

# CERTIFICATION TEST REPORT

**Report Number.** : 4791083081-E8V3

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

**Model** : SC-53E, SCG27

**FCC ID** : A3LSMA556JPN

**EUT Description** : GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax,  
and NFC

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART E

**Date Of Issue:**  
2024-02-06

**Prepared by:**  
UL KOREA LTD.  
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL KOREA LTD. Suwon Laboratory  
218 Maeyeong-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16675, Korea  
TEL: (031) 337-9902  
FAX: (031) 213-5433

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2024-01-29	Initial issue	Dexter(Hyunsik) Yun
V2	2024-02-02	Updated to address TCB's question	Dexter(Hyunsik) Yun
V3	2024-02-06	Updated to address TCB's question	Dexter(Hyunsik) Yun

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>6</b>
4.1. MEASURING INSTRUMENT CALIBRATION .....	6
4.2. SAMPLE CALCULATION .....	6
4.3. MEASUREMENT UNCERTAINTY.....	7
4.4. DECISION RULE.....	7
<b>5. EQUIPMENT UNDER TEST.....</b>	<b>8</b>
5.1. DESCRIPTION OF EUT .....	8
5.2. DESCRIPTION OF AVAILABLE ANTENNAS .....	12
5.3. List of test reduction and modes covering other modes: .....	12
5.4. WORST-CASE CONFIGURATION AND MODE.....	13
5.5. DESCRIPTION OF TEST SETUP.....	14
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>16</b>
<b>7. SUMMARY TABLE .....</b>	<b>17</b>
<b>8. MEASUREMENT METHODS .....</b>	<b>18</b>
<b>9. REFERENCE MEASUREMENTS RESULTS .....</b>	<b>19</b>
9.1. ON TIME AND DUTY CYCLE RESULTS.....	19
9.2. 26 dB BANDWIDTH.....	20
9.2.1. 802.11a.....	22
9.2.2. 802.11n HT20 .....	22
9.2.3. 802.11n HT40 .....	22
9.2.4. 802.11ac VHT80.....	23
9.2.5. 802.11ax HE20 .....	23
9.2.6. 802.11ax HE40 .....	23
9.2.7. 802.11ax HE80 .....	24
9.2.8. STRADDLE CHANNEL.....	24
9.2.9. 802.11ax HE20(RU).....	25
9.2.10. 802.11ax HE40(RU).....	26
9.2.11. 802.11ax HE80(RU).....	26
9.2.12. 802.11ax STRADDLE CHANNEL(RU).....	27
<b>10. ANTENNA PORT TEST RESULTS .....</b>	<b>28</b>
10.1. 6 dB BANDWIDTH .....	28

10.1.1.	STRADDLE CHANNEL.....	30
10.1.2.	UNII-3 BAND .....	31
10.1.3.	UNII-3 BAND(RU).....	31
10.2.	OUTPUT POWER AND PPSD.....	32
10.2.1.	802.11a MODE .....	34
10.2.2.	802.11n HT20 MODE .....	35
10.2.3.	802.11n HT40 MODE .....	36
10.2.4.	802.11ac VHT80 MODE .....	37
10.2.5.	STRADDLE CHANNEL.....	38
10.2.6.	802.11ax HE20 MODE .....	39
10.2.7.	802.11ax HE40 MODE .....	43
10.2.8.	802.11ax HE80 MODE .....	45
10.2.9.	STRADDLE CHANNEL(802.11ax).....	47
10.2.10.	OUTPUT POWER AND PPSD PLOTS(WORST CASE).....	48
<b>11.</b>	<b>TRANSMITTER ABOVE 1 GHz.....</b>	<b>61</b>
11.1.	TX ABOVE 1GHz 2Tx MODE IN THE 5.2GHz BAND.....	64
11.2.	TX ABOVE 1GHz 2Tx MODE IN THE 5.3GHz BAND.....	68
11.3.	TX ABOVE 1GHz 2Tx MODE IN THE 5.5 GHz BAND.....	72
11.4.	TX ABOVE 1GHz 2Tx MODE IN THE 5.8 GHz BAND.....	77
<b>12.</b>	<b>WORST-CASE BELOW 1 GHz .....</b>	<b>81</b>
<b>13.</b>	<b>AC POWER LINE CONDUCTED EMISSIONS .....</b>	<b>82</b>
<b>14.</b>	<b>DYNAMIC FREQUENCY SELECTION.....</b>	<b>85</b>
14.1.	OVERVIEW.....	85
14.1.1.	LIMITS.....	85
14.1.2.	TEST AND MEASUREMENT SYSTEM .....	88
14.1.3.	SETUP OF EUT.....	91
14.1.4.	DESCRIPTION OF EUT .....	92
14.2.	RESULTS FOR 80 MHz BANDWIDTH (UNII-2A BAND) .....	93
14.2.1.	TEST CHANNEL .....	93
14.2.2.	RADAR WAVEFORM AND TRAFFIC .....	93
14.2.3.	OVERLAPPING CHANNEL TESTS.....	94
14.2.4.	MOVE AND CLOSING TIME .....	94
14.1.	RESULTS FOR 80 MHz BANDWIDTH (UNII-2C BAND).....	97
14.1.1.	TEST CHANNEL .....	97
14.1.2.	RADAR WAVEFORM AND TRAFFIC .....	97
14.1.3.	OVERLAPPING CHANNEL TESTS.....	98
14.1.4.	MOVE AND CLOSING TIME .....	98

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, and NFC

**MODEL NUMBER:** SC-53E, SCG27

**SERIAL NUMBER:** 7ab3a2c4292c7ece, 7ab3a2c5c72c7ece (CONDUCTED);  
7ab3a2c4e12c7ece, 7ab3a2c5e82c7ece (RADIATED);

**DATE TESTED:** 2023-12-20 ~ 2024-02-06

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	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.

Approved & Released For  
UL KOREA LTD. By:



Seokhwan Hong  
Suwon Lab Engineer  
UL KOREA LTD.

Tested By:



Dexter(Hyunsik) Yun  
Suwon Lab Engineer  
UL KOREA LTD.

## 2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
4. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
5. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
6. KDB 662911 D01 v02r01
7. ANSI C63.10-2013.

## 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(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

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:

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

$$\begin{aligned} \text{AC Corrected Reading (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Extension Cord} \\ &\text{Loss (dB)} + \text{Cable Loss (dB)} \\ 44.72 \text{ dBuV} &= 34.72 \text{ dBuV} + 9.9 \text{ dB} + 0.1 \text{ dB} \end{aligned}$$

### 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	2.80 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.06 dB
Radiated Disturbance, Above 18 GHz	6.02 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 2, Clause 4.4.3 in IEC Guide 115:2021.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, and NFC. This test report addresses the NII (WLAN) operational mode.

Representative model	Difference	Derivative model
		SCG27
SC-53E	Hardware	Same as SC-53E
	Software	Different UI

The model SC-53E was used for final testing and is representative of the test results in this report.

#### 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
	802.11ax MIMO	TX/RX	TX/RX

#### Simultaneous TX Condition

Simultaneous Tx Condition: Non-RSDB

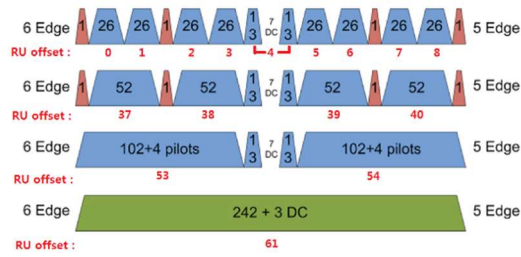
Mode	# of TX	5GHz WLAN		2.4GHz Bluetooth		Test Case
		ANT1	ANT2	ANT1	ANT2	
<b>Bluetooth ANT1 + 5GHz MIMO</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>

Note. Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found

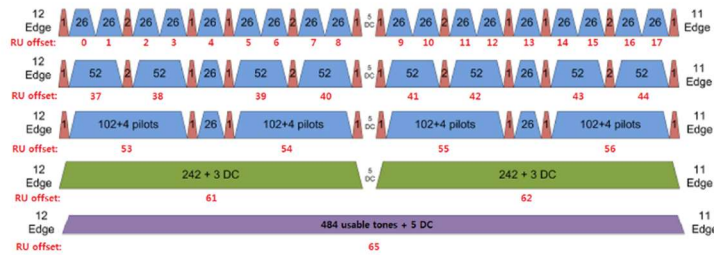


**802.11ax RU allocations**

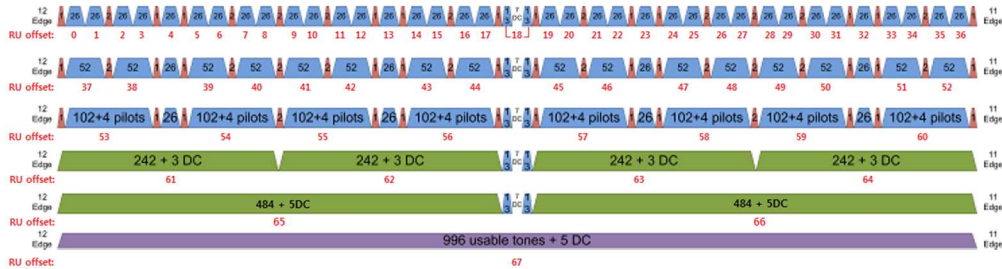
**- HE 20 Mode -  
 20 MHz**



**- HE 40 Mode -  
 40 MHz**



**- HE 80(996T) Mode -**



**Test RU offset for tones in each modes**

Mode	Tones	RU offset
HE20	26T	0
		4
		8
	52T	37
		38
		40
	106T	53
	54	
242T / SU <sup>Note</sup>	61 / -	
HE40	26T	0
		9
		17
	52T	37
		41
		44
	106T	53
	54	
242T	56	
484T / SU <sup>Note</sup>	61	
	62	
	65 / -	
HE80	26T	0
		18
		36
	52T	37
		45
		52
	106T	53
	57	
242T	60	
484T	61	
	62	
	64	
	65	
	66	
	66	
	996T / SU <sup>Note</sup>	67 / -

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

**Band portion of RU allocation about straddle channels**

Mode	Channel	Tones	RU offset	Portion
HE20	Straddle 5720 MHz	26T	6	UNII 2C & UNII 3
		242T / SU	61 / -	
HE40	Straddle 5710 MHz	26T	15	UNII 2C & UNII 3
		484T / SU	65 / -	
HE80	Straddle 5690 MHz	26T	34	UNII 2C & UNII 3
		996T / SU	67 / -	

Note: In case of RU straddle channel, test was performed overlapping RU position.

**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	15.12	32.51
		802.11n(HT20) MIMO	15.14	32.66
		802.11ax(HE20) MIMO	15.07	32.14
	5190 - 5230	802.11n(HT40) MIMO	11.28	13.43
		802.11ax(HE40) MIMO	10.95	12.45
	5210	802.11ac(VHT80) MIMO	3.93	2.47
	802.11ax(HE80) MIMO	10.99	12.56	
UNII-2A	5260 - 5320	802.11a MIMO	15.56	35.97
		802.11n(HT20) MIMO	15.69	37.07
		802.11ax(HE20) MIMO	15.34	34.20
	5190 - 5230	802.11n(HT40) MIMO	14.79	30.13
		802.11ax(HE40) MIMO	15.01	31.70
	5270 - 5310	802.11ac(VHT80) MIMO	3.59	2.29
	802.11ax(HE80) MIMO	3.97	2.49	
UNII-2C	5500 - 5720	802.11a MIMO	14.68	29.38
		802.11n(HT20) MIMO	14.61	28.91
		802.11ax(HE20) MIMO	14.46	27.93
	5510 - 5710	802.11n(HT40) MIMO	14.42	27.67
		802.11ax(HE40) MIMO	14.37	27.35
	5530 - 5690	802.11ac(VHT80) MIMO	13.26	21.18
	802.11ax(HE80) MIMO	13.20	20.89	
UNII-3	5745 - 5825	802.11a MIMO	15.29	33.81
		802.11n(HT20) MIMO	15.32	34.04
		802.11ax(HE20) MIMO	14.92	31.05
	5755 - 5795	802.11n(HT40) MIMO	14.94	31.19
		802.11ax(HE40) MIMO	14.47	27.99
	5775	802.11ac(VHT80) MIMO	5.32	3.40
	802.11ax(HE80) MIMO	6.28	4.25	

## 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:

UNII Band	Frequency Range[MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain[dBi]
UNII 1	5150 - 5250	-7.18	-7.08	-4.12
UNII 2A	5250 - 5350	-6.99	-7.12	-4.04
UNII 2C	5470 - 5725	-7.43	-7.29	-4.35
UNII 3	5725 - 5850	-7.31	-7.22	-4.25

Directional gain for the MIMO operations is determined using KDB 662911 D01 Multiple Transmitter Output section F (2)(d)(1) for *Unequal antenna gains, with equal transmit powers*. The gain is calculated using the formula for correlated transmissions across the two transmit antennas.

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

Sample calculation for this device with  $N_{ANT} = 2$

Directional gain =  $10 \log[(10^{-3.5/20} + 10^{-7.1/20})^2 / 2] = -2.1$  dBi

“BT/WIFI #1\_2.4GHz, 5GHz (SUB4)” and “WIFI #2\_5GHz (SUB1)” 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
802.11ax HE20(SU)		802.11ax HE20 RU(242T) 2TX	802.11ax HE20 SU 2TX
802.11n HT40		802.11n HT40 2TX	
802.11ac VHT40		802.11ac VHT40 2TX	802.11n HT40 2TX
802.11ax HE40(SU)		802.11ax HE40 RU(484T) 2TX	802.11ax HE40 SU 2TX
802.11ac VHT80		802.11ac VHT80 2TX	
802.11ax HE80(SU)		802.11ax HE80 RU(996T) 2TX	802.11ax HE80 SU 2TX

## 5.4. WORST-CASE CONFIGURATION AND MODE

Both SISO and MIMO have been investigated and confirmed MIMO was the worst case set for radiated band edge and spurious emission tests.

The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z on 2TX MIMO mode. It was determined that X orientation was the worst-case orientation for 2TX MIMO mode.

Radiated and power line conducted tests were performed with EUT connected to AC power adapter as the worst-case configuration. Radiated harmonics spurious 1~18 GHz Low/Mid/High channels, 18-40GHz were performed with the EUT set at the 2TX MIMO 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.

For Radiated spurious test, 802.11a 2TX mode has equal or higher output power and PSD results than other modes and therefore, it was set for full test. Spot-check was performed in 802.11n 2TX, 802.11ac 2TX or 802.11ax 2TX.

For Radiated band-edge test, 802.11a 2TX, 802.11n 2TX, 802.11ac 2TX, 802.11ax 2TX SU mode were fully tested. In some cases, the RU tune-up power is higher than the SU mode, which has been tested in both SU and RU modes.  
(802.11ax HE40 Ch.151 and HE80 Ch.42, 58 and 106)

Simultaneous transmission with the Bluetooth and Wi-Fi were investigated, and no noticeable emission was found.

For 802.11ax mode, output power and PSD tests were investigated between all different tones and found that SU mode had the highest output power and RU 26T has the highest PSD readings; and therefore, conducted tests were performed on SU mode and RU 26T mode.

In case of 6dB Bandwidth, it was tested at the RU allocation with lowest tones number, RU 26Tones as the worst-case scenario.

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  
802.11ax HE20 mode: MCS0 2Tx  
802.11ax HE40 mode: MCS0 2Tx  
802.11ax HE80 mode: MCS0 2Tx

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37W61WENTASEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02117A	N/A

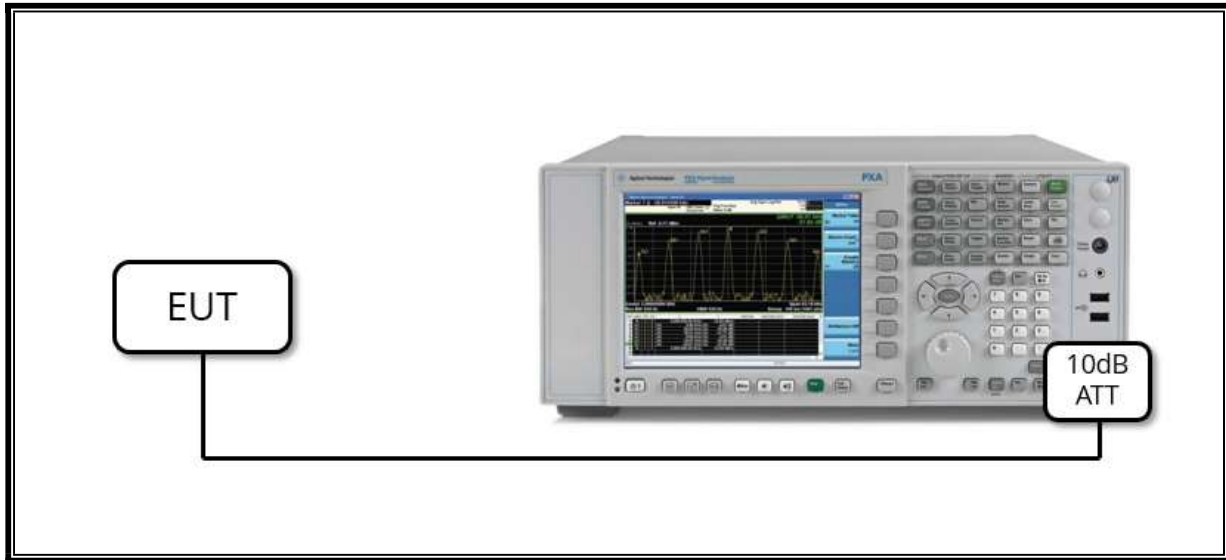
### I/O CABLE

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

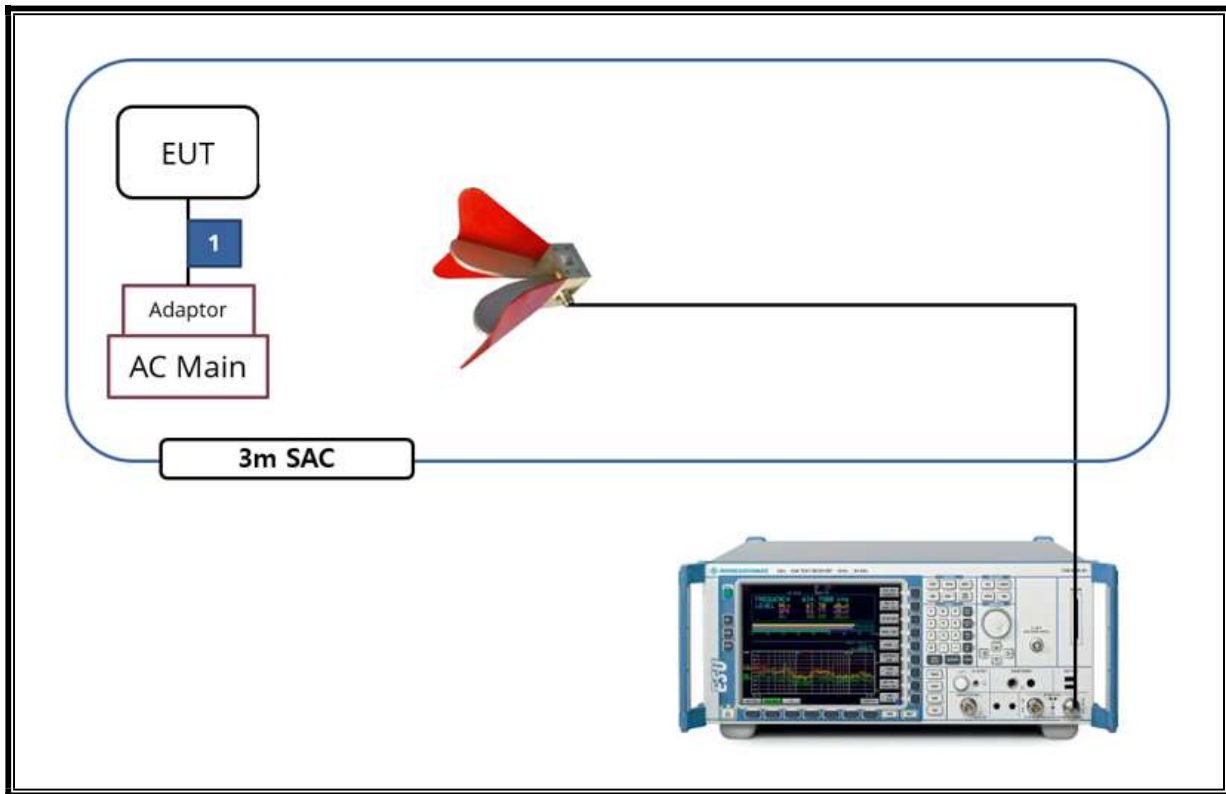
### TEST SETUP

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	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00218957	2025-01-08
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preampifier	ETS	3115-PA	00167475	2024-07-25
Preampifier	ETS	3116C-PA	00168841	2024-07-25
Preampifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preampifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2024-07-25
Preampifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2024-07-25
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2024-07-23
Average Power Sensor	Agilent / HP	U2000	MY54260010	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A001	2024-07-23
Attenuator	PASTERNAK	PE7087-10	A008	2024-07-27
Attenuator	PASTERNAK	PE7004-10	2	2024-07-23
Attenuator	PASTERNAK	PE7087-10	A009	2024-07-24
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2024-07-23
Notch Filter	Micro-Tronics	BRM50702-02	G037	2024-07-24
Notch Filter	Micro-Tronics	BRM50716-2	006	2024-07-24
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2024-07-24
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2024-07-24
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2024-07-23
LISN	R&S	ENV-216	101836	2024-07-23
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
Termination	WEINSCHL	M1406A	T09	2024-07-23
Attenuator	WEINSCHL	WA76-30-21	A015	2024-07-24
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	Test Description	Test Limit	Test Condition	Test Result
15.407(e)	6dB Band width (5.8GHz)	> 500kHz	Conducted	Complies
15.407 (a)(1)(iv)	TX Cond. Power (5.150-5.250)	< 24dBm		Complies
15.407 (a)(2)	TX Cond. Power (5.250-5.350 & 5.470-5.725)	< 24dBm or 11+10Log(26dB BW)		Complies
15.407 (a)(3)(i)	TX Cond. Power (5.725-5.850)	< 30dBm		Complies
15.407 (a)(1)(iv) & (a)(2)	PSD (5.150-5.250 & 5.250-5.350 & 5.470-5.725)	< 11dBm/MHz		Complies
15.407 (a)(3)	PSD (5.725-5.850)	< 30dBm/500kHz		Complies
15.207 (a)	AC Power Line conducted emissions	Section 13	Radiated	Complies
15.407 (b) & 15.209	Radiated Spurious Emission	< 74dBuV/m PK < 54dBuV/m AV		Complies
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Condcuted	Complies <sup>Note</sup>

Note. This EUT does not support channel puncturing.

## 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.a(Method PM)

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	2.790	2.920	0.955	95.548	0.20
802.11n(HT20) MIMO	5.100	5.240	0.973	97.328	0.12
802.11n(HT40) MIMO	4.740	4.840	0.979	97.934	0.09
802.11ac(VHT80) MIMO	1.135	1.285	0.883	88.327	0.54

Mode	ANT.	Tone	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11ax HE20	MIMO	26T	5.140	5.260	0.977	97.719	0.10
		SU	2.550	2.690	0.948	94.796	0.23
802.11ax HE40	MIMO	26T	5.100	5.200	0.981	98.077	-
		SU	1.303	1.454	0.896	89.615	0.48
802.11ax HE80	MIMO	26T	5.120	5.260	0.973	97.338	0.12
		SU	0.990	1.145	0.865	86.463	0.63

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

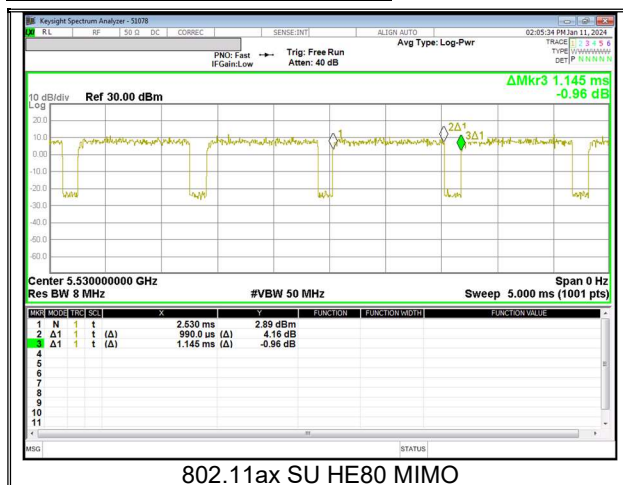
#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

#### DUTY CYCLE SAMPLE PLOTS



## 9.2. 26 dB BANDWIDTH

### LIMITS

None; for reporting purposes only.

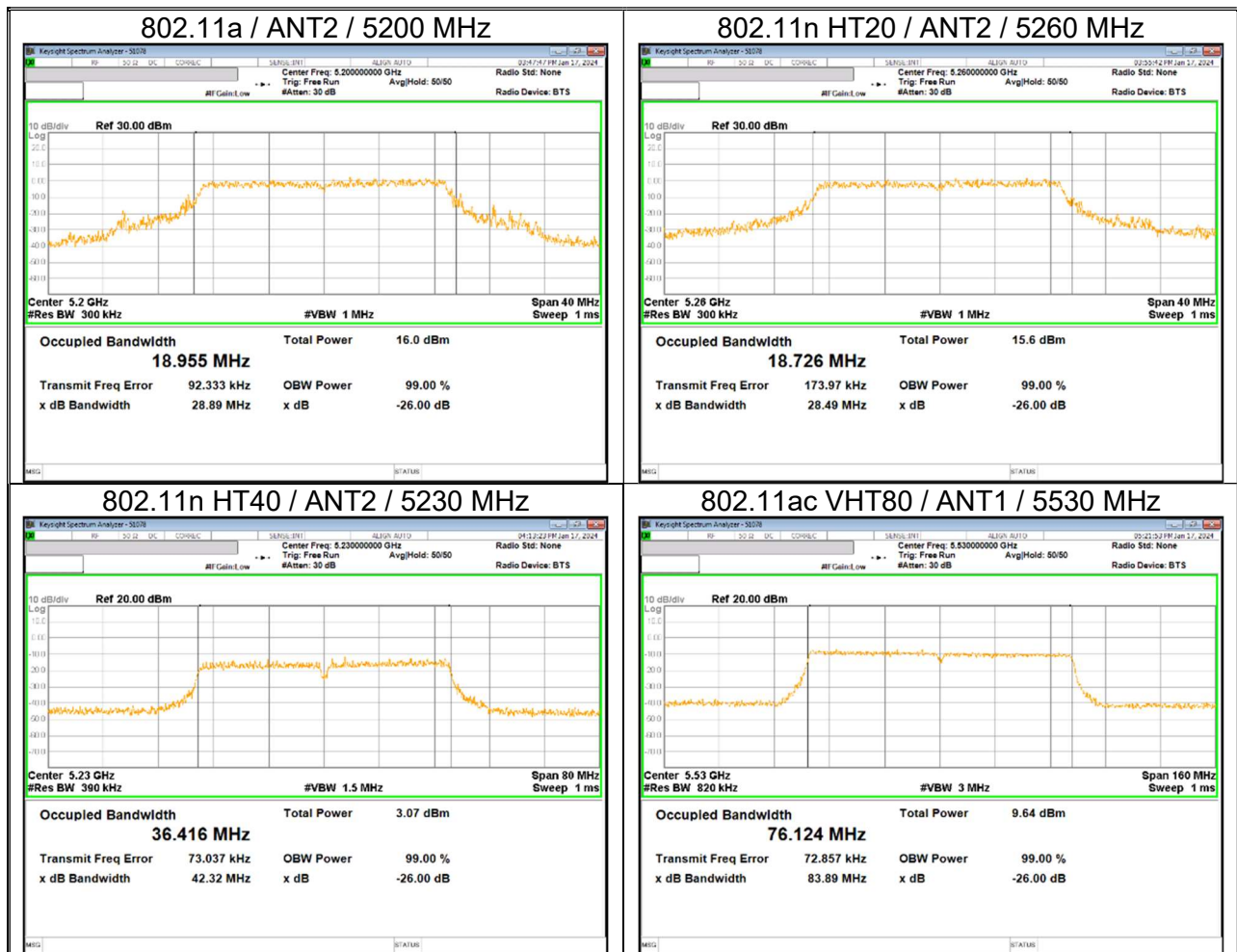
### TEST PROCEDURE

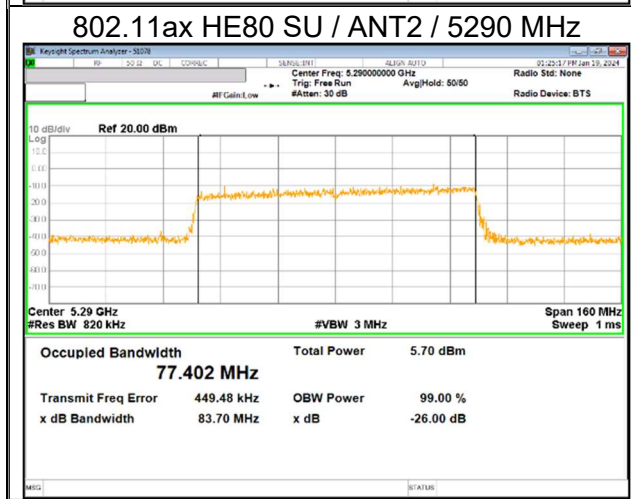
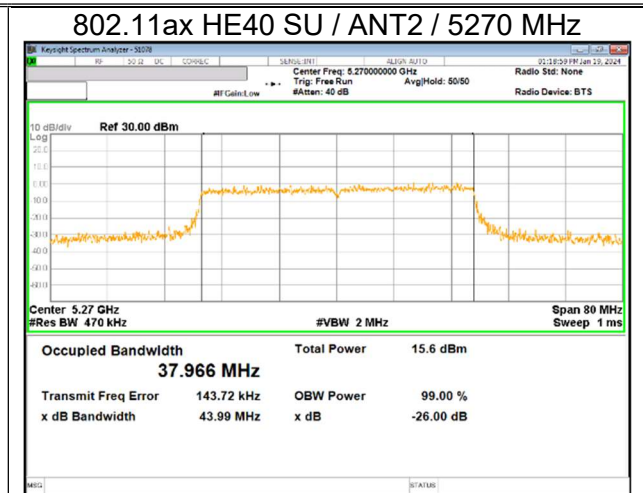
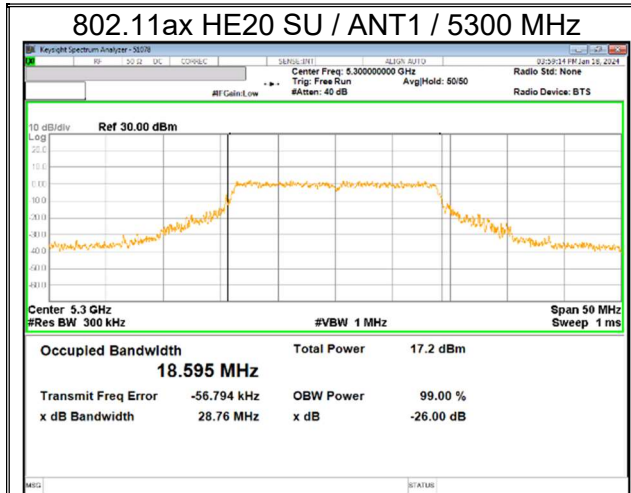
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

### RESULTS

- Please refer to the next page

### WORST CASE TEST PLOTS





**9.2.1. 802.11a**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	36	5180	29.29	29.32	28.89	18.77	18.99
	40	5200	29.07	<b>28.89</b>		18.84	18.96
	48	5240	29.70	30.10		18.86	18.69
UNII-2A <sup>Note</sup>	52	5260	29.43	29.49	29.35	18.77	18.77
	60	5300	30.44	29.35		19.15	18.86
	64	5320	29.74	28.72		18.91	18.49
UNII-2C	100	5500	30.20	39.24	29.58		
	116	5580	30.31	29.58			
	140	5700	30.38	30.11			

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

**9.2.2. 802.11n HT20**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	36	5180	28.58	29.16	28.58	18.95	18.88
	40	5200	30.55	29.47		19.17	18.60
	48	5240	29.30	30.52		18.68	18.93
UNII-2A <sup>Note</sup>	52	5260	30.59	<b>28.49</b>	28.49	19.05	18.73
	60	5300	29.98	29.21		19.05	18.67
	64	5320	30.18	28.72		18.80	18.62
UNII-2C	100	5500	29.25	39.77	28.88		
	116	5580	28.88	26.94			
	140	5700	29.26	28.88			

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

**9.2.3. 802.11n HT40**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	38	5190	43.94	79.71	42.32	36.57	39.55
	46	5230	44.90	<b>42.32</b>		36.70	36.42
UNII-2A <sup>Note</sup>	54	5270	44.47	43.53	43.53	36.56	36.55
	62	5310	44.78	72.92		36.49	37.21
UNII-2C	102	5510	45.63	48.91	44.61		
	110	5550	45.18	73.31			
	134	5670	44.61	73.19			

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

**9.2.4. 802.11ac VHT80**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz]	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	42	5210	84.31	84.54	84.31	76.13	76.14
UNII-2A <sup>Note</sup>	58	5290	86.10	83.90	83.90	76.14	76.01
UNII-2C	106	5530	<b>83.89</b>	151.20	83.89		
	122	5610	85.51	154.30			

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

**9.2.5. 802.11ax HE20**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz] <sup>(Note)</sup>	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	36	5180	29.39	30.35	29.34	19.43	19.25
	40	5200	30.16	27.14		19.08	19.32
	48	5240	29.34	36.59		19.12	19.48
UNII-2A <sup>Note</sup>	52	5260	30.00	29.67	28.76	18.82	19.38
	60	5300	<b>28.76</b>	30.04		18.60	19.39
	64	5320	29.24	37.76		18.55	19.44
UNII-2C	100	5500	29.36	37.97	29.98		
	116	5580	30.67	27.79			
	140	5700	29.98	35.43			

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

**9.2.6. 802.11ax HE40**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz] <sup>(Note)</sup>	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	38	5190	45.53	77.45	45.51	38.13	39.35
	46	5230	45.51	78.23		38.04	38.83
UNII-2A <sup>Note</sup>	54	5270	45.73	<b>43.99</b>	43.99	38.02	37.97
	62	5310	45.94	77.89		38.03	38.37
UNII-2C	102	5510	45.58	76.53	45.50		
	110	5550	46.04	58.62			
	134	5670	45.50	66.58			

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

**9.2.7. 802.11ax HE80**

Band	Channel	Center Freq. [MHz]	26 dB BW [MHz]		Worst	99% BW [MHz](Note)	
			ANT1	ANT2		ANT1	ANT2
UNII-1 <sup>Note</sup>	42	5210	86.31	84.29	84.29	77.72	77.66
UNII-2A <sup>Note</sup>	58	5290	86.00	<b>83.70</b>	83.70	77.78	77.40
UNII-2C	106	5530	85.50	158.10	85.50		
	122	5610	86.70	128.70			

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

**9.2.8. STRADDLE CHANNEL**

Mode	Channel	Center Freq. [MHz]	26 dB BW [MHz]			
			ANT1		ANT2	
			UNII-2C	UNII-3	UNII-2C	UNII-3
802.11a	Straddle	5720	18.25	8.06	20.27	9.24
802.11n HT20	Straddle	5720	20.46	10.42	20.40	10.42
802.11n HT40	Straddle	5710	38.70	8.08	37.06	7.10
802.11ac VHT80	Straddle	5690	78.38	8.18	78.06	7.80
802.11ax HE20(SU)	Straddle	5720	19.31	10.57	20.03	9.05
802.11ax HE40(SU)	Straddle	5710	38.50	8.10	42.98	11.04
802.11ax HE80(SU)	Straddle	5690	78.83	8.06	111.74	7.11



**9.2.9. 802.11ax HE20(RU)**

Band Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 <sup>Note</sup>	5180	26T	0	21.89	21.06	19.24	19.02
			4	18.32	18.08	17.01	16.85
			8	22.01	21.02	19.24	18.83
	5200		0	21.73	21.19	19.34	19.15
			4	18.21	18.07	16.97	16.92
			8	21.75	20.96	19.13	19.17
	5240		0	21.79	21.22	19.37	18.96
			4	18.33	18.10	17.05	16.88
			8	21.27	21.44	19.24	19.00
UNII-2A <sup>Note</sup>	5260	26T	0	21.69	20.95	19.26	18.92
			4	18.30	18.07	17.02	16.94
			8	21.67	20.91	19.13	18.97
	5300		0	21.67	20.71	19.37	18.88
			4	18.28	18.11	17.02	16.94
			8	21.45	21.11	19.14	18.92
	5320		0	21.74	20.55	19.26	18.89
			4	18.34	18.05	17.02	16.85
			8	21.59	20.74	19.16	18.80
UNII-2C	5500	26T	0	21.30	20.78		
			4	18.34	18.02		
			8	21.40	20.94		
	5580		0	22.06	21.54		
			4	18.26	18.07		
			8	21.00	21.24		
	5700		0	21.31	21.10		
			4	18.32	18.04		
			8	21.84	21.15		

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

**9.2.10. 802.11ax HE40(RU)**

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 <sup>Note</sup>	5190	26T	0	21.80	20.81	19.33	44.04
			9	23.00	21.95	20.14	22.72
			17	21.85	21.15	19.23	19.76
	5230		0	21.89	21.21	19.44	36.63
			9	22.50	25.29	20.13	24.01
			17	21.69	21.35	19.22	19.72
UNII-2A <sup>Note</sup>	5270	26T	0	21.86	20.51	19.39	25.93
			9	23.13	25.34	20.08	24.43
			17	21.73	20.99	19.26	19.55
	5310		0	21.84	21.99	19.38	23.78
			9	23.16	21.95	20.20	20.23
			17	21.87	21.79	19.30	19.42
UNII-2C	5510	26T	0	21.79	21.59		
			9	22.90	22.46		
			17	21.87	22.74		
	5550		0	22.02	21.13		
			9	22.56	25.27		
			17	21.74	22.55		
	5670		0	22.08	21.03		
			9	23.06	23.67		
			17	21.64	21.20		

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

**9.2.11. 802.11ax HE80(RU)**

Band	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]		99% BW [MHz]	
				ANT1	ANT2	ANT1	ANT2
UNII-1 <sup>Note</sup>	5210	26T	0	22.77	21.23	20.20	18.89
			18	38.42	37.99	36.18	35.94
			36	23.02	21.87	19.99	19.49
UNII-2A <sup>Note</sup>	5290	26T	0	23.01	22.17	20.34	19.41
			18	38.44	38.32	36.29	36.06
			36	22.96	22.14	19.97	19.57
UNII-2C	5530	26T	0	22.95	21.12		
			18	38.44	38.20		
			36	22.79	21.40		
	5610		0	23.33	20.97		
			18	38.54	38.35		
			36	22.82	21.86		

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

**9.2.12. 802.11ax STRADDLE CHANNEL(RU)**

Band	Mode	Center Freq. [MHz]	Tones	RU offset	26 dB BW [MHz]			
					ANT1		ANT2	
					UNII-2C	UNII-3	UNII-2C	UNII-3
Straddle Channel	HE20	5720	26T	6	14.10	4.15	19.54	3.14
	HE40	5710		15	14.50	4.40	14.00	4.06
	HE80	5690		34	14.42	4.38	14.03	4.34

# 10. ANTENNA PORT TEST RESULTS

## 10.1. 6 dB BANDWIDTH

### LIMITS

FCC §15.407

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

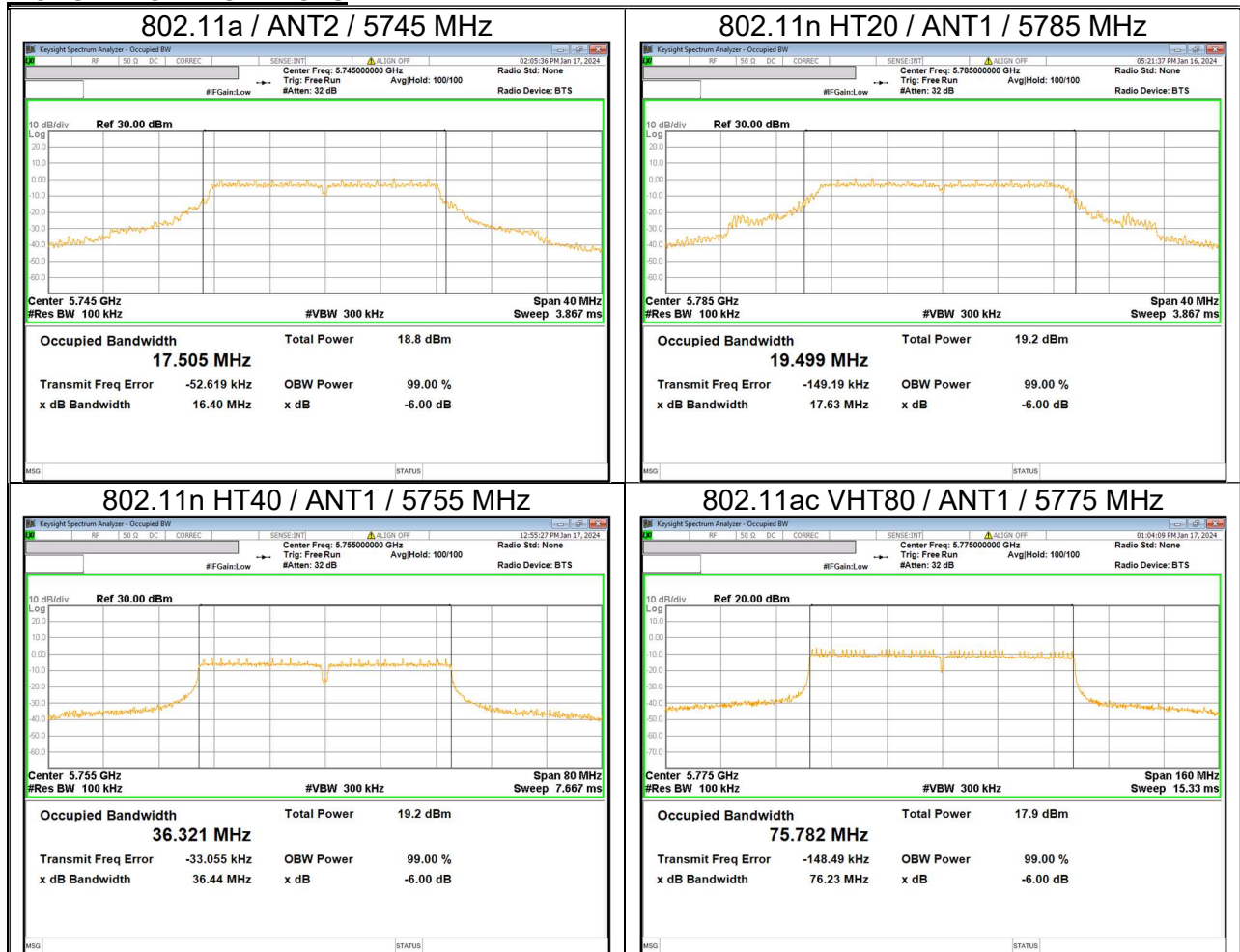
### TEST PROCEDURE

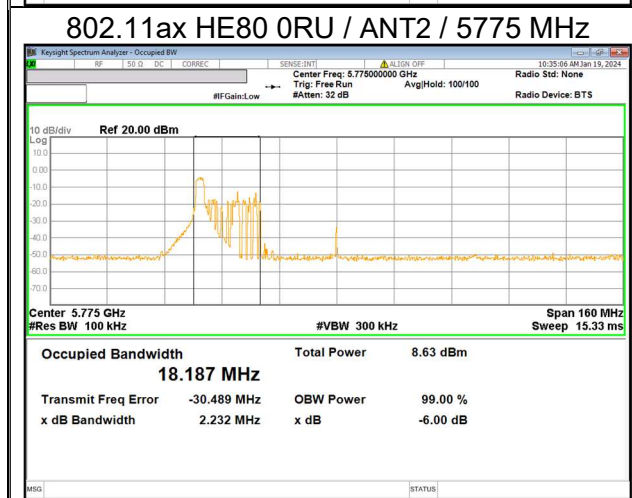
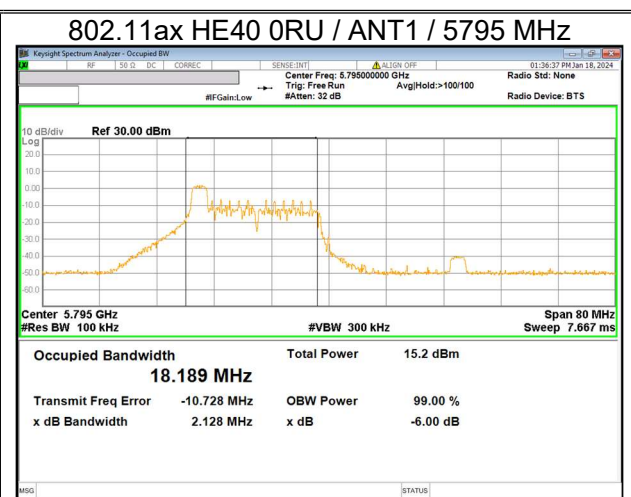
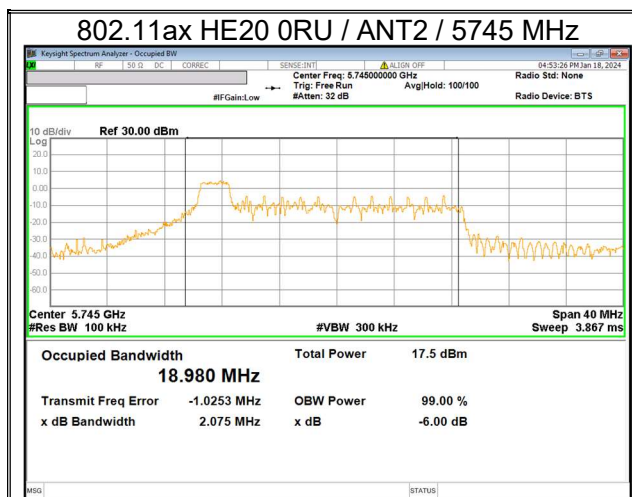
Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100kHz, the VBW >= 3 x RBW, peak detector and max hold.

### RESULTS

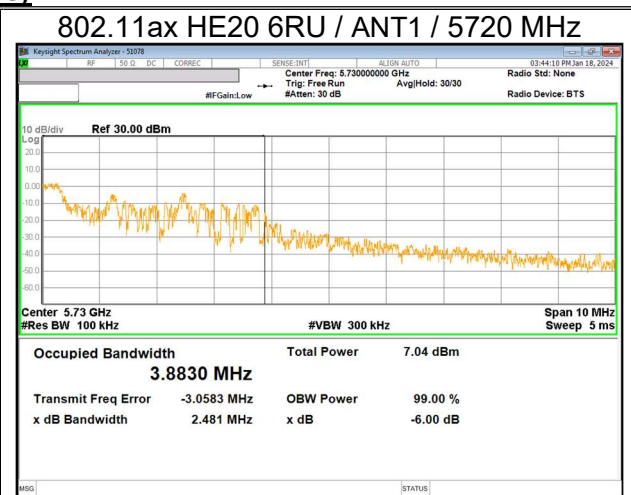
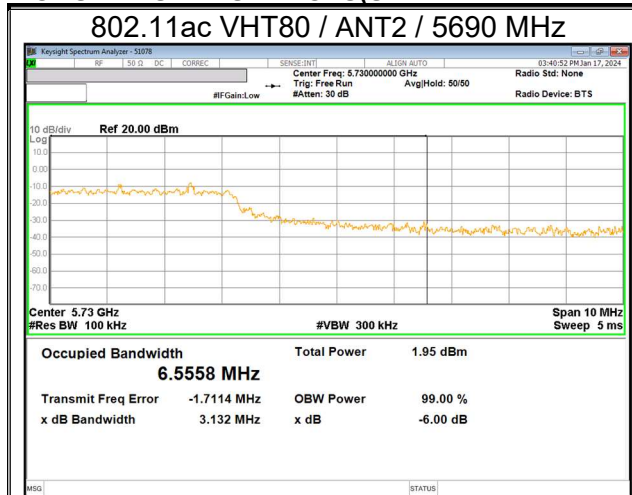
- Please refer to the next page

### WORST CASE TEST PLOTS





### WORST CASE TEST PLOTS(STRADDLE CHANNELS)



**10.1.1. STRADDLE CHANNEL**

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]	
			UNII-3	
			ANT1	ANT2
802.11a	Straddle	5720	3.147	3.168
802.11n HT20	Straddle	5720	3.877	3.843
802.11n HT40	Straddle	5710	3.257	3.210
802.11ac VHT80	Straddle	5690	3.145	<b>3.132</b>
802.11ax HE20(SU)	Straddle	5720	4.775	4.457
802.11ax HE40(SU)	Straddle	5710	4.032	4.034
802.11ax HE80(SU)	Straddle	5690	4.025	4.026

Band	Mode	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]	
					UNII-3	
					ANT1	ANT2
Straddle Channel	HE20	5720	26T	6	<b>2.481</b>	2.491
	HE40	5710		15	3.522	3.730
	HE80	5690		34	3.512	2.539

**10.1.2. UNII-3 BAND**

Mode	Channel	Center Freq. [MHz]	6 dB BW [MHz]		Worst	Minimum Limit [MHz]
			ANT1	ANT2		
802.11a	149	5745	16.41	<b>16.40</b>	16.40	0.5
	157	5785	16.42	16.41		
	165	5825	16.41	16.45		
802.11n HT20	149	5745	17.72	17.65	17.63	
	157	5785	<b>17.63</b>	17.66		
	165	5825	17.65	17.67		
802.11n HT40	151	5755	<b>36.44</b>	36.48	36.44	
	159	5795	36.46	36.44		
802.11ac VHT80	155	5775	<b>76.23</b>	76.51	76.23	
802.11ax HE20(SU)	149	5745	19.60	19.38	19.23	
	157	5785	19.53	19.23		
	165	5825	19.29	19.62		
802.11ax HE40(SU)	151	5755	38.23	38.25	38.21	
	159	5795	38.21	38.22		
802.11ax HE80(SU)	155	5775	78.21	78.10	78.10	

**10.1.3. UNII-3 BAND(RU)**

Mode	Channel	Center Freq. [MHz]	Tones	RU offset	6 dB BW [MHz]		Minimum Limit [MHz]
					ANT1	ANT2	
HE20	149	5745	26T	0	2.094	<b>2.075</b>	0.5
	157	5785			2.113	2.090	
	165	5825			2.124	2.089	
	<b>Minimum 6dB Bandwidth</b>		2.075				
HE40	151	5755	26T	0	2.174	2.162	
	159	5795			<b>2.128</b>	2.133	
	<b>Minimum 6dB Bandwidth</b>		2.128				
HE80	155	5775	26T	0	2.255	<b>2.232</b>	
	<b>Minimum 6dB Bandwidth</b>		2.232				

## 10.2. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a)(1)(iv), (a)(2), (a)(3)(i), (a)(3)(iii)

### FCC

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



**TEST PROCEDURE**

KDB 789033 Method PM is used for output power. Duty correction factor has already been applied to the power meter and the average power value is measured.

KDB 789033 Method SA-2 is used for PSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging).

**Straddle Channel(UNII-2C&3)**

KDB 789033 Method SA-2 is used for only power of straddle Ch. and PSD. 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	-7.18	-7.08	-4.12
UNII 2A 5250 - 5350	-6.99	-7.12	-4.04
UNII 2C 5470 - 5725	-7.43	-7.29	-4.35
UNII 3 5725 - 5850	-7.31	-7.22	-4.25

Note. Since the correrated gain does not exceed 6dBi, bands do not consider the antenna gain.

**10.2.1. 802.11a MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	13.70	9.58		15.12	23.98
	40	5200	12.93	10.21		14.79	
	48	5240	5.13	2.38		6.98	
UNII-2A	52	5260	13.60	11.16		15.56	23.98
	60	5300	12.61	11.42		15.07	
	64	5320	11.52	10.33		13.98	
UNII-2C	100	5500	11.45	10.24		13.90	23.98
	116	5580	12.15	10.76		14.52	
	140	5700	12.57	10.52		14.68	
UNII-3	149	5745	12.84	11.64		15.29	30.00
	157	5785	12.43	11.47		14.99	
	165	5825	10.28	10.26		13.28	

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2				
UNII-1	36	5180	2.57	-1.50	0.20		4.21	11.00
	40	5200	1.99	-1.20	0.20		3.89	
	48	5240	-6.00	-8.12	0.20		-3.72	
UNII-2A	52	5260	2.12	-0.35	0.20		4.26	11.00
	60	5300	1.53	0.71	0.20		4.35	
	64	5320	1.23	0.32	0.20		4.01	
UNII-2C	100	5500	0.00	-0.62	0.20		2.91	11.00
	116	5580	1.14	0.11	0.20		3.86	
	140	5700	2.00	0.12	0.20		<b>4.37</b>	
UNII-3	149	5745	-1.53	-2.34	0.20		1.29	30.00/500kHz
	157	5785	-1.68	-2.09	0.20		1.33	
	165	5825	-4.79	-5.21	0.20		-1.79	

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

**10.2.2. 802.11n HT20 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	36	5180	13.66	9.73		15.14	23.98
	40	5200	13.09	10.48		14.99	
	48	5240	3.72	0.86		5.53	
UNII-2A	52	5260	13.51	11.66		15.69	23.98
	60	5300	13.06	11.96		15.56	
	64	5320	4.36	2.13		6.40	
UNII-2C	100	5500	7.20	6.09		9.69	23.98
	116	5580	12.16	10.96		14.61	
	140	5700	1.97	0.27		4.21	
UNII-3	149	5745	12.83	11.72		15.32	30.00
	157	5785	12.56	11.63		15.13	
	165	5825	10.29	10.14		13.23	

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2				
UNII-1	36	5180	1.93	-1.38	0.12		3.71	11.00
	40	5200	1.68	-0.33	0.12		3.92	
	48	5240	-7.87	-11.24	0.12		-6.11	
UNII-2A	52	5260	1.92	-0.53	0.12		4.00	11.00
	60	5300	1.46	0.49	0.12		<b>4.13</b>	
	64	5320	-7.12	-8.13	0.12		-4.46	
UNII-2C	100	5500	-4.44	-5.32	0.12		-1.73	11.00
	116	5580	0.74	-0.44	0.12		3.32	
	140	5700	-9.49	-10.86	0.12		-6.99	
UNII-3	149	5745	-1.44	-2.53	0.12		1.18	30.00/500kHz
	157	5785	-1.69	-2.00	0.12		1.28	
	165	5825	-5.01	-5.38	0.12		-2.06	

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

**10.2.3. 802.11n HT40 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	38	5190	9.48	6.58		11.28	23.98
	46	5230	2.75	-2.37		3.91	
UNII-2A	54	5270	13.06	9.95		14.79	23.98
	62	5310	4.08	1.39		5.95	
UNII-2C	102	5510	3.05	-0.73		4.57	23.98
	110	5550	12.40	10.12		14.42	
	134	5670	0.15	-1.43		2.44	
UNII-3	151	5755	12.21	11.64		14.94	30.00
	159	5795	12.31	11.31		14.85	

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2				
UNII-1	38	5190	-3.52	-9.05	0.09		-2.35	11.00
	46	5230	-12.68	-16.32	0.09		-11.03	
UNII-2A	54	5270	-2.15	-4.20	0.09		<b>0.05</b>	11.00
	62	5310	-9.31	-9.72	0.09		-6.41	
UNII-2C	102	5510	-12.16	-14.24	0.09		-9.98	11.00
	110	5550	-2.49	-4.76	0.09		-0.38	
	134	5670	-14.36	-15.05	0.09		-11.59	
UNII-3	151	5755	-5.26	-6.15	0.09		-2.58	30.00/500kHz
	159	5795	-5.17	-7.26	0.09		-2.99	

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

**10.2.4. 802.11ac VHT80 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Average Power [dBm]		Direct. Gain [dBi]	Corr'd Power [dBm]	Limit [dBm]
			ANT1	ANT2			
UNII-1	42	5210	2.21	-0.91		3.93	23.98
UNII-2A	58	5290	1.62	-0.80		3.59	23.98
UNII-2C	106	5530	3.42	0.98		5.38	23.98
	122	5610	10.43	10.06		13.26	
UNII-3	155	5775	2.05	2.56		5.32	30.00

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Direct. Gain [dBi]	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2				
UNII-1	42	5210	-15.96	-17.55	0.54		-13.14	11.00
UNII-2A	58	5290	-15.98	-16.61	0.54		-12.73	11.00
UNII-2C	106	5530	-13.92	-16.21	0.54		-11.36	11.00
	122	5610	-7.43	-7.99	0.54		<b>-4.15</b>	
UNII-3	155	5775	-17.44	-18.27	0.54		-14.28	30.00/500kHz

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

### 10.2.5. STRADDLE CHANNEL

#### Output Power Results

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
802.11a	UNII-2C	5720	11.23	12.40	10.46	11.64	0.20	14.07	23.98
	UNII-3		5.21		4.47		0.20	8.07	30.00
802.11n HT20	UNII-2C	5720	11.18	12.37	10.29	11.53	0.12	14.14	23.56
	UNII-3		5.63		5.00		0.12	8.69	30.00
802.11n HT40	UNII-2C	5710	11.53	12.02	10.00	10.51	0.09	13.94	23.98
	UNII-3		1.35		0.07		0.09	3.86	30.00
802.11ac VHT80	UNII-2C	5690	9.47	10.19	8.53	9.27	0.54	12.58	23.98
	UNII-3		-4.26		-4.79		0.54	-0.97	30.00

\* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

#### PSD Results

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2			
802.11a	UNII-2C	5720	1.35	0.68	0.20	4.24	11.00
	UNII-3		-1.62	-2.27	0.20	1.27	30.00/500kHz
802.11n HT20	UNII-2C	5720	1.13	0.43	0.12	3.92	11.00
	UNII-3		-1.79	-2.49	0.12	1.00	30.00/500kHz
802.11n HT40	UNII-2C	5710	-2.40	-3.76	0.09	0.08	11.00
	UNII-3		-5.55	-6.60	0.09	-2.94	30.00/500kHz
802.11ac VHT80	UNII-2C	5690	-7.34	-8.56	0.54	-4.36	11.00
	UNII-3		-11.15	-11.50	0.54	-7.77	30.00/500kHz

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

**10.2.6. 802.11ax HE20 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	3.65	-1.70	4.76	23.98
				4	4.13	-1.02	5.29	
				8	4.50	-0.38	5.72	
			SU	-	12.34	9.05	14.01	
	40	5200	26T	0	8.34	5.99	10.33	
				4	8.20	6.03	10.26	
				8	8.35	6.55	10.55	
			SU	-	13.38	10.16	15.07	
	48	5240	26T	0	8.93	5.14	10.45	
				4	8.76	5.82	10.54	
				8	8.84	5.93	10.63	
			SU	-	5.31	2.56	7.16	
UNII-2A	52	5260	26T	0	9.02	5.17	10.52	23.56
				4	8.74	5.51	10.43	
				8	8.72	6.05	10.60	
			SU	-	13.25	11.16	15.34	
	60	5300	26T	0	8.23	6.23	10.35	
				4	8.15	6.56	10.44	
				8	8.07	6.92	10.54	
			SU	-	13.11	11.36	15.33	
	64	5320	26T	0	1.48	-1.73	3.18	
				4	1.53	-1.36	3.33	
				8	1.25	-1.05	3.26	
			SU	-	8.28	7.62	10.97	

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

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-2C	100	5500	26T	0	3.56	0.57	5.33	23.56
				4	3.36	0.45	5.15	
				8	3.23	0.48	5.08	
			SU	-	4.45	2.24	6.49	
	116	5580	26T	0	7.60	7.29	10.46	
				4	7.44	7.15	10.31	
				8	7.24	7.43	10.35	
			SU	-	12.28	10.43	14.46	
	140	5700	26T	0	-0.34	-2.44	1.75	
				4	-0.84	-2.38	1.47	
				8	-0.67	-2.26	1.62	
			SU	-	5.24	3.66	7.53	
UNII-3	149	5745	26T	0	7.74	7.61	10.69	30.00
				4	7.57	7.35	10.47	
				8	7.49	7.48	10.50	
			SU	-	12.52	11.20	14.92	
	157	5785	26T	0	7.38	8.77	11.14	
				4	7.02	8.54	10.86	
				8	6.88	8.62	10.85	
			SU	-	11.93	11.15	14.57	
	165	5825	26T	0	7.27	8.83	11.13	
				4	7.23	8.61	10.98	
				8	7.11	8.73	11.01	
			SU	-	8.81	8.24	11.54	

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



**PSD Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	36	5180	26T	0	1.83	-4.04	2.93	11.00
				4	0.74	-4.64	1.95	
				8	2.24	-2.58	3.58	
			SU	-	1.16	-2.47	2.95	
	40	5200	26T	0	6.24	2.49	7.87	
				4	5.20	1.84	6.94	
				8	6.42	3.44	8.29	
			SU	-	1.61	-1.31	3.63	
	48	5240	26T	0	7.02	1.53	8.20	
				4	5.32	0.94	6.77	
				8	6.74	2.59	8.26	
			SU	-	-6.46	-10.92	-4.90	
UNII-2A	52	5260	26T	0	6.75	1.80	8.06	11.00
				4	5.62	0.87	6.97	
				8	6.67	2.46	8.17	
			SU	-	1.64	-1.78	3.50	
	60	5300	26T	0	6.29	2.79	8.00	
				4	5.47	2.15	7.23	
				8	5.91	4.00	8.17	
			SU	-	1.28	-1.32	3.41	
	64	5320	26T	0	-0.92	-4.85	0.66	
				4	-2.00	-5.36	-0.25	
				8	-0.75	-4.03	1.03	
			SU	-	-3.35	-6.13	-1.28	
UNII-2C	100	5500	26T	0	0.26	-2.35	2.26	11.00
				4	-0.83	-3.62	1.10	
				8	-0.04	-2.55	2.00	
			SU	-	-5.95	-8.91	-3.94	
	116	5580	26T	0	6.39	4.32	<b>8.59</b>	
				4	4.67	2.79	6.94	
				8	5.79	4.50	8.30	
			SU	-	0.97	-1.21	3.26	
	140	5700	26T	0	-1.91	-4.77	0.00	
				4	-3.08	-6.01	-1.19	
				8	-1.94	-4.36	0.12	
			SU	-	-5.34	-7.73	-3.13	

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

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	149	5745	26T	0	3.79	3.29		6.66	30.00 /500kHz
				4	3.30	2.40		5.98	
				8	3.45	2.73		6.21	
			SU	-	-1.14	-2.85		1.33	
	157	5785	26T	0	3.89	2.59		6.40	
				4	3.00	2.39		5.82	
				8	3.32	2.72		6.14	
			SU	-	-1.62	-2.61		1.15	
	165	5825	26T	0	4.68	3.38		7.18	
				4	3.85	2.77		6.45	
				8	4.01	3.04		6.66	
			SU	-	-4.67	-5.67		-1.90	

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

**10.2.7. 802.11ax HE40 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	5.22	0.02	6.37	23.98
				9	5.67	1.10	6.97	
				17	6.07	2.07	7.53	
			SU	-	9.26	6.03	10.95	
	46	5230	26T	0	8.41	5.44	10.18	
				9	8.74	6.18	10.66	
				17	8.93	5.90	10.68	
			SU	-	5.47	0.83	6.75	
UNII-2A	54	5270	26T	0	8.81	6.41	10.78	23.96
				9	8.13	6.97	10.60	
				17	8.06	7.51	10.80	
			SU	-	13.30	10.13	15.01	
	62	5310	26T	0	3.10	-0.95	4.54	
				9	2.58	-0.09	4.46	
				17	2.23	0.66	4.53	
			SU	-	4.09	0.55	5.68	
UNII-2C	102	5510	26T	0	3.41	-0.29	4.95	23.96
				9	2.56	-0.35	4.35	
				17	2.01	-0.20	4.05	
			SU	-	4.21	0.68	5.80	
	110	5550	26T	0	8.16	7.37	10.79	
				9	7.51	6.56	10.07	
				17	7.13	6.61	9.89	
			SU	-	12.34	10.08	14.37	
	134	5670	26T	0	2.24	0.68	4.54	
				9	1.26	0.42	3.87	
				17	1.16	0.52	3.86	
			SU	-	11.08	10.02	13.59	
UNII-3	151	5755	26T	0	2.62	0.45	4.68	30.00
				9	2.21	0.26	4.35	
				17	1.81	0.18	4.08	
			SU	-	10.00	8.70	12.41	
	159	5795	26T	0	4.76	4.26	7.53	
				9	4.15	4.03	7.10	
				17	3.64	3.94	6.80	
			SU	-	11.66	11.24	14.47	

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	38	5190	26T	0	2.44	-1.70	3.86	11.00
				9	2.73	-1.52	4.11	
				17	3.19	-0.64	4.69	
	SU	-	-5.16	-7.88	-2.82			
	46	5230	26T	0	6.17	2.73	7.79	
				9	6.79	3.37	8.42	
17				6.91	4.39	<b>8.84</b>		
SU	-	-9.61	-12.93	-7.47				
UNII-2A	54	5270	26T	0	6.68	3.48	8.38	11.00
				9	6.72	4.44	8.74	
				17	6.28	5.25	8.81	
	SU	-	-1.83	-3.20	1.03			
	62	5310	26T	0	0.66	-2.12	2.50	
				9	0.28	-1.03	2.69	
17				0.18	-0.26	2.97		
SU	-	-10.76	-11.61	-7.68				
UNII-2C	102	5510	26T	0	1.27	-1.17	3.23	11.00
				9	0.29	-2.04	2.29	
				17	-0.27	-2.46	1.78	
			SU	-	-10.81	-13.49	-8.46	
	118	5590	26T	0	6.34	4.59	8.56	
				9	5.79	4.38	8.15	
				17	5.14	4.43	7.81	
			SU	-	-2.04	-4.54	0.38	
	134	5670	26T	0	0.30	-1.73	2.41	
				9	0.11	-1.60	2.35	
				17	-0.20	-1.62	2.16	
			SU	-	-3.63	-4.66	-0.62	

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

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	151	5755	26T	0	-1.80	-5.05		-0.12	30.00 /500kHz
				9	-2.11	-5.04		-0.32	
				17	-2.05	-5.11		-0.30	
			SU	-	-5.45	-7.66		-2.92	
	159	5795	26T	0	0.24	-1.74		2.37	
				9	-0.50	-1.97		1.84	
				17	-0.18	-2.02		2.01	
			SU	-	-4.93	-7.27		-2.45	

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

**10.2.8. 802.11ax HE80 MODE**

**Output Power Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Average Power [dBm]		Corr'd Power [dBm]	Limit [dBm]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	7.36	4.19	9.07	23.98
				18	7.85	6.42	10.20	
				36	8.05	7.91	10.99	
			SU	-	1.36	-2.79	2.77	
UNII-2A	58	5290	26T	0	2.36	-3.11	3.44	23.98
				18	1.64	-1.04	3.51	
				36	1.05	0.87	3.97	
			SU	-	2.10	-1.61	3.64	
UNII-2C	106	5530	26T	0	5.19	1.49	6.73	23.98
				18	3.58	1.94	5.85	
				36	2.33	1.93	5.14	
			SU	-	3.62	1.54	5.71	
	122	5610	26T	0	8.32	5.90	10.29	
				18	7.23	6.34	9.82	
				36	6.37	6.35	9.37	
			SU	-	10.49	9.86	13.20	
UNII-3	155	5775	26T	0	2.53	0.68	4.71	30.00
				18	1.57	0.91	4.26	
				36	0.89	0.76	3.84	
			SU	-	3.26	3.28	6.28	

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

**PSD Results**

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm/MHz]		Corr'd PSD [dBm/MHz]	PSD Limit [dBm/MHz]
					ANT1	ANT2		
UNII-1	42	5210	26T	0	4.24	-0.62	5.59	11.00
				18	3.58	0.83	5.55	
				36	5.04	3.79	7.59	
			SU	-	-16.53	-19.09	-13.98	
UNII-2A	58	5290	26T	0	0.55	-7.37	1.32	11.00
				18	-1.26	-6.12	0.09	
				36	-0.91	-3.04	1.29	
			SU	-	-15.98	-16.69	-12.68	
UNII-2C	106	5530	26T	0	2.08	-0.07	4.27	11.00
				18	-0.17	-2.18	2.07	
				36	0.20	-2.20	2.30	
			SU	-	-12.96	-15.58	-10.44	
	122	5610	26T	0	5.71	3.23	<b>7.77</b>	
				18	3.76	2.42	6.27	
				36	4.25	3.47	7.01	
			SU	-	-6.73	-8.13	-3.73	

Band	Channel	Center Freq. [MHz]	Tones	RU offset	Meas PSD [dBm]		Direct. Gain [dBi]	Corr'd PSD [dBm]	PSD Limit [dBm]
					ANT1	ANT2			
UNII-3	155	5775	26T	0	-2.20	-4.30		0.01	30.00 /500kHz
				18	-3.64	-5.05		-1.16	
				36	-4.85	-4.80		-1.69	
			SU	-	-14.90	-16.36		-11.93	

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

**10.2.9. STRADDLE CHANNEL(802.11ax)**

**Output Power Results(SU)**

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
HE20	UNII-2C	5720	11.46	12.85	10.37	11.82	0.23	14.19	23.98
	UNII-3		6.34		5.50		0.23	9.18	30.00
HE40	UNII-2C	5710	12.02	12.99	9.65	10.65	0.48	14.49	23.98
	UNII-3		2.82		0.72		0.48	5.38	30.00
HE80	UNII-2C	5690	9.60	10.46	8.67	9.56	0.63	12.80	23.98
	UNII-3		-2.95		-3.47		0.63	0.44	30.00

\* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

**PSD Results(SU)**

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2			
HE20	UNII-2C	5720	1.43	0.29	0.23	4.14	11.00
	UNII-3		-1.68	-2.61	0.23	1.12	30.00/500kHz
HE40	UNII-2C	5710	-1.39	-4.02	0.48	0.98	11.00
	UNII-3		-4.83	-6.99	0.48	-2.29	30.00/500kHz
HE80	UNII-2C	5690	-7.23	-7.99	0.63	-3.95	11.00
	UNII-3		-10.75	-10.95	0.63	-7.21	30.00/500kHz

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

**Output Power Results(RU)**

Mode	Band	Center Freq. [MHz]	Meas Power [dBm]				DCCF.	Corr'd Power [dBm]	Limit [dBm]
			ANT1	Total	ANT2	Total			
HE20	UNII-2C	5720 (6RU)	7.74	8.80	6.75	7.82	0.10	10.38	22.48
	UNII-3		1.67		0.71		0.10	4.33	30.00
HE40	UNII-2C	5710 (15RU)	7.93	8.17	6.34	6.59	-	10.22	22.54
	UNII-3		-4.58		-5.91		-	-2.18	30.00
HE80	UNII-2C	5690 (34RU)	6.07	6.49	5.55	5.98	0.12	8.95	23.98
	UNII-3		-5.33		-5.76		0.12	-2.41	30.00

\* Calculation of Output Power : Corr'd Power = Ant1 meas. Power + Ant2 meas. Power + Duty CF [dB]

**PSD Results(RU)**

Mode	Band	Center Freq. [MHz]	Meas PSD [dBm/MHz]		DCCF.	Corr'd PSD [dBm]	Limit [dBm/MHz]
			ANT1	ANT2			
HE20	UNII-2C	5720 (6RU)	6.35	5.89	0.10	9.24	11.00
	UNII-3		3.07	2.06	0.10	5.71	30.00/500kHz
HE40	UNII-2C	5710 (15RU)	6.28	4.40	-	8.45	11.00
	UNII-3		-5.31	-6.75	-	-2.96	30.00/500kHz
HE80	UNII-2C	5690 (34RU)	4.25	3.62	0.12	7.08	11.00
	UNII-3		-6.97	-6.96	0.12	-3.83	30.00/500kHz

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

### 10.2.10. OUTPUT POWER AND PPSD PLOTS(WORST CASE)

