass	H
5929.51	156	99	-45.13	-13	-32.13	Pass	H
6429.08	146	323	-43.08	-13	-30.08	Pass	H
8127.46	147	355	-42.86	-13	-29.86	Pass	H
1152.54	143	242	-56.62	-13	-43.62	Pass	V
1432.63	152	50	-58.31	-13	-45.31	Pass	V
3517.14	160	327	-49.83	-13	-36.83	Pass	V
3898.62	148	314	-49.37	-13	-36.37	Pass	V
5896.30	147	179	-46.57	-13	-33.57	Pass	V
6512.47	144	239	-47.72	-13	-34.72	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1339.69	150	145	-54.15	-13	-41.15	Pass	H
1682.73	146	240	-51.30	-13	-38.30	Pass	H
3807.74	150	32	-50.23	-13	-37.23	Pass	H
5873.97	146	255	-46.60	-13	-33.60	Pass	H
6384.94	149	7	-49.61	-13	-36.61	Pass	H
7985.47	151	96	-46.47	-13	-33.47	Pass	H
1309.81	149	352	-52.89	-13	-39.89	Pass	V
1443.30	148	141	-56.36	-13	-43.36	Pass	V
3510.93	147	140	-53.92	-13	-40.92	Pass	V
3989.66	148	197	-53.12	-13	-40.12	Pass	V
5832.74	150	317	-46.36	-13	-33.36	Pass	V
6542.68	150	105	-47.24	-13	-34.24	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1364.75	151	255	-58.19	-13	-45.19	Pass	H
1657.60	152	264	-51.05	-13	-38.05	Pass	H
3890.35	152	359	-45.19	-13	-32.19	Pass	H
6006.21	145	215	-38.70	-13	-25.70	Pass	H
6559.23	151	326	-42.53	-13	-29.53	Pass	H
7961.49	150	174	-47.32	-13	-34.32	Pass	H
1282.59	146	322	-57.63	-13	-44.63	Pass	V
1359.00	155	264	-57.48	-13	-44.48	Pass	V
3495.54	150	319	-55.05	-13	-42.05	Pass	V
3894.70	153	324	-51.17	-13	-38.17	Pass	V
5695.59	153	33	-45.46	-13	-32.46	Pass	V
6598.33	148	262	-49.68	-13	-36.68	Pass	V

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Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1408.00	152	110	-57.69	-13	-44.69	Pass	H
1663.77	146	141	-49.81	-13	-36.81	Pass	H
3934.40	152	41	-47.88	-13	-34.88	Pass	H
5975.42	145	292	-44.24	-13	-31.24	Pass	H
6505.42	146	129	-46.47	-13	-33.47	Pass	H
7936.06	150	249	-44.51	-13	-31.51	Pass	H
1093.64	150	45	-51.93	-13	-38.93	Pass	V
1382.95	148	8	-53.54	-13	-40.54	Pass	V
3607.57	146	89	-49.08	-13	-36.08	Pass	V
4002.77	149	77	-49.12	-13	-36.12	Pass	V
5758.33	152	334	-46.73	-13	-33.73	Pass	V
6597.36	145	80	-49.26	-13	-36.26	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1265.29	153	228	-50.95	-13	-41.45	Pass	H
1810.30	147	67	-51.37	-13	-37.85	Pass	H
3880.59	154	219	-45.03	-13	-35.2	Pass	H
5992.00	149	61	-45.10	-13	-30.39	Pass	H
6469.91	151	13	-43.13	-13	-32.24	Pass	H
8131.08	150	91	-45.59	-13	-30.22	Pass	H
1182.35	146	92	-58.85	-13	-44.9	Pass	V
1347.45	145	67	-55.75	-13	-43.63	Pass	V
3456.86	146	233	-47.31	-13	-35.94	Pass	V
3890.21	148	345	-47.31	-13	-36.01	Pass	V
5918.03	147	296	-43.42	-13	-33.75	Pass	V
6617.72	150	238	-46.27	-13	-32.41	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1417.78	150	44	-54.42	-13	-41.42	Pass	H
1685.31	150	133	-52.01	-13	-39.01	Pass	H
3820.38	155	347	-42.38	-13	-29.38	Pass	H
5988.61	147	189	-40.26	-13	-27.26	Pass	H
6480.71	154	214	-39.70	-13	-26.70	Pass	H
8021.42	149	135	-42.00	-13	-29.00	Pass	H
1138.14	151	289	-53.66	-13	-40.66	Pass	V
1388.56	150	224	-61.69	-13	-48.69	Pass	V
3632.82	146	32	-49.70	-13	-36.70	Pass	V
3779.74	152	194	-47.14	-13	-34.14	Pass	V
5891.74	153	229	-48.04	-13	-35.04	Pass	V
6575.83	153	313	-44.22	-13	-31.22	Pass	V

Note:

5) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

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Band 7 20775 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1364.90	155	37	-60.62	-13	-47.62	Pass	H
1717.57	153	131	-49.68	-13	-36.68	Pass	H
3865.52	155	286	-51.24	-13	-38.24	Pass	H
5944.43	153	282	-48.89	-13	-35.89	Pass	H
6499.61	151	311	-45.18	-13	-32.18	Pass	H
8050.21	149	268	-44.78	-13	-31.78	Pass	H
1242.99	151	19	-57.08	-13	-44.08	Pass	V
1382.00	154	107	-54.24	-13	-41.24	Pass	V
3568.37	154	111	-47.57	-13	-34.57	Pass	V
3884.40	146	359	-53.47	-13	-40.47	Pass	V
5853.42	152	325	-46.43	-13	-33.43	Pass	V
6668.21	152	251	-48.91	-13	-35.91	Pass	V

Band 7 21100 channel/BW 5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1274.07	145	146	-50.64	-13	-37.64	Pass	H
1783.26	152	224	-50.40	-13	-37.40	Pass	H
3928.82	147	263	-45.96	-13	-32.96	Pass	H
5837.53	154	92	-40.60	-13	-27.60	Pass	H
6537.87	152	11	-41.03	-13	-28.03	Pass	H
8014.37	148	15	-47.21	-13	-34.21	Pass	H
1163.30	146	156	-54.73	-13	-41.73	Pass	V
1418.29	147	108	-60.84	-13	-47.84	Pass	V
3515.37	151	112	-45.05	-13	-32.05	Pass	V
3908.49	148	311	-49.18	-13	-36.18	Pass	V
5775.06	154	325	-40.54	-13	-27.54	Pass	V
6580.92	150	307	-44.73	-13	-31.73	Pass	V

Band 7 21425 channel/BW 5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1326.20	149	165	-55.35	-13	-42.35	Pass	H
1677.75	146	208	-51.77	-13	-38.77	Pass	H
3803.76	146	4	-42.26	-13	-29.26	Pass	H
5933.68	150	198	-39.64	-13	-26.64	Pass	H
6484.67	146	341	-43.97	-13	-30.97	Pass	H
8038.81	150	235	-39.38	-13	-26.38	Pass	H
1151.63	146	292	-57.35	-13	-44.35	Pass	V
1468.55	150	158	-54.81	-13	-41.81	Pass	V
3621.79	149	55	-49.91	-13	-36.91	Pass	V
3844.98	150	319	-49.49	-13	-36.49	Pass	V
5715.32	146	118	-49.17	-13	-36.17	Pass	V
6462.52	150	155	-47.15	-13	-34.15	Pass	V

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Band 7 20775 channel/BW 5 (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1365.94	150	78	-53.20	-13	-40.20	Pass	H
1701.12	149	291	-52.92	-13	-39.92	Pass	H
3904.90	151	213	-49.40	-13	-36.40	Pass	H
5894.68	150	89	-46.20	-13	-33.20	Pass	H
6456.72	151	329	-50.48	-13	-37.48	Pass	H
7931.79	148	138	-50.44	-13	-37.44	Pass	H
1229.36	149	99	-54.42	-13	-41.42	Pass	V
1501.34	148	217	-54.44	-13	-41.44	Pass	V
3502.64	150	12	-49.55	-13	-36.55	Pass	V
3856.01	150	137	-46.51	-13	-33.51	Pass	V
5796.79	146	356	-47.05	-13	-34.05	Pass	V
6561.88	146	95	-49.62	-13	-36.62	Pass	V

Band 7 21100 channel/BW 5 (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1262.66	150	142	-55.78	-13	-42.78	Pass	H
1774.43	146	280	-55.49	-13	-42.49	Pass	H
3943.45	150	330	-45.38	-13	-32.38	Pass	H
5887.58	146	194	-42.59	-13	-29.59	Pass	H
6380.92	149	260	-50.66	-13	-37.66	Pass	H
7956.08	151	31	-45.93	-13	-32.93	Pass	H
1217.37	149	4	-55.20	-13	-42.20	Pass	V
1457.63	148	257	-61.95	-13	-48.95	Pass	V
3593.54	147	55	-49.85	-13	-36.85	Pass	V
3981.32	148	273	-51.65	-13	-38.65	Pass	V
5730.68	150	136	-51.14	-13	-38.14	Pass	V
6593.77	150	16	-49.33	-13	-36.33	Pass	V

Band 7 21425 channel/BW 5 (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1253.56	149	156	-56.57	-13	-43.57	Pass	H
1615.54	149	170	-48.03	-13	-35.03	Pass	H
3749.11	149	127	-46.88	-13	-33.88	Pass	H
5839.18	146	42	-42.89	-13	-29.89	Pass	H
6457.62	147	69	-40.55	-13	-27.55	Pass	H
7905.73	151	110	-47.10	-13	-34.10	Pass	H
1169.54	148	61	-53.65	-13	-40.65	Pass	V
1308.18	147	266	-54.43	-13	-41.43	Pass	V
3427.59	148	303	-52.35	-13	-39.35	Pass	V
3881.84	149	195	-47.92	-13	-34.92	Pass	V
5776.95	147	323	-46.94	-13	-33.94	Pass	V
6538.09	146	325	-49.43	-13	-36.43	Pass	V

Note:

7) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

8) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

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Band 41 40265 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1248.73	149	165	-54.70	-25	-29.70	Pass	H
1755.69	146	208	-46.64	-25	-21.64	Pass	H
3929.50	146	4	-44.61	-25	-19.61	Pass	H
5860.26	150	198	-44.62	-25	-19.62	Pass	H
6565.43	146	341	-42.02	-25	-17.02	Pass	H
8177.39	150	235	-47.77	-25	-22.77	Pass	H
1201.88	146	292	-53.90	-25	-28.90	Pass	V
1506.77	150	158	-56.65	-25	-31.65	Pass	V
3610.12	149	55	-53.40	-25	-28.40	Pass	V
3782.36	150	319	-50.30	-25	-25.30	Pass	V
5827.30	146	118	-45.93	-25	-20.93	Pass	V
6523.39	150	155	-48.55	-25	-23.55	Pass	V
Band 41 40740 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1267.87	149	165	-55.89	-25	-30.89	Pass	H
1682.48	146	208	-47.04	-25	-22.04	Pass	H
3853.83	146	4	-47.21	-25	-22.21	Pass	H
5828.93	150	198	-40.23	-25	-15.23	Pass	H
6579.26	146	341	-38.59	-25	-13.59	Pass	H
8119.35	150	235	-43.15	-25	-18.15	Pass	H
1268.63	146	292	-54.36	-25	-29.36	Pass	V
1399.81	150	158	-59.04	-25	-34.04	Pass	V
3590.84	149	55	-53.46	-25	-28.46	Pass	V
3809.60	150	319	-48.55	-25	-23.55	Pass	V
5850.11	146	118	-43.82	-25	-18.82	Pass	V
6568.61	150	155	-41.70	-25	-16.70	Pass	V
Band 41 41215 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1254.65	149	165	-54.59	-25	-29.59	Pass	H
1771.22	146	208	-48.44	-25	-23.44	Pass	H
3846.52	146	4	-44.89	-25	-19.89	Pass	H
5836.93	150	198	-43.20	-25	-18.20	Pass	H
6515.47	146	341	-46.77	-25	-21.77	Pass	H
8096.01	150	235	-44.68	-25	-19.68	Pass	H
1232.23	146	292	-53.20	-25	-28.20	Pass	V
1512.20	150	158	-55.70	-25	-30.70	Pass	V
3602.93	149	55	-47.09	-25	-22.09	Pass	V
3912.52	150	319	-49.98	-25	-24.98	Pass	V
5771.19	146	118	-44.67	-25	-19.67	Pass	V
6604.69	150	155	-50.36	-25	-25.36	Pass	V



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Band 41 40265 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1255.14	149	165	-51.76	-25	-26.76	Pass	H
1696.30	146	208	-47.51	-25	-22.51	Pass	H
3952.27	146	4	-48.99	-25	-23.99	Pass	H
5850.75	150	198	-38.76	-25	-13.76	Pass	H
6603.70	146	341	-42.07	-25	-17.07	Pass	H
8106.60	150	235	-44.75	-25	-19.75	Pass	H
1116.23	146	292	-51.79	-25	-26.79	Pass	V
1373.94	150	158	-57.03	-25	-32.03	Pass	V
3628.99	149	55	-53.10	-25	-28.10	Pass	V
3748.14	150	319	-50.71	-25	-25.71	Pass	V
5798.75	146	118	-47.87	-25	-22.87	Pass	V
6549.82	150	155	-44.92	-25	-19.92	Pass	V
Band 41 40740 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1376.55	147	127	-55.34	-25	-30.34	Pass	H
1708.44	149	84	-49.53	-25	-24.53	Pass	H
3854.31	154	185	-45.40	-25	-20.40	Pass	H
5802.33	151	57	-43.95	-25	-18.95	Pass	H
6580.92	146	92	-45.58	-25	-20.58	Pass	H
8091.15	152	311	-43.49	-25	-18.49	Pass	H
1112.30	147	131	-55.99	-25	-30.99	Pass	V
1390.16	151	290	-59.20	-25	-34.20	Pass	V
3562.66	151	66	-49.67	-25	-24.67	Pass	V
3871.55	154	218	-48.27	-25	-23.27	Pass	V
5875.11	146	228	-45.16	-25	-20.16	Pass	V
6602.76	149	332	-48.20	-25	-23.20	Pass	V
Band 41 41215 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1382.81	149	165	-57.71	-25	-32.71	Pass	H
1756.33	146	208	-49.13	-25	-24.13	Pass	H
3878.55	146	4	-47.35	-25	-22.35	Pass	H
5865.05	150	198	-44.46	-25	-19.46	Pass	H
6524.74	146	341	-44.51	-25	-19.51	Pass	H
8161.97	150	235	-43.33	-25	-18.33	Pass	H
1146.80	146	292	-53.04	-25	-28.04	Pass	V
1428.63	150	158	-57.44	-25	-32.44	Pass	V
3561.38	149	55	-52.38	-25	-27.38	Pass	V
3896.68	150	319	-49.09	-25	-24.09	Pass	V
5706.70	146	118	-43.76	-25	-18.76	Pass	V
6607.92	150	155	-44.90	-25	-19.90	Pass	V

## Note:

9) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

10) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

## 12. FREQUENCY STABILITY

### 12.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

### 12.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

### 12.3 Summary of Test Results/Plots

Note: 1.Normal Voltage NV= DC3.7V; Low Voltage LV=DC3.33; High Voltage HV=DC4.07V

Test result: Pass

## LTE Band 2

Test Frequency:1880.0MHz QPSK 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0027	2.5
40		-2	-0.0009	2.5
30		-5	-0.0021	2.5
20		-8	-0.0032	2.5
10		-10	-0.0040	2.5
0		-4	-0.0014	2.5
-10		-5	-0.0018	2.5
-20		-5	-0.0018	2.5
-30		-7	-0.0026	2.5
20		3.33	-4	-0.0016
20	4.07	-7	-0.0025	2.5

Test Frequency:1880.0MHz 16QAM 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0027	2.5
40		-2	-0.0007	2.5
30		-7	-0.0025	2.5
20		-8	-0.0032	2.5
10		-10	-0.0040	2.5
0		-4	-0.0014	2.5
-10		-6	-0.0022	2.5
-20		-4	-0.0017	2.5
-30		-7	-0.0025	2.5
20		3.33	-4	-0.0016
20	4.07	-6	-0.0023	2.5

LTE Band 2

Test Frequency:1880.0MHz QPSK 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-6	-0.0030	2.5
40		-2	-0.0009	2.5
30		-5	-0.0021	2.5
20		-7	-0.0027	2.5
10		-10	-0.0040	2.5
0		-5	-0.0019	2.5
-10		-5	-0.0019	2.5
-20		-6	-0.0022	2.5
-30		-5	-0.0020	2.5
20		3.33	-3	-0.0013
20	4.07	-6	-0.0025	2.5

Test Frequency:1880.0MHz 16QAM 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0022	2.5
40		-2	-0.0008	2.5
30		-7	-0.0027	2.5
20		-7	-0.0028	2.5
10		-11	-0.0042	2.5
0		-5	-0.0018	2.5
-10		-6	-0.0023	2.5
-20		-5	-0.0018	2.5
-30		-6	-0.0025	2.5
20		3.33	-3	-0.0012
20	4.07	-6	-0.0024	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0024	2.5
40		-3	-0.0013	2.5
30		-6	-0.0022	2.5
20		-8	-0.0031	2.5
10		-9	-0.0037	2.5
0		-5	-0.0018	2.5
-10		-5	-0.0021	2.5
-20		-4	-0.0017	2.5
-30		-5	-0.0021	2.5
20		3.33	-4	-0.0014
20	4.07	-6	-0.0022	2.5

Test Frequency:1880.0MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0027	2.5
40		-2	-0.0007	2.5
30		-6	-0.0025	2.5
20		-8	-0.0031	2.5
10		-10	-0.0040	2.5
0		-5	-0.0018	2.5
-10		-6	-0.0022	2.5
-20		-4	-0.0017	2.5
-30		-7	-0.0026	2.5
20		3.33	-3	-0.0011
20	4.07	-6	-0.0025	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-6	-0.0030	2.5
40		-3	-0.0011	2.5
30		-7	-0.0026	2.5
20		-7	-0.0028	2.5
10		-10	-0.0040	2.5
0		-4	-0.0017	2.5
-10		-5	-0.0018	2.5
-20		-4	-0.0017	2.5
-30		-7	-0.0027	2.5
20		3.33	-3	-0.0010
20	4.07	-6	-0.0022	2.5

Test Frequency:1880.0MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0026	2.5
40		-2	-0.0008	2.5
30		-5	-0.0020	2.5
20		-7	-0.0029	2.5
10		-11	-0.0043	2.5
0		-5	-0.0020	2.5
-10		-6	-0.0022	2.5
-20		-6	-0.0023	2.5
-30		-6	-0.0022	2.5
20		3.33	-4	-0.0015
20	4.07	-6	-0.0022	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0026	2.5
40		-2	-0.0009	2.5
30		-7	-0.0027	2.5
20		-7	-0.0027	2.5
10		-11	-0.0042	2.5
0		-4	-0.0017	2.5
-10		-6	-0.0023	2.5
-20		-6	-0.0022	2.5
-30		-6	-0.0021	2.5
20		3.33	-3	-0.0012
20	4.07	-6	-0.0022	2.5

Test Frequency:1880.0MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-5	-0.0027	2.5
40		-3	-0.0012	2.5
30		-6	-0.0025	2.5
20		-8	-0.0030	2.5
10		-11	-0.0044	2.5
0		-5	-0.0018	2.5
-10		-5	-0.0020	2.5
-20		-5	-0.0021	2.5
-30		-6	-0.0022	2.5
20		3.33	-3	-0.0012
20	4.07	-5	-0.0021	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-6	-0.0029	2.5
40		-3	-0.0010	2.5
30		-7	-0.0025	2.5
20		-8	-0.0032	2.5
10		-9	-0.0036	2.5
0		-5	-0.0019	2.5
-10		-4	-0.0017	2.5
-20		-5	-0.0019	2.5
-30		-7	-0.0026	2.5
20		3.33	-4	-0.0015
20	4.07	-6	-0.0023	2.5

Test Frequency:1880.0MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0023	2.5
40		-3	-0.0013	2.5
30		-7	-0.0025	2.5
20		-8	-0.0031	2.5
10		-10	-0.0038	2.5
0		-5	-0.0018	2.5
-10		-5	-0.0020	2.5
-20		-5	-0.0018	2.5
-30		-6	-0.0023	2.5
20		3.33	-3	-0.0012
20	4.07	-5	-0.0020	2.5



## LTE Band 4

Test Frequency:1732.5MHz QPSK 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0021	2.5
40		-8	-0.0047	2.5
30		-8	-0.0048	2.5
20		1	0.0007	2.5
10		-10	-0.0058	2.5
0		-8	-0.0046	2.5
-10		-6	-0.0037	2.5
-20		-6	-0.0034	2.5
-30		-9	-0.0050	2.5
20		3.33	-5	-0.0029
20	4.07	-7	-0.0039	2.5

Test Frequency:1732.5MHz 16QAM 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0019	2.5
40		-8	-0.0049	2.5
30		-7	-0.0040	2.5
20		1	0.0004	2.5
10		-10	-0.0056	2.5
0		-8	-0.0045	2.5
-10		-8	-0.0045	2.5
-20		-5	-0.0028	2.5
-30		-9	-0.0053	2.5
20		3.33	-5	-0.0030
20	4.07	-6	-0.0036	2.5

## LTE Band 4

Test Frequency:1732.5MHz QPSK 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0021	2.5
40		-7	-0.0043	2.5
30		-7	-0.0041	2.5
20		0	0.0002	2.5
10		-10	-0.0056	2.5
0		-8	-0.0046	2.5
-10		-6	-0.0036	2.5
-20		-5	-0.0029	2.5
-30		-9	-0.0053	2.5
20		3.33	-5	-0.0032
20	4.07	-6	-0.0036	2.5

Test Frequency:1732.5MHz 16QAM 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0019	2.5
40		-7	-0.0041	2.5
30		-8	-0.0046	2.5
20		2	0.0009	2.5
10		-9	-0.0054	2.5
0		-8	-0.0043	2.5
-10		-8	-0.0047	2.5
-20		-5	-0.0026	2.5
-30		-8	-0.0046	2.5
20		3.33	-7	-0.0039
20	4.07	-7	-0.0041	2.5

## LTE Band 4

Test Frequency:1732.5MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-2	-0.0013	2.5
40		-9	-0.0050	2.5
30		-8	-0.0044	2.5
20		1	0.0009	2.5
10		-10	-0.0057	2.5
0		-9	-0.0050	2.5
-10		-7	-0.0040	2.5
-20		-5	-0.0026	2.5
-30		-9	-0.0050	2.5
20		3.33	-7	-0.0038
20	4.07	-7	-0.0042	2.5

Test Frequency:1732.5MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0020	-1
40		-7	-0.0043	-5
30		-7	-0.0043	-6
20		2	0.0009	-7
10		-9	-0.0050	-8
0		-7	-0.0040	-7
-10		-7	-0.0038	-12
-20		-5	-0.0027	-7
-30		-9	-0.0052	-8
20		3.33	-7	-0.0038
20	4.07	-6	-0.0033	-8

## LTE Band 4

Test Frequency:1732.5MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0017	2.5
40		-9	-0.0050	2.5
30		-7	-0.0042	2.5
20		0	0.0002	2.5
10		-11	-0.0061	2.5
0		-8	-0.0048	2.5
-10		-8	-0.0045	2.5
-20		-5	-0.0030	2.5
-30		-8	-0.0045	2.5
20		3.33	-6	-0.0036
20	4.07	-7	-0.0042	2.5

Test Frequency:1732.5MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0023	2.5
40		-7	-0.0042	2.5
30		-7	-0.0041	2.5
20		1	0.0007	2.5
10		-10	-0.0057	2.5
0		-8	-0.0046	2.5
-10		-7	-0.0043	2.5
-20		-6	-0.0032	2.5
-30		-9	-0.0049	2.5
20		3.33	-6	-0.0036
20	4.07	-7	-0.0043	2.5

## LTE Band 4

Test Frequency:1732.5MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0017	2.5
40		-7	-0.0043	2.5
30		-8	-0.0047	2.5
20		1	0.0003	2.5
10		-10	-0.0055	2.5
0		-9	-0.0049	2.5
-10		-8	-0.0047	2.5
-20		-5	-0.0031	2.5
-30		-9	-0.0049	2.5
20		3.33	-6	-0.0036
20	4.07	-7	-0.0042	2.5

Test Frequency:1732.5MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0016	2.5
40		-8	-0.0049	2.5
30		-8	-0.0046	2.5
20		0	0.0002	2.5
10		-10	-0.0057	2.5
0		-7	-0.0040	2.5
-10		-7	-0.0038	2.5
-20		-5	-0.0026	2.5
-30		-9	-0.0052	2.5
20		3.33	-7	-0.0038
20	4.07	-7	-0.0040	2.5

## LTE Band 4

Test Frequency:1732.5MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-4	-0.0022	2.5
40		-7	-0.0040	2.5
30		-7	-0.0040	2.5
20		1	0.0006	2.5
10		-10	-0.0057	2.5
0		-8	-0.0045	2.5
-10		-8	-0.0045	2.5
-20		-5	-0.0027	2.5
-30		-9	-0.0053	2.5
20		3.33	-6	-0.0033
20	4.07	-7	-0.0041	2.5

Test Frequency:1732.5MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-3	-0.0017	2.5
40		-8	-0.0049	2.5
30		-8	-0.0044	2.5
20		1	0.0006	2.5
10		-9	-0.0050	2.5
0		-8	-0.0046	2.5
-10		-6	-0.0037	2.5
-20		-5	-0.0027	2.5
-30		-8	-0.0049	2.5
20		3.33	-6	-0.0037
20	4.07	-6	-0.0036	2.5

## LTE Band 5

Test Frequency:836.5MHz QPSK 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0079	2.5
40		-6	-0.0069	2.5
30		-7	-0.0087	2.5
20		-5	-0.0061	2.5
10		-7	-0.0078	2.5
0		-6	-0.0072	2.5
-10		-9	-0.0111	2.5
-20		-7	-0.0080	2.5
-30		-9	-0.0113	2.5
20		3.33	-8	-0.0092
20	4.07	-8	-0.0094	2.5

Test Frequency:836.5MHz 16QAM 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0081	2.5
40		-5	-0.0061	2.5
30		-7	-0.0078	2.5
20		-5	-0.0059	2.5
10		-8	-0.0092	2.5
0		-4	-0.0052	2.5
-10		-9	-0.0107	2.5
-20		-8	-0.0101	2.5
-30		-8	-0.0095	2.5
20		3.33	-9	-0.0106
20	4.07	-6	-0.0075	2.5

## LTE Band 5

Test Frequency:836.5MHz QPSK 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0087	2.5
40		-6	-0.0068	2.5
30		-6	-0.0071	2.5
20		-6	-0.0069	2.5
10		-6	-0.0076	2.5
0		-4	-0.0049	2.5
-10		-10	-0.0116	2.5
-20		-8	-0.0092	2.5
-30		-9	-0.0103	2.5
20		3.33	-8	-0.0098
20	4.07	-8	-0.0095	2.5

Test Frequency:836.5MHz 16QAM 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-8	-0.0093	2.5
40		-5	-0.0058	2.5
30		-6	-0.0073	2.5
20		-5	-0.0058	2.5
10		-7	-0.0089	2.5
0		-6	-0.0072	2.5
-10		-8	-0.0095	2.5
-20		-7	-0.0080	2.5
-30		-10	-0.0116	2.5
20		3.33	-8	-0.0098
20	4.07	-6	-0.0076	2.5



## LTE Band 5

Test Frequency:836.5MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-8	-0.0097	2.5
40		-6	-0.0077	2.5
30		-8	-0.0090	2.5
20		-6	-0.0069	2.5
10		-7	-0.0085	2.5
0		-6	-0.0066	2.5
-10		-9	-0.0104	2.5
-20		-7	-0.0085	2.5
-30		-9	-0.0109	2.5
20		3.33	-9	-0.0107
20	4.07	-8	-0.0090	2.5

Test Frequency:836.5MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0082	2.5
40		-5	-0.0057	2.5
30		-6	-0.0072	2.5
20		-5	-0.0056	2.5
10		-7	-0.0089	2.5
0		-6	-0.0068	2.5
-10		-10	-0.0115	2.5
-20		-7	-0.0081	2.5
-30		-9	-0.0103	2.5
20		3.33	-8	-0.0095
20	4.07	-7	-0.0084	2.5

LTE Band 5

Test Frequency:836.5MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-8	-0.0095	2.5
40		-6	-0.0069	2.5
30		-6	-0.0076	2.5
20		-5	-0.0055	2.5
10		-8	-0.0090	2.5
0		-5	-0.0061	2.5
-10		-9	-0.0112	2.5
-20		-8	-0.0098	2.5
-30		-10	-0.0115	2.5
20		3.33	-9	-0.0110
20	4.07	-7	-0.0080	2.5

Test Frequency:836.5MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0079	2.5
40		-6	-0.0071	2.5
30		-7	-0.0078	2.5
20		-4	-0.0050	2.5
10		-6	-0.0076	2.5
0		-5	-0.0057	2.5
-10		-8	-0.0100	2.5
-20		-7	-0.0081	2.5
-30		-8	-0.0095	2.5
20		3.33	-8	-0.0098
20	4.07	-7	-0.0084	2.5

LTE Band 7

Test Frequency:2535MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	0	0.0000	2.5
40		-1	-0.0003	2.5
30		1	0.0004	2.5
20		1	0.0004	2.5
10		1	0.0004	2.5
0		1	0.0003	2.5
-10		1	0.0004	2.5
-20		0	-0.0001	2.5
-30		1	0.0004	2.5
20		3.33	0	0.0000
20	4.07	-1	-0.0002	2.5

Test Frequency:2535MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-1	-0.0004	2.5
40		1	0.0004	2.5
30		0	0.0001	2.5
20		1	0.0004	2.5
10		1	0.0005	2.5
0		1	0.0004	2.5
-10		1	0.0002	2.5
-20		1	0.0003	2.5
-30		1	0.0005	2.5
20		3.33	2	0.0007
20	4.07	0	0.0000	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-2	-0.0006	2.5
40		0	-0.0002	2.5
30		0	-0.0001	2.5
20		0	-0.0001	2.5
10		1	0.0002	2.5
0		1	0.0002	2.5
-10		1	0.0005	2.5
-20		0	0.0000	2.5
-30		0	-0.0002	2.5
20		3.33	1	0.0002
20	4.07	-1	-0.0004	2.5

Test Frequency:2535MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	0	-0.0001	2.5
40		0	0.0001	2.5
30		0	0.0000	2.5
20		1	0.0005	2.5
10		0	-0.0001	2.5
0		0	0.0000	2.5
-10		0	-0.0001	2.5
-20		0	-0.0001	2.5
-30		0	0.0001	2.5
20		3.33	0	0.0001
20	4.07	0	0.0000	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-1	-0.0006	2.5
40		0	0.0001	2.5
30		1	0.0003	2.5
20		1	0.0003	2.5
10		1	0.0005	2.5
0		0	0.0002	2.5
-10		0	0.0001	2.5
-20		1	0.0003	2.5
-30		1	0.0004	2.5
20		3.33	2	0.0006
20	4.07	0	0.0001	2.5

Test Frequency:2535MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-1	-0.0004	2.5
40		0	0.0001	2.5
30		1	0.0004	2.5
20		0	-0.0001	2.5
10		0	0.0000	2.5
0		0	-0.0001	2.5
-10		0	0.0000	2.5
-20		1	0.0003	2.5
-30		1	0.0003	2.5
20		3.33	0	0.0001
20	4.07	-1	-0.0004	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-2	-0.0007	2.5
40		-1	-0.0003	2.5
30		0	0.0001	2.5
20		0	0.0001	2.5
10		0	0.0000	2.5
0		1	0.0004	2.5
-10		1	0.0003	2.5
-20		1	0.0002	2.5
-30		0	0.0002	2.5
20		3.33	1	0.0002
20	4.07	1	0.0003	2.5

Test Frequency:2535MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-1	-0.0002	2.5
40		0	0.0001	2.5
30		1	0.0003	2.5
20		1	0.0002	2.5
10		0	-0.0001	2.5
0		2	0.0006	2.5
-10		0	0.0000	2.5
-20		0	0.0000	2.5
-30		1	0.0003	2.5
20		3.33	1	0.0003
20	4.07	0	-0.0001	2.5

## LTE Band 41

Test Frequency:2593MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0106	2.5
40		-25	-0.0096	2.5
30		-23	-0.0090	2.5
20		-27	-0.0102	2.5
10		-24	-0.0092	2.5
0		-27	-0.0104	2.5
-10		-24	-0.0093	2.5
-20		-21	-0.0082	2.5
-30		-22	-0.0084	2.5
20		3.33	-33	-0.0125
20	4.07	-24	-0.0091	2.5

Test Frequency:2593MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0108	2.5
40		-24	-0.0094	2.5
30		-23	-0.0090	2.5
20		-26	-0.0100	2.5
10		-24	-0.0091	2.5
0		-25	-0.0098	2.5
-10		-24	-0.0094	2.5
-20		-21	-0.0082	2.5
-30		-22	-0.0084	2.5
20		3.33	-32	-0.0125
20	4.07	-24	-0.0092	2.5

LTE Band 41

Test Frequency:2593MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0108	2.5
40		-24	-0.0094	2.5
30		-25	-0.0095	2.5
20		-26	-0.0099	2.5
10		-24	-0.0092	2.5
0		-26	-0.0100	2.5
-10		-24	-0.0091	2.5
-20		-23	-0.0088	2.5
-30		-22	-0.0084	2.5
20		3.33	-32	-0.0125
20	4.07	-24	-0.0092	2.5

Test Frequency:2593MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-27	-0.0104	2.5
40		-23	-0.0090	2.5
30		-24	-0.0092	2.5
20		-26	-0.0101	2.5
10		-24	-0.0094	2.5
0		-26	-0.0101	2.5
-10		-23	-0.0090	2.5
-20		-22	-0.0085	2.5
-30		-21	-0.0082	2.5
20		3.33	-33	-0.0126
20	4.07	-25	-0.0096	2.5



## LTE Band 41

Test Frequency:2593MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0108	2.5
40		-23	-0.0090	2.5
30		-24	-0.0091	2.5
20		-25	-0.0096	2.5
10		-24	-0.0094	2.5
0		-26	-0.0100	2.5
-10		-23	-0.0089	2.5
-20		-21	-0.0082	2.5
-30		-22	-0.0083	2.5
20		3.33	-33	-0.0126
20	4.07	-23	-0.0090	2.5

Test Frequency:2593MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-27	-0.0106	2.5
40		-25	-0.0095	2.5
30		-24	-0.0094	2.5
20		-26	-0.0102	2.5
10		-23	-0.0090	2.5
0		-26	-0.0100	2.5
-10		-23	-0.0089	2.5
-20		-22	-0.0084	2.5
-30		-22	-0.0085	2.5
20		3.33	-33	-0.0125
20	4.07	-25	-0.0097	2.5

LTE Band 41

Test Frequency:2593MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0107	2.5
40		-25	-0.0096	2.5
30		-23	-0.0090	2.5
20		-25	-0.0097	2.5
10		-24	-0.0094	2.5
0		-26	-0.0100	2.5
-10		-23	-0.0090	2.5
-20		-21	-0.0082	2.5
-30		-21	-0.0082	2.5
20		3.33	-34	-0.0130
20	4.07	-25	-0.0097	2.5

Test Frequency:2593MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-28	-0.0106	2.5
40		-23	-0.0090	2.5
30		-24	-0.0093	2.5
20		-26	-0.0099	2.5
10		-24	-0.0092	2.5
0		-27	-0.0104	2.5
-10		-25	-0.0095	2.5
-20		-23	-0.0087	2.5
-30		-22	-0.0084	2.5
20		3.33	-32	-0.0123
20	4.07	-25	-0.0096	2.5

\*\*\*\*\* END OF REPORT \*\*\*\*\*