CERTIFICATION TEST REPORT

Report Number. : 4789219881-E4V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-G986B/DS, SM-G986B
FCC ID	:	A3LSMG986B
EUT Description	:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+, NFC and WPT
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
December 16, 2019

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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	12/09/19	Initial issue	Sungeun Lee
V2	12/12/19	Updated to address TCB's question	Sungeun Lee
V3	12/16/19	Updated to address TCB's question	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+, NFC and WPT
MODEL NUMBER:	SM-G986B/DS, SM-G986B
SERIAL NUMBER:	R3CM90336DM, R3CM9030DBT, R3CM90FS9RV (CONDUCTED) R3CM9033F1L, R3CM9033H2J, R3CM90FSA4H (RADIATED);
DATE TESTED:	OCT 22, 2019 – NOV 22, 2019;

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Sungeun Lee
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 DTS Meas Guidance v05r02.
4. ANSI C63.10-2013.
5. KDB 662911 D01 v02r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☐ Chamber 2
☒ Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at http://www.iasonline.org/wp-content/uploads/2017/05/TL-637.pdf.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

Uncertainty figures are valid to a confidence level of 95%.

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+, NFC and WPT. This test report addresses the DTS (WLAN) operational mode.

This report covers the Samsung models SM-G986B/DS and SM-G986B.
These models are identical in hardware except SM-G986B has single SIM tray.
With some pre-scan, model SM-G986B/DS was set for final test.

WiFi Operating mode

Frequency rage	Mode	Antenna 1	Antenna 2
2.4GHz (2412 MHz ~ 2472 MHz)	802.11ax(HE20) SISO	TX/RX	TX/RX
	802.11ax(HE20) MIMO	TX/RX	TX/RX

Simultaneous TX Condition

Simultaneous Tx Condition - RSDB

Mode	# of TX	5GHz		2.4GHz		Test Case
		ANT1	ANT2	ANT1	ANT2	
2.4GHz + 5GHz RSDB Only	**2**	**A**	**-**	**-**	**A**	**V**
	2	**-**	**A**	**A**	**-**	**V**
	2	A	-	A	-	-
	2	-	A	-	A	-
2.4GHz + 5GHz RSDB & MIMO	3	A	A	A	-	-
	3	A	A	-	A	-
	3	A	-	A	A	-
	3	-	A	A	A	-
2.4GHz + 5GHz RSDB MIMO	**4**	**A**	**A**	**A**	**A**	**V**

Note. A = 13 dBm

Simultaneous Tx Condition - Bluetooth with 5GHz WLAN (Not RSDB)

Mode	# of TX	5GHz		2.4GHz Bluetooth	Test Case
		ANT1	ANT2	ANT1	
2.4GHz Bluetooth + 5GHz WLAN (Not RSDB)	2	A	-	B	-
	2	-	A	B	-
	3	**A**	**A**	**B**	**V**

Note1. A = 13 dBm, B = 16.5 dBm
Note2. Spurious Emissions for Simultaneous Transmission were reported on the UNII 802.11ax test report(4789219881-E8).

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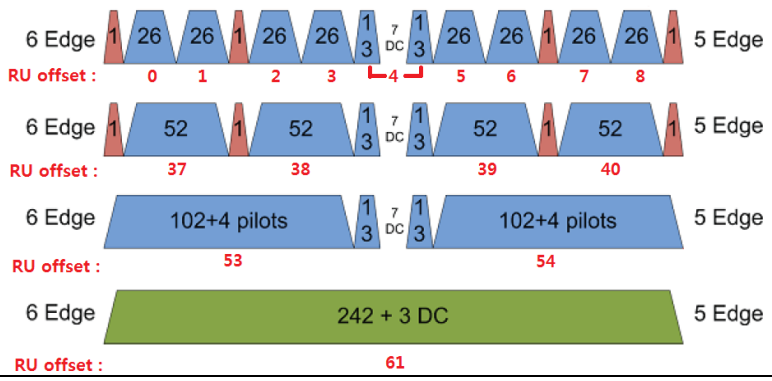
802.11ax RU allocations



HE20

Test RU offset for tones

Mode	Tones number in RU	RU offset
HE20	26T	0
		4
		8
	52T	37
		38
		40
	106T	53
		54
	242T / SU Note 1	61 / -

Note 1: Full RU(Resource Unit) 242T mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in SISO and the SU mode with highest output power in MIMO.

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5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Frequency Range [MHz]	Mode	Output Power [dBm]		Output Power [mW]	
		ANT1	ANT2	ANT1	ANT2
2412 - 2472	802.11ax HE20 SISO	16.94	16.94	49.43	49.43
	802.11ax HE20 MIMO	**19.32**		**85.51**	

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The internal antenna was Permanently attached.
Therefore this E.U.T Complies with the requirement of §15.203.

The radio utilizes an internal antennas, with ANT1's maximum gain of -6.46 dBi and ANT2's maximum gain of -6.00 dBi

"Sub2 WiFi1" and "Sub7 WiFi2" as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.4. LIST OF TEST REDUCTION AND MODES

The output power on covered modes is equal to or less than one referenced.

Frequency Range [MHz]	Mode	Coverd by
2412 - 2472	802.11ax HE20 RU 242T mode 1TX	802.11ax HE20 SU mode 1TX
	802.11ax HE20 RU 242T mode 2TX	802.11ax HE20 SU mode 2TX

5.5. TESTED CHANNELS LIST

802.11ax Mode	Channel	Frequency (MHz)
Reduction Low	1	2412
Low	2	2417
Mid	6	2437
High	10	2457
Reduction High 1	11	2462
Reduction High 2	12	2467
Reduction High 3	13	2472

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

For SISO (ANT1), the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.
For SISO (ANT2), the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.
For MIMO, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Based on the baseline scan, the worst-case data rates were:
802.11ax HE20 mode: MCS0 (1TX)
802.11ax HE20 mode: MCS0 (2TX)

Worst-case selection criteria for test items :

- For the radiated band-edge test, it was tested at SU mode for band-edge.

- For the spurious emissions, it was tested at the bandwidth/RU allocation with actual highest power and bandwidth/RU allocation with actual highest PSD for each bandwidth.

- For the 6dB Bandwidth, it was tested at the RU allocation with lowest tones number for each bandwidth.

Note : All radiated and power line conducted tests were performed attached with travel adapter for the worst case condition mode.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37M5DX86X1SE3	N/A
Data Cable	SAMSUNG	EP-DG977	N/A	N/A

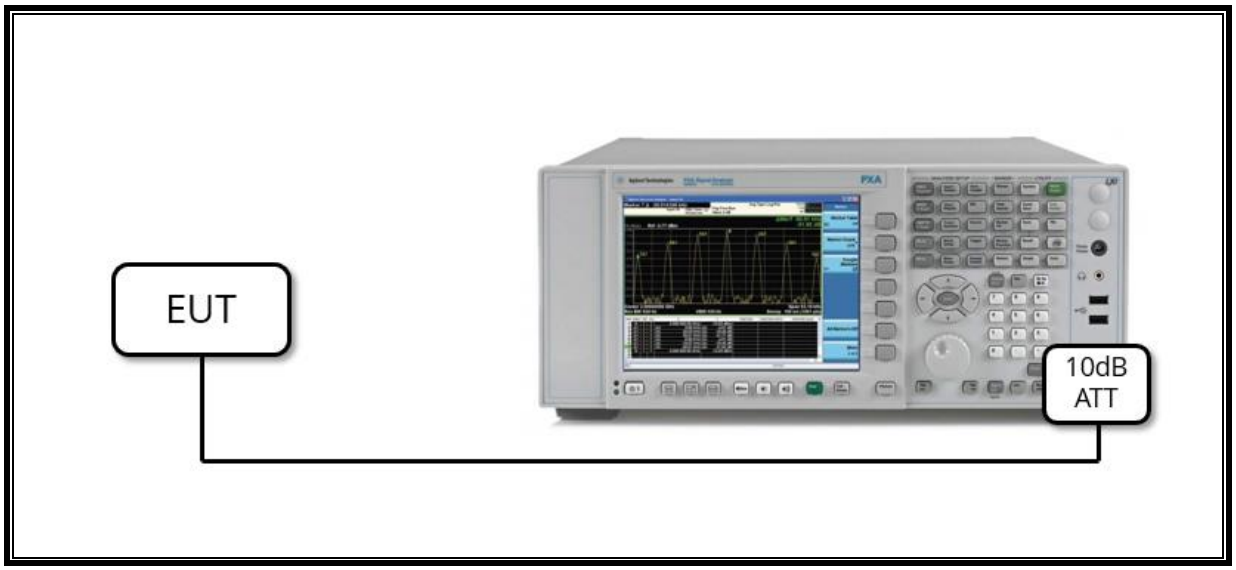
I/O CABLE

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0m	N/A

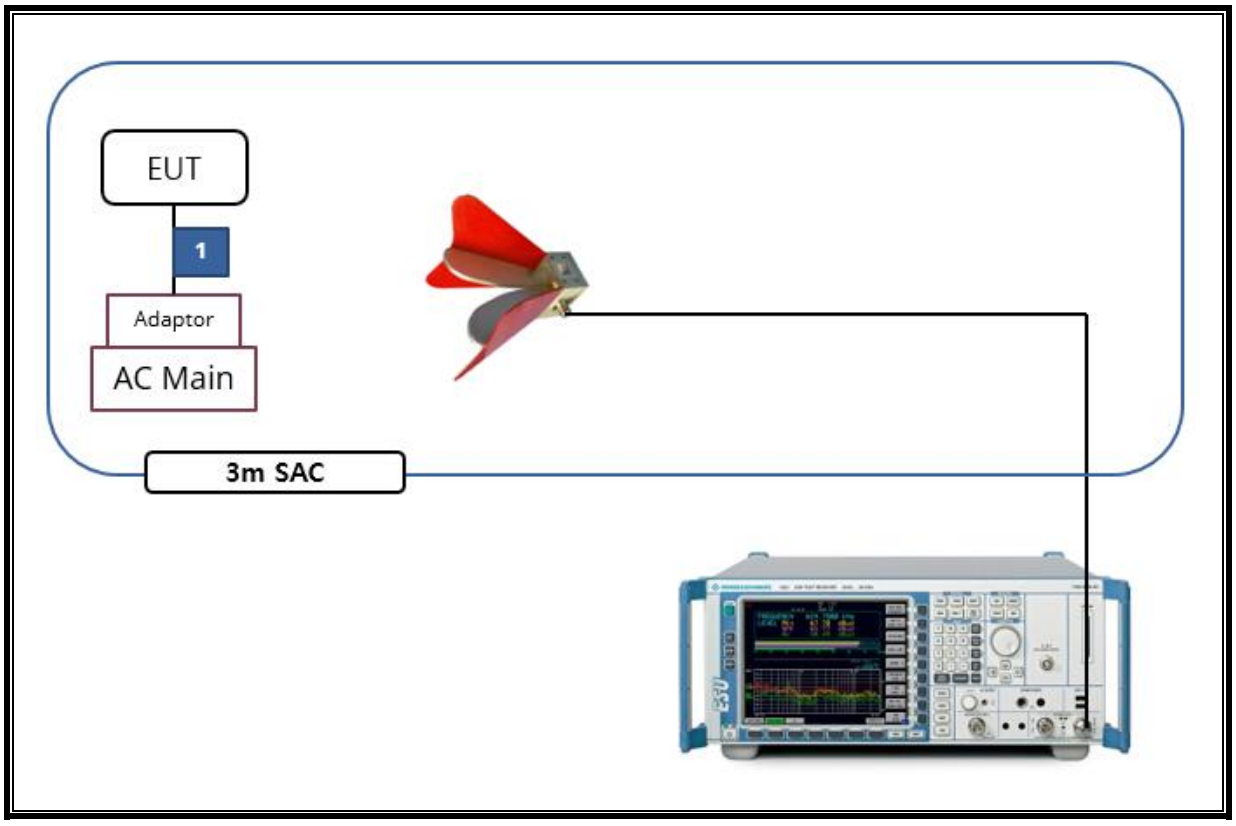
TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software in hidden menu exercised the EUT to enable DTS mode.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**New Cal Due**
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	08-04-20
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-14-20
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-08-20
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-05-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-20
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20
Attenuator	PASTERNACK	PE7087-10	A001	08-08-20
Attenuator	PASTERNACK	PE7087-10	A008	08-08-20
Attenuator	PASTERNACK	PE7004-10	2	08-06-20
Attenuator	PASTERNACK	PE7087-10	A009	08-08-20
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-05-20
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-06-20
LISN	R&S	ENV-216	101837	08-09-20
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21

Antenna, Loop, 9kHz-30MHz			
Description	**Manufacturer**	**Model**	**Version**
Radiated software	UL	UL EMC	Ver 9.5
AC Line Conducted software	UL	UL EMC	Ver 9.5

7. REFERENCE MEASUREMENT RESULTS

7.1. ON TIME AND DUTY CYCLE RESULTS

LIMITS

None; for reporting purposes only.

Mode	ANT	Tone	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
802.11ax HE20	Single	26T	4.898	4.944	0.99	99.07	0.00	0.204
		52T	5.214	5.316	0.98	98.08	0.00	0.192
		106T	2.489	2.590	0.96	96.10	0.17	0.402
		242T	1.122	1.222	0.92	91.82	0.37	0.891
		SU	1.044	1.145	0.91	91.18	0.40	0.958
	ALL	26T	5.223	5.324	0.98	98.10	0.00	0.191
		52T	2.649	2.750	0.96	96.33	0.16	0.378
		106T	1.284	1.385	0.93	92.71	0.33	0.779
		242T	0.601	0.701	0.86	85.66	0.67	1.664
		SU	0.557	0.658	0.85	84.76	0.72	1.794

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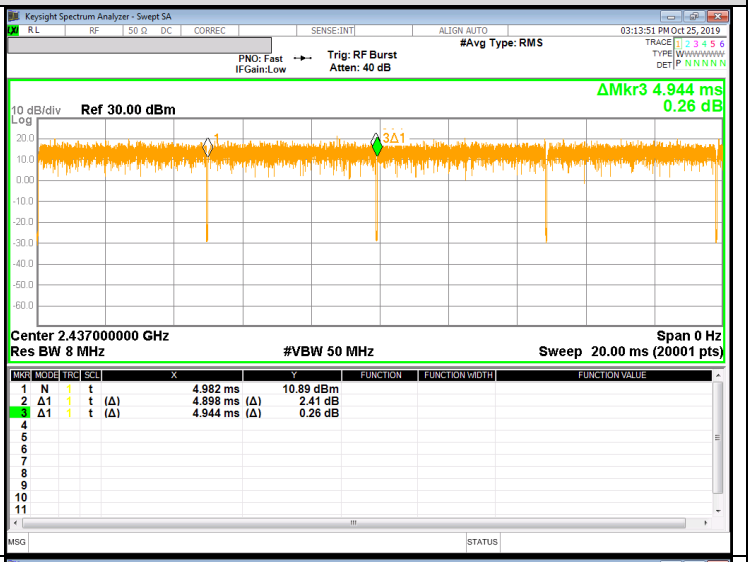
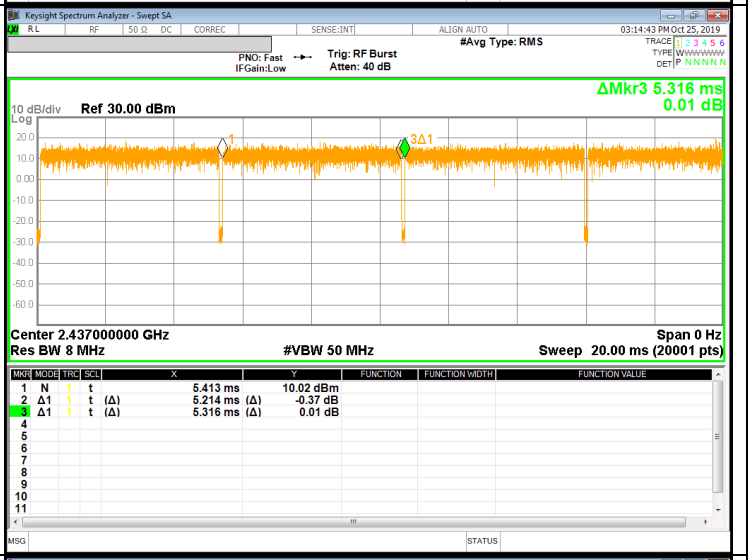
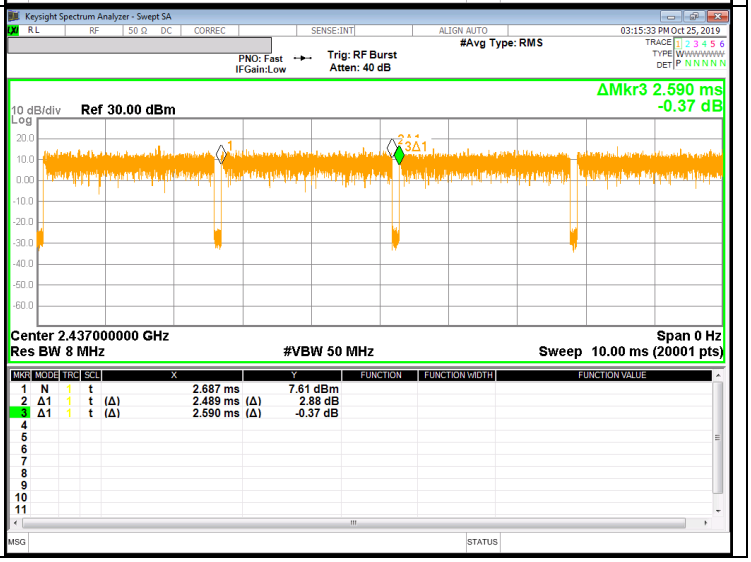
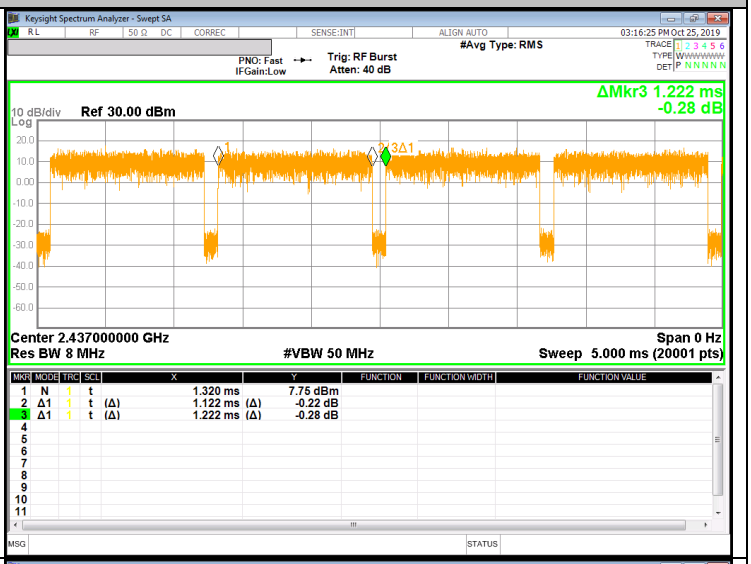
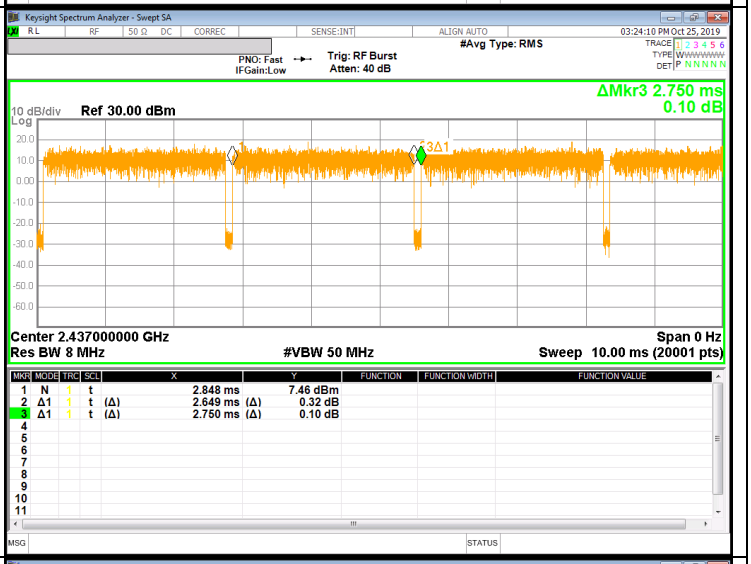
7.1.1. ON TIME AND DUTY CYCLE PLOT

ANT	Mode (Tones)	Tset Plot
Single	26T	
	52T	
	106T	

ANT	Mode (Tones)	Tset Plot
Single	242T	
	SU	

ANT	Mode (Tones)	Tset Plot
MIMO	26T	
	52T	
	106T	

ANT	Mode (Tones)	Tset Plot
MIMO	242T	
	SU	

8. MEASUREMENT METHODS

6 dB BW : KDB 558074 D01 v05r02, Section 8.2

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.2.3.

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band EMISSIONS (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN RESTRICTED BANDS KDB 558074 D01 v05r02, Section 8.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

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9. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Band width (6dB)	>500kHz	Conducted	Pass
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-30dBc		Pass
15.247 (b)(3)	TX conducted output power	<30dBm		Pass
15.247 (e)	PSD	<8dBm		Pass
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

Reference to KDB 558074 D01 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to100 kHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

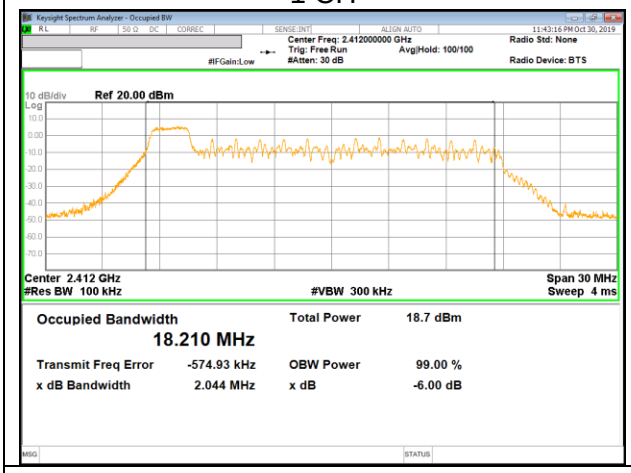
10.1.1. 802.11ax HE20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	Tones	RU offset	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
				ANT1	ANT2	
1	2412	26T	0	2.044	2.059	0.5
2	2417			2.075	2.073	
6	2437			2.071	2.083	
10	2457			2.070	2.013	
11	2462			2.019	2.060	
12	2467			2.038	2.064	
13	2472			2.058	2.075	
Worst				**2.019**	**2.013**	

10.1.2. 6 dB BANDWIDTH PLOTS

1TX_ANT 1_26T_0RU

1 CH



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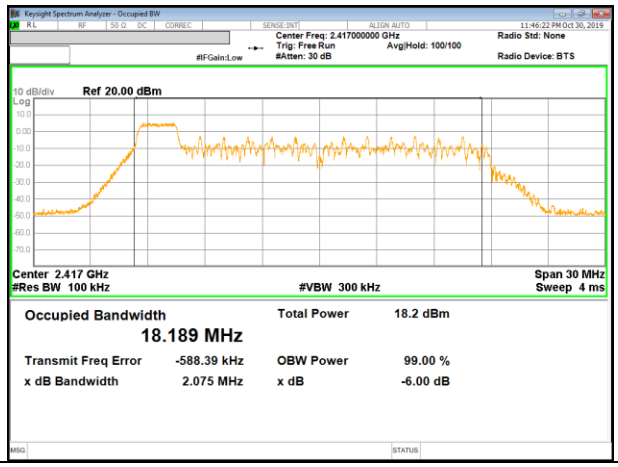

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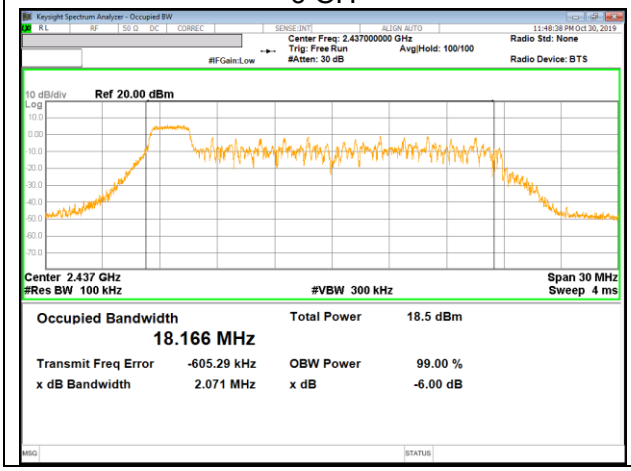

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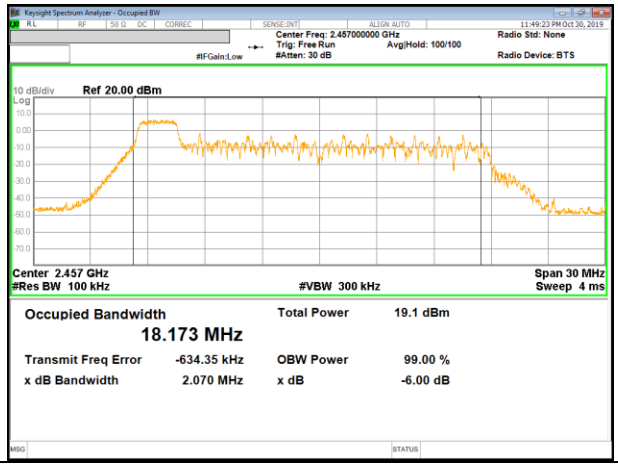

1TX_ANT 1_26T_0RU

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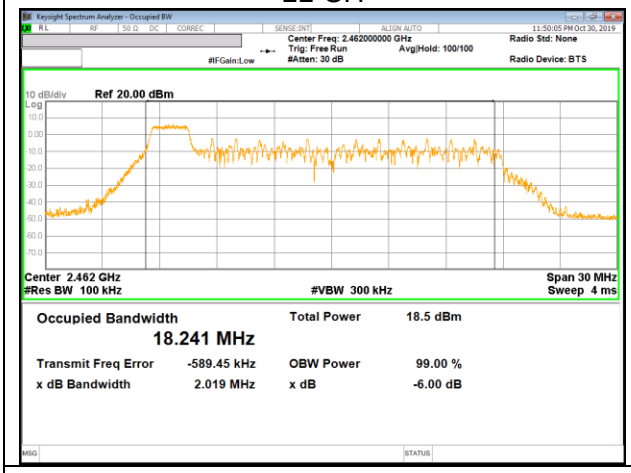

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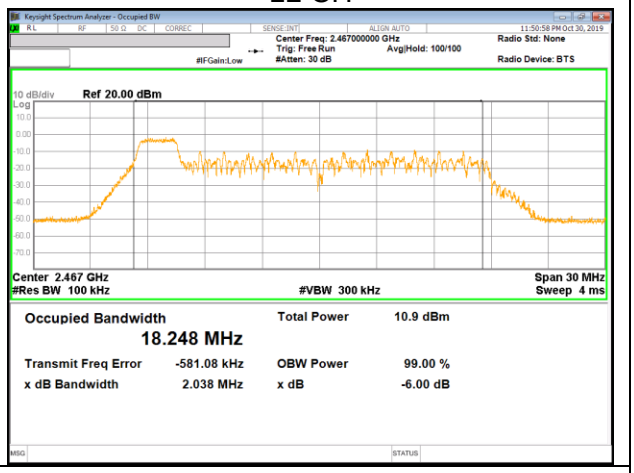
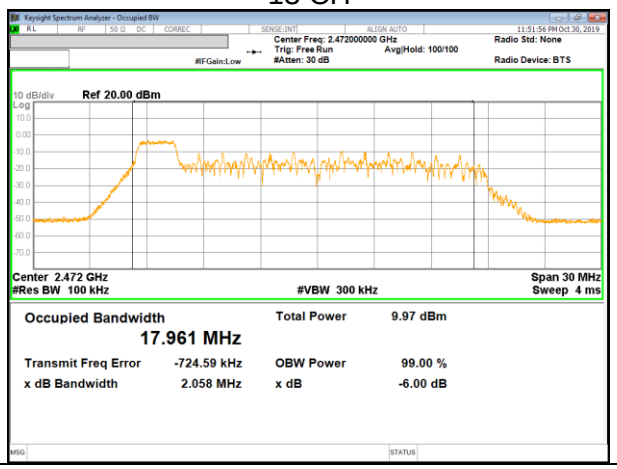
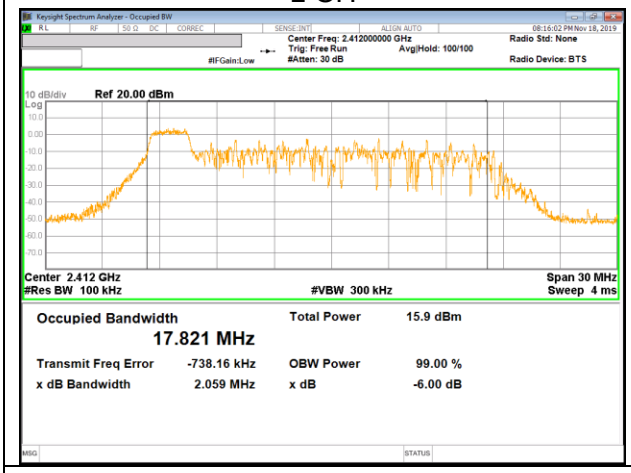


13 CH

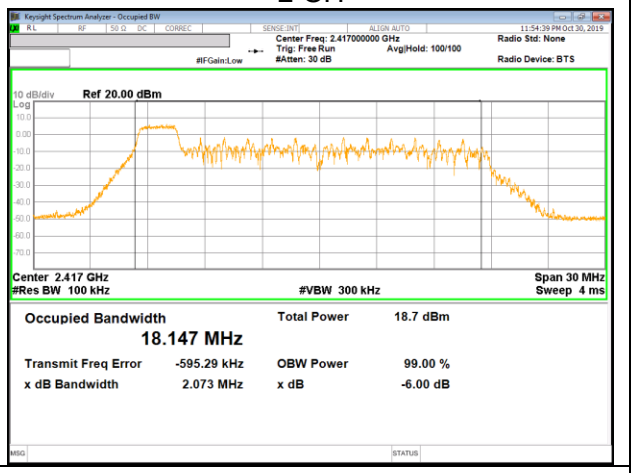


1TX_ANT 2_26T_0RU

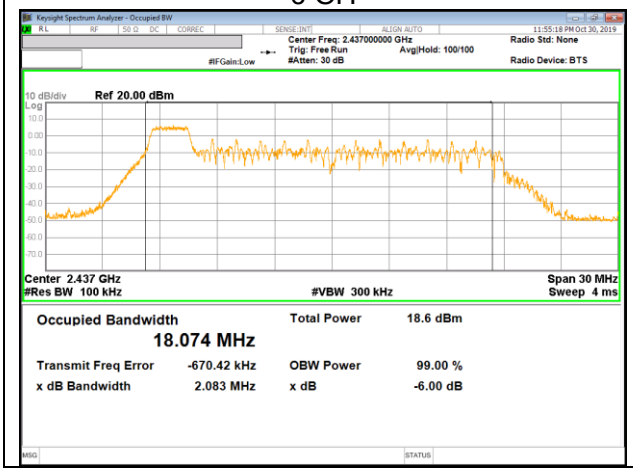
1 CH



2 CH



6 CH



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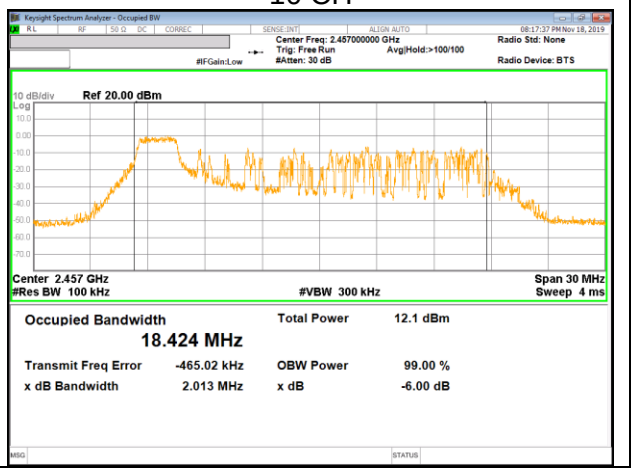
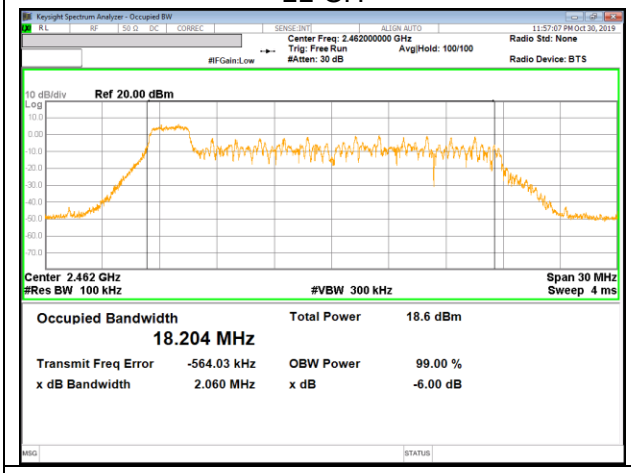


1TX_ANT 2_26T_0RU

11 CH



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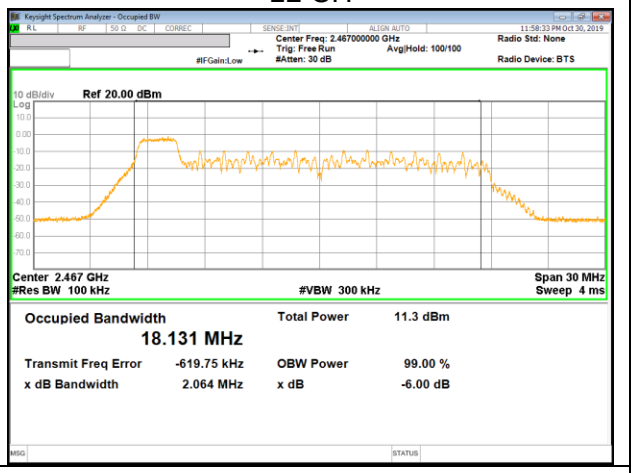

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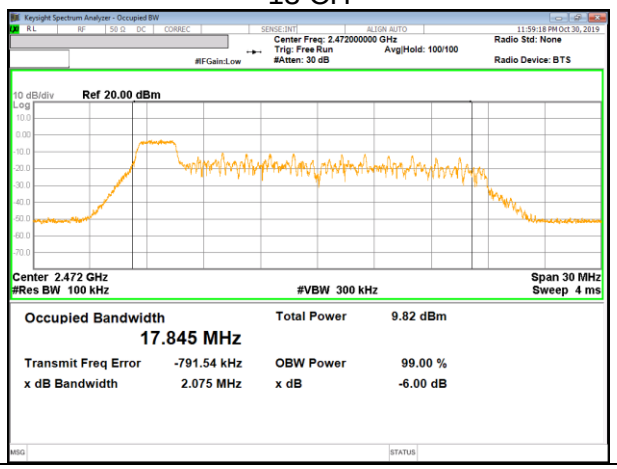

10.2. OUTPUT POWER

LIMITS

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power.

Output power measurement was performed utilizing the 8.3.2.3 under KDB558074 D01 15.247 Meas Guidance.

Duty cycle correction factor is already added to the average output power results for duty cycle factor < 98%.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains.
The directional gain is:

2.4GHz

Bands (MHz)	ANT 1 [dBi]	ANT 2 [dBi]	Correlated Directional Gain [dBi]
2412-2472	-6.46	-6.00	-3.22

RESULTS

10.2.1. 802.11ax HE20 SISO MODE IN THE 2.4 GHz BAND

Frequency Range [MHz]	ANT Gain		FCC Power Limit [dBm]	Max Power [dBm]
	ANT1	ANT2		
2412 - 2472	-6.46	-6.00	30.00	30.00

Included in Calculations of Corr'd Power				
Duty Cycle CF	HE20	26T	0.00	dB
		52T	0.00	dB
		106T	0.17	dB
		SU	0.40	dB

Calculation of Output Power result
→ Corr'd Power = Meas Power + Duty Cycle CF

Channel	Frequency [MHz]	Tones	RU Offset	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
1	2412	26T	0	9.70	9.48	9.70	9.48	30.00
			4	10.20	10.80	10.20	10.80	
			8	9.50	9.36	9.50	9.36	
		52T	37	11.68	11.22	11.68	11.22	
			38	11.41	10.96	11.41	10.96	
			40	11.80	11.96	11.80	11.96	
		106T	53	12.79	13.23	12.96	13.40	
			54	12.89	12.88	13.06	13.05	
		SU	-	13.65	14.38	14.05	14.78	
2	2417	26T	0	9.20	9.46	9.20	9.46	30.00
			4	9.82	10.39	9.82	10.39	
			8	9.15	8.91	9.15	8.91	
		52T	37	11.62	10.84	11.62	10.84	
			38	10.97	11.50	10.97	11.50	
			40	11.76	11.64	11.76	11.64	
		106T	53	13.45	13.04	13.62	13.21	
			54	12.94	13.49	13.11	13.66	
		SU	-	16.54	15.84	16.94	16.24	
6	2437	26T	0	9.92	9.88	9.92	9.88	30.00
			4	10.04	10.16	10.04	10.16	
			8	9.61	9.49	9.61	9.49	
		52T	37	11.24	10.74	11.24	10.74	
			38	10.70	11.16	10.70	11.16	
			40	10.96	11.76	10.96	11.76	
		106T	53	13.44	12.94	13.61	13.11	
			54	12.95	13.59	13.12	13.76	
		SU	-	15.66	16.54	16.06	16.94	

10	2457	26T	0	9.66	10.20	9.66	10.20	30.00
			4	9.91	10.72	9.91	10.72	
			8	8.92	9.82	8.92	9.82	
		52T	37	11.13	11.10	11.13	11.10	
			38	11.30	11.35	11.30	11.35	
			40	11.46	11.16	11.46	11.16	
		106T	53	13.33	13.51	13.50	13.68	
			54	13.71	13.73	13.88	13.90	
		SU	-	16.01	15.91	16.41	16.31	
11	2462	26T	0	9.52	9.50	9.52	9.50	30.00
			4	10.06	10.40	10.06	10.40	
			8	10.01	9.15	10.01	9.15	
		52T	37	10.68	11.50	10.68	11.50	
			38	11.17	11.84	11.17	11.84	
			40	10.73	11.88	10.73	11.88	
		106T	53	13.04	12.95	13.21	13.12	
			54	12.88	13.69	13.05	13.86	
		SU	-	12.85	13.16	13.25	13.56	
12	2467	26T	0	1.99	2.30	1.99	2.30	30.00
			4	2.82	2.88	2.82	2.88	
			8	2.60	1.80	2.60	1.80	
		52T	37	2.20	2.62	2.20	2.62	
			38	2.60	2.77	2.60	2.77	
			40	2.88	2.48	2.88	2.48	
		106T	53	2.20	2.96	2.37	3.13	
			54	2.89	2.84	3.06	3.01	
		SU	-	2.40	2.83	2.80	3.23	
13	2472	26T	0	0.85	1.02	0.85	1.02	30.00
			4	0.80	0.90	0.80	0.90	
			8	0.01	0.30	0.01	0.30	
		52T	37	1.36	0.67	1.36	0.67	
			38	0.92	1.18	0.92	1.18	
			40	0.61	0.51	0.61	0.51	
		106T	53	0.30	1.15	0.47	1.32	
			54	1.13	1.11	1.30	1.28	
		SU	-	0.13	0.56	0.53	0.96	

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10.2.2. 802.11ax HE20 MIMO MODE IN THE 2.4 GHz BAND

Frequency Range [MHz]	ANT Gain Correlated Chain Directional Gain [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
2412 - 2472	-3.22	30.00	30.00

Included in Calculations of Corr'd Power				
Duty Cycle CF	HE20	26T	0.00	dB
		52T	0.16	dB
		106T	0.33	dB
		SU	0.72	dB

Calculation of Output Power result
→ Total Corr'd Power = ANT1 Power + ANT2 Power + Duty Cycle CF

Channel	Frequency [MHz]	Tones	RU Offset	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
1	2412	26T	0	6.54	6.64	9.60	30.00
			4	7.20	7.54	10.38	
			8	6.30	6.21	9.27	
		52T	37	7.65	7.36	10.68	
			38	8.73	8.35	11.71	
			40	8.28	7.93	11.28	
		106T	53	9.77	10.01	13.23	
			54	10.27	10.28	13.62	
		SU	-	13.50	13.53	17.25	
2	2417	26T	0	6.24	6.92	9.60	30.00
			4	6.98	7.32	10.16	
			8	6.36	6.13	9.26	
		52T	37	6.95	7.85	10.59	
			38	7.69	8.32	11.19	
			40	7.97	7.84	11.08	
		106T	53	9.94	10.50	13.57	
			54	9.92	9.96	13.28	
		SU	-	15.47	15.71	19.32	
6	2437	26T	0	6.90	7.75	10.36	30.00
			4	7.20	6.95	10.09	
			8	6.41	6.60	9.52	
		52T	37	7.68	8.67	11.37	
			38	7.64	7.40	10.69	
			40	8.33	8.17	11.42	
		106T	53	10.07	9.88	13.32	
			54	10.11	9.94	13.37	
		SU	-	15.61	15.39	19.23	

10	2457	26T	0	7.94	6.02	10.10	30.00
			4	7.95	7.77	10.87	
			8	6.47	7.36	9.95	
		52T	37	8.47	6.70	10.84	
			38	8.01	6.64	10.55	
			40	6.91	7.39	10.33	
		106T	53	10.50	9.39	13.32	
			54	9.69	10.69	13.56	
		SU	-	15.56	15.02	19.03	
11	2462	26T	0	7.46	6.48	10.01	30.00
			4	7.02	7.05	10.05	
			8	7.66	7.07	10.39	
		52T	37	8.31	7.28	11.00	
			38	8.62	8.54	11.75	
			40	8.30	8.42	11.53	
		106T	53	10.47	9.50	13.35	
			54	10.30	10.09	13.54	
		SU	-	12.53	12.35	16.17	
12	2467	26T	0	-1.04	11.00	11.26	30.00
			4	-0.90	-0.03	2.57	
			8	-0.22	-1.35	2.26	
		52T	37	-1.04	-0.40	2.46	
			38	-1.66	-0.32	2.23	
			40	-0.35	-1.11	2.46	
		106T	53	-0.98	-0.27	2.73	
			54	0.07	-0.62	3.08	
		SU	-	1.81	2.22	5.75	
13	2472	26T	0	-3.21	-1.51	0.73	30.00
			4	-3.02	-1.91	0.58	
			8	-3.72	-2.92	-0.29	
		52T	37	-3.29	-1.67	0.77	
			38	-3.50	-1.96	0.51	
			40	-3.07	-2.65	0.32	
		106T	53	-4.15	-2.78	-0.07	
			54	-3.41	-3.33	-0.03	
		SU	-	-0.49	-0.28	3.35	

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10.3. PSD

LIMITS

FCC §15.247

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Power Spectral Density was performed utilizing the section8.4 under KDB558074 D01 15.247 Meas Guidance.

RESULTS

10.3.1. 802.11ax HE20 SISO MODE IN THE 2.4 GHz BAND

Included in Calculations of Corr'd Power				
Duty Cycle CF	HE20	26T	0.00	dB
		SU	0.40	dB

Calculation of Output PSD result
1TX
Corr'd PSD = Meas PSD + Duty Cycle CF

Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSD [dBm]		Corr'd PPSD [dBm]		Power Limit [dBm]	Margin [dB]
				ANT1	ANT2	ANT1	ANT2		
1	2412	26T	0	-2.65	-2.75	-2.65	-2.75	8.00	-10.75
			4	-2.13	-1.81	-2.13	-1.81		-9.81
			8	-3.07	-2.52	-3.07	-2.52		-10.52
		SU	-	-7.87	-6.94	-7.47	-6.54		-14.54
2	2417	26T	0	-2.92	-2.53	-2.92	-2.53	8.00	-10.53
			4	-2.33	-1.52	-2.33	-1.52		-9.52
			8	-2.99	-3.54	-2.99	-3.54		-11.54
		SU	-	-6.14	-5.57	-5.74	-5.17		-13.17
6	2437	26T	0	-2.72	-2.47	-2.72	-2.47	8.00	-10.47
			4	-2.03	-2.35	-2.03	-2.35		-10.35
			8	-2.36	-2.73	-2.36	-2.73		-10.73
		SU	-	-6.04	-6.03	-5.64	-5.63		-13.63
10	2457	26T	0	-2.44	-2.09	-2.44	-2.09	8.00	-10.09
			4	-2.54	-1.39	-2.54	-1.39		-9.39
			8	-3.50	-2.55	-3.50	-2.55		-10.55
		SU	-	-5.97	-6.34	-5.57	-5.94		-13.94
11	2462	26T	0	-2.52	-2.88	-2.52	-2.88	8.00	-10.88
			4	-2.33	-2.05	-2.33	-2.05		-10.05
			8	-2.63	-3.02	-2.63	-3.02		-11.02
		SU	-	-9.24	-7.98	-8.84	-7.58		-15.58

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10.3.2. 802.11ax HE20 MIMO MODE IN THE 2.4 GHz BAND

Included in Calculations of Corr'd Power				
Duty Cycle CF	HE20	26T	0.00	dB
		SU	0.72	dB

2TX
Total PSD = ANT1 Meas PSD + ANT2 Meas PSD + Duty Cycle CF

Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSD [dBm]		Total Corr'd PPSD [dBm]	Power Limit [dBm]	Margin [dB]
				ANT1	ANT2			
1	2412	26T	0	-6.38	-5.77	-3.05	8.00	-11.05
			4	-4.00	-4.43	-1.20		-9.20
			8	-5.25	-5.79	-2.50		-10.50
		SU	-	-7.78	-7.56	-3.94		-11.94
2	2417	26T	0	-5.50	-4.90	-2.18	8.00	-10.18
			4	-4.47	-4.40	-1.43		-9.43
			8	-5.97	-6.67	-3.30		-11.30
		SU	-	-5.93	-5.10	-1.77		-9.77
6	2437	26T	0	-5.15	-4.82	-1.97	8.00	-9.97
			4	-4.84	-5.17	-1.99		-9.99
			8	-4.87	-5.54	-2.18		-10.18
		SU	-	-5.89	-5.89	-2.16		-10.16
10	2457	26T	0	-4.11	-6.86	-2.26	8.00	-10.26
			4	-4.30	-4.31	-1.30		-9.30
			8	-6.11	-4.73	-2.35		-10.35
		SU	-	-5.66	-6.19	-2.19		-10.19
11	2462	26T	0	-4.08	-6.43	-2.08	8.00	-10.08
			4	-5.42	-3.43	-1.30		-9.30
			8	-4.80	-5.41	-2.08		-10.08
		SU	-	-9.44	-9.18	-5.57		-13.57

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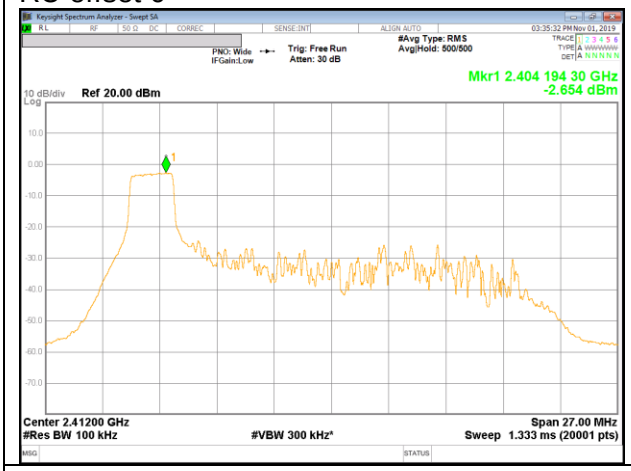
10.3.3. SISO_PSD_RESULT

1 CHANNEL_26T	
ANT1	**ANT2**
RU offset 0	RU offset 0
	
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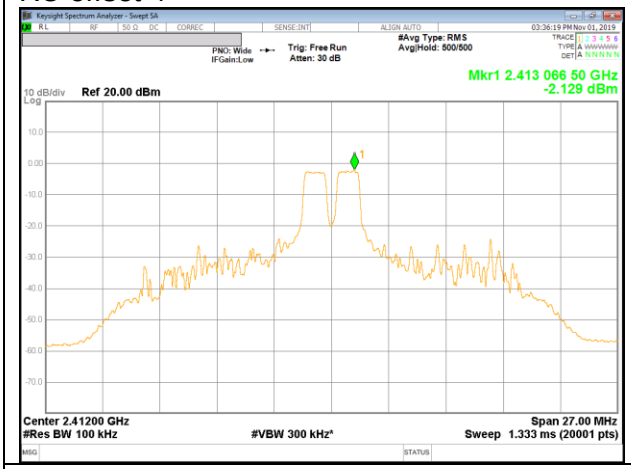	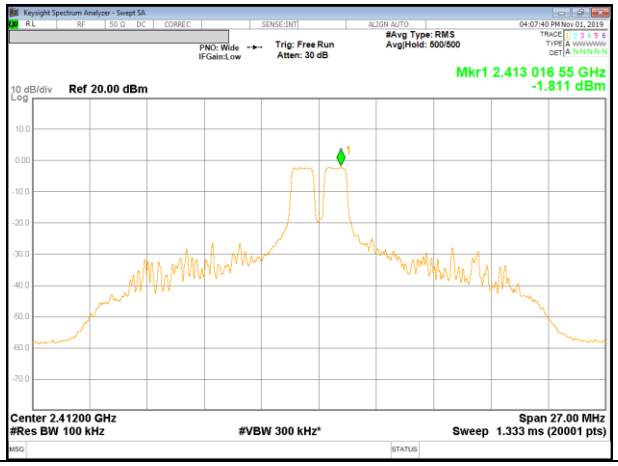
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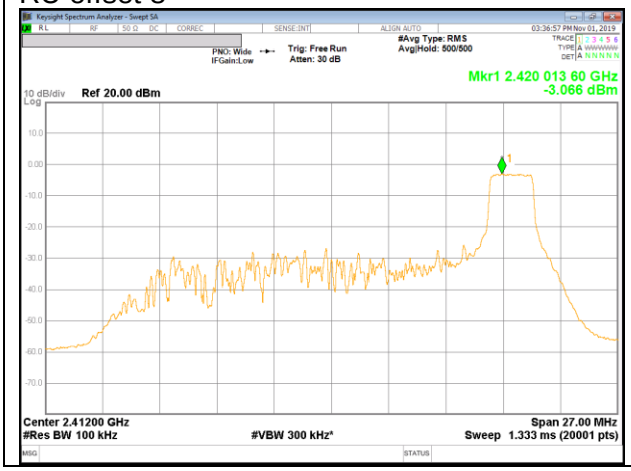
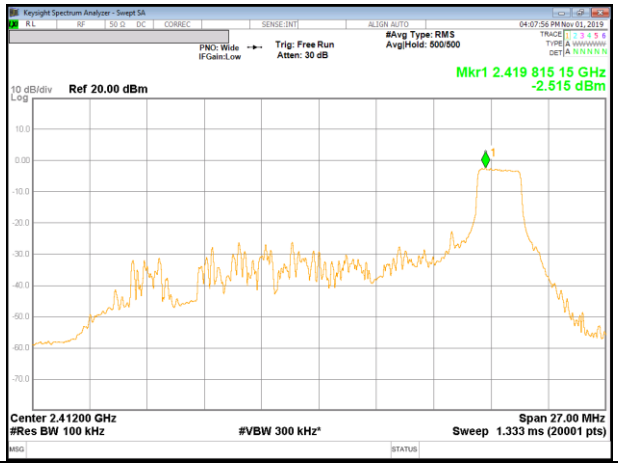
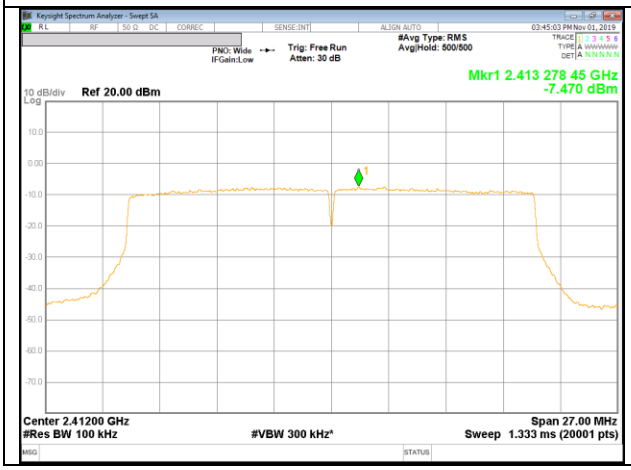
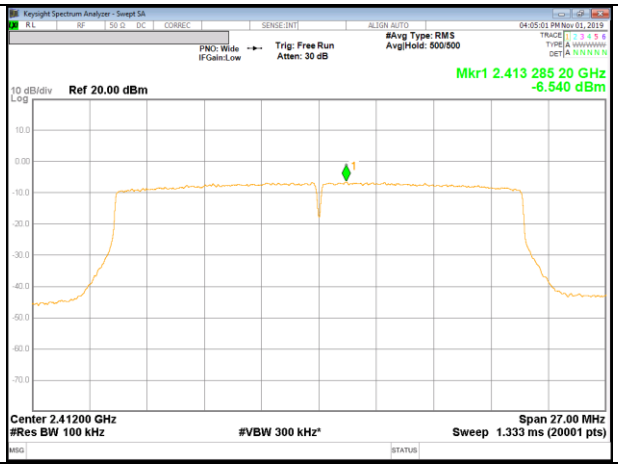
	

1 CHANNEL_SU	
ANT1	**ANT2**
	

2 CHANNEL_26T	
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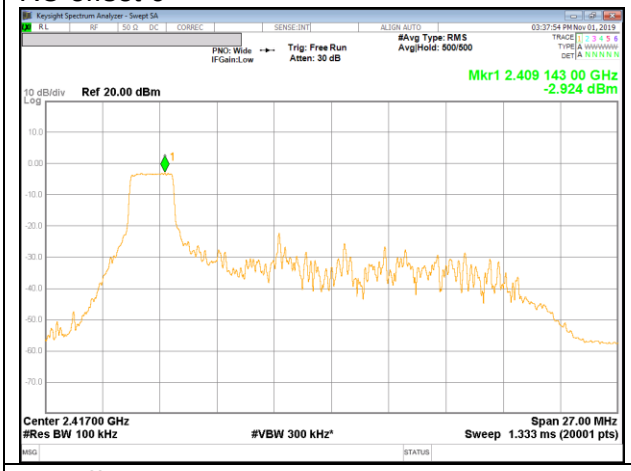	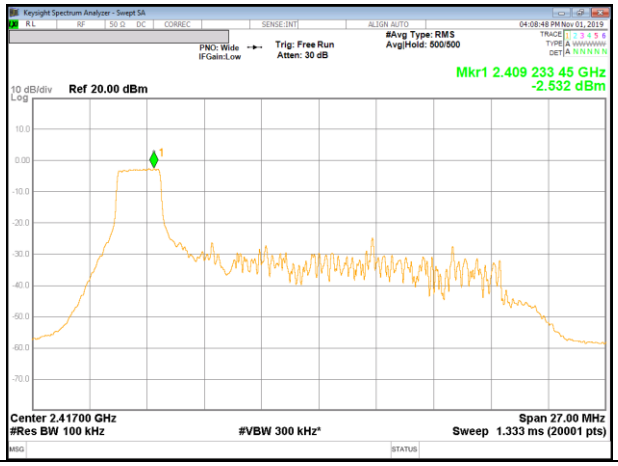
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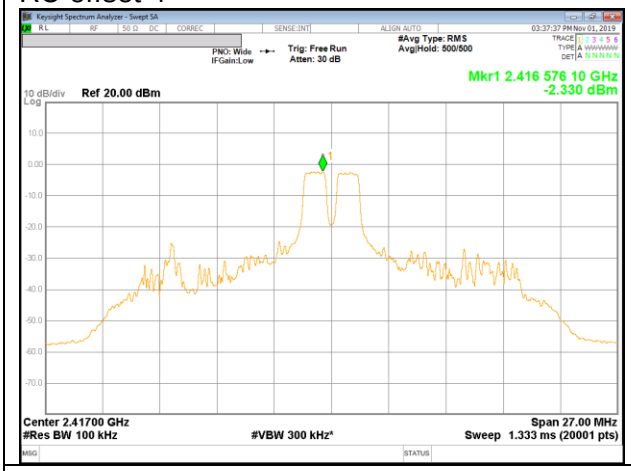	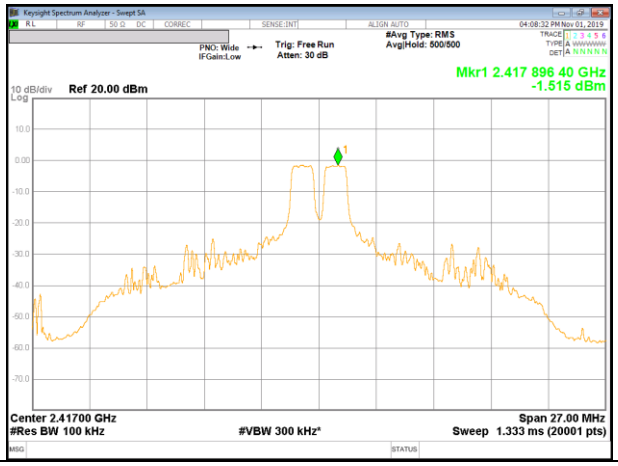
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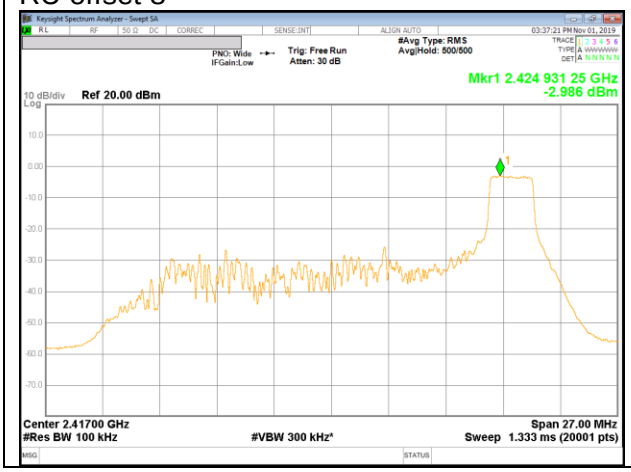	

2 CHANNEL_SU	
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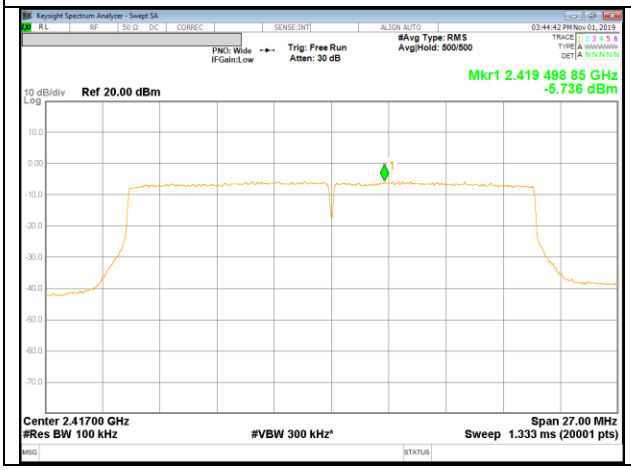	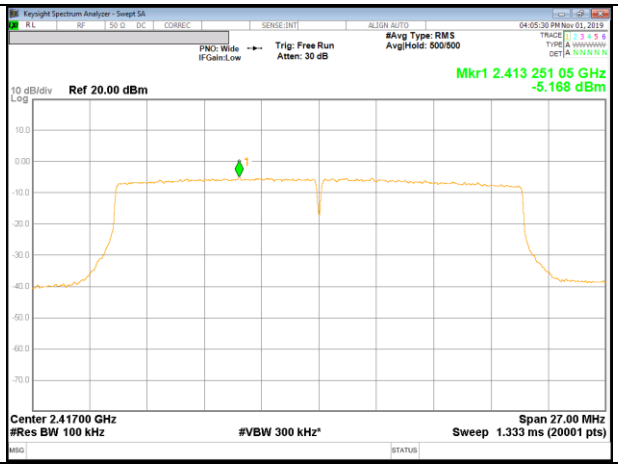

6 CHANNEL_26T	
ANT1	**ANT2**
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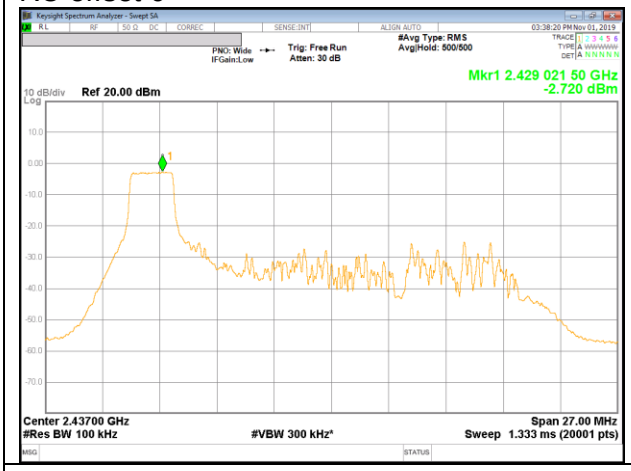	
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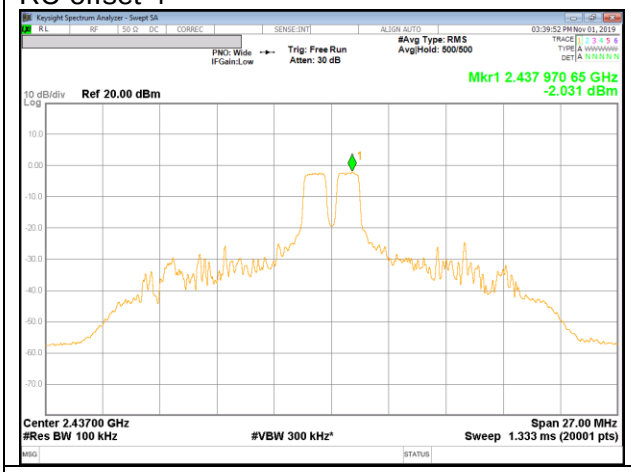	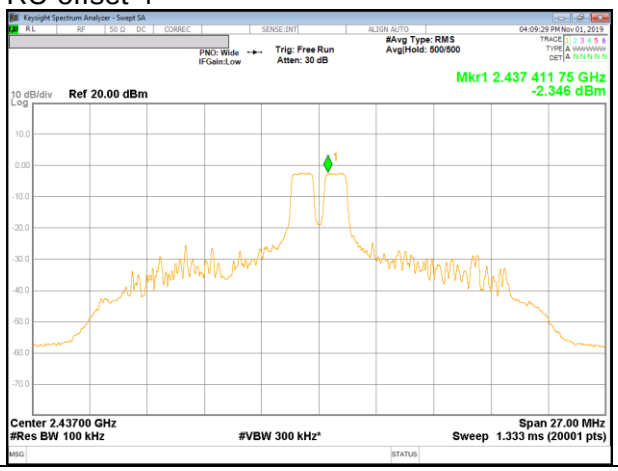
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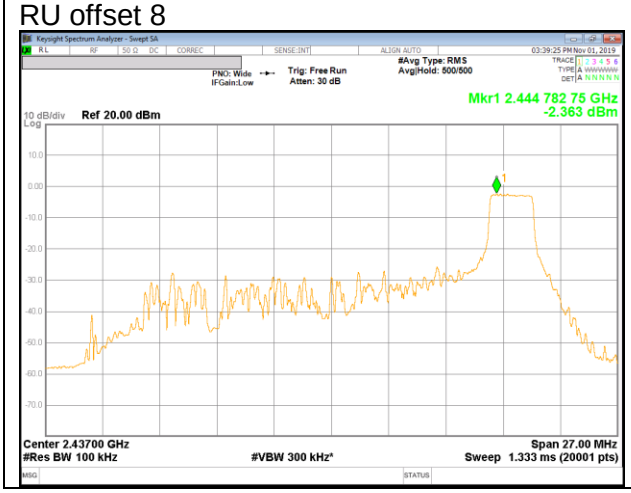
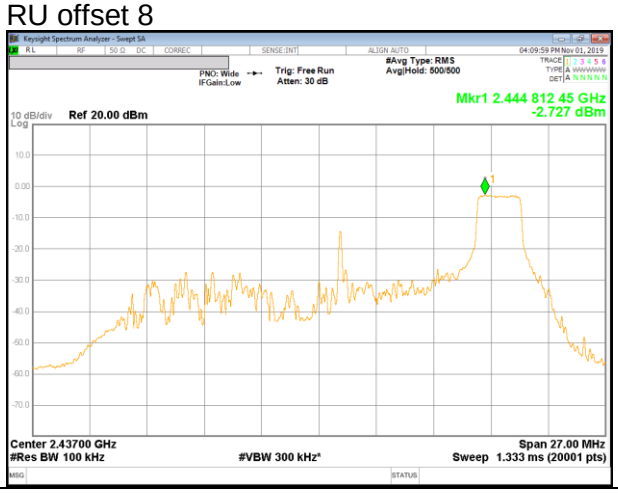
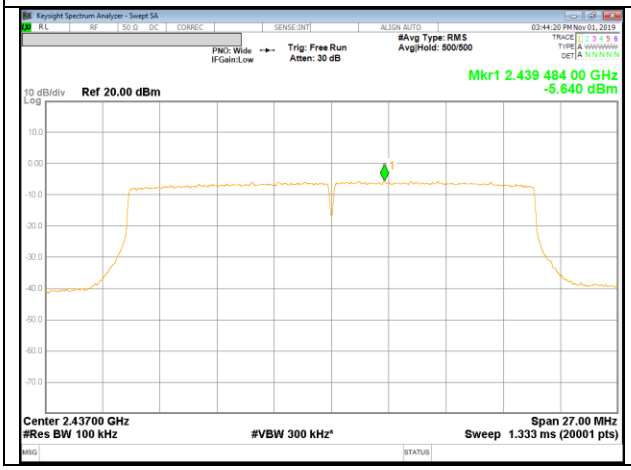
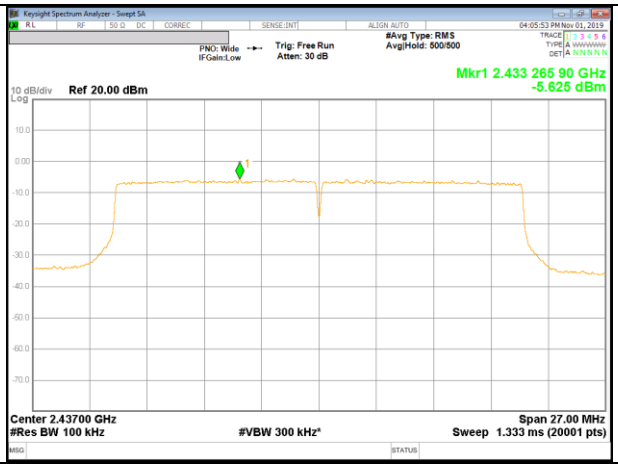
	

6 CHANNEL_SU	
ANT1	**ANT2**
	

10 CHANNEL_26T	
ANT1	**ANT2**
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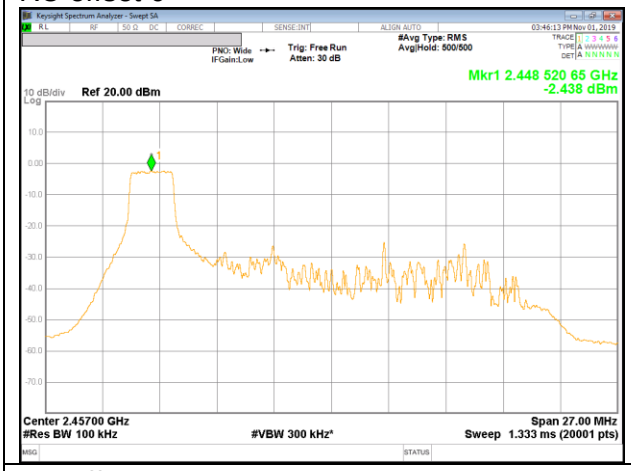
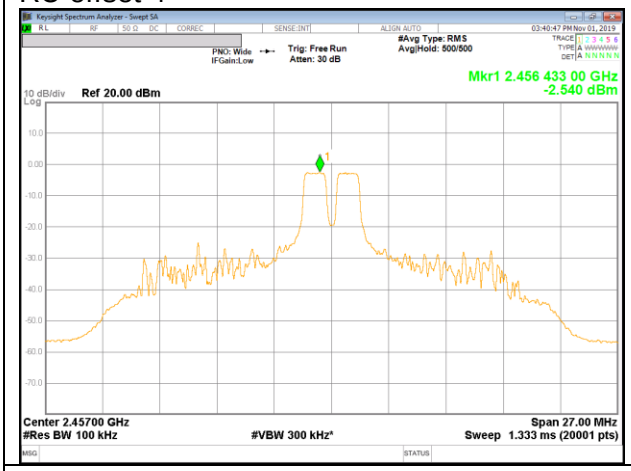
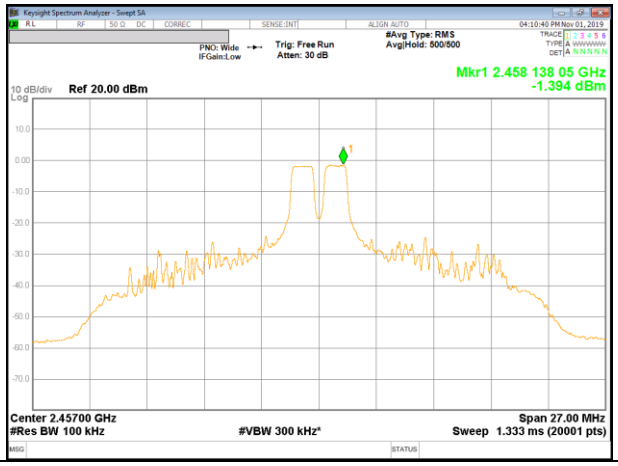
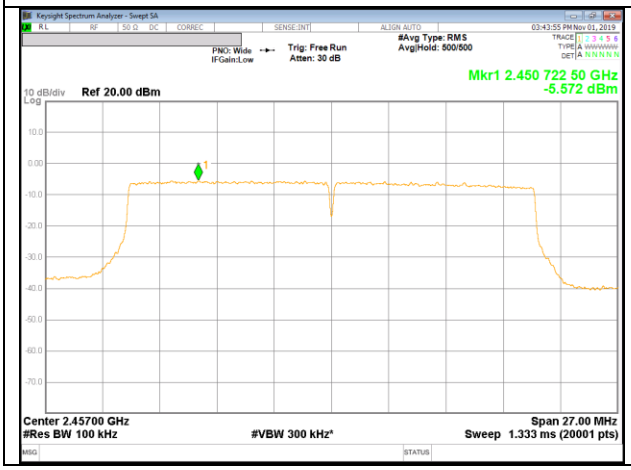
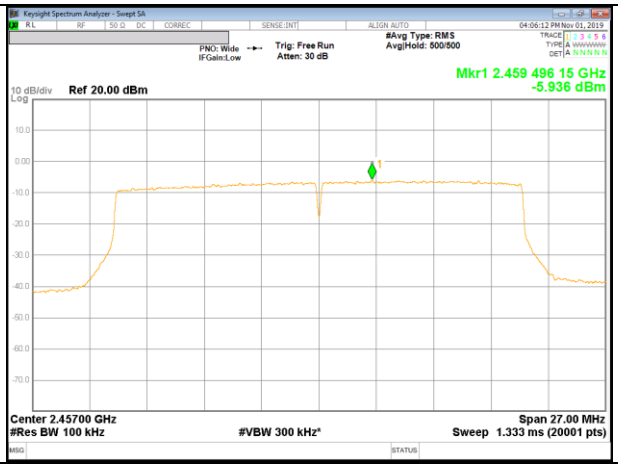
	
RU offset 4	RU offset 4
	
RU offset 8	RU offset 8
	

10 CHANNEL_SU	
ANT1	**ANT2**
	

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218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

11 CHANNEL_26T	
ANT1	**ANT2**
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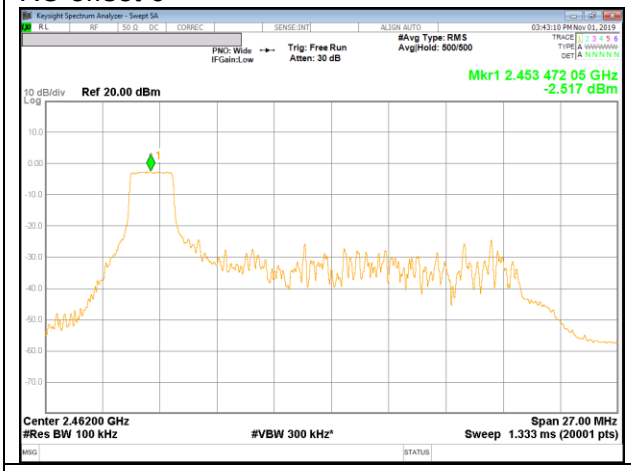	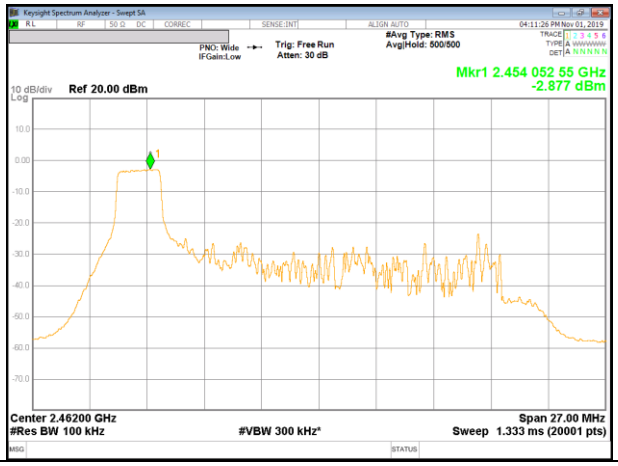
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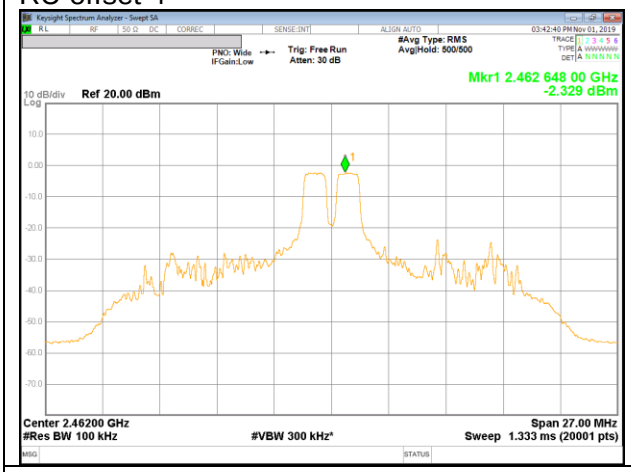	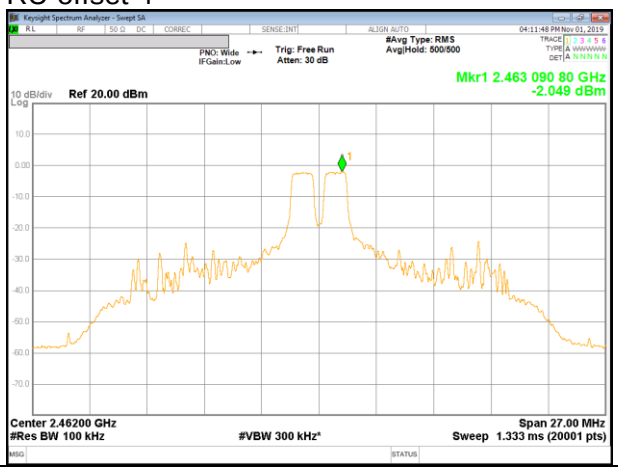
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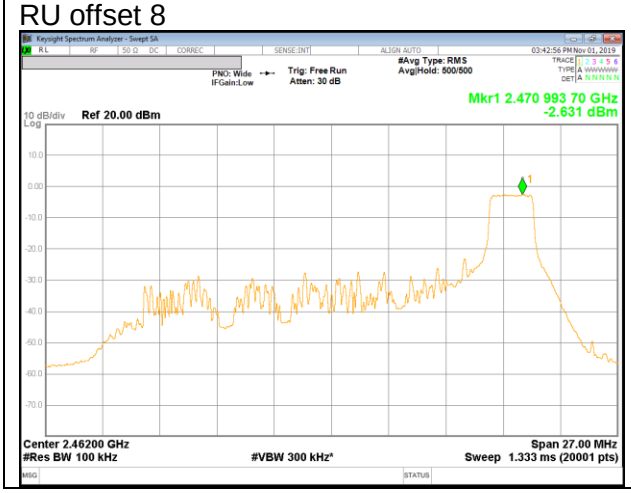
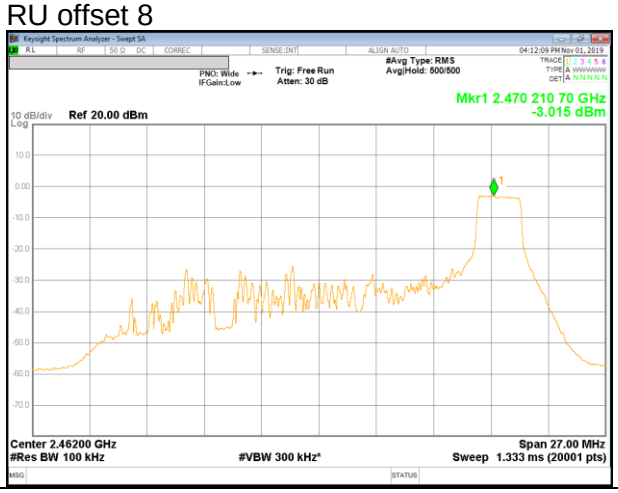
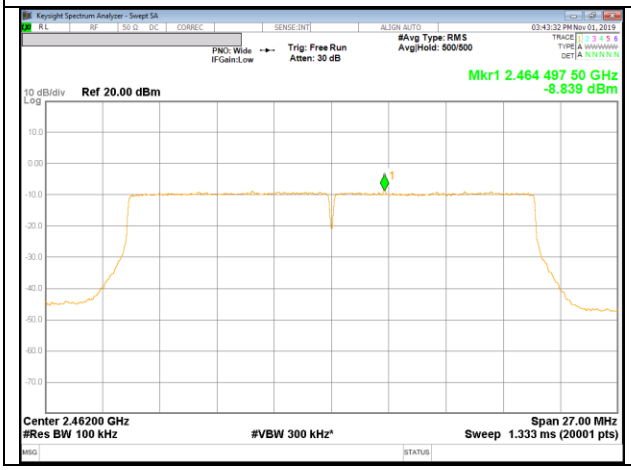
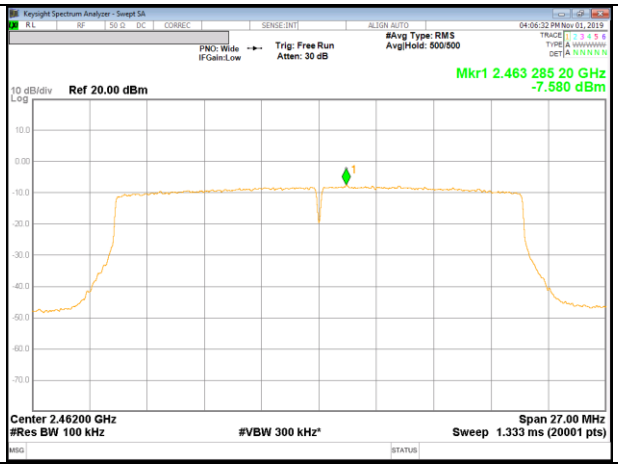
	

11 CHANNEL_SU	
ANT1	**ANT2**
	

10.3.1. MIMO_PSD_RESULT

1 CHANNEL_26T	
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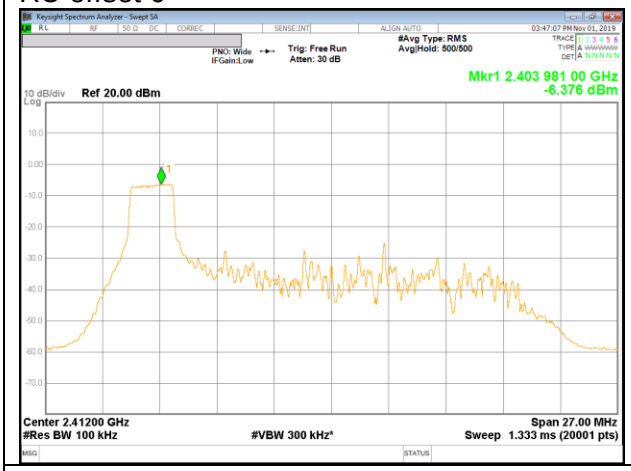	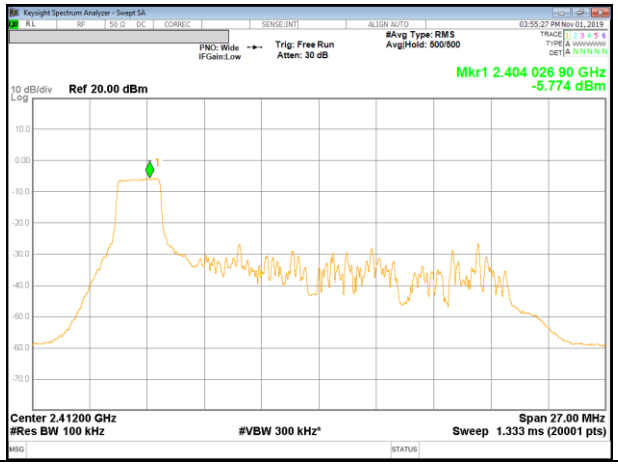
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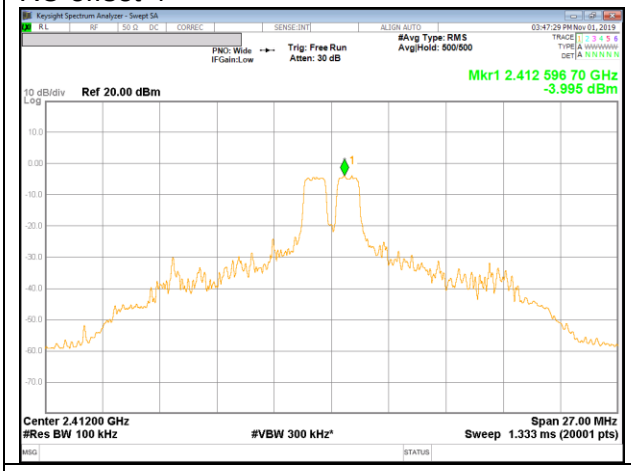	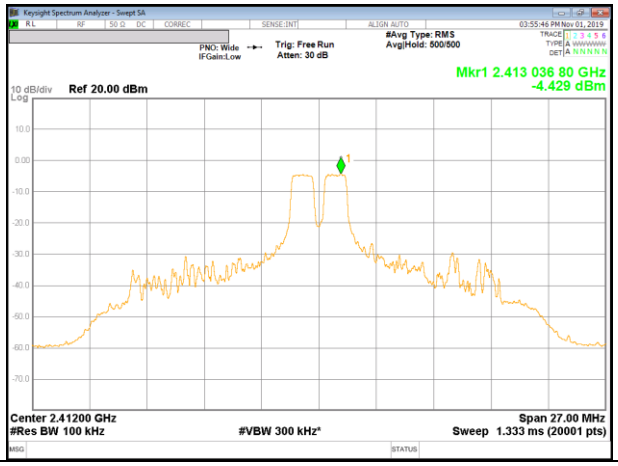
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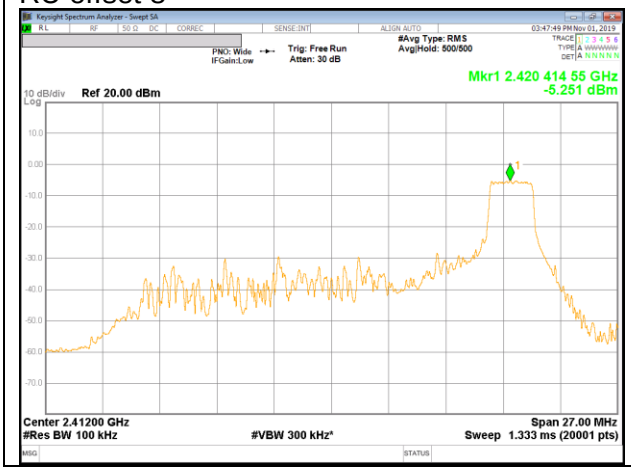
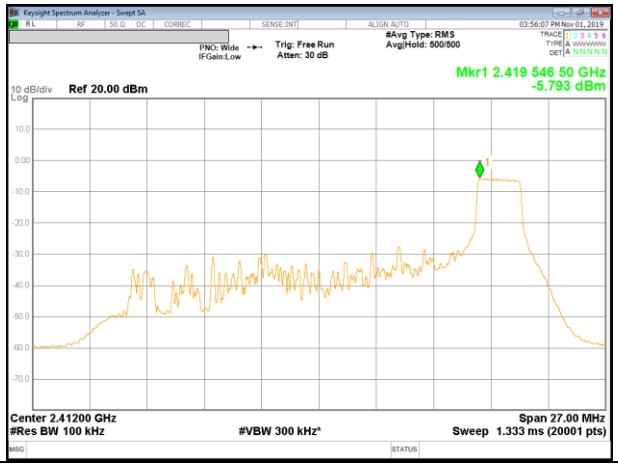
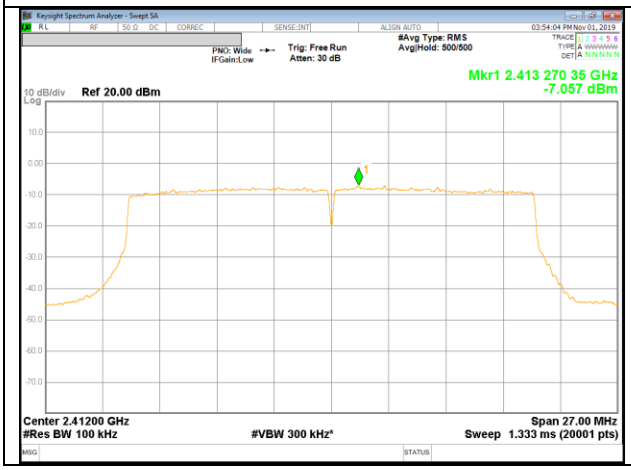
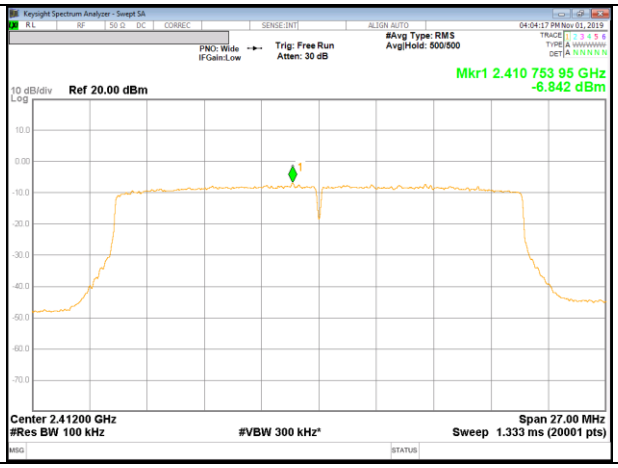
	

1 CHANNEL_SU	
ANT1	**ANT2**
	

2 CHANNEL_26T	
ANT1	**ANT2**
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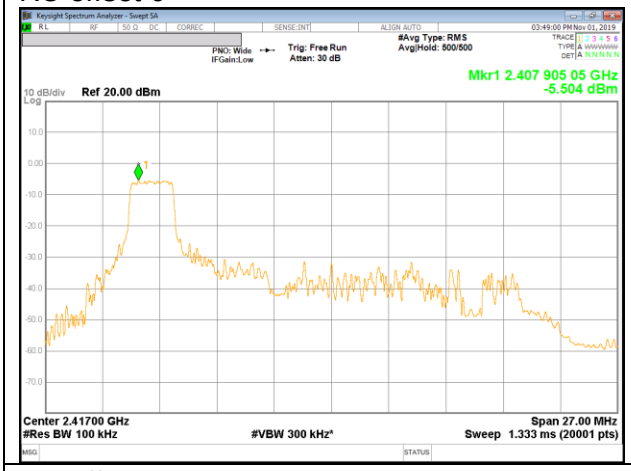	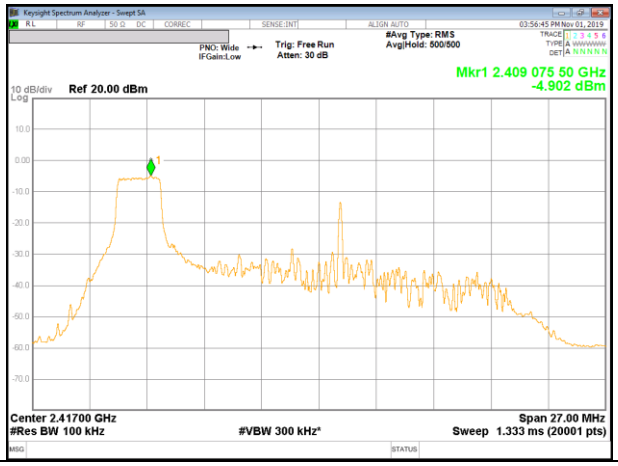
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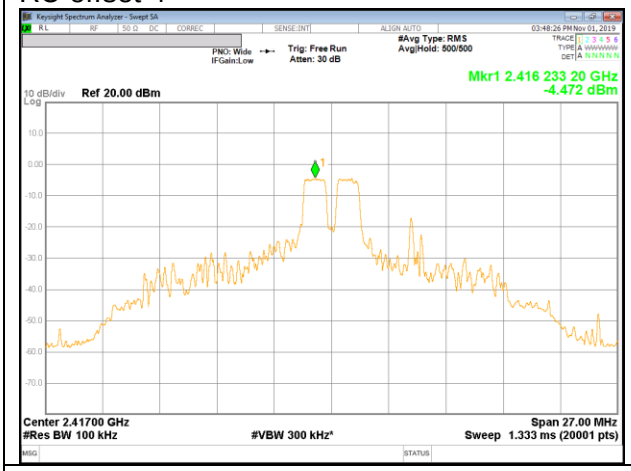	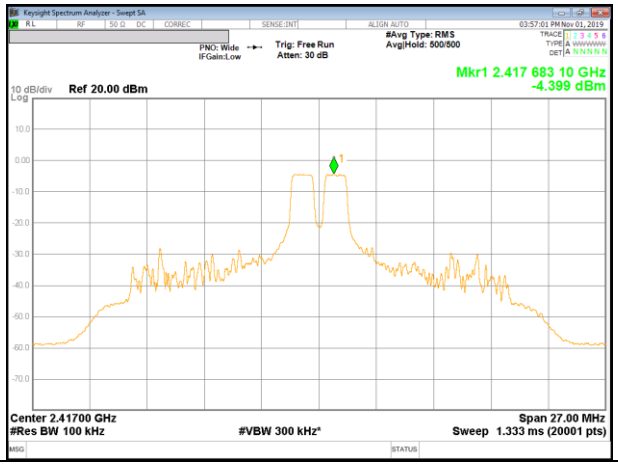
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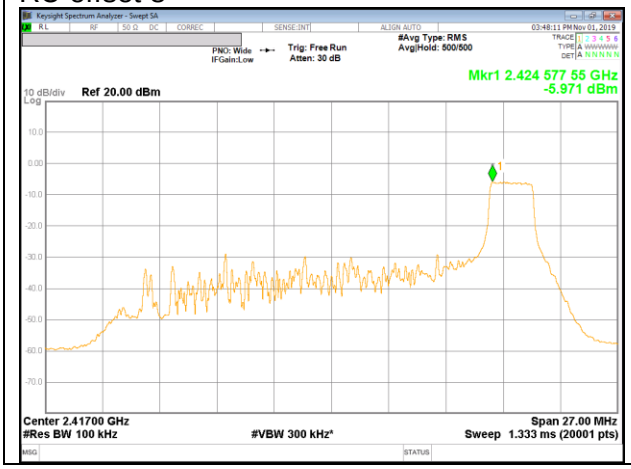
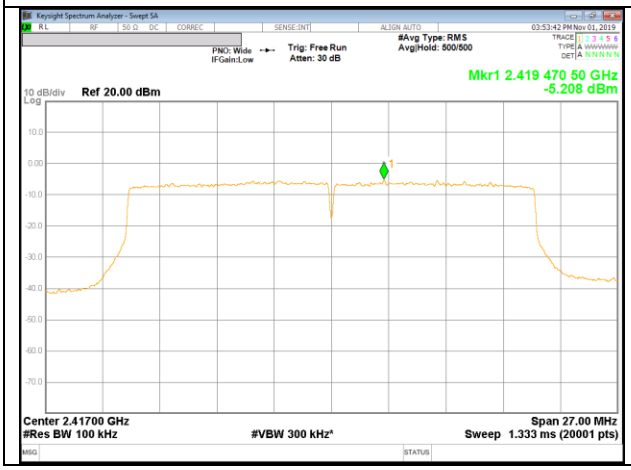
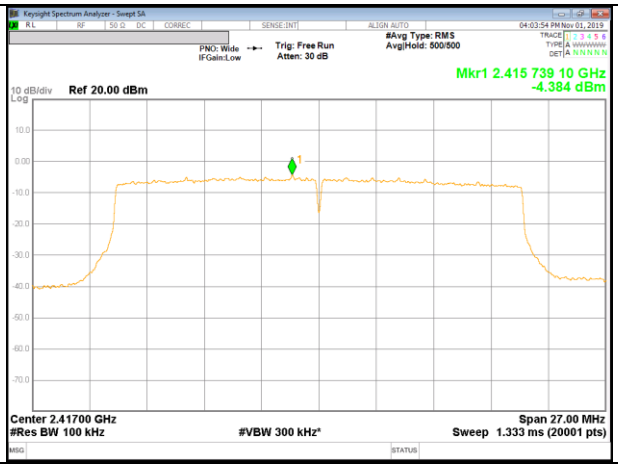
	

2 CHANNEL_SU	
ANT1	**ANT2**
	

6 CHANNEL_26T	
ANT1	**ANT2**
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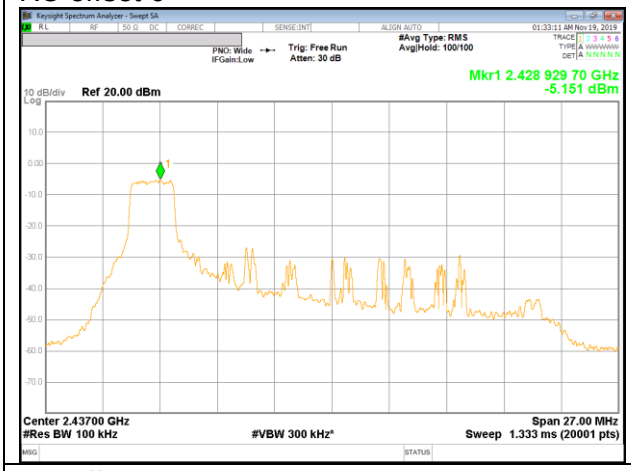	
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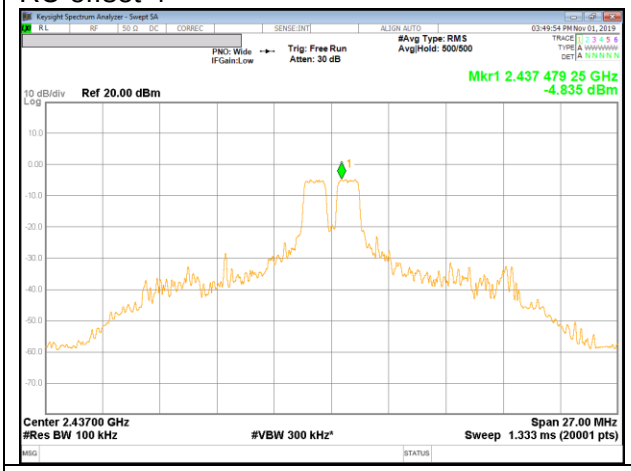	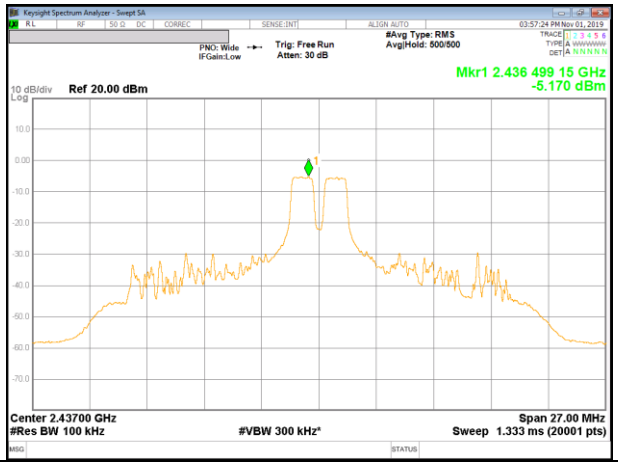
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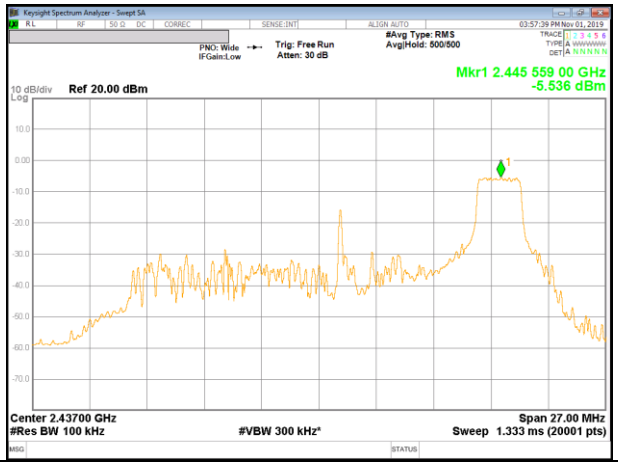
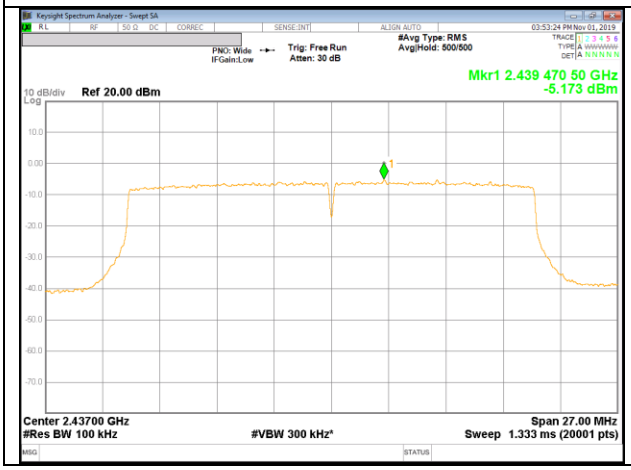
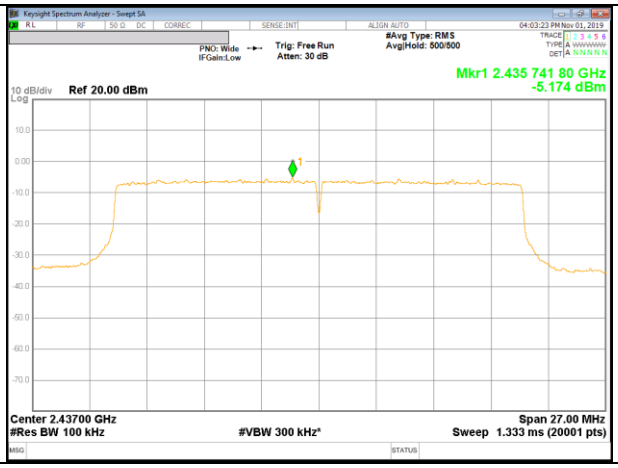
	

6 CHANNEL_SU	
ANT1	**ANT2**
	

10 CHANNEL_26T	
ANT1	**ANT2**
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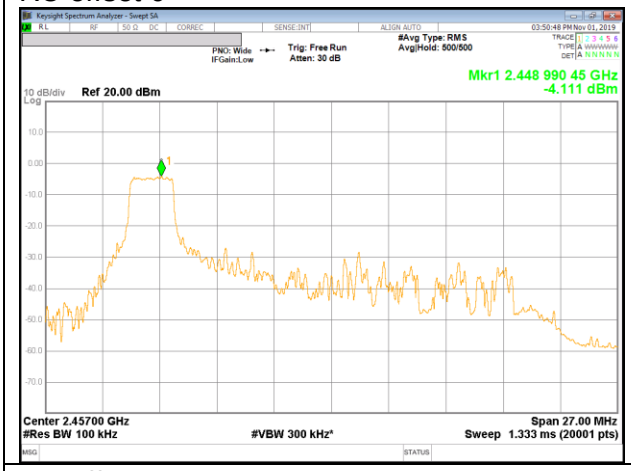	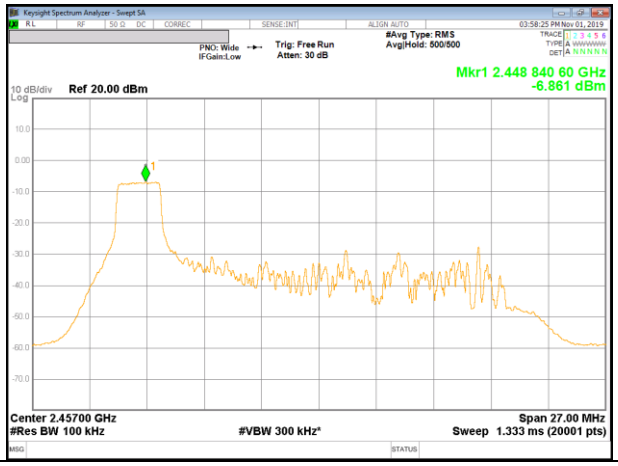
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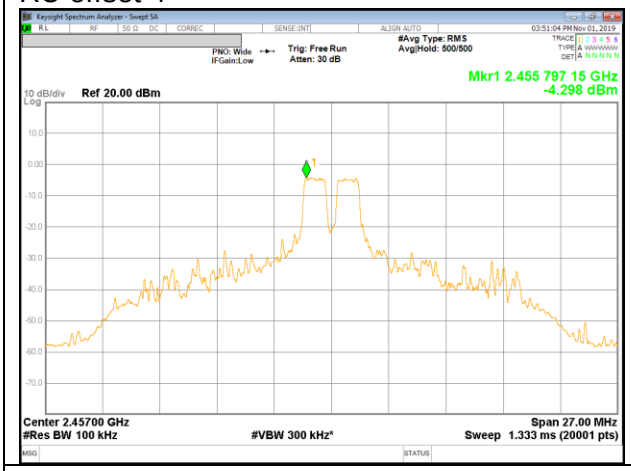	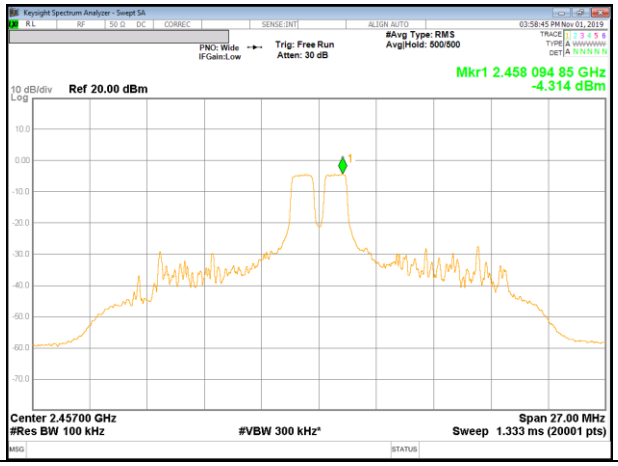
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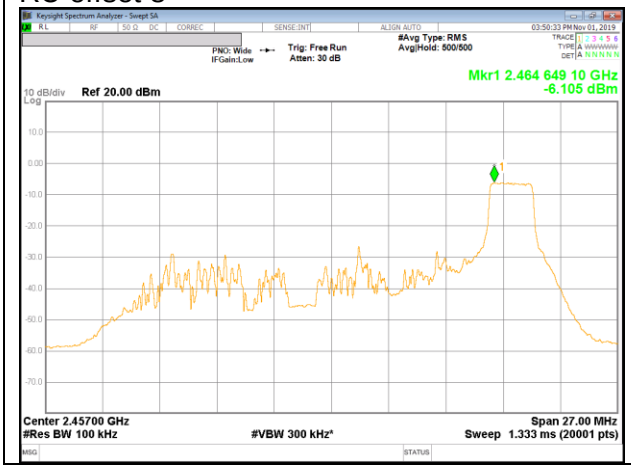	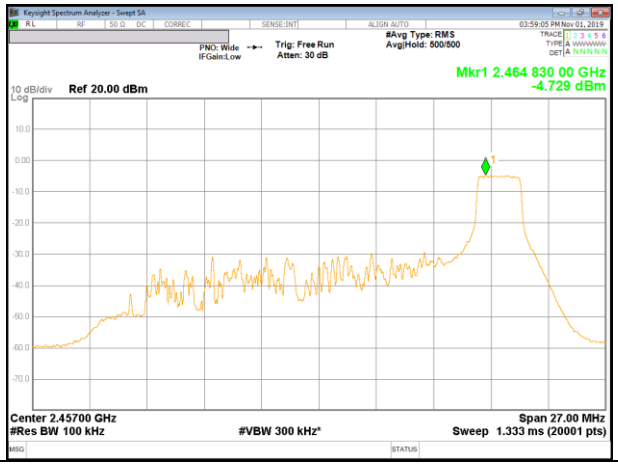

10 CHANNEL_SU	
ANT1	**ANT2**