



NCC RADIO TEST REPORT

Equipment : “Abbott” i-STAT Alinity Instrument
(“亞培”艾斯特床旁血液監護儀)
Brand Name : Abbott
Model Name : AN-500
Marketing Name : AN-500
Applicant : 美商亞培股份有限公司
台北市中山區民生東路 3 段 51 號 6 樓及 49 號 5 樓、6 樓
Manufacturer : ABBOTT POINT OF CARE INC.
400 College Road East Princeton, NJ 08540, U.S.A
Standard : NCC LP0002 (2018-01-10)

The product was received on Mar. 12, 2020 and testing was started from Apr. 06, 2020 and completed on May 20, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures NCC LP0002 (2018-01-10) and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Product Feature of Equipment Under Test.....	5
1.2 Modification of EUT	5
1.3 Testing Location	6
1.4 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	10
2.5 EUT Operation Test Setup	10
2.6 Measurement Results Explanation Example.....	10
3 Test Result	11
3.1 6dB and 99% Bandwidth Measurement	11
3.2 Output Power Measurement.....	13
3.3 Power Spectral Density Measurement	14
3.4 Conducted Band Edges and Spurious Emission Measurement	16
3.5 Radiated Band Edges and Spurious Emission Measurement	35
3.6 AC Conducted Emission Measurement.....	39
3.7 Antenna Requirements.....	41
4 List of Measuring Equipment.....	42
5 Uncertainty of Evaluation	44
Appendix A. Conducted Test Results	
Appendix B. AC Conducted Emission Test Result	
Appendix C. Radiated Spurious Emission	
Appendix D. Radiated Spurious Emission Plots	
Annex A. Receiver Radiated Emission	
Annex B. Maximum Power Density	
Appendix E. Duty Cycle Plots	
Appendix F. Setup Photographs	



History of this test report

Report No.	Version	Description	Issued Date
TR012109A	01	Initial issue of report	Apr. 28, 2020
TR012109A	02	1. Revise accessory list in section 1.1. 2. Update test data. 3. Revise Brand name for AC Adapter	May 22, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	LP0002 3.10.1.6 (2)(A)	6dB Bandwidth	Pass	-
3.1	-	99% Occupied Bandwidth	Reporting only	-
3.2	LP0002 3.10.1.2 (1)(C)	Power Output Measurement	Pass	-
3.3	LP0002 3.10.1.6 (2)(B)	Power Spectral Density	Pass	-
3.4	LP0002 3.10.1.5	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	LP0002 3.10.1.5	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 0.14 dB at 4924.000 MHz
3.6	LP0002 2.3	AC Conducted Emission	Pass	Under limit 3.98 dB at 0.527 MHz
3.7	LP0002 2.2 3.10.1.3 3.10.1.4	Antenna Requirement	Pass	-
Annex A	LP0002 2.11	Receiver Radiated Emission	Pass	Please refer to Annex A
Annex B	LP0002 2.2 5.20.2	Maximum Power Density	Pass	-

Declaration of Conformity:

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

Comments and Explanations:

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

Reviewed by: Wii Chang

Report Producer: Cindy Liu

1 General Description

1.1 Product Feature of Equipment Under Test

Wi-Fi 2.4GHz 802.11b/g/n and Wi-Fi 5GHz 802.11a/n

Product Specification subjective to this standard	
Antenna Type	WLAN <Ant.1>: PCB Antenna <Ant.2>: PCB Antenna

Specification of Accessory		
AC Adapter	Brand Name	Abbott
	Model Name	MENB1060A0551F02
Base Station	Brand Name	Abbott
	Model Name	BST-500
Battery	Brand Name	Abbott
	Model Name	RB-500

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH05-HY	CO05-HY

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

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory	
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855	
Test Site No.	Sporton Site No.	
	03CH15-HY	

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

FCC designation No.: TW1190 and TW0007

1.4 Applicable Standards

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

- ♦ NCC LP0002 (2018-01-10)
- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.

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 and Accessory. The worst cases (Cradle Mode) 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

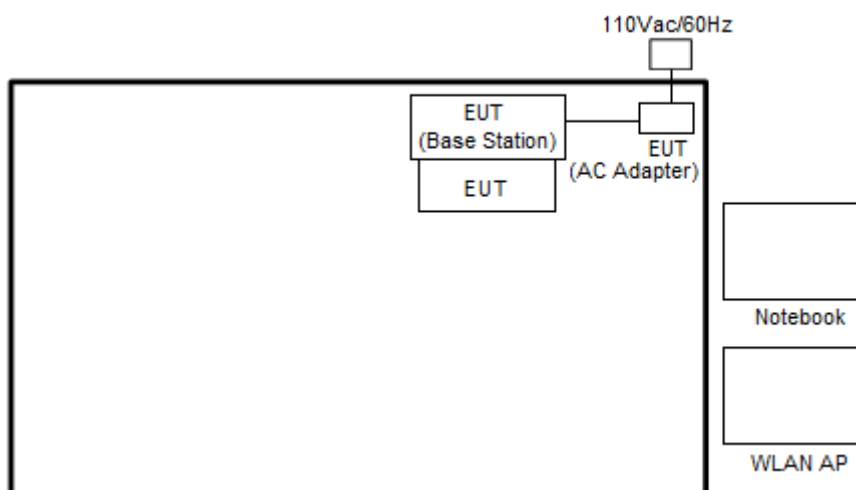
Test Cases	
AC Conducted Emission	Mode 1 :WLAN (2.4GHz) Link + Base Station + AC Adapter Mode 2 WLAN (2.4GHz) Idle + Base Station + AC Adapter
Remark: The worst case of conducted emission is mode 1; only the test data of it was reported.	

Ch. #	2400-2483.5 MHz		
	802.11b	802.11g	802.11n HT20
Low	01	01	01
Middle	06	06	06
High	11	11	11

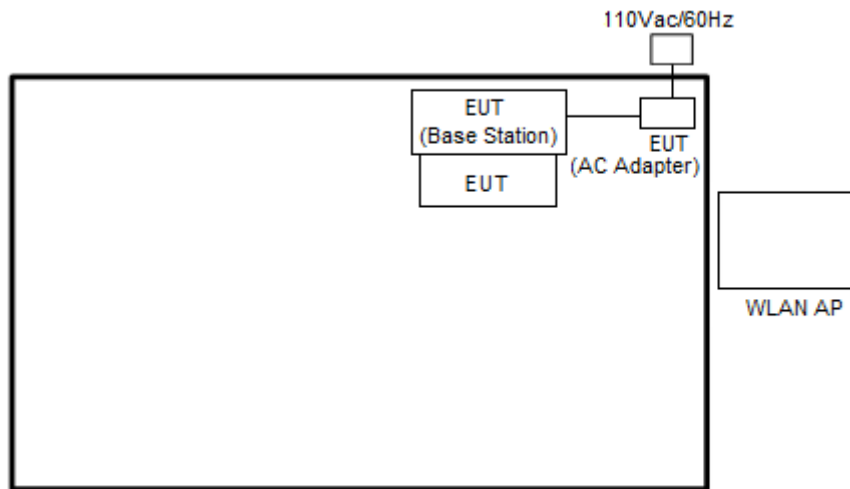
Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

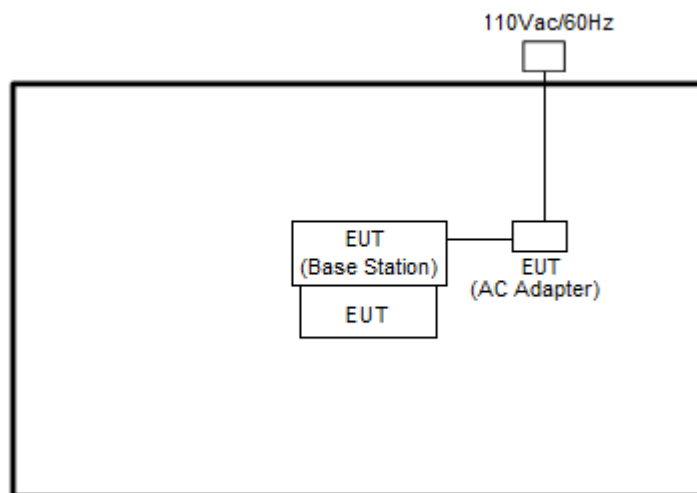
<AC Conducted Emission with Adapter Mode>



<AC Conducted Emission with WLAN Idle Mode>



<WLAN Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

Remark: Applicant has ensured accessory would not be attached with the product on the market, accessory is provided by lab for testing.

2.5 EUT Operation Test Setup

The RF test items, utility “Tera Term” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

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

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

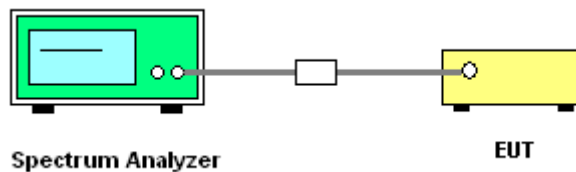
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
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) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) $\geq 3 * RBW$.
6. Measure and record the results in the test report.

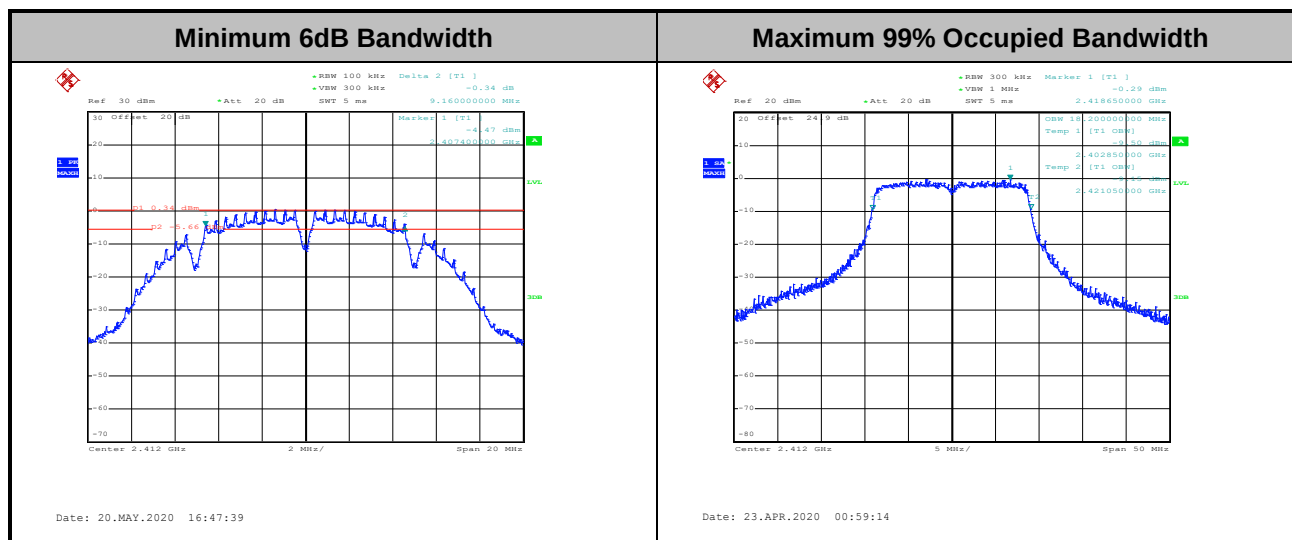
3.1.4 Test Setup





3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.



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 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.

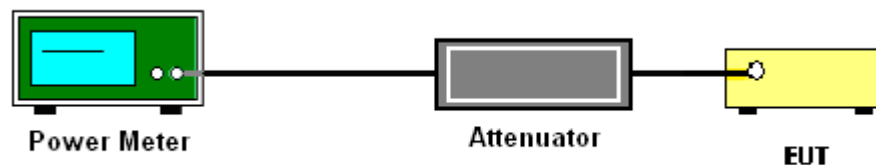
3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.1 Method AVGPM
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 Average Output Power

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.

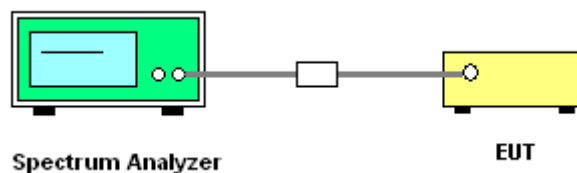
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

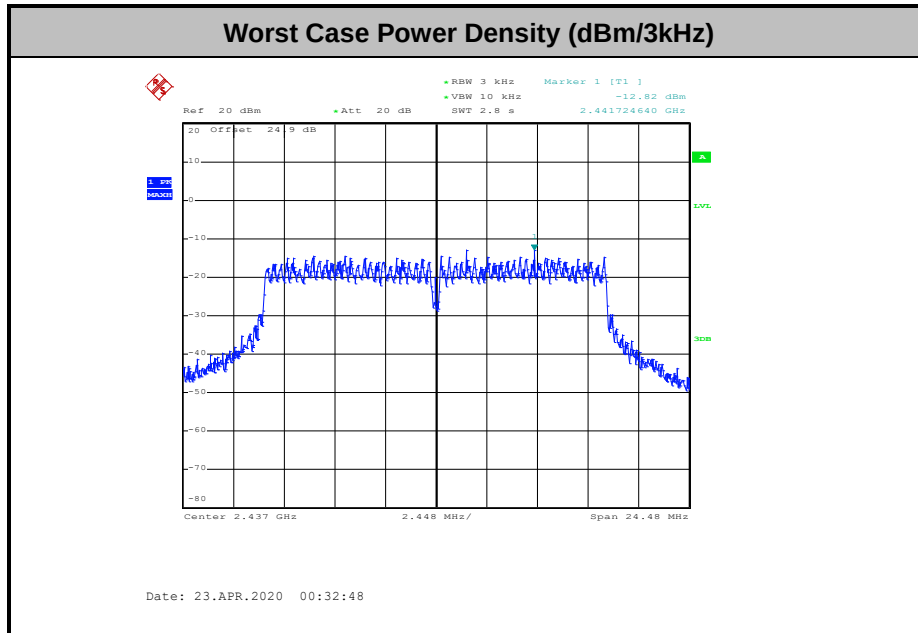
1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
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.



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 and radiated emissions which fall in the restricted bands, as defined in NCC LP0002 section 2.7, must also comply with the radiated emission limits specified in NCC LP0002 section 2.8..

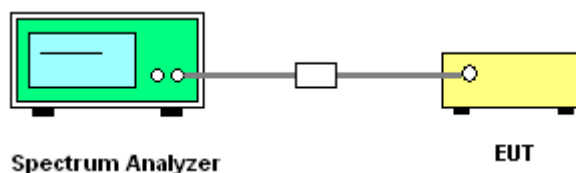
3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
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.
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



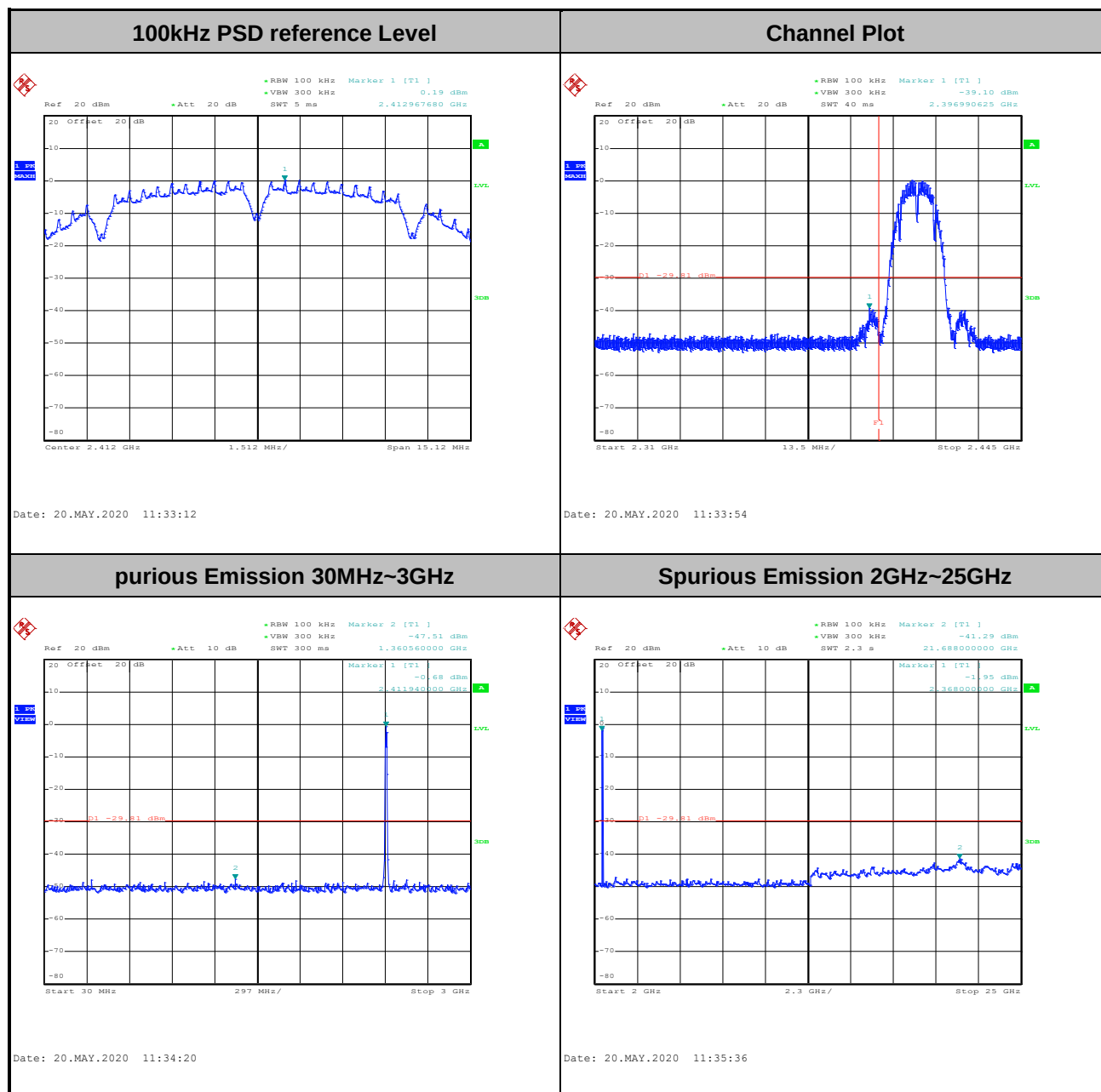


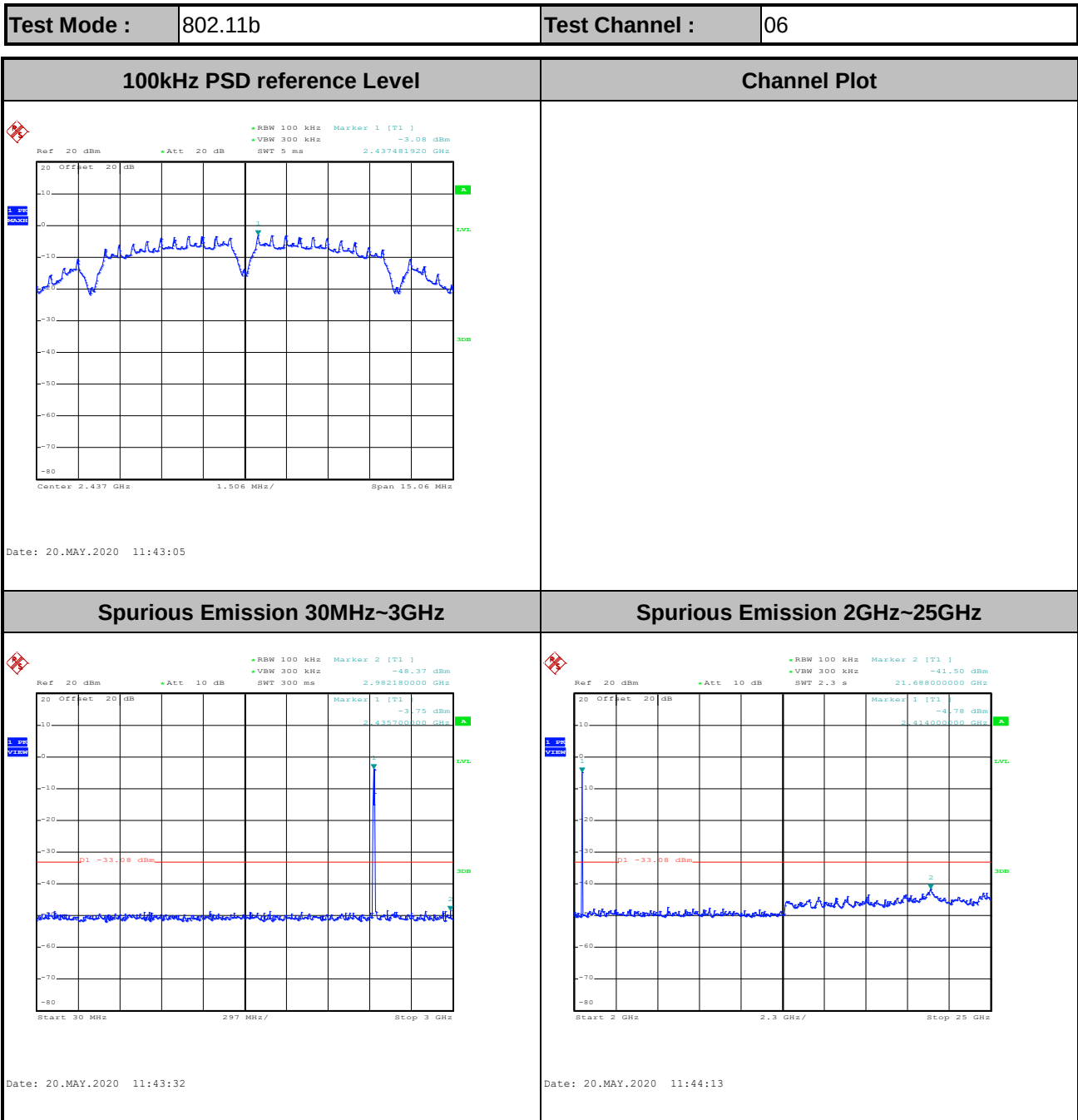
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Jacob Yu and Kai Liao	Temperature :	21~25°C
		Relative Humidity :	51~54%

Number of TX = 1, Ant. 1 (Measured)

Test Mode :	802.11b	Test Channel :	01
-------------	---------	----------------	----

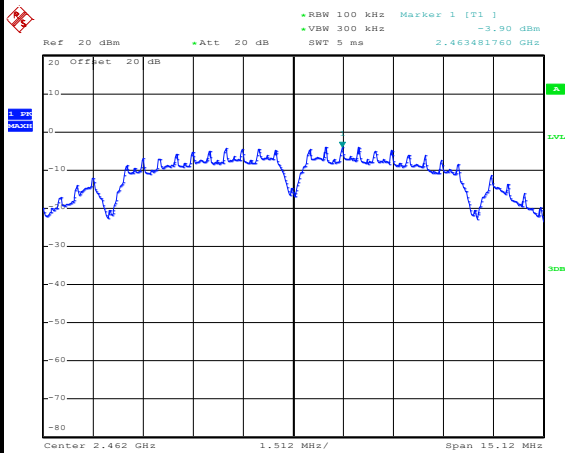






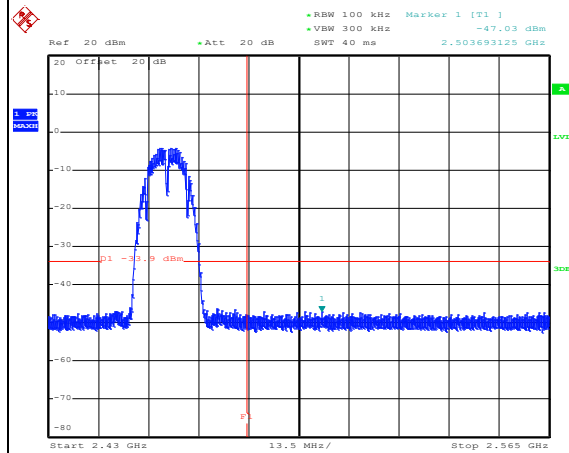
Test Mode :	802.11b	Test Channel :	11
-------------	---------	----------------	----

100kHz PSD reference Level



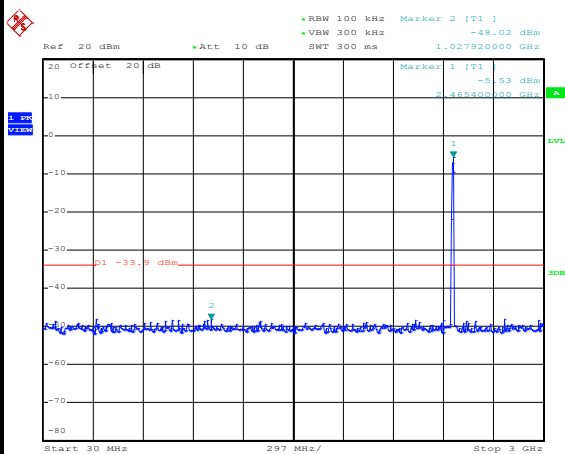
Date: 20.MAY.2020 11:52:46

Channel Plot



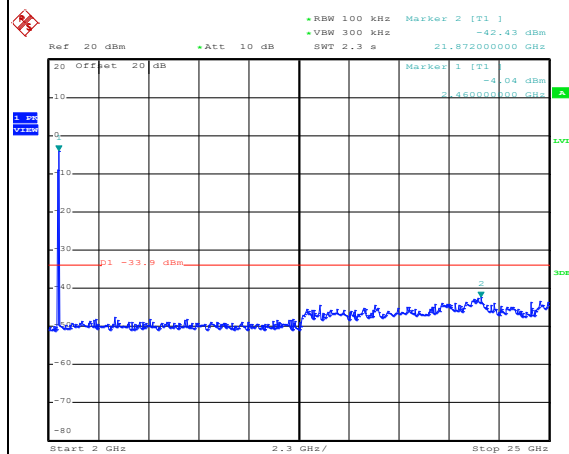
Date: 20.MAY.2020 11:53:57

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2020 11:54:55

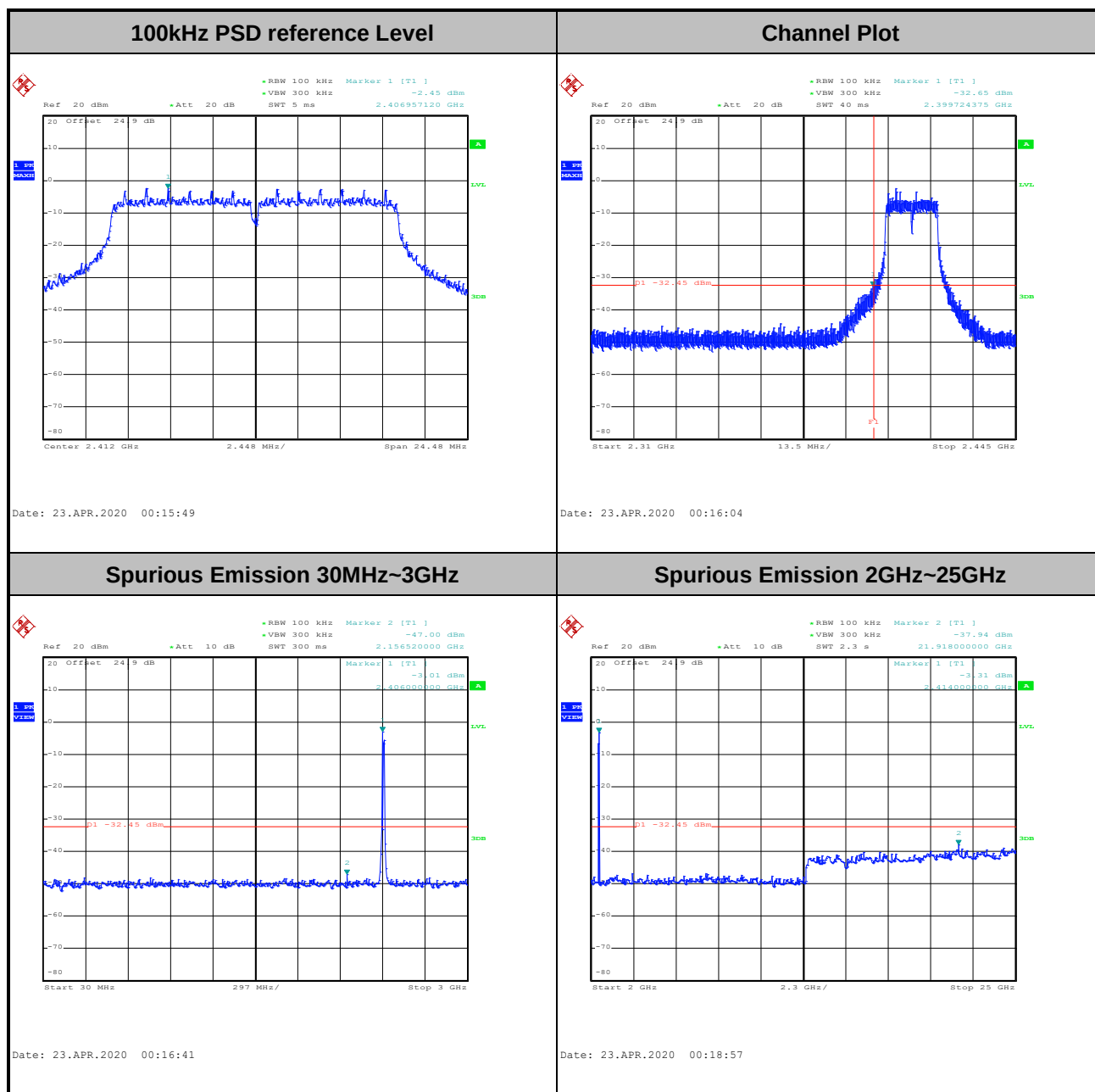
Spurious Emission 2GHz~25GHz



Date: 20.MAY.2020 11:55:20

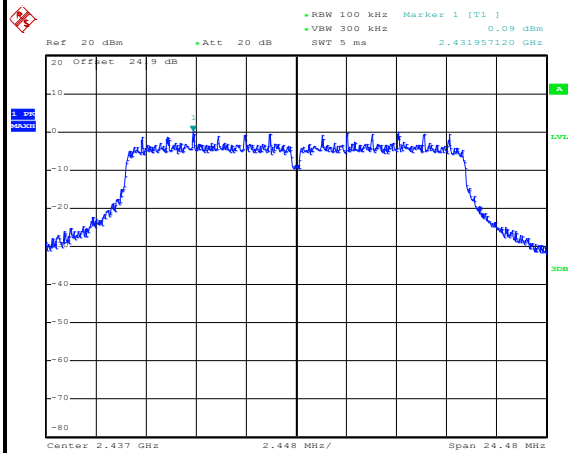


Test Mode :	802.11g	Test Channel :	01
-------------	---------	----------------	----



Test Mode :	802.11g	Test Channel :	06
--------------------	---------	-----------------------	----

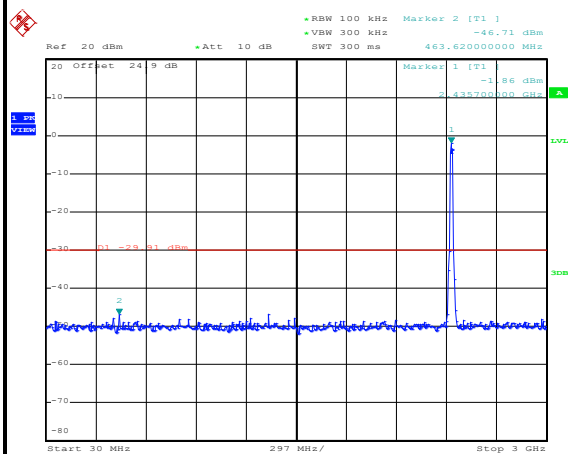
100kHz PSD reference Level



Date: 23.APR.2020 00:33:05

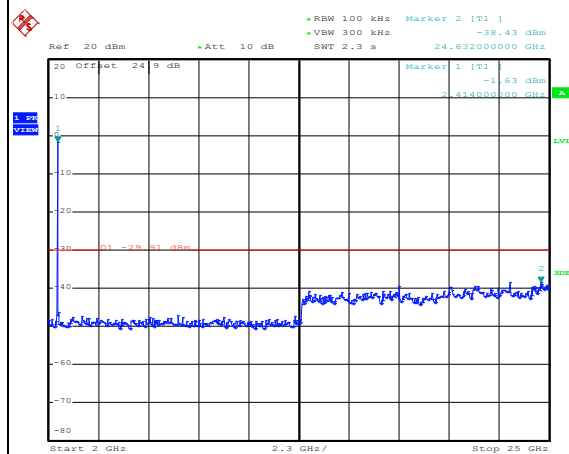
Channel Plot

Spurious Emission 30MHz~3GHz

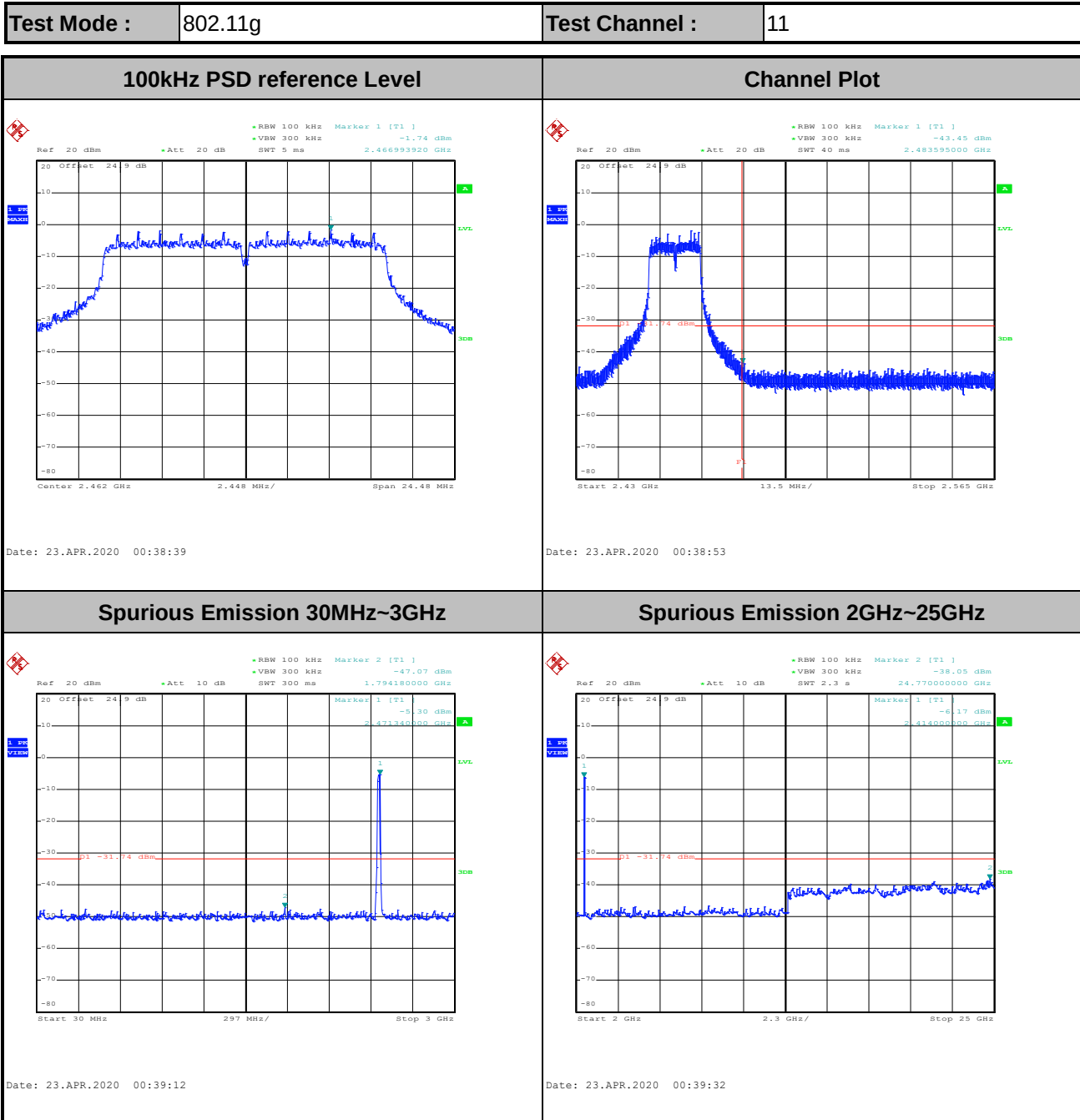


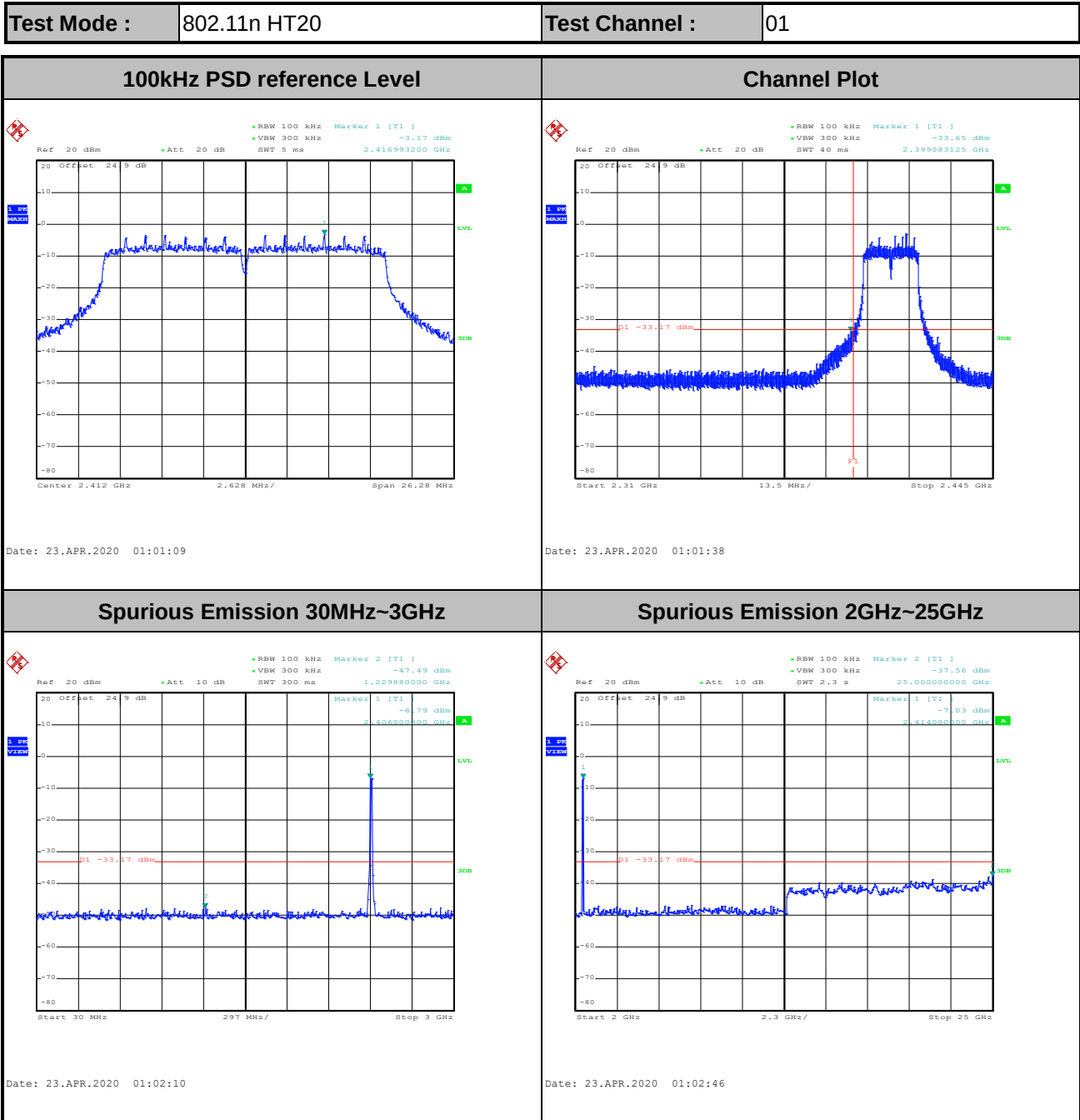
Date: 23.APR.2020 00:33:22

Spurious Emission 2GHz~25GHz



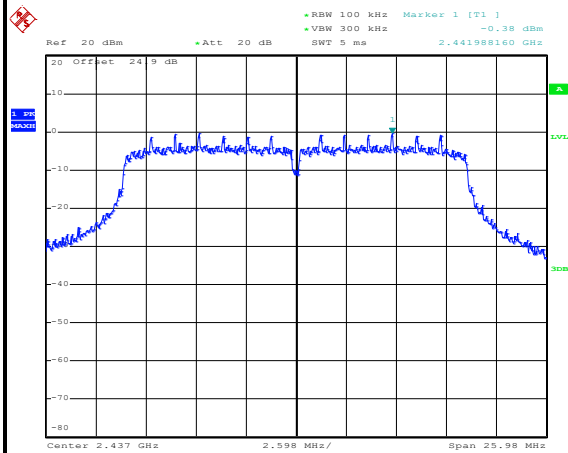
Date: 23.APR.2020 00:33:52





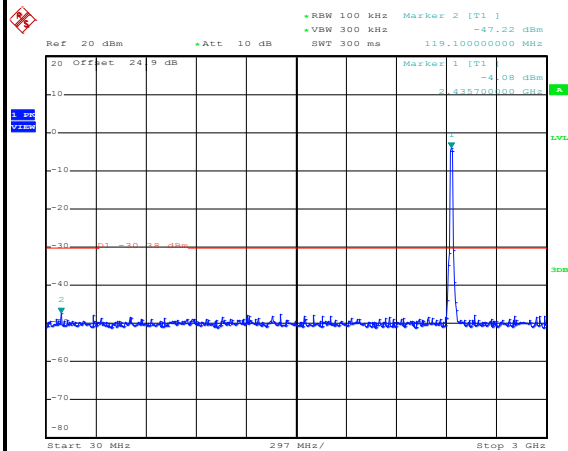
Test Mode :	802.11n HT20	Test Channel :	06
--------------------	--------------	-----------------------	----

100kHz PSD reference Level



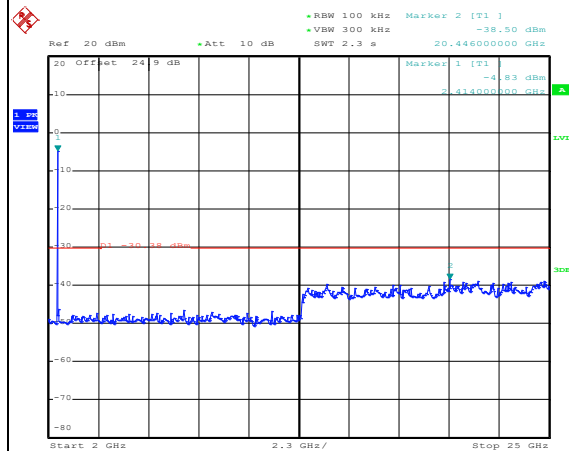
Date: 23.APR.2020 01:18:21

Channel Plot



Date: 23.APR.2020 01:18:38

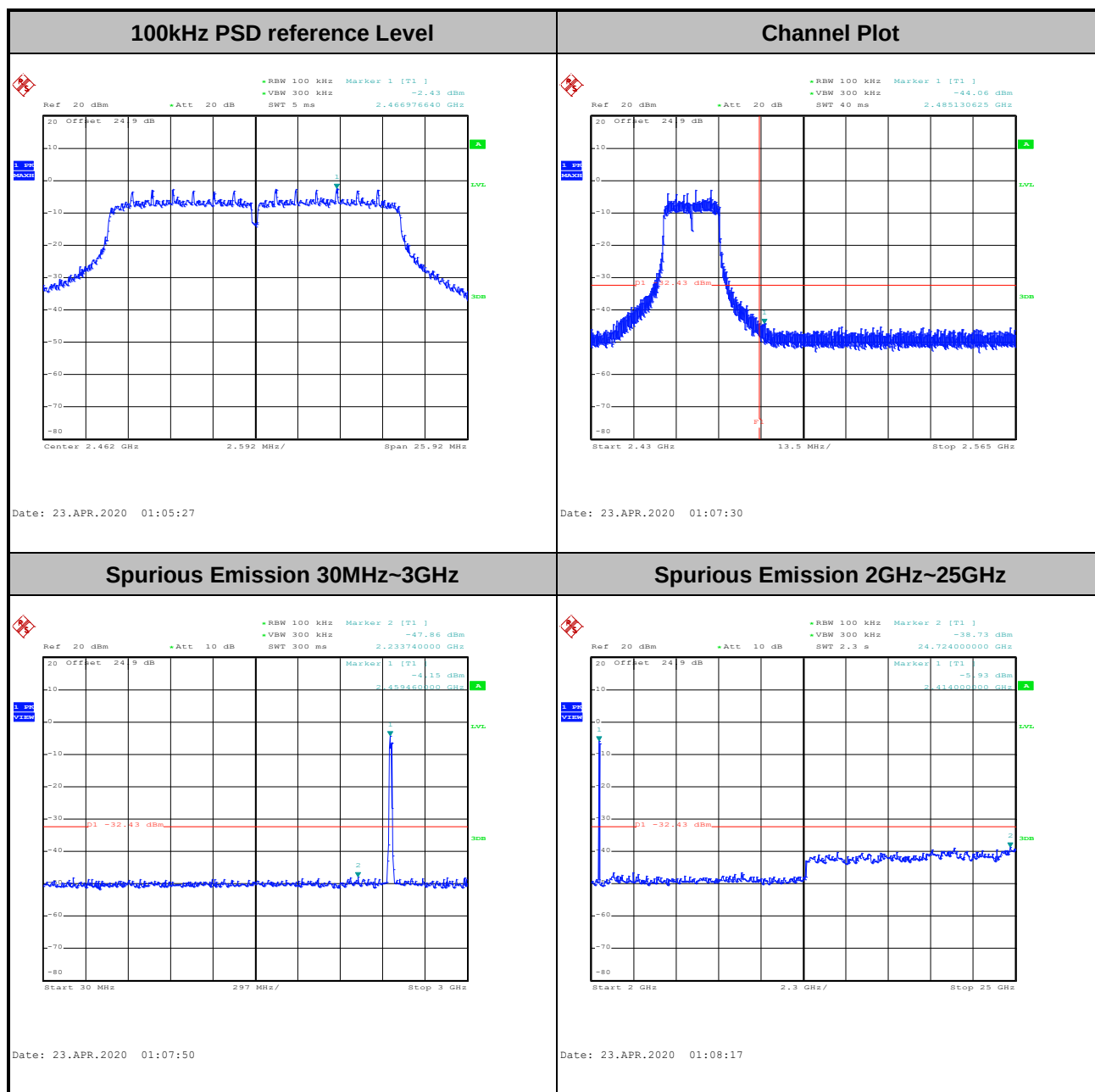
Spurious Emission 2GHz~25GHz



Date: 23.APR.2020 01:18:54



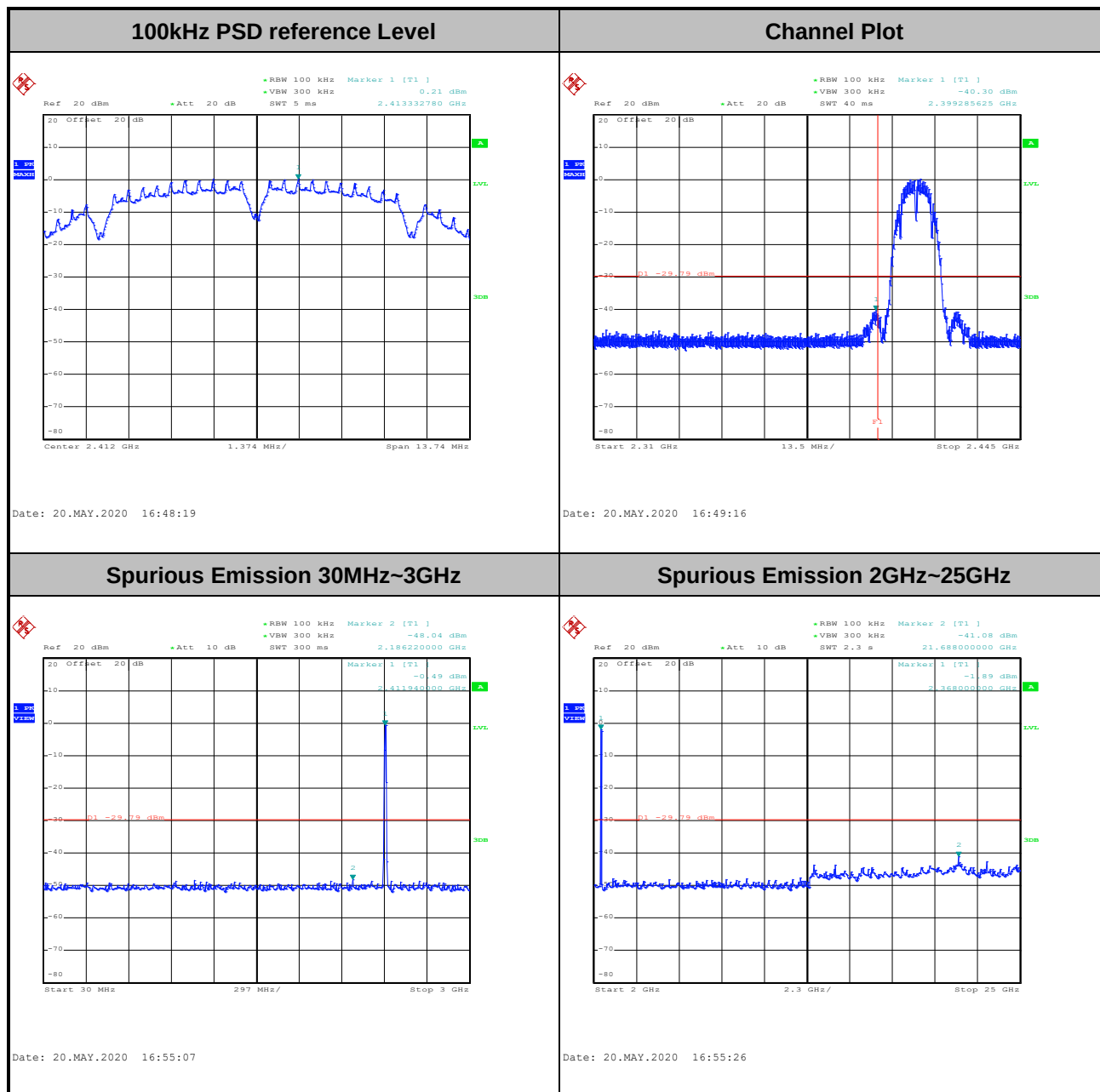
Test Mode :	802.11n HT20	Test Channel :	11
-------------	--------------	----------------	----

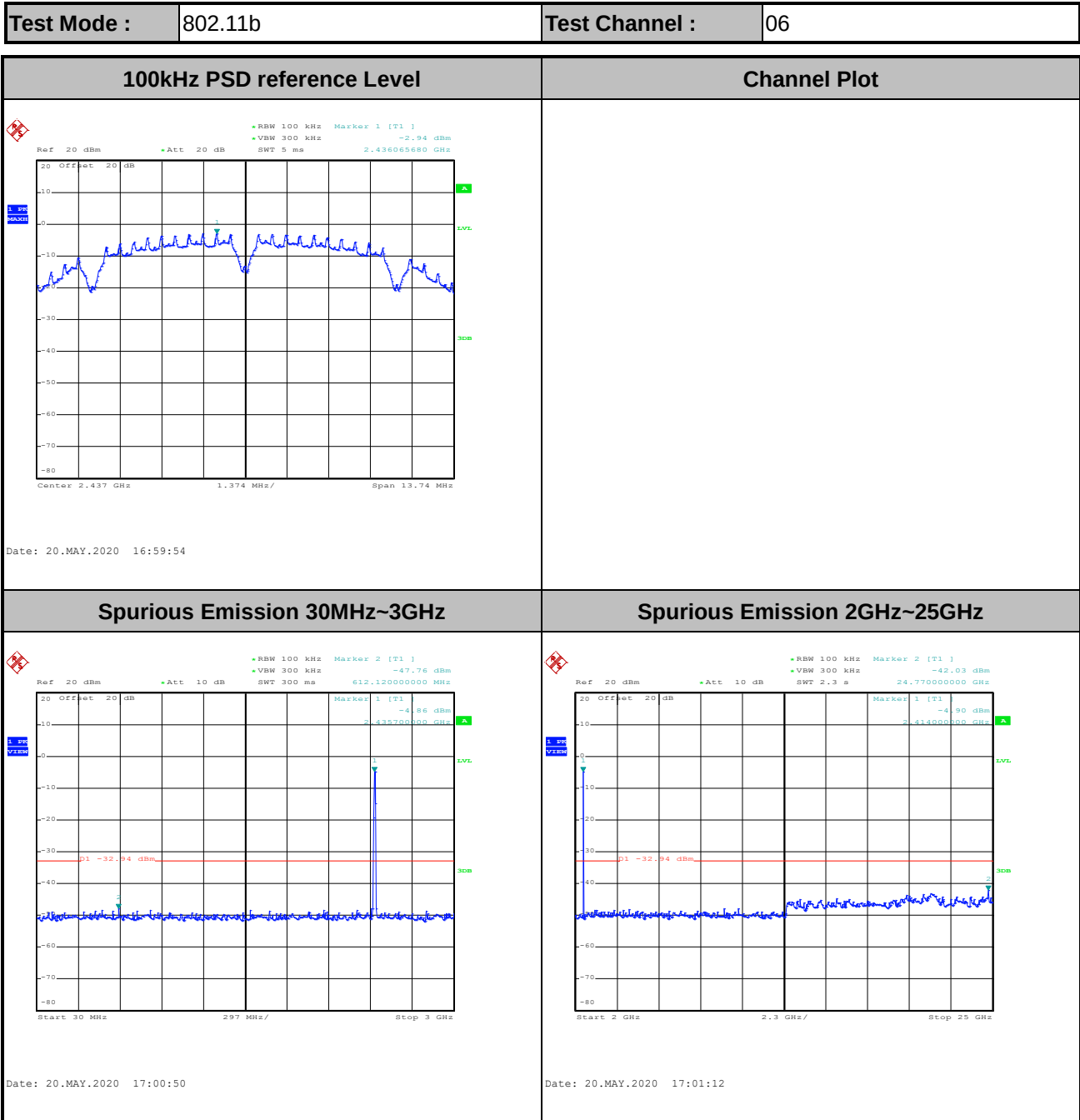




Number of TX = 1, Ant. 2 (Measured)

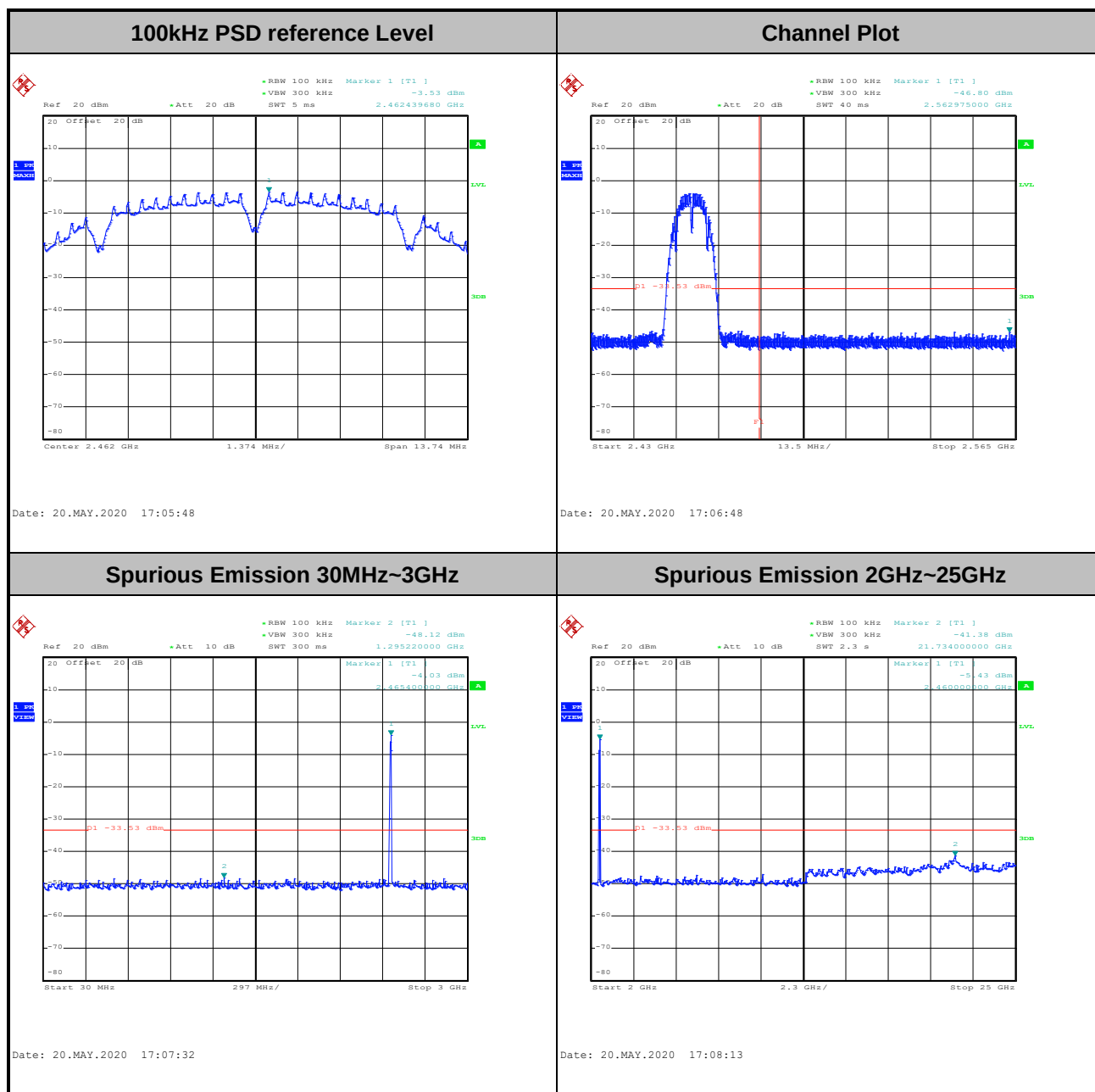
Test Mode :	802.11b	Test Channel :	01
-------------	---------	----------------	----

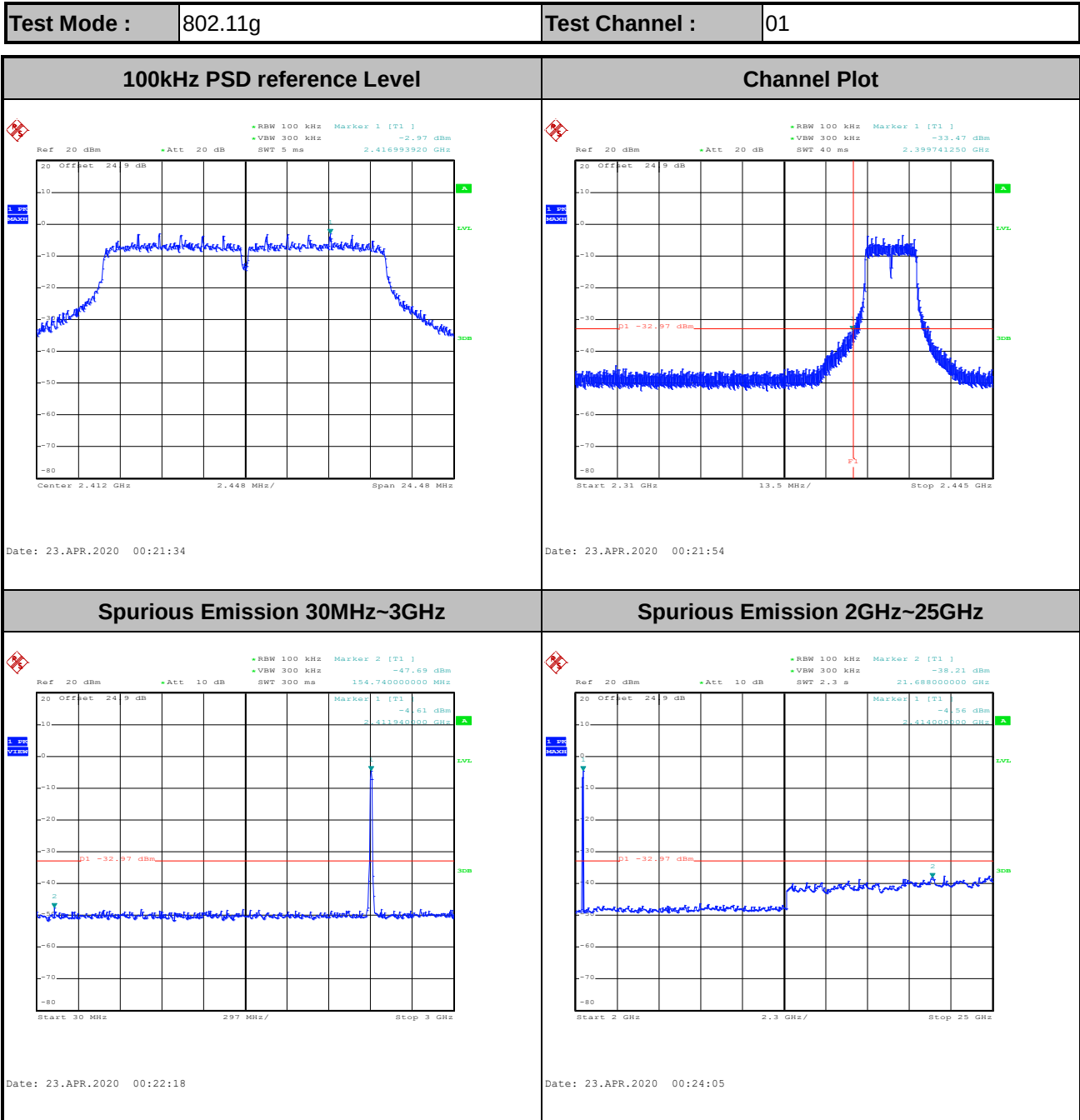






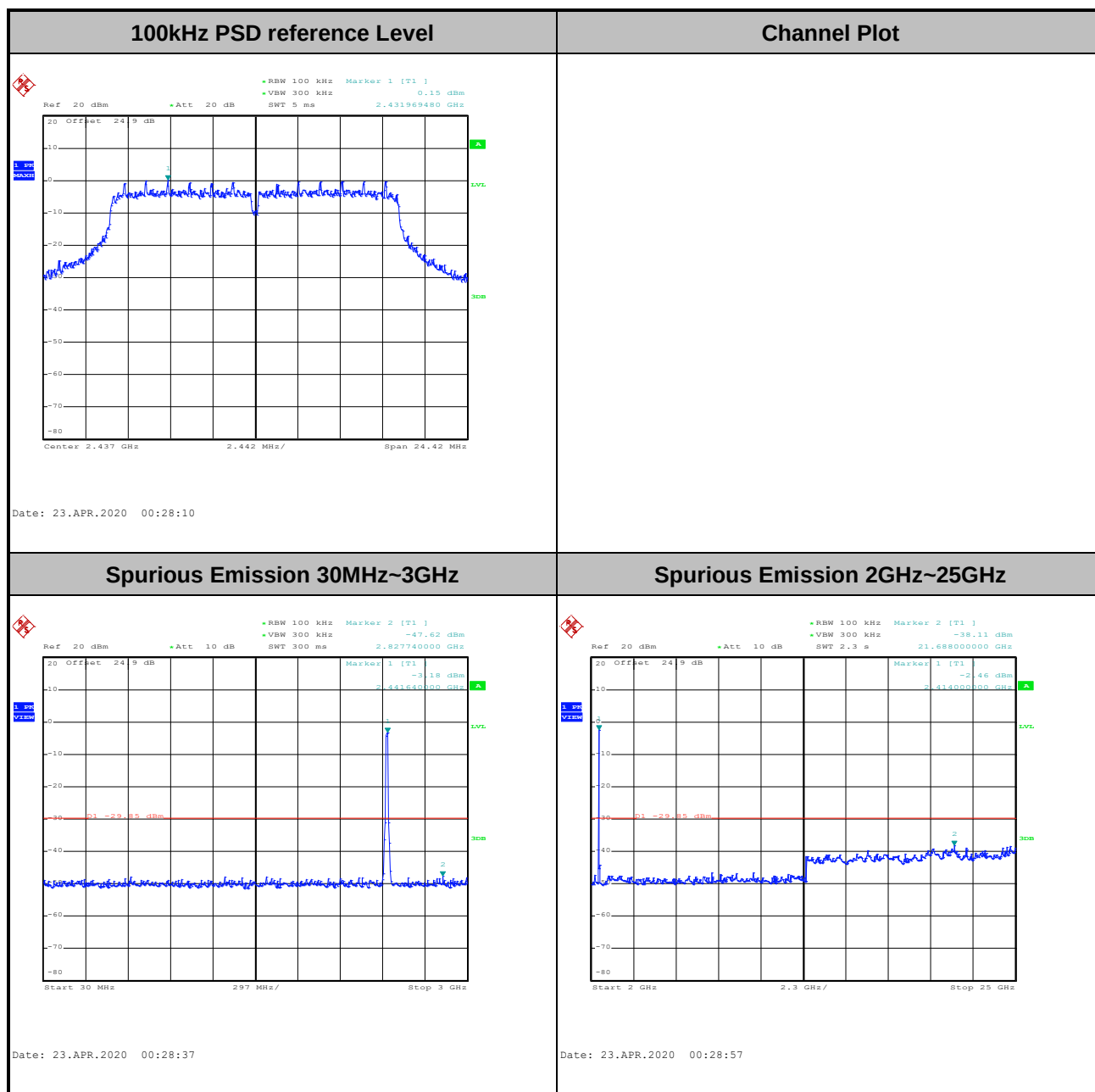
Test Mode :	802.11b	Test Channel :	11
-------------	---------	----------------	----

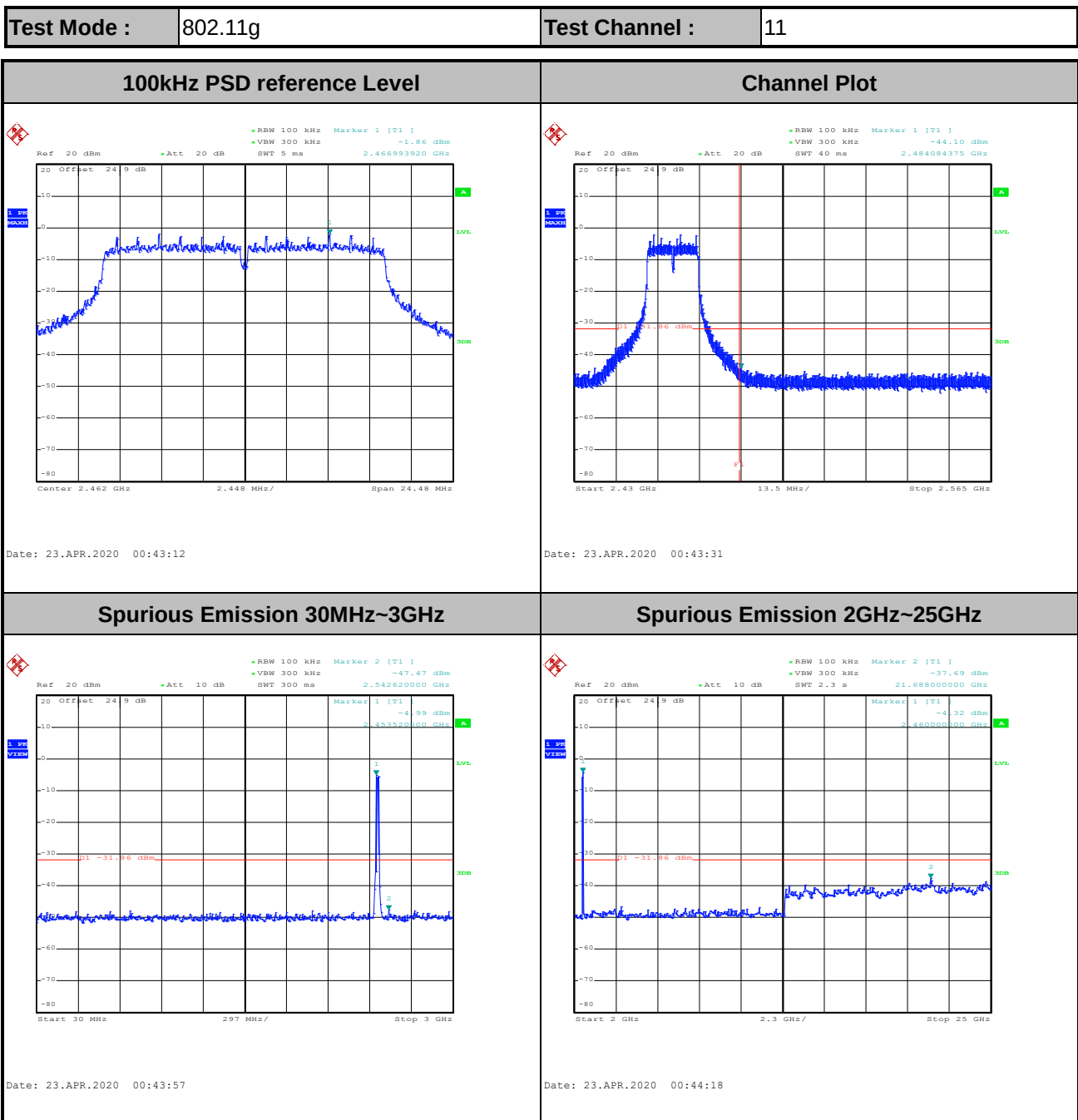


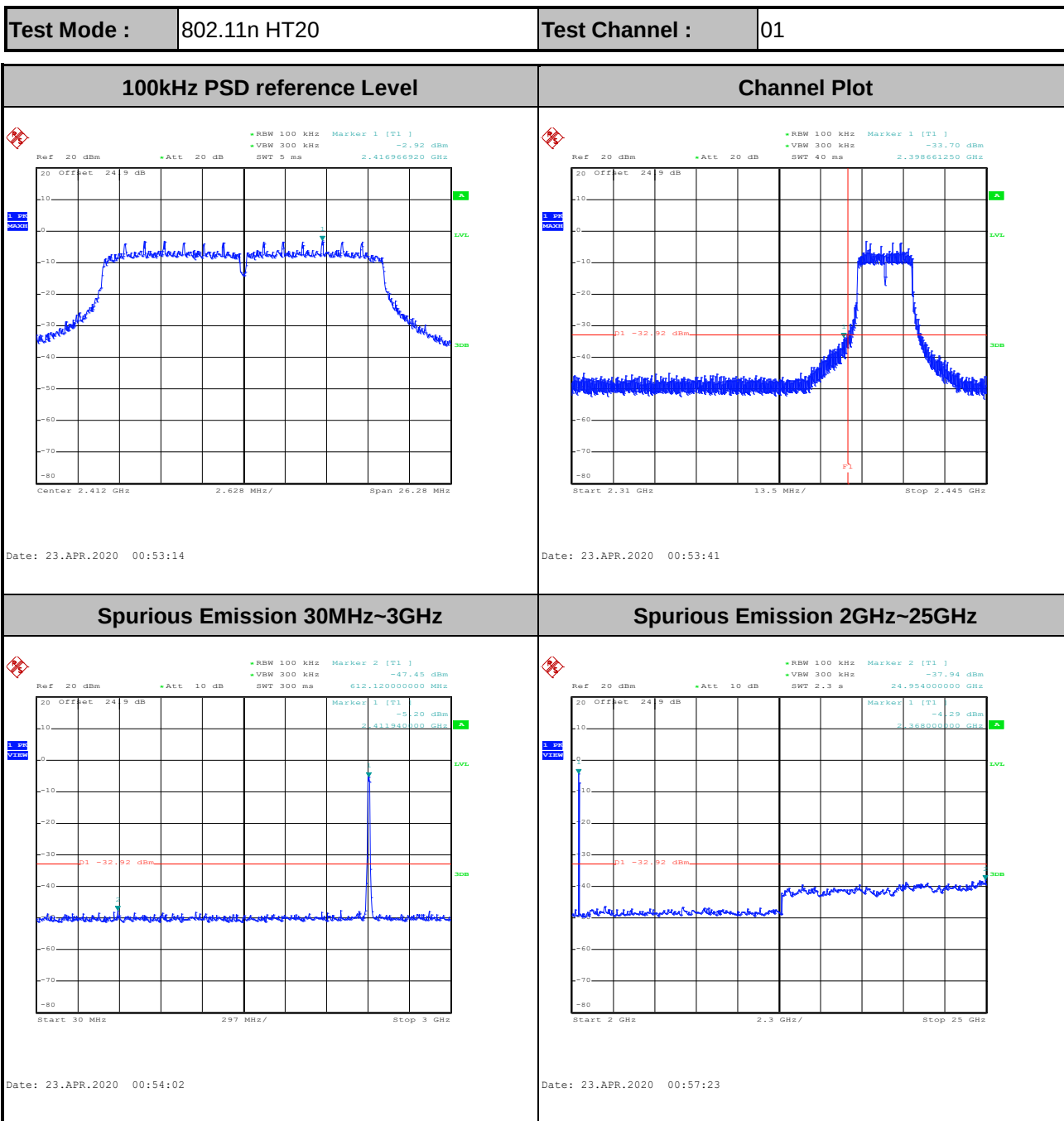


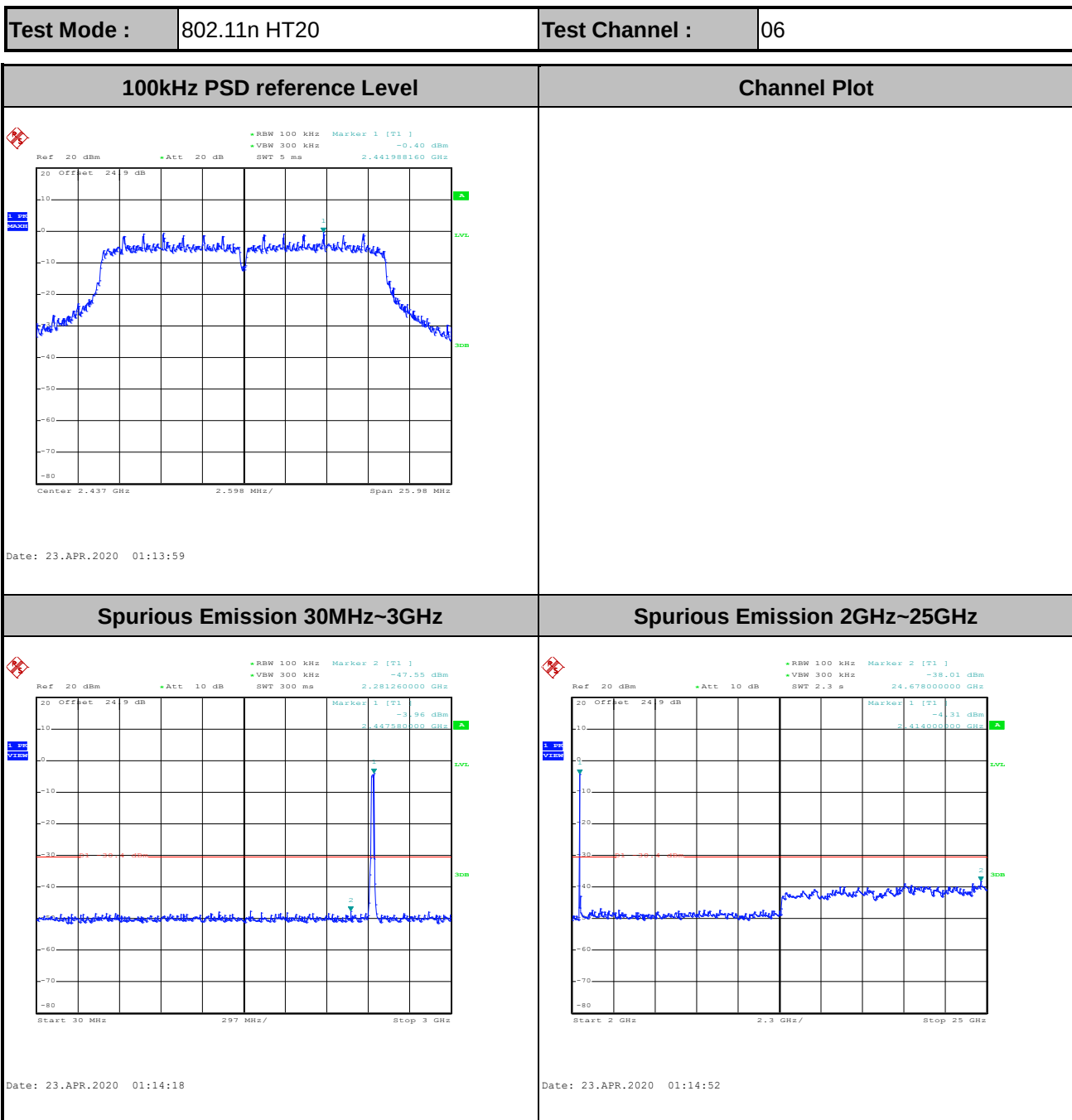


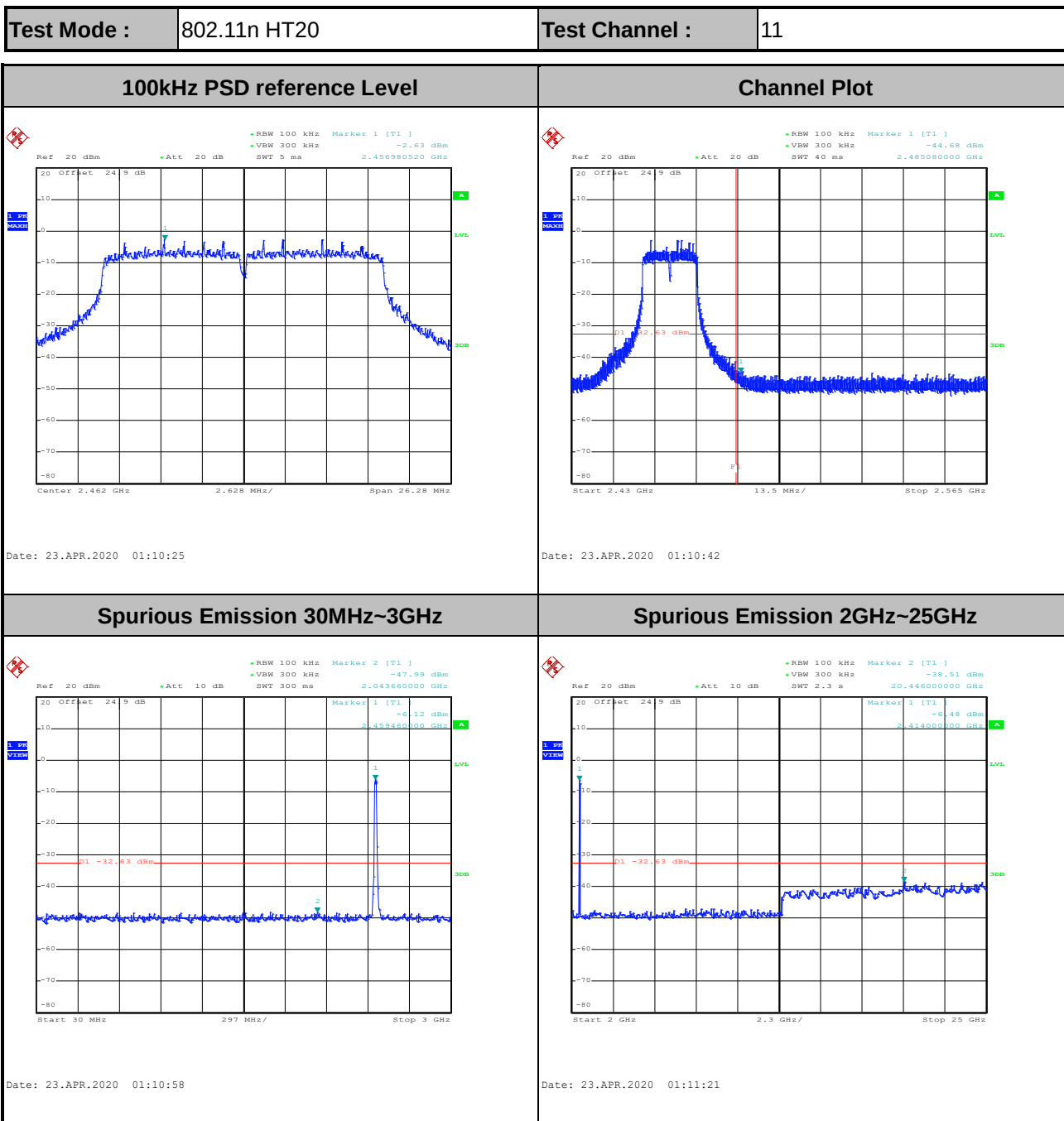
Test Mode :	802.11g	Test Channel :	06
-------------	---------	----------------	----











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 NCC LP0002 section 2.8 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

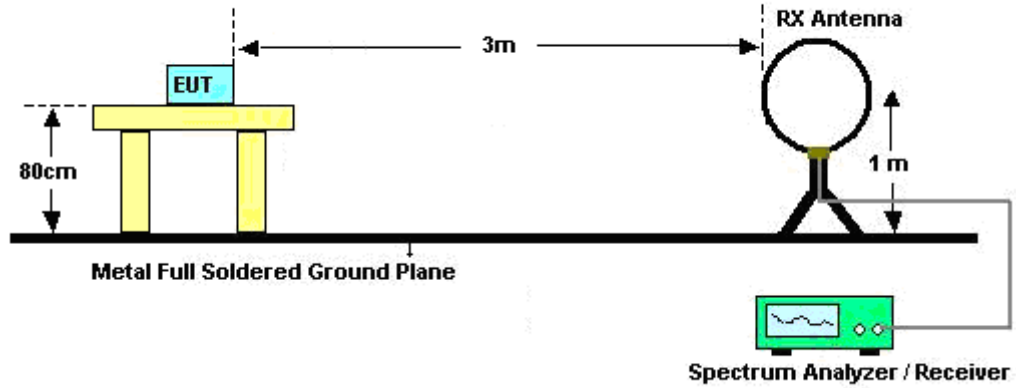
See list of measuring equipment of this test report.

3.5.3 Test Procedures

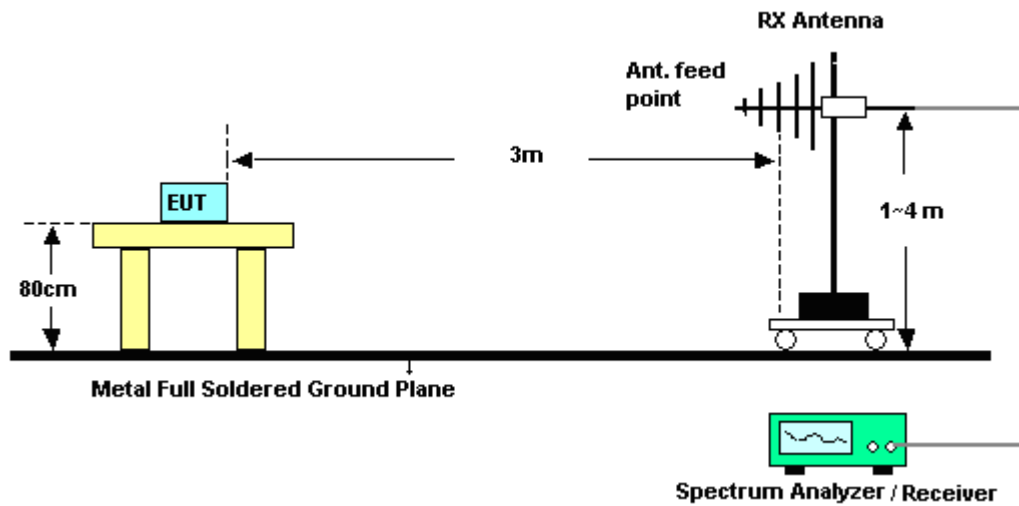
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - $VBW = 10$ Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

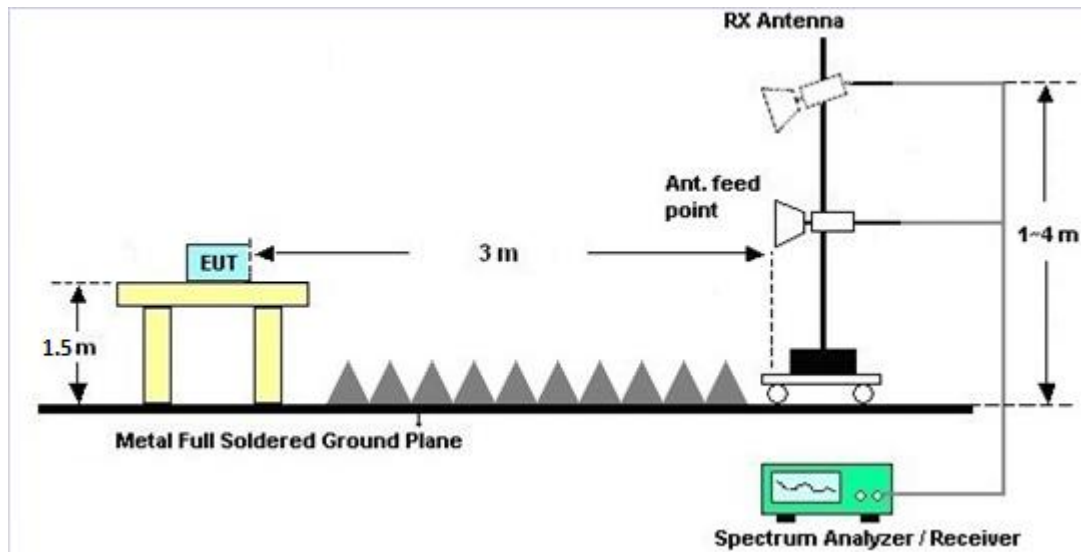
For radiated emissions below 30MHz



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 per NCC LP0002 section 5.13 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

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 (dB μ V)	
	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.

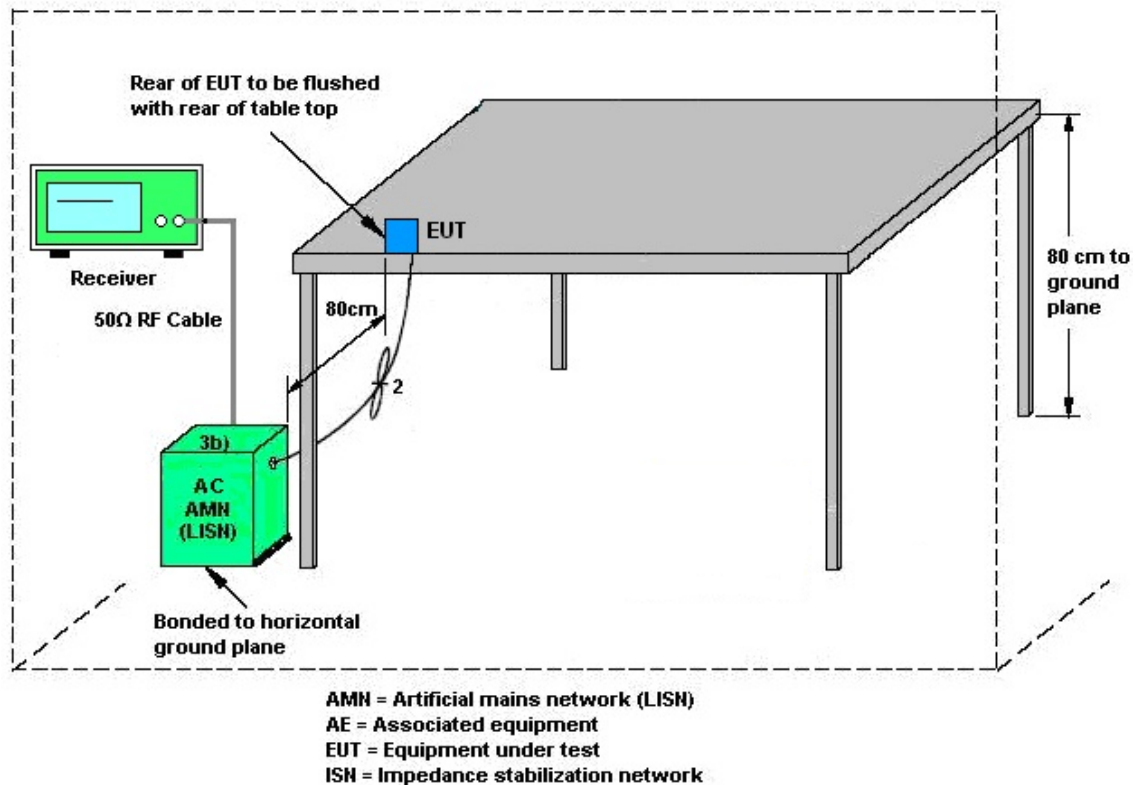
3.6.2 Measuring Instruments

See list of measuring equipment 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 LP0002 Section 2.2, Section 3.10.1.3, and Section 3.10.1.4

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
Hygrometer	Testo	608-H2	41410069	N/A	Jun. 17, 2019	Apr. 06, 2020 ~ May 20, 2020	Jun. 16, 2020	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	17100015SNO36	10MHz~6GHz	Jan. 22, 2020	Apr. 06, 2020 ~ May 20, 2020	Jan. 21, 2021	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Aug. 14, 2019	Apr. 06, 2020 ~ May 20, 2020	Aug. 13, 2020	Conducted (TH05-HY)
Switch Control Manframe	Burgeon	ETF-1405-0	EC1900157	N/A	Aug. 15, 2019	Apr. 06, 2020 ~ May 20, 2020	Aug. 14, 2020	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 14, 2020	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 15, 2019	May 14, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 07, 2019	May 14, 2020	Nov. 06, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 15, 2019	May 14, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 14, 2020	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 02, 2020	May 14, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 02, 2020	May 14, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 09, 2020	Apr. 10, 2020 ~ May 20, 2020	Jan. 08, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Feb. 09, 2020	Apr. 10, 2020 ~ May 20, 2020	Feb. 08, 2021	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1620	1-18GHz	Oct. 28, 2019	Apr. 10, 2020 ~ May 20, 2020	Oct. 27, 2020	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 10, 2019	Apr. 10, 2020 ~ May 20, 2020	Dec. 09, 2020	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 27, 2019	Apr. 10, 2020 ~ May 20, 2020	Dec. 26, 2020	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055007	1GHz~18GHz	Mar. 31, 2020	Apr. 10, 2020 ~ May 20, 2020	Mar. 30, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 23, 2019	Apr. 10, 2020 ~ May 20, 2020	Aug. 22, 2020	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Apr. 10, 2020 ~ May 20, 2020	Dec. 12, 2020	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20MHz~8.4GHz	Nov. 01, 2019	Apr. 10, 2020 ~ May 20, 2020	Oct. 31, 2020	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	Apr. 29, 2019	Apr. 10, 2020 ~ Apr. 27, 2020	Apr. 28, 2020	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May. 04, 2020	May 04, 2020 ~ May 20, 2020	May. 03, 2021	Radiation (03CH15-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Apr. 10, 2020 ~ May 20, 2020	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Apr. 10, 2020 ~ May 20, 2020	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Apr. 10, 2020 ~ May 20, 2020	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18 GHz	Apr. 15, 2019	Apr. 10, 2020 ~ May 20, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4PE	30M-18 GHz	Apr. 15, 2019	Apr. 10, 2020 ~ May 20, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY802430/4	30M~18GHz	May 13, 2019	Apr. 10, 2020 ~ Apr. 20, 2020	May 12, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY802430/4	30M~18GHz	Apr. 14, 2020	Apr. 20, 2020 ~ May 20, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Apr. 10, 2020 ~ May 20, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Apr. 10, 2020 ~ May 20, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN4	1.53G Low Pass	Jul. 04, 2019	Apr. 10, 2020 ~ May 20, 2020	Jul. 03, 2020	Radiation (03CH15-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3
---	-----

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.4
---	-----

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

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

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Jacob Yu / Kai Liao	Temperature:	21~25	°C
Test Date:	2020/4/6~2020/5/20	Relative Humidity:	51~54	%

Maximum Power Density				
Max. Power	Gain	EIRP	20 cm PSD	PSD Limit
13.80	2.50	16.30	0.0085	1.00
dBm	dBi	dBm	mW/cm ²	mW/cm ²

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band Single Antenna										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	1	1	2412	14.00	12.70	10.08	9.16	0.50	Pass
11b	1Mbps	1	6	2437	13.95	12.65	10.04	9.16	0.50	Pass
11b	1Mbps	1	11	2462	13.95	12.65	10.08	9.16	0.50	Pass
11g	6Mbps	1	1	2412	16.95	17.05	16.32	16.32	0.50	Pass
11g	6Mbps	1	6	2437	17.20	17.10	16.32	16.28	0.50	Pass
11g	6Mbps	1	11	2462	16.90	17.05	16.32	16.32	0.50	Pass
HT20	MCS0	1	1	2412	18.20	18.00	17.52	17.52	0.50	Pass
HT20	MCS0	1	6	2437	18.05	18.10	17.32	17.32	0.50	Pass
HT20	MCS0	1	11	2462	18.00	18.15	17.28	17.52	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	10.40	10.10		30.00	30.00	2.50	2.50	12.90	12.60	36.00	36.00	Pass
11b	1Mbps	1	6	2437	7.20	7.00		30.00	30.00	2.50	2.50	9.70	9.50	36.00	36.00	Pass
11b	1Mbps	1	11	2462	6.20	6.10		30.00	30.00	2.50	2.50	8.70	8.60	36.00	36.00	Pass
11g	6Mbps	1	1	2412	8.80	8.70		30.00	30.00	2.50	2.50	11.30	11.20	36.00	36.00	Pass
11g	6Mbps	1	6	2437	11.60	11.50		30.00	30.00	2.50	2.50	14.10	14.00	36.00	36.00	Pass
11g	6Mbps	1	11	2462	9.40	9.30		30.00	30.00	2.50	2.50	11.90	11.80	36.00	36.00	Pass
HT20	MCS0	1	1	2412	8.20	8.10		30.00	30.00	2.50	2.50	10.70	10.60	36.00	36.00	Pass
HT20	MCS0	1	6	2437	11.10	11.00		30.00	30.00	2.50	2.50	13.60	13.50	36.00	36.00	Pass
HT20	MCS0	1	11	2462	8.90	8.80		30.00	30.00	2.50	2.50	11.40	11.30	36.00	36.00	Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band Single Antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	-13.37	-13.61		2.50	2.50	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-17.16	-16.55		2.50	2.50	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-17.81	-17.72		2.50	2.50	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-15.28	-16.76		2.50	2.50	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-12.82	-13.59		2.50	2.50	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-14.87	-15.95		2.50	2.50	8.00	8.00	Pass
HT20	MCS0	1	1	2412	-17.18	-16.35		2.50	2.50	8.00	8.00	Pass
HT20	MCS0	1	6	2437	-15.39	-14.05		2.50	2.50	8.00	8.00	Pass
HT20	MCS0	1	11	2462	-16.74	-16.57		2.50	2.50	8.00	8.00	Pass

Measured power density (dBm) has offset with cable loss.



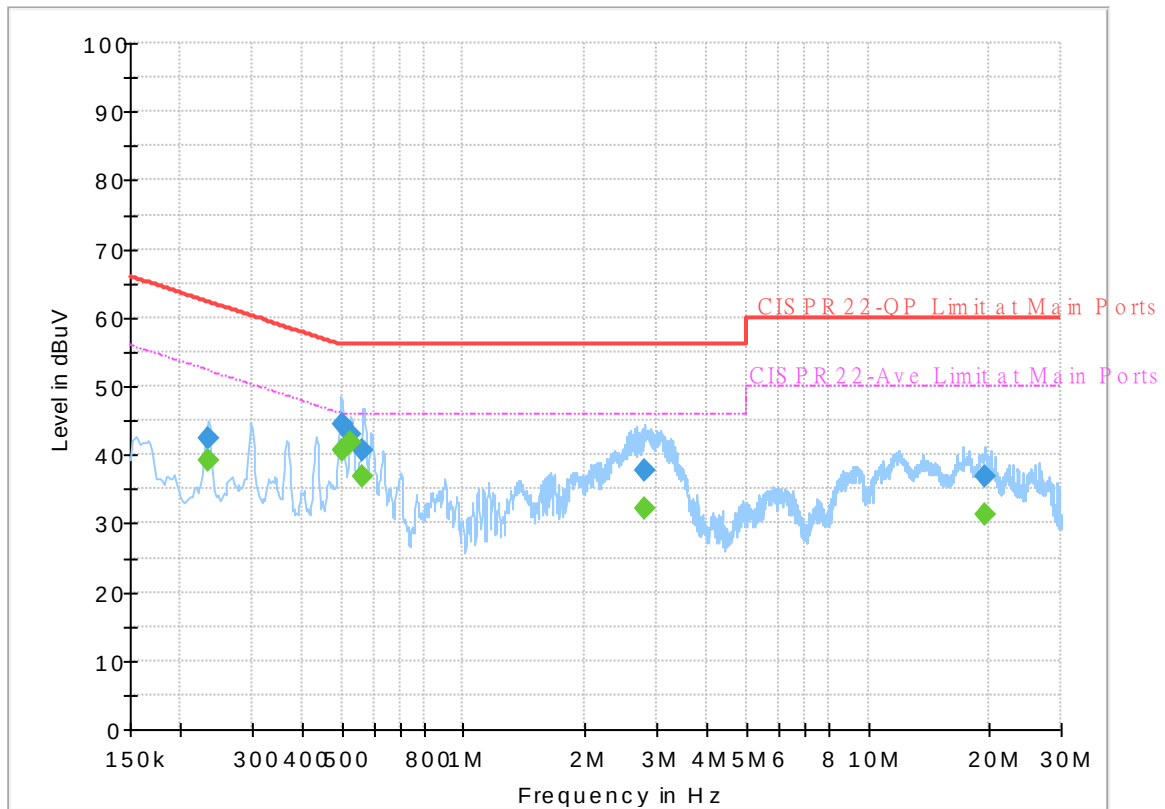
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	Temperature :	21~24℃
		Relative Humidity :	42~50%

EUT Information

Report NO : 012109
Test Mode : Mode 1
Test Voltage : 110Vac/60Hz
Phase : Line

Full Spectrum



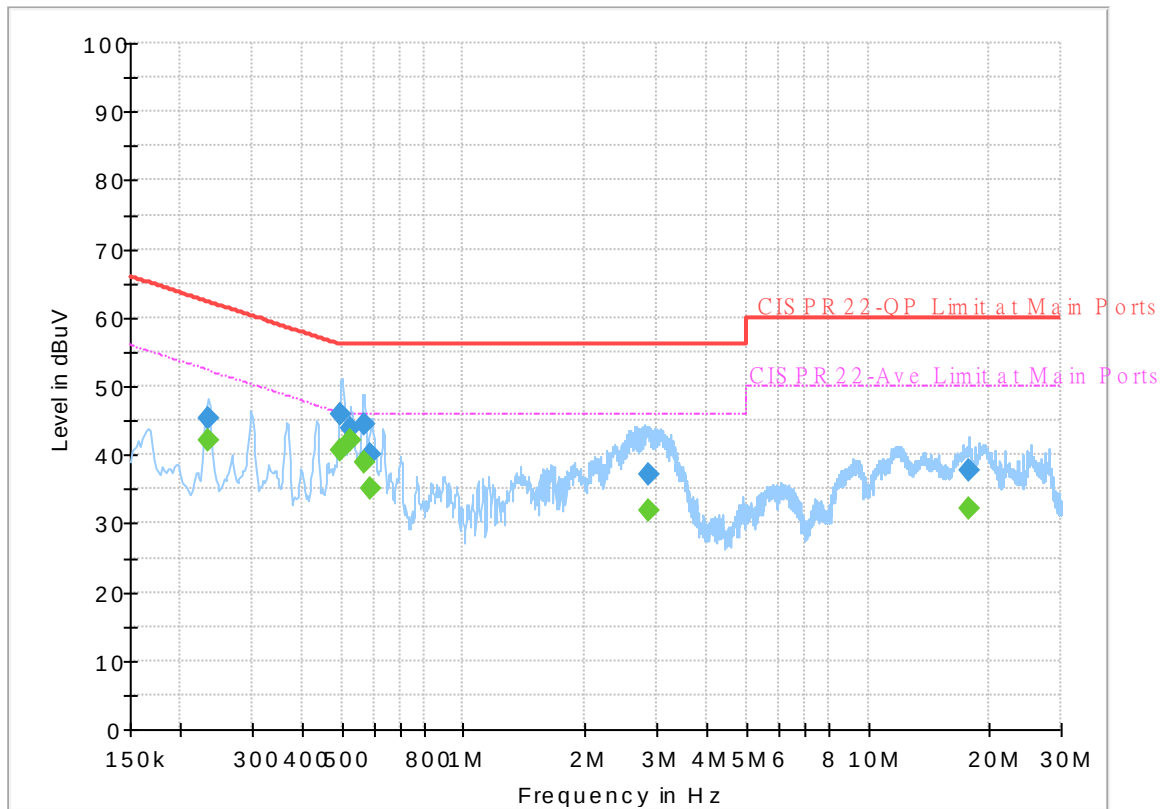
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.233700	---	39.24	52.32	13.08	L1	OFF	19.5
0.233700	42.38	---	62.32	19.94	L1	OFF	19.5
0.502260	---	40.51	46.00	5.49	L1	OFF	19.5
0.502260	44.30	---	56.00	11.70	L1	OFF	19.5
0.526830	---	41.91	46.00	4.09	L1	OFF	19.5
0.526830	43.09	---	56.00	12.91	L1	OFF	19.5
0.559500	---	36.96	46.00	9.04	L1	OFF	19.5
0.559500	40.77	---	56.00	15.23	L1	OFF	19.5
2.794740	---	32.14	46.00	13.86	L1	OFF	19.6
2.794740	37.87	---	56.00	18.13	L1	OFF	19.6
19.466250	---	31.37	50.00	18.63	L1	OFF	19.8
19.466250	36.91	---	60.00	23.09	L1	OFF	19.8

EUT Information

Report NO : 012109
Test Mode : Mode 1
Test Voltage : 110Vac/60Hz
Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.232980	---	42.00	52.34	10.34	N	OFF	19.5
0.232980	45.31	---	62.34	17.03	N	OFF	19.5
0.496500	---	40.65	46.06	5.41	N	OFF	19.5
0.496500	45.78	---	56.06	10.28	N	OFF	19.5
0.526830	---	42.02	46.00	3.98	N	OFF	19.5
0.526830	43.82	---	56.00	12.18	N	OFF	19.5
0.568950	---	38.88	46.00	7.12	N	OFF	19.5
0.568950	44.30	---	56.00	11.70	N	OFF	19.5
0.588750	---	35.02	46.00	10.98	N	OFF	19.5
0.588750	40.02	---	56.00	15.98	N	OFF	19.5
2.859810	---	31.98	46.00	14.02	N	OFF	19.6
2.859810	37.03	---	56.00	18.97	N	OFF	19.6
17.753910	---	32.13	50.00	17.87	N	OFF	19.9
17.753910	37.58	---	60.00	22.42	N	OFF	19.9



Appendix C. Radiated Spurious Emission

Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	24.3~24.9°C
		Relative Humidity :	55~60%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2327.955	54.67	-19.33	74	41.73	28.04	16.08	31.18	100	323	P	H
		2386.335	44.34	-9.66	54	31.56	27.78	16.15	31.15	100	323	A	H
	*	2412	102.24	-	-	89.51	27.68	16.18	31.13	100	323	P	H
	*	2412	99.22	-	-	86.49	27.68	16.18	31.13	100	323	A	H
		2316.195	54.22	-19.78	74	41.27	28.07	16.06	31.18	392	299	P	V
		2386.125	43.66	-10.34	54	30.88	27.78	16.15	31.15	392	299	A	V
	*	2412	98.77	-	-	86.04	27.68	16.18	31.13	392	299	P	V
	*	2412	95.79	-	-	83.06	27.68	16.18	31.13	392	299	A	V
802.11b CH 06 2437MHz		2315.6	55.28	-18.72	74	42.33	28.07	16.06	31.18	100	326	P	H
		2342.96	43.49	-10.51	54	30.55	28.01	16.1	31.17	100	326	A	H
	*	2437	104.3	-	-	91.58	27.63	16.21	31.12	100	326	P	H
	*	2437	101.38	-	-	88.66	27.63	16.21	31.12	100	326	A	H
		2489.02	53.65	-20.35	74	40.97	27.52	16.26	31.1	100	326	P	H
		2486.23	43.38	-10.62	54	30.69	27.53	16.26	31.1	100	326	A	H
		2345.84	54.25	-19.75	74	41.31	28.01	16.1	31.17	386	280	P	V
		2343.44	43.43	-10.57	54	30.49	28.01	16.1	31.17	386	280	A	V
	*	2437	100.78	-	-	88.06	27.63	16.21	31.12	386	280	P	V
	*	2437	97.79	-	-	85.07	27.63	16.21	31.12	386	280	A	V
		2492.26	53.89	-20.11	74	41.2	27.52	16.26	31.09	386	280	P	V
		2484.16	43.21	-10.79	54	30.53	27.53	16.25	31.1	386	280	A	V



802.11b CH 11 2462MHz	*	2462	104.19	-	-	91.49	27.58	16.23	31.11	100	317	P	H
	*	2462	101.1	-	-	88.4	27.58	16.23	31.11	100	317	A	H
		2483.8	55.18	-18.82	74	42.5	27.53	16.25	31.1	100	317	P	H
		2486.8	45.17	-8.83	54	32.48	27.53	16.26	31.1	100	317	A	H
													H
													H
	*	2462	99.78	-	-	87.08	27.58	16.23	31.11	385	261	P	V
	*	2462	96.59	-	-	83.89	27.58	16.23	31.11	385	261	A	V
		2496.12	53.69	-20.31	74	41	27.51	16.27	31.09	385	261	P	V
		2486.8	43.51	-10.49	54	30.82	27.53	16.26	31.1	385	261	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	57.65	-16.35	74	74.82	31.25	10.67	59.09	257	298	P	H
		4824	52.26	-1.74	54	69.43	31.25	10.67	59.09	257	298	A	H
													H
													H
		4824	58.32	-15.68	74	75.49	31.25	10.67	59.09	300	320	P	V
		4824	53.55	-0.45	54	70.72	31.25	10.67	59.09	300	320	A	V
													V
													V
802.11b CH 06 2437MHz		4874	56.07	-17.93	74	72.37	31.25	10.72	58.27	300	295	P	H
		4874	50	-4	54	66.3	31.25	10.72	58.27	300	295	A	H
		7311	46.63	-27.37	74	56.06	36.52	12.56	58.51	100	0	P	H
													H
		4874	58.33	-15.67	74	74.63	31.25	10.72	58.27	283	325	P	V
		4874	53.47	-0.53	54	69.77	31.25	10.72	58.27	283	325	A	V
		7311	45.98	-28.02	74	55.41	36.52	12.56	58.51	100	0	P	V
													V
802.11b CH 11 2462MHz		4924	57.44	-16.56	74	74.48	31.34	10.77	59.15	300	290	P	H
		4924	52.35	-1.65	54	69.39	31.34	10.77	59.15	300	290	A	H
		7386	45.5	-28.5	74	54.83	36.46	12.67	58.46	100	0	P	H
													H
		4924	58.99	-15.01	74	76.03	31.34	10.77	59.15	300	262	P	V
		4924	53.86	-0.14	54	70.9	31.34	10.77	59.15	300	262	A	V
		7386	46.01	-27.99	74	55.34	36.46	12.67	58.46	100	0	P	V
													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. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.905	60.29	-13.71	74	47.52	27.76	16.16	31.15	100	326	P	H
		2390	46.85	-7.15	54	34.08	27.76	16.16	31.15	100	326	A	H
	*	2412	99.8	-	-	87.07	27.68	16.18	31.13	100	326	P	H
	*	2412	92.3	-	-	79.57	27.68	16.18	31.13	100	326	A	H
													H
													H
		2388.855	56.58	-17.42	74	43.8	27.77	16.16	31.15	394	299	P	V
		2390	45.57	-8.43	54	32.8	27.76	16.16	31.15	394	299	A	V
	*	2412	96.39	-	-	83.66	27.68	16.18	31.13	394	299	P	V
	*	2412	88.54	-	-	75.81	27.68	16.18	31.13	394	299	A	V
													V
													V
802.11g CH 06 2437MHz		2330.48	53.8	-20.2	74	40.85	28.04	16.08	31.17	100	322	P	H
		2341.68	43.44	-10.56	54	30.5	28.02	16.09	31.17	100	322	A	H
	*	2437	104.12	-	-	91.4	27.63	16.21	31.12	100	322	P	H
	*	2437	96.41	-	-	83.69	27.63	16.21	31.12	100	322	A	H
		2492.53	53.83	-20.17	74	41.15	27.51	16.26	31.09	100	322	P	H
		2483.53	43.31	-10.69	54	30.63	27.53	16.25	31.1	100	322	A	H
		2379.92	54.63	-19.37	74	41.82	27.82	16.14	31.15	384	279	P	V
		2336.4	43.42	-10.58	54	30.47	28.03	16.09	31.17	384	279	A	V
	*	2437	100.59	-	-	87.87	27.63	16.21	31.12	384	279	P	V
	*	2437	92.78	-	-	80.06	27.63	16.21	31.12	384	279	A	V
		2483.53	53.45	-20.55	74	40.77	27.53	16.25	31.1	384	279	P	V
		2483.98	43.18	-10.82	54	30.5	27.53	16.25	31.1	384	279	A	V



802.11g CH 11 2462MHz	*	2462	106.29	-	-	92.34	27.58	17.48	31.11	296	200	P	H
	*	2462	98.2	-	-	84.25	27.58	17.48	31.11	296	200	A	H
		2483.72	69.62	-4.38	74	55.67	27.53	17.52	31.1	296	200	P	H
		2483.52	53.41	-0.59	54	39.46	27.53	17.52	31.1	296	200	A	H
													H
													H
	*	2462	102.7	-	-	88.75	27.58	17.48	31.11	400	165	P	V
	*	2462	94.57	-	-	80.62	27.58	17.48	31.11	400	165	A	V
		2483.52	67.57	-6.43	74	53.62	27.53	17.52	31.1	400	165	P	V
		2483.52	51.26	-2.74	54	37.31	27.53	17.52	31.1	400	165	A	V
													V
													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 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	49.82	-24.18	74	66.99	31.25	10.67	59.09	100	0	P	H
													H
													H
													H
		4824	60.75	-13.25	74	77.92	31.25	10.67	59.09	299	329	P	V
		4824	43.86	-10.14	54	61.03	31.25	10.67	59.09	299	329	P	V
													V
													V
802.11g CH 06 2437MHz		4874	63.93	-10.07	74	81.08	31.25	10.72	59.12	100	304	P	H
		4874	46.32	-7.68	54	63.47	31.25	10.72	59.12	100	304	A	H
		7311	46.08	-27.92	74	55.56	36.52	12.56	58.56	100	0	P	H
													H
		4874	65.67	-8.33	74	82.82	31.25	10.72	59.12	300	329	P	V
		4874	48.64	-5.36	54	65.79	31.25	10.72	59.12	300	329	A	V
		7311	45.17	-28.83	74	54.65	36.52	12.56	58.56	100	0	P	V
													V
802.11g CH 11 2462MHz		4924	63.15	-10.85	74	79.31	31.34	10.77	58.27	300	296	P	H
		4924	45.38	-8.62	54	61.54	31.34	10.77	58.27	300	296	A	H
		7386	45.15	-28.85	74	54.58	36.46	12.67	58.56	100	0	P	H
													H
		4924	64.73	-9.27	74	80.89	31.34	10.77	58.27	100	308	P	V
		4924	46.03	-7.97	54	62.19	31.34	10.77	58.27	100	308	A	V
		7386	45.64	-28.36	74	55.07	36.46	12.67	58.56	100	0	P	V
													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	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.905	59.86	-14.14	74	47.09	27.76	16.16	31.15	100	324	P	H
		2390	47.06	-6.94	54	34.29	27.76	16.16	31.15	100	324	A	H
	*	2412	98.4	-	-	85.67	27.68	16.18	31.13	100	324	P	H
	*	2412	90.66	-	-	77.93	27.68	16.18	31.13	100	324	A	H
													H
													H
		2390	57.84	-16.16	74	45.07	27.76	16.16	31.15	392	297	P	V
		2390	45.29	-8.71	54	32.52	27.76	16.16	31.15	392	297	A	V
	*	2412	95.28	-	-	82.55	27.68	16.18	31.13	392	297	P	V
	*	2412	87.67	-	-	74.94	27.68	16.18	31.13	392	297	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2337.2	54.64	-19.36	74	41.69	28.03	16.09	31.17	100	325	P	H
		2342.48	43.55	-10.45	54	30.6	28.02	16.1	31.17	100	325	A	H
	*	2437	103.2	-	-	90.48	27.63	16.21	31.12	100	325	P	H
	*	2437	95.61	-	-	82.89	27.63	16.21	31.12	100	325	A	H
		2490.37	54.16	-19.84	74	41.47	27.52	16.26	31.09	100	325	P	H
		2484.61	43.42	-10.58	54	30.74	27.53	16.25	31.1	100	325	A	H
		2319.6	54.19	-19.81	74	41.24	28.06	16.07	31.18	383	281	P	V
		2336.08	43.48	-10.52	54	30.53	28.03	16.09	31.17	383	281	A	V
	*	2437	99.43	-	-	86.71	27.63	16.21	31.12	383	281	P	V
	*	2437	91.78	-	-	79.06	27.63	16.21	31.12	383	281	A	V
		2484.34	53.74	-20.26	74	41.06	27.53	16.25	31.1	383	281	P	V
		2483.71	43.25	-10.75	54	30.57	27.53	16.25	31.1	383	281	A	V



802.11n HT20 CH 11 2462MHz	*	2462	104.84	-	-	87.8	27.58	16.23	31.11	100	321	P	H
	*	2462	97.08	-	-	80.38	27.58	16.23	31.11	100	321	A	H
		2483.84	70.36	-3.64	74	56.41	27.53	17.52	31.1	296	203	P	H
		2483.52	53.82	-0.18	54	39.87	27.53	17.52	31.1	296	203	A	H
													H
													H
	*	2462	100.81	-	-	83.61	27.58	16.23	31.11	383	256	P	V
	*	2462	93.16	-	-	75.9	27.58	16.23	31.11	383	256	A	V
		2483.68	68.07	-5.93	74	54.12	27.53	17.52	31.1	400	165	P	V
		2483.52	50.99	-3.01	54	37.04	27.53	17.52	31.1	400	165	A	V
													V
													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 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	47.87	-26.13	74	65.04	31.25	10.67	59.09	100	0	P	H
													H
													H
													H
		4824	49.38	-24.62	74	66.55	31.25	10.67	59.09	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	62.75	-11.25	74	79.9	31.25	10.72	59.12	100	306	P	H
		4874	45.33	-8.67	54	62.48	31.25	10.72	59.12	100	306	A	H
		7311	45.29	-28.71	74	54.77	36.52	12.56	58.56	100	0	P	H
													H
		4874	64.68	-9.32	74	81.83	31.25	10.72	59.12	300	328	P	V
		4874	47.52	-6.48	54	64.67	31.25	10.72	59.12	300	328	A	V
		7311	44.49	-29.51	74	53.97	36.52	12.56	58.56	100	0	P	V
													V
802.11n HT20 CH 11 2462MHz		4924	62.38	-11.62	74	78.54	31.34	10.77	58.27	302	295	P	H
		4924	44.46	-9.54	54	60.62	31.34	10.77	58.27	302	295	A	H
		7386	45.64	-28.36	74	55.07	36.46	12.67	58.56	100	0	P	H
													H
		4924	63.86	-10.14	74	80.02	31.34	10.77	58.27	100	306	P	V
		4924	46.73	-7.27	54	62.89	31.34	10.77	58.27	100	306	A	V
		7386	46.59	-27.41	74	56.02	36.46	12.67	58.56	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		194.9	40.59	-2.91	43.5	55.99	15.04	1.94	32.38	-	-	P	H
		317.12	45.09	-0.91	46	55.83	19.33	2.42	32.49	100	0	P	H
		353.98	43.58	-2.42	46	53.17	20.29	2.54	32.42	-	-	P	H
		416.06	41.36	-4.64	46	48.42	22.46	2.76	32.28	-	-	P	H
		431.58	43.87	-2.13	46	50.8	22.68	2.81	32.42	-	-	P	H
		462.62	42.14	-3.86	46	48.59	23.18	2.92	32.55	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		256.01	36.55	-9.45	46	47.72	19.02	2.23	32.42	-	-	P	V
		288.02	38.21	-7.79	46	49.56	18.82	2.32	32.49	-	-	P	V
		321.97	39.1	-6.9	46	49.72	19.43	2.43	32.48	-	-	P	V
		416.06	37.43	-8.57	46	44.49	22.46	2.76	32.28	-	-	P	V
		431.58	39.32	-6.68	46	46.25	22.68	2.81	32.42	100	0	P	V
		547.01	38.65	-7.35	46	43.16	24.53	3.26	32.3	-	-	P	V
													V
												V	
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 11 2462MHz	*	2462	102.27	-	-	88.04	27.58	17.76	31.11	100	172	P	H
	*	2462	94.85	-	-	80.62	27.58	17.76	31.11	100	172	A	H
		2484.32	64.61	-9.39	74	50.37	27.53	17.81	31.1	100	172	P	H
		2483.52	50.76	-3.24	54	36.53	27.53	17.8	31.1	100	172	A	H
													H
													H
	*	2462	97.59	-	-	83.36	27.58	17.76	31.11	100	216	P	V
	*	2462	89.5	-	-	75.27	27.58	17.76	31.11	100	216	A	V
		2484.56	58.77	-15.23	74	44.53	27.53	17.81	31.1	100	216	P	V
		2483.56	47.61	-6.39	54	33.38	27.53	17.8	31.1	100	216	A	V
													V
													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 (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz		4924	42.98	-31.02	74	58.88	31.34	11.03	58.27	100	0	P	H
		7386	44.99	-29.01	74	54.48	36.46	12.61	58.56	100	0	P	H
													H
													H
		4924	42.66	-31.34	74	58.56	31.34	11.03	58.27	100	0	P	V
		7386	44.9	-29.1	74	54.39	36.46	12.61	58.56	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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



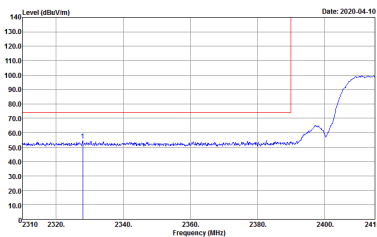
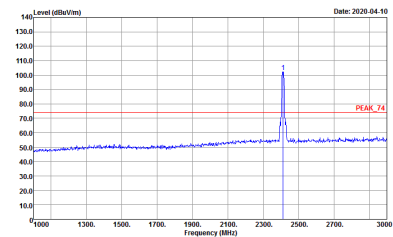
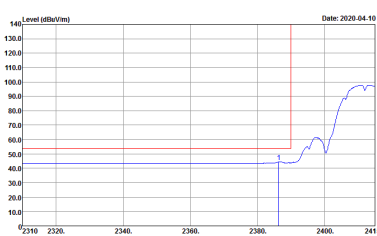
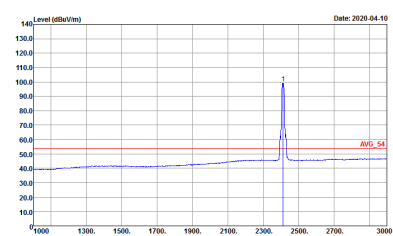
Appendix D. Radiated Spurious Emission Plots

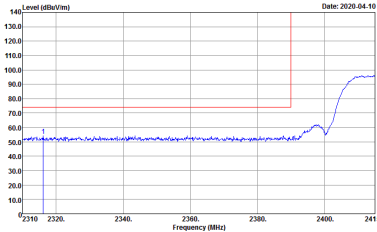
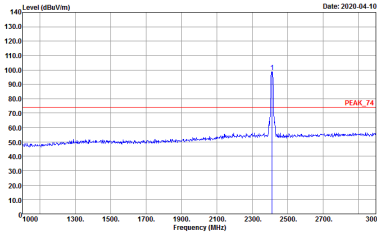
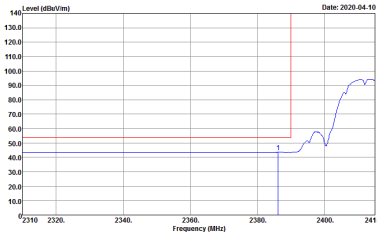
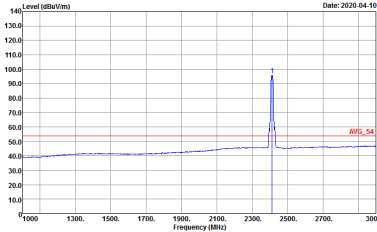
Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	24.3~24.9°C
		Relative Humidity :	55~60%

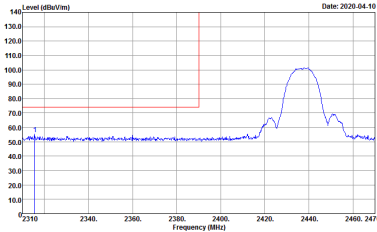
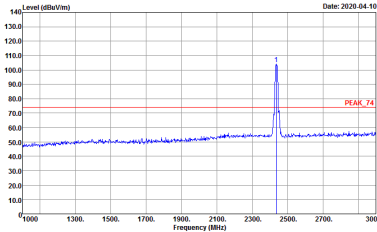
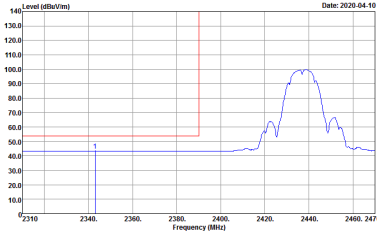
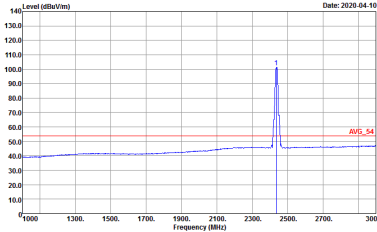
Note symbol

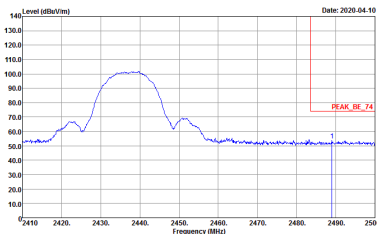
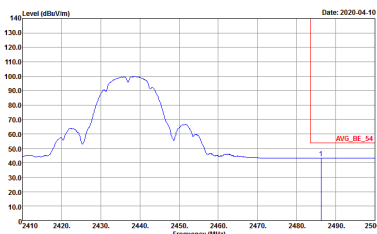
-L	Low channel location
-R	High channel location

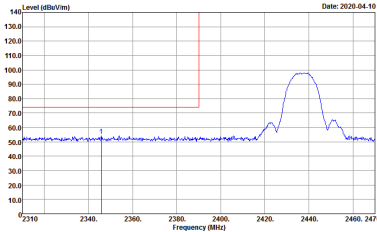
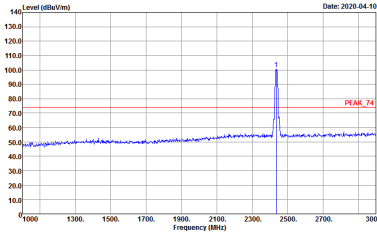
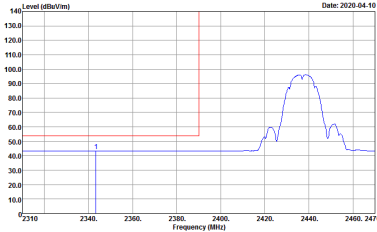
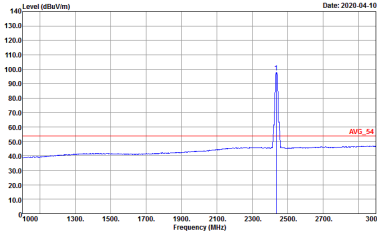
2.4GHz 2400~2483.5MHz
WIFI 802.11b (Band Edge @ 3m)

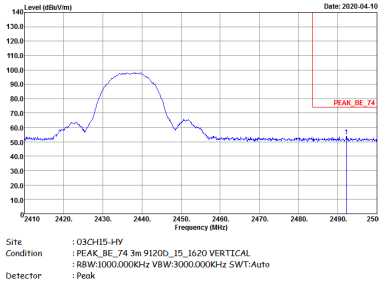
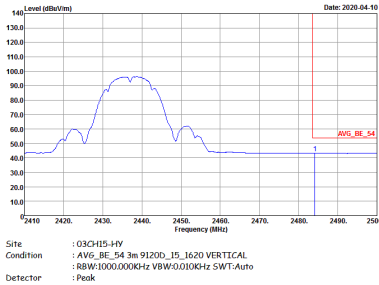
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CHI5-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CHI5-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
	 Site : 03CHI5-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CHI5-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak
Avg.		

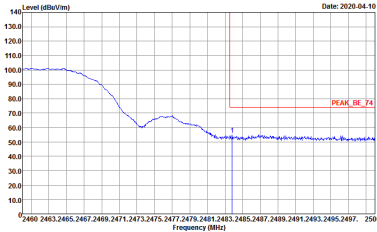
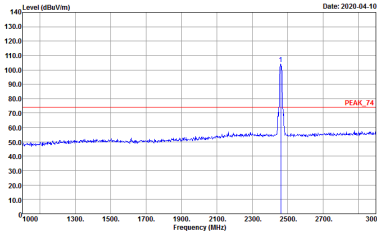
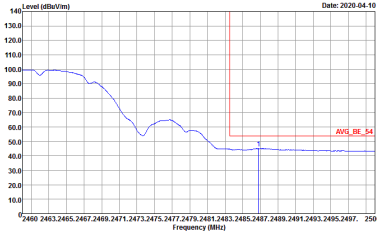
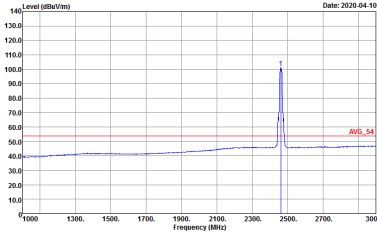
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

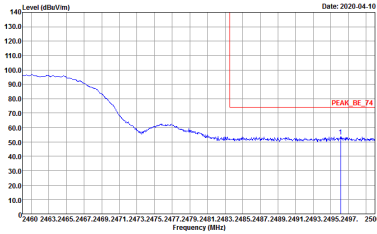
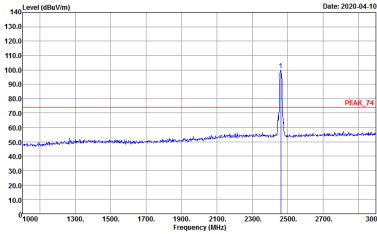
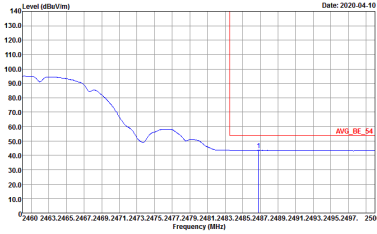
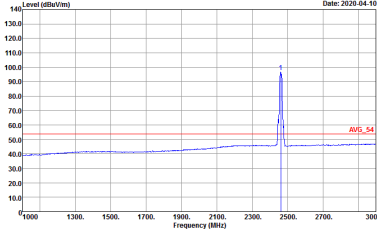
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank

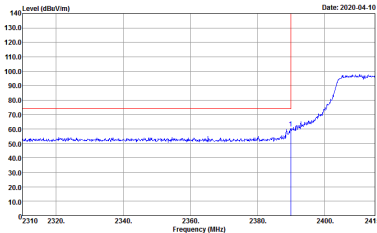
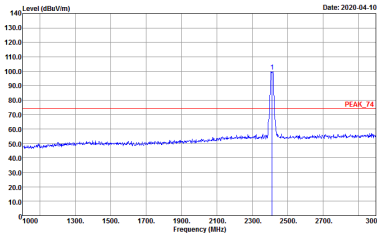
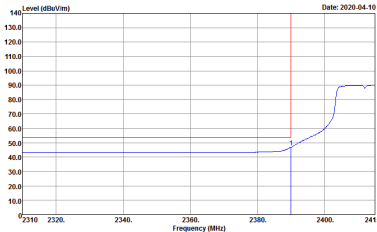
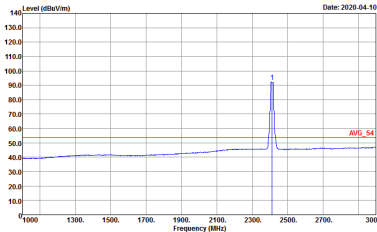
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

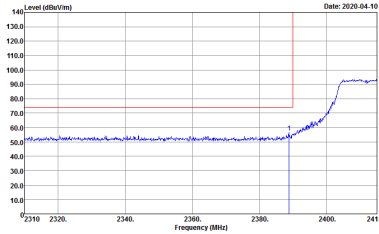
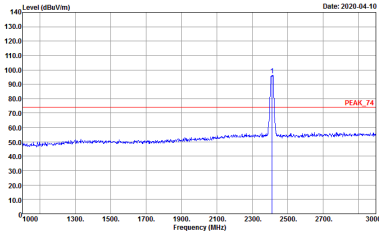
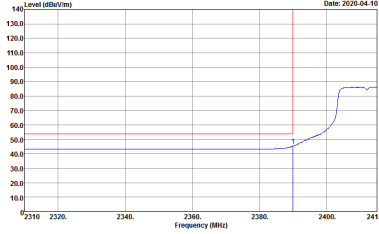
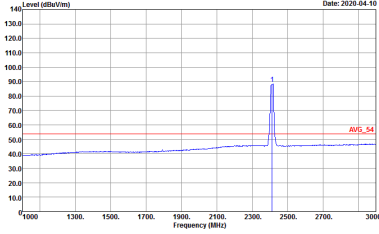
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

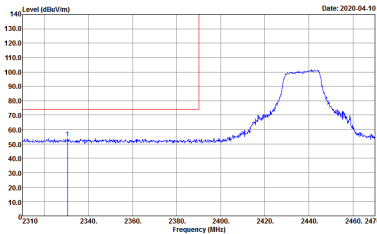
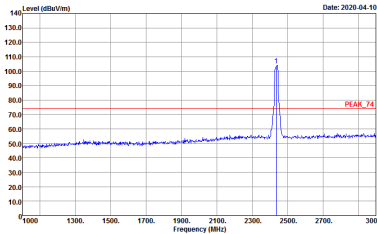
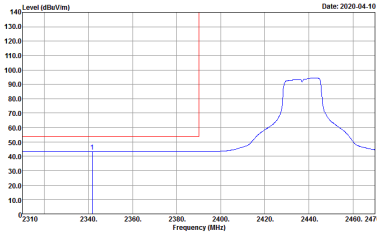
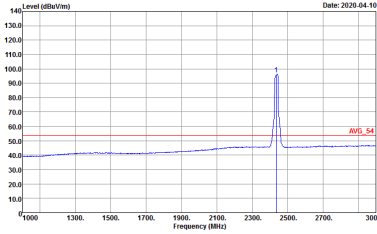
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL Detector : Peak

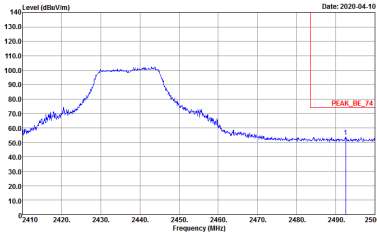
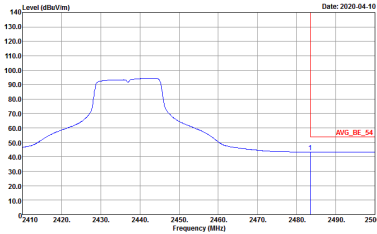
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

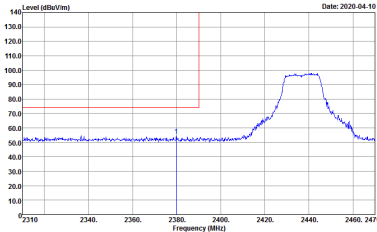
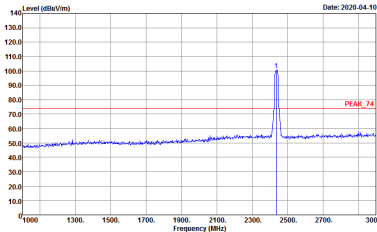
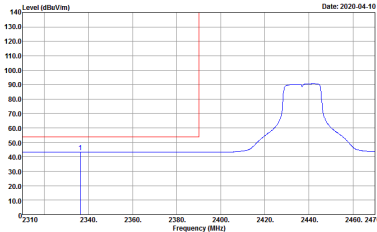
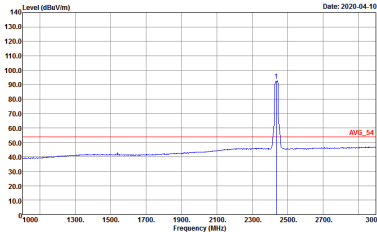
2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

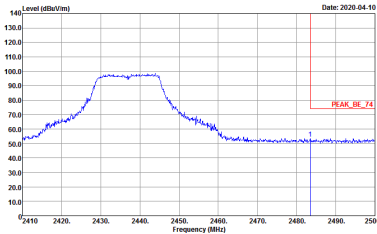
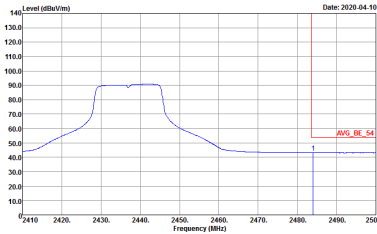
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

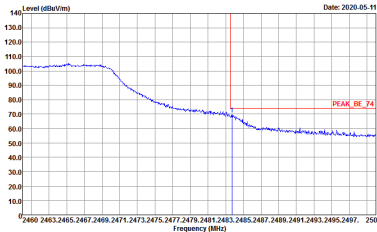
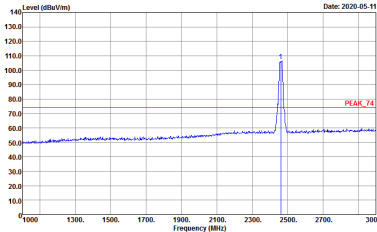
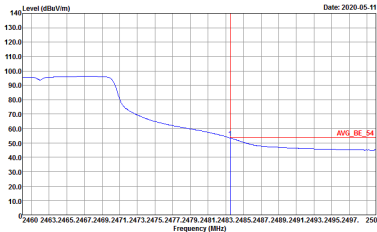
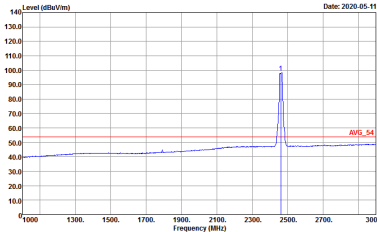
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak

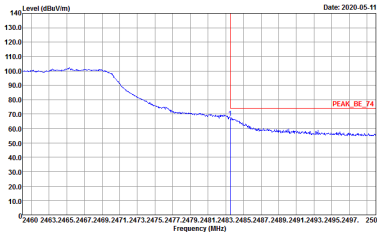
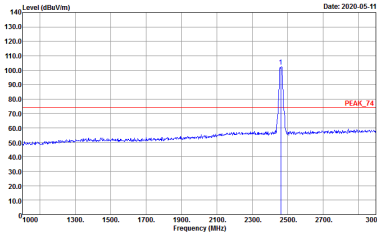
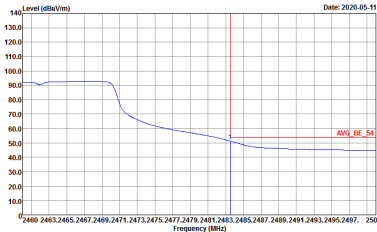
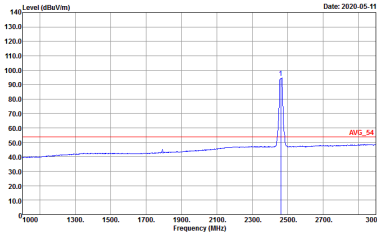
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	Left blank

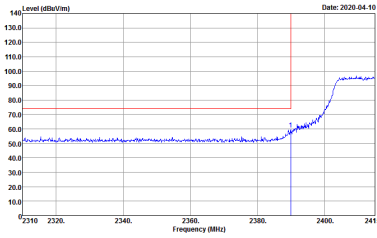
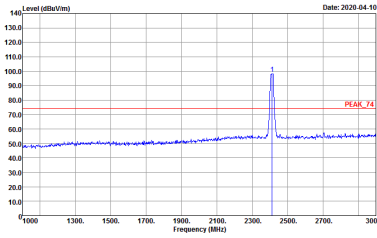
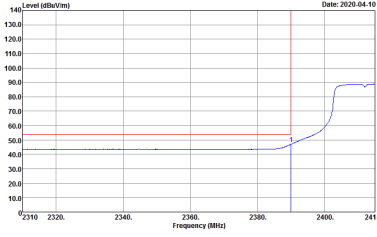
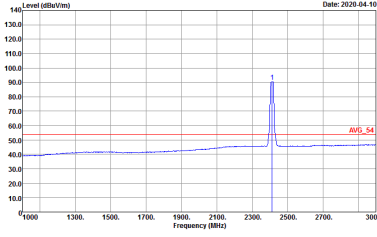
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak

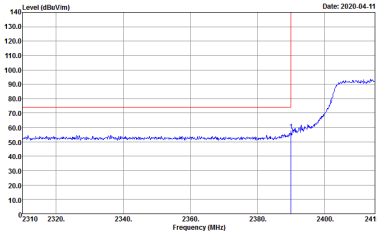
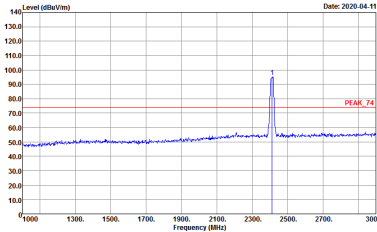
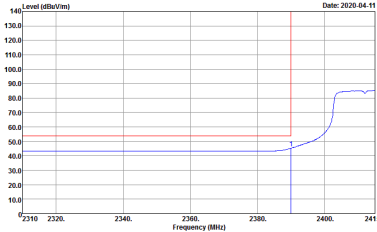
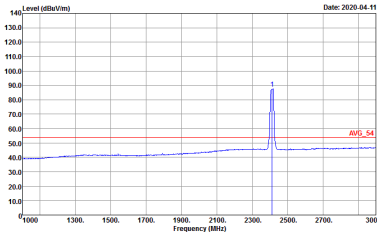
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left Blank
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	Left Blank

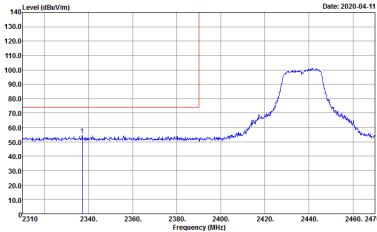
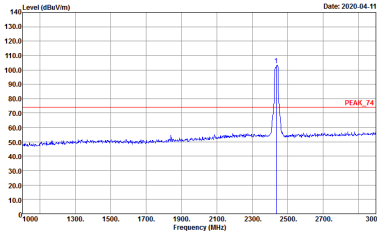
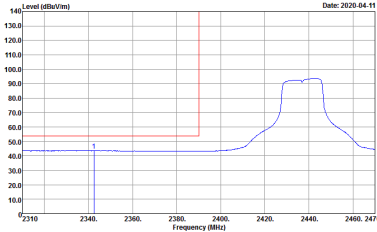
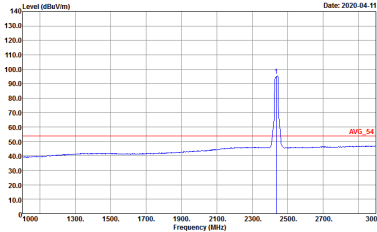
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL Detector : Peak

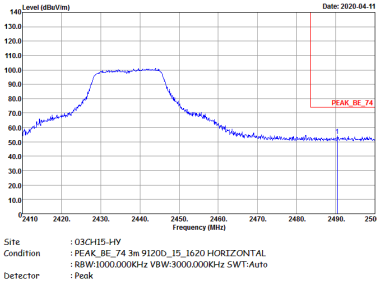
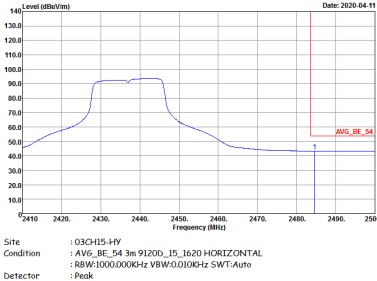
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak

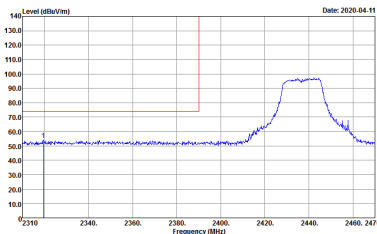
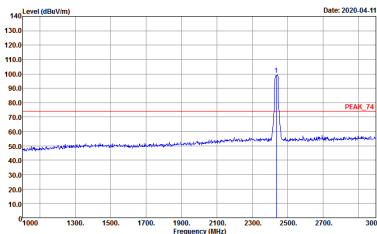
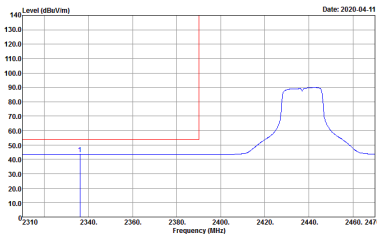
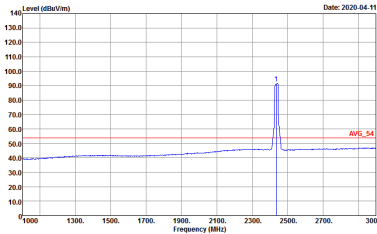
2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

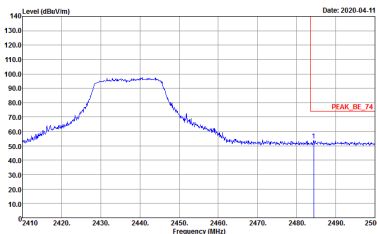
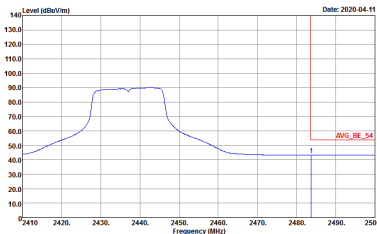
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

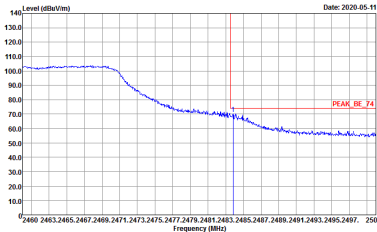
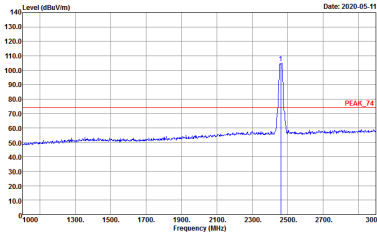
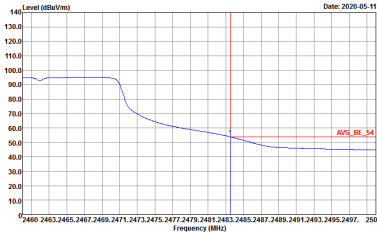
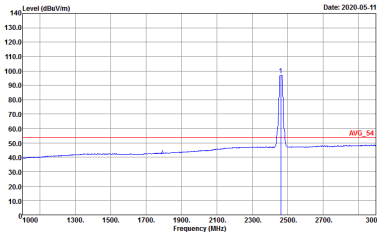
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak

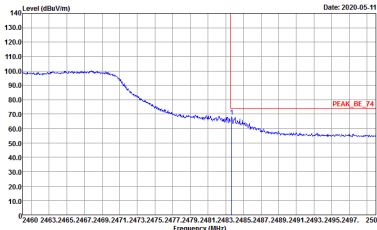
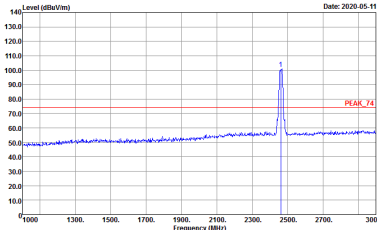
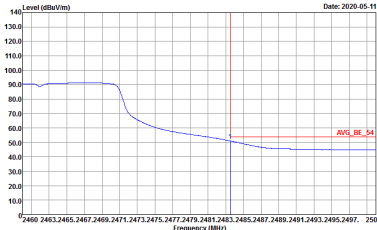
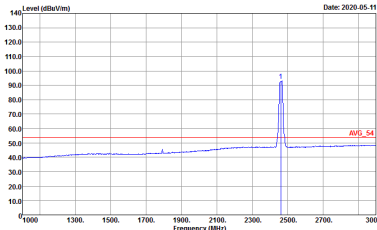
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000kHz VBW:0.010kHz SWT:Auto Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left Blank
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left Blank

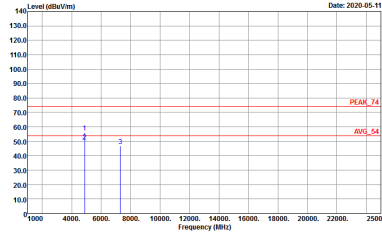
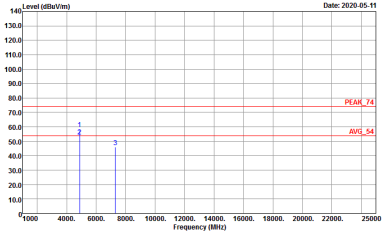
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak



2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 3m)

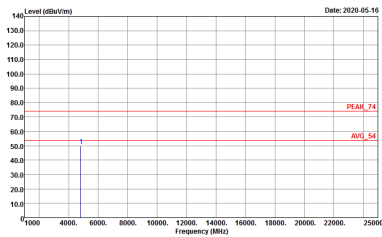
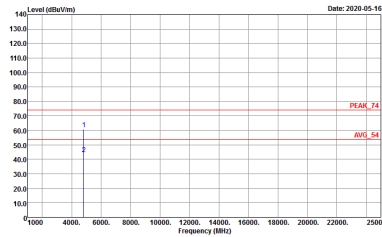
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

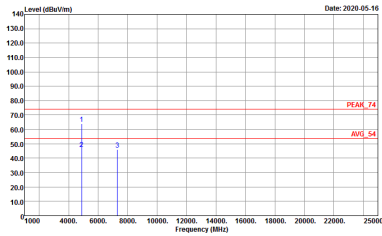
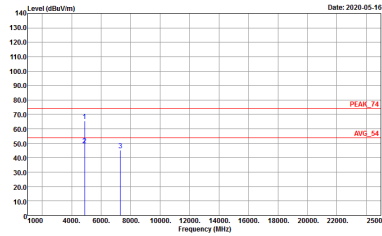
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak



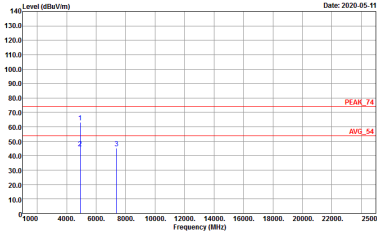
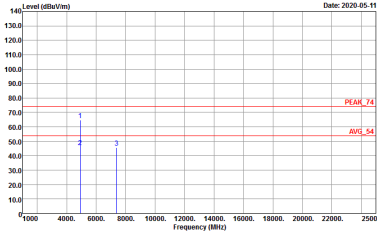
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2020-05-16 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	Level (dBuV/m) Date: 2020-05-16 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

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

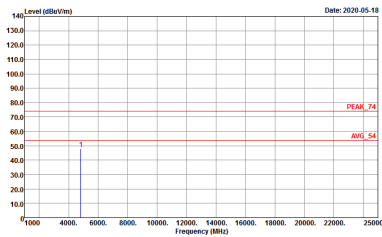
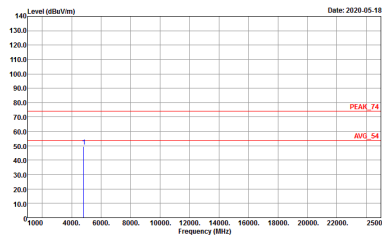
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

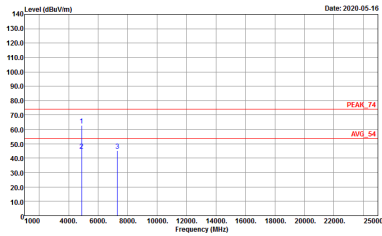
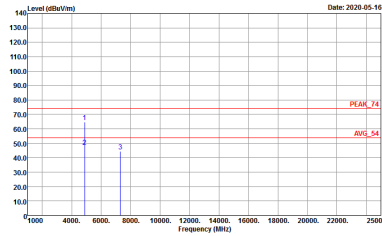
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

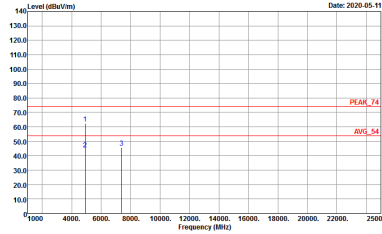
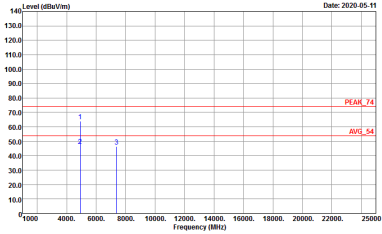


WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

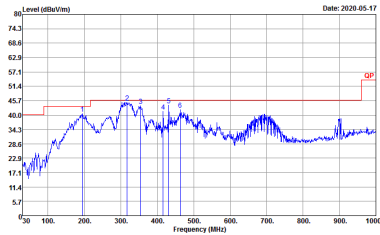
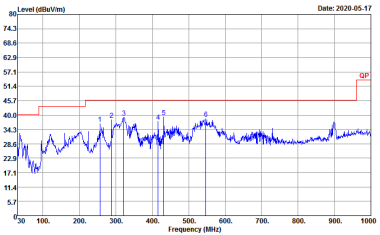
2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

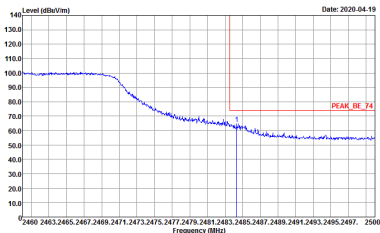
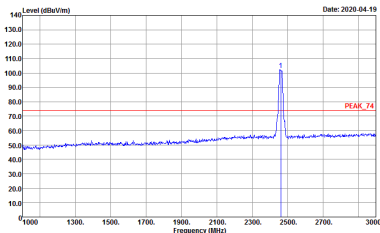
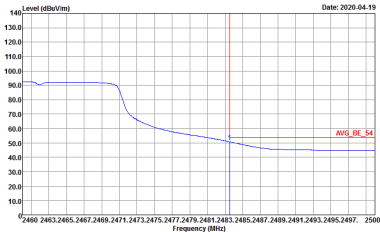
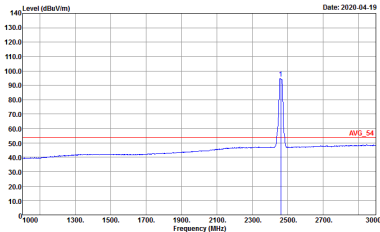
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

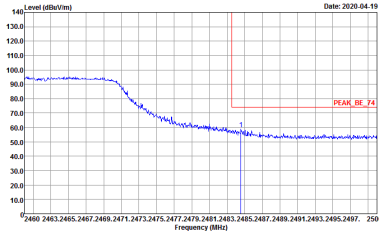
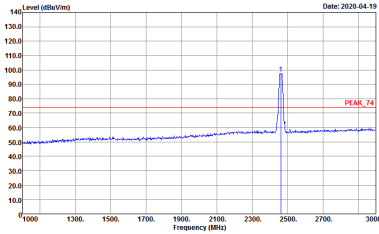
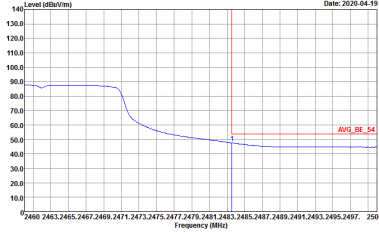
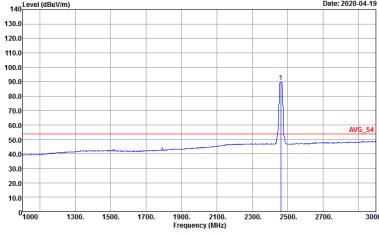
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

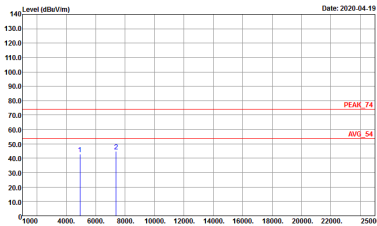
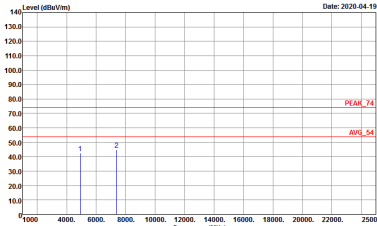
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH15-HY Condition : QP 3m BIL06_15_41912 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : QP 3m BIL06_15_41912 VERTICAL Detector : Peak

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 CH11 2462MHz	
2	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak

WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
2	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak

2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
2	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak

Annex. A Receiver Radiated Emission Measurement

A.1 Limit of Receiver Radiated Emission

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

A.2 Measuring Instruments

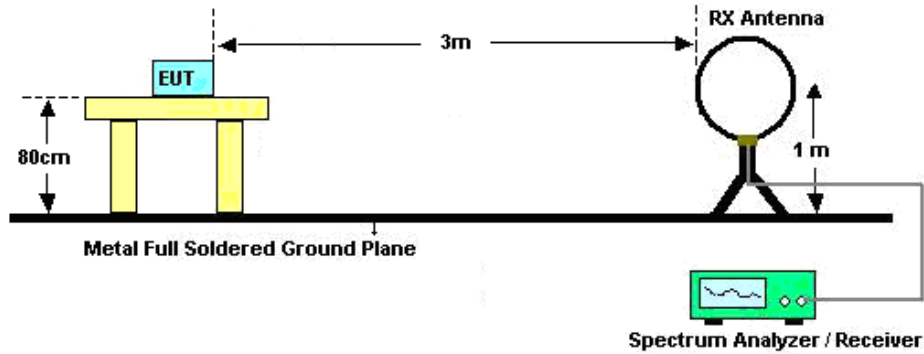
See list of measuring equipment of this test report.

A.3 Test Procedures

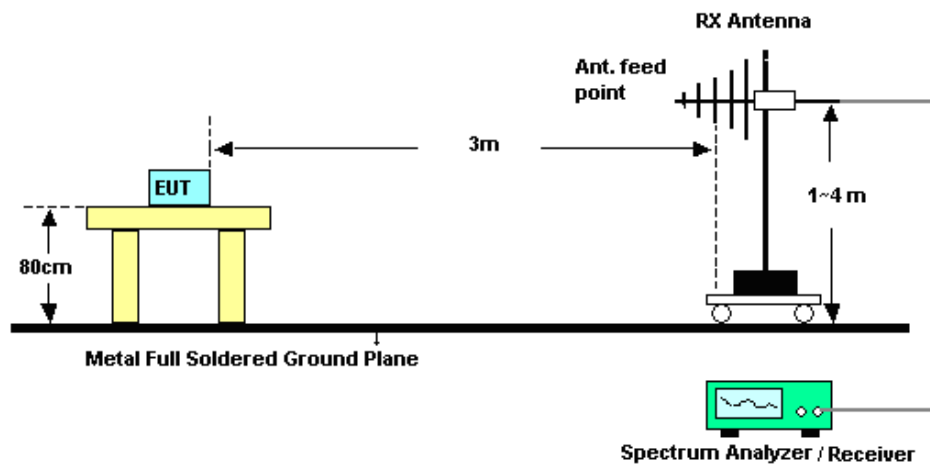
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

A.4 Test Setup

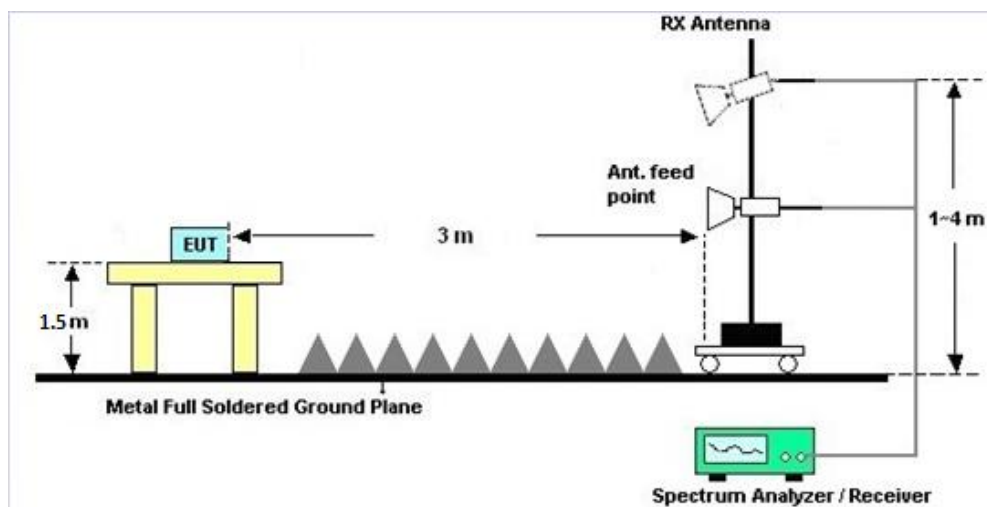
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

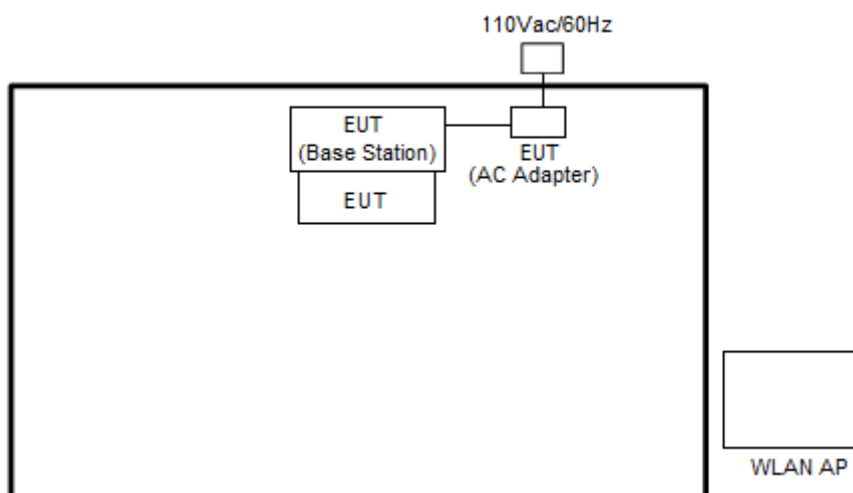


A.5 Test Result of Receiver Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per NCC LP0002 section 5.13 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

A.6 Connection Diagram of Test System



A.7 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m

Remark: Applicant has ensured accessory would not be attached with the product on the market, accessory is provided by lab or applicant for testing.

A.8 Test Result of Receiver Radiated Spurious Emission (30MHz ~ 5th Harmonic)

Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	24.3~24.9°C
		Relative Humidity :	55~60%
Frequency	416.060 MHz	Margin	Under 2.84 dB
Test Mode	WLAN (2.4GHz) Idle		

	Idle Mode										
	Horizontal										
Peak Avg.	<										

Annex. B Maximum Power Density

B.1 RF Exposure Limit Introduction

According to NCC LP0002, the criteria listed in Table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §5.20.2.1 and §5.20.2.2.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

B.2 Standalone Power Density Calculation

Please refer to Appendix A.

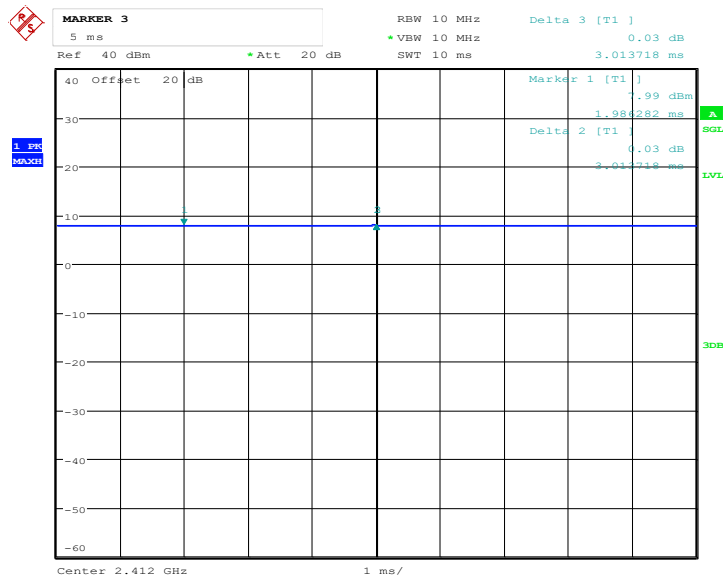


Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1	802.11b	100.00	-	-	10Hz	0.00
2	802.11b	100.00	-	-	10Hz	0.00
1	802.11g	98.74	-	-	10Hz	0.06
2	802.11g	98.45	-	-	10Hz	0.07
1	2.4GHz 802.11n HT20	98.14	-	-	10Hz	0.08
2	2.4GHz 802.11n HT20	98.39	-	-	10Hz	0.07

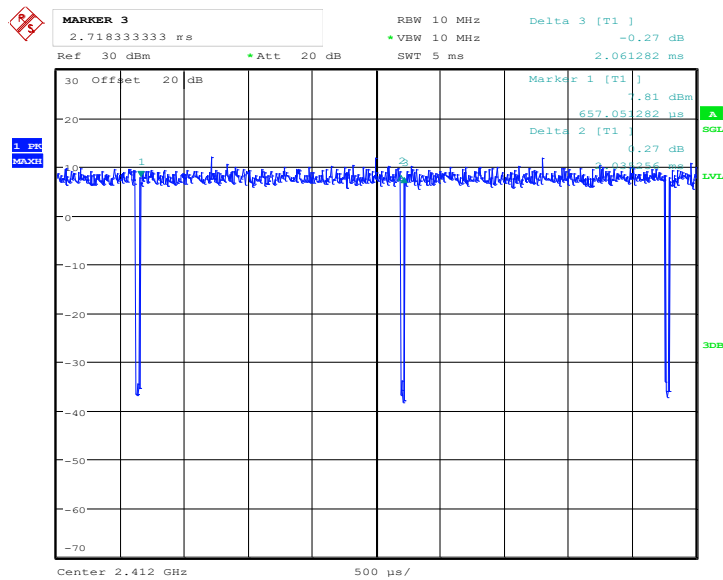
<Ant. 1>

802.11b



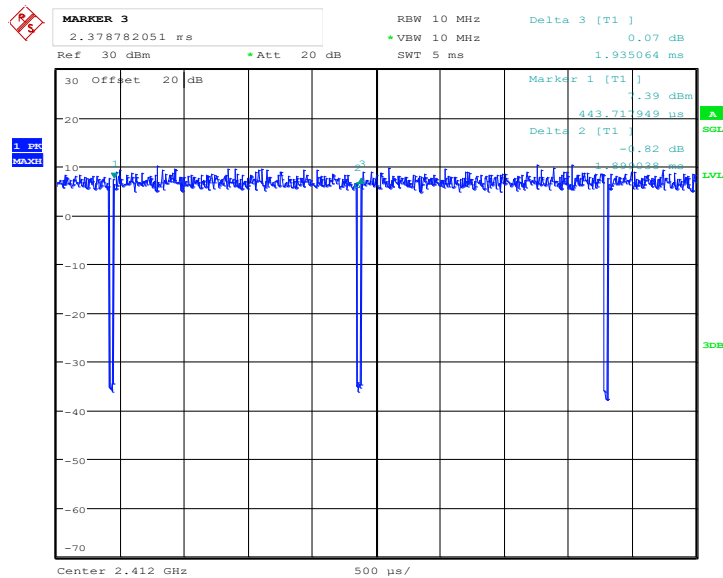
Date: 6.APR.2020 18:22:17

802.11g



Date: 6.APR.2020 18:25:24

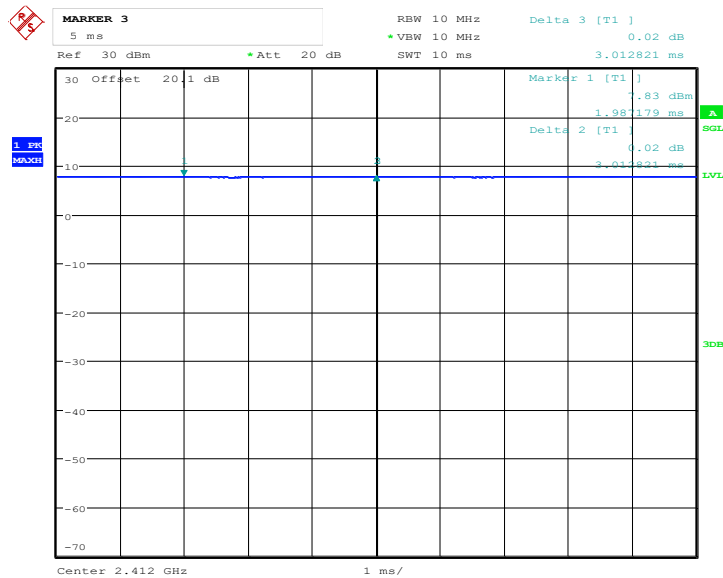
802.11n HT20



Date: 6.APR.2020 18:33:08

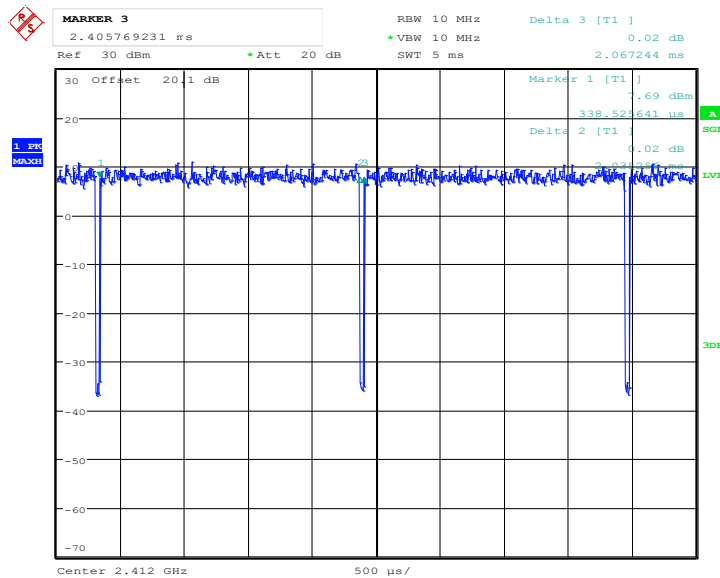
<Ant. 2>

802.11b



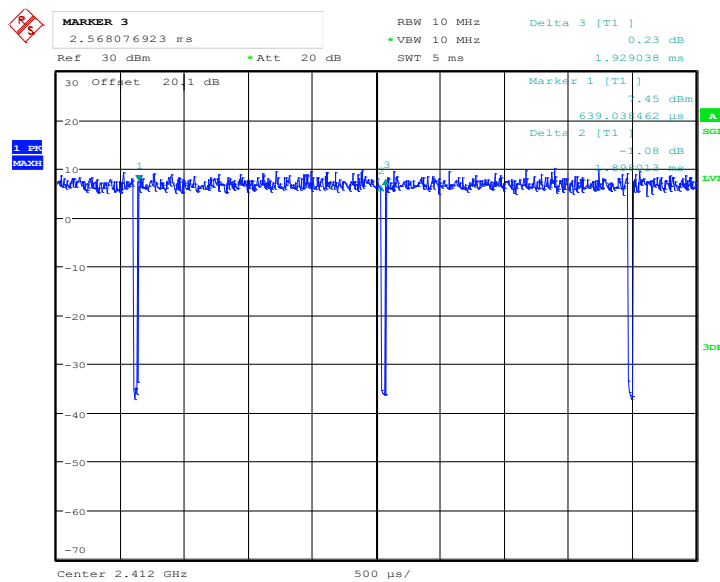
Date: 6.APR.2020 18:23:06

802.11g



Date: 6.APR.2020 18:27:27

802.11n HT20



Date: 6.APR.2020 18:30:47