

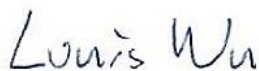


FCC RADIO TEST REPORT

FCC ID : UZ7EC55BK
Equipment : Enterprise Computer
Brand Name : Zebra
Model Name : EC55BK
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 Jul. 31, 2020 and testing was started from Oct. 08, 2020 and completed on Oct. 22, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR070405F	01	Initial issue of report	Nov. 05, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.403 (i)	6dB & 26dB Bandwidth	Not Required	-
-	2.1049	99% Occupied Bandwidth	Not Required	-
3.1	15.407 (a)	Maximum Conducted Output Power	Pass	-
-	15.407 (a)	Power Spectral Density	Not Required	-
3.2	15.407(b)	Unwanted Emissions	Pass	Under limit 10.95 dB at 5648.600 MHz
-	15.207	AC Conducted Emission	Not Required	-
-	15.407 (c)	Automatically Discontinue Transmission	Not Required	-
3.3	15.203 & 15.407 (a)	Antenna Requirement	Pass	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report. The difference between EC55AK and EC55BK is the performance for cellular bands. The detail of similarity and difference can be found in Operation Description. All the test cases were performed on original report which can be referred to Sporton Report Number FR070401F as appendix E. Based on the original report, the test cases were verified.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Ruby Zou

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Enterprise Computer
Brand Name	Zebra
Model Name	EC55BK
FCC ID	UZ7EC55BK
EUT supports Radios application	GSM/WCDMA/HSPA/LTE/NFC/GNSS WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EV2
SW Version	Android version 10
FW Version	10-13-12.00-QG-U00-PRD-HEL-04
MFD	02JUL20
EUT Stage	Engineering Sample

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

Specification of Accessories				
AC Adapter	Brand Name	Zebra	Part Number	PWR-WUA5V15W0US
USB TYPE-C to TYPE-C cable	Brand Name	Zebra	Part Number	CBL-EC5X-USBC3A-01
Battery 1	Brand Name	Zebra	Part Number	BT-000424-00
Battery 2	Brand Name	Zebra	Part Number	BT-000424-08
Earphone 1	Brand Name	Zebra	Part Number	HDST-35MM-PTVP-01
Earphone 2	Brand Name	Zebra	Part Number	HS2100-OTH
USB TYPE C to 3.5mm audio connector	Brand Name	Symbol	Part Number	ADP-USBC-35MM1-01
3.5mm Jack 43"(1.1m) Standard Cable	Brand Name	Zebra	Part Number	CBL-HS2100-3MS1-01
Trigger Handle	Brand Name	Zebra	Part Number	TRG-EC5X-SNP1-01
Soft Holster	Brand Name	Zebra	Part Number	SG-EC5X-HLSTR1-01
Protective Boot	Brand Name	Zebra	Part Number	SG-EC5X-BOOT1-01

Sample list				
	Sample 1	Sample 2	Sample 3	Sample 4
Operating System	ANDROID	ANDROID	ANDROID	ANDROID
RAM	3GB	3GB	4GB	4GB
FLASH	32GB	32GB	64GB	64GB
Scanner	NO	SE4100	SE4100	SE4100
Front Camera	5MP	NO	5MP	5MP
Rear Camera	13MP	13MP	13MP	13MP
	MICRO SD	MICRO SD	MICRO SD	MICRO SD
	GMS	GMS	GMS	GMS
Back connector	NO I/O CONNECTOR	2-PIN	2-PIN	8-PIN
	ROW - Excludes China	ROW - Excludes China	ROW - Excludes China	ROW - Excludes China

1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna <CDD Modes>	<Ant. 0> 802.11a : 17.30 dBm / 0.0537 W 802.11n HT20 : 17.30 dBm / 0.0537 W 802.11n HT40 : 17.20 dBm / 0.0525 W 802.11ac VHT20: 17.40 dBm / 0.0550 W 802.11ac VHT40: 17.30 dBm / 0.0537 W 802.11ac VHT80: 17.30 dBm / 0.0537 W <Ant. 1> 802.11a : 17.30 dBm / 0.0537 W 802.11n HT20 : 17.30 dBm / 0.0537 W 802.11n HT40 : 17.30 dBm / 0.0537 W 802.11ac VHT20: 17.40 dBm / 0.0550 W 802.11ac VHT40: 17.40 dBm / 0.0550 W 802.11ac VHT80: 17.20 dBm / 0.0525 W MIMO <Ant. 0+1> 802.11a : 19.86 dBm / 0.0968 W 802.11n HT20 : 19.66 dBm / 0.0925 W 802.11n HT40 : 19.66 dBm / 0.0925 W 802.11ac VHT20: 19.76 dBm / 0.0946 W 802.11ac VHT40: 19.76 dBm / 0.0946 W 802.11ac VHT80: 19.76 dBm / 0.0946 W
Maximum Output Power <TXBF Modes>	MIMO <Ant. 0+1> 802.11ac VHT20: 19.46 dBm / 0.0883 W 802.11ac VHT40: 19.51 dBm / 0.0893 W 802.11ac VHT80: 19.47 dBm / 0.0885 W

Product Specification subjective to this standard			
Antenna Type / Gain	Ant. 0: PIFA Antenna with gain 1.60 dBi Ant. 1: PIFA Antenna with gain 3.00 dBi		
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)		
Antenna Function Description		Ant. 0	Ant. 1
	802.11 a/n/ac	V	V
	802.11 a/n/ac MIMO	V	V
	802.11ac TXBF	V	V

Note: MIMO Ant. 0+1 is a calculated result from sum of the power MIMO Ant. 0 and MIMO Ant. 1.

1.3 Modification of EUT

No modifications are made to the EUT during all test items.



1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH05-HY

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH13-HY

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

FCC designation No.: TW1190 and TW0007

1.5 Applicable Standards

According to the specifications of 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 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
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: radiation emission (1GHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (CDD Mode: X plane for Ant. 0, Z Plane for Ant. 1 and MIMO Ant. 0+1; TXBF Mode: Z plane with Notebook) were recorded in this report.

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 in "^{*}" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

CDD Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

TXBF Mode

Modulation	Data Rate
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Remark: For Radiated Test Cases, the tests were performed with Battery 1 and Sample 1

Ch. #		Band IV : 5725-5850 MHz	
		802.11a	802.11ac VHT80
L	Low	-	-
M	Middle	-	155
H	High	165	-

Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.



<CDD Mode>

<Ant. 0>

802.11a RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 149	5745	17.20
CH 157	5785	17.20
CH 165	5825	17.30

802.11n HT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	17.20
CH 157	5785	17.30
CH 165	5825	17.10

802.11n HT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	17.20
CH 159	5795	17.20

802.11ac VHT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	17.30
CH 157	5785	17.40
CH 165	5825	17.20

802.11ac VHT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	17.30
CH 159	5795	17.30

802.11ac VHT80 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 155	5775	17.30

<Ant. 1>

802.11a RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 149	5745	17.20
CH 157	5785	17.20
CH 165	5825	17.30

802.11n HT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	17.30
CH 157	5785	17.20
CH 165	5825	17.10

802.11n HT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	17.30
CH 159	5795	17.20



802.11ac VHT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	17.40
CH 157	5785	17.30
CH 165	5825	17.20

802.11ac VHT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	17.40
CH 159	5795	17.30

802.11ac VHT80 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 155	5775	17.20

**MIMO <Ant. 0+1>**

802.11a RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 149	5745	19.86
CH 157	5785	19.71
CH 165	5825	19.81

802.11n HT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	19.61
CH 157	5785	19.56
CH 165	5825	19.66

802.11n HT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	19.66
CH 159	5795	19.61

802.11ac VHT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	19.71
CH 157	5785	19.66
CH 165	5825	19.76

802.11ac VHT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	19.76
CH 159	5795	19.71

802.11ac VHT80 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 155	5775	19.76

<TXBF Mode>

MIMO <Ant. 0+1>

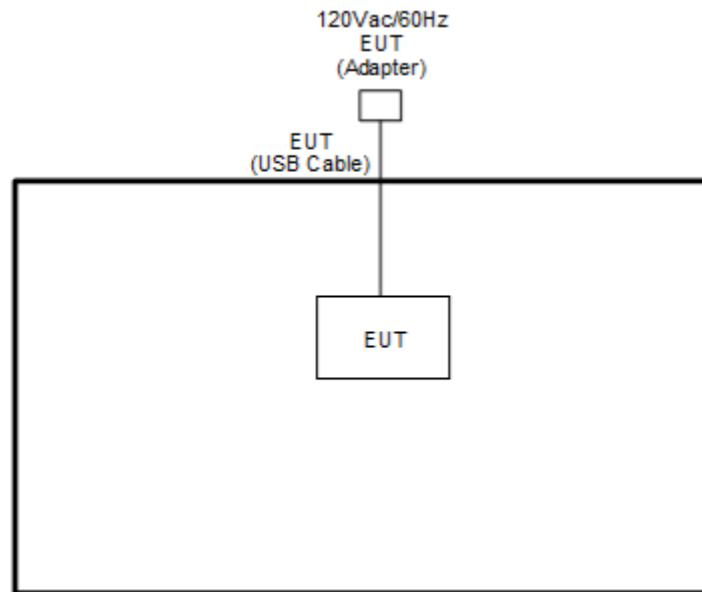
802.11ac VHT20 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 149	5745	19.46
CH 157	5785	19.42
CH 165	5825	19.46

802.11ac VHT40 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 151	5755	19.41
CH 159	5795	19.51

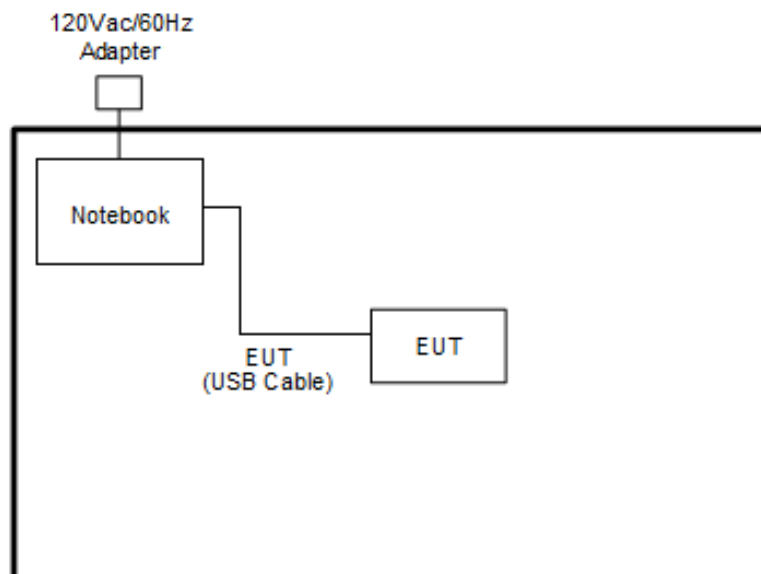
802.11ac VHT80 RF Output Power (dBm)		
Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 155	5775	19.47

2.3 Connection Diagram of Test System

<CDD Mode>



<TXBF Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Acer	N18Q13	PD9AX201NG	NA	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m
2.	Notebook	Lenovo	L570	NA	NA	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT V4.0" 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.

For TXBF mode, the modulation modes and data rates manipulated by the command lines in the engineering program made the EUT link to another EUT by power under the normal operation. The "abd" software tool was used to enable the EUT to transmit signals continuously.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 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.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

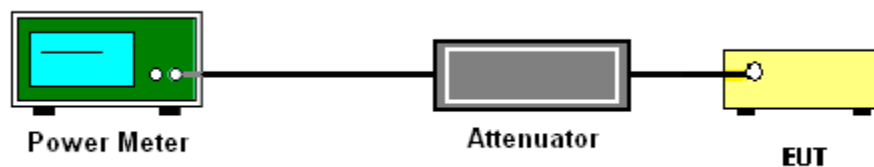
3.1.3 Test Procedures

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

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.

3.1.4 Test Setup





3.1.5 Test Result of Maximum Conducted Output Power

Test Engineer :	Kathy Chen	Temperature :	23.2°C
		Relative Humidity :	54.3%

<CDD Mode>

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 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	17.20	17.20	-	30.00	30.00	1.60	3.00	Pass
11a	6Mbps	1	157	5785	17.20	17.20		30.00	30.00	1.60	3.00	Pass
11a	6Mbps	1	165	5825	17.30	17.30		30.00	30.00	1.60	3.00	Pass
HT20	MCS0	1	149	5745	17.20	17.30		30.00	30.00	1.60	3.00	Pass
HT20	MCS0	1	157	5785	17.30	17.20		30.00	30.00	1.60	3.00	Pass
HT20	MCS0	1	165	5825	17.10	17.10		30.00	30.00	1.60	3.00	Pass
HT40	MCS0	1	151	5755	17.20	17.30		30.00	30.00	1.60	3.00	Pass
HT40	MCS0	1	159	5795	17.20	17.20		30.00	30.00	1.60	3.00	Pass
VHT20	MCS0	1	149	5745	17.30	17.40		30.00	30.00	1.60	3.00	Pass
VHT20	MCS0	1	157	5785	17.40	17.30		30.00	30.00	1.60	3.00	Pass
VHT20	MCS0	1	165	5825	17.20	17.20		30.00	30.00	1.60	3.00	Pass
VHT40	MCS0	1	151	5755	17.30	17.40		30.00	30.00	1.60	3.00	Pass
VHT40	MCS0	1	159	5795	17.30	17.30		30.00	30.00	1.60	3.00	Pass
VHT80	MCS0	1	155	5775	17.30	17.20		30.00	30.00	1.60	3.00	Pass

Band IV MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	16.90	16.80	19.86	30.00		3.00		Pass
11a	6Mbps	2	157	5785	16.80	16.60	19.71	30.00		3.00		Pass
11a	6Mbps	2	165	5825	16.80	16.80	19.81	30.00		3.00		Pass
HT20	MCS0	2	149	5745	16.60	16.60	19.61	30.00		3.00		Pass
HT20	MCS0	2	157	5785	16.70	16.40	19.56	30.00		3.00		Pass
HT20	MCS0	2	165	5825	16.60	16.70	19.66	30.00		3.00		Pass
HT40	MCS0	2	151	5755	16.70	16.60	19.66	30.00		3.00		Pass
HT40	MCS0	2	159	5795	16.70	16.50	19.61	30.00		3.00		Pass
VHT20	MCS0	2	149	5745	16.70	16.70	19.71	30.00		3.00		Pass
VHT20	MCS0	2	157	5785	16.80	16.50	19.66	30.00		3.00		Pass
VHT20	MCS0	2	165	5825	16.70	16.80	19.76	30.00		3.00		Pass
VHT40	MCS0	2	151	5755	16.80	16.70	19.76	30.00		3.00		Pass
VHT40	MCS0	2	159	5795	16.80	16.60	19.71	30.00		3.00		Pass
VHT80	MCS0	2	155	5775	16.80	16.70	19.76	30.00		3.00		Pass



Test Engineer :	Shiming Liu	Temperature :	23.2℃
		Relative Humidity :	54.3%

<TXBF Mode>

Band IV MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 0	Ant 1	SUM	Ant 0	Ant 1	Ant 0	Ant 1	
VHT20	MCS0	2	149	5745	16.60	16.30	19.46	30.00		5.34		Pass
VHT20	MCS0	2	157	5785	16.70	16.10	19.42	30.00		5.34		Pass
VHT20	MCS0	2	165	5825	16.60	16.30	19.46	30.00		5.34		Pass
VHT40	MCS0	2	151	5755	16.60	16.20	19.41	30.00		5.34		Pass
VHT40	MCS0	2	159	5795	16.70	16.30	19.51	30.00		5.34		Pass
VHT80	MCS0	2	155	5775	16.70	16.20	19.47	30.00		5.34		Pass

3.2 Unwanted Emissions Measurement

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

3.2.1 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 fallen 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.

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

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.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 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 Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

(2) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

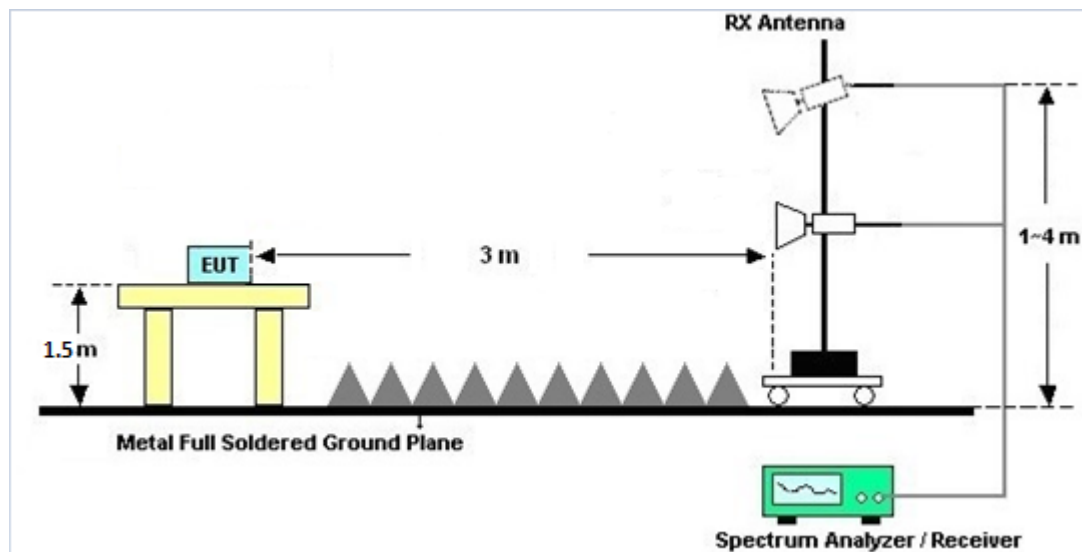
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

2. The EUT was placed on a turntable with 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was 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 was 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. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

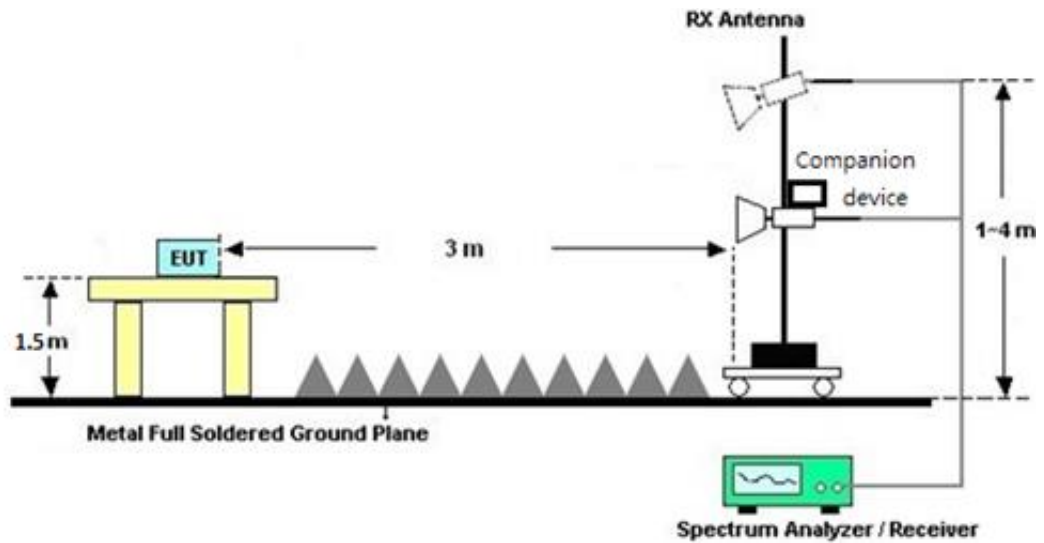
3.2.4 Test Setup

For radiated emissions above 1GHz

<CDD Mode>



<TXBF Modes>



3.2.5 Test Result of Radiated Band Edges

Please refer to Appendix A and B.

3.2.6 Duty Cycle

Please refer to Appendix C.

3.2.7 Test Result of Unwanted Radiated Emission

Please refer to Appendix A and B.



3.3 Antenna Requirements

3.3.1 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.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 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
<CDD Mode>								
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Oct. 20, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054S NO10	10MHz~6GHz	Dec. 23, 2019	Oct. 20, 2020	Dec. 22, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Dec. 30, 2019	Oct. 20, 2020	Dec. 29, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Oct. 20, 2020	Mar. 16, 2021	Conducted (TH05-HY)
<TXBF Mode>								
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Oct. 20, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054S NO10	10MHz~6GHz	Dec. 23, 2019	Oct. 20, 2020	Dec. 22, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Dec. 30, 2019	Oct. 20, 2020	Dec. 29, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Oct. 20, 2020	Mar. 16, 2021	Conducted (TH05-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 14, 2018	Oct. 08, 2020~Oct. 22, 2020	Nov. 13, 2020	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-124 1	1GHz~18GHz	Jul. 15, 2020	Oct. 08, 2020~Oct. 22, 2020	Jul. 14, 2021	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP150115	N/A	N/A	Oct. 08, 2020~Oct. 22, 2020	N/A	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 19, 2020	Oct. 08, 2020~Oct. 22, 2020	May 18, 2021	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY532701 47	1GHz~26.5GHz	Oct. 28, 2019	Oct. 08, 2020~Oct. 22, 2020	Oct. 27, 2020	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705 26	10Hz~44GHz	Mar. 20, 2020	Oct. 08, 2020~Oct. 22, 2020	Mar. 19, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000 -40ST	SN5	6.75GHz High Pass Filter	Mar. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz~40GHz	Mar. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Feb. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Feb. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/ 4	30MHz~18GHz	Feb. 12, 2020	Oct. 08, 2020~Oct. 22, 2020	Feb. 11, 2021	Radiation (03CH13-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 08, 2020~ Oct. 22, 2020	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 08, 2020~ Oct. 22, 2020	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 08, 2020~ Oct. 22, 2020	N/A	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Oct. 08, 2020~ Oct. 22, 2020	N/A	Radiation (03CH13-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY541300 85	20MHz~8.4GHz	Nov. 01, 2019	Oct. 08, 2020~ Oct. 22, 2020	Oct. 31, 2020	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 584	18GHz~40GHz	Dec. 10, 2019	Oct. 08, 2020~ Oct. 22, 2020	Dec. 09, 2020	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 13, 2019	Oct. 08, 2020~ Oct. 22, 2020	Dec. 12, 2020	Radiation (03CH13-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8
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Appendix A. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Jacky Hong and Wilson Wu	Temperature :	21.5~25.5°C
		Relative Humidity :	49.5~55.5%

<CDD Mode>

Band 4 - 5725~5850MHz

WIFI 802.11ac VHT80 (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.
0		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT80 CH 155 5775MHz		5602.4	52.53	-15.67	68.2	41.31	31.7	6.3	26.78	110	89	P	H
		5700	58.82	-46.38	105.2	47.47	31.8	6.42	26.87	110	89	P	H
		5720	61.82	-48.98	110.8	50.34	31.92	6.44	26.88	110	89	P	H
		5724	64.92	-55	119.92	53.42	31.94	6.45	26.89	110	89	P	H
	*	5775	102.68	-	-	91	32.1	6.52	26.94	110	89	P	H
	*	5775	95.28	-	-	83.6	32.1	6.52	26.94	110	89	A	H
		5853.8	62.9	-50.64	113.54	51.05	32.31	6.54	27	110	89	P	H
		5858.6	62.9	-46.89	109.79	51.05	32.32	6.54	27.01	110	89	P	H
		5880.8	56.69	-44.2	100.89	44.82	32.36	6.54	27.03	110	89	P	H
		5938.2	52.42	-15.78	68.2	40.41	32.55	6.54	27.08	110	89	P	H
		5600.8	51.61	-16.59	68.2	40.39	31.7	6.3	26.78	376	356	P	V
		5698.8	52.52	-51.8	104.32	41.16	31.8	6.42	26.86	376	356	P	V
		5717.4	55.18	-54.89	110.07	43.72	31.9	6.44	26.88	376	356	P	V
		5722.2	52.33	-63.49	115.82	40.84	31.93	6.45	26.89	376	356	P	V
	*	5775	99.38	-	-	87.7	32.1	6.51	26.93	376	356	P	V
	*	5775	91.98	-	-	80.3	32.1	6.51	26.93	376	356	A	V
		5850.4	57.45	-63.84	121.29	45.61	32.3	6.54	27	376	356	P	V
		5855	56.45	-54.35	110.8	44.6	32.31	6.54	27	376	356	P	V
		5875.2	52.43	-52.62	105.05	40.56	32.35	6.54	27.02	376	356	P	V
		5940.8	52.92	-15.28	68.2	40.9	32.56	6.54	27.08	376	356	P	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. 0	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	47.07	-26.93	74	52.47	39.95	10.47	55.82	100	0	P	H
		17325	48.53	-19.67	68.2	51.55	40.33	13.14	56.49	100	0	P	H
													H
													H
		11550	46.4	-27.6	74	51.8	39.95	10.47	55.82	100	0	P	V
		17325	49.09	-19.11	68.2	52.11	40.33	13.14	56.49	100	0	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 802.11a (Band Edge @ 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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 165 5825MHz	*	5825	108.46	-	-	96.7	32.2	6.54	26.98	205	82	P	H
	*	5825	100.76	-	-	89	32.2	6.54	26.98	205	82	A	H
		5852.6	59.25	-57.02	116.27	47.4	32.31	6.54	27	205	82	P	H
		5855	56.14	-54.66	110.8	44.29	32.31	6.54	27	205	82	P	H
		5889	52.76	-42.05	94.81	40.87	32.38	6.54	27.03	205	82	P	H
		5939.4	52.7	-15.5	68.2	40.68	32.56	6.54	27.08	205	82	P	H
													H
													H
	*	5825	111.16	-	-	99.4	32.2	6.54	26.98	201	355	P	V
	*	5825	103.36	-	-	91.6	32.2	6.54	26.98	201	355	A	V
		5852.8	61.11	-54.71	115.82	49.26	32.31	6.54	27	201	355	P	V
		5855.6	58.35	-52.28	110.63	46.5	32.31	6.54	27	201	355	P	V
		5884	54.24	-44.28	98.52	42.36	32.37	6.54	27.03	201	355	P	V
		5937.2	52.37	-15.83	68.2	40.35	32.55	6.54	27.07	201	355	P	V
													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. 1	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		11650	47.29	-26.71	74	53.09	39.55	10.53	55.88	100	0	P	H
		17475	48.39	-19.81	68.2	51.04	40.92	13.23	56.8	100	0	P	H
													H
													H
		11650	46.86	-27.14	74	52.66	39.55	10.53	55.88	100	0	P	V
		17475	49.95	-18.25	68.2	52.6	40.92	13.23	56.8	100	0	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 (Band Edge @ 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.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT80 CH 155 5775MHz		5648.6	57.25	-10.95	68.2	45.91	31.8	6.36	26.82	191	358	P	H
		5697	69.32	-33.67	102.99	57.77	31.99	6.42	26.86	191	358	P	H
		5717.4	74.06	-36.01	110.07	62.47	32.03	6.44	26.88	191	358	P	H
		5723.4	73.41	-45.14	118.55	61.8	32.05	6.45	26.89	191	358	P	H
	*	5775	107.98	-	-	96.3	32.1	6.51	26.93	191	358	P	H
	*	5775	100.68	-	-	89	32.1	6.51	26.93	191	358	A	H
		5853.8	72.43	-41.11	113.54	60.57	32.32	6.54	27	191	358	P	H
		5863.2	70.36	-38.14	108.5	58.48	32.35	6.54	27.01	191	358	P	H
		5878.8	63.78	-38.6	102.38	51.84	32.42	6.54	27.02	191	358	P	H
		5929.6	55.23	-12.97	68.2	43.14	32.62	6.54	27.07	191	358	P	H
													H
													H
		5647.2	56.64	-11.56	68.2	45.29	31.81	6.36	26.82	165	356	P	V
		5697.8	69.14	-34.44	103.58	57.59	31.99	6.42	26.86	165	356	P	V
		5717.4	74.44	-35.63	110.07	62.85	32.03	6.44	26.88	165	356	P	V
		5723.6	74.24	-44.77	119.01	62.63	32.05	6.45	26.89	165	356	P	V
	*	5775	108.28	-	-	96.6	32.1	6.51	26.93	165	356	P	V
	*	5775	100.62	-	-	88.94	32.1	6.51	26.93	165	356	A	V
		5850.6	73.22	-47.61	120.83	61.38	32.3	6.54	27	165	356	P	V
		5863.2	70.31	-38.19	108.5	58.43	32.35	6.54	27.01	165	356	P	V
		5876.6	63.57	-40.44	104.01	51.64	32.41	6.54	27.02	165	356	P	V
		5925.4	55.31	-12.89	68.2	43.23	32.6	6.54	27.06	165	356	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. 0+1	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	46.63	-27.37	74	52.03	39.95	10.47	55.82	100	0	P	H
		17325	48.18	-20.02	68.2	51.2	40.33	13.14	56.49	100	0	P	H
													H
													H
		11550	47.28	-26.72	74	52.68	39.95	10.47	55.82	100	0	P	V
		17325	48.79	-19.41	68.2	51.81	40.33	13.14	56.49	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



<TXBF Mode>

Band 4 - 5725~5850MHz

WIFI 802.11ac VHT80 (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.
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT80 CH 155 5775MHz		5647.2	56.56	-11.64	68.2	45.21	31.81	6.36	26.82	217	72	P	H
		5698.8	70.03	-34.29	104.32	58.47	32	6.42	26.86	217	72	P	H
		5712.8	71.83	-36.96	108.79	60.24	32.03	6.44	26.88	217	72	P	H
		5723.8	72.7	-46.76	119.46	61.09	32.05	6.45	26.89	217	72	P	H
	*	5775	107.36	-	-	95.68	32.1	6.51	26.93	217	72	P	H
	*	5775	97.19	-	-	85.51	32.1	6.51	26.93	217	72	A	H
		5853.2	71.01	-43.89	114.9	59.16	32.31	6.54	27	217	72	P	H
		5859.2	70.35	-39.27	109.62	58.48	32.34	6.54	27.01	217	72	P	H
		5875.8	63.78	-40.83	104.61	51.86	32.4	6.54	27.02	217	72	P	H
		5927.4	52.77	-15.43	68.2	40.69	32.61	6.54	27.07	217	72	P	H
													H
													H
		5643.2	55.92	-12.28	68.2	44.58	31.81	6.35	26.82	100	94	P	V
		5697.6	69.15	-34.28	103.43	57.6	31.99	6.42	26.86	100	94	P	V
		5719.2	74.19	-36.39	110.58	62.59	32.04	6.44	26.88	100	94	P	V
		5723.6	72.73	-46.28	119.01	61.12	32.05	6.45	26.89	100	94	P	V
	*	5775	106.39	-	-	94.71	32.1	6.51	26.93	100	94	P	V
	*	5775	98.03	-	-	86.35	32.1	6.51	26.93	100	94	A	V
		5854	71.01	-42.07	113.08	59.15	32.32	6.54	27	100	94	P	V
		5857.4	68.49	-41.64	110.13	56.62	32.33	6.54	27	100	94	P	V
		5875.6	62.95	-41.8	104.75	51.03	32.4	6.54	27.02	100	94	P	V
		5925	52.73	-15.47	68.2	40.65	32.6	6.54	27.06	100	94	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. 0+1	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	46.5	-27.5	74	51.9	39.95	10.47	55.82	100	0	P	H
		17325	49.14	-19.06	68.2	52.16	40.33	13.14	56.49	100	0	P	H
													H
													H
		11550	46.41	-27.59	74	51.81	39.95	10.47	55.82	100	0	P	V
		17325	49.43	-18.77	68.2	52.45	40.33	13.14	56.49	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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	P eak or A verage
H/V	H orizontal or V ertical

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.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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 @ 2390MHz:

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 @ 2390MHz:

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 B. Radiated Spurious Emission Plots

Test Engineer :	Daniel Lee, Jacky Hong and Wilson Wu	Temperature :	21.5~25.5°C
		Relative Humidity :	49.5~55.5%

Note symbol

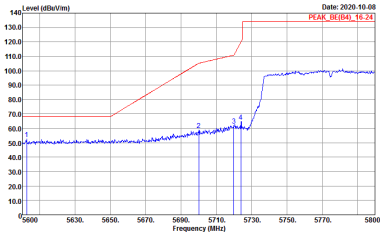
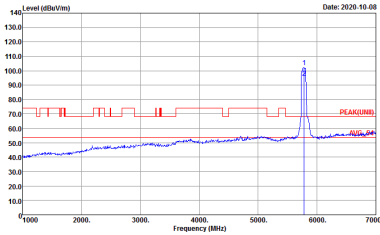
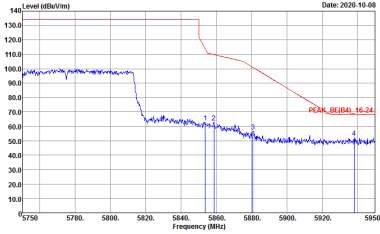
-L	Low channel location
-R	High channel location

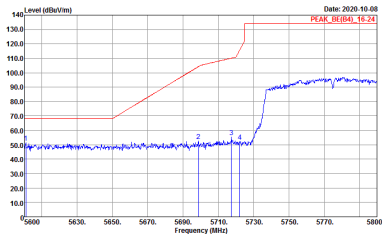
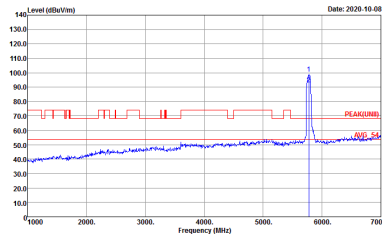
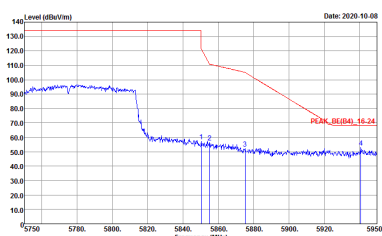


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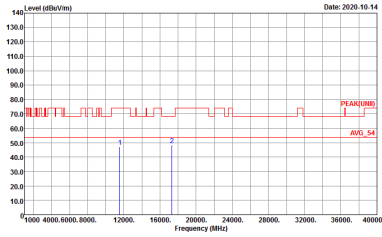
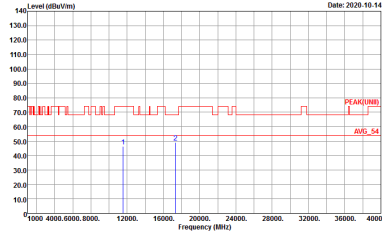
Band 4 - 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

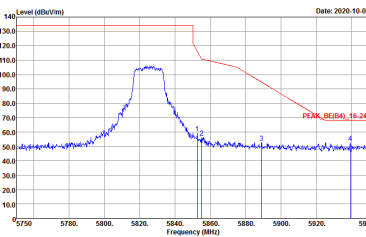
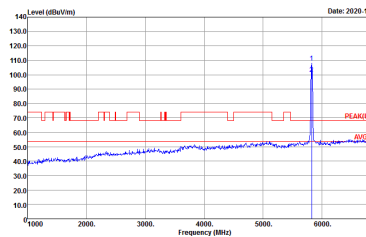
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(04)_16-24 3m HORN_91200_1212 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1212 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak
	 Site : 03CH13-HY Condition : PEAK_BE(04)_16-24 3m HORN_91200_1212 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0	Vertical	Fundamental
Peak	 Site : 03CH13-1HY Condition : PEAK_BE(04)_16-24 3m HORN_91200_1212 VERTICAL Detector : Peak	 Site : 03CH13-1HY Condition : PEAK(UNII) 3m HORN_91200_1212 VERTICAL Detector : Peak
Peak	 Site : 03CH13-1HY Condition : PEAK_BE(04)_16-24 3m HORN_91200_1212 VERTICAL Detector : Peak	Left blank

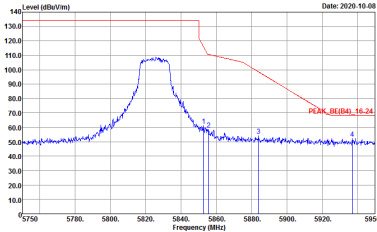
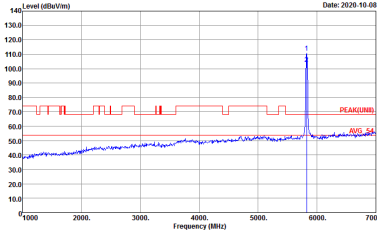
Band 4 - 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL Detector : Peak

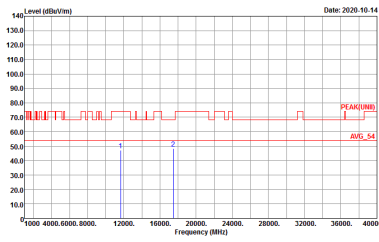
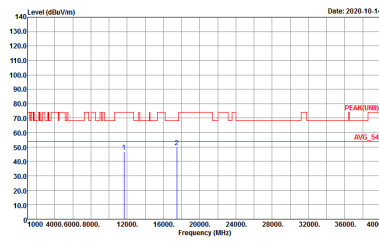
Band 4 - 5725~5850MHz
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(B4)_16-24 3m HORN_91200_1212 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1212 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak



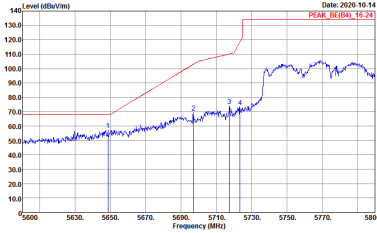
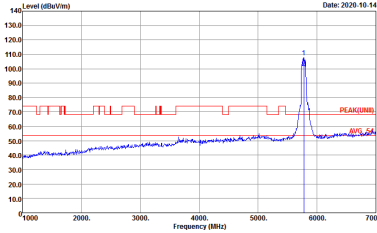
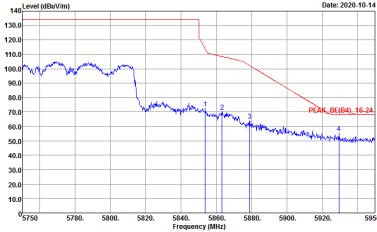
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(84)_16-24 3m HORN_91200_1212 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1212 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak

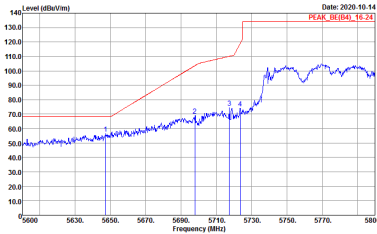
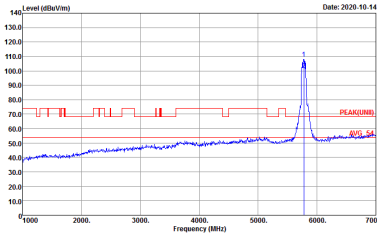
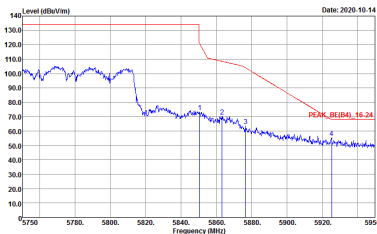
Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL Detector : Peak

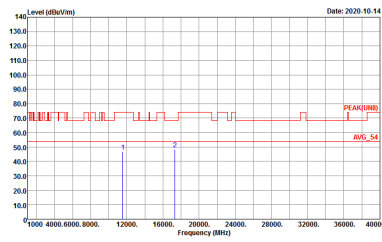
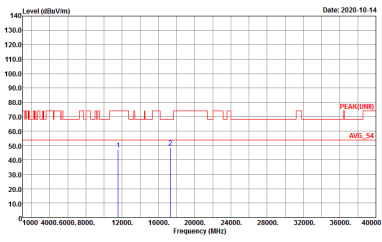


Band 4 - 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(84)_16-24 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Peak	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Peak
Peak	 Site : 03CH13-HY Condition : PEAK_BE(84)_16-24 3m HORN_91200_1241 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Peak	Left blank

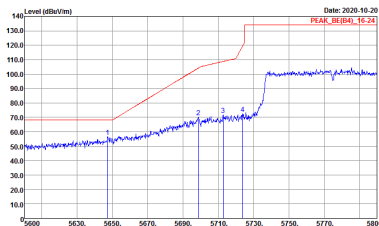
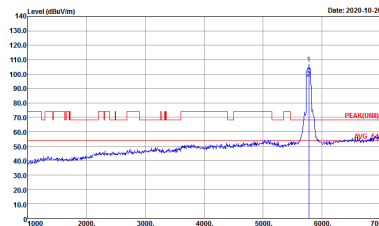
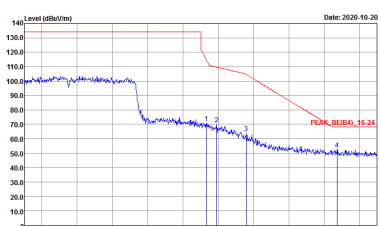
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0+1	Vertical	Fundamental
Peak	 Date: 2020-10-14 Site : 03CH13-HY Condition : PEAK_BE(B4)_16-24 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto : Peak	 Date: 2020-10-14 Site : 03CH13-HY Condition : PEAK(UNII) 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto : Peak
Peak	 Date: 2020-10-14 Site : 03CH13-HY Condition : PEAK_BE(B4)_16-24 3m HORN_91200_1241 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto : Peak	Left blank

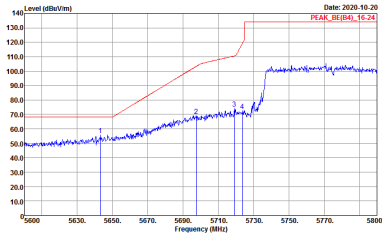
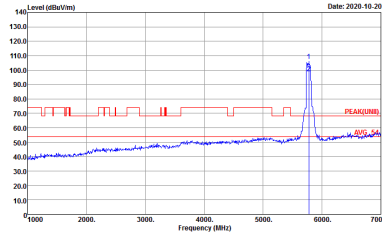
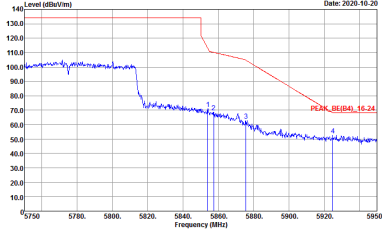
Band 4 - 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0+1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL Detector : Peak

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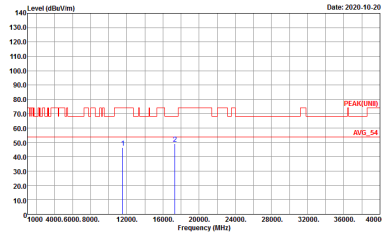
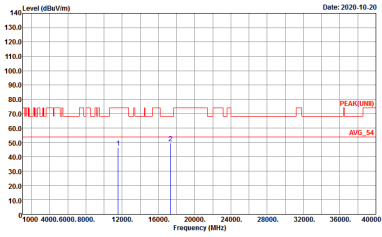
Band 4 - 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(B4)_16-24 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH13-HY Condition : PEAK_BE(B4)_16-24 3m HORN_91200_1241 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	
0+1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE(84)_16-24 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH13-HY Condition : PEAK_BE(84)_16-24 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



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

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
0+1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-4V Condition : PEAK(UNIT) 3m HORN_91200_1241 HORIZONTAL	 Site : 03CH13-4V Condition : PEAK(UNIT) 3m HORN_91200_1241 VERTICAL



Appendix C. Duty Cycle Plots

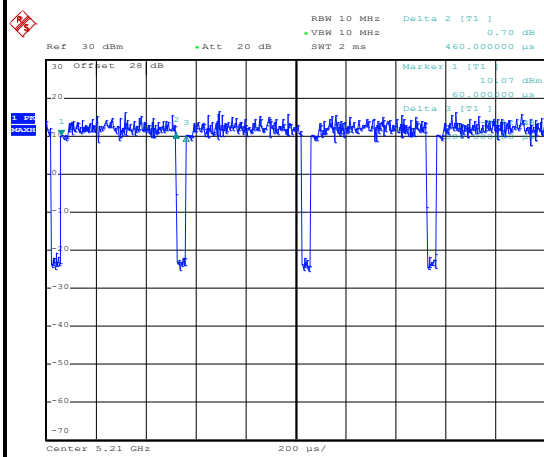
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
0	5GHz 802.11ac VHT80	92.00	460	2.17	3kHz	0.36
1	802.11a	97.65	2075	0.48	1kHz	0.10
0+1	5GHz 802.11ac VHT80 for Ant. 0	92.00	460	2.17	3kHz	0.36
0+1	5GHz 802.11ac VHT80 for Ant. 1	92.80	464	2.16	3kHz	0.32



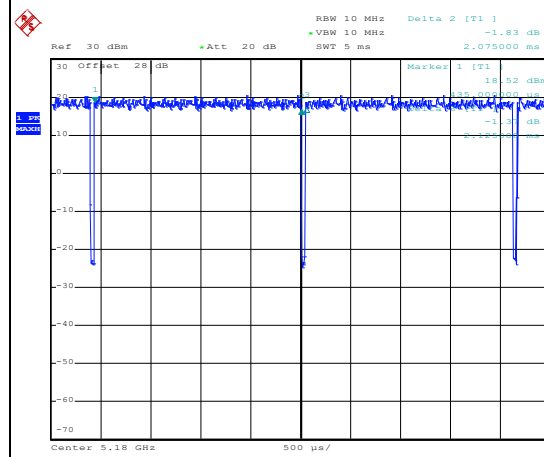
<Ant. 0>

<Ant. 1>

802.11ac VHT80



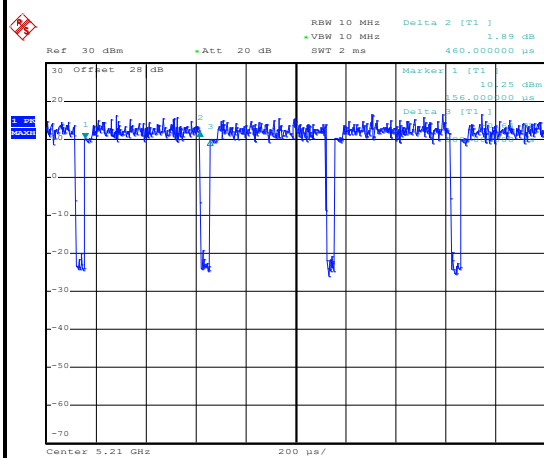
802.11a



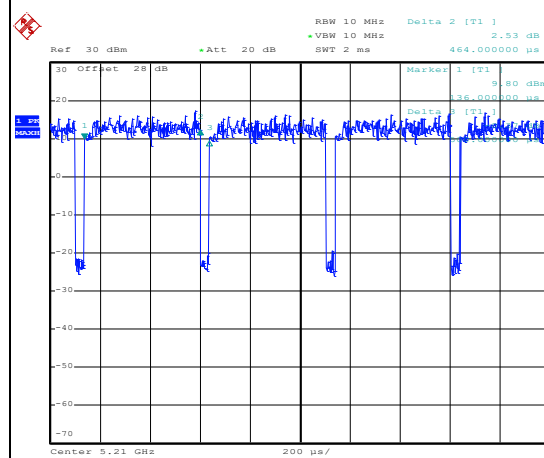
MIMO <Ant. 0>

MIMO <Ant. 1>

802.11ac VHT80



802.11ac VHT80





Appendix E. Original Report

Please refer to Sporton report number FR070401F as below.