TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBWIN-WTW-P22110682
FCC ID:	J9C-QCNCM865
Product:	Qualcomm WiFi 7/BT Combo module
Brand:	Qualcomm
Model No.:	QCNCM865
Received Date:	2022/11/24
Test Date:	2023/1/10 ~ 2023/2/21
Issued Date:	2023/3/21
Applicant:	Qualcomm Technologies, Inc.
Address:	5775 Morehouse Drive, San Diego, CA 92121-1714
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** 2023/3/21

May Chen / Manager

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Prepared by : Vivian Huang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBWIN-WTW-P22110682	Original release.	2023/3/21

1 Certificate

Product:	Qualcomm WiFi 7/BT Combo module
Brand:	Qualcomm
Test Model:	QCNCM865
Sample Status:	Engineering sample
Applicant:	Qualcomm Technologies, Inc.
Test Date:	2023/1/10 ~ 2023/2/21
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01

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.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -9.73 dB at 0.56797 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -4.1 dB at 297.60 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -1.5 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	Antenna connector is MHF 4L not a standard connector.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	Specification	Expanded Uncertainty (k=2) (±)
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.5 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Qualcomm WiFi 7/BT Combo module
Brand	Qualcomm
Test Model	QCNCM865
Status of EUT	Engineering sample
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDM in VHT mode 4096QAM for OFDMA in 11ax mode 4096QAM for OFDMA in 11be mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps VHT: up to 400 Mbps 802.11ax: up to 573.5 Mbps 802.11be: up to 688.2 Mbps
Operating Frequency	2.412 GHz ~ 2.472 GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20), 802.11be (EHT20): 13 802.11n (HT40), VHT40, 802.11ax (HE40), 802.11be (EHT40): 9
Resource Unit (RU)	Single RU: 26-tone, 52-tone, 106-tone, 242-tone, 484-tone Multi-RU(Small RU):52-tone + 26-tone, 106-tone + 26-tone
Output Power	532.507 mW (27.26 dBm)

Note:

1. There are Bluetooth and WLAN (2.4 GHz & 5 GHz & 5.9 GHz & 6 GHz) technology used for the EUT.
2. Simultaneously transmission condition.

DBS		
Condition	Technology	
1	WLAN(2.4GHz)_Ant 0+1	WLAN(5GHz) _Ant 0+1
2	WLAN(2.4GHz) _Ant 0+1	WLAN(6GHz) _Ant 0+1

HBS+BT			
Condition	Technology		
3	Bluetooth_Ant 0+1	WLAN(5GHz) _Ant 0+1	
4	Bluetooth_Ant 0+1	WLAN(6GHz) _Ant 0+1	
5	WLAN(5GHz_U-NII-1, U-NII-2A) _Ant 0+1	WLAN(5GHz_U-NII-2C, U-NII-3, U-NII-4) _Ant 0+1	Bluetooth
6	WLAN(5GHz_U-NII-1, U-NII-2A) _Ant 0+1	WLAN(6GHz) _Ant 0+1	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

3. QCNCM865 has HW variant SKUs below to support different Microsoft Windows platform system and feature:

SKU	Support platform system and feature
NCM865	**X86 platform, support DBS and HBS**
NCM865A	Qualcomm platform, support DBS and HBS
NCM835	X86 platform, support DBS
NCM835A	Qualcomm platform, support DBS
Note: From the above SKUs, the worst was found in **SKU (NCM865)**. Therefore only the test data of the modes were recorded in this report.	

4. The EUT support OFDMA and Partial RU mode, therefore partial RU combination were investigated and the worst case scenario was identified. (The worst case data were presented in section 3.4)
5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain0/1	Hong-Bo	260-25094	3.53 3.06 3.07 4.81 4.2	2.4~2.4835GHz 5.15~5.25GHz 5.25~5.35GHz 5.47~5.725GHz 5.725~5.850GHz	0.74 1.16 1.18 1.26 1.28	PIFA	MHF 4L	300mm
2	Chain0/1	Hong-Bo	260-25083	5.09 5.14 5.09 5.16 5.12	5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	1.29 1.35 1.38 1.45 1.50	PIFA	MHF 4L	300mm
3	Chain0/1	Hong-Bo	260-25084	3.22 3.35 3.42 4.77 4.72 4.71 4.75 4.29 4.81 4.74	2.4~2.4835 GHz 5.150~5.250 GHz 5.250~5.350 GHz 5.470~5.725 GHz 5.725~5.850 GHz 5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	0.49 0.76 0.77 0.80 0.84 0.84 0.86 0.91 0.96 0.98	Monopole	MHF 4L	200mm

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

2.4 GHz Band		
Modulation Mode	**TX & RX Configuration**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11be (EHT20)	2TX	2RX
802.11be (EHT40)	2TX	2RX
802.11ax (RU26/52/106/242/484/52+26/106+26)	2TX	2RX

Note:

1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz), 802.11ax mode for 20MHz (40MHz) and 802.11be mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n/VHT/ax mode is the same as the 802.11be mode or more lower than it and investigated worst case to representative mode in test report.

3.3 Channel List

13 channels are provided for 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20), 802.11be (EHT20):

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz	12	2467 MHz
		13	2472 MHz

9 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40), 802.11be (EHT40):

Channel	Frequency	Channel	Frequency
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz	10	2457 MHz
		11	2462 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

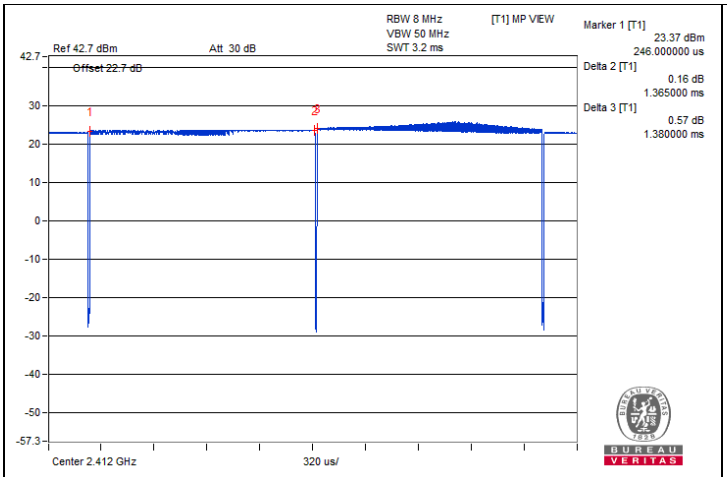
Test Item	EUT Configure Mode	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter	RU/MRU Index
RF Output Power / Power Spectral Density	A	802.11b	CDD	1, 6, 11, 12, 13	DSSS	1Mb/s	NA
		802.11g		1, 2, 6, 10, 11, 12, 13	BPSK	6Mb/s	NA
		802.11be (EHT20)		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	NA
		802.11be (EHT40)		3, 4, 6, 8, 9, 10, 11	BPSK	MCS0	NA
		802.11be (EHT20) 26-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	0, 0, 0, 8, 8, 8, 8
		802.11be (EHT20) 52-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	37, 37, 37, 40, 40, 40, 40
		802.11be (EHT20) 106-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	53, 53, 53, 54, 54, 54, 54
		802.11be (EHT20) 242-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT40) 484-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT20) 52+26-tone MRU		6	BPSK	MCS0	UL_RU52+26_Low_70_MCS0 UL_RU52+26_High_72_MCS0
		802.11be (EHT20) 106+26-tone MRU		6	BPSK	MCS0	UL_RU106+26_Low_82_MCS0 UL_RU106+26_High_83_MCS0

6 dB Bandwidth	A	802.11b	CDD	1, 6, 11, 12, 13	DSSS	1Mb/s	NA
		802.11g		1, 2, 6, 10, 11, 12, 13	BPSK	6Mb/s	NA
		802.11be (EHT20)		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	NA
		802.11be (EHT40)		3, 4, 6, 8, 9, 10, 11	BPSK	MCS0	NA
		802.11be (EHT20) 26-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	0, 0, 0, 8, 8, 8, 8
		802.11be (EHT20) 52-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	37, 37, 37, 40, 40, 40, 40
		802.11be (EHT20) 106-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	53, 53, 53, 54, 54, 54, 54
		802.11be (EHT20) 242-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT40) 484-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT20) 52+26-tone MRU		6	BPSK	MCS0	UL_RU52+26_Low_70_MCS0 UL_RU52+26_High_72_MCS0
		802.11be (EHT20) 106+26-tone MRU		6	BPSK	MCS0	UL_RU106+26_Low_82_MCS0 UL_RU106+26_High_83_MCS0
Conducted Out of Band Emissions	A	802.11b	CDD	1, 6, 11, 12, 13	DSSS	1Mb/s	NA
		802.11g		1, 2, 6, 10, 11, 12, 13	BPSK	6Mb/s	NA
		802.11be (EHT20)		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	NA
		802.11be (EHT40)		3, 4, 6, 8, 9, 10, 11	BPSK	MCS0	NA
		802.11be (EHT20) 26-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	0, 0, 0, 8, 8, 8, 8
		802.11be (EHT20) 52-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	37, 37, 37, 40, 40, 40, 40
		802.11be (EHT20) 106-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	53, 53, 53, 54, 54, 54, 54

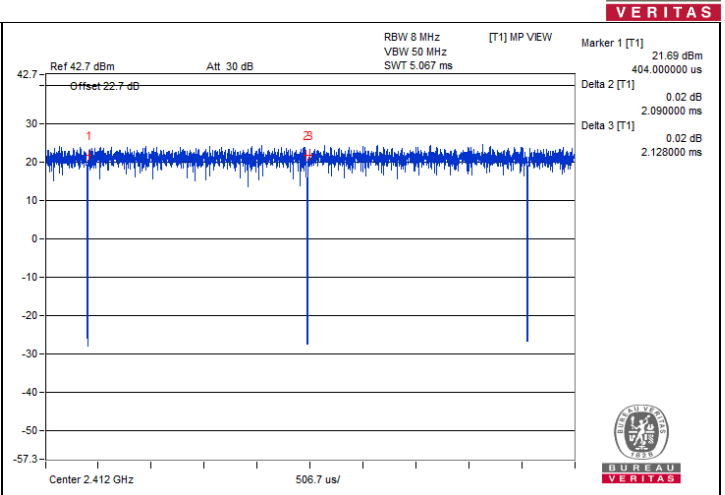
AC Power Conducted Emissions	B	802.11b	CDD	1	DBPSK	1Mb/s	NA
Unwanted Emissions below 1 GHz	A, B	802.11b	CDD	1	DBPSK	1Mb/s	NA
Unwanted Emissions above 1 GHz	A, B	802.11b	CDD	1, 6, 11, 12, 13	DSSS	1Mb/s	NA
		802.11g		1, 2, 6, 10, 11, 12, 13	BPSK	6Mb/s	NA
		802.11be (EHT20)		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	NA
		802.11be (EHT40)		3, 4, 6, 8, 9, 10, 11	BPSK	MCS0	NA
		802.11be (EHT) 26-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	0, 0, 0, 8, 8, 8, 8
		802.11be (EHT) 52-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	37, 37, 37, 40, 40, 40, 40
		802.11be (EHT) 106-tone RU		1, 2, 6, 10, 11, 12, 13	BPSK	MCS0	53, 53, 53, 54, 54, 54, 54
		802.11be (EHT20) 242-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT40) 484-tone RU		6	BPSK	MCS0	NA
		802.11be (EHT) 52+26-tone MRU		6	BPSK	MCS0	UL_RU52+26_Low_70_MCS0 UL_RU52+26_High_72_MCS0
		802.11be (EHT) 106+26-tone MRU		6	BPSK	MCS0	UL_RU106+26_Low_82_MCS0 UL_RU106+26_High_83_MCS0
EUT Configure Mode:	A	EUT only (w/o antenna)					
	B	EUT with 50 ohm terminator					

3.5 Duty Cycle of Test Signal

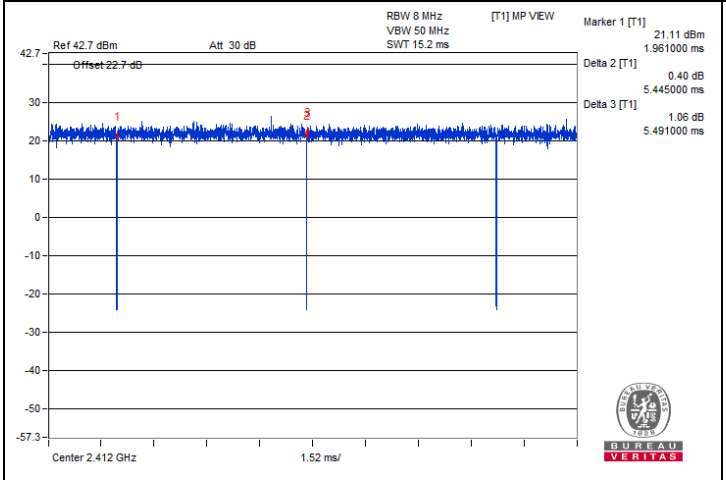
802.11b: Duty cycle = 1.365 ms / 1.38 ms x 100% = 98.9%
802.11g: Duty cycle = 2.09 ms / 2.128 ms x 100% = 98.2%
802.11be (EHT20): Duty cycle = 5.445 ms / 5.491 ms x 100% = 99.2%
802.11be (EHT40): Duty cycle = 5.446 ms / 5.488 ms x 100% = 99.2%
802.11be (EHT20) 26-tone RU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%
802.11be (EHT20) 52-tone RU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%
802.11be (EHT20) 106-tone RU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%
802.11be (EHT20) 242-tone RU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%
802.11be (EHT40) 484-tone RU: Duty cycle = 3.319 ms / 3.357 ms x 100% = 98.9%
802.11be (EHT20) 52+26-tone MRU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%
802.11be (EHT20) 106+26-tone MRU: Duty cycle = 5.058 ms / 5.111 ms x 100% = 99.0%



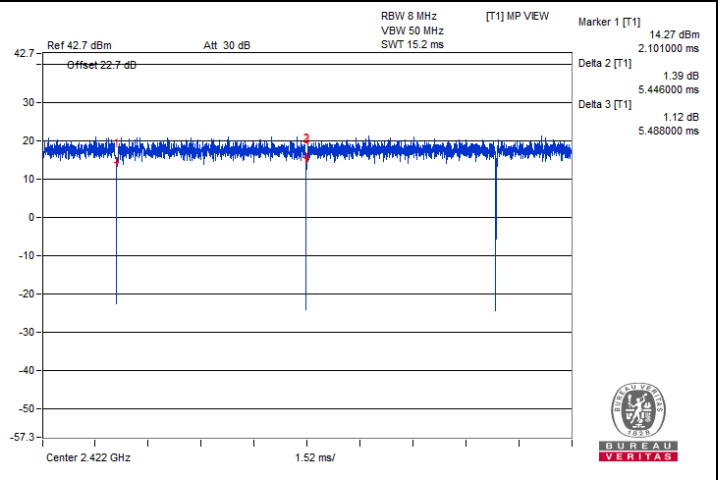
802.11b



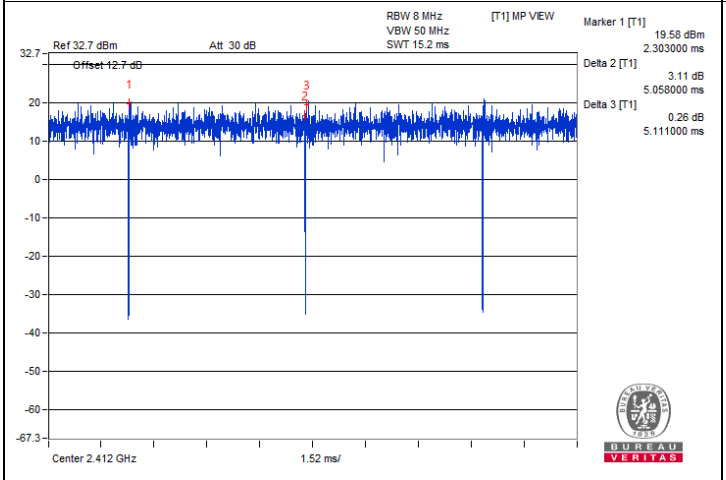
802.11g



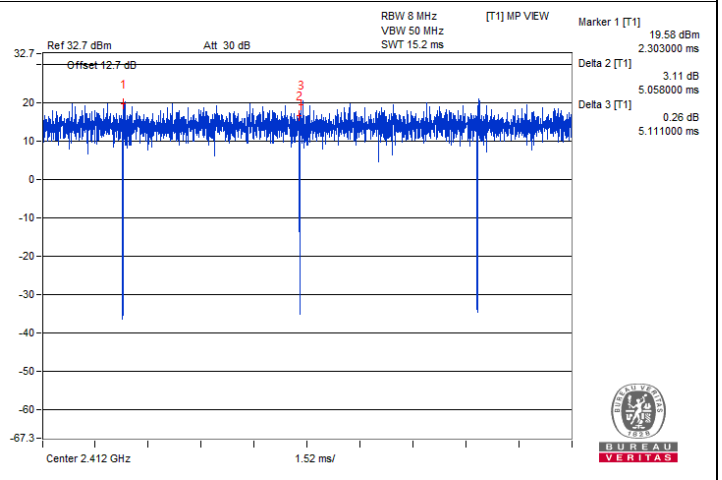
802.11be (EHT20)



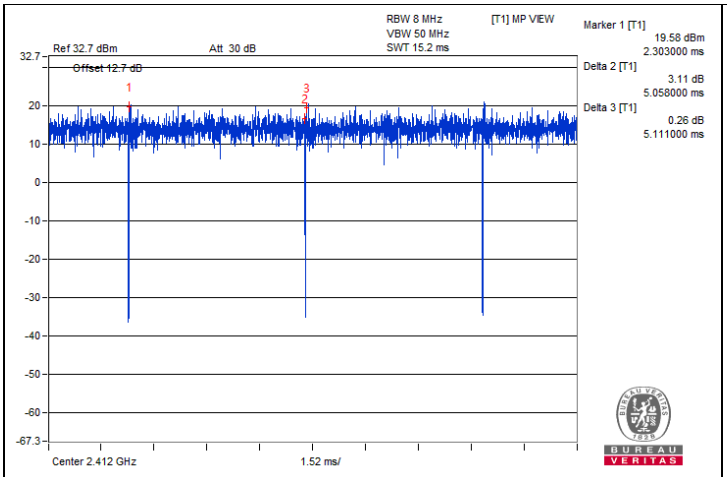
802.11be (EHT40)



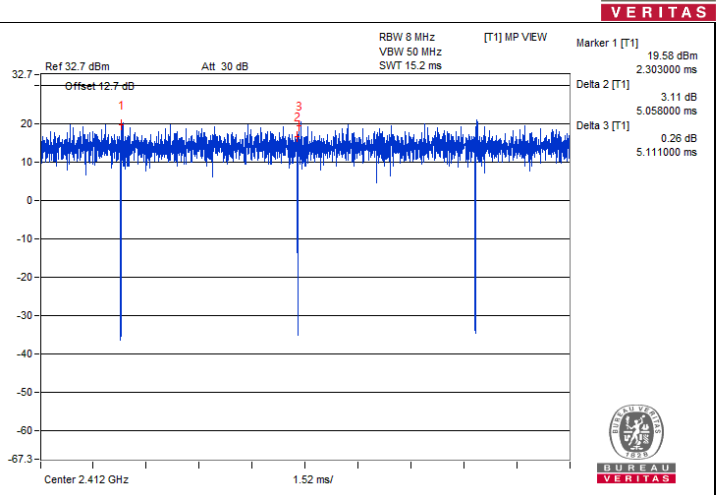
802.11be (EHT20) 26-tone RU



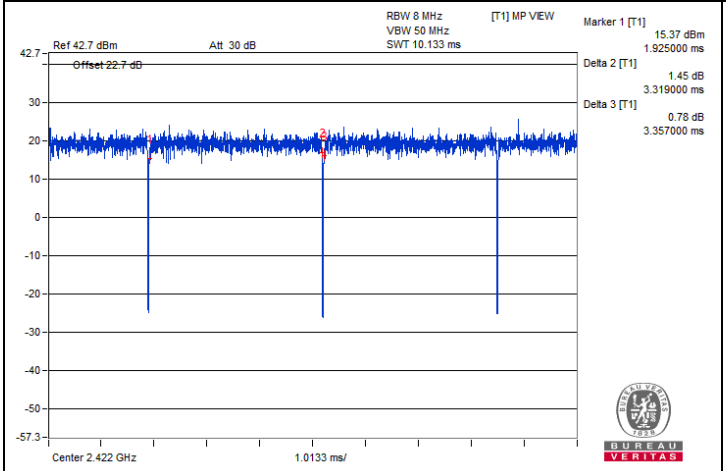
802.11be (EHT20) 52-tone RU



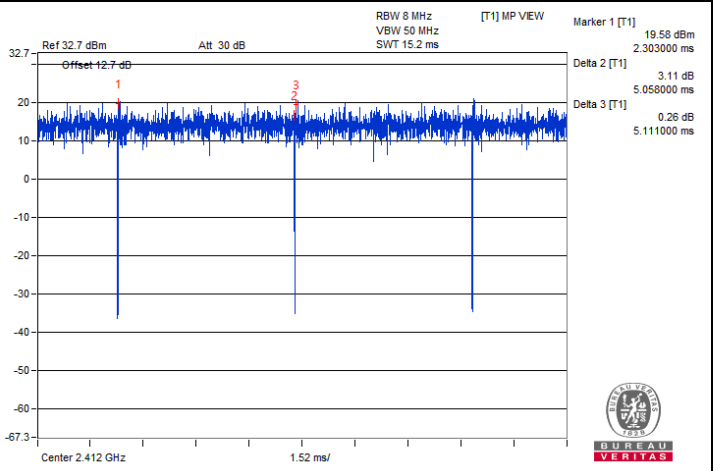
802.11be (EHT20) 106-tone RU



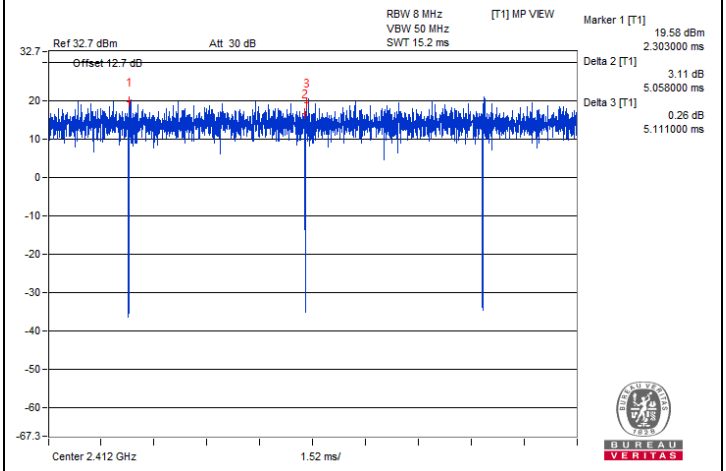
802.11be (EHT20) 242-tone RU



802.11be (EHT40) 484-tone RU



802.11be (EHT20) 52+26-tone MRU



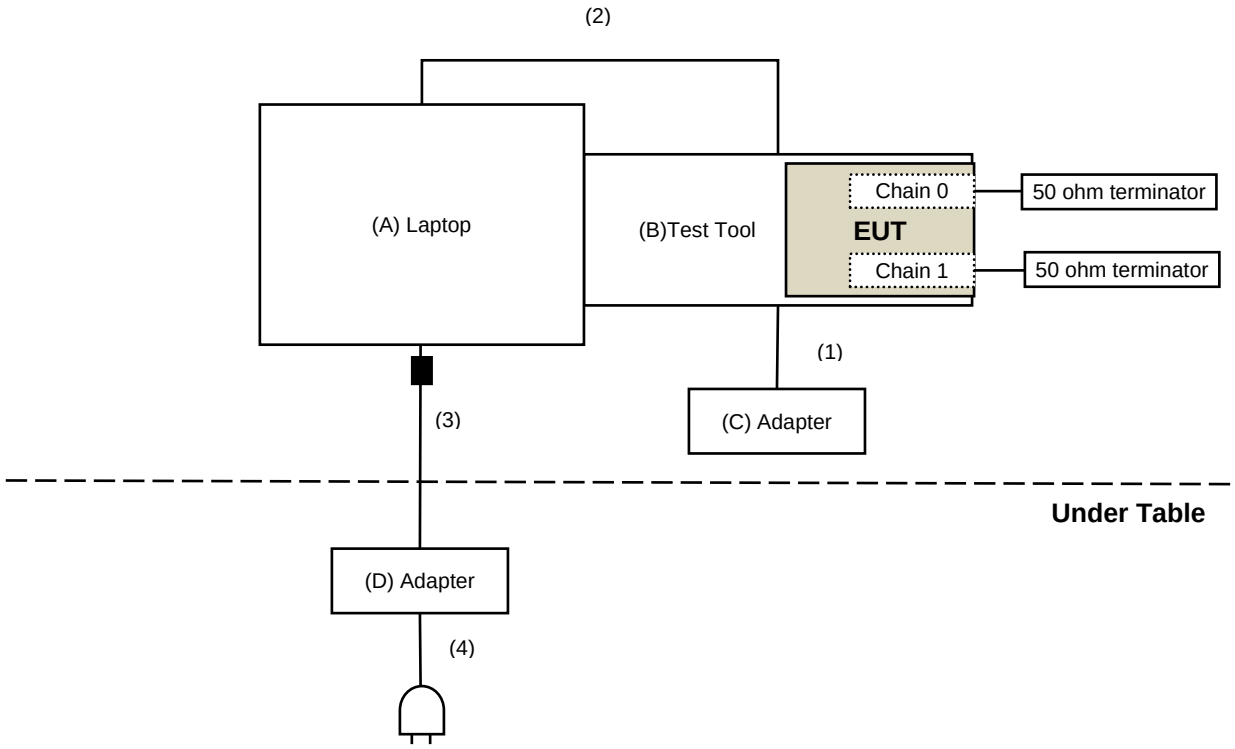
802.11be (EHT20) 106+26-tone MRU

3.6 Test Program Used and Operation Descriptions

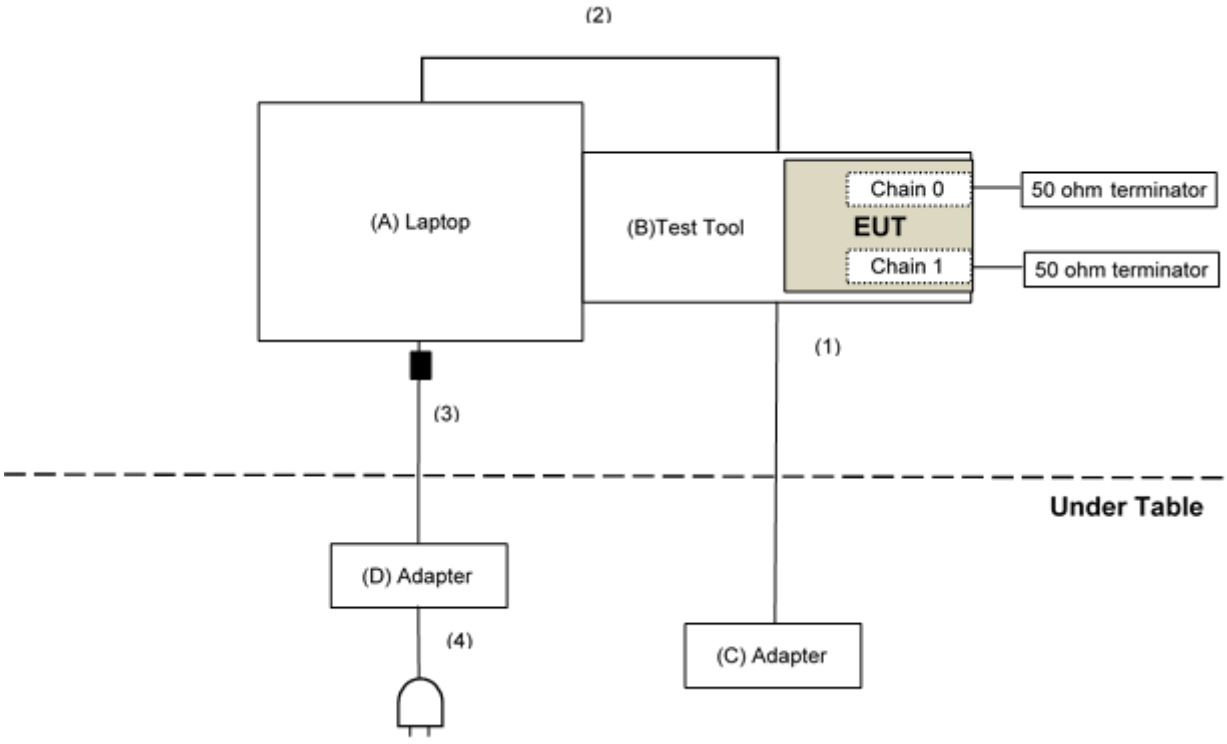
Controlling software (QRCT 4.0.00159.1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

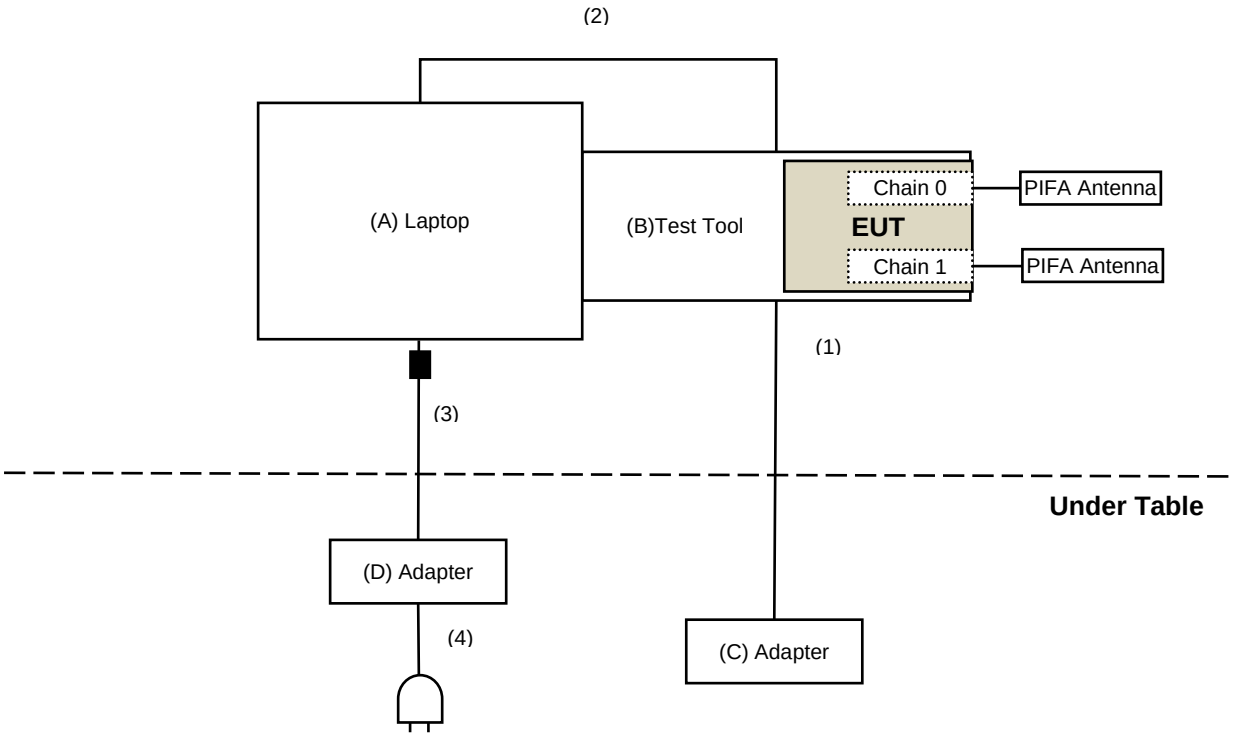
For AC Power Conducted Emission test



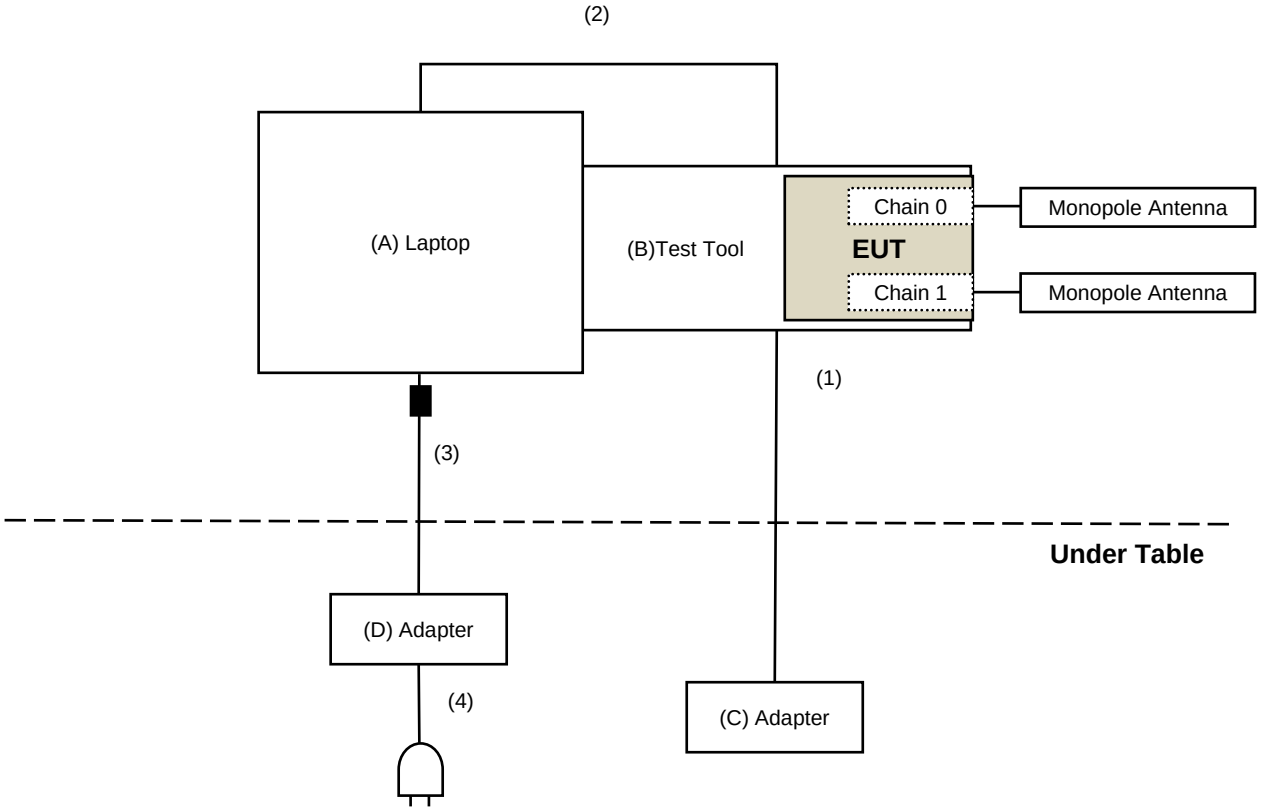
For Unwanted Emission test



For Unwanted Emission Above 1GHz with Antenna Set 1 test



For Unwanted Emission Above 1GHz with Antenna Set 3 test



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Dell	E5420	6FGHKV1	N/A	Provided by Lab
B	Test Tool	Qualcomm	N/A	N/A	N/A	Supplied by applicant
C	Adapter	PHIHONG	PSAA12A-120L6	N/A	N/A	Supplied by applicant
D	Adapter	Dell	LLA65NS2-01	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.2	NO	0	Supplied by applicant
2	USB Cable	1	0.6	Yes	0	Provided by Lab
3	DC Cable	1	1.8	NO	1	Provided by Lab
4	AC Cable	1	1.5	NO	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/1/10

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/1/10

4.3 6 dB Bandwidth

Refer to section 4.2 to get information of the instruments.

4.4 Conducted Out of Band Emissions

Refer to section 4.2 to get information of the instruments.

4.5 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance	N/A	EMC-01	2022/9/27	2023/9/26
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2022/10/18	2023/10/17
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2022/8/24	2023/8/23
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A
TEST RECEIVER R&S	ESCS 30	847124/029	2022/10/14	2023/10/13

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2023/2/20

4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bilog Antenna Schwarzbeck	VULB 9168	9168-0842	2022/10/24	2023/10/23
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2022/12/28	2023/12/27
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
Pre_Amplifier EMCI	EMC330N	980538	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-5-1	2022/4/25	2023/4/24
		966-5-2	2022/4/25	2023/4/24
		966-5-3	2022/4/25	2023/4/24
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Test Receiver R&S	ESR3	102528	2023/2/10	2024/2/9

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2023/2/15

4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980509	2022/4/25	2023/4/24
	EMC184045SE	980387	2022/12/28	2023/12/27
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/12/28	2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-1500	180503	2022/4/25	2023/4/24
	EMC104-SM-SM-2000	180501	2022/4/25	2023/4/24
	EMC104-SM-SM-6000	180506	2022/4/25	2023/4/24
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Test Receiver R&S	ESR3	102528	2022/2/25 2023/2/10	2023/2/24 2024/2/9

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2023/1/11 ~ 2023/2/21

5 Limits of Test Items

5.1 RF Output Power

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

5.2 Power Spectral Density

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz.

5.3 6 dB Bandwidth

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

5.4 Conducted Out of Band Emissions

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

5.5 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.6 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.7 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

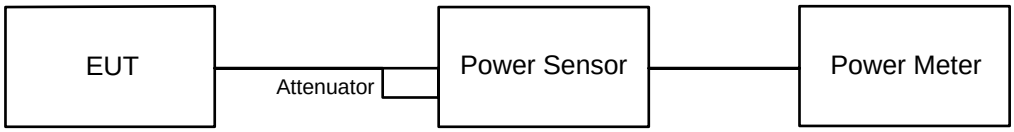
Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup



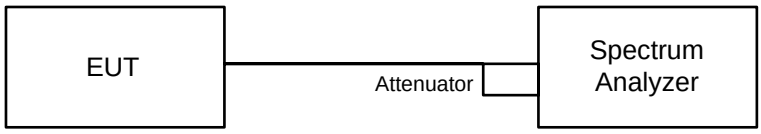
6.1.2 Test Procedure

Peak Power:
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average Power:
Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

6.2 Power Spectral Density

6.2.1 Test Setup

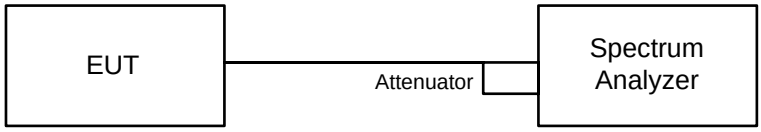


6.2.2 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

6.3 6 dB Bandwidth

6.3.1 Test Setup

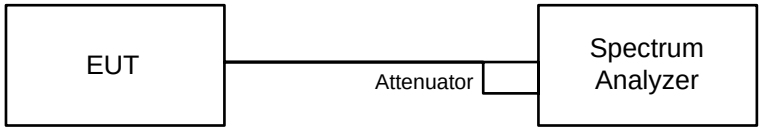


6.3.2 Test Procedure

a. Set resolution bandwidth (RBW) = 100 kHz.
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.4 Conducted Out of Band Emissions

6.4.1 Test Setup



6.4.2 Test Procedure

MEASUREMENT PROCEDURE REF

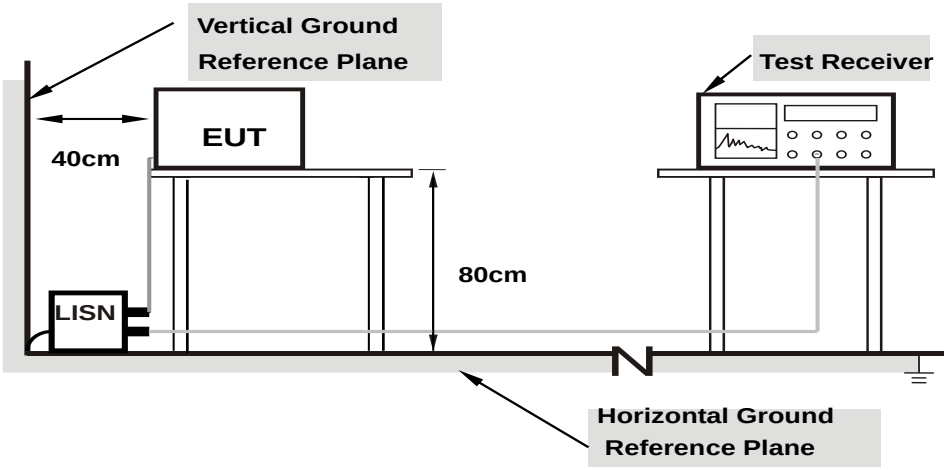
a. Set instrument center frequency same as DTS channel BW max emission level frequency.
b. Set the span to ≥ 1.5 times the DTS bandwidth.
c. Set the RBW = 100 kHz.
d. Set the VBW ≥ 300 kHz.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

6.5 AC Power Conducted Emissions

6.5.1 Test Setup



Note: 1.Support units were connected to second LISN.

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

6.5.2 Test Procedure

a. The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

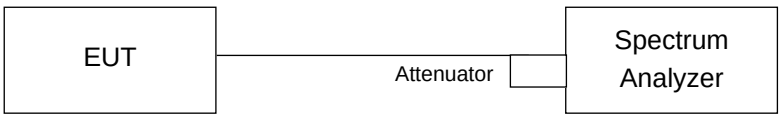
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

6.6 Unwanted Emissions below 1 GHz

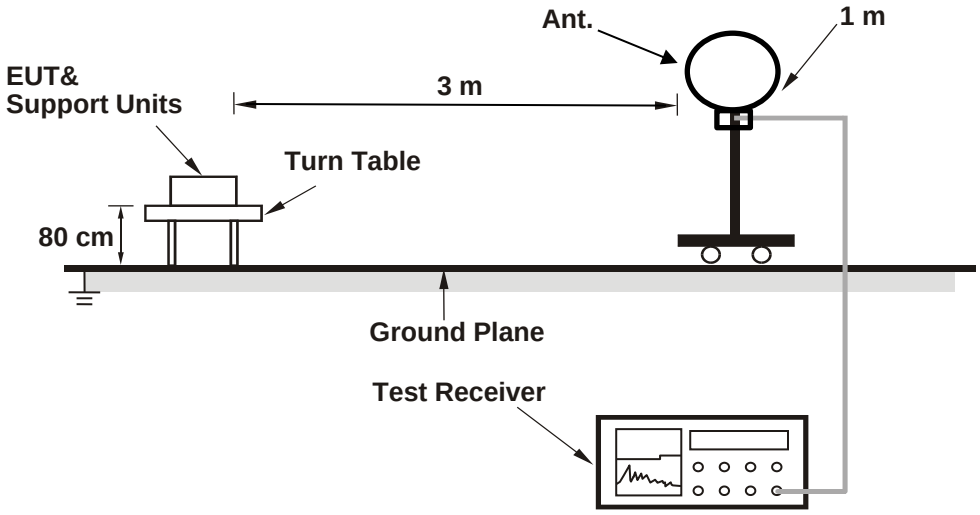
6.6.1 Test Setup

For Conducted Configuration:

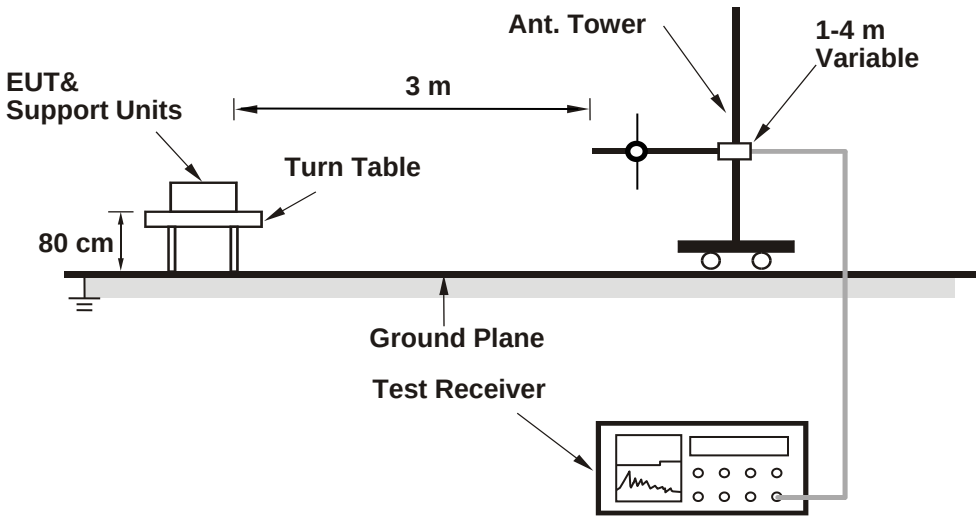


For Radiated Configuration:

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.6.2 Test Procedure

Following FCC KDB 558074 D01 DTS Meas. Guidance :
Radiated versus Conducted Measurements.
The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.
The following steps was performed:

a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.

b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT

c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater

d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)

e. For all of Radiation emission test

For Radiated emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

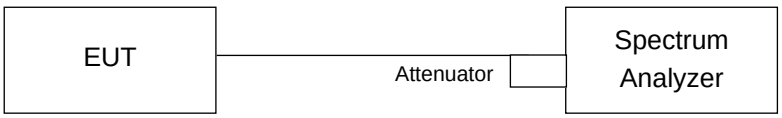
Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

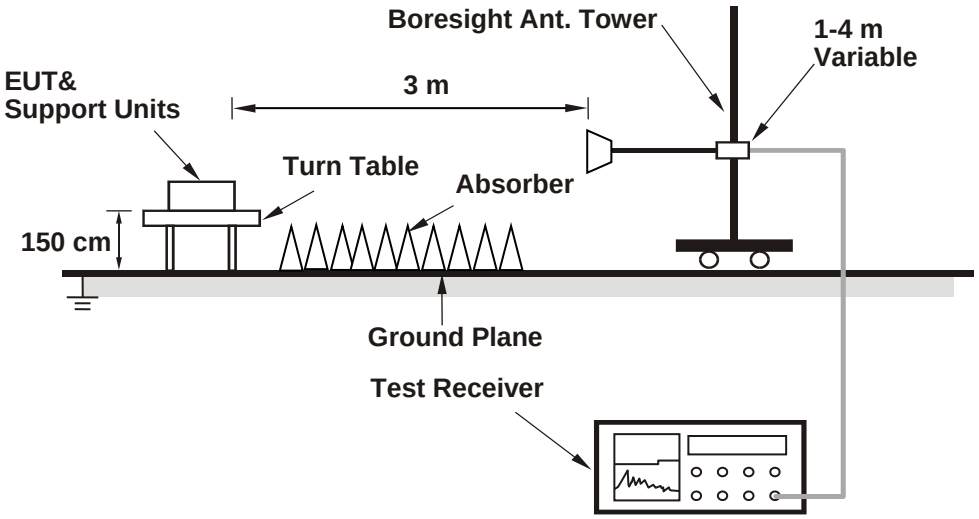
6.7 Unwanted Emissions above 1 GHz

6.7.1 Test Setup

For Conducted Configuration:



For Radiated Configuration:



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

6.7.2 Test Procedure

Following FCC KDB 558074 D01 DTS Meas. Guidance :
Radiated versus Conducted Measurements.
The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.
The following steps was performed:

a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
e. For all of Radiation emission test

For Radiated emission above 1 GHz

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10 Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	24°C, 65% RH	Tested By:	Eric Peng

For Peak Power

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.66	21.04	273.612	24.37	30	Pass
6	2437	21.78	20.67	267.342	24.27	30	Pass
11	2462	21.86	20.77	272.861	24.36	30	Pass
12	2467	20.30	19.58	197.934	22.97	30	Pass
13	2472	14.84	13.69	53.867	17.31	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	23.58	23.14	434.097	26.38	30	Pass
2	2417	23.87	23.11	448.426	26.52	30	Pass
6	2437	23.63	22.84	422.984	26.26	30	Pass
10	2457	23.58	22.94	424.823	26.28	30	Pass
11	2462	22.49	21.85	330.528	25.19	30	Pass
12	2467	20.32	19.27	192.174	22.84	30	Pass
13	2472	1.58	1.23	2.766	4.42	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20)

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	23.74	22.43	411.577	26.14	30	Pass
2	2417	24.37	22.95	470.769	26.73	30	Pass
6	2437	24.39	23.26	486.626	26.87	30	Pass
10	2457	24.19	23.47	484.753	26.86	30	Pass
11	2462	20.98	20.22	230.51	23.63	30	Pass
12	2467	20.09	19.41	189.391	22.77	30	Pass
13	2472	1.52	1.16	2.725	4.35	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT40)

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	20.04	19.30	186.039	22.70	30	Pass
4	2427	20.46	19.56	201.538	23.04	30	Pass
6	2437	22.03	21.36	296.361	24.72	30	Pass
8	2447	20.01	18.64	173.344	22.39	30	Pass
9	2452	19.33	18.04	149.383	21.74	30	Pass
10	2457	17.23	16.18	94.34	19.75	30	Pass
11	2462	0.27	0.07	2.08	3.18	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 26-tone RU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	24.21	23.18	471.603	26.74	30	Pass
2	2417	24.07	23.20	464.2	26.67	30	Pass
6	2437	24.63	23.55	516.867	27.13	30	Pass
10	2457	24.57	23.06	488.72	26.89	30	Pass
11	2462	24.31	22.39	443.154	26.47	30	Pass
12	2467	22.95	21.18	328.462	25.16	30	Pass
13	2472	-3.41	-3.22	0.9325	-0.30	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 52-tone RU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	24.03	23.11	457.574	26.60	30	Pass
2	2417	23.95	23.34	464.088	26.67	30	Pass
6	2437	24.37	23.65	505.266	27.04	30	Pass
10	2457	24.28	22.65	451.994	26.55	30	Pass
11	2462	23.63	21.44	369.99	25.68	30	Pass
12	2467	22.04	20.85	281.574	24.50	30	Pass
13	2472	-2.24	-2.09	1.2151	0.85	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 106-tone RU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	24.32	23.73	506.444	27.05	30	Pass
2	2417	24.28	23.75	505.054	27.03	30	Pass
6	2437	24.79	23.64	532.507	27.26	30	Pass
10	2457	24.62	23.01	489.721	26.90	30	Pass
11	2462	23.75	22.15	401.196	26.03	30	Pass
12	2467	21.08	19.97	227.545	23.57	30	Pass
13	2472	-0.33	0.18	1.9691	2.94	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 242-tone RU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
6	2437	24.31	24.06	524.457	27.20	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT40) 484-tone RU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
6	2437	22.15	21.39	301.78	24.80	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 52+26-tone MRU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
6	2437	24.44	23.87	521.752	27.17	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11be (EHT20) 106+26-tone MRU

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
6	2437	24.39	23.53	500.213	26.99	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 3.53 dBi < 6 dBi, so the output power limit shall not be reduced.

For Average Power

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	19.41	18.36	155.846	21.93
6	2437	19.06	18.30	148.146	21.71
11	2462	19.32	18.23	152.034	21.82
12	2467	17.62	17.07	108.743	20.36
13	2472	12.17	11.18	29.604	14.71

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	18.40	17.80	129.439	21.12
2	2417	18.62	17.84	133.591	21.26
6	2437	18.54	17.68	130.063	21.14
10	2457	18.41	17.82	129.877	21.14
11	2462	17.05	16.63	96.725	19.86
12	2467	14.99	14.19	57.792	17.62
13	2472	-3.51	-3.96	0.8474	-0.72

802.11be (EHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	18.06	16.90	112.951	20.53
2	2417	18.63	17.29	126.525	21.02
6	2437	18.46	17.75	129.712	21.13
10	2457	18.42	17.86	130.597	21.16
11	2462	15.13	14.37	59.936	17.78
12	2467	14.58	13.86	53.002	17.24
13	2472	-4.06	-4.48	0.7491	-1.25

802.11be (EHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
3	2422	14.99	14.24	58.096	17.64
4	2427	15.43	14.71	64.494	18.10
6	2437	17.05	16.47	95.06	19.78
8	2447	14.92	13.89	55.536	17.45
9	2452	14.48	13.59	50.91	17.07
10	2457	12.40	11.56	31.7	15.01
11	2462	-4.65	-4.85	0.6701	-1.74

802.11be (EHT20) 26-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	18.51	17.60	128.502	21.09
2	2417	18.39	17.75	128.59	21.09
6	2437	19.05	18.08	144.621	21.60
10	2457	19.03	17.57	137.131	21.37
11	2462	18.81	16.85	124.45	20.95
12	2467	16.44	15.68	81.038	19.09
13	2472	-8.16	-8.03	0.3102	-5.08

802.11be (EHT20) 52-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	18.50	17.63	128.737	21.10
2	2417	18.37	17.76	128.41	21.09
6	2437	18.99	17.92	141.194	21.50
10	2457	18.96	17.06	129.521	21.12
11	2462	18.32	16.38	111.371	20.47
12	2467	16.53	15.64	81.622	19.12
13	2472	-6.91	-6.90	0.4079	-3.89

802.11be (EHT20) 106-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	18.99	18.24	145.931	21.64
2	2417	18.93	18.39	147.187	21.68
6	2437	19.40	18.39	156.12	21.93
10	2457	19.39	17.71	145.916	21.64
11	2462	18.50	16.91	119.885	20.79
12	2467	16.03	14.86	70.706	18.49
13	2472	-4.10	-4.41	0.7513	-1.24

802.11be (EHT20) 242-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	18.98	18.24	145.749	21.64

802.11be (EHT40) 484-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	16.73	15.85	85.557	19.32

802.11be (EHT20) 52+26-tone MRU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	19.03	18.14	145.146	21.62

802.11be (EHT20) 106+26-tone MRU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	19.08	18.05	144.736	21.61

7.2 Power Spectral Density

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	24°C, 65% RH	Tested By:	Eric Peng

802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-3.30	-3.83	-0.55	7.46	Pass
6	2437	-4.14	-5.29	-1.67	7.46	Pass
11	2462	-3.81	-4.47	-1.12	7.46	Pass
12	2467	-4.87	-5.41	-2.12	7.46	Pass
13	2472	-10.14	-11.32	-7.68	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11g

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-6.63	-7.98	-4.24	7.46	Pass
2	2417	-7.10	-8.14	-4.58	7.46	Pass
6	2437	-8.04	-8.92	-5.45	7.46	Pass
10	2457	-5.97	-8.87	-4.17	7.46	Pass
11	2462	-9.50	-6.50	-4.74	7.46	Pass
12	2467	-10.70	-9.96	-7.30	7.46	Pass
13	2472	-28.96	-29.36	-26.15	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-7.25	-8.74	-4.92	7.46	Pass
2	2417	-6.62	-8.15	-4.31	7.46	Pass
6	2437	-4.93	-6.29	-2.55	7.46	Pass
10	2457	-5.29	-8.24	-3.51	7.46	Pass
11	2462	-10.13	-11.49	-7.75	7.46	Pass
12	2467	-10.92	-12.19	-8.50	7.46	Pass
13	2472	-29.76	-29.82	-26.78	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
3	2422	-11.41	-13.60	-9.36	7.46	Pass
4	2427	-13.09	-13.87	-10.45	7.46	Pass
6	2437	-10.29	-11.52	-7.85	7.46	Pass
8	2447	-13.78	-14.23	-10.99	7.46	Pass
9	2452	-14.51	-13.94	-11.21	7.46	Pass
10	2457	-17.26	-16.83	-14.03	7.46	Pass
11	2462	-32.48	-33.18	-29.81	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20) 26-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	1.11	0.07	3.63	7.46	Pass
2	2417	1.04	0.25	3.67	7.46	Pass
6	2437	1.89	0.25	4.16	7.46	Pass
10	2457	3.11	1.76	5.50	7.46	Pass
11	2462	1.57	-0.81	3.55	7.46	Pass
12	2467	-1.21	-0.45	2.20	7.46	Pass
13	2472	-22.07	-22.50	-19.27	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20) 52-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-0.70	-3.27	1.21	7.46	Pass
2	2417	-1.83	-1.92	1.14	7.46	Pass
6	2437	-0.54	-1.97	1.81	7.46	Pass
10	2457	-0.48	-3.62	1.24	7.46	Pass
11	2462	-1.99	-3.43	0.36	7.46	Pass
12	2467	-4.03	-4.85	-1.41	7.46	Pass
13	2472	-27.44	-27.08	-24.25	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20) 106-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-3.35	-4.60	-0.92	7.46	Pass
2	2417	-1.47	-3.86	0.51	7.46	Pass
6	2437	-1.62	-4.95	0.04	7.46	Pass
10	2457	-3.62	-4.84	-1.18	7.46	Pass
11	2462	-3.79	-5.22	-1.44	7.46	Pass
12	2467	-5.83	-7.44	-3.55	7.46	Pass
13	2472	-24.38	-26.91	-22.45	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20) 242-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
6	2437	-5.64	-6.63	-3.10	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT40) 484-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
6	2437	-10.43	-12.09	-8.17	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

802.11be (EHT20) 52+26-tone MRU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
6	2437	-2.23	-3.03	0.40	7.46	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

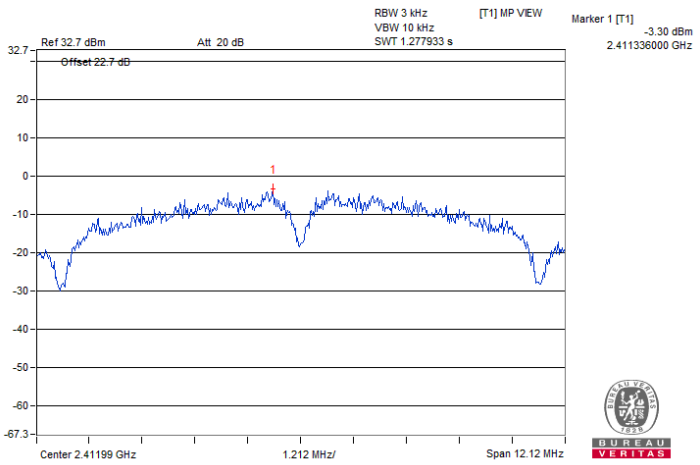
802.11be (EHT20) 106+26-tone MRU

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
6	2437	-3.38	-3.50	-0.43	7.46	Pass

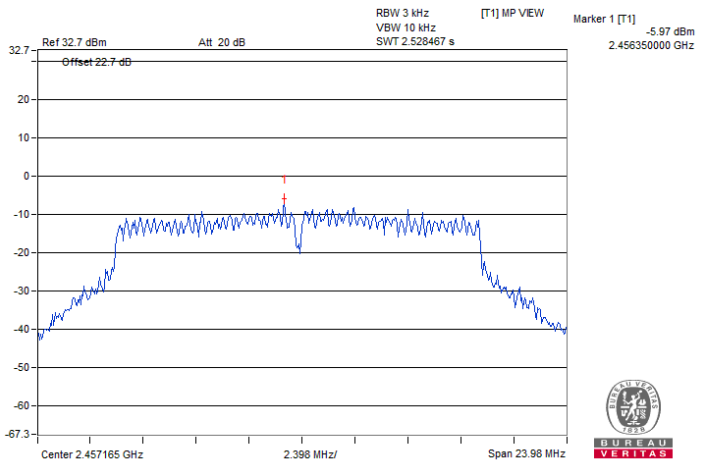
Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. The directional gain is 6.54 dBi > 6 dBi, so the power density limit shall be reduced to 8-(6.54-6) = 7.46 dBm/3kHz.

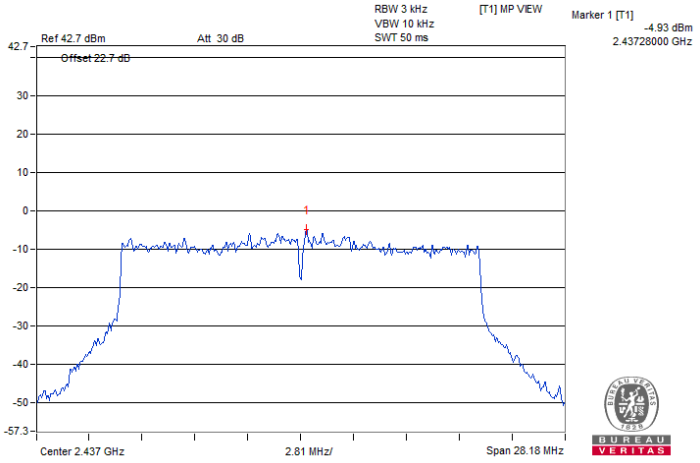
Spectrum Plot of Maximum Value



802.11b / Chain 0 : CH 1



802.11g / Chain 0 : CH 10



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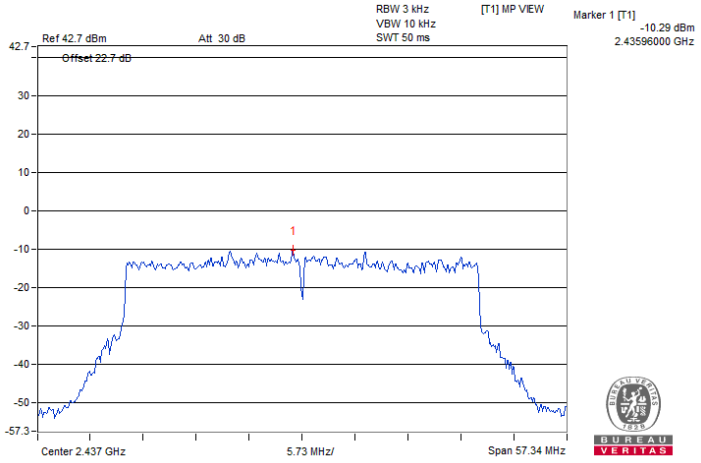
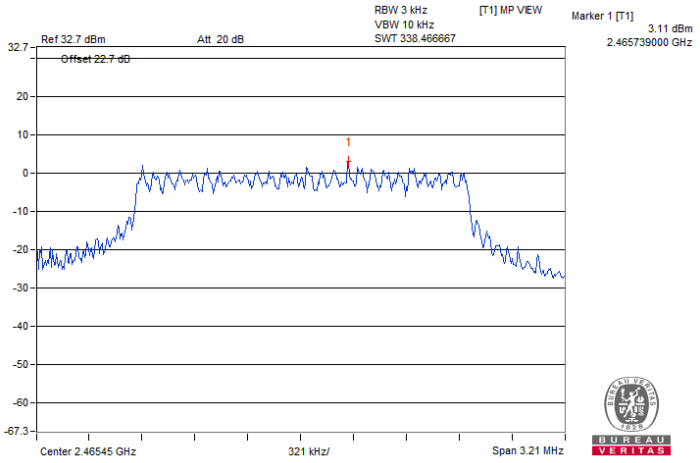
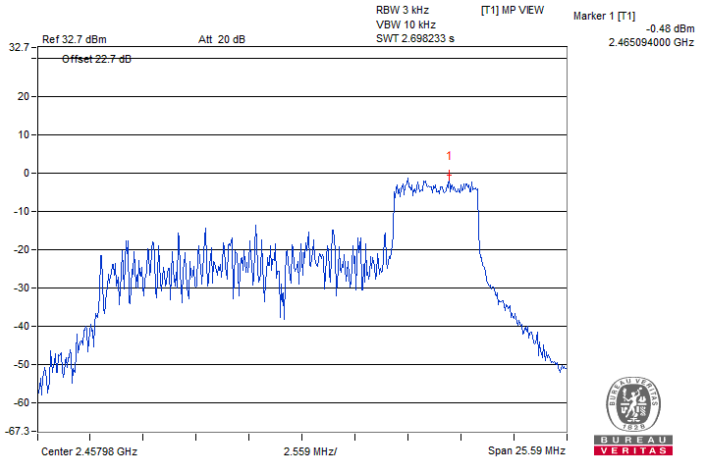


802.11be (EHT40) / Chain 0 : CH 6

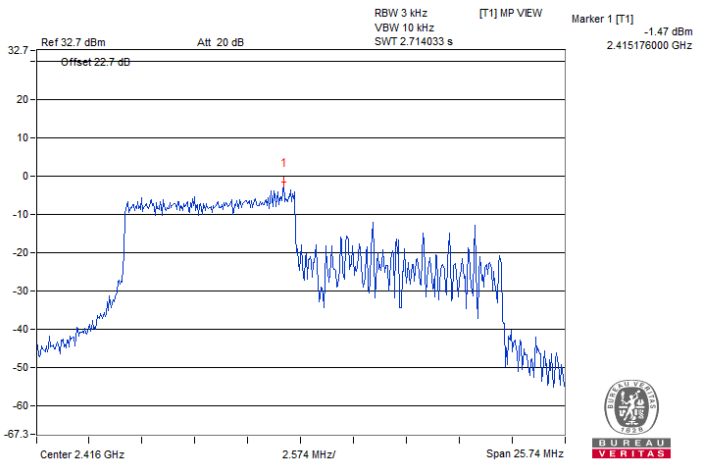


802.11be (EHT20) 26-tone RU / Chain 0 : CH 10

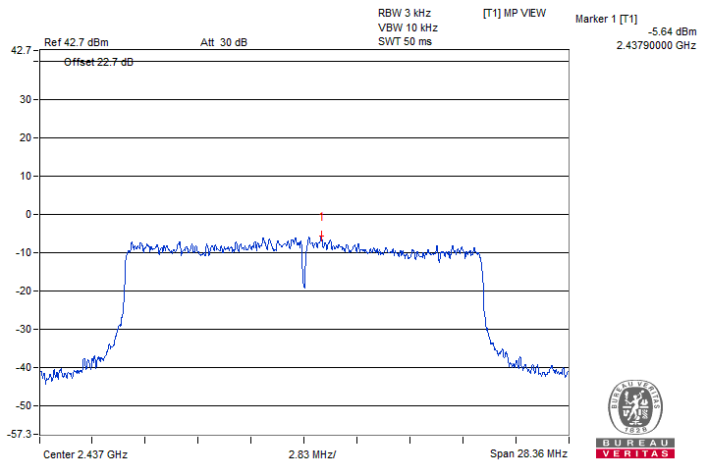


802.11be (EHT20) 52-tone RU / Chain 0 : CH 10

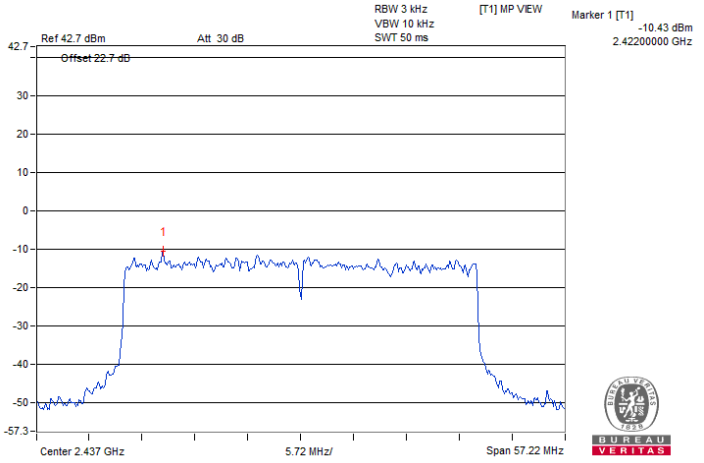
Spectrum Plot of Maximum Value



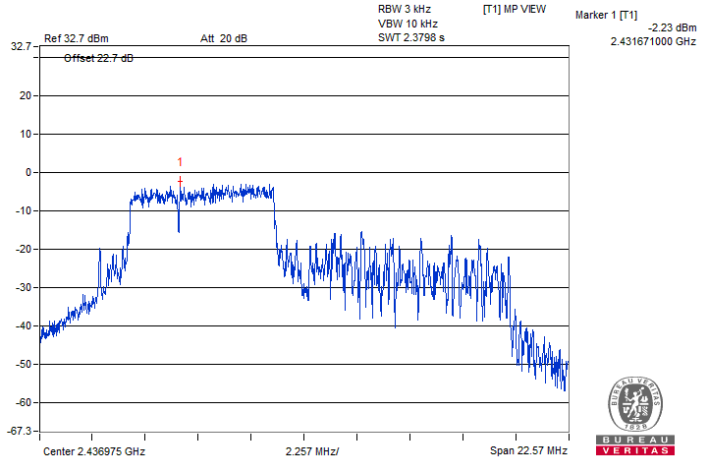
802.11be (EHT20) 106-tone RU / Chain 0 : CH 2



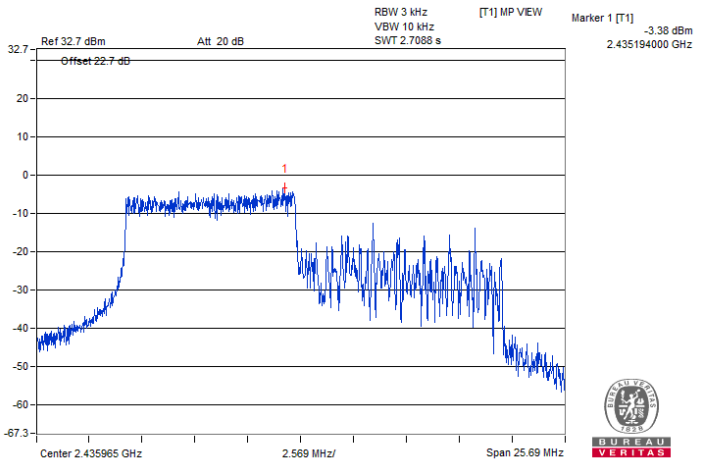
802.11be (EHT20) 242-tone RU / Chain 0 : CH 6



802.11be (EHT40) 484-tone RU / Chain 0 : CH 6



802.11be (EHT20) 52+26-tone MRU / Chain 0 : CH 6



802.11be (EHT20) 106+26-tone MRU / Chain 0 : CH 6

7.3 6 dB Bandwidth

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	24°C, 65% RH	Tested By:	Eric Peng

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	8.09	8.08	0.5	Pass
6	2437	8.07	8.09	0.5	Pass
11	2462	8.07	8.05	0.5	Pass
12	2467	8.08	8.07	0.5	Pass
13	2472	7.60	7.60	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	16.00	16.31	0.5	Pass
2	2417	15.92	16.28	0.5	Pass
6	2437	15.94	16.35	0.5	Pass
10	2457	15.92	16.06	0.5	Pass
11	2462	16.06	15.80	0.5	Pass
12	2467	15.92	16.30	0.5	Pass
13	2472	15.71	16.07	0.5	Pass

802.11be (EHT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	18.85	18.79	0.5	Pass
2	2417	18.73	18.73	0.5	Pass
6	2437	18.88	18.89	0.5	Pass
10	2457	18.87	18.75	0.5	Pass
11	2462	18.55	18.67	0.5	Pass
12	2467	18.70	18.85	0.5	Pass
13	2472	18.38	18.85	0.5	Pass

802.11be (EHT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
3	2422	37.96	38.01	0.5	Pass
4	2427	37.97	38.01	0.5	Pass
6	2437	37.94	38.31	0.5	Pass
8	2447	38.29	38.04	0.5	Pass
9	2452	38.24	37.86	0.5	Pass
10	2457	38.12	36.36	0.5	Pass
11	2462	37.97	36.71	0.5	Pass

802.11be (EHT20) 26-tone RU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	12.08	12.01	0.5	Pass
2	2417	12.09	12.08	0.5	Pass
6	2437	10.83	10.83	0.5	Pass
10	2457	2.14	10.86	0.5	Pass
11	2462	8.32	10.84	0.5	Pass
12	2467	8.31	2.14	0.5	Pass
13	2472	12.07	10.86	0.5	Pass

802.11be (EHT20) 52-tone RU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	17.05	17.09	0.5	Pass
2	2417	17.11	17.03	0.5	Pass
6	2437	15.81	17.08	0.5	Pass
10	2457	17.06	17.07	0.5	Pass
11	2462	17.01	17.04	0.5	Pass
12	2467	17.06	17.06	0.5	Pass
13	2472	17.11	17.11	0.5	Pass

802.11be (EHT20) 106-tone RU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	17.15	17.12	0.5	Pass
2	2417	17.16	17.16	0.5	Pass
6	2437	17.12	17.13	0.5	Pass
10	2457	17.15	17.16	0.5	Pass
11	2462	17.14	17.07	0.5	Pass
12	2467	17.12	17.16	0.5	Pass
13	2472	17.16	17.14	0.5	Pass

802.11be (EHT20) 242-tone RU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
6	2437	18.91	18.95	0.5	Pass

802.11be (EHT40) 484-tone RU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
6	2437	38.15	38.15	0.5	Pass

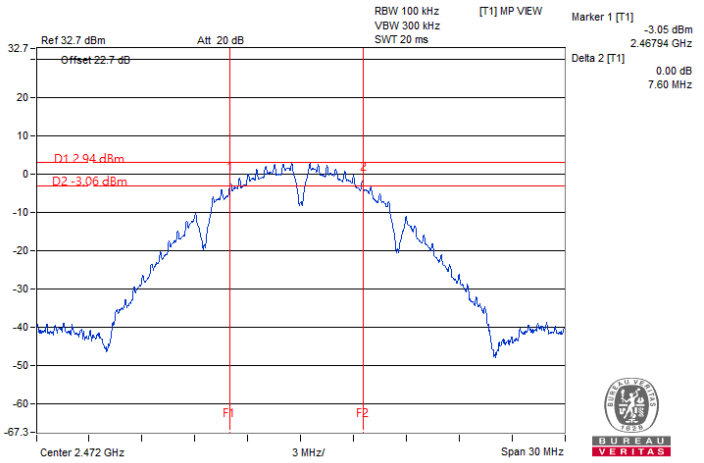
802.11be (EHT20) 52+26-tone MRU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
6	2437	15.05	15.01	0.5	Pass

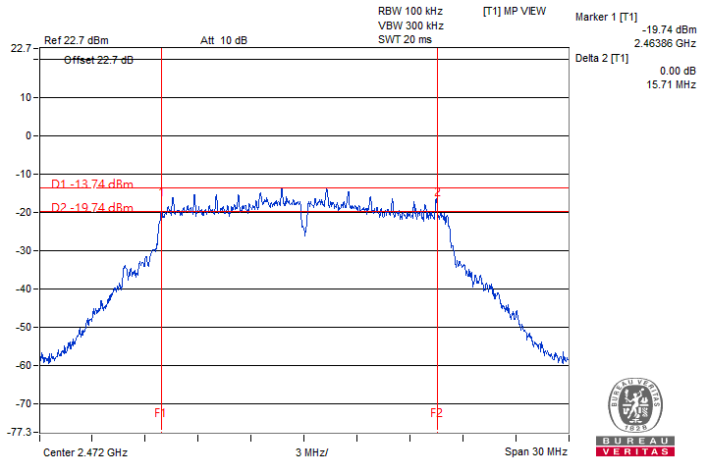
802.11be (EHT20) 106+26-tone MRU

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
6	2437	17.13	17.16	0.5	Pass

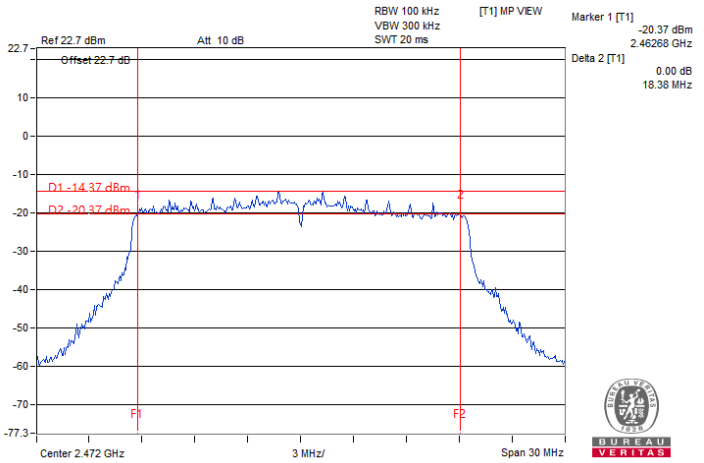
Spectrum Plot of Minimum Value



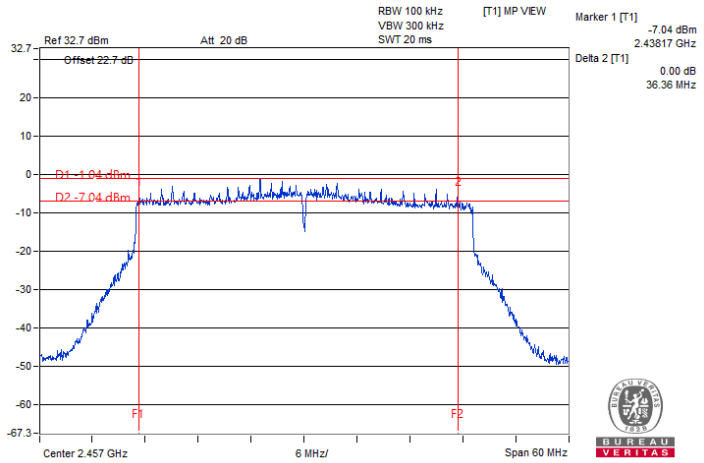
802.11b / Chain 0 : CH 13



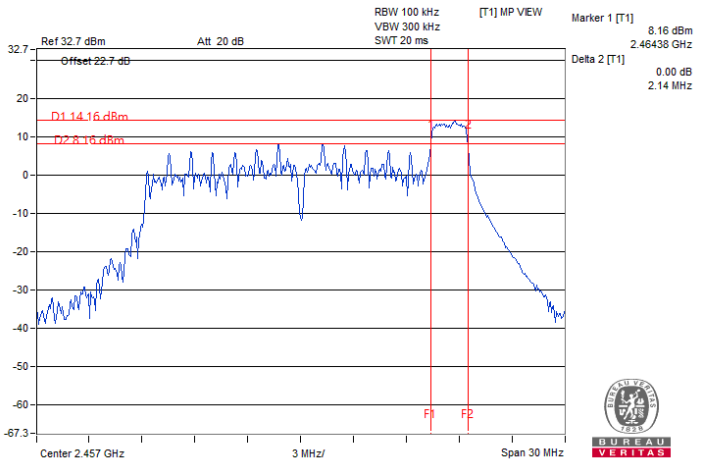
802.11g / Chain 0 : CH 13



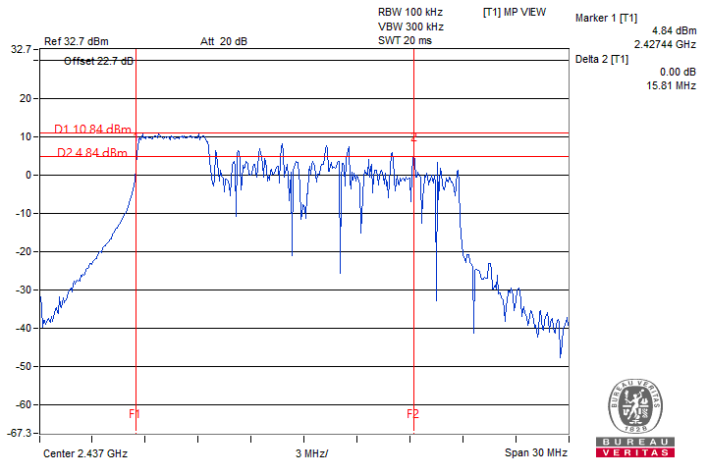
802.11be (EHT20) / Chain 0 : CH 13



802.11be (EHT40) / Chain 1 : CH 10

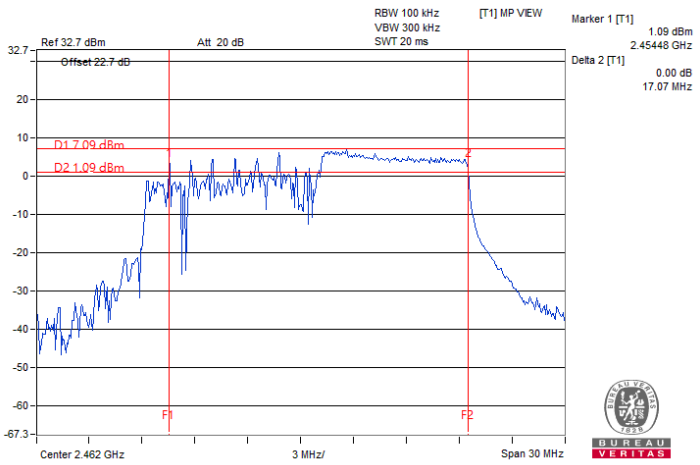


802.11be (EHT20) 26-tone RU / Chain 0 : CH 10

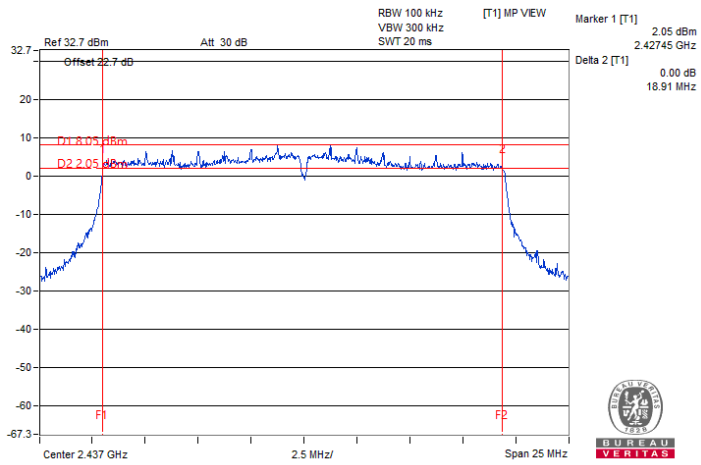


802.11be (EHT20) 52-tone RU / Chain 0 : CH 6

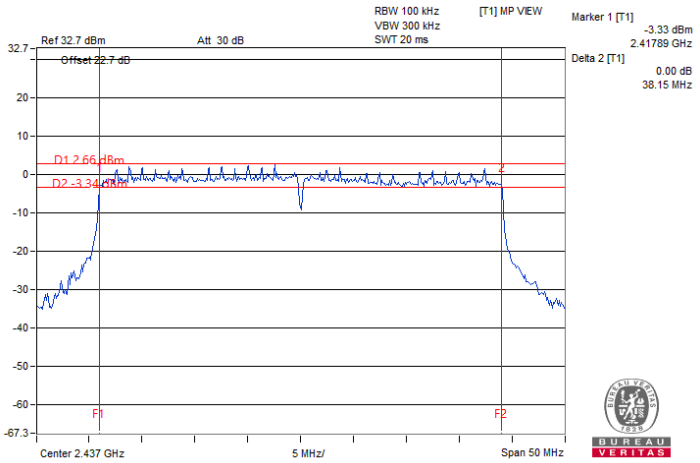
Spectrum Plot of Minimum Value



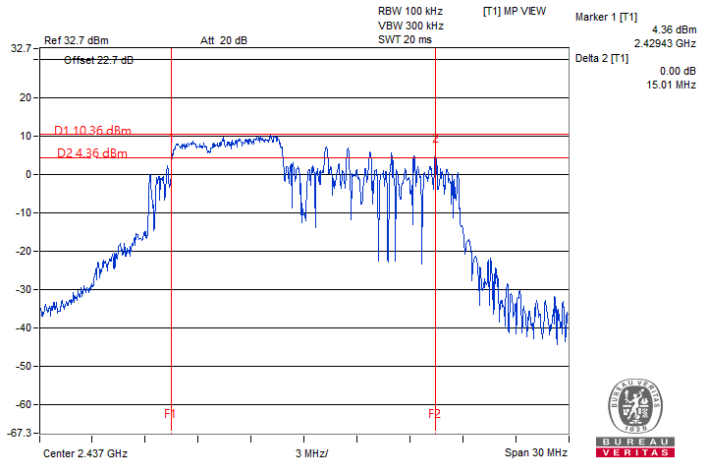
802.11be (EHT20) 106-tone RU / Chain 1 : CH 11



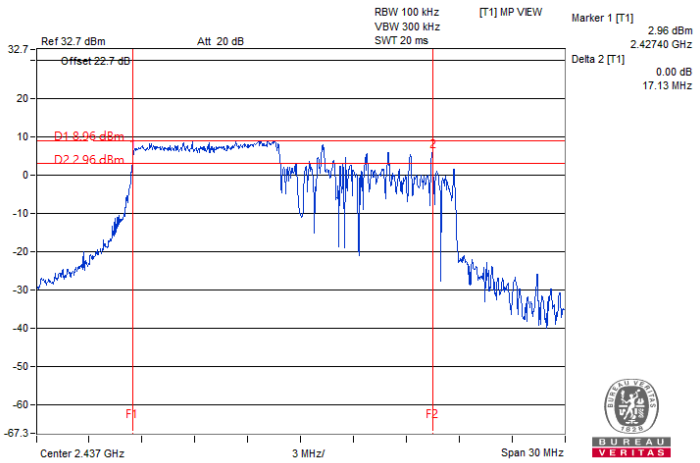
802.11be (EHT20) 242-tone RU / Chain 0 : CH 6



802.11be (EHT40) 484-tone RU / Chain 0 : CH 6



802.11be (EHT20) 52+26-tone MRU / Chain 1 : CH 6



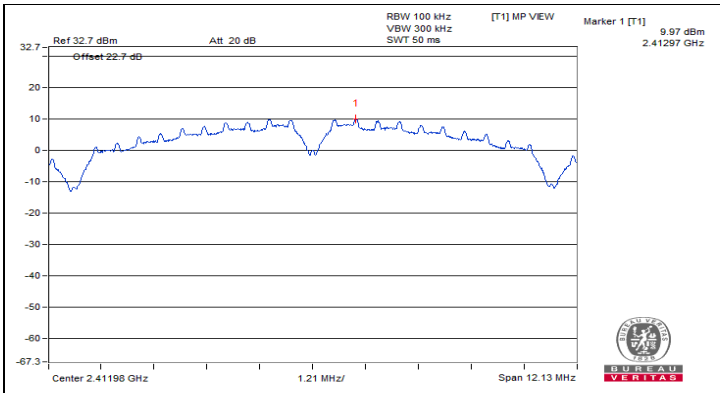
802.11be (EHT20) 106+26-tone MRU / Chain 0 : CH 6

7.4 Conducted Out of Band Emissions

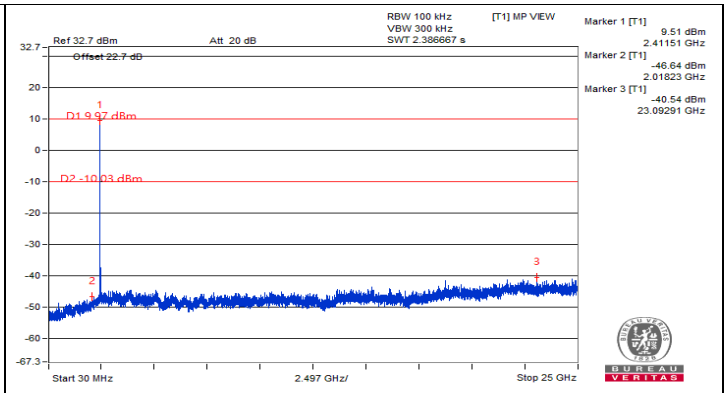
Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	24°C, 65% RH	Tested By:	Eric Peng

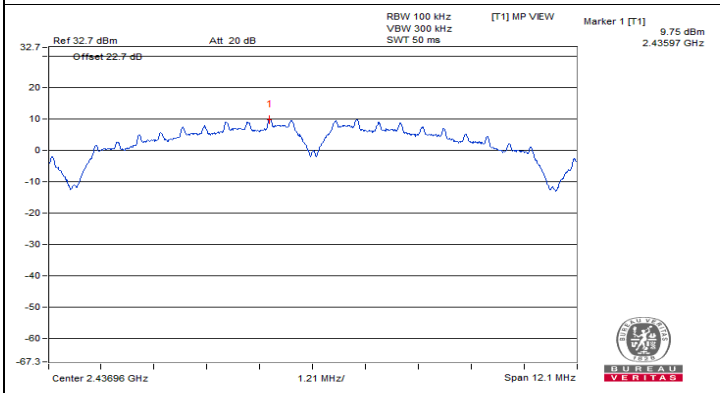
802.11b



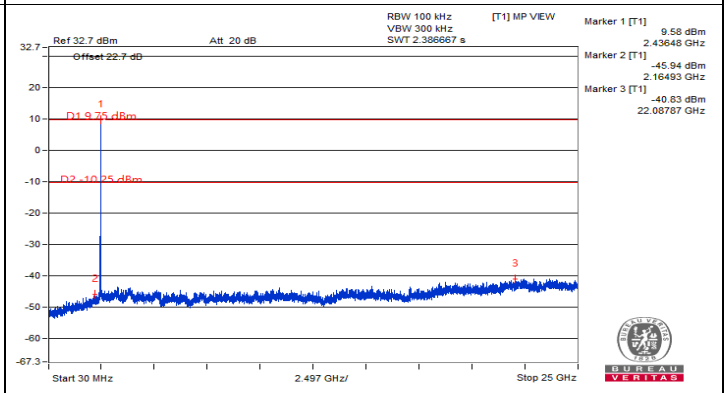
Chain 0 : CH 1



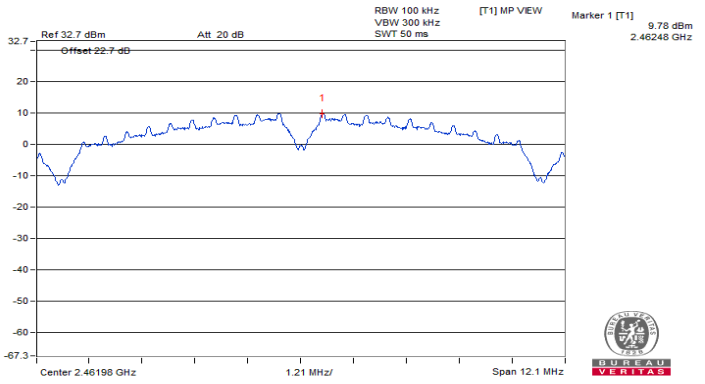
Chain 0 : CH 1



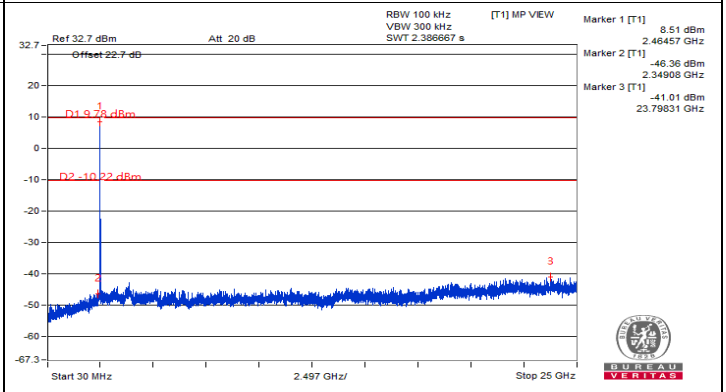
Chain 0 : CH 6



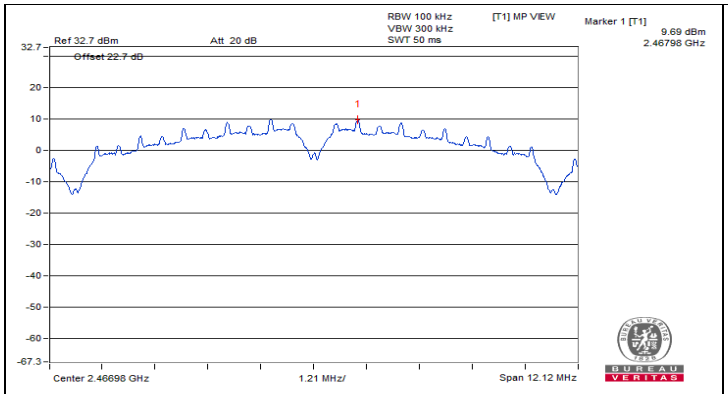
Chain 0 : CH 6



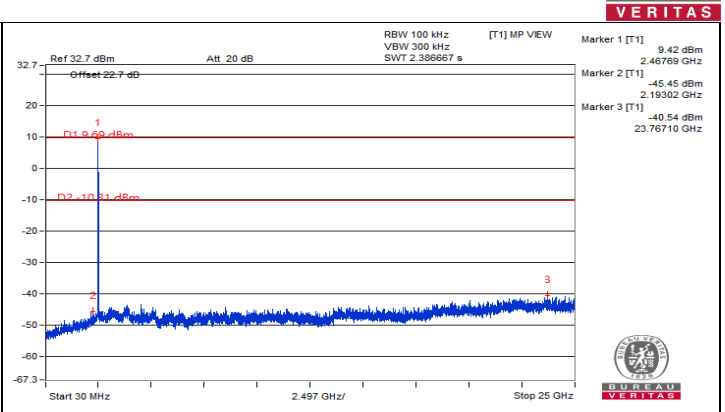
Chain 0 : CH 11



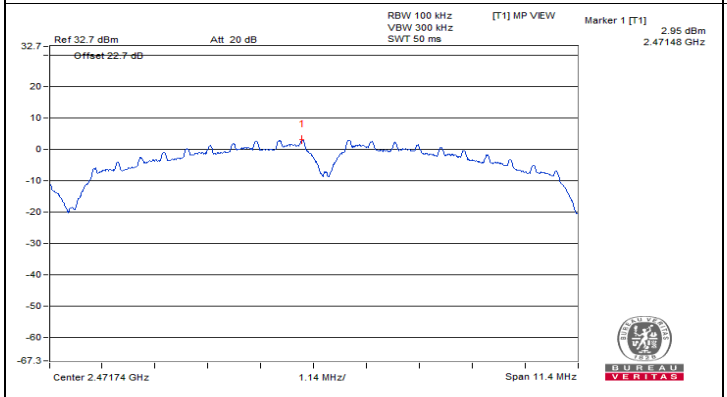
Chain 0 : CH 11



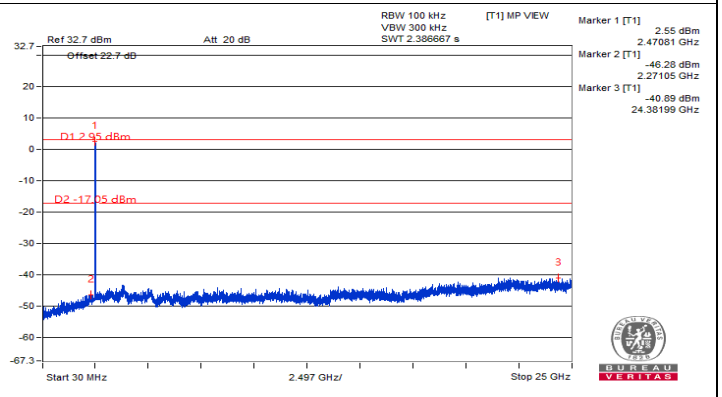
Chain 0 : CH 12



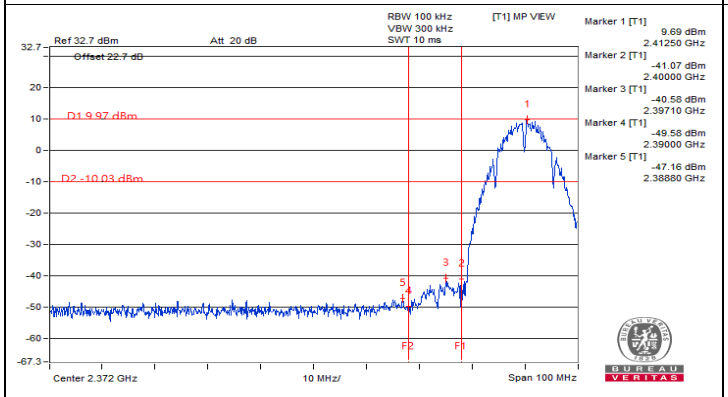
Chain 0 : CH 12



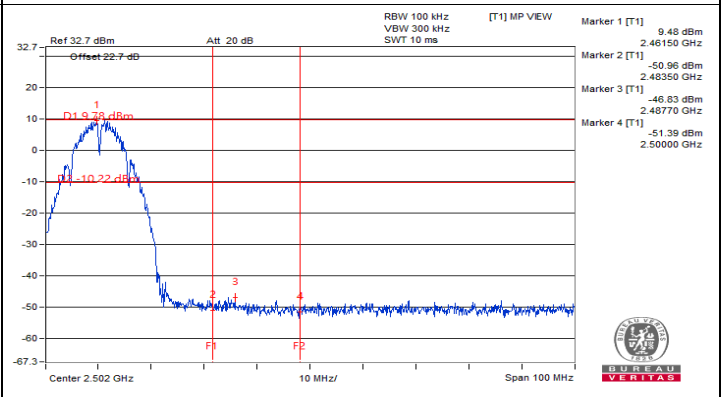
Chain 0 : CH 13



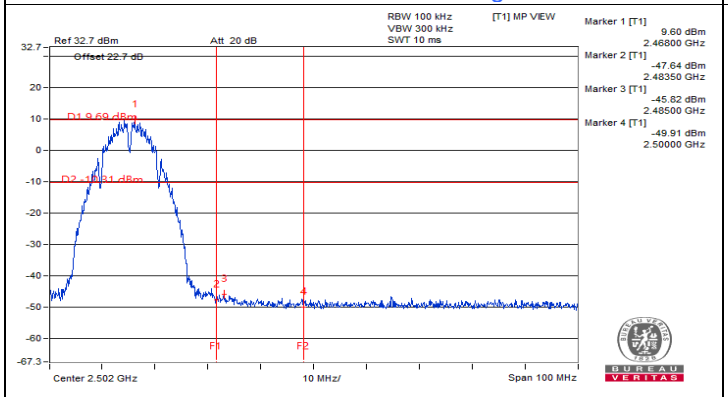
Chain 0 : CH 13



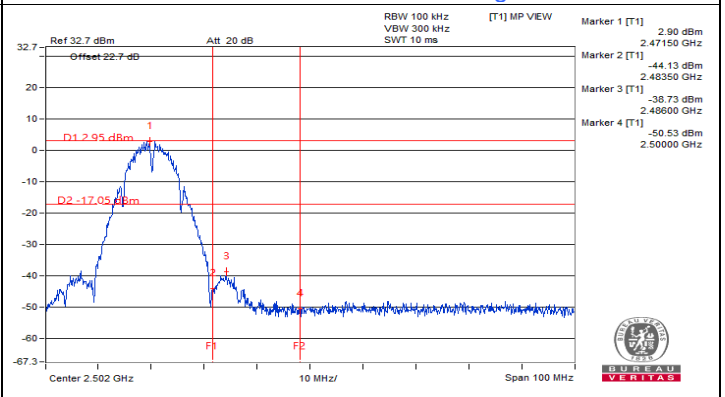
Chain 0 : CH 1 Band edge



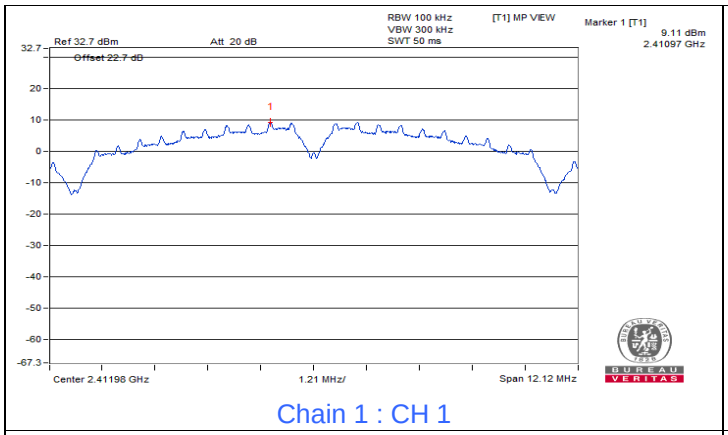
Chain 0 : CH 11 Band edge



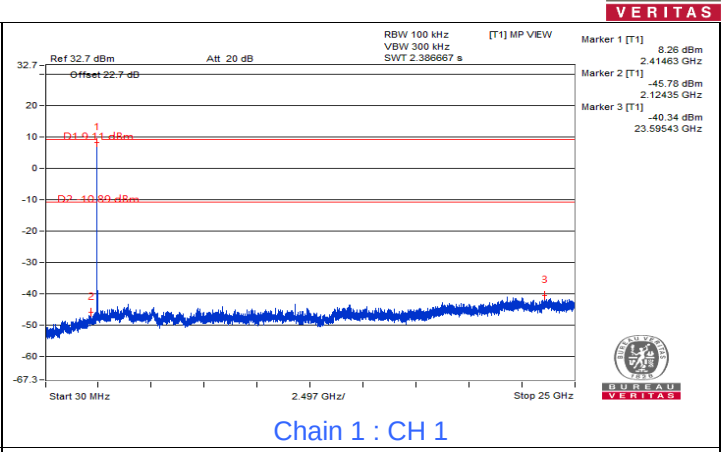
Chain 0 : CH 12 Band edge



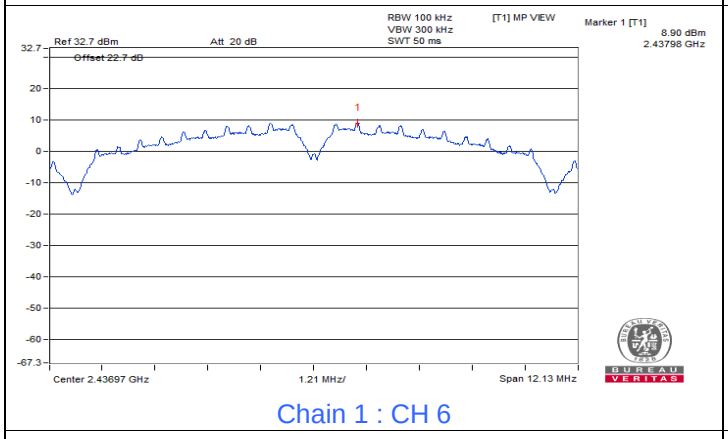
Chain 0 : CH 13 Band edge



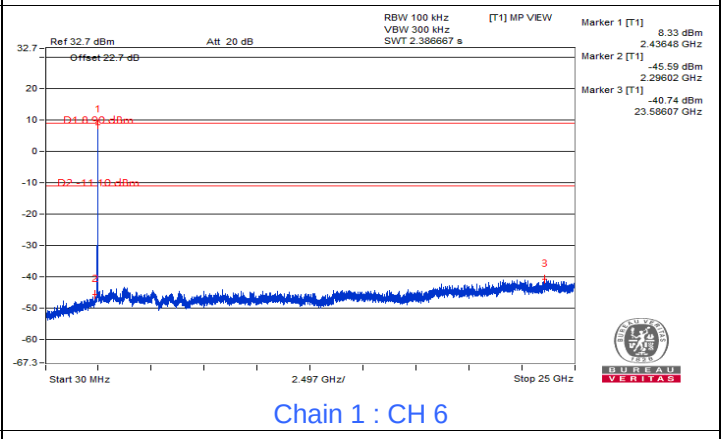
Chain 1 : CH 1



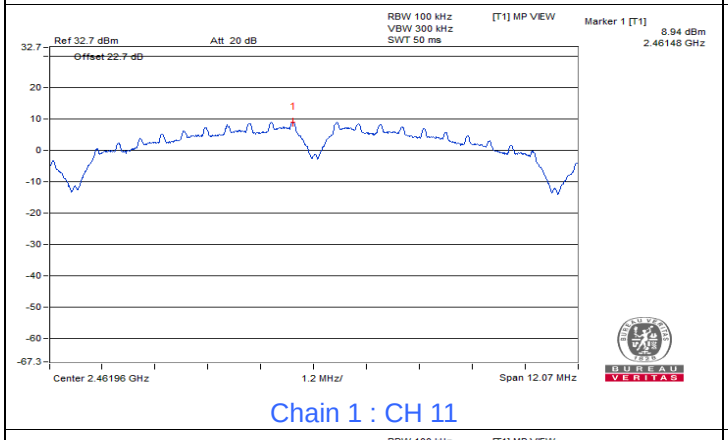
Chain 1 : CH 1



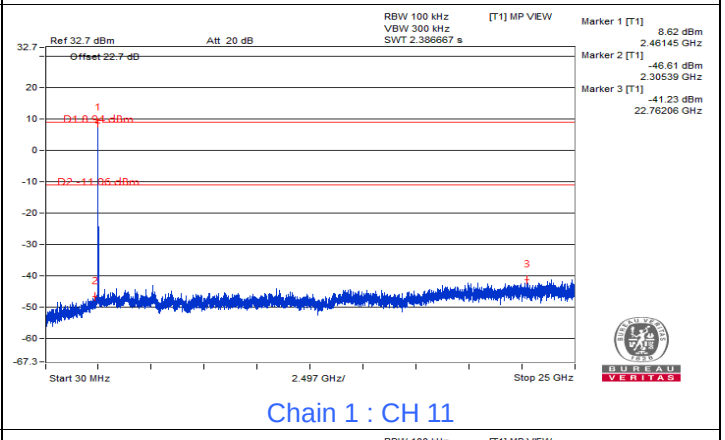
Chain 1 : CH 6



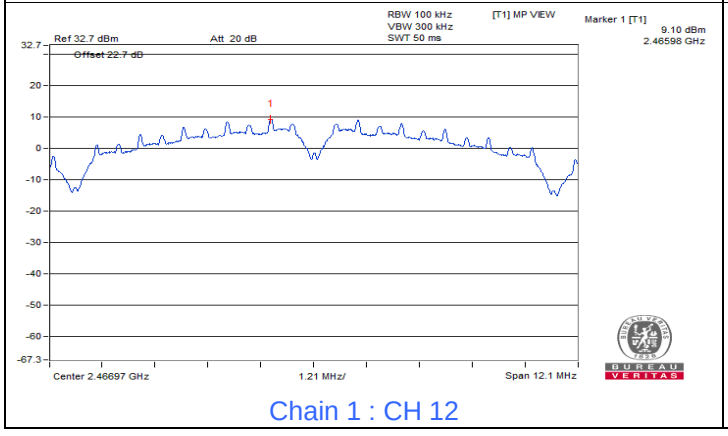
Chain 1 : CH 6



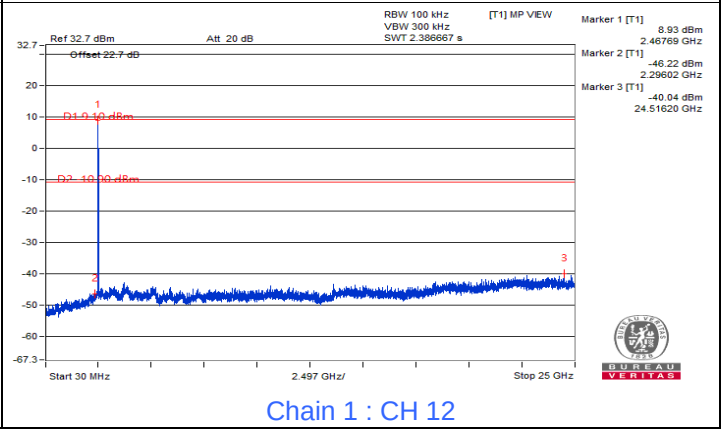
Chain 1 : CH 11



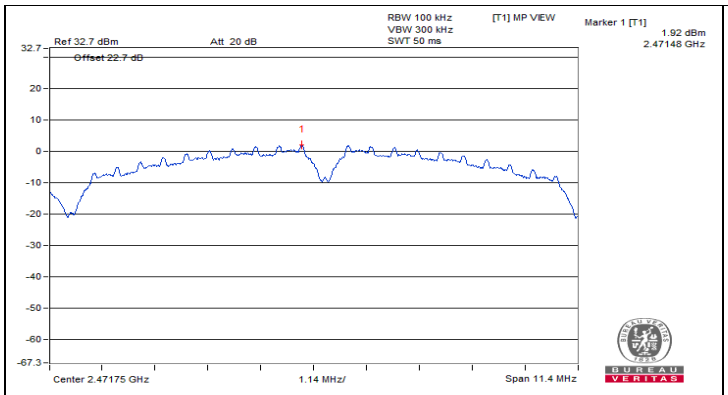
Chain 1 : CH 11



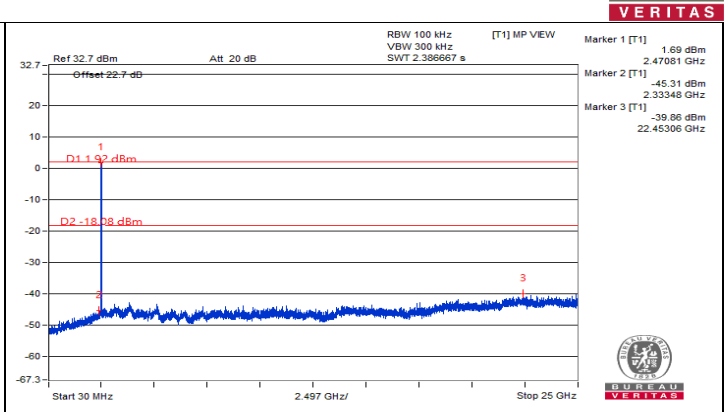
Chain 1 : CH 12



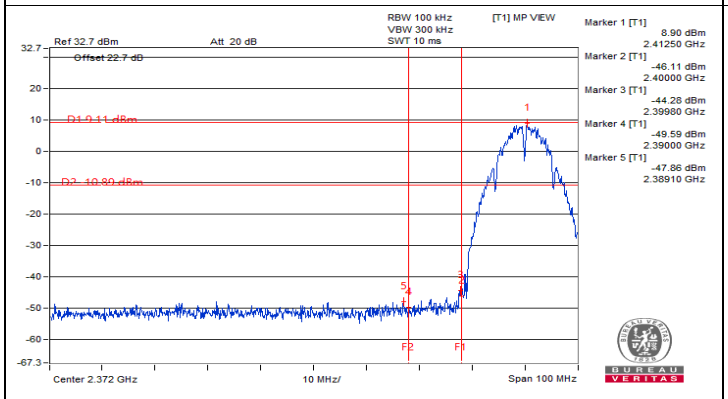
Chain 1 : CH 12



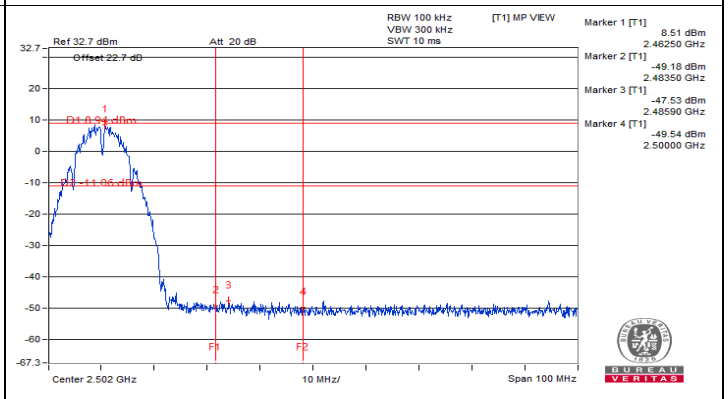
Chain 1 : CH 13



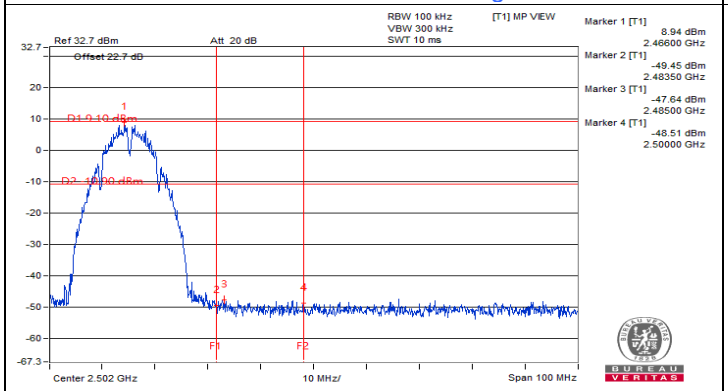
Chain 1 : CH 13



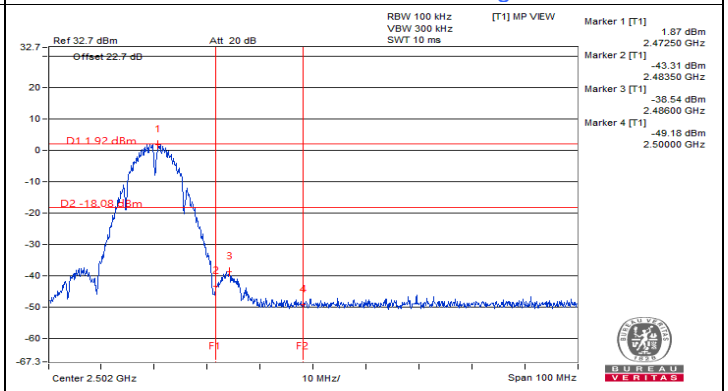
Chain 1 : CH 1 Band edge



Chain 1 : CH 11 Band edge

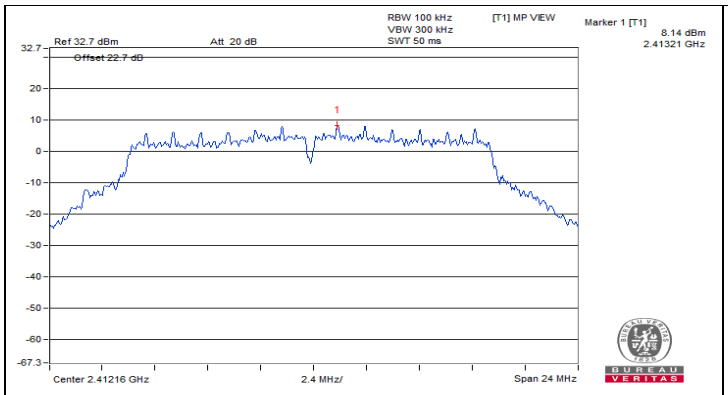


Chain 1 : CH 12 Band edge

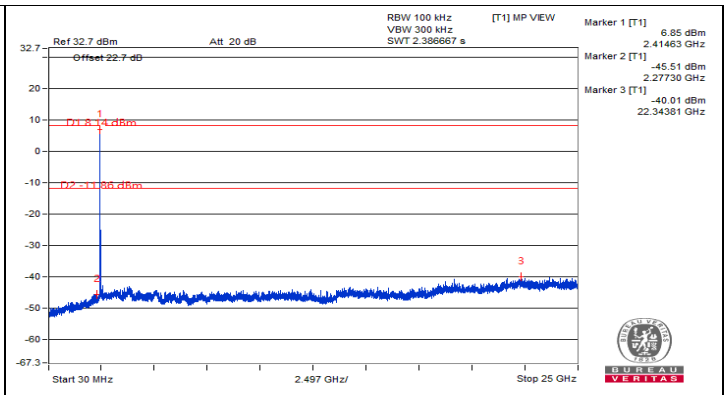


Chain 1 : CH 13 Band edge

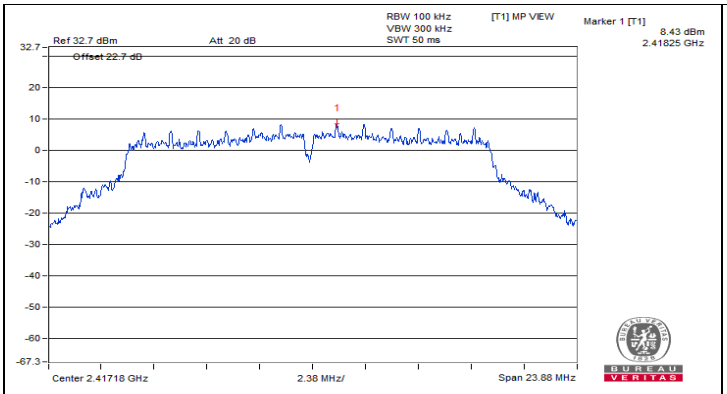
802.11g



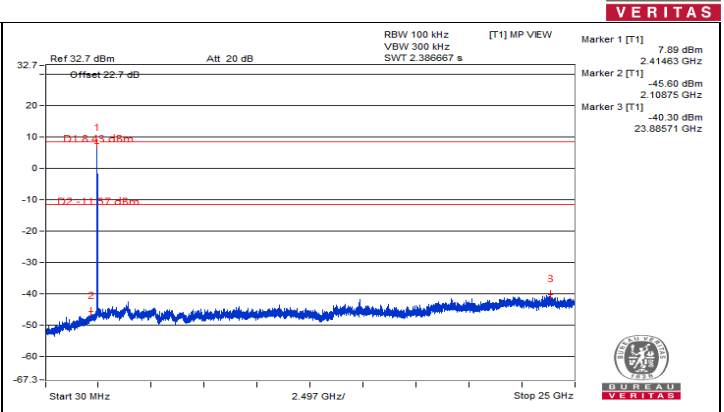
Chain 0 : CH 1



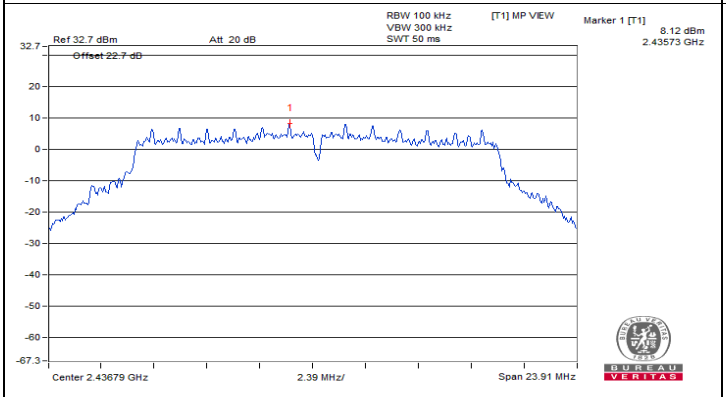
Chain 0 : CH 1



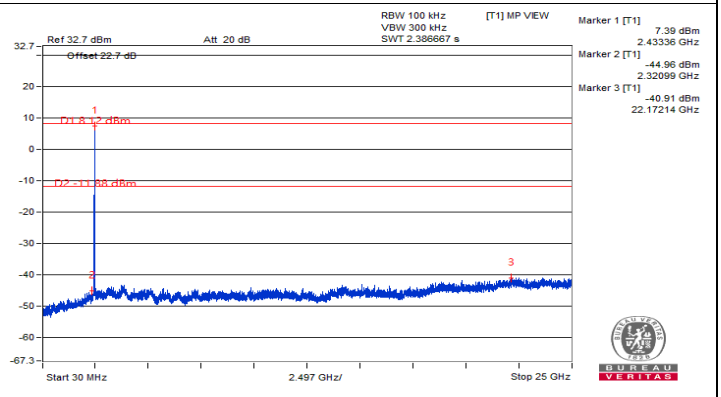
Chain 0 : CH 2



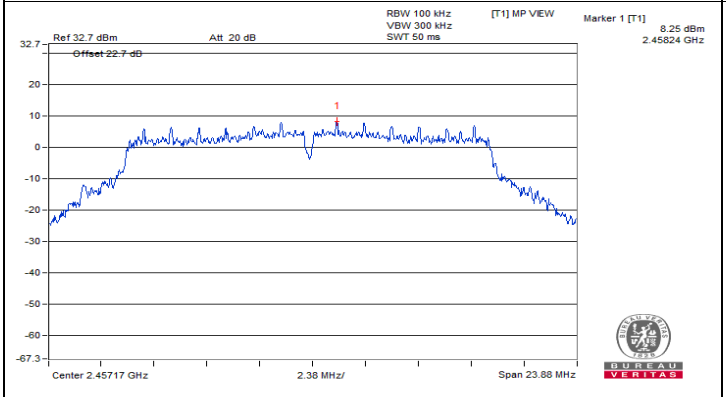
Chain 0 : CH 2



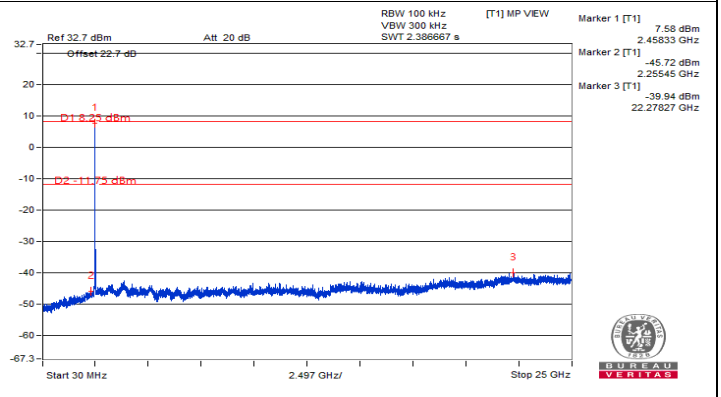
Chain 0 : CH 6



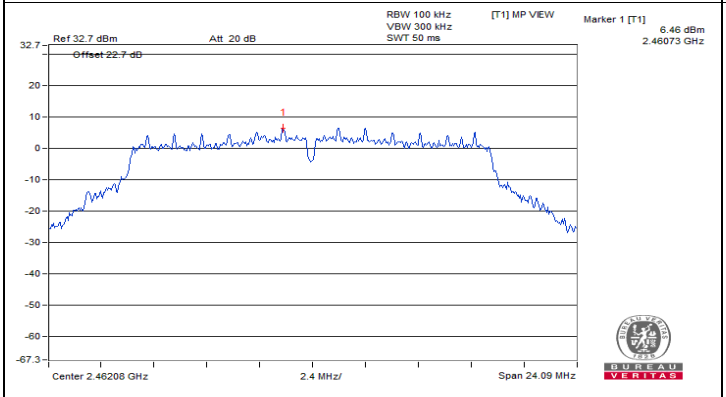
Chain 0 : CH 6



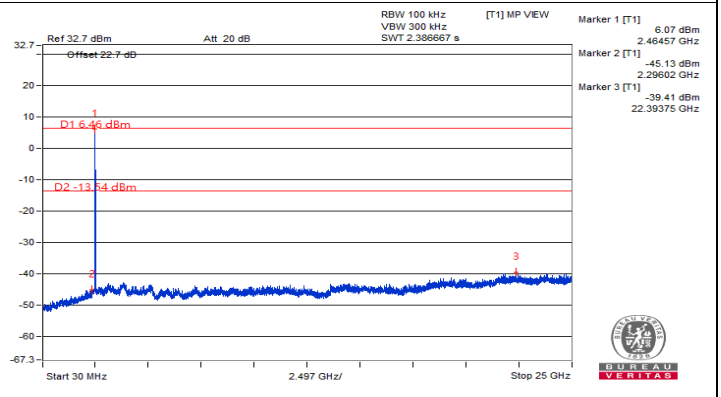
Chain 0 : CH 10



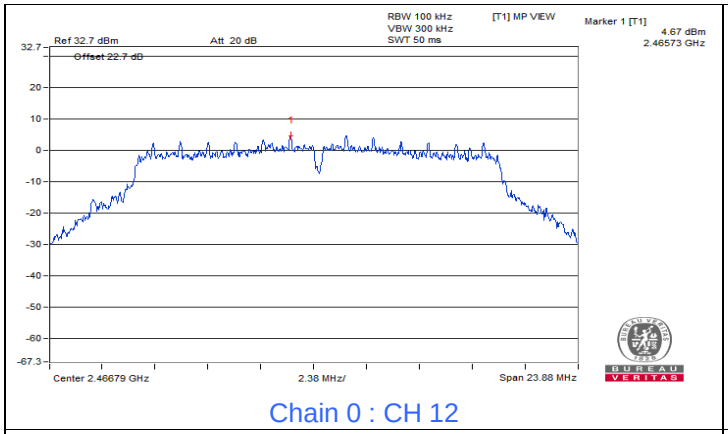
Chain 0 : CH 10



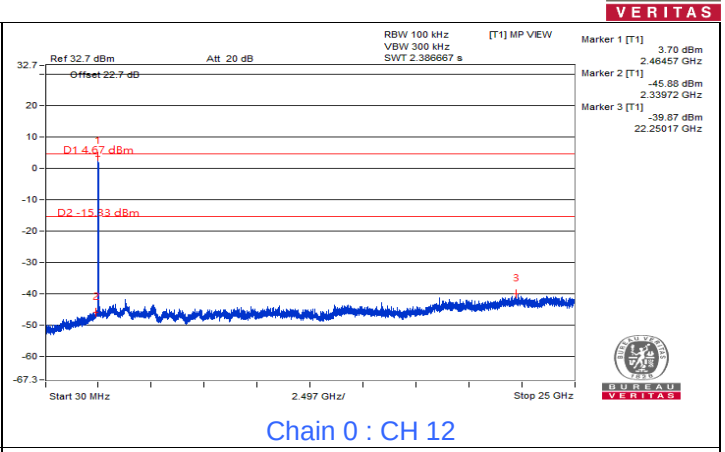
Chain 0 : CH 11



Chain 0 : CH 11



Chain 0 : CH 12



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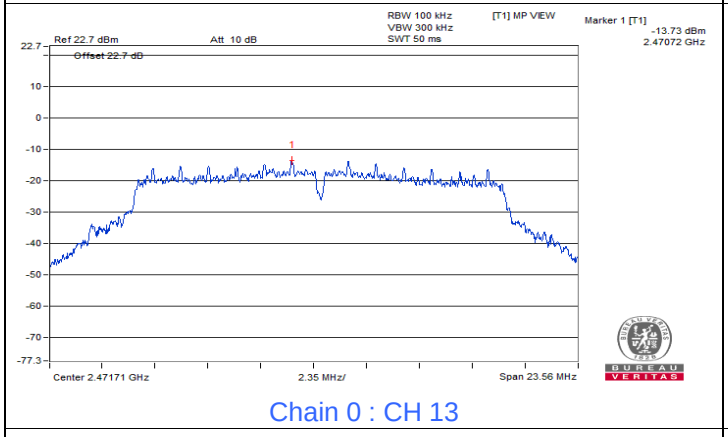
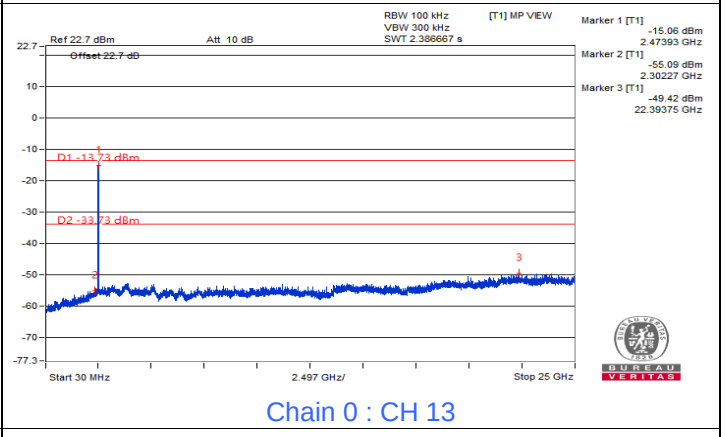
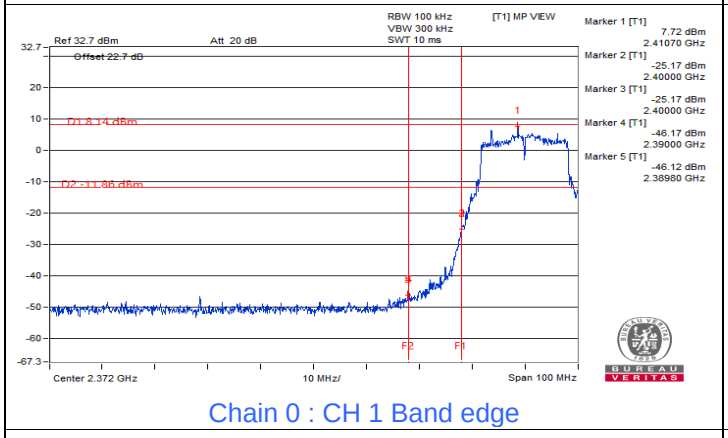


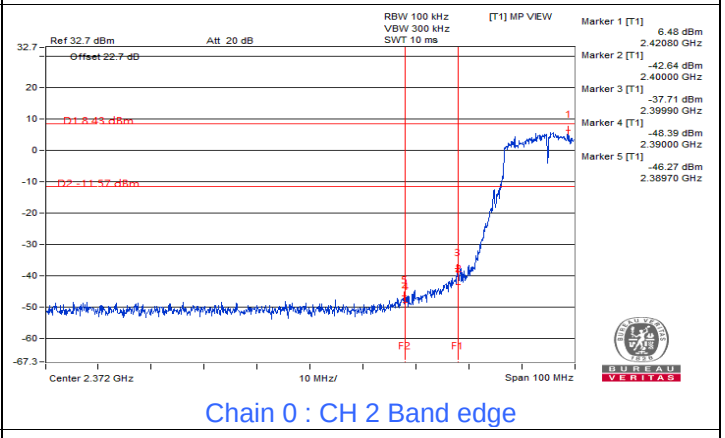
Chain 0 : CH 13



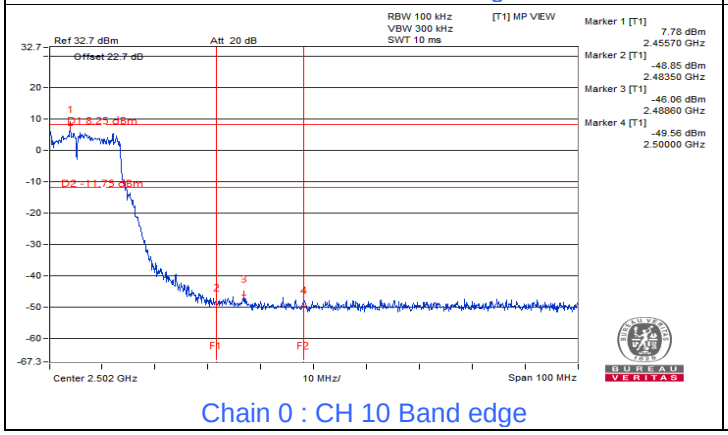
Chain 0 : CH 13



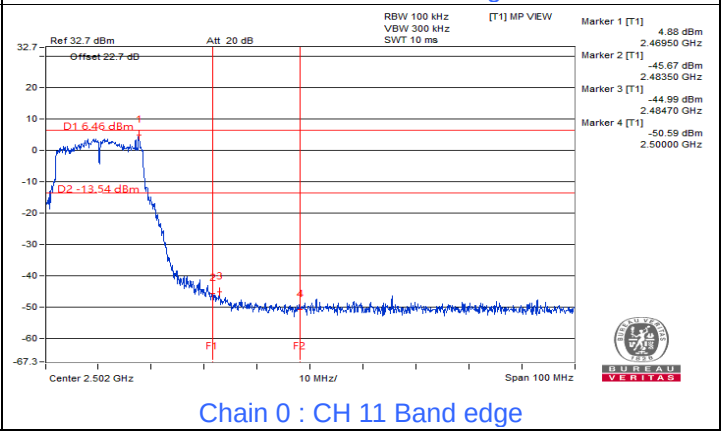
Chain 0 : CH 1 Band edge



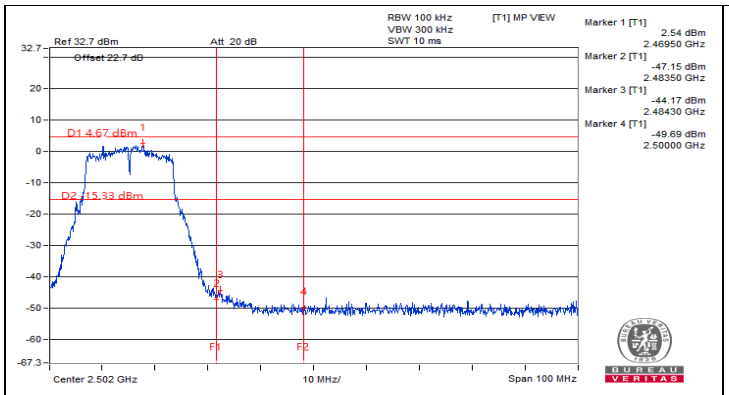
Chain 0 : CH 2 Band edge



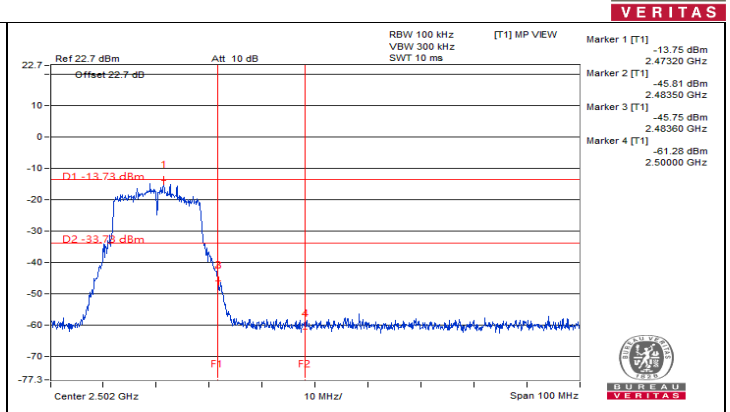
Chain 0 : CH 10 Band edge



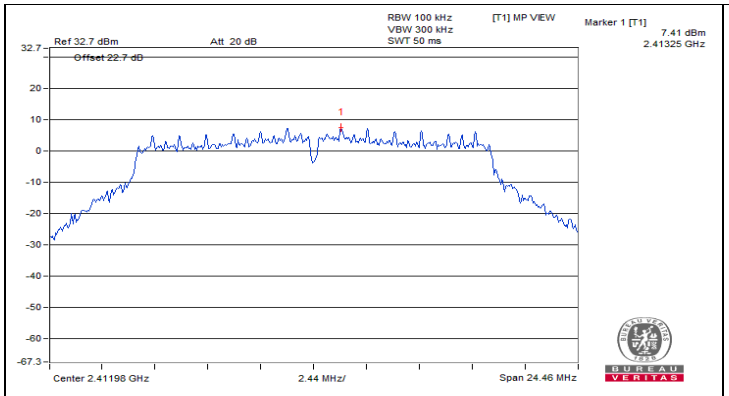
Chain 0 : CH 11 Band edge



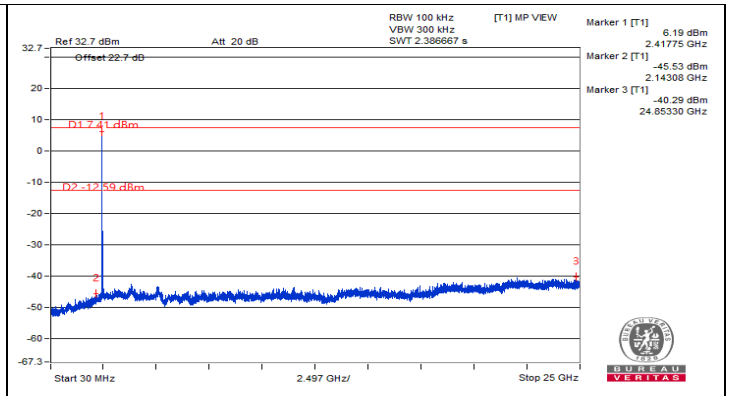
Chain 0 : CH 12 Band edge



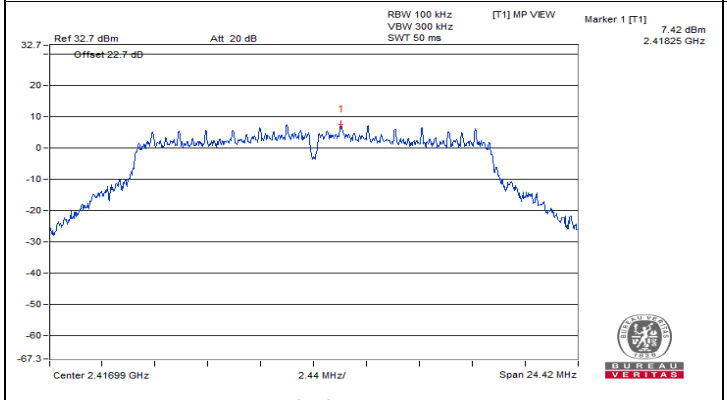
Chain 0 : CH 13 Band edge



Chain 1 : CH 1



Chain 1 : CH 1



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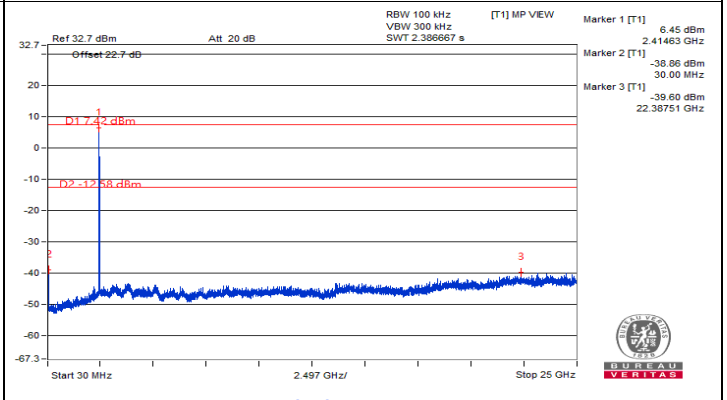

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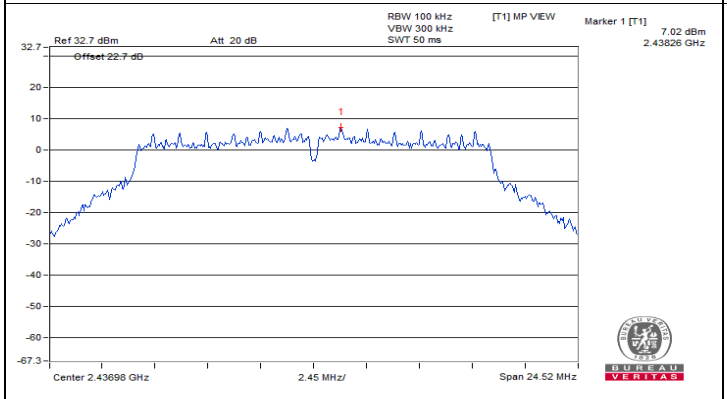
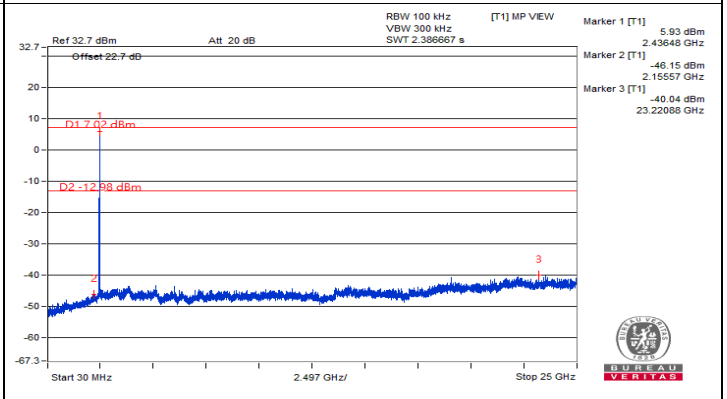
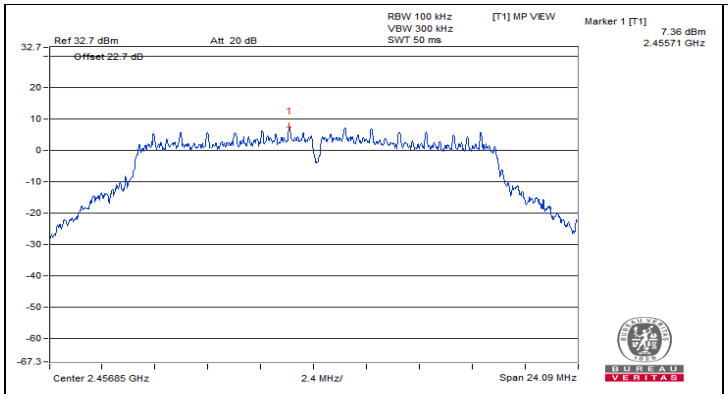


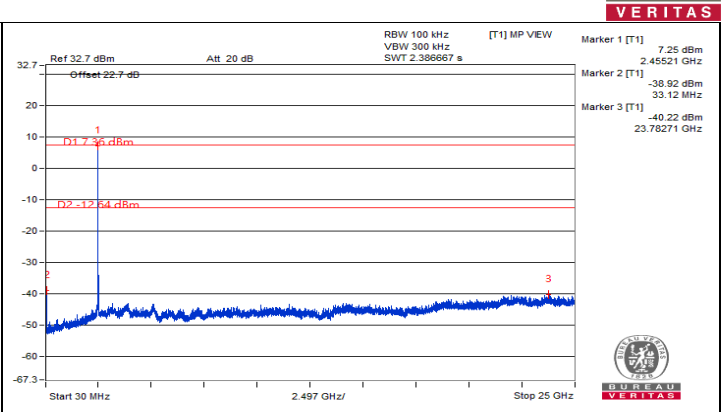
Chain 1 : CH 6



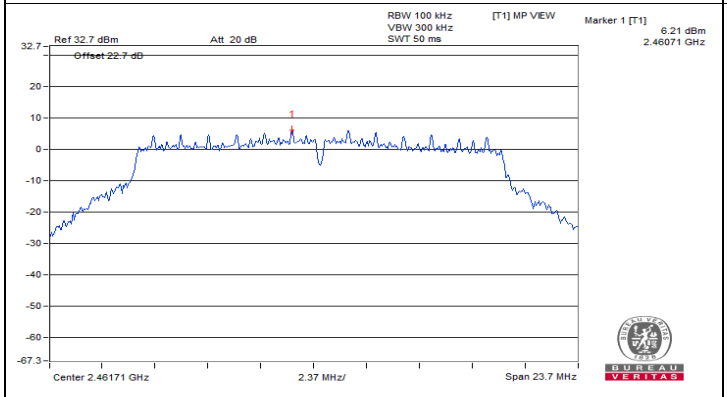
Chain 1 : CH 6



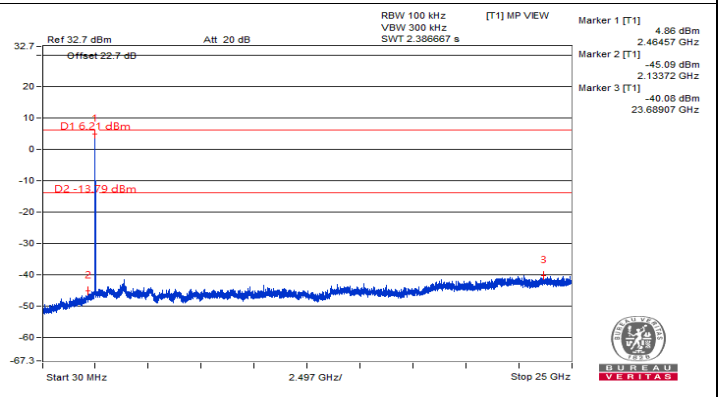
Chain 1 : CH 10



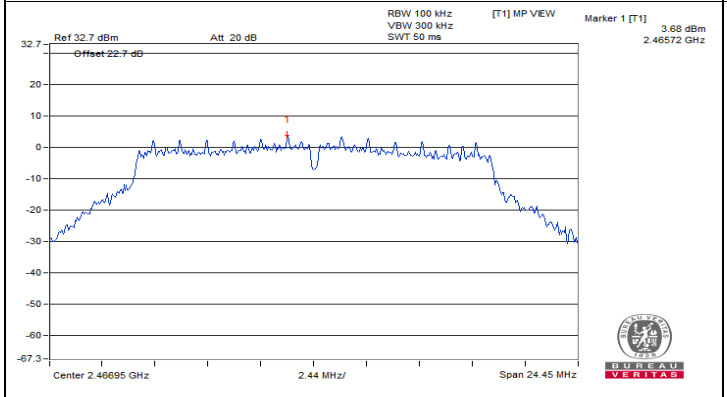
Chain 1 : CH 10



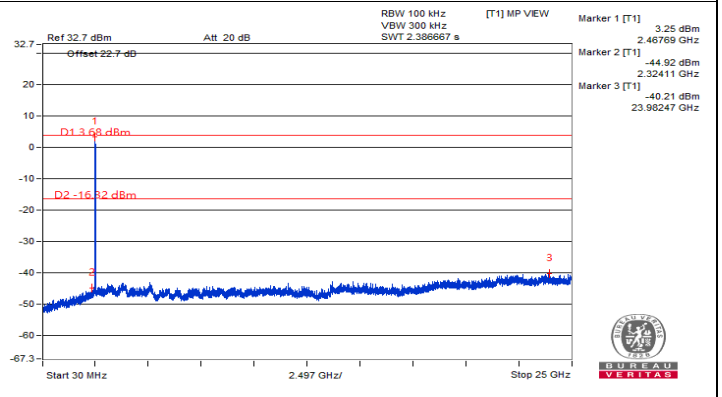
Chain 1 : CH 11



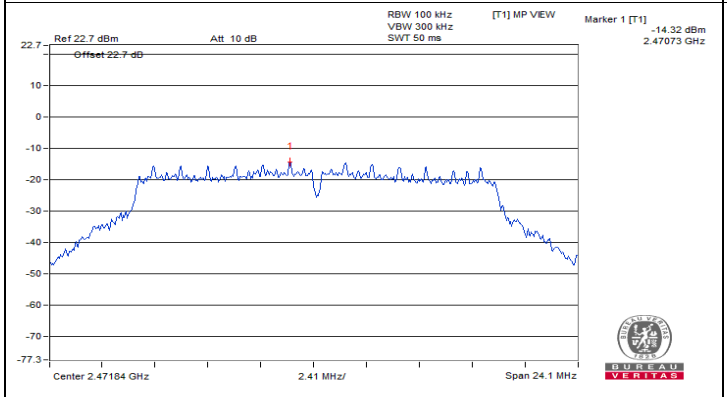
Chain 1 : CH 11



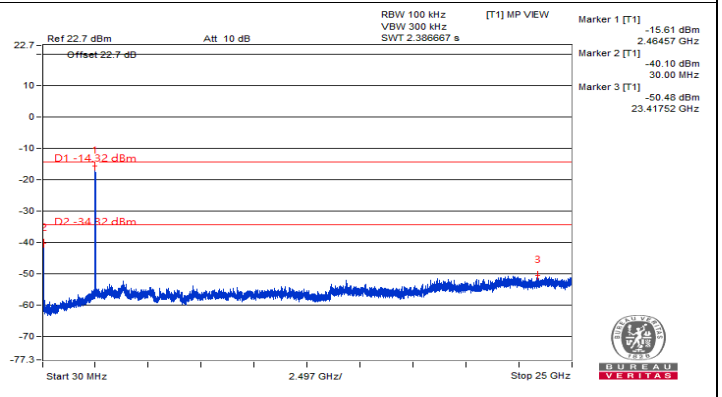
Chain 1 : CH 12



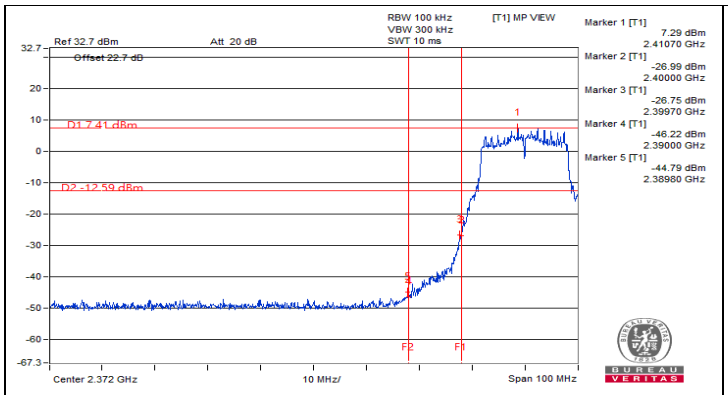
Chain 1 : CH 12



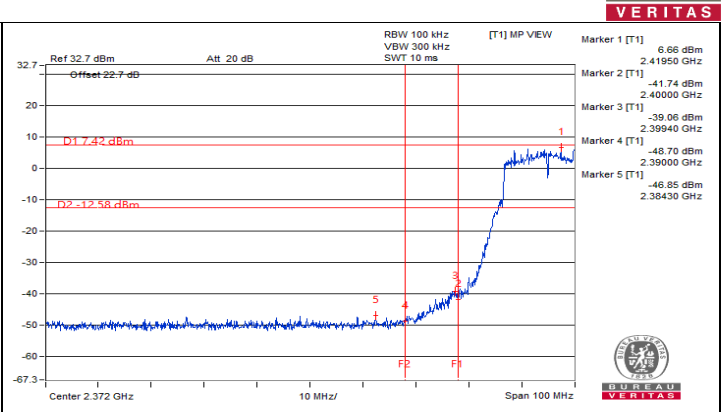
Chain 1 : CH 13



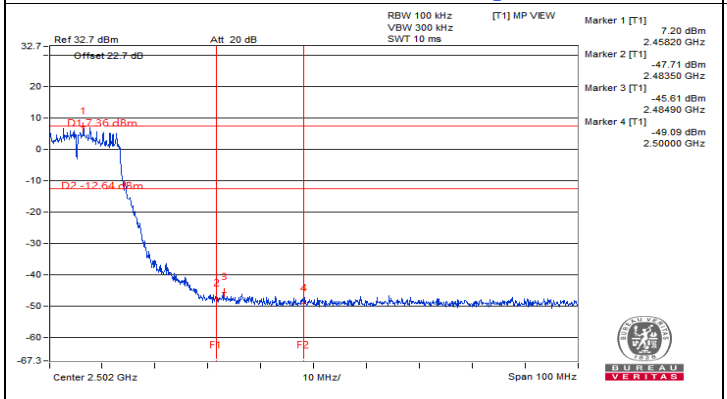
Chain 1 : CH 13



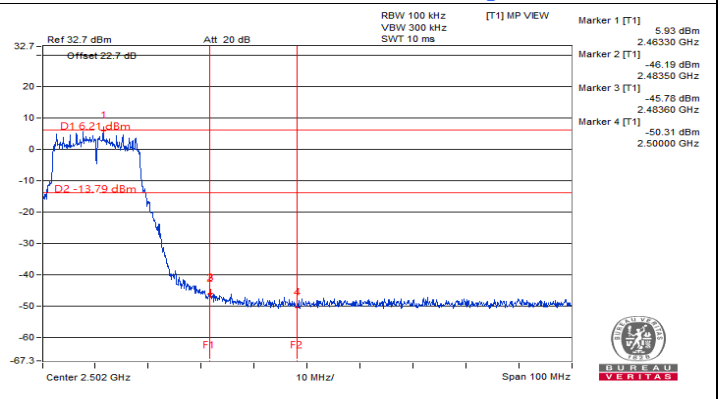
Chain 1 : CH 1 Band edge



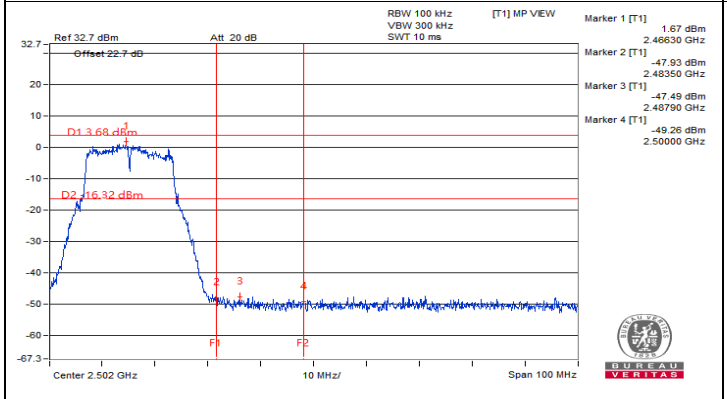
Chain 1 : CH 2 Band edge



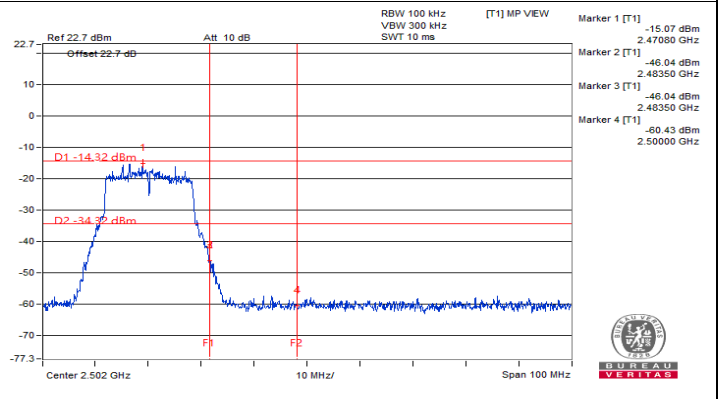
Chain 1 : CH 10 Band edge



Chain 1 : CH 11 Band edge



Chain 1 : CH 12 Band edge



Chain 1 : CH 13 Band edge

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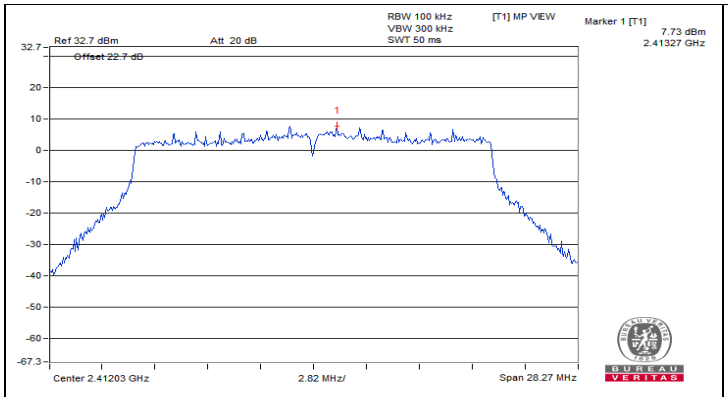
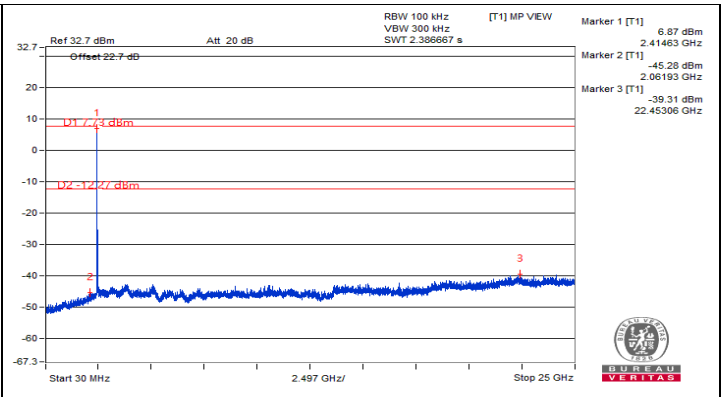


Chain 0 : CH 1



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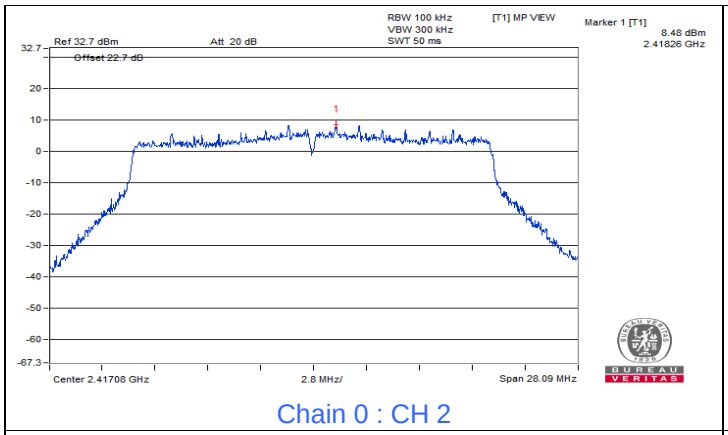
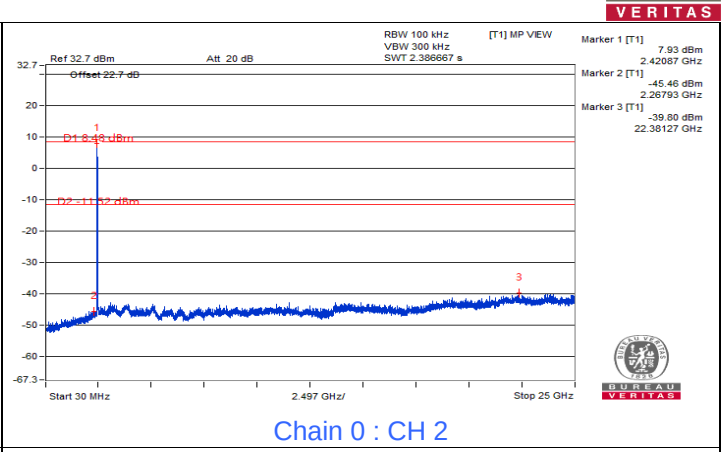


Chain 0 : CH 2



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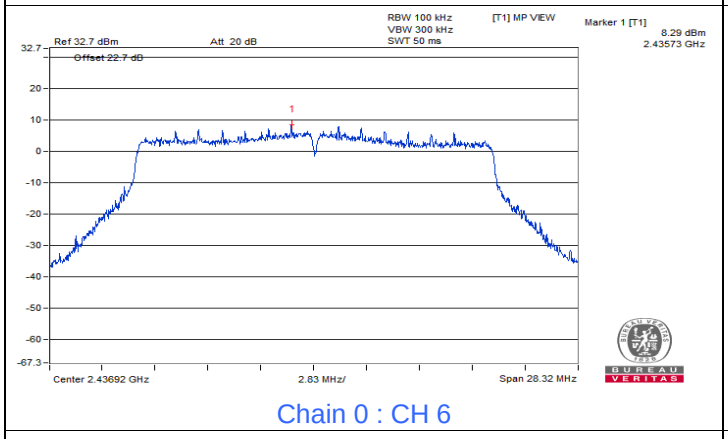
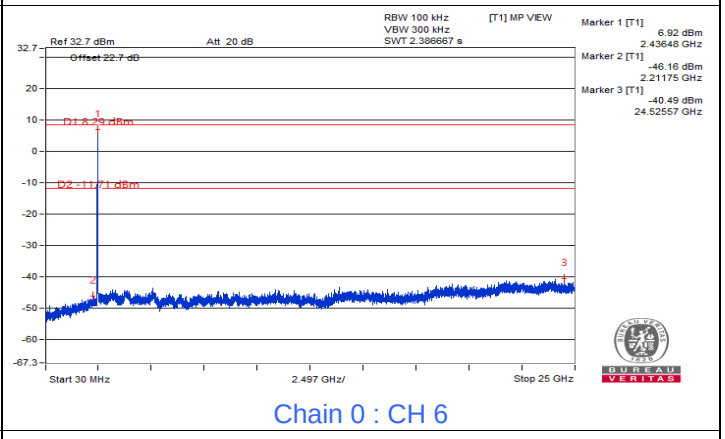
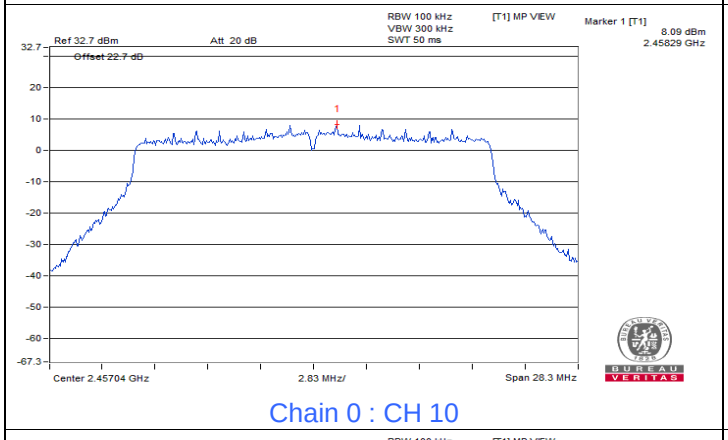


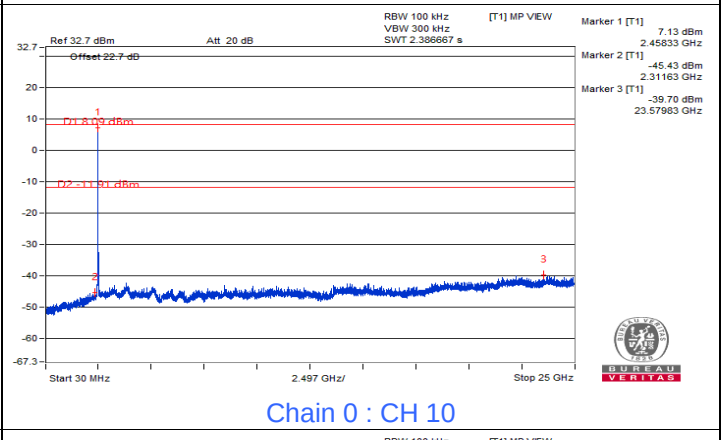
Chain 0 : CH 6



Chain 0 : CH 6



Chain 0 : CH 10



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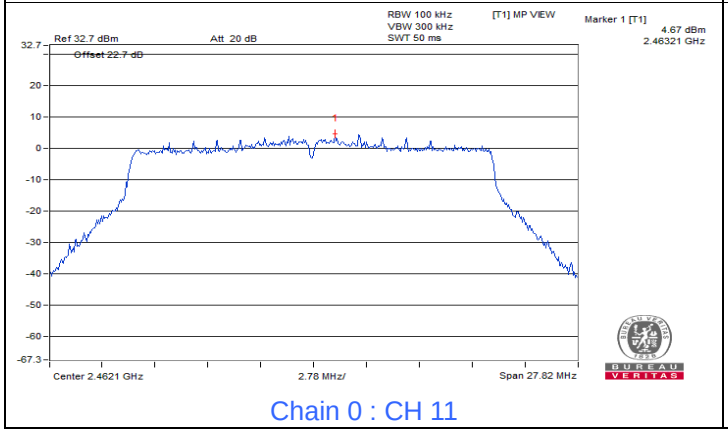
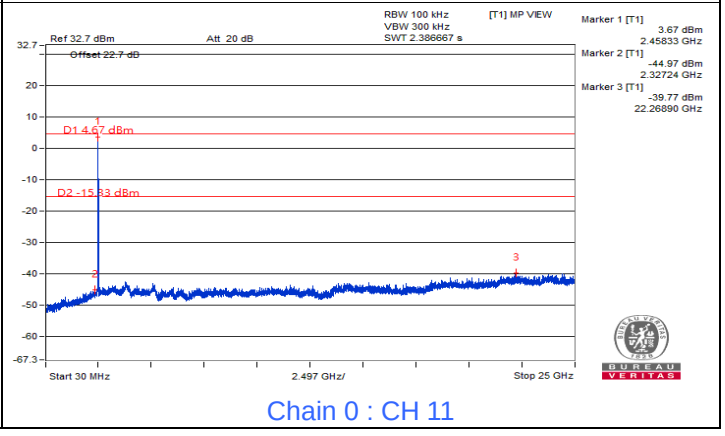
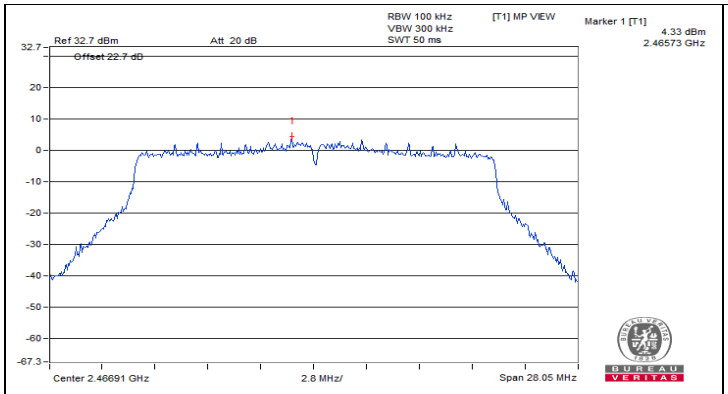


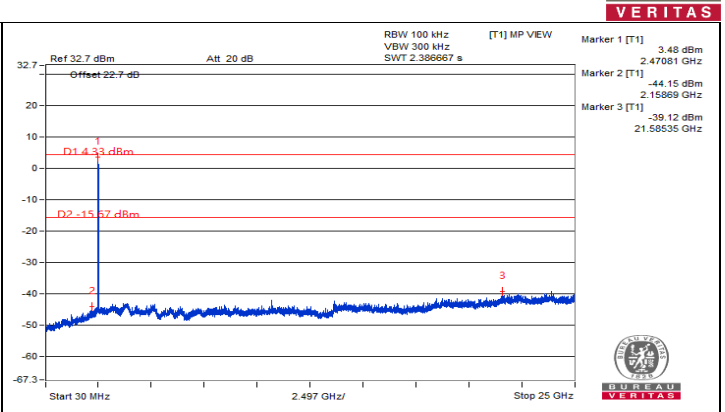
Chain 0 : CH 11



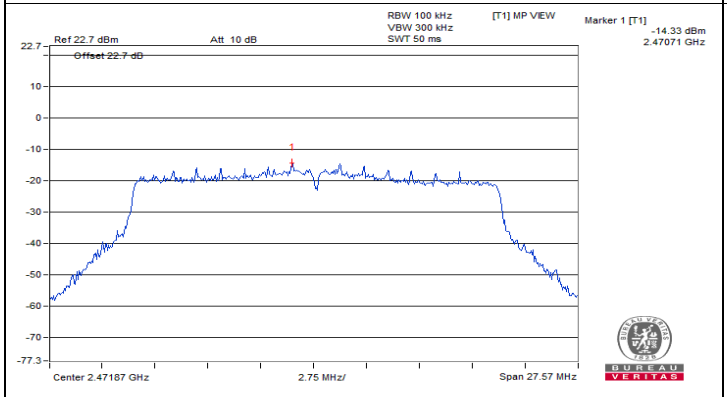
Chain 0 : CH 11



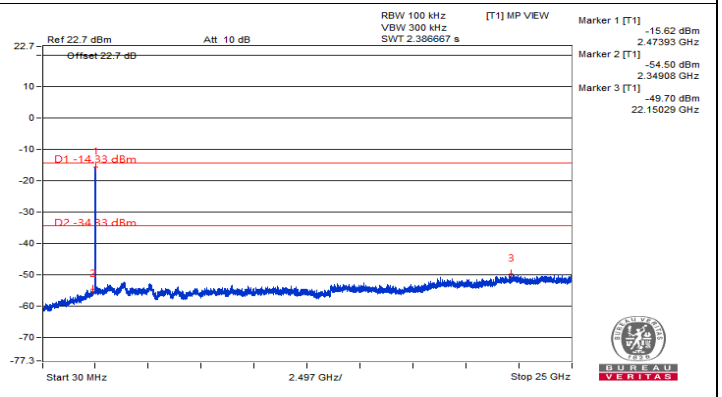
Chain 0 : CH 12



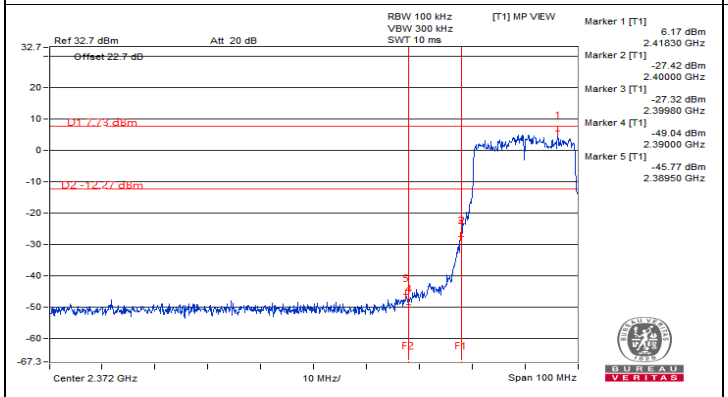
Chain 0 : CH 12



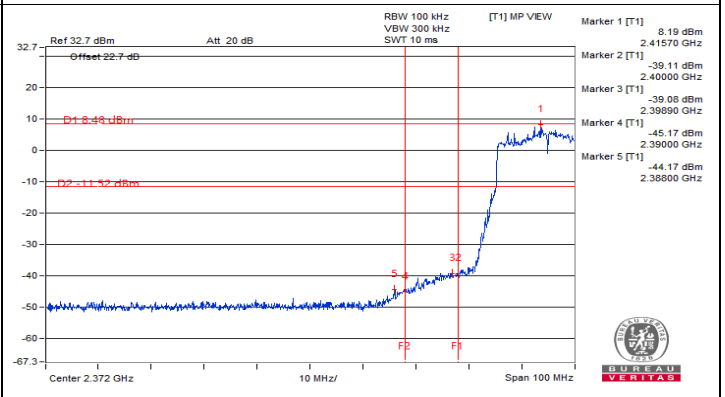
Chain 0 : CH 13



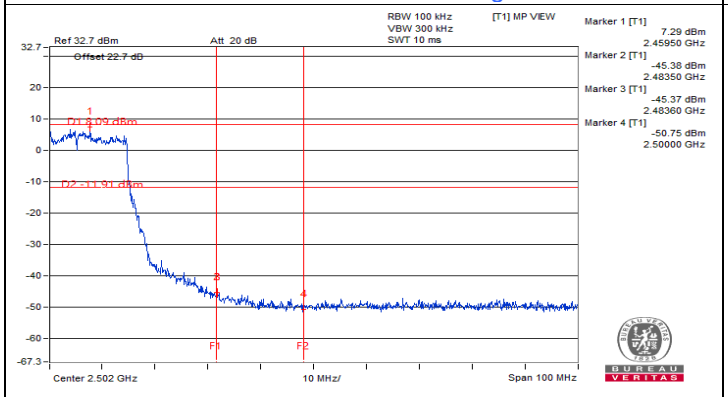
Chain 0 : CH 13



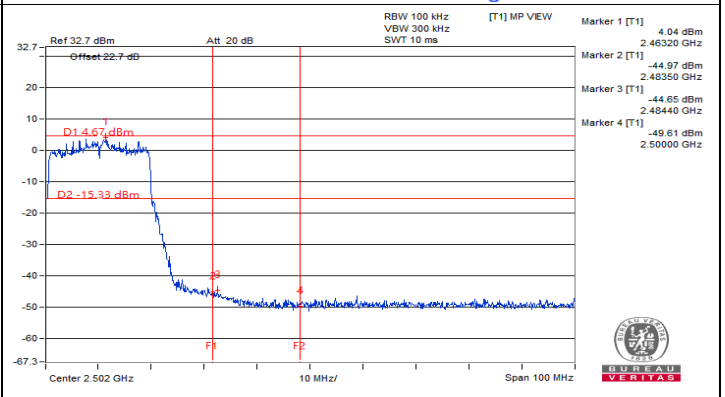
Chain 0 : CH 1 Band edge



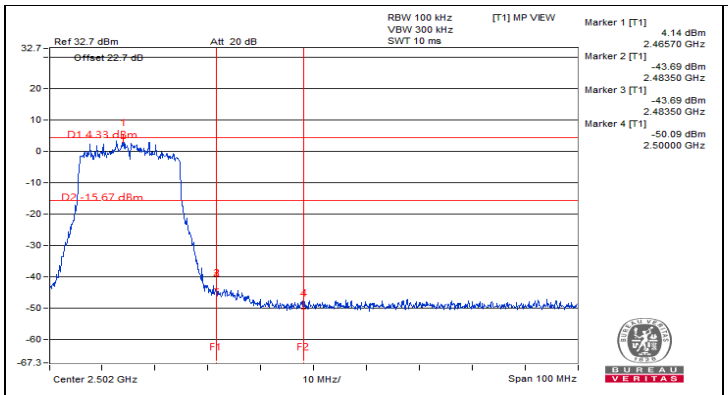
Chain 0 : CH 2 Band edge



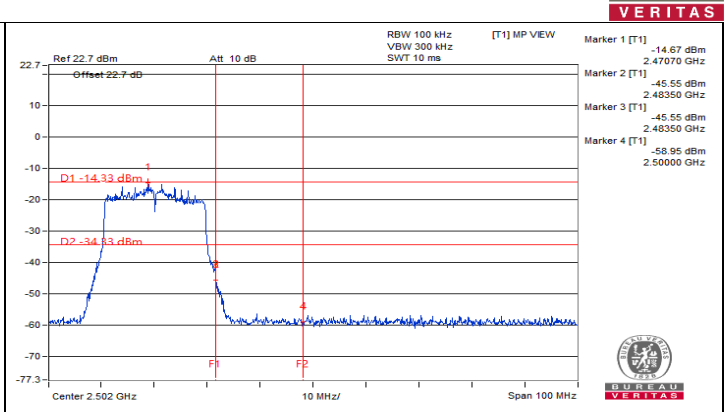
Chain 0 : CH 10 Band edge



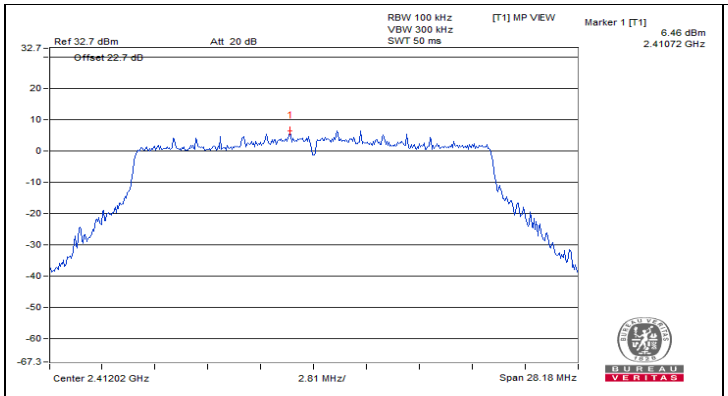
Chain 0 : CH 11 Band edge



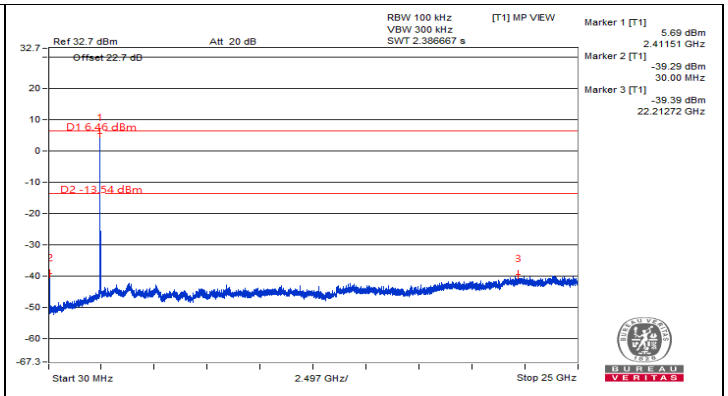
Chain 0 : CH 12 Band edge



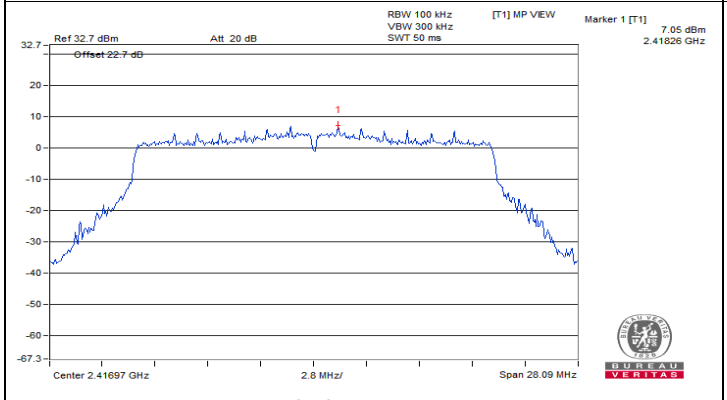
Chain 0 : CH 13 Band edge



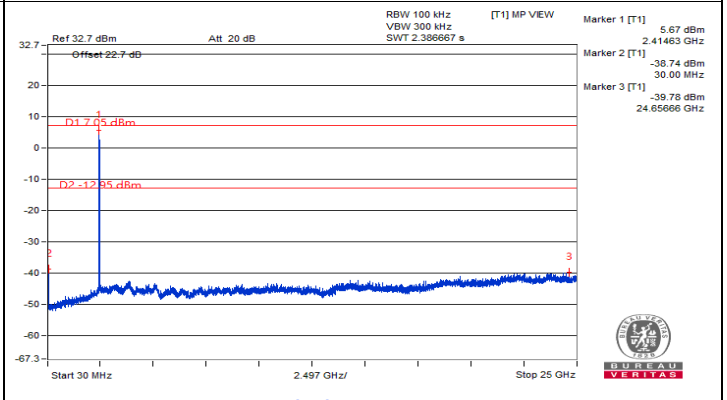
Chain 1 : CH 1



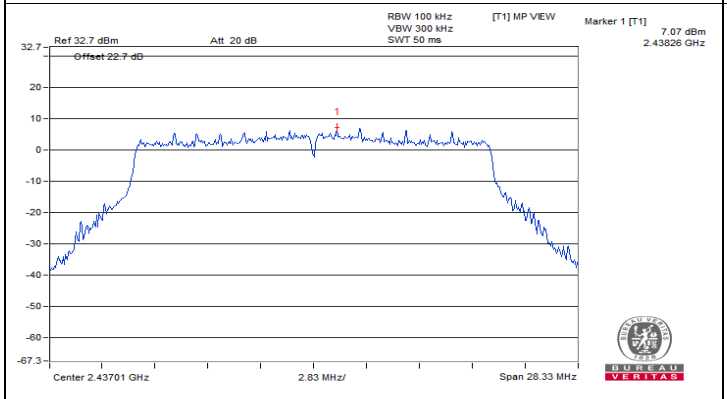
Chain 1 : CH 1



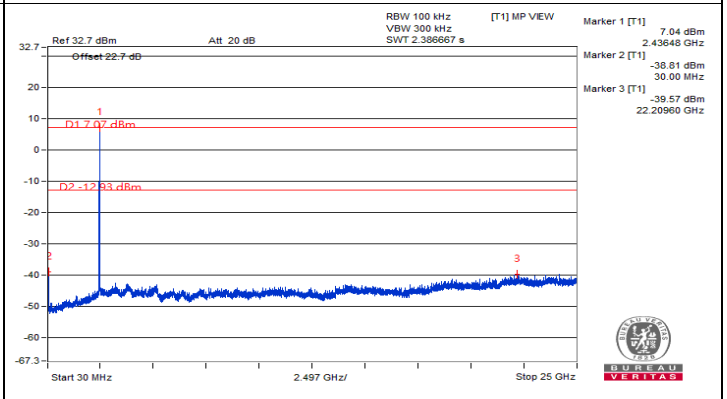
Chain 1 : CH 2



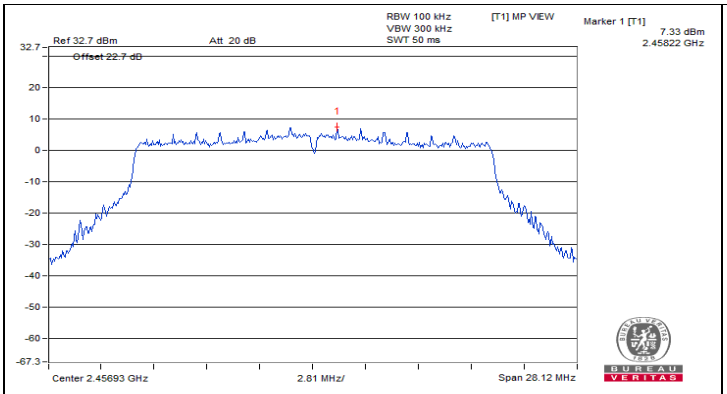
Chain 1 : CH 2



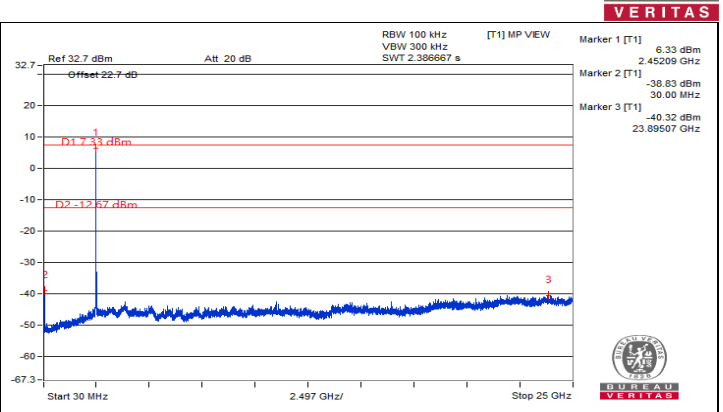
Chain 1 : CH 6



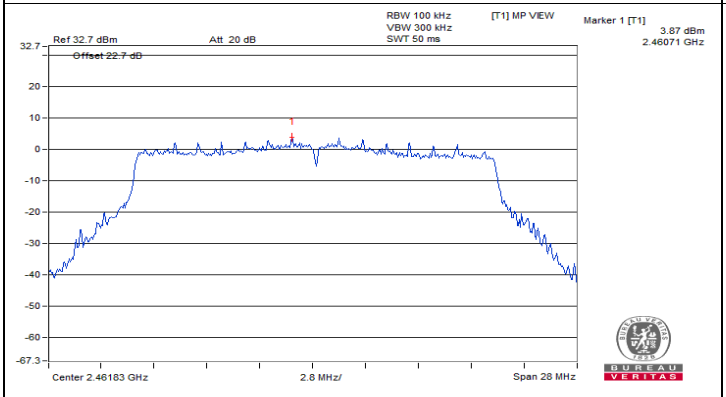
Chain 1 : CH 6



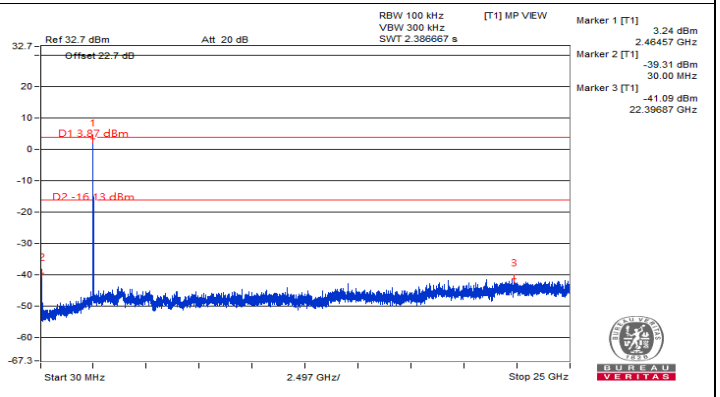
Chain 1 : CH 10



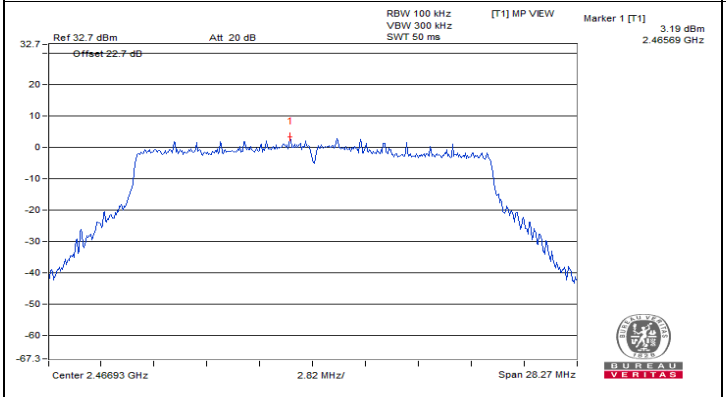
Chain 1 : CH 10



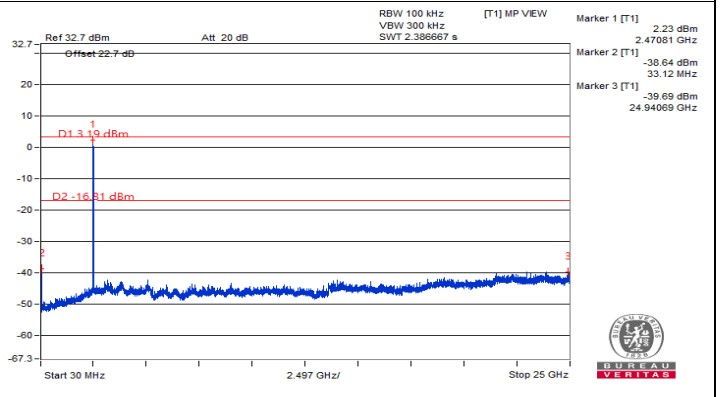
Chain 1 : CH 11



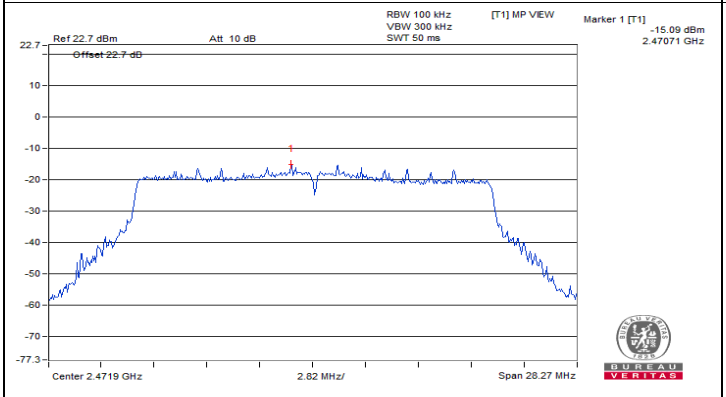
Chain 1 : CH 11



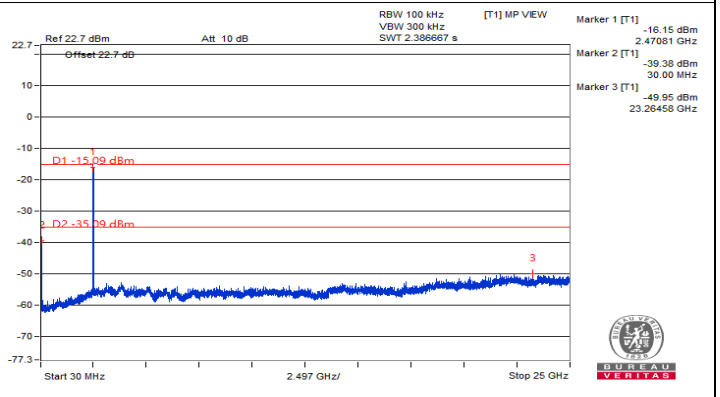
Chain 1 : CH 12



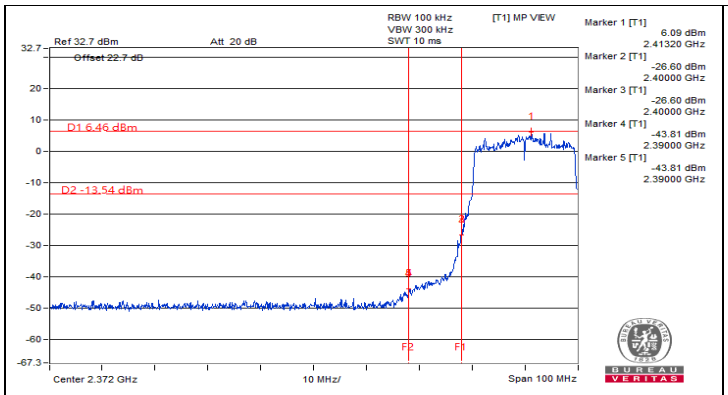
Chain 1 : CH 12



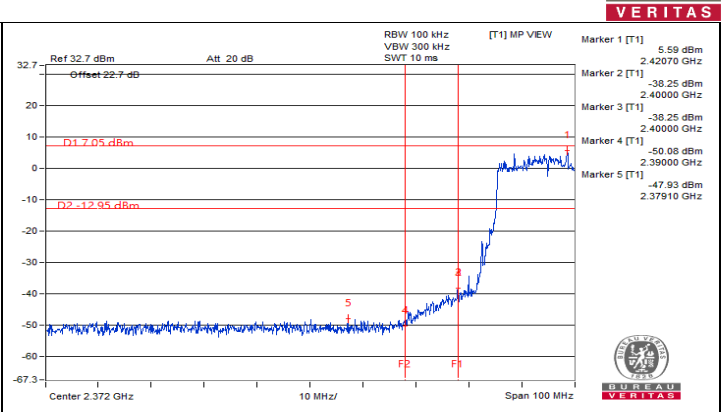
Chain 1 : CH 13



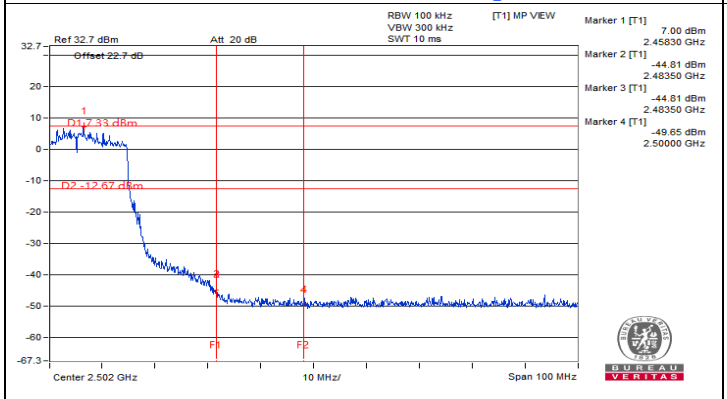
Chain 1 : CH 13



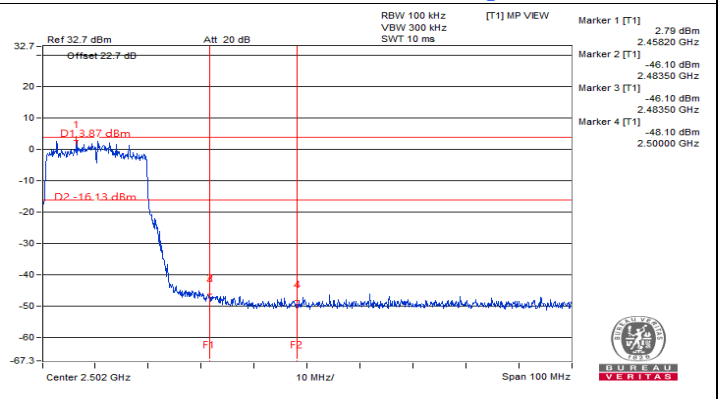
Chain 1 : CH 1 Band edge



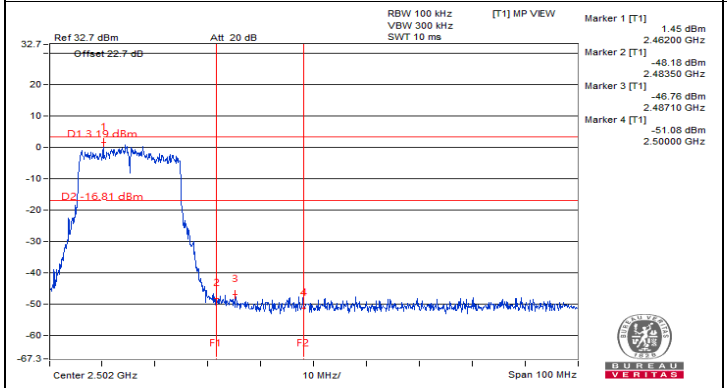
Chain 1 : CH 2 Band edge



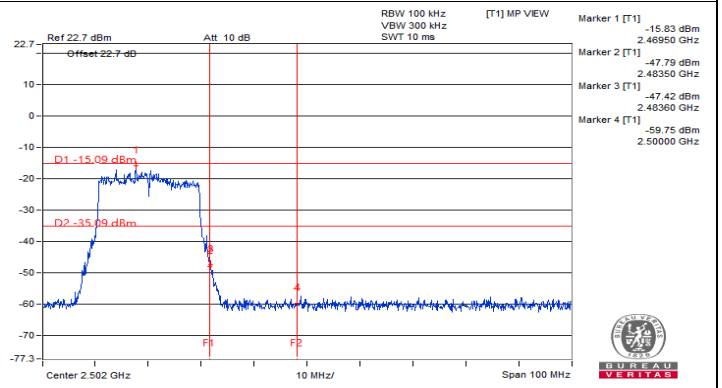
Chain 1 : CH 10 Band edge



Chain 1 : CH 11 Band edge



Chain 1 : CH 12 Band edge



Chain 1 : CH 13 Band edge

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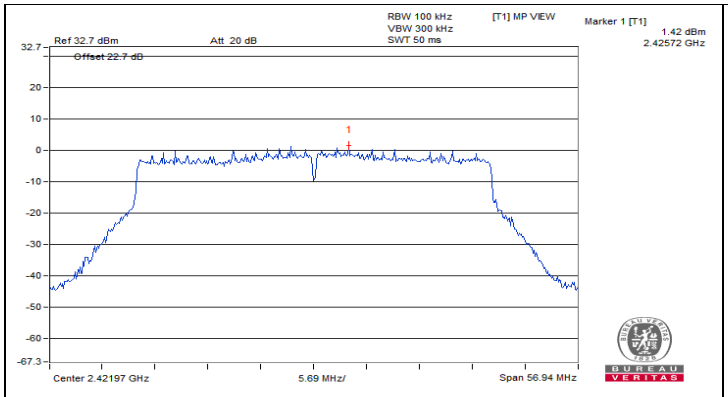
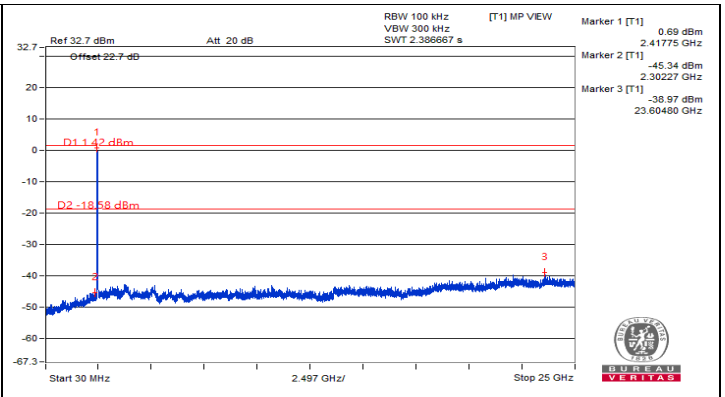
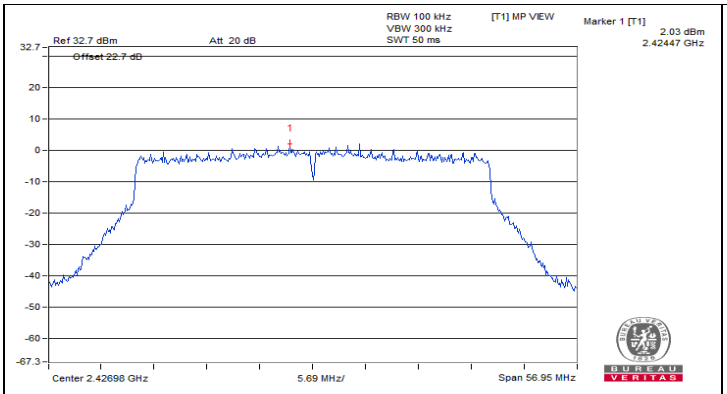


Chain 0 : CH 3



Chain 0 : CH 3



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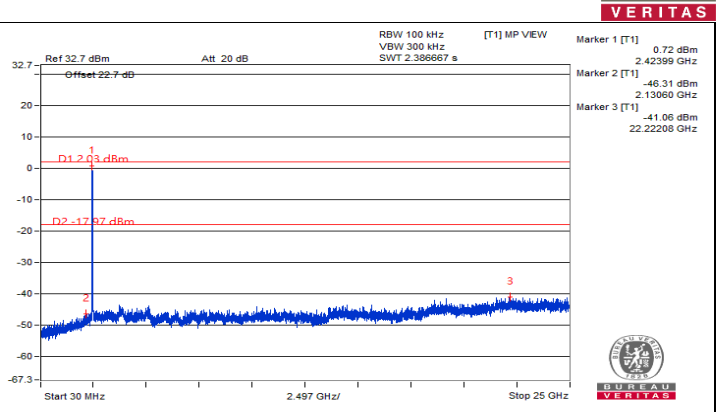
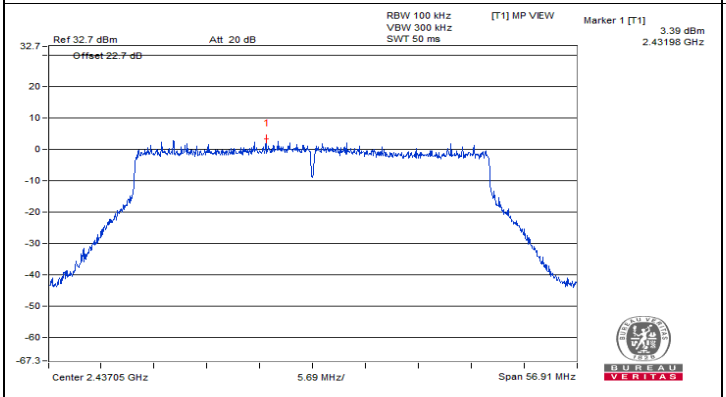
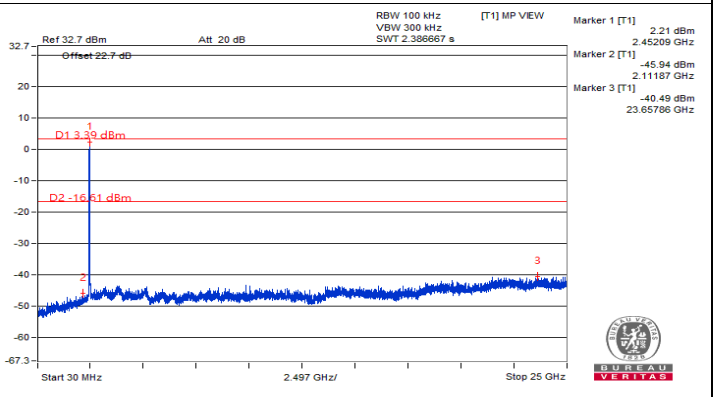


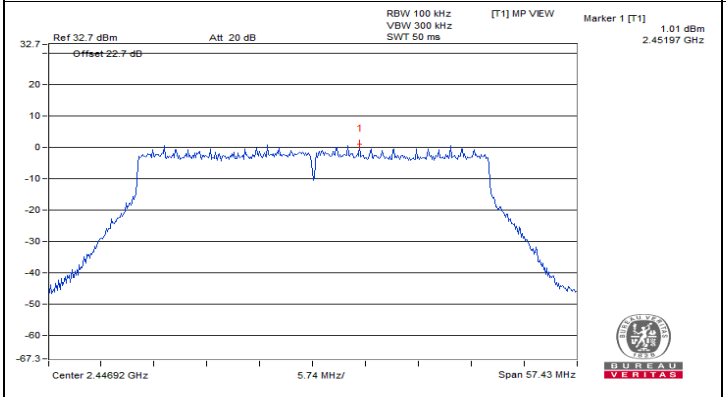
Chain 0 : CH 4



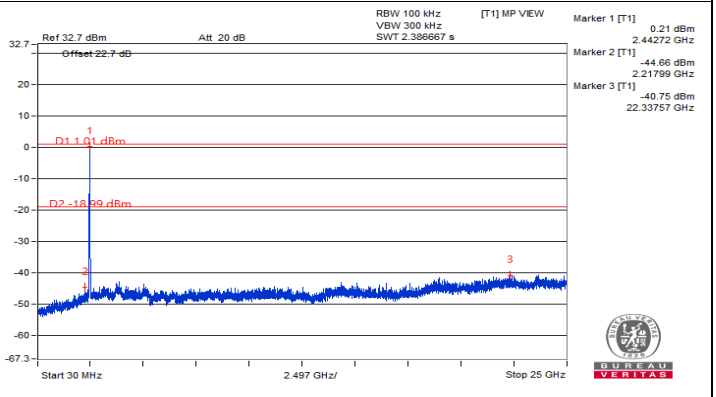
Chain 0 : CH 6



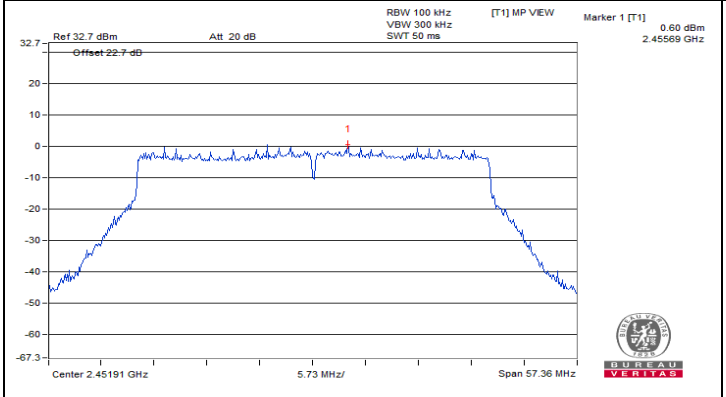
Chain 0 : CH 6



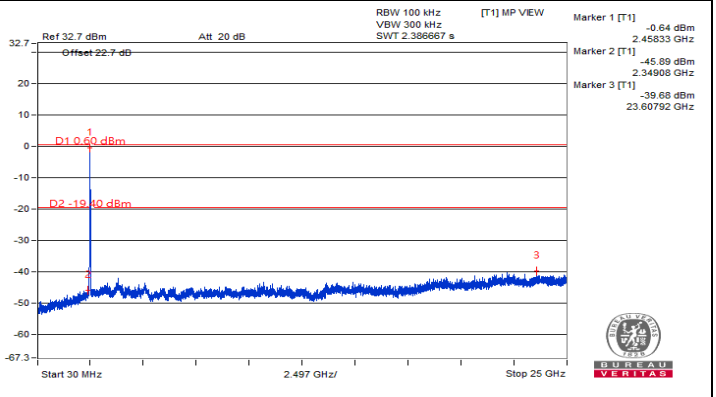
Chain 0 : CH 8



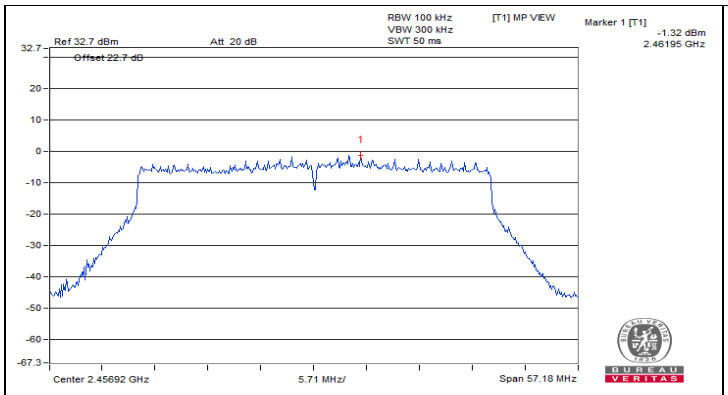
Chain 0 : CH 8



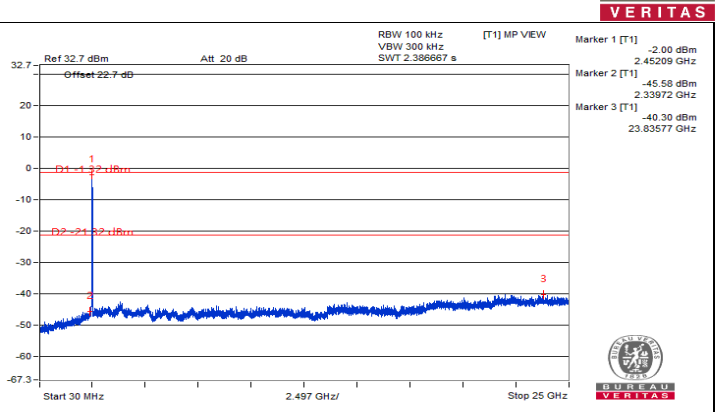
Chain 0 : CH 9



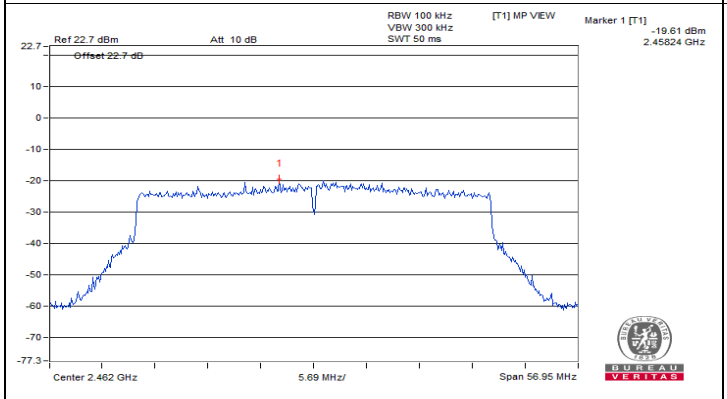
Chain 0 : CH 9



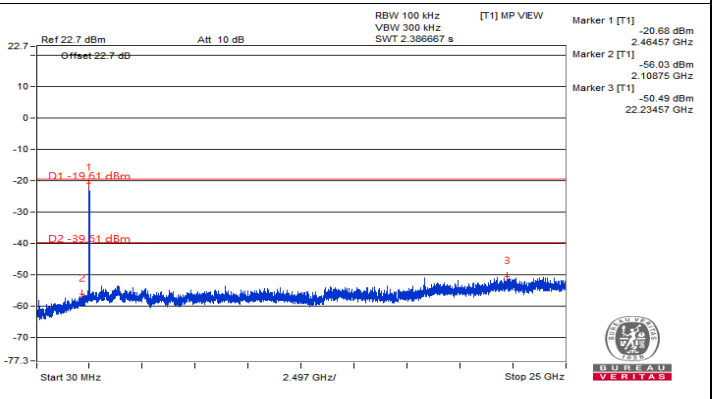
Chain 0 : CH 10



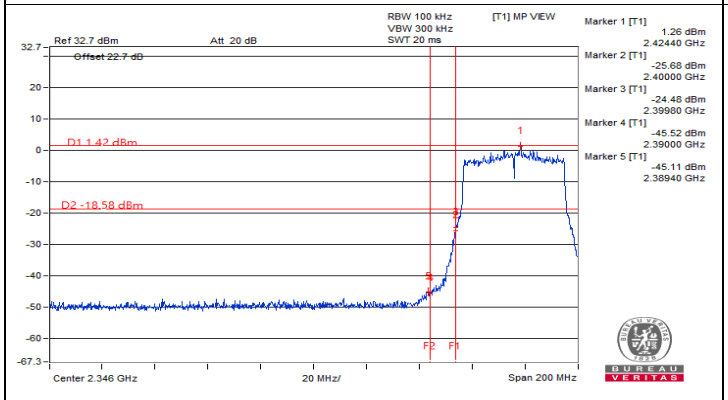
Chain 0 : CH 10



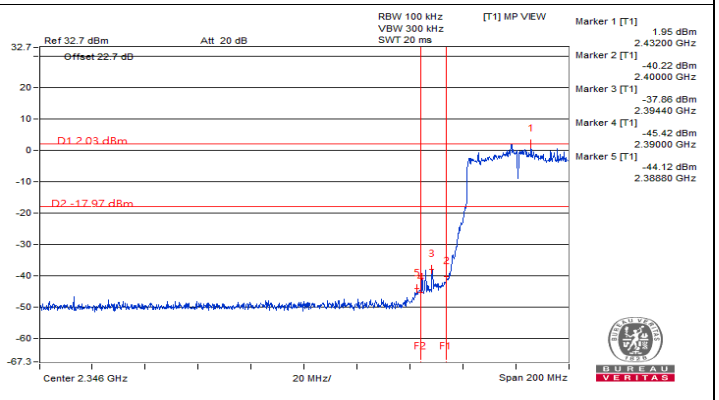
Chain 0 : CH 11



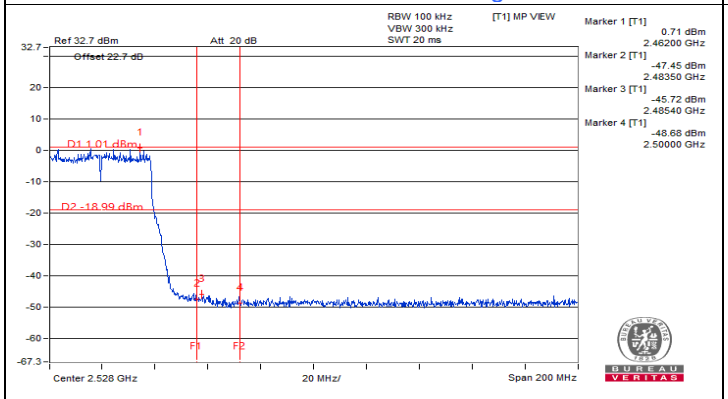
Chain 0 : CH 11



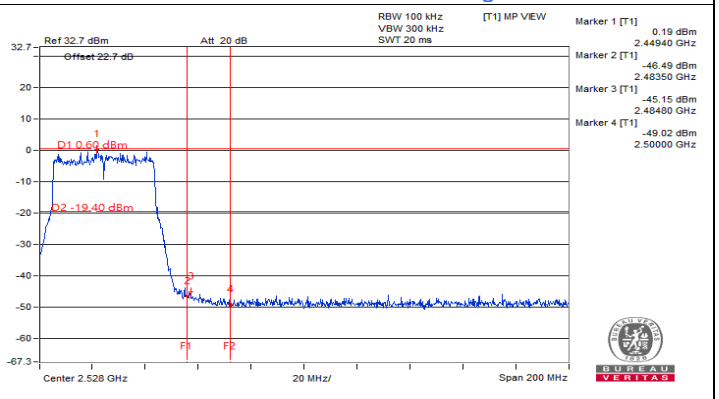
Chain 0 : CH 3 Band edge



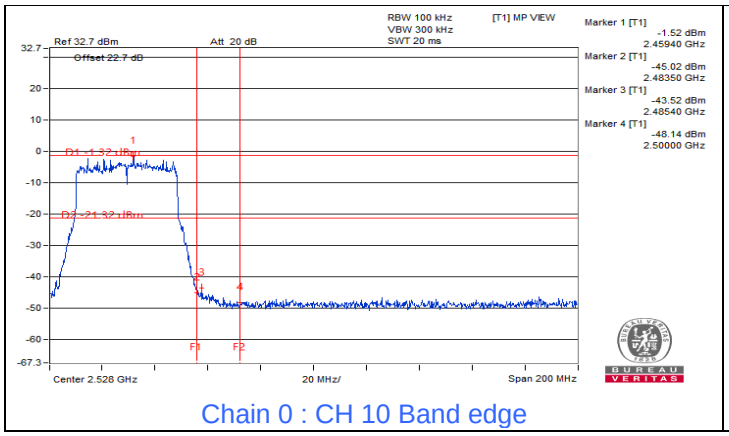
Chain 0 : CH 4 Band edge



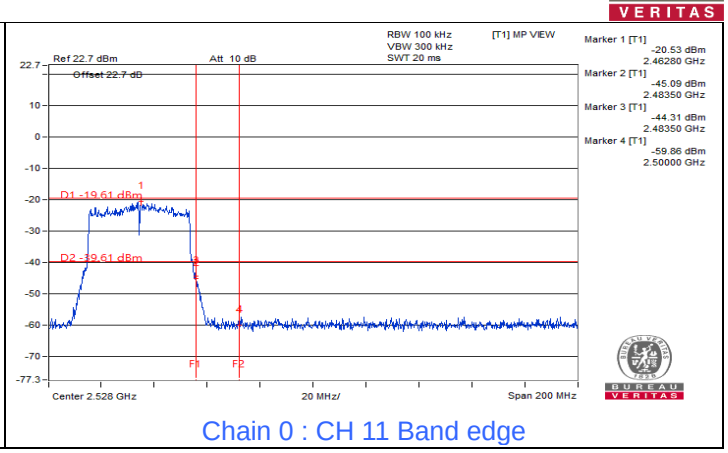
Chain 0 : CH 8 Band edge



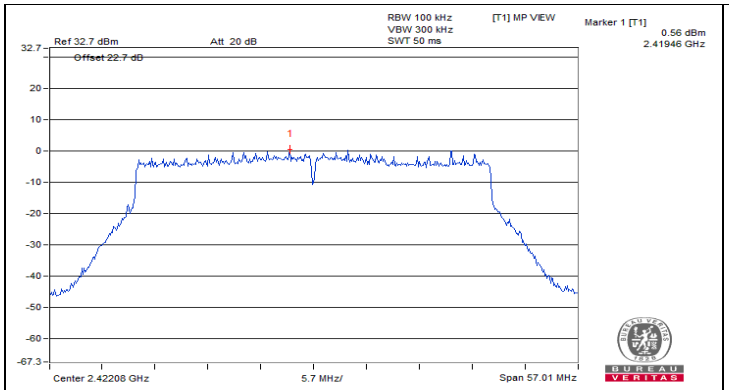
Chain 0 : CH 9 Band edge



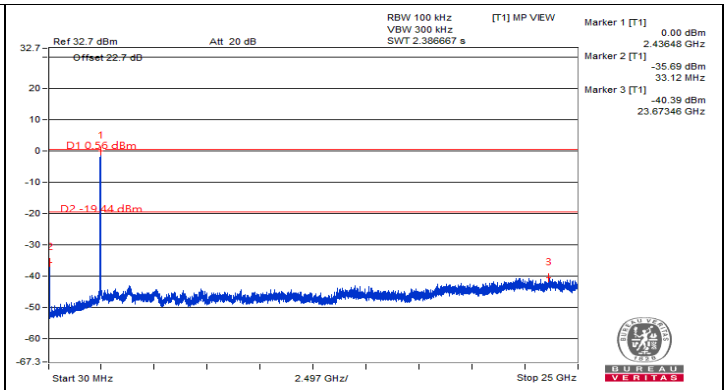
Chain 0 : CH 10 Band edge



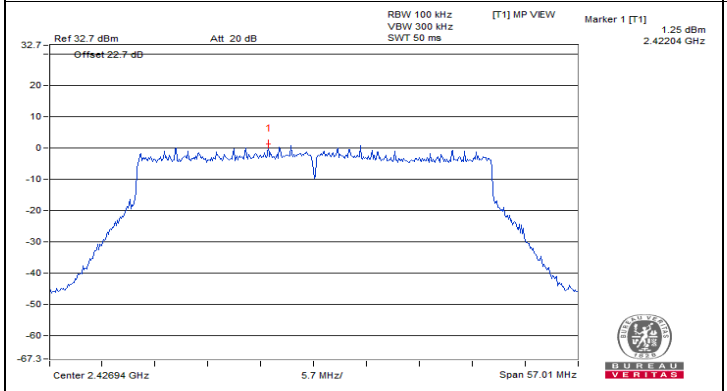
Chain 0 : CH 11 Band edge



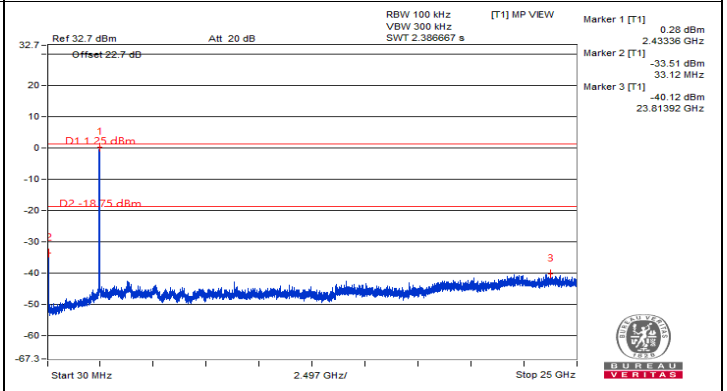
Chain 1 : CH 3



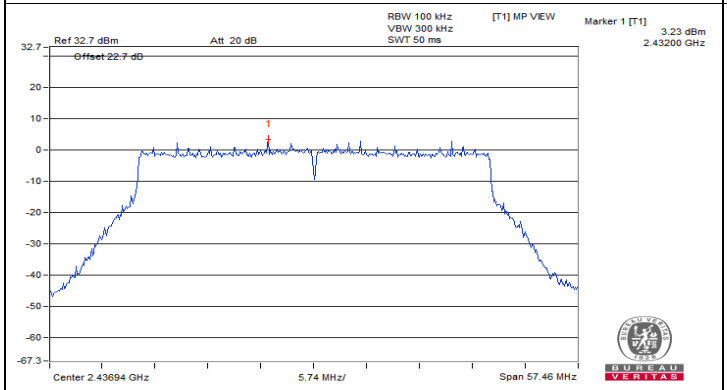
Chain 1 : CH 3



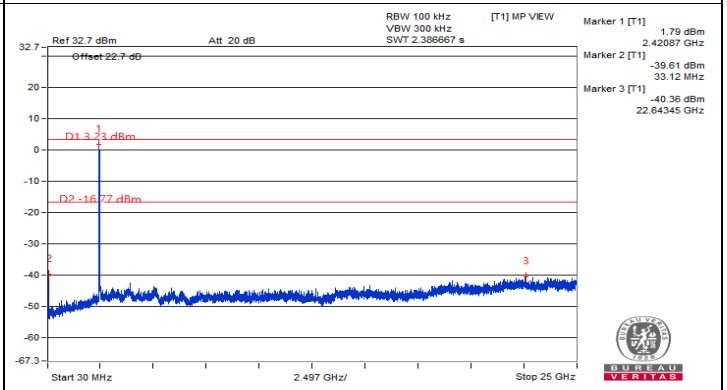
Chain 1 : CH 4



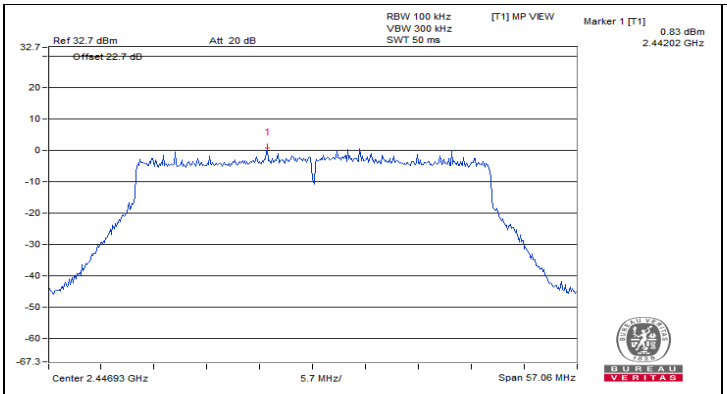
Chain 1 : CH 4



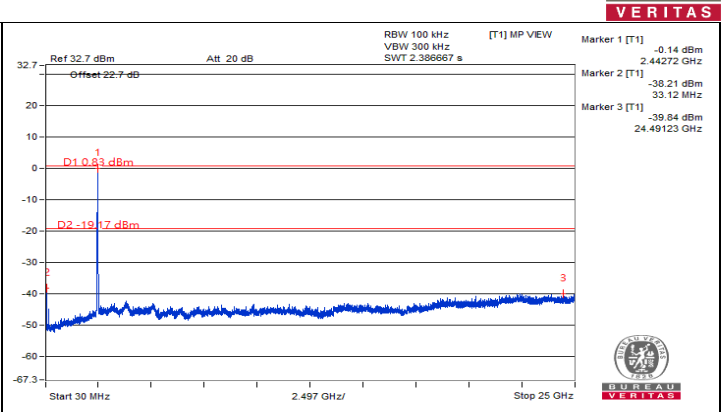
Chain 1 : CH 6



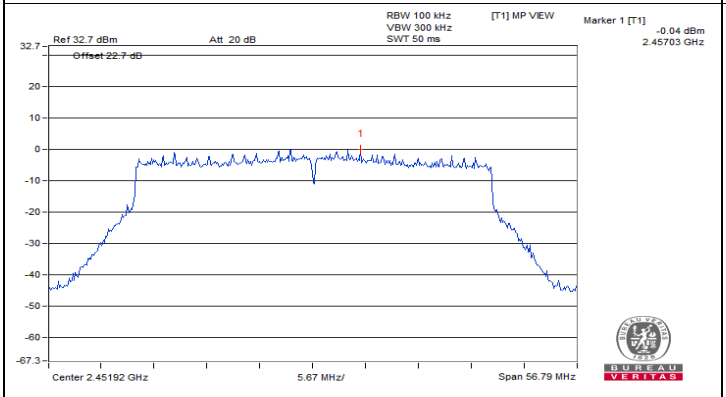
Chain 1 : CH 6



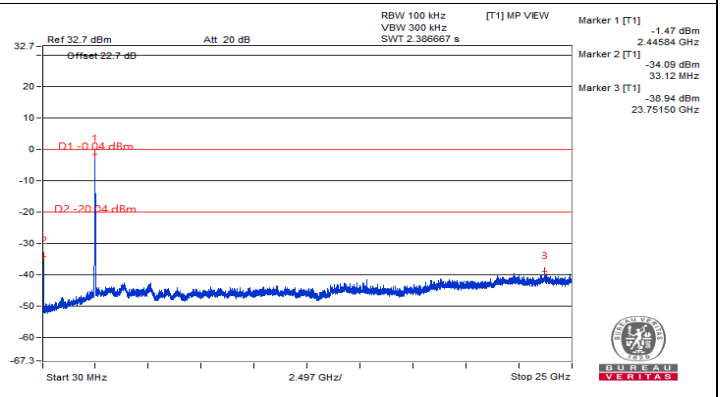
Chain 1 : CH 8



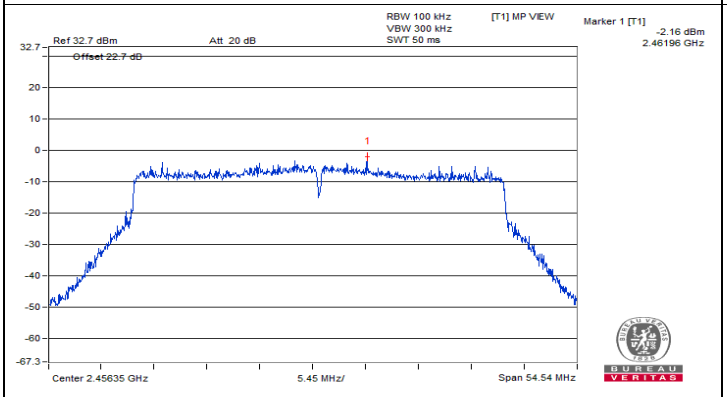
Chain 1 : CH 8



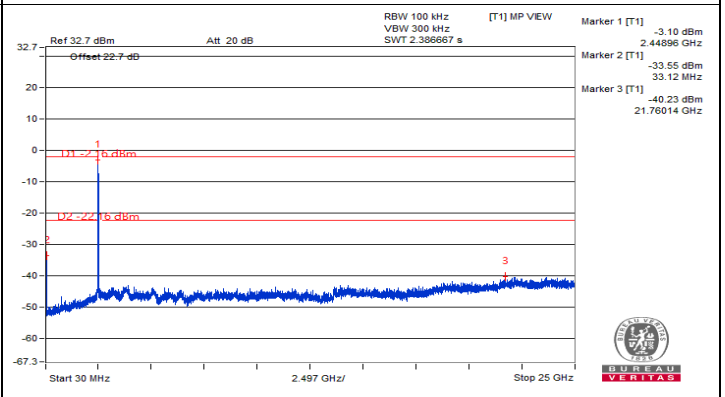
Chain 1 : CH 9



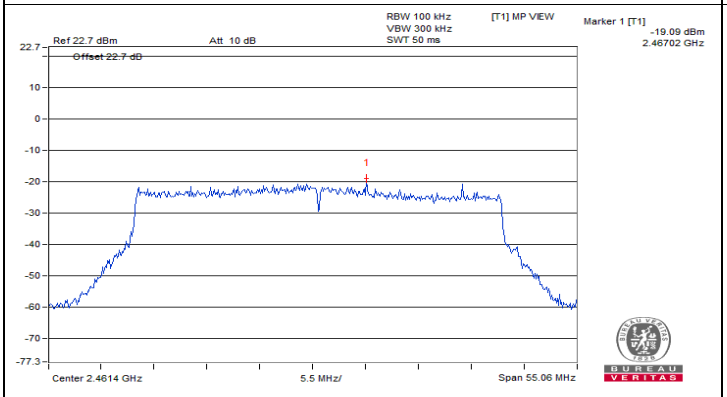
Chain 1 : CH 9



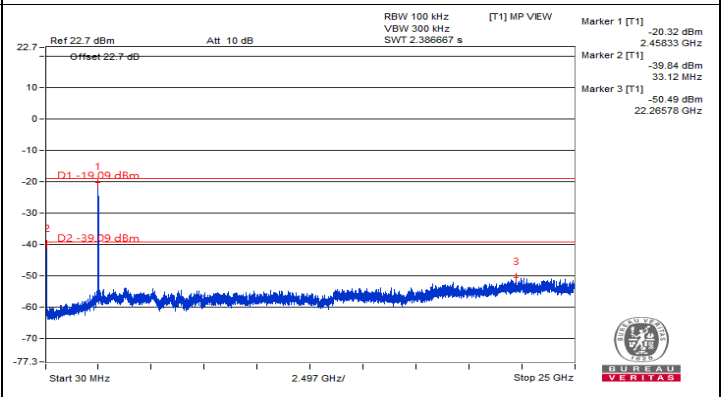
Chain 1 : CH 10



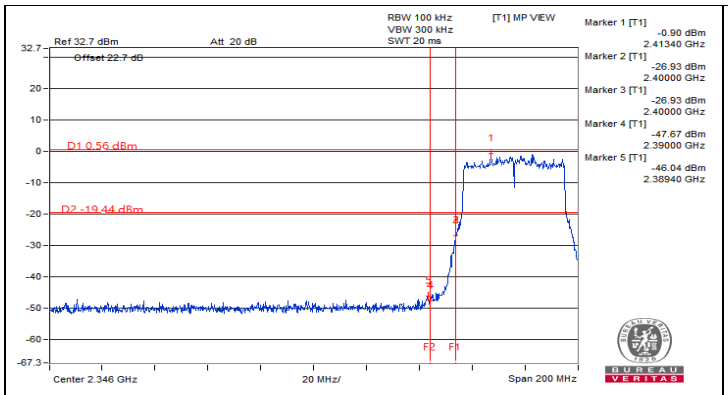
Chain 1 : CH 10



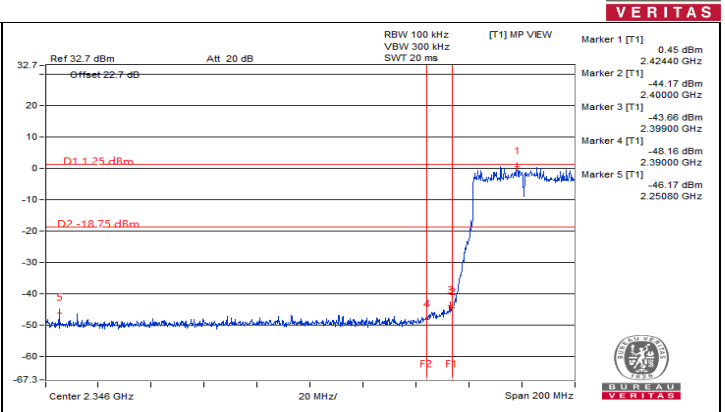
Chain 1 : CH 11



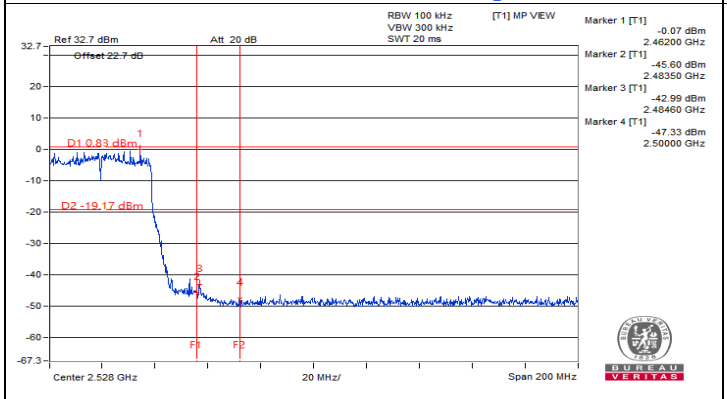
Chain 1 : CH 11



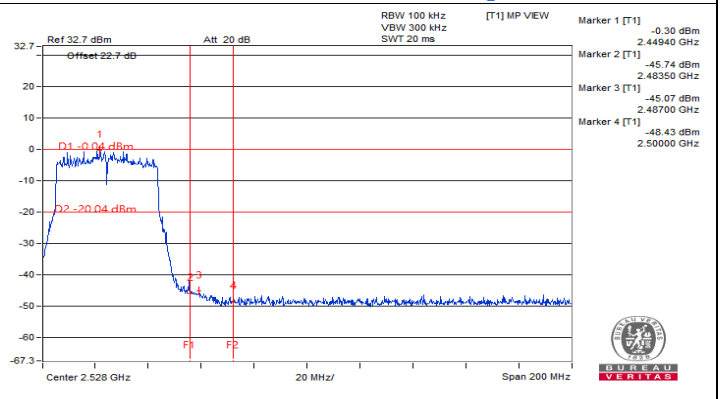
Chain 1 : CH 3 Band edge



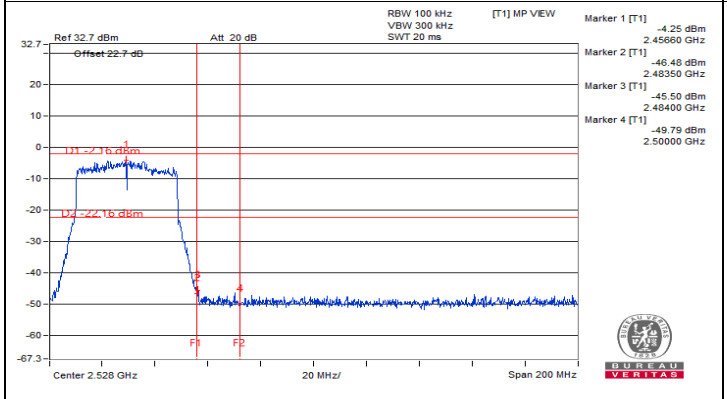
Chain 1 : CH 4 Band edge



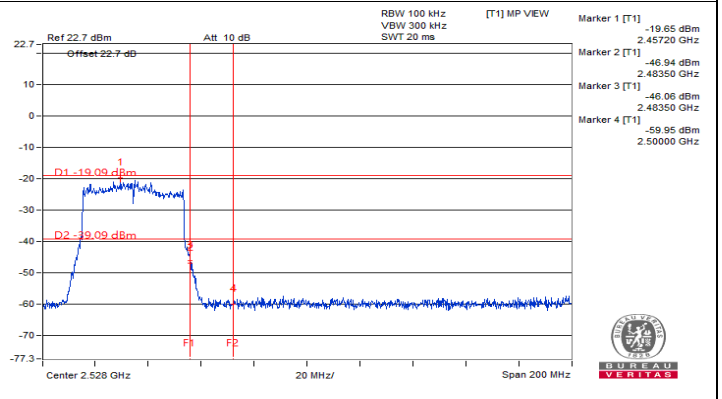
Chain 1 : CH 8 Band edge



Chain 1 : CH 9 Band edge



Chain 1 : CH 10 Band edge



Chain 1 : CH 11 Band edge

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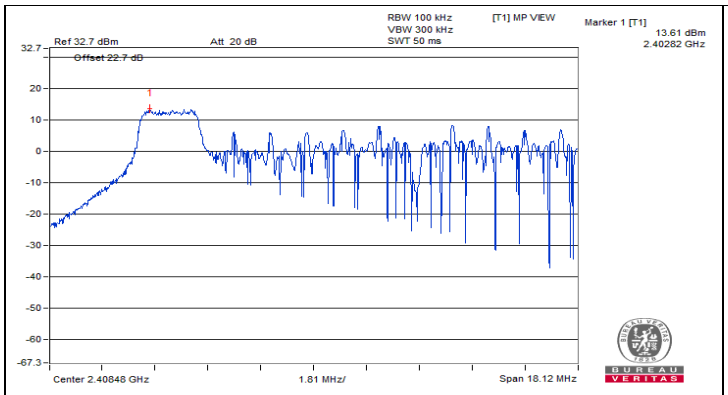
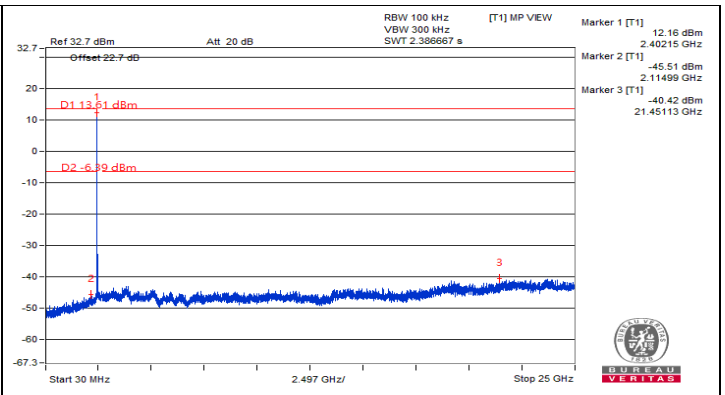
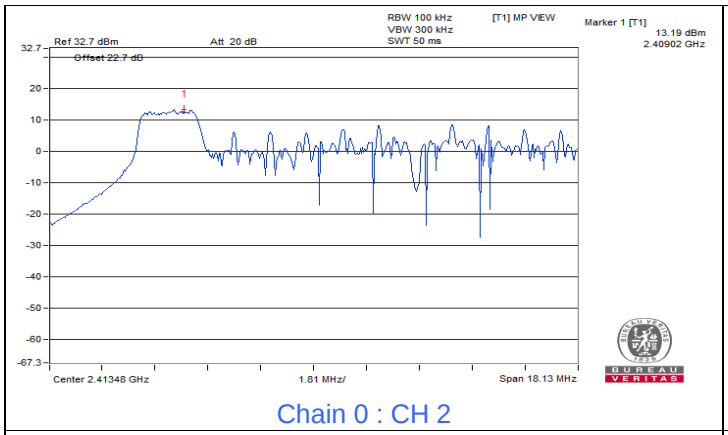


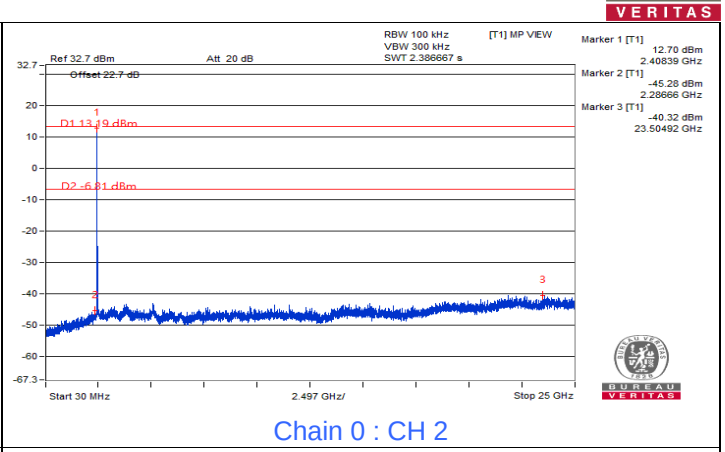
Chain 0 : CH 1



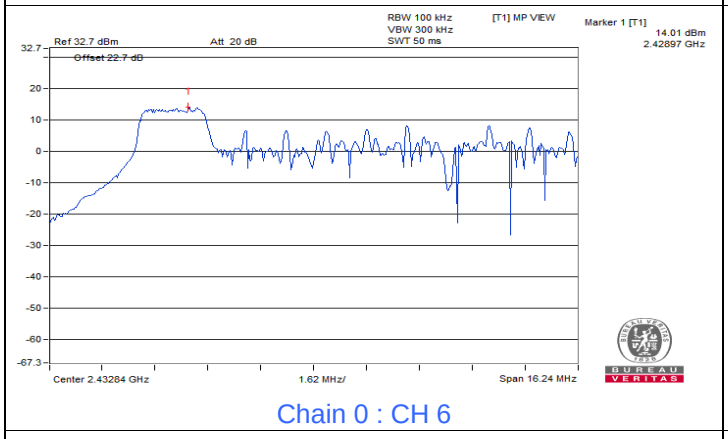
Chain 0 : CH 1



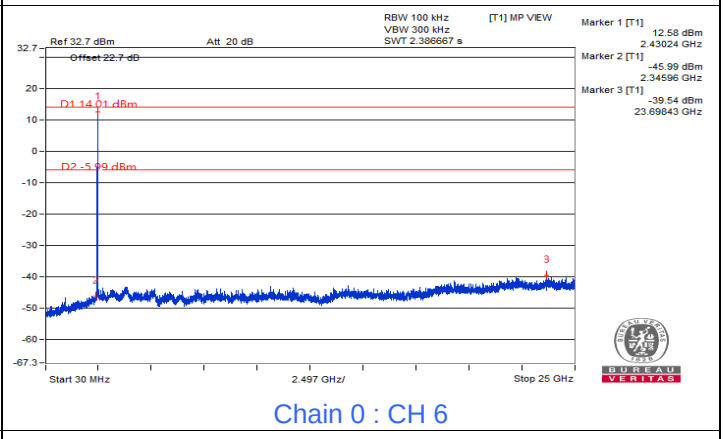
Chain 0 : CH 2



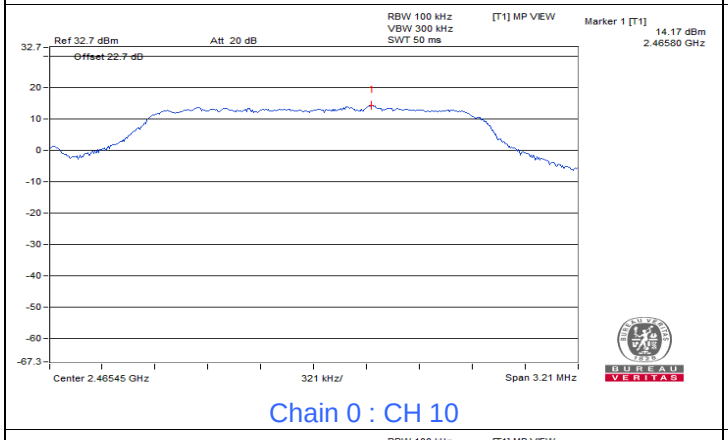
Chain 0 : CH 2



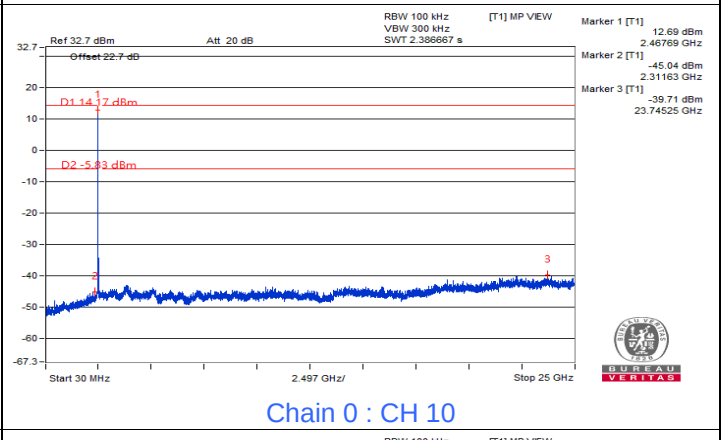
Chain 0 : CH 6



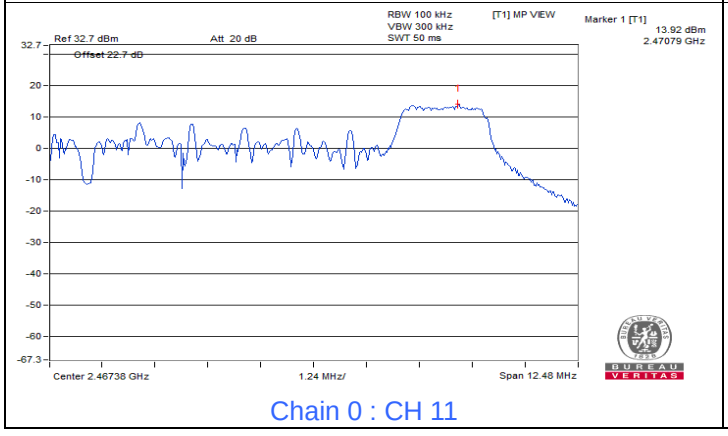
Chain 0 : CH 6



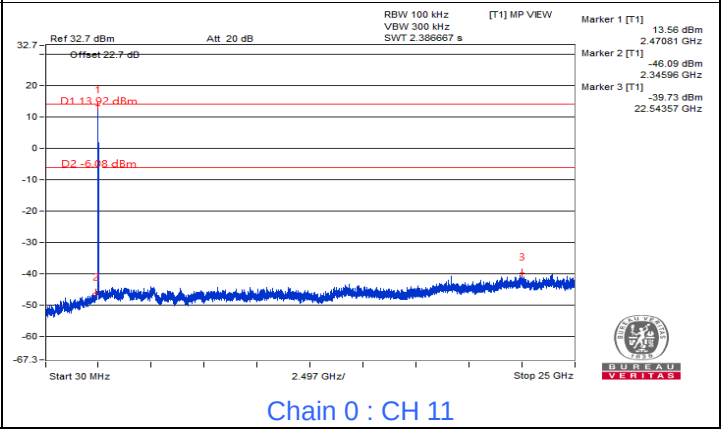
Chain 0 : CH 10



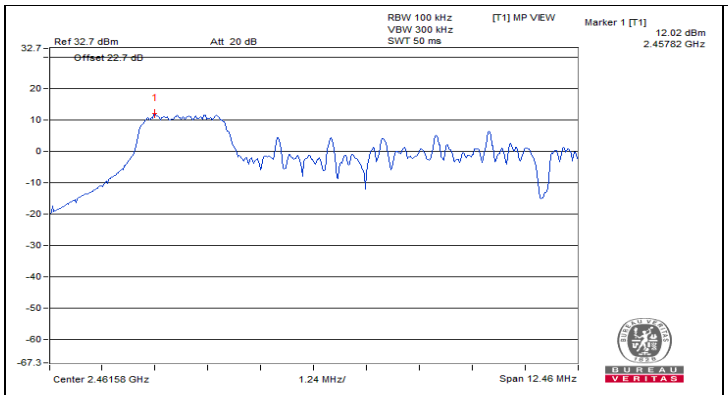
Chain 0 : CH 10



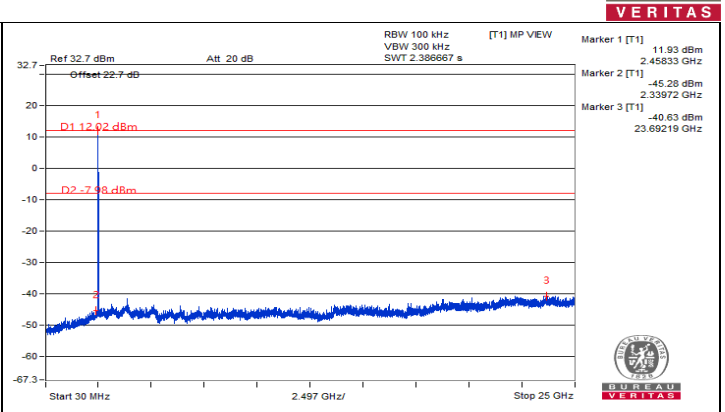
Chain 0 : CH 11



Chain 0 : CH 11



Chain 0 : CH 12



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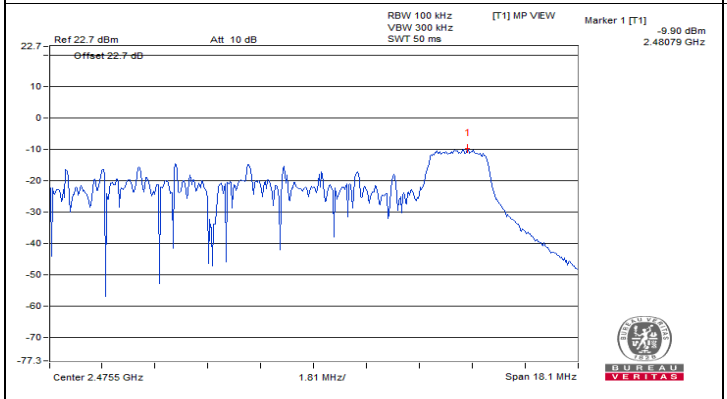
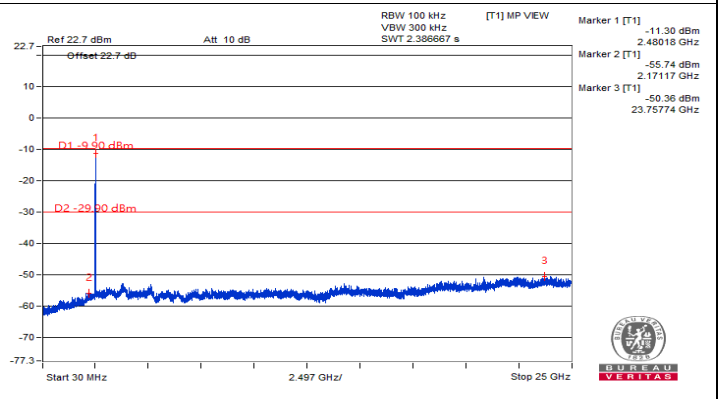
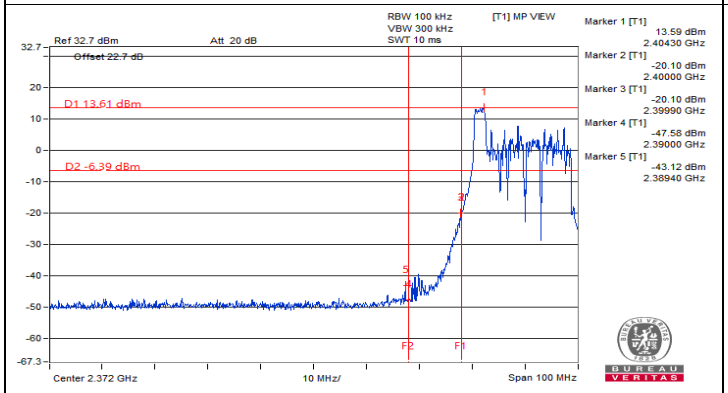


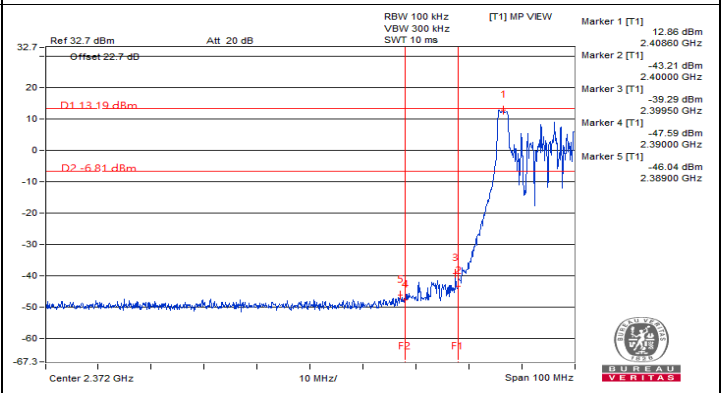
Chain 0 : CH 13



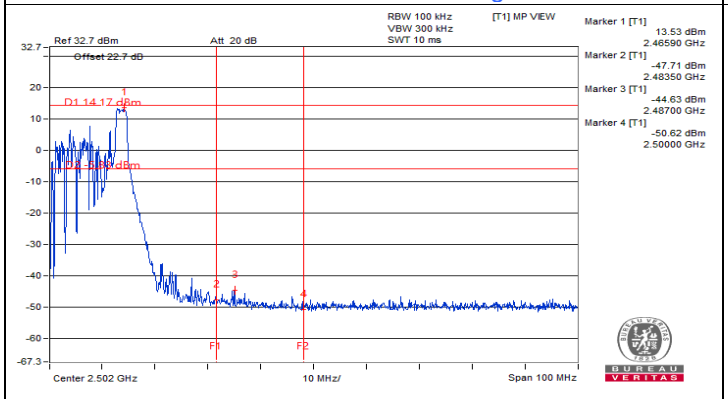
Chain 0 : CH 13



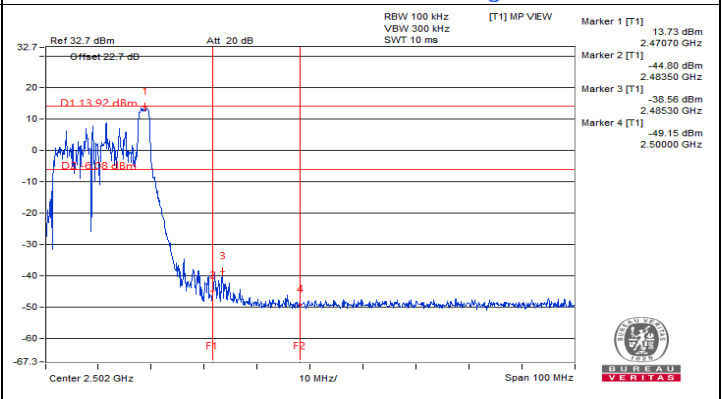
Chain 0 : CH 1 Band edge



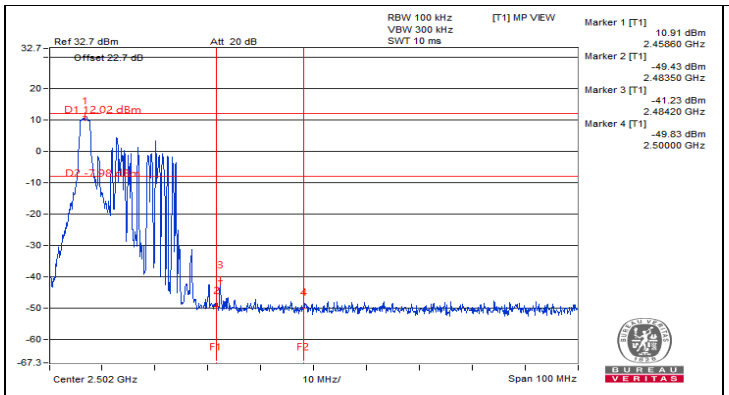
Chain 0 : CH 2 Band edge



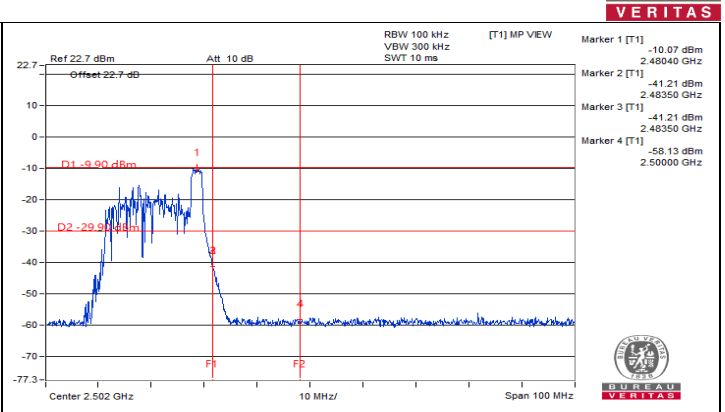
Chain 0 : CH 10 Band edge



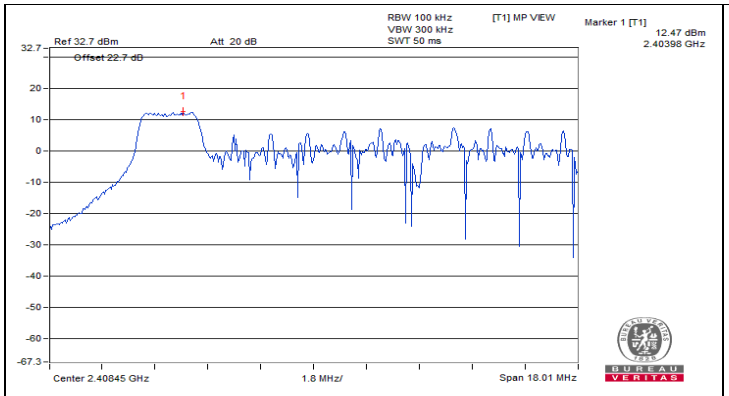
Chain 0 : CH 11 Band edge



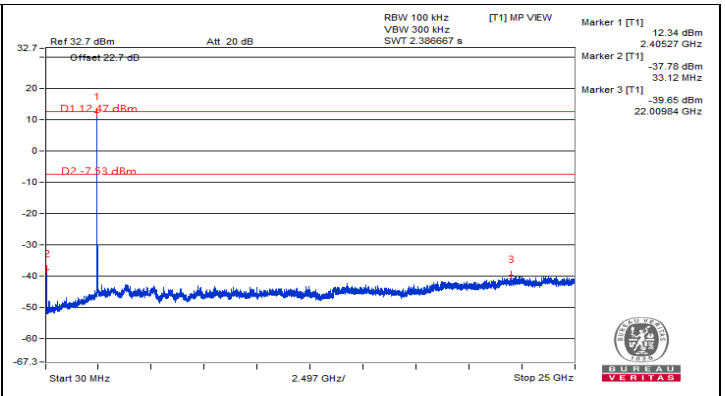
Chain 0 : CH 12 Band edge



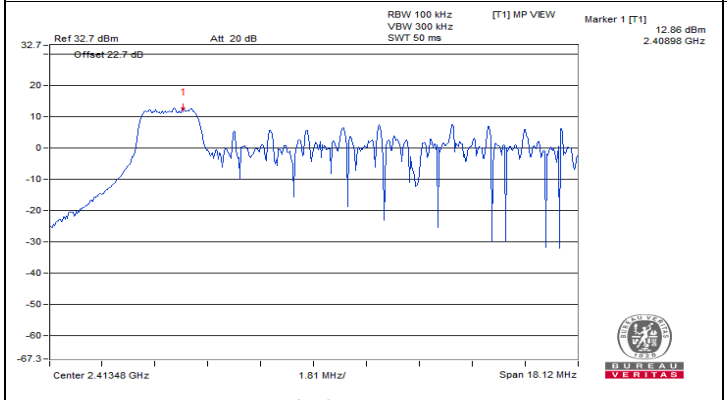
Chain 0 : CH 13 Band edge



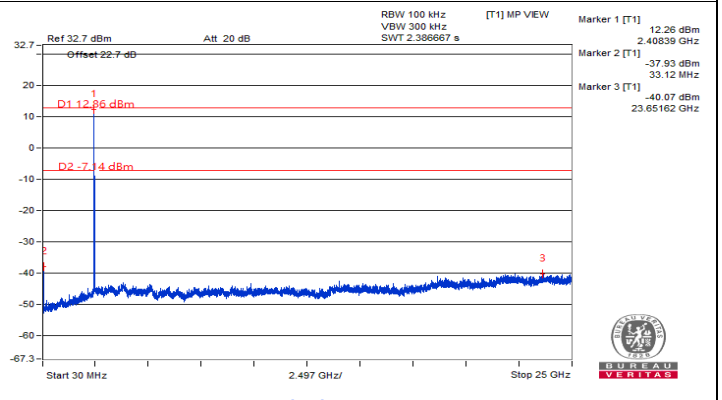
Chain 1 : CH 1



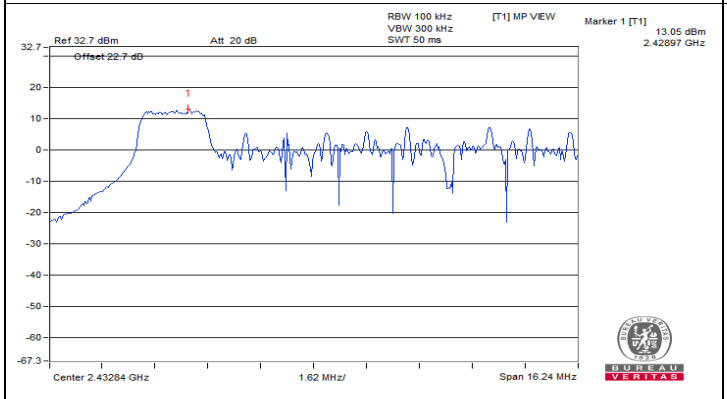
Chain 1 : CH 1



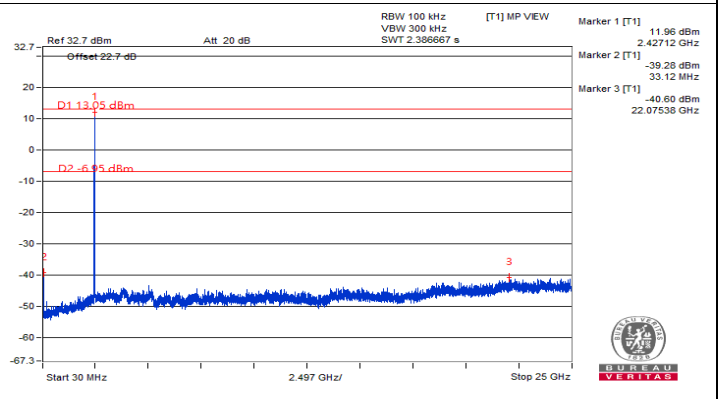
Chain 1 : CH 2



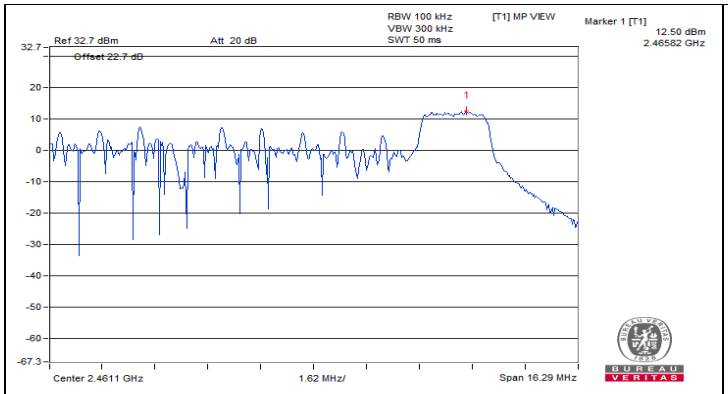
Chain 1 : CH 2



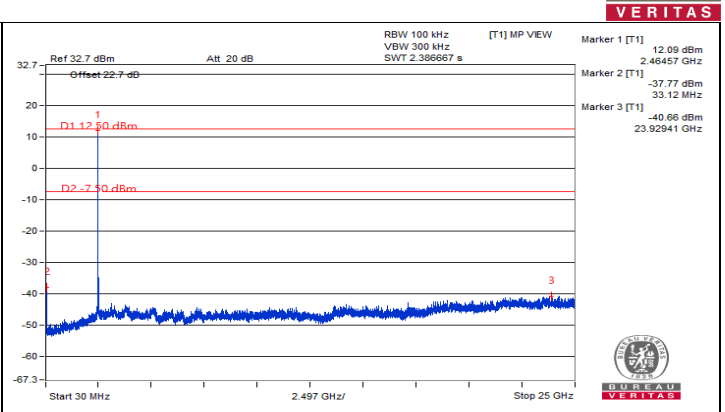
Chain 1 : CH 6



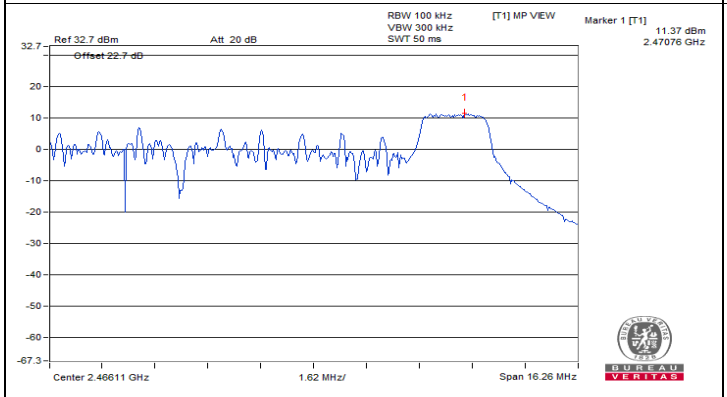
Chain 1 : CH 6



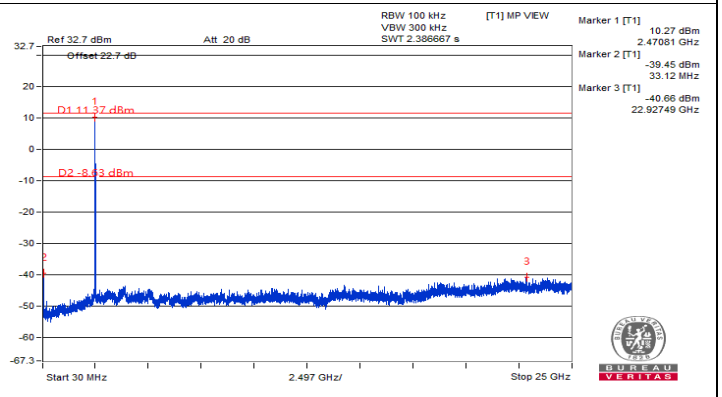
Chain 1 : CH 10



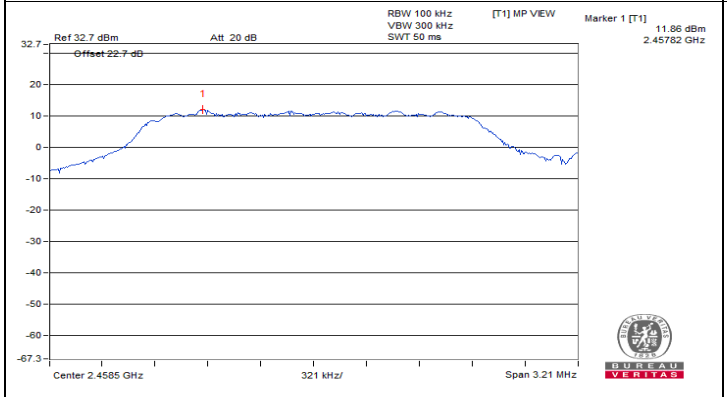
Chain 1 : CH 10



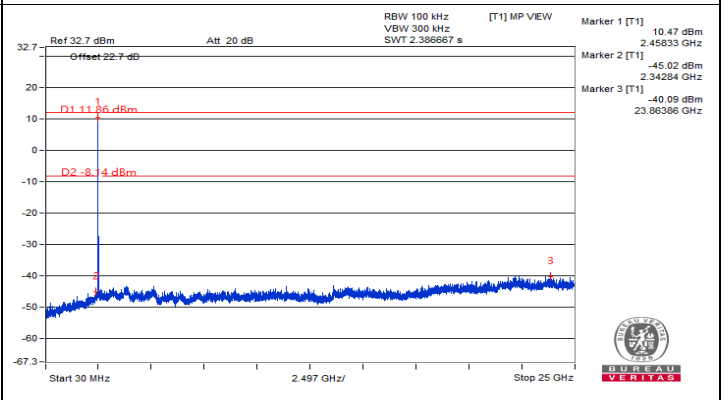
Chain 1 : CH 11



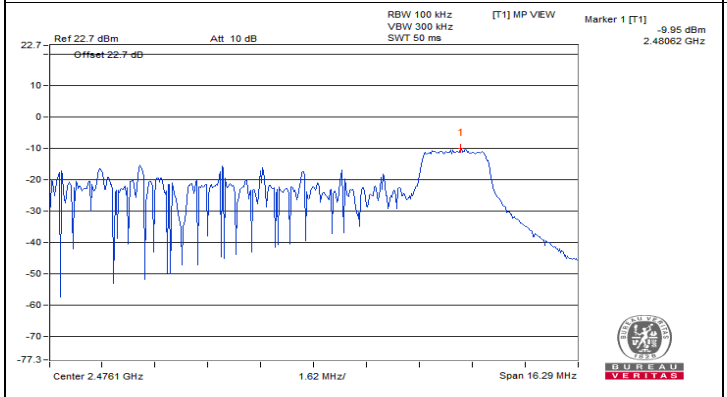
Chain 1 : CH 11



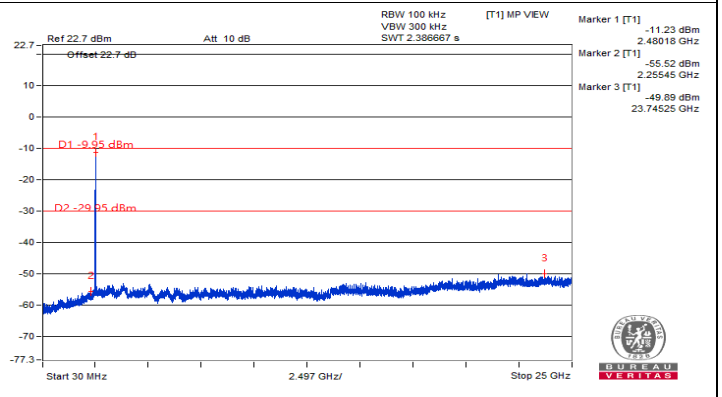
Chain 1 : CH 12



Chain 1 : CH 12



Chain 1 : CH 13



Chain 1 : CH 13