

FCC RF Test Report (WLAN 5GHz)

Report No.: RFBHQC-WTW-P20110057-1

FCC ID: RSE-4122TCH2

Product Name: DGA0122

Product Description: Dual Band Wi-Fi DSL Gateway

Trade Name: Technicolor

Model Number: DGA4122TCH2

Series Model: DGA4122CPR

Product Code: DGA4122TCH2, DGA4122CPR

Received Date: Nov. 05, 2020

Test Date: Nov. 06 to 27, 2020

Issued Date: Jan. 27, 2021

Applicant: Technicolor Delivery Technologies Belgium

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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBHQC-WTW-P20110057-1	Original release.	Jan. 27, 2021

1 Certificate of Conformity

Product Name: DGA0122

Product Description: Dual Band Wi-Fi DSL Gateway

Trade Name: Technicolor

Test Model: DGA4122TCH2

Series Model: DGA4122CPR

Product Code: DGA4122TCH2, DGA4122CPR

Sample Status: Product Unit

Applicant: Technicolor Delivery Technologies Belgium

Test Date: Nov. 06 to 27, 2020

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

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 EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Jan. 27, 2021
Claire Kuan / Specialist

Approved by :  , **Date:** Jan. 27, 2021
Clark Lin / Technical Manager

2 Summary of Test Results

Applied Standard: 47 CFR FCC Part 15 Subpart E					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
3.9	15.203	Antenna Requirements	-	-	PASS
4.1	15.407(b)(6)	AC Power Conducted Emissions	Margin is -12.03dB at 7.19141MHz.	-	PASS
4.2	-	99% Occupied Bandwidth & 26dB Bandwidth	99% Occupied Bandwidth [MHz]: 5150-5250MHz: 11a: 17.04 11ac 20M: 18.12 11ac 40M: 36.96 11ac 80M: 75.84 5725-5850MHz: 11a: 16.92 11ac 20M: 18.12 11ac 40M: 36.96 11ac 80M: 76.32 26dB Bandwidth [MHz]: 5150-5250MHz: 11a: 26.87 11ac 20M: 29.11 11ac 40M: 65.37 11ac 80M: 84.05 5725-5850MHz: 11a: 21.32 11ac 20M: 24.27 11ac 40M: 66.23 11ac 80M: 133.07	-	-
4.3	15.407(e)	6dB bandwidth for U-NII-3	Minimum Bandwidth [MHz]: 5725-5850MHz: 11a: 16.45 11ac 20M: 17.77 11ac 40M: 36.48 11ac 80M: 76.15	≥500kHz	PASS

Applied Standard: 47 CFR FCC Part 15 Subpart E					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
4.3	15.407 (a)(1/2/3)	Maximum Conducted Output Power	5150-5250MHz: 11a: 1S3T CDD: 25.96 dBm 11ac 20M: 1S3T CDD: 26.07 dBm 1S3T TxBF: 25.83 dBm 2S3T TxBF: 26.21 dBm 11ac 40M: 1S3T CDD: 25.33 dBm 1S3T TxBF: 25.33 dBm 2S3T TxBF: 25.34 dBm 11ac 80M: 1S3T CDD: 19.64 dBm 1S3T TxBF: 19.68 dBm 2S3T TxBF: 19.63 dBm 5725-5850MHz: 11a: 1S3T CDD: 24.10 dBm 11ac 20M: 1S3T CDD: 24.38 dBm 1S3T TxBF: 24.17 dBm 2S3T TxBF: 24.49 dBm 11ac 40M: 1S3T CDD: 25.28 dBm 1S3T TxBF: 24.99 dBm 2S3T TxBF: 25.15 dBm 11ac 80M: 1S3T CDD: 25.49 dBm 1S3T TxBF: 25.42 dBm 2S3T TxBF: 25.35 dBm	Power [dBm] 5150-5250MHz:30 5725-5850MHz:30	PASS

Applied Standard: 47 CFR FCC Part 15 Subpart E					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
4.4	15.407 (a)(1/2/3)	Power Spectral Density	5150-5250MHz: [dBm/MHz] 11a: 1S3T CDD: 12.84 11ac 20M: 1S3T CDD: 13.30 1S3T TxBF: 13.04 2S3T TxBF: 12.50 11ac 40M: 1S3T CDD: 8.91 1S3T TxBF: 8.72 2S3T TxBF: 9.08 11ac 80M: 1S3T CDD: -0.10 1S3T TxBF: -0.26 2S3T TxBF: 0.06 5725-5850MHz: [dBm/500kHz] 11a: 1S3T CDD: 5.33 11ac 20M: 1S3T CDD: 4.76 1S3T TxBF: 4.74 2S3T TxBF: 4.74 11ac 40M: 1S3T CDD: 2.17 1S3T TxBF: 2.01 2S3T TxBF: 2.30 11ac 80M: 1S3T CDD: -1.42 1S3T TxBF: -1.41 2S3T TxBF: -1.34	5150-5250MHz: 17 [dBm/MHz] 5725-5850MHz: 30 [dBm/500kHz]	PASS
4.5	15.407 (b)(1/2/3/4/6)	Radiated Emissions	Margin is -0.1dB at 11490.00 MHz & 11590.00 MHz & 11650.00 MHz & 17475.00MHz.	-	PASS
		Band Edge	Margin is -0.1dB at 5107.00 MHz & 5122.49 MHz & 5359.10 MHz	-	PASS
4.6	15.407(g)	Frequency Stability	-	Signal shall remain in-band	PASS

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Basic Description of Equipment Under Test (WLAN 5GHz)

Items	Description
Product Name	DGA0122
Product Description	Dual Band Wi-Fi DSL Gateway
Trade Name	Technicolor
Model Number	DGA4122TCH2
Series Model	DGA4122CPR
Product Code	DGA4122TCH2, DGA4122CPR
FCC ID	RSE-4122TCH2
Power Type	From power adapter
Antenna	Refer section 3.10
EUT Stage	☒ Product Unit ☐ Pre-Sample
Operating Band and Conducted Output Power	☒ U-NII-1 5150~5250MHz ☒ IEEE 802.11a: 25.96dBm ☒ IEEE 802.11ac 20MHz: 1S3T CDD Mode: 26.07dBm 1S3T TxBF Mode: 25.83dBm 2S3T TxBF Mode: 26.21dBm ☒ IEEE 802.11ac 40MHz: 1S3T CDD Mode: 25.33dBm 1S3T TxBF Mode: 25.33dBm 2S3T TxBF Mode: 25.34dBm ☒ IEEE 802.11ac 80MHz: 1S3T CDD Mode: 19.64dBm 1S3T TxBF Mode: 19.68dBm 2S3T TxBF Mode: 19.63dBm
	☐ U-NII-2A 5250~5350MHz ☐ IEEE 802.11a: ☐ IEEE 802.11ac 20MHz: ☐ IEEE 802.11ac 40MHz: ☐ IEEE 802.11ac 80MHz:
	☐ U-NII-2C 5470~ 5725 MHz ☐ IEEE 802.11a: ☐ IEEE 802.11ac 20MHz: ☐ IEEE 802.11ac 40MHz: ☐ IEEE 802.11ac 80MHz:

Operating Band and Conducted Output Power	U-NII-3 5725~ 5850 MHz		☒	IEEE 802.11a: 24.10dBm
			☒	IEEE 802.11ac 20MHz: 1S3T CDD Mode: 24.38dBm 1S3T TxBF Mode: 24.17dBm 2S3T TxBF Mode: 24.49dBm
			☒	IEEE 802.11ac 40MHz: 1S3T CDD Mode: 25.28dBm 1S3T TxBF Mode: 24.99dBm 2S3T TxBF Mode: 25.15dBm
			☒	IEEE 802.11ac 80MHz: 1S3T CDD Mode: 25.49dBm 1S3T TxBF Mode: 25.42dBm 2S3T TxBF Mode: 25.35dBm
Product Type	For IEEE 802.11a: WLAN(3TX, 3RX) For IEEE 802.11n: WLAN(3TX, 3RX) For IEEE 802.11ac: WLAN (3TX, 3RX)			
Nominal Bandwidth	20MHz / 40MHz / 80MHz			
Modulation	802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11n: (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: (BPSK / QPSK / 16QAM / 64QAM/ 256QAM)			
Data Rate (Mbps)	802.11a mode : OFDM (6/9/12/18/24/36/48/54) 802.11n 20MHz mode : MCS0~MCS23 802.11n 40MHz mode : MCS0~MCS23 802.11ac 20MHz mode : MCS0~MCS9 for NSS1~NSS3 See the below table 802.11ac 40MHz mode : MCS0~MCS9 for NSS1~NSS3 See the below table 802.11ac 80MHz mode : MCS0~MCS9 for NSS1~NSS3 See the below table			
TPC Function	☒	With TPC	☐	Without TPC
Beam forming Function	☒	With Beam forming	☐	Without Beam forming
DFS Operating Mode(s)	☒	Master	☐	Slave without radar detection
DFS Function	☐	5250~5350MHz		
	☐	5470~5725MHz		
	☐	5600~5650MHz		
Off Channel CAC Feature Implemented	No Support			
Ad-hoc/Hotspot Mode	No Ad-hoc/Hotspot operation in 5150 - 5350 MHz and 5470 - 5725 MHz.			
User Access Restrictions	DFS controls (hardware or software) related to radar detection are NOT accessible to the user.			
I/O Ports	DSL Port x 1 FXS Port x 2 LAN Port x 4 WAN Port x 1 USB 2.0 Port x 1			
Hardware Version	Beta2a			
Software Version	19.4.0419-4389025-20200927140853-abcf33bd2a813810535b075fbbd7b195d963bf37			

802.11n Data Rate spec

Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)	
		LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)
11n 20MHz Nss=1	MCS0	6.5	7.2	11n 40MHz Nss=1	MCS0	13.5	15
	MCS1	13	14.4		MCS1	27	30
	MCS2	19.5	21.7		MCS2	40.5	45
	MCS3	26	28.9		MCS3	54	60
	MCS4	39	43.3		MCS4	81	90
	MCS5	52	57.8		MCS5	108	120
	MCS6	58.5	65		MCS6	121.5	135
	MCS7	65	72.2		MCS7	135	150
11n 20MHz Nss=2	MCS8	13	14.4	11n 40MHz Nss=2	MCS8	27	30
	MCS9	26	28.9		MCS9	54	60
	MCS10	39	43.3		MCS10	81	90
	MCS11	52	57.8		MCS11	108	120
	MCS12	78	86.7		MCS12	162	180
	MCS13	104	115.6		MCS13	216	240
	MCS14	117	130		MCS14	243	270
	MCS15	130	144.4		MCS15	270	300
11n 20MHz Nss=3	MCS16	19.5	21.7	11n 40MHz Nss=3	MCS16	40.5	45
	MCS17	39	43.3		MCS17	81	90
	MCS18	58.5	65		MCS18	121.5	135
	MCS19	78	86.7		MCS19	162	180
	MCS20	117	130		MCS20	243	270
	MCS21	156	173.3		MCS21	324	360
	MCS22	175.5	195		MCS22	364.5	405
	MCS23	195	216.7		MCS23	405	450

802.11ac Data Rate spec

Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)	
		LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)
11ac 20MHz NSS = 1	MCS0	6.5	7.2	11ac 40MHz NSS = 1	MCS0	13.5	15.0	11ac 80MHz NSS = 1	MCS0	29.3	32.5
	MCS1	13.0	14.4		MCS1	27	30.0		MCS1	58.5	65.0
	MCS2	19.5	21.7		MCS2	40.5	45.0		MCS2	87.8	97.5
	MCS3	26	28.9		MCS3	54	60.0		MCS3	117.0	130.0
	MCS4	39	43.3		MCS4	81	90.0		MCS4	175.5	195.0
	MCS5	52	57.8		MCS5	108	120.0		MCS5	234.0	260.0
	MCS6	58.5	65		MCS6	121.5	135.0		MCS6	263.3	292.5
	MCS7	65	72.2		MCS7	135.0	150.0		MCS7	292.5	325.0
	MCS8	78	86.7		MCS8	162.0	180.0		MCS8	351.0	390.0
	MCS9	Note	Note		MCS9	180.0	200.0		MCS9	390.0	433.3

Note: MCS 9 is invalid due to mod(NCBPS/NES, DR) not being equal to 0.

Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)	
		LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)
11ac 20MHz NSS = 2	MCS0	13.0	14.4	11ac 40MHz NSS = 2	MCS0	27.0	30.0	11ac 80MHz NSS = 2	MCS0	58.5	65.0
	MCS1	26.0	28.9		MCS1	54.0	60.0		MCS1	117.0	130.0
	MCS2	39.0	43.3		MCS2	81.0	90.0		MCS2	175.5	195.0
	MCS3	52.0	57.8		MCS3	108.0	120.0		MCS3	234.0	260.0
	MCS4	78.0	86.7		MCS4	162.0	180.0		MCS4	351.0	390.0
	MCS5	104.0	115.6		MCS5	216.0	240.0		MCS5	468.0	520.0
	MCS6	117.0	130.0		MCS6	243.0	270.0		MCS6	526.5	585.0
	MCS7	130.0	144.4		MCS7	270.0	300.0		MCS7	585.0	650.0
	MCS8	156.0	173.3		MCS8	324.0	360.0		MCS8	702.0	780.0
	MCS9	13.0	14.4		MCS9	360.0	400.0		MCS9	780.0	866.7

Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)		Standard	Index	Data Rate (Mbps)	
		LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)			LGI (800ns)	SGI (400ns)
11ac 20MHz NSS = 3	MCS0	19.5	21.7	11ac 40MHz NSS = 3	MCS0	40.5	45.0	11ac 80MHz NSS = 3	MCS0	87.8	97.5
	MCS1	39.0	43.3		MCS1	81.0	90.0		MCS1	175.5	195.0
	MCS2	58.5	65.0		MCS2	121.5	135.0		MCS2	263.3	292.5
	MCS3	78.0	86.7		MCS3	162.0	180.0		MCS3	351.0	190.0
	MCS4	117.0	130		MCS4	243.0	270.0		MCS4	526.5	585.0
	MCS5	156.0	173.3		MCS5	324.0	360.0		MCS5	702.0	780.0
	MCS6	175.5	195.0		MCS6	364.5	405.0		MCS6	Note	Note
	MCS7	195.0	216.7		MCS7	405.0	450.0		MCS7	877.5	975.0
	MCS8	234.0	260.0		MCS8	486.0	540.0		MCS8	1053.0	1170.0
	MCS9	260.0	228.9		MCS9	540.0	600.0		MCS9	1170.0	1300.0

Note: MCS 6 is invalid due to mod(NCBPS/NES, DR) not being equal to 0.

3.2 Accessories

Brand	HONOR
Model	ADS-24FUA-12Y 12024EPCU
P/N	6245817A
Input Power	100-240Vac, 50/60Hz, Max. 0.7A
Output Power	12Vdc, 2.0A
Power Line	1.5m



3.3 Feature of Equipment Under Test

Please refer to user manual.

3.4 Information Provided by the Manufacturer

Interface Availability

Interface	DC Power	ADSL: (ADSL2+) VDSL2 17a: (B8-8, B7-9)	Ethernet LAN 1000Mbps	Ethernet WAN 1000Mbps	USB 2.0	FXS	WLAN IEEE 802.11n (2.4GHz)	WLAN IEEE 802.11ac (5GHz)
Model								
DGA4122TCH2 (EUT)	12Vdc,2A	● Annex A	●(4 port)	●(1 port)	●(1 port)	●(2 port)	●	●

- : Equipped
- : Not Equipped

3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB662911 D03 MIMO Antenna Gain Measurement v01

All test items have been performed as a reference to the above KDB test guidance.

3.6 Cabling Attached to the Equipment

Cable and Interconnection

Interface	Cable type	Cable length delivered with the modem	"Real life" Cable length that can be attached to this type of interface	Cable length to be used for testing	Internal/ external connection
Ethernet	UTP Cat 5	2 meter	> 10 meter	Two 10 meter cables;	Internal
WAN	UTP Cat 5	2 meter	> 10 meter	10 meter cable;	External
AC power	UTP	1.5 meter	>10 meter	1.5 meter	External
FXS1/2	UTP Cat 3	2 meter	> 10 meter	1 meter cable	Internal
USB 2.0	STP	NA	NA	NA	Internal
DSL	UTP Cat 3	2 meter cable	> 10 meter	10 meter	External

3.7 Transmit Operating Mode

For 5150~5250MHz & 5725~ 5850 MHz

Transmit Operating Mode					Transmit Multiple Antennas					
☒	Operating mode 1 (single antenna)				☒	1TX				
☒	Operating mode 2 (multiple antenna, no beam forming)				☒	2TX	☒	3TX	☐	4TX
☒	Operating mode 3 (multiple antenna, with beam forming)				☒	2TX	☒	3TX	☐	4TX
☒	802.11a	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX
☒	802.11n 20MHz	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX
☒	802.11n 40MHz	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX
☒	802.11ac 20MHz	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX
☒	802.11ac 40MHz	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX
☒	802.11ac 80MHz	Operating mode	☒	1TX	☒	2TX	☒	3TX	☐	4TX

For IEEE802.11a,

6Mbps~54Mbps: 1TX; 2TX; 3TX

For IEEE802.11n,

MCS0~MCS7: 1 Stream 1TX, 1 Stream 2TX, 1 Stream 3TX

MCS8~MCS15: 2 Stream 2TX; 2 Stream 3TX

MCS16~MCS23: 3 Stream 3TX

For IEEE802.11ac 20MHz,

Nss1MCS0~Nss1MCS8: 1 Stream 1TX, 1 Stream 2TX, 1 Stream 3TX

Nss2MCS0~Nss2MCS8: 2 Stream 2TX; 2 Stream 3TX

Nss3MCS0~Nss3MCS9: 3 Stream 3TX

For IEEE802.11n/ac 40/80MHz,

Nss1MCS0~Nss1MCS9: 1 Stream 1TX, 1 Stream 2TX, 1 Stream 3TX

Nss2MCS0~Nss2MCS9: 2 Stream 2TX; 2 Stream 3TX

Nss3MCS0~Nss3MCS9: 3 Stream 3TX

3.8 Antenna Requirements

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

3.9 Antenna Information

5G Antenna Information					
Ant.	Brand	Model No.	Antenna Type	Cable Length	Connector
5G1	Technicolor	--	Metallic Antenna	--	Murata
5G2	Technicolor	--	Metallic Antenna	--	Murata
5G3	Technicolor	6252355B	PCB Antenna	170 mm	i-Pex

Antenna & Bandwidth

Antenna	1st (TX)			2nd (TX)			3rd (TX)		
Bandwidth Mode	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz
802.11a	V	X	X	V	X	X	V	X	X
802.11n	V	V	X	V	V	X	V	V	X
802.11ac	V	V	V	V	V	V	V	V	V

Frequency	Max. Antenna Gain (dBi)			Max. Directional Gain (dBi)		
	5G-ANT1	5G-ANT2	5G-ANT3	CDD Mode	TXBF Nss1	TXBF Nss2
5150~5250MHz	3.79	3.30	3.82	3.41	3.41	0.64
5250~5350MHz	4.18	3.34	3.67	3.53	3.53	0.99
5470~5725MHz	4.07	3.59	4.16	3.73	3.73	0.90
5725~5850MHz	3.62	3.43	4.03	3.98	3.98	0.97

Note:

1. Antenna Gain refer to "P20110057 Operation Description of Antenna Specification" files.
2. Maximum Correlated Directional Gain following KDB662911 D03 MIMO Antenna Gain Measurement.

3.10 Table for Carrier Frequency

9 channels are provided for Bandwidth 20MHz:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz	36	5180 MHz	44	5220 MHz
	40	5200 MHz	48	5240 MHz
5725~5850 MHz	149	5745 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 MHz	-	-

4 channels are provided for Bandwidth 40MHz:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz	38	5190 MHz	46	5230 MHz
5725~5850 MHz	151	5755 MHz	159	5795 MHz

2 channels are provided for Bandwidth 80MHz:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz	42	5210 MHz	-	-
5725~5850 MHz	155	5775 MHz	-	-

3.11 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Note	Channel	Data Rate	Antenna
AC Power Conducted Emissions	802.11ac 20MHz	OFDM/BPSK	48	-	1+2+3
Occupied Bandwidth & 26dB Bandwidth	802.11a	OFDM/BPSK	36/40/48	Nss1 MCS0 (1S3T CDD)	1+2+3
	802.11ac 20MHz		36/40/48	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		38/46	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		42	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
6dB bandwidth (for U-NII-3)	802.11a	OFDM/BPSK	149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
	802.11ac 20MHz		149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		155	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3

Test Items	Mode	Note	Channel	Data Rate	Antenna
Maximum Conducted Output Power (Average)	802.11a	OFDM/BPSK	36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
	802.11ac 20MHz		36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
Power Spectral Density	802.11a	OFDM/BPSK	36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
	802.11ac 20MHz		36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3

Test Items	Mode	Note	Channel	Data Rate	Antenna
Unwanted Emission in the restricted bands Above 1GHz (Radiated)	802.11ac 20MHz	OFDM/BPSK	36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
Unwanted Emission out of the restricted bands Above 1GHz (Radiated)	802.11ac 20MHz	OFDM/BPSK	36/40/48 149/157/165	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 40MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
	802.11ac 80MHz		38/46 151/159	Nss1 MCS0 (1S3T CDD)	1+2+3
				Nss1 MCS0 (1S3T TxBF)	1+2+3
				Nss2 MCS0 (2S3T TxBF)	1+2+3
Radiated Emissions Below 1GHz(Radiated)	802.11ac 20MHz	OFDM/BPSK	48	-	1+2+3
Frequency Stability	802.11ac 20MHz	Un-modulation	36/40/48 149/157/165	-	1+2+3
	802.11ac 40MHz		38/46 151/159		1+2+3
	802.11ac 80MHz		42 155	-	1+2+3

Note:

1. The device with multiple operating mode, measurements on the middle channel were tested to determine the worst case mode. (Each modulation family were tested in band edge, spurious emissions and in band PSD after investigate worst case mode)
2. Base on same power with 802.11a, 802.11ac 20MHz mode, the unwanted emission test results only perform 802.11ac 20MHz mode.
3. Base on tx core command, the 11a default mode is 1S3T CDD, the 802.11ac 20MHz/ 40MHz/80MHz, default mode are 1S3T CDD, 2S3T CDD, ,1S3T TxBF, 2S3T TxBF

wl -i wl1 txcore

txcore enabled bitmap (Nsts {4..1}) 0x00 0x07 0x07 0x07

txcore mask OFDM 0x07 CCK 0x07

4. Base on same power setting, the 11a 1S3T CDD mode covered by 802.11ac 20MHz 1S3T CDD mode; 802.11ac 20MHz/40MHz/80MHz 2S3T CDD, 3S3T SDM covered by 802.11ac 20MHz/40MHz/80MHz 1S3T CDD mode, 802.11a mode were only tested the "Maximum Conducted Output Power", "Power Spectral Density" and "Bandwidth".

3.12 Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

The Power Setting Parameter					
Test Software Version	19.4.0419-4389025-20200927140853-abc33bd2a813810535b075fbbd7b195d963bf37				
Worst Modulation Mode	Number of Transmit Chains (NTX)	Frequency (MHz)	Maximum Output Power(dBm)	Power Setting	Data Rate / MCS
802.11a (CDD)	1 stream 3TX	5180	24.22	Default(19.25)	6Mbps
802.11a (CDD)	1 stream 3TX	5200	25.07	Default(20)	6Mbps
802.11a (CDD)	1 stream 3TX	5240	25.96	Default(20.75)	6Mbps
802.11a (CDD)	1 stream 3TX	5745	24.07	Default(19.25)	6Mbps
802.11a (CDD)	1 stream 3TX	5785	24.10	Default(19.25)	6Mbps
802.11a (CDD)	1 stream 3TX	5825	23.96	Default(19)	6Mbps
802.11ac 20MHz (CDD)	1 stream 3TX	5180	24.50	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (CDD)	1 stream 3TX	5200	25.15	Default(20)	Nss1MCS0 (8.6)
802.11ac 20MHz (CDD)	1 stream 3TX	5240	26.07	Default(20.75)	Nss1MCS0 (8.6)
802.11ac 20MHz (CDD)	1 stream 3TX	5745	24.31	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (CDD)	1 stream 3TX	5785	24.38	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (CDD)	1 stream 3TX	5825	24.36	Default(19)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5180	24.38	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5200	25.03	Default(20)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5240	25.83	Default(20.75)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5745	24.10	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5785	24.17	Default(19.25)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	1 stream 3TX	5825	24.09	Default(19)	Nss1MCS0 (8.6)
802.11ac 20MHz (TxBF)	2 stream 3TX	5180	24.47	Default(19.25)	Nss2MCS0 (17.2)
802.11ac 20MHz (TxBF)	2 stream 3TX	5200	25.30	Default(20)	Nss2MCS0 (17.2)
802.11ac 20MHz (TxBF)	2 stream 3TX	5240	26.21	Default(20.75)	Nss2MCS0 (17.2)
802.11ac 20MHz (TxBF)	2 stream 3TX	5745	24.33	Default(19.25)	Nss2MCS0 (17.2)
802.11ac 20MHz (TxBF)	2 stream 3TX	5785	24.49	Default(19.25)	Nss2MCS0 (17.2)
802.11ac 20MHz (TxBF)	2 stream 3TX	5825	24.14	Default(19)	Nss2MCS0 (17.2)

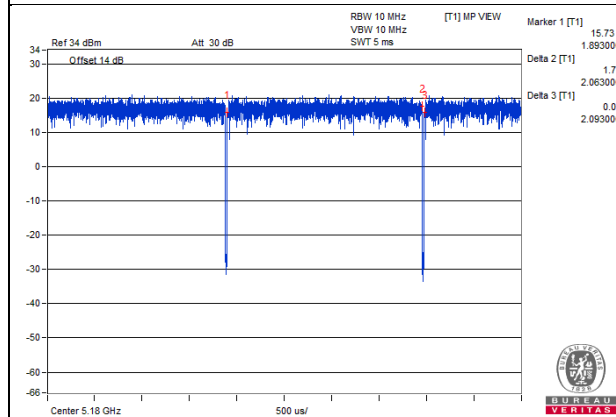
Worst Modulation Mode	Number of Transmit Chains (NTX)	Frequency (MHz)	Maximum Output Power(dBm)	Power Setting	Data Rate / MCS
802.11ac 40MHz (CDD)	1 stream 3TX	5190	20.93	Default(16)	Nss1MCS0 (17.2)
802.11ac 40MHz (CDD)	1 stream 3TX	5230	25.33	Default(20.5)	Nss1MCS0 (17.2)
802.11ac 40MHz (CDD)	1 stream 3TX	5755	25.28	Default(21)	Nss1MCS0 (17.2)
802.11ac 40MHz (CDD)	1 stream 3TX	5795	25.17	Default(20.75)	Nss1MCS0 (17.2)
802.11ac 40MHz (TxBF)	1 stream 3TX	5190	20.39	Default(16)	Nss1MCS0 (17.2)
802.11ac 40MHz (TxBF)	1 stream 3TX	5230	25.33	Default(20.5)	Nss1MCS0 (17.2)
802.11ac 40MHz (TxBF)	1 stream 3TX	5755	24.95	Default(21)	Nss1MCS0 (17.2)
802.11ac 40MHz (TxBF)	1 stream 3TX	5795	24.99	Default(20.75)	Nss1MCS0 (17.2)
802.11ac 40MHz (TxBF)	2 stream 3TX	5190	20.60	Default(16)	Nss2MCS0 (34.4)
802.11ac 40MHz (TxBF)	2 stream 3TX	5230	25.34	Default(20.5)	Nss2MCS0 (34.4)
802.11ac 40MHz (TxBF)	2 stream 3TX	5755	25.06	Default(21)	Nss2MCS0 (34.4)
802.11ac 40MHz (TxBF)	2 stream 3TX	5795	25.15	Default(20.75)	Nss2MCS0 (34.4)
802.11ac 80MHz (CDD)	1 stream 3TX	5210	19.64	Default(14.75)	Nss1MCS0 (36)
802.11ac 80MHz (CDD)	1 stream 3TX	5775	25.49	Default(20.5)	Nss1MCS0 (36)
802.11ac 80MHz (TxBF)	1 stream 3TX	5210	19.68	Default(14.75)	Nss1MCS0 (36)
802.11ac 80MHz (TxBF)	1 stream 3TX	5775	25.42	Default(20.5)	Nss1MCS0 (36)
802.11ac 80MHz (TxBF)	2 stream 3TX	5210	19.63	Default(14.75)	Nss2MCS0 (72.1)
802.11ac 80MHz (TxBF)	2 stream 3TX	5775	25.35	Default(20.5)	Nss2MCS0 (72.1)

3.13 On Time and Duty Cycle

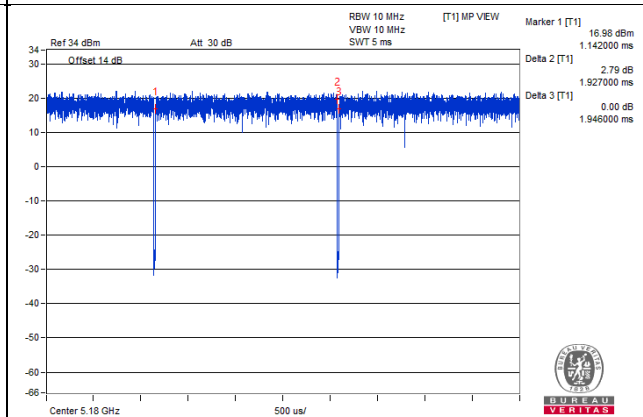
Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
11a 1S3T CDD	2.063	2.093	98.6	0	10
11ac 20MHz 1S3T CDD	1.927	1.946	99	0	10
11ac 20MHz 1S3T TxBF	1.937	1.95	98.8	0	10
11ac 20MHz 2S3T TxBF	0.984	1.008	97.6	0.1	2
11ac 40MHz 1S3T CDD	0.952	0.978	97.3	0.12	2
11ac 40MHz 1S3T TxBF	0.952	0.97	98.1	0	0.01
11ac 40MHz 2S3T TxBF	0.499	0.518	96.3	0.16	3
11ac 80MHz 1S3T CDD	1.143	1.162	98.4	0	0.01
11ac 80MHz 1S3T TxBF	1.142	1.162	98.3	0	0.01
11ac 80MHz 2S3T TxBF	0.596	0.623	95.7	0.19	2

Note: Power measurement using sweep trigger and gating of the power meter, duty factor is not required.

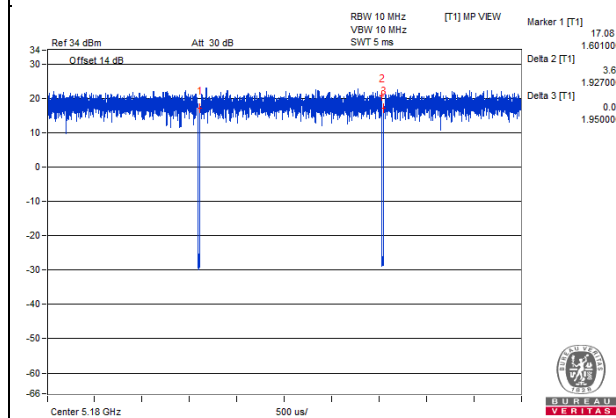
11a 1S3T CDD



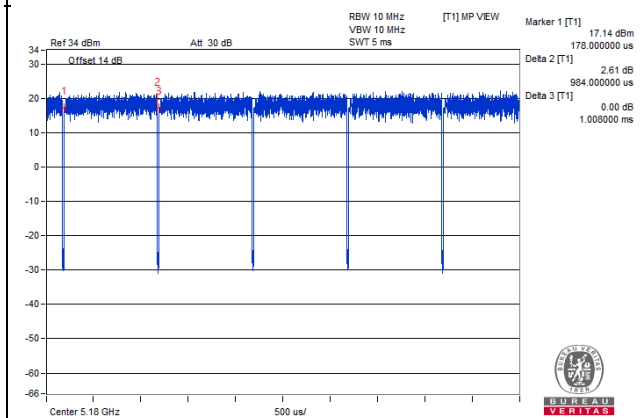
11ac 20MHz 1S3T CDD



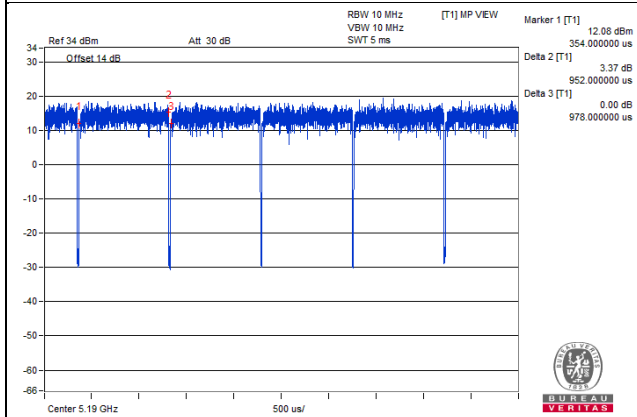
11ac 20MHz 1S3T TxBF



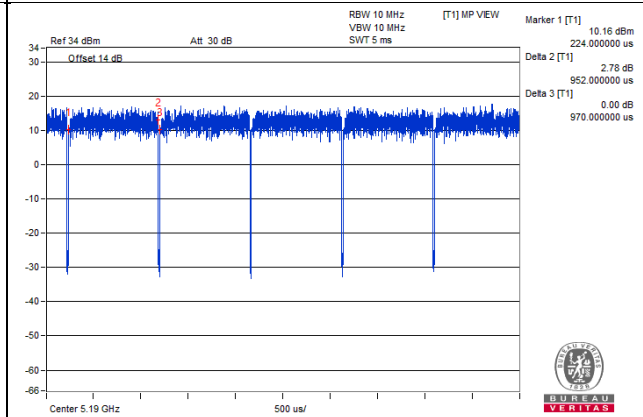
11ac 20MHz 2S3T TxBF



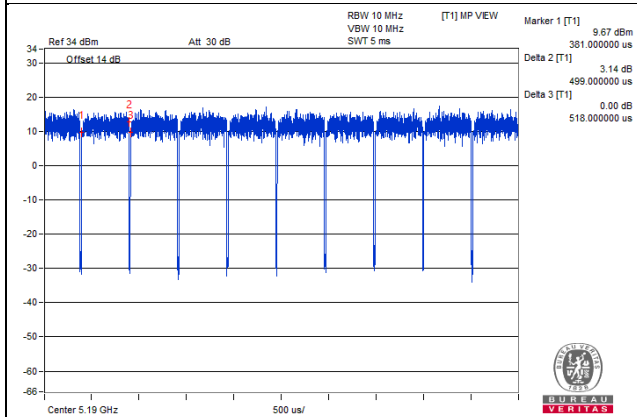
11ac 40MHz 1S3T CDD



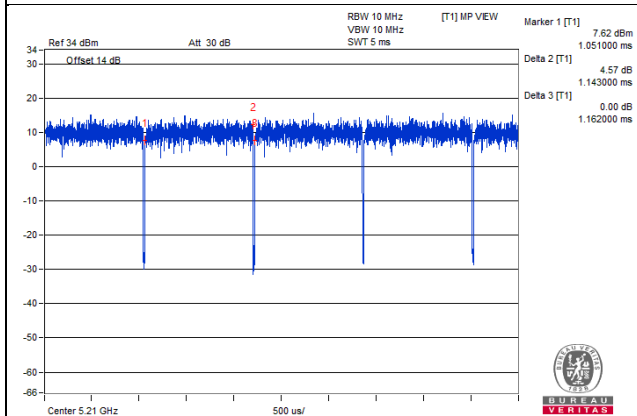
11ac 40MHz 1S3T TxBF



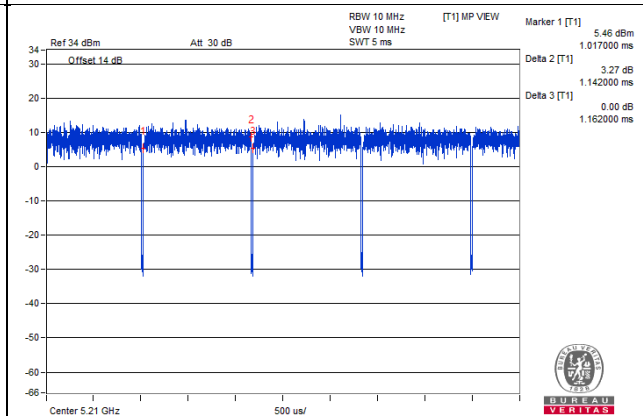
11ac 40MHz 2S3T TxBF



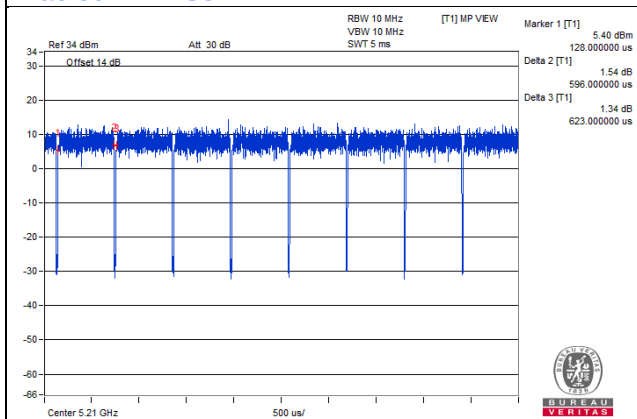
11ac 80MHz 1S3T CDD



11ac 80MHz 1S3T TxBF



11ac 80MHz 2S3T TxBF



3.14 Testing Location Information

Test Site Location					
Address	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan				
TEL	886-3-6668565				
FAX	886-3-6668323				
Test Site No.	Site Category	Location	FCC Reg. No.	IC Reg. No.	VCCI Reg. No
Conduction 1	Conduction	Hsinchu	-	-	-
Chamber 3	966 Chamber	Hsinchu	-	-	-
Oven 2	Oven	Hsinchu	-	-	-

3.15 EUT Diagram and Support Equipment

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

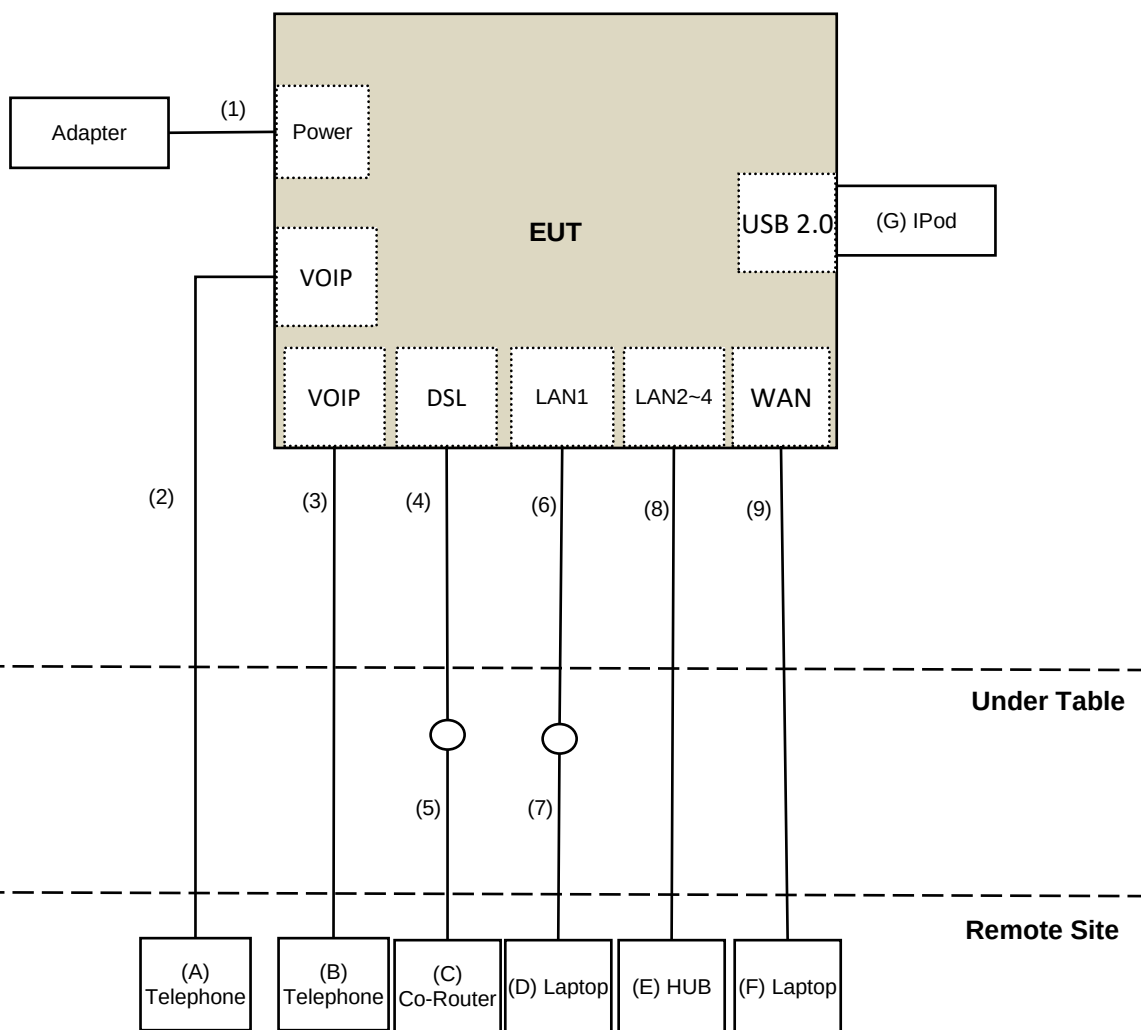
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Telephone	WONDER	WD-303	7C17KA04011	NA	Provided by Lab
B.	Telephone	Romeo	TE-812	97285638	NA	Provided by Lab
C.	Co-Router	ZyXEL	IES-1000	S4Z3112558	NA	Provided by Lab
D.	Laptop	DELL	E5430	GM1SKV1	DoC	Provided by Lab
E.	HUB	ZyXEL	GS1100-16	S150H44000046	DoC	Provided by Lab
F.	Laptop	DELL	E5430	DM1SKV1	DoC	Provided by Lab
G.	iPod	Apple	MD778TA/A	CC4JL03FF4T1	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.2	No	0	Supplied by client
2.	RJ-11 Cable	1	10	No	0	Provided by Lab
3.	RJ-11 Cable	1	10	No	0	Provided by Lab
4.	RJ-11 Cable	1	1.5	No	0	Supplied by client
5.	RJ-11 Cable	1	10	No	0	Provided by Lab
6.	RJ-45 Cable	1	1.5	No	0	Supplied by client
7.	RJ-45 Cable	1	10	No	0	Provided by Lab
8.	RJ-45 Cable	3	10	No	0	Provided by Lab
9.	RJ-45 Cable	1	10	No	0	Provided by Lab

EUT Diagram



4 Test Types and Results

4.1 AC Power Conducted Emissions Measurement

4.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

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

4.1.2 Measuring Instruments and Setting

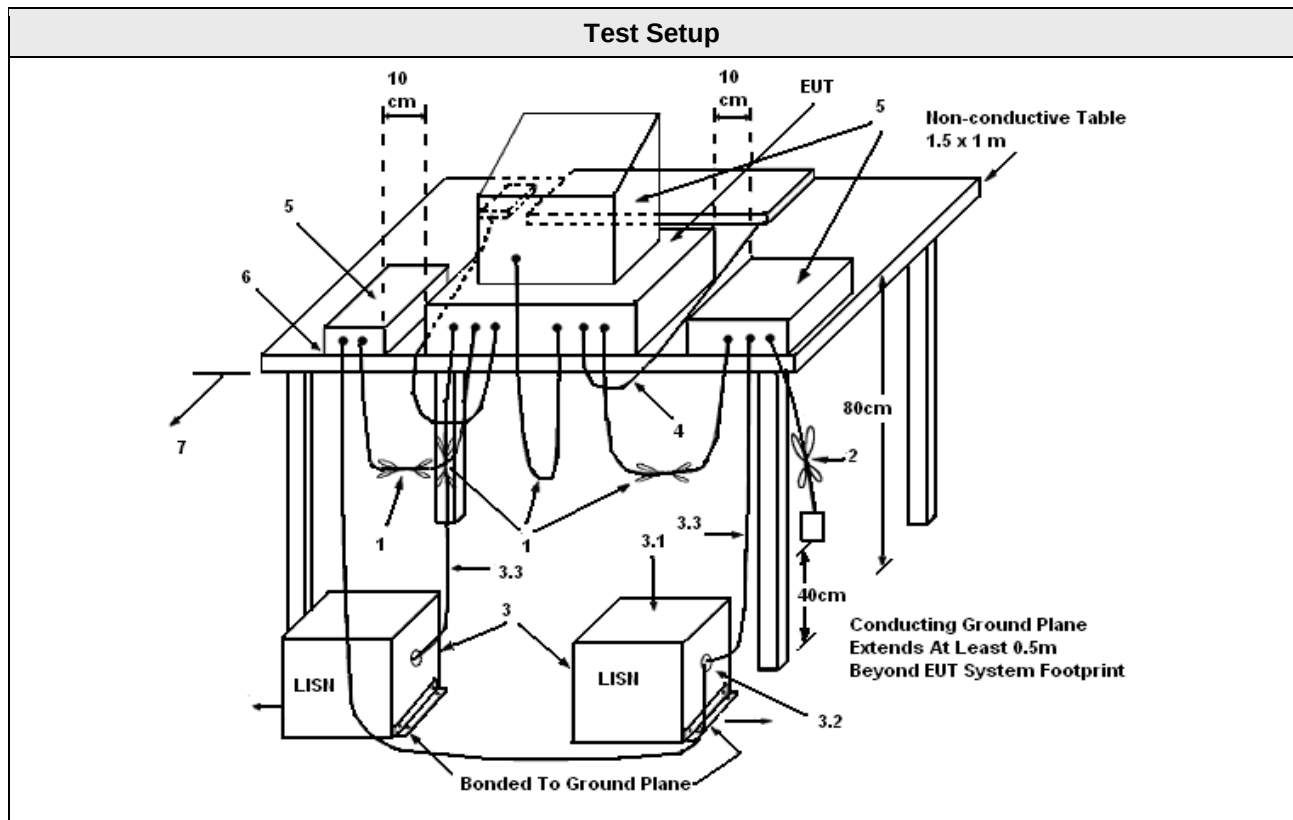
Please refer to section 5 of instruments list in this report. The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4 Test Setup Layout



1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
2. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
4. All other equipment powered from additional LISN(s).
5. Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
8. Non-EUT components of EUT system being tested.
9. Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
10. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5 Test Deviation

There are no deviations with the original standard.

4.1.6 EUT Operating during Test

The EUT was placed on the test table and programmed in normal function.

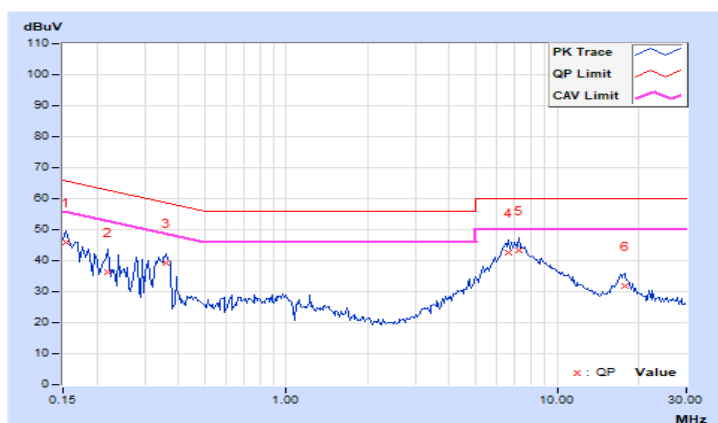
4.1.7 Test Results of AC Power Conducted Emissions

Frequency Range	150kHz ~ 30Mz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 200Hz; Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Test Mode	Mode 1	Tested by	Sampson Chen

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.96	35.79	24.01	45.75	33.97	65.79	55.79	-20.04	-21.82
2	0.22031	9.99	26.30	17.37	36.29	27.36	62.81	52.81	-26.52	-25.45
3	0.36094	10.01	29.39	23.65	39.40	33.66	58.71	48.71	-19.31	-15.05
4	6.61719	10.47	32.00	26.61	42.47	37.08	60.00	50.00	-17.53	-12.92
5	7.19141	10.51	32.67	27.46	43.18	37.97	60.00	50.00	-16.82	-12.03
6	17.79688	11.30	20.60	15.81	31.90	27.11	60.00	50.00	-28.10	-22.89

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

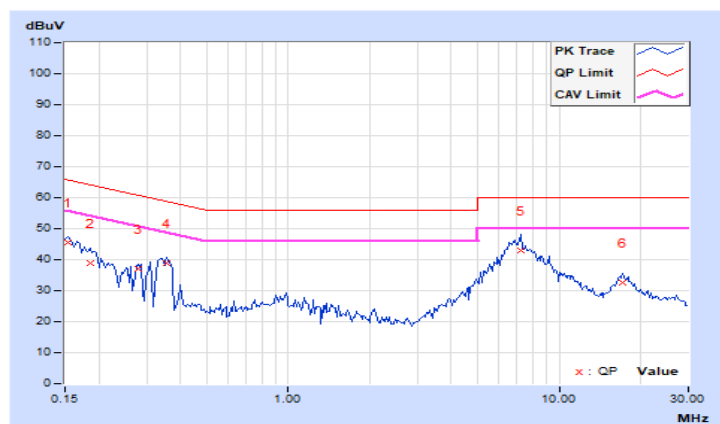


Frequency Range	150kHz ~ 30Mz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 200Hz; Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Test Mode	Mode 1	Tested by	Sampson Chen

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.94	35.49	23.46	45.43	33.40	65.79	55.79	-20.36	-22.39
2	0.18516	9.97	29.08	16.73	39.05	26.70	64.25	54.25	-25.20	-27.55
3	0.27891	9.99	26.89	23.74	36.88	33.73	60.85	50.85	-23.97	-17.12
4	0.35703	10.00	28.73	22.50	38.73	32.50	58.80	48.80	-20.07	-16.30
5	7.20703	10.45	32.57	27.34	43.02	37.79	60.00	50.00	-16.98	-12.21
6	17.11719	11.02	21.59	17.08	32.61	28.10	60.00	50.00	-27.39	-21.90

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.2 Occupied Bandwidth and 26dB Bandwidth Measurement

4.2.1 Measuring Instruments and Setting

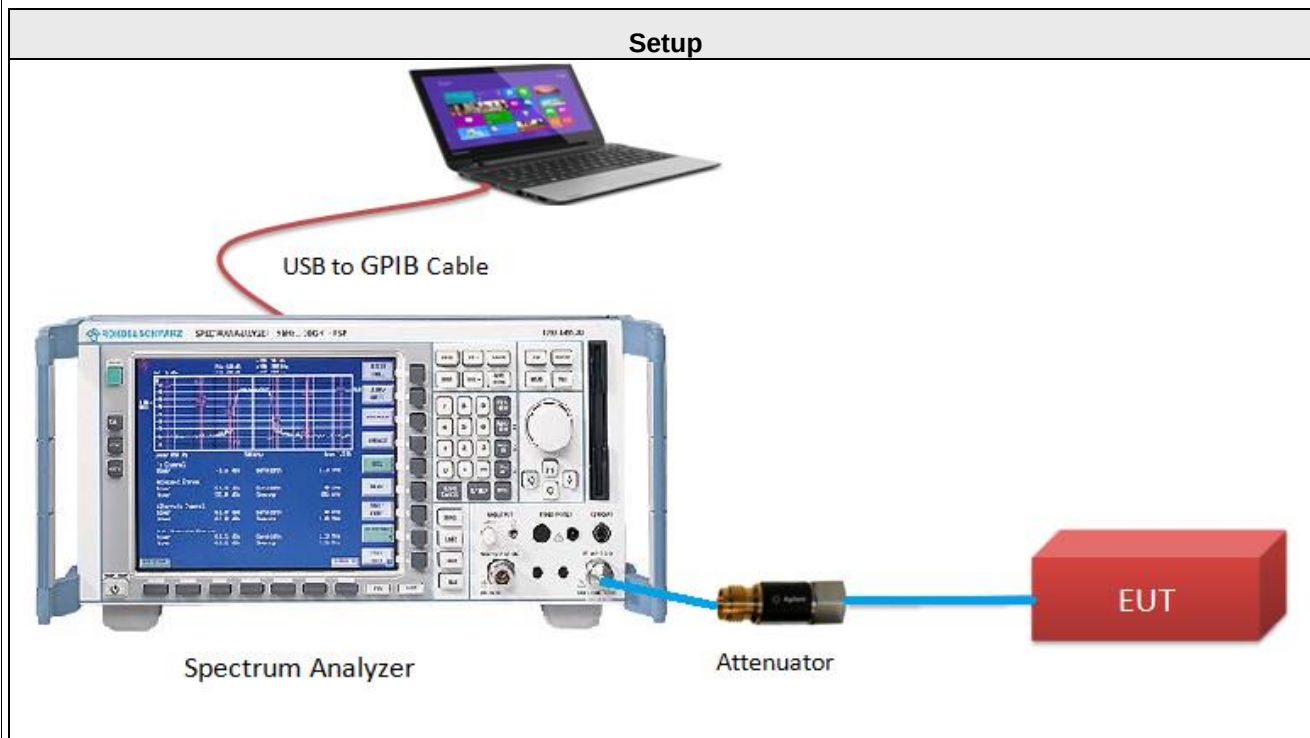
The following table is the setting of the Spectrum Analyzer.

99% Occupied Bandwidth	
Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5 times to 5.0 times the OBW
RBW	1% to 5% of the anticipated emission bandwidth
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max hold
Sweep Time	Auto
26dB Bandwidth	
Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth.
VBW	> RBW
Detector	Peak
Trace	Max hold
Sweep Time	Auto

4.2.2 Test Procedure

- 1 The transmitter output (antenna port) was connected to the spectrum analyzer.
- 2 Test was performed in accordance with Measurement of Digital Transmission Systems Operating under 789033 D02 General UNII Test Procedures New Rules v02r01, in section "Emission bandwidth (C)(1)" & "99 Percent Occupied Bandwidth"(D). 12/14/2017.
- 3 When measuring Emission bandwidth with multiple antenna systems, add every result of the values by mathematic formula.

4.2.3 Test Setup Layout



4.2.4 Test Deviation

There are no deviations with the original standard.

4.2.5 EUT Operating Conditions

The EUT was programmed to be in continuously transmitting mode.

4.2.6 Test Results

Temperature	25°C	Humidity	60%
Test Engineer	Kevin Ko		

11a 1S3T CDD

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	20.78	21.09	20.73
40	5200	21.04	21.46	21.57
48	5240	26.87	25.72	25.63
149	5745	20.41	20.92	20.67
157	5785	20.63	21.19	20.60
165	5825	20.59	21.32	20.71

11ac 20MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	23.50	21.28	21.64
40	5200	22.44	23.11	24.71
48	5240	29.01	27.25	28.71
149	5745	21.19	21.25	20.91
157	5785	22.57	24.27	21.03
165	5825	21.34	22.91	22.20

11ac 20MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	21.85	21.65	20.97
40	5200	24.47	23.41	23.52
48	5240	29.11	27.29	25.85
149	5745	21.23	21.89	21.36
157	5785	21.07	22.50	21.08
165	5825	21.02	23.14	22.04

11ac 20MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	20.83	20.68	21.21
40	5200	22.29	24.16	20.69
48	5240	26.18	28.28	24.79
149	5745	20.83	20.75	21.09
157	5785	20.74	22.47	20.84
165	5825	20.94	20.89	21.26

11ac 40MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	40.84	41.27	41.54
46	5230	58.16	55.68	65.37
151	5755	55.01	62.84	57.48
159	5795	52.23	66.23	57.79

11ac 40MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	40.93	40.85	41.36
46	5230	58.62	56.26	57.10
151	5755	54.29	57.88	55.74
159	5795	53.79	65.86	56.08

11ac 40MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	41.13	40.94	41.02
46	5230	58.19	61.45	57.38
151	5755	51.43	60.70	43.49
159	5795	49.77	61.27	41.69

11ac 80MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	82.78	83.64	84.05
155	5775	133.07	130.66	98.05

11ac 80MHz 1S3T TxBF

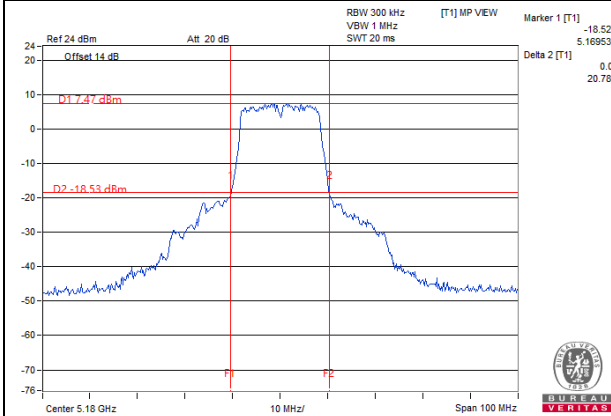
CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	83.03	83.43	83.75
155	5775	123.65	117.86	97.82

11ac 80MHz 2S3T TxBF

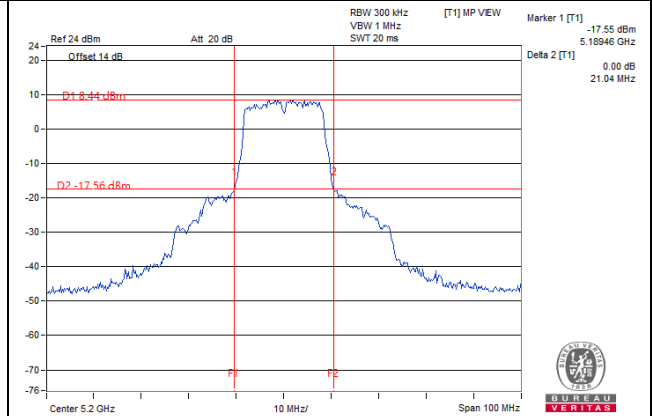
CHANNEL	FREQUENCY (MHz)	26dB Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	83.17	83.32	83.44
155	5775	93.24	117.00	84.16

26dB BANDWIDTH SPECTRUM PLOT

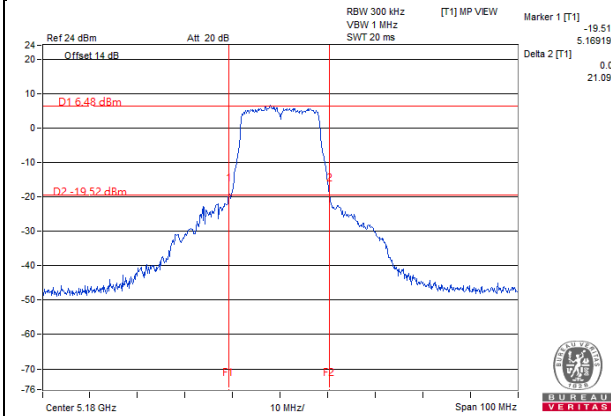
11a 1S3T CDD CH36 Ant1



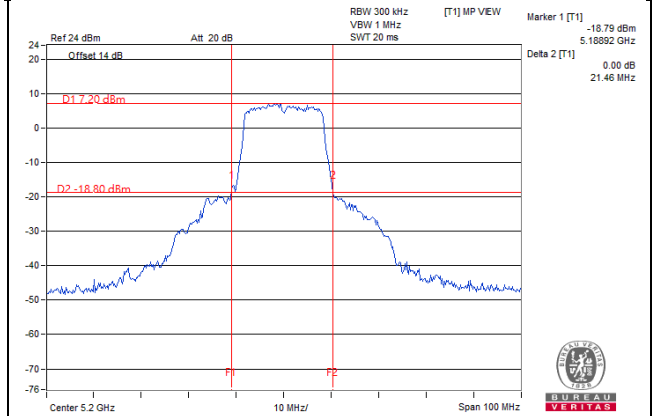
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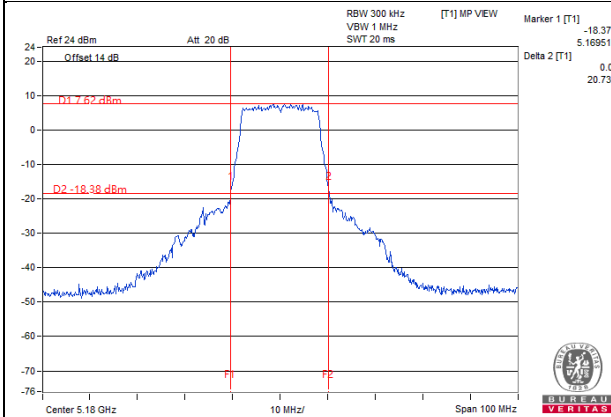
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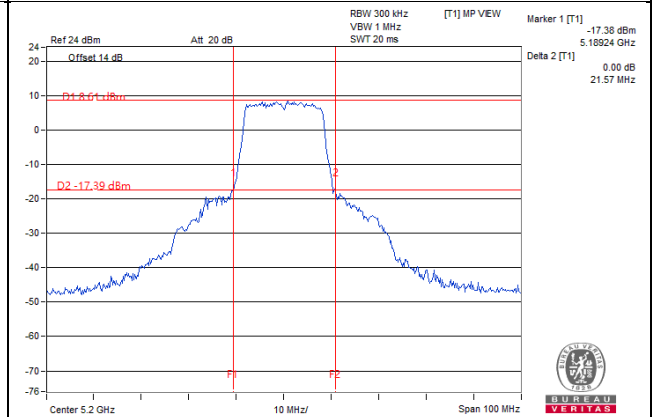
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11a 1S3T CDD CH36 Ant3

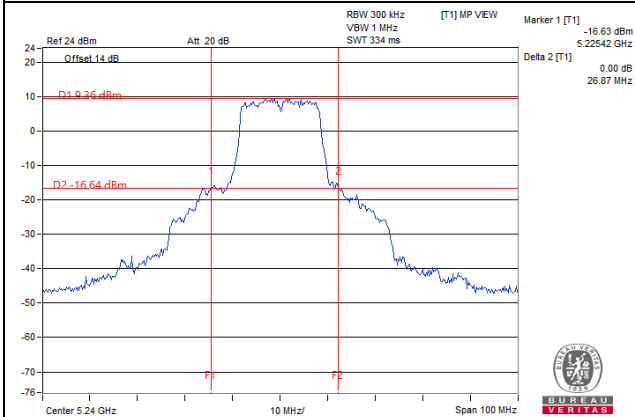


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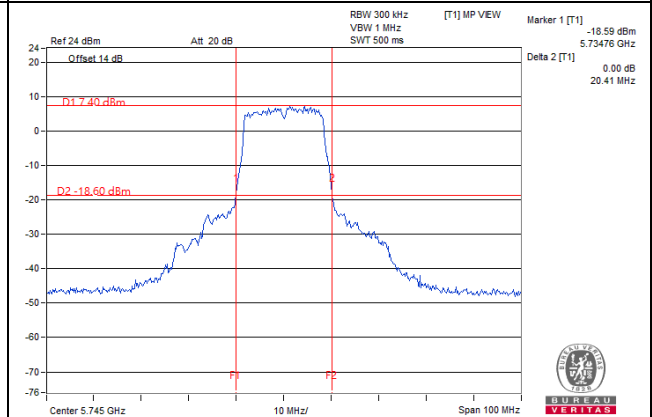


26dB BANDWIDTH SPECTRUM PLOT

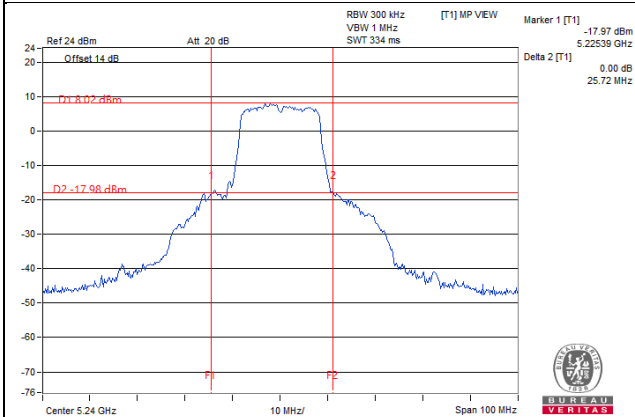
11a 1S3T CDD CH48 Ant1



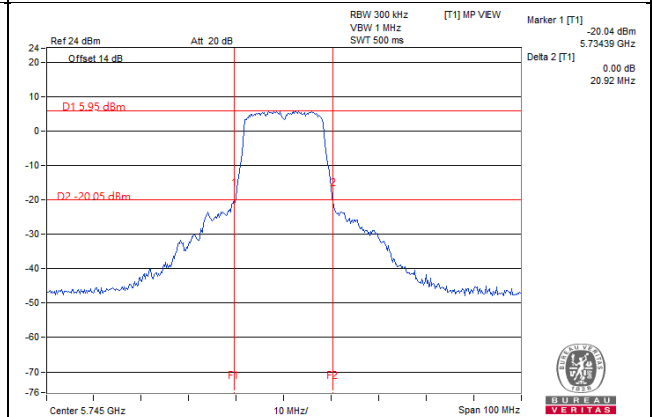
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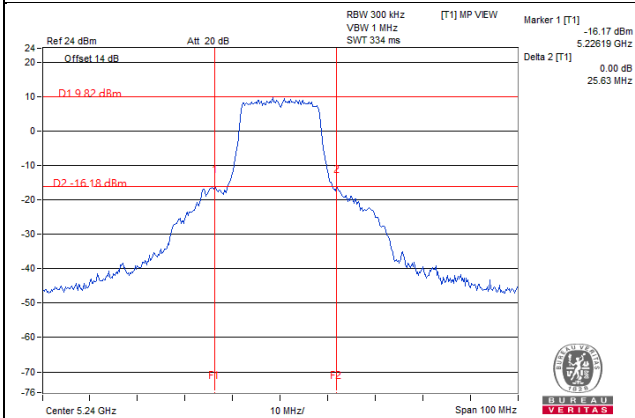
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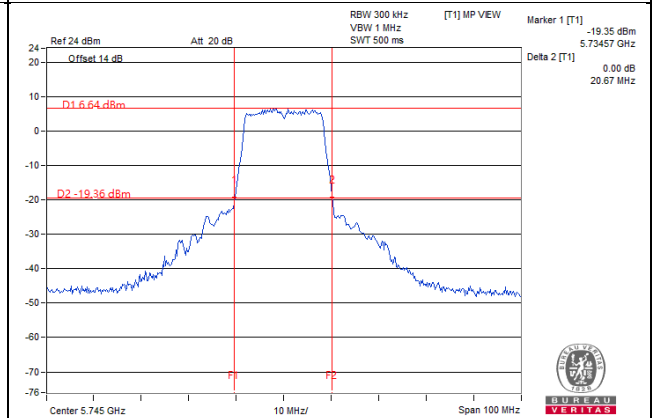
11a 1S3T CDD CH149 Ant2



11a 1S3T CDD CH48 Ant3

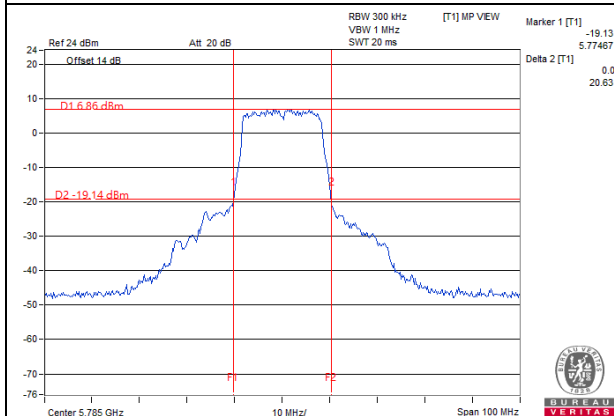


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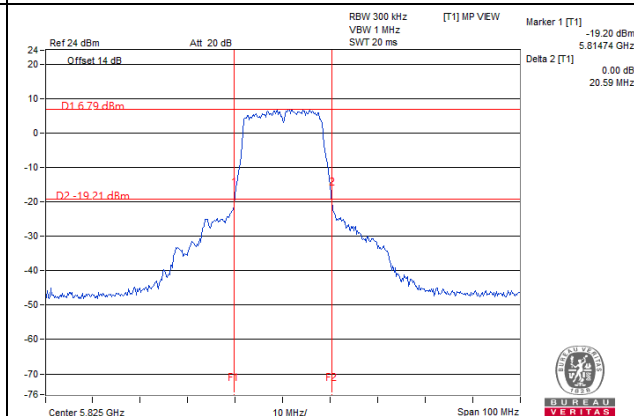


26dB BANDWIDTH SPECTRUM PLOT

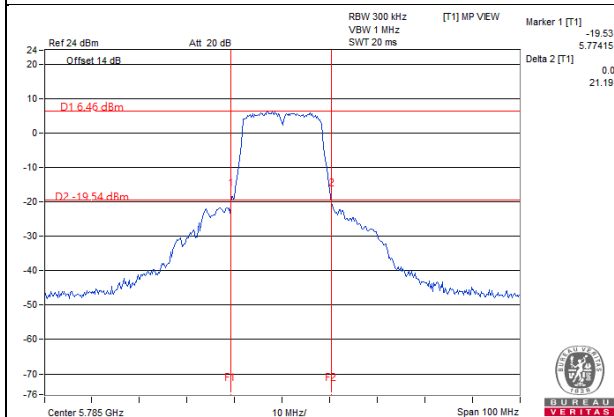
11a 1S3T CDD CH157 Ant1



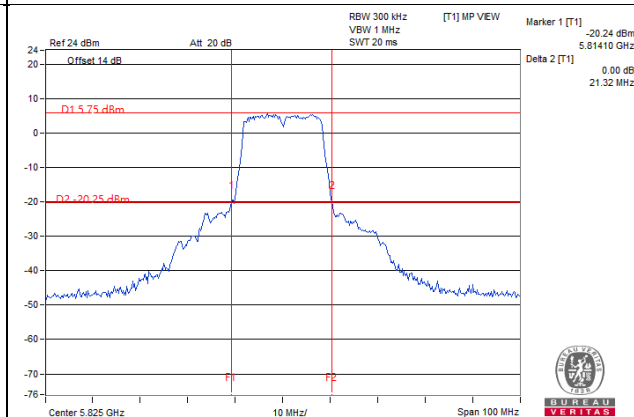
11a 1S3T CDD CH165 Ant1



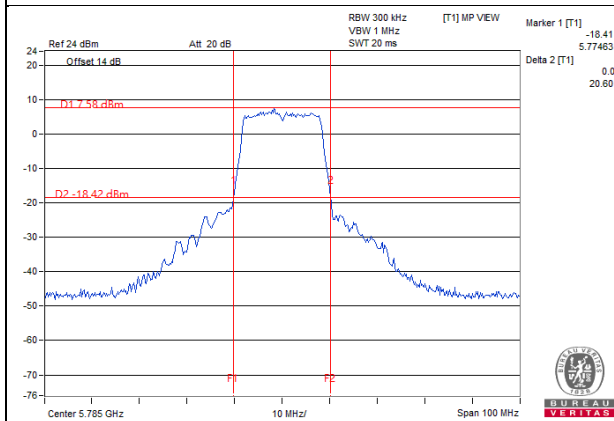
11a 1S3T CDD CH157 Ant2



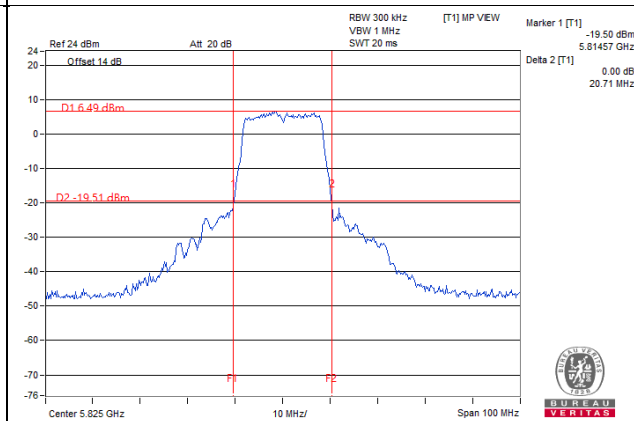
11a 1S3T CDD CH165 Ant2



11a 1S3T CDD CH157 Ant3

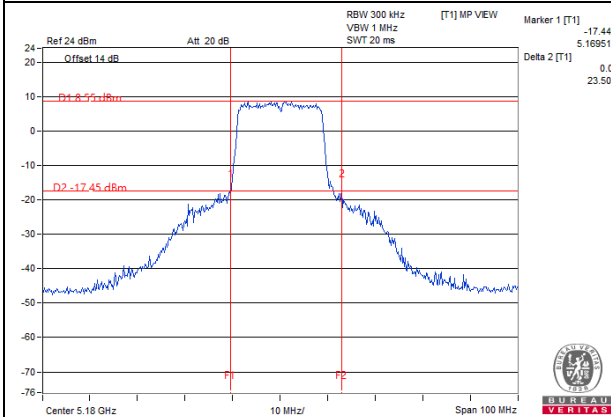


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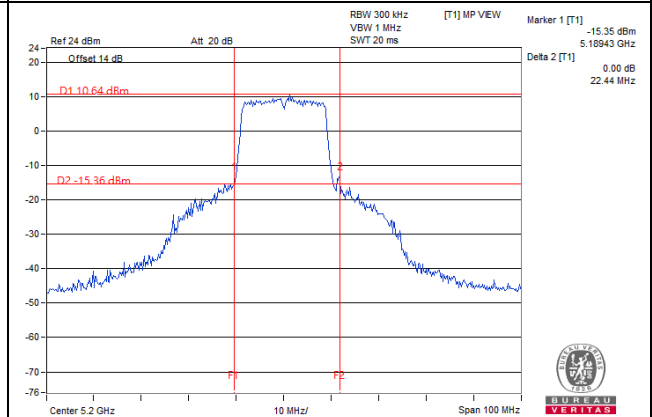


26dB BANDWIDTH SPECTRUM PLOT

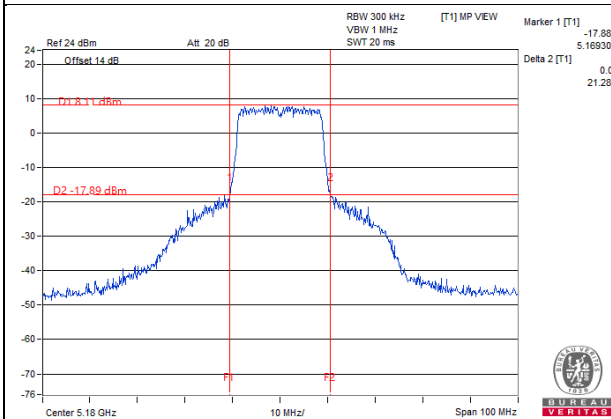
11ac 20MHz 1S3T CDD CH36 Ant1



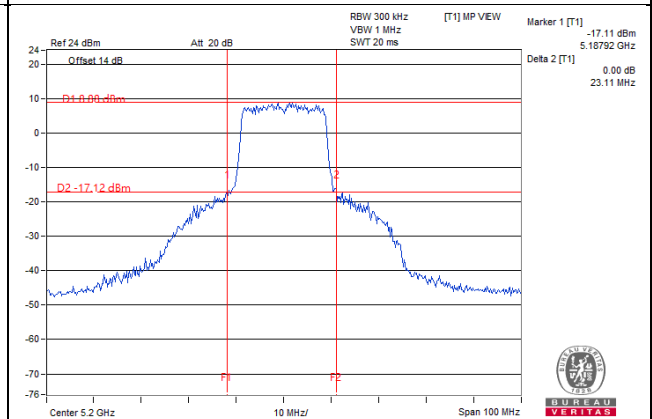
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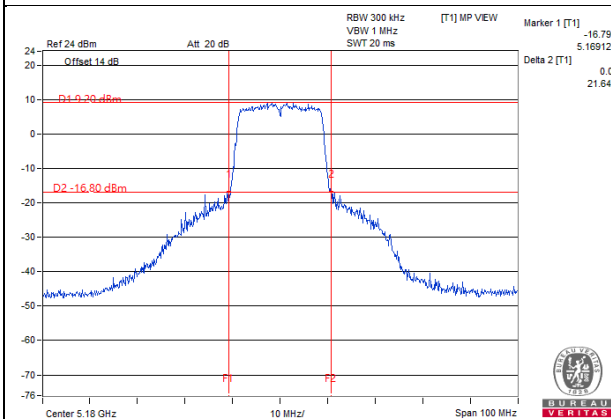
11ac 20MHz 1S3T CDD CH36 Ant2



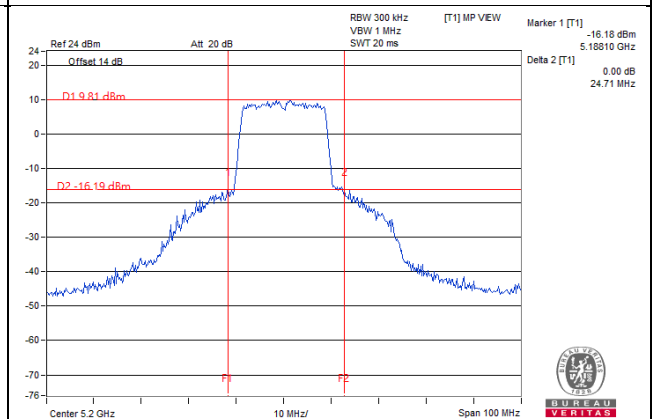
11ac 20MHz 1S3T CDD CH40 Ant2



11ac 20MHz 1S3T CDD CH36 Ant3

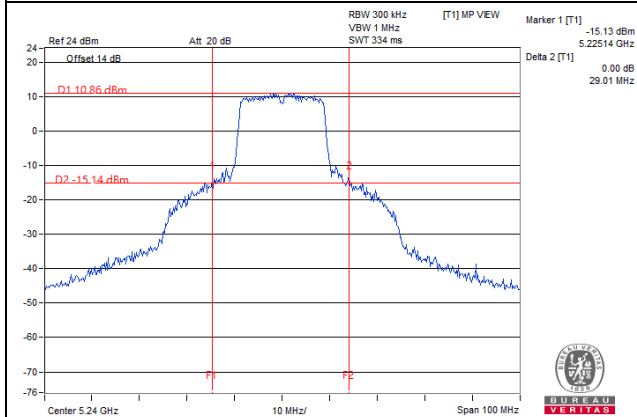


11ac 20MHz 1S3T CDD CH40 Ant3

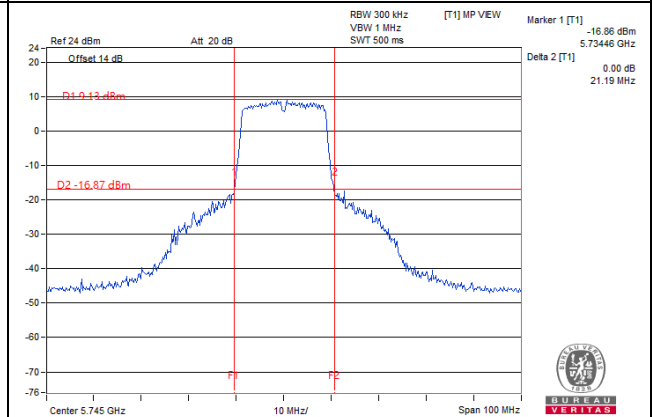


26dB BANDWIDTH SPECTRUM PLOT

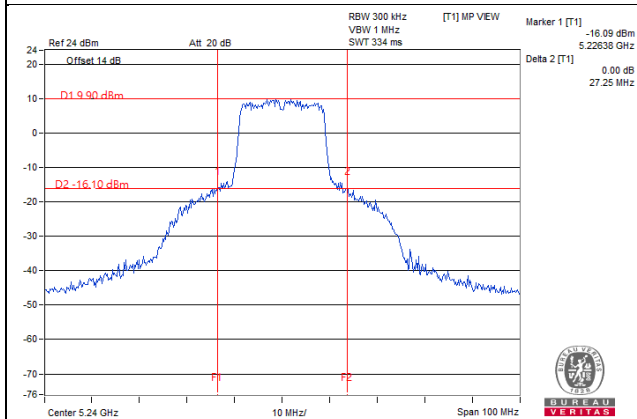
11ac 20MHz 1S3T CDD CH48 Ant1



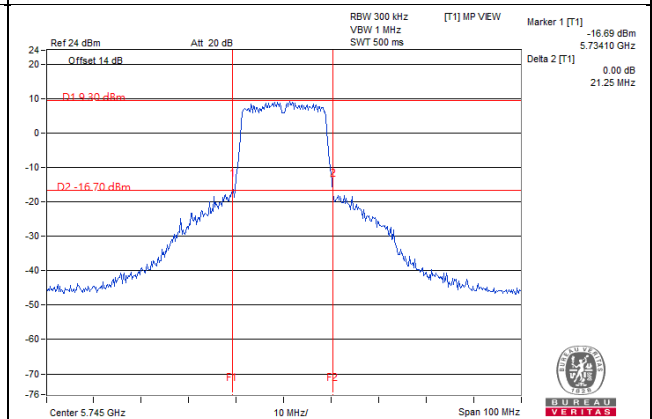
11ac 20MHz 1S3T CDD CH149 Ant1



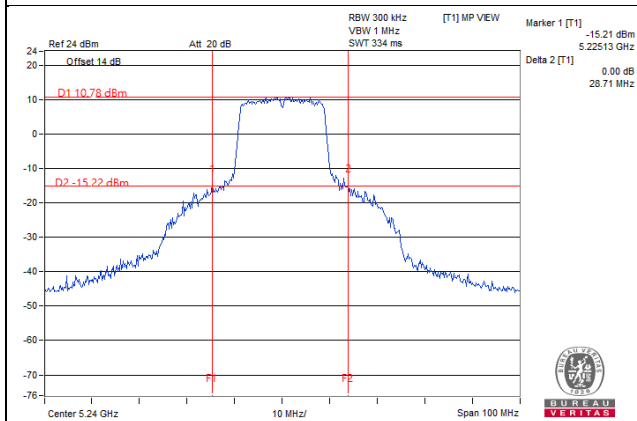
11ac 20MHz 1S3T CDD CH48 Ant2



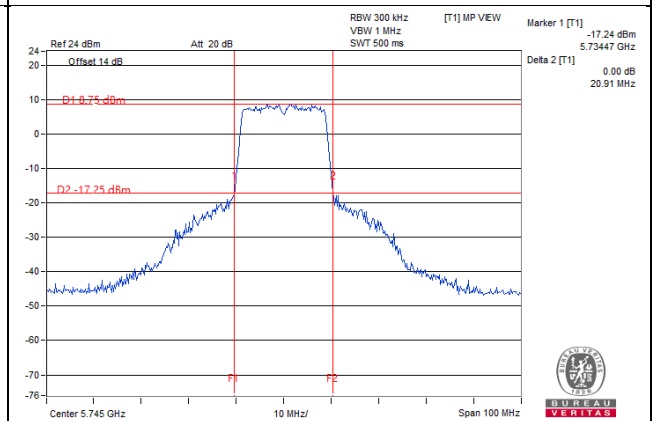
11ac 20MHz 1S3T CDD CH149 Ant2



11ac 20MHz 1S3T CDD CH48 Ant3

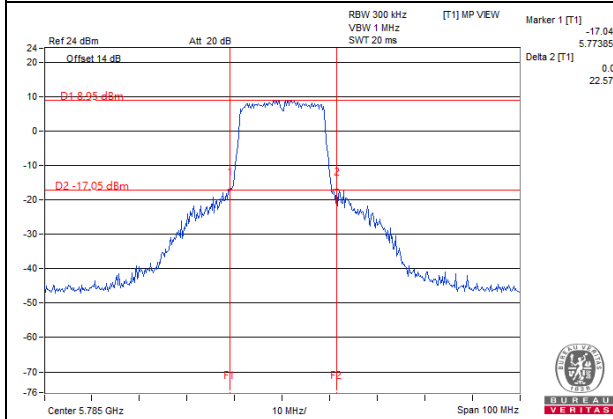


11ac 20MHz 1S3T CDD CH149 Ant3

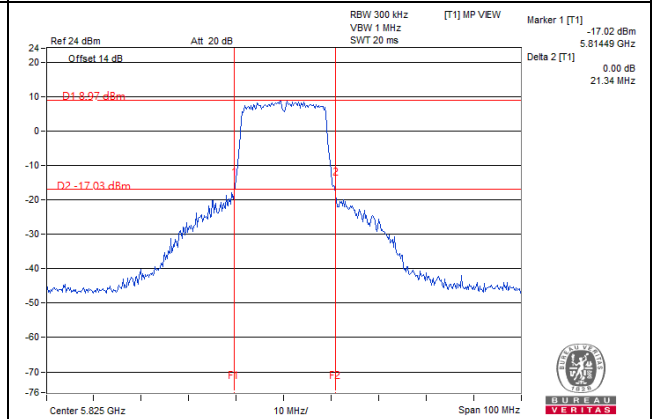


26dB BANDWIDTH SPECTRUM PLOT

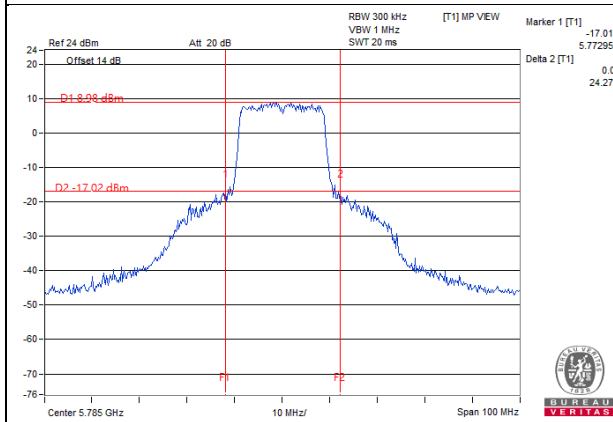
11ac 20MHz 1S3T CDD CH157 Ant1



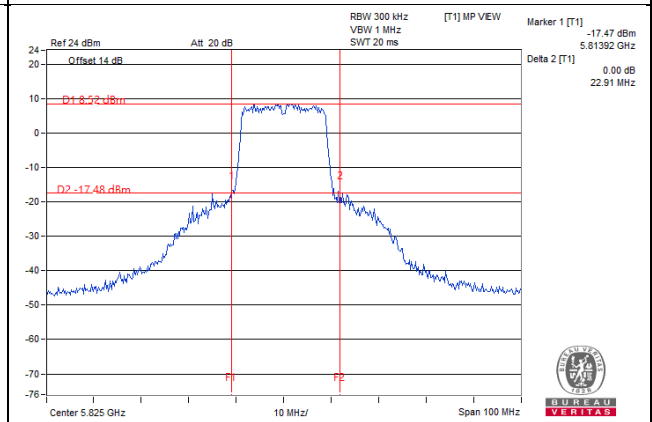
11ac 20MHz 1S3T CDD CH165 Ant1



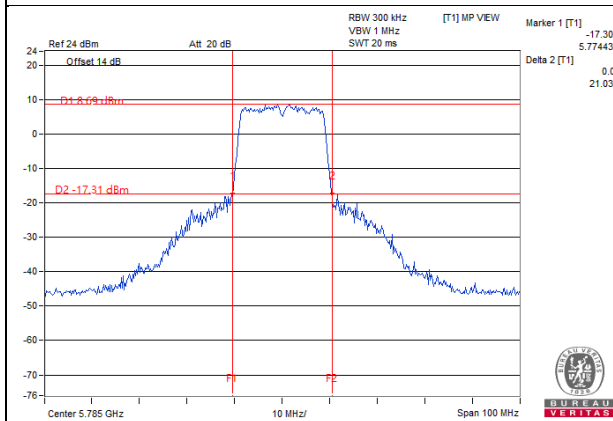
11ac 20MHz 1S3T CDD CH157 Ant2



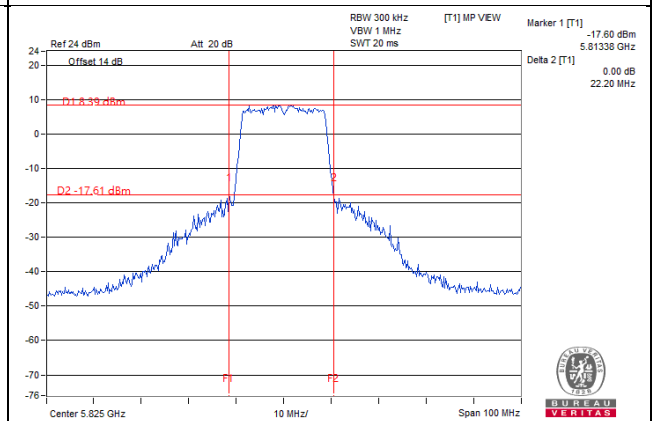
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11ac 20MHz 1S3T CDD CH157 Ant3

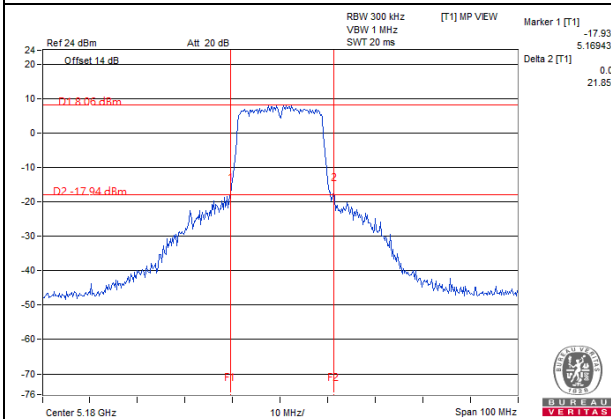


11ac 20MHz 1S3T CDD CH165 Ant3

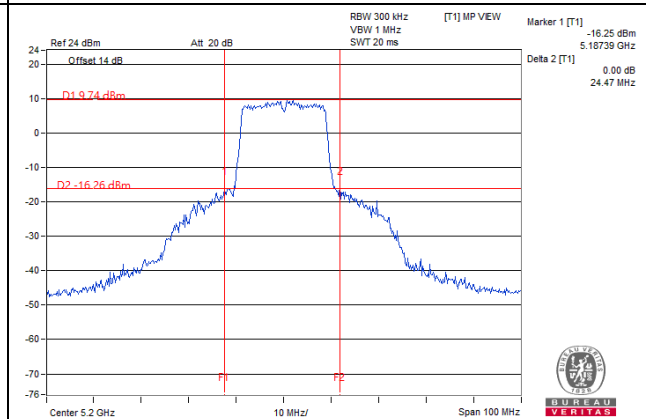


26dB BANDWIDTH SPECTRUM PLOT

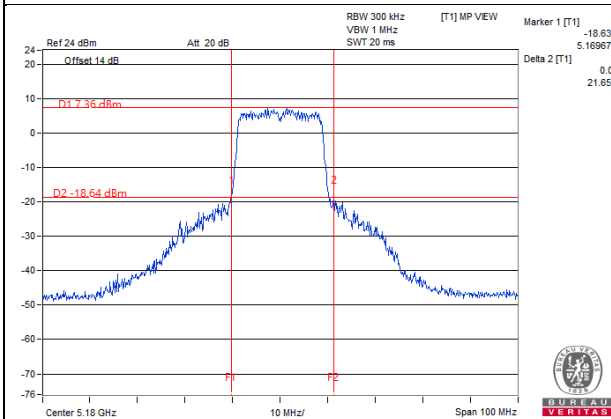
11ac 20MHz 1S3T TxBF CH36 Ant1



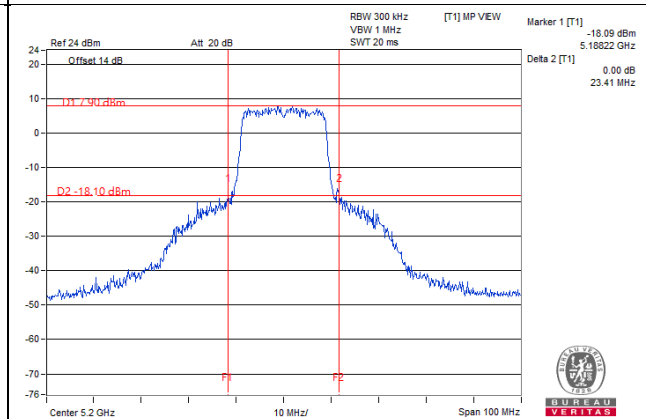
11ac 20MHz 1S3T TxBF CH40 Ant1



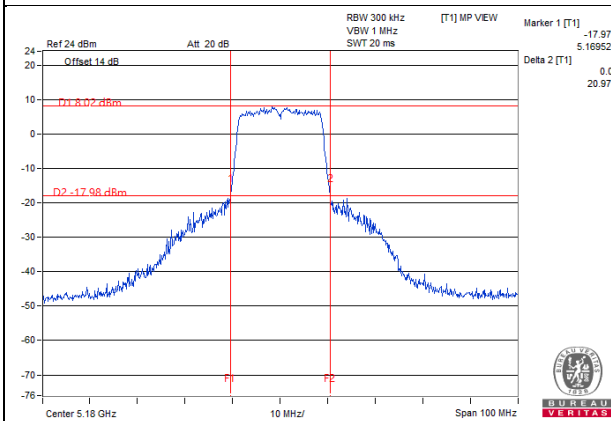
11ac 20MHz 1S3T TxBF CH36 Ant2



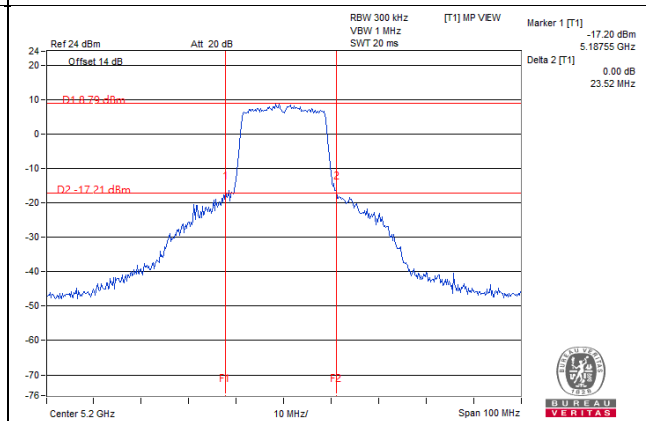
11ac 20MHz 1S3T TxBF CH40 Ant2



11ac 20MHz 1S3T TxBF CH36 Ant3

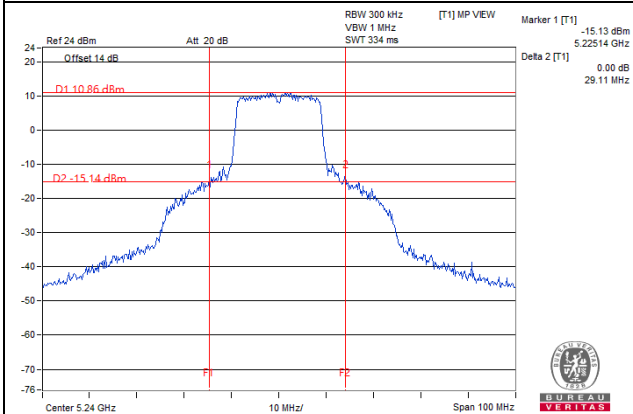


11ac 20MHz 1S3T TxBF CH40 Ant3

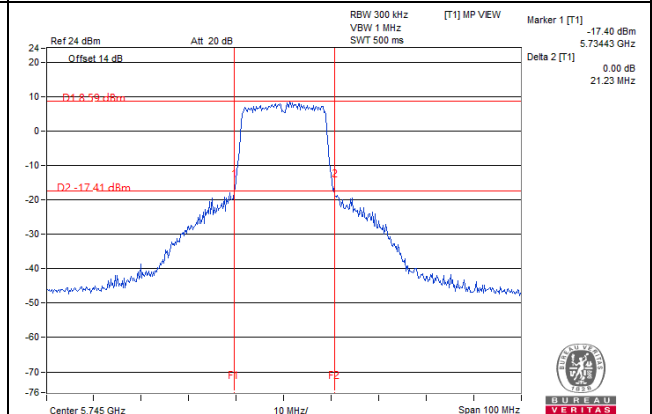


26dB BANDWIDTH SPECTRUM PLOT

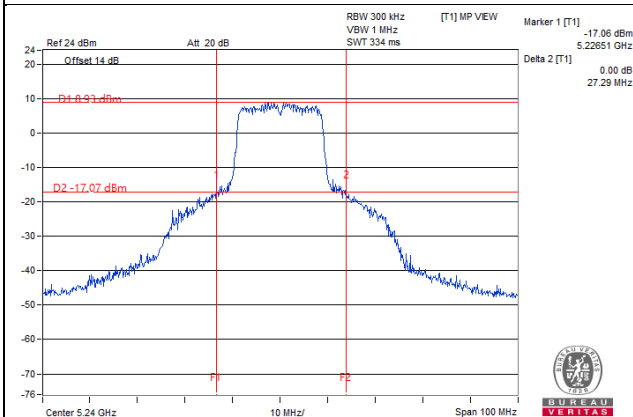
11ac 20MHz 1S3T TxBF CH48 Ant1



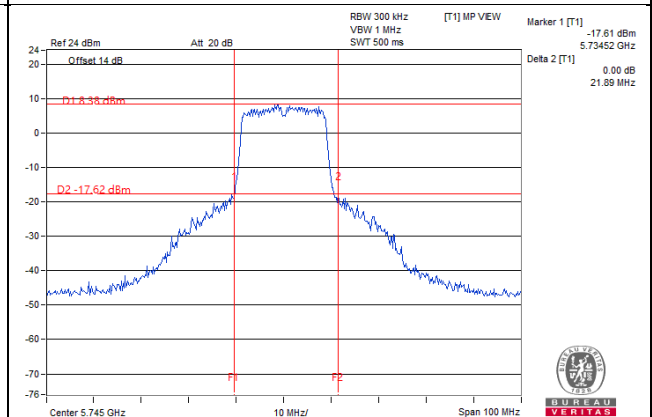
11ac 20MHz 1S3T TxBF CH149 Ant1



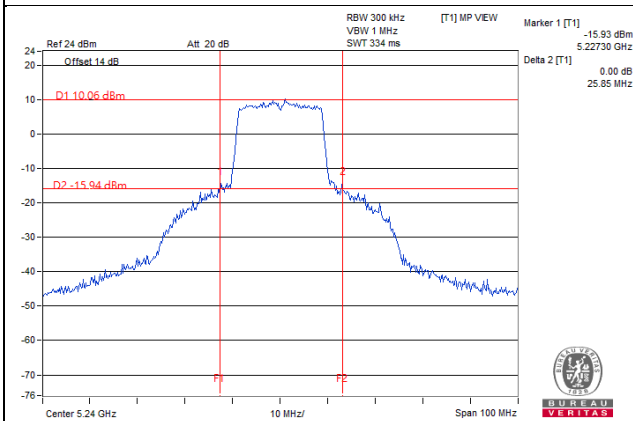
11ac 20MHz 1S3T TxBF CH48 Ant2



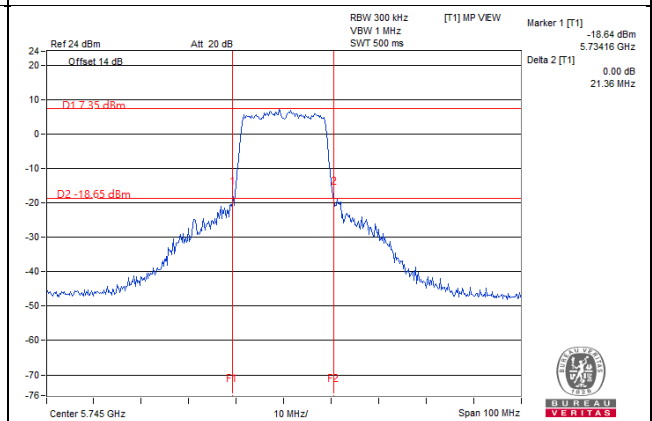
11ac 20MHz 1S3T TxBF CH149 Ant2



11ac 20MHz 1S3T TxBF CH48 Ant3

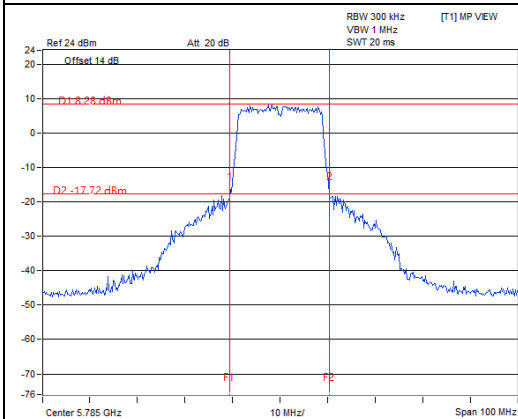


11ac 20MHz 1S3T TxBF CH149 Ant3

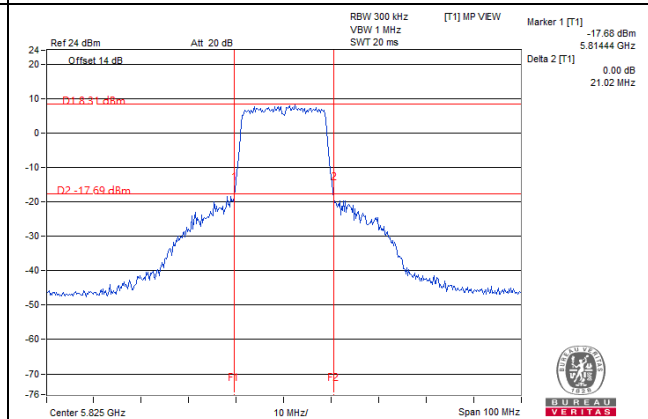


26dB BANDWIDTH SPECTRUM PLOT

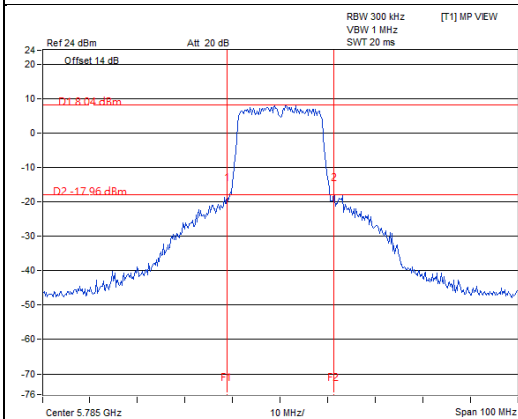
11ac 20MHz 1S3T TxBF CH157 Ant1



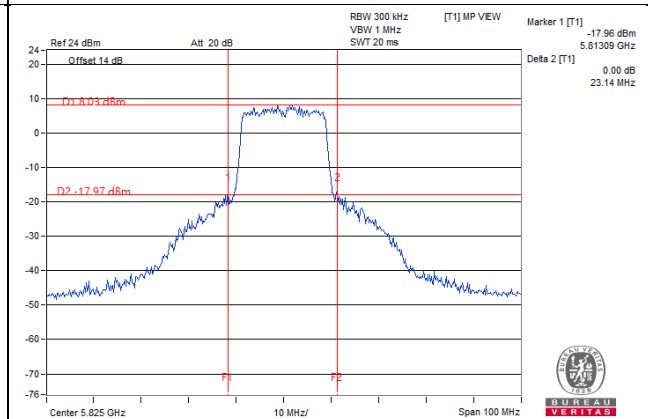
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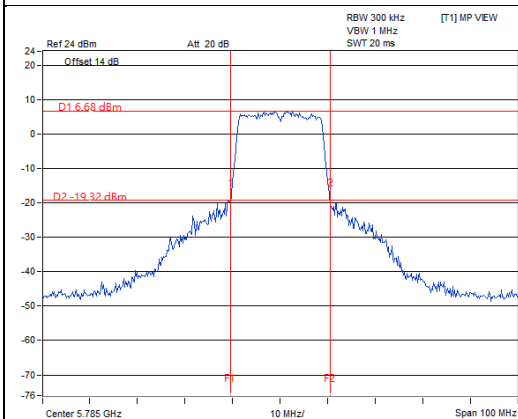
11ac 20MHz 1S3T TxBF CH157 Ant2



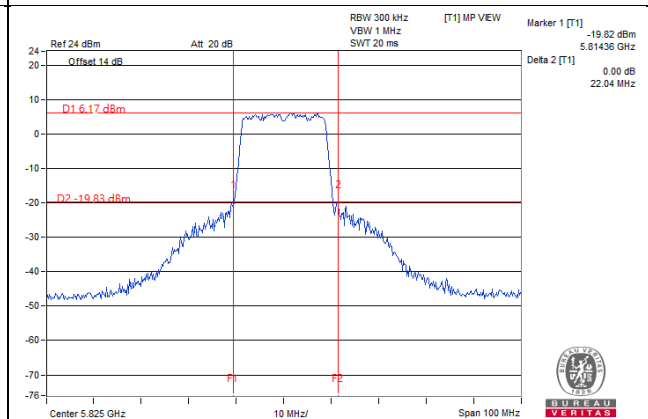
11ac 20MHz 1S3T TxBF CH165 Ant2



11ac 20MHz 1S3T TxBF CH157 Ant3

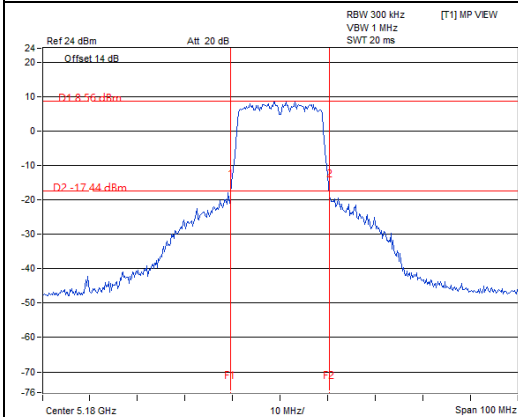


11ac 20MHz 1S3T TxBF CH165 Ant3

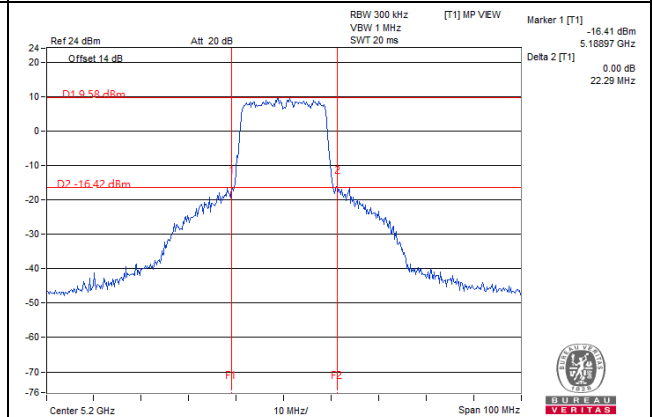


26dB BANDWIDTH SPECTRUM PLOT

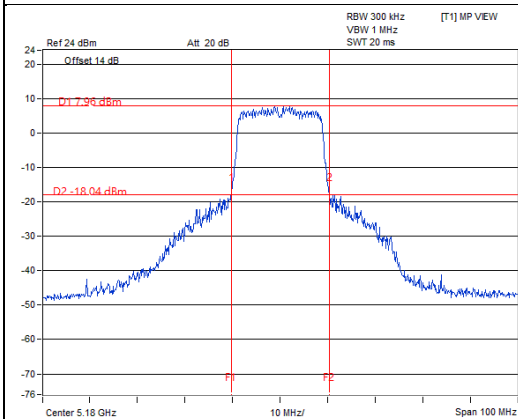
11ac 20MHz 2S3T TxBF CH36 Ant1



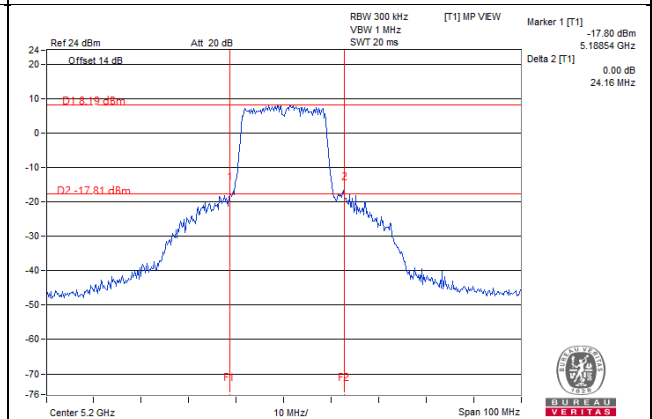
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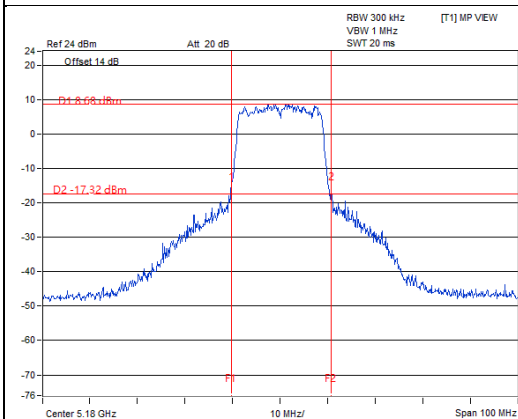
11ac 20MHz 2S3T TxBF CH36 Ant2



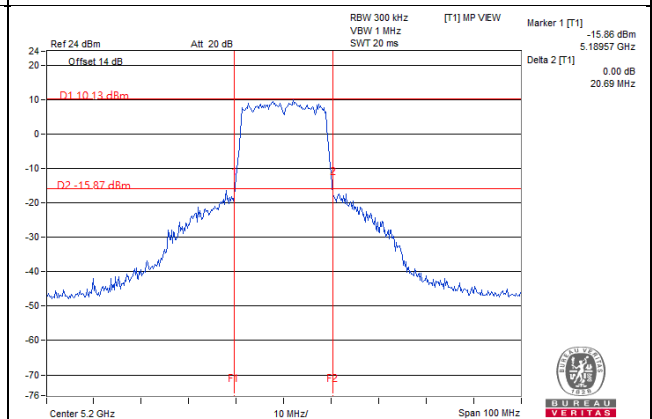
11ac 20MHz 2S3T TxBF CH40 Ant2



11ac 20MHz 2S3T TxBF CH36 Ant3

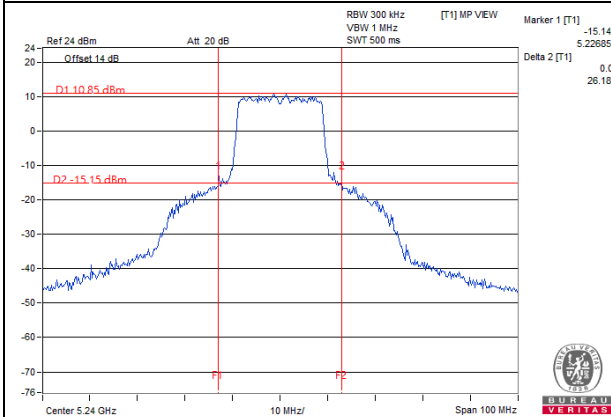


11ac 20MHz 2S3T TxBF CH40 Ant3

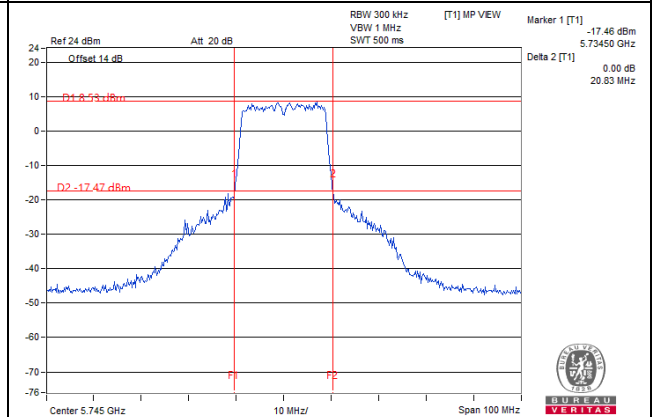


26dB BANDWIDTH SPECTRUM PLOT

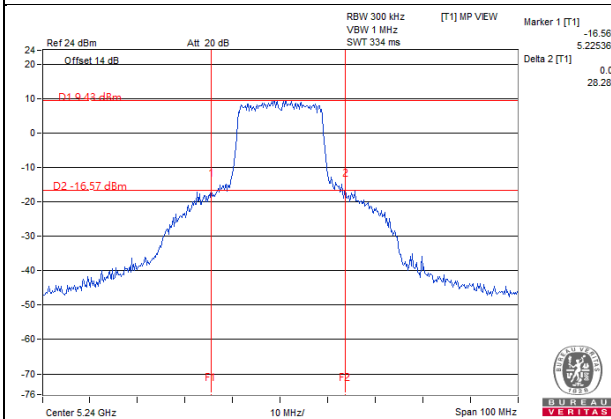
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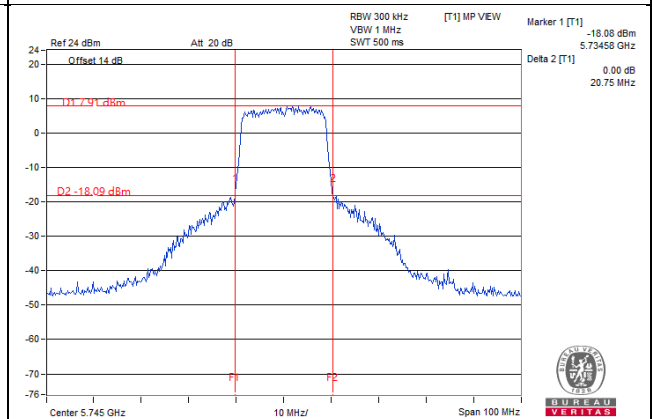
11ac 20MHz 2S3T TxBF CH149 Ant1



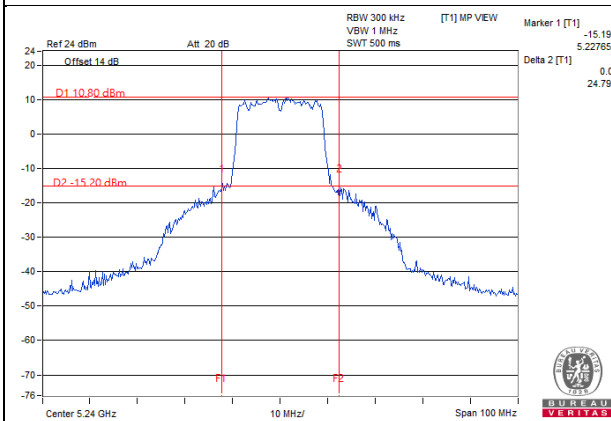
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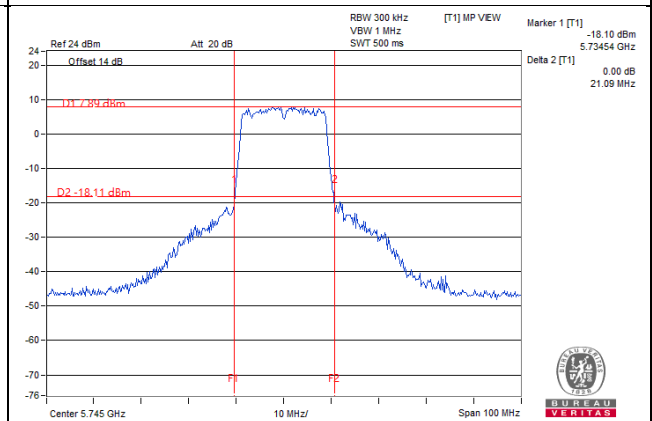
11ac 20MHz 2S3T TxBF CH149 Ant2



11ac 20MHz 2S3T TxBF CH48 Ant3

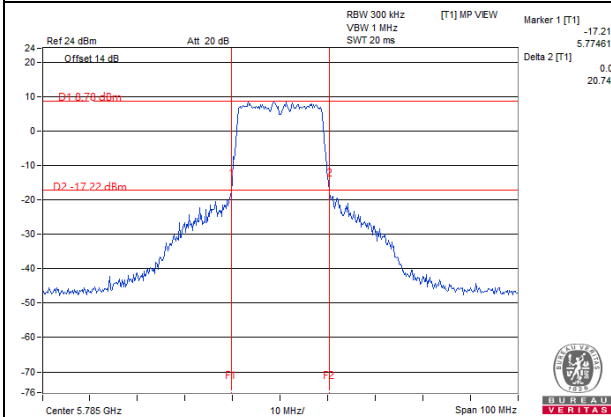


11ac 20MHz 2S3T TxBF CH149 Ant3

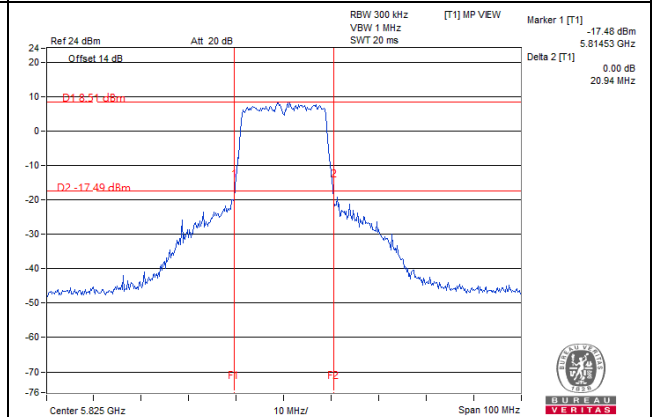


26dB BANDWIDTH SPECTRUM PLOT

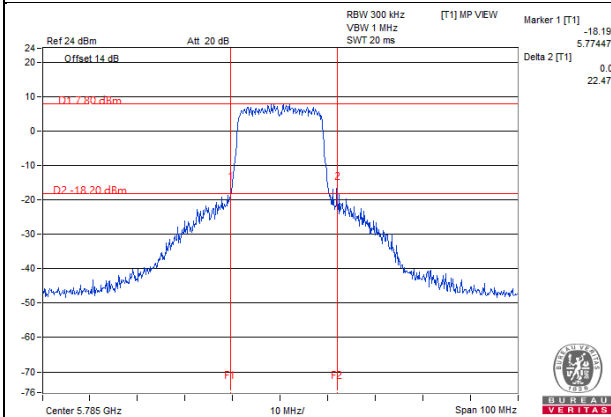
11ac 20MHz 2S3T TxBF CH157 Ant1



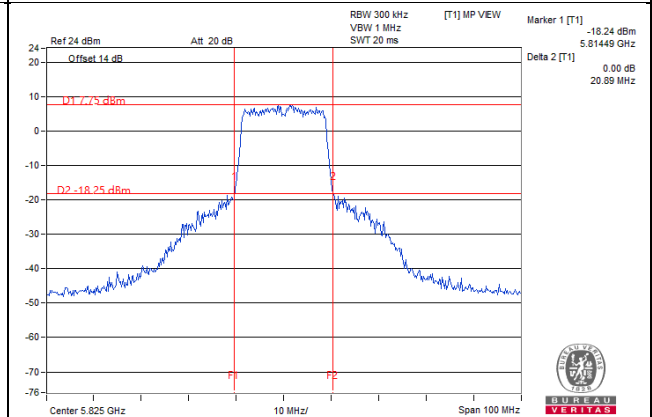
11ac 20MHz 2S3T TxBF CH165 Ant1



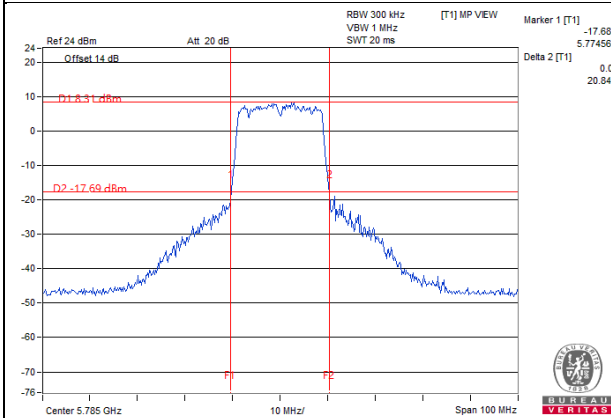
11ac 20MHz 2S3T TxBF CH157 Ant2



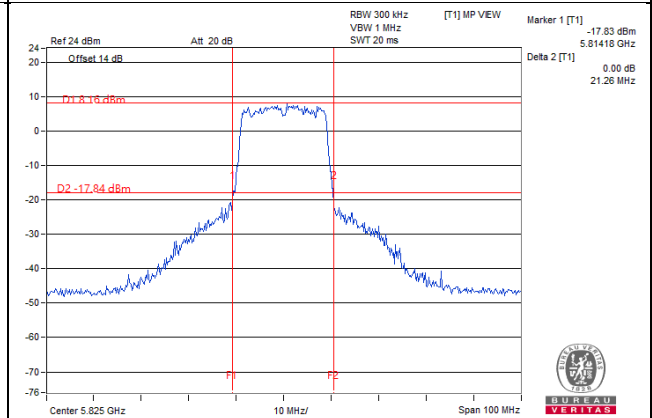
11ac 20MHz 2S3T TxBF CH165 Ant2



11ac 20MHz 2S3T TxBF CH157 Ant3

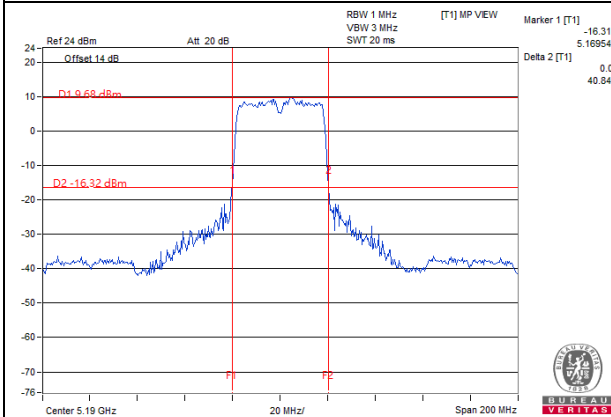


11ac 20MHz 2S3T TxBF CH165 Ant3

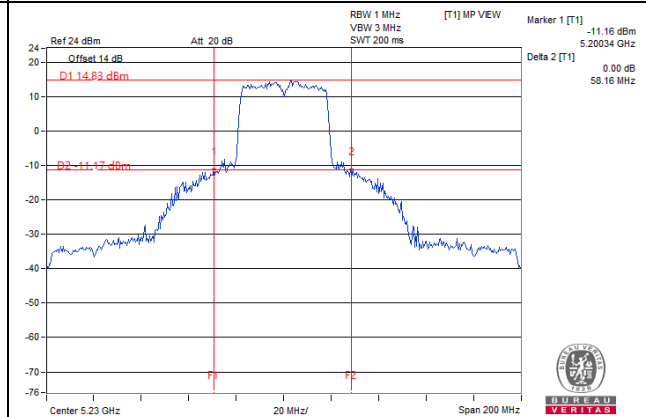


26dB BANDWIDTH SPECTRUM PLOT

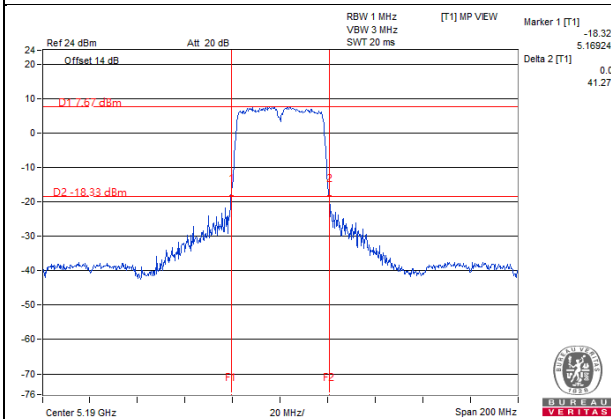
11ac 40MHz 1S3T CDD CH38 Ant1



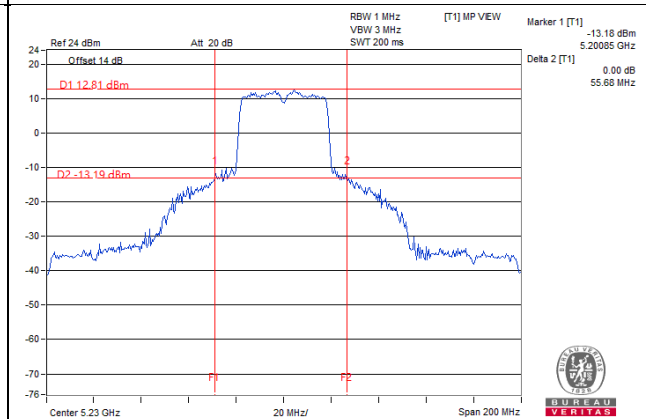
11ac 40MHz 1S3T CDD CH46 Ant1



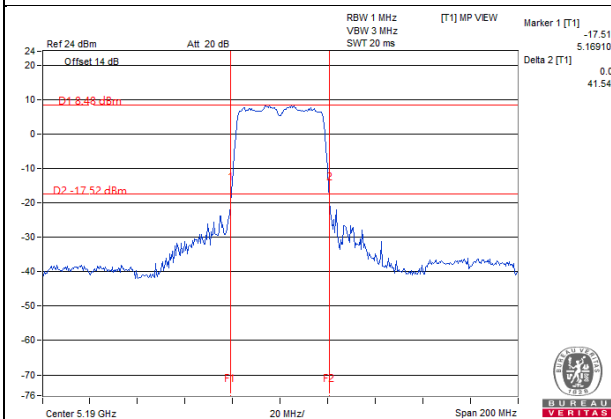
11ac 40MHz 1S3T CDD CH38 Ant2



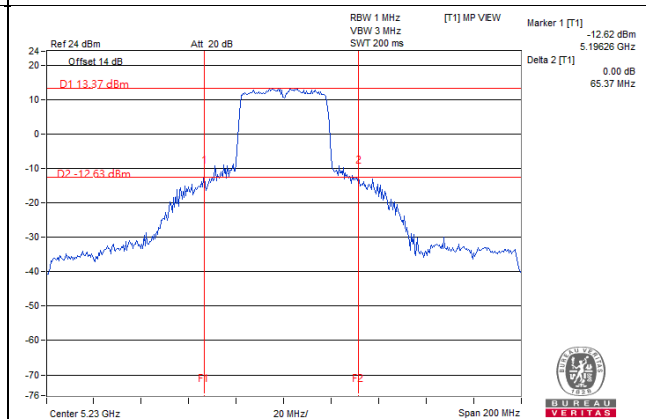
11ac 40MHz 1S3T CDD CH46 Ant2



11ac 40MHz 1S3T CDD CH38 Ant3

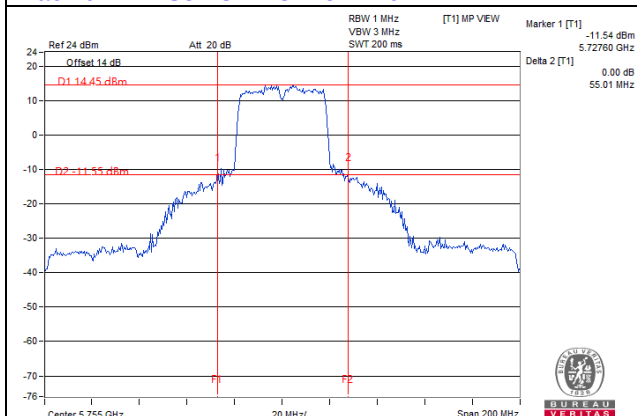


11ac 40MHz 1S3T CDD CH46 Ant3

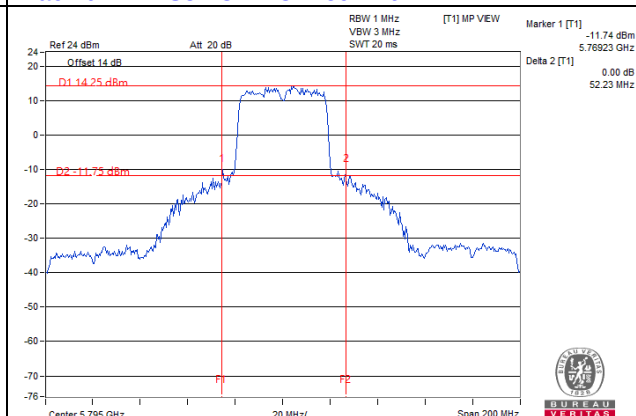


26dB BANDWIDTH SPECTRUM PLOT

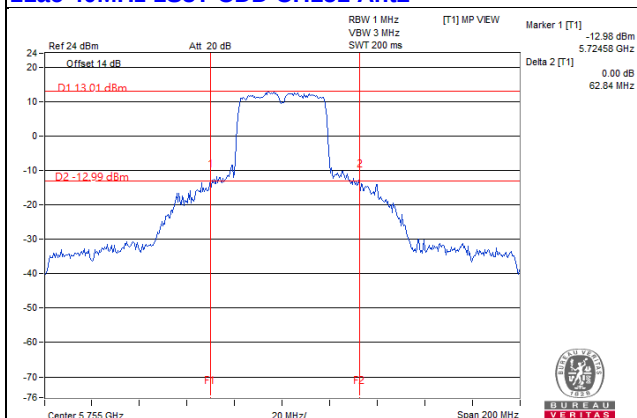
11ac 40MHz 1S3T CDD CH151 Ant1



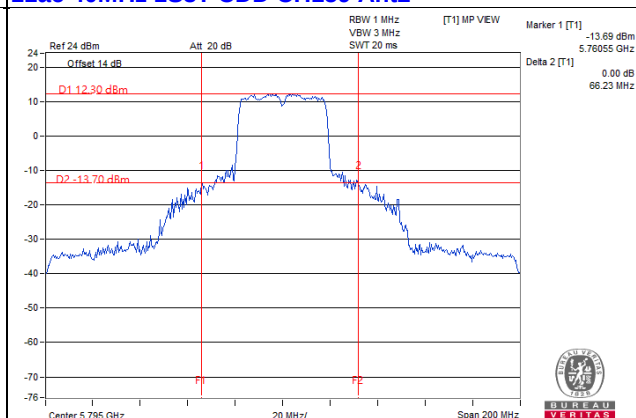
11ac 40MHz 1S3T CDD CH159 Ant1



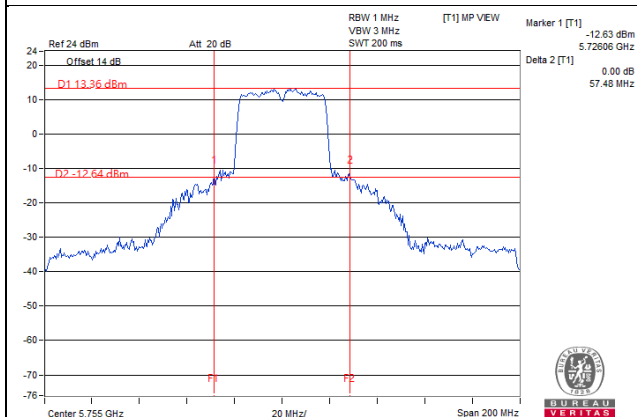
11ac 40MHz 1S3T CDD CH151 Ant2



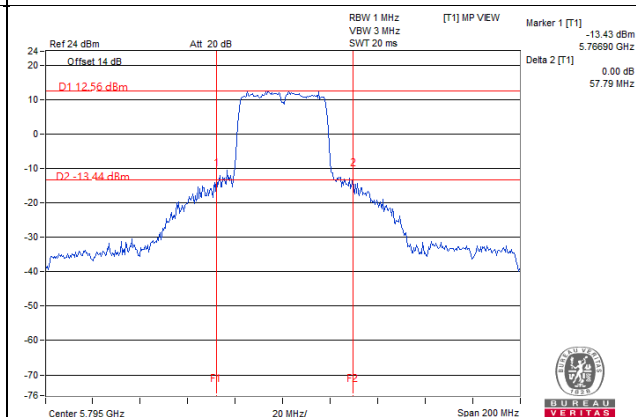
11ac 40MHz 1S3T CDD CH159 Ant2



11ac 40MHz 1S3T CDD CH151 Ant3

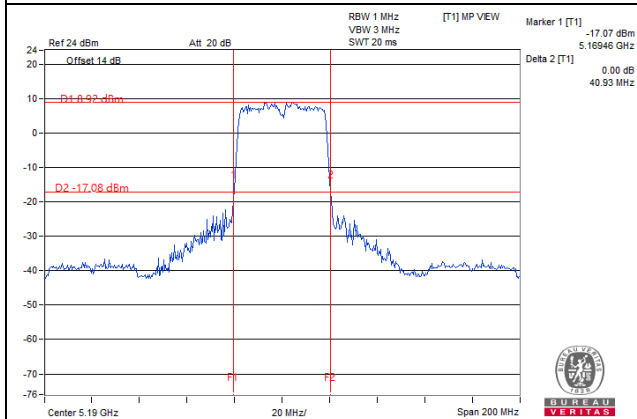


11ac 40MHz 1S3T CDD CH159 Ant3

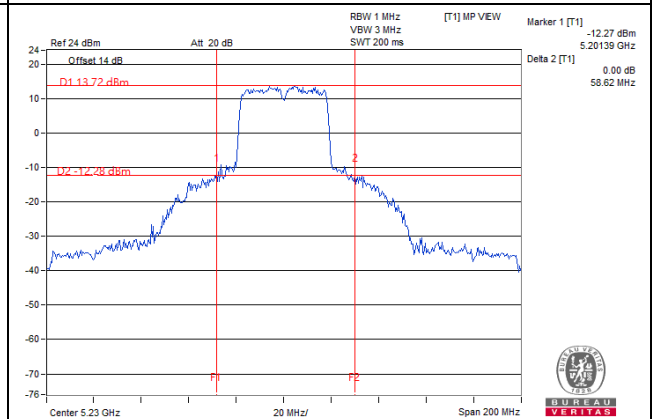


26dB BANDWIDTH SPECTRUM PLOT

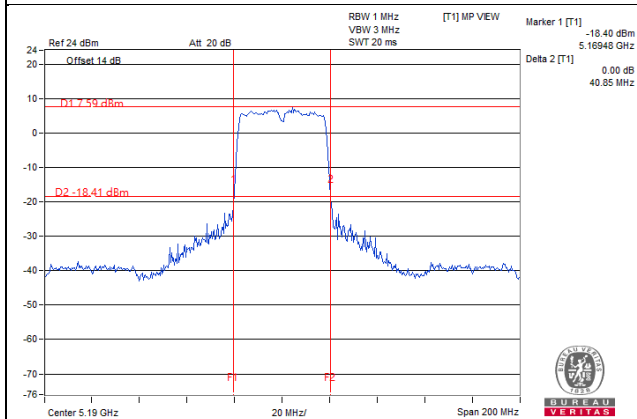
11ac 40MHz 1S3T TxBF CH38 Ant1



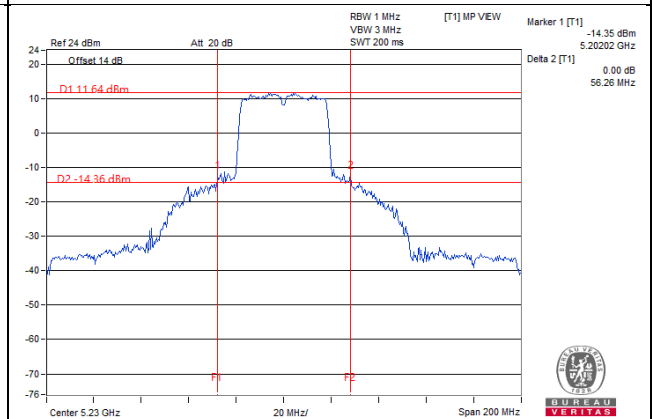
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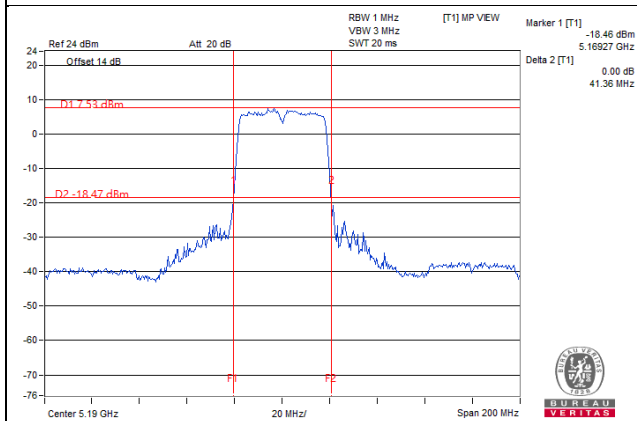
11ac 40MHz 1S3T TxBF CH38 Ant2



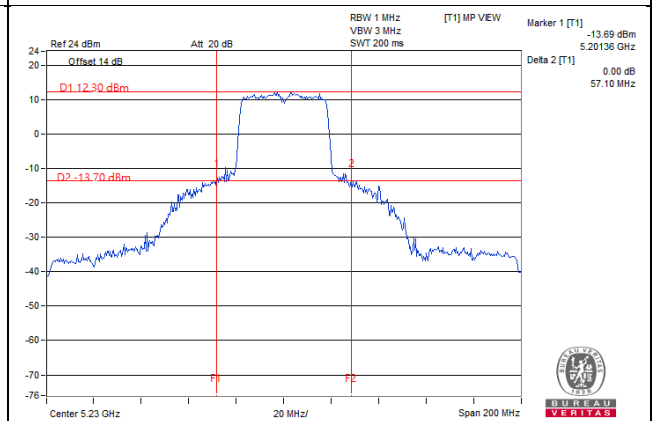
11ac 40MHz 1S3T TxBF CH46 Ant2



11ac 40MHz 1S3T TxBF CH38 Ant3

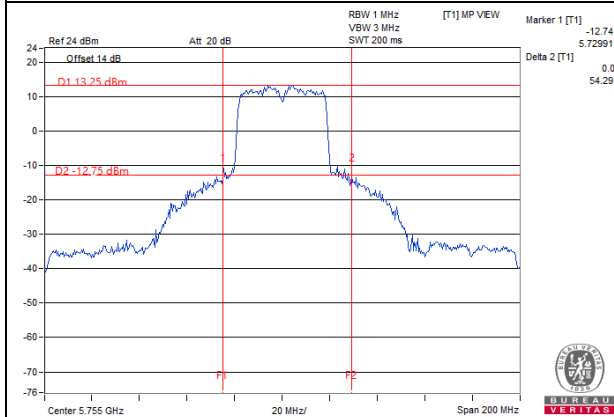


11ac 40MHz 1S3T TxBF CH46 Ant3

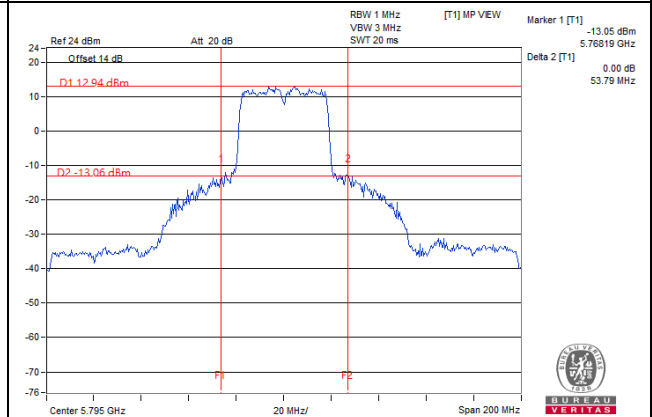


26dB BANDWIDTH SPECTRUM PLOT

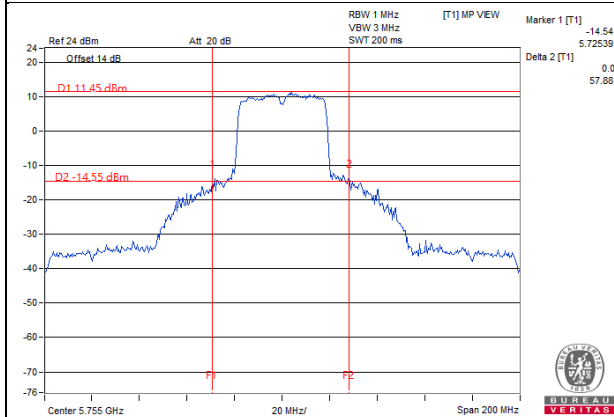
11ac 40MHz 1S3T TxBF CH151 Ant1



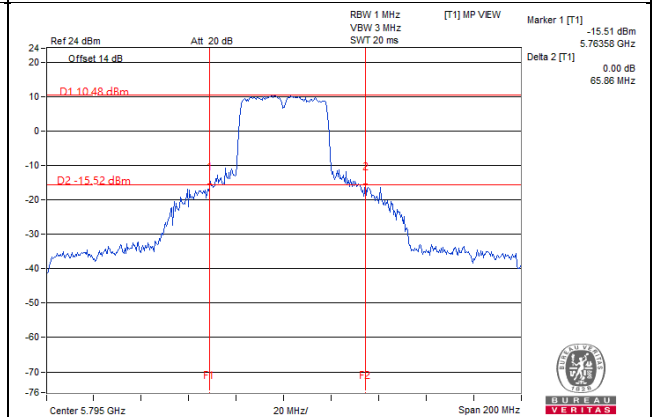
11ac 40MHz 1S3T TxBF CH159 Ant1



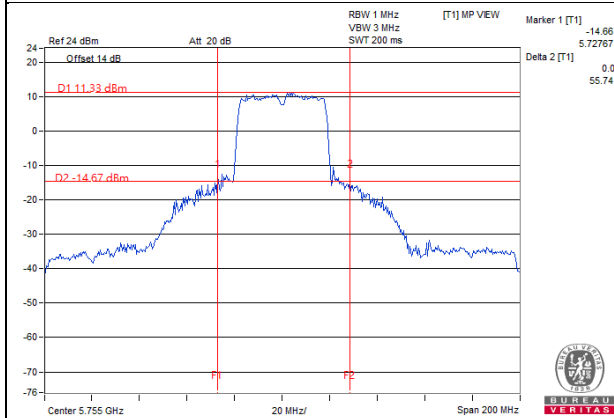
11ac 40MHz 1S3T TxBF CH151 Ant2



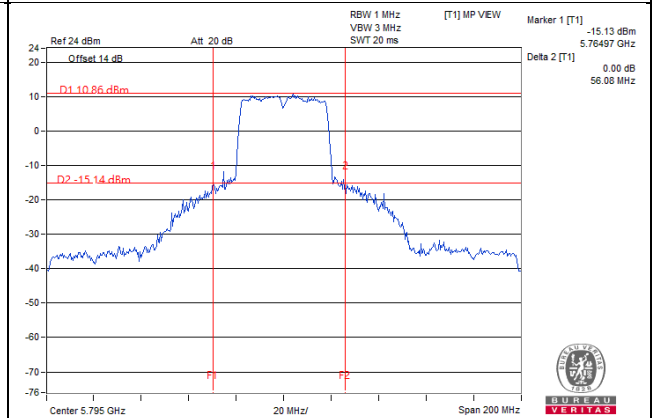
11ac 40MHz 1S3T TxBF CH159 Ant2



11ac 40MHz 1S3T TxBF CH151 Ant3

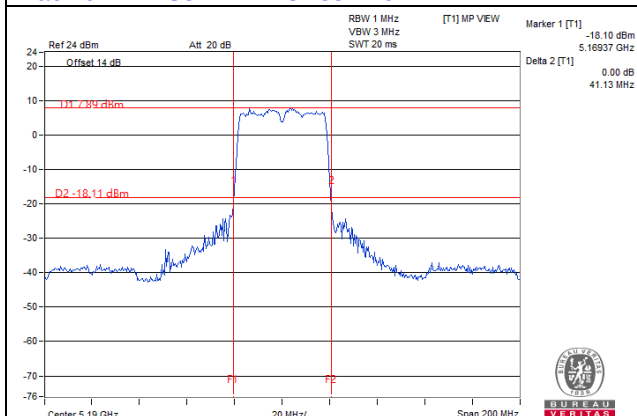


11ac 40MHz 1S3T TxBF CH159 Ant3

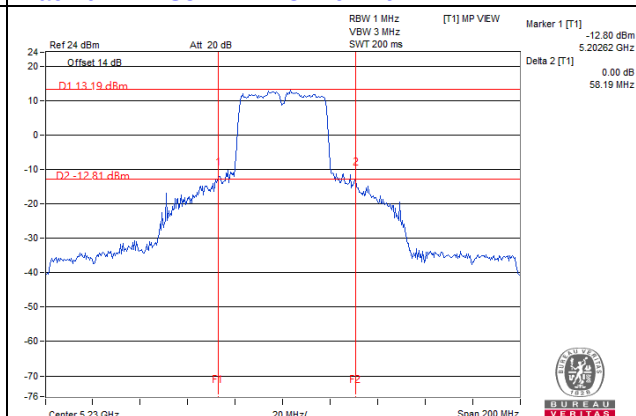


26dB BANDWIDTH SPECTRUM PLOT

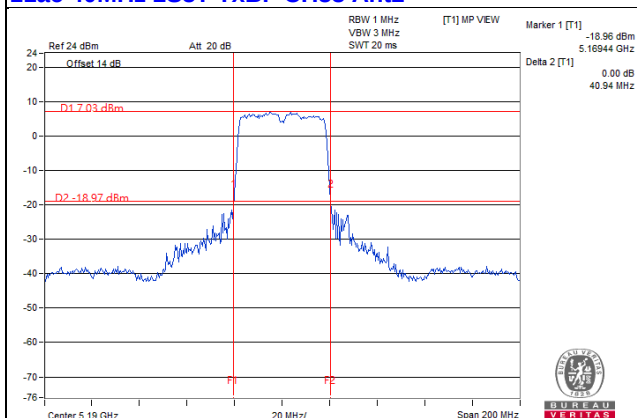
11ac 40MHz 2S3T TxBF CH38 Ant1



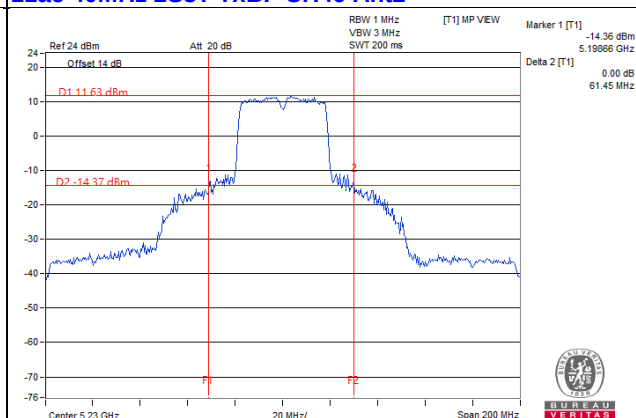
11ac 40MHz 2S3T TxBF CH46 Ant1



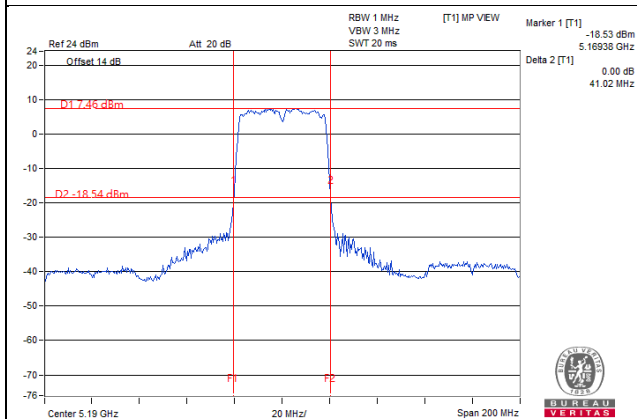
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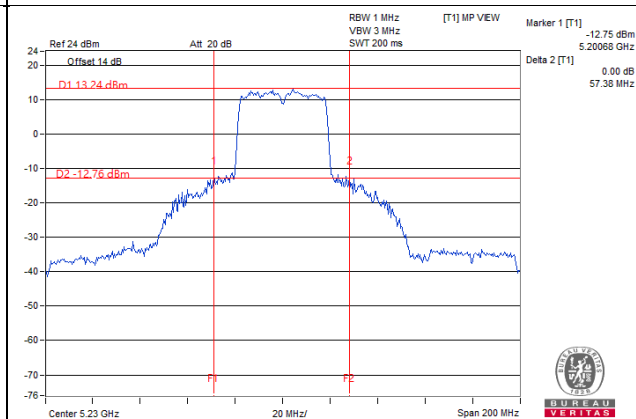
11ac 40MHz 2S3T TxBF CH46 Ant2



11ac 40MHz 2S3T TxBF CH38 Ant3

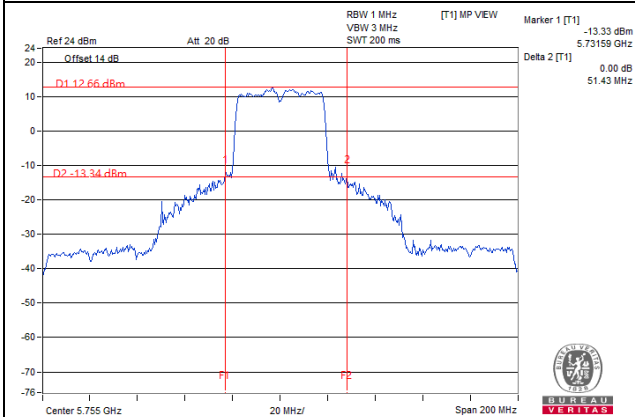


11ac 40MHz 2S3T TxBF CH46 Ant3

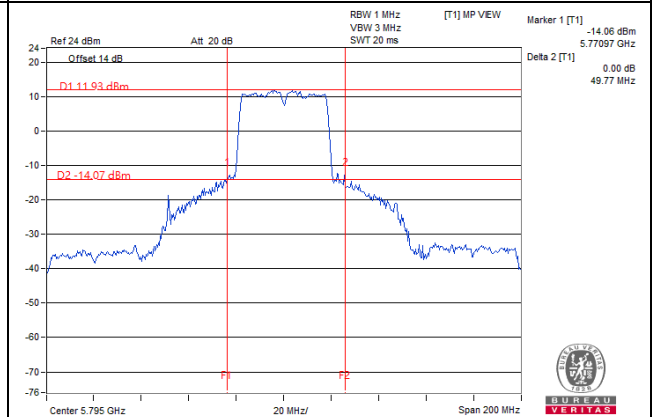


26dB BANDWIDTH SPECTRUM PLOT

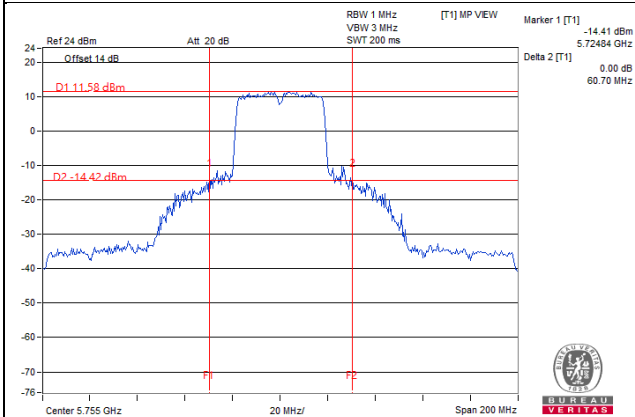
11ac 40MHz 2S3T TxBF CH151 Ant1



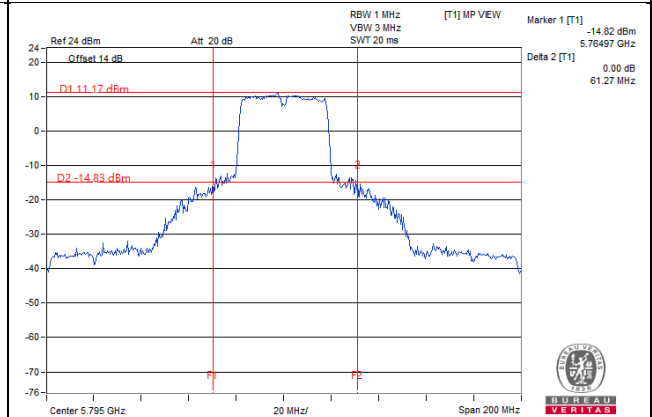
11ac 40MHz 2S3T TxBF CH159 Ant1



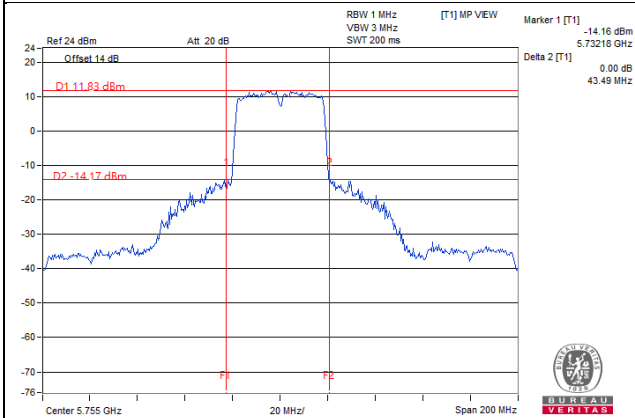
11ac 40MHz 2S3T TxBF CH151 Ant2



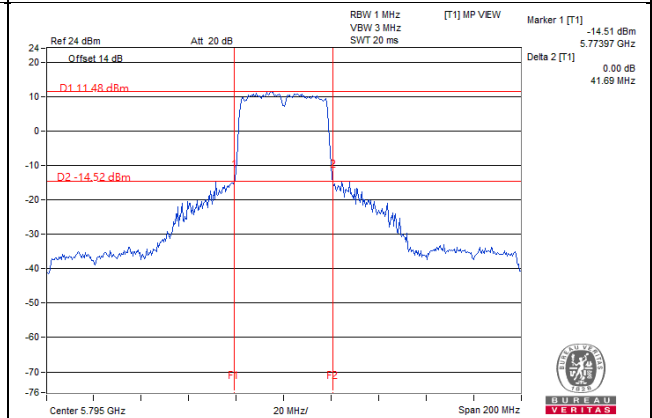
11ac 40MHz 2S3T TxBF CH159 Ant2



11ac 40MHz 2S3T TxBF CH151 Ant3

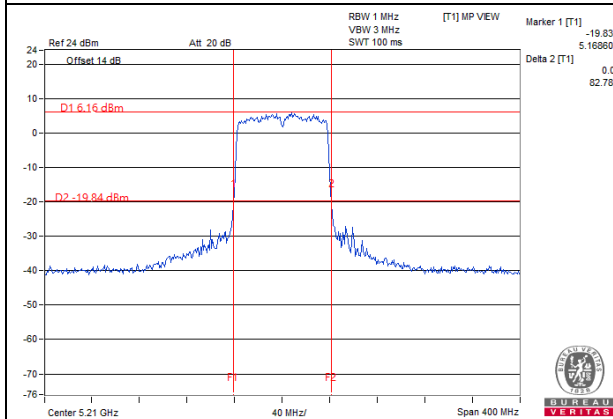


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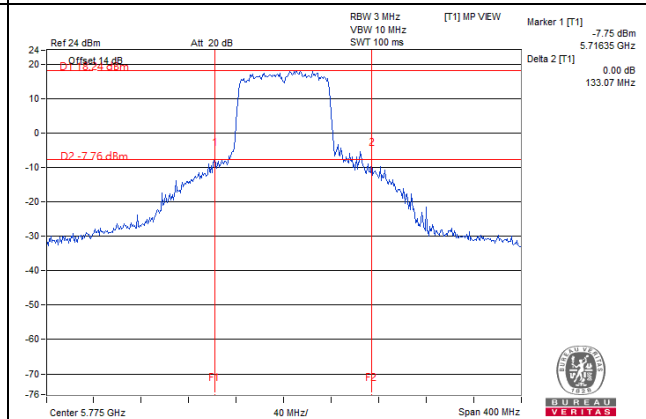


26dB BANDWIDTH SPECTRUM PLOT

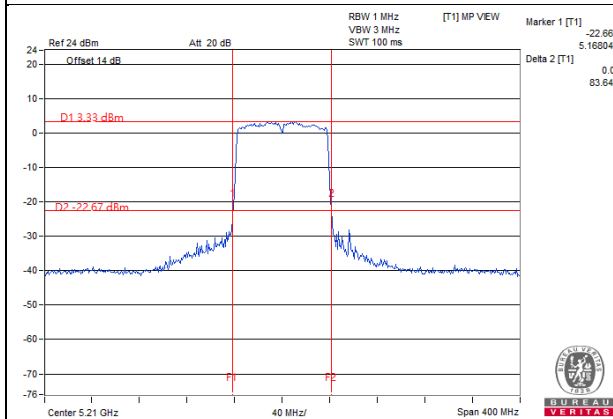
11ac 80MHz 1S3T CDD CH42 Ant1



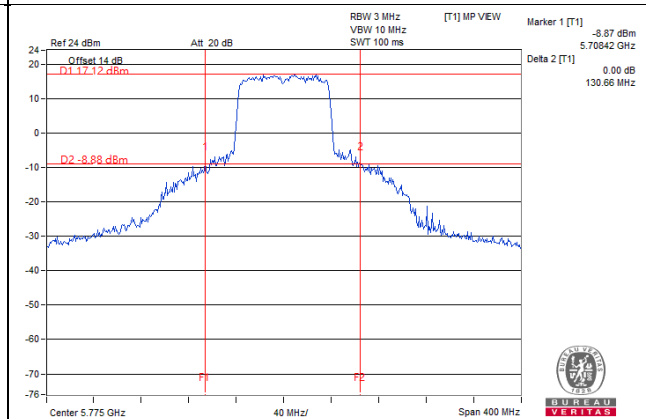
11ac 80MHz 1S3T CDD CH155 Ant1



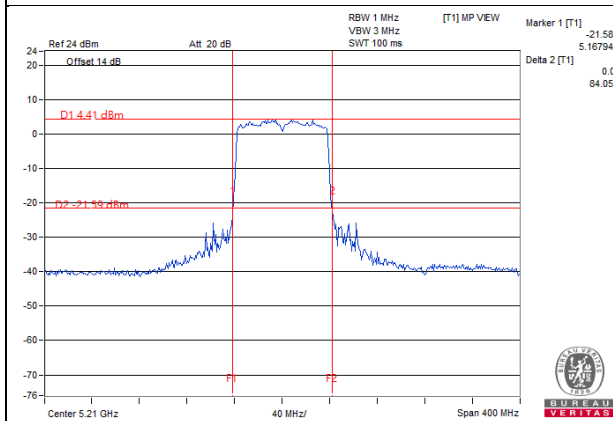
11ac 80MHz 1S3T CDD CH42 Ant2



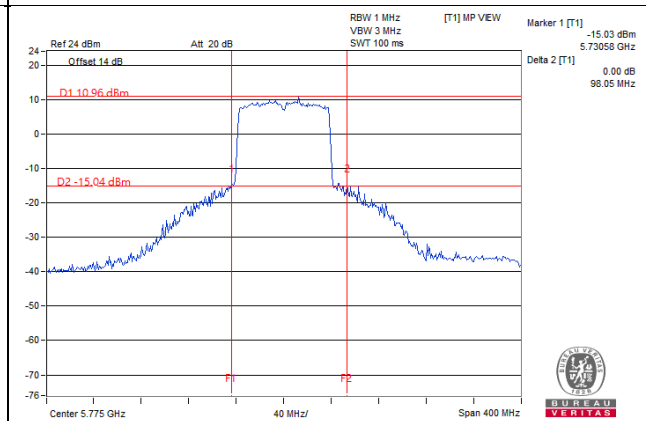
11ac 80MHz 1S3T CDD CH155 Ant2



11ac 80MHz 1S3T CDD CH42 Ant3

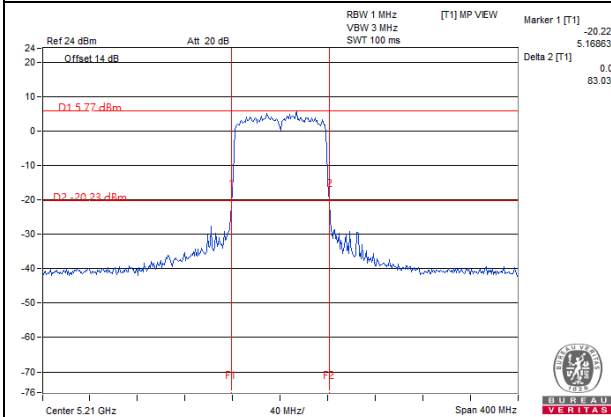


11ac 80MHz 1S3T CDD CH155 Ant3

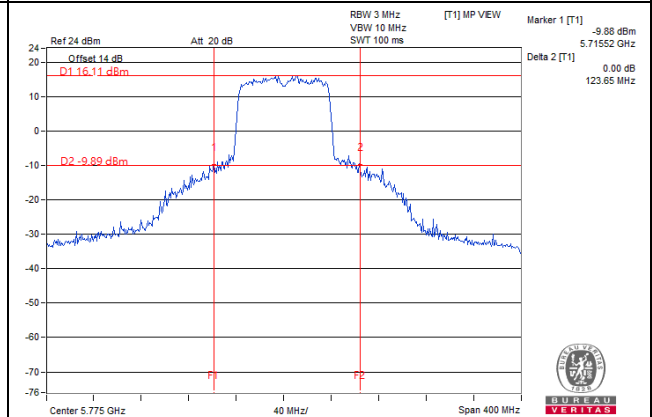


26dB BANDWIDTH SPECTRUM PLOT

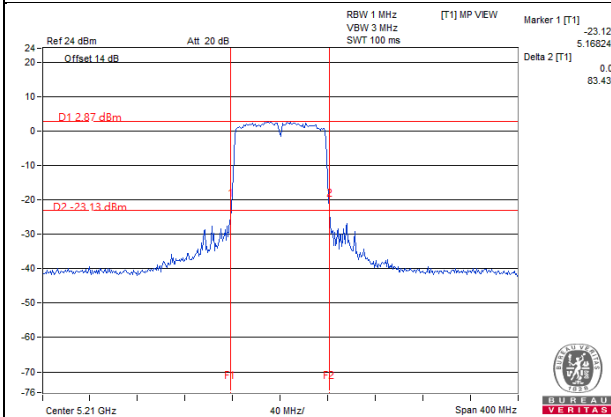
11ac 80MHz 1S3T TxBF CH42 Ant1



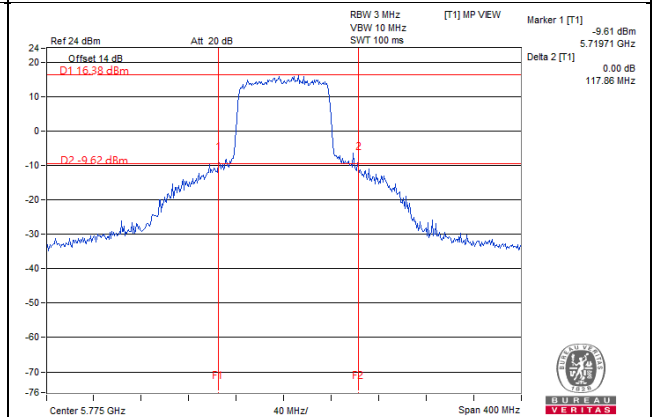
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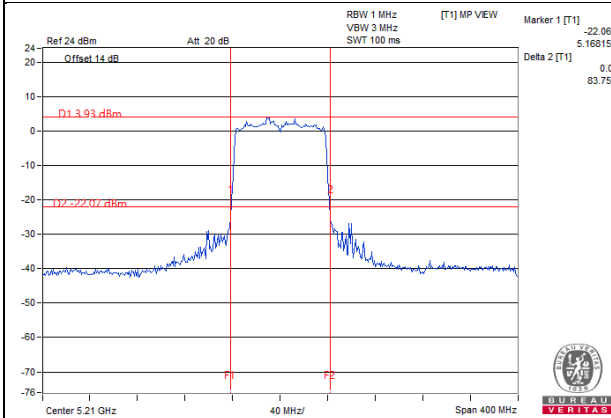
11ac 80MHz 1S3T TxBF CH42 Ant2



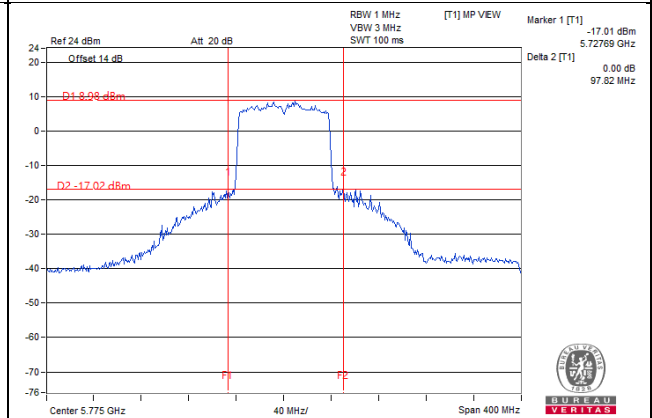
11ac 80MHz 1S3T TxBF CH155 Ant2



11ac 80MHz 1S3T TxBF CH42 Ant3

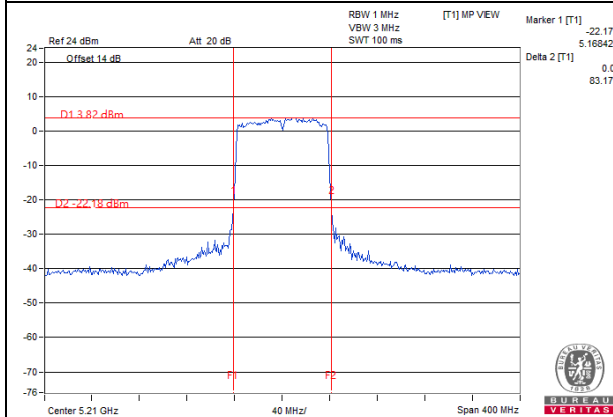


11ac 80MHz 1S3T TxBF CH155 Ant3

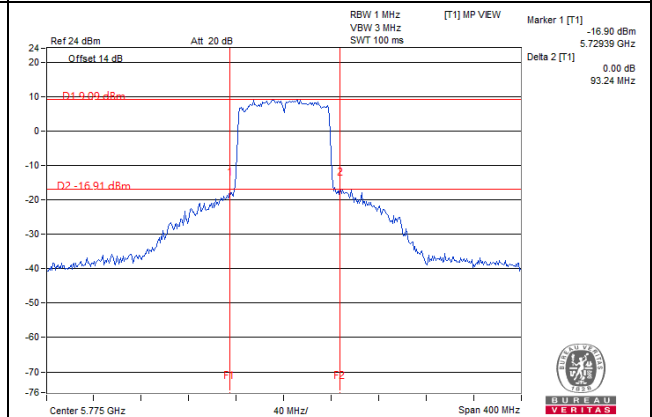


26dB BANDWIDTH SPECTRUM PLOT

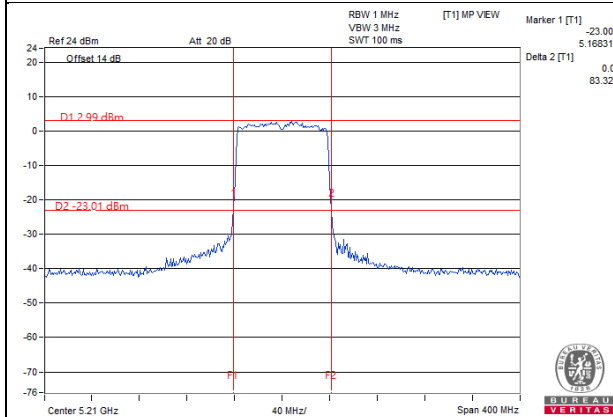
11ac 80MHz 2S3T TxBF CH42 Ant1



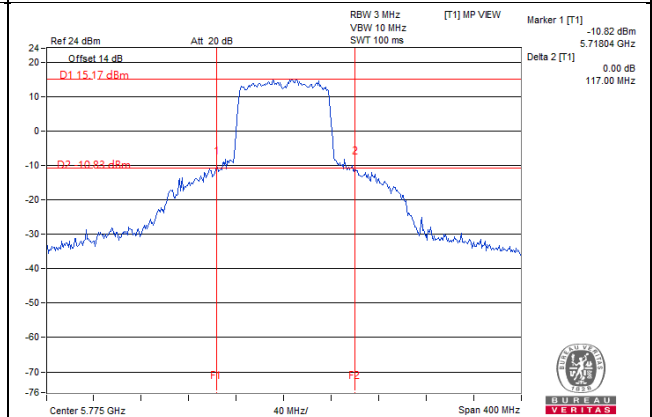
11ac 80MHz 2S3T TxBF CH155 Ant1



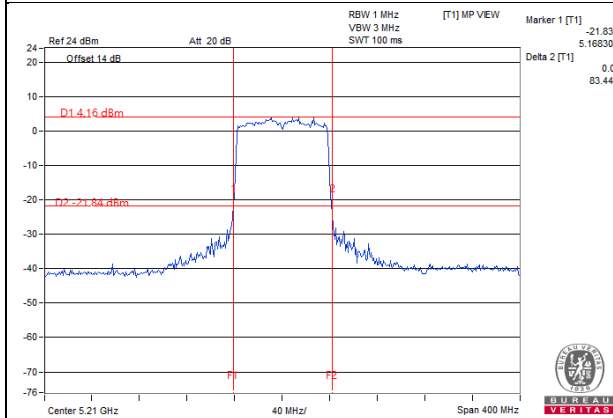
11ac 80MHz 2S3T TxBF CH42 Ant2



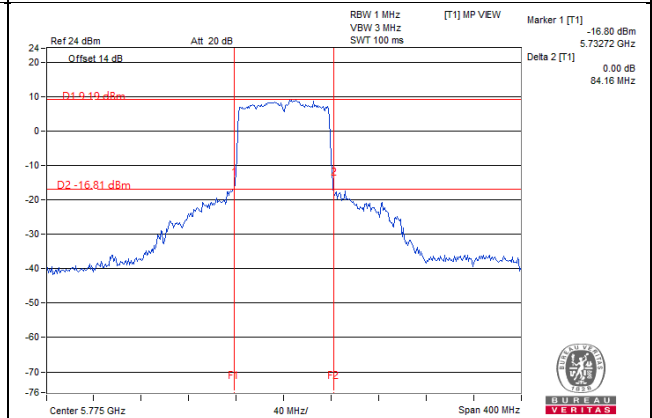
11ac 80MHz 2S3T TxBF CH155 Ant2



11ac 80MHz 2S3T TxBF CH42 Ant3



11ac 80MHz 2S3T TxBF CH155 Ant3



11a 1S3T CDD

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	16.92	16.95	16.87
40	5200	16.80	16.92	17.04
48	5240	17.04	17.04	17.04
149	5745	16.80	16.80	16.92
157	5785	16.80	16.92	16.92
165	5825	16.80	16.80	16.92

11ac 20MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	17.88	17.83	18.00
40	5200	17.88	18.00	18.12
48	5240	18.12	17.88	18.12
149	5745	17.88	17.88	18.12
157	5785	17.88	17.88	17.88
165	5825	17.88	17.88	18.00

11ac 20MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	17.88	17.83	18.00
40	5200	17.88	17.91	18.00
48	5240	18.12	17.91	18.12
149	5745	17.88	17.88	18.00
157	5785	17.88	17.88	18.00
165	5825	17.88	17.88	18.00

11ac 20MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
36	5180	18.00	17.83	17.92
40	5200	18.00	17.88	18.00
48	5240	18.12	17.88	18.12
149	5745	17.88	17.88	18.00
157	5785	18.12	17.83	17.88
165	5825	17.88	17.88	17.88

11ac 40MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	36.48	36.69	36.48
46	5230	36.72	36.72	36.72
151	5755	36.96	36.96	36.72
159	5795	36.96	36.72	36.72

11ac 40MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	36.48	36.72	36.48
46	5230	36.72	36.72	36.72
151	5755	36.72	36.96	36.72
159	5795	36.72	36.72	36.72

11ac 40MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
38	5190	36.48	36.48	36.72
46	5230	36.72	36.96	36.72
151	5755	36.72	36.72	36.72
159	5795	36.72	36.72	36.72

11ac 80MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	75.84	75.84	75.84
155	5775	75.84	75.84	75.84

11ac 80MHz 1S3T TxBF

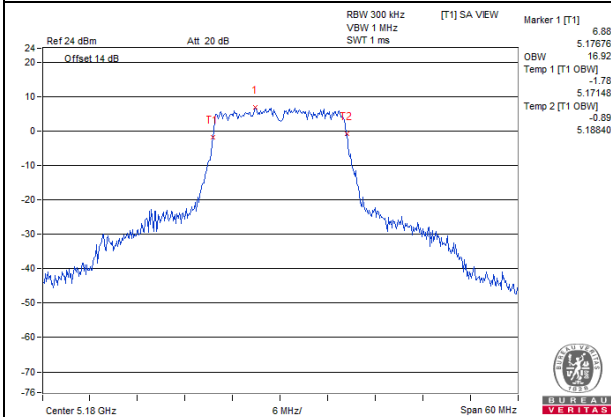
CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	75.84	75.36	75.84
155	5775	75.84	75.84	76.32

11ac 80MHz 2S3T TxBF

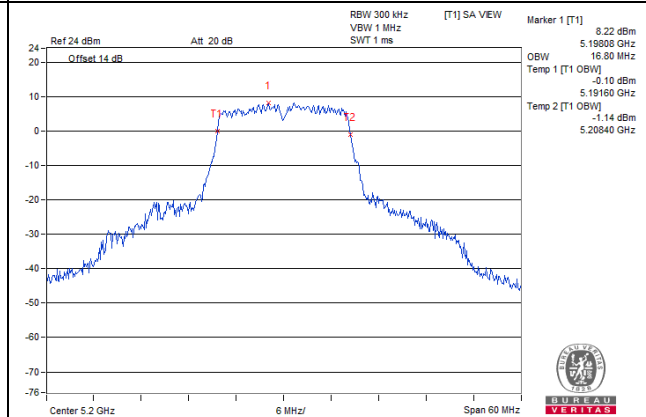
CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)		
		Ant 1	Ant 2	Ant 3
42	5210	75.84	75.84	75.84
155	5775	75.84	75.84	76.32

99% OCCUPIED BANDWIDTH SPECTRUM PLOT

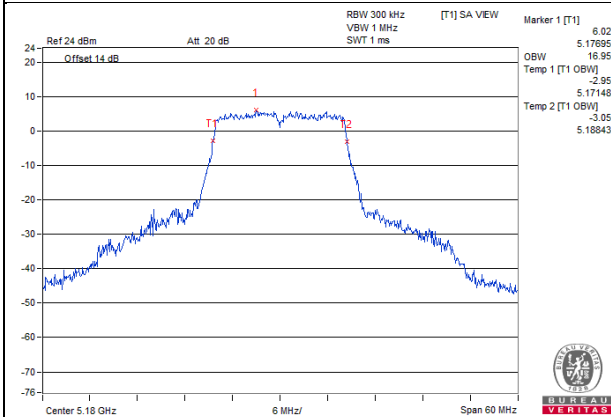
11a 1S3T CDD CH36 Ant1



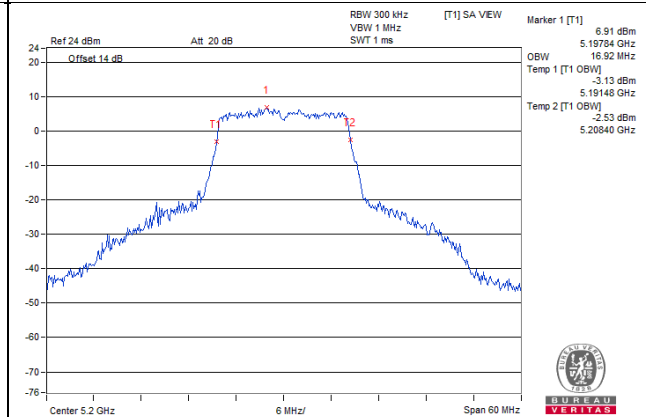
11a 1S3T CDD CH40 Ant1



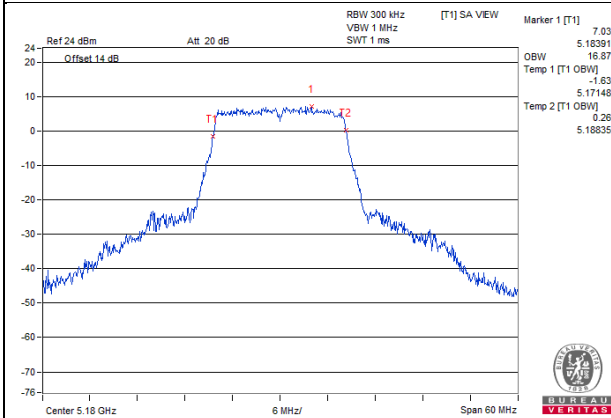
11a 1S3T CDD CH36 Ant2



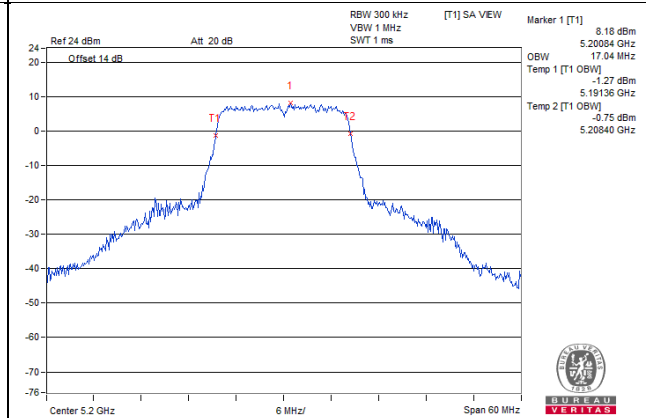
11a 1S3T CDD CH40 Ant2



11a 1S3T CDD CH36 Ant3

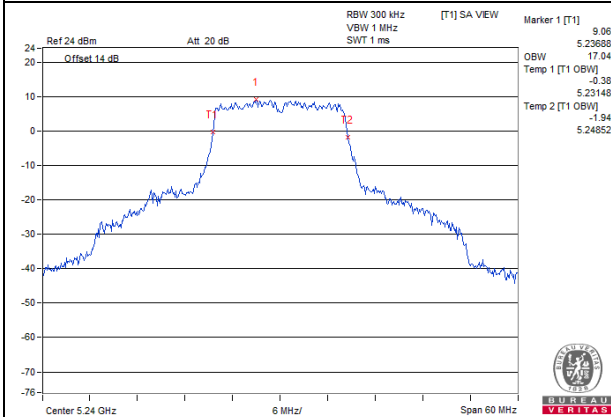


11a 1S3T CDD CH40 Ant3

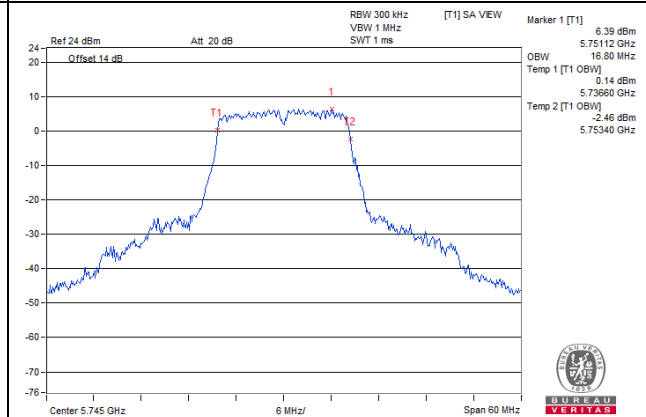


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

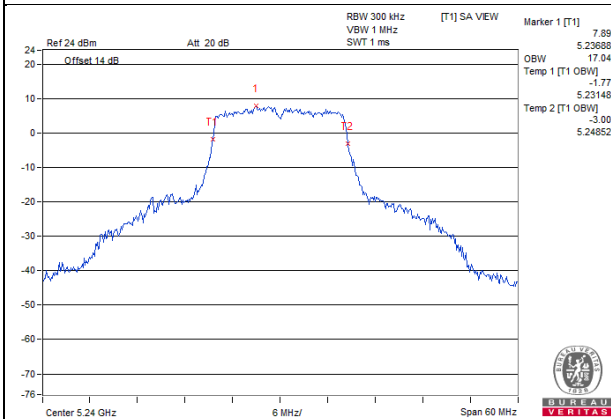
11a 1S3T CDD CH48 Ant1



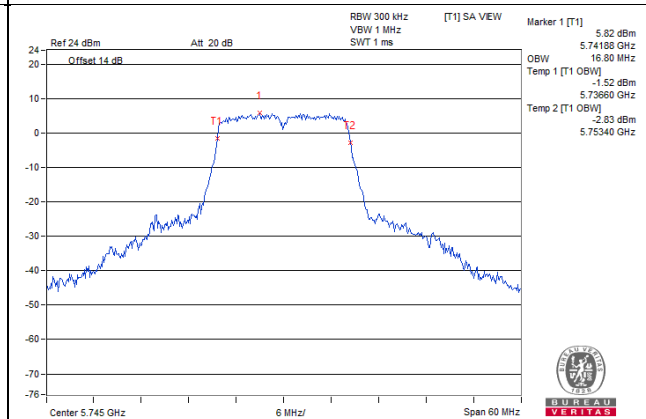
11a 1S3T CDD CH149 Ant1



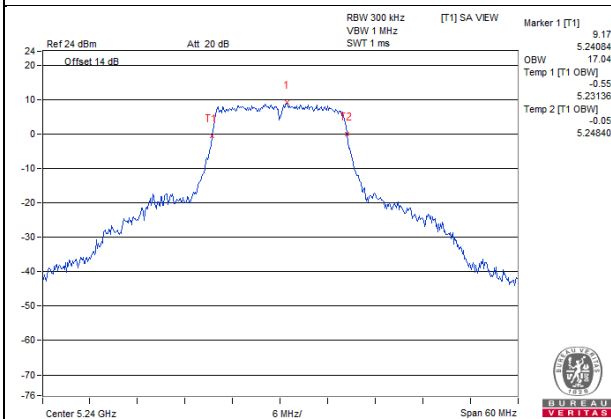
11a 1S3T CDD CH48 Ant2



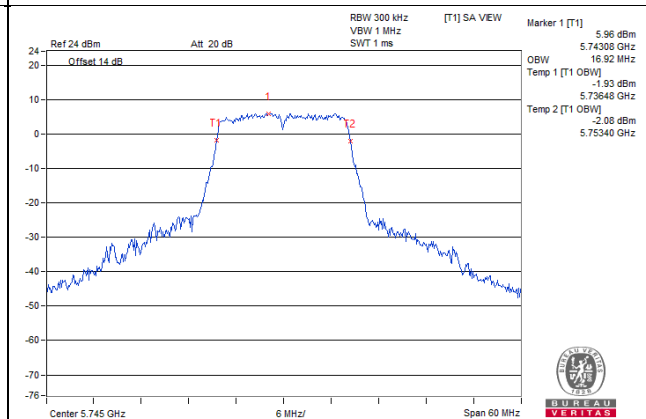
11a 1S3T CDD CH149 Ant2



11a 1S3T CDD CH48 Ant3

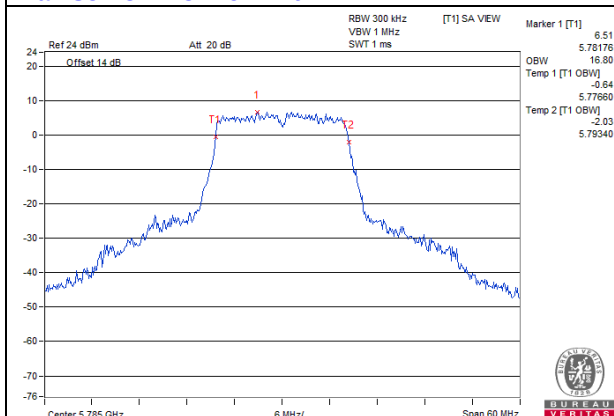


11a 1S3T CDD CH149 Ant3

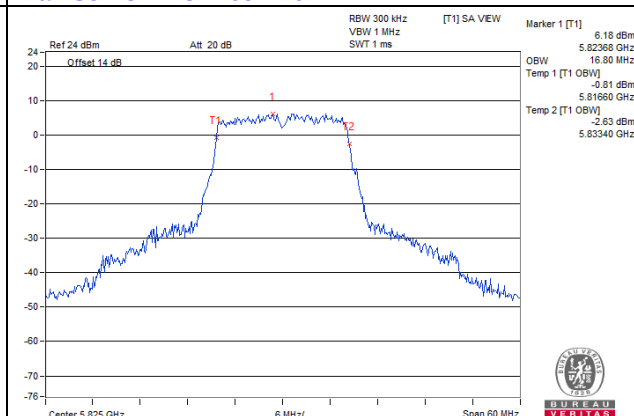


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

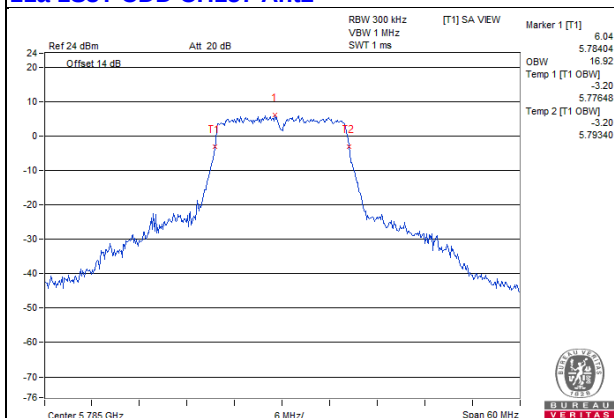
11a 1S3T CDD CH157 Ant1



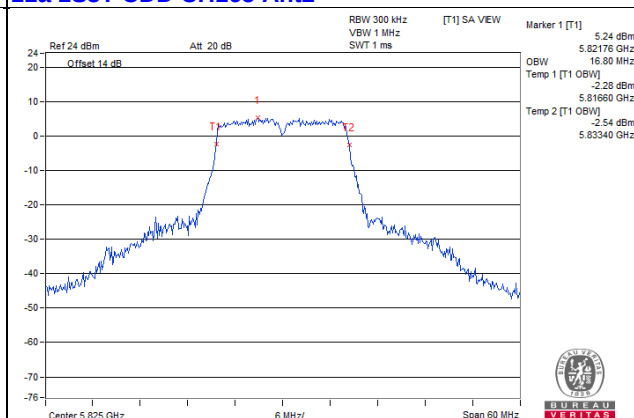
11a 1S3T CDD CH165 Ant1



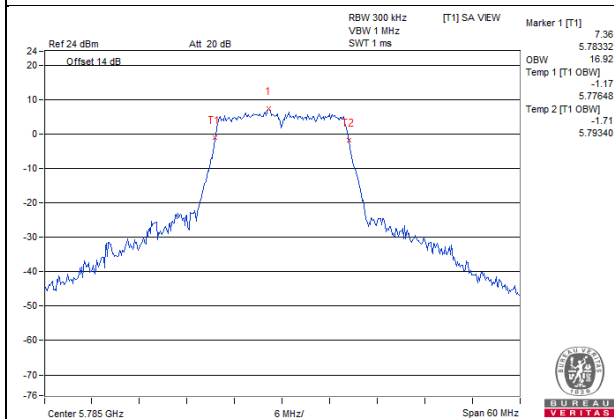
11a 1S3T CDD CH157 Ant2



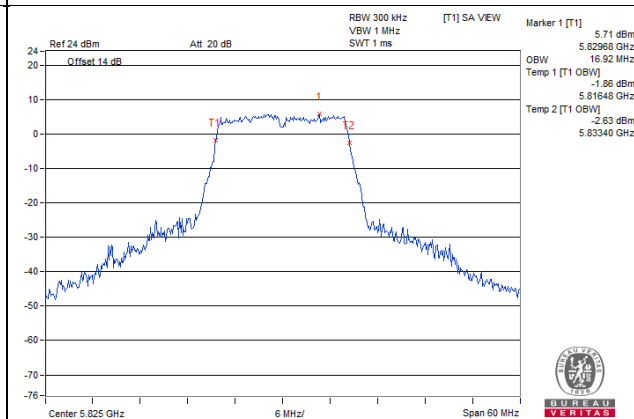
11a 1S3T CDD CH165 Ant2



11a 1S3T CDD CH157 Ant3

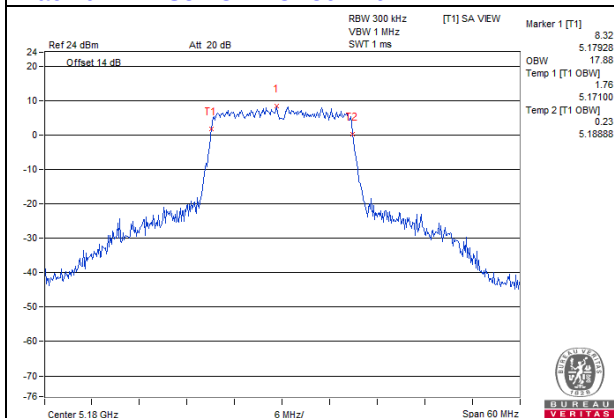


11a 1S3T CDD CH165 Ant3

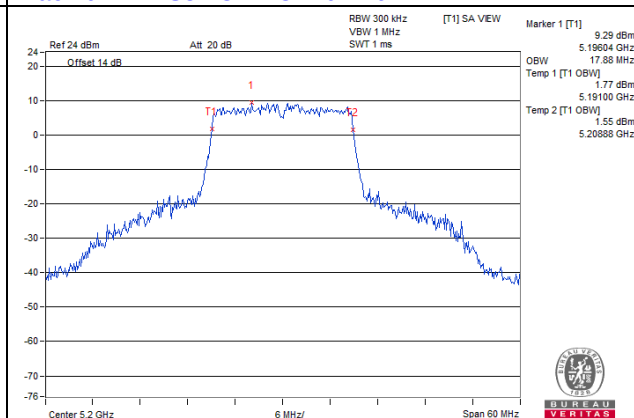


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

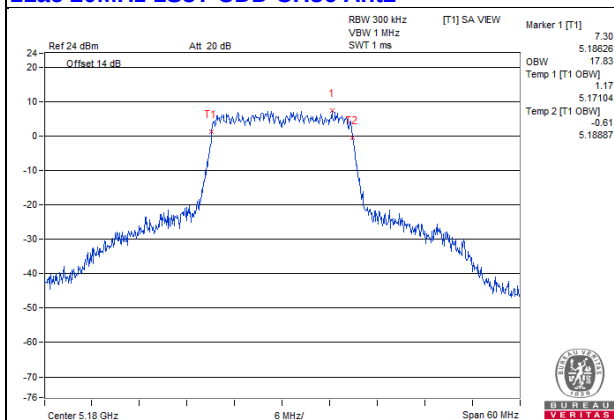
11ac 20MHz 1S3T CDD CH36 Ant1



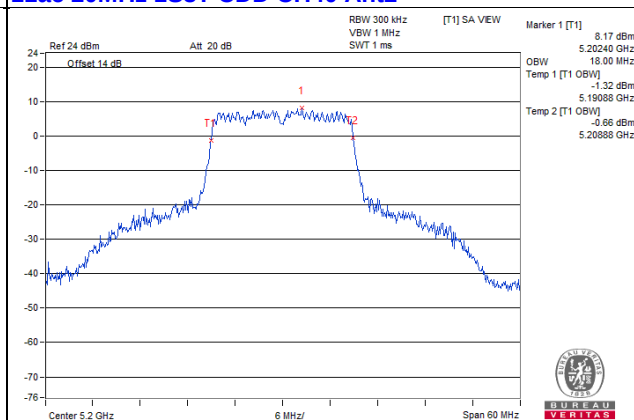
11ac 20MHz 1S3T CDD CH40 Ant1



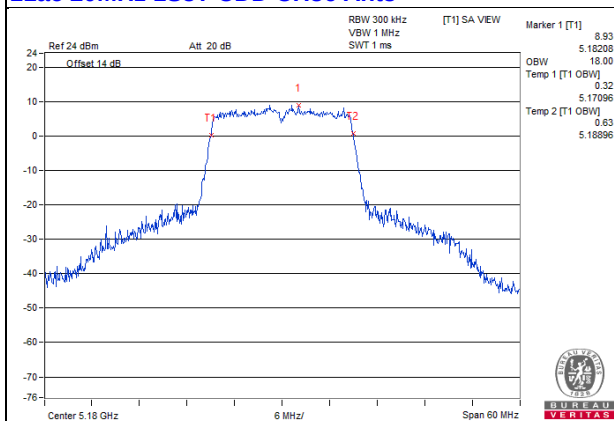
11ac 20MHz 1S3T CDD CH36 Ant2



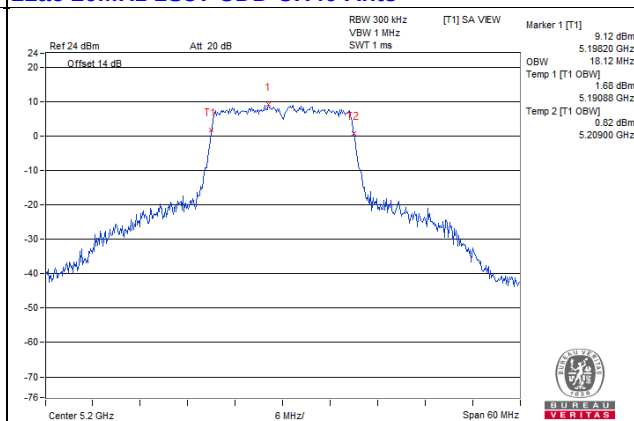
11ac 20MHz 1S3T CDD CH40 Ant2



11ac 20MHz 1S3T CDD CH36 Ant3

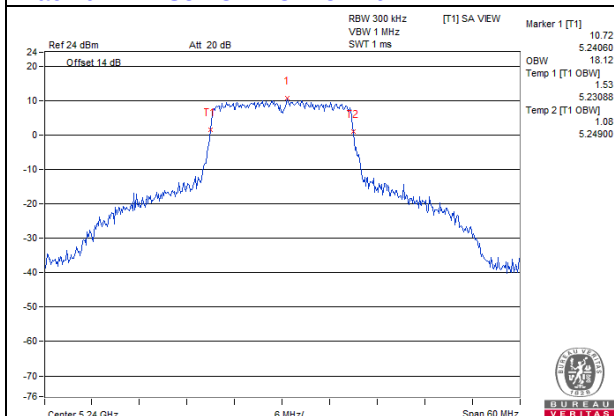


11ac 20MHz 1S3T CDD CH40 Ant3

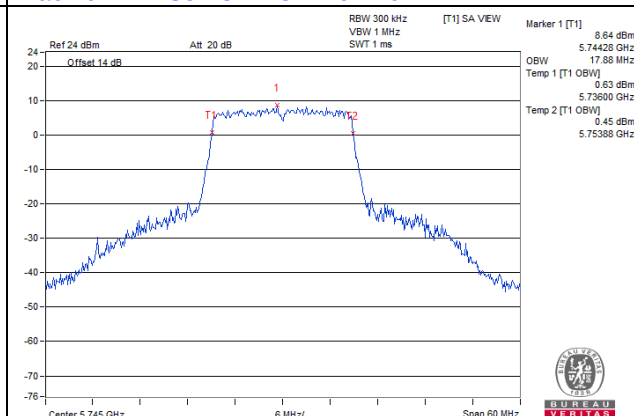


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

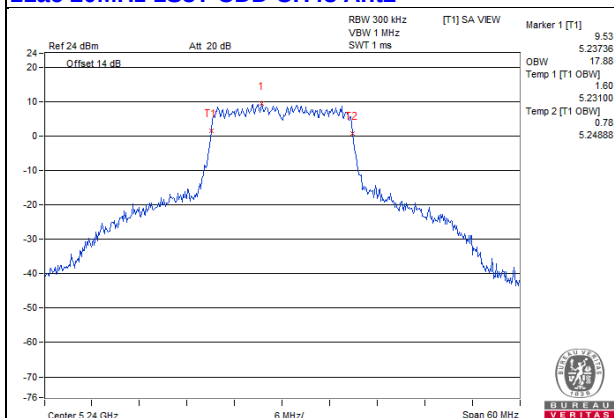
11ac 20MHz 1S3T CDD CH48 Ant1



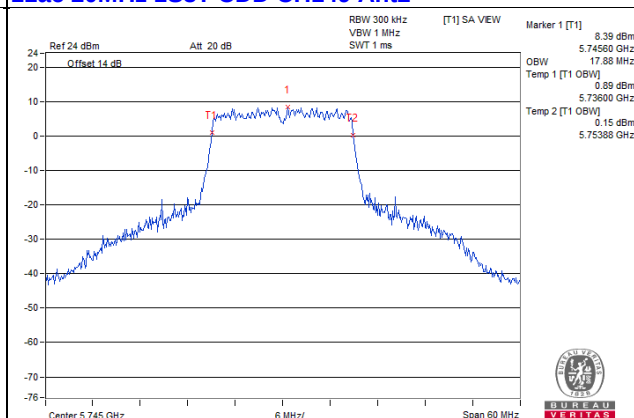
11ac 20MHz 1S3T CDD CH149 Ant1



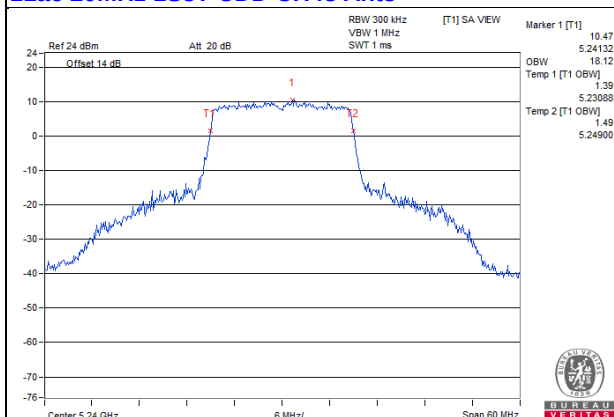
11ac 20MHz 1S3T CDD CH48 Ant2



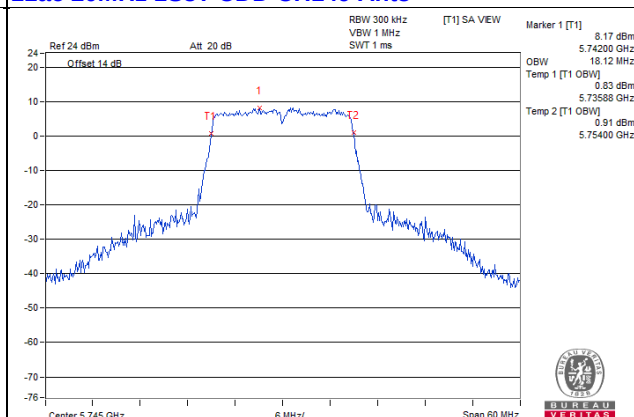
11ac 20MHz 1S3T CDD CH149 Ant2



11ac 20MHz 1S3T CDD CH48 Ant3

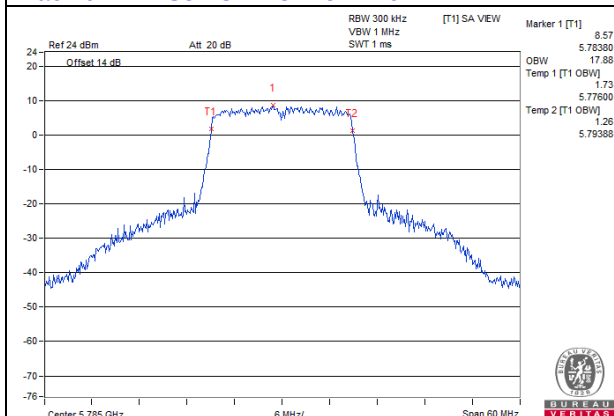


11ac 20MHz 1S3T CDD CH149 Ant3

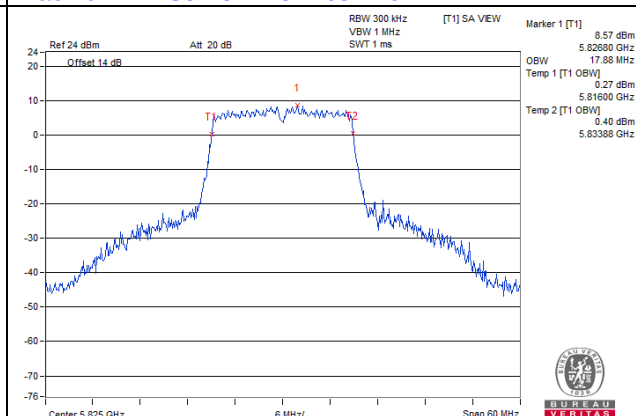


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

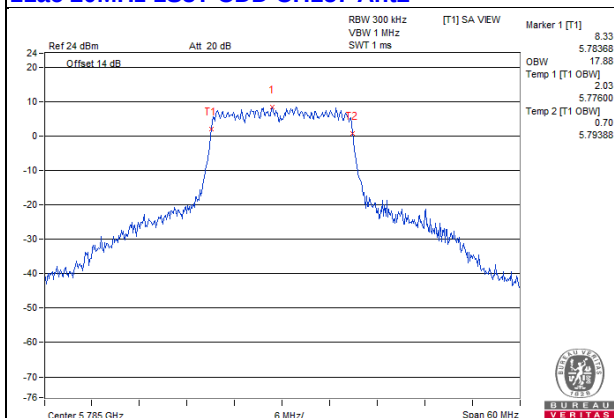
11ac 20MHz 1S3T CDD CH157 Ant1



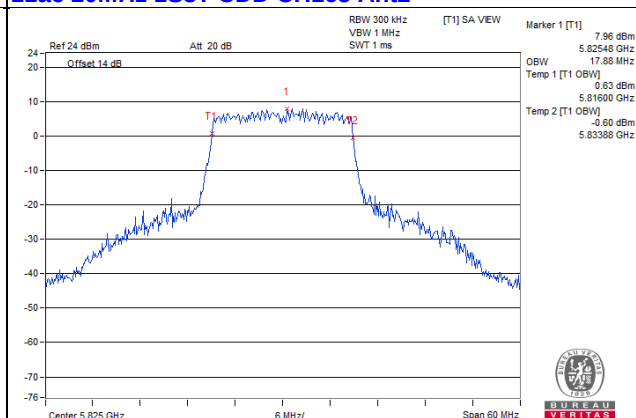
11ac 20MHz 1S3T CDD CH165 Ant1



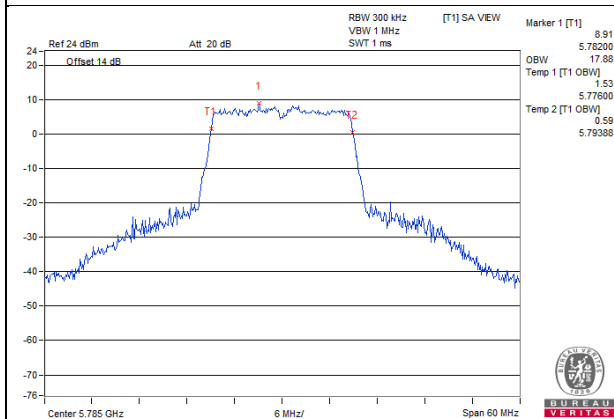
11ac 20MHz 1S3T CDD CH157 Ant2



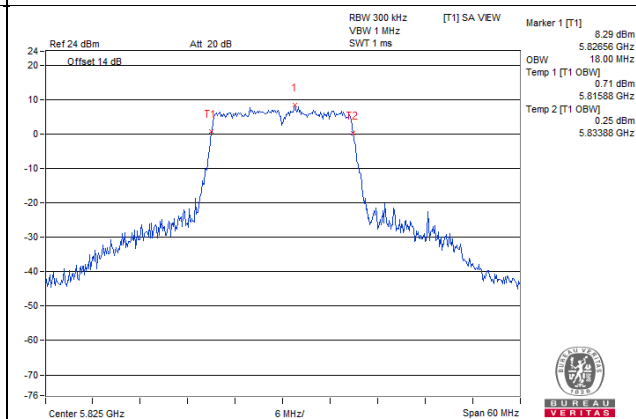
11ac 20MHz 1S3T CDD CH165 Ant2



11ac 20MHz 1S3T CDD CH157 Ant3

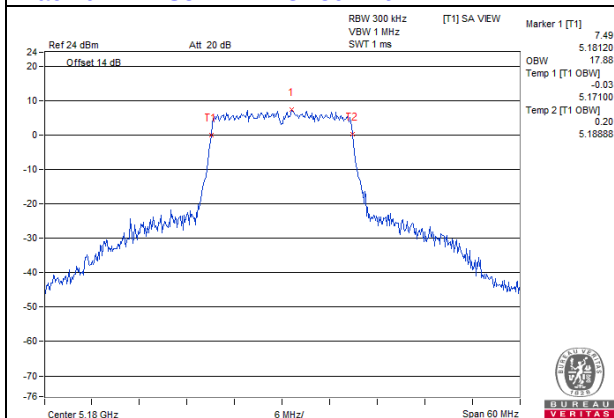


11ac 20MHz 1S3T CDD CH165 Ant3

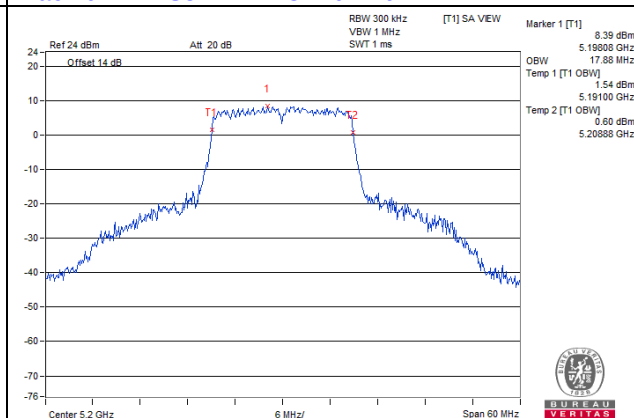


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

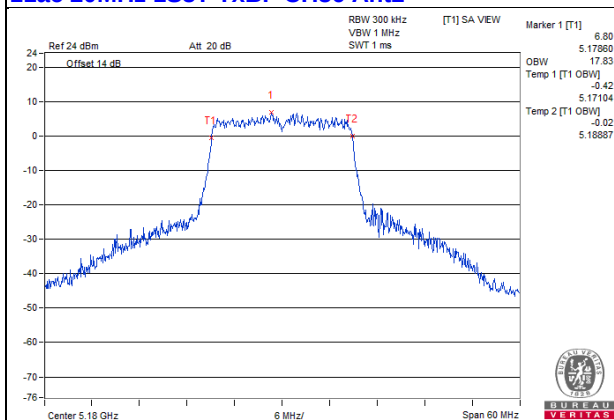
11ac 20MHz 1S3T TxBF CH36 Ant1



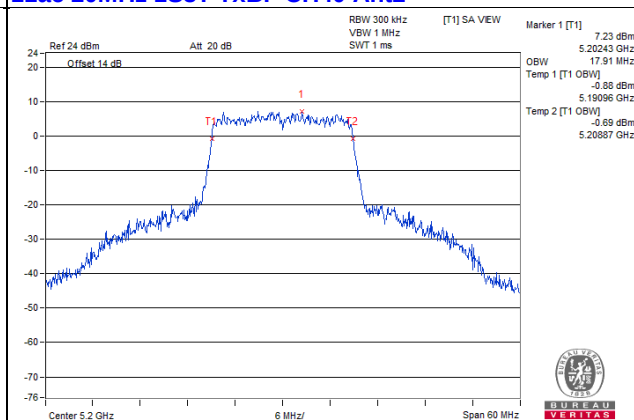
11ac 20MHz 1S3T TxBF CH40 Ant1



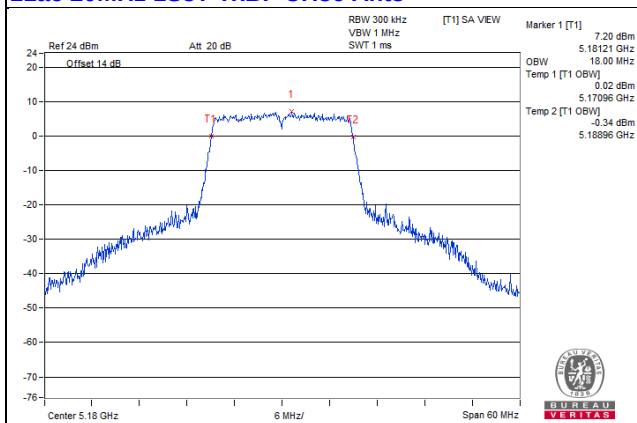
11ac 20MHz 1S3T TxBF CH36 Ant2



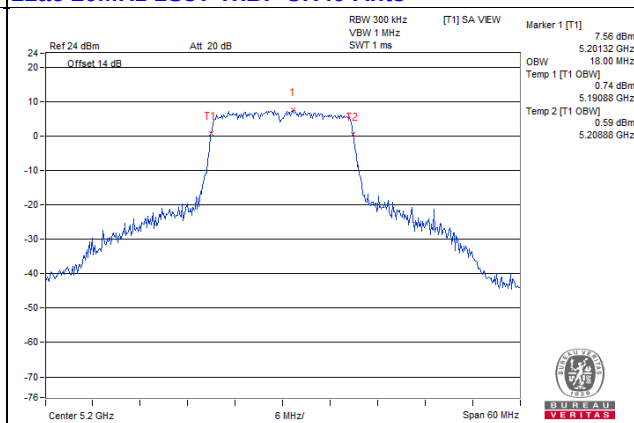
11ac 20MHz 1S3T TxBF CH40 Ant2



11ac 20MHz 1S3T TxBF CH36 Ant3

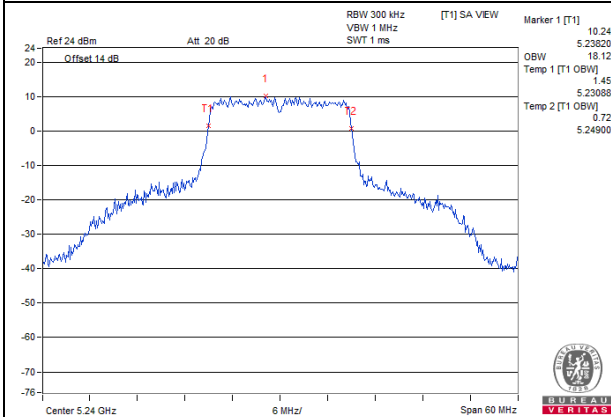


11ac 20MHz 1S3T TxBF CH40 Ant3

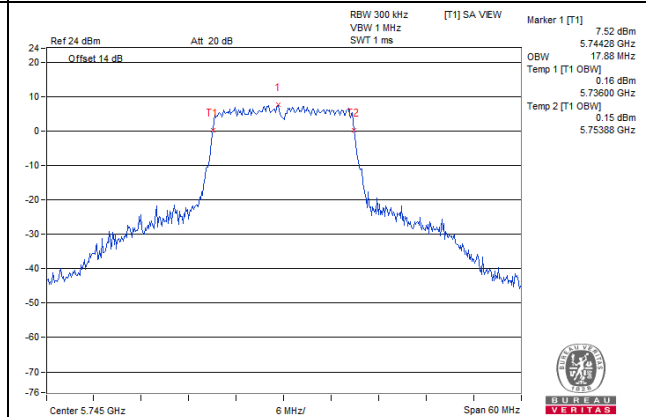


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

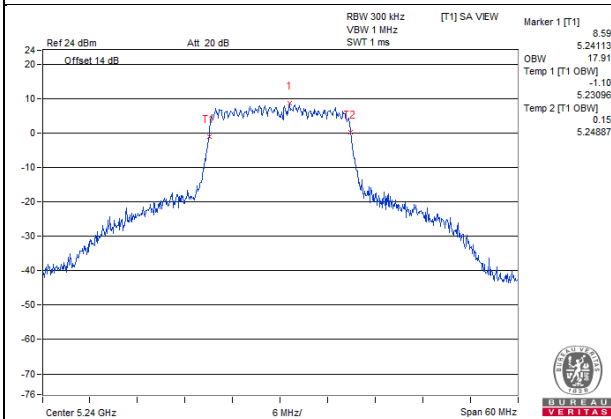
11ac 20MHz 1S3T TxBF CH48 Ant1



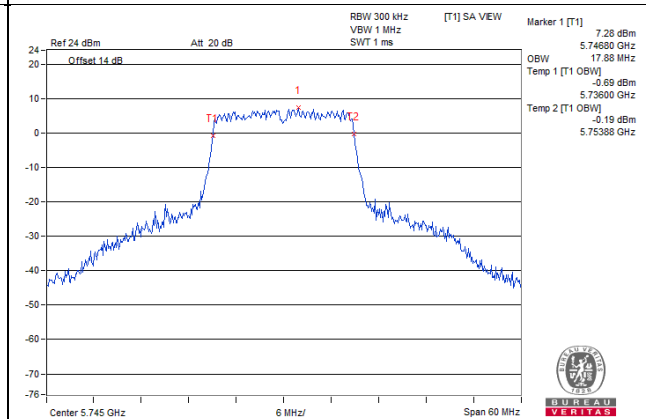
11ac 20MHz 1S3T TxBF CH149 Ant1



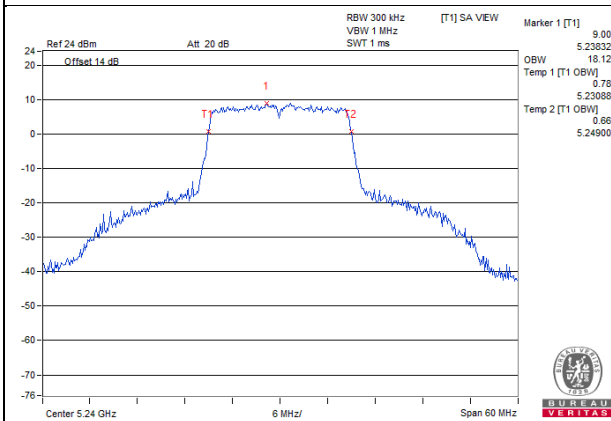
11ac 20MHz 1S3T TxBF CH48 Ant2



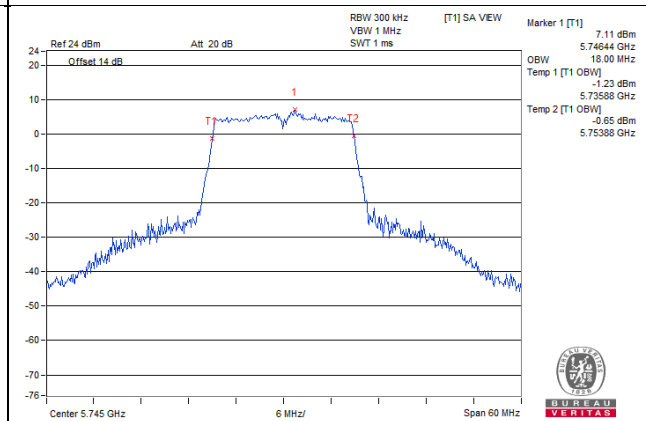
11ac 20MHz 1S3T TxBF CH149 Ant2



11ac 20MHz 1S3T TxBF CH48 Ant3

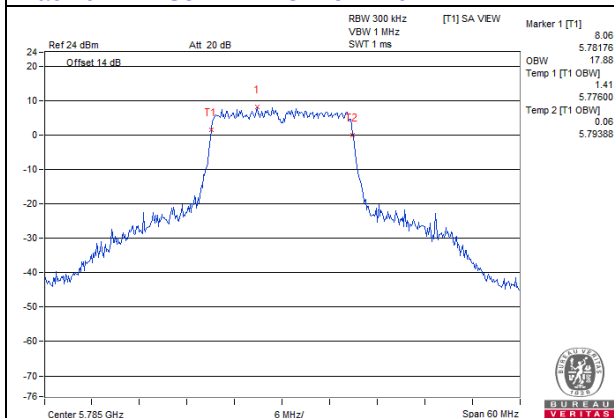


11ac 20MHz 1S3T TxBF CH149 Ant3

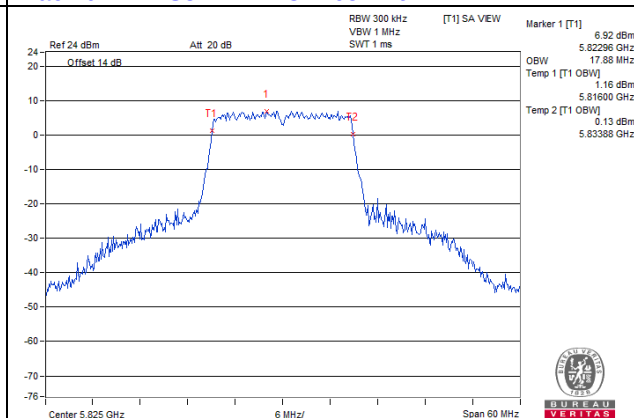


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

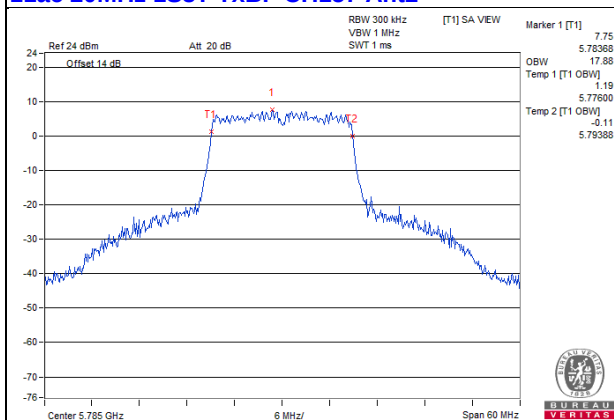
11ac 20MHz 1S3T TxBF CH157 Ant1



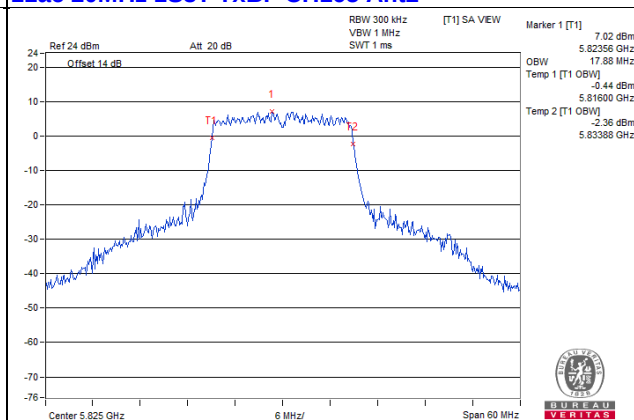
11ac 20MHz 1S3T TxBF CH165 Ant1



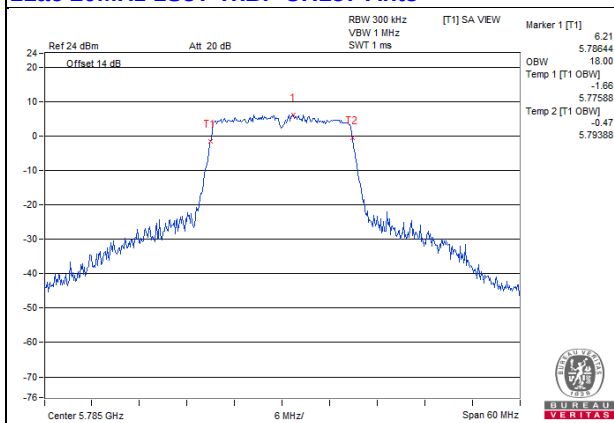
11ac 20MHz 1S3T TxBF CH157 Ant2



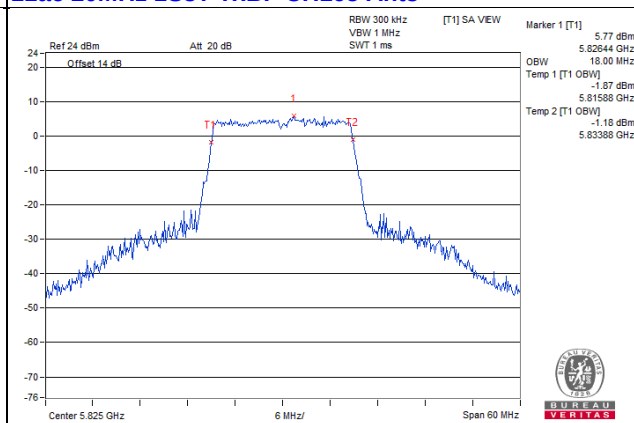
11ac 20MHz 1S3T TxBF CH165 Ant2



11ac 20MHz 1S3T TxBF CH157 Ant3

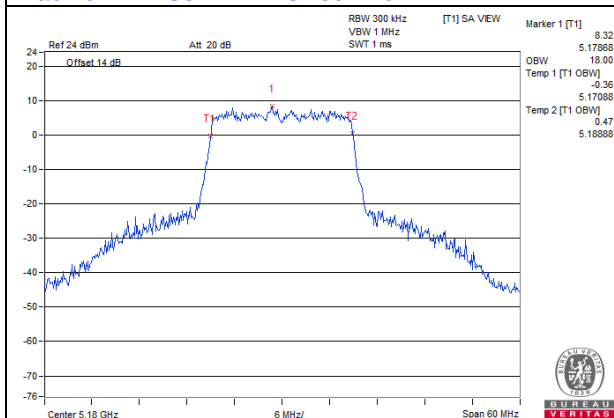


11ac 20MHz 1S3T TxBF CH165 Ant3

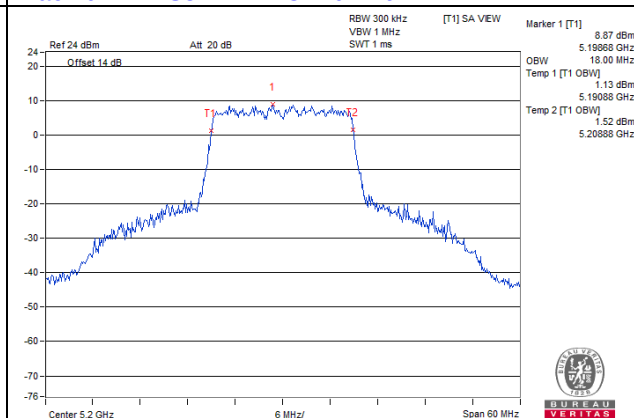


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

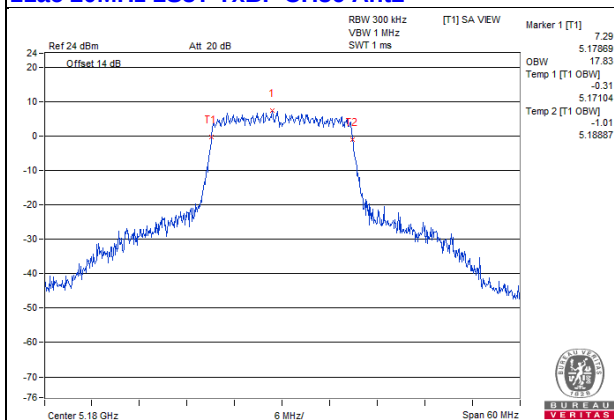
11ac 20MHz 2S3T TxBF CH36 Ant1



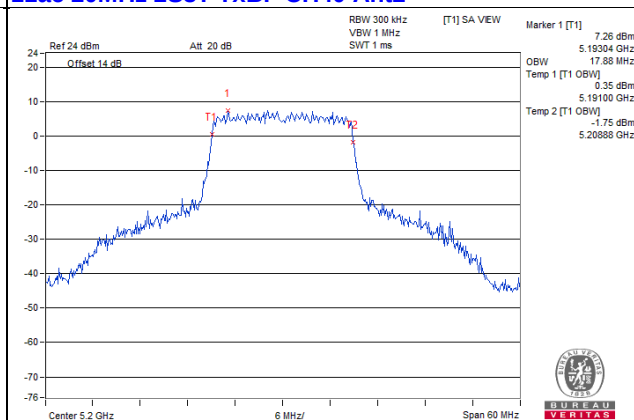
11ac 20MHz 2S3T TxBF CH40 Ant1



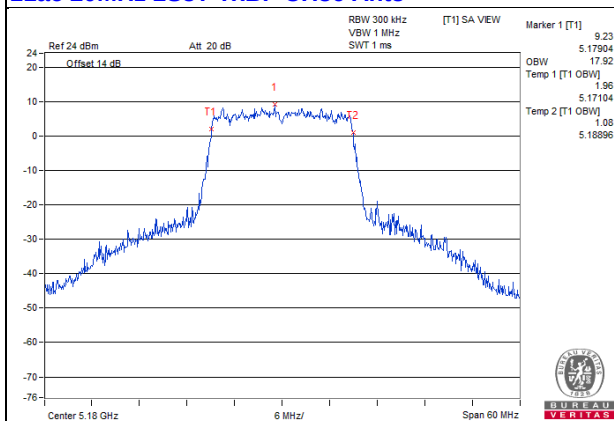
11ac 20MHz 2S3T TxBF CH36 Ant2



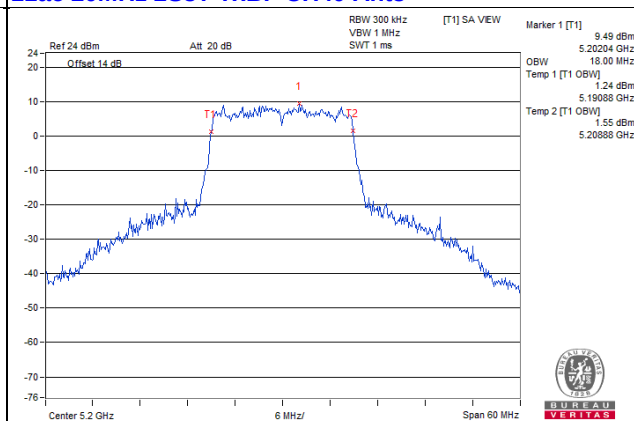
11ac 20MHz 2S3T TxBF CH40 Ant2



11ac 20MHz 2S3T TxBF CH36 Ant3

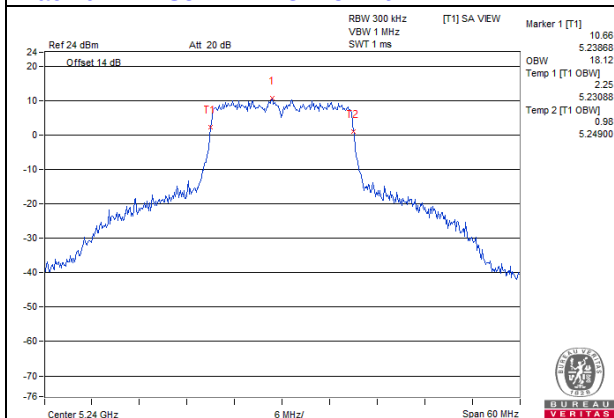


11ac 20MHz 2S3T TxBF CH40 Ant3

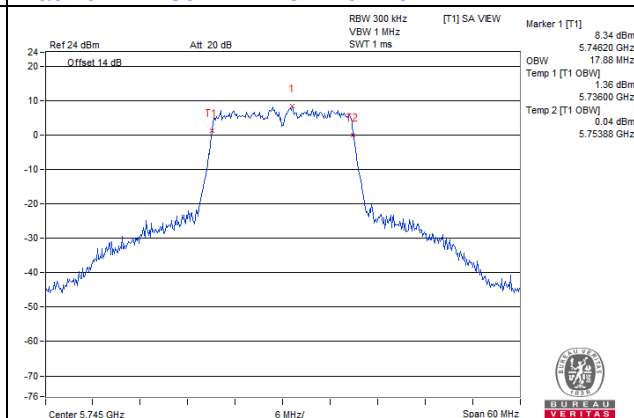


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

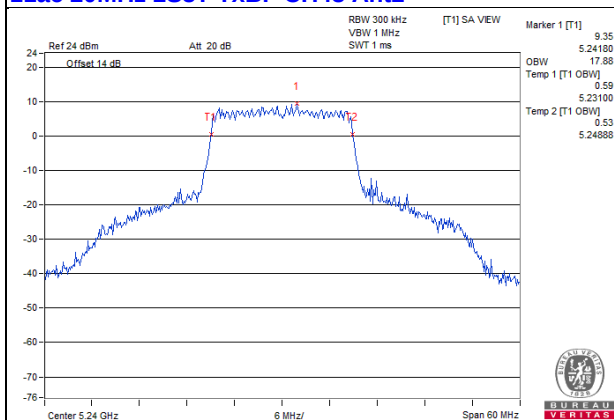
11ac 20MHz 2S3T TxBF CH48 Ant1



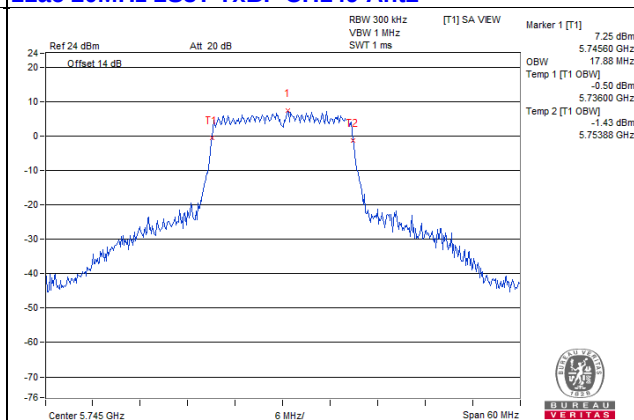
11ac 20MHz 2S3T TxBF CH149 Ant1



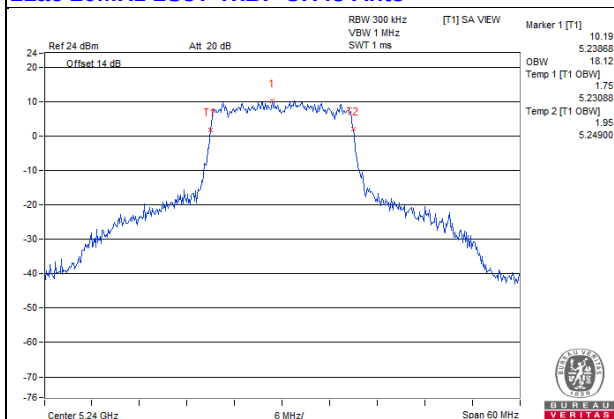
11ac 20MHz 2S3T TxBF CH48 Ant2



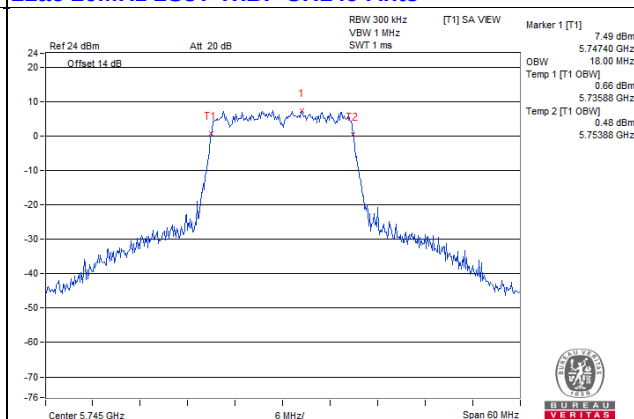
11ac 20MHz 2S3T TxBF CH149 Ant2



11ac 20MHz 2S3T TxBF CH48 Ant3

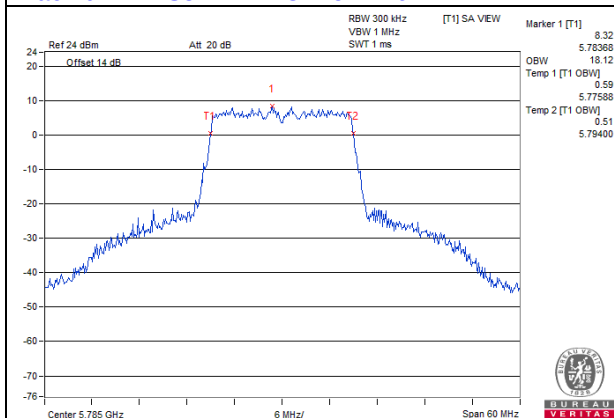


11ac 20MHz 2S3T TxBF CH149 Ant3

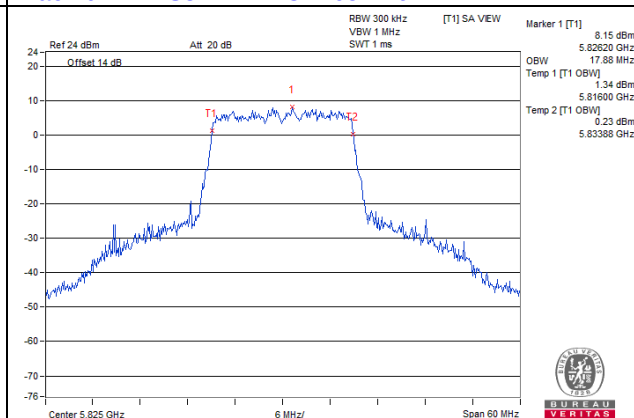


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

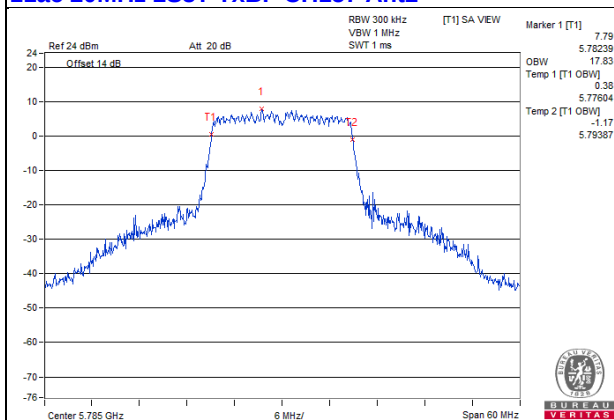
11ac 20MHz 2S3T TxBF CH157 Ant1



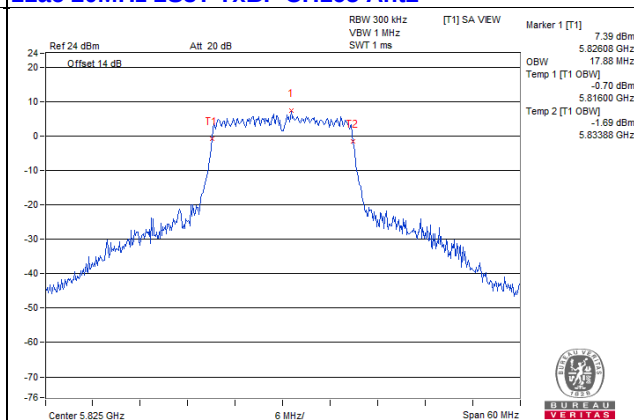
11ac 20MHz 2S3T TxBF CH165 Ant1



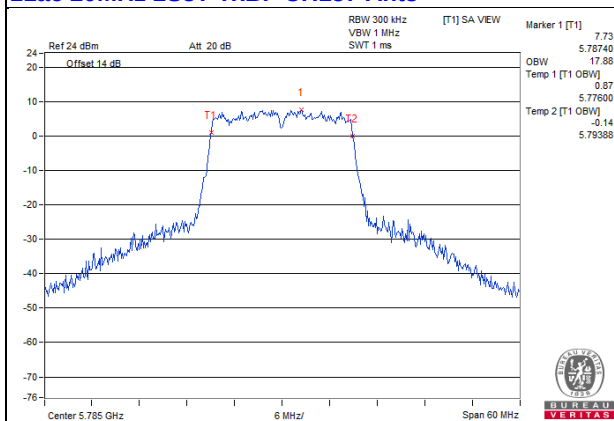
11ac 20MHz 2S3T TxBF CH157 Ant2



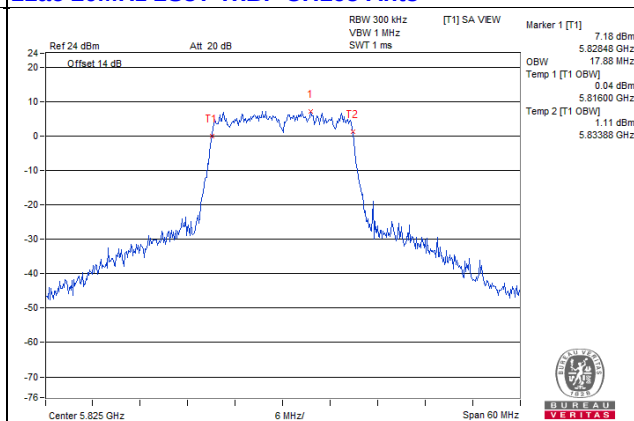
11ac 20MHz 2S3T TxBF CH165 Ant2



11ac 20MHz 2S3T TxBF CH157 Ant3

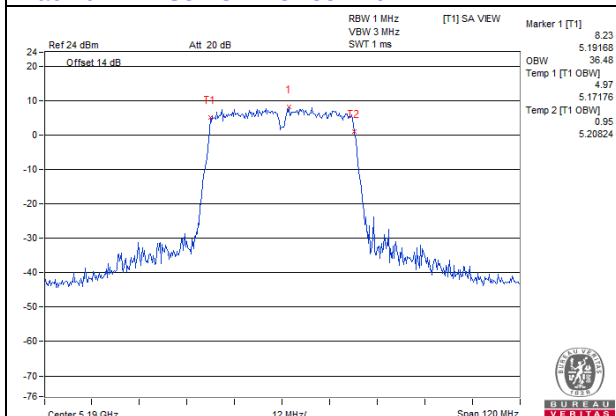


11ac 20MHz 2S3T TxBF CH165 Ant3

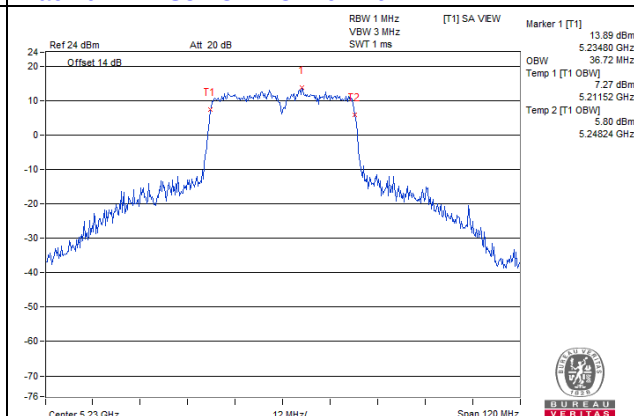


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

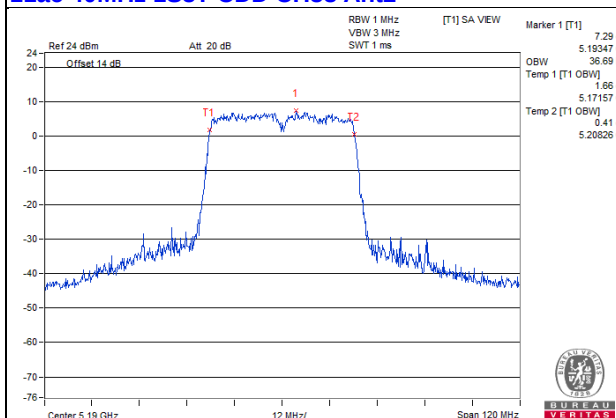
11ac 40MHz 1S3T CDD CH38 Ant1



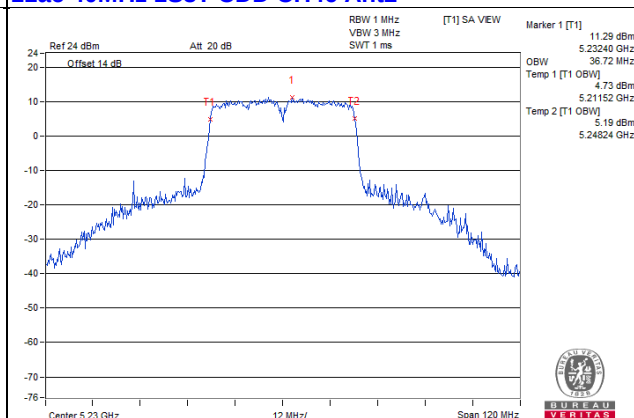
11ac 40MHz 1S3T CDD CH46 Ant1



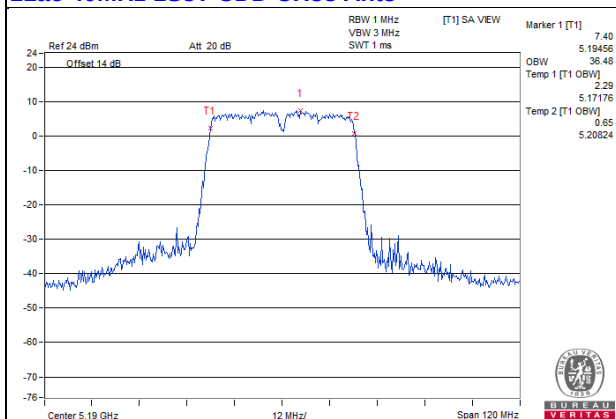
11ac 40MHz 1S3T CDD CH38 Ant2



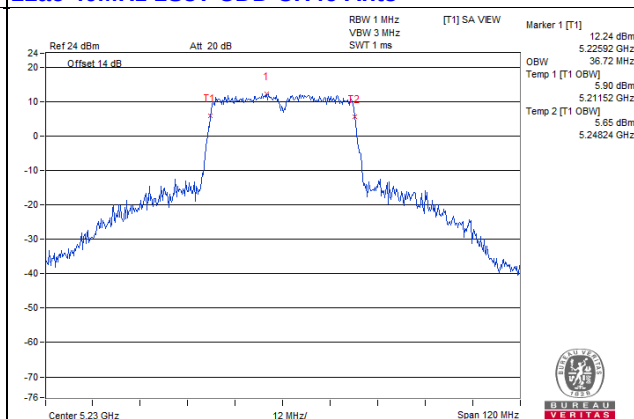
11ac 40MHz 1S3T CDD CH46 Ant2



11ac 40MHz 1S3T CDD CH38 Ant3

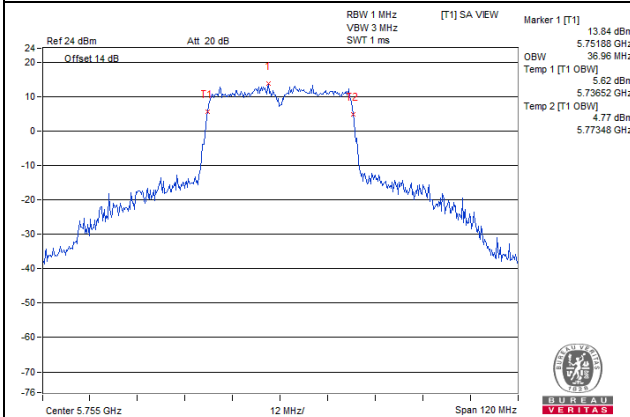


11ac 40MHz 1S3T CDD CH46 Ant3

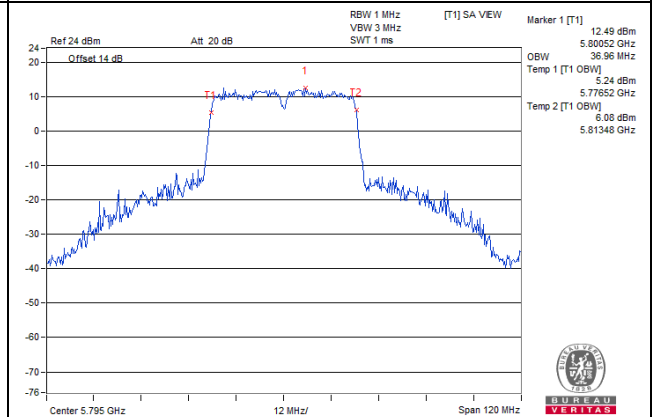


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

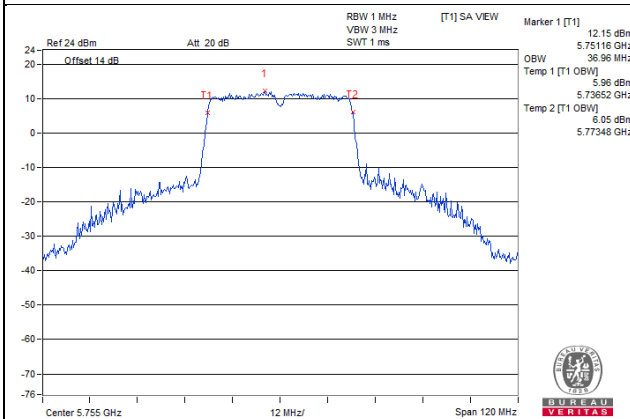
11ac 40MHz 1S3T CDD CH151 Ant1



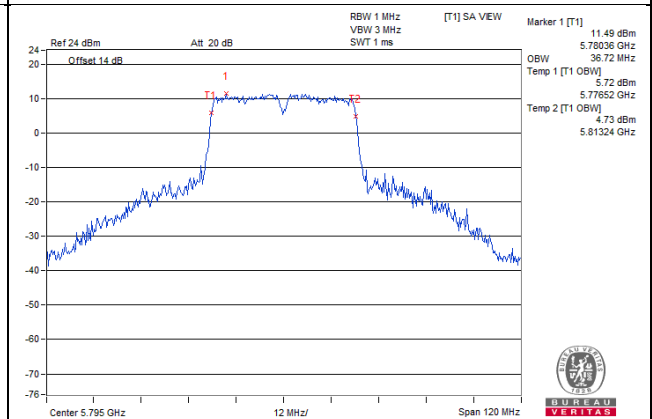
11ac 40MHz 1S3T CDD CH159 Ant1



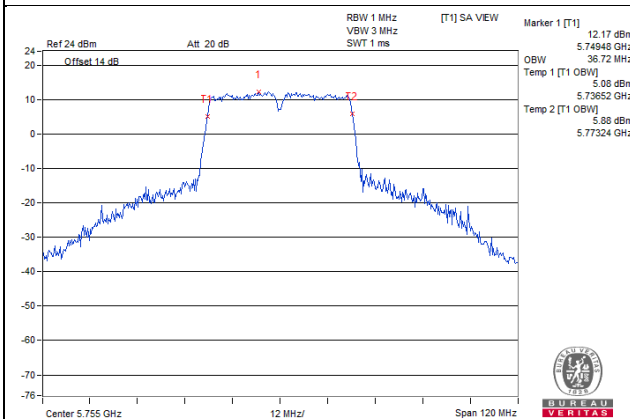
11ac 40MHz 1S3T CDD CH151 Ant2



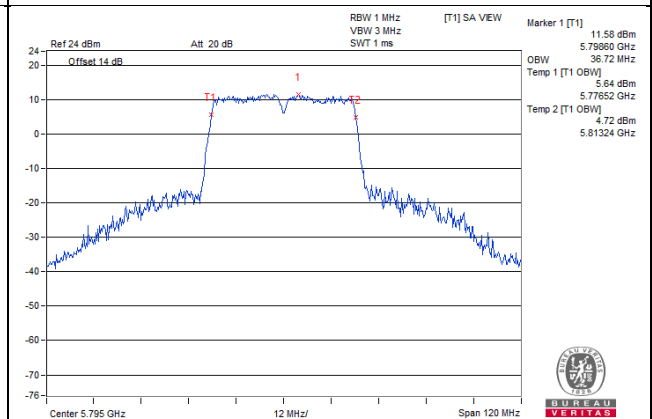
11ac 40MHz 1S3T CDD CH159 Ant2



11ac 40MHz 1S3T CDD CH151 Ant3

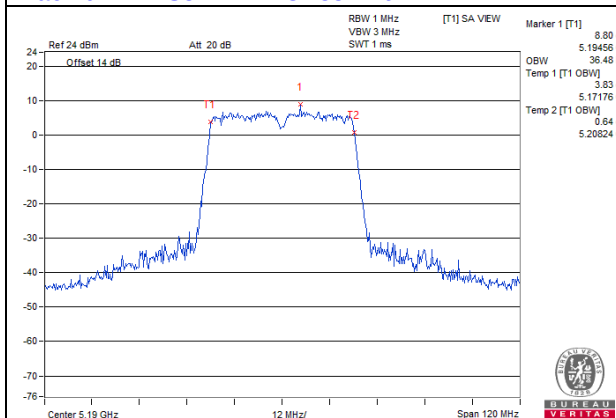


11ac 40MHz 1S3T CDD CH159 Ant3

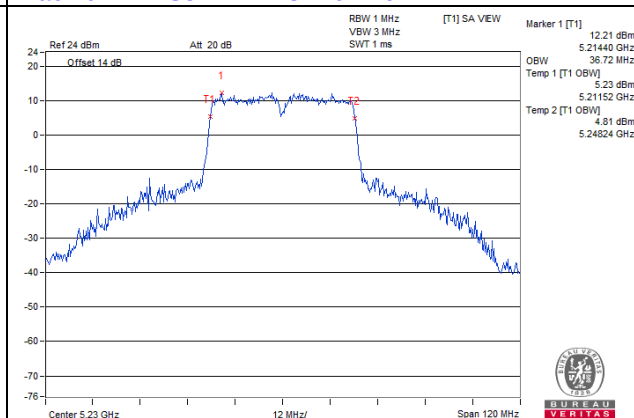


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

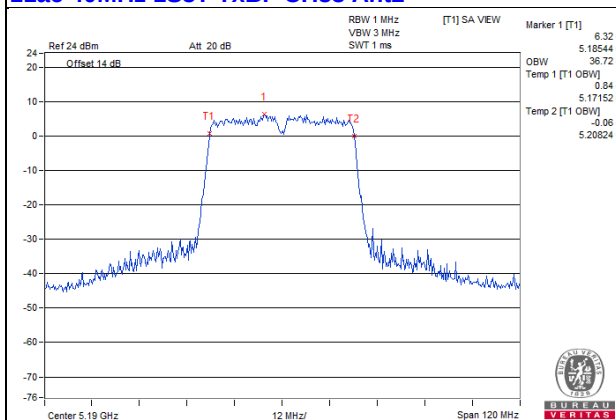
11ac 40MHz 1S3T TxBF CH38 Ant1



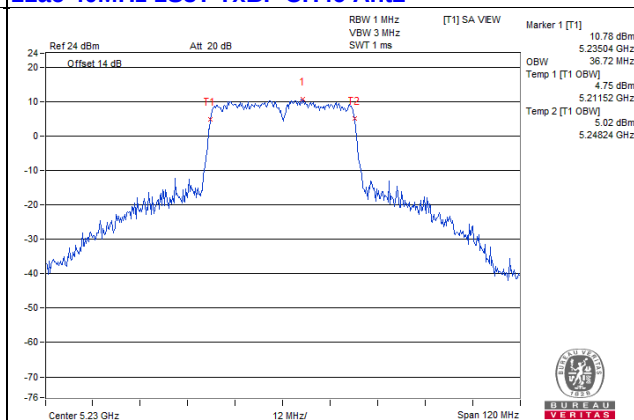
11ac 40MHz 1S3T TxBF CH46 Ant1



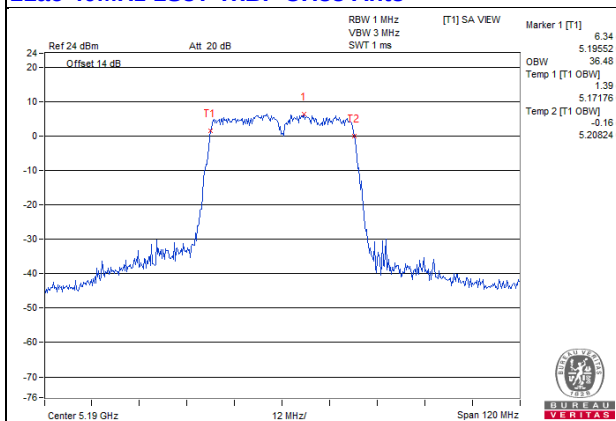
11ac 40MHz 1S3T TxBF CH38 Ant2



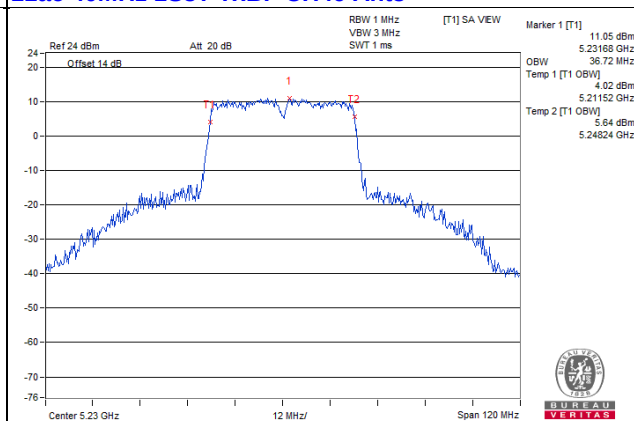
11ac 40MHz 1S3T TxBF CH46 Ant2



11ac 40MHz 1S3T TxBF CH38 Ant3

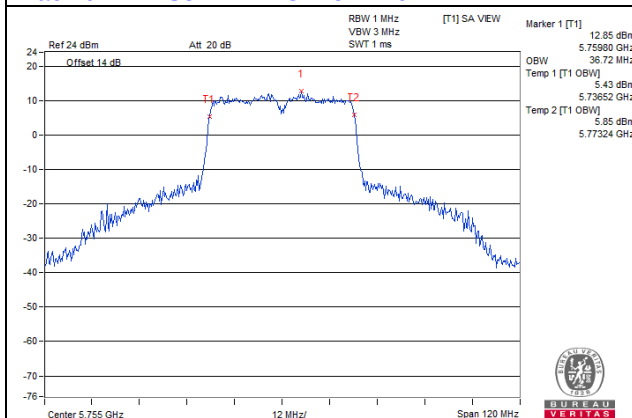


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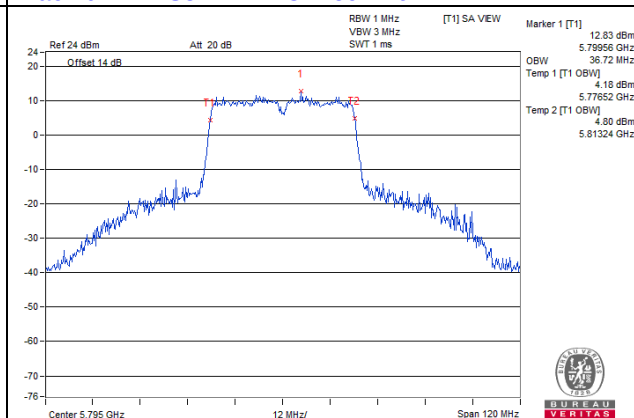


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

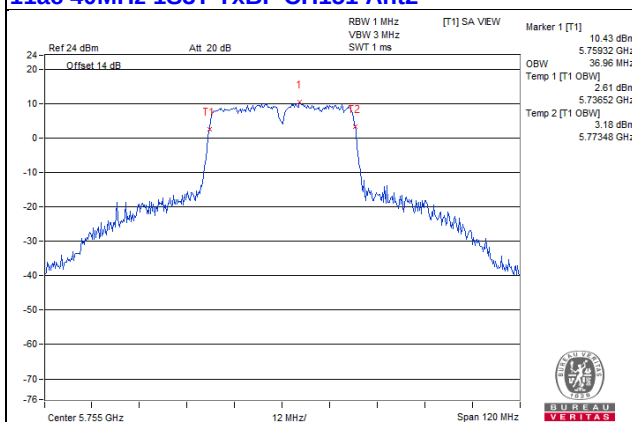
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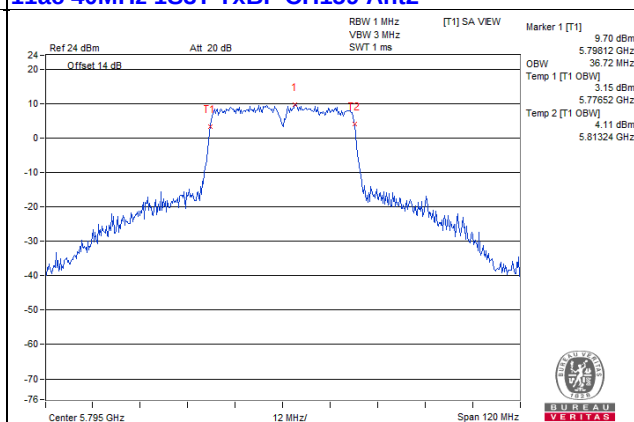
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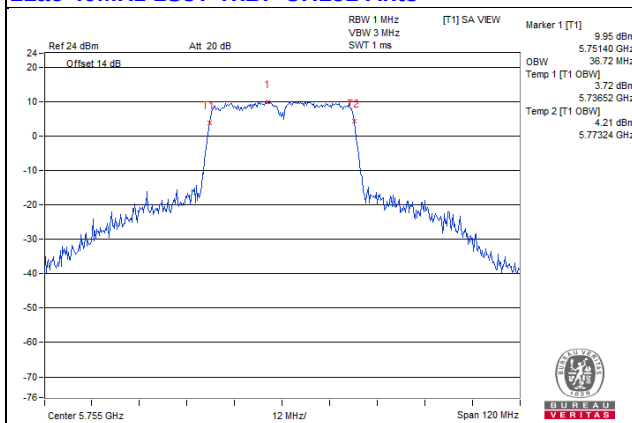
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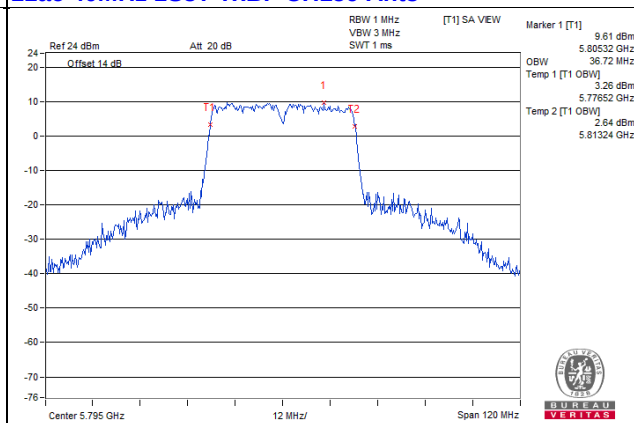
11ac 40MHz 1S3T TxBF CH159 Ant2



11ac 40MHz 1S3T TxBF CH151 Ant3

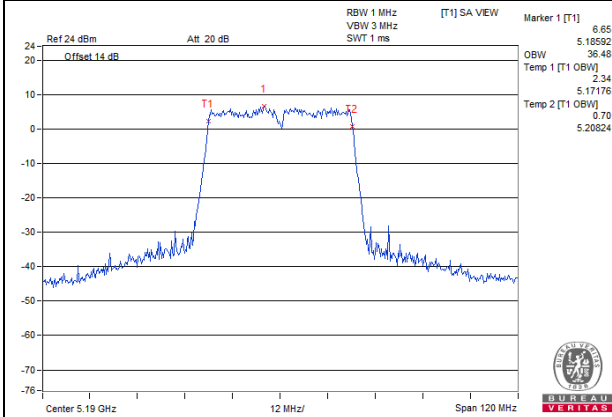


11ac 40MHz 1S3T TxBF CH159 Ant3

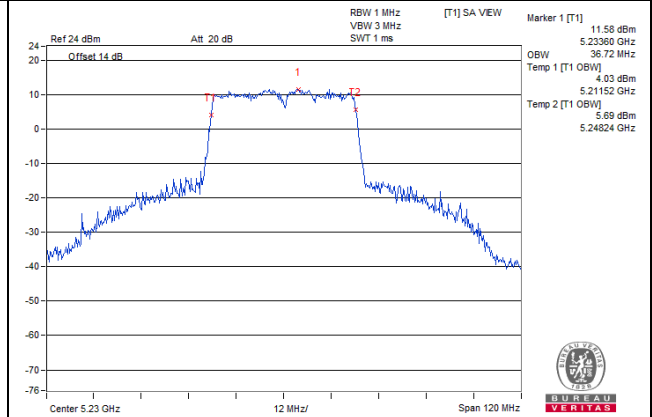


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

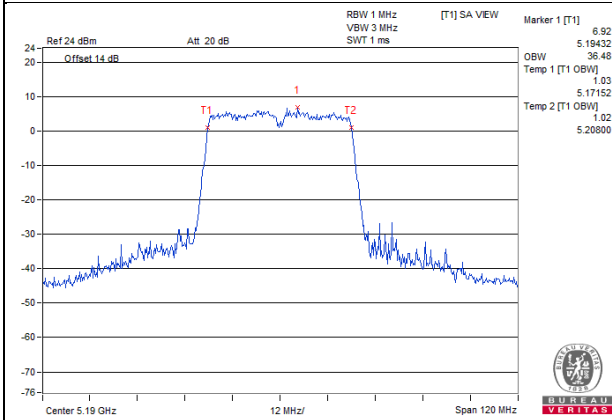
11ac 40MHz 2S3T TxBF CH38 Ant1



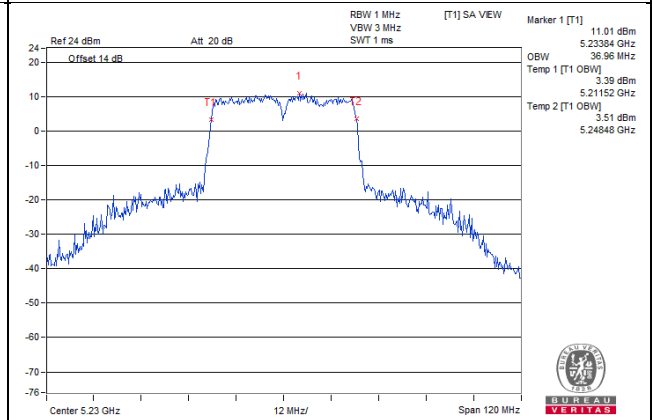
11ac 40MHz 2S3T TxBF CH46 Ant1



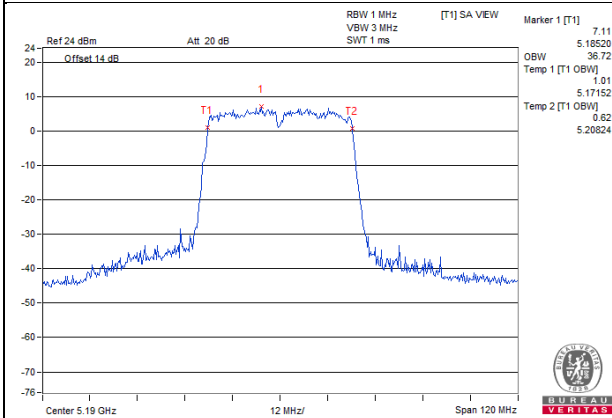
11ac 40MHz 2S3T TxBF CH38 Ant2



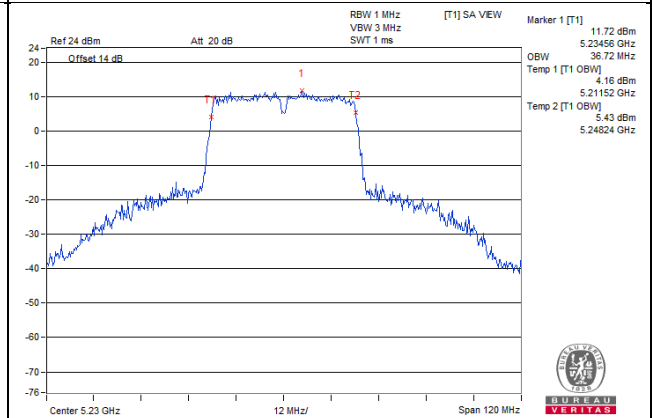
11ac 40MHz 2S3T TxBF CH46 Ant2



11ac 40MHz 2S3T TxBF CH38 Ant3

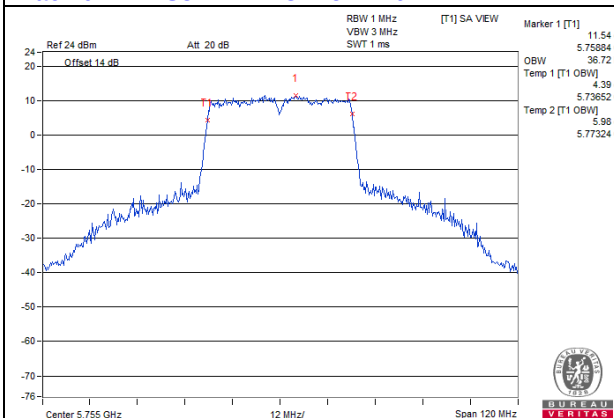


11ac 40MHz 2S3T TxBF CH46 Ant3

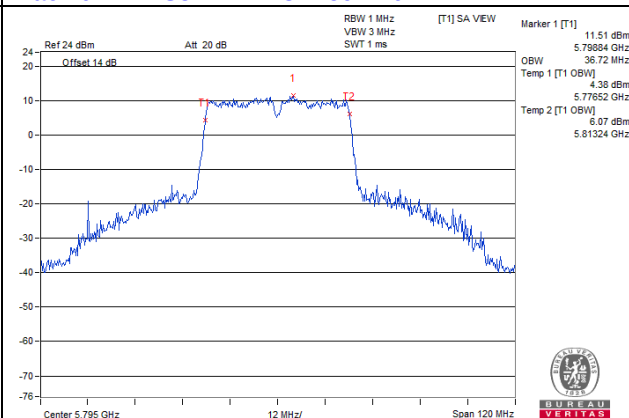


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

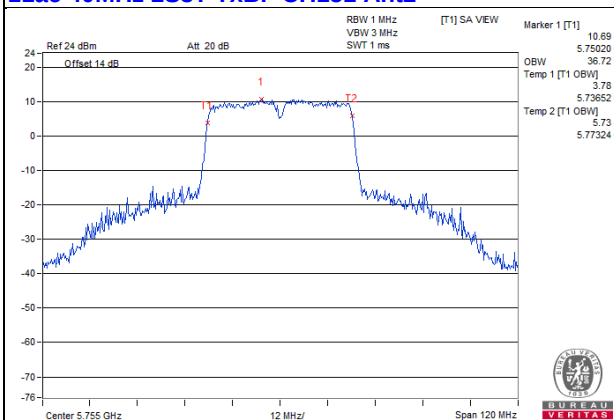
11ac 40MHz 2S3T TxBF CH151 Ant1



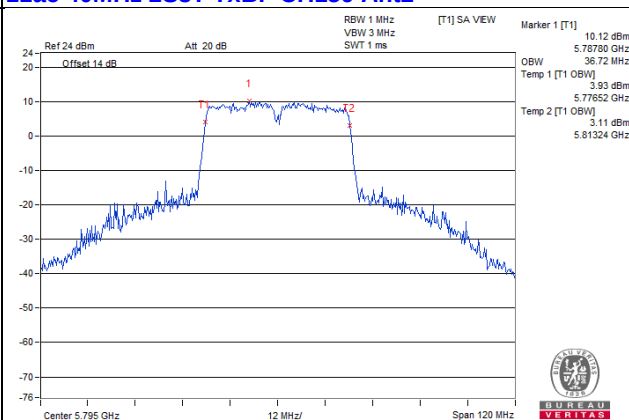
11ac 40MHz 2S3T TxBF CH159 Ant1



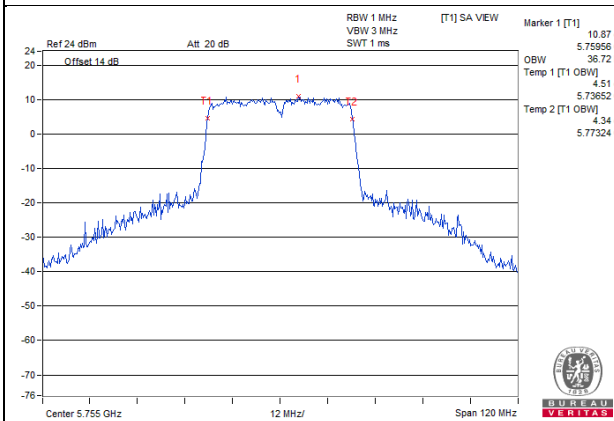
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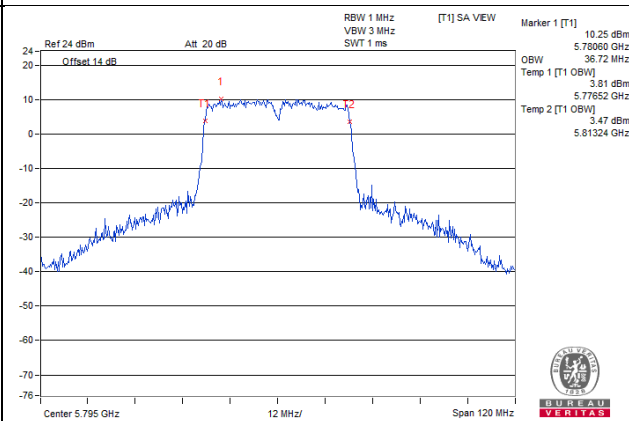
11ac 40MHz 2S3T TxBF CH159 Ant2



11ac 40MHz 2S3T TxBF CH151 Ant3

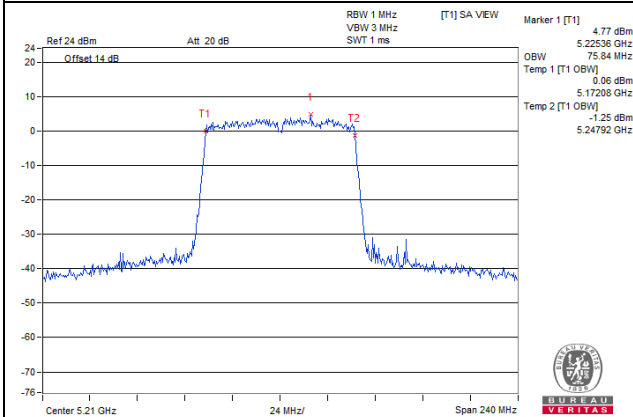


11ac 40MHz 2S3T TxBF CH159 Ant3

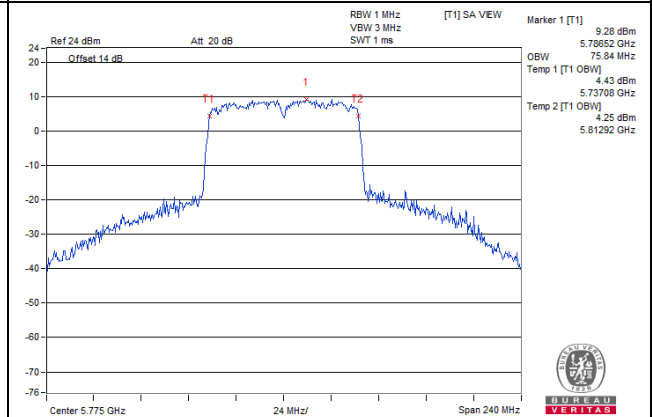


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

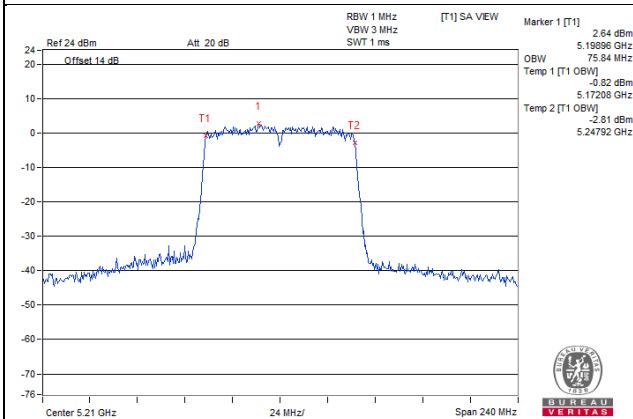
11ac 80MHz 1S3T CDD CH42 Ant1



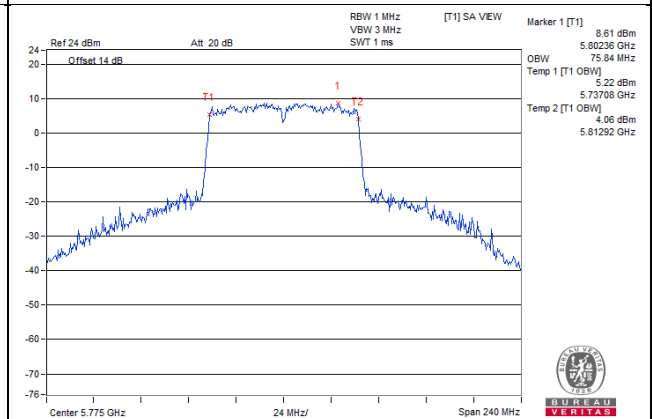
11ac 80MHz 1S3T CDD CH155 Ant1



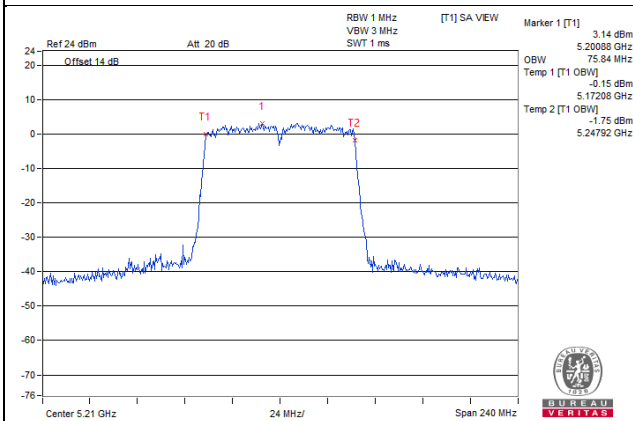
11ac 80MHz 1S3T CDD CH42 Ant2



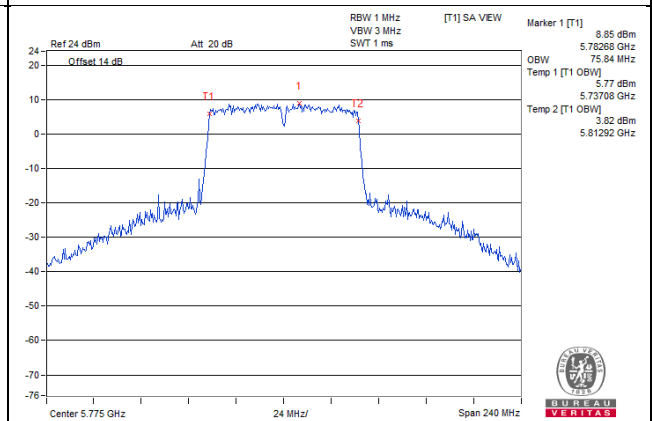
11ac 80MHz 1S3T CDD CH155 Ant2



11ac 80MHz 1S3T CDD CH42 Ant3

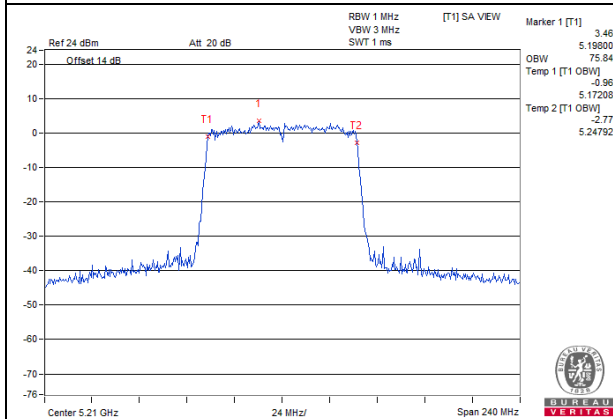


11ac 80MHz 1S3T CDD CH155 Ant3

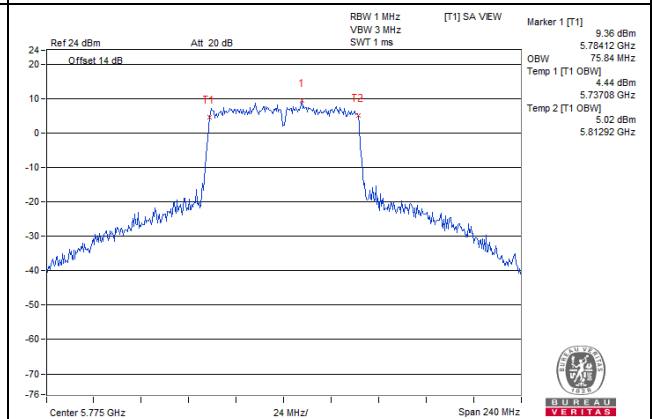


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

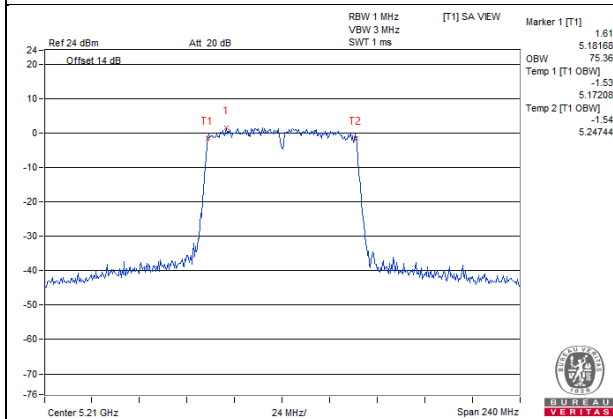
11ac 80MHz 1S3T TxBF CH42 Ant1



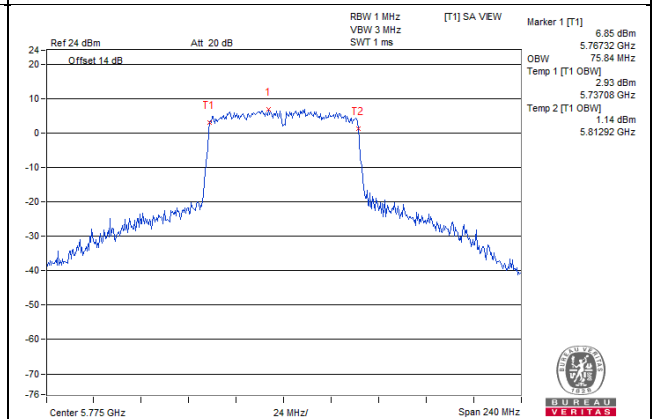
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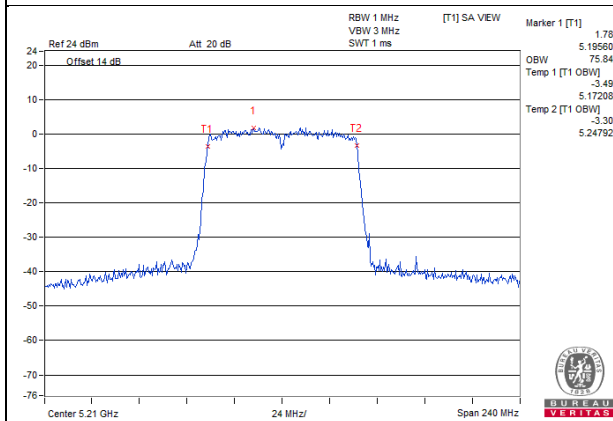
11ac 80MHz 1S3T TxBF CH42 Ant2



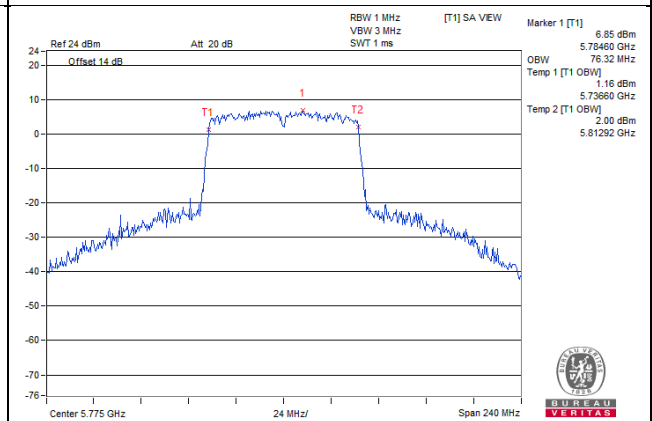
11ac 80MHz 1S3T TxBF CH155 Ant2



11ac 80MHz 1S3T TxBF CH42 Ant3

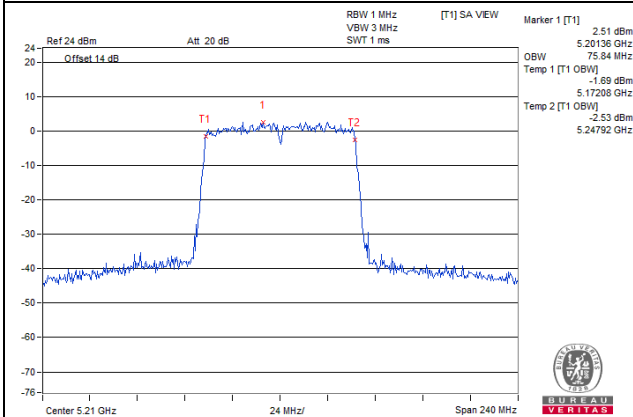


11ac 80MHz 1S3T TxBF CH155 Ant3

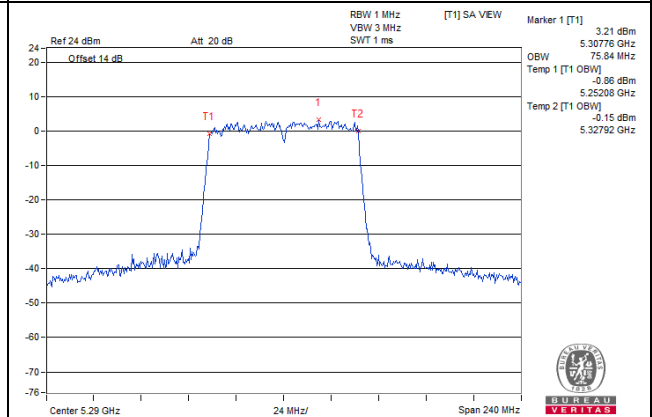


99% OCCUPIED BANDWIDTH SPECTRUM PLOT

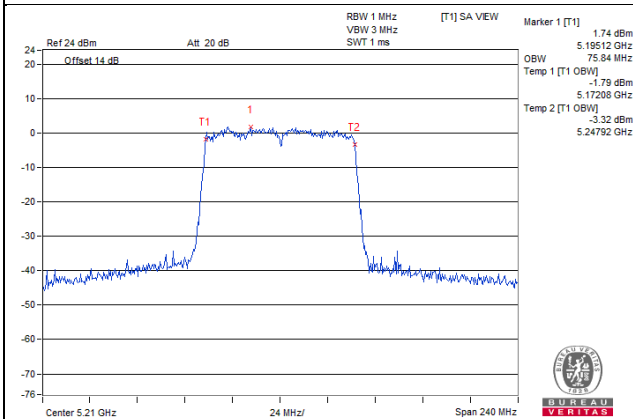
11ac 80MHz 2S3T TxBF CH42 Ant1



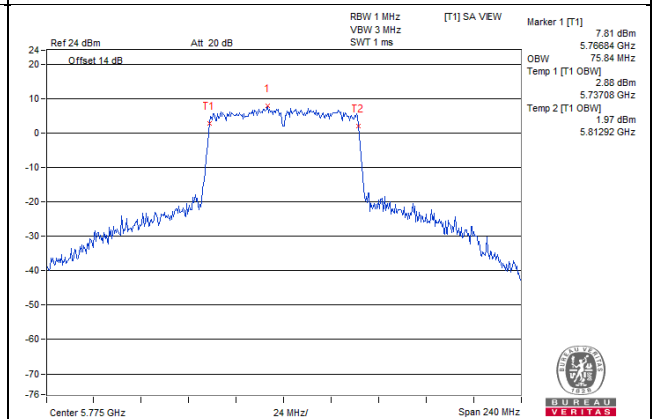
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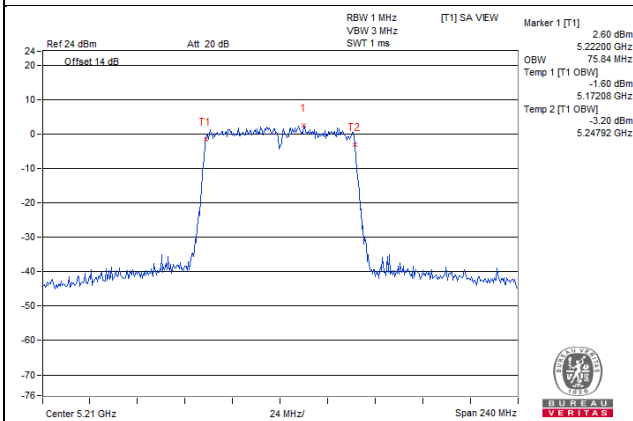
11ac 80MHz 2S3T TxBF CH42 Ant2



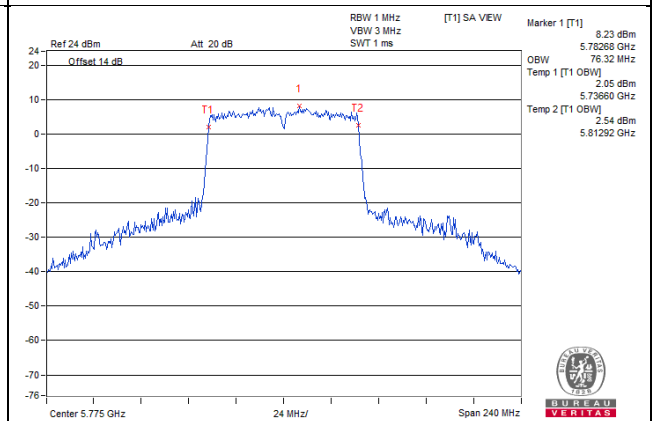
11ac 80MHz 2S3T TxBF CH155 Ant2



11ac 80MHz 2S3T TxBF CH42 Ant3



11ac 80MHz 2S3T TxBF CH155 Ant3



4.3 6dB Bandwidth Measurement

4.3.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz

4.3.2 Measuring Instruments and Setting

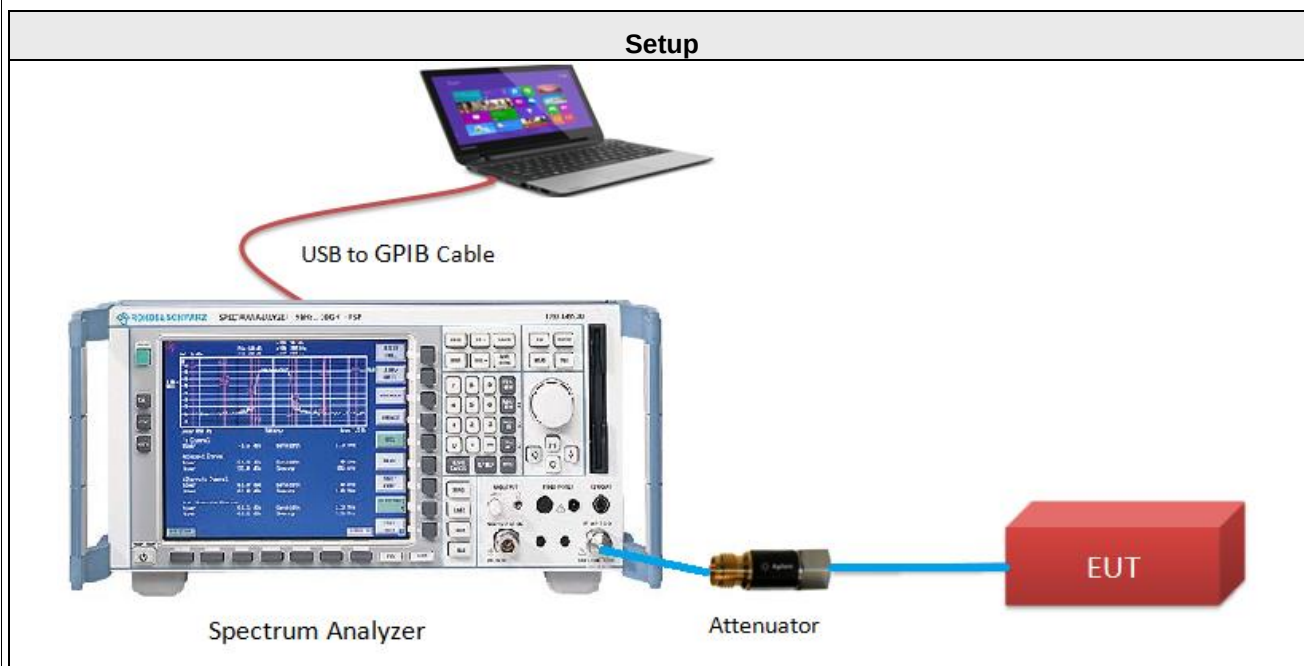
The following table is the setting of the Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100KHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

4.3.3 Test Procedures

- 1 The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
- 2 Test was performed in accordance with Measurement of Digital Transmission Systems Operating under 789033 D02 General UNII Test Procedures New Rules v02r01, in section "Emission bandwidth (C)(2)", 12/14/2017
- 3 Measured the spectrum width with power higher than 6dB account by this measurement.

4.3.4 Test Setup Layout



4.3.5 Test Deviation

There are no deviations with the original standard.

4.3.6 EUT Operating Conditions

The EUT was programmed to be in continuously transmitting mode.

4.3.7 Test Results of 6dB Bandwidth

Temperature	25°C	Humidity	60%
Test Engineer	Kevin Ko		

11a 1S3T CDD

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
149	5745	16.43	16.42	16.41	0.5	PASS
157	5785	16.44	16.42	16.42	0.5	PASS
165	5825	16.45	16.42	16.41	0.5	PASS

11ac 20MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
149	5745	17.65	17.67	17.65	0.5	PASS
157	5785	17.66	17.68	17.64	0.5	PASS
165	5825	17.66	17.67	17.65	0.5	PASS

11ac 20MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
149	5745	17.67	17.68	17.66	0.5	PASS
157	5785	17.66	17.68	17.65	0.5	PASS
165	5825	17.67	17.67	17.65	0.5	PASS

11ac 20MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
149	5745	17.72	17.66	17.77	0.5	PASS
157	5785	17.75	17.65	17.74	0.5	PASS
165	5825	17.69	17.66	17.72	0.5	PASS

11ac 40MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
151	5755	36.4	36.37	36.40	0.5	PASS
159	5795	36.38	36.42	36.34	0.5	PASS

11ac 40MHz 1S3T TxBF

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
151	5755	36.43	36.38	36.38	0.5	PASS
159	5795	36.47	36.48	36.39	0.5	PASS

11ac 40MHz 2S3T TxBF

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
151	5755	36.26	36.42	36.33	0.5	PASS
159	5795	36.38	36.43	36.23	0.5	PASS

11ac 80MHz 1S3T CDD

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
155	5775	75.97	75.68	76.14	0.5	PASS

11ac 80MHz 1S3T TxBF

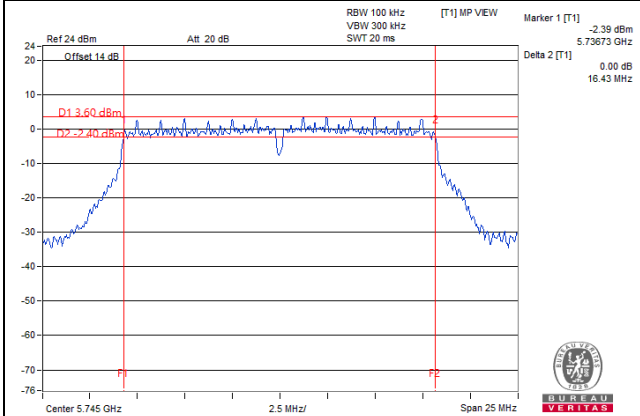
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
155	5775	75.92	75.61	75.83	0.5	PASS

11ac 80MHz 2S3T TxBF

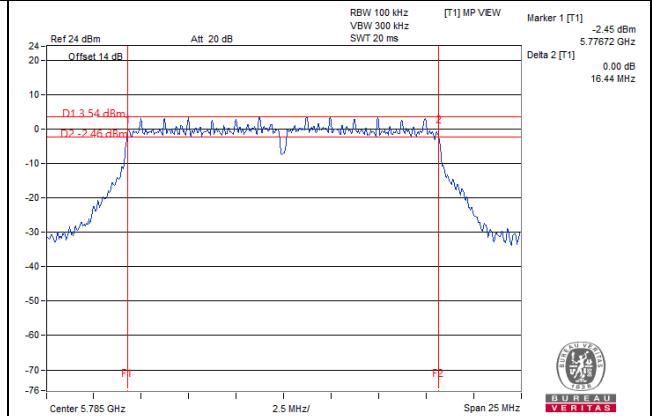
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		ANT 1	ANT 2	ANT 3		
155	5775	76.15	75.55	76.13	0.5	PASS

6dB BANDWIDTH SPECTRUM PLOT

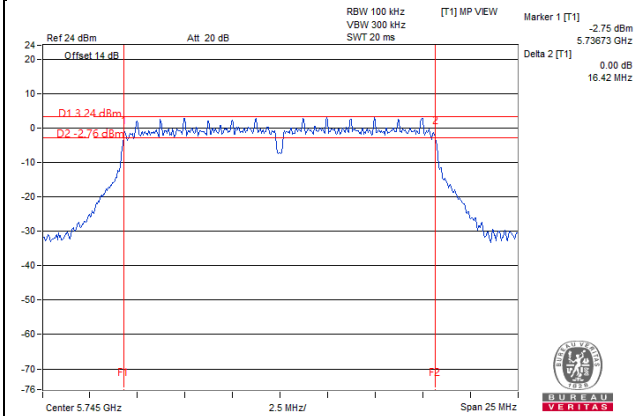
11a 1S3T CDD CH149 Ant1



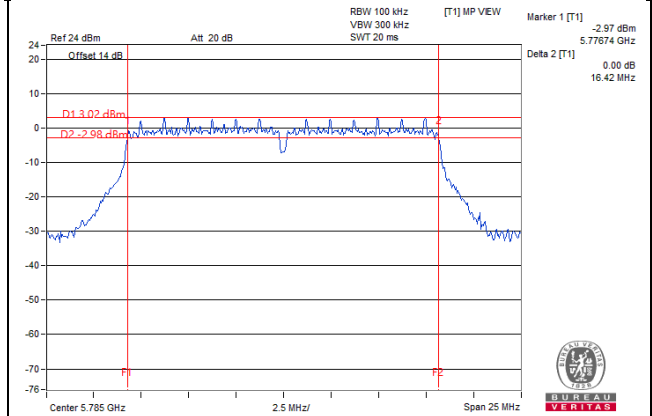
11a 1S3T CDD CH157 Ant1



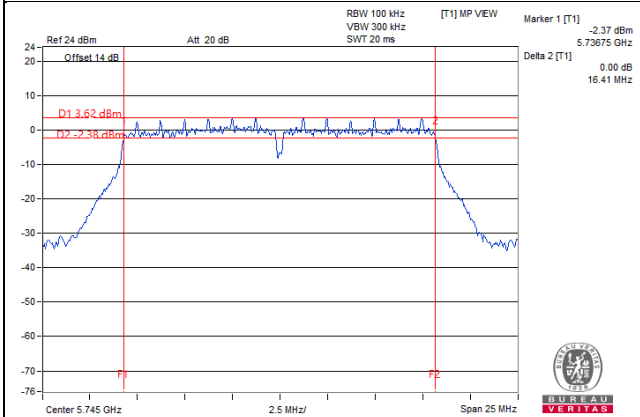
11a 1S3T CDD CH149 Ant2



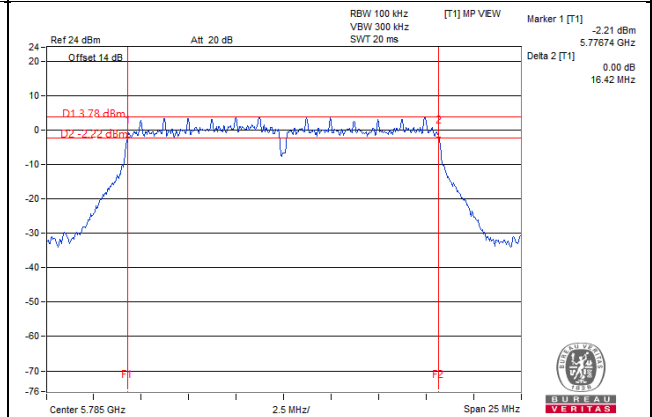
11a 1S3T CDD CH157 Ant2



11a 1S3T CDD CH149 Ant3

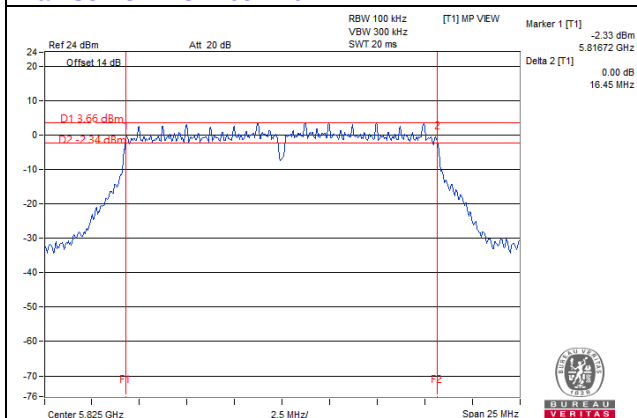


11a 1S3T CDD CH157 Ant3

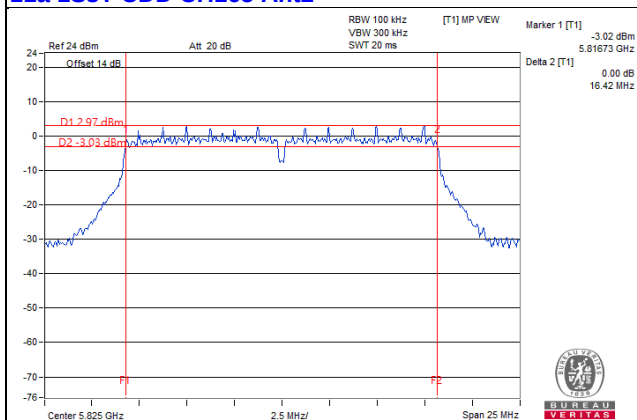


6dB BANDWIDTH SPECTRUM PLOT

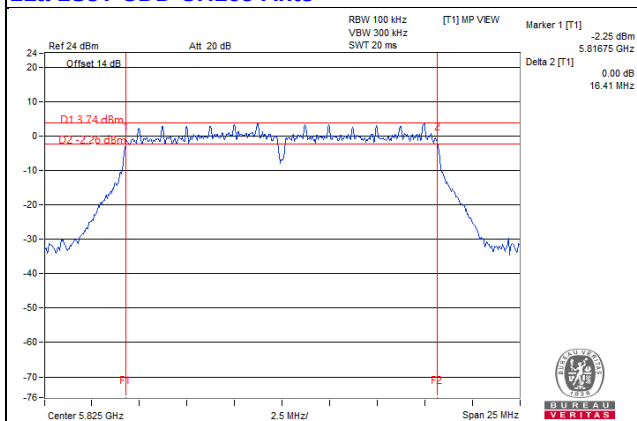
11a 1S3T CDD CH165 Ant1



11a 1S3T CDD CH165 Ant2

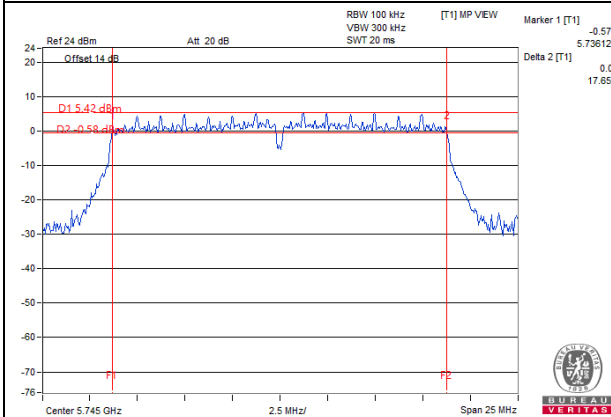


11a 1S3T CDD CH165 Ant3

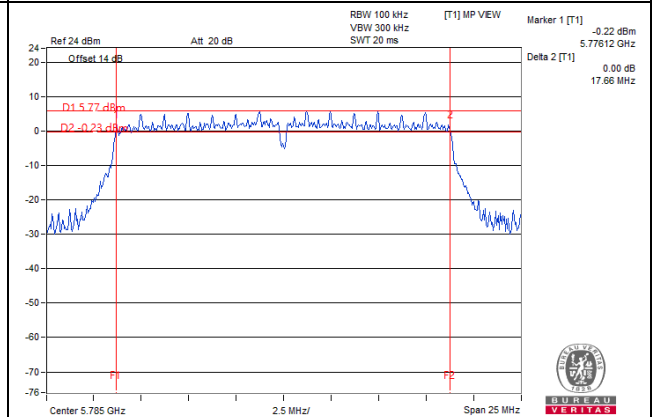


6dB BANDWIDTH SPECTRUM PLOT

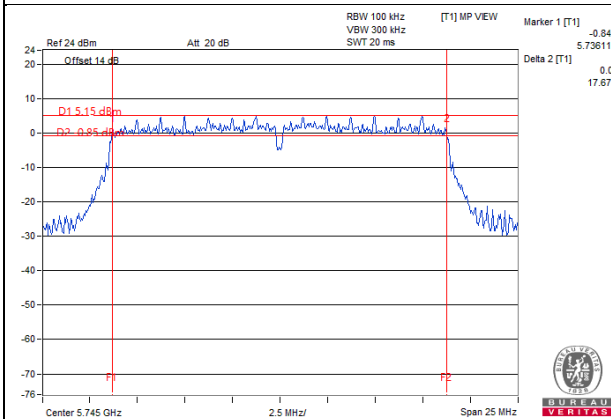
11ac 20MHz 1S3T CDD CH149 Ant1



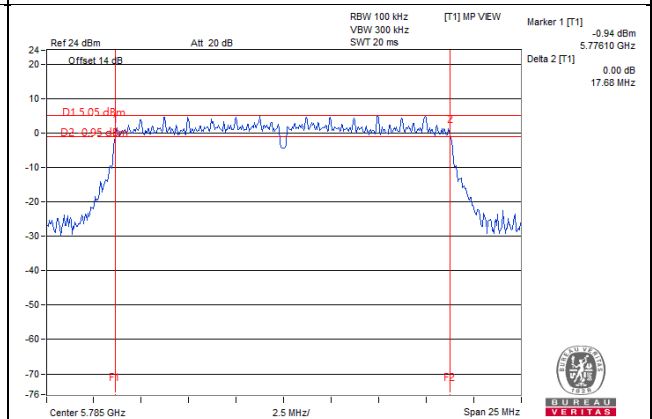
11ac 20MHz 1S3T CDD CH157 Ant1



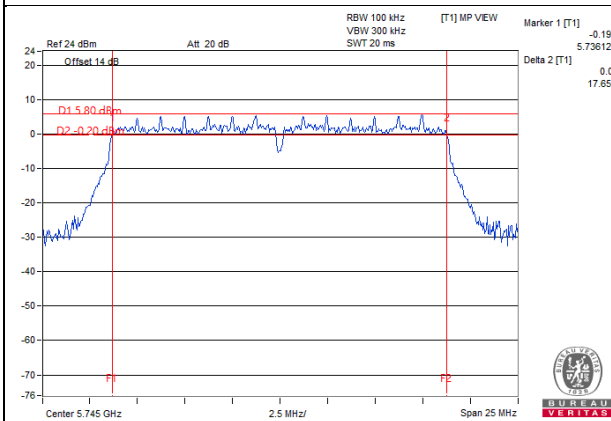
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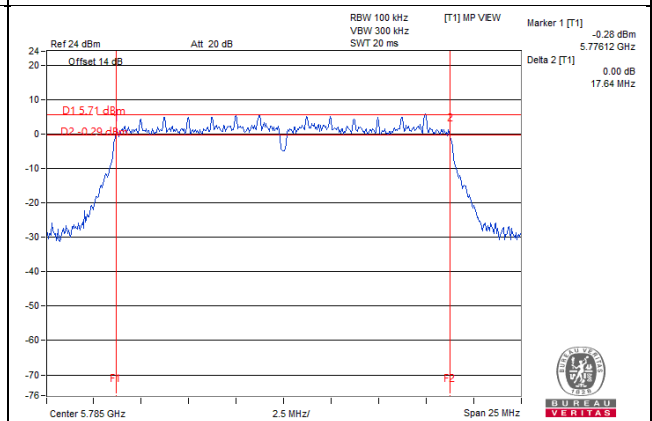
11ac 20MHz 1S3T CDD CH157 Ant2



11ac 20MHz 1S3T CDD CH149 Ant3

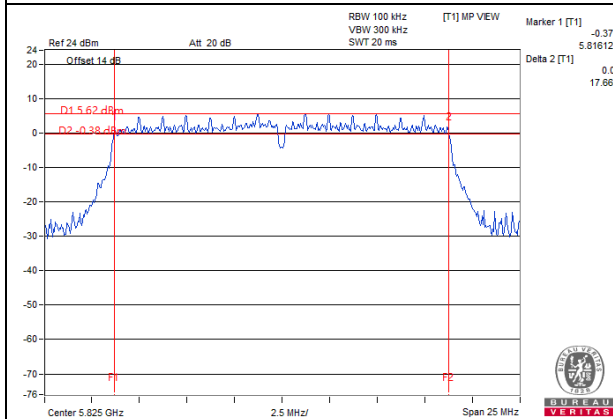


11ac 20MHz 1S3T CDD CH157 Ant3

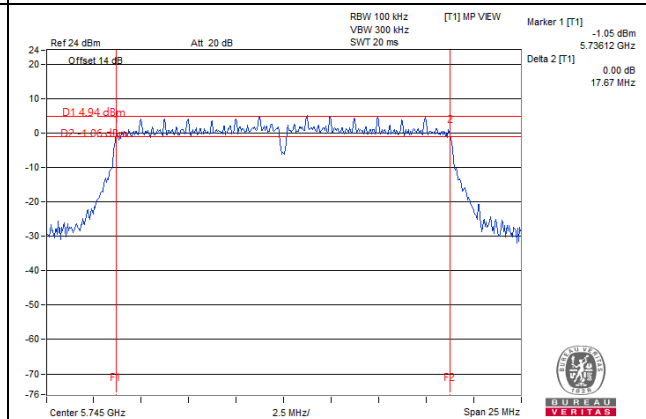


6dB BANDWIDTH SPECTRUM PLOT

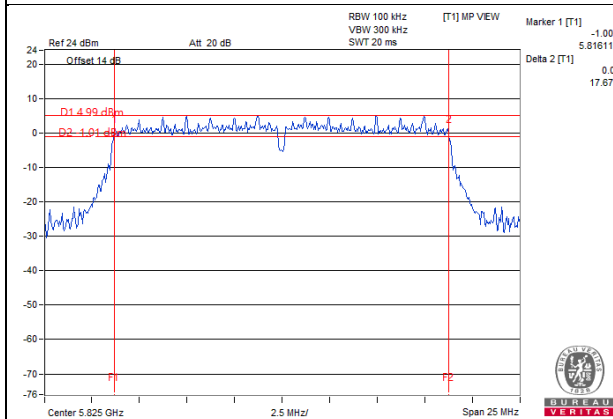
11ac 20MHz 1S3T CDD CH165 Ant1



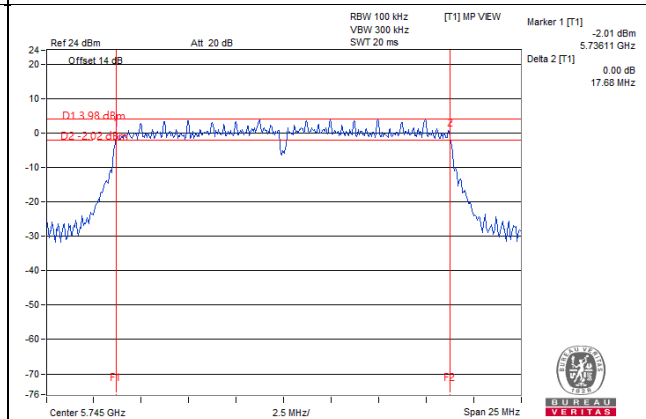
11ac 20MHz 1S3T TxBF CH149 Ant1



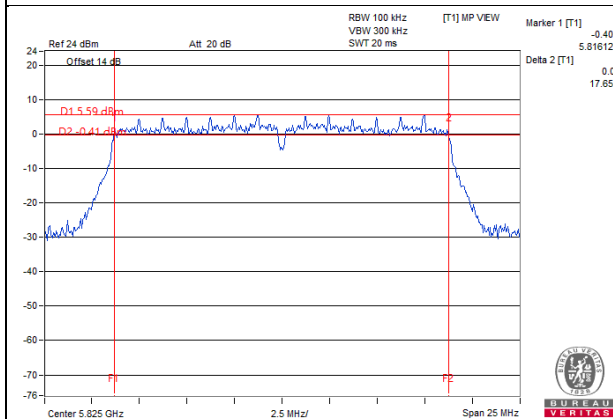
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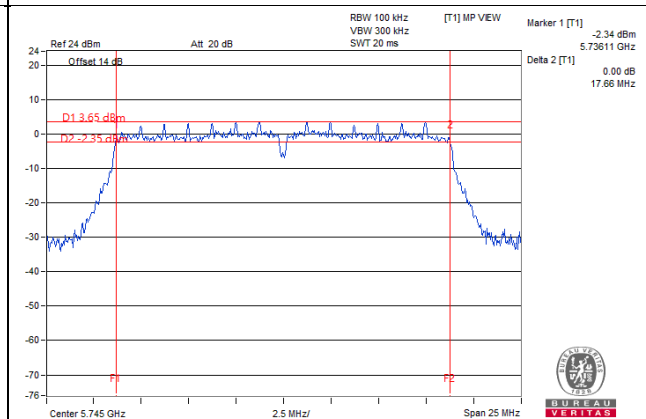
11ac 20MHz 1S3T TxBF CH149 Ant2



11ac 20MHz 1S3T CDD CH165 Ant3

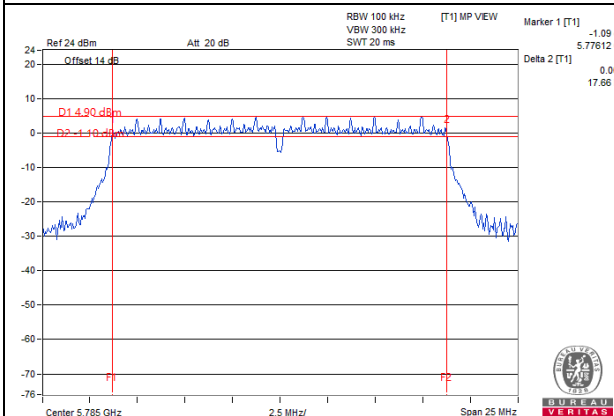


11ac 20MHz 1S3T TxBF CH149 Ant3

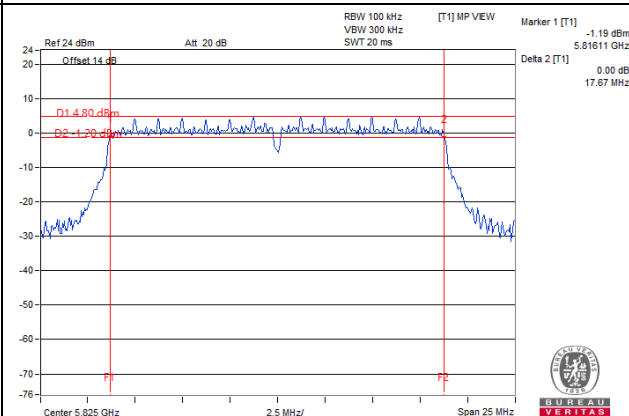


6dB BANDWIDTH SPECTRUM PLOT

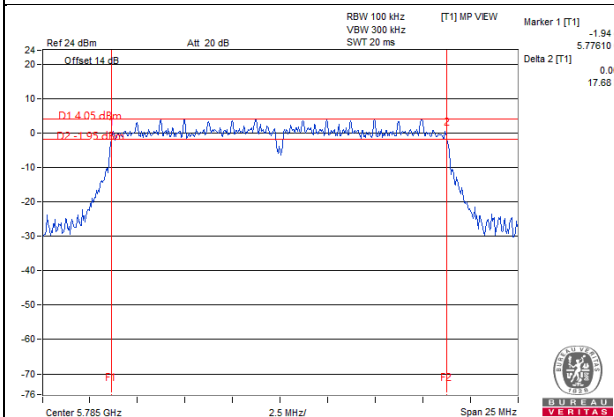
11ac 20MHz 1S3T TxBF CH157 Ant1



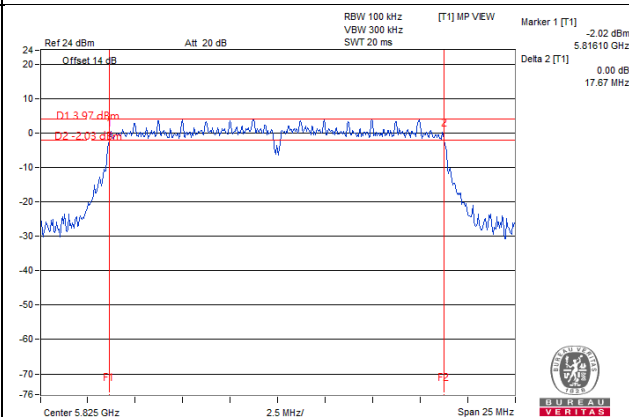
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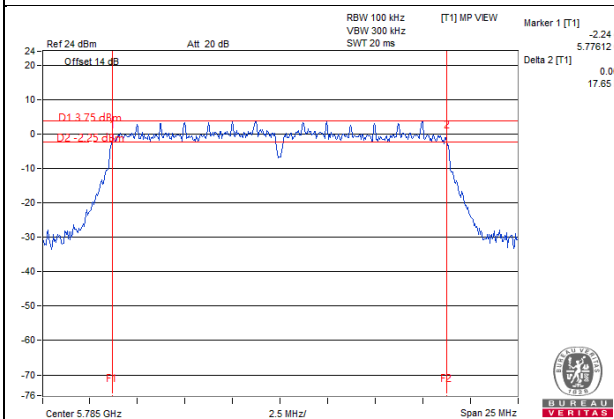
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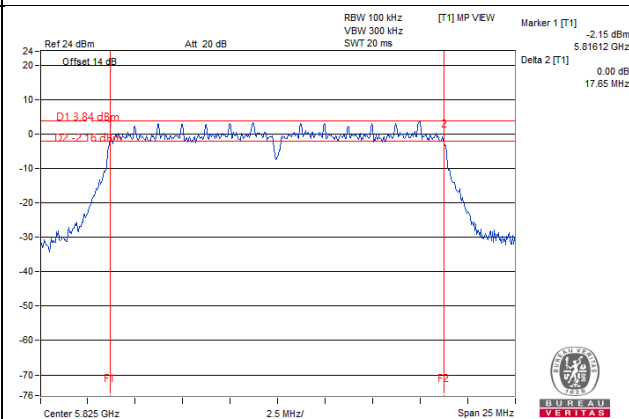
11ac 20MHz 1S3T TxBF CH165 Ant2



11ac 20MHz 1S3T TxBF CH157 Ant3

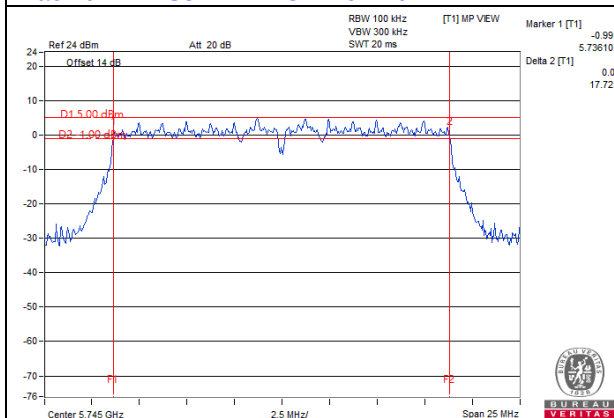


11ac 20MHz 1S3T TxBF CH165 Ant3

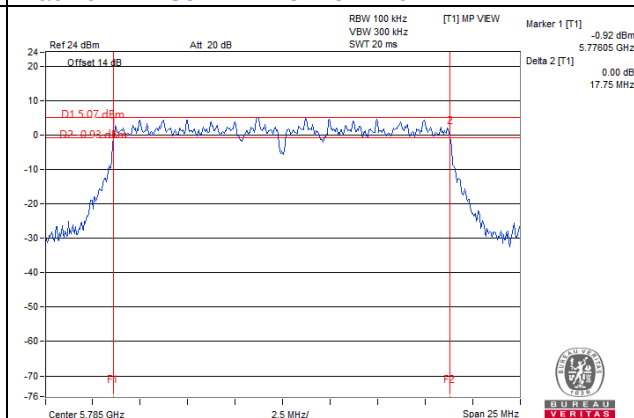


6dB BANDWIDTH SPECTRUM PLOT

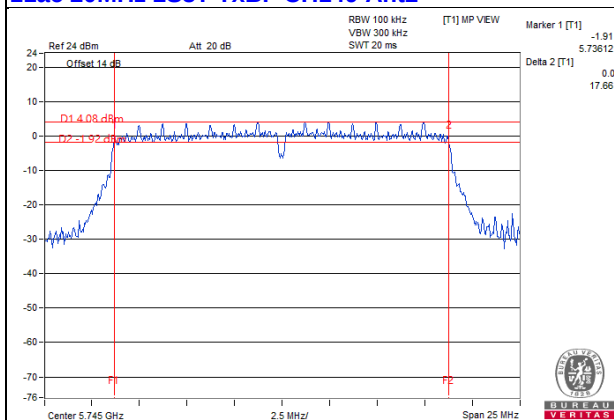
11ac 20MHz 2S3T TxBF CH149 Ant1



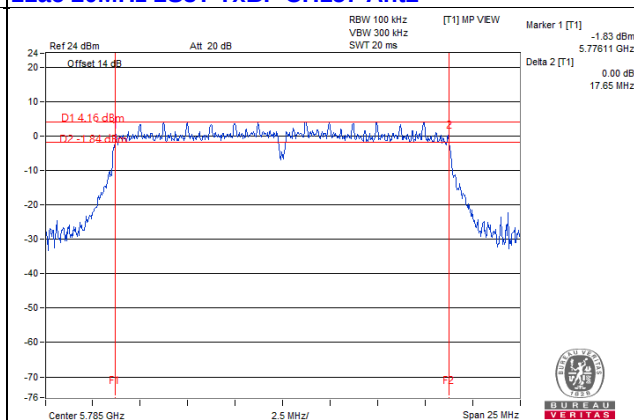
11ac 20MHz 2S3T TxBF CH157 Ant1



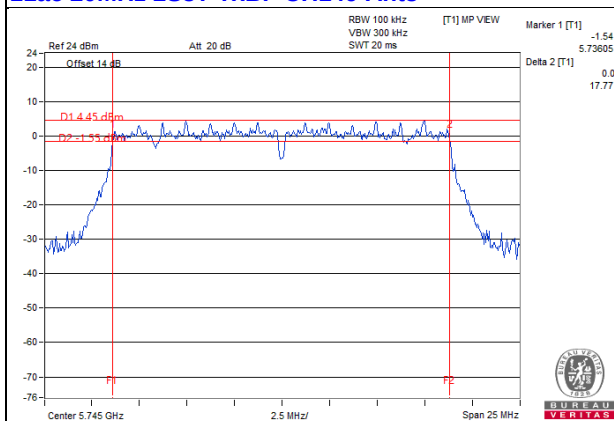
11ac 20MHz 2S3T TxBF CH149 Ant2



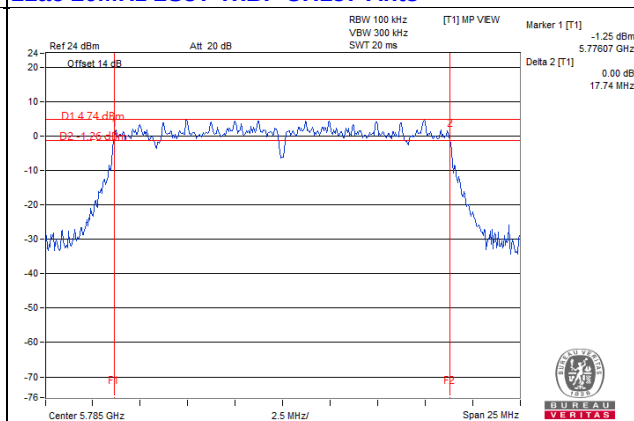
11ac 20MHz 2S3T TxBF CH157 Ant2



11ac 20MHz 2S3T TxBF CH149 Ant3

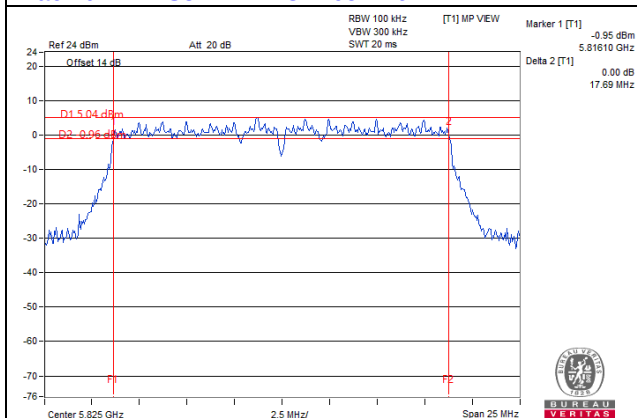


11ac 20MHz 2S3T TxBF CH157 Ant3

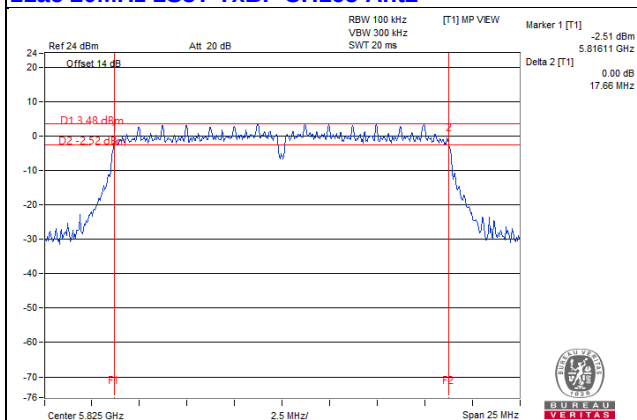


6dB BANDWIDTH SPECTRUM PLOT

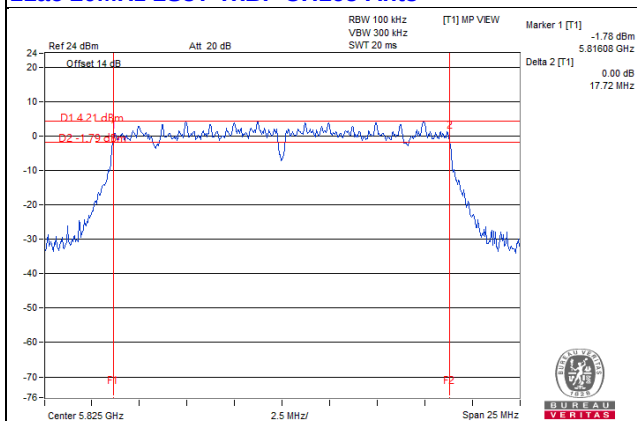
11ac 20MHz 2S3T TxBF CH165 Ant1



11ac 20MHz 2S3T TxBF CH165 Ant2

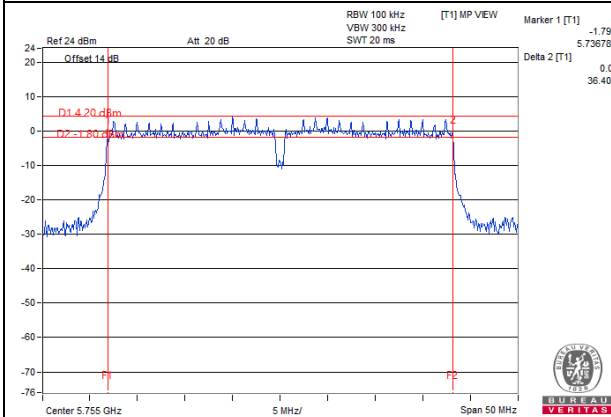


11ac 20MHz 2S3T TxBF CH165 Ant3

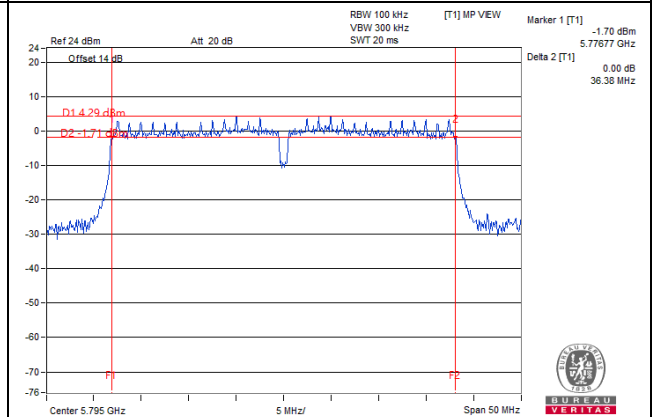


6dB BANDWIDTH SPECTRUM PLOT

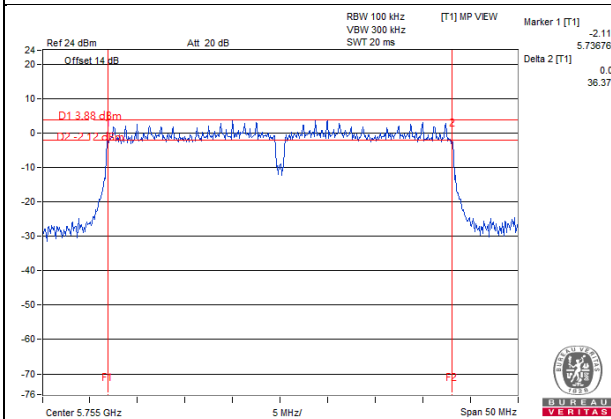
11ac 40MHz 1S3T CDD CH151 Ant1



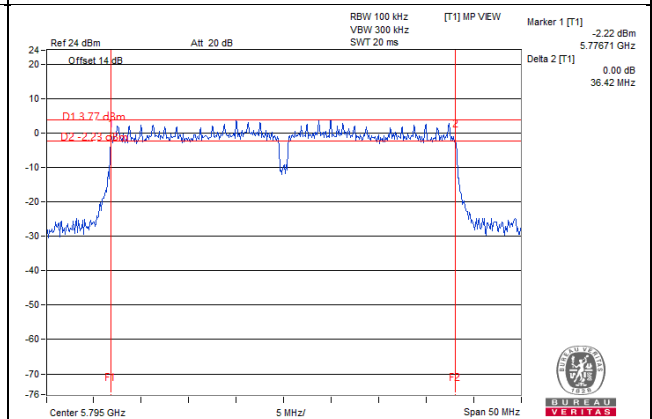
11ac 40MHz 1S3T CDD CH159 Ant1



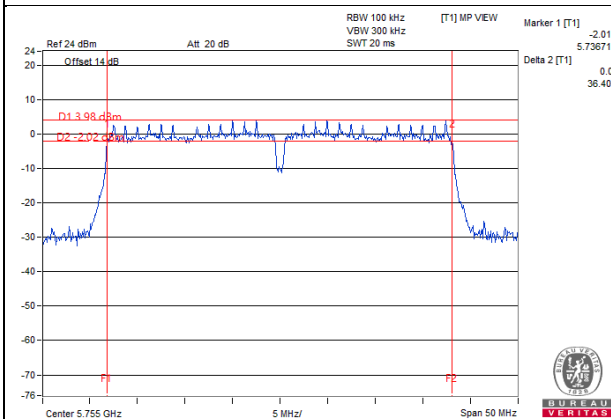
11ac 40MHz 1S3T CDD CH151 Ant2



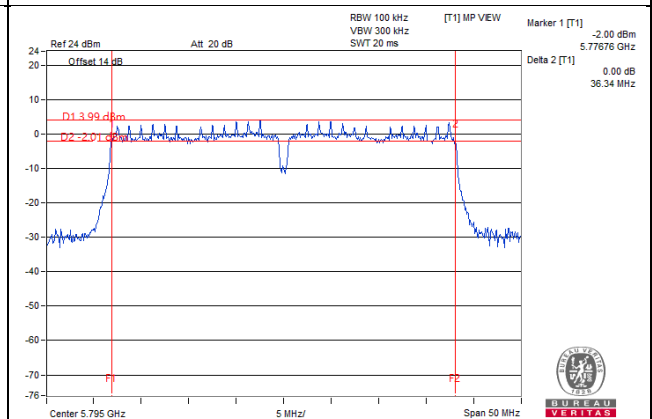
11ac 40MHz 1S3T CDD CH159 Ant2



11ac 40MHz 1S3T CDD CH151 Ant3

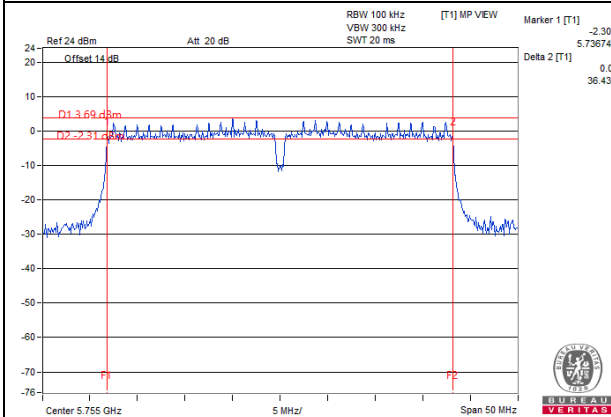


11ac 40MHz 1S3T CDD CH159 Ant3

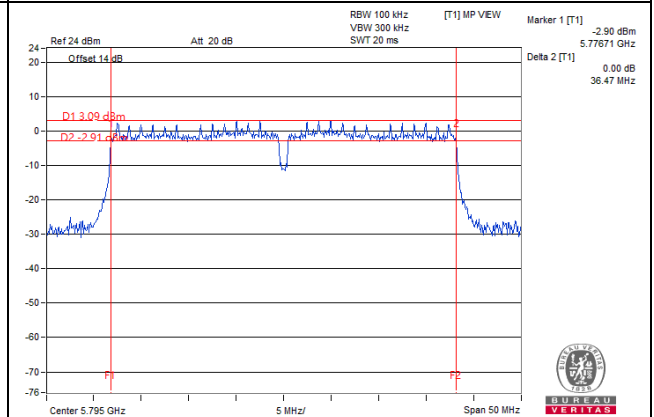


6dB BANDWIDTH SPECTRUM PLOT

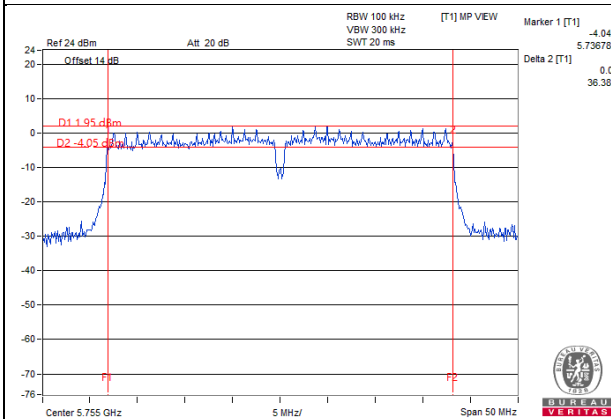
11ac 40MHz 1S3T TxBF CH151 Ant1



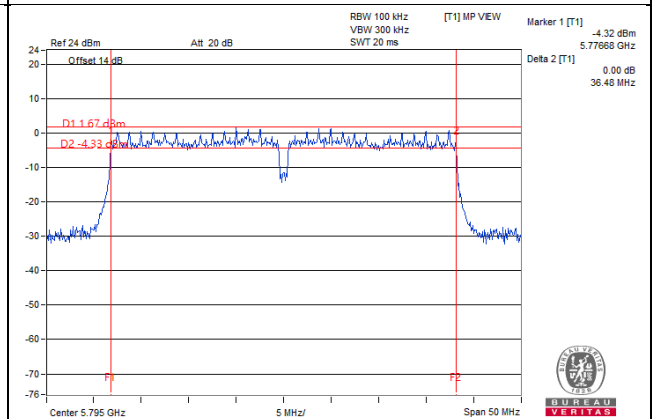
11ac 40MHz 1S3T TxBF CH159 Ant1



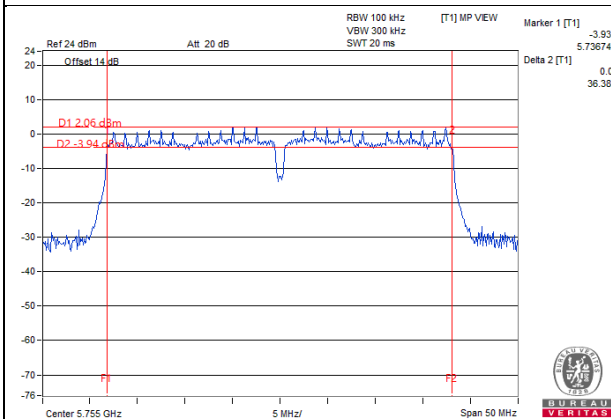
11ac 40MHz 1S3T TxBF CH151 Ant2



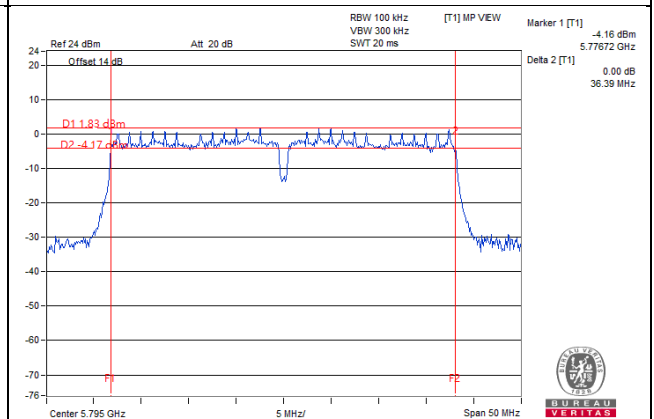
11ac 40MHz 1S3T TxBF CH159 Ant2



11ac 40MHz 1S3T TxBF CH151 Ant3

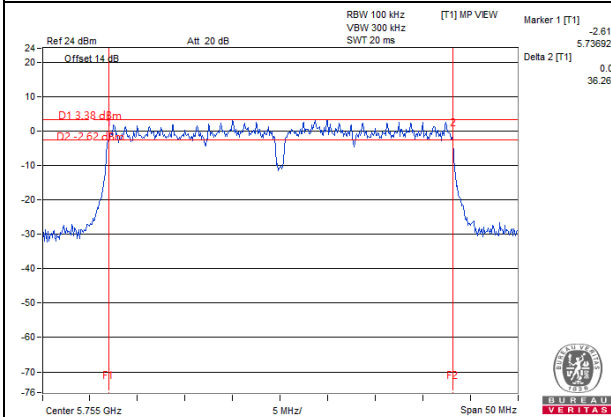


11ac 40MHz 1S3T TxBF CH159 Ant3

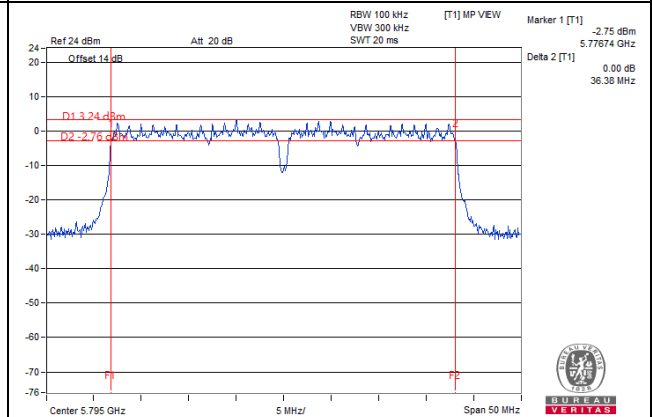


6dB BANDWIDTH SPECTRUM PLOT

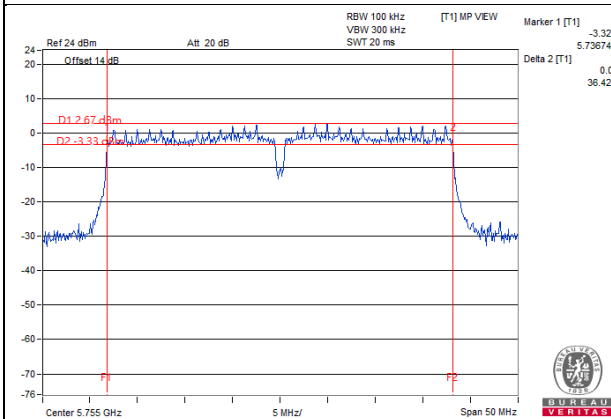
11ac 40MHz 2S3T TxBF CH151 Ant1



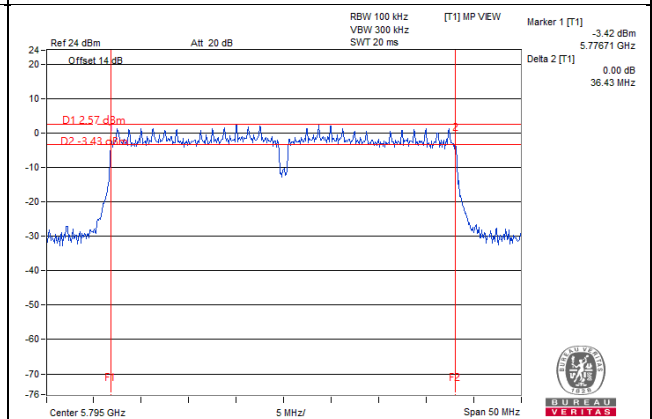
11ac 40MHz 2S3T TxBF CH159 Ant1



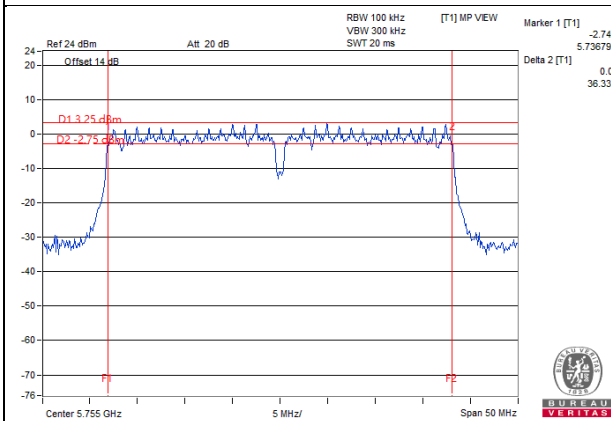
11ac 40MHz 2S3T TxBF CH151 Ant2



11ac 40MHz 2S3T TxBF CH159 Ant2



11ac 40MHz 2S3T TxBF CH151 Ant3



11ac 40MHz 2S3T TxBF CH159 Ant3

