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TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR22-SRF0177 Page (1) of (171)	eurofins KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2022-09-05

2. Use of Report : Certification

3. Name of Product / Model : Notebook PC / NP345XNA

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID : A3LNP345XNA

6. Date of Test : 2022-09-15 to 2022-10-26

7. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test method used : FCC Part 15 Subpart C, 15.247
RSS-247 Issue 2 February 2017
RSS-Gen Issue 5 February 2021

9. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Kwonse Kim (Signature)	Technical Manager Name : Seungyong Kim (Signature)

2022-10-28

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2022-10-28	Originally issued	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Factory	:	SAMSUNG ELECTRONICS VIETNAM CO.,LTD.(SEV)
Address	:	Khu Cong nghiep Ten Phong 1, Yen Trung, Yen Phong, Bac Ning, Vietnam
Laboratory	:	Eurofins KCTL Co.,Ltd.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Notebook PC		
Model	:	NP345XNA		
Modulation technique	:	WIFI(802.11b/g/n/ac/ax)	:	DSSS, OFDM, OFDMA
Number of channels	:	13 ch (20 ㎒)		
Power source	:	DC 7.72 V		
Antenna specification	:	Antenna 1	:	FPCB Antenna
		Antenna 2	:	FPCB Antenna
Antenna gain	:	Antenna 1	:	-3.12 dBi
		Antenna 2	:	-3.04 dBi
Frequency range	:	2 412 ㎒ ~ 2 472 ㎒		(802.11b/g/n/ac/ax_HT20/VHT20/HE20)
Software version	:	NP345XNA.001		
Hardware version	:	REV0.3		
Test device serial No.	:	Conducted	:	KCUQ930T9006402
		Radiated	:	KCUQ930T900637M
Operation temperature	:	-20 ℃ ~ 60 ℃		

2.1. Frequency/channel operations

This device contains the following capabilities:
WLAN (11a/b/g/n/ac/ax), Bluetooth (BDR/EDR/BLE), NR N5/66, LTE B2/4/5/12/13/17/26/41/66, WCDMA 850/1700/1900

Ch.	Frequency (㎒)
01	2 412
..	..
06	2 437
..	..
11	2 462
12	2 467
13	2 472

Table 2.1-1. 802.11ax HE20 mode

2.2. Simultaneous Tx Condition

The device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the Bluetooth, 2.4 ㎓, 5 ㎓, or 6 ㎓ bands simultaneously on each antenna.

Simultaneous Tx condition – not RSDB

Mode	# of TX	WLAN 6 ㎓		WLAN 5 ㎓		WLAN 2.4 ㎓		Bluetooth	Report
		ANT 1	ANT 2	ANT 1	ANT 2	ANT 1	ANT 2	ANT 1	
Bluetooth + WLAN	3	O	O	-	-	-	-	O	
	3	-	-	O	O	-	-	O	
	2	-	-	-	-	-	O	O	√

Notes.
Simultaneous condition was performed as a worst case which is configured as a combination of lowest margin for each mode during radiated spurious emission.

2.3. RU allocations

BW (㎒)	Tones (T)	RU offset	Test RU offset		
			Low	Mid	High
20	26	0 ~ 8	0	4	8
	52	37 ~ 40	37	38	40
	106	53 ~ 54	53	-	54
	242	61 / SU	-	61 / -	-

2.4. Duty Cycle Factor

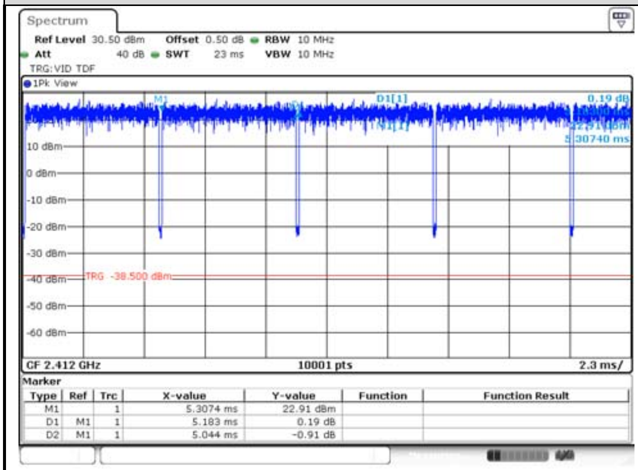
Test mode	Tone	Period (ms)	On time (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty Cycle Factor (dB)
802.11ax HE 20 SISO	26T	5.183	5.044	0.973 2	97.32	0.12
	52T	5.208	5.068	0.973 1	97.31	0.12
	106T	2.870	2.730	0.951 2	95.12	0.22
	242T	1.355	1.219	0.899 6	89.96	0.46
	SU	1.248	1.144	0.916 7	91.67	0.38
802.11ax HE 20 MIMO	26T	5.189	5.052	0.973 6	97.36	0.12
	52T	5.189	5.052	0.973 6	97.36	0.12
	106T	2.862	2.736	0.956 0	95.60	0.20
	242T	1.359	1.233	0.907 3	90.73	0.42
	SU	1.248	1.143	0.915 9	91.59	0.38

Notes.

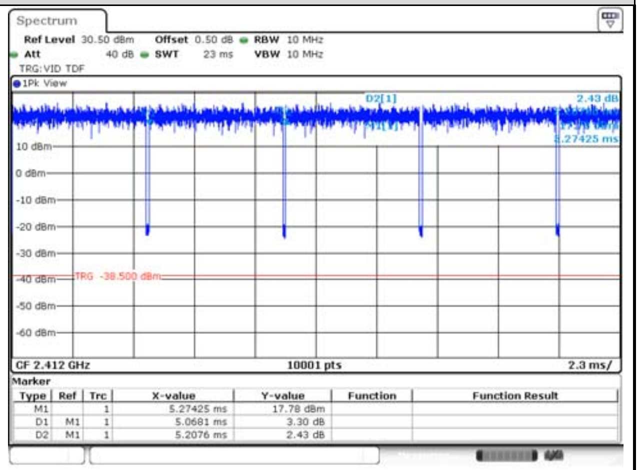
1. Duty cycle (Linear) = Ton time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not compensated to Average result if duty cycle is more than 98%

SISO

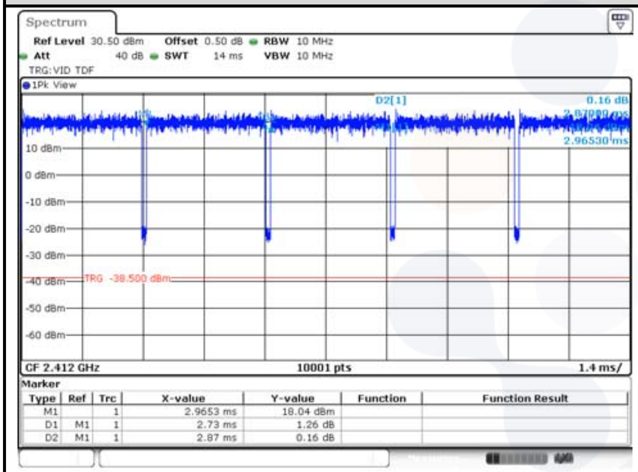
26T



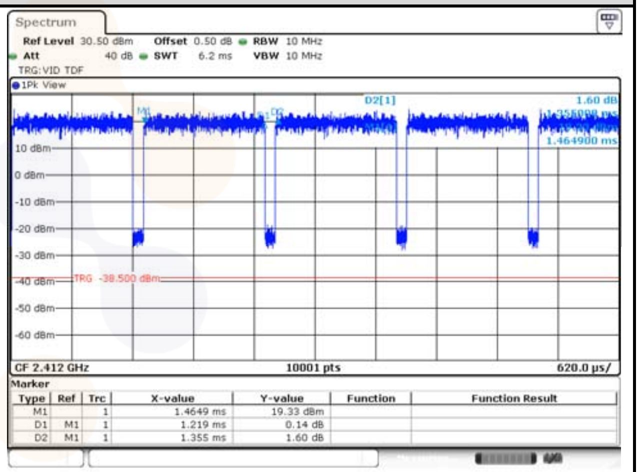
52T



106T



242T



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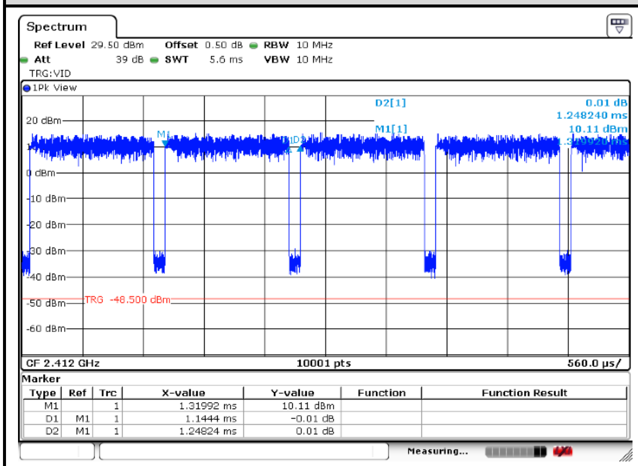

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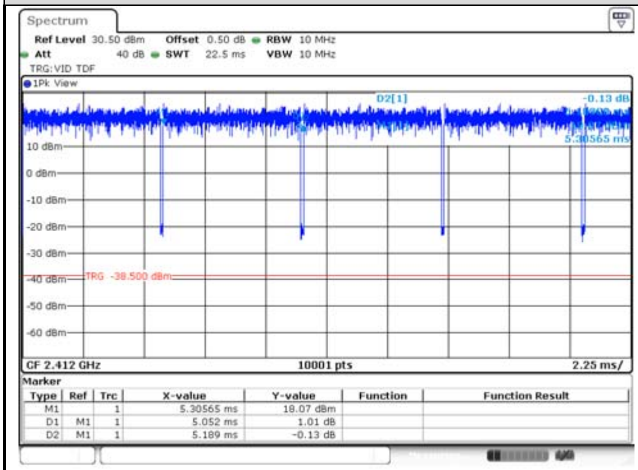
MIMO

26T



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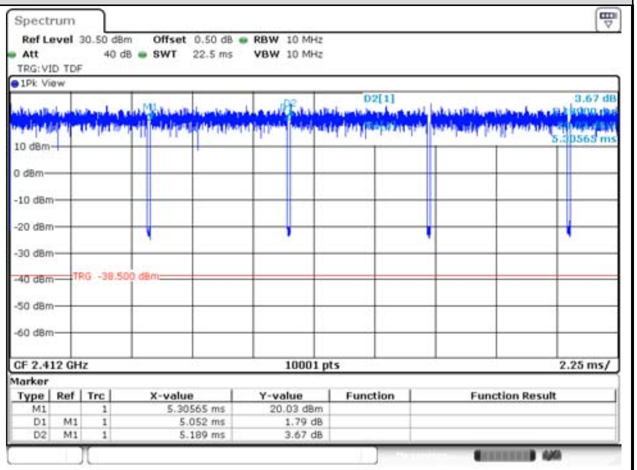
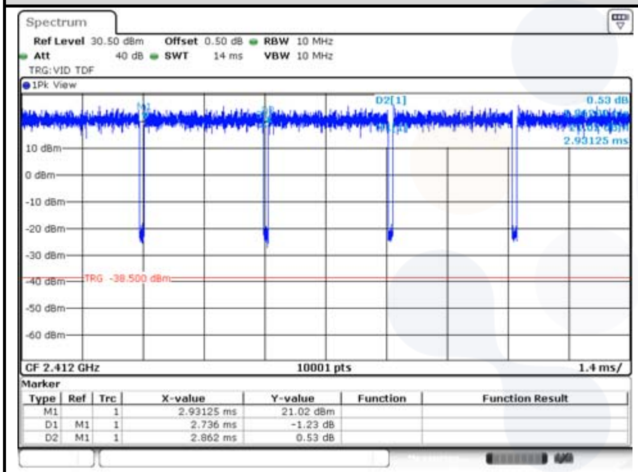
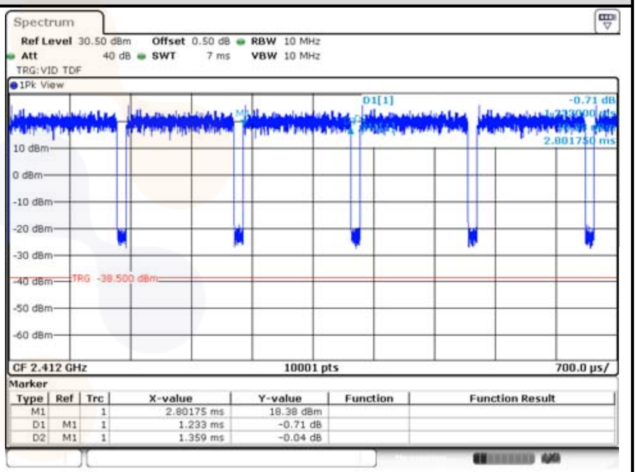


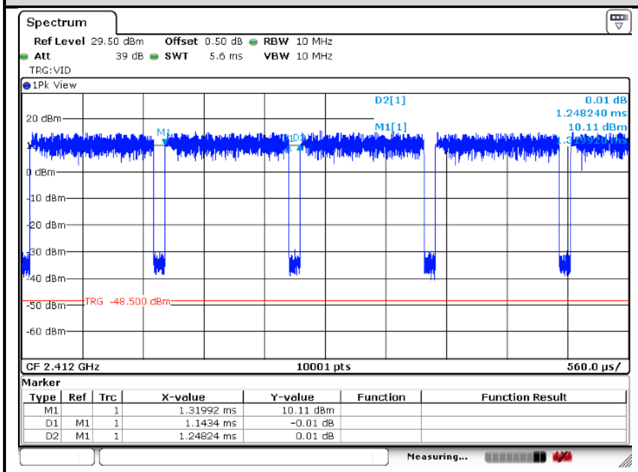
106T



242T



SU



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3. Antenna requirement

Requirement of FCC part section 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.

Requirement of RSS-Gen Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.
For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).
When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

- The transmitter has permanently attached FPCB Antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.247.

3.1 Antenna information

Mode	SISO		CDD	MIMO
	ANT 1	ANT 2	ANT 1 + 2	ANT 1 + 2
802.11ax HE20	×	√	√	√

√ = Support, ×= Not support

3.2 Directional Gain Calculations

According to clause F), 2), d), (i) of KDB 662911 D01 Multiple Transmitter Output, Directional gain may be calculated by using the formulas as below.

Directional Antenna Gain

ANT 1 Gain (dBi)	ANT 2 Gain (dBi)	Combined Gain (dBi)
-3.12	-3.04	-0.07

Note.

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

Sample calculation

Directional gain = $10 \log[(10^{-3.12/20} + 10^{-3.04/20})^2 / 2] = -0.07$ dBi

4. Summary of tests

FCC Part section(s)	IC Rule Referene	Parameter	Test Condition	Test results
15.247(b)(3)	RSS-247 (5.4)(d)	Maximum peak output power	Conducted	Pass
15.247(e)	RSS-247 (5.2)(b)	Peak power spectral density		Pass
15.247(a)(2)	RSS-247 (5.2)(a)	6 dB channel bandwidth		Pass
-	RSS-Gen (6.7)	Occupied Bandwidth		Pass
15.207(a)	RSS-Gen (8.8)	AC Conducted Emissions		Pass
15.247(d)	RSS-247 (5.5)	Conducted Spurious Emissions		Pass
15.205(a), 15.209(a)	RSS-Gen (8.9), (8.10)	Spurious emission	Radiated	Pass
		Band-edge, restricted band		Pass

Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
3. The orthogonal plan is configured as x-axis because the device operates as desktop device in standard laptop mode. Therefore, all final radiated testing was performed with the EUT in X orientation.
4. All the radiated tests have been performed several case.(Stand alone, with accessories (TA etc.)) Worst case: stand alone
5. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
   - KDB 558074 D01 v05r02
   - KDB 662911 D01 v02r01
6. The worst-case data rate were : MCS0
7. For AC Conducted emission and spurious emission below 1 ㎓, please refer to 15.247 legacy test report.

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.
All measurement uncertainty values are shown with a coverage factor of *k*=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Conducted RF power	0.9 dB	
Conducted spurious emissions	1.6 dB	
Radiated spurious emissions	Below 30 MHz:	2.3 dB
	30 MHz ~ 1 000 MHz	2.2 dB
	1 000 MHz ~ 18 000 MHz	5.6 dB
	Above 18 000 MHz	5.7 dB
Conducted emissions	9 kHz ~ 150 kHz	3.7 dB
	150 kHz ~ 30 MHz	3.3 dB

6. Measurement results explanation example

The offset level is set in the spectrum analyzer to compensate the RF cable loss factor between EUT conducted output port and spectrum analyzer.
With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor(㏈)
30	9.64	9 000	11.63
50	9.93	10 000	11.85
100	10.22	11 000	11.62
200	10.26	12 000	11.74
300	10.34	13 000	12.35
400	10.4	14 000	12.26
500	10.64	15 000	12.08
600	10.71	16 000	12.67
700	10.75	17 000	12.27
800	10.75	18 000	12.53
900	10.83	19 000	12.68
1 000	10.84	20 000	12.56
2 000	11.48	21 000	13.33
3 000	11.8	22 000	13.18
4 000	12.03	23 000	12.95
5 000	12.61	24 000	13.28
6 000	13	25 000	13.09
7 000	11.2	26 000	13.96
8 000	11.34	26 500	13.15

Note : Offset(㏈) = RF cable loss(㏈) + Attenuator(㏈)

7. Test results

7.1. Maximum peak output power

Test setup

Limit

FCC

According to §15.247(b)(3), For systems using digital modulation in the 902-928 ㎒, 2 400-2 483.5 ㎒, and 5 725-5 850 ㎒ bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to §15.247(b)(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC

According to RSS-247 5.4(d), For DTSs employing digital modulation techniques operating in the bands 902-928 ㎒ and 2400-2483.5 ㎒, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

Test procedure

ANSI C63.10 - Section 11.9
Used test method is section 11.9.1.3 and 11.9.2.3.1

Test settings

General
Section 15.247 permits the maximum conducted (average) output power to be measured as an alternative to the maximum peak conducted output power for demonstrating compliance to the limit. When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth (see ANSI C63.10 for measurement guidance).

When using a spectrum analyzer or EMI receiver to perform these measurements, it shall be capable of utilizing a number of measurement points in each sweep that is greater than or equal to twice the span/RBW to set a bin-to-bin spacing of ≤ RBW/2 so that narrowband signals are not lost between frequency bins.

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level. The intent is to test at 100 % duty cycle; however a small reduction in duty cycle (to no lower than 98 %) is permitted, if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

If continuous transmission (or at least 98 % duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level, with the transmit duration as long as possible, and the duty cycle as high as possible during which sweep triggering/signal gating techniques may be used to perform the measurement over the transmission duration.

11.9.1. Maximum peak conducted output power
One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

11.9.1.1. RBW ≥ DTS bandwidth
The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

11.9.1.3. PKPM1 Peak power meter method
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

11.9.2.3.1. Measurement using a power meter (PM)

Method AVGPM is a measurement using an RF average power meter, as follows:

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
   1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
   2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
   3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal as described in 11.6.

c) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.

d) Adjust the measurement in dBm by adding [10 log(1/D)], where D is the duty cycle

Notes:

A peak responding power sensor is used, where the power sensor system video bandwidth is greater than the occupied bandwidth of the EUT.

Test results

SISO_ANT2
Conducted Output Power

Frequency (MHz)	Tone	RU offset	Measured output power				Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)	
			Peak	Average		Average	
2 412	26T	0	24.47	12.37	0.12	12.49	30.00
		4	22.16	12.38	0.12	12.50	
		8	22.18	13.15	0.12	13.27	
	52T	37	25.90	14.24	0.12	14.36	
		38	25.48	15.11	0.12	15.23	
		40	25.90	15.44	0.12	15.56	
	106T	53	23.55	11.99	0.22	12.21	
		54	23.24	12.97	0.22	13.19	
	242T	61	22.06	11.61	0.46	12.07	
	SU	-	21.12	12.87	0.38	13.25	
2 437	26T	0	23.81	13.69	0.12	13.81	
		4	23.78	12.47	0.12	12.59	
		8	23.86	12.55	0.12	12.67	
	52T	37	25.02	15.41	0.12	15.53	
		38	24.87	14.78	0.12	14.90	
		40	24.73	14.01	0.12	14.13	
	106T	53	23.74	15.12	0.22	15.34	
		54	23.76	14.07	0.22	14.29	
	242T	61	24.65	14.45	0.46	14.91	
	SU	-	22.45	14.14	0.38	14.52	
2 462	26T	0	25.57	12.84	0.12	12.96	
		4	22.29	12.30	0.12	12.42	
		8	23.65	13.62	0.12	13.74	
	52T	37	26.09	14.02	0.12	14.14	
		38	26.05	14.60	0.12	14.72	
		40	25.82	15.24	0.12	15.36	
	106T	53	26.22	14.42	0.22	14.64	
		54	24.44	15.29	0.22	15.51	
	242T	61	21.12	11.01	0.46	11.47	
	SU	-	20.51	12.20	0.38	12.58	

Frequency (㎒)	Tone	RU offset	Measured output power				Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)	
			Peak	Average		Average	
2 467	26T	0	16.40	4.62	0.12	4.74	30.00
		4	15.16	4.85	0.12	4.97	
		8	17.25	4.05	0.12	4.17	
	52T	37	16.36	4.70	0.12	4.82	
		38	16.17	5.47	0.12	5.59	
		40	17.27	4.71	0.12	4.83	
	106T	53	16.21	5.11	0.22	5.33	
		54	16.07	5.61	0.22	5.83	
	242T	61	16.62	4.48	0.46	4.94	
	SU	-	13.73	5.35	0.38	5.73	
2 472	26T	0	2.23	-7.76	0.12	-7.64	
		4	2.28	-8.10	0.12	-7.98	
		8	4.29	-8.58	0.12	-8.46	
	52T	37	6.53	-4.03	0.12	-3.91	
		38	6.53	-3.96	0.12	-3.84	
		40	7.46	-4.83	0.12	-4.71	
	106T	53	6.49	-3.96	0.22	-3.74	
		54	6.51	-5.01	0.22	-4.79	
	242T	61	10.57	0.12	0.46	0.58	
	SU	-	8.86	0.27	0.38	0.65	

Notes:

1. Average result(dB m) = Average Reading (dB m) + DCF(dB)

E.I.R.P.

Frequency (㎒)	Tone	RU offset	Measured output power				Max e.i.r.p Limit (dBm)
			Conducted Output Power (㏈m)		ANT Gain (dBi)	Max.e.i.r.p (dBm)	
			Peak	Average		Average	
2 412	26T	0	24.47	12.49	-3.04	9.45	36.02
		4	22.16	12.50		9.46	
		8	22.18	13.27		10.23	
	52T	37	25.90	14.36		11.32	
		38	25.48	15.23		12.19	
		40	25.90	15.56		12.52	
	106T	53	23.55	12.21		9.17	
		54	23.24	13.19		10.15	
	242T	61	22.06	12.07		9.03	
	SU	-	21.12	13.25		10.21	
2 437	26T	0	23.81	13.81		10.77	
		4	23.78	12.59		9.55	
		8	23.86	12.67		9.63	
	52T	37	25.02	15.53		12.49	
		38	24.87	14.9		11.86	
		40	24.73	14.13		11.09	
	106T	53	23.74	15.34		12.30	
		54	23.76	14.29		11.25	
	242T	61	24.65	14.91		11.87	
	SU	-	22.45	14.52		11.48	
2 462	26T	0	25.57	12.96		9.92	
		4	22.29	12.42		9.38	
		8	23.65	13.74		10.70	
	52T	37	26.09	14.14		11.10	
		38	26.05	14.72		11.68	
		40	25.82	15.36		12.32	
	106T	53	26.22	14.64		11.60	
		54	24.44	15.51		12.47	
	242T	61	21.12	11.47		8.43	
	SU	-	20.51	12.58		9.54	

Frequency (㎒)	Tone	RU offset	Measured output power				Max e.i.r.p Limit (dBm)
			Conducted Output Power (㏈m)		ANT Gain (dBi)	Max.e.i.r.p (dBm)	
			Peak	Average		Average	
2 467	26T	0	16.40	4.74	-3.04	1.70	36.02
		4	15.16	4.97		1.93	
		8	17.25	4.17		1.13	
	52T	37	16.36	4.82		1.78	
		38	16.17	5.59		2.55	
		40	17.27	4.83		1.79	
	106T	53	16.21	5.33		2.29	
		54	16.07	5.83		2.79	
	242T	61	16.62	4.94		1.90	
	SU	-	13.73	5.73		2.69	
2 472	26T	0	2.23	-7.64		-10.68	
		4	2.28	-7.98		-11.02	
		8	4.29	-8.46		-11.50	
	52T	37	6.53	-3.91		-6.95	
		38	6.53	-3.84		-6.88	
		40	7.46	-4.71		-7.75	
	106T	53	6.49	-3.74		-6.78	
		54	6.51	-4.79		-7.83	
	242T	61	10.57	0.58		-2.46	
	SU	-	8.86	0.65		-2.39	

Notes:
1. E.I.R.P. Calculation:
E.I.R.P. (dB m) = Conducted output power (dB m) + Antenna gain (dB i)

MIMO_ANT1+ANT2
Conducted Output Power

Frequency (㎒)	Tone	RU offset	Measured output power							Limit (dBm)
			Reading (dBm)				DCF (dB)	Result (dBm)		
			Peak		Average			Peak	Average	
			ANT 1	ANT 2	ANT 1	ANT 2				
2 412	26T	0	22.63	21.97	12.93	12.01	0.12	25.32	15.62	30.00
		4	22.61	21.97	12.67	12.12	0.12	25.31	15.53	
		8	23.33	21.48	13.68	12.21	0.12	25.51	16.14	
	52T	37	23.81	23.51	14.89	14.44	0.12	26.67	17.80	
		38	24.31	23.71	15.58	14.97	0.12	27.03	18.42	
		40	23.78	23.20	15.00	14.59	0.12	26.51	17.93	
	106T	53	22.29	22.15	12.58	12.20	0.20	25.23	15.60	
		54	22.42	22.14	12.93	12.61	0.20	25.29	15.98	
	242T	61	22.23	21.46	11.89	11.30	0.42	24.87	15.04	
	SU	-	20.50	19.49	12.28	11.87	0.38	23.03	15.47	
2 437	26T	0	23.12	21.76	13.17	11.60	0.12	25.50	15.59	
		4	23.10	23.62	12.83	12.19	0.12	26.38	15.65	
		8	24.16	24.27	12.59	13.53	0.12	27.23	16.22	
	52T	37	24.37	24.13	15.06	13.21	0.12	27.26	17.36	
		38	24.51	25.20	15.74	14.80	0.12	27.88	18.43	
		40	24.63	25.54	14.95	15.09	0.12	28.12	18.15	
	106T	53	24.09	23.35	15.40	14.04	0.20	26.75	17.98	
		54	23.77	24.67	15.13	15.13	0.20	27.25	18.34	
	242T	61	23.96	24.47	13.55	12.90	0.42	27.23	16.67	
	SU	-	22.10	21.97	13.72	13.48	0.38	25.05	16.99	
2 462	26T	0	21.51	21.43	12.21	11.95	0.12	24.48	15.21	
		4	22.14	22.07	12.04	12.03	0.12	25.12	15.17	
		8	22.13	22.04	12.76	12.87	0.12	25.10	15.95	
	52T	37	24.03	23.99	15.81	15.68	0.12	27.02	18.88	
		38	24.04	23.95	15.42	15.26	0.12	27.01	18.47	
		40	23.48	23.45	14.58	14.72	0.12	26.48	17.78	
	106T	53	23.98	23.95	15.71	15.49	0.20	26.98	18.81	
		54	23.44	23.47	14.45	14.54	0.20	26.47	17.71	
	242T	61	21.81	21.40	11.67	11.27	0.42	24.62	14.90	
	SU	-	18.79	18.70	11.18	11.14	0.38	21.76	14.55	

Frequency (㎒)	Tone	RU offset	Measured output power							Limit (dBm)
			Reading (dBm)				DCF (dB)	Result (dBm)		
			Peak		Average			Peak	Average	
			ANT 1	ANT 2	ANT 1	ANT 2				
2 467	26T	0	16.46	16.27	5.78	5.46	0.12	19.38	8.75	30.00
		4	16.52	16.31	5.39	5.23	0.12	19.43	8.44	
		8	15.65	15.17	5.04	4.67	0.12	18.43	7.99	
	52T	37	16.62	16.28	5.67	5.23	0.12	19.46	8.59	
		38	16.61	16.30	5.37	5.11	0.12	19.47	8.37	
		40	15.62	15.20	4.93	4.60	0.12	18.43	7.90	
	106T	53	16.59	16.21	5.60	5.24	0.20	19.41	8.63	
		54	15.67	15.17	4.93	4.55	0.20	18.44	7.95	
	242T	61	16.39	16.38	4.65	4.73	0.42	19.40	8.12	
	SU	-	13.43	14.01	5.33	5.49	0.38	16.74	8.80	
2 472	26T	0	2.74	3.23	-7.88	-6.84	0.12	6.00	-4.20	
		4	2.75	3.12	-7.60	-7.25	0.12	5.95	-4.29	
		8	4.07	4.15	-9.06	-8.77	0.12	7.12	-5.78	
	52T	37	6.06	7.56	-4.96	-2.99	0.12	9.88	-0.73	
		38	6.12	7.68	-4.63	-2.82	0.12	9.98	-0.50	
		40	7.26	8.57	-5.04	-3.74	0.12	10.97	-1.21	
	106T	53	6.18	7.50	-4.60	-2.86	0.20	9.90	-0.43	
		54	7.17	8.42	-4.17	-3.04	0.20	10.85	-0.36	
	242T	61	10.13	10.78	-0.58	-0.36	0.42	13.48	2.96	
	SU	-	9.07	8.84	0.59	0.31	0.38	11.97	3.84	

Notes:

1. Peak result(dBm) = 10log($10^{(ANT1/10)}+10^{(ANT2/10)}$) (dBm)
2. Average result(dBm) = 10log($10^{(ANT1/10)}+10^{(ANT2/10)}$) (dBm) + DCF(dB)

E.I.R.P.

Frequency (㎒)	Tone	RU offset	Measured output power					Limit (dBm)
			Conducted output Power (dBm)		ANT Gain (dBi)	Max.e.i.r.p (dBm)		
			Peak	Average		Peak	Average	
2 412	26T	0	25.32	15.62	-0.07	25.25	15.55	36.02
		4	25.31	15.53		25.24	15.46	
		8	25.51	16.14		25.44	16.07	
	52T	37	26.67	17.80		26.60	17.73	
		38	27.03	18.42		26.96	18.35	
		40	26.51	17.93		26.44	17.86	
	106T	53	25.23	15.60		25.16	15.53	
		54	25.29	15.98		25.22	15.91	
	242T	61	24.87	15.04		24.80	14.97	
	SU	-	23.03	15.47		22.96	15.40	
2 437	26T	0	25.50	15.59		25.43	15.52	
		4	26.38	15.65		26.31	15.58	
		8	27.23	16.22		27.16	16.15	
	52T	37	27.26	17.36		27.19	17.29	
		38	27.88	18.43		27.81	18.36	
		40	28.12	18.15		28.05	18.08	
	106T	53	26.75	17.98		26.68	17.91	
		54	27.25	18.34		27.18	18.27	
	242T	61	27.23	16.67		27.16	16.60	
	SU	-	25.05	16.99		24.98	16.92	
2 462	26T	0	24.48	15.21		24.41	15.14	
		4	25.12	15.17		25.05	15.10	
		8	25.10	15.95		25.03	15.88	
	52T	37	27.02	18.88		26.95	18.81	
		38	27.01	18.47		26.94	18.40	
		40	26.48	17.78		26.41	17.71	
	106T	53	26.98	18.81		26.91	18.74	
		54	26.47	17.71		26.40	17.64	
	242T	61	24.62	14.90		24.55	14.83	
	SU	-	21.76	14.55		21.69	14.48	

Frequency (㎒)	Tone	RU offset	Measured output power					Limit (dBm)
			Conducted output Power (dBm)		ANT Gain (dBi)	Max.e.i.r.p (dBm)		
			Peak	Average		Peak	Average	
2 467	26T	0	19.38	8.75	-0.07	19.31	8.68	36.02
		4	19.43	8.44		19.36	8.37	
		8	18.43	7.99		18.36	7.92	
	52T	37	19.46	8.59		19.39	8.52	
		38	19.47	8.37		19.40	8.30	
		40	18.43	7.90		18.36	7.83	
	106T	53	19.41	8.63		19.34	8.56	
		54	18.44	7.95		18.37	7.88	
	242T	61	19.40	8.12		19.33	8.05	
	SU	-	16.74	8.80		16.67	8.73	
2 472	26T	0	6.00	-4.20		5.93	-4.27	
		4	5.95	-4.29		5.88	-4.36	
		8	7.12	-5.78		7.05	-5.85	
	52T	37	9.88	-0.73		9.81	-0.80	
		38	9.98	-0.50		9.91	-0.57	
		40	10.97	-1.21		10.90	-1.28	
	106T	53	9.90	-0.43		9.83	-0.50	
		54	10.85	-0.36		10.78	-0.43	
	242T	61	13.48	2.96		13.41	2.89	
	SU	-	11.97	3.84		11.90	3.77	

Notes:

1. E.I.R.P. Calculation:
   E.I.R.P. (dB m) = Conducted output power (dB m) + Antenna gain (dB i)

7.2. Peak Power Spectral Density

Test setup

EUT	Attenuator	Spectrum analyzer

Limit

According to §15.247(e) and RSS-247(5.2), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test procedure

ANSI C63.10 - Section 11.10.2

Test settings

Method PKPSD (peak PSD)

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

1) Set analyzer center frequency to DTS channel center frequency.
2) Set the span to 1.5 times the DTS bandwidth.
3) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4) Set the VBW ≥ 3 x RBW.
5) Detector = peak.
6) Sweep time = auto couple.
7) Trace mode = max hold.
8) Allow trace to fully stabilize.
9) Use the peak marker function to determine the maximum amplitude level within the RBW.
10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test results

SISO_ANT2

Frequency (㎒)	Tone	RU offset	Results (dB m/ 3 ㎑)	Limit (dBm/ 3㎑)
2 412	26T	0	-3.94	8.00
		4	-4.36	
		8	-4.79	
	52T	37	-4.57	
		38	-3.69	
		40	-2.67	
	106T	53	-9.90	
		54	-6.37	
	242T	61	-13.45	
	SU	-	-13.48	
2 437	26T	0	-3.17	
		4	-4.76	
		8	-3.75	
	52T	37	-3.71	
		38	-3.88	
		40	-3.26	
	106T	53	-6.79	
		54	-7.74	
	242T	61	-10.15	
	SU	-	-10.86	
2 462	26T	0	-3.88	
		4	-5.39	
		8	-3.72	
	52T	37	-2.43	
		38	-3.25	
		40	-3.24	
	106T	53	-6.44	
		54	-7.27	
	242T	61	-14.52	
	SU	-	-15.93	
2 467	26T	0	-13.49	
		4	-13.28	
		8	-15.09	
	52T	37	-14.74	
		38	-13.44	
		40	-14.65	
	106T	53	-16.70	
		54	-17.65	
	242T	61	-19.89	
	SU	-	-23.08	
2 472	26T	0	-24.68	
		4	-24.93	
		8	-25.17	
	52T	37	-22.87	
		38	-22.59	
		40	-23.88	
	106T	53	-25.94	
		54	-26.27	
	242T	61	-25.13	
	SU	-	-27.53	

MIMO

Frequency (㎒)	Tone	RU offset	Reading(dB m/ 3 ㎑)		Result (dBm/ 3㎑)	Limit (dBm/ 3㎑)
			ANT 1	ANT 2		
2 412	26T	0	-4.81	-5.78	-2.26	8.00
		4	-5.48	-5.92	-2.68	
		8	-4.45	-5.76	-2.05	
	52T	37	-3.78	-4.44	-1.09	
		38	-3.82	-3.91	-0.85	
		40	-4.20	-3.99	-1.08	
	106T	53	-8.32	-10.87	-6.40	
		54	-8.20	-9.95	-5.98	
	242T	61	-12.10	-13.94	-9.91	
	SU	-	-13.56	-14.88	-11.16	
2 437	26T	0	-4.40	-6.67	-2.38	
		4	-4.71	-5.40	-2.03	
		8	-4.56	-3.69	-1.09	
	52T	37	-3.82	-5.88	-1.72	
		38	-3.67	-4.14	-0.89	
		40	-4.09	-3.54	-0.80	
	106T	53	-7.66	-9.08	-5.30	
		54	-7.82	-6.86	-4.30	
	242T	61	-12.07	-11.63	-8.83	
	SU	-	-12.45	-14.51	-10.35	
2 462	26T	0	-3.31	-3.75	-0.51	
		4	-6.18	-5.63	-2.89	
		8	-5.01	-3.92	-1.42	
	52T	37	-3.52	-2.99	-0.24	
		38	-4.18	-3.81	-0.98	
		40	-3.86	-3.83	-0.83	
	106T	53	-7.33	-7.38	-4.34	
		54	-7.22	-8.03	-4.60	
	242T	61	-11.51	-14.04	-9.58	
	SU	-	-12.97	-15.63	-11.09	
2 467	26T	0	-11.40	-12.37	-8.85	
		4	-12.19	-12.79	-9.47	
		8	-13.02	-13.37	-10.18	
	52T	37	-13.45	-13.66	-10.54	
		38	-14.54	-14.04	-11.27	
		40	-14.65	-13.84	-11.22	
	106T	53	-17.39	-17.24	-14.30	
		54	-18.18	-17.96	-15.06	
	242T	61	-20.08	-20.36	-17.21	
	SU	-	-20.86	-21.89	-18.33	
2 472	26T	0	-24.89	-24.00	-21.41	
		4	-23.48	-23.85	-20.65	
		8	-25.08	-25.46	-22.26	
	52T	37	-23.82	-21.66	-19.60	
		38	-23.38	-21.63	-19.41	
		40	-22.56	-20.86	-18.62	
	106T	53	-26.36	-25.00	-22.62	
		54	-26.26	-24.39	-22.21	
	242T	61	-24.82	-24.40	-21.59	
	SU	-	-25.36	-27.71	-23.37	

Notes:

1. Result(dB m) = $10\log(10^{(Ant1/10)}+10^{(ant2/10)})$ (dB m)

SISO_ANT2

26T / 2 412 ㎒	52T / 2 412 ㎒
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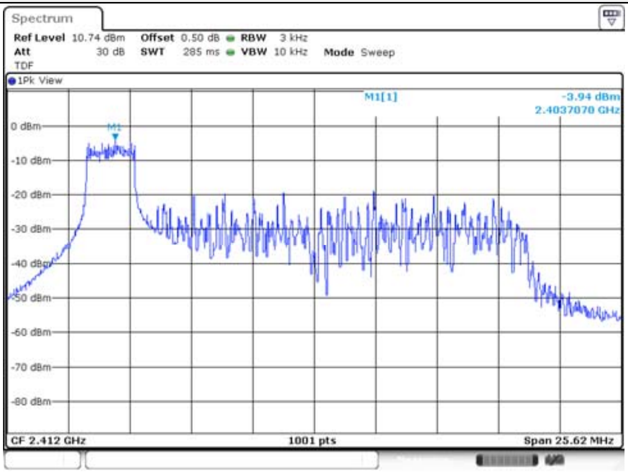	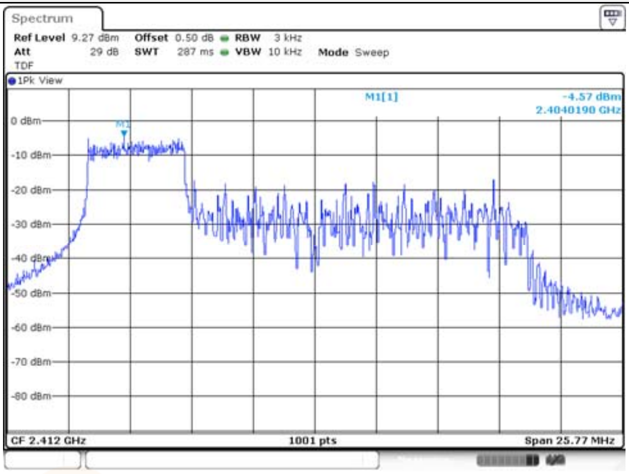
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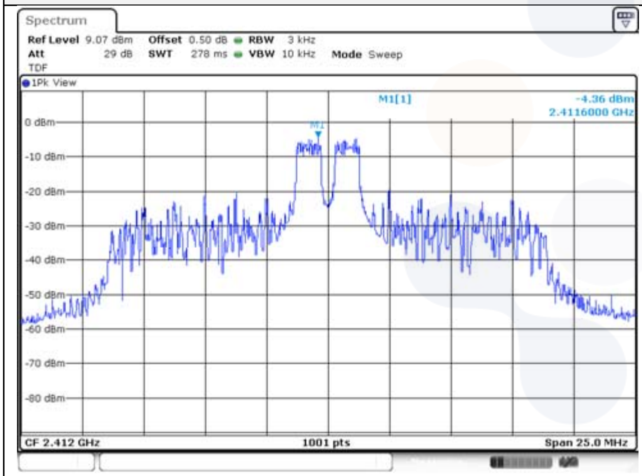	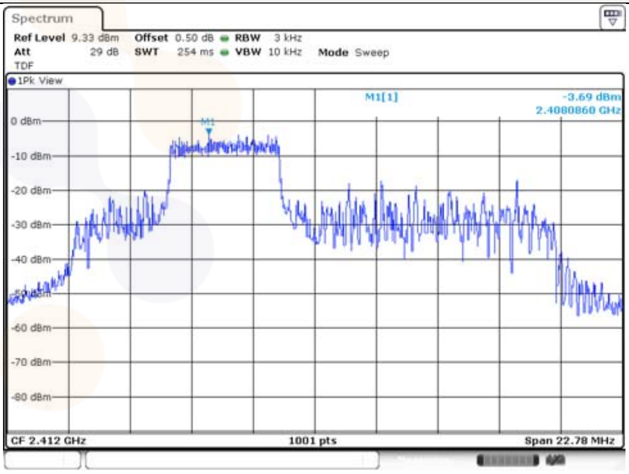
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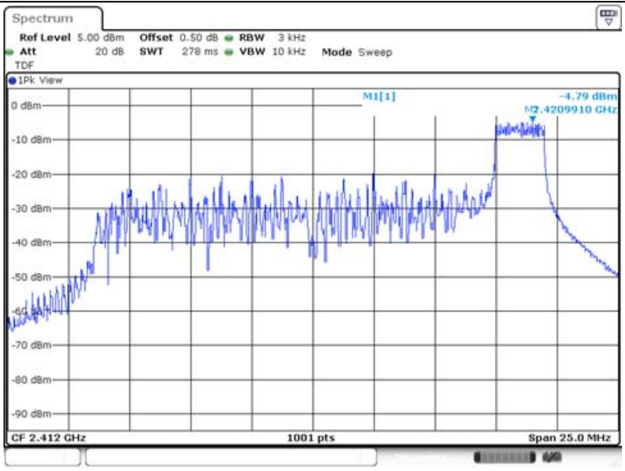	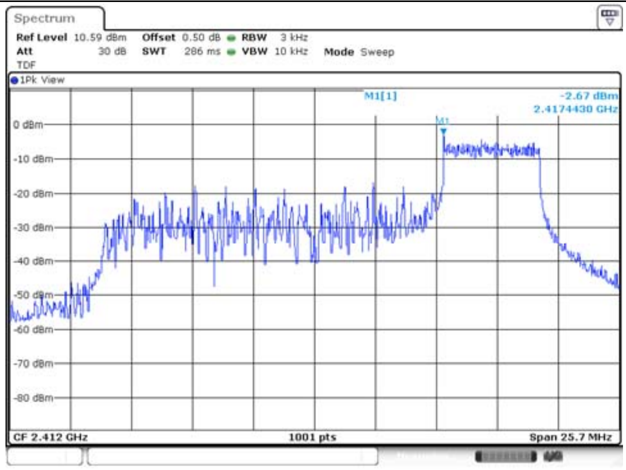

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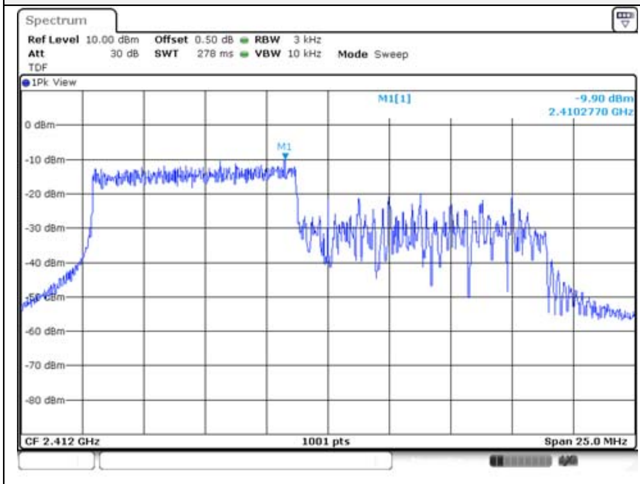
<tr><td>
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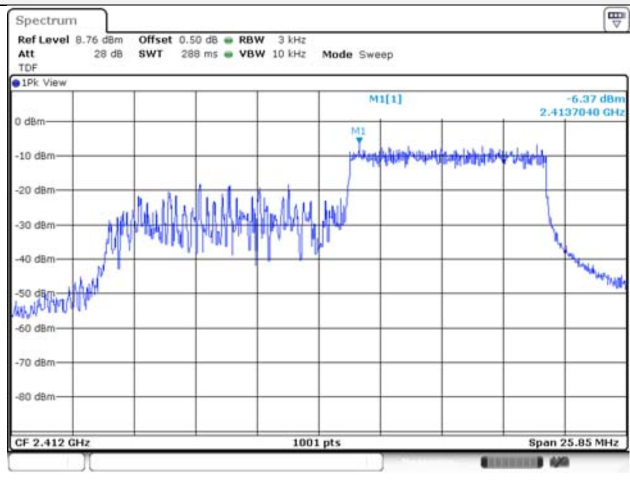
<td>
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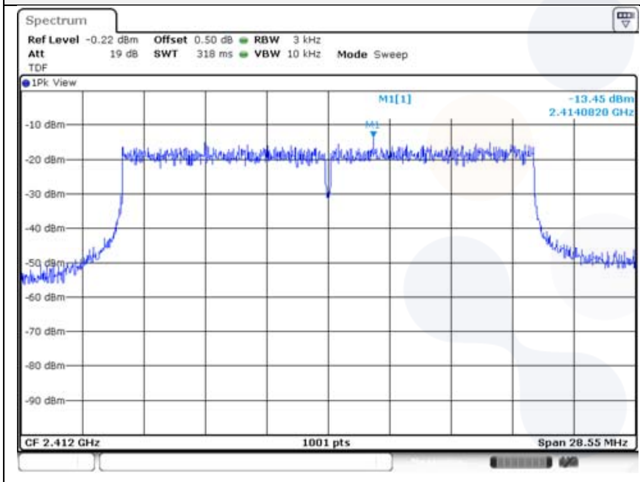
<tr><td>
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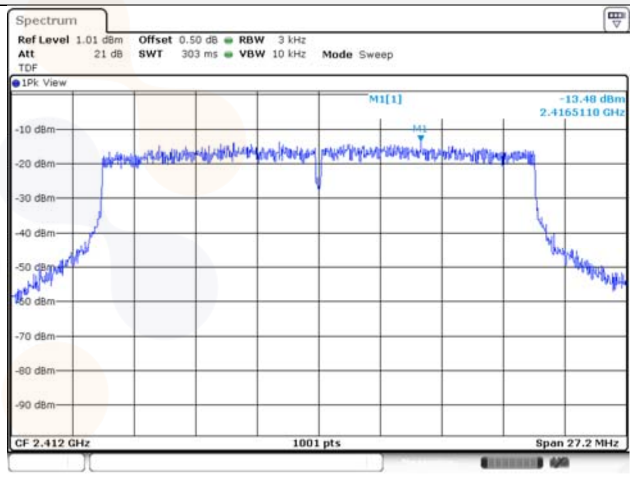
<td>
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26T / 2 437 ㎒	52T / 2 437 ㎒
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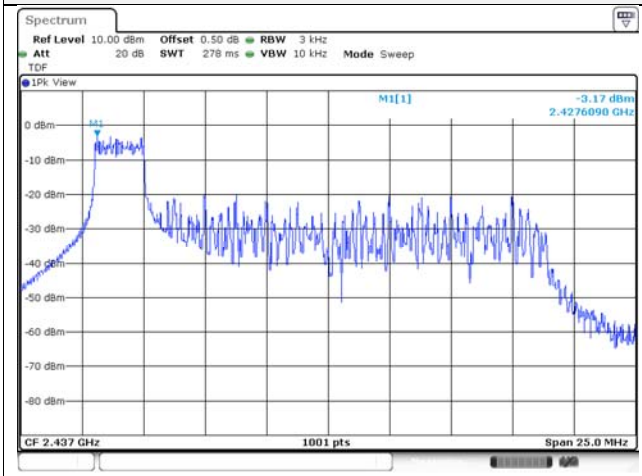
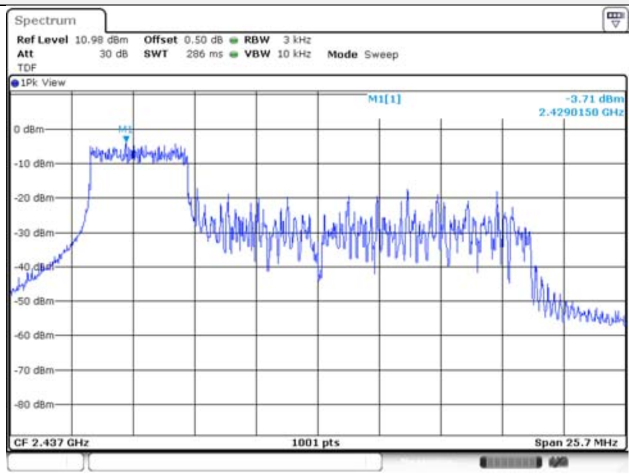
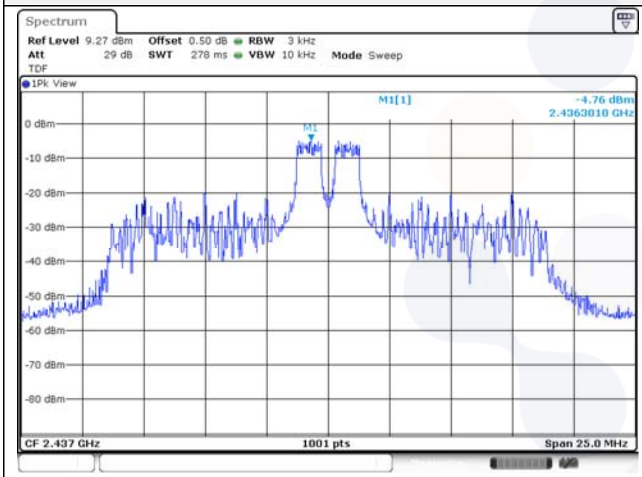
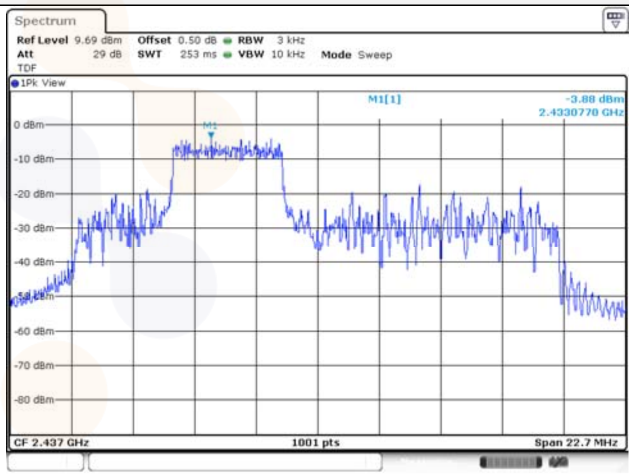




RU offset 4	RU offset 38





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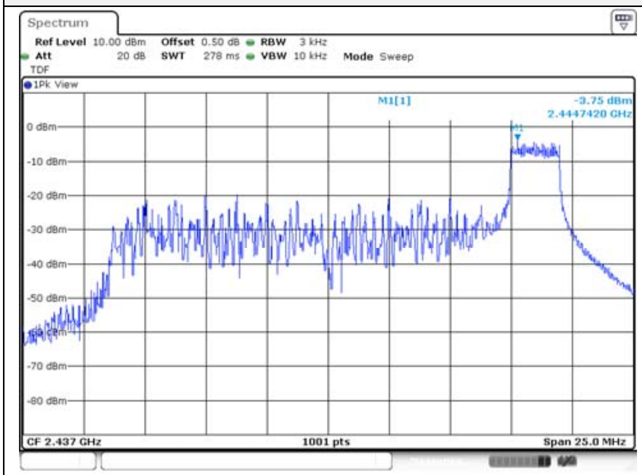

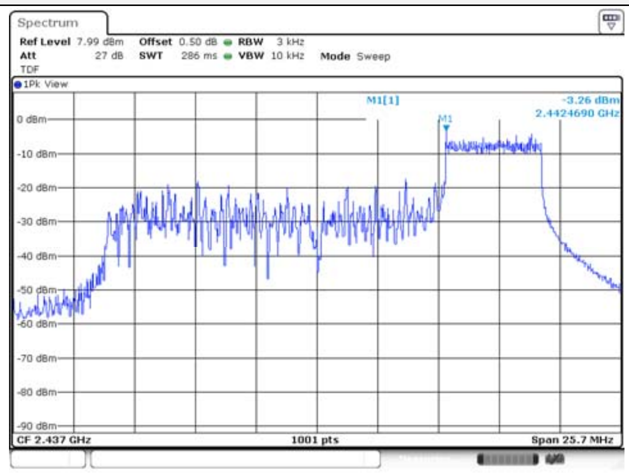

106T / 2 437 ㎒

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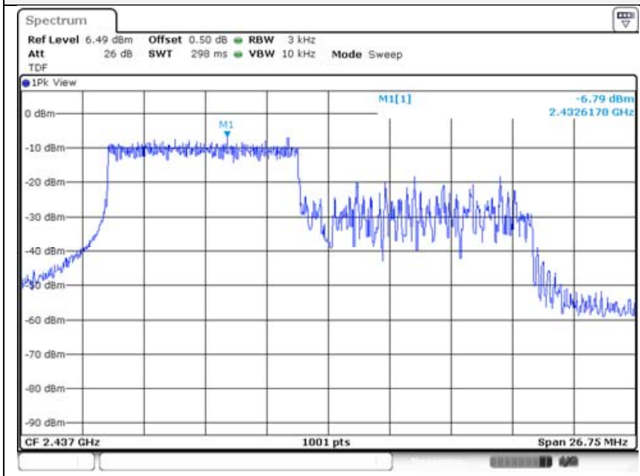
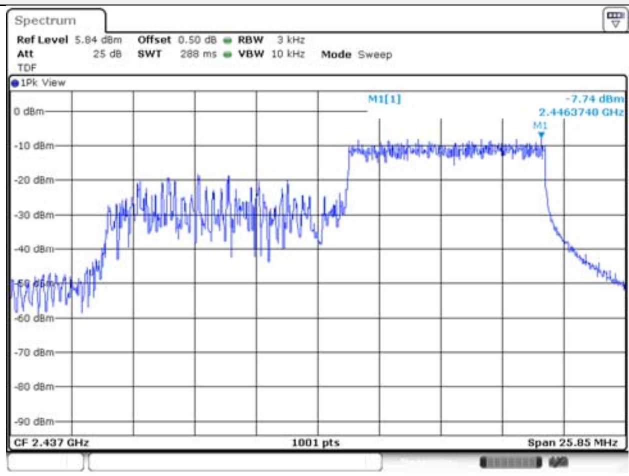
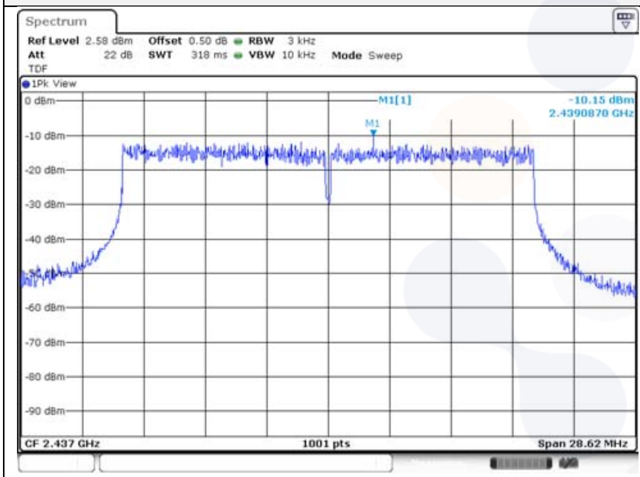


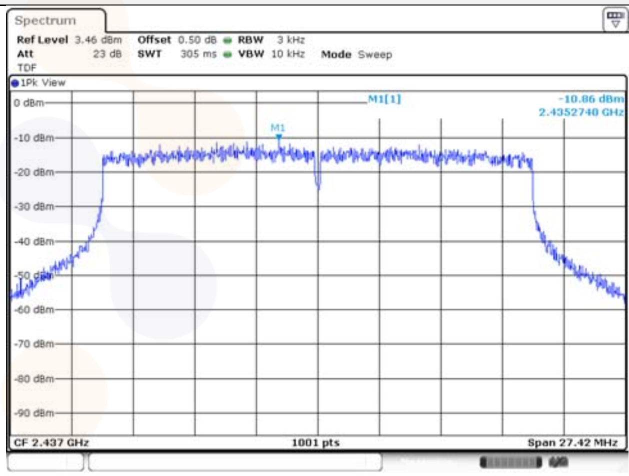
RU offset 54



242T / 2 437 ㎒



SU / 2 437 ㎒



26T / 2 462 ㎒	52T / 2 462 ㎒
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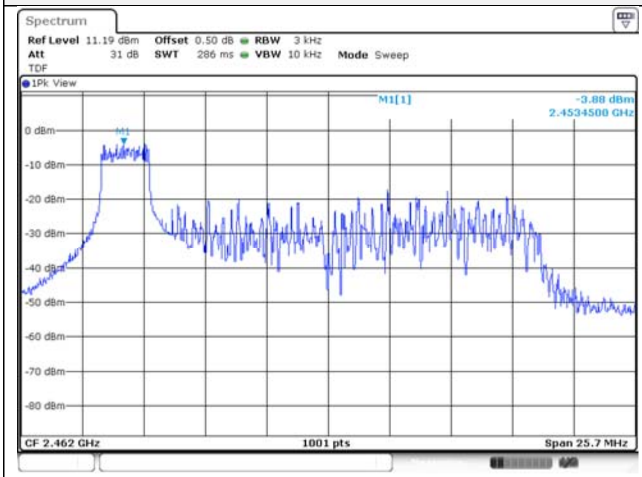	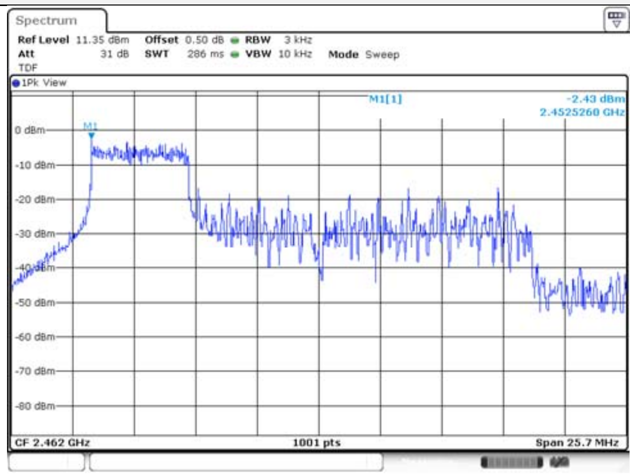
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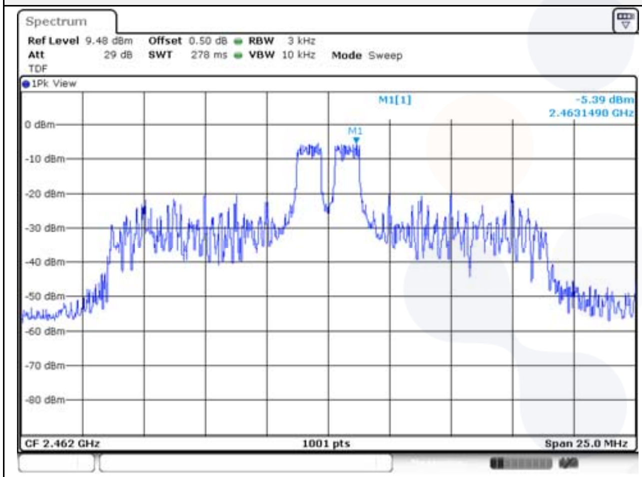	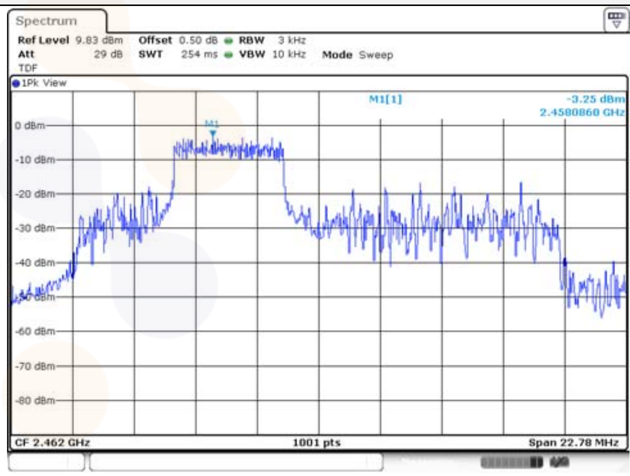
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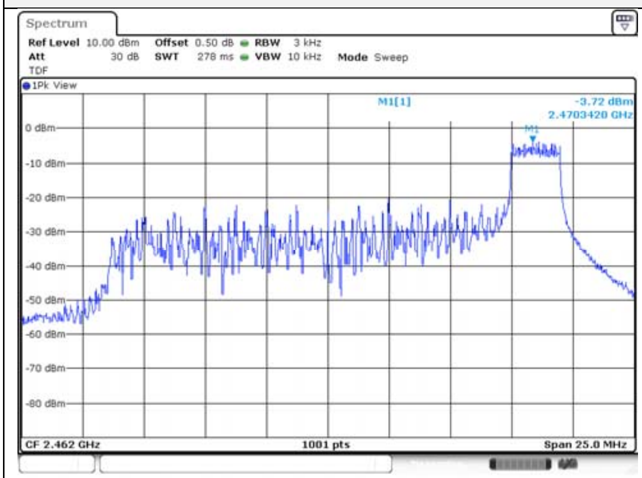	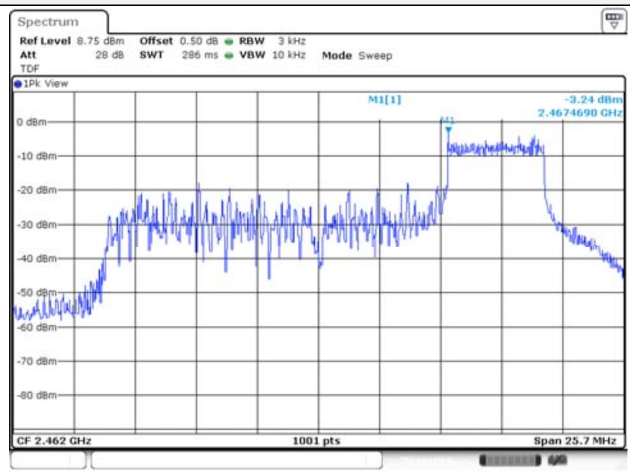

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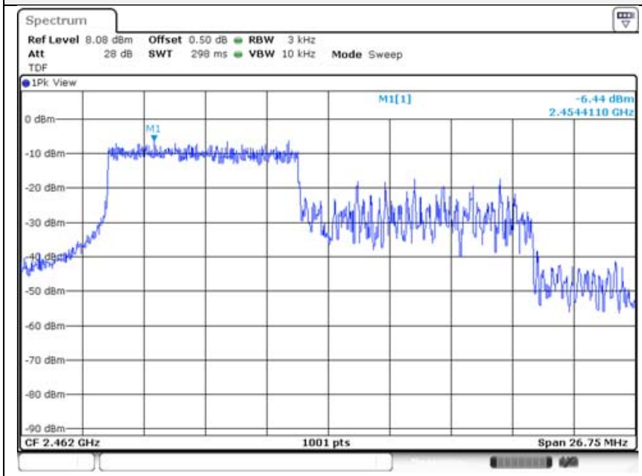
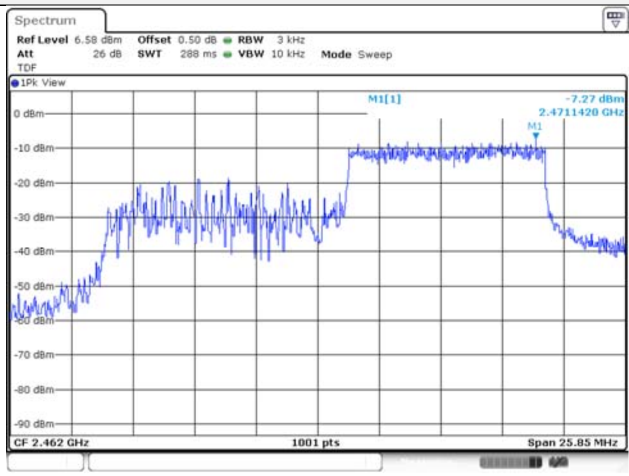
<tr><td>
</td><td>
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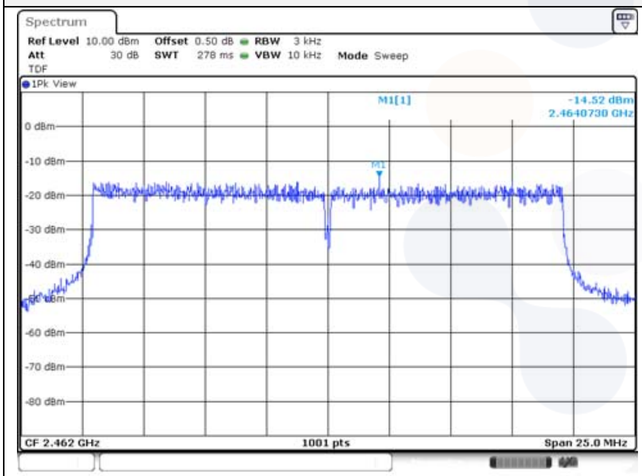
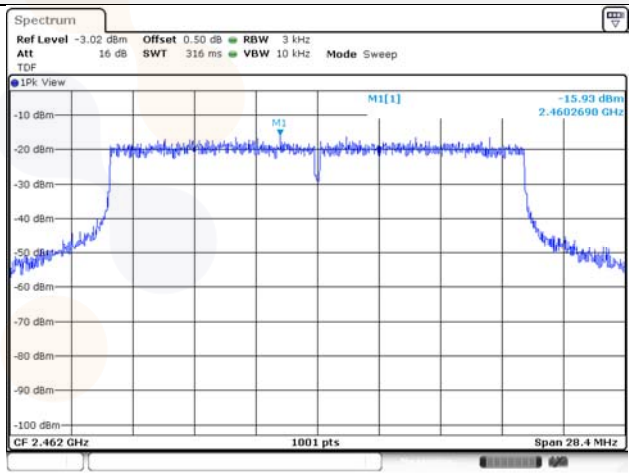
<tr><td>
</td><td>
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26T / 2 467 ㎒	52T / 2 467 ㎒
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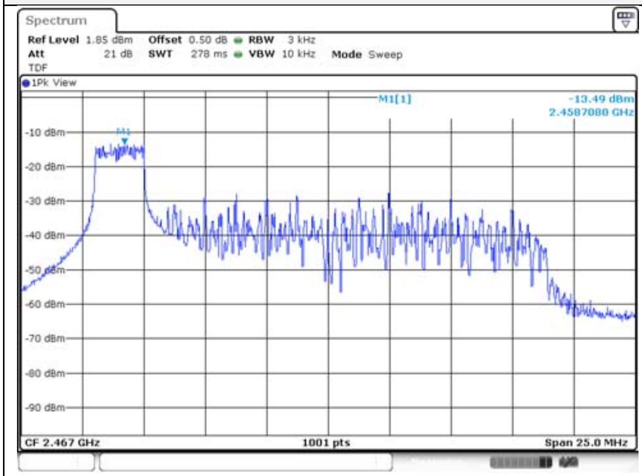	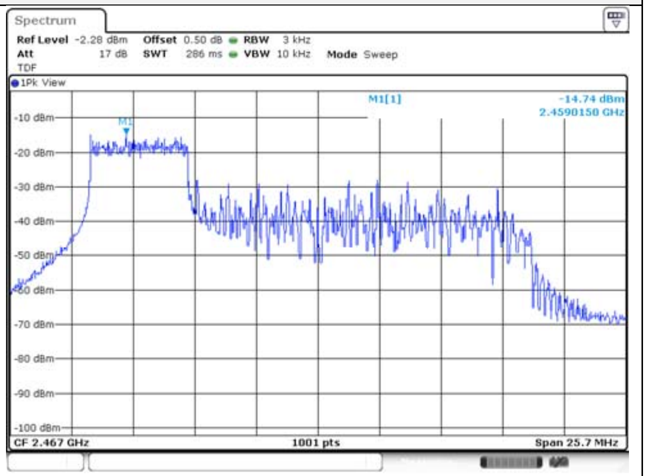
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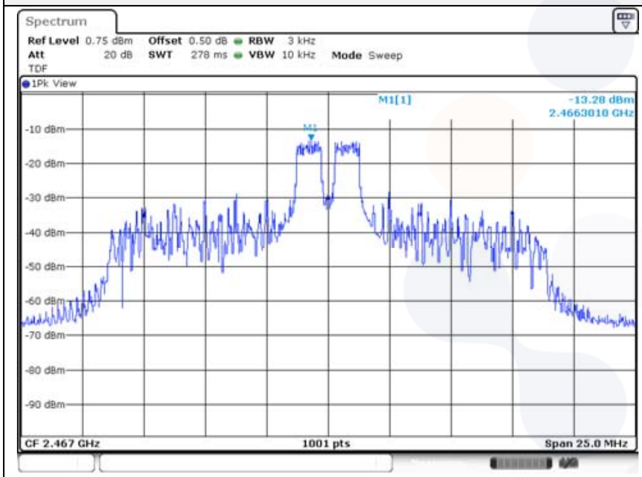	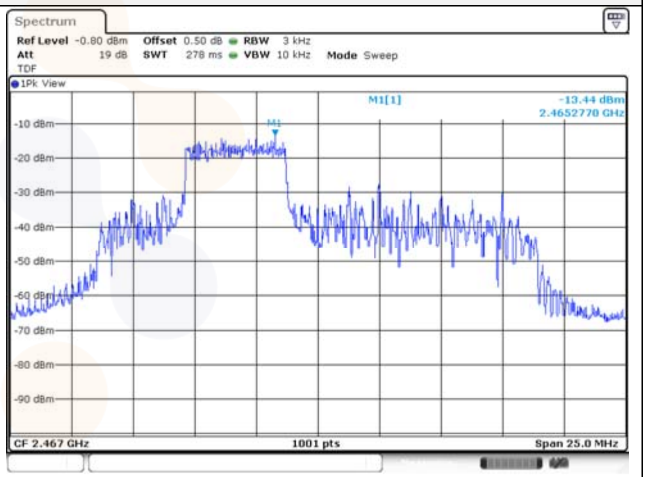
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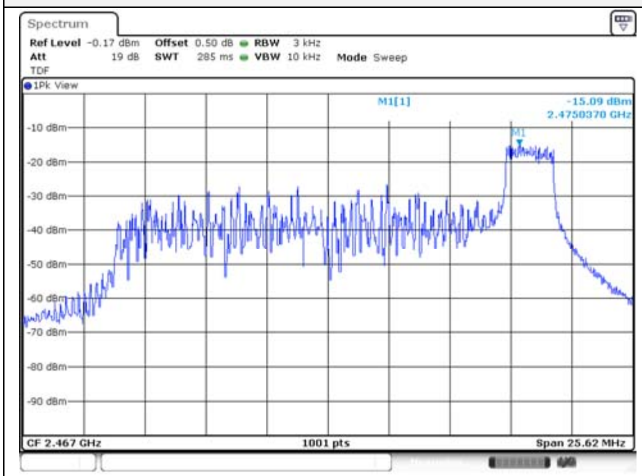	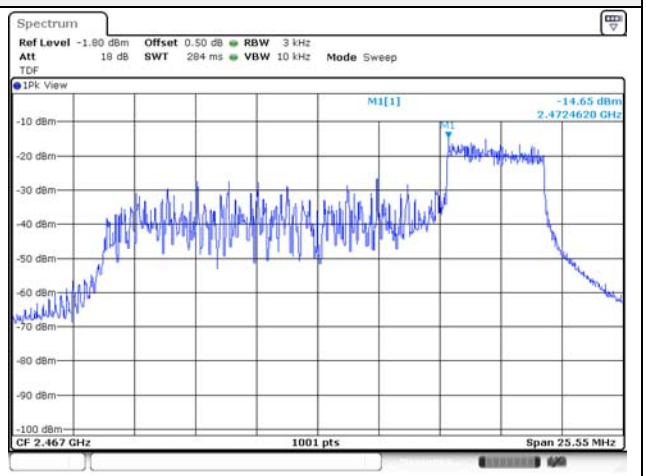

106T / 2 467 ㎒

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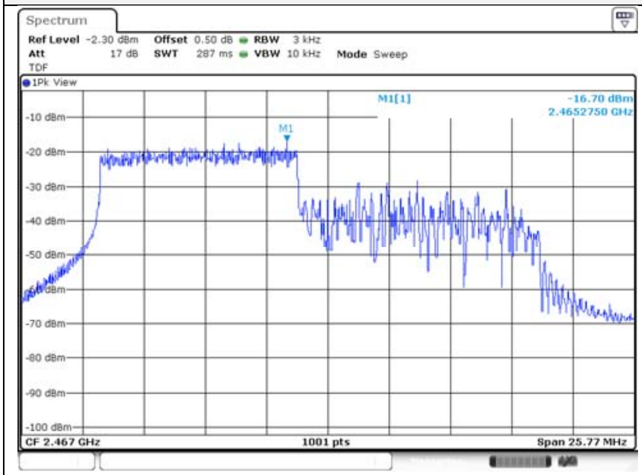
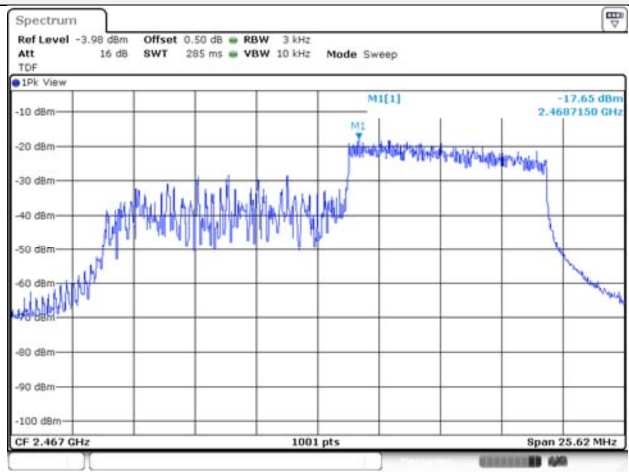
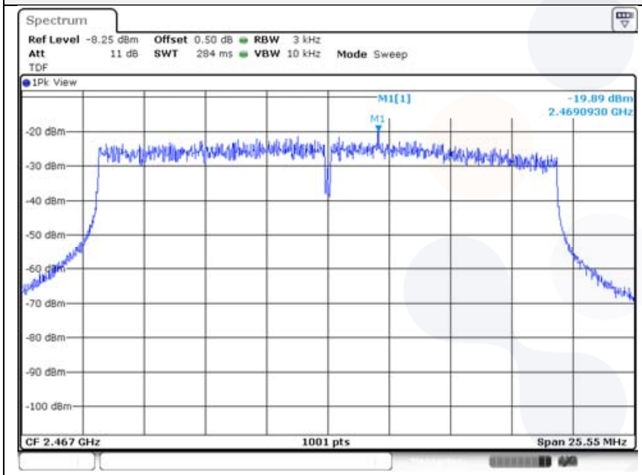
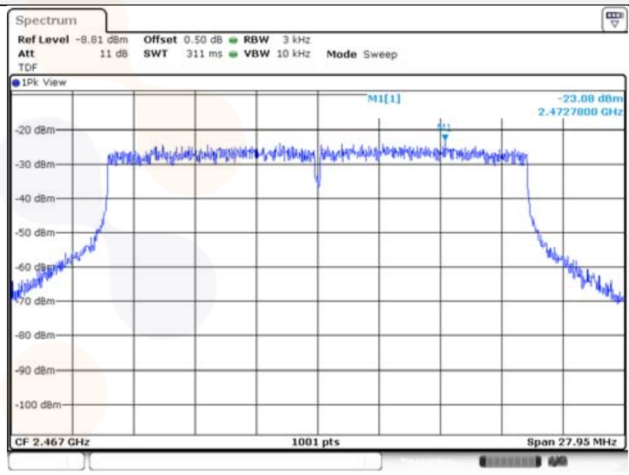
	

242T / 2 467 ㎒	SU / 2 467 ㎒
	

26T / 2 472 ㎒	52T / 2 472 ㎒
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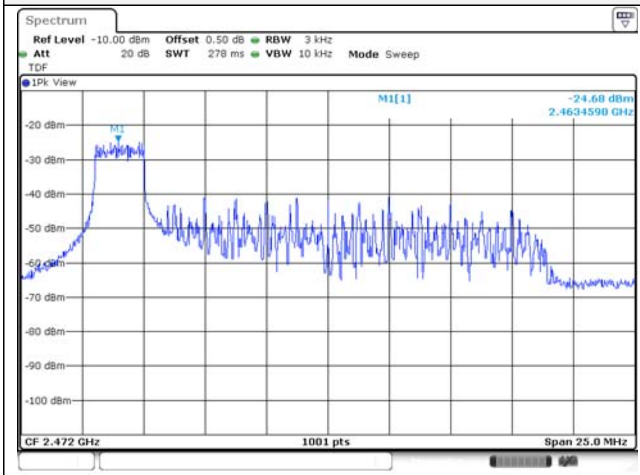	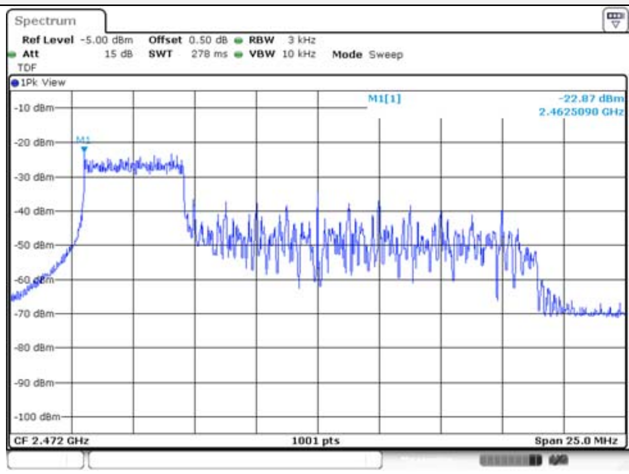
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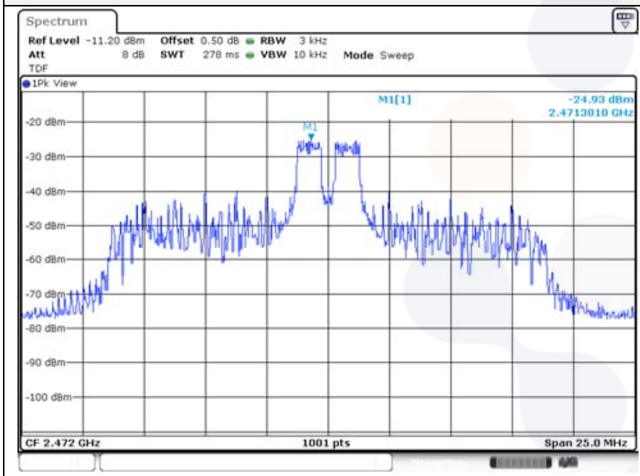	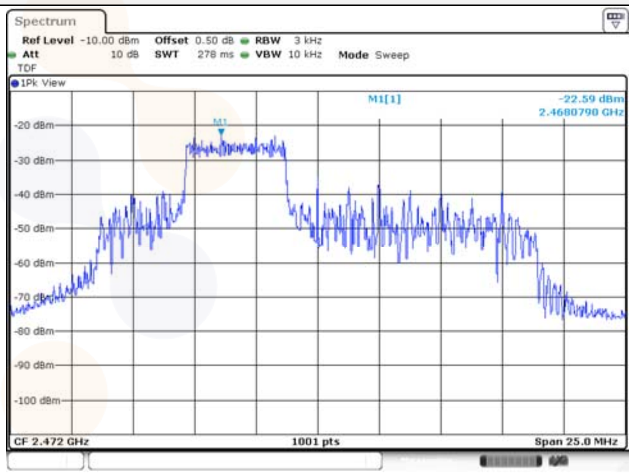
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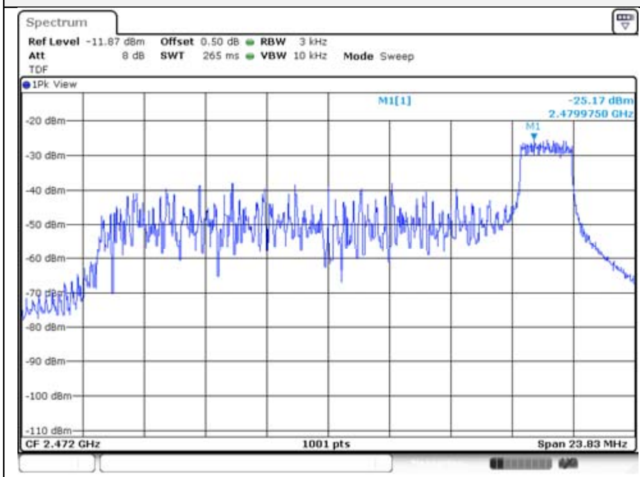	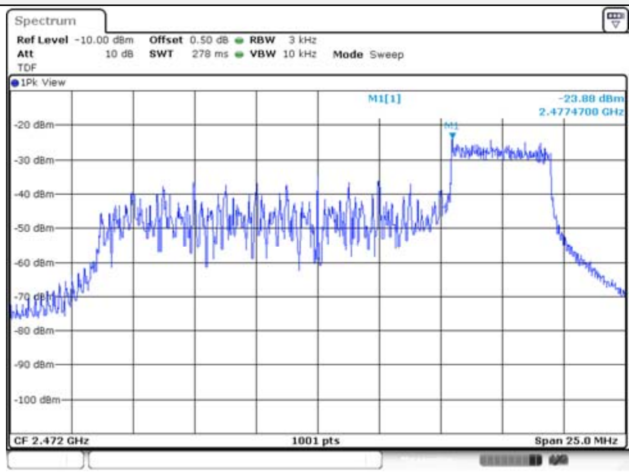

106T / 2 472 ㎒

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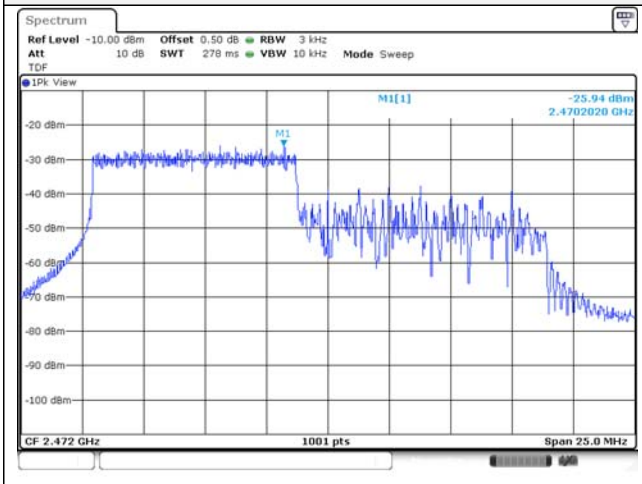

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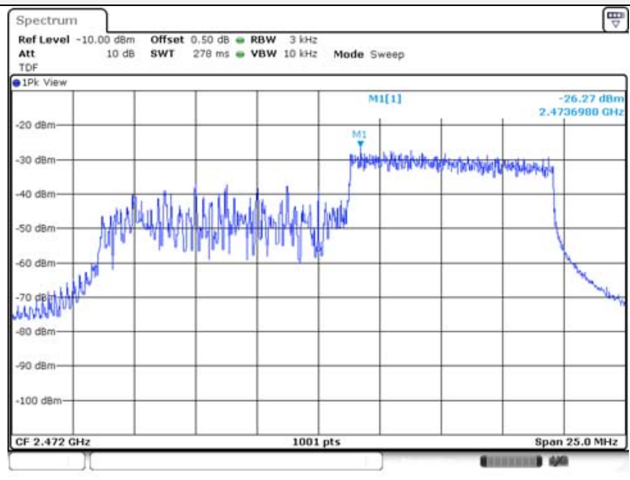

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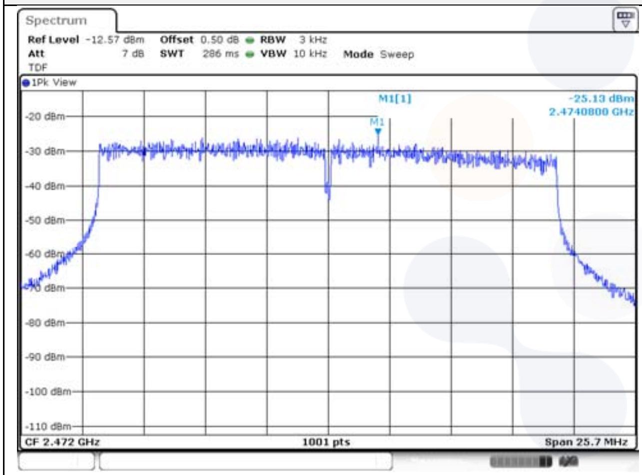

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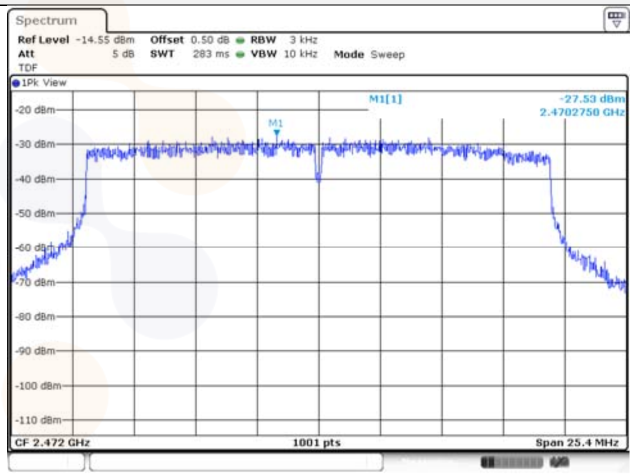

MIMO_ANT1+ANT2

26T / 2 412 ㎒	
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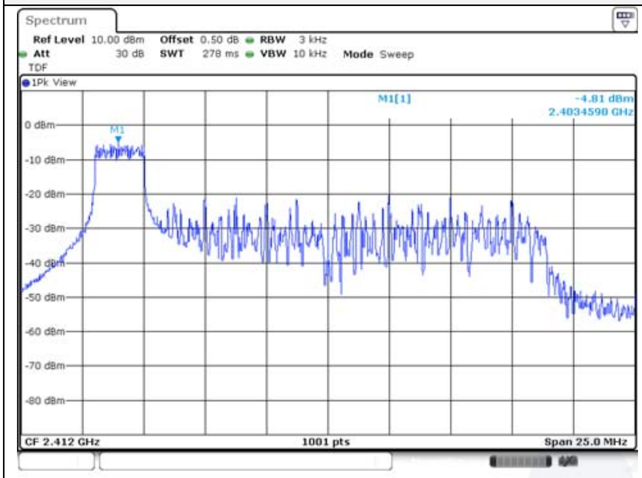	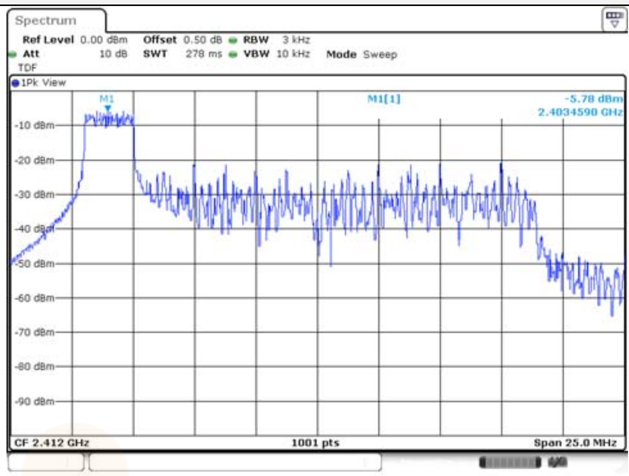
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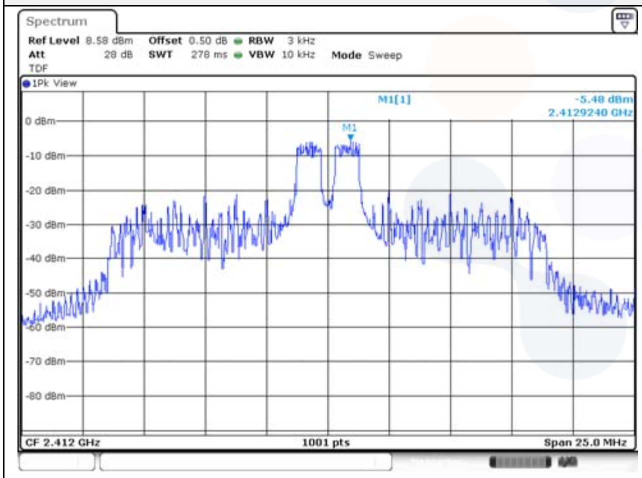	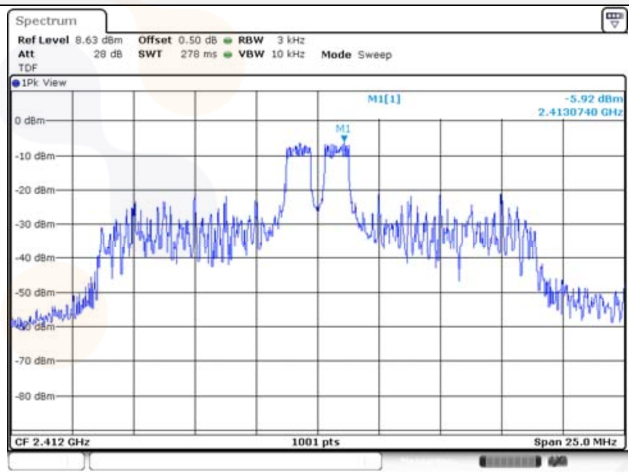
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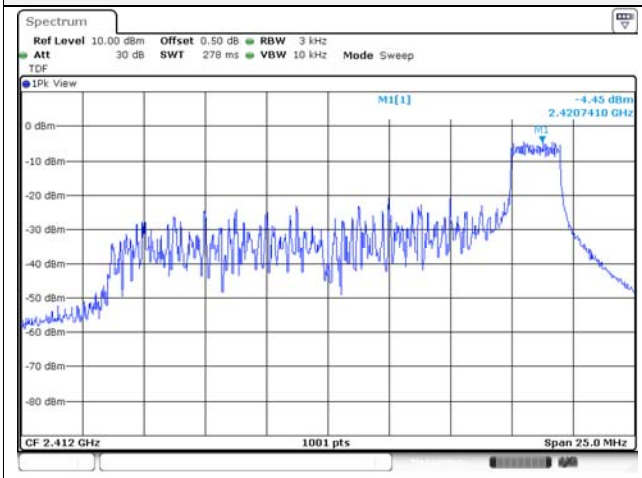	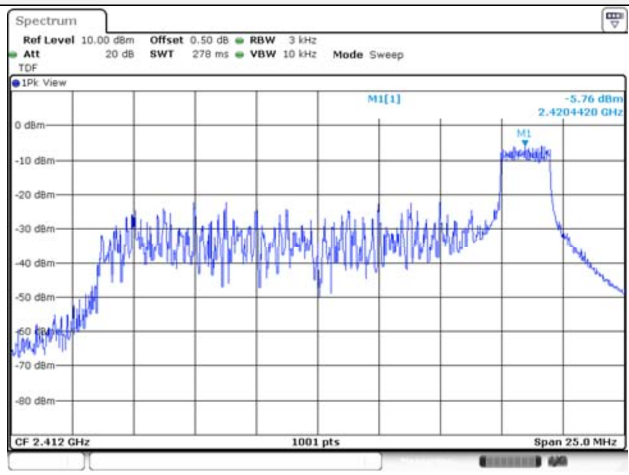

52T / 2 412 ㎒

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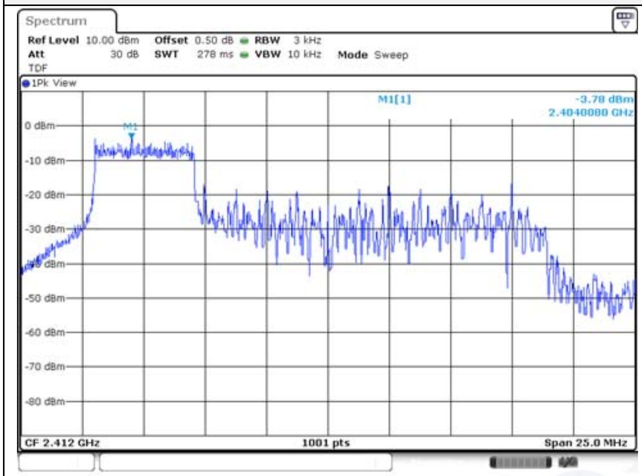

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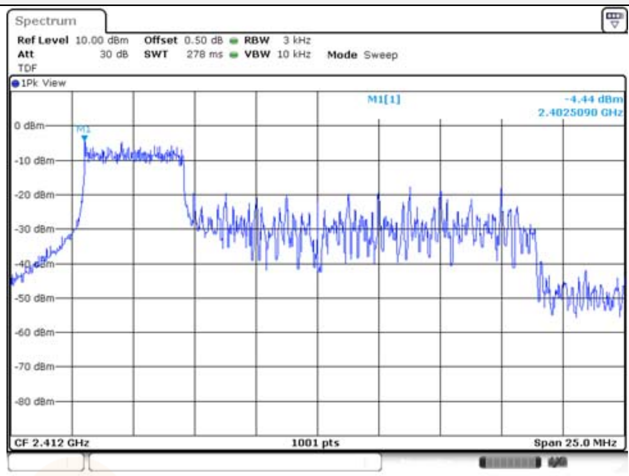

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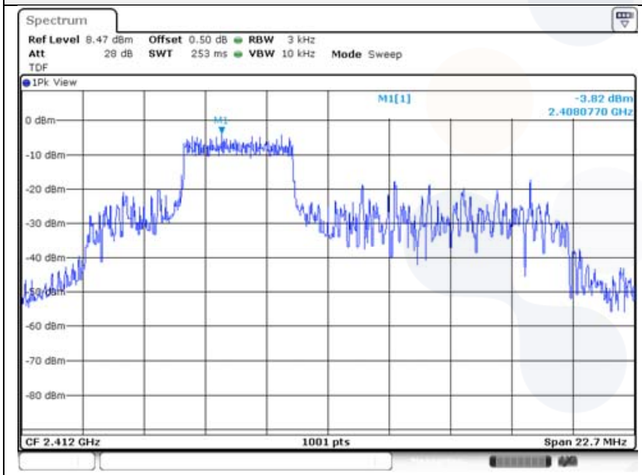

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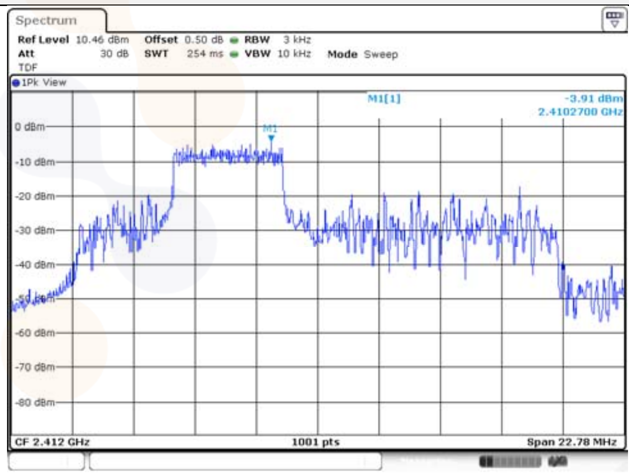

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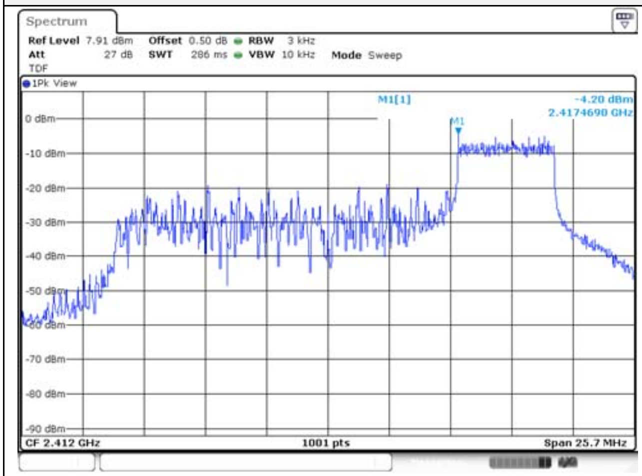

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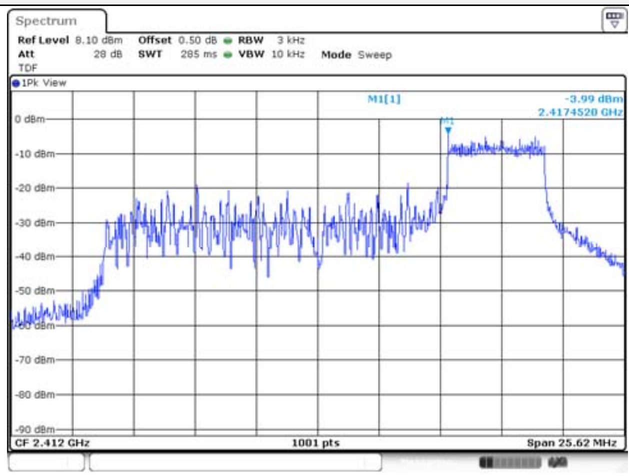

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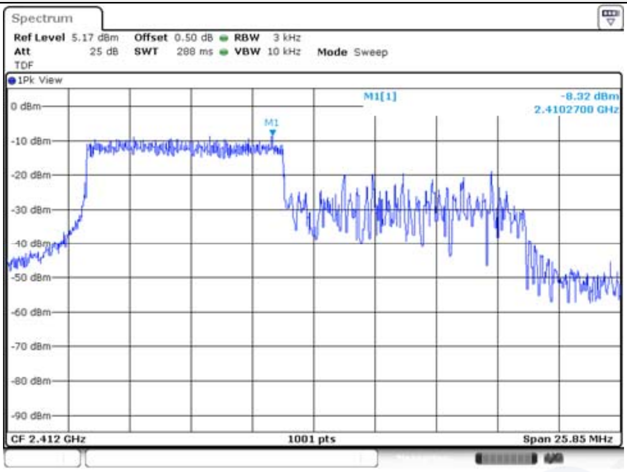
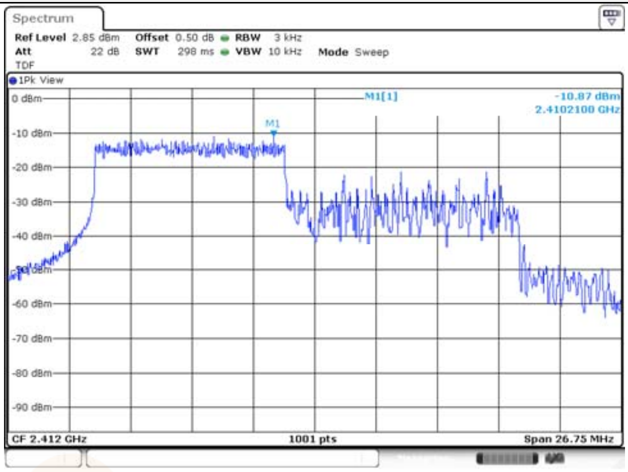
<tr><td>
</td><td>
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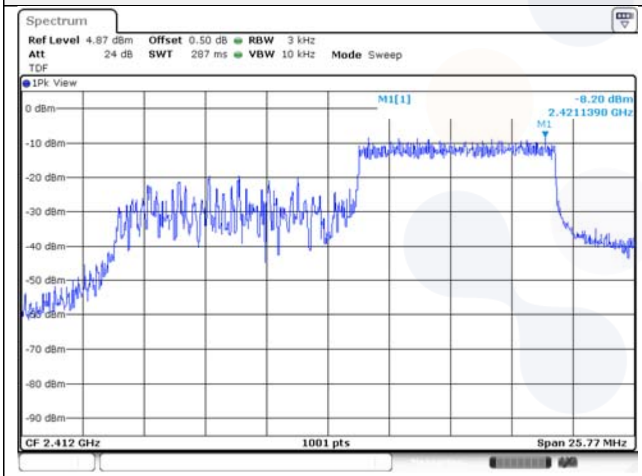
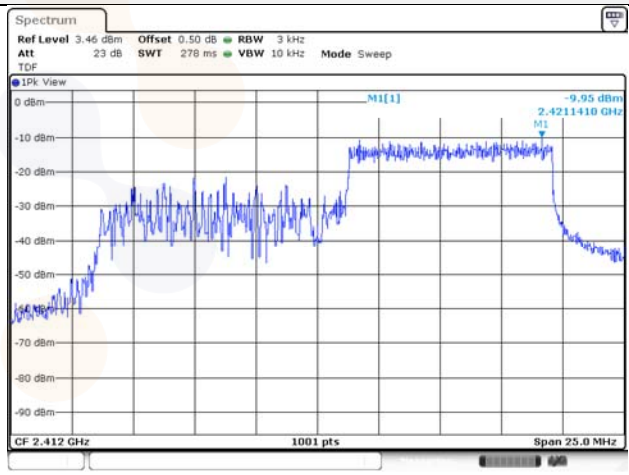
<tr><td>
</td><td>
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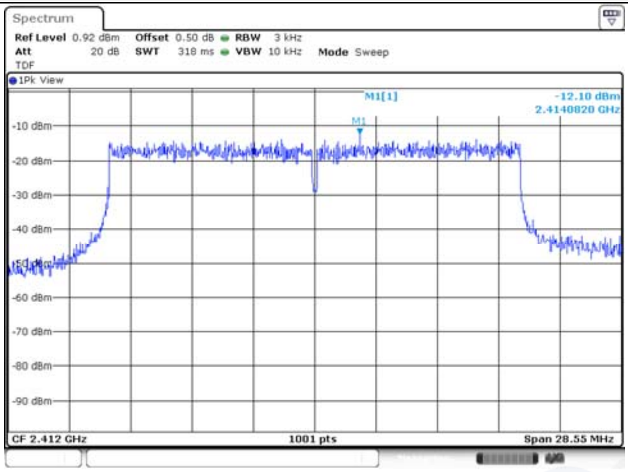
<tr><td>
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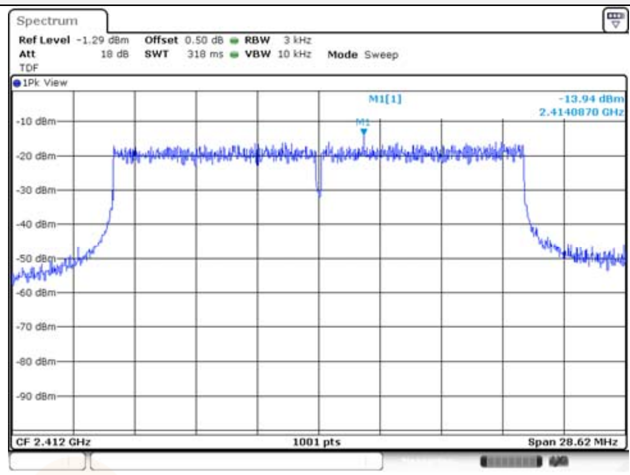
<td>
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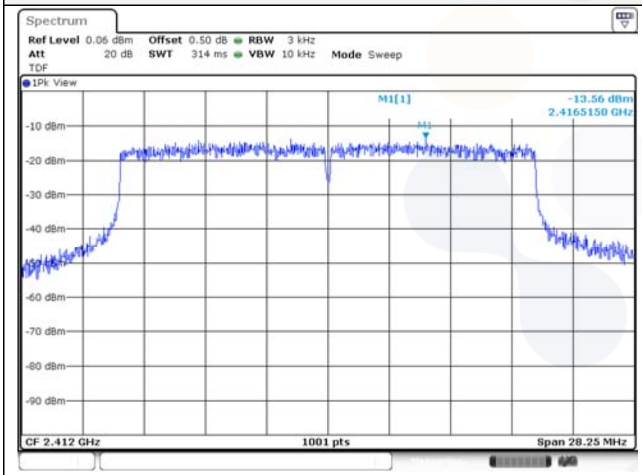
<tr><td>
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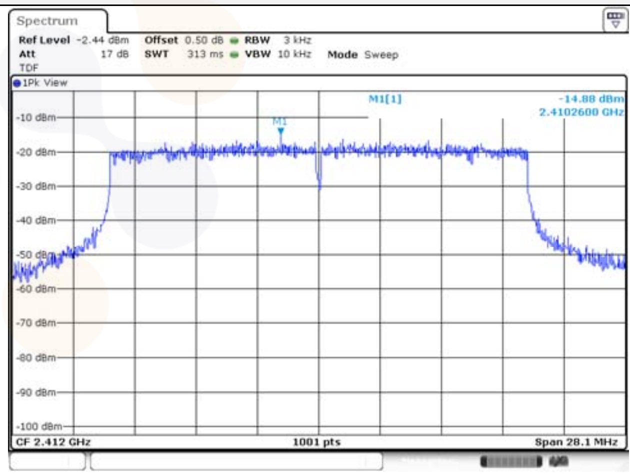
<td>
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26T / 2 437 ㎒

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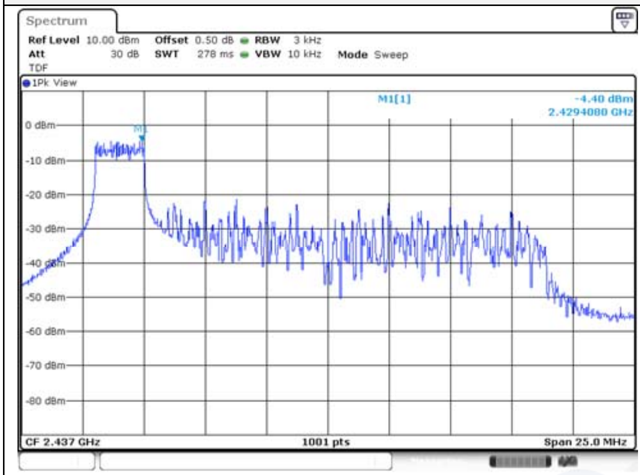

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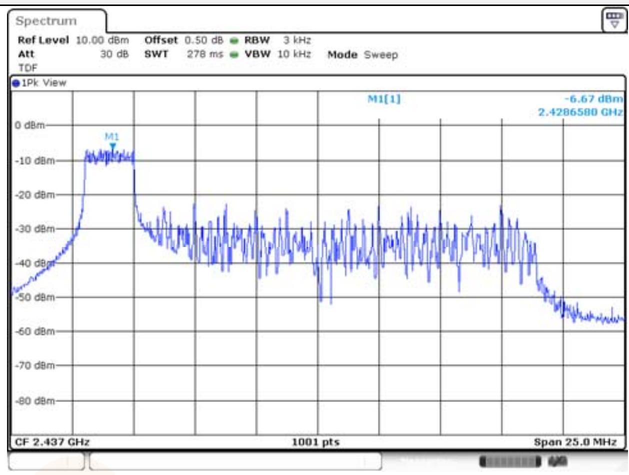

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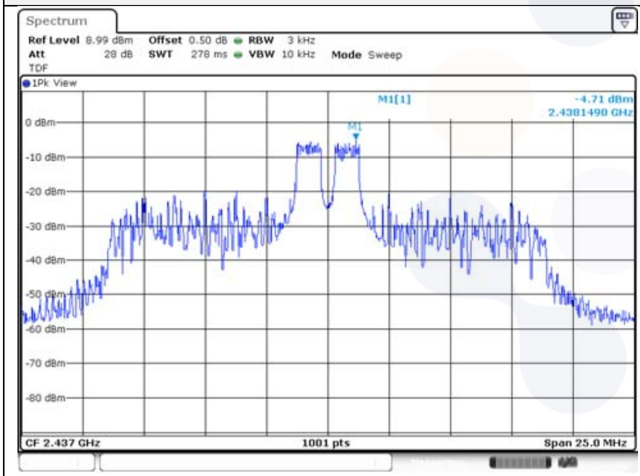

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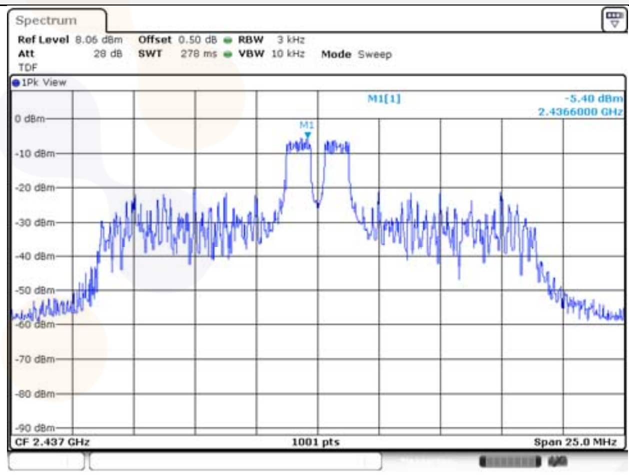

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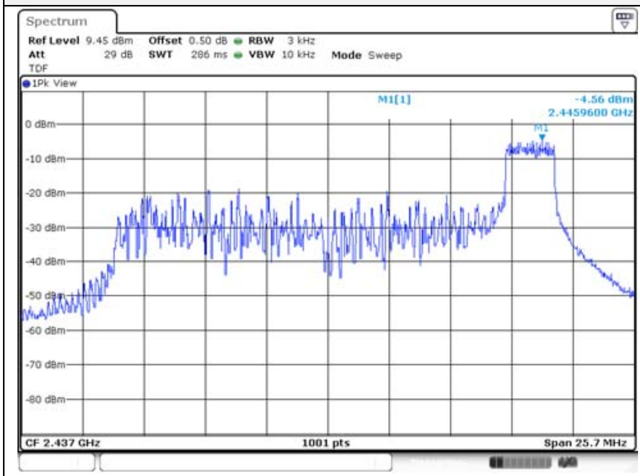

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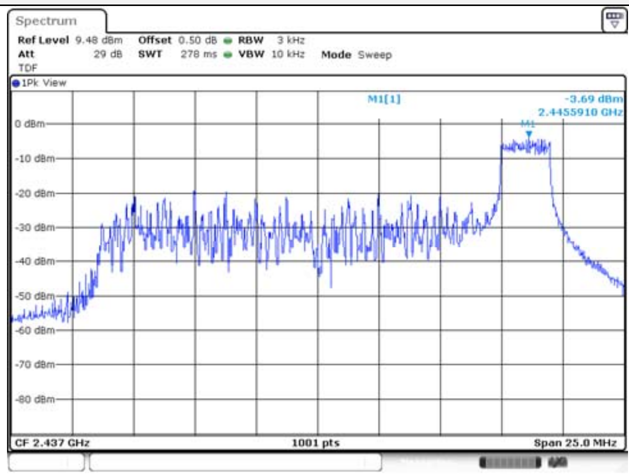

52T / 2 437 ㎒	
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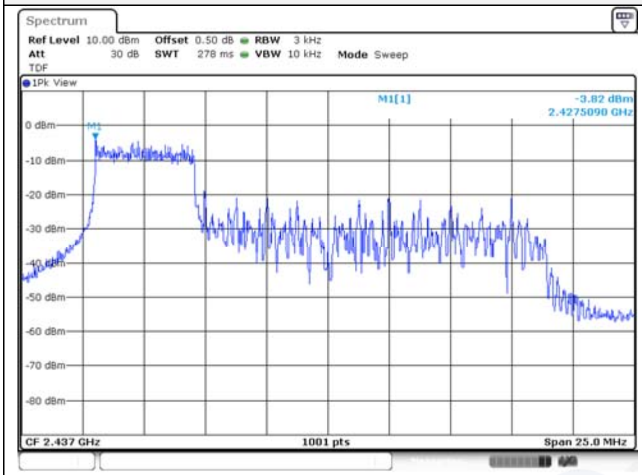	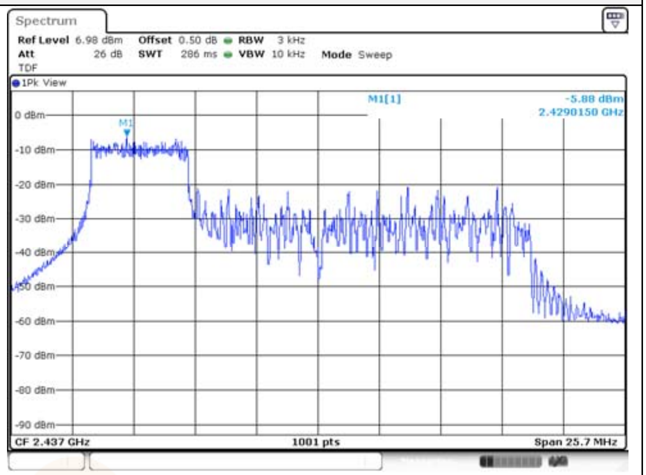
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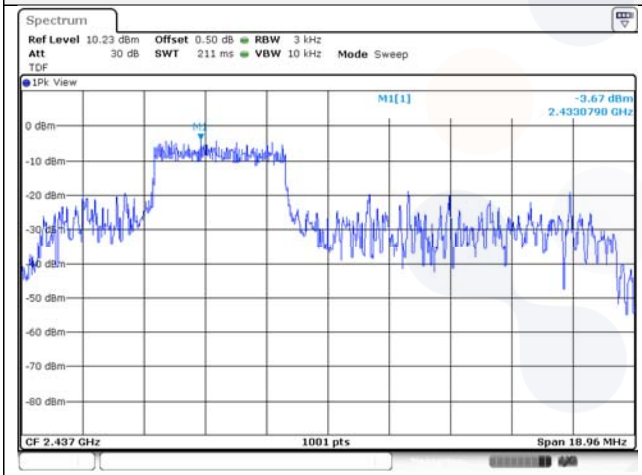	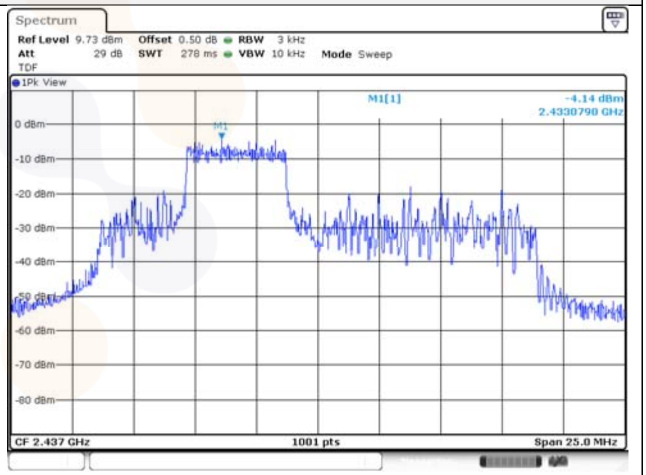
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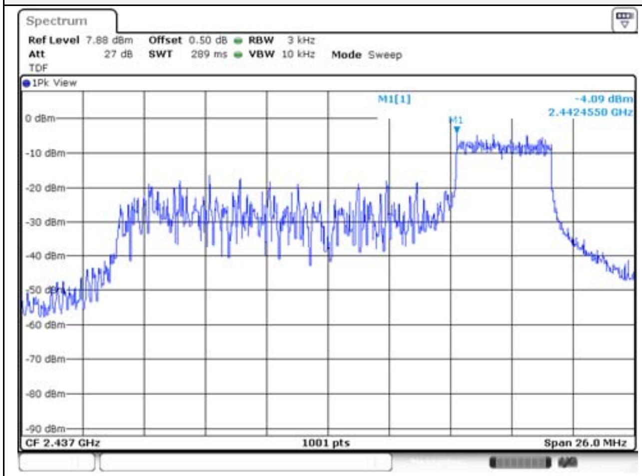	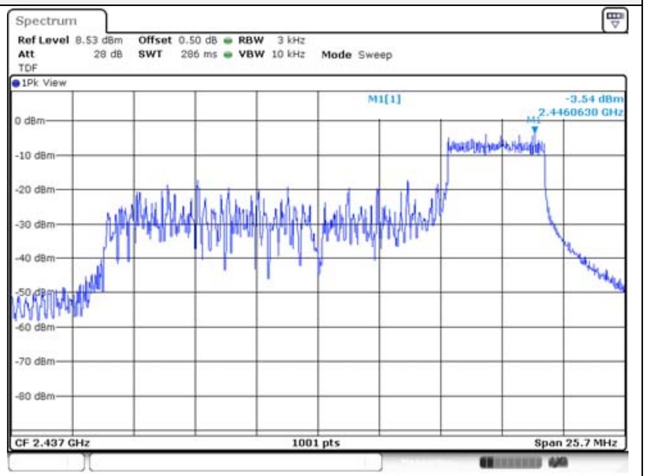

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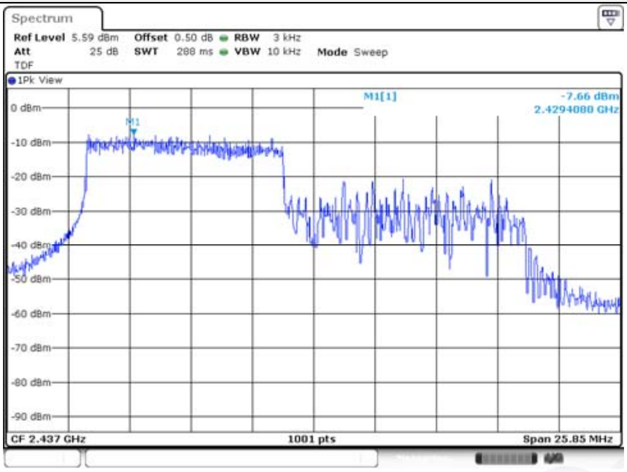
ANT 1 — RU offset 53



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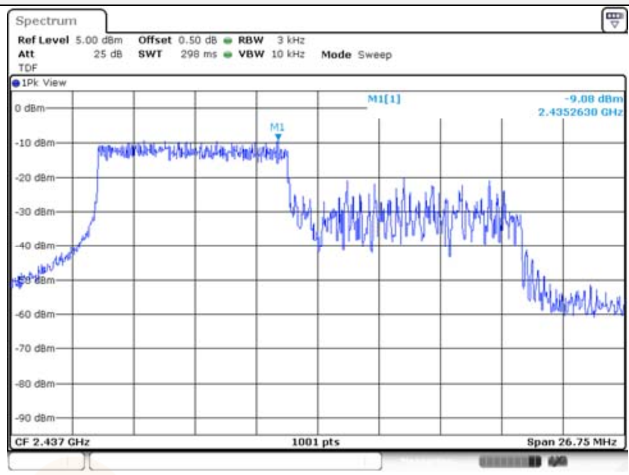

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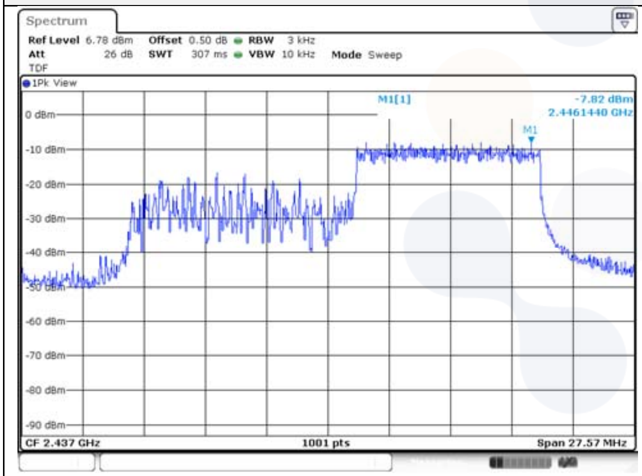

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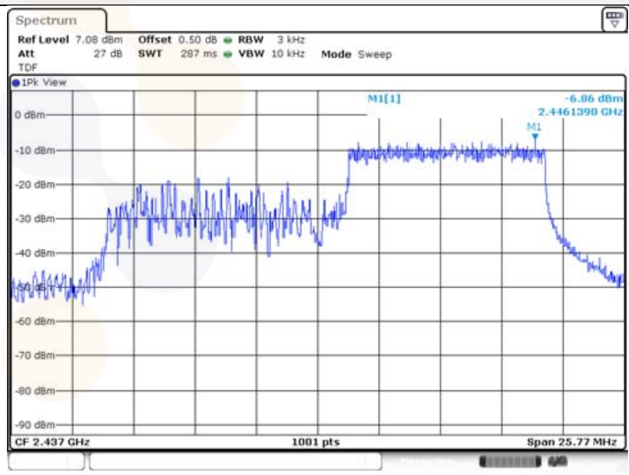

242T / 2 437 ㎒	
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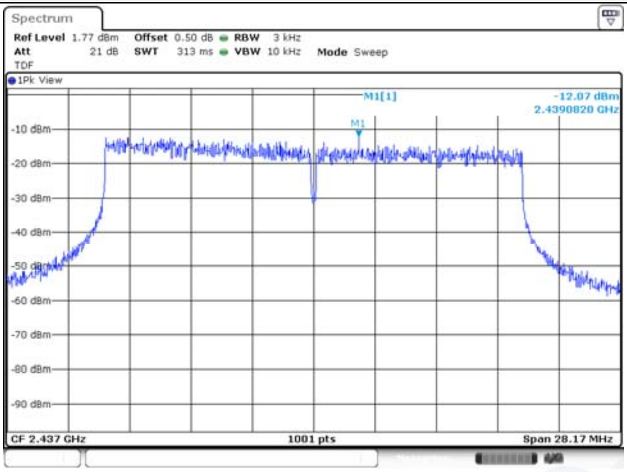
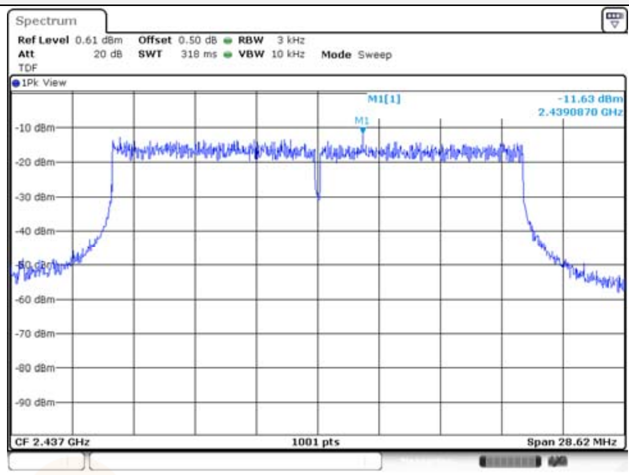
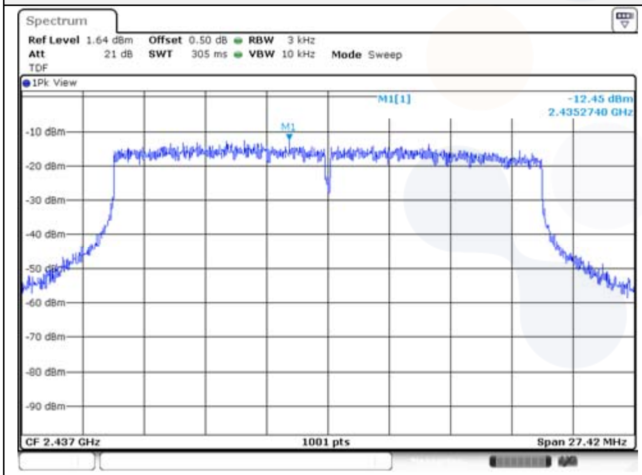
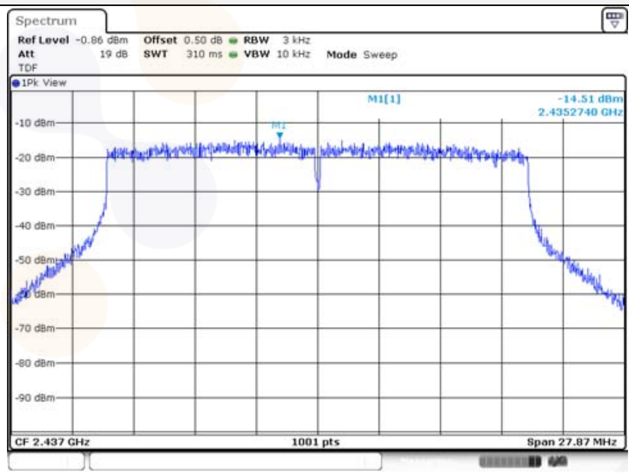
ANT 1	ANT 2
	
SU / 2 437 ㎒	
ANT 1	ANT 2
	

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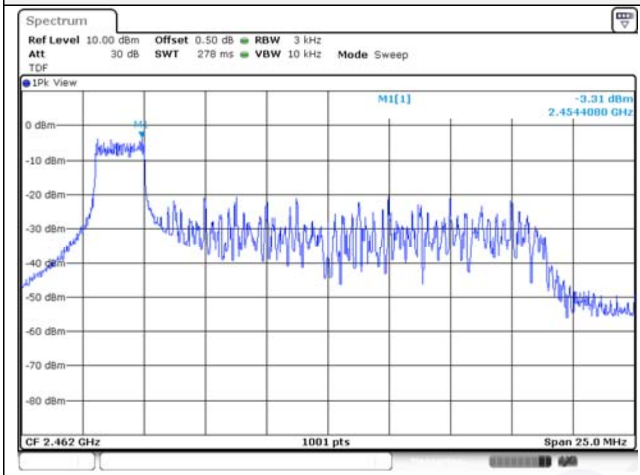
ANT 1 — RU offset 0



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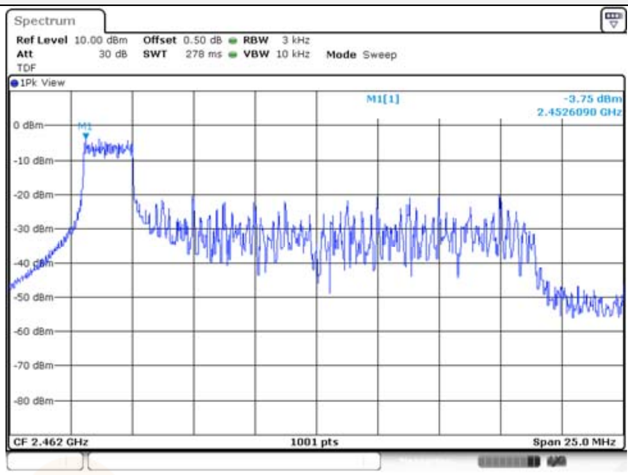

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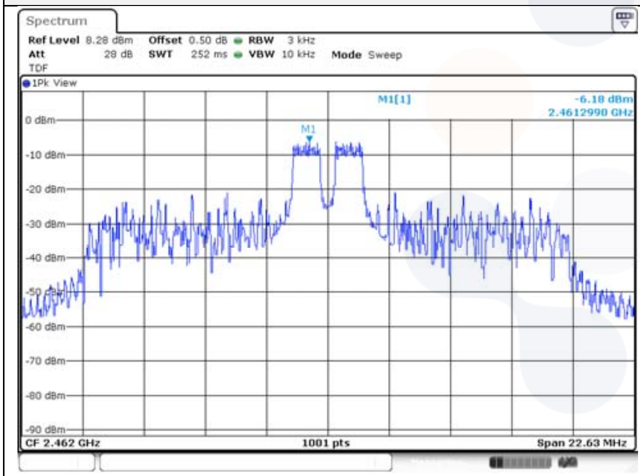

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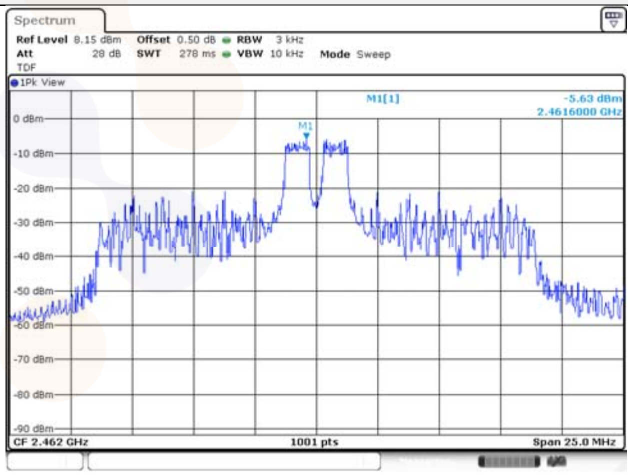

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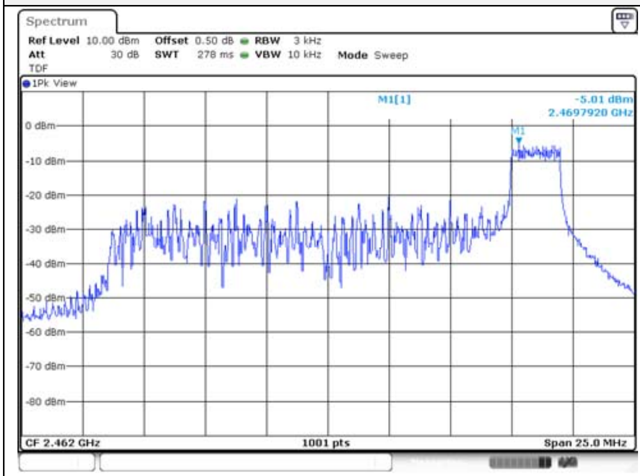

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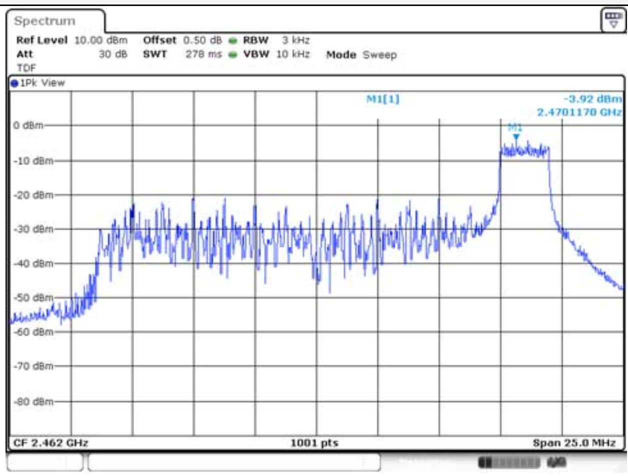

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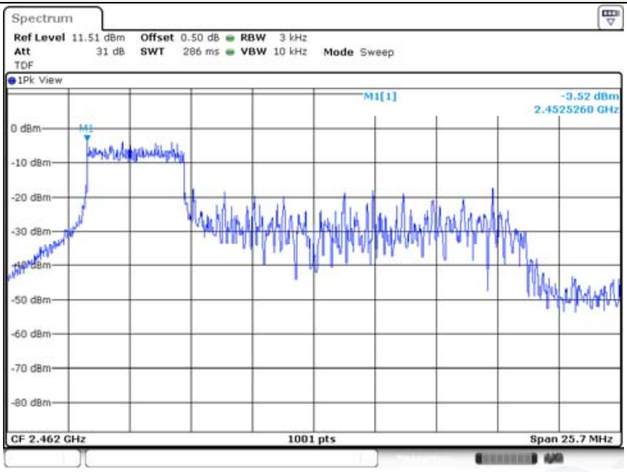
RU offset 37

ANT 1



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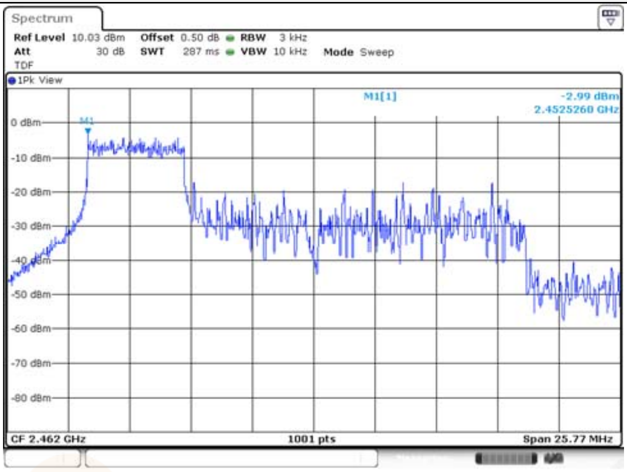
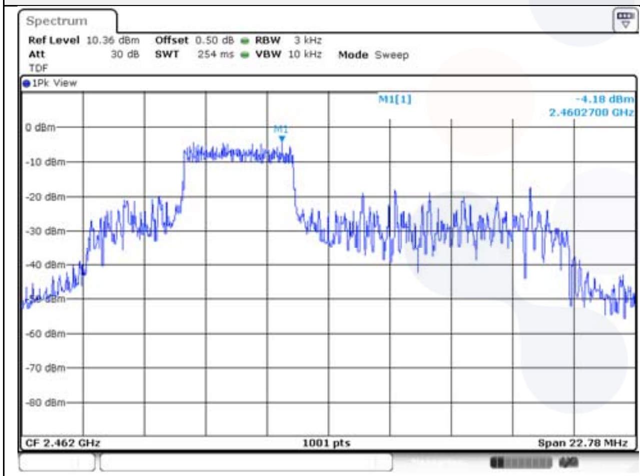


RU offset 38

ANT 1



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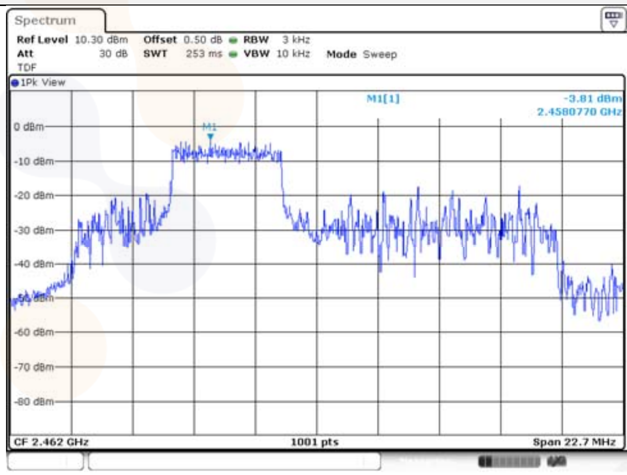
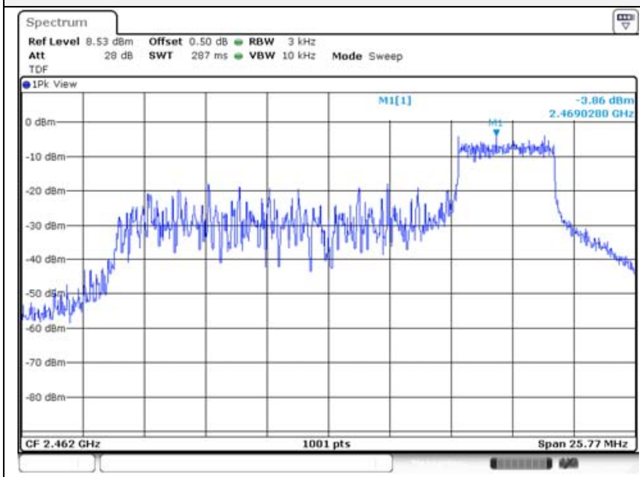


RU offset 40

ANT 1



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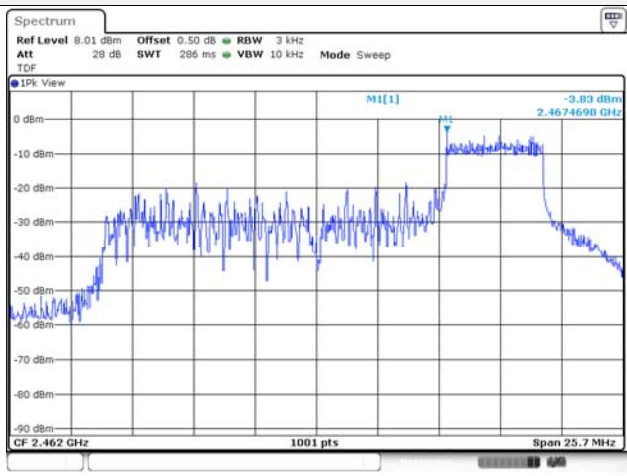

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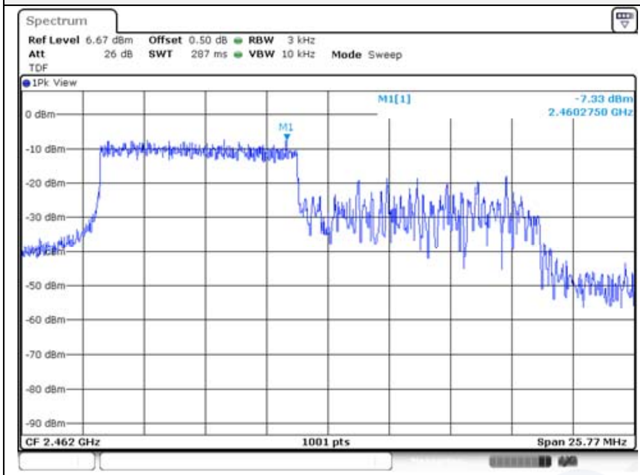
<tr><td>
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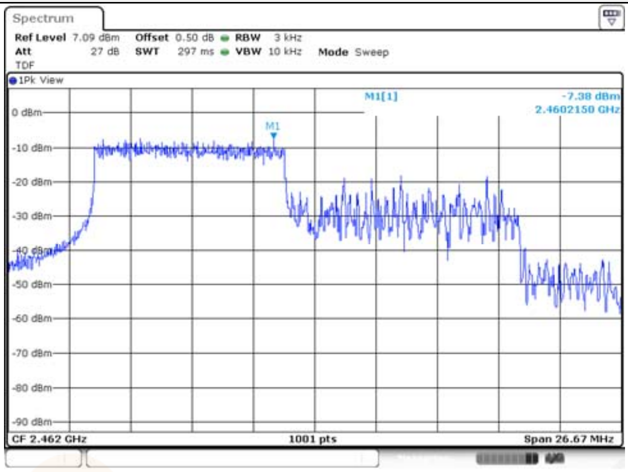
<td>
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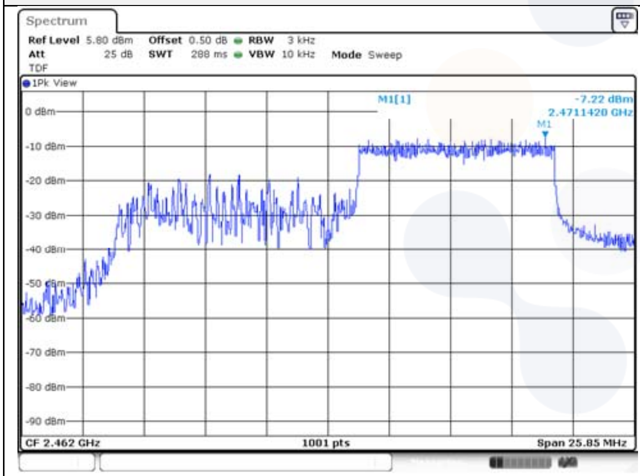
<tr><td>
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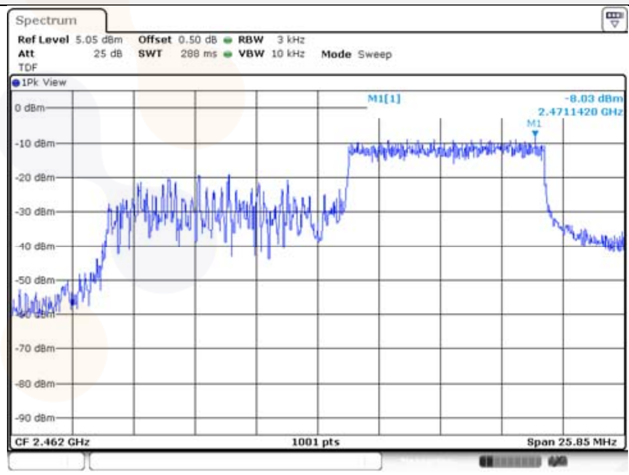
<td>
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