



FCC RADIO TEST REPORT

FCC ID : A4R-H2D
Equipment : Interactive internet streaming device
Model Name : H2D
Applicant : Google LLC
1600 Amphitheatre Parkway,
Mountain View, California, 94043 USA
Standard : FCC Part 15 Subpart C §15.247

The product was received on Jun. 05, 2019 and testing was started from Jun. 18, 2019 and completed on Aug. 20, 2019. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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



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History of this test report

Report No.	Version	Description	Issued Date
FR960558C	01	Initial issue of report	Aug. 13, 2019
FR960558C	02	1. Revise the accessory mobile FCC ID 2. Revise test plot of worst case power density 3. Update test data of Conducted Band edge	Aug. 21, 2019
FR960558C	03	1. Revise the description of EUT supported radio to 802.15.4. 2. Revised Connection Diagram of Test System config.	Sep. 20, 2019

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	-
0	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 1.51 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 4.04 dB at 0.618 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: Ann Lee

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Interactive internet streaming device
Model Name	H2D
FCC ID	A4R-H2D
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE 802.15.4
EUT Stage	Identical Prototype

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

EUT Information List	
No.	S/N
#1	96040EXANZZ144
#2	96030EXANZZ0X0
#3	96050EXANZZ2T3

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	MIMO <Ant. 1+2> 802.11b : 28.18 dBm (0.6577 W) 802.11g : 27.72 dBm (0.5916 W) 802.11n HT20 : 26.82 dBm (0.4808 W) 802.11n HT40 : 19.57 dBm (0.0906 W) 802.11 ac VHT20 : 26.72 dBm (0.5916 W) 802.11 ac VHT40 : 19.47 dBm (0.0885 W)								
Antenna Type / Gain	<Ant. 1>PIFA Antenna type with gain 3.01 dBi <Ant. 2>PIFA Antenna type with gain 3.82 dBi								
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)								
Antenna Function for Transmitter	<table><tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr><tr><td>802.11 b/g/n/ac MIMO</td><td>V</td><td>V</td></tr></table>				Ant. 1	Ant. 2	802.11 b/g/n/ac MIMO	V	V
	Ant. 1	Ant. 2							
802.11 b/g/n/ac MIMO	V	V							

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

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.	
	03CH12-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.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).
- 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.

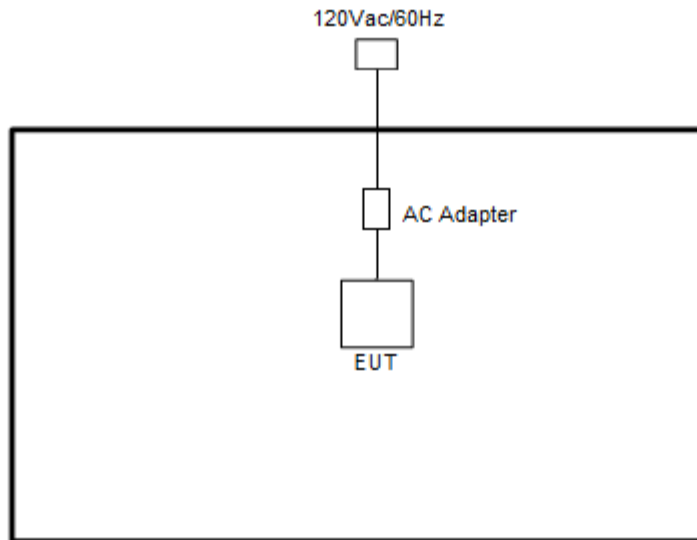
MIMO Mode

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20 (Covered by HT20)	MCS0
802.11ac VHT40 (Covered by HT40)	MCS0

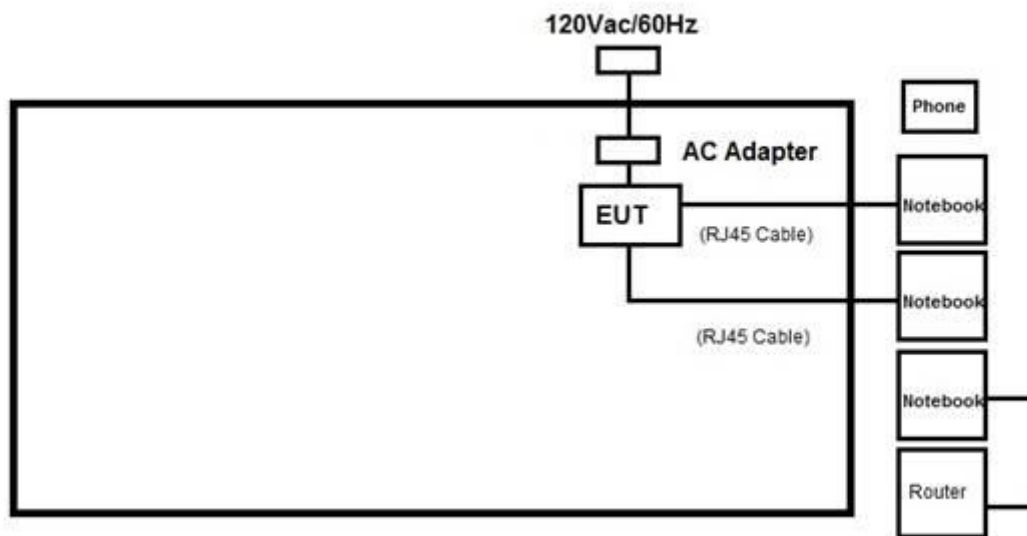
Test Cases	
AC Conducted Emission	Mode 1 :WLAN (2.4GHz) Link + WLAN (5GHz) Link + Bluetooth Link + 802.15.4 Link + Wan Link + Lan Link + AC Adapter 1

2.3 Connection Diagram of Test System

<WLAN TX Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Mobile Phone	Apple	A1687	BCG-E2944A	N/A	N/A
5.	Router	N/A	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT4_ 4.0.00064" 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.

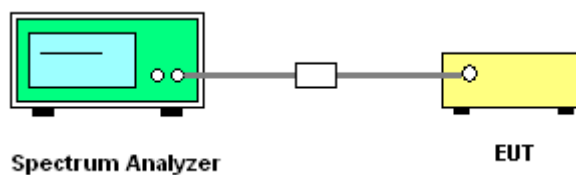
3.1.2 Measuring Instruments

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) $\geq 3 * RBW$.
6. Measure and record the results in the test report.

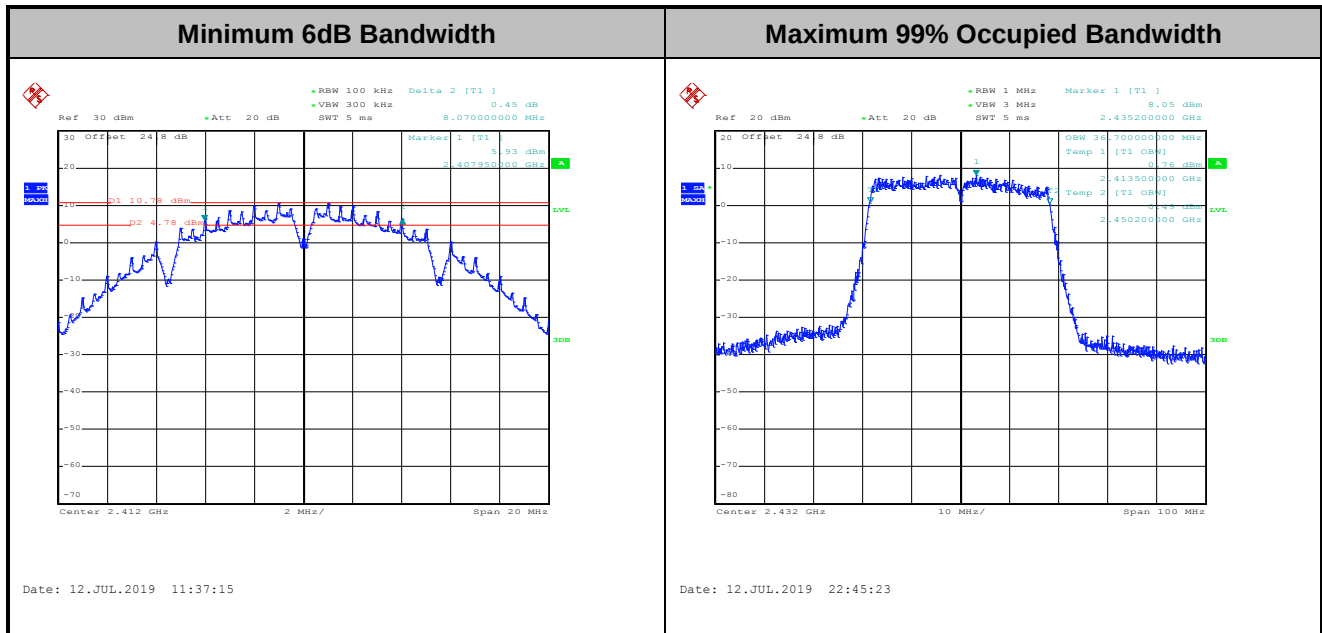
3.1.4 Test Setup





3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.



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

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the 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.

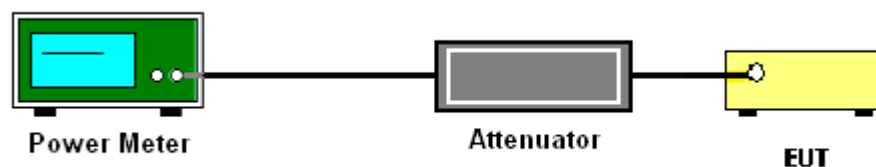
3.2.2 Measuring Instruments

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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

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.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

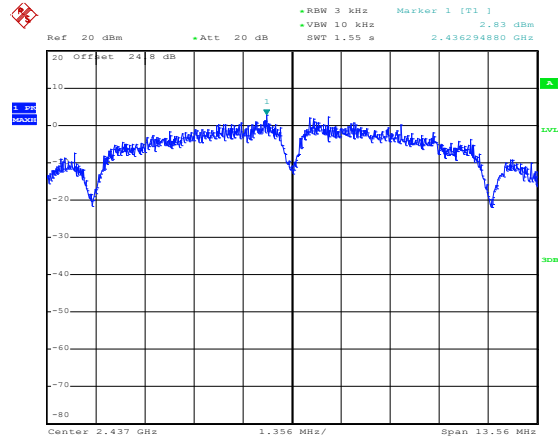
Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)



3.3.4 Test Result of Power Spectral Density

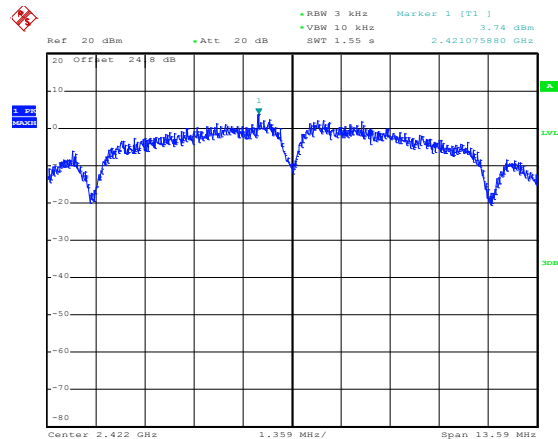
Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz) for MIMO Ant. 1



Date: 12.JUL.2019 12:12:45

Worst Case Power Density (dBm/3kHz) for MIMO Ant. 2



Date: 12.JUL.2019 12:06:13

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.

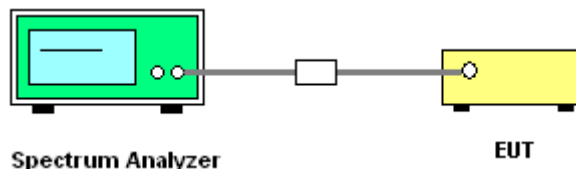
3.4.2 Measuring Instruments

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



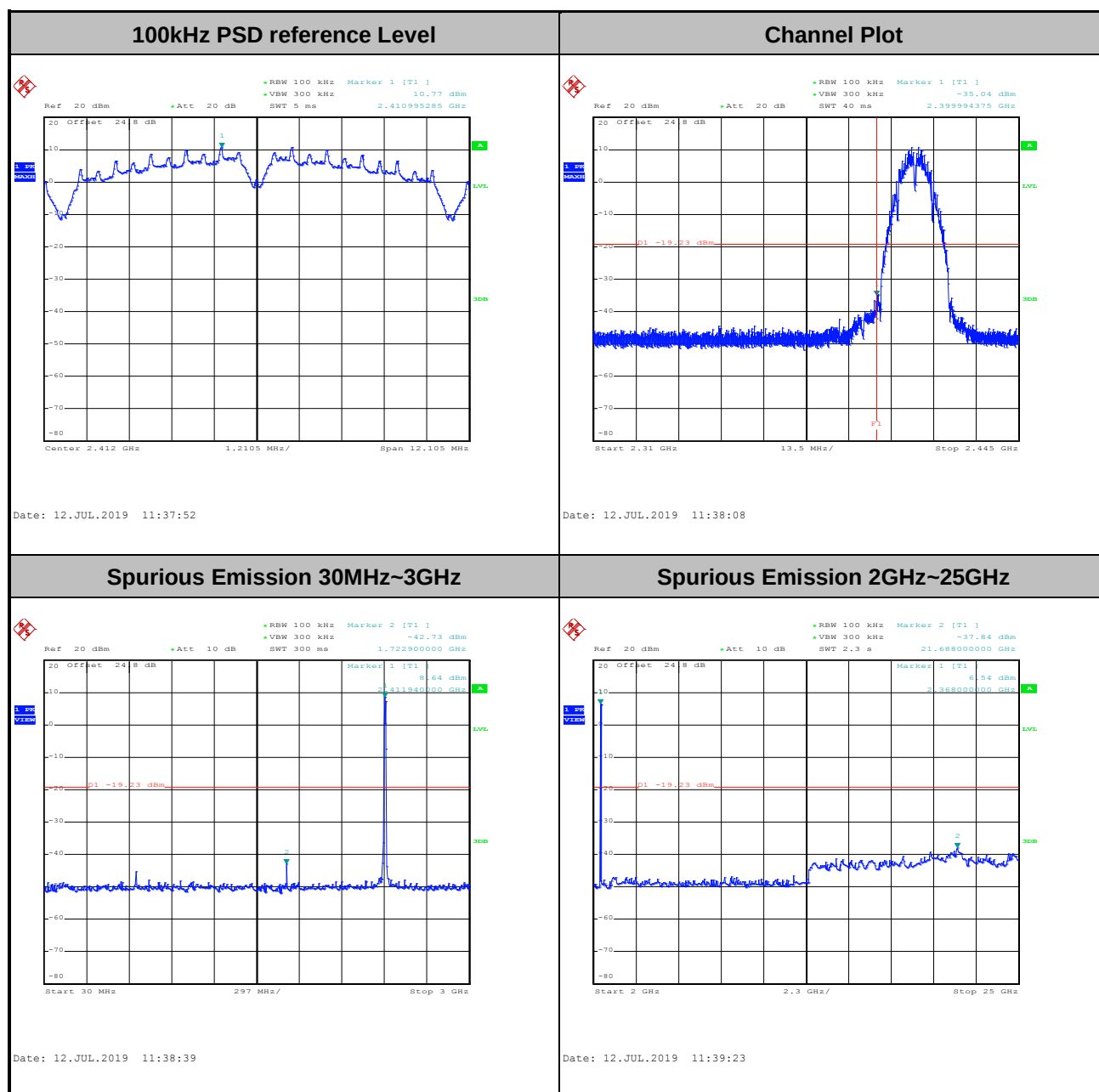


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Richard Qiu and Luffy Lin	Temperature :	21~25°C
		Relative Humidity :	51~54%

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

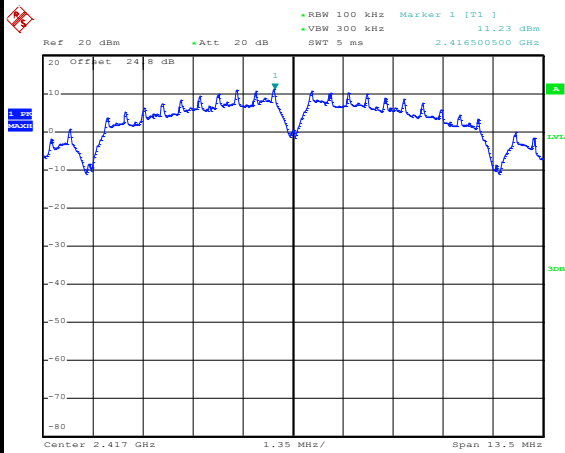
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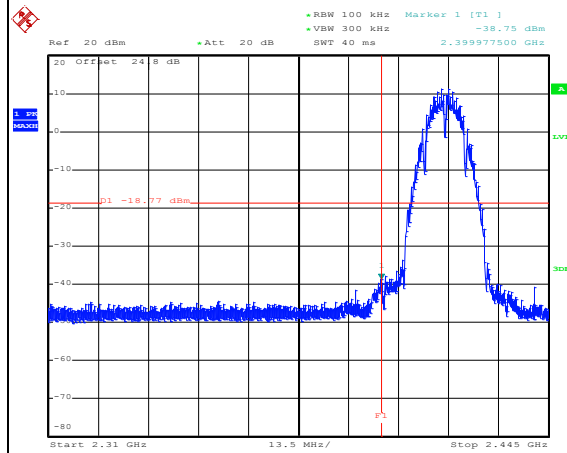
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100kHz PSD reference Level



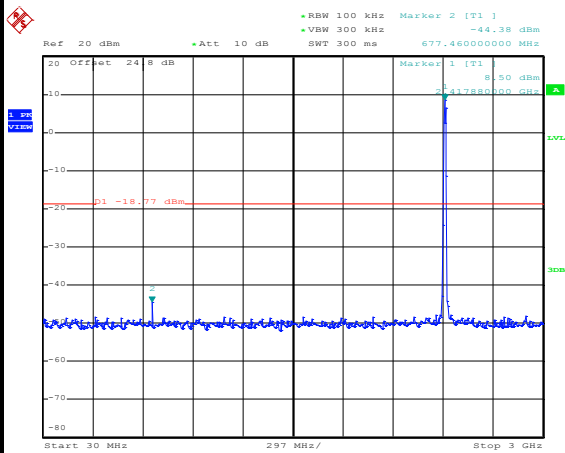
Date: 12.JUL.2019 11:59:22

Channel Plot



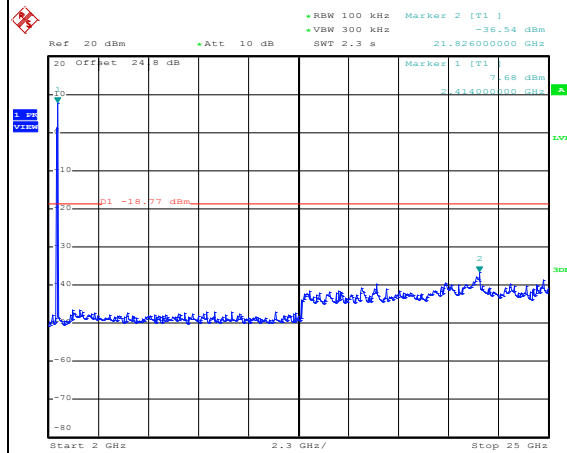
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Spurious Emission 30MHz~3GHz

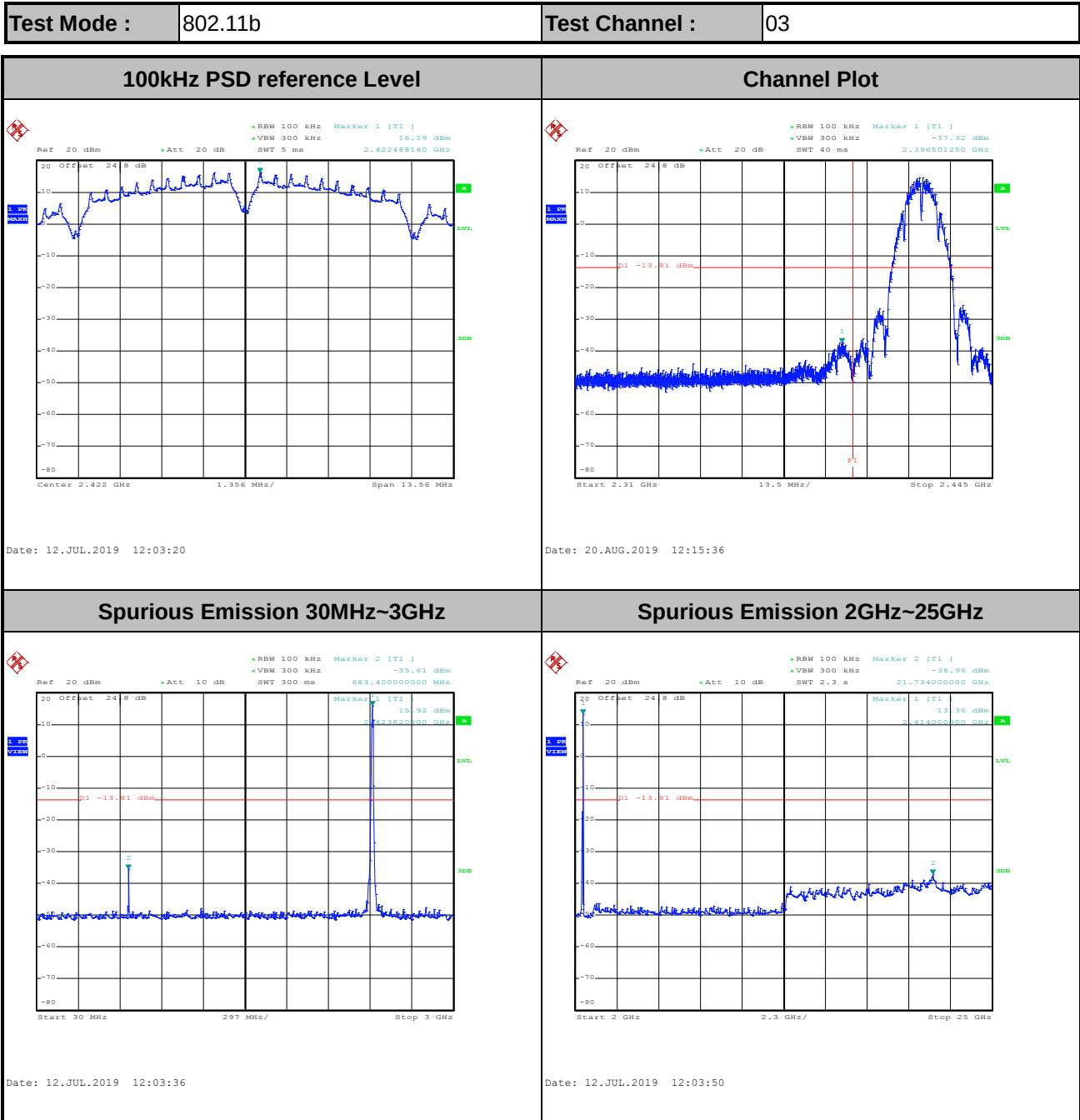


Date: 12.JUL.2019 11:59:48

Spurious Emission 2GHz~25GHz



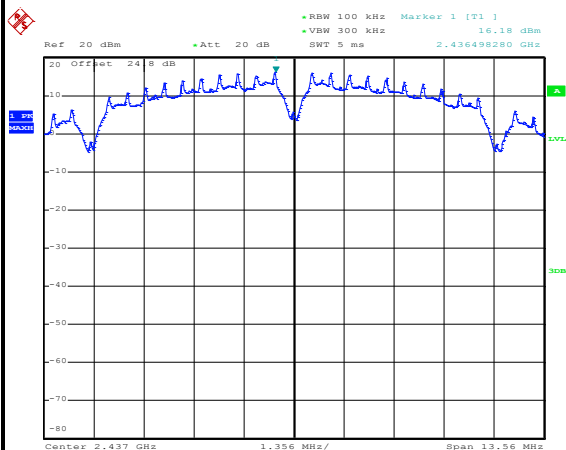
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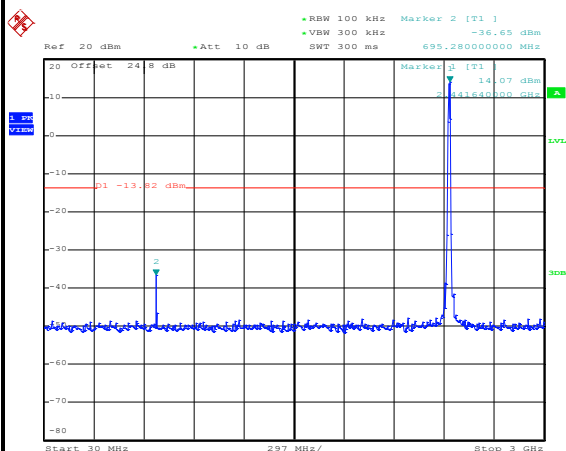
Test Mode :	802.11b	Test Channel :	06
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100kHz PSD reference Level



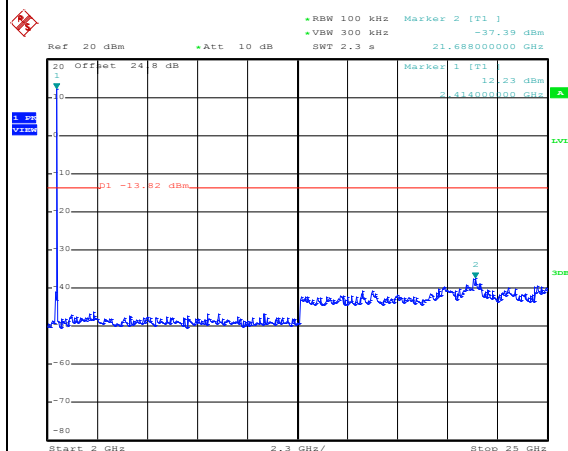
Date: 12.JUL.2019 12:13:04

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 12:13:25

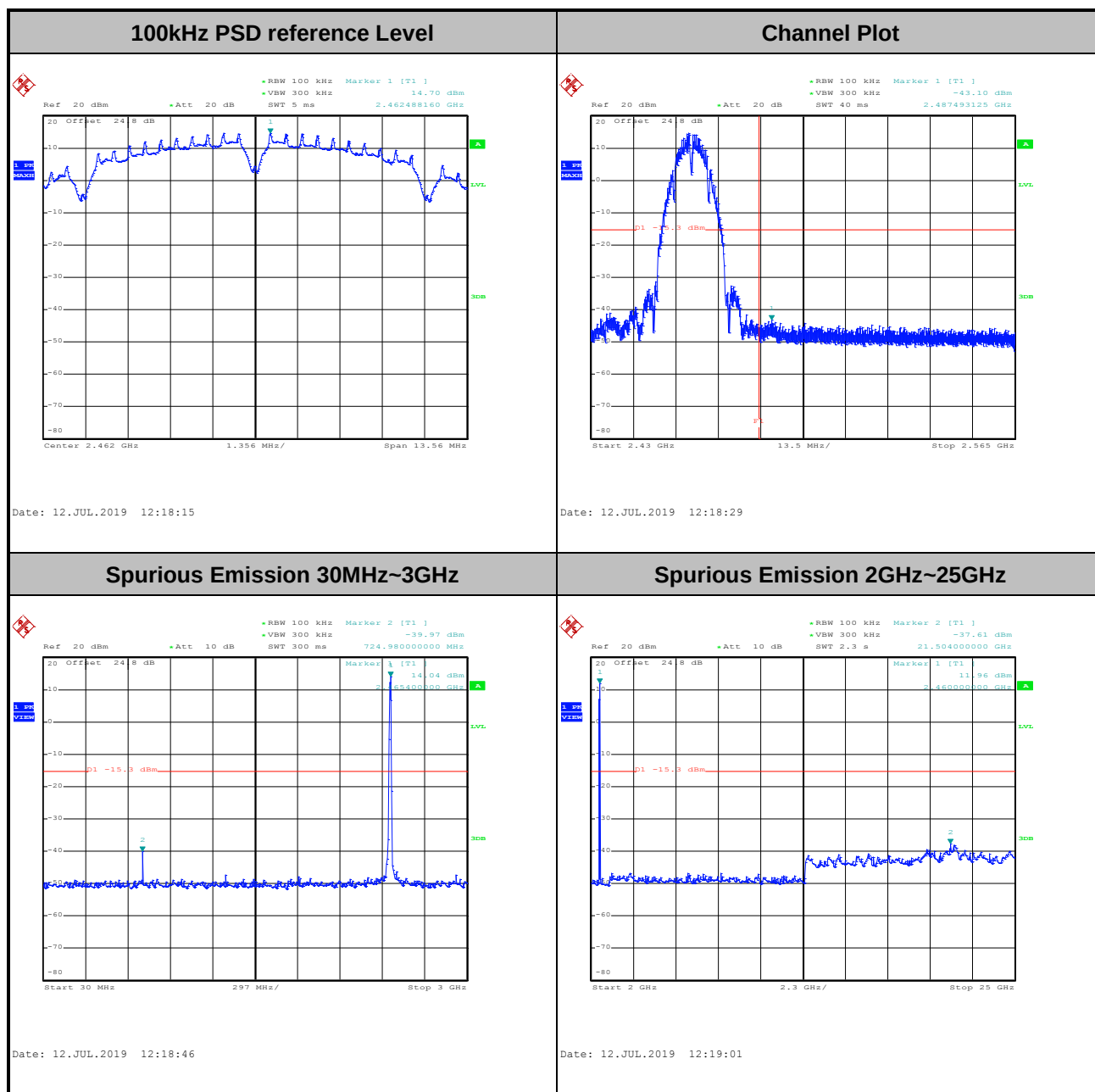
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 12:13:40

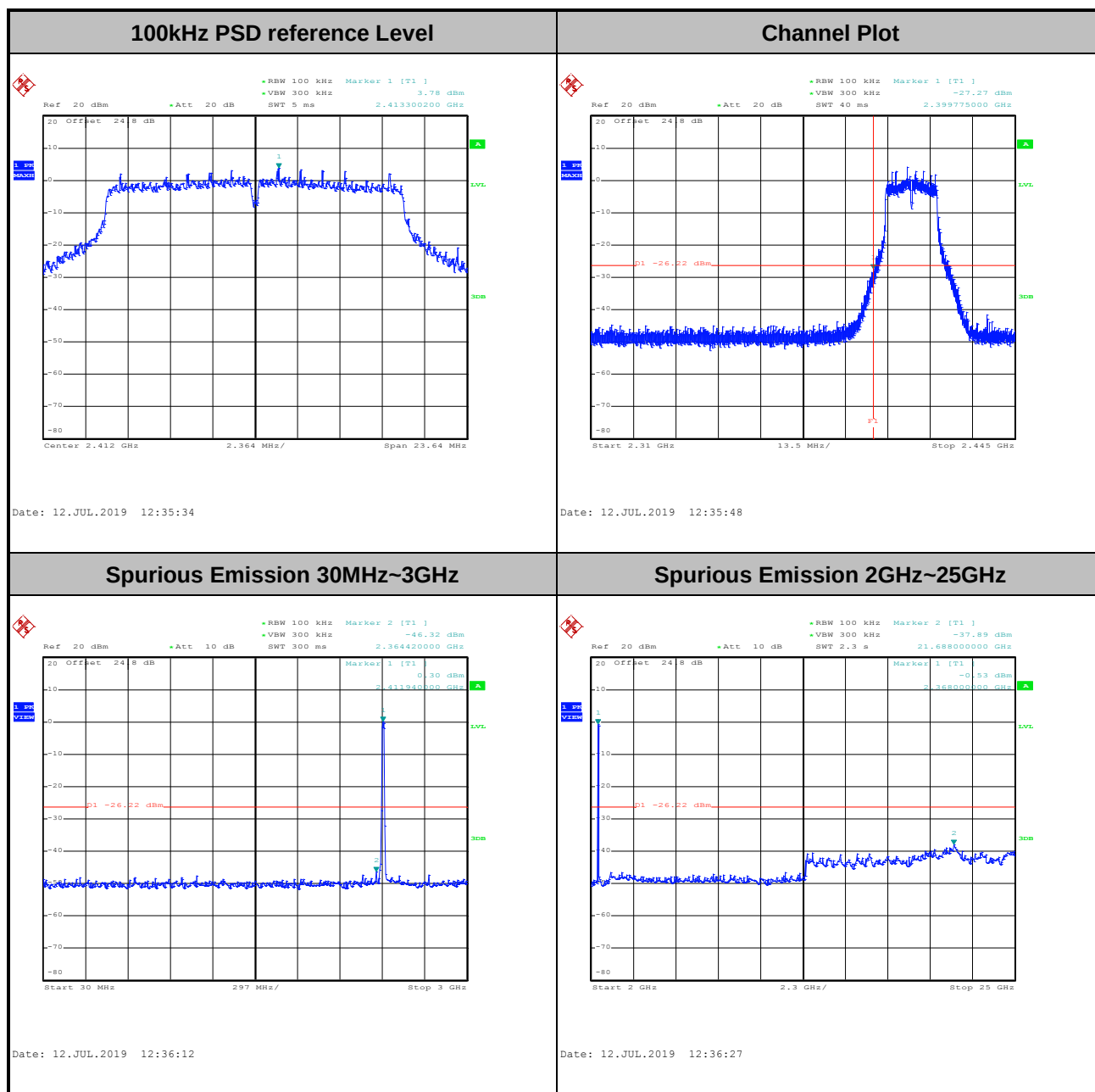


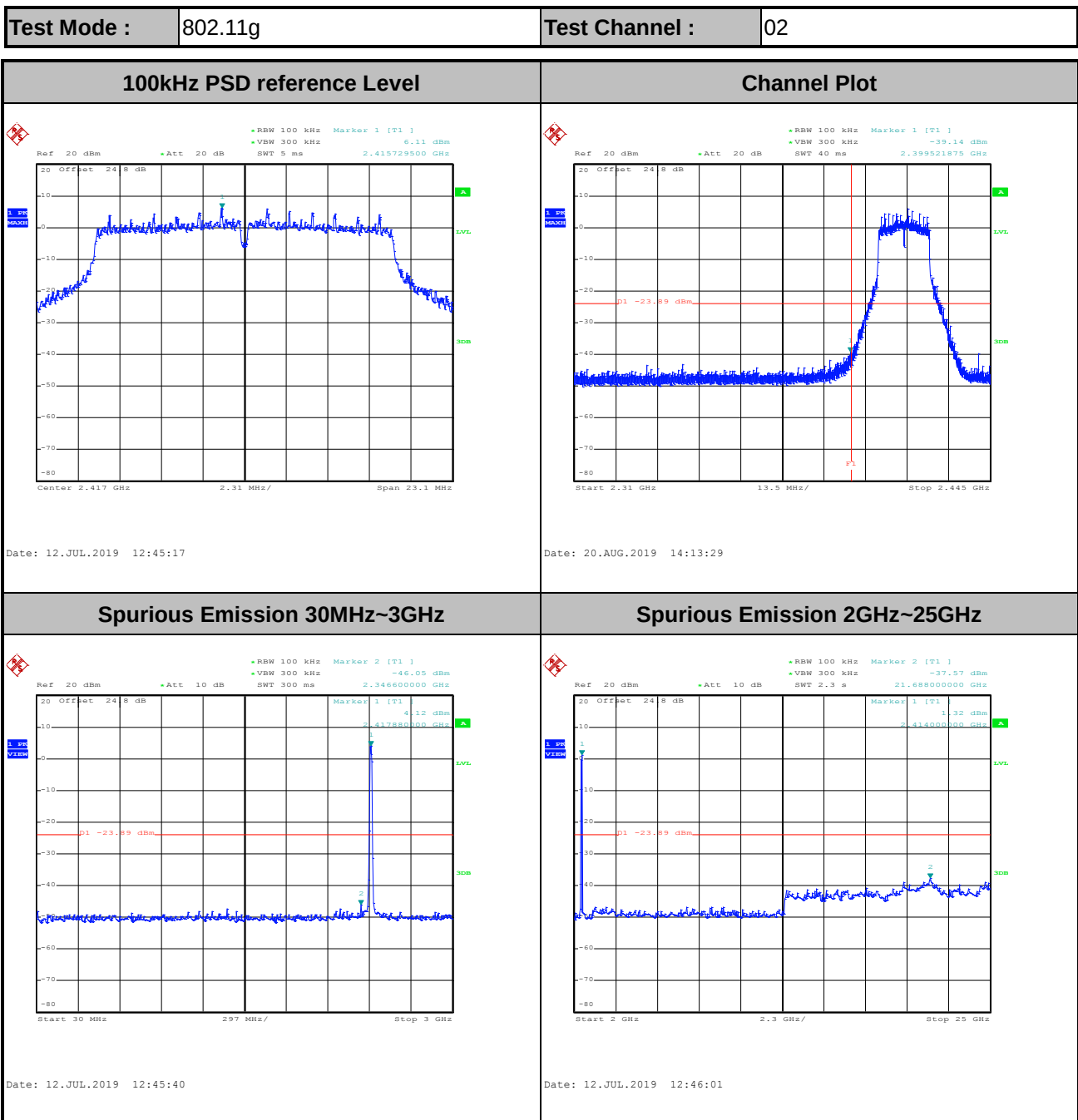
Test Mode :	802.11b	Test Channel :	11
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Test Mode :	802.11g	Test Channel :	01
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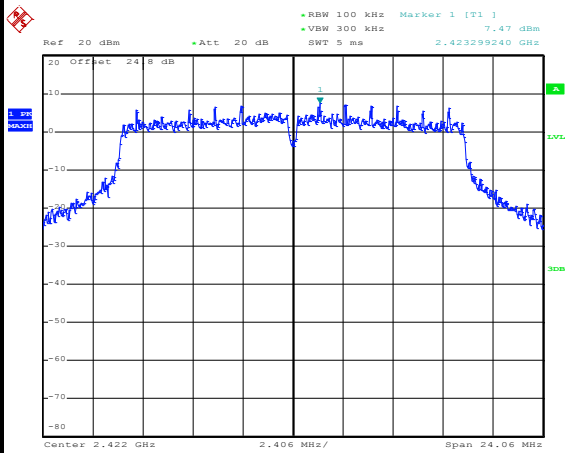






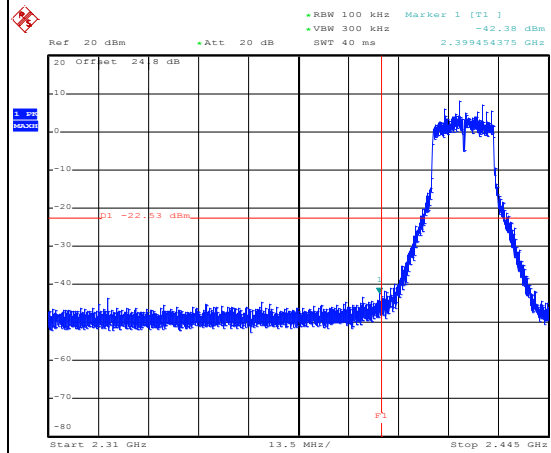
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100kHz PSD reference Level



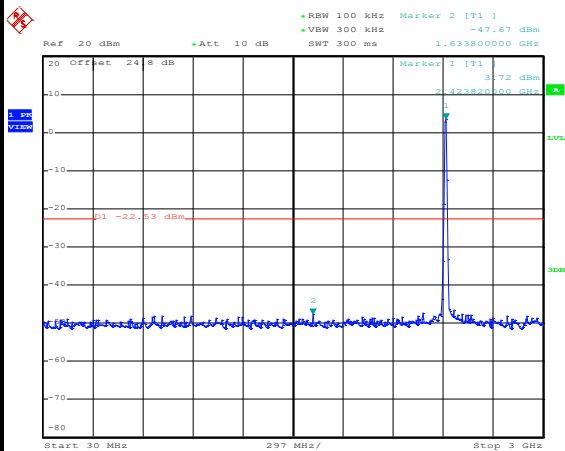
Date: 12.JUL.2019 12:53:49

Channel Plot



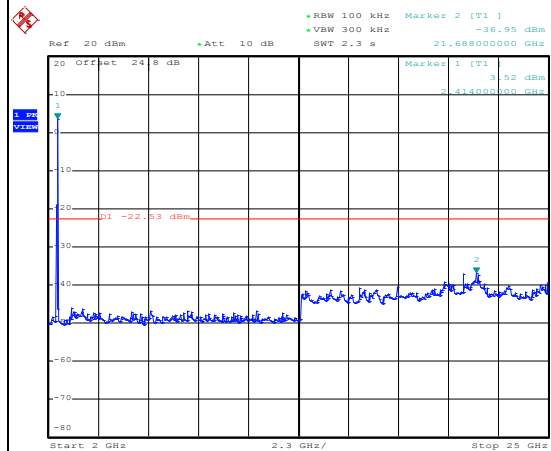
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Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 12:54:33

Spurious Emission 2GHz~25GHz

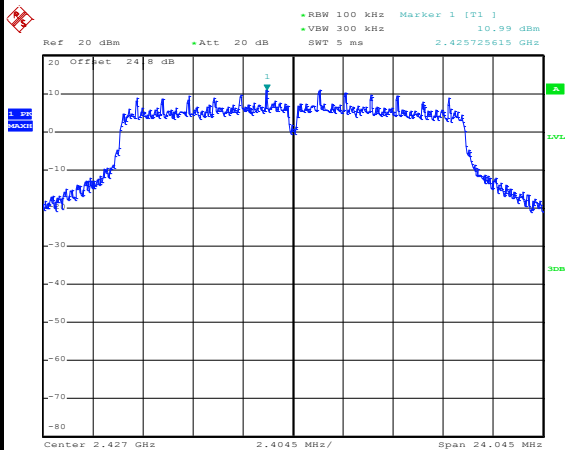


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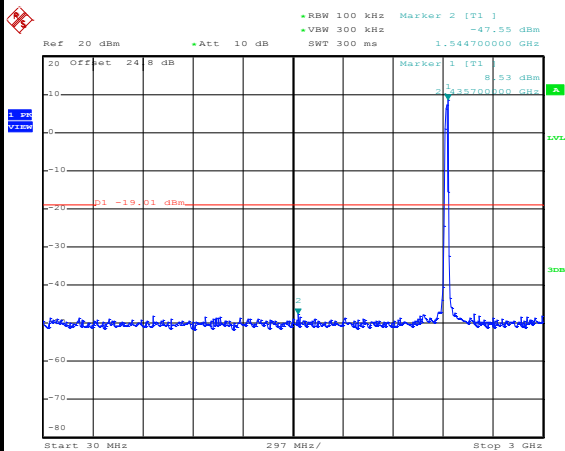
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100kHz PSD reference Level



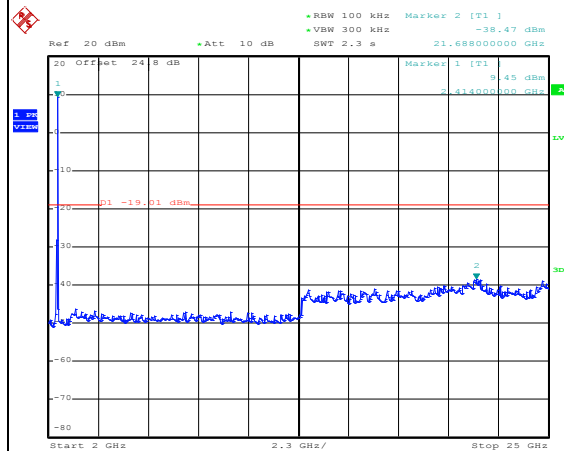
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Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 14:40:14

Spurious Emission 2GHz~25GHz

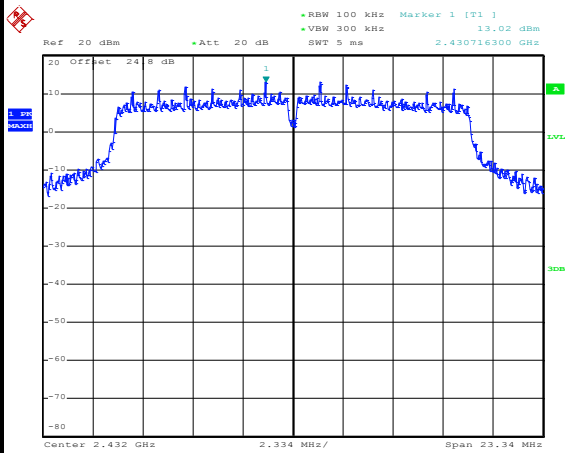


Date: 12.JUL.2019 14:40:29



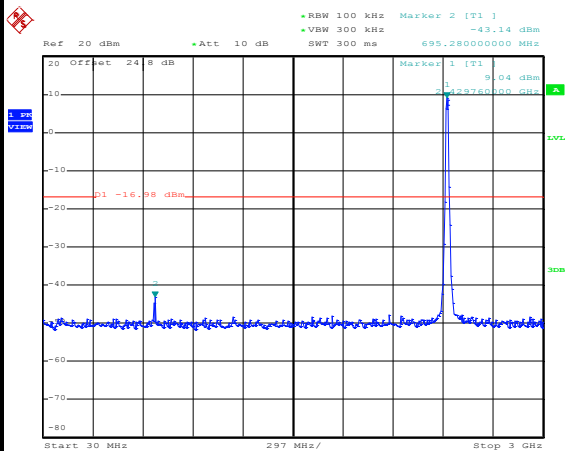
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100kHz PSD reference Level



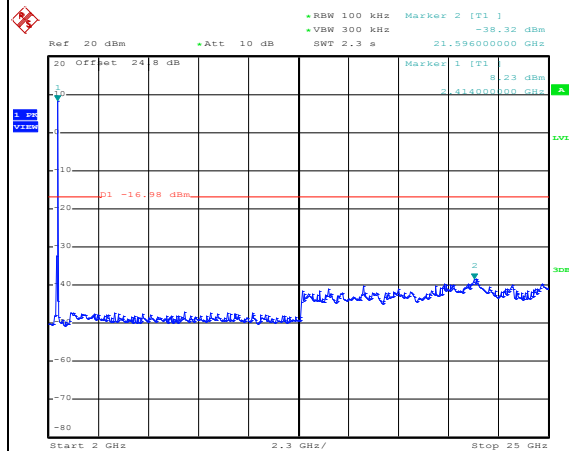
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Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 14:53:41

Spurious Emission 2GHz~25GHz

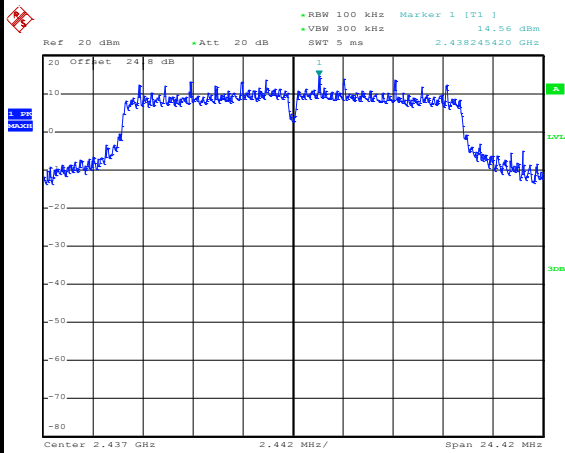


Date: 12.JUL.2019 14:53:56



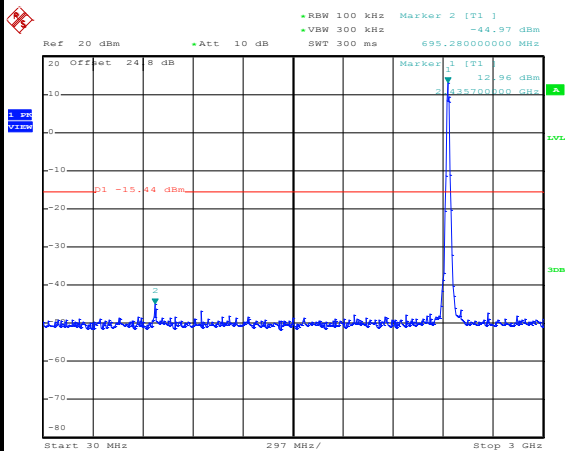
Test Mode :	802.11g	Test Channel :	06
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100kHz PSD reference Level



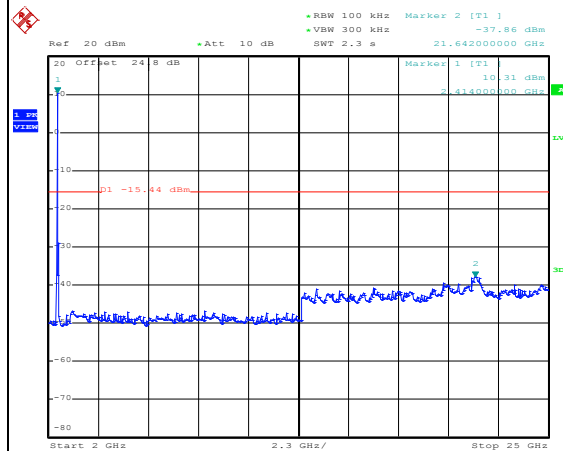
Date: 12.JUL.2019 14:57:04

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 14:57:26

Spurious Emission 2GHz~25GHz

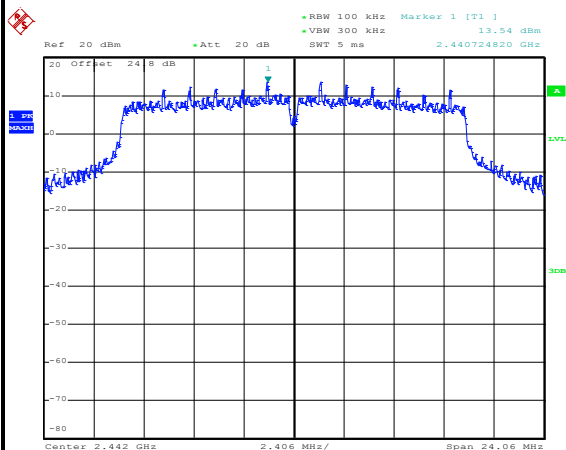


Date: 12.JUL.2019 14:57:41



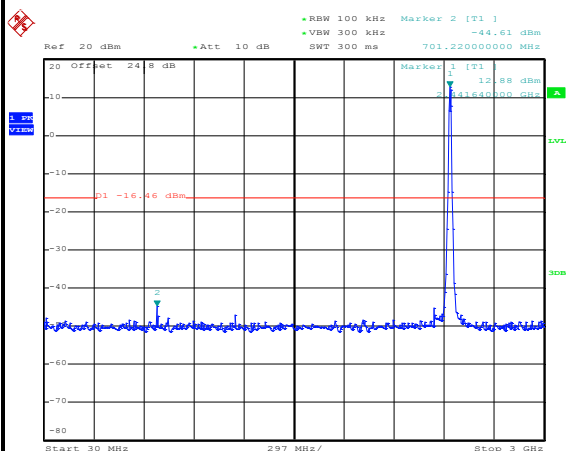
Test Mode :	802.11g	Test Channel :	07
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100kHz PSD reference Level



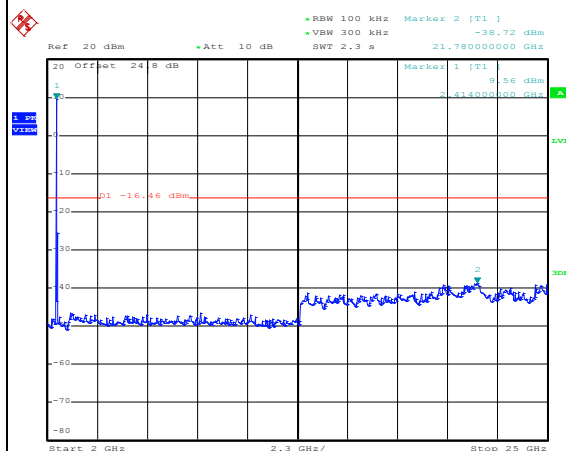
Date: 12.JUL.2019 15:06:48

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:07:11

Spurious Emission 2GHz~25GHz

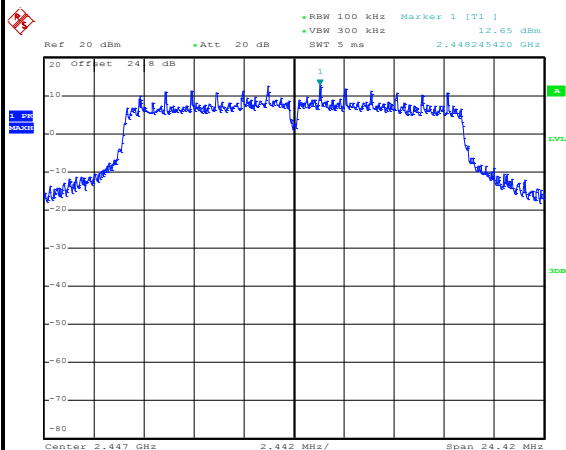


Date: 12.JUL.2019 15:07:28



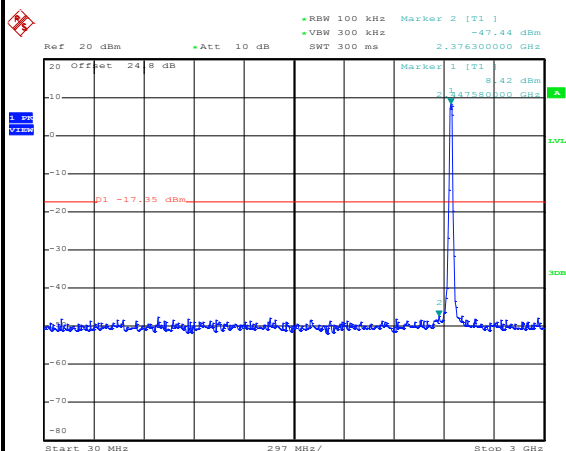
Test Mode :	802.11g	Test Channel :	08
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100kHz PSD reference Level



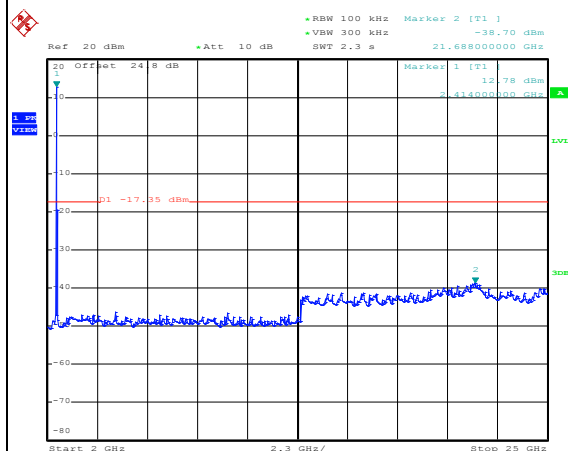
Date: 12.JUL.2019 15:11:39

Spurious Emission 30MHz~3GHz

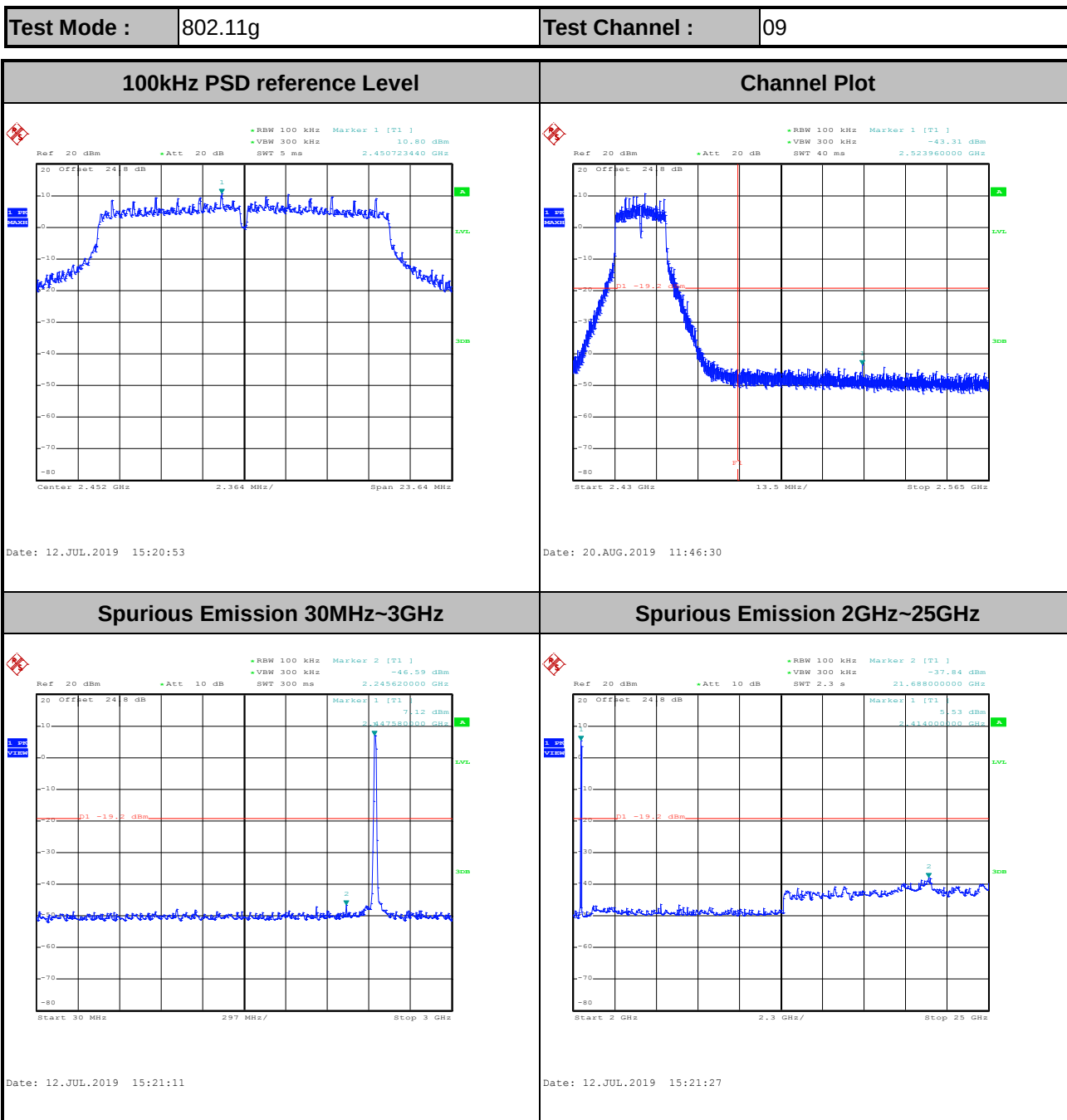


Date: 12.JUL.2019 15:12:03

Spurious Emission 2GHz~25GHz



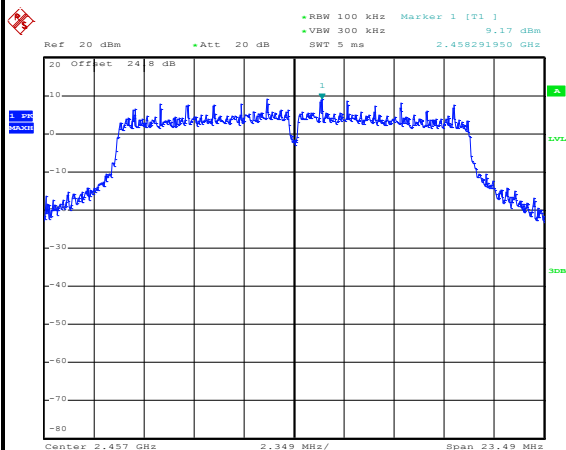
Date: 12.JUL.2019 15:12:17





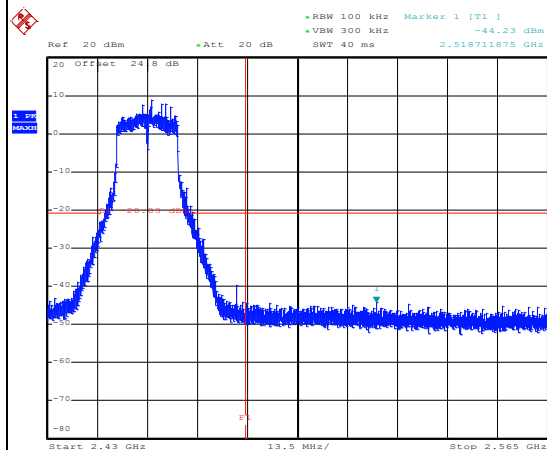
Test Mode :	802.11g	Test Channel :	10
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100kHz PSD reference Level



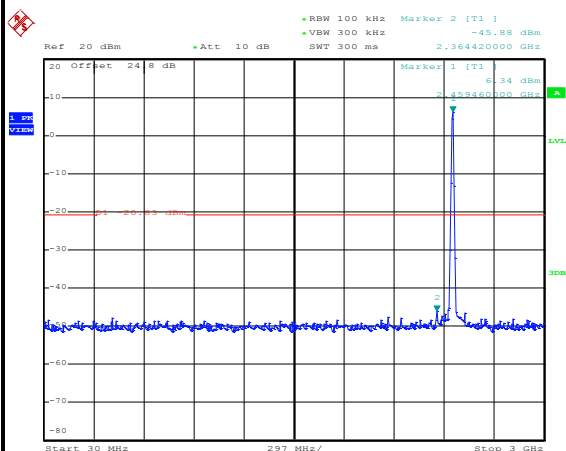
Date: 12.JUL.2019 15:24:44

Channel Plot



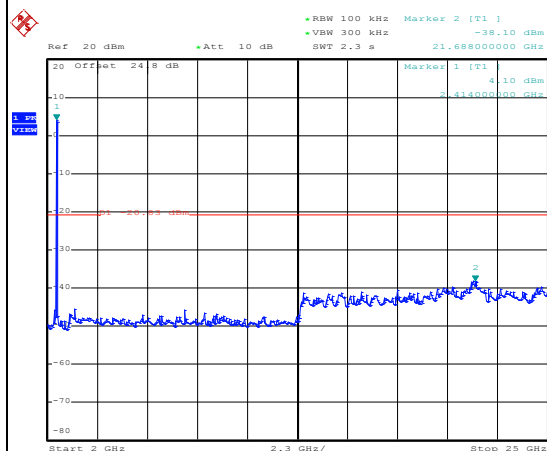
Date: 20.AUG.2019 11:49:02

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:25:02

Spurious Emission 2GHz~25GHz

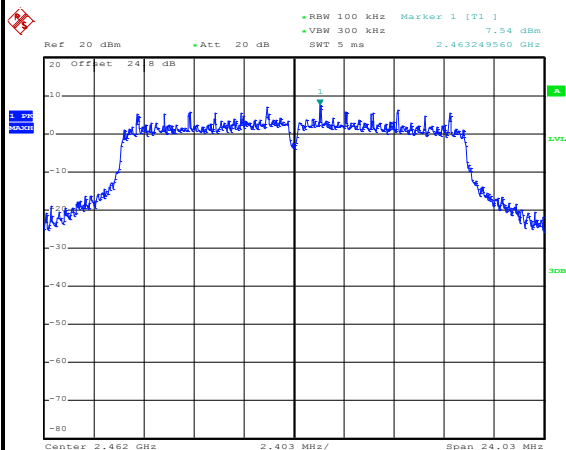


Date: 12.JUL.2019 15:25:17



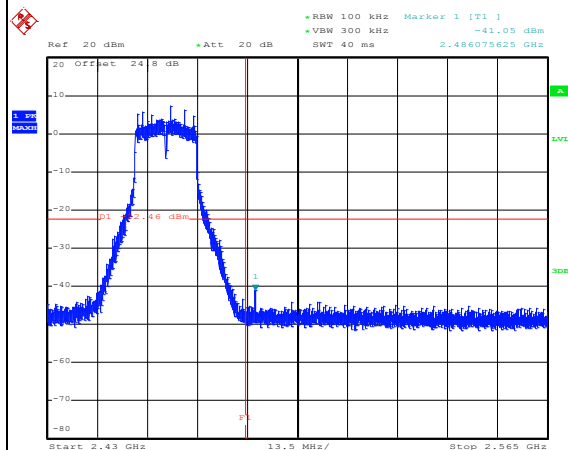
Test Mode :	802.11g	Test Channel :	11
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100kHz PSD reference Level



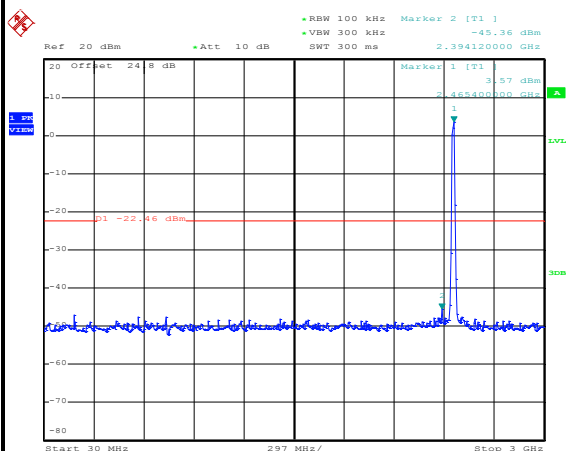
Date: 12.JUL.2019 15:35:07

Channel Plot



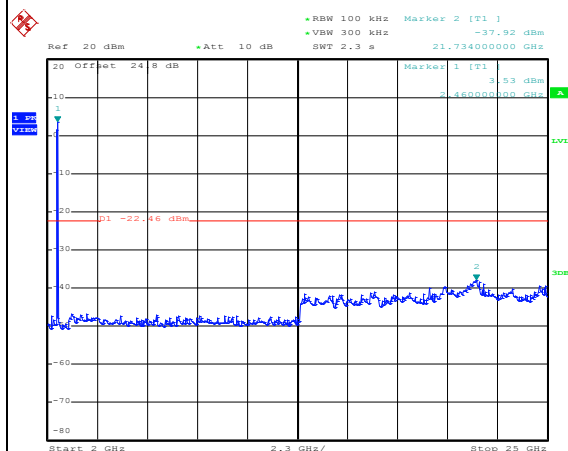
Date: 12.JUL.2019 15:35:24

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:35:48

Spurious Emission 2GHz~25GHz

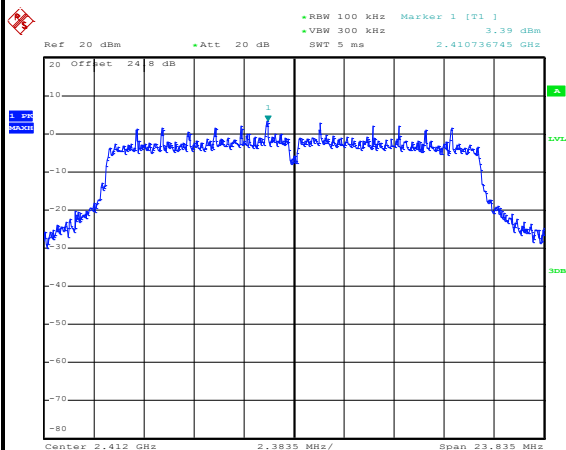


Date: 12.JUL.2019 15:36:06



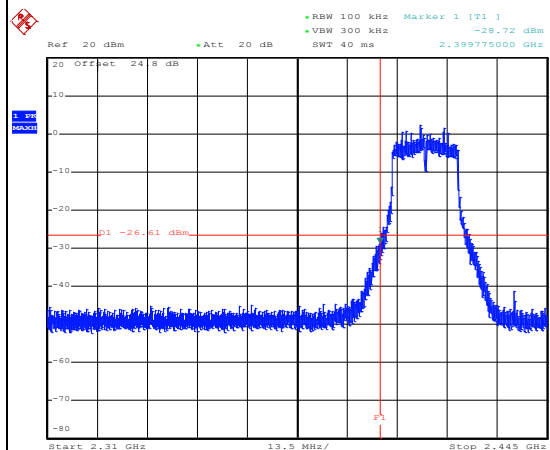
Test Mode :	802.11n HT20	Test Channel :	01
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100kHz PSD reference Level



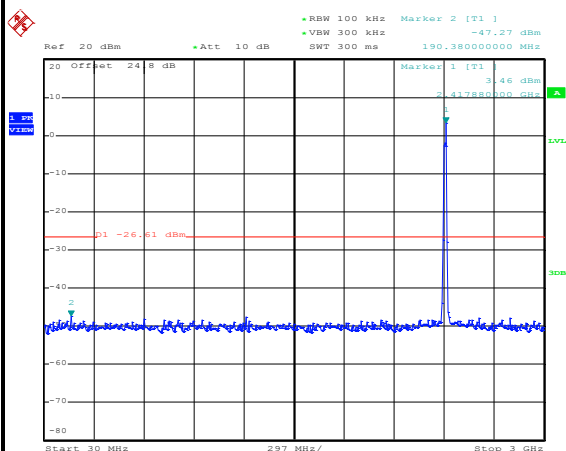
Date: 12.JUL.2019 18:05:50

Channel Plot



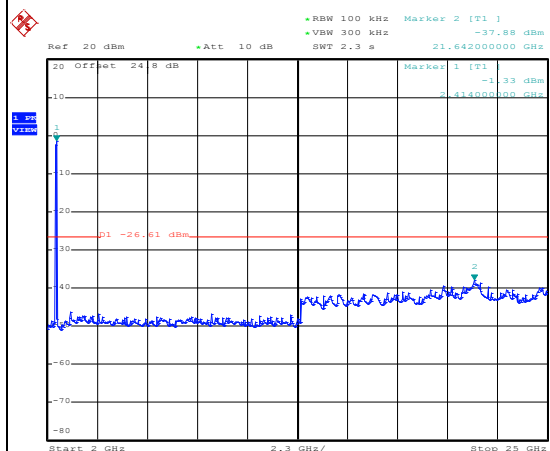
Date: 20.AUG.2019 11:51:08

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 18:06:40

Spurious Emission 2GHz~25GHz



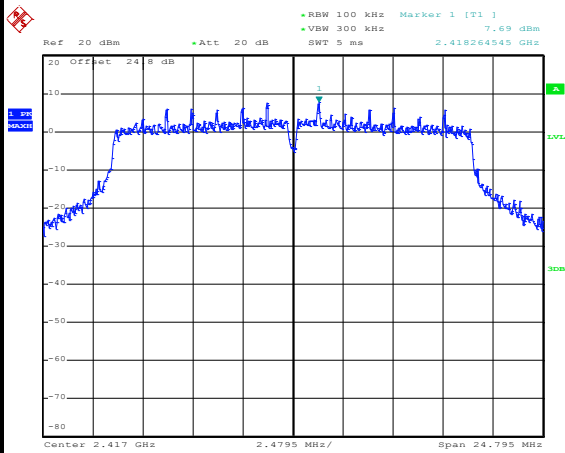
Date: 12.JUL.2019 18:06:54



Test Mode : 802.11n HT20

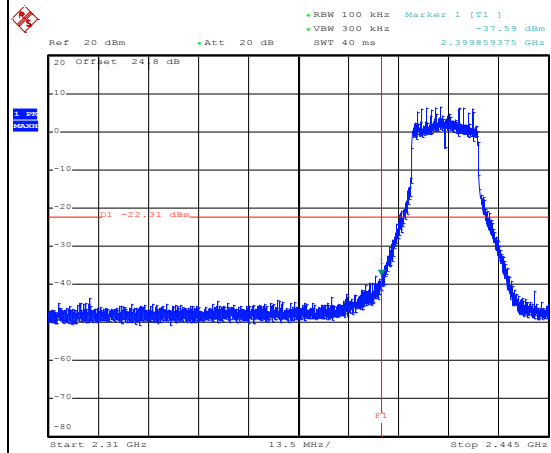
Test Channel : 02

100kHz PSD reference Level



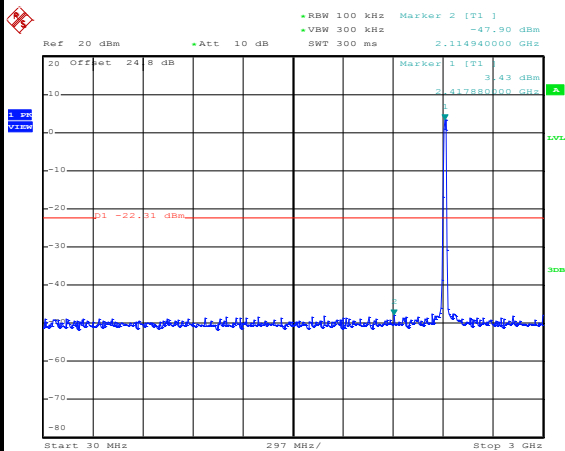
Date: 12.JUL.2019 18:23:59

Channel Plot



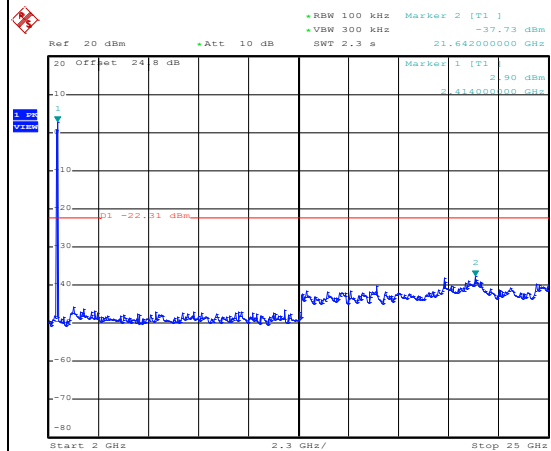
Date: 20.AUG.2019 14:58:19

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 18:24:19

Spurious Emission 2GHz~25GHz

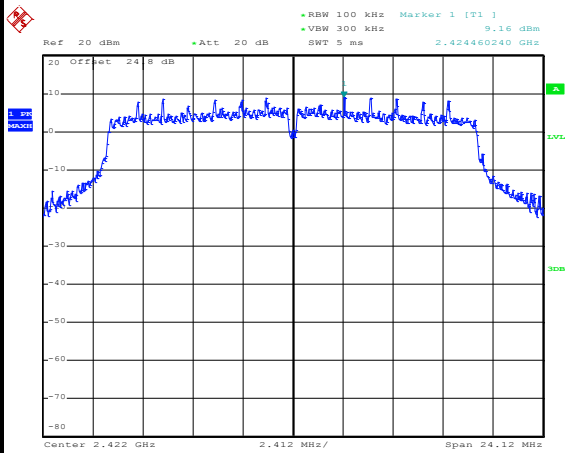


Date: 12.JUL.2019 18:24:44



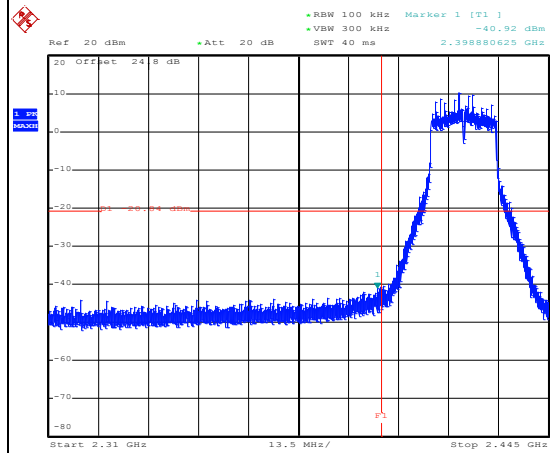
Test Mode :	802.11n HT20	Test Channel :	03
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100kHz PSD reference Level



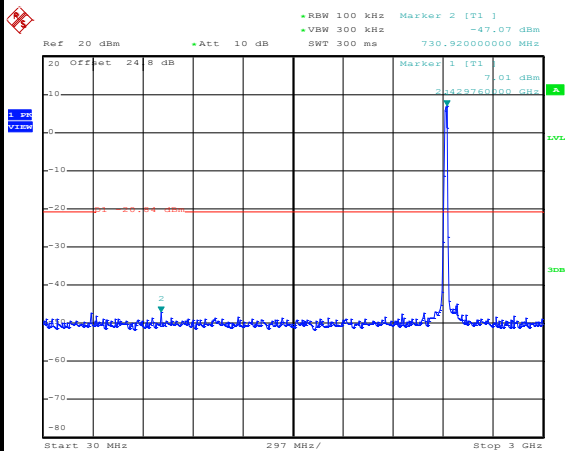
Date: 12.JUL.2019 20:00:29

Channel Plot



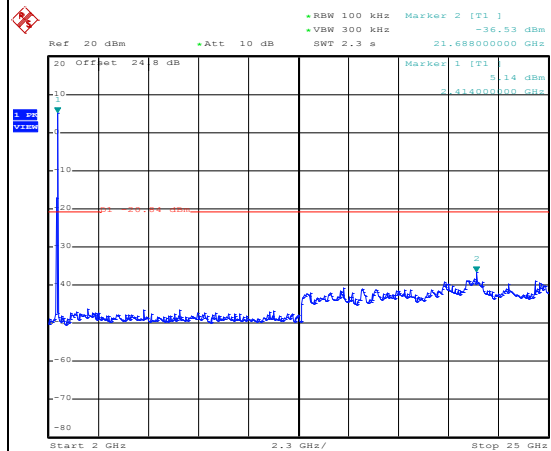
Date: 20.AUG.2019 14:45:04

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:01:05

Spurious Emission 2GHz~25GHz

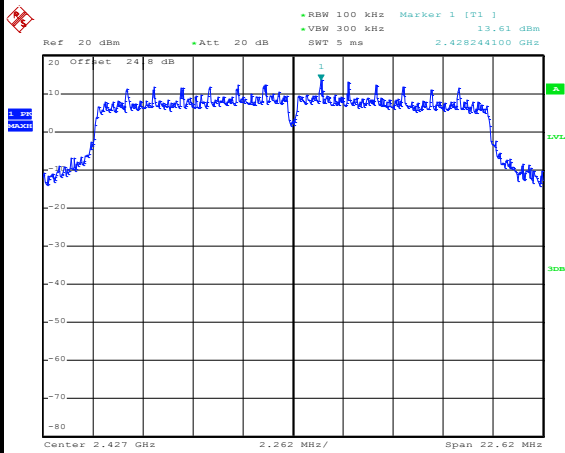


Date: 12.JUL.2019 20:01:26



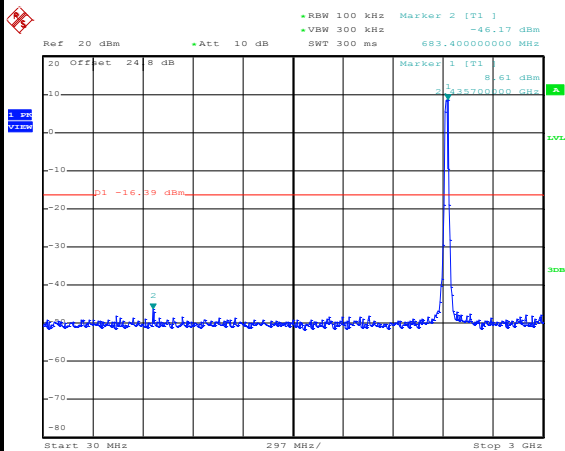
Test Mode :	802.11n HT20	Test Channel :	04
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100kHz PSD reference Level



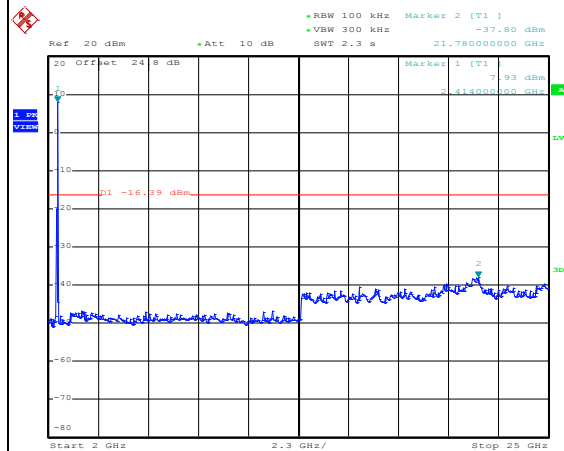
Date: 12.JUL.2019 20:13:20

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:13:51

Spurious Emission 2GHz~25GHz

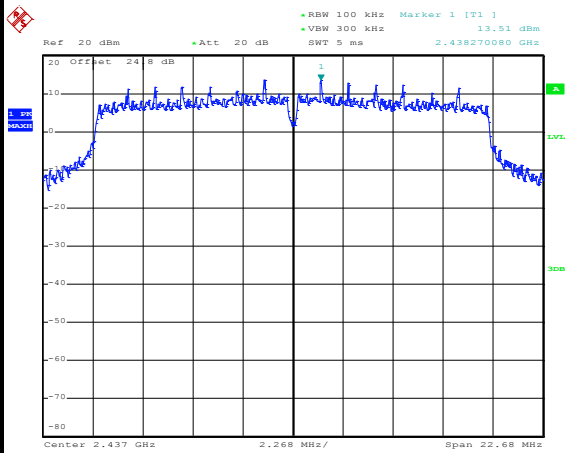


Date: 12.JUL.2019 20:14:26



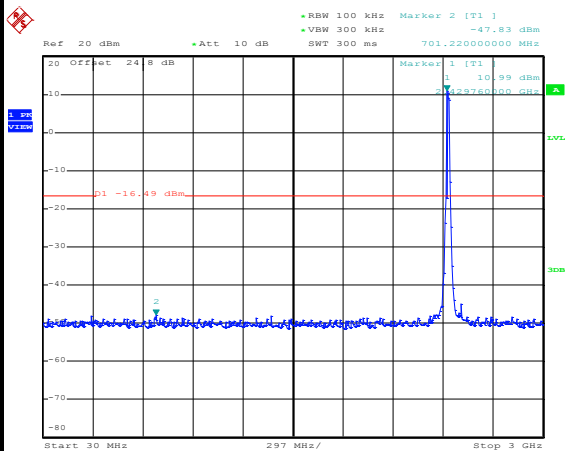
Test Mode :	802.11n HT20	Test Channel :	06
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100kHz PSD reference Level



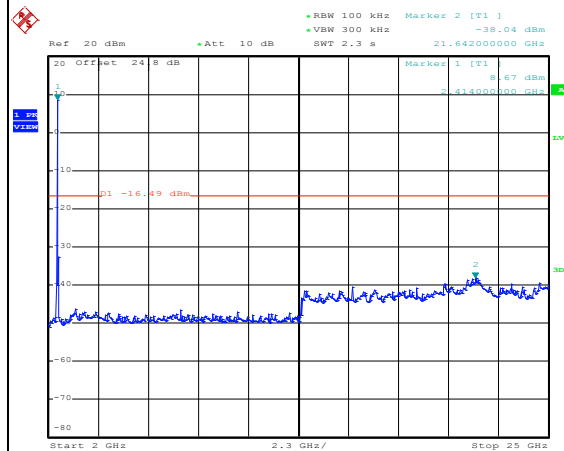
Date: 12.JUL.2019 20:35:02

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:35:30

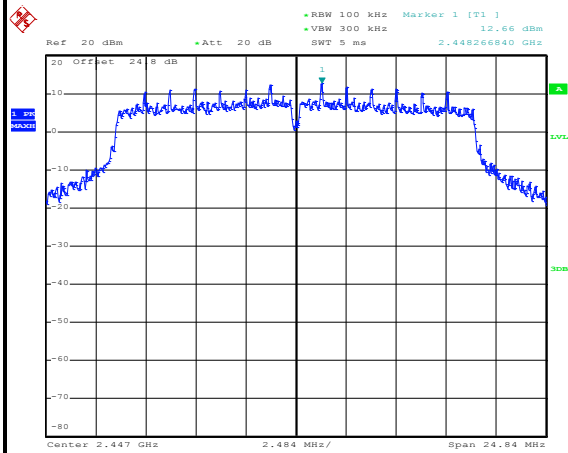
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 20:35:45

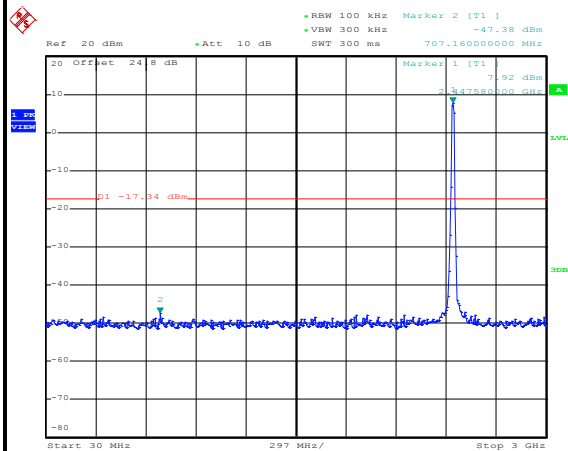
Test Mode :	802.11n HT20	Test Channel :	08
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100kHz PSD reference Level



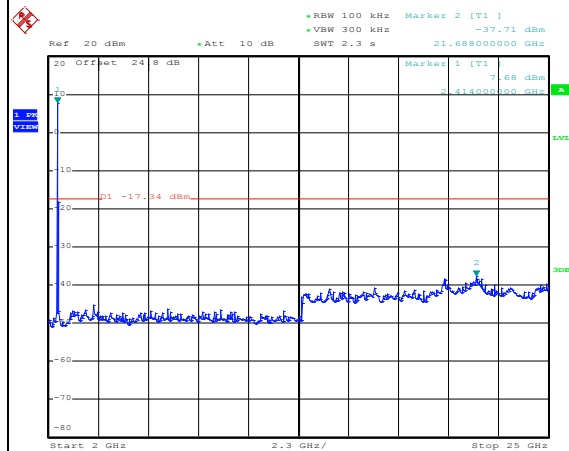
Date: 12.JUL.2019 20:49:14

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:49:43

Spurious Emission 2GHz~25GHz

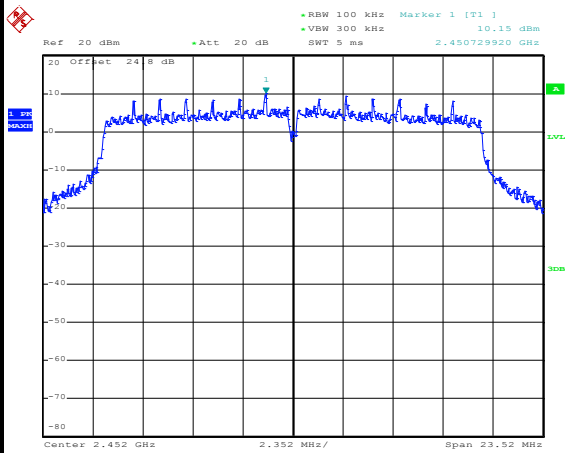


Date: 12.JUL.2019 20:50:01



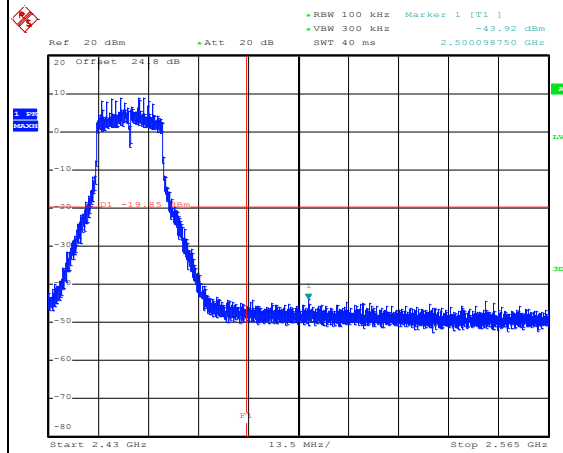
Test Mode :	802.11n HT20	Test Channel :	09
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100kHz PSD reference Level



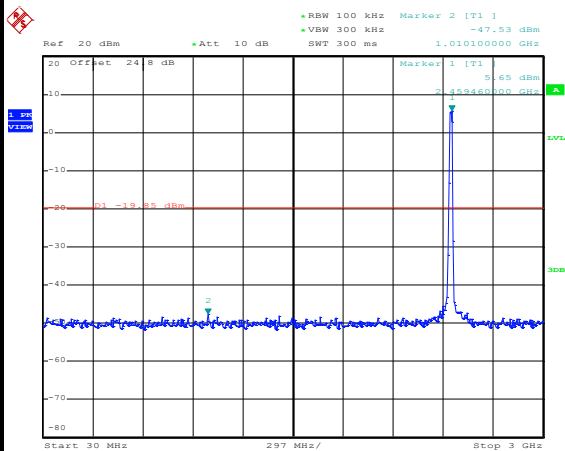
Date: 12.JUL.2019 21:02:27

Channel Plot



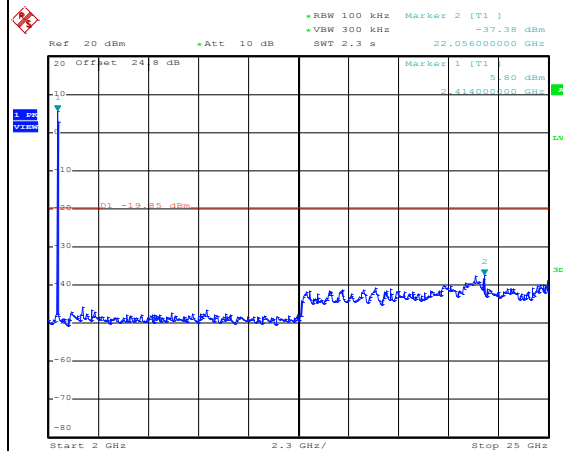
Date: 20.AUG.2019 14:48:47

Spurious Emission 30MHz~3GHz

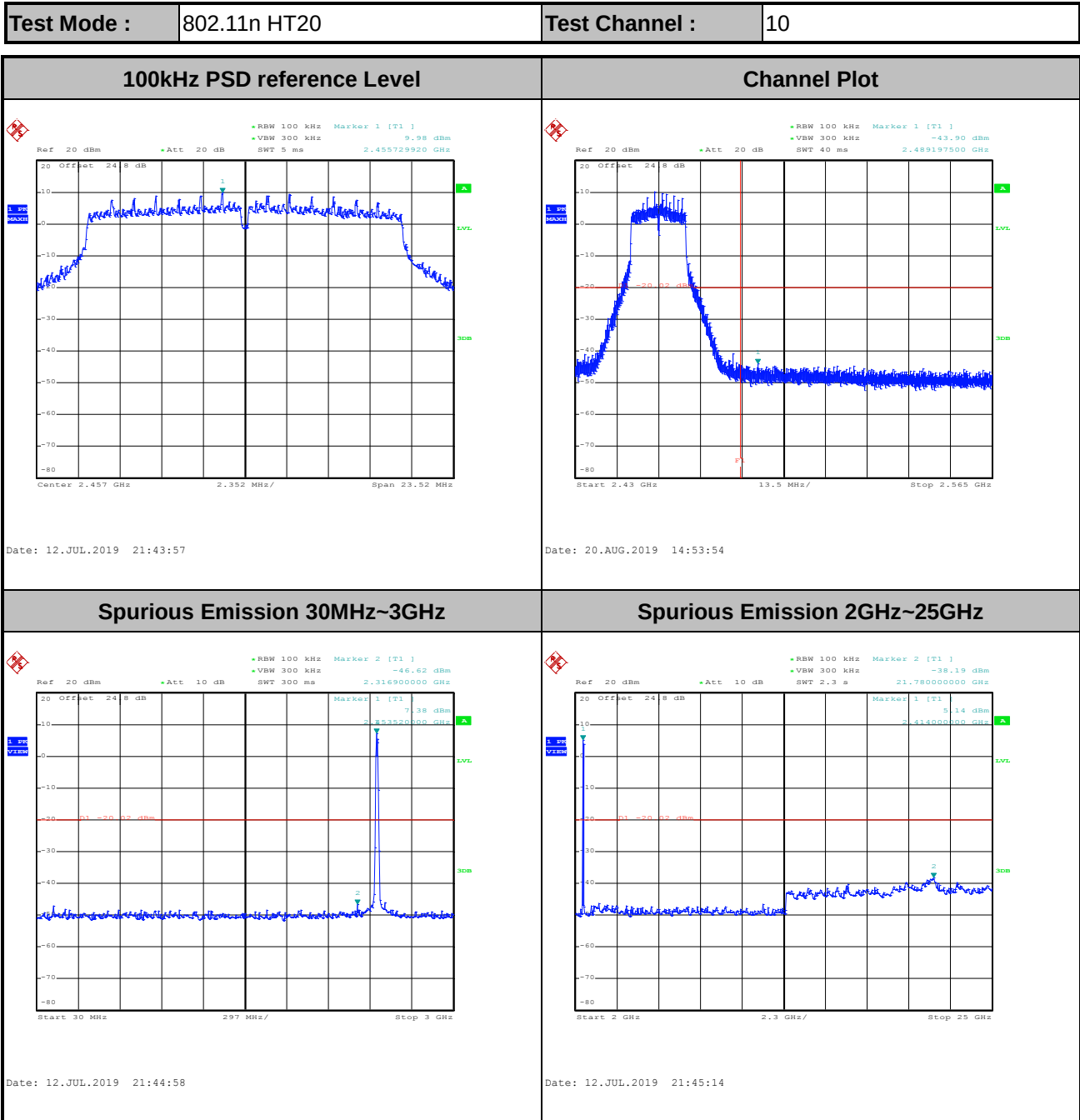


Date: 12.JUL.2019 21:02:54

Spurious Emission 2GHz~25GHz



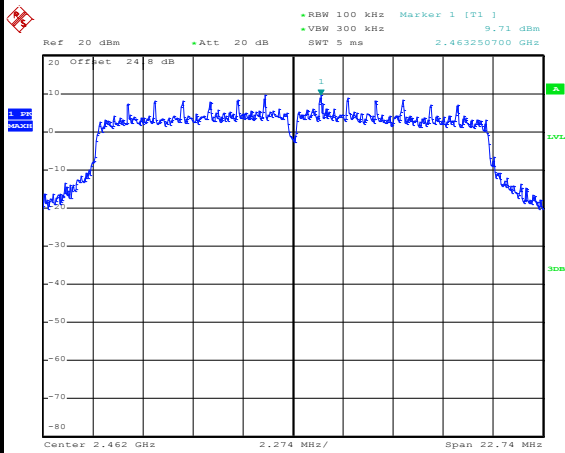
Date: 12.JUL.2019 21:03:23





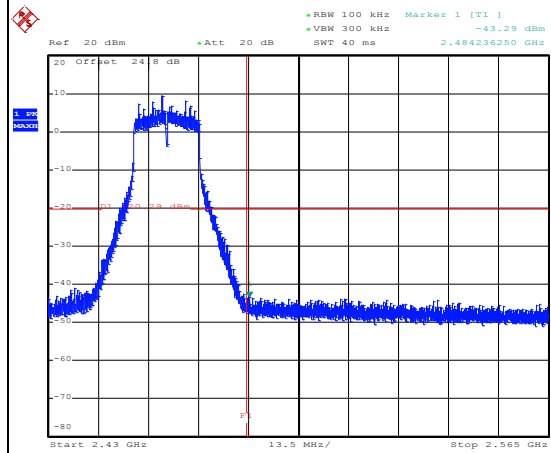
Test Mode :	802.11n HT20	Test Channel :	11
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100kHz PSD reference Level



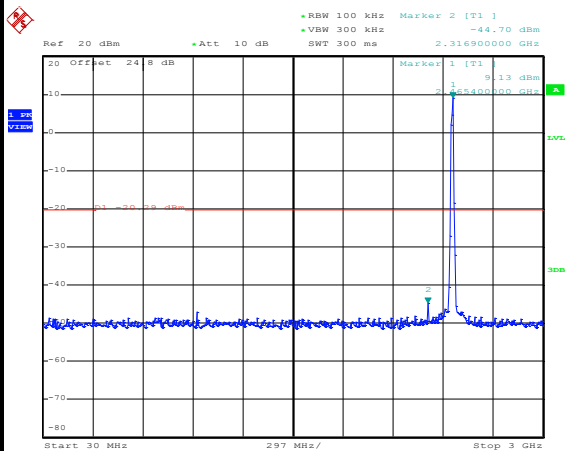
Date: 12.JUL.2019 21:54:50

Channel Plot



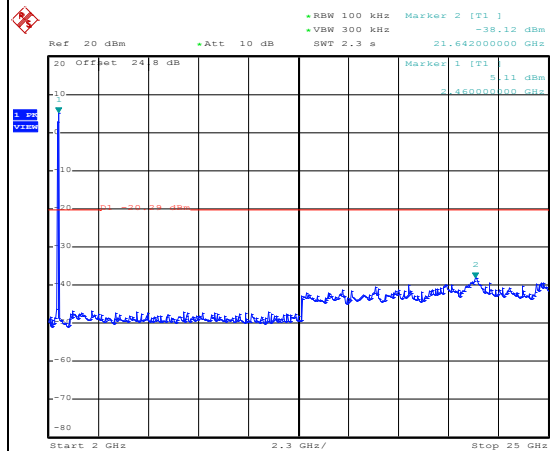
Date: 12.JUL.2019 21:55:39

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 21:56:27

Spurious Emission 2GHz~25GHz

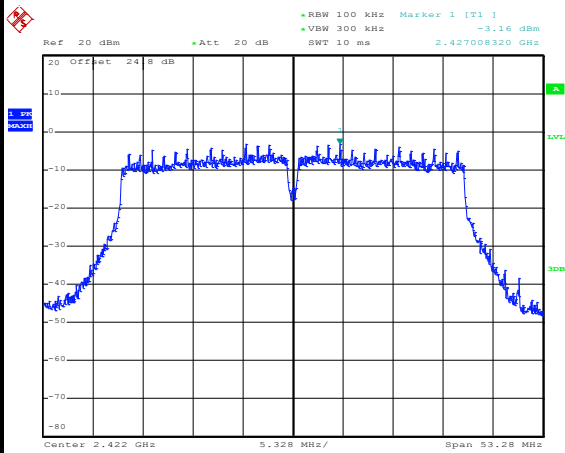


Date: 12.JUL.2019 21:56:46



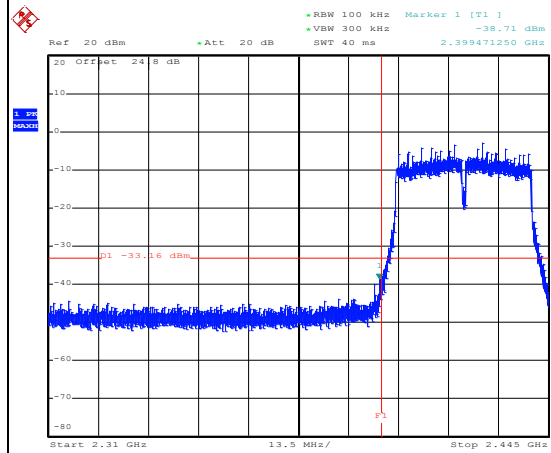
Test Mode :	802.11n HT40	Test Channel :	03
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100kHz PSD reference Level



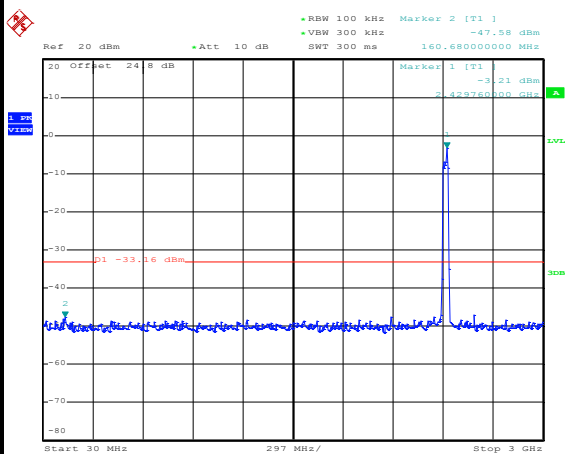
Date: 12.JUL.2019 22:10:46

Channel Plot



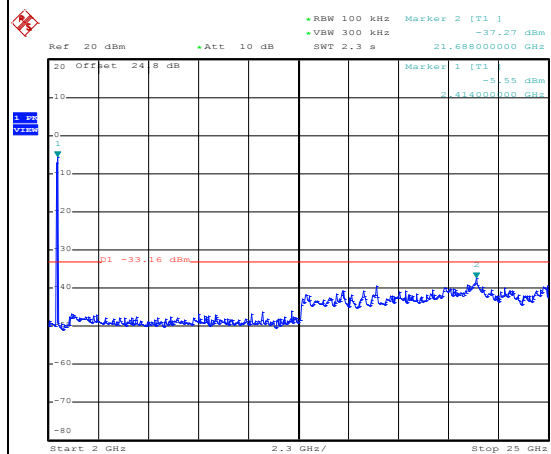
Date: 12.JUL.2019 22:11:01

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 22:11:29

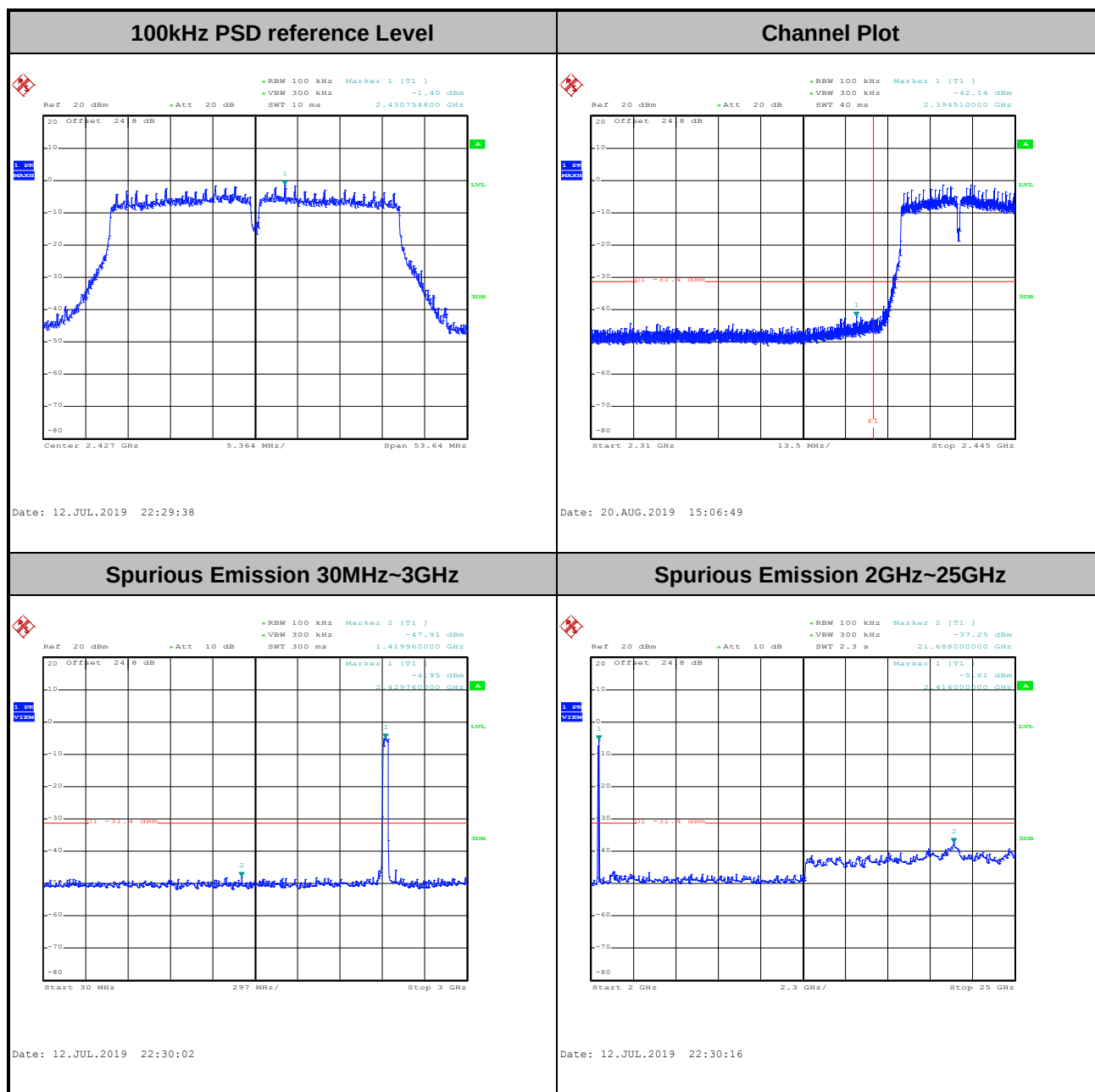
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 22:11:43



Test Mode :	802.11n HT40	Test Channel :	04
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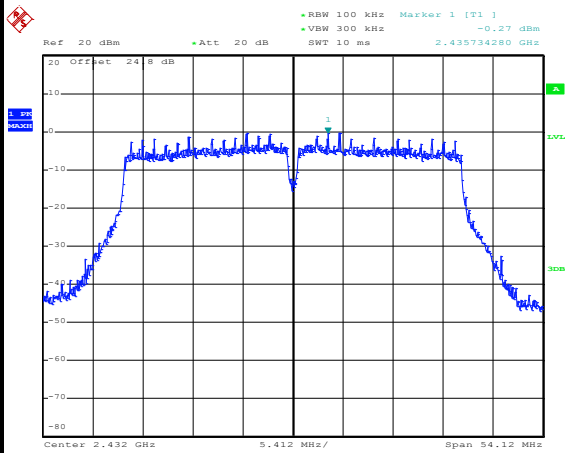




Test Mode : 802.11n HT40

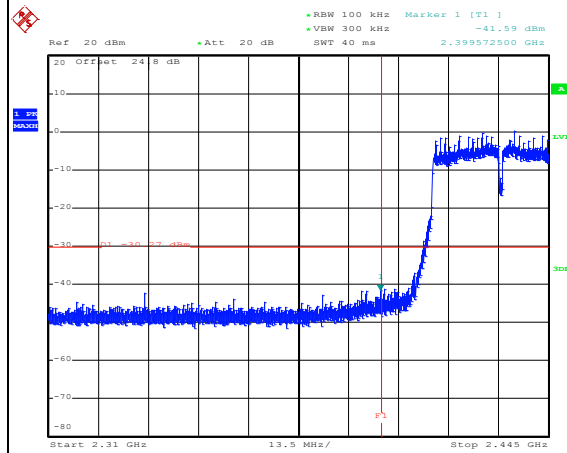
Test Channel : 05

100kHz PSD reference Level



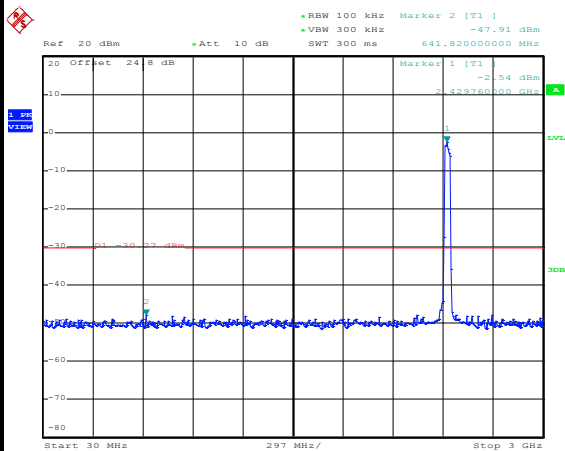
Date: 12.JUL.2019 22:40:55

Channel Plot



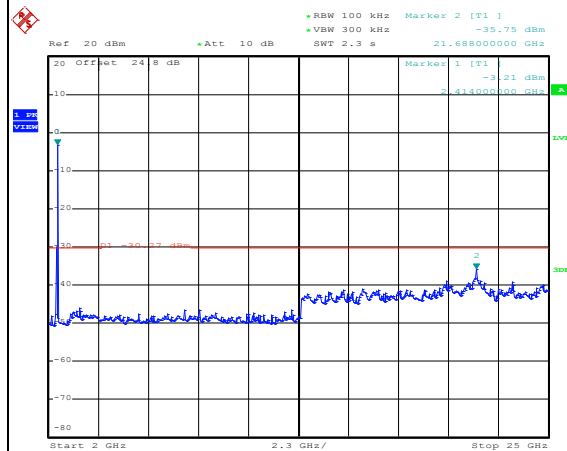
Date: 20.AUG.2019 15:18:14

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 22:41:20

Spurious Emission 2GHz~25GHz

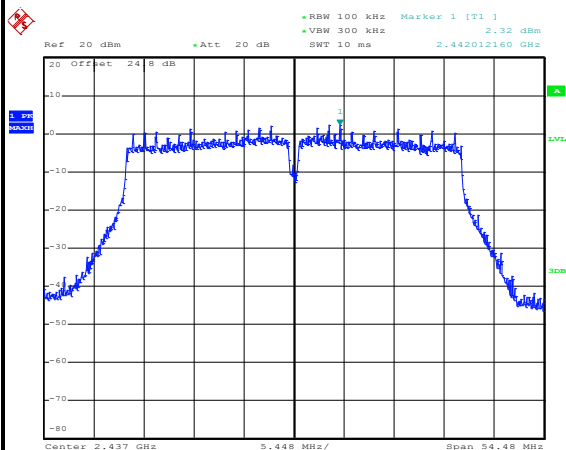


Date: 12.JUL.2019 22:41:36



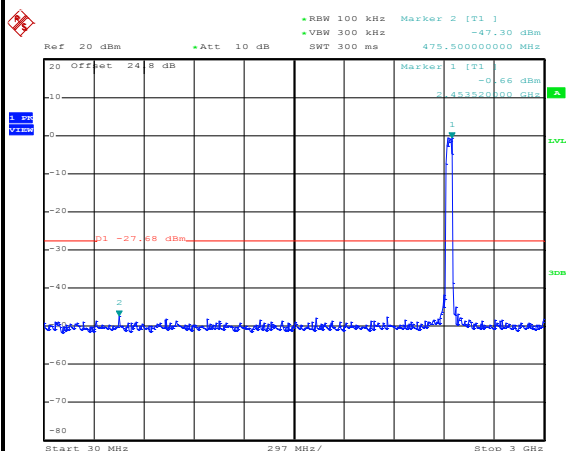
Test Mode :	802.11n HT40	Test Channel :	06
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100kHz PSD reference Level



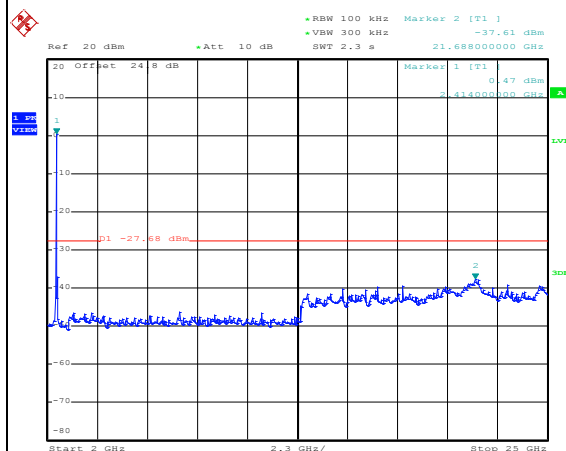
Date: 12.JUL.2019 23:01:58

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 23:02:30

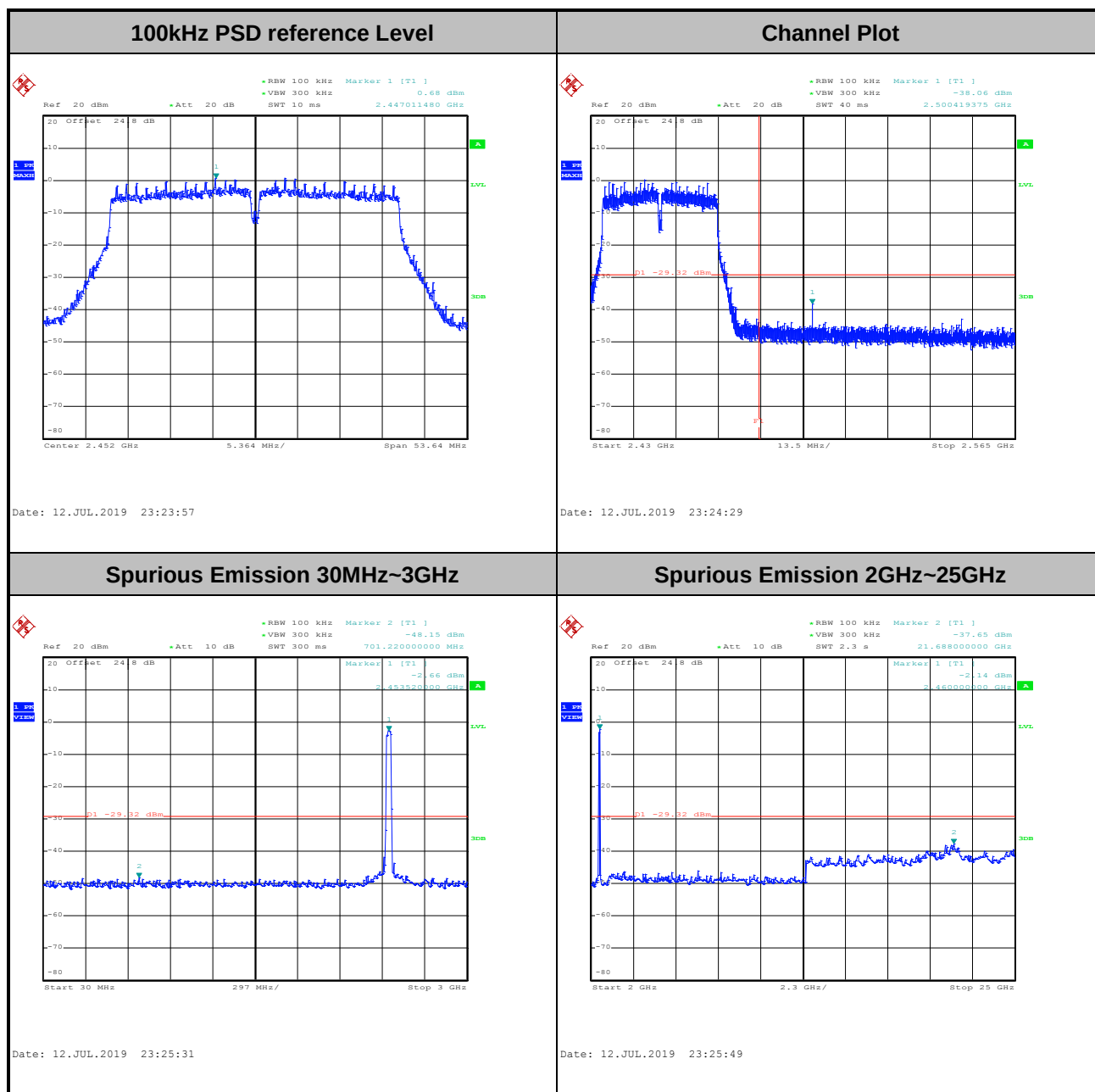
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 23:02:45



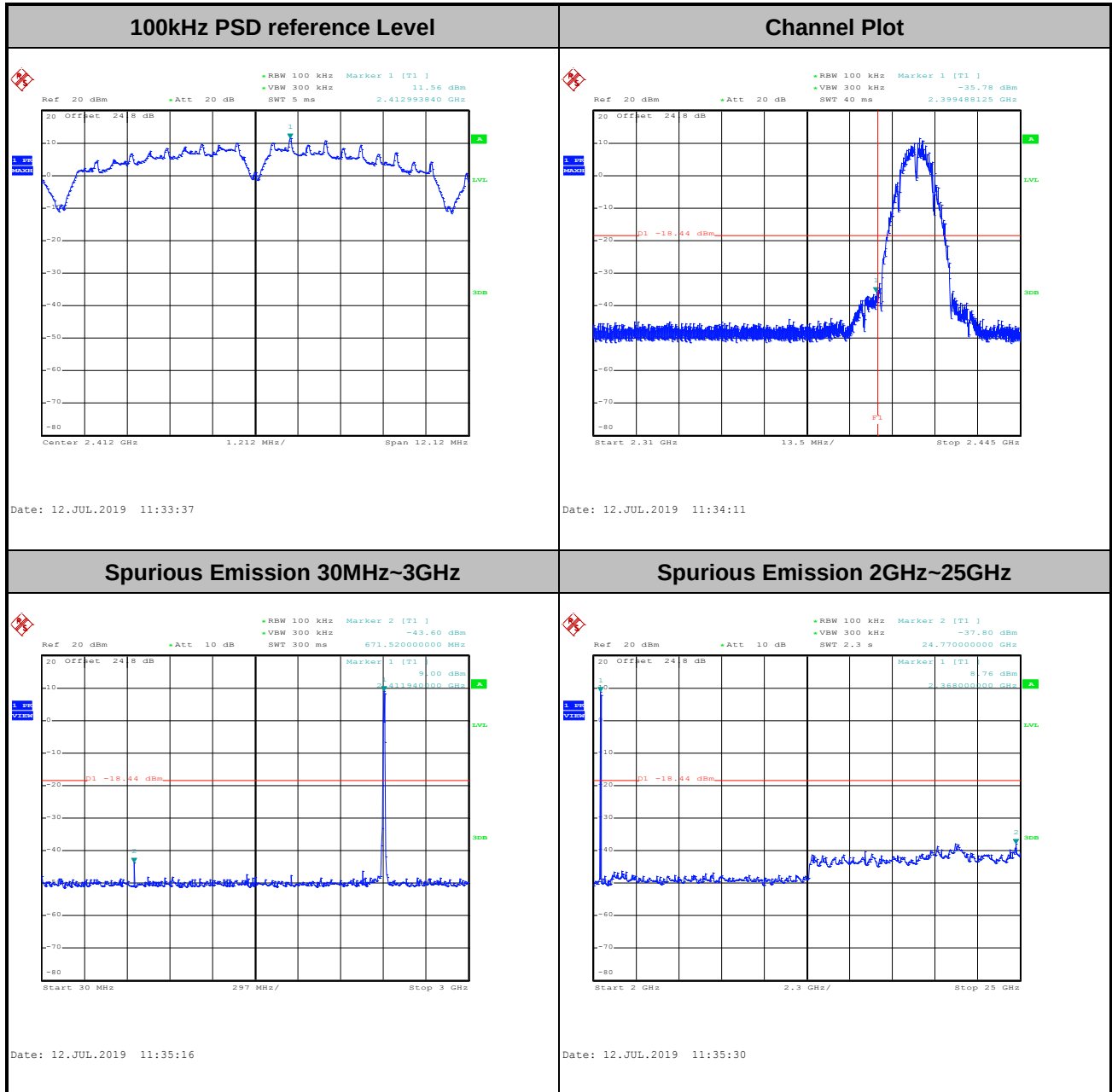
Test Mode :	802.11n HT40	Test Channel :	09
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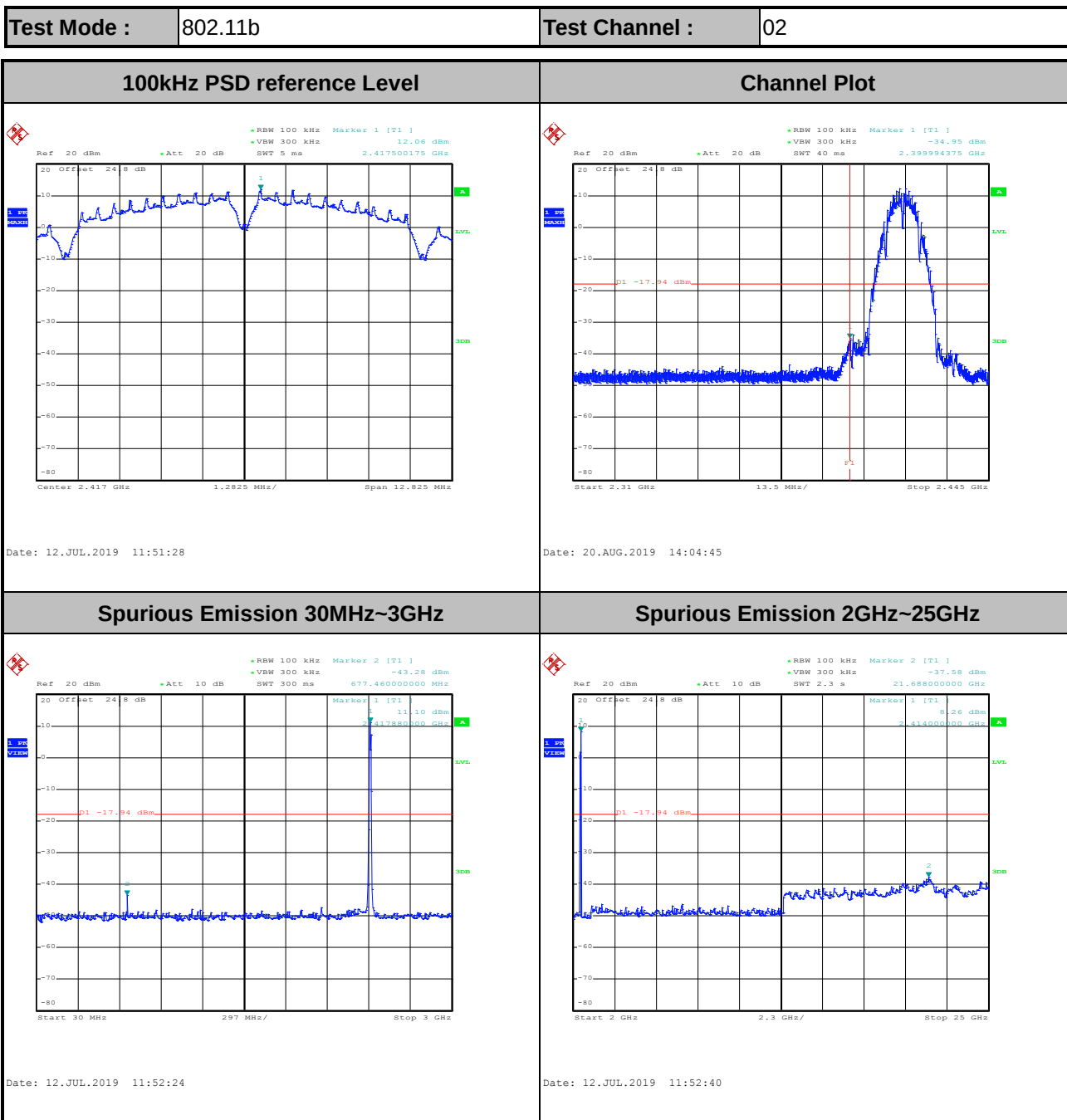




Number of TX = 2, Ant. 2 (Measured)

Test Mode :	802.11b	Test Channel :	01
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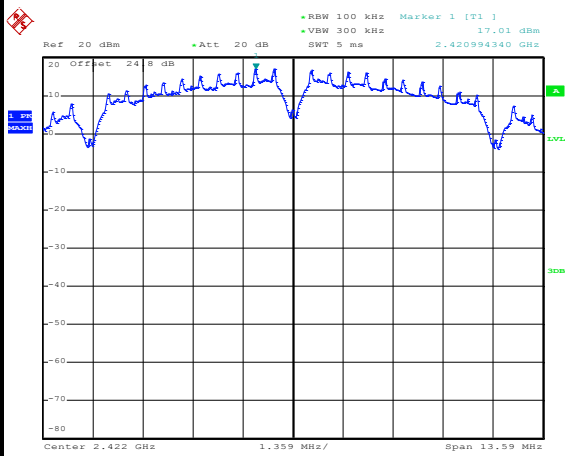






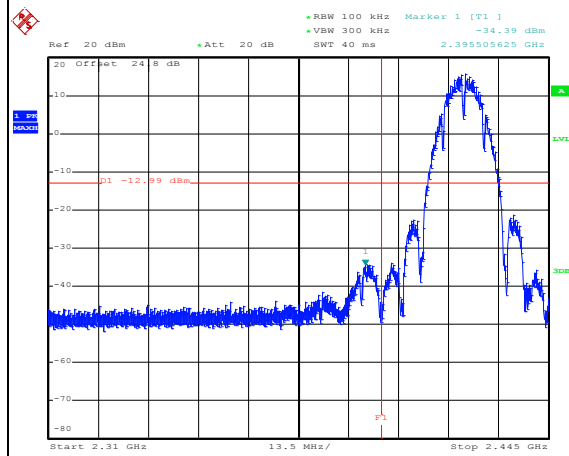
Test Mode :	802.11b	Test Channel :	03
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100kHz PSD reference Level



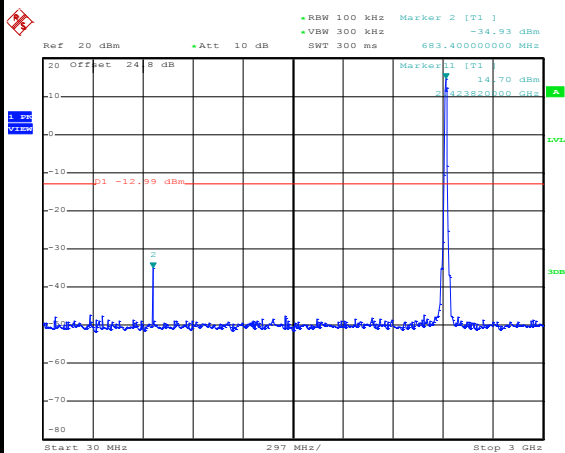
Date: 12.JUL.2019 12:06:27

Channel Plot



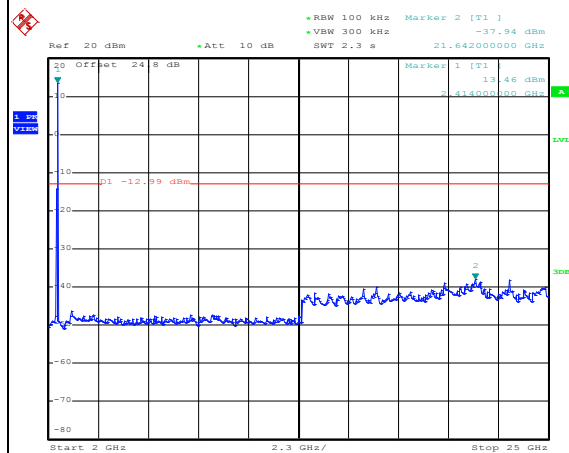
Date: 20.AUG.2019 11:39:53

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 12:06:43

Spurious Emission 2GHz~25GHz

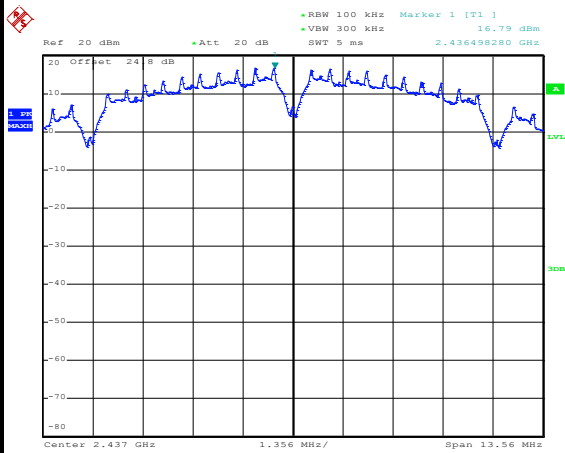


Date: 12.JUL.2019 12:06:58



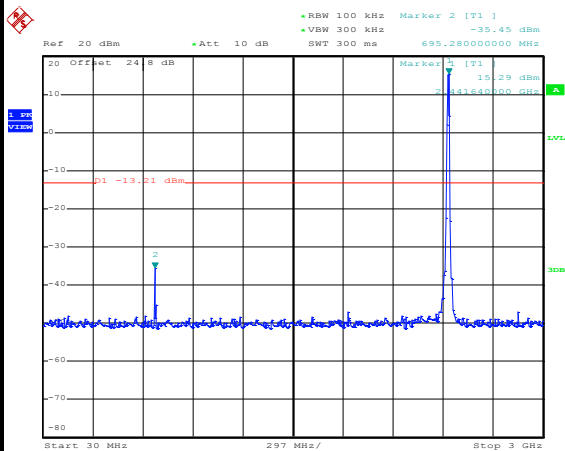
Test Mode :	802.11b	Test Channel :	06
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100kHz PSD reference Level



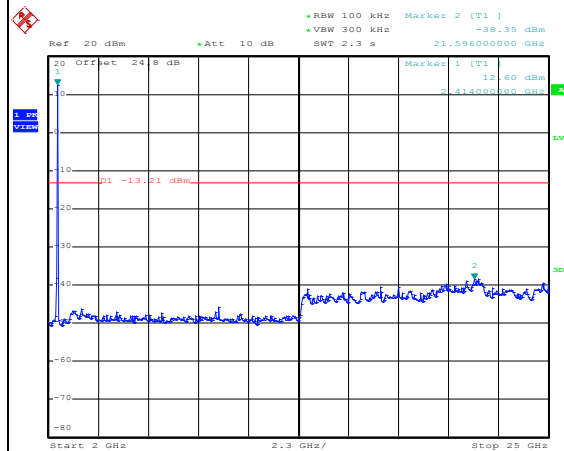
Date: 12.JUL.2019 12:10:16

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 12:10:34

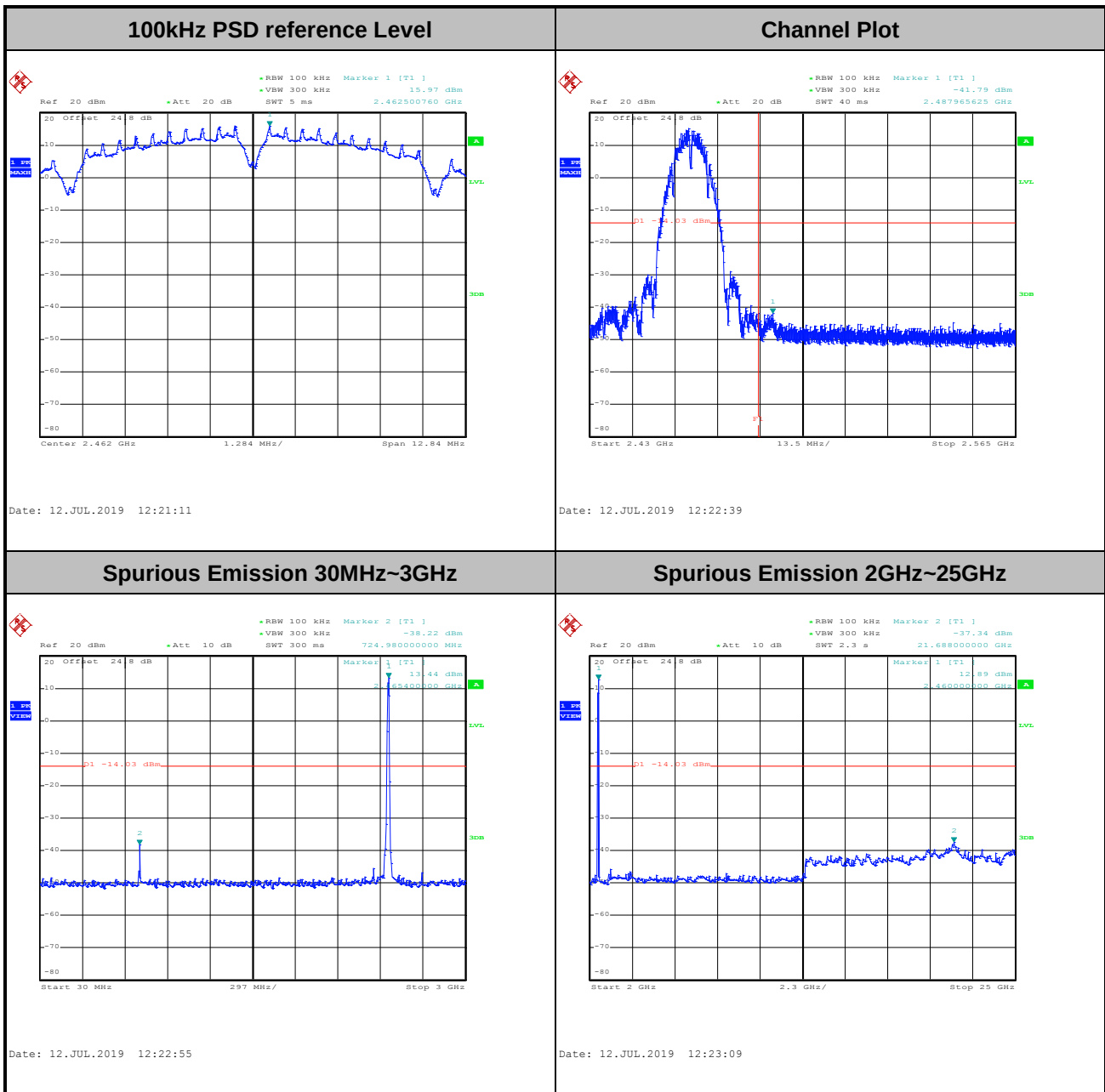
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 12:10:48

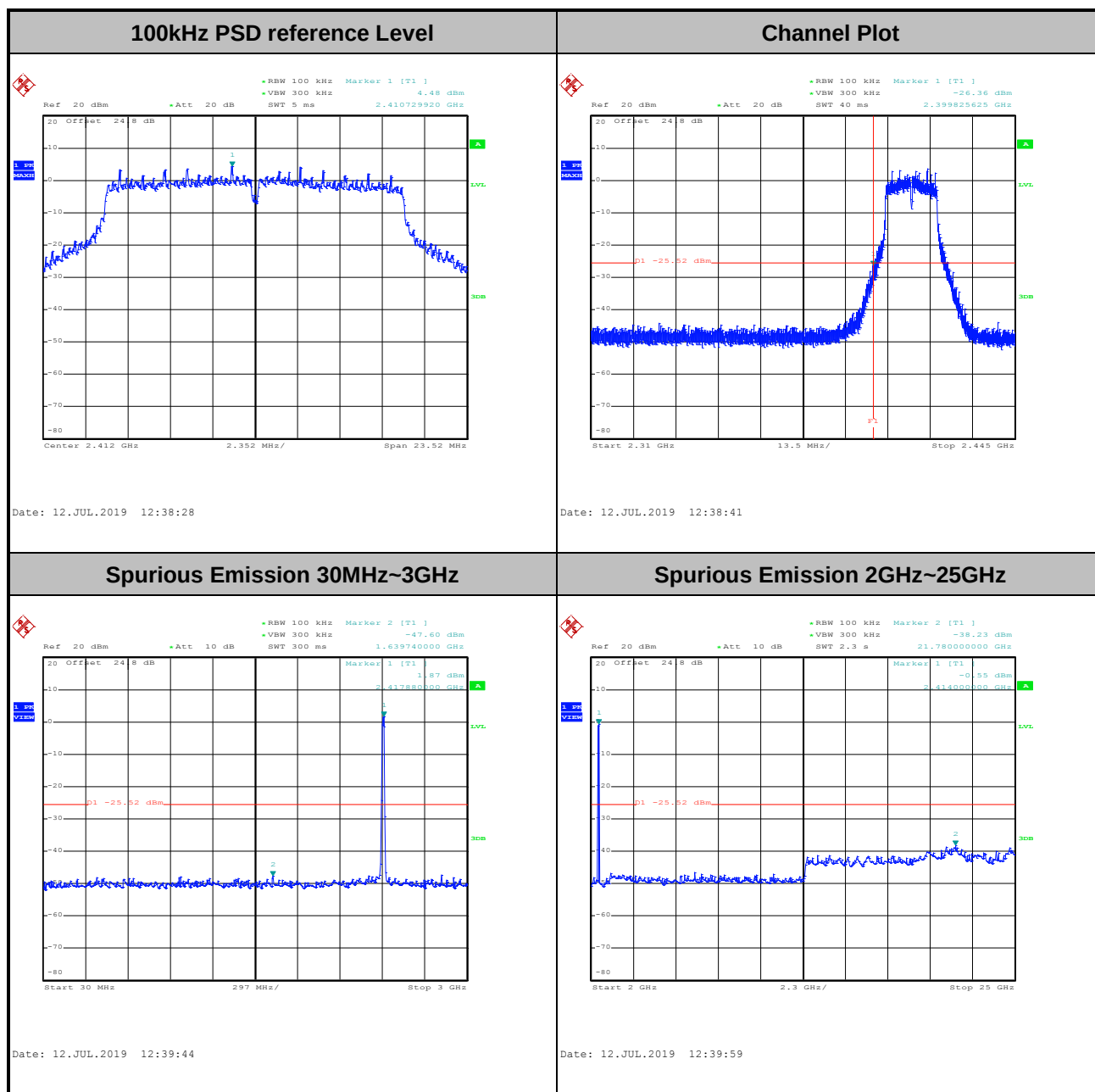


Test Mode :	802.11b	Test Channel :	11
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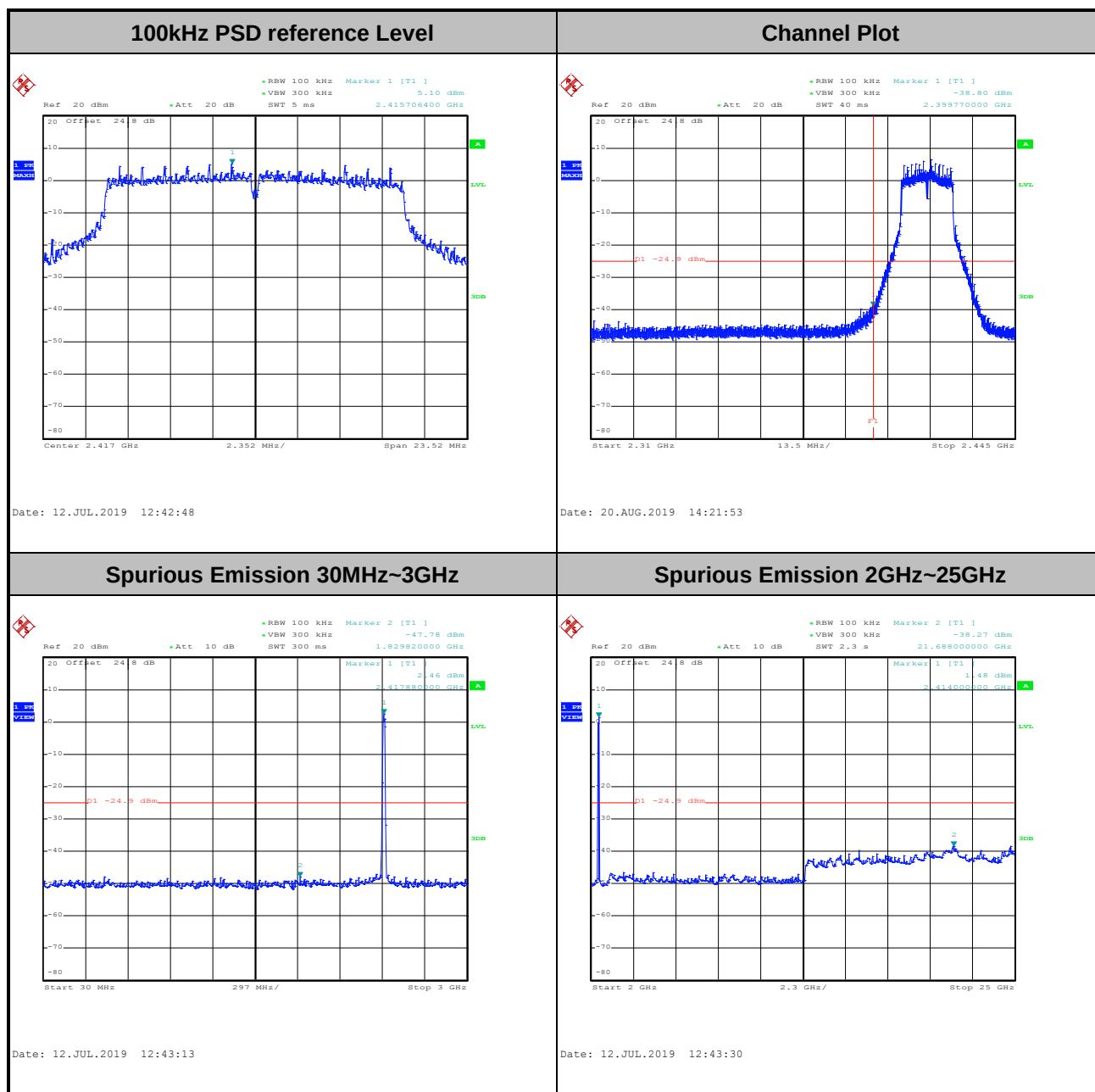


Test Mode :	802.11g	Test Channel :	01
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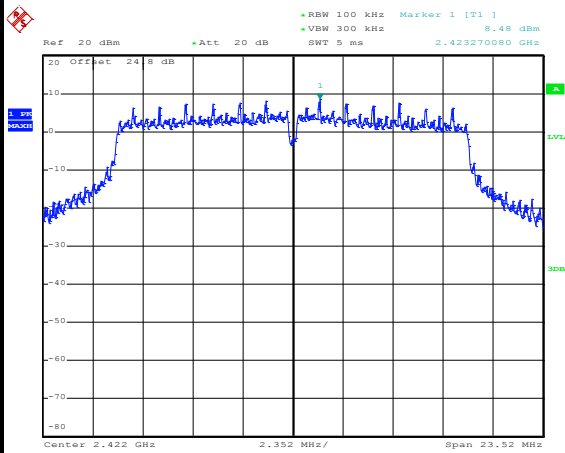
Test Mode :	802.11g	Test Channel :	02
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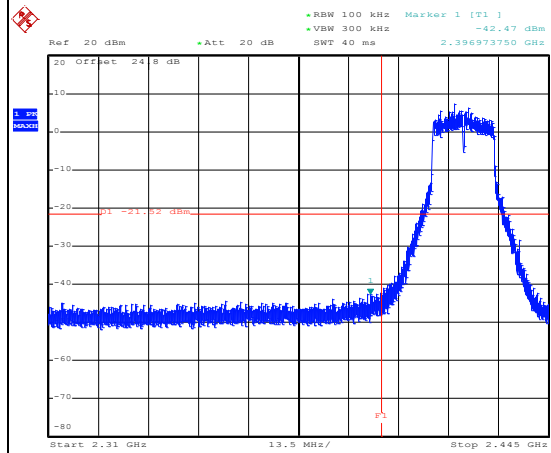
Test Mode :	802.11g	Test Channel :	03
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100kHz PSD reference Level



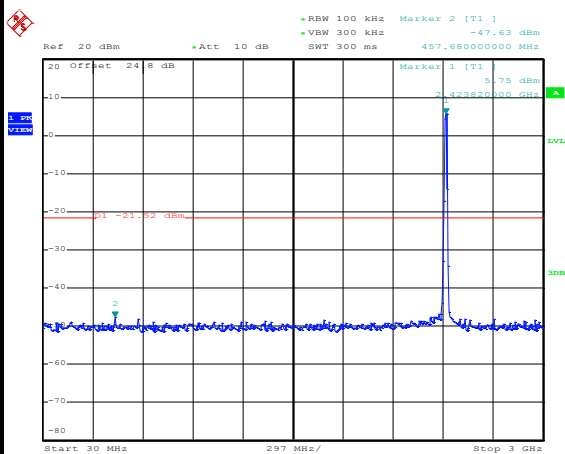
Date: 12.JUL.2019 12:56:37

Channel Plot



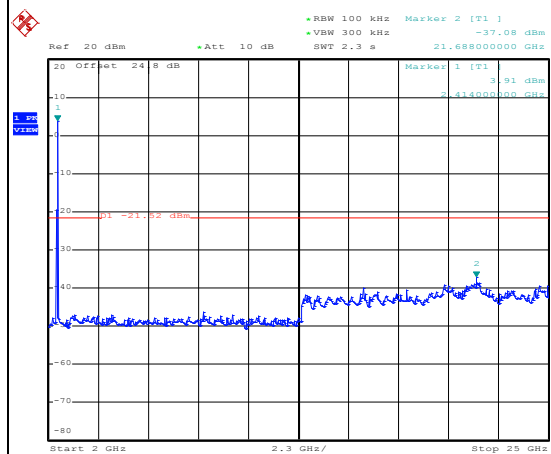
Date: 20.AUG.2019 11:44:53

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 12:57:02

Spurious Emission 2GHz~25GHz

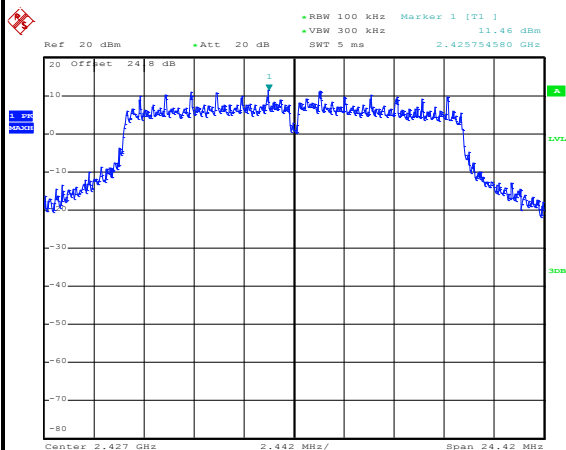


Date: 12.JUL.2019 12:57:17



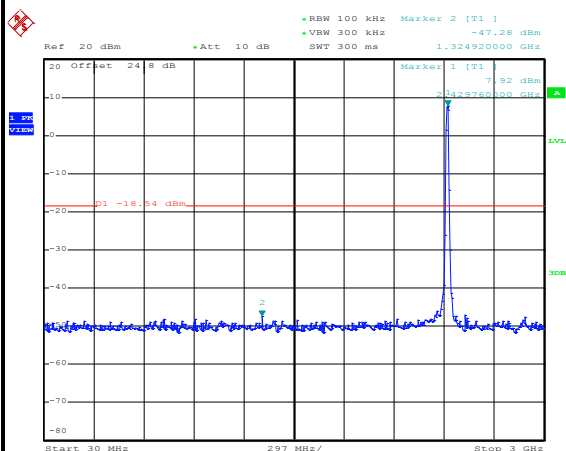
Test Mode :	802.11g	Test Channel :	04
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100kHz PSD reference Level



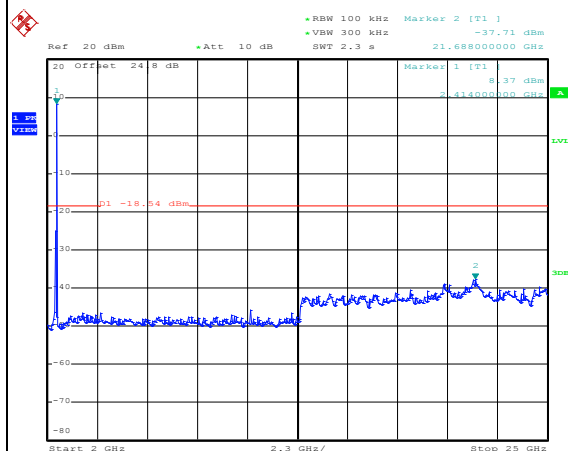
Date: 12.JUL.2019 14:42:13

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 14:42:36

Spurious Emission 2GHz~25GHz

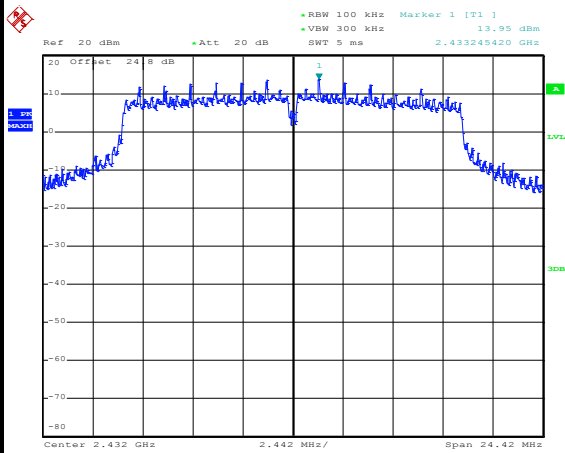


Date: 12.JUL.2019 14:42:50



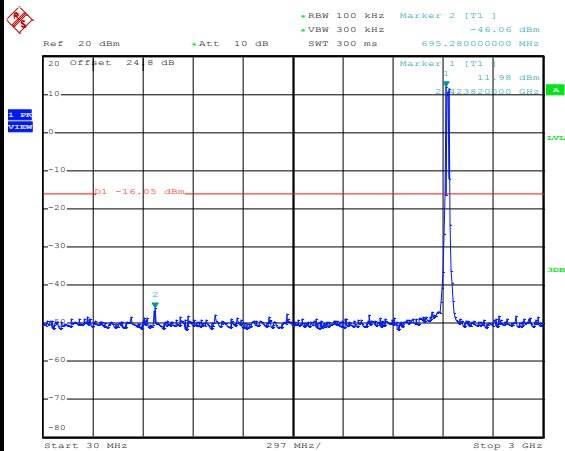
Test Mode :	802.11g	Test Channel :	05
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100kHz PSD reference Level



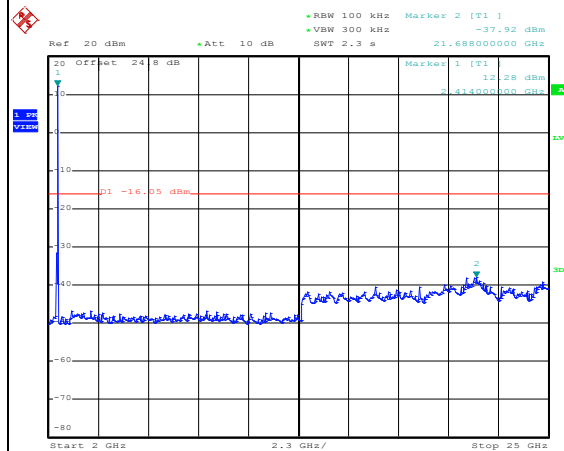
Date: 12.JUL.2019 14:50:21

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 14:50:43

Spurious Emission 2GHz~25GHz

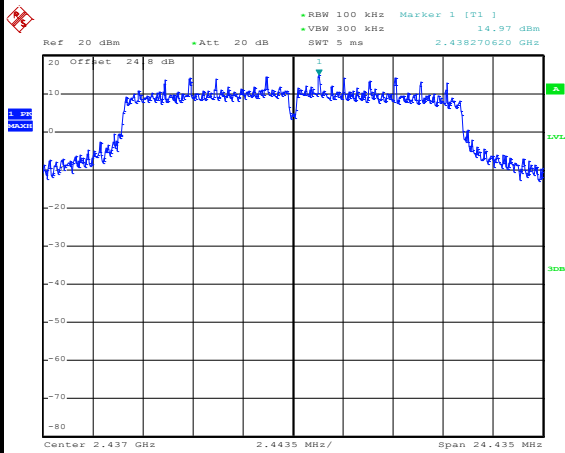


Date: 12.JUL.2019 14:50:58



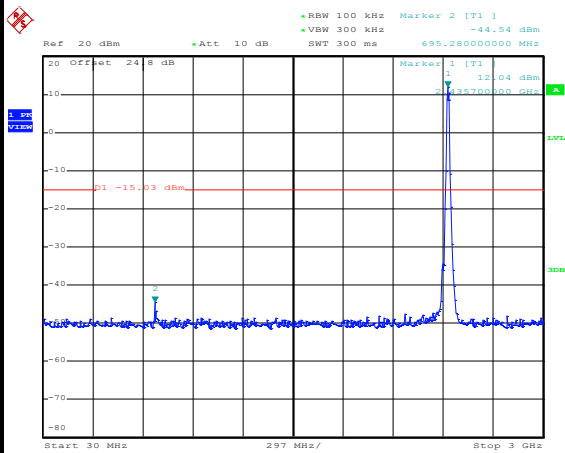
Test Mode :	802.11g	Test Channel :	06
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100kHz PSD reference Level



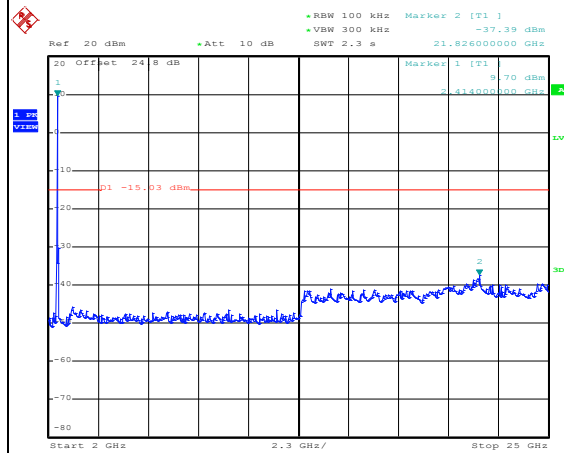
Date: 12.JUL.2019 15:00:10

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:00:36

Spurious Emission 2GHz~25GHz

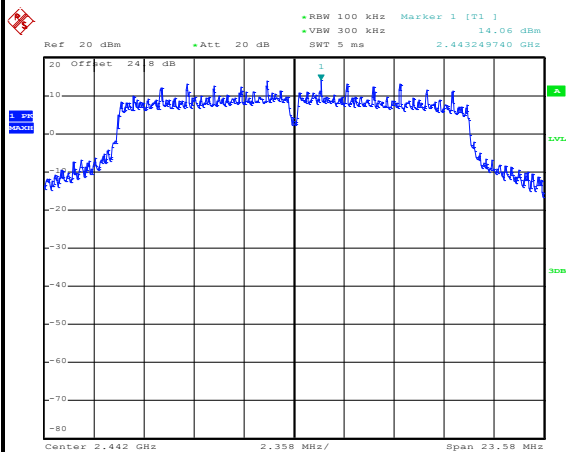


Date: 12.JUL.2019 15:00:53



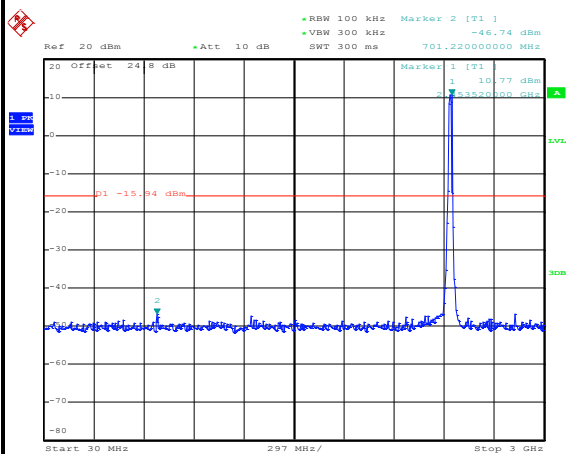
Test Mode :	802.11g	Test Channel :	07
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100kHz PSD reference Level



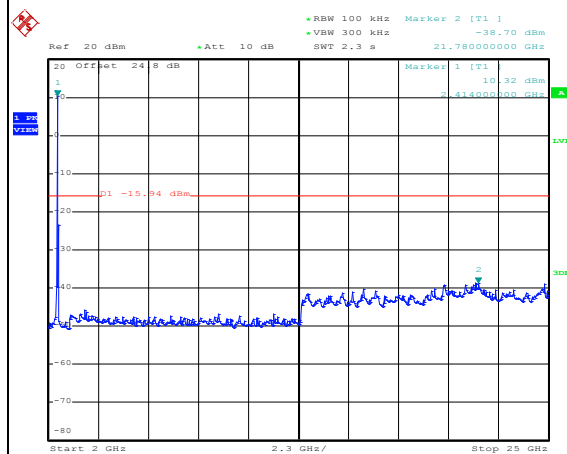
Date: 12.JUL.2019 15:03:56

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:04:20

Spurious Emission 2GHz~25GHz

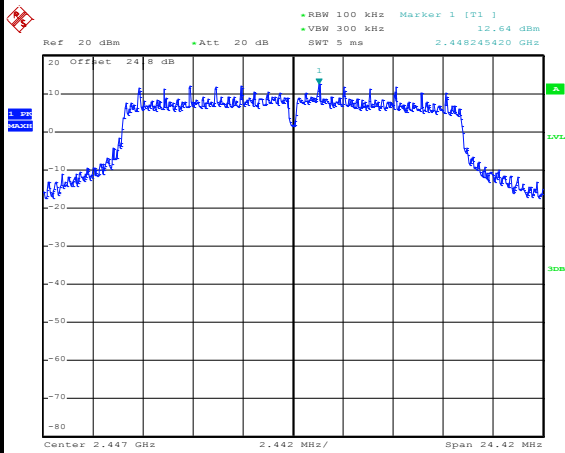


Date: 12.JUL.2019 15:04:34



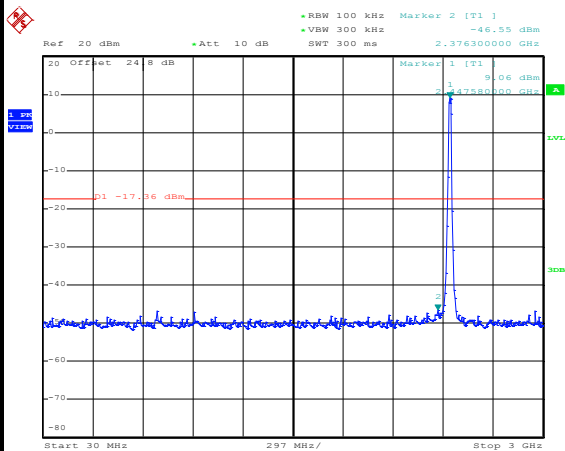
Test Mode :	802.11g	Test Channel :	08
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100kHz PSD reference Level



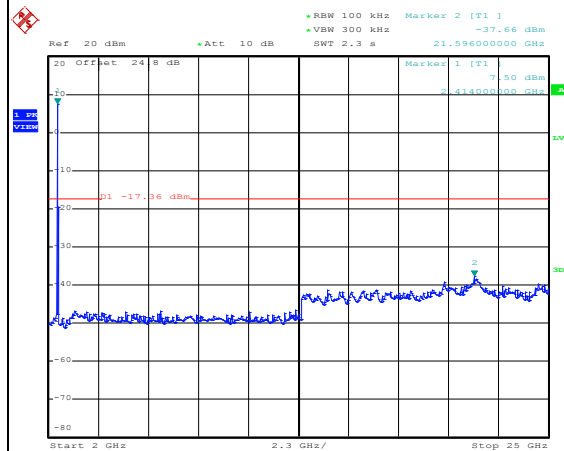
Date: 12.JUL.2019 15:14:05

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:14:27

Spurious Emission 2GHz~25GHz

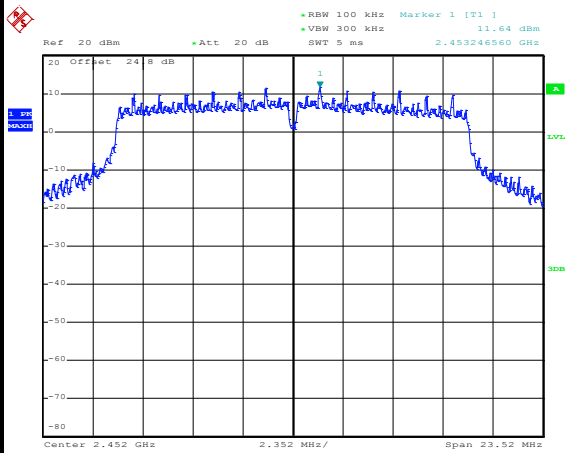


Date: 12.JUL.2019 15:14:41



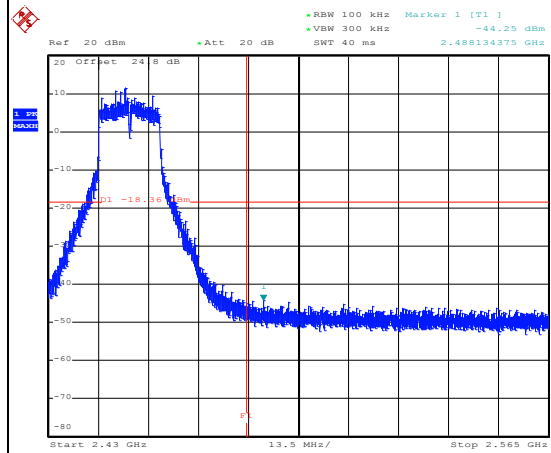
Test Mode :	802.11g	Test Channel :	09
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100kHz PSD reference Level



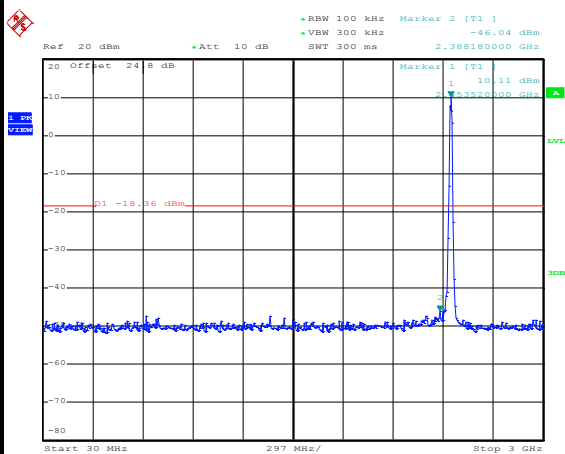
Date: 12.JUL.2019 15:17:38

Channel Plot



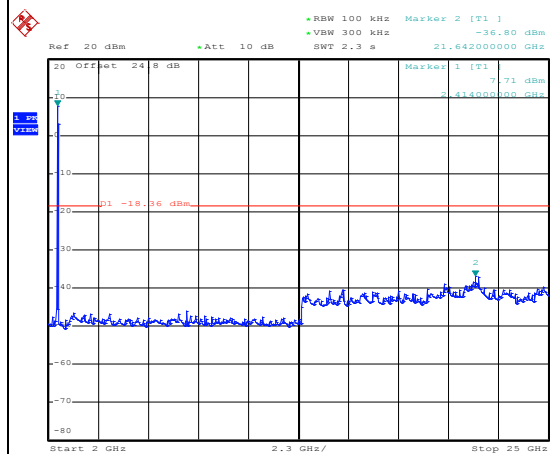
Date: 20.AUG.2019 11:46:59

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:17:56

Spurious Emission 2GHz~25GHz

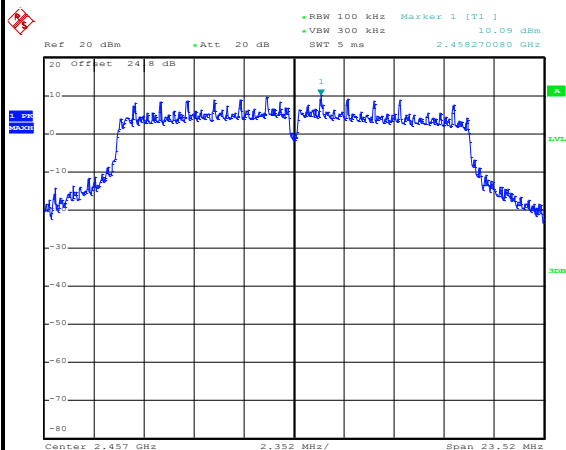


Date: 12.JUL.2019 15:18:11



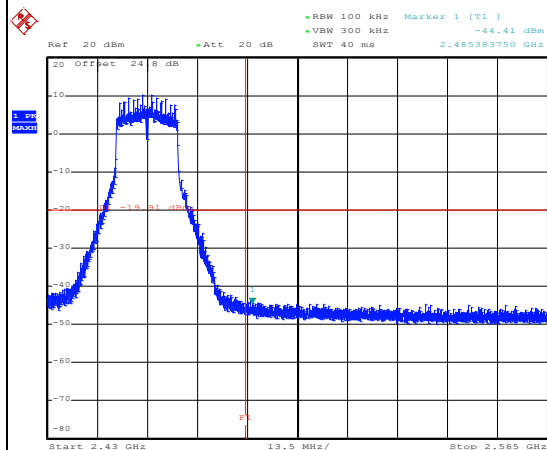
Test Mode :	802.11g	Test Channel :	10
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100kHz PSD reference Level



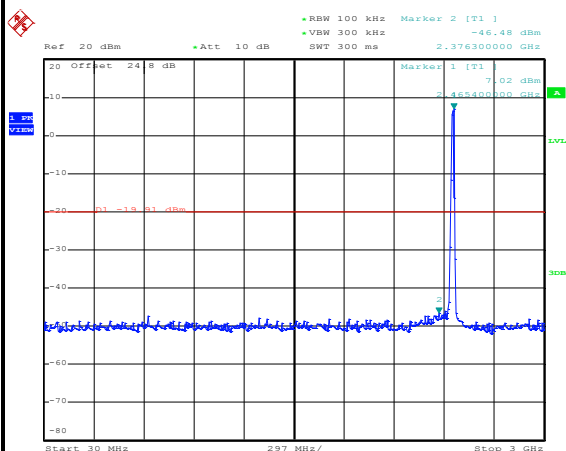
Date: 12.JUL.2019 15:27:06

Channel Plot



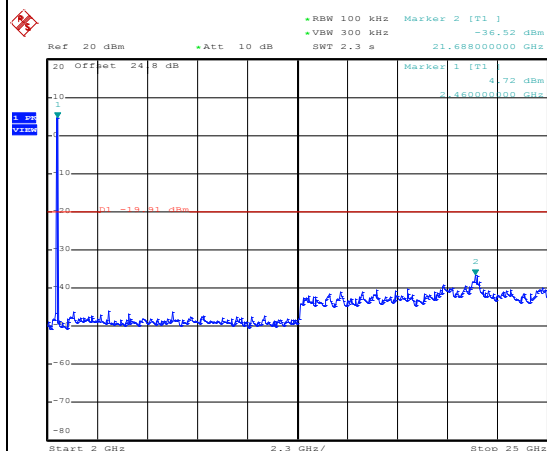
Date: 20.AUG.2019 14:27:52

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 15:27:24

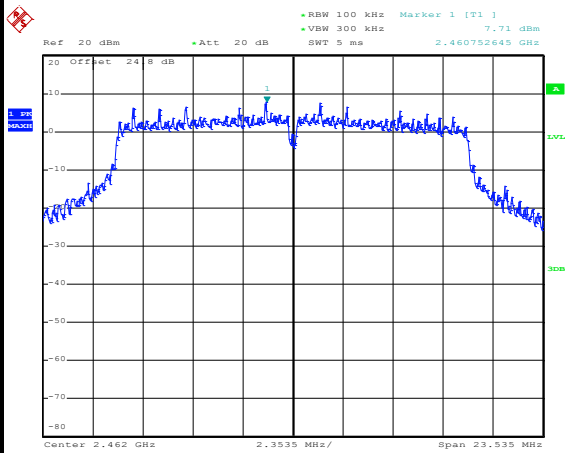
Spurious Emission 2GHz~25GHz



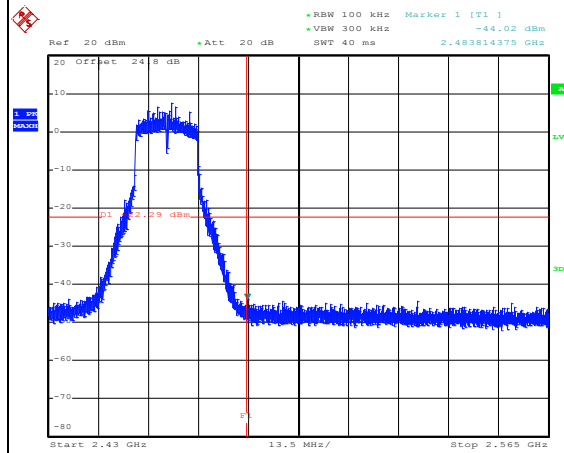
Date: 12.JUL.2019 15:27:38



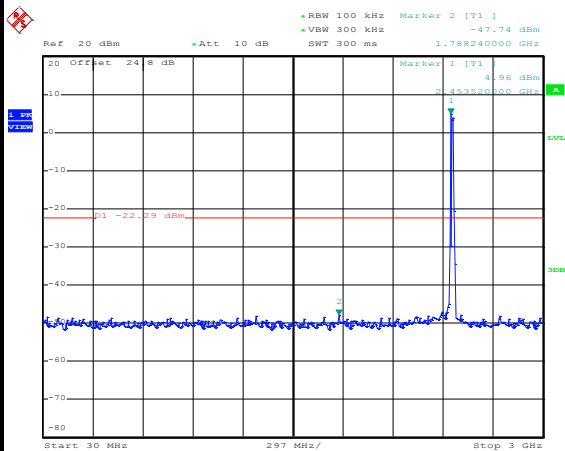
Test Mode :	802.11g	Test Channel :	11
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100kHz PSD reference Level

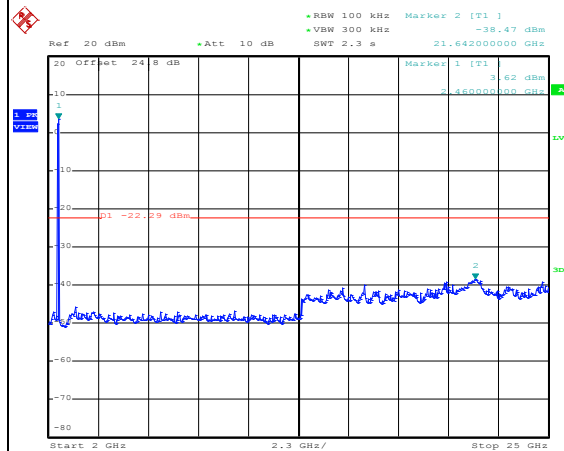
Date: 12.JUL.2019 15:31:18

Channel Plot

Date: 12.JUL.2019 15:31:38

Spurious Emission 30MHz~3GHz

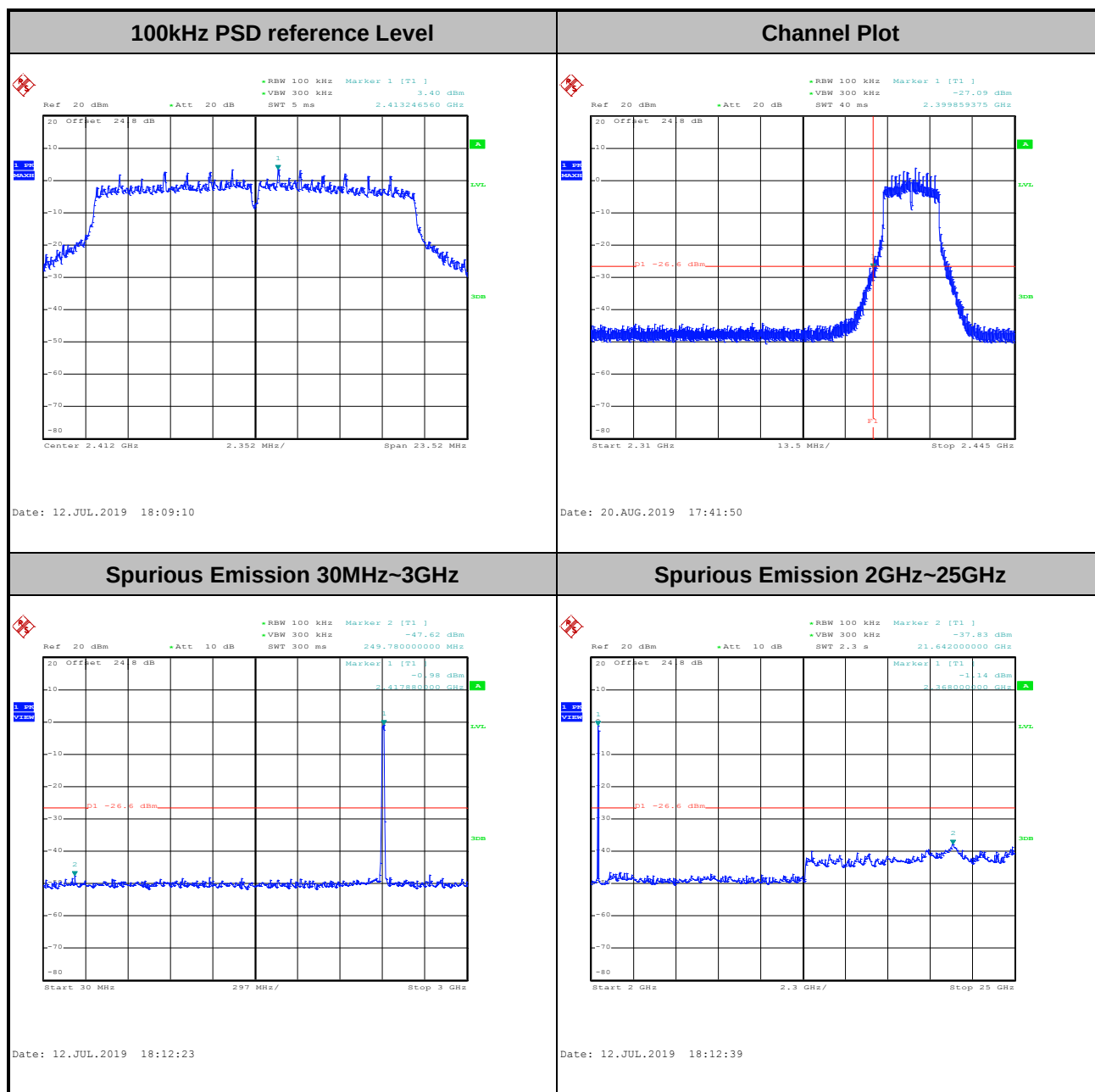
Date: 12.JUL.2019 15:32:32

Spurious Emission 2GHz~25GHz

Date: 12.JUL.2019 15:32:50



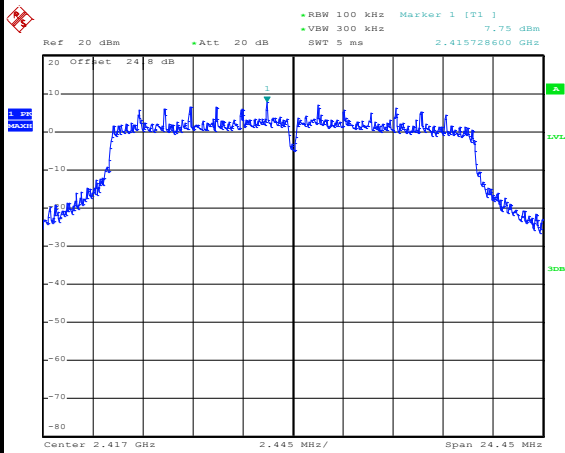
Test Mode :	802.11n HT20	Test Channel :	01
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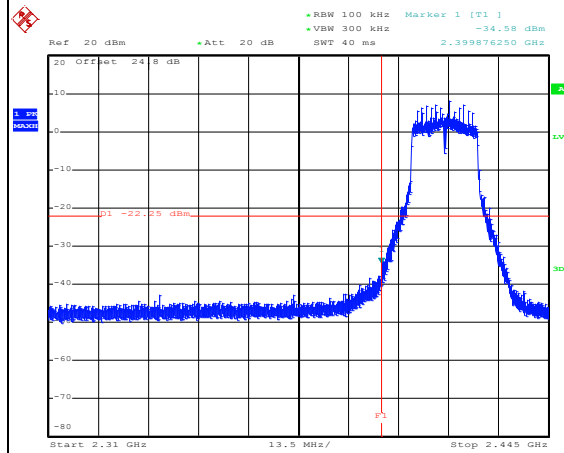
Test Mode :	802.11n HT20	Test Channel :	02
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100kHz PSD reference Level



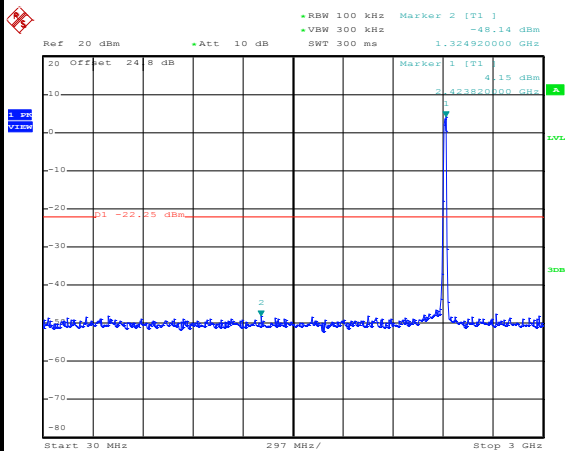
Date: 12.JUL.2019 18:15:38

Channel Plot



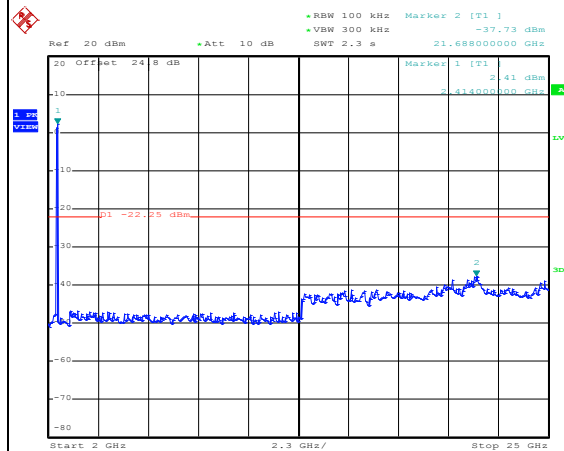
Date: 20.AUG.2019 14:59:53

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 18:16:00

Spurious Emission 2GHz~25GHz

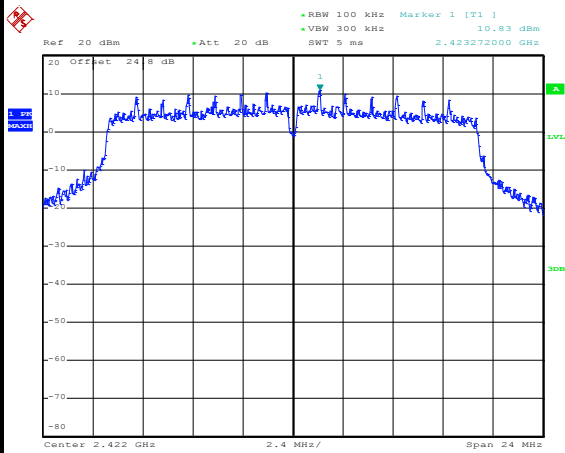


Date: 12.JUL.2019 18:16:14



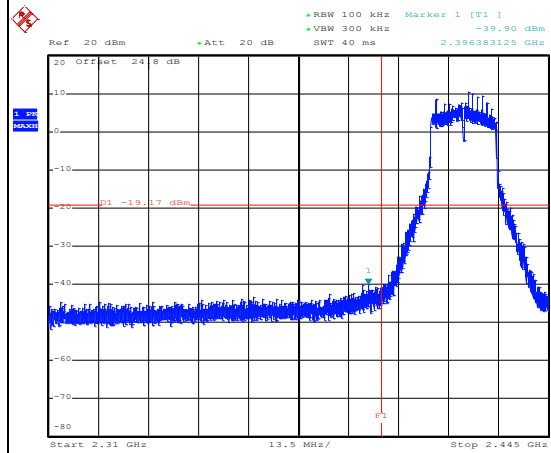
Test Mode :	802.11n HT20	Test Channel :	03
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100kHz PSD reference Level



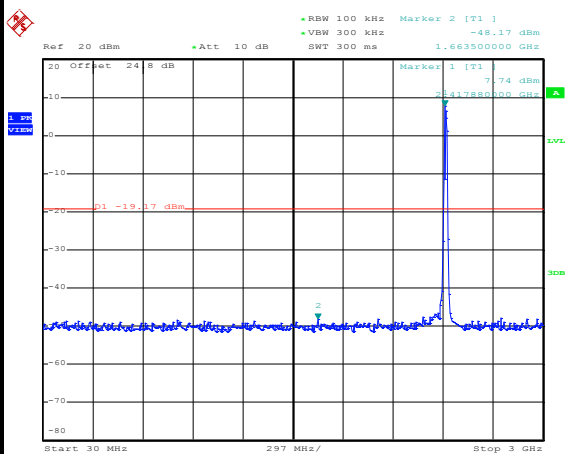
Date: 12.JUL.2019 20:07:52

Channel Plot



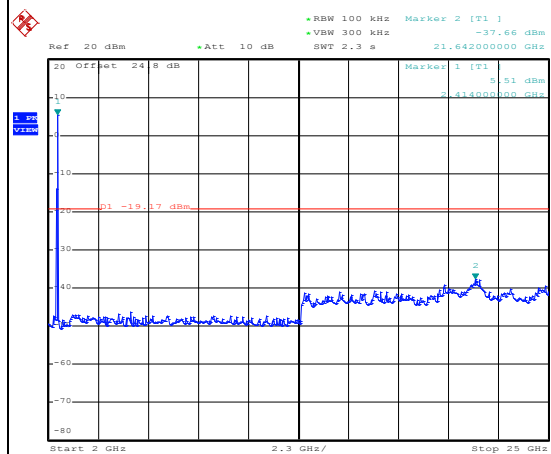
Date: 20.AUG.2019 14:46:05

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:08:18

Spurious Emission 2GHz~25GHz

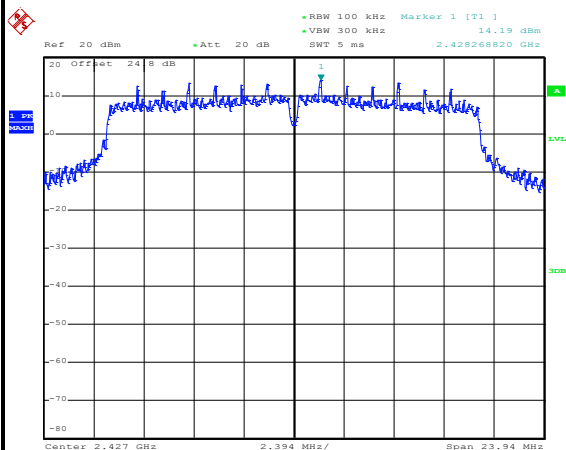


Date: 12.JUL.2019 20:08:38



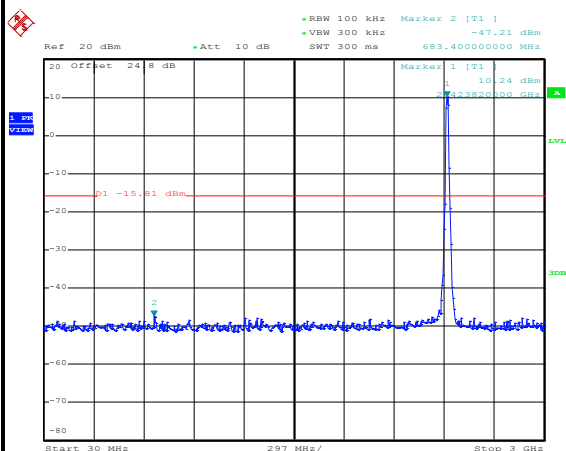
Test Mode :	802.11n HT20	Test Channel :	04
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100kHz PSD reference Level



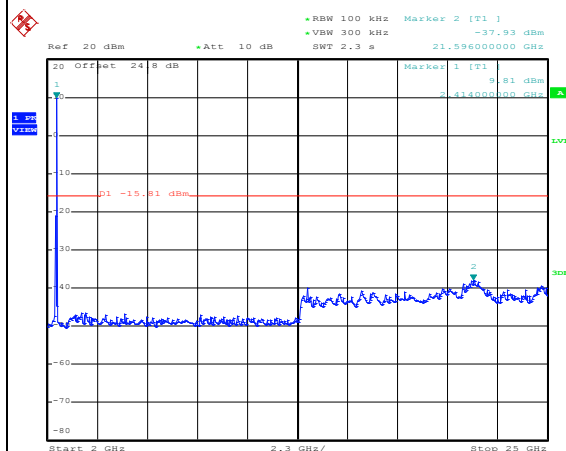
Date: 12.JUL.2019 20:18:23

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:22:47

Spurious Emission 2GHz~25GHz

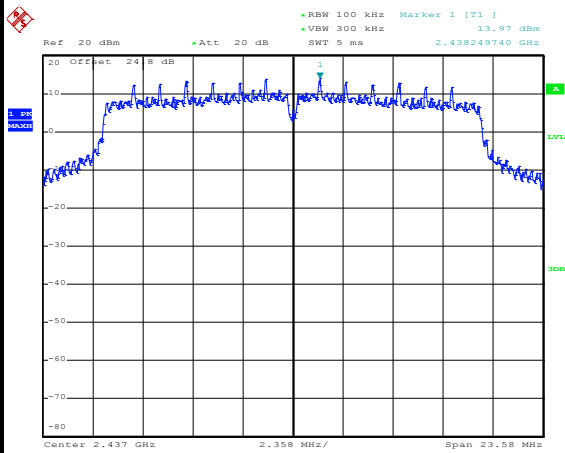


Date: 12.JUL.2019 20:23:03



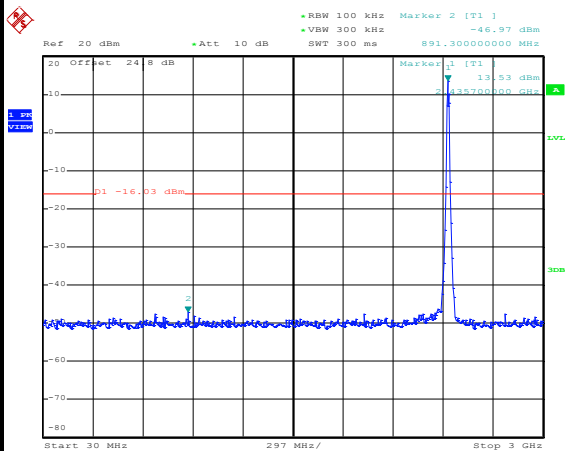
Test Mode :	802.11n HT20	Test Channel :	06
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100kHz PSD reference Level



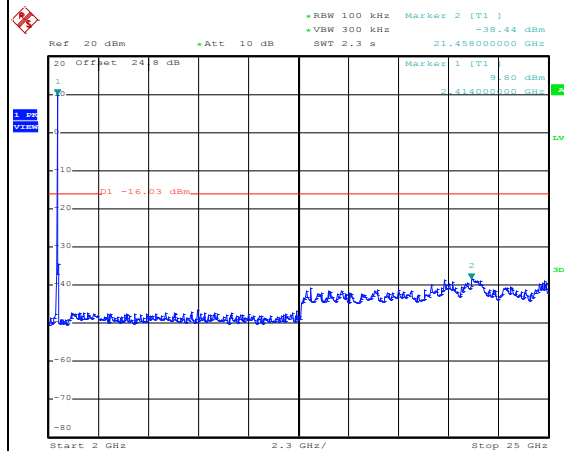
Date: 12.JUL.2019 20:39:57

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:40:33

Spurious Emission 2GHz~25GHz

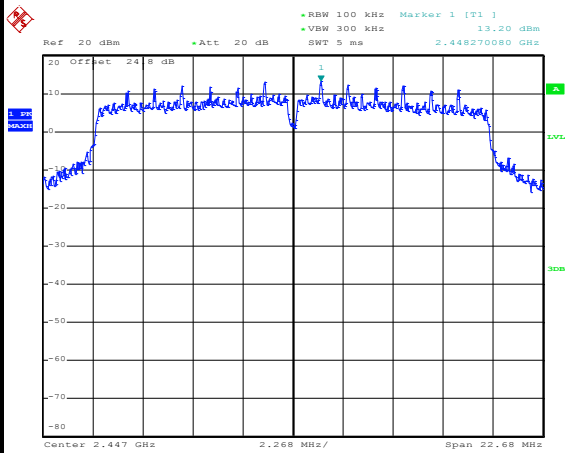


Date: 12.JUL.2019 20:40:55



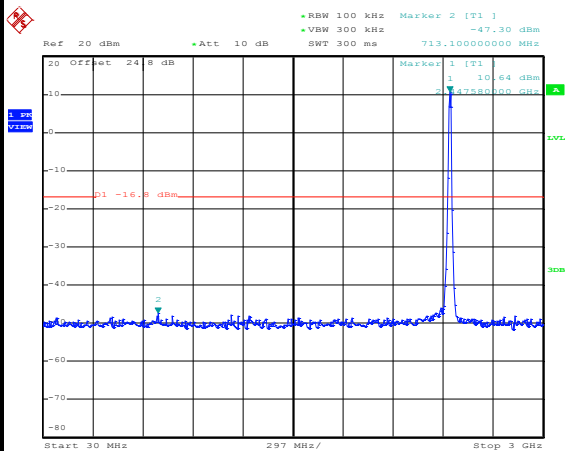
Test Mode :	802.11n HT20	Test Channel :	08
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100kHz PSD reference Level



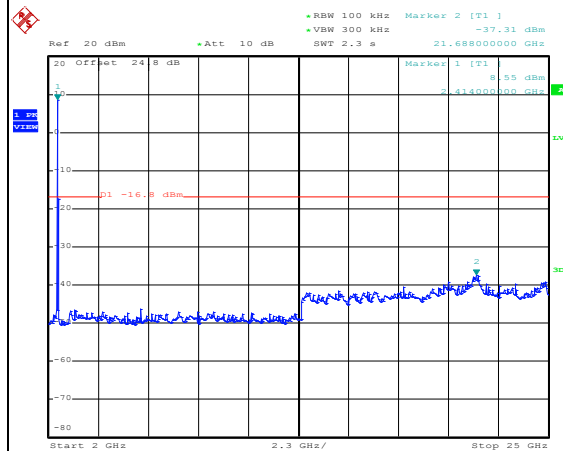
Date: 12.JUL.2019 20:52:49

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 20:53:09

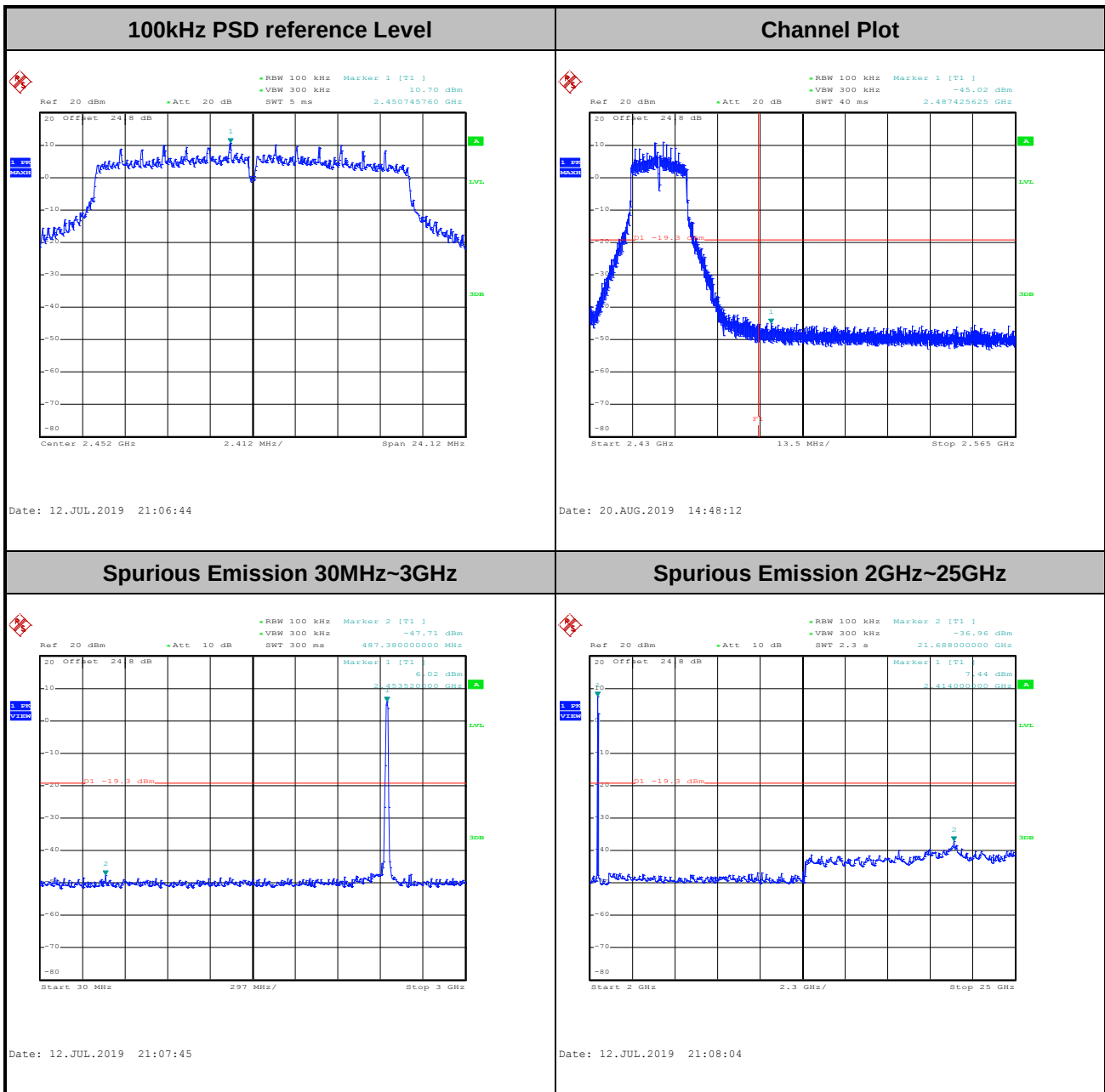
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 20:53:28

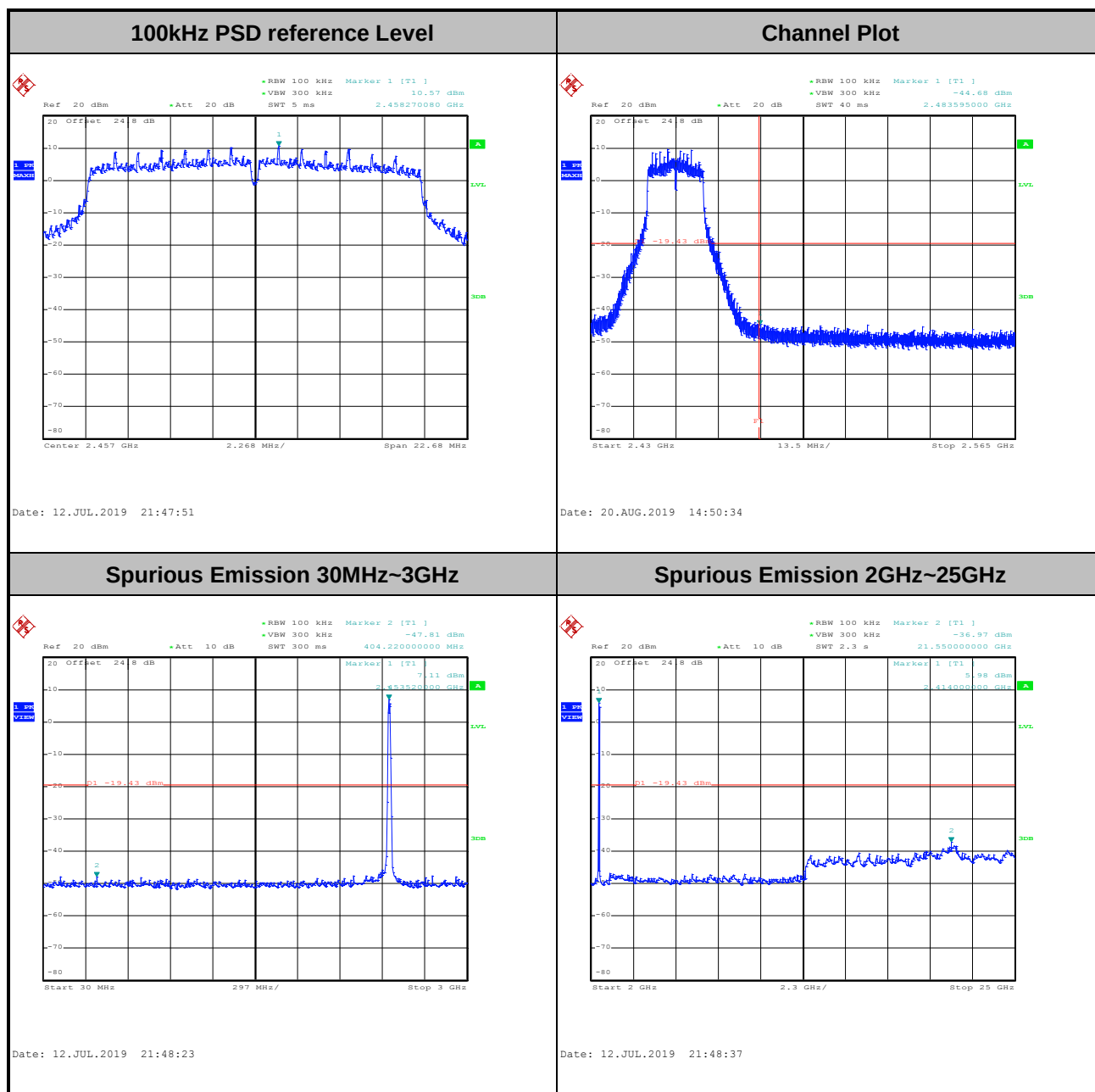


Test Mode :	802.11n HT20	Test Channel :	09
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Test Mode :	802.11n HT20	Test Channel :	10
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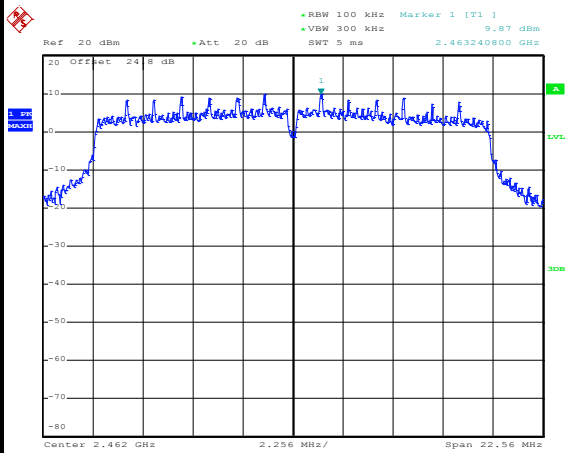




Test Mode : 802.11n HT20

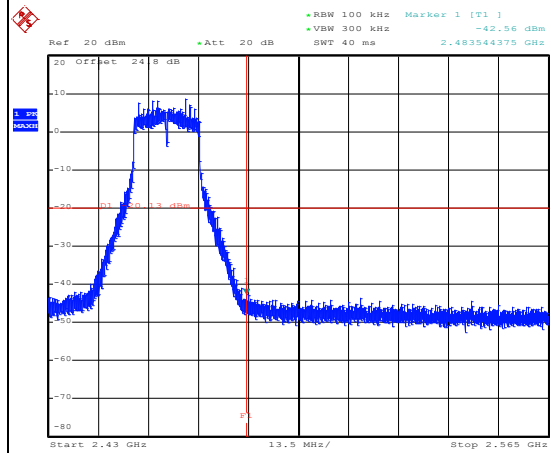
Test Channel : 11

100kHz PSD reference Level



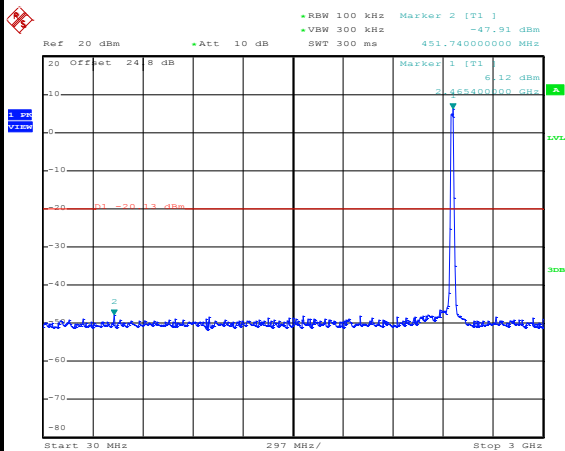
Date: 12.JUL.2019 21:59:06

Channel Plot



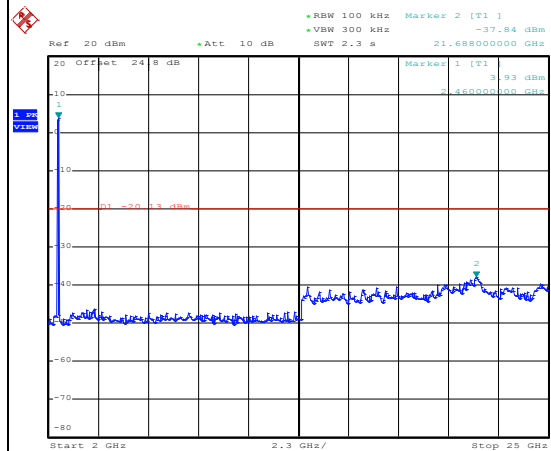
Date: 12.JUL.2019 21:59:45

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 22:00:07

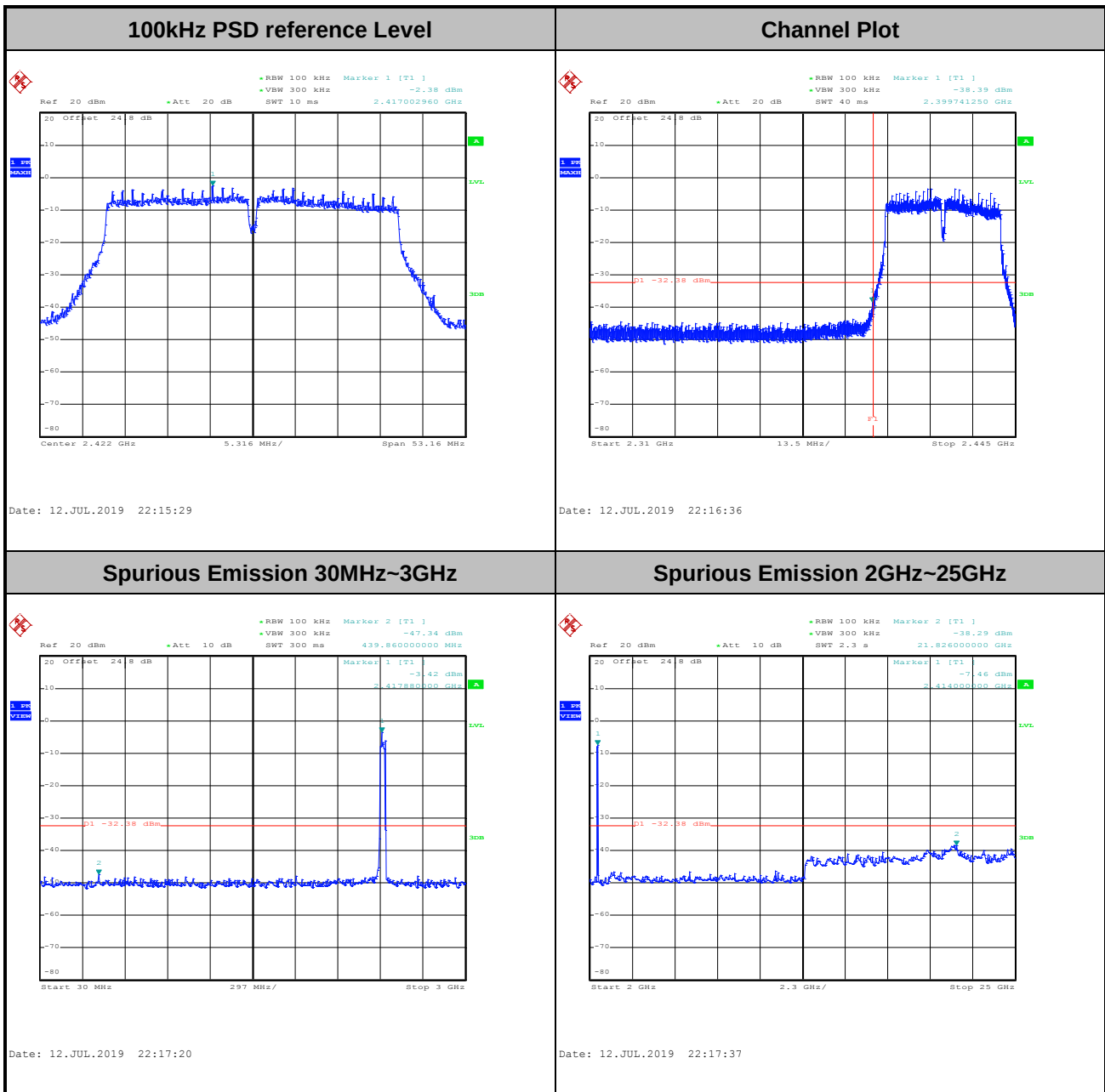
Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 22:00:36

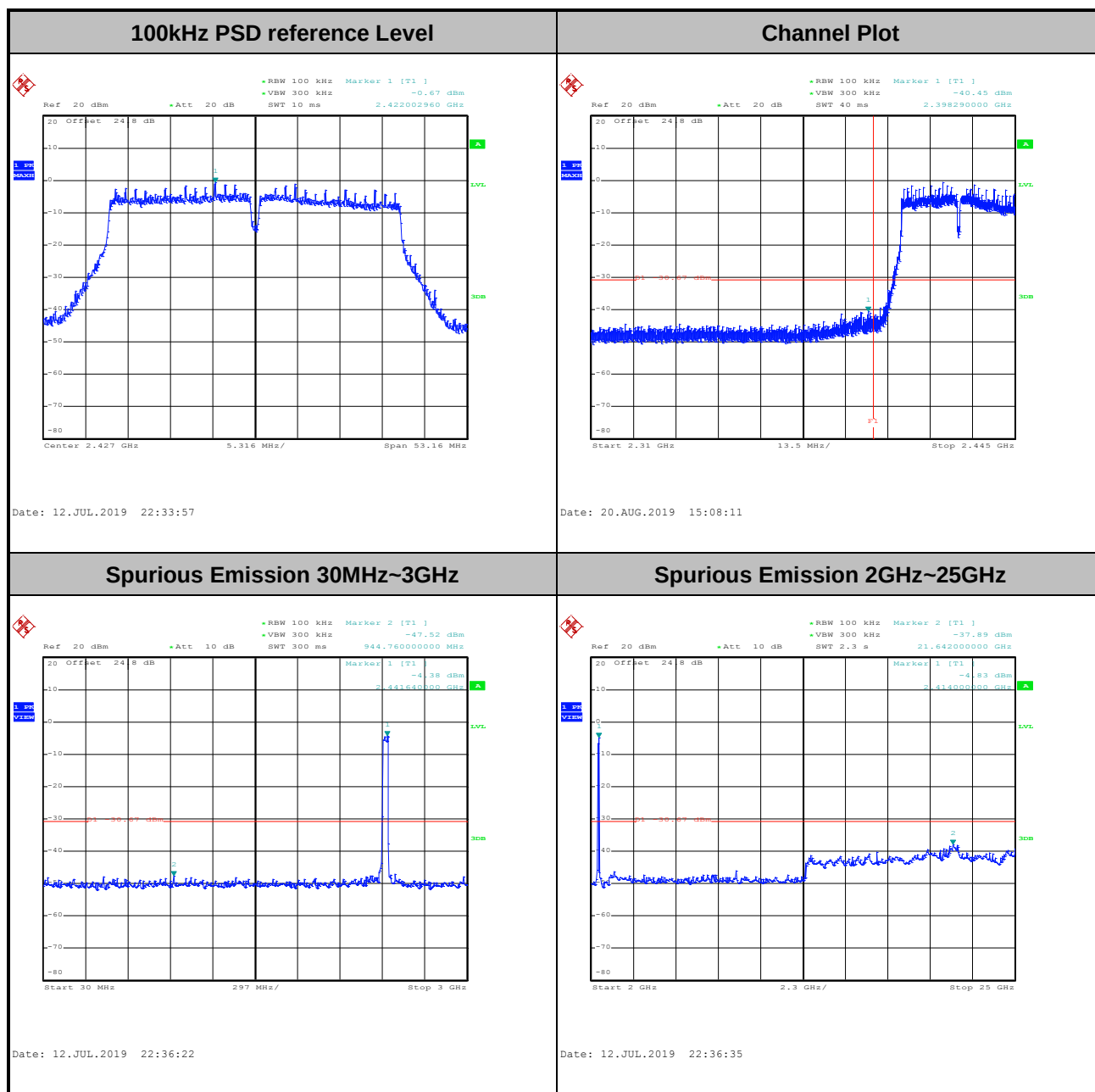


Test Mode :	802.11n HT40	Test Channel :	03
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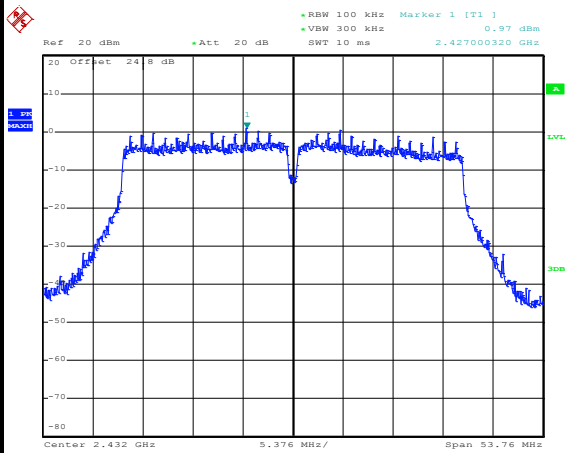
Test Mode :	802.11n HT40	Test Channel :	04
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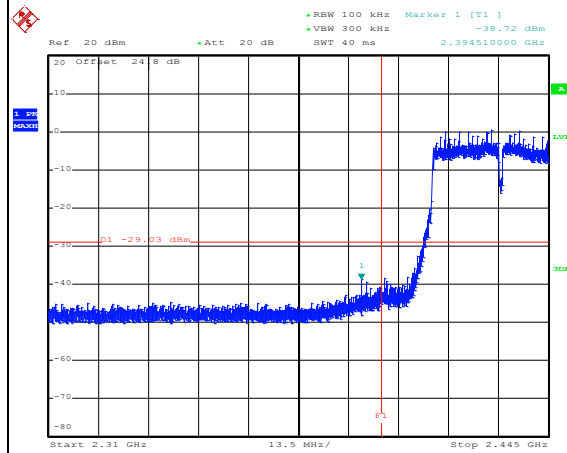
Test Mode :	802.11n HT40	Test Channel :	05
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100kHz PSD reference Level



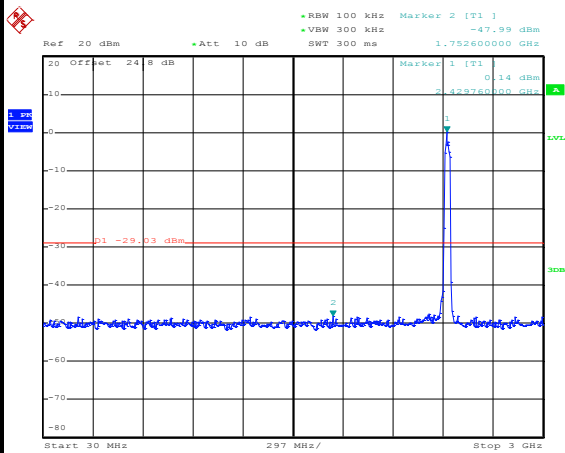
Date: 12.JUL.2019 22:44:20

Channel Plot



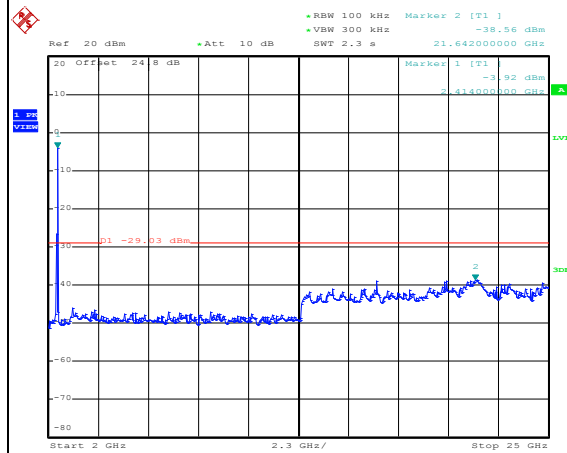
Date: 20.AUG.2019 15:09:50

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 22:44:43

Spurious Emission 2GHz~25GHz

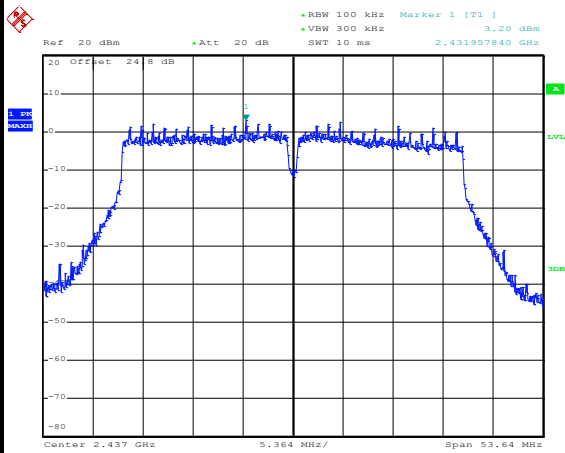


Date: 12.JUL.2019 22:45:04



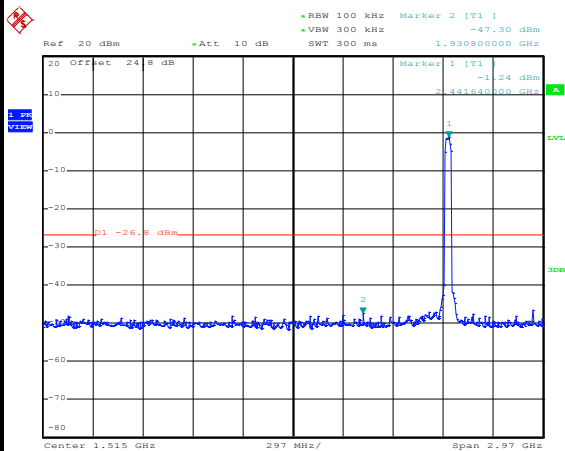
Test Mode :	802.11n HT40	Test Channel :	06
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100kHz PSD reference Level



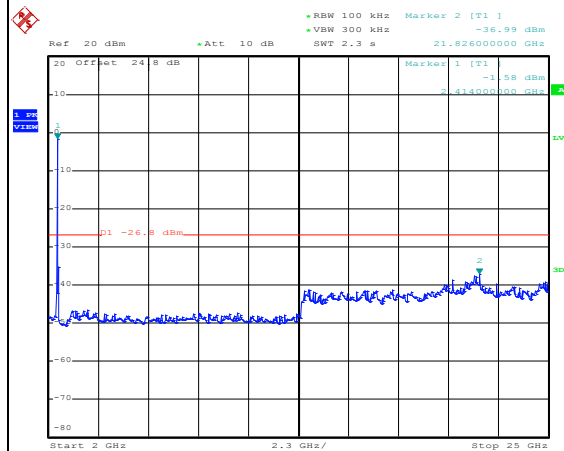
Date: 12.JUL.2019 23:07:02

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 23:07:40

Spurious Emission 2GHz~25GHz

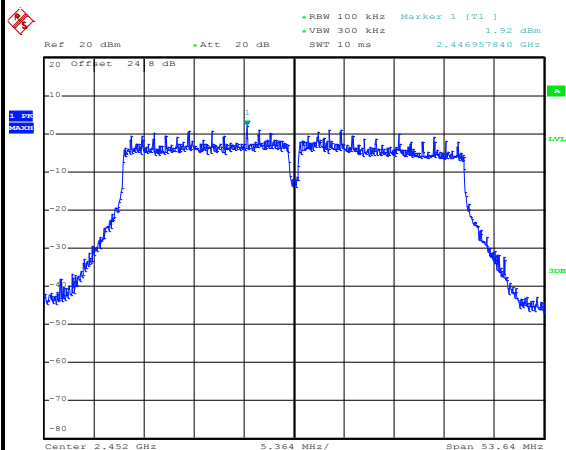


Date: 12.JUL.2019 23:07:58



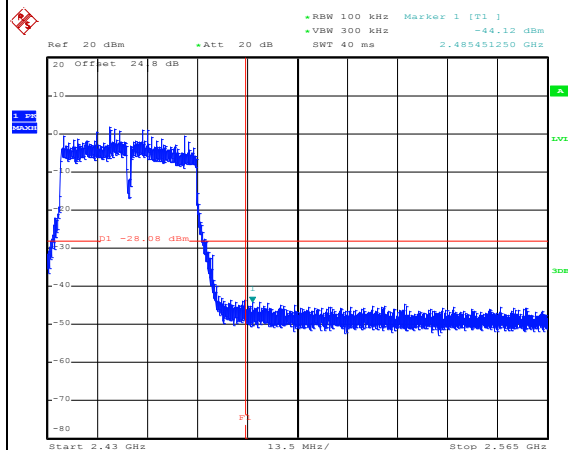
Test Mode :	802.11n HT40	Test Channel :	09
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100kHz PSD reference Level



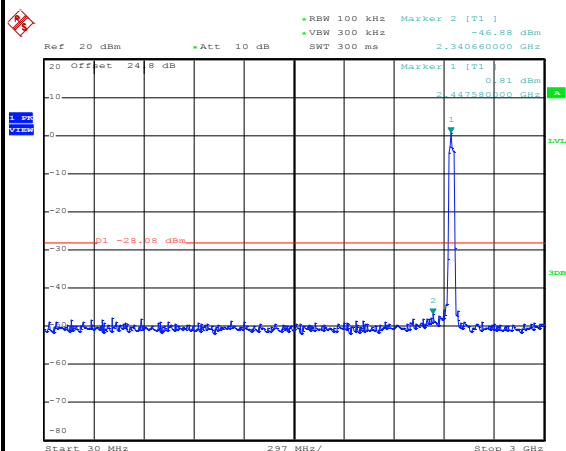
Date: 12.JUL.2019 23:28:46

Channel Plot



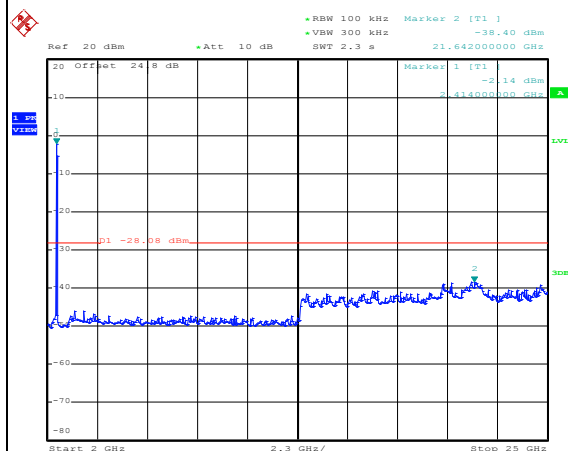
Date: 12.JUL.2019 23:29:21

Spurious Emission 30MHz~3GHz



Date: 12.JUL.2019 23:30:48

Spurious Emission 2GHz~25GHz



Date: 12.JUL.2019 23:31:03

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

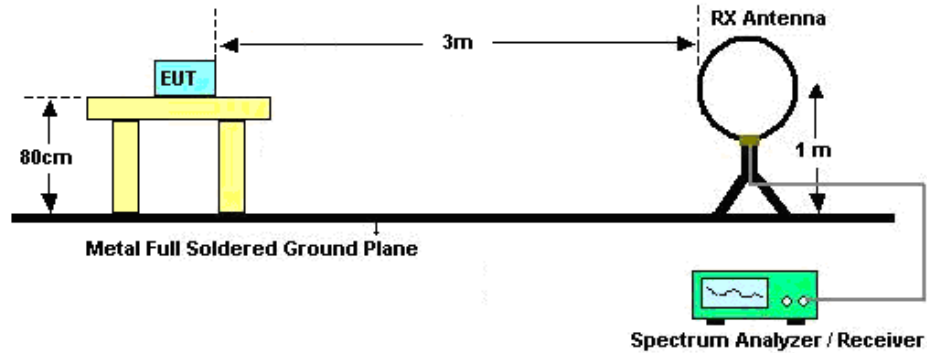
See list of measuring equipment of this test report.

3.5.3 Test Procedures

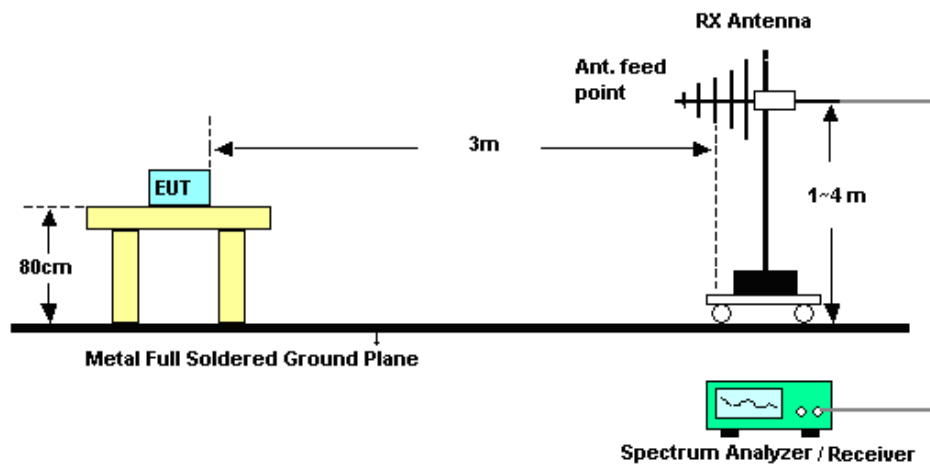
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - $VBW = 10$ Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

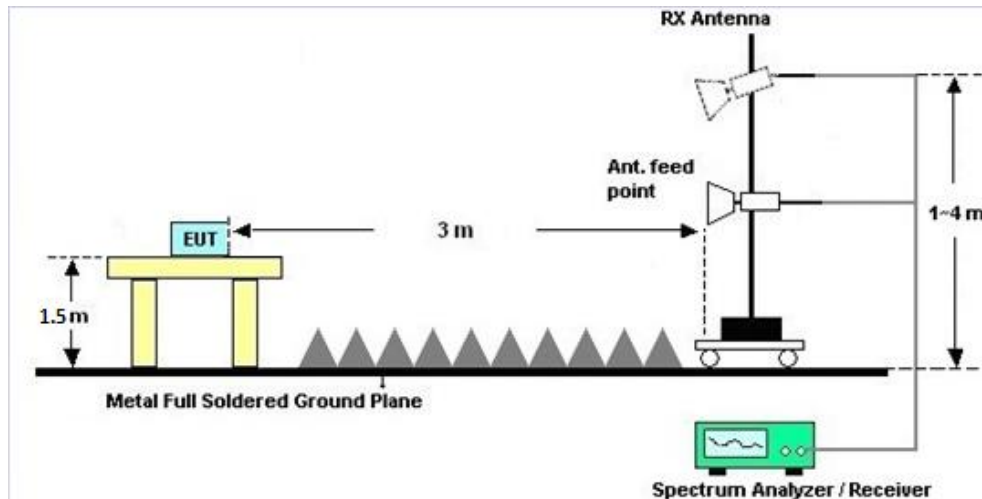
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

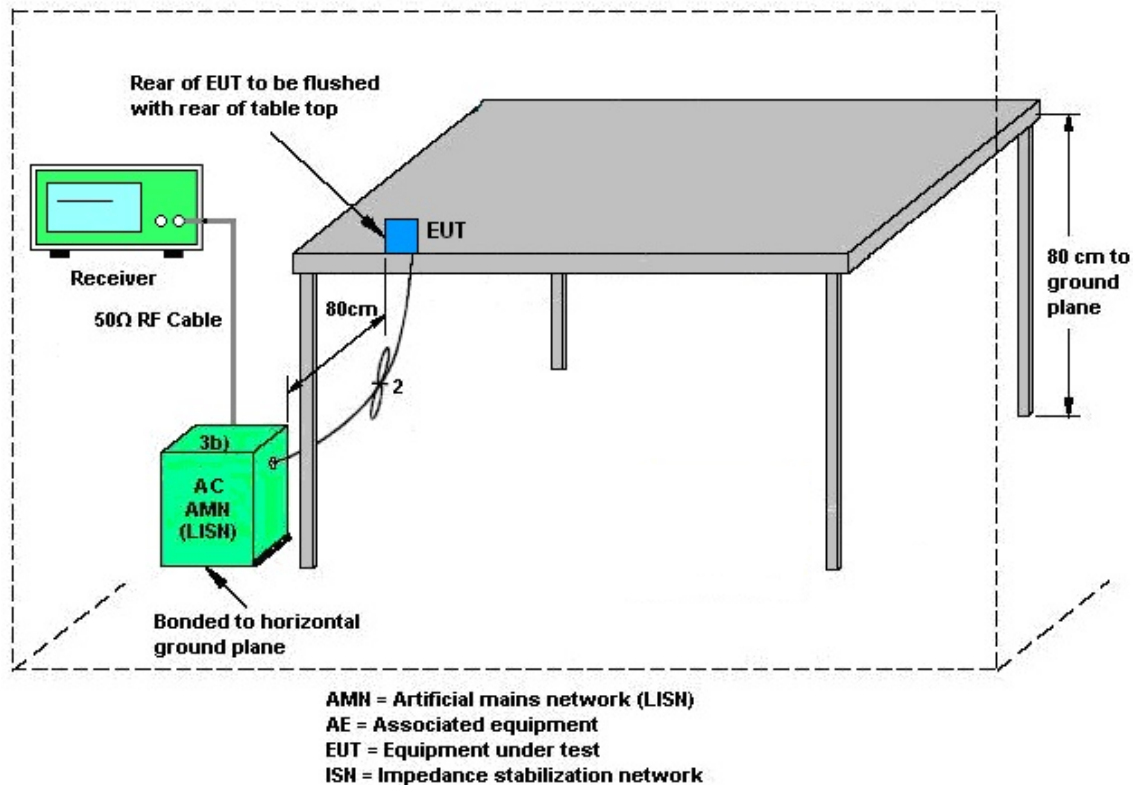
3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

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

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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

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

For power measurements on IEEE 802.11 devices,

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

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

The EUT supports CDD mode.

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

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

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

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant. 1	Ant. 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
2.4 GHz	3.01	3.82	6.43	6.43	0.43	0.43

Power Limit Reduction = $DG(\text{Power}) - 6\text{dBi}$, (min = 0)

PSD Limit Reduction = $DG(\text{PSD}) - 6\text{dBi}$, (min = 0)



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Sensor	DARE	RPR3006W	16I00054S NO10	10MHz~6GHz	Dec. 19, 2018	Jul. 12, 2019~ Aug. 20, 2019	Dec. 18, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz~40GHz	Nov. 21, 2018	Jul. 12, 2019~ Aug. 20, 2019	Nov. 20, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	EM	EMSW18	SW107090 3	N/A	Dec 19,2018	Jul. 12, 2019~ Aug. 20, 2019	Dec. 18, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 18, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 12, 2018	Jun. 18, 2019	Nov. 11, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	Jun. 18, 2019	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	Jun. 18, 2019	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 18, 2019	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Dec. 31, 2018	Jun. 18, 2019	Dec. 30, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Dec. 31, 2018	Jun. 18, 2019	Dec. 30, 2019	Conduction (CO05-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Jun. 24, 2019~ Jul. 21, 2019	Jan. 06, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	37059&01	30MHz~1GHz	Oct. 13, 2018	Jun. 24, 2019~ Jul. 21, 2019	Oct. 12, 2019	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-132 8	1GHz ~ 18GHz	Nov. 09, 2018	Jun. 24, 2019~ Jul. 21, 2019	Nov. 08, 2019	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 584	18GHz ~ 40GHz	Dec. 05, 2018	Jun. 24, 2019~ Jul. 21, 2019	Dec. 04, 2019	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2019	Jun. 24, 2019~ Jul. 21, 2019	Mar. 24, 2020	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A023 75	1GHz~26.5GHz	May 27, 2019	Jun. 24, 2019~ Jul. 21, 2019	May 26, 2020	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 20, 2019	Jun. 24, 2019~ Jul. 21, 2019	May 19, 2020	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Jun. 24, 2019~ Jul. 21, 2019	Dec. 05, 2019	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 26, 2018	Jun. 24, 2019~ Jul. 21, 2019	Dec. 25, 2019	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705 26	10Hz~44GHz	Mar. 19, 2019	Jun. 24, 2019~ Jul. 21, 2019	Mar. 18, 2020	Radiation (03CH12-HY)
Filter	Wainwright	WLK4-1000-1 530-6000-40S S	SN11	1 GHz Lowpass	Sep. 16, 2018	Jun. 24, 2019~ Jul. 21, 2019	Sep. 15, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60SS	SN3	3 GHz Highpass	Sep. 16, 2018	Jun. 24, 2019~ Jul. 21, 2019	Sep. 15, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 13, 2019	Jun. 24, 2019~ Jul. 21, 2019	Mar. 12, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 16, 2018	Jun. 24, 2019~ Jul. 21, 2019	Oct. 15, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 16, 2018	Jun. 24, 2019~ Jul. 21, 2019	Oct. 15, 2019	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Jun. 24, 2019~ Jul. 21, 2019	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 24, 2019~ Jul. 21, 2019	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-00098 9	N/A	N/A	Jun. 24, 2019~ Jul. 21, 2019	N/A	Radiation (03CH12-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.2
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Richard Qiu / Luffy Lin	Temperature:	21~25	°C
Test Date:	2019/7/12	Relative Humidity:	51~54	%
TX Tool		TX Tool Version		

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	2	1	2412	13.75	13.60	8.07	8.08	0.50	Pass
11b	1Mbps	2	2	2417	13.75	13.60	9.00	8.55	0.50	Pass
11b	1Mbps	2	3	2422	14.30	14.55	9.04	9.06	0.50	Pass
11b	1Mbps	2	6	2437	14.30	14.45	9.04	9.04	0.50	Pass
11b	1Mbps	2	11	2462	14.00	14.05	9.04	8.56	0.50	Pass
11g	6Mbps	2	1	2412	16.75	16.70	15.76	15.68	0.50	Pass
11g	6Mbps	2	2	2417	16.70	16.70	15.40	15.68	0.50	Pass
11g	6Mbps	2	3	2422	16.75	16.65	16.04	15.68	0.50	Pass
11g	6Mbps	2	4	2427	16.80	16.75	16.03	16.28	0.50	Pass
11g	6Mbps	2	5	2432	17.00	17.00	15.56	16.28	0.50	Pass
11g	6Mbps	2	6	2437	17.60	18.00	16.28	16.29	0.50	Pass
11g	6Mbps	2	7	2442	17.10	17.15	16.04	15.72	0.50	Pass
11g	6Mbps	2	8	2447	16.95	16.90	16.28	16.28	0.50	Pass
11g	6Mbps	2	9	2452	16.85	16.80	15.76	15.68	0.50	Pass
11g	6Mbps	2	10	2457	16.75	16.70	15.66	15.68	0.50	Pass
11g	6Mbps	2	11	2462	16.75	16.70	16.02	15.69	0.50	Pass
HT20	MCS0	2	1	2412	17.90	17.80	15.89	15.68	0.50	Pass
HT20	MCS0	2	2	2417	17.90	17.85	16.53	16.30	0.50	Pass
HT20	MCS0	2	3	2422	17.90	17.90	16.08	16.00	0.50	Pass
HT20	MCS0	2	4	2427	18.20	18.30	15.08	15.96	0.50	Pass
HT20	MCS0	2	6	2437	18.15	18.15	15.12	15.72	0.50	Pass
HT20	MCS0	2	8	2447	18.00	18.00	16.56	15.12	0.50	Pass
HT20	MCS0	2	9	2452	17.95	17.90	15.68	16.08	0.50	Pass
HT20	MCS0	2	10	2457	17.90	17.90	15.68	15.12	0.50	Pass
HT20	MCS0	2	11	2462	17.90	17.85	15.16	15.04	0.50	Pass
HT40	MCS0	2	3	2422	36.60	36.60	35.52	35.44	0.50	Pass
HT40	MCS0	2	4	2427	36.50	36.60	35.76	35.44	0.50	Pass
HT40	MCS0	2	5	2432	36.50	36.70	36.08	35.84	0.50	Pass
HT40	MCS0	2	6	2437	36.60	36.60	36.32	35.76	0.50	Pass
HT40	MCS0	2	9	2452	36.60	36.60	35.76	35.76	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band																
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
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	19.00	19.90	22.48	30.00		3.82		26.30		36.00		Pass
11b	1Mbps	2	2	2417	19.50	20.40	22.98	30.00		3.82		26.80		36.00		Pass
11b	1Mbps	2	3	2422	24.70	25.60	28.18	30.00		3.82		32.00		36.00		Pass
11b	1Mbps	2	6	2437	24.70	25.40	28.07	30.00		3.82		31.89		36.00		Pass
11b	1Mbps	2	11	2462	23.40	24.40	26.94	30.00		3.82		30.76		36.00		Pass
11g	6Mbps	2	1	2412	14.70	15.10	17.91	30.00		3.82		21.73		36.00		Pass
11g	6Mbps	2	2	2417	16.10	16.30	19.21	30.00		3.82		23.03		36.00		Pass
11g	6Mbps	2	3	2422	18.20	18.70	21.47	30.00		3.82		25.29		36.00		Pass
11g	6Mbps	2	4	2427	21.00	21.80	24.43	30.00		3.82		28.25		36.00		Pass
11g	6Mbps	2	5	2432	22.90	23.80	26.38	30.00		3.82		30.20		36.00		Pass
11g	6Mbps	2	6	2437	24.40	25.00	27.72	30.00		3.82		31.54		36.00		Pass
11g	6Mbps	2	7	2442	23.50	23.90	26.71	30.00		3.82		30.53		36.00		Pass
11g	6Mbps	2	8	2447	22.50	23.10	25.82	30.00		3.82		29.64		36.00		Pass
11g	6Mbps	2	9	2452	20.90	21.90	24.44	30.00		3.82		28.26		36.00		Pass
11g	6Mbps	2	10	2457	19.40	20.10	22.77	30.00		3.82		26.59		36.00		Pass
11g	6Mbps	2	11	2462	17.50	18.00	20.77	30.00		3.82		24.59		36.00		Pass
HT20	MCS0	2	1	2412	13.60	14.10	16.87	30.00		3.82		20.69		36.00		Pass
HT20	MCS0	2	2	2417	17.50	17.90	20.71	30.00		3.82		24.53		36.00		Pass
HT20	MCS0	2	3	2422	20.20	20.80	23.52	30.00		3.82		27.34		36.00		Pass
HT20	MCS0	2	4	2427	23.50	24.10	26.82	30.00		3.82		30.64		36.00		Pass
HT20	MCS0	2	6	2437	23.40	23.90	26.67	30.00		3.82		30.49		36.00		Pass
HT20	MCS0	2	8	2447	22.50	23.10	25.82	30.00		3.82		29.64		36.00		Pass
HT20	MCS0	2	9	2452	20.20	20.80	23.52	30.00		3.82		27.34		36.00		Pass
HT20	MCS0	2	10	2457	20.00	20.70	23.37	30.00		3.82		27.19		36.00		Pass
HT20	MCS0	2	11	2462	19.60	20.00	22.81	30.00		3.82		26.63		36.00		Pass
HT40	MCS0	2	3	2422	10.80	11.00	13.91	30.00		3.82		17.73		36.00		Pass
HT40	MCS0	2	4	2427	12.60	13.10	15.87	30.00		3.82		19.69		36.00		Pass
HT40	MCS0	2	5	2432	13.90	14.50	17.22	30.00		3.82		21.04		36.00		Pass
HT40	MCS0	2	6	2437	16.30	16.80	19.57	30.00		3.82		23.39		36.00		Pass
HT40	MCS0	2	9	2452	14.80	15.40	18.12	30.00		3.82		21.94		36.00		Pass
VHT20	MCS0	2	1	2412	13.50	14.00	16.77	30.00		3.82		20.59		36.00		Pass
VHT20	MCS0	2	2	2417	17.40	17.80	20.61	30.00		3.82		24.43		36.00		Pass
VHT20	MCS0	2	3	2422	20.10	20.70	23.42	30.00		3.82		27.24		36.00		Pass
VHT20	MCS0	2	4	2427	23.40	24.00	26.72	30.00		3.82		30.54		36.00		Pass
VHT20	MCS0	2	6	2437	23.30	23.80	26.57	30.00		3.82		30.39		36.00		Pass
VHT20	MCS0	2	8	2447	22.40	23.00	25.72	30.00		3.82		29.54		36.00		Pass
VHT20	MCS0	2	9	2452	20.00	20.70	23.37	30.00		3.82		27.19		36.00		Pass
VHT20	MCS0	2	10	2457	19.90	20.60	23.27	30.00		3.82		27.09		36.00		Pass
VHT20	MCS0	2	11	2462	19.50	19.90	22.71	30.00		3.82		26.53		36.00		Pass
VHT40	MCS0	2	3	2422	10.70	10.90	13.81	30.00		3.82		17.63		36.00		Pass
VHT40	MCS0	2	4	2427	12.50	13.00	15.77	30.00		3.82		19.59		36.00		Pass
VHT40	MCS0	2	5	2432	13.80	14.40	17.12	30.00		3.82		20.94		36.00		Pass
VHT40	MCS0	2	6	2437	16.20	16.70	19.47	30.00		3.82		23.29		36.00		Pass
VHT40	MCS0	2	9	2452	14.70	15.30	18.02	30.00		3.82		21.84		36.00		Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-3.37	-2.77	0.24	6.43		7.57		Pass
11b	1Mbps	2	2	2417	-2.87	-2.57	0.44	6.43		7.57		Pass
11b	1Mbps	2	3	2422	2.33	3.74	6.75	6.43		7.57		Pass
11b	1Mbps	2	6	2437	2.83	3.00	6.01	6.43		7.57		Pass
11b	1Mbps	2	11	2462	2.00	0.70	5.01	6.43		7.57		Pass
11g	6Mbps	2	1	2412	-11.09	-9.99	-6.98	6.43		7.57		Pass
11g	1Mbps	2	2	2417	-7.66	-9.37	-4.65	6.43		7.57		Pass
11g	6Mbps	2	3	2422	-6.17	-4.98	-1.97	6.43		7.57		Pass
11g	6Mbps	2	4	2427	-4.58	-3.32	-0.31	6.43		7.57		Pass
11g	6Mbps	2	5	2432	-0.93	-1.01	2.08	6.43		7.57		Pass
11g	6Mbps	2	6	2437	-0.78	0.73	3.74	6.43		7.57		Pass
11g	6Mbps	2	7	2442	-1.61	-0.86	2.15	6.43		7.57		Pass
11g	6Mbps	2	8	2447	-2.72	-2.45	0.56	6.43		7.57		Pass
11g	6Mbps	2	9	2452	-5.17	-1.79	1.22	6.43		7.57		Pass
11g	6Mbps	2	10	2457	-4.71	-4.46	-1.45	6.43		7.57		Pass
11g	6Mbps	2	11	2462	-6.98	-7.14	-3.97	6.43		7.57		Pass
HT20	MCS0	2	1	2412	-12.36	-11.67	-8.66	6.43		7.57		Pass
HT20	MCS0	2	2	2417	-6.91	-7.43	-3.90	6.43		7.57		Pass
HT20	MCS0	2	3	2422	-5.29	-5.22	-2.21	6.43		7.57		Pass
HT20	MCS0	2	4	2427	-0.62	-2.42	2.39	6.43		7.57		Pass
HT20	MCS0	2	6	2437	-2.04	-1.39	1.62	6.43		7.57		Pass
HT20	MCS0	2	8	2447	-3.37	-2.33	0.68	6.43		7.57		Pass
HT20	MCS0	2	9	2452	-4.79	-4.80	-1.78	6.43		7.57		Pass
HT20	MCS0	2	10	2457	-5.91	-5.24	-2.23	6.43		7.57		Pass
HT20	MCS0	2	11	2462	-5.61	-5.85	-2.60	6.43		7.57		Pass
HT40	MCS0	2	3	2422	-17.27	-17.56	-14.26	6.43		7.57		Pass
HT40	MCS0	2	4	2427	-15.83	-15.52	-12.51	6.43		7.57		Pass
HT40	MCS0	2	5	2432	-14.49	-14.33	-11.32	6.43		7.57		Pass
HT40	MCS0	2	6	2437	-12.47	-11.10	-8.09	6.43		7.57		Pass
HT40	MCS0	2	9	2452	-12.32	-13.28	-9.31	6.43		7.57		Pass

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



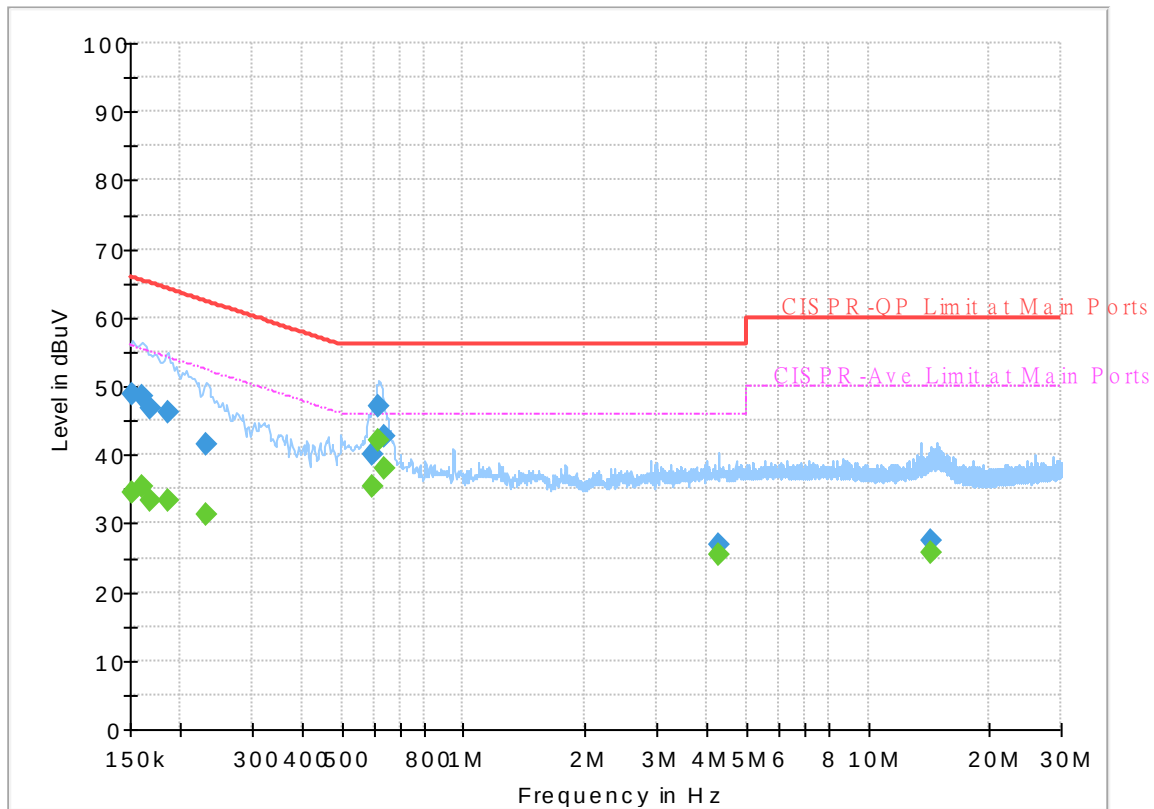
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	Temperature :	23~25℃
		Relative Humidity :	54~56%

EUT Information

Report NO : 960558-03
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



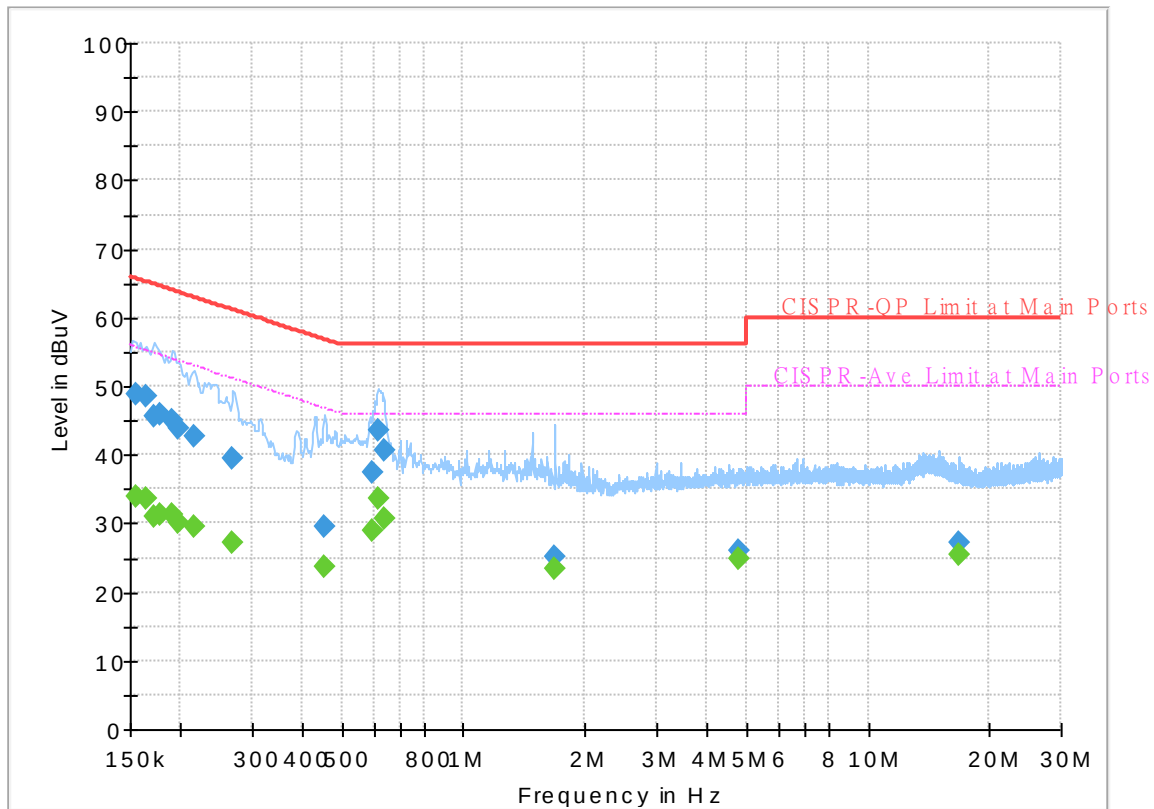
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	34.37	55.88	21.51	L1	OFF	19.5
0.152250	48.84	---	65.88	17.04	L1	OFF	19.5
0.161250	---	35.46	55.40	19.94	L1	OFF	19.5
0.161250	48.52	---	65.40	16.88	L1	OFF	19.5
0.168000	---	33.46	55.06	21.60	L1	OFF	19.5
0.168000	46.73	---	65.06	18.33	L1	OFF	19.5
0.186000	---	33.30	54.21	20.91	L1	OFF	19.5
0.186000	46.16	---	64.21	18.05	L1	OFF	19.5
0.231000	---	31.29	52.41	21.12	L1	OFF	19.5
0.231000	41.38	---	62.41	21.03	L1	OFF	19.5
0.595500	---	35.31	46.00	10.69	L1	OFF	19.5
0.595500	40.07	---	56.00	15.93	L1	OFF	19.5
0.618000	---	41.96	46.00	4.04	L1	OFF	19.6
0.618000	47.14	---	56.00	8.86	L1	OFF	19.6
0.636000	---	37.88	46.00	8.12	L1	OFF	19.6
0.636000	42.58	---	56.00	13.42	L1	OFF	19.6
4.290000	---	25.32	46.00	20.68	L1	OFF	19.7
4.290000	27.04	---	56.00	28.96	L1	OFF	19.7
14.383500	---	25.62	50.00	24.38	L1	OFF	20.1
14.383500	27.36	---	60.00	32.64	L1	OFF	20.1

EUT Information

Report NO : 960558-03
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	33.84	55.75	21.91	N	OFF	19.5
0.154500	48.78	---	65.75	16.97	N	OFF	19.5
0.163500	---	33.51	55.28	21.77	N	OFF	19.5
0.163500	48.50	---	65.28	16.78	N	OFF	19.5
0.172500	---	31.08	54.84	23.76	N	OFF	19.5
0.172500	45.73	---	64.84	19.11	N	OFF	19.5
0.177000	---	31.38	54.63	23.25	N	OFF	19.5
0.177000	45.94	---	64.63	18.69	N	OFF	19.5
0.190500	---	31.28	54.02	22.74	N	OFF	19.5
0.190500	45.05	---	64.02	18.97	N	OFF	19.5
0.197250	---	30.09	53.73	23.64	N	OFF	19.5
0.197250	43.90	---	63.73	19.83	N	OFF	19.5
0.215250	---	29.40	53.00	23.60	N	OFF	19.5
0.215250	42.82	---	63.00	20.18	N	OFF	19.5
0.269250	---	27.32	51.14	23.82	N	OFF	19.5
0.269250	39.61	---	61.14	21.53	N	OFF	19.5
0.451500	---	23.74	46.85	23.11	N	OFF	19.5
0.451500	29.52	---	56.85	27.33	N	OFF	19.5
0.597750	---	28.86	46.00	17.14	N	OFF	19.5
0.597750	37.34	---	56.00	18.66	N	OFF	19.5
0.613500	---	33.60	46.00	12.40	N	OFF	19.6

0.613500	43.61	---	56.00	12.39	N	OFF	19.6
0.636000	---	30.83	46.00	15.17	N	OFF	19.6
0.636000	40.50	---	56.00	15.50	N	OFF	19.6
1.684500	---	23.46	46.00	22.54	N	OFF	19.6
1.684500	25.24	---	56.00	30.76	N	OFF	19.6
4.780500	---	24.80	46.00	21.20	N	OFF	19.7
4.780500	26.08	---	56.00	29.92	N	OFF	19.7
16.743750	---	25.47	50.00	24.53	N	OFF	20.2
16.743750	27.13	---	60.00	32.87	N	OFF	20.2



Appendix C. Radiated Spurious Emission

Test Engineer :	Jack Cheng, Lance Chiang and Chuan Chu	Temperature :	19.3~27°C
		Relative Humidity :	52~71.4%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	63.33	-10.67	74	52.34	27.52	16.63	33.16	123	124	P	H
		2388.12	48.7	-5.3	54	37.71	27.52	16.63	33.16	123	124	A	H
	*	2412	116.27	-	-	105.32	27.48	16.65	33.18	123	124	P	H
	*	2412	113.14	-	-	102.19	27.48	16.65	33.18	123	124	A	H
													H
													H
		2388.12	60.27	-13.73	74	49.28	27.52	16.63	33.16	172	0	P	V
		2385.39	51.95	-2.05	54	40.95	27.53	16.62	33.15	172	0	A	V
	*	2412	116.82	-	-	105.87	27.48	16.65	33.18	172	0	P	V
	*	2412	113.65	-	-	102.7	27.48	16.65	33.18	172	0	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 02 2417MHz		2368.38	56.83	-17.17	74	45.8	27.56	16.6	33.13	151	52	P	H
		2390	46.79	-7.21	54	35.8	27.52	16.63	33.16	151	52	A	H
	*	2417	114.18	-	-	103.25	27.47	16.65	33.19	151	52	P	H
	*	2417	111.04	-	-	100.11	27.47	16.65	33.19	151	52	A	H
													H
													H
		2388.96	60.42	-13.58	74	49.43	27.52	16.63	33.16	201	343	P	V
		2390	51.42	-2.58	54	40.43	27.52	16.63	33.16	201	343	A	V
	*	2417	113.19	-	-	102.26	27.47	16.65	33.19	201	343	P	V
	*	2417	109.86	-	-	98.93	27.47	16.65	33.19	201	343	A	V
													V
													V
802.11b CH 03 2422MHz		2384.48	59.85	-14.15	74	48.85	27.53	16.62	33.15	113	52	P	H
		2382.66	50.25	-3.75	54	39.25	27.53	16.62	33.15	113	52	A	H
	*	2422	118.71	-	-	107.79	27.46	16.66	33.2	113	52	P	H
	*	2422	115.54	-	-	104.62	27.46	16.66	33.2	113	52	A	H
													H
													H
		2387.56	59.99	-14.01	74	49	27.52	16.63	33.16	195	351	P	V
		2389.94	50.82	-3.18	54	39.83	27.52	16.63	33.16	195	351	A	V
	*	2422	119.7	-	-	108.78	27.46	16.66	33.2	195	351	P	V
	*	2422	116.37	-	-	105.45	27.46	16.66	33.2	195	351	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 06 2437MHz		2386.86	57.01	-16.99	74	46.01	27.53	16.62	33.15	116	232	P	H
		2386.3	47.13	-6.87	54	36.13	27.53	16.62	33.15	116	232	A	H
	*	2437	117.44	-	-	106.55	27.43	16.67	33.21	116	232	P	H
	*	2437	114.53	-	-	103.64	27.43	16.67	33.21	116	232	A	H
		2485.79	57.63	-16.37	74	46.86	27.33	16.71	33.27	116	232	P	H
		2485.16	47.55	-6.45	54	36.78	27.33	16.71	33.27	116	232	A	H
		2389.24	60.36	-13.64	74	49.37	27.52	16.63	33.16	231	357	P	V
		2389.94	50.85	-3.15	54	39.86	27.52	16.63	33.16	231	357	A	V
	*	2437	121.65	-	-	110.76	27.43	16.67	33.21	231	357	P	V
	*	2437	118.27	-	-	107.38	27.43	16.67	33.21	231	357	A	V
		2499.3	59.44	-14.56	74	48.71	27.3	16.72	33.29	231	357	P	V
		2483.83	49.12	-4.88	54	38.35	27.33	16.71	33.27	231	357	A	V
802.11b CH 11 2462MHz	*	2462	118.43	-	-	107.6	27.38	16.69	33.24	111	51	P	H
	*	2462	115.26	-	-	104.43	27.38	16.69	33.24	111	51	A	H
		2484.08	59.43	-14.57	74	48.66	27.33	16.71	33.27	111	51	P	H
		2483.52	52	-2	54	41.23	27.33	16.71	33.27	111	51	A	H
													H
													H
	*	2462	120.68	-	-	109.85	27.38	16.69	33.24	193	358	P	V
	*	2462	117.37	-	-	106.54	27.38	16.69	33.24	193	358	A	V
		2486.2	62.44	-11.56	74	51.67	27.33	16.71	33.27	193	358	P	V
		2488.12	52.11	-1.89	54	41.36	27.32	16.71	33.28	193	358	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	38	-36	74	55.6	31.1	10.46	59.16	100	0	P	H
													H
													H
													H
		4824	37.56	-36.44	74	55.16	31.1	10.46	59.16	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	35.88	-38.12	74	53.51	31.1	10.44	59.17	100	0	P	H
		7311	41.69	-32.31	74	51.33	36.58	12.96	59.18	100	0	P	H
													H
													H
		4874	36.79	-37.21	74	54.42	31.1	10.44	59.17	100	0	P	V
		7311	41.93	-32.07	74	51.57	36.58	12.96	59.18	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	36.01	-37.99	74	53.57	31.2	10.42	59.18	100	0	P	H
		7386	41.39	-32.61	74	51.2	36.36	12.98	59.15	100	0	P	H
													H
													H
		4924	36.93	-37.07	74	54.49	31.2	10.42	59.18	100	0	P	V
		7386	41.81	-32.19	74	51.62	36.36	12.98	59.15	100	0	P	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 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2384.13	62.11	-11.89	74	51.11	27.53	16.62	33.15	124	231	P	H
		2389.17	47.36	-6.64	54	36.37	27.52	16.63	33.16	124	231	A	H
	*	2412	109.52	-	-	98.57	27.48	16.65	33.18	124	231	P	H
	*	2412	102.89	-	-	91.94	27.48	16.65	33.18	124	231	A	H
													H
													H
		2384.865	62.36	-11.64	74	51.36	27.53	16.62	33.15	199	344	P	V
		2390	52.27	-1.73	54	41.28	27.52	16.63	33.16	199	344	A	V
	*	2412	115.88	-	-	104.93	27.48	16.65	33.18	199	344	P	V
	*	2412	108.13	-	-	97.18	27.48	16.65	33.18	199	344	A	V
													V
													V
802.11g CH 02 2417MHz		2389.94	62.66	-11.34	74	51.67	27.52	16.63	33.16	126	234	P	H
		2388.4	47.93	-6.07	54	36.94	27.52	16.63	33.16	126	234	A	H
	*	2417	111.2	-	-	100.27	27.47	16.65	33.19	126	234	P	H
	*	2417	104.47	-	-	93.54	27.47	16.65	33.19	126	234	A	H
													H
													H
		2388.54	64.42	-9.58	74	53.43	27.52	16.63	33.16	179	352	P	V
		2389.94	52.41	-1.59	54	41.42	27.52	16.63	33.16	179	352	A	V
	*	2417	118.21	-	-	107.28	27.47	16.65	33.19	179	352	P	V
	*	2417	110.3	-	-	99.37	27.47	16.65	33.19	179	352	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 03 2422MHz		2389.94	60.49	-13.51	74	49.5	27.52	16.63	33.16	114	234	P	H
		2388.82	48.31	-5.69	54	37.32	27.52	16.63	33.16	114	234	A	H
	*	2422	113.95	-	-	103.03	27.46	16.66	33.2	114	234	P	H
	*	2422	106.43	-	-	95.51	27.46	16.66	33.2	114	234	A	H
													H
													H
		2389.66	62.81	-11.19	74	51.82	27.52	16.63	33.16	180	352	P	V
		2390	52.45	-1.55	54	41.46	27.52	16.63	33.16	180	352	A	V
	*	2422	118.96	-	-	108.04	27.46	16.66	33.2	180	352	P	V
	*	2422	111.7	-	-	100.78	27.46	16.66	33.2	180	352	A	V
													V
													V
802.11g CH 04 2427MHz		2381.68	60.62	-13.38	74	49.61	27.54	16.62	33.15	115	235	P	H
		2388.54	48.31	-5.69	54	37.32	27.52	16.63	33.16	115	235	A	H
	*	2427	117.28	-	-	106.37	27.45	16.66	33.2	115	235	P	H
	*	2427	109.58	-	-	98.67	27.45	16.66	33.2	115	235	A	H
													H
													H
		2385.6	61.54	-12.46	74	50.54	27.53	16.62	33.15	199	353	P	V
		2389.94	52.36	-1.64	54	41.37	27.52	16.63	33.16	199	353	A	V
	*	2427	121.89	-	-	110.98	27.45	16.66	33.2	199	353	P	V
	*	2427	114.34	-	-	103.43	27.45	16.66	33.2	199	353	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 05 2432MHz		2387.42	59.37	-14.63	74	48.37	27.53	16.62	33.15	117	236	P	H
		2388.4	48.13	-5.87	54	37.14	27.52	16.63	33.16	117	236	A	H
	*	2432	118.81	-	-	107.91	27.44	16.67	33.21	117	236	P	H
	*	2432	111.31	-	-	100.41	27.44	16.67	33.21	117	236	A	H
		2484.32	57.86	-16.14	74	47.09	27.33	16.71	33.27	117	236	P	H
		2483.52	46.75	-7.25	54	35.98	27.33	16.71	33.27	117	236	A	H
		2389.94	62.73	-11.27	74	51.74	27.52	16.63	33.16	201	353	P	V
		2389.94	52.37	-1.63	54	41.38	27.52	16.63	33.16	201	353	A	V
	*	2432	123.17	-	-	112.27	27.44	16.67	33.21	201	353	P	V
	*	2432	115.77	-	-	104.87	27.44	16.67	33.21	201	353	A	V
		2484.32	60.34	-13.66	74	49.57	27.33	16.71	33.27	201	353	P	V
		2484.8	50.21	-3.79	54	39.44	27.33	16.71	33.27	201	353	A	V
802.11g CH 06 2437MHz		2389.38	59.69	-14.31	74	48.7	27.52	16.63	33.16	100	292	P	H
		2389.1	48.86	-5.14	54	37.87	27.52	16.63	33.16	100	292	A	H
	*	2437	119.32	-	-	108.43	27.43	16.67	33.21	100	292	P	H
	*	2437	112.04	-	-	101.15	27.43	16.67	33.21	100	292	A	H
		2484.11	58.6	-15.4	74	47.83	27.33	16.71	33.27	100	292	P	H
		2483.62	48.05	-5.95	54	37.28	27.33	16.71	33.27	100	292	A	H
		2389.66	63.24	-10.76	74	52.25	27.52	16.63	33.16	146	354	P	V
		2389.94	52.46	-1.54	54	41.47	27.52	16.63	33.16	146	354	A	V
	*	2437	124.17	-	-	113.28	27.43	16.67	33.21	146	354	P	V
	*	2437	116.13	-	-	105.24	27.43	16.67	33.21	146	354	A	V
		2485.23	63.04	-10.96	74	52.27	27.33	16.71	33.27	146	354	P	V
		2484.53	51.39	-2.61	54	40.62	27.33	16.71	33.27	146	354	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 07 2442MHz		2389.94	58.3	-15.7	74	47.31	27.52	16.63	33.16	143	121	P	H
		2387.84	48.4	-5.6	54	37.41	27.52	16.63	33.16	143	121	A	H
	*	2442	119.15	-	-	108.27	27.42	16.68	33.22	143	121	P	H
	*	2442	112.69	-	-	101.81	27.42	16.68	33.22	143	121	A	H
		2487.75	59.51	-14.49	74	48.76	27.32	16.71	33.28	143	121	P	H
		2483.5	48.48	-5.52	54	37.71	27.33	16.71	33.27	143	121	A	H
		2386.86	61.25	-12.75	74	50.25	27.53	16.62	33.15	147	4	P	V
		2389.94	50.8	-3.2	54	39.81	27.52	16.63	33.16	147	4	A	V
	*	2442	123.33	-	-	112.45	27.42	16.68	33.22	147	4	P	V
	*	2442	116.34	-	-	105.46	27.42	16.68	33.22	147	4	A	V
		2483.97	62.34	-11.66	74	51.57	27.33	16.71	33.27	147	4	P	V
		2484.67	51.94	-2.06	54	41.17	27.33	16.71	33.27	147	4	A	V
802.11g CH 08 2447MHz	*	2447	117.46	-	-	106.6	27.41	16.68	33.23	173	121	P	H
	*	2447	110.3	-	-	99.44	27.41	16.68	33.23	173	121	A	H
		2487.1	58.11	-15.89	74	47.34	27.33	16.71	33.27	173	121	P	H
		2483.5	47.94	-6.06	54	37.17	27.33	16.71	33.27	173	121	A	H
													H
													H
	*	2447	122.38	-	-	111.52	27.41	16.68	33.23	166	352	P	V
	*	2447	115.26	-	-	104.4	27.41	16.68	33.23	166	352	A	V
		2494.12	62.67	-11.33	74	51.92	27.31	16.72	33.28	166	352	P	V
		2484.64	52.32	-1.68	54	41.55	27.33	16.71	33.27	166	352	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 09 2452MHz	*	2452	116.04	-	-	105.19	27.4	16.68	33.23	100	299	P	H
	*	2452	108.89	-	-	98.04	27.4	16.68	33.23	100	299	A	H
		2496.29	59.65	-14.35	74	48.91	27.31	16.72	33.29	100	299	P	H
		2483.5	49.23	-4.77	54	38.46	27.33	16.71	33.27	100	299	A	H
													H
													H
	*	2452	121.1	-	-	110.25	27.4	16.68	33.23	225	330	P	V
	*	2452	113.29	-	-	102.44	27.4	16.68	33.23	225	330	A	V
		2483.5	62.55	-11.45	74	51.78	27.33	16.71	33.27	225	330	P	V
		2483.55	52.16	-1.84	54	41.39	27.33	16.71	33.27	225	330	A	V
													V
													V
802.11g CH 10 2457MHz	*	2457	114.48	-	-	103.64	27.39	16.69	33.24	145	232	P	H
	*	2457	106.87	-	-	96.03	27.39	16.69	33.24	145	232	A	H
		2483.8	63.61	-10.39	74	52.84	27.33	16.71	33.27	145	232	P	H
		2483.5	49.41	-4.59	54	38.64	27.33	16.71	33.27	145	232	A	H
													H
													H
	*	2457	120.49	-	-	109.65	27.39	16.69	33.24	192	354	P	V
	*	2457	112.79	-	-	101.95	27.39	16.69	33.24	192	354	A	V
		2483.5	65.88	-8.12	74	55.11	27.33	16.71	33.27	192	354	P	V
		2484.76	52.45	-1.55	54	41.68	27.33	16.71	33.27	192	354	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz	*	2462	112.6	-	-	101.77	27.38	16.69	33.24	194	58	P	H
	*	2462	105.59	-	-	94.76	27.38	16.69	33.24	194	58	A	H
		2486.12	61.41	-12.59	74	50.64	27.33	16.71	33.27	194	58	P	H
		2483.52	47.54	-6.46	54	36.77	27.33	16.71	33.27	194	58	A	H
													H
													H
	*	2462	118.28	-	-	107.45	27.38	16.69	33.24	191	360	P	V
	*	2462	110.51	-	-	99.68	27.38	16.69	33.24	191	360	A	V
		2485.84	64.13	-9.87	74	53.36	27.33	16.71	33.27	191	360	P	V
		2485.08	50.49	-3.51	54	39.72	27.33	16.71	33.27	191	360	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	36.04	-37.96	74	53.64	31.1	10.46	59.16	100	0	P	H
													H
													H
													H
		4824	36.53	-37.47	74	54.13	31.1	10.46	59.16	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	36.72	-37.28	74	54.35	31.1	10.44	59.17	100	0	P	H
		7311	41.85	-32.15	74	51.49	36.58	12.96	59.18	100	0	P	H
													H
													H
		4874	36.74	-37.26	74	54.37	31.1	10.44	59.17	100	0	P	V
		7311	41.71	-32.29	74	51.35	36.58	12.96	59.18	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	36.72	-37.28	74	54.28	31.2	10.42	59.18	100	0	P	H
		7386	42.06	-31.94	74	51.87	36.36	12.98	59.15	100	0	P	H
													H
													H
		4924	38.07	-35.93	74	55.63	31.2	10.42	59.18	100	0	P	V
		7386	41.39	-32.61	74	51.2	36.36	12.98	59.15	100	0	P	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 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2385.495	61.43	-12.57	74	50.43	27.53	16.62	33.15	126	51	P	H
		2390	48.37	-5.63	54	37.38	27.52	16.63	33.16	126	51	A	H
	*	2412	109.17	-	-	98.22	27.48	16.65	33.18	126	51	P	H
	*	2412	101.85	-	-	90.9	27.48	16.65	33.18	126	51	A	H
													H
													H
		2389.59	63.64	-10.36	74	52.65	27.52	16.63	33.16	184	2	P	V
		2390	52.28	-1.72	54	41.29	27.52	16.63	33.16	184	2	A	V
	*	2412	113.38	-	-	102.43	27.48	16.65	33.18	184	2	P	V
	*	2412	105.5	-	-	94.55	27.48	16.65	33.18	184	2	A	V
													V
													V
802.11n HT20 CH 02 2417MHz		2385.18	57.73	-16.27	74	46.73	27.53	16.62	33.15	296	126	P	H
		2389.94	46.84	-7.16	54	35.85	27.52	16.63	33.16	296	126	A	H
	*	2417	112.36	-	-	101.43	27.47	16.65	33.19	296	126	P	H
	*	2417	104.48	-	-	93.55	27.47	16.65	33.19	296	126	A	H
													H
													H
		2388.68	61.75	-12.25	74	50.76	27.52	16.63	33.16	184	8	P	V
		2389.94	51.9	-2.1	54	40.91	27.52	16.63	33.16	184	8	A	V
	*	2417	117.39	-	-	106.46	27.47	16.65	33.19	184	8	P	V
	*	2417	109.71	-	-	98.78	27.47	16.65	33.19	184	8	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 03 2442MHz		2385.74	58.75	-15.25	74	47.75	27.53	16.62	33.15	325	121	P	H
		2387.28	47.36	-6.64	54	36.36	27.53	16.62	33.15	325	121	A	H
	*	2422	115.24	-	-	104.32	27.46	16.66	33.2	325	121	P	H
	*	2422	107.81	-	-	96.89	27.46	16.66	33.2	325	121	A	H
													H
													H
		2387.42	61.65	-12.35	74	50.65	27.53	16.62	33.15	200	347	P	V
		2389.94	52.41	-1.59	54	41.42	27.52	16.63	33.16	200	347	A	V
	*	2422	119.46	-	-	108.54	27.46	16.66	33.2	200	347	P	V
	*	2422	112.22	-	-	101.3	27.46	16.66	33.2	200	347	A	V
													V
													V
802.11n HT20 CH 04 2447MHz		2388.12	63.25	-10.75	74	52.26	27.52	16.63	33.16	287	122	P	H
		2389.8	51.07	-2.93	54	40.08	27.52	16.63	33.16	287	122	A	H
	*	2427	118.56	-	-	107.65	27.45	16.66	33.2	287	122	P	H
	*	2427	110.81	-	-	99.9	27.45	16.66	33.2	287	122	A	H
													H
													H
		2382.1	66.24	-7.76	74	55.23	27.54	16.62	33.15	200	342	P	V
		2389.94	52.27	-1.73	54	41.28	27.52	16.63	33.16	200	342	A	V
	*	2427	121.86	-	-	110.95	27.45	16.66	33.2	200	342	P	V
	*	2427	114.74	-	-	103.83	27.45	16.66	33.2	200	342	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 06 2437MHz		2380.56	57.55	-16.45	74	46.54	27.54	16.62	33.15	100	121	P	H
		2389.8	46.86	-7.14	54	35.87	27.52	16.63	33.16	100	121	A	H
	*	2437	118.92	-	-	108.03	27.43	16.67	33.21	100	121	P	H
	*	2437	111.15	-	-	100.26	27.43	16.67	33.21	100	121	A	H
		2483.9	57.26	-16.74	74	46.49	27.33	16.71	33.27	100	121	P	H
		2483.55	46.19	-7.81	54	35.42	27.33	16.71	33.27	100	121	A	H
		2389.8	62.84	-11.16	74	51.85	27.52	16.63	33.16	234	346	P	V
		2389.38	51.25	-2.75	54	40.26	27.52	16.63	33.16	234	346	A	V
	*	2437	121.46	-	-	110.57	27.43	16.67	33.21	234	346	P	V
	*	2437	113.92	-	-	103.03	27.43	16.67	33.21	234	346	A	V
		2484.53	60.99	-13.01	74	50.22	27.33	16.71	33.27	234	346	P	V
802.11n HT20 CH 08 2447MHz		2483.5	49.82	-4.18	54	39.05	27.33	16.71	33.27	234	346	A	V
	*	2447	117.66	-	-	106.8	27.41	16.68	33.23	282	119	P	H
	*	2447	109.72	-	-	98.86	27.41	16.68	33.23	282	119	A	H
		2483.56	59.13	-14.87	74	48.36	27.33	16.71	33.27	282	119	P	H
		2483.68	48.19	-5.81	54	37.42	27.33	16.71	33.27	282	119	A	H
													H
													H
	*	2447	120.62	-	-	109.76	27.41	16.68	33.23	167	347	P	V
	*	2447	113.78	-	-	102.92	27.41	16.68	33.23	167	347	A	V
		2483.8	62.25	-11.75	74	51.48	27.33	16.71	33.27	167	347	P	V
		2483.56	52.04	-1.96	54	41.27	27.33	16.71	33.27	167	347	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 09 2452MHz	*	2452	116.13	-	-	105.28	27.4	16.68	33.23	281	119	P	H
	*	2452	108.33	-	-	97.48	27.4	16.68	33.23	281	119	A	H
		2483.8	57.73	-16.27	74	46.96	27.33	16.71	33.27	281	119	P	H
		2490.22	47	-7	54	36.24	27.32	16.72	33.28	281	119	A	H
													H
													H
	*	2452	118.43	-	-	107.58	27.4	16.68	33.23	194	345	P	V
	*	2452	111.13	-	-	100.28	27.4	16.68	33.23	194	345	A	V
		2499.16	63.06	-10.94	74	52.33	27.3	16.72	33.29	194	345	P	V
		2483.5	52.49	-1.51	54	41.72	27.33	16.71	33.27	194	345	A	V
													V
													V
802.11n HT20 CH 10 2457MHz	*	2457	114.36	-	-	103.52	27.39	16.69	33.24	281	123	P	H
	*	2457	107.02	-	-	96.18	27.39	16.69	33.24	281	123	A	H
		2484.04	60.69	-13.31	74	49.92	27.33	16.71	33.27	281	123	P	H
		2483.5	47.83	-6.17	54	37.06	27.33	16.71	33.27	281	123	A	H
													H
													H
	*	2457	118.54	-	-	107.7	27.39	16.69	33.24	227	343	P	V
	*	2457	111.38	-	-	100.54	27.39	16.69	33.24	227	343	A	V
		2484.88	64.04	-9.96	74	53.27	27.33	16.71	33.27	227	343	P	V
		2485.78	52.28	-1.72	54	41.51	27.33	16.71	33.27	227	343	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz	*	2460	115.74	-	-	104.91	27.38	16.69	33.24	136	120	P	H
	*	2460	107.93	-	-	97.1	27.38	16.69	33.24	136	120	A	H
		2486.24	63.58	-10.42	74	52.81	27.33	16.71	33.27	136	120	P	H
		2483.52	52.02	-1.98	54	41.25	27.33	16.71	33.27	136	120	A	H
													H
													H
	*	2462	119.56	-	-	108.73	27.38	16.69	33.24	187	358	P	V
	*	2462	111.81	-	-	100.98	27.38	16.69	33.24	187	358	A	V
		2487.52	65.47	-8.53	74	54.72	27.32	16.71	33.28	187	358	P	V
		2483.52	51.84	-2.16	54	41.07	27.33	16.71	33.27	187	358	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	38.25	-35.75	74	54.24	31.1	10.46	57.55	100	0	P	H
													H
													H
													H
		4824	38.47	-35.53	74	54.46	31.1	10.46	57.55	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	39.2	-34.8	74	55.11	31.1	10.44	57.45	100	0	P	H
		7311	44.33	-29.67	74	52.06	36.58	12.96	57.27	100	0	P	H
													H
													H
		4874	39.08	-34.92	74	54.99	31.1	10.44	57.45	100	0	P	V
		7311	44.62	-29.38	74	52.35	36.58	12.96	57.27	100	0	P	V
													V
													V
802.11n HT20 CH 11 2462MHz		4924	37.86	-36.14	74	53.59	31.2	10.42	57.35	100	0	P	H
		7386	42.8	-31.2	74	50.82	36.36	12.98	57.36	100	0	P	H
													H
													H
		4924	37.85	-36.15	74	53.58	31.2	10.42	57.35	100	0	P	V
		7386	42.67	-31.33	74	50.69	36.36	12.98	57.36	100	0	P	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 HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		2381.68	57.88	-16.12	74	46.87	27.54	16.62	33.15	114	120	P	H
		2387.14	48.72	-5.28	54	37.72	27.53	16.62	33.15	114	120	A	H
	*	2422	103.87	-	-	92.95	27.46	16.66	33.2	114	120	P	H
	*	2422	96.07	-	-	85.15	27.46	16.66	33.2	114	120	A	H
		2493.98	56.5	-17.5	74	45.75	27.31	16.72	33.28	114	120	P	H
		2496.08	46.74	-7.26	54	36	27.31	16.72	33.29	114	120	A	H
		2385.74	60.28	-13.72	74	49.28	27.53	16.62	33.15	198	354	P	V
		2385.74	51.94	-2.06	54	40.94	27.53	16.62	33.15	198	354	A	V
	*	2422	108.19	-	-	97.27	27.46	16.66	33.2	198	354	P	V
	*	2422	100.34	-	-	89.42	27.46	16.66	33.2	198	354	A	V
		2493.98	60.71	-13.29	74	49.96	27.31	16.72	33.28	198	354	P	V
		2493.84	50.14	-3.86	54	39.39	27.31	16.72	33.28	198	354	A	V
802.11n HT40 CH 04 2427MHz		2389.38	59.56	-14.44	74	48.57	27.52	16.63	33.16	110	295	P	H
		2389.38	51.35	-2.65	54	40.36	27.52	16.63	33.16	110	295	A	H
	*	2427	105.01	-	-	94.1	27.45	16.66	33.2	110	295	P	H
	*	2427	97	-	-	86.09	27.45	16.66	33.2	110	295	A	H
		2498.74	56.73	-17.27	74	46	27.3	16.72	33.29	110	295	P	H
		2499.09	47.17	-6.83	54	36.44	27.3	16.72	33.29	110	295	A	H
		2384.62	61.54	-12.46	74	50.54	27.53	16.62	33.15	228	0	P	V
		2385.32	52.34	-1.66	54	41.34	27.53	16.62	33.15	228	0	A	V
	*	2427	109.15	-	-	98.24	27.45	16.66	33.2	228	0	P	V
	*	2427	101.93	-	-	91.02	27.45	16.66	33.2	228	0	A	V
		2499.16	58.87	-15.13	74	48.14	27.3	16.72	33.29	228	0	P	V
		2498.95	48.76	-5.24	54	38.03	27.3	16.72	33.29	228	0	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 05 2432MHz		2386.86	57.72	-16.28	74	46.72	27.53	16.62	33.15	100	238	P	H
		2335.76	47.67	-6.33	54	36.51	27.69	16.56	33.09	100	238	A	H
	*	2432	106.27	-	-	95.37	27.44	16.67	33.21	100	238	P	H
	*	2432	98.48	-	-	87.58	27.44	16.67	33.21	100	238	A	H
		2489.71	57.07	-16.93	74	46.31	27.32	16.72	33.28	100	238	P	H
		2496.08	47.15	-6.85	54	36.41	27.31	16.72	33.29	100	238	A	H
		2389.52	61.89	-12.11	74	50.9	27.52	16.63	33.16	198	346	P	V
		2387.28	52.36	-1.64	54	41.36	27.53	16.62	33.15	198	346	A	V
	*	2432	111.53	-	-	100.63	27.44	16.67	33.21	198	346	P	V
	*	2432	103.51	-	-	92.61	27.44	16.67	33.21	198	346	A	V
		2498.25	59.01	-14.99	74	48.28	27.3	16.72	33.29	198	346	P	V
		2484.04	48.92	-5.08	54	38.15	27.33	16.71	33.27	198	346	A	V
802.11n HT40 CH 06 2437MHz		2388.68	60.47	-13.53	74	49.48	27.52	16.63	33.16	118	120	P	H
		2389.8	49.35	-4.65	54	38.36	27.52	16.63	33.16	118	120	A	H
	*	2437	109.56	-	-	98.67	27.43	16.67	33.21	118	120	P	H
	*	2437	101.73	-	-	90.84	27.43	16.67	33.21	118	120	A	H
		2484.46	58	-16	74	47.23	27.33	16.71	33.27	118	120	P	H
		2484.32	48.42	-5.58	54	37.65	27.33	16.71	33.27	118	120	A	H
		2389.1	61.45	-12.55	74	50.46	27.52	16.63	33.16	170	13	P	V
		2389.66	51.96	-2.04	54	40.97	27.52	16.63	33.16	170	13	A	V
	*	2437	112.87	-	-	101.98	27.43	16.67	33.21	170	13	P	V
	*	2437	105.22	-	-	94.33	27.43	16.67	33.21	170	13	A	V
		2487.12	60.71	-13.29	74	49.94	27.33	16.71	33.27	170	13	P	V
		2484.88	51.67	-2.33	54	40.9	27.33	16.71	33.27	170	13	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 09 2452MHz		2379.72	57.67	-16.33	74	46.66	27.54	16.62	33.15	106	118	P	H
		2380	48.25	-5.75	54	37.24	27.54	16.62	33.15	106	118	A	H
	*	2452	108.6	-	-	97.75	27.4	16.68	33.23	106	118	P	H
	*	2452	100.47	-	-	89.62	27.4	16.68	33.23	106	118	A	H
		2486.84	61	-13	74	50.23	27.33	16.71	33.27	106	118	P	H
		2486.91	50.8	-3.2	54	40.03	27.33	16.71	33.27	106	118	A	H
		2355.92	61.51	-12.49	74	50.45	27.59	16.59	33.12	220	345	P	V
		2355.78	51.82	-2.18	54	40.76	27.59	16.59	33.12	220	345	A	V
	*	2452	112.2	-	-	101.35	27.4	16.68	33.23	220	345	P	V
	*	2452	103.71	-	-	92.86	27.4	16.68	33.23	220	345	A	V
		2489.71	62.11	-11.89	74	51.35	27.32	16.72	33.28	220	345	P	V
		2483.55	51.95	-2.05	54	41.18	27.33	16.71	33.27	220	345	A	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 HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		4844	38.39	-35.61	74	54.34	31.1	10.46	57.51	100	0	P	H
		7266	44.69	-29.31	74	52.37	36.6	12.94	57.22	100	0	P	H
													H
													H
		4844	38.79	-35.21	74	54.74	31.1	10.46	57.51	100	0	P	V
		7266	43.91	-30.09	74	51.59	36.6	12.94	57.22	100	0	P	V
													V
													V
802.11n HT40 CH 06 2437MHz		4874	39.49	-34.51	74	55.4	31.1	10.44	57.45	100	0	P	H
		7311	45.08	-28.92	74	52.81	36.58	12.96	57.27	100	0	P	H
													H
													H
		4874	38.41	-35.59	74	54.32	31.1	10.44	57.45	100	0	P	V
		7311	44.47	-29.53	74	52.2	36.58	12.96	57.27	100	0	P	V
													V
													V
802.11n HT40 CH 09 2452MHz		4904	37.83	-36.17	74	53.67	31.12	10.43	57.39	100	0	P	H
		7356	43.62	-30.38	74	51.5	36.48	12.97	57.33	100	0	P	H
													H
													H
		4904	38.41	-35.59	74	54.25	31.12	10.43	57.39	100	0	P	V
		7356	43.73	-30.27	74	51.61	36.48	12.97	57.33	100	0	P	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

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		69.77	30.39	-9.61	40	47.46	12.16	1.22	30.45	-	-	P	H
		81.41	30.8	-9.2	40	46.42	13.5	1.32	30.44	-	-	P	H
		179.38	31.96	-11.54	43.5	45.3	15.06	1.94	30.34	-	-	P	H
		729.37	36.27	-9.73	46	34.47	27.47	3.78	29.45	-	-	P	H
		749.74	38.63	-7.37	46	36.27	27.93	3.84	29.41	100	0	P	H
		889.42	36.16	-9.84	46	32.04	29.05	4.23	29.16	-	-	P	H
													H
													H
													H
													H
													H
													H
		35.82	33.51	-6.49	40	41.42	21.52	0.84	30.27	100	0	P	V
		70.74	30.35	-9.65	40	47.3	12.27	1.23	30.45	-	-	P	V
		128.94	28.02	-15.48	43.5	39.48	17.4	1.54	30.4	-	-	P	V
		721.61	36.26	-9.74	46	34.81	27.16	3.76	29.47	-	-	P	V
		746.83	36.83	-9.17	46	34.49	27.92	3.83	29.41	-	-	P	V
		909.79	35.92	-10.08	46	31.56	29.18	4.29	29.11	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

2. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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



Appendix D. Radiated Spurious Emission Plots

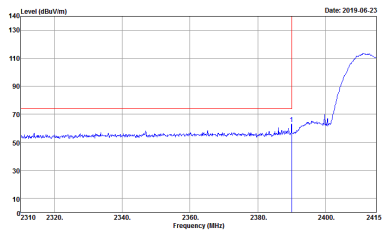
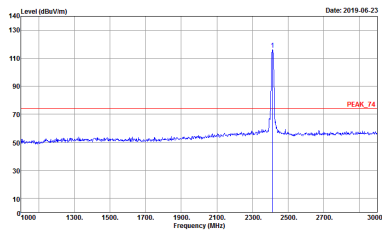
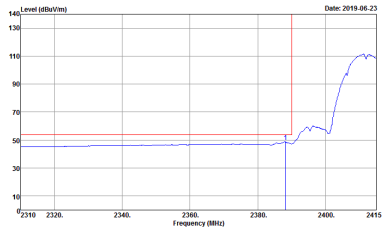
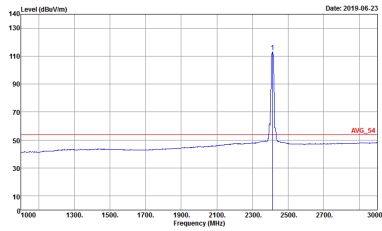
Test Engineer :	Jack Cheng, Lance Chiang and Chuan Chu	Temperature :	19.3~27°C
		Relative Humidity :	52~71.4%

Note symbol

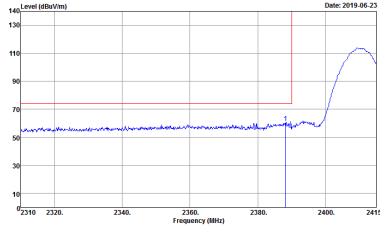
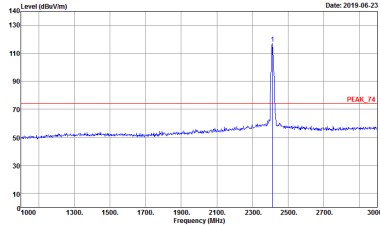
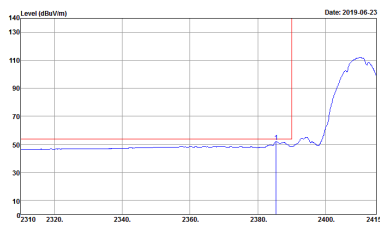
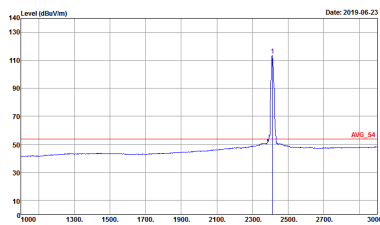
-L	Low channel location
-R	High channel location

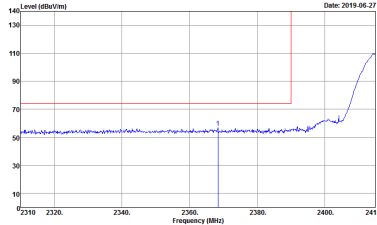
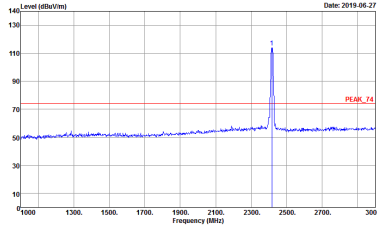
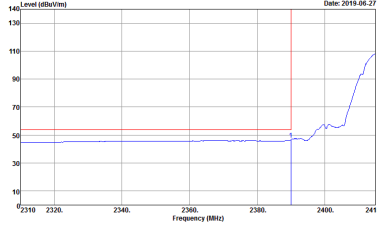
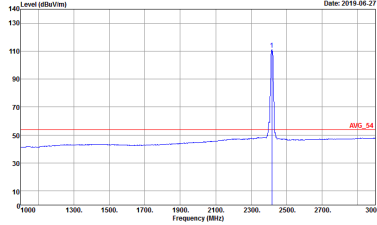


2.4GHz 2400~2483.5MHz
WIFI 802.11b (Band Edge @ 3m)

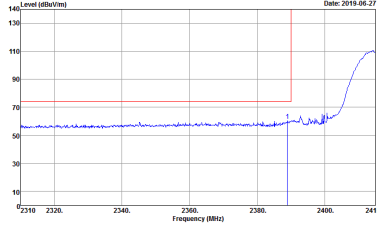
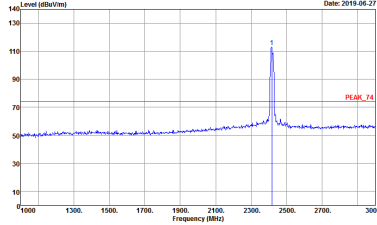
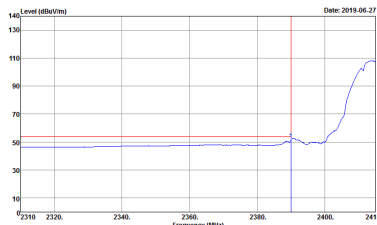
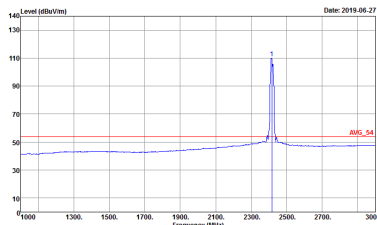
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 13 Setting : 19	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 13 Setting : 19
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 13 Setting : 19	 Site : 03CH12-HY Condition : AVG_54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 13 Setting : 19



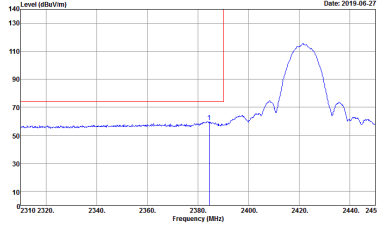
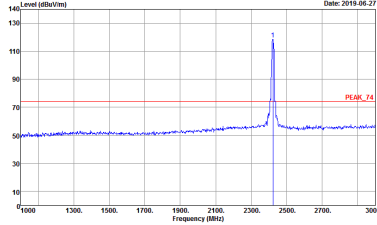
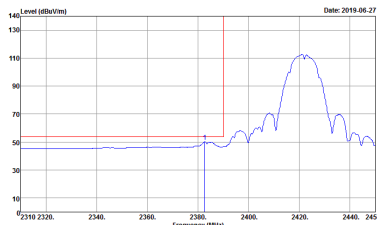
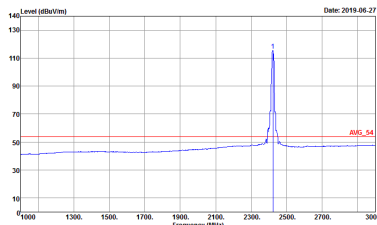
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_9C_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 13 Setting : 19	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 13 Setting : 19
Avg.	 Site : 03CH12-HY Condition : AVG_9C_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 13 Setting : 19	 Site : 03CH12-HY Condition : AVG_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 13 Setting : 19

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH02 2417MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, BE_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5
	 Site : 03CH12-HY Condition : AVG, BE_54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5

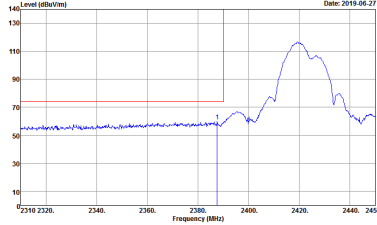
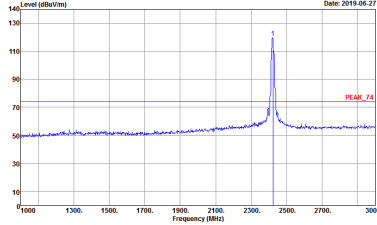
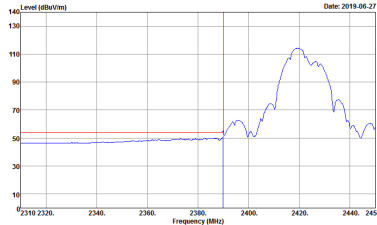
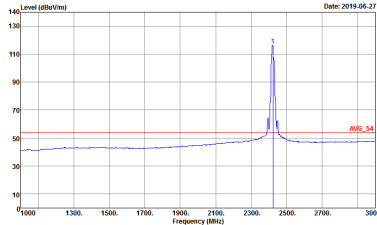


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH02 2417MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_9C_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5
Avg.	 Site : 03CH12-HY Condition : AVG_9C_54 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5	 Site : 03CH12-HY Condition : AVG_54 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 14 Setting : 19.5



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH03 2422MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_9C_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 15 Setting : 25	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 15 Setting : 25
Avg.	 Site : 03CH12-HY Condition : AVG_9C_54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 15 Setting : 25	 Site : 03CH12-HY Condition : AVG_54 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 960558 Mode : 15 Setting : 25



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH03 2422MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_9C_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 15 Setting : 25	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 15 Setting : 25
Avg.	 Site : 03CH12-HY Condition : AVG_9C_54 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 15 Setting : 25	 Site : 03CH12-HY Condition : AVG_54 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 960558 Mode : 15 Setting : 25