



TEST REPORT

No. I22N00718-RLAN

for

HMD Global Oy

Smart Phone

Model Name: TA-1429

with

Hardware Version: V01

Software Version: 00WW_0_017

FCC ID: 2AJOTTA-1429

Issued Date: 2022-04-29

Designation Number: CN1210

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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1. Summary of Test Report

1.1. Test Items

Description	Smart Phone
Model Name	TA-1429
Applicant's name	HMD Global Oy
Manufacturer's Name	HMD Global Oy

1.2. Test Standards

FCC Part15-2019; ANSI C63.10-2013; KDB789033-V02r01; KDB 905462-D02

1.3. Test Result

Pass

Please refer to "5.2. Test Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,
Futian District, Shenzhen, Guangdong, P. R. China

1.5. Project data

Testing Start Date:	2022-04-02
Testing End Date:	2022-04-21

1.6. Signature

Lin Kanfeng
(Prepared this test report)

An Ran
(Reviewed this test report)

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2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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Email: reza.serafat@hmdglobal.com
Tel.: +393 31 6272922
Fax: /

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Smart Phone
Model Name	TA-1429
RLAN Frequency Range	ISM Bands: 5150MHz~5250MHz; 5250MHz~5350MHz; 5470MHz~5725MHz; 5725MHz~5850MHz.
RLAN Protocol	IEEE 802.11a,802.11n-HT20/40,802.11ac-VHT20/40/80
Type of modulation	OFDM
Antenna Type	Integrated
Supply Voltage	DC 3.8V
Power source	Battery
FCC ID	2AJOTTA-1429
Device Type (DFS)	Client without radar detection (only support client mode)
TPC feature available	No
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
UT03aa	351935780004224	V02	00WW_0_017	2022-04-02
UT08aa	355400570003247	V01	00WW_0_017	2022-04-02

*EUT ID: is used to identify the test sample in the lab internally.

UT03aa is used for conduction test, UT08aa used for radiation test and AC Power line Conducted Emission test.

3.3. Internal Identification of AE

AE ID*	Description	Model	Manufacturer
AE1	Battery	GH6581	Shenzhen Aerospace Electronic CO.,Ltd.
AE2	Charger	AD-010U	Shenzhen Baijunda Electronics Co. LTD

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Smart Phone with dedicated antenna.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

TA-1429 is the variant of the initial certified product TA-1413,TA-1413 supports 2 SIM slots and TA-1429 supports 1 SIM slot.

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47,Part 15,Subpart C FCC CFR 47,Part 15,Subpart E	2019
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 789033	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E	V02r01
KDB 905462	Compliance Measurement Procedures for Unlicensed-national Information Infrastructure Devices Operating in the 5250-5350 MHz and 5470-5725 MHz Bands Incorporating Dynamic Frequency Selection	D02

5. Test Results

5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

5.2. Test Results

No.	Test cases	Sub-clause of Part15E	Verdict
1	Maximum Output Power	15.407(a)	P
2	Power Spectral Density	15.407(a)	P
3	Occupied 26dB Bandwidth	15.403(i)	/
4	Occupied 6dB Bandwidth	15.407(e)	P
5	99% Occupied Bandwidth	15.403	/
6	Band edge compliance	15.209	P
7	Radiated Spurious Emissions	15.209	P
8	AC Power line Conducted	15.207	P
9	Transmit Power Control	15.407	NA
10	Dynamic Frequency Selection	15.407(h)	P

See **ANNEX A** for details.

Note: According to the definition of the application description, the device will automatically discontinue transmission in case of either absence of information to transmit or operational failure.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

6. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2022-12-29	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2022-12-29	1 year
3	Data Acquisition	U2531A	TW55443507	Keysight	/	/
4	Vector Signal General	SMU200A	104096	Rohde & Schwarz	2022-12-29	1 year
5	Test Receiver	ESCI	100701	Rohde & Schwarz	2022-08-08	1 year
6	LISN	ENV216	102067	Rohde & Schwarz	2022-07-15	1 year
No.	Equipment	Model	FCC ID	Manufacturer	Calibration Due date	Calibration Period
7	Master AP	RT-AC960 0R	MSQ-RTG03 H	ASUS	/	/

Radiated test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 years
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2024-05-27	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2025-03-15	3 years
4	Horn Antenna	QSH-SL-18 -26-S-20	17013	Q-par	2023-01-06	3 years
5	Horn Antenna	QSH-SL-8- 26-40-K-20	17014	Q-par	2023-01-06	3 years
6	Test Receiver	ESR7	101676	Rohde & Schwarz	2022-11-24	1 year
7	Spectrum Analyser	FSV40	101192	Rohde & Schwarz	2023-01-12	1 year
8	Chamber	FACT3-2.0	1285	ETS-Lindgren	2023-05-29	2 years

Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal. The EUT was programmed to be in continuously transmitting mode.

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

7. Laboratory Environment

Semi-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3 m distance, from 30 to 1000 MHz

Shielded room

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4 Ω

Fully-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

8. Measurement Uncertainty

Test Name	Uncertainty ($k=2$)	
1. RF Output Power - Conducted	1.32dB	
2. Power Spectral Density - Conducted	2.32dB	
3. Occupied channel bandwidth - Conducted	$\pm 66\text{Hz}$	
4. Transmitter Spurious Emission - Conducted	$30\text{MHz} \leq f < 1\text{GHz}$	1.41dB
	$1\text{GHz} \leq f < 7\text{GHz}$	1.92dB
	$7\text{GHz} \leq f < 13\text{GHz}$	2.31dB
	$13\text{GHz} \leq f \leq 26\text{GHz}$	2.61dB
5. Transmitter Spurious Emission - Radiated	$9\text{kHz} \leq f < 30\text{MHz}$	1.74dB
	$30\text{MHz} \leq f < 1\text{GHz}$	4.84dB
	$1\text{GHz} \leq f < 18\text{GHz}$	4.68dB
	$18\text{GHz} \leq f \leq 40\text{GHz}$	3.76dB
6. AC Power line Conducted Emission	$150\text{kHz} \leq f \leq 30\text{MHz}$	3.00dB

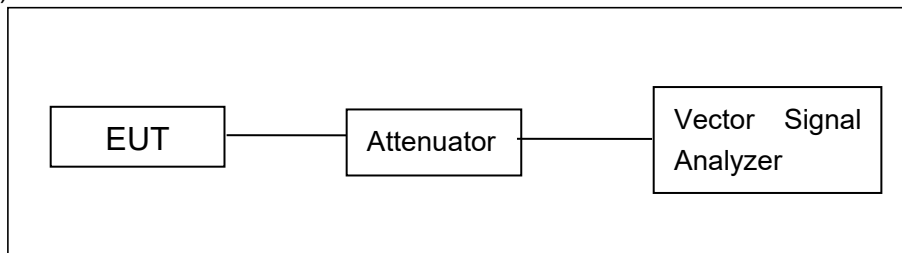
ANNEX A: Detailed Test Results

Test Configuration:

The measurement is made according to ANSI C63.10.

Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values.

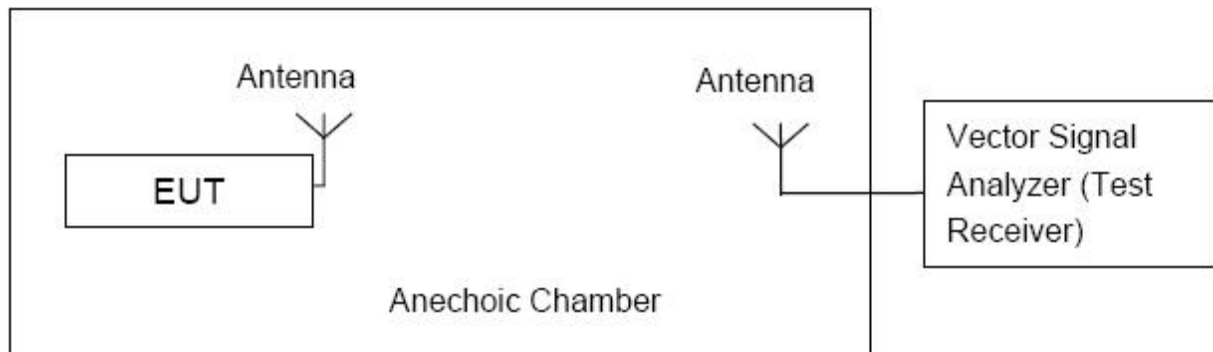


Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows:

Sweep frequency from 30 MHz to 1 GHz, RBW = 100 KHz, VBW = 300 KHz;

Sweep frequency from 1 GHz to 26 GHz, RBW = 1 MHz, VBW = 10 Hz;



The measurement is made according to KDB 789033.

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

**A.0 Antenna requirement****Measurement Limit:**

Standard	Requirement
FCC CRF Part 15.203	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 a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

**Conclusion: The Directional gains of antenna used for transmitting: -0.3dBi;
The RF transmitter uses an integrate antenna without connector.**

A.1. Maximum output Power

Measurement Limit and Method:

Standard	Frequency (MHz)	Limit (dBm)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	24
	5250MHz~5350MHz	24 or 11+10logB
	5470MHz~5725MHz	24 or 11+10logB
	5725MHz~5850MHz	30

Limit use the less value, and B is the 26dB bandwidth.

Measurement of method: See ANSI C63.10-2013-Clause 12.3.3.2

Method PM-G is a measurement using a gated RF average power meter.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Measurement Results:

U-NII Band	Mode	Channel	Frequency (MHz)	RF output power (dBm)
5.2GHz Band (UNII-1)	802.11a	CH 36	5180	13.63
		CH 40	5220	13.56
		CH 48	5240	13.48
	802.11n-HT20	CH 36	5180	13.49
		CH 40	5220	13.45
		CH 48	5240	13.33
	802.11n-HT40	CH 38	5190	13.24
		CH 46	5230	13.07
	802.11ac-VHT20	CH 36	5180	13.52
		CH 40	5220	13.44
		CH 48	5240	13.31
	802.11ac-VHT40	CH 38	5190	13.11
		CH 46	5230	12.89
	802.11ac-VHT80	CH 42	5210	12.11

U–NII Band	Mode	Channel	Frequency (MHz)	RF output power (dBm)
5.3GHz Band (UNII-2A)	802.11a	CH 52	5260	13.95
		CH 56	5280	13.91
		CH 64	5320	14.65
	802.11n-HT20	CH 52	5260	13.87
		CH 56	5280	13.82
		CH 64	5320	14.52
	802.11n-HT40	CH 54	5270	13.51
		CH 62	5310	14.19
	802.11ac-VHT20	CH 52	5260	13.87
		CH 56	5280	13.81
		CH 64	5320	14.54
	802.11ac-VHT40	CH 54	5270	13.41
		CH 62	5310	14.05
	802.11ac-VHT80	CH 58	5290	12.90

U–NII Band	Mode	Channel	Frequency (MHz)	RF output power (dBm)
5.5GHz Band (UNII-2C)	802.11a	CH 100	5500	14.61
		CH 120	5580	14.56
		CH 140	5700	14.13
	802.11n-HT20	CH 100	5500	14.56
		CH 120	5580	14.52
		CH 140	5700	14.02
	802.11n-HT40	CH 102	5510	14.05
		CH 118	5590	13.70
		CH 134	5670	13.61
	802.11ac-VHT20	CH 100	5500	14.51
		CH 120	5580	14.53
		CH 140	5700	13.97
	802.11ac-VHT40	CH 102	5510	13.98
		CH 118	5590	13.68
		CH 134	5670	13.48
	802.11ac-VHT80	CH 106	5530	13.21
		CH 122	5610	13.17

U-NII Band	Mode	Channel	Frequency (MHz)	RF output power (dBm)
5.8GHz Band (UNII-3)	802.11a	CH 149	5745	13.69
		CH 157	5785	13.38
		CH 165	5825	12.92
	802.11n-HT20	CH 149	5745	13.51
		CH 157	5785	13.18
		CH 165	5825	12.82
	802.11n-HT40	CH 151	5755	12.98
		CH 159	5795	12.64
	802.11ac-VHT20	CH 149	5745	13.47
		CH 157	5785	13.07
		CH 165	5825	12.73
	802.11ac-VHT40	CH 151	5755	12.87
		CH 159	5795	12.53
	802.11ac-VHT80	CH 155	5775	13.14

Note:

The data rate 6Mbps (11a mode), MCS0 (11n mode) and MCS0 (11ac mode) are selected as the worst case. 802.11a, 802.11n-HT40 and 802.11ac-VHT80 are selected as the worst-case. The following cases and test graphs are mostly performed with this condition.

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

Conclusion: PASS

A.3. Peak Power Spectral Density (conducted)

Measurement Limit:

Standard	Frequency (MHz)	Limit
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11dBm/MHz(FCC)
		10dBm/MHz EIRP(IC)
	5250MHz~5350MHz	11dBm/MHz
	5470MHz~5725MHz	11dBm/MHz
	5725MHz~5850MHz	30dBm/500kHz

The PPSD measurement method SA-1 is made according to KDB 789033.

Measurement Results:

5.2GHz Band (UNII-1) & 5.3GHz Band (UNII-2A) & 5.5GHz Band (UNII-2C):

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180MHz(Ch36)	7.51	P
	5220MHz(Ch44)	8.28	P
	5240MHz(Ch48)	6.80	P
	5260MHz(Ch52)	8.54	P
	5280MHz(Ch56)	8.48	P
	5320MHz(Ch64)	9.36	P
	5500MHz(Ch100)	9.44	P
	5580MHz(Ch116)	9.02	P
	5700MHz(Ch140)	7.70	P
802.11n-HT40	5190MHz(Ch38)	4.80	P
	5230MHz(Ch46)	5.07	P
	5270MHz(Ch54)	4.98	P
	5310MHz(Ch62)	6.09	P
	5510MHz(Ch102)	6.14	P
	5550MHz(Ch110)	5.54	P
	5670MHz(Ch134)	7.88	P
802.11ac-VHT80	5210MHz(Ch42)	0.18	P
	5290MHz(Ch58)	0.70	P
	5530MHz(Ch106)	1.93	P
	5610MHz(Ch122)	2.08	P



5.8GHz Band (UNII-3):

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	5745MHz(CH149)	4.47	P
	5785MHz(CH157)	3.61	P
	5825MHz(CH165)	3.38	P
802.11n HT40	5755MHz(CH151)	1.94	P
	5795MHz(CH159)	1.38	P
802.11ac-VHT80	5775MHz(CH155)	-1.59	P

Conclusion: PASS

A.4. Occupied 26dB Bandwidth (conducted)

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403 (i)	/

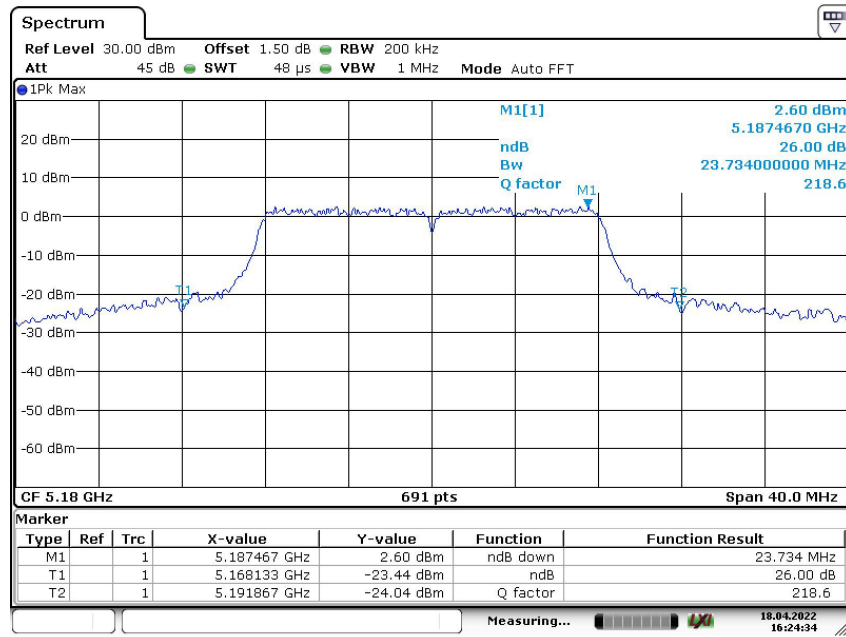
The measurement is made according to KDB 789033

Measurement Result:

Mode	Channel	Occupied 26dB Bandwidth(MHz)		Conclusion
802.11a	5180MHz(Ch36)	Fig.1	23.73	/
	5200MHz(Ch40)	Fig.2	21.59	/
	5240MHz(Ch48)	Fig.3	20.37	/
	5260MHz(Ch52)	Fig.4	19.10	/
	5280MHz(Ch56)	Fig.5	20.84	/
	5320MHz(Ch64)	Fig.6	20.03	/
	5500MHz(Ch100)	Fig.7	23.50	/
	5600MHz(Ch120)	Fig.8	20.96	/
	5700MHz(Ch140)	Fig.9	20.20	/
802.11n-HT40	5190MHz(Ch38)	Fig.10	40.29	/
	5230MHz(Ch46)	Fig.11	39.71	/
	5270MHz(Ch54)	Fig.12	39.36	/
	5310MHz(Ch62)	Fig.13	39.83	/
	5510MHz(Ch102)	Fig.14	39.59	/
	5550MHz(Ch110)	Fig.15	40.75	/
	5670MHz(Ch134)	Fig.16	39.59	/
802.11 ac-VHT80	5210MHz(Ch42)	Fig.17	78.49	/
	5290MHz(Ch58)	Fig.18	78.03	/
	5530MHz(Ch106)	Fig.19	78.03	/
	5610MHz(Ch122)	Fig.20	78.03	/

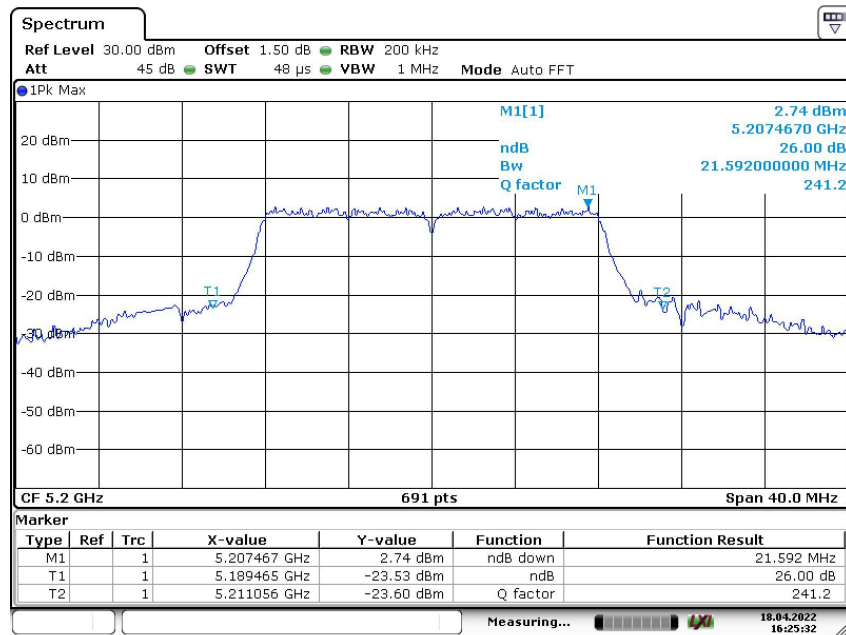
See below for test graphs.

Conclusion: PASS



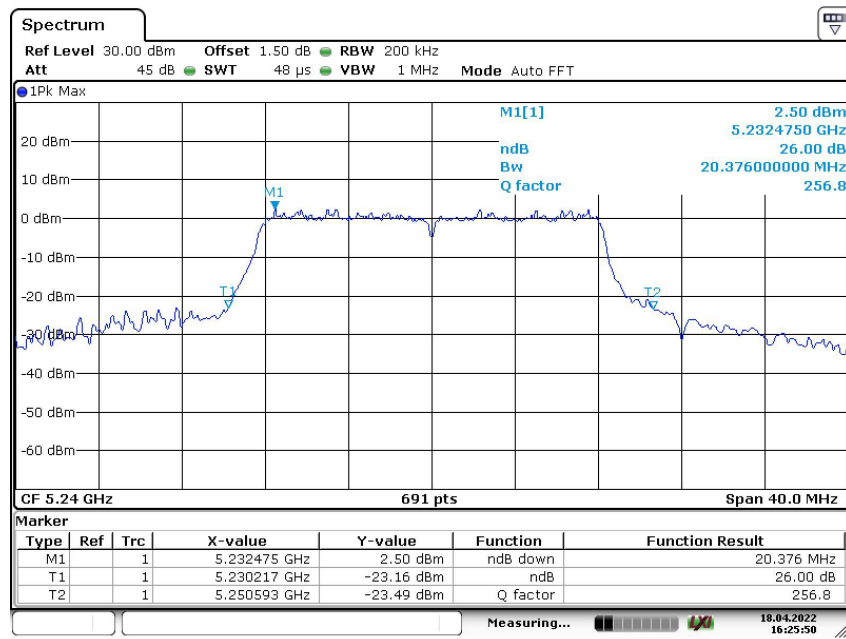
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Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)



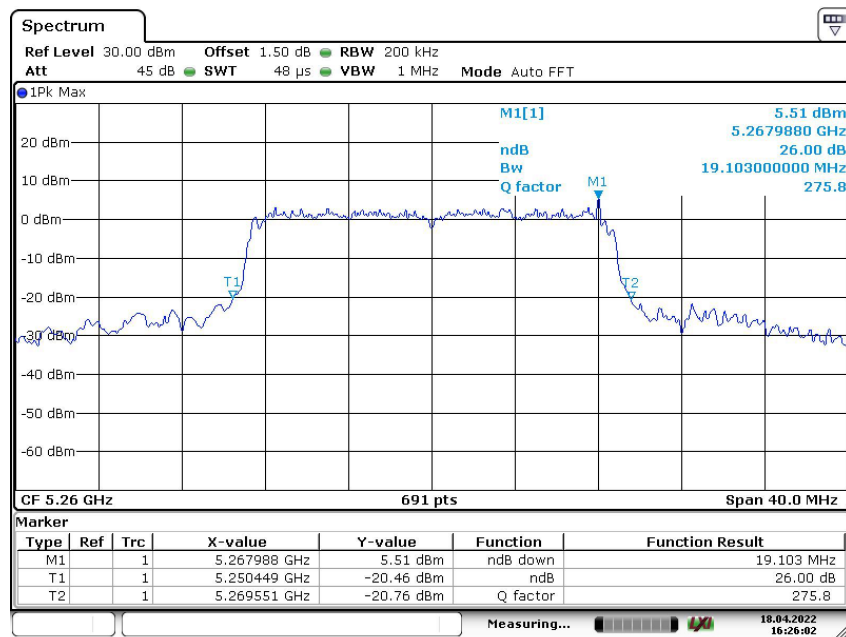
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Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)



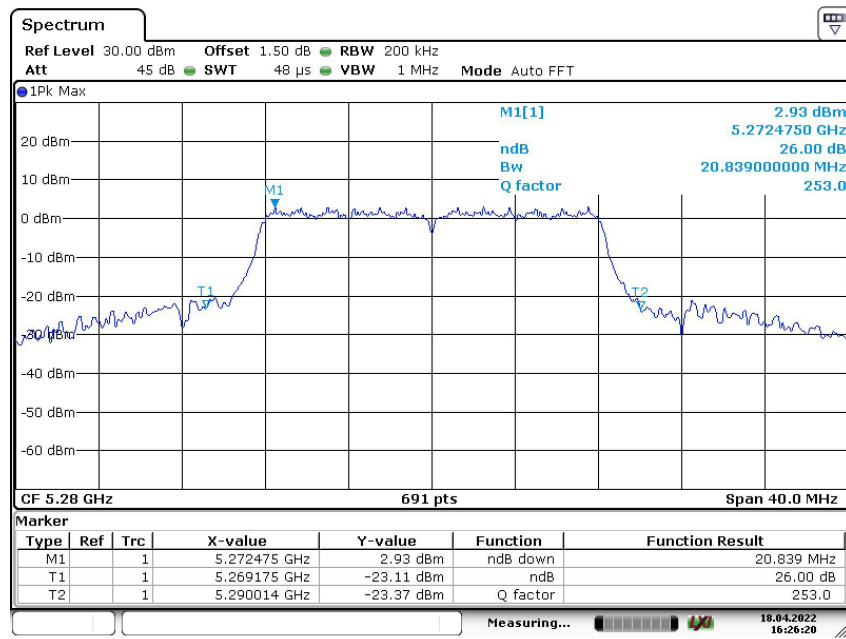
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Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz)



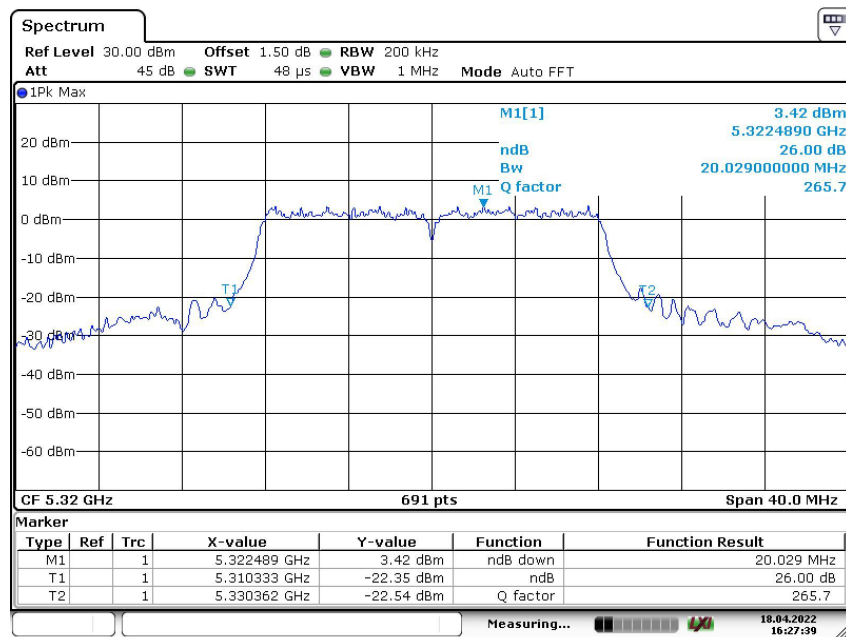
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Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)



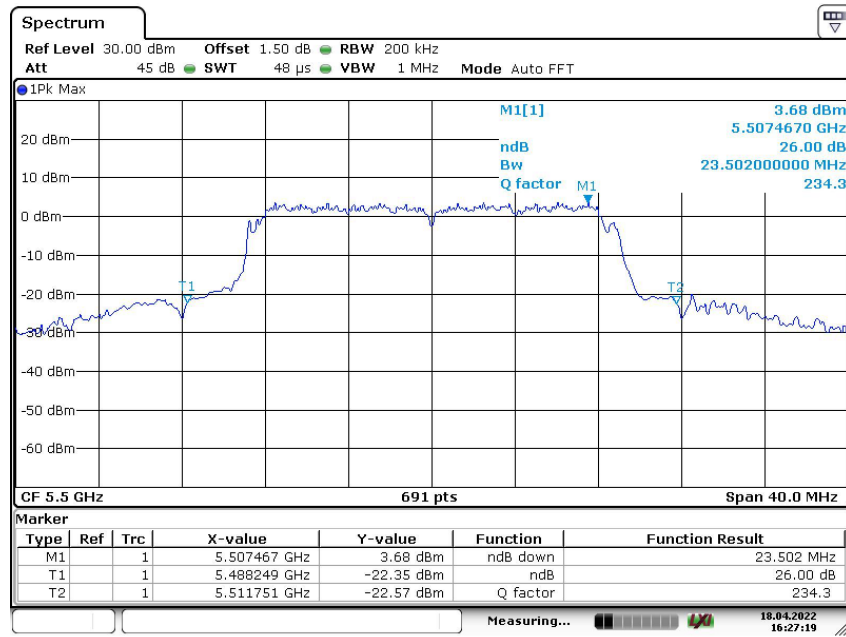
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Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)



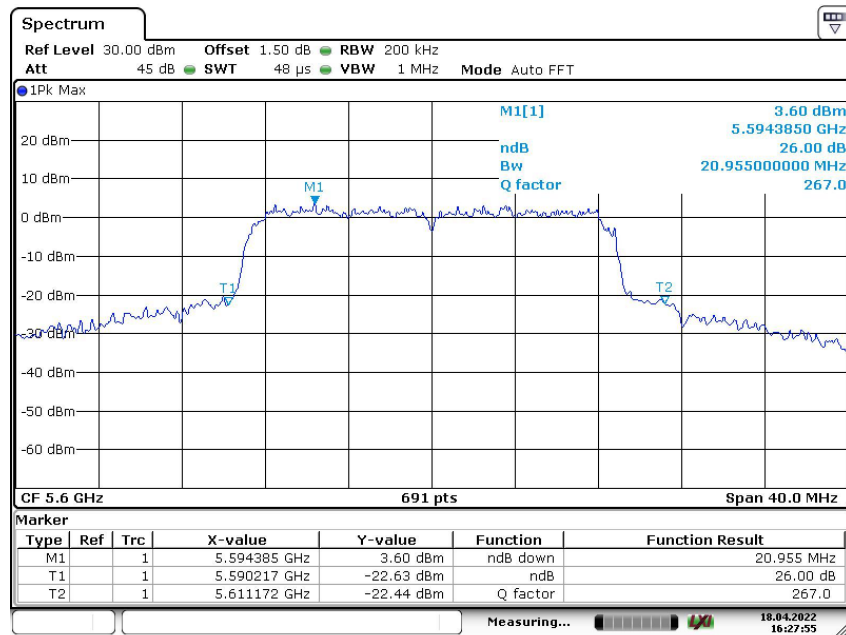
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Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)



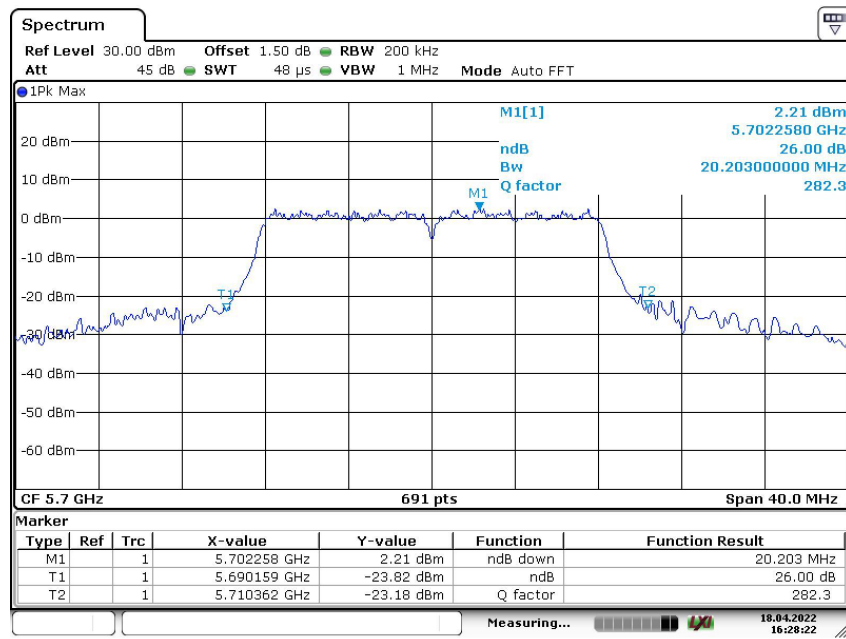
Date: 18.APR.2022 16:27:20

Fig. 7 Occupied 26dB Bandwidth (802.11a, 5500MHz)



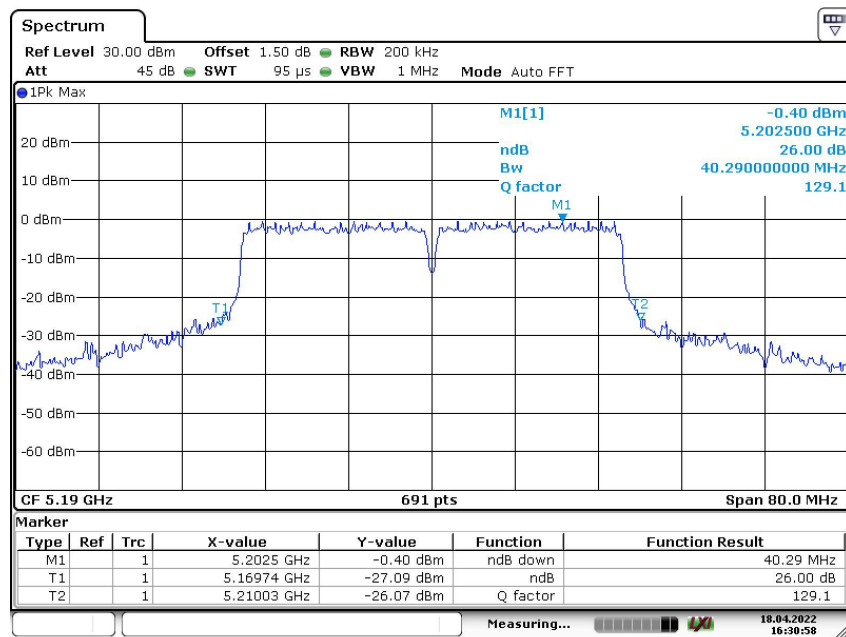
Date: 18.APR.2022 16:27:54

Fig. 8 Occupied 26dB Bandwidth (802.11a, 5600MHz)



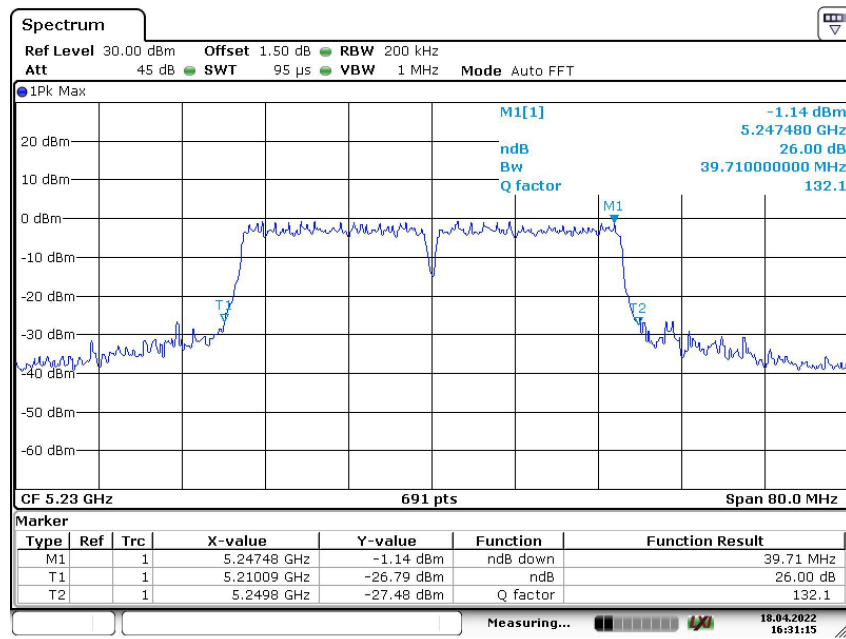
Date: 18.APR.2022 16:28:22

Fig. 9 Occupied 26dB Bandwidth (802.11a, 5700MHz)



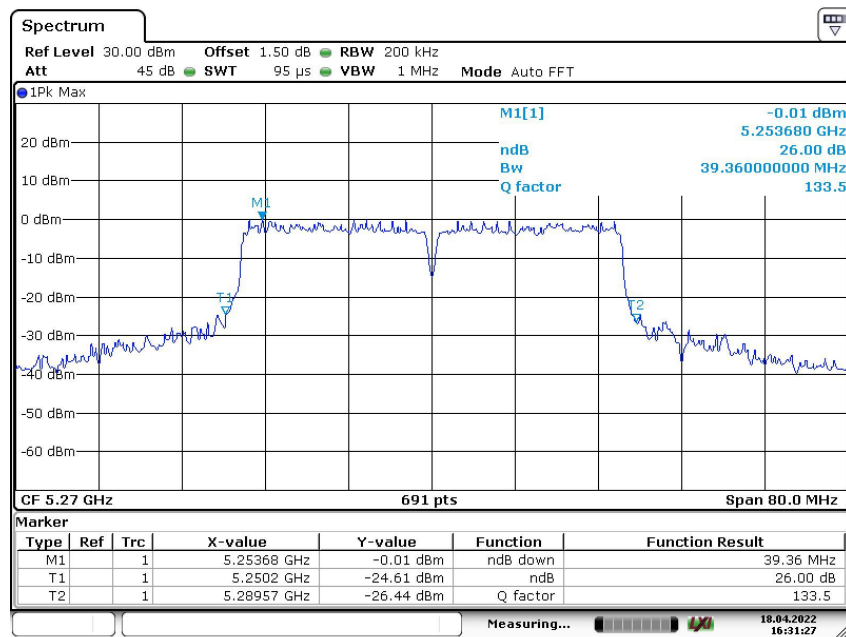
Date: 18.APR.2022 16:30:59

Fig. 10 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)



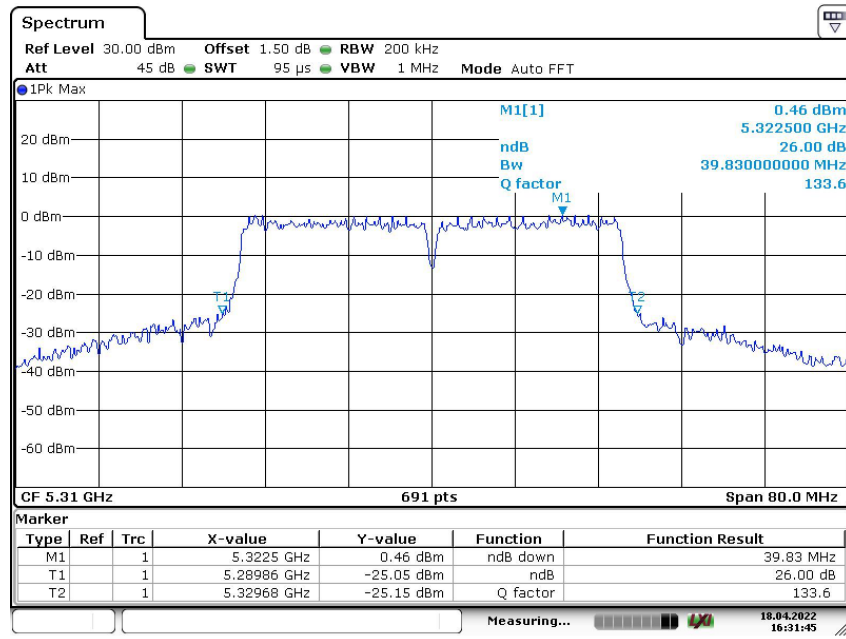
Date: 18.APR.2022 16:31:16

Fig. 11 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)



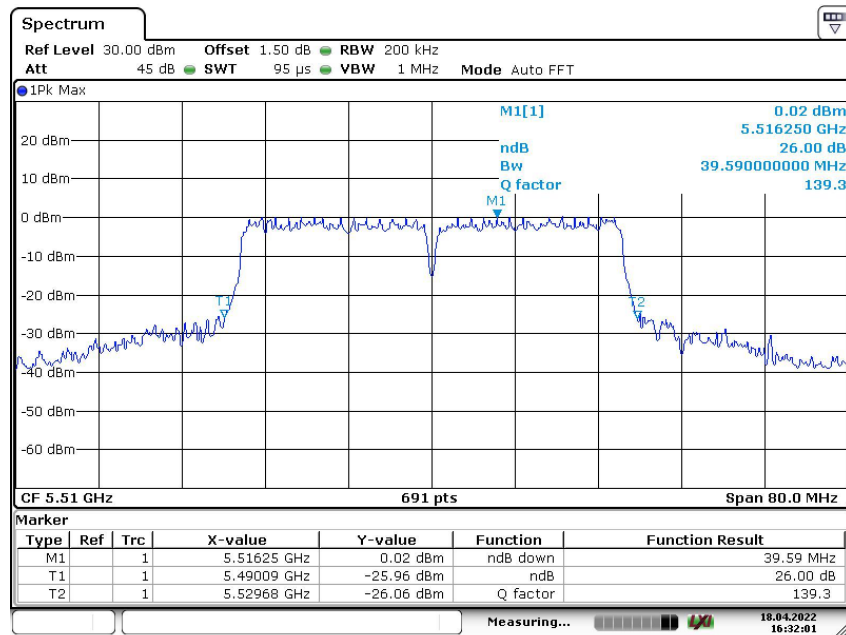
Date: 18.APR.2022 16:31:28

Fig. 12 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)



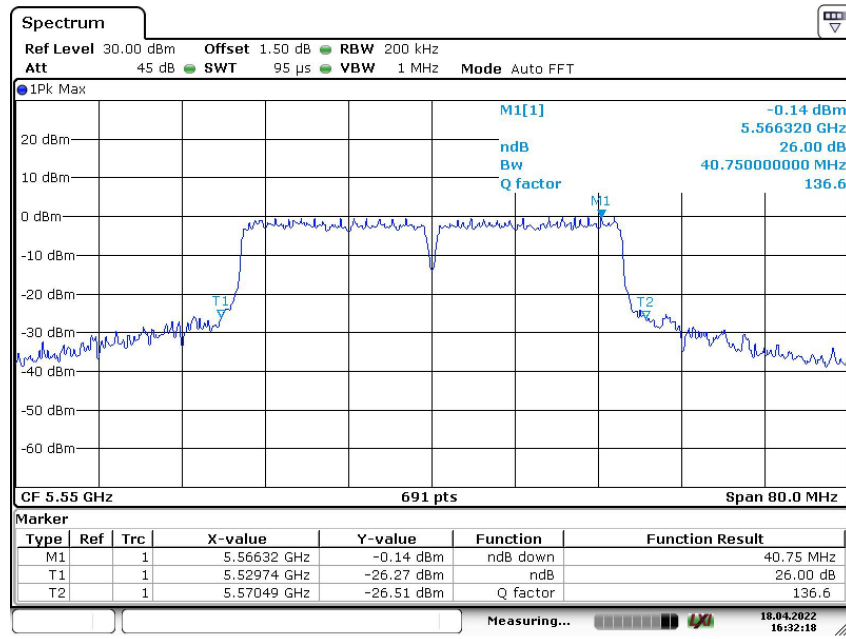
Date: 18.APR.2022 16:31:45

Fig. 13 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)



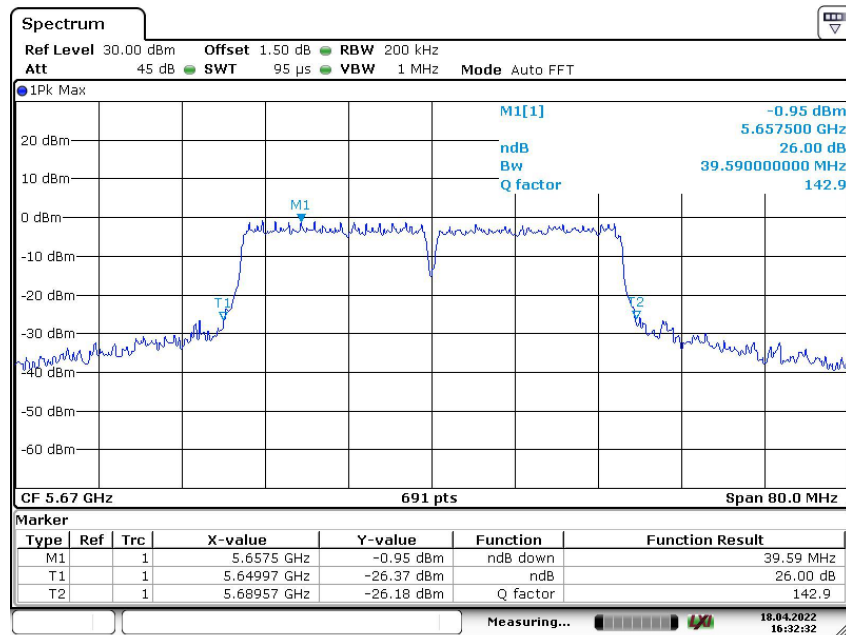
Date: 18.APR.2022 16:32:01

Fig. 14 Occupied 26dB Bandwidth (802.11n-HT40, 5510MHz)



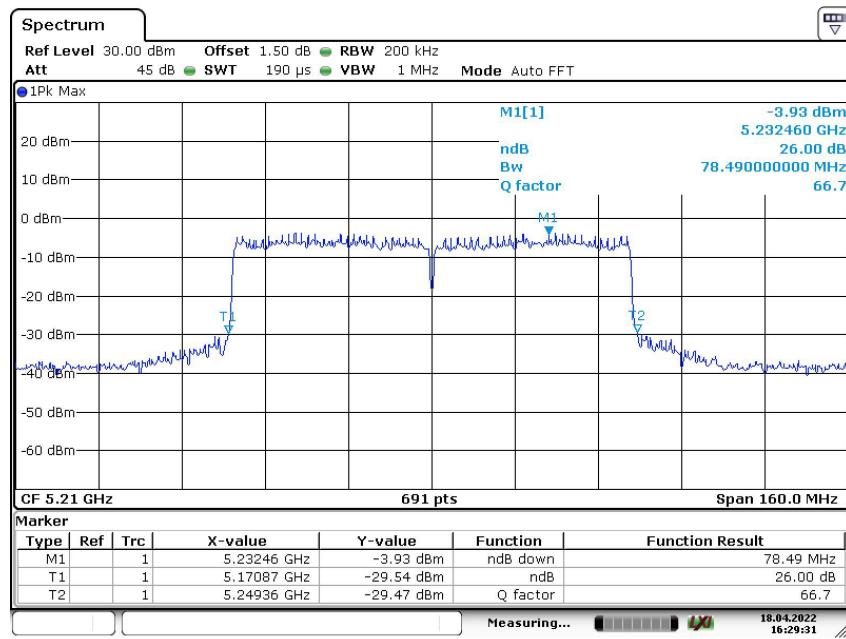
Date: 18.APR.2022 16:32:18

Fig. 15 Occupied 26dB Bandwidth (802.11n-HT40, 5550MHz)



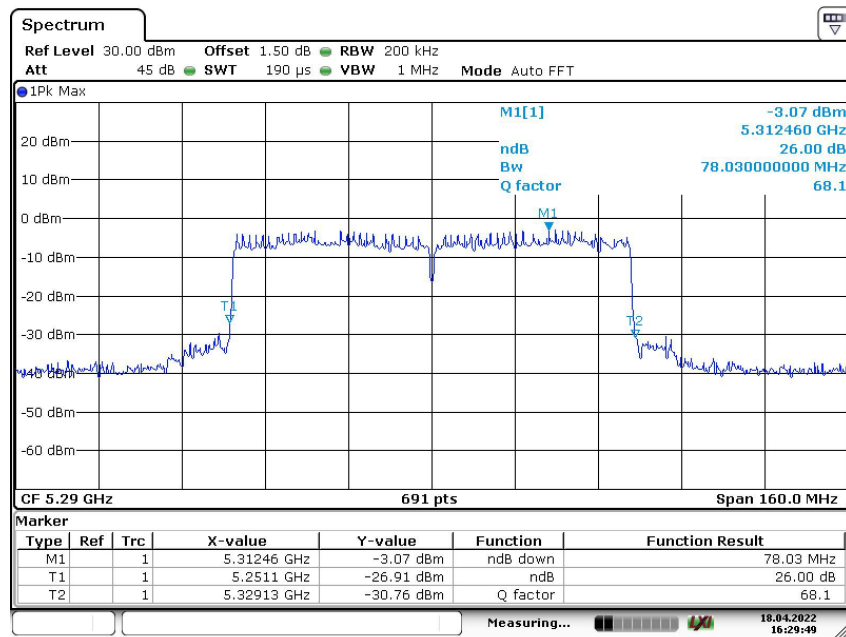
Date: 18.APR.2022 16:32:33

Fig. 16 Occupied 26dB Bandwidth (802.11n-HT40, 5670MHz)



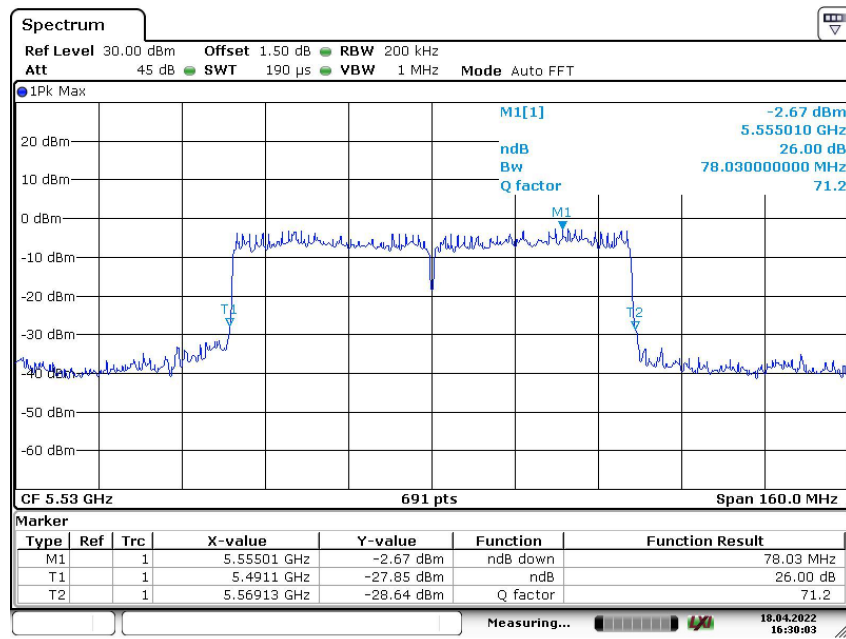
Date: 18.APR.2022 16:29:31

Fig. 17 Occupied 26dB Bandwidth (802.11ac-VHT80, 5210MHz)



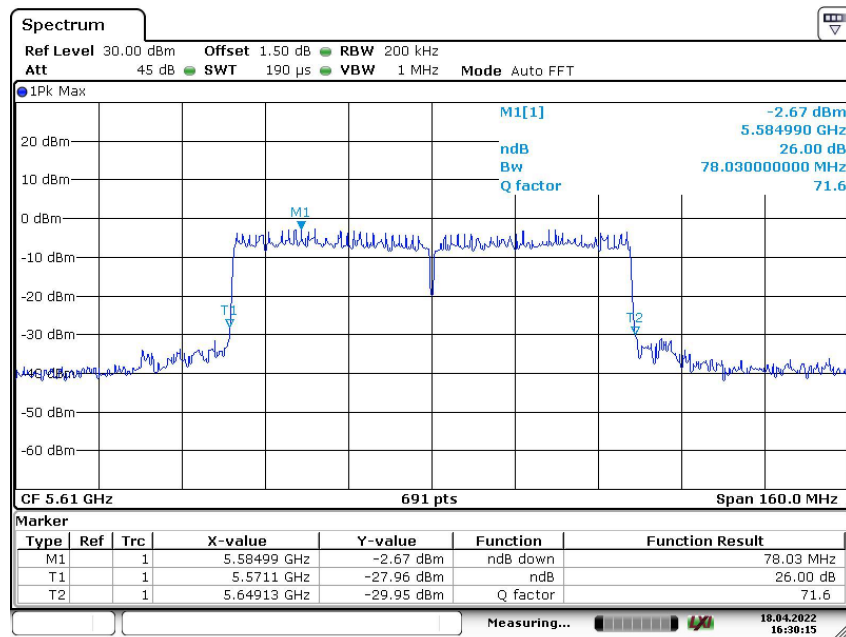
Date: 18.APR.2022 16:29:49

Fig. 18 Occupied 26dB Bandwidth (802.11ac-VHT80, 5290MHz)



Date: 18.APR.2022 16:30:04

Fig. 19 Occupied 26dB Bandwidth (802.11ac-VHT80, 5530MHz)



Date: 18.APR.2022 16:30:16

Fig. 20 Occupied 26dB Bandwidth (802.11ac-VHT80, 5610MHz)

A.5. Occupied 6dB Bandwidth (conducted)

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.407 (e)	≥ 0.5

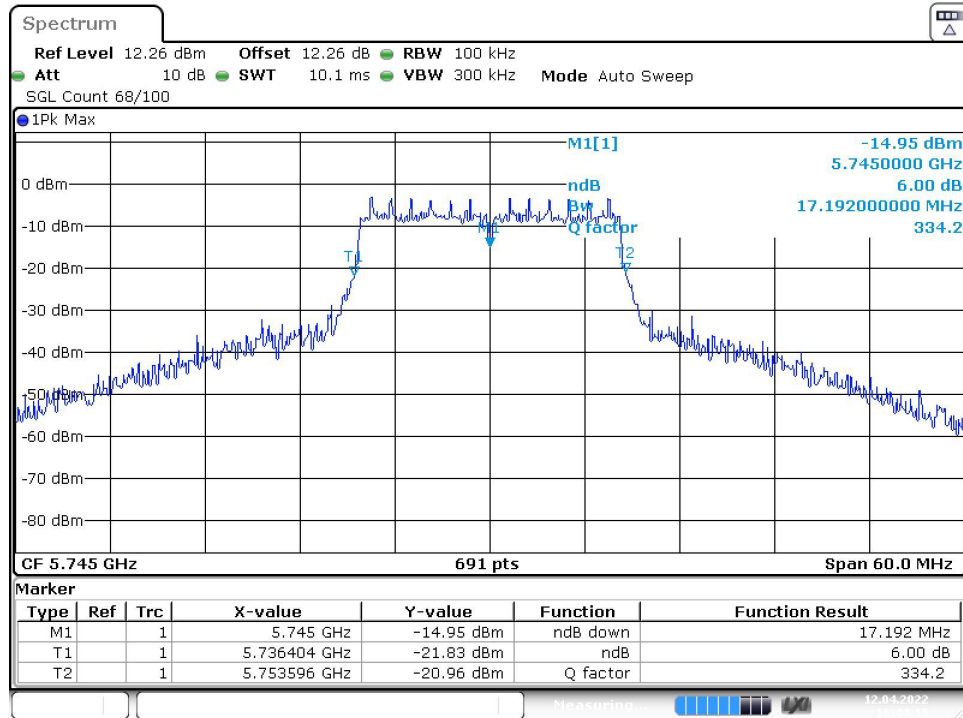
The measurement is made according to KDB 789033

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth(MHz)		Conclusion
802.11a	5745MHz(Ch149)	Fig.21	17.19	P
	5785MHz(Ch157)	Fig.22	17.19	P
	5825MHz(Ch165)	Fig.23	17.11	P
802.11n-HT40	5755MHz(Ch151)	Fig.24	37.25	P
	5795MHz(Ch159)	Fig.25	37.51	P
802.11ac-VHT80	5775MHz(Ch155)	Fig.26	60.78	P

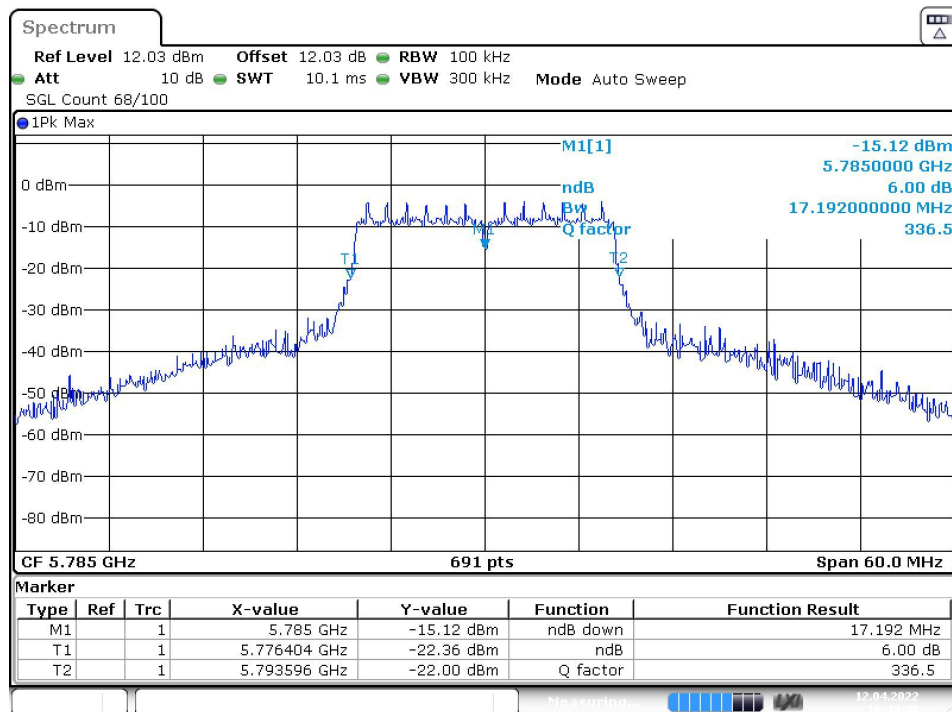
See below for test graphs.

Conclusion: PASS



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Fig. 21 Occupied 6dB Bandwidth (802.11a, 5745MHz)



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Fig. 22 Occupied 6dB Bandwidth (802.11a, 5785MHz)