

FCC Test Report

FCC ID : MCLU97B002
Equipment : Femto Cell (AIRAVE 4 LTE)
Model No. : AV100C
Brand Name : Airspan
Applicant : Hon Hai Precision Ind. Co., Ltd.
Address : 5F-1, 5 Hsin-An Road, Hsinchu,
Science-Based Industrial Park, Taiwan, R.O.C
Standard : 47 CFR FCC Part 27 Subpart M
Received Date : Aug. 08, 2018
Tested Date : Aug. 08 ~ Aug. 29, 2018

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FG880701P27	Rev. 01	Initial issue	Sep. 05, 2018

Summary of Test Results

FCC Rules	Description of Test	Measured	Result
2.1046 / 27.50(h)(1)	Output power	Maximum EIRP [dBm]: 25.76	Pass
2.1053 / 27.53(m)(2)	Radiated Emissions	Meet the requirement of limit	Pass
2.1051 / 27.53(m)(2)	Conducted Emissions	Meet the requirement of limit	Pass
2.1051 / 27.53(m)(2)	Channel Edge Measurement	Meet the requirement of limit	Pass
2.1049 / 27.53(m)(6)	Emission Bandwidth	Meet the requirement of limit	Pass
2.1055 / 27.54	Frequency Stability	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	Channel Bandwidth: 5MHz: 2498.5 MHz ~ 2687.5 MHz Channel Bandwidth: 10MHz: 2501.0 MHz ~ 2685.0 MHz Channel Bandwidth: 20MHz: 2506.0 MHz ~ 2680.0 MHz
Modulation Type	QPSK, 16QAM, 64QAM (Uplink)
Duplex Mode	TDD
Category	Cat. 4
Release Version	9
H/W Version	S1
S/W Version	2.2.0.38

1.1.2 Maximum Conducted Power and Emission Designator

Channel Bandwidth	Modulation	Maximum EIRP (W)	Emission Designator
5MHz	QPSK	0.366	4M50G7D
5MHz	16QAM	0.367	4M50W7D
5MHz	64QAM	0.372	4M50W7D
10MHz	QPSK	0.356	8M95G7D
10MHz	16QAM	0.356	8M96W7D
10MHz	64QAM	0.370	8M97W7D
20MHz	QPSK	0.361	17M9G7D
20MHz	16QAM	0.361	17M9W7D
20MHz	64QAM	0.377	17M9W7D

1.1.3 Antenna Details

Ant. No.	Type	Connector	Gain (dBi)	Remark
1	PIFA	UFL	2.97	---

1.1.4 EUT Operational Condition

Power Supply Type	12Vdc from AC adapter		
Operational Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (40°C)	<input checked="" type="checkbox"/> Tmin (0°C)

1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	Adapter	Brand: DVE Model: DSA-42PFB-12 2 120300 I/P: 100-240Vac, 50/60Hz, 1.2A O/P: 12Vdc, 3A Power line: DC 1.5m non-shielded with one core AC 3.5m non-shielded without core
2	External GPS Antenna	10m non-shielded without core
3	RJ45 cable	1m non-shielded without core

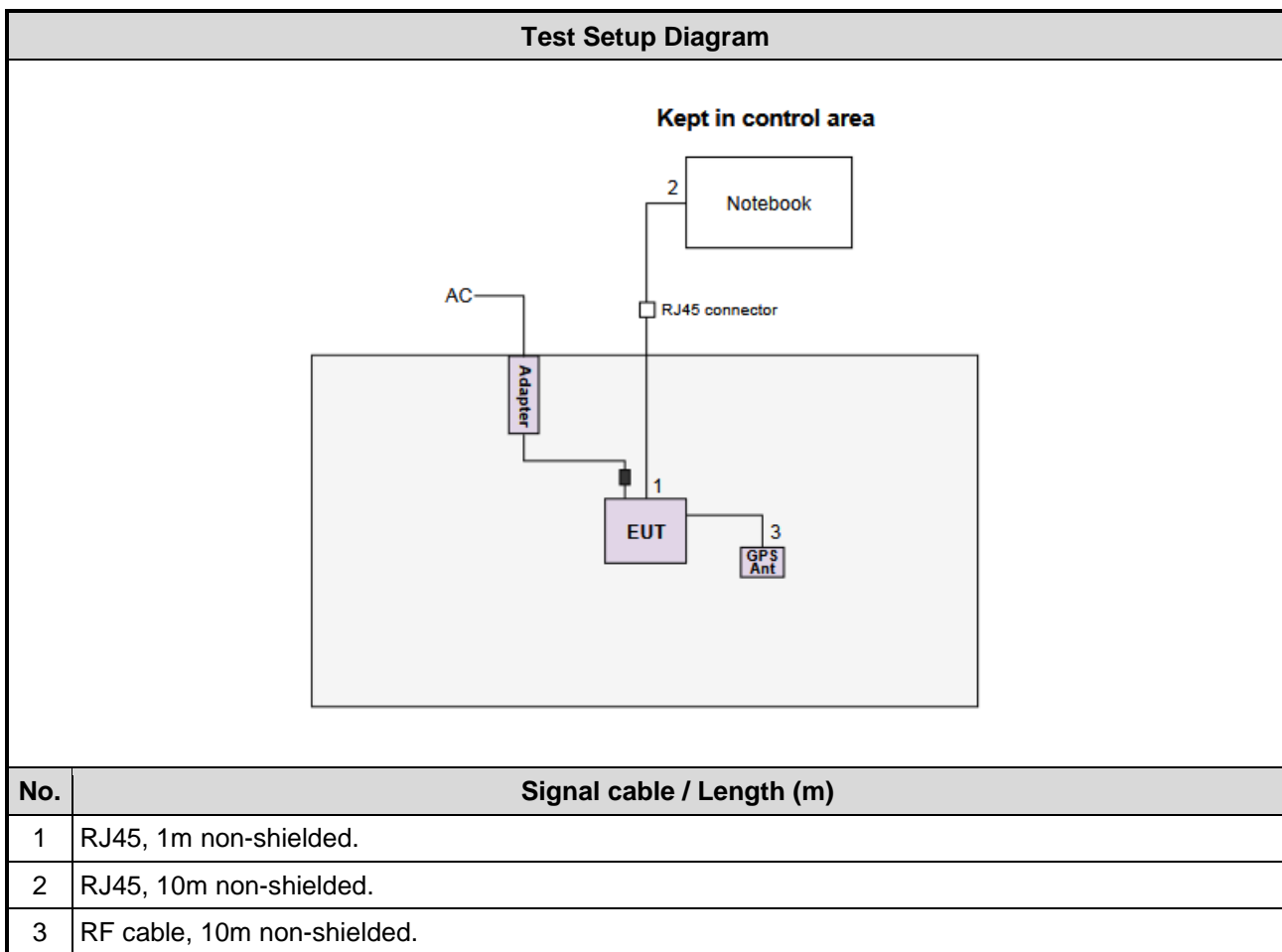
1.1.6 Operating Channel List

Channel Bandwidth (MHz)	Channel	Frequency (MHz)
5	39675	2498.5
5	40620	2593.0
5	41565	2687.5
10	39700	2501.0
10	40620	2593.0
10	41540	2685.0
20	39750	2506.0
20	40620	2593.0
20	41490	2680.0

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E5470	DoC	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 03, 2018	Jan. 02, 2019
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 18, 2018	Jan. 17, 2019
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 23, 2017	Nov. 22, 2018
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2017	Nov. 12, 2018
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 07, 2017	Dec. 06, 2018
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018
Preamplifier	Agilent	83017A	MY39501309	Sep. 25, 2017	Sep. 24, 2018
Preamplifier	MITEQ	TTA1840-35-HG	1864481	Aug. 31, 2017	Aug. 30, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY32487/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Nov. 27, 2017	Nov. 26, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Nov. 27, 2017	Nov. 26, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Nov. 27, 2017	Nov. 26, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Nov. 27, 2017	Nov. 26, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 16, 2018	Apr. 15, 2019
Spectrum Analyzer	R&S	FSV40	101499	Jan. 03, 2018	Jan. 02, 2019
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2017	Nov. 26, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 16, 2017	Oct. 15, 2018
Power Sensor	Anritsu	MA2411B	1207366	Oct. 16, 2017	Oct. 15, 2018
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 01, 2017	Nov. 30, 2018
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards.

47 CFR FCC Part 27 Subpart M

ANSI C63.4-2014

ANSI C63.26-2015

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 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 ($k=2$))

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.134 Hz
Conducted power	± 0.808 dB
Frequency error	± 34.134 Hz
Conducted emission	± 2.670 dB
Radiated emission ≤ 1 GHz	± 3.66 dB
Radiated emission > 1 GHz	± 5.37 dB
Temperature	± 0.6 °C

2 Test Configuration

2.1 Testing Condition and Location Information

Test Item	Test Site	Ambient Condition	Tested By
RF conducted	TH01-WS	22°C / 64%	Aska Huang
Radiated Emissions	03CH03-WS	23-24°C / 62-63%	Vincent Yeh

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Channel Bandwidth	Modulation	Test channel
Output Power	5 MHz	QPSK / 16QAM / 64QAM	39675 / 40620 / 41565
Conducted Emissions	10 MHz	QPSK / 16QAM / 64QAM	39700 / 40620 / 41540
Occupied Bandwidth	20 MHz	QPSK / 16QAM / 64QAM	39750 / 40620 / 41490
Radiated Emission \leq 1GHz	5 MHz	64QAM	39675
	10 MHz	64QAM	39700
	20 MHz	64QAM	41490
Radiated Emission $>$ 1GHz	5 MHz	64QAM	39675 / 40620 / 41565
	10 MHz	64QAM	39700 / 40620 / 41540
	20 MHz	64QAM	39750 / 40620 / 41490
Band Edge	5 MHz	QPSK / 16QAM / 64QAM	39675 / 41565
	10 MHz	QPSK / 16QAM / 64QAM	39700 / 41540
	20 MHz	QPSK / 16QAM / 64QAM	39750 / 41490
Frequency Stability	5 MHz	Un-modulation	40620
	10 MHz		40620
	20 MHz		40620

3 Test Results

3.1 Output Power

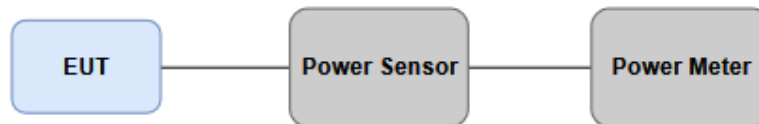
3.1.1 Limit of Output Power

The maximum EIRP of base station shall not exceed $33 \text{ dBW} + 10\log(X/Y) \text{ dBW}$, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

3.1.2 Test Procedures

1. The EUT is set to maximum output power level at low / middel / high channel.
2. Measure the output power of low / middle / high channel of the EUT.
3. Determine the EIRP by adding the effective antenna gain to the adjusted power level.

3.1.3 Test Setup



3.1.4 Test Result of Conducted and EIRP

Channel Bandwidth: 5MHz

Conducted Power

Modulation	Channel	Channel Freq. (MHz)	Conducted AV Power (dBm)		
			ANT1	ANT2	Total
QPSK	39675	2498.5	16.62	16.65	19.65
QPSK	40620	2593.0	16.53	16.42	19.49
QPSK	41565	2687.5	16.61	16.52	19.58
16QAM	39675	2498.5	16.63	16.63	19.64
16QAM	40620	2593.0	16.71	16.61	19.67
16QAM	41565	2687.5	16.63	16.43	19.54
64QAM	39675	2498.5	16.71	16.73	19.73
64QAM	40620	2593.0	16.73	16.67	19.71
64QAM	41565	2687.5	16.65	16.61	19.64

EIRP

QPSK							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39675	2498.5	19.65	0.092	5.98	25.63	0.366	61.73
40620	2593.0	19.49	0.089	5.98	25.47	0.352	61.73
41565	2687.5	19.58	0.091	5.98	25.56	0.360	61.73
16QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39675	2498.5	19.64	0.092	5.98	25.62	0.365	61.73
40620	2593.0	19.67	0.093	5.98	25.65	0.367	61.73
41565	2687.5	19.54	0.090	5.98	25.52	0.356	61.73
64QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39675	2498.5	19.73	0.094	5.98	25.71	0.372	61.73
40620	2593.0	19.71	0.094	5.98	25.69	0.371	61.73
41565	2687.5	19.64	0.092	5.98	25.62	0.365	61.73

Note:

1. EIRP limit = 33 dBW + 10log(4.4791/6) dBW = 31.73 dBW = 61.73 dBm
2. Directional gain = 2.97 + 10* log(2/1) = 5.98 dBi.

Channel Bandwidth: 10MHz

Conducted Power

Modulation	Channel	Channel Freq. (MHz)	Conducted AV Power (dBm)		
			ANT1	ANT2	Total
QPSK	39700	2501.0	16.52	16.51	19.53
QPSK	40620	2593.0	16.53	16.48	19.52
QPSK	41540	2685.0	16.51	16.55	19.54
16QAM	39700	2501.0	16.61	16.43	19.53
16QAM	40620	2593.0	16.53	16.48	19.52
16QAM	41540	2685.0	16.61	16.36	19.50
64QAM	39700	2501.0	16.67	16.71	19.70
64QAM	40620	2593.0	16.71	16.62	19.68
64QAM	41540	2685.0	16.58	16.72	19.66

EIRP

QPSK							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39700	2501.0	19.53	0.090	5.98	25.51	0.356	64.73
40620	2593.0	19.52	0.090	5.98	25.50	0.355	64.73
41540	2685.0	19.54	0.090	5.98	25.52	0.356	64.73
16QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39700	2501.0	19.53	0.090	5.98	25.51	0.356	64.73
40620	2593.0	19.52	0.090	5.98	25.50	0.355	64.73
41540	2685.0	19.50	0.089	5.98	25.48	0.353	64.73
64QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39700	2501.0	19.70	0.093	5.98	25.68	0.370	64.73
40620	2593.0	19.68	0.093	5.98	25.66	0.368	64.73
41540	2685.0	19.66	0.092	5.98	25.64	0.366	64.73

Note:

1. EIRP limit = 33 dBW + 10log(8.9415/6) dBW = 34.73 dBW = 64.73 dBm
2. Directional gain = 2.97 + 10* log(2/1) = 5.98 dBi.

Channel Bandwidth: 20MHz

Conducted Power

Modulation	Channel	Channel Freq. (MHz)	Conducted AV Power (dBm)		
			ANT1	ANT2	Total
QPSK	39750	2506.0	16.42	16.72	19.58
QPSK	40620	2593.0	16.43	16.75	19.60
QPSK	41490	2680.0	16.38	16.74	19.57
16QAM	39750	2506.0	16.35	16.62	19.50
16QAM	40620	2593.0	16.22	16.53	19.39
16QAM	41490	2680.0	16.31	16.85	19.60
64QAM	39750	2506.0	16.63	16.83	19.74
64QAM	40620	2593.0	16.62	16.85	19.75
64QAM	41490	2680.0	16.68	16.86	19.78

EIRP

QPSK							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39750	2506.0	19.58	0.091	5.98	25.56	0.360	67.73
40620	2593.0	19.60	0.091	5.98	25.58	0.361	67.73
41490	2680.0	19.57	0.091	5.98	25.55	0.359	67.73
16QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39750	2506.0	19.50	0.089	5.98	25.48	0.353	67.73
40620	2593.0	19.39	0.087	5.98	25.37	0.344	67.73
41490	2680.0	19.60	0.091	5.98	25.58	0.361	67.73
64QAM							
Channel	Channel Freq. (MHz)	Total Conducted AV Power (dBm)	Conducted Power (W)	Directional Gain (dBi)	E.I.R.P Power (dBm)	E.I.R.P Power (W)	E.I.R.P Limit (dBm)
39750	2506.0	19.74	0.094	5.98	25.72	0.373	67.73
40620	2593.0	19.75	0.094	5.98	25.73	0.374	67.73
41490	2680.0	19.78	0.095	5.98	25.76	0.377	67.73

Note:

1. EIRP limit = 33 dBW + 10log(17.842/6) dBW = 37.73 dBW = 67.73 dBm
2. Directional gain = 2.97 + 10* log(2/1) = 5.98 dBi.

3.2 Radiated Emissions

3.2.1 Limit of Radiated Emissions

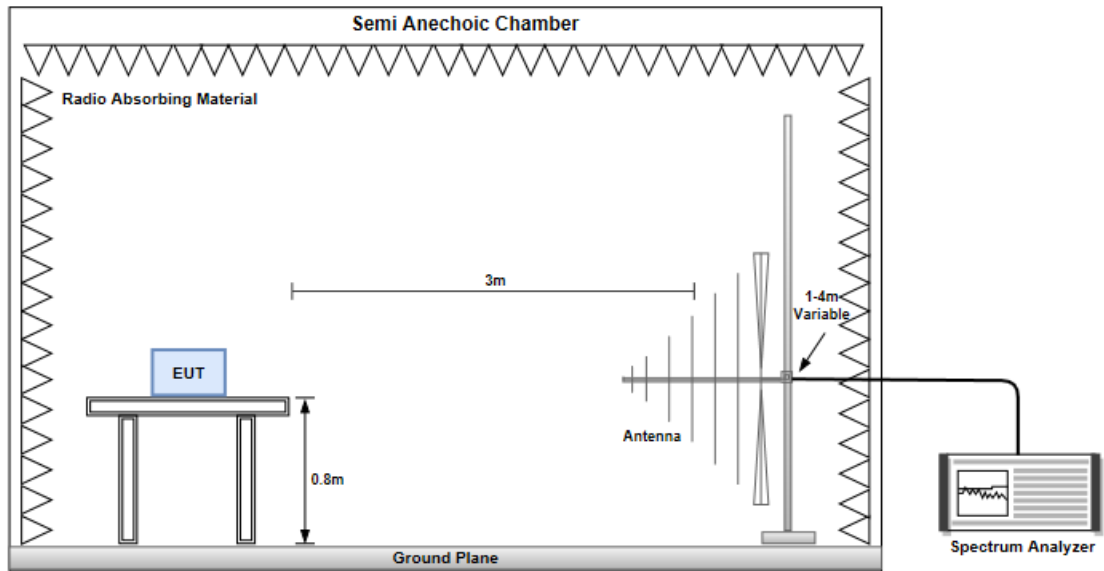
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB equal to -13dBm.

3.2.2 Test Procedures

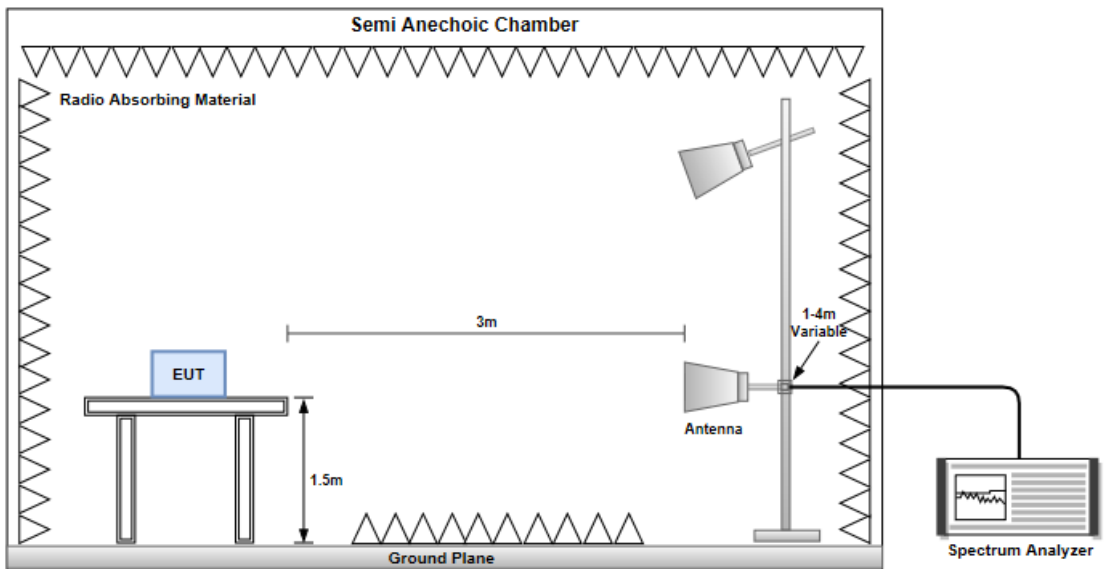
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
4. After finding the max radiated emission, substitution method will be used for getting effective radiated power. EUT will be removed and substitution antenna will be placed at same position. Signal generator will output CW signal to substitution antenna through a RF cable. Rotate turntable and move antenna to find maximum radiated emission. Adjust output power of signal generator to let the maximum radiated emission is same as step 3. Record the output power level.
5. E.I.R.P = output power of step 4 + gain of substitution antenna – cable loss of RF cable.

3.2.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



Channel Bandwidth: 5MHz

3.2.4 Test Result of Radiated Emissions below 1GHz

Mode		64QAM, Channel: 39675					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
63.95	H	-69.26	-13.00	-56.26	-69.17	-61.75	-7.51
249.22	H	-57.38	-13.00	-44.38	-54.30	-61.51	4.13
258.92	H	-59.70	-13.00	-46.70	-56.91	-63.81	4.11
634.31	H	-58.01	-13.00	-45.01	-63.54	-61.54	3.53
825.40	H	-62.73	-13.00	-49.73	-72.06	-65.78	3.05
1000.00	H	-52.16	-13.00	-39.16	-63.05	-54.48	2.32
98.87	V	-68.77	-13.00	-55.77	-67.74	-68.97	0.20
242.43	V	-51.58	-13.00	-38.58	-53.66	-55.69	4.11
258.92	V	-55.40	-13.00	-42.40	-57.60	-59.41	4.01
651.77	V	-59.75	-13.00	-46.75	-68.26	-63.34	3.59
825.40	V	-61.73	-13.00	-48.73	-71.23	-64.78	3.05
1000.00	V	-54.55	-13.00	-41.55	-67.14	-56.87	2.32

Note: EIRP = S.G Power value + Correction factor.

3.2.5 Test Result of Radiated Emissions above 1GHz

Mode		64QAM, Channel: 39675					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
4997.00	H	-42.10	-13.00	-29.10	-59.61	-47.96	5.86
9994.00	H	-40.09	-13.00	-27.09	-63.24	-41.77	1.68
14991.00	H	-34.16	-13.00	-21.16	-59.06	-34.97	0.81
4997.00	V	-42.32	-13.00	-29.32	-59.89	-48.18	5.86
9994.00	V	-40.93	-13.00	-27.93	-62.37	-42.61	1.68
14991.00	V	-36.53	-13.00	-23.53	-64.32	-37.34	0.81

Mode		64QAM, Channel: 40620					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5186.00	H	-44.68	-13.00	-31.68	-61.55	-50.61	5.93
10372.00	H	-41.02	-13.00	-28.02	-63.42	-42.13	1.11
15558.00	H	-33.76	-13.00	-20.76	-59.92	-37.29	3.53
5186.00	V	-41.45	-13.00	-28.45	-58.62	-47.38	5.93
10372.00	V	-41.81	-13.00	-28.81	-63.02	-42.92	1.11
15558.00	V	-35.38	-13.00	-22.38	-61.83	-38.91	3.53

Mode		64QAM, Channel: 41565					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5375.00	H	-40.80	-13.00	-27.80	-56.87	-46.83	6.03
10750.00	H	-42.15	-13.00	-29.15	-64.30	-42.90	0.75
16125.00	H	-36.86	-13.00	-23.86	-63.14	-40.76	3.90
5375.00	V	-42.04	-13.00	-29.04	-58.71	-48.07	6.03
10750.00	V	-41.69	-13.00	-28.69	-63.36	-42.44	0.75
16125.00	V	-33.22	-13.00	-20.22	-60.04	-37.12	3.90

Note: EIRP = S.G Power value + Correction factor.

Channel Bandwidth: 10MHz

3.2.6 Test Result of Radiated Emissions below 1GHz

Mode	64QAM, Channel: 39700						
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
62.58	H	-70.64	-13.00	-57.64	-70.63	-62.66	-7.98
250.36	H	-58.69	-13.00	-45.69	-55.64	-62.82	4.13
258.00	H	-59.69	-13.00	-46.69	-56.87	-63.80	4.11
635.41	H	-59.57	-13.00	-46.57	-65.11	-63.11	3.54
825.60	H	-63.61	-13.00	-50.61	-72.94	-66.66	3.05
1000.00	H	-53.36	-13.00	-40.36	-64.25	-55.68	2.32
99.64	V	-69.69	-13.00	-56.69	-68.69	-69.88	0.19
243.23	V	-52.36	-13.00	-39.36	-54.47	-56.48	4.12
258.47	V	-56.31	-13.00	-43.31	-58.51	-60.42	4.11
652.90	V	-60.00	-13.00	-47.00	-68.52	-63.59	3.59
825.40	V	-61.73	-13.00	-48.73	-71.23	-64.78	3.05
1000.00	V	-55.61	-13.00	-42.61	-68.20	-57.93	2.32

Note: EIRP = S.G Power value + Correction factor.

3.2.7 Test Result of Radiated Emissions above 1GHz

Mode		64QAM, Channel: 39700					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5002.00	H	-36.91	-13.00	-23.91	-54.41	-42.77	5.86
10004.00	H	-39.81	-13.00	-26.81	-62.99	-41.48	1.67
15006.00	H	-35.09	-13.00	-22.09	-60.03	-35.95	0.86
5002.00	V	-44.13	-13.00	-31.13	-61.63	-49.99	5.86
10004.00	V	-41.45	-13.00	-28.45	-62.90	-43.12	1.67
15006.00	V	-37.25	-13.00	-24.25	-65.07	-38.11	0.86

Mode		64QAM, Channel: 40620					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5186.00	H	-39.42	-13.00	-26.42	-56.29	-45.35	5.93
10372.00	H	-40.96	-13.00	-27.96	-63.36	-42.07	1.11
15558.00	H	-33.57	-13.00	-20.57	-59.73	-37.10	3.53
5186.00	V	-43.65	-13.00	-30.65	-60.82	-49.58	5.93
10372.00	V	-42.28	-13.00	-29.28	-63.49	-43.39	1.11
15558.00	V	-35.66	-13.00	-22.66	-62.11	-39.19	3.53

Mode		64QAM, Channel: 41540					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5370.00	H	-36.35	-13.00	-23.35	-52.44	-42.38	6.03
10740.00	H	-40.70	-13.00	-27.70	-62.85	-41.45	0.75
16110.00	H	-37.57	-13.00	-24.57	-63.75	-41.52	3.95
5370.00	V	-43.98	-13.00	-30.98	-60.66	-50.01	6.03
10740.00	V	-41.20	-13.00	-28.20	-62.85	-41.95	0.75
16110.00	V	-34.06	-13.00	-21.06	-60.85	-38.01	3.95

Note: EIRP = S.G Power value + Correction factor.

Channel Bandwidth: 20MHz

3.2.8 Test Result of Radiated Emissions below 1GHz

Mode	64QAM, Channel: 41490						
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
30.97	H	-67.94	-13.00	-54.94	-75.90	-54.05	-13.89
61.04	H	-70.49	-13.00	-57.49	-70.56	-61.99	-8.50
233.70	H	-62.44	-13.00	-49.44	-58.85	-66.54	4.10
249.22	H	-57.95	-13.00	-44.95	-54.87	-62.08	4.13
258.92	H	-61.46	-13.00	-48.46	-58.67	-65.57	4.11
623.64	H	-59.43	-13.00	-46.43	-64.79	-62.92	3.49
30.97	V	-68.75	-13.00	-55.75	-64.60	-54.86	-13.89
67.83	V	-69.23	-13.00	-56.23	-65.85	-63.03	-6.20
249.22	V	-55.41	-13.00	-42.41	-57.67	-59.54	4.13
258.92	V	-58.82	-13.00	-45.82	-61.02	-62.93	4.11
477.17	V	-65.85	-13.00	-52.85	-69.47	-69.68	3.83
825.40	V	-61.39	-13.00	-48.39	-70.89	-64.44	3.05

Note: EIRP = S.G Power value + Correction factor.

3.2.9 Test Result of Radiated Emissions above 1GHz

Mode		64QAM, Channel: 39750					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5012.00	H	-45.99	-13.00	-32.99	-60.73	-51.85	5.86
10024.00	H	-39.56	-13.00	-26.56	-63.82	-41.20	1.64
15036.00	H	-36.42	-13.00	-23.42	-61.50	-37.44	1.02
5012.00	V	-48.01	-13.00	-35.01	-62.15	-53.87	5.86
10024.00	V	-41.01	-13.00	-28.01	-63.25	-42.65	1.64
15036.00	V	-37.19	-13.00	-24.19	-65.30	-38.21	1.02

Mode		64QAM, Channel: 40620					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5186.00	H	-47.69	-13.00	-34.69	-62.37	-53.62	5.93
10372.00	H	-39.85	-13.00	-26.85	-63.70	-40.96	1.11
15558.00	H	-34.76	-13.00	-21.76	-62.38	-38.29	3.53
5186.00	V	-46.29	-13.00	-33.29	-60.54	-52.22	5.93
10372.00	V	-41.75	-13.00	-28.75	-64.25	-42.86	1.11
15558.00	V	-36.29	-13.00	-23.29	-63.21	-39.82	3.53

Mode		64QAM, Channel: 41490					
Frequency (MHz)	Antenna Polarity	E.I.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
5360.00	H	-41.54	-13.00	-28.54	-55.80	-47.56	6.02
10720.00	H	-40.29	-13.00	-27.29	-64.13	-41.06	0.77
16080.00	H	-30.94	-13.00	-17.94	-58.67	-35.00	4.06
5360.00	V	-46.54	-13.00	-33.54	-60.35	-52.56	6.02
10720.00	V	-41.40	-13.00	-28.40	-64.41	-42.17	0.77
16080.00	V	-36.66	-13.00	-23.66	-62.81	-40.72	4.06

Note: EIRP = S.G Power value + Correction factor.

3.3 Conducted Emissions

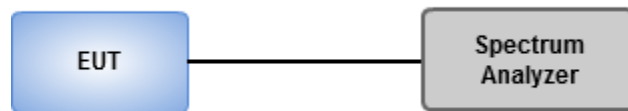
3.3.1 Limit of Conducted Emissions

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 equal to -13dBm.

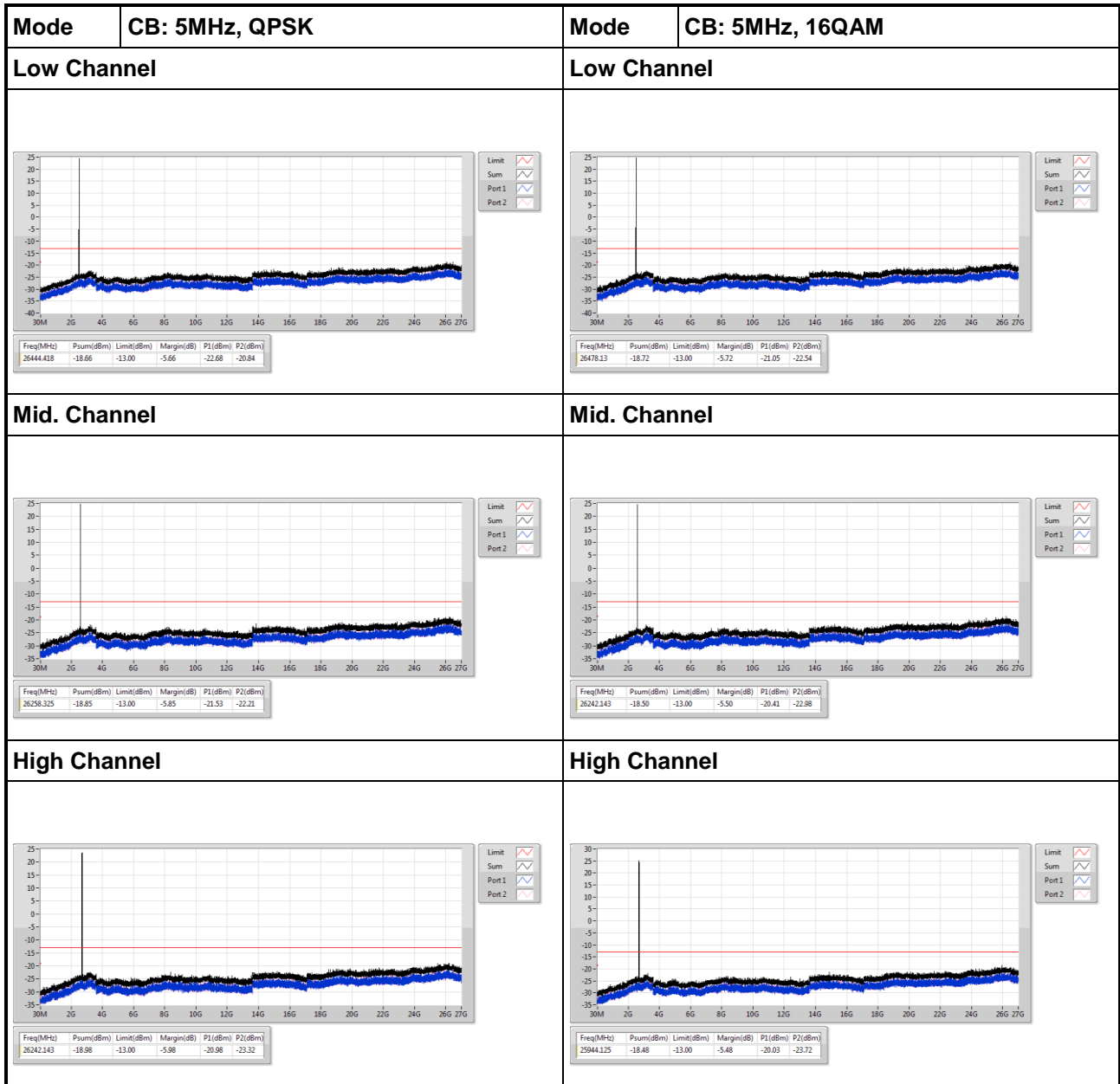
3.3.2 Test Procedures

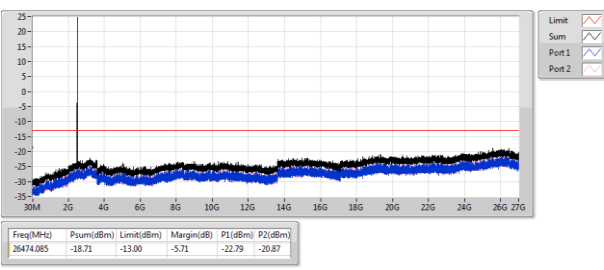
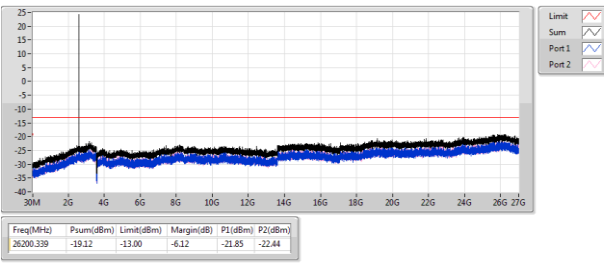
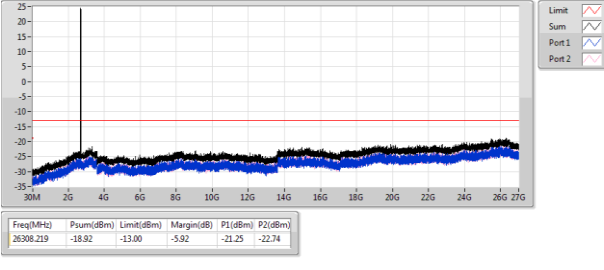
1. Lowest, middle and highest operating channels are tested for this item.
2. Scan frequency range is from 30MHz~27GHz.
3. Set RBW = 1MHz, VBW = 3MHz, detector = average, sweep time = auto.
4. Record the max trace value and capture the test plot of each sub frequency band.

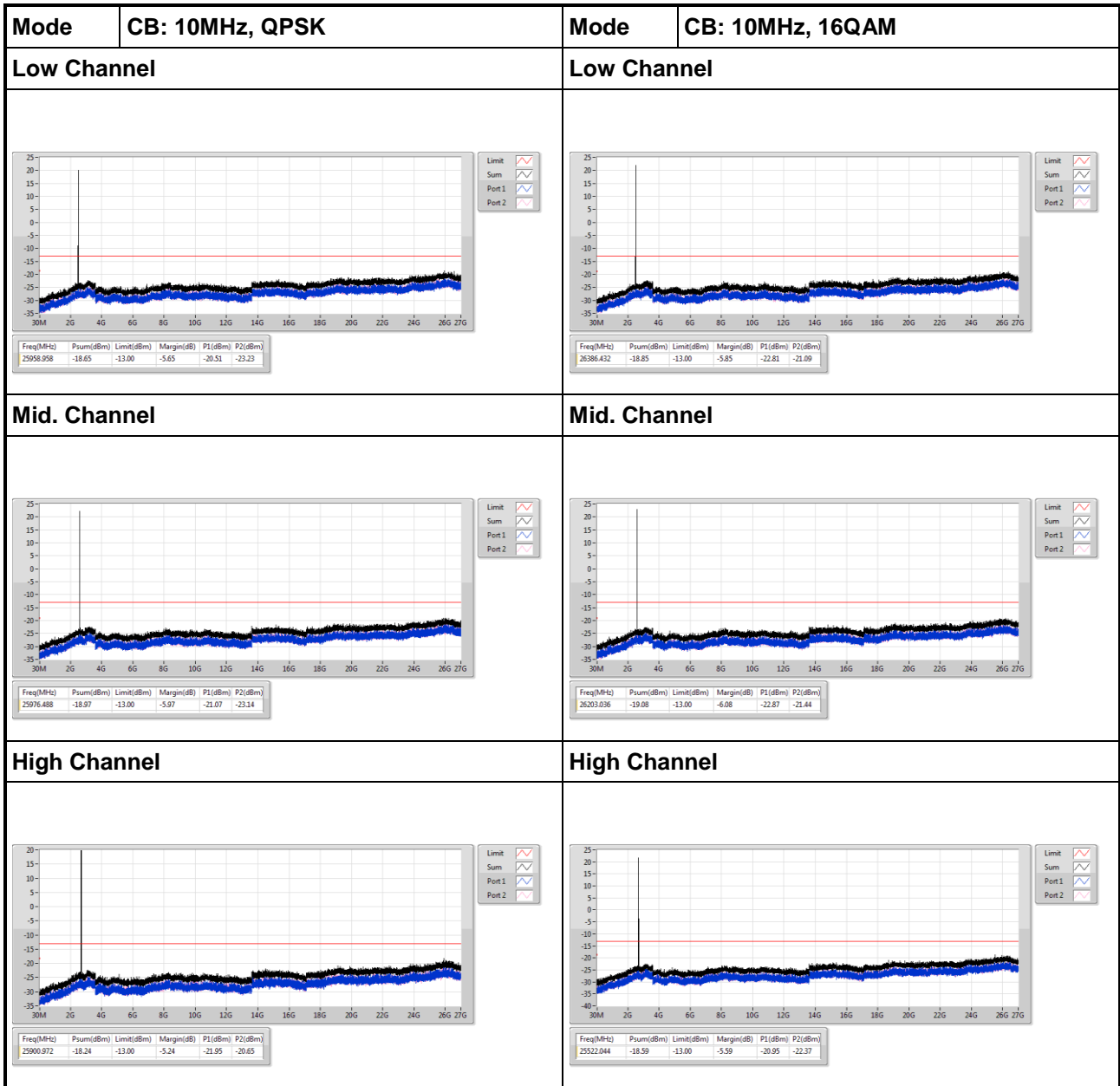
3.3.3 Test Setup

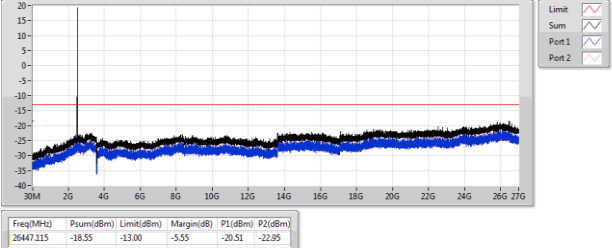
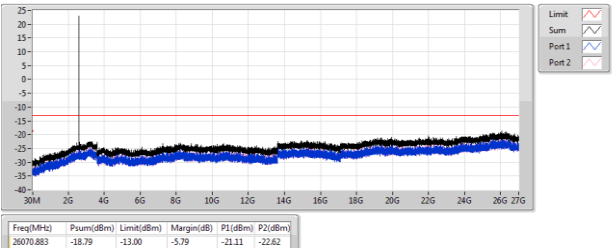
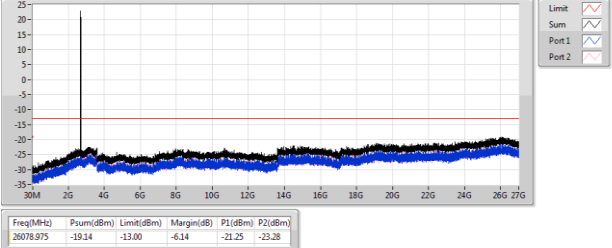


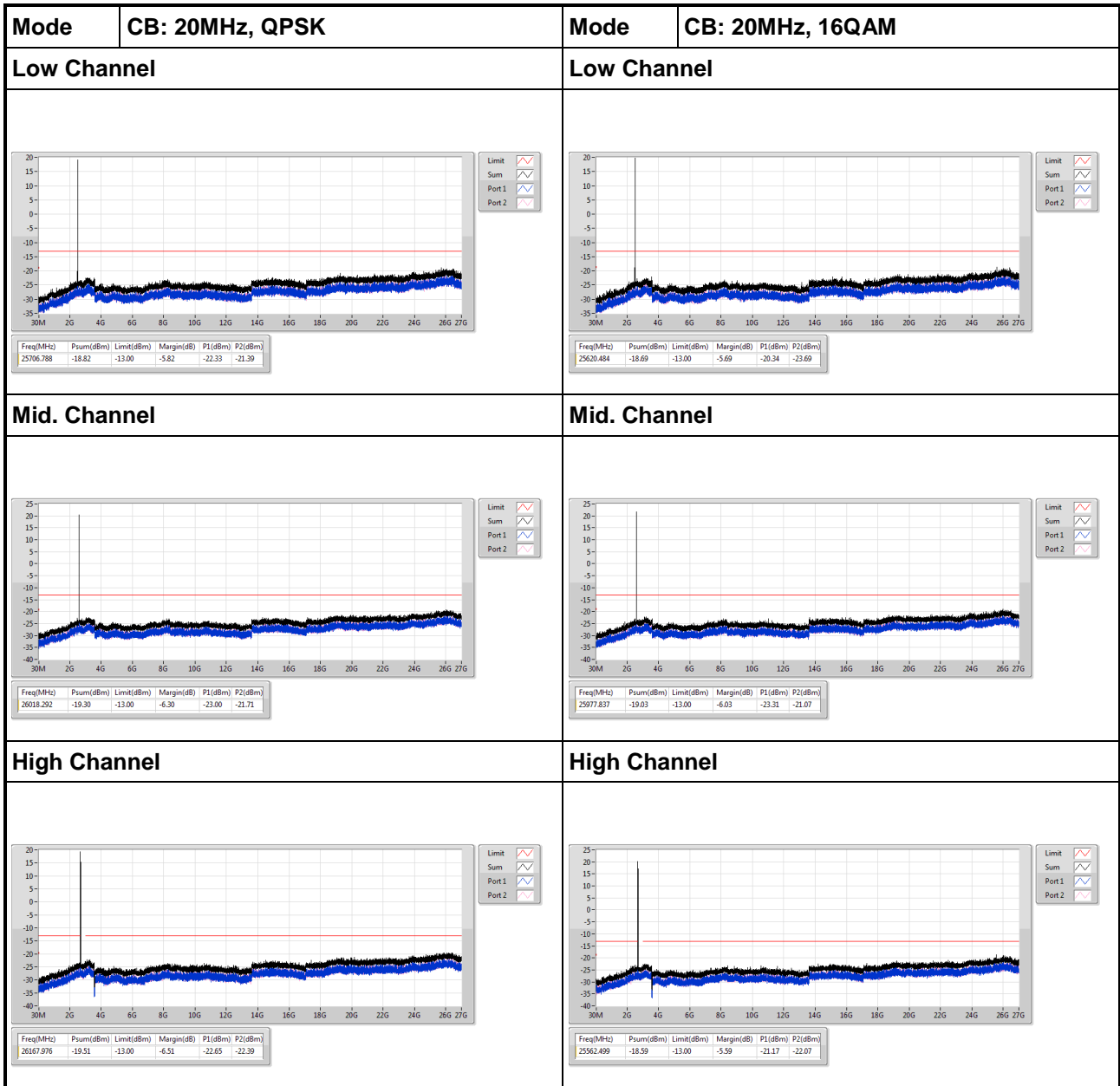
3.3.4 Test Result of Conducted Emissions

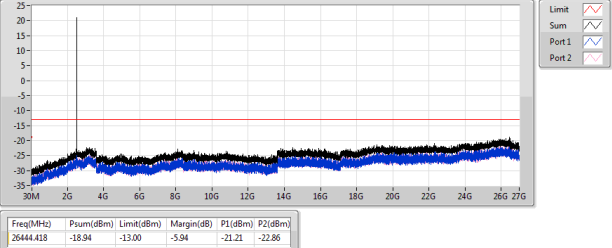
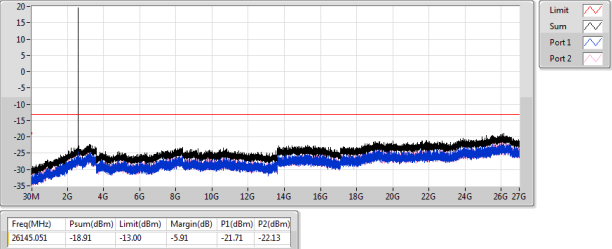
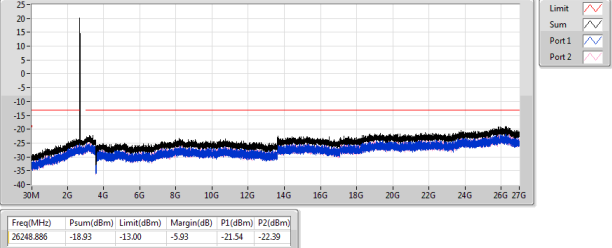


Mode	CB: 5MHz, 64QAM	---												
Low Channel		---												
 <table border="1" data-bbox="159 672 446 716"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26474.085</td> <td>-18.71</td> <td>-13.00</td> <td>-5.71</td> <td>-22.79</td> <td>-20.87</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26474.085	-18.71	-13.00	-5.71	-22.79	-20.87	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26474.085	-18.71	-13.00	-5.71	-22.79	-20.87									
Mid. Channel		---												
 <table border="1" data-bbox="159 1075 446 1120"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26200.339</td> <td>-19.12</td> <td>-13.00</td> <td>-6.12</td> <td>-21.85</td> <td>-22.44</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26200.339	-19.12	-13.00	-6.12	-21.85	-22.44	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26200.339	-19.12	-13.00	-6.12	-21.85	-22.44									
High Channel		---												
 <table border="1" data-bbox="159 1478 446 1523"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26308.219</td> <td>-18.92</td> <td>-13.00</td> <td>-5.92</td> <td>-21.25</td> <td>-22.74</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26308.219	-18.92	-13.00	-5.92	-21.25	-22.74	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26308.219	-18.92	-13.00	-5.92	-21.25	-22.74									



Mode	CB: 10MHz, 64QAM	---												
Low Channel		---												
 <table border="1" data-bbox="159 672 454 705"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26447.115</td> <td>-18.55</td> <td>-13.00</td> <td>-5.55</td> <td>-20.51</td> <td>-22.95</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26447.115	-18.55	-13.00	-5.55	-20.51	-22.95	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26447.115	-18.55	-13.00	-5.55	-20.51	-22.95									
Mid. Channel		---												
 <table border="1" data-bbox="159 1066 454 1099"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26070.883</td> <td>-18.79</td> <td>-13.00</td> <td>-5.79</td> <td>-21.11</td> <td>-22.62</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26070.883	-18.79	-13.00	-5.79	-21.11	-22.62	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26070.883	-18.79	-13.00	-5.79	-21.11	-22.62									
High Channel		---												
 <table border="1" data-bbox="159 1469 454 1503"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26078.975</td> <td>-19.14</td> <td>-13.00</td> <td>-6.14</td> <td>-21.25</td> <td>-23.28</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26078.975	-19.14	-13.00	-6.14	-21.25	-23.28	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26078.975	-19.14	-13.00	-6.14	-21.25	-23.28									



Mode	CB: 20MHz, 64QAM	---												
Low Channel		---												
 <table border="1" data-bbox="159 672 454 705"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26444.418</td> <td>-18.94</td> <td>-13.00</td> <td>-5.94</td> <td>-21.21</td> <td>-22.86</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26444.418	-18.94	-13.00	-5.94	-21.21	-22.86	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26444.418	-18.94	-13.00	-5.94	-21.21	-22.86									
Mid. Channel		---												
 <table border="1" data-bbox="159 1070 454 1104"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26145.051</td> <td>-18.91</td> <td>-13.00</td> <td>-5.91</td> <td>-21.71</td> <td>-22.13</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26145.051	-18.91	-13.00	-5.91	-21.71	-22.13	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26145.051	-18.91	-13.00	-5.91	-21.71	-22.13									
High Channel		---												
 <table border="1" data-bbox="159 1469 454 1503"> <thead> <tr> <th>Freq(MHz)</th> <th>Psum(dBm)</th> <th>Limit(dBm)</th> <th>Margin(dB)</th> <th>P1(dBm)</th> <th>P2(dBm)</th> </tr> </thead> <tbody> <tr> <td>26248.886</td> <td>-18.93</td> <td>-13.00</td> <td>-5.93</td> <td>-21.54</td> <td>-22.39</td> </tr> </tbody> </table>		Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)	26248.886	-18.93	-13.00	-5.93	-21.54	-22.39	---
Freq(MHz)	Psum(dBm)	Limit(dBm)	Margin(dB)	P1(dBm)	P2(dBm)									
26248.886	-18.93	-13.00	-5.93	-21.54	-22.39									

3.4 Channel Edge

3.4.1 Limit of Channel Edge

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 equal to -13dBm

3.4.2 Test Procedures

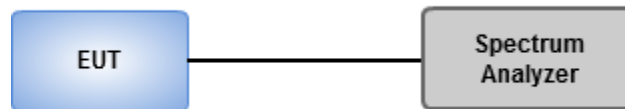
For 2495 ~ 2520 MHz / 2665 ~ 2691 MHz

1. Lowest and highest operating channels are tested for this item.
2. Set RBW = 1% of emission bandwidth, VBW = 3 x RBW, detector = RMS, sweep time = auto.
3. Enable adjacent channel power of spectrum analyzer to measure power of channel edge
4. Record the max trace value and capture the test plot.

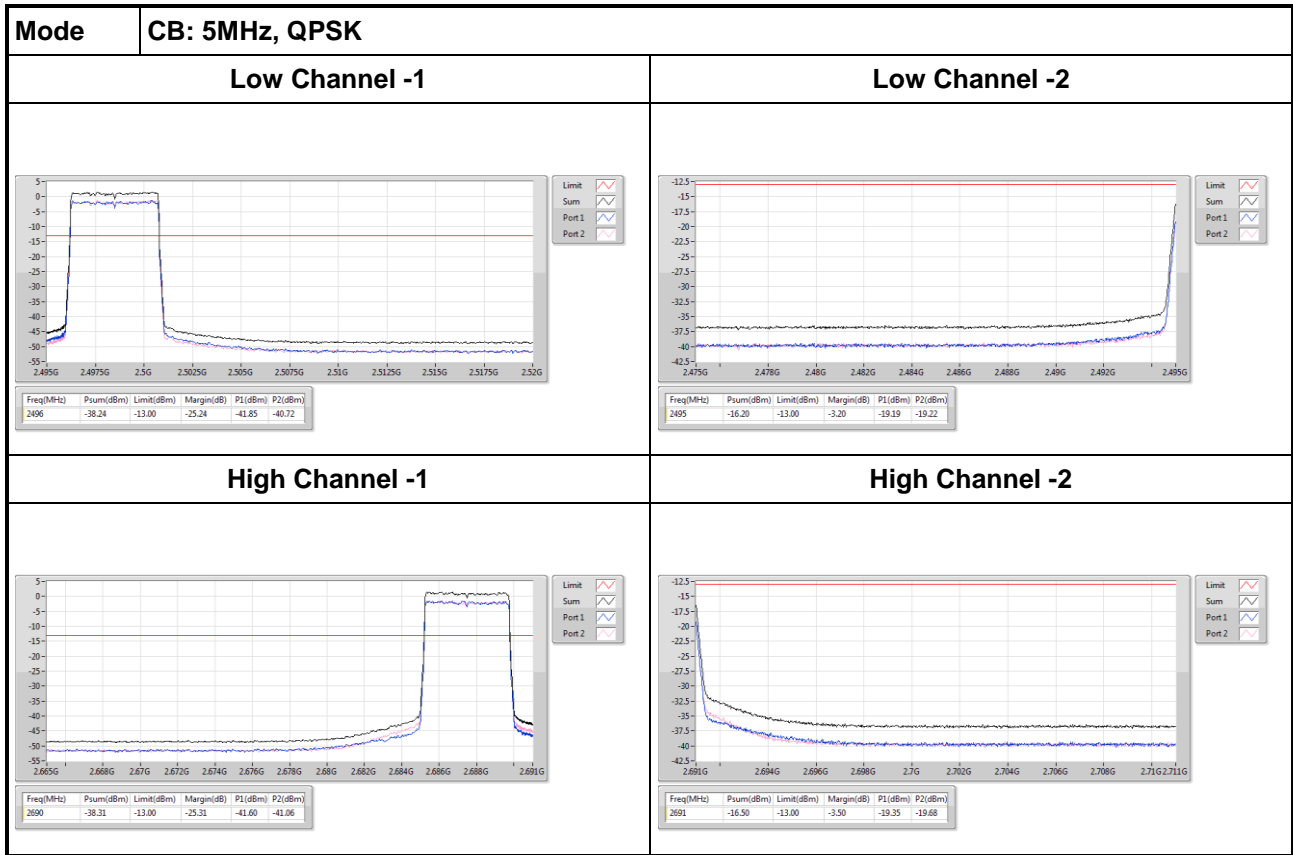
For 2475 ~ 2495 MHz / 2691 ~ 2711 MHz

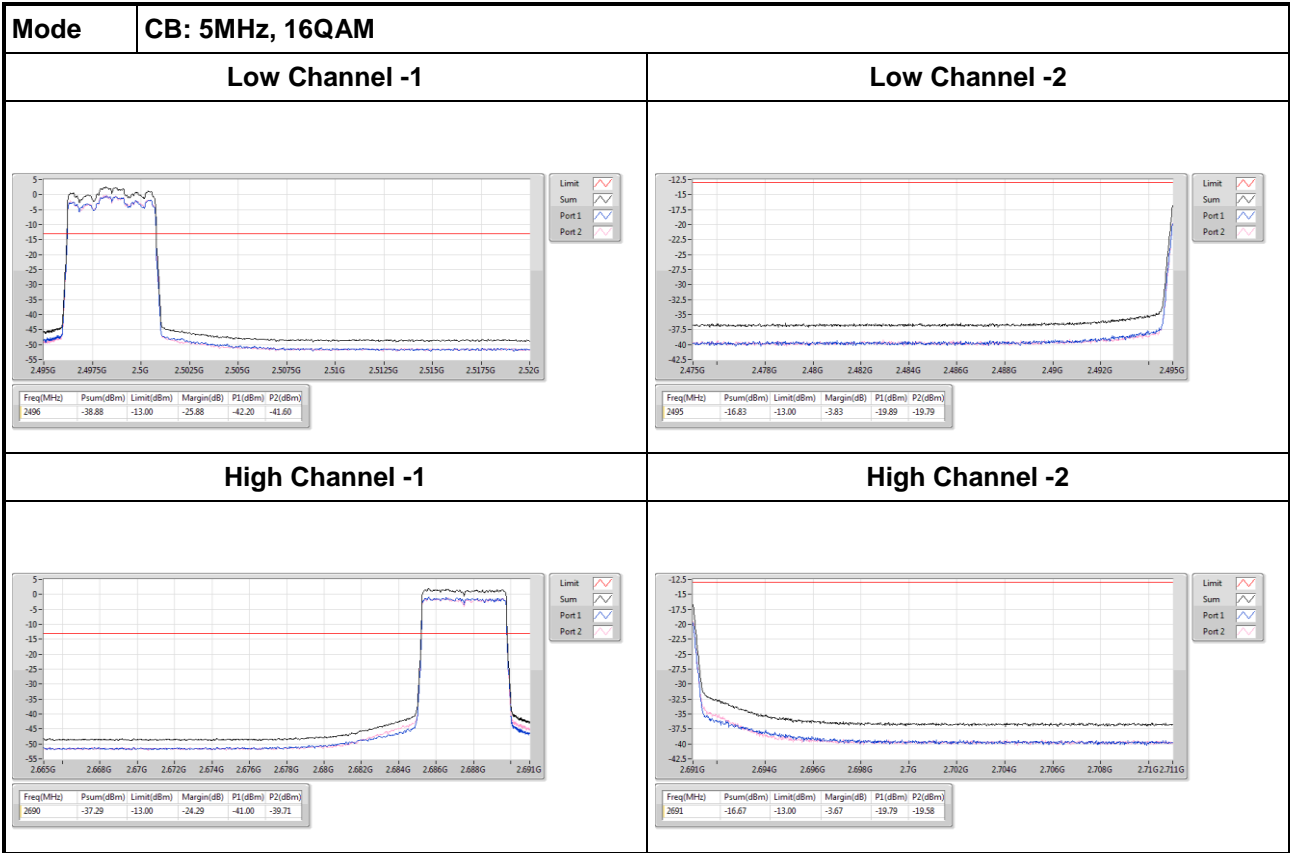
1. Lowest and highest operating channels are tested for this item.
2. Set RBW = 1MHz, VBW = 3MHz, detector = RMS, sweep time = auto.
3. Record the max trace value and capture the test plot.

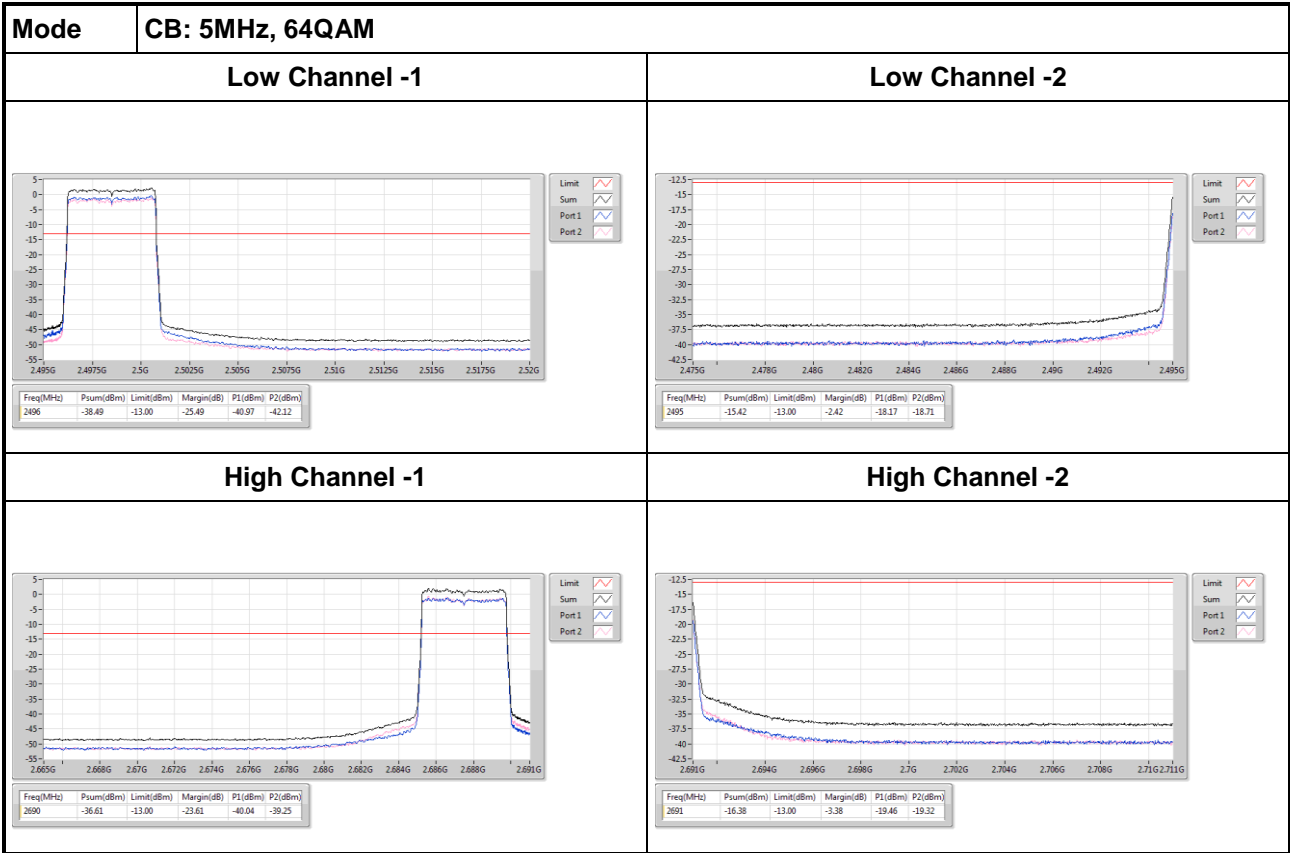
3.4.3 Test Setup

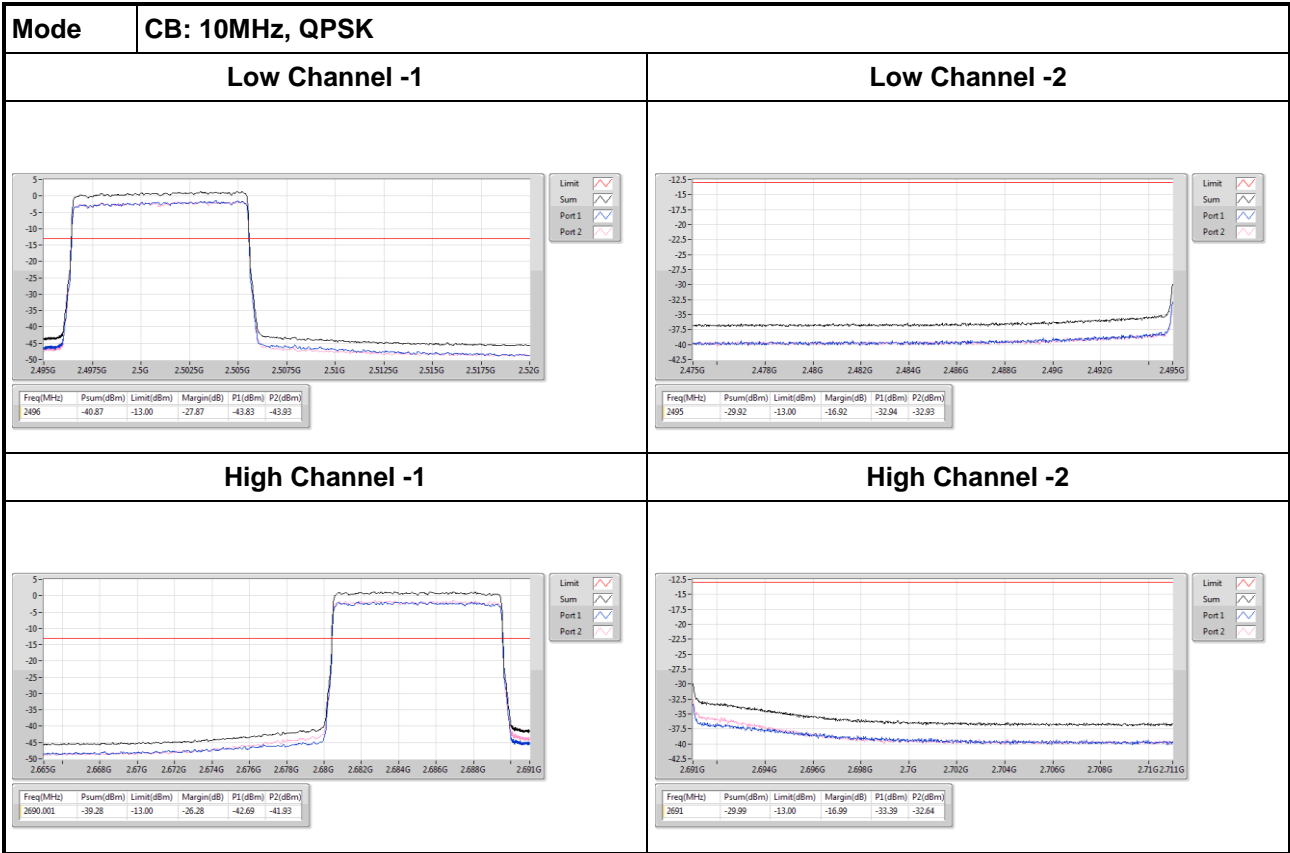


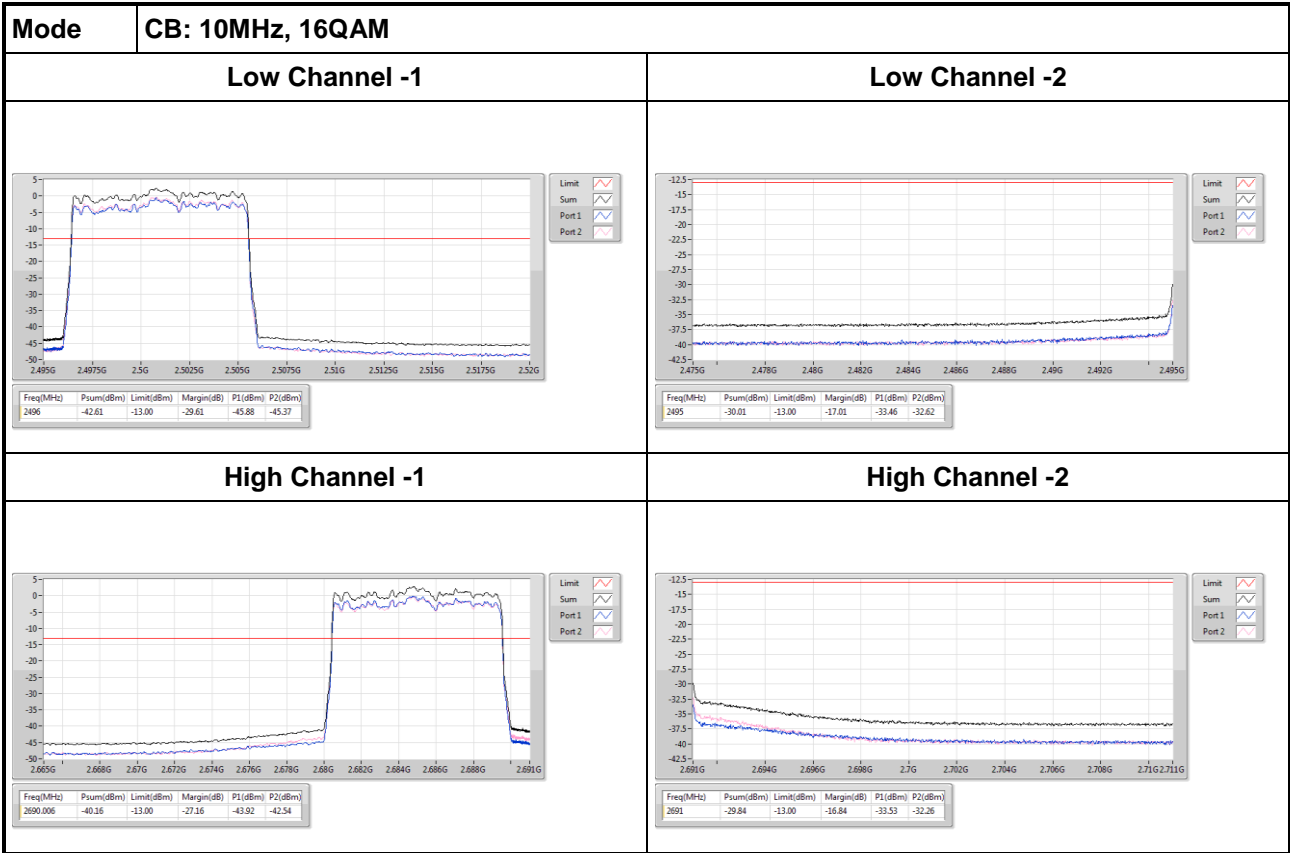
3.4.4 Test Result of Band Edge

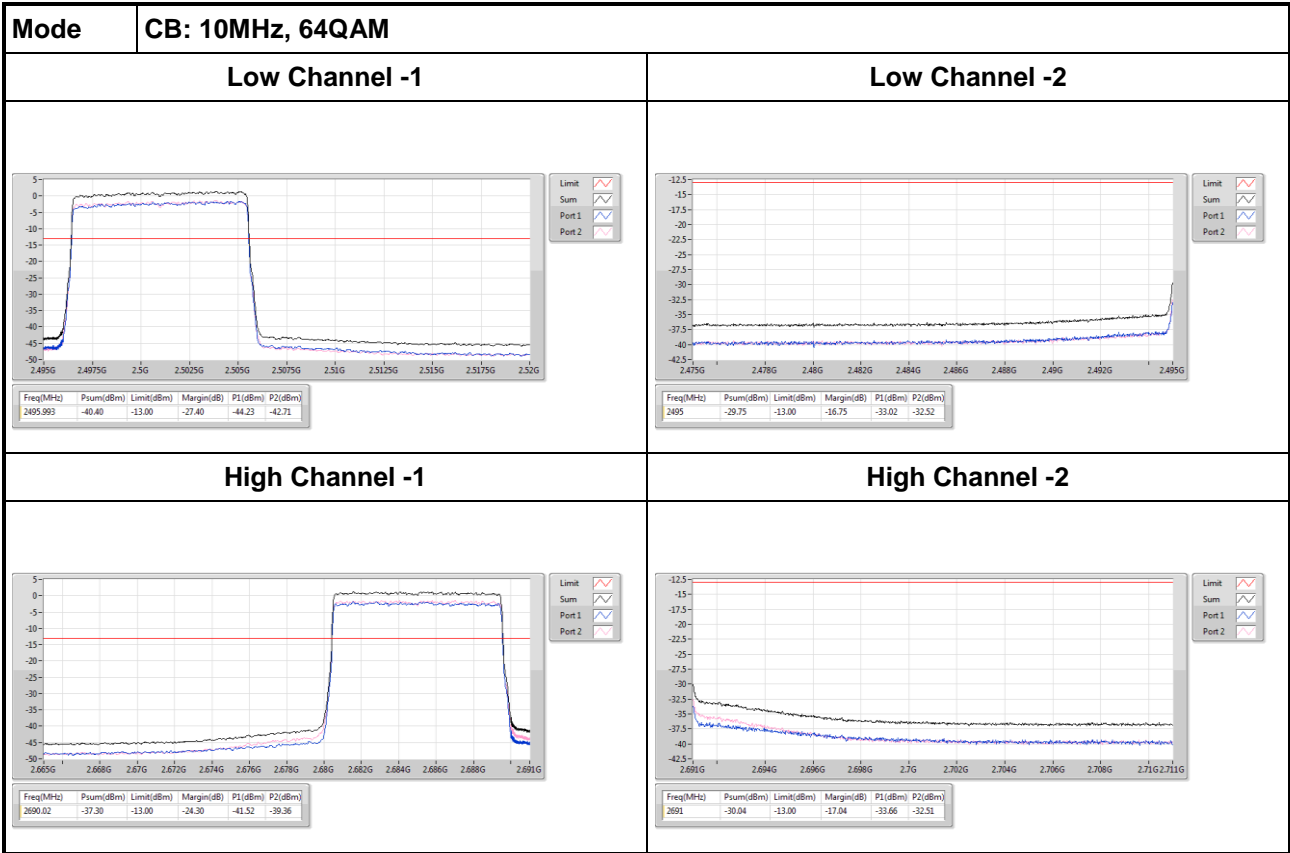


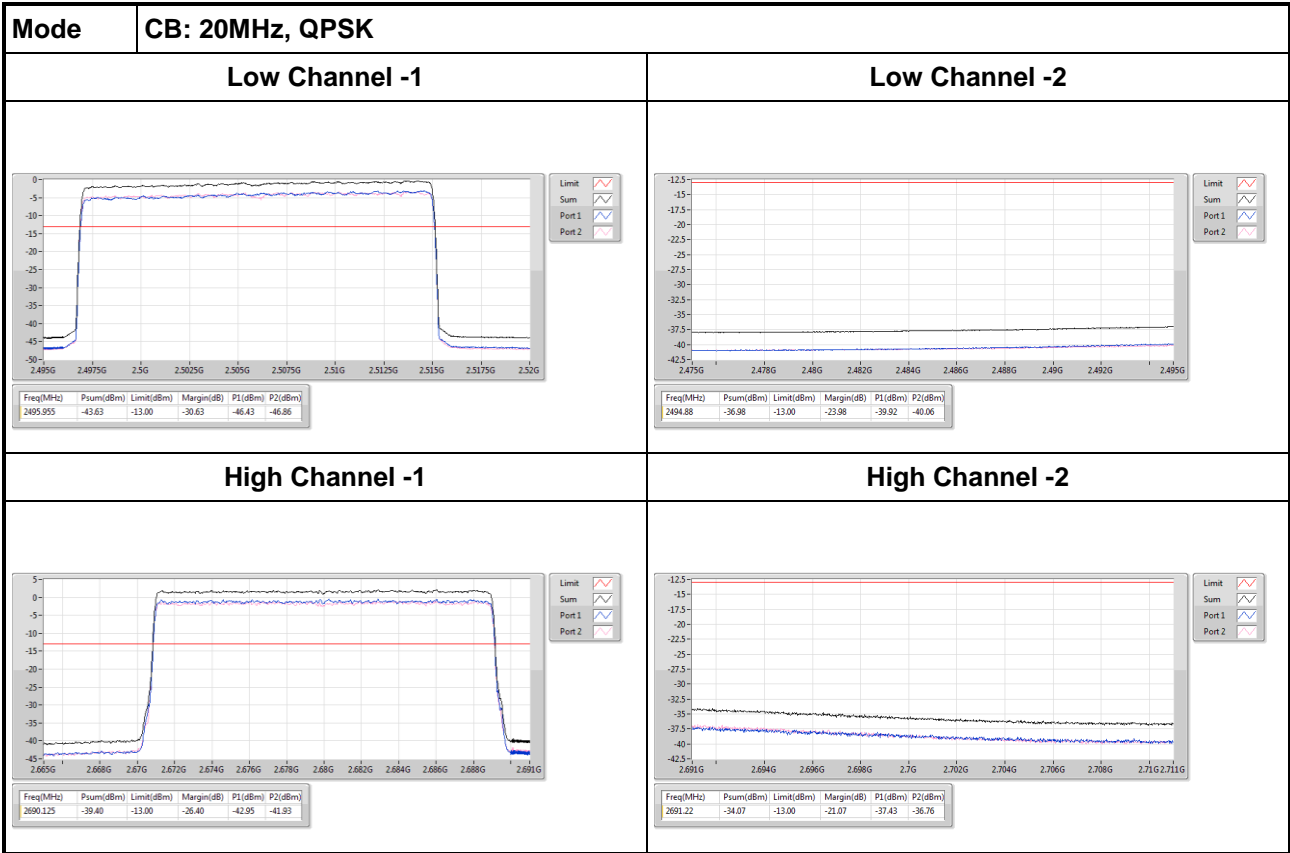


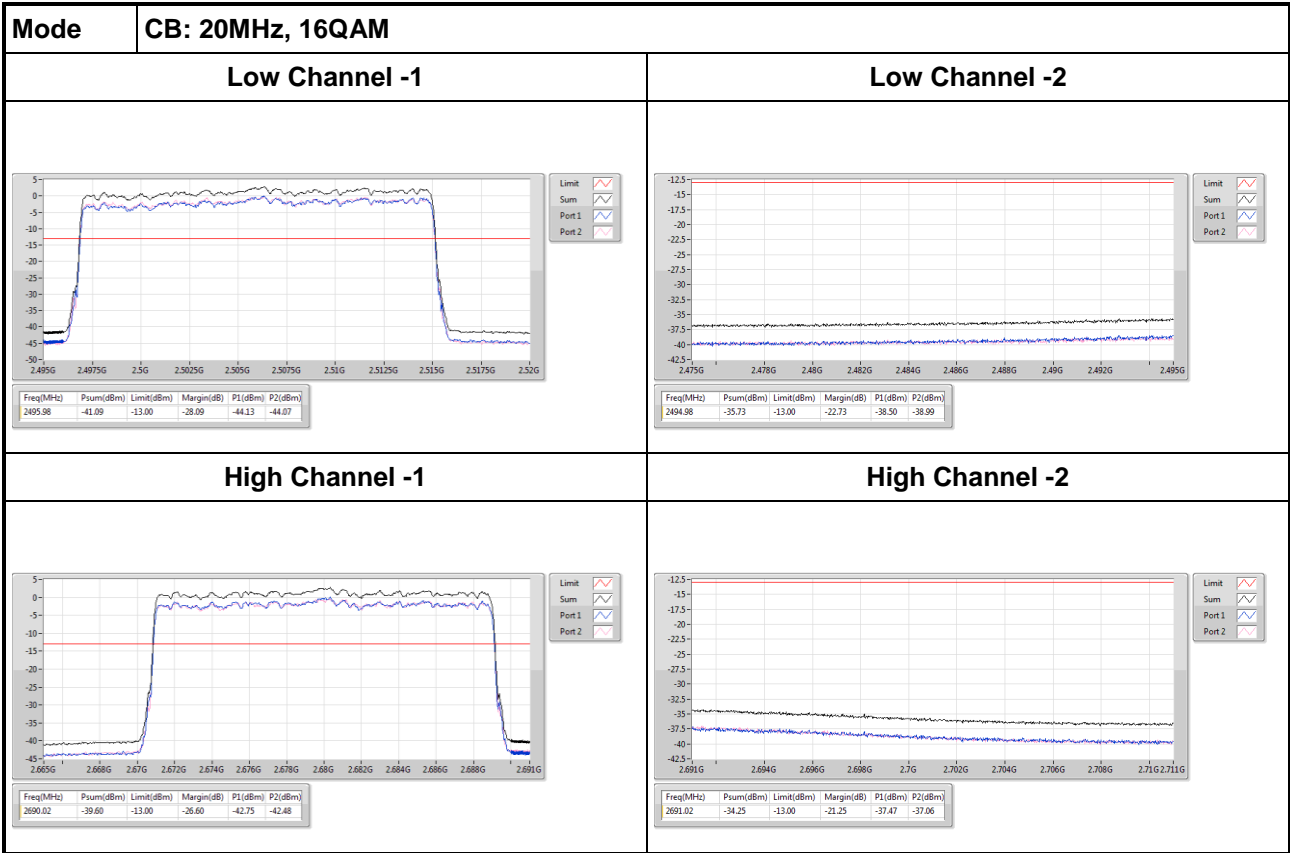


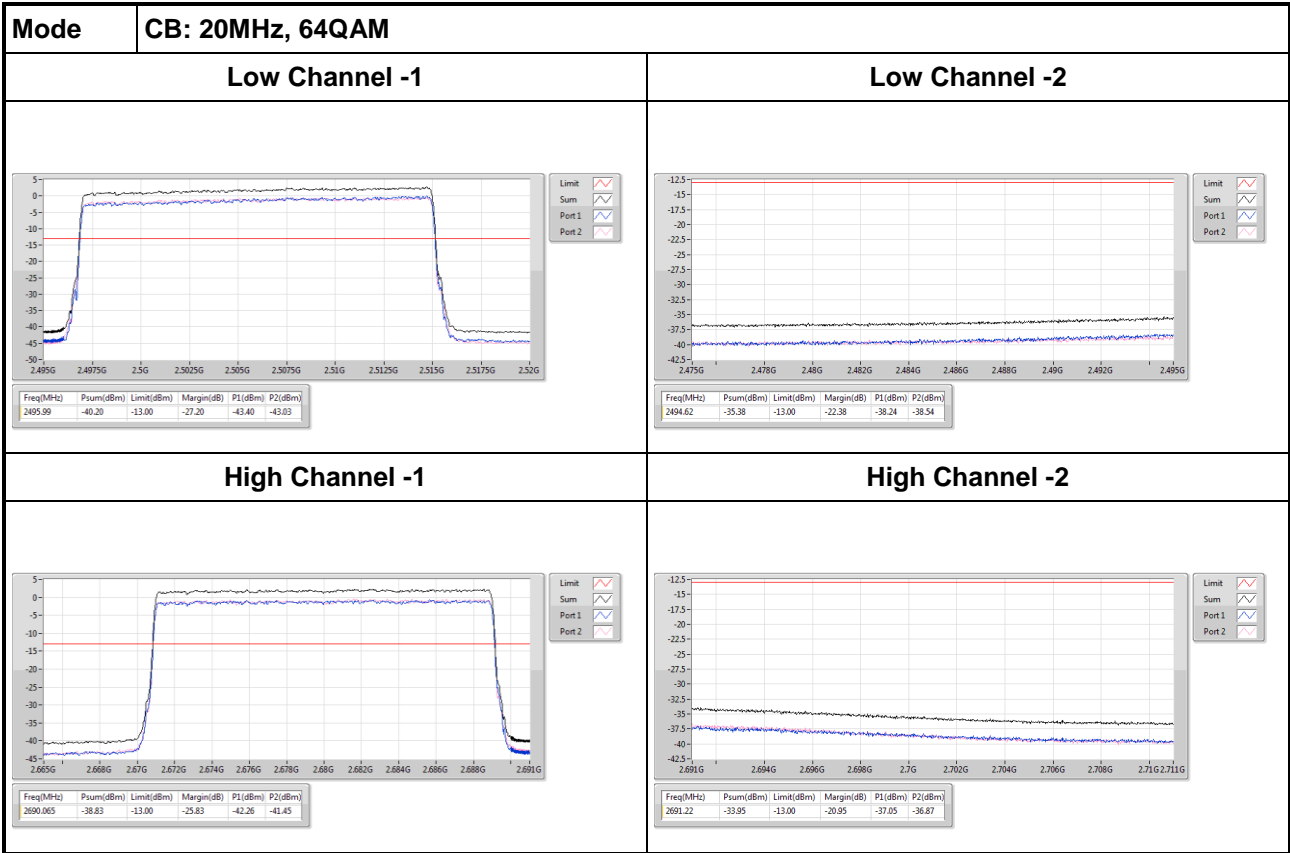










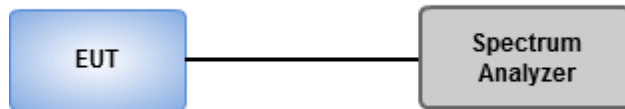


3.5 Emission and Occupied Bandwidth

3.5.1 Test Procedures

1. Set resolution bandwidth (RBW) = 51~200 kHz, Video bandwidth = 160~620 kHz for 5 ~ 20 MHz channel bandwidth
2. Set Detector = Peak, Trace mode = max hold, Sweep = auto couple, Allow the trace to stabilize.
3. Using 26dB and occupied bandwidth measurement function of spectrum analyzer to measure bandwidth

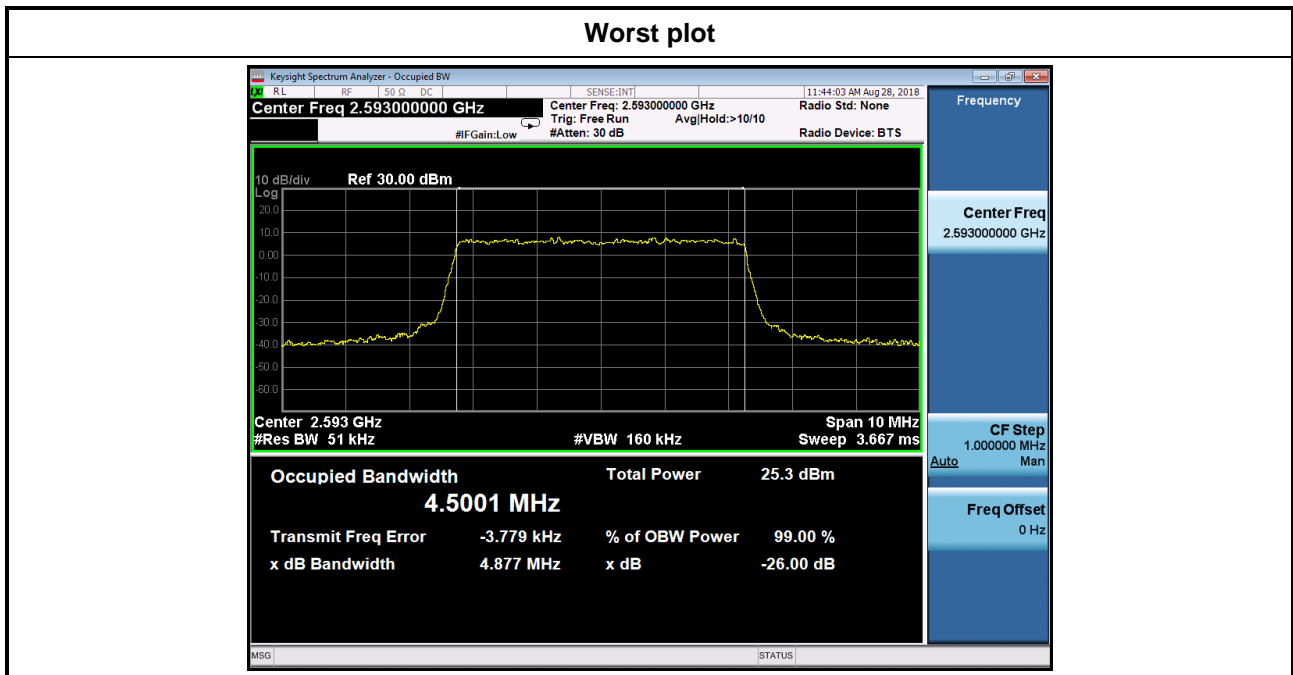
3.5.2 Test Setup



3.5.3 Test Result of Occupied Bandwidth

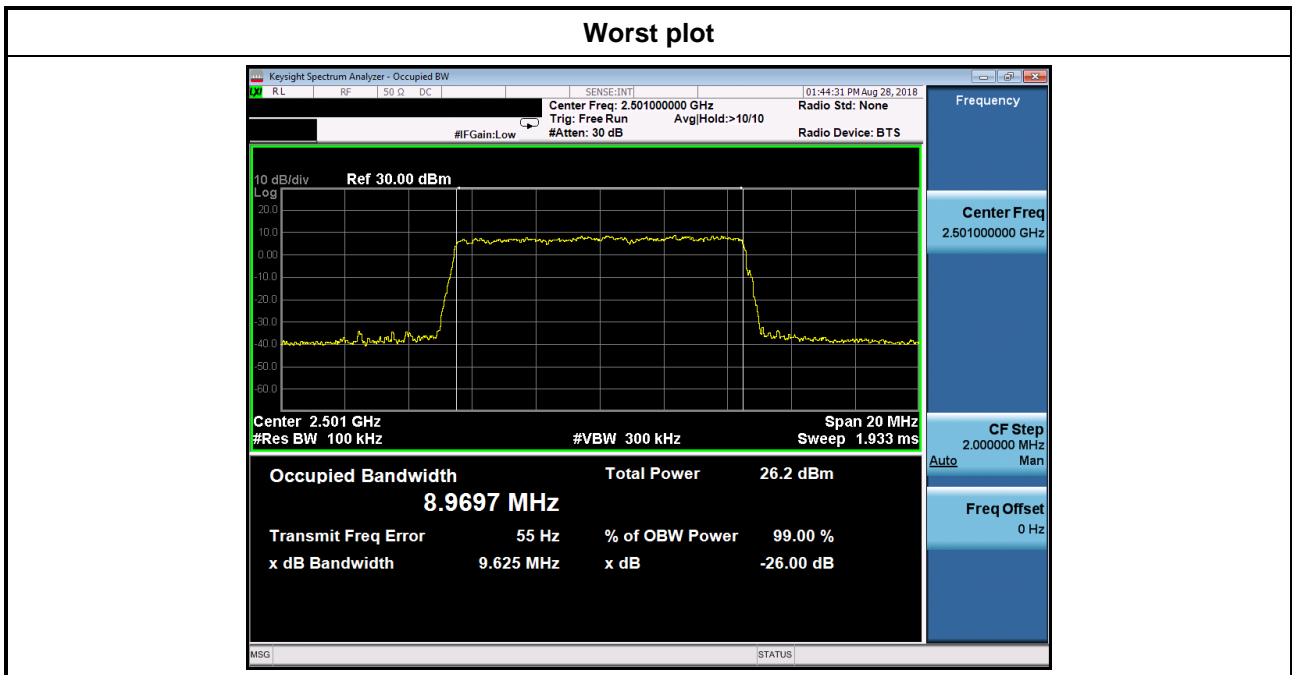
Channel Bandwidth (MHz)	Modulation	Frequency (MHz)	Antenna Port	26dB BW (MHz)	99% OBW (MHz)
5	QPSK	2498.5	ANT 0	4.867	4.4894
			ANT 1	4.870	4.5000
5	QPSK	2593.0	ANT 0	4.856	4.4791
			ANT 1	4.877	4.5001
5	QPSK	2687.5	ANT 0	4.855	4.4813
			ANT 1	4.883	4.4979
5	16QAM	2498.5	ANT 0	4.867	4.4795
			ANT 1	4.863	4.4898
5	16QAM	2593.0	ANT 0	4.850	4.4933
			ANT 1	4.870	4.4995
5	16QAM	2687.5	ANT 0	4.879	4.4874
			ANT 1	4.866	4.4965
5	64QAM	2498.5	ANT 0	4.861	4.4955
			ANT 1	4.853	4.4814
5	64QAM	2593.0	ANT 0	4.868	4.4847
			ANT 1	4.871	4.4933
5	64QAM	2687.5	ANT 0	4.880	4.4846
			ANT 1	4.873	4.4936

Worst plot

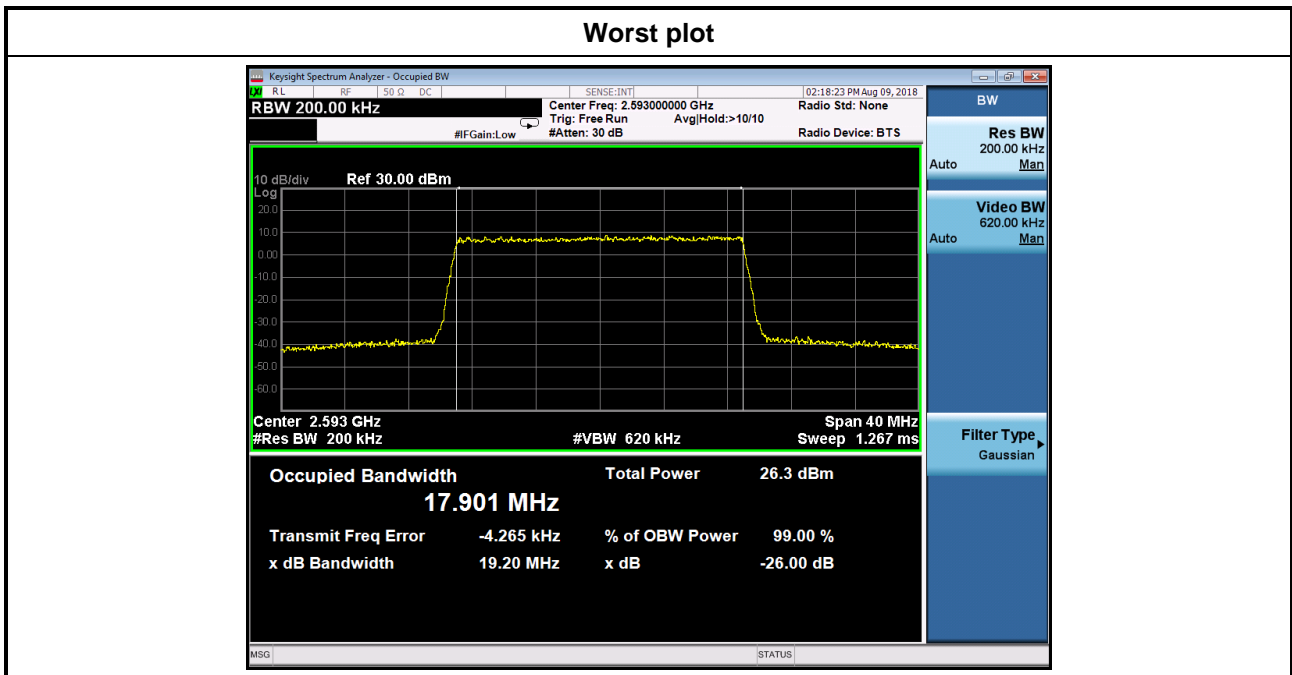


Channel Bandwidth (MHz)	Modulation	Frequency (MHz)	Antenna Port	26dB BW (MHz)	99% OBW (MHz)
10	QPSK	2501.0	ANT 0	9.728	8.9511
			ANT 1	9.690	8.9475
10	QPSK	2593.0	ANT 0	9.726	8.9523
			ANT 1	9.683	8.9520
10	QPSK	2685.0	ANT 0	9.685	8.9491
			ANT 1	9.688	8.9513
10	16QAM	2501.0	ANT 0	9.689	8.9549
			ANT 1	9.646	8.9513
10	16QAM	2593.0	ANT 0	9.708	8.9477
			ANT 1	9.720	8.9562
10	16QAM	2685.0	ANT 0	9.735	8.9511
			ANT 1	9.752	8.9495
10	64QAM	2501.0	ANT 0	9.625	8.9697
			ANT 1	9.662	8.9415
10	64QAM	2593.0	ANT 0	9.725	8.9450
			ANT 1	9.727	8.9560
10	64QAM	2685.0	ANT 0	9.733	8.9515
			ANT 1	9.751	8.9566

Worst plot



Channel Bandwidth (MHz)	Modulation	Frequency (MHz)	Antenna Port	26dB BW (MHz)	99% OBW (MHz)
20	QPSK	2506.0	ANT 0	19.17	17.899
			ANT 1	19.19	17.900
20	QPSK	2593.0	ANT 0	19.14	17.877
			ANT 1	19.17	17.872
20	QPSK	2680.0	ANT 0	19.12	17.871
			ANT 1	19.13	17.871
20	16QAM	2506.0	ANT 0	19.03	17.842
			ANT 1	19.01	17.843
20	16QAM	2593.0	ANT 0	19.09	17.891
			ANT 1	19.07	17.899
20	16QAM	2680.0	ANT 0	19.05	17.872
			ANT 1	19.06	17.882
20	64QAM	2506.0	ANT 0	19.14	17.846
			ANT 1	19.16	17.871
20	64QAM	2593.0	ANT 0	19.20	17.901
			ANT 1	19.20	17.873
20	64QAM	2680.0	ANT 0	19.20	17.868
			ANT 1	19.21	17.899



3.6 Frequency Stability

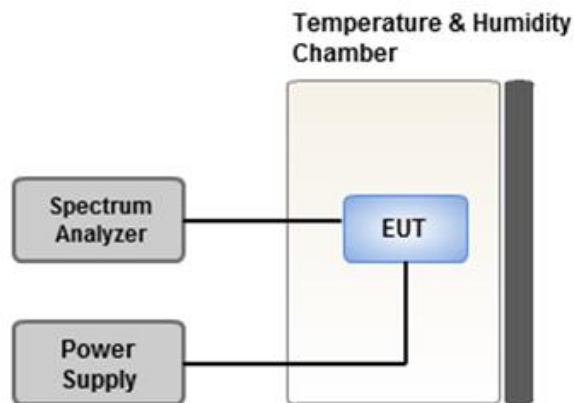
3.6.1 Limit of Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.6.2 Test Procedures

1. EUT was placed at temperature chamber and connected to an external power supply.
2. Temperature and voltage condition shall be tested to confirm frequency stability.
3. Temperature range is from -30~50°C and voltage range is from 85 to 115 percent of the nominal value.
4. Confirm frequency drift value of simulator and record it.

3.6.3 Test Setup



3.6.4 Test Result of Frequency Stability

Temperature (°C)	Frequency Drift (ppm)		
	Channel Bandwidth: 5MHz	Channel Bandwidth: 10MHz	Channel Bandwidth: 20MHz
T20°C _{Vmax}	0.03	0.02	0.02
T20°C _{Vmin}	0.02	0.02	0.01
T50°C _{Vnom}	0.01	0.01	0.02
T40°C _{Vnom}	0.02	0.02	0.01
T30°C _{Vnom}	0.02	0.02	0.03
T20°C _{Vnom}	0.03	0.01	0.02
T10°C _{Vnom}	0.02	0.02	0.01
T0°C _{Vnom}	0.01	0.01	0.01
T-10°C _{Vnom}	-0.02	-0.02	-0.01
T-20°C _{Vnom}	-0.01	-0.01	-0.02
T-30°C _{Vnom}	-0.02	-0.03	-0.02
Vnom [V]: 120	Vmax [V]: 138	Vmin [V]: 102	
Tnom [°C]: 20	Tmax [°C]: 50	Tmin [°C]: -30	

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

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If you have any suggestion, please feel free to contact us as below information

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