TEST REPORT

Reference No.	:	WTS19S04025068W-1
FCC ID	:	2AG32MBS3100190
Applicant	:	Baicells Technologies Co., Ltd.
Address	:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer	:	The same as above
Address	:	The same as above
Product	:	LTE Base Station
Model(s)	:	mBS31001
Brand Name	:	BaiCells
Standards	:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 90 Subpart Z
Date of Receipt sample	:	2019-04-23
Date of Test	:	2019-04-24 to 2019-06-28
Date of Issue	:	2019-07-02
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Compiled by:

Ford Wang / Project Engineer

Approved by:

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC (The Federal Communications Commission), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. ISED CAB identifier: CN0013			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Contents

4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S04025068W-1	2019-04-23	2019-04-24 to 2019-06-28	2019-07-02	original	-	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	LTE Base Station
Model(s):	mBS31001
Model Description:	N/A
Note:	N/A

5.2 Details of E.U.T.

Operation Frequency:	3655MHz~3695MHz
Type of Modulation:	QPSK, 16QAM, 64QAM
Antenna installation:	External antenna
Antenna Gain:	9.0dBi
Ratings:	DC 48V, 1.5A
Number of transmitter chains:	2Tx*2Rx (MIMO)*2

For the purpose of increasing capacity and DL/UL throughput, This outdoor TDD base station has 2 cells within one eNB, which means 2 carriers(Master and Slave) are configured correspondingly. Under such circumstance, the deployment of antenna and relative center frequency setting must be taken into account carefully in order to avoid interference from opposite cell.

This device support 2*MIMO(2Tx*2Rx) transmission mode 3 per carrier as defined in the 3GPP specification with two transmission antennas. The MIMO scheme is open loop transmission and the signals are uncorrelated transmitted in multiple channels in a single frequency band. Carrier Aggregation is not supported and no additional requirement for directional gain calculations based on supported operating modes.

5.3 Channel List

Normal

10MHz		20MHz	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Low	3655	Low	3660
Middle	3675	Middle	3675
High	3695	High	3690

5.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Description
Data Mode (E-TM1.1)	Keep the EUT in data communicating mode (E-TM1.1). (10MHz, 20MHz)

Data Mode (E-TM3.1)	Keep the EUT in data communicating mode (E-TM3.1). (10MHz, 20MHz)

5.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
	FCC	
RF Output Power	Part 2.1046 Part 90.1321	PASS
Modulation Characteristics	Part 2.1047	PASS
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 90.209	PASS
Emission Mask	Part 90.210(b)	PASS
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 90.1323	PASS
Field Strength of Spurious Radiation	Part 2.1053 Part 90.1323	PASS
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 90.213(a)	PASS
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 90.213(a)	PASS

Pass: The EUT complies with the essential requirements in the standard.

Note 1: According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 & KDB 971168 D01 Power Means License Digital Systems v03.

Note 2: The duty cycle correction = 10 log (1/0.68) = 1.7 (dB)；

Offset factor=ATT loss + Cable loss + Duty cycle correction=10+0.5+1.7=12.2 (dB)；

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7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	2018-09-12	2019-09-11
2.	LISN	R&S	ENV216	101215	2018-09-12	2019-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2018-09-12	2019-09-11
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	2018-09-12	2019-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018-09-12	2019-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2018-09-12	2019-09-11
4.	Cable	LARGE	RF300	-	2018-09-12	2019-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	2019-04-29	2020-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2019-04-09	2020-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2019-04-09	2020-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-09-12	2019-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2019-04-09	2020-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2019-04-09	2020-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2019-04-13	2020-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2019-04-13	2020-04-12
9	Universal Radio Communication Tester	R&S	CMU 200	112461	2019-04-13	2020-04-12
10	Signal Generator	R&S	SMR20	100046	2018-09-12	2019-09-11
11	Smart Antenna	SCHWARZBECK	HA08	-	2019-04-09	2020-04-08
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**

1	Test Receiver	R&S	ESCI	101296	2019-04-13	2020-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019-04-09	2020-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2019-04-13	2020-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2019-04-13	2020-04-12
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2018-09-12	2019-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2018-09-12	2019-09-11
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	2019-04-13	2020-04-12
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2018-09-12	2019-09-11

7.2 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10^{-7}Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval：95%. Confidence factor:k=2	

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 Transmit Output Power and PSD

Test Requirement:	FCC part90.1321(a)
Test Method:	FCC part2.1046
	ANSI C63.26-2015
Test Mode:	Data communicating mode
Limit:	FCC: (a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum. (b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following: (1) Different information must be transmitted to each receiver. (2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, *i.e.*, the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph(a) of this section, as applicable. The directional antenna gain shall be computed as follows: (i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi, of the individual element or stave having the highest gain. (ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence is presented, *e.g.*, due to shading of the array or coherence loss in the beam-forming. (3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does not exceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (b)(2) of this section by more than 8 dB. (4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

8.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

8.2 Test Procedure

Transmit Output Power Test:RBW=1MHz, VBW=3MHz, Detector mode= Average,

PSD:RBW=300kHz, VBW=1MHz, Detector mode= Average,

Trace mode: Power averaging over 100 sweeps

8.3 Test Result

Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
10	E-TM1.1	Low	29.89	29.49	32.70	9.0	41.70	44.0
		Middle	29.87	29.92	**32.91**	9.0	41.91	
		High	29.57	29.49	32.54	9.0	41.54	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/20MHz)	Chain 1 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit (dBm/20MHz)
20	E-TM1.1	Low	29.63	29.75	32.70	9.0	41.70	44.0
		Middle	29.86	29.63	32.76	9.0	41.76	
		High	29.73	29.68	32.72	9.0	41.72	

Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 Output Power (dBm/10MHz)	Chain 3 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
10	E-TM1.1	Low	29.77	29.72	32.76	9.0	41.76	44.0
		Middle	29.62	29.93	32.79	9.0	41.79	
		High	29.24	29.72	32.50	9.0	41.50	
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 Output Power (dBm/20MHz)	Chain 3 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit (dBm/20MHz)
20	E-TM1.1	Low	29.55	29.69	32.63	9.0	41.63	44.0
		Middle	29.89	29.81	32.86	9.0	41.86	
		High	29.43	29.83	32.64	9.0	41.64	

PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
10	E-TM1.1	Low	15.553	15.882	18.731	9.0	27.731	30.0
		Middle	15.588	15.986	18.802	9.0	27.802	
		High	15.783	15.649	18.727	9.0	27.727	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
20	E-TM1.1	Low	15.827	16.061	18.956	9.0	27.956	30.0
		Middle	16.232	16.210	19.231	9.0	28.231	
		High	15.955	15.765	18.871	9.0	27.871	

PSD								
Bandwidth (MHz)	**Modulation**	**Test Channel**	**Chain 2 PSD (dBm/MHz)**	**Chain 3 PSD (dBm/MHz)**	**Total PSD (dBm/MHz)**	**Antenna Gain (dBi)**	**EIRP density (dBm/MHz)**	**EIRP density Limit (dBm/MHz)**
10	E-TM1.1	Low	16.167	15.947	19.069	9.0	28.069	30.0
		Middle	16.342	16.177	19.271	9.0	28.271	
		High	15.955	16.082	19.029	9.0	28.029	
Bandwidth (MHz)	**Modulation**	**Test Channel**	**Chain 2 PSD (dBm/MHz)**	**Chain 3 PSD (dBm/MHz)**	**Total PSD (dBm/MHz)**	**Antenna Gain (dBi)**	**EIRP density (dBm/MHz)**	**EIRP density Limit (dBm/MHz)**
20	E-TM1.1	Low	15.736	15.942	18.851	9.0	27.851	30.0
		Middle	16.286	16.276	19.291	9.0	28.291	
		High	15.642	16.081	18.877	9.0	27.877	

Test Plots
Output Power at antenna terminal
Chain 0

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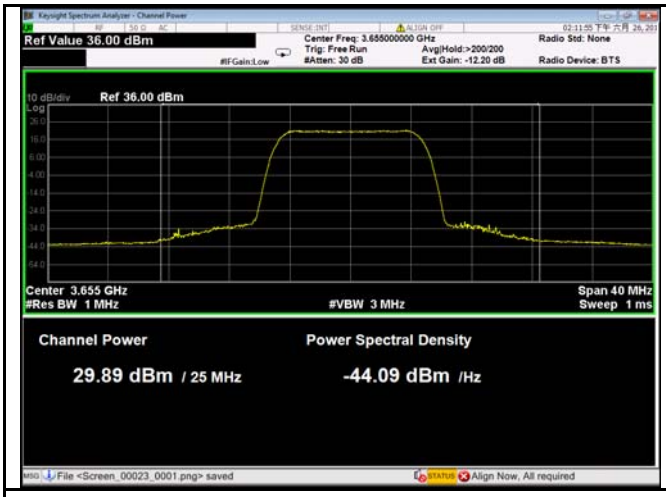
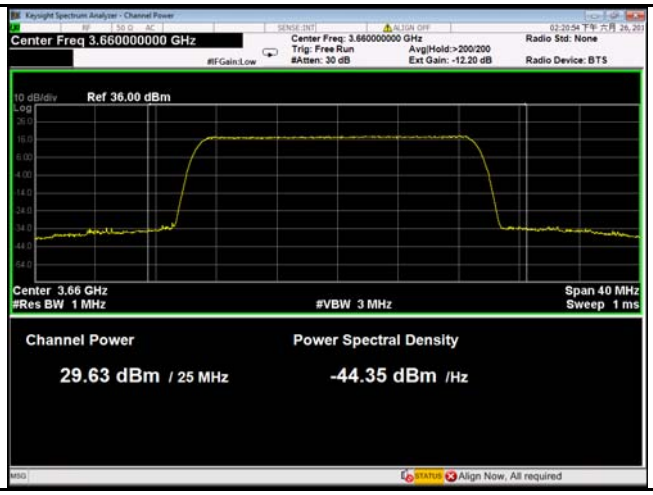
<tr><td> 
</td><td> 
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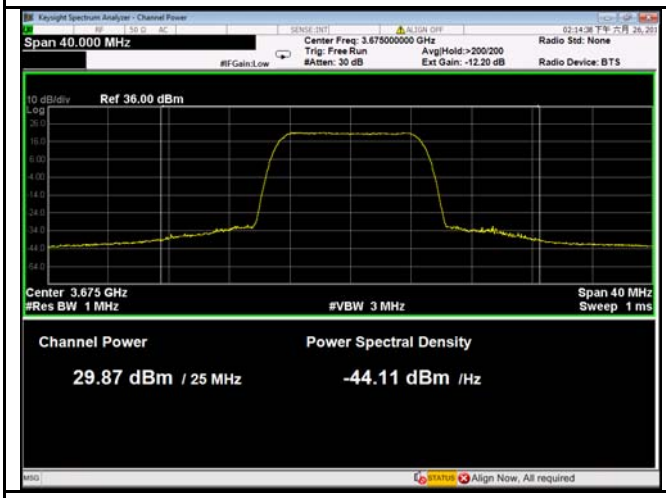
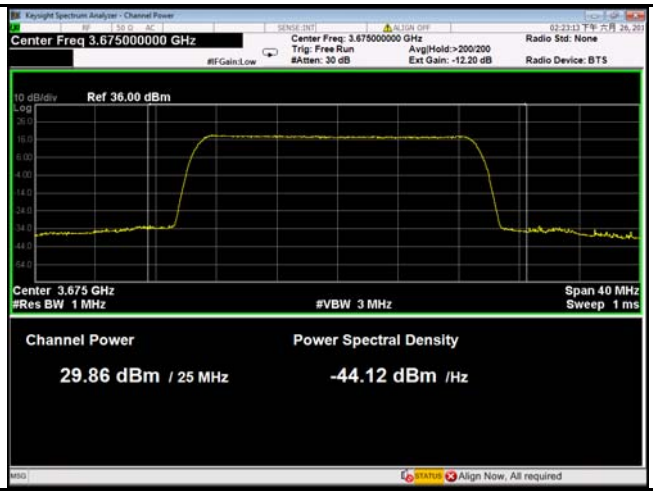
<tr><td> 
</td><td> 
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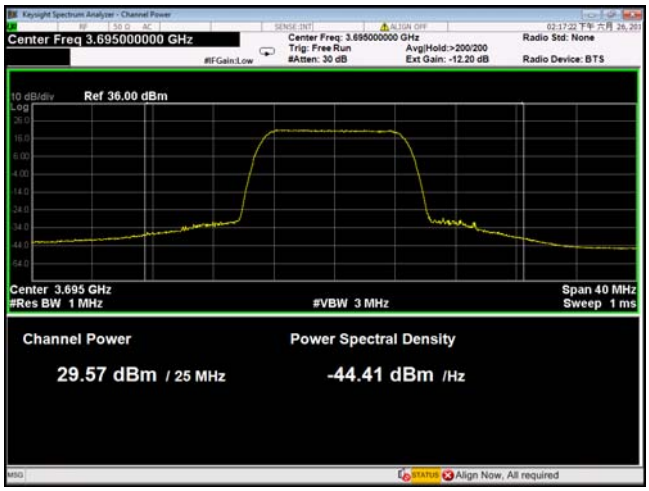
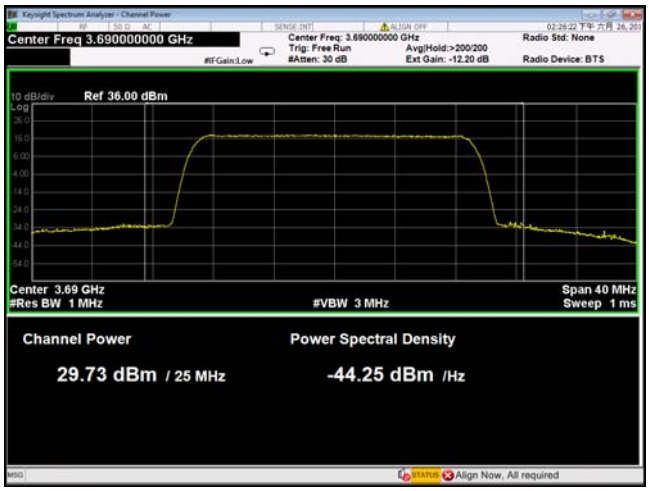
<tr><td> 
</td><td> 
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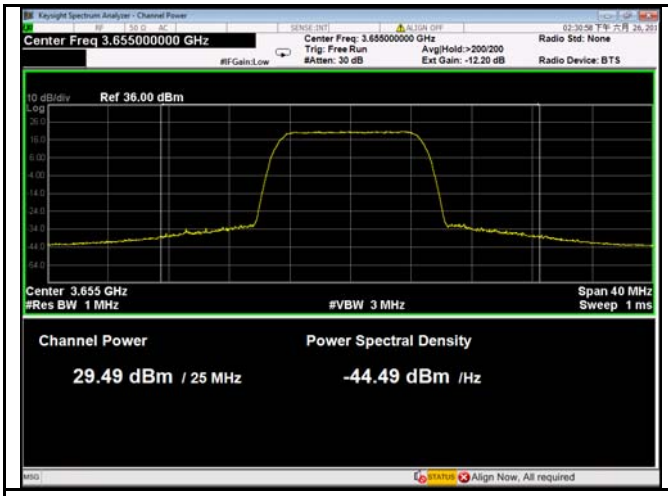

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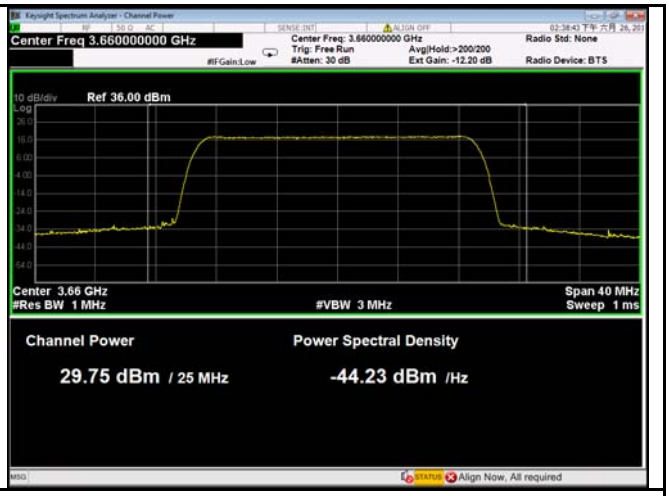

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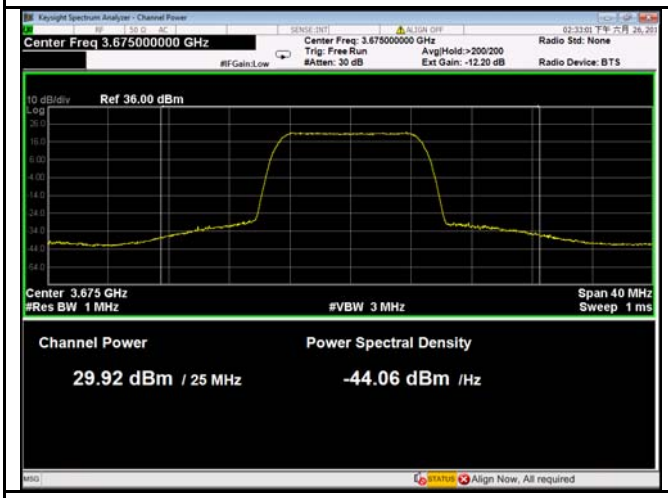

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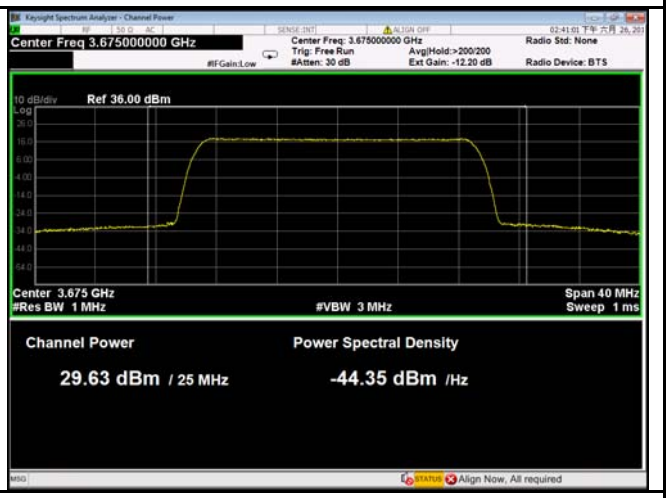

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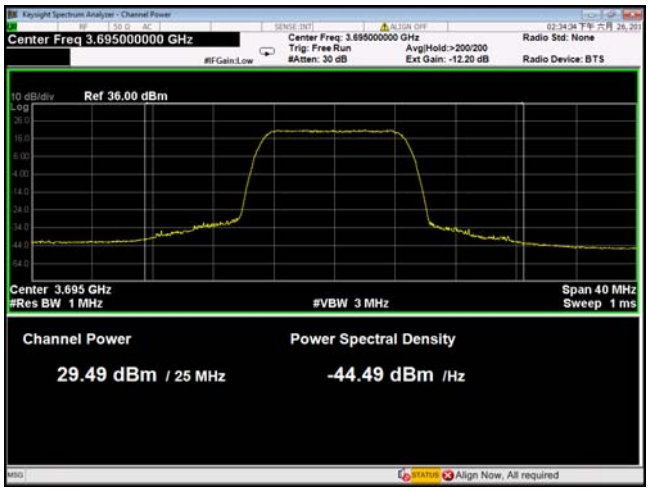

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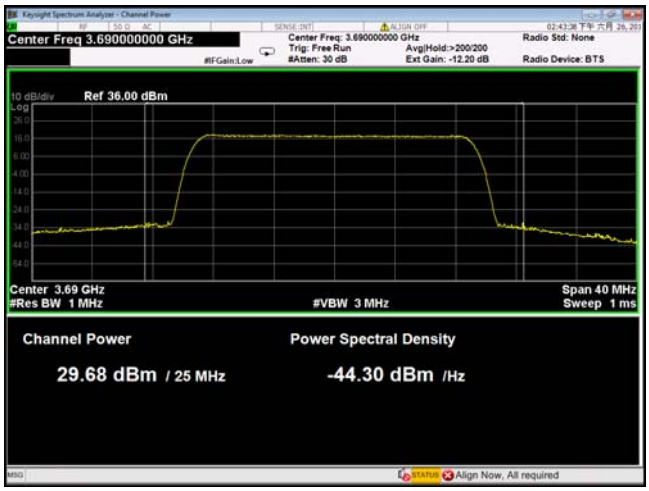
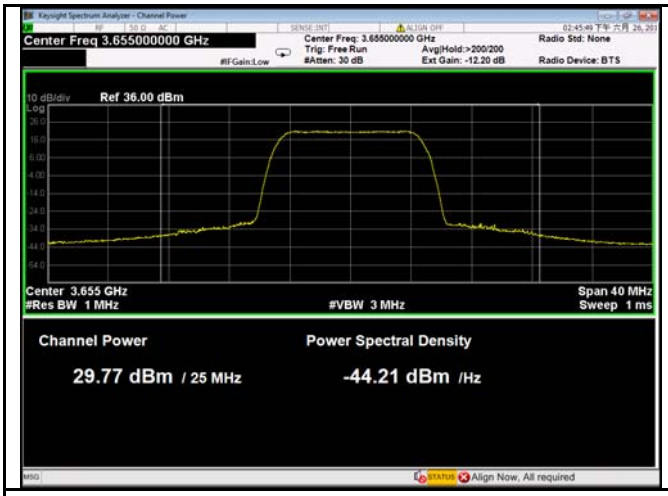


20MHz - High CH E-TM1.1

Chain 2



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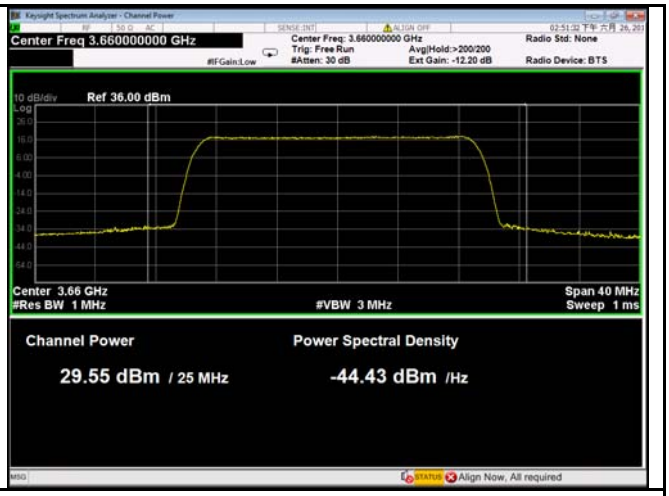

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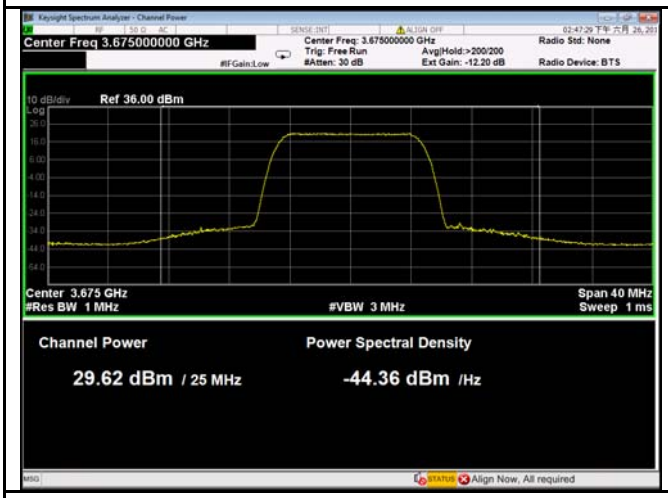
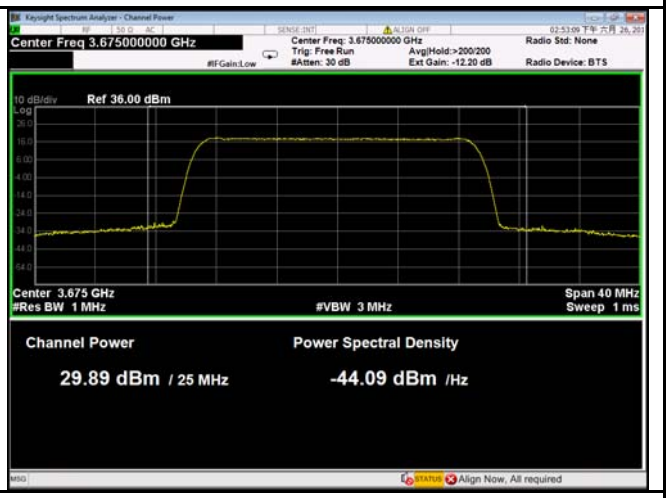
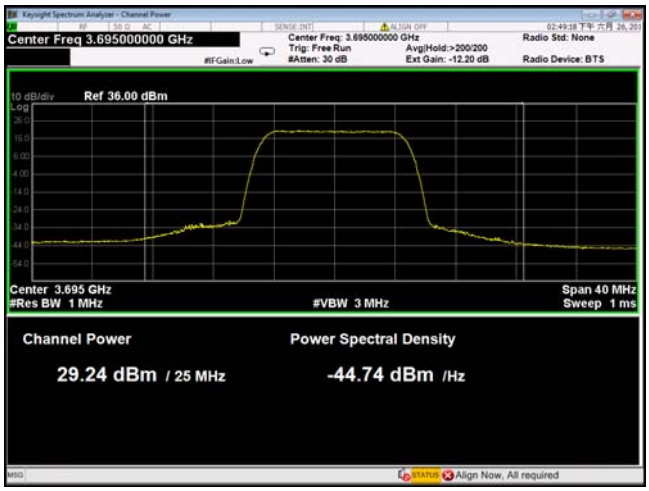


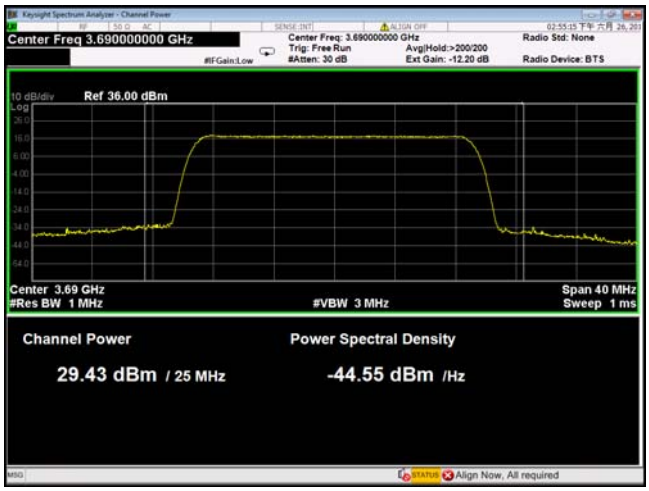
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1

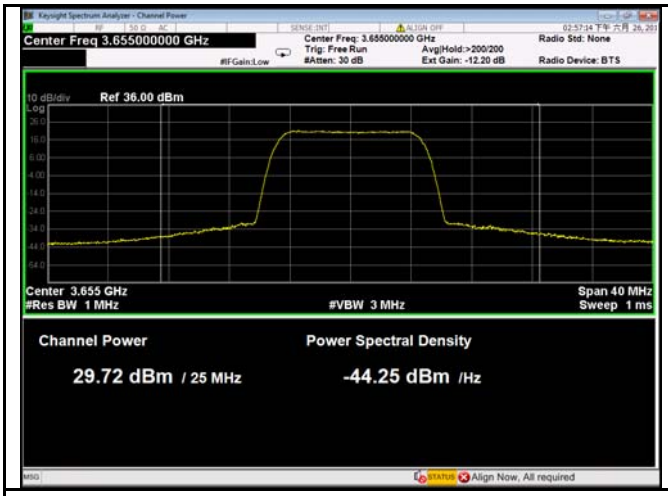


10MHz - High CH E-TM1.1

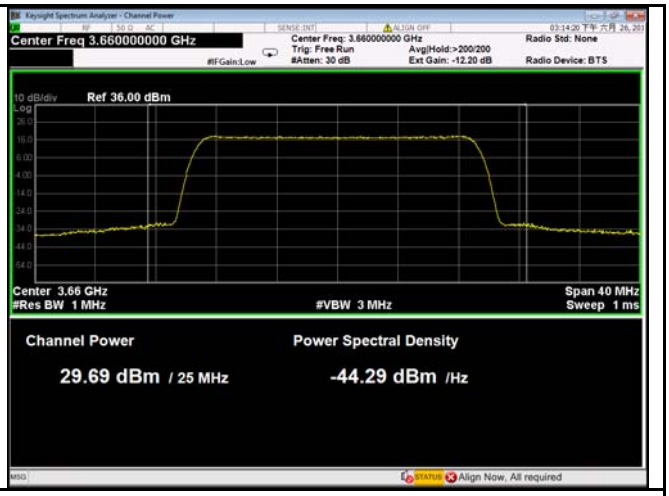


20MHz - High CH E-TM1.1

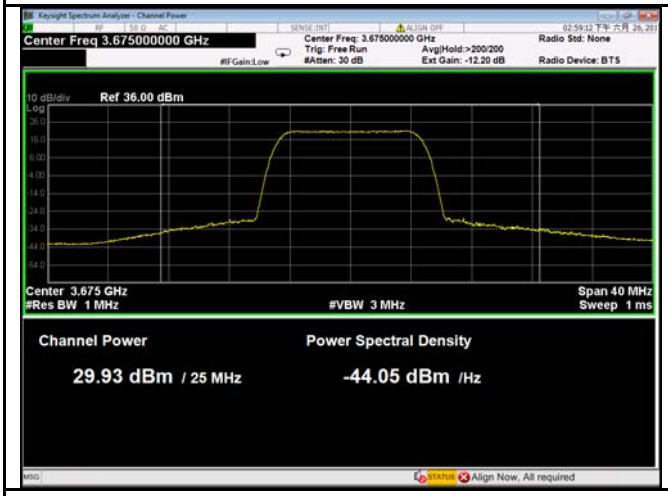
Chain 3



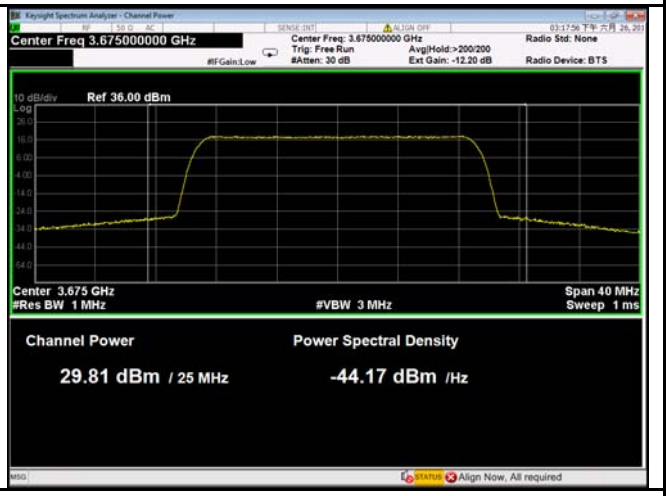
10MHz - Low CH E-TM1.1



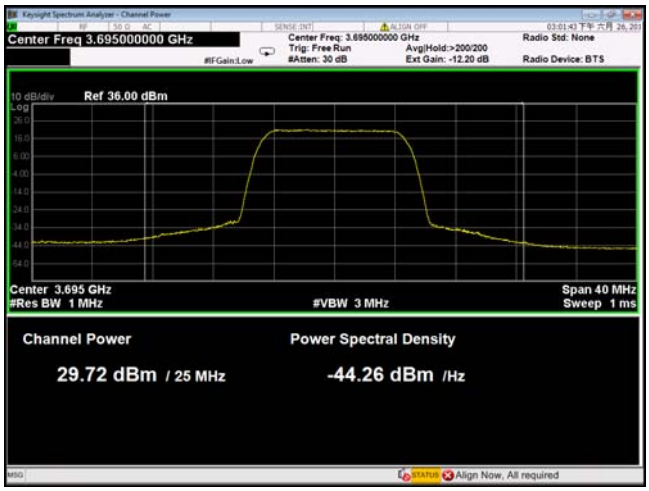
20MHz - Low CH E-TM1.1



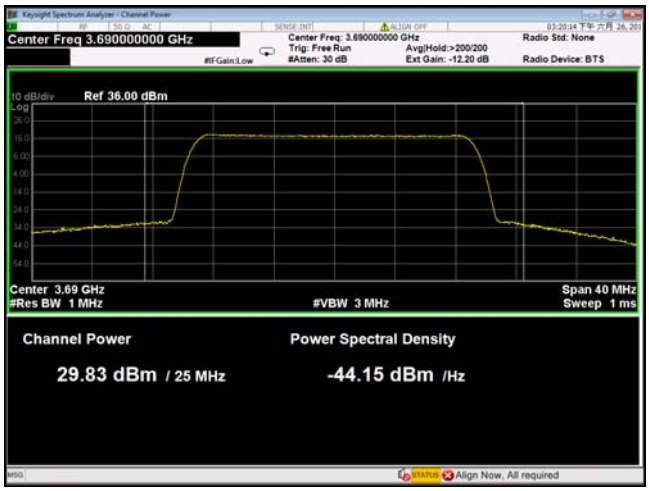
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1

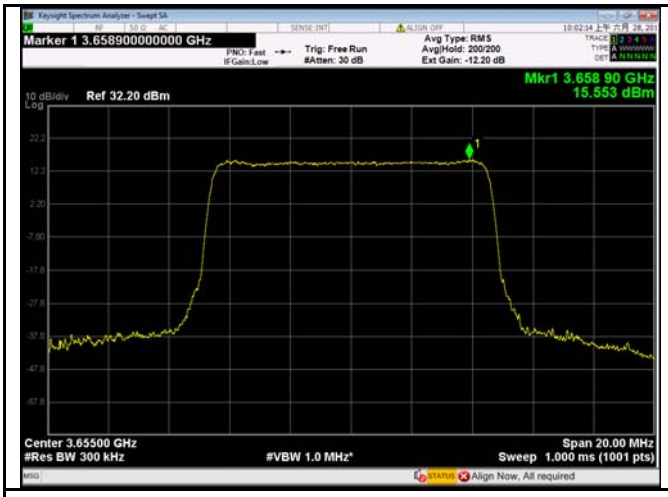


10MHz - High CH E-TM1.1

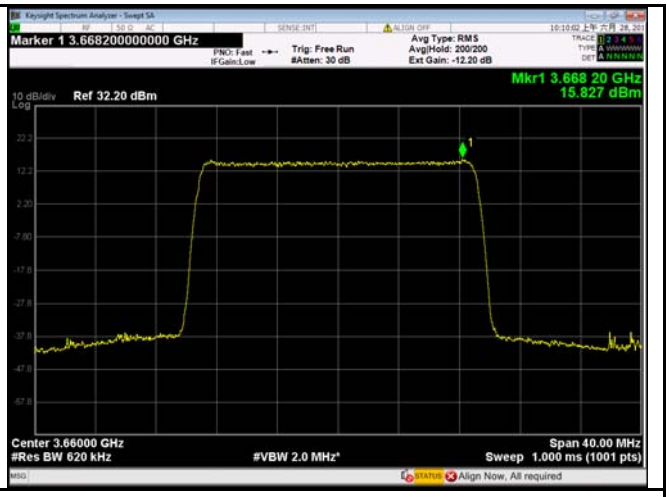


20MHz - High CH E-TM1.1

Master-PSD
Chain 0



10MHz - Low CH E-TM1.1



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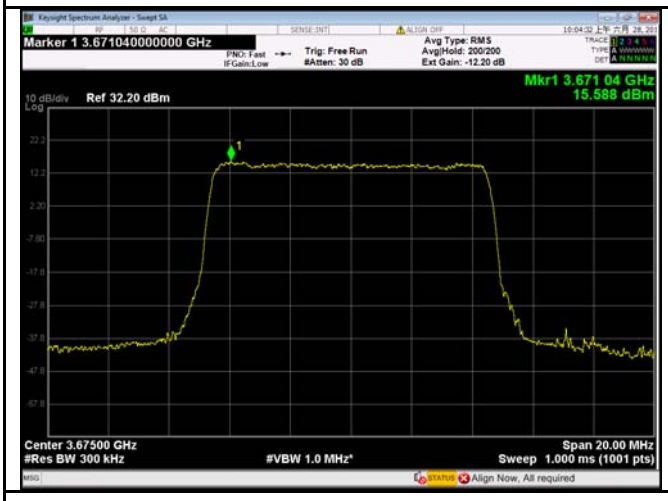
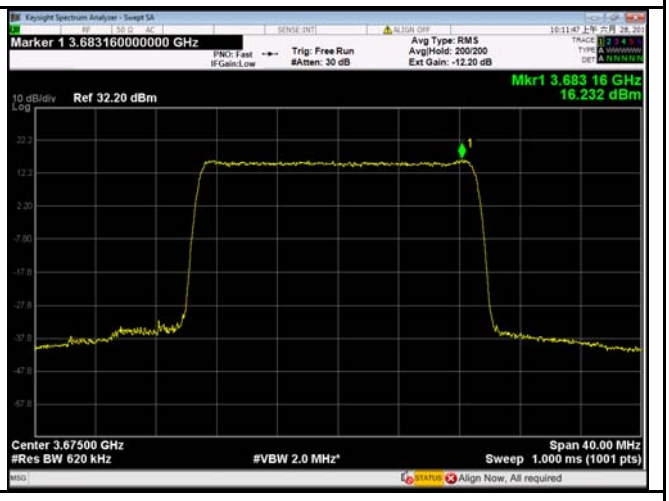
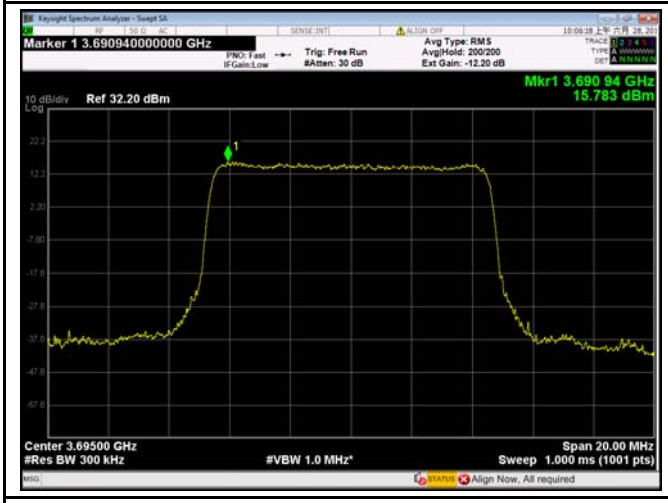


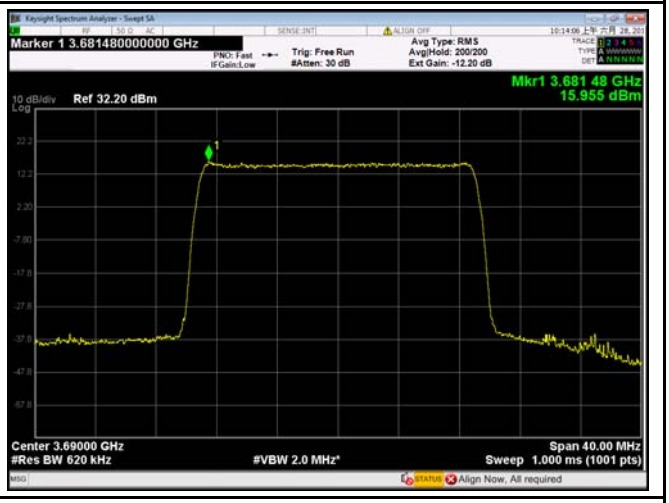
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1

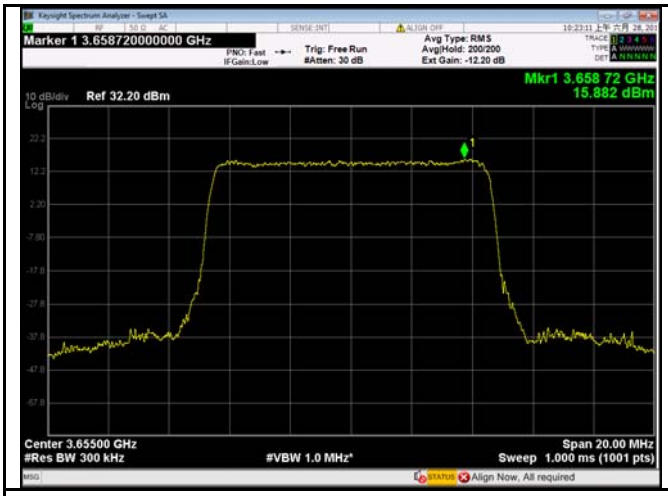


10MHz - High CH E-TM1.1

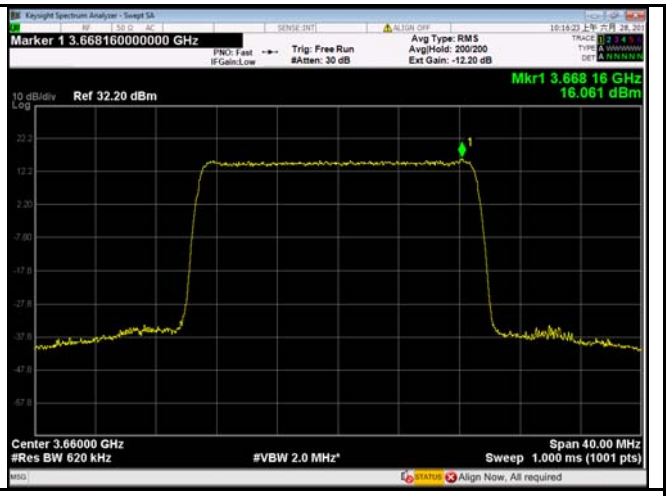


20MHz - High CH E-TM1.1

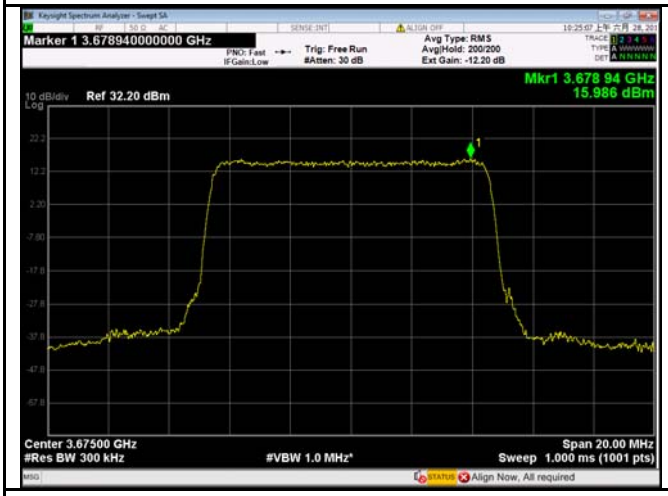
Chain 1



10MHz - Low CH E-TM1.1



20MHz - Low CH E-TM1.1



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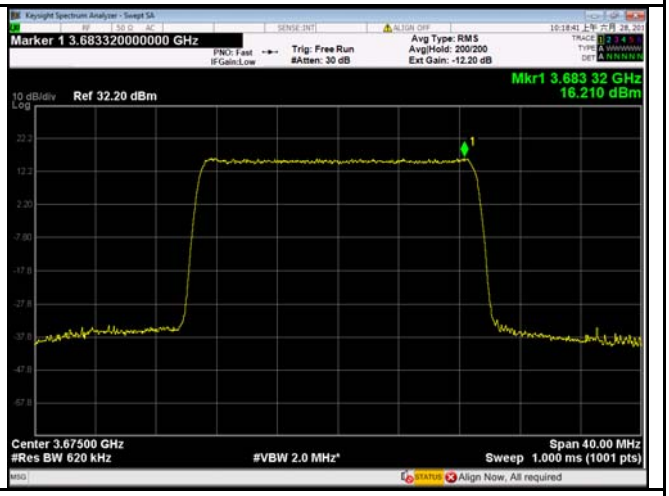
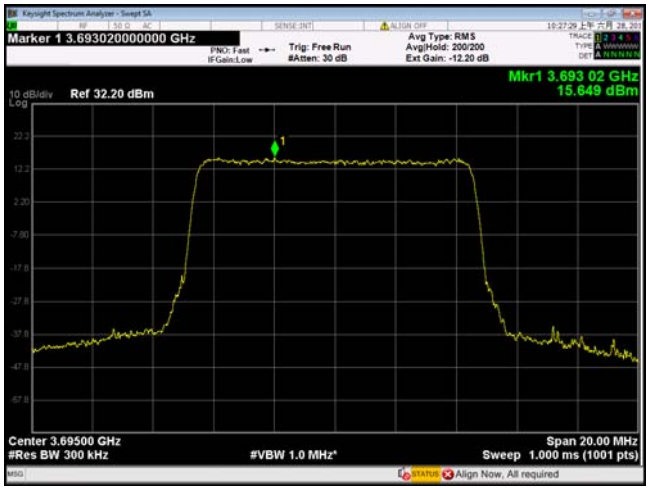
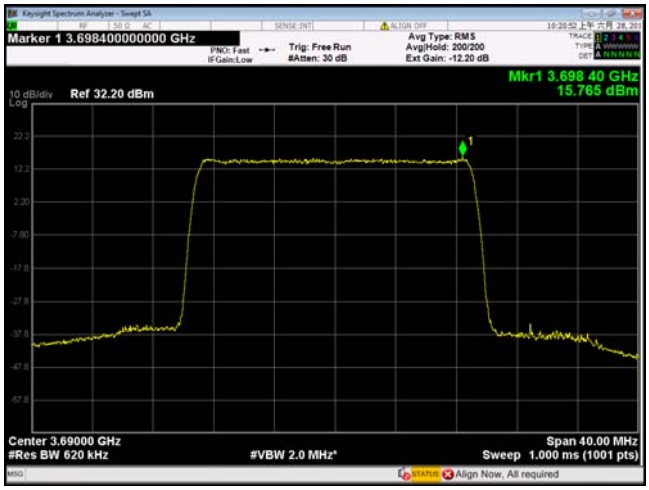


20MHz - Middle CH E-TM1.1

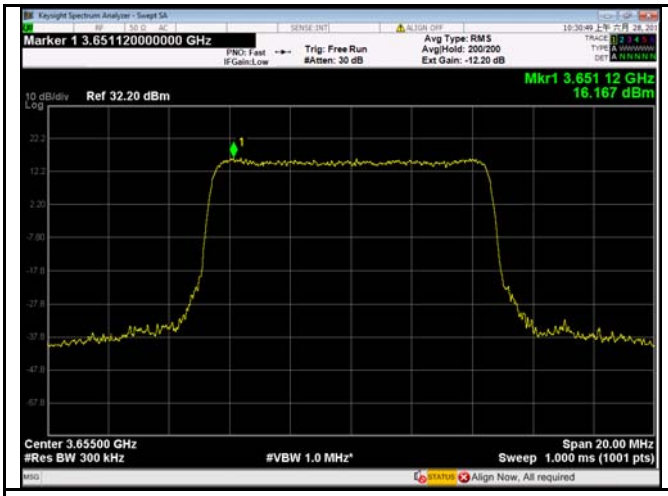


10MHz - High CH E-TM1.1

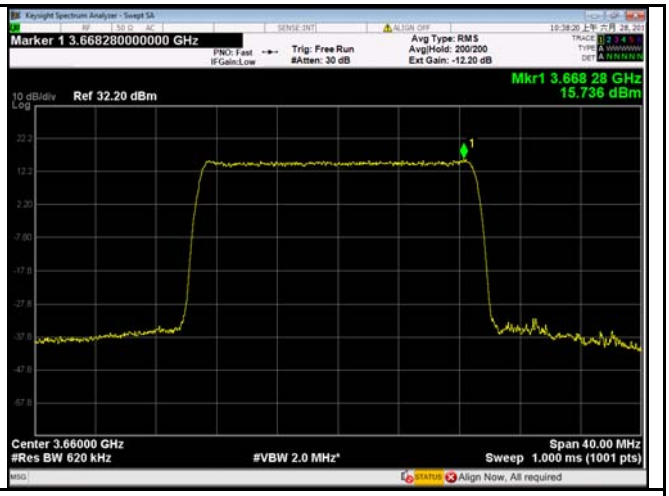


20MHz - High CH E-TM1.1

Chain 2



10MHz - Low CH E-TM1.1



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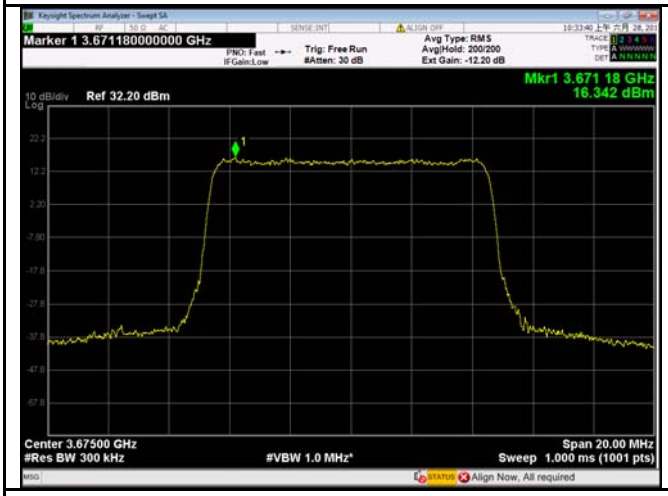
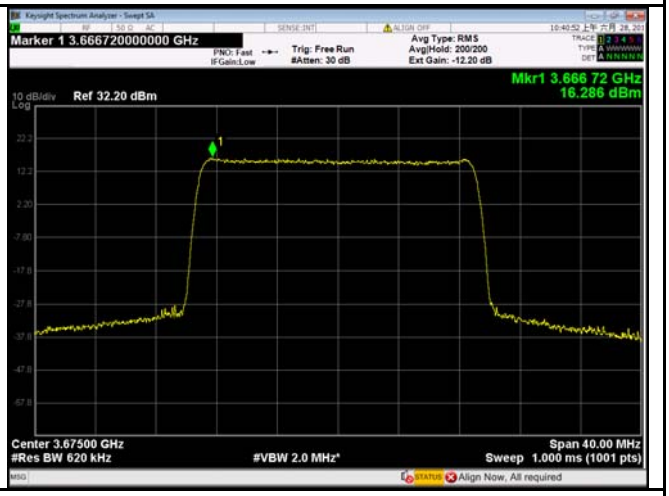


10MHz - Middle CH E-TM1.1



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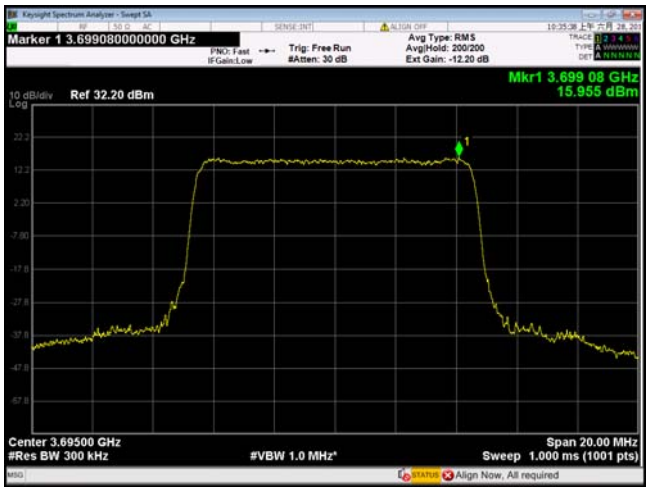

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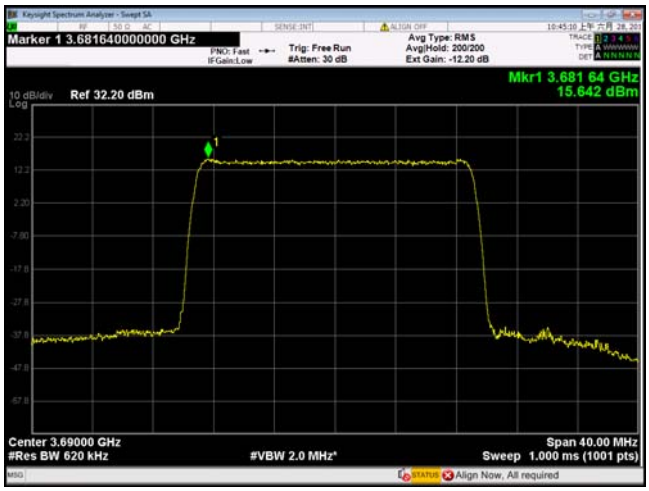
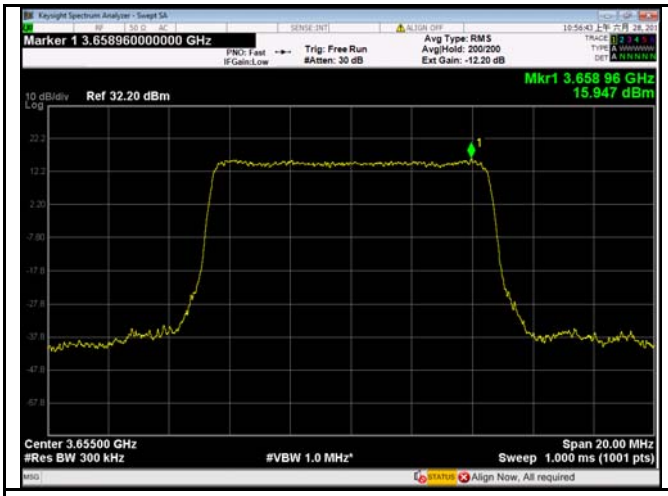


20MHz - High CH E-TM1.1

Chain 3



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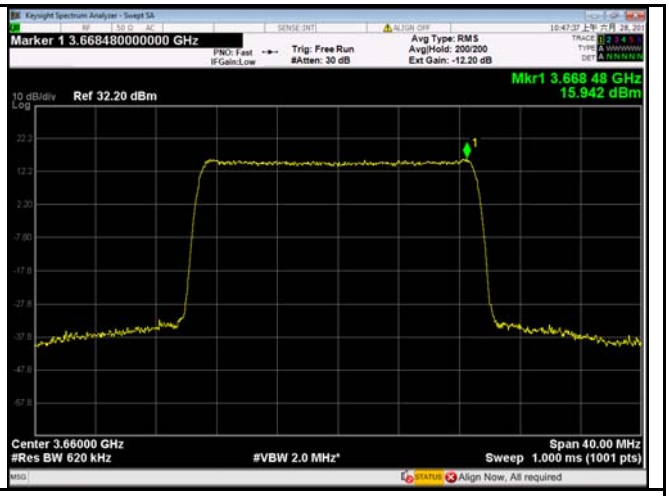

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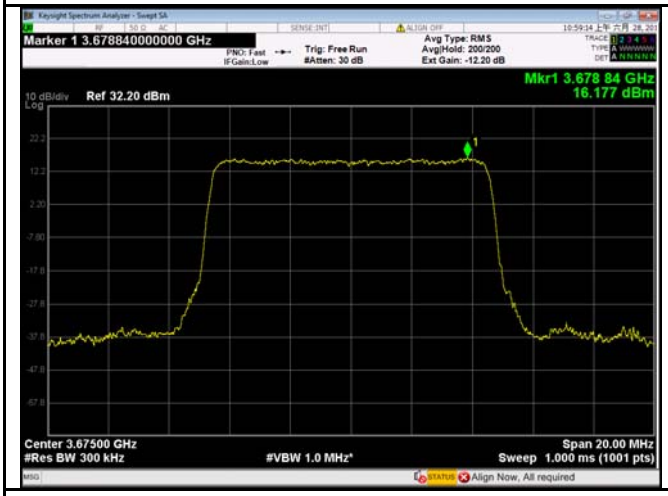
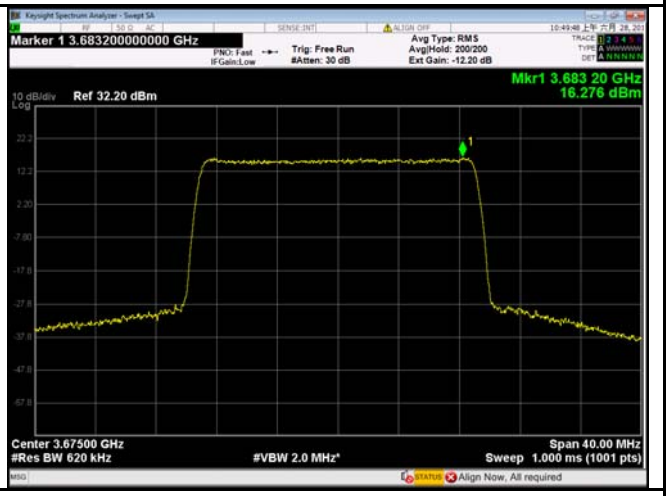
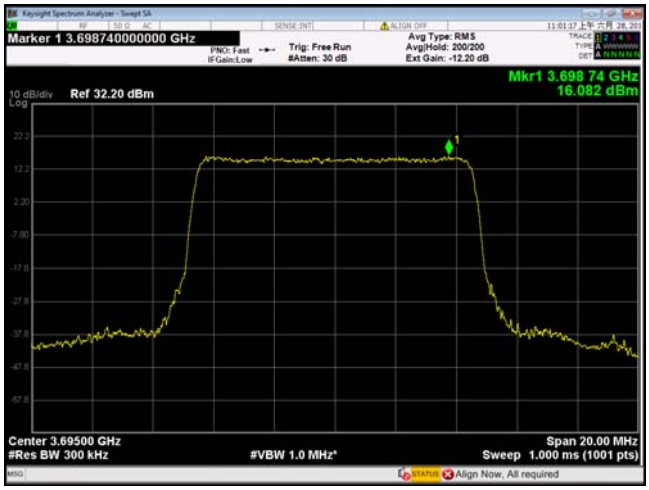


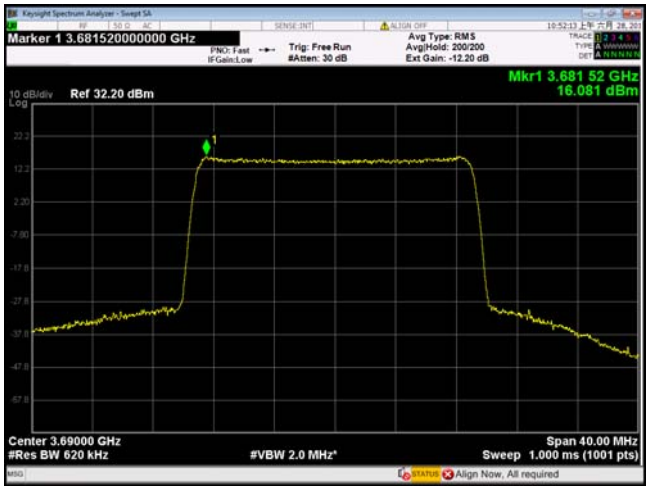
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1



10MHz - High CH E-TM1.1



20MHz - High CH E-TM1.1

9 Occupy Bandwidth

Test Requirement:	FCC part 90.209
Test Method:	FCC part 2.1049
	ANSI C63.26-2015
Test Mode:	Data communicating mode

9.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

9.2 Test Procedure

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer.

2. The transmitter shall be operated at its maximum carrier powermeasured under normal test conditions.

3. The span of the analyzer shall be set to capture all products of themodulation process, including the emission skirts.

4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% ofthe occupied bandwidth (OBW) and video bandwidth (VBW) shall beapproximately 3x RBW.

9.3 Test Result

Chain 0

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	E-TM1.1	Low	9.296	8.924
		Middle	9.309	8.914
		High	9.305	8.919
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	E-TM1.1	Low	18.49	17.804
		Middle	18.51	17.825
		High	18.51	17.805

Chain 1

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	E-TM1.1	Low	9.317	8.916
		Middle	9.276	8.913
		High	9.291	8.915
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	E-TM1.1	Low	18.52	17.801
		Middle	18.50	17.806
		High	18.51	17.794

Chain 2

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	E-TM1.1	Low	9.323	8.911
		Middle	9.292	8.925
		High	9.291	8.904
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	E-TM1.1	Low	18.52	17.803
		Middle	18.50	17.800
		High	18.50	17.809

Chain 3

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	E-TM1.1	Low	9.306	8.907
		Middle	9.314	8.919
		High	9.307	8.916
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	E-TM1.1	Low	18.51	17.801
		Middle	18.51	17.794
		High	18.51	17.801

Test Plots
Chain 0

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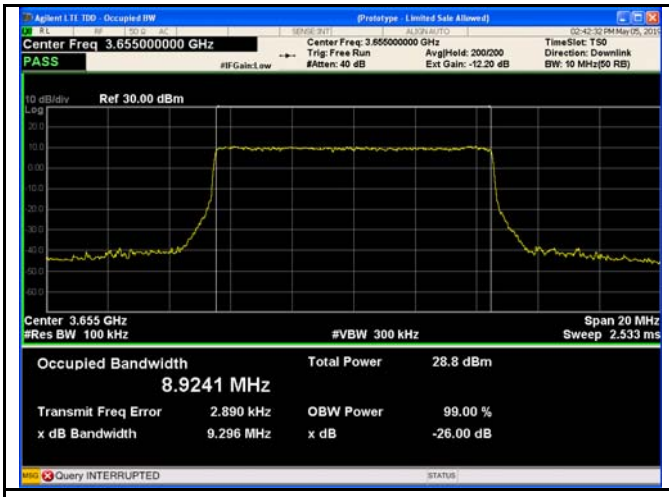
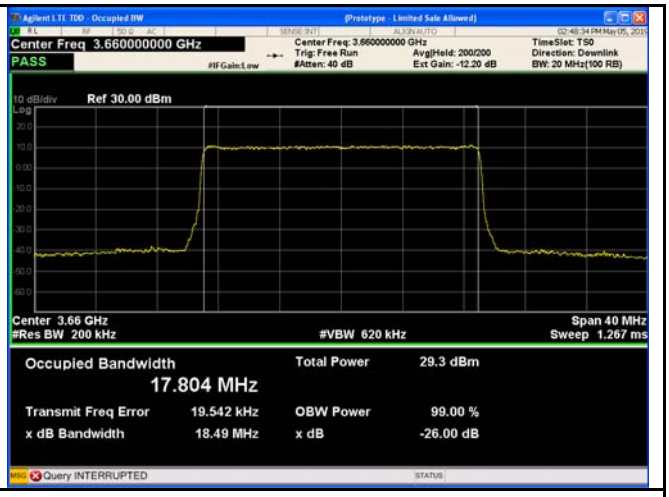
<tr><td> 
</td><td> 
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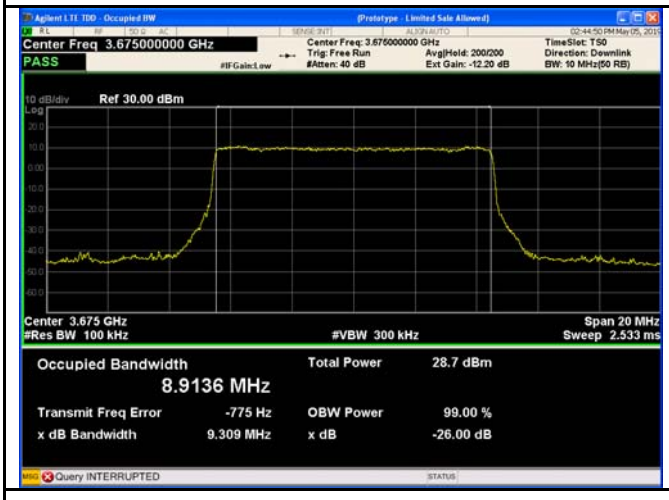
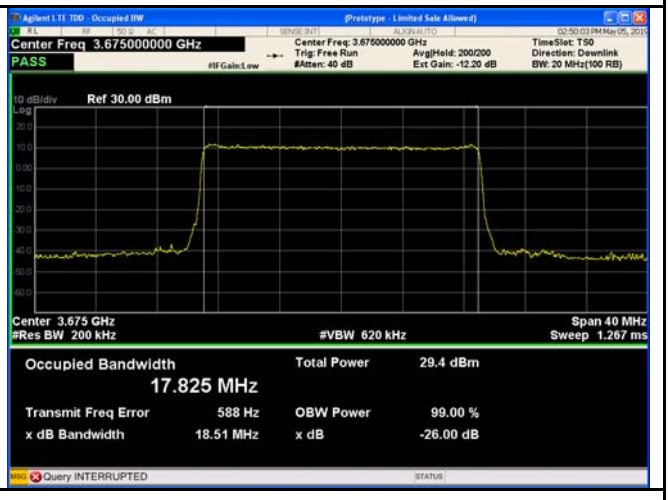
<tr><td> 
</td><td> 
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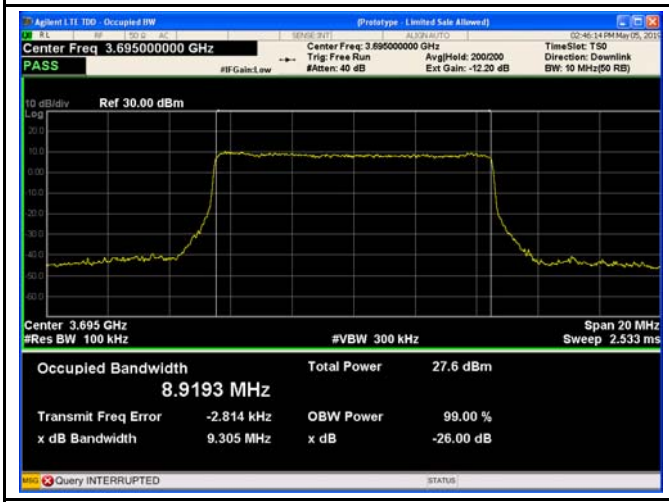
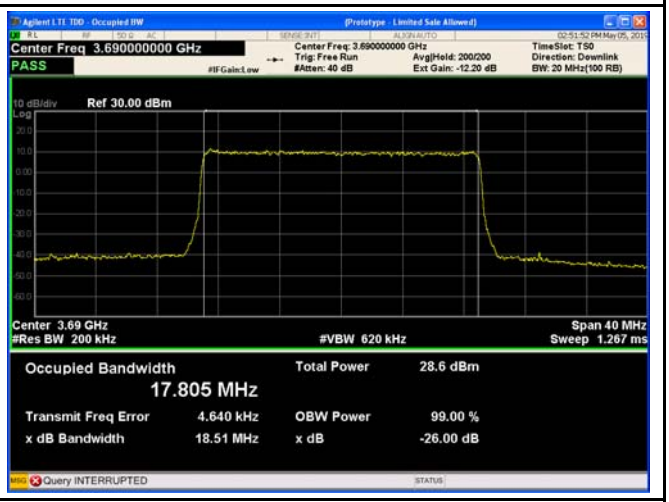
<tr><td> 
</td><td> 
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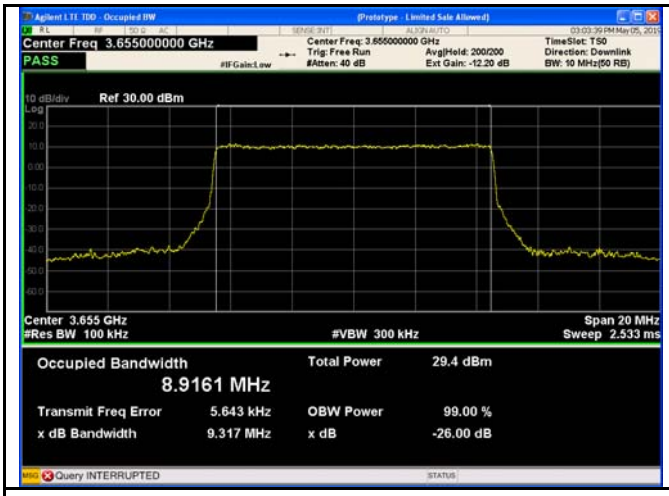
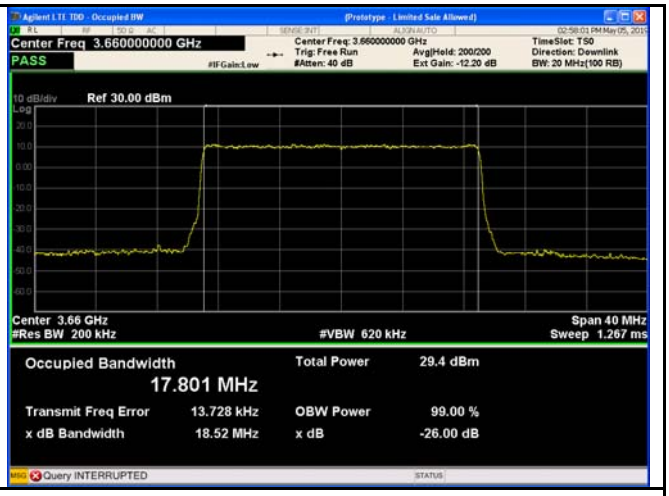
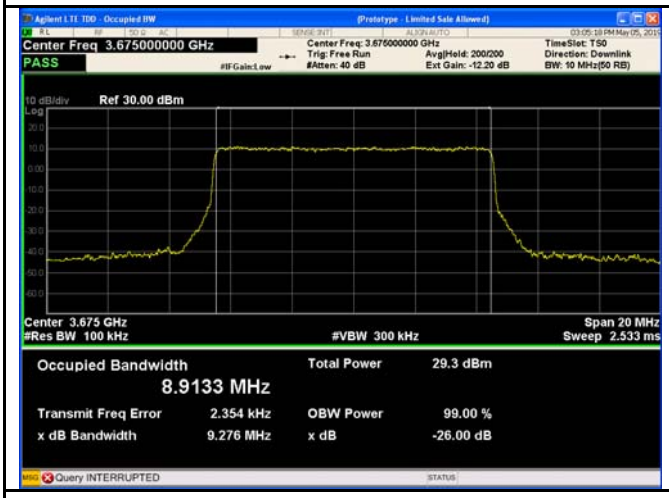
Chain 1



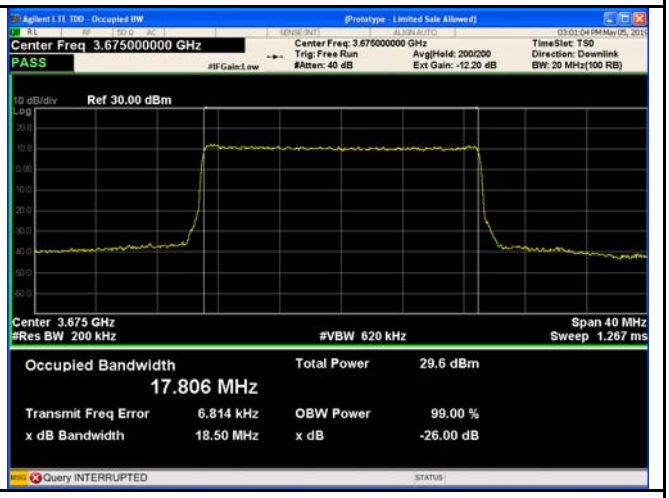
10MHz - Low CH E-TM1.1



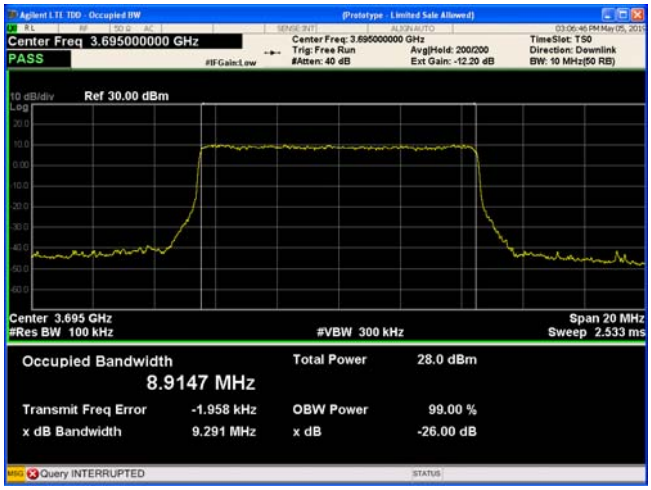
20MHz - Low CH E-TM1.1



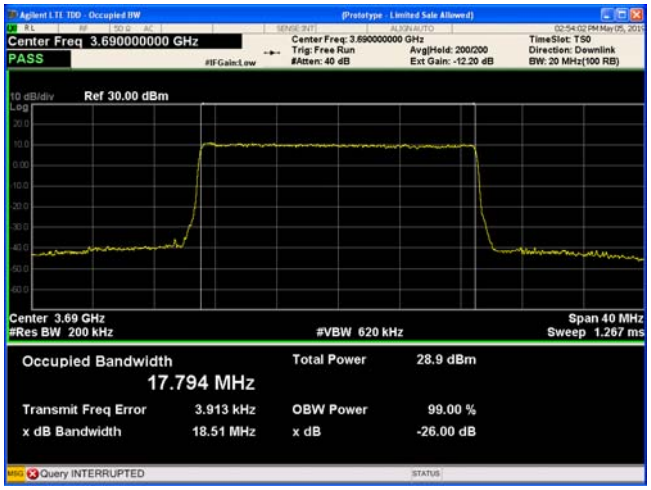
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1



10MHz - High CH E-TM1.1



20MHz - High CH E-TM1.1

Chain 2

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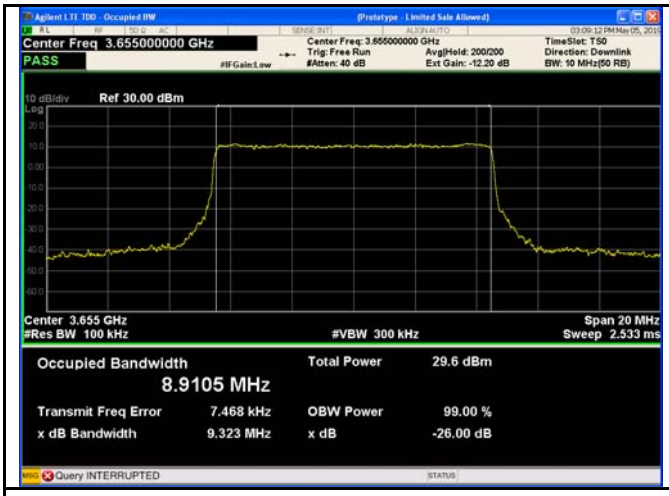
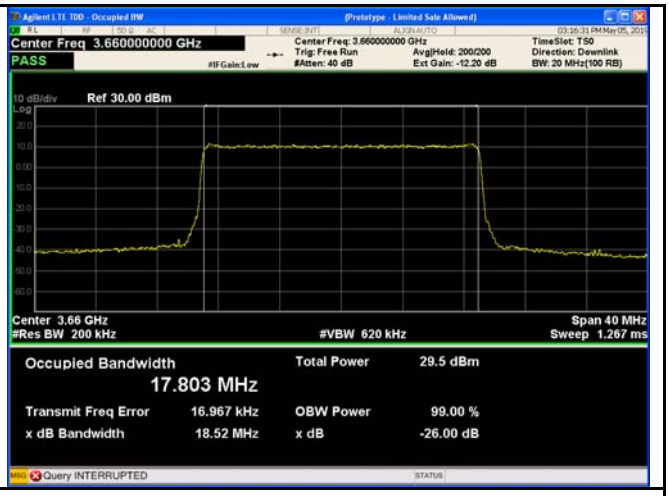
<tr><td> 
</td><td> 
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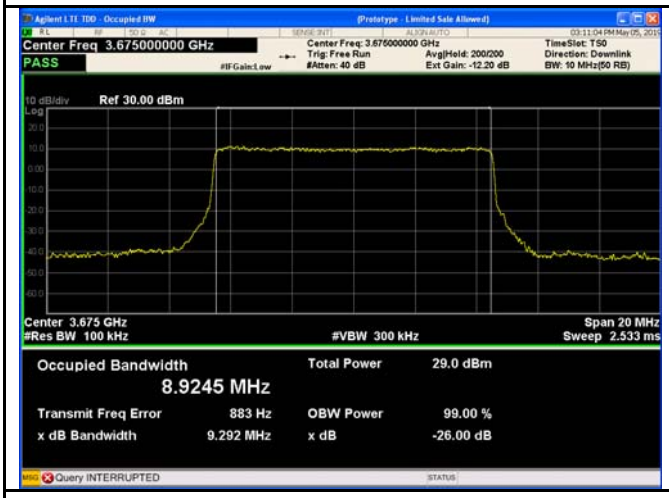
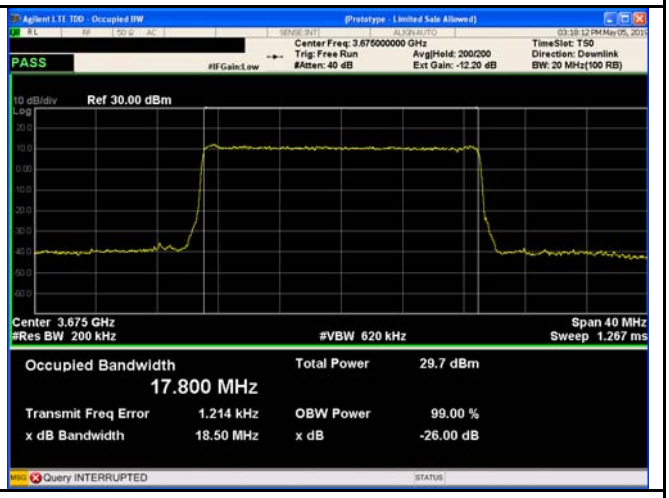
<tr><td>10MHz - Low CH E-TM1.1</td><td>20MHz - Low CH E-TM1.1</td></tr>
<tr><td> 
</td><td> 
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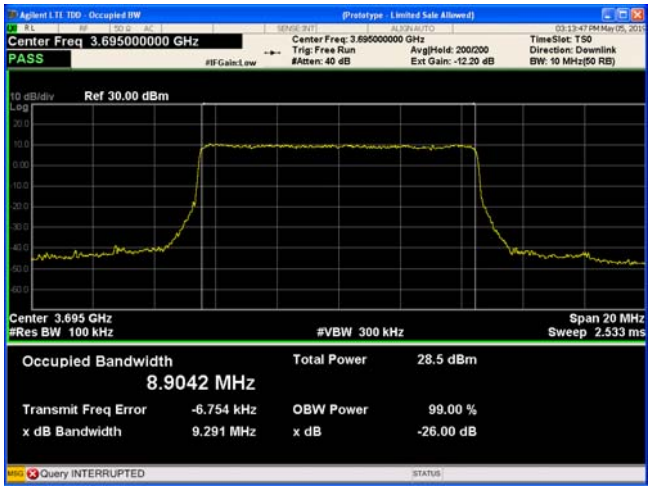
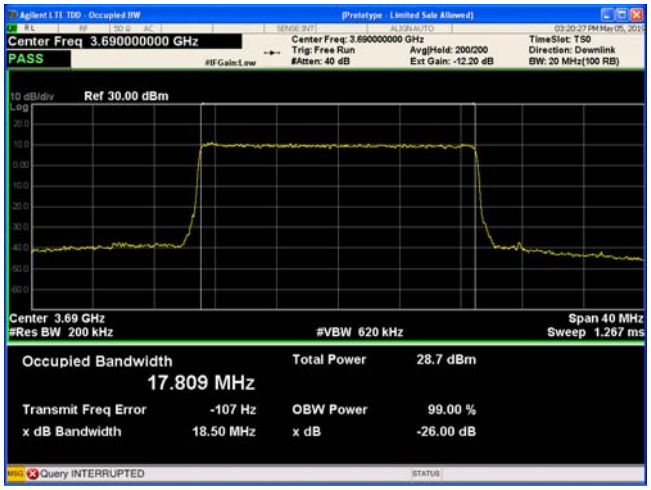
<tr><td>10MHz - Middle CH E-TM1.1</td><td>20MHz - Middle CH E-TM1.1</td></tr>
<tr><td> 
</td><td> 
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<tr><td>10MHz - High CH E-TM1.1</td><td>20MHz - High CH E-TM1.1</td></tr>
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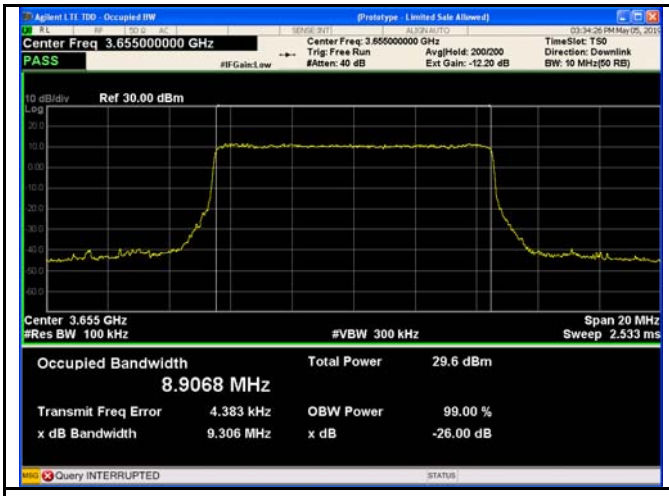
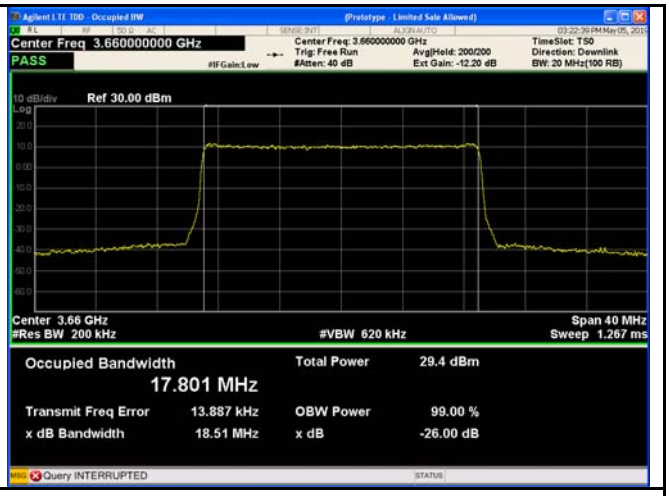
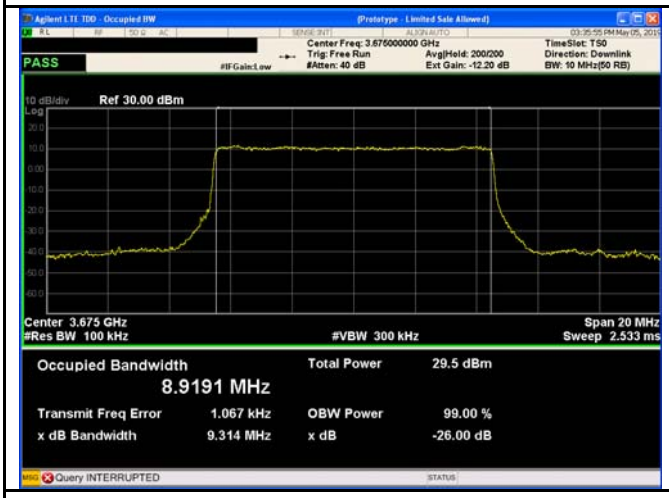
Chain 3



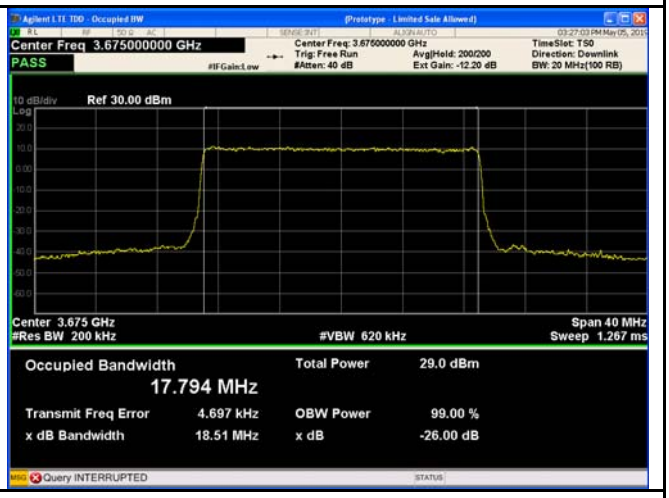
10MHz - Low CH E-TM1.1



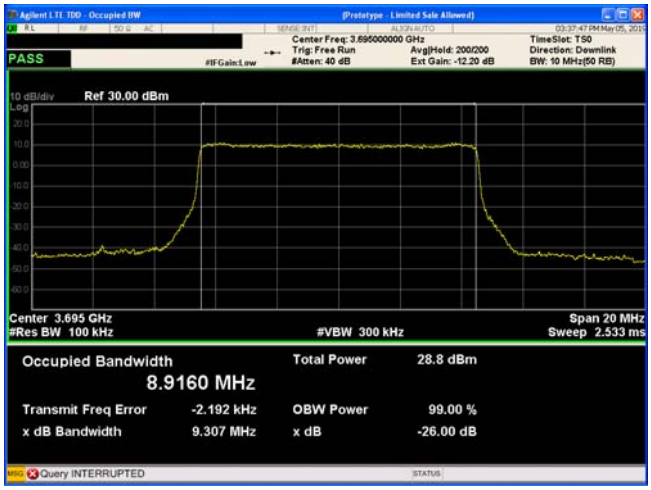
20MHz - Low CH E-TM1.1



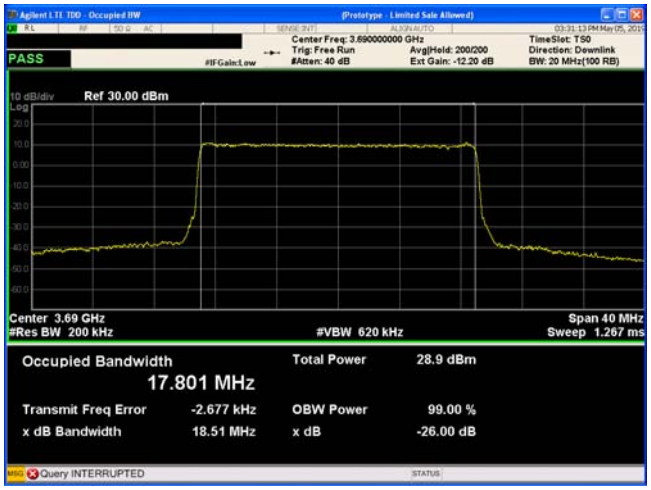
10MHz - Middle CH E-TM1.1



20MHz - Middle CH E-TM1.1



10MHz - High CH E-TM1.1



20MHz - High CH E-TM1.1

10 Emission Mask

Test Requirement:	FCC part 90.210(b)
Test Mode:	Data communicating mode
Limit:	Emission Mask B. For transmitters 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 + 10 log (P) dB

10.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

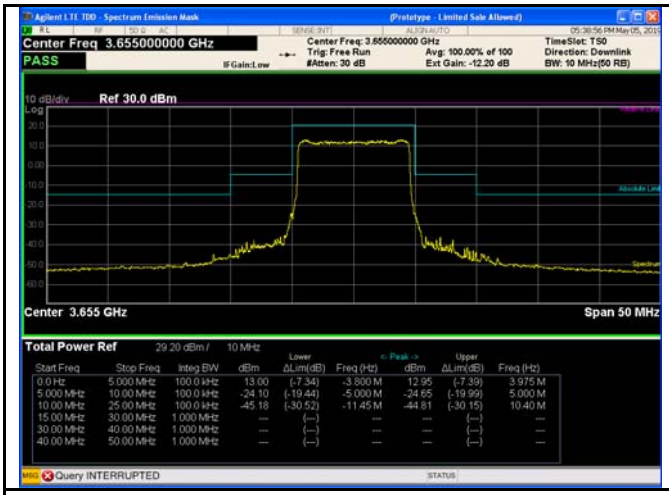
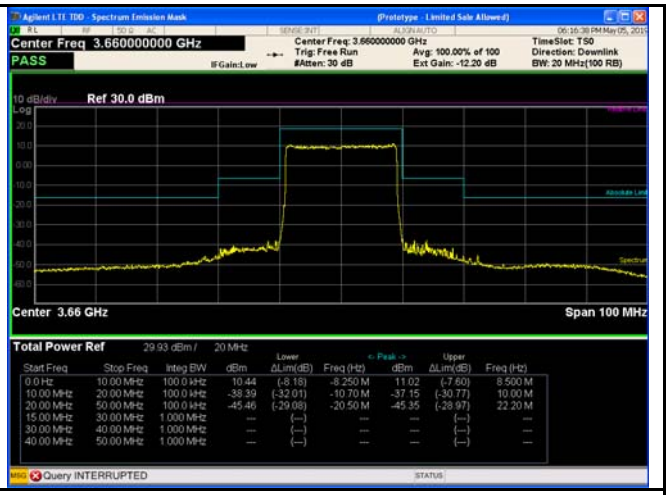
10.2 Test Procedure

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. RBW=100kHz, VBW=1MHz, Detector mode= RMS,
Trace mode: Power averaging over 100 sweeps

Note: For FCC part 90.210(b) 3, more than 250 percent emission was considered in radiated emission test items.

10.3 Test Result

Test Plots
Chain 0

<table>
<tr><td> 
</td><td> 
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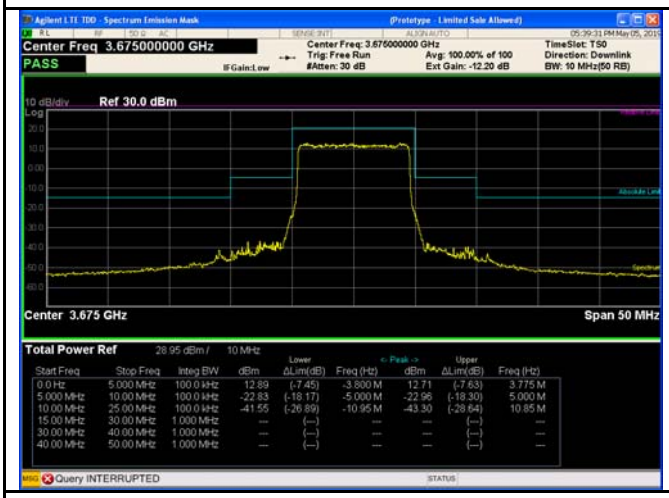
<tr><td>10MHz - Low CH E-TM1.1</td><td>20MHz - Low CH E-TM1.1</td></tr>
<tr><td> 
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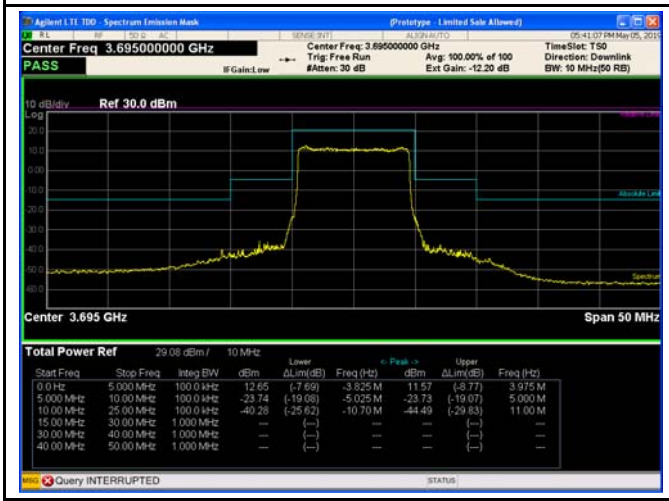
<tr><td>10MHz - Middle CH E-TM1.1</td><td>20MHz - Middle CH E-TM1.1</td></tr>
<tr><td> 
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<tr><td>10MHz - High CH E-TM1.1</td><td>20MHz - High CH E-TM1.1</td></tr>
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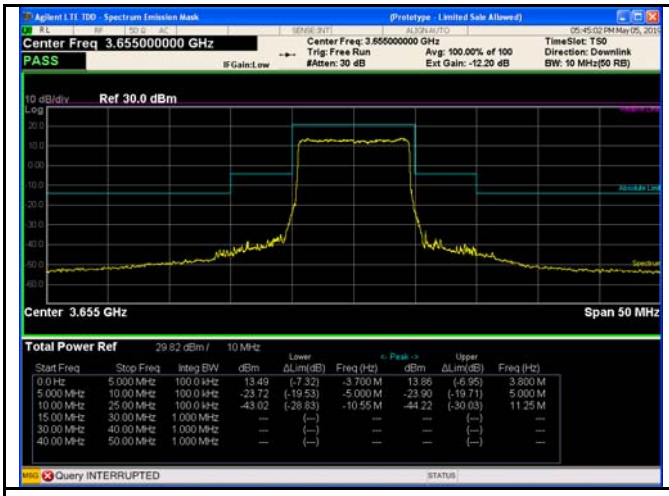
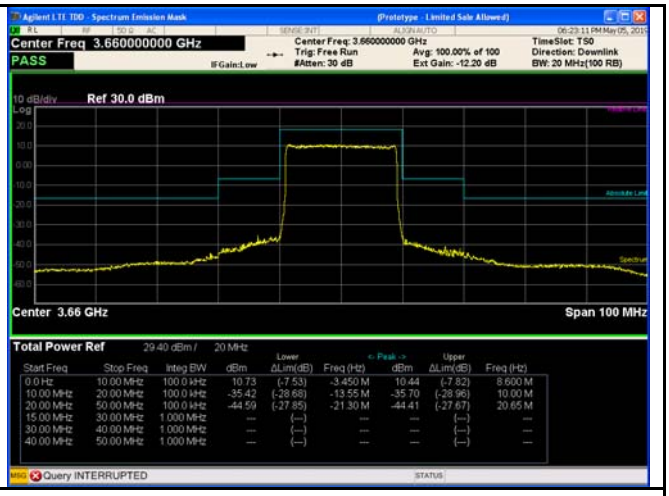
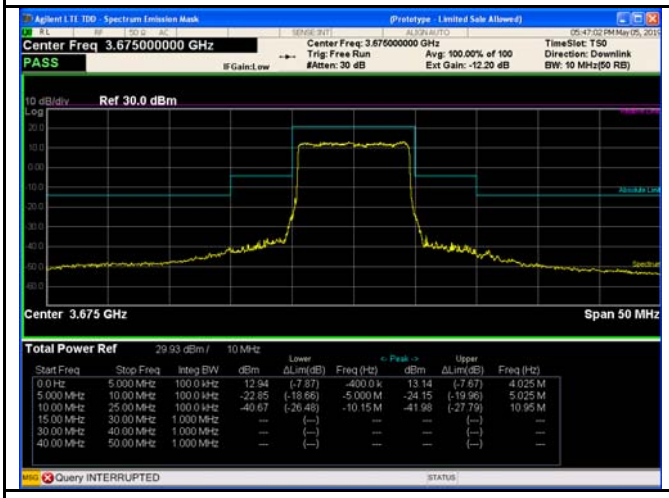
Chain 1



10MHz - Low CH E-TM1.1

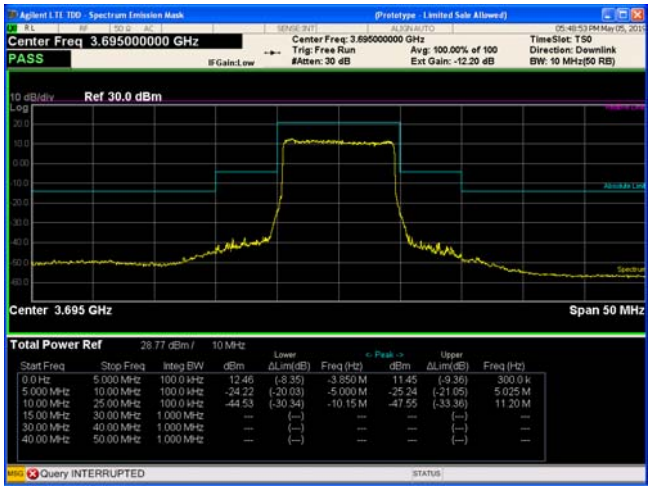


20MHz - Low CH E-TM1.1

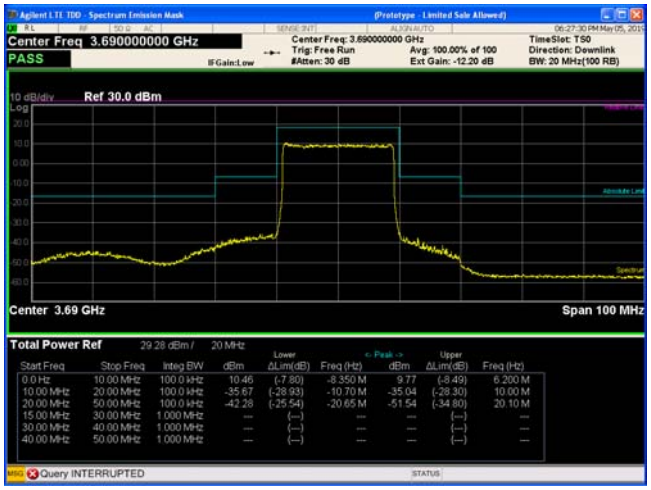


10MHz - Middle CH E-TM1.1

20MHz - Middle CH E-TM1.1

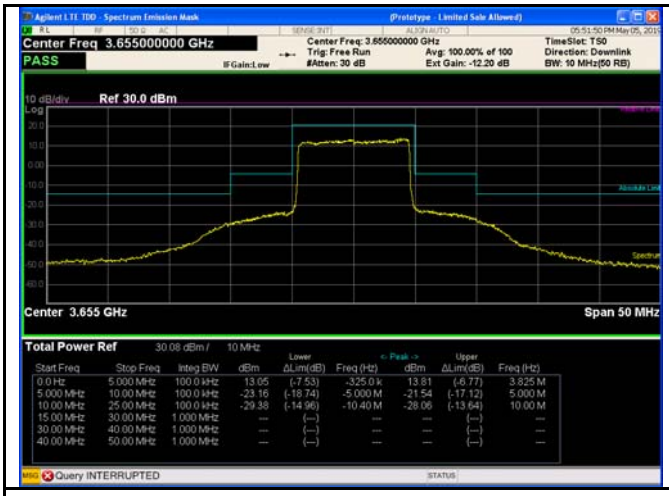


10MHz - High CH E-TM1.1

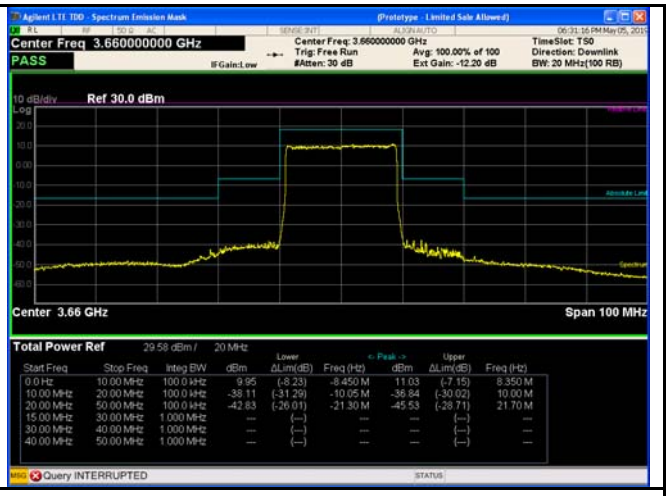


20MHz - High CH E-TM1.1

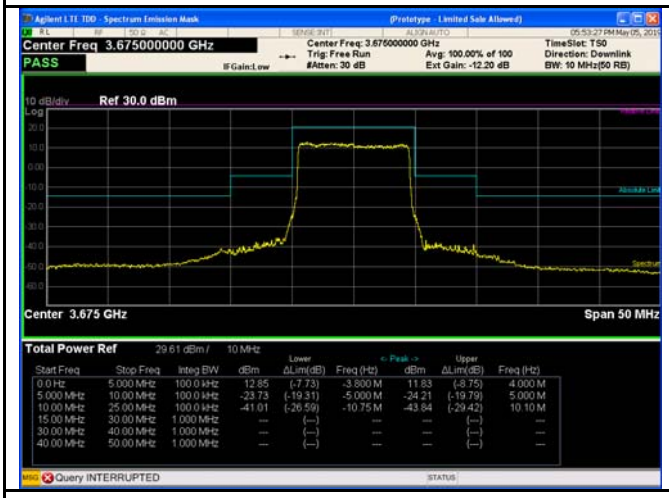
Chain 2



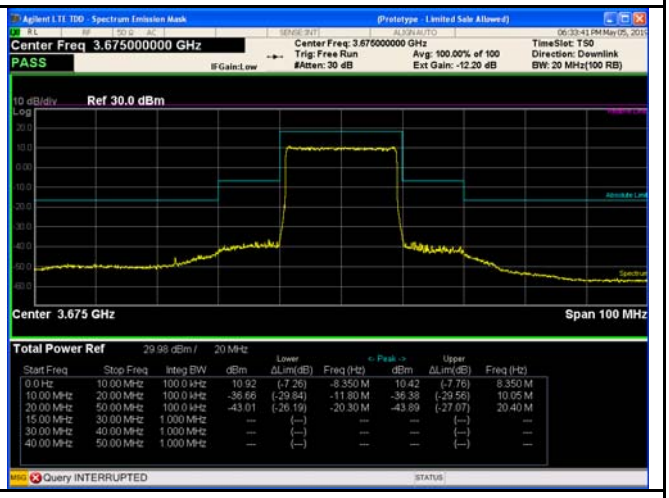
10MHz - Low CH E-TM1.1



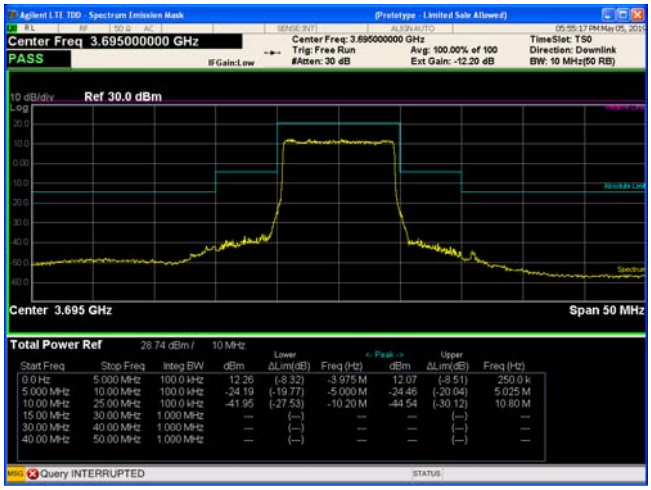
20MHz - Low CH E-TM1.1



10MHz - Middle CH E-TM1.1



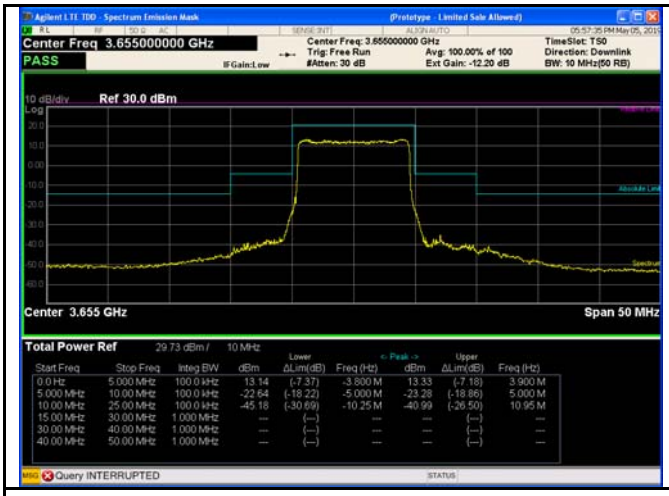
20MHz - Middle CH E-TM1.1



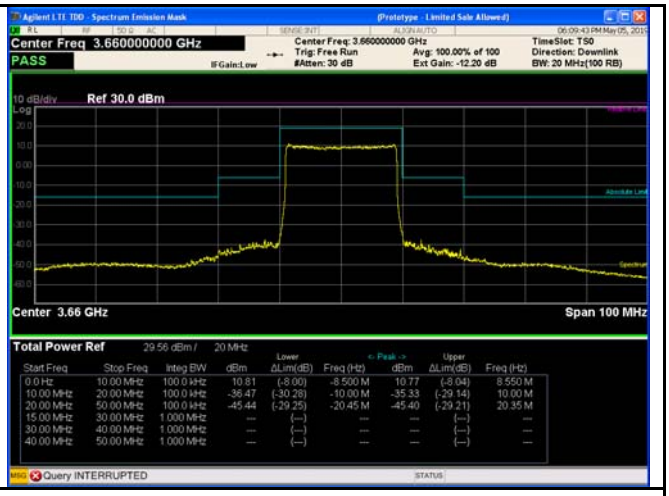
10MHz - High CH E-TM1.1

20MHz - High CH E-TM1.1

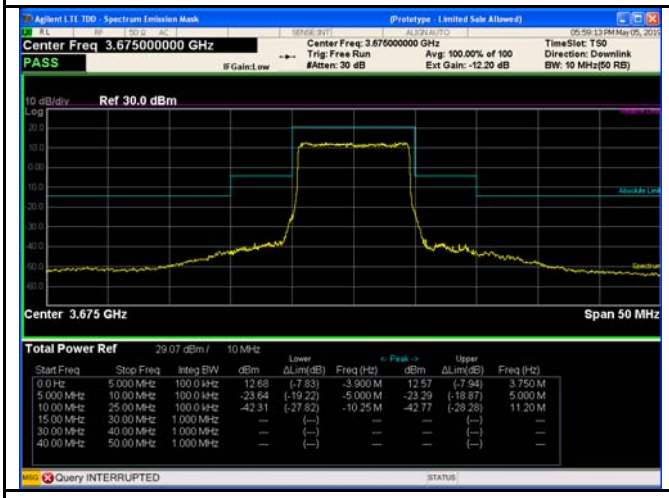
Chain 3



10MHz - Low CH E-TM1.1

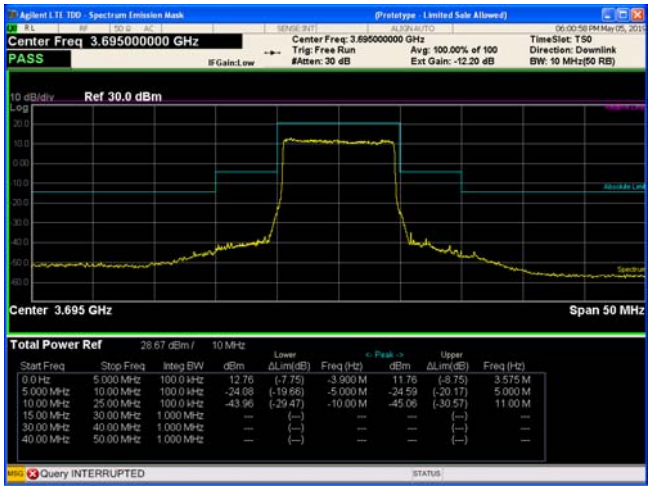


20MHz - Low CH E-TM1.1

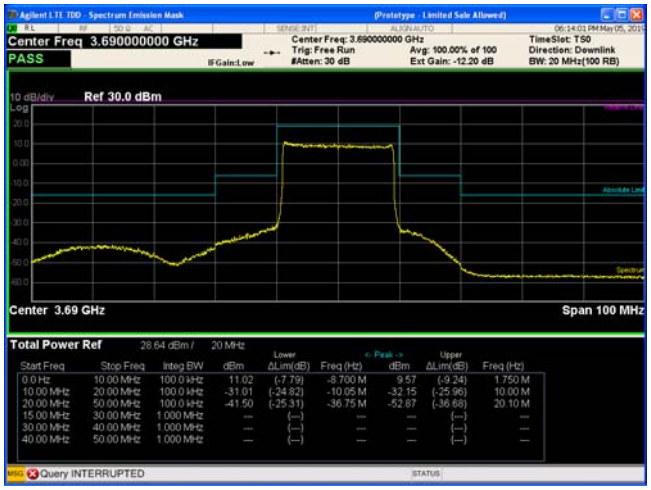


10MHz - Middle CH E-TM1.1

20MHz - Middle CH E-TM1.1



10MHz - High CH E-TM1.1



20MHz - High CH E-TM1.1

11 Out of band emission at antenna terminals

Test Requirement: FCC part90.1323

Test Method: FCC part2.1051

ANSI C63.26-2015

Test Mode: Data communicating mode

Limit: -13dBm

11.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.3kPa

11.2 Test Procedure

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.
4. Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

11.3 Test Result

Remark: The permit frequency range of Part 90Z is from 3650-3700MHz. according the frequency table of the device on page 7. Notes as below:

1. The frequency star and stop for band edge test instruction as below:

bandwidth	Left > 1MHz	Left 1MHz immediately	Low channel	Middle Channel	High channel	Right 1MHz immediately	Right > 1MHz
10MHz	3644-3649	3649-3650	3655	3675	3695	3700-3701	3701-3706
20MHz	3639-3649	3649-3650	3660	3675	3690	3700-3701	3701-3711

Note 1:

For **low** channel, we test left 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit left band 3650 MHz; the emission above right of 3700MHz has no intentional.

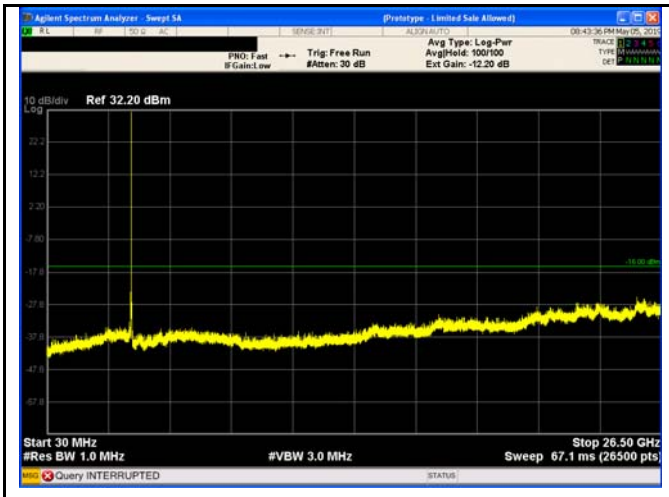
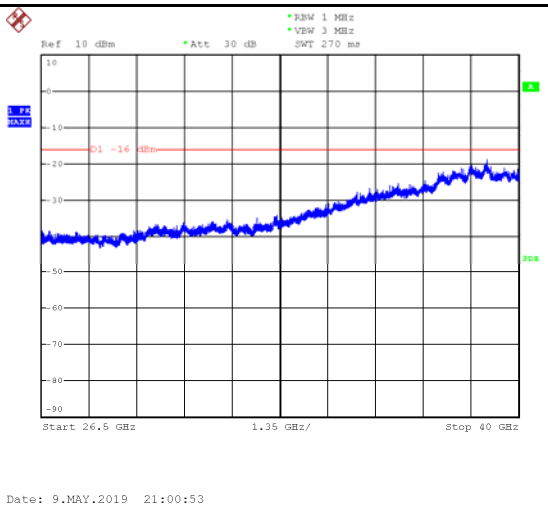
For **high** channel, we test right 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit right band 3700 MHz; the emission below left of 3650MHz has no intentional.

For **middle** channel, we both test left and right 1 MHz immediately and more than 1MHz away (5 MHz for 10 MHz bandwidth & 10MHz for 20MHz bandwidth) from the permit band 3650 MHz to 3700 MHz; see above table.

2. The RBW and the limit instruction as below: (The general limit = -13dBm)

1. For 2x2 MIMO, the limit=-13dBm -10 log 2=-16dBm.
2. For RBW=100kHz, the limit = -16dBm – 10log(1MHz/100kHz)= -26dBm
3. For RBW=50kHz, the limit= -16dBm – 10log(1MHz/50kHz)= -29dBm
   (The spectrum of N9020A only display the RBW=51kHz, and RBW=50kHz limit is lower than RBW=51kHz.)
4. For RBW=200kHz, the limit= -16dBm - 10log(1MHz/200kHz)= -23dBm

Test Plots Spurious emission
Chain 0

<table>
<tr><td> 
</td><td> 
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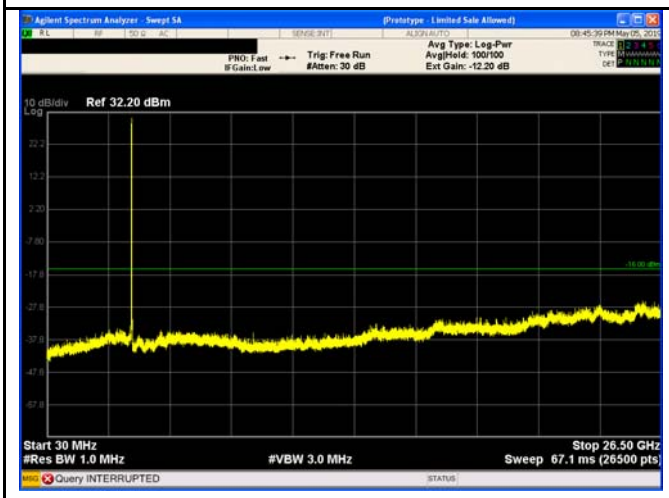
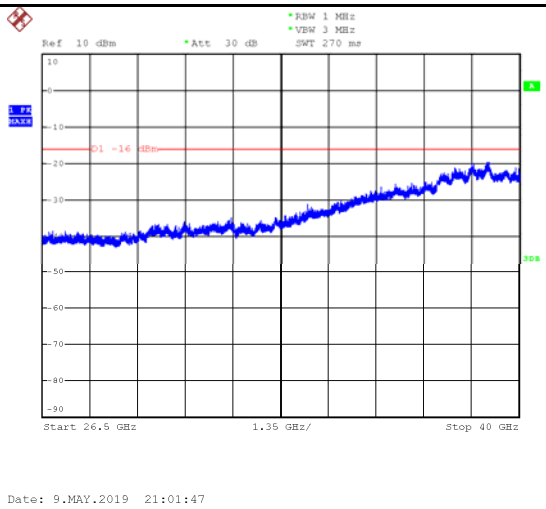
<tr><td>10MHz - Low CH 30MHz~26.5GHz</td><td>10MHz - Low CH 26.5GHz~40GHz</td></tr>
<tr><td> 
</td><td> 
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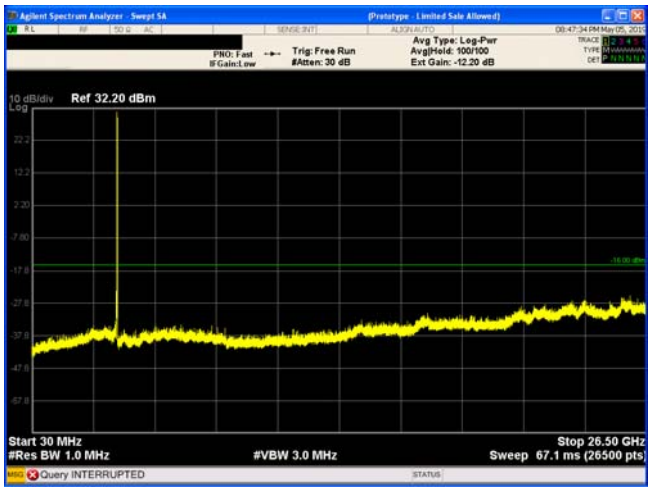
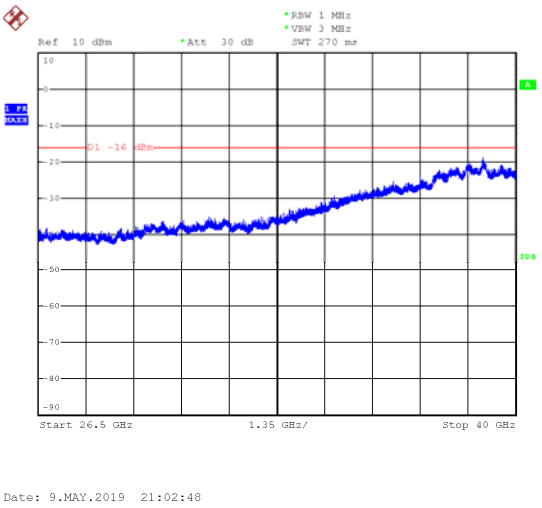
<tr><td>10MHz - Middle CH 30MHz~26.5GHz</td><td>10MHz - Middle CH 26.5GHz~40GHz</td></tr>
<tr><td> 
</td><td> 
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<tr><td>10MHz - High CH 30MHz~26.5GHz</td><td>10MHz - High CH 26.5GHz~40GHz</td></tr>
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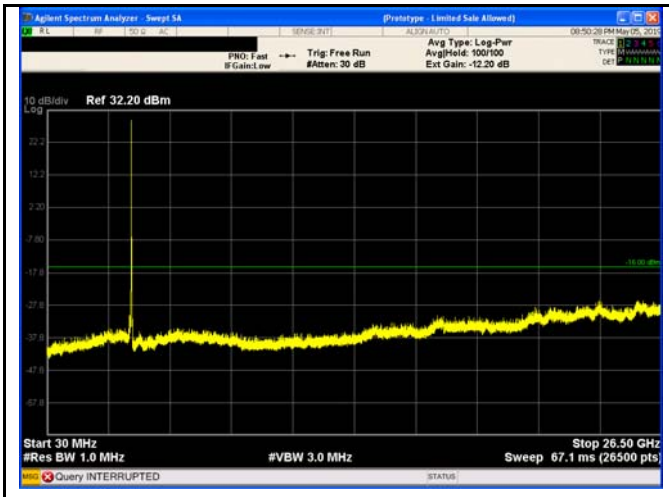
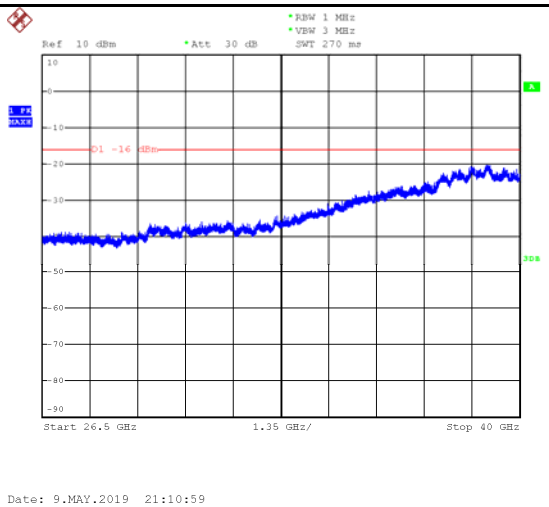
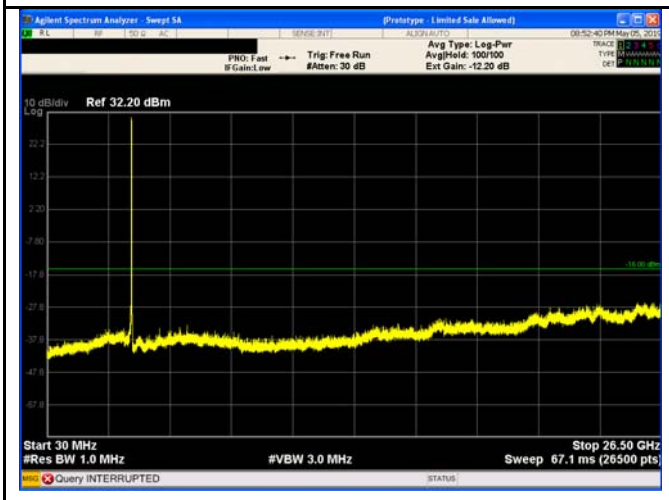


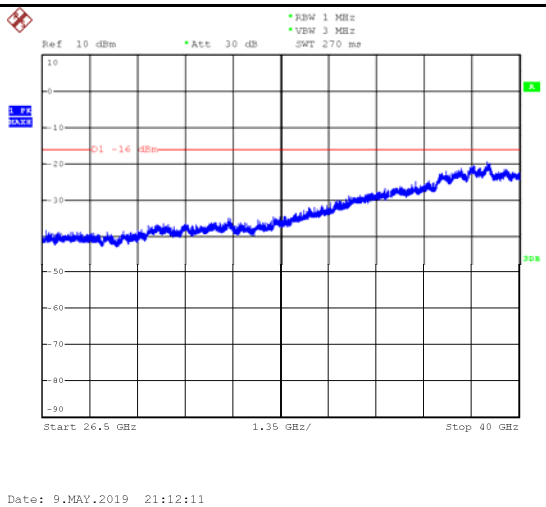
20MHz - Low CH 30MHz~26.5GHz



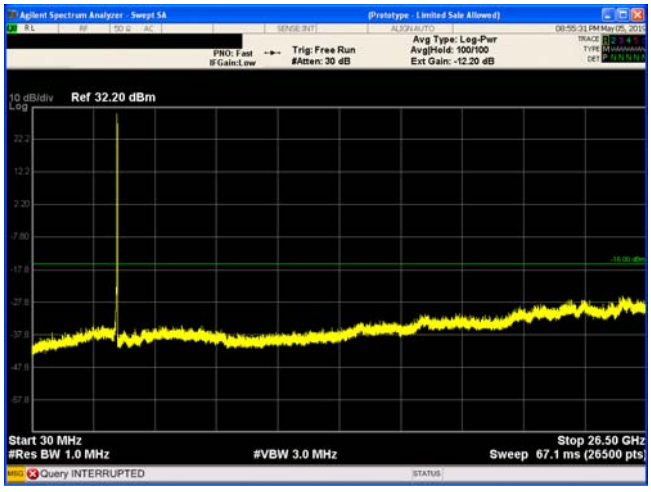
20MHz - Low CH 26.5GHz~40GHz



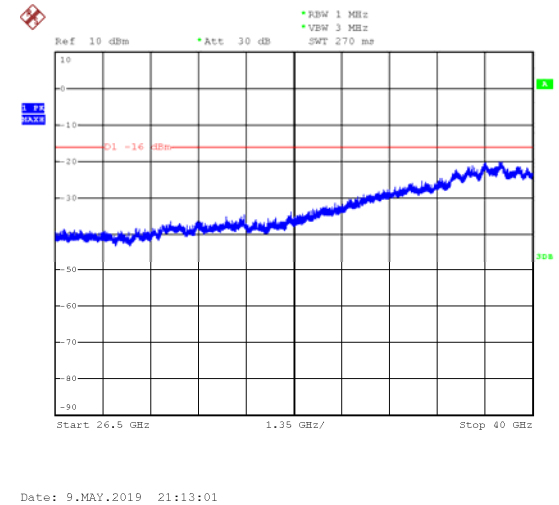
20MHz - Middle CH 30MHz~26.5GHz



20MHz - Middle CH 26.5GHz~40GHz



20MHz - High CH 30MHz~26.5GHz



20MHz - High CH 26.5GHz~40GHz

Chain 1

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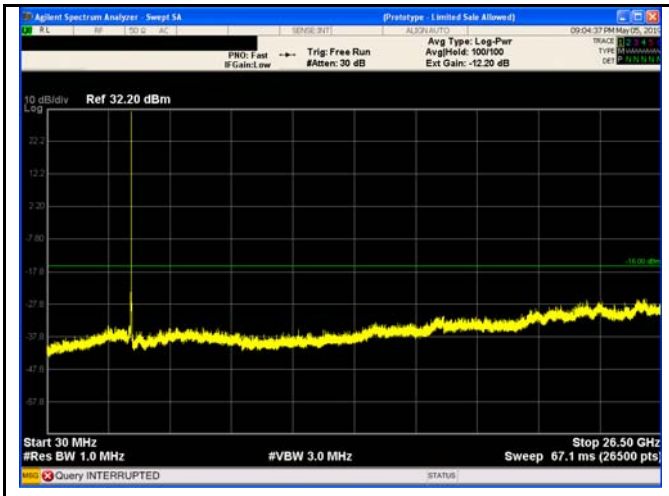
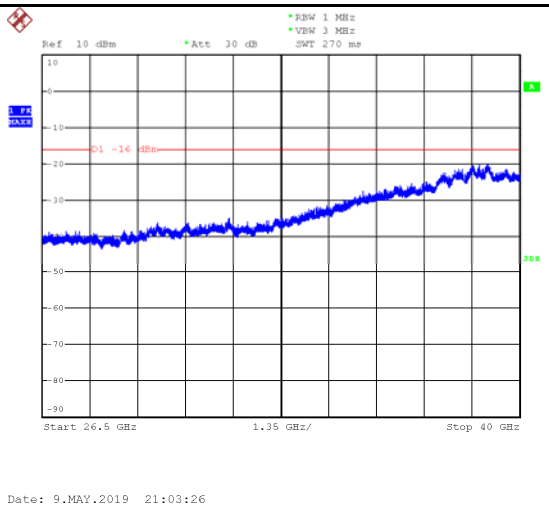
<tr><td> 
</td><td> 
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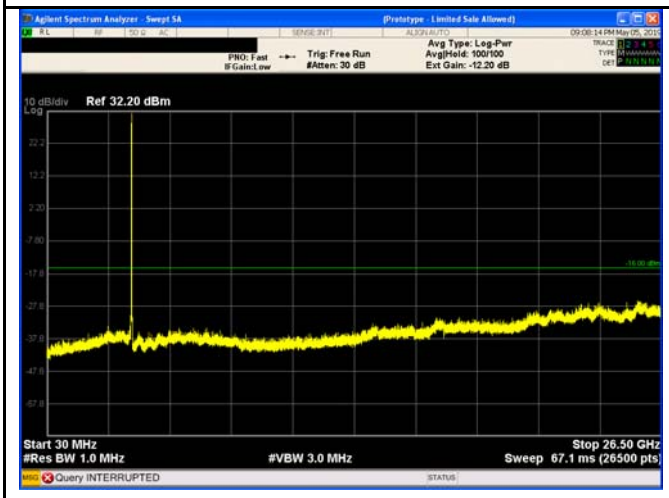
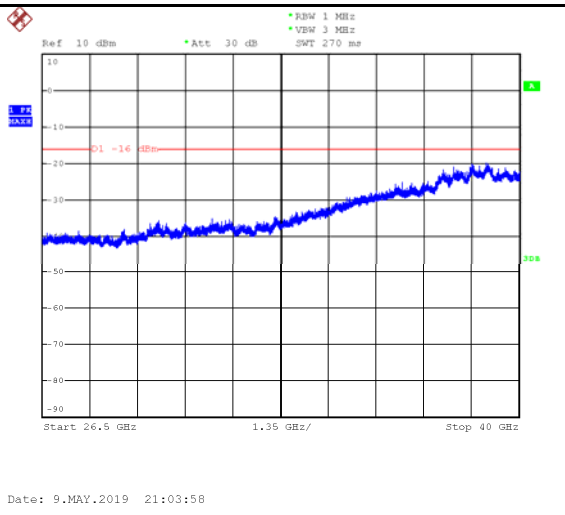
<tr><td>10MHz - Low CH 30MHz~26.5GHz</td><td>10MHz - Low CH 26.5GHz~40GHz</td></tr>
<tr><td> 
</td><td> 
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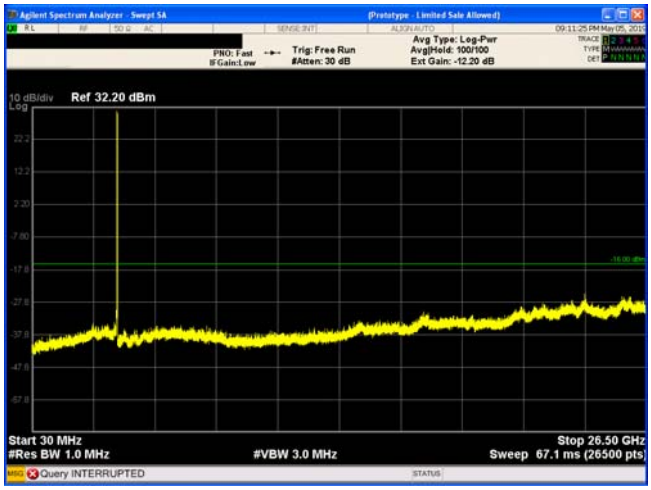
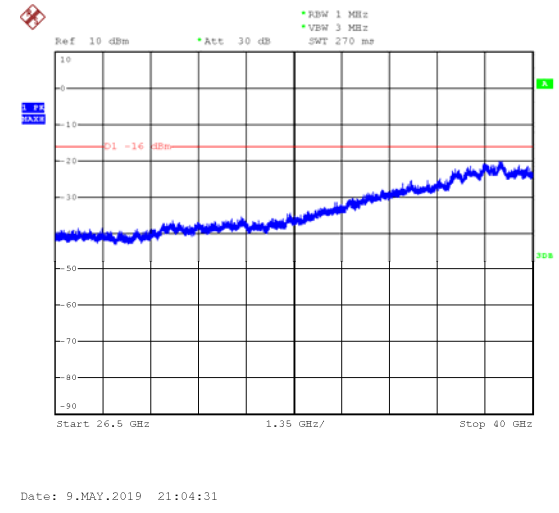
<tr><td>10MHz - Middle CH 30MHz~26.5GHz</td><td>10MHz - Middle CH 26.5GHz~40GHz</td></tr>
<tr><td> 
</td><td> 
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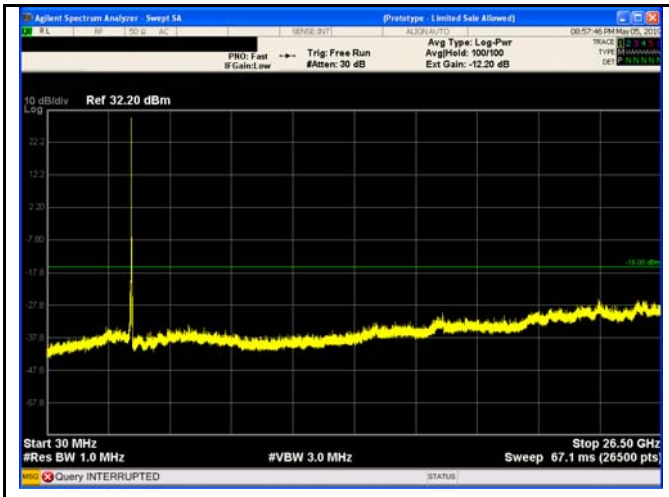
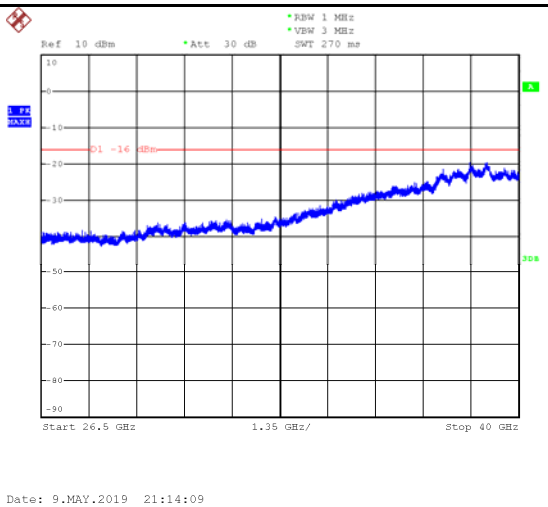
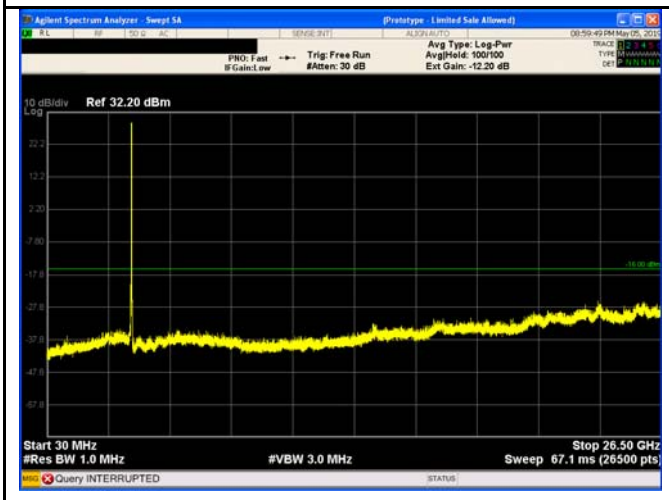


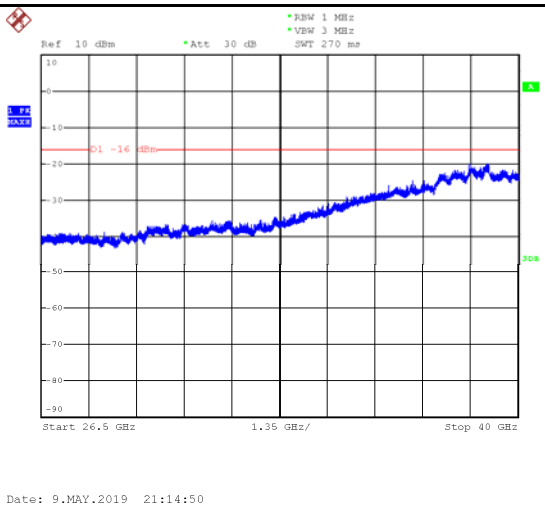
20MHz - Low CH 30MHz~26.5GHz



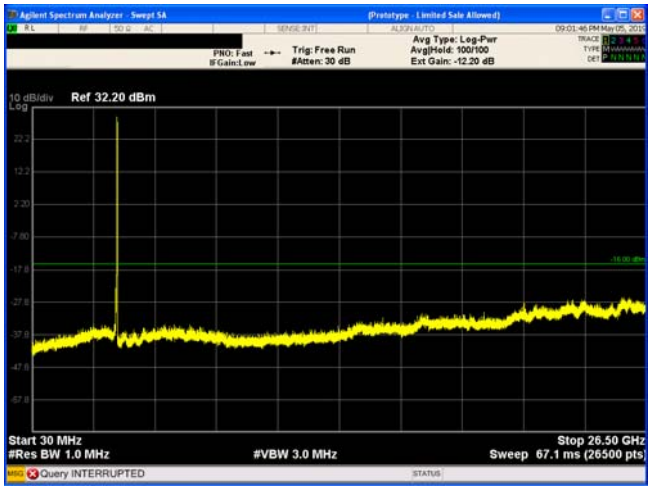
20MHz - Low CH 26.5GHz~40GHz



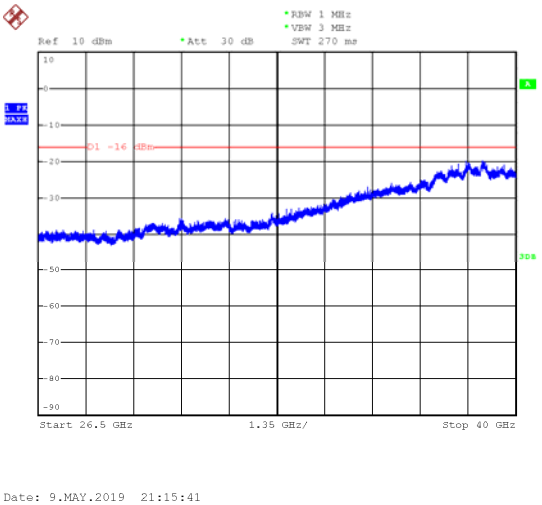
20MHz - Middle CH 30MHz~26.5GHz



20MHz - Middle CH 26.5GHz~40GHz

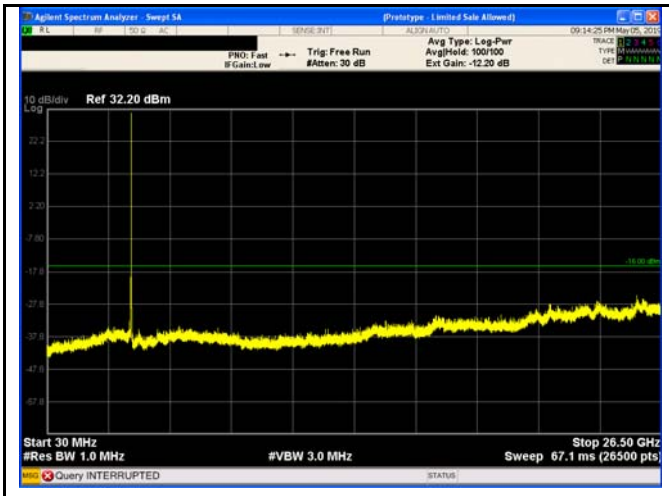
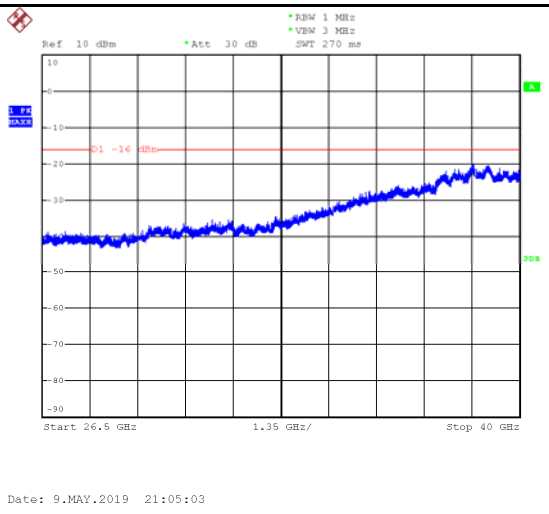
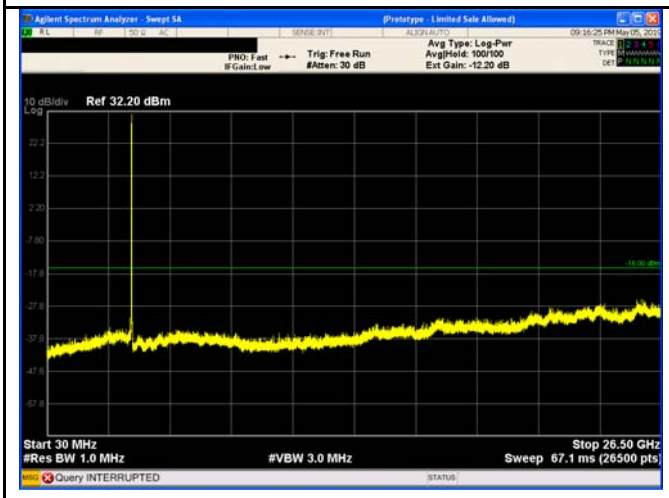
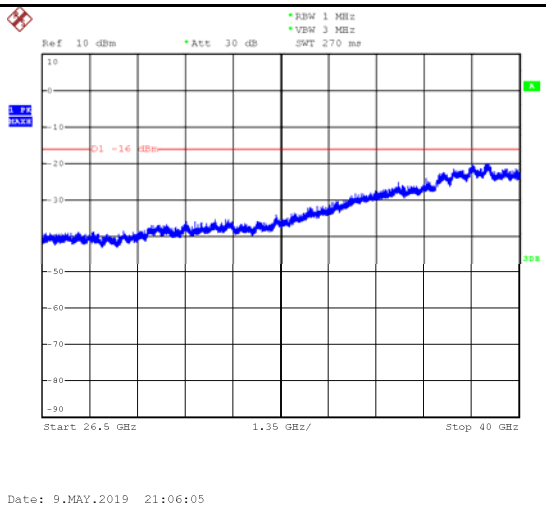
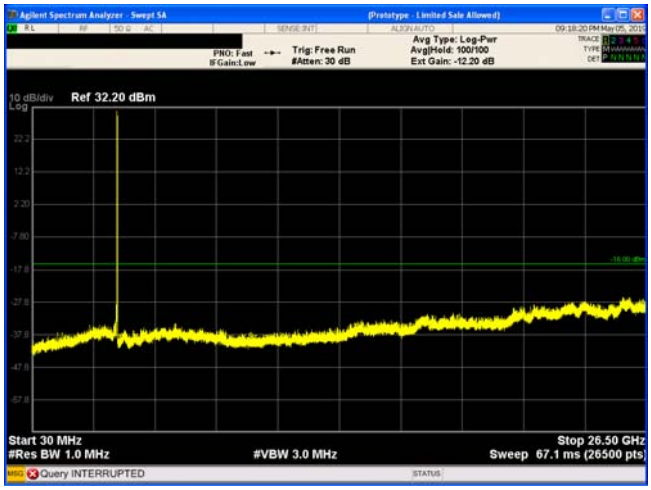
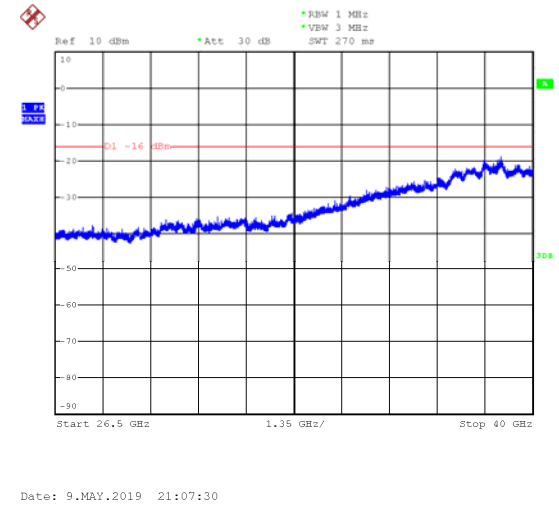


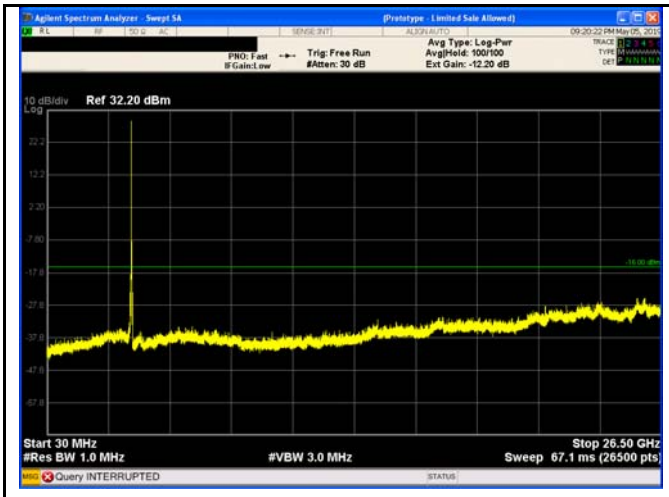
20MHz - High CH 30MHz~26.5GHz



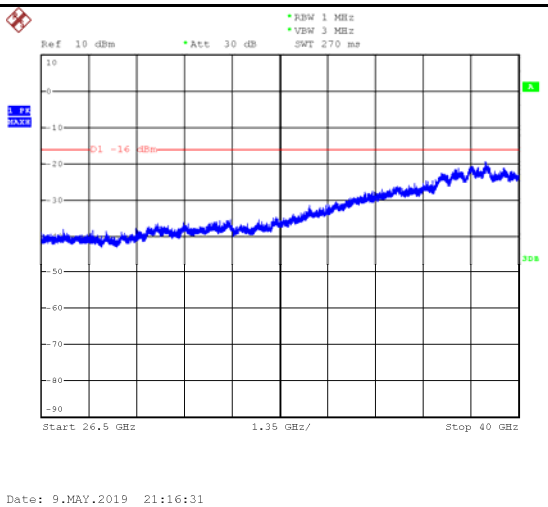
20MHz - High CH 26.5GHz~40GHz

Chain 2

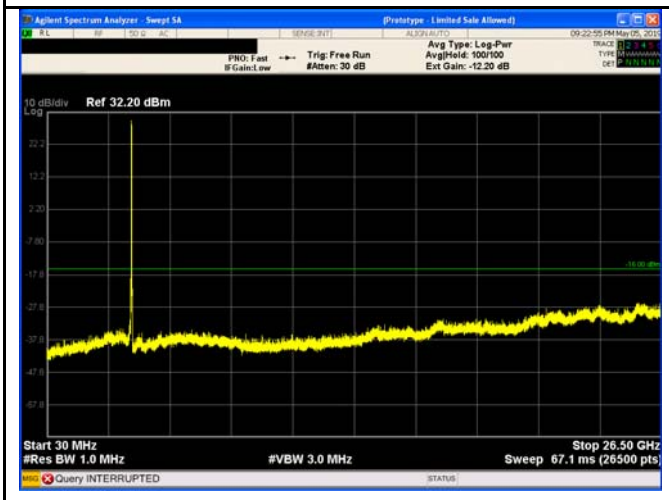
	
10MHz - Low CH 30MHz~26.5GHz	10MHz - Low CH 26.5GHz~40GHz
	
10MHz - Middle CH 30MHz~26.5GHz	10MHz - Middle CH 26.5GHz~40GHz
	
10MHz - High CH 30MHz~26.5GHz	10MHz - High CH 26.5GHz~40GHz



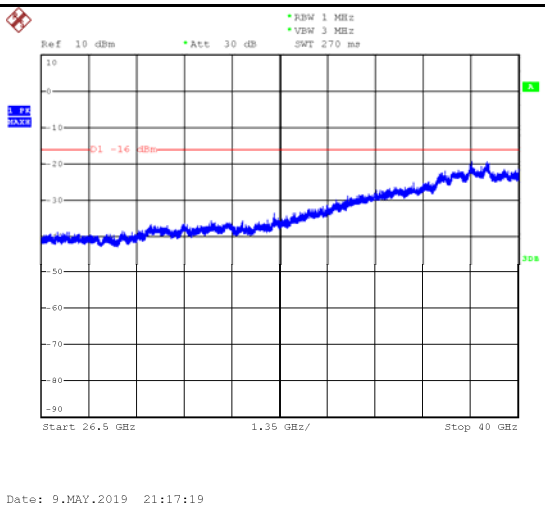
20MHz - Low CH 30MHz~26.5GHz



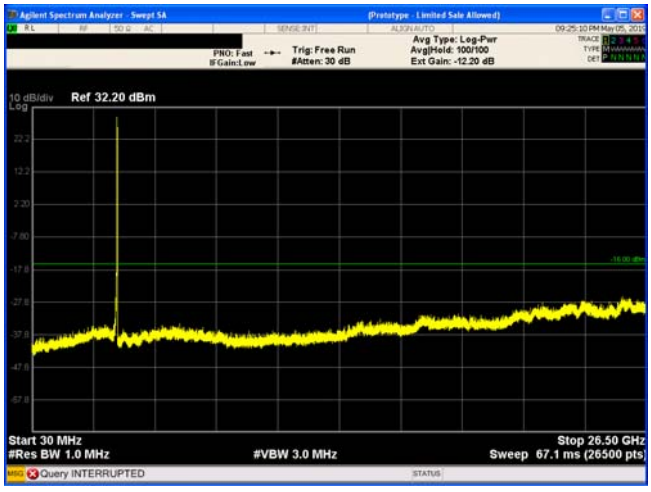
20MHz - Low CH 26.5GHz~40GHz



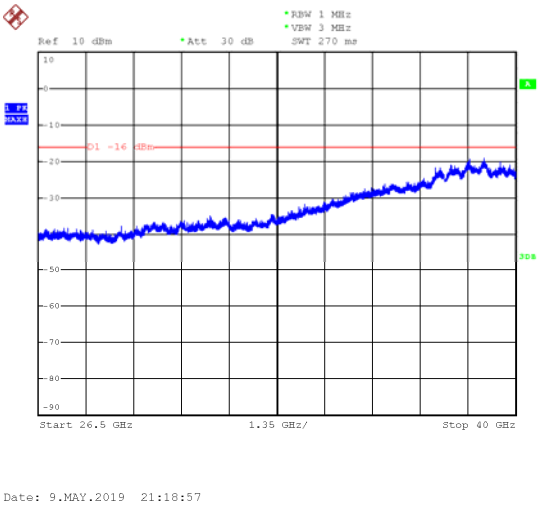
20MHz - Middle CH 30MHz~26.5GHz



20MHz - Middle CH 26.5GHz~40GHz

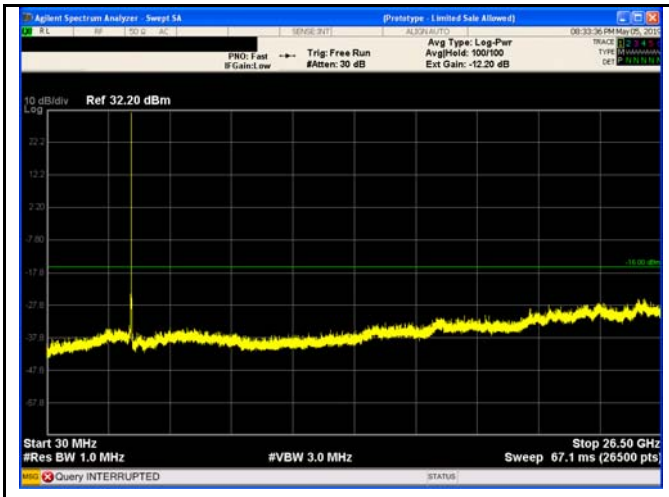


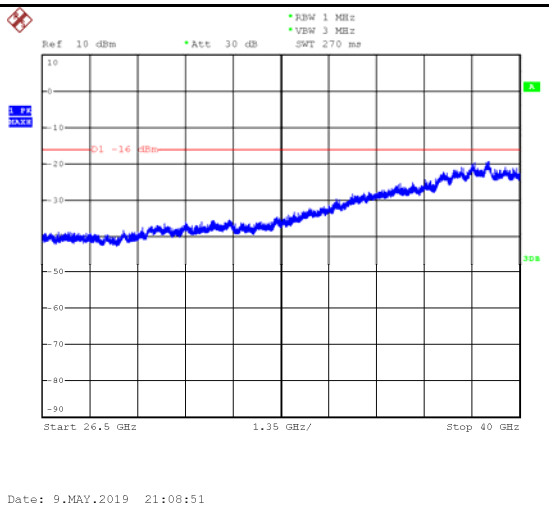
20MHz - High CH 30MHz~26.5GHz



20MHz - High CH 26.5GHz~40GHz

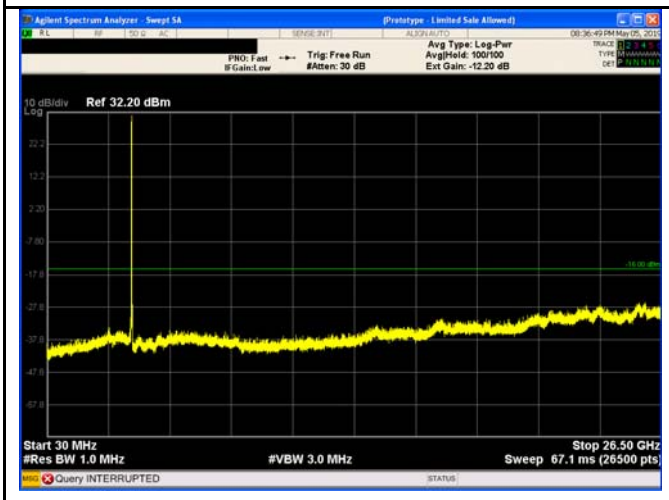
Chain 3

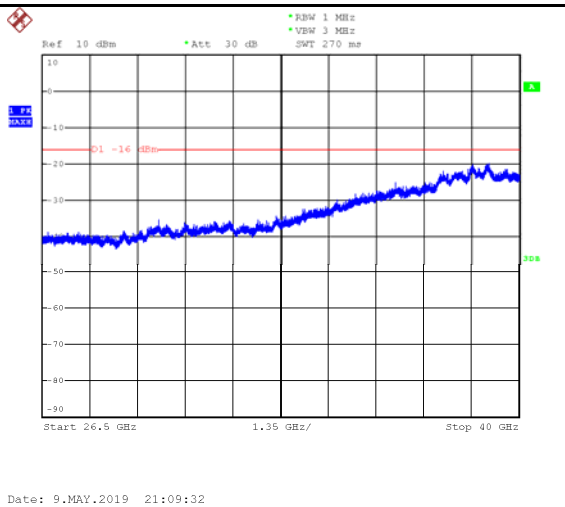




10MHz - Low CH 30MHz~26.5GHz

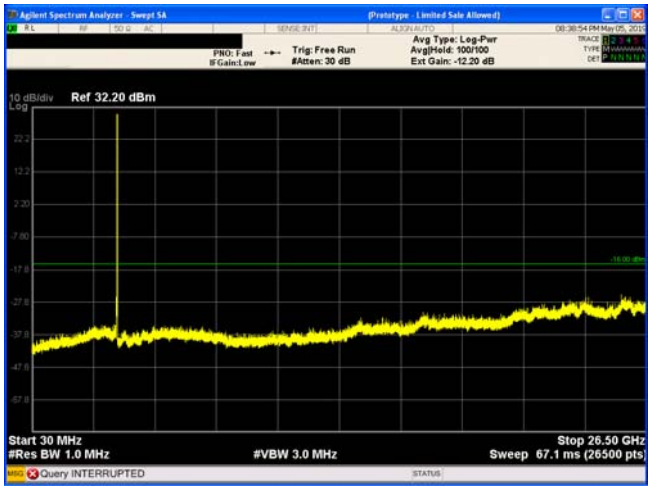
10MHz - Low CH 26.5GHz~40GHz

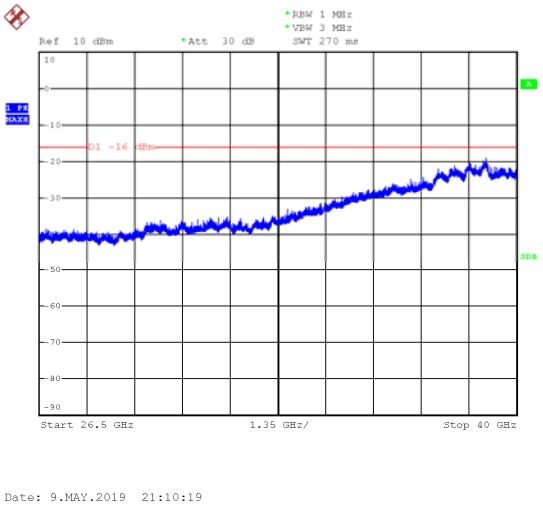




10MHz - Middle CH 30MHz~26.5GHz

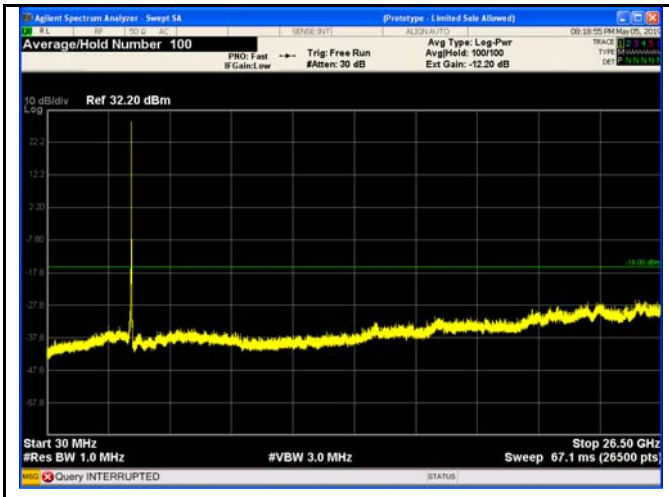
10MHz - Middle CH 26.5GHz~40GHz



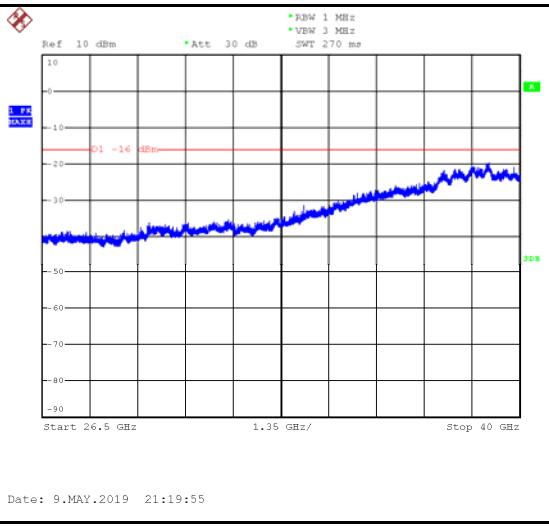


10MHz - High CH 30MHz~26.5GHz

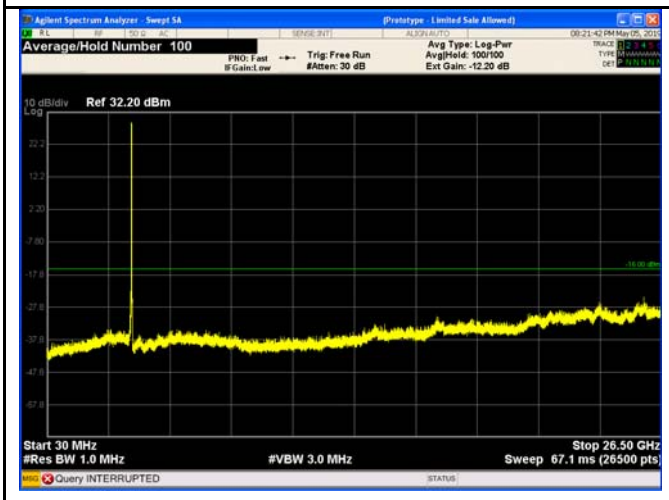
10MHz - High CH 26.5GHz~40GHz



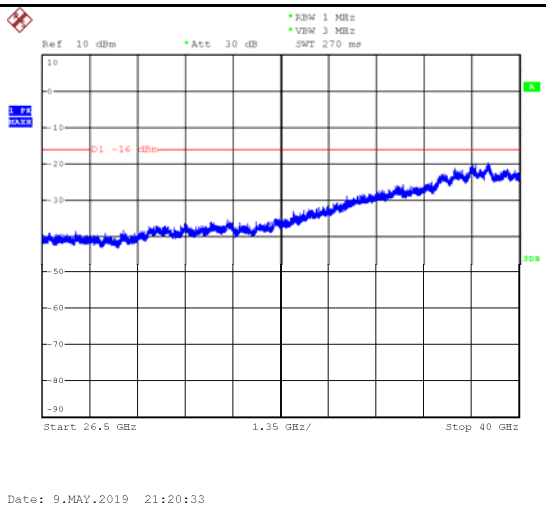
20MHz - Low CH 30MHz~26.5GHz



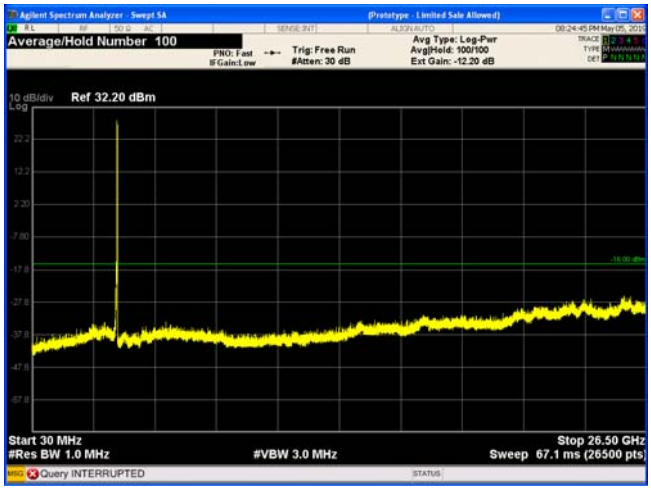
20MHz - Low CH 26.5GHz~40GHz



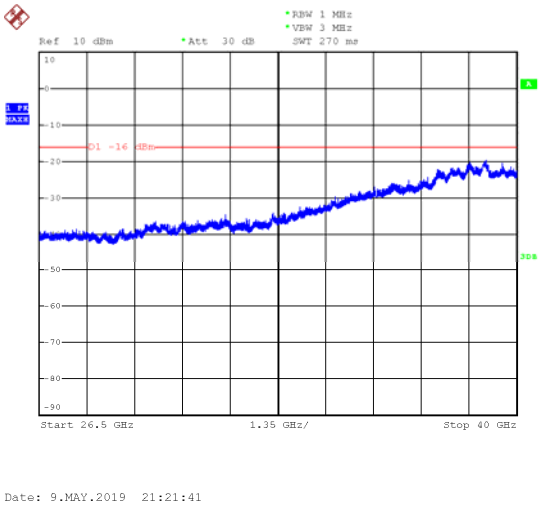
20MHz - Middle CH 30MHz~26.5GHz



20MHz - Middle CH 26.5GHz~40GHz



20MHz - High CH 30MHz~26.5GHz



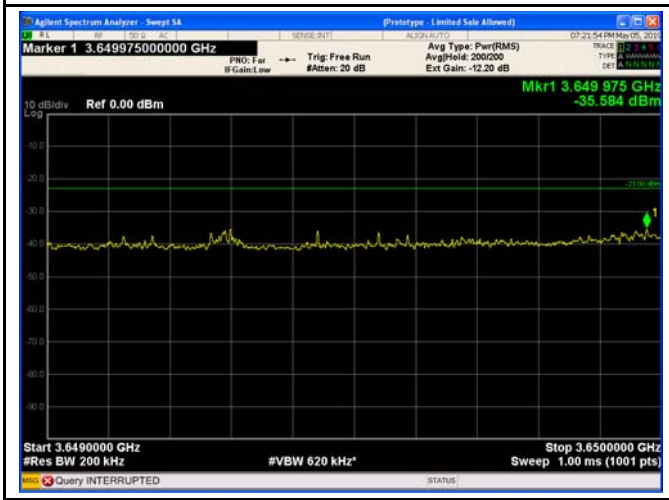
20MHz - High CH 26.5GHz~40GHz

Band edge emission
Chain 0

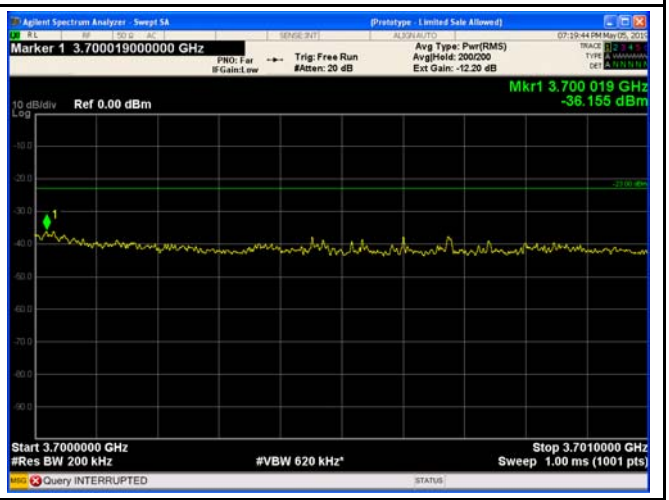
(1MHz immediately)

10MHz – 3649MHz-3650MHz Low CH E-TM1.1

10MHz - 3700MHz -3701MHz High CH E-TM1.1

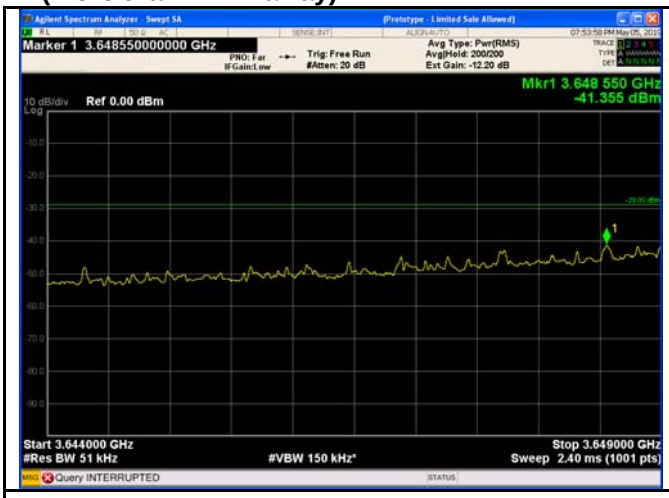


20MHz – 3649MHz-3650MHz Low CH E-TM1.1

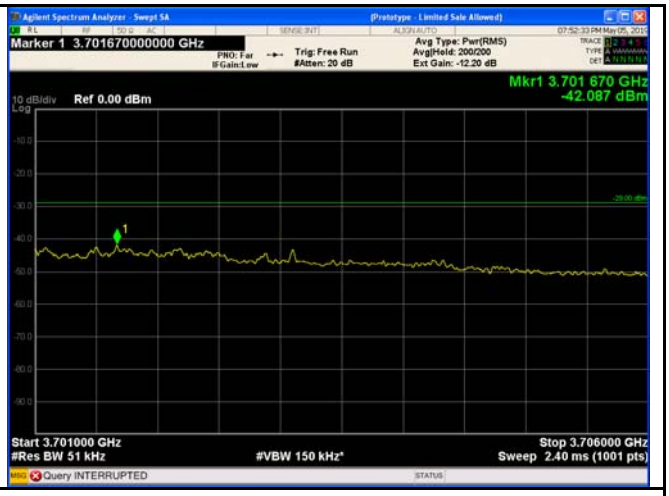


20MHz - 3700MHz -3701MHz High CH E-TM1.1

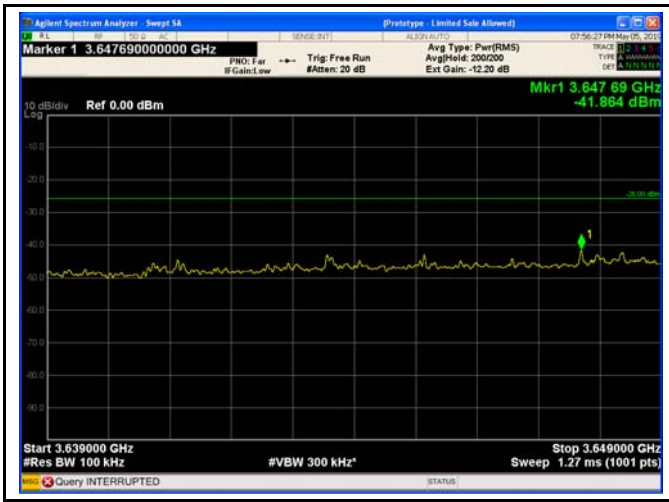
Chain 0
(more than 1MHz away)



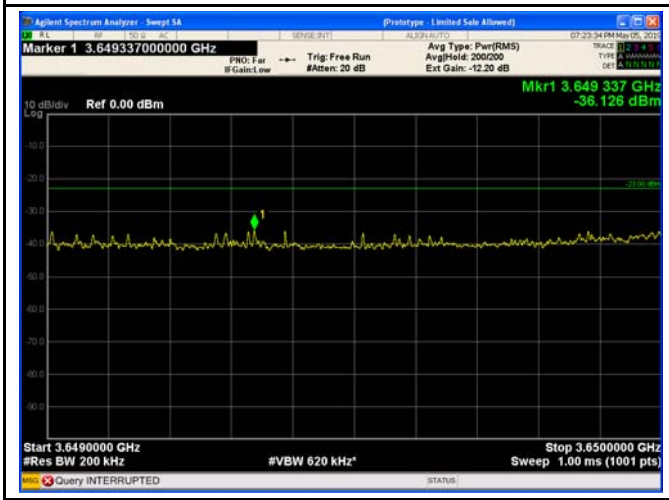
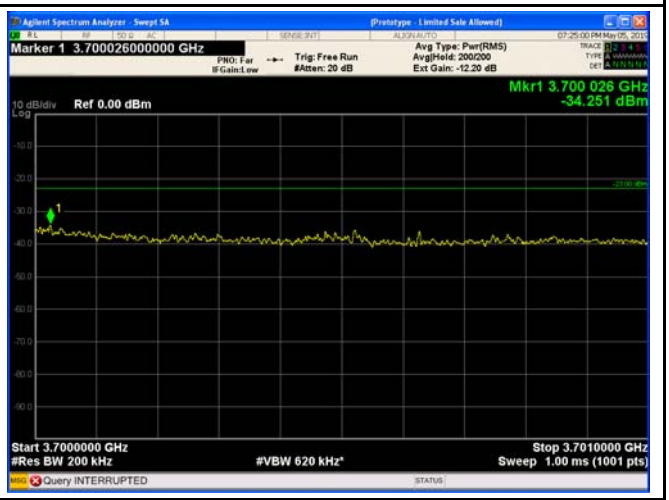
10MHz – 3649MHz-3650MHz Low CH E-TM1.1



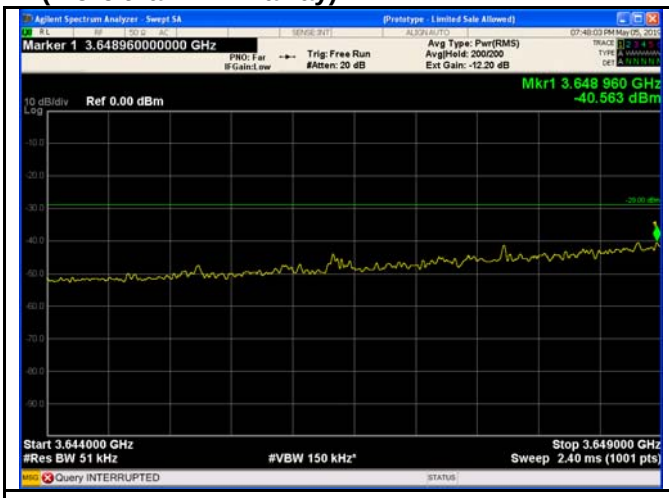
10MHz - 3700MHz -3701MHz High CH E-TM1.1

	
20MHz – 3649MHz-3650MHz Low CH E-TM1.1	20MHz - 3700MHz -3701MHz High CH E-TM1.1

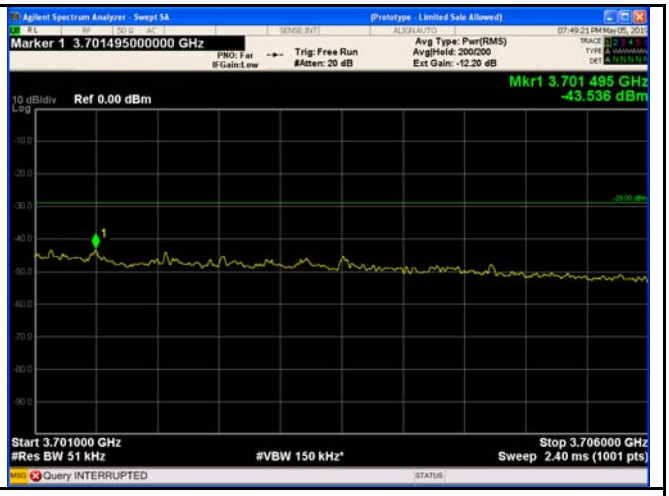
Chain 1
(1MHz immediately)

	
10MHz – 3649MHz-3650MHz Low CH E-TM1.1	10MHz - 3700MHz -3701MHz High CH E-TM1.1
	
20MHz – 3649MHz-3650MHz Low CH E-TM1.1	20MHz - 3700MHz -3701MHz High CH E-TM1.1

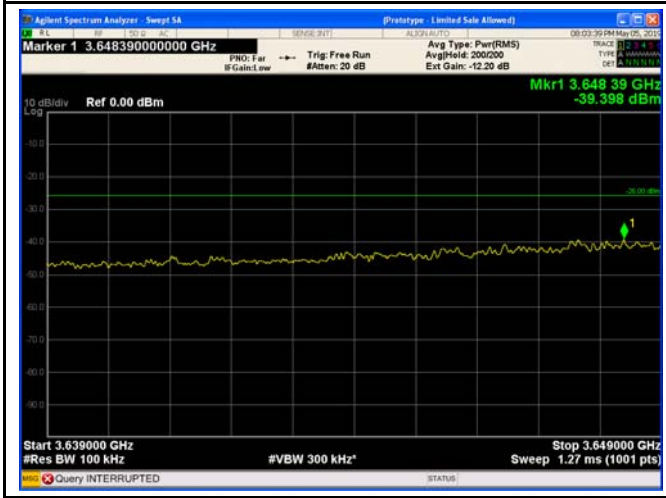
Chain 1
(more than 1MHz away)



10MHz – 3649MHz-3650MHz Low CH E-TM1.1



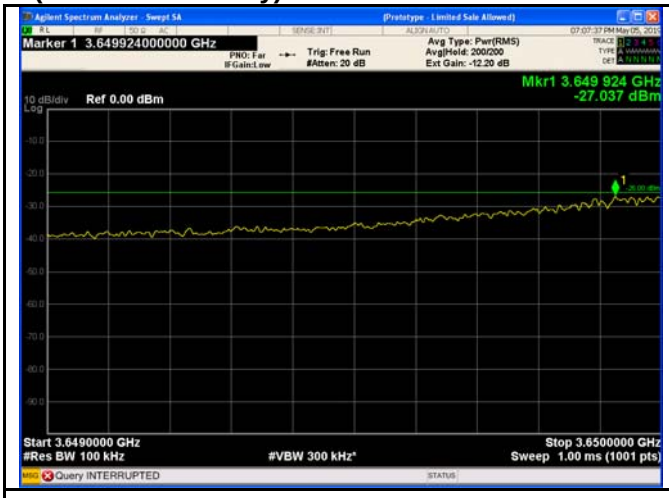
10MHz - 3700MHz -3701MHz High CH E-TM1.1



20MHz – 3649MHz-3650MHz Low CH E-TM1.1

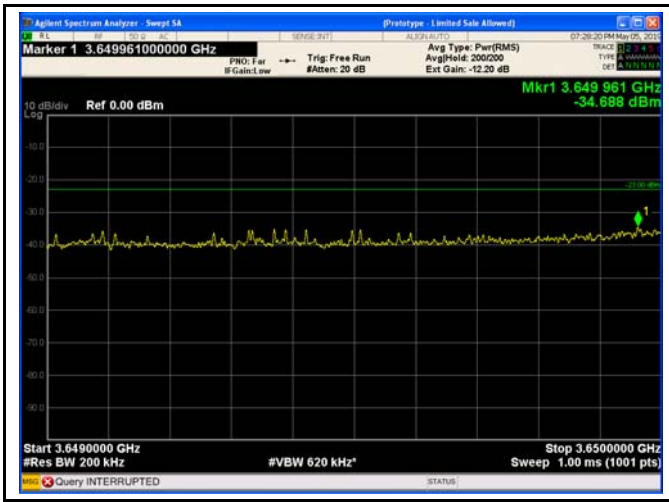
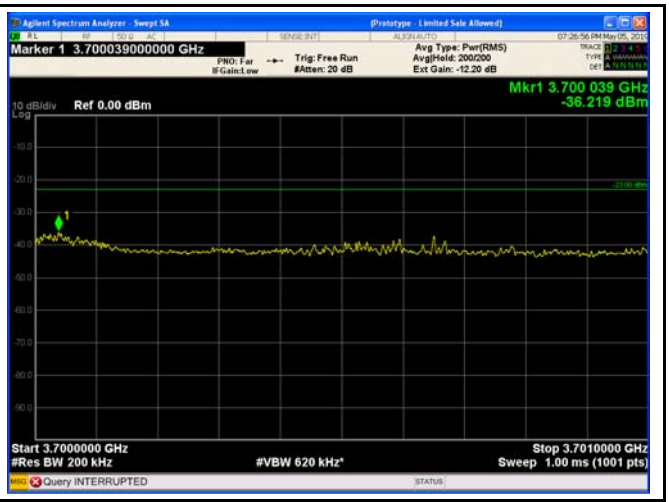
20MHz - 3700MHz -3701MHz High CH E-TM1.1

Chain 2
(1MHz immediately)

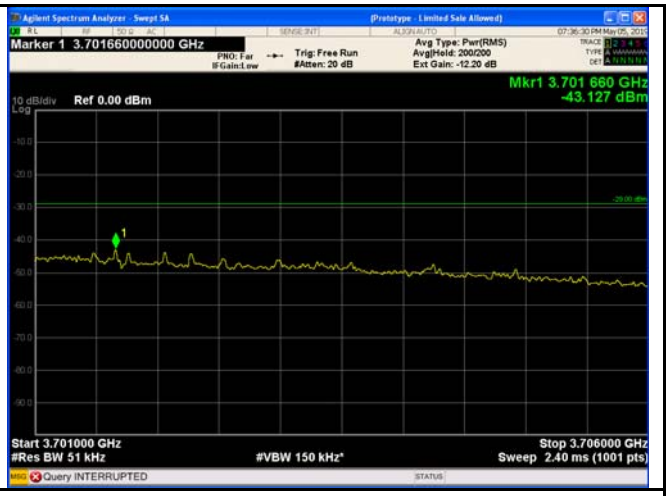
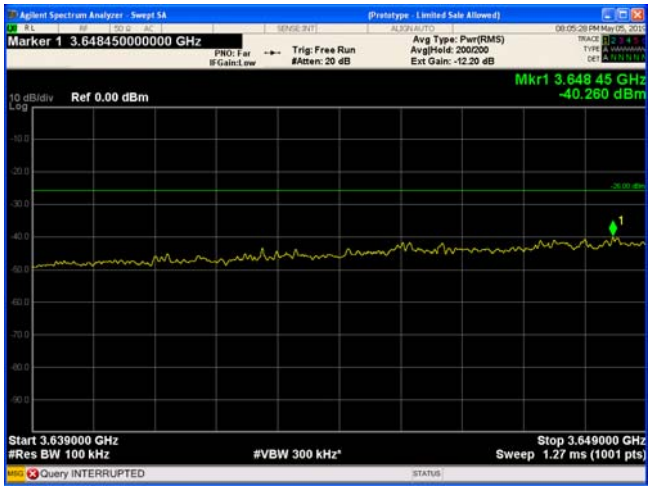
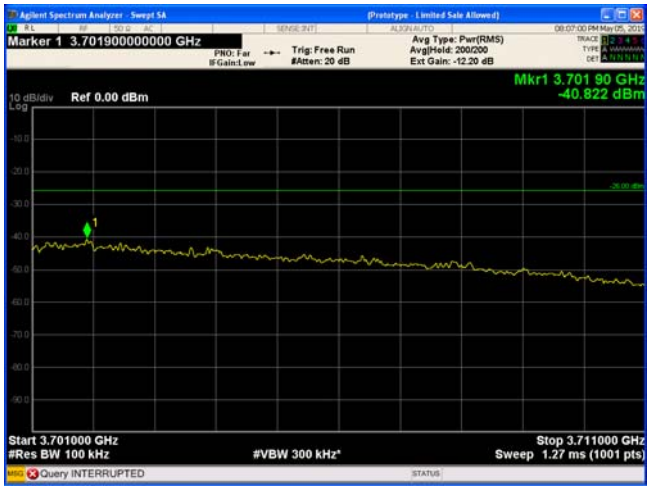


10MHz – 3649MHz-3650MHz Low CH E-TM1.1

10MHz - 3700MHz -3701MHz High CH E-TM1.1

	
20MHz – 3649MHz-3650MHz Low CH E-TM1.1	20MHz - 3700MHz -3701MHz High CH E-TM1.1

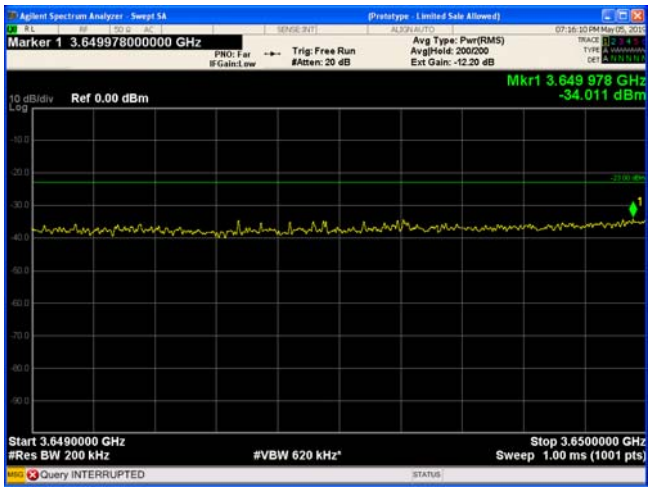
Chain 2
(more than 1MHz away)

	
10MHz – 3649MHz-3650MHz Low CH E-TM1.1	10MHz - 3700MHz -3701MHz High CH E-TM1.1
	
20MHz – 3649MHz-3650MHz Low CH E-TM1.1	20MHz - 3700MHz -3701MHz High CH E-TM1.1

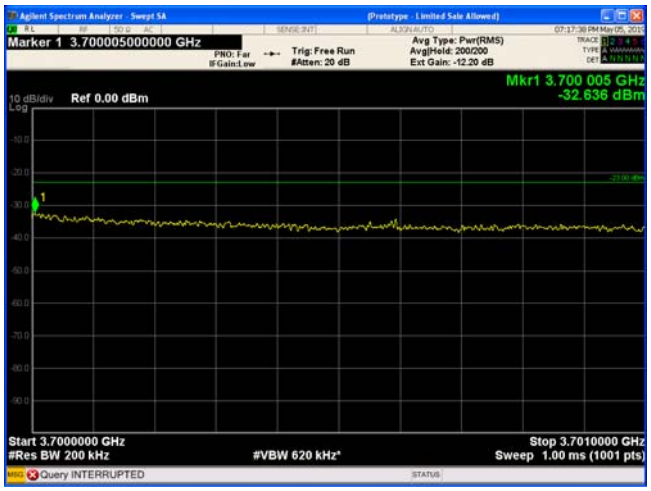
Chain 3
(1MHz immediately)

10MHz – 3649MHz-3650MHz Low CH E-TM1.1

10MHz - 3700MHz -3701MHz High CH E-TM1.1



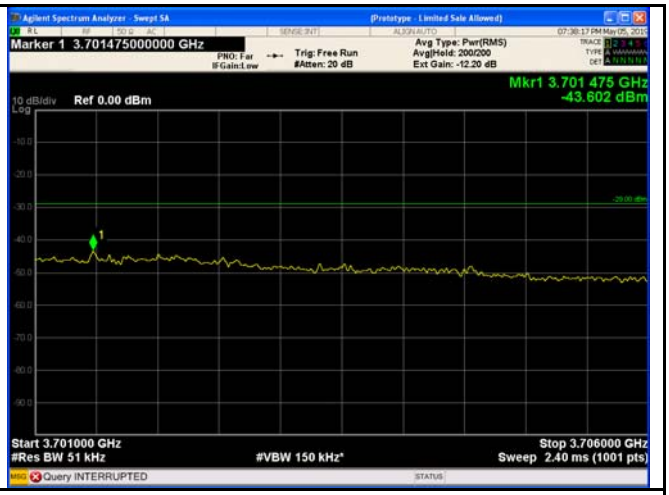
20MHz – 3649MHz-3650MHz Low CH E-TM1.1



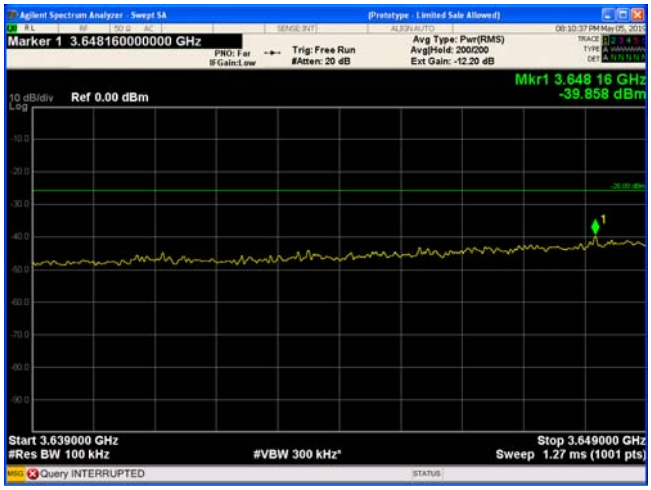
20MHz - 3700MHz -3701MHz High CH E-TM1.1

Chain 3
(more than 1MHz away)

10MHz – 3649MHz-3650MHz Low CH E-TM1.1



10MHz - 3700MHz -3701MHz High CH E-TM1.1

	
20MHz – 3649MHz-3650MHz Low CH E-TM1.1	20MHz - 3700MHz -3701MHz High CH E-TM1.1

12 Field strength of spurious radiation measurement

Test Requirement:	FCC part90.1323
Test Method:	FCC part2.1051
	ANSI C63.26-2015
Test Mode:	Data communicating mode
Limit:	-13dBm

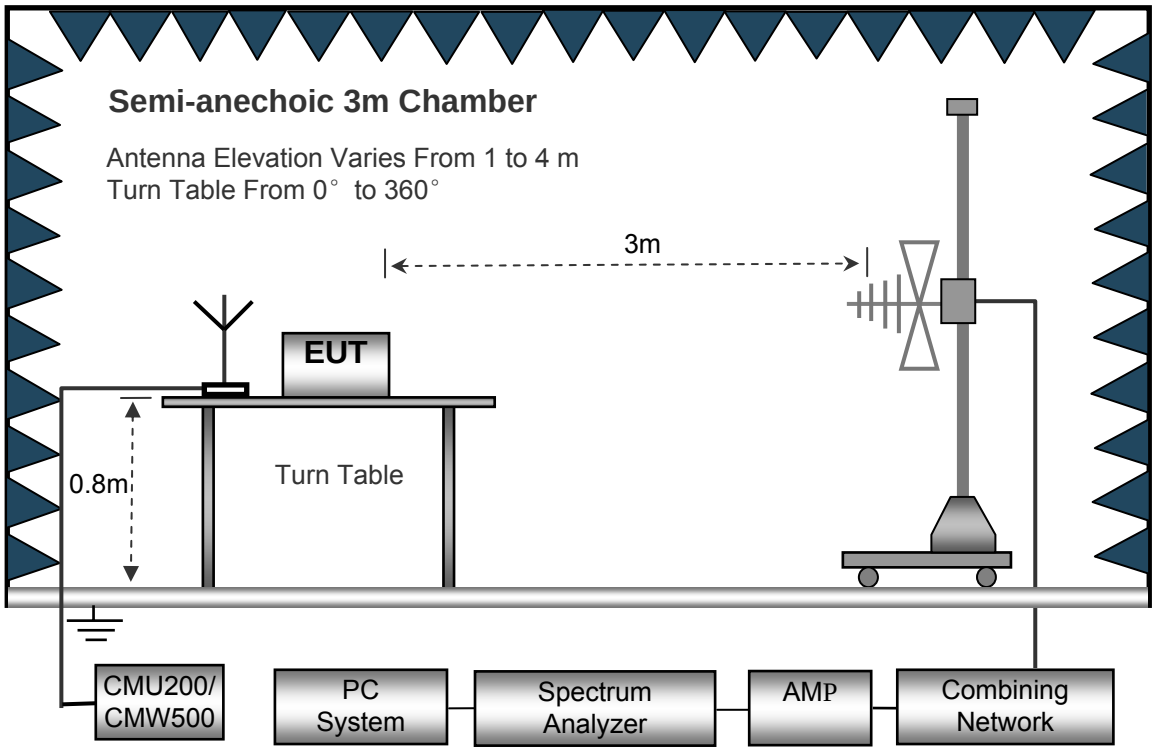
12.1 EUT Operation

Operating Environment :

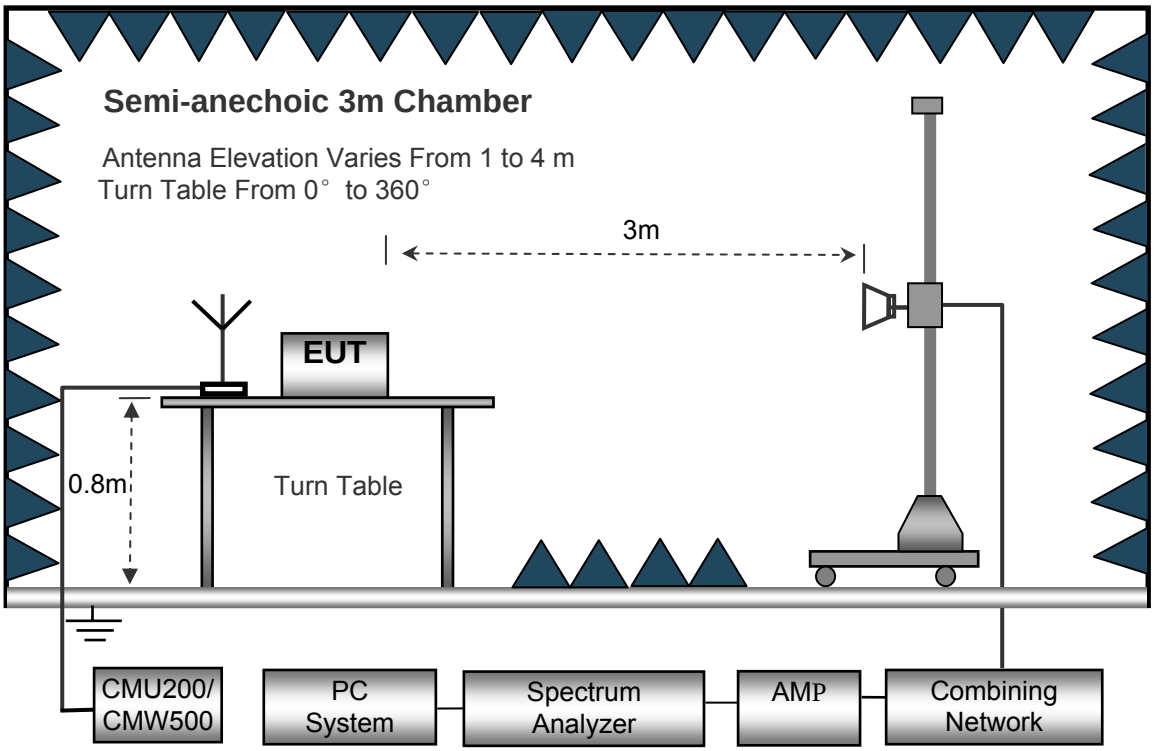
Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

12.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site.
The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth 100kHz
Video Bandwidth 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth 1MHz
Video Bandwidth 3MHz
Detector ..... Ave.
Resolution Bandwidth 1MHz
Video Bandwidth 10Hz

12.4 Test Procedure

1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.
3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.
4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.
   ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)

12.5 Test Result

30MHz-18GHz

Chain 0

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Low channel										
198.38	43.82	192	2.1	H	-66.69	0.15	0.00	-66.84	-13.00	-53.84
198.38	47.54	186	2.0	V	-60.05	0.15	0.00	-60.20	-13.00	-47.20
7320.00	67.43	251	2.0	H	-46.54	0.30	9.40	-37.44	-13.00	-24.44
7320.00	59.23	198	1.7	V	-54.30	0.30	9.40	-45.20	-13.00	-32.20
10980.00	63.33	69	1.9	H	-50.67	0.43	10.60	-40.50	-13.00	-27.50
10980.00	61.47	321	1.3	V	-48.81	0.43	10.60	-38.64	-13.00	-25.64
Middle channel										
199.38	42.42	289	1.4	H	-68.09	0.15	0.00	-68.24	-13.00	-55.24
199.38	47.68	13	2.0	V	-59.91	0.15	0.00	-60.06	-13.00	-47.06
7350.00	63.87	302	2.0	H	-50.10	0.30	9.40	-41.00	-13.00	-28.00
7350.00	59.23	244	2.0	V	-54.30	0.30	9.40	-45.20	-13.00	-32.20
11025.00	59.85	308	1.6	H	-54.15	0.43	10.60	-43.98	-13.00	-30.98
11025.00	61.45	254	1.9	V	-48.83	0.43	10.60	-38.66	-13.00	-25.66
High channel										
199.38	42.43	138	1.5	H	-68.08	0.15	0.00	-68.23	-13.00	-55.23
199.38	47.65	357	1.2	V	-59.94	0.15	0.00	-60.09	-13.00	-47.09
7380.00	69.84	75	1.8	H	-44.13	0.30	9.40	-35.03	-13.00	-22.03
7380.00	60.32	343	2.1	V	-53.21	0.30	9.40	-44.11	-13.00	-31.11
11070.00	59.83	99	1.4	H	-54.17	0.43	10.60	-44.00	-13.00	-31.00
11070.00	58.14	239	1.2	V	-52.14	0.43	10.60	-41.97	-13.00	-28.97

Chain 1

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Low channel										
198.38	43.90	137	1.2	H	-66.61	0.15	0.00	-66.76	-13.00	-53.76
198.38	48.18	174	1.5	V	-59.41	0.15	0.00	-59.56	-13.00	-46.56
7320.00	66.37	283	1.2	H	-47.60	0.30	9.40	-38.50	-13.00	-25.50
7320.00	57.60	271	1.5	V	-55.93	0.30	9.40	-46.83	-13.00	-33.83
10980.00	63.06	170	2.2	H	-50.94	0.43	10.60	-40.77	-13.00	-27.77
10980.00	59.69	74	1.9	V	-50.59	0.43	10.60	-40.42	-13.00	-27.42
Middle channel										
199.38	42.00	137	1.8	H	-68.51	0.15	0.00	-68.66	-13.00	-55.66
199.38	47.27	350	1.8	V	-60.32	0.15	0.00	-60.47	-13.00	-47.47
7350.00	63.36	97	1.1	H	-50.61	0.30	9.40	-41.51	-13.00	-28.51
7350.00	58.11	274	1.4	V	-55.42	0.30	9.40	-46.32	-13.00	-33.32
11025.00	59.06	98	1.0	H	-54.94	0.43	10.60	-44.77	-13.00	-31.77
11025.00	61.35	233	2.0	V	-48.93	0.43	10.60	-38.76	-13.00	-25.76
High channel										
199.38	43.06	234	2.2	H	-67.45	0.15	0.00	-67.60	-13.00	-54.60
199.38	46.89	99	1.3	V	-60.70	0.15	0.00	-60.85	-13.00	-47.85
7380.00	68.95	176	1.9	H	-45.02	0.30	9.40	-35.92	-13.00	-22.92
7380.00	59.50	259	1.4	V	-54.03	0.30	9.40	-44.93	-13.00	-31.93
11070.00	58.60	100	1.2	H	-55.40	0.43	10.60	-45.23	-13.00	-32.23
11070.00	57.37	240	1.5	V	-52.91	0.43	10.60	-42.74	-13.00	-29.74

Chain 2

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Low channel										
198.38	43.54	295	1.6	H	-66.97	0.15	0.00	-67.12	-13.00	-54.12
198.38	47.81	166	1.5	V	-59.78	0.15	0.00	-59.93	-13.00	-46.93
7320.00	66.77	316	1.1	H	-47.20	0.30	9.40	-38.10	-13.00	-25.10
7320.00	57.81	332	1.2	V	-55.72	0.30	9.40	-46.62	-13.00	-33.62
10980.00	62.08	12	1.3	H	-51.92	0.43	10.60	-41.75	-13.00	-28.75
10980.00	59.66	13	1.9	V	-50.62	0.43	10.60	-40.45	-13.00	-27.45
Middle channel										
199.38	42.72	212	1.5	H	-67.79	0.15	0.00	-67.94	-13.00	-54.94
199.38	47.83	63	1.8	V	-59.76	0.15	0.00	-59.91	-13.00	-46.91
7350.00	62.11	24	1.7	H	-51.86	0.30	9.40	-42.76	-13.00	-29.76
7350.00	59.19	241	1.3	V	-54.34	0.30	9.40	-45.24	-13.00	-32.24
11025.00	59.52	115	2.0	H	-54.48	0.43	10.60	-44.31	-13.00	-31.31
11025.00	60.84	6	1.3	V	-49.44	0.43	10.60	-39.27	-13.00	-26.27
High channel										
199.38	42.42	220	1.0	H	-68.09	0.15	0.00	-68.24	-13.00	-55.24
199.38	47.48	109	2.2	V	-60.11	0.15	0.00	-60.26	-13.00	-47.26
7380.00	69.06	176	1.3	H	-44.91	0.30	9.40	-35.81	-13.00	-22.81
7380.00	59.65	245	1.4	V	-53.88	0.30	9.40	-44.78	-13.00	-31.78
11070.00	59.74	239	1.5	H	-54.26	0.43	10.60	-44.09	-13.00	-31.09
11070.00	57.96	268	1.2	V	-52.32	0.43	10.60	-42.15	-13.00	-29.15

Chain 3

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
Low channel										
198.38	43.75	146	1.3	H	-66.76	0.15	0.00	-66.91	-13.00	-53.91
198.38	48.53	126	1.6	V	-59.06	0.15	0.00	-59.21	-13.00	-46.21
7320.00	66.16	149	1.7	H	-47.81	0.30	9.40	-38.71	-13.00	-25.71
7320.00	59.00	53	1.3	V	-54.53	0.30	9.40	-45.43	-13.00	-32.43
10980.00	62.40	314	1.3	H	-51.60	0.43	10.60	-41.43	-13.00	-28.43
10980.00	60.42	141	1.8	V	-49.86	0.43	10.60	-39.69	-13.00	-26.69
Middle channel										
199.38	43.35	150	2.0	H	-67.16	0.15	0.00	-67.31	-13.00	-54.31
199.38	46.97	267	1.5	V	-60.62	0.15	0.00	-60.77	-13.00	-47.77
7350.00	62.72	94	2.0	H	-51.25	0.30	9.40	-42.15	-13.00	-29.15
7350.00	57.80	339	1.0	V	-55.73	0.30	9.40	-46.63	-13.00	-33.63
11025.00	58.41	232	2.0	H	-55.59	0.43	10.60	-45.42	-13.00	-32.42
11025.00	60.95	47	1.6	V	-49.33	0.43	10.60	-39.16	-13.00	-26.16
High channel										
199.38	41.46	344	1.2	H	-69.05	0.15	0.00	-69.20	-13.00	-56.20
199.38	48.44	340	2.0	V	-59.15	0.15	0.00	-59.30	-13.00	-46.30
7380.00	68.57	332	1.5	H	-45.40	0.30	9.40	-36.30	-13.00	-23.30
7380.00	58.47	50	1.6	V	-55.06	0.30	9.40	-45.96	-13.00	-32.96
11070.00	59.79	316	1.7	H	-54.21	0.43	10.60	-44.04	-13.00	-31.04
11070.00	57.63	292	1.3	V	-52.65	0.43	10.60	-42.48	-13.00	-29.48

Remark:

Test Frequency: 18GHz~40GHz

The measurements were more than 20 dB below the limit and not recorded.

13 Frequency stability V.S. Temperature measurement

Test Requirement: FCC Part90.213(a)

Test Method: FCC Part2.1055(a)(1)(b)

ANSI C63.26-2015

Test Mode: Data communicating mode

Limit: FCC:

Frequency range (MHz)	Fixed and base stations (±ppm)	Mobile stations (±ppm)	
		Over 2 watts output power	2 watts or less output power
Below 25	100	100	200
25–50	20	20	50
72–76	5		50
150–174	5	5	50
216–220	1.0		1.0
220–222	0.1	1.5	1.5
421–512	2.5	5	5
806–809	1.0	1.5	1.5
809–824	1.5	2.5	2.5
851–854	1.0	1.5	1.5
854–869	1.5	2.5	2.5
896–901	0.1	1.5	1.5
902–928	2.5	2.5	2.5
902–928	2.5	2.5	2.5
929–930	1.5		
935–940	0.1	1.5	1.5
1427–1435	300	300	300
Above 2450			

13.1 EUT Operation

Operating Environment :

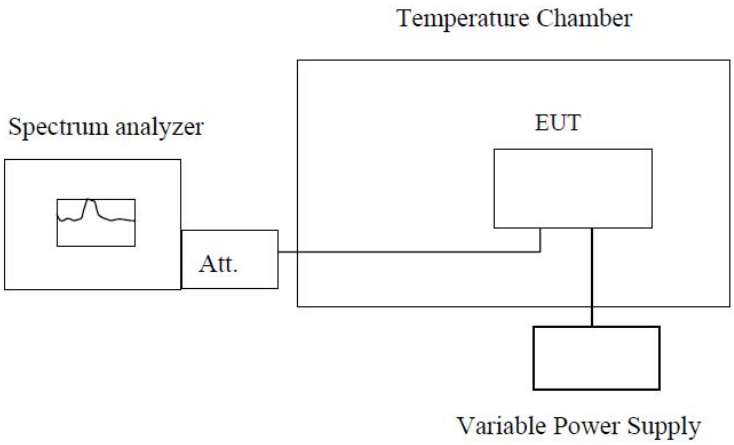
Temperature: 23.5 °C

Humidity: 52.3 % RH

Atmospheric Pressure: 101.3kPa

13.2 Test Procedure

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.



Note : Measurement setup for testing on Antenna connector

13.3 Test Result

Remark: All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.

Chain 0

Test Frequency: 3655MHz E-TM3.1 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	120	0.0327
-25		109	0.0297
-10		115	0.0314
0		112	0.0306
10		111	0.0303
20		109	0.0297
30		117	0.0319
40		116	0.0317
58		111	0.0303

Test Frequency: 3660MHz E-TM3.1 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	107	0.0292
-25		102	0.0279
-10		95	0.0260
0		102	0.0279
10		104	0.0284
20		107	0.0292
30		104	0.0284
40		104	0.0284
58		103	0.0281

Chain 1

Test Frequency: 3655MHz E-TM3.1 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	100	0.0273
-25		117	0.0319
-10		107	0.0292
0		108	0.0295
10		117	0.0319
20		116	0.0317
30		109	0.0297
40		116	0.0317
58		106	0.0289

Test Frequency: 3660MHz E-TM3.1 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	96	0.0262
-25		104	0.0284
-10		99	0.0270
0		103	0.0281
10		108	0.0295
20		102	0.0279
30		95	0.0260
40		98	0.0268
58		104	0.0284

Chain 2

Test Frequency: 3655MHz E-TM3.1 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	109	0.0297
-25		110	0.0300
-10		106	0.0289
0		107	0.0292
10		105	0.0286
20		116	0.0317
30		113	0.0308
40		109	0.0297
58		104	0.0284

Test Frequency: 3660MHz E-TM3.1 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	99	0.0270
-25		102	0.0279
-10		105	0.0287
0		101	0.0276
10		105	0.0287
20		104	0.0284
30		92	0.0251
40		109	0.0298
58		93	0.0254

Chain 3

Test Frequency: 3655MHz E-TM3.1 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	104	0.0284
-25		94	0.0256
-10		105	0.0286
0		99	0.0270
10		96	0.0262
20		103	0.0281
30		104	0.0284
40		92	0.0251
58		103	0.0281

Test Frequency: 3660MHz E-TM3.1 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-40	48	109	0.0298
-25		97	0.0265
-10		101	0.0276
0		105	0.0287
10		108	0.0295
20		113	0.0309
30		110	0.0301
40		104	0.0284
58		113	0.0309

14 Frequency stability V.S. Voltage measurement

Test Requirement: FCC Part90.213(a)

Test Method: FCC Part2.1055(a)(1)(b)

ANSI C63.26-2015

Test Mode: Data communicating mode

Limit: FCC:

Frequency range (MHz)	Fixed and base stations (±ppm)	Mobile stations (±ppm)	
		Over 2 watts output power	2 watts or less output power
Below 25	100	100	200
25–50	20	20	50
72–76	5		50
150–174	5	5	50
216–220	1.0		1.0
220–222	0.1	1.5	1.5
421–512	2.5	5	5
806–809	1.0	1.5	1.5
809–824	1.5	2.5	2.5
851–854	1.0	1.5	1.5
854–869	1.5	2.5	2.5
896–901	0.1	1.5	1.5
902–928	2.5	2.5	2.5
902–928	2.5	2.5	2.5
929–930	1.5		
935–940	0.1	1.5	1.5
1427–1435	300	300	300
Above 2450			

14.1 EUT Operation

Operating Environment :

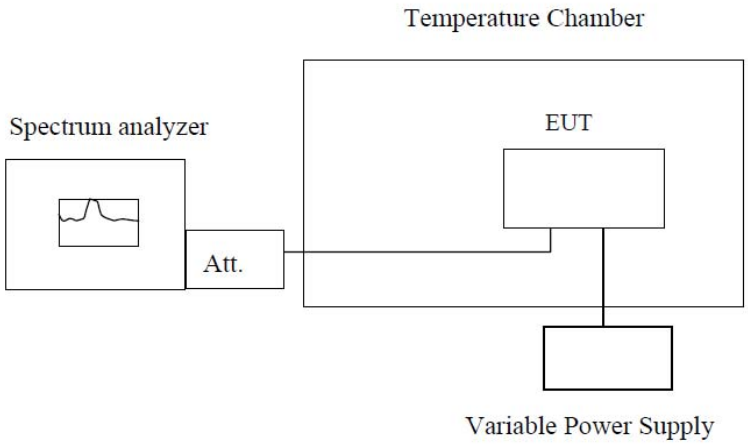
Temperature: 22.9 °C

Humidity: 52.0 % RH

Atmospheric Pressure: 101.3kPa

14.2 Test Procedure

1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.



Note : Measurement setup for testing on Antenna connector

14.3 Test Result

Remark: All three channels of E-TM3.1 have been tested, but only the worst channel and the worst modulation show in this test item.

Chain 0

Test Frequency: 3655MHz QPSK 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	97	0.0265
	48	92	0.0251
	55	100	0.0273

Test Frequency: 3660MHz QPSK 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	108	0.0295
	48	110	0.0301
	55	104	0.0284

Chain 1

Test Frequency: 3655MHz QPSK 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	93	0.0254
	48	101	0.0276
	55	95	0.0259

Test Frequency: 3660MHz QPSK 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	106	0.0290
	48	106	0.0290
	55	107	0.0292

Chain 2

Test Frequency: 3655MHz QPSK 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	100	0.0273
	48	107	0.0292
	55	101	0.0276

Test Frequency: 3660MHz QPSK 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	104	0.0284
	48	97	0.0265
	55	108	0.0295

Chain 3

Test Frequency: 3655MHz QPSK 10MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	104	0.0284
	48	97	0.0265
	55	100	0.0273

Test Frequency: 3660MHz QPSK 20MHz			
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
25	42	98	0.0268
	48	110	0.0301
	55	106	0.0290

15 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS19S04025068W_Photo.

====== End of Report ======