FCC RF Test Report

APPLICANT	:	Getac Technology Corporation.
EQUIPMENT	:	WLAN module
BRAND NAME	:	Getac
MODEL NAME	:	8265NGW
FCC ID	:	QYL8265NG
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

This is a partial report. The product testing was completed on Jul. 08, 2018. We, Sporton International (Shenzhen) 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.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

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

Eric Shih

Approved by: Eric Shih / Manager

TESTING
NVLAP LAB CODE 600156-0

Sporton International (Shenzhen) Inc.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China

TABLE OF CONTENTS

REVISION HISTORY **3**
SUMMARY OF TEST RESULT **4**
1 GENERAL DESCRIPTION **5**
1.1 Applicant 5
1.2 Product Feature of Equipment Under Test 5
1.3 Modification of EUT 5
1.4 Testing Location 6
1.5 Applicable Standards 6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **7**
2.1 Carrier Frequency and Channel 7
2.2 Test Mode 7
2.3 Connection Diagram of Test System 8
2.4 Support Unit used in test configuration and system 8
2.5 EUT Operation Test Setup 8
3 TEST RESULT **9**
3.1 Output Power Measurement 9
3.2 Radiated Band Edges and Spurious Emission Measurement 10
3.3 Antenna Requirements 14
4 LIST OF MEASURING EQUIPMENT **15**
5 UNCERTAINTY OF EVALUATION **16**
APPENDIX A. CONDUCTED TEST RESULTS
APPENDIX B. RADIATED SPURIOUS EMISSION
APPENDIX C. RADIATED SPURIOUS EMISSION PLOTS
APPENDIX D. DUTY CYCLE PLOTS
APPENDIX E. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR570164-39C	Rev. 01	Initial issue of report	Jul. 31, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.59 dB at 2390.00 MHz
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-
Remark: Except Conducted output power and Radiated Spurious Emission is carrying out, for the other test data please refer to modular report “160321-01.TR02”.					

1 General Description

1.1 Applicant

Getac Technology Corporation.
5F., Building A, No. 209, Sec.1, Nangang Rd.,Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

1.2 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS: PATCH Antenna NFC: Loop Antenna Digitizer: Loop Antenna

The product was installed into Tablet (Brand Name: Getac, Model Name: RX10) during test, and all tests were performed with SKU A.

SKU Table		
RX10 SKU		
	SKU A	SKU B
CPU	i5	M3
DDR	8G	4G
SSD	256GB	128GB
Panel	FHD	FHD
Digitizer	Support	Not Support
WLAN/BT	Support	Not Support
WWAN	Support	Not Support
GPS	Support	Not Support
RFID	Support	Not Support
Battery	5800mAh & 2160mAh	2160mAh

1.3 Modification of EUT

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

1.4 Testing Location

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist. Taoyuan City Taiwan Tel: 886-3-327-3456 FAX: +886-3-327-0978		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	TH05-HY	TW1190	553509

Note: Test data subcontracted Conducted power in section 3.1 of this report.

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No is CN5019.

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	577730

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

1.5 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated:, radiation emission (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 (Y plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

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

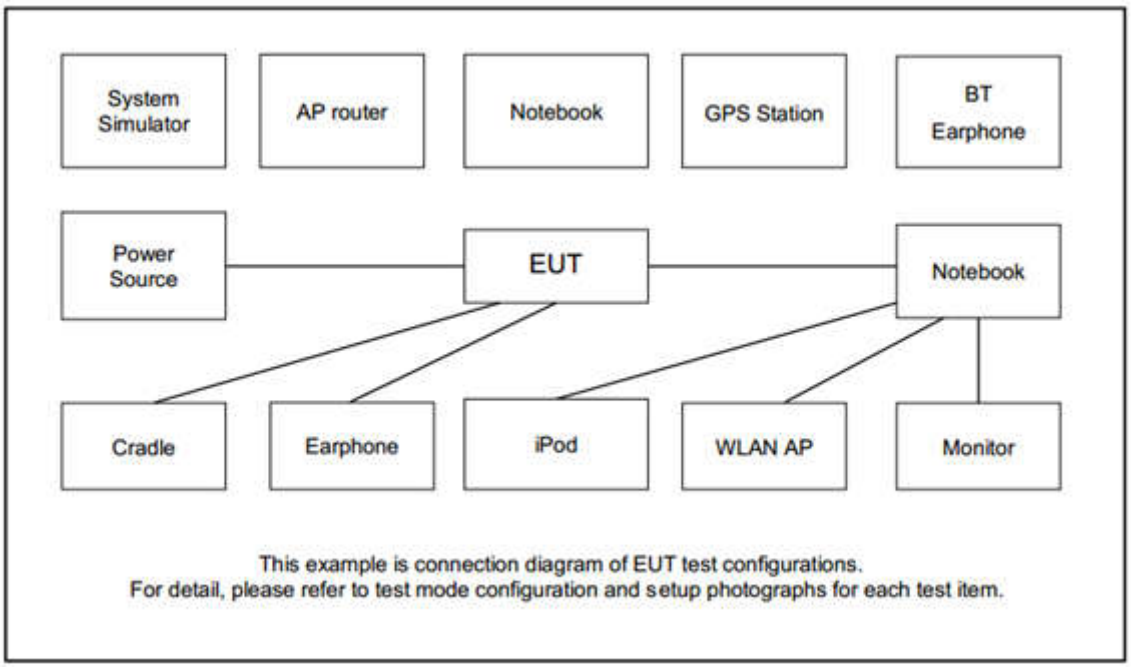
Single Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps

MIMO Antenna

Modulation	Data Rate
802.11n HT20	MCS0

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.	Earphone	Apple	MC690ZP/A	N/A	Shielded, 1.0m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

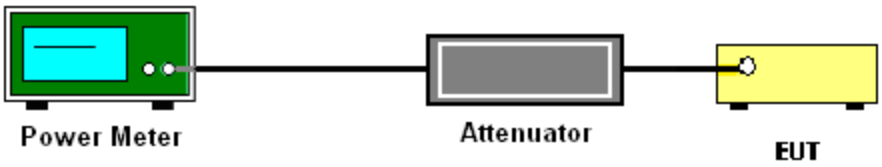
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.3 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.1.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.2.2 Measuring Instruments

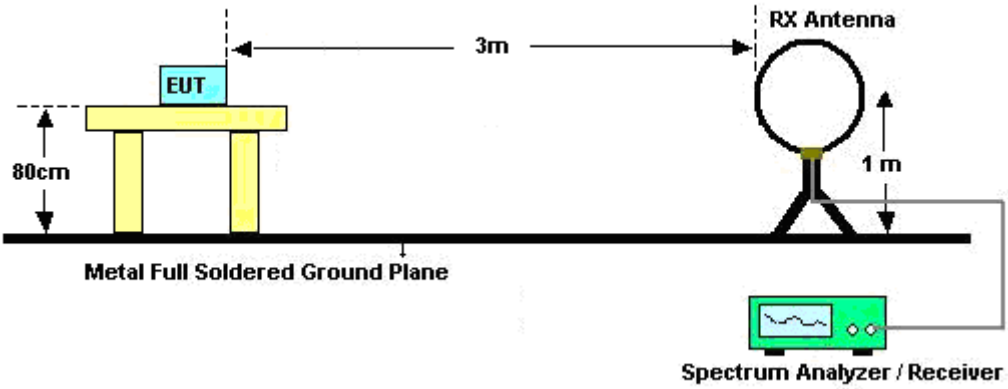
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

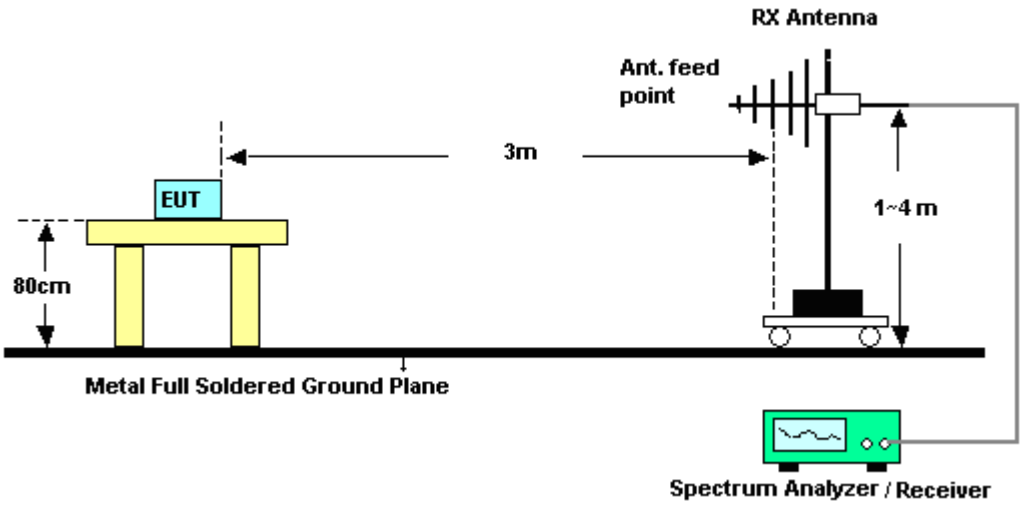
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
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.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - 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.

3.2.4 Test Setup

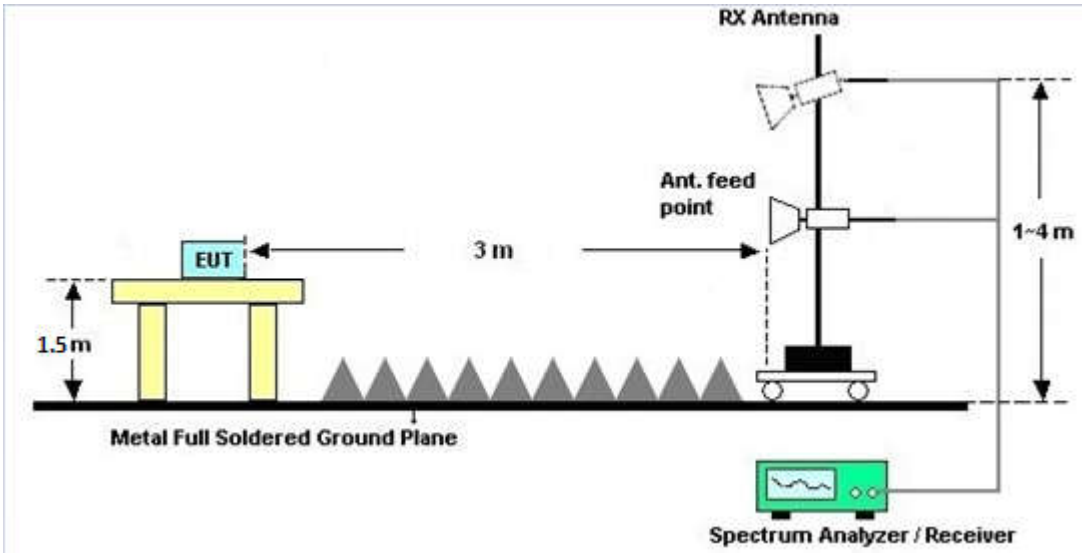
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.2.7 Duty Cycle

Please refer to Appendix D.

3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.3 Antenna Requirements

3.3.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>						
	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	2.35	-0.28	2.35	4.14	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

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	Jun. 15, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 07, 2017	Jun. 15, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2017	Jun. 15, 2018	Nov. 20, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Jun. 15, 2018	Feb. 28, 2019	Conducted (TH05-HY)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Apr. 19, 2018	Jul. 06, 2018~ Jul. 08, 2018	Apr.18, 2019	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May.14, 2018	Jul. 06, 2018~ Jul. 08, 2018	May.13, 2019	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Apr. 19, 2018	Jul. 06, 2018~ Jul. 08, 2018	Apr. 18, 2019	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	119436	1GHz~18GHz	Jul. 28, 2017	Jul. 06, 2018~ Jul. 08, 2018	Jul. 27, 2018	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Mar.30, 2018	Jul. 06, 2018~ Jul. 08, 2018	Mar.29, 2019	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 19, 2018	Jul. 06, 2018~ Jul. 08, 2018	Apr.18, 2019	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1707137	1GHz~18GHz	Oct.19, 2017	Jul. 06, 2018~ Jul. 08, 2018	Oct 18, 2018	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5GHz	Oct.19, 2017	Jul. 06, 2018~ Jul. 08, 2018	Oct 18, 2018	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul.18.2017	Jul. 06, 2018~ Jul. 08, 2018	Jul.17.2018	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jul. 06, 2018~ Jul. 08, 2018	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 06, 2018~ Jul. 08, 2018	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Eason Huang	Temperature:	21~25	°C
Test Date:	2018/6/15	Relative Humidity:	51~54	%

Report Number : FR570164-39C

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	17.59	17.55	-	30.00	30.00	2.35	-0.28	19.94	17.27	36.00	36.00	Pass
11b	1Mbps	1	6	2437	17.65	17.64	-	30.00	30.00	2.35	-0.28	20.00	17.36	36.00	36.00	Pass
11b	1Mbps	1	11	2462	17.71	17.62	-	30.00	30.00	2.35	-0.28	20.06	17.34	36.00	36.00	Pass
11g	6Mbps	1	1	2412	20.37	20.24	-	30.00	30.00	2.35	-0.28	22.72	19.96	36.00	36.00	Pass
11g	6Mbps	1	6	2437	20.22	20.21	-	30.00	30.00	2.35	-0.28	22.57	19.93	36.00	36.00	Pass
11g	6Mbps	1	11	2462	20.20	20.18	-	30.00	30.00	2.35	-0.28	22.55	19.90	36.00	36.00	Pass
HT20	MCS0	1	1	2412	20.45	20.34	-	30.00	30.00	2.35	-0.28	22.80	20.06	36.00	36.00	Pass
HT20	MCS0	1	6	2437	20.43	20.31	-	30.00	30.00	2.35	-0.28	22.78	20.03	36.00	36.00	Pass
HT20	MCS0	1	11	2462	20.34	20.36	-	30.00	30.00	2.35	-0.28	22.69	20.08	36.00	36.00	Pass
HT40	MCS0	1	3	2422	19.28	19.26	-	30.00	30.00	2.35	-0.28	21.63	18.98	36.00	36.00	Pass
HT40	MCS0	1	6	2437	19.32	19.22	-	30.00	30.00	2.35	-0.28	21.67	18.94	36.00	36.00	Pass
HT40	MCS0	1	9	2452	19.34	19.32	-	30.00	30.00	2.35	-0.28	21.69	19.04	36.00	36.00	Pass
VHT20		1	1	2412	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
VHT20		1	6	2437	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
VHT20		1	11	2462	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
VHT40		1	3	2422	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
VHT40		1	6	2437	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
VHT40		1	9	2452	-	-	-	30.00	30.00	2.35	-0.28	-	-	-	-	Pass
11b	1Mbps	2	1	2412	-	-	-	30.00		2.35		-		-		Pass
11b	1Mbps	2	6	2437	-	-	-	30.00		2.35		-		-		Pass
11b	1Mbps	2	11	2462	-	-	-	30.00		2.35		-		-		Pass
11g	6Mbps	2	1	2412	-	-	-	30.00		2.35		-		-		Pass
11g	6Mbps	2	6	2437	-	-	-	30.00		2.35		-		-		Pass
11g	6Mbps	2	11	2462	-	-	-	30.00		2.35		-		-		Pass
HT20	MCS0	2	1	2412	17.23	17.21	20.23	30.00		2.35		22.58		36.00		Pass
HT20	MCS0	2	6	2437	17.34	17.12	20.24	30.00		2.35		22.59		36.00		Pass
HT20	MCS0	2	11	2462	17.25	17.18	20.23	30.00		2.35		22.58		36.00		Pass
HT40	MCS0	2	3	2422	15.50	15.49	18.51	30.00		2.35		20.86		36.00		Pass
HT40	MCS0	2	6	2437	15.53	15.50	18.53	30.00		2.35		20.88		36.00		Pass
HT40	MCS0	2	9	2452	15.54	15.55	18.56	30.00		2.35		20.91		36.00		Pass
VHT20	MCS0	2	1	2412	-	-	-	30.00		2.35		-		-		Pass
VHT20	MCS0	2	6	2437	-	-	-	30.00		2.35		-		-		Pass
VHT20	MCS0	2	11	2462	-	-	-	30.00		2.35		-		-		Pass
VHT40	MCS0	2	3	2422	-	-	-	30.00		2.35		-		-		Pass
VHT40	MCS0	2	6	2437	-	-	-	30.00		2.35		-		-		Pass
VHT40	MCS0	2	9	2452	-	-	-	30.00		2.35		-		-		Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.05	0.05	14.90	14.86	-
11b	1Mbps	1	6	2437	0.05	0.05	14.91	14.90	
11b	1Mbps	1	11	2462	0.05	0.05	14.92	14.85	
11g	6Mbps	1	1	2412	0.06	0.06	14.99	14.89	
11g	6Mbps	1	6	2437	0.06	0.06	14.95	14.93	
11g	6Mbps	1	11	2462	0.06	0.06	14.93	14.91	
HT20	MCS0	1	1	2412	0.06	0.07	14.92	14.89	
HT20	MCS0	1	6	2437	0.06	0.07	14.94	14.87	
HT20	MCS0	1	11	2462	0.06	0.07	14.90	14.89	
HT40	MCS0	1	3	2422	0.12	0.14	14.88	14.87	
HT40	MCS0	1	6	2437	0.12	0.14	14.89	14.82	
HT40	MCS0	1	9	2452	0.12	0.14	14.92	14.91	
HT20	MCS0	2	1	2412	0.08	0.08	11.91	11.88	14.91
HT20	MCS0	2	6	2437	0.08	0.08	12.02	11.79	14.92
HT20	MCS0	2	11	2462	0.08	0.08	11.90	11.85	14.89
HT40	MCS0	2	3	2422	0.16	0.16	11.84	11.83	14.85
HT40	MCS0	2	6	2437	0.16	0.16	11.86	11.84	14.86
HT40	MCS0	2	9	2452	0.16	0.16	11.83	11.94	14.90

Note: Measured power (dBm) has offset with cable loss.

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)
802.11b CH 06 2437MHz		2386.72	53.27	-20.73	74	52.02	27.23	6.81	32.79	133	136	P	H
		2387	43.92	-10.08	54	42.67	27.23	6.81	32.79	133	136	A	H
	*	2437	103.71	-	-	102.21	27.37	6.86	32.73	133	136	P	H
	*	2437	101.88	-	-	100.38	27.37	6.86	32.73	133	136	A	H
		2496.08	53.2	-20.8	74	51.46	27.5	6.91	32.67	133	136	P	H
		2485.79	45.31	-8.69	54	43.63	27.46	6.91	32.69	133	136	A	H
		2380.7	51.85	-22.15	74	50.74	27.19	6.73	32.81	134	11	P	V
		2387.14	41.47	-12.53	54	40.22	27.23	6.81	32.79	134	11	A	V
	*	2437	99.85	-	-	98.35	27.37	6.86	32.73	134	11	P	V
	*	2437	97.97	-	-	96.47	27.37	6.86	32.73	134	11	A	V
		2490.34	53.25	-20.75	74	51.51	27.5	6.91	32.67	134	11	P	V
		2485.86	42.92	-11.08	54	41.24	27.46	6.91	32.69	134	11	A	V

2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)
802.11b CH 06 2437MHz		4874	41.65	-32.35	74	57.05	31.78	10.92	58.1	165	106	P	H
		7311	48.77	-25.23	74	57.74	35.66	13.29	57.92	174	100	P	H
		4874	40.99	-33.01	74	56.39	31.78	10.92	58.1	165	106	P	V
		7311	48.17	-25.83	74	57.14	35.66	13.29	57.92	174	100	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 2	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)
802.11g CH 11 2462MHz	*	2462	100.83	-	-	99.27	27.41	6.86	32.71	124	252	P	H
	*	2462	93.91	-	-	92.35	27.41	6.86	32.71	124	252	A	H
		2490.76	53.67	-20.33	74	51.93	27.5	6.91	32.67	124	252	P	H
		2483.52	42.42	-11.58	54	40.74	27.46	6.91	32.69	124	252	A	H
	*	2462	104.9	-	-	103.34	27.41	6.86	32.71	170	300	P	V
	*	2462	97.53	-	-	95.97	27.41	6.86	32.71	170	300	A	V
		2483.96	56.46	-17.54	74	54.78	27.46	6.91	32.69	170	300	P	V
		2483.52	44.78	-9.22	54	43.1	27.46	6.91	32.69	170	300	A	V

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 2	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)
802.11g CH 11 2462MHz		4924	41.78	-32.22	74	56.98	31.83	10.99	58.02	150	285	P	H
		7386	48.32	-25.68	74	57.04	35.81	13.12	57.65	155	274	P	H
		4924	42.54	-31.46	74	57.74	31.83	10.99	58.02	150	285	P	V
		7386	50.51	-23.49	74	59.23	35.81	13.12	57.65	155	274	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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 01 2412MHz		2389.28	58.61	-15.39	74	57.36	27.23	6.81	32.79	155	136	P	H
		2390	45.41	-8.59	54	44.16	27.23	6.81	32.79	155	136	A	H
	*	2412	104.18	-	-	102.86	27.28	6.81	32.77	155	136	P	H
	*	2412	98.13	-	-	96.81	27.28	6.81	32.77	155	136	A	H
		2381.82	57.45	-16.55	74	56.34	27.19	6.73	32.81	141	336	P	V
		2390	44.38	-9.62	54	43.13	27.23	6.81	32.79	141	336	A	V
	*	2412	104.78	-	-	103.46	27.28	6.81	32.77	141	336	P	V
	*	2412	98.01	-	-	96.69	27.28	6.81	32.77	141	336	A	V

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	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 01 2412MHz		4824	41.65	-32.35	74	57.22	31.73	10.89	58.19	185	255	P	H
		4824	42.1	-31.9	74	57.67	31.73	10.89	58.19	185	255	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI Ant. 1+2	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)
2.4GHz 802.11n HT20 LF		30	24.61	-15.39	40	31.68	24.3	0.23	31.6	100	36	P	H
		140.58	22.18	-21.32	43.5	35.04	17.33	1.23	31.42	-	-	P	H
		257.95	26.18	-19.82	46	35.55	19.76	1.89	31.02	-	-	P	H
		354.95	26.93	-19.07	46	35.21	20.58	2.24	31.1	-	-	P	H
		581.93	29.72	-16.28	46	33.49	24.48	2.95	31.2	-	-	P	H
		610.06	29.9	-16.1	46	33.32	24.74	3.04	31.2	-	-	P	H
		33.88	28.19	-11.81	40	37.55	21.94	0.3	31.6	100	45	P	V
		106.63	22.88	-20.62	43.5	36.26	17.2	0.91	31.49	-	-	P	V
		241.46	18.98	-27.02	46	30.46	17.74	1.82	31.04	-	-	P	V
		357.86	25.07	-20.93	46	33.26	20.66	2.25	31.1	-	-	P	V
		570.29	28.87	-17.13	46	32.82	24.34	2.91	31.2	-	-	P	V
		741.98	32.07	-13.93	46	34.37	25.56	3.43	31.29	-	-	P	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	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 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. 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”.

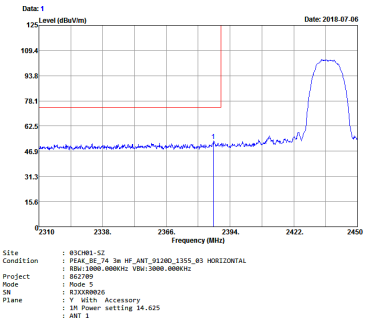
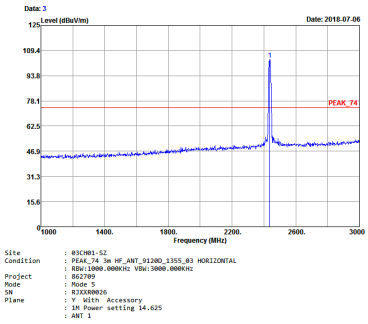
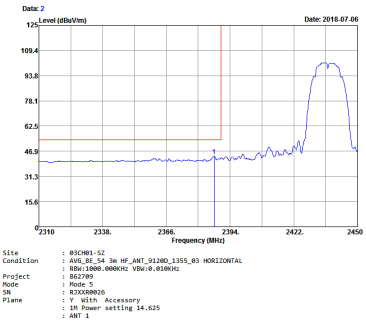
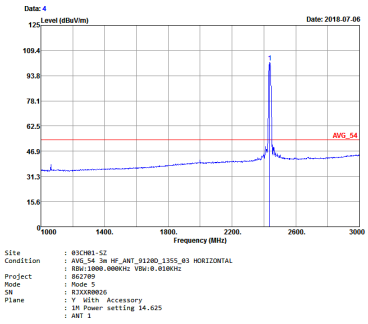
Appendix C. Radiated Spurious Emission Plots

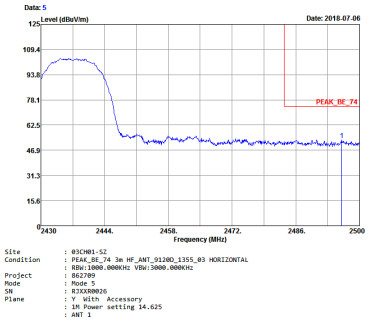
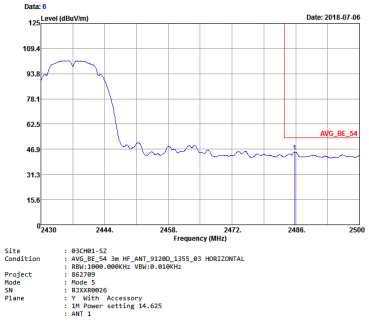
Note symbol

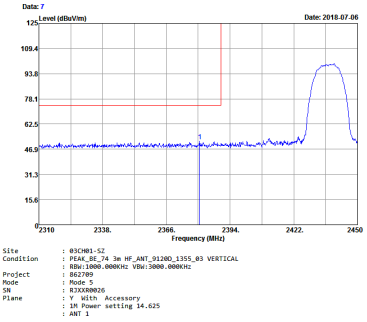
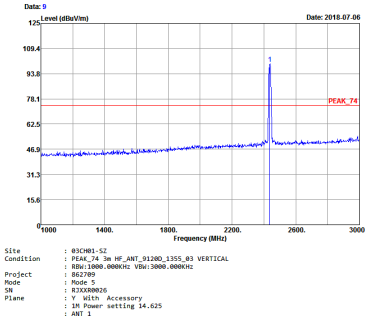
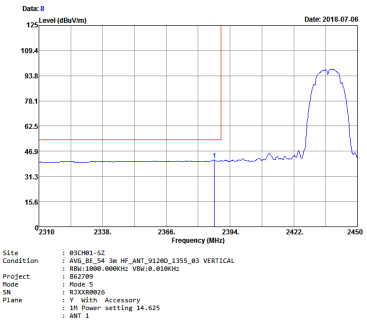
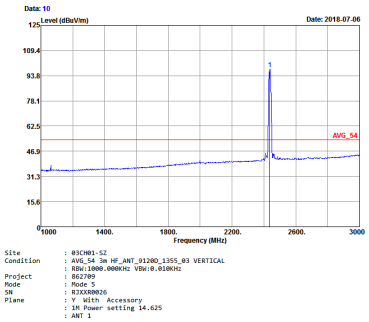
-L	**Low channel location**
-R	**High channel location**

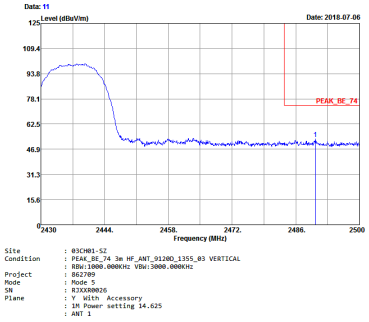
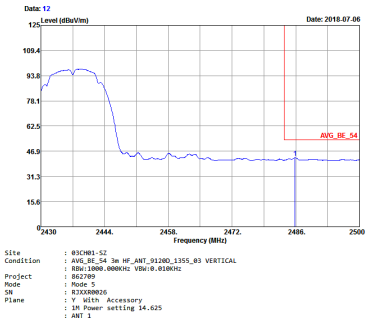
2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

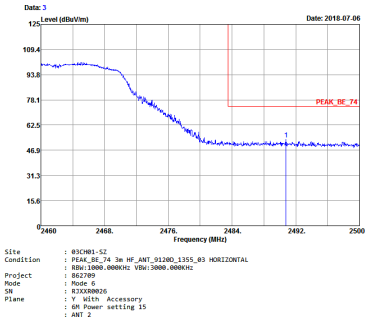
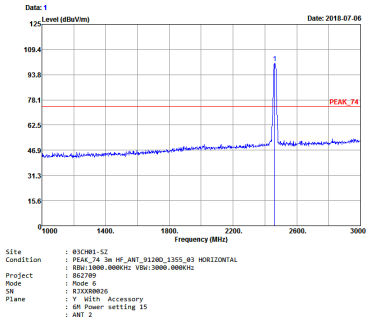
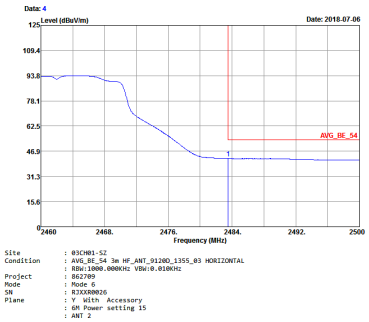
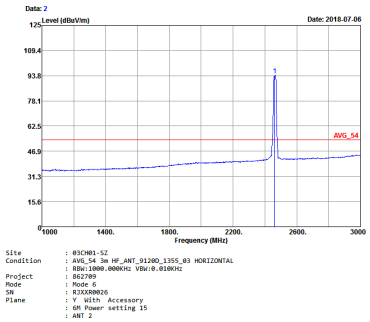
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		-
Avg.		-

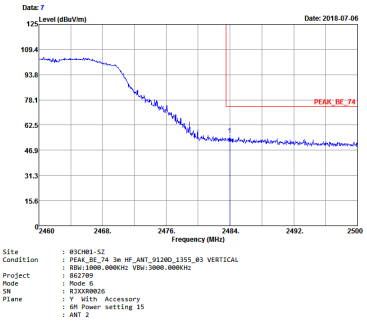
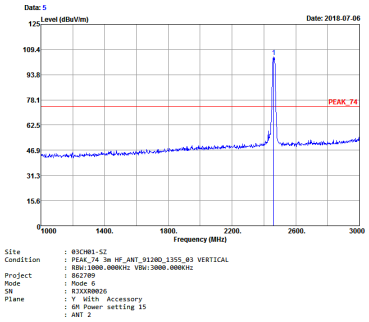
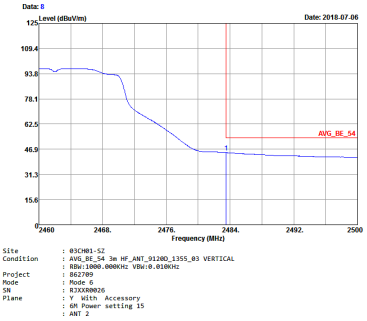
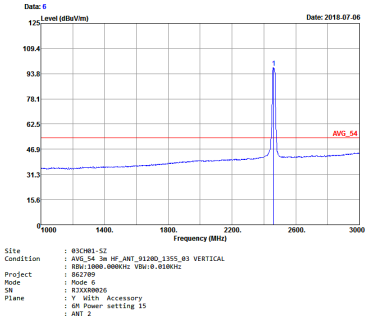
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak		-
Avg.		-

2.4GHz 2400~2483.5MHz

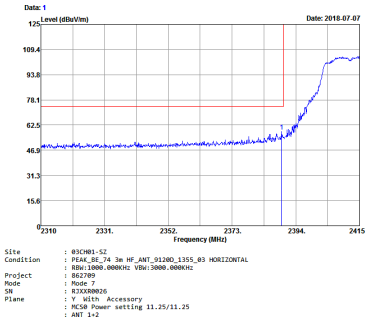
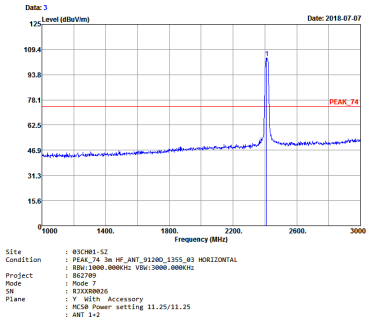
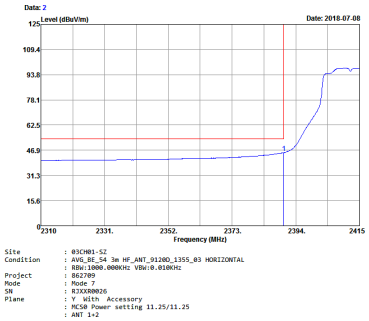
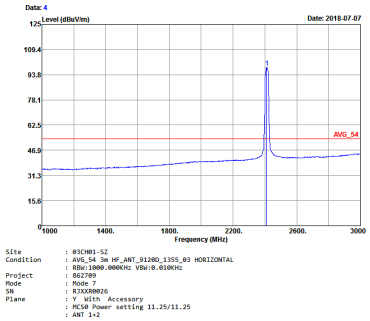
WIFI 802.11g (Band Edge @ 3m)

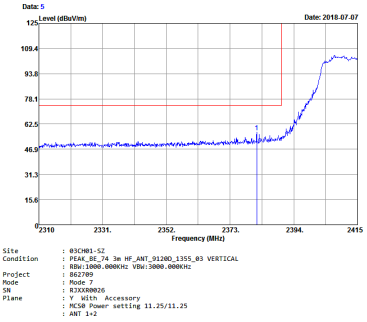
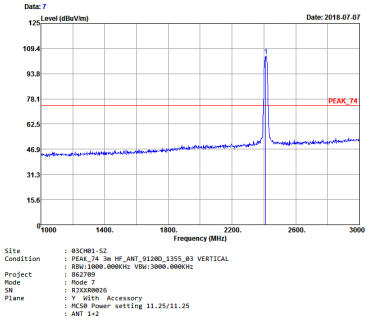
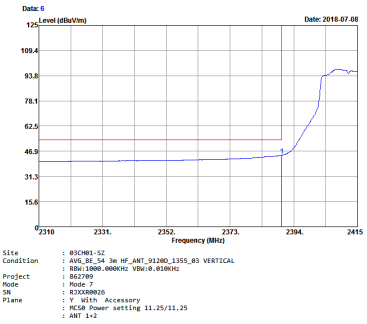
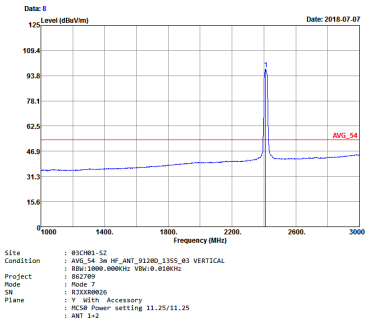
IFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
2	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
2	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

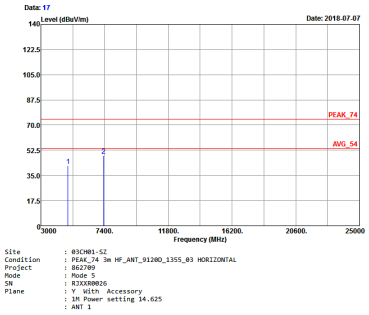
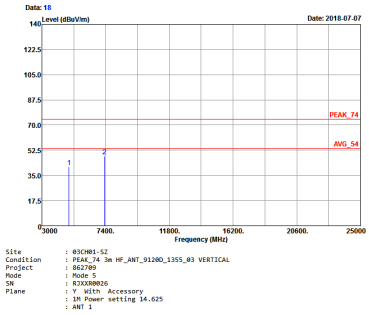
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		

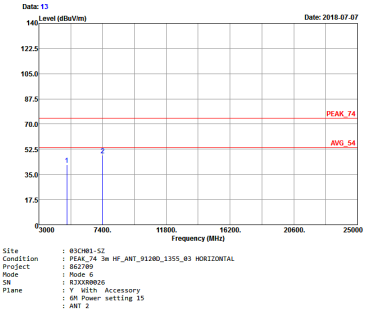
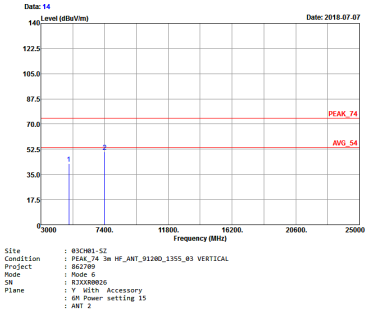
.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.		

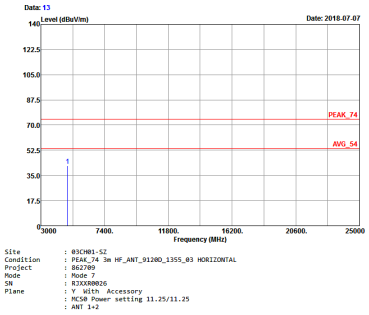
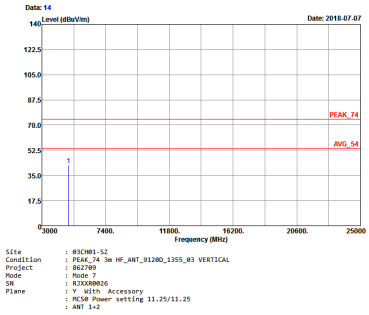
2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

IFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
2	Horizontal	Vertical
Peak Avg.		

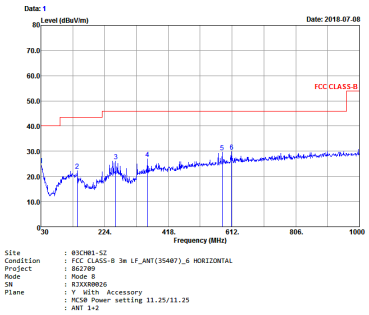
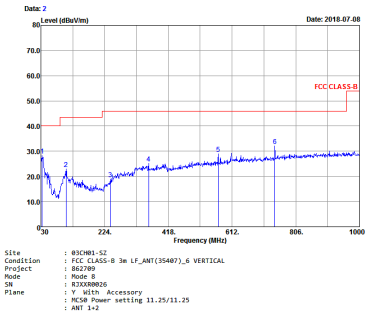
2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

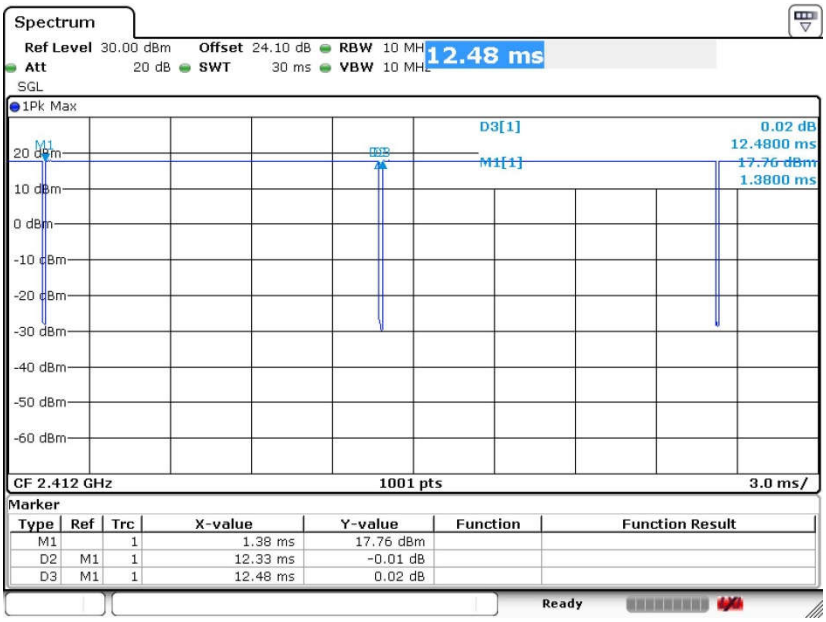
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
1+2	Horizontal	Vertical
QP / Peak		

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1	802.11b	98.80	-	-	10Hz	0.05
2	802.11g	98.56	-	-	10Hz	0.06
1+2	2.4GHz 802.11n HT20 Ant.1	98.20	-	-	10Hz	0.08
1+2	2.4GHz 802.11n HT20 Ant.2	98.20	-	-	10Hz	0.08

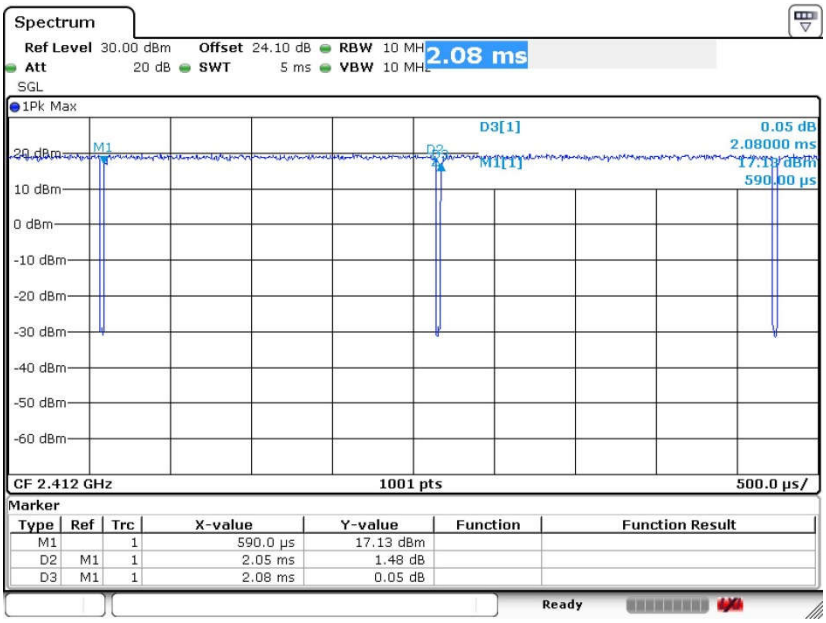
<Ant. 1>

802.11b



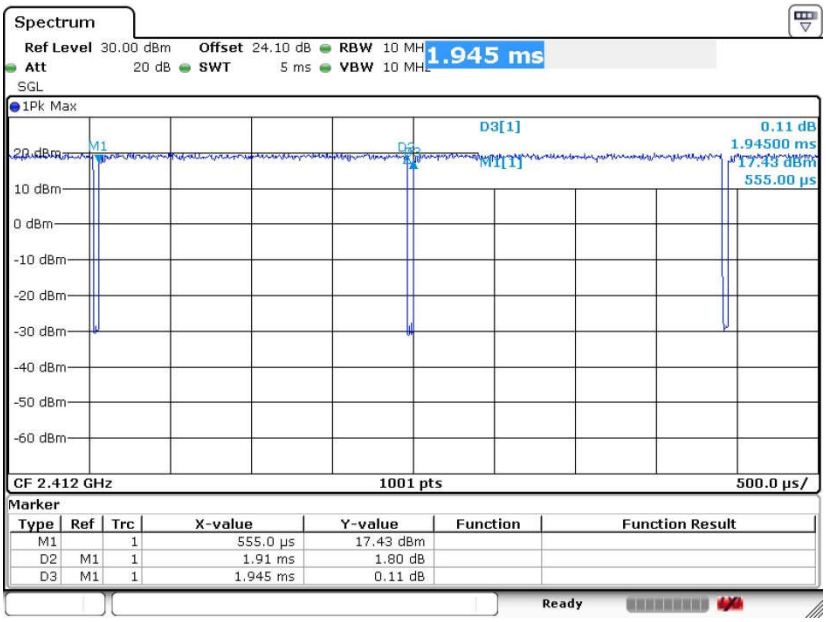
<Ant. 2>

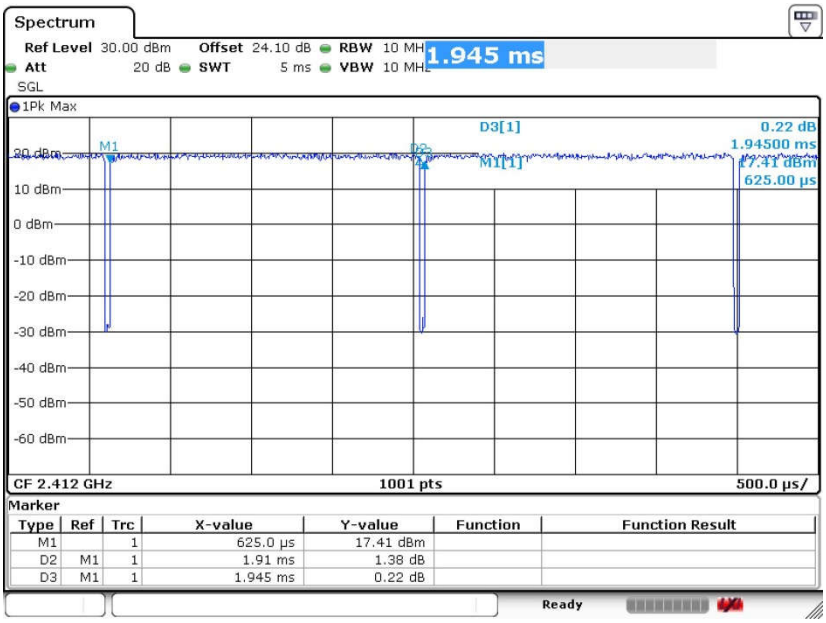
802.11b



MIMO <Ant. 1>

802.11n HT20



MIMO <Ant. 2>

802.11n HT20