FCC RF Test Report

APPLICANT	:	**HMD global Oy**
EQUIPMENT	:	**Mobile Phone**
BRAND NAME	:	**Nokia**
MODEL NAME	:	**TA-1184**
FCC ID	:	**2AJOTTA-1184**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DTS) Digital Transmission System**

The product was received on Mar. 05, 2019 and testing was completed on Mar. 30, 2019. We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

James Huang

Approved by: James Huang / Manager

NVLAP®
TESTING
NVLAP LAB CODE 600155-0

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone,
Jiangsu Province 215335, China

TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1 GENERAL DESCRIPTION **5**

1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 6
1.5 Modification of EUT 6
1.6 Testing Location 6
1.7 Applicable Standards 6

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **8**

2.1 Carrier Frequency and Channel 8
2.2 Test Mode 9
2.3 Connection Diagram of Test System 10
2.4 Support Unit used in test configuration and system 10
2.5 EUT Operation Test Setup 11
2.6 Measurement Results Explanation Example 11

3 TEST RESULT **12**

3.1 6dB and 99% Bandwidth Measurement 12
3.2 Output Power Measurement 14
3.3 Power Spectral Density Measurement 15
3.4 Conducted Band Edges and Spurious Emission Measurement 17
3.5 Radiated Band Edges and Spurious Emission Measurement 27
3.6 AC Conducted Emission Measurement 31
3.7 Antenna Requirements 33

4 LIST OF MEASURING EQUIPMENT **34**

5 UNCERTAINTY OF EVALUATION **35**

APPENDIX A. CONDUCTED TEST RESULTS

APPENDIX B. AC CONDUCTED EMISSION TEST RESULT

APPENDIX C. RADIATED SPURIOUS EMISSION

APPENDIX D. RADIATED SPURIOUS EMISSION PLOTS

APPENDIX E. DUTY CYCLE PLOTS

APPENDIX F. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR930509-01C	Rev. 01	Initial issue of report	Apr. 16, 2019

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 11.8 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.52 dB at 0.747 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

HMD global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2 Manufacturer

HMD global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Nokia
Model Name	TA-1184
FCC ID	2AJOTTA-1184
EUT supports Radios application	GSM/GPS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+ /LTE/ FM Receiver/GNSS WLAN 11b/g/n HT20 Bluetooth BR/EDR/LE
IMEI Code	Conducted: N/A Radiation: 352916100002923/352916100002931 Conduction: 352916100002667/352916100002675
HW Version	DVT_0.2
SW Version	00WW_0_095
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT. According to the difference, choose sample 1 to perform full test.

Object	Sample 1 with Dual SIMs(TA-1184)		Sample 2 with Dual SIMs(TA-1184)	
	Specifications	Supplier	Specifications	Supplier
Memory	3+32G	Kingston	3+32G	Foresee
TP+LCD	HQ23201454000	K&D	HQ23201454000	Holitech
Battery Cover	HQ20704757000	Goodmark-new	HQ20746201000	Zhiyin
Front Camera	HQ20207233000	Jinkang	HQ20207233000	Tianshi
Rear Camera	HQ20207234000	Tianshi	HQ20207234000	Guangzhen
Speaker	HQ20312058000	Xichun	HQ20312058000	Xinrongda
Receiver	HQ20321087000	Dongsheng	HQ20321087000	Xinrongda
MIC	HQ12030105000	Knowles	HQ12030105000	Minxinwei

Motor	HQ20400123000	Kunwang	HQ20400123000	Jinlangda

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 18.09 dBm (0.0644 W) 802.11g : 23.97 dBm (0.2495 W) 802.11n HT20 : 22.92 dBm (0.1959 W)
99% Occupied Bandwidth	802.11b : 13.09MHz 802.11g : 17.78MHz 802.11n HT20 : 18.38MHz
Antenna Type / Gain	IFA Antenna with gain -0.18 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0).

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	TH01-KS CO01-KS 03CH06-KS	CN5013	630927

1.7 Applicable Standards

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

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r01
- 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)
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.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

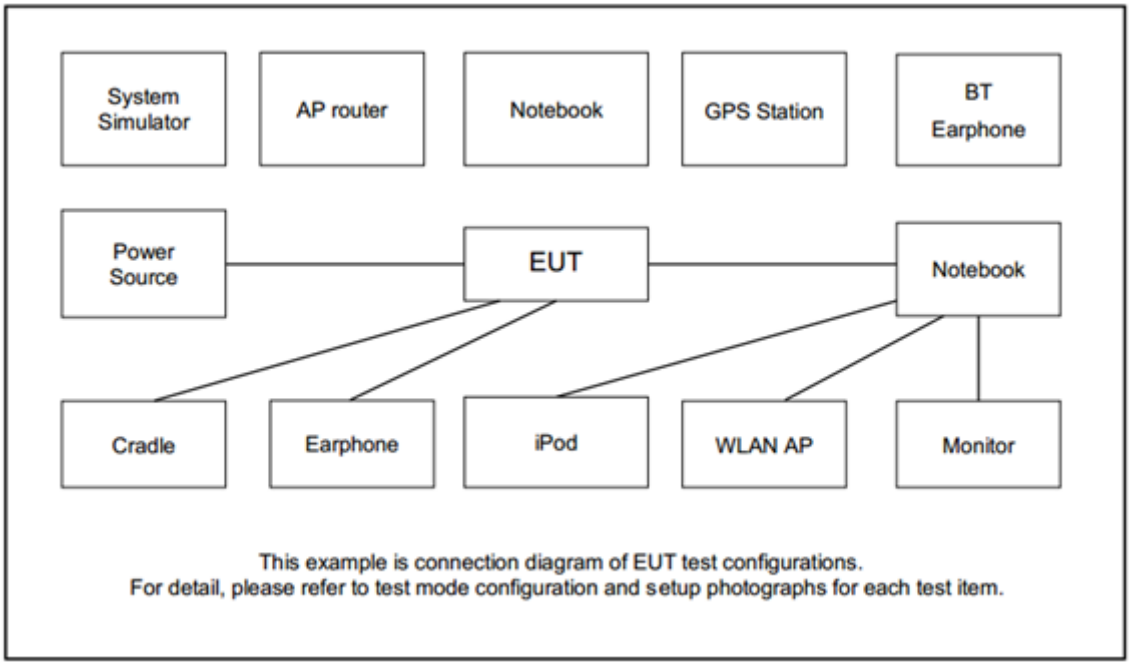
Test Cases	
AC Conducted Emission	Mode 1 :GSM 850 Idle + Bluetooth Link + WLAN Link (2.4G) + USB Cable1 (Charging from Adapter) + Earphone + Battery 1

Remark:

1. The worst case of conducted emission is mode 1; only the test data of it was reported.

2. For Radiated Test Cases, The tests were performance with Adapter, Battery 1 and Earphone

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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
5.	SD Card	Kingston	8GB	N/A	N/A	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.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

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 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
Offset = RF cable loss
Following shows an offset computation example with cable loss 5.1 dB

Offset(dB) = RF cable loss(dB)
= 5.1(dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

3.1.2 Measuring Instruments

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

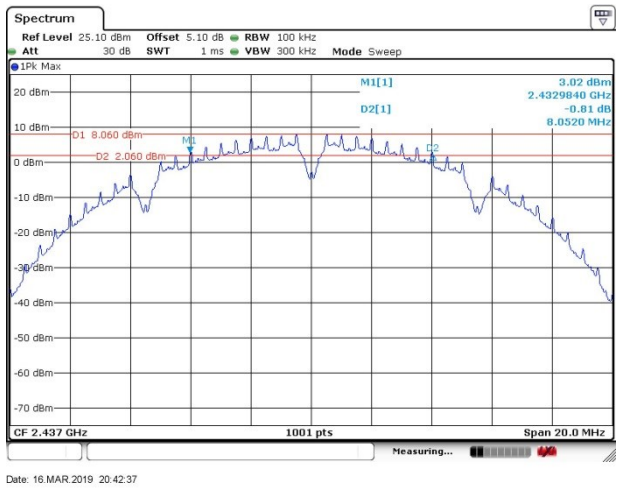
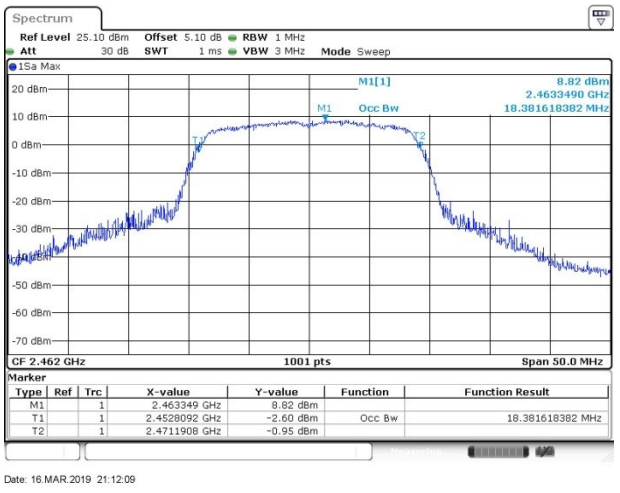
3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer 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. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup

3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	

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

3.2 Output Power Measurement

3.2.1 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.

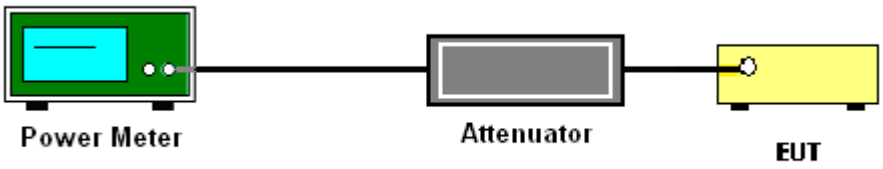
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 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.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

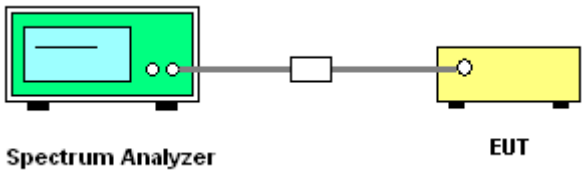
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer 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. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

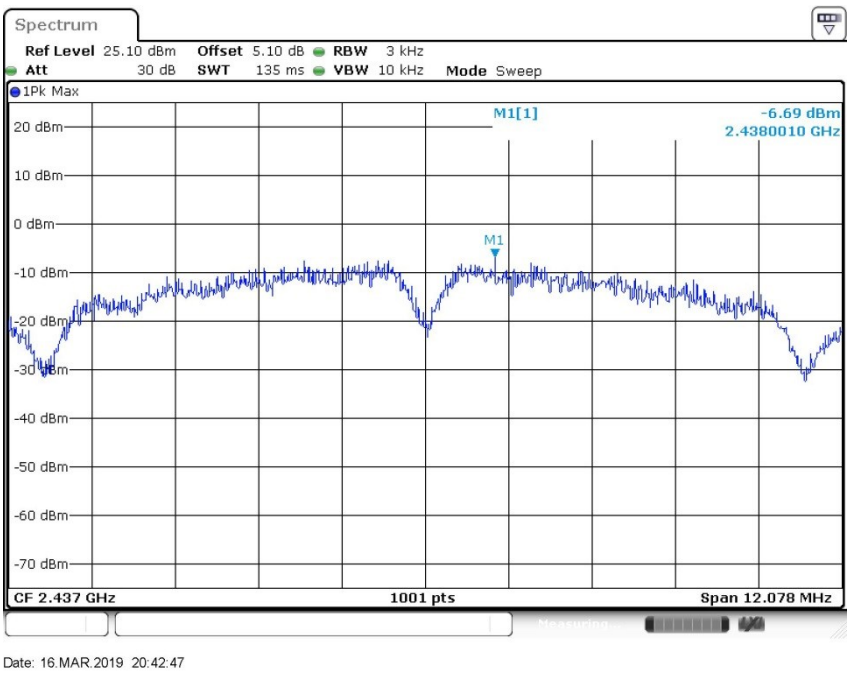
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

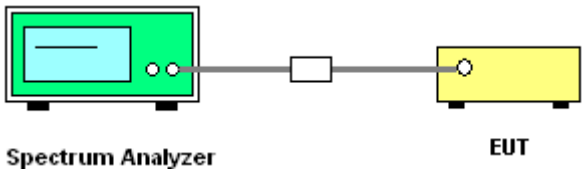
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer 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. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

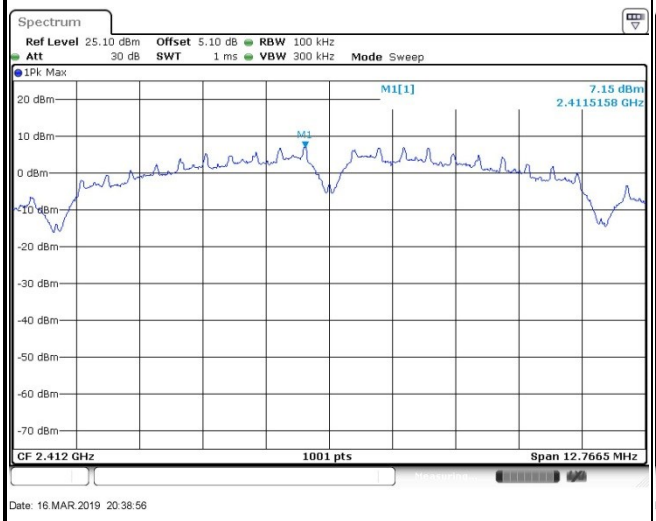


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

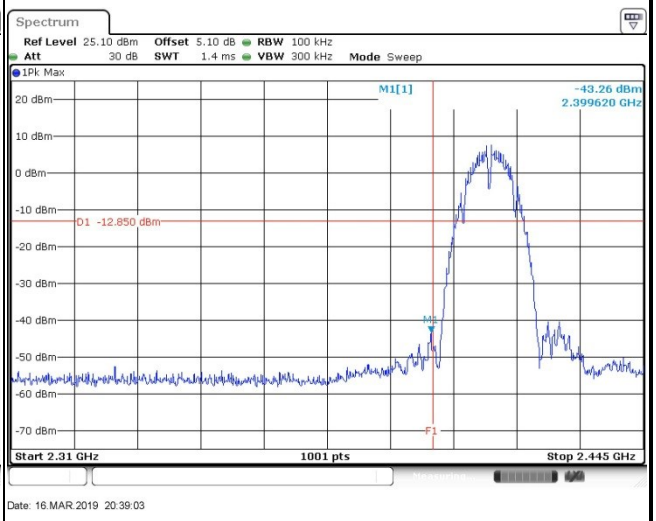
Test Engineer :	Aly Cao	**Temperature :**	21~25℃
		Relative Humidity :	51~54%

Test Mode :	802.11b	**Test Channel :**	01

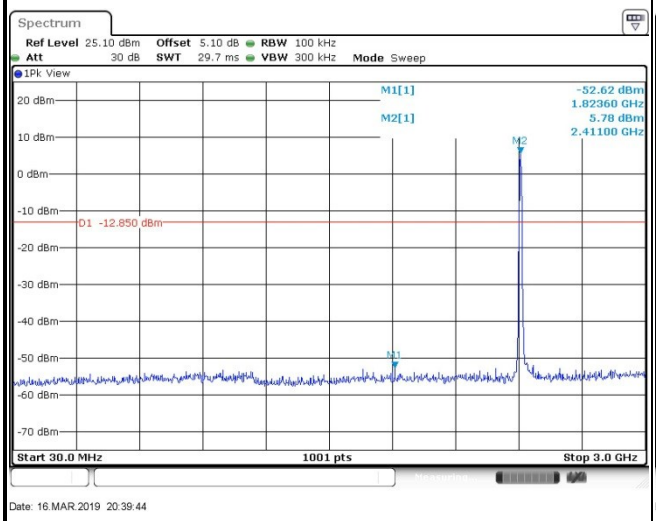
100kHz PSD reference Level



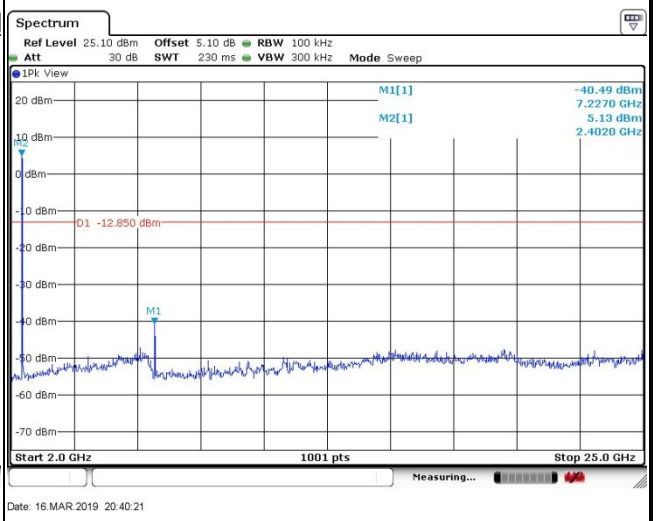
Channel Plot



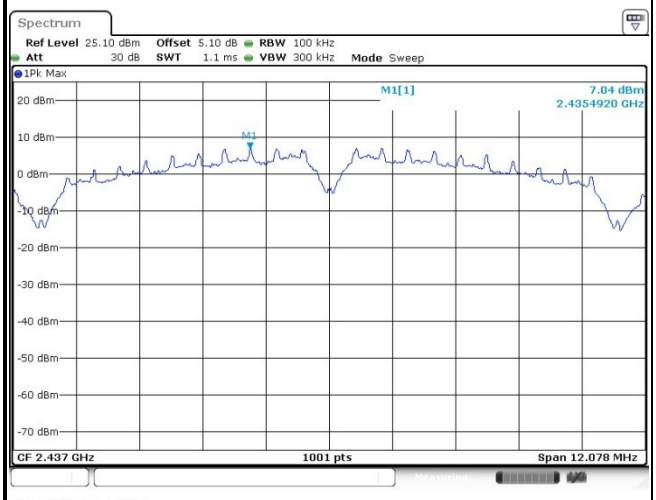
Spurious Emission 30MHz~3GHz

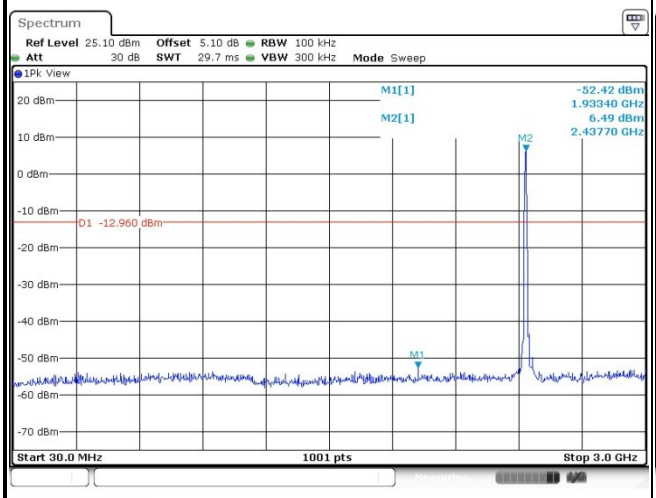
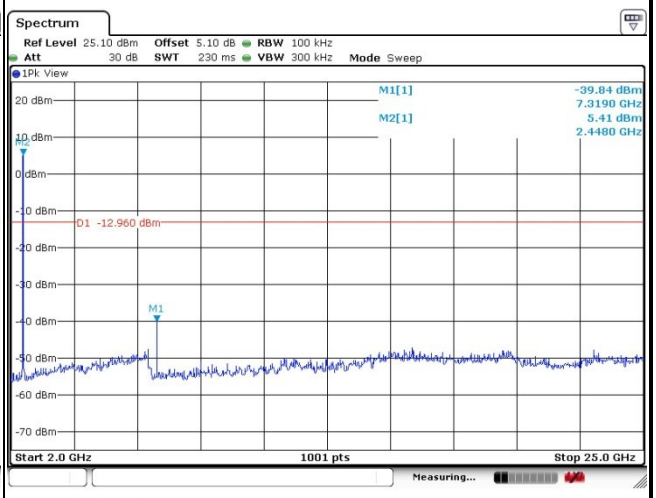


Spurious Emission 2GHz~25GHz

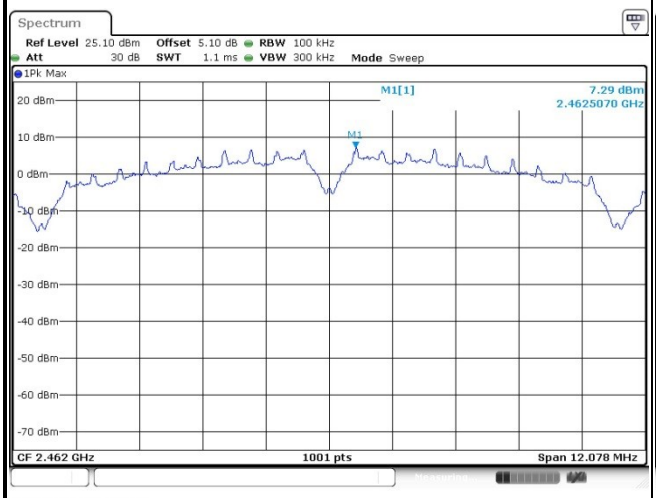
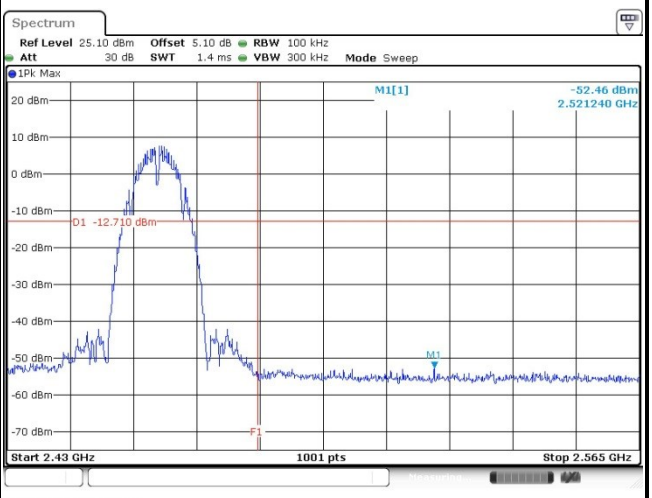
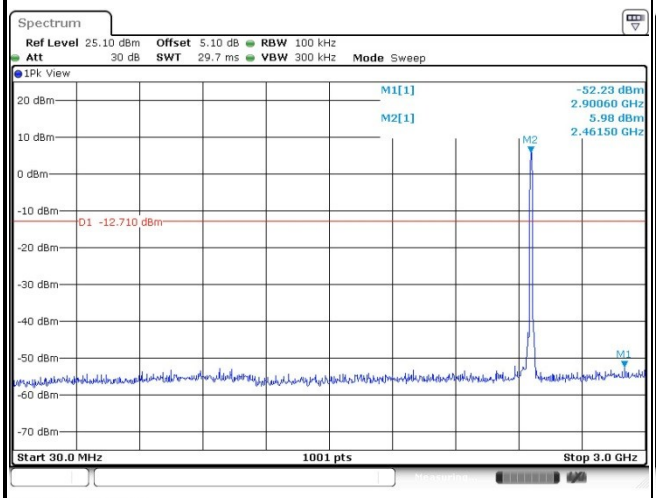
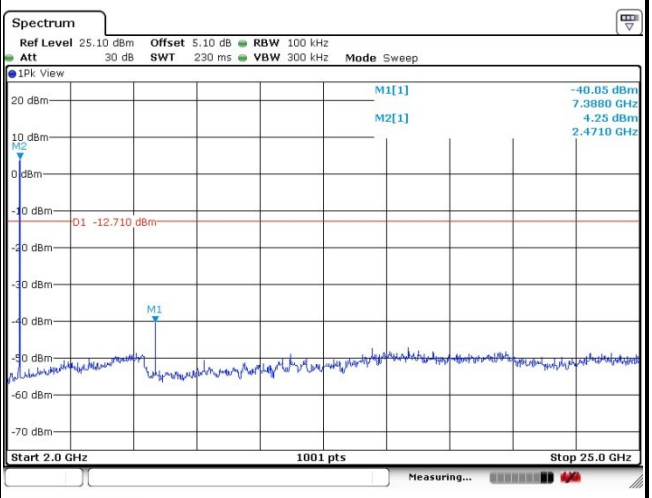


Test Mode :	802.11b	Test Channel :	06

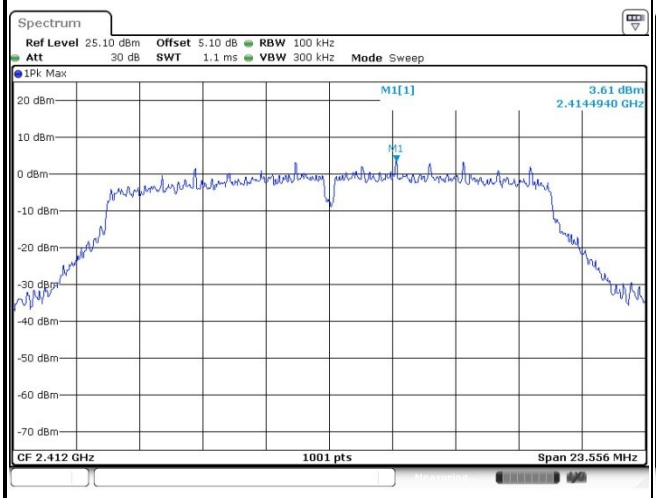
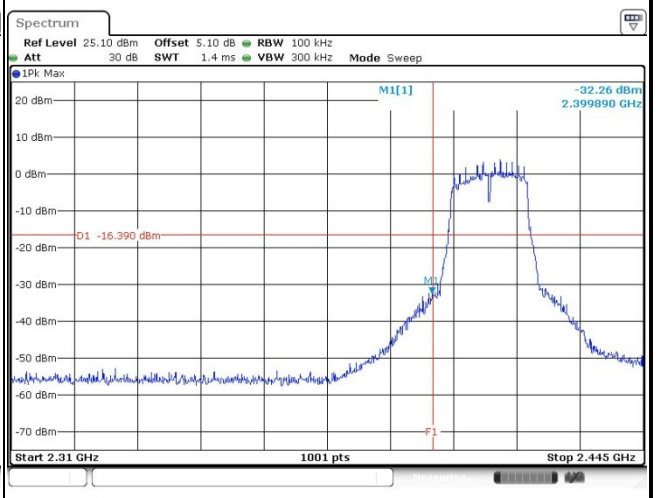
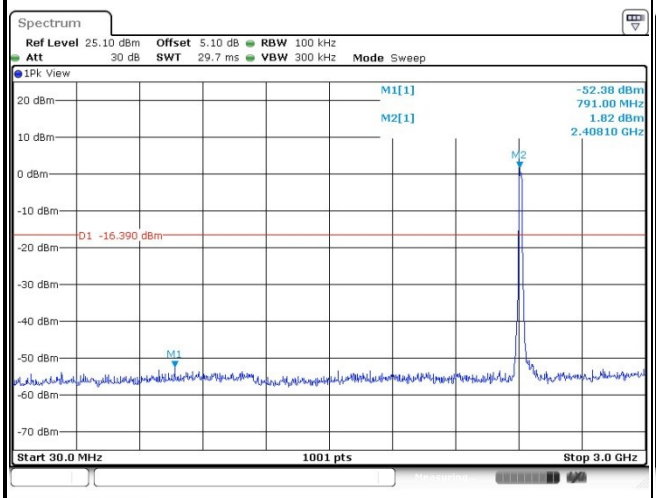
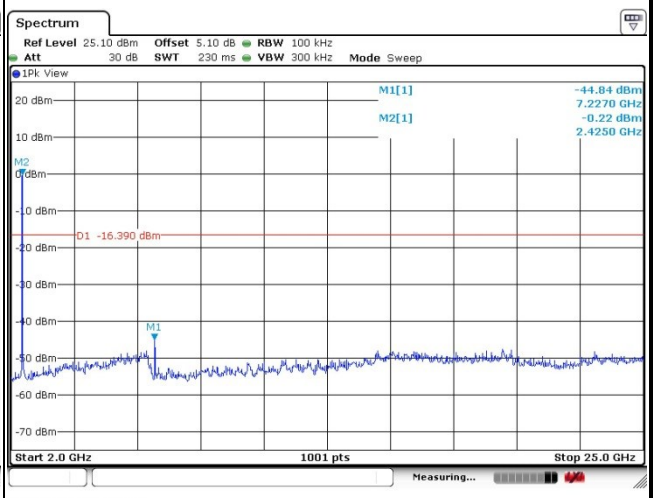
100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

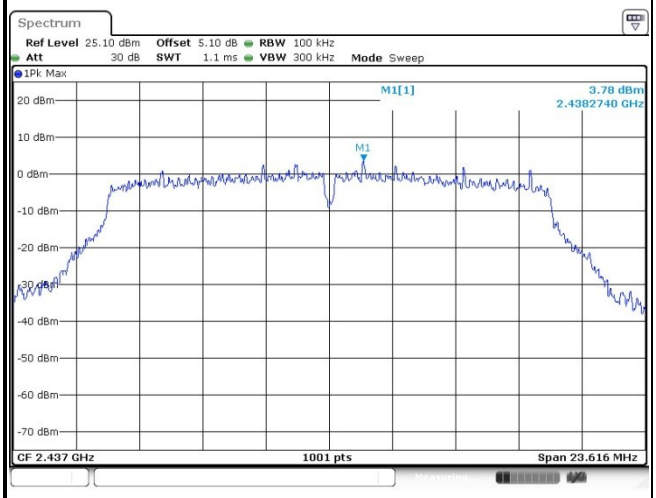
Test Mode :	802.11b	Test Channel :	11

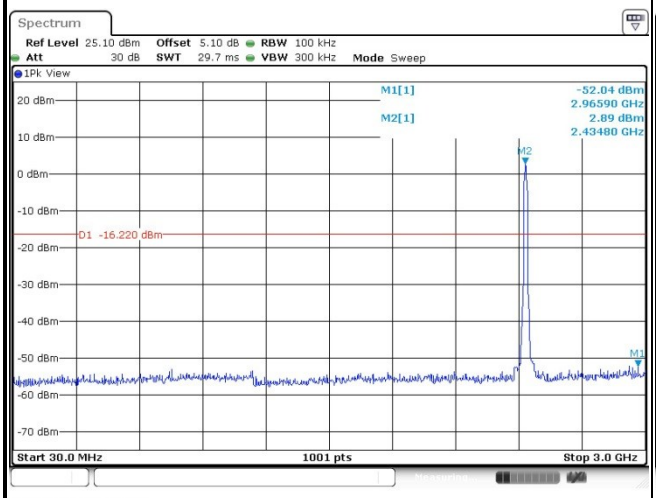
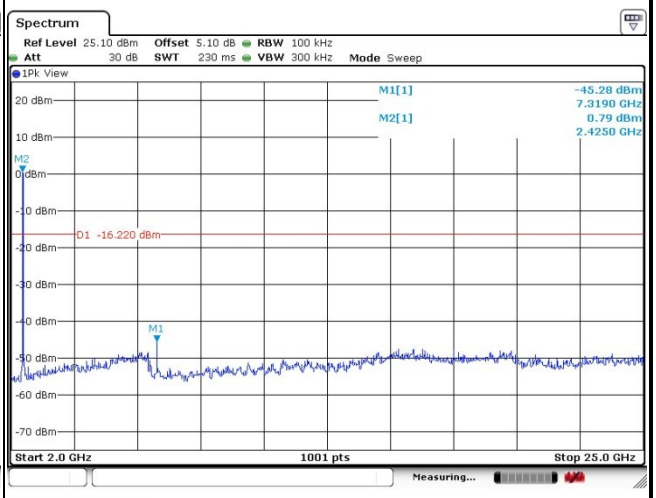
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	01

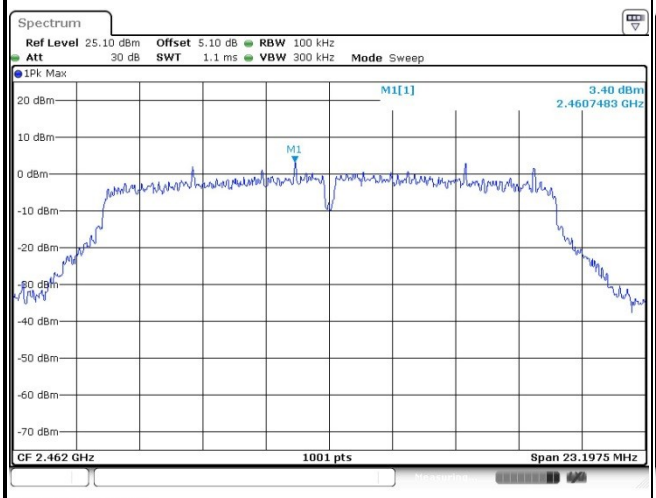
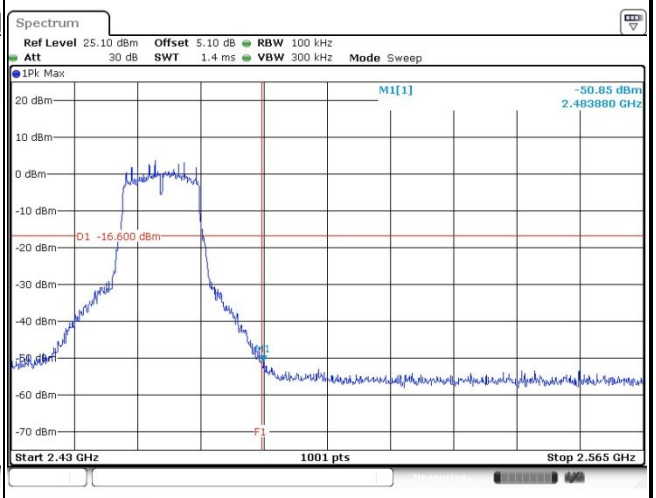
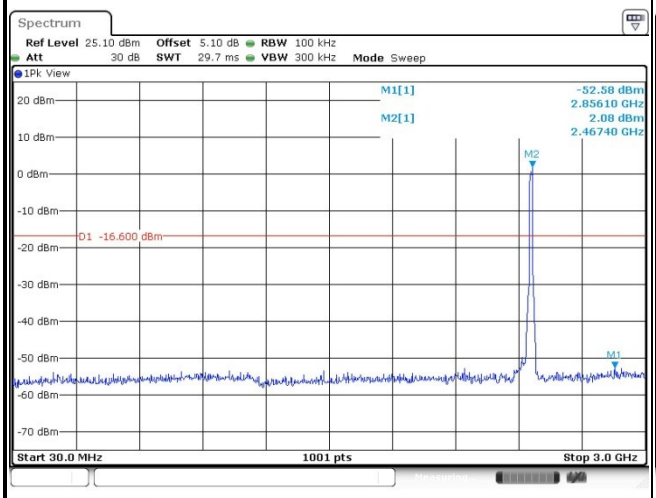
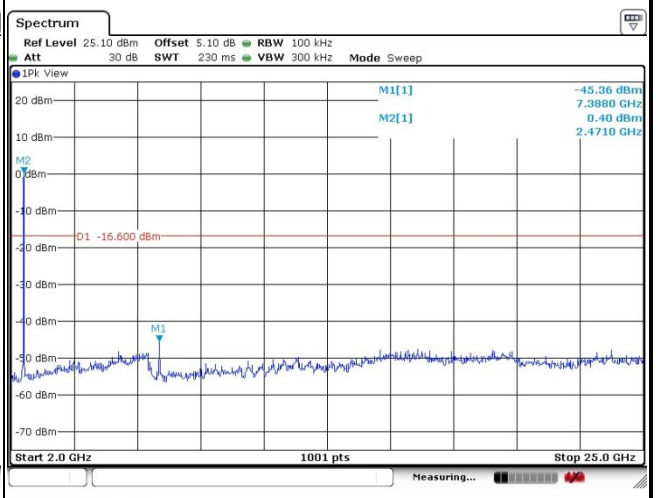
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	06

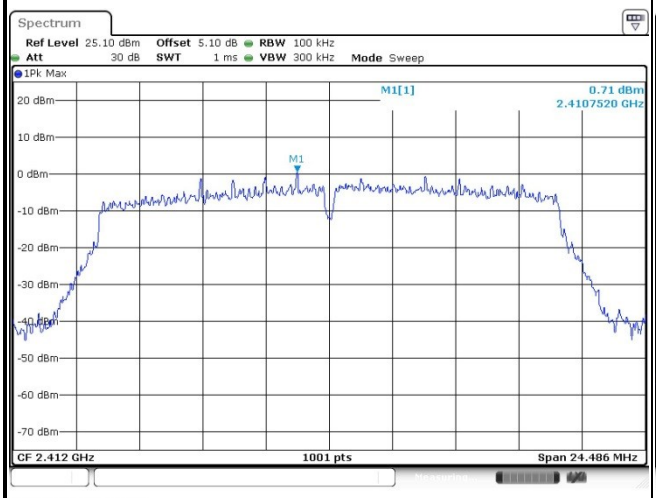
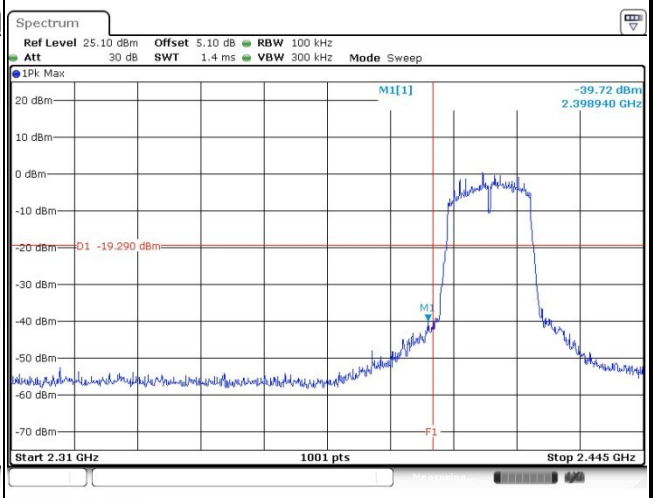
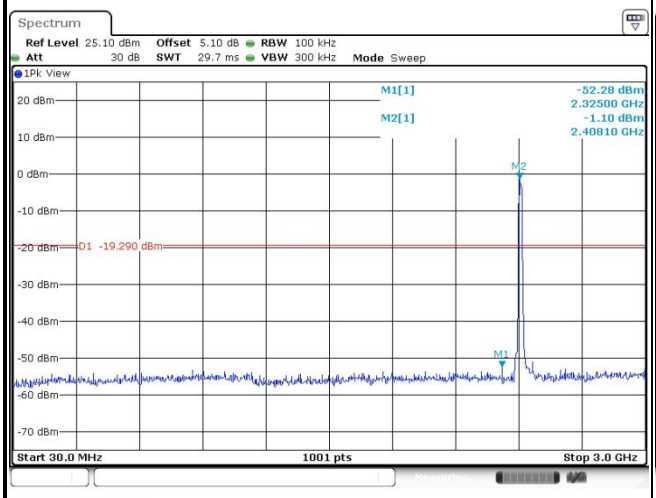
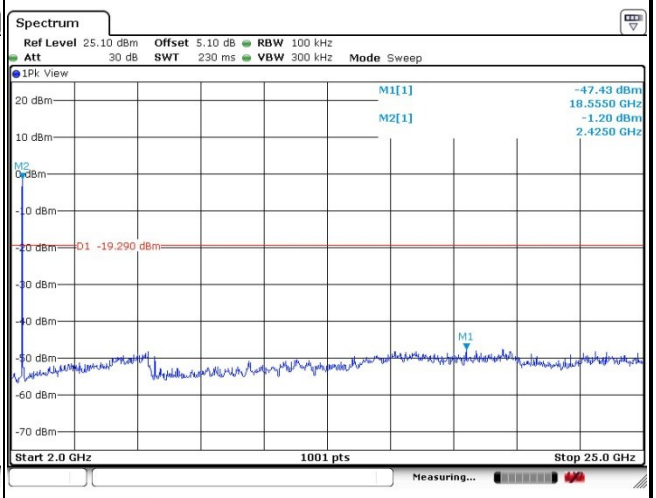
100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

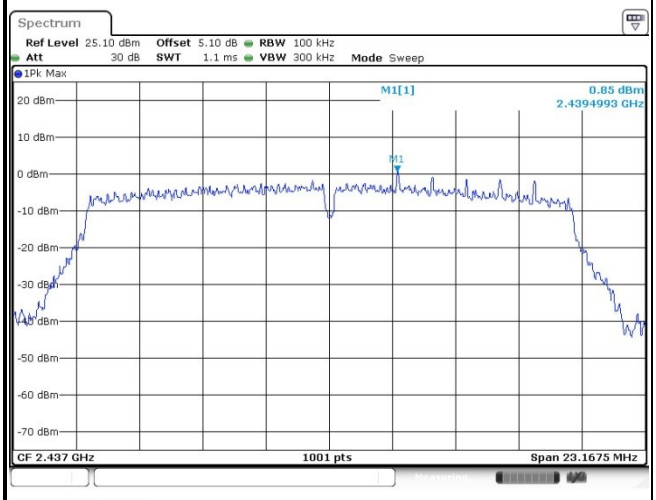
Test Mode :	802.11g	Test Channel :	11

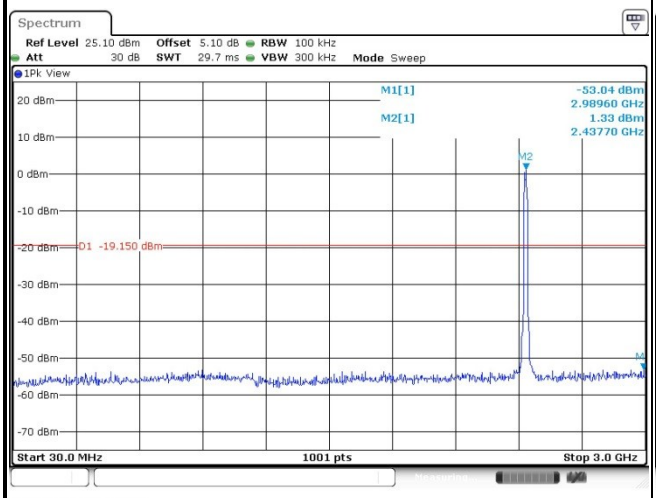
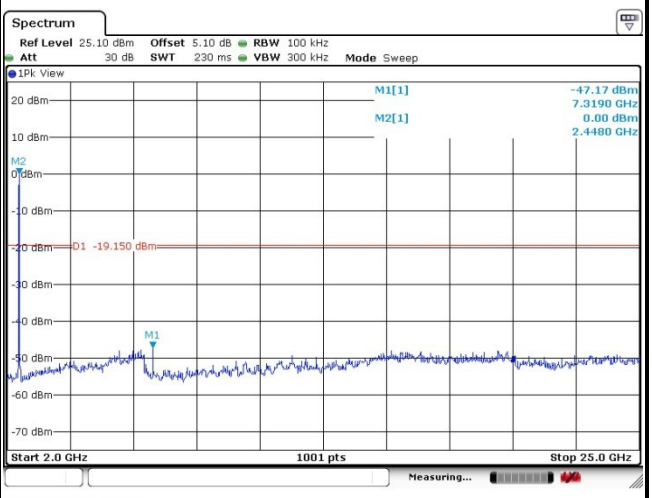
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	01

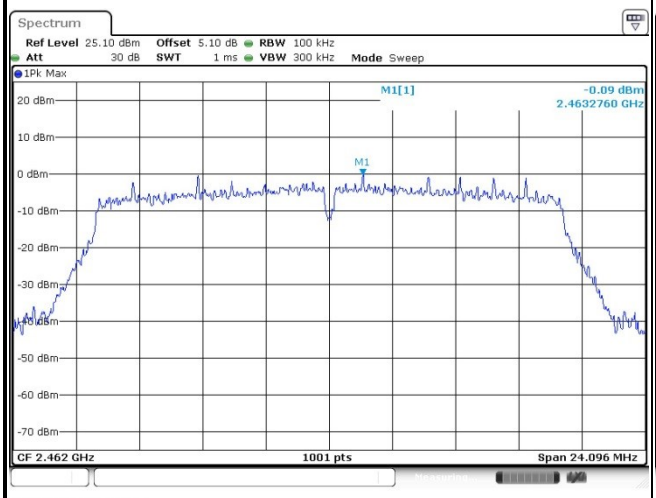
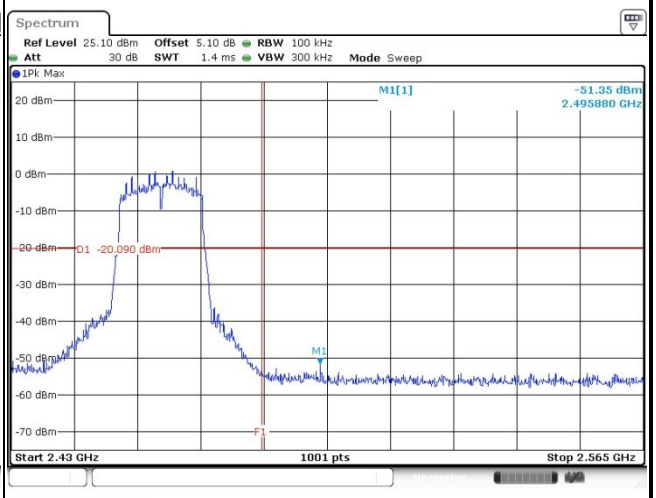
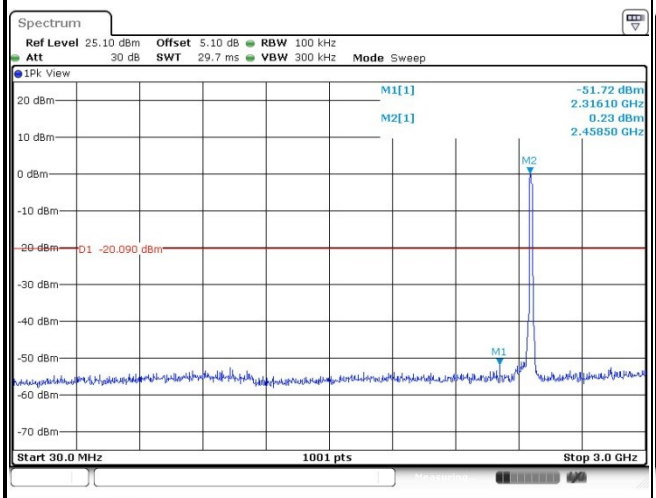
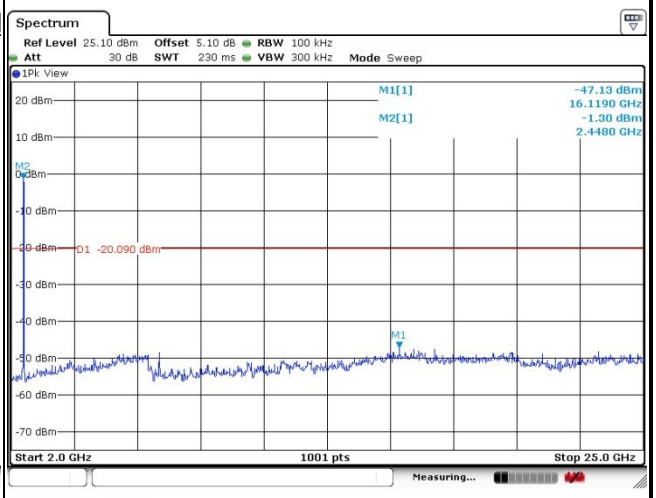
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	06

100kHz PSD reference Level	
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 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

3.5.2 Measuring Instruments

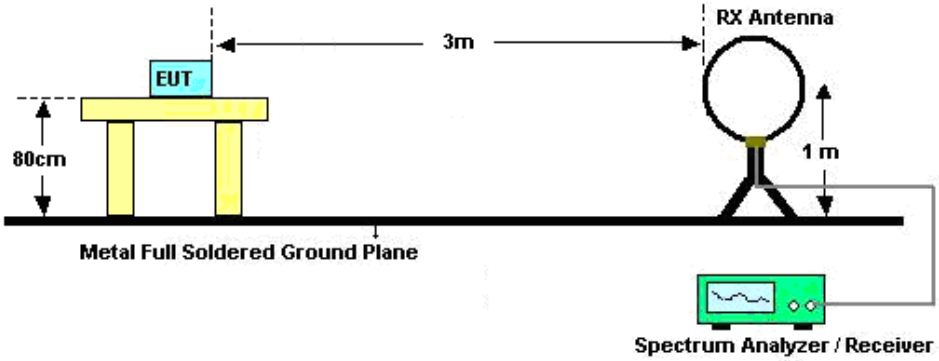
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

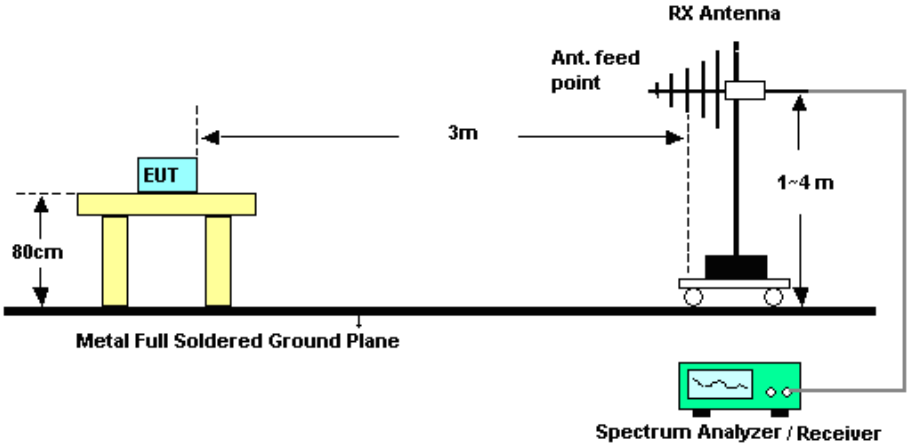
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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.

3.5.4 Test Setup

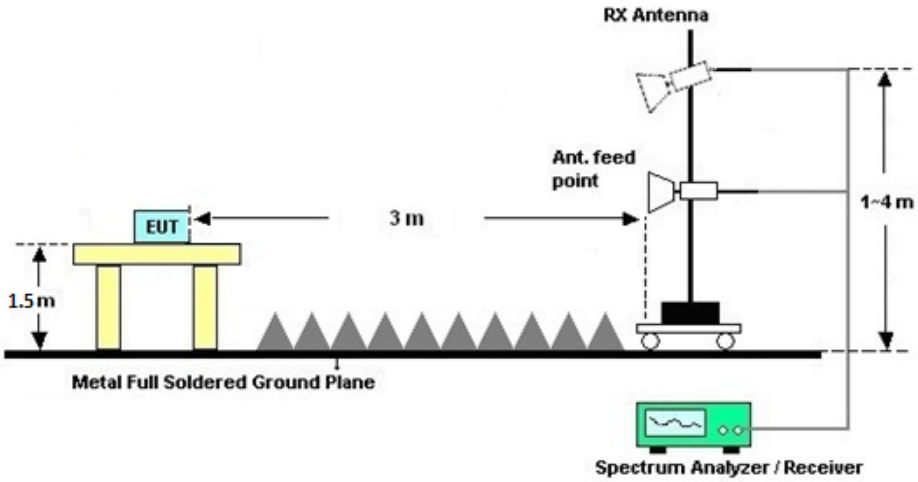
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 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.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 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.

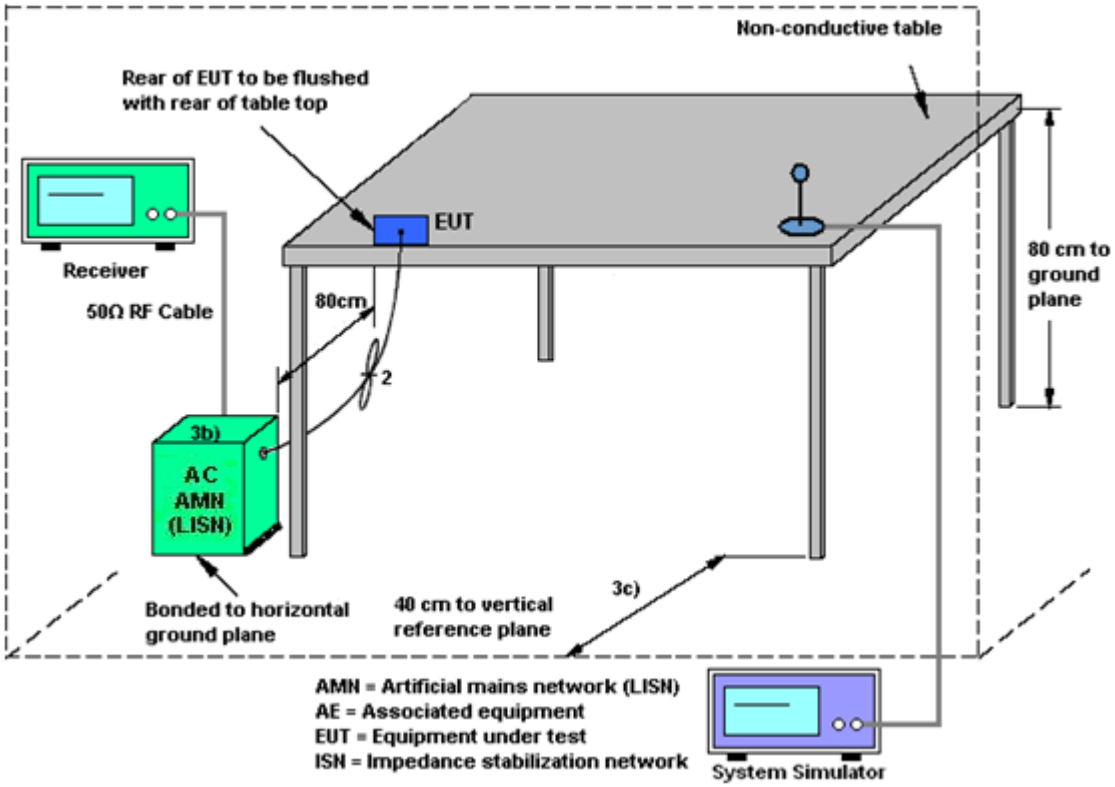
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it 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 (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 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
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	Mar. 16, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 14, 2019	Mar. 16, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Mar. 16, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Oct. 12, 2018	Mar. 24, 2019	Oct. 11, 2019	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471084	10Hz-44GHz	Jun. 25, 2018	Mar. 24, 2019	Jun. 24, 2019	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Mar. 24, 2019	Oct. 18, 2019	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Mar. 24, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 20, 2018	Mar. 24, 2019	Oct. 19, 2019	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Mar. 24, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 6, 2018	Mar. 24, 2019	Aug. 5, 2019	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2019	Mar. 24, 2019	Jan. 13, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Apr. 17. 2018	Mar. 24, 2019	Apr. 16, 2019	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 18, 2018	Mar. 24, 2019	Apr. 17, 2019	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 19, 2018	Mar. 30, 2019	Apr. 18, 2019	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Mar. 30, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Mar. 30, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Mar. 30, 2019	Oct. 11, 2019	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.9dB**

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

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

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))	**5.0dB**

Appendix A. Conducted Test Result

A1 - DTS Part

Test Engineer:	Aly Cao	Temperature:	21~25	°C
Test Date:	2019/03/16	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	13.09	8.51	0.50	Pass
11b	1Mbps	1	6	2437	13.04	8.05	0.50	Pass
11b	1Mbps	1	11	2462	13.09	8.05	0.50	Pass
11g	6Mbps	1	1	2412	17.78	15.07	0.50	Pass
11g	6Mbps	1	6	2437	17.48	15.74	0.50	Pass
11g	6Mbps	1	11	2462	17.58	15.47	0.50	Pass
HT20	MCS0	1	1	2412	18.28	16.32	0.50	Pass
HT20	MCS0	1	6	2437	18.28	15.45	0.50	Pass
HT20	MCS0	1	11	2462	18.38	16.06	0.50	Pass

TEST RESULTS DATA
Peak Power Table

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
11b	1Mbps	1	1	2412	17.85	30.00	-0.18	17.67	36.00	Pass
11b	1Mbps	1	6	2437	18.09	30.00	-0.18	17.91	36.00	Pass
11b	1Mbps	1	11	2462	17.63	30.00	-0.18	17.45	36.00	Pass
11g	6Mbps	1	1	2412	23.68	30.00	-0.18	23.50	36.00	Pass
11g	6Mbps	1	6	2437	23.97	30.00	-0.18	23.79	36.00	Pass
11g	6Mbps	1	11	2462	23.12	30.00	-0.18	22.94	36.00	Pass
HT20	MCS0	1	1	2412	22.87	30.00	-0.18	22.69	36.00	Pass
HT20	MCS0	1	6	2437	22.92	30.00	-0.18	22.74	36.00	Pass
HT20	MCS0	1	11	2462	22.87	30.00	-0.18	22.69	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

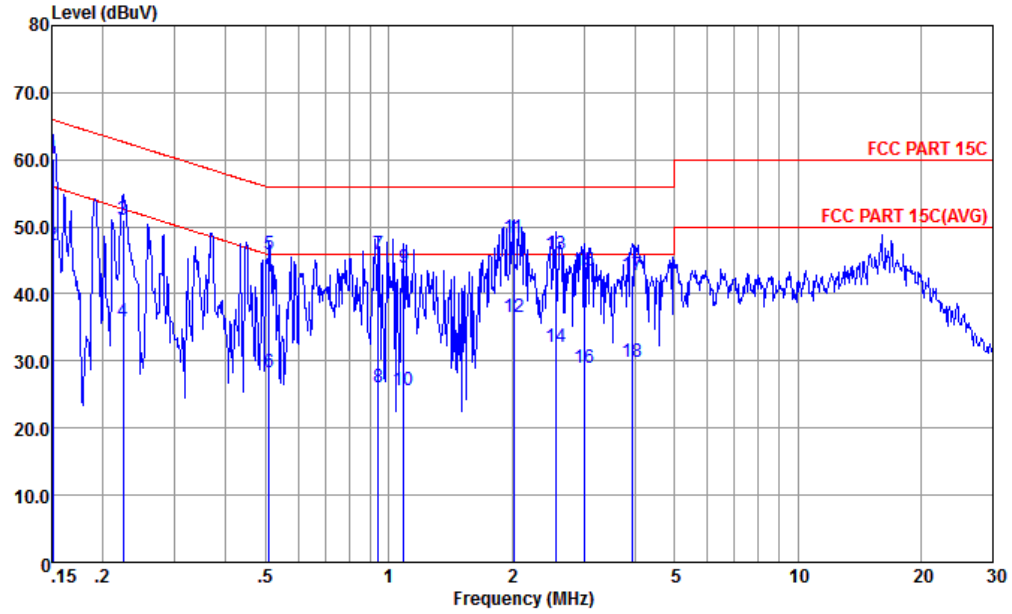
2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	15.93
11b	1Mbps	1	6	2437	0.00	16.11
11b	1Mbps	1	11	2462	0.00	15.76
11g	6Mbps	1	1	2412	0.13	14.17
11g	6Mbps	1	6	2437	0.13	14.47
11g	6Mbps	1	11	2462	0.13	14.24
HT20	MCS0	1	1	2412	0.14	11.73
HT20	MCS0	1	6	2437	0.14	12.02
HT20	MCS0	1	11	2462	0.14	11.83

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-7.61	-0.18	8.00	Pass
11b	1Mbps	1	6	2437	-6.69	-0.18	8.00	Pass
11b	1Mbps	1	11	2462	-7.24	-0.18	8.00	Pass
11g	6Mbps	1	1	2412	-10.67	-0.18	8.00	Pass
11g	6Mbps	1	6	2437	-11.00	-0.18	8.00	Pass
11g	6Mbps	1	11	2462	-12.22	-0.18	8.00	Pass
HT20	MCS0	1	1	2412	-14.88	-0.18	8.00	Pass
HT20	MCS0	1	6	2437	-14.44	-0.18	8.00	Pass
HT20	MCS0	1	11	2462	-14.17	-0.18	8.00	Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Amos Zhang	**Temperature :**	23.3~24.2℃
		Relative Humidity :	28~30%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

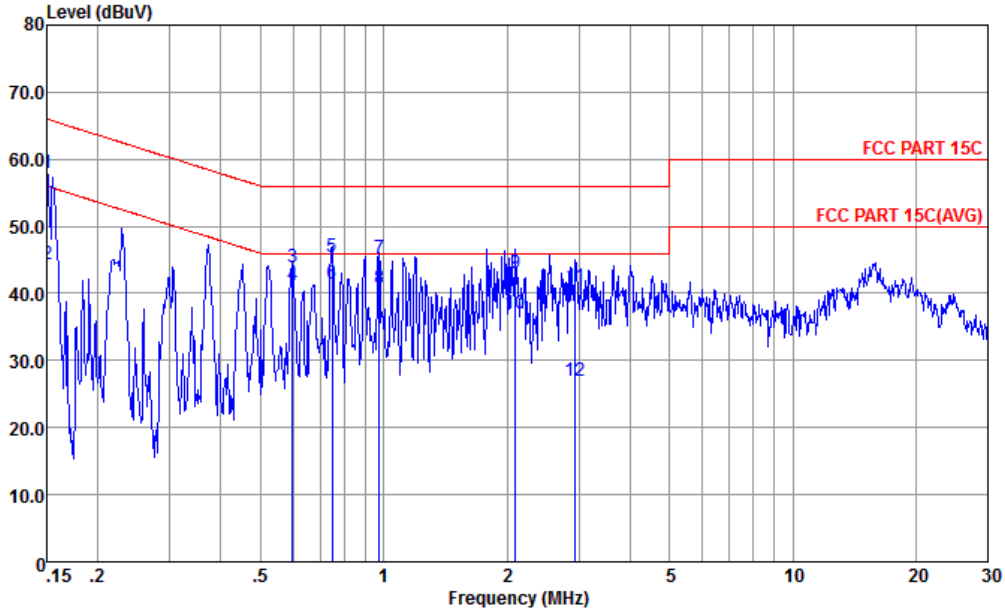


Site : CO01-KS
Condition : FCC PART 15C LISN-L-181119-060105 LINE

: 352916100002667/352916100002675 #10

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.151	60.17	-5.79	65.96	49.60	0.09	10.48	QP
2		0.151	47.17	-8.79	55.96	36.60	0.09	10.48	Average
3		0.224	51.08	-11.58	62.66	40.60	0.13	10.35	QP
4		0.224	35.78	-16.88	52.66	25.30	0.13	10.35	Average
5		0.510	46.01	-9.99	56.00	35.60	0.17	10.24	QP
6		0.510	28.21	-17.79	46.00	17.80	0.17	10.24	Average
7		0.943	45.93	-10.07	56.00	35.49	0.20	10.24	QP
8		0.943	26.03	-19.97	46.00	15.59	0.20	10.24	Average
9		1.088	43.94	-12.06	56.00	33.51	0.20	10.23	QP
10		1.088	25.74	-20.26	46.00	15.31	0.20	10.23	Average
11		2.023	48.25	-7.75	56.00	37.80	0.22	10.23	QP
12		2.023	36.55	-9.45	46.00	26.10	0.22	10.23	Average
13		2.554	45.96	-10.04	56.00	35.49	0.23	10.24	QP
14		2.554	32.06	-13.94	46.00	21.59	0.23	10.24	Average
15		3.009	43.38	-12.62	56.00	32.91	0.23	10.24	QP
16		3.009	29.08	-16.92	46.00	18.61	0.23	10.24	Average
17		3.943	42.79	-13.21	56.00	32.30	0.24	10.25	QP
18		3.943	29.79	-16.21	46.00	19.30	0.24	10.25	Average

Test Engineer :	Amos Zhang	**Temperature :**	23.3~24.2℃
		Relative Humidity :	28~30%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-181119-060105 NEUTRAL

: 352916100002667/352916100002675 #10

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.150	57.96	-8.04	66.00	47.30	0.18	10.48	QP
2		0.150	44.26	-11.74	56.00	33.60	0.18	10.48	Average
3		0.598	43.98	-12.02	56.00	33.60	0.14	10.24	QP
4		0.598	41.28	-4.72	46.00	30.90	0.14	10.24	Average
5		0.747	45.48	-10.52	56.00	35.10	0.14	10.24	QP
6	*	0.747	41.48	-4.52	46.00	31.10	0.14	10.24	Average
7		0.974	45.27	-10.73	56.00	34.91	0.13	10.23	QP
8		0.974	40.77	-5.23	46.00	30.41	0.13	10.23	Average
9		2.099	42.98	-13.02	56.00	32.60	0.15	10.23	QP
10		2.099	36.98	-9.02	46.00	26.60	0.15	10.23	Average
11		2.946	41.00	-15.00	56.00	30.60	0.16	10.24	QP
12		2.946	27.00	-19.00	46.00	16.60	0.16	10.24	Average

Appendix C. Radiated Spurious Emission

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

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		2350.95	47.06	-26.94	74	49.02	-1.96	32.97	5.57	116	63	P	H
		2389.95	36.29	-17.71	54	38.09	-1.8	33.03	5.63	116	63	A	H
	*	2414	100.68	-	-	102.27	-1.59	33.03	5.65	116	63	P	H
	*	2414	97.88	-	-	99.47	-1.59	33.03	5.65	116	63	P	H
		2330.15	46.69	-27.31	74	48.7	-2.01	32.94	5.55	160	117	P	V
		2389.82	36.92	-17.08	54	38.72	-1.8	33.03	5.63	160	117	A	V
	*	2414	100.59	-	-	102.18	-1.59	33.03	5.65	160	117	P	V
	*	2414	97.8	-	-	99.39	-1.59	33.03	5.65	160	117	A	V
802.11b CH 11 2462MHz	*	2462	102.08	-	-	102.71	-0.63	32.67	5.7	300	144	P	H
	*	2462	99.13	-	-	99.76	-0.63	32.67	5.7	300	144	A	H
		2483.8	49.44	-24.56	74	49.68	-0.24	32.49	5.72	300	144	P	H
		2483.5	37.55	-16.45	54	37.79	-0.24	32.49	5.72	300	144	A	H
	*	2462	103.34	-	-	103.97	-0.63	32.67	5.7	269	115	P	V
	*	2462	100.51	-	-	101.14	-0.63	32.67	5.7	269	115	A	V
		2484.16	50.22	-23.78	74	50.46	-0.24	32.49	5.72	269	115	P	V
		2483.5	37.99	-16.01	54	38.23	-0.24	32.49	5.72	269	115	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

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		4824	45.04	-28.96	74	69.44	-24.4	63.75	8.43	150	360	P	H
		4824	43.53	-30.47	74	67.93	-24.4	63.75	8.43	150	360	P	V
802.11b CH 06 2437MHz		4872	40.6	-33.4	74	64.85	-24.25	63.73	8.43	150	360	P	H
		7308	41.69	-32.31	74	60.47	-18.78	64.37	10.07	150	360	P	H
		4872	38.49	-35.51	74	62.74	-24.25	63.73	8.43	150	360	P	V
		7308	40.19	-33.81	74	58.97	-18.78	64.37	10.07	150	360	P	V
802.11b CH 11 2462MHz		4926	37.16	-36.84	74	61.25	-24.09	63.71	8.44	100	360	P	H
		7386	40.46	-33.54	74	59	-18.54	64.38	10.15	100	360	P	H
		4926	36	-38	74	60.09	-24.09	63.71	8.44	100	360	P	V
		7386	40.34	-33.66	74	58.88	-18.54	64.38	10.15	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

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)
802.11g CH 01 2412MHz		2389.69	48.7	-25.3	74	50.47	-1.77	33	5.63	332	121	P	H
		2389.95	38.03	-15.97	54	39.83	-1.8	33.03	5.63	332	121	A	H
	*	2418	100.26	-	-	101.67	-1.41	32.85	5.65	332	121	P	H
	*	2416	92.66	-	-	94.07	-1.41	32.85	5.65	332	121	A	H
		2389.43	49.7	-24.3	74	51.47	-1.77	33	5.63	110	82	P	V
		2389.95	38.73	-15.27	54	40.53	-1.8	33.03	5.63	110	82	A	V
	*	2416	101.67	-	-	103.08	-1.41	32.85	5.65	110	82	P	V
	*	2416	93.46	-	-	94.87	-1.41	32.85	5.65	110	82	A	V
802.11g CH 11 2462MHz	*	2458	103.53	-	-	104.16	-0.63	32.67	5.7	290	123	P	H
	*	2462	96.22	-	-	96.85	-0.63	32.67	5.7	290	123	A	H
		2483.92	54.98	-19.02	74	55.22	-0.24	32.49	5.72	290	123	P	H
		2483.5	42.2	-11.8	54	42.44	-0.24	32.49	5.72	290	123	A	H
	*	2460	104.62	-	-	105.25	-0.63	32.67	5.7	100	110	P	V
	*	2460	96.88	-	-	97.51	-0.63	32.67	5.7	100	110	A	V
		2483.56	56.6	-17.4	74	56.84	-0.24	32.49	5.72	100	110	P	V
		2483.5	43.57	-10.43	54	43.81	-0.24	32.49	5.72	100	110	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

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)
802.11g CH 01 2412MHz		4824	41.12	-32.88	74	65.52	-24.4	63.75	8.43	150	360	P	H
		4824	40.19	-33.81	74	64.59	-24.4	63.75	8.43	150	360	P	V
802.11g CH 06 2437MHz		4872	36.8	-37.2	74	61.05	-24.25	63.73	8.43	150	360	P	H
		7308	40.71	-33.29	74	59.49	-18.78	64.37	10.07	150	360	P	H
		4872	35.9	-38.1	74	60.15	-24.25	63.73	8.43	150	360	P	V
		7308	40.78	-33.22	74	59.56	-18.78	64.37	10.07	150	360	P	V
802.11g CH 11 2462MHz		4926	35.83	-38.17	74	59.92	-24.09	63.71	8.44	100	360	P	H
		7386	40.44	-33.56	74	58.98	-18.54	64.38	10.15	100	360	P	H
		4926	35.9	-38.1	74	59.99	-24.09	63.71	8.44	100	360	P	V
		7386	41.68	-32.32	74	60.22	-18.54	64.38	10.15	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

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)
802.11n HT20 CH 01 2412MHz		2389.17	48.39	-25.61	74	50.16	-1.77	33	5.63	118	56	P	H
		2389.95	37.23	-16.77	54	39.03	-1.8	33.03	5.63	118	56	A	H
	*	2416	97.08	-	-	98.49	-1.41	32.85	5.65	118	56	P	H
	*	2416	89.57	-	-	90.98	-1.41	32.85	5.65	118	56	A	H
		2389.69	48.28	-25.72	74	50.05	-1.77	33	5.63	158	132	P	V
		2389.95	37.22	-16.78	54	39.02	-1.8	33.03	5.63	158	132	A	V
	*	2418	98.68	-	-	100.09	-1.41	32.85	5.65	158	132	P	V
	*	2416	90.7	-	-	92.11	-1.41	32.85	5.65	158	132	A	V
802.11n HT20 CH 11 2462MHz	*	2460	100.29	-	-	100.92	-0.63	32.67	5.7	100	58	P	H
	*	2460	92.72	-	-	93.35	-0.63	32.67	5.7	100	58	A	H
		2483.56	52.37	-21.63	74	52.61	-0.24	32.49	5.72	100	58	P	H
		2483.62	39.95	-14.05	54	40.19	-0.24	32.49	5.72	100	58	A	H
	*	2462	100.69	-	-	101.32	-0.63	32.67	5.7	300	83	P	V
	*	2460	92.97	-	-	93.6	-0.63	32.67	5.7	300	83	A	V
		2483.8	53.17	-20.83	74	53.41	-0.24	32.49	5.72	300	83	P	V
		2483.74	40.6	-13.4	54	40.84	-0.24	32.49	5.72	300	83	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

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)
802.11n HT20 CH 01 2412MHz		4824	38.59	-35.41	74	62.99	-24.4	63.75	8.43	150	360	P	H
		4824	37.86	-36.14	74	62.26	-24.4	63.75	8.43	150	360	P	V
802.11n HT20 CH 06 2437MHz		4872	35.29	-38.71	74	59.54	-24.25	63.73	8.43	150	360	P	H
		7308	40.7	-33.3	74	59.48	-18.78	64.37	10.07	150	360	P	H
		4872	35.38	-38.62	74	59.63	-24.25	63.73	8.43	150	360	P	V
		7308	40.92	-33.08	74	59.7	-18.78	64.37	10.07	150	360	P	V
802.11n HT20 CH 11 2462MHz		4926	34.89	-39.11	74	58.98	-24.09	63.71	8.44	100	360	P	H
		7386	40.88	-33.12	74	59.42	-18.54	64.38	10.15	100	360	P	H
		4926	35.69	-38.31	74	59.78	-24.09	63.71	8.44	100	360	P	V
		7386	39.97	-34.03	74	58.51	-18.54	64.38	10.15	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

15C Emission below 1GHz

2.4GHz WIFI 802.11G (LF)

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)
2.4GHz 802.11G LF		30	17.83	-22.17	40	26.15	-8.32	32.98	0.46	-	-	P	H
		174.53	17.59	-25.91	43.5	33.78	-16.19	32.94	1.35	-	-	P	H
		612.97	21.81	-24.19	46	27.88	-6.07	33.34	2.63	-	-	P	H
		762.35	24.05	-21.95	46	28.44	-4.39	33.08	3.04	-	-	P	H
		870.02	24.87	-21.13	46	27.67	-2.8	32.48	3.3	100	0	P	H
		960.23	24.86	-29.14	54	25.97	-1.11	31.62	3.47	-	-	P	H
		33.88	30.13	-9.87	40	40.64	-10.51	32.96	0.49	100	0	P	V
		48.43	30.03	-9.97	40	47.46	-17.43	32.96	0.61	-	-	P	V
		75.59	19.45	-20.55	40	38.7	-19.25	32.92	0.82	-	-	P	V
		544.1	21.7	-24.3	46	28.62	-6.92	33.3	2.46	-	-	P	V
		690.57	23.08	-22.92	46	28.64	-5.56	33.28	2.85	-	-	P	V
		873.9	26.17	-19.83	46	28.92	-2.75	32.46	3.31	-	-	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 per 15.209(c).
!	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+2		(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)

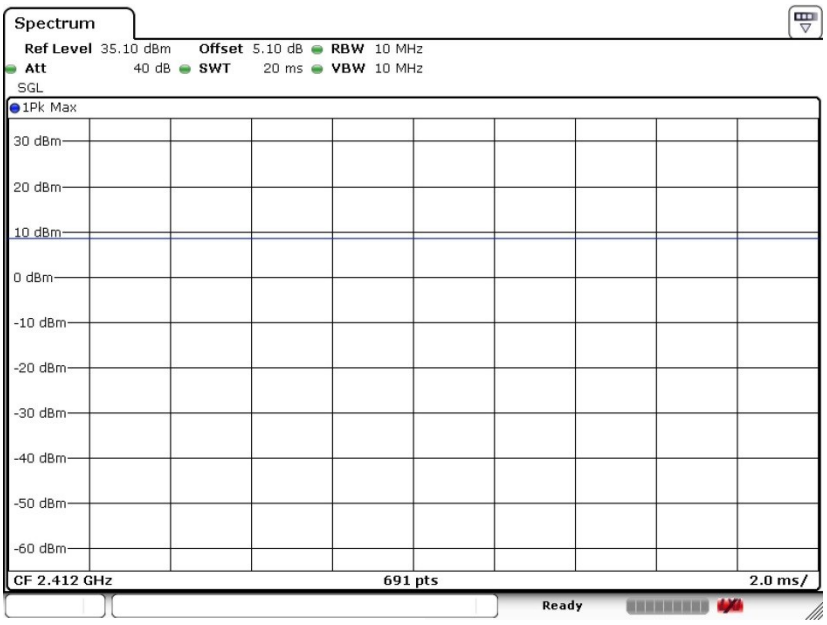
= -10.46(dB)

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

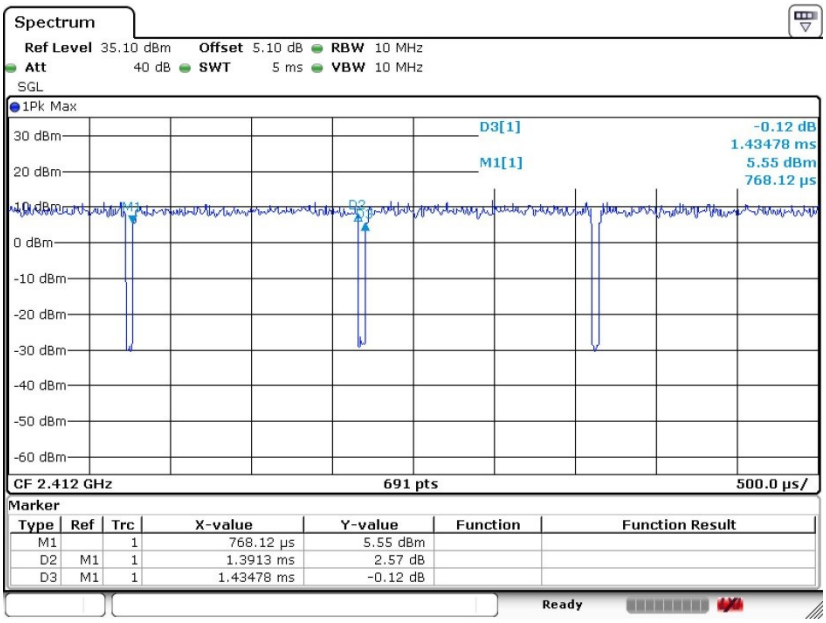
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	96.97	1.3913	0.7188	750Hz
802.11n HT20	96.77	1.3044	0.7667	820Hz

802.11b



802.11g



802.11n HT20