FCC RF Test Report

APPLICANT	:	Vantiva USA LLC
EQUIPMENT	:	DOCSIS 3.1
BRAND NAME	:	Vantiva
MODEL NAME	:	CGM4981COM2
FCC ID	:	G954981X2
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	15E 6 GHz Low Power Indoor Access Point (6ID)
TEST DATE(S)	:	Oct. 18, 2023 ~ Dec. 04, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FR391301E	01	Initial issue of report	Dec. 18, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i) 15.407(a)(10)	26dB Emission Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)(5)	Fundamental Maximum EIRP	Pass	-
3.3	15.407(a)(5)	Fundamental Power Spectral Density	Pass	-
3.4	15.407(b)(6)	In-Band Emissions (Channel Mask)	Pass	-
3.5	15.407(d)(6)	Contention Based Protocol	Pass	
3.6	15.407(b)	Unwanted Emissions	Pass	Under limit 0.58 dB at 7125.00 MHz
3.7	15.207	AC Conducted Emission	Pass	Under limit 20.75 dB at 2.540 MHz
3.8	15.203 15.407(a)	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Vantiva USA LLC
4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.2 Manufacturer

Vantiva USA LLC
4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	DOCSIS 3.1
Brand Name	Vantiva
Model Name	CGM4981COM2
FCC ID	G954981X2
HW Version	FGR1
SW Version	6.2p30s1
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>U-NII-5: 5925 MHz ~ 6425 MHz
U-NII-6: 6425 MHz ~ 6525 MHz
U-NII-7: 6525 MHz ~ 6875 MHz
U-NII-8: 6875 MHz ~ 7125 MHz</td></tr>
<tr><td>Maximum EIRP</td><td>MIMO <Ant. 1+2+3+4>
<5925 MHz ~ 7125 MHz >
802.11ax HE20 : 18.03 dBm / 0.0635 W
802.11ax HE40 : 20.83 dBm / 0.1211 W
802.11ax HE80 : 23.89 dBm / 0.2449 W
802.11ax HE160 : 26.02 dBm / 0.3999 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>MIMO <Ant. 1+2+3+4>
802.11ax HE20 : 19.231 MHz
802.11ax HE40 : 38.262 MHz
802.11ax HE80 : 77.562 MHz
802.11ax HE160 : 157.522 MHz</td></tr>
<tr><td>Antenna Type</td><td>PCB Antenna</td></tr>
<tr><td>Type of Modulation</td><td>802.11ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th><th>Ant. 3</th><th>Ant. 4</th></tr>
<tr><td>802.11ax SISO</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
<tr><td>802.11ax CDD 1S4T</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
<tr><td>802.11ax Tx Beamforming 1S4T</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Remark:

1. For SISO&MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.
2. The device does not support partial RU tone and channel puncturing function for 802.11ax mode.
3. WIFI MIMO support CDD by manufacturer declared.
4. The device supports multiple spatial streams, the worst case directional gain will occur when NSS = 1, therefore, the 1S4T(CDD&TXBF) mode is the worst; 1S4T: NSS=1, MIMO 4Tx.
5. The device does not support UNII-8 CH233 (BW=20M, Center Frequency = 7115MHz).
6. Please refer to the antenna report for the maximum/ minimum Single antenna gain.

Frequency Band	Maximum Single Antenna gain (dBi)				Minimum Antenna Gain (dBi)			
	ANT1	ANT2	ANT3	ANT4	ANT1	ANT2	ANT3	ANT4
6GHz UNII-5	3.84	2.85	4.10	5.90	1.72	1.94	3.21	4.89
6GHz UNII-6	3.84	2.85	3.82	5.90	2.73	2.05	3.04	5.12
6GHz UNII-7	3.68	4.23	4.90	5.55	2.73	2.05	3.04	3.83
6GHz UNII-8	4.14	5.44	5.98	6.09	2.39	2.18	4.07	3.88

CBP test with antenna path of minimum gain (Antenna 1, Minimum gain= 1.72 dBi).

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Netbit	**Model Name**	NBC56A120460VU
AC Adapter 2	**Brand Name**	Netbit	**Model Name**	NBC56B120460VU
AC Adapter 3	**Brand Name**	Acbel	**Model Name**	ADK002

1.6 Modification of EUT

No modifications are made to the EUT during all test items.

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH06-KS DFS01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	210616
2.	CO01-KS	AUDIX	E3	6.2009-8-24
3.	DFS01-KS	Sporton	Test Tools	1.0

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z, and Wall installation plane. The worst cases were recorded in this report(Refer to appendix C).

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

<U-NII-5, 6, 7, 8>

BW 20M	**Channel**	1	5	9	13	17	21	25	29
	Freq. (MHz)	5955	5975	5995	6015	6035	6055	6075	6095
BW 40M	**Channel**	3		11		19		27	
	Freq. (MHz)	5965		6005		6045		6085	
BW 80M	**Channel**	7				23			
	Freq. (MHz)	5985				6065			
BW 160M	**Channel**	15							
	Freq. (MHz)	6025							

BW 20M	**Channel**	33	37	41	45	49	53	57	61
	Freq. (MHz)	6115	6135	6155	6175	6195	6215	6235	6255
BW 40M	**Channel**	35		43		51		59	
	Freq. (MHz)	6125		6165		6205		6245	
BW 80M	**Channel**	39				55			
	Freq. (MHz)	6145				6225			
BW 160M	**Channel**	47							
	Freq. (MHz)	6185							

BW 20M	**Channel**	65	69	73	77	81	85	89	93
	Freq. (MHz)	6275	6295	6315	6335	6355	6375	6395	6415
BW 40M	**Channel**	67		75		83		91	
	Freq. (MHz)	6285		6325		6365		6405	
BW 80M	**Channel**	71				87			
	Freq. (MHz)	6305				6385			
BW 160M	**Channel**	79							
	Freq. (MHz)	6345							

BW 20M	Channel	97	101	105	109	113	117	121	125
	Freq. (MHz)	6435	6455	6475	6495	6515	6535	6555	6575
BW 40M	Channel	99		107		115		123	
	Freq. (MHz)	6445		6485		6525		6565	
BW 80M	Channel	103				119			
	Freq. (MHz)	6465				6545			
BW 160M	Channel	111							
	Freq. (MHz)	6505							

BW 20M	Channel	129	133	137	141	145	149	153	157
	Freq. (MHz)	6595	6615	6635	6655	6675	6695	6715	6735
BW 40M	Channel	131		139		147		155	
	Freq. (MHz)	6605		6645		6685		6725	
BW 80M	Channel	135				151			
	Freq. (MHz)	6625				6705			
BW 160M	Channel	143							
	Freq. (MHz)	6665							

BW 20M	Channel	161	165	169	173	177	181	185	189
	Freq. (MHz)	6755	6775	6795	6815	6835	6855	6875	6895
BW 40M	Channel	163		171		179		187	
	Freq. (MHz)	6765		6805		6845		6885	
BW 80M	Channel	167				183			
	Freq. (MHz)	6785				6865			
BW 160M	Channel	175							
	Freq. (MHz)	6825							

BW 20M	Channel	193	197	201	205	209	213	217	221
	Freq. (MHz)	6915	6935	6955	6975	6995	7015	7035	7055
BW 40M	Channel	195		203		211		219	
	Freq. (MHz)	6925		6965		7005		7045	
BW 80M	Channel	199				215			
	Freq. (MHz)	6945				7025			
BW 160M	Channel	207							
	Freq. (MHz)	6985							

BW 20M	Channel	225	229	-
	Freq. (MHz)	7075	7095	-
BW 40M	Channel	227		
	Freq. (MHz)	7085		

2.2 Test Mode

Final test modes are considering the modulation and worse data rates refer to Appendix C.

For Radiated Test Cases, the tests were performance with Adapter and RJ45/RJ11/Coaxial Cable

Test Cases	
AC Conducted Emission	Mode 1 : WLAN Tx (6G) + Lan Load + Wan Load + CMTS Load + Power from Adapter

Mode	Non-Beamforming Power setting	Beamforming Power setting
802.11ax HE20_Nss1,(MCS0)_4TX	-	-
5955MHz	5	2.5
6175MHz	6	2.5
6415MHz	5	1.5
6435MHz	4.5	2
6475MHz	5	3
6515MHz	5.5	2.5
6535MHz	5	3
6695MHz	5	3.5
6855MHz	7	4.5
6875MHz	8.5	4.5
6895MHz	5.5	4
6995MHz	5.5	4
7095MHz	6	3
802.11ax HE40_Nss1,(MCS0)_4TX	-	-
5965MHz	8.5	5.5
6165MHz	11	6.5
6405MHz	10.5	6
6445MHz	9.5	5.5
6485MHz	10	5
6525MHz	9.5	5
6565MHz	7.5	5.5
6685MHz	8.5	6.5
6845MHz	10.5	7.5
6885MHz	12	6
6925MHz	9.5	7
7005MHz	9.5	6
7085MHz	11	6.5
802.11ax HE80_Nss1,(MCS0)_4TX	-	-
5985MHz	12.5	9
6145MHz	13	9
6385MHz	11	9
6465MHz	10	8

6545MHz	10	7.5
6625MHz	11	9.5
6705MHz	10.5	10
6785MHz	13	10.5
6865MHz	13.5	9
6945MHz	13	9.5
7025MHz	12	10
802.11ax HE160_Nss1,(MCS0)_4TX	-	-
6025MHz	15	13
6185MHz	15.5	12
6345MHz	15	11.5
6505MHz	13	10
6665MHz	14.5	13
6825MHz	16	12.5
6985MHz	16.5	14.5

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE20	802.11ax HE20	802.11ax HE20	802.11ax HE20
L	Low	001	097	117	189
M	Middle	045	105	149	209
H	High	093	113	181	229
Straddle		-	-	-	185

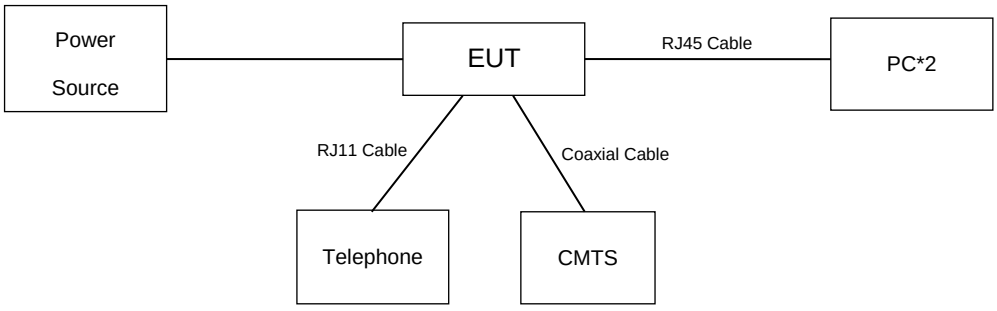
Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE40	802.11ax HE40	802.11ax HE40	802.11ax HE40
L	Low	003	099	123	195
M	Middle	043	-	147	203
H	High	091	107	179	227
Straddle		-	115	-	187

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE80	802.11ax HE80	802.11ax HE80	802.11ax HE80
L	Low	007	103	135	199
M	Middle	039		151	-
H	High	087		167	215
Straddle		-	119	183	-

Ch. #		5925-6425 MHz UNII-5	6425-6525 MHz UNII-6	6525-6875 MHz UNII-7	6875-7125 MHz UNII-8
		802.11ax HE160	802.11ax HE160	802.11ax HE160	802.11ax HE160
L	Low	015	-	143	207
M	Middle	047			
H	High	079			
Straddle		-	111	175	-

Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max EIRP power.

2.3 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	PC	Lenovo	Yangtian M4900c	Fcc DoC	N/A	Unshielded,1.8m
2.	(USB)Mouse	Lenovo	OEUUOA	Fcc DoC	Shielded, 1.8m	N/A
3.	(USB)Keyboard	Lenovo	SK-8821	Fcc DoC	Shielded, 1.8m	N/A
4.	Monitor	Lenovo	LS2033wA	Fcc DoC	N/A	Unshielded,1.8m
5.	PC	Dell	D12M	Fcc DoC	N/A	Unshielded,1.8m
6.	(USB)Mouse	Dell	MS111-P	Fcc DoC	Shielded, 1.8m	N/A
7.	(USB)Keyboard	Dell	SK-8120	Fcc DoC	Shielded, 1.8m	N/A
8.	Telephone	bubugao	HCD007(6082)TSD	N/A	N/A	N/A
9.	RJ45 Cable	N/A	N/A	N/A	N/A	N/A
10.	RJ11 Cable	N/A	N/A	N/A	N/A	N/A
11.	CMTS	TOPISION	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program “QRCT TX Tool” was provided and enabled to make EUT continuously transmit.

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 CFR 15.407 (a)(10)

The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

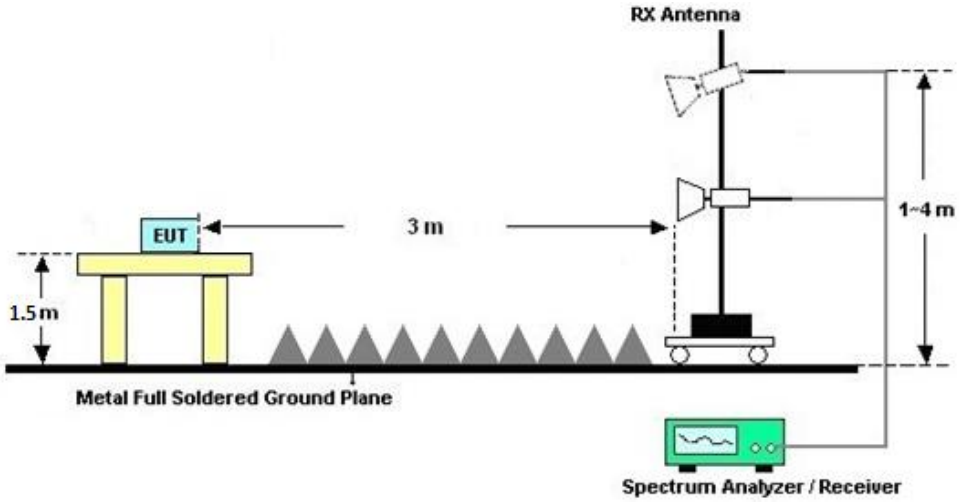
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

3.2 Fundamental Maximum EIRP Measurement

3.2.1 Limit of Fundamental Maximum EIRP

<FCC 14-30 CFR 15.407>

(a)(5) For an indoor access point operating in the 5.925-7.125 GHz band, the maximum e.i.r.p. over the frequency band of operation must not exceed 30dBm.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

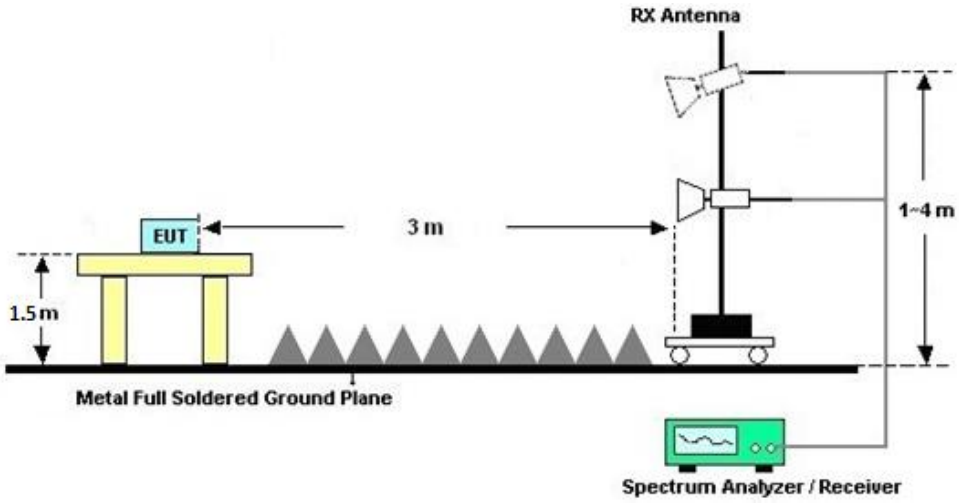
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

1. Measure the duty cycle, x, of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal
3. Set RBW = 1 MHz
4. Set VBW ≥ 3 MHz
5. Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode
8. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter
10. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times
11. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.

3.2.4 Test Setup



3.2.5 Test Result of Fundamental Maximum EIRP

Please refer to Appendix A.

Note：

EIRP(dBm) = Final Level(dBμV/m) - 95.2

Final Level(dBμV/m) = Read Level(dBμV/m) + Path Loss(dB) + DT Factor

Path Loss(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) - Preamp Factor(dB)

3.3 Fundamental Power Spectral Density Measurement

3.3.1 Limit of Fundamental Power Spectral Density

<FCC 14-30 CFR 15.407>

(a)(5) For an indoor access point operating in the 5.925-7.125 GHz band, the maximum power spectral density must not exceed 5dBm e.i.r.p. in any 1-megahertz band.

3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

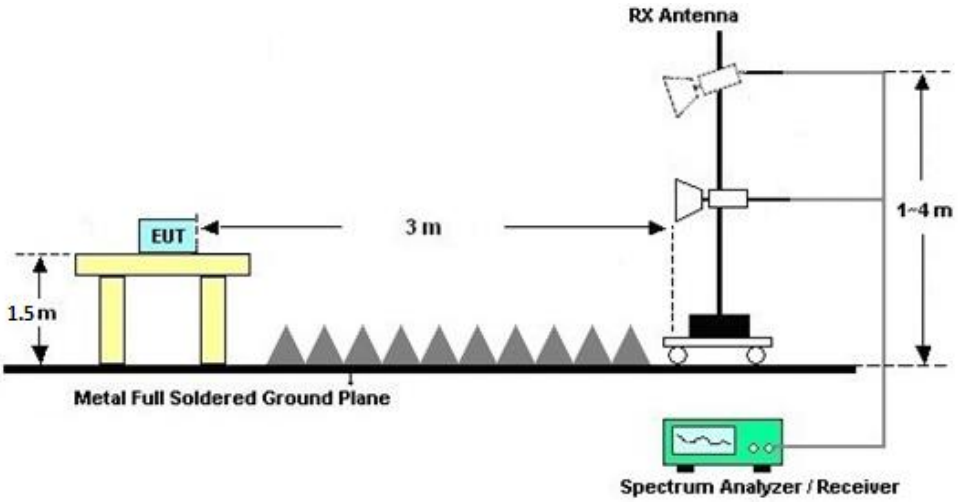
Section F) Maximum power spectral density.

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

1. Measure the duty cycle, x, of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal
3. Set RBW = 1 MHz
4. Set VBW ≥ 3 MHz
5. Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode
8. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter
10. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times

The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Note :

EIRP PSD(dBm/MHz) = Final Level(dBμV/m) - 95.2

Final Level(dBμV/m) = Read Level(dBμV/m) + Path Loss(dB) + DT Factor

Path Loss(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) - Preamp Factor(dB)

3.4 In-Band Emissions (Channel Mask)

3.4.1 Limit of Unwanted Emissions

<FCC 14-30 CFR 15.407>

(b)(6) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement.

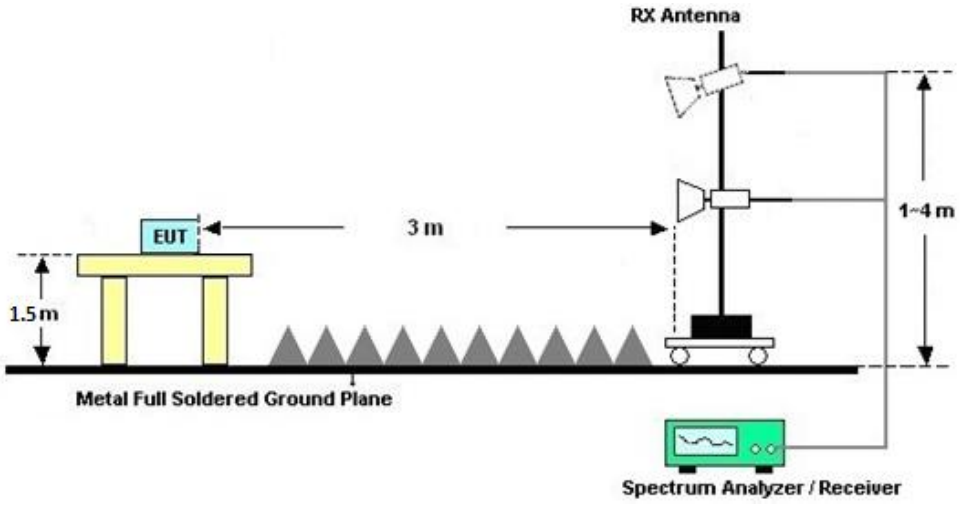
Section J) In-Band Emissions.

1. Take nominal bandwidth as reference channel bandwidth provided that 26 dB emission bandwidth is always larger than nominal bandwidth
2. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:
   a) Set the span to encompass the entire 26 dB EBW of the signal.
   b) Set RBW = same RBW used for 26 dB EBW measurement.
   c) Set VBW ≥ 3 X RBW
   d) Number of points in sweep ≥ [2 X span / RBW].
   e) Sweep time = auto.
   f) Detector = RMS (i.e., power averaging)
   g) Trace average at least 100 traces in power averaging (rms) mode.
   h) Use the peak search function on the instrument to find the peak of the spectrum.
3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
   a. Suppressed by 20 dB at 1 MHz outside of the channel edge.
   b. Suppressed by 28 dB at one channel bandwidth from the channel center.

c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.

4. Adjust the span to encompass the entire mask as necessary.
5. Clear trace.
6. Trace average at least 100 traces in power averaging (rms) mode.
7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

3.4.4 Test Setup



3.4.5 Test Result

Please refer to Appendix A.

3.5 Contention Based Protocol

3.5.1 Limit of Contention Based Protocol

<FCC 14-30 CFR 15.407>

(d)(6) Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:
$BWEUT$: Transmission bandwidth of EUT signal
$BWInc$: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)
$fc1$: Center frequency of EUT transmission
$fc2$: Center frequency of simulated incumbent signal

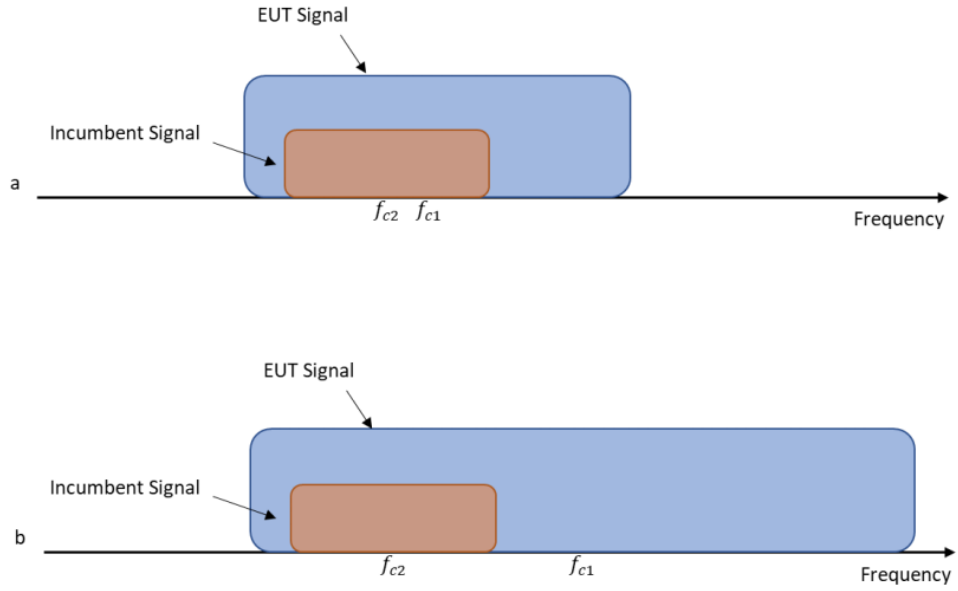


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

1. To ensure EUT reliably detects an incumbent signal in both scenarios shown in Figure 1, the detection threshold test may be repeated more than once with the incumbent signal (having center frequency $fc2$) tuned to different center frequencies within the UT transmission bandwidth. The criteria specified in Table 1 determines how many times the detection threshold test must be performed
2. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
3. Monitor the signal analyzer to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
4. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
5. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 2, choose a different center

frequency for the AWGN signal and repeat the process.

6. EUT was driven in MIMO mode, the interferer signal was injected to both chains to monitor the performance, while the interferer level is determined according to the lowest antenna gain among both antennas.

3.5.4 Test Setup

Conducted Setup

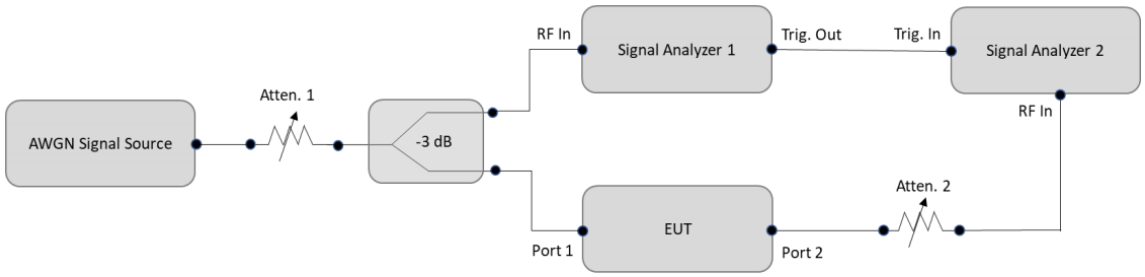


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.5.5 Support Unit used in test configuration and system

Instrument	Brand Name	Model No.	Characteristics
Signal Generator	Keysight	5172B/5172BX07	9KHz~7.2GHz
Spectrum Analyzer	Rohde & Schwarz	FSV30	9KHz~30GHz
Terminal (NB Server)	DELL	P78G	LAN

3.5.6 Test Summary of Contention Based Protocol Test

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 5	6135	20	6135	-62.57	100	-62	-64.29	2.29
					Result: Stop Transmission			
				-63.57	< 90	-62	-65.29	3.29
					Result: Minimal Operation			
				-64.76	0	-62	-66.48	4.48
					Result: Normal Operation			
	6185	160	6110	-63.05	100	-62	-64.77	2.77
					Result: Stop Transmission			
				-64.05	< 90	-62	-65.77	3.77
					Result: Minimal Operation			
				-64.95	0	-62	-66.67	4.67
					Result: Normal Operation			
			6185	-63.54	100	-62	-65.26	3.26
					Result: Stop Transmission			
				-64.54	< 90	-62	-66.26	4.26
					Result: Minimal Operation			
				-65.54	0	-62	-67.26	5.26
					Result: Normal Operation			
			6260	-64.1	100	-62	-65.82	3.82
					Result: Stop Transmission			
				-65.1	< 90	-62	-66.82	4.82
					Result: Minimal Operation			
				-65.47	0	-62	-67.19	5.19
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 1, gain = 1.72dBi)

Note 2: Path Loss between antenna and RF connector is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 6	6455	20	6455	-63.01	100	-62	-64.73	2.73
					Result: Stop Transmission			
				-64.01	< 90	-62	-65.73	3.73
					Result: Minimal Operation			
				-64.87	0	-62	-66.59	4.59
					Result: Normal Operation			
	6505	160	6430	-63.52	100	-62	-65.24	3.24
					Result: Stop Transmission			
				-64.52	< 90	-62	-66.24	4.24
					Result: Minimal Operation			
				-65.36	0	-62	-67.08	5.08
					Result: Normal Operation			
			6505	-63.32	100	-62	-65.04	3.04
					Result: Stop Transmission			
				-64.32	< 90	-62	-66.04	4.04
					Result: Minimal Operation			
				-65.83	0	-62	-67.55	5.55
					Result: Normal Operation			
			6580	-63.64	100	-62	-65.36	3.36
					Result: Stop Transmission			
				-64.64	< 90	-62	-66.36	4.36
					Result: Minimal Operation			
				-65.46	0	-62	-67.18	5.18
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 1, gain = 1.72dBi)

Note 2: Path Loss between antenna and RF connector is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 7	6695	20	6695	-62.82	100	-62	-64.54	2.54
					Result: Stop Transmission			
				-63.82	< 90	-62	-65.54	3.54
					Result: Minimal Operation			
				-65.15	0	-62	-66.87	4.87
					Result: Normal Operation			
	6665	160	6590	-62.98	100	-62	-64.7	2.70
					Result: Stop Transmission			
				-63.98	< 90	-62	-65.7	3.70
					Result: Minimal Operation			
				-64.75	0	-62	-66.47	4.47
					Result: Normal Operation			
			6665	-63.63	100	-62	-65.35	3.35
					Result: Stop Transmission			
				-64.63	< 90	-62	-66.35	4.35
					Result: Minimal Operation			
				-66.51	0	-62	-68.23	6.23
					Result: Normal Operation			
			6740	-62.57	100	-62	-64.29	2.29
					Result: Stop Transmission			
				-63.57	< 90	-62	-65.29	3.29
					Result: Minimal Operation			
				-64.18	0	-62	-65.9	3.90
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 1, gain = 1.72dBi)

Note 2: Path Loss between antenna and RF connector is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

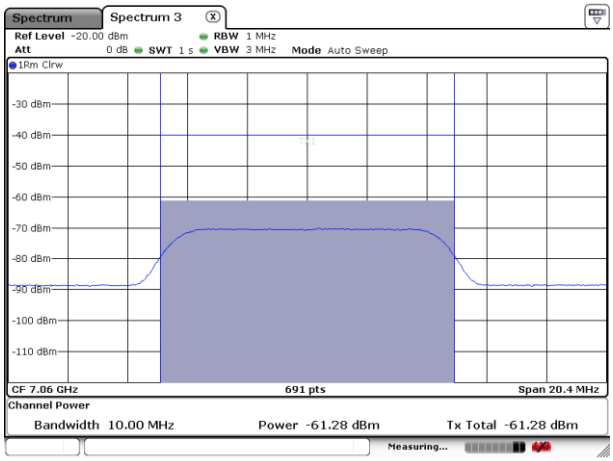
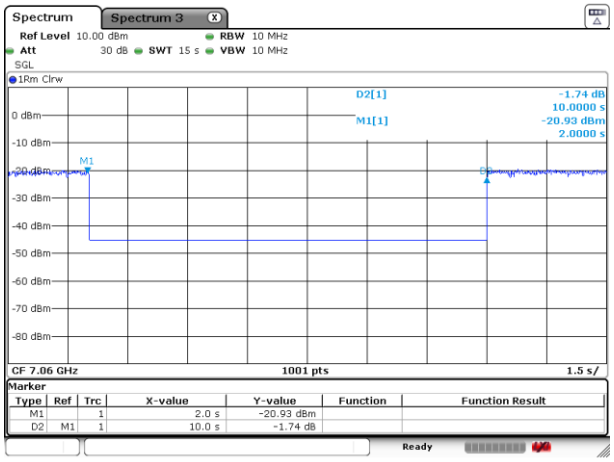
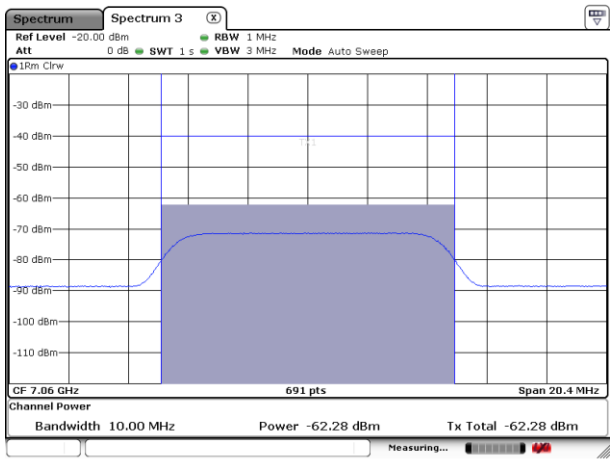
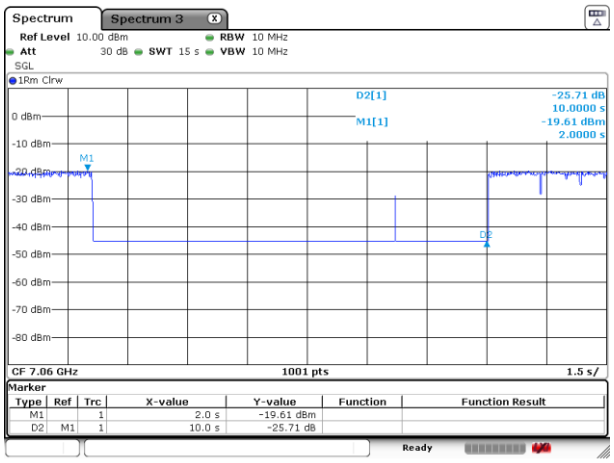
Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Injected AWGN Level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Adjusted Power (dBm)	Margin (dB)
UNII Band 8	7015	20	7015	-62.19	100	-62	-63.91	1.91
					Result: Stop Transmission			
				-63.19	< 90	-62	-64.91	2.91
					Result: Minimal Operation			
				-64.13	0	-62	-65.85	3.85
					Result: Normal Operation			
	6985	160	6910	-63.81	100	-62	-65.53	3.53
					Result: Stop Transmission			
				-64.81	< 90	-62	-66.53	4.53
					Result: Minimal Operation			
				-65.72	0	-62	-67.44	5.44
					Result: Normal Operation			
			6985	-64.79	100	-62	-66.51	4.51
					Result: Stop Transmission			
				-65.79	< 90	-62	-67.51	5.51
					Result: Minimal Operation			
				-67.85	0	-62	-69.57	7.57
					Result: Normal Operation			
			7060	**-61.28 (worst)**	100	-62	-63	**1.00**
					Result: Stop Transmission			
				-62.28	< 90	-62	-64	2.00
					Result: Minimal Operation			
				-63.23	0	-62	-64.95	2.95
					Result: Normal Operation			

Note 1: Adjusted Power = Injected AWGN Level - minimum antenna gain (Antenna 1, gain = 1.72dBi)

Note 2: Path Loss between antenna and RF connector is negligible. (0 dB)

Note 3: Margin = Regulated Threshold level - Adjusted Power

3.5.7 Worst Case Plots of Contention Based Protocol

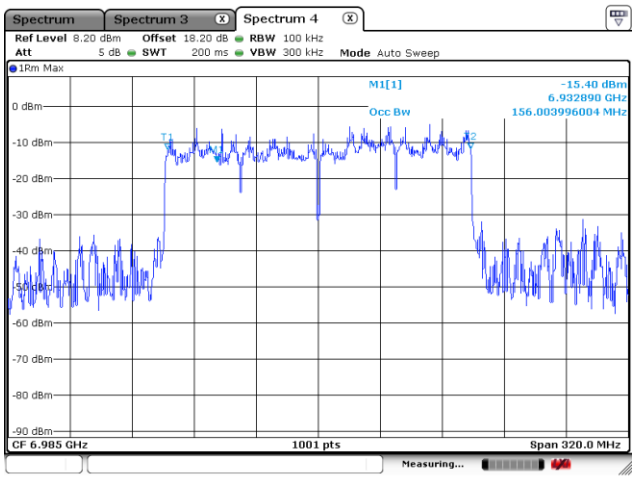
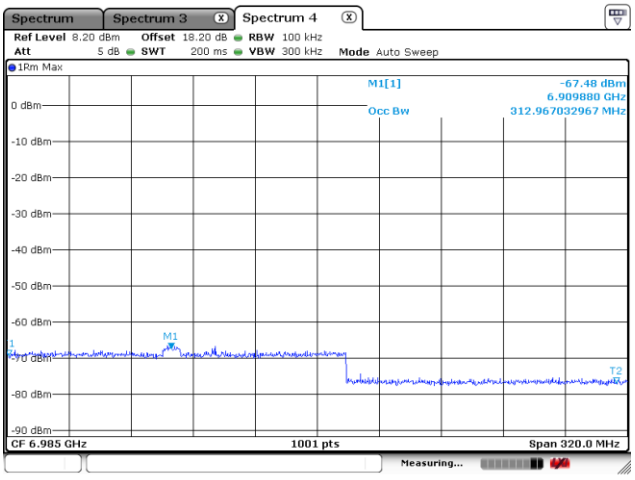
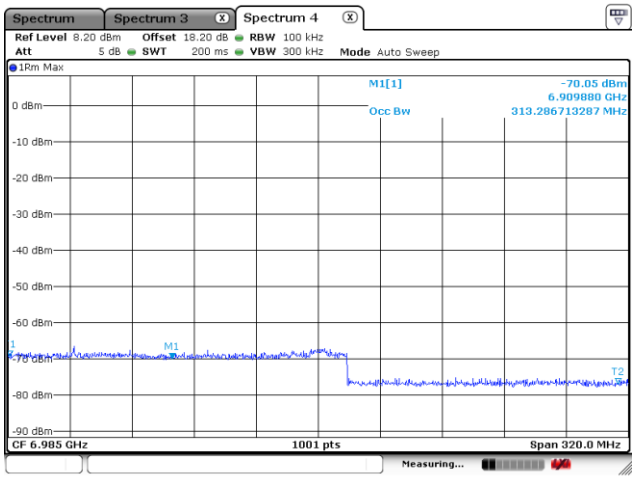
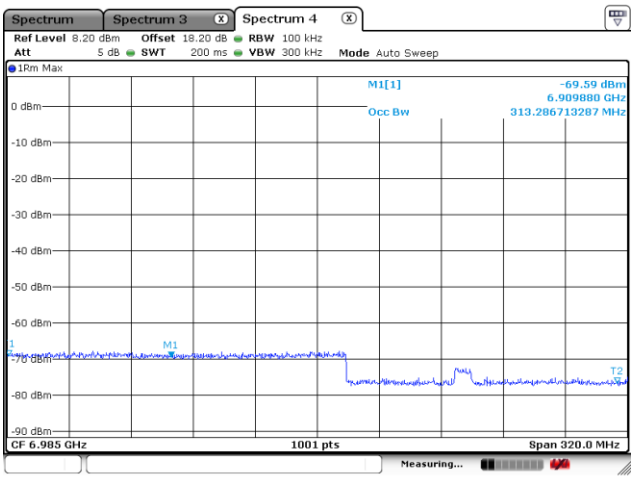
Contention Based Protocol Result Plots on U-NII 8 (AWGN Interference)	
802.11ax (HE160) / 7060MHz Threshold Level (TL) = -61.28dBm	802.11ax (HE160) / 7060MHz Test result is pass due to no transmission occur.
	
802.11ax (HE160) / 7060MHz Threshold Level (TL) = -62.28dBm	802.11ax (HE160) / 7060MHz Transmit when the interferer is 1dB lower.
	

Remark: M1: Injection of AWGN signal, D1: Removal of AWGN signal

3.5.8 Worst Case of Contention Based Protocol Transmission Bandwidth

Verify transmission absence when Incumbent signal at different frequency (frequency domain plots).

1. When Incumbent Signal inject at lowest frequency, the whole 160MHz bandwidth stop transmission;
2. When Incumbent Signal inject at middle frequency, the whole 160MHz bandwidth stop transmission;
3. When Incumbent Signal inject at highest frequency, the whole 160MHz bandwidth stop transmission;

UNII 8_CH207 (6985MHz / BW=160MHz)	
Non-Incumbent Signal (full 160MHz)	Incumbent Signal @ Lowest Frequency
	
Incumbent Signal @ Middle Frequency	Incumbent Signal @ Highest Frequency
	

3.6 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.6.1 Limit of Unwanted Emissions

(1) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27 (RMS)	68.2
- 7 (Peak)	88.2

Unwanted emissions outside of restricted bands are measured with a RMS detector.
In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz for CDD mode

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
   - Detector = peak.

   (4) Procedures for Average Unwanted Emissions Measurements Above 1000MHz for TXBF mode

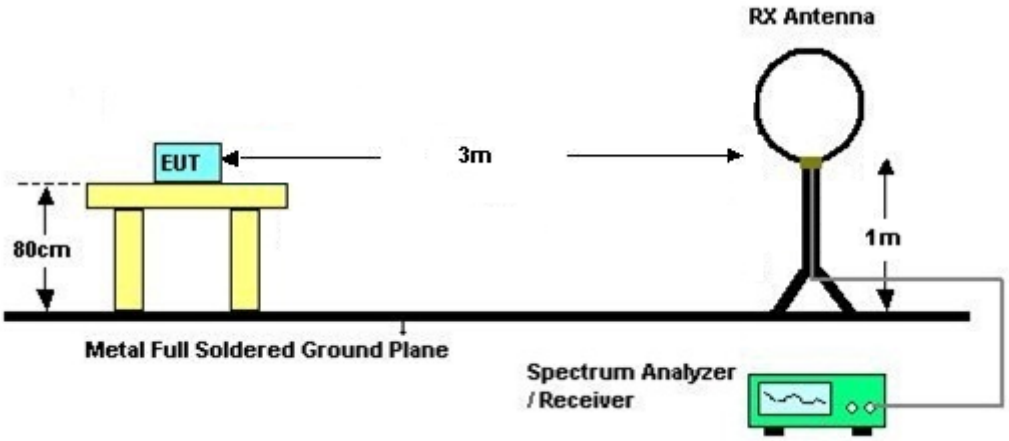
   - RBW = 1 MHz
   - VBW = 3 MHz
   - Detector = power averaging (rms), set span/(# of points in sweep) ≥ RBW/2.
   - Averaging type = power averaging (RMS)
   - The correction factor shall be offset is 10 log (1/x), where x is the duty cycle.

2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

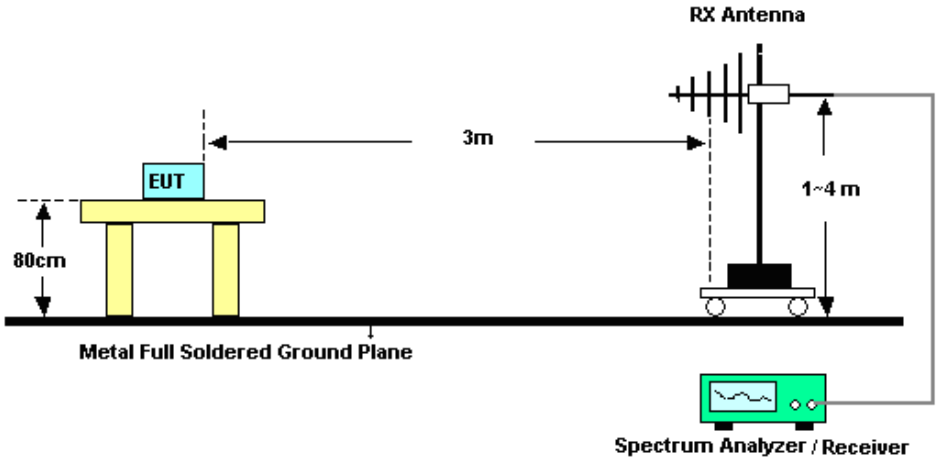
3.6.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz

<CDD Mode>



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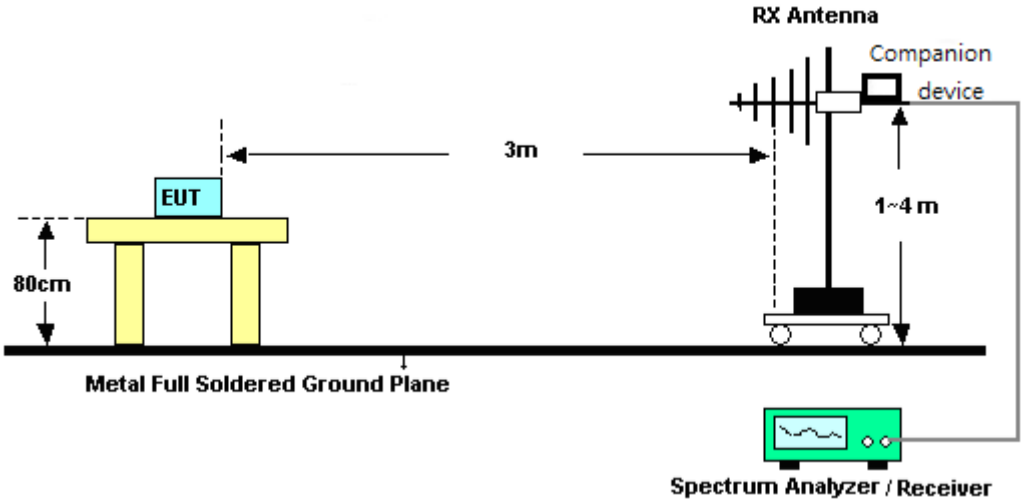
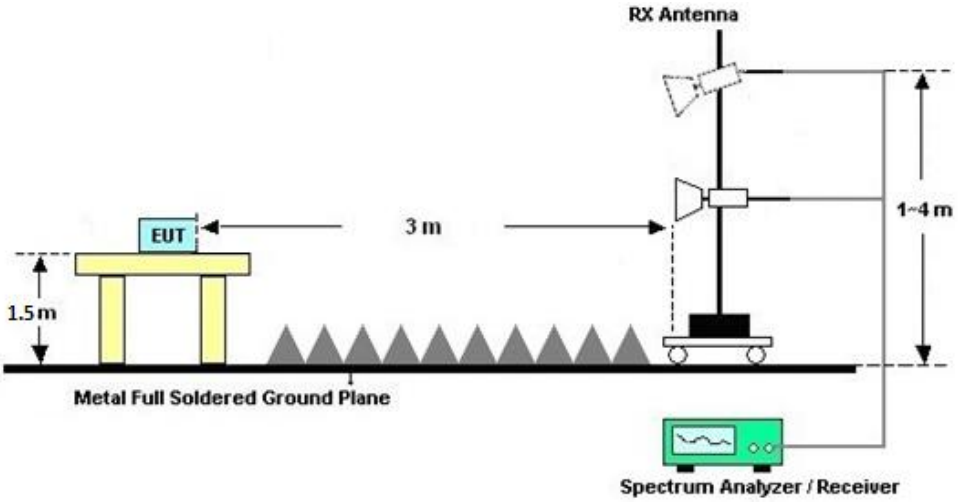


For radiated emissions above 1GHz

<CDD Mode>



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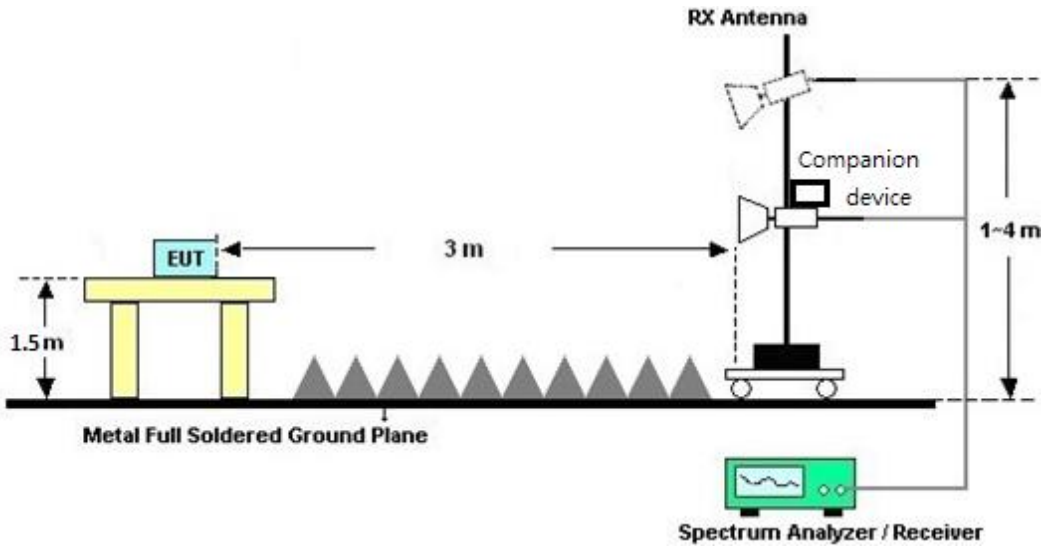


3.6.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.6.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

3.6.7 Duty Cycle

Please refer to Appendix D.

3.6.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.7 AC Conducted Emission Measurement

3.7.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (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 the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

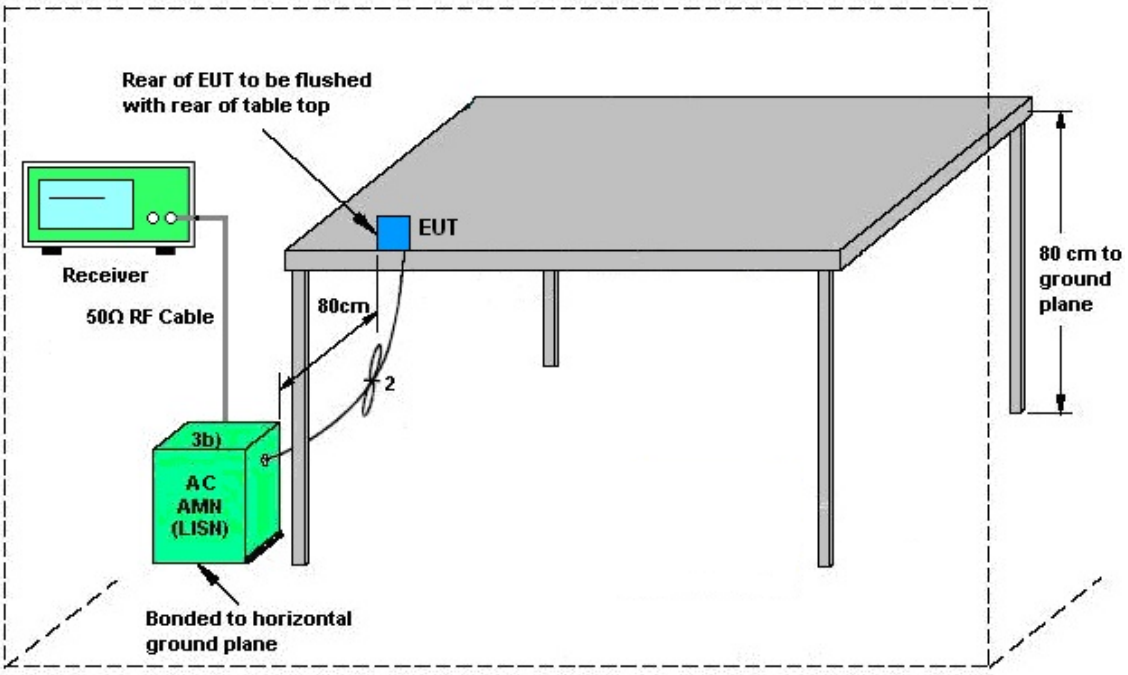
3.7.2 Measuring Instruments

See list of measuring equipment of this test report.

3.7.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.7.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.7.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.8 Antenna Requirements

3.8.1 Standard Applicable

§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.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used. The EUT complies with the requirement of 15.203.

3.8.3 Antenna Gain

The following information was declared by manufacturer. Please refer to the antenna report for the Max/Min Antenna Gain.

Frequency Band	Maximum Single Antenna gain (dBi)				Minimum Antenna Gain (dBi)			
	ANT1	ANT2	ANT3	ANT4	ANT1	ANT2	ANT3	ANT4
6GHz UNII-5	3.84	2.85	4.10	5.90	1.72	1.94	3.21	4.89
6GHz UNII-6	3.84	2.85	3.82	5.90	2.73	2.05	3.04	5.12
6GHz UNII-7	3.68	4.23	4.90	5.55	2.73	2.05	3.04	3.83
6GHz UNII-8	4.14	5.44	5.98	6.09	2.39	2.18	4.07	3.88

For Power/PSD testing, the radiated method is selected, including the antenna gain, and no need to calculate direction gain using formula according to KDB 662911. Refer to the appendix for the test results.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Oct. 18, 2023~ Nov. 18, 2023	Oct. 10, 2024	Radiation (03CH06-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 10, 2023	Oct. 18, 2023~ Nov. 18, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY60242126	10Hz-44GHz	Oct. 10, 2023	Oct. 18, 2023~ Nov. 18, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 10, 2023	Oct. 18, 2023~ Nov. 18, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	Apr. 09, 2023	Oct. 18, 2023~ Nov. 18, 2023	Apr. 08, 2024	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 06, 2023	Oct. 18, 2023~ Nov. 18, 2023	Apr. 05, 2024	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 08, 2023	Oct. 18, 2023~ Nov. 18, 2023	Jan. 07, 2024	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	380827	9KHz ~1GHZ	Jul. 06, 2023	Oct. 18, 2023~ Nov. 18, 2023	Jul. 05, 2024	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Oct. 18, 2023~ Nov. 18, 2023	Jan. 04, 2024	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082395	1Ghz-18Ghz	Jan. 05, 2023	Oct. 18, 2023~ Nov. 18, 2023	Jan. 04, 2024	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270319	500MHz~26.5GHz	Oct. 10, 2023	Oct. 18, 2023~ Nov. 18, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 18, 2023~ Nov. 18, 2023	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Oct. 18, 2023~ Nov. 18, 2023	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Oct. 18, 2023~ Nov. 18, 2023	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 16, 2023	Dec. 04, 2023	May 15, 2024	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Dec. 04, 2023	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 16, 2023	Dec. 04, 2023	May 15, 2024	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Dec. 04, 2023	Oct. 10, 2024	Conduction (CO01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Nov. 20, 2023	Oct. 10, 2024	CBP (DFS01-KS)
MXG-B RF Vector Signal Genertor	Keysight	5182B /5182BX07	MY56200417 /MY59360210	9kHz~7.2GHz	May 16, 2023	Nov. 20, 2023	May 15, 2024	CBP (DFS01-KS)
Combiner	MTJ Cooperation	MTJ7114-M	N/A	0.5GHz~18GHz	NCR	Nov. 20, 2023	NCR	CBP (DFS01-KS)

NCR: No Calibration Required

5 Measurement Uncertainty

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.94 dB

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.32 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.26 dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.02 dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.26 dB

---------- THE END ----------

Appendix A. Test Results of EIRP & PSD & 26dB/99% Bandwidth & Mask

Ambient Condition: 25 ℃, 45 %RH	
Test Date: 2023.10.20~11.18	**Test Engineer:** Henry Li

<CDD 1S4T>:

26dB Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX20MIMO	Total	5955	20.18	5944.56	5964.74	320	PASS
	Total	6175	20.529	6165.06	6185.589	320	PASS
	Total	6415	20.28	6405.11	6425.39	320	PASS
	Total	6435	20.729	6424.86	6445.589	320	PASS
	Total	6475	20.529	6465.11	6485.639	320	PASS
	Total	6515	20.33	6505.21	6525.539	320	PASS
	Total	6535	20.28	6525.26	6545.539	320	PASS
	Total	6695	20.579	6685.11	6705.689	320	PASS
	Total	6855	19.98	6845.21	6865.19	320	PASS
	Total	6875	20.779	6864.71	6885.49	320	PASS
	Total	6895	20.43	6884.66	6905.09	320	PASS
	Total	6995	20.03	6985.01	7005.04	320	PASS
	Total	7095	20.729	7084.71	7105.44	320	PASS
11AX40MIMO	Total	5965	39.83	5944.95	5984.78	320	PASS
	Total	6165	39.65	6144.86	6184.51	320	PASS
	Total	6405	39.74	6384.95	6424.69	320	PASS
	Total	6445	39.92	6424.95	6464.87	320	PASS
	Total	6485	39.65	6464.95	6504.6	320	PASS
	Total	6525	40.1	6504.77	6544.87	320	PASS
	Total	6565	39.83	6545.13	6584.96	320	PASS
	Total	6685	39.83	6665.13	6704.96	320	PASS
	Total	6845	39.65	6825.22	6864.87	320	PASS
	Total	6885	40.1	6864.95	6904.96	320	PASS
	Total	6925	39.471	6905.22	6944.69	320	PASS
	Total	7005	39.65	6985.13	7024.78	320	PASS
	Total	7085	39.83	7064.95	7104.78	320	PASS
11AX80MIMO	Total	5985	81.04	5944.08	6025.12	320	PASS
	Total	6145	80.56	6104.88	6185.44	320	PASS
	Total	6385	80.88	6344.88	6425.76	320	PASS
	Total	6465	80.88	6424.88	6505.76	320	PASS
	Total	6545	81.2	6504.72	6585.92	320	PASS
	Total	6625	81.04	6584.72	6665.76	320	PASS
	Total	6705	80.72	6664.88	6745.6	320	PASS
	Total	6785	81.2	6744.72	6825.92	320	PASS
	Total	6865	80.72	6824.88	6905.6	320	PASS
	Total	6945	81.2	6904.56	6985.76	320	PASS

	Total	7025	80.88	6984.72	7065.6	320	PASS
11AX160MIMO	Total	6025	164.32	5943.16	6107.48	320	PASS
	Total	6185	164.32	6103.48	6267.8	320	PASS
	Total	6345	164.96	6262.84	6427.8	320	PASS
	Total	6505	165.59	6422.84	6588.44	320	PASS
	Total	6665	164.32	6583.16	6747.48	320	PASS
	Total	6825	164.64	6743.16	6907.8	320	PASS
	Total	6985	163.68	6903.16	7066.84	320	PASS

Test Graphs

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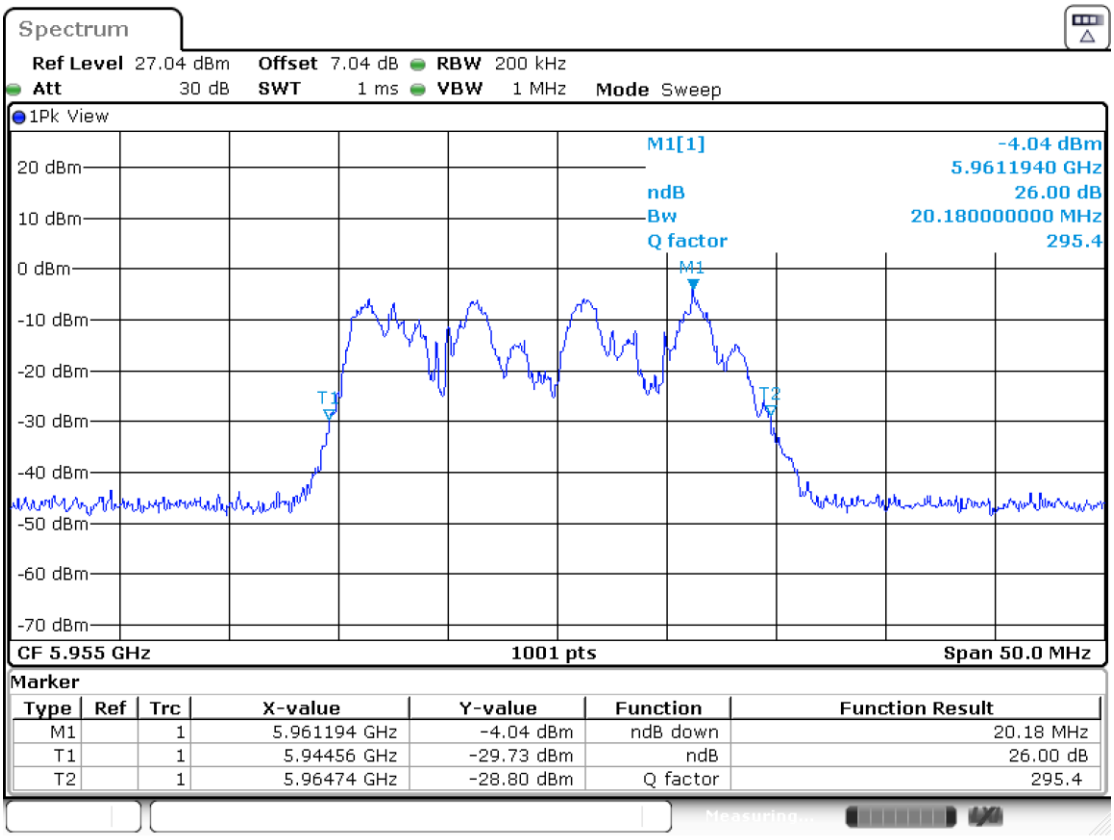

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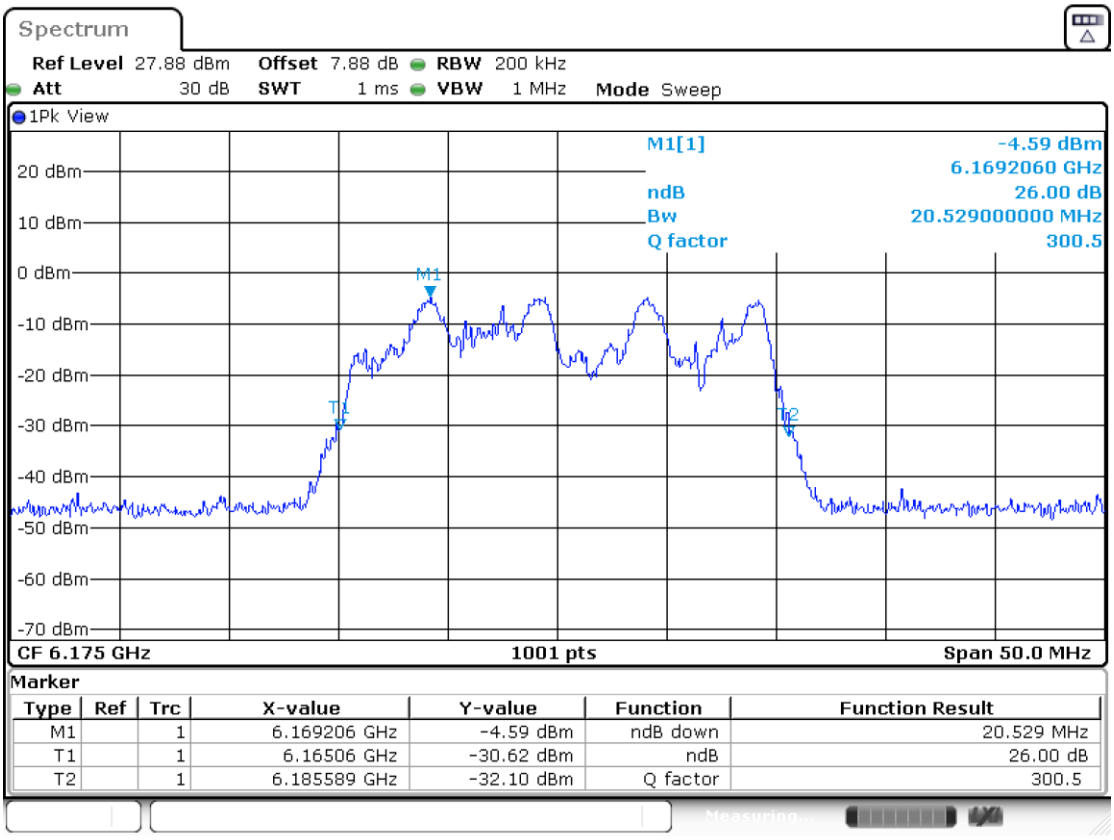

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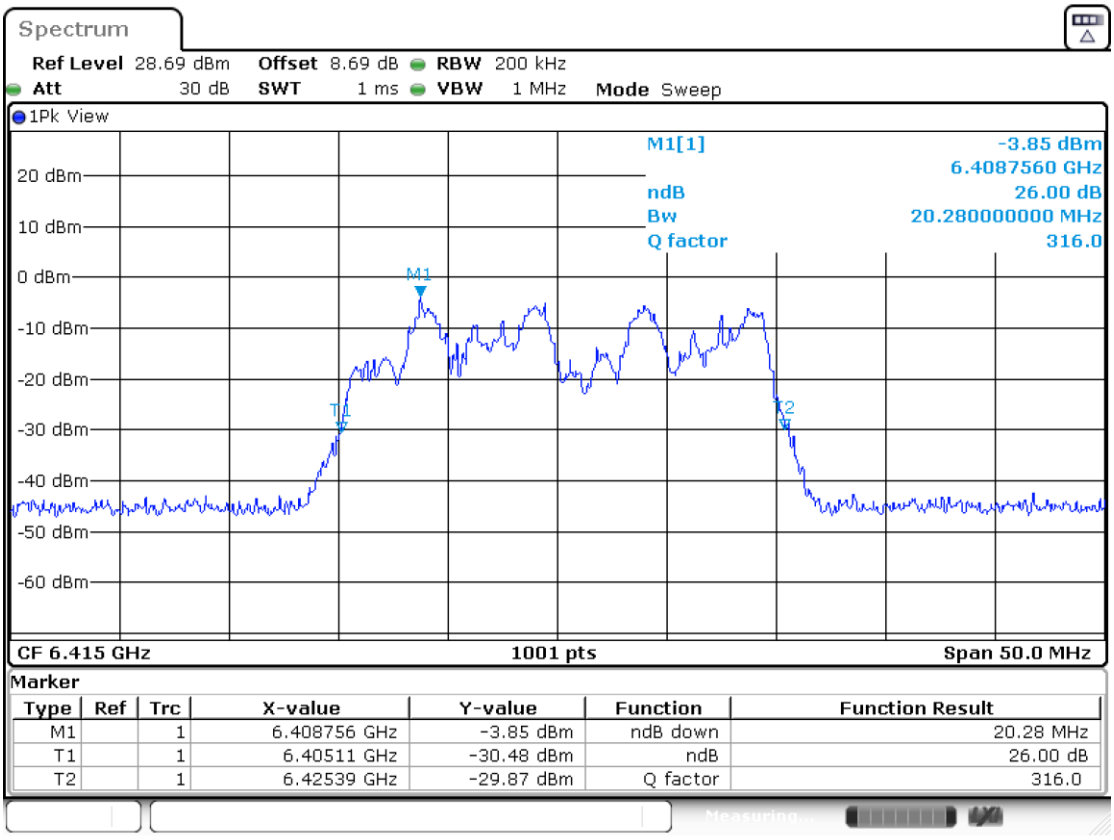

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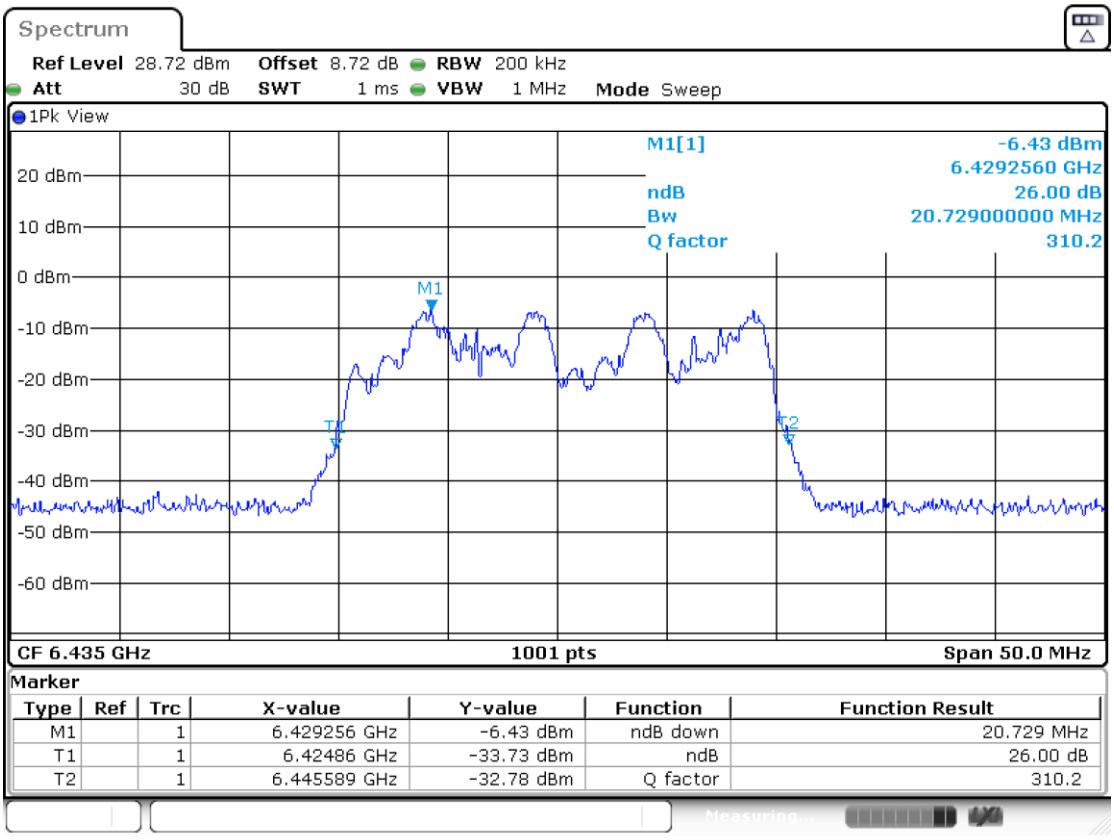

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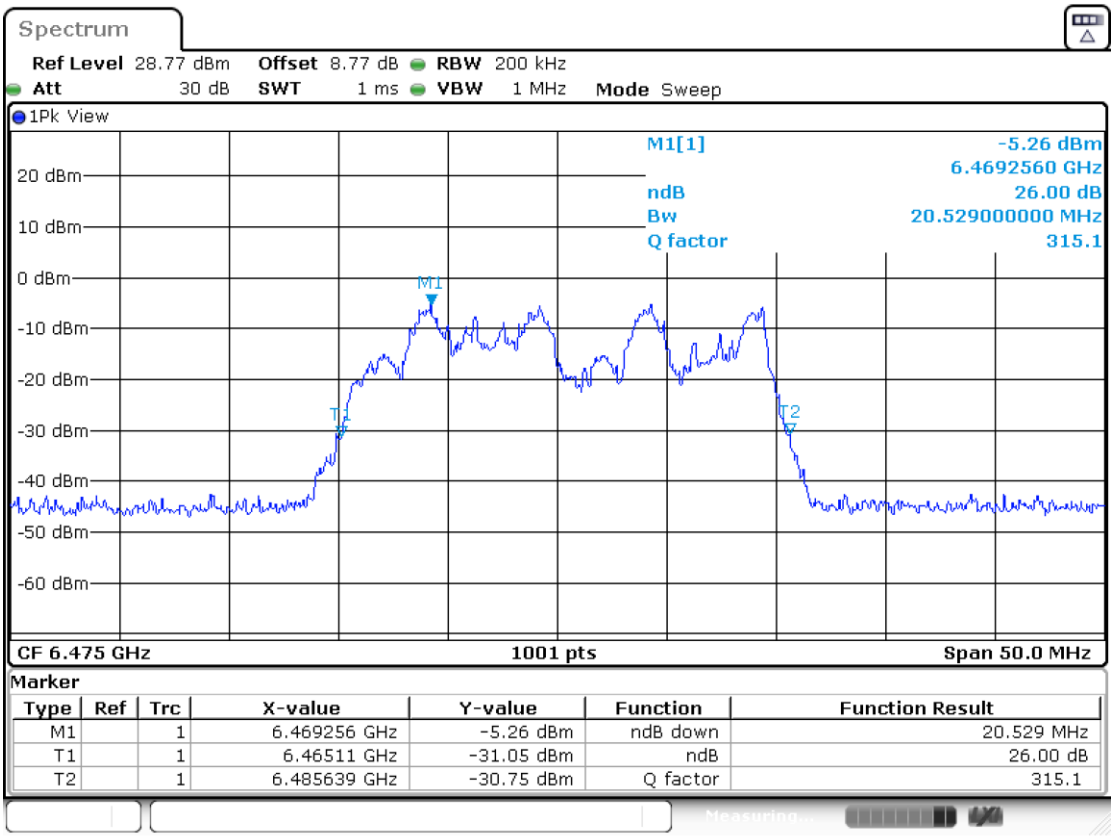

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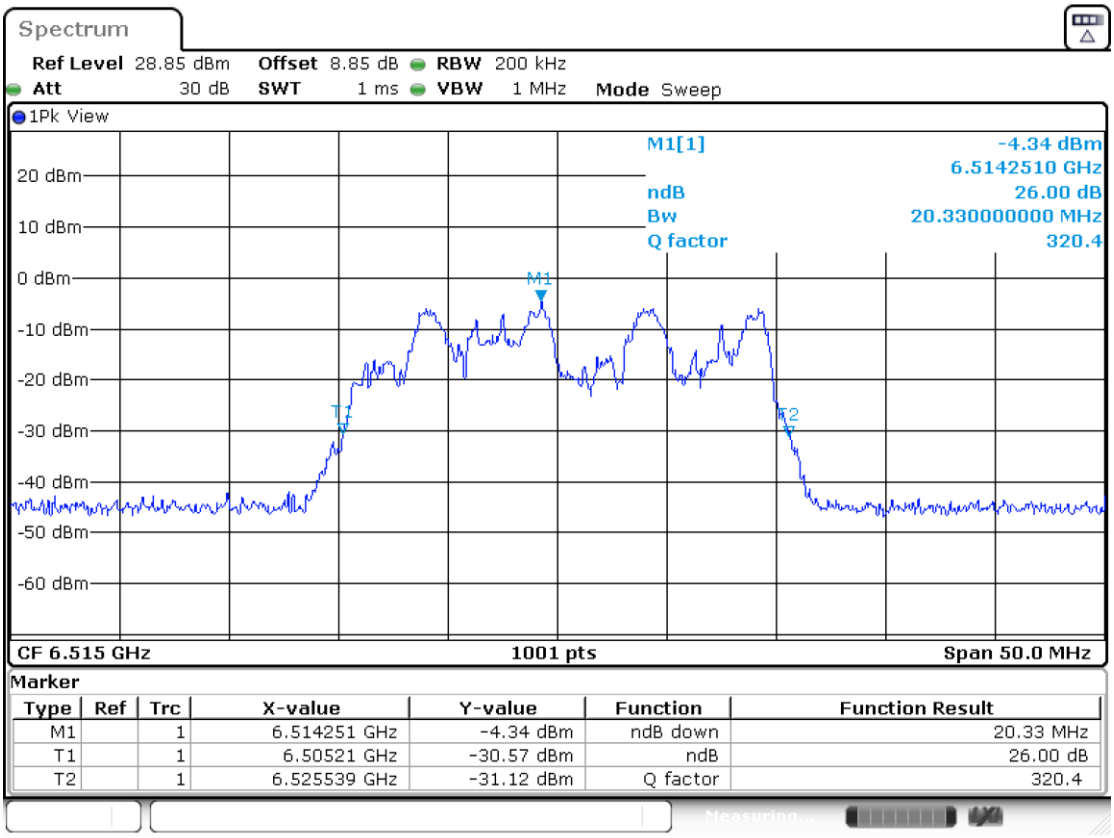

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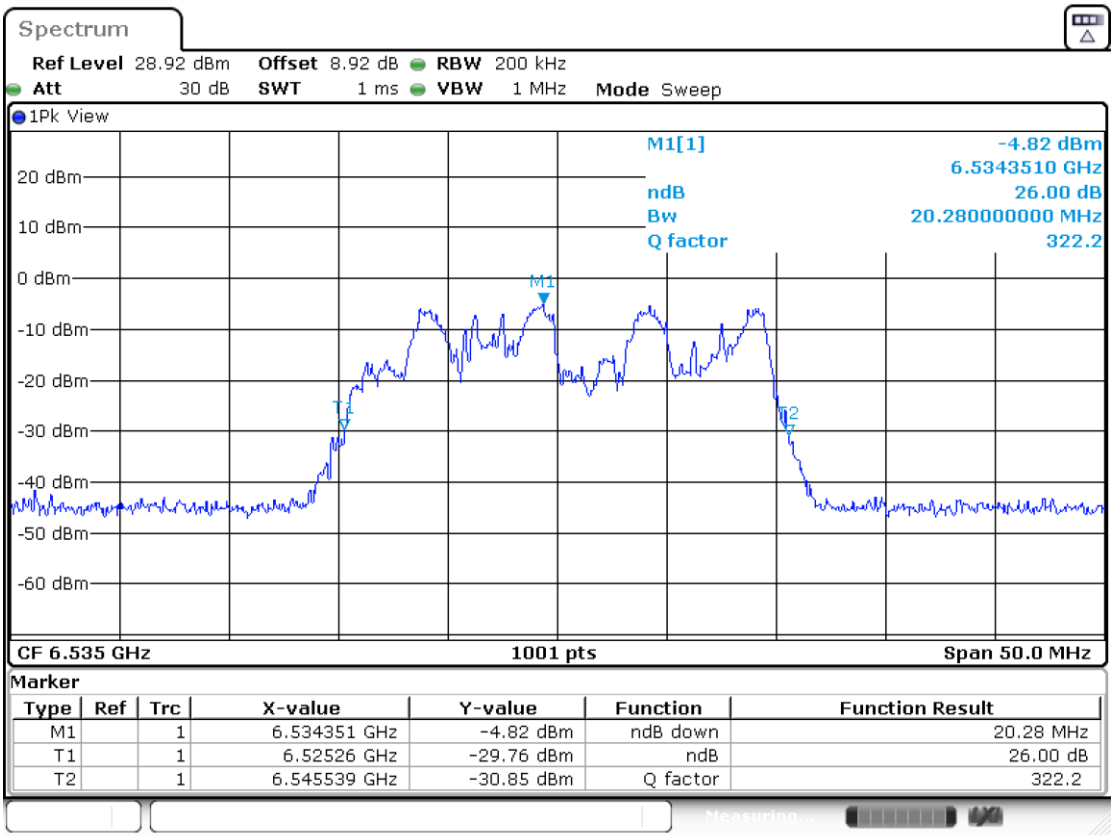

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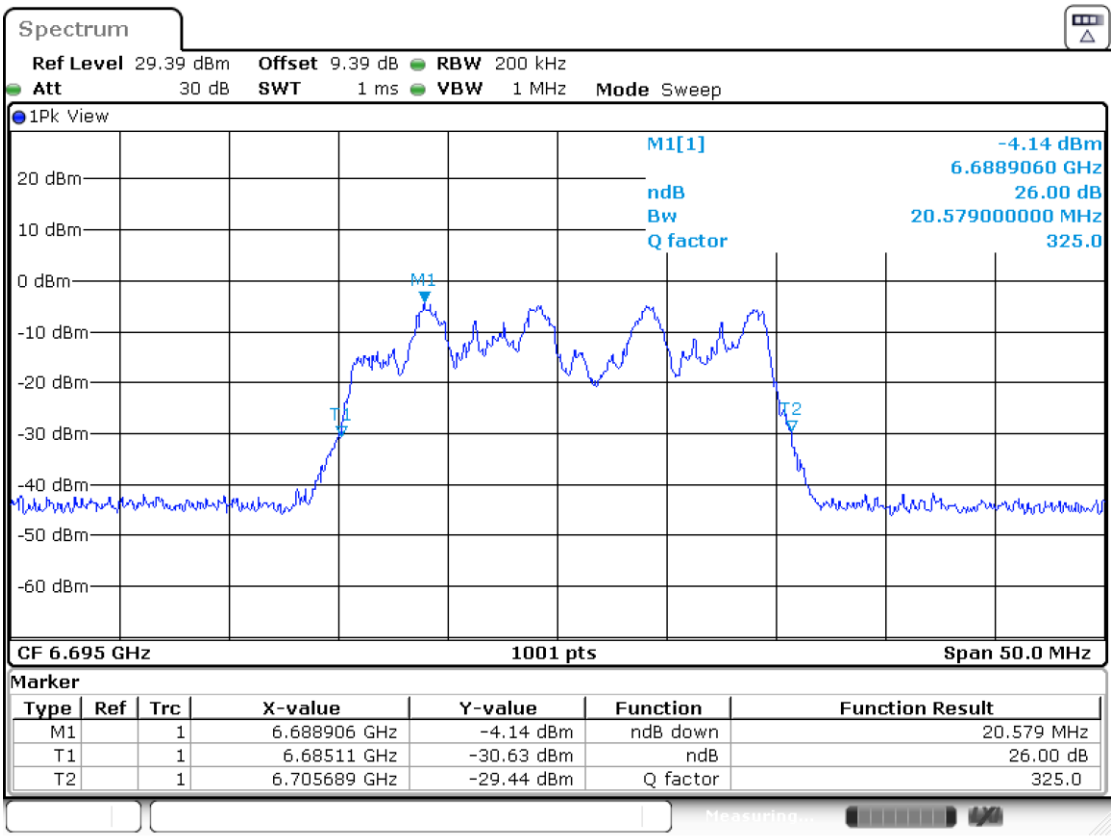

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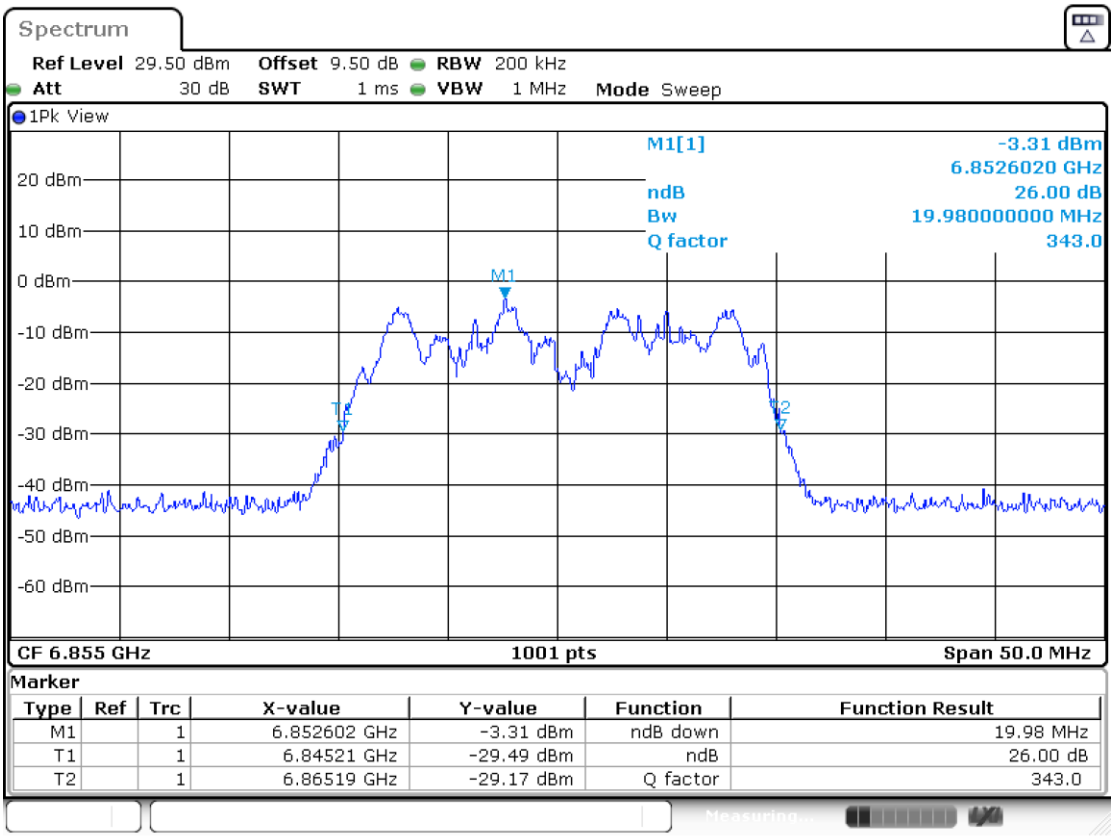

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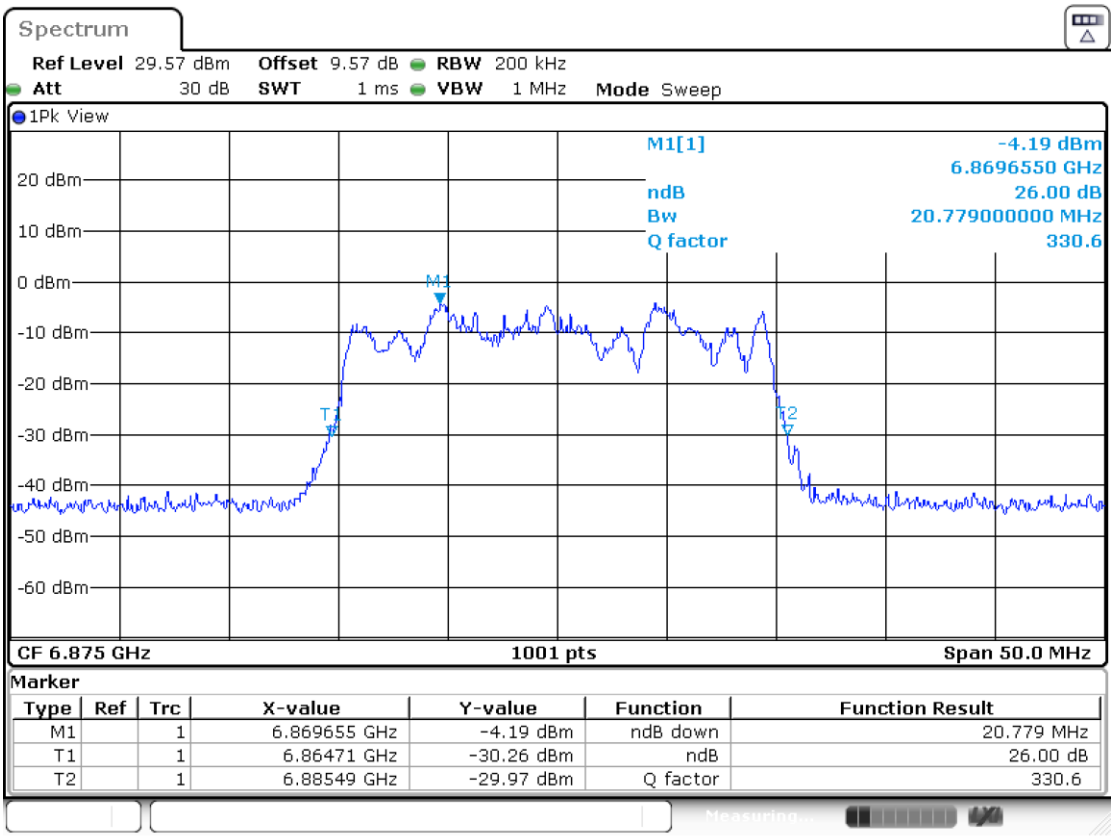

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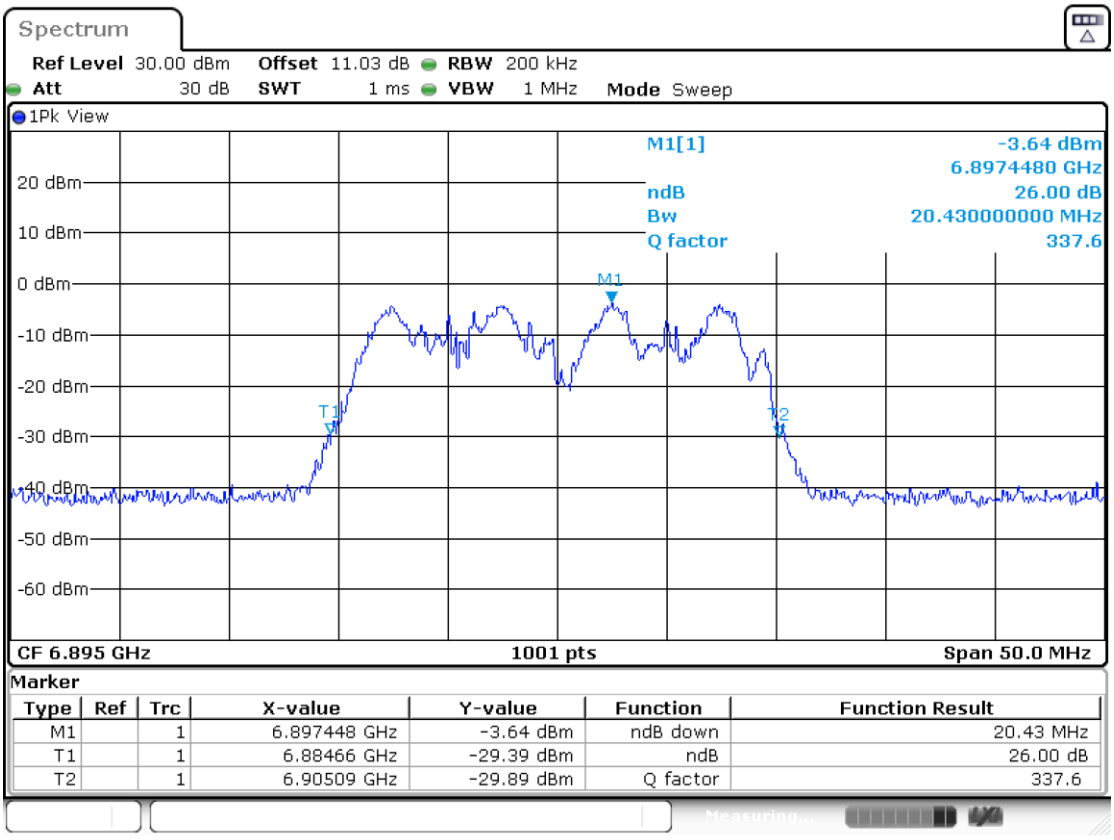

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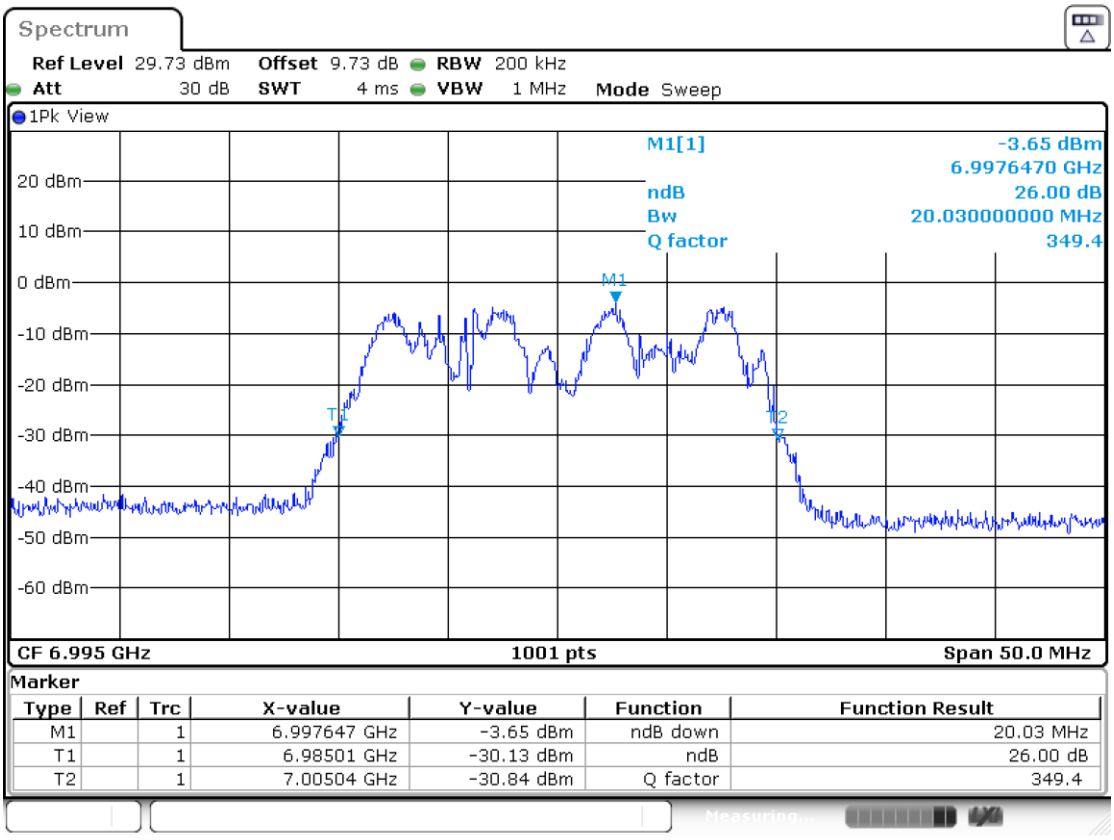

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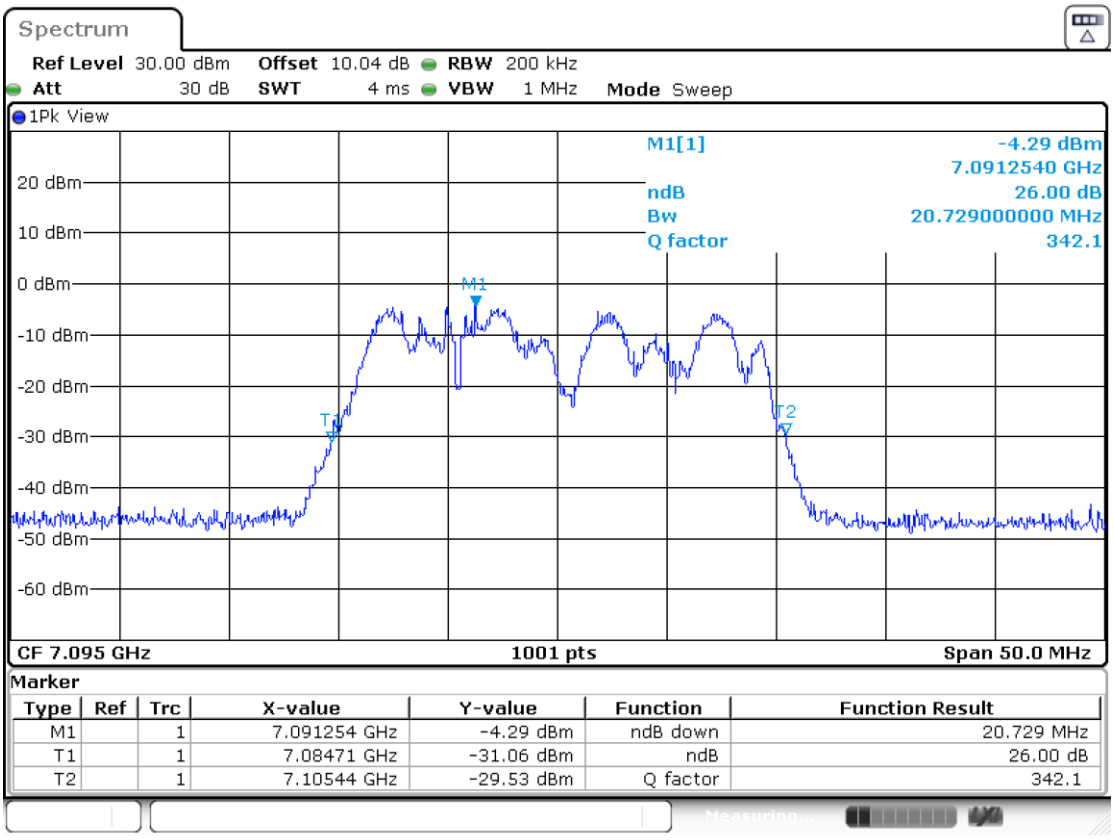

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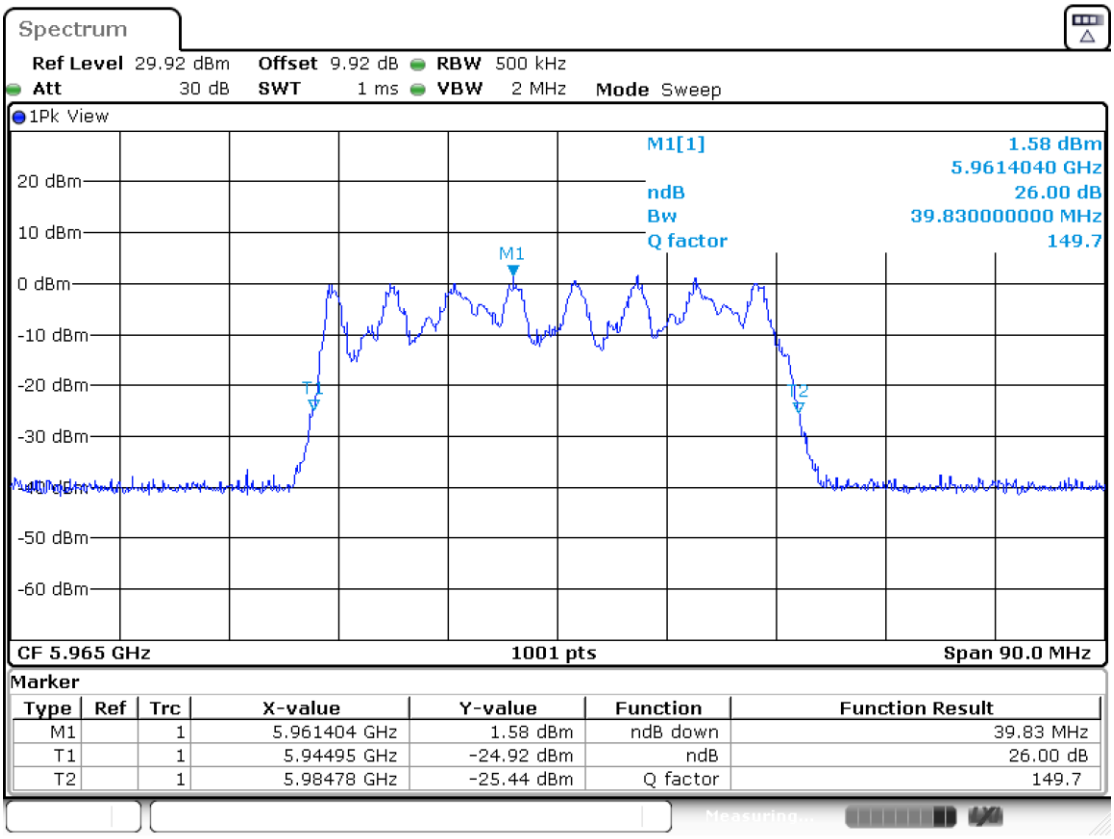

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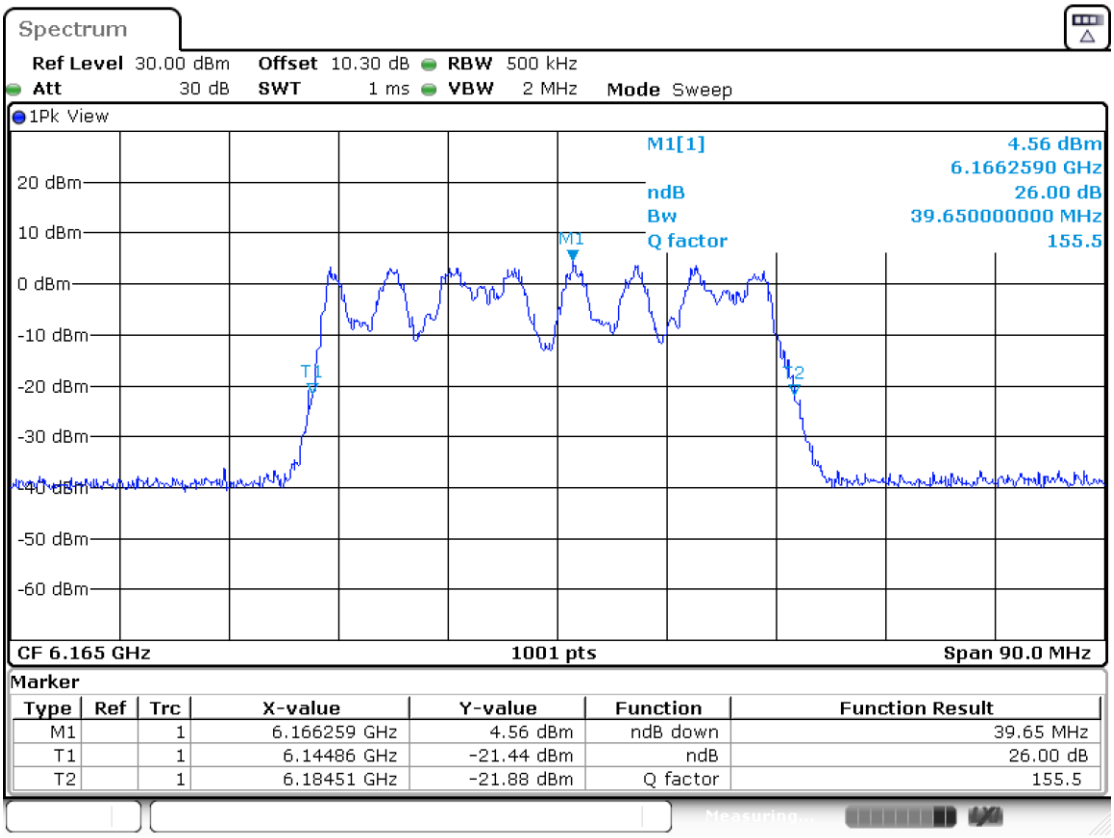

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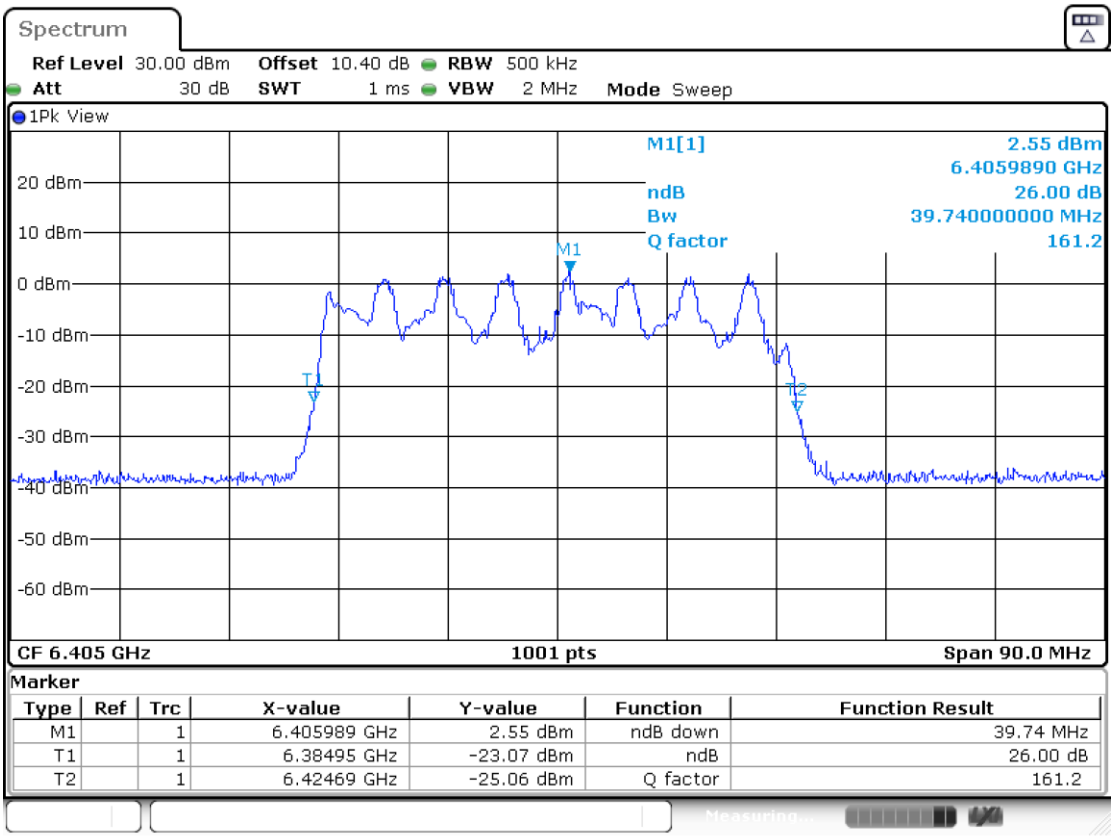

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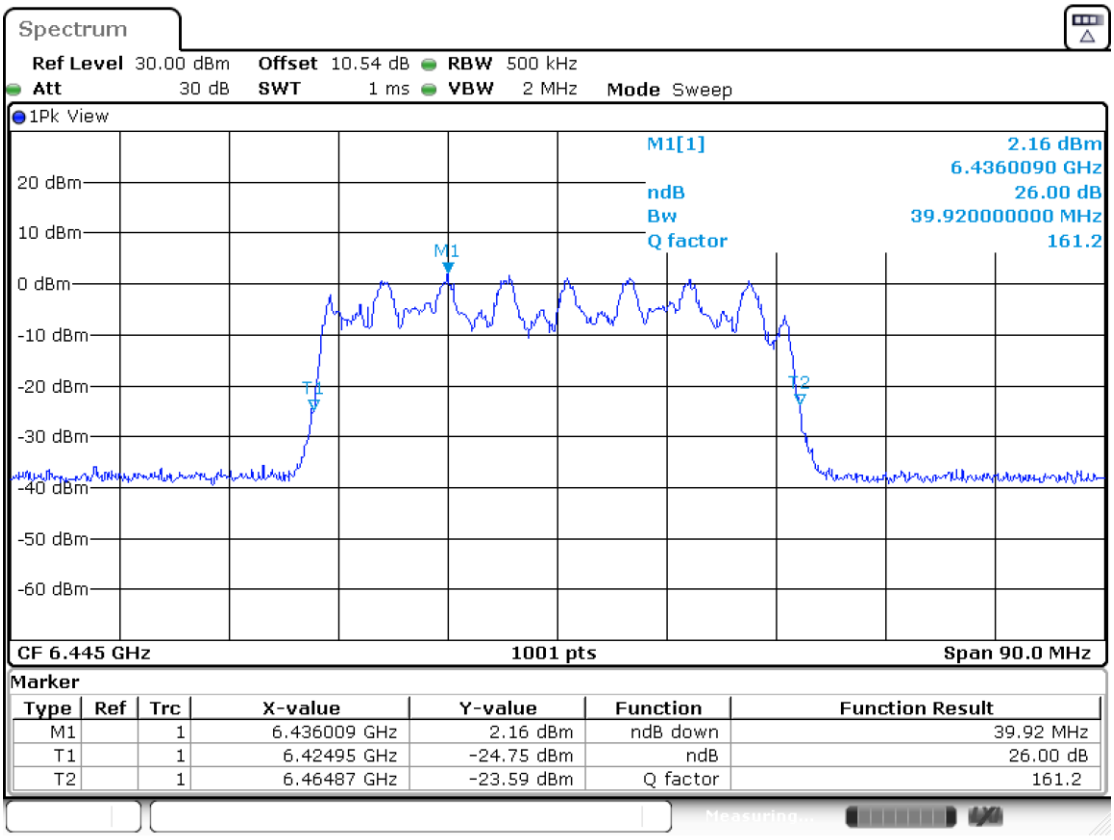

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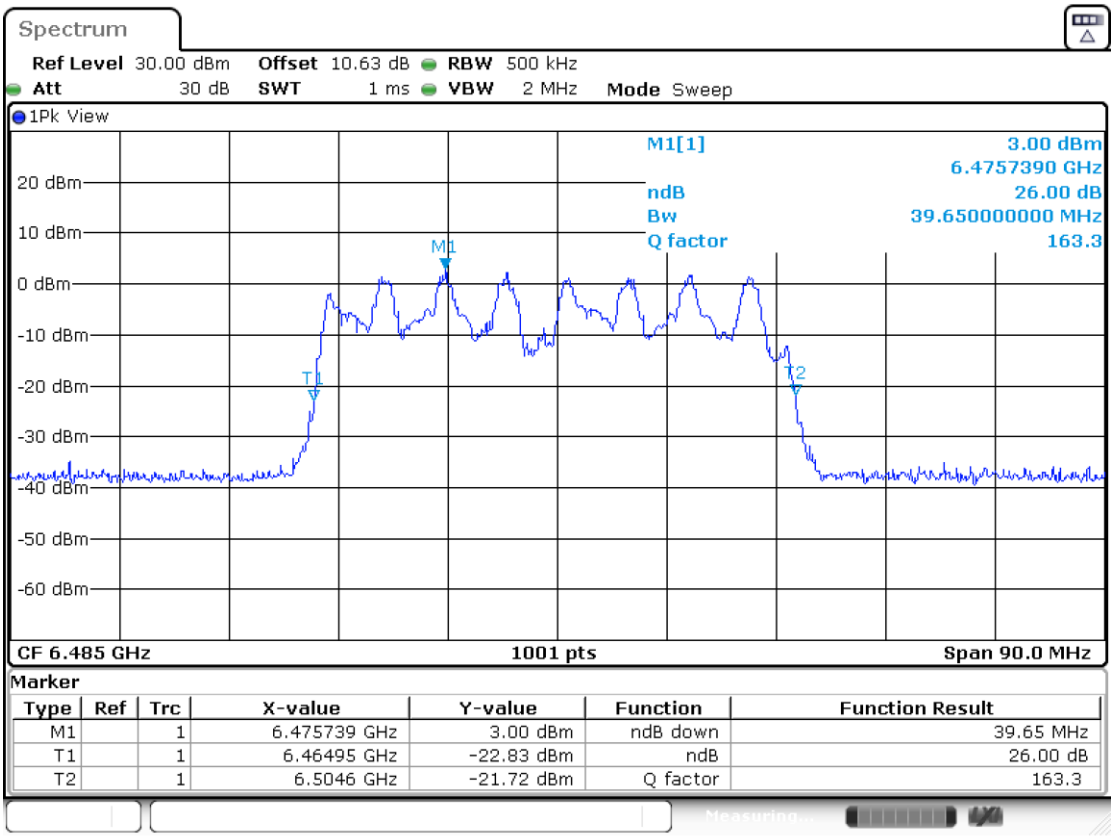

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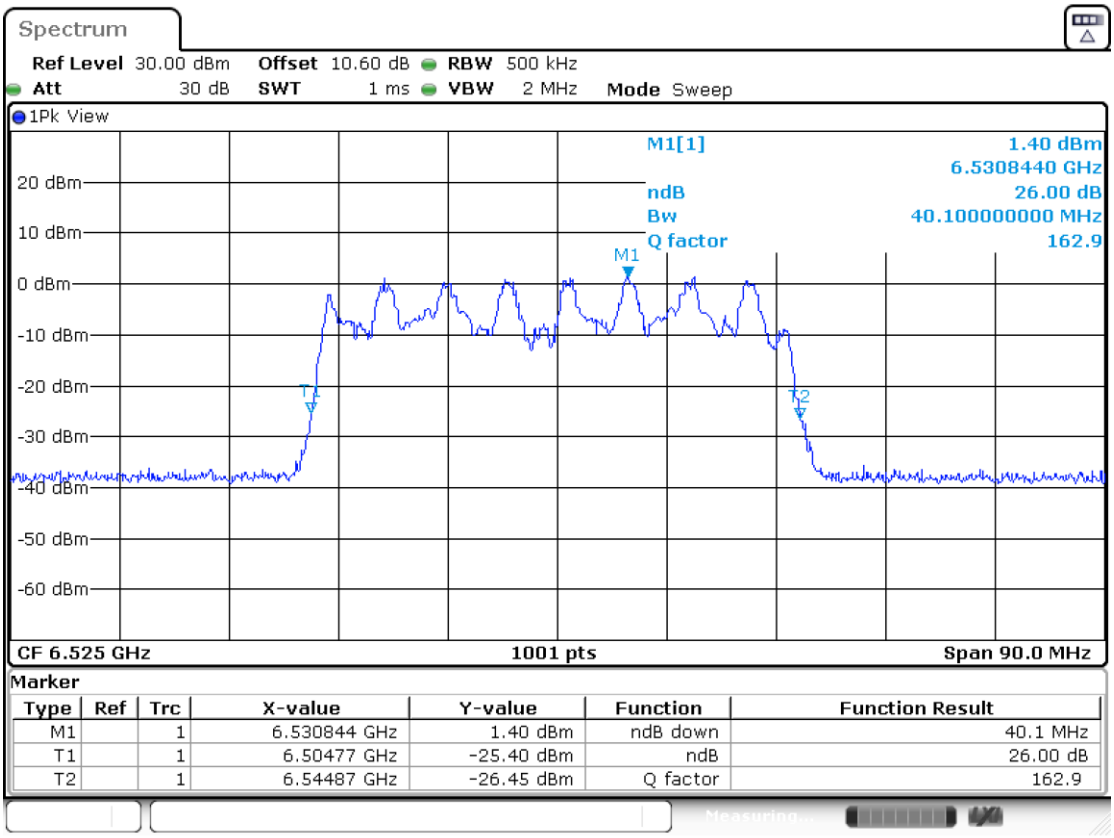

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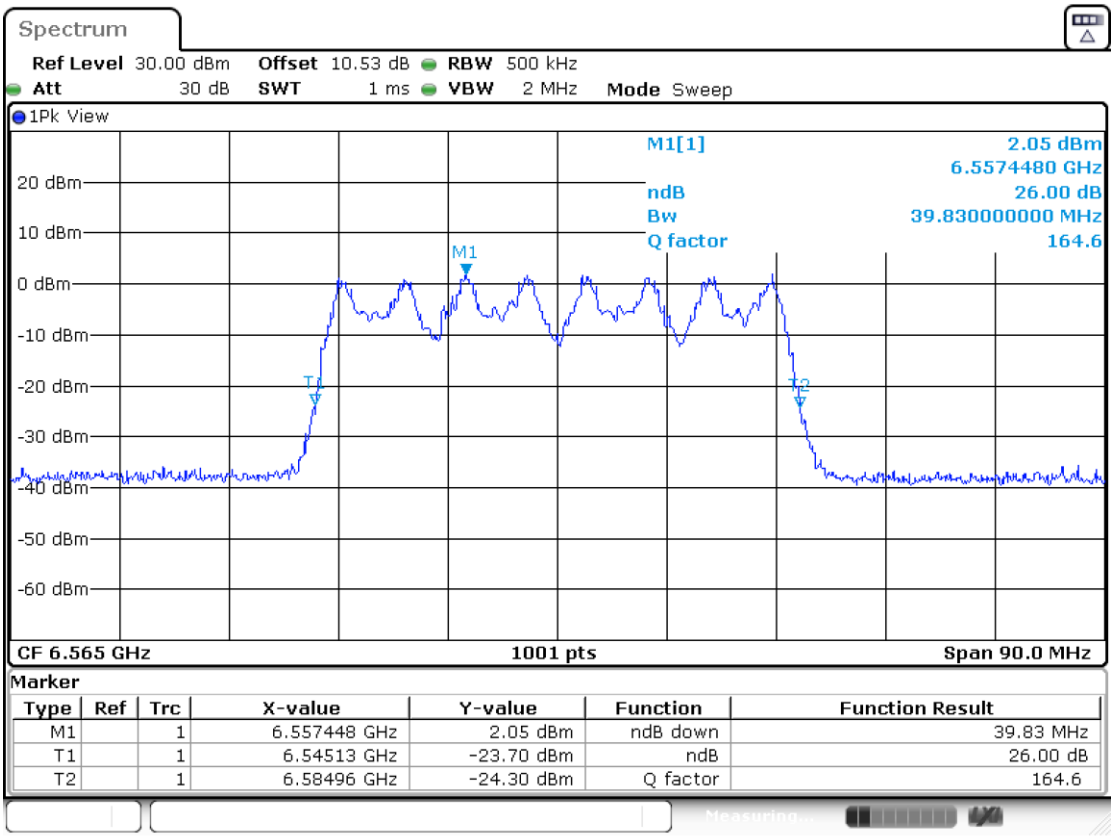

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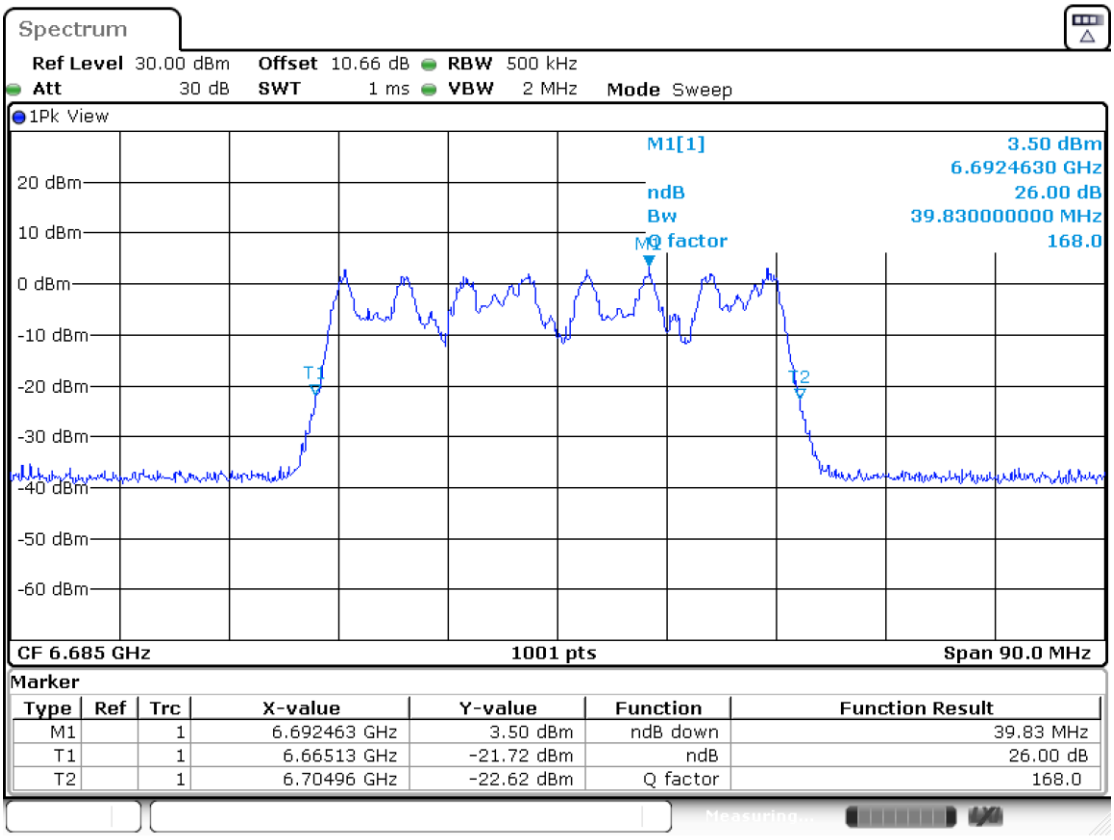

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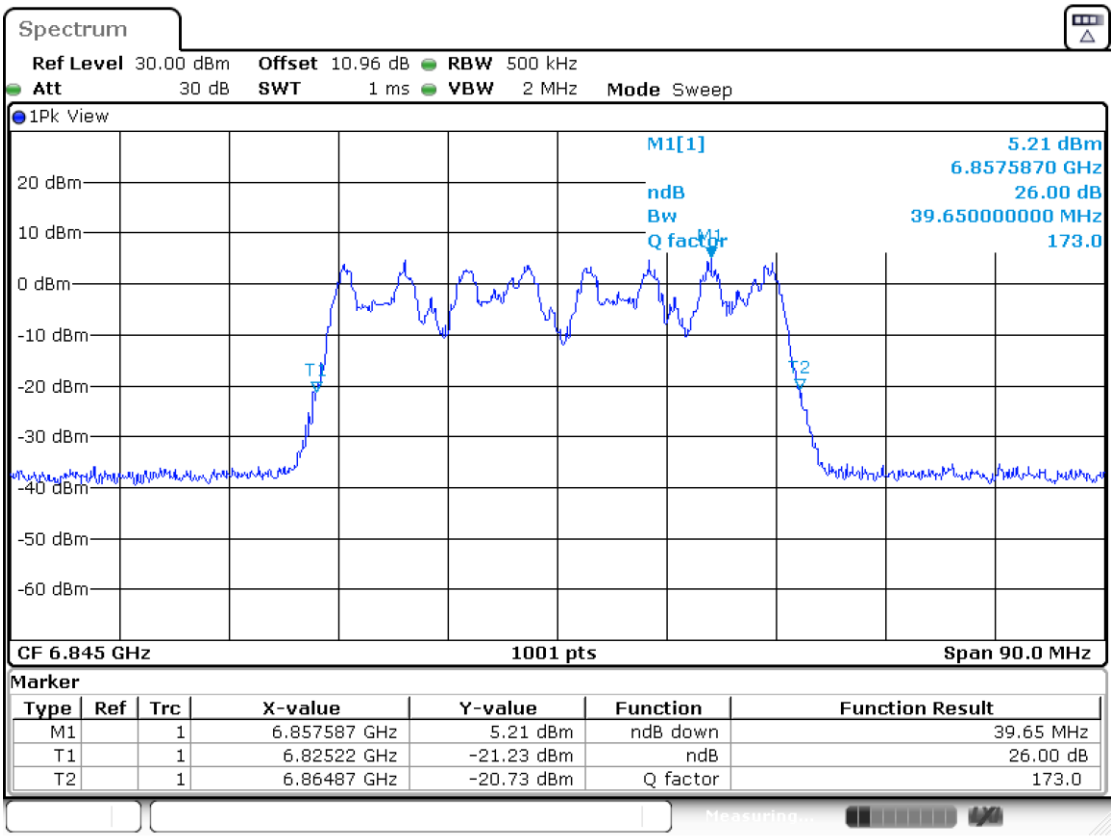

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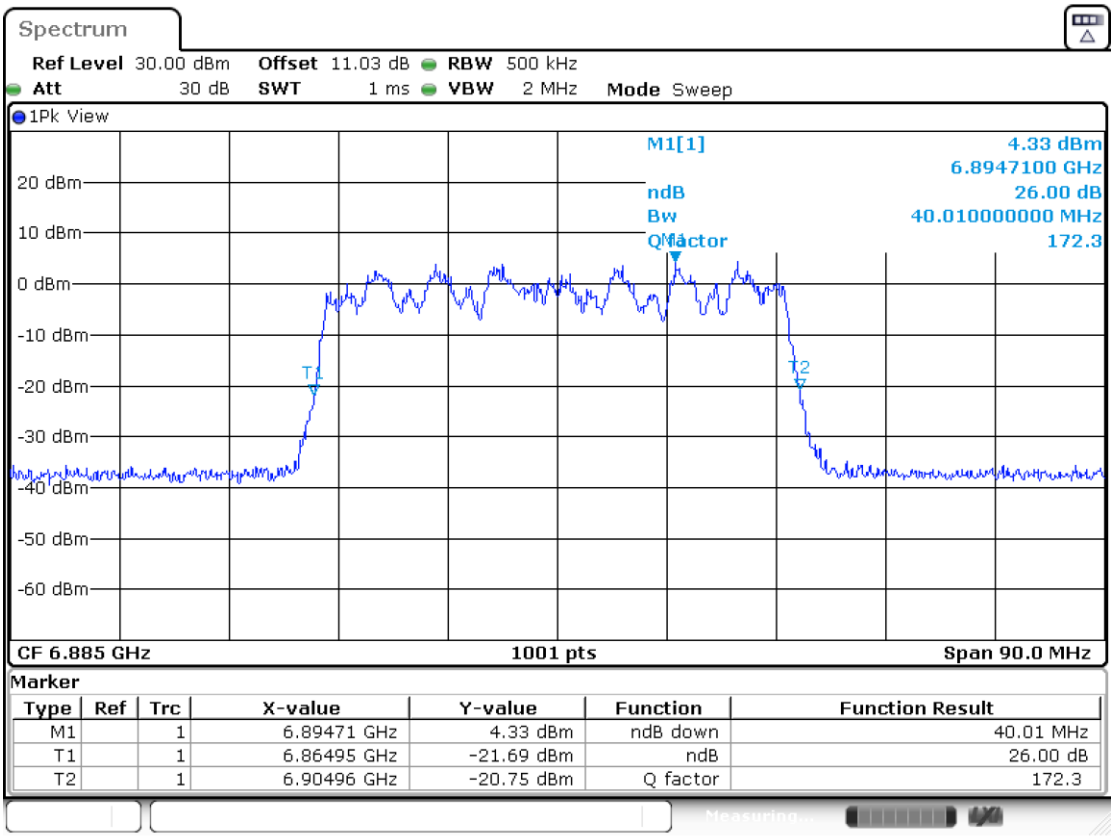

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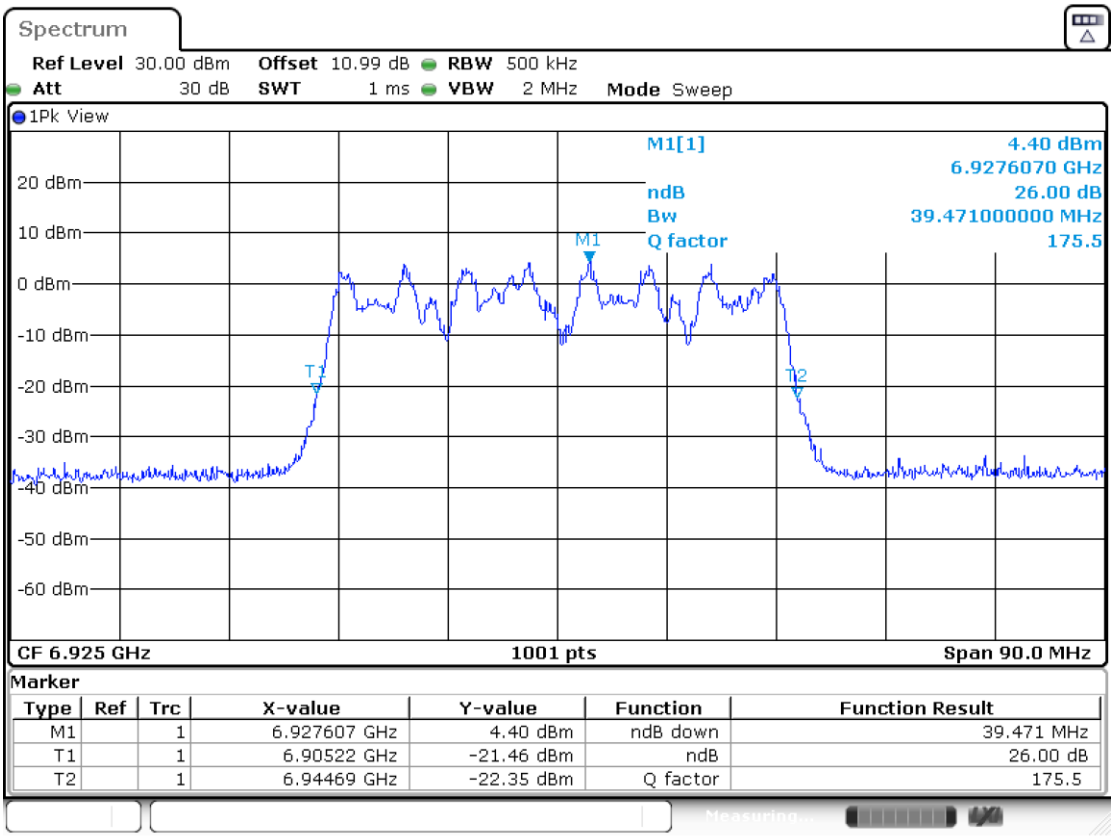

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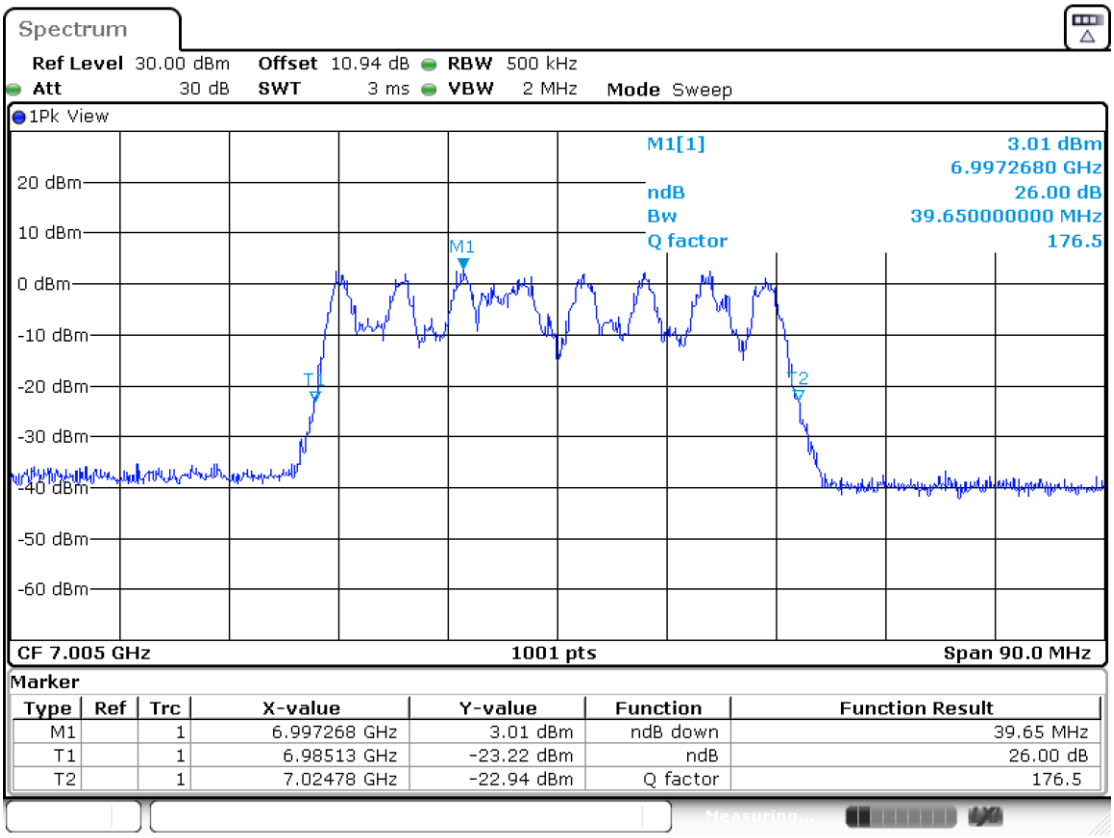

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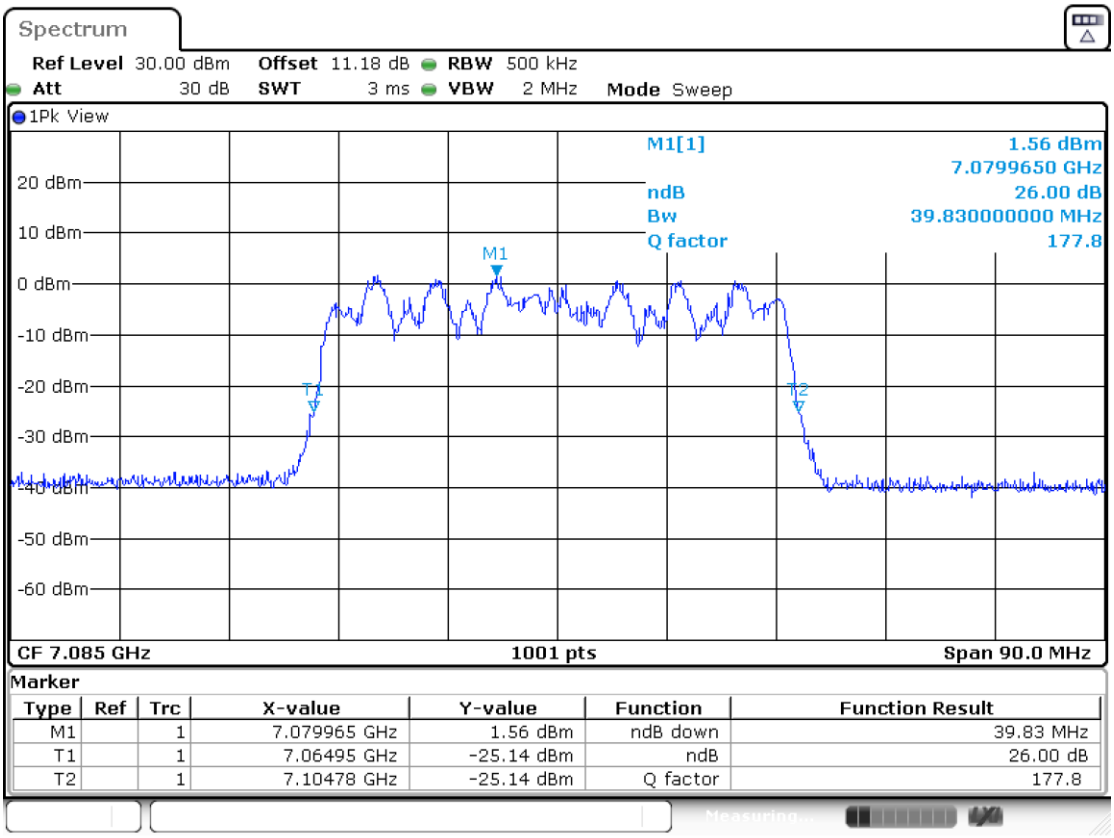

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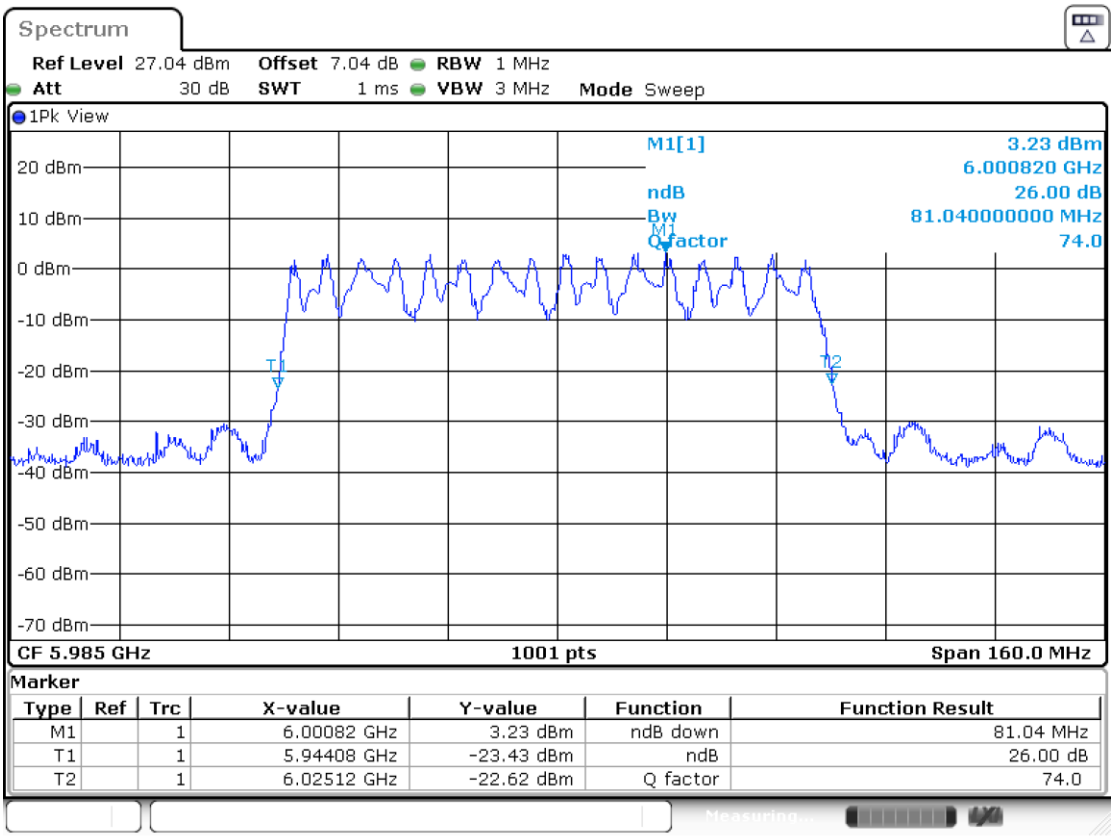

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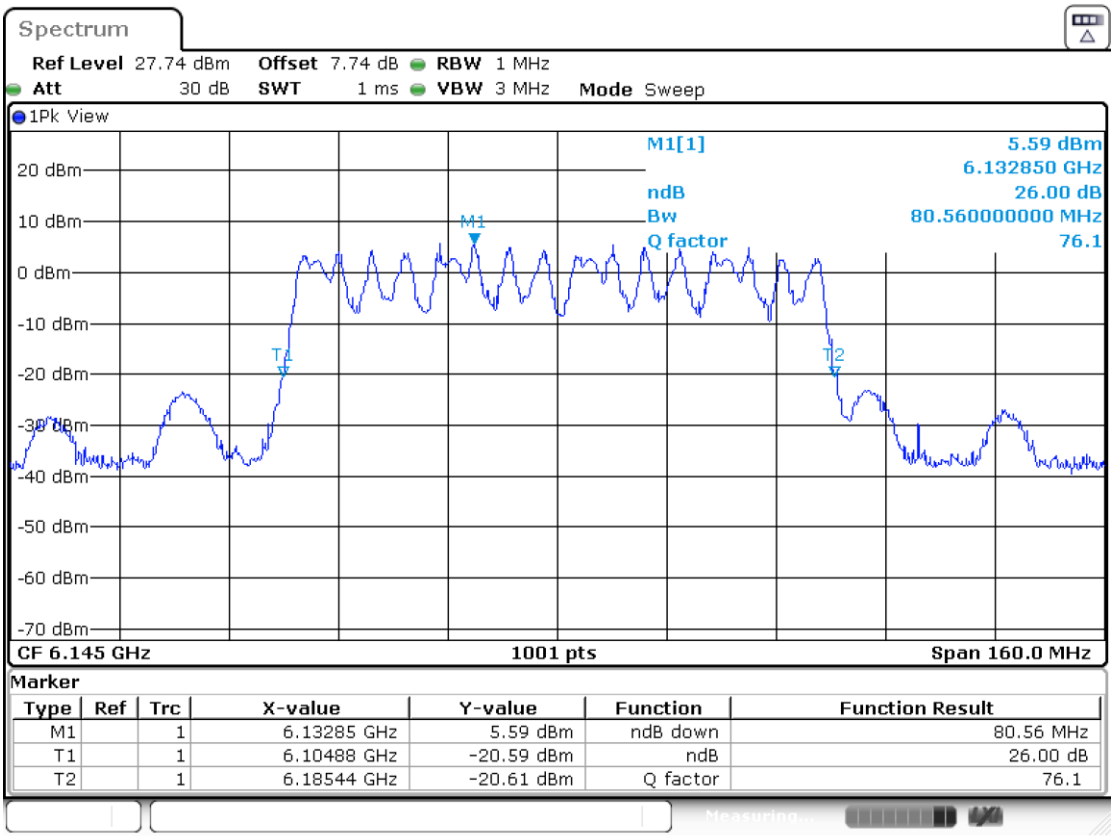

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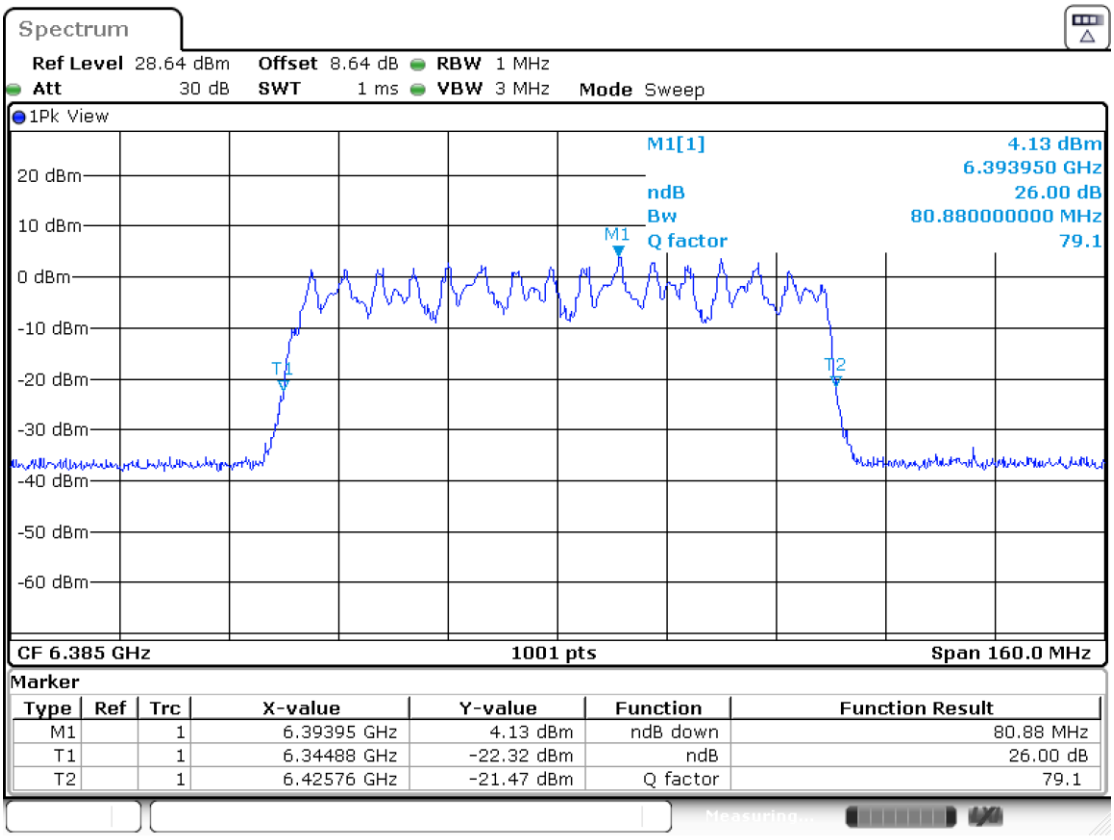

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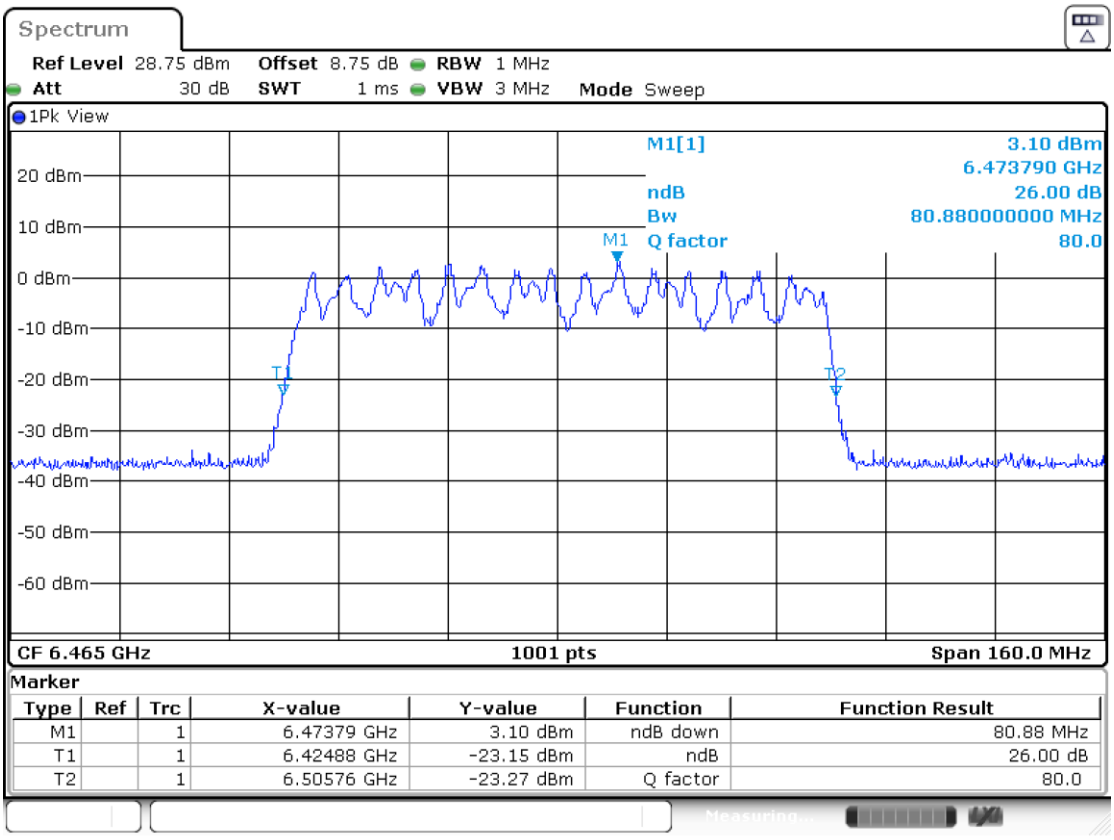

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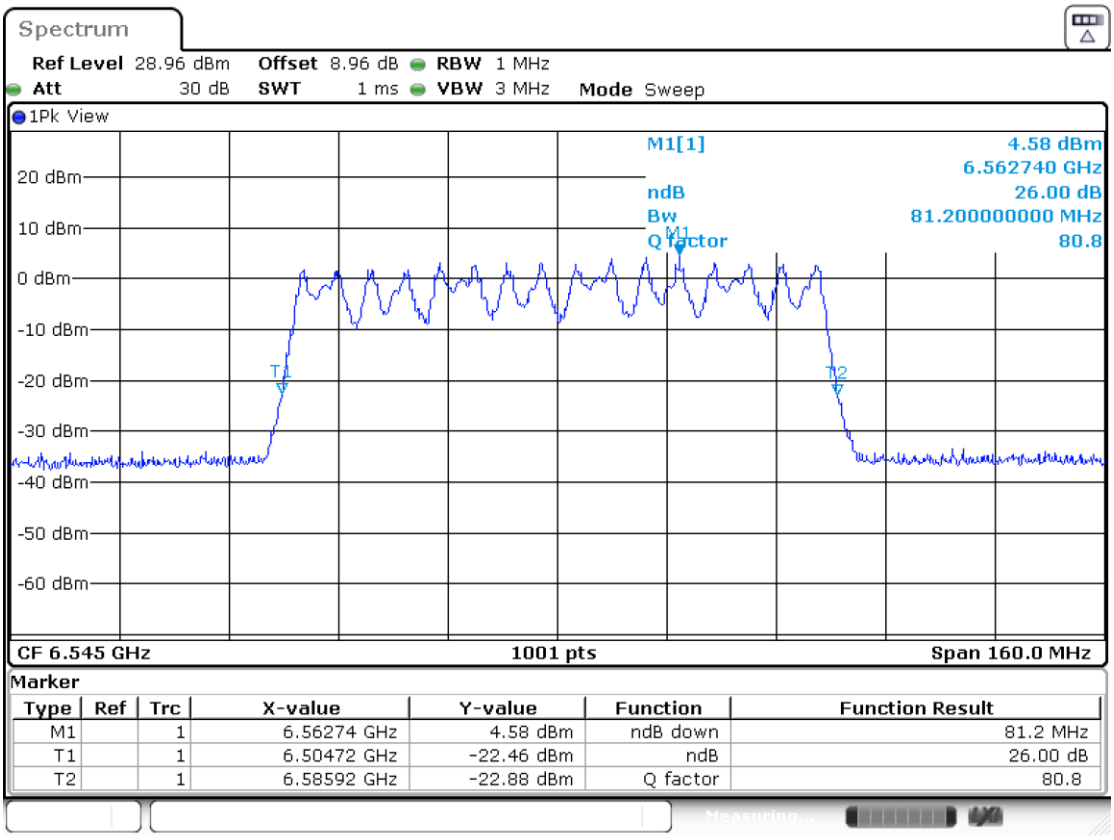

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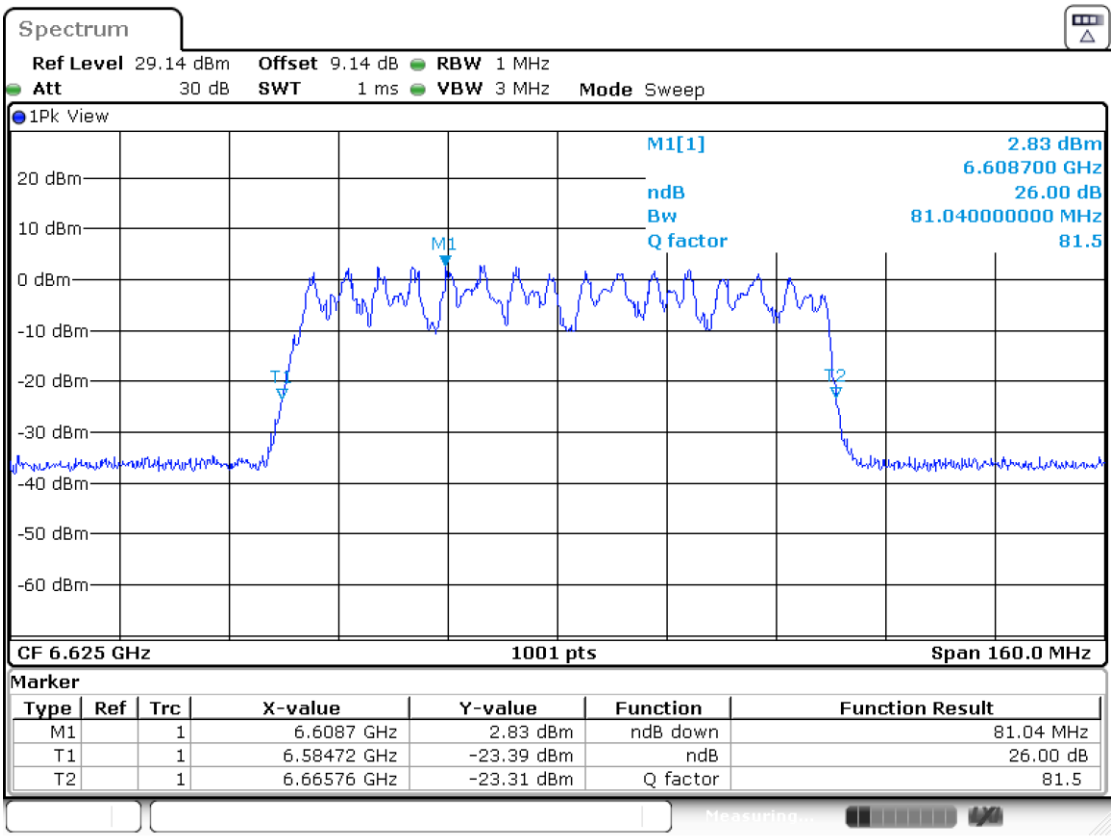

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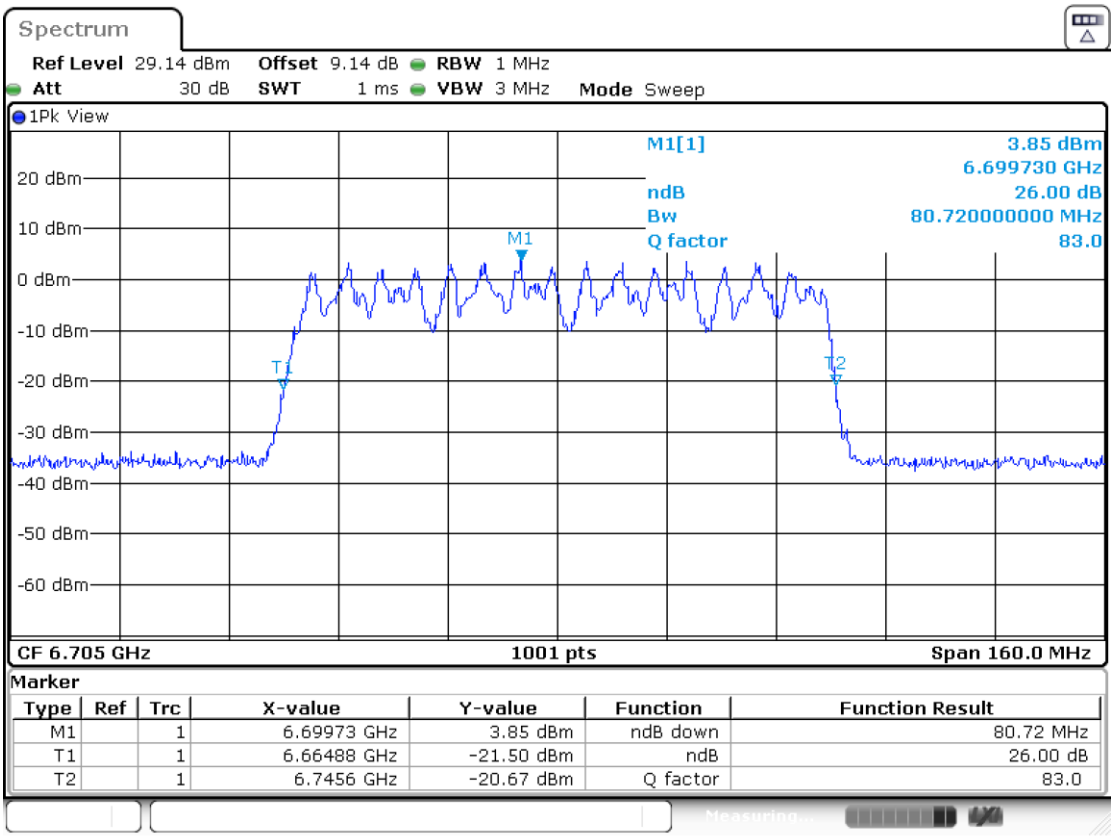

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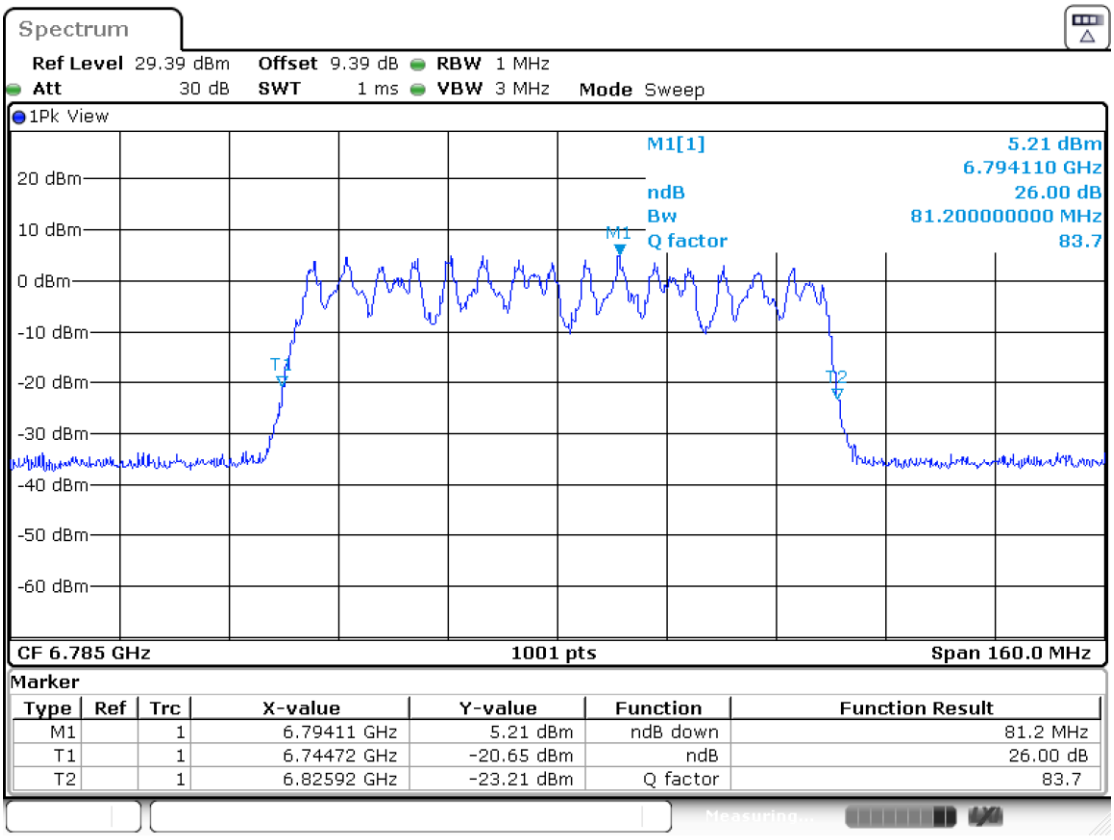

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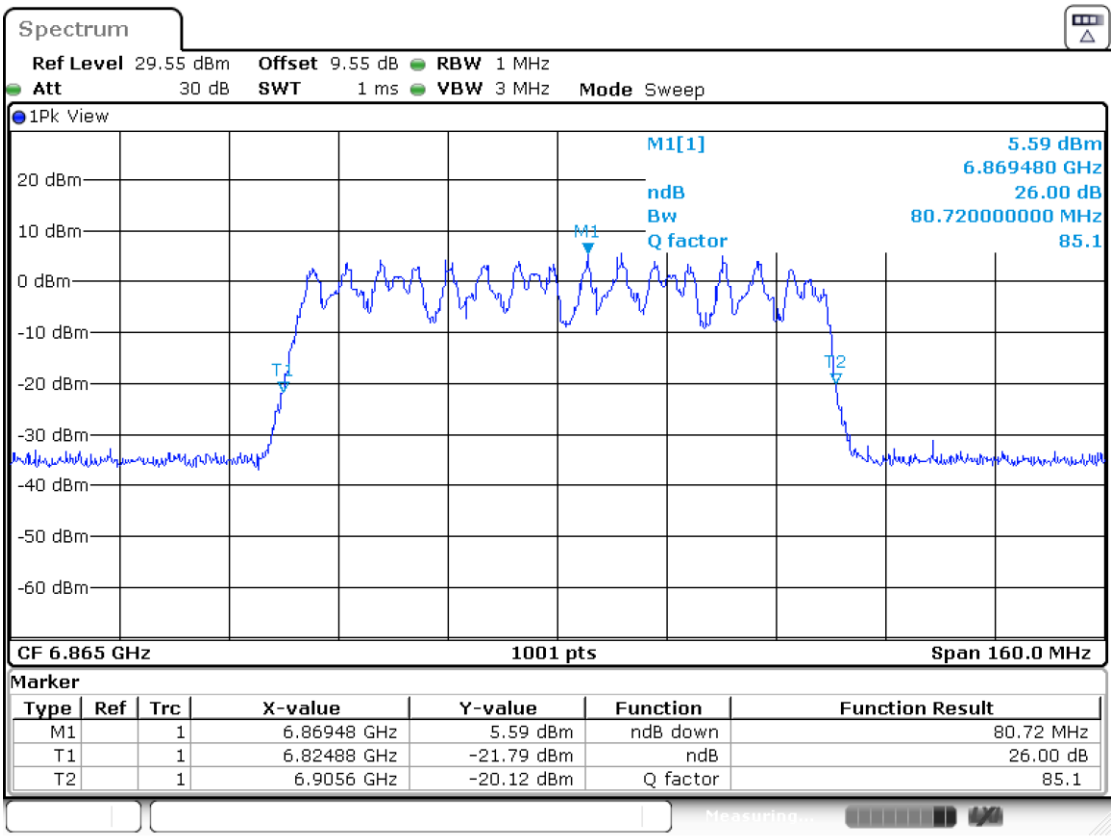

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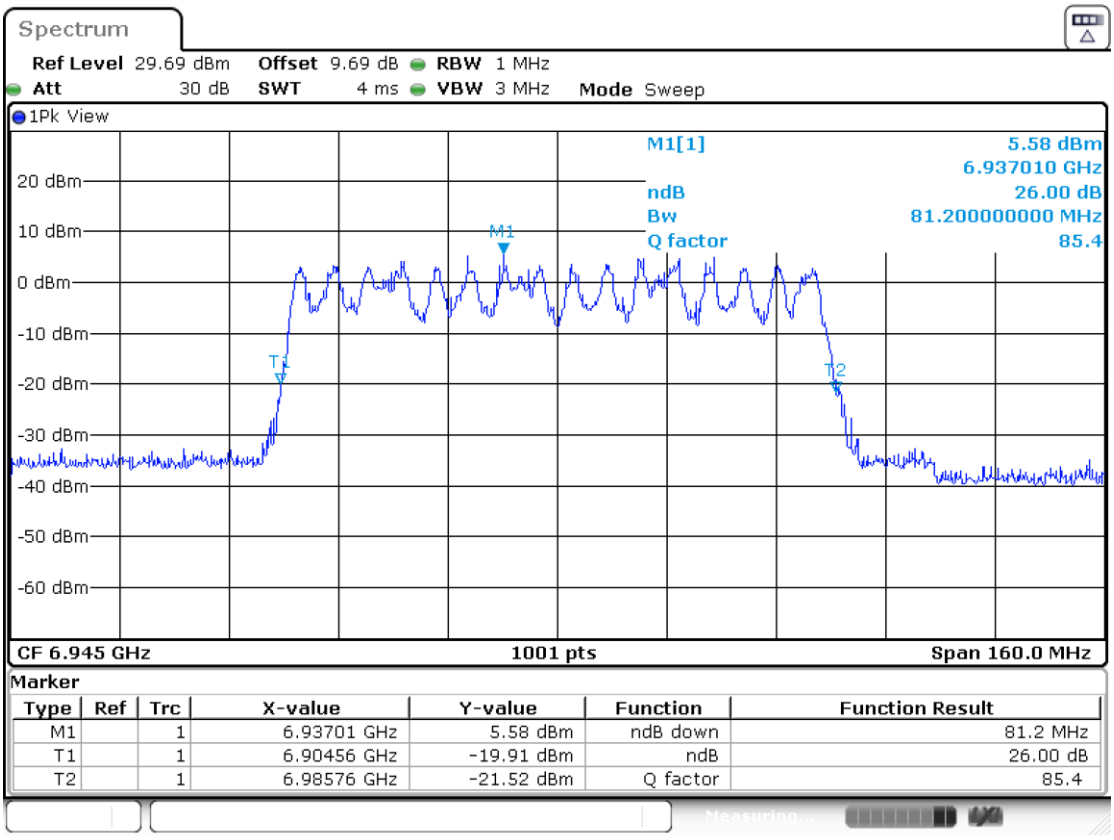

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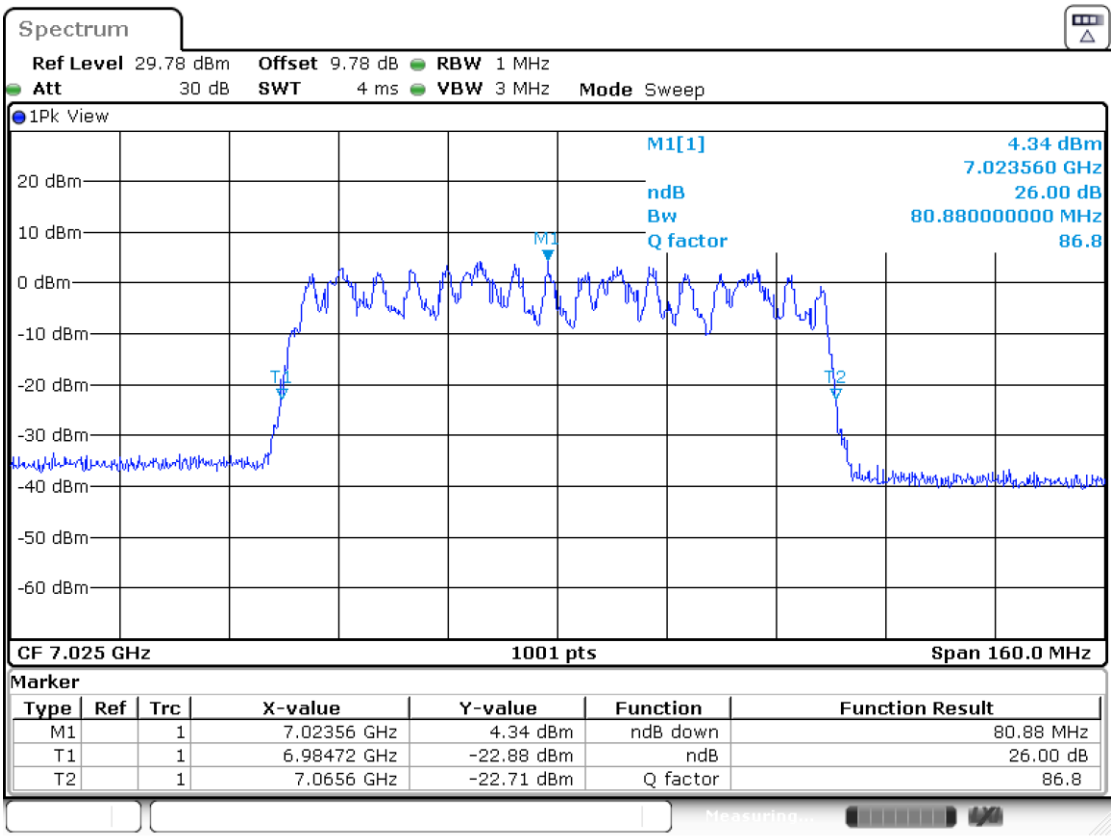

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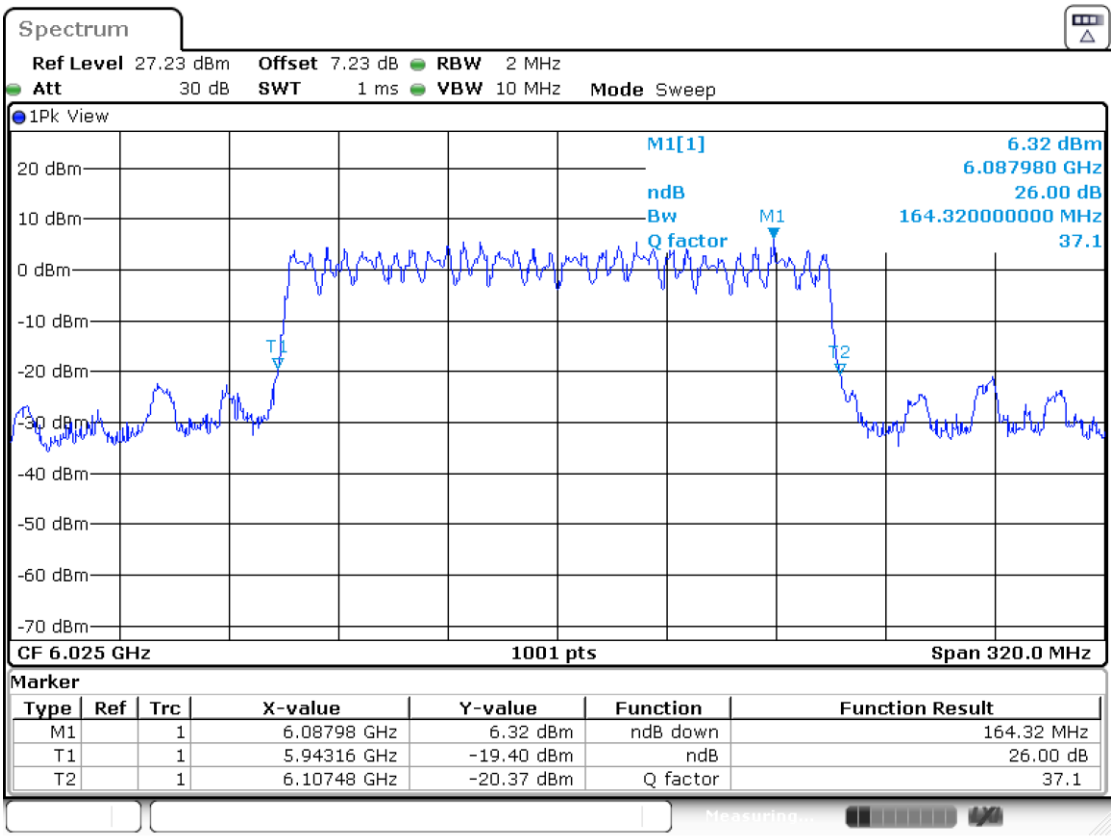

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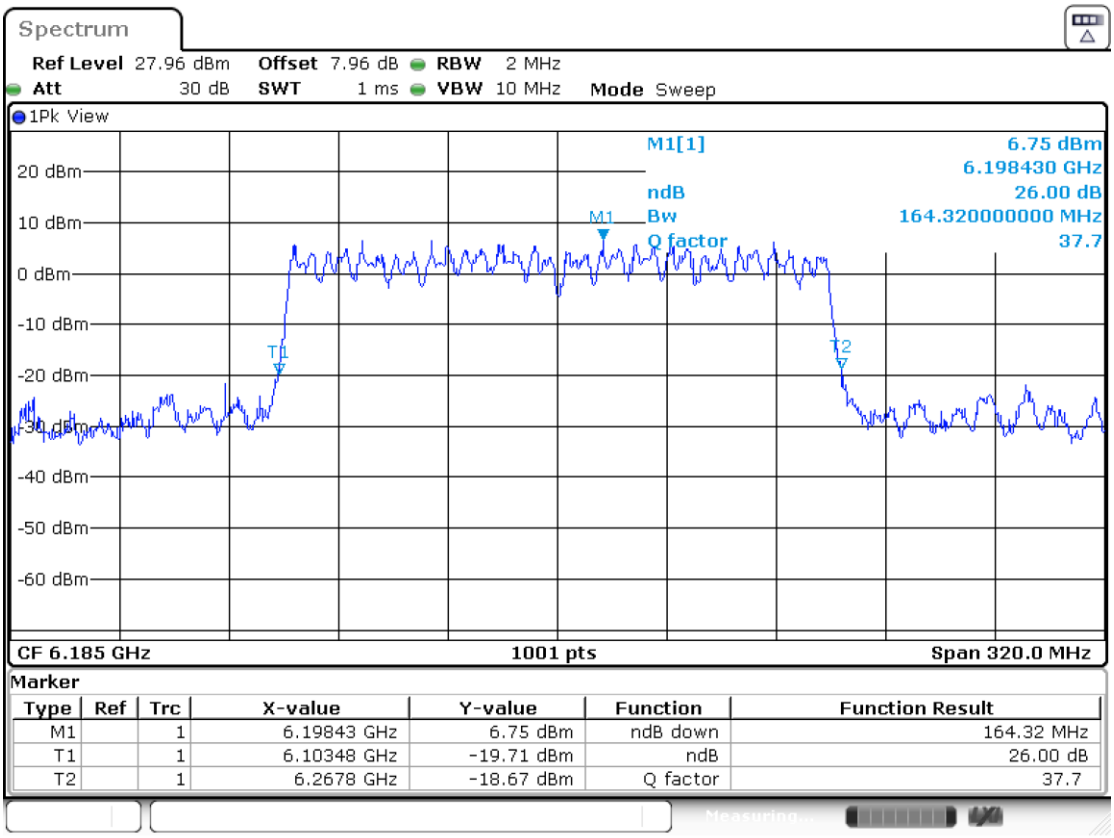

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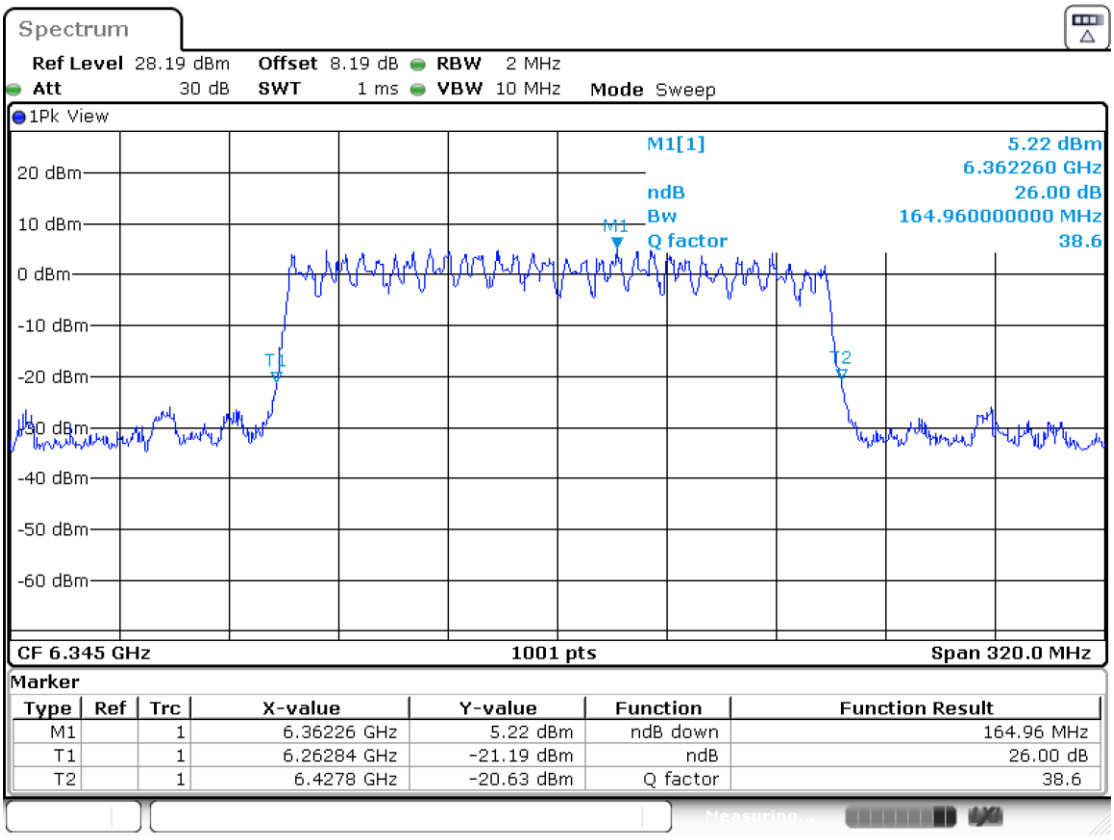

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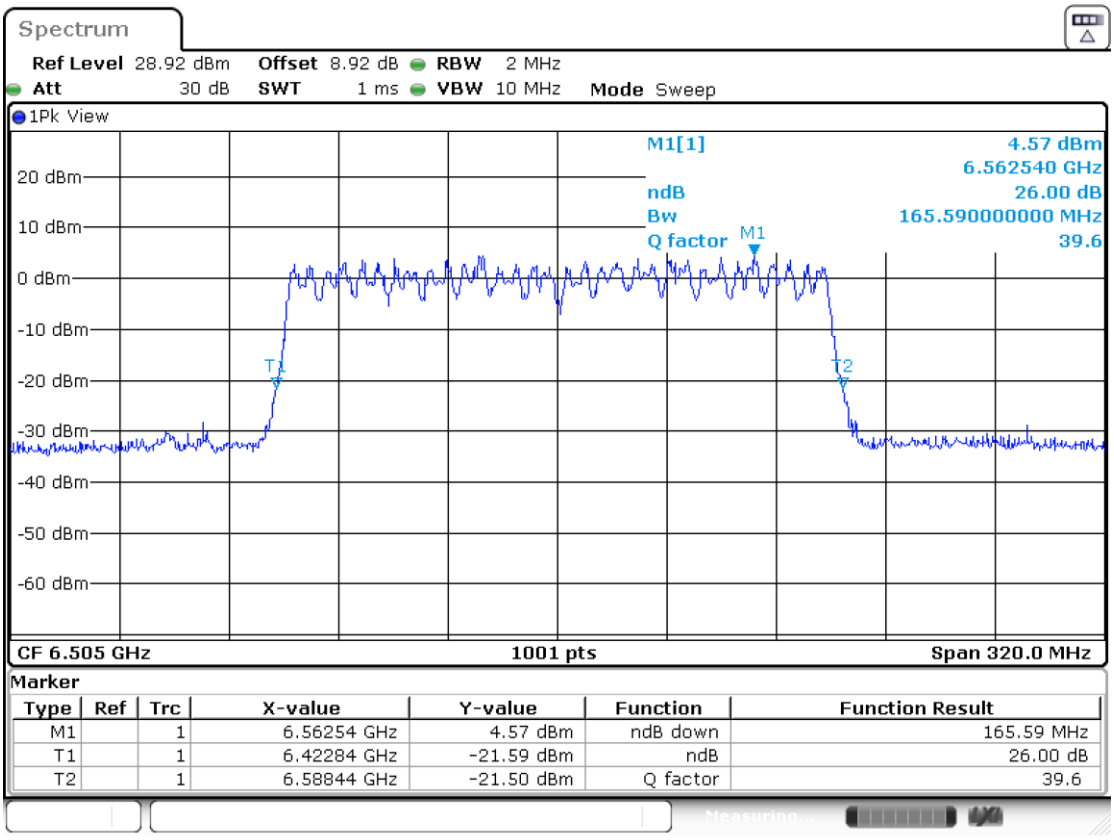

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