FCC Radio Test Report

FCC ID: XMR2019SC650TNA

This report concerns: Original Grant

Project No.	:	2001H013
Equipment	:	Smart Module
Brand Name	:	QUECTEL
Test Model	:	SC650T-NA
Series Model	:	N/A
Applicant	:	Quectel Wireless Solutions Co., Ltd.
Address	:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.
Manufacturer	:	Quectel Wireless Solutions Co., Ltd.
Address	:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233.
Date of Receipt	:	Jan. 15, 2020
Date of Test	:	Jan. 15, 2020~Feb. 27, 2020
Issued Date	:	Mar. 16, 2020
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH2020011452
Standard(s)	:	47 CFR FCC Part 90 Subpart R 47 CFR FCC Part 2 & ANSI/TIA-603-D-2010 FCC KDB 971168 D01 Power Meas License Digital Systems v03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Iscaa Min

Prepared by : Iscaa Min

Krain. Wu

Approved by : Krain Wu

Certificate # 5123.03

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

Table of Contents Page

Table of Contents Page

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Mar. 16, 2020

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 90 Subpart R & Part 2			
Standard(s) Section	Test Item	Judgment	Remark
2.1046 & 90.542	Radiated power	PASS	------
2.1046 & 90.542	Conducted Output Power	PASS	------
2.1049	Occupied Bandwidth	PASS	------
2.1051 & 90.543	Conducted Spurious Emissions	PASS	------
2.1053 & 90.543	Radiated Spurious Emissions	PASS	------
2.1051 & 90.543	Band Edge Measurements	PASS	------
2.1055 & 90.539	Frequency Stability	PASS	------
-	Peak To Average Ratio	PASS	------

Note:

For the verdict, the “N/A” denotes “not applicable”, the “N/T” denotes “not tested”.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210,China
BTL's Test Firm Registration Number for FCC: 476765
BTL's Designation Number for FCC: CN1241

1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) k=1.96 or k=2(which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).
Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y).

The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
SH-CB01	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
SH-CB01	CISPR	1GHz ~ 6GHz	4.40
		6GHz ~ 18GHz	4.86

Test Site	Method	Measurement Frequency Range	U,(dB)
SH-CB01	CISPR	18 ~ 26.5 GHz	3.64
		26.5 ~ 40 GHz	3.78

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environmental Conditions	Test Voltage
EIRP	23°C, 59%RH	DC 3.8V
Output Power	23°C, 59%RH	DC 3.8V
Occupied Bandwidth	23°C, 59%RH	DC 3.8V
Conducted Emission	23°C, 59%RH	DC 3.8V
Radiated Emission	18°C, 40%RH	DC 3.8V
Band Edge	23°C, 59%RH	DC 3.8V
Peak to Average Ratio	23°C, 59%RH	DC 3.8V
Frequency Stability	Normal and Extreme	Normal and Extreme

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Smart Module				
Brand Name	QUECTEL				
Test Model	SC650T-NA				
Series Model	N/A				
Model Difference(s)	N/A				
Software Version	SC650TNAPAR05A03				
Hardware Version	R1.0				
IMEI No.1	861394040018223				
IMEI No.2	861394040018231				
Antenna Type	Dipole				
Antenna Gain	LTE Band 14	4.45 dBi			
Modulation Type	LTE		UL: QPSK,16QAM DL: QPSK,16QAM		
Operation Frequency	LTE Band 14 (Channel Bandwidth: 5MHz)		793MHz ~ 795.5MHz		
	LTE Band 14 (Channel Bandwidth: 10MHz)		793.0MHz		
Max. ERP Power	LTE Band 14 (Channel Bandwidth: 5MHz)		QPSK	25.81	dBm
			16QAM	24.40	dBm
	LTE Band 14 (Channel Bandwidth: 10MHz)		QPSK	25.79	dBm
			16QAM	25.05	dBm
Power Source	DC power supply.				
Power Rating	DC 3.8V				

Note:
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

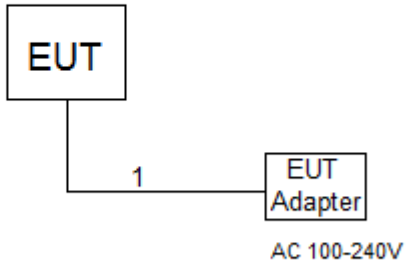
2.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

Following channel(s) was (were) selected for the final test as listed below:

LTE BAND 14 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & ERP	23330 to 23355	23330 to 23355	5MHz	QPSK, 16QAM	1RB/12RB/25RB
		23330	10MHz	QPSK, 16QAM	1RB/25RB/50RB
Occupied Bandwidth	23330 to 23355	23230	5MHz	QPSK, 16QAM	25RB
	23330 to 23355	23330	10MHz	QPSK, 16QAM	50RB
Conducted Spurious Emission	23330 to 23355	23230	5MHz	QPSK	1 RB
		23330	10MHz	QPSK	1 RB
Radiated Spurious Emission	23330 to 23355	23230	5MHz	QPSK	1 RB
	23330 to 23355	23330	10MHz	QPSK	1 RB
Band Edge	23330 to 23355	23330 to 23355	5MHz	QPSK	1RB/25RB
	23330 to 23355	23230	10MHz	QPSK	1RB/50RB
Peak To Average Ratio	23330 to 23355	23330 to 23355	5MHz	QPSK, 16QAM	25RB
	23330 to 23355	23330	10MHz	QPSK, 16QAM	50RB
Frequency Stability	23330 to 23355	23330	5MHz	QPSK	1RB
	23330 to 23355	23330	10MHz	QPSK	1RB

Note:
1) The mark “V” means that this configuration is chosen for testing.
2) The mark “-” means that this configuration is not testing.
3) 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.

2.3 BLOCK DIGRAM SHOWING THECONFIGURATIONOFSYSTEMTESTED FOR RADIATED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
1	Adapter	-	YHSW-050100U/T	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	N/A	N/A	1m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

3.1.2 TEST PROCEDURE

ERP:

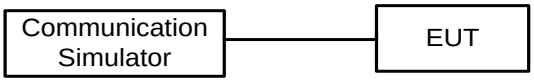
EIRP= Output Power +Antenan gain

Conducted Power:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TESTSETUP LAYOUT

Conducted Power Measurement



3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

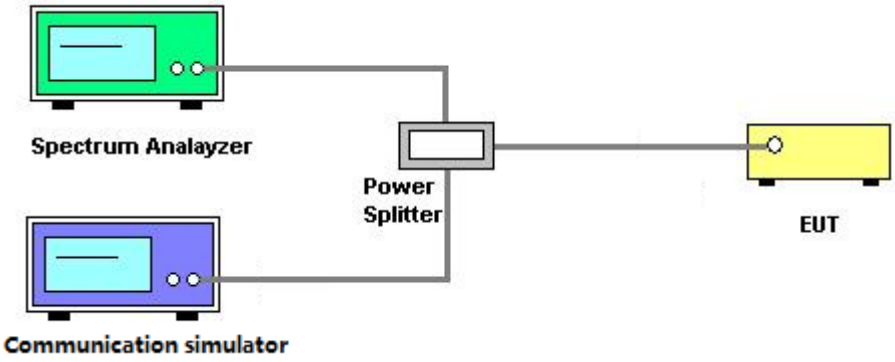
Please refer to the Appendix A.

3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.

3.2.2 TEST SETUP LAYOUT



3.2.3 TEST DEVIATION

No deviation

3.2.4 TEST RESULTS

Please refer to the Appendix B.

3.3 CONDUCTED EMISSIONS MEASUREMENT

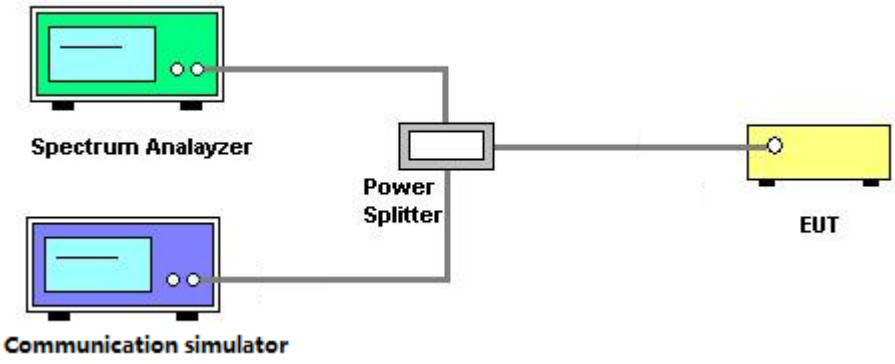
3.3.1 LIMIT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10 (P) dB. The limit of emission is equal to -13dBm.

3.3.2 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v03 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from 43+10log(P)dB below the transmitter power P(Watts)
   =P(W)-[43+10log(P)](dB)
   =[30+10log(P)](dBm)-[43+10log(P)](dB)
   =-13dBm

3.3.3 TESTSETUP LAYOUT



3.3.4 TESTDEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the Appendix C.

3.4 RADIATED EMISSIONS MEASUREMENT

3.4.1 LIMIT

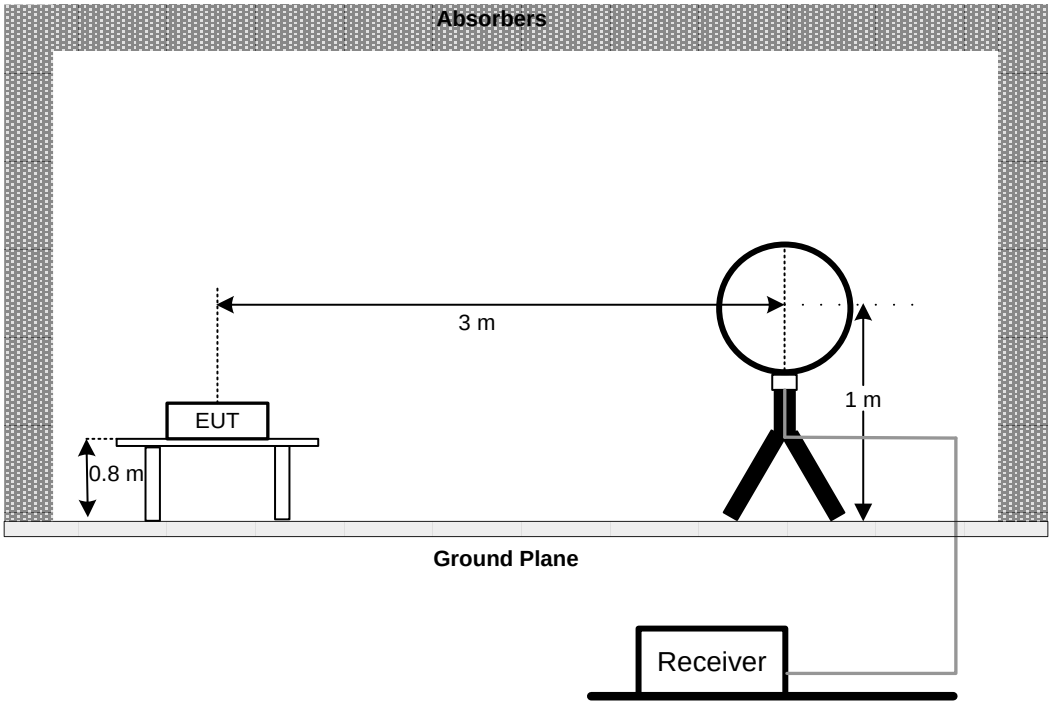
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10 (P) dB. The limit of emission is equal to -13dBm.

3.4.2 TEST PROCEDURES

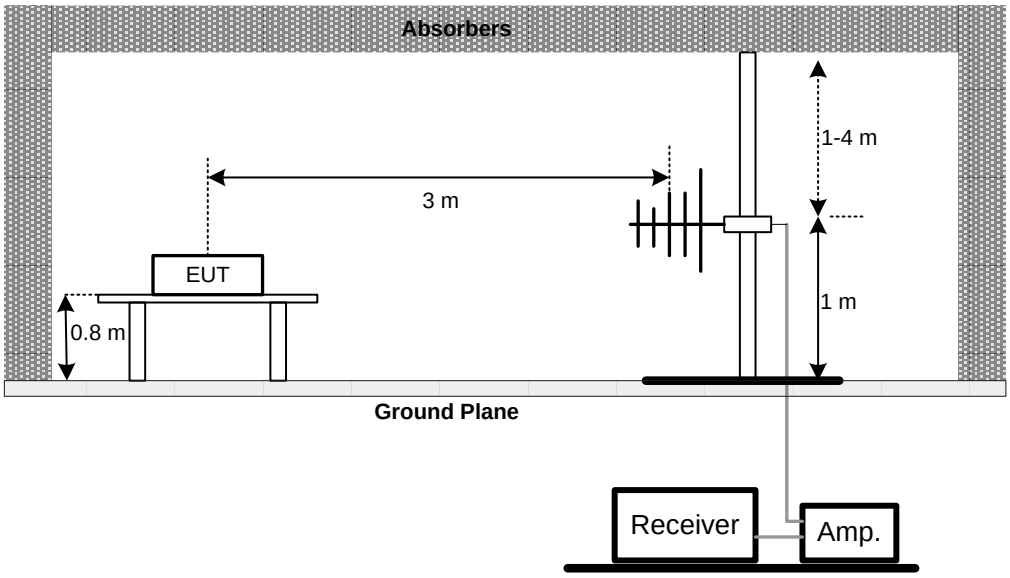
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.4.3 TESTSETUP LAYOUT

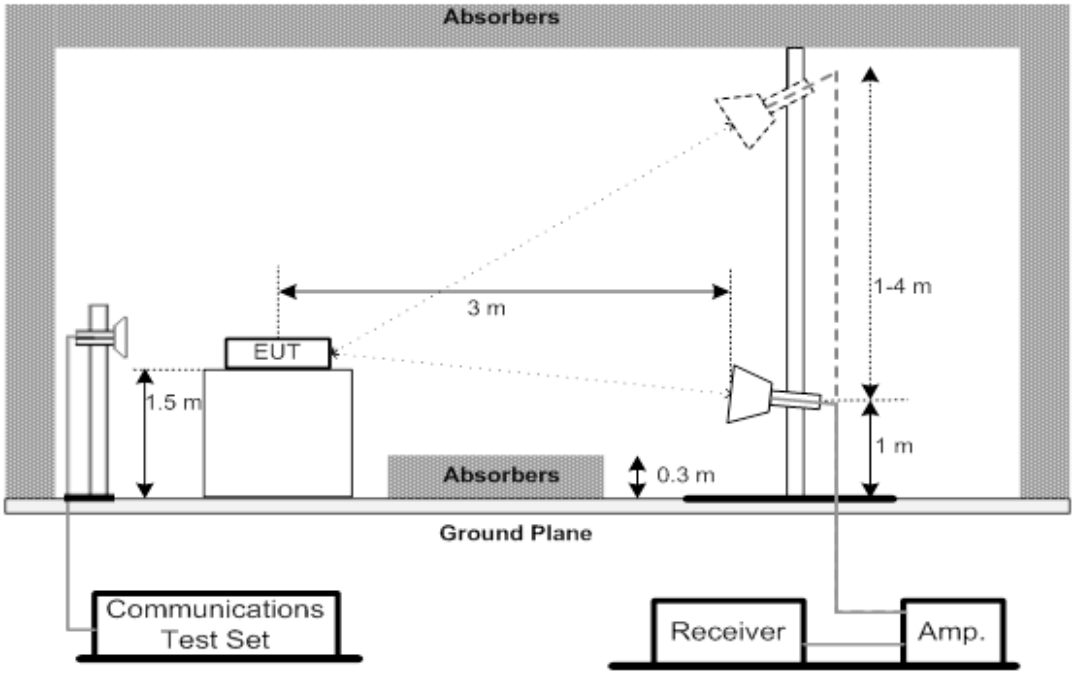
Below 30MHz



30MHz to 1GHz



Above 1GHz



3.4.4 TESTDEVIATION

No deviation

3.4.5 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the Appendix D.

3.4.6 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the Appendix E.

3.5 BAND EDGE /EMISSION MASK MEASUREMENT

3.5.1 LIMIT

For operations in the 758-768 MHz and the 788-798 MHz bands, 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 all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

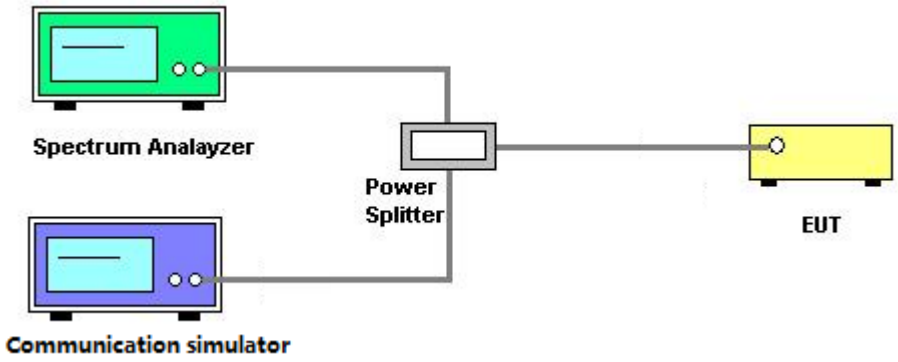
(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) 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 30 kHz may be employed.

3.5.2 TEST PROCEDURES

1. All measurements were done at low and high operational frequency range.
2. Set RBW=1% of 26dBc bandwidth, VBW=3 X RBW, detector=RMS, Sweep time = Auto.
3. Record the max trace plot into the test report.

3.5.3 TESTSETUP LAYOUT



3.5.4 TESTDEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the Appendix F.

3.6 FREQUENCY STABILITY MEASUREMENT

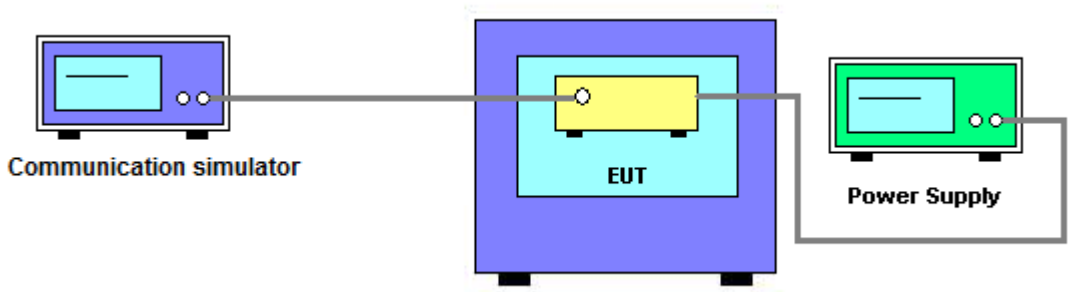
3.6.1 LIMIT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

3.6.2 TEST PROCEDURES

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5°C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

3.6.3 TESTSETUP LAYOUT



3.6.4 TESTDEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the Appendix G.

3.7 PEAK TO AVERAGE RATIO MEASUREMENT

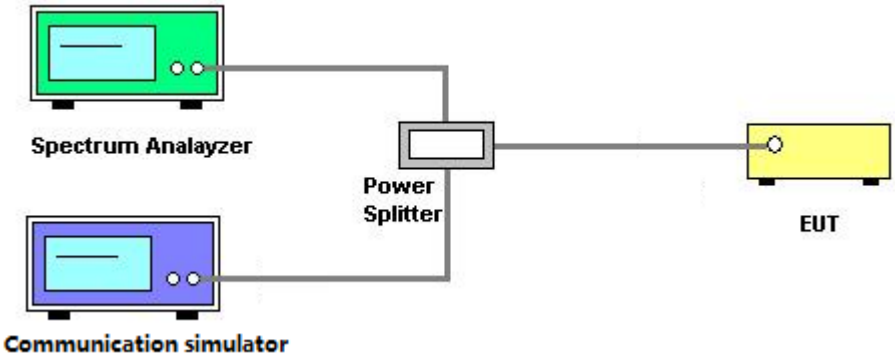
3.7.1 LIMIT

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.

3.7.2 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.7.3 TEST SETUP LAYOUT



3.7.4 TEST DEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the Appendix H.

4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Emission Measurement(9K-30M)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EMCI	EMCI LPA600	275	Mar. 29, 2020
2	EMI Test Receiver	R&S	ESCI	100082	Mar. 29, 2020
3	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emission Measurement(30M-1G)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Mar. 29, 2020
2	Pre-Amplifier	emci	EMC9135	980400	Mar. 29, 2020
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 29, 2020
4	Test Cable	emci	EMC104-SM-SM-7000	170330	Apr. 17, 2020
5	Test Cable	emci	EMC104-SM-SM-1000	170331	Apr. 17, 2020
6	Test Cable	emci	EMC104-SM-NM-3500	170621	Apr. 17, 2020
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020

Radiated Emission Measurement(1G-18G)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pre-Amplifier	emci	EMC184045SE	980409	Mar. 29, 2020
2	Pre-Amplifier	emci	EMC012645SE	980421	Mar. 29, 2020
3	Pre-Amplifier	emci	EMC9135	980400	Mar. 29, 2020
4	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1787	Mar. 29, 2020
5	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00203919	Mar. 29, 2020
6	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Mar. 29, 2020
7	Cable	N/A	EMC102-SM-SM-6000	170336	Apr. 17, 2020
8	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020

Conducted Emission & Band Edge & Occupied Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 29, 2020
2	Power Divider	JUK	PD-4SF-2060	N/A	N/A
3	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020
4	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 29, 2020
2*	Power Divider	JUK	PD-4SF-2060	N/A	N/A
3	Wideband Radio Communication Test	R&S	CMW500	131463	Sep. 01, 2020
4	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020
5	Temperature And Humidity Box	Blue pand	BPHS-120B	170616454	Sep. 01, 2020

Remark: ”N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.
*All calibration period of equipment list is three year

APPENDIX A - OUTPUT POWER

Output Power (dBm):

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				23305CH	23330CH	23355CH
				790.5MHz	793MHz	795.5MHz
14 / 5M	QPSK	1	0	23.06	23.31	23.17
		1	13	22.80	23.12	23.41
		1	24	23.28	23.16	23.29
		12	0	22.89	23.24	23.34
		12	6	23.32	23.11	23.22
		12	11	22.97	23.51	23.01
		25	0	22.15	22.26	22.28
	16QAM	1	0	21.77	21.93	21.81
		1	13	21.53	21.87	21.60
		1	24	21.81	21.78	21.85
		12	0	21.79	22.04	21.53
		12	6	21.99	21.74	21.63
		12	11	21.58	22.10	21.94
		25	0	21.18	21.36	21.25

LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				23330CH
				793MHz
14 / 10M	QPSK	1	0	23.28
		1	25	23.49
		1	49	23.44
		25	0	23.34
		25	13	23.42
		25	25	23.35
		50	0	22.12
	16QAM	1	0	22.47
		1	25	22.39
		1	49	22.60
		25	0	22.75
		25	13	22.66
		25	25	22.33
		50	0	21.08

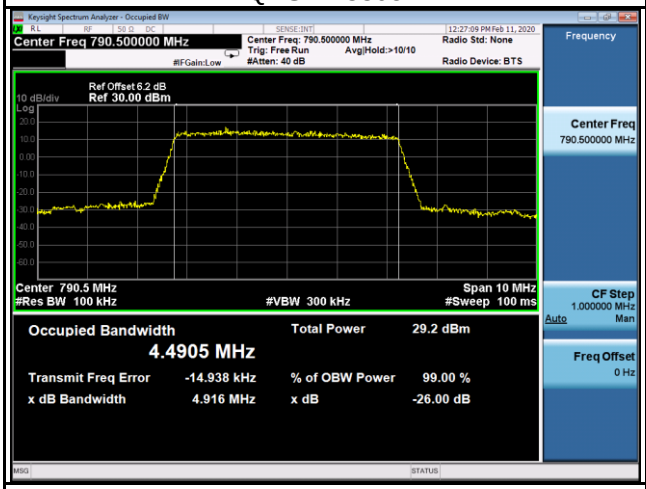
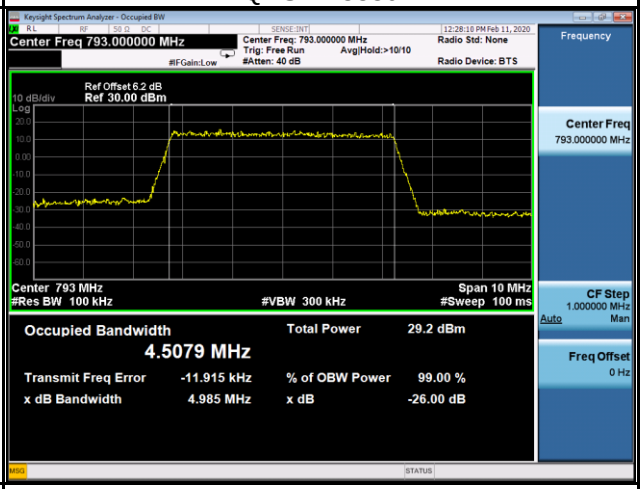
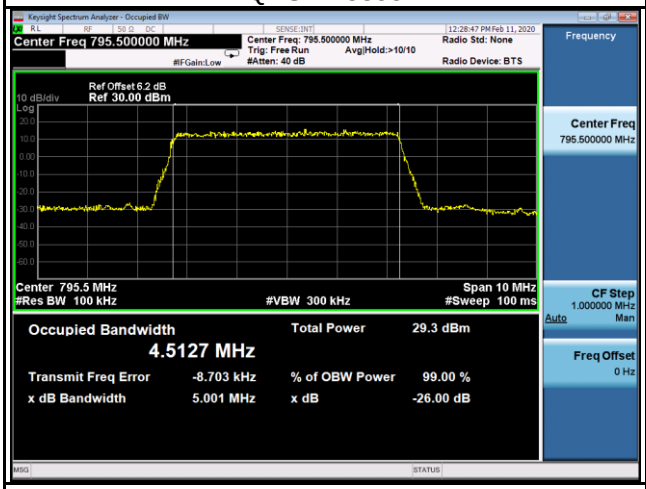
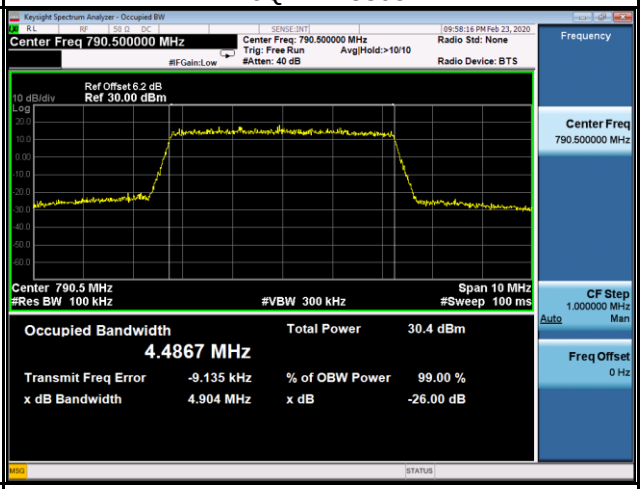
ERP Power (dBm):

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				23305CH	23330CH	23355CH
				790.5MHz	793MHz	795.5MHz
14 / 5M	QPSK	1	0	25.36	25.61	25.47
		1	13	25.10	25.42	25.71
		1	24	25.58	25.46	25.59
		12	0	25.19	25.54	25.64
		12	6	25.62	25.41	25.52
		12	11	25.27	25.81	25.31
		25	0	24.45	24.56	24.58
	16QAM	1	0	24.07	24.23	24.11
		1	13	23.83	24.17	23.90
		1	24	24.11	24.08	24.15
		12	0	24.09	24.34	23.83
		12	6	24.29	24.04	23.93
		12	11	23.88	24.40	24.24
		25	0	23.48	23.66	23.55

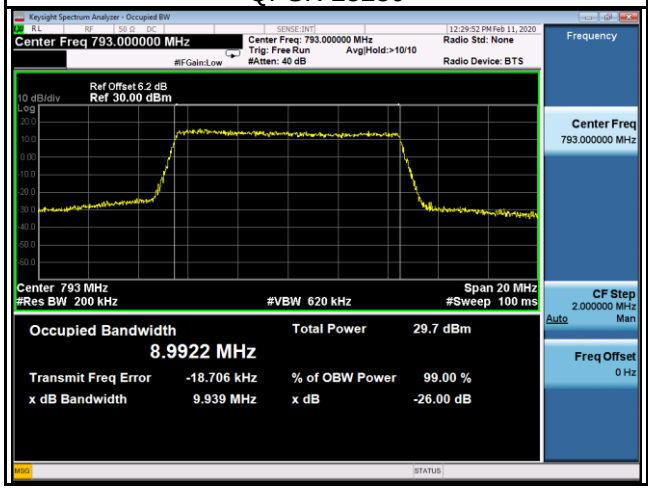
LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				23330CH
				793MHz
14 / 10M	QPSK	1	0	25.58
		1	25	25.79
		1	49	25.74
		25	0	25.64
		25	13	25.72
		25	25	25.65
		50	0	24.42
	16QAM	1	0	24.77
		1	25	24.69
		1	49	24.90
		25	0	25.05
		25	13	24.96
		25	25	24.63
		50	0	23.38

APPENDIX B - OCCUPIED BANDWIDTH

LTE Band 14_5M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
23305	790.5	4.4905	23305	790.5	4.4867
23330	793.0	4.5079	23330	793.0	4.4958
23355	795.5	4.5127	23355	795.5	4.4948
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23305	790.5	4.9160	23305	790.5	4.9040
23330	793.0	4.9850	23330	793.0	4.9900
23355	795.5	5.0010	23355	795.5	5.0030

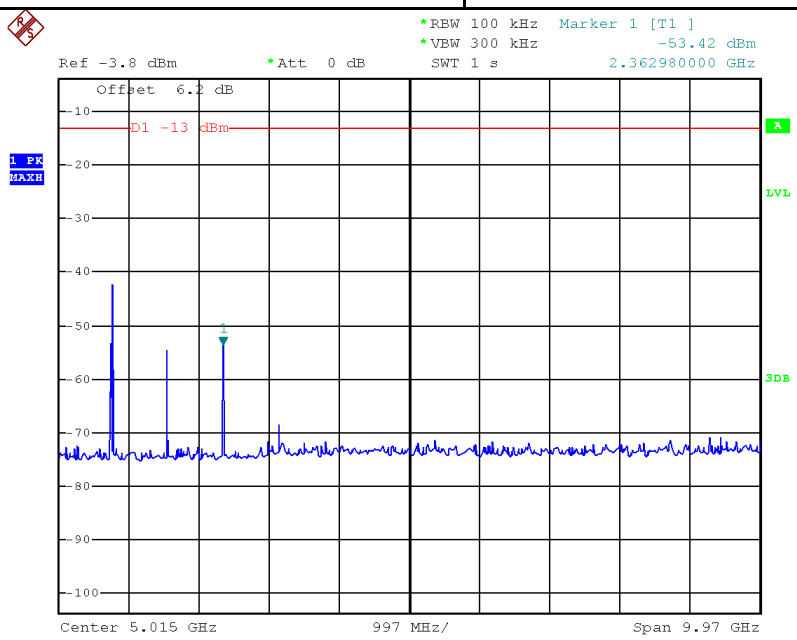
Spectrum Plot	
QPSK-23305	QPSK-23330
	
QPSK-23355	16QAM-23305
	
16QAM-23330	16QAM-23355
	

LTE Band 14_10M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
23330	793.0	8.9922	23330	793.0	8.9587
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23330	793.0	9.9390	23330	793.0	9.9130

Spectrum Plot	
QPSK-23230	16QAM-23230
	

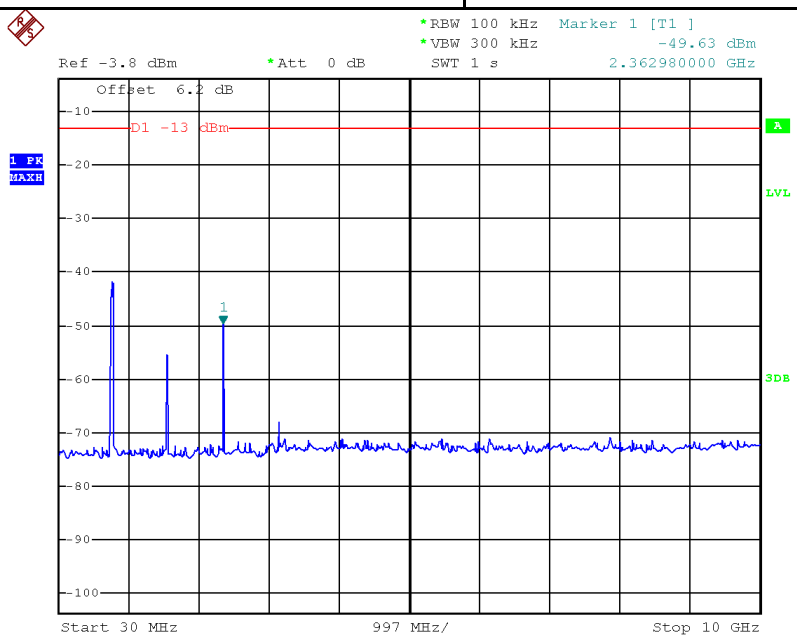
APPENDIX C - CONDUCTED EMISSIONS

LTE Band 14_5M	
Channel	Frequency(MHz)
23330	793.0



Date: 24.FEB.2020 13:22:45

LTE Band 14_10M	
Channel	Frequency(MHz)
23330	793.0

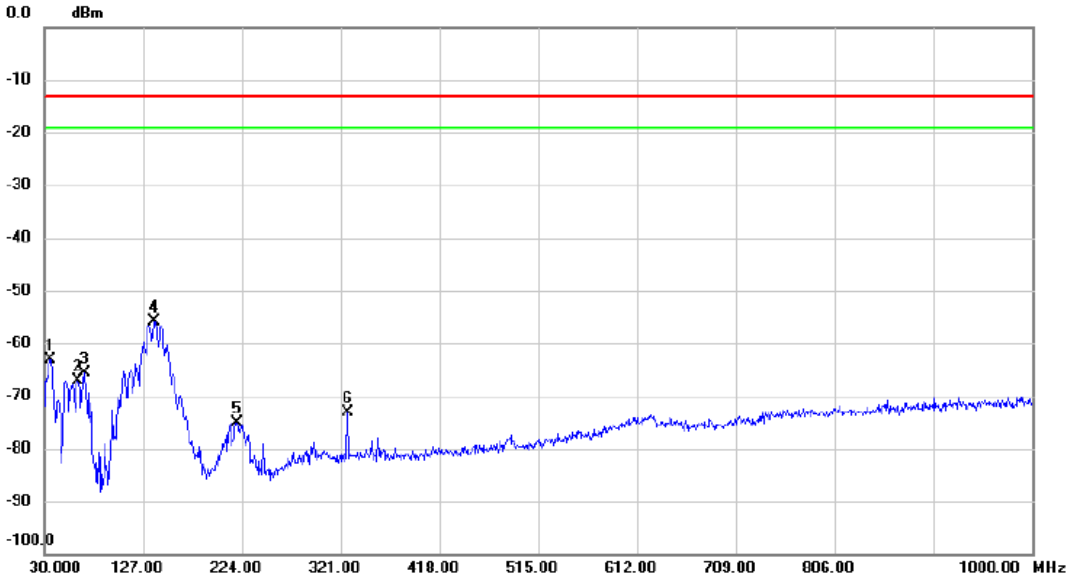


Date: 24.FEB.2020 13:21:48

APPENDIX D - RADIATED EMISSION (30MHZ TO 1GHZ)

Test Mode:	LTE Band 14_TX Mode_5M

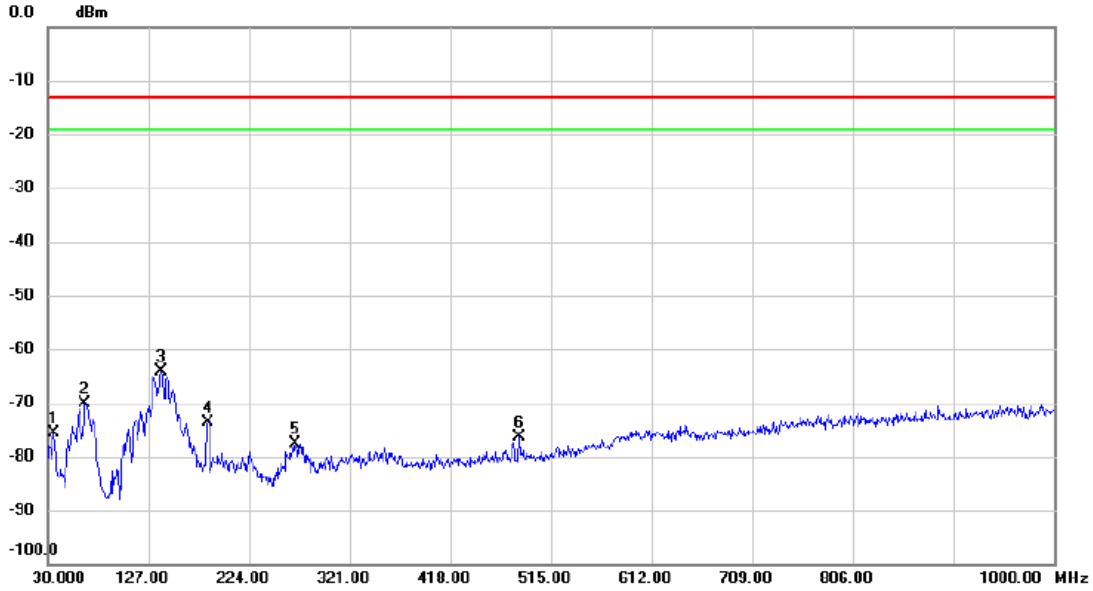
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		35.8200	-45.96	-17.08	-63.04	-13.00	-50.04	peak	
2		62.9800	-48.72	-18.35	-67.07	-13.00	-54.07	peak	
3		68.8000	-46.50	-19.16	-65.66	-13.00	-52.66	peak	
4	*	138.6400	-39.94	-15.86	-55.80	-13.00	-42.80	peak	
5		219.1500	-57.04	-18.01	-75.05	-13.00	-62.05	peak	
6		327.7900	-59.16	-13.90	-73.06	-13.00	-60.06	peak	

Test Mode:	LTE Band 14_TX Mode_5M

Horizontal

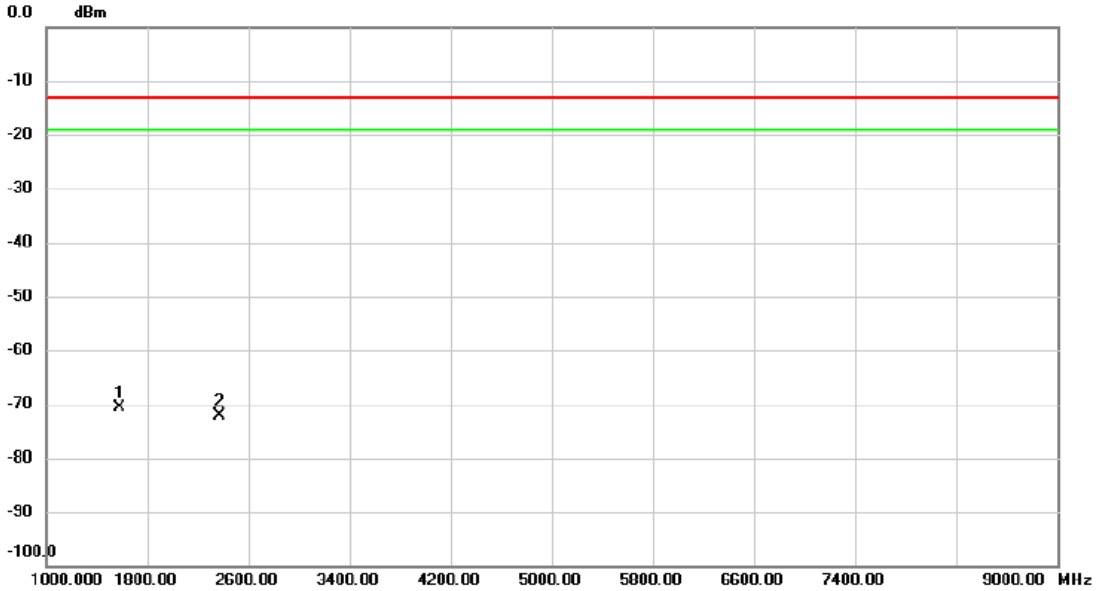


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		35.8200	-58.59	-17.08	-75.67	-13.00	-62.67	peak	
2		65.8900	-51.17	-18.94	-70.11	-13.00	-57.11	peak	
3	*	139.6100	-48.30	-15.74	-64.04	-13.00	-51.04	peak	
4		184.2300	-55.84	-17.76	-73.60	-13.00	-60.60	peak	
5		268.6200	-61.70	-15.90	-77.60	-13.00	-64.60	peak	
6		484.9300	-63.60	-12.78	-76.38	-13.00	-63.38	peak	

APPENDIX E - RADIATED EMISSION (ABOVE 1GHZ)

Test Mode:	LTE Band 14_TX CH23330_5M

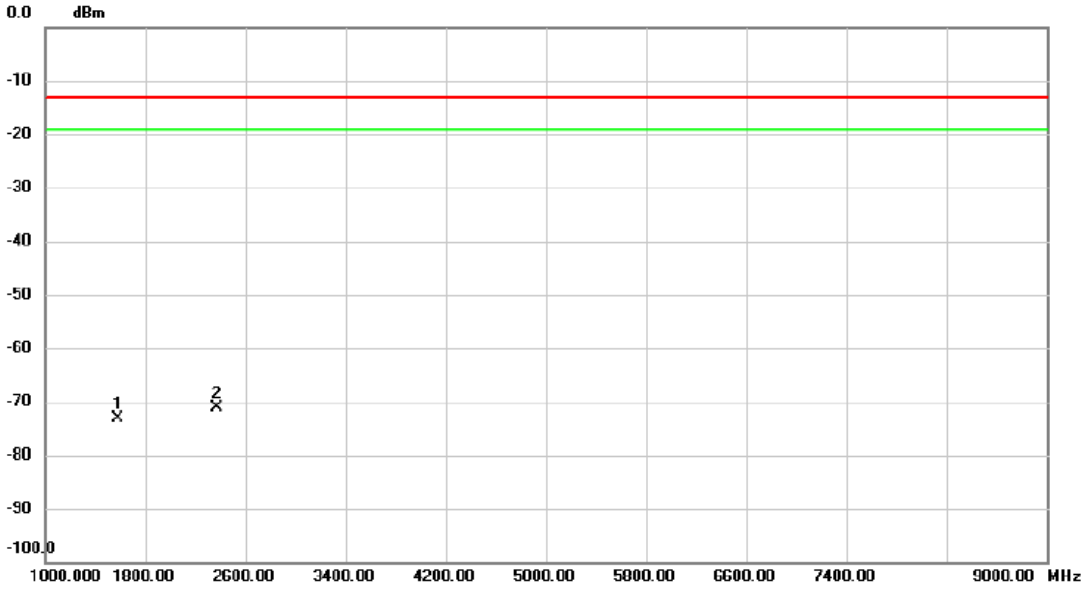
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1581.680	-51.66	-19.08	-70.74	-13.00	-57.74	peak	
2		2372.520	-55.62	-16.38	-72.00	-13.00	-59.00	peak	

Test Mode:	LTE Band 14_TX CH23330_5M

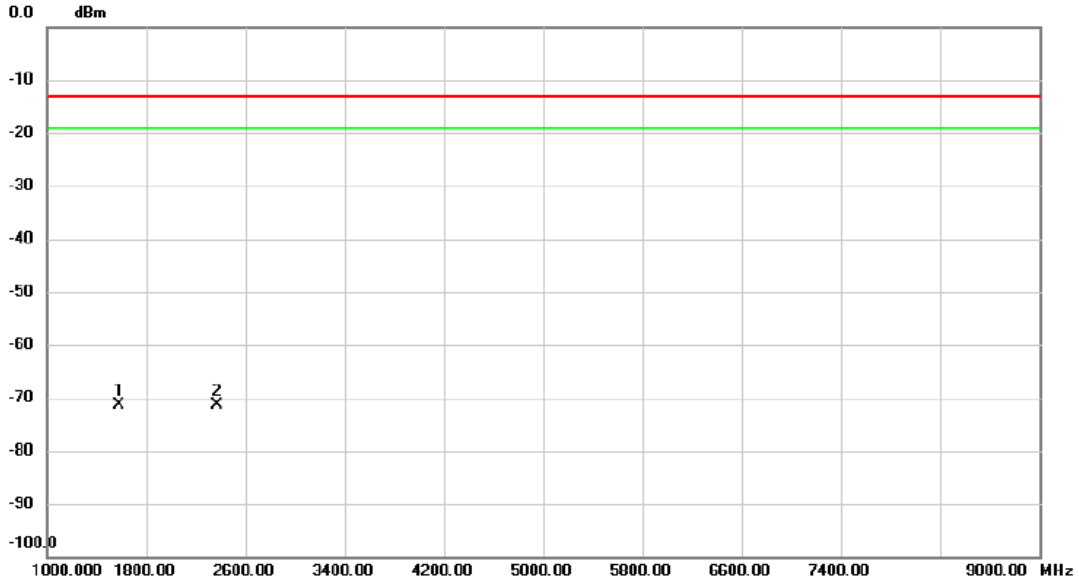
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1581.680	-53.92	-19.08	-73.00	-13.00	-60.00	peak	
2	*	2372.520	-54.76	-16.38	-71.14	-13.00	-58.14	peak	

Test Mode:	LTE Band 14_TX CH23330_10M

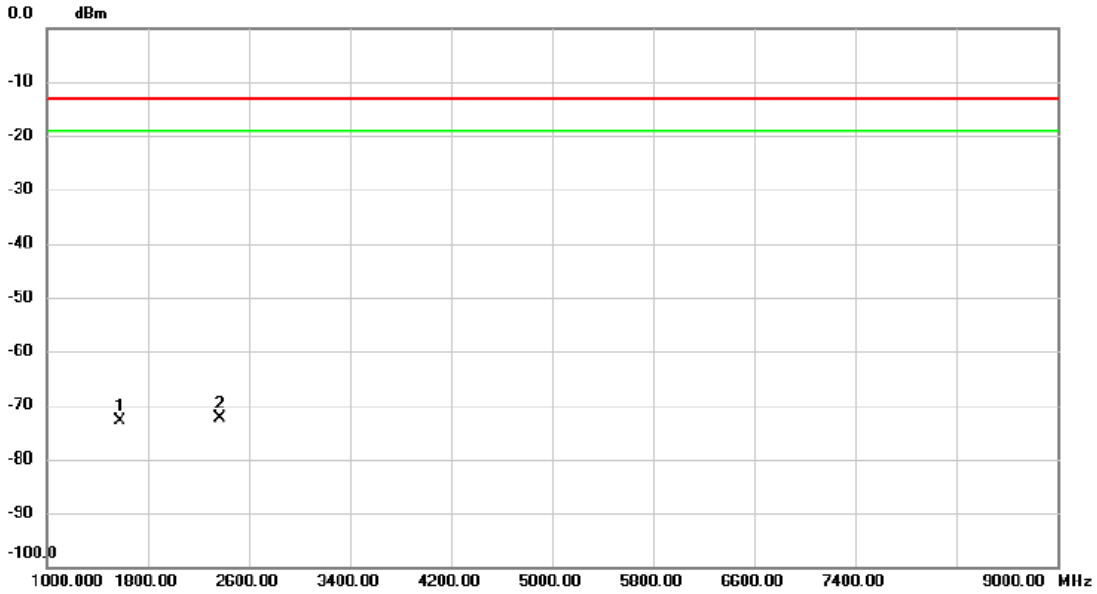
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1577.180	-52.18	-19.10	-71.28	-13.00	-58.28	peak	
2		2365.770	-54.95	-16.40	-71.35	-13.00	-58.35	peak	

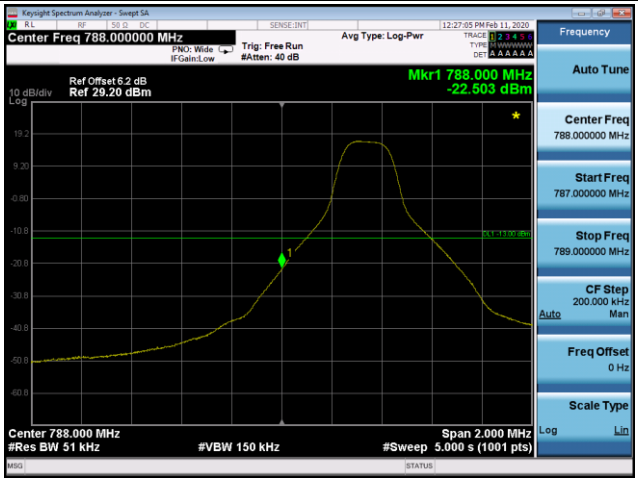
Test Mode:	LTE Band 14_TX CH23330_10M

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1577.180	-53.89	-19.10	-72.99	-13.00	-59.99	peak	
2	*	2365.770	-55.90	-16.40	-72.30	-13.00	-59.30	peak	

APPENDIX F - BAND EDGE

LTE Band 14_5M			
1RB#0		1RB#24	
Channel	23305	Channel	23355
			
25RB#0			
Channel	23305	Channel	23355
			

APPENDIX G - FREQUENCY STABILITY

Test Mode:	LTE Band 14_CH23330_5M

Temperature vs. Frequency Stabiility

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	-5.89	-0.007427491	±2.5
-20	-3.45	-0.004355968	
-10	-3.01	-0.003792847	
0	-1.28	-0.001618684	
10	-9.00	-0.011352885	
20	-4.91	-0.006189483	
30	-5.07	-0.006391689	
40	-9.19	-0.011590828	
50	-7.91	-0.009974824	
Max. Deviation (ppm)	-9.19	-0.011590828	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
3.55	-4.84	-0.006107697	±2.5
3.80	-1.09	-0.001374123	
4.40	-7.30	-0.009207694	
Max. Deviation (ppm)	-7.30	-0.009207694	

Test Mode:	LTE Band 14_CH23330_10M

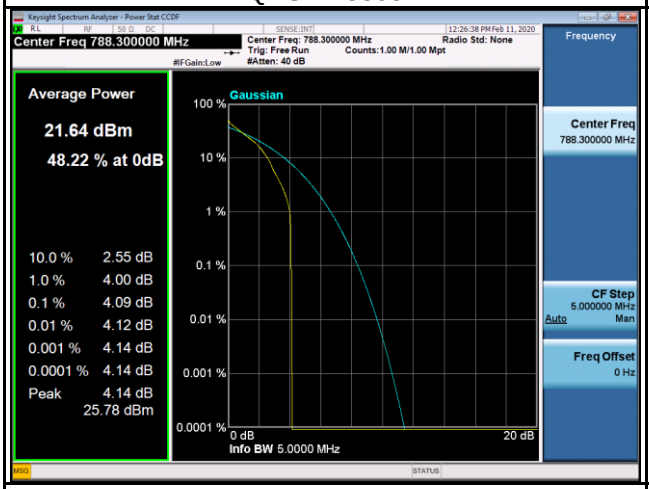
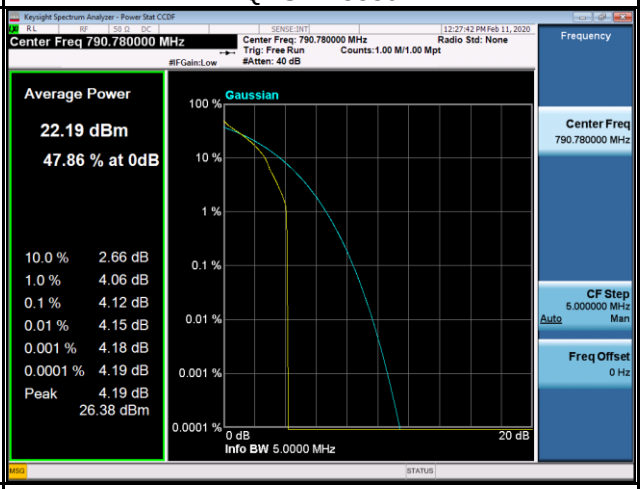
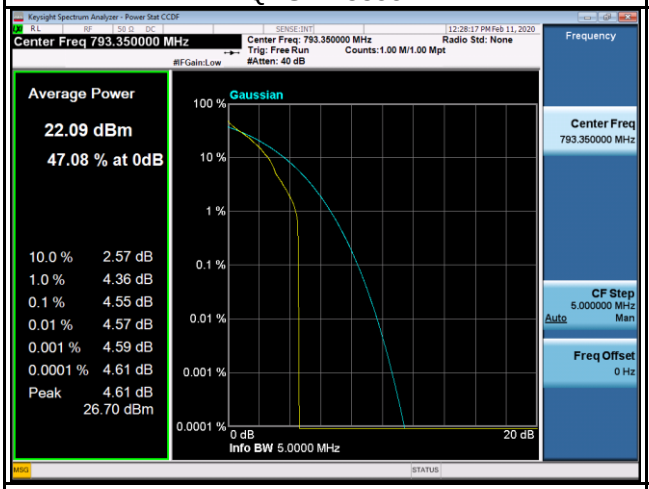
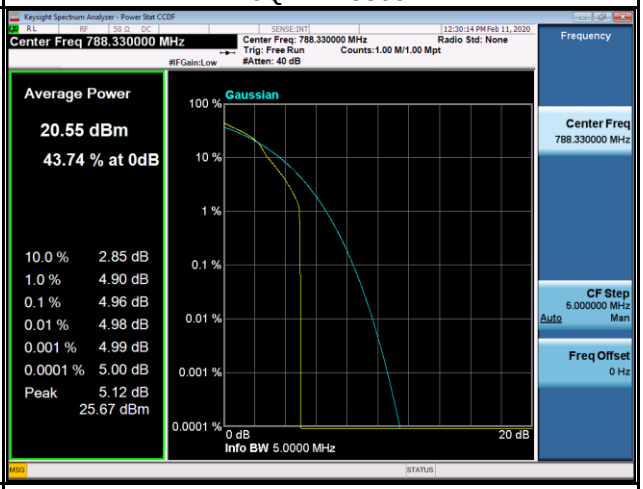
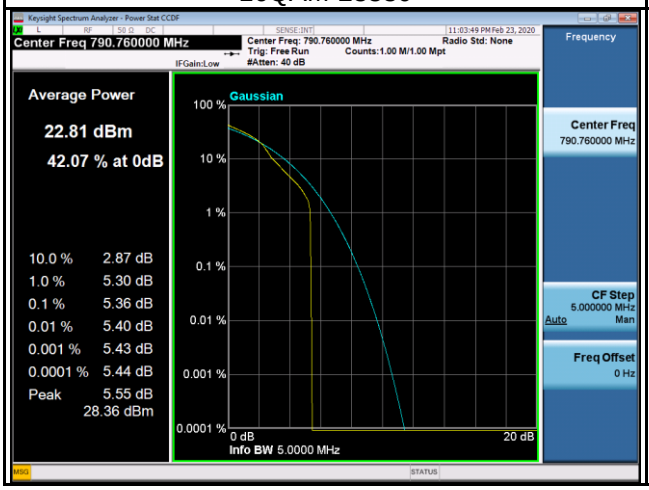
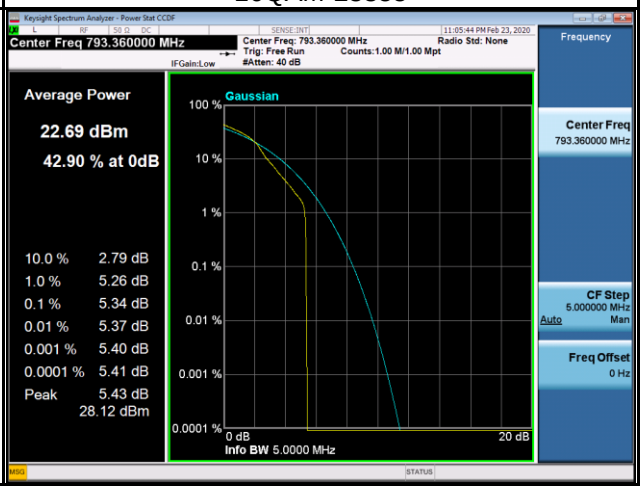
Temperature vs. Frequency Stabiility

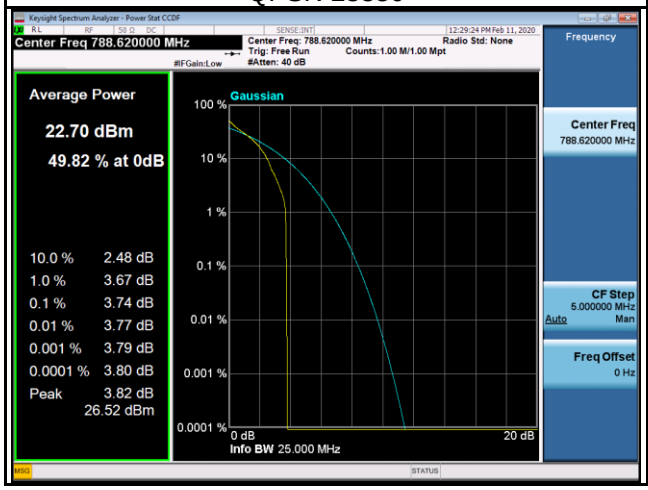
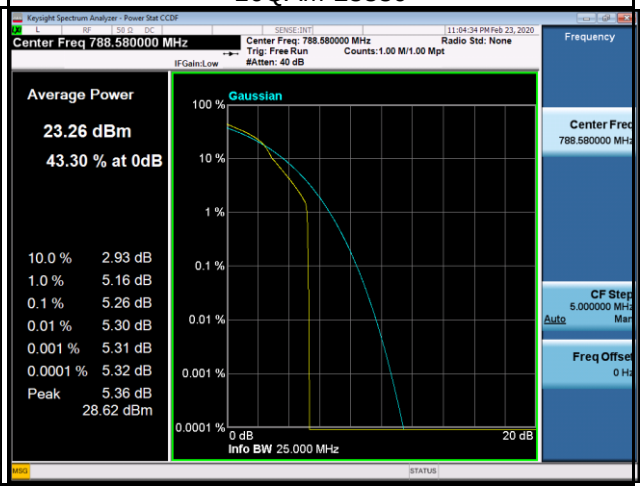
Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	-1.89	-0.002383354	±2.5
-20	-2.74	-0.003457431	
-10	-1.94	-0.002448211	
0	-0.53	-0.000664895	
10	-6.06	-0.007645997	
20	-1.76	-0.002220000	
30	1.67	0.002111915	
40	-1.89	-0.002378756	
50	-4.62	-0.005831263	
Max. Deviation (ppm)	-6.06	-0.007645997	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
3.55	2.07	0.002606868	±2.5
3.80	-1.70	-0.002146909	
4.40	-1.92	-0.002422907	
Max. Deviation (ppm)	2.07	0.002606868	

APPENDIX H - PEAK TO AVERAGE RATIO

LTE Band 14 Spectrum Plot_5M	
QPSK-23305	QPSK-23330
	
QPSK-23355	16QAM-23305
	
16QAM-23330	16QAM-23355
	

LTE Band 14 Spectrum Plot_10M	
QPSK-23330	16QAM-23330
	

End of Test Report