



CERTIFICATION TEST REPORT

Report Number. : 4789867697-E4V3

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-T730

FCC ID : A3LSMT730

IC : 649E-SMT730

EUT Description : DTS/UNII a/b/g/n/ac Tablet + BT/BLE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E
INDUSTRY CANADA RSS-247 Issue 2
INDUSTRY CANADA RSS-GEN Issue 5

Date Of Issue:
2021-05-03

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TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2021-04-27	Initial issue	Hyunsik Yun
V2	2021-04-30	Updated to address TCB's question	Hyunsik Yun
V3	2021-05-03	Updated to address TCB's question	Hyunsik Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: DTS/UNII a/b/g/n/ac Tablet + BT/BLE
MODEL NUMBER: SM-T730
SERIAL NUMBER: R32R2009HKX (Conducted, Original);
R32R2009QPH, R32R2009K5M, R32R300FS7B (Radiated, Original);
R32R30060LW (Radiated, Spot-check);
DATE TESTED: 2021-03-16 ~ 2021-04-14(Original);
2021-04-13 ~ 2021-04-27(Spot-check);

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Complies
INDUSTRY CANADA RSS-247 Issue 2	Complies
INDUSTRY CANADA RSS-GEN Issue 5	Complies

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.

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1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMT736B NII(FCC CFR 47 Part 15E). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMT730(IC : 649E-SMT730, Model number : SM-T730) shares the same enclosure and circuit board as FCC ID: A3LSMT736B(Model number : SM-T736B). The WLAN antennas and surrounding circuitry and layout are identical between these two units for re-used bands.

In SM-T730 model, all of the RF parts(5G/LTE/WCDMA/GSM) are removed from the PCB.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMT736B(Model number : SM-T736B) remains representative of FCC ID: A3LSMT730(IC : 649E-SMT730, Model number : SM-T730). The test data of FCC ID: A3LSMT736B(Model number : SM-T736B) being submitted for this application to cover WLAN features.

Model number, SM-T736B, is not certified for ISED certification.

1.3. SPOT CHECK VERIFICATION DATA

Band	Test Item	Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-T736B	SM-T730		
					FCC ID : A3LSMT736B	FCC ID : A3LSMT730		
UNII WLAN (5 GHz)	Band Edge	11n HT40 5190 ALL	5190 MHz	54 dBuV/m	50.21 dBuV/m	44.80 dBuV/m	-5.41 dB	
	RSE	11a 5180 ALL	10360 MHz	68.2 dBuV/m	60.67 dBuV/m	54.36 dBuV/m	-6.31 dB	
	Band Edge	11a 5320 ALL	5320 MHz	54 dBuV/m	48.26 dBuV/m	45.14 dBuV/m	-3.12 dB	
	RSE	11a 5260 ALL	10520 MHz	68.2 dBuV/m	61.23 dBuV/m	53.60 dBuV/m	-7.63 dB	
	Band Edge	11ac VHT80 5530 ALL	5530 MHz	68.2 dBuV/m	63.63 dBuV/m	59.27 dBuV/m	-4.36 dB	
	RSE	11a 5580 ALL	11160 MHz	54 dBuV/m	50.51 dBuV/m	41.55 dBuV/m	-8.96 dB	
	Band Edge	11n HT40 5755 ALL	5755 MHz	-27 dBm	-38.23 dBm	-39.83 dBm	-1.60 dB	
	RSE	11a 5785 ALL	7713 MHz	54 dBuV/m	48.08 dBuV/m	38.16 dBuV/m	-9.92 dB	

Note1. Comparison of two models, upper deviation is within 3dB range and all test results are under FCC technical limits.

Note2. UNII DFS detection mechanism/software of variant model is the same as parent model, thus the original DFS report is being reused and no spot-check is done on the variant model.

1.4. REFERENCE DETAIL

Reference application that contains the re-used reference data.

Equipment Class	Reference FCC ID	Application Type	Reference Test report	Reuse (EMC/RFX)	Report Title / Section
DTS	A3LSMT736B	Original Grant	4789841420-E3	EMC	Report DTS[b,g,n] WLAN/ All sections
			4789841420-E4	EMC	FCC Report BLE/ All sections
DSS	A3LSMT736B	Original Grant	4789841420-E5	EMC	FCC Report BT/ All sections
NII	A3LSMT736B	Original Grant	4789841420-E6	EMC	FCC Report UNII[a,n,ac] WLAN/ All sections

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. IC RSS-GEN Issue 5.
4. IC RSS-247 Issue 2.
5. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
6. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
7. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
8. KDB 662911 D01 v02r01
9. ANSI C63.10-2013.
10. KDB 484596 D01 Referencing Test Data v01

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	
<input checked="" type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

Used ISED Test Site Reg.(company number): 2324L
CAB Identifier: KR0161

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

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 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 DTS/UNII a/b/g/n/ac Tablet + BT/BLE.
 This test report addresses the NII (UNII 802.11a/n/ac) operational mode.

WiFi operating mode

Frequency range	Mode	ANT1	ANT2
5GHz (5180 MHz ~ 5825 MHz)	802.11a MIMO	TX/RX	TX/RX
	802.11n MIMO	TX/RX	TX/RX
	802.11ac MIMO	TX/RX	TX/RX

MAXIMUM OUTPUT POWER

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

Band	Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
UNII-1	5180 - 5240	802.11a MIMO	19.22	83.56
		802.11n(HT20) MIMO	18.98	79.07
	5190 - 5230	802.11n(HT40) MIMO	16.81	47.97
	5210	802.11ac(VHT80) MIMO	15.44	34.99
UNII-2A	5260 - 5320	802.11a MIMO	19.20	83.18
		802.11n(HT20) MIMO	19.12	81.66
	5190 - 5230	802.11n(HT40) MIMO	16.94	49.43
	5270 - 5310	802.11ac(VHT80) MIMO	15.48	35.32
UNII-2C	5500 - 5720	802.11a MIMO	19.23	83.75
		802.11n(HT20) MIMO	19.06	80.54
	5510 - 5710	802.11n(HT40) MIMO	16.87	48.64
	5530 - 5690	802.11ac(VHT80) MIMO	15.45	35.08
UNII-3	5745 - 5825	802.11a MIMO	18.87	77.09
		802.11n(HT20) MIMO	18.69	73.96
	5755 - 5795	802.11n(HT40) MIMO	16.46	44.26
	5775	802.11ac(VHT80) MIMO	15.04	31.92

5.2. 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 a internal antenna, with a maximum gain of:

Frequency Band [MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain [dBi]
UNII 1 5150 - 5250	-3.68	-4.57	-1.10
UNII 2A 5250 - 5350	-1.64	-4.02	0.26
UNII 2C 5470 - 5725	-1.67	-5.55	-0.38
UNII 3 5725 - 5850	-1.51	-5.17	-0.14

“WiFi1” and “WiFi2” as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.3. List of test reduction and modes covering other modes:

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

Authorized Frequency Band			
Mode	Antenna Stream	Mode	Covered by
802.11a	MIMO	802.11a 2TX	
802.11n HT20		802.11n HT20 2TX	
802.11ac VHT20		802.11ac VHT20 2TX	802.11n HT20 2TX
802.11n HT40		802.11n HT40 2TX	
802.11ac VHT40		802.11ac VHT40 2TX	802.11n HT40 2TX
802.11ac VHT80		802.11ac VHT80 2TX	

5.4. 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.

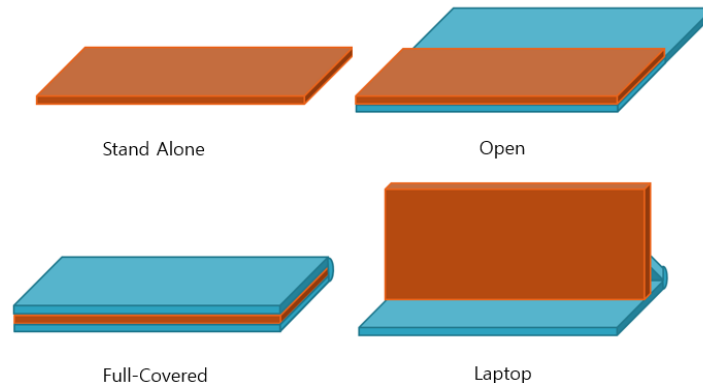
i. Worst Axis Condition

The fundamental and radiated spurious emission were investigated in three orthogonal orientations X, Y and Z, it was determined that below orientation was worst-case orientation for each antenna.

Antenna	Worst Case			
	X	Y	Z	Laptop
ANT1	-	Stand Alone	-	-
ANT2	Stand Alone	-	-	-
ANT ALL	Stand Alone	-	-	-

ii. Foldable Condition

The Fundamental of the EUT was investigated in four foldable conditions(Stand Alone, , Open, Full-Coverd, Laptop).



Based on the baseline scan, the worst-case data rates were:



- 802.11a mode: 6 Mbps 2Tx
- 802.11n HT20 mode: MCS0 2Tx
- 802.11n HT40 mode: MCS0 2Tx
- 802.11ac VHT80 mode: MCS0 2Tx

Radiation test for 802.11a / n HT20 & HT40 / ac VHT80 were evaluated at MIMO mode.

Note : All radiated and power line conducted tests were performed connected with charger for evaluation of worst case mode.

Test case configuration for 802.11a, n HT20 & 40,ac VHT20 & 40 & 80 modes :

Mode	Band	SISO Target[dBm]			MIMO Target[dBm]		
		802.11a	802.11n	802.11ac	802.11a	802.11n	802.11ac
5GHZ (20 MHz)	UNII-1	16	16	16	19	19	19
	UNII-2A	16	16	16	19	19	19
	UNII-2C	16	16	16	19	19	19
	UNII-3	16	16	16	19	19	19
5GHZ (40 MHz)	UNII-1		13	13		16	16
	UNII-2A		13	13		16	16
	UNII-2C		13	13		16	16
	UNII-3		13	13		16	16
5GHZ (80 MHz)	UNII-1			12			15
	UNII-2A			12			15
	UNII-2C			12			15
	UNII-3			12			15

 Band-Edge & Spurious Emission
 Band-Edge & Spot-Check Spurious Emission^{Note}

Note. Compared to the 802.11a mode, target power is the same or lower and the density is low, so only the spot-check test was performed in the 802.11n & 802.11ac mode. Spot check test was performed in the worst tested band of 802.11a mode.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	R37R1XS0P35DK3	N/A
Data Cable	SAMSUNG	EP-DT725BBE	N/A	N/A

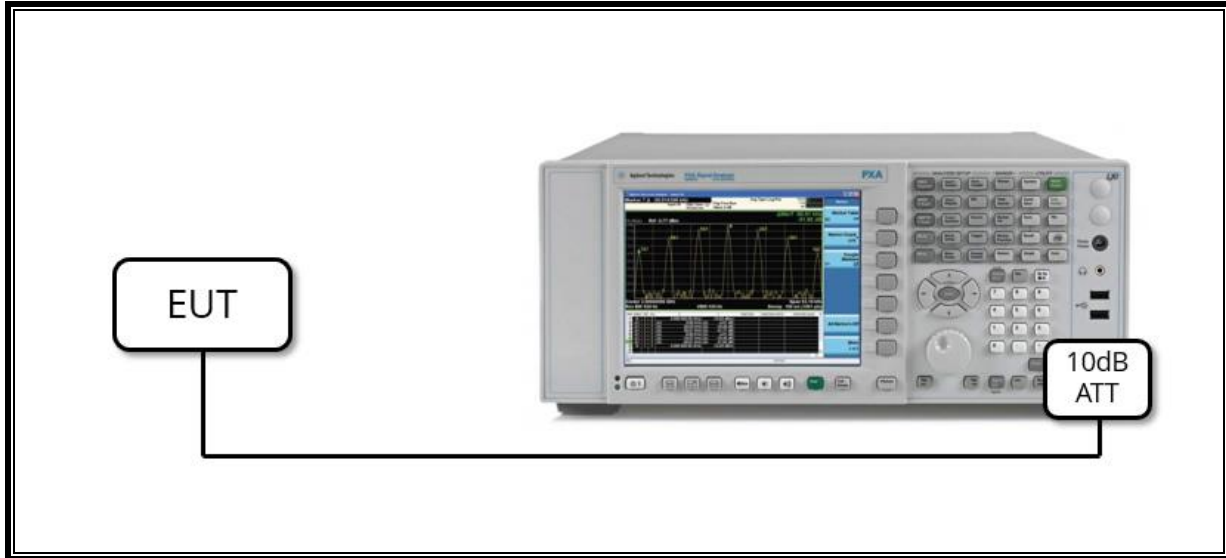
I/O CABLE

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	1.0 m	N/A

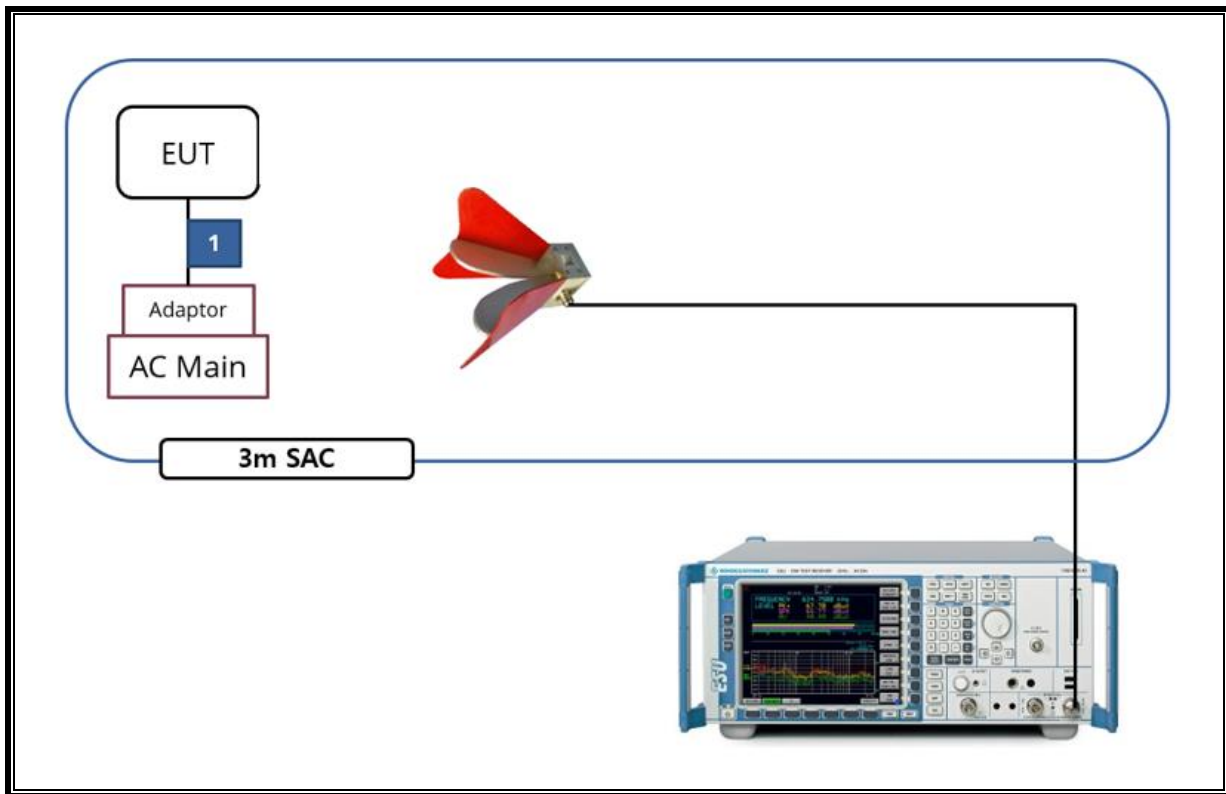
TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software exercised the EUT to enable NII mode.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00218957	01-15-23
Antenna, Horn, 40 GHz	ETS	3116C	00166155	01-15-23
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-05-21
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-21
EMI Test Receiver, 44 GHz	R&S	ESW44	101590	08-04-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-03-21
Attenuator	PASTERNAK	PE7004-10	2	08-04-21
Attenuator	PASTERNAK	PE7087-10	A009	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-04-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-04-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-04-21
LISN	R&S	ENV-216	101837	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Termination	WEINSCHL	M1406A	T01	08-05-21
Attenuator	WEINSCHL	WA76-30-21	A015	08-05-21
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

7. SUMMARY TABLE

FCC Part Section	IC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.407(e)	RSS-247 6.2.4.1	6dB Band width (5.8GHz)	500 kHz	Condcuted	PASS
15.407 (a)(2)	RSS-247 6.2.1.1 6.2.2.1 6.2.3.1	TX Cond. Power 5.15-2.25, 5.25-5.35 & 5.47-5.725	Section 10.2		PASS
15.407 (a)(3)	RSS-247 6.2.4.1	TX Cond. Power 5.725-5.825	Section 10.2		PASS
15.407 (a)(5)	RSS-247 6.2.1.1 6.2.2.1 6.2.3.1	PSD (5.2,5.3,5.5GHz)	Section 10.2		PASS
15.407 (a)(5)	RSS-247 6.2.4.1	PSD (5.8GHz)	Section 10.2		PASS
15.207 (a)	RSS-GEN Clause 8.8	AC Power Line conducted emissions	Section 13	Radiated	PASS
15.407 (b) & 15.209	RSS-GEN Clause 7 & 8.9	Radiated Spurious Emission	< 54dBuV/m		PASS
15.407 (h)(2)	RSS-247 6.3	Dynamic Frequency Selection	N/A	Condcuted	PASS

8. MEASUREMENT METHODS

On-Time and Duty Cycle : KDB 789033 D02 v02r01, Section II.B.

6dB Emission BW : KDB 789033 D02 v02r01, Section II.C.2.

26dB Emission BW : KDB 789033 D02 v02r01, Section II.C.1.

99% Occupied BW : KDB 789033 D02 v02r01, Section II.D.

Conducted Output Power : KDB 789033 D02 v02r01, Section II.E.3.b(Method PM-G)

Conducted Output Power for Straddle Channel (ch144/142/138 for 20/40/80MHz BW):

KDB 789033 D02 v02r01, Section II.E.2.b(Method SA-1)

Power Spectral Density : KDB 789033 D02 v02r01, Section II.F.

Unwanted emissions in restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

Unwanted emissions in non-restricted bands : KDB 789033 D02 v02r01, Section II.G.3 – II.G.6.

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

9. REFERENCE MEASUREMENTS RESULTS

9.1. ON TIME AND DUTY CYCLE RESULTS

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11a MIMO	2.796	2.833	0.987	98.694	-
802.11n(HT20) MIMO	2.599	2.637	0.986	98.559	-
802.11n(HT40) MIMO	2.484	2.520	0.986	98.571	-
802.11ac(VHT80) MIMO	1.276	1.312	0.973	97.256	0.12

Note. If the duty cycle is over 98%, compensation is not included in average measurement.

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

9.2. DUTY CYCLE PLOTS



9.3. 26 dB & 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

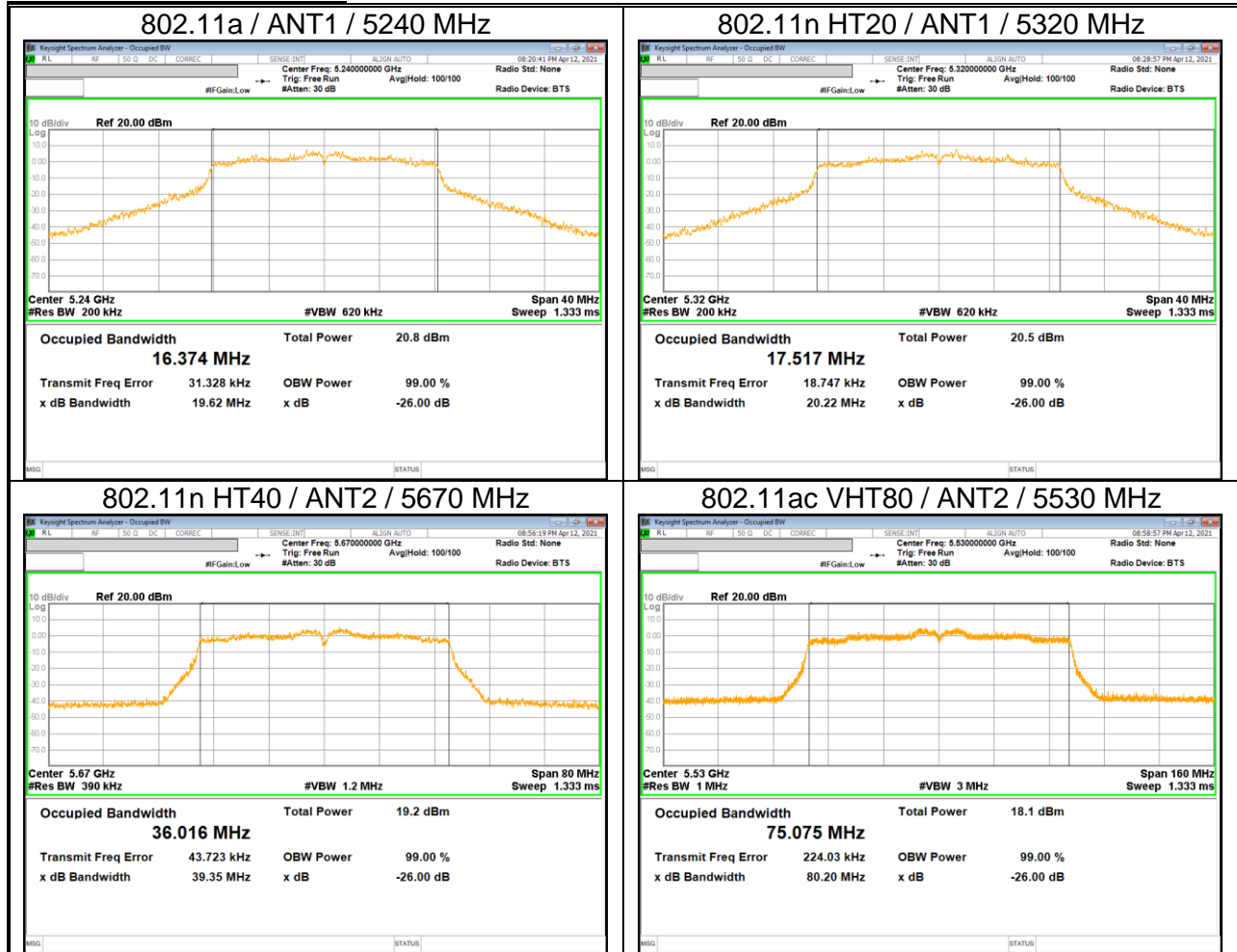
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer.

- 26 dB Bandwidth
 RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.
- 99% Bandwidth
 RBW: 1 ~ 5% of 99% Bandwidth, VBW >= 3 x RBW, sample detector and clear write.

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



9.3.1. 5.2 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note1)	
				ANT1	ANT2		ANT1	ANT2
UNII-1	802.11a	Low	5180	20.09	20.24	19.62	16.43	16.40
		Mid	5200	20.17	20.01		16.39	16.39
		High	5240	19.62	20.25		16.37	16.38
	802.11n HT20	Low	5180	20.82	21.73	20.55	17.61	17.62
		Mid	5200	20.78	20.55		17.55	17.61
		High	5240	21.32	21.98		17.55	17.58
	802.11n HT40	Low	5190	39.49	40.53	39.49	35.96	35.99
		High	5230	39.65	39.60		35.96	35.91
	802.11ac VHT80	Mid	5210	81.41	80.61	80.61	75.12	75.14

Note1. As a result of 99% bandwidth test, the bandwidth of UNII-1 does not interfere with UNII-2A.

9.3.2. 5.3 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note2)	
				ANT1	ANT2		ANT1	ANT2
UNII-2A	802.11a	Low	5260	21.17	21.15	20.27	16.34	16.37
		Mid	5300	20.27	21.25		16.34	16.37
		High	5320	20.98	21.31		16.36	16.37
	802.11n HT20	Low	5260	21.02	21.15	20.22	17.52	17.56
		Mid	5300	21.75	20.92		17.51	17.54
		High	5320	20.22	21.29		17.52	17.54
	802.11n HT40	Low	5270	40.15	39.78	39.78	36.02	35.95
		High	5310	40.10	40.14		36.00	36.01
	802.11ac VHT80	Mid	5290	81.15	80.59	80.59	75.13	75.21

Note2. As a result of 99% bandwidth test, the bandwidth of UNII-2A does not interfere with UNII-1.

9.3.3. 5.5 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
				ANT1	ANT2		ANT1	ANT2
UNII-2C	802.11a	Low	5500	20.33	21.19	20.33	16.37	16.40
		Mid	5580	21.14	20.88		16.320	16.40
		High	5700	20.48	21.18		16.33	16.37
	802.11n HT20	Low	5500	21.36	21.56	20.49	17.54	17.61
		Mid	5580	20.84	22.60		17.50	17.58
		High	5700	20.49	21.94		17.54	17.55
	802.11n HT40	Low	5510	39.40	39.50	39.35	35.96	35.90
		Mid	5590	39.74	39.78		35.96	35.98
		High	5670	39.42	39.35		36.02	36.02
	802.11ac VHT80	Low	5530	80.92	80.20	80.20	75.16	75.08
		High	5610	82.14	81.16		75.18	75.11

9.3.4. STRADDLE CHANNEL

Band	Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]			
				ANT1		ANT2	
				UNII-2C	UNII-3	UNII-2C	UNII-3
Straddle Channel	802.11a	Straddle	5720	15.53	5.25	14.74	4.61
	802.11n HT20	Straddle	5720	15.24	5.66	15.40	4.98
	802.11n HT40	Straddle	5710	35.23	4.80	34.64	4.63
	802.11ac VHT80	Straddle	5690	75.32	5.57	75.29	5.24

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB & 99% BANDWIDTH

LIMITS

FCC §15.407 & RSS-247 6.2.4.1

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

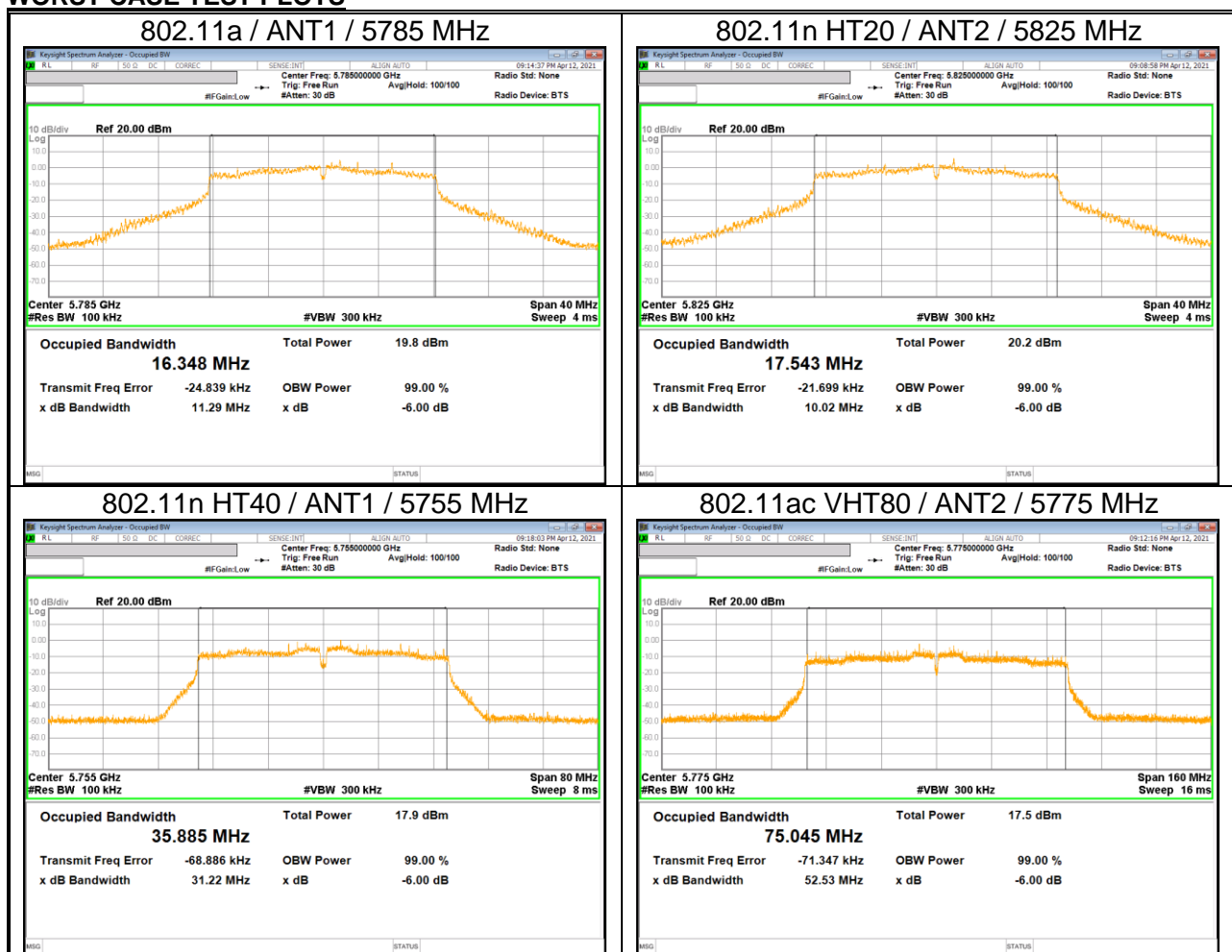
TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



10.1.1. 5.8 GHz BAND

Band	Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]		Worst	Minimum Limit [MHz]
				ANT1	ANT2		
UNII-3	802.11a	Low	5745	15.27	11.32	11.29	0.5
		Mid	5785	11.29	15.33		
		High	5825	15.08	15.06		
	802.11n HT20	Low	5745	10.05	12.58	10.02	
		Mid	5785	15.65	13.80		
		High	5825	13.15	10.02		
	802.11n HT40	Low	5755	31.22	33.77	31.22	
		High	5795	32.50	31.36		
	802.11ac VHT80	Mid	5775	62.55	52.53	52.53	

Band	Mode	Channel	Center Freq. [MHz]	99% BW [MHz]		Minimum Limit [MHz]
				ANT1	ANT2	
UNII-3	802.11a	Low	5745	16.36	16.43	-
		Mid	5785	16.39	16.52	
		High	5825	16.51	16.47	
	802.11n HT20	Low	5745	17.60	17.65	
		Mid	5785	17.70	17.60	
		High	5825	17.81	17.68	
	802.11n HT40	Low	5755	36.29	36.12	
		High	5795	36.27	36.10	
	802.11ac VHT80	Mid	5775	75.69	75.60	

10.2. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1) (2) (3)
 RSS-247 6.2

Band	FCC Limit	IC Limit
UNII 1 5150 - 5250	250 mW power 11 dBm/1MHz PSD	200 mW or 10+ 10log10(OBW) e.i.r.p. power 10 dBm/1MHz e.i.r.p. PSD
UNII 2A 5250 - 5350	250 mW or 11 dBm + 10 log(26dB) power 11 dBm/1MHz PSD	250 mW or 11 dBm + 10 log(OBW) power 11 dBm/1MHz PSD
UNII 2C 5470 - 5725		
UNII 3 5725 - 5850	1 W power 30dBm/500kHz PSD	

TEST PROCEDURE

KDB 789033 Method PM is used for output power.

KDB 789033 Method SA-2 is used for only power of straddle Ch. and PPSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging). Band power function used for power and peak marker value of the spectrum is used for PSD.

DIRECTIONAL ANTENNA GAIN

For OUTPUT POWER and PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

Frequency Band [MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain [dBi]
UNII 1 5150 - 5250	-3.68	-4.57	-1.10
UNII 2A 5250 - 5350	-1.64	-4.02	0.26
UNII 2C 5470 - 5725	-1.67	-5.55	-0.38
UNII 3 5725 - 5850	-1.51	-5.17	-0.14

10.2.1. 2Tx MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Minimum BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	19.62(26 dB) 16.37(99%)	-1.10	23.98(FCC) 23.24(IC)^{Note}	11.00(FCC) 11.10(IC)
		Mid	5200				
		High	5240				
	802.11n HT20	Low	5180	20.55(26 dB) 17.55(99%)		23.98(FCC) 23.54(IC)^{Note}	11.00(FCC) 11.10(IC)
		Mid	5200				
		High	5240				
	802.11n HT40	Low	5190	39.49(26 dB) 35.91(99%)		23.98(FCC) 24.11(IC) ^{Note}	11.00(FCC) 11.10(IC)
		High	5230				
	802.11ac VHT80	Mid	5210	80.61(26 dB) 75.12(99%)		23.98(FCC) 24.11(IC) ^{Note}	11.00(FCC) 11.10(IC)
	Included in Calculations of Corr'd Power & PPSD						
Duty Cycle CF [dB]				802.11a		-	dB
				802.11n HT20		-	dB
				802.11n HT40		-	dB
				802.11ac VHT80		0.12	dB

Note. UNII-1 Band's limit calculation method sample(11a mode):

Limit = 10 + 10log₁₀(16.37) - G(Maximum antenna gain) = 22.14 - (-1.1) = 23.24

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]		Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-1	802.11a	Low	5180	16.25	16.16	19.22	23.24
		Mid	5200	15.91	15.85	18.89	
		High	5240	16.16	15.98	19.08	
	802.11n HT20	Low	5180	15.86	16.07	18.98	23.54
		Mid	5200	15.65	16.01	18.84	
		High	5240	15.90	15.95	18.94	
	802.11n HT40	Low	5190	13.79	13.80	16.81	23.98
		High	5230	13.66	13.87	16.78	
	802.11ac VHT80	Mid	5210	12.31	12.54	15.44	23.98

Note. Worst limit among FCC or IC is applied.

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

Corr'd Power = Ant1 Average Power + Ant2 Average Power

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-1	802.11a	Low	5180	6.967	7.554	10.280	11.00
		Mid	5200	6.899	6.941	9.930	
		High	5240	6.864	7.041	9.960	
	802.11n HT20	Low	5180	6.878	6.612	9.760	
		Mid	5200	6.322	6.219	9.280	
		High	5240	7.005	6.361	9.710	
	802.11n HT40	Low	5190	1.818	1.769	4.800	
		High	5230	1.565	1.819	4.700	
	802.11ac VHT80	Mid	5210	-3.220	-2.727	0.040	

Note. Worst limit among FCC or IC is applied.

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB]

10.2.2. 2Tx MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Minimum BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	20.27(26dB) 16.34(99%)	0.26	23.98(FCC) 23.13(IC)	11.00
		Mid	5300				
		High	5320				
	802.11n HT20	Low	5260	20.22(26dB) 17.51(99%)		23.98(FCC) 23.43(IC)	11.00
		Mid	5300				
		High	5320				
	802.11n HT40	Low	5270	39.78(26dB) 35.95(99%)		23.98(FCC) 23.98(IC)	11.00
		High	5310				
	802.11ac VHT80	Mid	5290	80.59(26dB) 75.13(99%)		23.98(FCC) 23.98(IC)	11.00
	Included in Calculations of Corr'd Power & PPSD						
Duty Cycle CF [dB]				802.11a		-	dB
				802.11n HT20		-	dB
				802.11n HT40		-	dB
				802.11ac VHT80		0.12	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]		Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2A	802.11a	Low	5260	16.25	16.13	19.20	23.13
		Mid	5300	15.94	16.07	19.02	
		High	5320	15.87	15.90	18.90	
	802.11n HT20	Low	5260	16.16	16.05	19.12	23.43
		Mid	5300	15.89	15.99	18.95	
		High	5320	15.84	15.83	18.85	
	802.11n HT40	Low	5270	13.96	13.89	16.94	23.98
		High	5310	13.57	13.74	16.67	
	802.11ac VHT80	Mid	5290	12.48	12.46	15.48	23.98

Note. Worst limit among FCC or IC is applied.

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]

Corr'd Power = Ant1 Average Power + Ant2 Average Power

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2A	802.11a	Low	5260	6.931	7.142	10.050	11.00
		Mid	5300	6.890	7.236	10.080	
		High	5320	6.610	7.054	9.850	
	802.11n HT20	Low	5260	6.914	6.470	9.710	
		Mid	5300	6.505	6.880	9.710	
		High	5320	6.815	6.271	9.560	
	802.11n HT40	Low	5270	2.171	1.654	4.930	
		High	5310	1.664	1.549	4.620	
	802.11ac VHT80	Mid	5290	-2.634	-3.003	0.200	

Note. Worst limit among FCC or IC is applied.

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB]

10.2.3. 2Tx MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	20.33(26dB) 16.32(99%)	-0.29	23.98(FCC) 23.13(IC)	11.00
		Mid	5580				
		High	5700				
	802.11n HT20	Low	5500	20.49(26dB) 17.50(99%)			
		Mid	5580				
		High	5700				
	802.11n HT40	Low	5510	39.35(26dB) 35.90(99%)			
		Mid	5590				
		High	5670				
	802.11ac VHT80	Low	5530	80.20(26dB) 75.08(99%)			
		High	5610				
	Included in Calculations of Corr'd Power & PSD						
Duty Cycle CF [dB]				802.11a		-	dB
				802.11n HT20		-	dB
				802.11n HT40		-	dB
				802.11ac VHT80		0.12	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]		Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2C	802.11a	Low	5500	16.01	16.42	19.23	23.13
		Mid	5580	15.82	16.38	19.12	
		High	5700	15.61	16.25	18.95	
	802.11n HT20	Low	5500	15.84	16.25	19.06	23.43
		Mid	5580	15.82	16.02	18.93	
		High	5700	15.59	15.94	18.78	
	802.11n HT40	Low	5510	13.73	13.98	16.87	23.98
		Mid	5590	13.04	13.53	16.30	
		High	5670	13.46	13.82	16.65	
	802.11ac VHT80	Low	5530	12.18	12.45	15.33	23.98
		High	5610	12.13	12.72	15.45	

Note. Worst limit among FCC or IC is applied.

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
 Corr'd Power = Ant1 Average Power + Ant2 Average Power

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2C	802.11a	Low	5500	6.972	7.251	10.120	11.00
		Mid	5580	6.745	7.297	10.040	
		High	5700	6.937	7.228	10.100	
	802.11n HT20	Low	5500	6.751	6.201	9.500	
		Mid	5580	6.670	6.815	9.750	
		High	5700	6.365	6.623	9.510	
	802.11n HT40	Low	5510	1.651	1.525	4.600	
		Mid	5590	0.802	1.275	4.060	
		High	5670	1.761	2.115	4.950	
	802.11ac VHT80	Low	5530	-3.633	-2.671	-0.120	
		High	5610	-3.901	-2.542	-0.160	

Note. Worst limit among FCC or IC is applied.

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB]

10.2.4. 2Tx MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain, Limits

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	-	dB
	802.11n HT20	-	dB
	802.11n HT40	-	dB
	802.11ac VHT80	0.12	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Average Power [dBm]		Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-3	802.11a	Low	5745	15.79	15.92	18.87	30.00
		Mid	5785	15.51	15.98	18.76	
		High	5825	15.66	15.97	18.83	
	802.11n HT20	Low	5745	15.62	15.72	18.68	
		Mid	5785	15.33	15.75	18.56	
		High	5825	15.57	15.78	18.69	
	802.11n HT40	Low	5755	13.31	13.58	16.46	
		High	5795	13.26	13.64	16.46	
	802.11ac VHT80	Mid	5775	11.77	12.28	15.04	

* Calculation of Output Power : Average Power = Meas Power + Duty CF[dB]
 Corr'd Power = Ant1 Average Power + Ant2 Average Power

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]		Total Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
				ANT1	ANT2		
UNII-3	802.11a	Low	5745	3.584	4.180	6.900	30.00
		Mid	5785	3.287	3.951	6.640	
		High	5825	3.840	4.332	7.100	
	802.11n HT20	Low	5745	3.051	3.626	6.360	
		Mid	5785	2.875	3.915	6.440	
		High	5825	4.072	3.818	6.960	
	802.11n HT40	Low	5755	-1.925	-0.951	1.600	
		High	5795	-1.814	-0.970	1.640	
	802.11ac VHT80	Mid	5775	-6.861	-5.654	-3.210	

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB]

10.2.5. 2Tx Mode Straddle channel IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	14.74	-0.29	22.68	11.00
	802.11n HT20	Straddle	5720	15.24		22.83	11.00
	802.11n HT40	Straddle	5710	34.64		23.98	11.00
	802.11ac VHT80	Straddle	5690	75.29		23.98	11.00
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			-	dB
			802.11n HT20			-	dB
			802.11n HT40			-	dB
			802.11ac VHT80			0.12	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2C	802.11a	Straddle	5720	14.88	15.63	18.28	22.68
	802.11n HT20	Straddle	5720	14.63	15.39	18.03	22.83
	802.11n HT40	Straddle	5710	13.45	13.57	16.52	23.98
	802.11ac VHT80	Straddle	5690	12.03	12.67	15.37	23.98

* Calculation of Output Power : Total Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2C	802.11a	Straddle	5720	6.736	7.347	10.060	11.00
	802.11n HT20	Straddle	5720	6.232	6.973	9.630	
	802.11n HT40	Straddle	5710	1.197	1.787	4.510	
	802.11ac VHT80	Straddle	5690	-2.824	-2.059	0.590	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF

10.2.6. 2Tx Mode Straddle channel IN THE 5.8 GHZ BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	4.61	-1.18	30.00	30.00
	802.11n HT20	Straddle	5720	4.98			
	802.11n HT40	Straddle	5710	4.63			
	802.11ac VHT80	Straddle	5690	5.24			
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			-	dB
			802.11n HT20			-	dB
			802.11n HT40			-	dB
			802.11ac VHT80			0.12	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-3	802.11a	Straddle	5720	6.58	7.23	9.93	30.00
	802.11n HT20	Straddle	5720	7.09	7.60	10.36	
	802.11n HT40	Straddle	5710	0.29	0.77	3.55	
	802.11ac VHT80	Straddle	5690	-4.18	-3.45	-0.79	

* Calculation of Output Power : Total Corr'd Power = Meas Power + Duty CF [dB]

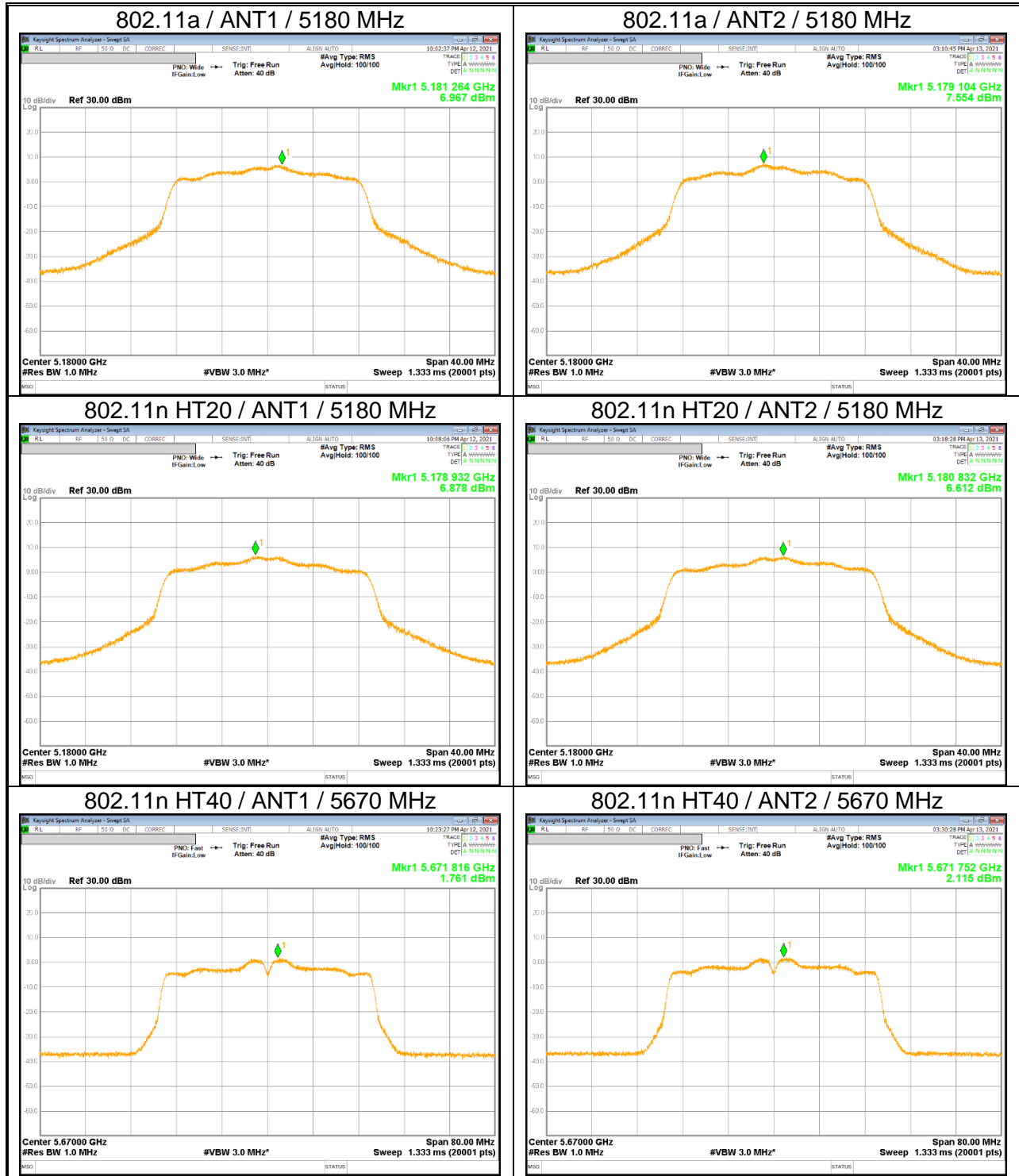
PPSD Results

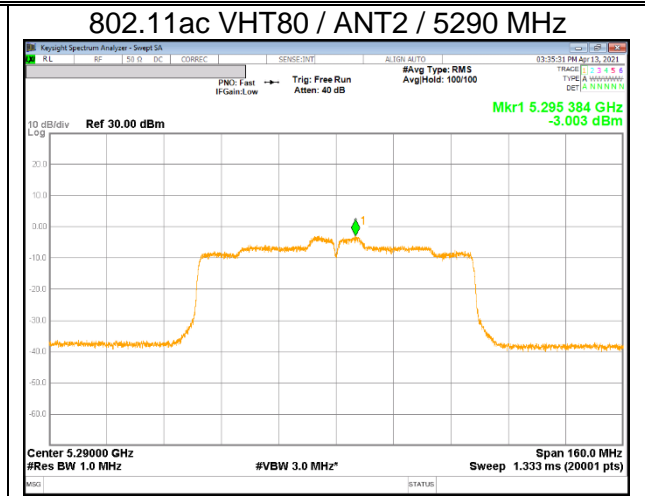
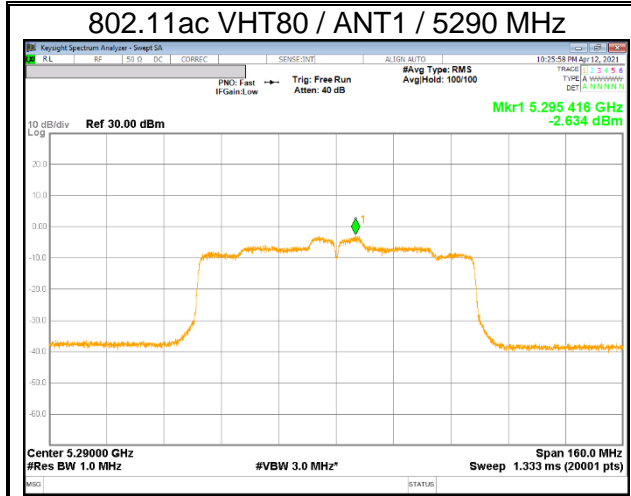
Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]		Total Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
				ANT1	ANT2		
UNII-3	802.11a	Straddle	5720	0.628	1.268	3.970	30.00
	802.11n HT20	Straddle	5720	0.767	0.927	3.860	
	802.11n HT40	Straddle	5710	-7.394	-6.347	-3.830	
	802.11ac VHT80	Straddle	5690	-11.091	-10.549	-7.800	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF

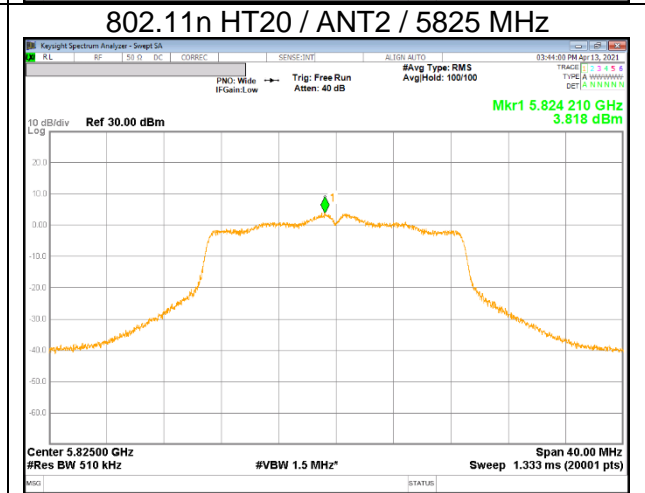
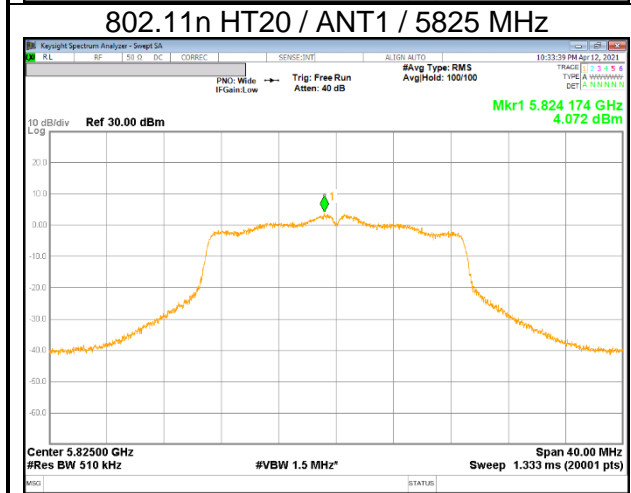
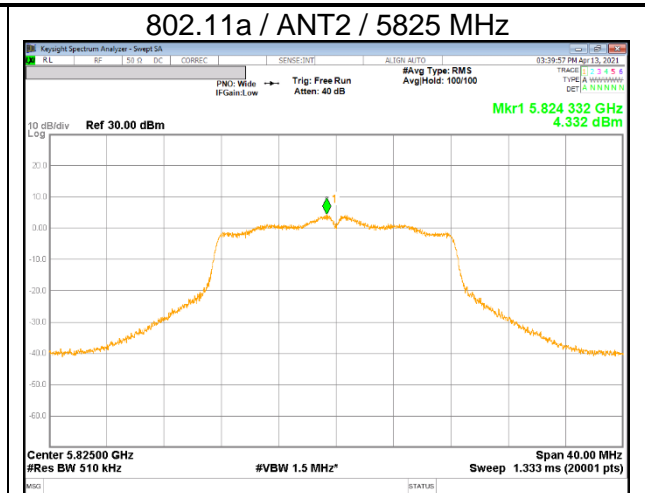
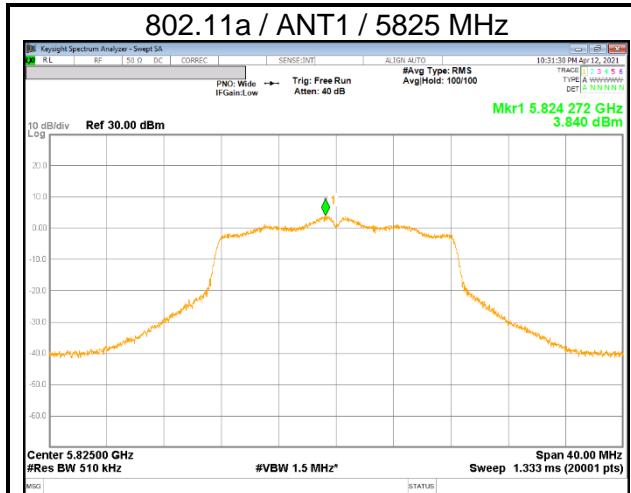
10.2.7. OUTPUT POWER AND PPSD PLOTS(WORST CASE)

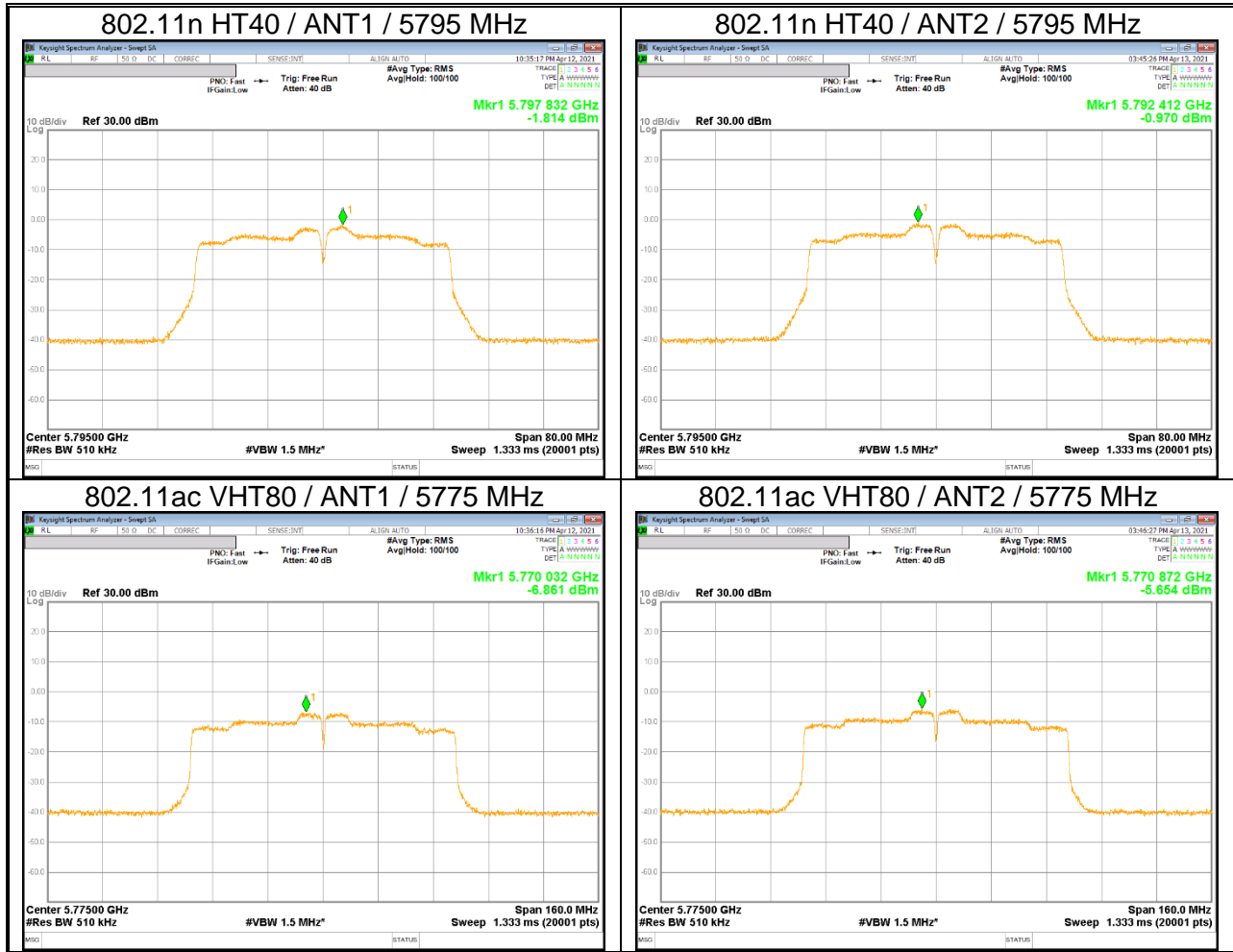
UNII-1 & 2A & 2C



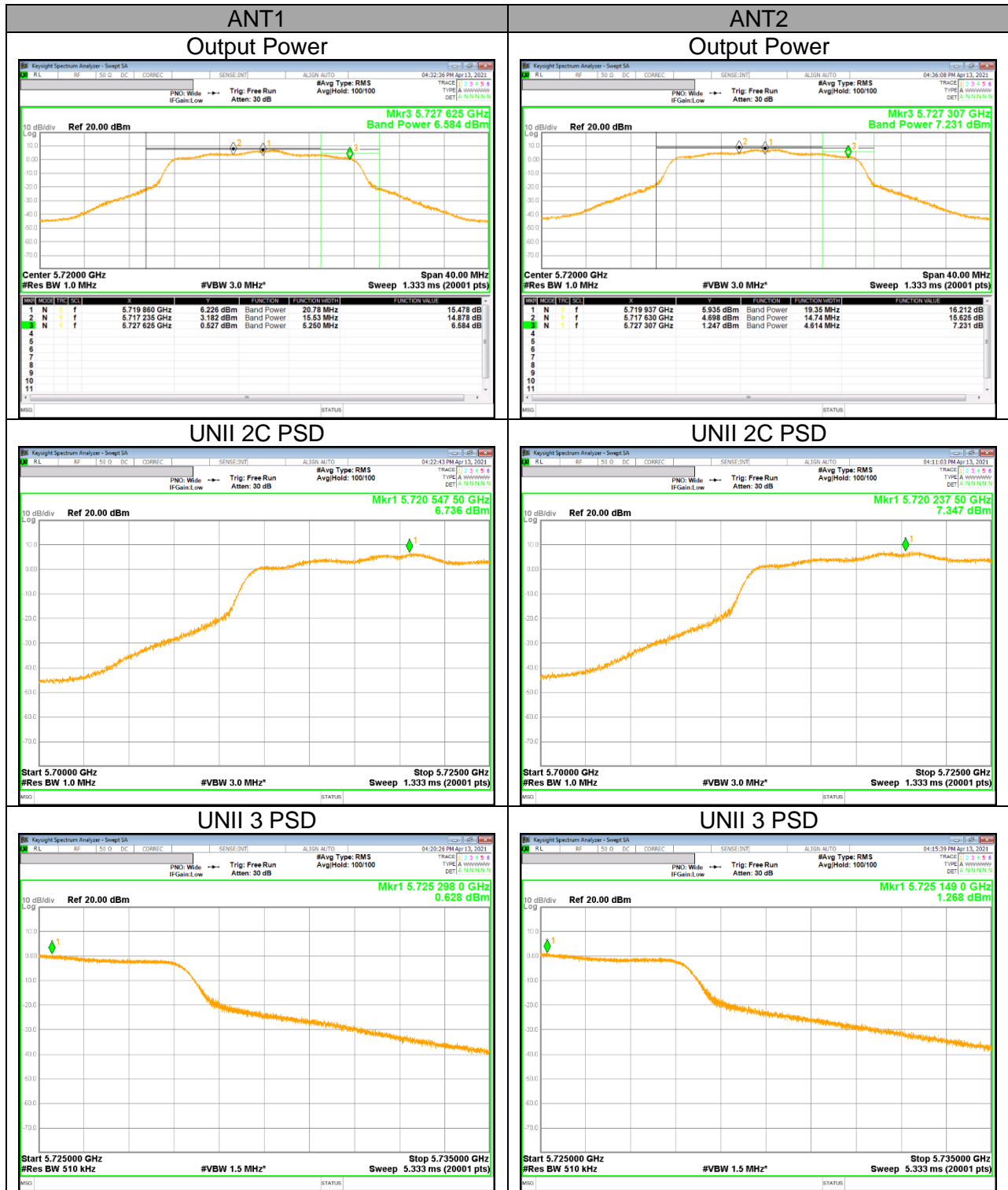


UNII-3

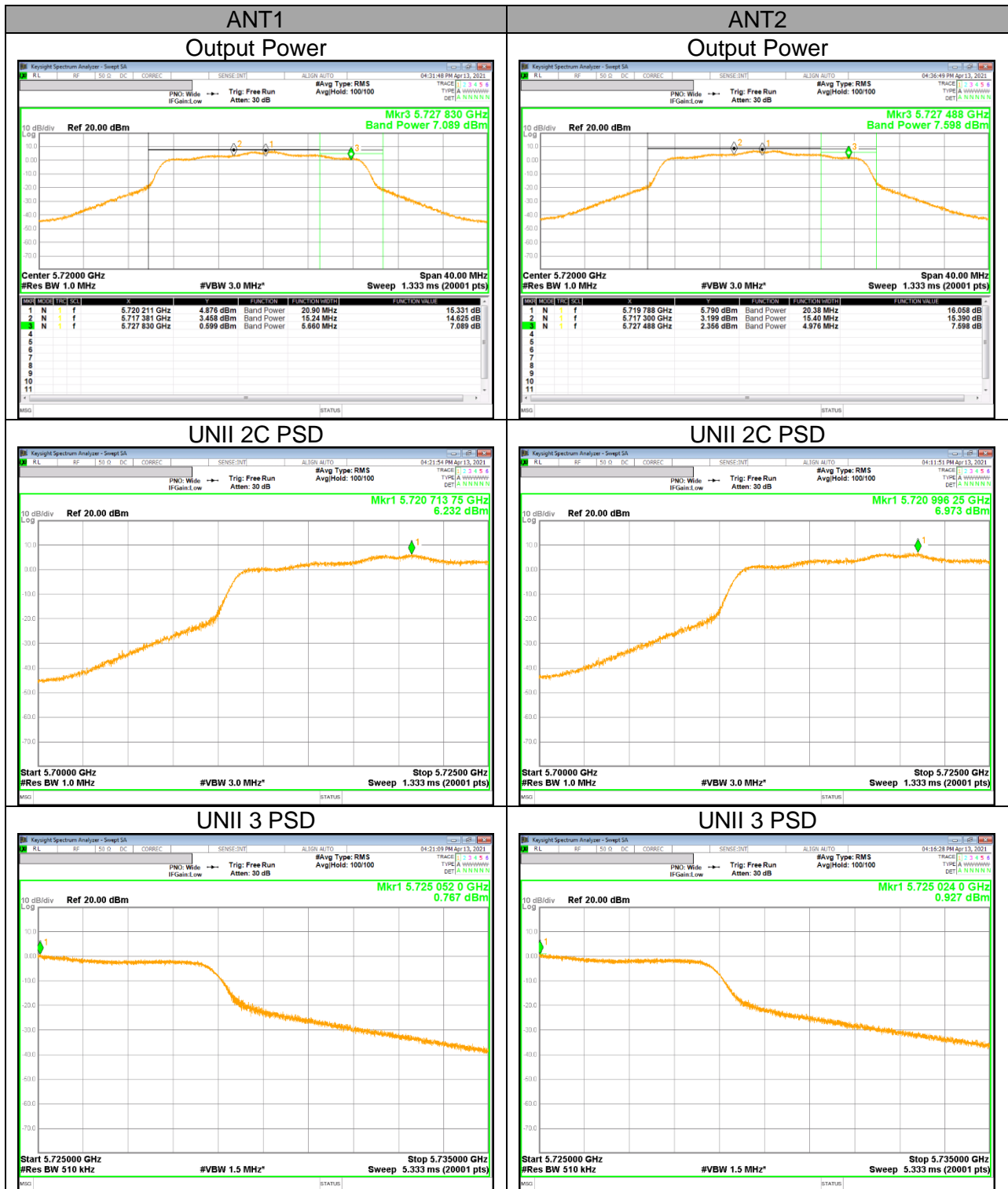




UNII Straddle Ch. IEEE 802.11a mode Output Power and PSD



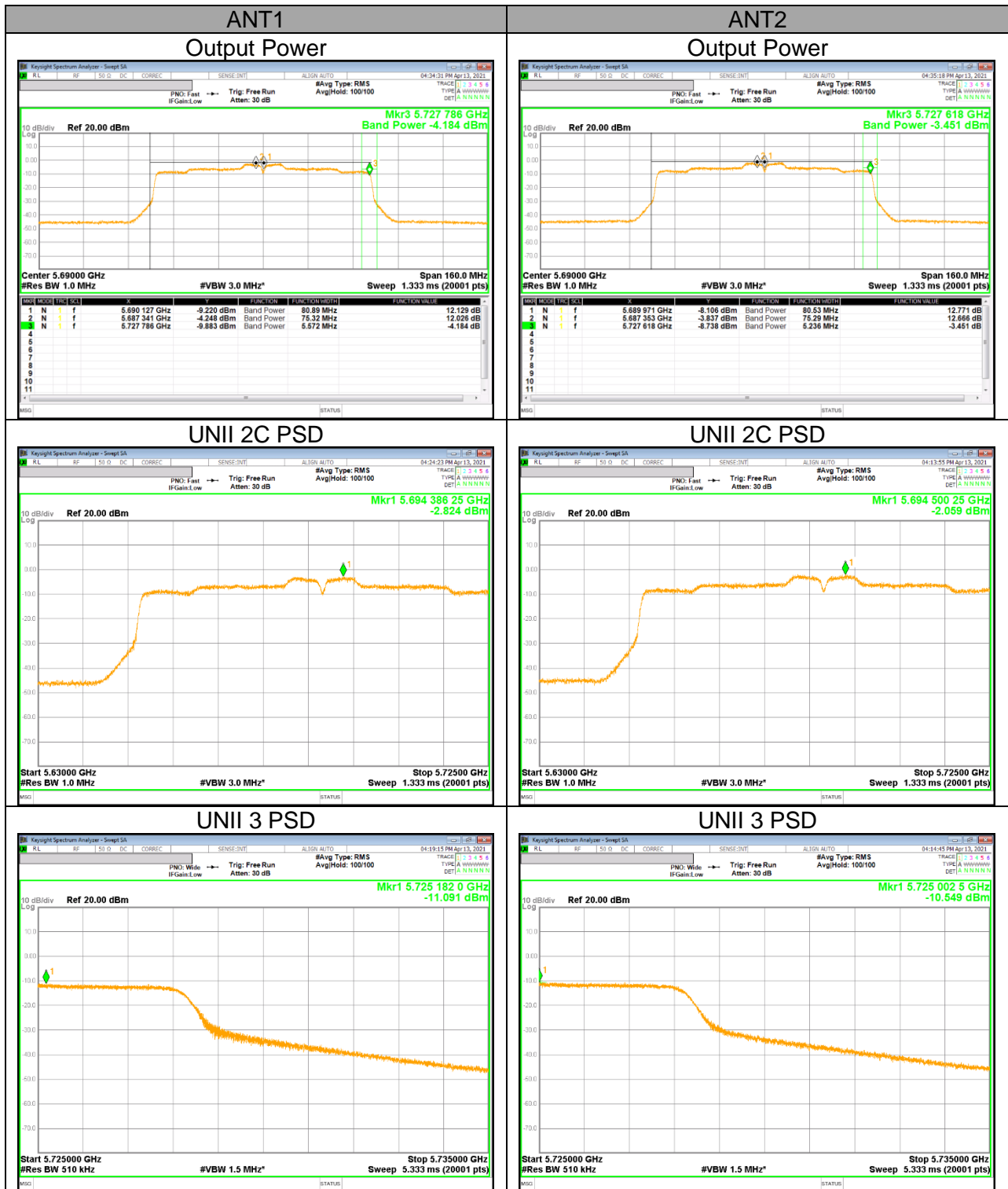
UNII Straddle Ch. IEEE 802.11n HT20 mode Output Power and PSD



UNII Straddle Ch. IEEE 802.11n HT40 mode Output Power and PSD



UNII Straddle Ch. IEEE 802.11ac VHT80 mode Output Power and PSD



11. TRANSMITTER ABOVE 1 GHz

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358 3600 ~ 4400		

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

FCC §15.407 (b)

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary,
provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Note

- Limit translation to field strength level (FCC §15.407)

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$$

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$$

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 100 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Reference to KDB 789033 D02 v02r01 UNII part G) 6) c) Method AD:

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1GHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

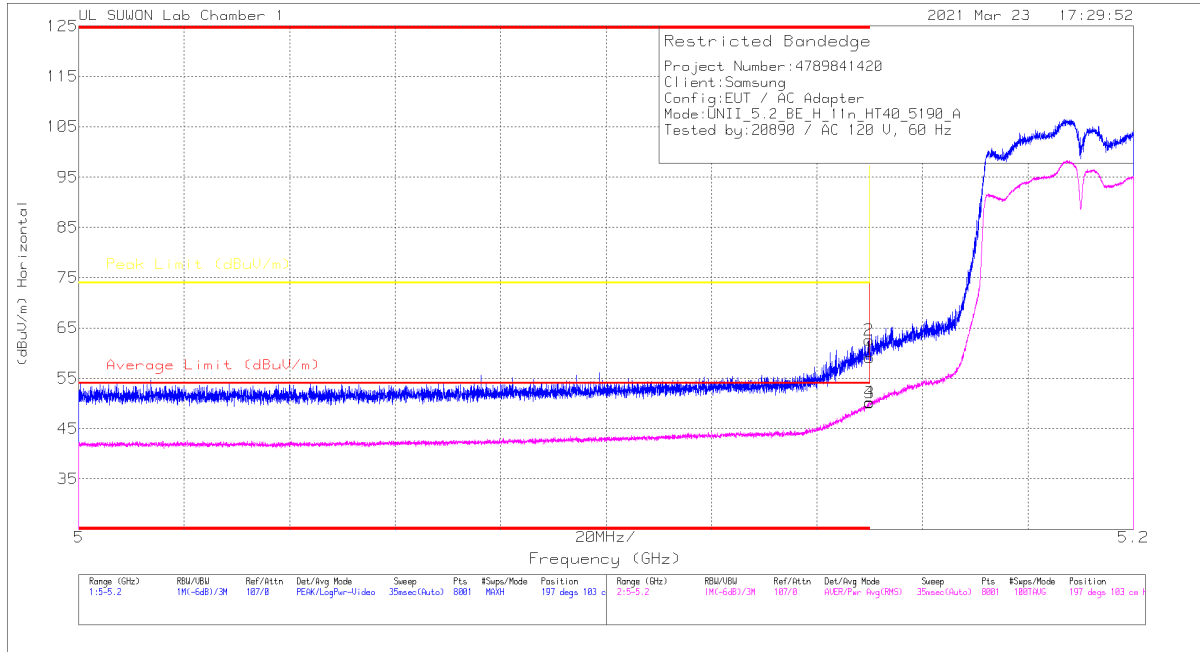
Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

11.1. TX ABOVE 1GHz 2Tx MODE IN THE 5.2GHz BAND

BANDEDGE (WORST CASE: 802.11n HT20 / 5190 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Pk Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.15	46.39	Pk	34.3	-21.6	0	59.99	-	-	74	-14.91	197	103	H
2	* 5.1499	49.99	Pk	34.3	-21.7	0	62.59	-	-	74	-11.41	197	103	H
3	5.15	37.48	RMS	34.3	-21.6	0	50.18	54	-3.82	-	-	197	103	H
4	* 5.14993	37.61	RMS	34.3	-21.7	0	50.21	54	-3.79	-	-	197	103	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

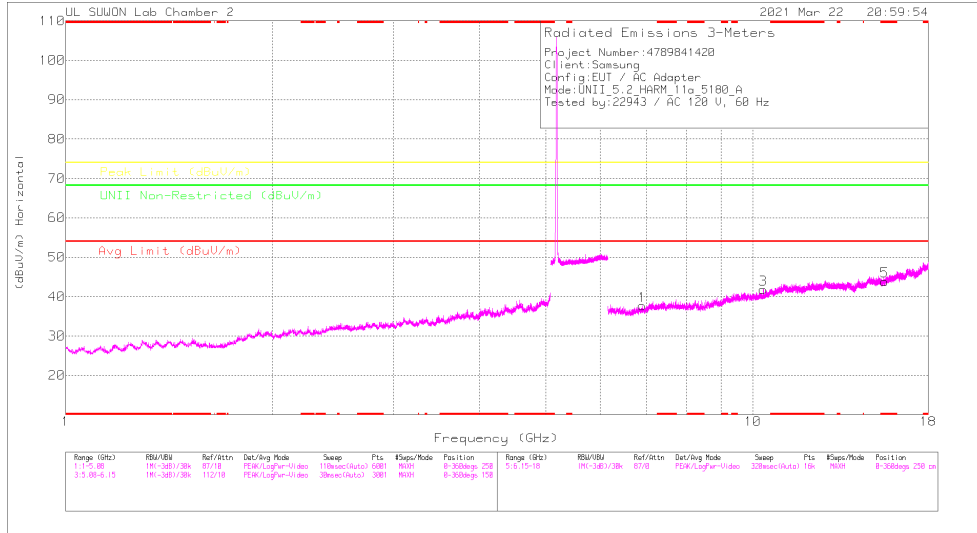
BANDEDGE TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity		
802.11a	5180	MIMO	5.150	39.26	Pk	34.40	-17.70	0.00	55.96	-	-	74.00	-18.04	200	154	H		
			* 5.1362	41.45	Pk	34.30	-17.70	0.00	58.05	-	-	74.00	-15.95	200	154	H		
			5.150	29.10	RMS	34.40	-17.70	0.00	45.80	54.00	-8.20	-	-	-	200	154	H	
			* 5.1455	29.56	RMS	34.40	-17.70	0.00	46.26	54.00	-7.74	-	-	-	200	154	H	
			5.150	39.72	Pk	34.40	-17.70	0.00	56.42	-	-	-	-	74.00	-17.58	175	265	V
			* 5.14288	41.61	Pk	34.40	-17.70	0.00	58.31	-	-	-	-	74.00	-15.69	175	265	V
			5.150	29.43	RMS	34.40	-17.70	0.00	46.13	54.00	-7.87	-	-	-	-	175	265	V
			* 5.14995	30.08	RMS	34.40	-17.70	0.00	46.78	54.00	-7.22	-	-	-	-	175	265	V
			5.150	41.48	Pk	34.30	-21.60	0.00	54.18	-	-	-	-	74.00	-19.82	191	103	H
			* 5.14595	46.09	Pk	34.30	-21.70	0.00	58.69	-	-	-	-	74.00	-15.31	191	103	H
802.11n (HT20)	5180	MIMO	5.150	32.26	RMS	34.30	-21.60	0.00	44.96	54.00	-9.04	-	-	-	191	103	H	
			* 5.14823	32.50	RMS	34.30	-21.70	0.00	45.10	54.00	-8.90	-	-	-	191	103	H	
			5.150	41.63	Pk	34.30	-21.60	0.00	54.33	-	-	-	74.00	-19.67	165	269	V	
			* 5.1461	43.93	Pk	34.30	-21.70	0.00	56.53	-	-	-	74.00	-17.47	165	269	V	
			5.150	32.37	RMS	34.30	-21.60	0.00	45.07	54.00	-8.93	-	-	-	165	269	V	
			* 5.14925	32.53	RMS	34.30	-21.70	0.00	45.13	54.00	-8.87	-	-	-	165	269	V	
			5.150	46.39	Pk	34.30	-21.60	0.00	59.09	-	-	-	-	74.00	-14.91	197	103	H
			* 5.1499	49.99	Pk	34.30	-21.70	0.00	62.59	-	-	-	-	74.00	-11.41	197	103	H
			5.150	37.48	RMS	34.30	-21.60	0.00	50.18	54.00	-3.82	-	-	-	-	197	103	H
			* 5.14993	37.61	RMS	34.30	-21.70	0.00	50.21	54.00	-3.79	-	-	-	-	197	103	H
802.11n (HT40)	5190	MIMO	5.150	46.03	Pk	34.30	-21.60	0.00	58.73	-	-	-	-	74.00	-15.27	172	282	V
			* 5.14675	50.18	Pk	34.30	-21.70	0.00	62.78	-	-	-	74.00	-11.22	172	282	V	
			5.150	36.32	RMS	34.30	-21.60	0.00	49.02	54.00	-4.98	-	-	-	172	282	V	
			* 5.14995	36.80	RMS	34.30	-21.70	0.00	49.40	54.00	-4.60	-	-	-	172	282	V	
			5.150	44.81	Pk	34.30	-21.60	0.00	57.51	-	-	-	-	74.00	-16.49	194	134	H
			* 5.14838	49.01	Pk	34.30	-21.70	0.00	61.61	-	-	-	-	74.00	-12.39	194	134	H
			5.150	36.75	RMS	34.30	-21.60	0.12	49.57	54.00	-4.43	-	-	-	-	194	134	H
			* 5.1498	36.96	RMS	34.30	-21.70	0.12	49.68	54.00	-4.32	-	-	-	-	194	134	H
			5.150	47.32	Pk	34.30	-21.60	0.00	60.02	-	-	-	-	74.00	-13.98	168	268	V
			* 5.14813	49.41	Pk	34.30	-21.70	0.00	62.01	-	-	-	-	74.00	-11.99	168	268	V
802.11ac (VHT80)	5210	MIMO	5.150	36.57	RMS	34.30	-21.60	0.12	49.39	54.00	-4.61	-	-	-	168	268	V	
			* 5.14798	37.28	RMS	34.30	-21.70	0.12	50.00	54.00	-4.00	-	-	-	168	268	V	

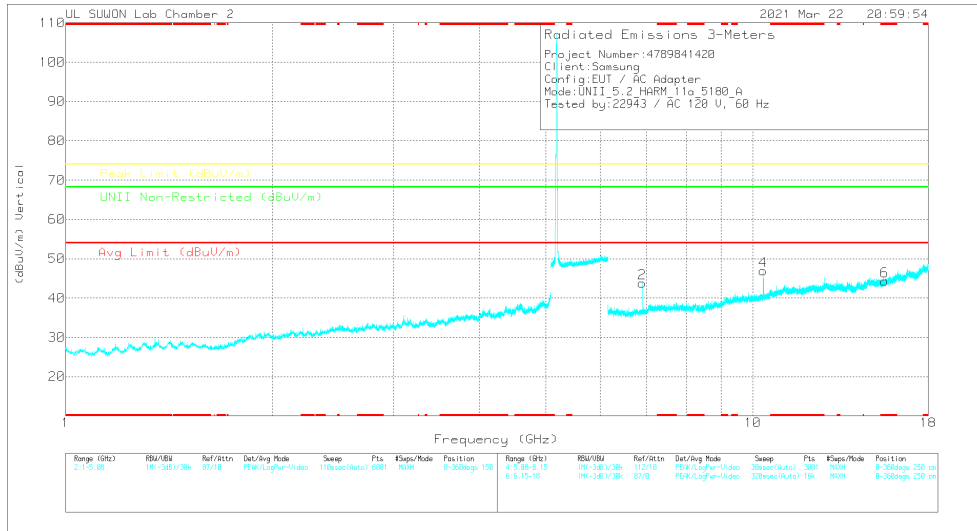
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5180 MHz)
5180 MHz HORIZONTAL



5180 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5180 MHz DATA

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	317_00168724	6GHz_HF[S]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Asimuth (Degs)	Height (cm)	Polarity
6.90677	36.81	PK-U	35.8	-24.6	0	48.01	-	-	-	-	68.2	-20.19	215	104	H
6.90677	36.67	PK-U	35.8	-24.6	0	48.87	-	-	-	-	68.2	-18.33	283	354	V
10.35543	36.96	PK-U	37.7	-20	0	54.66	-	-	-	-	68.2	-13.54	101	349	H
10.36093	42.97	PK-U	37.7	-20	0	60.67	-	-	-	-	68.2	-7.53	98	228	V
* 15.54066	34.64	PK-U	40	-19.4	0	55.24	-	-	74	-18.76	-	-	0	100	H
* 15.54278	34.09	PK-U	40	-19.4	0	54.69	-	-	74	-18.31	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK-U - U-NII: Maximum Peak

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5180	MIMO	6.907	36.81	PK-U	35.80	-24.60	0.00	48.01	-	-	-	-	68.20	-20.19	215	104	H
			6.907	38.67	PK-U	35.80	-24.60	0.00	49.87	-	-	-	-	68.20	-18.33	263	354	V
			10.355	36.96	PK-U	37.70	-20.00	0.00	54.66	-	-	-	-	68.20	-13.54	101	349	H
			10.361	42.97	PK-U	37.70	-20.00	0.00	60.67	-	-	-	-	68.20	-7.53	98	228	V
			* 15.54066	34.64	PK-U	40.00	-19.40	0.00	55.24	-	-	74.00	-18.76	-	-	0	100	H
			* 15.54278	34.09	PK-U	40.00	-19.40	0.00	54.69	-	-	74.00	-19.31	-	-	0	100	V
	5200	MIMO	6.923	37.08	PK-U	35.80	-24.80	0.00	48.08	-	-	-	-	68.20	-20.12	213	108	H
			6.934	39.13	PK-U	35.80	-24.90	0.00	50.03	-	-	-	-	68.20	-18.17	132	386	V
			10.401	37.29	PK-U	37.70	-20.10	0.00	54.89	-	-	-	-	68.20	-13.31	101	347	H
			10.401	41.55	PK-U	37.70	-20.10	0.00	59.15	-	-	-	-	68.20	-9.05	78	220	V
			* 15.60175	34.11	PK-U	40.00	-19.50	0.00	54.61	-	-	74.00	-19.39	-	-	0	100	H
			* 15.60041	34.32	PK-U	40.00	-19.50	0.00	54.82	-	-	74.00	-19.18	-	-	0	100	V
	5240	MIMO	6.987	39.20	PK-U	35.90	-25.30	0.00	49.80	-	-	-	-	68.20	-18.40	179	400	H
			6.987	40.61	PK-U	35.90	-25.30	0.00	51.21	-	-	-	-	68.20	-16.99	81	245	V
			10.481	36.48	PK-U	37.80	-19.90	0.00	54.38	-	-	-	-	68.20	-13.82	18	219	H
			10.481	42.28	PK-U	37.80	-19.90	0.00	60.18	-	-	-	-	68.20	-8.02	142	212	V
			* 15.72259	34.54	PK-U	40.20	-19.50	0.00	55.24	-	-	74.00	-18.76	-	-	0	100	H
			* 15.7201	34.24	PK-U	40.20	-19.30	0.00	55.14	-	-	74.00	-18.86	-	-	0	100	V

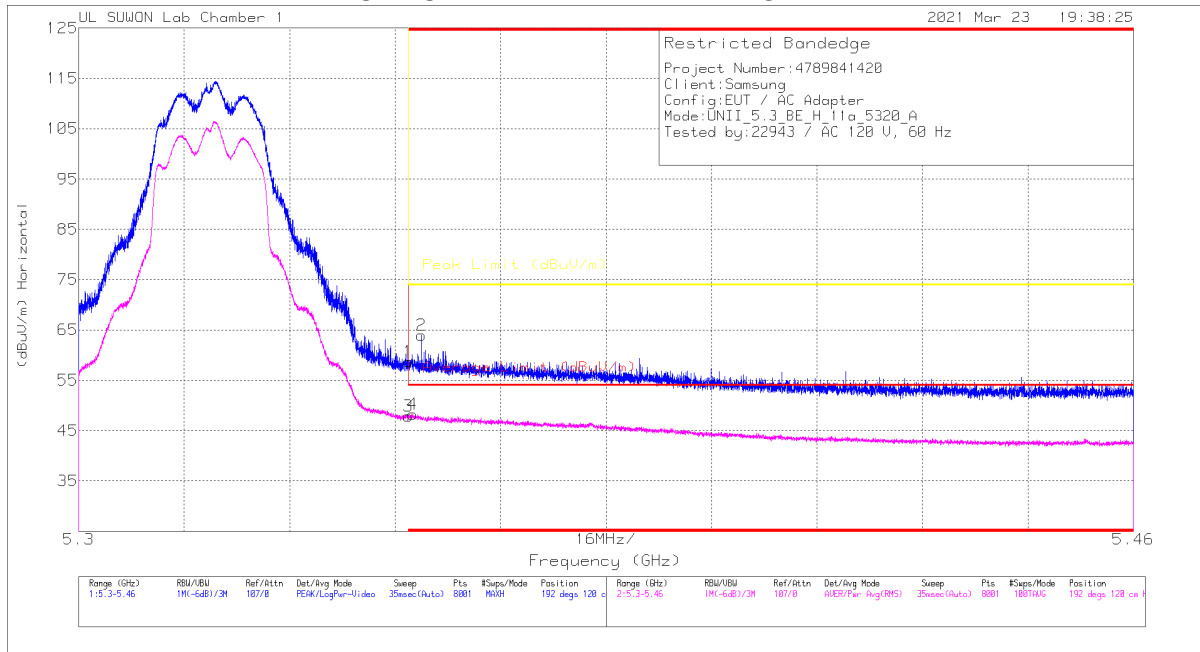
Note1. PK-U - U-NII: Maximum Peak

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.2. TX ABOVE 1GHz 2Tx MODE IN THE 5.3GHz BAND

BANDEDGE (WORST CASE: 802.11a / 5320 MHz)

HORIZONTAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.35002	45.69	Pk	34.5	-21.5	0	58.69	-	-	74	-15.31	192	120	H
2	* 5.35202	50.92	Pk	34.5	-21.5	0	63.92	-	-	74	-10.08	192	120	H
3	* 5.35002	34.94	RMS	34.5	-21.5	0	47.94	54	-6.06	-	-	192	120	H
4	* 5.35062	35.26	RMS	34.5	-21.5	0	48.26	54	-5.74	-	-	192	120	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

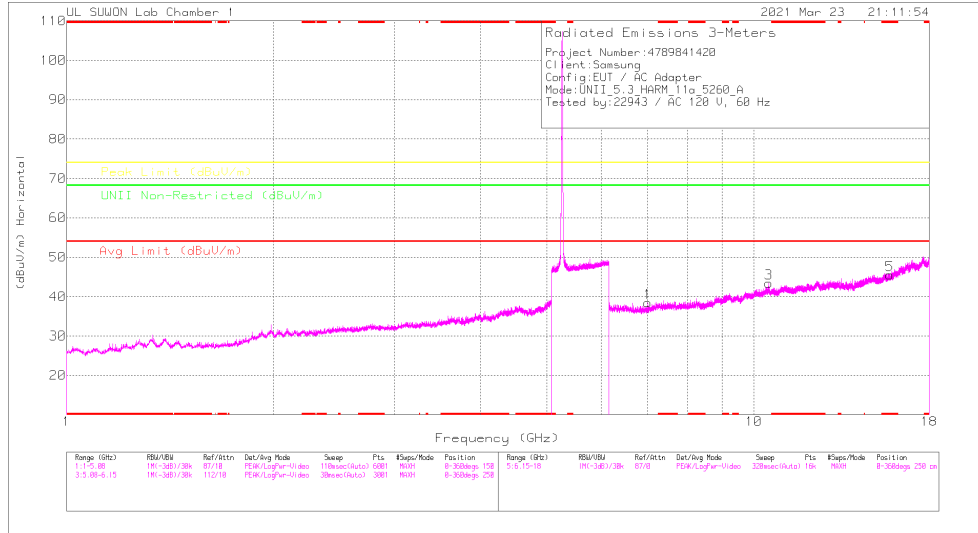
RMS - RMS detection

BANDEDGE TEST DATA

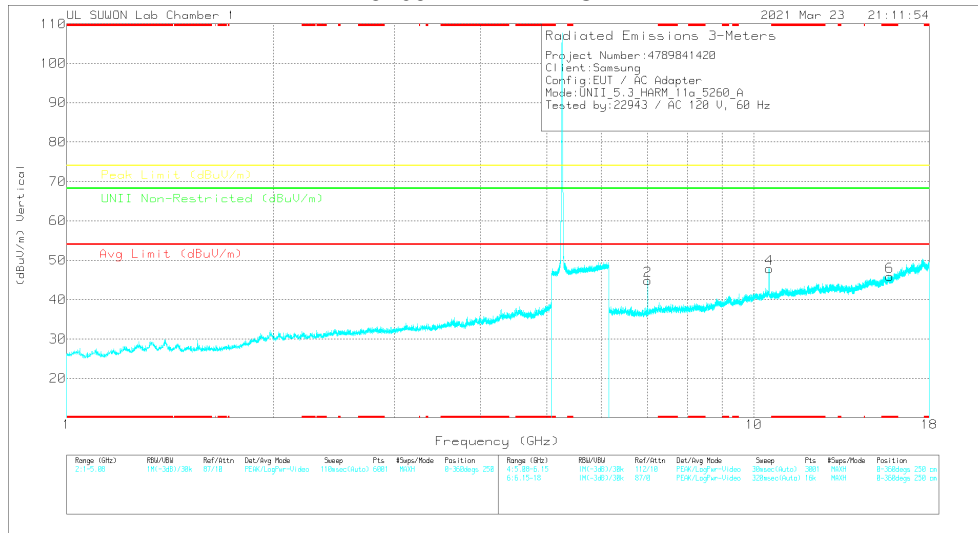
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5320	MIMO	* 5.35002	45.69	Pk	34.50	-21.50	0.00	58.69	-	-	74.00	-15.31	192	120	H
			* 5.35202	50.92	Pk	34.50	-21.50	0.00	63.92	-	-	74.00	-10.08	192	120	H
			* 5.35002	34.94	RMS	34.50	-21.50	0.00	47.94	54.00	-6.06	-	-	192	120	H
			* 5.35062	35.26	RMS	34.50	-21.50	0.00	48.26	54.00	-5.74	-	-	192	120	H
			* 5.35002	43.73	Pk	34.50	-21.50	0.00	56.73	-	-	74.00	-17.27	180	245	V
			* 5.35524	46.93	Pk	34.50	-21.50	0.00	59.93	-	-	74.00	-14.07	180	245	V
			* 5.35002	34.18	RMS	34.50	-21.50	0.00	47.18	54.00	-6.82	-	-	180	245	V
			* 5.35054	34.75	RMS	34.50	-21.60	0.00	47.65	54.00	-6.35	-	-	180	245	V
			* 5.35002	43.35	Pk	34.50	-21.50	0.00	56.35	-	-	74.00	-17.65	197	100	H
			* 5.35003	45.52	Pk	34.50	-21.60	0.00	58.42	-	-	74.00	-15.58	197	100	H
802.11n (HT20)	5320	MIMO	* 5.35002	32.18	RMS	34.50	-21.50	0.00	45.18	54.00	-8.82	-	-	197	100	H
			* 5.35016	32.86	RMS	34.50	-21.60	0.00	45.76	54.00	-8.24	-	-	197	100	H
			* 5.35002	42.52	Pk	34.50	-21.50	0.00	55.52	-	-	74.00	-18.48	171	254	V
			* 5.36642	44.48	Pk	34.50	-21.50	0.00	57.48	-	-	74.00	-16.52	171	254	V
			* 5.35002	32.80	RMS	34.50	-21.50	0.00	45.80	54.00	-8.20	-	-	171	254	V
			* 5.35082	32.73	RMS	34.50	-21.50	0.00	45.73	54.00	-8.27	-	-	171	254	V
			* 5.35002	45.46	Pk	34.50	-21.50	0.00	58.46	-	-	74.00	-15.54	192	119	H
			* 5.35024	48.26	Pk	34.50	-21.60	0.00	61.16	-	-	74.00	-12.84	192	119	H
			* 5.35002	34.56	RMS	34.50	-21.50	0.00	47.56	54.00	-6.44	-	-	192	119	H
			* 5.35008	35.08	RMS	34.50	-21.60	0.00	47.98	54.00	-6.02	-	-	192	119	H
802.11n (HT40)	5310	MIMO	* 5.35002	47.22	Pk	34.50	-21.50	0.00	60.22	-	-	74.00	-13.78	182	256	V
			* 5.35574	47.98	Pk	34.50	-21.50	0.00	60.98	-	-	74.00	-13.02	182	256	V
			* 5.35002	33.86	RMS	34.50	-21.50	0.00	46.86	54.00	-7.14	-	-	182	256	V
			* 5.35296	34.81	RMS	34.50	-21.50	0.00	47.81	54.00	-6.19	-	-	182	256	V
			* 5.35002	45.49	Pk	34.50	-21.50	0.00	58.49	-	-	74.00	-15.51	198	100	H
			* 5.35004	46.54	Pk	34.50	-21.50	0.00	59.54	-	-	74.00	-14.46	198	100	H
			* 5.35002	33.84	RMS	34.50	-21.50	0.12	46.96	54.00	-7.04	-	-	198	100	H
			* 5.35076	34.57	RMS	34.50	-21.50	0.12	47.69	54.00	-6.31	-	-	198	100	H
			* 5.35002	43.60	Pk	34.50	-21.50	0.00	56.60	-	-	74.00	-17.40	178	256	V
			* 5.3534	47.15	Pk	34.50	-21.50	0.00	60.15	-	-	74.00	-13.85	178	256	V
802.11ac (VHT80)	5290	MIMO	* 5.35002	34.37	RMS	34.50	-21.50	0.12	47.49	54.00	-6.51	-	-	178	256	V
			* 5.3524	34.95	RMS	34.50	-21.40	0.12	48.17	54.00	-5.83	-	-	178	256	V

Note1. Pk - Peak detector, RMS - RMS detector
 Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5260 MHz)
5260 MHz HORIZONTAL



5260 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5260 MHz DATA

Radiated Emissions

Frequency (GHz)	Meas Reading (dBuV)	Det	2197_00160717	@GHz_HF@B	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Lim (dBuV/m)	Margin (dB)	Peak Lim (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Deg)	Height (cm)	Polarity
7.0132	39.9	PK-U		35.8	-27.5	0	48.2	-	-	-	68.2	-20	142	373	H
7.01352	41.14	PK-U		35.8	-27.5	0	49.44	-	-	-	68.2	-18.76	265	388	V
10.52389	39.73	PK-U		37.9	-22.6	0	55.03	-	-	-	68.2	-13.17	106	322	H
10.52112	45.93	PK-U		37.9	-22.6	0	61.23	-	-	-	68.2	-6.97	285	346	V
* 15.78125	36.41	PK-U		40.2	-21.1	0	55.51	-	74	-18.49	-	-	0	100	H
* 15.78116	36.6	PK-U		40.2	-21.1	0	55.7	-	74	-18.3	-	-	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

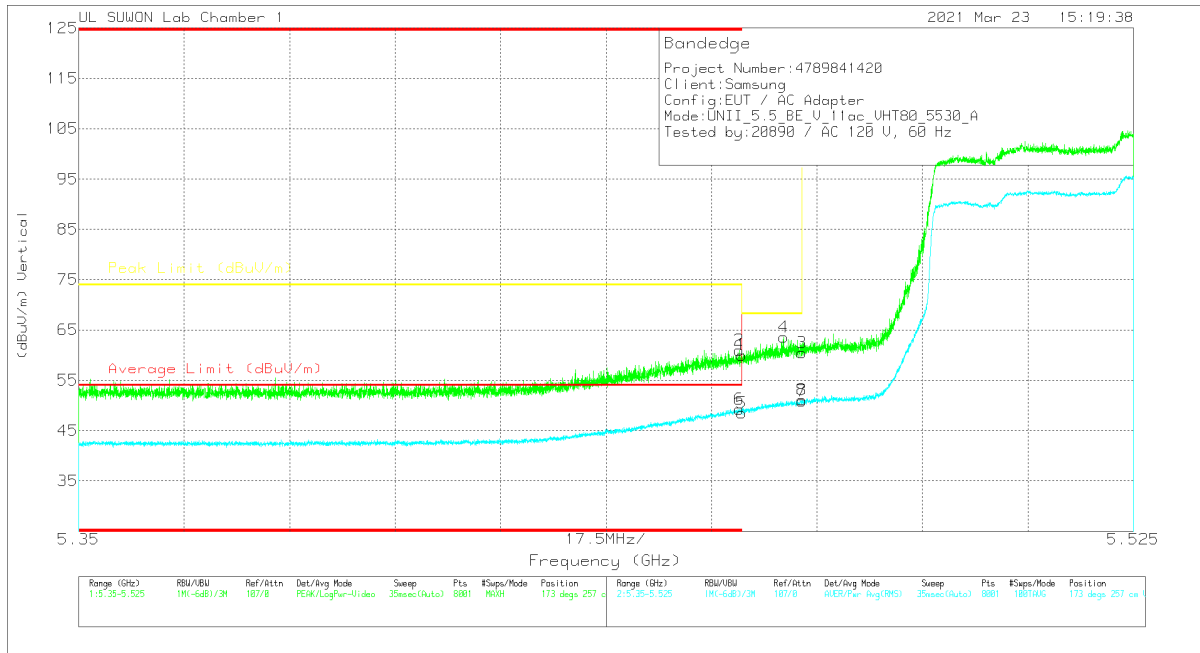
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity		
802.11a	5260	MIMO	7.013	39.90	PK-U	35.80	-27.50	0.00	48.20	-	-	-	-	68.20	-20.00	142	373	H		
			7.014	41.14	PK-U	35.80	-27.50	0.00	49.44	-	-	-	-	-	68.20	-18.76	265	388	V	
			10.521	39.73	PK-U	37.90	-22.60	0.00	55.03	-	-	-	-	-	68.20	-13.17	106	322	H	
			10.521	45.93	PK-U	37.90	-22.60	0.00	61.23	-	-	-	-	-	68.20	-6.97	285	346	V	
			*15.78125	36.41	PK-U	40.20	-21.10	0.00	55.51	-	-	74.00	-18.49	-	-	-	0	100	H	
			*15.78116	36.60	PK-U	40.20	-21.10	0.00	55.70	-	-	74.00	-18.30	-	-	-	0	100	V	
	5300	MIMO	7.066	40.23	PK-U	35.80	-27.70	0.00	48.33	-	-	-	-	-	68.20	-19.87	196	142	H	
			7.067	41.71	PK-U	35.80	-27.70	0.00	49.81	-	-	-	-	-	68.20	-18.39	128	192	V	
			*10.60101	39.05	PK-U	38.00	-22.50	0.00	54.55	-	-	74.00	-19.45	-	-	-	111	298	H	
			*10.60119	26.54	ADR	38.00	-22.50	0.00	42.04	54.00	-11.96	-	-	-	-	-	-	111	298	H
			*10.60111	44.74	PK-U	38.00	-22.50	0.00	60.24	-	-	74.00	-13.76	-	-	-	-	281	172	V
			*10.60114	31.40	ADR	38.00	-22.50	0.00	46.90	54.00	-7.10	-	-	-	-	-	-	281	172	V
	5320	MIMO	*15.90091	36.64	PK-U	40.30	-21.00	0.00	55.94	-	-	74.00	-18.06	-	-	-	0	100	H	
			*15.90026	36.88	PK-U	40.30	-21.00	0.00	56.18	-	-	74.00	-17.82	-	-	-	0	100	V	
			7.095	39.56	PK-U	35.90	-27.90	0.00	47.56	-	-	-	-	-	-	68.20	-20.64	75	106	H
			7.093	43.15	PK-U	35.90	-27.80	0.00	51.25	-	-	-	-	-	-	68.20	-16.95	124	227	V
			*10.63636	40.00	PK-U	38.00	-22.10	0.00	55.90	-	-	74.00	-18.10	-	-	-	-	107	272	H
			*10.64138	26.06	ADR	38.00	-22.00	0.00	42.06	54.00	-11.94	-	-	-	-	-	-	107	272	H
			*10.63612	43.31	PK-U	38.00	-22.10	0.00	59.21	-	-	74.00	-14.79	-	-	-	-	280	198	V
			*10.64092	30.59	ADR	38.00	-22.10	0.00	46.49	54.00	-7.51	-	-	-	-	-	-	280	198	V
			*15.95836	36.65	PK-U	40.40	-20.80	0.00	56.25	-	-	74.00	-17.75	-	-	-	-	0	100	H
			*15.96111	36.63	PK-U	40.40	-20.80	0.00	56.23	-	-	74.00	-17.77	-	-	-	-	0	100	V

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
 Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.3. TX ABOVE 1GHz 2Tx MODE IN THE 5.5 GHz BAND

BANDEDGE (WORST CASE: 802.11ac VHT80 / 5530 MHz)

VERTICAL PEAK AND AVERAGE DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.45999	46.84	Pk	34.5	-21.3	0	60.04	-	-	74	-13.96	173	257	V
2	* 5.45964	47.73	Pk	34.5	-21.3	0	60.93	-	-	74	-13.07	173	257	V
3	5.46998	47.22	Pk	34.5	-21.3	0	60.42	-	-	68.2	-7.78	173	257	V
4	5.46697	50.43	Pk	34.5	-21.3	0	63.63	-	-	68.2	-4.57	173	257	V
5	* 5.45999	35.14	RMS	34.5	-21.3	.12	48.46	54	-5.54	-	-	173	257	V
6	* 5.45959	35.92	RMS	34.5	-21.3	.12	49.24	54	-4.76	-	-	173	257	V
7	5.46998	37.51	RMS	34.5	-21.3	.12	50.83	-	-	-	-	173	257	V
8	5.46994	37.76	RMS	34.5	-21.3	.12	51.08	-	-	-	-	173	257	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

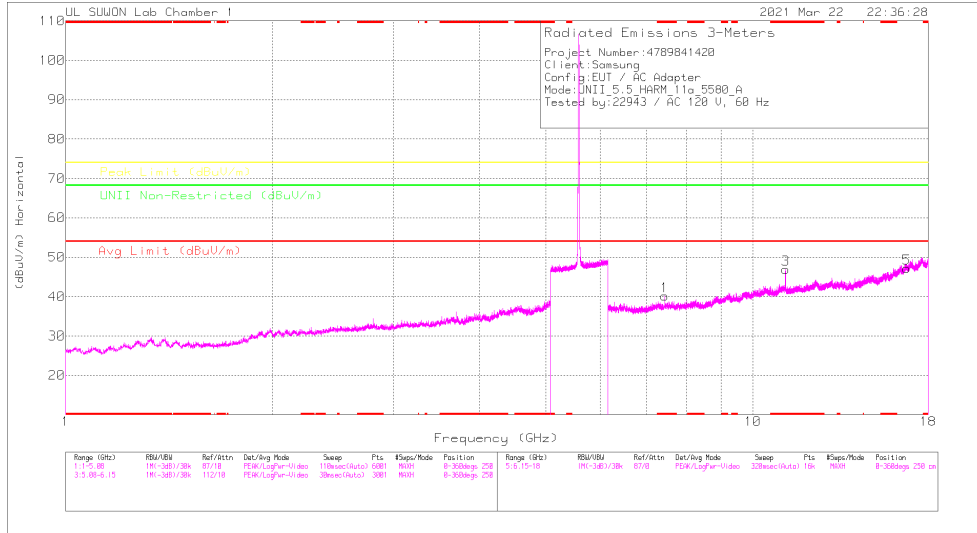
RMS - RMS detection

BANDEDGE TEST DATA

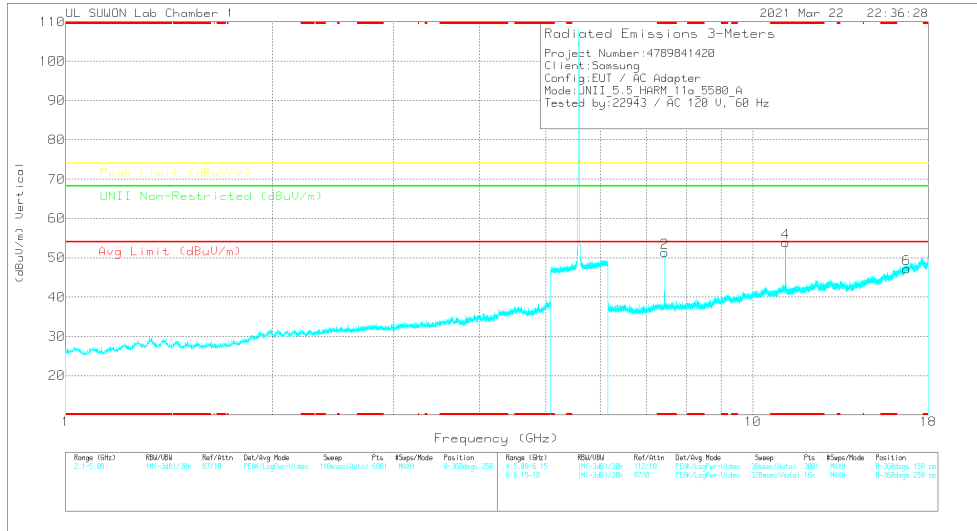
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
802.11a	5500	MIMO	* 5.45999	41.56	Pk	34.50	-21.30	0.00	54.76	-	-	74.00	-19.24	195	100	H	
			* 5.45865	44.16	Pk	34.50	-21.30	0.00	57.36	-	-	74.00	-16.64	195	100	H	
			5.46998	42.63	Pk	34.50	-21.30	0.00	55.83	-	-	68.20	-12.37	195	100	H	
			5.46865	45.65	Pk	34.50	-21.30	0.00	58.85	-	-	68.20	-9.35	195	100	H	
			* 5.45999	31.65	RMS	34.50	-21.30	0.00	44.85	54.00	-9.15	-	-	195	100	H	
			* 5.45277	32.61	RMS	34.50	-21.40	0.00	45.71	54.00	-8.29	-	-	195	100	H	
			5.46998	33.59	RMS	34.50	-21.30	0.00	46.79	-	-	-	-	195	100	H	
			5.46753	33.37	RMS	34.50	-21.30	0.00	46.57	-	-	-	-	195	100	H	
			* 5.45999	41.84	Pk	34.50	-21.30	0.00	55.04	-	-	74.00	-18.96	175	257	V	
			* 5.45666	44.01	Pk	34.50	-21.40	0.00	57.11	-	-	74.00	-16.89	175	257	V	
			5.46998	43.12	Pk	34.50	-21.30	0.00	56.32	-	-	68.20	-11.88	175	257	V	
			5.46922	45.51	Pk	34.50	-21.40	0.00	58.61	-	-	68.20	-9.59	175	257	V	
	* 5.45999	32.08	RMS	34.50	-21.30	0.00	45.28	54.00	-8.72	-	-	175	257	V			
	* 5.45924	32.41	RMS	34.50	-21.30	0.00	45.61	54.00	-8.39	-	-	175	257	V			
	5.46998	33.32	RMS	34.50	-21.30	0.00	46.52	-	-	-	-	175	257	V			
	5.46966	33.60	RMS	34.50	-21.30	0.00	46.80	-	-	-	-	175	257	V			
	5700	MIMO	5.72502	45.48	Pk	34.90	-20.90	0.00	59.48	-	-	68.20	-8.72	193	100	H	
			5.72503	47.77	Pk	34.90	-20.90	0.00	61.77	-	-	68.20	-6.43	193	100	H	
			5.72502	46.92	Pk	34.90	-20.90	0.00	60.92	-	-	68.20	-7.28	180	254	V	
			5.72533	48.41	Pk	34.90	-20.90	0.00	62.41	-	-	68.20	-5.79	180	254	V	
			* 5.45999	40.83	Pk	34.50	-21.30	0.00	54.03	-	-	74.00	-19.97	197	100	H	
			* 5.45216	43.50	Pk	34.50	-21.40	0.00	56.60	-	-	74.00	-17.40	197	100	H	
	802.11n (HT20)	5500	MIMO	5.46998	41.63	Pk	34.50	-21.30	0.00	54.83	-	-	68.20	-13.37	197	100	H
				5.46983	44.29	Pk	34.50	-21.30	0.00	57.49	-	-	68.20	-10.71	197	100	H
* 5.45999				31.10	RMS	34.50	-21.30	0.00	44.30	54.00	-9.70	-	-	197	100	H	
* 5.45815				31.63	RMS	34.50	-21.30	0.00	44.83	54.00	-9.17	-	-	197	100	H	
5.46998				32.06	RMS	34.50	-21.30	0.00	45.26	-	-	-	-	197	100	H	
5.46988				32.44	RMS	34.50	-21.30	0.00	45.64	-	-	-	-	197	100	H	
* 5.45999				41.45	Pk	34.50	-21.30	0.00	54.65	-	-	74.00	-19.35	178	247	V	
* 5.45345				44.73	Pk	34.50	-21.40	0.00	57.83	-	-	74.00	-16.17	178	247	V	
5.46998				42.52	Pk	34.50	-21.30	0.00	55.72	-	-	68.20	-12.48	178	247	V	
5.46476				44.46	Pk	34.50	-21.30	0.00	57.66	-	-	68.20	-10.54	178	247	V	
* 5.45999				31.48	RMS	34.50	-21.30	0.00	44.68	54.00	-9.32	-	-	178	247	V	
* 5.45973				32.26	RMS	34.50	-21.30	0.00	45.46	54.00	-8.54	-	-	178	247	V	
5.46998		32.82	RMS	34.50	-21.30	0.00	46.02	-	-	-	-	178	247	V			
5.46994		33.00	RMS	34.50	-21.30	0.00	46.20	-	-	-	-	178	247	V			
5700		MIMO	5.72502	41.29	Pk	34.90	-20.90	0.00	55.29	-	-	68.20	-12.91	301	134	H	
			5.76658	43.35	Pk	35.00	-21.10	0.00	57.25	-	-	68.20	-10.95	301	134	H	
			5.72502	44.18	Pk	34.90	-20.90	0.00	58.18	-	-	68.20	-10.02	169	251	V	
			5.72536	46.04	Pk	34.90	-20.90	0.00	60.04	-	-	68.20	-8.15	169	251	V	
			* 5.45999	41.95	Pk	34.50	-21.30	0.00	55.15	-	-	74.00	-18.85	190	134	H	
			* 5.45994	44.44	Pk	34.50	-21.30	0.00	57.64	-	-	74.00	-16.36	190	134	H	
802.11n (HT40)		5510	MIMO	5.46998	47.92	Pk	34.50	-21.30	0.00	61.12	-	-	68.20	-7.08	190	134	H
				5.46988	49.52	Pk	34.50	-21.30	0.00	62.72	-	-	68.20	-5.48	190	134	H
				* 5.45999	31.96	RMS	34.50	-21.30	0.00	45.16	54.00	-8.84	-	-	190	134	H
				* 5.45913	32.38	RMS	34.50	-21.30	0.00	45.58	54.00	-8.42	-	-	190	134	H
	5.46998			35.75	RMS	34.50	-21.30	0.00	48.95	-	-	-	-	190	134	H	
	5.46990			36.21	RMS	34.50	-21.30	0.00	49.41	-	-	-	-	190	134	H	
	* 5.45999			43.09	Pk	34.50	-21.30	0.00	56.29	-	-	74.00	-17.71	165	256	V	
	* 5.45955			44.95	Pk	34.50	-21.30	0.00	58.15	-	-	74.00	-15.85	165	256	V	
	5.46998			46.75	Pk	34.50	-21.30	0.00	59.95	-	-	68.20	-8.25	165	256	V	
	5.46944			50.04	Pk	34.50	-21.40	0.00	63.14	-	-	68.20	-5.06	165	256	V	
	* 5.45999			32.52	RMS	34.50	-21.30	0.00	45.72	54.00	-8.28	-	-	165	256	V	
	* 5.45946			32.87	RMS	34.50	-21.30	0.00	46.07	54.00	-7.93	-	-	165	256	V	
	5.46998	36.91	RMS	34.50	-21.30	0.00	50.11	-	-	-	-	165	256	V			
	5.46961	37.23	RMS	34.50	-21.30	0.00	50.43	-	-	-	-	165	256	V			
	5670	MIMO	5.72502	43.10	Pk	34.90	-20.90	0.00	57.10	-	-	68.20	-11.10	194	104	H	
			5.72598	46.39	Pk	34.90	-21.00	0.00	60.29	-	-	68.20	-7.91	194	104	H	
			5.72502	45.88	Pk	34.90	-20.90	0.00	59.88	-	-	68.20	-8.32	175	254	V	
			5.73113	46.25	Pk	34.90	-21.00	0.00	60.15	-	-	68.20	-8.05	175	254	V	
			* 5.45999	45.57	Pk	34.50	-21.30	0.00	58.77	-	-	74.00	-15.23	196	115	H	
			* 5.45935	47.63	Pk	34.50	-21.30	0.00	60.83	-	-	74.00	-13.17	196	115	H	
	802.11ac (VHT80)	5530	MIMO	5.46998	46.67	Pk	34.50	-21.30	0.00	59.87	-	-	68.20	-8.33	196	115	H
				5.46950	49.30	Pk	34.50	-21.40	0.00	62.40	-	-	68.20	-5.80	196	115	H
				* 5.45999	34.59	RMS	34.50	-21.30	0.12	47.91	54.00	-6.09	-	-	196	115	H
				* 5.45966	35.44	RMS	34.50	-21.30	0.12	48.76	54.00	-5.24	-	-	196	115	H
5.46998				36.13	RMS	34.50	-21.30	0.12	49.45	-	-	-	-	196	115	H	
5.46926				36.72	RMS	34.50	-21.40	0.12	49.94	-	-	-	-	196	115	H	
* 5.45999				46.84	Pk	34.50	-21.30	0.00	60.04	-	-	74.00	-13.96	173	257	V	
* 5.45964				47.73	Pk	34.50	-21.30	0.00	60.93	-	-	74.00	-13.07	173	257	V	
5.46998				47.22	Pk	34.50	-21.30	0.00	60.42	-	-	68.20	-7.78	173	257	V	
5.46697				50.43	Pk	34.50	-21.30	0.00	63.63	-	-	68.20	-4.57	173	257	V	
* 5.45999				35.14	RMS	34.50	-21.30	0.12	48.46	54.00	-5.54	-	-	173	257	V	
* 5.45959				35.92	RMS	34.50	-21.30	0.12	49.24	54.00	-4.76	-	-	173	257	V	
5.46998		37.51	RMS	34.50	-21.30	0.12	50.83	-	-	-	-	173	257	V			
5.46994		37.76	RMS	34.50	-21.30	0.12	51.08	-	-	-	-	173	257	V			
5610		MIMO	5.72502	38.94	Pk	34.90	-20.90	0.00	52.94	-	-	68.20	-15.26	196	108	H	
			5.79275	41.63	Pk	35.00	-20.90	0.00	55.73	-	-	68.20	-12.47	196	108	H	
			5.72502	38.34	Pk	34.90	-20.90	0.00	52.34	-	-	68.20	-15.86	194	106	V	
			5.81188	42.14	Pk	35.00	-20.90	0.00	56.24	-	-	68.20	-11.96	194	106	V	

Note1. Pk - Peak detector, RMS - RMS detector
 Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5580 MHz)
5580 MHz HORIZONTAL



5580 MHz VERTICAL



Note. Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5580 MHz DATA

Radiated Emissions

Frequency (GHz)	Meas Reading (dBm)	Det	317_00168717	6GHz_HPS(B)	DC Corr (dB)	Consolid Reading (dBm)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Admth (Disp)	Height (m)	Polarity	
* 7.4401	41.4	PK-U	35.8	-27.2	0	50	-	-	74	-24	-	-	-	62	394	H
* 7.43998	32.58	ADR	35.8	-27.2	0	41.18	54	-12.82	-	-	-	-	-	62	394	H
* 7.43998	46.07	PK-U	35.8	-27.2	0	54.67	-	-	74	-19.33	-	-	-	72	234	V
* 7.43998	42.06	ADR	35.8	-27.2	0	50.66	54	-3.34	-	-	-	-	-	72	234	V
* 11.161	47.65	PK-U	38.4	-22.5	0	63.55	-	-	74	-10.45	-	-	-	243	250	V
* 11.1613	34.51	ADR	38.4	-22.4	0	50.51	54	-3.49	-	-	-	-	-	243	250	V
16.74018	34.96	PK-U	41.5	-18	0	58.36	-	-	-	-	68.2	-9.84	360	100	H	
16.73651	34.23	PK-U	41.5	-17.9	0	57.83	-	-	-	-	68.2	-10.37	360	100	V	

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

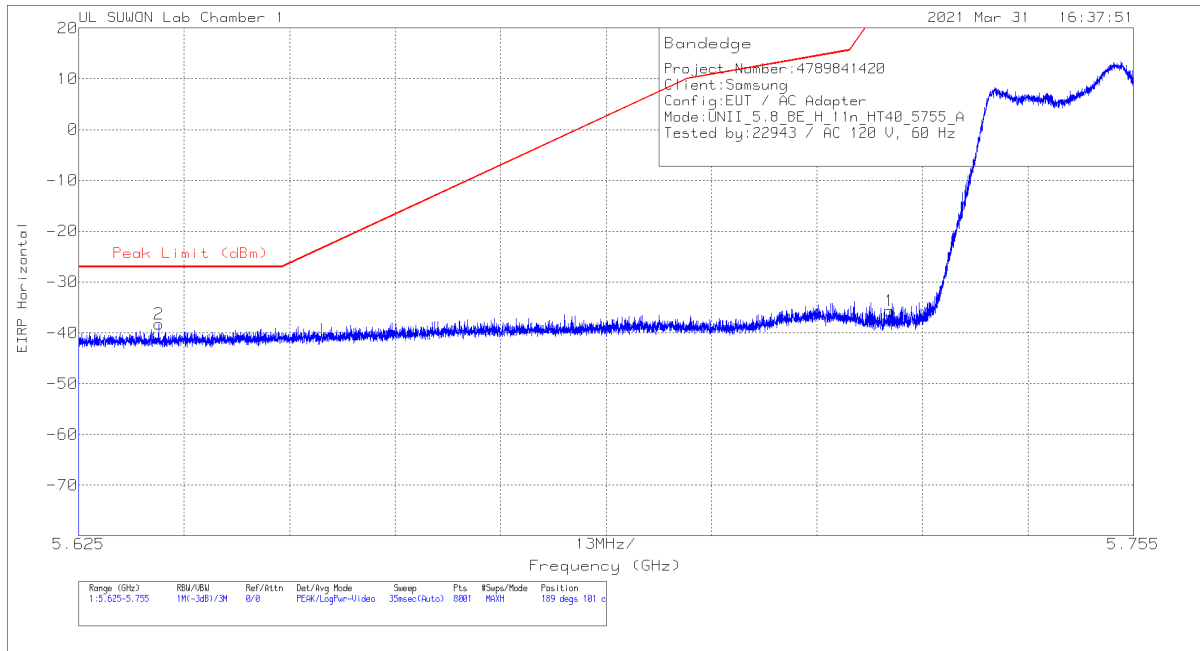
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity		
802.11a	5500	MIMO	*7.3333	41.37	PK-U	35.80	-26.80	0.00	50.37	-	-	74.00	-23.63	-	-	63	226	H		
			**7.3333	31.83	ADR	35.80	-26.80	0.00	40.83	54.00	-13.17	-	-	-	-	-	63	226	H	
			**7.33328	45.48	PK-U	35.80	-26.80	0.00	54.48	-	-	-	74.00	-19.52	-	-	69	222	V	
			**7.33328	40.68	ADR	35.80	-26.80	0.00	49.68	54.00	-4.32	-	-	-	-	-	69	222	V	
			**11.00088	45.71	PK-U	38.20	-21.70	0.00	62.21	-	-	-	74.00	-11.79	-	-	291	108	V	
			**11.00088	32.09	ADR	38.20	-21.70	0.00	48.59	54.00	-5.41	-	-	-	-	-	291	108	V	
	5580	MIMO	16.501	36.02	PK-U	41.10	-19.60	0.00	57.52	-	-	-	-	-	68.20	-10.68	0	100	H	
			**16.500	35.70	PK-U	41.10	-19.60	0.00	57.20	-	-	-	-	-	68.20	-11.00	0	100	V	
			*7.4401	41.40	PK-U	35.80	-27.20	0.00	50.00	-	-	-	74.00	-24.00	-	-	62	394	H	
			**7.43998	32.58	ADR	35.80	-27.20	0.00	41.18	54.00	-12.82	-	-	-	-	-	62	394	H	
			**7.43998	46.07	PK-U	35.80	-27.20	0.00	54.67	-	-	-	74.00	-19.33	-	-	72	234	V	
			**7.43998	42.06	ADR	35.80	-27.20	0.00	50.66	54.00	-3.34	-	-	-	-	-	72	234	V	
	5700	MIMO	**11.161	47.65	PK-U	38.40	-22.50	0.00	63.55	-	-	-	74.00	-10.45	-	-	243	250	V	
			**11.1613	34.51	ADR	38.40	-22.40	0.00	50.51	54.00	-3.49	-	-	-	-	243	250	V		
			16.740	34.86	PK-U	41.50	-18.00	0.00	58.36	-	-	-	-	-	68.20	-9.84	360	100	H	
			16.737	34.23	PK-U	41.50	-17.90	0.00	57.83	-	-	-	-	-	68.20	-10.37	360	100	V	
			*7.59968	39.99	PK-U	35.80	-26.70	0.00	49.09	-	-	-	74.00	-24.91	-	-	197	101	H	
			**7.59994	30.03	ADR	35.80	-26.70	0.00	39.13	54.00	-14.87	-	-	-	-	-	197	101	H	
	802.11n (HT20) Spot-Check	5580	MIMO	*7.59982	43.54	PK-U	35.80	-26.70	0.00	50.69	-	-	74.00	-21.36	-	-	287	330	V	
				**7.59996	38.54	ADR	35.80	-26.70	0.00	47.64	54.00	-6.36	-	-	-	-	287	330	V	
				**11.40136	37.43	PK-U	38.40	-22.20	0.00	53.63	-	-	-	74.00	-20.37	-	-	209	101	H
				**11.40068	25.04	ADR	38.40	-22.20	0.00	41.24	54.00	-12.76	-	-	-	-	-	209	101	H
				**11.40164	41.14	PK-U	38.40	-22.20	0.00	57.34	-	-	-	74.00	-16.66	-	-	247	101	V
				**11.4011	28.14	ADR	38.40	-22.20	0.00	44.34	54.00	-9.66	-	-	-	-	-	247	101	V
17.102				35.01	PK-U	41.50	-17.50	0.00	59.01	-	-	-	-	-	68.20	-9.19	360	100	H	
17.100				34.65	PK-U	41.50	-17.60	0.00	58.55	-	-	-	-	-	68.20	-9.65	360	100	V	
*7.44001				41.70	PK-U	35.80	-27.20	0.00	50.30	-	-	-	74.00	-23.70	-	-	59	242	H	
**7.44001				32.33	ADR	35.80	-27.20	0.00	40.93	54.00	-13.07	-	-	-	-	-	59	242	H	
*7.43992				45.28	PK-U	35.80	-27.20	0.00	53.88	-	-	-	74.00	-20.12	-	-	66	220	V	
802.11n (HT40) Spot-Check				5590	MIMO	**7.43992	39.97	ADR	35.80	-27.20	0.00	48.57	54.00	-5.43	-	-	-	-	66	220
	**11.16234	37.37	PK-U			38.40	-22.40	0.00	53.37	-	-	-	74.00	-20.63	-	-	76	356	H	
	**11.16092	24.49	ADR			38.40	-22.50	0.00	40.39	54.00	-13.61	-	-	-	-	-	76	356	H	
	**11.15804	40.42	PK-U			38.40	-22.40	0.00	56.42	-	-	-	74.00	-17.58	-	-	112	320	V	
	**11.16218	27.20	ADR			38.40	-22.40	0.00	43.20	54.00	-10.80	-	-	-	-	-	112	320	V	
	16.732	34.78	PK-U			41.50	-17.80	0.00	58.48	-	-	-	-	-	68.20	-9.72	0	100	H	
	16.741	34.87	PK-U			41.50	-18.00	0.00	58.37	-	-	-	-	-	68.20	-9.83	0	100	V	
	*7.45266	42.05	PK-U			35.80	-27.20	0.00	50.65	-	-	-	74.00	-23.35	-	-	298	400	H	
	**7.4532	32.70	ADR			35.80	-27.20	0.00	41.30	54.00	-12.70	-	-	-	-	-	298	400	H	
	**7.45318	44.59	PK-U			35.80	-27.20	0.00	53.19	-	-	-	74.00	-20.81	-	-	55	394	V	
	*7.45326	39.15	ADR			35.80	-27.20	0.00	47.75	54.00	-6.25	-	-	-	-	-	55	394	V	
	**11.17885	36.22	PK-U			38.40	-22.40	0.00	52.22	-	-	-	74.00	-21.78	-	-	0	100	H	
**11.1822	36.26	PK-U	38.40	-22.30	0.00	52.36	-	-	-	74.00	-21.64	-	-	0	100	V				
16.775	34.51	PK-U	41.60	-18.10	0.00	58.01	-	-	-	-	-	68.20	-10.19	0	100	H				
16.764	34.43	PK-U	41.60	-18.00	0.00	58.03	-	-	-	-	-	68.20	-10.17	0	100	V				
802.11ac (VHT80) Spot-Check	5610	MIMO	*7.47987	41.26	PK-U	35.70	-26.90	0.00	50.06	-	-	74.00	-23.94	-	-	14	340	H		
			**7.47993	32.08	ADR	35.70	-26.90	0.12	41.00	54.00	-13.00	-	-	-	-	14	340	H		
			*7.48	44.42	PK-U	35.70	-26.90	0.00	53.22	-	-	-	74.00	-20.78	-	-	247	231	V	
			**7.47995	39.27	ADR	35.70	-26.90	0.12	48.19	54.00	-5.81	-	-	-	-	-	247	231	V	
			**11.22019	36.23	PK-U	38.40	-22.20	0.00	52.43	-	-	-	74.00	-21.57	-	-	360	100	H	
			**11.22158	36.14	PK-U	38.40	-22.20	0.00	52.34	-	-	-	74.00	-21.66	-	-	360	100	V	
			16.833	34.94	PK-U	41.60	-18.50	0.00	58.04	-	-	-	-	-	68.20	-10.16	360	100	H	
			16.832	34.57	PK-U	41.60	-18.50	0.00	57.67	-	-	-	-	-	68.20	-10.53	360	100	V	

Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
 Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

11.4. TX ABOVE 1GHz 2Tx MODE IN THE 5.8 GHz BAND

BANDEDGE (WORST CASE: 802.11n HT40 / 5755 MHz)

HORIZONTAL PEAK DATA



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168717	10dB_ATT[dB]	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.72499	-61.44	Pk	34.9	-20.9	11.8	0	-35.64	26.97	-62.61	189	101	H
2	5.63485	-63.73	Pk	34.7	-21	11.8	0	-38.23	-27	-11.23	189	101	H

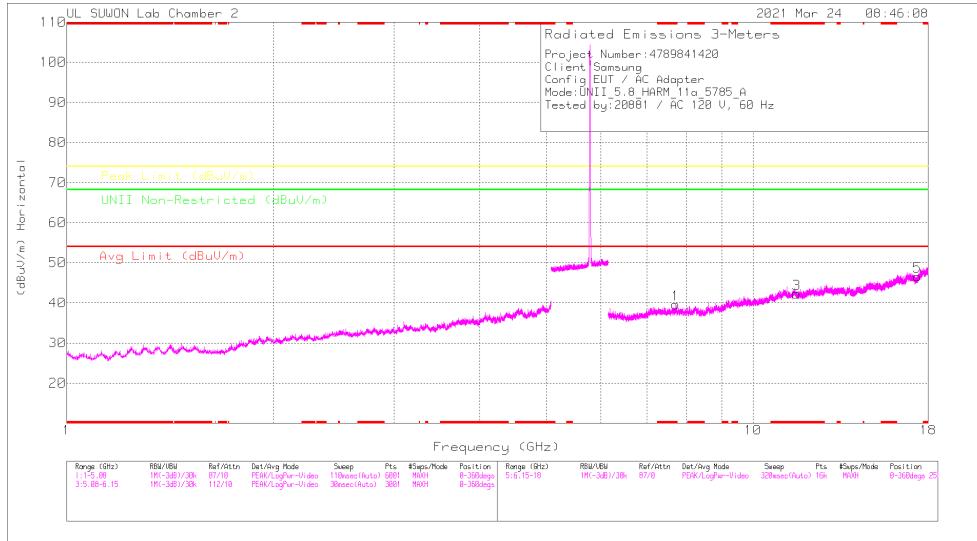
Pk - Peak detector

BANDEDGE TEST DATA

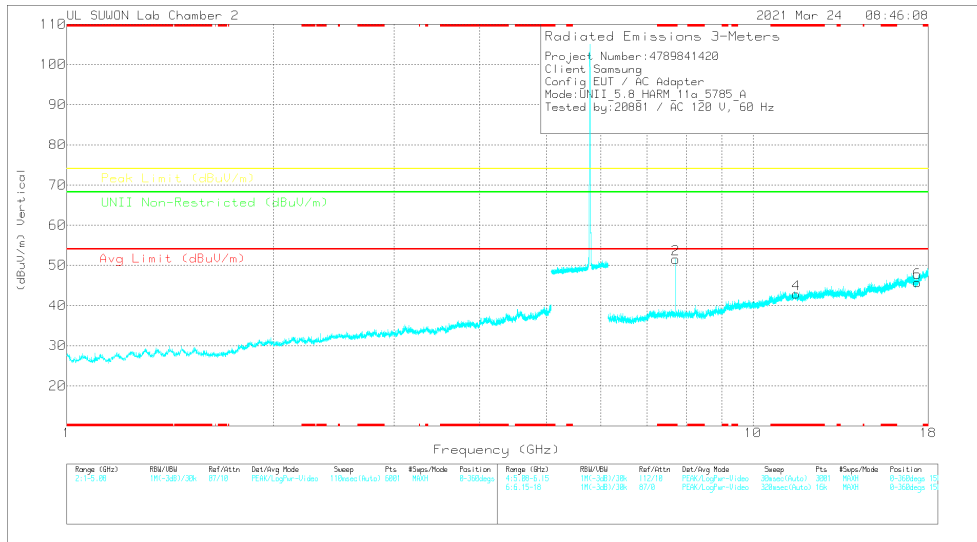
Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBm]	Detector Mode	ANT Factor	Loss [dB]	Conv. F [dB]	DC Corr [dB]	Result [dBm]	PK Limit [dBm]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
802.11a	5745	MIMO	5.72499	-61.39	Pk	34.90	-20.90	11.80	0.00	-35.59	26.97	-62.56	191	100	H
			5.64504	-64.11	Pk	34.80	-20.90	11.80	0.00	-38.41	-27.00	-11.41	191	100	H
			5.72499	-61.56	Pk	34.90	-20.90	11.80	0.00	-35.76	26.97	-62.73	163	242	V
			5.62934	-64.62	Pk	34.70	-21.10	11.80	0.00	-39.22	-27.00	-12.22	163	242	V
			5.92835	-64.09	Pk	35.10	-20.90	11.80	0.00	-38.09	26.94	-65.03	179	107	H
	5825	MIMO	5.92835	-65.07	Pk	35.10	-20.80	11.80	0.00	-38.97	-27.00	-11.97	179	107	H
			5.85003	-61.25	Pk	35.10	-20.90	11.80	0.00	-35.25	26.94	-62.19	169	255	V
			5.95113	-65.06	Pk	35.20	-20.70	11.80	0.00	-38.76	-27.00	-11.76	169	255	V
			5.72499	-61.71	Pk	34.90	-20.90	11.80	0.00	-35.91	26.97	-62.88	187	101	H
			5.64244	-64.44	Pk	34.80	-21.00	11.80	0.00	-38.84	-27.00	-11.84	187	101	H
802.11n (HT20)	5745	MIMO	5.72499	-61.55	Pk	34.90	-20.90	11.80	0.00	-35.75	26.97	-62.72	177	277	V
			5.64809	-64.54	Pk	34.80	-20.90	11.80	0.00	-38.84	-27.00	-11.84	177	277	V
			5.85003	-61.76	Pk	35.10	-20.90	11.80	0.00	-35.76	26.94	-62.70	191	100	H
			5.95443	-65.10	Pk	35.20	-20.60	11.80	0.00	-38.70	-27.00	-11.70	191	100	H
			5.85003	-59.02	Pk	35.10	-20.90	11.80	0.00	-33.02	26.94	-59.96	169	254	V
	5825	MIMO	5.93865	-65.26	Pk	35.20	-20.70	11.80	0.00	-38.96	-27.00	-11.96	169	254	V
			5.72499	-61.44	Pk	34.90	-20.90	11.80	0.00	-35.64	26.97	-62.61	189	101	H
			5.63485	-63.73	Pk	34.70	-21.00	11.80	0.00	-38.23	-27.00	-11.23	189	101	H
			5.72499	-62.69	Pk	34.90	-20.90	11.80	0.00	-36.89	26.97	-63.86	182	253	V
			5.63241	-63.90	Pk	34.70	-21.00	11.80	0.00	-38.40	-27.00	-11.40	182	253	V
802.11n (HT40)	5755	MIMO	5.85003	-66.22	Pk	35.10	-20.90	11.80	0.00	-40.22	26.94	-67.16	182	124	H
			5.93320	-64.88	Pk	35.10	-20.70	11.80	0.00	-38.68	-27.00	-11.68	182	124	H
			5.85003	-64.71	Pk	35.10	-20.90	11.80	0.00	-38.71	26.94	-65.65	171	258	V
			5.99340	-65.33	Pk	35.20	-20.60	11.80	0.00	-38.93	-27.00	-11.93	171	258	V
			5.72499	-64.69	Pk	34.90	-20.90	11.80	0.00	-38.89	26.97	-65.86	186	100	H
	5775 (Lower Side)	MIMO	5.64764	-64.90	Pk	34.80	-20.90	11.80	0.00	-39.20	-27.00	-12.20	186	100	H
			5.72499	-63.46	Pk	34.90	-20.90	11.80	0.00	-37.66	26.97	-64.63	171	276	V
			5.64440	-64.88	Pk	34.80	-21.00	11.80	0.00	-39.28	-27.00	-12.28	171	276	V
			5.85003	-65.64	Pk	35.10	-20.90	11.80	0.00	-39.64	26.94	-66.58	190	101	H
			5.93725	-65.36	Pk	35.20	-20.80	11.80	0.00	-39.16	-27.00	-12.16	190	101	H
802.11ac (VHT80)	5775 (Upper Side)	MIMO	5.85003	-65.18	Pk	35.10	-20.90	11.80	0.00	-39.18	26.94	-66.12	172	269	V
			5.94025	-65.33	Pk	35.20	-20.80	11.80	0.00	-39.13	-27.00	-12.13	172	269	V

Note. Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 802.11a / 5785 MHz)
5785 MHz HORIZONTAL



5785 MHz VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

5785 MHz DATA

Radiated Emissions

Frequency (GHz)	Max Reading (dBuV)	Dir	317_00168724	5GHz_HPSR	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
* 7.71344	38.27	PK-U	36	-23.2	0	51.07	-	-	74	-22.93	-	-	61	388	H
* 7.71326	29.22	ADR	36	-23.2	0	42.02	54	-11.98	-	-	-	-	61	388	H
* 7.7133	41.05	PK-U	36	-23.2	0	53.85	-	-	74	-20.15	-	-	283	365	V
* 7.71326	35.28	ADR	36	-23.2	0	48.08	54	-5.92	-	-	-	-	283	365	V
* 11.56802	33.81	PK-U	38.3	-19.3	0	52.81	-	-	74	-21.19	-	-	0	100	H
* 11.57152	34.43	PK-U	38.3	-19.3	0	53.43	-	-	74	-20.57	-	-	0	100	V
17.35744	34.19	PK-U	41	-18.4	0	56.79	-	-	-	-	68.2	-11.41	0	100	H
17.35098	34.39	PK-U	41	-18.2	0	57.19	-	-	-	-	68.2	-11.01	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

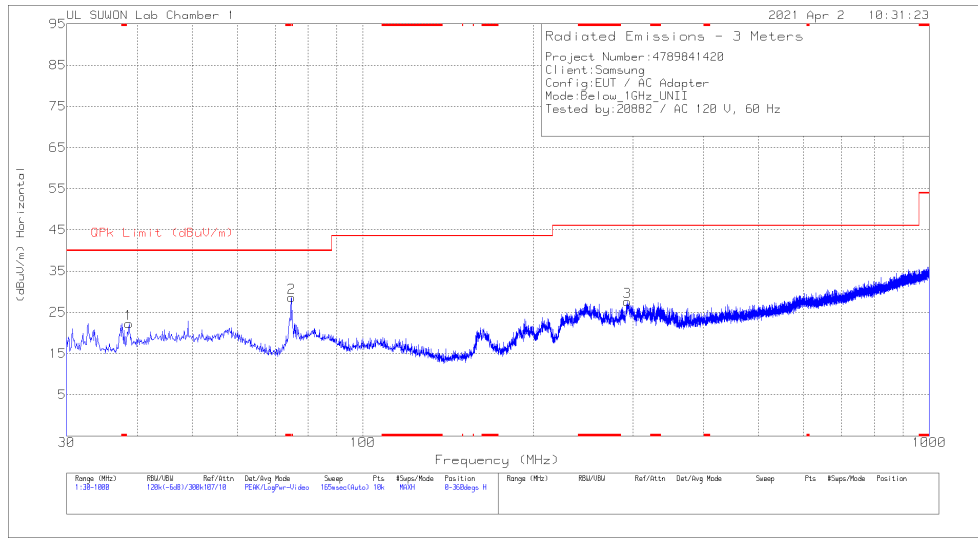
HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Mode	Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Non-Restricted [dBuV/m]	Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
802.11a	5745	MIMO	* 7.6601	40.50	PK-U	35.80	-26.70	0.00	49.60	-	-	74.00	-24.40	-	-	206	376	H	
			** 7.65992	32.03	ADR	35.80	-26.70	0.00	41.13	54.00	-12.87	-	-	-	-	-	206	376	H
			** 7.65998	42.83	PK-U	35.80	-26.70	0.00	51.93	-	-	-	74.00	-22.07	-	-	287	340	V
			** 7.65994	37.46	ADR	35.80	-26.70	0.00	46.56	54.00	-7.44	-	-	-	-	-	287	340	V
			** 11.4912	38.08	PK-U	38.40	-22.20	0.00	54.28	-	-	-	74.00	-19.72	-	-	180	341	H
			** 11.49066	25.55	ADR	38.40	-22.20	0.00	41.75	54.00	-12.25	-	-	-	-	-	180	341	H
			** 11.49064	42.41	PK-U	38.40	-22.20	0.00	58.61	-	-	-	74.00	-15.39	-	-	265	286	V
			** 11.49044	29.31	ADR	38.40	-22.20	0.00	45.51	54.00	-8.49	-	-	-	-	-	265	286	V
			** 17.235	34.61	PK-U	41.30	-17.60	0.00	58.31	-	-	-	-	-	68.20	-9.89	0	100	H
			** 17.238	34.98	PK-U	41.30	-17.40	0.00	58.88	-	-	-	-	-	68.20	-9.32	0	100	V
	5785	MIMO	* 7.71344	38.27	PK-U	36.00	-23.20	0.00	51.07	-	-	-	74.00	-22.93	-	-	61	388	H
			** 7.71326	29.22	ADR	36.00	-23.20	0.00	42.02	54.00	-11.98	-	-	-	-	61	388	H	
			** 7.71333	41.05	PK-U	36.00	-23.20	0.00	53.85	-	-	-	74.00	-20.15	-	-	283	365	V
			** 7.71326	35.28	ADR	36.00	-23.20	0.00	48.08	54.00	-5.92	-	-	-	-	283	365	V	
			** 11.56802	33.81	PK-U	38.30	-19.30	0.00	52.81	-	-	-	74.00	-21.19	-	-	0	100	H
			** 11.57152	34.43	PK-U	38.30	-19.30	0.00	53.43	-	-	-	74.00	-20.57	-	-	0	100	V
			** 17.357	34.19	PK-U	41.00	-18.40	0.00	56.79	-	-	-	-	-	68.20	-11.41	0	100	H
			** 17.351	34.39	PK-U	41.00	-18.20	0.00	57.19	-	-	-	-	-	68.20	-11.01	0	100	V
			** 7.767	37.58	PK-U	36.00	-23.10	0.00	50.48	-	-	-	-	-	68.20	-17.72	203	354	H
			** 7.766	40.27	PK-U	36.00	-23.10	0.00	53.17	-	-	-	-	-	68.20	-15.03	284	360	V
	5825	MIMO	* 11.651	34.32	PK-U	38.40	-19.20	0.00	53.52	-	-	-	74.00	-20.48	-	-	217	386	H
			** 11.65002	21.98	ADR	38.40	-19.30	0.00	41.08	54.00	-12.92	-	-	-	-	217	386	H	
			** 11.65156	39.84	PK-U	38.40	-19.20	0.00	59.04	-	-	-	74.00	-14.96	-	-	269	258	V
			** 11.65116	26.74	ADR	38.40	-19.20	0.00	45.94	54.00	-8.06	-	-	-	-	269	258	V	
			** 17.476	34.30	PK-U	41.20	-17.60	0.00	57.90	-	-	-	-	-	68.20	-10.30	360	100	H
			** 17.474	34.29	PK-U	41.10	-17.80	0.00	57.59	-	-	-	-	-	68.20	-10.61	360	100	V

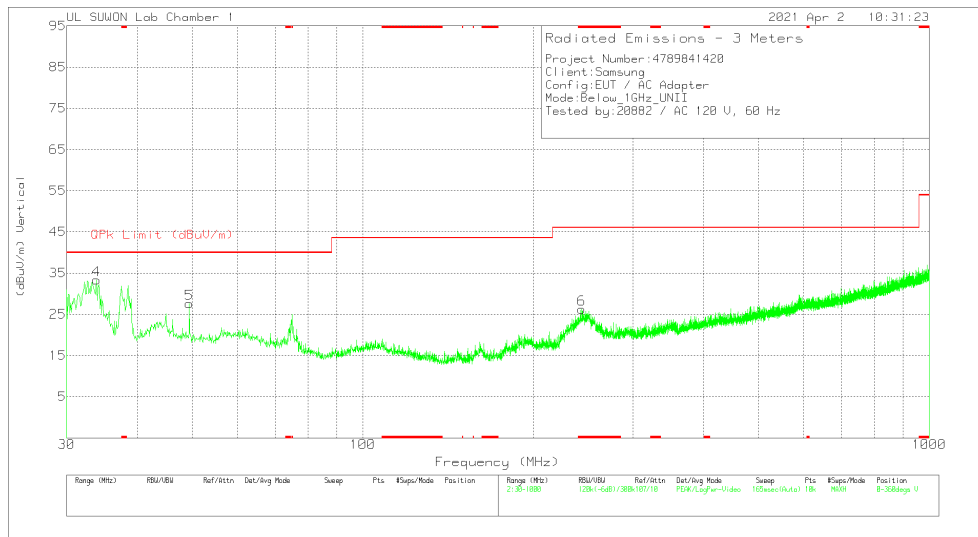
Note1. PK-U - U-NII: Maximum Peak / ADR - U-NII AD primary method, RMS average
 Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

12. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



Below 1G Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	QPK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	38.633	34.89	Pk	18.2	-30.8	0	22.29	40	-17.71	0-360	200	H
2	* 74.814	45.14	Pk	13.5	-30	0	28.64	40	-11.36	0-360	300	H
3	293.355	36.09	Pk	19.2	-27.7	0	27.59	46.02	-18.43	0-360	100	H
4	33.88	47.97	Pk	16.2	-30.8	0	33.37	40	-6.63	0-360	100	V
5	49.4	38.21	Pk	19.8	-30.4	0	27.61	40	-12.39	0-360	200	V
6	* 243.691	36.07	Pk	18.3	-28.1	0	26.27	46.02	-19.75	0-360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector

13. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [*]	56 to 46 [*]
0.5-5	56	46
5-30	60	50

^{*}Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

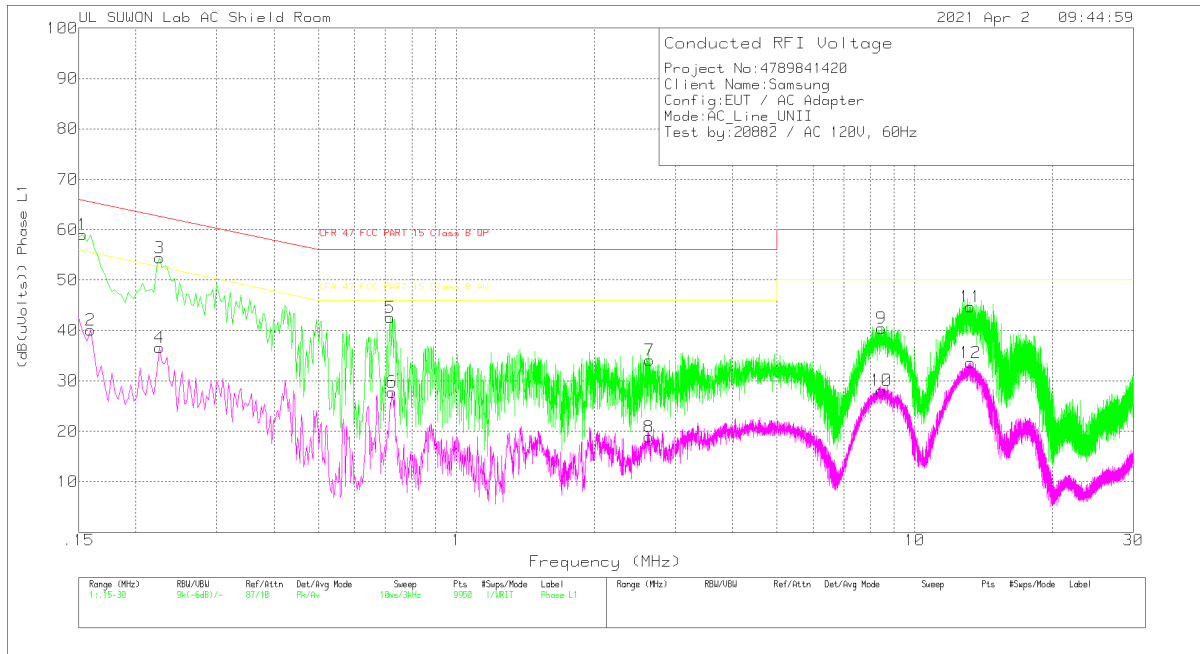
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

WORST EMISSIONS

LINE 1 DATA



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.153	49.12	Pk	9.8	.1	59.02	65.84	-6.82	-	-
2	.159	30.1	Av	9.9	.1	40.1	-	-	55.52	-15.42
3	.225	44.39	Pk	9.8	.2	54.39	62.63	-8.24	-	-
4	.225	26.65	Av	9.8	.2	36.65	-	-	52.63	-15.98
5	.717	32.53	Pk	9.9	.2	42.63	56	-13.37	-	-
6	.723	17.71	Av	9.9	.2	27.81	-	-	46	-18.19
7	2.643	24.13	Pk	9.7	.3	34.13	56	-21.87	-	-
8	2.634	8.86	Av	9.7	.3	18.86	-	-	46	-27.14
9	8.454	30.31	Pk	9.9	.3	40.51	60	-19.49	-	-
10	8.46	17.96	Av	9.9	.3	28.16	-	-	50	-21.84
11	13.245	34.33	Pk	10	.4	44.73	60	-15.27	-	-
12	13.245	23.15	Av	10	.4	33.55	-	-	50	-16.45

Pk - Peak detector

Av - Average detection

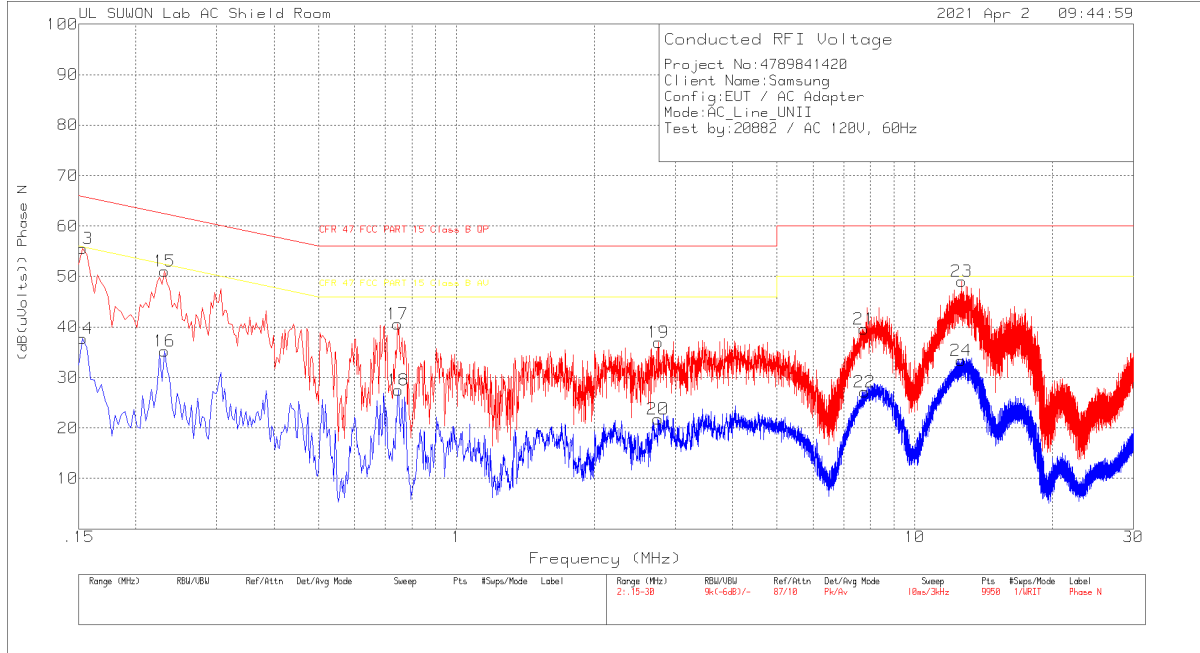
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
.15375	26.94	Qp	9.8	.1	36.84	65.79	-28.95	-	-
.15915	25.03	Qp	9.9	.1	35.03	65.51	-30.48	-	-
.22425	23.94	Qp	9.8	.2	33.94	62.66	-28.72	-	-

Qp - Quasi-Peak detector

LINE 2 DATA



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.153	45.61	Pk	9.8	.1	55.51	65.84	-10.33	-	-
14	.153	27.83	Av	9.8	.1	37.73	-	-	55.84	-18.11
15	.231	41.11	Pk	9.8	.2	51.11	62.41	-11.3	-	-
16	.231	25.21	Av	9.8	.2	35.21	-	-	52.41	-17.2
17	.744	30.43	Pk	9.9	.2	40.53	56	-15.47	-	-
18	.747	17.37	Av	9.9	.2	27.47	-	-	46	-18.53
19	2.757	26.85	Pk	9.8	.3	36.95	56	-19.05	-	-
20	2.754	11.63	Av	9.8	.3	21.73	-	-	46	-24.27
21	7.758	29.42	Pk	9.9	.3	39.62	60	-20.38	-	-
22	7.767	16.98	Av	9.9	.3	27.18	-	-	50	-22.82
23	12.648	38.81	Pk	10	.3	49.11	60	-10.89	-	-
24	12.615	23	Av	10	.3	33.3	-	-	50	-16.7

Pk - Peak detector

Av - Average detection

14. DYNAMIC FREQUENCY SELECTION

14.1. OVERVIEW

14.1.1. LIMITS

INNOVATION, SCIENCE and ECONOMIC DEVELOPMENT CANADA (ISED)

ISDE RSS-247 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-247 Issue 2

Note: For the Band 5600 – 5650 MHz, no operation is permitted.

Until further notice, devices subject to this annex shall not be capable of transmitting in the band 5600 – 5650 MHz. This restriction is for the protection of Environment Canada weather radars operating in this band.

FCC

§15.407 (h), FCC KDB 905462 D02 “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION” and KDB 905462 D03 “U-NII CLIENT DEVICES WITHOUT RADAR DETECTION CAPABILITY”.

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.		

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see notes)
E.I.R.P. \geq 200 mill watt	-64 dBm
E.I.R.P. < 200 mill watt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 mill watt that do not meet power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.	

Table 4: DFS Response requirement values

Parameter	Value
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds (See Note 1)
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3)

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (usec)	PRI (usec)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in table 5a	Roundup: $\{(1/360) \times (19 \times 10^6 \text{ PRI}_{\text{usec}})\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec. With a minimum increment of 1 usec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
<p>Note 1: Short Pulse Radar Type 0 should be used for the <i>Detection Bandwidth</i> test, <i>Channel Move Time</i>, and <i>Channel Closing Time</i> tests.</p>					

Table 6 – Long Pulse Radar Test Signal

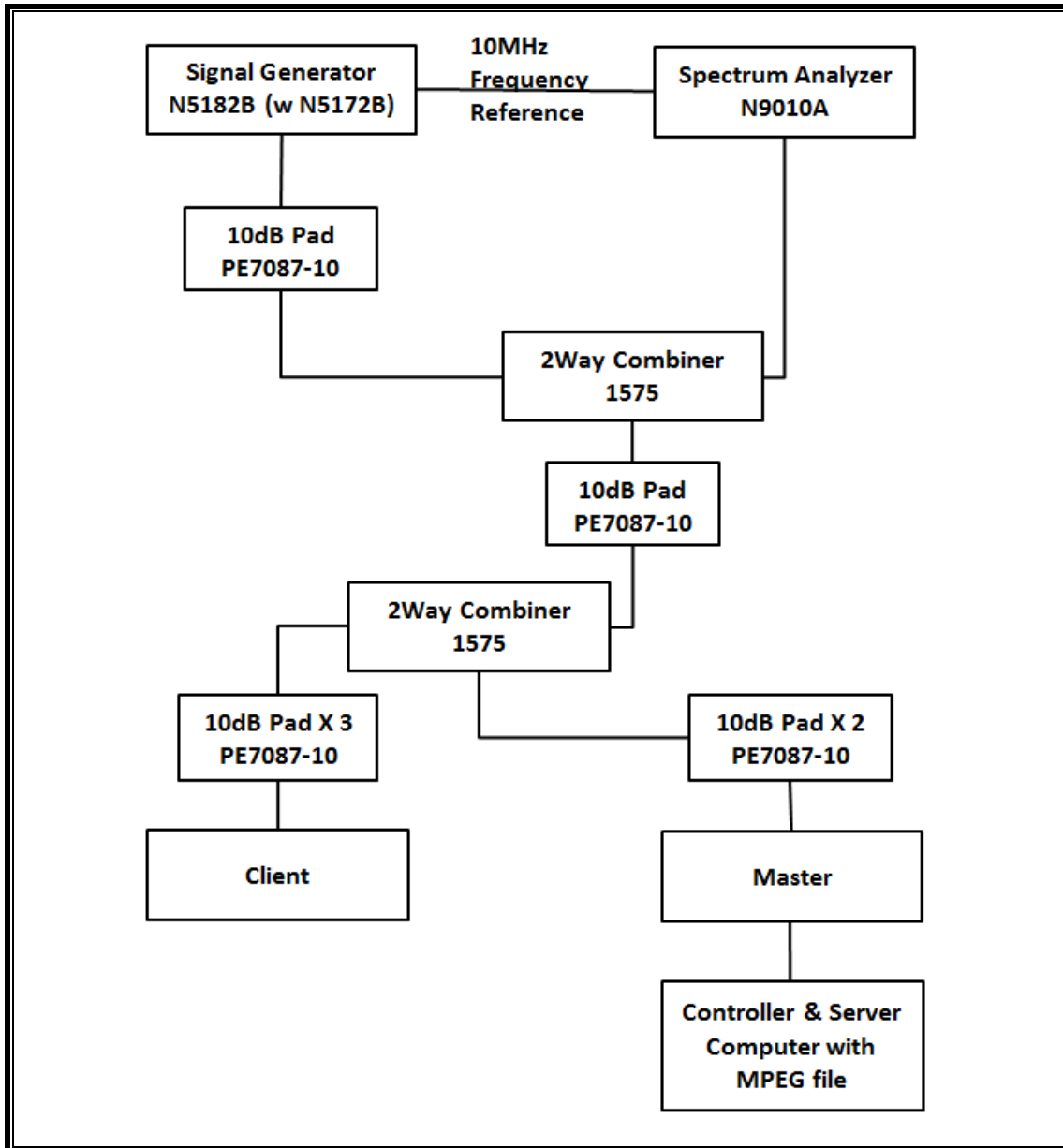
Radar Waveform Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

14.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the Keysite Signal Studio for Pulse Building as N5172B. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 1, 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of KDB 905462 D02. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

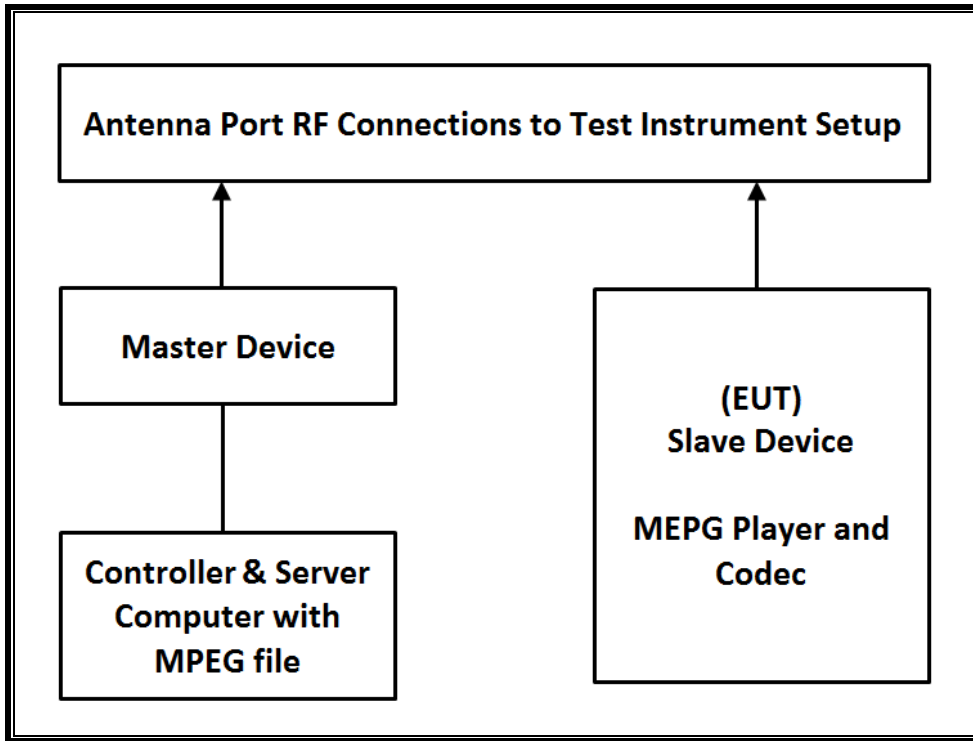
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	S/N	Next Cal Due
Spectrum Analyzer, 7 GHz	Agilent / HP	N9010A	MY54200580	08-05-21
Vector Signal Generator, 6GHz	Agilent / HP	N5182B	MY53051241	08-03-21
Combiner	WEINSCHTEL	WA1534	UL001	01-27-22
Combiner	WEINSCHTEL	WA1535	UL002	01-27-22

14.1.3. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Wireless Access Point	Cisco	AIR-CAP3702E-A-K9	FTX182276QX	LDK102087
Notebook PC (Controller/Server)	HP	HP EliteDesk 800 G1 TWR	CZC4125J25	DoC

14.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level of the widest bandwidth (802.11ac VHT80) within these bands is 12.48 dBm in the 5250-5350 MHz band and 12.72 dBm in the 5470-5725 MHz band.

The antenna assembly utilized two antenna.

Gain of ANT1 : -1.64 dBi for UNII 2A and -1.67 dBi for UNII 2C.

Gain of ANT2 : -4.02 dBi for UNII 2A and -5.55 dBi for UNII 2C.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required conducted threshold at the antenna port is $-64 + 1 = -63$ dBm.

The calibrated radiated DFS Detection Threshold level is set to -64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The EUT uses one transmitter/receiver chain connected to an antenna to perform radiated tests. WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the controller/server PC to the EUT using iPerf version 2.0.5 software package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11 architecture. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz.

The software installed in the access point is 12.4(25d)JA1.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102087. The minimum antenna gain for the Master Device is 6 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is $-64 + 1 = -63$ dBm.

The calibrated radiated DFS Detection Threshold level is set to -64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

14.2. RESULTS FOR 80 MHz BANDWIDTH (UNII-2A BAND)

14.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5290 MHz.

14.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



14.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

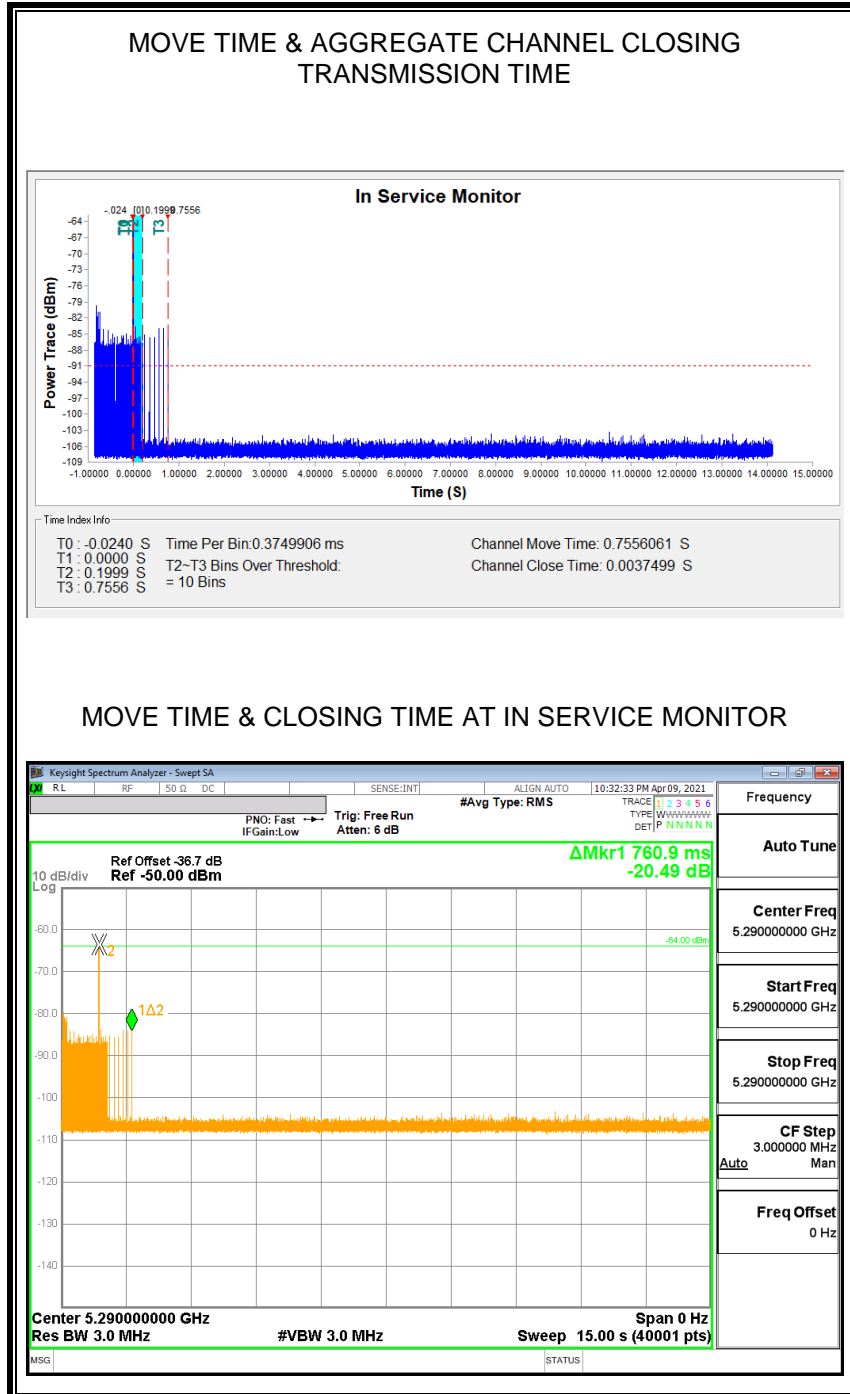
Channel Move Time (sec)	Limit (sec)
0.756	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.750	60

MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

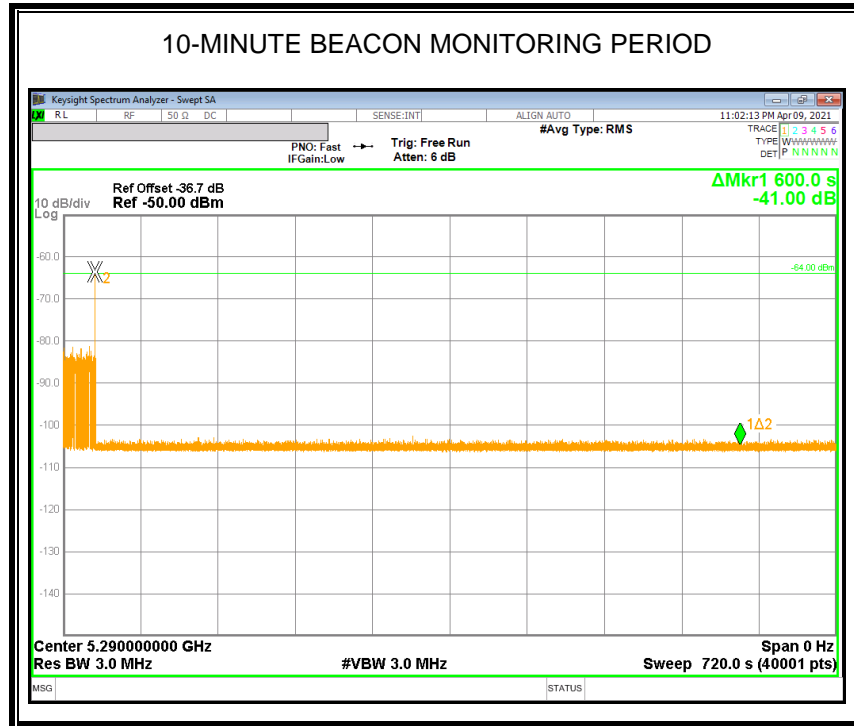
No transmissions are observed during the aggregate monitoring period.



NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 10-minute observation time.



14.3. RESULTS FOR 80 MHz BANDWIDTH (UNII-2C BAND)

14.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5530 MHz.

14.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



14.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

14.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

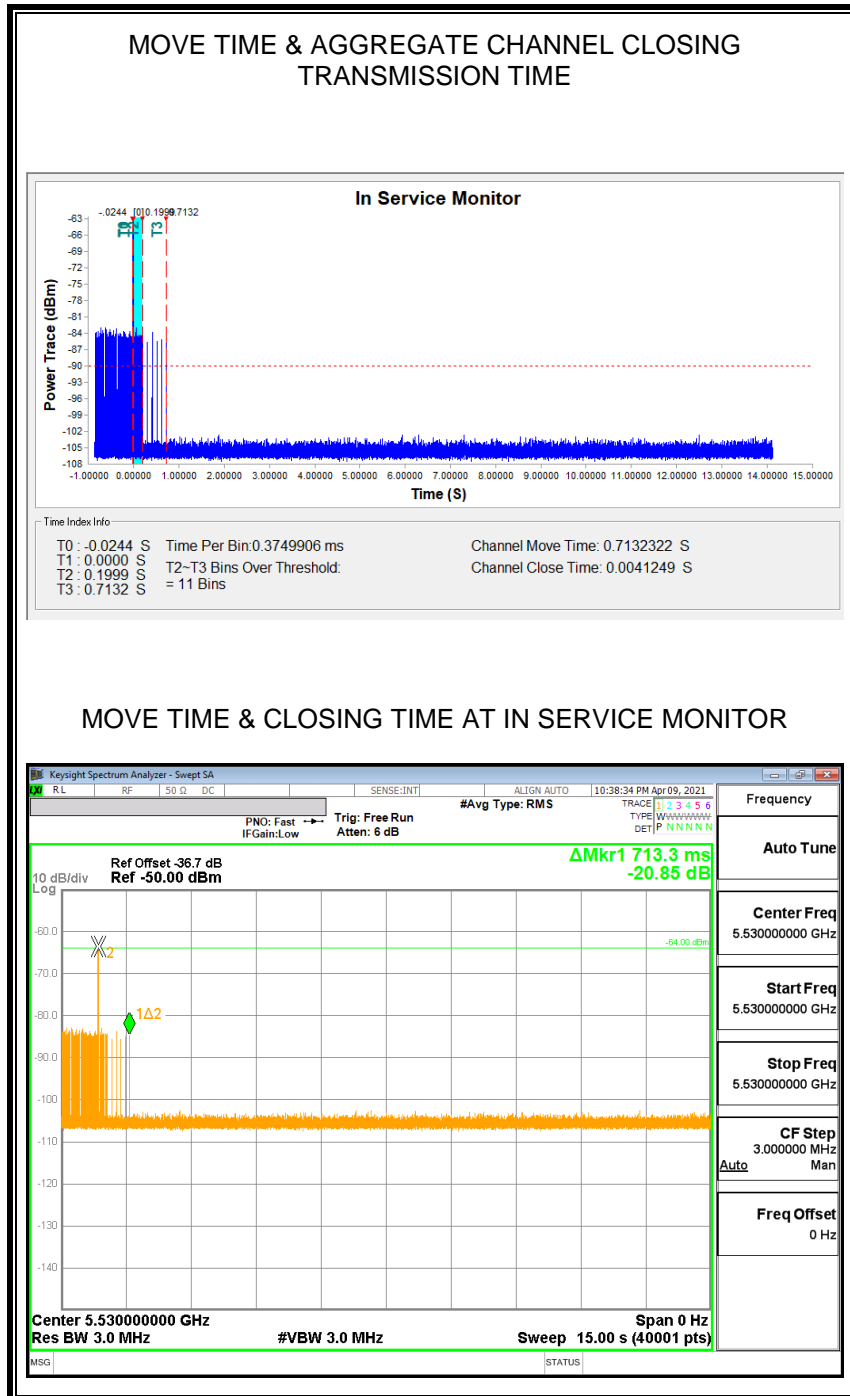
Channel Move Time (sec)	Limit (sec)
0.713	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.125	60

MOVE TIME & CHANNEL CLOSING TIME

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

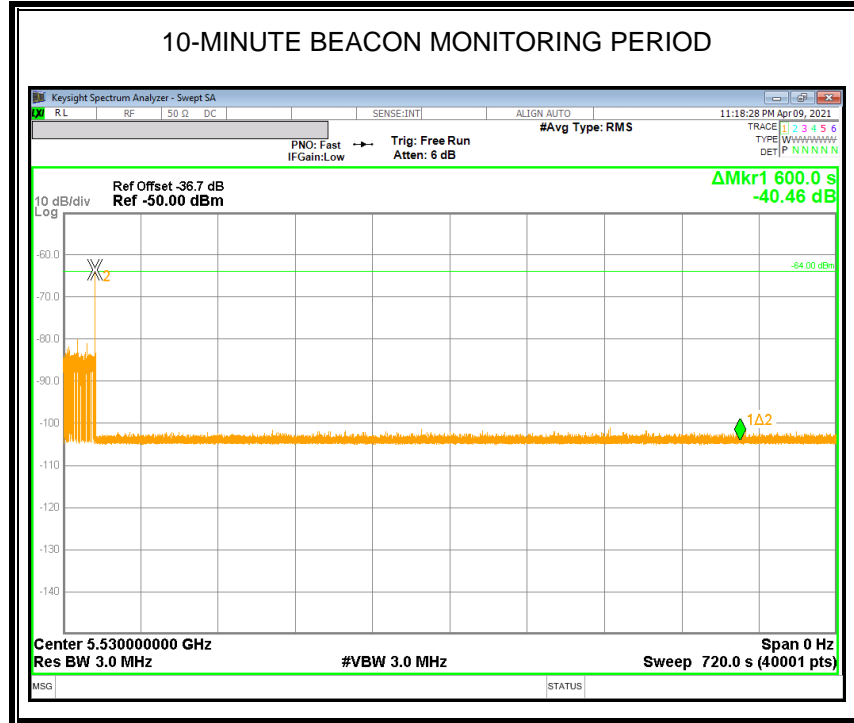
No transmissions are observed during the aggregate monitoring period.



NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 10-minute observation time.



END OF TEST REPORT