FCC RADIO TEST REPORT

FCC ID	:	**A4RGWX3T**
Equipment	:	**Wireless Product**
Model Name	:	**GWX3T**
Applicant	:	**Google LLC** **1600 Amphitheatre Parkway,** **Mountain View, California, 94043 USA**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Jul. 16, 2020 and testing was started from Jul. 17, 2020 and completed on Oct. 13, 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 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. 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.)

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History of this test report

Report No.	Version	Description	Issued Date
FR031625-01B	01	Initial issue of report	Sep. 14, 2020
FR031625-01B	02	Revising test description and test data.	Oct. 14, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 1.54 dB at 2389.695 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 11.66 dB at 0.163 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	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

Product Feature	
Equipment	Wireless Product
Model Name	GWX3T
FCC ID	A4RGWX3T
EUT supports Radios application	WLAN 11a/b/g/n HT20 Bluetooth - LE

Remark: The above EUT's information was declared by manufacturer.

EUT Information List	
S/N	Performed Test Item
34A1905A1G6128000114	Conducted Measurement
	Radiated Spurious Emission
	Conducted Emission

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Average) Output Power to antenna	**<Ant. 1>** 802.11b : 20.00 dBm (0.1000 W) 802.11g : 20.30 dBm (0.1072 W) 802.11n HT20 : 19.10 dBm (0.0813 W) **<Ant. 2>** 802.11b : 19.70 dBm (0.0933 W) 802.11g : 20.20 dBm (0.1047 W) 802.11n HT20 : 19.00 dBm (0.0794 W)
99% Occupied Bandwidth	**<Ant. 1>** 802.11b : 11.90MHz 802.11g : 16.75MHz 802.11n HT20 : 17.80MHz **<Ant. 2>** 802.11b : 11.90MHz 802.11g : 16.70MHz 802.11n HT20 : 17.80MHz
Antenna Type / Gain	**<Ant. 1>**PCB IFA Antenna type with gain 1.91 dBi **<Ant. 2>**PCB IFA Antenna type with gain 1.33 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.3 Modification of EUT

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

1.4 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

1.5 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. 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 measured on both antenna. The worst cases (Ant. 1, X plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
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

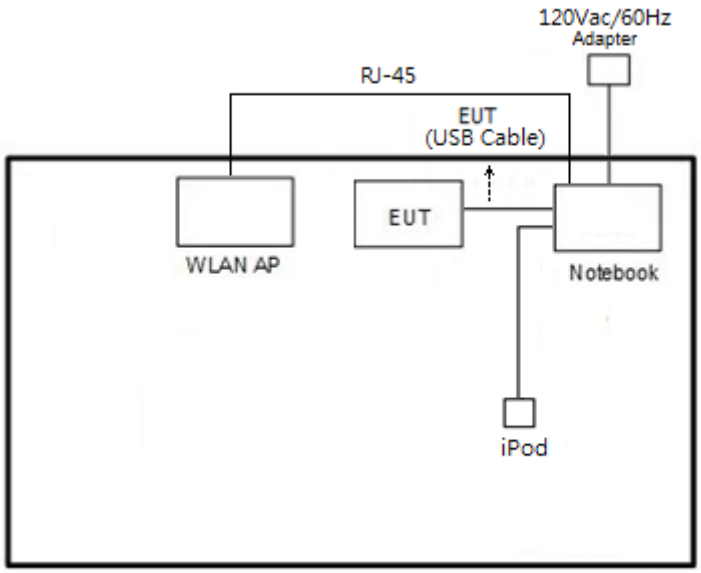
Test Cases	
AC Conducted Emission	Mode 1 : Bluetooth - LE Tx (2402MHz) + USB Cable (Charging from Notebook) Mode 2 : 802.11g Tx (2437 MHz) for Ant. 1 + USB Cable (Charging from Notebook) Mode 3 : 802.11g Tx (2437 MHz) for Ant. 2 + USB Cable (Charging from Notebook)
Remark: The worst case of conducted 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
	02	02	02
Middle	06	06	06
High	10	10	10
	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 Mode>



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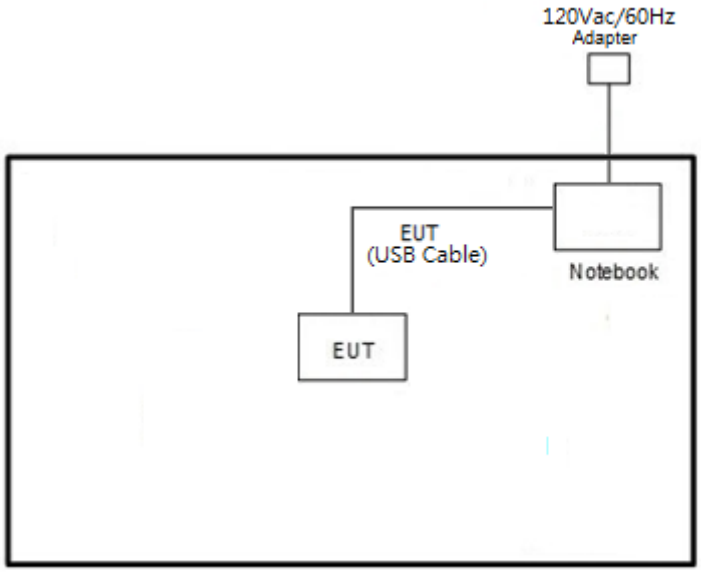


2.4 Support Unit used in test configuration and system

Item	Equipment	Brand 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
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2.5 EUT Operation Test Setup

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

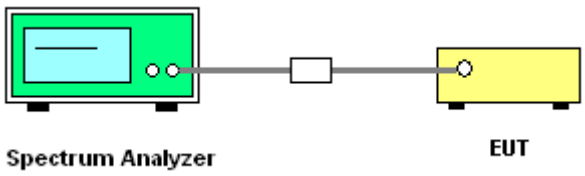
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

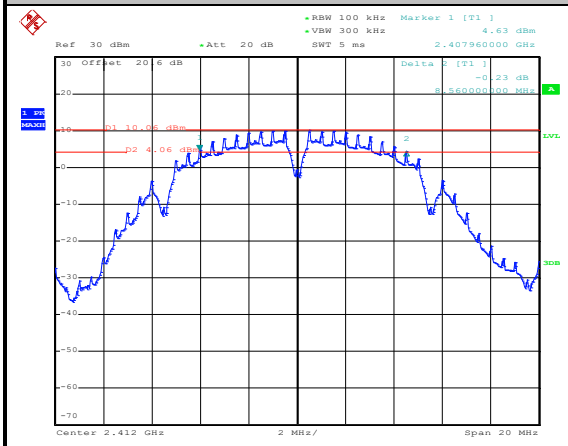
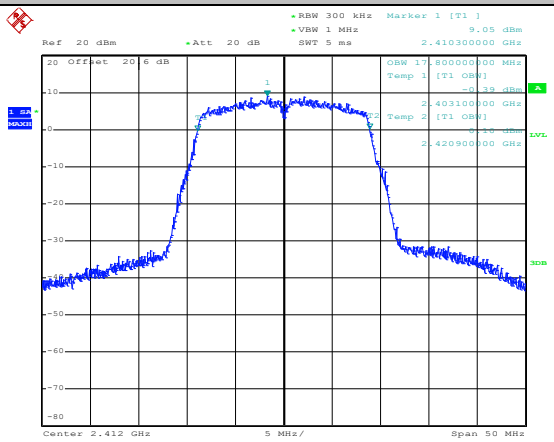
1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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) ≥ 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.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	
Date: 8.AUG.2020 11:42:42	Date: 8.AUG.2020 12:48:54

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.

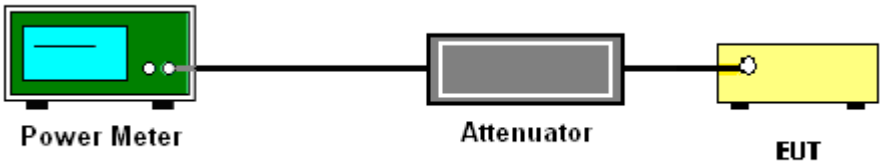
3.2.2 Measuring Instruments

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 11.9.2.3.2 Method AVGPM-G
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.

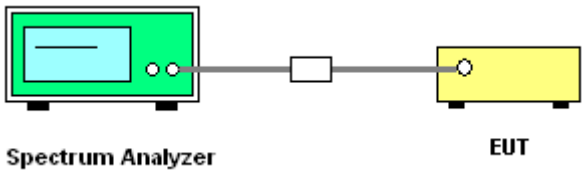
3.3.2 Measuring Instruments

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.

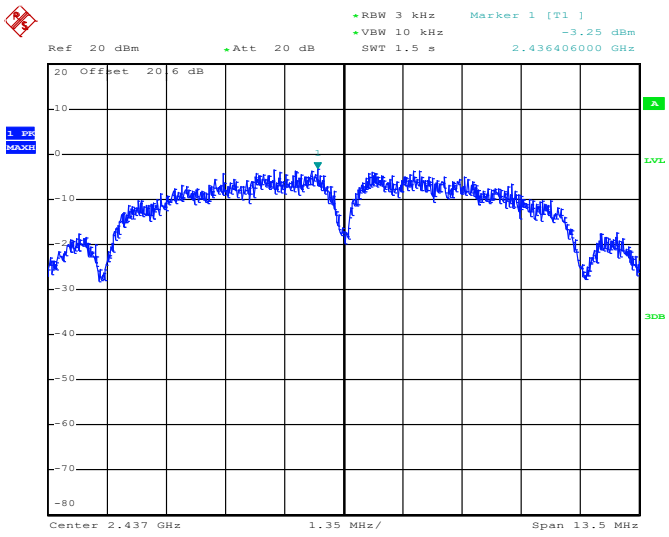
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



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3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

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

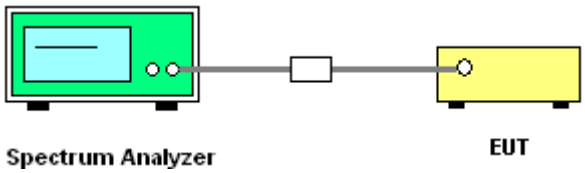
3.4.2 Measuring Instruments

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 per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



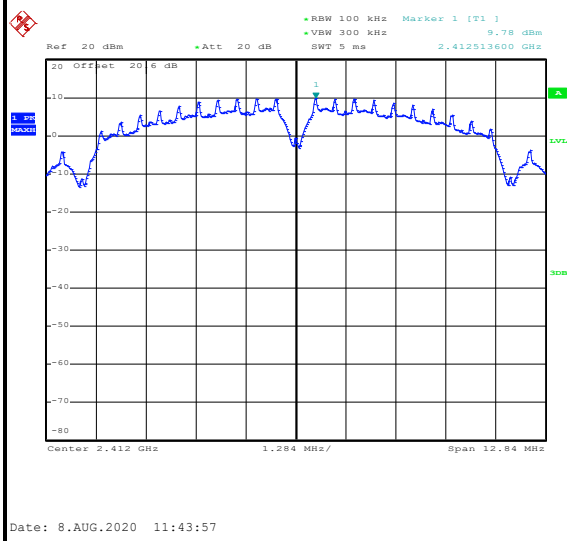
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Jacob Yu	**Temperature :**	21.2~23.7℃
		Relative Humidity :	47.2~57.8%

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

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

100kHz PSD reference Level



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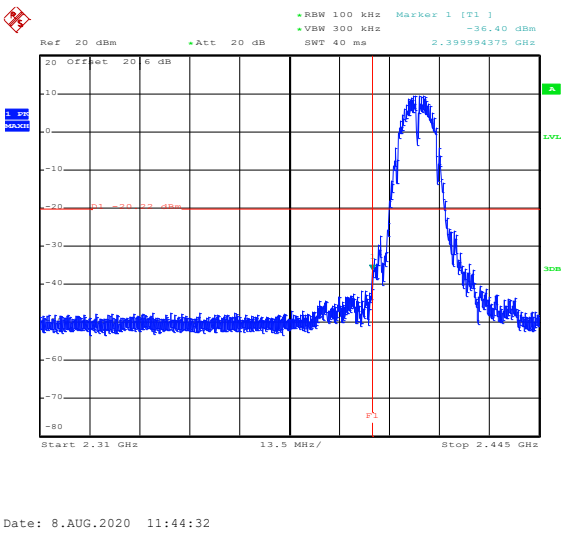
Channel Plot



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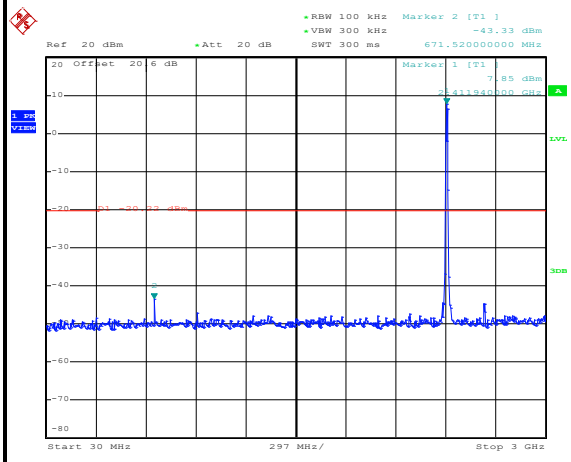
Spurious Emission 30MHz~3GHz



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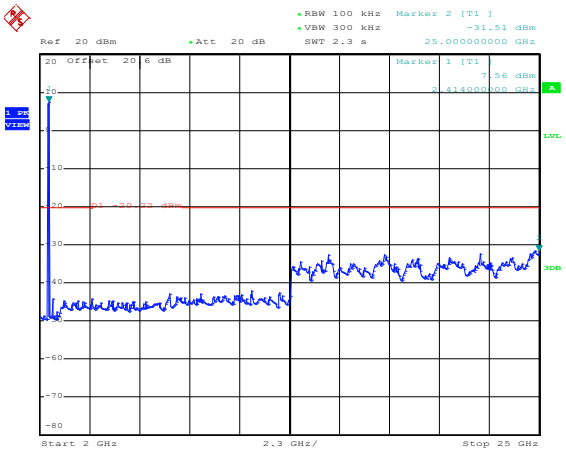
Spurious Emission 2GHz~25GHz



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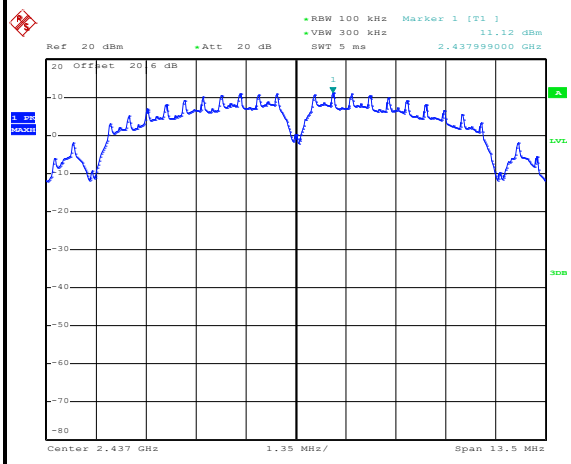
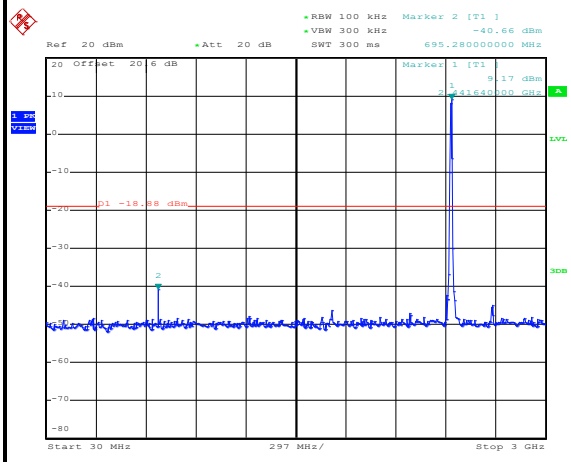
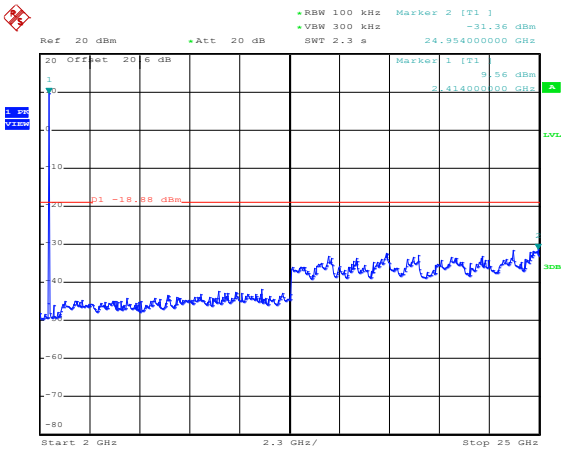
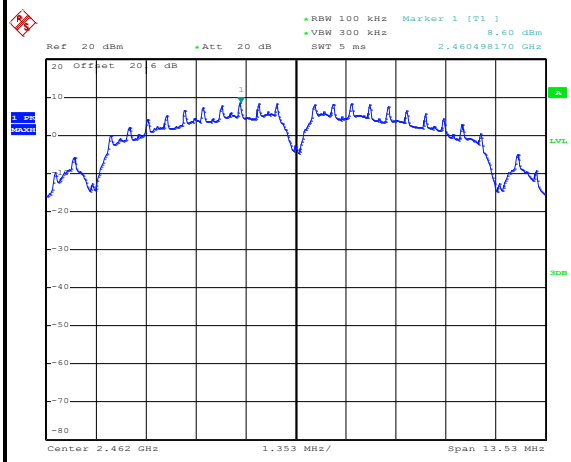
Test Mode :	802.11b	Test Channel :	06

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

Test Mode :	802.11b	Test Channel :	11

100kHz PSD reference Level



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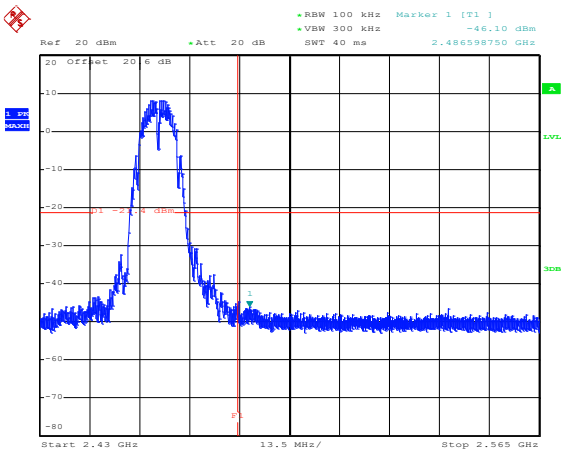
Channel Plot



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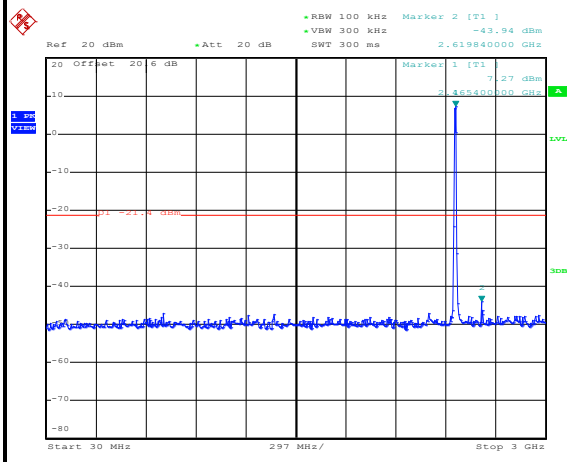
Spurious Emission 30MHz~3GHz



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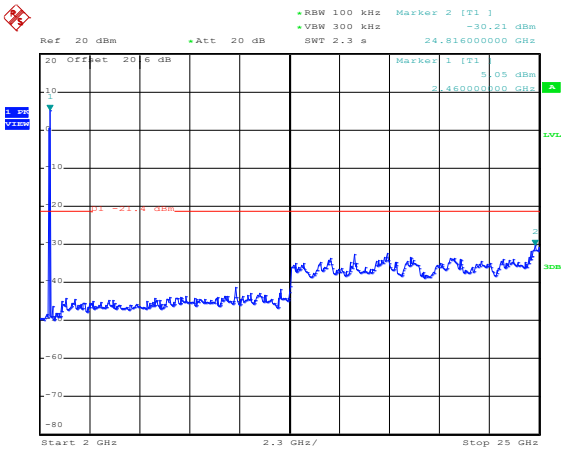
Spurious Emission 2GHz~25GHz



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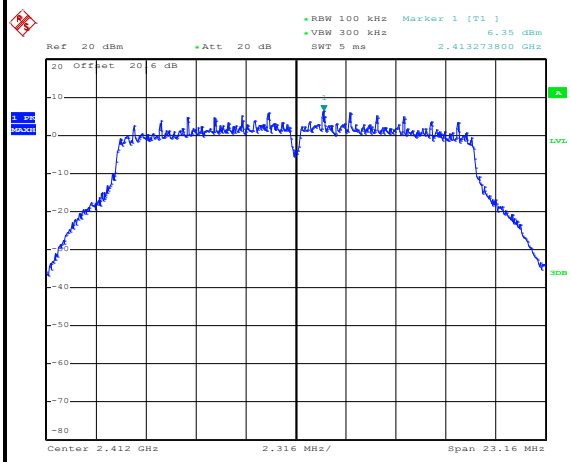
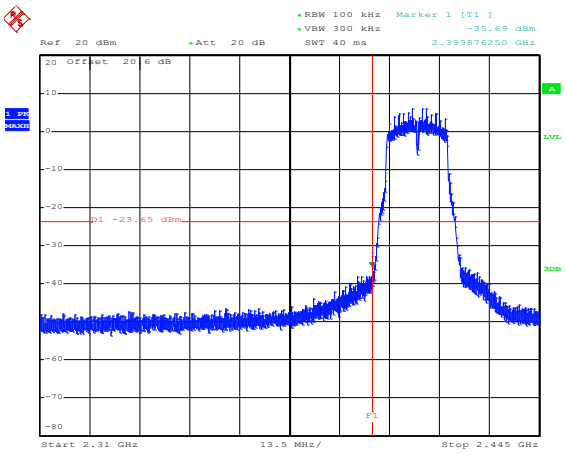
Test Mode :	802.11g	Test Channel :	01

100kHz PSD reference Level	Channel Plot
	
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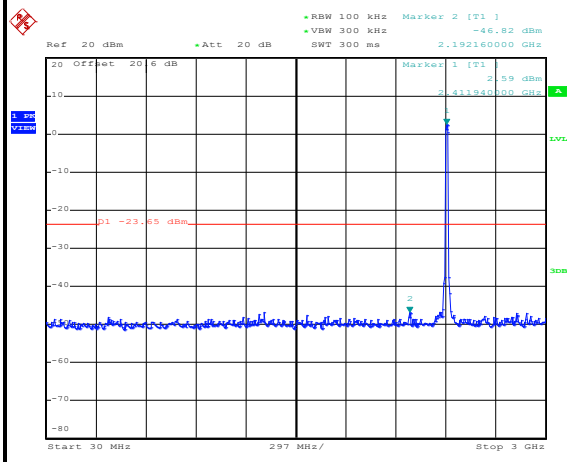
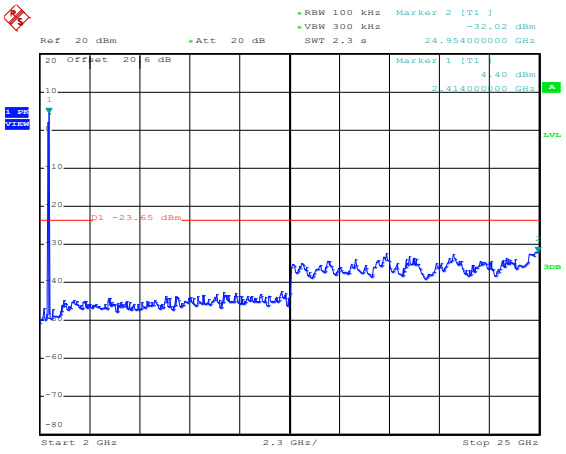
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	
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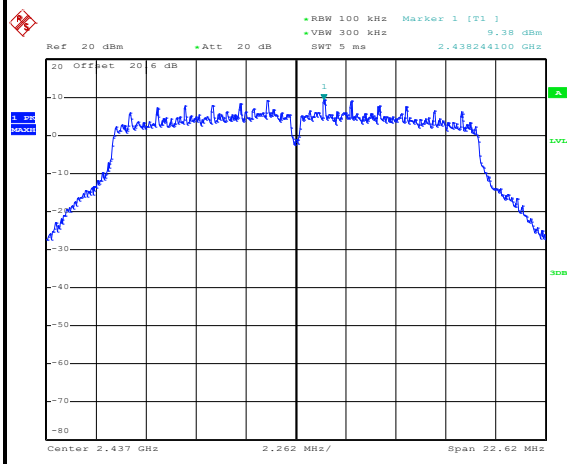
Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

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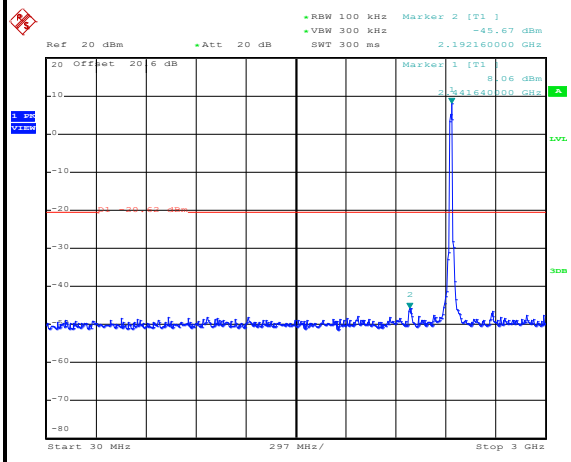
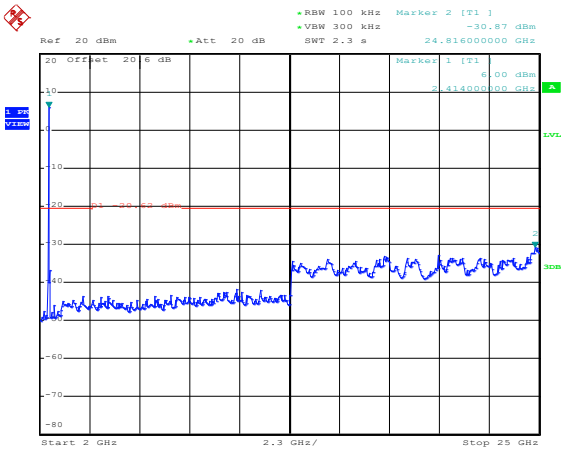
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

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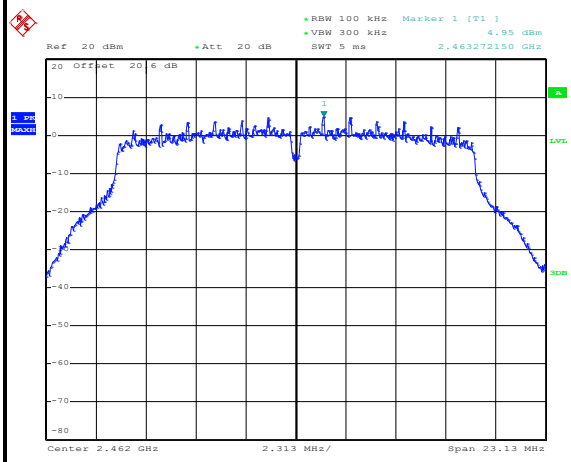
Test Mode :	802.11g	Test Channel :	11

100kHz PSD reference Level



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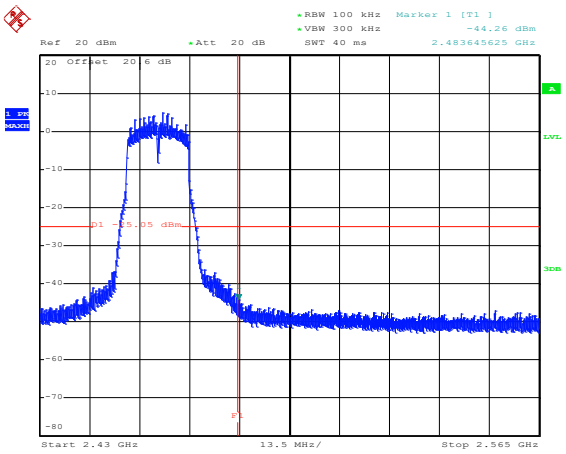
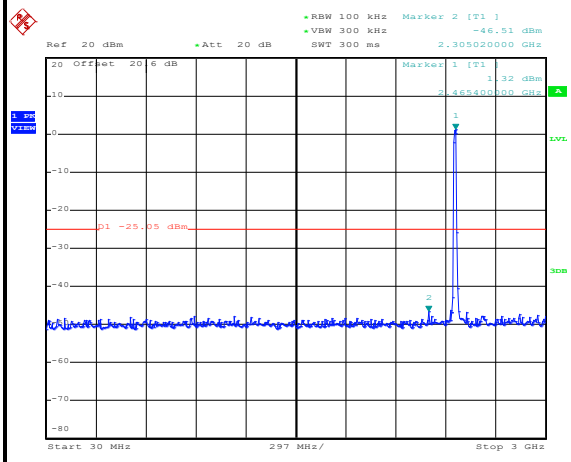
Channel Plot



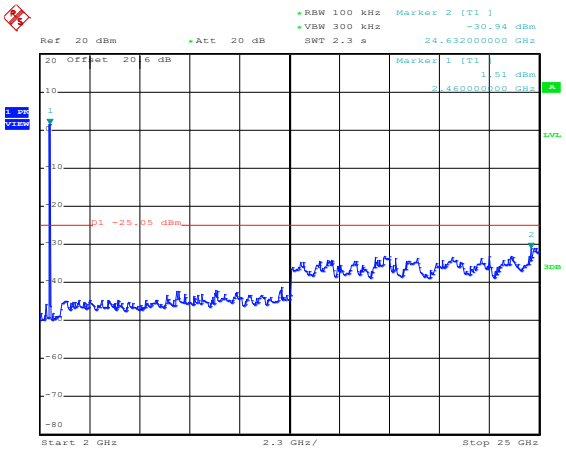
Date: 8.AUG.2020 12:33:27

Spurious Emission 30MHz~3GHz



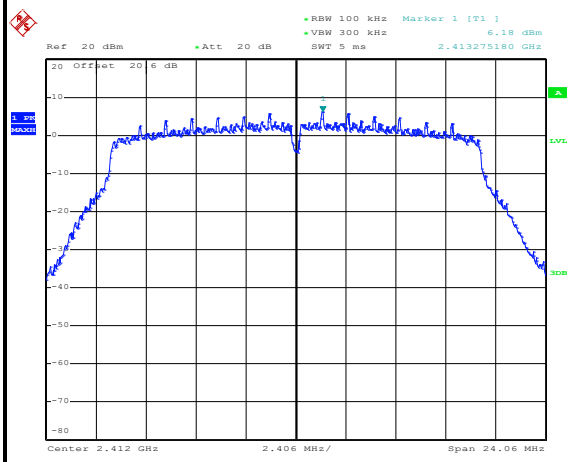
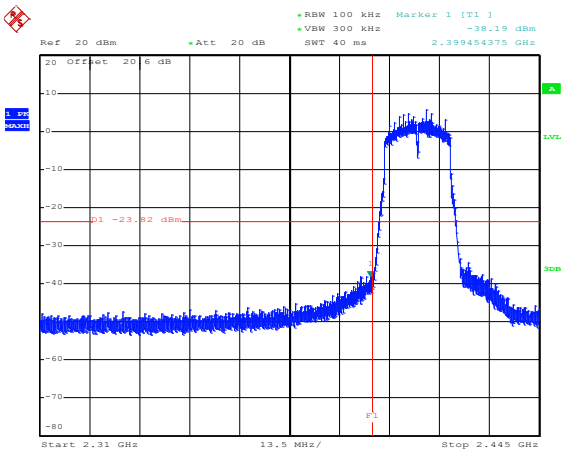
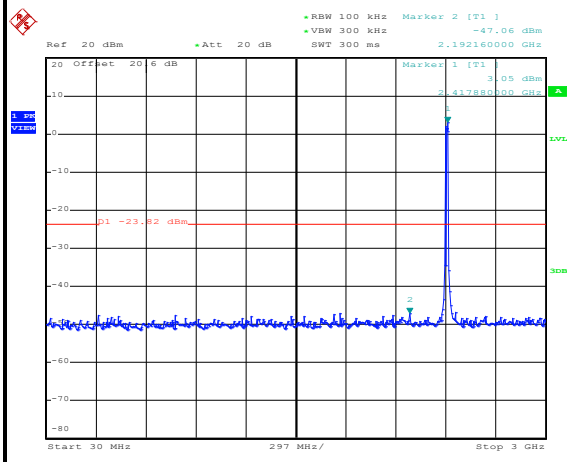
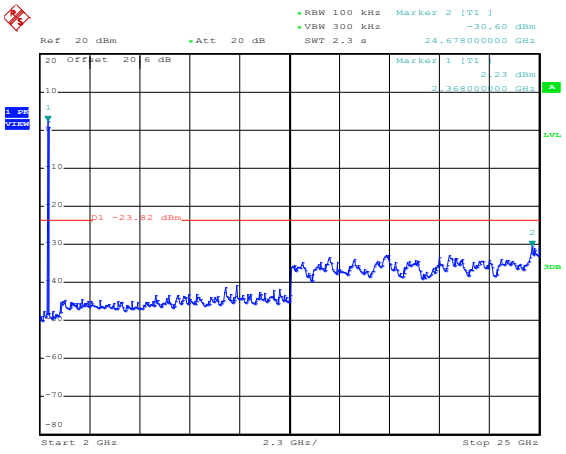
Date: 8.AUG.2020 12:33:57

Spurious Emission 2GHz~25GHz

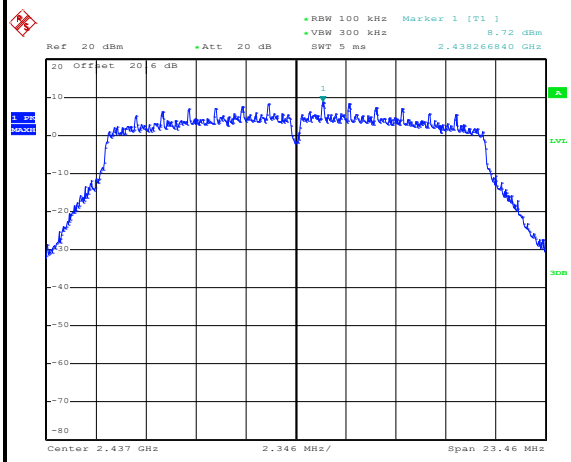


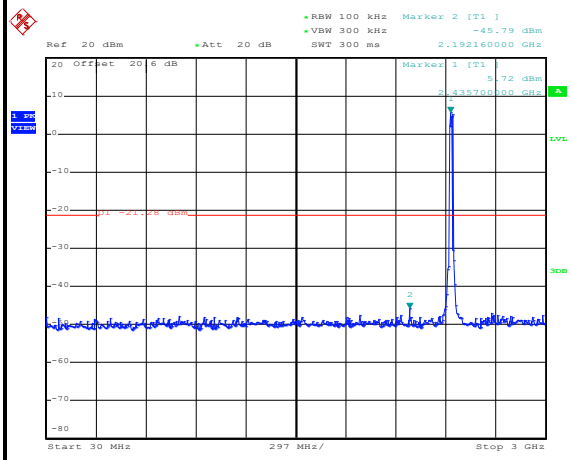
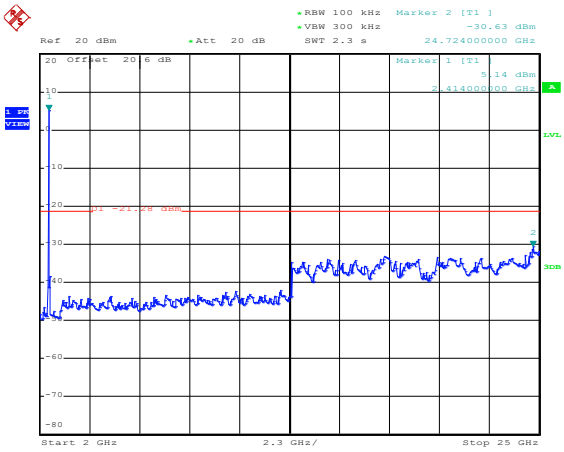
Date: 8.AUG.2020 12:34:15

Test Mode :	802.11n HT20	Test Channel :	01

100kHz PSD reference Level	Channel Plot
	
Date: 8.AUG.2020 12:44:06	Date: 8.AUG.2020 12:46:58
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	
Date: 8.AUG.2020 12:47:43	Date: 8.AUG.2020 12:47:59

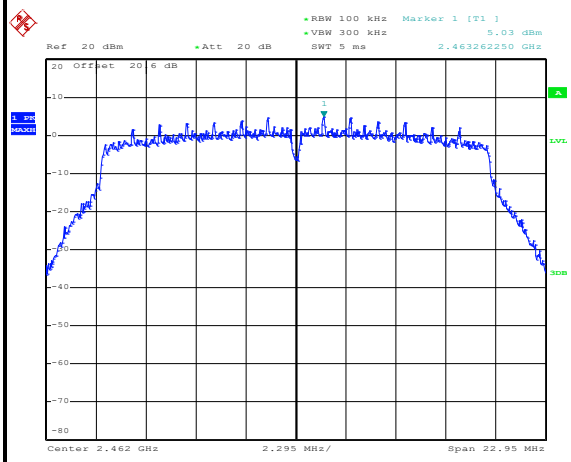
Test Mode :	802.11n HT20	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	
Date: 8.AUG.2020 12:52:06	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	
Date: 8.AUG.2020 12:53:29	Date: 8.AUG.2020 12:53:45

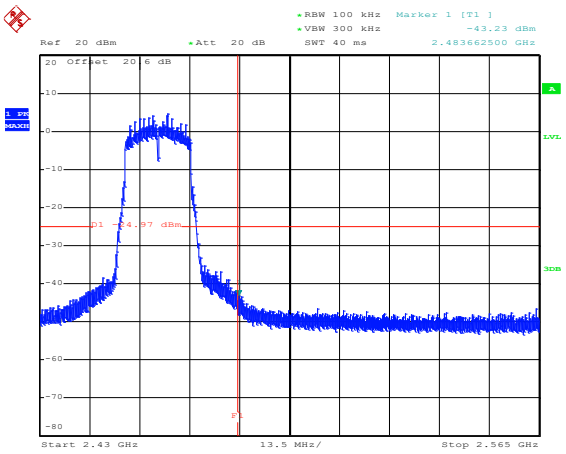
Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level



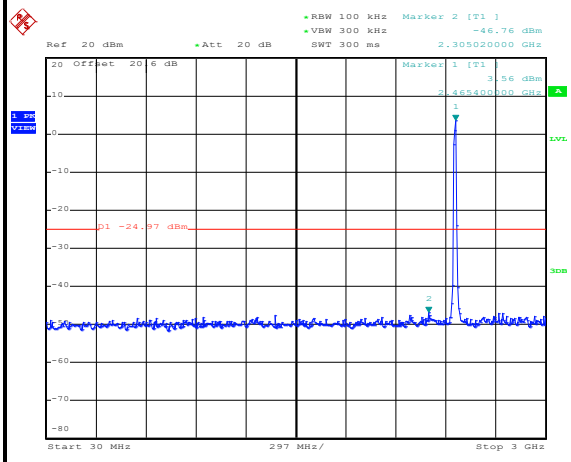
Date: 8.AUG.2020 13:00:16

Channel Plot



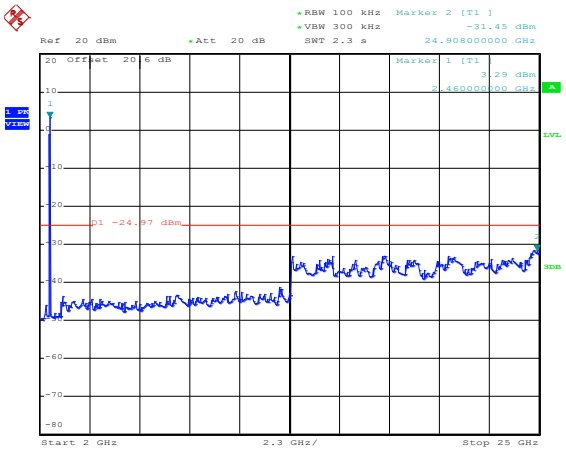
Date: 8.AUG.2020 13:02:31

Spurious Emission 30MHz~3GHz



Date: 8.AUG.2020 13:03:08

Spurious Emission 2GHz~25GHz

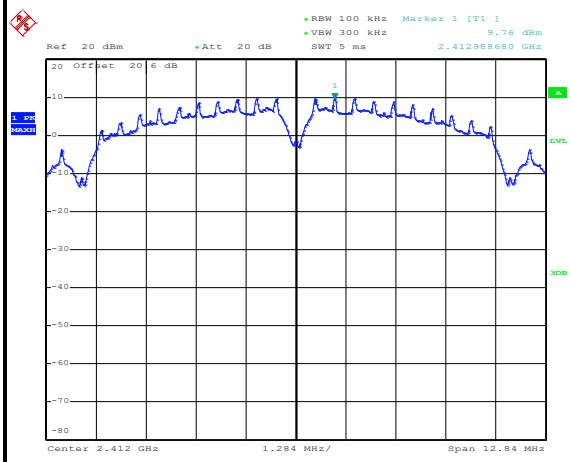


Date: 8.AUG.2020 13:03:26

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

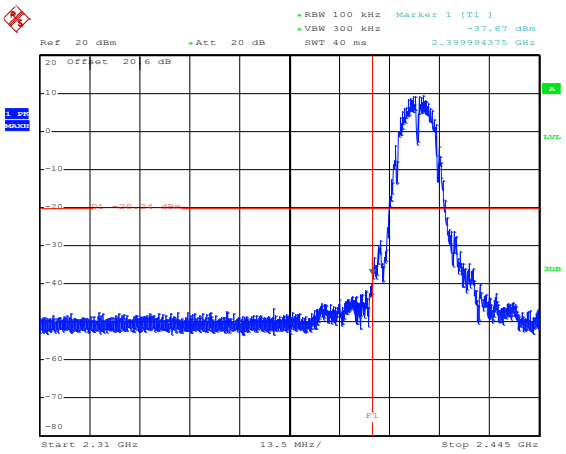
Test Mode :	802.11b	Test Channel :	01

100kHz PSD reference Level



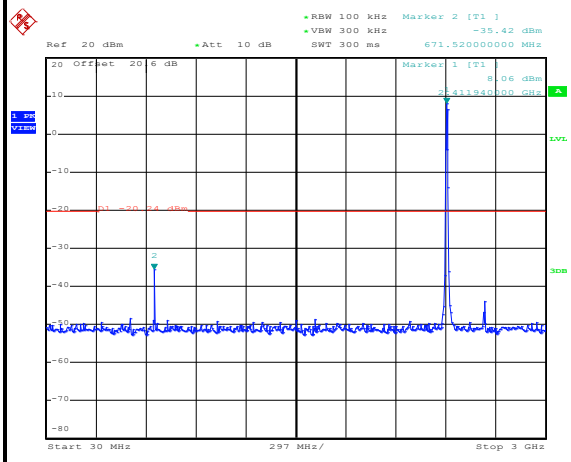
Date: 10.AUG.2020 21:26:07

Channel Plot



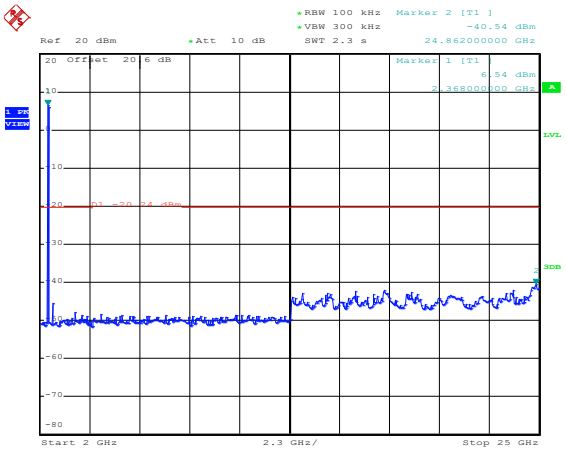
Date: 10.AUG.2020 21:26:26

Spurious Emission 30MHz~3GHz



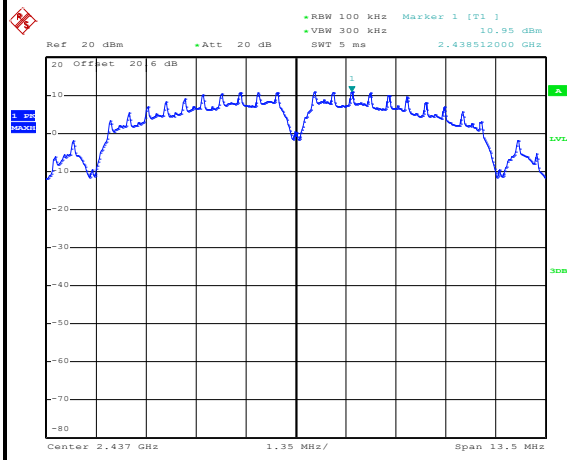
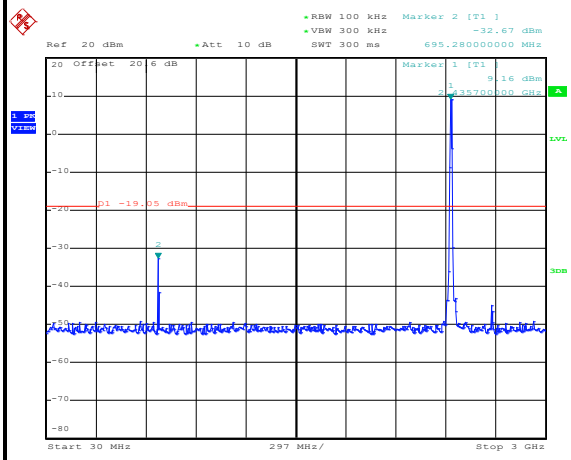
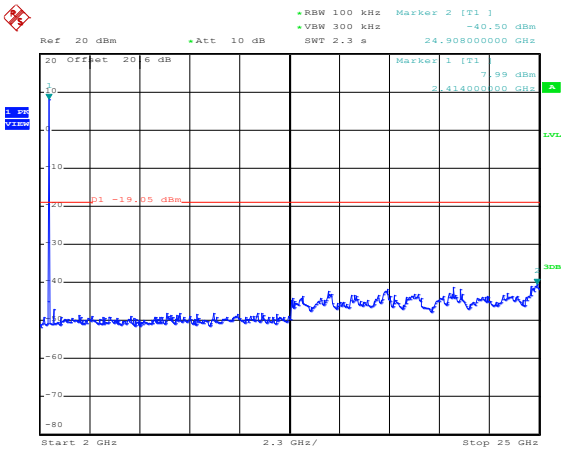
Date: 10.AUG.2020 21:26:55

Spurious Emission 2GHz~25GHz

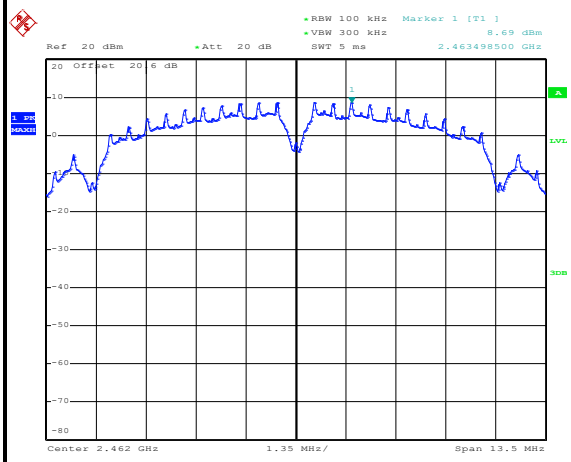
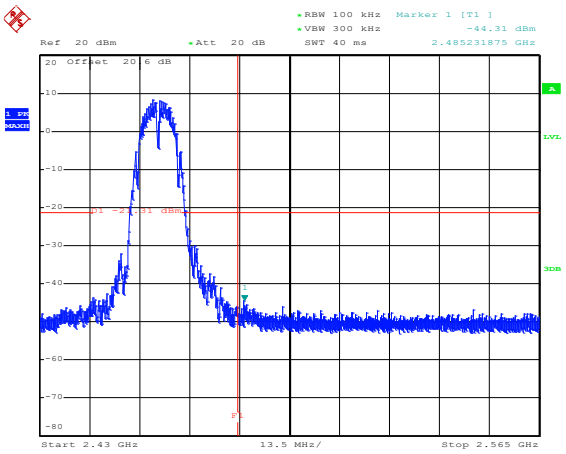
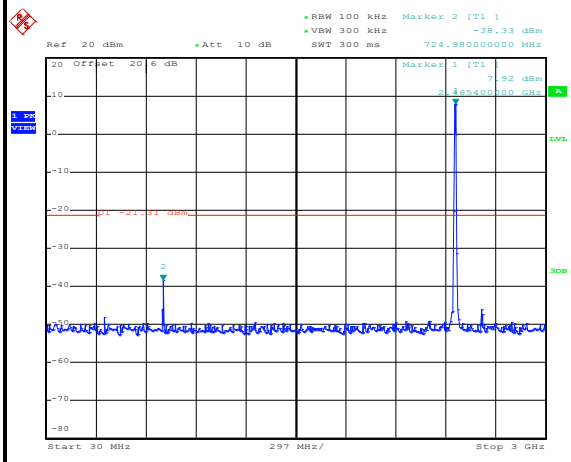
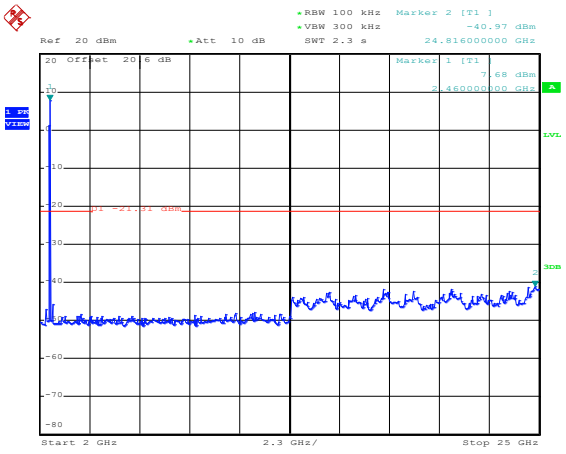


Date: 10.AUG.2020 21:27:17

Test Mode :	802.11b	Test Channel :	06

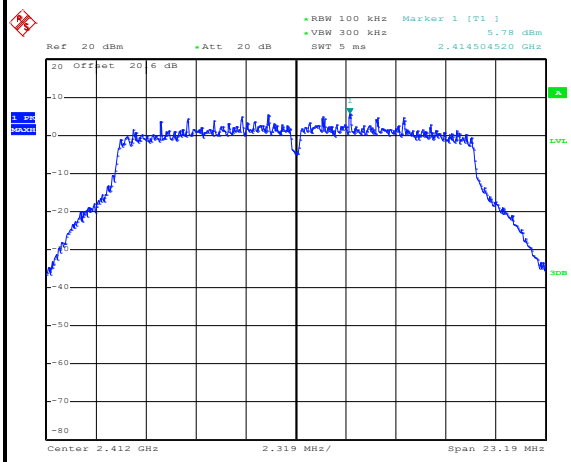
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11b	Test Channel :	11

100kHz PSD reference Level	Channel Plot
	
Date: 10.AUG.2020 21:37:39	Date: 10.AUG.2020 21:38:24
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	
Date: 10.AUG.2020 21:39:30	Date: 10.AUG.2020 21:39:46

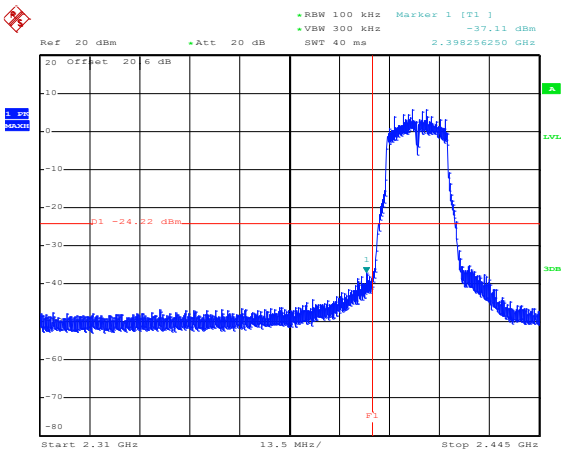
Test Mode :	802.11g	Test Channel :	01

100kHz PSD reference Level



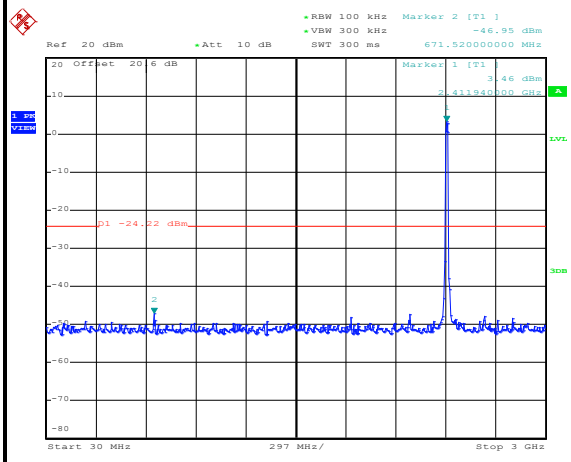
Date: 10.AUG.2020 21:47:30

Channel Plot



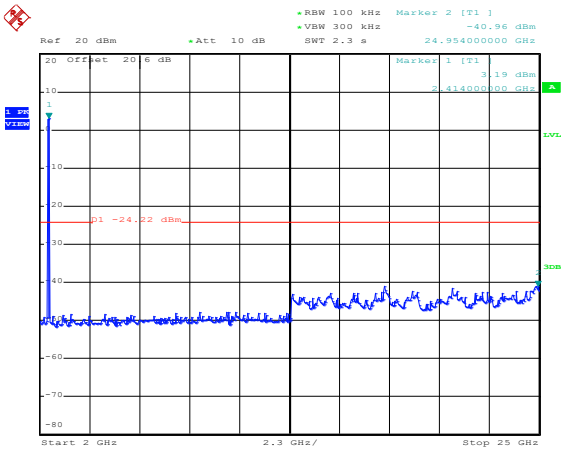
Date: 10.AUG.2020 21:48:22

Spurious Emission 30MHz~3GHz



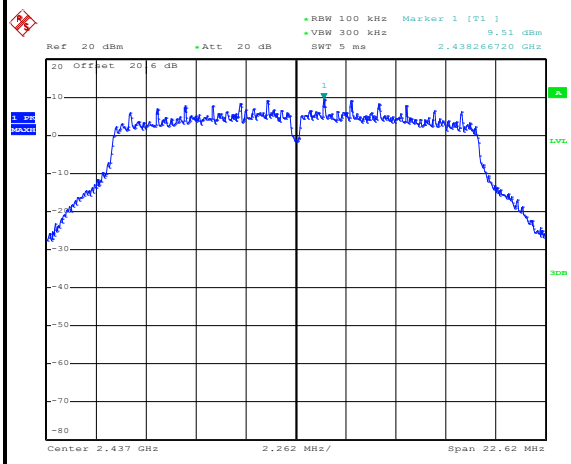
Date: 10.AUG.2020 21:48:51

Spurious Emission 2GHz~25GHz

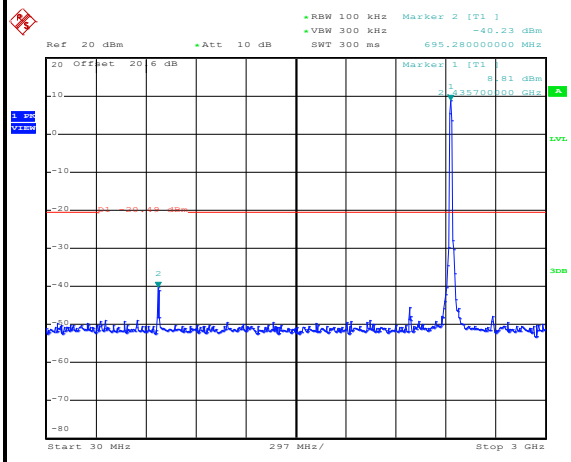
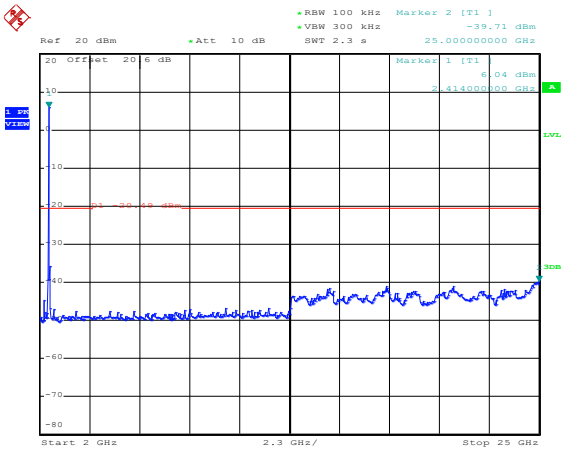


Date: 10.AUG.2020 21:49:07

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Date: 10.AUG.2020 21:52:07

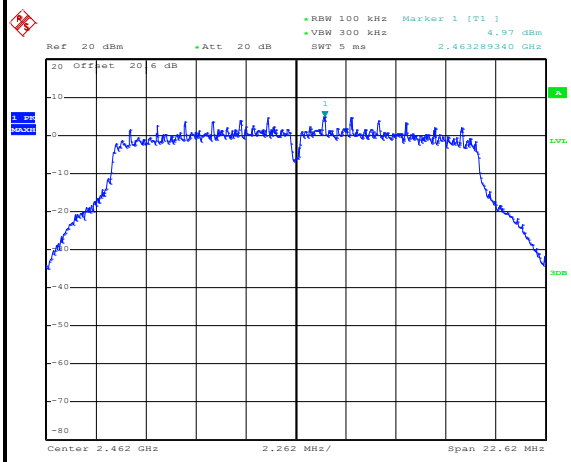
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Date: 10.AUG.2020 21:52:29

Date: 10.AUG.2020 21:54:20

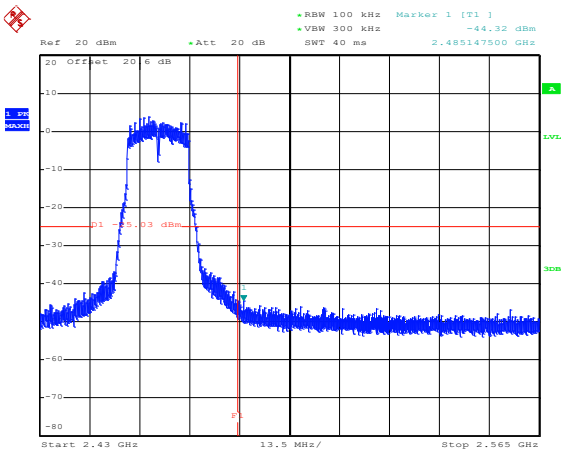
Test Mode :	802.11g	Test Channel :	11

100kHz PSD reference Level



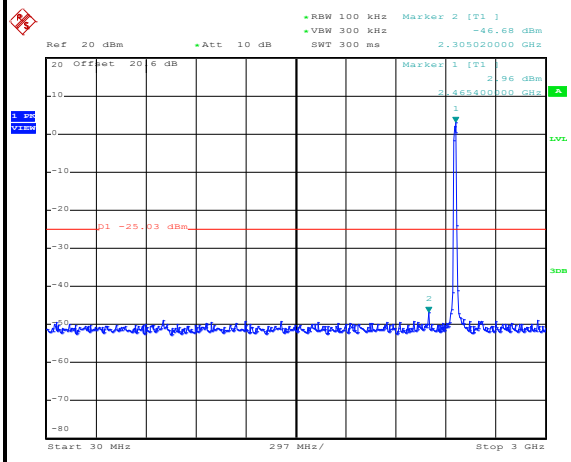
Date: 10.AUG.2020 21:57:24

Channel Plot



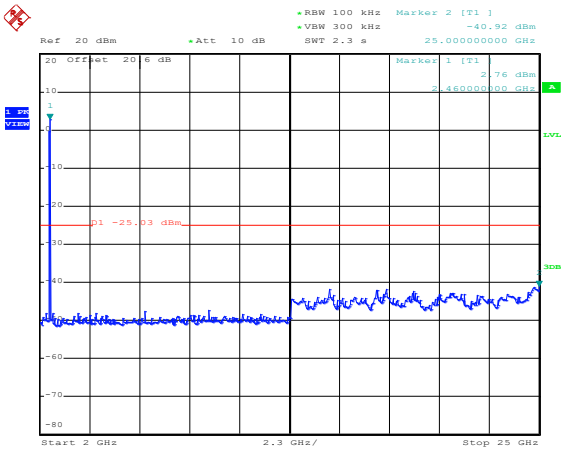
Date: 10.AUG.2020 21:57:46

Spurious Emission 30MHz~3GHz



Date: 10.AUG.2020 21:58:09

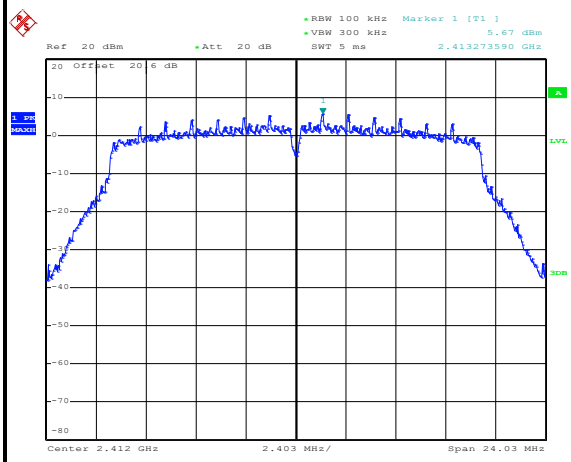
Spurious Emission 2GHz~25GHz



Date: 10.AUG.2020 21:58:25

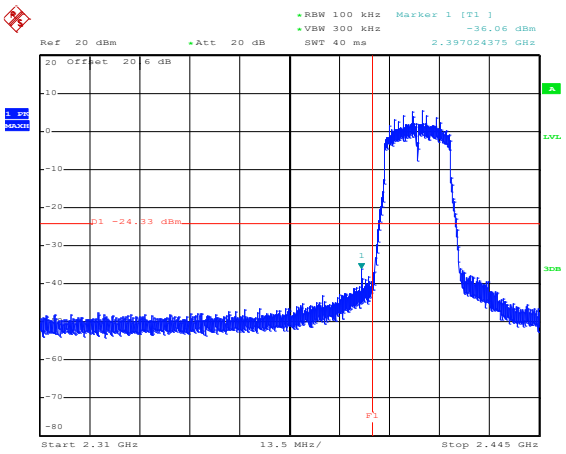
Test Mode :	802.11n HT20	Test Channel :	01

100kHz PSD reference Level



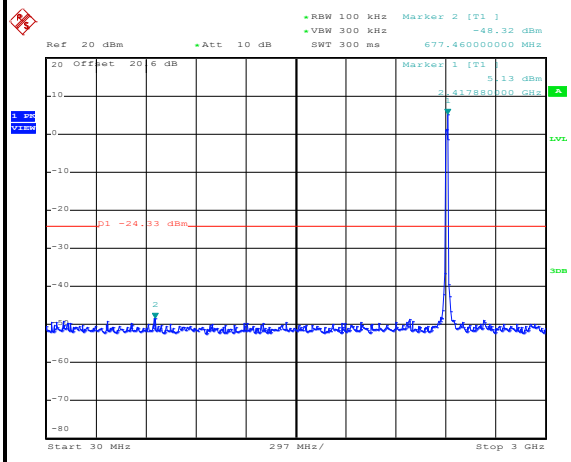
Date: 11.AUG.2020 11:59:42

Channel Plot



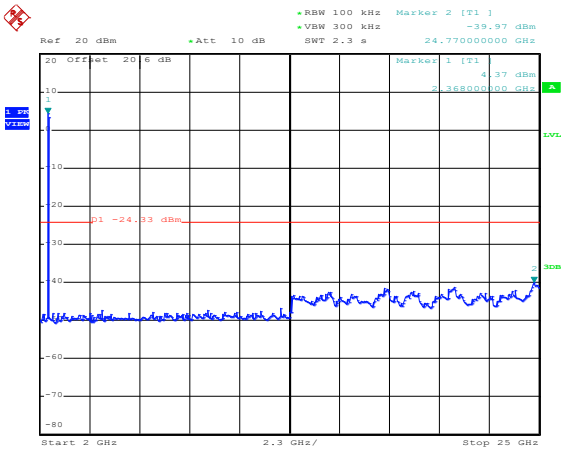
Date: 11.AUG.2020 12:00:40

Spurious Emission 30MHz~3GHz



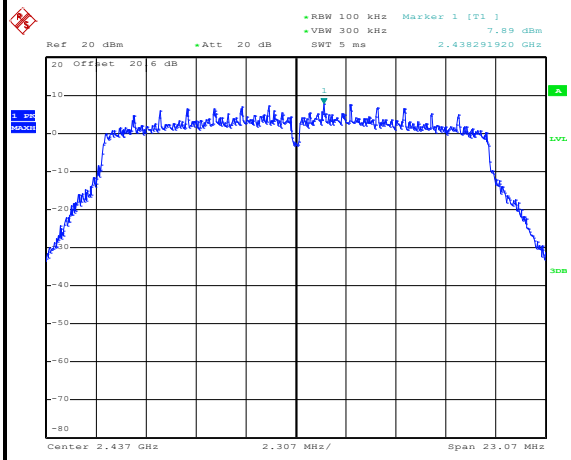
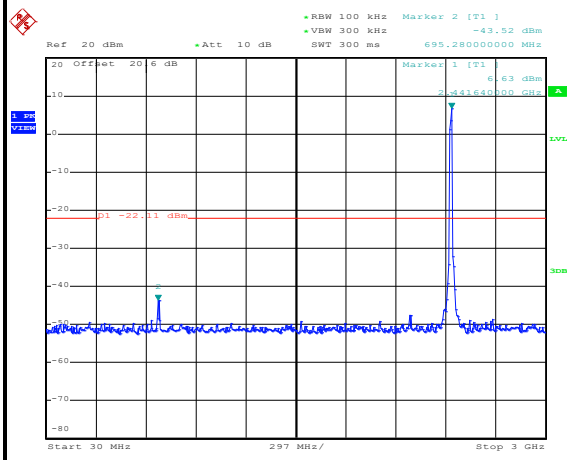
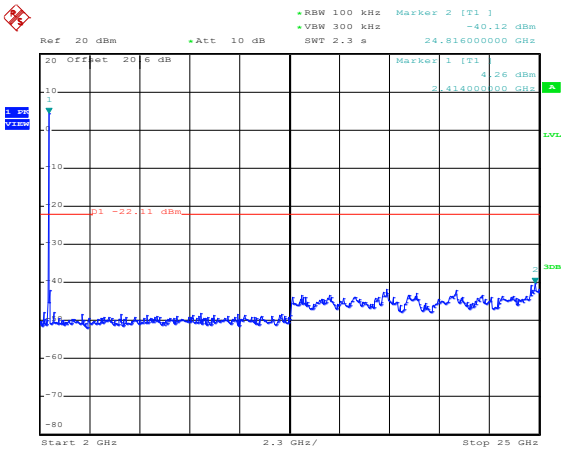
Date: 11.AUG.2020 12:01:26

Spurious Emission 2GHz~25GHz



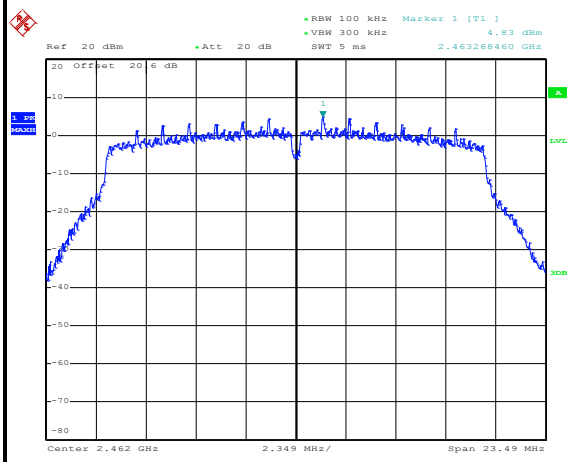
Date: 11.AUG.2020 12:02:47

Test Mode :	802.11n HT20	Test Channel :	06

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

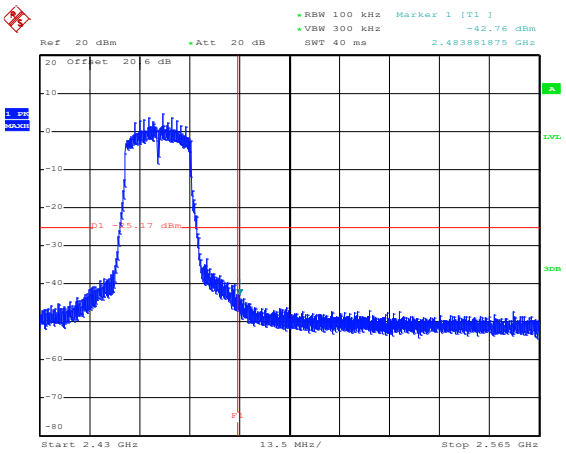
Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level



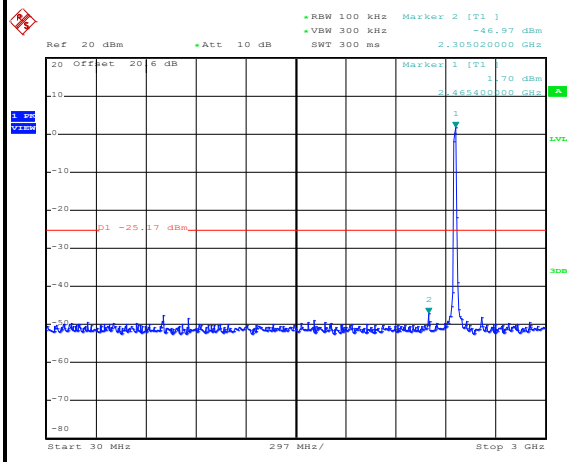
Date: 11.AUG.2020 12:10:29

Channel Plot



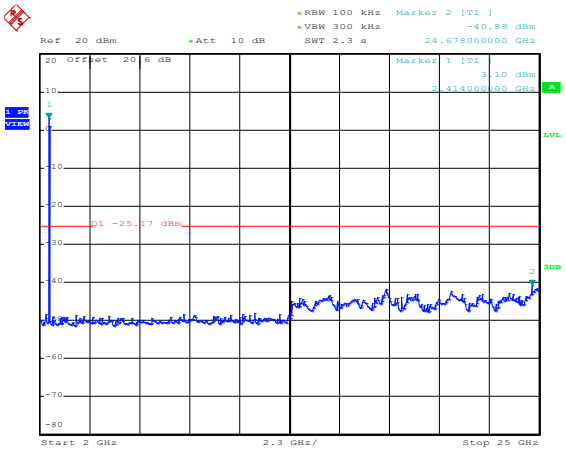
Date: 11.AUG.2020 12:11:06

Spurious Emission 30MHz~3GHz



Date: 11.AUG.2020 12:11:23

Spurious Emission 2GHz~25GHz



Date: 11.AUG.2020 12:11:42

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

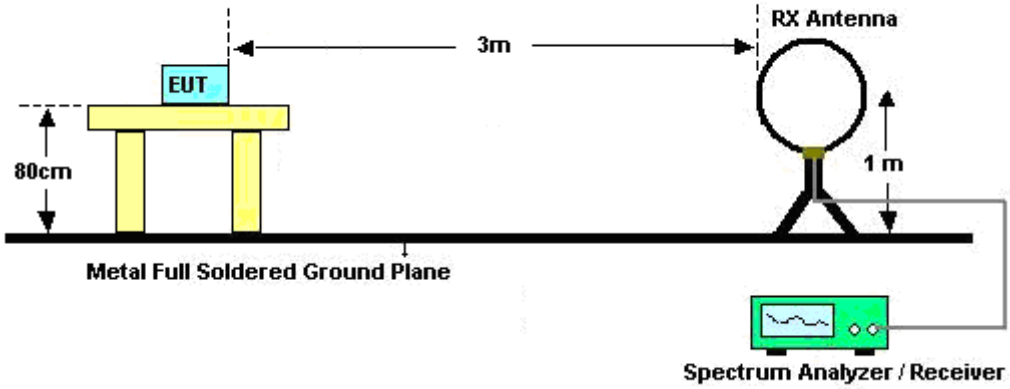
3.5.3 Test Procedures

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
   For average measurement: Reporting Read Level (dBμV) has already added the duty factor offset. The factor please refers to appendix E.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - RBW = 1 MHz; VBW ≥ 3 MHz
   - Detector = RMS
   - Averaging type = linear voltage averaging.
   - Sweep time = Auto.
   - race average at least 100 traces in power averaging mode.
   - Add 20 log(1/d), where d is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, with 50% duty cycle, at least 200 traces shall be averaged.

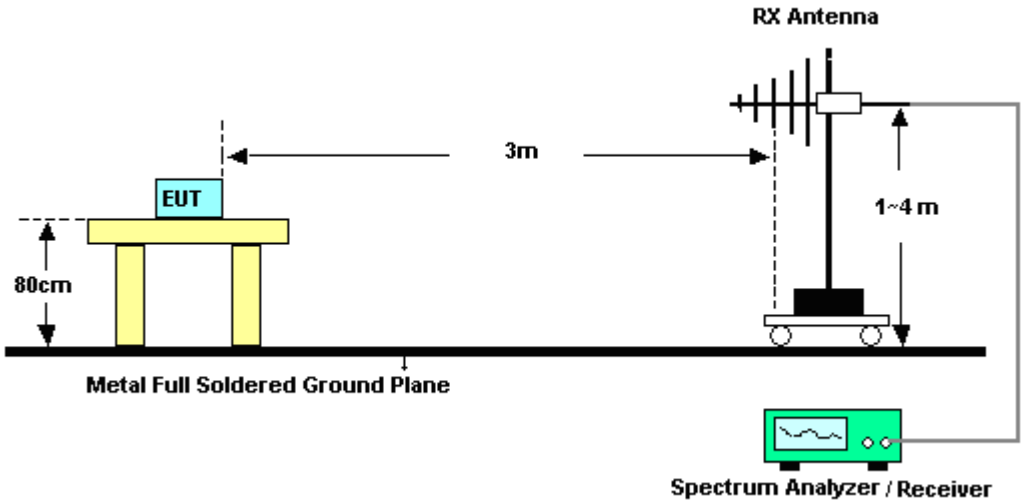
.

3.5.4 Test Setup

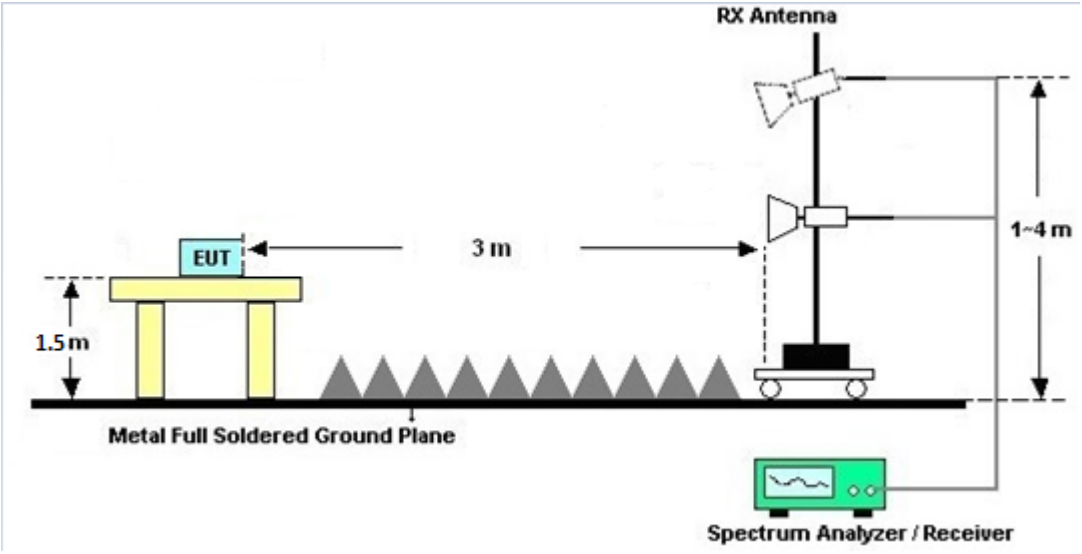
For radiated emissions below 30MHz



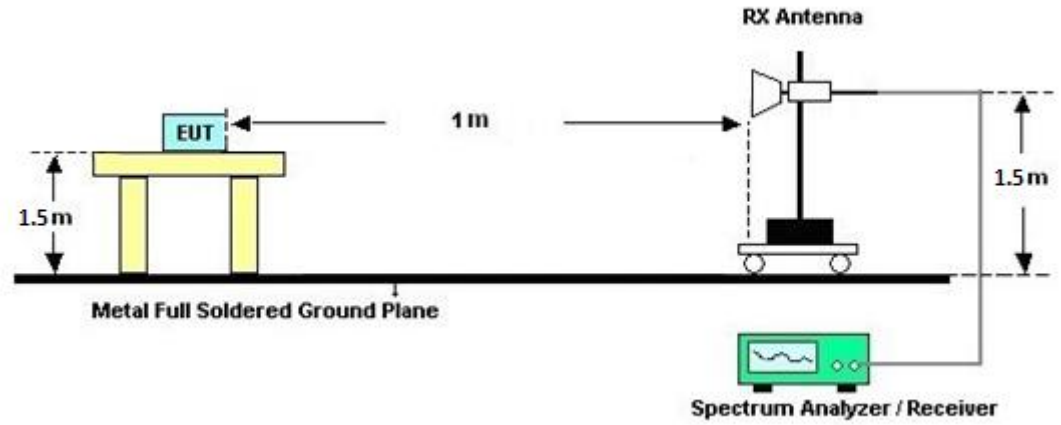
For radiated emissions from 30MHz to 1GHz



For radiated emissions from 1GHz to 18GHz



For radiated emissions above 18GHz



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

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

There is a comparison data of both open-field test site and 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 (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

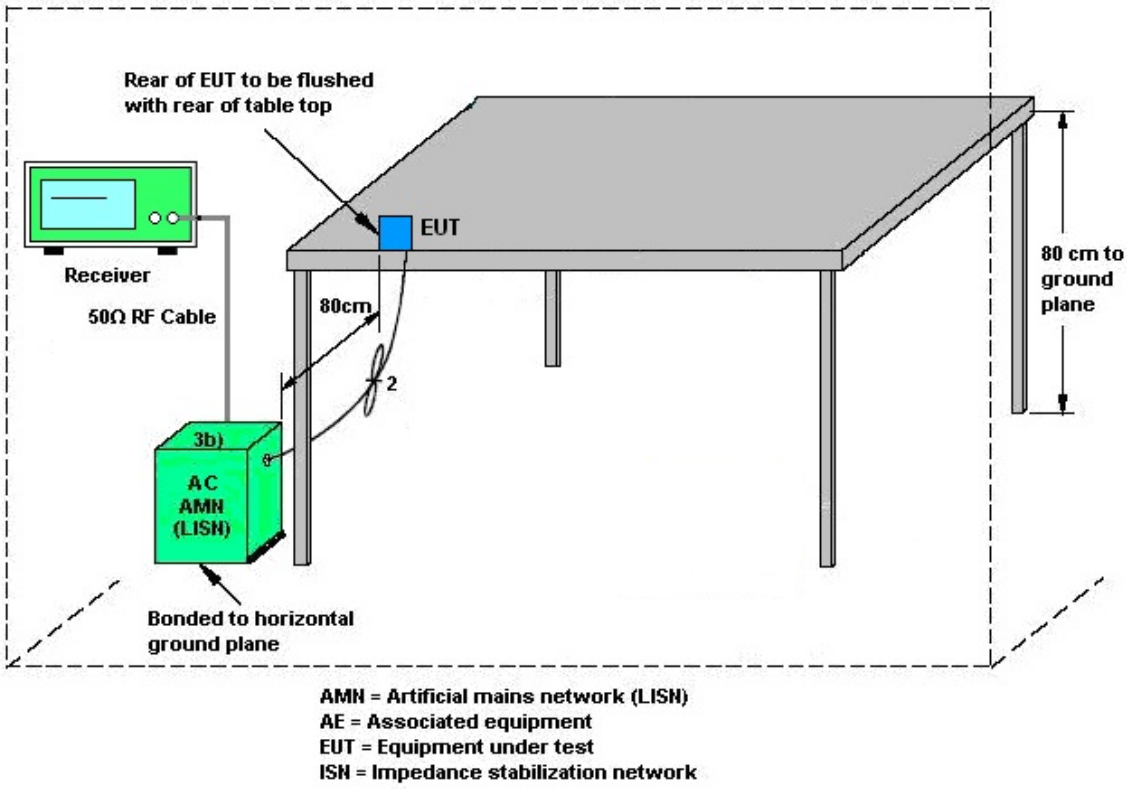
3.6.2 Measuring Instruments

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 rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Ji Zhan	HTC-1	2	N/A	Mar. 02, 2020	Jul. 17, 2020~ Sep. 14, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO10	10MHz~6GHz	Dec. 23, 2019	Jul. 17, 2020~ Sep. 14, 2020	Dec. 22, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz-30GHz	Nov. 26, 2019	Jul. 17, 2020~ Sep. 14, 2020	Nov. 25, 2020	Conducted (TH05-HY)
Switch Control Manframe	Burgeon	ETF-058	EC1300484	N/A	Aug. 22, 2019	Jul. 17, 2020~ Sep. 14, 2020	Aug. 21, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Aug. 19, 2020~ Sep. 14, 2020	Mar. 16, 2021	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Aug. 13, 2020	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 15, 2019	Aug. 13, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 07, 2019	Aug. 13, 2020	Nov. 06, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 20, 2019	Aug. 13, 2020	Nov. 19, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 15, 2019	Aug. 13, 2020	Nov. 14, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Aug. 13, 2020	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 02, 2020	Aug. 13, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 02, 2020	Aug. 13, 2020	Jan. 01, 2021	Conduction (CO05-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 09, 2020	Jul. 20, 2020~ Oct. 13, 2020	Jan. 08, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Feb. 09, 2020	Jul. 20, 2020~ Oct. 13, 2020	Feb. 08, 2021	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 27, 2019	Jul. 20, 2020~ Oct. 13, 2020	Dec. 26, 2020	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1620	1-18GHz	Oct. 28, 2019	Jul. 20, 2020~ Oct. 13, 2020	Oct. 27, 2020	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 10, 2019	Jul. 20, 2020~ Oct. 13, 2020	Dec. 09, 2020	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055006	1GHz~18GHz	May 07, 2020	Jul. 20, 2020~ Oct. 13, 2020	May 06, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 23, 2019	Jul. 20, 2020~ Sep. 02, 2020	Aug. 22, 2020	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 21, 2020	Oct. 12, 2020~ Oct. 13, 2020	Aug. 20, 2021	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Jul. 20, 2020~ Oct. 13, 2020	Dec. 12, 2020	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20MHz~8.4GHz	Nov. 01, 2019	Jul. 20, 2020~ Oct. 13, 2020	Oct. 31, 2020	Radiation (03CH15-HY
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May 04, 2020	Jul. 20, 2020~ Oct. 13, 2020	May 03, 2021	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jul. 20, 2020~ Oct. 13, 2020	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jul. 20, 2020~ Oct. 13, 2020	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Jul. 20, 2020~ Oct. 13, 2020	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 14, 2020	Jul. 20, 2020~ Oct. 13, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4PE	30M-18G	Apr. 14, 2020	Jul. 20, 2020~ Oct. 13, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY37710/4	30M-18G	Apr. 17, 2020	Jul. 20, 2020~ Oct. 13, 2020	Apr. 16, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Jul. 20, 2020~ Oct. 13, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Jul. 20, 2020~ Oct. 13, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN4	1.53G Low Pass	Jul. 03, 2020	Jul. 20, 2020~ Oct. 13, 2020	Jul. 02, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN4	3GHz High Pass Filter	Sep. 17, 2019	Jul. 20, 2020~ Sep. 02, 2020	Sep. 16, 2020	Radiation (03CH15-HY)
Filter	Marvelous Microwave Inc	MFN_2400.2485.S5	40009N	2.4GHz notch filter	Apr. 17, 2020	Oct. 12, 2020~ Oct. 13, 2020	Apr. 16, 2021	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	Temperature:	21.2~23.7	°C
Test Date:	2020/7/17-2020/9/14	Relative Humidity:	47.2~57.8	%

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	11.60	11.60	8.56	8.56	0.50	Pass
11b	1Mbps	1	6	2437	11.90	11.90	9.00	9.00	0.50	Pass
11b	1Mbps	1	11	2462	11.45	11.45	9.02	9.00	0.50	Pass
11g	6Mbps	1	1	2412	16.70	16.65	15.44	15.46	0.50	Pass
11g	6Mbps	1	6	2437	16.75	16.70	15.08	15.08	0.50	Pass
11g	6Mbps	1	11	2462	16.70	16.70	15.42	15.08	0.50	Pass
HT20	MCS0	1	1	2412	17.80	17.80	16.04	16.02	0.50	Pass
HT20	MCS0	1	6	2437	17.75	17.80	15.64	15.38	0.50	Pass
HT20	MCS0	1	11	2462	17.80	17.80	15.30	15.66	0.50	Pass

Report Number : FR031625-01B

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	18.80	18.50		30.00	30.00	1.91	1.33	20.71	19.83	36.00	36.00	Pass
11b	1Mbps	1	2	2417	19.50	19.40		30.00	30.00	1.91	1.33	21.41	20.73	36.00	36.00	Pass
11b	1Mbps	1	6	2437	20.00	19.70		30.00	30.00	1.91	1.33	21.91	21.03	36.00	36.00	Pass
11b	1Mbps	1	10	2457	19.40	19.20		30.00	30.00	1.91	1.33	21.31	20.53	36.00	36.00	Pass
11b	1Mbps	1	11	2462	18.80	19.00		30.00	30.00	1.91	1.33	20.71	20.33	36.00	36.00	Pass
11g	6Mbps	1	1	2412	16.50	16.40		30.00	30.00	1.91	1.33	18.41	17.73	36.00	36.00	Pass
11g	6Mbps	1	2	2417	18.00	17.80		30.00	30.00	1.91	1.33	19.91	19.13	36.00	36.00	Pass
11g	6Mbps	1	6	2437	20.30	20.20		30.00	30.00	1.91	1.33	22.21	21.53	36.00	36.00	Pass
11g	6Mbps	1	10	2457	18.10	18.00		30.00	30.00	1.91	1.33	20.01	19.33	36.00	36.00	Pass
11g	6Mbps	1	11	2462	16.60	16.50		30.00	30.00	1.91	1.33	18.51	17.83	36.00	36.00	Pass
HT20	MCS0	1	1	2412	17.10	16.90		30.00	30.00	1.91	1.33	19.01	18.23	36.00	36.00	Pass
HT20	MCS0	1	2	2417	17.90	17.70		30.00	30.00	1.91	1.33	19.81	19.03	36.00	36.00	Pass
HT20	MCS0	1	6	2437	19.10	19.00		30.00	30.00	1.91	1.33	21.01	20.33	36.00	36.00	Pass
HT20	MCS0	1	10	2457	19.10	19.00		30.00	30.00	1.91	1.33	21.01	20.33	36.00	36.00	Pass
HT20	MCS0	1	11	2462	15.70	15.50		30.00	30.00	1.91	1.33	17.61	16.83	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	-4.37	-3.78		1.91	1.33	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-3.53	-3.25		1.91	1.33	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-6.06	-5.15		1.91	1.33	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-8.63	-8.56		1.91	1.33	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-4.89	-5.63		1.91	1.33	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-9.34	-9.37		1.91	1.33	8.00	8.00	Pass
HT20	MCS0	1	1	2412	-7.20	-9.66		1.91	1.33	8.00	8.00	Pass
HT20	MCS0	1	6	2437	-6.66	-7.43		1.91	1.33	8.00	8.00	Pass
HT20	MCS0	1	11	2462	-10.17	-9.95		1.91	1.33	8.00	8.00	Pass

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

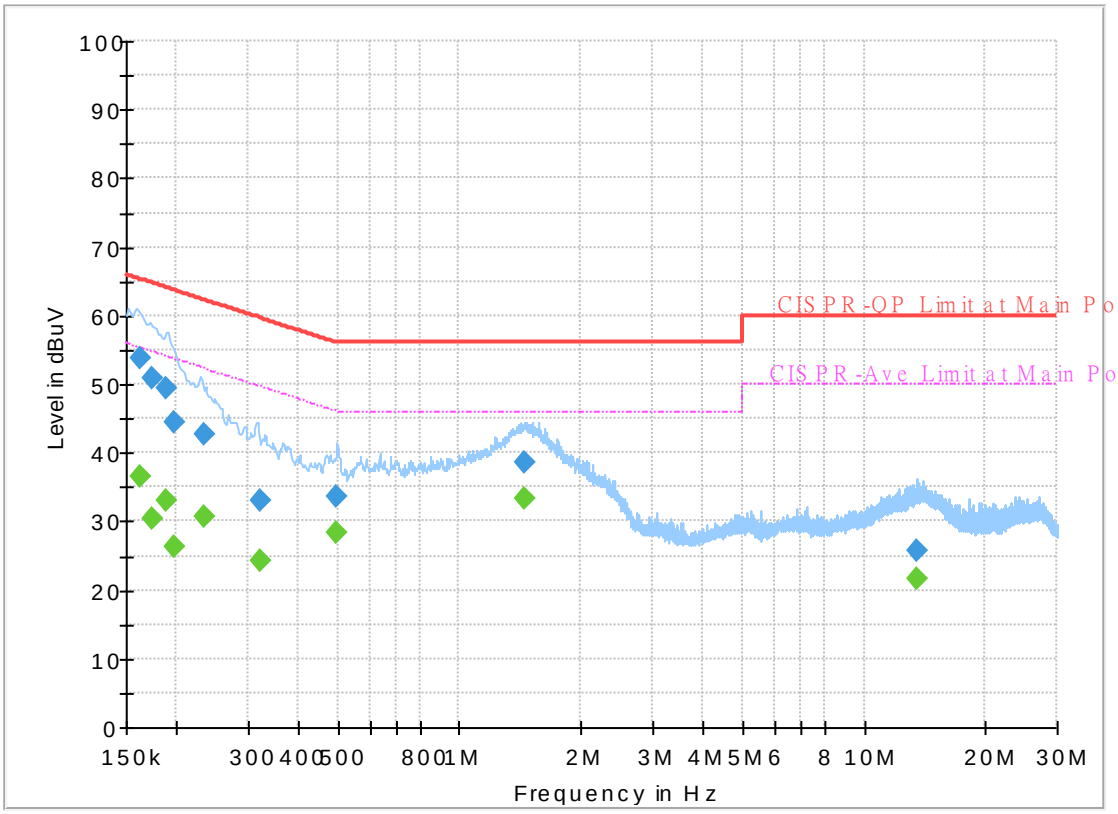
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	**Temperature :**	24~26℃
		Relative Humidity :	42~50%

EUT Information

Report NO :	031625-01
Test Mode :	Mode 1
Test Voltage :	Power From System
Phase :	Line

Full Spectrum



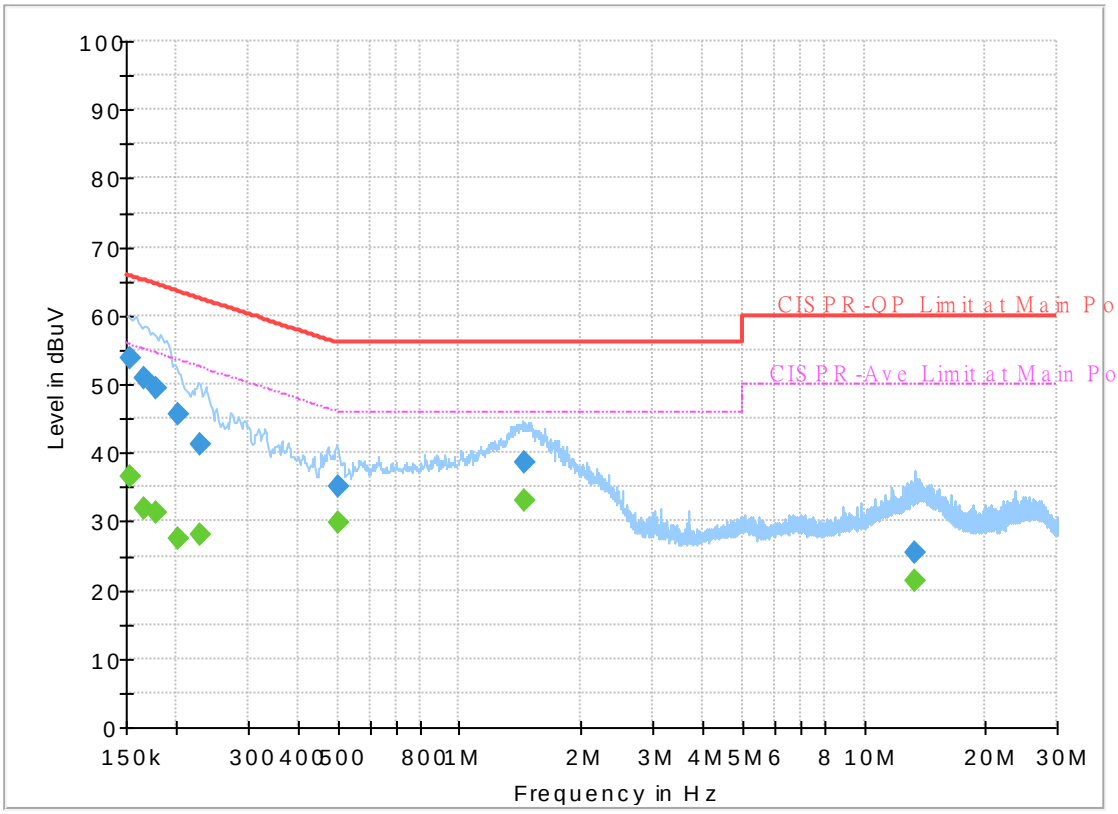
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162690	---	36.53	55.33	18.80	L1	OFF	19.5
0.162690	53.67	---	65.33	11.66	L1	OFF	19.5
0.174840	---	30.43	54.73	24.30	L1	OFF	19.5
0.174840	50.74	---	64.73	13.99	L1	OFF	19.5
0.188250	---	32.97	54.11	21.14	L1	OFF	19.5
0.188250	49.51	---	64.11	14.60	L1	OFF	19.5
0.197250	---	26.31	53.73	27.42	L1	OFF	19.5
0.197250	44.57	---	63.73	19.16	L1	OFF	19.5
0.233250	---	30.68	52.33	21.65	L1	OFF	19.5
0.233250	42.56	---	62.33	19.77	L1	OFF	19.5
0.321000	---	24.29	49.68	25.39	L1	OFF	19.5
0.321000	33.04	---	59.68	26.64	L1	OFF	19.5
0.498030	---	28.22	46.03	17.81	L1	OFF	19.5
0.498030	33.52	---	56.03	22.51	L1	OFF	19.5
1.455630	---	33.24	46.00	12.76	L1	OFF	19.6
1.455630	38.65	---	56.00	17.35	L1	OFF	19.6
13.469640	---	21.52	50.00	28.48	L1	OFF	19.8
13.469640	25.62	---	60.00	34.38	L1	OFF	19.8

EUT Information

Report NO :	031625-01
Test Mode :	Mode 1
Test Voltage :	Power From System
Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152835	---	36.61	55.84	19.23	N	OFF	19.5
0.152835	53.68	---	65.84	12.16	N	OFF	19.5
0.166830	---	31.98	55.12	23.14	N	OFF	19.5
0.166830	50.98	---	65.12	14.14	N	OFF	19.5
0.177000	---	31.37	54.63	23.26	N	OFF	19.5
0.177000	49.53	---	64.63	15.10	N	OFF	19.5
0.201750	---	27.62	53.54	25.92	N	OFF	19.5
0.201750	45.64	---	63.54	17.90	N	OFF	19.5
0.228750	---	27.93	52.50	24.57	N	OFF	19.5
0.228750	41.36	---	62.50	21.14	N	OFF	19.5
0.499470	---	29.86	46.01	16.15	N	OFF	19.5
0.499470	35.11	---	56.01	20.90	N	OFF	19.5
1.450500	---	32.99	46.00	13.01	N	OFF	19.6
1.450500	38.71	---	56.00	17.29	N	OFF	19.6
13.396200	---	21.43	50.00	28.57	N	OFF	19.9
13.396200	25.49	---	60.00	34.51	N	OFF	19.9

Appendix C. Radiated Spurious Emission

Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	21.8~22.6°C
		Relative Humidity :	47~61%

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	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.275	68.63	-5.37	74	54.44	27.76	17.35	30.92	111	231	P	H
		2387.07	52.42	-1.58	54	38.22	27.78	17.34	30.92	111	231	A	H
	*	2412	112.81	-	-	98.65	27.68	17.39	30.91	111	231	P	H
	*	2412	109.77	-	-	95.61	27.68	17.39	30.91	111	231	A	H
													H
802.11b													H
CH 01		2388.75	65.4	-8.6	74	51.21	27.77	17.34	30.92	400	276	P	V
2412MHz		2387.175	50.52	-3.48	54	36.32	27.78	17.34	30.92	400	276	A	V
	*	2412	111.07	-	-	96.91	27.68	17.39	30.91	400	276	P	V
	*	2412	107.96	-	-	93.8	27.68	17.39	30.91	400	276	A	V
													V
													V
		2386.125	66.1	-7.9	74	51.9	27.78	17.34	30.92	312	241	P	H
		2390	50.83	-3.17	54	36.64	27.76	17.35	30.92	312	241	A	H
	*	2417	114.69	-	-	100.52	27.67	17.4	30.9	312	241	P	H
	*	2417	111.57	-	-	97.4	27.67	17.4	30.9	312	241	A	H
802.11b													H
CH 02													H
2417MHz		2387.175	63.12	-10.88	74	48.92	27.78	17.34	30.92	397	276	P	V
		2390	47.42	-6.58	54	33.23	27.76	17.35	30.92	397	276	A	V
	*	2417	111.35	-	-	97.18	27.67	17.4	30.9	397	276	P	V
	*	2417	108.27	-	-	94.1	27.67	17.4	30.9	397	276	A	V
													V

802.11b CH 06 2437MHz		2389.52	60.21	-13.79	74	46.02	27.76	17.35	30.92	310	244	P	H
		2363.6	44.72	-9.28	54	30.44	27.92	17.29	30.93	310	244	A	H
	*	2437	114.76	-	-	100.6	27.63	17.43	30.9	310	244	P	H
	*	2437	111.61	-	-	97.45	27.63	17.43	30.9	310	244	A	H
		2484.25	61.78	-12.22	74	47.61	27.53	17.52	30.88	310	244	P	H
		2487.58	44.06	-9.94	54	29.9	27.52	17.52	30.88	310	244	A	H
		2362.16	57.43	-16.57	74	43.14	27.93	17.29	30.93	387	287	P	V
		2364.24	44.11	-9.89	54	29.83	27.91	17.3	30.93	387	287	A	V
	*	2437	111.22	-	-	97.06	27.63	17.43	30.9	387	287	P	V
	*	2437	108.27	-	-	94.11	27.63	17.43	30.9	387	287	A	V
		2484.07	59.68	-14.32	74	45.51	27.53	17.52	30.88	387	287	P	V
		2484.16	43.85	-10.15	54	29.68	27.53	17.52	30.88	387	287	A	V
802.11b CH 10 2457MHz	*	2457	114.87	-	-	100.7	27.59	17.47	30.89	274	241	P	H
	*	2457	111.76	-	-	97.59	27.59	17.47	30.89	274	241	A	H
		2486.24	68	-6	74	53.83	27.53	17.52	30.88	274	241	P	H
		2483.52	52.11	-1.89	54	37.94	27.53	17.52	30.88	274	241	A	H
													H
													H
	*	2457	111.09	-	-	96.92	27.59	17.47	30.89	386	275	P	V
	*	2457	107.97	-	-	93.8	27.59	17.47	30.89	386	275	A	V
		2484.24	63.96	-10.04	74	49.79	27.53	17.52	30.88	386	275	P	V
		2483.56	48.56	-5.44	54	34.39	27.53	17.52	30.88	386	275	A	V
													V
													V

802.11b CH 11 2462MHz	*	2462	113.07	-	-	98.9	27.58	17.48	30.89	100	232	P	H
	*	2462	109.92	-	-	95.75	27.58	17.48	30.89	100	232	A	H
		2484	69.1	-4.9	74	54.93	27.53	17.52	30.88	100	232	P	H
		2486.76	51.36	-2.64	54	37.19	27.53	17.52	30.88	100	232	A	H
													H
													H
	*	2462	109.62	-	-	95.45	27.58	17.48	30.89	379	282	P	V
	*	2462	106.47	-	-	92.3	27.58	17.48	30.89	379	282	A	V
		2484.16	65.68	-8.32	74	51.51	27.53	17.52	30.88	379	282	P	V
		2483.52	49.91	-4.09	54	35.74	27.53	17.52	30.88	379	282	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	45.46	-28.54	74	62.63	31.25	10.67	59.09	100	0	P	H
		17955	59.91	-14.09	74	50.33	47.9	19.63	57.95	100	350	P	H
		17955	49.4	-4.6	54	39.82	47.9	19.63	57.95	100	350	A	H
													H
		4824	46.21	-27.79	74	63.38	31.25	10.67	59.09	100	0	P	V
		17985	60.35	-13.65	74	50.11	48.5	19.66	57.92	300	240	P	V
		17985	50.35	-3.65	54	40.11	48.5	19.66	57.92	300	240	A	V
													V
802.11b CH 06 2437MHz		2200	57.15	-16.85	74	43.09	28.1	16.96	31	300	237	P	H
		2200	44.63	-9.37	54	30.57	28.1	16.96	31	300	237	A	H
		4874	44.48	-29.52	74	61.63	31.25	10.72	59.12	100	0	P	H
		7311	46.67	-27.33	74	56.15	36.52	12.56	58.56	100	0	P	H
		17985	60.28	-13.72	74	50.04	48.5	19.66	57.92	100	345	P	H
		17985	50.07	-3.93	54	39.83	48.5	19.66	57.92	100	345	A	H
		2200	56.46	-17.54	74	42.4	28.1	16.96	31	383	281	P	V
		2200	44.31	-9.69	54	30.25	28.1	16.96	31	383	281	A	V
		4874	43.54	-30.46	74	60.69	31.25	10.72	59.12	100	0	P	V
		7311	44.64	-29.36	74	54.12	36.52	12.56	58.56	100	0	P	V
		17955	60.57	-13.43	74	50.99	47.9	19.63	57.95	300	239	P	V
		17955	48.53	-5.47	54	38.95	47.9	19.63	57.95	300	239	A	V

802.11b CH 11 2462MHz		2300	60.34	-13.66	74	46.02	28.1	17.17	30.95	100	230	P	H
		2300	51.82	-2.18	54	37.5	28.1	17.17	30.95	100	230	A	H
		2310	57.4	-16.6	74	43.08	28.08	17.19	30.95	100	230	P	H
		2310	44.83	-9.17	54	30.51	28.08	17.19	30.95	100	230	A	H
		4924	46.18	-27.82	74	63.22	31.34	10.77	59.15	100	0	P	H
		7836	45.09	-28.91	74	53.7	36.44	12.85	57.9	100	0	P	H
		17985	60.78	-13.22	74	50.54	48.5	19.66	57.92	100	348	P	H
		17985	49.68	-4.32	54	39.44	48.5	19.66	57.92	100	348	A	H
		2300	57.93	-16.07	74	43.61	28.1	17.17	30.95	400	279	P	V
		2300	48.56	-5.44	54	34.24	28.1	17.17	30.95	400	279	A	V
		2310	55.17	-18.83	74	40.85	28.08	17.19	30.95	400	279	P	V
		2310	46.98	-7.02	54	32.66	28.08	17.19	30.95	400	279	A	V
		4924	44.95	-29.05	74	61.99	31.34	10.77	59.15	100	0	P	V
		7836	44.98	-29.02	74	53.59	36.44	12.85	57.9	100	0	P	V
		17970	59.43	-14.57	74	49.52	48.2	19.65	57.94	300	252	P	V
		17970	49.03	-4.97	54	39.12	48.2	19.65	57.94	300	252	A	V

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		2389.485	64.22	-9.78	74	50.03	27.76	17.35	30.92	111	242	P	H
		2389.8	50.35	-3.65	54	36.16	27.76	17.35	30.92	111	242	A	H
	*	2412	113.76	-	-	99.6	27.68	17.39	30.91	111	242	P	H
	*	2412	105.69	-	-	91.53	27.68	17.39	30.91	111	242	A	H
													H
													H
		2389.8	60.02	-13.98	74	45.83	27.76	17.35	30.92	315	276	P	V
		2389.905	47.41	-6.59	54	33.22	27.76	17.35	30.92	315	276	A	V
	*	2412	110.17	-	-	96.01	27.68	17.39	30.91	315	276	P	V
	*	2412	102.54	-	-	88.38	27.68	17.39	30.91	315	276	A	V
													V
													V
802.11g CH 02 2417MHz		2388.96	65.27	-8.73	74	51.07	27.77	17.35	30.92	313	241	P	H
		2389.8	51.42	-2.58	54	37.23	27.76	17.35	30.92	313	241	A	H
	*	2417	115.06	-	-	100.89	27.67	17.4	30.9	313	241	P	H
	*	2417	106.94	-	-	92.77	27.67	17.4	30.9	313	241	A	H
													H
													H
		2389.1	61.71	-12.29	74	47.51	27.77	17.35	30.92	354	279	P	V
		2389.94	48.46	-5.54	54	34.27	27.76	17.35	30.92	354	279	A	V
	*	2417	111.19	-	-	97.02	27.67	17.4	30.9	354	279	P	V
	*	2417	103.12	-	-	88.95	27.67	17.4	30.9	354	279	A	V
													V
													V

802.11g CH 06 2437MHz		2385.84	60.79	-13.21	74	46.59	27.78	17.34	30.92	307	244	P	H
		2389.36	49.53	-4.47	54	35.34	27.76	17.35	30.92	307	244	A	H
	*	2437	117.65	-	-	103.49	27.63	17.43	30.9	307	244	P	H
	*	2437	109.56	-	-	95.4	27.63	17.43	30.9	307	244	A	H
		2483.53	60.92	-13.08	74	46.75	27.53	17.52	30.88	307	244	P	H
		2483.98	48.36	-5.64	54	34.19	27.53	17.52	30.88	307	244	A	H
		2389.04	57.84	-16.16	74	43.64	27.77	17.35	30.92	390	287	P	V
		2389.84	46.46	-7.54	54	32.27	27.76	17.35	30.92	390	287	A	V
	*	2437	114.03	-	-	99.87	27.63	17.43	30.9	390	287	P	V
	*	2437	106.29	-	-	92.13	27.63	17.43	30.9	390	287	A	V
		2484.61	57.92	-16.08	74	43.75	27.53	17.52	30.88	390	287	P	V
		2484.16	46.01	-7.99	54	31.84	27.53	17.52	30.88	390	287	A	V
802.11g CH 10 2457MHz	*	2457	115.85	-	-	101.68	27.59	17.47	30.89	273	244	P	H
	*	2457	107.79	-	-	93.62	27.59	17.47	30.89	273	244	A	H
		2484.34	63.68	-10.32	74	49.51	27.53	17.52	30.88	273	244	P	H
		2483.56	51.9	-2.1	54	37.73	27.53	17.52	30.88	273	244	A	H
													H
													H
	*	2457	110.42	-	-	96.25	27.59	17.47	30.89	387	287	P	V
	*	2457	103.06	-	-	88.89	27.59	17.47	30.89	387	287	A	V
		2484.58	60.16	-13.84	74	45.99	27.53	17.52	30.88	387	287	P	V
		2483.56	48.61	-5.39	54	34.44	27.53	17.52	30.88	387	287	A	V
													V
													V

802.11g CH 11 2462MHz	*	2462	113.23	-	-	99.07	27.58	17.48	30.89	300	244	P	H
	*	2462	105.09	-	-	90.92	27.58	17.48	30.89	300	244	A	H
		2483.64	65.99	-8.01	74	51.82	27.53	17.52	30.88	300	244	P	H
		2483.64	52.12	-1.88	54	37.95	27.53	17.52	30.88	300	244	A	H
													H
													H
	*	2462	109.75	-	-	95.58	27.58	17.48	30.89	341	278	P	V
	*	2462	101.54	-	-	87.37	27.58	17.48	30.89	341	278	A	V
		2483.52	61.17	-12.83	74	47	27.53	17.52	30.88	341	278	P	V
		2483.52	48.42	-5.58	54	34.25	27.53	17.52	30.88	341	278	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	41.94	-32.06	74	59.11	31.25	10.67	59.09	100	0	P	H
		17955	60.6	-13.4	74	51.02	47.9	19.63	57.95	100	335	P	H
		17955	49.45	-4.55	54	39.87	47.9	19.63	57.95	100	335	A	H
													H
		4824	40.86	-33.14	74	58.03	31.25	10.67	59.09	100	0	P	V
		17970	59.81	-14.19	74	49.9	48.2	19.65	57.94	300	229	P	V
		17970	48.86	-5.14	54	38.95	48.2	19.65	57.94	300	229	A	V
													V
802.11g CH 06 2437MHz		2200	61.22	-12.78	74	47.16	28.1	16.96	31	300	237	P	H
		2200	51.34	-2.66	54	37.28	28.1	16.96	31	300	237	A	H
		4874	40.93	-33.07	74	58.08	31.25	10.72	59.12	100	0	P	H
		7311	45.14	-28.86	74	54.62	36.52	12.56	58.56	100	0	P	H
		17985	59.72	-14.28	74	49.48	48.5	19.66	57.92	100	355	P	H
		17985	50.55	-3.45	54	40.31	48.5	19.66	57.92	100	355	A	H
		2200	59.09	-14.91	74	45.03	28.1	16.96	31	386	280	P	V
		2200	49.22	-4.78	54	35.16	28.1	16.96	31	386	280	A	V
		4874	41.2	-32.8	74	58.35	31.25	10.72	59.12	100	0	P	V
		7311	46.14	-27.86	74	55.62	36.52	12.56	58.56	100	0	P	V
		17985	59.38	-14.62	74	49.14	48.5	19.66	57.92	300	241	P	V
		17985	50.38	-3.62	54	40.14	48.5	19.66	57.92	300	241	A	V

802.11g CH 11 2462MHz		2300	59.79	-14.21	74	45.47	28.1	7.25	30.95	308	241	P	H
		2300	49.38	-4.62	54	35.06	28.1	7.25	30.95	308	241	A	H
		2310	58.34	-15.66	74	44.02	28.08	7.27	30.95	308	241	P	H
		2310	49.22	-4.78	54	34.9	28.08	7.27	30.95	308	241	A	H
		4924	41.18	-32.82	74	58.22	31.34	10.23	59.15	100	0	P	H
		7386	43.86	-30.14	74	53.19	36.46	12.16	58.46	100	0	P	H
		17955	59.49	-14.51	74	49.91	47.9	18.98	57.95	100	350	P	H
		17955	49.21	-4.79	54	39.63	47.9	18.98	57.95	100	350	A	H
		2300	59	-15	74	44.68	28.1	7.25	30.95	390	286	P	V
		2300	47.63	-6.37	54	33.31	28.1	7.25	30.95	390	286	P	V
		2310	56.77	-17.23	74	42.45	28.08	7.27	30.95	390	286	P	V
		2310	47.48	-6.52	54	33.16	28.08	7.27	30.95	390	286	A	V
		4924	40.46	-33.54	74	57.5	31.34	10.23	59.15	100	0	P	V
		7386	44.06	-29.94	74	53.39	36.46	12.16	58.46	100	0	P	V
		17985	59.82	-14.18	74	49.58	48.5	19.01	57.92	300	251	P	V
		17985	49.27	-4.73	54	39.03	48.5	19.01	57.92	300	251	A	V

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)
		2389.695	66.06	-7.94	74	51.87	27.76	17.35	30.92	274	244	P	H
		2389.695	52.46	-1.54	54	38.27	27.76	17.35	30.92	274	244	A	H
	*	2412	114.69	-	-	100.53	27.68	17.39	30.91	274	244	P	H
	*	2412	106.72	-	-	92.56	27.68	17.39	30.91	274	244	A	H
802.11n													H
HT20													H
CH 01		2384.025	60.5	-13.5	74	46.28	27.8	17.34	30.92	392	280	P	V
2412MHz		2389.905	48.48	-5.52	54	34.29	27.76	17.35	30.92	392	280	A	V
	*	2412	109.82	-	-	95.66	27.68	17.39	30.91	392	280	P	V
	*	2412	102.17	-	-	88.01	27.68	17.39	30.91	392	280	A	V
													V
													V
		2384.76	66.86	-7.14	74	52.65	27.79	17.34	30.92	110	242	P	H
		2389.38	52.31	-1.69	54	38.12	27.76	17.35	30.92	110	242	A	H
	*	2417	114.31	-	-	100.14	27.67	17.4	30.9	110	242	P	H
	*	2417	106.46	-	-	92.29	27.67	17.4	30.9	110	242	A	H
802.11n													H
HT20													H
CH 02		2388.82	62.32	-11.68	74	48.13	27.77	17.34	30.92	358	280	P	V
2417MHz		2389.94	49.21	-4.79	54	35.02	27.76	17.35	30.92	358	280	A	V
	*	2417	110.78	-	-	96.61	27.67	17.4	30.9	358	280	P	V
	*	2417	102.58	-	-	88.41	27.67	17.4	30.9	358	280	A	V
													V
													V

		2388.88	61.17	-12.83	74	46.98	27.77	17.34	30.92	307	244	P	H
		2389.84	48.43	-5.57	54	34.24	27.76	17.35	30.92	307	244	A	H
	*	2437	116.09	-	-	101.93	27.63	17.43	30.9	307	244	P	H
	*	2437	107.86	-	-	93.7	27.63	17.43	30.9	307	244	A	H
802.11n		2485.15	60.67	-13.33	74	46.5	27.53	17.52	30.88	307	244	P	H
HT20		2483.89	47.8	-6.2	54	33.63	27.53	17.52	30.88	307	244	A	H
CH 06		2389.52	57.56	-16.44	74	43.37	27.76	17.35	30.92	387	290	P	V
2437MHz		2389.04	45.85	-8.15	54	31.65	27.77	17.35	30.92	387	290	A	V
	*	2437	112.05	-	-	97.89	27.63	17.43	30.9	387	290	P	V
	*	2437	104.32	-	-	90.16	27.63	17.43	30.9	387	290	A	V
		2483.98	57.62	-16.38	74	43.45	27.53	17.52	30.88	387	290	P	V
		2483.53	45.98	-8.02	54	31.81	27.53	17.52	30.88	387	290	A	V
	*	2457	114.84	-	-	100.67	27.59	17.47	30.89	100	242	P	H
	*	2457	107.06	-	-	92.89	27.59	17.47	30.89	100	242	A	H
		2484.28	70.63	-3.37	74	56.46	27.53	17.52	30.88	100	242	P	H
		2483.5	49.88	-4.12	54	35.71	27.53	17.52	30.88	100	242	A	H
802.11n													H
HT20													H
CH 10	*	2457	111.35	-	-	97.18	27.59	17.47	30.89	386	283	P	V
2457MHz	*	2457	104.09	-	-	89.92	27.59	17.47	30.89	386	283	A	V
		2484.82	64.87	-9.13	74	50.7	27.53	17.52	30.88	386	283	P	V
		2483.62	48.59	-5.41	54	34.42	27.53	17.52	30.88	386	283	A	V
													V
													V

	*	2462	112.23	-	-	98.06	27.58	17.48	30.89	300	243	P	H
	*	2462	104.19	-	-	90.02	27.58	17.48	30.89	300	243	A	H
		2483.84	68.61	-5.39	74	54.44	27.53	17.52	30.88	300	243	P	H
		2483.5	52.02	-1.98	54	37.85	27.53	17.52	30.88	300	243	A	H
802.11n													H
HT20													H
CH 11	*	2462	108.7	-	-	94.53	27.58	17.48	30.89	376	265	P	V
2462MHz	*	2462	100.69	-	-	86.52	27.58	17.48	30.89	376	265	A	V
		2483.6	65.46	-8.54	74	51.29	27.53	17.52	30.88	376	265	P	V
		2483.5	49.04	-4.96	54	34.87	27.53	17.52	30.88	376	265	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)
		4824	42.05	-31.95	74	59.22	31.25	10.67	59.09	100	0	P	H
		17985	59.9	-14.1	74	49.66	48.5	19.66	57.92	100	357	P	H
802.11n		17985	49.18	-4.82	54	38.94	48.5	19.66	57.92	100	357	A	H
HT20													H
CH 01		4824	41.61	-32.39	74	58.78	31.25	10.67	59.09	100	0	P	V
2412MHz		17970	58.93	-15.07	74	49.02	48.2	19.65	57.94	300	225	P	V
		17970	49.39	-4.61	54	39.48	48.2	19.65	57.94	300	225	A	V
													V
		2200	59.46	-14.54	74	45.4	28.1	16.96	31	344	241	P	H
		2200	50.07	-3.93	54	36.01	28.1	16.96	31	344	241	A	H
		4874	41.47	-32.53	74	58.62	31.25	10.72	59.12	100	0	P	H
		7311	45.94	-28.06	74	55.42	36.52	12.56	58.56	100	0	P	H
802.11n		17985	59.9	-14.1	74	49.66	48.5	19.66	57.92	100	350	P	H
HT20		17985	49.18	-4.82	54	38.94	48.5	19.66	57.92	100	350	A	H
CH 06		2200	59.2	-14.8	74	45.14	28.1	16.96	31	383	280	P	V
2437MHz		2200	48.41	-5.59	54	34.35	28.1	16.96	31	383	280	A	V
		4874	41.5	-32.5	74	58.65	31.25	10.72	59.12	100	0	P	V
		7311	45.04	-28.96	74	54.52	36.52	12.56	58.56	100	0	P	V
		17925	58.11	-15.89	74	49.2	47.3	19.6	57.99	300	235	P	V
		17925	48.67	-5.33	54	39.76	47.3	19.6	57.99	300	235	A	V

		2300	59.91	-14.09	74	45.59	28.1	17.17	30.95	300	238	P	H
		2300	48.86	-5.14	54	34.54	28.1	17.17	30.95	300	238	A	H
		2310	59.82	-14.18	74	45.5	28.08	17.19	30.95	300	238	P	H
		2310	48.52	-5.48	54	34.2	28.08	17.19	30.95	300	238	A	H
		4924	42.62	-31.38	74	59.66	31.34	10.77	59.15	100	0	P	H
		7386	44.72	-29.28	74	54.05	36.46	12.67	58.46	100	0	P	H
802.11n		17955	59.79	-14.21	74	50.21	47.9	19.63	57.95	100	353	P	H
HT20		17955	49.35	-4.65	54	39.77	47.9	19.63	57.95	100	353	A	H
CH 11		2300	58.71	-15.29	74	44.39	28.1	17.17	30.95	387	277	P	V
2462MHz		2300	47.06	-6.94	54	32.74	28.1	17.17	30.95	387	277	A	V
		2310	58.31	-15.69	74	43.99	28.08	17.19	30.95	387	277	P	V
		2310	46.69	-7.31	54	32.37	28.08	17.19	30.95	387	277	A	V
		4924	41.17	-32.83	74	58.21	31.34	10.77	59.15	100	0	P	V
		7386	44.62	-29.38	74	53.95	36.46	12.67	58.46	100	0	P	V
		17955	59.91	-14.09	74	50.33	47.9	19.63	57.95	300	261	P	V
		17955	49.1	-4.9	54	39.52	47.9	19.63	57.95	300	261	A	V

Emission above 18GHz

2.4GHz WIFI 802.11b (SHF)

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 802.11b SHF		19890	39.09	-34.91	74	43.84	37.78	11.34	53.87	150	0	P	H
													H
													H
													H
		20954	40.38	-33.62	74	43.38	38.36	12.05	53.41	150	0	P	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11b (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 802.11b LF		71.71	33.38	-6.62	40	52.21	12.65	1.11	32.59	100	0	P	H
		185.2	36.4	-7.1	43.5	51.8	15.06	1.92	32.38	-	-	P	H
		259.89	36.62	-9.38	46	47.13	19.64	2.28	32.43	-	-	P	H
		334.58	33.89	-12.11	46	44.09	19.76	2.5	32.46	-	-	P	H
		368.53	32.78	-13.22	46	41.9	20.59	2.62	32.33	-	-	P	H
		900.09	38.54	-7.46	46	37.64	28.56	4.3	31.96	-	-	P	H
													H
													H
													H
													H
													H
													H
		71.71	23.8	-16.2	40	42.63	12.65	1.11	32.59	-	-	P	V
		185.2	27.58	-15.92	43.5	42.98	15.06	1.92	32.38	-	-	P	V
		259.89	25.62	-20.38	46	36.13	19.64	2.28	32.43	-	-	P	V
		333.61	24.83	-21.17	46	35.06	19.74	2.5	32.47	-	-	P	V
		408.3	29.5	-16.5	46	36.82	22.13	2.76	32.21	-	-	P	V
		899.12	38.76	-7.24	46	37.86	28.56	4.3	31.96	100	0	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

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

- For average measurement: Reporting Read Level (dBμV) has already added the duty factor offset. The factor please refers to appendix E.

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

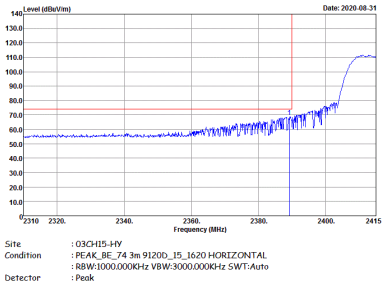
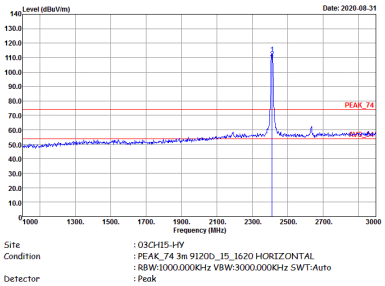
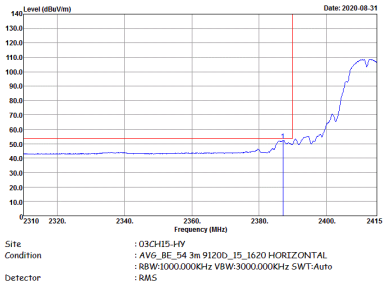
Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	**Temperature :**	21.8~22.6°C
		Relative Humidity :	47~61%

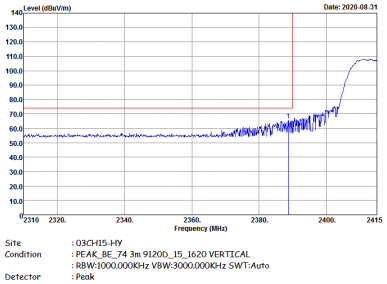
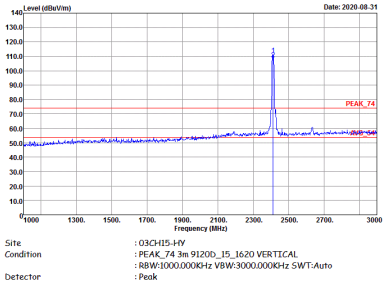
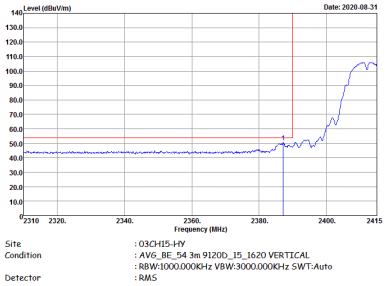
Note symbol

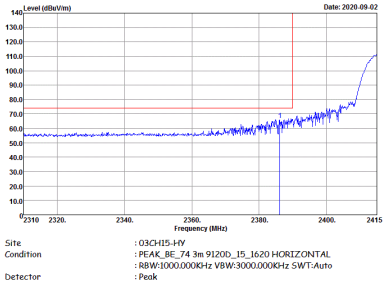
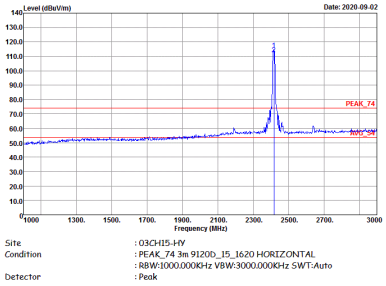
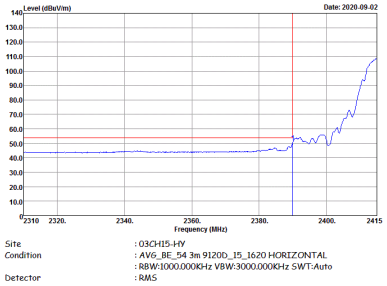
-L	**Low channel location**
-R	**High channel location**

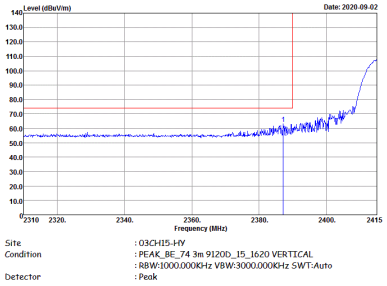
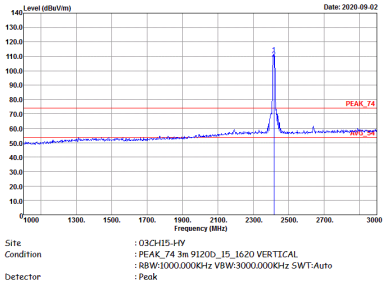
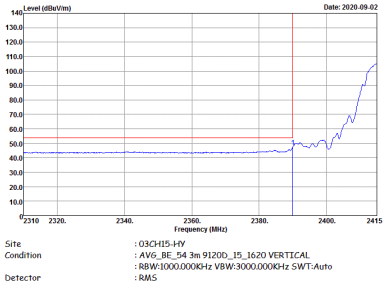
2.4GHz 2400~2483.5MHz

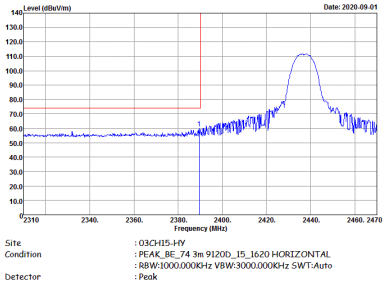
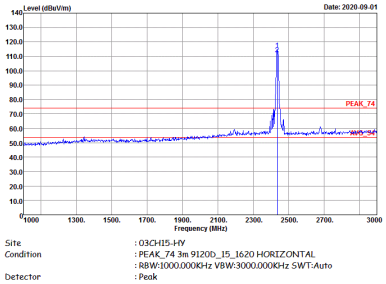
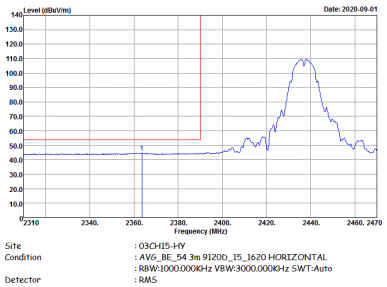
WIFI 802.11b (Band Edge @ 3m)

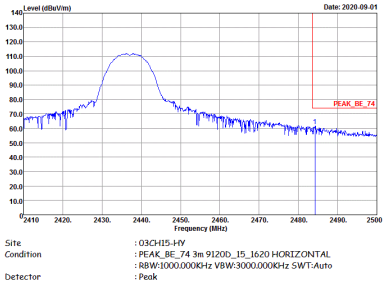
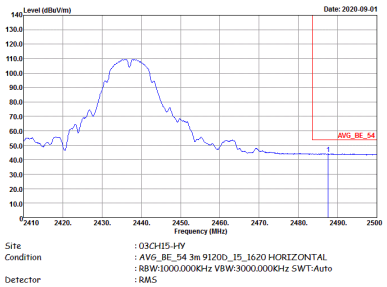
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

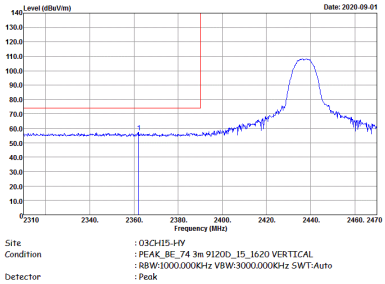
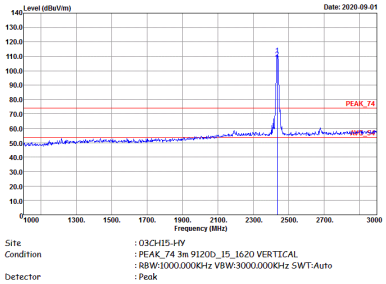
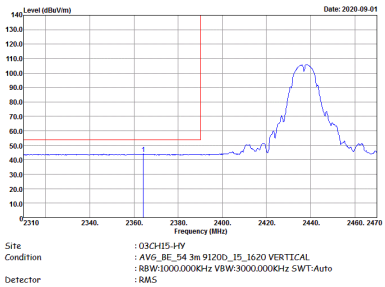
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

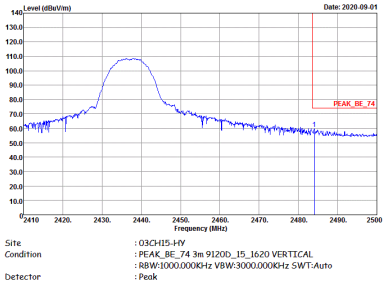
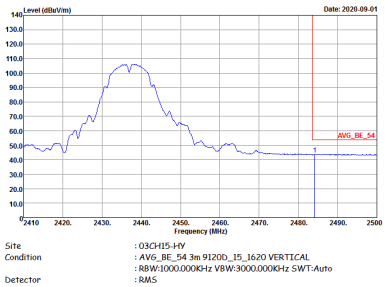
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH02 2417MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

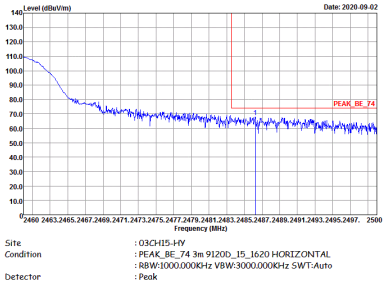
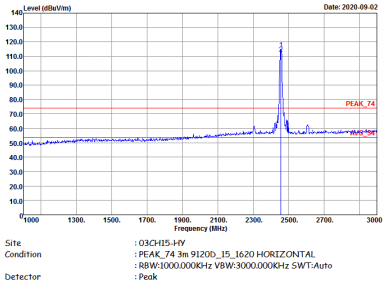
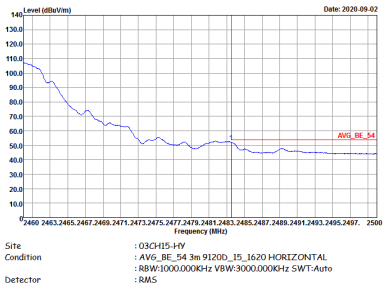
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH02 2417MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

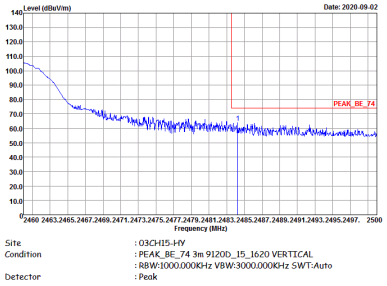
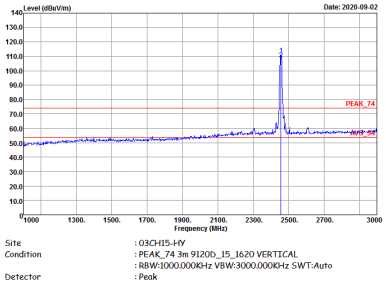
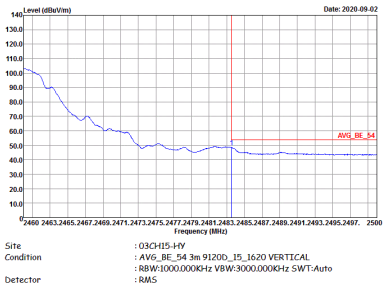
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

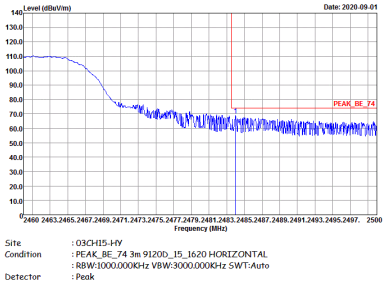
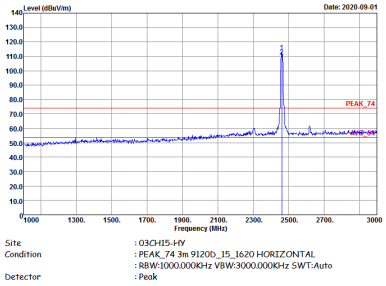
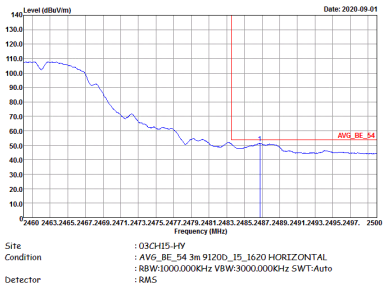
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

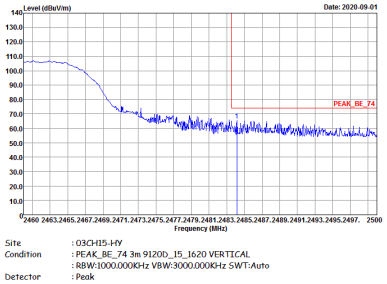
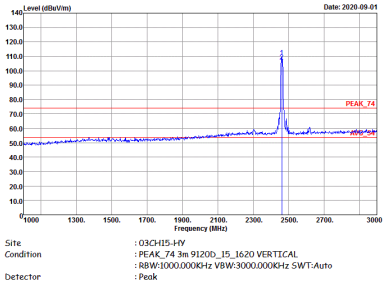
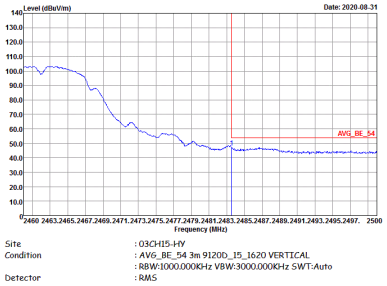
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

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 CH10 2457MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

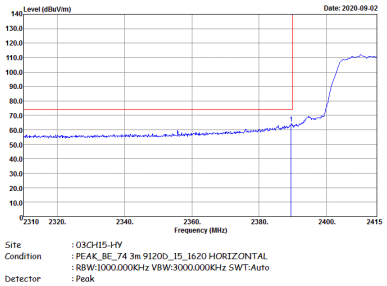
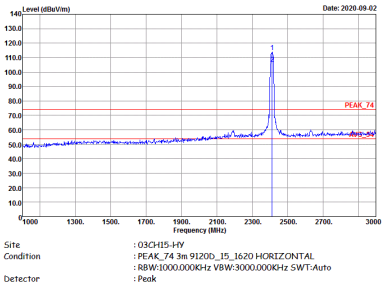
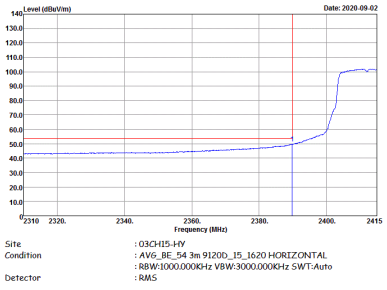
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH10 2457MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

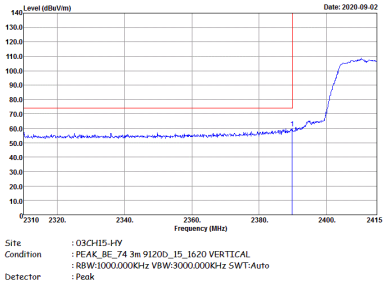
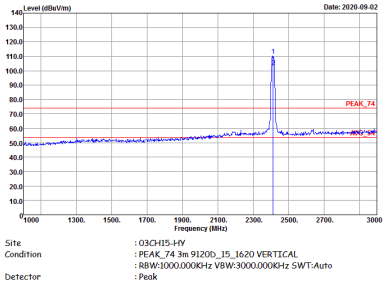
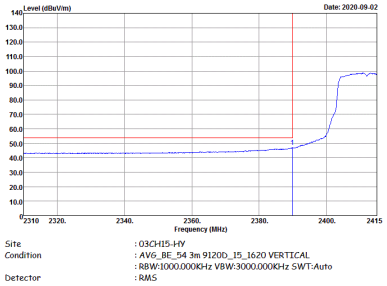
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

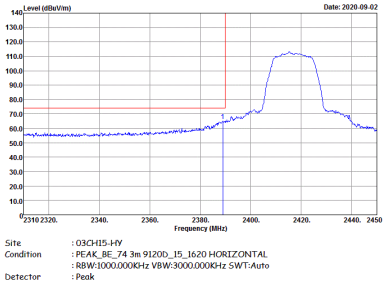
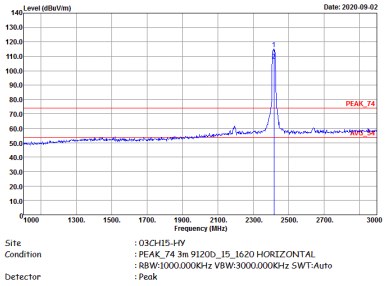
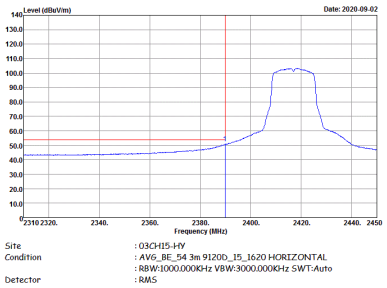
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

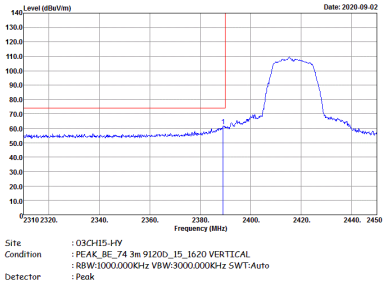
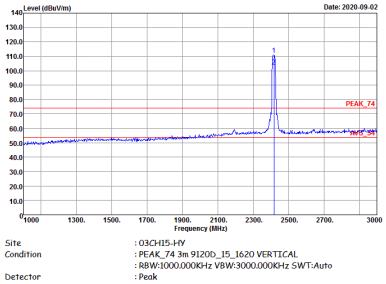
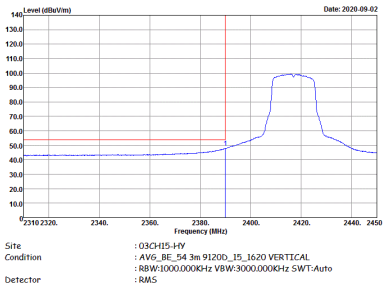
2.4GHz 2400~2483.5MHz

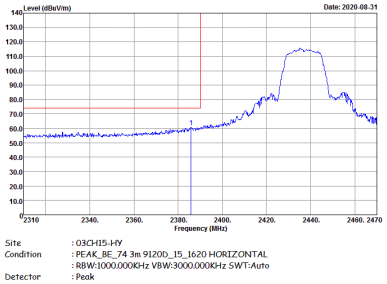
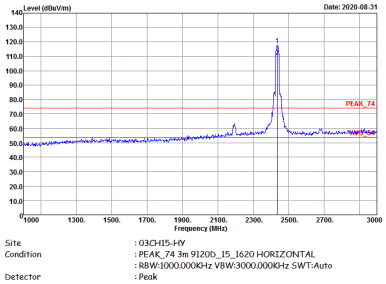
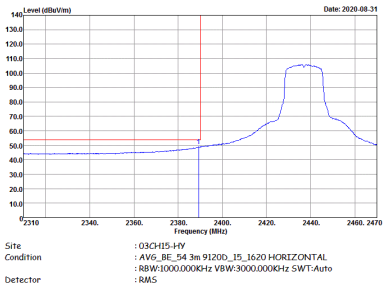
WIFI 802.11g (Band Edge @ 3m)

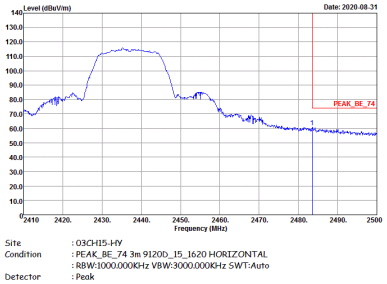
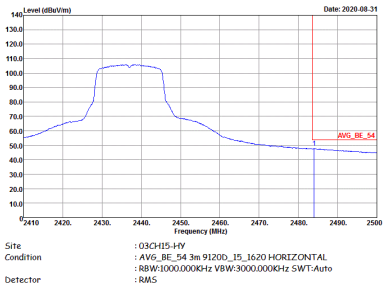
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

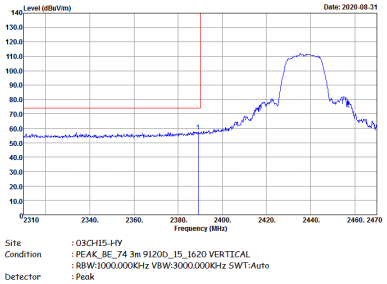
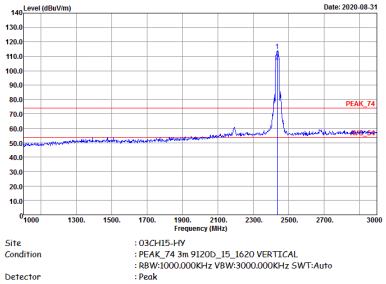
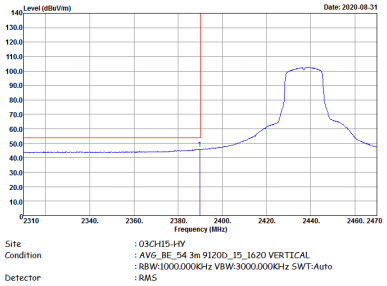
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

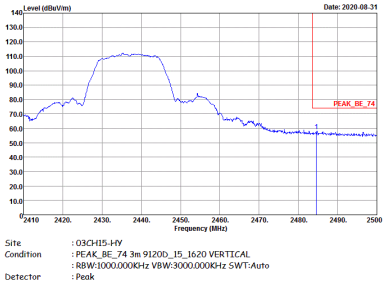
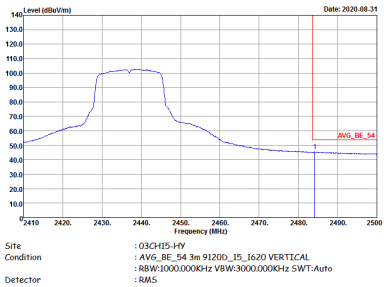
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

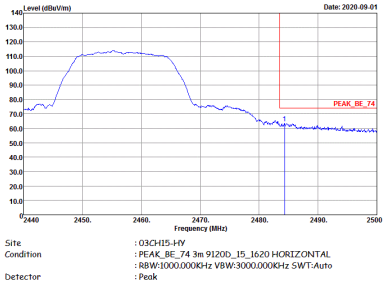
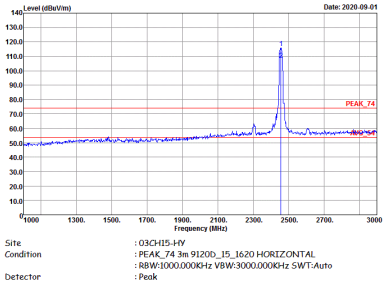
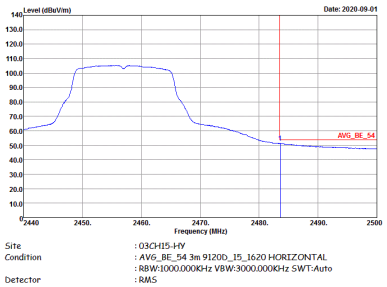
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

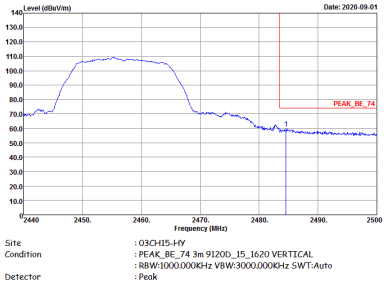
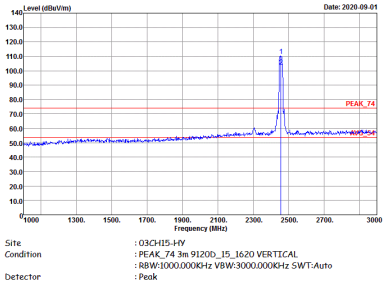
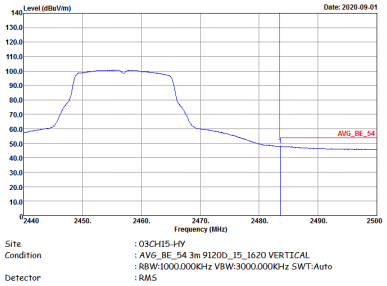
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left blank

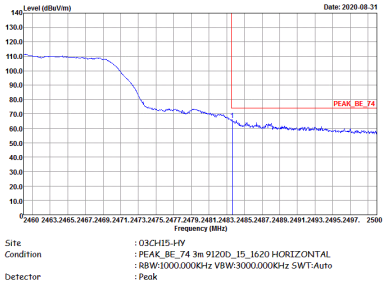
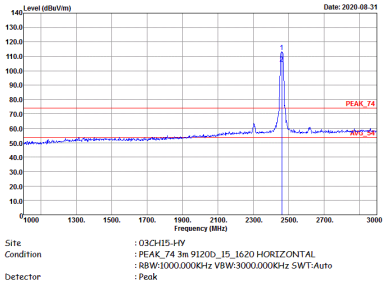
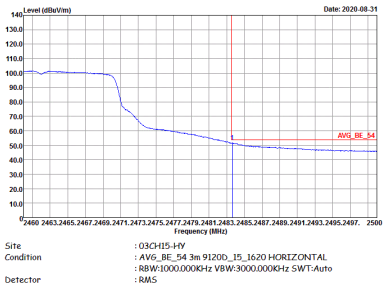
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

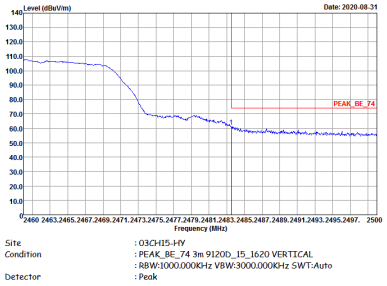
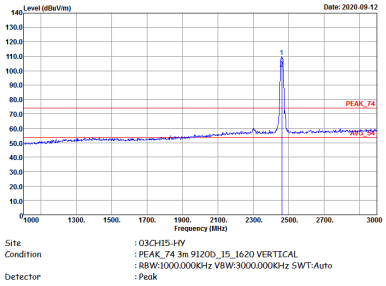
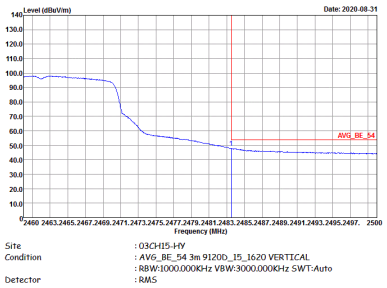
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left blank

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

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

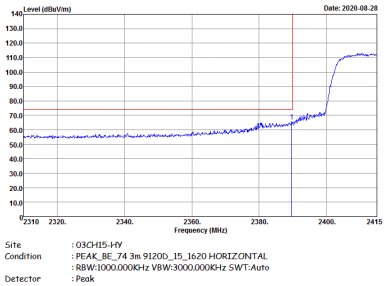
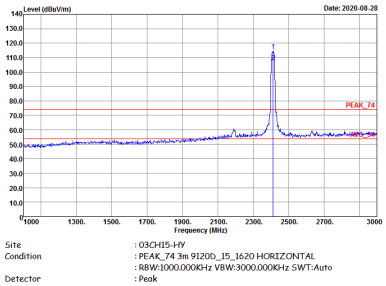
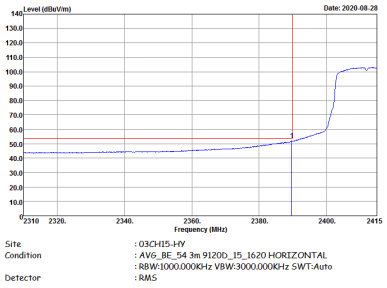
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

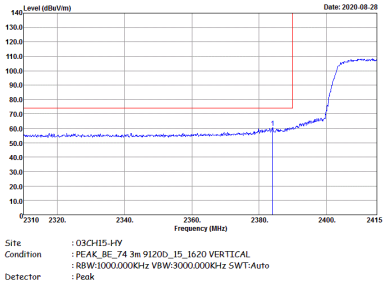
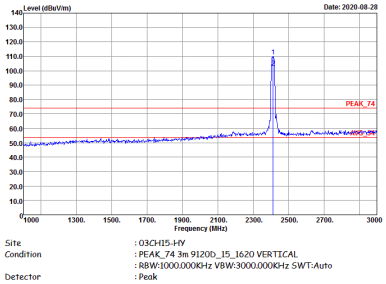
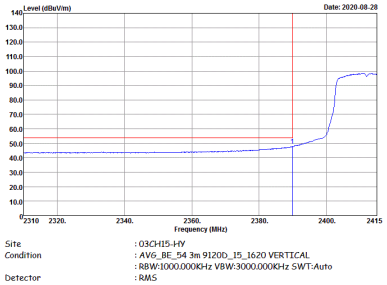
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

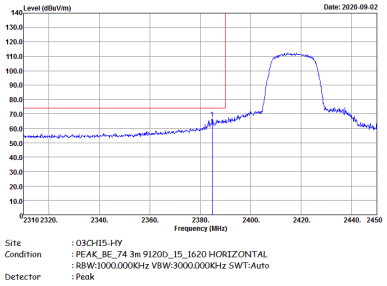
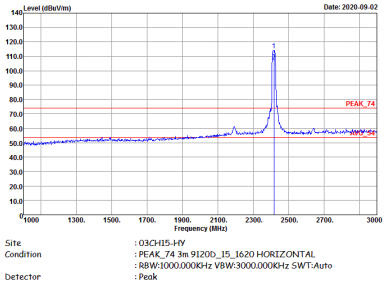
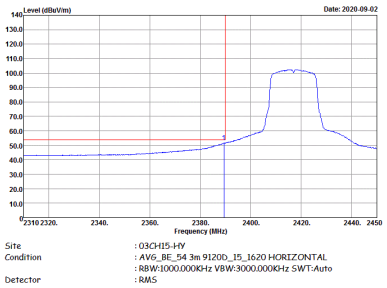
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

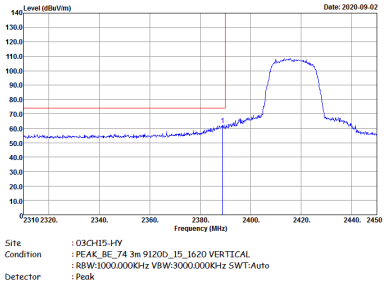
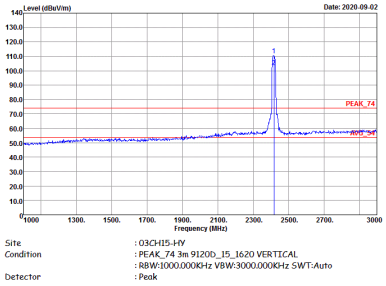
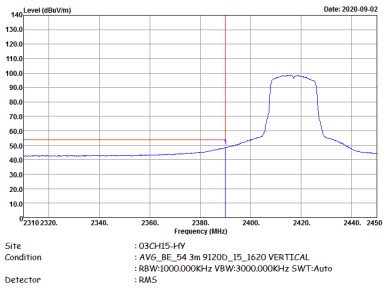
2.4GHz 2400~2483.5MHz

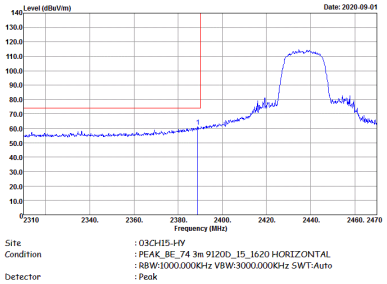
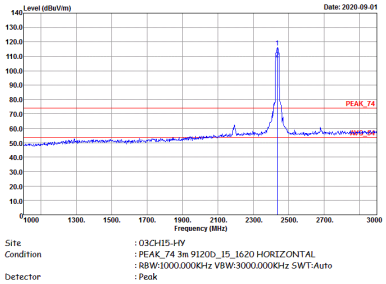
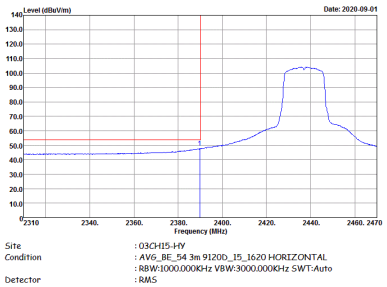
WIFI 802.11n HT20 (Band Edge @ 3m)

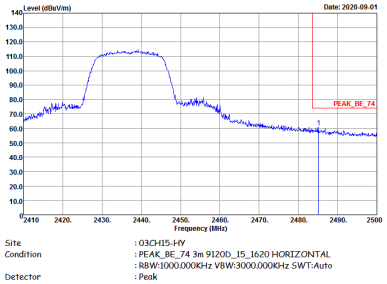
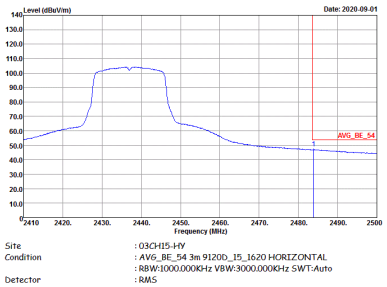
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

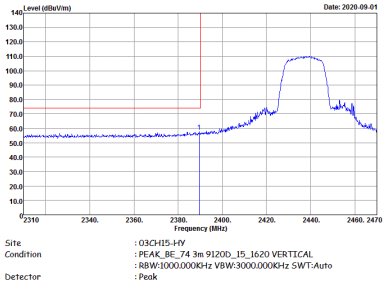
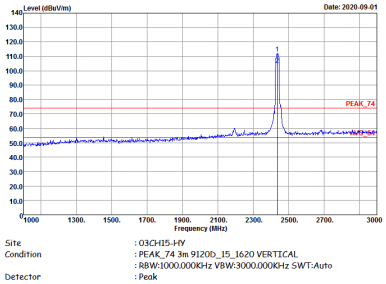
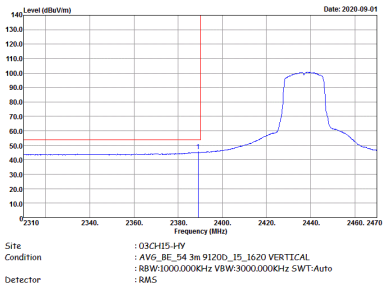
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

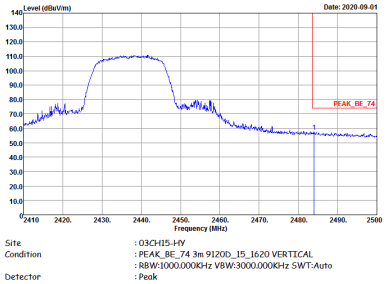
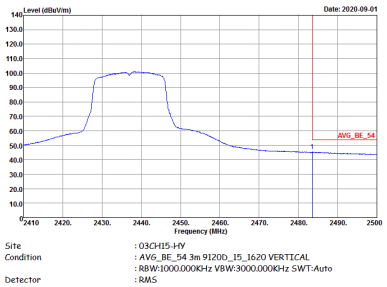
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH02 2417MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

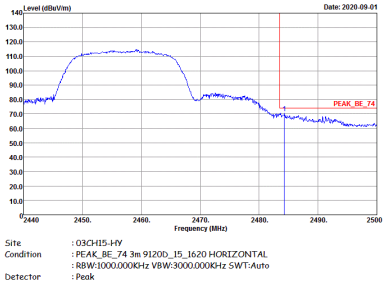
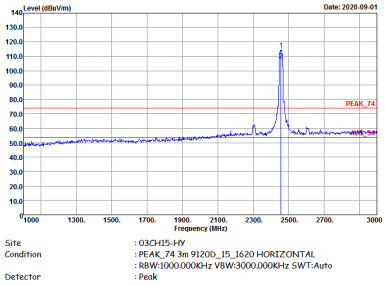
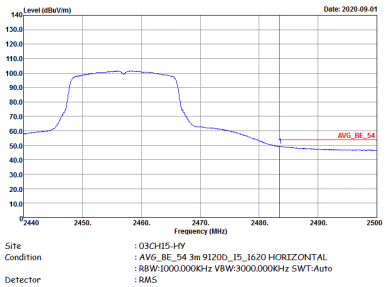
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH02 2417MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

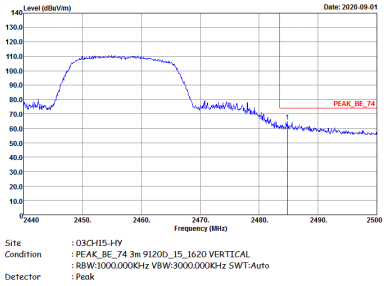
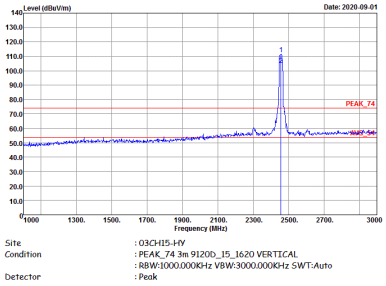
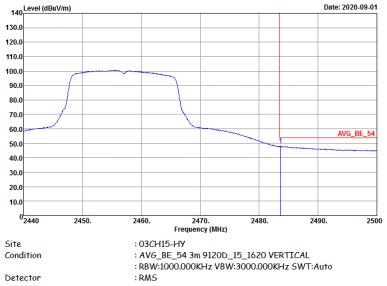
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

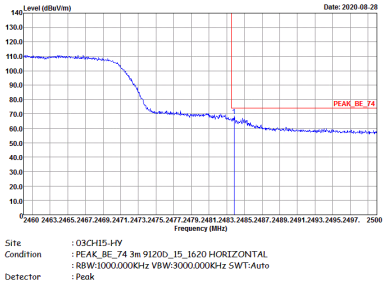
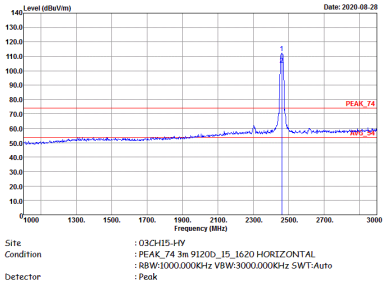
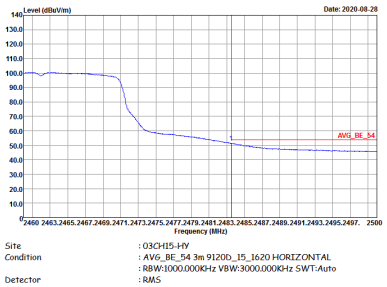
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

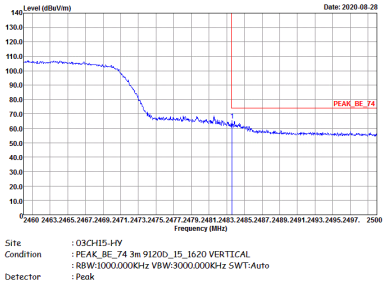
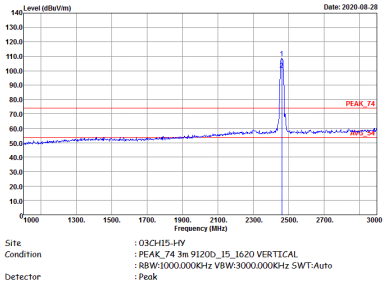
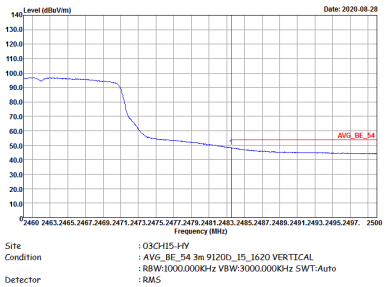
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

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

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH10 2457MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_15_1620 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 9120D_15_1620 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : RMS	Left Blank

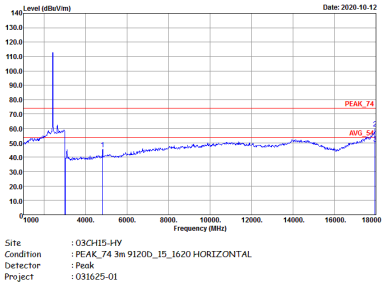
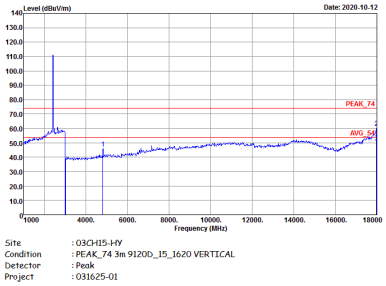
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH10 2457MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

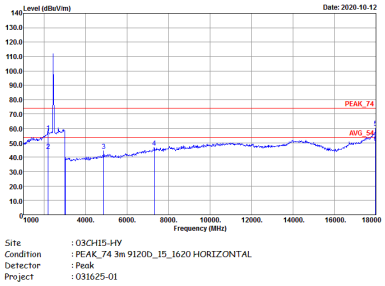
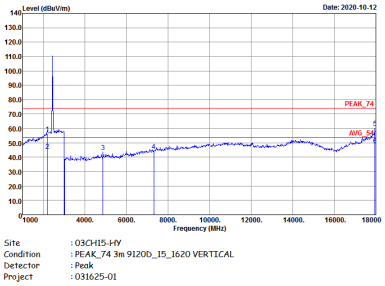
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak		
Avg.		Left Blank

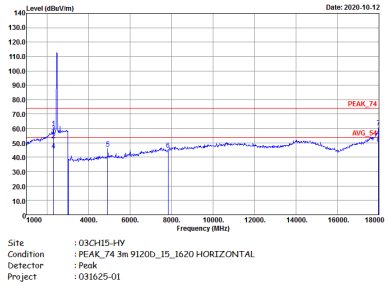
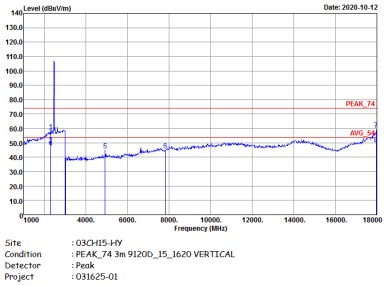
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak		
Avg.		Left Blank

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

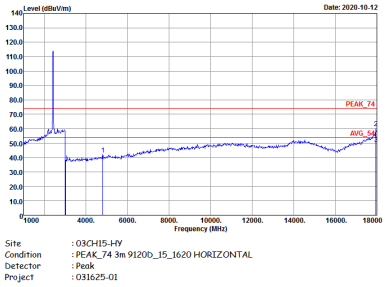
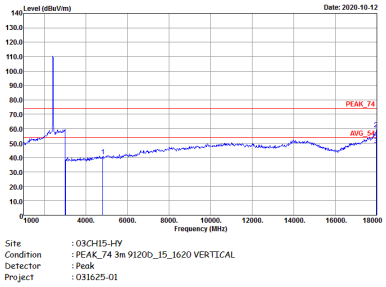
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

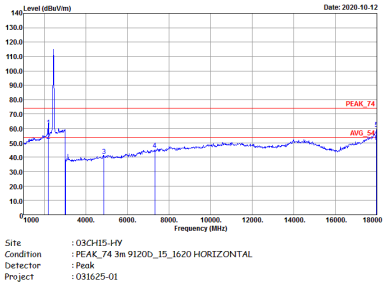
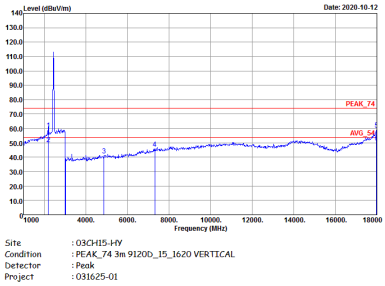
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 HORIZONTAL Detector : Peak Project : 031625-01	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 031625-01

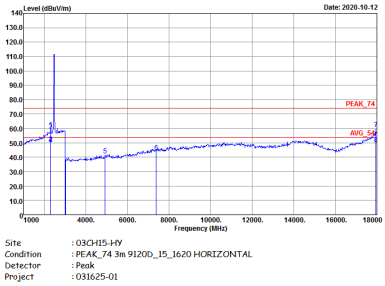
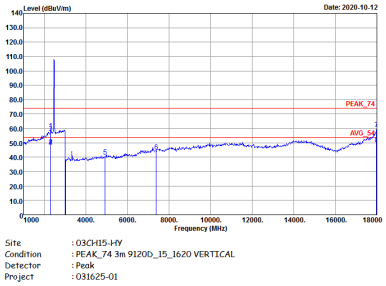
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

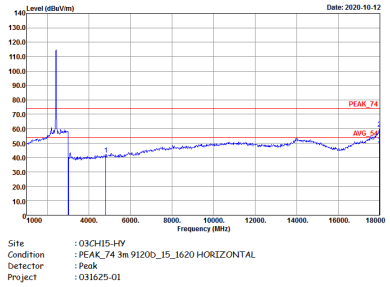
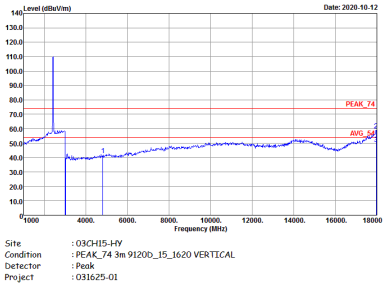
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

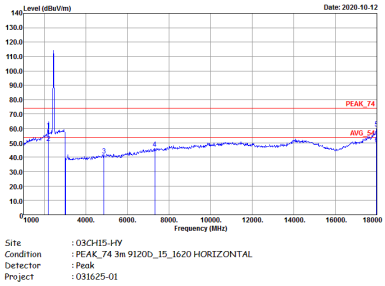
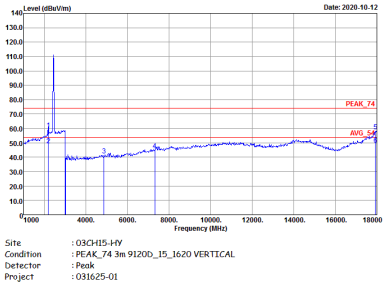
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 HORIZONTAL Detector : Peak Project : 031625-01	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 031625-01

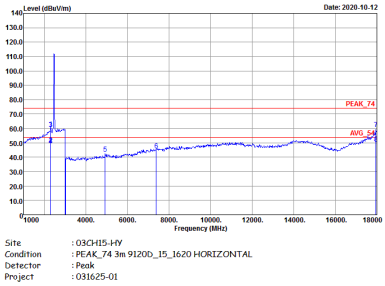
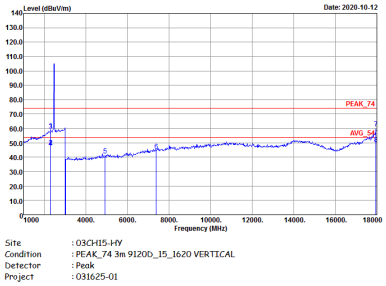
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

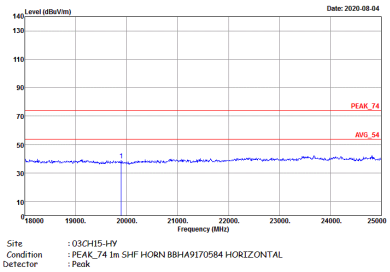
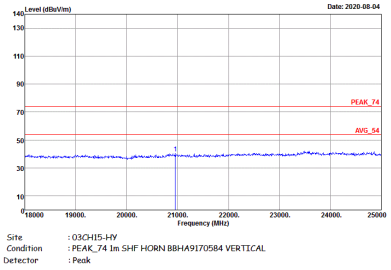
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.		

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 9120D_15_1620 HORIZONTAL Detector : Peak Project : 031625-01	 Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 031625-01

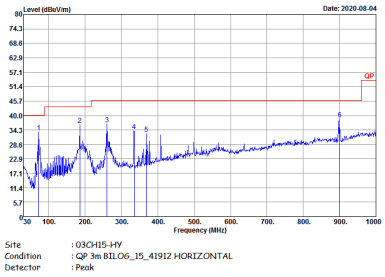
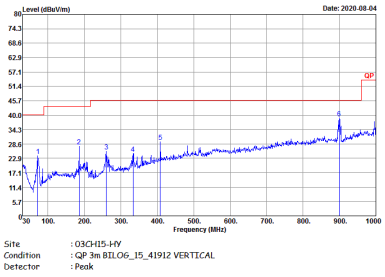
Emission above 18GHz

2.4GHz WIFI 802.11b (SHF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11b SHF	
1	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

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

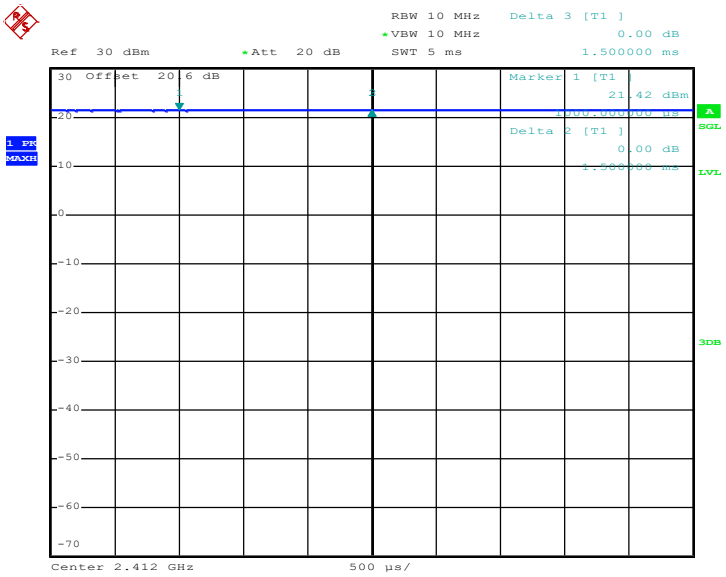
Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1	802.11b	100.00	-	-	10Hz	0.00
1	802.11g	93.18	1435	0.70	1kHz	0.62
1	2.4GHz 802.11n HT20	92.07	1335	0.75	1kHz	0.72

Remark: Duty factor is 20 log(1/d), where d is the duty cycle.

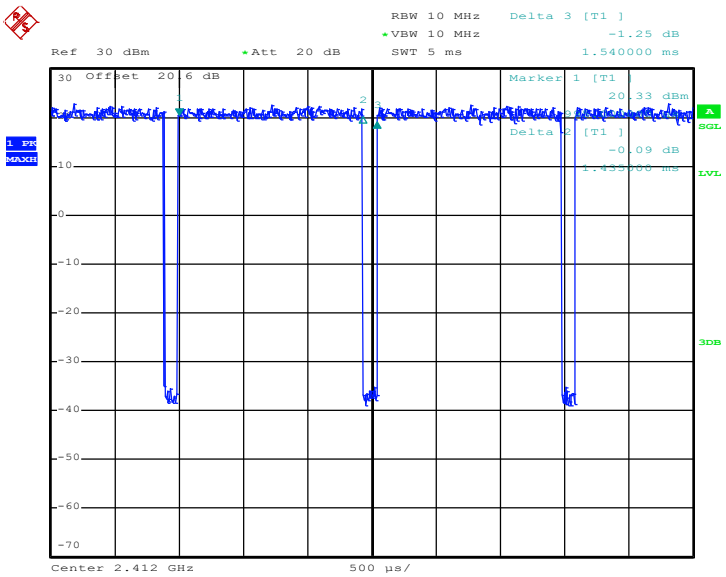
<Ant. 1>

802.11b



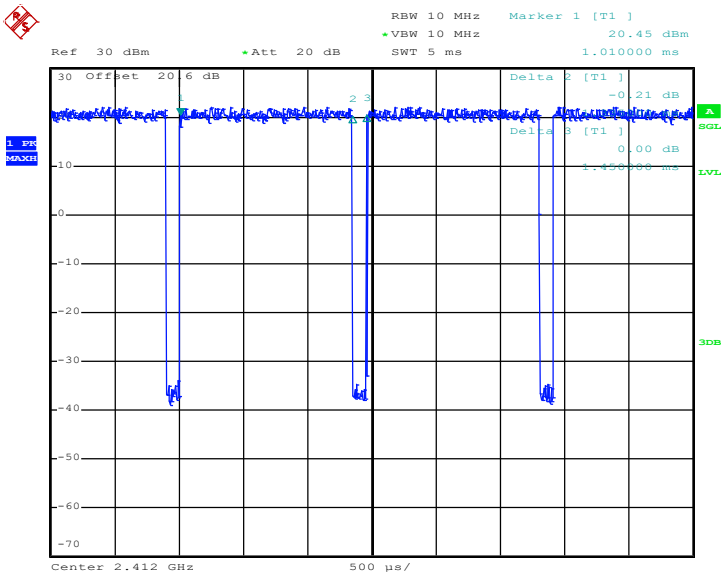
Date: 17.JUL.2020 10:24:53

802.11g



Date: 17.JUL.2020 10:52:52

802.11n HT20



Date: 17.JUL.2020 11:00:11

THE END