

Prüfbericht-Nr.: <i>Test Report No.:</i>	JP21PGQD 003	Auftrags-Nr.: <i>Order No.:</i>	150232700	Seite 1 von 111 <i>Page 1 of 111</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order Date:</i>	2020-12-25	
Auftraggeber: <i>Client:</i>	Mitsubishi Electric Corporation Sanda Works 2-3-33, Miwa, Sanda-city, Hyogo, 669-1513, Japan			
Prüfgegenstand: <i>Test Item:</i>	Display Audio			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	NR-000	Serien-Nr.: <i>Serial No.:</i>	Refer to section 4.3	
Auftrags-Inhalt: <i>Order Content:</i>	Radio Testing			
Prüfgrundlage: <i>Test Specification:</i>	FCC 47 CFR Part 15, Subpart E ANSI C63.10-2013			
Wareneingangsdatum: <i>Date of Receipt:</i>	2021-01-07, 2021-01-20			
Prüfmuster-Nr.: <i>Test Sample No.:</i>	A00292387, A002991001, A002990060			
Prüfzeitraum: <i>Testing Period:</i>	2021-01-13 - 2021-01-26			
Ort der Prüfung: <i>Place of Testing:</i>	Yokohama EMC Laboratory			
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Japan Ltd.			
Prüfergebnis*: <i>Test Result*:</i>	Pass			
Überprüft von: <i>Reviewed by:</i>		Genehmigt von: <i>Authorized by:</i>		
Datum: 2021-02-26 <i>Date:</i>	_____	Datum: 2021-02-26 <i>Date:</i>	_____	
Stellung / Position:	Inspector	Stellung / Position:	Reviewer	
Sonstiges / Other:	DFS is outside the scope of this test report.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the Test Item at Delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) * Legend: P(ass) = passed a.m. test specification(s)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n) F(ail) = failed a.m. test specification(s)	N/A = nicht anwendbar N/A = not applicable	N/T = nicht getestet N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

REVISIONS

Report No.	Issue date	Changes / Remarks
JP21PGQD 001	2021-02-26	Original document for WLAN 2.4GHz
JP21PGQD 002	2021-02-26	Original document for Bluetooth
JP21PGQD 003	2021-02-26	Original document for WLAN 5GHz

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1. General Remarks

1.1 Test Specifications

Table 1: Test Summary

Test	Specifications	Result
Radio: FCC 47 CFR Part 15, Subpart E ANSI C63.10-2013		
Maximum Conducted Output Power	FCC 15.407 (a)(1)-(3)	Pass
Maximum Power Spectral Density	FCC 15.407 (a)(1)-(3)	Pass
26dB Bandwidth	FCC 15.407(a)(1)(iv), (2)	Performed
6dB Bandwidth	FCC 15.407(e)	Pass
99% Bandwidth	For reference	Performed
Radiated Spurious Emissions of Transmitter and Band Edge	FCC 15.205, FCC 15.209, FCC 15.407(b)	Pass
Conducted Emission on AC Power Ports	FCC 15.207 Not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.	N/A

1.2 Test Report Purpose

The purpose of this test report is to show compliance of the EUT (Equipment Under Test) with the requirements of the FCC rules listed in section 1.1.

This test report is intended for C2PC application due to modifications on the certified radio transmitter in accordance with the KDB Publication No. 178919 D01 v06.

This test report covers WLAN (5GHz) part of the product, who has multiple wireless connectivity: Bluetooth, WLAN (2.4GHz and 5GHz)

1.3 Complementary Materials

There is no attachment to this test report.

2. Test Sites

2.1 Test Facilities

TÜV Rheinland Japan Ltd. – Global Technology Assessment Center
4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The test facility is recognized by the Federal Communications Commission (FCC) as Accredited Testing Laboratory under designation number JP0017.

The test facility is accredited by VLAC (member of ILAC) under number VLAC-017 according to ISO/IEC 17025:2017.

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Model Name	Serial Number	Equip. ID	Cal. Interval	Cal. Date	Next Cal.
For Antenna Port Conducted Emission							
EMI Receiver	Rohde & Schwarz	ESW 26	101316	RF-0812	1 year	2020-04-22	2021-04-22
3dB Attenuator	Huber + Suhner	6603_SMA-50-1/199_NE	-	RF-0761	1 year	2020-03-16	2021-03-16
For Radiated Emission (RE)							
Radiated Emission Measurement Soft-ware (above 30MHz)	Toyo Corporation	EP7/RE	VER. 8.0.90	RF-0026	1 year	2020-02-25	2021-02-25
EMI Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	1 year	2020-08-17	2021-08-17
RF Selector (10m Chamber)	Toyo Corporation	NS4900	0703-182	RF-0029	1 year	2020-02-25	2021-02-25
Loop Antenna with Amplifier, 9kHz-30MHz	Rohde & Schwarz	HFH2-Z2	100139	RF-0048	1 year	2020-04-24	2021-04-24
Trilog Antenna No. 2, 30-1000MHz	Schwarzbeck	VULB 9168	9168-475	RF-0462	1 year	2020-04-28	2021-04-28
5dB Attenuator	Pasternack	PE7047-5	-	RF-0731	1 year	2020-04-28	2021-04-28
Horn Antenna, 1-8GHz	Schwarzbeck	BBHA 9120 D	1059	RF-0553	1 year	2020-04-18	2021-04-18
Microwave Pre-amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	1 year	2021-01-06	2022-01-06
Horn Antenna with Pre-amplifier, 8-18GHz (RX)	Toyo Corporation	HAP06-18W	00000025	RF-0065	1 year	2020-04-18	2021-04-18
5.47-5.725GHz Band Reject Filter	Micro-Tronics	BRC50704	G149	RF-0849	1 year	2020-07-17	2020-07-17
5.725-5.875GHz Band Reject Filter	Micro-Tronics	BRC50705	G155	RF-0850	1 year	2020-07-17	2020-07-17
5.15-5.35GHz Band Reject Filter	Micro-Tronics	BRC50703	027	RF-0408	1 year	2020-07-17	2020-07-17
High Pass Filter, 8-18GHz	Micro-Tronics	HPM50107	006	RF-0334	1 year	2020-04-18	2021-04-18
Horn Antenna with Pre-amplifier, 18-26.5GHz (RX)	Toyo Corporation	HAP18-26N	00000010	RF-0070	1 year	2020-04-18	2021-04-18
Constant Voltage Constant Frequency Stabilizers and Power Accessories							
CVCF (10m Chamber)	NF Corporation	ES2000U	9067307	RF-0212	1 year	2020-03-13	2021-03-13
CVCF Booster (10m Chamber)	NF Corporation	ES2000B	9074408	RF-0213	1 year	2020-03-13	2021-03-13
True RMS Multimeter	Fluke	87V	97680445	RF-0281	1 year	2020-12-15	2021-12-15

Kind of Equipment	Manufacturer	Model Name	Serial Number	Equip. ID	Cal. Interval	Cal. Date	Next Cal.
True RMS Multimeter	Fluke	87V	16110176	RF-0414	1 year	2020-06-18	2021-06-18
DC Power Supply	Kikusui	PWR800L	NA003235	PV-0039	1 year	2020-10-07	2021-10-07

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025 has been confirmed before testing.

2.3 Measurement Uncertainty

Table 3: Emission Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
AC Power Line Conducted Emission	150kHz - 30MHz	±2.0dB
Antenna Port Conducted Emission	20Hz - 40GHz	±1.5dB
Radiated Emission	150kHz - 30MHz	±4.7dB
	30MHz - 1GHz	±4.8dB
	> 1GHz	±3.8dB

Note:

The measurement instrumentation uncertainty (MIU) was determined according to CISPR 16-4-2 and ETSI TR 100-028. All MIU values mentioned in the above table are smaller than the uncertainty budgets specified by CISPR 16-4-2 and ETSI TR 100-028, therefore compliance for all emission measurements is deemed to occur if no measured disturbance level exceeds the disturbance limit.

3. General Product Information

3.1 Product Function and Intended Use

The **EUT** (Equipment Under Test) is a display audio installed in vehicles with wireless connectivity of Bluetooth, WLAN (2.4GHz) and GNSS.

3.2 Ratings and System Details

Radio standard:	IEEE 802.11a, IEEE 802.11n (20HT), IEEE 802.11n (40HT)
Frequency range:	IEEE 802.11a, IEEE 802.11n (20HT): 5180 - 5240MHz 5260 - 5320MHz 5500 - 5700MHz 5745 - 5825MHz IEEE 802.11n (40HT): 5190 - 5230MHz 5270 - 5310MHz 5510 - 5670MHz 5755 - 5795MHz
Antenna gain:	3.6dBi for W52, W53 2.17dBi for W56, W58
Antenna type:	Pattern antenna (Inverted F)
Antenna mounting type:	Internal
Modulation type:	BPSK, QPSK, 16 QAM, 64QAM
Signal spreading:	OFDM
Transmit speed:	IEEE 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps IEEE 802.11n (20HT): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5 Mbps IEEE 802.11n (40HT): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5 Mbps
Rated temperature:	-30 to +70°C
Rated voltage:	DC 12V
Rated input Current:	1.4A
Protection class:	III
Test voltage:	DC 13.2V for radio testing

3.3 Noise Generating and Noise Suppressing Parts

The highest frequency generated or used by the EUT is 900MHz as digital interface portion, 5825MHz as radio portion.

3.4 Submitted Documents and Information

Following documents have been submitted by the client:

Block Diagram, BOM, Label and location.

Following information provided in this test report has been submitted by the client:

- client name and address;
- EUT identification, ratings, system details, and description of product function and intended use;
- information related to noise generating and noise suppressing parts (if any).

4. Test Setup and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15, Sections 15.31, 15.33, 15.35, 15.205, 15.207, 15.209, 15.407.

The test methods, which have been used, are based on ANSI C63.10.

For details, see under each test item.

4.2 Operation Modes

The basic operation modes used for testing are:

T. EUT transmits a continuous modulated signal at specified channel

Configurations:

- IEEE 802.11a: 48 Mbps, PN9 (*)
- IEEE 802.11n (20HT): MCS 2, PN9 (*)
- IEEE 802.11n (40HT): MCS 1, PN9 (*)

Note (*): The worst condition was determined based on the test result of Maximum Conducted Output Power.

Note: Since 11g and 11n (20HT) have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest conducted output power.

4.3 Physical Configuration for Testing

The test system was configured in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10.

Figure 1: Block Diagram (Internal Amplifier model, Conducted Radio Testing)

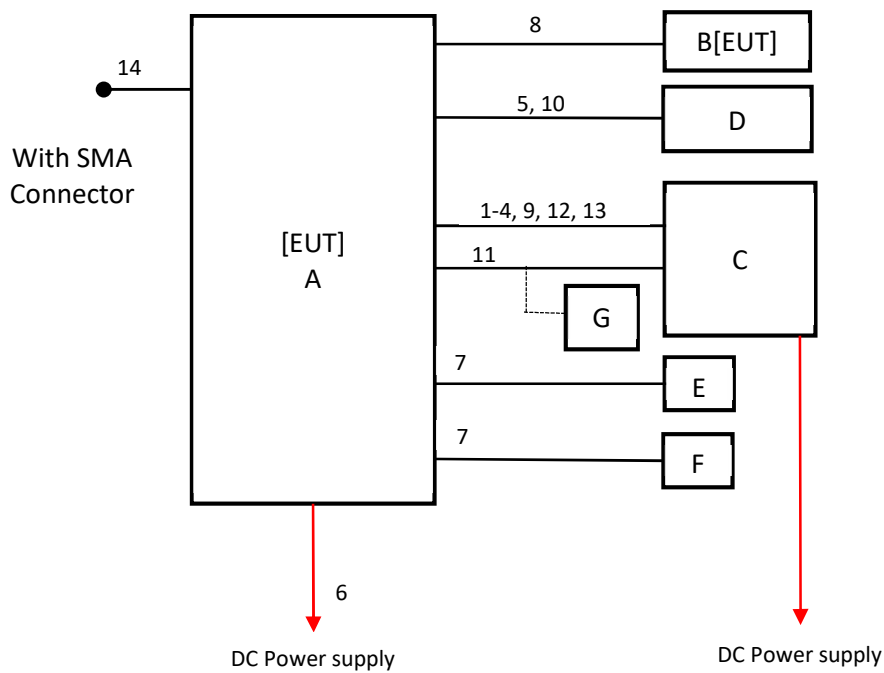


Figure 2: Block Diagram (Internal Amplifier model, Radiated Radio Testing)

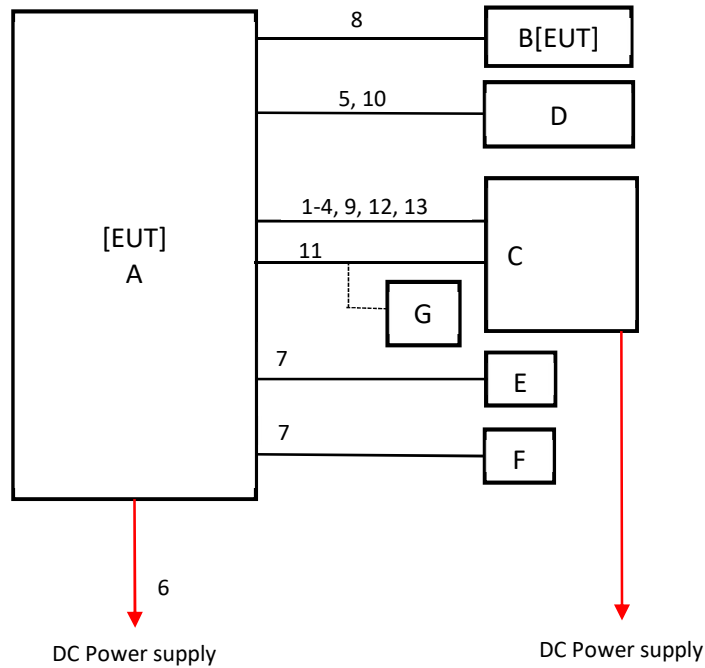


Table 4: The System consists of the Following Units

No.	Item	Model No.	Serial Number	Manufacturer	Remarks
A	UNIT ASSY, AUDIO	NR-000	<i>See Note below</i>	Mitsubishi Electric Corporation Sanda Works	EUT
B	GPS Antenna	-/-	Unspecified	Mitsubishi Electric Corporation Sanda Works	EUT
C	Dummy load	-/-	Unspecified	Mitsubishi Electric Corporation Sanda Works	-/-
D	Display	39710-TBAA-A11	506VIBB000701	LG	-/-
E, F	Speaker	TP1371	Unspecified	Tiaoping	-/-
G	HD Video Capture	GV-HDREC	Unspecified	I-O DATA DEVICE, INC	-/-

Note:

For more details, refer to section: Photographs of the Test Set-Up.

The samples of the model NR-000 with the following S/N were available;

- No. 90ZPU003 for conducted radio measurements;
- No. 90ZPU004 for radiated radio measurements.

Table 5: Interfaces present on the EUT

No.	Name	Length(m)	Shield		Remarks
			Cable	Connector	
1	Signal cable	2m	Shielded	Shielded	-
2	Signal cable	2m	Shielded/Unshielded	Unshielded	-
3	Signal cable	2m	Shielded/Unshielded	Unshielded	-
4	Signal cable	2m	Shielded/Unshielded	Unshielded	-
5	Display cable	1m	Shielded	Shielded	-
6	DC cable	1m	Unshielded	Unshielded	-
7	Signal cable	1m	Unshielded	Unshielded	-
8	GPS cable	3m	Shielded	Shielded	-
9	Signal cable	2m	Shielded	Shielded	-
10	Display cable	2m	Unshielded	Unshielded	-
11	Signal cable	2m	Shielded	Shielded	-
12	Signal cable	2m	Shielded	Shielded	-
13	Signal cable	2m	Shielded	Shielded	-
14	Coaxial cable	0.18m	Shielded	Shielded	For conducted testing purpose only

For more details, refer to section: Photographs of the Test Setup.

4.4 Test Software

The EUT was provided by the manufacturer with suitable software to allow operation in all the required modes.

Software used for testing: TBAW #12.9a by Mitsubishi Electric Corporation Sanda Works.

This firmware was running on the EUT. It was used to enable the operation modes (mode T) listed in section 4.2 as appropriate.

4.5 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

1. Product: Dummy Load
Manufacturer: Mitsubishi Electric Corporation Sanda Works
Rated Voltage: DC 12V
Serial Number: Unspecified
2. Product: Display
Manufacturer: LG
Model: 39710-TBAA-A11
Rated Voltage: DC 13.2V
Serial Number: 506VIBB000701
3. Product: Speaker × 2
Manufacturer: Tiaoping
Model: TP1371
Serial Number: Unspecified
4. Product: HD Video Caputure
Manufacturer: I-O DATA DEVICE, INC
Model: GV-HDREC
Rated Voltage: DC 5V
Input Current: 840mA
Protection Class: III
Serial Number: K4W10527455T

4.6 Countermeasures to achieve Compliance

No additional measures were employed to achieve compliance.

5. Test Results RADIO

5.1 Technical Requirements

5.1.1 Supply Voltage Requirements

RESULT:

PASS

Requirements:

FCC 15.31(e)

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Verdict:

The EUT has an internal voltage regulator to supply the RF circuit. Hence it complies with the supply voltage requirements.

5.1.2 Antenna Requirements

RESULT:

PASS

Requirements:

FCC 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.

Verdict:

The EUT has an internal antenna which is not user accessible. Hence it complies with the antenna requirements.

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5.1.3 Restricted Bands of Operation

RESULT:

PASS

Requirements:

FCC 15.205

Only spurious emissions are permitted in any of the restricted frequency bands, unless otherwise specified.

Verdict:

The EUT operation frequency ranges are 5150-5350MHz, and 5470-5850MHz. Therefore only spurious emissions may be found in the restricted bands of operation and the EUT complies with the restricted frequency band requirement.

5.2 Conducted Measurements at Antenna Port

5.2.1 Maximum Conducted Output Power

RESULT:

PASS

Date of testing: 2021-01-26

Ambient temperature: 22°C

Relative humidity: 52%

Atmospheric pressure: 1019hPa

Requirements:

FCC 15.407 (a)(1)-(3)

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test procedure:

ANSI C63.10 §12.3.2 Method SA-2

Table 6: Maximum Conducted Output Power, 802.11a, 48Mbps

Freq. [MHz]	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5180	2.05	5.54	7.59	24	16.41
5220	2.13	5.54	7.67	24	16.33
5240	2.03	5.54	7.57	24	16.43
5260	1.76	5.54	7.30	24 (*)	16.70
5300	1.74	5.54	7.28	24 (*)	16.72
5320	1.89	5.54	7.43	24 (*)	16.57
5500	1.73	5.54	7.27	24 (*)	16.73
5580	2.26	5.54	7.80	24 (*)	16.20
5700	2.35	5.54	7.89	24 (*)	16.11
5745	2.77	5.54	8.31	30	21.69
5785	2.58	5.54	8.12	30	21.88
5825	2.47	5.54	8.01	30	21.99

Note (*): Limit = the lesser of 24dBm and $11 + 10 \times \log(26\text{dB Bandwidth})$

Table 7: Maximum Conducted Output Power, 802.11a, 5180MHz, all Data Rates

Data Rate [Mbps]	Reading [dBm]	Duty Cycle	Duty Factor [dB]	Result [dBm]	Remark
6	5.35	71.53%	1.46	6.81	
9	5.18	62.83%	2.02	7.20	
12	4.75	56.17%	2.50	7.25	
18	4.12	46.94%	3.28	7.40	
24	3.37	40.21%	3.96	7.33	
36	2.48	32.34%	4.90	7.38	
48	2.05	27.94%	5.54	7.59	Worst
54	1.63	28.90%	5.39	7.02	

Note: Duty Factor = $10 \times \log(1 / \text{Duty Cycle})$

Table 8: Maximum Conducted Output Power, 802.11n (20HT), MCS2

Freq. [MHz]	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5180	4.19	3.36	7.55	24	16.45
5220	4.39	3.36	7.75	24	16.25
5240	4.38	3.36	7.74	24	16.26
5260	4.16	3.36	7.52	24 (*)	16.48
5300	4.03	3.36	7.39	24 (*)	16.61
5320	4.04	3.36	7.40	24 (*)	16.60
5500	4.14	3.36	7.50	24 (*)	16.50
5580	4.57	3.36	7.93	24 (*)	16.07
5700	4.58	3.36	7.94	24 (*)	16.06
5745	5.16	3.36	8.52	30	21.48
5785	4.72	3.36	8.08	30	21.92
5825	4.57	3.36	7.93	30	22.07

Note (*): Limit = the lesser of 24dBm and $11 + 10 \times \log(26\text{dB Bandwidth})$

Table 9: Maximum Conducted Output Power, 802.11n (20HT), 5180MHz, all Data Rates

Data Rate [MCS]	Reading [dBm]	Duty Cycle	Duty Factor [dB]	Result [dBm]	Remark
0	5.57	69.94%	1.55	7.12	
1	4.94	56.10%	2.51	7.45	
2	4.19	46.17%	3.36	7.55	Worst
3	3.73	42.02%	3.77	7.50	
4	2.77	33.84%	4.71	7.48	
5	2.31	30.02%	5.23	7.54	
6	2.02	28.24%	5.49	7.51	
7	1.64	27.31%	5.64	7.28	

Note: Duty Factor = $10 \times \log(1 / \text{Duty Cycle})$

Table 10: Maximum Conducted Output Power, 802.11n (40HT), MCS1

Freq. [MHz]	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5190	2.57	3.99	6.56	24	17.44
5230	2.73	3.99	6.72	24	17.28
5270	2.48	3.99	6.47	24 (*)	17.53
5310	2.43	3.99	6.42	24 (*)	17.58
5510	2.73	3.99	6.72	24 (*)	17.28
5550	2.74	3.99	6.73	24 (*)	17.27
5670	3.03	3.99	7.02	24 (*)	16.98
5755	3.30	3.99	7.29	30	22.71
5795	3.09	3.99	7.08	30	22.92

Note (*): Limit = the lesser of 24dBm and $11 + 10 \times \log(26\text{dB Bandwidth})$

Table 11: Maximum Conducted Output Power, 802.11n (40HT), 5190MHz, all Data Rates

Data Rate [MCS]	Reading [dBm]	Duty Cycle	Duty Factor [dB]	Result [dBm]	Remark
0	3.63	55.20%	2.58	6.21	
1	2.57	39.92%	3.99	6.56	Worst
2	1.99	36.06%	4.43	6.42	
3	1.36	33.27%	4.78	6.14	
4	0.66	26.91%	5.70	6.36	
5	-0.08	24.42%	6.12	6.04	
6	-0.23	23.34%	6.32	6.09	
7	-0.82	23.02%	6.38	5.56	

Note: Duty Factor = $10 \times \log(1 / \text{Duty Cycle})$

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5.2.2 26dB Bandwidth

RESULT:

PERFORMED

Date of testing: 2021-01-25, 2021-01-26

Ambient temperature: 20, 22°C
Relative humidity: 47, 52%
Atmospheric pressure: 1022, 1019hPa

Requirements:

FCC 15.407(a)(1)(iv), (2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test procedure:

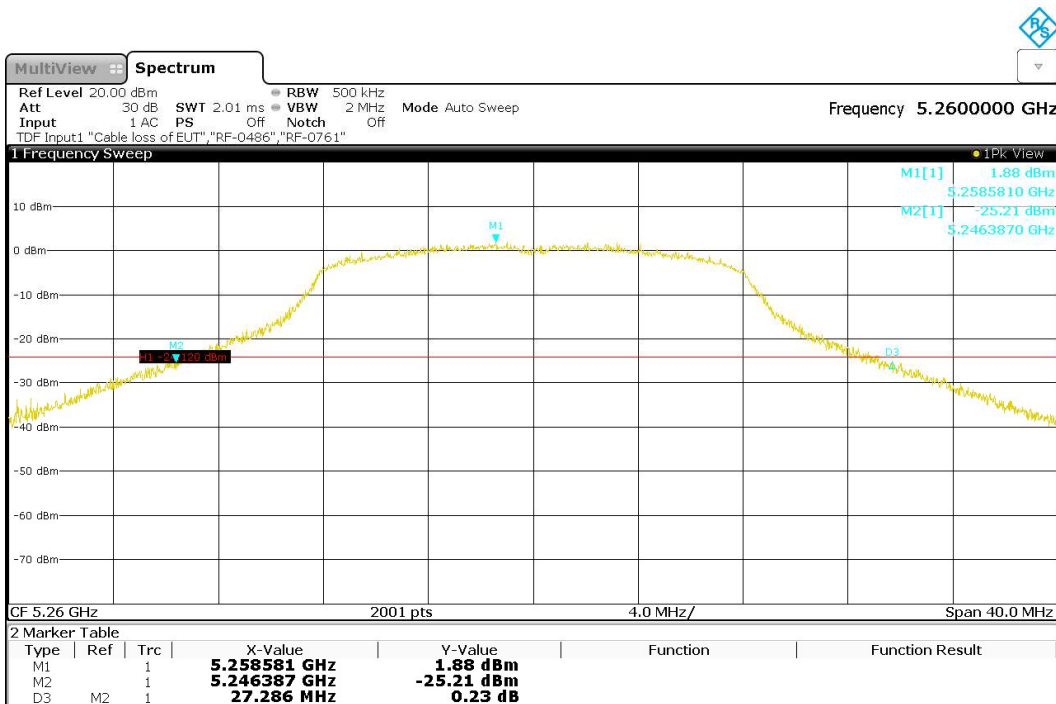
ANSI C63.10 §12.4

The 6dB bandwidth was measured at the antenna port with a spectrum analyzer using a peak detector. Markers placed at the lowest and highest intersections of the trace with a 26dBc line were used to calculate the emission bandwidth.

Table 12: 26dB Bandwidth, 802.11a

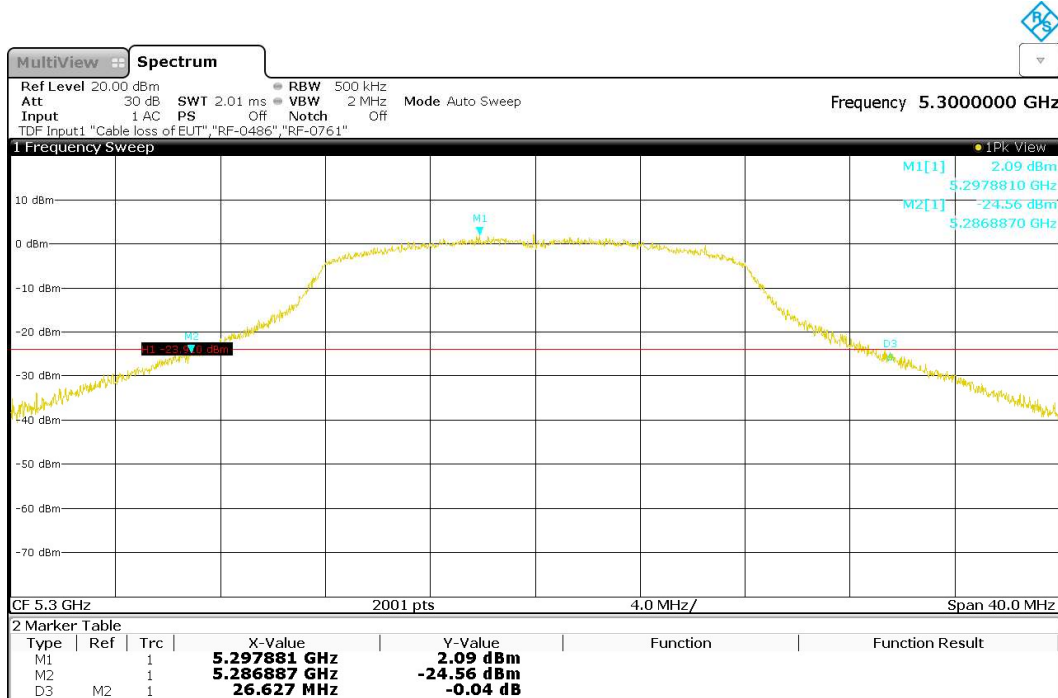
Operating Frequency [MHz]	26dB Bandwidth [MHz]
5260	27.286
5300	26.627
5320	21.300
5500	21.489
5580	26.667
5700	21.489

Figure 3: 26dB Bandwidth, 802.11a, 5260MHz



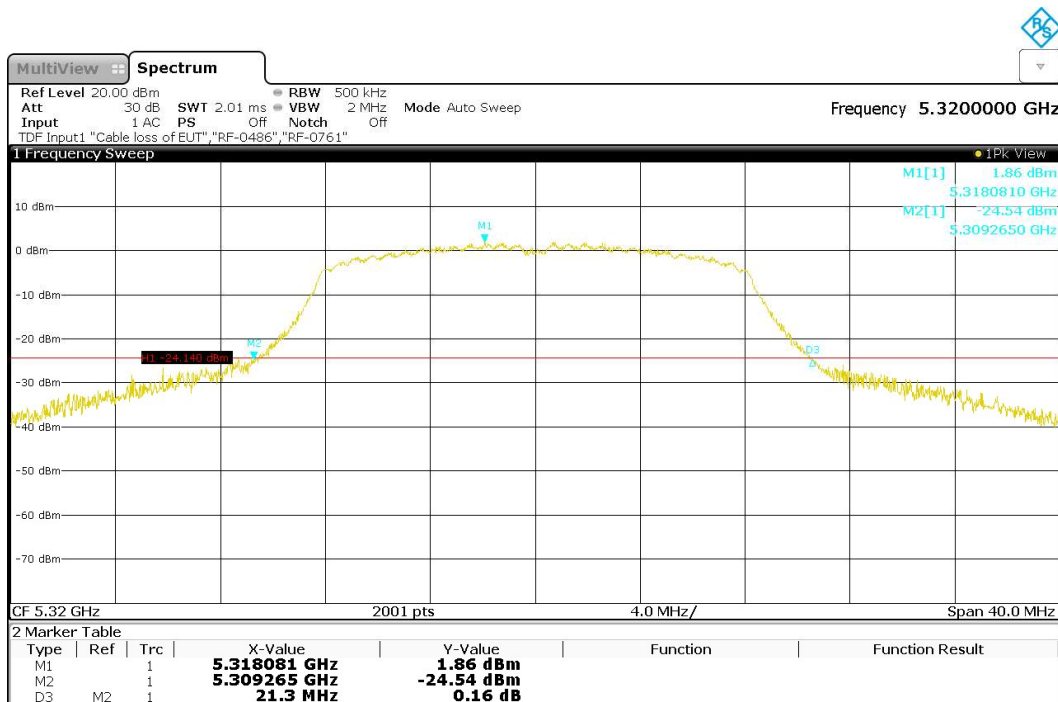
12:06:25 26.01.2021

Figure 4: 26dB Bandwidth, 802.11a, 5300MHz



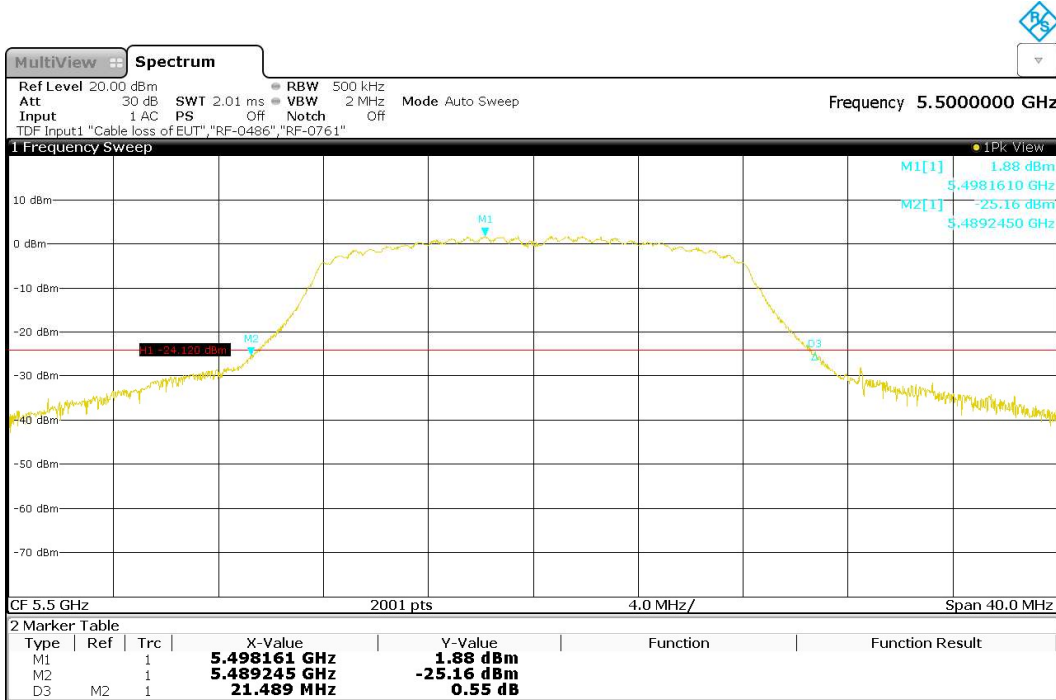
12:09:37 26.01.2021

Figure 5: 26dB Bandwidth, 802.11a, 5320MHz



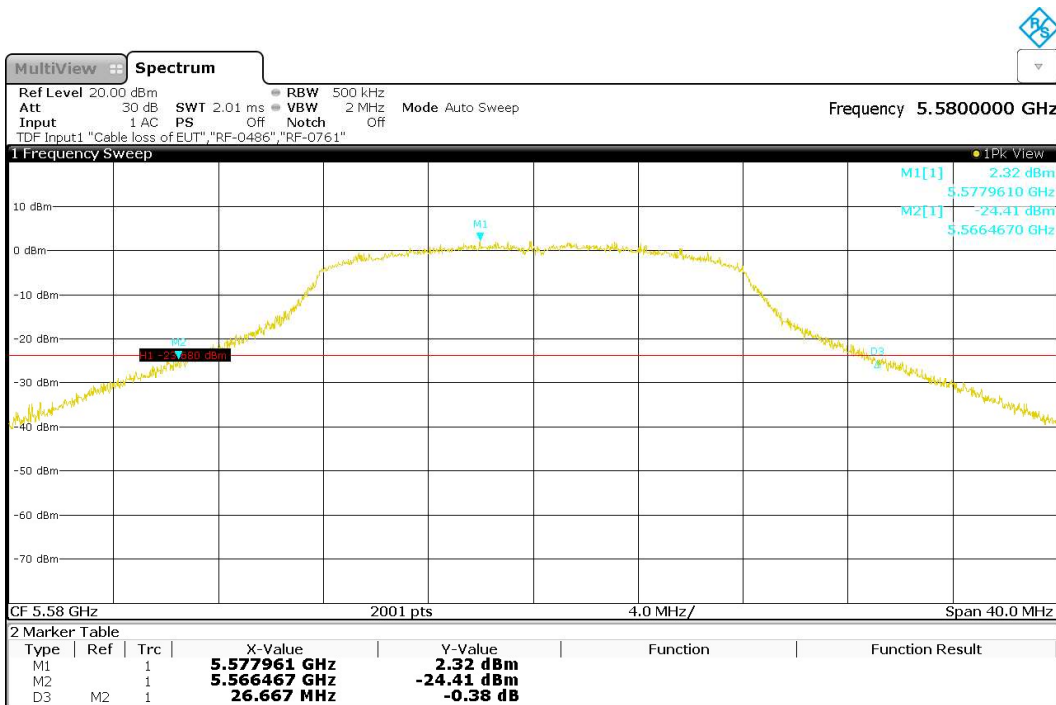
13:04:49 26.01.2021

Figure 6: 26dB Bandwidth, 802.11a, 5500MHz



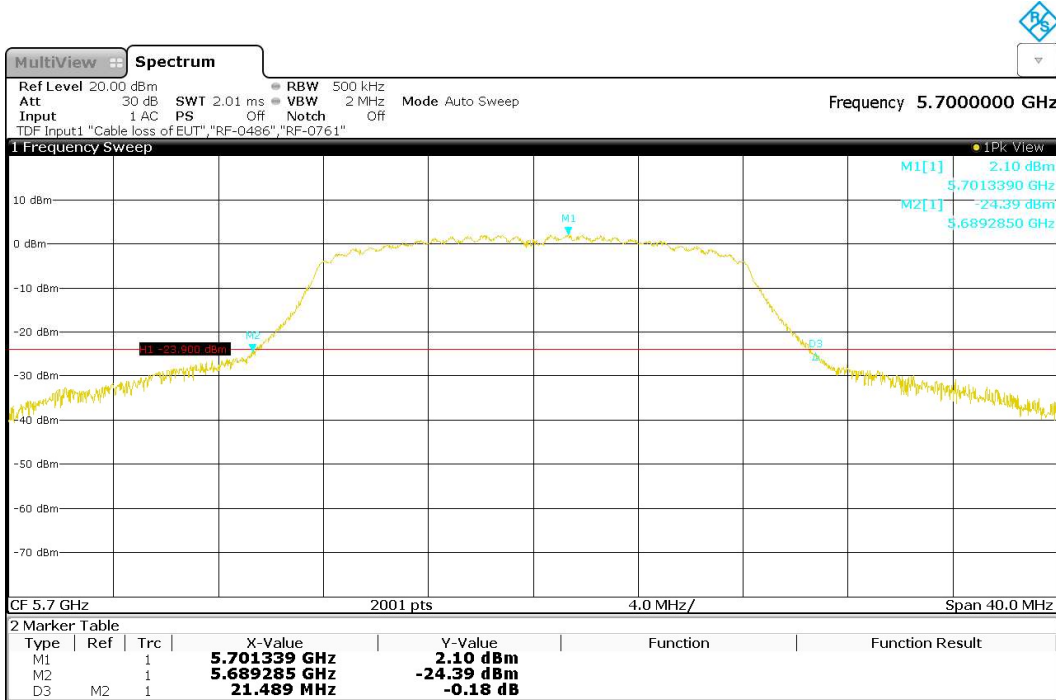
13:11:31 26.01.2021

Figure 7: 26dB Bandwidth, 802.11a, 5580MHz



13:15:22 26.01.2021

Figure 8: 26dB Bandwidth, 802.11a, 5700MHz

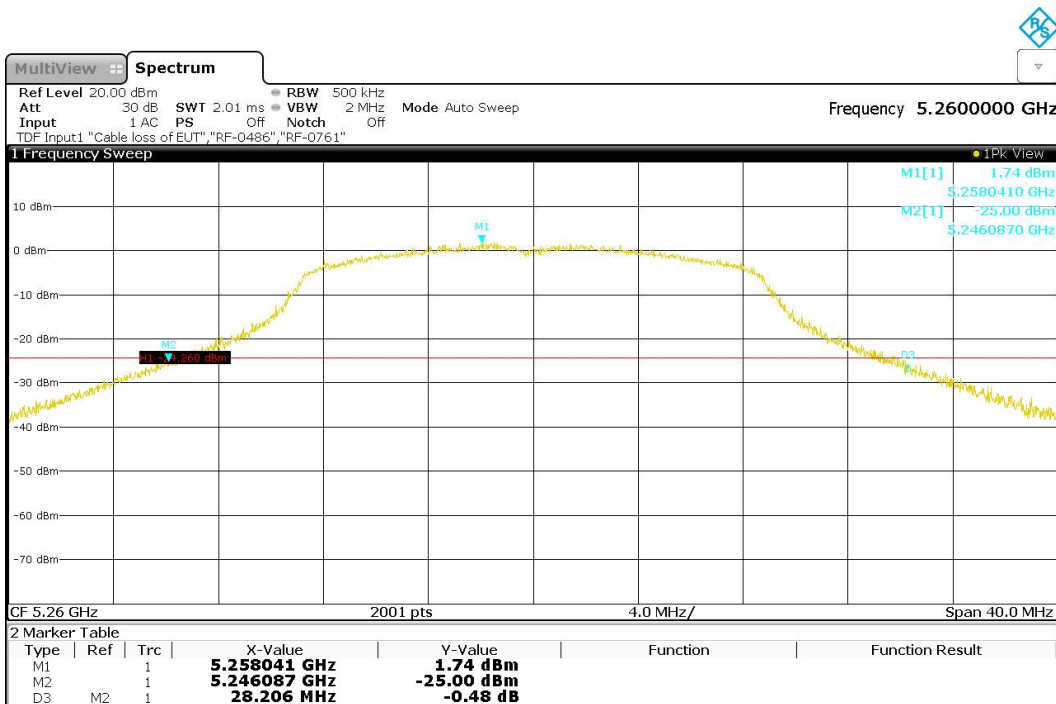


13:20:10 26.01.2021

Table 13: 26dB Bandwidth, 802.11n (20HT)

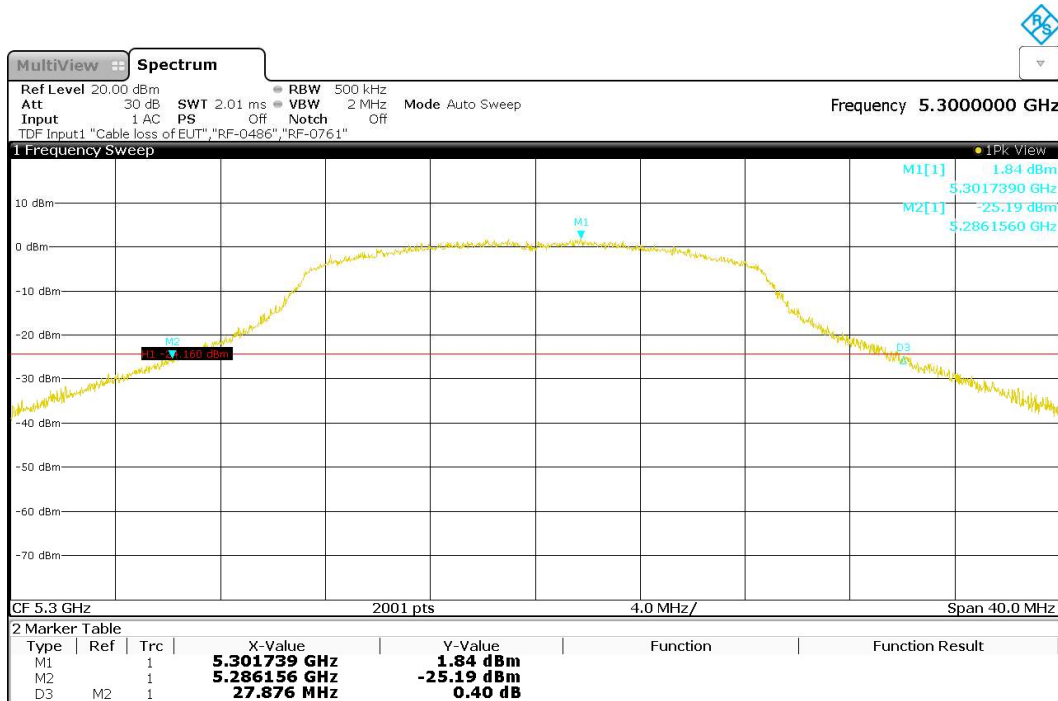
Operating Frequency [MHz]	26dB Bandwidth [MHz]
5260	28.206
5300	27.876
5320	22.809
5500	22.129
5580	27.846
5700	22.389

Figure 9: 26dB Bandwidth, 802.11n (20HT), 5260MHz



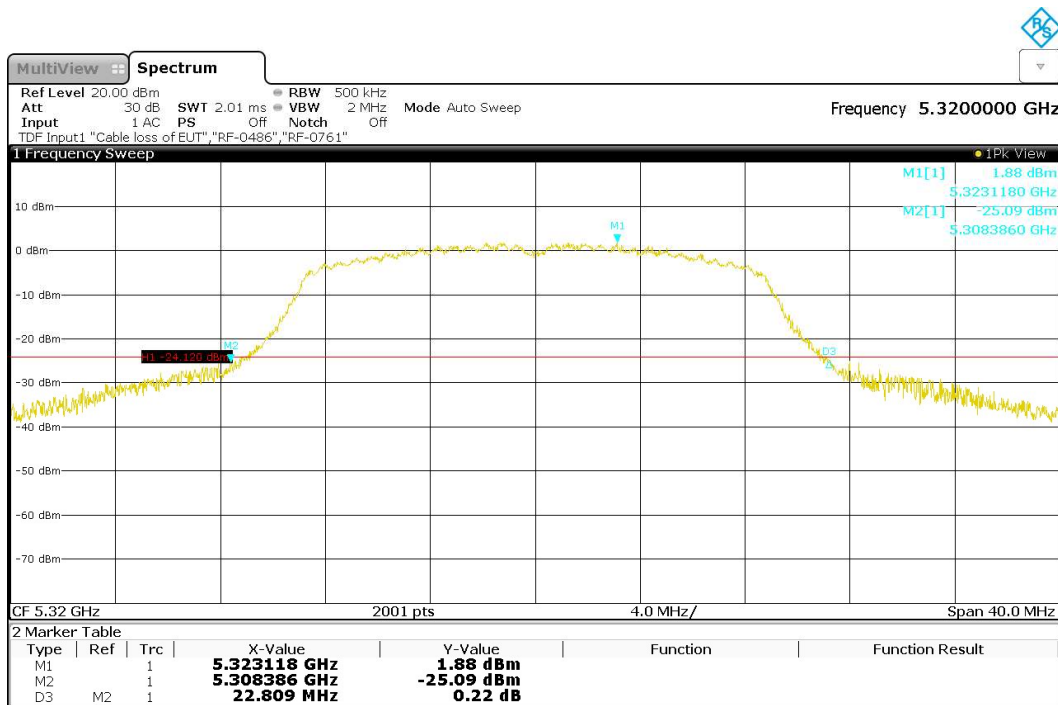
12:03:01 26.01.2021

Figure 10: 26dB Bandwidth, 802.11n (20HT), 5300MHz



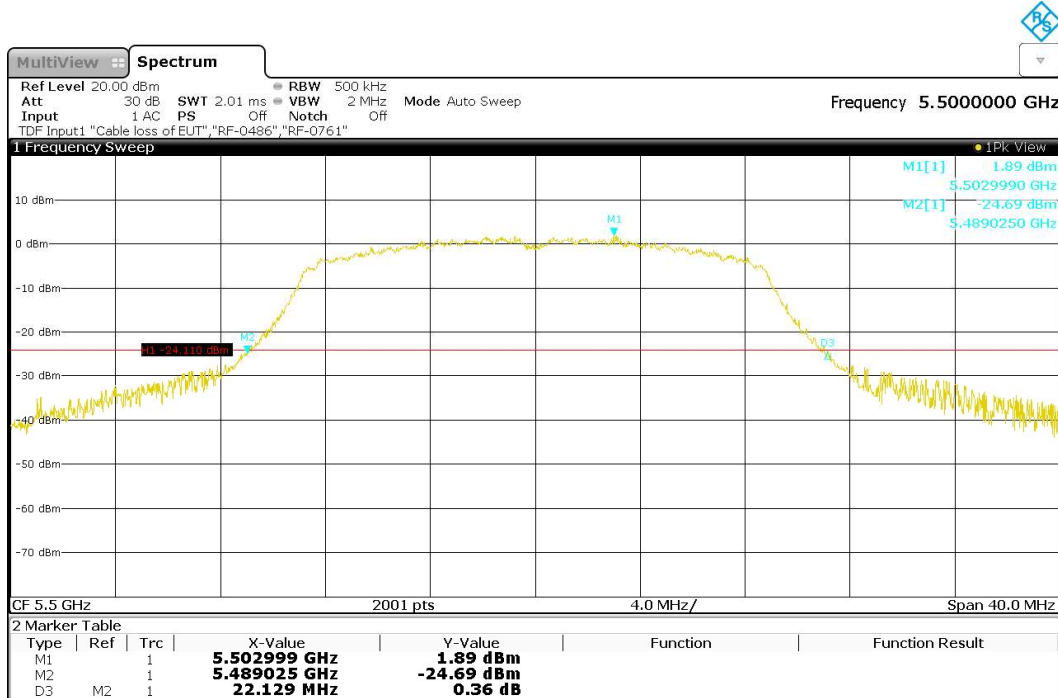
12:00:16 26.01.2021

Figure 11: 26dB Bandwidth, 802.11n (20HT), 5320MHz



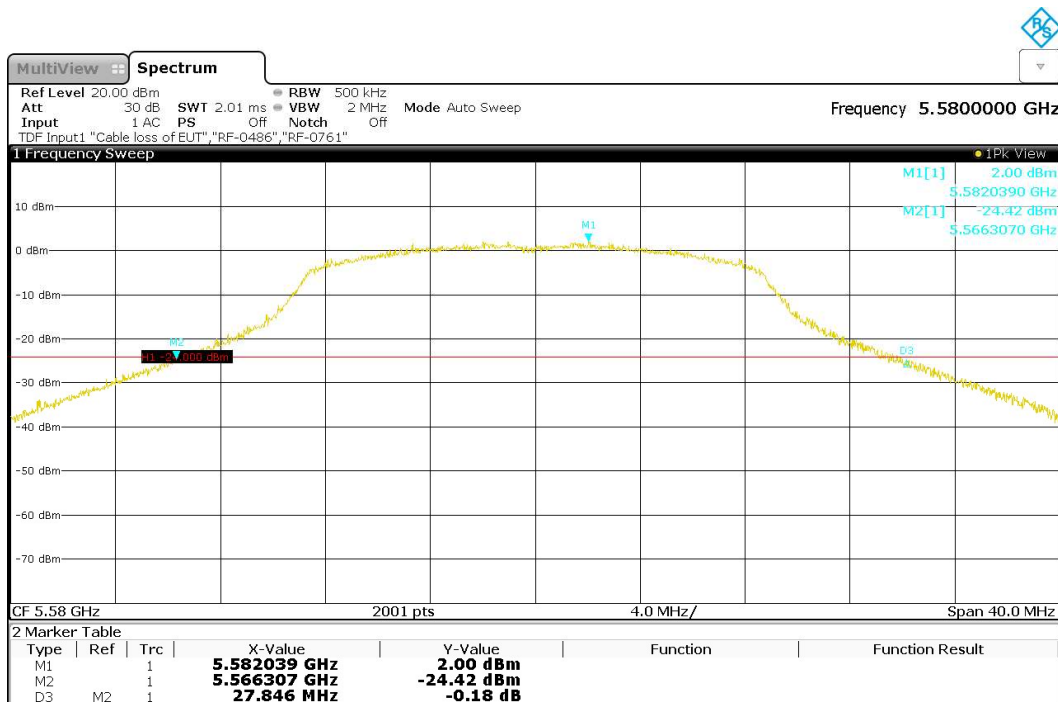
11:55:07 26.01.2021

Figure 12: 26dB Bandwidth, 802.11n (20HT), 5500MHz



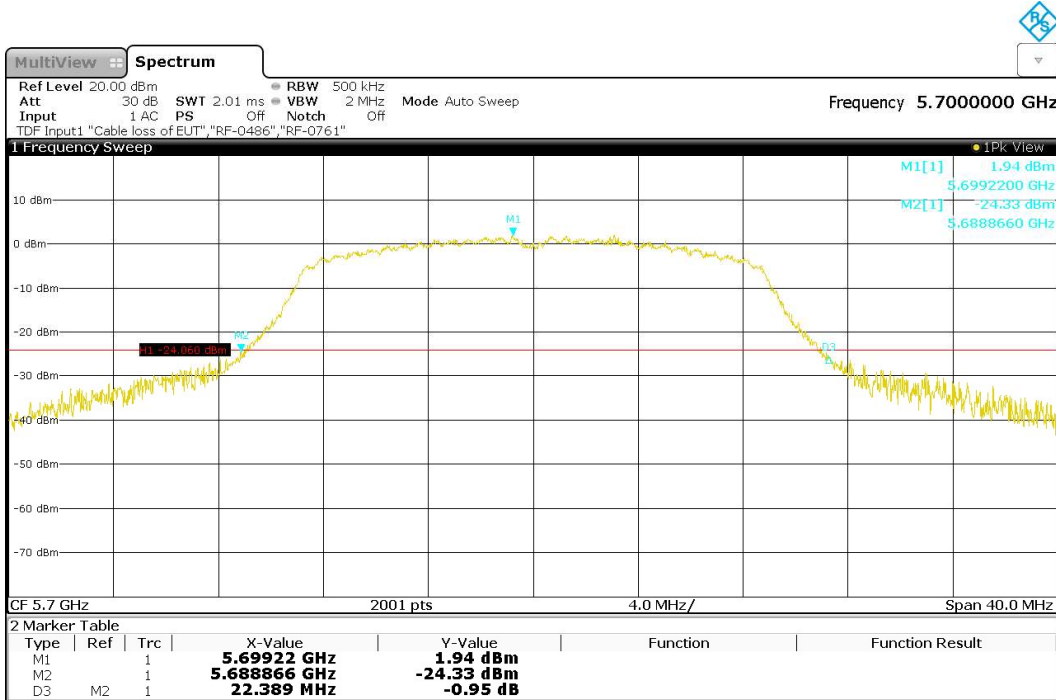
11:52:01 26.01.2021

Figure 13: 26dB Bandwidth, 802.11n (20HT), 5580MHz



11:45:25 26.01.2021

Figure 14: 26dB Bandwidth, 802.11n (20HT), 5700MHz

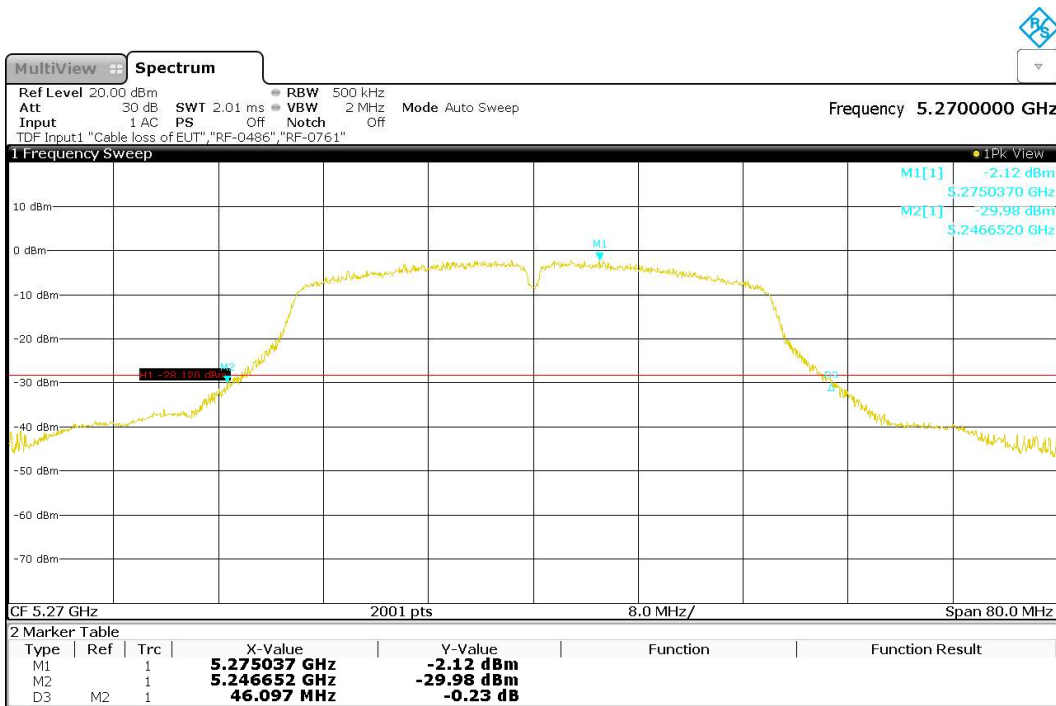


11:49:00 26.01.2021

Table 14: 26dB Bandwidth, 802.11n (40HT)

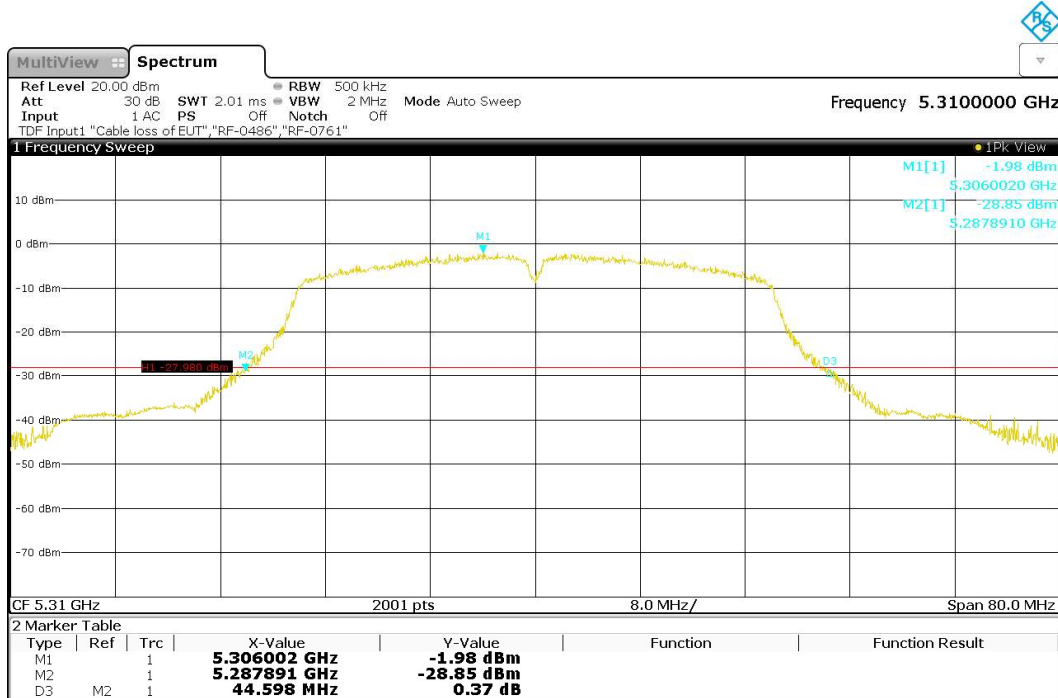
Operating Frequency [MHz]	26dB Bandwidth [MHz]
5270	46.097
5310	44.598
5510	40.820
5550	45.117
5670	45.137

Figure 15: 26dB Bandwidth, 802.11n (40HT), 5270MHz



13:25:54 26.01.2021

Figure 16: 26dB Bandwidth, 802.11n (40HT), 5310MHz



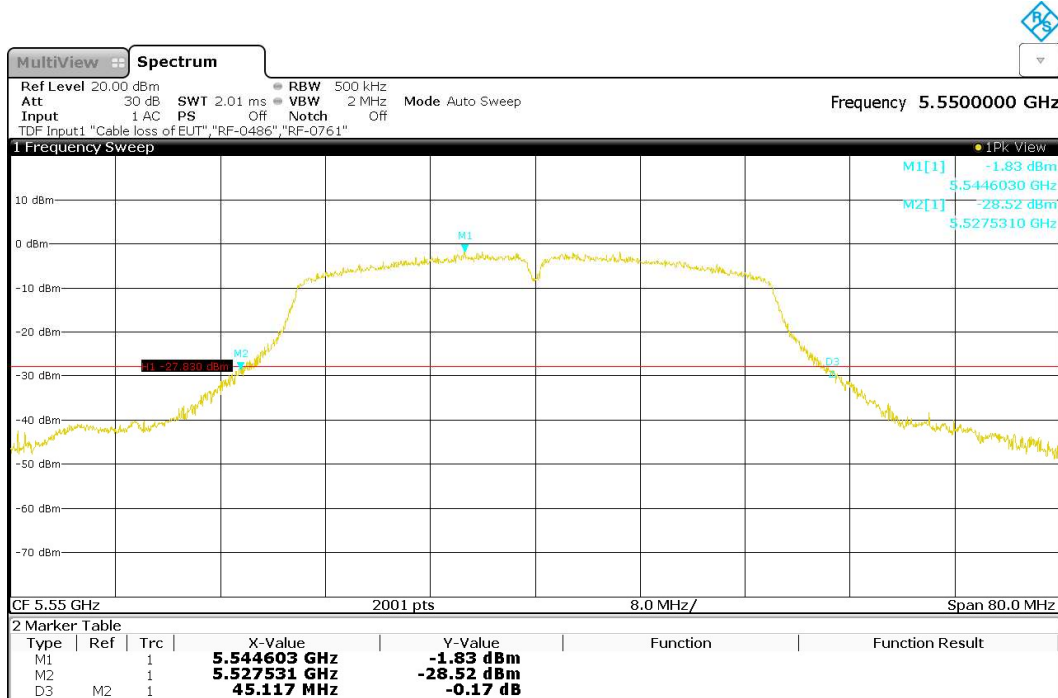
13:32:39 26.01.2021

Figure 17: 26dB Bandwidth, 802.11n (40HT), 5510MHz



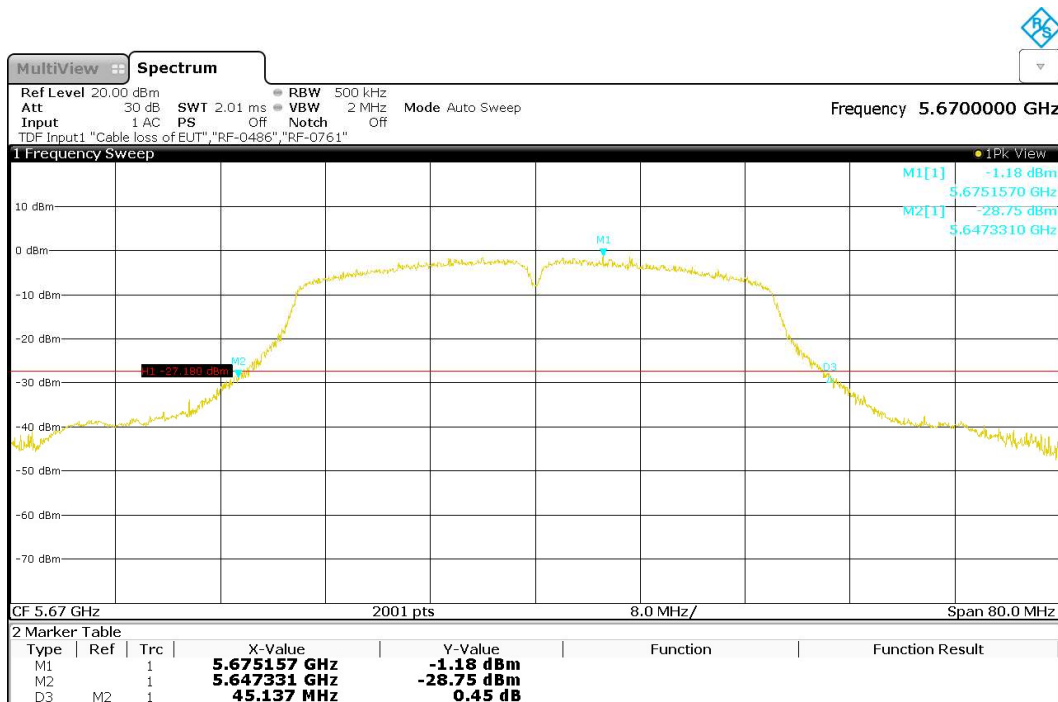
13:34:36 26.01.2021

Figure 18: 26dB Bandwidth, 802.11n (40HT), 5550MHz



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Figure 19: 26dB Bandwidth, 802.11n (40HT), 5670MHz



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5.2.3 6dB Bandwidth

RESULT:

PASS

Date of testing: 2021-01-25, 2021-01-26

Ambient temperature: 20, 22°C
Relative humidity: 47, 52%
Atmospheric pressure: 1022, 1019hPa

Requirements:

FCC 15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test procedure:

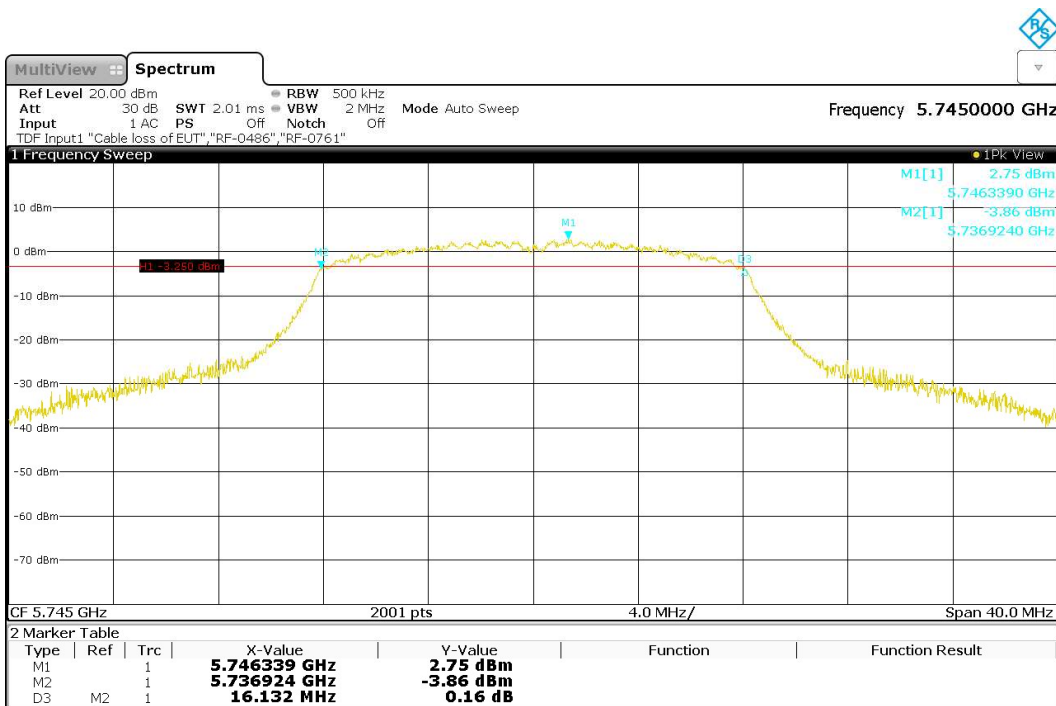
ANSI C63.10 §12.4

The 6dB bandwidth was measured at the antenna port with a spectrum analyzer using a peak detector. Markers placed at the lowest and highest intersections of the trace with a 6dBc line were used to calculate the emission bandwidth.

Table 15: 6dB Bandwidth, 802.11a

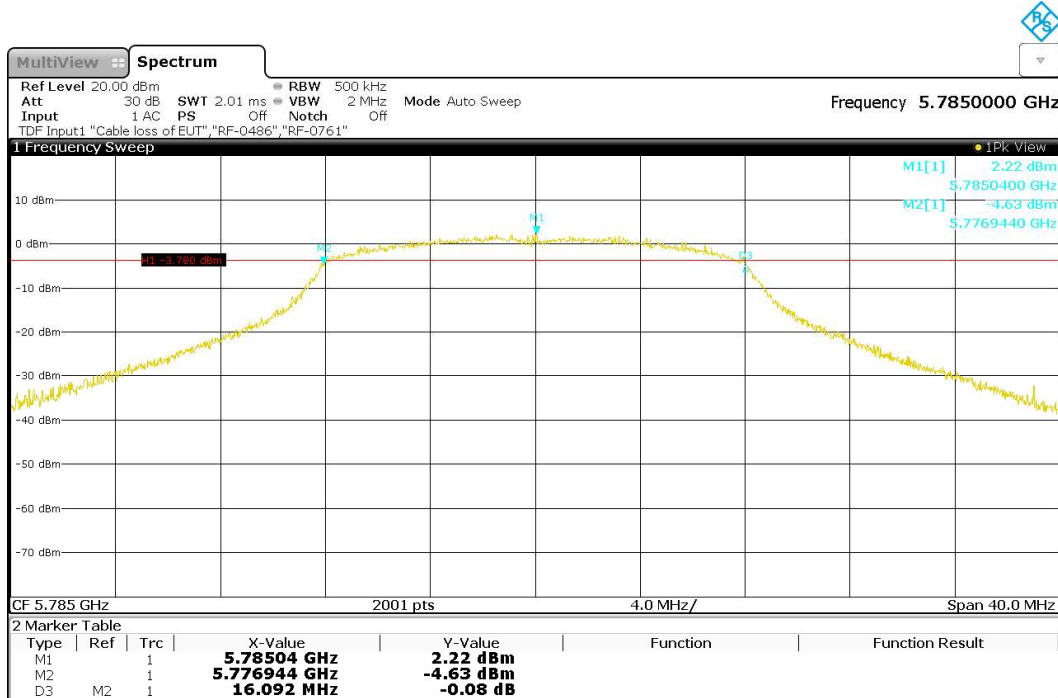
Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
5745	16.132	>0.5
5785	16.092	>0.5
5825	16.212	>0.5

Figure 20: 6dB Bandwidth, 802.11a, 5745MHz



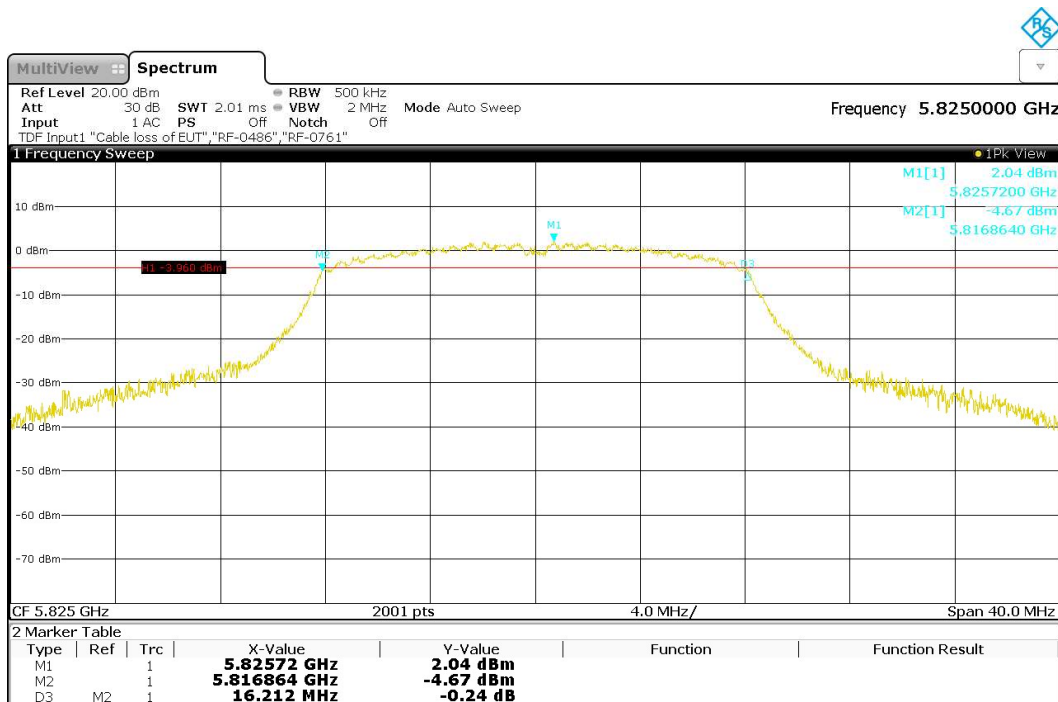
10:09:46 26.01.2021

Figure 21: 6dB Bandwidth, 802.11a, 5785MHz



10:04:04 26.01.2021

Figure 22: 6dB Bandwidth, 802.11a, 5825MHz

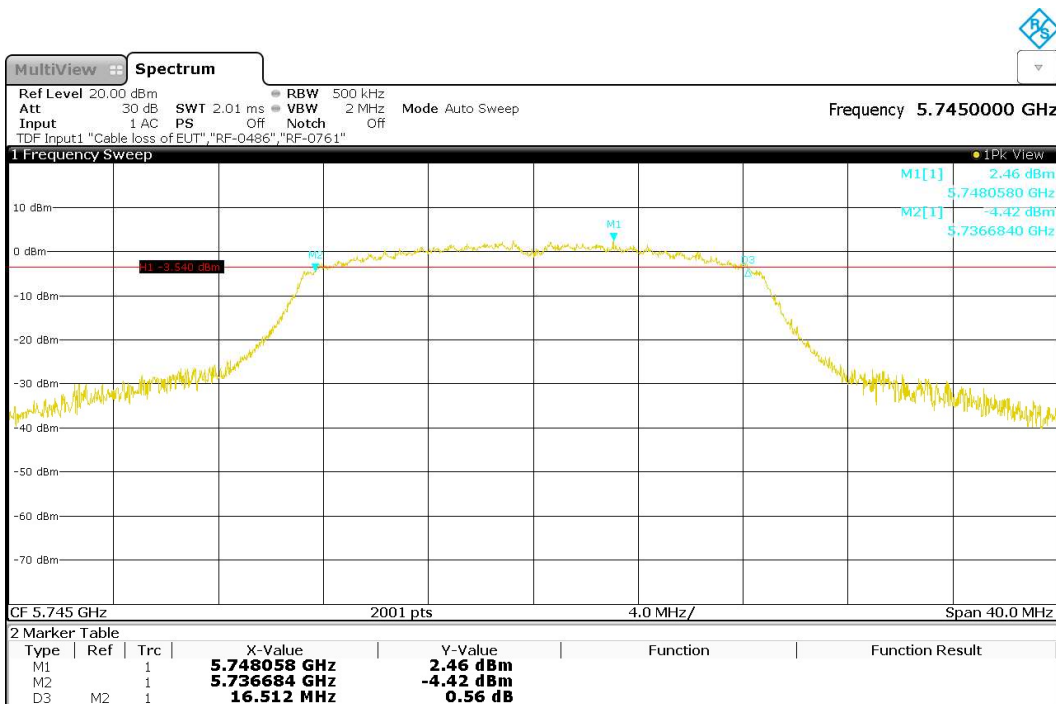


10:07:08 26.01.2021

Table 16: 6dB Bandwidth, 802.11n (20HT)

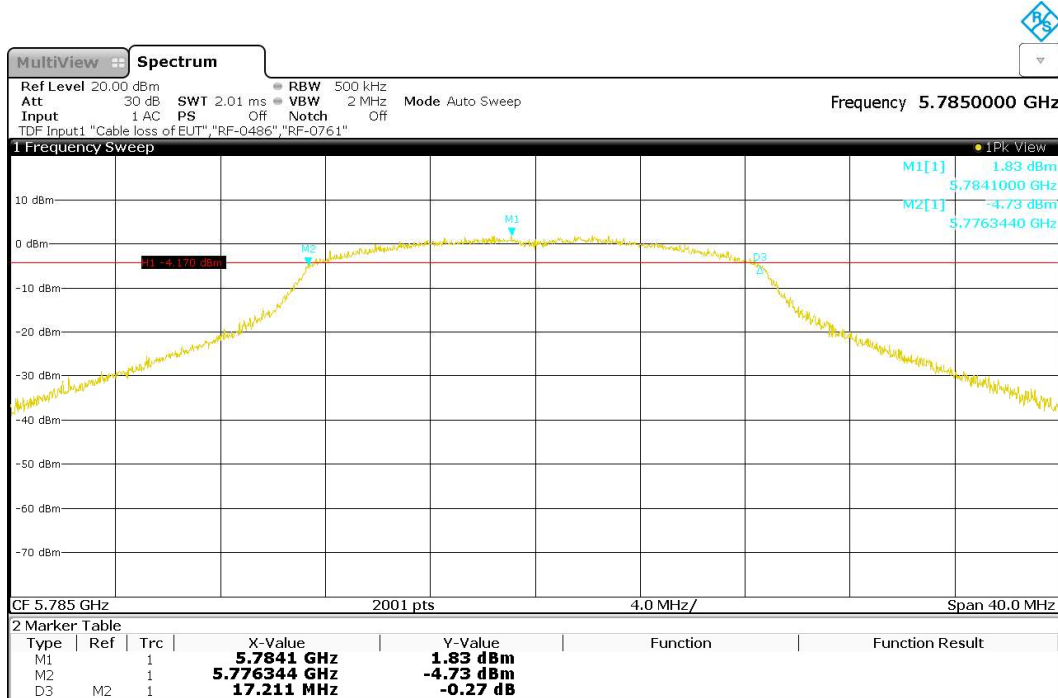
Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
5745	16.512	>0.5
5785	17.211	>0.5
5825	17.331	>0.5

Figure 23: 6dB Bandwidth, 802.11n (20HT), 5745MHz



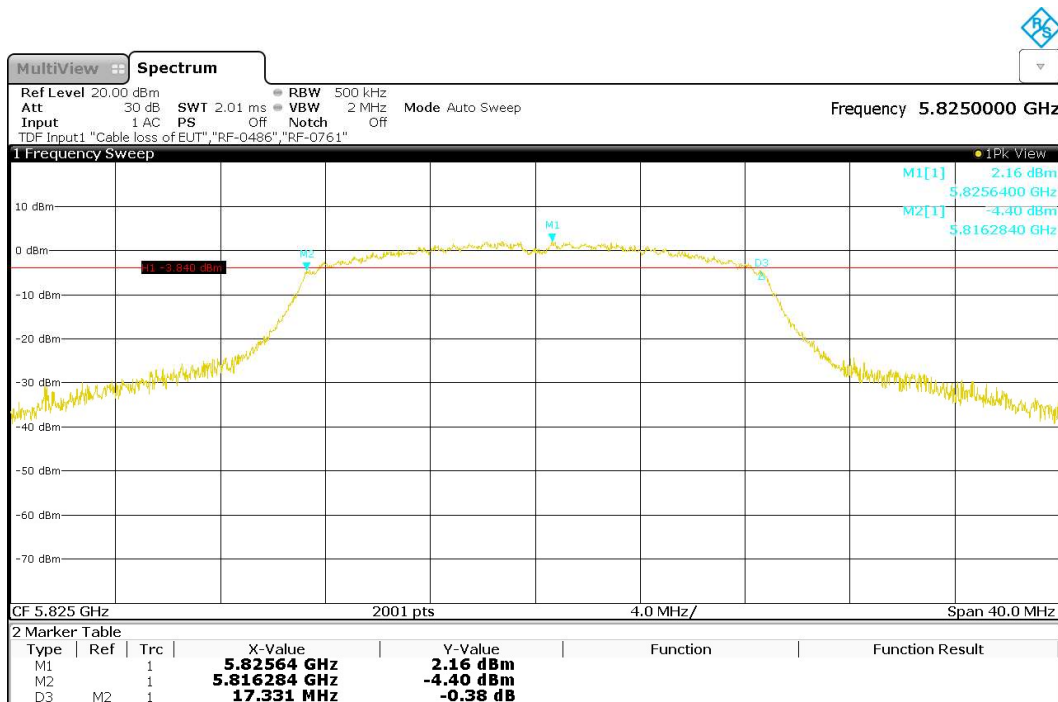
10:15:18 26.01.2021

Figure 24: 6dB Bandwidth, 802.11n (20HT), 5785MHz



10:18:00 26.01.2021

Figure 25: 6dB Bandwidth, 802.11n (20HT), 5825

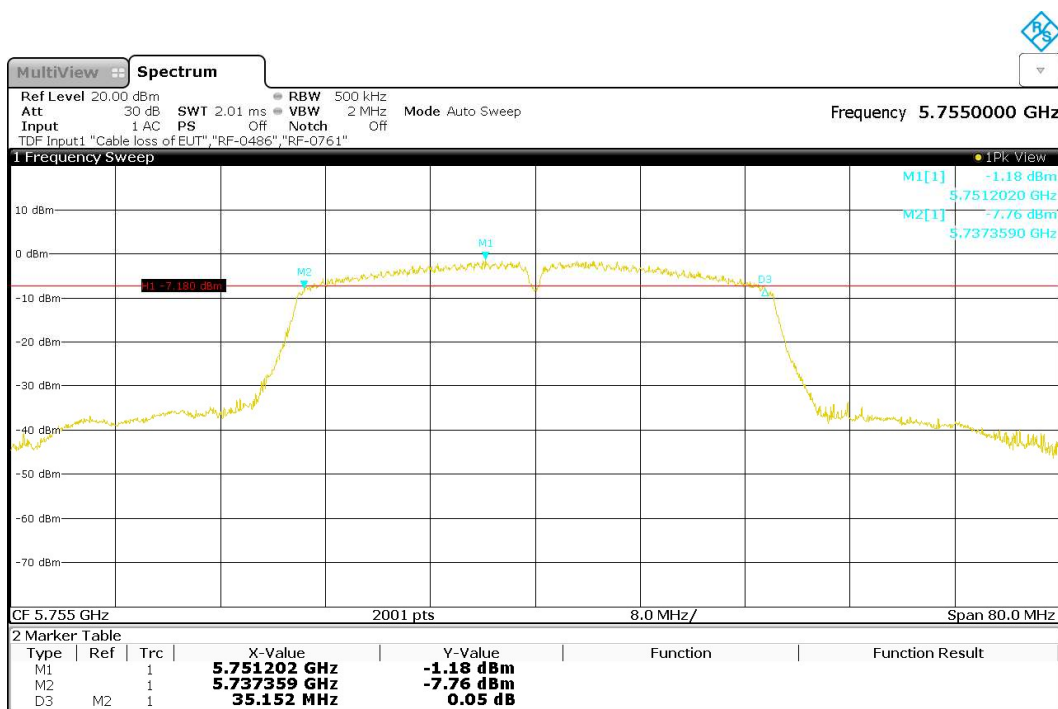


10:20:27 26.01.2021

Table 17: 6dB Bandwidth, 802.11n (40HT)

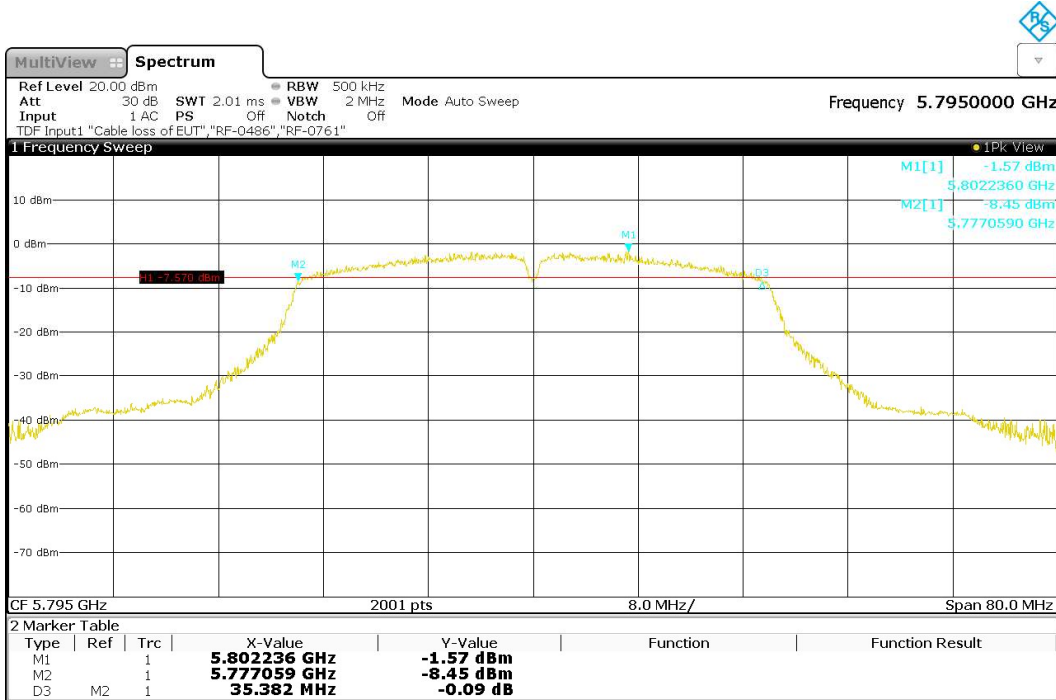
Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
5755	35.152	>0.5
5795	35.382	>0.5

Figure 26: 6dB Bandwidth, 802.11n (40HT), 5755MHz



10:26:25 26.01.2021

Figure 27: 6dB Bandwidth, 802.11n (40HT), 5795MHz



10:23:44 26.01.2021

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5.2.4 99% Bandwidth

RESULT:

PERFORMED

Date of testing: 2021-01-25, 2021-01-26

Ambient temperature: 20, 22°C

Relative humidity: 47, 52%

Atmospheric pressure: 1022, 1019hPa

Test procedure:

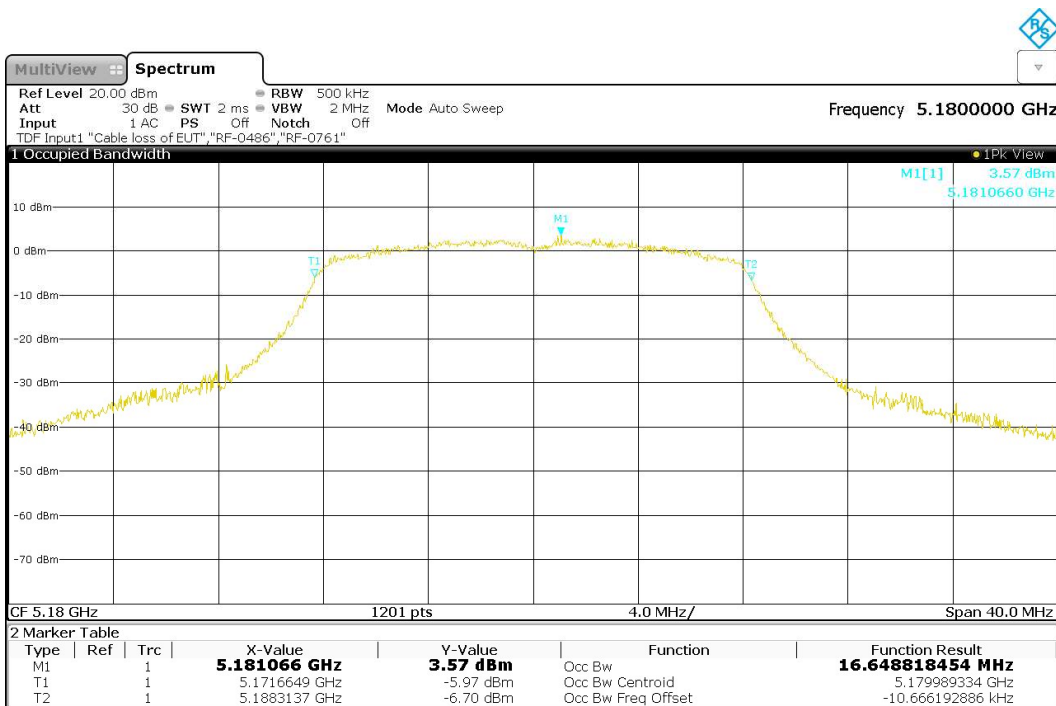
ANSI C63.10 §6.9.3

The 99% bandwidth was measured at the antenna port with a spectrum analyzer using a peak detector. The value of the emission bandwidth was obtained by using the OBW function of the analyzer with a 99% coverage setting.

Table 18: 99% Bandwidth, 802.11a

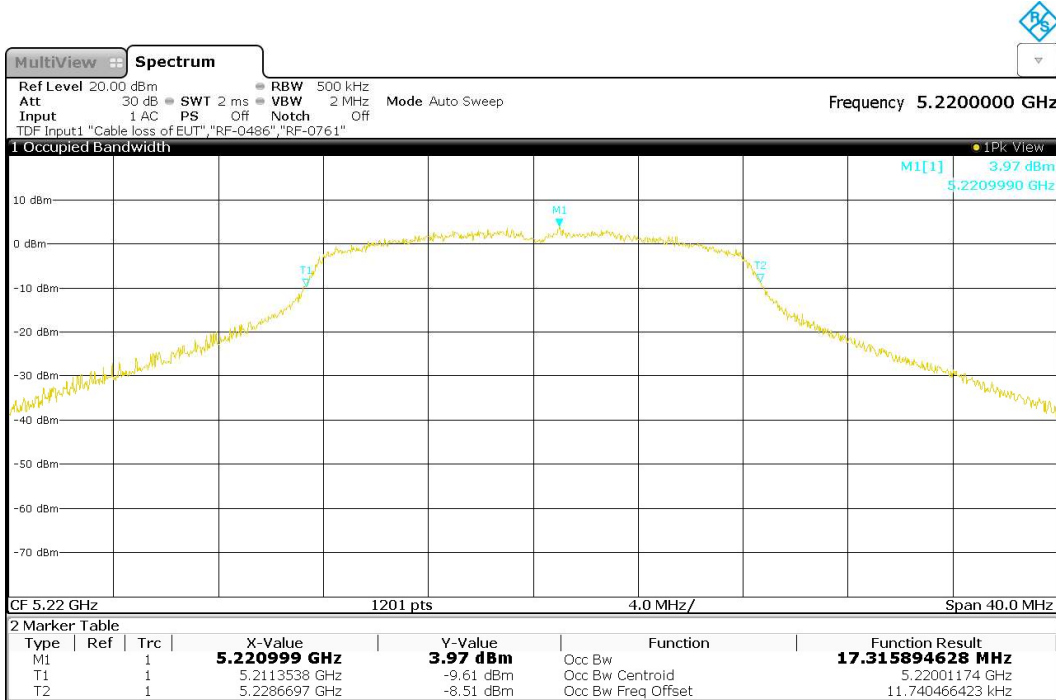
Operating Frequency [MHz]	99% Bandwidth [MHz]
5180	16.649
5220	17.326
5240	17.277
5260	17.281
5300	17.263
5320	16.668
5500	16.642
5580	17.281
5700	16.661
5745	16.674
5785	17.317
5825	16.662

Figure 28: 99% Bandwidth, 802.11a, 5180MHz



13:37:41 25.01.2021

Figure 29: 99% Bandwidth, 802.11a, 5220MHz



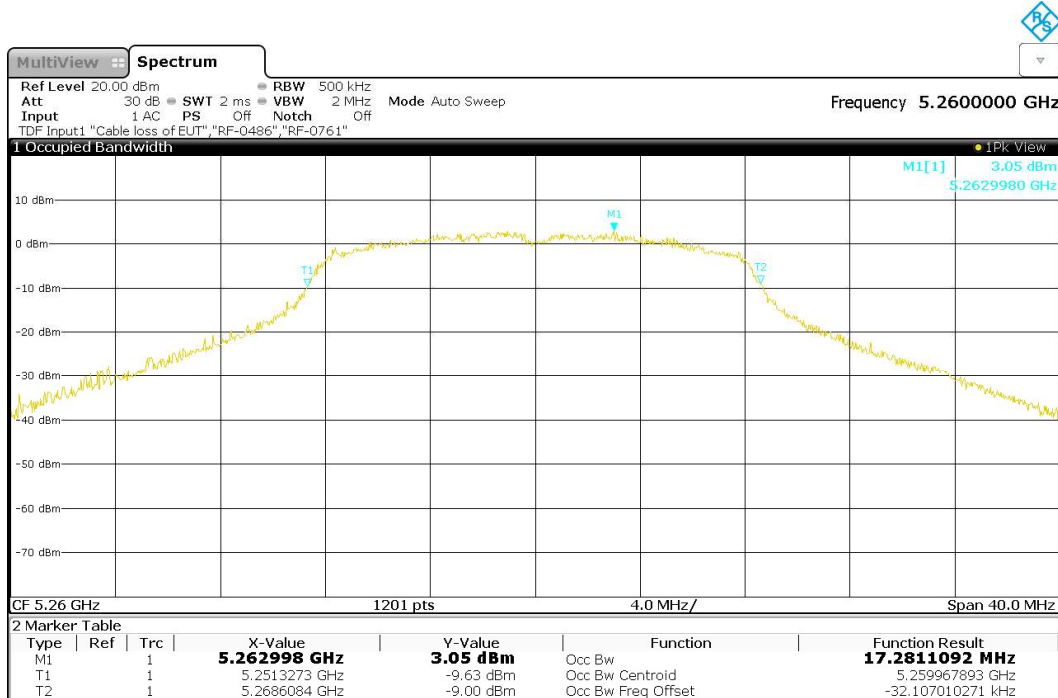
13:35:44 25.01.2021

Figure 30: 99% Bandwidth, 802.11a, 5240MHz



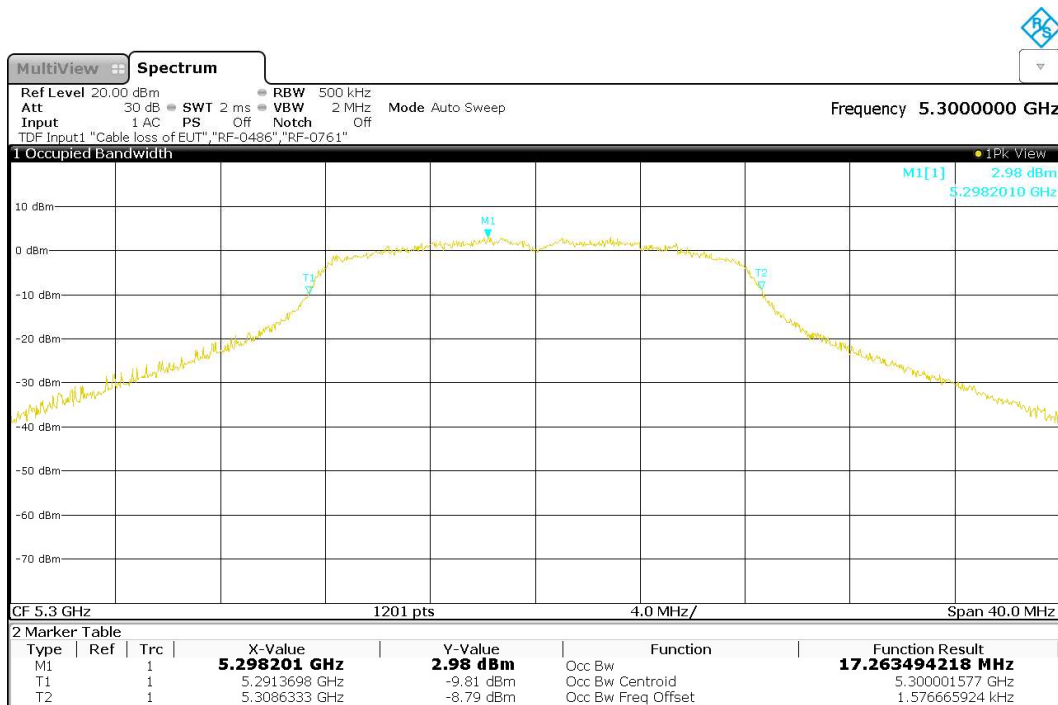
13:33:49 25.01.2021

Figure 31: 99% Bandwidth, 802.11a, 5260MHz



13:32:10 25.01.2021

Figure 32: 99% Bandwidth, 802.11a, 5300MHz



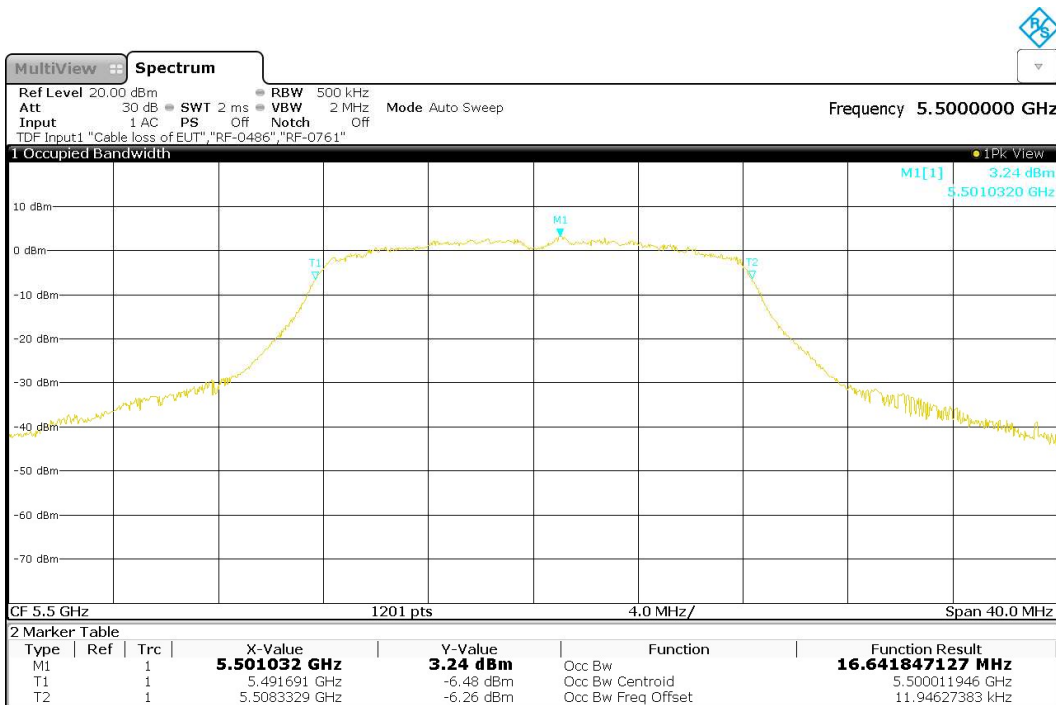
13:30:26 25.01.2021

Figure 33: 99% Bandwidth, 802.11a, 5320MHz



13:28:51 25.01.2021

Figure 34: 99% Bandwidth, 802.11a, 5500MHz



13:27:16 25.01.2021