FCC RF Test Report

APPLICANT	:	MiTAC Digital Technology Corporation
EQUIPMENT	:	Tablet
BRAND NAME	:	MiTAC, Mio, NAVMAN, MAGELLAN
MODEL NAME	:	N564B
FCC ID	:	P4Q-N564B
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Feb. 08, 2018 and testing was completed on Apr. 16, 2018. We, SPORTON INTERNATIONAL INC., 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 of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR722135-07F	Rev. 01	Initial issue of report	Apr. 30, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 2.11 dB at 11490.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 14.56 dB at 0.562 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

MiTAC Digital Technology Corporation
No.200, Wen Hua 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

1.2 Manufacturer

MITAC Computer (Kunshan) Co,. Ltd.
No. 269, 2nd Avenue, District A, Conprehensive Free Trade Zone, 300 Kunshan, China

1.3 Product Feature of Equipment Under Test

WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n, NFC, and GNSS

Product Specification subjective to this standard	
Sample 1	EUT with SKU 1
Sample 2	EUT with SKU 2
Integrated WWAN Module	Brand Name: u-blox Model Name: LARA-R202
Integrated WLAN Module	Brand Name: Qualcomm Model Name: WCN3660B
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS/GLONASS: PATCH Antenna NFC: Loop Antenna

Remark: All test items were performed with Sample 1

<Sample Information>

SKU	SKU 1	SKU 2
Model name	N564B	N564B
WLAN	Support (2.4G + 5G)	Support (2.4G + 5G)
WWAN	Support	Support
RFID(13.56MHz)	Support	Not Support
RAM	2G	2G
Storage	16G	16G
Camera	Support	Support

1.4 Modification of EUT

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

1.5 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	CO05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
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.**
	03CH12-HY

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

1.6 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.
- 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. 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, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

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
	-	-	165	5825

Note: The above Frequency and Channel in "*" were 802.11n HT40.

2.2 Test Mode

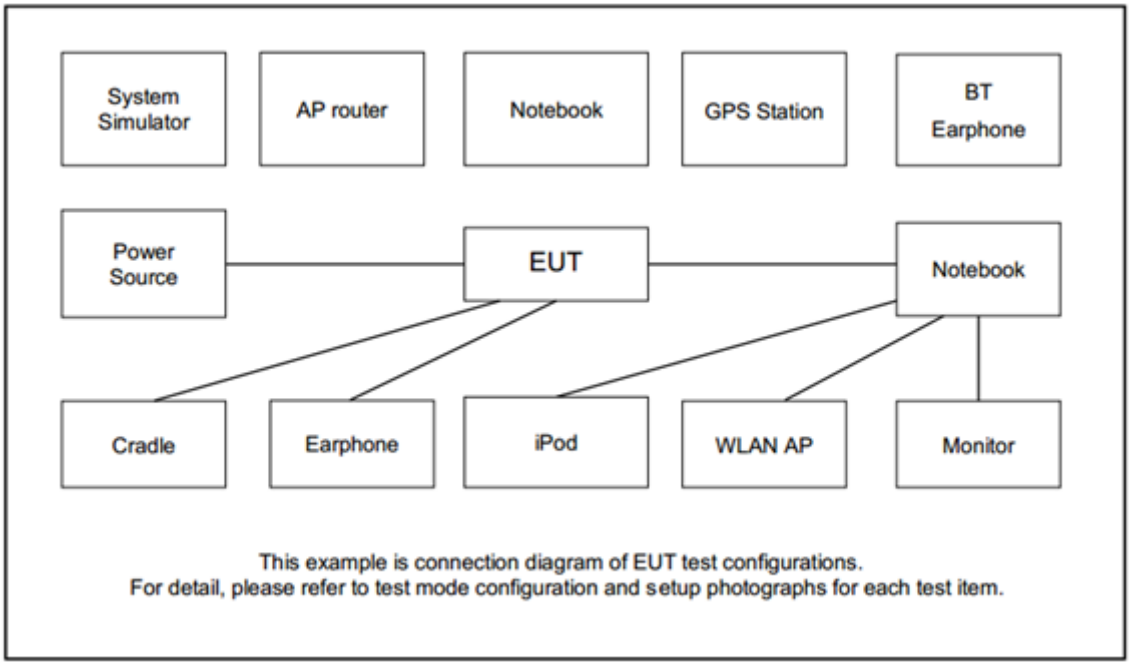
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5GHz) Link + NFC On + USB Cable (Charging from AC Adapter) for Sample 3
Remark: For Radiated Test Cases, The tests were performance with Sample 3	

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

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,1.8m
3.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT" 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 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

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.

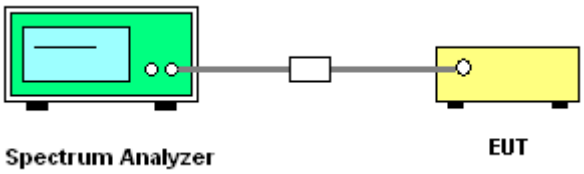
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of 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 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x 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.

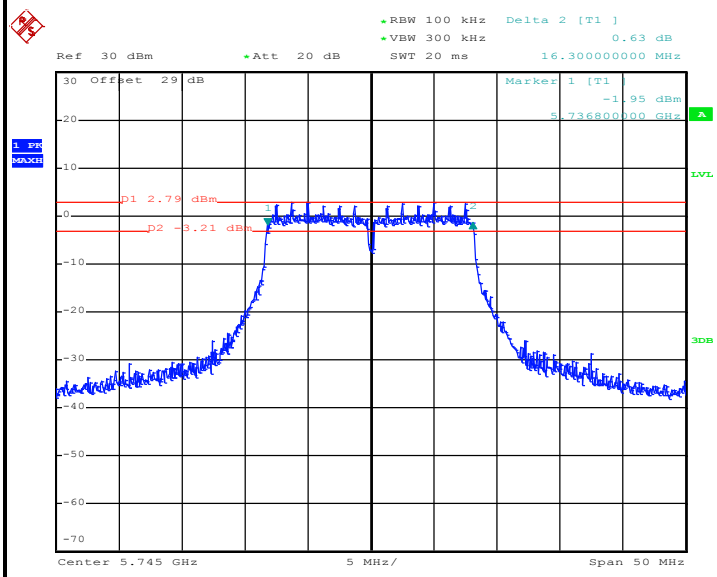
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

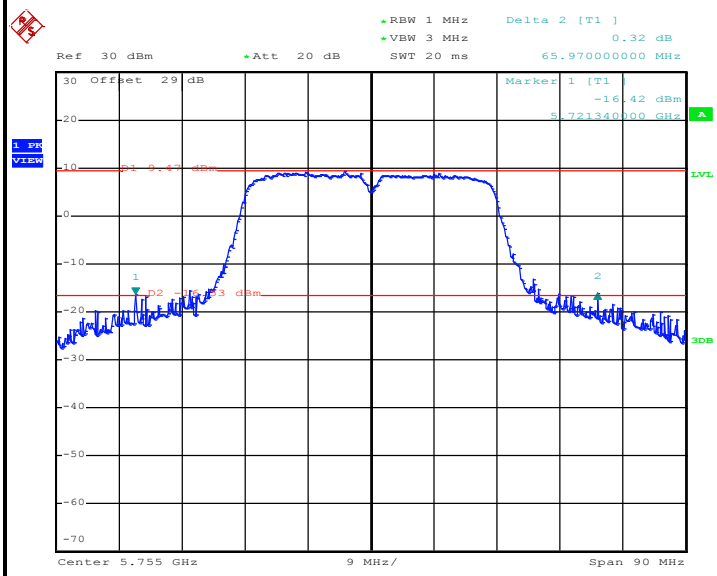
Please refer to Appendix A.

Minimum 6dB Bandwidth



Date: 9.APR.2018 15:55:17

Maximum 26dB Bandwidth



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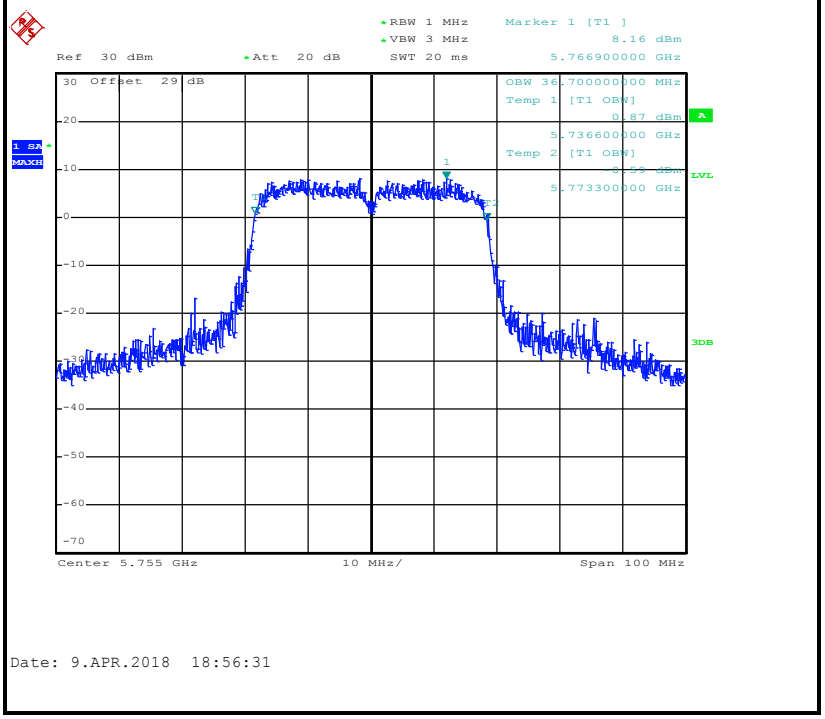
Maximum 99% Occupied Bandwidth



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

The measuring equipment is listed in the section 4 of this test report.

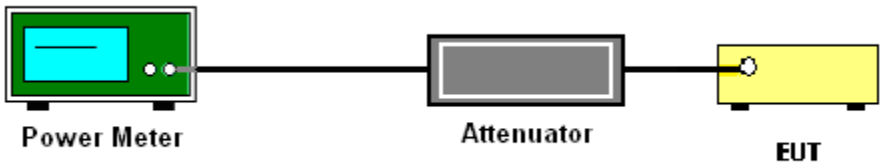
3.2.3 Test Procedures

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

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

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

The measuring equipment is listed in the section 4 of 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.

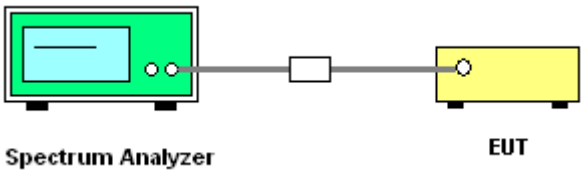
 # Method SA-2 #

(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 = 300 kHz.
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(500kHz/RBW) to the test result.
- 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 dB if the duty cycle is 25 percent.

1. The RF output of EUT was 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.

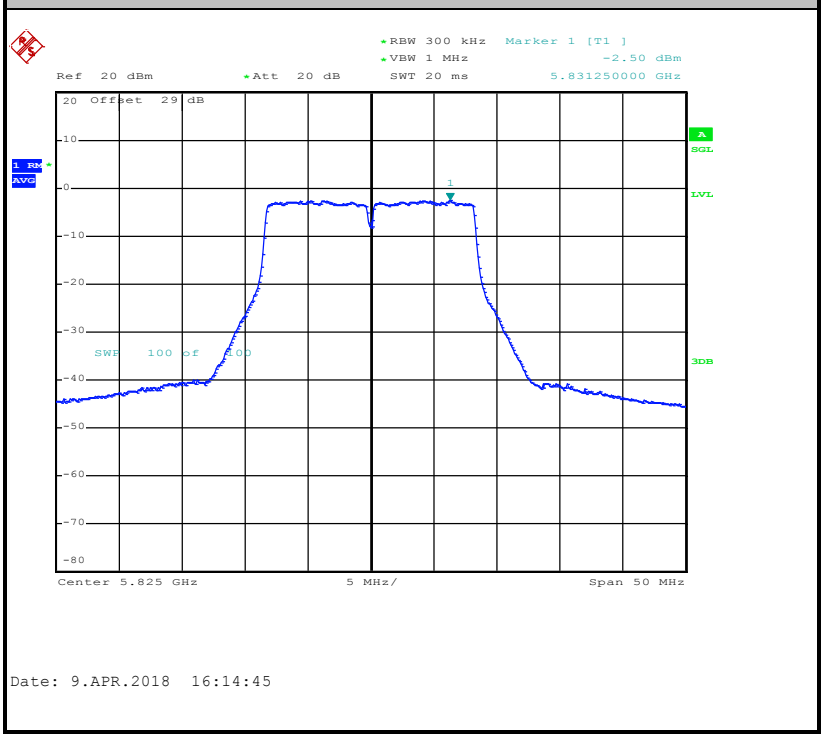
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



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 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.

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

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

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

(i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits 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.[3]

(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of 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 1000MHz

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

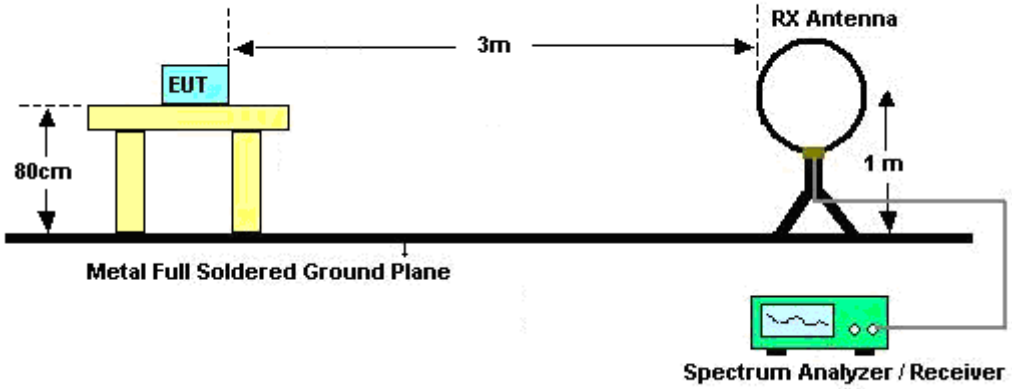
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

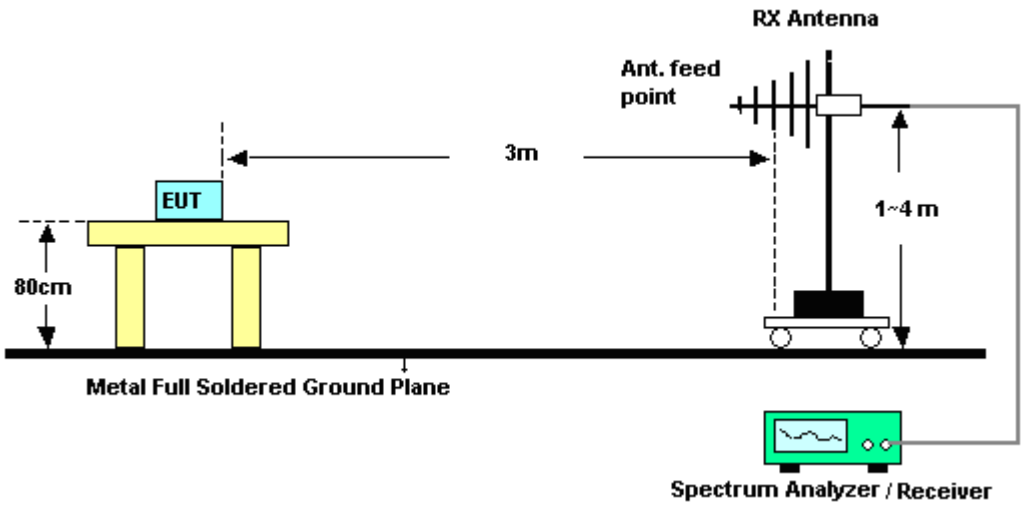
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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 below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. 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.

3.4.4 Test Setup

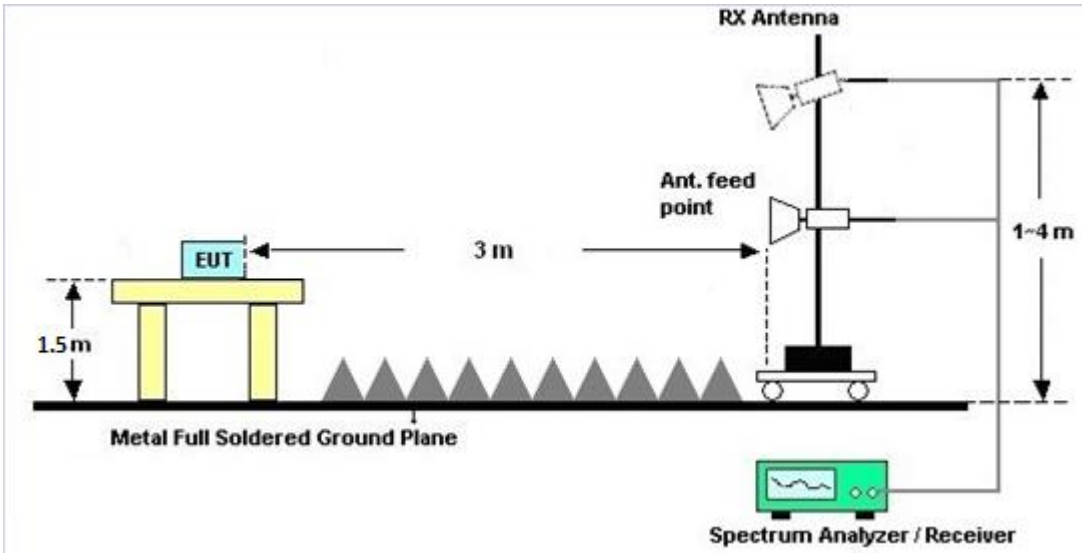
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C and D.

3.4.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

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 (dBμV)	
	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.

For terminal test result, the testing follows FCC KDB 174176.

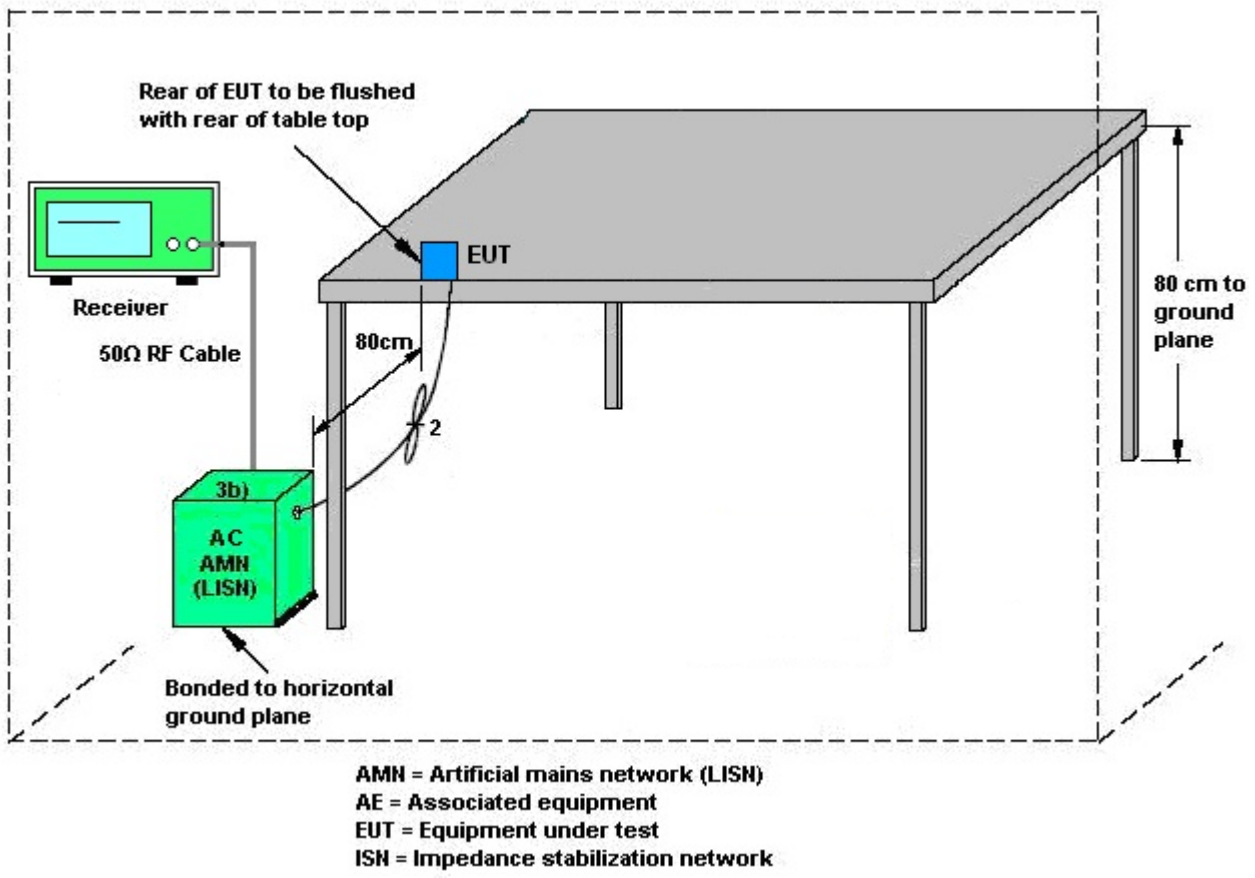
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was 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 should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1240001	N/A	Sep. 07, 2017	Feb. 14, 2018~ Apr. 16, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 07, 2017	Feb. 14, 2018~ Apr. 16, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 20, 2017	Feb. 14, 2018~ Apr. 16, 2018	Jun. 19, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 02, 2017	Feb. 14, 2018~ Feb. 28, 2018	Mar. 01, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Mar. 01, 2018~ Apr. 16, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 24, 2018~ Mar. 29, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Mar. 24, 2018~ Mar. 29, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Mar. 24, 2018~ Mar. 29, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Mar. 24, 2018~ Mar. 29, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Mar. 24, 2018~ Mar. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Mar. 24, 2018~ Mar. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Mar. 22, 2018~ Apr. 02, 2018	Jul. 17, 2018	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 31, 2017	Mar. 22, 2018~ Apr. 02, 2018	Oct. 30, 2018	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 14, 2017	Mar. 22, 2018~ Apr. 02, 2018	Oct. 13, 2018	Radiation (03CH12-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Mar. 22, 2018~ Apr. 02, 2018	Nov. 22, 2018	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 25, 2017	Mar. 22, 2018~ Apr. 02, 2018	Dec. 24, 2018	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 20, 2017	Mar. 22, 2018~ Apr. 02, 2018	Oct. 19, 2018	Radiation (03CH12-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Jan. 19, 2018	Mar. 22, 2018~ Apr. 02, 2018	Jan. 18, 2020	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 15, 2018	Mar. 22, 2018~ Apr. 02, 2018	Jan. 14, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN2	1.2G Low Pass	Jul. 17, 2017	Mar. 22, 2018~ Apr. 02, 2018	Jul. 16, 2018	Radiation (03CH12-HY)
Filter	Woken	WHKX8-5272.5-6750-18000-40ST	SN2	6.75G Highpass	Jul. 17, 2017	Mar. 22, 2018~ Apr. 02, 2018	Jul. 16, 2018	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Mar. 22, 2018~ Apr. 02, 2018	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Mar. 22, 2018~ Apr. 02, 2018	N/A	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 27, 2017	Mar. 22, 2018~ Apr. 02, 2018	Apr. 26, 2018	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 22, 2017	Mar. 22, 2018~ Apr. 02, 2018	May 21, 2018	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Mar. 22, 2018~ Apr. 02, 2018	N/A	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 14, 2018	Mar. 22, 2018~ Apr. 02, 2018	Mar. 13, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15539/4	30M-18G	Mar. 14, 2018	Mar. 22, 2018~ Apr. 02, 2018	Mar. 13, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36979/4	30M-18G	Mar. 14, 2018	Mar. 22, 2018~ Apr. 02, 2018	Mar. 13, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 17, 2017	Mar. 22, 2018~ Apr. 02, 2018	Oct. 16, 2018	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 17, 2017	Mar. 22, 2018~ Apr. 02, 2018	Oct. 16, 2018	Radiation (03CH12-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.70

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.10

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.20

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.70

Appendix A. Test Result of Conducted Test Items

Test Engineer:	White Lin / Rebecca Li	Temperature:	21~25	°C
Test Date:	2018/2/14~2018/4/16	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.90	31.80	16.30	0.5	Pass
11a	6Mbps	1	157	5785	18.15	27.50	16.30	0.5	Pass
11a	6Mbps	1	165	5825	18.25	24.70	16.30	0.5	Pass
HT20	MCS 0	1	149	5745	18.90	29.00	17.60	0.5	Pass
HT20	MCS 0	1	157	5785	19.05	27.75	17.60	0.5	Pass
HT20	MCS 0	1	165	5825	19.00	28.15	17.55	0.5	Pass
HT40	MCS 0	1	151	5755	36.70	65.97	35.00	0.5	Pass
HT40	MCS 0	1	159	5795	36.60	60.57	34.92	0.5	Pass

Report Number : FR722135-07F

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.59	11.11	30.00	3.04		Pass
11a	6Mbps	1	157	5785	0.59	11.20	30.00	3.04		Pass
11a	6Mbps	1	165	5825	0.59	11.44	30.00	3.04		Pass
HT20	MCS 0	1	149	5745	0.63	11.22	30.00	3.04		Pass
HT20	MCS 0	1	157	5785	0.63	11.05	30.00	3.04		Pass
HT20	MCS 0	1	165	5825	0.63	11.49	30.00	3.04		Pass
HT40	MCS 0	1	151	5755	0.70	11.43	30.00	3.04		Pass
HT40	MCS 0	1	159	5795	0.70	11.53	30.00	3.04		Pass

Report Number : FR722135-07F

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.59	2.22	-4.30	30.00	3.04	Pass
11a	6Mbps	1	157	5785	0.59	2.22	-4.03	30.00	3.04	Pass
11a	6Mbps	1	165	5825	0.59	2.22	-3.58	30.00	3.04	Pass
HT20	MCS 0	1	149	5745	0.63	2.22	-4.37	30.00	3.04	Pass
HT20	MCS 0	1	157	5785	0.63	2.22	-4.85	30.00	3.04	Pass
HT20	MCS 0	1	165	5825	0.63	2.22	-3.88	30.00	3.04	Pass
HT40	MCS 0	1	151	5755	0.70	2.22	-6.66	30.00	3.04	Pass
HT40	MCS 0	1	159	5795	0.70	2.22	-6.54	30.00	3.04	Pass

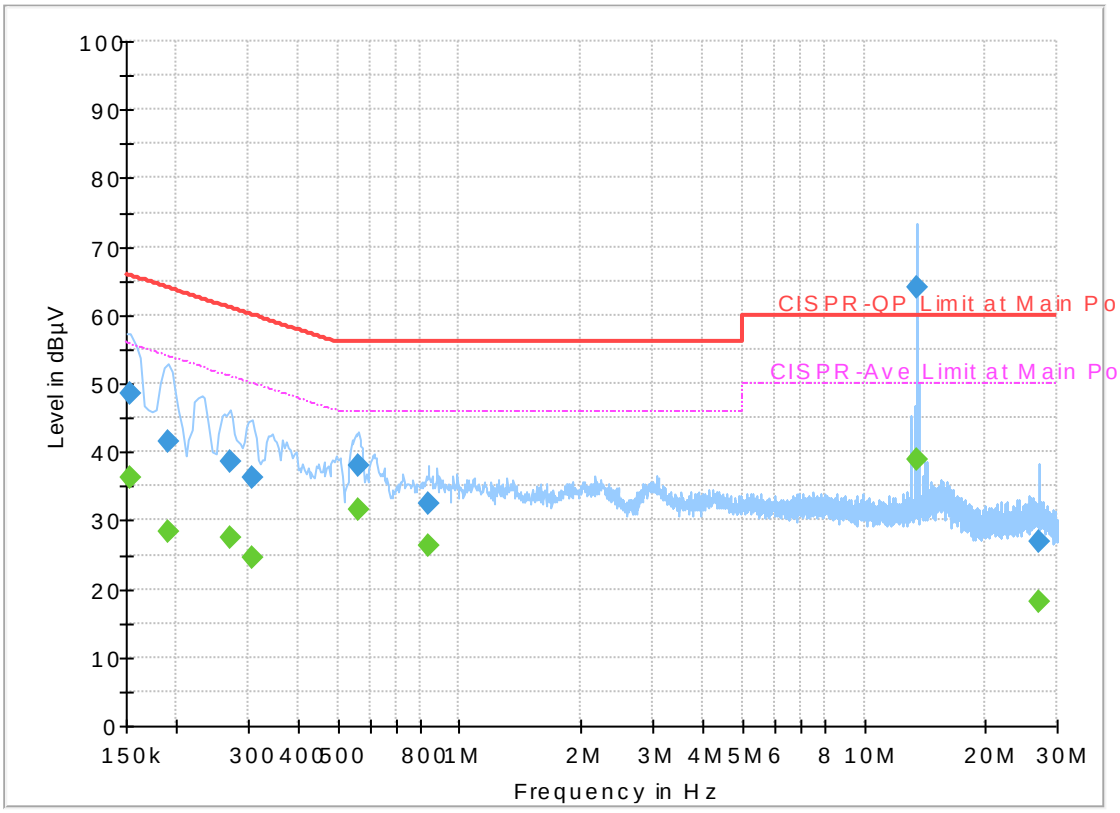
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Shareef Yu	**Temperature :**	23~24℃
		Relative Humidity :	58~62%

EUT Information

Report NO :	722135-07
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line
	Original Mode

Full Spectrum

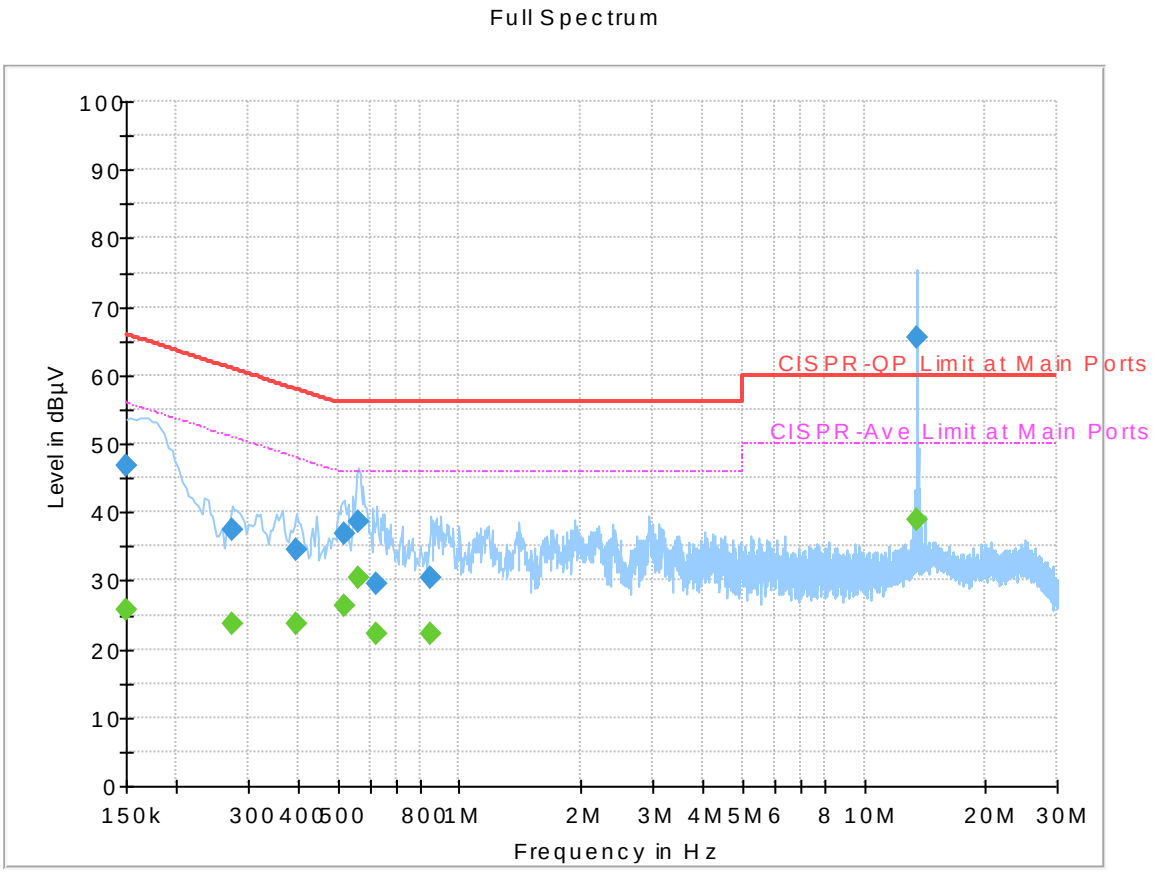


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	36.29	55.78	19.49	L1	OFF	19.5
0.154000	48.48	---	65.78	17.30	L1	OFF	19.5
0.190000	---	28.37	54.04	25.67	L1	OFF	19.5
0.190000	41.44	---	64.04	22.60	L1	OFF	19.5
0.270000	---	27.45	51.12	23.67	L1	OFF	19.5
0.270000	38.62	---	61.12	22.50	L1	OFF	19.5
0.306000	---	24.62	50.08	25.46	L1	OFF	19.5
0.306000	36.33	---	60.08	23.75	L1	OFF	19.5
0.562000	---	31.44	46.00	14.56	L1	OFF	19.5
0.562000	38.13	---	56.00	17.87	L1	OFF	19.5
0.838000	---	26.22	46.00	19.78	L1	OFF	19.5
0.838000	32.36	---	56.00	23.64	L1	OFF	19.5
13.560000	---	39.01	50.00	10.99	L1	OFF	19.7
13.560000	64.13	---	60.00	-4.13	L1	OFF	19.7
27.082000	---	18.25	50.00	31.75	L1	OFF	19.8
27.082000	26.91	---	60.00	33.09	L1	OFF	19.8

EUT Information

Report NO :	722135-07
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral
	Original Mode



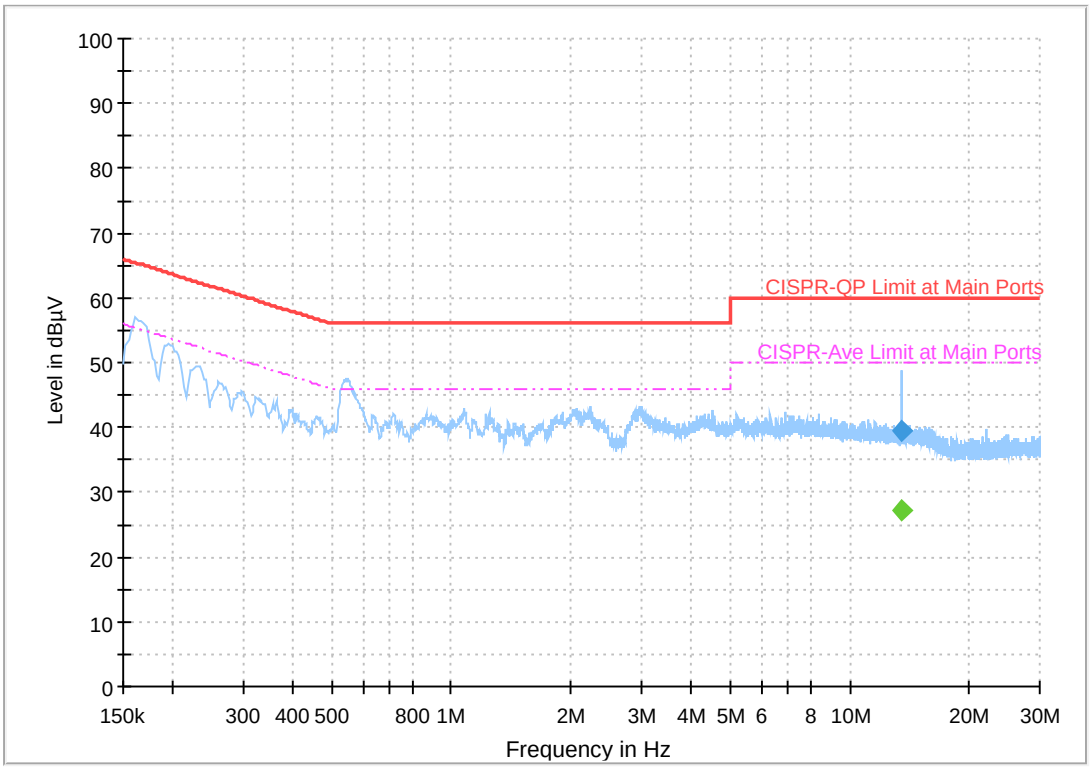
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	25.67	56.00	30.33	N	OFF	19.5
0.150000	46.87	---	66.00	19.13	N	OFF	19.5
0.274000	---	23.83	51.00	27.17	N	OFF	19.5
0.274000	37.32	---	61.00	23.68	N	OFF	19.5
0.394000	---	23.59	47.98	24.39	N	OFF	19.5
0.394000	34.40	---	57.98	23.58	N	OFF	19.5
0.518000	---	26.31	46.00	19.69	N	OFF	19.5
0.518000	36.89	---	56.00	19.11	N	OFF	19.5
0.562000	---	30.27	46.00	15.73	N	OFF	19.5
0.562000	38.62	---	56.00	17.38	N	OFF	19.5
0.626000	---	22.21	46.00	23.79	N	OFF	19.5
0.626000	29.58	---	56.00	26.42	N	OFF	19.5
0.850000	---	22.34	46.00	23.66	N	OFF	19.5
0.850000	30.35	---	56.00	25.65	N	OFF	19.5
13.560000	---	39.00	50.00	11.00	N	OFF	19.8
13.560000	65.40	---	60.00	-5.40	N	OFF	19.8

EUT Information

Report NO :	722135-07
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line
	Terminal Mode

Full Spectrum

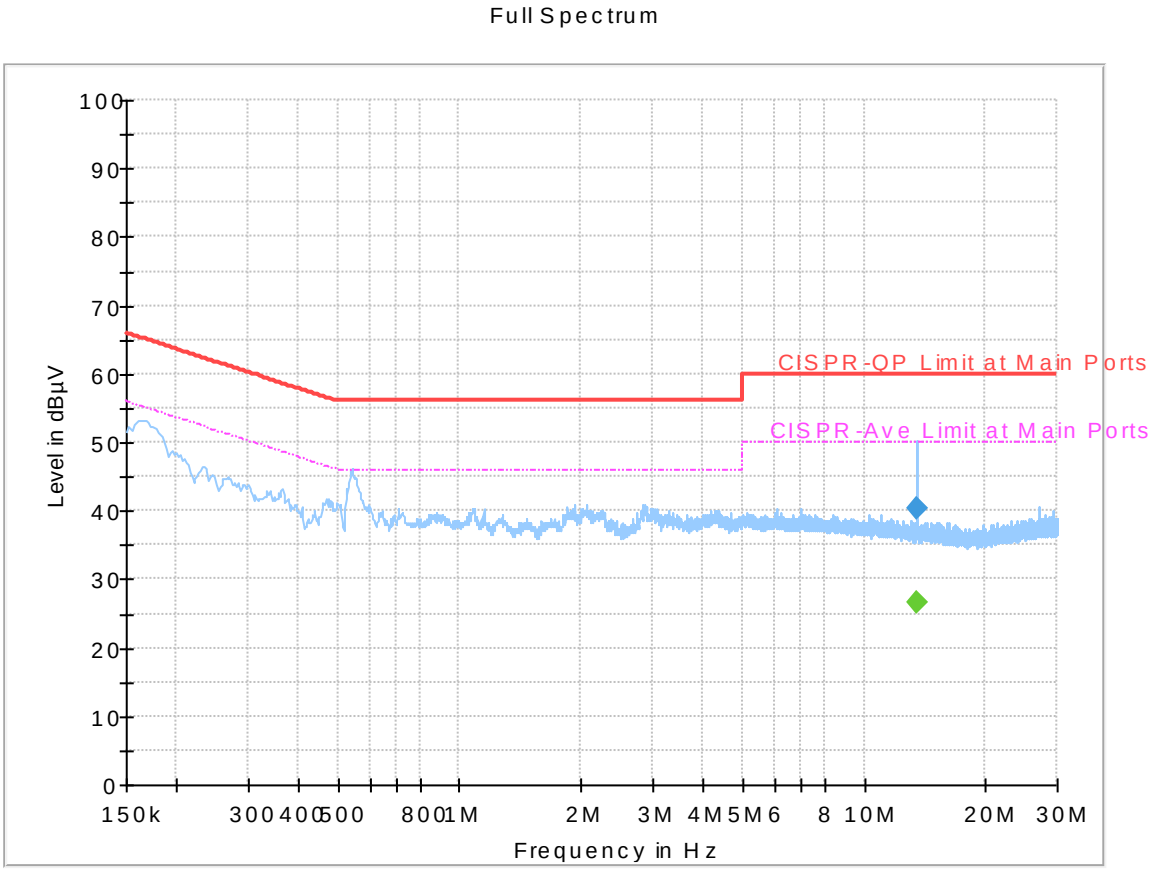


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	27.18	50.00	22.82	L1	OFF	19.7
13.560000	39.61	---	60.00	20.39	L1	OFF	19.7

EUT Information

Report NO :	722135-07
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral
	Terminal Mode



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	26.70	50.00	23.30	N	OFF	19.8
13.560000	40.43	---	60.00	19.57	N	OFF	19.8

Appendix C. Radiated Spurious Emission

Test Engineer :	Nick Yu, Watt Tseng, and Karl Hou	Temperature :	21~24°C
		Relative Humidity :	59~62%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	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		5644.4	52.84	-15.36	68.2	45.52	32.19	6.35	31.22	107	254	P	H
		5689.4	57.83	-39.55	97.38	50.45	32.27	6.36	31.25	107	254	P	H
		5719.6	73.5	-37.19	110.69	66.08	32.31	6.37	31.26	107	254	P	H
		5724.8	83.54	-38.2	121.74	76.12	32.31	6.37	31.26	107	254	P	H
	*	5745	111.65	-	-	104.21	32.34	6.37	31.27	107	254	P	H
	*	5745	100.46	-	-	93.02	32.34	6.37	31.27	107	254	A	H
													H
													H
		5641.8	50.1	-18.1	68.2	42.78	32.19	6.35	31.22	201	8	P	V
		5691.4	56.42	-42.44	98.86	49.04	32.27	6.36	31.25	201	8	P	V
		5718.6	67.83	-42.58	110.41	60.41	32.31	6.37	31.26	201	8	P	V
		5723.4	79.22	-39.33	118.55	71.8	32.31	6.37	31.26	201	8	P	V
	*	5745	108.57	-	-	101.13	32.34	6.37	31.27	201	8	P	V
	*	5745	97.4	-	-	89.96	32.34	6.37	31.27	201	8	A	V
													V
													V

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 157 5785MHz		5636.4	52.92	-15.28	68.2	45.6	32.19	6.35	31.22	106	255	P	H
		5691.6	54.78	-44.23	99.01	47.4	32.27	6.36	31.25	106	255	P	H
		5719.6	53.78	-56.91	110.69	46.36	32.31	6.37	31.26	106	255	P	H
		5723	50.99	-66.65	117.64	43.57	32.31	6.37	31.26	106	255	P	H
	*	5785	109.63	-	-	102.15	32.39	6.38	31.29	106	255	P	H
	*	5785	98.42	-	-	90.94	32.39	6.38	31.29	106	255	A	H
		5852.2	50.56	-66.62	117.18	42.98	32.48	6.42	31.32	106	255	P	H
		5873.4	49.54	-56.11	105.65	41.91	32.53	6.43	31.33	106	255	P	H
		5885.2	51.32	-46.31	97.63	43.69	32.53	6.44	31.34	106	255	P	H
		5927.8	49.73	-18.47	68.2	42.01	32.6	6.47	31.35	106	255	P	H
													H
													H
		5639.2	51.14	-17.06	68.2	43.82	32.19	6.35	31.22	225	8	P	V
		5683	51.98	-40.68	92.66	44.63	32.24	6.36	31.25	225	8	P	V
		5719	53.04	-57.48	110.52	45.62	32.31	6.37	31.26	225	8	P	V
		5720.8	50.19	-62.43	112.62	42.77	32.31	6.37	31.26	225	8	P	V
	*	5785	107.18	-	-	99.7	32.39	6.38	31.29	225	8	P	V
	*	5785	96.2	-	-	88.72	32.39	6.38	31.29	225	8	A	V
		5850.6	49.06	-71.77	120.83	41.48	32.48	6.42	31.32	225	8	P	V
		5874.6	49.17	-56.14	105.31	41.54	32.53	6.43	31.33	225	8	P	V
		5876.4	49.87	-54.29	104.16	42.24	32.53	6.43	31.33	225	8	P	V
		5932	50.01	-18.19	68.2	42.29	32.6	6.47	31.35	225	8	P	V
													V
													V

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)
	*	5825	109.37	-	-	101.83	32.46	6.39	31.31	103	252	P	H
	*	5825	97.57	-	-	90.03	32.46	6.39	31.31	103	252	A	H
		5851	66.26	-53.66	119.92	58.68	32.48	6.42	31.32	103	252	P	H
		5862.4	56.43	-52.3	108.73	48.82	32.51	6.43	31.33	103	252	P	H
		5878.2	51.54	-51.28	102.82	43.91	32.53	6.43	31.33	103	252	P	H
		5925.4	50.57	-17.63	68.2	42.85	32.6	6.47	31.35	103	252	P	H
													H
802.11a													H
CH 165	*	5825	107.17	-	-	99.63	32.46	6.39	31.31	218	8	P	V
5825MHz	*	5825	95.84	-	-	88.3	32.46	6.39	31.31	218	8	A	V
		5850	60.57	-61.63	122.2	52.99	32.48	6.42	31.32	218	8	P	V
		5855.2	58.37	-52.37	110.74	50.76	32.51	6.42	31.32	218	8	P	V
		5877.6	50.88	-52.39	103.27	43.25	32.53	6.43	31.33	218	8	P	V
		5936.6	50.21	-17.99	68.2	42.5	32.6	6.48	31.37	218	8	P	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 149 5745MHz		11490	59.94	-14.06	74	65.91	40.11	10.33	56.41	400	340	P	H
		11490	45.13	-8.87	54	51.1	40.11	10.33	56.41	400	340	A	H
		17235	48.77	-19.43	68.2	50.77	41.54	12.73	56.27	100	0	P	H
													H
		11490	68.78	-5.22	74	74.75	40.11	10.33	56.41	108	198	P	V
		11490	51.89	-2.11	54	57.86	40.11	10.33	56.41	108	198	A	V
		17235	50.62	-17.58	68.2	52.62	41.54	12.73	56.27	100	0	P	V
													V
802.11a CH 157 5785MHz		11570	59.32	-14.68	74	65.42	39.93	10.37	56.4	398	356	P	H
		11570	43.81	-10.19	54	49.91	39.93	10.37	56.4	398	356	A	H
		17355	51.28	-16.92	68.2	52.96	41.96	12.82	56.46	100	0	P	H
													H
		11570	68.76	-5.24	74	74.86	39.93	10.37	56.4	104	196	P	V
		11570	51.15	-2.85	54	57.25	39.93	10.37	56.4	104	196	A	V
		17355	50.67	-17.53	68.2	52.35	41.96	12.82	56.46	100	0	P	V
													V
802.11a CH 165 5825MHz		11650	58.65	-15.35	74	64.87	39.77	10.41	56.4	388	326	P	H
		11650	42.32	-11.68	54	48.54	39.77	10.41	56.4	388	326	A	H
		17475	48.79	-19.41	68.2	50.15	42.38	12.91	56.65	100	0	P	H
													H
		11650	68	-6	74	74.22	39.77	10.41	56.4	103	198	P	V
		11650	49.47	-4.53	54	55.69	39.77	10.41	56.4	103	198	A	V
		17475	48.77	-19.43	68.2	50.13	42.38	12.91	56.65	100	0	P	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 (Band Edge @ 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)
		5641	52.89	-15.31	68.2	45.57	32.19	6.35	31.22	114	255	P	H
		5691.4	59.28	-39.58	98.86	51.9	32.27	6.36	31.25	114	255	P	H
		5719.4	73.19	-37.44	110.63	65.77	32.31	6.37	31.26	114	255	P	H
		5724.8	82.72	-39.02	121.74	75.3	32.31	6.37	31.26	114	255	P	H
	*	5745	111.5	-	-	104.06	32.34	6.37	31.27	114	255	P	H
	*	5745	100.19	-	-	92.75	32.34	6.37	31.27	114	255	A	H
802.11n													H
HT20													H
CH 149		5607	50.34	-17.86	68.2	43.07	32.14	6.34	31.21	232	9	P	V
5745MHz		5691	57.44	-41.12	98.56	50.06	32.27	6.36	31.25	232	9	P	V
		5720	69.78	-41.02	110.8	62.36	32.31	6.37	31.26	232	9	P	V
		5722.8	79.75	-37.43	117.18	72.33	32.31	6.37	31.26	232	9	P	V
	*	5745	107.89	-	-	100.45	32.34	6.37	31.27	232	9	P	V
	*	5745	97.13	-	-	89.69	32.34	6.37	31.27	232	9	A	V
													V
													V

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)
		5610.4	54.72	-13.48	68.2	47.45	32.14	6.34	31.21	118	255	P	H
		5684.6	53.48	-40.36	93.84	46.1	32.27	6.36	31.25	118	255	P	H
		5718	55.03	-55.21	110.24	47.61	32.31	6.37	31.26	118	255	P	H
		5720	51.87	-58.93	110.8	44.45	32.31	6.37	31.26	118	255	P	H
	*	5785	109.61	-	-	102.13	32.39	6.38	31.29	118	255	P	H
	*	5785	98.2	-	-	90.72	32.39	6.38	31.29	118	255	A	H
		5851.6	49.22	-69.33	118.55	41.64	32.48	6.42	31.32	118	255	P	H
		5859.6	52.28	-57.23	109.51	44.68	32.51	6.42	31.33	118	255	P	H
		5887.2	50.81	-45.33	96.14	43.18	32.53	6.44	31.34	118	255	P	H
		5947.4	49.26	-18.94	68.2	41.52	32.63	6.48	31.37	118	255	P	H
802.11n													H
HT20													H
CH 157		5610	51.37	-16.83	68.2	44.1	32.14	6.34	31.21	212	7	P	V
5785MHz		5681.4	51.2	-40.27	91.47	43.86	32.24	6.35	31.25	212	7	P	V
		5719.4	52.88	-57.75	110.63	45.46	32.31	6.37	31.26	212	7	P	V
		5720.2	51	-60.26	111.26	43.58	32.31	6.37	31.26	212	7	P	V
	*	5785	107.48	-	-	100	32.39	6.38	31.29	212	7	P	V
	*	5785	95.92	-	-	88.44	32.39	6.38	31.29	212	7	A	V
		5852.2	48.87	-68.31	117.18	41.29	32.48	6.42	31.32	212	7	P	V
		5873.2	50.46	-55.24	105.7	42.83	32.53	6.43	31.33	212	7	P	V
		5882	49.87	-50.13	100	42.23	32.53	6.44	31.33	212	7	P	V
		5947.8	49.7	-18.5	68.2	41.96	32.63	6.48	31.37	212	7	P	V
													V
													V

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)
	*	5825	109.09	-	-	101.55	32.46	6.39	31.31	112	255	P	H
	*	5825	97.49	-	-	89.95	32.46	6.39	31.31	112	255	A	H
		5850.2	64.58	-57.16	121.74	57	32.48	6.42	31.32	112	255	P	H
		5856.8	58.52	-51.78	110.3	50.91	32.51	6.42	31.32	112	255	P	H
		5876.2	52.78	-51.53	104.31	45.15	32.53	6.43	31.33	112	255	P	H
		5929.4	49.57	-18.63	68.2	41.85	32.6	6.47	31.35	112	255	P	H
802.11n													H
HT20													H
CH 165	*	5825	106.99	-	-	99.45	32.46	6.39	31.31	234	12	P	V
5825MHz	*	5825	95.56	-	-	88.02	32.46	6.39	31.31	234	12	A	V
		5850.2	62.45	-59.29	121.74	54.87	32.48	6.42	31.32	234	12	P	V
		5856.4	58.93	-51.48	110.41	51.32	32.51	6.42	31.32	234	12	P	V
		5879.8	52.47	-49.16	101.63	44.83	32.53	6.44	31.33	234	12	P	V
		5929	49.42	-18.78	68.2	41.7	32.6	6.47	31.35	234	12	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. 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)
802.11n HT20 CH 149 5745MHz		11490	59.31	-14.69	74	65.28	40.11	10.33	56.41	399	340	P	H
		11490	44.96	-9.04	54	50.93	40.11	10.33	56.41	399	340	A	H
		17235	50.15	-18.05	68.2	52.15	41.54	12.73	56.27	100	0	P	H
													H
		11490	68.95	-5.05	74	74.92	40.11	10.33	56.41	108	197	P	V
		11490	51.85	-2.15	54	57.82	40.11	10.33	56.41	108	197	A	V
		17235	50.58	-17.62	68.2	52.58	41.54	12.73	56.27	100	0	P	V
													V
802.11n HT20 CH 157 5785MHz		11570	59.44	-14.56	74	65.54	39.93	10.37	56.4	368	358	P	H
		11570	43.49	-10.51	54	49.59	39.93	10.37	56.4	368	358	A	H
		17355	49.92	-18.28	68.2	51.6	41.96	12.82	56.46	100	0	P	H
													H
		11570	67.85	-6.15	74	73.95	39.93	10.37	56.4	103	196	P	V
		11570	51.5	-2.5	54	57.6	39.93	10.37	56.4	103	196	A	V
		17355	50.48	-17.72	68.2	52.16	41.96	12.82	56.46	100	0	P	V
													V
802.11n HT20 CH 165 5825MHz		11650	57.9	-16.1	74	64.12	39.77	10.41	56.4	388	327	P	H
		11650	41.9	-12.1	54	48.12	39.77	10.41	56.4	388	327	A	H
		17475	48.8	-19.4	68.2	50.16	42.38	12.91	56.65	100	0	P	H
													H
		11650	67.66	-6.34	74	73.88	39.77	10.41	56.4	102	198	P	V
		11650	49.39	-4.61	54	55.61	39.77	10.41	56.4	102	198	A	V
		17475	48.74	-19.46	68.2	50.1	42.38	12.91	56.65	100	0	P	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 (Band Edge @ 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)
		5646.8	55.11	-13.09	68.2	47.79	32.19	6.35	31.22	110	255	P	H
		5699.2	73.83	-30.78	104.61	66.45	32.27	6.36	31.25	110	255	P	H
		5719.8	83.1	-27.64	110.74	75.68	32.31	6.37	31.26	110	255	P	H
		5725	85.55	-36.65	122.2	78.13	32.31	6.37	31.26	110	255	P	H
	*	5755	109.75	-	-	102.29	32.36	6.37	31.27	110	255	P	H
	*	5755	98.28	-	-	90.82	32.36	6.37	31.27	110	255	A	H
		5851	52.73	-67.19	119.92	45.15	32.48	6.42	31.32	110	255	P	H
		5859.6	51.31	-58.2	109.51	43.71	32.51	6.42	31.33	110	255	P	H
		5887.2	49.32	-46.82	96.14	41.69	32.53	6.44	31.34	110	255	P	H
		5947	49.92	-18.28	68.2	42.18	32.63	6.48	31.37	110	255	P	H
802.11n													H
HT40													H
CH 151		5648	52.63	-15.57	68.2	45.31	32.19	6.35	31.22	219	8	P	V
5755MHz		5699	70.38	-34.08	104.46	63	32.27	6.36	31.25	219	8	P	V
		5719.8	81.04	-29.7	110.74	73.62	32.31	6.37	31.26	219	8	P	V
		5725	82.68	-39.52	122.2	75.26	32.31	6.37	31.26	219	8	P	V
	*	5755	106.63	-	-	99.17	32.36	6.37	31.27	219	8	P	V
	*	5755	95.07	-	-	87.61	32.36	6.37	31.27	219	8	A	V
		5851	52.39	-67.53	119.92	44.81	32.48	6.42	31.32	219	8	P	V
		5855.8	50.68	-59.9	110.58	43.07	32.51	6.42	31.32	219	8	P	V
		5922.6	49.43	-20.54	69.97	41.71	32.6	6.47	31.35	219	8	P	V
		5936	49.53	-18.67	68.2	41.82	32.6	6.48	31.37	219	8	P	V
													V
													V

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)
		5642.6	52.42	-15.78	68.2	45.1	32.19	6.35	31.22	109	255	P	H
		5691.8	56.03	-43.12	99.15	48.65	32.27	6.36	31.25	109	255	P	H
		5719.6	58	-52.69	110.69	50.58	32.31	6.37	31.26	109	255	P	H
		5723.4	58.58	-59.97	118.55	51.16	32.31	6.37	31.26	109	255	P	H
	*	5795	107.59	-	-	100.09	32.41	6.38	31.29	109	255	P	H
	*	5795	96.38	-	-	88.88	32.41	6.38	31.29	109	255	A	H
		5850.2	61.57	-60.17	121.74	53.99	32.48	6.42	31.32	109	255	P	H
		5859.6	60.54	-48.97	109.51	52.94	32.51	6.42	31.33	109	255	P	H
		5898.4	52.12	-35.73	87.85	44.44	32.56	6.46	31.34	109	255	P	H
		5925.8	49.71	-18.49	68.2	41.99	32.6	6.47	31.35	109	255	P	H
802.11n													H
HT40													H
CH 159		5615.2	50.17	-18.03	68.2	42.9	32.14	6.34	31.21	226	8	P	V
5795MHz		5691.6	52.97	-46.04	99.01	45.59	32.27	6.36	31.25	226	8	P	V
		5717	56.41	-53.55	109.96	49.02	32.29	6.36	31.26	226	8	P	V
		5723.6	55.95	-63.06	119.01	48.53	32.31	6.37	31.26	226	8	P	V
	*	5795	104.9	-	-	97.4	32.41	6.38	31.29	226	8	P	V
	*	5795	94.05	-	-	86.55	32.41	6.38	31.29	226	8	A	V
		5852	58.86	-58.78	117.64	51.28	32.48	6.42	31.32	226	8	P	V
		5855.2	57.38	-53.36	110.74	49.77	32.51	6.42	31.32	226	8	P	V
		5881	50.91	-49.83	100.74	43.27	32.53	6.44	31.33	226	8	P	V
		5935.8	50.15	-18.05	68.2	42.44	32.6	6.48	31.37	226	8	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. 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)
802.11n HT40 CH 151 5755MHz		11510	58.25	-15.75	74	64.21	40.1	10.34	56.4	368	342	P	H
		11510	45.46	-8.54	54	51.42	40.1	10.34	56.4	368	342	A	H
		17265	49.39	-18.81	68.2	51.31	41.66	12.75	56.33	100	0	P	H
													H
		11510	66.6	-7.4	74	72.56	40.1	10.34	56.4	104	198	P	V
		11510	51.53	-2.47	54	57.49	40.1	10.34	56.4	104	198	A	V
		17265	49.39	-18.81	68.2	51.31	41.66	12.75	56.33	100	0	P	V
													V
802.11n HT40 CH 159 5795MHz		11590	58.44	-15.56	74	64.57	39.89	10.38	56.4	398	315	P	H
		11590	43.66	-10.34	54	49.79	39.89	10.38	56.4	398	315	A	H
		17385	49.58	-18.62	68.2	51.17	42.08	12.84	56.51	100	0	P	H
													H
		11590	66.72	-7.28	74	72.85	39.89	10.38	56.4	103	197	P	V
		11590	51.81	-2.19	54	57.94	39.89	10.38	56.4	103	197	A	V
		17385	50.31	-17.89	68.2	51.9	42.08	12.84	56.51	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11a (LF @ 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)
5GHz 802.11a LF		186.6	29.52	-13.98	43.5	45.97	14.59	1.23	32.27	-	-	P	H
		247.35	32.8	-13.2	46	45.57	18.05	1.38	32.2	-	-	P	H
		262.74	40.77	-5.23	46	51.89	19.63	1.43	32.18	100	0	P	H
		493.2	29.2	-16.8	46	35.76	23.62	2.02	32.2	-	-	P	H
		729.8	31.28	-14.72	46	33.66	27.27	2.47	32.12	-	-	P	H
		962.9	33.16	-20.84	54	30.04	31.12	2.94	30.94	-	-	P	H
													H
													H
													H
													H
													H
													H
		36.75	30.28	-9.72	40	41.34	20.79	0.48	32.33	100	0	P	V
		84.27	26.39	-13.61	40	44.19	13.7	0.8	32.3	-	-	P	V
		119.37	31.27	-12.23	43.5	45.34	17.27	0.95	32.29	-	-	P	V
		570.9	26.57	-19.43	46	30.9	25.72	2.16	32.21	-	-	P	V
		745.9	30.15	-15.85	46	31.96	27.77	2.51	32.09	-	-	P	V
		981.1	33.92	-20.08	54	30.68	31.03	2.98	30.77	-	-	P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against 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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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 D. Radiated Spurious Emission Plots

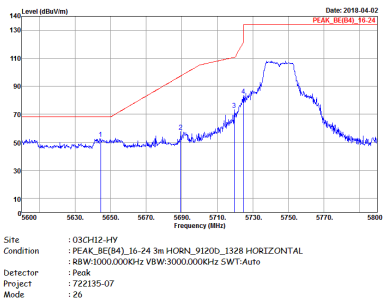
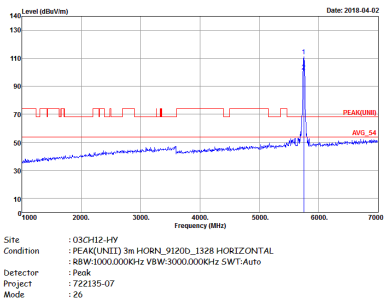
Test Engineer :	Nick Yu, Watt Tseng, and Karl Hou	**Temperature :**	21~24°C
		Relative Humidity :	59~62%

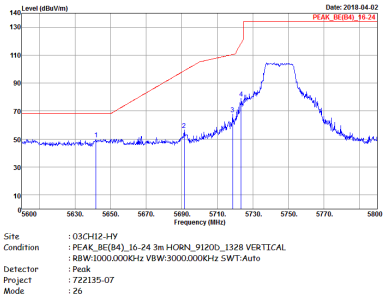
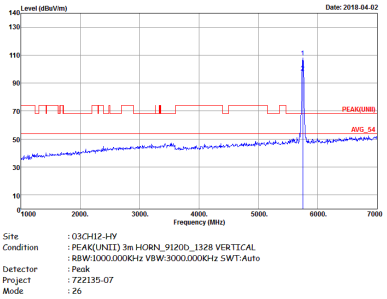
Note symbol

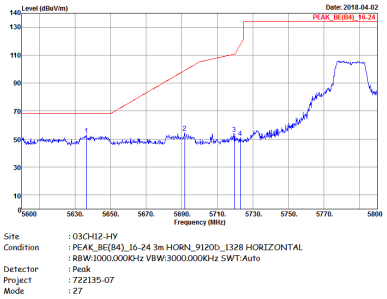
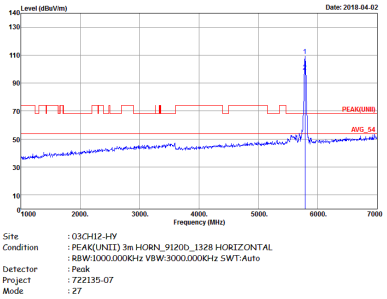
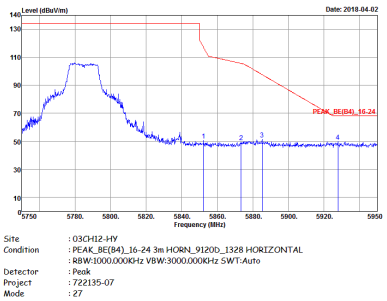
-L	**Low channel location**
-R	**High channel location**

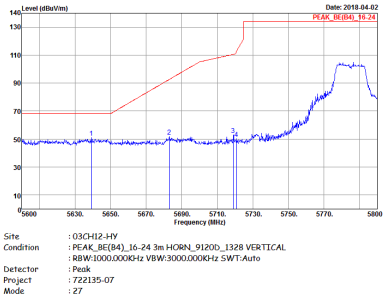
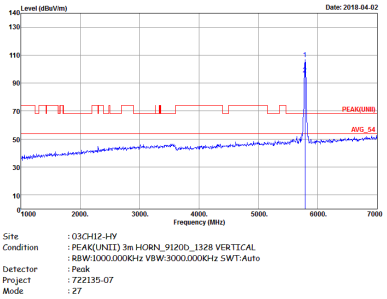
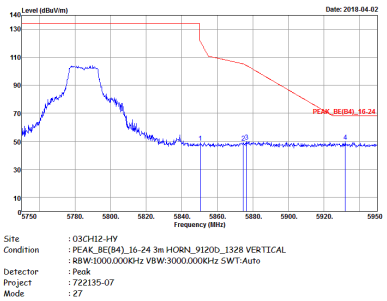
Band 4 - 5725~5850MHz

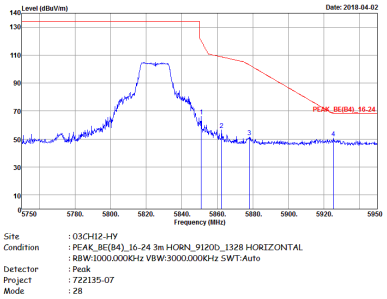
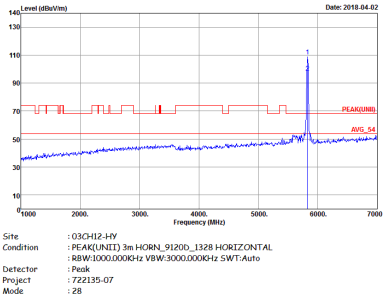
WIFI 802.11a (Band Edge @ 3m)

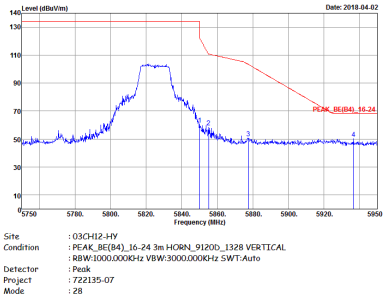
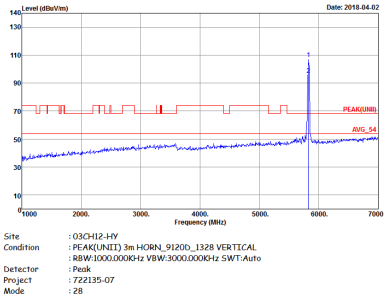
WIFI	**Band 4 5725~5850MHz Band Edge @ 3m**	
ANT	**802.11a CH149 5745MHz**	
1	**Horizontal**	**Fundamental**
Peak		

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Vertical	Fundamental
Peak		

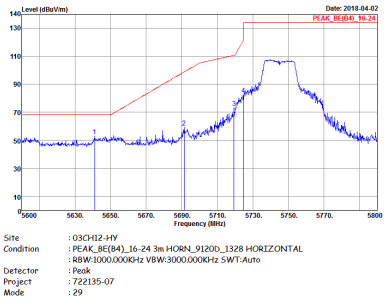
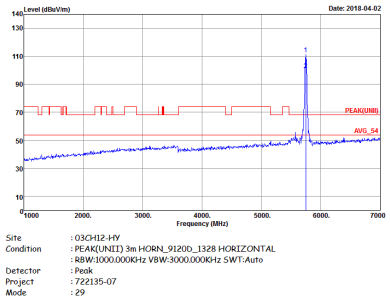
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

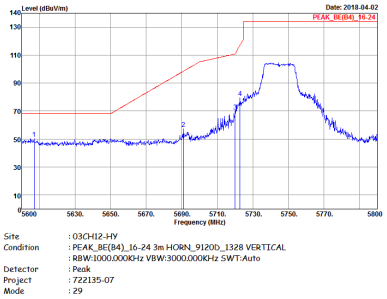
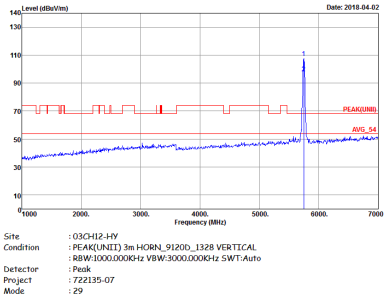
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

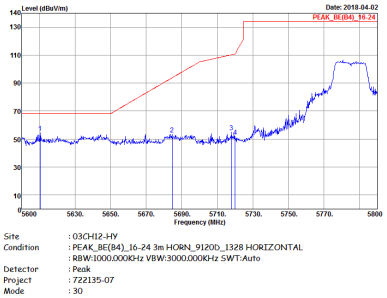
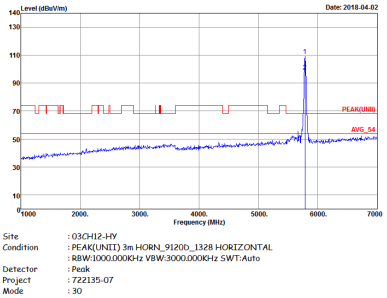
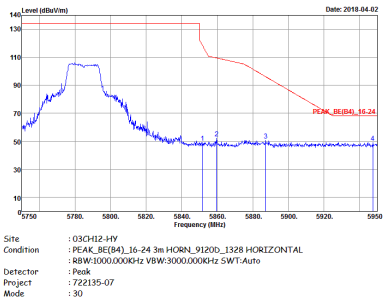
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

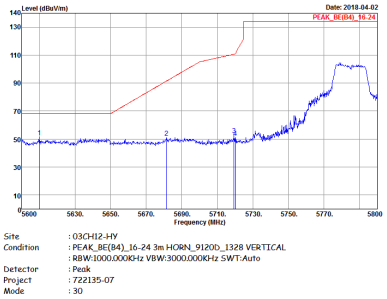
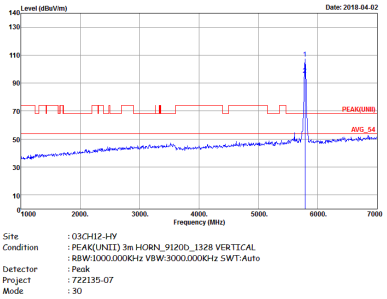
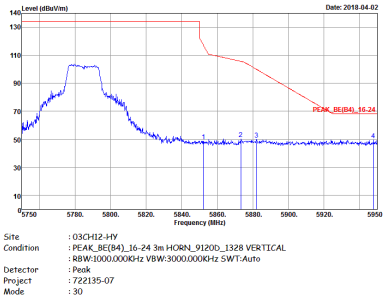
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak		

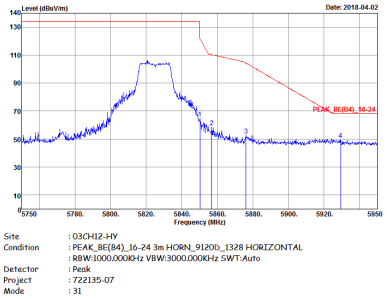
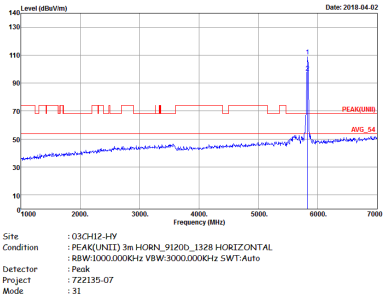
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

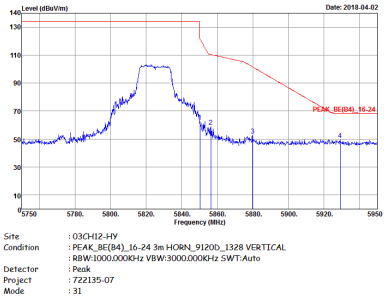
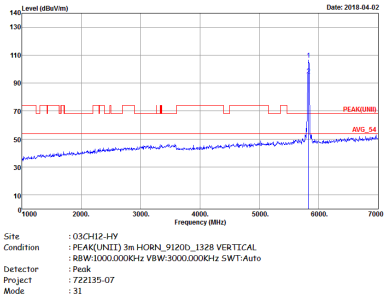
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak		

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Vertical	Fundamental
Peak		

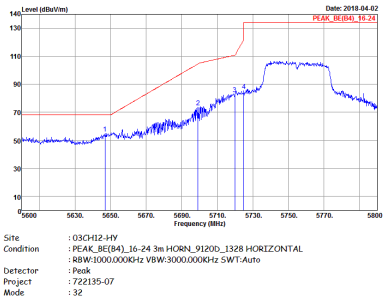
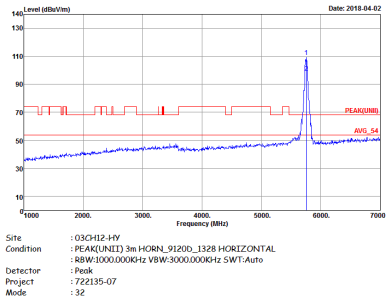
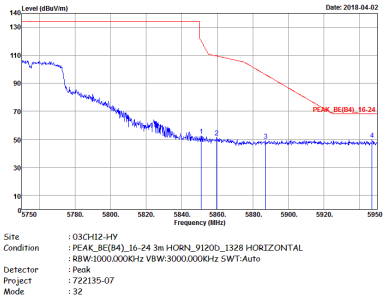
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

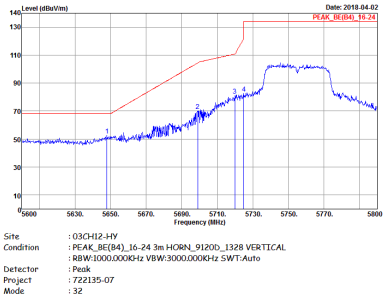
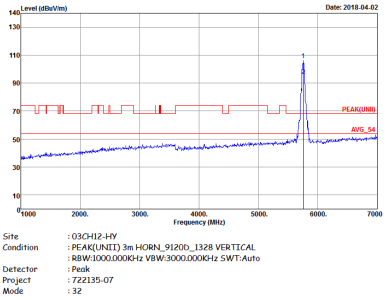
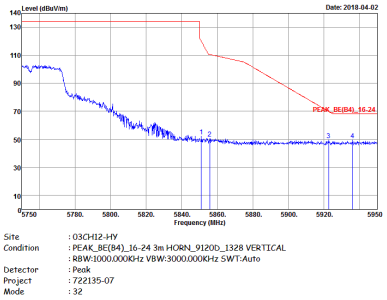
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

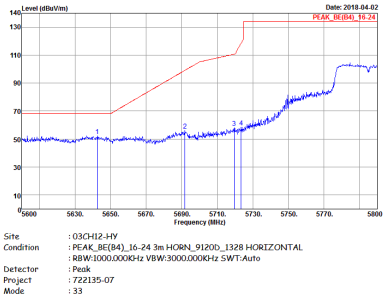
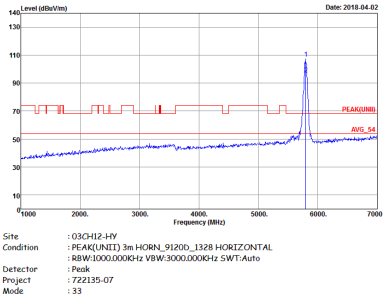
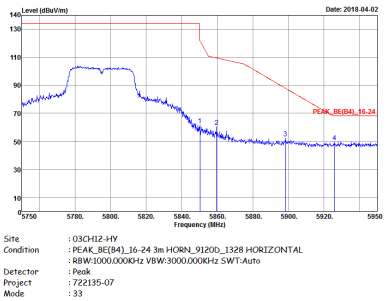
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak		

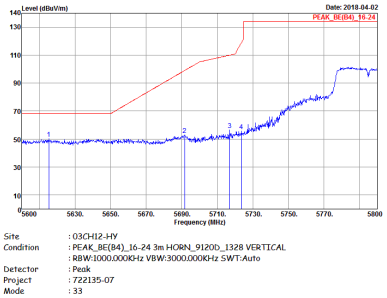
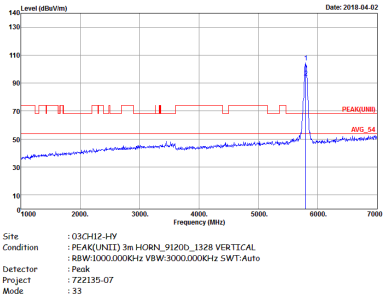
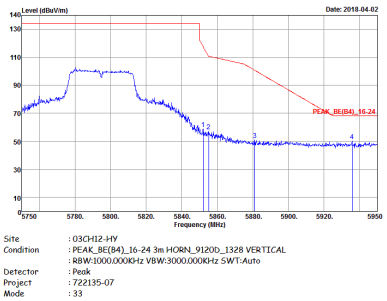
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak		

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	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

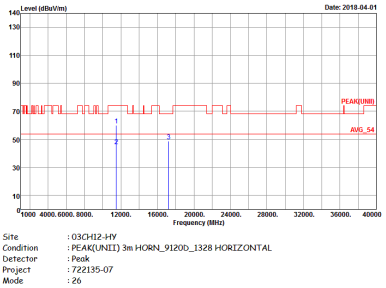
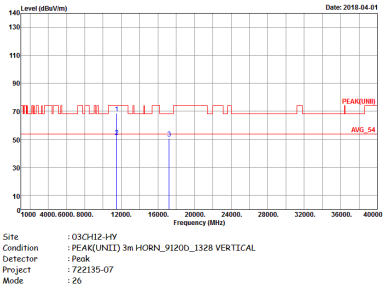
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Fundamental
Peak		
Peak		Left blank

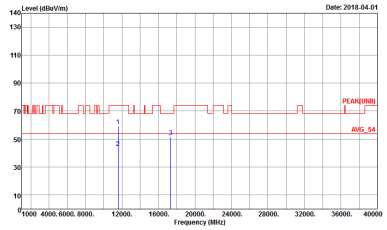
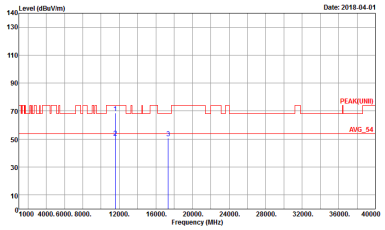
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Vertical	Fundamental
Peak		
Peak		Left blank

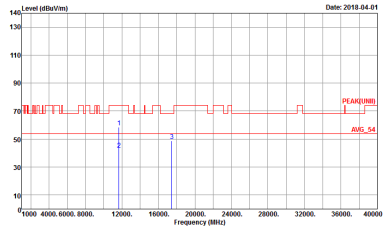
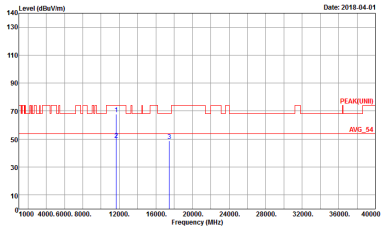
Band 4 5725~5850MHz

Band 4 - 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

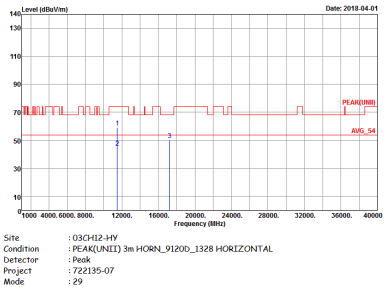
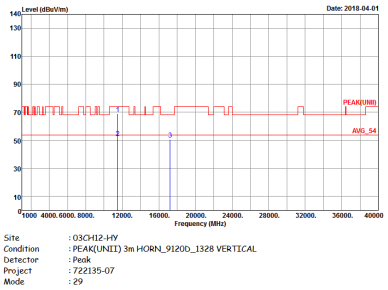
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

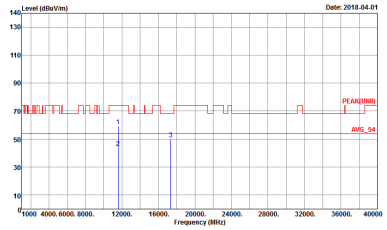
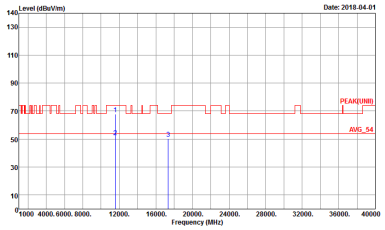
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 27	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 722135-07 Mode : 27

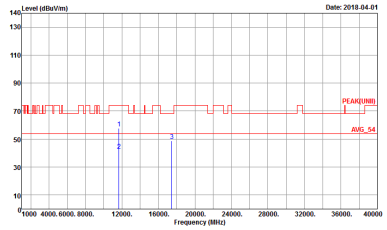
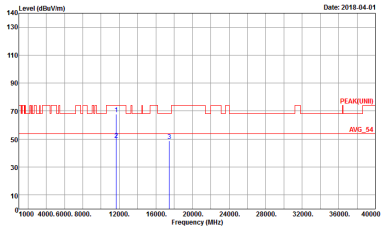
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 28	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 722135-07 Mode : 28

Band 4 5725~5850MHz

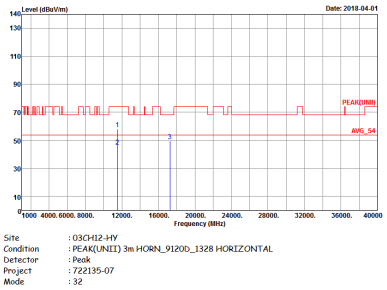
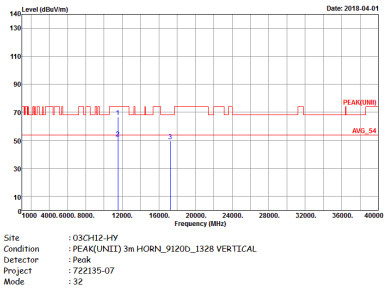
WIFI 802.11n HT20 (Harmonic @ 3m)

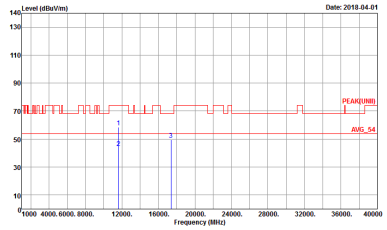
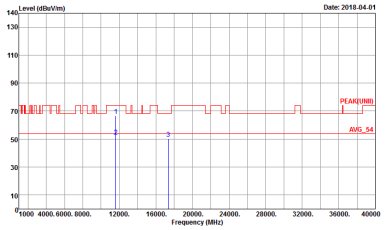
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 30	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 722135-07 Mode : 30

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 31	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 722135-07 Mode : 31

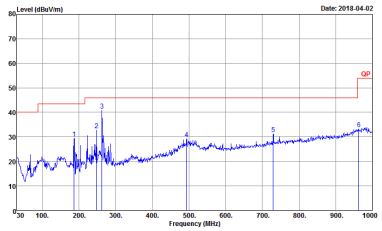
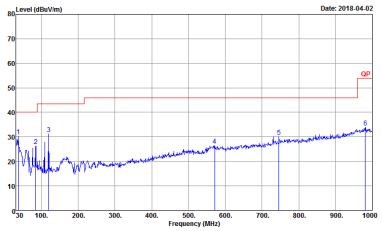
Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 33	 Site : 03CH12-HY Condition : PEAK(UNII) 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 722135-07 Mode : 33

Emission below 1GHz

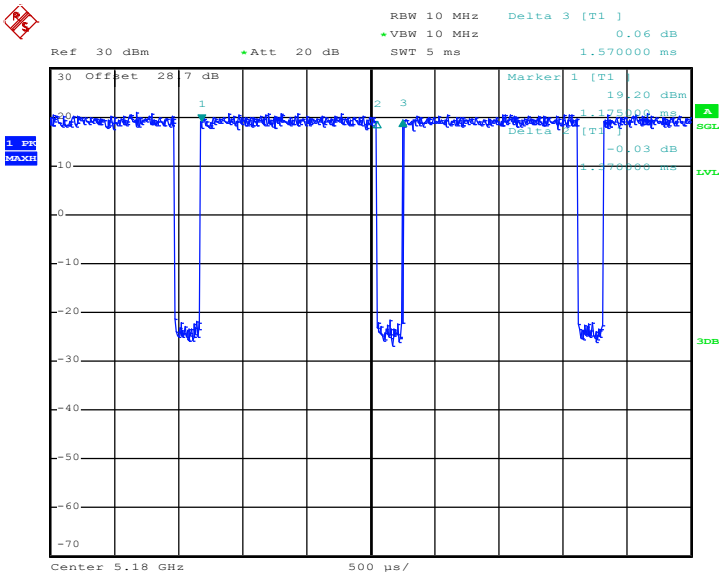
5GHz WIFI 802.11a (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11a LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH12-HY Condition : QP 3m BILOG_6111D_35414 HORIZONTAL Detector : Peak Project : 722135-07 Mode : 35	 Site : 03CH12-HY Condition : QP 3m BILOG_6111D_35414 VERTICAL Detector : Peak Project : 722135-07 Mode : 35

Appendix E. Duty Cycle Plots

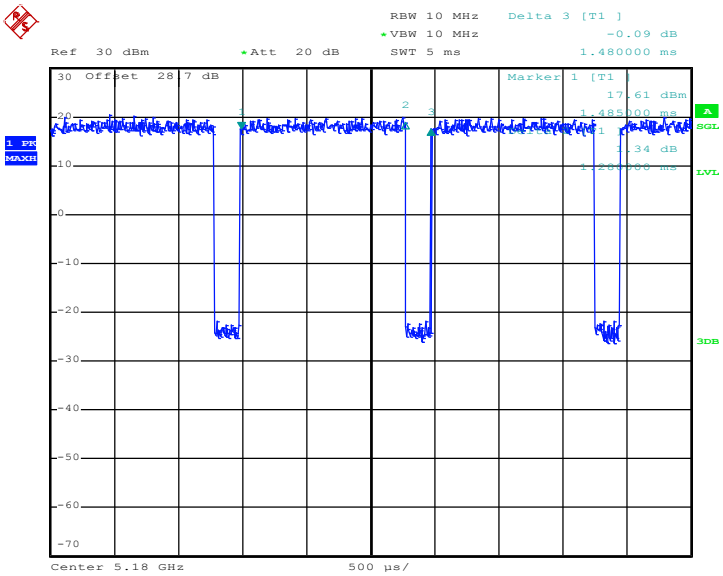
Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
802.11a	87.26	1370	0.73	1kHz	0.59
5GHz 802.11n HT20	86.49	1280	0.78	1kHz	0.63
5GHz 802.11n HT40	86.14	630	1.59	3kHz	0.70

802.11a



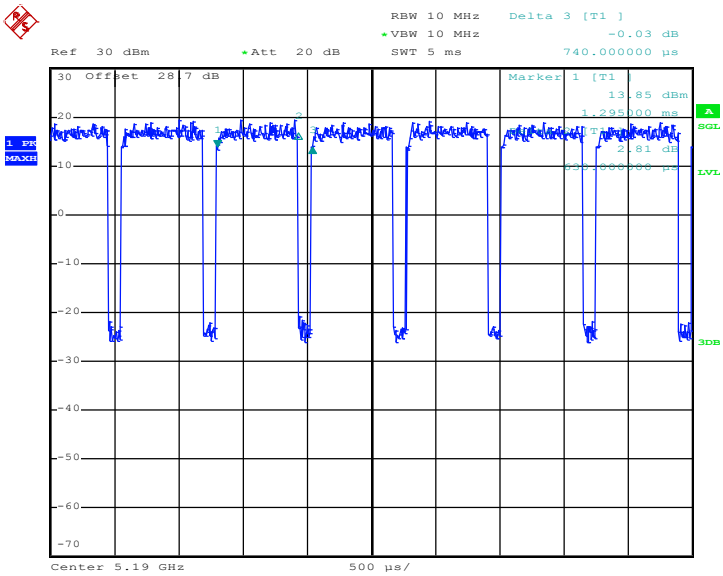
Date: 14.FEB.2018 10:29:47

802.11n HT20



Date: 14.FEB.2018 13:39:24

802.11n HT40



Date: 14.FEB.2018 13:52:48