FCC Radio Test Report

FCC ID: 2AWG9-OSPREY

This report concerns: Original Grant

Project No.	:	2107C014
Equipment	:	4G LTE WiFi Router
Brand Name	:	WiFiRanger
Test Model	:	OSPREY
Series Model	:	N/A
Applicant	:	WiFiRanger, A LinOra Company
Address	:	943 W Overland Road, , Meridian,Idaho United States 83642
Manufacturer	:	Shenzhen Comnect Technology Co.,Ltd
Address	:	G Zone, 3/F, Building 1, Baisha High-Tech Park, Xili Street, Shenzhen
Factory	:	Shenzhen Comnect Technology Co.,Ltd
Address	:	Second Standard Factory, Zhongcai Road, Yingbin Avenue, Luxi Industrial Park,Jiangxi
Date of Receipt	:	Jul. 08, 2021
Date of Test	:	Jul. 09, 2021 ~ Aug. 03, 2021
Issued Date	:	Aug. 25, 2021
Report Version	:	R01
Test Sample	:	Engineering Sample No.: DG2021070560 for conducted, DG2021070562 for radiated.
Standard(s)	:	47 CFR FCC Part 90 Subpart R 47 CFR FCC Part 2 ANSI/TIA/EIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

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

Gabriel Zhu

Prepared by : Gabriel Zhu

Steven Lu

Approved by : Steven Lu

TESTING CERT #5123.02

Add: No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China
Tel: +86-769-8318-3000
Web: www.newbtl.com

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.

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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.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 23, 2021
R01	Removed test photos.	Aug. 25, 2021

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 (a)(7)	Effective Radiated Power	PASS	------
2.1049	Occupied Bandwidth	PASS	------
2.1053 & 90.543(e)(3)	Conducted Spurious Emissions	PASS	------
2.1053 & 90.543(e)(3) & 90.543(f)	Radiated Spurious Emissions	PASS	------
2.1051 & 90.210(n)	Mask Measurements	PASS	------
-	Peak To Average Ratio	PASS	Record Only
2.1053 & 90.543(e)(2)(3)	Condcted Band Edge Measurement	PASS	------
2.1055 & 90.539(e)	Frequency Stability	PASS	------

Note:

(1) “N/A” denotes test is not applicable in this test report.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China.
BTL's Test Firm Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	-	3.02
		30MHz ~ 200MHz	V	4.26
		30MHz ~ 200MHz	H	3.38
		200MHz ~ 1,000MHz	V	3.98
		200MHz ~ 1,000MHz	H	3.94

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	3.96
		6GHz ~ 18GHz	5.24

B. Other Measurement:

Parameter	Uncertainty
Spectrum Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Power Spectral Density	±0.86 dB
Frequency Stability	±0.16 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

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	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	21.8°C	46%	AC 120V/60Hz	Tate Liu
Occupied Bandwidth	21.8°C	46%	AC 120V/60Hz	Tate Liu
Conducted Spurious Emissions	21.8°C	46%	AC 120V/60Hz	Tate Liu
Radiated Spurious Emissions	25°C	60%	AC 120V/60Hz	Kwok Guo
Band Edge	21.8°C	46%	AC 120V/60Hz	Tate Liu
Peak to Average Ratio	21.8°C	46%	AC 120V/60Hz	Tate Liu
Condcted Band Edge Measurement	21.8°C	46%	AC 120V/60Hz	Tate Liu
Frequency Stability	Normal & Extreme	46%	Normal & Extreme	Tate Liu

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	4G LTE WiFi Router			
Brand Name	WiFiRanger			
Test Model	OSPREY			
Series Model	N/A			
Model Difference(s)	N/A			
Power Source	DC voltage supplied from AC adapter. (Support Units)			
Power Rating	I/P: 100-240V~ 50/60Hz 0.3A max O/P: 12.0V ⎓ 1A			
IEMI No.	Radiated	866834043420244		
	Conducted	866834044831423		
Modulation Type	LTE	QPSK,16QAM		
Max. ERP	LTE	Channel Bandwidth (MHz)	QPSK (dBm)	16QAM (dBm)
	Band 14	5	24.98	23.78
		10	25.13	23.76

Note:

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

2. Channel List:

LTE Band 14					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	5	23305	790.5	5305	760.5
	10	23330	793	5330	763
Mid Range	5/10	23330	793	5330	763
High Range	5	23355	795.5	5.55	763.5
	10	23330	793	5330	763

3. Table for Filed Antenna:

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	Dipole	N/A	3.2	LTE Band 14

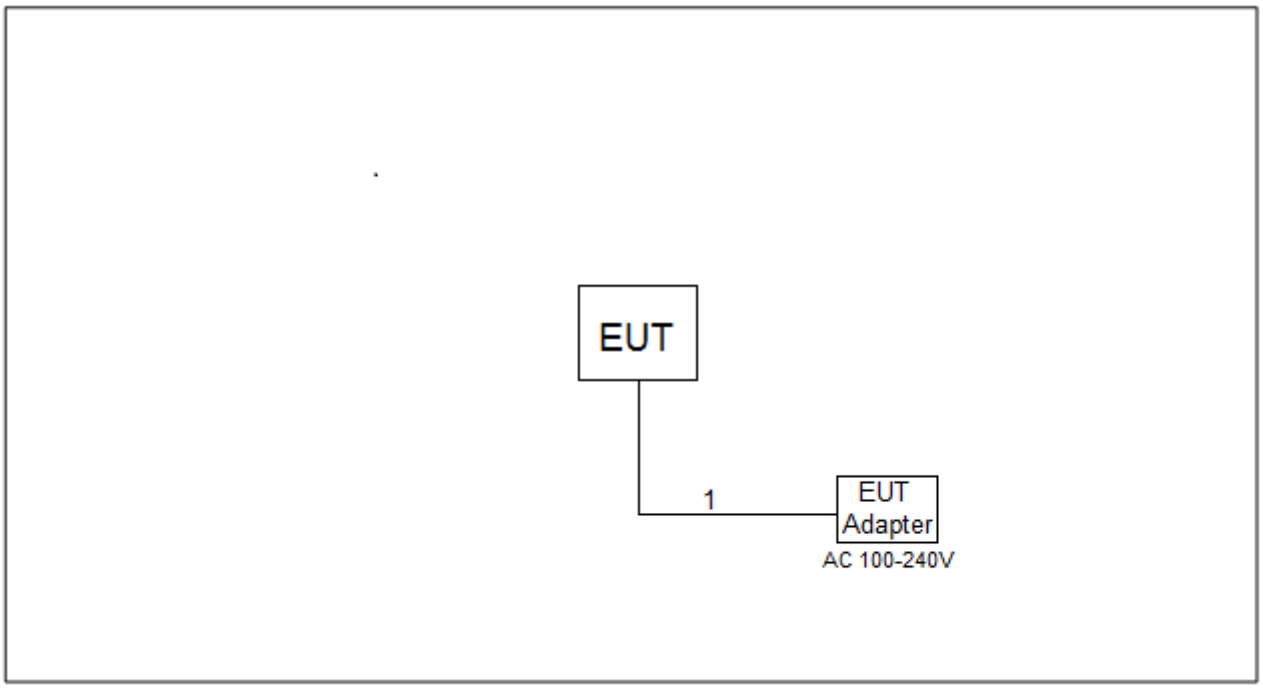
Note: The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

LTE BAND 14 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power &ERP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	1RB/12RB/25RB
	23330	23330	10MHz	QPSK, 16QAM	1RB/25RB/50RB
Occupied Bandwidth	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	25RB
	23330	23330	10MHz	QPSK, 16QAM	50RB
Conducted Spurious Emissions	23305 to 23355	23330	5MHz	QPSK	1RB
	23330	23330	10MHz	QPSK	1RB
Radiated Spurious Emissions	23305 to 23355	23330	5MHz	QPSK	1RB
	23330	23330	10MHz	QPSK	1RB
Mask	23305 to 23355	23305, 23355	5MHz	QPSK	1RB
					25RB
	23330	23330	10MHz	QPSK	1RB
					50RB
Peak To Average Ratio	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	1RB
	23330	23330	10MHz	QPSK, 16QAM	1RB
Condcted Band Edge Measurement	23305 to 23355	23305, 23355	5MHz	QPSK	1RB
					25RB
	23330	23330	10MHz	QPSK	1RB
					50RB
Frequency Stability	23305 to 23355	23330	5MHz	QPSK	1RB
	23330	23330	10MHz	QPSK	1RB

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATIONOFSYSTEMTESTED



2.4 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.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Mobile / Portable station are limited to 3 watts e.r.p.

3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.0.

ERP:

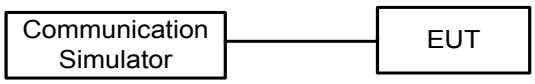
EIRP= Output Power + Antenan gain
ERP = EIPR - 2.15dBi.

Output Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and 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 TEST SETUP LAYOUT

Output Power Measurement



3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

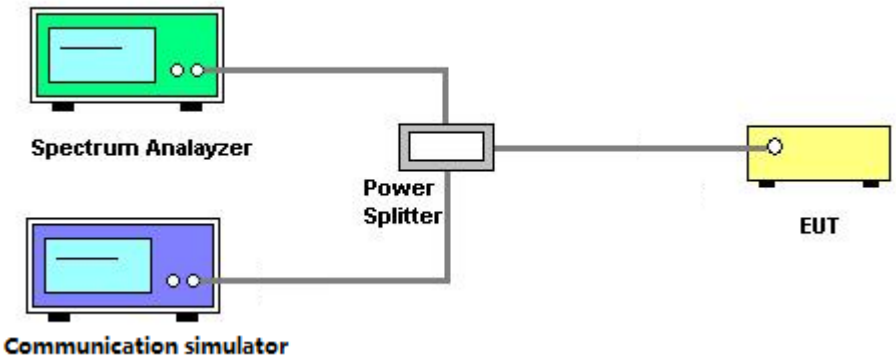
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.0.

1. 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.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. RBW=(1% ~ 5%)*EBW
   VBW≥3* RBW
4. Set spectrum analyzer with RMS detector.

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 SPURIOUS EMISSIONS MEASUREMENT

3.3.1 LIMIT

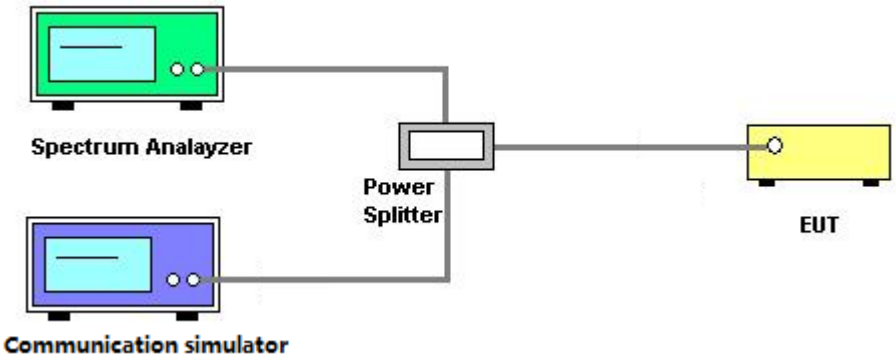
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.3.3 TEST SETUP LAYOUT



3.3.4 TEST DEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

3.4.1 LIMIT

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. The emission limit equal to -13dBm.

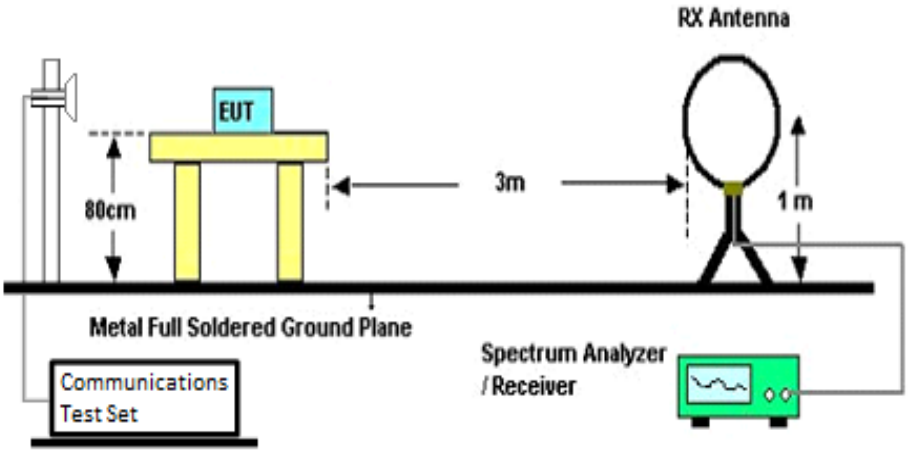
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.8.

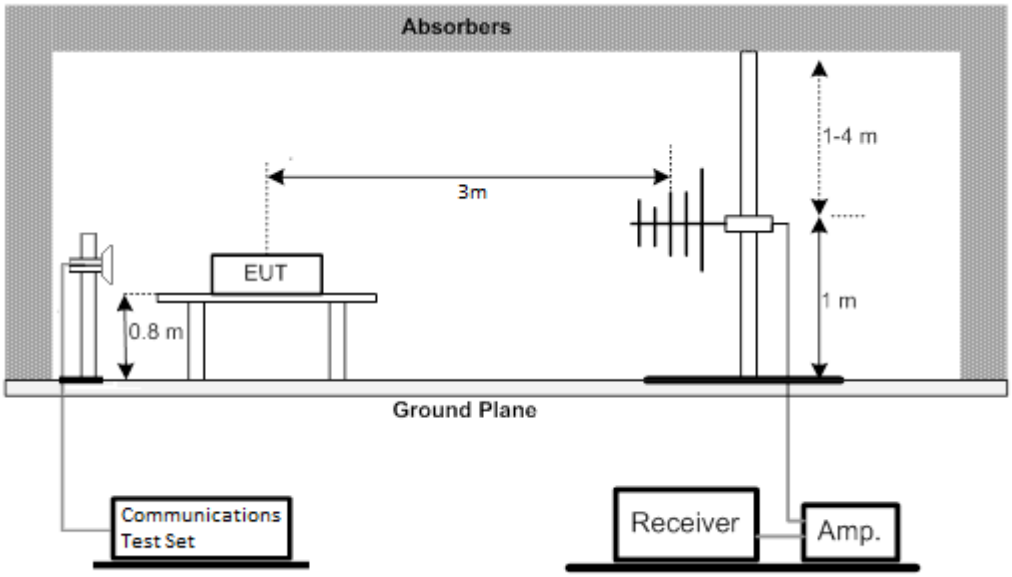
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. 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. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.4.3 TEST SETUP LAYOUT

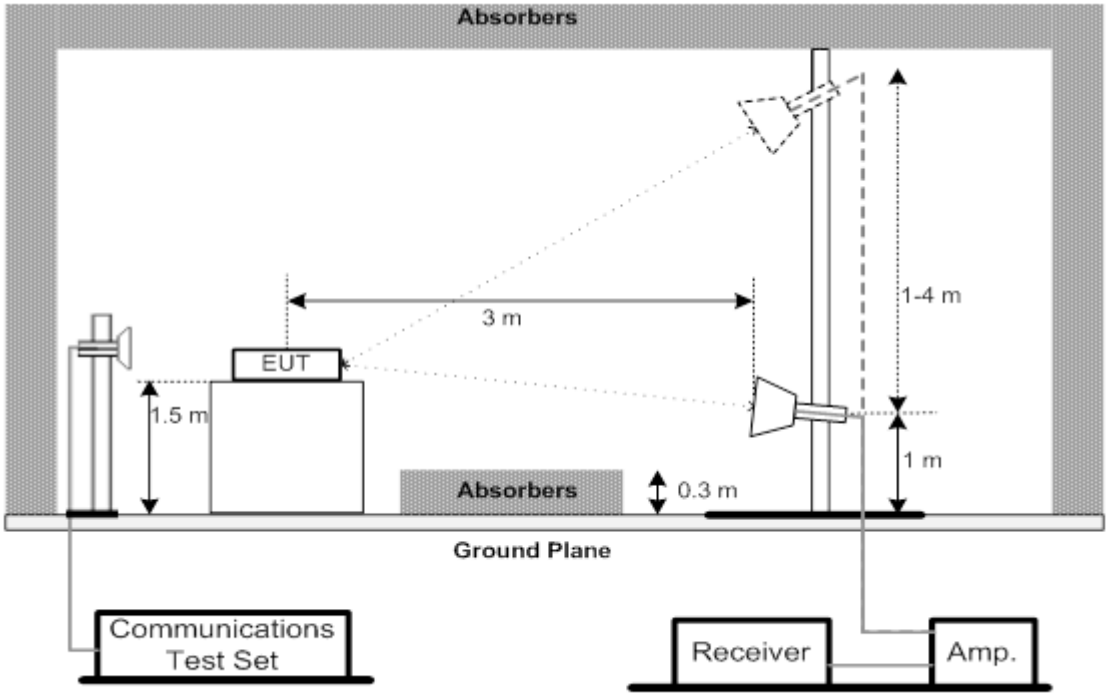
Below 30MHz



30MHz to 1000MHz



Above 1GHz



3.4.4 TEST DEVIATION

No deviation

3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

3.5 MASK MEASUREMENTS

3.5.1 LIMIT

<Mask B>

For transmitter that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

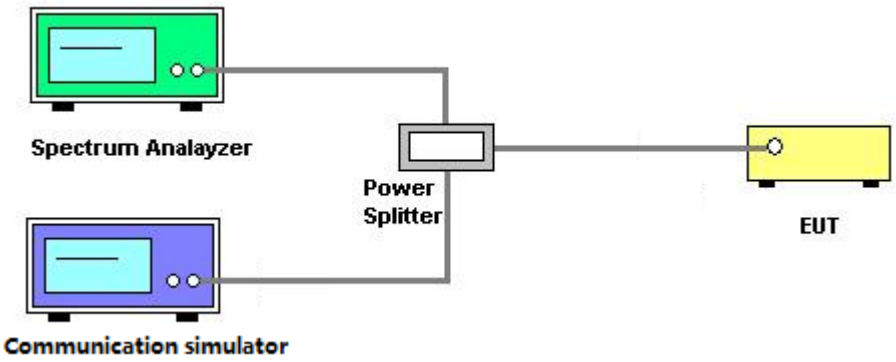
(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43+10log(P) dB.

3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

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 TEST SETUP LAYOUT



3.5.4 TEST DEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

3.6 PEAK TO AVERAGE RATIO MEASUREMENT

3.6.1 LIMIT

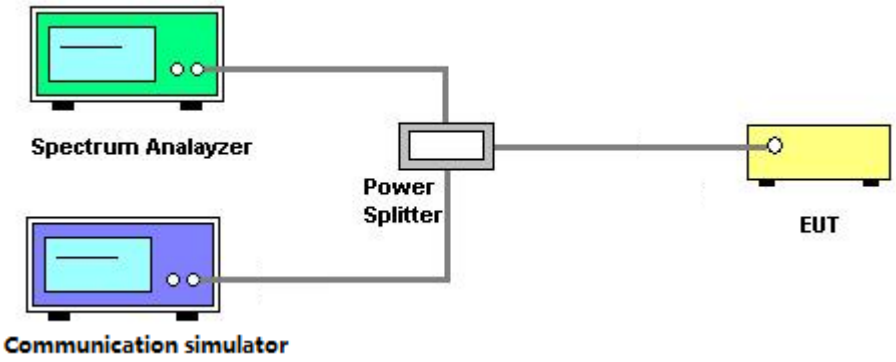
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

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%.

3.6.3 TEST SETUP LAYOUT



3.6.4 TEST DEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

3.7 CONDUCTED BAND EDGE MEASUREMENT

3.7.1 LIMIT

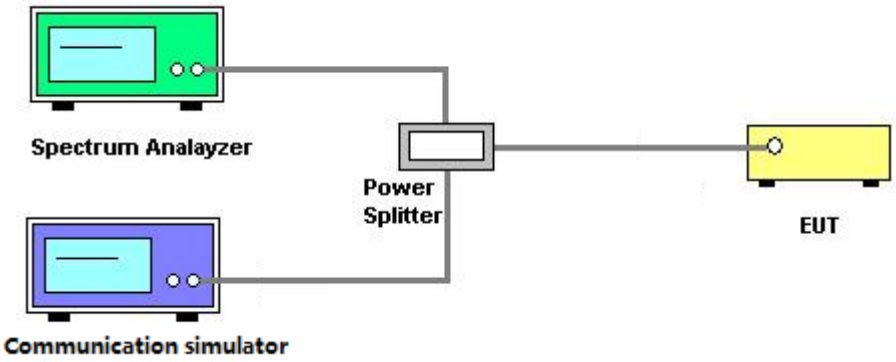
(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76+10log(P) dB In a 6.25 KHz band segment, for base and fixed stations.
(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65+10log(P) dB In a 6.25 KHz band segment, for mobile and portable stations.
(3) On all frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43+10log(P) dB.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. Record the max trace plot into the test report.

3.7.3 TEST SETUP LAYOUT



3.7.4 TEST DEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

3.8 FREQUENCY STABILITY MEASUREMENT

3.8.1 LIMIT

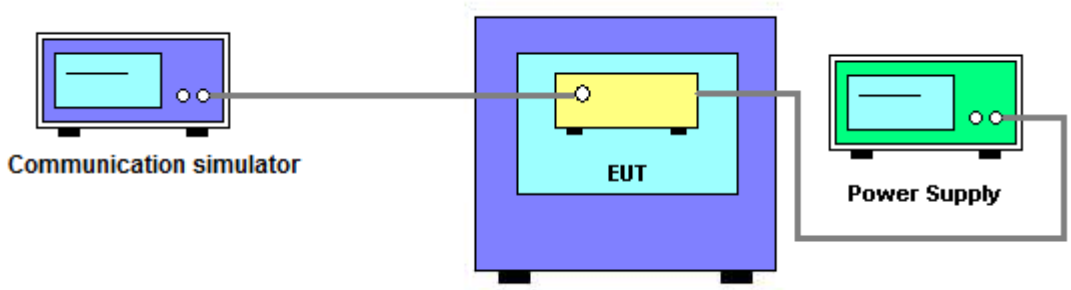
Tht frequency stability of mobile portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better.

3.8.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.0.

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.

3.8.3 TEST SETUP LAYOUT



3.8.4 TEST DEVIATION

No deviation

3.8.5 TEST RESULTS

Please refer to the APPENDIX J.

4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3231	Apr. 14, 2022
2	Amplifier	Agilent	8449B	3008A02334	Feb. 27, 2022
3	HighPass Filter	Wairrwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Feb. 27, 2022
4	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/ 12SS	38	Feb. 27, 2022
5	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Feb. 27, 2022
6	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Feb. 27, 2022
7	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/ 10SS	17	Feb. 27, 2022
8	HighPass Filter	Wairrwright Instruments Gmbh	WHK3.1/18G-10SS	24	Feb. 27, 2022
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
11	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022
12	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 07, 2022
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 07, 2022
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 07, 2022
16	Cable	emci	LMR-400(30MHz-1GHz) (8m+5m)	N/A	May 20, 2022
17	Cable	mitron	B10-01-01-12M	18072744	Oct. 16, 2021
18	Controller	ETS-Lindgren	2090	N/A	N/A
19	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
20	Loop Antenna	EM	EM-6876-1	230	Oct. 16, 2021
21	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 17, 2022
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2022

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Feb. 28, 2022
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2*	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
5	Const Temp,& Humidity Chamber	Bell	BTH-50C	20170306001	Feb. 27, 2022

Remark: “N/A” denotes no model name, serial no. or calibration specified.
“*” calibration period of equipment list is three year.
Except * item, all calibration period of equipment list is one 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	23.81	23.87	23.67
		1	13	23.78	23.79	23.63
		1	24	23.93	23.73	23.69
		12	0	22.94	22.85	22.84
		12	6	22.92	22.87	22.85
		12	11	22.84	22.95	22.76
		25	0	22.72	22.90	22.97
	16QAM	1	0	22.39	22.39	22.73
		1	13	22.28	22.07	22.46
		1	24	22.38	22.12	22.70
		12	0	21.65	21.82	21.70
		12	6	21.66	21.71	21.70
		12	11	21.60	21.74	21.61
		25	0	21.66	22.08	21.82

LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				23330CH
				793MHz
14 / 10M	QPSK	1	0	23.69
		1	25	23.78
		1	49	24.08
		25	0	22.94
		25	13	22.86
		25	25	22.86
		50	0	22.87
	16QAM	1	0	22.61
		1	25	22.69
		1	49	22.71
		25	0	21.89
		25	13	21.91
		25	25	21.91
		50	0	21.75

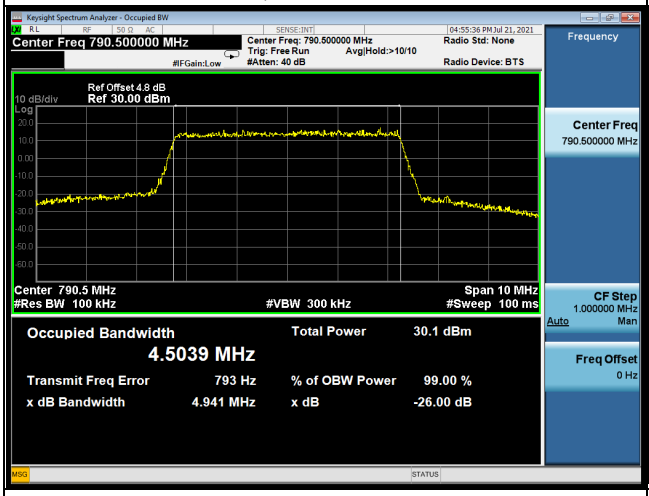
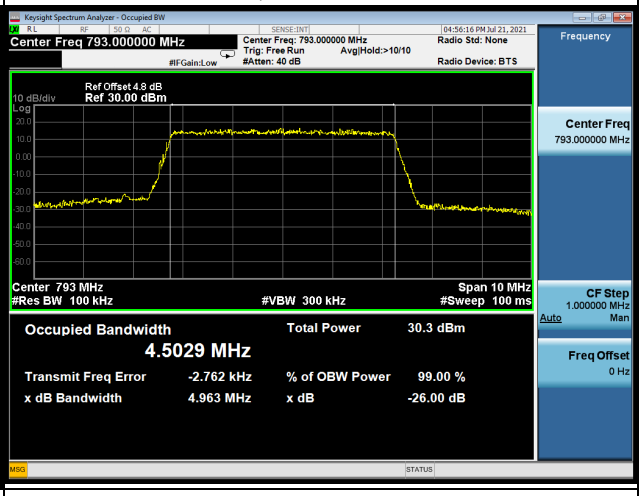
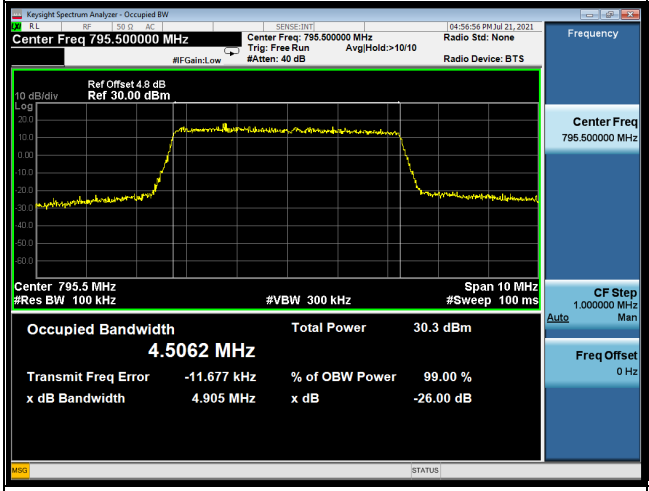
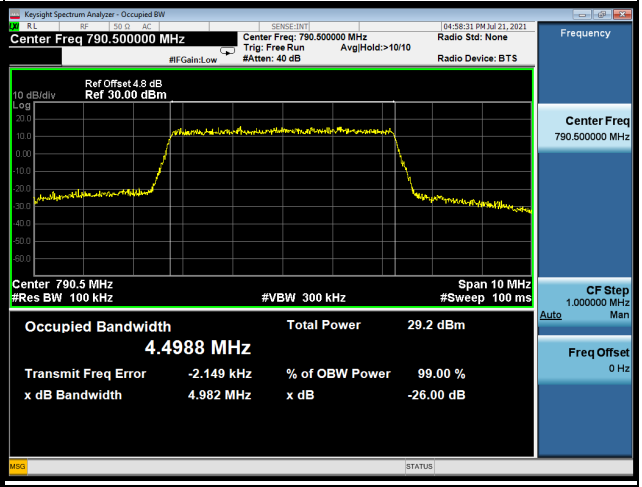
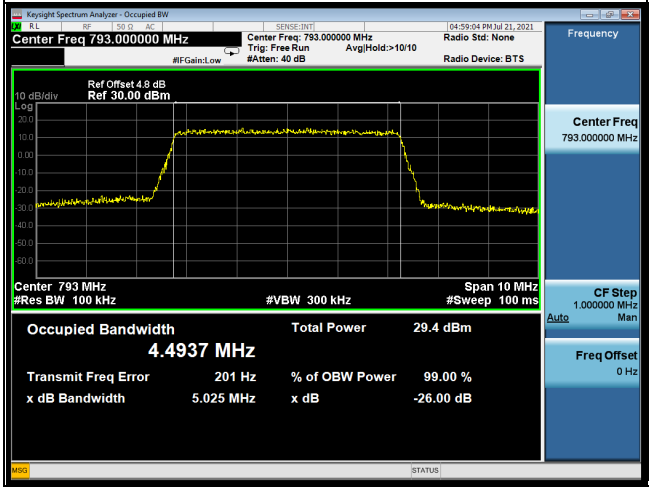
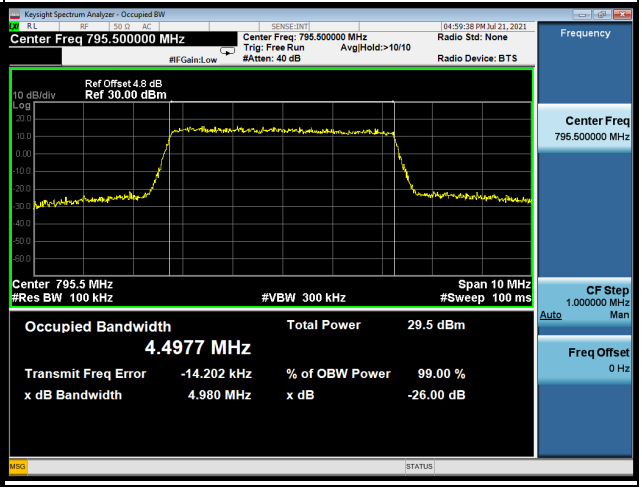
ERP (dBm):

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	24.86	24.92	24.72
		1	13	24.83	24.84	24.68
		1	24	24.98	24.78	24.74
		12	0	23.99	23.90	23.89
		12	6	23.97	23.92	23.90
		12	11	23.89	24.00	23.81
		25	0	23.77	23.95	24.02
	16QAM	1	0	23.44	23.44	23.78
		1	13	23.33	23.12	23.51
		1	24	23.43	23.17	23.75
		12	0	22.70	22.87	22.75
		12	6	22.71	22.76	22.75
		12	11	22.65	22.79	22.66
		25	0	22.71	23.13	22.87

LTE Band / BW	Modulation	RB Size	RB Offset	Mid CH
				23330CH
				793MHz
14 / 10M	QPSK	1	0	24.74
		1	25	24.83
		1	49	25.13
		25	0	23.99
		25	13	23.91
		25	25	23.91
		50	0	23.92
	16QAM	1	0	23.66
		1	25	23.74
		1	49	23.76
		25	0	22.94
		25	13	22.96
		25	25	22.96
		50	0	22.80

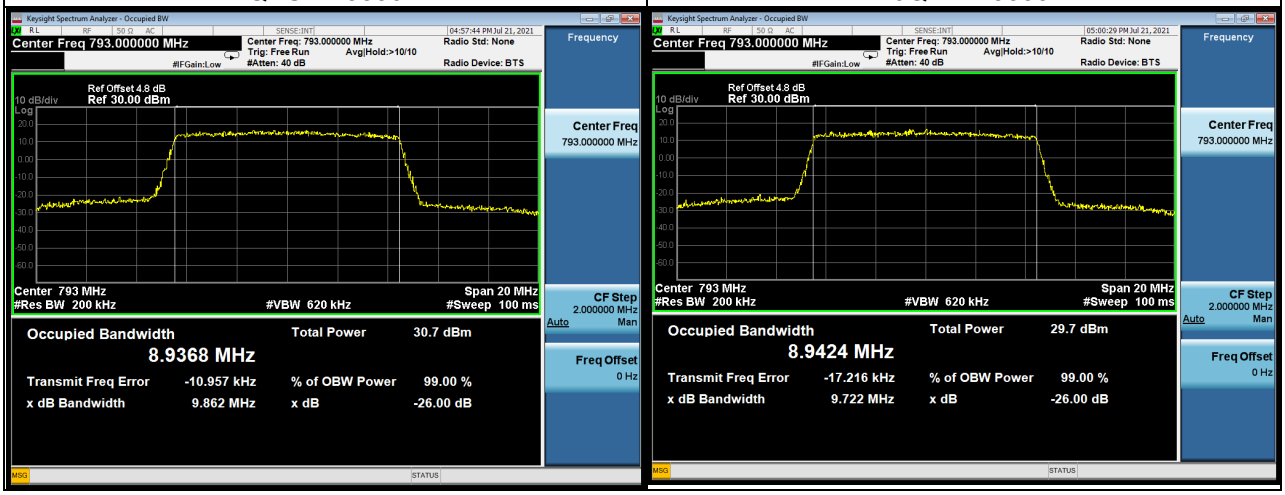
APPENDIX B - OCCUPIED BANDWIDTH

LTE Band 14_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23305	790.5	4.5039	23305	790.5	4.941
23330	793	4.5029	23330	793	4.963
23355	795.5	4.5062	23355	795.5	4.905
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23305	790.5	4.4988	23305	790.5	4.982
23330	793	4.4937	23330	793	5.025
23355	795.5	4.4977	23355	795.5	4.980

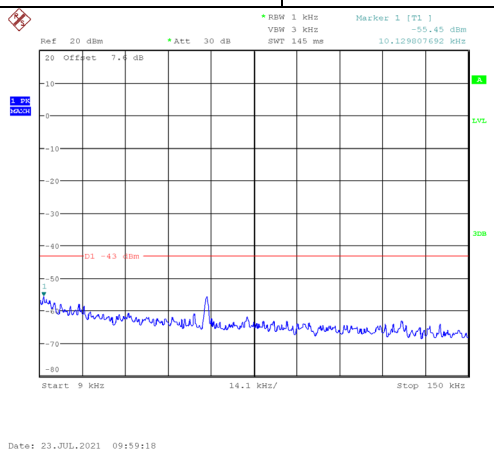
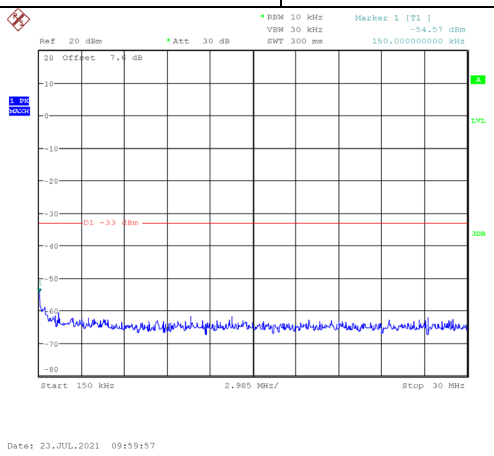
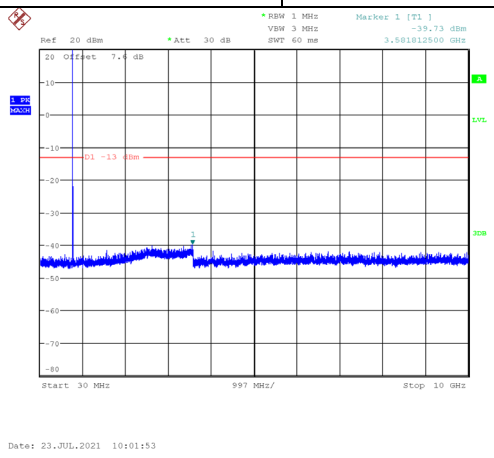
Spectrum Plot	
QPSK-23305	QPSK-23330
	
QPSK-23355	16QAM-23305
	
16QAM-23330	16QAM-23355
	

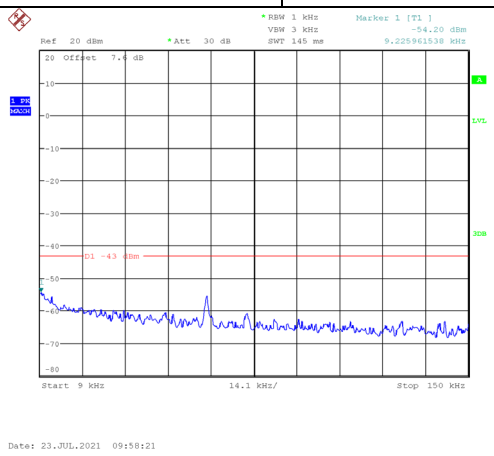
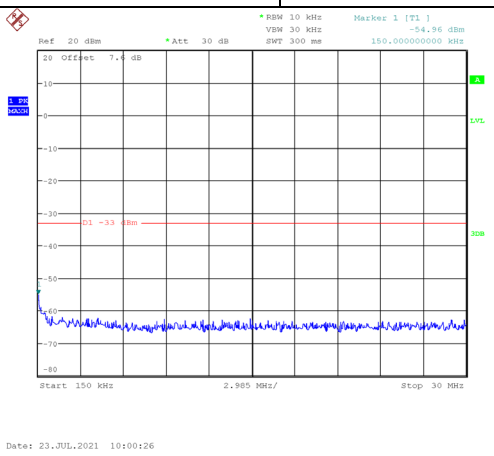
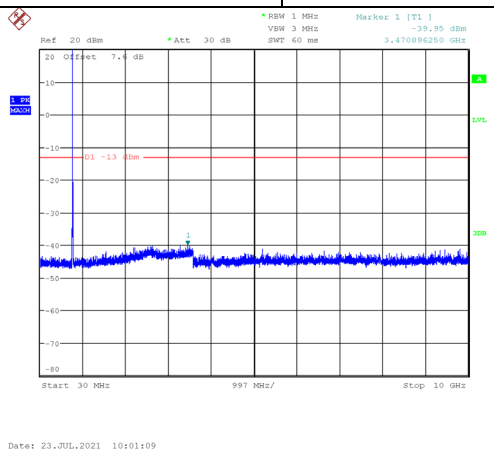
LTE Band 14_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23330	793	8.9368	23330	793	9.862
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23330	793	8.9424	23330	793	9.722

Spectrum Plot	
QPSK-23330	16QAM-23330



APPENDIX C - CONDUCTED SPURIOUS EMISSIONS

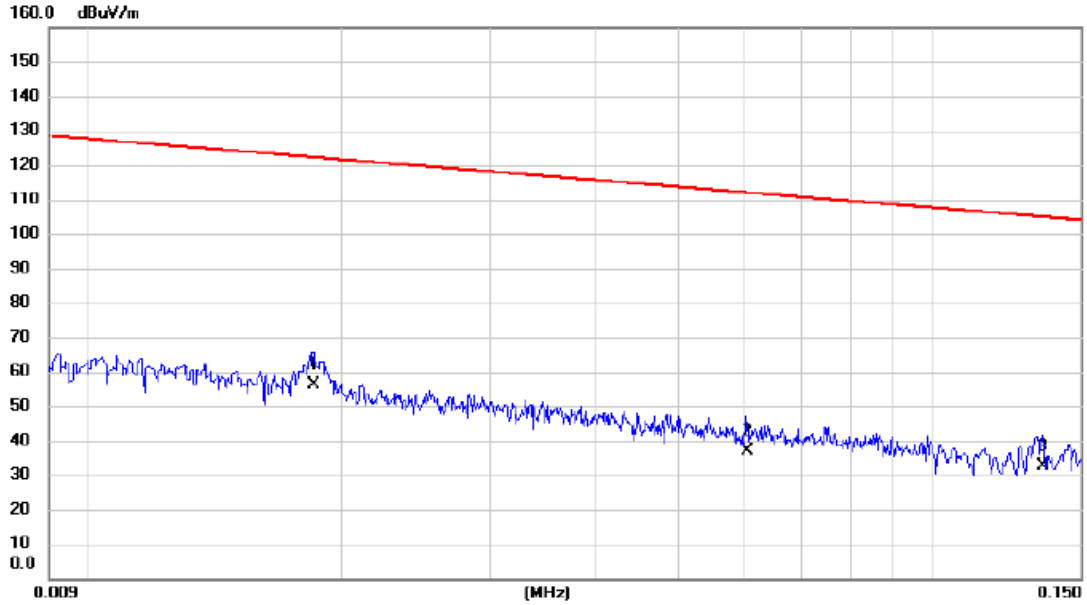
LTE Band 14_5M Spectrum Plot			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
23305	790.5	23330	793
			
Channel	Frequency(MHz)	-	-
23355	795.5	-	-
		-	

LTE Band 14_10M Spectrum Plot			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
23330	793	23330	793
			
Channel	Frequency(MHz)	-	-
23330	793	-	-
		-	

APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)

Test Mode	TX Mode

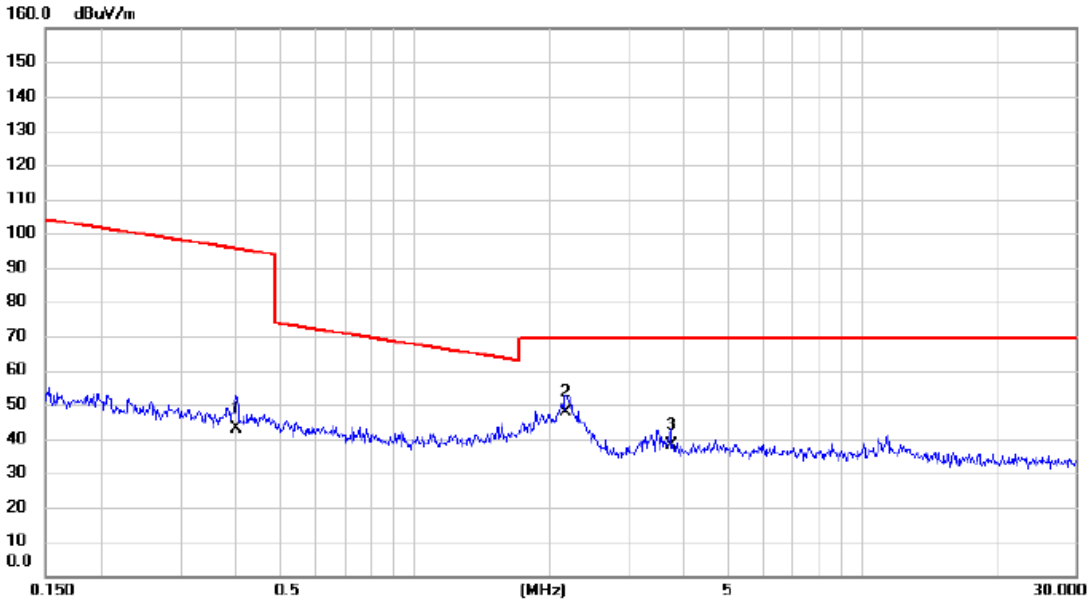
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	0.0185	42.58	13.68	56.26	122.26	-66.00	AVG			
2		0.0603	24.67	12.48	37.15	112.00	-74.85	AVG			
3		0.1352	19.95	12.73	32.68	104.99	-72.31	AVG			

Test Mode	TX Mode

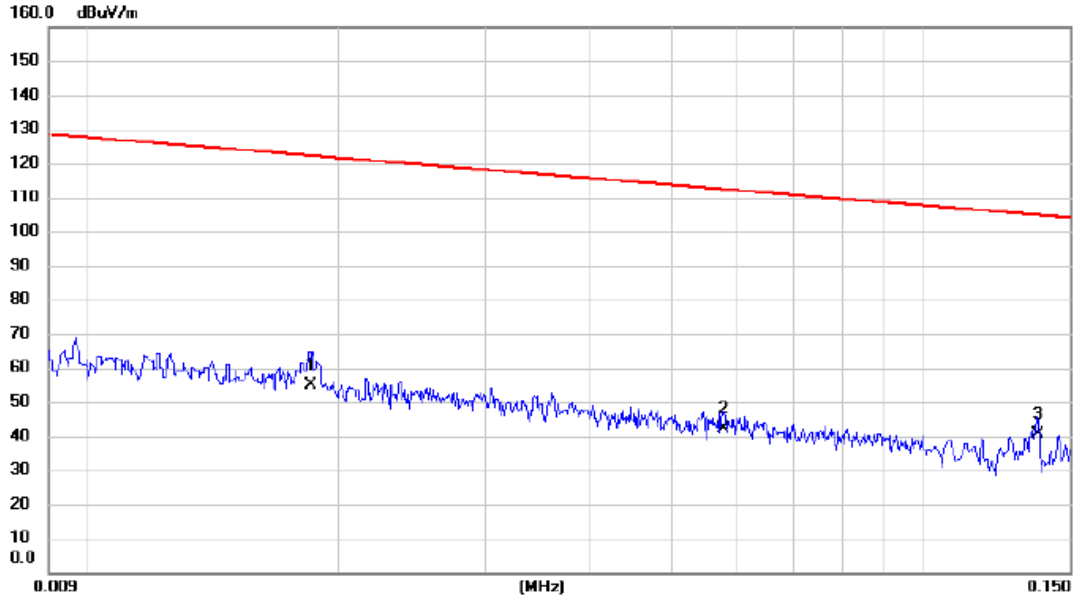
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.3997	30.75	12.26	43.01	95.57	-52.56	AVG			
2	*	2.1668	36.52	11.22	47.74	69.54	-21.80	QP			
3		3.7395	27.49	10.91	38.40	69.54	-31.14	QP			

Test Mode	TX Mode

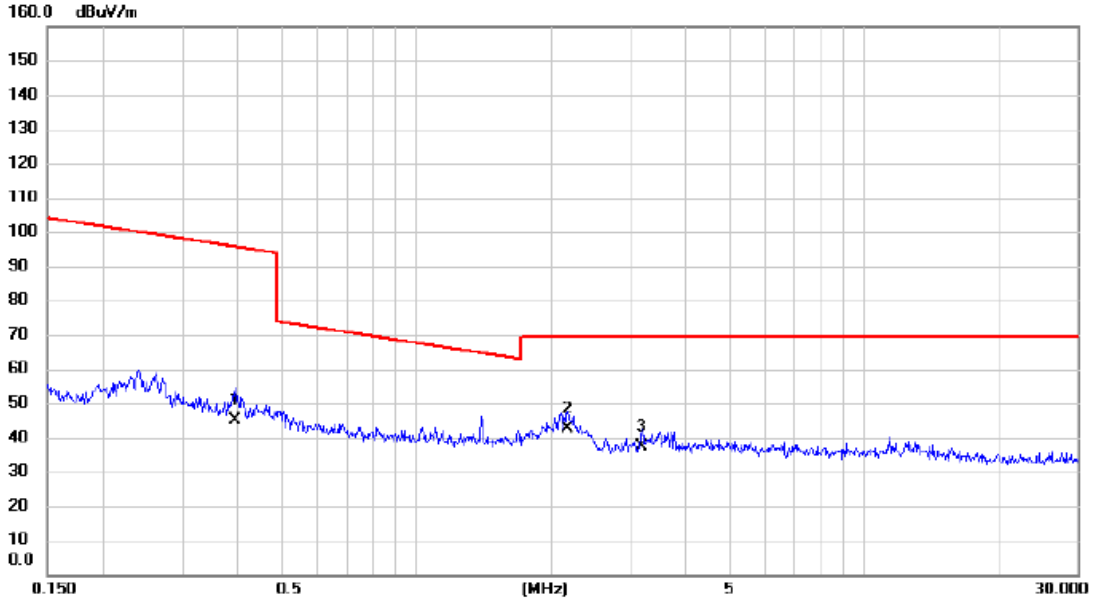
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0185	41.28	13.68	54.96	122.26	-67.30	AVG			
2		0.0578	29.56	12.47	42.03	112.37	-70.34	AVG			
3	*	0.1371	27.84	12.73	40.57	104.87	-64.30	AVG			

Test Mode	TX Mode

Ant 90°

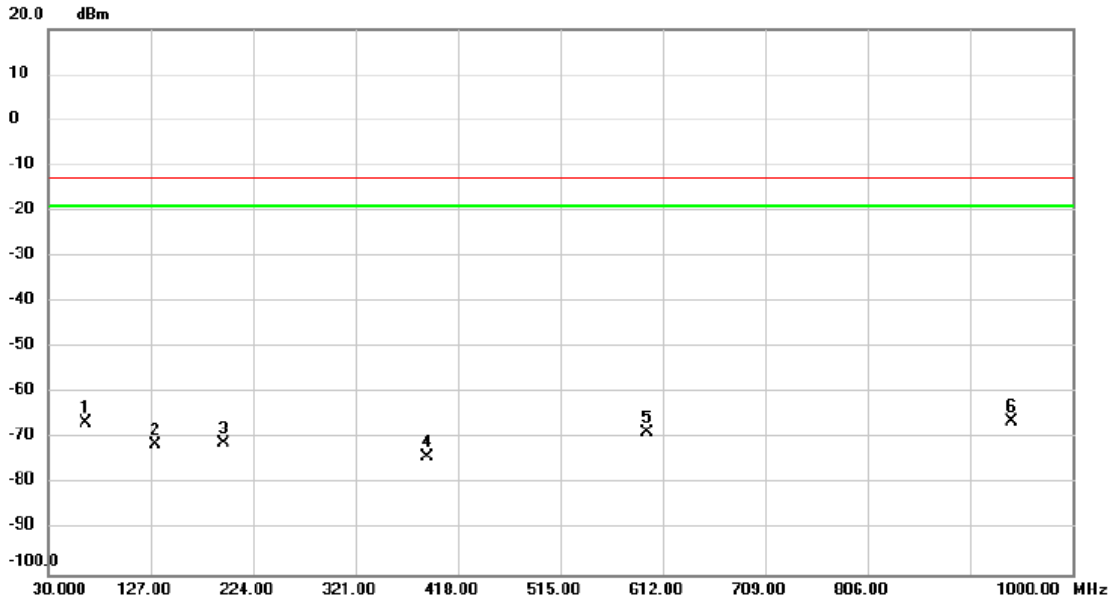


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.3933	32.59	12.28	44.87	95.71	-50.84	AVG			
2	*	2.1783	31.48	11.21	42.69	69.54	-26.85	QP			
3		3.1900	26.54	10.83	37.37	69.54	-32.17	QP			

APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)

Test Mode	LTE Band 14_TX CH23330_5M

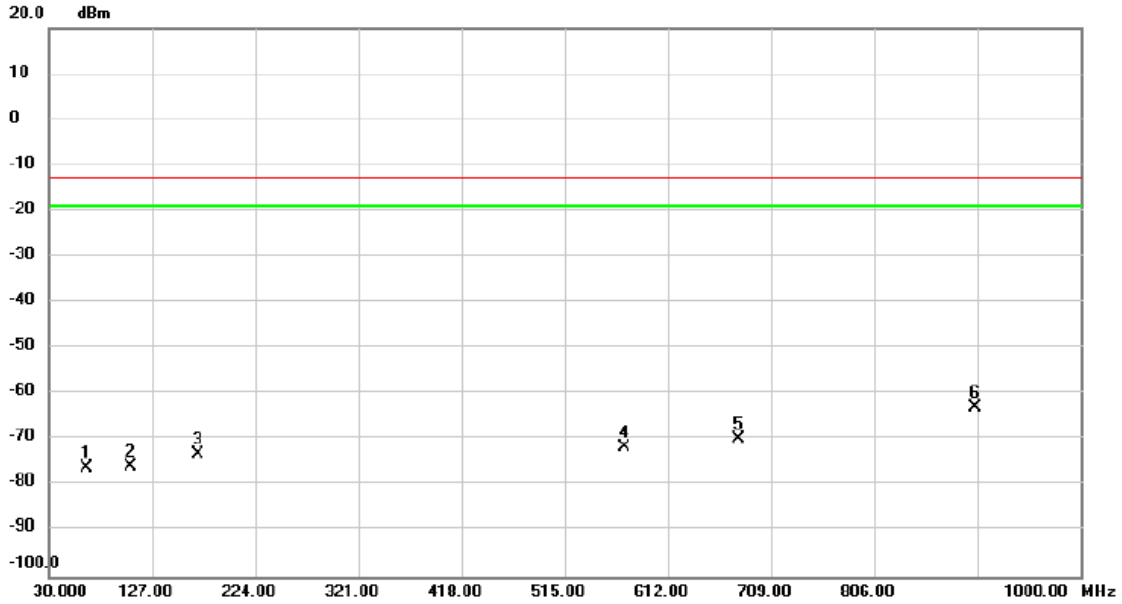
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		64.920	-61.26	-5.26	-66.52	-13.00	-53.52	peak	
2		131.850	-68.22	-3.12	-71.34	-13.00	-58.34	peak	
3		195.870	-66.07	-4.93	-71.00	-13.00	-58.00	peak	
4		388.415	-74.49	0.31	-74.18	-13.00	-61.18	peak	
5		597.450	-72.87	4.16	-68.71	-13.00	-55.71	peak	
6	*	941.800	-75.88	9.52	-66.36	-13.00	-53.36	peak	

Test Mode	LTE Band 14_TX CH23330_5M

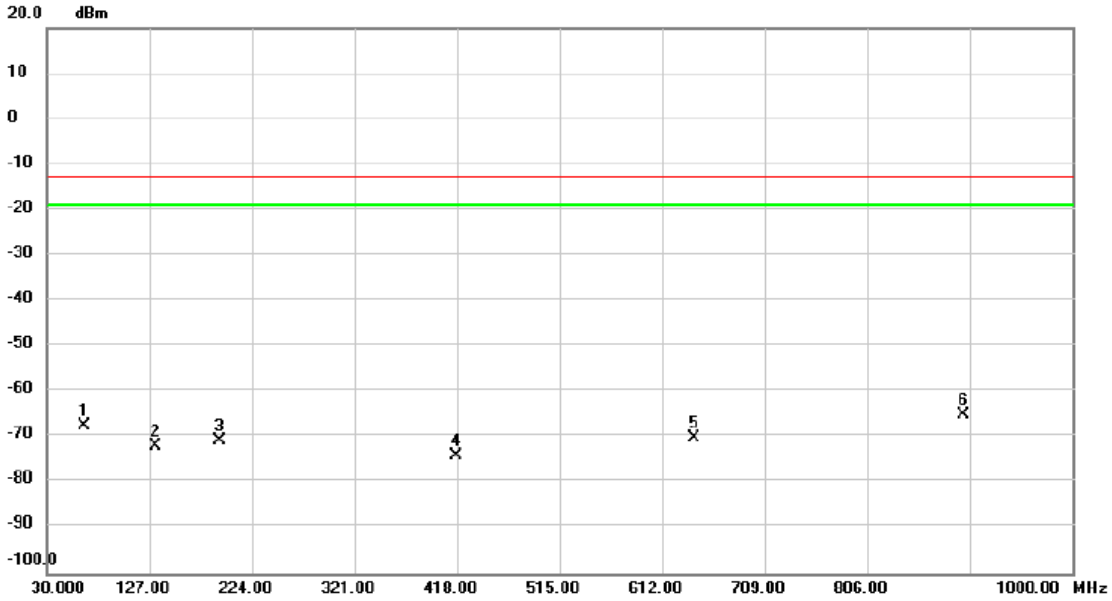
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		64.920	-70.92	-5.26	-76.18	-13.00	-63.18	peak	
2		107.115	-70.95	-4.84	-75.79	-13.00	-62.79	peak	
3		169.680	-70.67	-2.44	-73.11	-13.00	-60.11	peak	
4		571.745	-74.92	3.42	-71.50	-13.00	-58.50	peak	
5		677.960	-75.42	5.71	-69.71	-13.00	-56.71	peak	
6	*	900.575	-71.43	8.45	-62.98	-13.00	-49.98	peak	

Test Mode	LTE Band 14_TX CH23330_10M

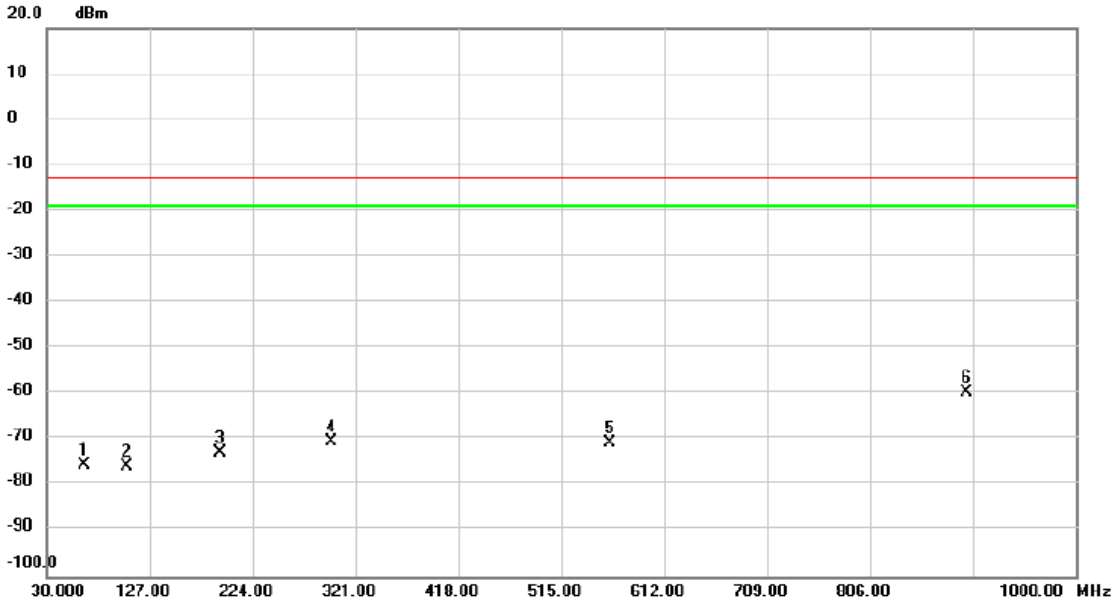
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		65.405	-61.96	-5.36	-67.32	-13.00	-54.32	peak	
2		133.305	-68.86	-3.10	-71.96	-13.00	-58.96	peak	
3		192.960	-65.95	-4.72	-70.67	-13.00	-57.67	peak	
4		417.515	-75.00	1.06	-73.94	-13.00	-60.94	peak	
5		642.070	-75.18	5.15	-70.03	-13.00	-57.03	peak	
6	*	897.665	-73.60	8.41	-65.19	-13.00	-52.19	peak	

Test Mode	LTE Band 14_TX CH23330_10M

Horizontal

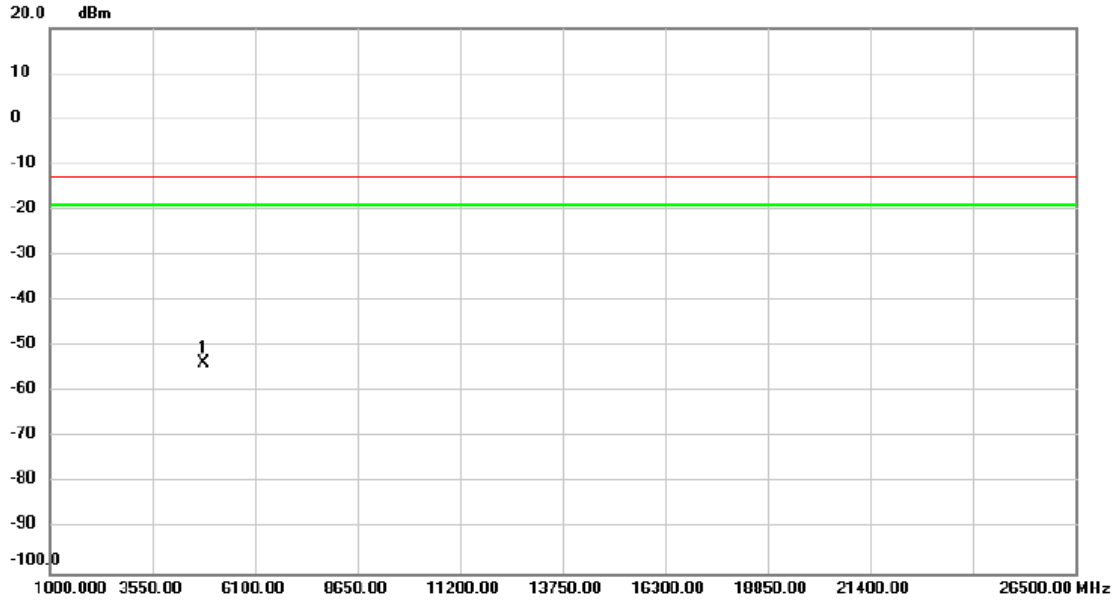


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		65.405	-70.10	-5.36	-75.46	-13.00	-62.46	peak	
2		105.660	-70.80	-4.94	-75.74	-13.00	-62.74	peak	
3		193.930	-68.07	-4.78	-72.85	-13.00	-59.85	peak	
4		298.690	-69.02	-1.47	-70.49	-13.00	-57.49	peak	
5		561.075	-73.98	3.11	-70.87	-13.00	-57.87	peak	
6	*	896.695	-68.14	8.40	-59.74	-13.00	-46.74	peak	

APPENDIX F - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)

Test Mode	LTE Band 14_TX CH23330_5M

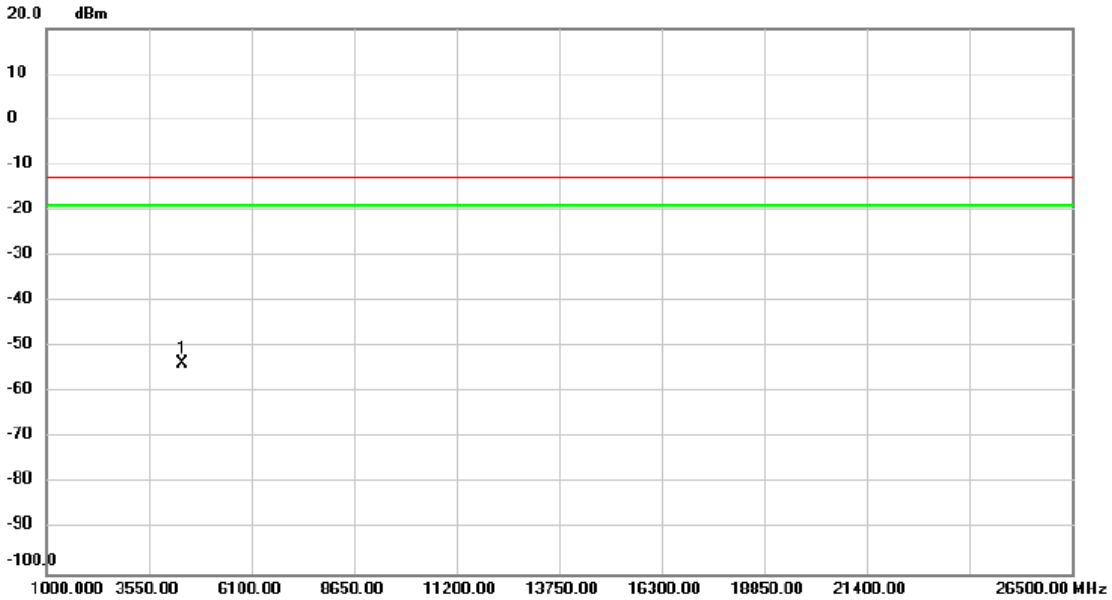
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	4812.250	-70.61	16.91	-53.70	-13.00	-40.70	peak	

Test Mode	LTE Band 14_TX CH23330_5M

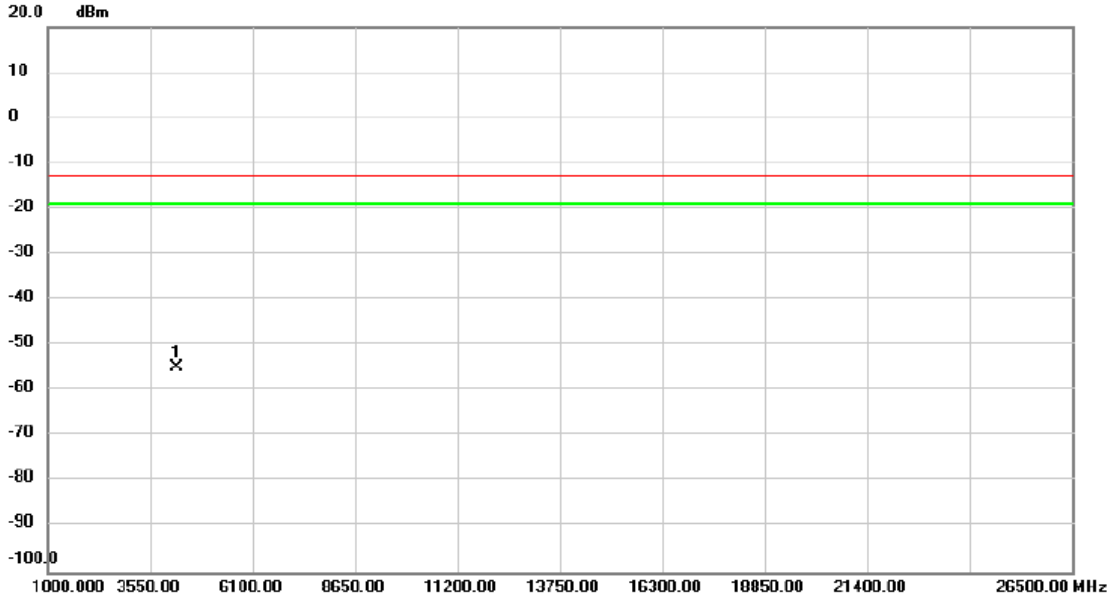
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	4378.750	-68.88	15.18	-53.70	-13.00	-40.70	peak	

Test Mode	LTE Band 14_TX CH23330_10M

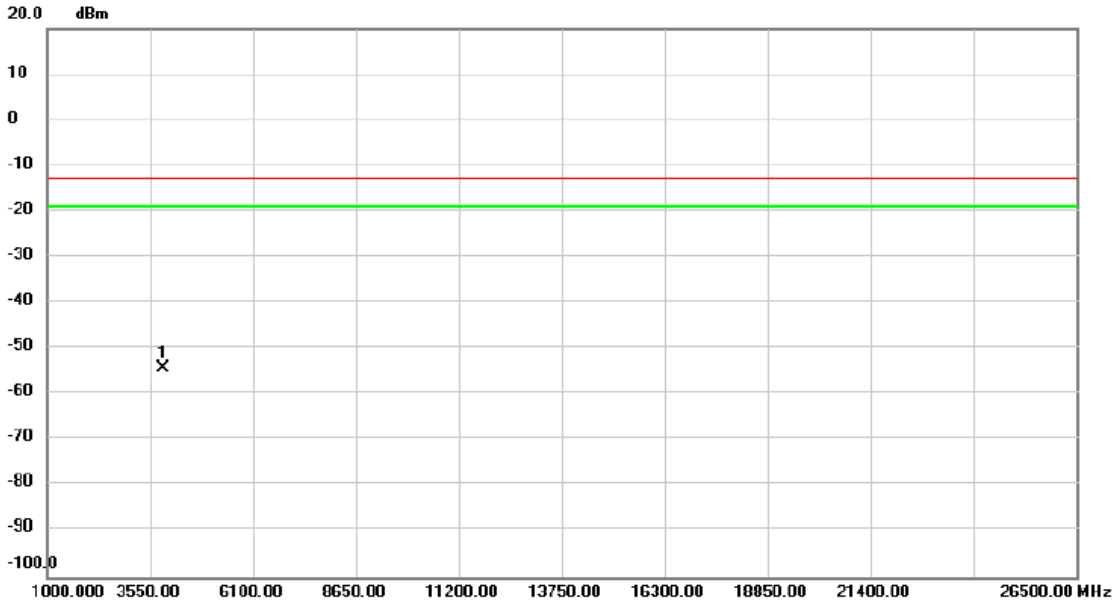
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	4225.750	-69.95	15.02	-54.93	-13.00	-41.93	peak	

Test Mode	LTE Band 14_TX CH23330_10M

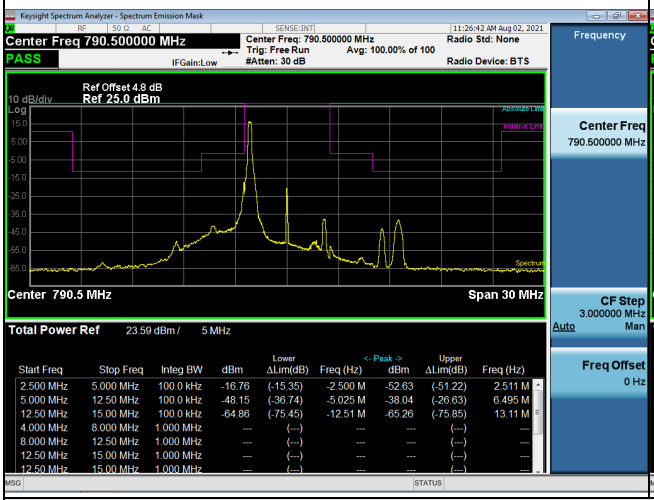
Horizontal

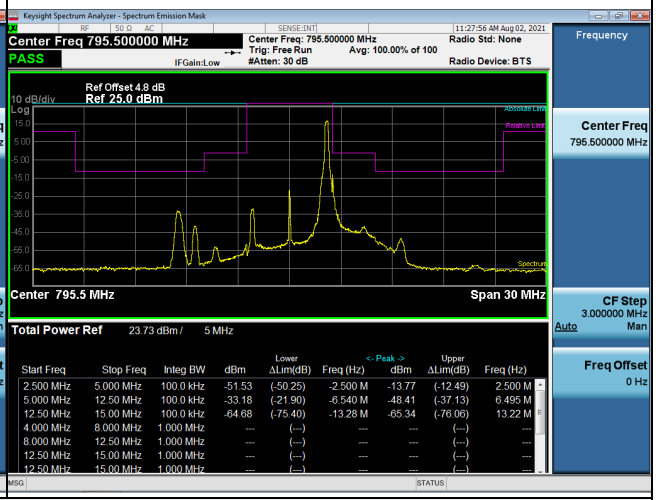


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3881.500	-68.64	14.41	-54.23	-13.00	-41.23	peak	

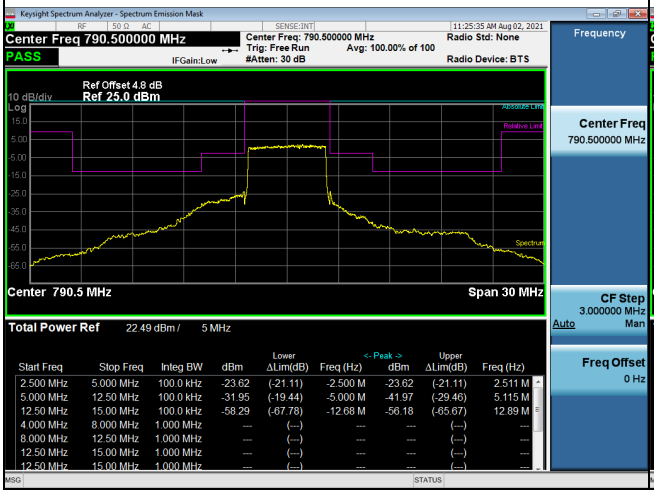
APPENDIX G - MASK

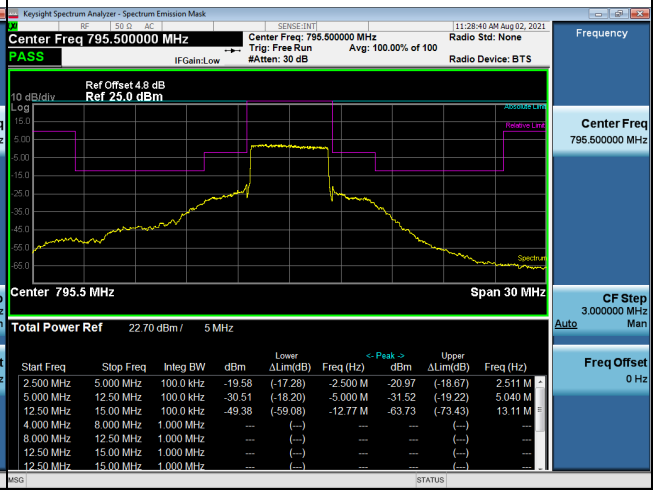
LTE Band 14_5M			
1RB#0		1RB#24	
Channel	23305	Channel	23355

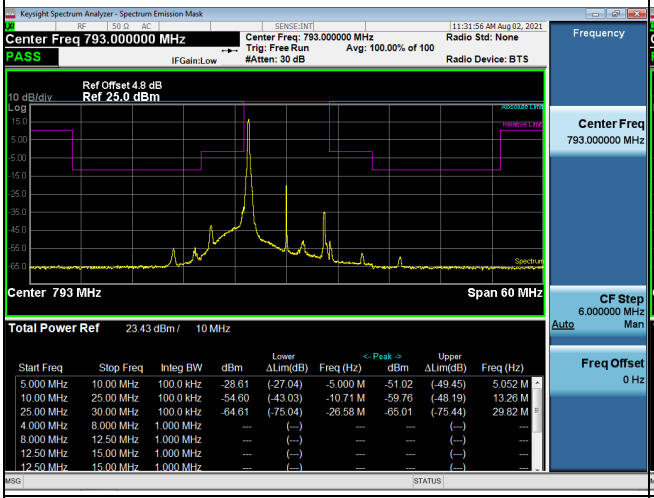
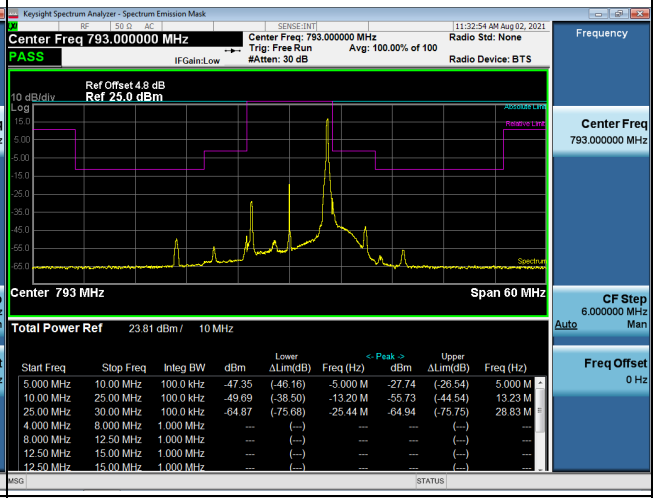
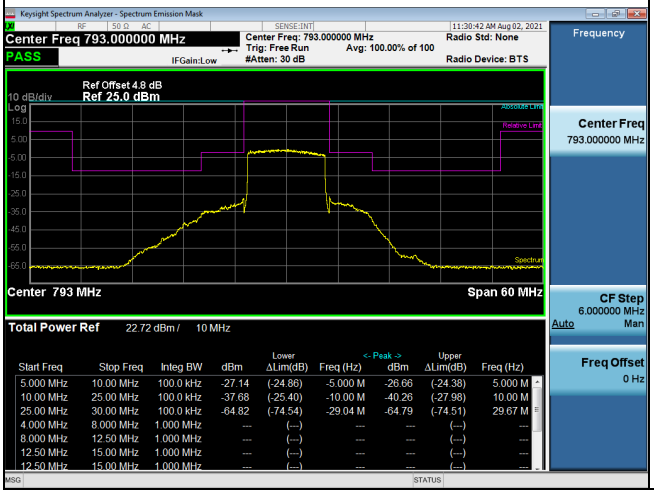




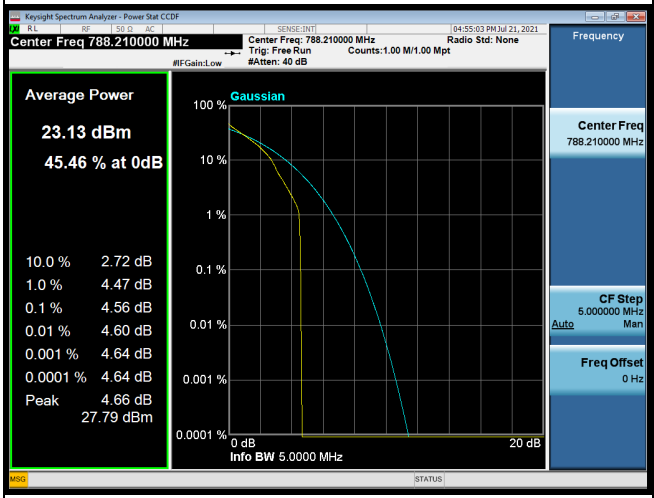
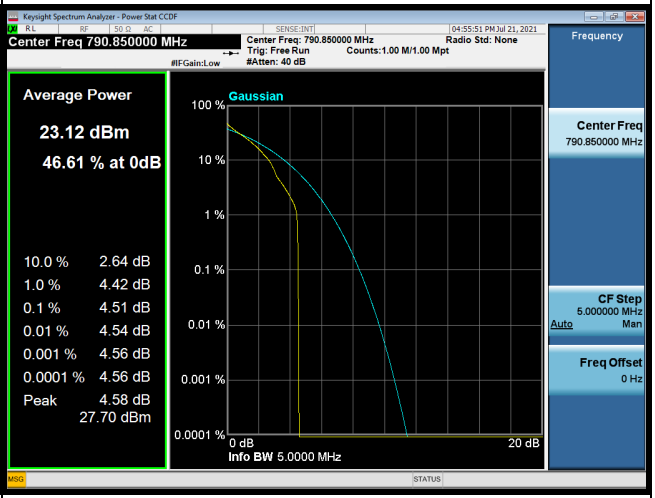
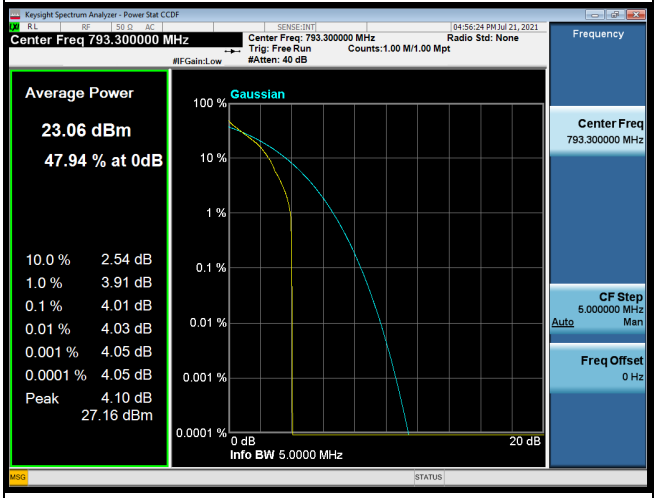
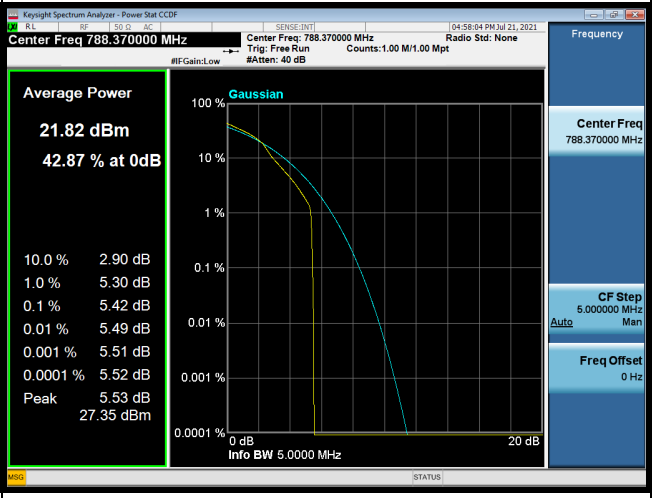
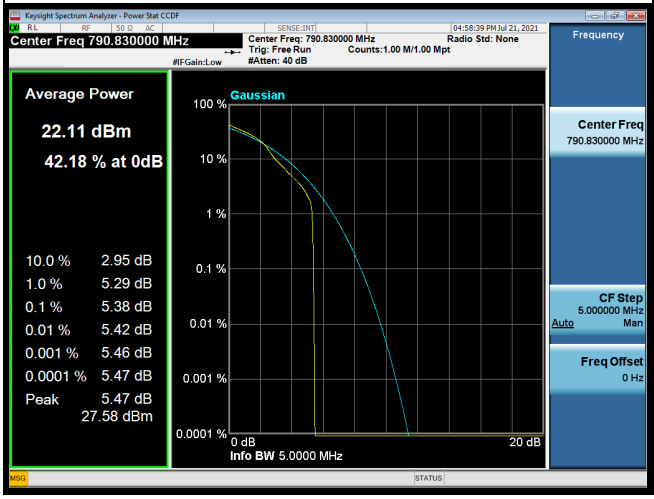
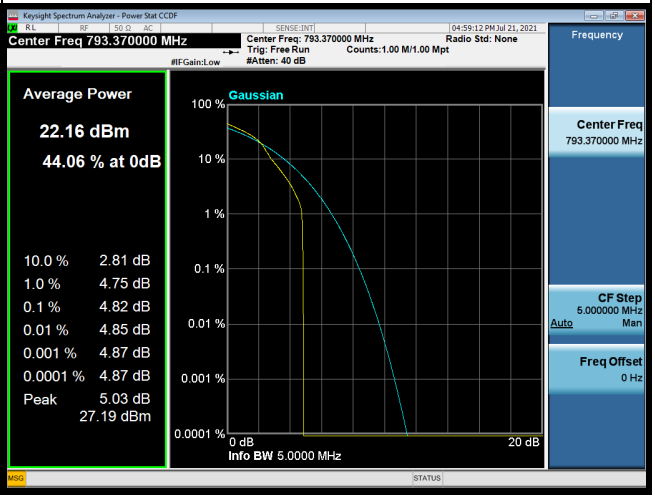
25RB#0			
Channel	23305	Channel	23355

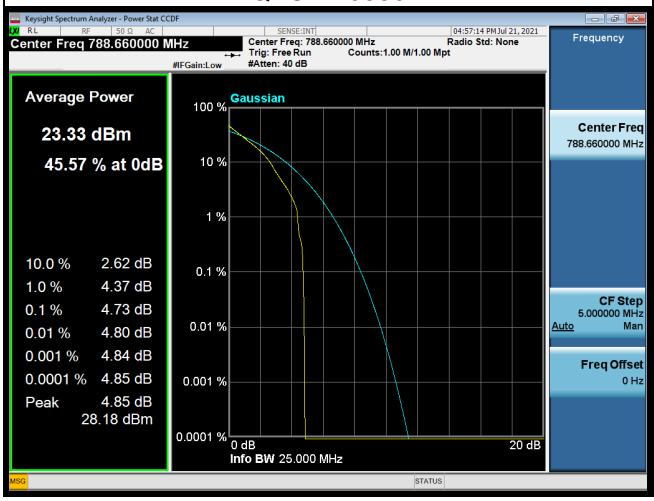
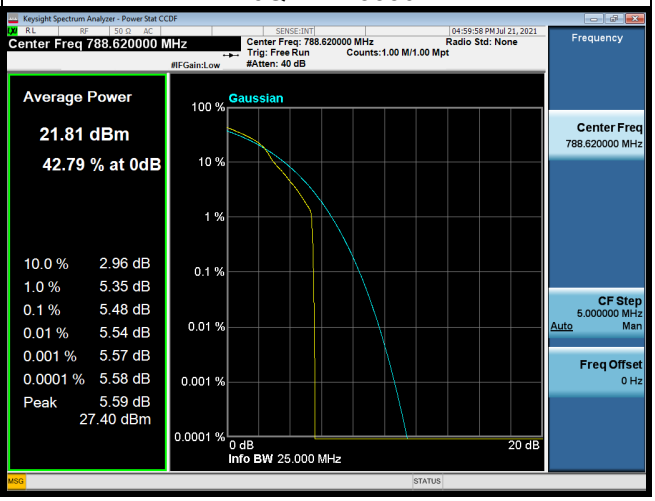




LTE Band 14_10M			
1RB#0		1RB#49	
Channel	23330	Channel	23330
			
50RB#0		-	
Channel	23330	-	
		-	

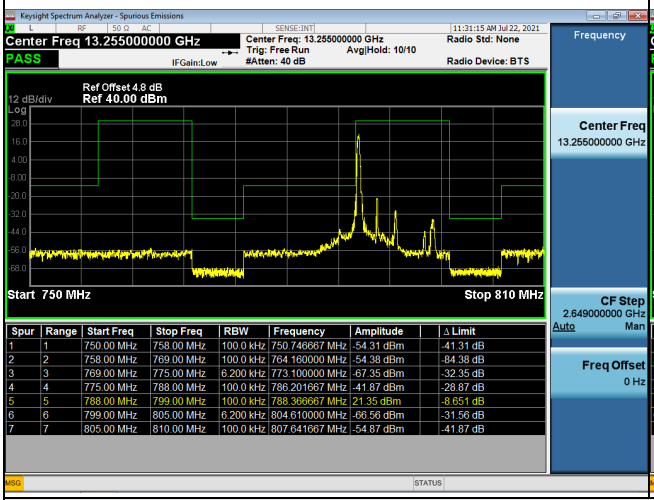
APPENDIX H - PEAK TO AVERAGE RATIO

LTE Band 14_5M Spectrum Plot	
QPSK-23305	QPSK-23330
	
QPSK-23355	16QAM-23305
	
16QAM-23330	16QAM-23355
	

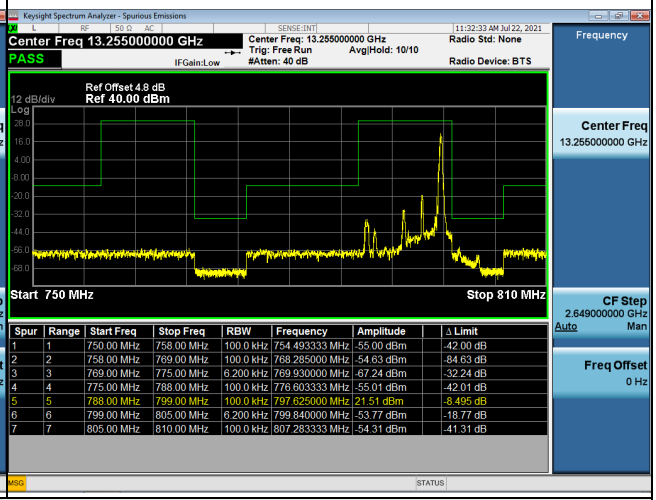
LTE Band 14_10M Spectrum Plot	
QPSK-23330	16QAM -23330
	

APPENDIX I - CONDUCTED BAND EDGE MEASUREMENT

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

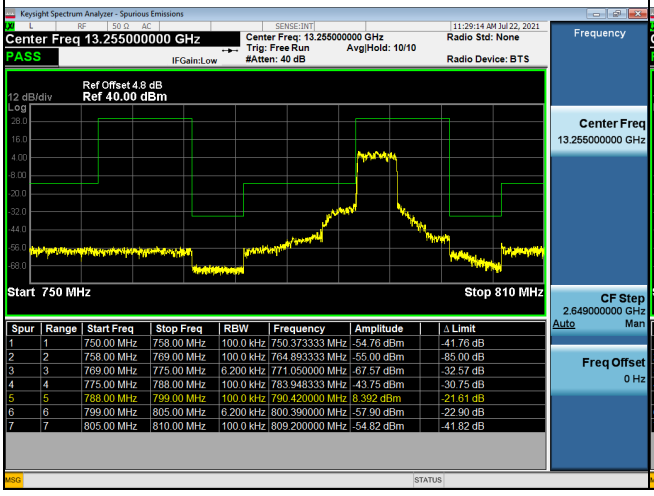


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	750.746667 MHz	-54.31 dBm	-41.31 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	764.160000 MHz	-54.38 dBm	-84.38 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	773.100000 MHz	-67.35 dBm	-32.35 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	786.201667 MHz	-41.87 dBm	-28.87 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	788.366667 MHz	21.35 dBm	-8.651 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	804.610000 MHz	-66.56 dBm	-31.56 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	807.641667 MHz	-54.87 dBm	-41.87 dB

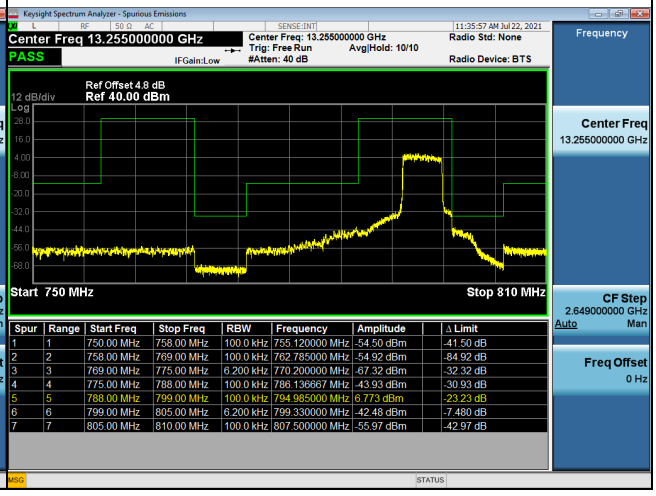


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	754.493333 MHz	-55.00 dBm	-42.00 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	768.285000 MHz	-54.63 dBm	-84.63 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	769.930000 MHz	-67.24 dBm	-32.24 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	776.603333 MHz	-55.01 dBm	-42.01 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	797.625000 MHz	21.51 dBm	-8.495 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	799.840000 MHz	-53.77 dBm	-18.77 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	807.283333 MHz	-54.31 dBm	-41.31 dB

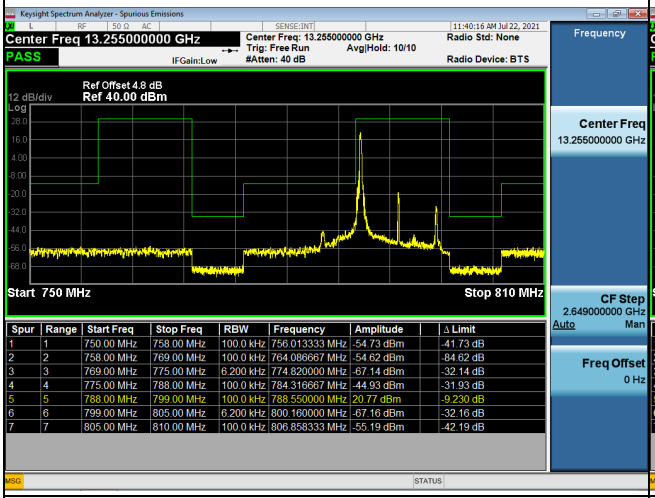
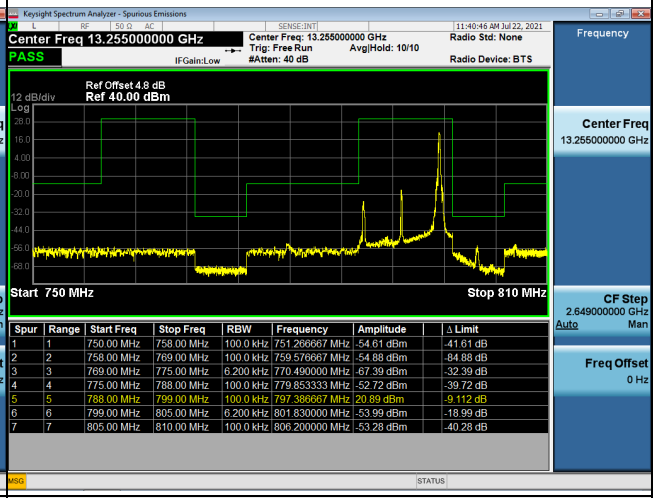
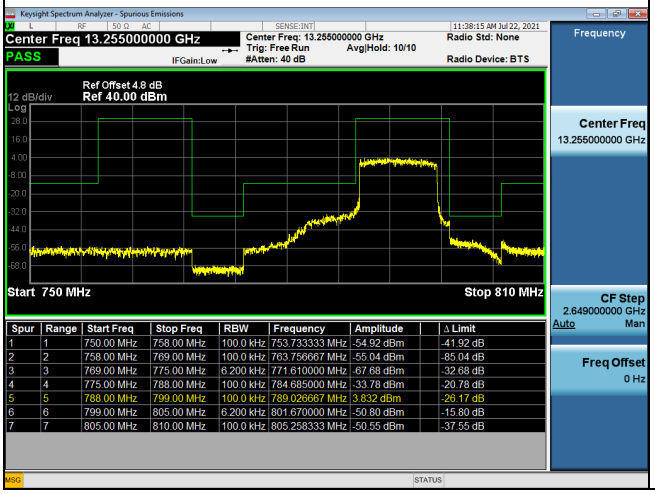
25RB#0			
Channel	23305	Channel	23355



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	750.373333 MHz	-54.76 dBm	-41.76 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	764.893333 MHz	-55.00 dBm	-85.00 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	771.050000 MHz	-67.57 dBm	-32.57 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	783.948333 MHz	-43.75 dBm	-30.75 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	790.420000 MHz	8.392 dBm	-21.61 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	800.390000 MHz	-57.90 dBm	-22.90 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	809.200000 MHz	-54.82 dBm	-41.82 dB



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	755.120000 MHz	-54.50 dBm	-41.50 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	762.785000 MHz	-54.92 dBm	-84.92 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	770.200000 MHz	-67.32 dBm	-32.32 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	786.136667 MHz	-43.93 dBm	-30.93 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	794.985000 MHz	6.773 dBm	-23.23 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	799.330000 MHz	-42.48 dBm	-7.480 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	807.500000 MHz	-55.97 dBm	-42.97 dB

LTE Band 14_10M			
1RB#0		1RB#49	
Channel	23330	Channel	23330
			
50RB#0		-	
Channel	23330	-	
		-	

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	756.013333 MHz	-54.73 dBm	-41.73 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	764.086667 MHz	-54.62 dBm	-84.62 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	774.820000 MHz	-67.14 dBm	-32.14 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	784.316667 MHz	-44.93 dBm	-31.93 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	788.550000 MHz	20.77 dBm	-9.230 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	800.160000 MHz	-67.16 dBm	-32.16 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	806.858333 MHz	-55.19 dBm	-42.19 dB

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	751.266667 MHz	-54.61 dBm	-41.61 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	759.576667 MHz	-54.88 dBm	-84.88 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	770.490000 MHz	-67.39 dBm	-32.39 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	779.853333 MHz	-52.72 dBm	-39.72 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	797.386667 MHz	20.89 dBm	-9.112 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	801.830000 MHz	-53.99 dBm	-18.99 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	806.200000 MHz	-53.28 dBm	-40.28 dB

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	750.00 MHz	758.00 MHz	100.0 kHz	753.733333 MHz	-54.92 dBm	-41.92 dB
2	2	758.00 MHz	769.00 MHz	100.0 kHz	763.756667 MHz	-55.04 dBm	-85.04 dB
3	3	769.00 MHz	775.00 MHz	6.200 kHz	771.610000 MHz	-67.68 dBm	-32.68 dB
4	4	775.00 MHz	788.00 MHz	100.0 kHz	784.685000 MHz	-33.78 dBm	-20.78 dB
5	5	788.00 MHz	799.00 MHz	100.0 kHz	789.026667 MHz	3.832 dBm	-26.17 dB
6	6	799.00 MHz	805.00 MHz	6.200 kHz	801.670000 MHz	-50.80 dBm	-15.80 dB
7	7	805.00 MHz	810.00 MHz	100.0 kHz	805.258333 MHz	-50.55 dBm	-37.55 dB

APPENDIX J - FREQUENCY STABILITY

Test Mode	LTE Band 14_CH23330_5M

Temperature vs. Frequency Stabiility

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	-6.26	-0.007894073	±1.25
-20	-1.95	-0.002459016	
-10	-4.66	-0.005876419	
0	1.16	0.001462799	
10	2.38	0.003001261	
20	-6.84	-0.008625473	
30	-7.05	-0.00889029	
40	-6.15	-0.007755359	
50	-5.14	-0.006481715	
Max. Deviation (ppm)	-7.05	-0.00889029	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
138	6.79	0.008562421	±1.25
120	3.95	0.004981084	
102	4.05	0.005107188	
Max. Deviation (ppm)	6.79	0.008562421	

Test Mode	LTE Band 14_CH23330_10M

Temperature vs. Frequency Stabiility

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	1.77	0.00223203	±1.25
-20	-7.12	-0.008978562	
-10	5.53	0.006973518	
0	6.75	0.00851198	
10	4.64	0.005851198	
20	3.41	0.004300126	
30	-7.08	-0.008928121	
40	-4.48	-0.005649433	
50	-2.74	-0.003455233	
Max. Deviation (ppm)	-7.12	-0.008978562	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
138	-1.33	-0.001677175	±1.25
120	-6.34	-0.007994956	
102	4.49	0.005662043	
Max. Deviation (ppm)	-6.34	-0.007994956	

End of Test Report