



FCC RADIO TEST REPORT

FCC ID : UZ7TC15BK
Equipment : Touch computer
Brand Name : Zebra
Model Name : TC15BK
Applicant : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Manufacturer : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Standard : FCC Part 15 Subpart E §15.407

The product was received on Dec. 20, 2021 and testing was performed from Mar. 02, 2022 to Mar. 23, 2022. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR1N2513F	01	Initial issue of report	Mar. 31, 2022
FR1N2513F	02	1. Add signature on the report front cover 2. Revise VHT80 description typo on page 10.	Apr. 03, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i)	6dB & 26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)	Maximum Conducted Output Power	Pass	-
3.3	15.407(a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	5.63 dB under the limit at 11650.000 MHz
3.5	15.207	AC Conducted Emission	Pass	12.03 dB under the limit at 0.438 MHz
3.6	15.203 15.407(a)	Antenna Requirement	Pass	-

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

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

Reviewed by: Keven Cheng

Report Producer: Clio Lo

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Touch computer
Brand Name	Zebra
Model Name	TC15BK
FCC ID	UZ7TC15BK
Sample 1	Scanner (SE4710)
Sample 2	Scanner (SE4100)
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/5G NR/NFC/GNSS WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EV2.4
SW Version	Groot-userdebug11 11-06-29.00-RG-U000-PRD-GRT FX3
MFD	26JAN22
EUT Stage	Identical Prototype

Remark: The EUT's information above is declared by manufacturer.

Specification of Accessories				
AC Adapter	Brand Name	Zebra	Part Number	PWR-WUA5V12W0US
Battery 1	Brand Name	Zebra	Model Number	BT-000454
			Part Number	BT-000454-20
Battery 2	Brand Name	Zebra	Model Number	BT-000454
			Part Number	BT-000454-70
Earphone	Brand Name	Zebra	Part Number	HDST-35MM-PTVP-01
USB Cable (Type C to Type A)	Brand Name	Zebra	Part Number	CBL-TC5X-USBC2A-01
Type C-Audio Cable (Type C to 3.5mm)	Brand Name	Zebra	Part Number	ADP-USBC-35MM1-01

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx/Rx Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna	802.11a: 17.90 dBm / 0.0617 W 802.11n HT20: 17.90 dBm / 0.0617 W 802.11n HT40: 17.30 dBm / 0.0537 W 802.11ac VHT20: 17.80 dBm / 0.0603 W 802.11ac VHT40: 17.20 dBm / 0.0525 W 802.11ac VHT80: 16.90 dBm / 0.0490 W
99% Occupied Bandwidth	802.11a: 17.08 MHz 802.11n HT20: 18.23 MHz 802.11n HT40: 36.76 MHz 802.11ac VHT80: 75.76 MHz
Antenna Type / Gain	PIFA Antenna with gain -1.82 dBi
Type of Modulation	802.11a/n: OFDM (BPSK/QPSK/16QAM/64QAM) 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.3 Modification of EUT

No modifications made to the EUT during the testing.

1.4 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY, 03CH16-HY, CO07-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW3786



1.5 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find X plane as worst plane.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155 [#]	5775	165	5825

Note:

1. The above Frequency and Channel with "*" are 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel with "[#]" are 802.11ac VHT80.

2.2 Test Mode

The final test modes consider the modulation and the worst data rates as shown in the table below.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20 (Covered by HT20)	MCS0
802.11ac VHT40 (Covered by HT40)	MCS0
802.11ac VHT80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + MPEG4 + USB Cable (Charging from Adapter) + Battery 1 for Sample 1
Remark: For Radiated Test Cases, the tests were performed with Battery 1 and Sample 1.	

Ch. #		Band IV : 5725-5850 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

802.11a RF Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
Duty Cycle (%)		98.08		97.30	96.50	94.80	93.30	90.70	88.20	87.00
CH 149	5745	17.90	CH 149	17.80	17.80	17.80	17.80	17.60	17.60	17.60
CH 157	5785	17.90								
CH 165	5825	17.90								



802.11n HT20 RF Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		97.93		97.30	96.50	94.80	93.30	90.70	88.10	86.90
CH 149	5745	17.90	CH 149	17.80	17.80	17.70	17.70	17.70	17.60	17.50
CH 157	5785	17.90								
CH 165	5825	17.80								

802.11n HT40 RF Output Power (dBm)										
Power vs. Channel			Power vs Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		95.88		93.00	90.20	87.70	83.80	80.20	78.90	77.80
CH 151	5755	17.30	CH 151	17.20	17.20	17.20	17.20	17.00	17.00	16.90
CH 159	5795	17.30								

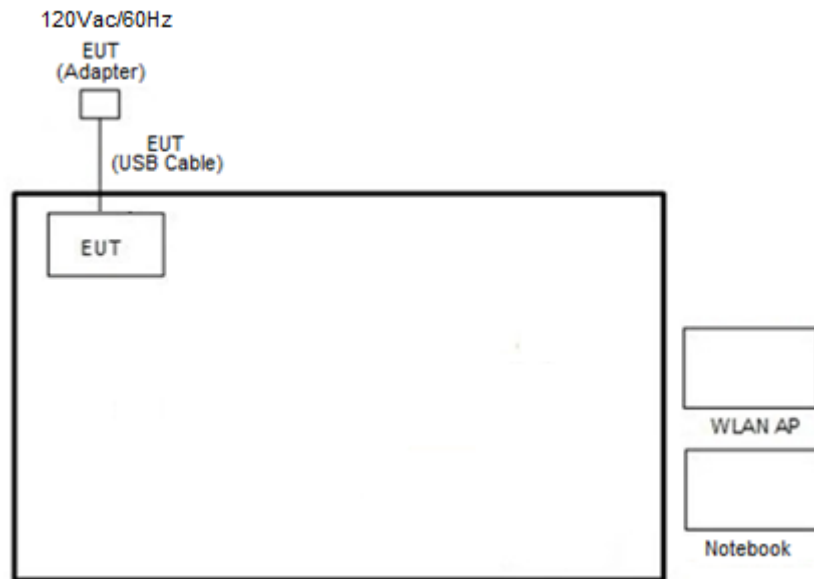
802.11ac VHT20 RF Output Power (dBm)											
Power vs. Channel			Power vs Data Rate								
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index							
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Duty Cycle (%)		98.20									
CH 149	5745	17.80	CH 149	17.70	17.70	17.70	17.70	17.70	17.70	17.70	17.80
CH 157	5785	17.80									
CH 165	5825	17.70									

802.11ac VHT40 RF Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle (%)		96.50										
CH 151	5755	17.20	CH 151	17.10	17.10	17.10	17.10	17.00	17.00	17.00	17.00	17.00
CH 159	5795	17.20										

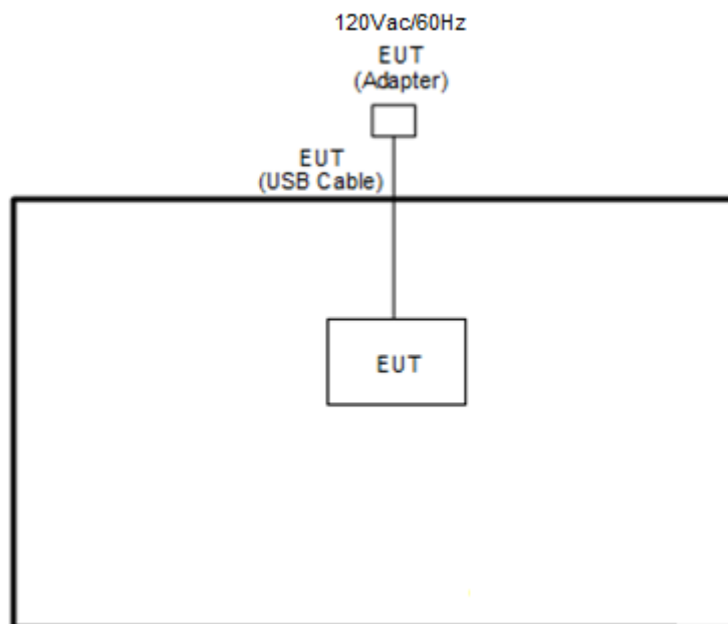
802.11ac VHT80 RF Output Power (dBm)												
Power vs. Channel			Power vs Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index								
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle (%)		92.68		87.20	83.20	79.80	75.40	71.60	70.70	69.70	67.20	66.30
CH 155	5775	16.90	CH 155	16.80	16.80	16.80	16.70	16.70	16.70	16.70	16.70	16.60

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<WLAN Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC52	N/A	N/A	Unshielded,1.8m
2.	Notebook	Dell	P79G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT Version 4.0.00194.0" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 4.2 + 10 = 14.2 \text{ (dB)}
 \end{aligned}$$

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

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

26dB and 99% Occupied bandwidth are reporting only.

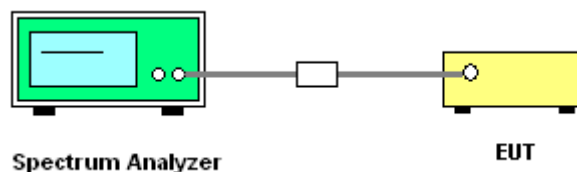
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section C) Emission bandwidth for the band 5.725-5.85 GHz
2. Set RBW = 100 kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup



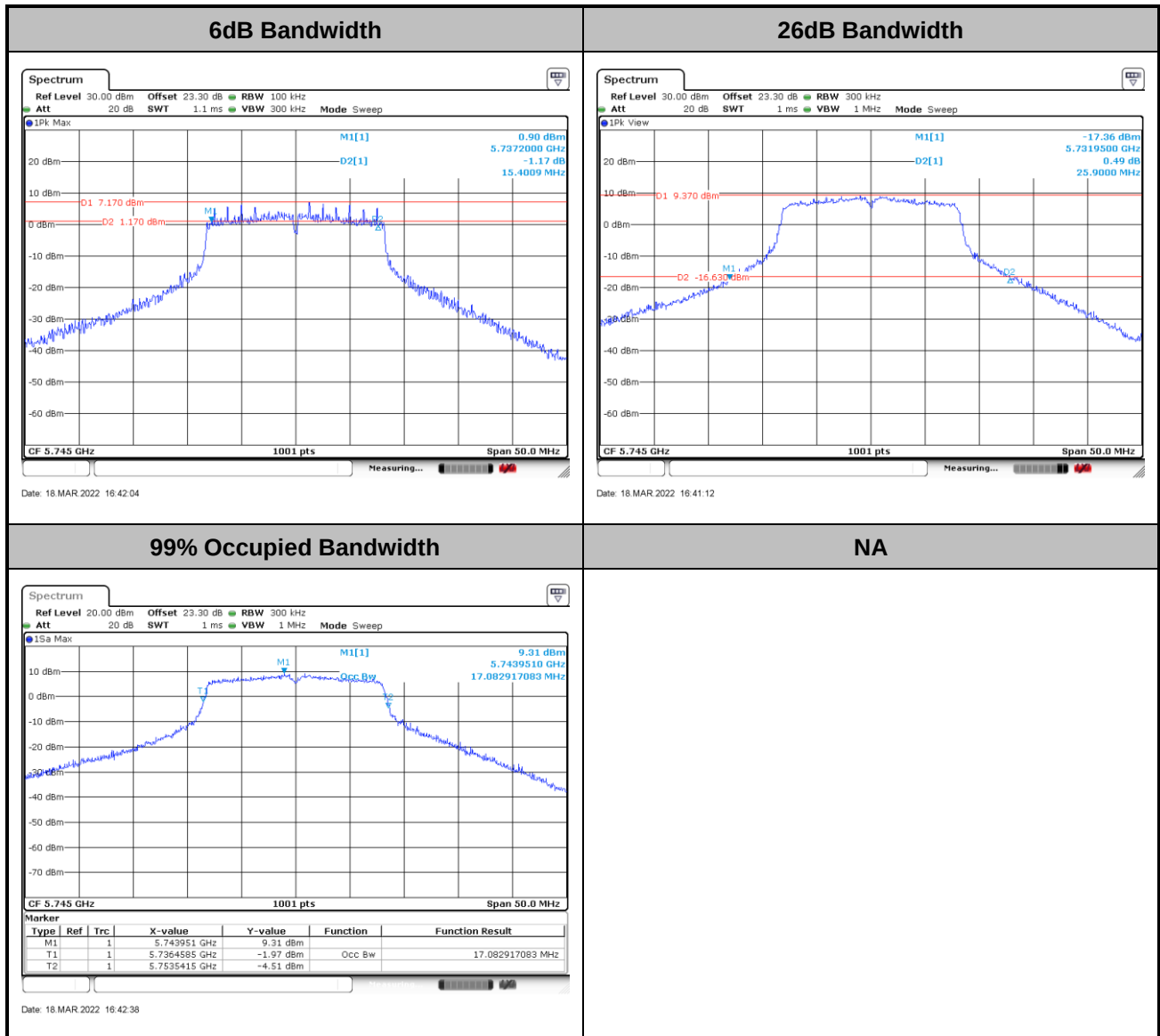
**3.1.5 Test Result of 6dB and 26dB and 99% Occupied Bandwidth**

Test Engineer :	Hank Hsu and Junyu Jhou	Temperature :	21~25℃
		Relative Humidity :	51~54%

Band IV Single Antenna									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 7	Ant 7	Ant 7		
11a	6Mbps	1	149	5745	17.08	25.90	15.40	0.5	Pass
11a	6Mbps	1	157	5785	17.08	25.80	15.80	0.5	Pass
11a	6Mbps	1	165	5825	16.93	25.45	15.45	0.5	Pass
HT20	MCS0	1	149	5745	18.23	27.65	17.25	0.5	Pass
HT20	MCS0	1	157	5785	18.18	27.80	16.30	0.5	Pass
HT20	MCS0	1	165	5825	17.98	26.10	15.80	0.5	Pass
HT40	MCS0	1	151	5755	36.66	41.94	36.09	0.5	Pass
HT40	MCS0	1	159	5795	36.76	41.76	35.64	0.5	Pass
VHT80	MCS0	1	155	5775	75.76	84.16	75.52	0.5	Pass



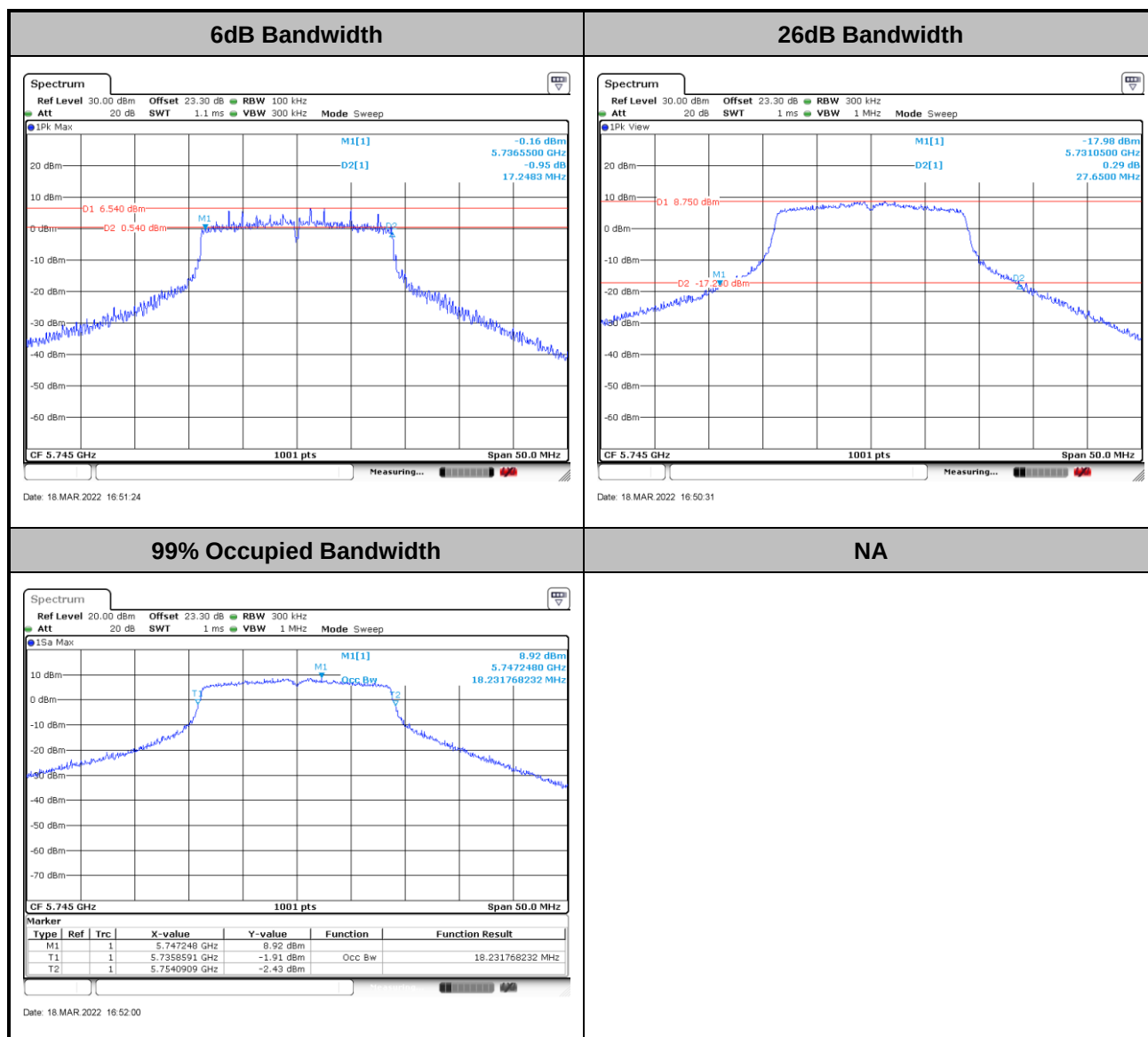
<802.11a>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

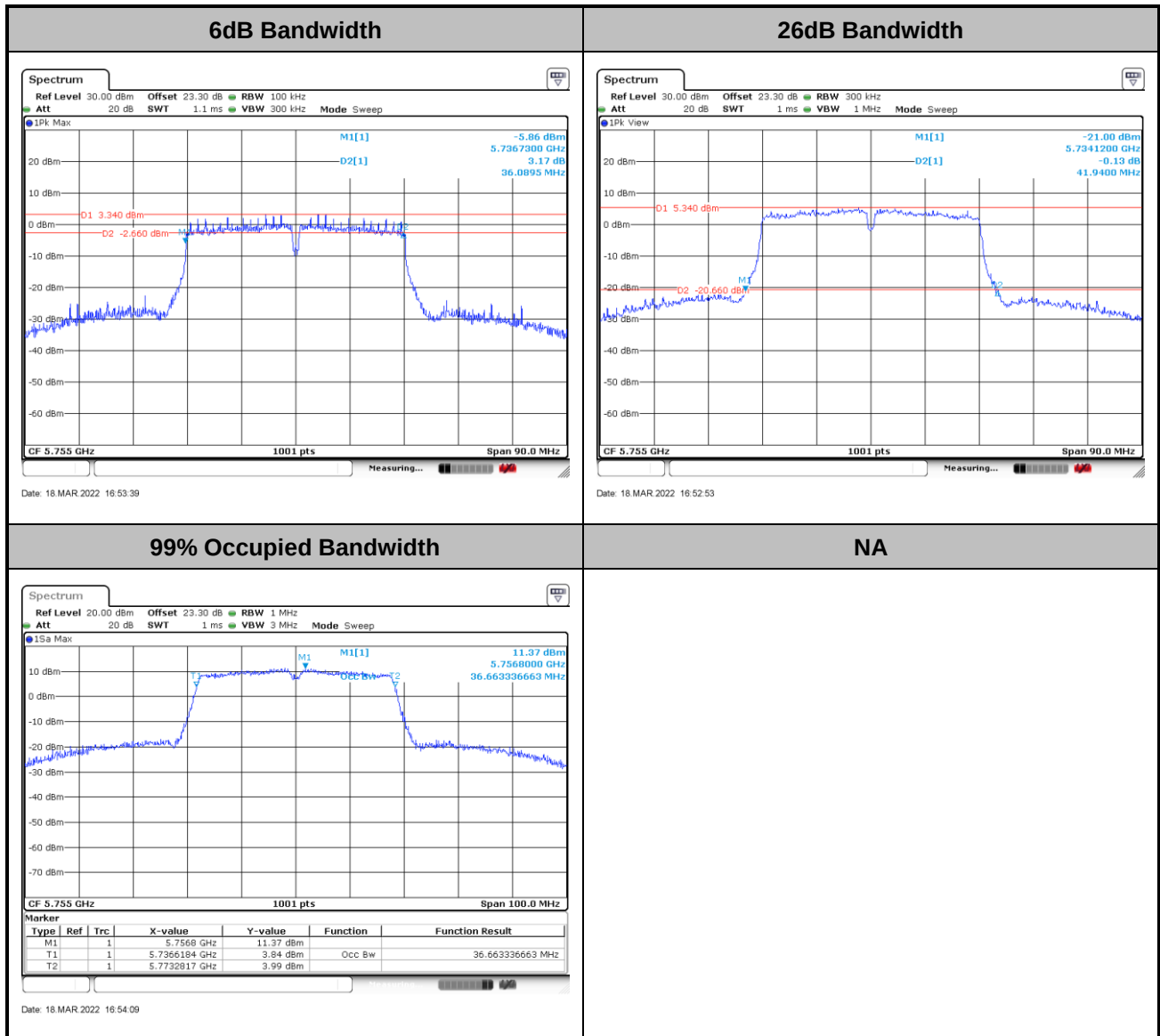


<802.11n HT20>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

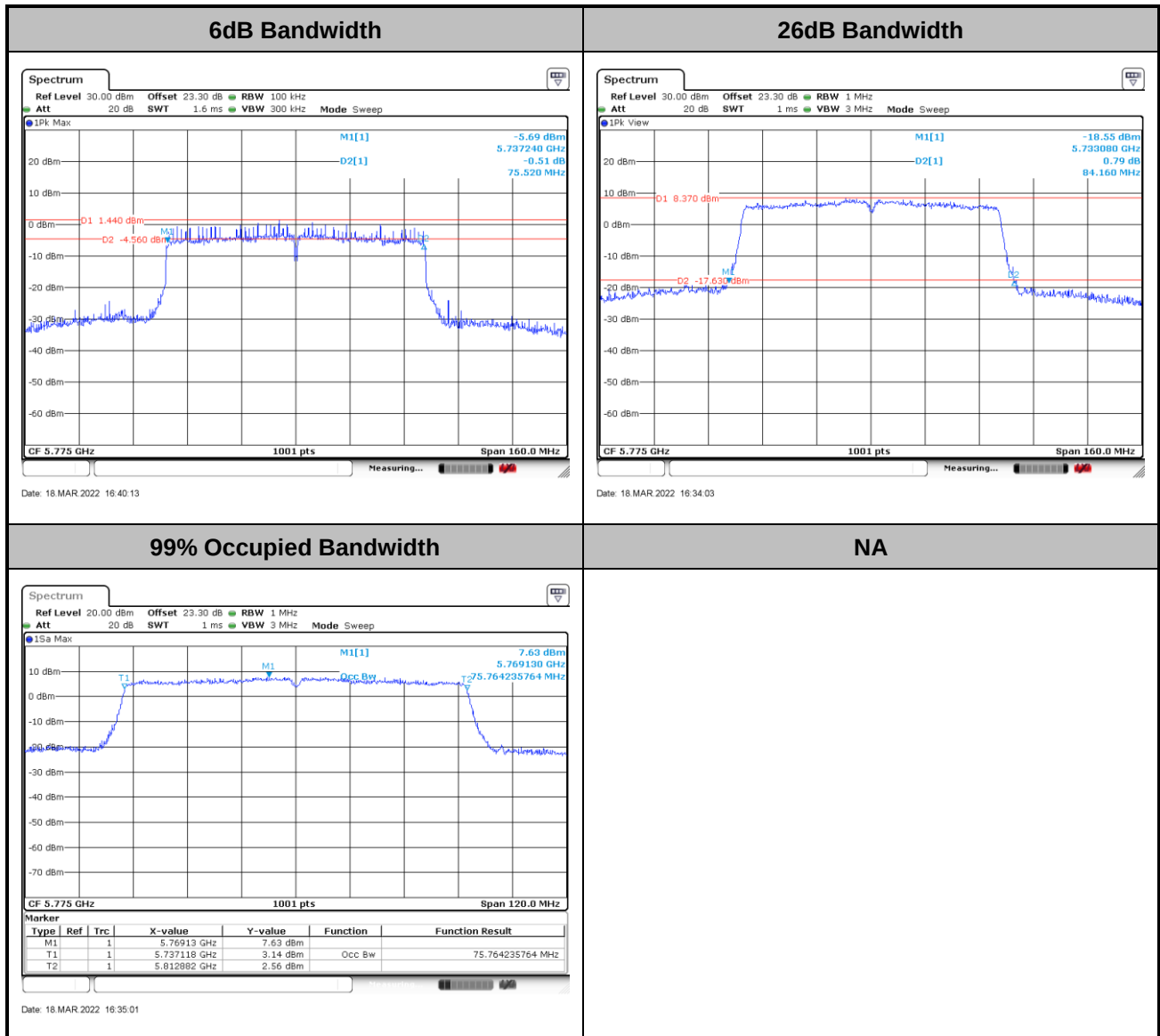
<802.11n HT40>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



<802.11ac VHT80>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

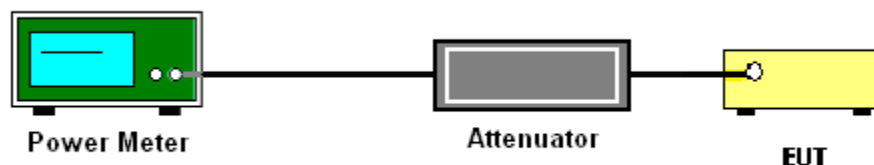
3.2.3 Test Procedures

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

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter.
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.2.4 Test Setup



**3.2.5 Test Result of Maximum Conducted Output Power**

Test Engineer :	Hank Hsu and Junyu Jhou	Temperature :	21~25℃
		Relative Humidity :	51~54%

Band IV Single Antenna								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	Pass/Fail
					Ant 7	Ant 7	Ant 7	
11a	6Mbps	1	149	5745	17.90	30.00	-1.82	Pass
11a	6Mbps	1	157	5785	17.90	30.00	-1.82	Pass
11a	6Mbps	1	165	5825	17.90	30.00	-1.82	Pass
HT20	MCS0	1	149	5745	17.90	30.00	-1.82	Pass
HT20	MCS0	1	157	5785	17.90	30.00	-1.82	Pass
HT20	MCS0	1	165	5825	17.80	30.00	-1.82	Pass
HT40	MCS0	1	151	5755	17.30	30.00	-1.82	Pass
HT40	MCS0	1	159	5795	17.30	30.00	-1.82	Pass
VHT20	MCS8	1	149	5745	17.80	30.00	-1.82	Pass
VHT20	MCS8	1	157	5785	17.80	30.00	-1.82	Pass
VHT20	MCS8	1	165	5825	17.70	30.00	-1.82	Pass
VHT40	MCS0	1	151	5755	17.20	30.00	-1.82	Pass
VHT40	MCS0	1	159	5795	17.20	30.00	-1.82	Pass
VHT80	MCS0	1	155	5775	16.90	30.00	-1.82	Pass



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.725–5.85 GHz, 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, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

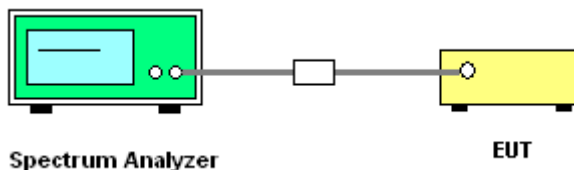
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300kHz.
 - Set VBW $\geq$ 1 MHz.
 - Add $10 \log(500 \text{ kHz/RBW})$ to the measured result, whereas RBW ($<500 \text{ kHz}$) is the reduced resolution bandwidth of the spectrum analyzer set during measurement
 - Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6 \text{ dB}$ if the duty cycle is 25 percent.
1. The RF output of EUT is connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

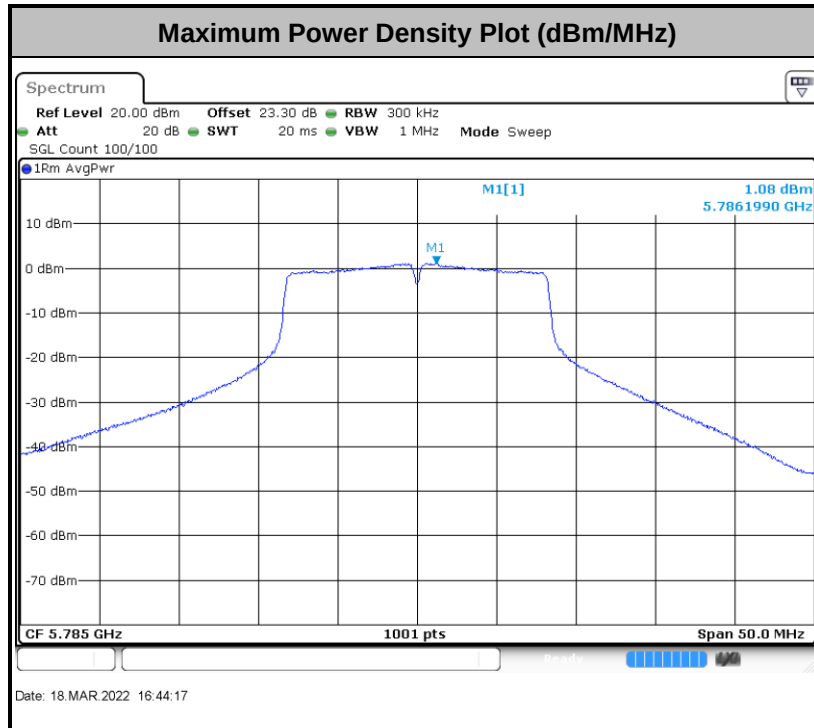
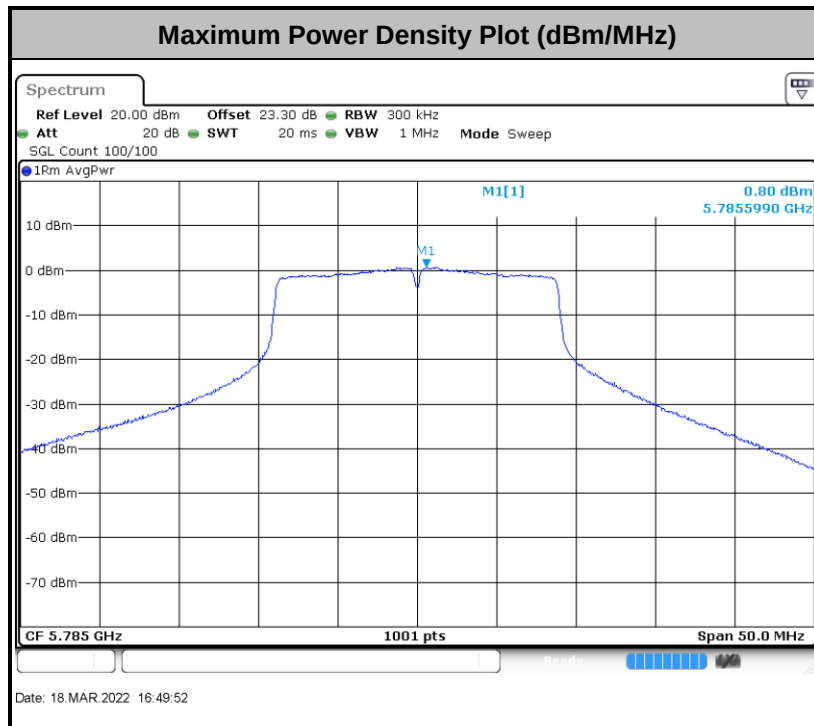
3.3.4 Test Setup

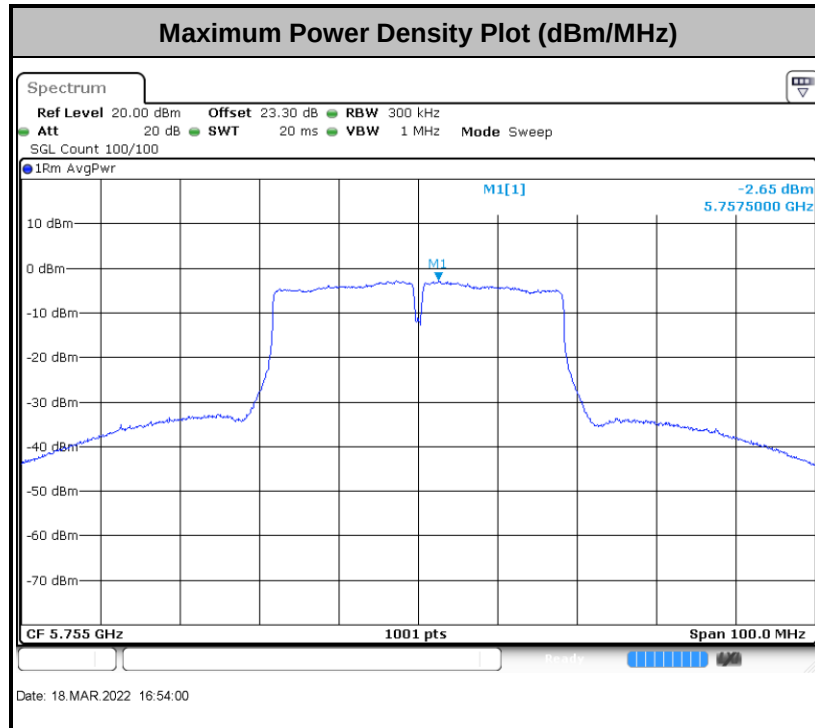
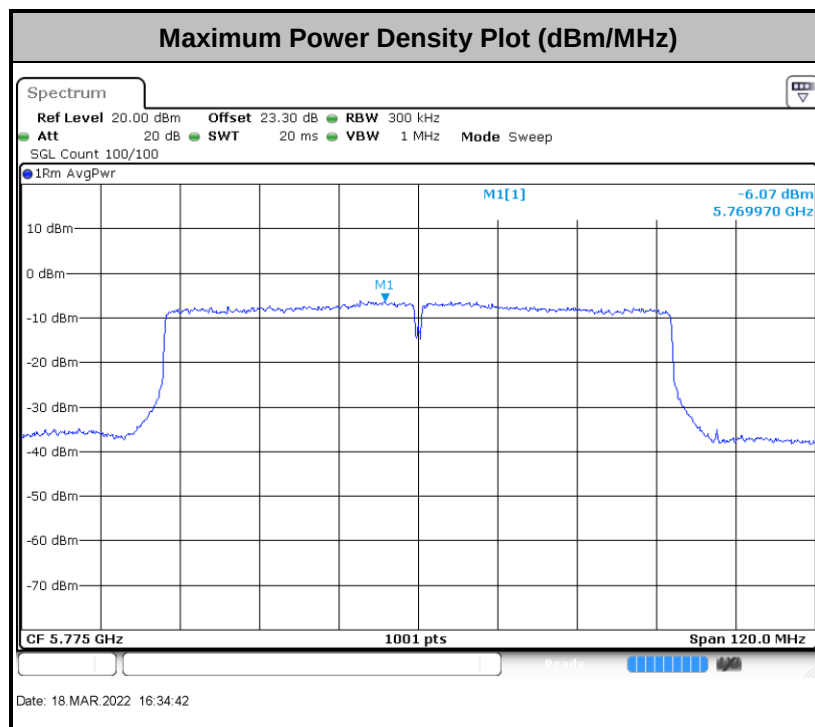


3.3.5 Test Result of Power Spectral Density

Test Engineer :	Hank Hsu and Junyu Jhou	Temperature :	21~25°C
		Relative Humidity :	51~54%

Band IV Single Antenna										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density with Duty Factor (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass /Fail
					Ant 7	Ant 7	Ant 7	Ant 7	Ant 7	
11a	6Mbps	1	149	5745	0.08	2.22	3.27	30.00	-1.82	Pass
11a	6Mbps	1	157	5785	0.08	2.22	3.38	30.00	-1.82	Pass
11a	6Mbps	1	165	5825	0.08	2.22	2.88	30.00	-1.82	Pass
HT20	MCS0	1	149	5745	0.09	2.22	2.93	30.00	-1.82	Pass
HT20	MCS0	1	157	5785	0.09	2.22	3.11	30.00	-1.82	Pass
HT20	MCS0	1	165	5825	0.09	2.22	2.44	30.00	-1.82	Pass
HT40	MCS0	1	151	5755	0.18	2.22	-0.25	30.00	-1.82	Pass
HT40	MCS0	1	159	5795	0.18	2.22	-0.40	30.00	-1.82	Pass
VHT80	MCS0	1	155	5775	0.33	2.22	-3.52	30.00	-1.82	Pass

<802.11a>

<802.11n HT20>


<802.11n HT40>

<802.11ac VHT80>


Note: Average Power Density (dB) = Measured value+ Duty Factor

3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(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.

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

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

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

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

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

- (3) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

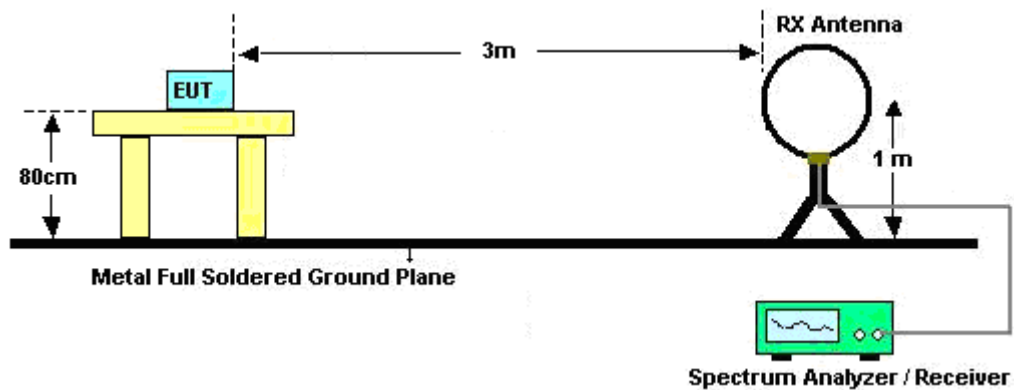
3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

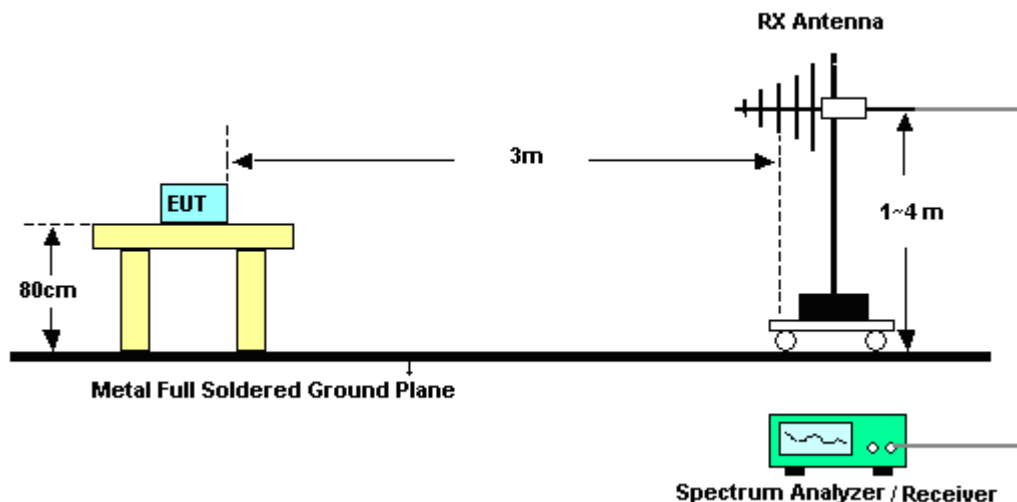
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“.

3.4.4 Test Setup

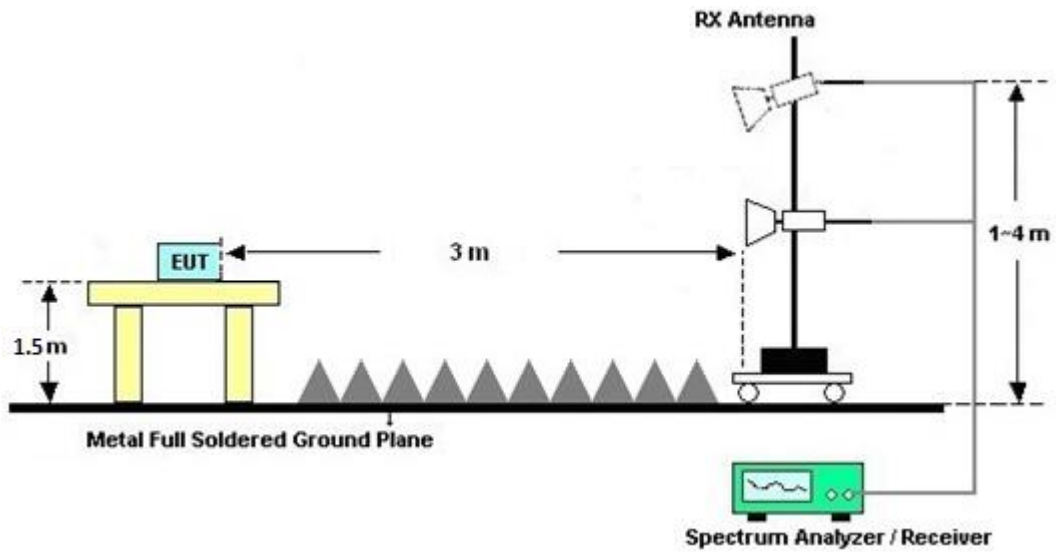
For radiated emissions below 30MHz



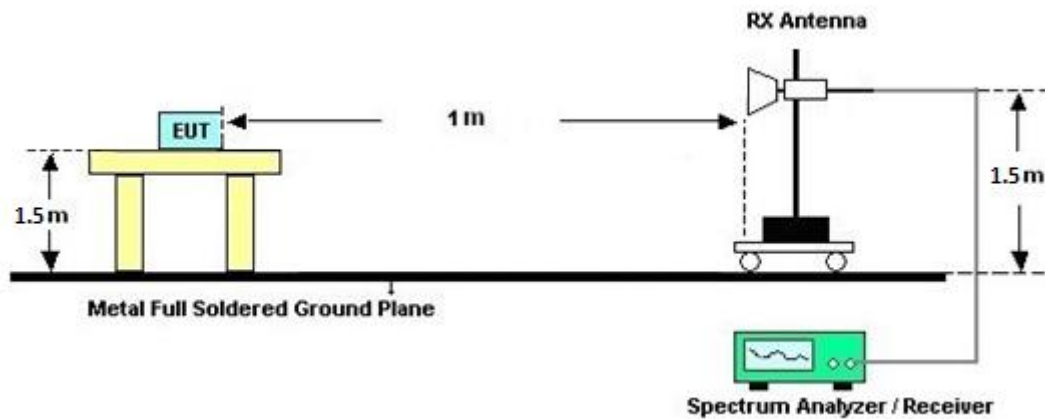
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz





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

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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B and C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

*Decreases with the logarithm of the frequency.

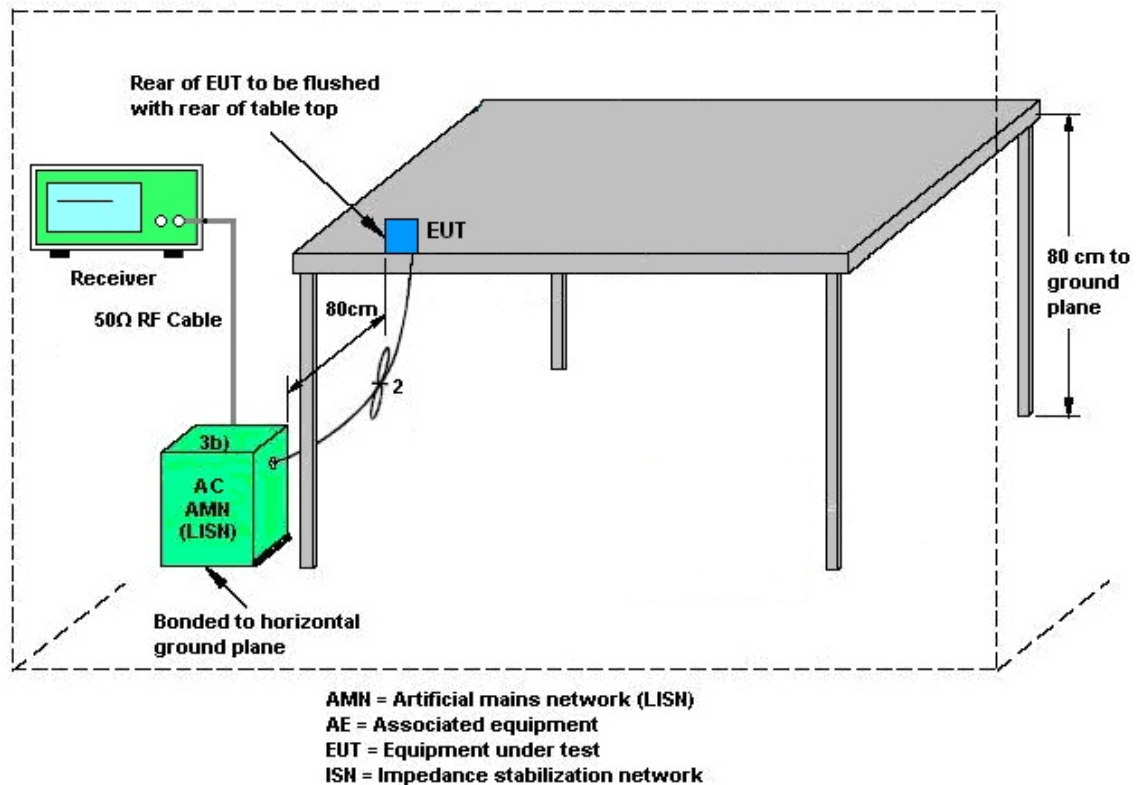
3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

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

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



3.6 Antenna Requirements

3.6.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 07, 2021	Mar. 14, 2022~ Mar. 23, 2022	Sep. 06, 2022	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N -06	47020 & 06	30MHz to 1GHz	Oct. 09, 2021	Mar. 14, 2022~ Mar. 23, 2022	Oct. 08, 2022	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-02114	1G~18GHz	Aug. 04, 2021	Mar. 14, 2022~ Mar. 23, 2022	Aug. 03, 2022	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	00993	18GHz ~40GHz	Nov. 30, 2021	Mar. 14, 2022~ Mar. 23, 2022	Nov. 29, 2022	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1G	Jul. 05, 2021	Mar. 14, 2022~ Mar. 23, 2022	Jul. 04, 2022	Radiation (03CH16-HY)
Amplifier	EMCI	EMC051845S E	980729	1-18GHz	Jul. 09, 2021	Mar. 14, 2022~ Mar. 23, 2022	Jul. 08, 2022	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Mar. 14, 2022~ Mar. 23, 2022	Jun. 21, 2022	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 09, 2021	Mar. 14, 2022~ Mar. 23, 2022	Dec. 08, 2022	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec.15, 2021	Mar. 14, 2022~ Mar. 23, 2022	Dec. 14, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11680/4P E	NA	Aug. 28, 2021	Mar. 14, 2022~ Mar. 23, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11688/4P E	NA	Aug. 28, 2021	Mar. 14, 2022~ Mar. 23, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	NA	Aug. 28, 2021	Mar. 14, 2022~ Mar. 23, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Mar. 14, 2022~ Mar. 23, 2022	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Mar. 14, 2022~ Mar. 23, 2022	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Mar. 14, 2022~ Mar. 23, 2022	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Mar. 14, 2022~ Mar. 23, 2022	N/A	Radiation (03CH16-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Mar. 14, 2022	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Mar. 14, 2022	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	9561-FN00373	9kHz-200MHz	Oct. 29, 2021	Mar. 14, 2022	Oct. 28, 2022	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	N/A	Mar. 14, 2022	N/A	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 16, 2022	Mar. 14, 2022	Feb. 15, 2023	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Oct. 21, 2021	Mar. 14, 2022	Oct. 20, 2022	Conduction (CO07-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Mar. 02, 2022 ~ Mar. 18, 2022	Nov. 15, 2022	Conducted (TH05-HY)
Power Meter	DARE	RPR3006W	16I00054SNO12 (NO:113)	10MHz~6GHz	Dec. 16, 2021	Mar. 02, 2022 ~ Mar. 18, 2022	Dec. 15, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Mar. 02, 2022 ~ Mar. 18, 2022	Aug. 29, 2022	Conducted (TH05-HY)
Switch Control Manframe	E-IUSTRUMENT	ETF-1405-0	EC1900067 (BOX7)	N/A	Aug. 12, 2021	Mar. 02, 2022 ~ Mar. 18, 2022	Aug. 11, 2022	Conducted (TH05-HY)



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8 dB
--	--------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2 dB
--	--------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8 dB
--	--------



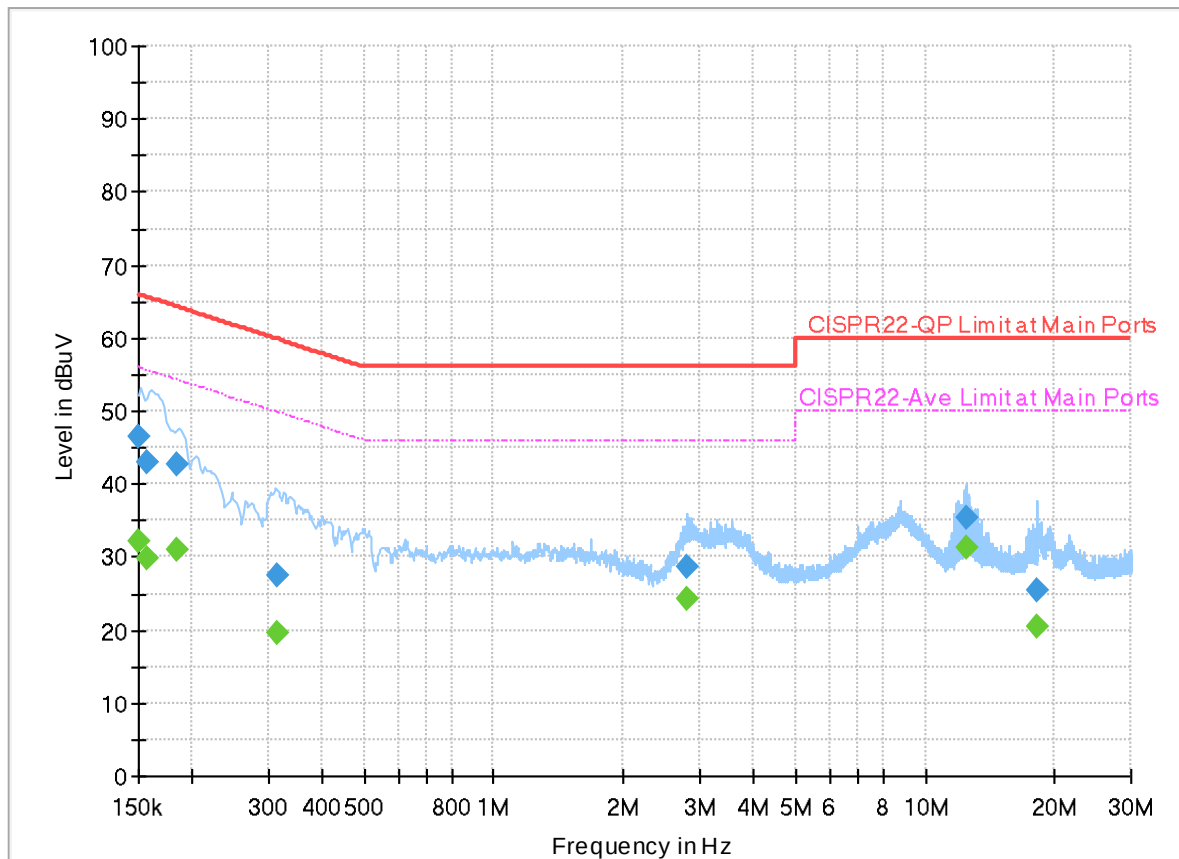
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	Temperature :	24.6~26.3℃
		Relative Humidity :	48.2~52.7%

EUT Information

Report NO : 1N2513
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



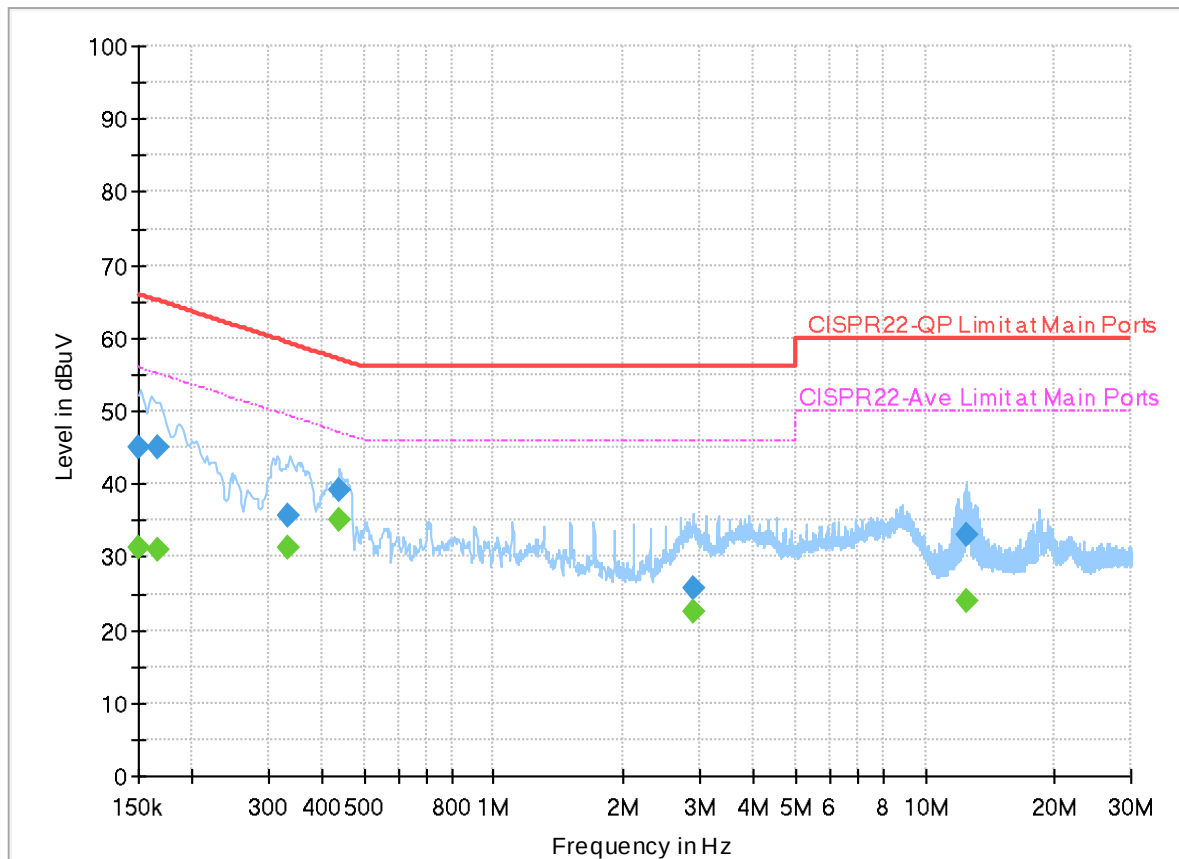
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	32.16	56.00	23.84	L1	OFF	20.0
0.150000	46.41	---	66.00	19.59	L1	OFF	20.0
0.156750	---	29.77	55.63	25.86	L1	OFF	20.0
0.156750	42.89	---	65.63	22.74	L1	OFF	20.0
0.184920	---	30.99	54.26	23.27	L1	OFF	20.0
0.184920	42.55	---	64.26	21.71	L1	OFF	20.0
0.314430	---	19.61	49.85	30.24	L1	OFF	20.0
0.314430	27.49	---	59.85	32.36	L1	OFF	20.0
2.809050	---	24.36	46.00	21.64	L1	OFF	20.0
2.809050	28.66	---	56.00	27.34	L1	OFF	20.0
12.409170	---	31.24	50.00	18.76	L1	OFF	20.2
12.409170	35.30	---	60.00	24.70	L1	OFF	20.2
18.224340	---	20.41	50.00	29.59	L1	OFF	20.2
18.224340	25.42	---	60.00	34.58	L1	OFF	20.2

EUT Information

Report NO : 1N2513
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	31.23	56.00	24.77	N	OFF	20.0
0.150000	45.08	---	66.00	20.92	N	OFF	20.0
0.166920	---	30.86	55.11	24.25	N	OFF	20.0
0.166920	44.91	---	65.11	20.20	N	OFF	20.0
0.333330	---	31.34	49.37	18.03	N	OFF	20.0
0.333330	35.72	---	59.37	23.65	N	OFF	20.0
0.438180	---	35.07	47.10	12.03	N	OFF	20.0
0.438180	39.09	---	57.10	18.01	N	OFF	20.0
2.907060	---	22.46	46.00	23.54	N	OFF	20.0
2.907060	25.81	---	56.00	30.19	N	OFF	20.0
12.425820	---	23.86	50.00	26.14	N	OFF	20.2
12.425820	33.00	---	60.00	27.00	N	OFF	20.2



Appendix B. Radiated Spurious Emission

Test Engineer :	Andy Yang, Karl Hou and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5618.2	55.02	-13.18	68.2	38.48	33.24	12.89	29.59	100	115	P	H
		5697.4	56.25	-47.03	103.28	39.63	33.3	12.93	29.61	100	115	P	H
		5719.8	63.92	-46.82	110.74	47.16	33.42	12.95	29.61	100	115	P	H
		5722.6	63.84	-52.89	116.73	47.06	33.44	12.95	29.61	100	115	P	H
	*	5745	110.17	-	-	93.25	33.57	12.96	29.61	100	115	P	H
	*	5745	102.24	-	-	85.32	33.57	12.96	29.61	100	115	A	H
													H
													H
		5645.2	55.58	-12.62	68.2	38.99	33.29	12.9	29.6	100	239	P	V
		5690.6	61.45	-36.82	98.27	44.82	33.3	12.93	29.6	100	239	P	V
		5718.8	65.41	-45.05	110.46	48.66	33.41	12.95	29.61	100	239	P	V
		5723.4	66.73	-51.82	118.55	49.95	33.44	12.95	29.61	100	239	P	V
	*	5745	113.77	-	-	96.85	33.57	12.96	29.61	100	239	P	V
	*	5745	105.95	-	-	89.03	33.57	12.96	29.61	100	239	A	V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5650	55.17	-13.03	68.2	38.56	33.3	12.91	29.6	100	115	P	H
		5672.4	55.29	-29.53	84.82	38.67	33.3	12.92	29.6	100	115	P	H
		5712.4	55.84	-52.83	108.67	39.14	33.37	12.94	29.61	100	115	P	H
		5722	55.34	-60.02	115.36	38.57	33.43	12.95	29.61	100	115	P	H
	*	5785	110.37	-	-	93.34	33.67	12.98	29.62	100	115	P	H
	*	5785	102.65	-	-	85.62	33.67	12.98	29.62	100	115	A	H
		5855	54.15	-56.65	110.8	36.97	34	12.81	29.63	100	115	P	H
		5863.2	54.71	-53.79	108.5	37.57	34	12.78	29.64	100	115	P	H
		5917.4	55.74	-18.06	73.8	38.75	34.03	12.61	29.65	100	115	P	H
		5945.4	54.9	-13.3	68.2	37.94	34.09	12.52	29.65	100	115	P	H
													H
													H
		5630	54.8	-13.4	68.2	38.23	33.26	12.9	29.59	110	238	P	V
		5689.4	56.58	-40.8	97.38	39.95	33.3	12.93	29.6	110	238	P	V
		5716	56.81	-52.87	109.68	40.08	33.4	12.94	29.61	110	238	P	V
		5725	57.86	-64.34	122.2	41.07	33.45	12.95	29.61	110	238	P	V
	*	5785	113.15	-	-	96.12	33.67	12.98	29.62	110	238	P	V
	*	5785	105.39	-	-	88.36	33.67	12.98	29.62	110	238	A	V
		5852.2	55.44	-61.74	117.18	38.25	34	12.82	29.63	110	238	P	V
		5859.2	55.8	-53.82	109.62	38.63	34	12.8	29.63	110	238	P	V
		5898.6	55.67	-32.03	87.7	38.64	34	12.67	29.64	110	238	P	V
		5938.6	55.51	-12.69	68.2	38.54	34.08	12.54	29.65	110	238	P	V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	109.01	-	-	91.88	33.85	12.91	29.63	109	113	P	H
	*	5825	100.83	-	-	83.7	33.85	12.91	29.63	109	113	A	H
		5855	55.65	-55.15	110.8	38.47	34	12.81	29.63	109	113	P	H
		5863.6	57.53	-50.86	108.39	40.39	34	12.78	29.64	109	113	P	H
		5890.6	56.07	-37.55	93.62	39.01	34	12.7	29.64	109	113	P	H
		5930.4	55.52	-12.68	68.2	38.54	34.06	12.57	29.65	109	113	P	H
													H
													H
	*	5825	111.38	-	-	94.25	33.85	12.91	29.63	109	233	P	V
	*	5825	103.49	-	-	86.36	33.85	12.91	29.63	109	233	A	V
		5850.6	62.28	-58.55	120.83	45.08	34	12.83	29.63	109	233	P	V
		5856.8	61.63	-48.67	110.3	44.45	34	12.81	29.63	109	233	P	V
		5909.2	56.73	-23.13	79.86	39.71	34.02	12.64	29.64	109	233	P	V
		5931	54.56	-13.64	68.2	37.59	34.06	12.56	29.65	109	233	P	V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11a (Harmonic @ 3m)**

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	56.99	-17.01	74	53.93	38.84	19.23	55.01	100	188	P	H
		11490	44.79	-9.21	54	41.73	38.84	19.23	55.01	100	188	A	H
		17235	47.75	-20.45	68.2	40.52	37.81	25.11	55.69	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		11490	59.31	-14.69	74	56.25	38.84	19.23	55.01	100	222	P	V
		11490	46.66	-7.34	54	43.6	38.84	19.23	55.01	100	222	A	V
		17235	47.83	-20.37	68.2	40.6	37.81	25.11	55.69	-	-	P	V
													V
													V
													V
													V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		11570	59.97	-14.03	74	56.88	38.8	19.27	54.98	100	179	P	H
		11570	47.29	-6.71	54	44.2	38.8	19.27	54.98	100	179	A	H
		17355	48.01	-20.19	68.2	40.63	38.17	25.16	55.95	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		11570	60.05	-13.95	74	56.96	38.8	19.27	54.98	100	218	P	V
		11570	48.03	-5.97	54	44.94	38.8	19.27	54.98	100	218	A	V
		17355	47.5	-20.7	68.2	40.12	38.17	25.16	55.95	-	-	P	V
													V
													V
													V
													V
													V
													V
													V

[illegible]



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5603	55.61	-12.59	68.2	39.11	33.21	12.88	29.59	102	114	P	H
		5657	57.46	-15.94	73.4	40.85	33.3	12.91	29.6	102	114	P	H
		5713.4	62.54	-46.41	108.95	45.83	33.38	12.94	29.61	102	114	P	H
		5721.8	62.69	-52.21	114.9	45.92	33.43	12.95	29.61	102	114	P	H
	*	5745	110.48	-	-	93.56	33.57	12.96	29.61	102	114	P	H
	*	5745	102.45	-	-	85.53	33.57	12.96	29.61	102	114	A	H
													H
													H
		5647.8	55.56	-12.64	68.2	38.95	33.3	12.91	29.6	103	237	P	V
		5697.6	61.73	-41.7	103.43	45.11	33.3	12.93	29.61	103	237	P	V
		5717.4	65.34	-44.73	110.07	48.61	33.4	12.94	29.61	103	237	P	V
		5721	66.32	-46.76	113.08	49.55	33.43	12.95	29.61	103	237	P	V
	*	5745	114.46	-	-	97.54	33.57	12.96	29.61	103	237	P	V
	*	5745	106.33	-	-	89.41	33.57	12.96	29.61	103	237	A	V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5619.8	54.66	-13.54	68.2	38.12	33.24	12.89	29.59	100	113	P	H
		5657	55.45	-17.95	73.4	38.84	33.3	12.91	29.6	100	113	P	H
		5716.8	55.41	-54.5	109.91	38.68	33.4	12.94	29.61	100	113	P	H
		5722.2	55.3	-60.52	115.82	38.53	33.43	12.95	29.61	100	113	P	H
	*	5785	109.59	-	-	92.56	33.67	12.98	29.62	100	113	P	H
	*	5785	101.55	-	-	84.52	33.67	12.98	29.62	100	113	A	H
		5854.6	54.4	-57.31	111.71	37.22	34	12.81	29.63	100	113	P	H
		5862.4	55.2	-53.53	108.73	38.05	34	12.79	29.64	100	113	P	H
		5915.6	55.53	-19.6	75.13	38.53	34.03	12.61	29.64	100	113	P	H
		5939.6	55.17	-13.03	68.2	38.2	34.08	12.54	29.65	100	113	P	H
													H
													H
		5640	55.97	-12.23	68.2	39.39	33.28	12.9	29.6	105	236	P	V
		5689.2	55.67	-41.57	97.24	39.04	33.3	12.93	29.6	105	236	P	V
		5716.4	58.1	-51.69	109.79	41.37	33.4	12.94	29.61	105	236	P	V
		5723.2	56.75	-61.35	118.1	39.97	33.44	12.95	29.61	105	236	P	V
	*	5785	112.32	-	-	95.29	33.67	12.98	29.62	105	236	P	V
	*	5785	104.32	-	-	87.29	33.67	12.98	29.62	105	236	A	V
		5850	55.3	-66.9	122.2	38.1	34	12.83	29.63	105	236	P	V
		5857.2	55.34	-54.84	110.18	38.17	34	12.8	29.63	105	236	P	V
		5910.4	56.29	-22.68	78.97	39.28	34.02	12.63	29.64	105	236	P	V
		5926.4	55.47	-12.73	68.2	38.49	34.05	12.58	29.65	105	236	P	V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5825	108.33	-	-	91.2	33.85	12.91	29.63	110	113	P	H
	*	5825	100.25	-	-	83.12	33.85	12.91	29.63	110	113	A	H
		5854.6	55.73	-55.98	111.71	38.55	34	12.81	29.63	110	113	P	H
		5873.4	56.4	-49.25	105.65	39.29	34	12.75	29.64	110	113	P	H
		5880.4	56.18	-45.01	101.19	39.09	34	12.73	29.64	110	113	P	H
		5950	54.59	-13.61	68.2	37.64	34.1	12.5	29.65	110	113	P	H
													H
													H
	*	5825	111.43	-	-	94.3	33.85	12.91	29.63	101	236	P	V
	*	5825	103.46	-	-	86.33	33.85	12.91	29.63	101	236	A	V
		5855	63.09	-47.71	110.8	45.91	34	12.81	29.63	101	236	P	V
		5855	63.09	-47.71	110.8	45.91	34	12.81	29.63	101	236	P	V
		5876.4	57.86	-46.3	104.16	40.76	34	12.74	29.64	101	236	P	V
		5941.2	54.87	-13.33	68.2	37.91	34.08	12.53	29.65	101	236	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	55.69	-18.31	74	52.63	38.84	19.23	55.01	100	185	P	H
		11490	44.03	-9.97	54	40.97	38.84	19.23	55.01	100	185	A	H
		17235	47.74	-20.46	68.2	40.51	37.81	25.11	55.69	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		11490	59.11	-14.89	74	56.05	38.84	19.23	55.01	100	221	P	V
		11490	46.42	-7.58	54	43.36	38.84	19.23	55.01	100	221	A	V
		17235	46.96	-21.24	68.2	39.73	37.81	25.11	55.69	-	-	P	V
													V
													V
													V
													V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		11570	57.64	-16.36	74	54.55	38.8	19.27	54.98	100	188	P	H
		11570	45.48	-8.52	54	42.39	38.8	19.27	54.98	100	188	A	H
		17355	46.64	-21.56	68.2	39.26	38.17	25.16	55.95	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		11570	59.81	-14.19	74	56.72	38.8	19.27	54.98	100	220	P	V
		11570	46.16	-7.84	54	43.07	38.8	19.27	54.98	100	220	A	V
		17355	46.8	-21.4	68.2	39.42	38.17	25.16	55.95	-	-	P	V
													V
													V
													V
													V
													V
													V

[illegible]



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5636.6	55.2	-13	68.2	38.62	33.27	12.9	29.59	100	113	P	H
		5697.2	65.46	-37.68	103.14	48.84	33.3	12.93	29.61	100	113	P	H
		5718.4	70.09	-40.26	110.35	53.34	33.41	12.95	29.61	100	113	P	H
		5722.2	70.11	-45.71	115.82	53.34	33.43	12.95	29.61	100	113	P	H
	*	5755	107.8	-	-	90.84	33.61	12.97	29.62	100	113	P	H
	*	5755	99.72	-	-	82.76	33.61	12.97	29.62	100	113	A	H
		5854	54.31	-58.77	113.08	37.13	34	12.81	29.63	100	113	P	H
		5855.6	55.69	-54.94	110.63	38.51	34	12.81	29.63	100	113	P	H
		5908.6	55.67	-24.63	80.3	38.65	34.02	12.64	29.64	100	113	P	H
		5943	55.09	-13.11	68.2	38.12	34.09	12.53	29.65	100	113	P	H
													H
													H
		5649	57.41	-10.79	68.2	40.8	33.3	12.91	29.6	102	237	P	V
		5697.4	67.79	-35.49	103.28	51.17	33.3	12.93	29.61	102	237	P	V
		5713.8	72.25	-36.82	109.07	55.54	33.38	12.94	29.61	102	237	P	V
		5723.2	72.55	-45.55	118.1	55.77	33.44	12.95	29.61	102	237	P	V
	*	5755	110.4	-	-	93.44	33.61	12.97	29.62	102	237	P	V
	*	5755	103.1	-	-	86.14	33.61	12.97	29.62	102	237	A	V
		5853.2	56.01	-58.89	114.9	38.82	34	12.82	29.63	102	237	P	V
		5858.4	56.03	-53.82	109.85	38.86	34	12.8	29.63	102	237	P	V
		5919.6	55.24	-16.94	72.18	38.25	34.04	12.6	29.65	102	237	P	V
		5938.6	56.26	-11.94	68.2	39.29	34.08	12.54	29.65	102	237	P	V
													V
													V



WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5648	54.94	-13.26	68.2	38.33	33.3	12.91	29.6	100	114	P	H
		5690.4	55.03	-43.09	98.12	38.4	33.3	12.93	29.6	100	114	P	H
		5714.6	57.09	-52.2	109.29	40.37	33.39	12.94	29.61	100	114	P	H
		5723.8	58.41	-61.05	119.46	41.63	33.44	12.95	29.61	100	114	P	H
	*	5795	106.44	-	-	89.38	33.69	12.99	29.62	100	114	P	H
	*	5795	98.8	-	-	81.74	33.69	12.99	29.62	100	114	A	H
		5852.4	59.91	-56.82	116.73	42.72	34	12.82	29.63	100	114	P	H
		5856.2	58.11	-52.35	110.46	40.93	34	12.81	29.63	100	114	P	H
		5886.2	56.59	-40.29	96.88	39.52	34	12.71	29.64	100	114	P	H
		5938.8	55.5	-12.7	68.2	38.53	34.08	12.54	29.65	100	114	P	H
													H
													H
		5630	55.17	-13.03	68.2	38.6	33.26	12.9	29.59	105	236	P	V
		5696.8	58.88	-43.96	102.84	42.26	33.3	12.93	29.61	105	236	P	V
		5717.8	58.32	-51.86	110.18	41.58	33.41	12.94	29.61	105	236	P	V
		5721.4	60.42	-53.57	113.99	43.65	33.43	12.95	29.61	105	236	P	V
	*	5795	109.49	-	-	92.43	33.69	12.99	29.62	105	236	P	V
	*	5795	101.94	-	-	84.88	33.69	12.99	29.62	105	236	A	V
		5852.4	63.45	-53.28	116.73	46.26	34	12.82	29.63	105	236	P	V
		5861.2	59.64	-49.42	109.06	42.49	34	12.79	29.64	105	236	P	V
		5877.2	56.94	-46.63	103.57	39.84	34	12.74	29.64	105	236	P	V
		5940.6	55.3	-12.9	68.2	38.34	34.08	12.53	29.65	105	236	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	47.66	-26.34	74	44.62	38.8	19.24	55	-	-	P	H
		17265	48.96	-19.24	68.2	41.7	37.9	25.11	55.75	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		11510	47.34	-26.66	74	44.3	38.8	19.24	55	-	-	P	V
		17265	47.64	-20.56	68.2	40.38	37.9	25.11	55.75	-	-	P	V
													V
													V
													V
													V
													V
													V

[illegible]



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5649.4	56.94	-11.26	68.2	40.33	33.3	12.91	29.6	100	115	P	H
		5685	66.7	-27.43	94.13	50.07	33.3	12.93	29.6	100	115	P	H
		5714.8	70.72	-38.63	109.35	54	33.39	12.94	29.61	100	115	P	H
		5722.8	67.8	-49.38	117.18	51.02	33.44	12.95	29.61	100	115	P	H
	*	5775	103.25	-	-	86.24	33.65	12.98	29.62	100	115	P	H
	*	5775	95.08	-	-	78.07	33.65	12.98	29.62	100	115	A	H
		5854.6	64.09	-47.62	111.71	46.91	34	12.81	29.63	100	115	P	H
		5856.2	64.36	-46.1	110.46	47.18	34	12.81	29.63	100	115	P	H
		5877.6	61.57	-41.7	103.27	44.47	34	12.74	29.64	100	115	P	H
		5936.2	55.52	-12.68	68.2	38.55	34.07	12.55	29.65	100	115	P	H
													H
													H
		5642.6	58.91	-9.29	68.2	42.32	33.29	12.9	29.6	100	239	P	V
		5686.4	71.01	-24.16	95.17	54.38	33.3	12.93	29.6	100	239	P	V
		5715	74.69	-34.71	109.4	57.97	33.39	12.94	29.61	100	239	P	V
		5723.8	69.97	-49.49	119.46	53.19	33.44	12.95	29.61	100	239	P	V
	*	5775	105.66	-	-	88.65	33.65	12.98	29.62	100	239	P	V
	*	5775	98.27	-	-	81.26	33.65	12.98	29.62	100	239	A	V
		5850.4	68.66	-52.63	121.29	51.46	34	12.83	29.63	100	239	P	V
		5857.2	66.68	-43.5	110.18	49.51	34	12.8	29.63	100	239	P	V
		5876.8	62.03	-41.83	103.86	44.93	34	12.74	29.64	100	239	P	V
		5935	55.6	-12.6	68.2	38.63	34.07	12.55	29.65	100	239	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 7	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11ac VHT80 CH 155 5775MHz		11550	47.65	-26.35	74	44.58	38.8	19.25	54.98	-	-	P	H	
		17325	48.55	-19.65	68.2	41.21	38.08	25.14	55.88	-	-	P	H	
													H	
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													H	
			11550	47.98	-26.02	74	44.91	38.8	19.25	54.98	-	-	P	V
			17325	48.56	-19.64	68.2	41.22	38.08	25.14	55.88	-	-	P	V
														V
														V
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Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		93.05	32.03	-11.47	43.5	47.65	14.94	1.75	32.31	-	-	P	H
		156.1	25.2	-18.3	43.5	38.34	16.83	2.28	32.25	-	-	P	H
		401.51	30.17	-15.83	46	36.9	22.12	3.54	32.39	-	-	P	H
		827.34	31.96	-14.04	46	30.55	28.45	5.05	32.09	-	-	P	H
		876.81	33.05	-12.95	46	30.68	28.89	5.21	31.73	-	-	P	H
		958.29	35.18	-10.82	46	30.01	30.83	5.47	31.13	-	-	P	H
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		38.73	33.37	-6.63	40	44.5	20.15	1.02	32.3	-	-	P	V
		52.31	33.5	-6.5	40	51.2	13.32	1.27	32.29	-	-	P	V
		93.05	30.86	-12.64	43.5	46.48	14.94	1.75	32.31	-	-	P	V
		557.68	29.07	-16.93	46	31.4	25.97	4.13	32.43	-	-	P	V
		853.53	32.67	-13.33	46	30.33	29.12	5.14	31.92	-	-	P	V
		938.89	34.02	-11.98	46	29.68	30.2	5.42	31.28	-	-	P	V
													V
													V
												V	
												V	
												V	
												V	
Remark	1. No other spurious found.												
	2. All results are PASS against limit line.												
	3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a		11490	56.99	-17.01	74	53.93	38.84	19.23	55.01	100	188	P	H
CH 149		11490	44.79	-9.21	54	41.73	38.84	19.23	55.01	100	188	A	H
5745MHz													

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 11490MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
 = 55.45 (dBμV/m)
2. Over Limit(dB)
 = Level(dBμV/m) – Limit Line(dBμV/m)
 = 55.45(dBμV/m) – 74(dBμV/m)
 = -18.55(dB)

For Average Limit @ 11490MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Radiated Spurious Emission Plots

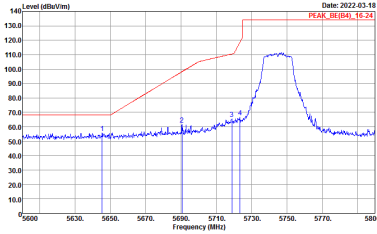
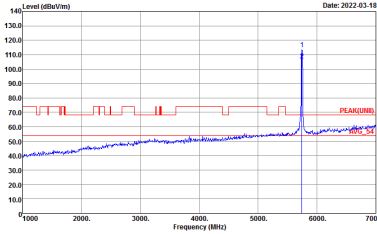
Test Engineer :	Andy Yang, Karl Hou and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

Band 4 - 5725~5850MHz

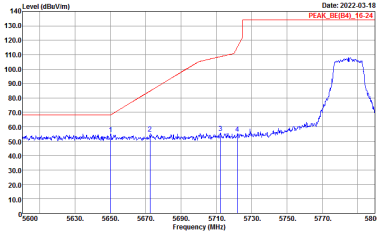
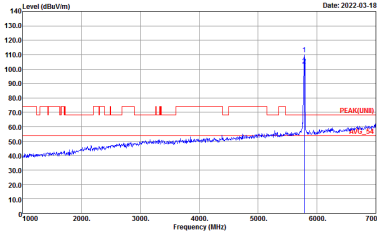
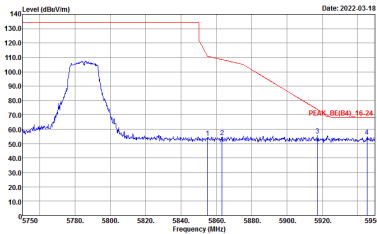
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
7	Horizontal	Fundamental
Peak	Site Condition : 03CH16-HY : PEAK_BE(84)_16-24 3m 91200_02114_210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site Condition : 03CH16-HY : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

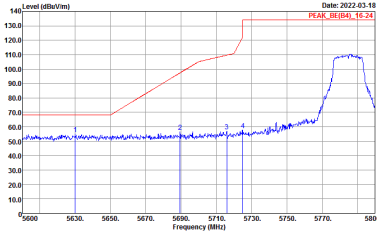
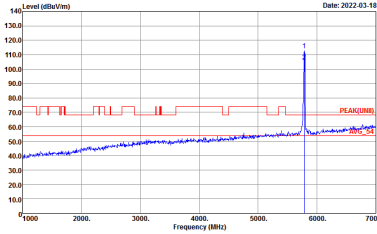
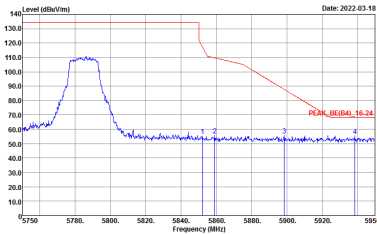


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

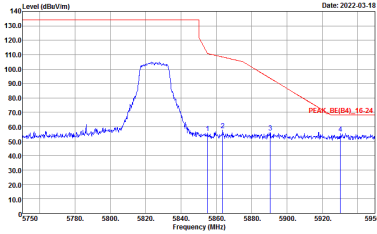
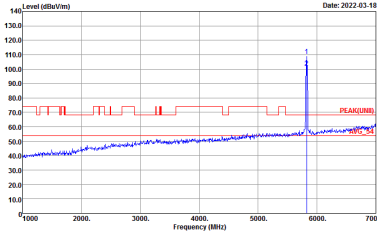


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

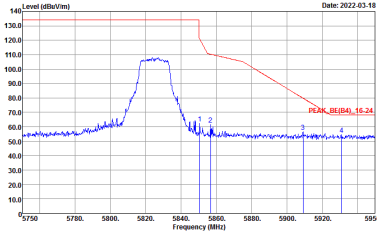
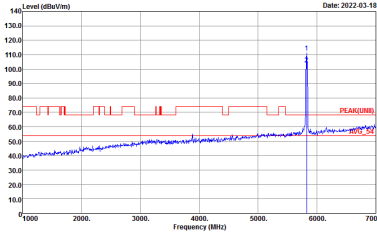


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



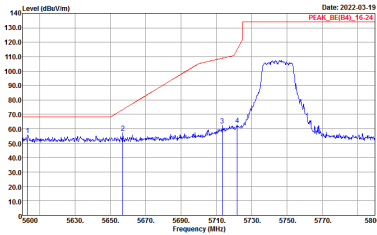
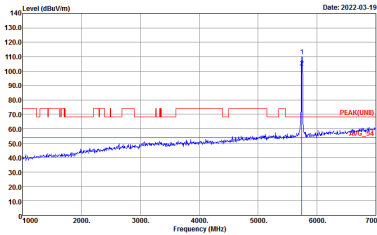
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



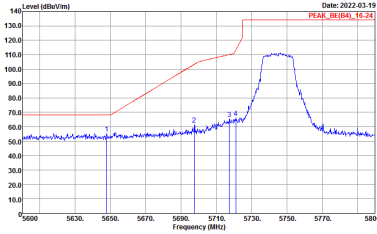
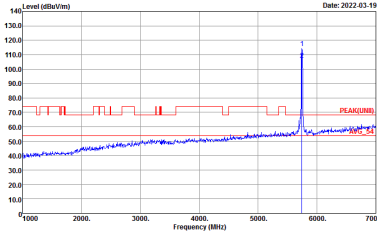
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



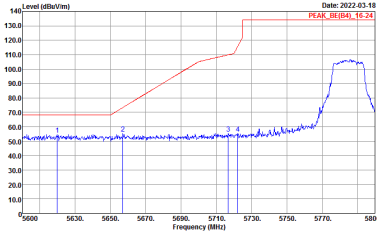
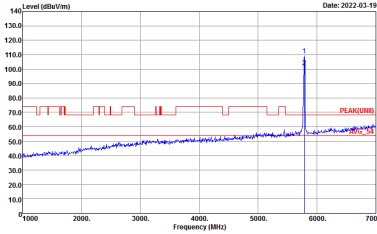
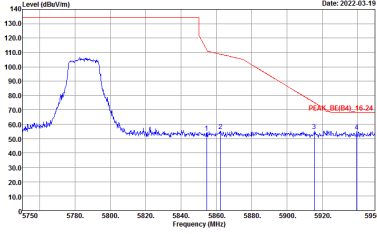
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

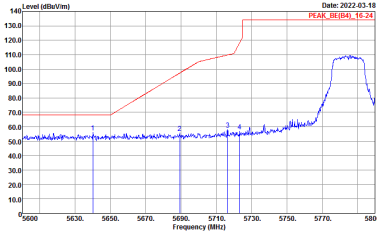
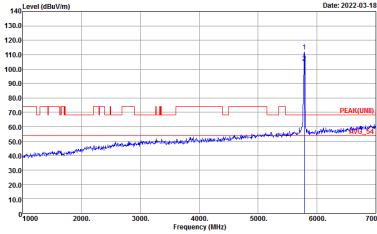
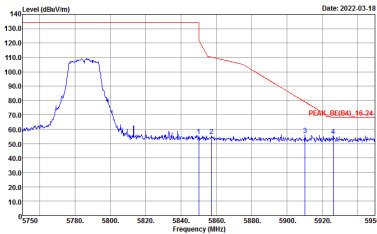


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_UNI(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

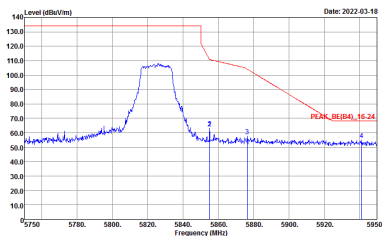
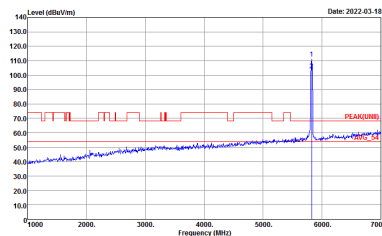


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_UNI(1) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



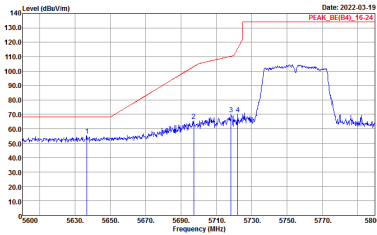
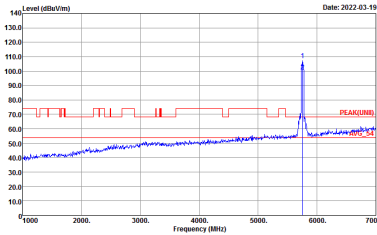
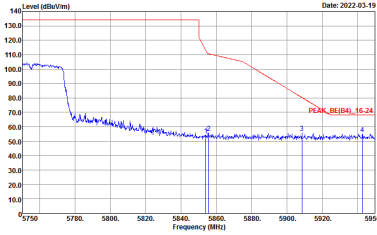
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
7	Horizontal	Fundamental
Peak	Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



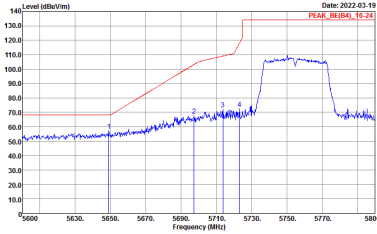
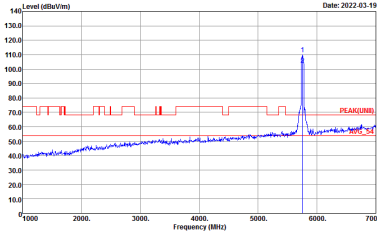
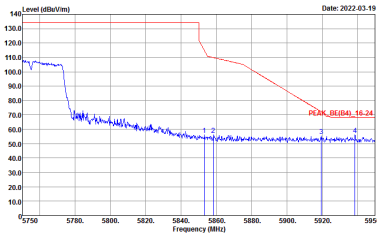
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

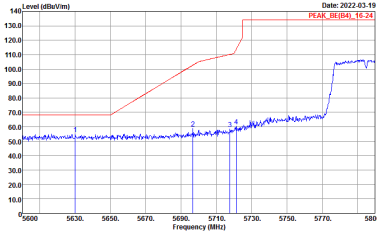
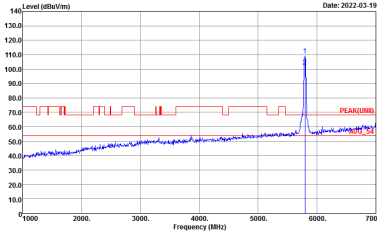
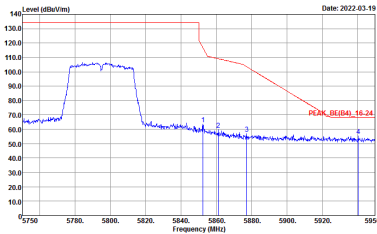


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_UNI(1) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



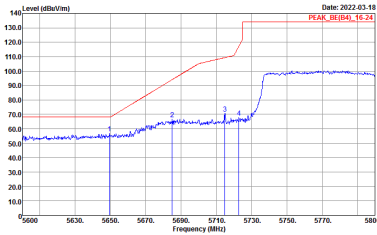
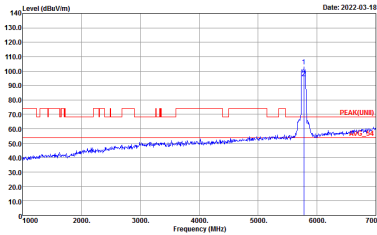
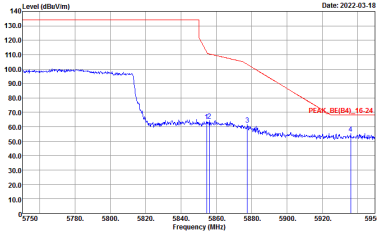
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
7	Horizontal	Fundamental
Peak	Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH16-HY Condition : PEAK(FUNB) 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



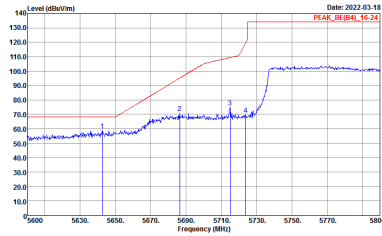
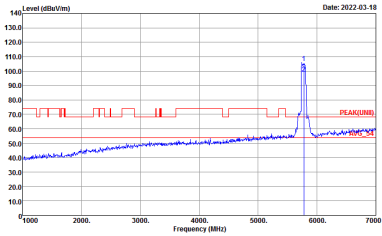
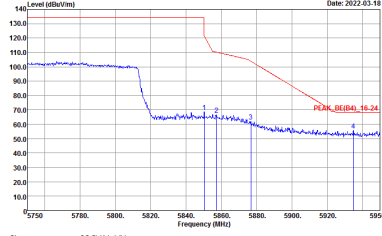
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_SE(84)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

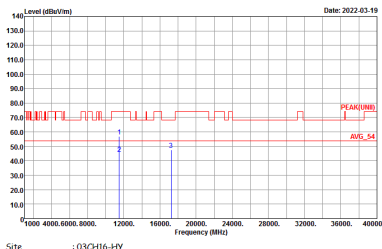
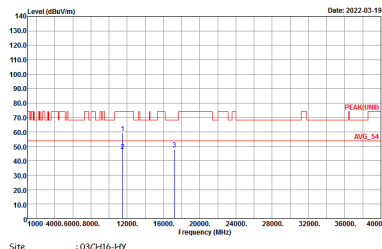
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
7	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



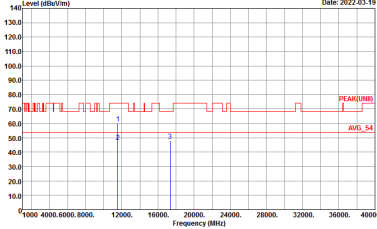
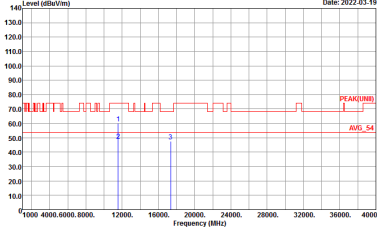
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
7	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_UNI(B4)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_02114_210804 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



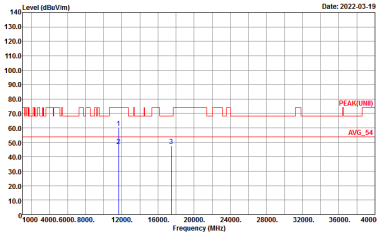
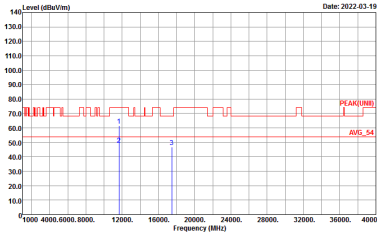
Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120D_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120D_02114_210804 VERTICAL



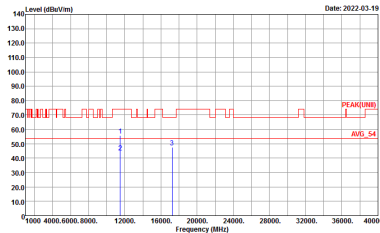
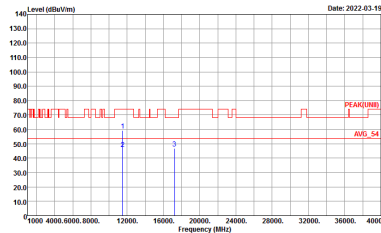
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL



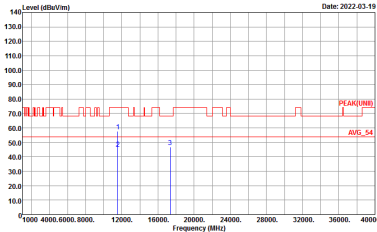
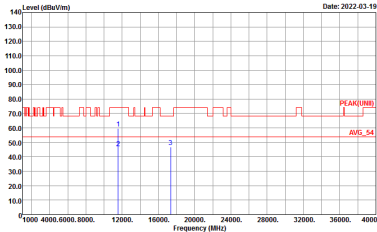
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL



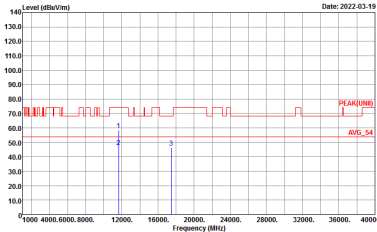
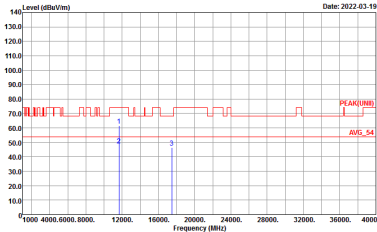
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL

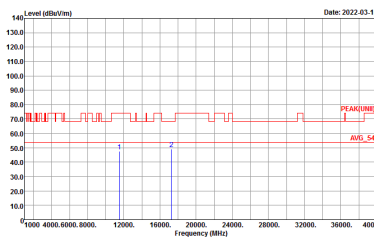
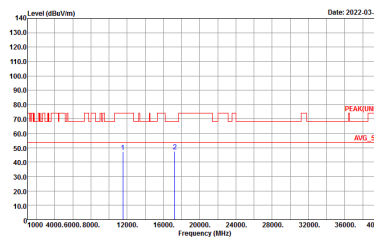


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL

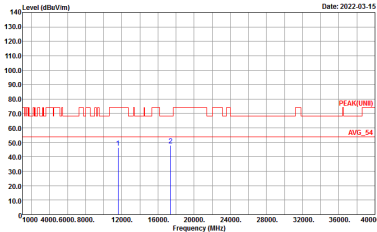
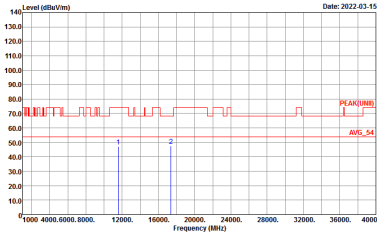


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL

Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

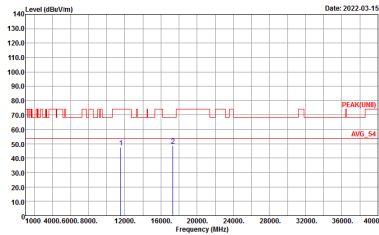
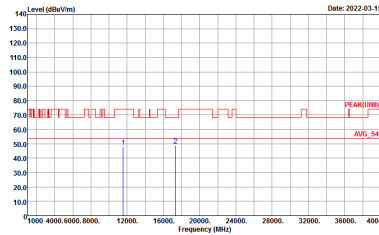
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL



Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

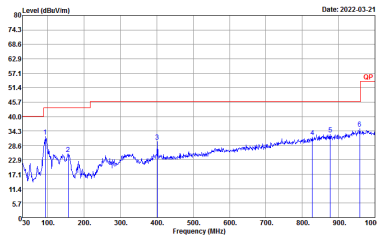
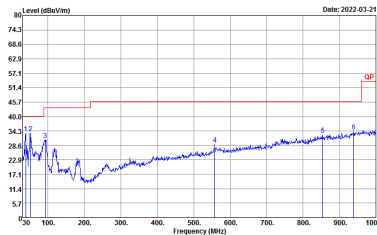
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_02114_210804 VERTICAL



Band 4 - 5725~5850MHz

Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

WIFI	5GHz WIFI	
ANT	802.11a LF	
7	Horizontal	Vertical
QP / Peak	 Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 HORIZONTAL	 Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 VERTICAL



Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11a	98.06	2025	0.49	10Hz
5GHz 802.11n HT20	98.18	1890	0.53	10Hz
5GHz 802.11n HT40	96.26	927	1.08	3kHz
5GHz 802.11n VHT80	92.68	456	2.19	3kHz

<Ant. 7>

