



FCC RF Test Report

APPLICANT : unitech Electronics Co., Ltd.
EQUIPMENT : Rugged Handheld Computer
BRAND NAME : unitech
MODEL NAME : PA726
FCC ID : HLEPA726BTNFL
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Nov. 04, 2017 and testing was completed on Jan. 27, 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



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FCC ID: HLEPA726BTNFL

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7N0405F	Rev. 01	Initial issue of report	Jan. 31, 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 9.26 dB at 959.400 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 17.40 dB at 0.150 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

unitech Electronics Co., Ltd.

5Fl., No. 136, Lane 235, Pao-Chiao Rd. Hsin-Tien Area, New Taipei City, Taiwan 231, R.O.C.

1.2 Manufacturer

unitech Electronics Co., Ltd.

5Fl., No. 136, Lane 235, Pao-Chiao Rd. Hsin-Tien Area, New Taipei City, Taiwan 231, R.O.C.

1.3 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN: Monopole Antenna Bluetooth: Monopole Antenna GPS / Glonass: Patch Antenna NFC: Loop Antenna

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 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 1 st 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	03CH07-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 (Z 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
	-	-	-	-
	153	5765	161	5805
	-	-	165	5825

2.2 Test Mode

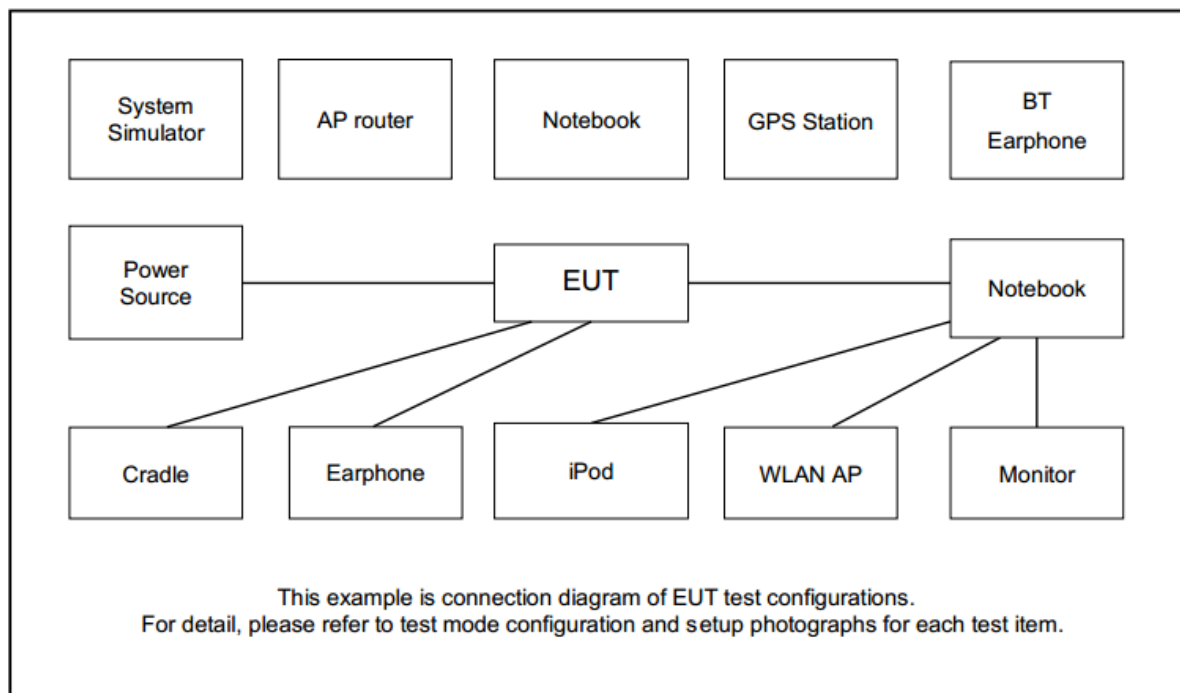
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + Bluetooth Link + Battery + Earphone + U cup USB Cable Charging with AC Power
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Ch. #		Band IV : 5725-5850 MHz	
		802.11a	802.11n HT20
L	Low	149	149
M	Middle	157	157
H	High	165	165

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.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
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.

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

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

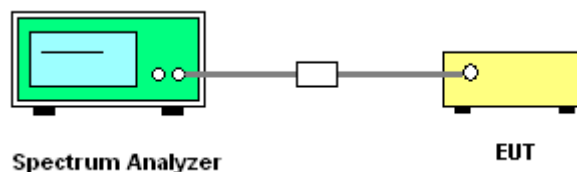
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

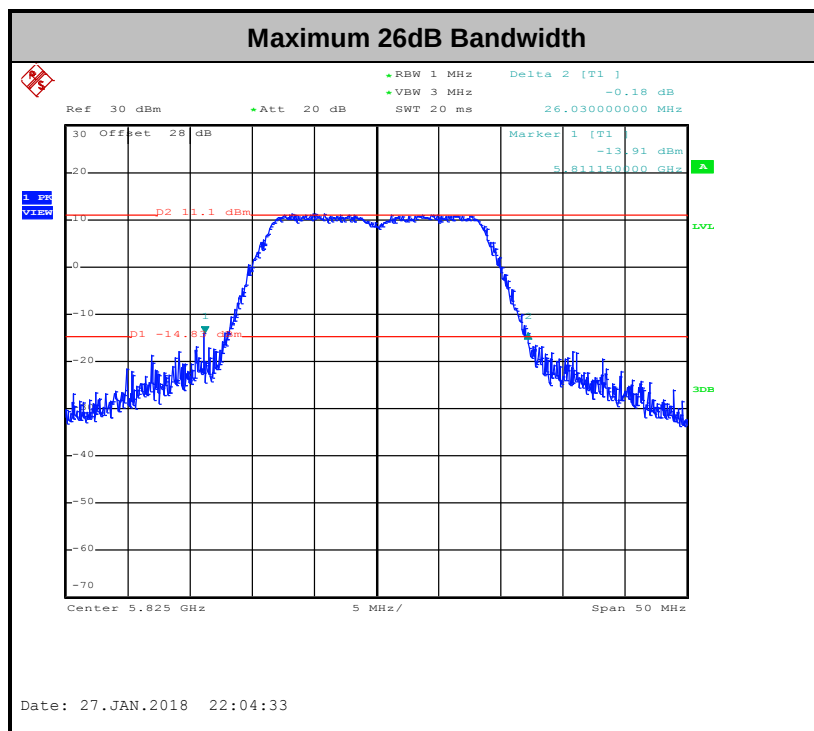
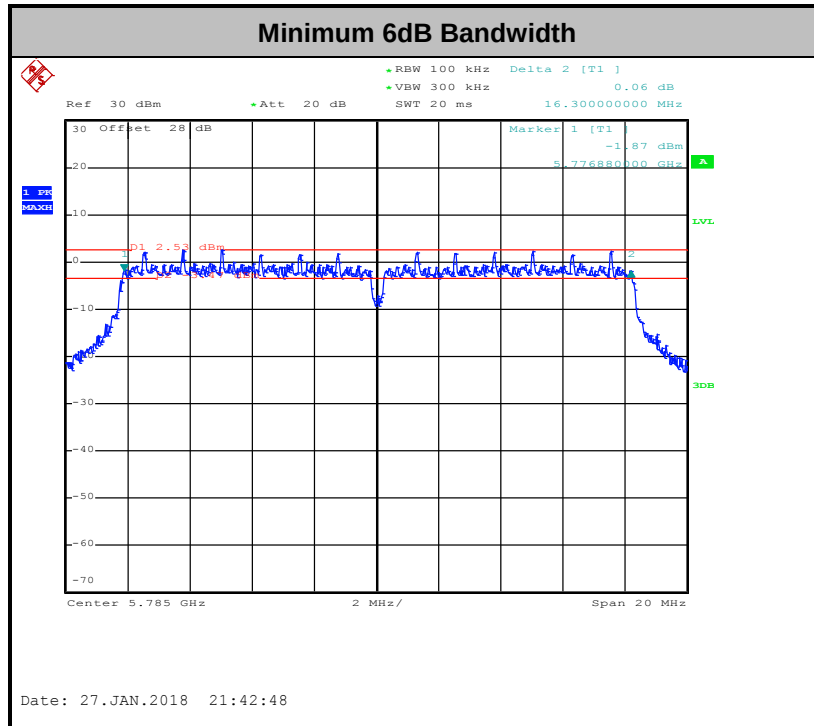
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is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

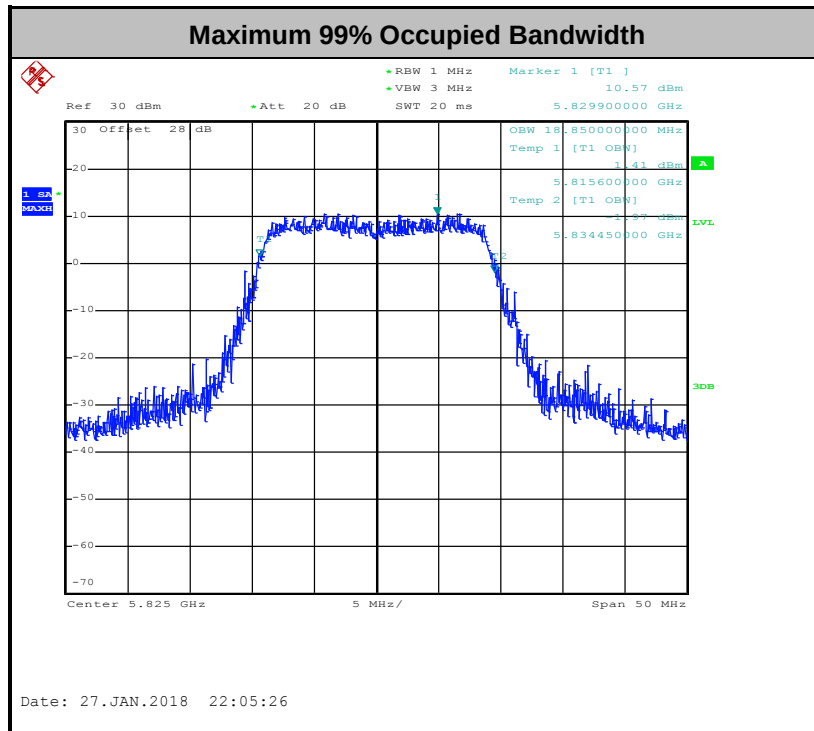
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.





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.

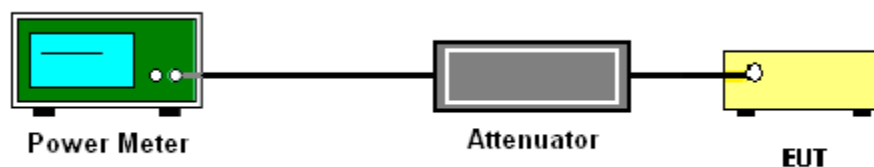
3.2.3 Test Procedures

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

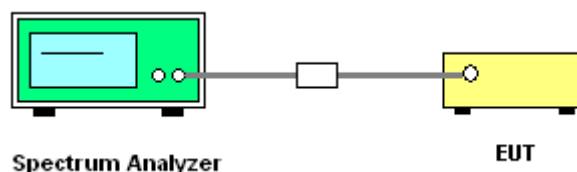
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section F) Maximum power spectral density.

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 $10 \log(500\text{kHz}/\text{RBW})$ 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.

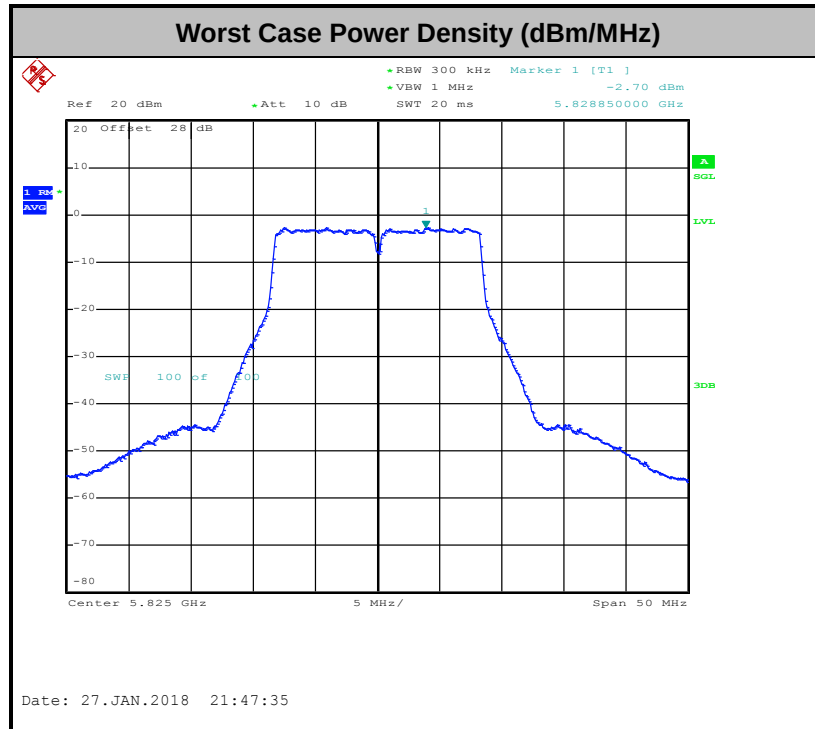
3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.





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.

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

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

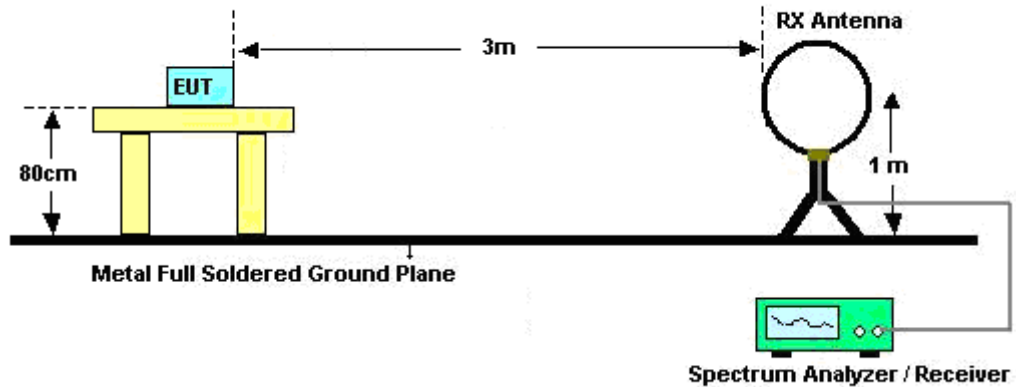
The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

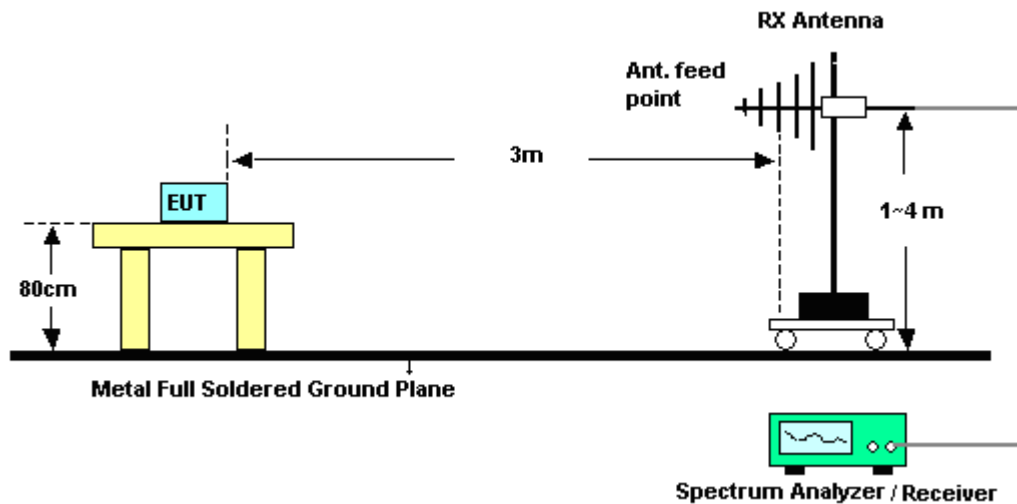
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
(1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 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 $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT 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

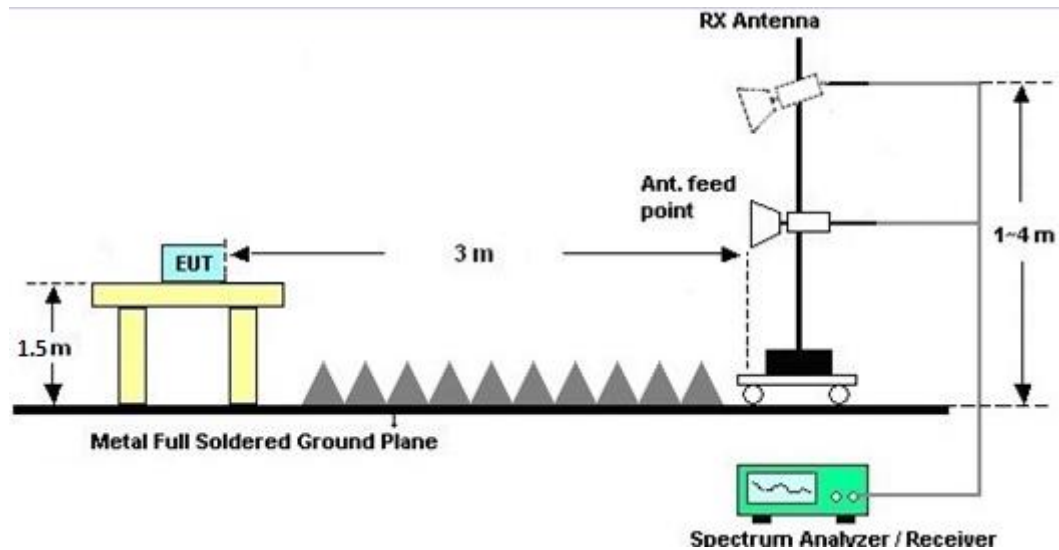
For radiated emissions below 30MHz



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.

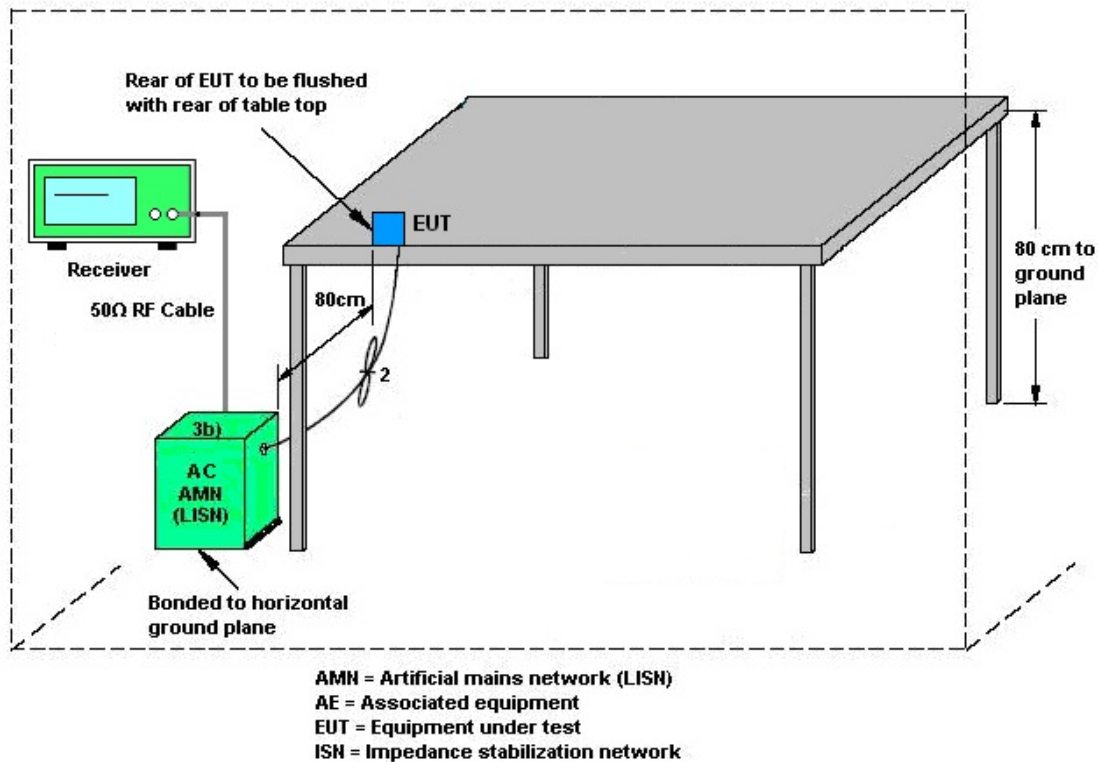
3.5.2 Measuring Instruments

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



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	0932001	N/A	Sep. 26, 2017	Dec. 28, 2017~ Jan. 27, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 26, 2017	Dec. 28, 2017~ Jan. 27, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Dec. 28, 2017~ Jan. 27, 2018	Nov. 12, 2018	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jan. 10, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 20, 2017	Jan. 10, 2018	Sep. 19, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jan. 10, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Jan. 03, 2018~ Jan. 11, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Jan. 03, 2018~ Jan. 11, 2018	Aug. 22, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Jan. 03, 2018~ Jan. 11, 2018	Nov. 09, 2019	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2017	Jan. 03, 2018~ Jan. 11, 2018	Apr. 24, 2018	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 14, 2017	Jan. 03, 2018~ Jan. 11, 2018	Mar. 13, 2018	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 30, 2017	Jan. 03, 2018~ Jan. 11, 2018	Oct. 29, 2018	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2017	Jan. 03, 2018~ Jan. 11, 2018	Apr. 16, 2018	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Jan. 03, 2018~ Jan. 11, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Jan. 03, 2018~ Jan. 11, 2018	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840- 35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jan. 03, 2018~ Jan. 11, 2018	Jul. 17, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Nov. 02, 2017	Jan. 03, 2018~ Jan. 11, 2018	Nov. 01, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jan. 03, 2018~ Jan. 11, 2018	Nov. 26, 2018	Radiation (03CH07-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.7
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.7
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.5
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Reece Lin / Luffy Lin	Temperature:	21~25	°C
Test Date:	2017/12/28~ 2018/01/27	Relative Humidity:	51~54	%

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

Band IV									
Mod.	Data Rate	N _{TX}	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	18.05	23.73	16.32	0.5	Pass
11a	6Mbps	1	157	5785	17.95	23.50	16.30	0.5	Pass
11a	6Mbps	1	165	5825	18.05	24.37	16.32	0.5	Pass
HT20	MCS 0	1	149	5745	18.80	24.27	17.60	0.5	Pass
HT20	MCS 0	1	157	5785	18.75	23.70	17.56	0.5	Pass
HT20	MCS 0	1	165	5825	18.85	26.03	17.58	0.5	Pass

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	14.72	30.00	2.78	Pass
11a	6Mbps	1	157	5785	0.59	14.71	30.00	2.78	Pass
11a	6Mbps	1	165	5825	0.59	14.89	30.00	2.78	Pass
HT20	MCS 0	1	149	5745	0.63	14.74	30.00	2.78	Pass
HT20	MCS 0	1	157	5785	0.63	14.79	30.00	2.78	Pass
HT20	MCS 0	1	165	5825	0.63	14.80	30.00	2.78	Pass
VHT20	MCS 0	1	149	5745	0.23	13.93	30.00	2.78	Pass
VHT20	MCS 0	1	157	5785	0.23	13.95	30.00	2.78	Pass
VHT20	MCS 0	1	165	5825	0.23	13.96	30.00	2.78	Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	N _{TX}	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	-0.50	30.00	2.78	Pass
11a	6Mbps	1	157	5785	0.59	2.22	-0.57	30.00	2.78	Pass
11a	6Mbps	1	165	5825	0.59	2.22	0.11	30.00	2.78	Pass
HT20	MCS 0	1	149	5745	0.63	2.22	-0.81	30.00	2.78	Pass
HT20	MCS 0	1	157	5785	0.63	2.22	-0.71	30.00	2.78	Pass
HT20	MCS 0	1	165	5825	0.63	2.22	-0.13	30.00	2.78	Pass



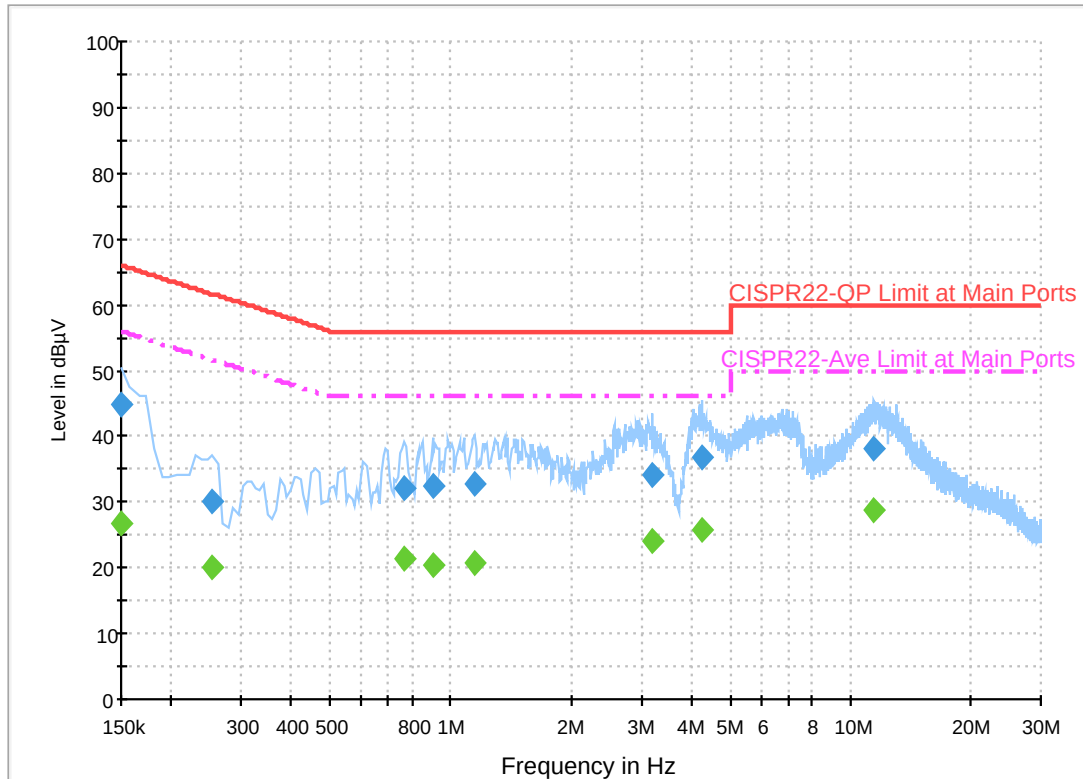
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Blue Lan	Temperature :	23~25℃
		Relative Humidity :	60~62%

EUT Information

Report NO : 7N0405
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

ENV216 Auto Test FCC Power Bar - L



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	44.9	Off	L1	19.5	21.1	66.0
0.254000	30.2	Off	L1	19.5	31.4	61.6
0.766000	32.3	Off	L1	19.5	23.7	56.0
0.902000	32.4	Off	L1	19.5	23.6	56.0
1.150000	32.8	Off	L1	19.6	23.2	56.0
3.198000	34.1	Off	L1	19.6	21.9	56.0
4.270000	36.9	Off	L1	19.6	19.1	56.0
11.502000	38.0	Off	L1	19.7	22.0	60.0

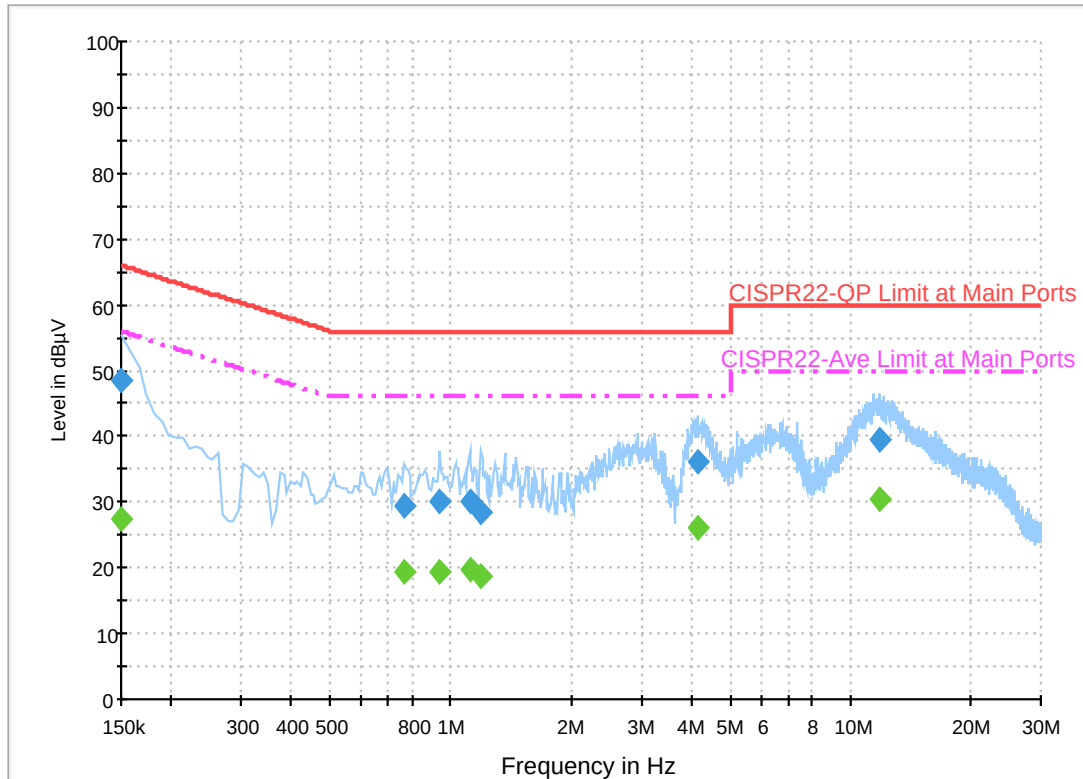
Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	26.7	Off	L1	19.5	29.3	56.0
0.254000	20.2	Off	L1	19.5	31.4	51.6
0.766000	21.4	Off	L1	19.5	24.6	46.0
0.902000	20.2	Off	L1	19.5	25.8	46.0
1.150000	20.7	Off	L1	19.6	25.3	46.0
3.198000	24.1	Off	L1	19.6	21.9	46.0
4.270000	25.8	Off	L1	19.6	20.2	46.0
11.502000	28.9	Off	L1	19.7	21.1	50.0

EUT Information

Report NO : 7N0405
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

ENV216 Auto Test FCC Power Bar - N



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.6	Off	N	19.5	17.4	66.0
0.766000	29.5	Off	N	19.5	26.5	56.0
0.942000	30.2	Off	N	19.5	25.8	56.0
1.118000	30.0	Off	N	19.5	26.0	56.0
1.190000	28.4	Off	N	19.5	27.6	56.0
4.150000	36.1	Off	N	19.6	19.9	56.0
11.838000	39.5	Off	N	19.7	20.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	27.5	Off	N	19.5	28.5	56.0
0.766000	19.3	Off	N	19.5	26.7	46.0
0.942000	19.5	Off	N	19.5	26.5	46.0
1.118000	19.9	Off	N	19.5	26.1	46.0
1.190000	18.7	Off	N	19.5	27.3	46.0
4.150000	26.2	Off	N	19.6	19.8	46.0
11.838000	30.4	Off	N	19.7	19.6	50.0



Appendix C. Radiated Spurious Emission

Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	17~21°C
		Relative Humidity :	48~58%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5621	49.87	-18.33	68.2	37.37	35.07	12.61	35.18	282	8	P	H
		5692	54.16	-45.14	99.3	41.52	35.17	12.67	35.2	282	8	P	H
		5703.6	50.92	-55.29	106.21	38.2	35.19	12.73	35.2	282	8	P	H
		5725	58.51	-63.69	122.2	45.77	35.21	12.73	35.2	282	8	P	H
	*	5745	108.63	-	-	95.81	35.24	12.79	35.21	282	8	P	H
	*	5745	100.74	-	-	87.92	35.24	12.79	35.21	282	8	A	H
													H
													H
		5617	49.6	-18.6	68.2	37.15	35.07	12.56	35.18	226	38	P	V
		5693	53.82	-46.22	100.04	41.18	35.17	12.67	35.2	226	38	P	V
		5715.6	52.06	-57.51	109.57	39.34	35.19	12.73	35.2	226	38	P	V
		5724.8	59.07	-62.67	121.74	46.33	35.21	12.73	35.2	226	38	P	V
	*	5745	104.68	-	-	91.86	35.24	12.79	35.21	226	38	P	V
	*	5745	98.48	-	-	85.66	35.24	12.79	35.21	226	38	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5648.4	50.41	-17.79	68.2	37.9	35.09	12.61	35.19	285	21	P	H
		5689.2	50.25	-46.99	97.24	37.61	35.17	12.67	35.2	285	21	P	H
		5719.2	51.76	-58.82	110.58	39.02	35.21	12.73	35.2	285	21	P	H
		5722.4	48.86	-67.41	116.27	36.12	35.21	12.73	35.2	285	21	P	H
	*	5785	108.06	-	-	95.14	35.29	12.85	35.22	285	21	P	H
	*	5785	101.12	-	-	88.2	35.29	12.85	35.22	285	21	A	H
		5853.6	50.63	-63.36	113.99	37.51	35.41	12.94	35.23	285	21	P	H
		5863	50.48	-58.08	108.56	37.29	35.41	13.02	35.24	285	21	P	H
		5881.8	51.47	-48.68	100.15	38.26	35.43	13.02	35.24	285	21	P	H
		5927.6	50.79	-17.41	68.2	37.42	35.5	13.11	35.24	285	21	P	H
													H
													H
		5648.2	50.8	-17.4	68.2	38.29	35.09	12.61	35.19	225	42	P	V
		5673	49.45	-35.81	85.26	36.83	35.14	12.67	35.19	225	42	P	V
		5701.2	51.29	-54.25	105.54	38.57	35.19	12.73	35.2	225	42	P	V
		5722.8	50.07	-67.11	117.18	37.33	35.21	12.73	35.2	225	42	P	V
	*	5785	104.67	-	-	91.75	35.29	12.85	35.22	225	42	P	V
	*	5785	98.01	-	-	85.09	35.29	12.85	35.22	225	42	A	V
		5850.2	51.25	-70.49	121.74	38.16	35.38	12.94	35.23	225	42	P	V
		5855	50.89	-59.91	110.8	37.77	35.41	12.94	35.23	225	42	P	V
		5912.6	51.42	-25.93	77.35	38.07	35.48	13.11	35.24	225	42	P	V
		5943	51.21	-16.99	68.2	37.73	35.53	13.2	35.25	225	42	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	108.46	-	-	95.38	35.36	12.94	35.22	280	21	P	H
	*	5825	100.62	-	-	87.54	35.36	12.94	35.22	280	21	A	H
		5851	55.67	-64.25	119.92	42.58	35.38	12.94	35.23	280	21	P	H
		5855.2	51.84	-58.9	110.74	38.72	35.41	12.94	35.23	280	21	P	H
		5877.4	54.62	-48.8	103.42	41.41	35.43	13.02	35.24	280	21	P	H
		5930	51.63	-16.57	68.2	38.26	35.5	13.11	35.24	280	21	P	H
													H
													H
	*	5825	104.43	-	-	91.35	35.36	12.94	35.22	224	42	P	V
	*	5825	97.71	-	-	84.63	35.36	12.94	35.22	224	42	A	V
		5850.8	55.59	-64.79	120.38	42.5	35.38	12.94	35.23	224	42	P	V
		5866.2	50.15	-57.51	107.66	36.96	35.41	13.02	35.24	224	42	P	V
		5876.8	51.72	-52.14	103.86	38.51	35.43	13.02	35.24	224	42	P	V
		5930.6	50.47	-17.73	68.2	37.1	35.5	13.11	35.24	224	42	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	47.5	-26.5	74	47.14	38.38	18.88	57.34	100	0	P	H
		17235	47.88	-20.32	68.2	38.1	41.77	23.38	55.8	100	0	P	H
													H
													H
		11490	48.73	-25.27	74	48.37	38.38	18.88	57.34	100	0	P	V
		17235	47.91	-20.29	68.2	38.13	41.77	23.38	55.8	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	45.2	-28.8	74	44.58	38.46	18.95	57.19	100	0	P	H
		17355	48.33	-19.87	68.2	38.65	41.61	23.45	55.8	100	0	P	H
													H
													H
		11570	48.45	-25.55	74	47.83	38.46	18.95	57.19	100	0	P	V
		17355	47.65	-20.55	68.2	37.97	41.61	23.45	55.8	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	46.4	-27.6	74	45.53	38.51	19.03	57.08	100	0	P	H
		17475	47.69	-20.51	68.2	38.12	41.45	23.52	55.8	100	0	P	H
													H
													H
		11650	48.46	-25.54	74	47.59	38.51	19.03	57.08	100	0	P	V
		17475	47.67	-20.53	68.2	38.1	41.45	23.52	55.8	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 802.11n 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5633.6	49.63	-18.57	68.2	37.12	35.09	12.61	35.19	280	8	P	H
		5693.2	52.8	-47.39	100.19	40.16	35.17	12.67	35.2	280	8	P	H
		5718.4	55.13	-55.22	110.35	42.39	35.21	12.73	35.2	280	8	P	H
		5724.8	63.06	-58.68	121.74	50.32	35.21	12.73	35.2	280	8	P	H
	*	5745	108.11	-	-	95.29	35.24	12.79	35.21	280	8	P	H
	*	5745	100.37	-	-	87.55	35.24	12.79	35.21	280	8	A	H
													H
													H
		5608.2	50.34	-17.86	68.2	37.92	35.04	12.56	35.18	228	38	P	V
		5692.6	52.69	-47.05	99.74	40.05	35.17	12.67	35.2	228	38	P	V
		5719.8	52.71	-58.03	110.74	39.97	35.21	12.73	35.2	228	38	P	V
		5724.2	61.69	-58.69	120.38	48.95	35.21	12.73	35.2	228	38	P	V
	*	5745	105.26	-	-	92.44	35.24	12.79	35.21	228	38	P	V
	*	5745	98.15	-	-	85.33	35.24	12.79	35.21	228	38	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5646.4	50.05	-18.15	68.2	37.54	35.09	12.61	35.19	286	20	P	H
		5653	49.87	-20.56	70.43	37.33	35.12	12.61	35.19	286	20	P	H
		5719.6	50.61	-60.08	110.69	37.87	35.21	12.73	35.2	286	20	P	H
		5721.4	49.28	-64.71	113.99	36.54	35.21	12.73	35.2	286	20	P	H
	*	5785	108.25	-	-	95.33	35.29	12.85	35.22	286	20	P	H
	*	5785	100.96	-	-	88.04	35.29	12.85	35.22	286	20	A	H
		5851.8	50.56	-67.54	118.1	37.47	35.38	12.94	35.23	286	20	P	H
		5859.8	51.47	-57.98	109.45	38.36	35.41	12.94	35.24	286	20	P	H
		5911.2	51.14	-27.24	78.38	37.79	35.48	13.11	35.24	286	20	P	H
		5930.6	50.37	-17.83	68.2	37	35.5	13.11	35.24	286	20	P	H
													H
													H
		5617.4	50.77	-17.43	68.2	38.32	35.07	12.56	35.18	222	41	P	V
		5662	50.17	-26.94	77.11	37.57	35.12	12.67	35.19	222	41	P	V
		5718.2	51.29	-59.01	110.3	38.55	35.21	12.73	35.2	222	41	P	V
		5723	48.44	-69.2	117.64	35.7	35.21	12.73	35.2	222	41	P	V
	*	5785	104.11	-	-	91.19	35.29	12.85	35.22	222	41	P	V
	*	5785	97.71	-	-	84.79	35.29	12.85	35.22	222	41	A	V
		5851.8	49.65	-68.45	118.1	36.56	35.38	12.94	35.23	222	41	P	V
		5865.4	50.7	-57.19	107.89	37.51	35.41	13.02	35.24	222	41	P	V
		5885.2	51.25	-46.38	97.63	38.04	35.43	13.02	35.24	222	41	P	V
		5944.2	50.48	-17.72	68.2	37	35.53	13.2	35.25	222	41	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5825	108.84	-	-	95.76	35.36	12.94	35.22	282	19	P	H
	*	5825	101.26	-	-	88.18	35.36	12.94	35.22	282	19	A	H
		5850.01	60.83	-61.35	122.18	47.74	35.38	12.94	35.23	282	19	P	H
		5866.4	52.04	-55.57	107.61	38.85	35.41	13.02	35.24	282	19	P	H
		5877.4	53.48	-49.94	103.42	40.27	35.43	13.02	35.24	282	19	P	H
		5934	52	-16.2	68.2	38.63	35.5	13.11	35.24	282	19	P	H
													H
													H
	*	5825	104.31	-	-	91.23	35.36	12.94	35.22	226	42	P	V
	*	5825	97.14	-	-	84.06	35.36	12.94	35.22	226	42	A	V
		5850.01	52.48	-69.7	122.18	39.39	35.38	12.94	35.23	226	42	P	V
		5863	51.2	-57.36	108.56	38.01	35.41	13.02	35.24	226	42	P	V
		5877	51.5	-52.21	103.71	38.29	35.43	13.02	35.24	226	42	P	V
		5943.2	51.11	-17.09	68.2	37.63	35.53	13.2	35.25	226	42	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)	Cable 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	46.03	-27.97	74	45.67	38.38	18.88	57.34	100	0	P	H
		17235	47.51	-20.69	68.2	37.73	41.77	23.38	55.8	100	0	P	H
													H
													H
		11490	48.19	-25.81	74	47.83	38.38	18.88	57.34	100	0	P	V
		17235	48.69	-19.51	68.2	38.91	41.77	23.38	55.8	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11570	45.76	-28.24	74	45.14	38.46	18.95	57.19	100	0	P	H
		17355	47.51	-20.69	68.2	37.83	41.61	23.45	55.8	100	0	P	H
													H
													H
		11570	47.06	-26.94	74	46.44	38.46	18.95	57.19	100	0	P	V
		17355	48.21	-19.99	68.2	38.53	41.61	23.45	55.8	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11650	46.89	-27.11	74	46.02	38.51	19.03	57.08	100	0	P	H
		17475	47.41	-20.79	68.2	37.84	41.45	23.52	55.8	100	0	P	H
													H
													H
		11650	47.31	-26.69	74	46.44	38.51	19.03	57.08	100	0	P	V
		17475	48.73	-19.47	68.2	39.16	41.45	23.52	55.8	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		30.27	27.13	-12.87	40	32.17	24.6	1.71	31.35	-	-	P	H
		48.36	25.63	-14.37	40	40.39	15.07	1.71	31.6	-	-	P	H
		258.69	26.15	-19.85	46	34.98	19.42	3.03	31.36	-	-	P	H
		856.5	33.46	-12.54	46	29.64	28.93	5.2	30.55	-	-	P	H
		906.2	33.87	-12.13	46	29.94	28.85	5.33	30.52	-	-	P	H
		959.4	36.74	-9.26	46	30.68	30.85	5.4	30.51	100	0	P	H
													H
													H
													H
													H
													H
													H
		32.43	28.26	-11.74	40	34.85	23.08	1.71	31.39	-	-	P	V
		78.06	24.01	-15.99	40	40.25	13.1	2.11	31.58	-	-	P	V
		264.9	31.43	-14.57	46	40.07	19.35	3.28	31.35	-	-	P	V
		836.2	33.23	-12.77	46	30	28.37	5.2	30.56	-	-	P	V
		912.5	33.94	-12.06	46	29.86	29	5.33	30.52	-	-	P	V
		952.4	35.8	-10.2	46	30.1	30.49	5.4	30.51	100	0	P	V
													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	Peak or Average
H/V	Horizontal or Vertical



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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		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. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable 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) + Cable 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

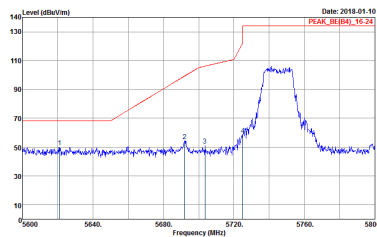
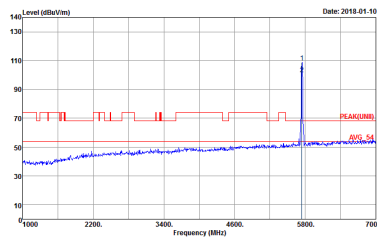
Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	17~21°C
		Relative Humidity :	48~58%

Note symbol

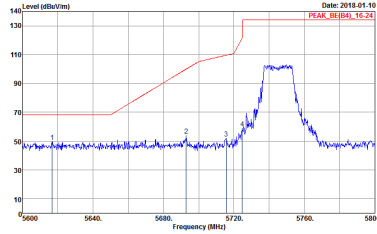
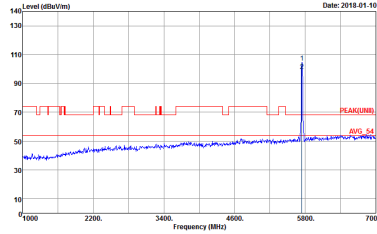
-L	Low channel location
-R	High channel location

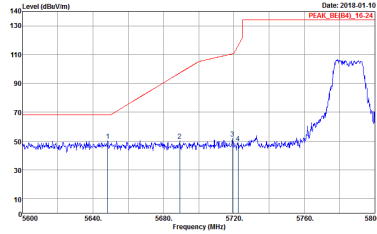
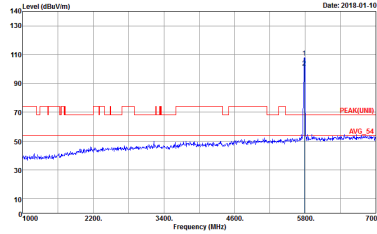
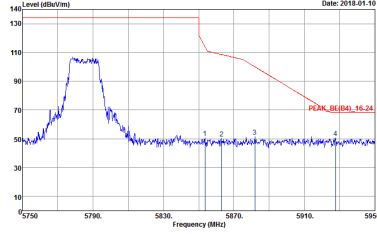
Band 4 - 5725~5850MHz

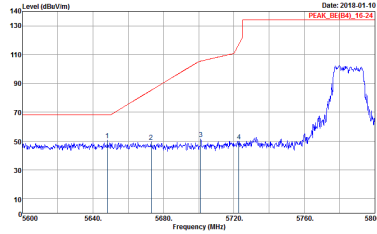
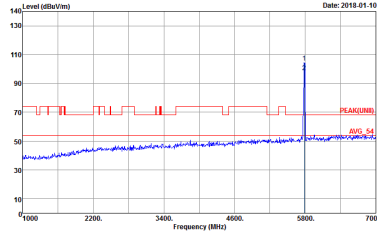
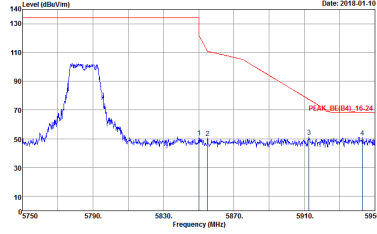
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-HY Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 7N0405 Date : 2018-01-10	 Site : 03CH07-HY Condition : PEAK(UNII) 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 7N0405 Date : 2018-01-10

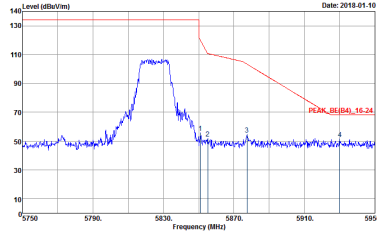
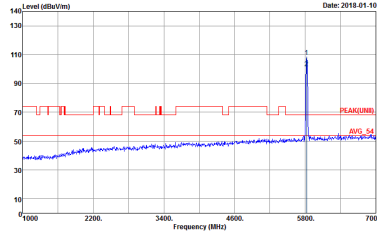


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH07-1HY Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 24	 Site : 03CH07-1HY Condition : PEAK(UNII) 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 24

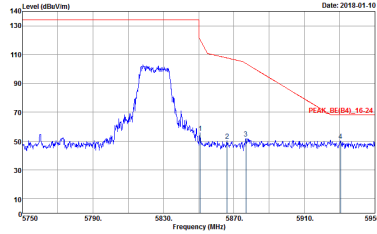
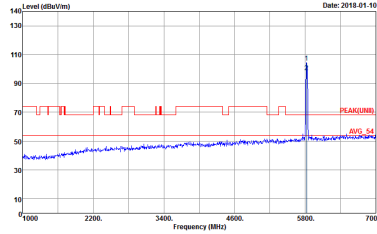
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 25	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 25
	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 25	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 25	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 25
	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 25	Left blank



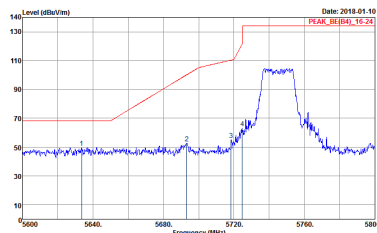
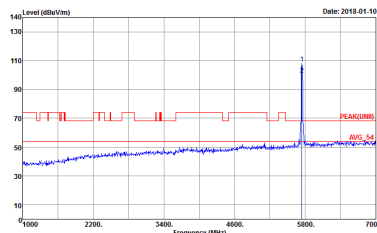
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z6	 Site : 03CH07-4Y Condition : PEAK(FUND)_16-24 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z6



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z6	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m HF_ANT_00075962 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z6

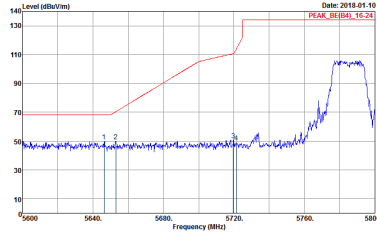
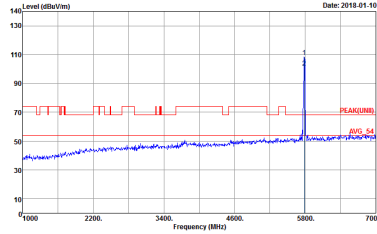
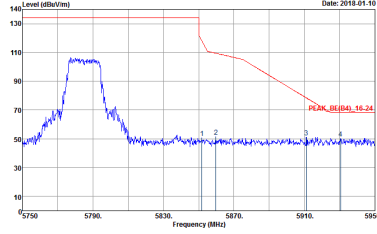


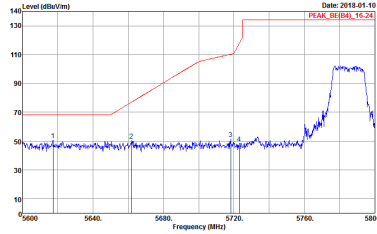
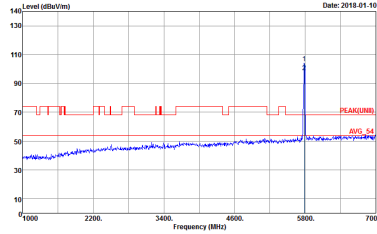
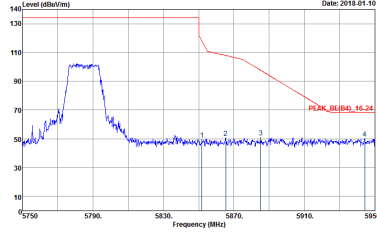
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-HY Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:3000.000kHz VBW:3000.000kHz SWT:Auto Project : 7N0405 Mode : 27	 Site : 03CH07-HY Condition : PEAK(UNB) 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:3000.000kHz VBW:3000.000kHz SWT:Auto Project : 7N0405 Mode : 27

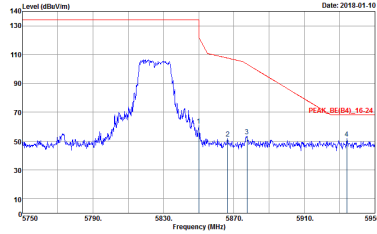
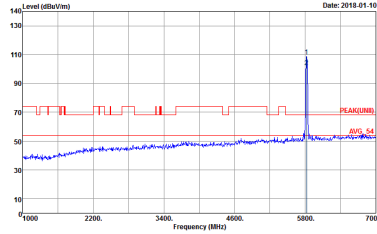


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1	Vertical	Fundamental
Peak	Site : 03CH07-1HY Condition : PEAK_86(84)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 27	Site : 03CH07-1HY Condition : PEAK_86(84)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 27

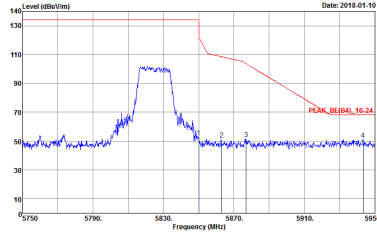
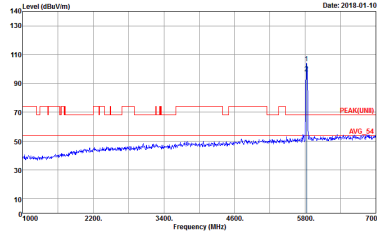
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 7N0405 Date: 2018-01-10 PEAK_BE(B4)_15-24	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 7N0405 Date: 2018-01-10 PEAK(UNII)_15-24
	 Site : 03CH07-4Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 7N0405 Date: 2018-01-10 PEAK_BE(B4)_15-24	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH07-4Y Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 28	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 28
	 Site : 03CH07-4Y Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 VERTICAL Detector : Peak Project : 7N0405 Mode : 28	Left blank

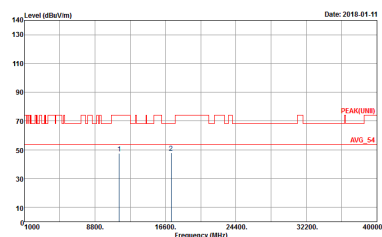
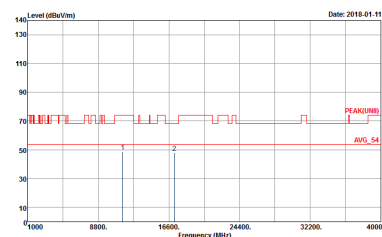


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH07-14Y Condition : PEAK_BE(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : 29	 Site : 03CH07-14Y Condition : PEAK(B4)_16-24 3m HF_ANT_00075962 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : 29



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH07-14Y Condition : PEAK_BE(84)_16-24 3m HF_ANT_00075962 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z9	 Site : 03CH07-14Y Condition : PEAK(UNII) 3m HF_ANT_00075962 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 7N0405 Mode : Z9

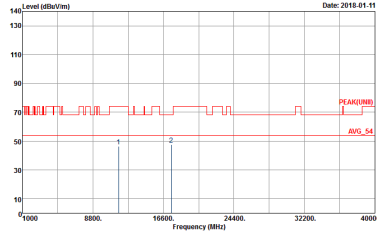
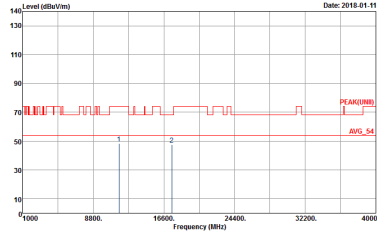
Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH07-14Y Condition : PEAK(UNIT) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 24	 Site : 03CH07-14Y Condition : PEAK(UNIT) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N0405 Mode : 24

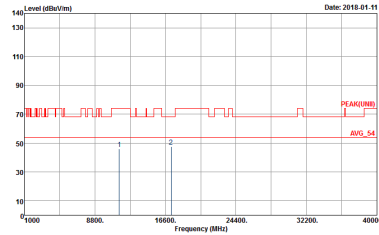
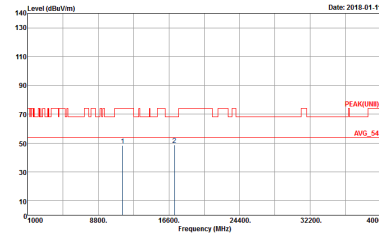


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7ND005 Mode : 25	Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7ND005 Mode : 25



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7ND405 Mode : 25	 Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7ND405 Mode : 25

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.	 Site : 03CH07-HY Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 27	 Site : 03CH07-HY Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N0405 Mode : 27

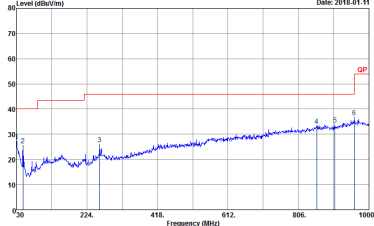
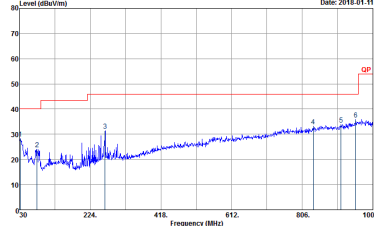


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1	Horizontal	Vertical
Peak Avg.	Site : 03CH07-4V Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7ND005 Mode : 28	Site : 03CH07-4V Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7ND005 Mode : 28



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 HORIZONTAL Detector : Peak Project : 7N0405 Mode : 29	Site : 03CH07-4Y Condition : PEAK(UNII) 3m SHF-EHF_131029 VERTICAL Detector : Peak Project : 7N0405 Mode : 29

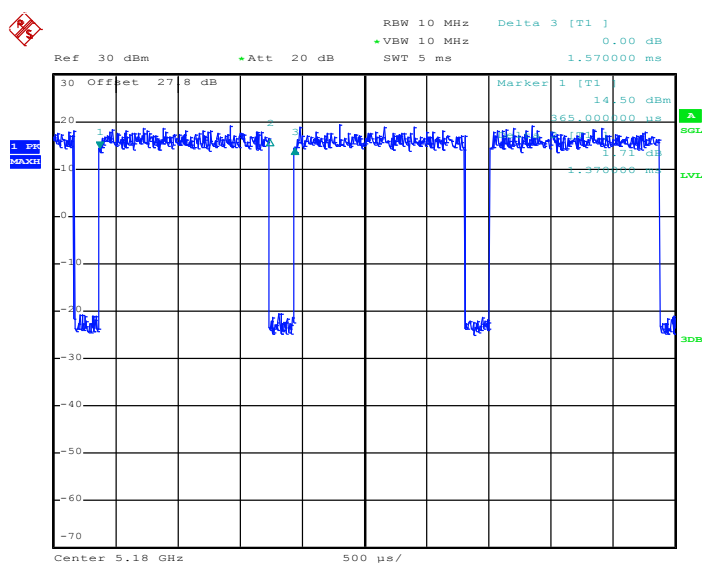
Emission below 1GHz
5GHz WIFI 802.11n HT20 (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11n HT20 LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH07-1FY Condition : QP 3m LF-ANT-35419(6) HORIZONTAL Detector : Peak Project : 7N0405 Mode : 30	 Site : 03CH07-1FY Condition : QP 3m LF-ANT-35419(6) VERTICAL Detector : Peak Project : 7N0405 Mode : 30

Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
802.11a	87.26	1370.00	0.73	1kHz	0.59
5GHz 802.11n HT20	86.49	1280.00	0.78	1kHz	0.63

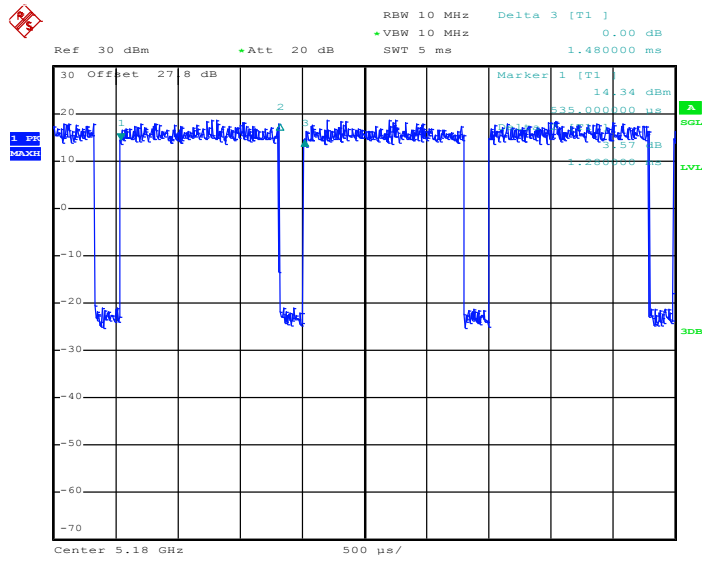
802.11a



Date: 28.DEC.2017 16:12:07



802.11n HT20



Date: 28.DEC.2017 16:13:48