FCC Test Report
(Part 27)

Report No.:	RF180829C14
FCC ID:	2AD8UAHBB01
Test Model:	AHBB
Received Date:	Aug. 29, 2018
Test Date:	Sep. 04 ~ Sep. 12, 2018
Issued Date:	Sep. 13, 2018
Applicant:	Nokia Solutions and Networks, OY
Address:	2000 W. Lucent Lane, Naperville, IL 60563, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF180829C14	Original release	Sep. 13, 2018

1 Certificate of Conformity

Product: AirScale Micro Remote Radio Head

Brand: Nokia

Test Model: AHBB

Sample Status: Engineering sample

Applicant: Nokia Solutions and Networks, OY

Test Date: Sep. 04 ~ Sep. 12, 2018

Standards: FCC Part 27, Subpart C, F

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Sep. 13, 2018

Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Sep. 13, 2018

Bruce Chen / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(b)(2)	Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
----	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Meet the requirement of limit.
2.1049 27.53(g)(1)	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -37.50dB at 1497.00MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 11, 2018	Apr. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2018	Aug. 07, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2018	Feb. 21, 2019
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2018	Jan. 14, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2018	Aug. 07, 2019
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 31, 2018	Jul. 30, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
High Speed Peak Power Meter	ML2495A	1232003	Dec. 29, 2017	Dec. 28, 2018
Power Sensor	MA2411B	1207333	Dec. 28, 2017	Dec. 27, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Mini-Circuits Power Splitter	ZN2PD-9G	NA	Jun. 21, 2018	Jun. 20, 2019
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-9.

3 General Information

3.1 General Description of EUT

Product	AirScale Micro Remote Radio Head		
Brand	Nokia		
Test Model	AHBB		
Status of EUT	Engineering sample		
Power Supply Rating	I/P: 100-240Vac, 50-60Hz, 3A MAX O/P: -54Vdc, 3A MAX		
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM		
Operating Frequency	LTE Band 13	Channel Bandwidth 5MHz	748.5MHz ~ 753.5MHz
		Channel Bandwidth 10MHz	751.0MHz
		Channel Bandwidth 5MHz + 5MHz	751.0MHz
Max. ERP Power	LTE Band 13	Channel Bandwidth 5MHz	315500.462mW (54.99dBm)
		Channel Bandwidth 10MHz	323593.657mW (55.10dBm)
		Channel Bandwidth 5MHz + 5MHz	319153.786mW (55.04dBm)
Emission Designator	LTE Band 13	Channel Bandwidth 5MHz	QPSK: 4M50G7D
			16QAM: 4M48D7W
			64QAM: 4M48D7W
			256QAM: 4M48D7W
		Channel Bandwidth 10MHz	QPSK: 9M00G7D
			16QAM: 9M00D7W
			64QAM: 8M96D7W
			256QAM: 9M00D7W
		Channel Bandwidth 5MHz + 5MHz	QPSK: 9M43G7D
			16QAM: 9M46D7W
			64QAM: 9M46D7W
			256QAM: 9M46D7W
Antenna Gain	8dBi		
S/N	474042A		
HW Version	X21		
SW Version	FDD-LTE 18A		
Accessory Device	Refer to Note as below		
Cable Supplied	NA		

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

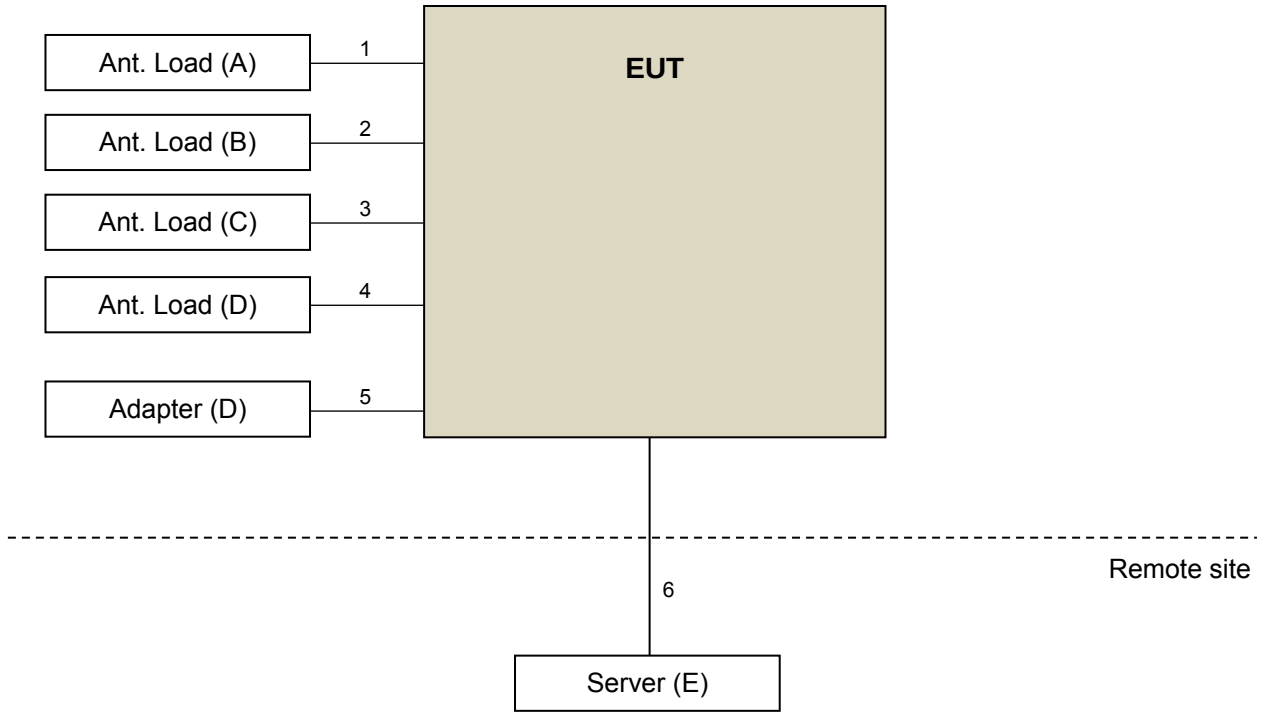
Modulation Mode	TX Function
QPSK、16QAM、64QAM、256QAM	1TX
QPSK、16QAM、64QAM、256QAM	2TX
QPSK、16QAM、64QAM、256QAM	3TX
QPSK、16QAM、64QAM、256QAM	4TX

2. The EUT contains following accessory devices.

AC PSU (Optional)	
Brand	Nokia
Model	APAB
Sales Item	474130A.102
S/N	U7174800066
Remark	SUPLET/S818A160-220S54W
Input Power	100-240Vac, 50-60Hz, 3A MAX
Output Power	-54Vdc, 3A MAX

3. The antenna gain for reference only, the test was done with 50ohm terminator on antenna port.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Ant. Load	NA	NA	NA	NA	Provided by manufacturer
B.	Ant. Load	NA	NA	NA	NA	Provided by manufacturer
C.	Ant. Load	NA	NA	NA	NA	Provided by manufacturer
D.	Ant. Load	NA	NA	NA	NA	Provided by manufacturer
E.	Adapter	NA	NA	NA	NA	Provided by manufacturer
F.	Server	NA	NA	NA	NA	Provided by manufacturer

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item E acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Ant. Cable	1	1	Y	0	-
2.	Ant. Cable	1	1	Y	0	-
3.	Ant. Cable	1	1	Y	0	-
4.	Ant. Cable	1	1	Y	0	-
5.	DC Cable	1	0.55	N	0	Provided by manufacturer
6.	Fiber Cable	2	10	N	0	-

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on X-plane. Following channel(s) was (were) selected for the final test as listed below:

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	5205 to 5255	5205 (748.5MHz), 5230 (751.0MHz), 5255 (753.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Modulation Characteristics	5230	5230 (751.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Frequency Stability	5205 to 5255	5230 (751.0MHz),	5MHz	QPSK	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK	Full RB
-	Emission Bandwidth	5205 to 5255	5205 (748.5MHz), 5230 (751.0MHz), 5255 (753.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Band Edge	5205 to 5255	5205 (748.5MHz), 5255 (753.5MHz)	5MHz	QPSK	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK	Full RB
-	Peak to Average Ratio	5205 to 5255	5205 (748.5MHz), 5230 (751.0MHz), 5255 (753.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Conducted Emission	5205 to 5255	5205 (748.5MHz), 5230 (751.0MHz), 5255 (753.5MHz)	5MHz	QPSK	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK	Full RB
-	Radiated Emission below 1GHz	5205 to 5255	23130(711.0MHz)	5MHz	QPSK	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK	Full RB
-	Radiated Emission above 1GHz	5205 to 5255	5205 (748.5MHz), 5230 (751.0MHz), 5255 (753.5MHz)	5MHz	QPSK	Full RB
		5230	5230 (751.0MHz)	10MHz	QPSK	Full RB

Note: The conducted output power for QPSK, 16QAM, 64QAM and 256QAM measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore, only Modulation Characteristics, Emission Bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under QPSK mode only.

2-Carriers Mode

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Emission Bandwidth	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
-	Band Edge	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK	Full RB
-	Conducted Emission	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK	Full RB
-	Radiated Emission below 1GHz	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK	Full RB
-	Radiated Emission above 1GHz	5230	5230 (751.0MHz)	5MHz + 5MHz	QPSK	Full RB

Note: The conducted output power for QPSK, 16QAM, 64QAM and 256QAM measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore, only Emission Bandwidth test item had been tested under QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Modulation characteristics	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Emission Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Radiated Emission	25deg. C, 65%RH	120Vac, 60Hz	Han Wu

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2
FCC 47 CFR Part 27
KDB 971168 D01 Power Meas License Digital Systems v03r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

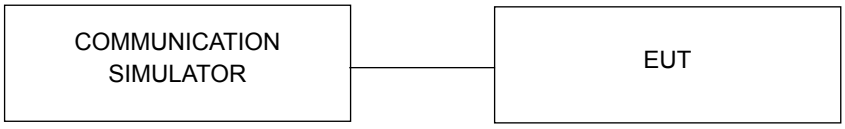
4.1.1 Limits of Output Power Measurement

Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.

4.1.2 Test Procedures

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

4.1.3 Test Setup



4.1.4 Test Results

Conducted Output Power (dBm)

1TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 0	37.07	36.99	36.98	37.01	37.08	37.09	36.97	36.92	36.97	36.95	36.89	36.89
	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.10	36.95	37.00	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 0	37.10	36.99	36.92	36.87
	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
2-Carriers / 5M+5M	Chain 0	37.04	37.01	36.88	36.85
	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56

2TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.10	36.95	37.00	36.99	36.92	36.95	36.91
	Total Power	40.12	40.10	40.03	40.10	40.07	40.12	39.95	39.95	39.98	39.97	39.93	39.90

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Total Power	40.27	40.06	39.95	39.95

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
2-Carriers / 5M+5M	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Total Power	40.22	40.16	39.84	39.78

Note: The 2TX MIMO power was select worst 2 chain total calculation

3TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.10	36.95	37.00	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92
	Total Power	41.84	41.84	41.79	41.86	41.81	41.87	41.69	41.72	41.72	41.73	41.70	41.67

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97
	Total Power	42.02	41.81	41.70	41.72

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751	751	751	751
		MHz	MHz	MHz	MHz
2-Carriers / 5M+5M	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56
	Total Power	41.96	41.90	41.57	41.47

Note: The 3TX MIMO power was select worst 3 chain total calculation

4TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 0	37.07	36.99	36.98	37.01	37.08	37.09	36.97	36.92	36.97	36.95	36.89	36.89
	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.1	36.95	37	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92
	Total Power	43.09	43.07	43.03	43.09	43.07	43.12	42.95	42.96	42.98	42.98	42.94	42.92

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 0	37.1	36.99	36.92	36.87
	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97
	Total Power	43.23	43.05	42.95	42.95

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
2-Carriers / 5M+5M	Chain 0	37.04	37.01	36.88	36.85
	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56
	Total Power	43.17	43.12	42.84	42.76

ERP Power (dBm)

1TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 0	37.07	36.99	36.98	37.01	37.08	37.09	36.97	36.92	36.97	36.95	36.89	36.89
	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.1	36.95	37	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92
	Antenna gain	8	8	8	8	8	8	8	8	8	8	8	8
	ERP Chain 0	42.92	42.84	42.83	42.86	42.93	42.94	42.82	42.77	42.82	42.8	42.74	42.74
	ERP Chain 1	**43**	42.94	42.87	42.98	42.9	42.97	42.77	42.73	42.8	42.84	42.73	42.72
	ERP Chain 2	42.92	42.93	42.87	42.9	42.91	42.95	42.8	42.85	42.84	42.77	42.8	42.76
	ERP Chain 3	42.84	42.89	42.86	42.93	42.87	42.94	42.74	42.82	42.77	42.83	42.82	42.77

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 0	37.1	36.99	36.92	36.87
	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97
	Antenna gain	8	8	8	8
	ERP Chain 0	42.95	42.84	42.77	42.72
	ERP Chain 1	43.13	42.93	42.83	42.8
	ERP Chain 2	43.08	42.86	42.74	42.77
	ERP Chain 3	43.08	42.88	42.77	42.82

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751	751	751	751
		MHz	MHz	MHz	MHz
2-Carriers / 5M+5M	Chain 0	37.04	37.01	36.88	36.85
	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56
	Antenna gain	8	8	8	8
	ERP Chain 0	42.89	42.86	42.73	42.7
	ERP Chain 1	43.11	43.03	42.76	42.74
	ERP Chain 2	43.01	42.97	42.6	42.5
	ERP Chain 3	42.99	42.94	42.57	42.41

Note: ERP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi) – 2.15.

2TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.1	36.95	37	36.99	36.92	36.95	36.91
	Total Power	40.12	40.10	40.03	40.10	40.07	40.12	39.95	39.95	39.98	39.97	39.93	39.90
	Directional Gain	11.01	11.01	11.01	11.01	11.01	11.01	11.01	11.01	11.01	11.01	11.01	11.01
	ERP	48.98	48.96	48.89	48.96	48.93	48.98	48.81	48.81	48.84	48.83	48.79	48.76

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Total Power	40.27	40.06	39.95	39.95
	Directional Gain	11.01	11.01	11.01	11.01
	ERP	49.13	48.92	48.81	48.81

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
2-Carriers / 5M+5M	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Total Power	40.22	40.16	39.84	39.78
	Directional Gain	11.01	11.01	11.01	11.01
	ERP	49.08	49.02	48.70	48.64

Note:

1. ERP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi) – 2.15.
2. The 2TX MIMO power was select worst 2 chain total calculation

3TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.10	36.95	37.00	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92
	Total Power	41.84	41.84	41.79	41.86	41.81	41.87	41.69	41.72	41.72	41.73	41.70	41.67
	Directional Gain	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77
	ERP	52.46	52.46	52.41	52.48	52.43	52.49	52.31	52.34	52.34	52.35	52.32	52.29

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97
	Total Power	42.02	41.81	41.70	41.72
	Directional Gain	12.77	12.77	12.77	12.77
	ERP	52.64	52.43	52.32	52.34

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
2-Carriers / 5M+5M	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56
	Total Power	41.96	41.90	41.57	41.47
	Directional Gain	12.77	12.77	12.77	12.77
	ERP	52.58	52.52	52.19	52.09

Note:

1. ERP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi) – 2.15.
2. The 3TX MIMO power was select worst 3 chain total calculation

4TX

Band / BW	Ant	QPSK			16QAM			64QAM			256QAM		
		Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
		5205	5230	5255	5205	5230	5255	5205	5230	5255	5205	5230	5255
		748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
13 / 5M	Chain 0	37.07	36.99	36.98	37.01	37.08	37.09	36.97	36.92	36.97	36.95	36.89	36.89
	Chain 1	37.15	37.09	37.02	37.13	37.05	37.12	36.92	36.88	36.95	36.99	36.88	36.87
	Chain 2	37.07	37.08	37.02	37.05	37.06	37.1	36.95	37	36.99	36.92	36.95	36.91
	Chain 3	36.99	37.04	37.01	37.08	37.02	37.09	36.89	36.97	36.92	36.98	36.97	36.92
	Total Power	43.09	43.07	43.03	43.09	43.07	43.12	42.95	42.96	42.98	42.98	42.94	42.92
	Directional Gain	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02
	ERP	54.96	54.94	54.9	54.96	54.94	**54.99**	54.82	54.83	54.85	54.85	54.81	54.79

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751 MHz	751 MHz	751 MHz	751 MHz
13 / 10M	Chain 0	37.1	36.99	36.92	36.87
	Chain 1	37.28	37.08	36.98	36.95
	Chain 2	37.23	37.01	36.89	36.92
	Chain 3	37.23	37.03	36.92	36.97
	Total Power	43.23	43.05	42.95	42.95
	Directional Gain	14.02	14.02	14.02	14.02
	ERP	**55.1**	54.92	54.82	54.82

Band / BW	Ant	QPSK	16QAM	64QAM	256QAM
		Mid CH	Mid CH	Mid CH	Mid CH
		5230	5230	5230	5230
		751	751	751	751
		MHz	MHz	MHz	MHz
2-Carriers / 5M+5M	Chain 0	37.04	37.01	36.88	36.85
	Chain 1	37.26	37.18	36.91	36.89
	Chain 2	37.16	37.12	36.75	36.65
	Chain 3	37.14	37.09	36.72	36.56
	Total Power	43.17	43.12	42.84	42.76
	Directional Gain	14.02	14.02	14.02	14.02
	ERP	**55.04**	54.99	54.71	54.63

Note: ERP (dBm) = Conducted Output Power (dBm) + Directional Gain (dBi) – 2.15.

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

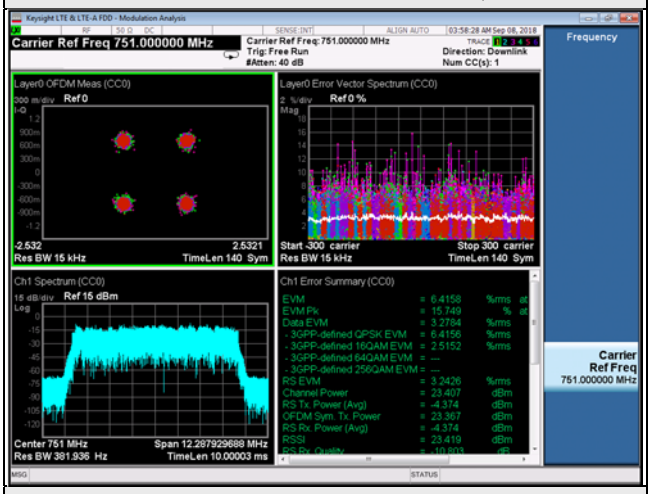
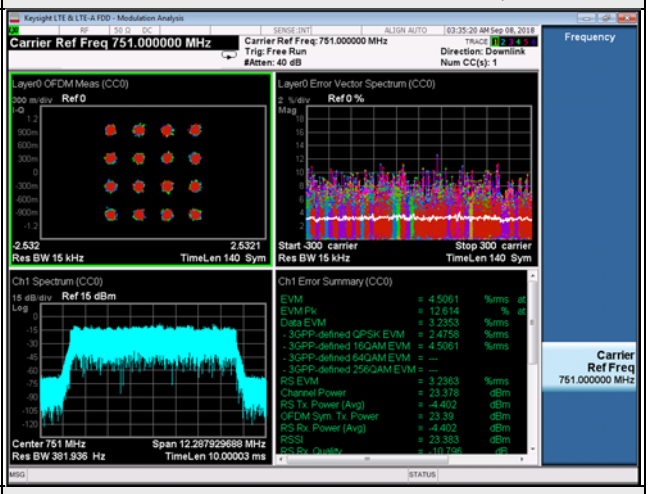
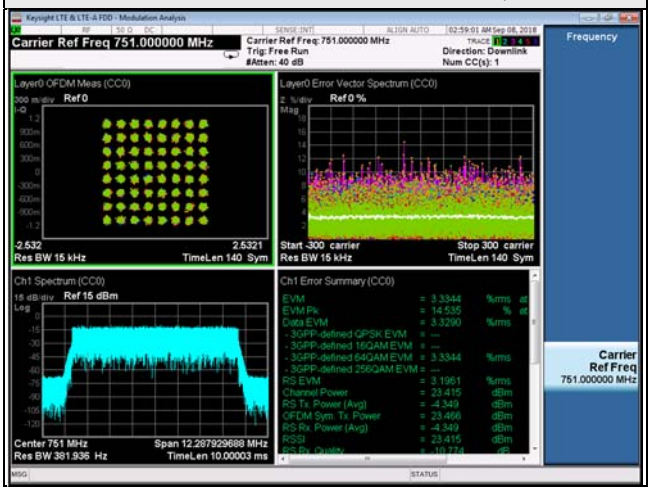
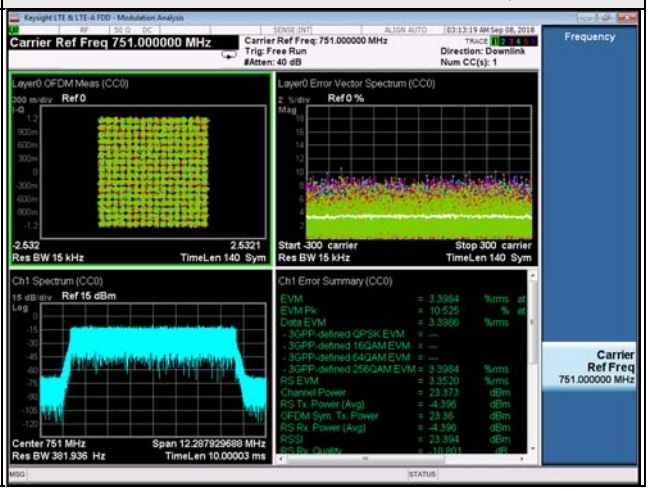
N/A

4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup

4.2.4 Test Results

Spectrum Plot of Measurement Value	
Channel: 5230 / Frequency (MHz): 751.0 MHz	
Channel Bandwidth: 10MHz / QPSK	Channel Bandwidth: 10MHz / 16QAM
	
Channel Bandwidth: 10MHz / 64QAM	Channel Bandwidth: 10MHz / 256QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -30℃ ~ 50℃.

4.3.2 Test Procedure

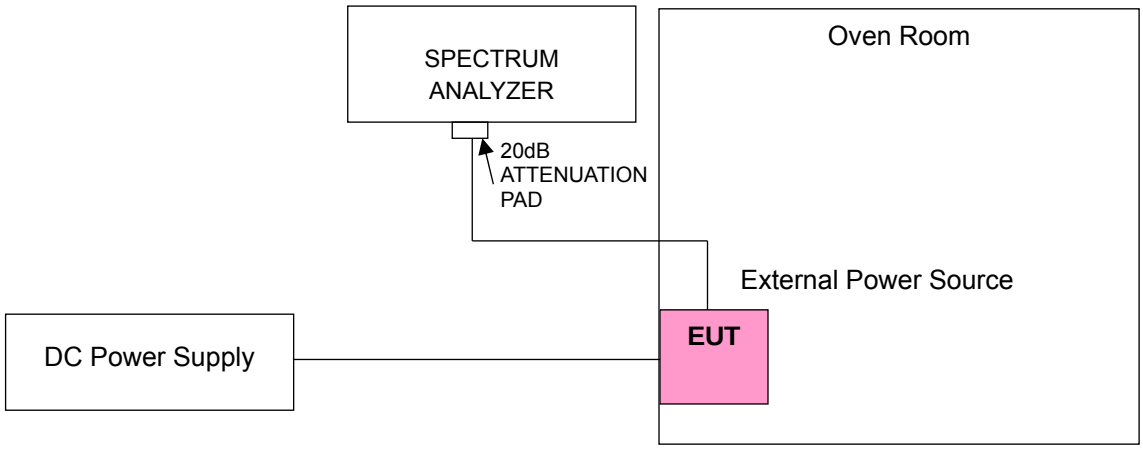
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
55.2	748.500001	0.002	753.500004	0.005
48	748.500004	0.005	753.500003	0.003
40.8	748.500002	0.002	753.500001	0.001

Note: The applicant defined the normal working voltage is from 40.8Vdc to 55.2Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	748.500001	0.002	753.500001	0.002
-20	748.500003	0.004	753.500002	0.003
-10	748.500002	0.003	753.500001	0.001
0	748.500003	0.004	753.500003	0.004
10	748.500003	0.004	753.500001	0.002
20	748.499997	-0.003	753.499997	-0.004
30	748.499997	-0.004	753.499997	-0.004
40	748.499998	-0.002	753.499997	-0.004
50	748.499997	-0.003	753.499999	-0.001
60	748.499997	-0.005	753.499998	-0.003

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	CH 5230	
	Frequency (MHz)	Frequency Error (ppm)
55.2	751.000003	0.003
48	751.000002	0.003
40.8	751.000004	0.005

Note: The applicant defined the normal working voltage is from 40.8Vdc to 55.2Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	CH 5230	
	Frequency (MHz)	Frequency Error (ppm)
-30	751.000002	0.002
-20	751.000003	0.004
-10	751.000002	0.002
0	751.000001	0.001
10	751.000003	0.005
20	750.999999	-0.002
30	750.999998	-0.002
40	750.999997	-0.004
50	750.999999	-0.002
60	750.999997	-0.004

4.4 Emission Bandwidth Measurement

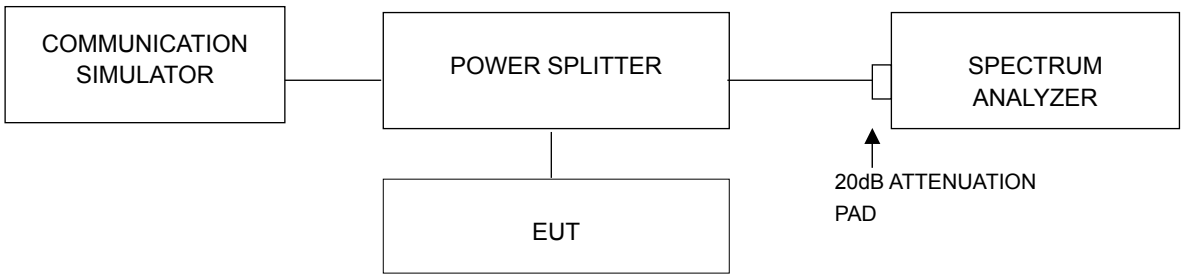
4.4.1 Limits of Emission Bandwidth Measurement

According to FCC 27.53(g)(1) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

4.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

4.4.3 Test Setup



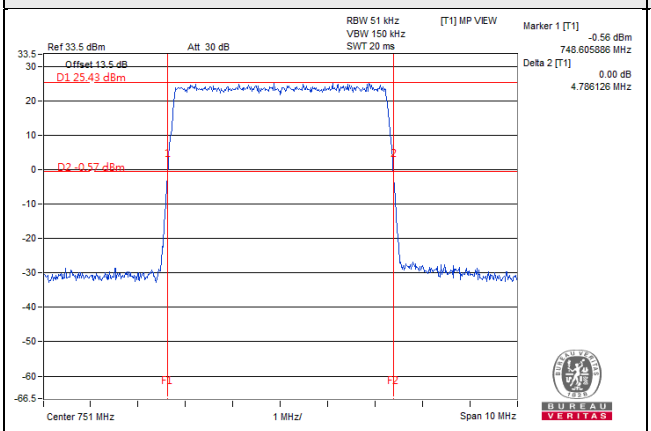
4.4.4 Test Result

Single Mode

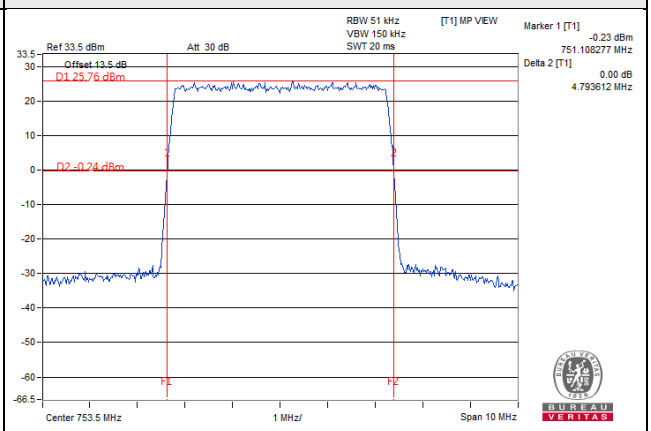
Channel Bandwidth: 5MHz									
26dBc Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5205	748.5	4.77	4.77	4.77	4.78	4.77	4.78	4.78	4.78
5230	751.0	4.78	4.76	4.77	4.76	4.77	4.76	4.76	4.77
5255	753.5	4.75	4.76	4.77	4.77	4.77	4.79	4.76	4.78
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5205	748.5	4.76	4.77	4.78	4.77	4.75	4.77	4.78	4.78
5230	751.0	4.78	4.76	4.78	4.78	4.79	4.78	4.77	4.76
5255	753.5	4.78	4.76	4.77	4.77	4.78	4.77	4.77	4.77

Spectrum Plot of Worst Value

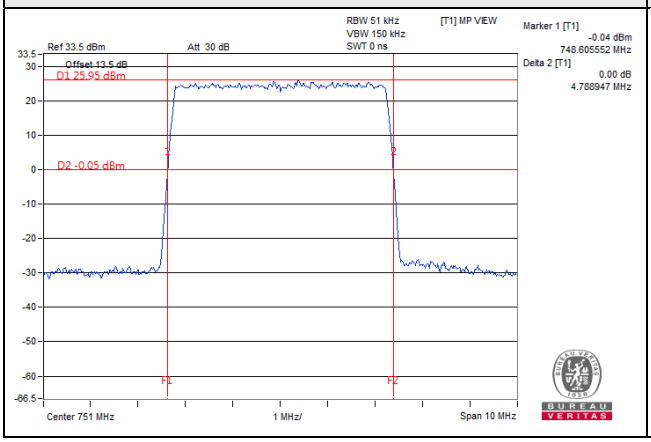
QPSK



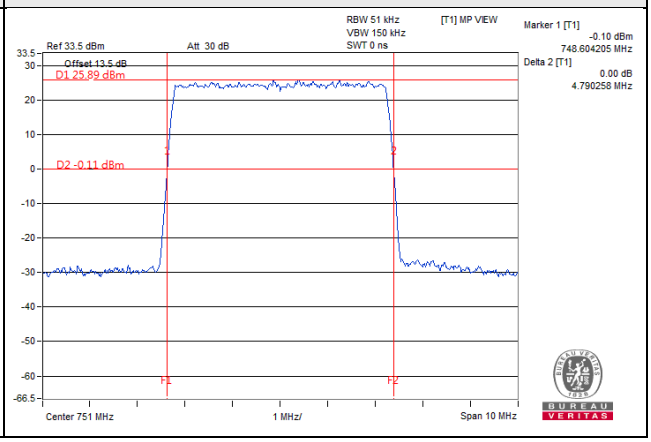
16QAM



64QAM



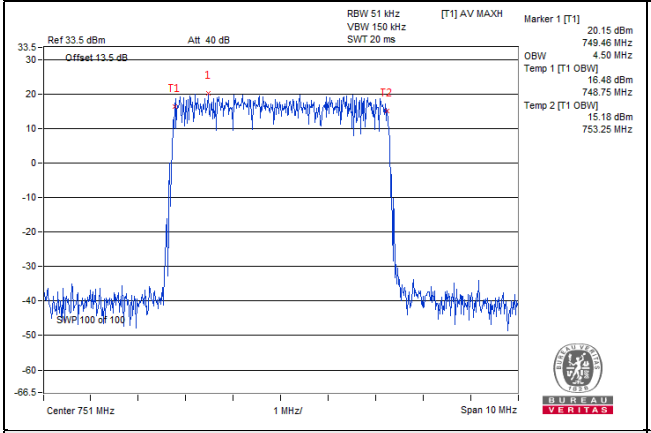
256QAM



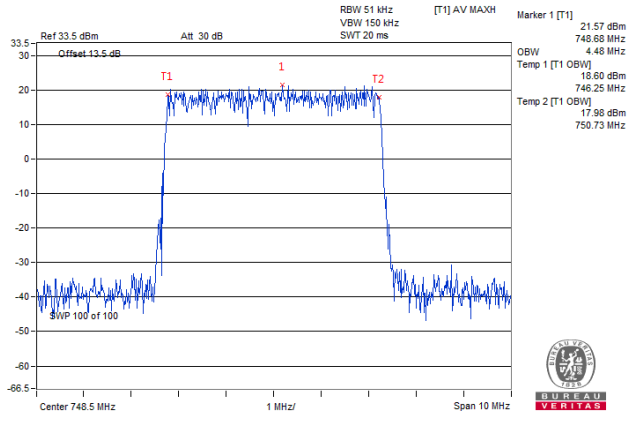
Channel Bandwidth: 5MHz									
Occupied Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5205	748.5	4.46	4.48	4.46	4.46	4.48	4.48	4.46	4.46
5230	751.0	4.48	4.48	4.48	4.50	4.46	4.48	4.48	4.48
5255	753.5	4.45	4.48	4.48	4.48	4.46	4.48	4.46	4.45
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5205	748.5	4.48	4.48	4.46	4.46	4.48	4.48	4.46	4.46
5230	751.0	4.48	4.48	4.46	4.48	4.46	4.48	4.46	4.48
5255	753.5	4.48	4.48	4.45	4.48	4.45	4.48	4.46	4.46

Spectrum Plot of Worst Value

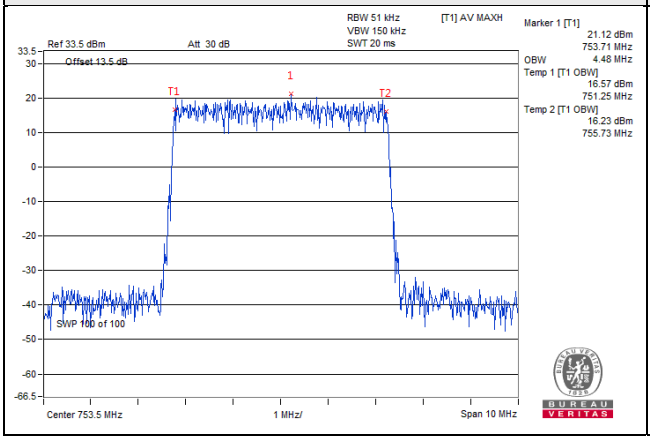
QPSK



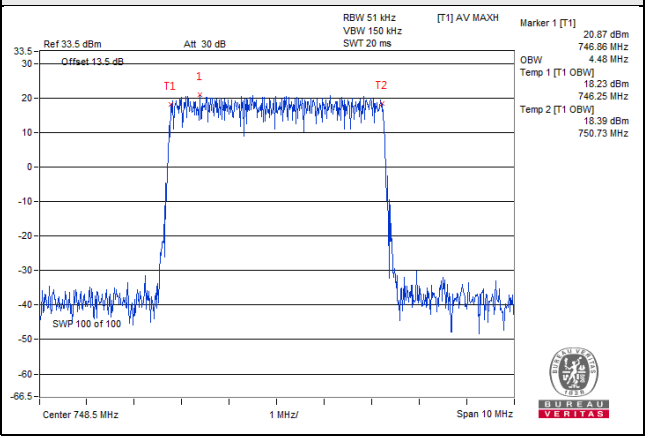
16QAM



64QAM



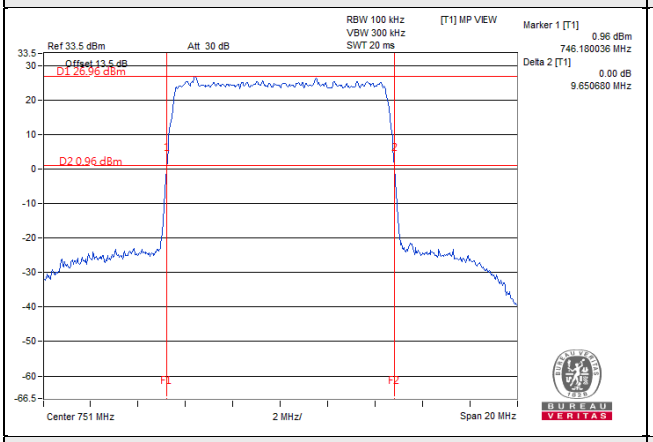
256QAM



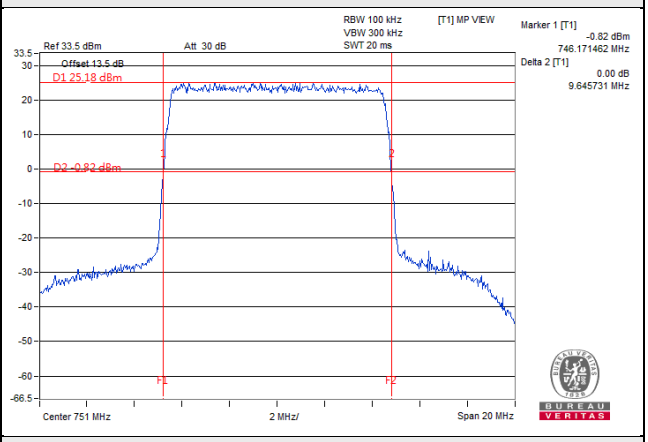
Channel Bandwidth: 10MHz									
26dBc Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.63	9.54	9.65	9.62	9.62	9.52	9.64	9.64
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.61	9.54	9.61	9.64	9.64	9.49	9.61	9.61

Spectrum Plot of Worst Value

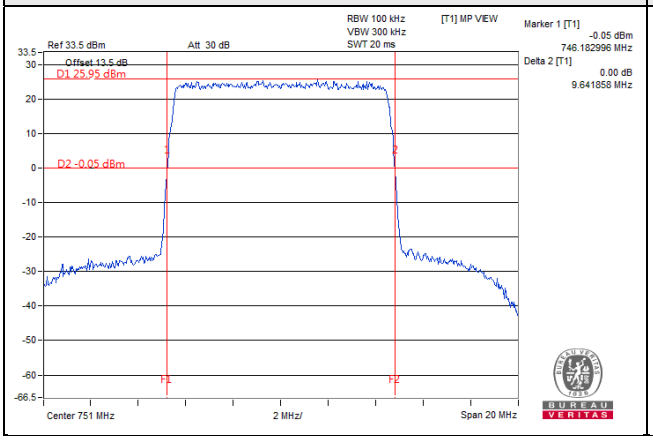
QPSK



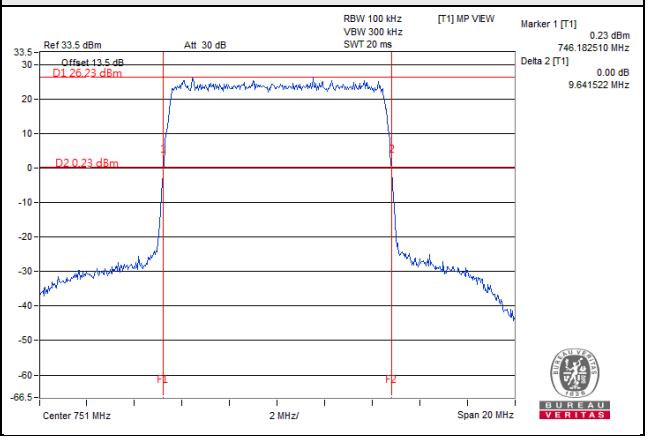
16QAM



64QAM



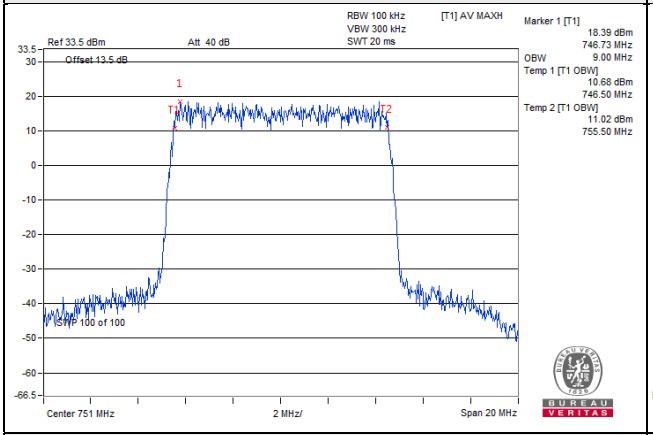
256QAM



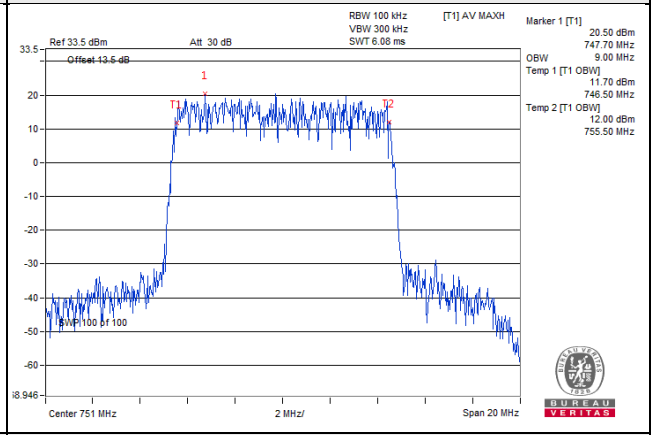
Channel Bandwidth: 10MHz									
Occupied Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	8.96	8.96	9.00	8.93	8.96	8.96	9.00	8.96
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	8.93	8.96	8.96	8.93	9.00	8.93	8.96	8.93

Spectrum Plot of Worst Value

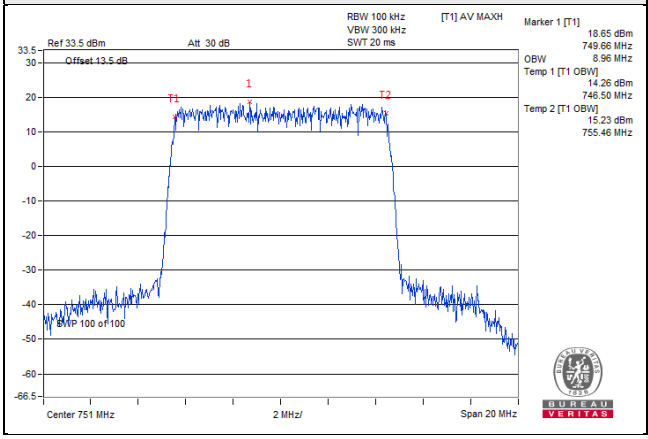
QPSK



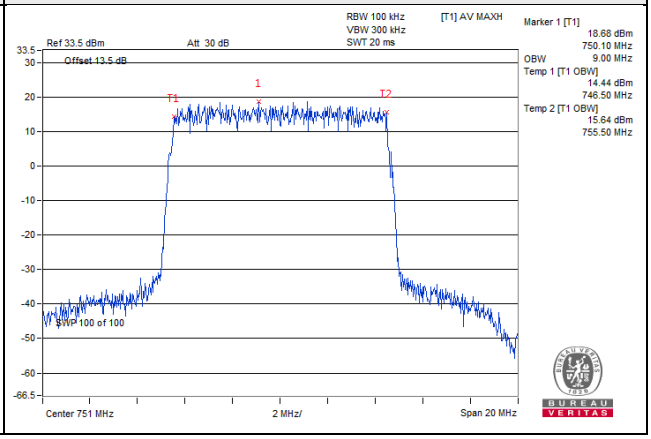
16QAM



64QAM



256QAM

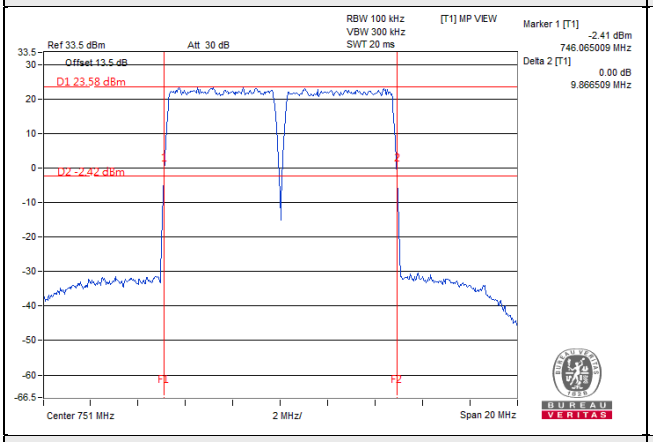


2-Carriers Mode

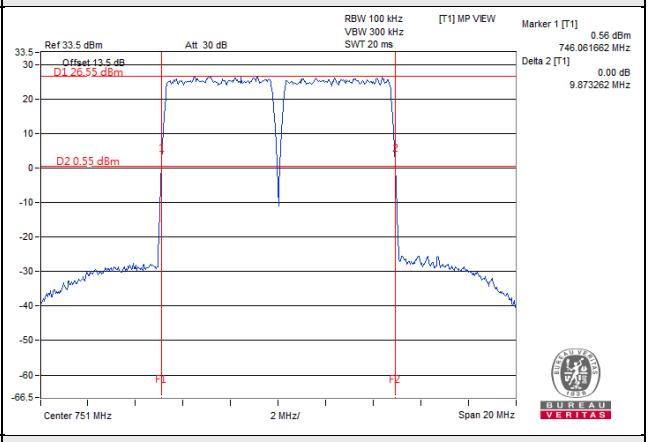
Channel Bandwidth: 5MHz + 5MHz									
26dBc Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.83	9.84	9.85	9.86	9.85	9.87	9.84	9.86
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.84	9.85	9.86	9.84	9.83	9.85	9.86	9.85

Spectrum Plot of Worst Value

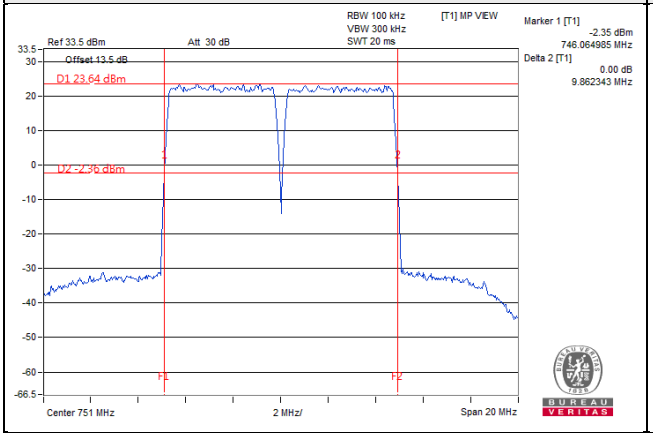
QPSK



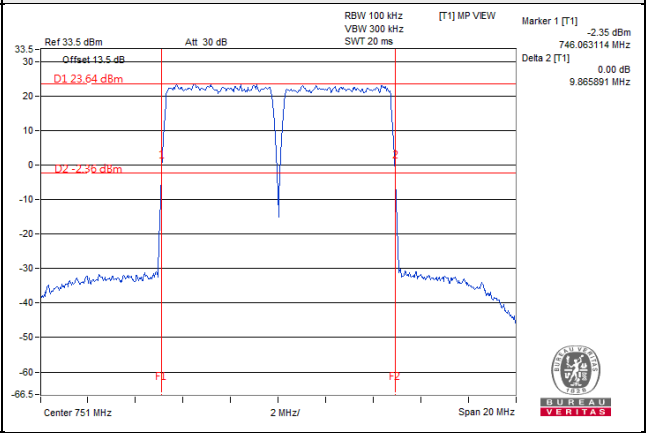
16QAM



64QAM



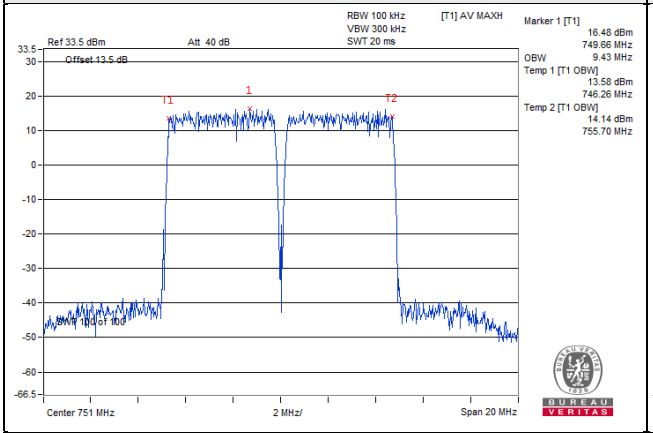
256QAM



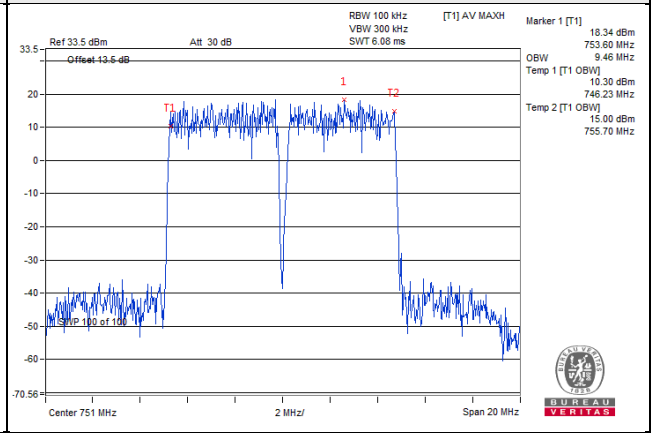
Channel Bandwidth: 5MHz + 5MHz									
Occupied Bandwidth (MHz)									
Channel	Frequency (MHz)	QPSK				16QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.43	9.43	9.43	9.43	9.46	9.43	9.43	9.43
Channel	Frequency (MHz)	64QAM				256QAM			
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
5230	751.0	9.43	9.43	9.43	9.46	9.46	9.43	9.40	9.40

Spectrum Plot of Worst Value

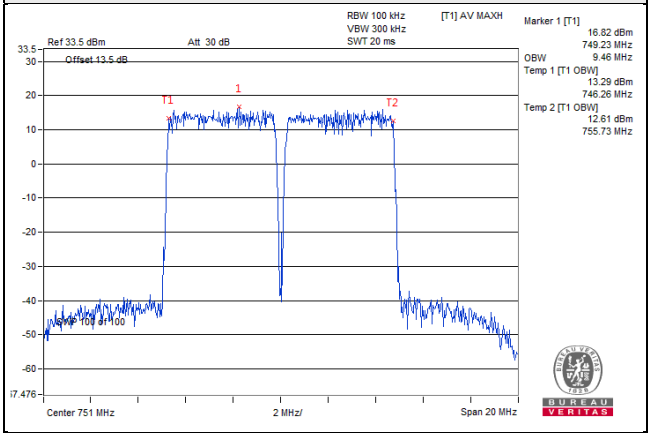
QPSK



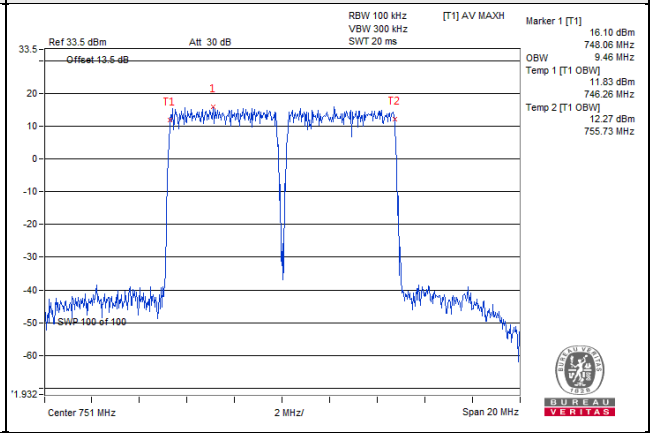
16QAM



64QAM



256QAM



4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

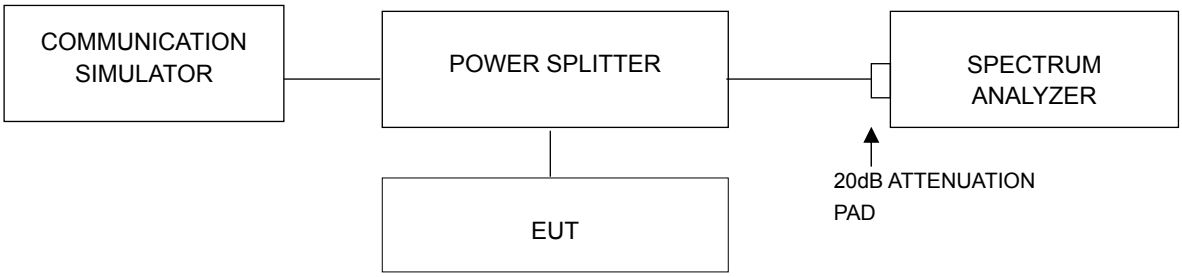
According to FCC 27.53(c), for operations in the 747 to 762 MHz band and the 777 to 792 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured watts, in accordance with the following:

(1) On any frequency outside the 747 to 762 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

Note: The Device has 4x4 MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 quidance.

{The limits is adjusted to -13dBm – 10*log(4) = -19.02dBm}

4.5.2 Test Setup



4.5.3 Test Procedures

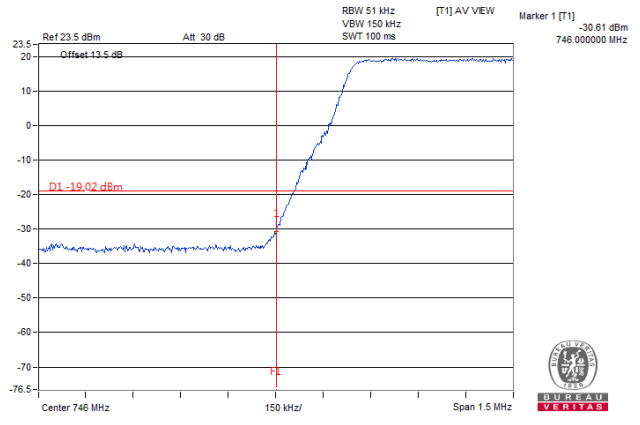
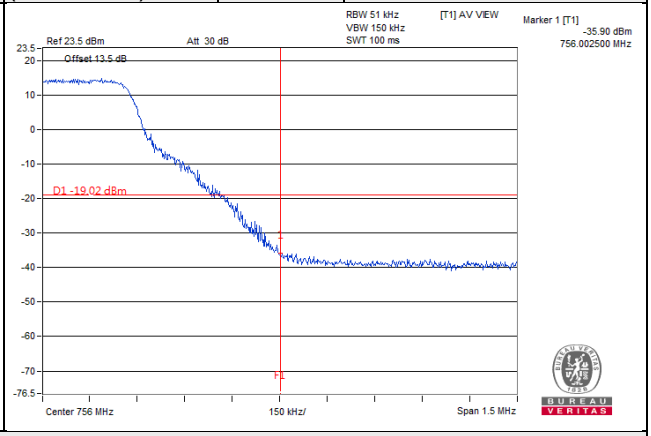
a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.

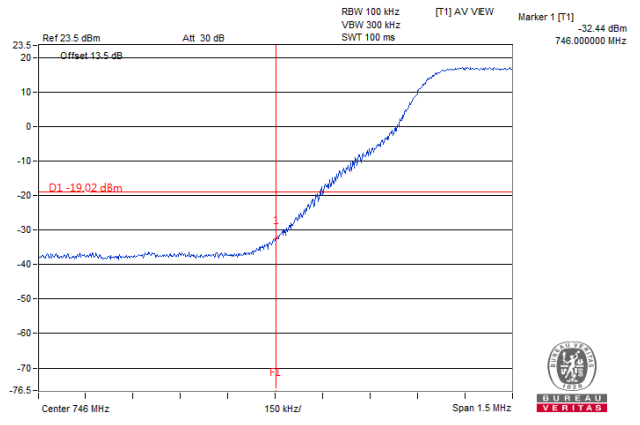
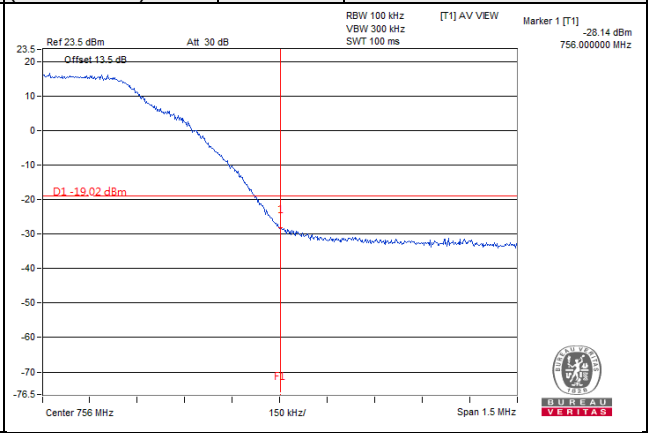
b. The center frequency of spectrum is the band edge frequency and span is RBW = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz).

c. Record the max trace plot into the test report.

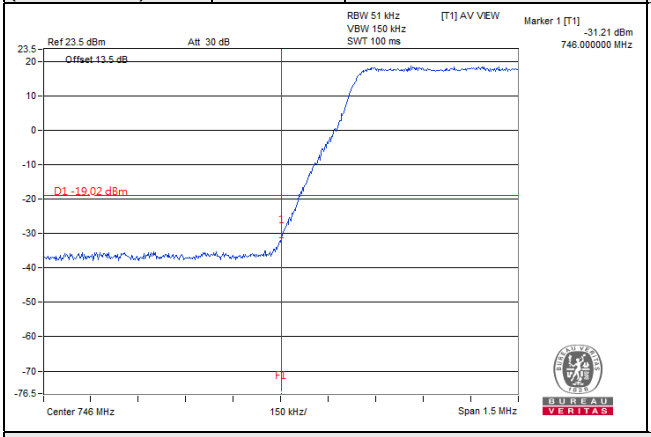
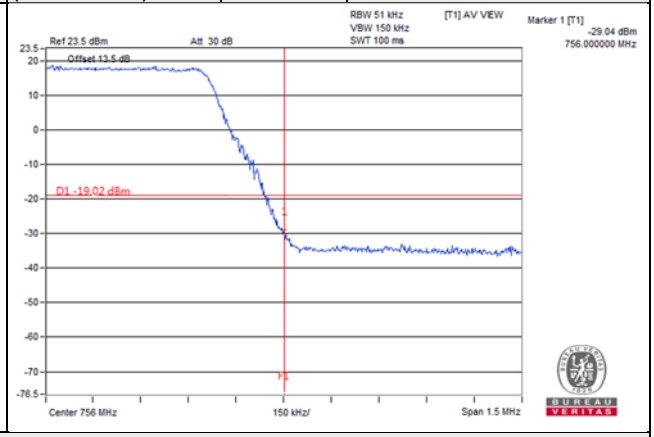
4.5.4 Test Results

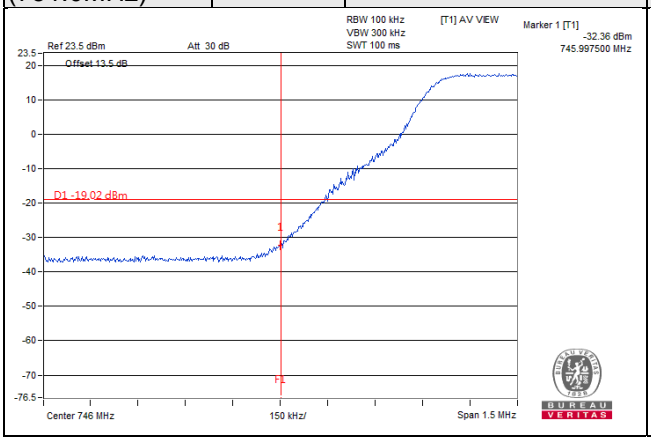
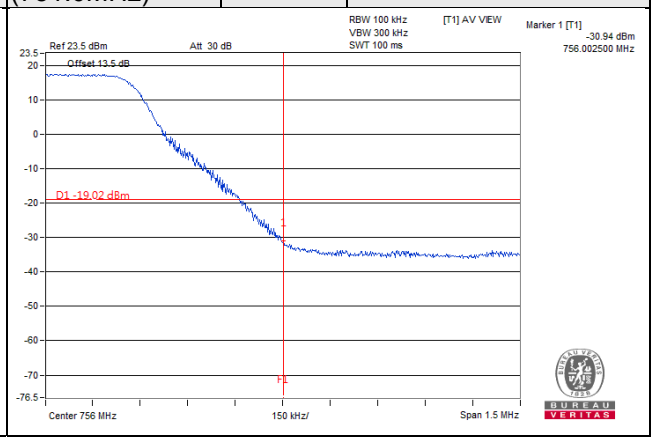
Single Mode (Chain 0)

Channel Bandwidth: 5MHz					
Channel 5205 (748.5MHz)	QPSK	Full RB	Channel 5255 (753.5MHz)	QPSK	Full RB
					

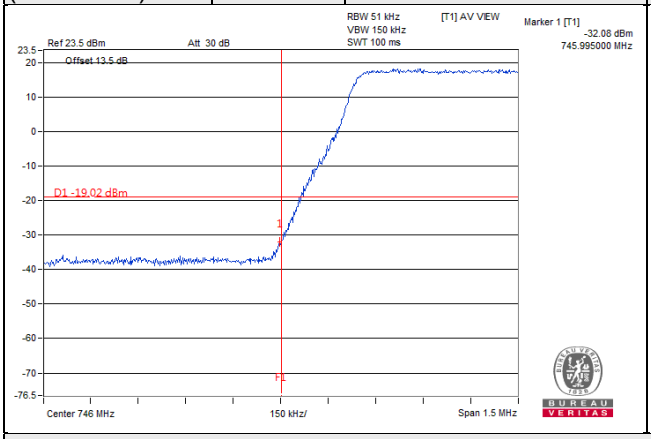
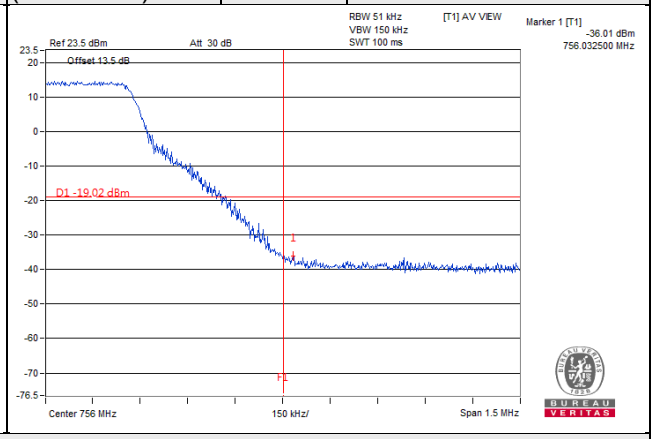
Channel Bandwidth: 10MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB
					

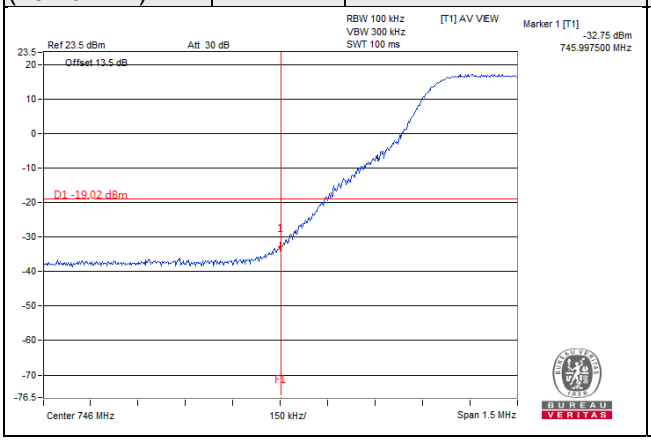
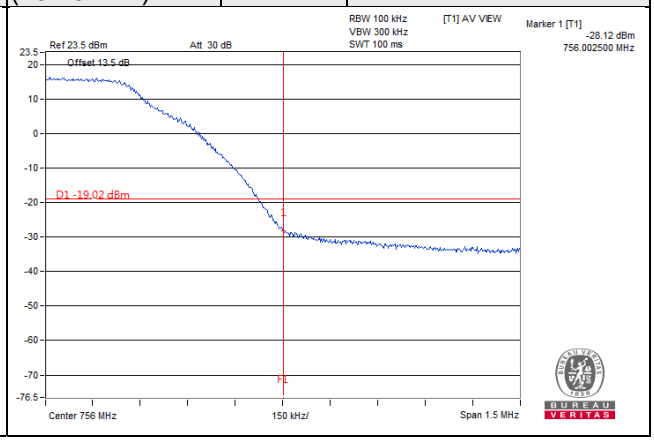
Single Mode (Chain 1)

Channel Bandwidth: 5MHz					
Channel 5205 (748.5MHz)	QPSK	Full RB	Channel 5255 (753.5MHz)	QPSK	Full RB
					

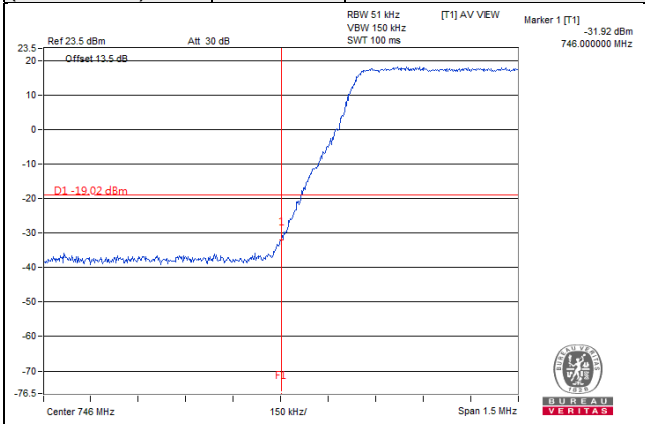
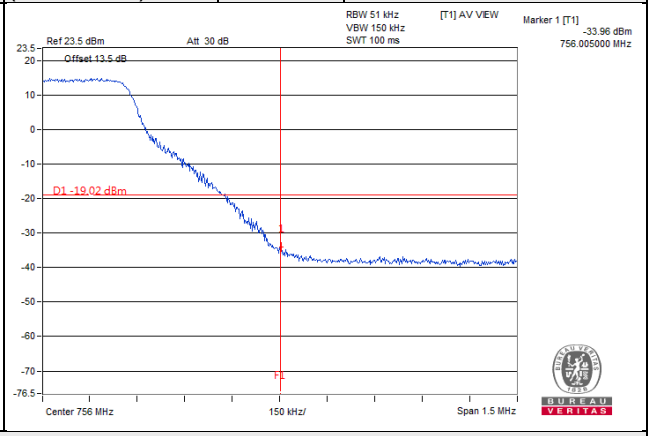
Channel Bandwidth: 10MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB
					

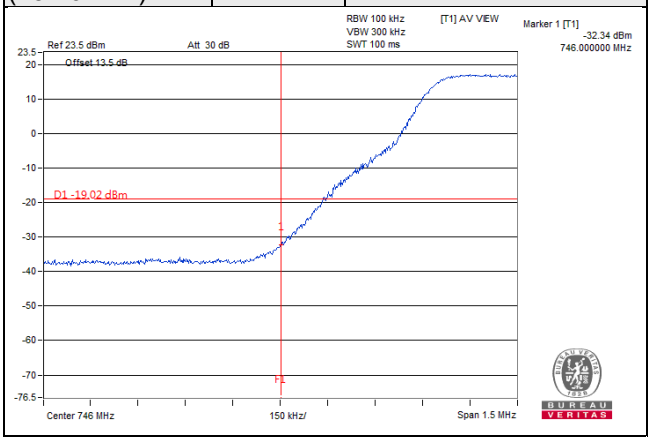
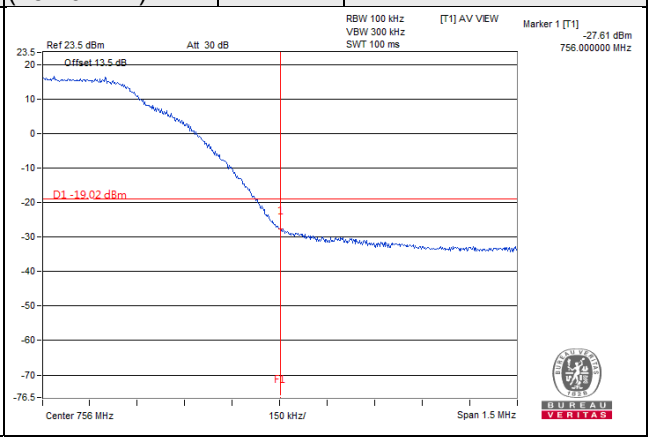
Single Mode (Chain 2)

Channel Bandwidth: 5MHz					
Channel 5205 (748.5MHz)	QPSK	Full RB	Channel 5255 (753.5MHz)	QPSK	Full RB
					

Channel Bandwidth: 10MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB
					

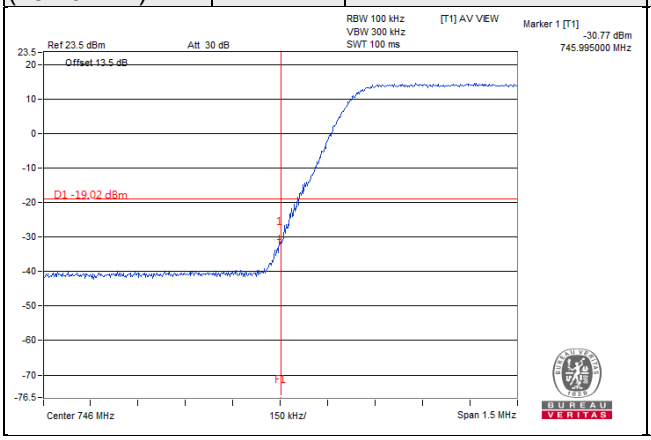
Single Mode (Chain 3)

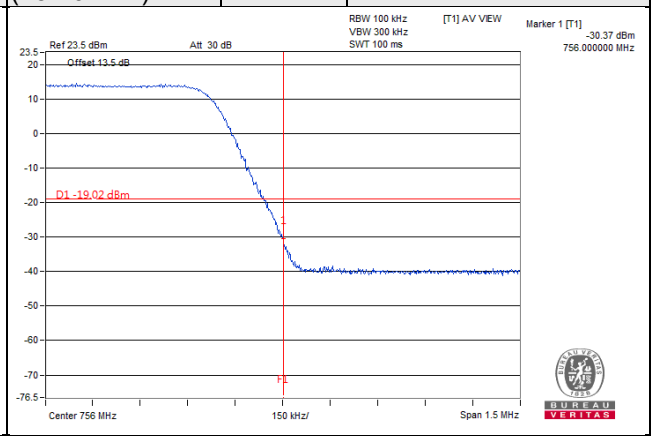
Channel Bandwidth: 5MHz					
Channel 5205 (748.5MHz)	QPSK	Full RB	Channel 5255 (753.5MHz)	QPSK	Full RB
					

Channel Bandwidth: 10MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB
					

2-Carriers Mode (Chain 0)

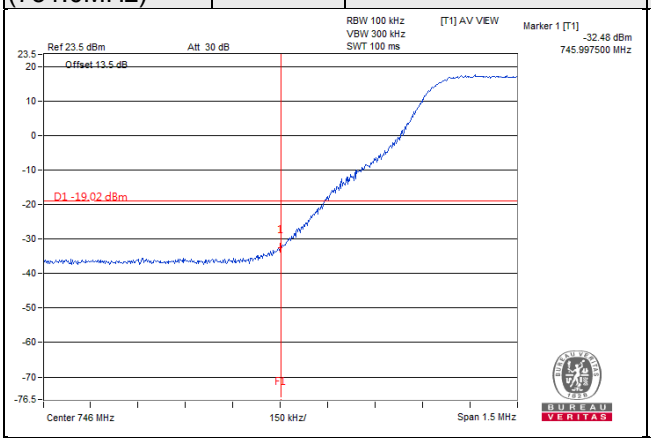
Channel Bandwidth: 5MHz + 5MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB

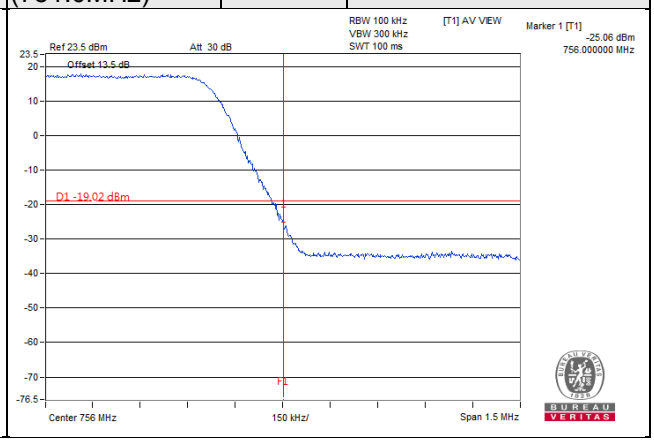




2-Carriers Mode (Chain 1)

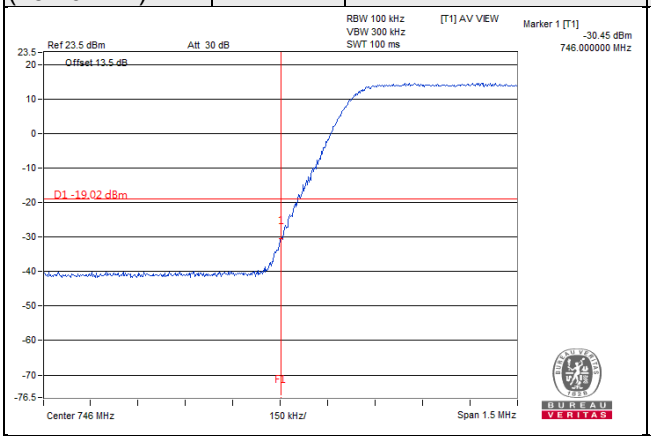
Channel Bandwidth: 5MHz + 5MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB

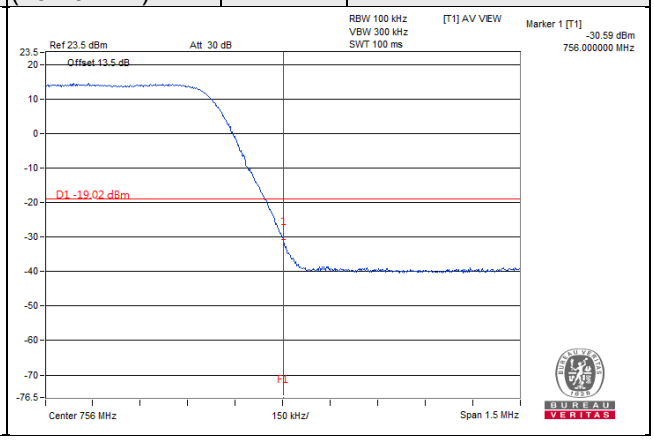




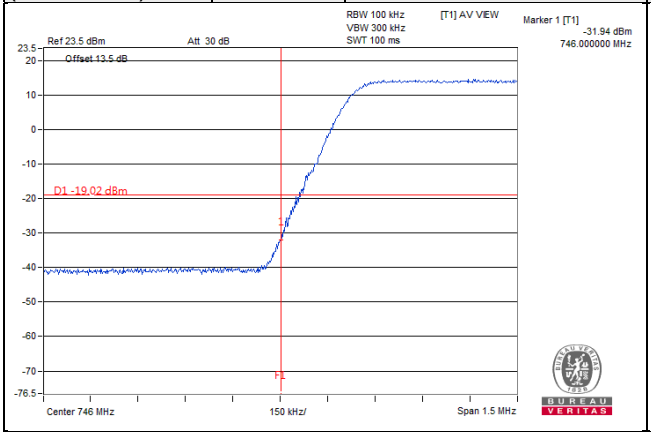
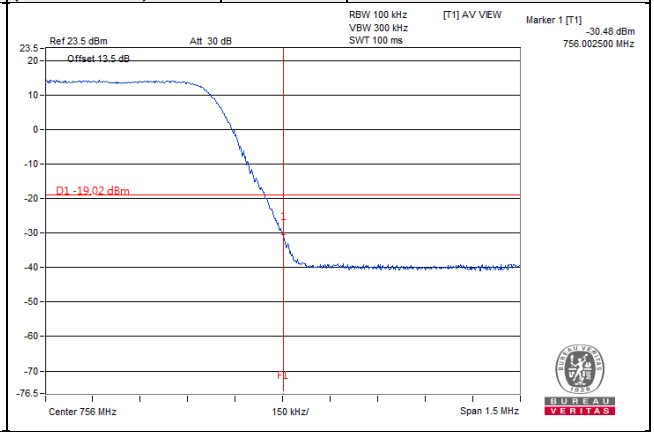
2-Carriers Mode (Chain 2)

Channel Bandwidth: 5MHz + 5MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB





2-Carriers Mode (Chain 3)

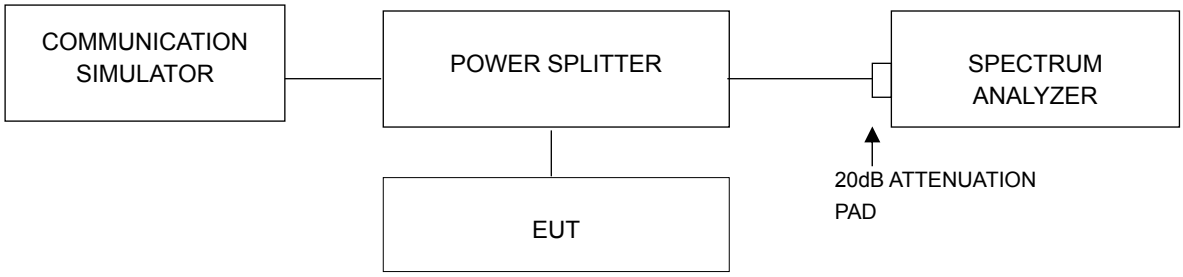
Channel Bandwidth: 5MHz + 5MHz					
Channel 5230 (751.0MHz)	QPSK	Full RB	Channel 5230 (751.0MHz)	QPSK	Full RB
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

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

4.6.2 Test Setup



4.6.3 Test Procedures

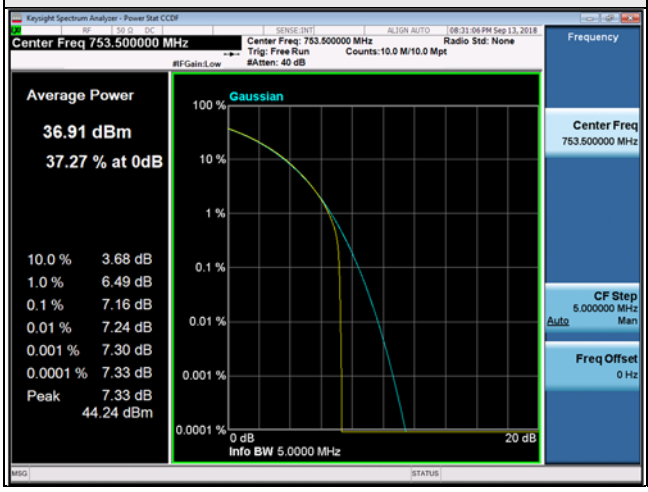
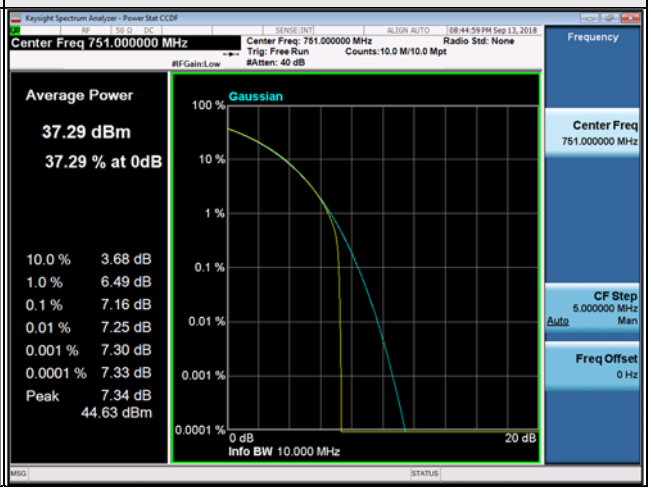
a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

b. Set the number of counts to a value that stabilizes the measured CCDF curve;

c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

Channel Bandwidth: 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
5205	748.5	7.15	7.15	7.16	7.16
5230	751.0	7.15	7.16	7.15	7.16
5255	753.5	7.15	7.16	7.16	7.15
Channel Bandwidth: 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
5230	751.0	7.16	7.15	7.15	7.15

Spectrum Plot Of Worst Value	
5MHz / 16QAM	10MHz / QPSK
	

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

According to FCC 27.53(c), for operations in the 747 to 762 MHz band and the 777 to 792 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured watts, in accordance with the following:

(1) On any frequency outside the 747 to 762 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

Note: The Device has 4x4 MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 quidance.

{The limits is adjusted to -13dBm – 10*log(4) = -19.02dBm}

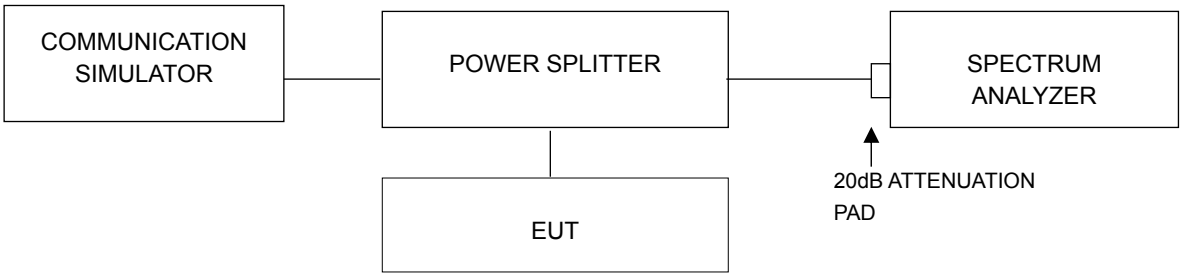
(2) On all frequencies between 764 to 776 MHz and 794 to 806 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

Note: The Device has 4x4 MIMO function, so the limit of spurious emissions needs to be reduced by 10log($Numbers_{Ant}$) according to FCC KDB 662911 D01 quidance.

{10log(10kHz/6.25kHz) = 2.04dB,
The limits is adjusted to -46dBm + 2.04dB – 10*log(4) = -49.98dBm}

Emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80dBW EIRP for discrete emission of less than 700Hz bandwidth.
{The limits is adjusted to -40dBm (-70dBW) – 10*log(4) = -46.02dBm}

4.7.2 Test Setup



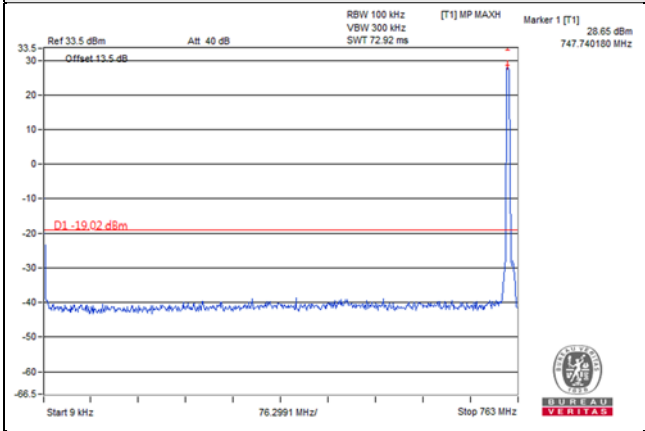
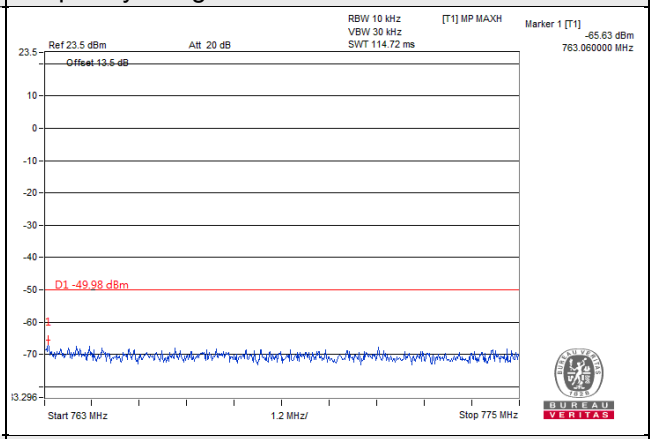
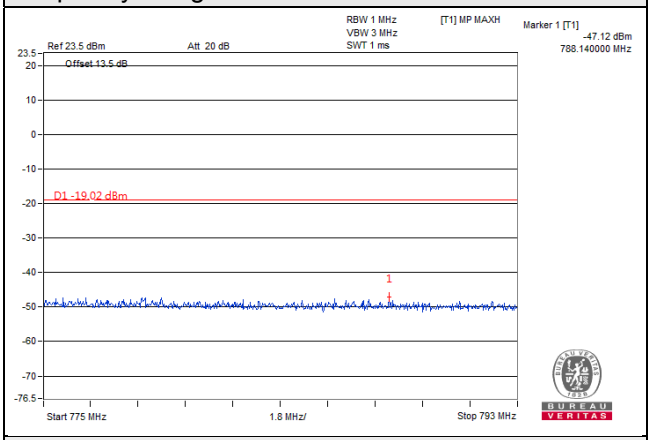
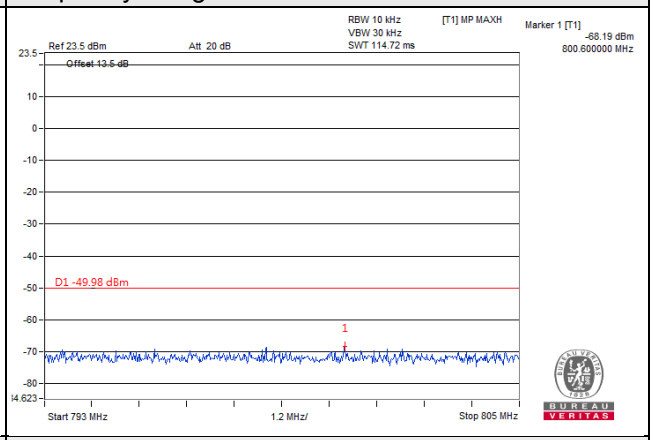
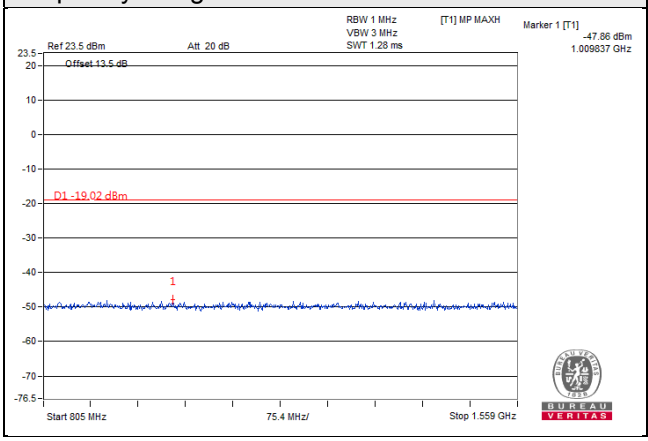
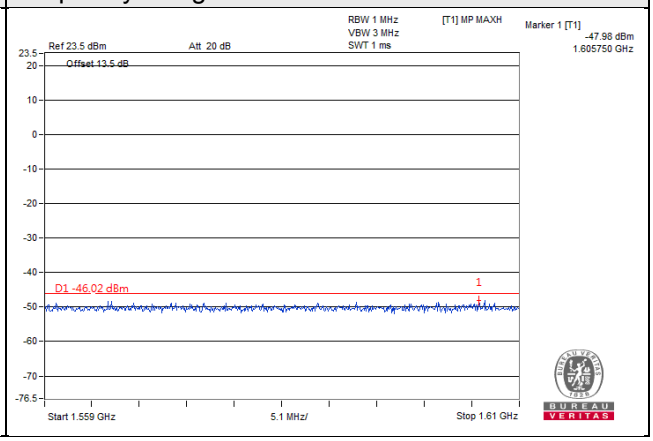
4.7.3 Test Procedure

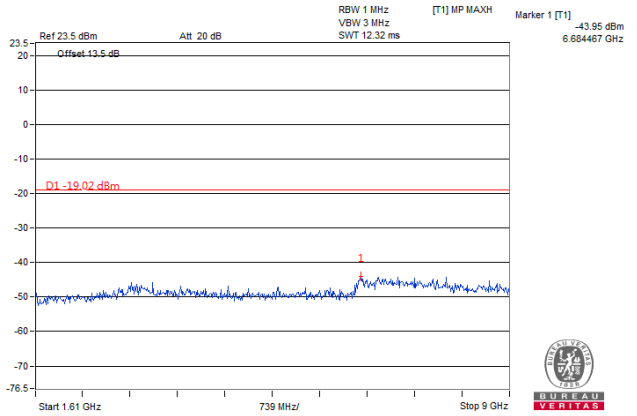
a. All measurements were done at 3 channels: low, middle and high operational frequency range.

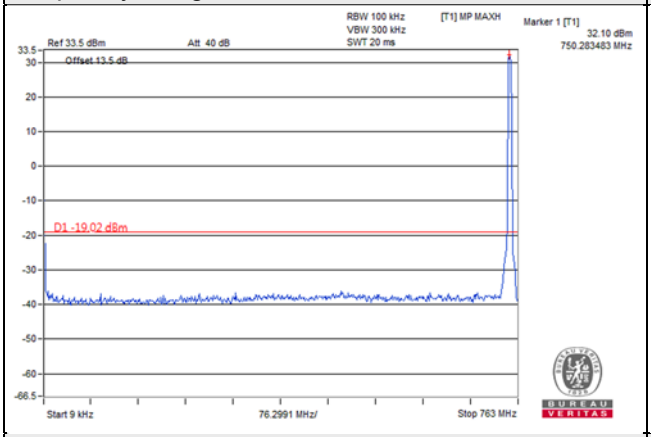
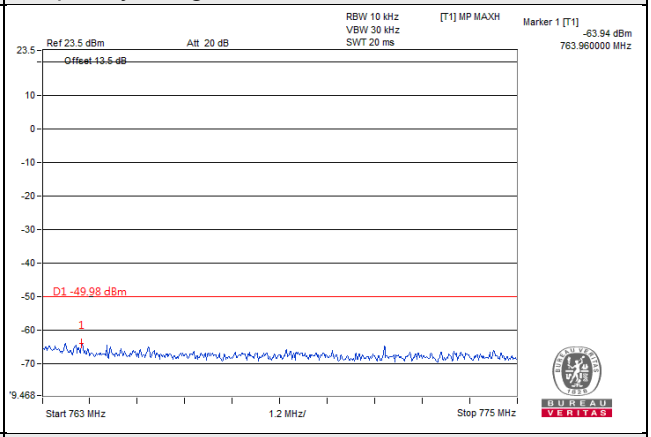
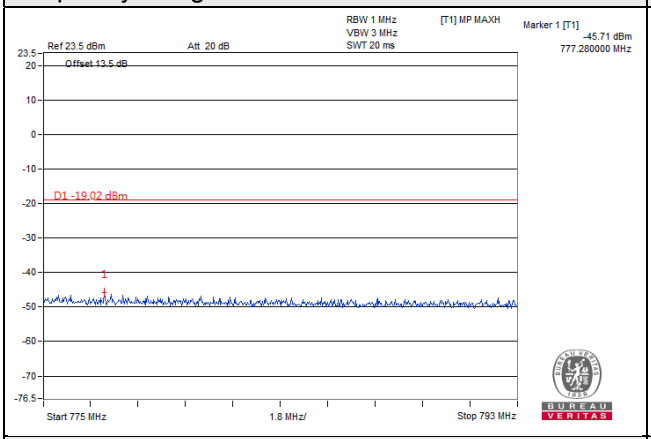
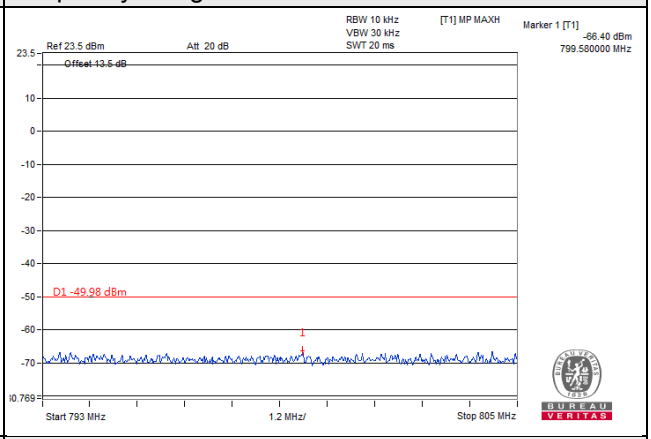
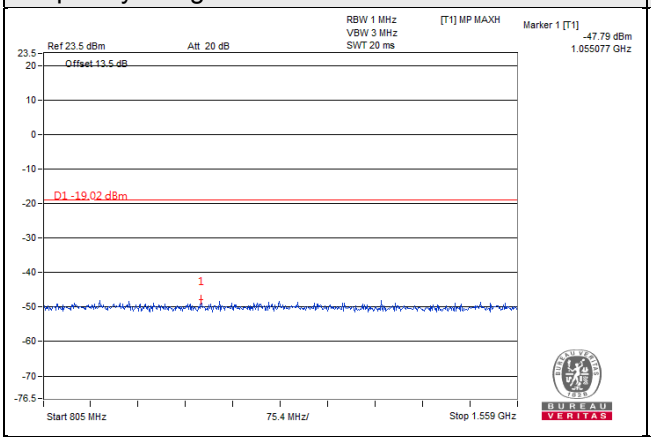
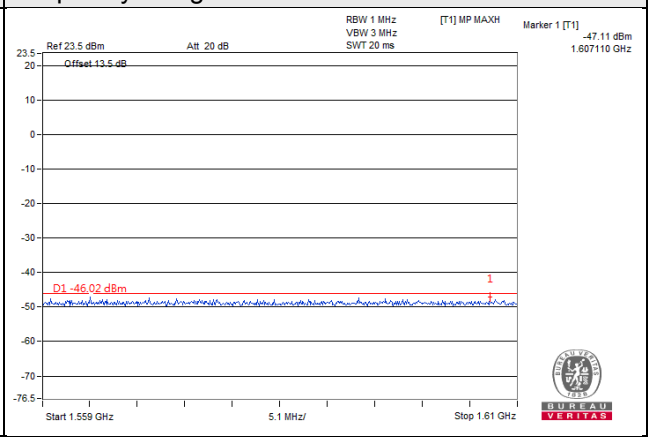
b. When the spectrum scanned from 9kHz to 26.5GHz, it shall be connected to the attenuator with the carried frequency.

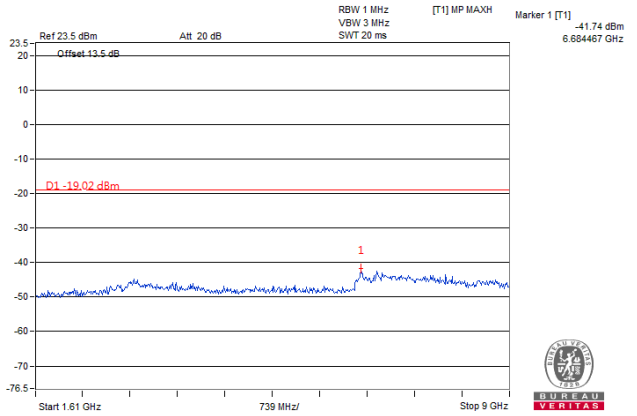
4.7.4 Test Results

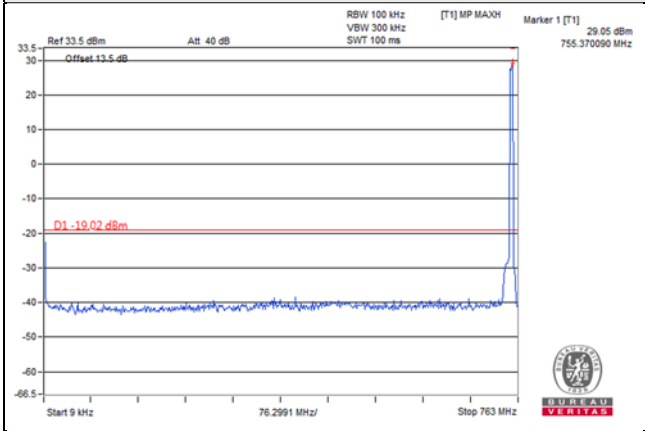
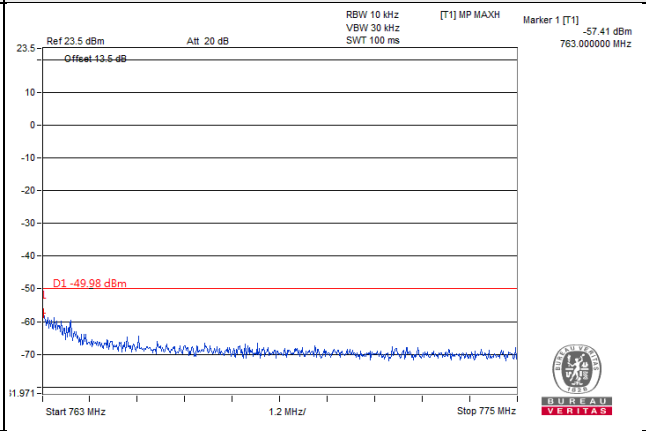
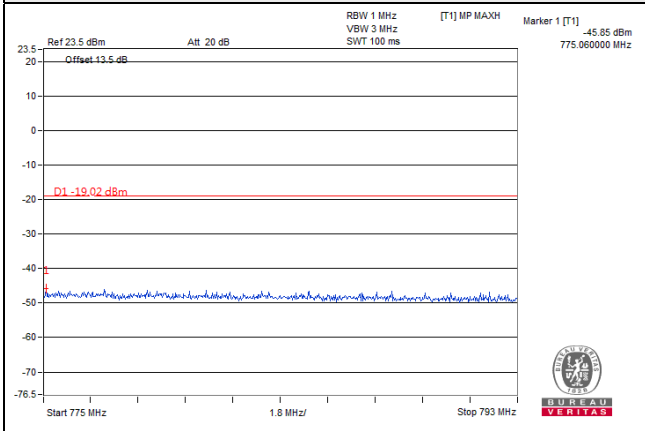
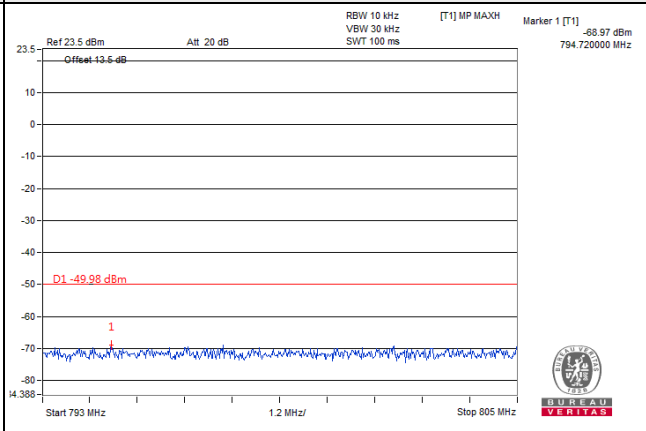
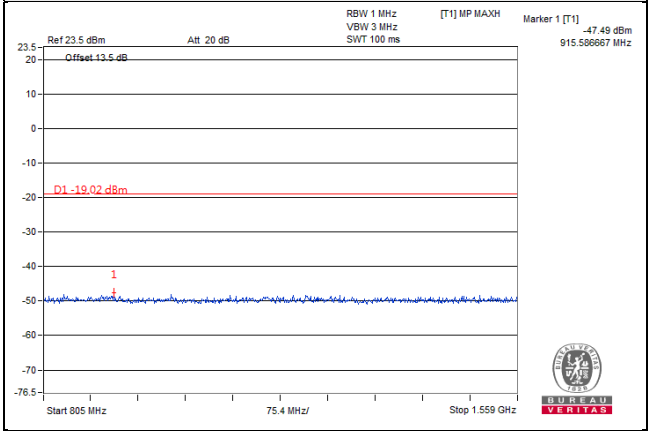
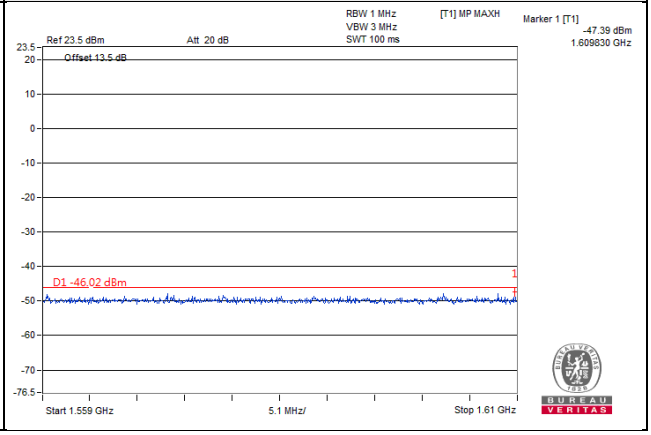
Single Mode (Chain 0)

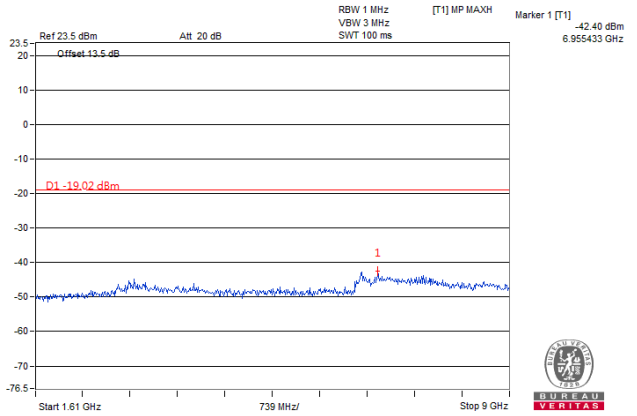
Channel Band width: 5MHz	
Channel 5205 (748.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

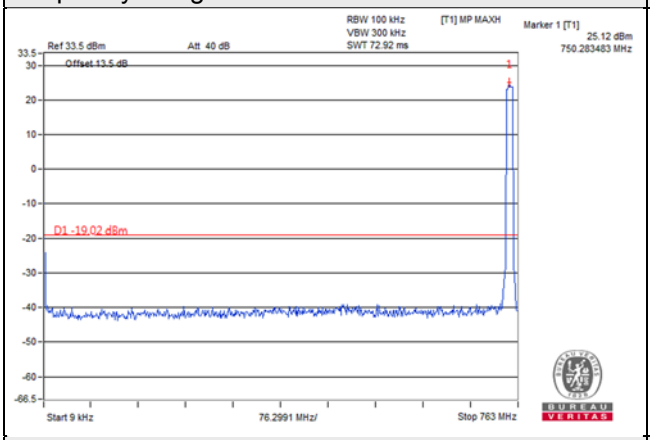
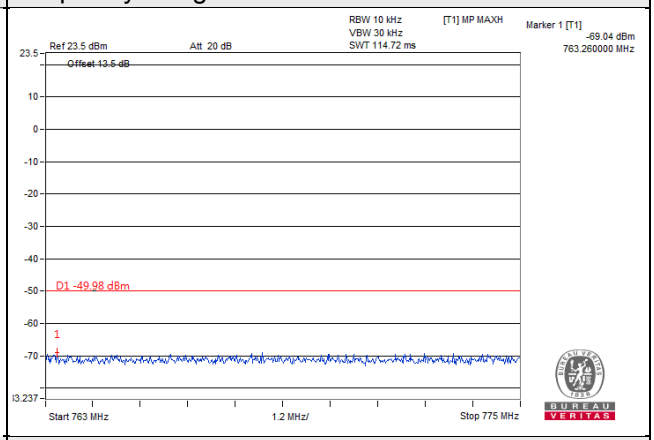
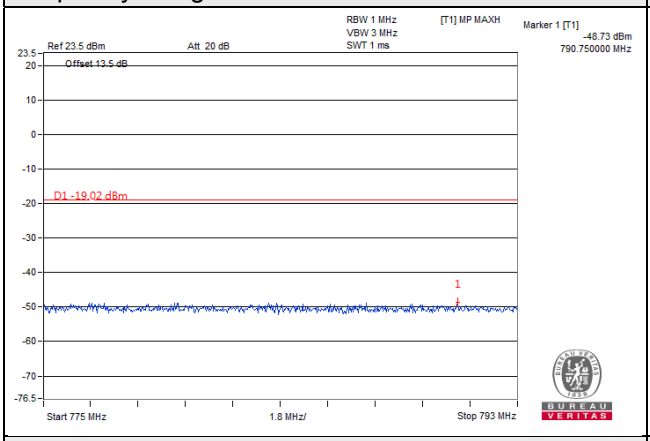
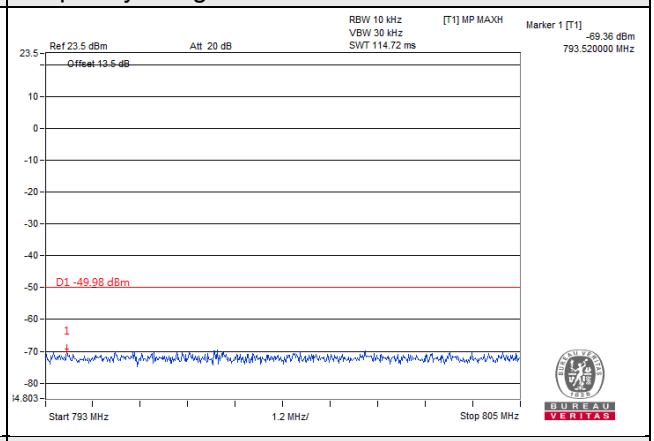
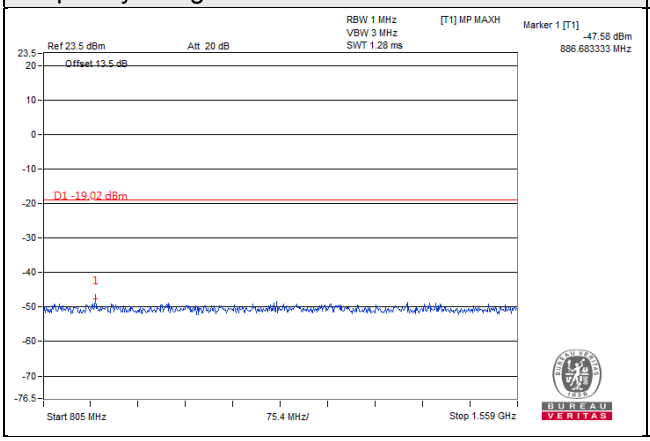
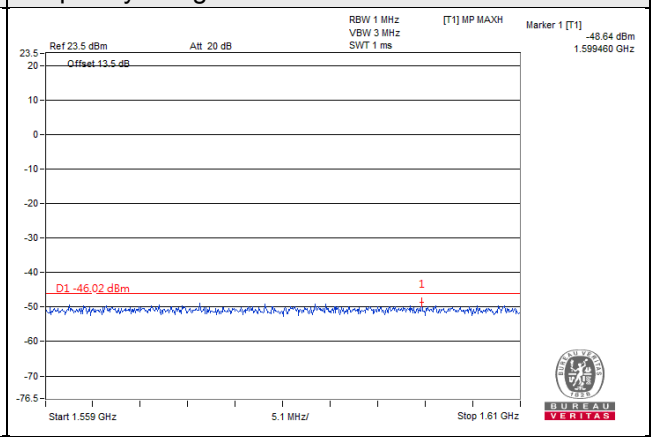
Frequency Range : 1.610GHz~9GHz	
	

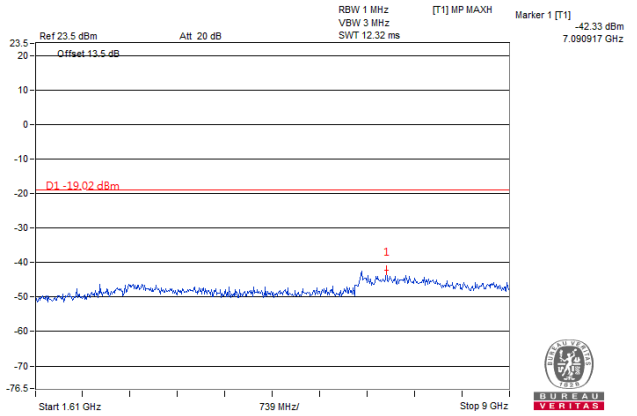
Channel Band width: 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

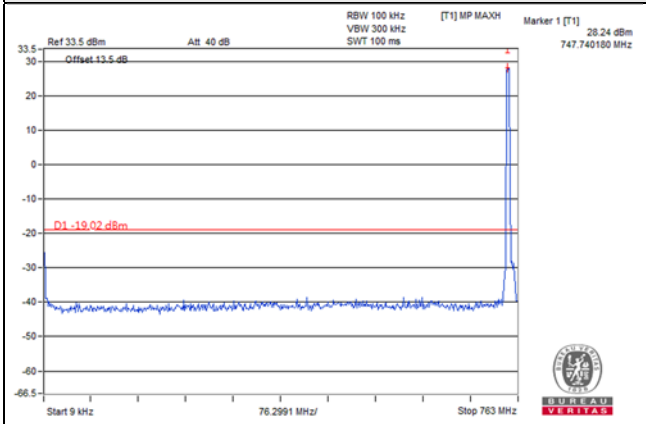
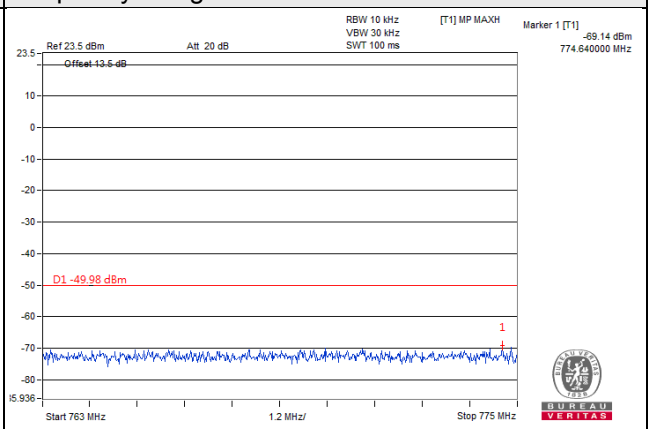
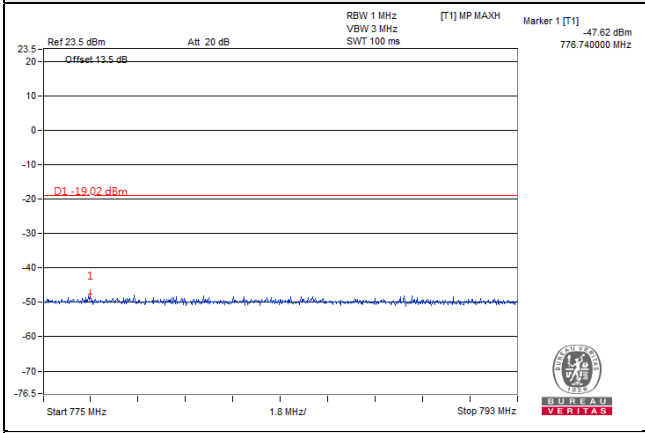
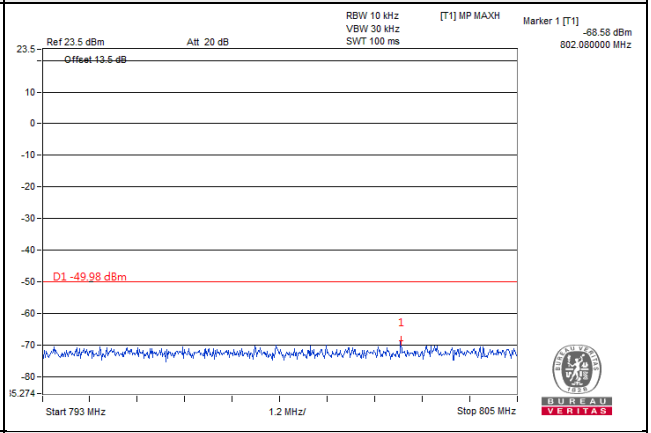
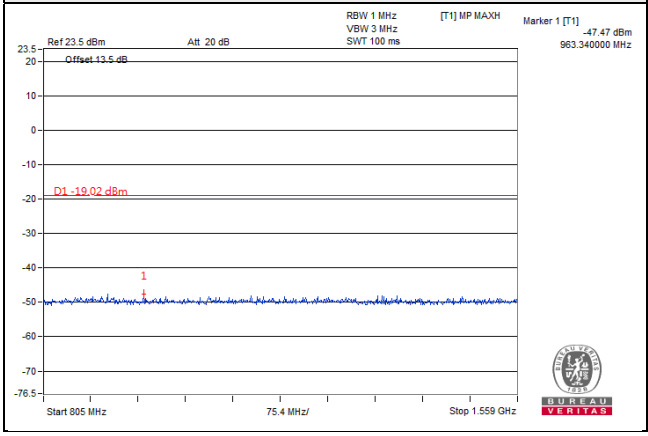
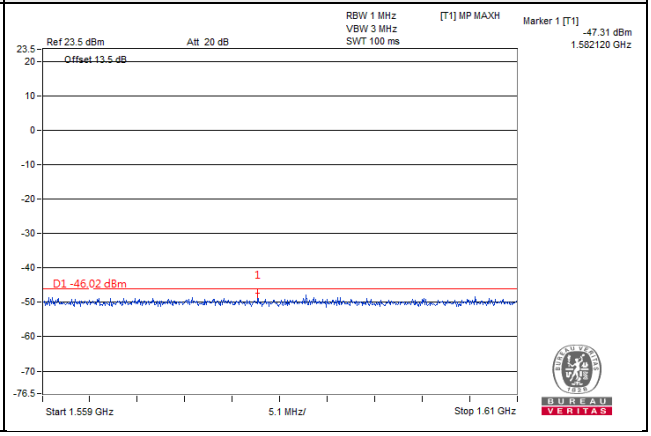
Channel Band width: 5MHz	
Channel 5255 (753.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

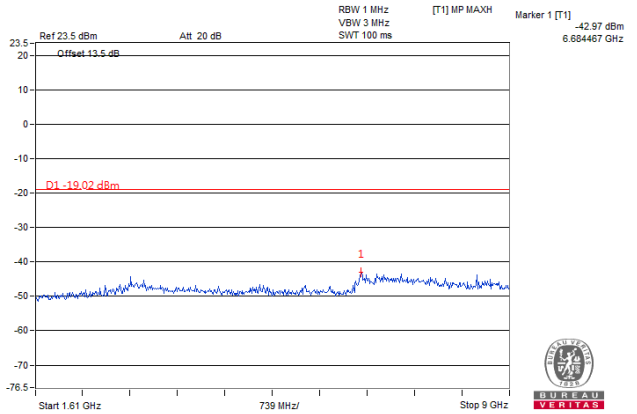
Frequency Range : 1.610GHz~9GHz	
	

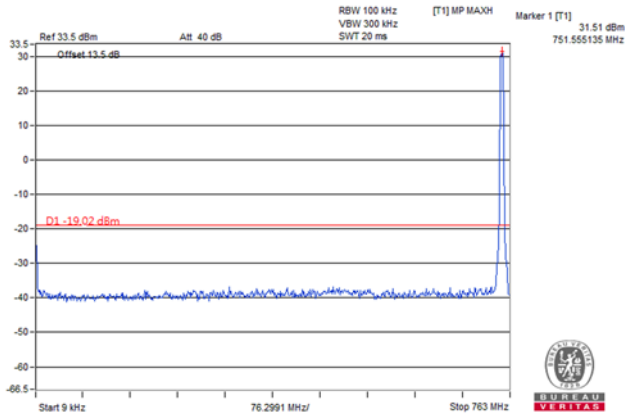
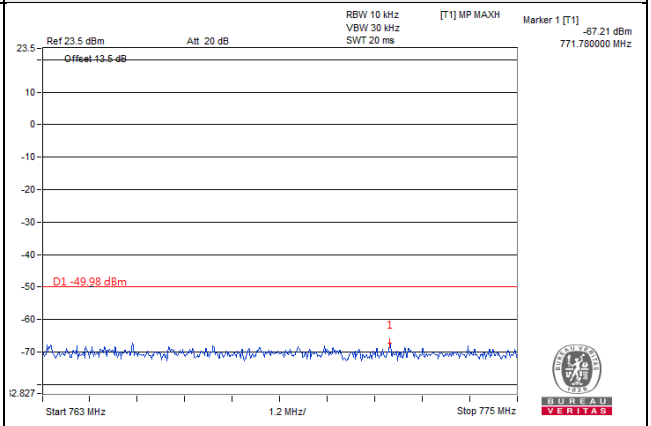
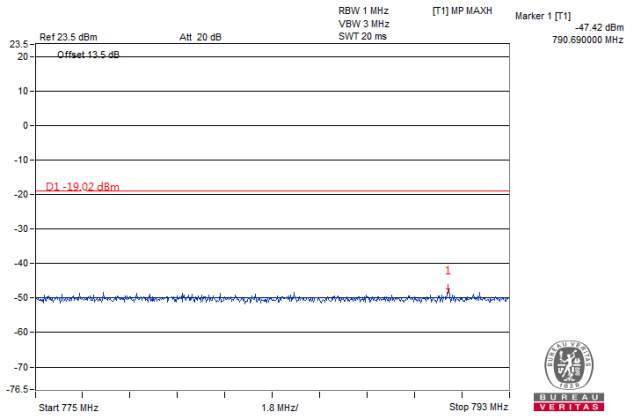
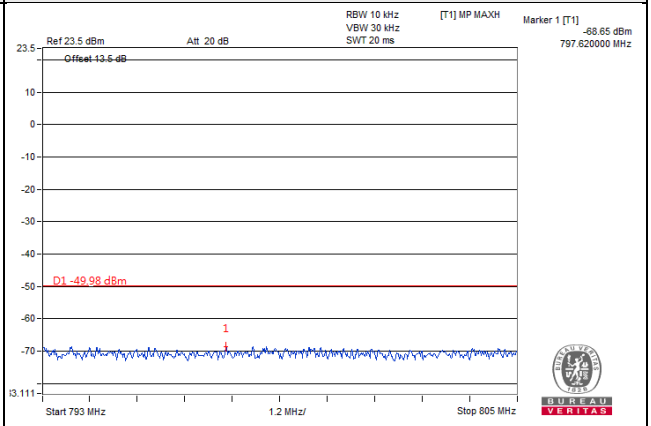
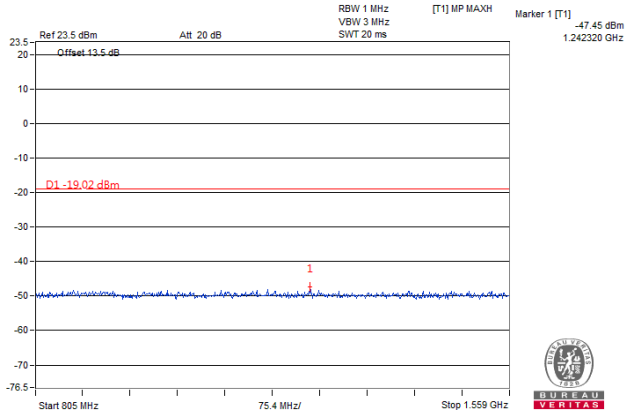
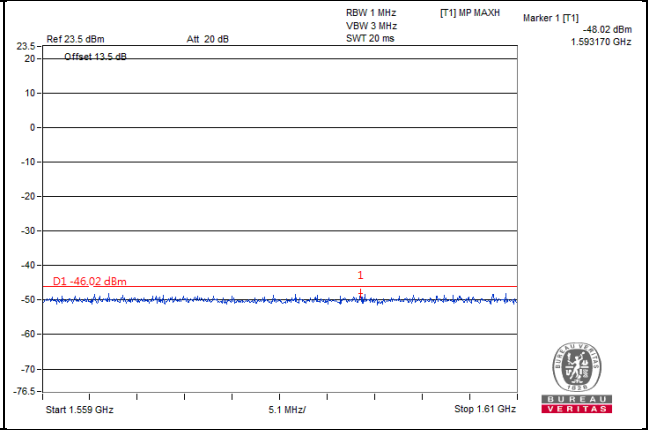
Channel Band width: 10MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

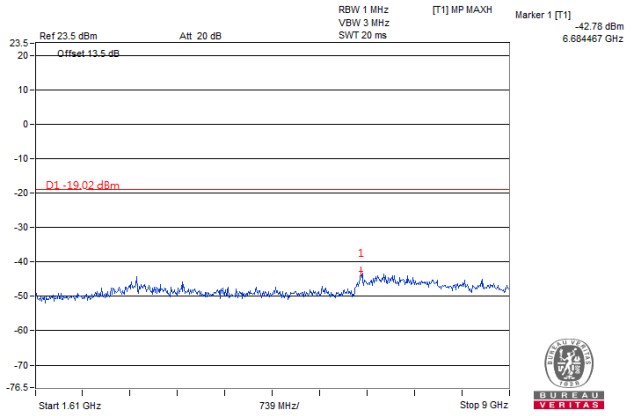
Frequency Range : 1.610GHz~9GHz	
	

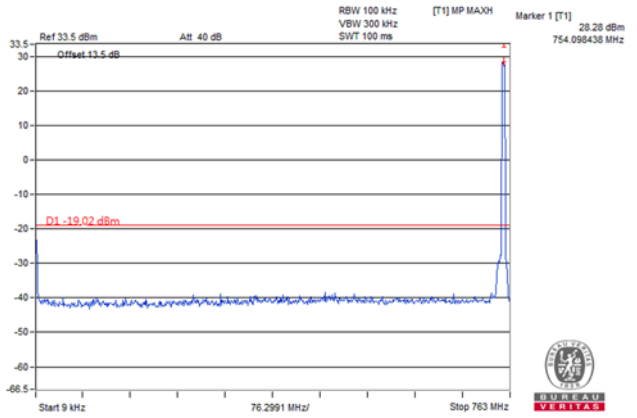
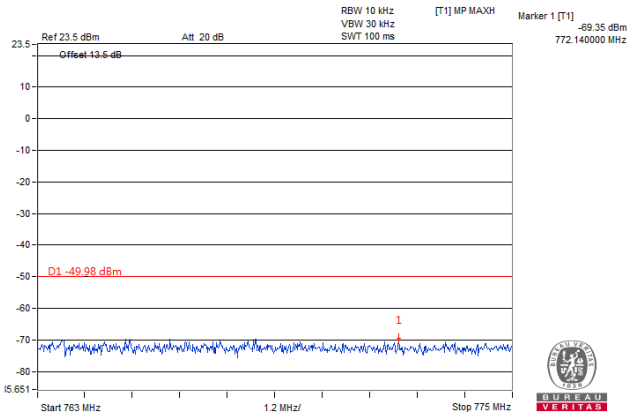
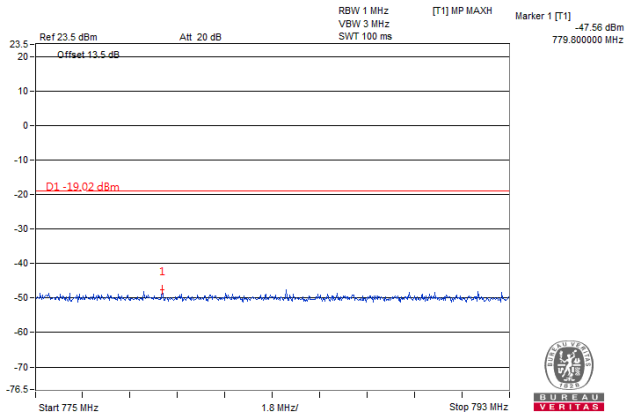
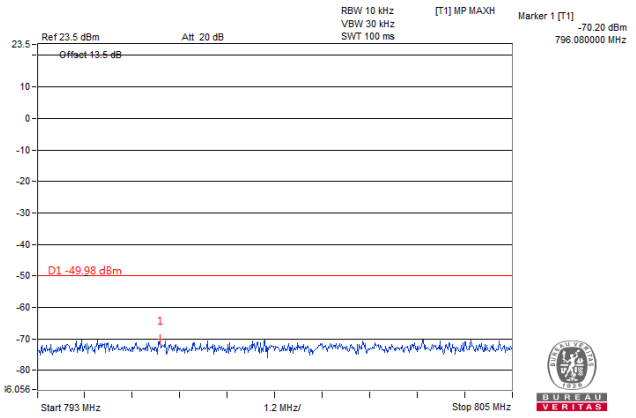
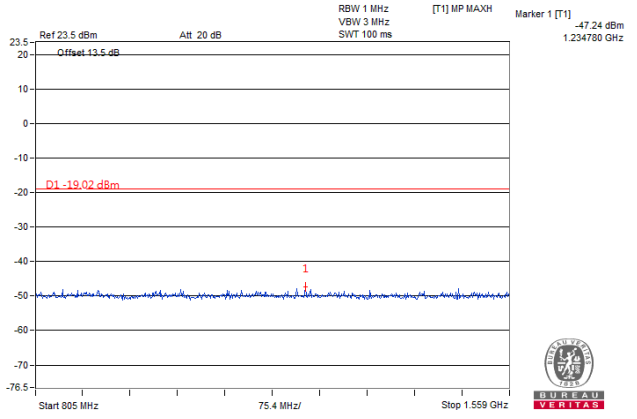
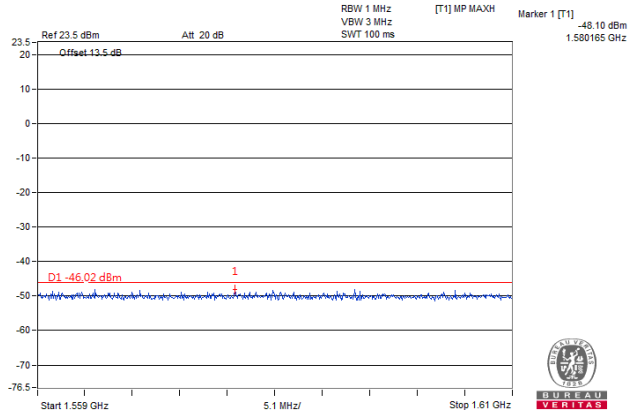
Single Mode (Chain 1)

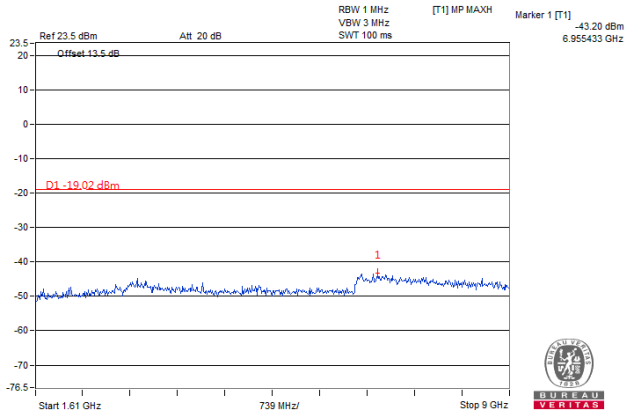
Channel Band width: 5MHz	
Channel 5205 (748.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

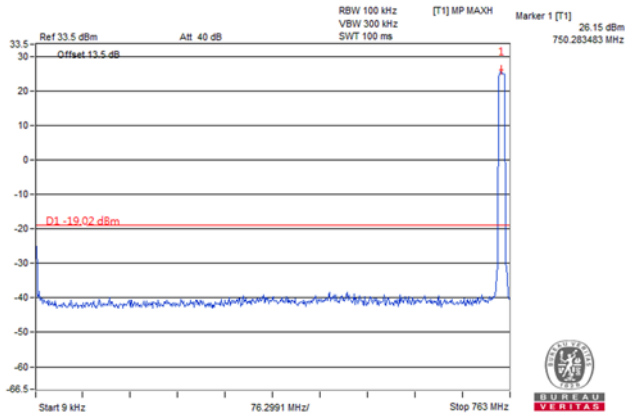
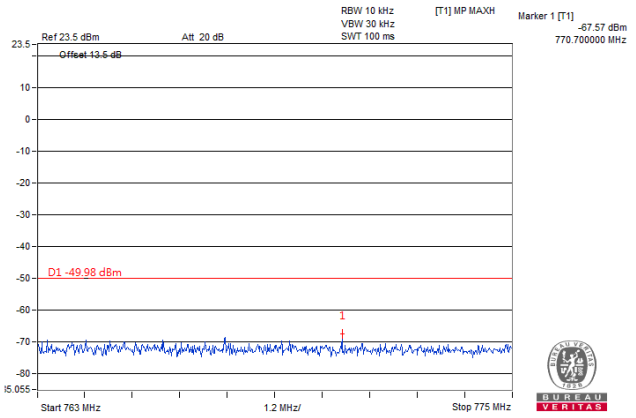
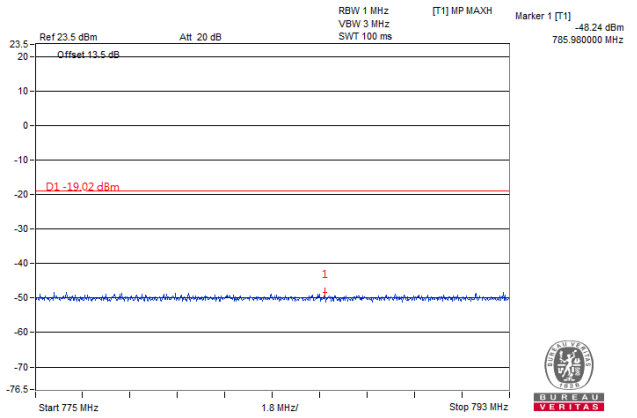
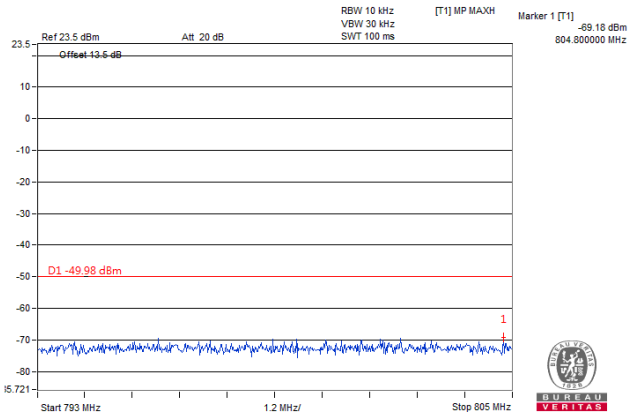
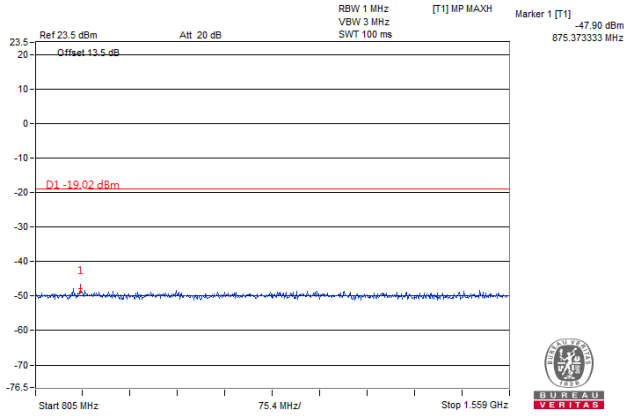
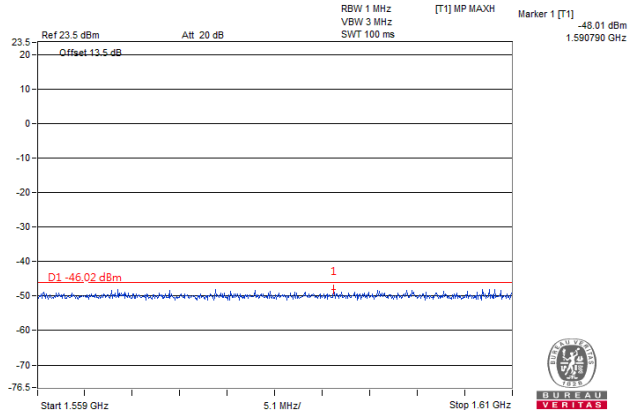
Frequency Range : 1.610GHz~9GHz	
	

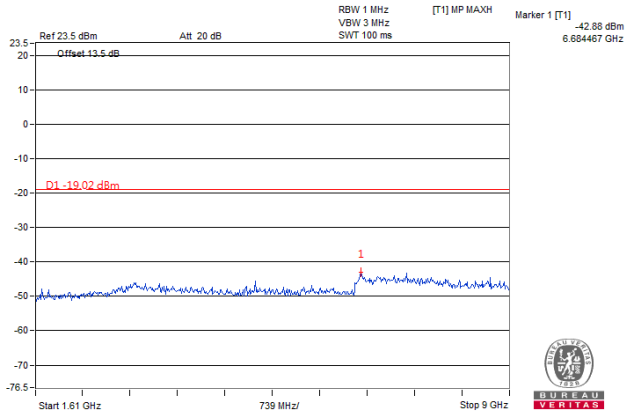
Channel Band width: 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

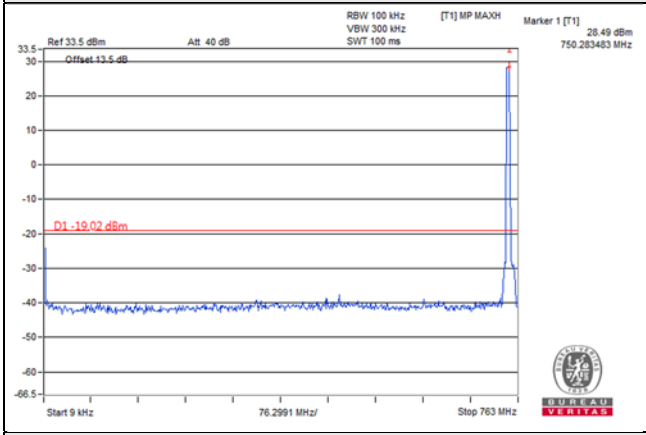
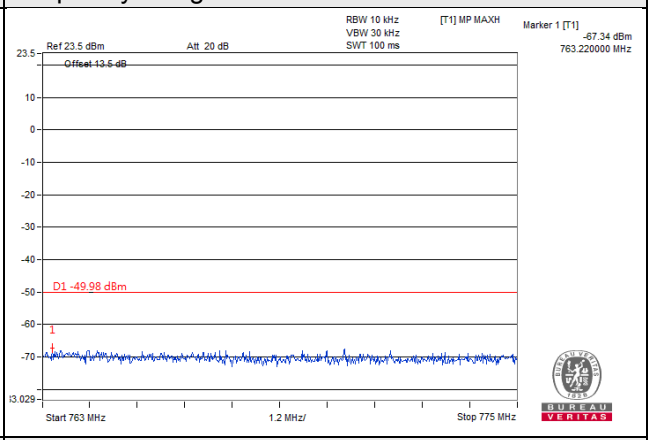
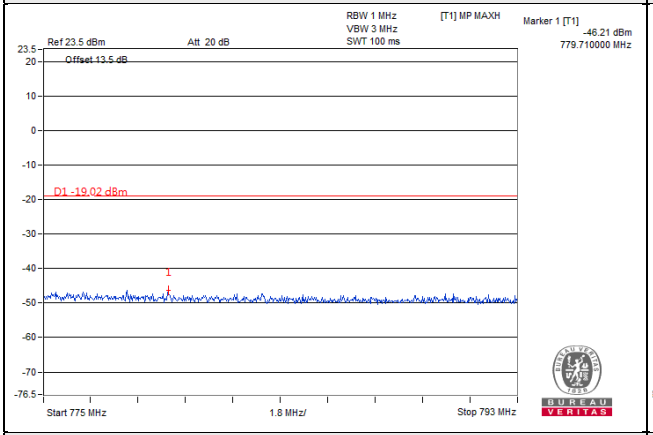
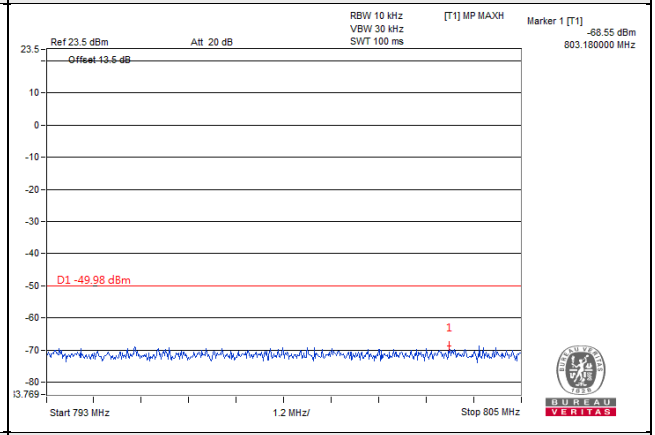
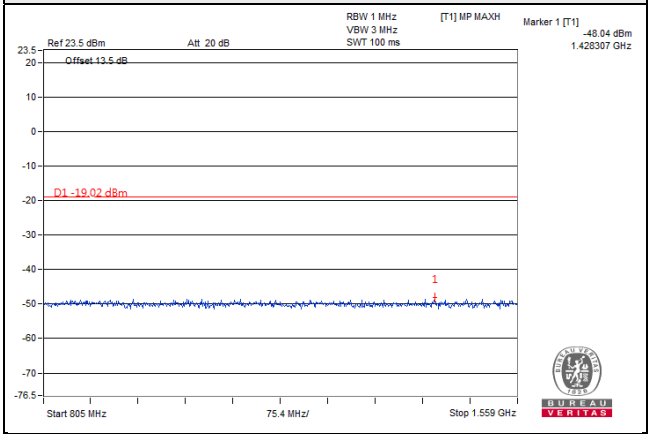
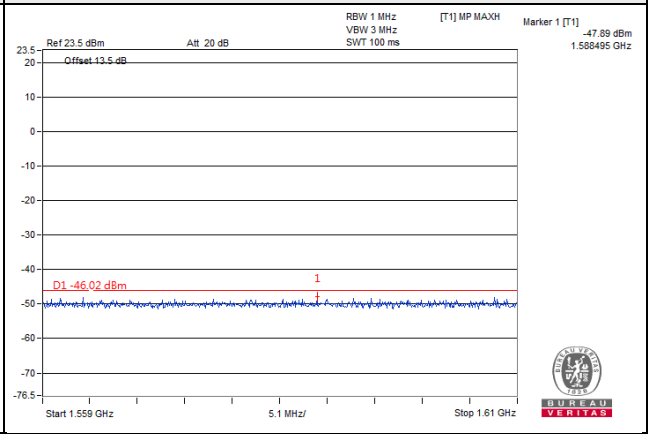
Channel Band width: 5MHz	
Channel 5255 (753.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

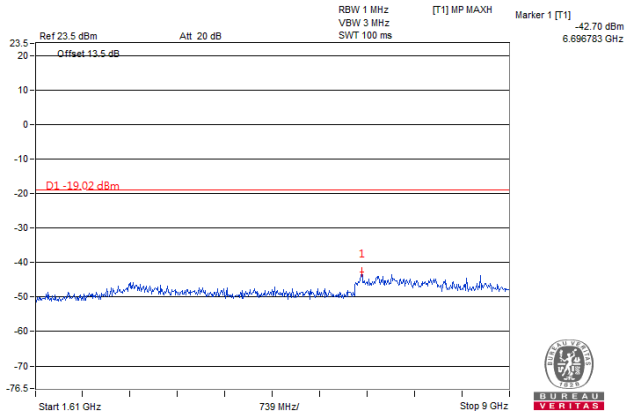
Frequency Range : 1.610GHz~9GHz	
	

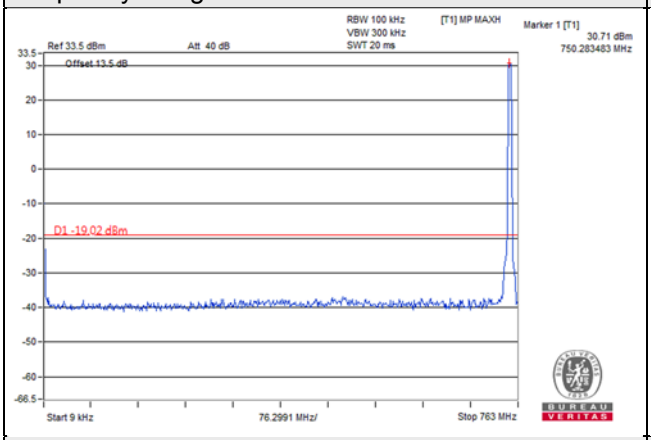
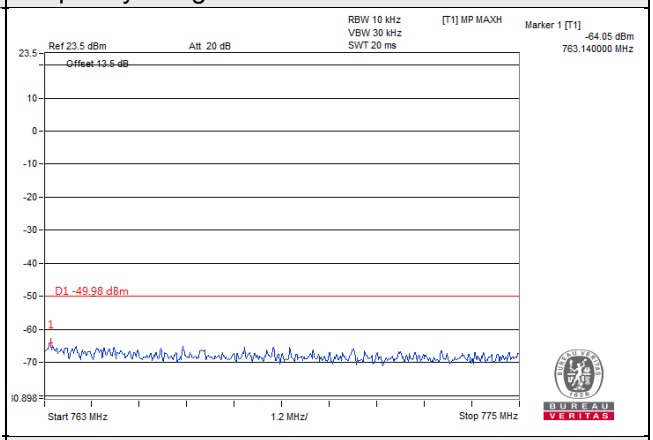
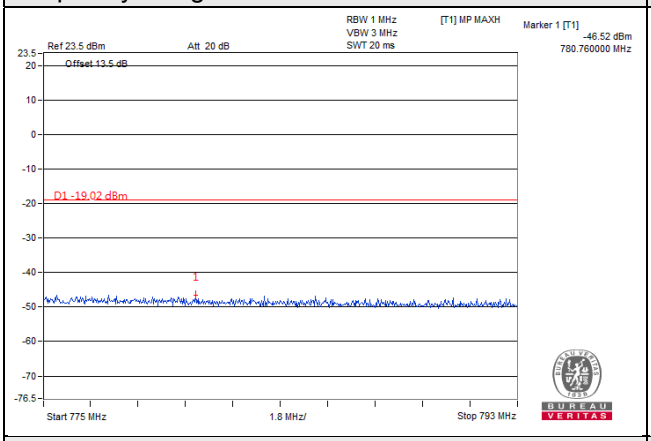
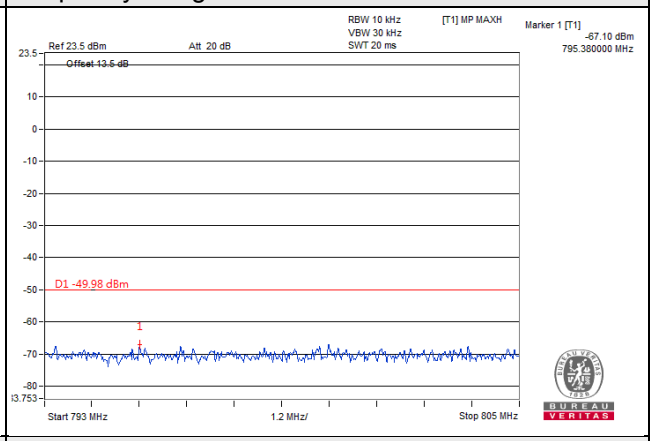
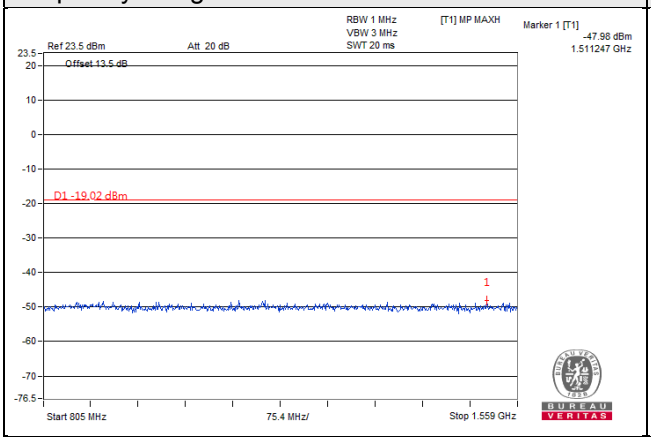
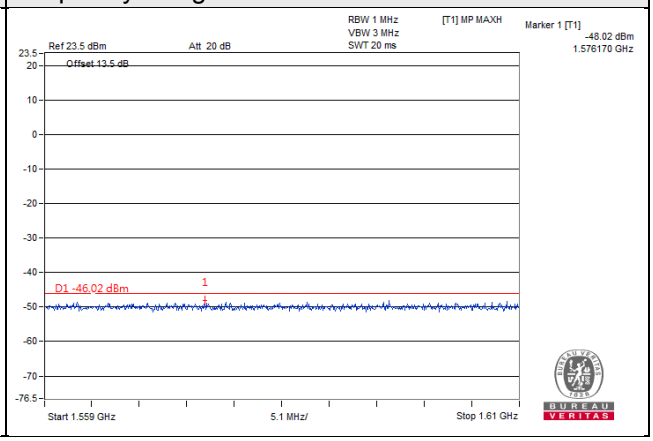
Channel Band width: 10MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

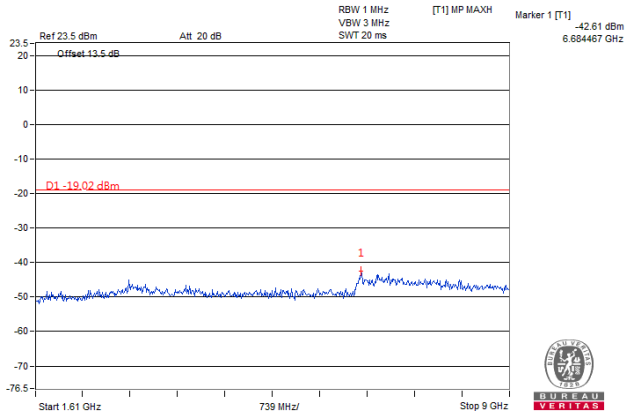
Frequency Range : 1.610GHz~9GHz	
	

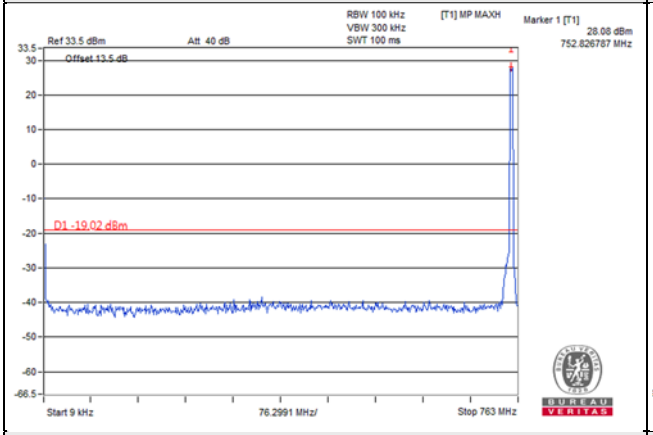
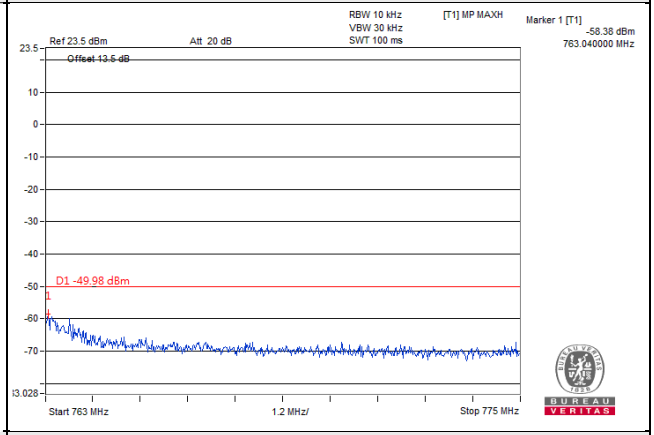
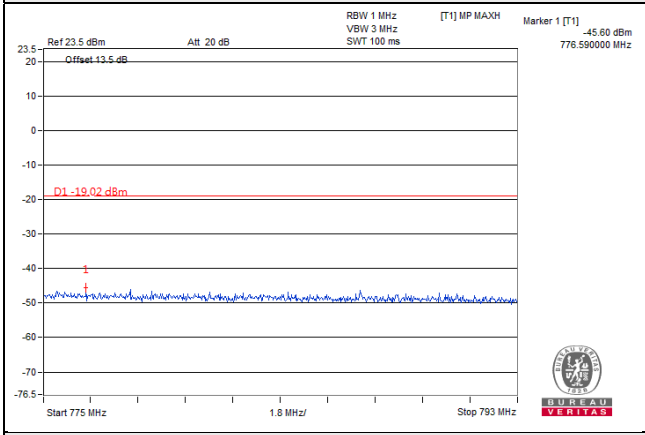
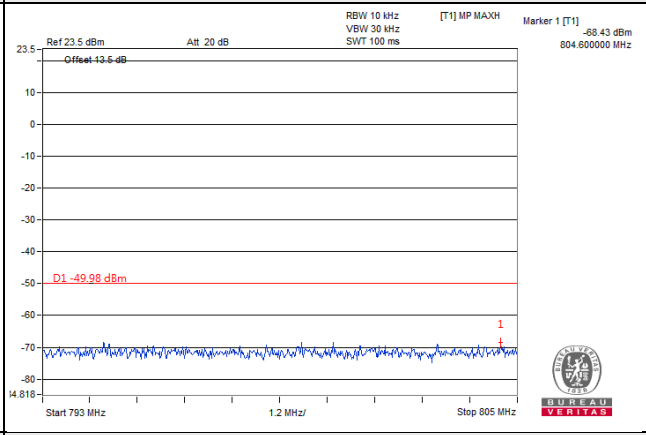
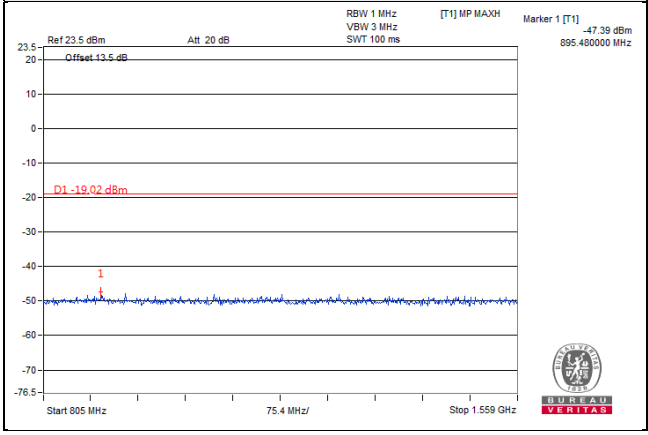
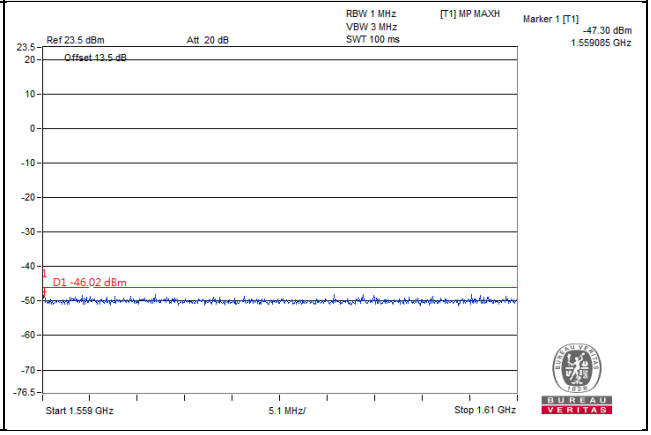
Single Mode (Chain 2)

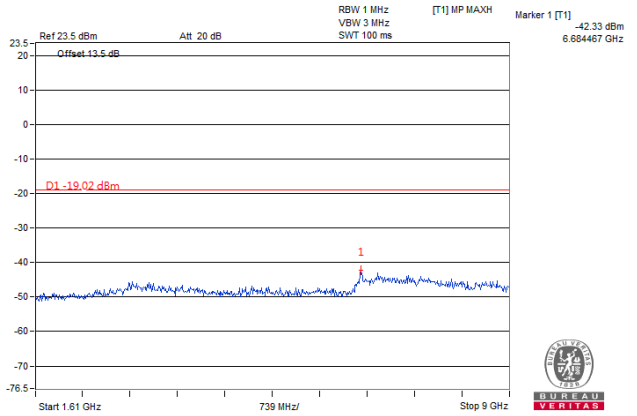
Channel Band width: 5MHz	
Channel 5205 (748.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

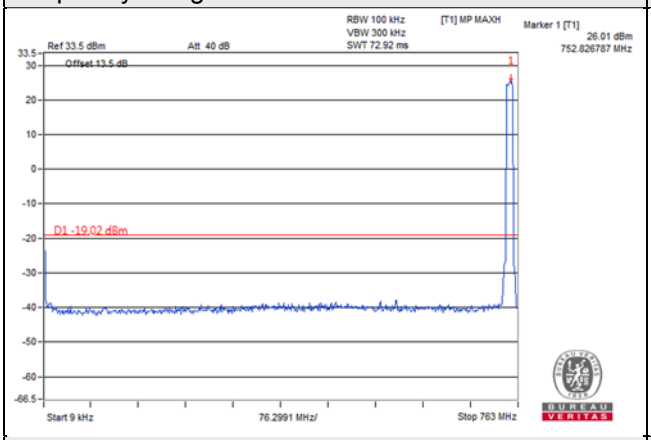
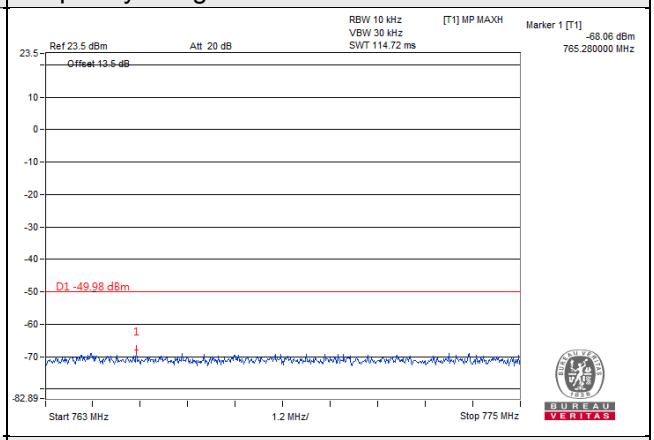
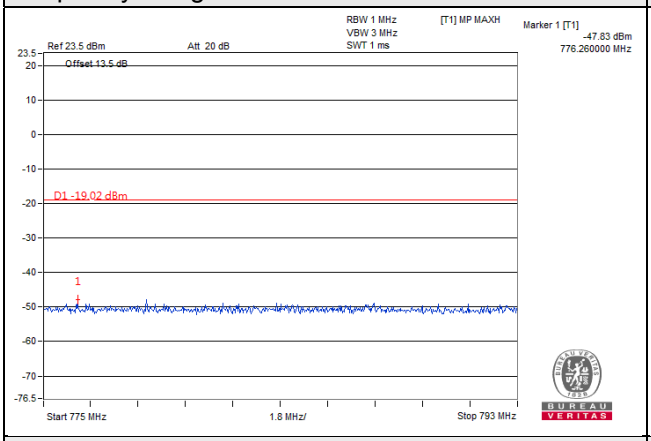
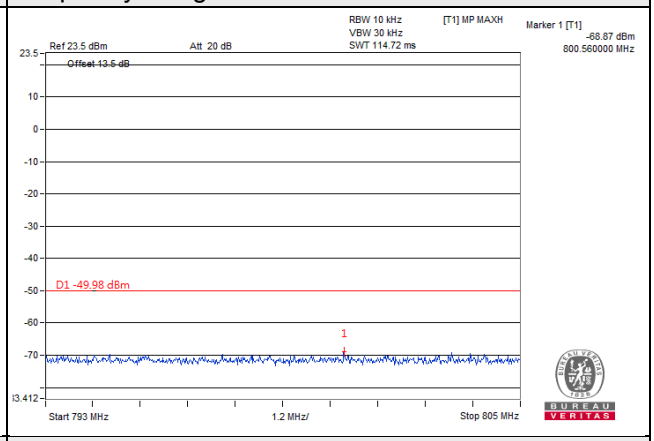
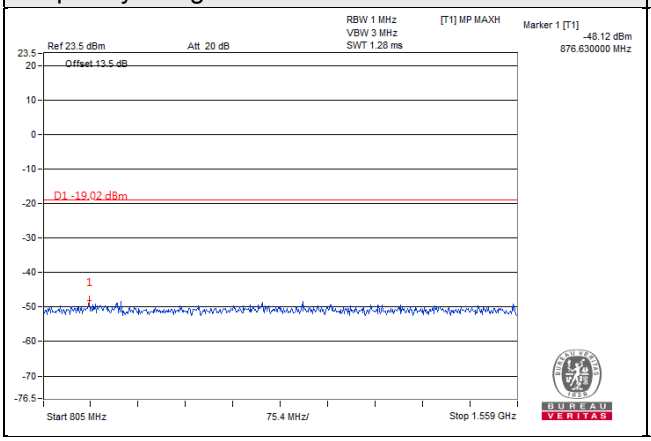
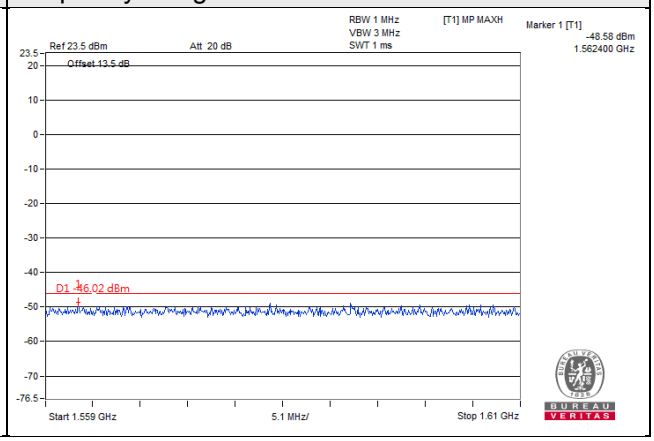
Frequency Range : 1.610GHz~9GHz	
	

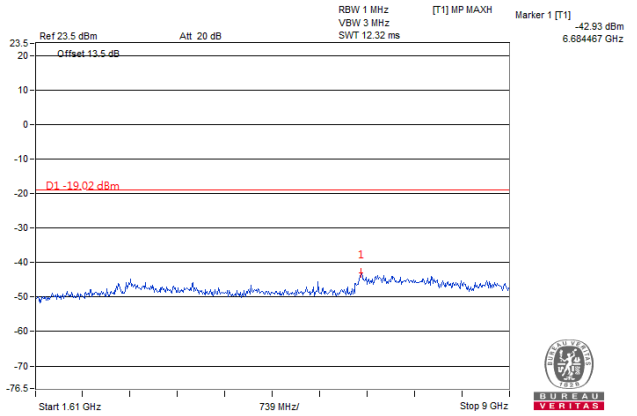
Channel Band width: 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

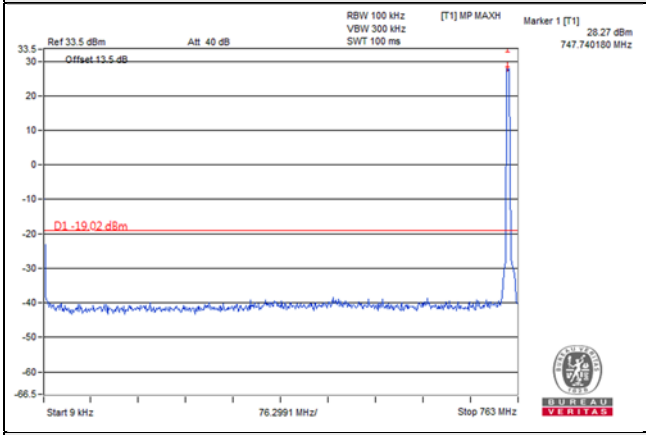
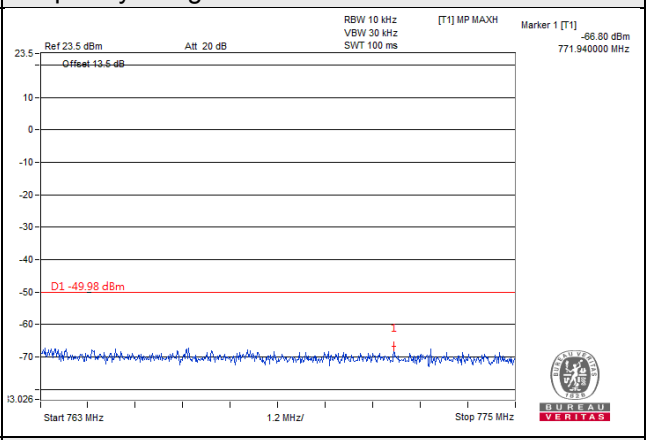
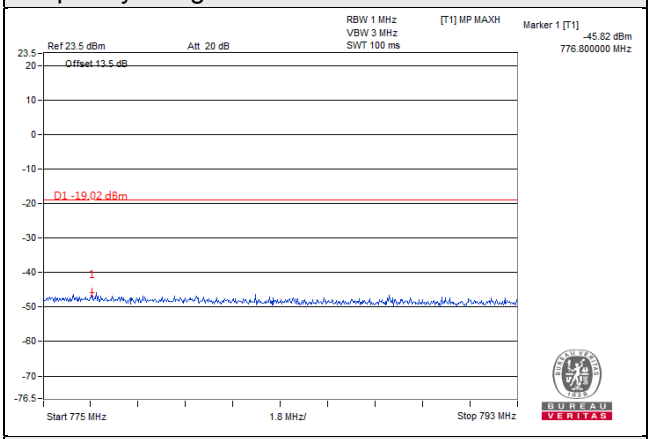
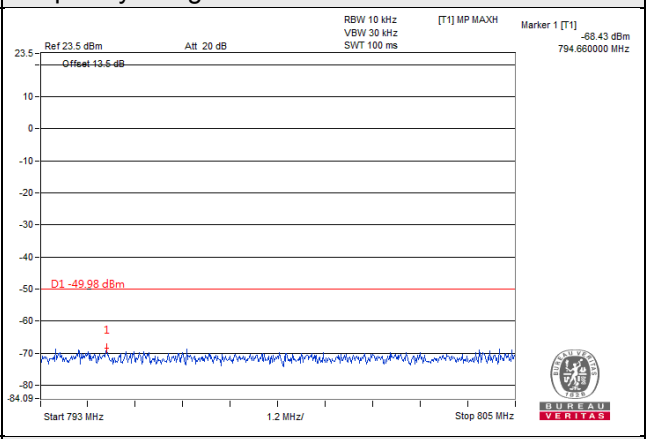
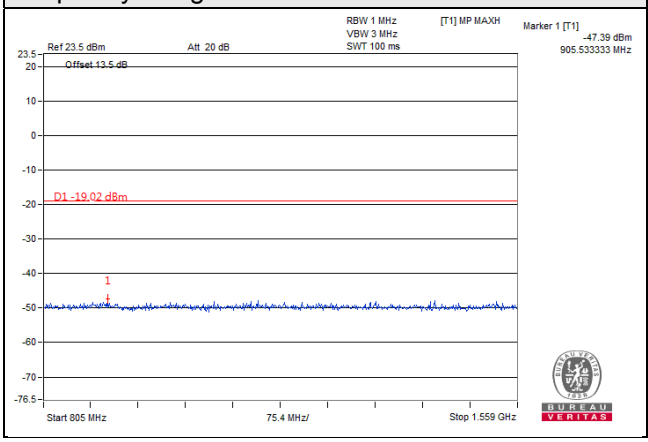
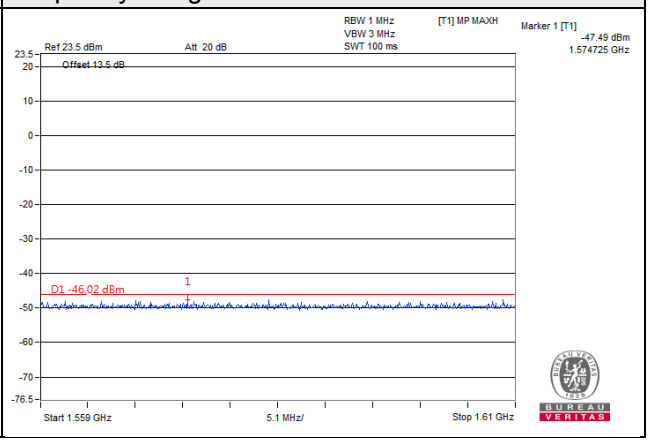
Channel Band width: 5MHz	
Channel 5255 (753.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

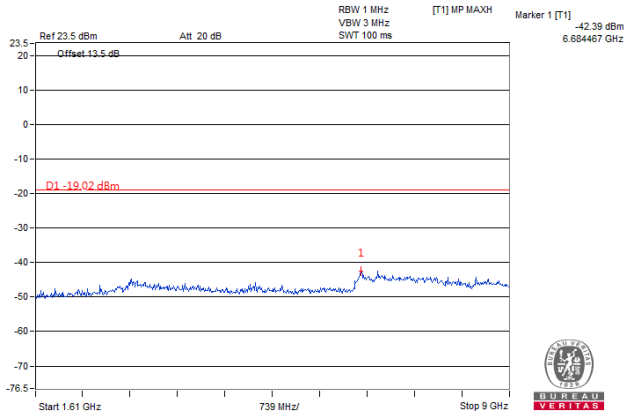
Frequency Range : 1.610GHz~9GHz	
	

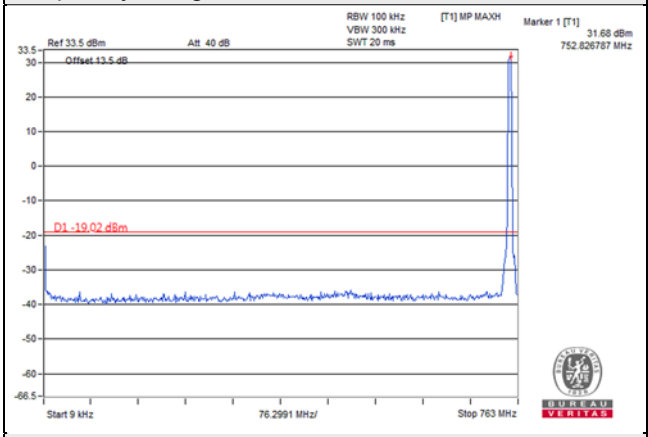
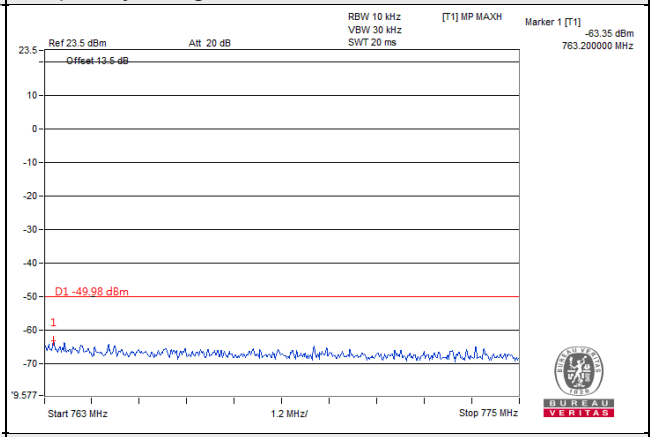
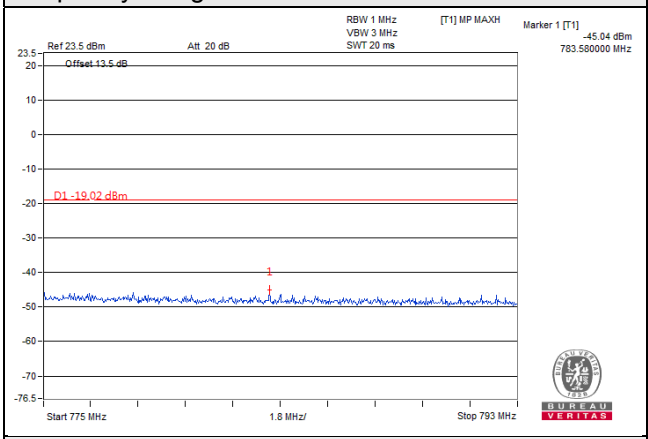
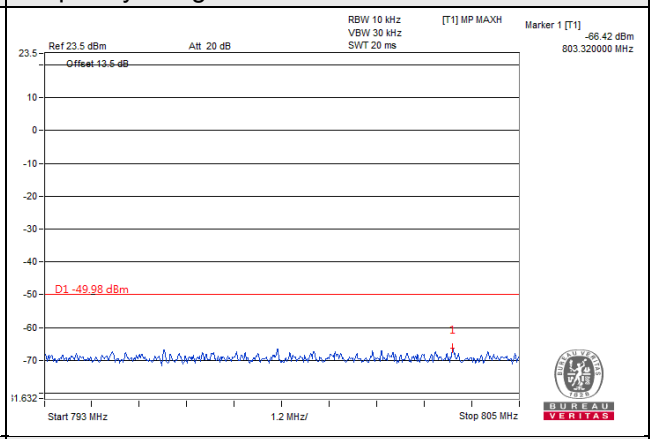
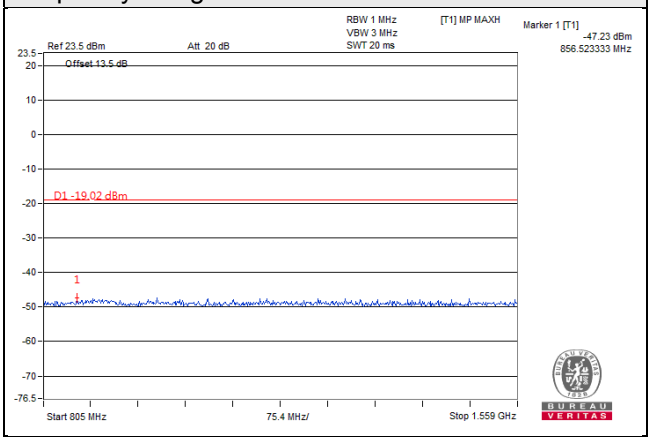
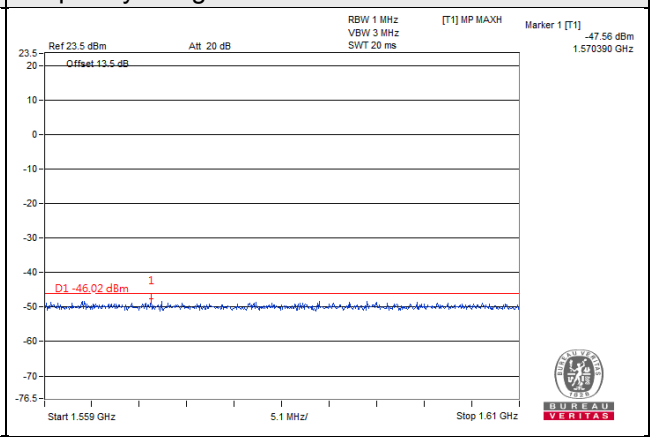
Channel Band width: 10MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

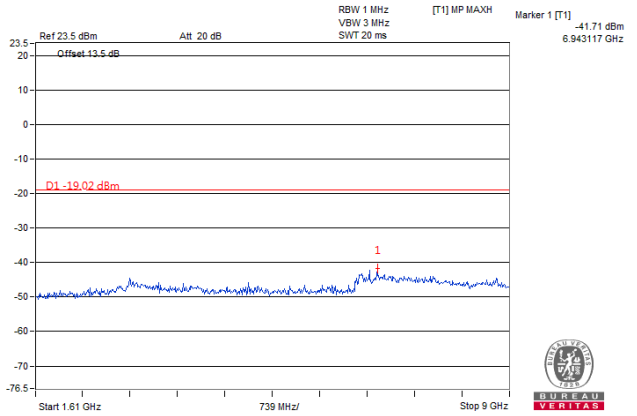
Frequency Range : 1.610GHz~9GHz	
	

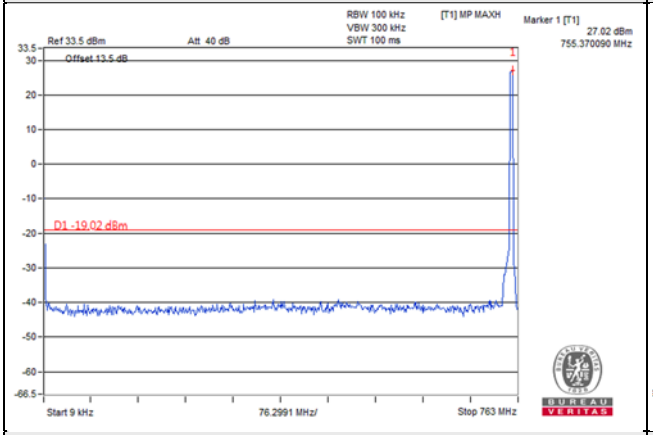
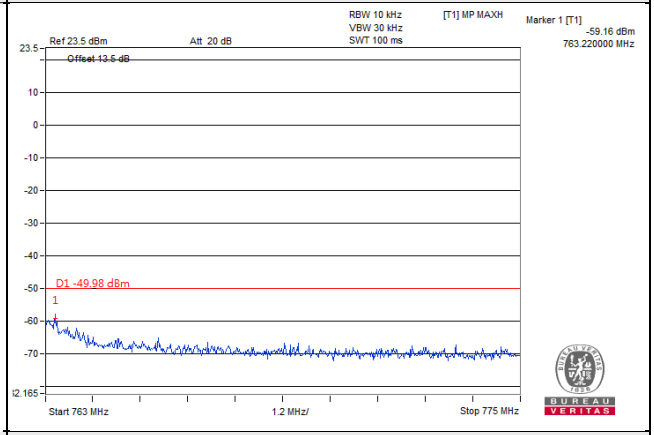
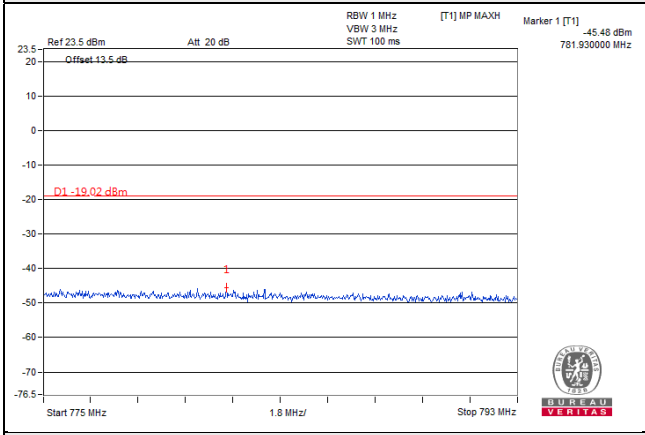
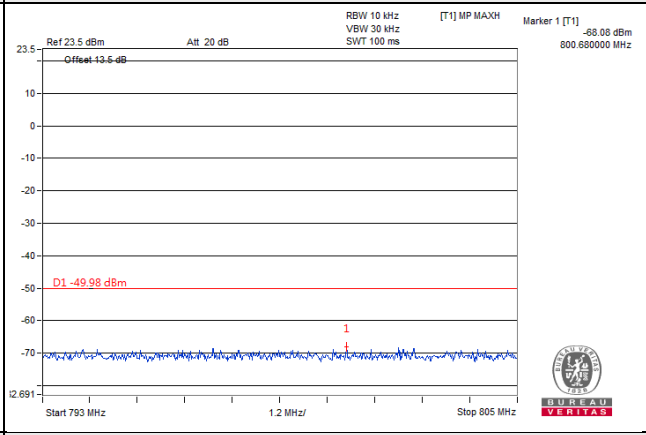
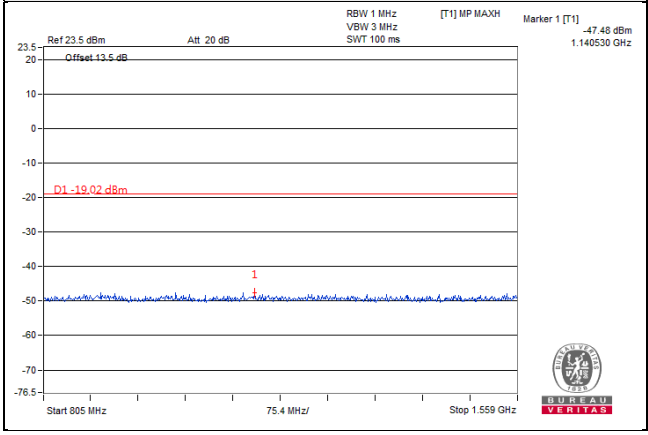
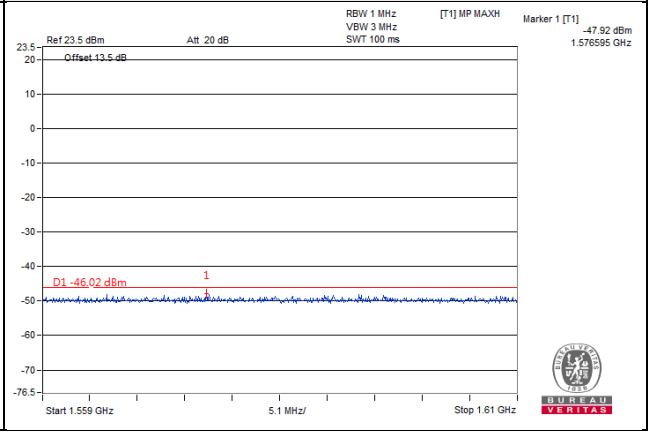
Single Mode (Chain 3)

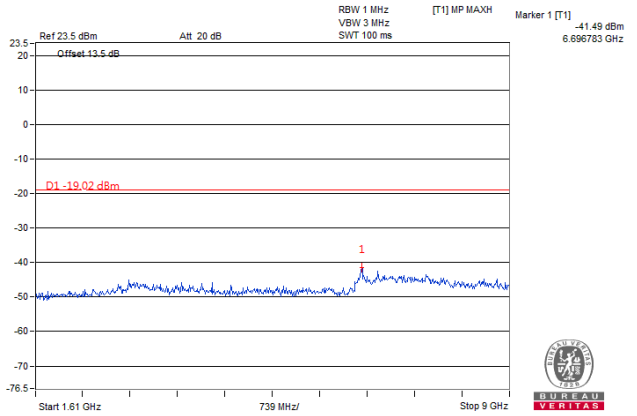
Channel Band width: 5MHz	
Channel 5205 (748.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

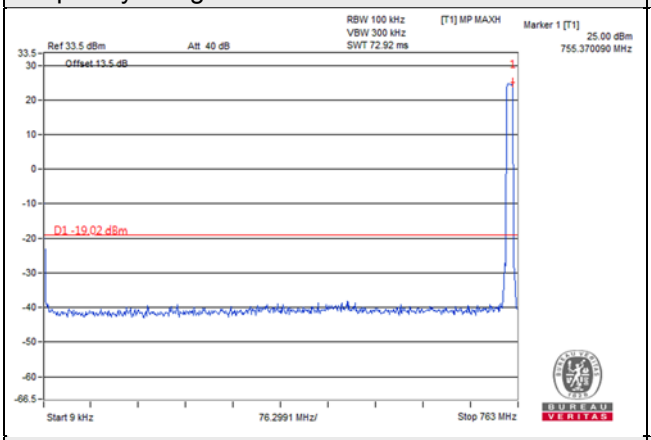
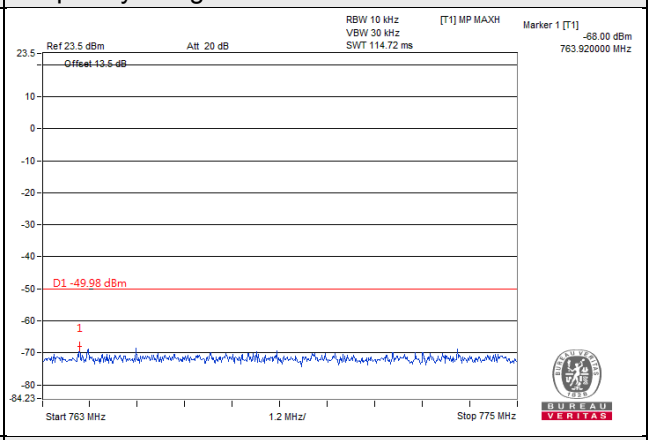
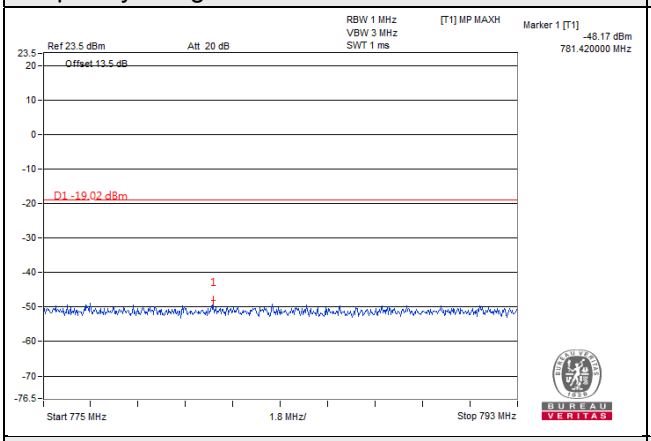
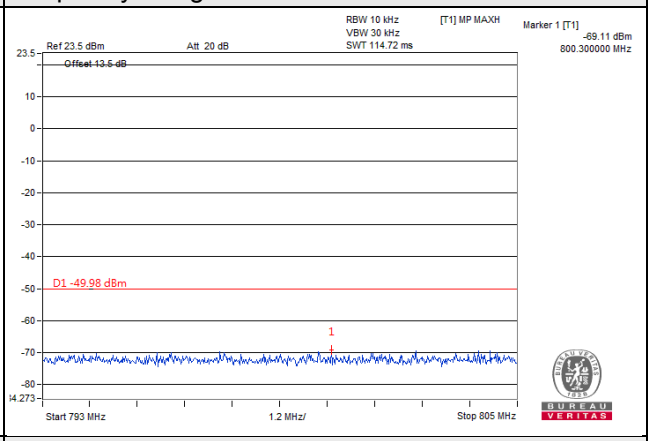
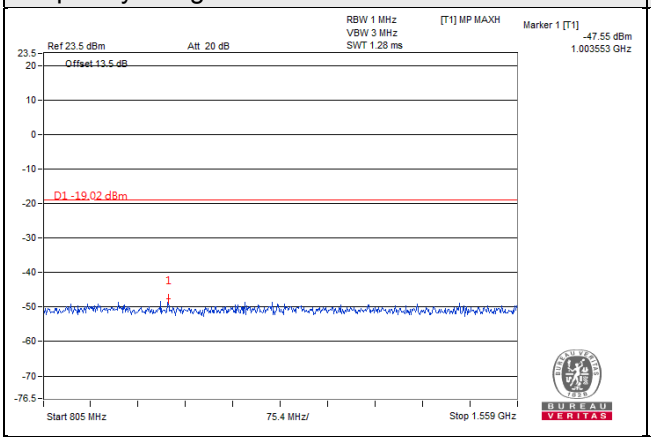
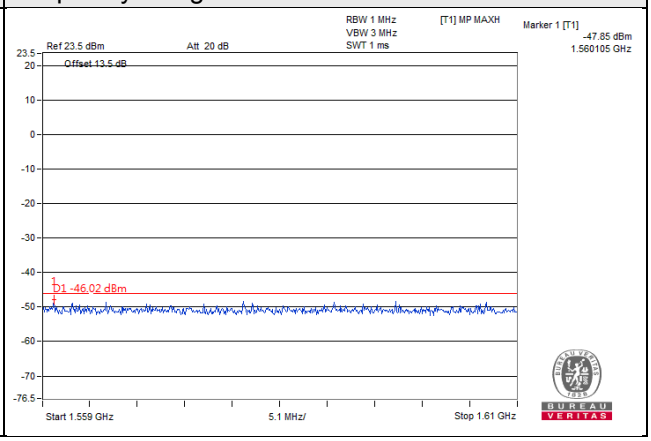
Frequency Range : 1.610GHz~9GHz	
	

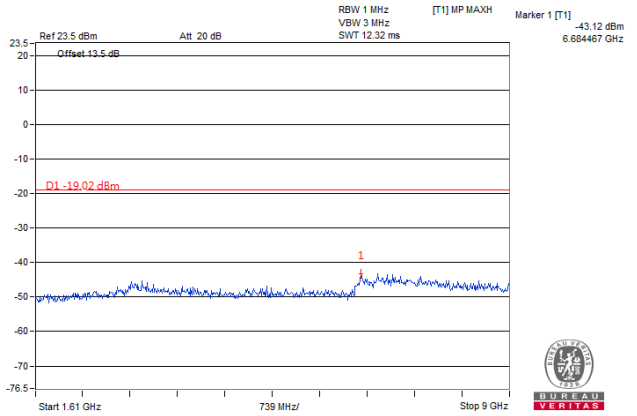
Channel Band width: 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

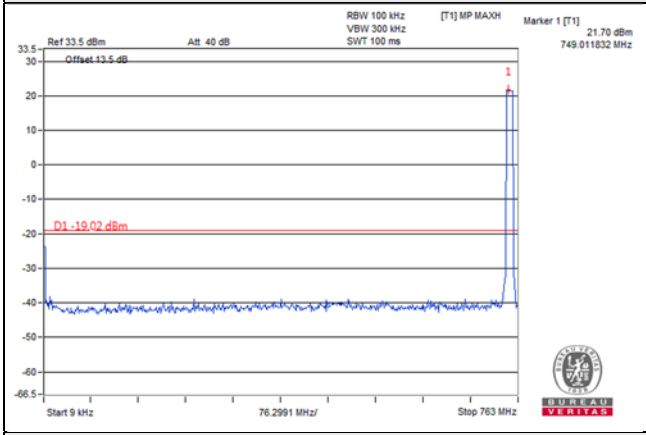
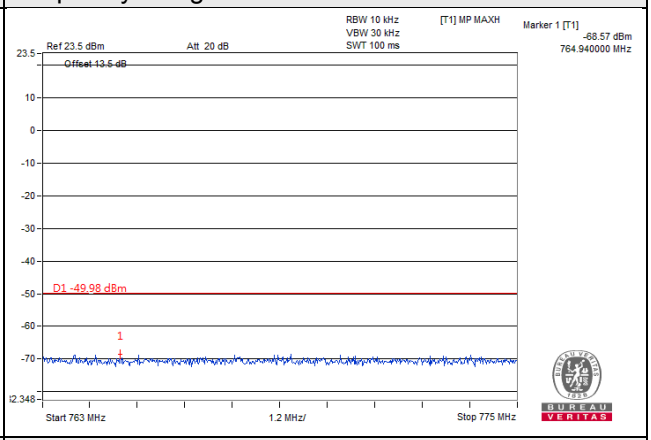
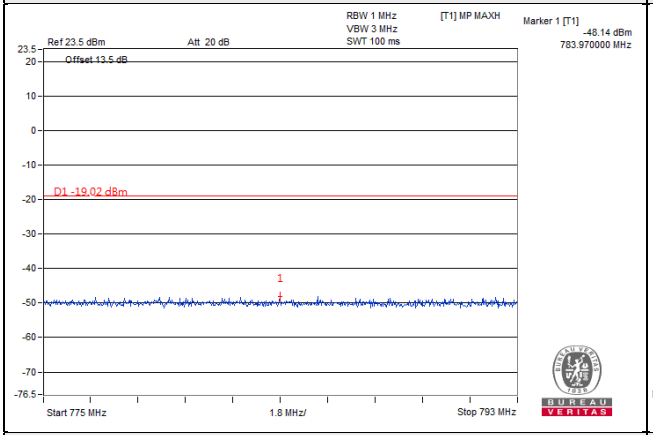
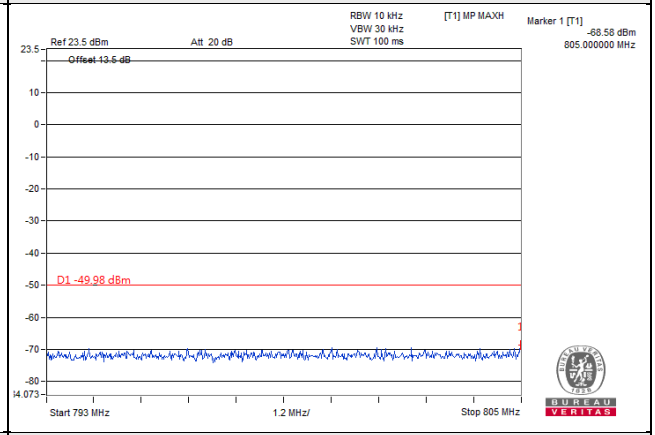
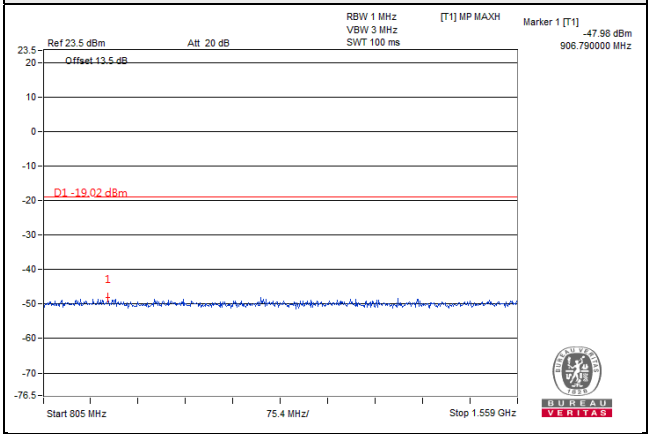
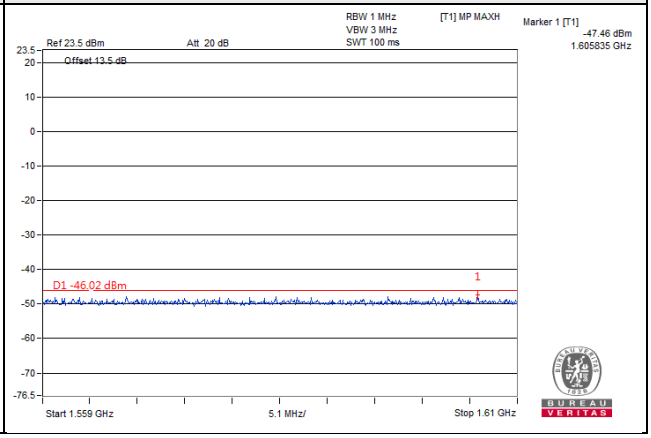
Channel Band width: 5MHz	
Channel 5255 (753.5MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

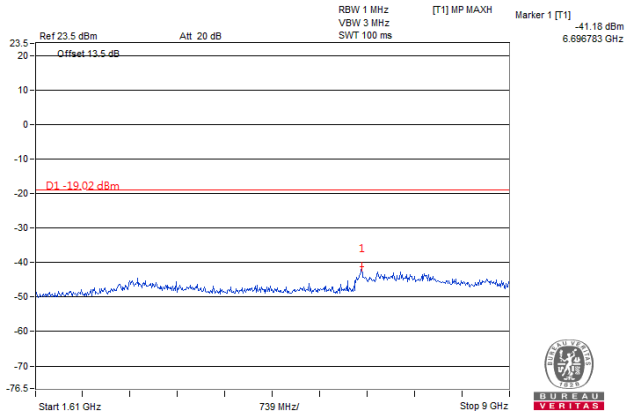
Frequency Range : 1.610GHz~9GHz	
	

Channel Band width: 10MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

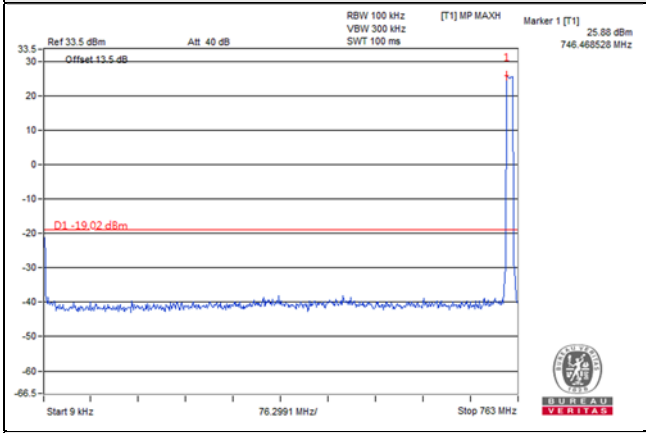
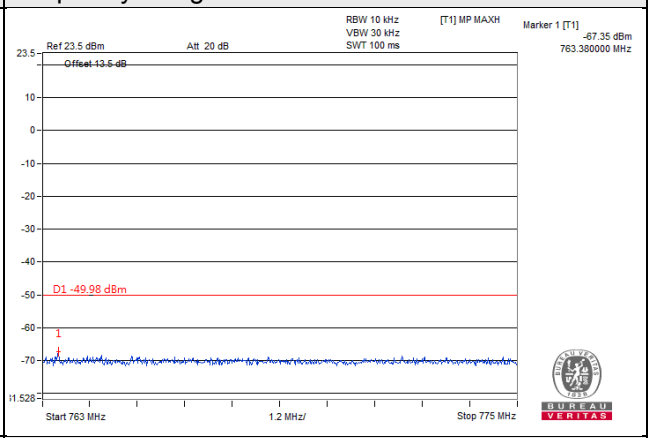
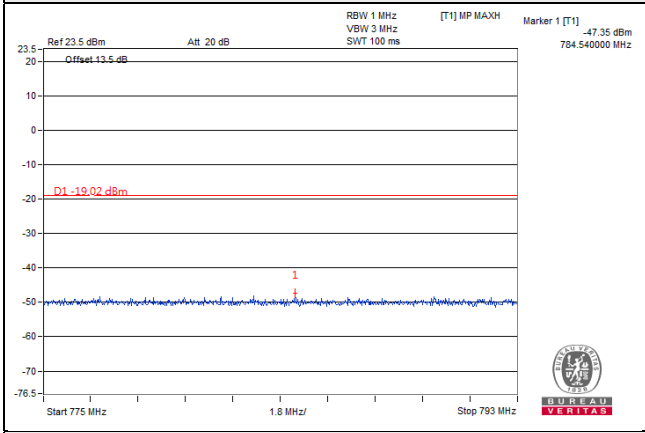
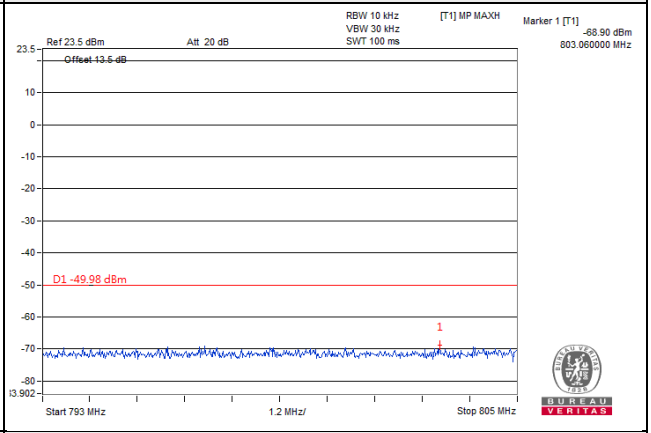
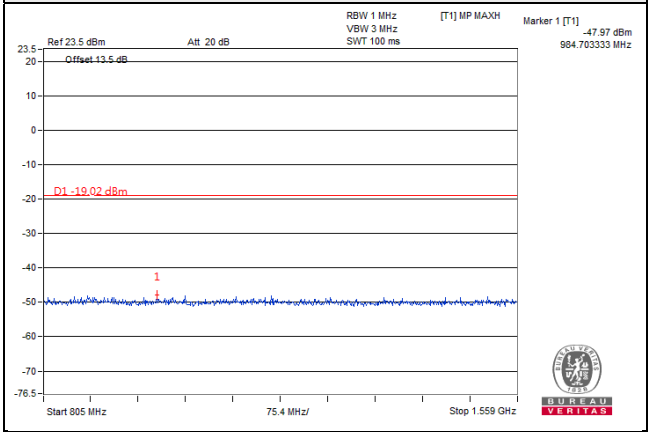
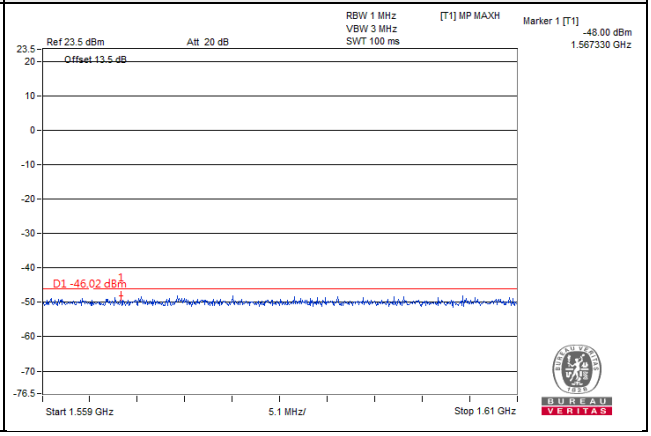
Frequency Range : 1.610GHz~9GHz	
	

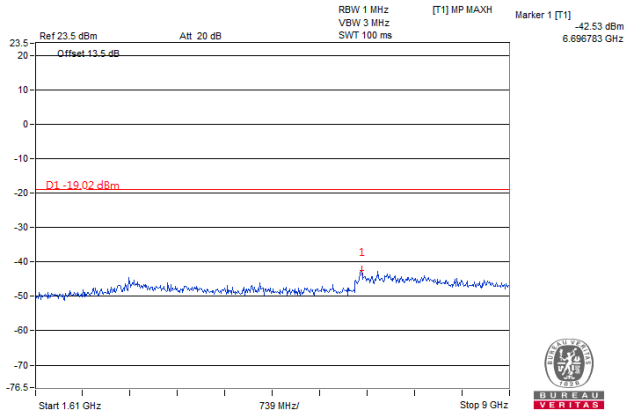
2-Carriers Mode (Chain 0)

Channel Band width: 5MHz + 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

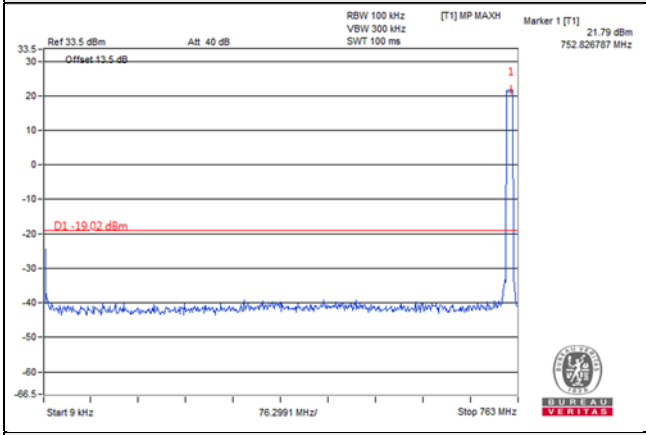
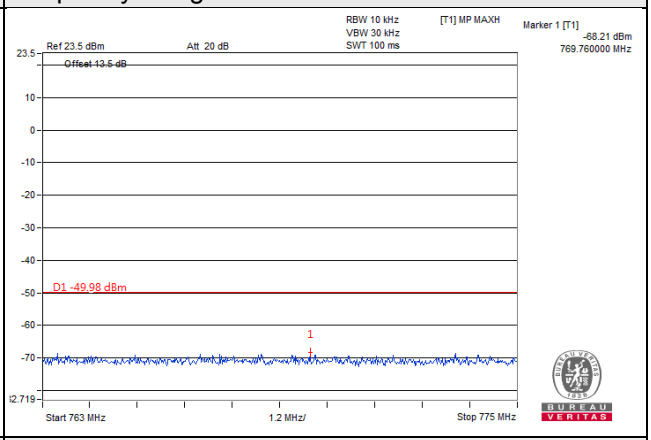
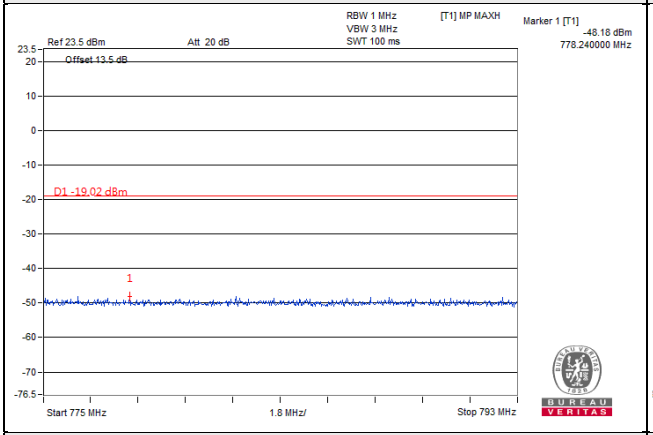
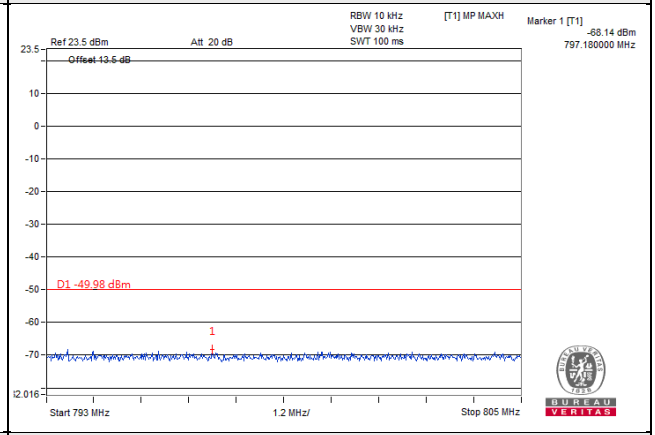
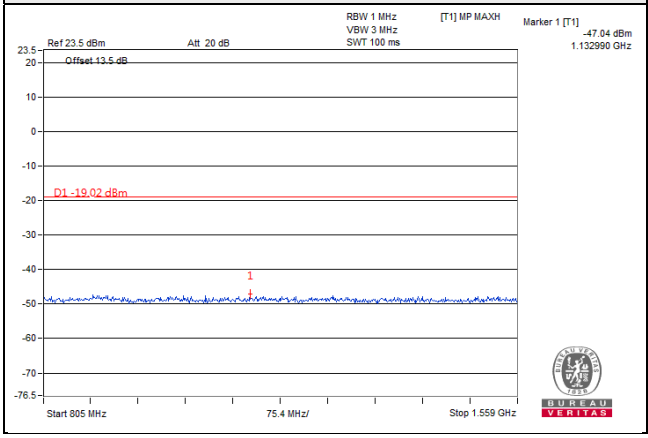
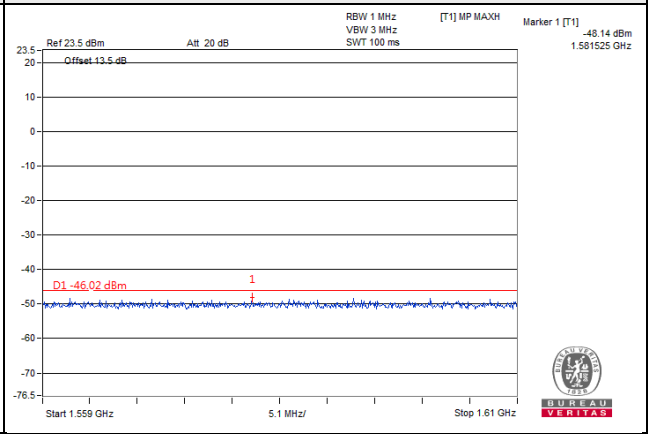
Frequency Range : 1.610GHz~9GHz	
	

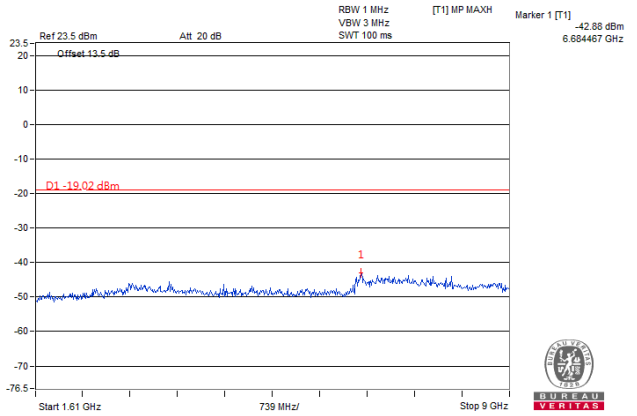
2-Carriers Mode (Chain 1)

Channel Band width: 5MHz + 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

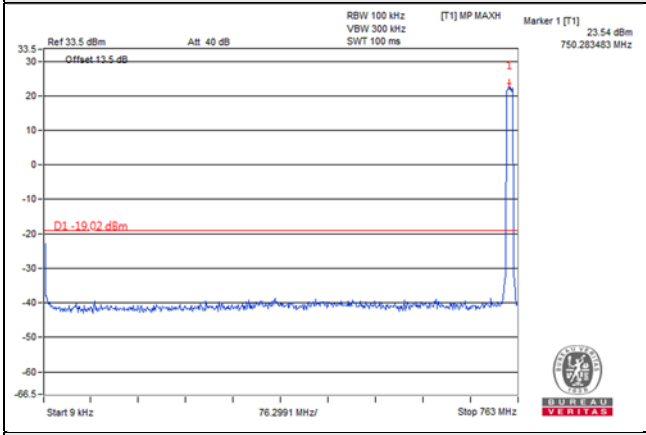
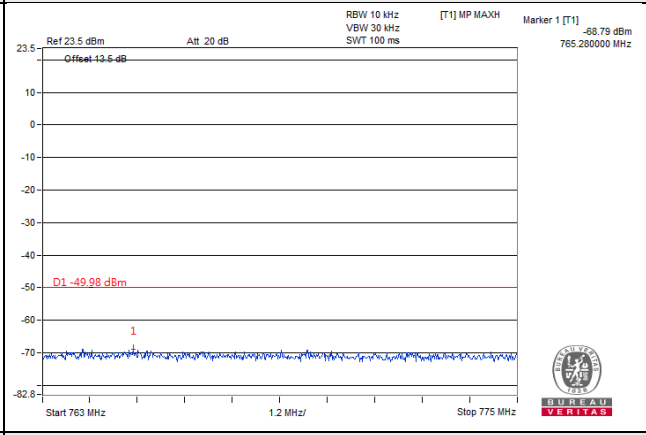
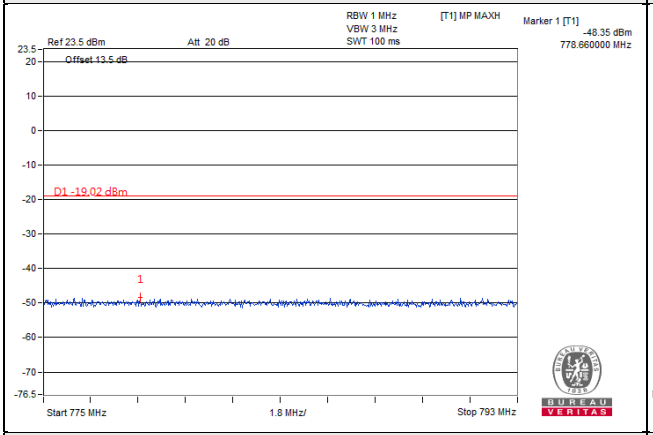
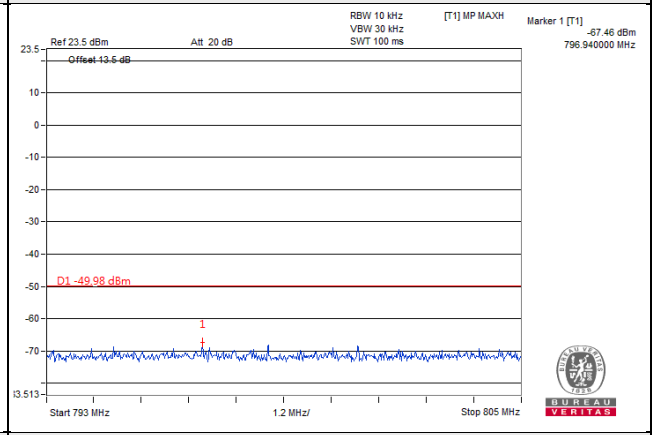
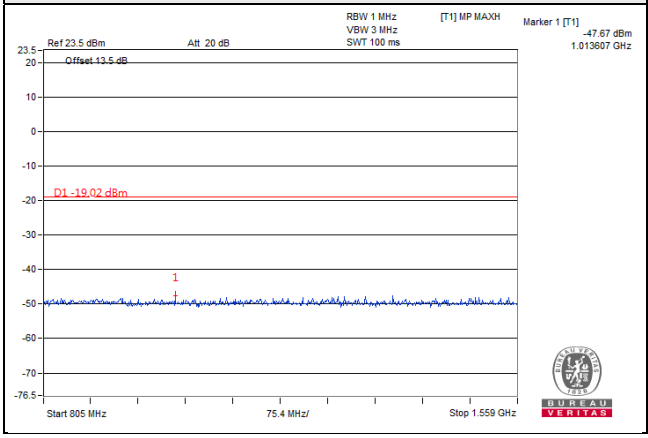
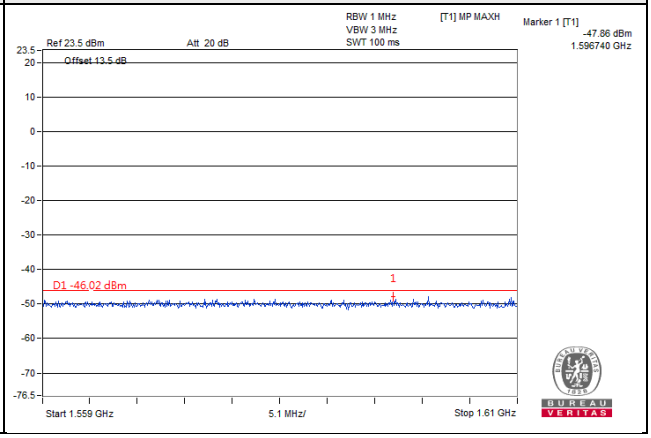
Frequency Range : 1.610GHz~9GHz	
	

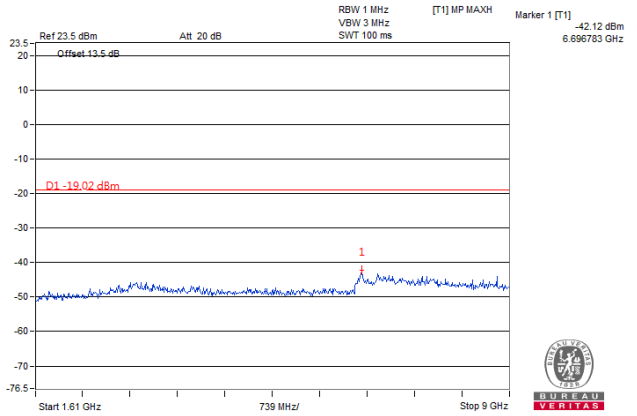
2-Carriers Mode (Chain 2)

Channel Band width: 5MHz + 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

2-Carriers Mode (Chain 3)

Channel Band width: 5MHz + 5MHz	
Channel 5230 (751.0MHz)	
Frequency Range : 9kHz~763MHz	Frequency Range : 763MHz~775MHz
	
Frequency Range : 775MHz~793MHz	Frequency Range : 793MHz~805MHz
	
Frequency Range : 805MHz~1.559GHz	Frequency Range : 1.559GHz~1.610GHz
	

Frequency Range : 1.610GHz~9GHz	
	

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

According to FCC 27.53(c), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, the emission limit equal to -13dBm.

4.8.2 Test Procedure

a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.

c. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution antenna.

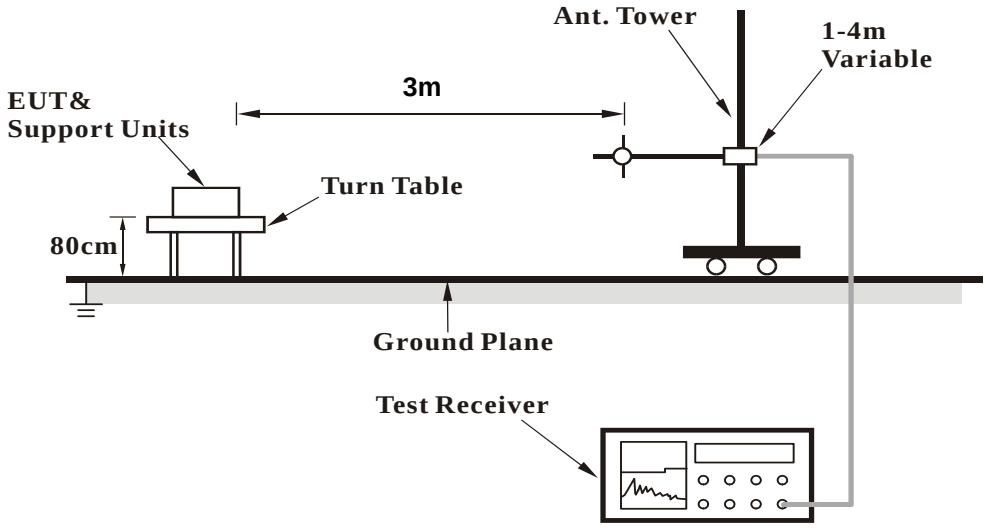
Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.8.3 Deviation from Test Standard

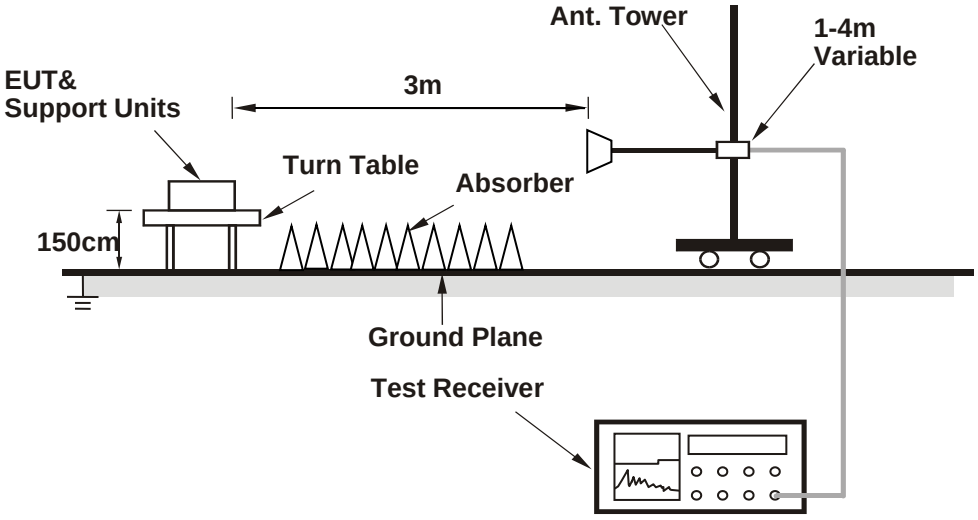
No deviation.

4.8.4 Test Setup

For Radiated Emission below or equal 1GHz



For Radiated Emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

Single Mode

Below 1GHz

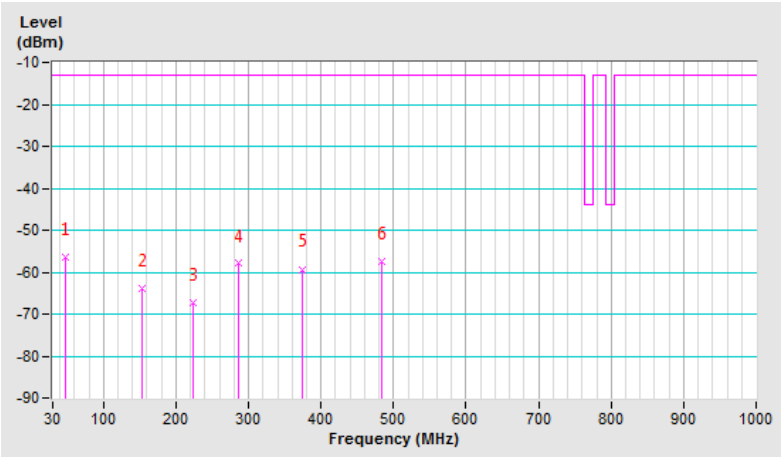
Channel Bandwidth: 5MHz

Mode	TX channel 5205 (748.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	47.46	-54.60	-47.40	-9.20	-56.60	-13.00	-43.60
2	153.19	-57.50	-61.00	-2.90	-63.90	-13.00	-50.90
3	223.03	-57.00	-65.30	-2.00	-67.30	-13.00	-54.30
4	286.08	-52.00	-56.30	-1.70	-58.00	-13.00	-45.00
5	374.35	-55.20	-63.00	3.70	-59.30	-13.00	-46.30
6	482.99	-54.90	-60.90	3.60	-57.30	-13.00	-44.30

Remarks:

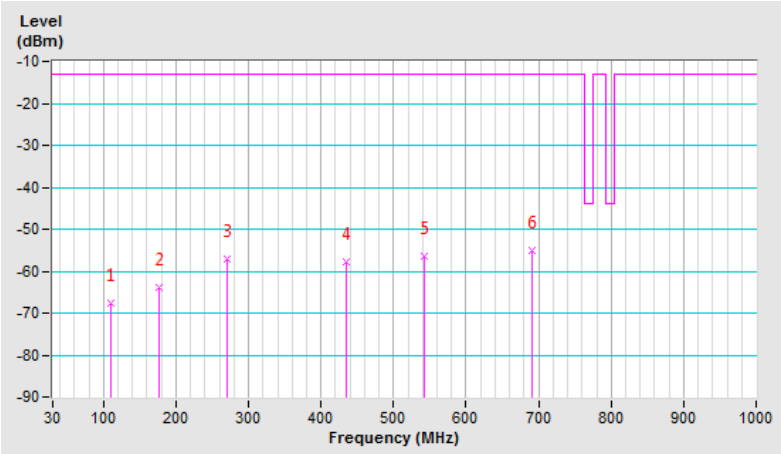
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 5205 (748.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	109.54	-57.20	-65.10	-2.50	-67.60	-13.00	-54.60
2	176.47	-58.00	-61.00	-2.90	-63.90	-13.00	-50.90
3	269.59	-56.80	-55.70	-1.40	-57.10	-13.00	-44.10
4	434.49	-55.60	-61.50	3.60	-57.90	-13.00	-44.90
5	542.16	-55.80	-60.40	3.90	-56.50	-13.00	-43.50
6	691.54	-58.80	-58.70	3.50	-55.20	-13.00	-42.20

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

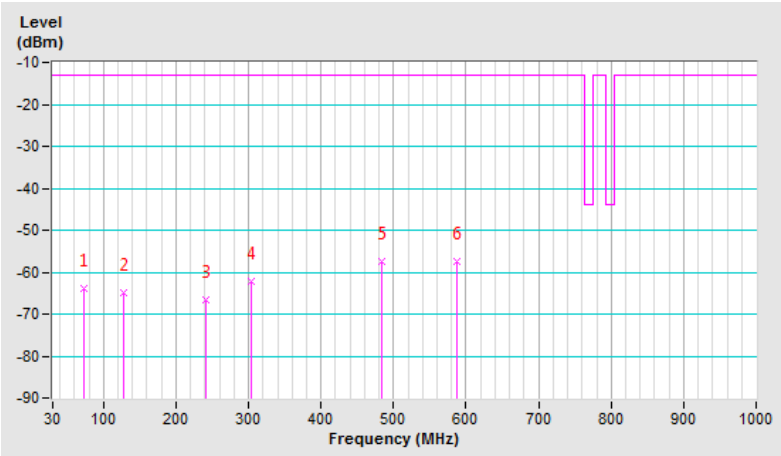


Channel Bandwidth: 10MHz

Mode	TX channel 5230 (751.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	72.68	-55.90	-63.90	-0.10	-64.00	-13.00	-51.00
2	127.97	-56.80	-61.80	-3.20	-65.00	-13.00	-52.00
3	240.49	-57.70	-65.20	-1.50	-66.70	-13.00	-53.70
4	303.54	-55.60	-66.00	3.70	-62.30	-13.00	-49.30
5	482.99	-54.90	-60.90	3.60	-57.30	-13.00	-44.30
6	586.78	-56.40	-61.20	3.80	-57.40	-13.00	-44.40

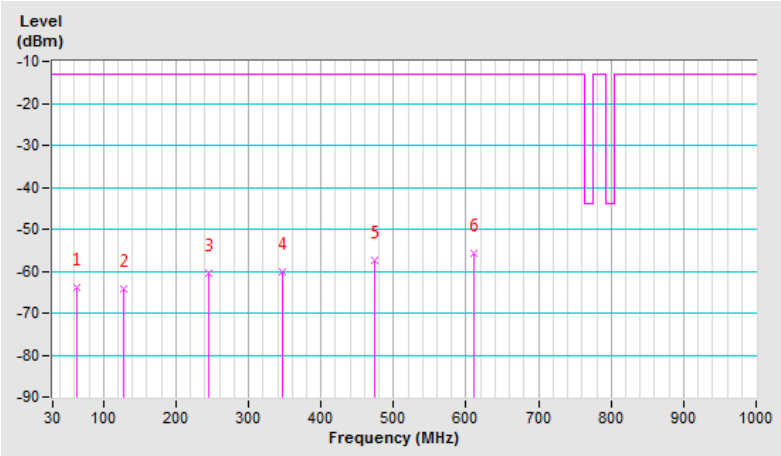
Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 5230 (751.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	62.98	-54.90	-61.40	-2.40	-63.80	-13.00	-50.80
2	127.97	-56.60	-61.10	-3.20	-64.30	-13.00	-51.30
3	245.34	-57.10	-58.90	-1.60	-60.50	-13.00	-47.50
4	346.22	-57.50	-64.20	3.90	-60.30	-13.00	-47.30
5	474.26	-55.00	-60.90	3.50	-57.40	-13.00	-44.40
6	610.06	-58.20	-59.40	3.70	-55.70	-13.00	-42.70

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz

Channel Bandwidth: 5MHz

Mode	TX channel 5205 (748.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	**1497.00**	**-59.40**	**-52.00**	**1.50**	**-50.50**	**-13.00**	**-37.50**
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1497.00	-60.50	-54.30	1.50	-52.80	-13.00	-39.80

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 5230 (751.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-60.50	-53.10	1.50	-51.60	-13.00	-38.60
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-62.40	-56.00	1.50	-54.50	-13.00	-41.50

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 5255 (753.5MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1507.00	-62.00	-54.60	1.50	-53.10	-13.00	-40.10
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1507.00	-61.90	-55.50	1.50	-54.00	-13.00	-41.00

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

Mode	TX channel 5230 (751.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-62.50	-55.00	1.50	-53.50	-13.00	-40.50
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-62.40	-56.00	1.50	-54.50	-13.00	-41.50

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

2-Carriers Mode

Below 1GHz

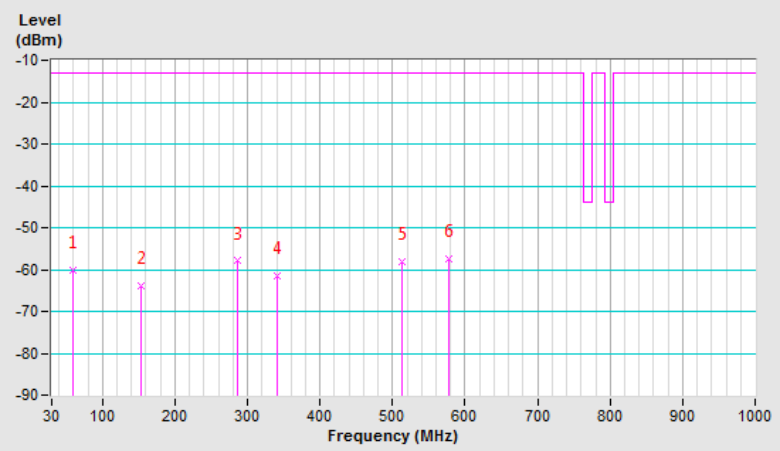
Channel Bandwidth: 5MHz + 5MHz

Mode	TX channel 5230 (751.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	59.10	-53.40	-56.20	-3.80	-60.00	-13.00	-47.00
2	153.19	-57.50	-61.00	-2.90	-63.90	-13.00	-50.90
3	286.08	-52.00	-56.30	-1.70	-58.00	-13.00	-45.00
4	340.40	-55.90	-65.50	4.00	-61.50	-13.00	-48.50
5	512.09	-56.20	-62.10	3.90	-58.20	-13.00	-45.20
6	577.08	-56.50	-61.30	3.70	-57.60	-13.00	-44.60

Remarks:

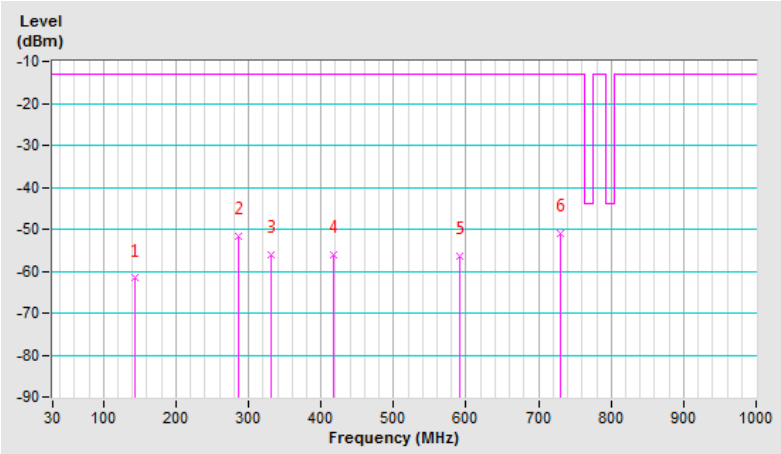
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 5230 (751.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	25deg. C, 65%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	142.52	-57.40	-58.60	-3.10	-61.70	-13.00	-48.70
2	286.08	-51.60	-50.00	-1.70	-51.70	-13.00	-38.70
3	330.70	-53.40	-60.00	4.00	-56.00	-13.00	-43.00
4	418.00	-53.60	-59.50	3.40	-56.10	-13.00	-43.10
5	590.66	-57.00	-60.20	3.80	-56.40	-13.00	-43.40
6	729.37	-55.40	-54.70	3.60	-51.10	-13.00	-38.10

Remarks:
1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz

Channel Bandwidth: 5MHz + 5MHz

Mode	TX channel 5230 (751.0MHz)	Frequency Range	Above 1000MHz
Environmental Conditions	25deg. C, 65%RH	In30put Power	120Vac, 60Hz
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-60.70	-53.20	1.50	-51.70	-13.00	-38.70
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1502.00	-62.00	-55.60	1.50	-54.10	-13.00	-41.10

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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