



FCC RADIO TEST REPORT

FCC ID : PKRISGM3000B
Equipment : M3000B
Brand Name : Inseego
Model Name : M3000B
Marketing Name : M3000
Applicant : Inseego Corp.
9710 Scranton Road Suite 200, San Diego,, CA 92121
Manufacturer : Inseego Corp.
9710 Scranton Road Suite 200, San Diego,, CA 92121
Standard : FCC Part 15 Subpart C §15.247

The product was received on Aug. 10, 2022 and testing was performed from Aug. 19, 2022 to Sep. 27, 2022. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR1D2409A	01	Initial issue of report	Sep. 29, 2022



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	2.19 dB under the limit at 2390.000 MHz
3.6	15.207	AC Conducted Emission	Pass	10.63 dB under the limit at 11.040 MHz
3.7	15.203	Antenna Requirement	Pass	-

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Avis Chuang

Report Producer: Dewi Huang



1 General Description

1.1 Product Feature of Equipment Under Test

3G-WCDMA, 4G-LTE, 5G-FR1, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, and GNSS

Product Feature	
Antenna Type	WWAN: Internal Antenna WLAN <Ant. 0>: Internal Antenna <Ant. 1>: Internal Antenna GPS / Glonass / BDS / Galileo: Internal Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	Ant. 0: 0.90 Ant. 1: 4.30

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.1.1 Antenna Gain

<For CDD Mode>

Follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01 F2)f)ii)

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

For power measurements on IEEE 802.11 devices,

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

G_{ANT} is set equal to the gain of the antenna having the highest gain.

For PSD measurements, the directional gain calculation.

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

As minimum $N_{SS}=1$ is supported by EUT, the formula can be simplified as:

$$Directional\ gain = 10 \cdot \log \left[\left(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20} \right)^2 / N_{ANT} \right] \text{ dBi}$$

Where G_1, G_2, \dots, G_N denote single antenna gain.

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

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4GHz	0.90	4.30	4.30	5.78	0.00	0.00

Calculation example:

If a device has two antenna, $G_{ANT1}= 0.90$ dBi; $G_{ANT2}=4.30$ dBi

Directional gain of power measurement = $\max(0.90,4.30) + 0 = 4.30$ dBi

Directional gain of PSD derived from formula which is

$$10 \times \log \left\{ \left[10^{(0.90 \text{ dBi} / 20)} + 10^{(4.30 \text{ dBi} / 20)} \right]^2 / 2 \right\}$$

$$= 5.78 \text{ dBi}$$

Power and PSD limit reduction = Composite gain – 6dBi, (min = 0)



1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY (TAF Code:1190)
Remark	The AC Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory

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

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY, 03CH13-HY

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

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by 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 15.247 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 the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

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

2.1 Carrier Frequency and Channel

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



2.2 Test Mode

This device support 26/52/106/242-tone RU.

The PSD of partial RU is reduced to be smaller than full RU according to TCB workshop interim guidance Oct. 2018.

The 802.11ax mode is investigated among different tones, full resource units (RU), partial resource units. The partial RU has no higher power than full RU's, thus the full RU is chosen as main test configuration.

The 802.11n mode has no higher power and PSD than 802.11ax mode, thus the 802.11ax mode is chosen as main test configuration, and the 802.11n mode is verified the power.

The SISO mode conducted power is covered by MIMO mode per chain, so only the MIMO mode is tested.

The final test modes include the worst data rates for each modulation shown in the table below.

MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20 (Covered by HE20)	MCS0
802.11ax HE20	MCS0

Remark: The conducted power level of each chain in MIMO mode is equal or higher than SISO mode.

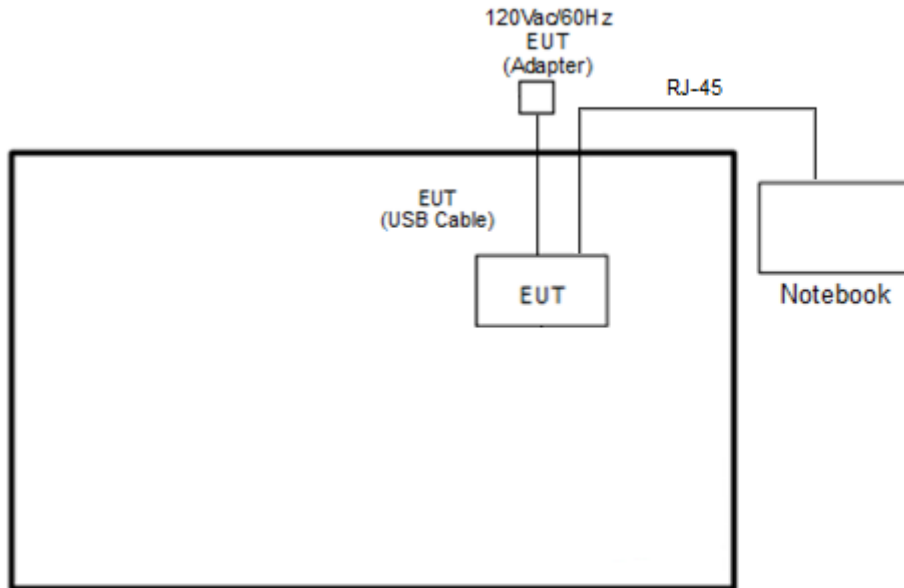
Test Cases	
AC Conducted Emission	Mode 1 :WLAN (2.4GHz) Link + LAN Link + USB Cable (Charging from Adapter)

Ch. #	2400-2483.5 MHz		
	802.11b	802.11g	802.11ax HE20
Low	01	01	01
Middle	06	06	06
High	11	11	11

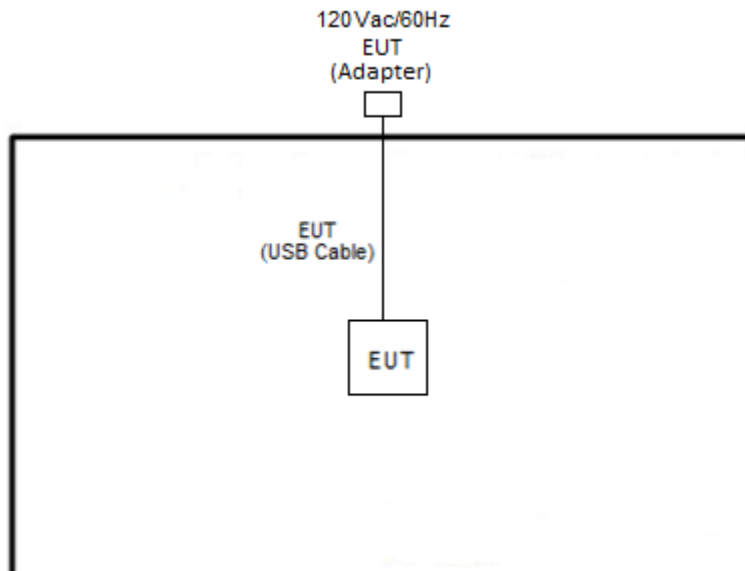
Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<WLAN Tx Mode>





2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT4.0.00195.0" 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 10 dB 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.

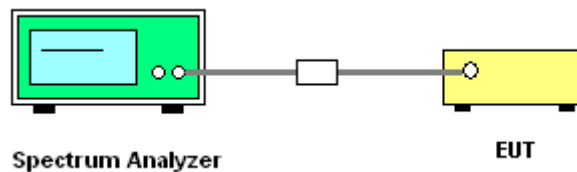
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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

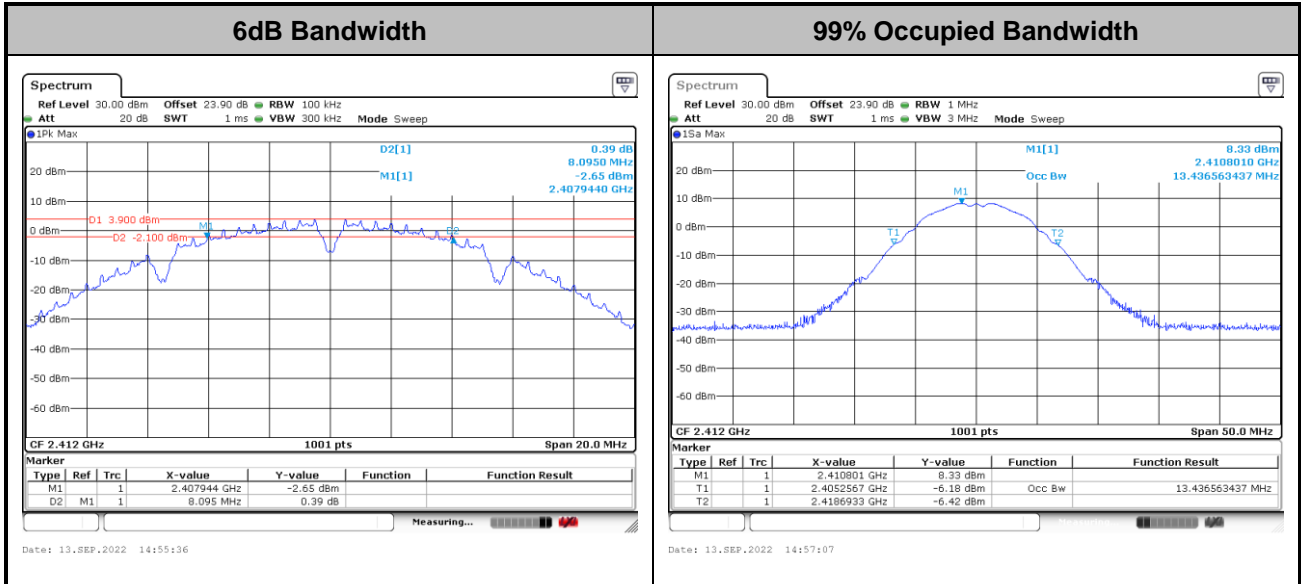




3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

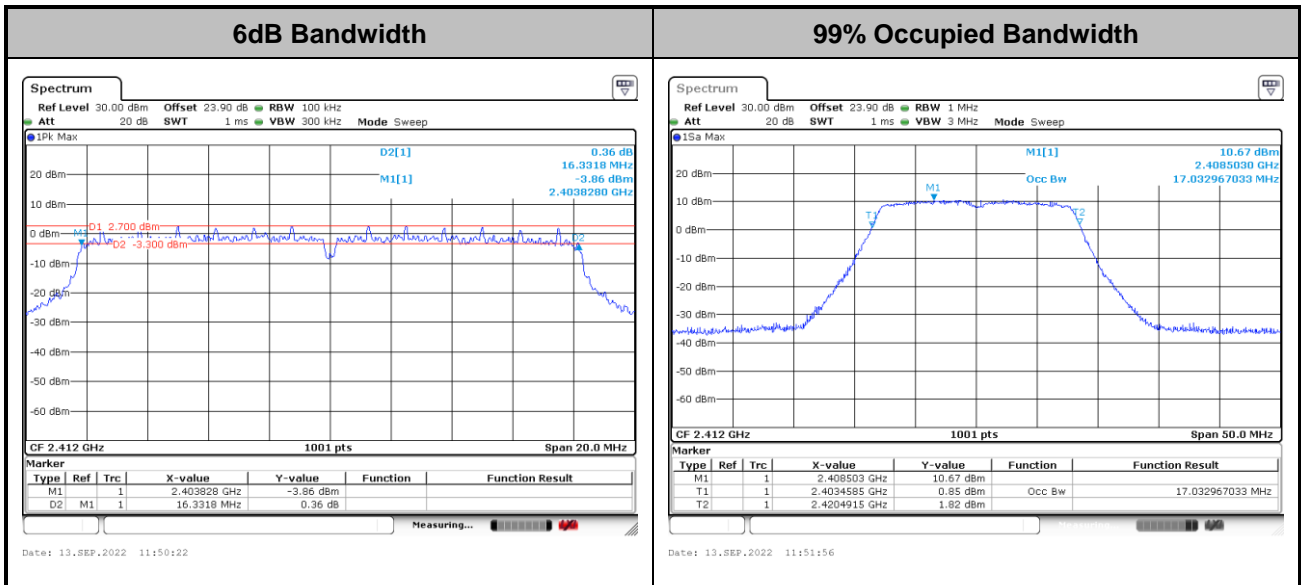
Please refer to Appendix A.

<802.11b>



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

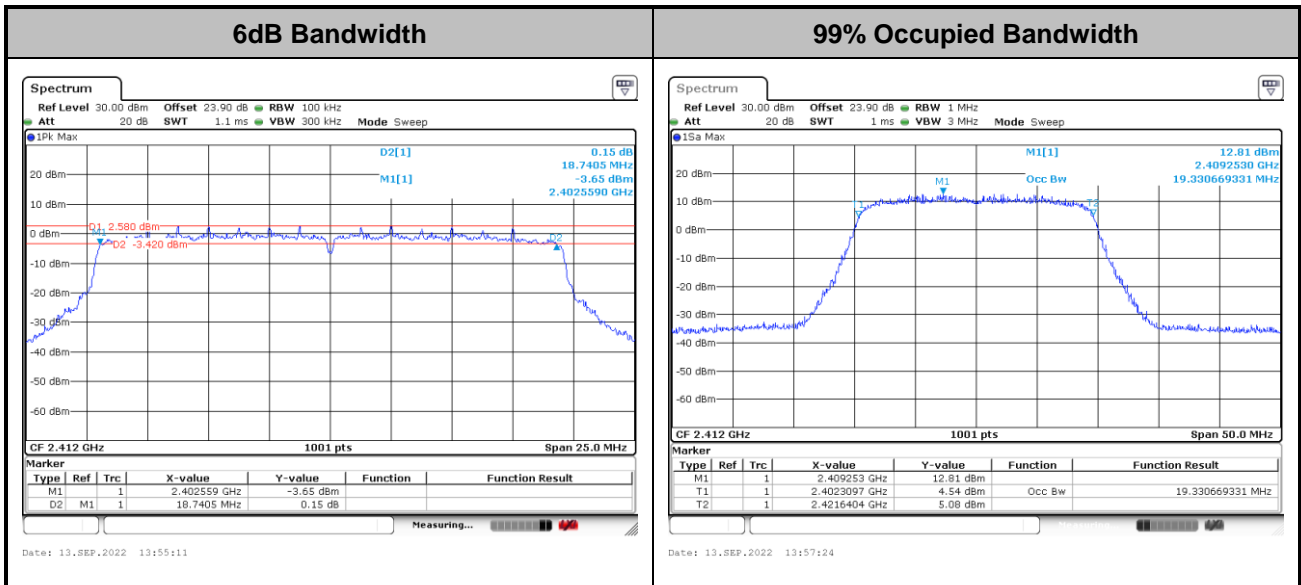
<802.11g>



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



<802.11ax HE20>



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

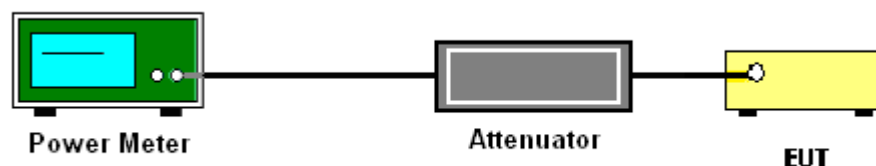
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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 8 dBm in any 3 kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

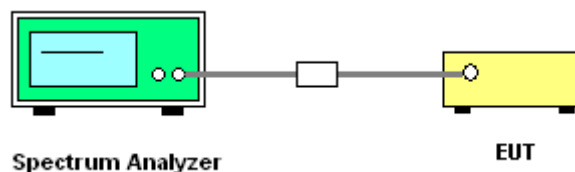
3.3.3 Test Procedures

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

Method (c): Measure and add $10 \log(N_{ANT})$ dB.

With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{ANT})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{ANT})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{ANT}^{th}$ of the PSD limit .

3.3.4 Test Setup

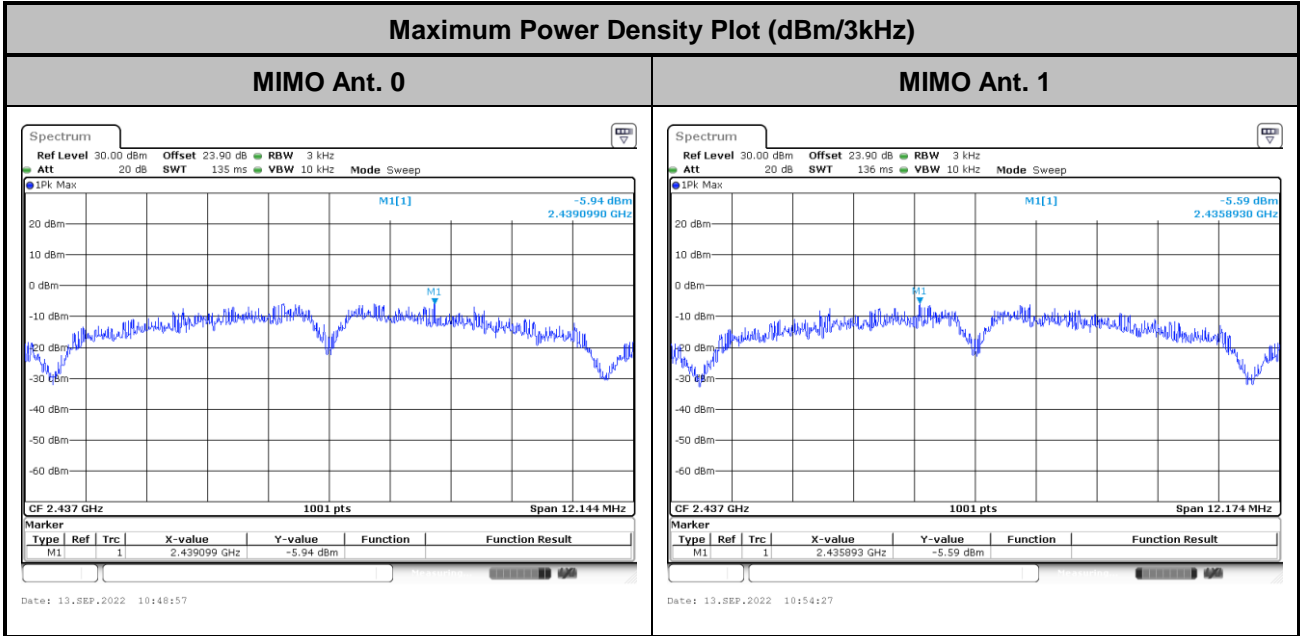




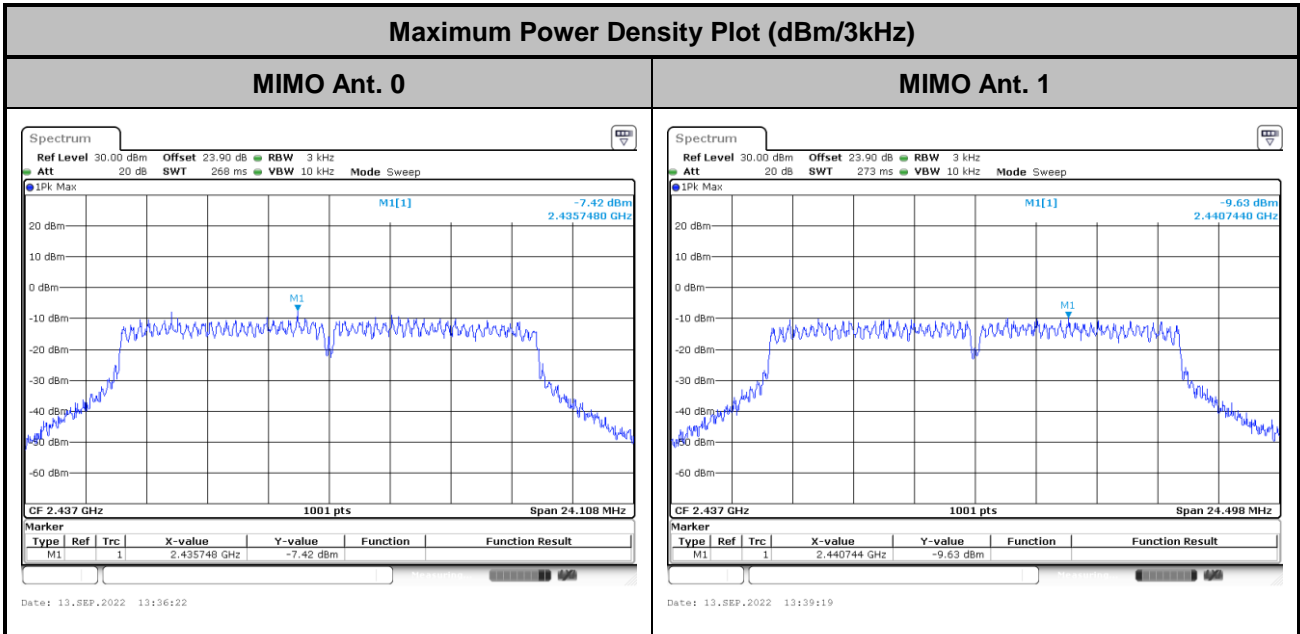
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

<802.11b>



<802.11g>



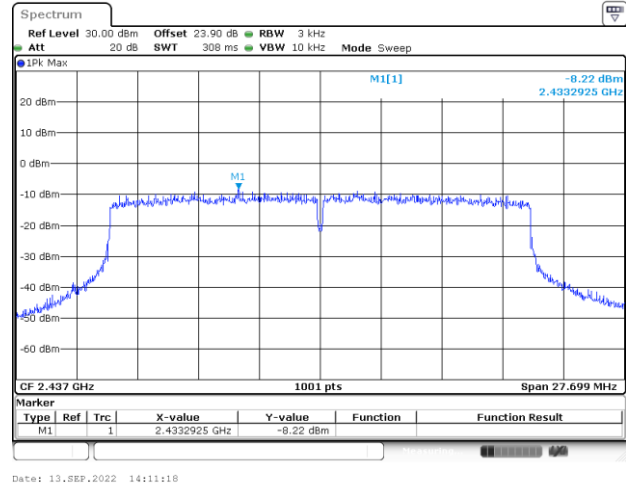
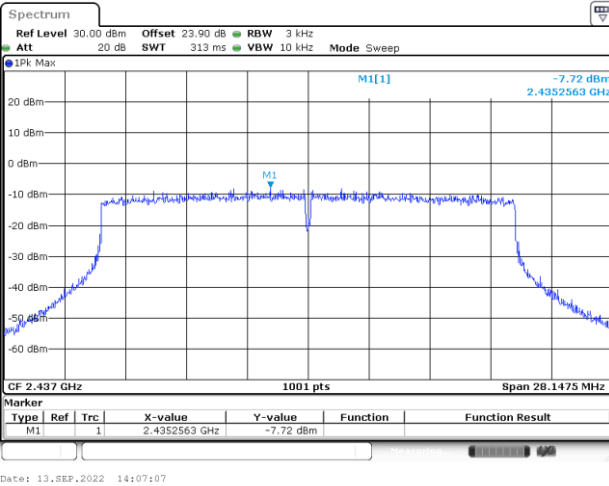


<802.11ax HE20>

Maximum Power Density Plot (dBm/3kHz)

MIMO Ant. 0

MIMO Ant. 1



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.

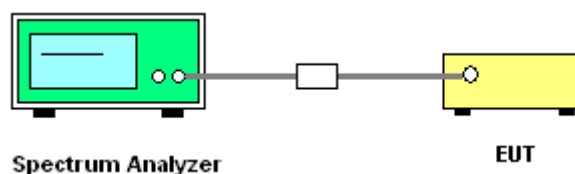
3.4.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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.

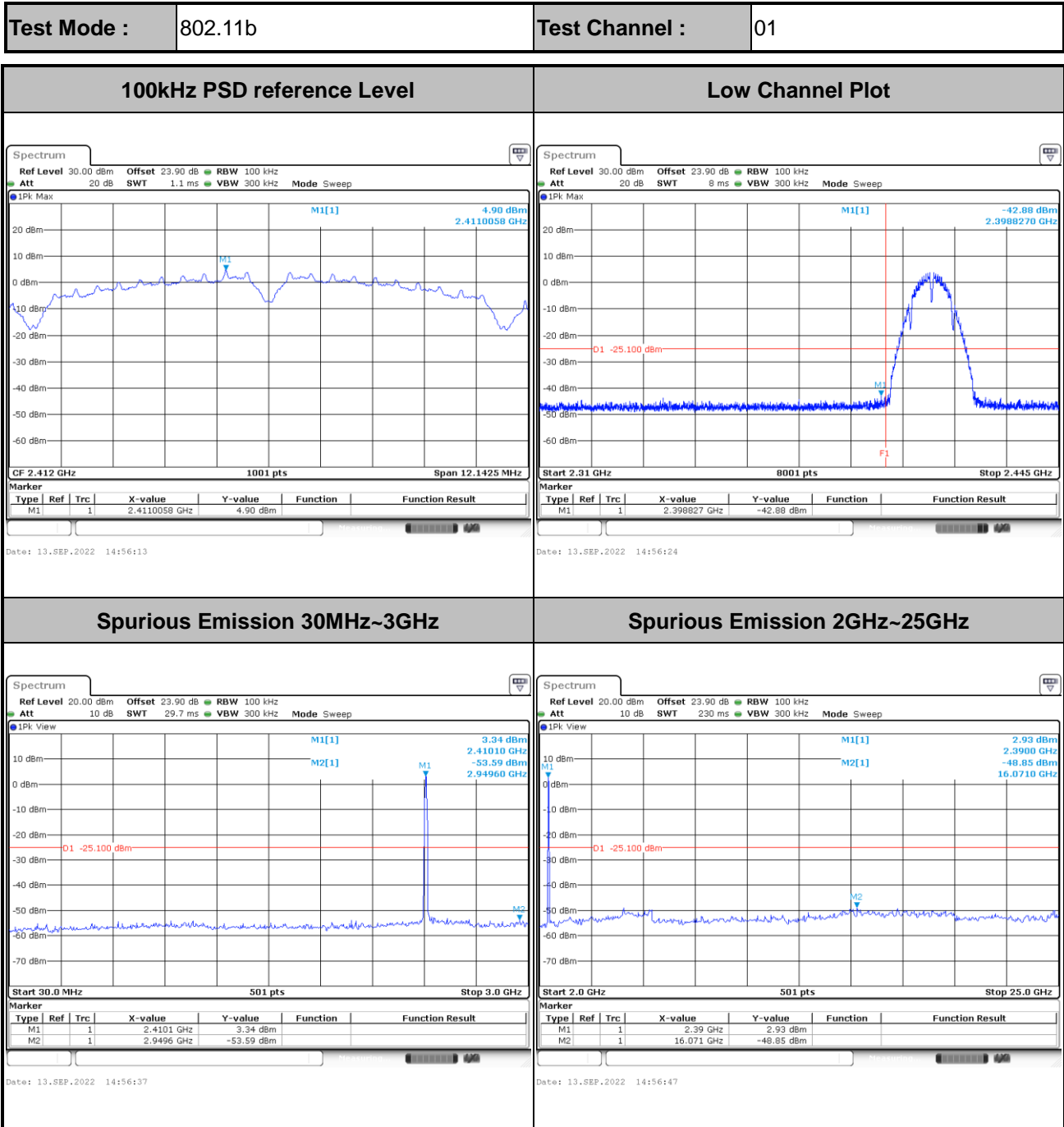
3.4.4 Test Setup





3.4.5 Test Result of Conducted Band Edges and Spurious Emission

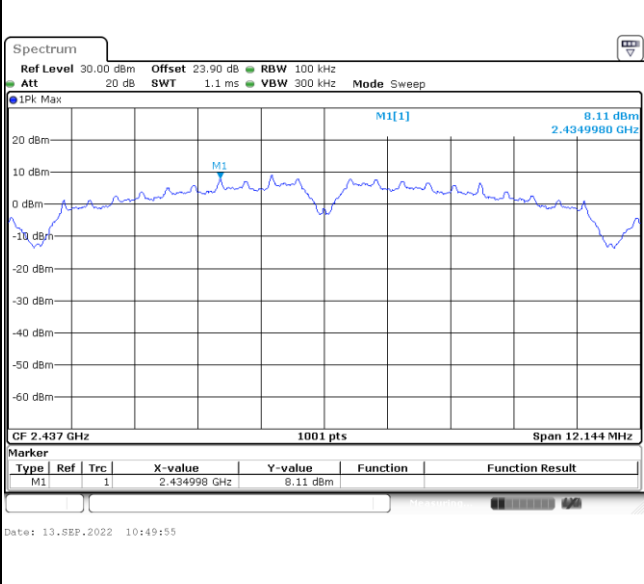
Number of TX = 2, Ant. 0 (Measured)



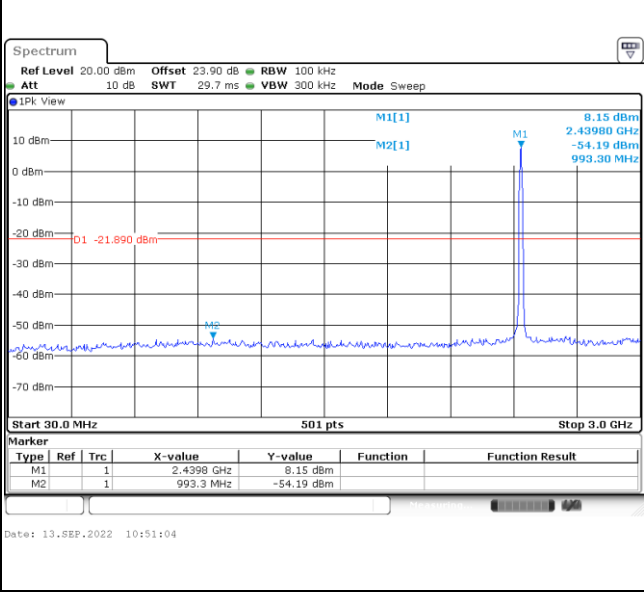


Test Mode :	802.11b	Test Channel :	06
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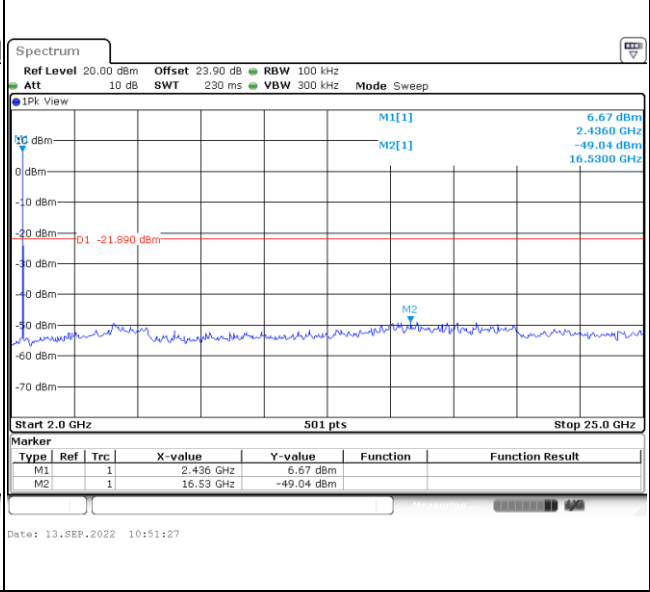
100kHz PSD reference Level	Mid Channel Plot
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Spurious Emission 30MHz~3GHz

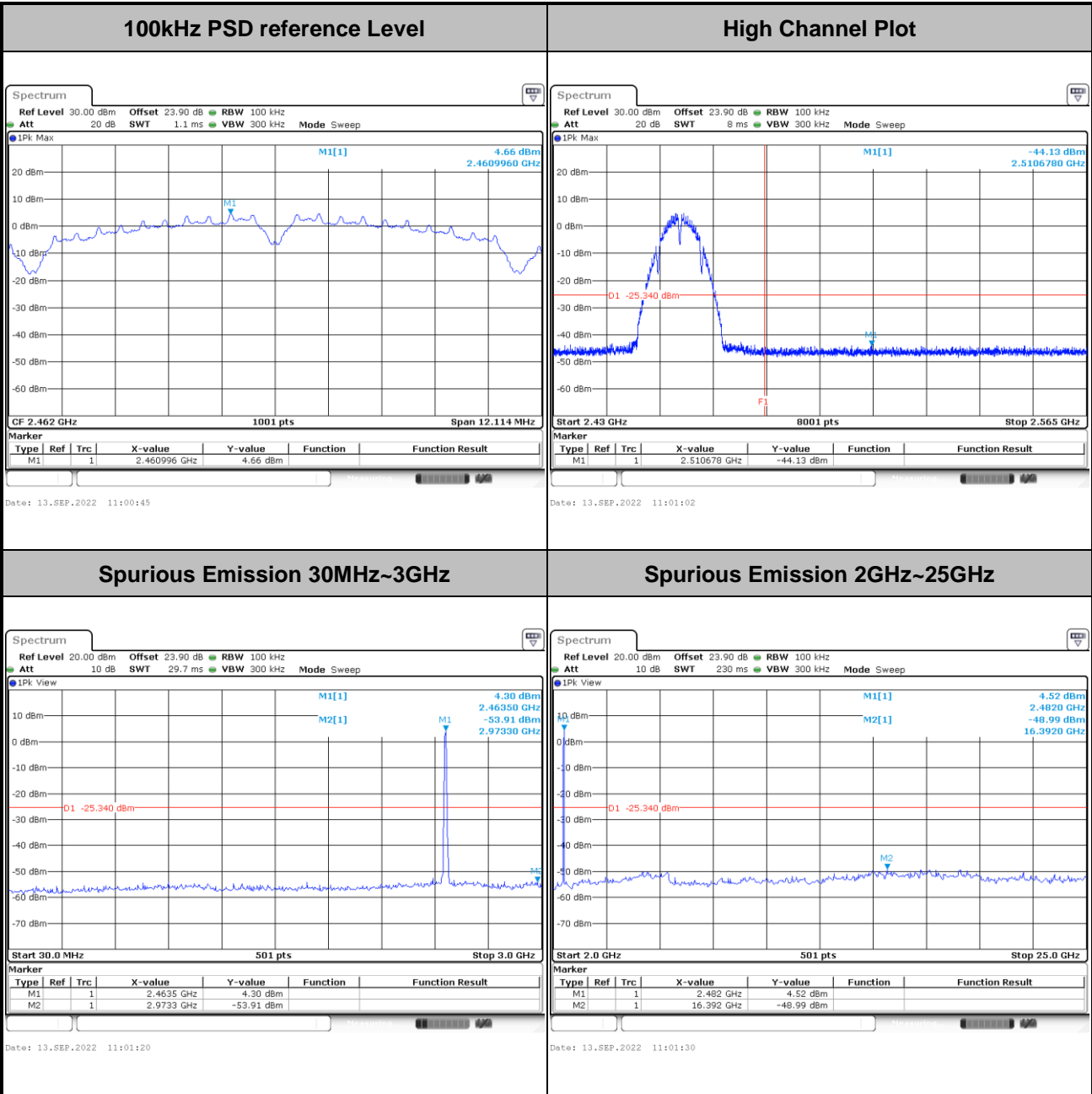


Spurious Emission 2GHz~25GHz



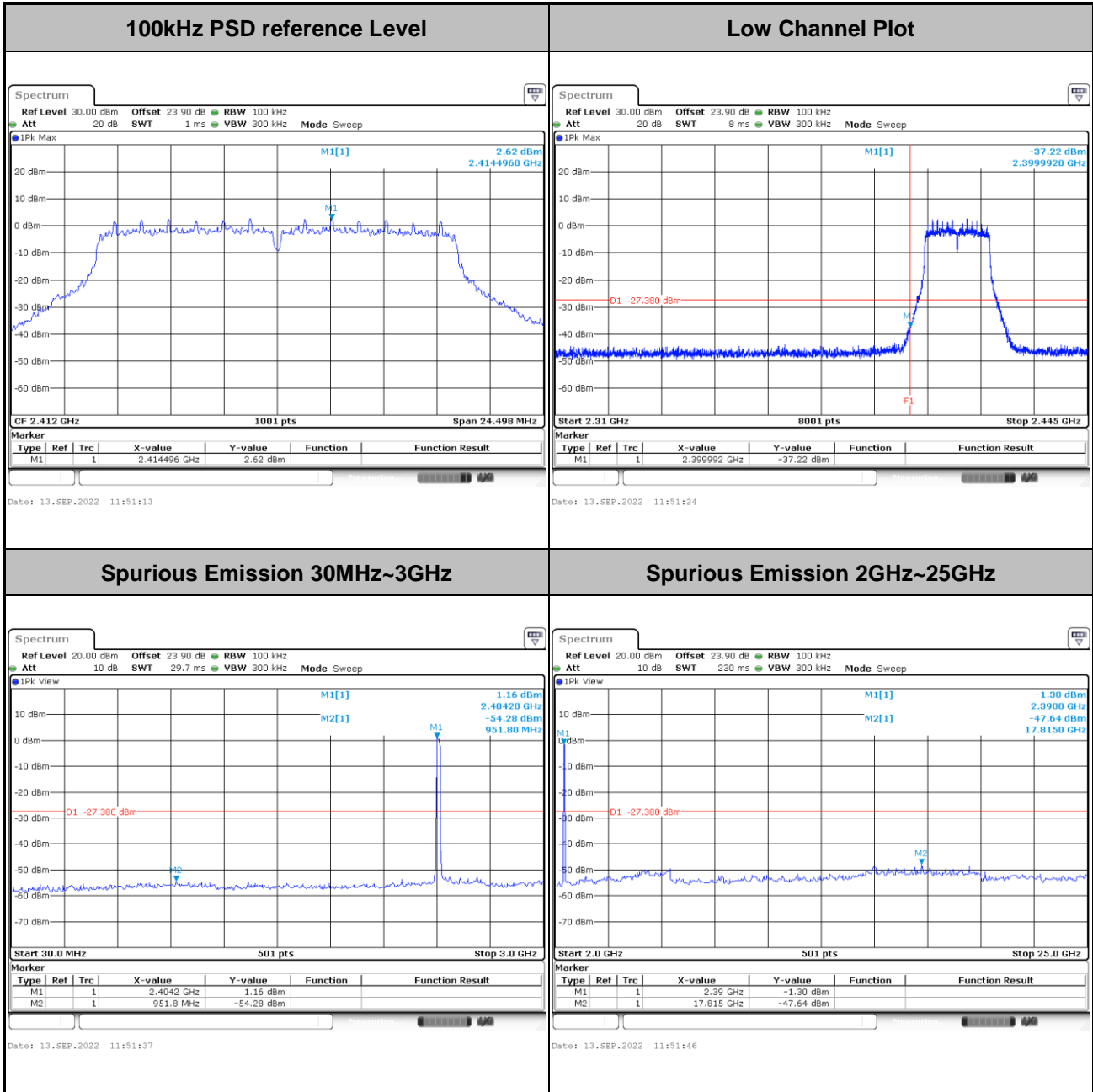


Test Mode :	802.11b	Test Channel :	11
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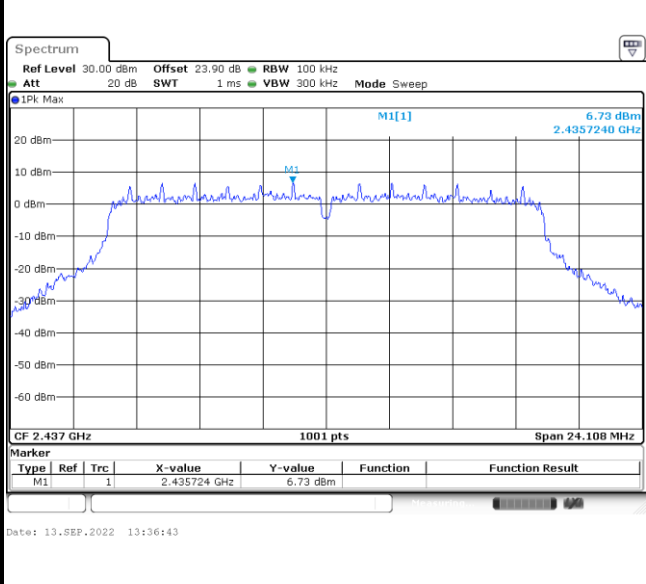
Test Mode :	802.11g	Test Channel :	01
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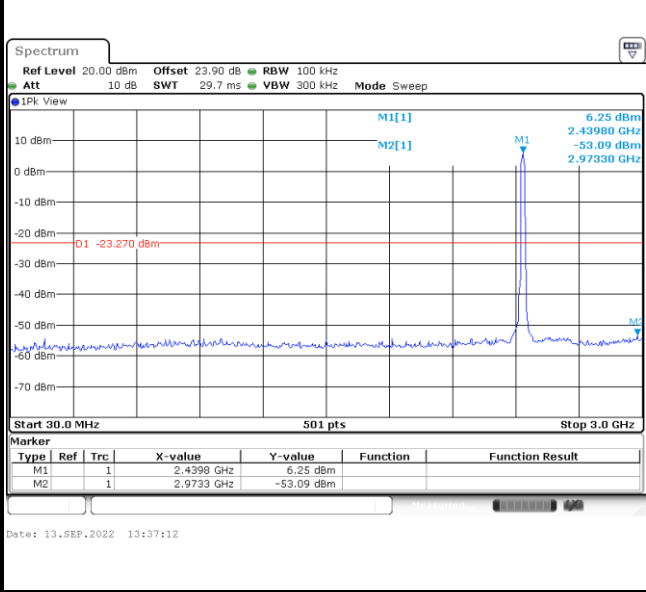


Test Mode :	802.11g	Test Channel :	06
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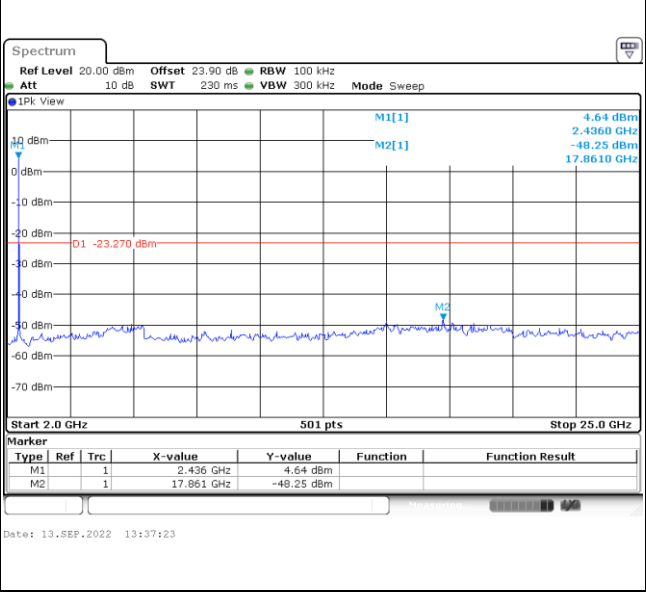
100kHz PSD reference Level	Mid Channel Plot
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Spurious Emission 30MHz~3GHz

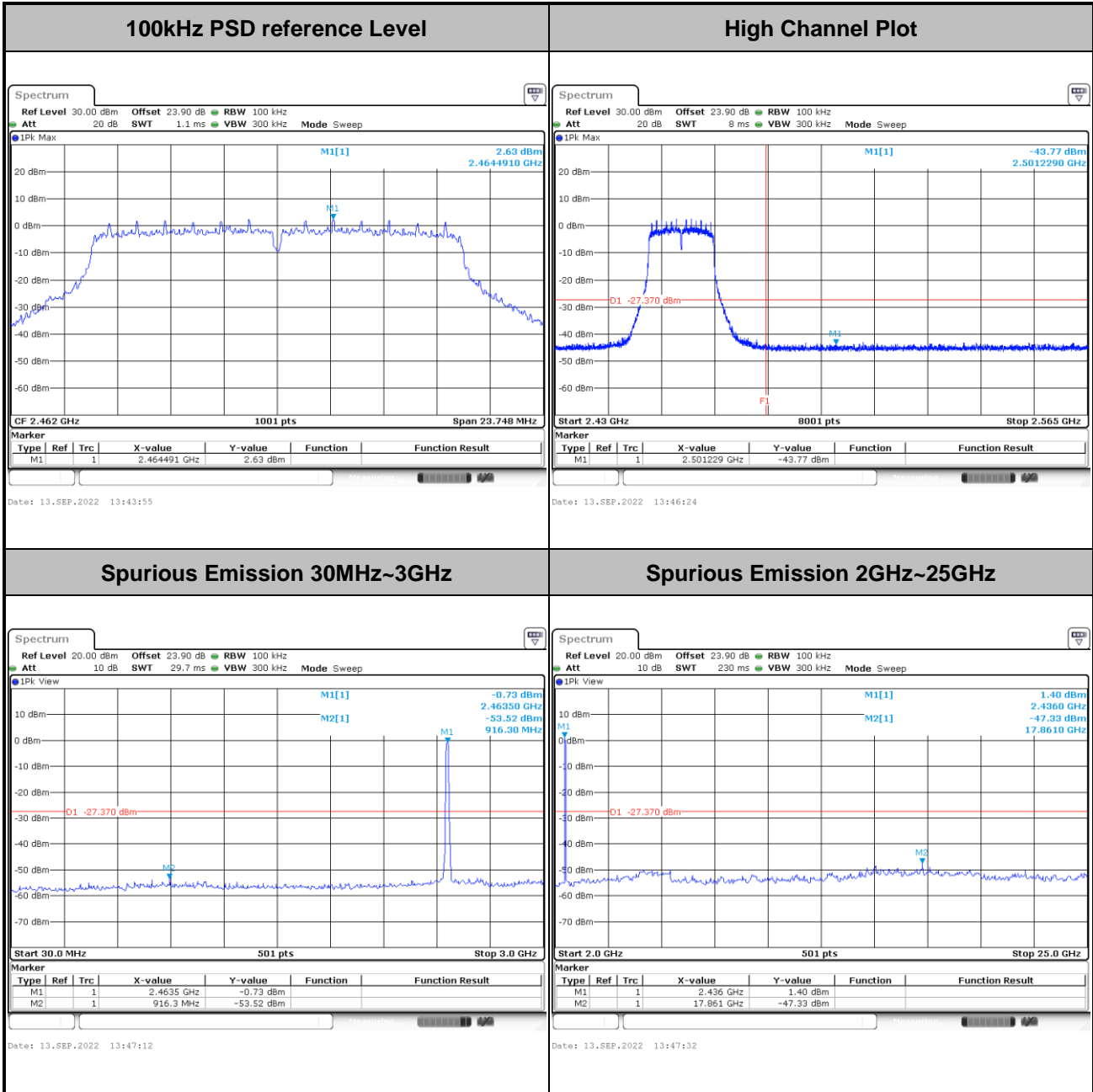


Spurious Emission 2GHz~25GHz



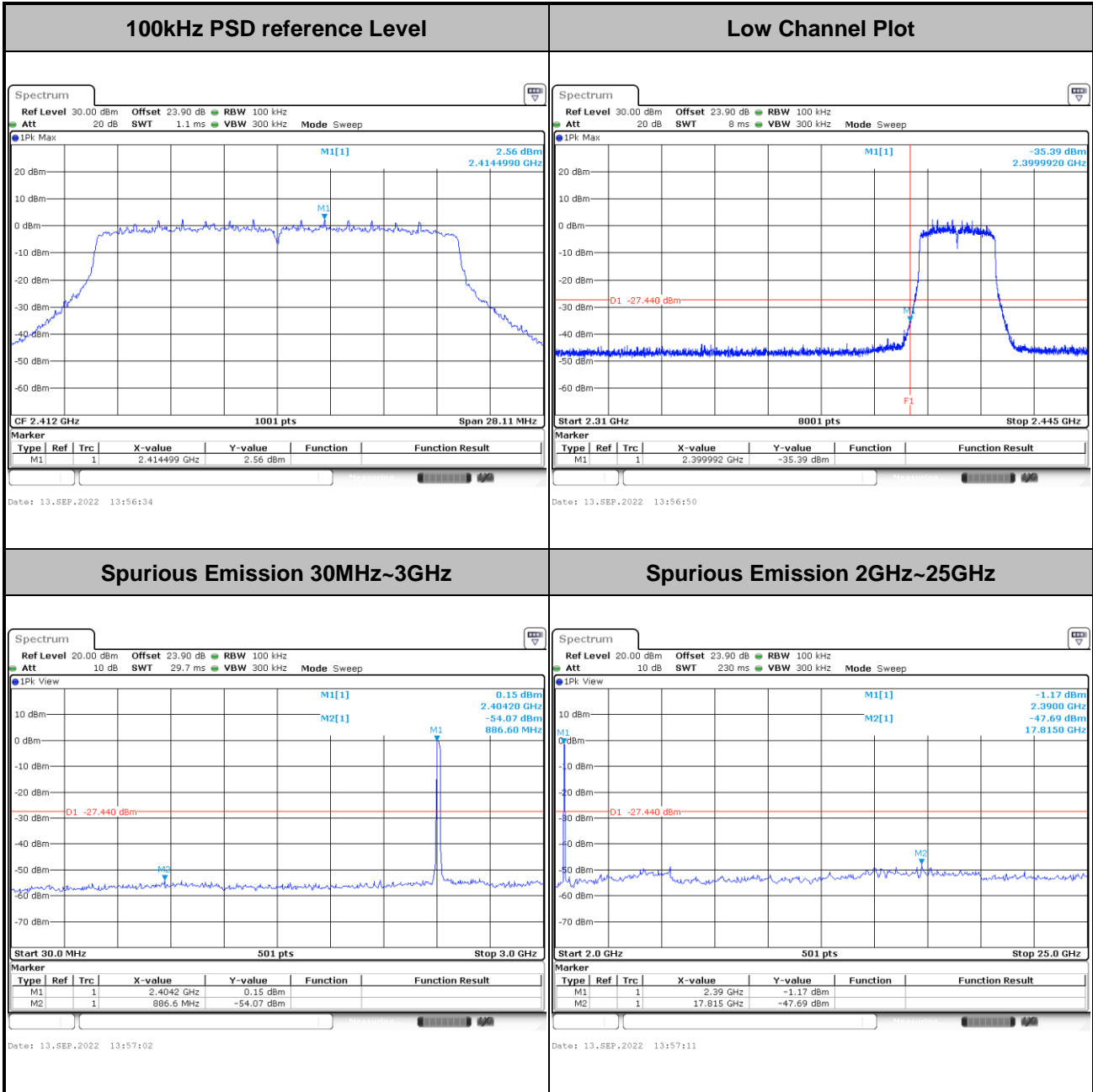


Test Mode :	802.11g	Test Channel :	11
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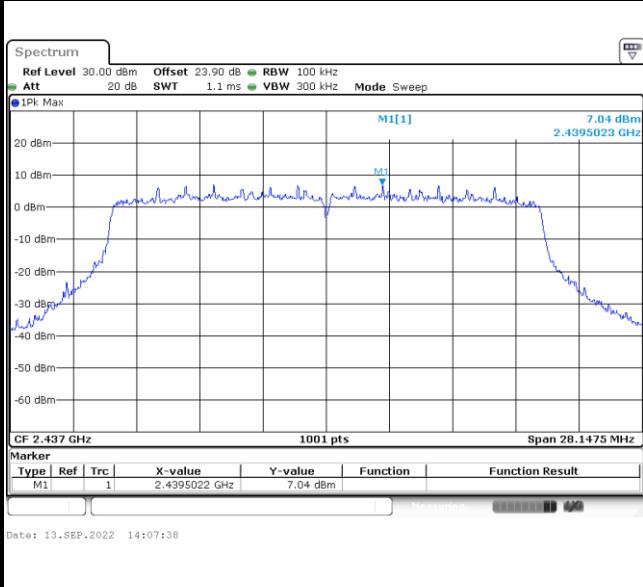
Test Mode :	802.11ax HE20	Test Channel :	01 Full RU
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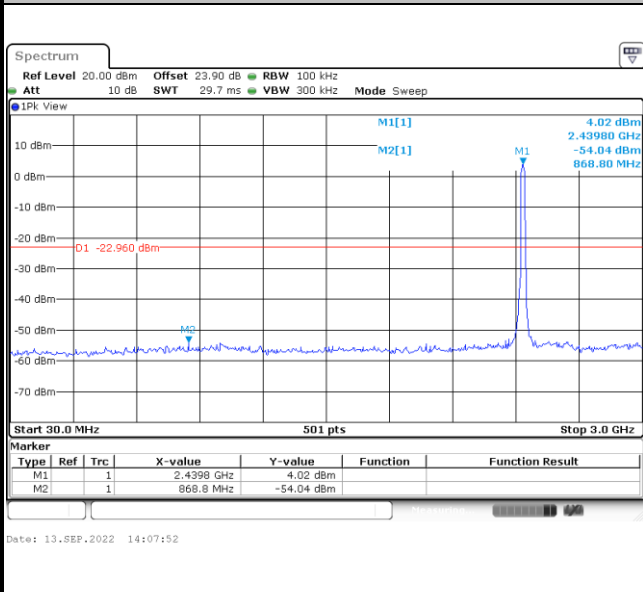


Test Mode :	802.11ax HE20	Test Channel :	06 Full RU
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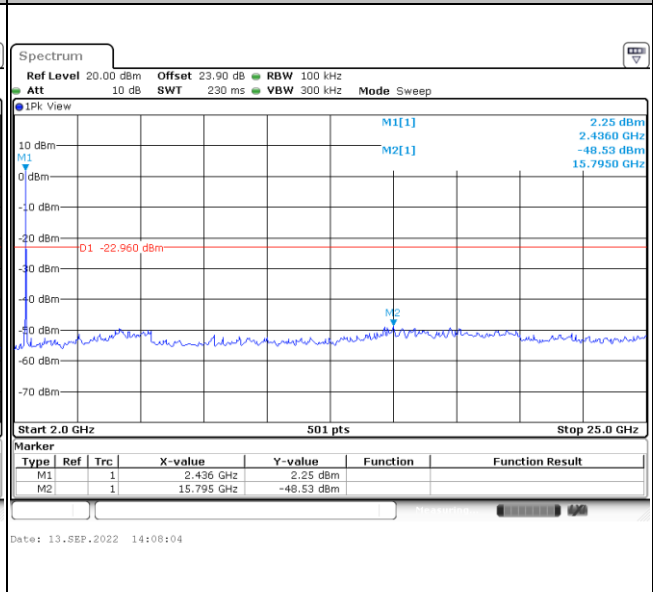
100kHz PSD reference Level	Mid Channel Plot
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Spurious Emission 30MHz~3GHz

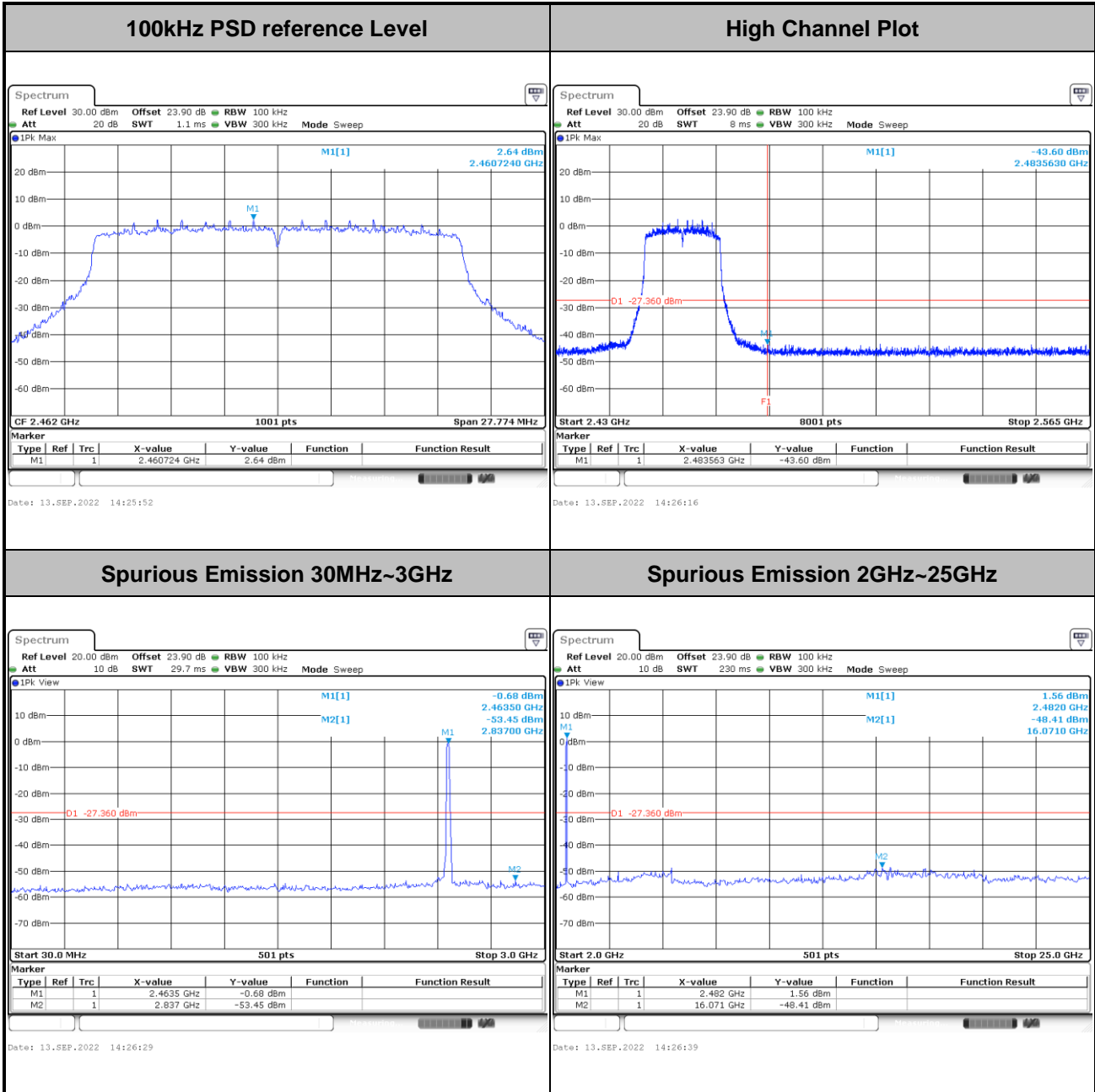


Spurious Emission 2GHz~25GHz





Test Mode :	802.11ax HE20	Test Channel :	11 Full RU
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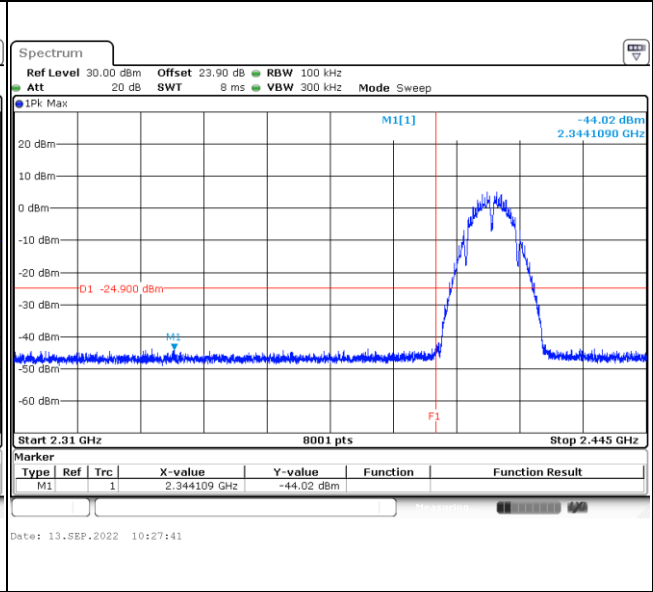
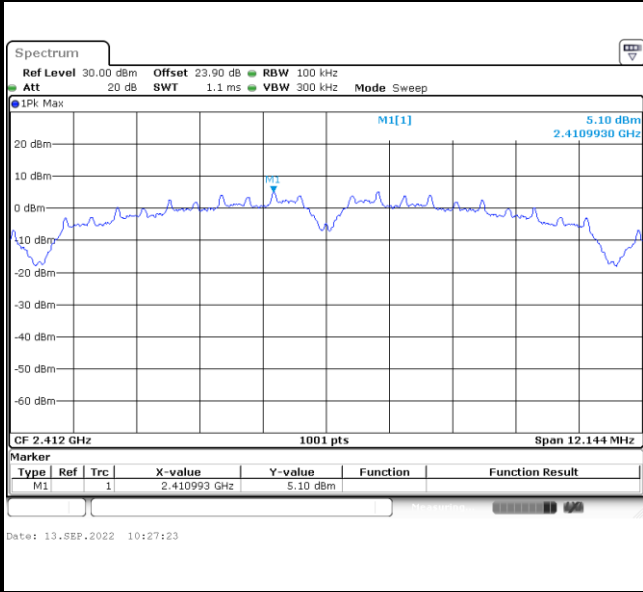




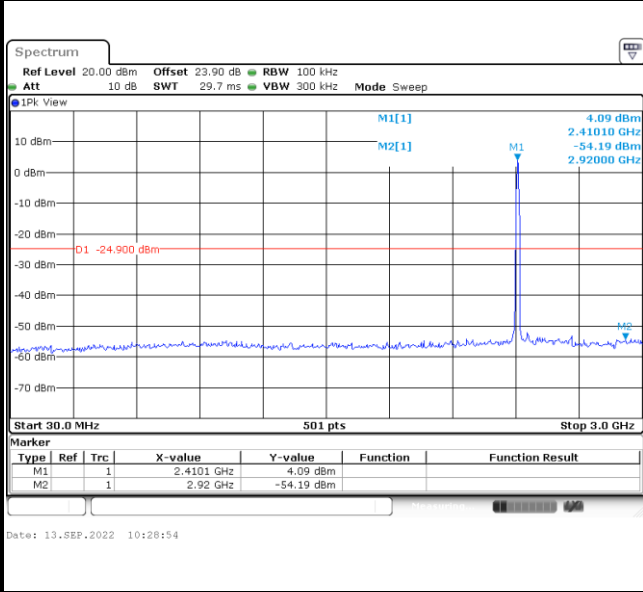
Number of TX = 2, Ant. 1 (Measured)

Test Mode :	802.11b	Test Channel :	01
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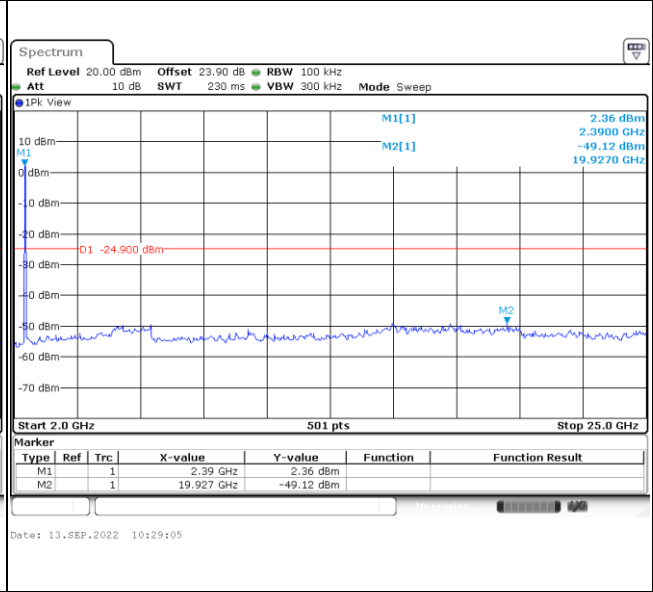
100kHz PSD reference Level	Low Channel Plot
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Spurious Emission 30MHz~3GHz

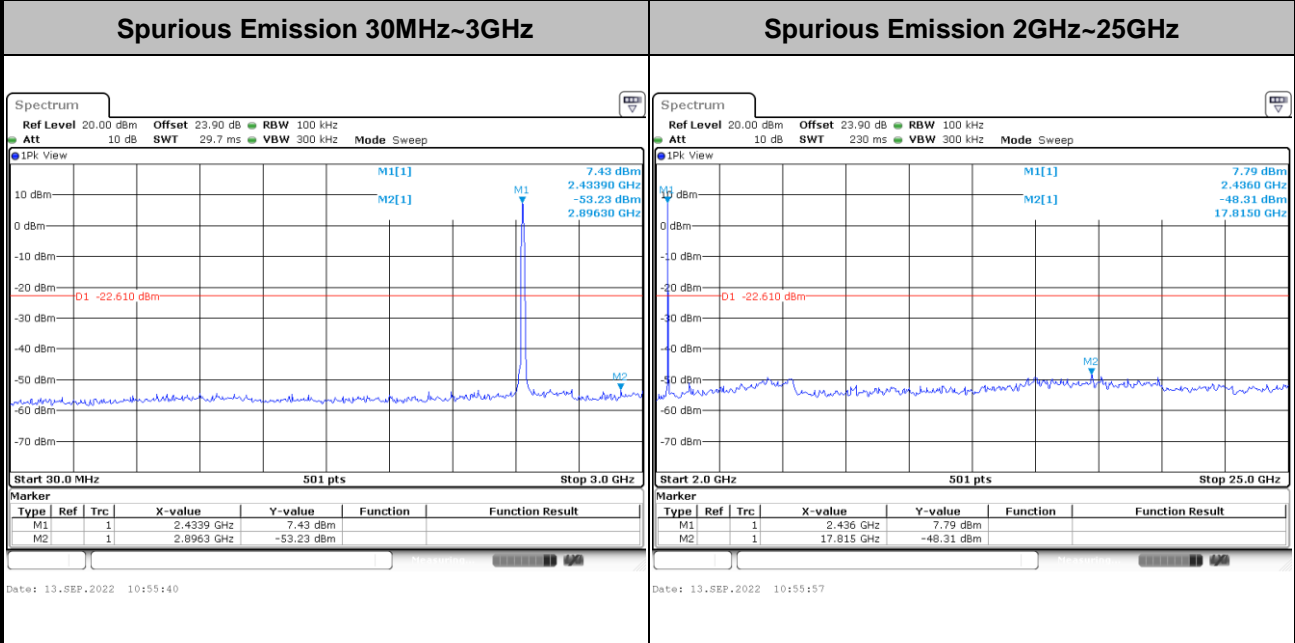
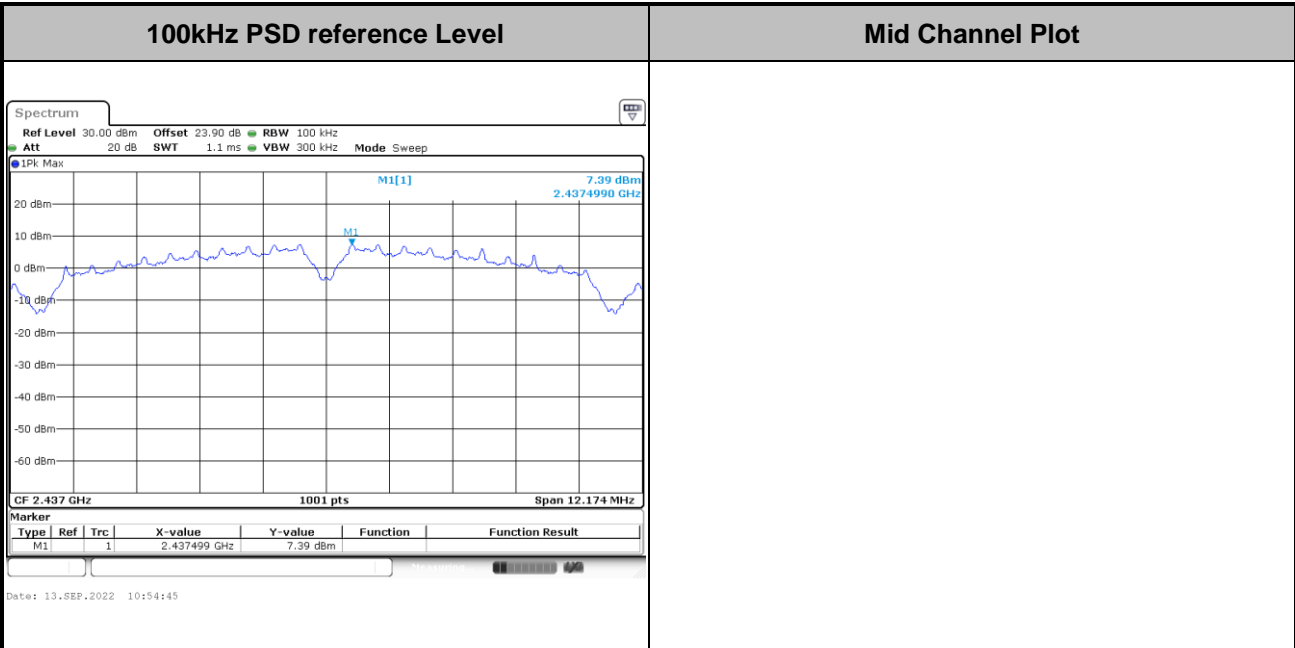


Spurious Emission 2GHz~25GHz



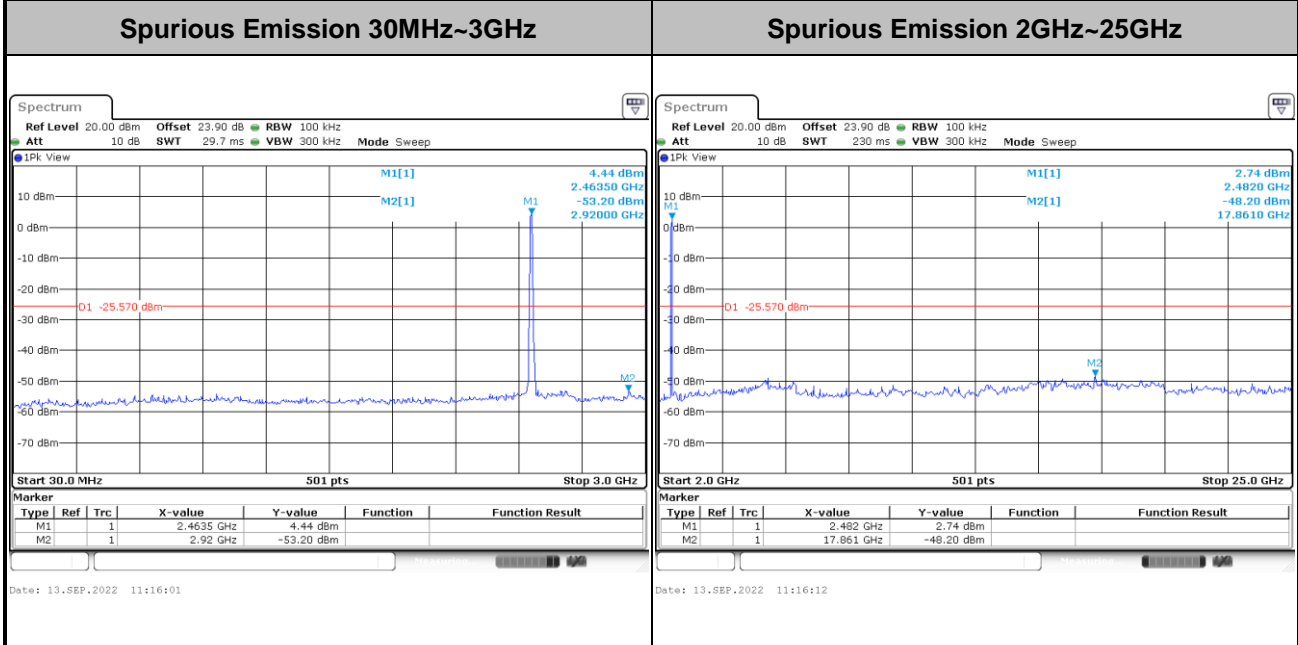
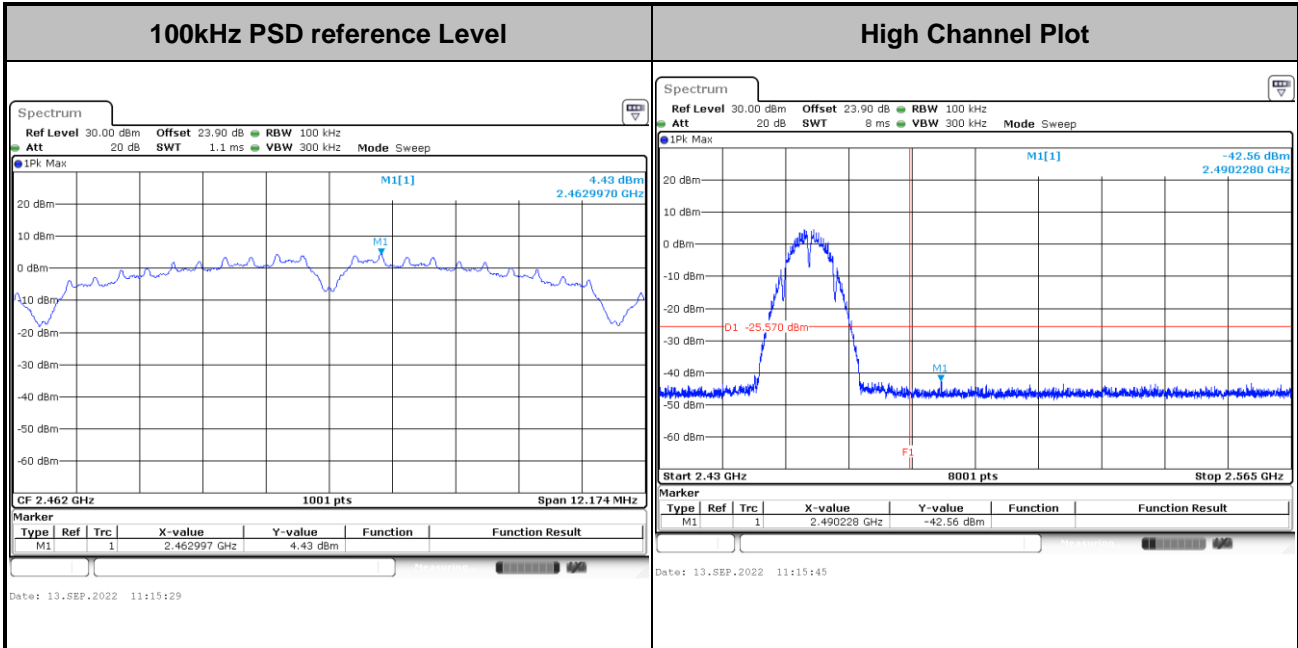


Test Mode :	802.11b	Test Channel :	06
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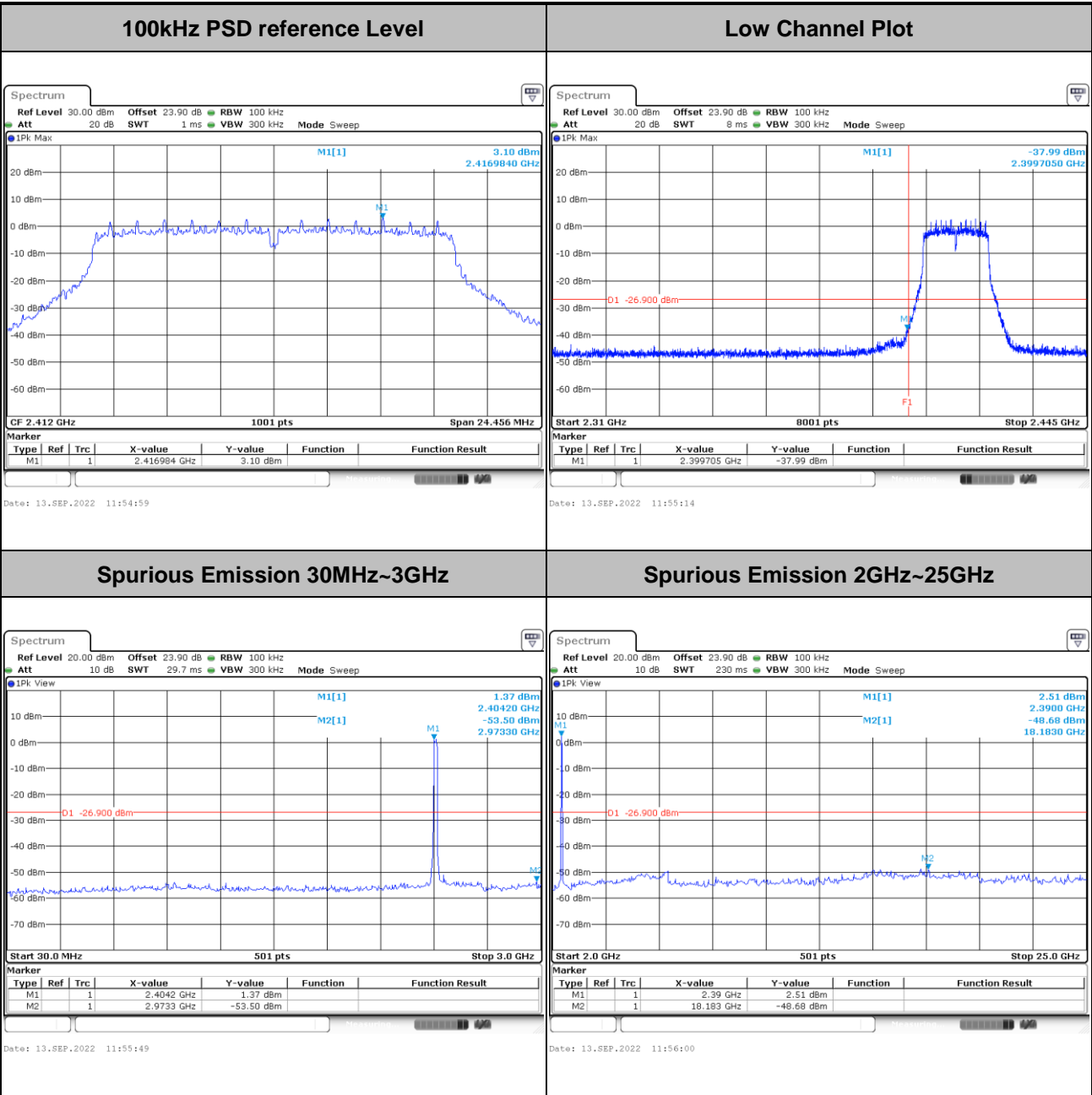


Test Mode :	802.11b	Test Channel :	11
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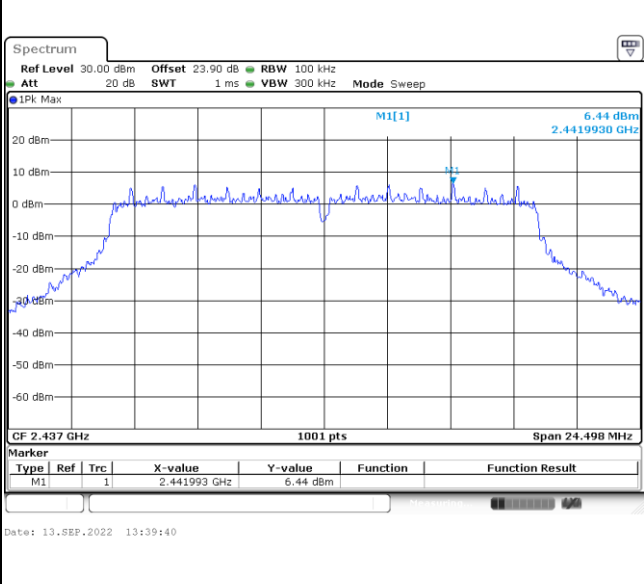
Test Mode :	802.11g	Test Channel :	01
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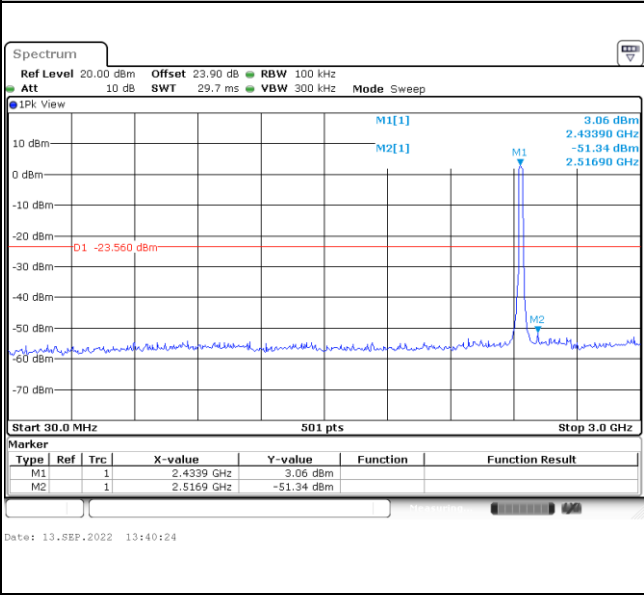


Test Mode :	802.11g	Test Channel :	06
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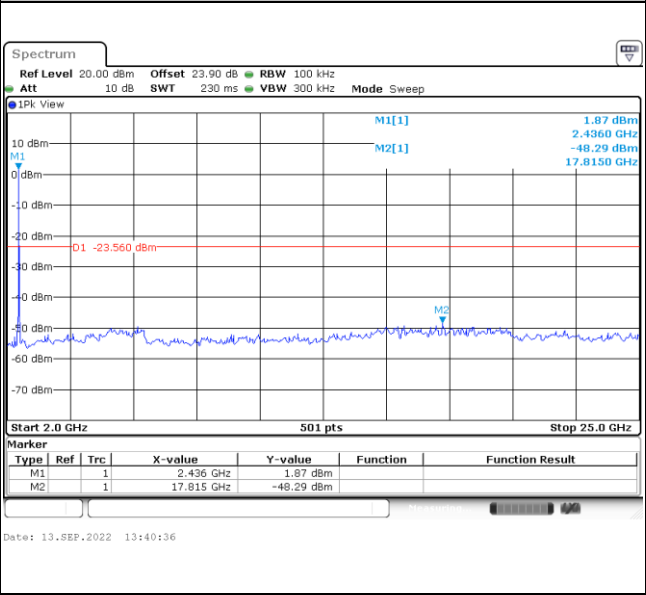
100kHz PSD reference Level	Mid Channel Plot
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Spurious Emission 30MHz~3GHz

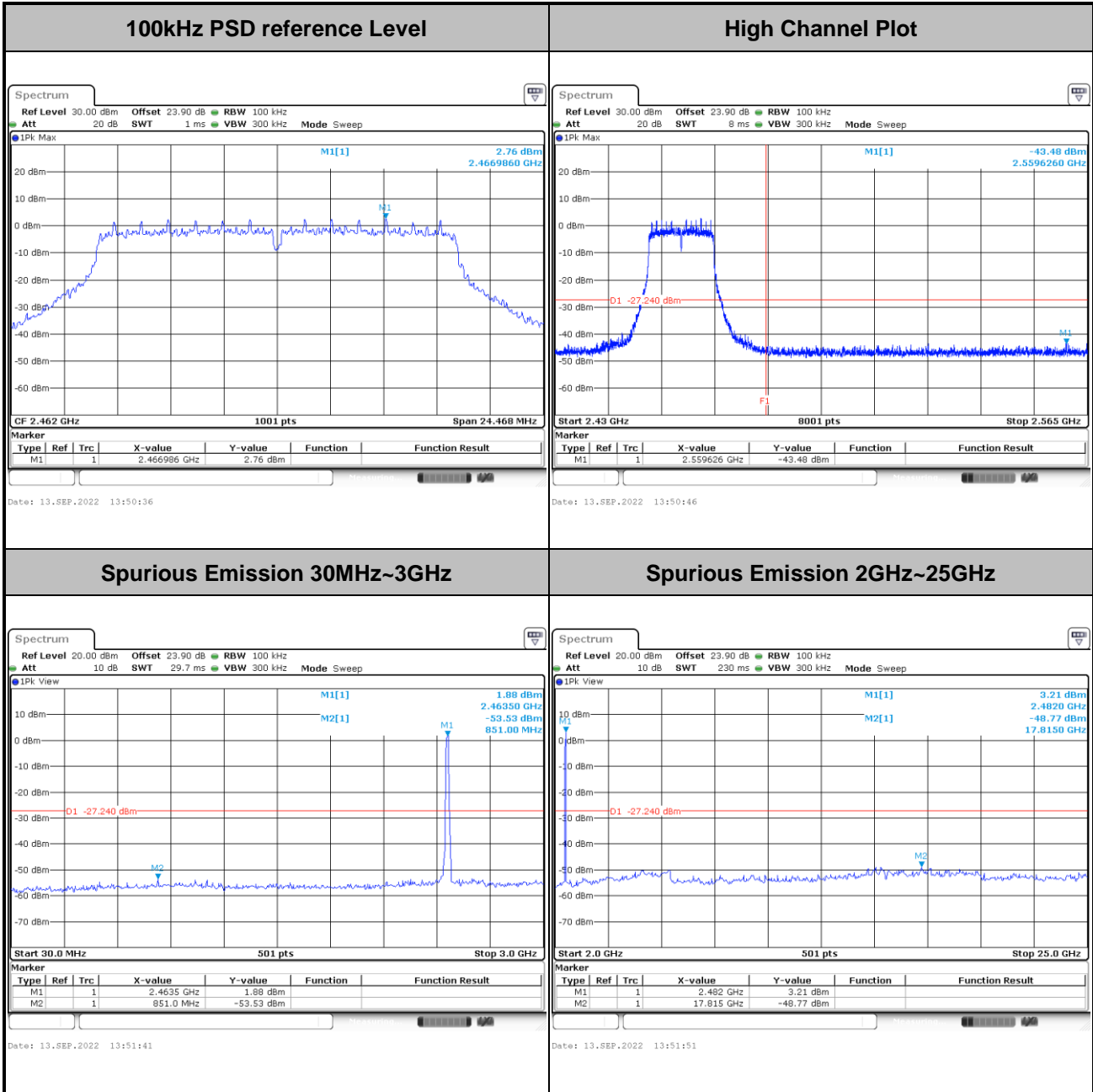


Spurious Emission 2GHz~25GHz



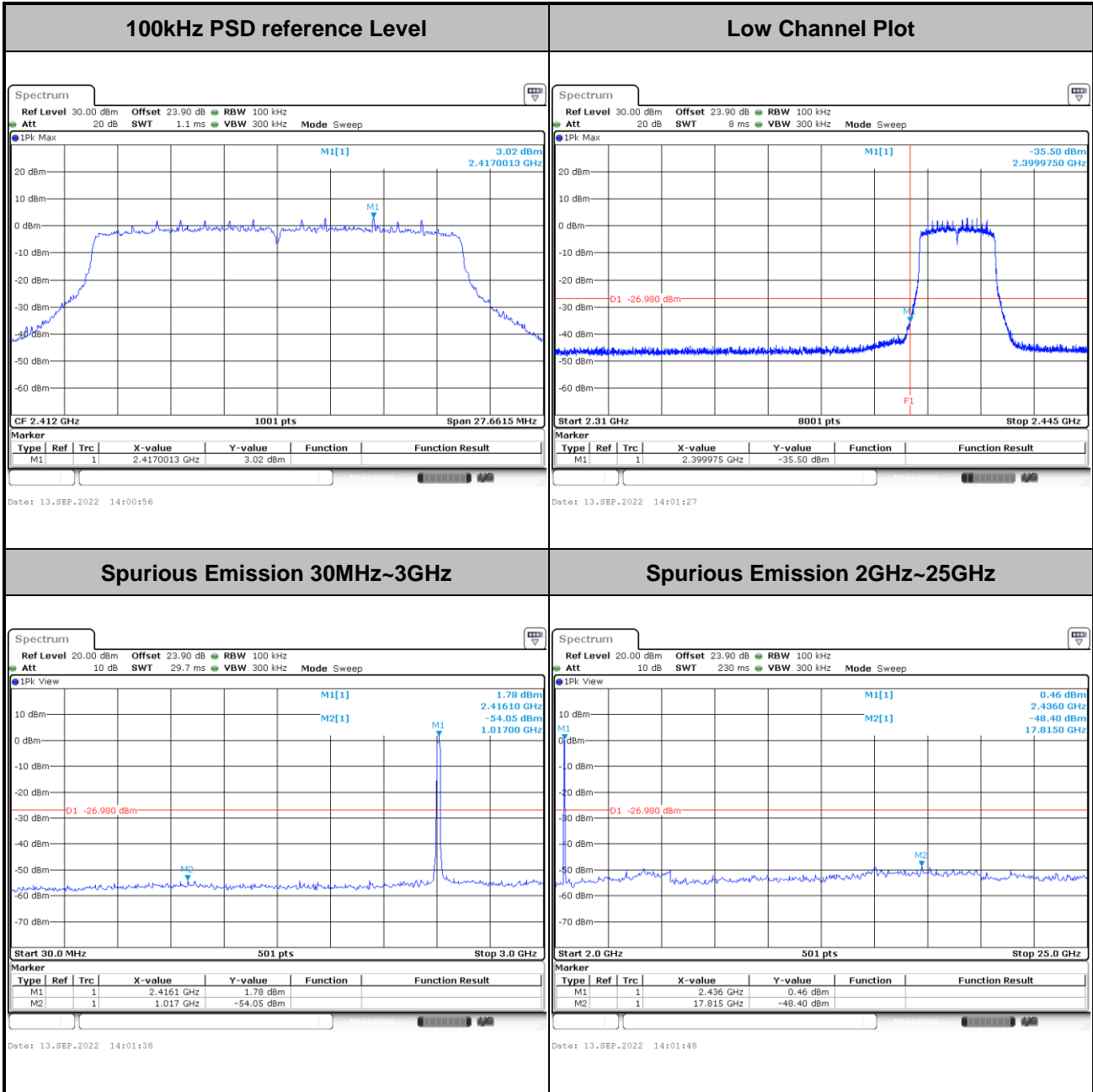


Test Mode :	802.11g	Test Channel :	11
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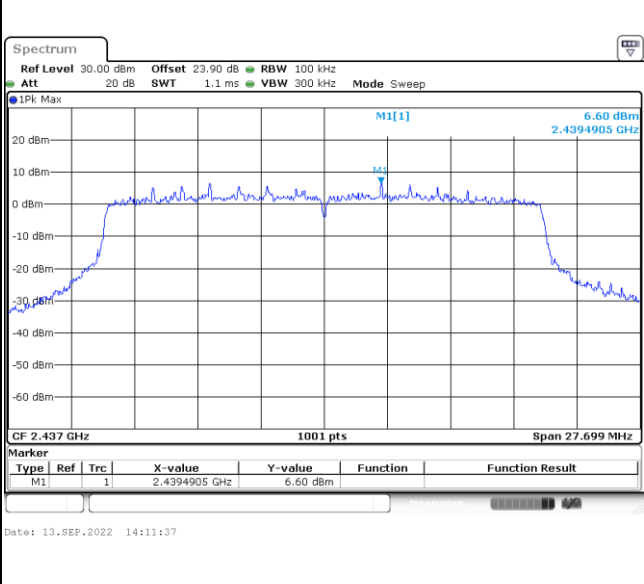
Test Mode :	802.11ax HE20	Test Channel :	01 Full RU
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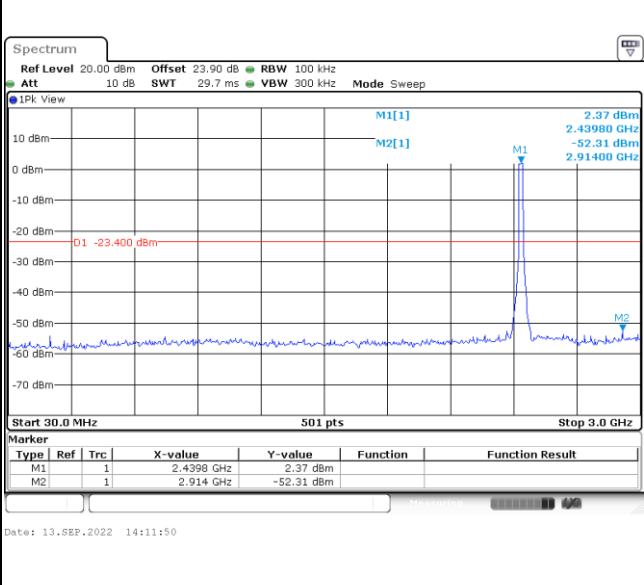


Test Mode :	802.11ax HE20	Test Channel :	06 Full RU
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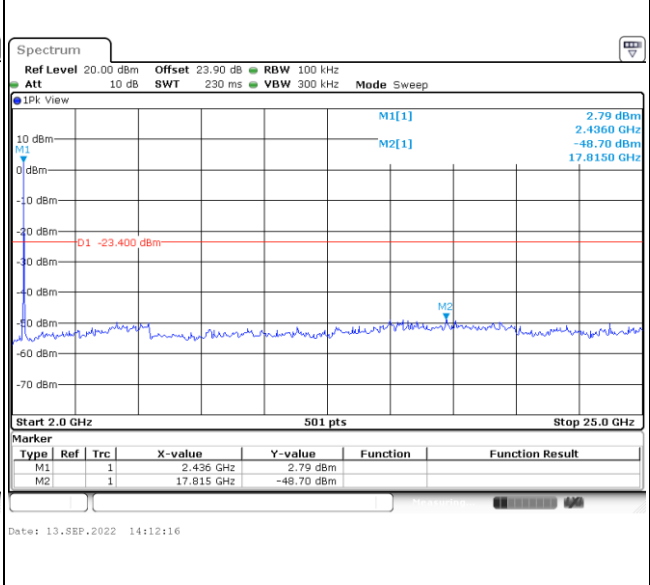
100kHz PSD reference Level	Mid Channel Plot
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Spurious Emission 30MHz~3GHz

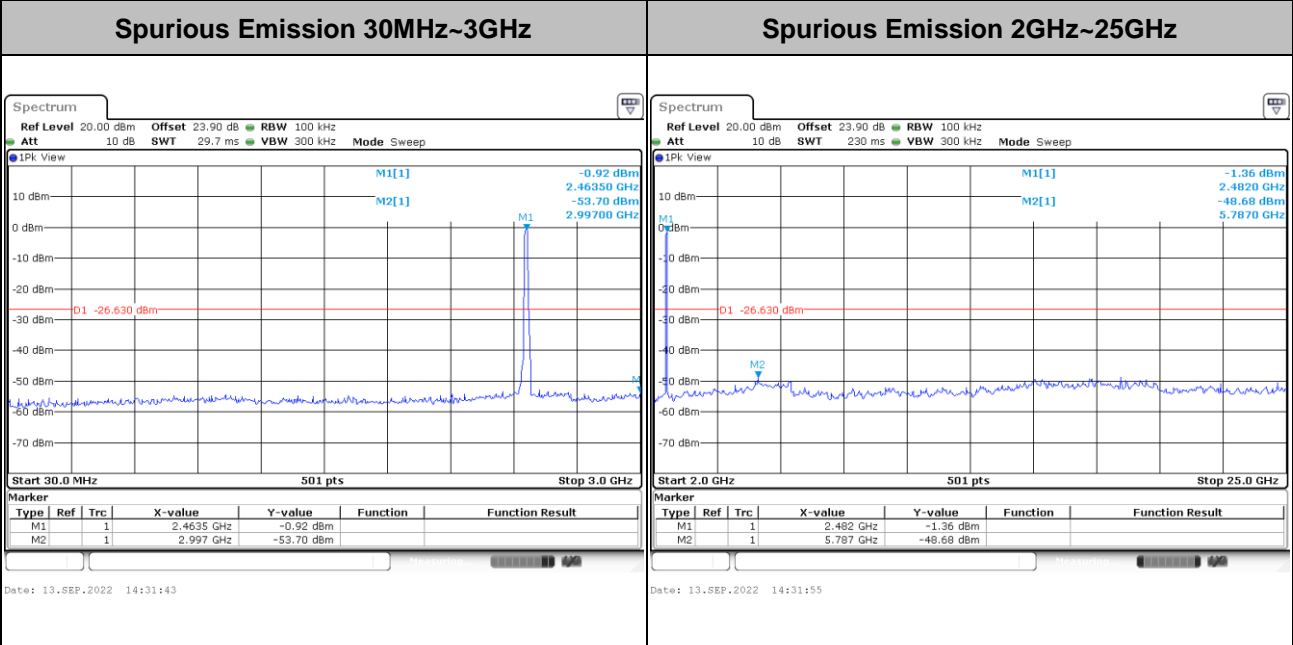
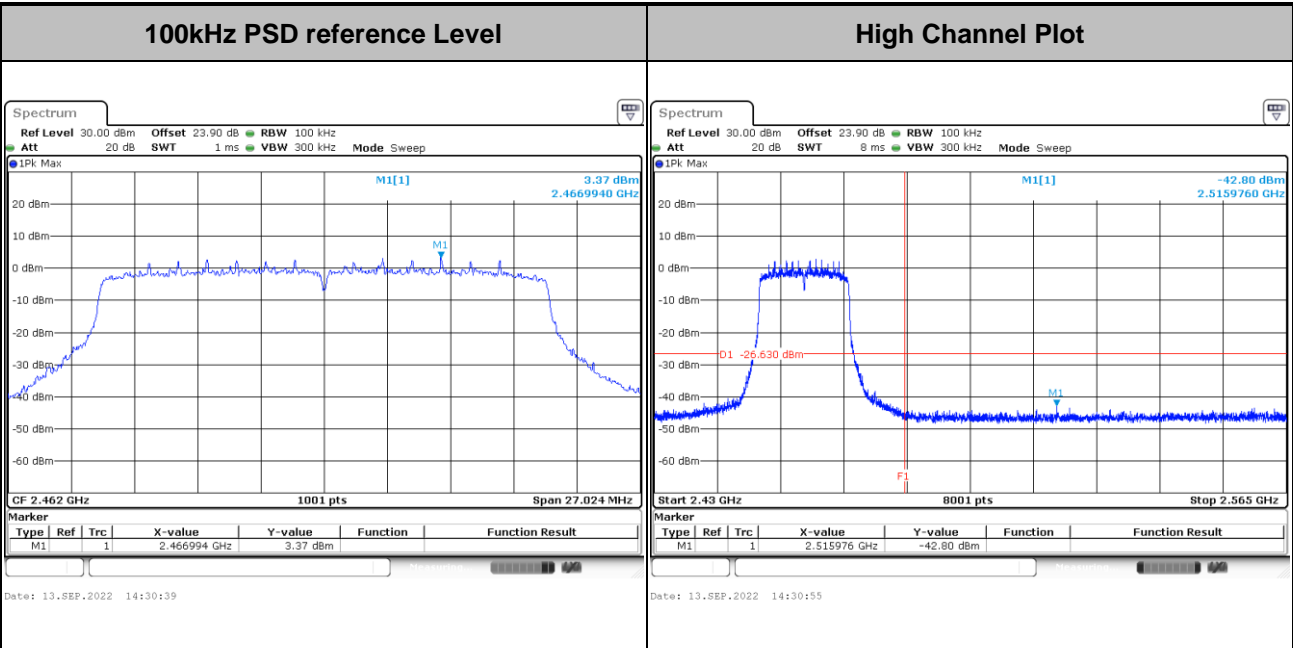


Spurious Emission 2GHz~25GHz





Test Mode :	802.11ax HE20	Test Channel :	11 Full RU
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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 is 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

Please refer to the measuring equipment list in this test report.

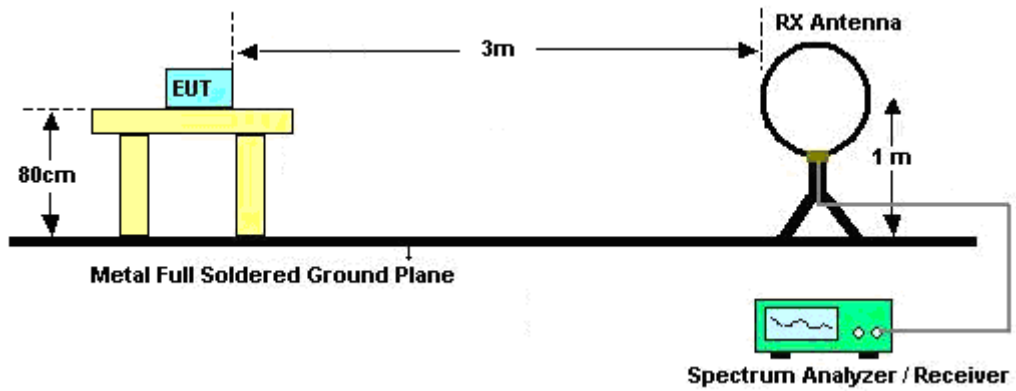


3.5.3 Test Procedures

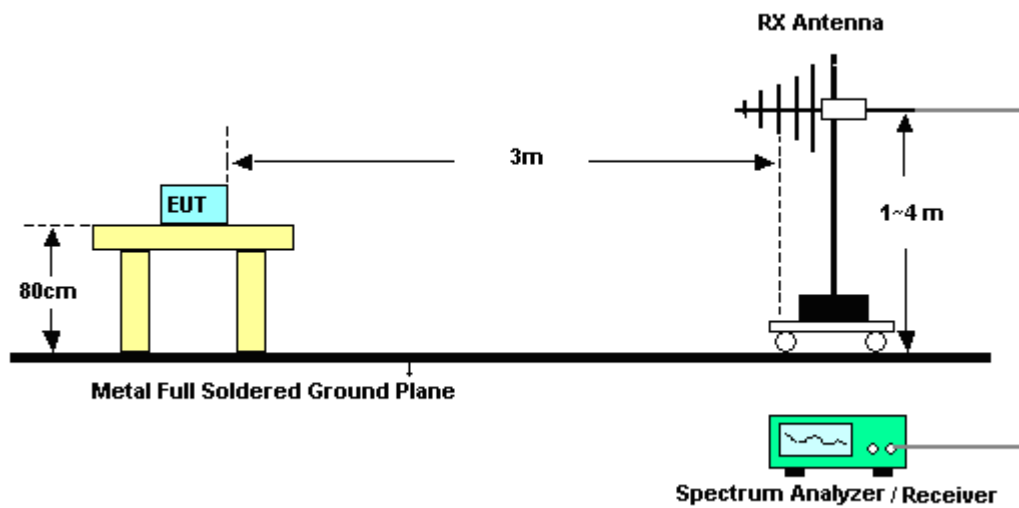
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“.
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= 3 MHz 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

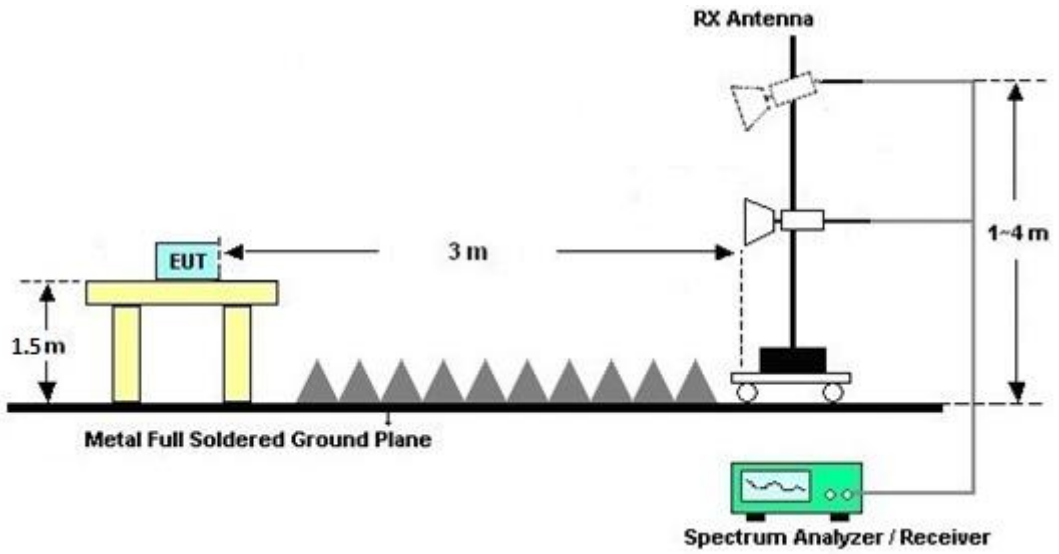
For radiated emissions below 30MHz



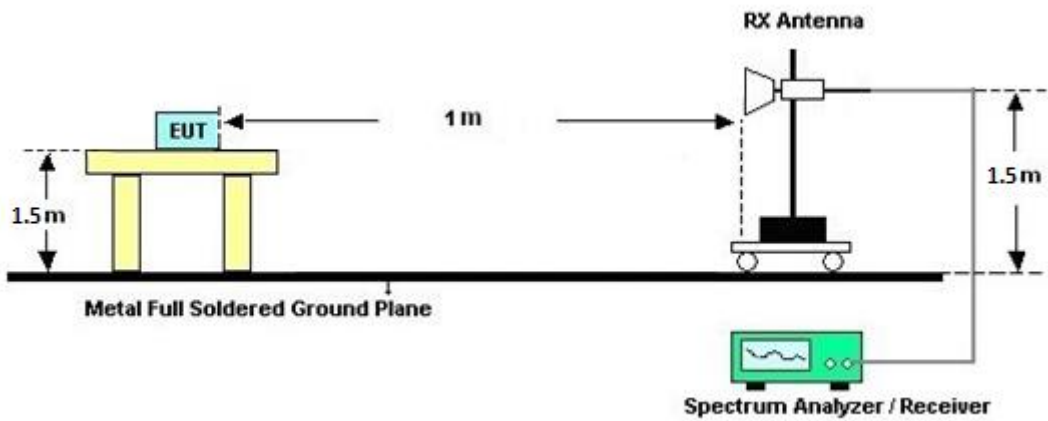
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz





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

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

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

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.



3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
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

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.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECEPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Aug. 19, 2022~ Sep. 27, 2022	Nov. 15, 2022	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	15I00041SNO 10 (NO:248)	10MHz~6GHz	Dec. 29, 2021	Aug. 19, 2022~ Sep. 27, 2022	Dec. 28, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101905	10Hz - 40GHz	Aug. 03, 2022	Aug. 19, 2022~ Sep. 27, 2022	Aug. 02, 2023	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Aug. 26, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2021	Aug. 26, 2022	Nov. 30, 2022	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2021	Aug. 26, 2022	Nov. 16, 2022	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 03, 2021	Aug. 26, 2022	Dec. 02, 2022	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Aug. 26, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Aug. 01, 2022	Aug. 26, 2022	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Aug. 26, 2022	Dec. 29, 2022	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	May 13, 2022	Aug. 31, 2022~ Sep. 09, 2022	May 12, 2023	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 24, 2021	Aug. 31, 2022~ Sep. 09, 2022	Dec. 23, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz~40GHz	Nov. 30, 2021	Aug. 31, 2022~ Sep. 09, 2022	Nov. 29, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 21, 2022	Aug. 31, 2022~ Sep. 09, 2022	Feb. 20, 2023	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917057 6	18GHz~40GHz	May 14, 2022	Aug. 31, 2022~ Sep. 09, 2022	May 13, 2023	Radiation (03CH13-HY)
Amplifier	SONOMA	310N	187282	9kHz~1GHz	Dec. 15, 2021	Aug. 31, 2022~ Sep. 09, 2022	Dec. 14, 2022	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	40103 & 07	30MHz~1GHz	Apr. 24, 2022	Aug. 31, 2022~ Sep. 09, 2022	Apr. 23, 2023	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	41912 & 05	30MHz~1GHz	Feb. 06, 2022	Aug. 31, 2022~ Sep. 09, 2022	Feb. 05, 2023	Radiation (03CH13-HY)
Hygrometer	TECEPEL	DTM-303B	TP200889	N/A	Sep. 30, 2021	Aug. 31, 2022~ Sep. 09, 2022	Sep. 29, 2022	Radiation (03CH13-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 17, 2022	Aug. 31, 2022~ Sep. 09, 2022	May 16, 2023	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 26, 2021	Aug. 31, 2022~ Sep. 09, 2022	Oct. 25, 2022	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 18, 2022	Aug. 31, 2022~ Sep. 09, 2022	Mar. 17, 2023	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 14, 2021	Aug. 31, 2022~ Sep. 09, 2022	Sep. 13, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-1080 -1200-15000-6 0SS	SN3	1.2GHz High Pass Filter	Jun. 30, 2022	Aug. 31, 2022~ Sep. 09, 2022	Jun. 29, 2023	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN2	3GHz High Pass Filter	Jul. 12, 2022	Aug. 31, 2022~ Sep. 09, 2022	Jul. 11, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 09, 2022	Aug. 31, 2022~ Sep. 09, 2022	Feb. 08, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 09, 2022	Aug. 31, 2022~ Sep. 09, 2022	Feb. 08, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9 kHz~30 MHz	Mar. 10, 2022	Aug. 31, 2022~ Sep. 09, 2022	Mar. 09, 2023	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 09, 2022	Aug. 31, 2022~ Sep. 09, 2022	Feb. 08, 2023	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Aug. 31, 2022~ Sep. 09, 2022	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Aug. 31, 2022~ Sep. 09, 2022	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Aug. 31, 2022~ Sep. 09, 2022	N/A	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1241	1-18GHz	Jul. 25, 2022	Aug. 31, 2022~ Sep. 09, 2022	Jul. 24, 2023	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1212	1GHz~18GHz	Mar. 10, 2022	Aug. 31, 2022~ Sep. 09, 2022	Mar. 09, 2023	Radiation (03CH13-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.1 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.0 dB
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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 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.9 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Eason Huang	Temperature:	21~25	°C
Test Date:	2022/08/19~2022/09/27	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant0	Ant1	Ant0	Ant1		
11b	1Mbps	2	1	2412	13.43	13.33	8.10	8.10	0.50	Pass
11b	1Mbps	2	6	2437	13.38	13.33	8.10	8.12	0.50	Pass
11b	1Mbps	2	11	2462	13.28	13.33	8.08	8.12	0.50	Pass
11g	6Mbps	2	1	2412	17.03	17.13	16.33	16.30	0.50	Pass
11g	6Mbps	2	6	2437	16.98	17.18	16.07	16.33	0.50	Pass
11g	6Mbps	2	11	2462	16.93	17.18	15.83	16.31	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant0	Ant1	SUM	Ant0	Ant1	Ant0	Ant1	Ant0	Ant1	Ant0	Ant1	
11b	1Mbps	2	1	2412	13.70	13.80	16.76	30.00		4.30		21.06		36.00		Pass
11b	1Mbps	2	6	2437	17.60	17.40	20.51	30.00		4.30		24.81		36.00		Pass
11b	1Mbps	2	11	2462	14.00	13.90	16.96	30.00		4.30		21.26		36.00		Pass
11g	6Mbps	2	1	2412	13.70	13.90	16.81	30.00		4.30		21.11		36.00		Pass
11g	6Mbps	2	6	2437	17.60	17.30	20.46	30.00		4.30		24.76		36.00		Pass
11g	6Mbps	2	11	2462	13.50	13.80	16.66	30.00		4.30		20.96		36.00		Pass
HT20	MCS0	2	1	2412	13.50	13.70	16.61	30.00		4.30		20.91		36.00		Pass
HT20	MCS0	2	6	2437	17.80	17.50	20.66	30.00		4.30		24.96		36.00		Pass
HT20	MCS0	2	11	2462	13.50	13.80	16.66	30.00		4.30		20.96		36.00		Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant0	Ant1	Worse + 3.01	Ant0	Ant1	Ant0	Ant1	
11b	1Mbps	2	1	2412	-8.60	-8.17	-5.16	5.78		8.00		Pass
11b	1Mbps	2	6	2437	-5.94	-5.59	-2.58	5.78		8.00		Pass
11b	1Mbps	2	11	2462	-8.77	-8.35	-5.34	5.78		8.00		Pass
11g	6Mbps	2	1	2412	-12.60	-13.06	-9.59	5.78		8.00		Pass
11g	6Mbps	2	6	2437	-7.42	-9.63	-4.41	5.78		8.00		Pass
11g	6Mbps	2	11	2462	-12.55	-12.19	-9.18	5.78		8.00		Pass

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

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band MIMO											
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
						Ant0	Ant1	Ant0	Ant1		
HE20	MCS0	2	1	2412	Full	19.33	19.28	18.74	18.44	0.50	Pass
HE20	MCS0	2	6	2437	Full	19.38	19.43	18.76	18.46	0.50	Pass
HE20	MCS0	2	11	2462	Full	19.33	19.33	18.52	18.01	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band MIMO																	
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
						Ant0	Ant1	SUM	Ant0	Ant1	Ant0	Ant1	Ant0	Ant1	Ant0	Ant1	
HE20	MCS0	2	1	2412	Full	13.60	13.80	16.71	30.00		4.30		21.01		36.00	Pass	
HE20	MCS0	2	1	2412	26/0	3.90	3.90	6.91	30.00		4.30		11.21		36.00	Pass	
HE20	MCS0	2	1	2412	52/37	6.20	6.10	9.16	30.00		4.30		13.46		36.00	Pass	
HE20	MCS0	2	1	2412	106/53	9.50	9.10	12.31	30.00		4.30		16.61		36.00	Pass	
HE20	MCS0	2	1	2412	242/61	12.90	13.10	16.01	30.00		4.30		20.31		36.00	Pass	
HE20	MCS0	2	6	2437	Full	17.90	17.60	20.76	30.00		4.30		25.06		36.00	Pass	
HE20	MCS0	2	6	2437	26/4	9.50	9.40	12.46	30.00		4.30		16.76		36.00	Pass	
HE20	MCS0	2	6	2437	52/39	12.10	12.10	15.11	30.00		4.30		19.41		36.00	Pass	
HE20	MCS0	2	6	2437	106/53	15.00	14.70	17.86	30.00		4.30		22.16		36.00	Pass	
HE20	MCS0	2	6	2437	242/61	17.30	17.00	20.16	30.00		4.30		24.46		36.00	Pass	
HE20	MCS0	2	11	2462	Full	13.60	13.90	16.76	30.00		4.30		21.06		36.00	Pass	
HE20	MCS0	2	11	2462	26/8	5.10	5.60	8.37	30.00		4.30		12.67		36.00	Pass	
HE20	MCS0	2	11	2462	52/40	8.30	8.10	11.21	30.00		4.30		15.51		36.00	Pass	
HE20	MCS0	2	11	2462	106/54	9.70	9.60	12.66	30.00		4.30		16.96		36.00	Pass	
HE20	MCS0	2	11	2462	242/61	13.30	13.30	16.31	30.00		4.30		20.61		36.00	Pass	

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

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band MIMO													
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	RU Config	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
						Ant0	Ant1	Worse + 3.01	Ant0	Ant1	Ant0	Ant1	
HE20	MCS0	2	1	2412	Full	-13.33	-13.07	-10.06	5.78		8.00		Pass
HE20	MCS0	2	1	2412	26/0	-13.52	-13.87	-10.51	5.78		8.00		Pass
HE20	MCS0	2	1	2412	52/37	-13.52	-13.39	-10.38	5.78		8.00		Pass
HE20	MCS0	2	1	2412	106/53	-13.38	-13.56	-10.37	5.78		8.00		Pass
HE20	MCS0	2	1	2412	242/61	-13.46	-13.11	-10.10	5.78		8.00		Pass
HE20	MCS0	2	6	2437	Full	-7.72	-8.22	-4.71	5.78		8.00		Pass
HE20	MCS0	2	6	2437	26/4	-7.92	-8.26	-4.91	5.78		8.00		Pass
HE20	MCS0	2	6	2437	52/39	-7.95	-8.31	-4.94	5.78		8.00		Pass
HE20	MCS0	2	6	2437	106/53	-7.82	-8.45	-4.81	5.78		8.00		Pass
HE20	MCS0	2	6	2437	242/61	-8.04	-8.27	-5.03	5.78		8.00		Pass
HE20	MCS0	2	11	2462	Full	-12.90	-11.41	-8.40	5.78		8.00		Pass
HE20	MCS0	2	11	2462	26/8	-13.08	-11.52	-8.51	5.78		8.00		Pass
HE20	MCS0	2	11	2462	52/40	-13.44	-11.82	-8.81	5.78		8.00		Pass
HE20	MCS0	2	11	2462	106/54	-12.91	-11.65	-8.64	5.78		8.00		Pass
HE20	MCS0	2	11	2462	242/61	-13.20	-11.59	-8.58	5.78		8.00		Pass

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



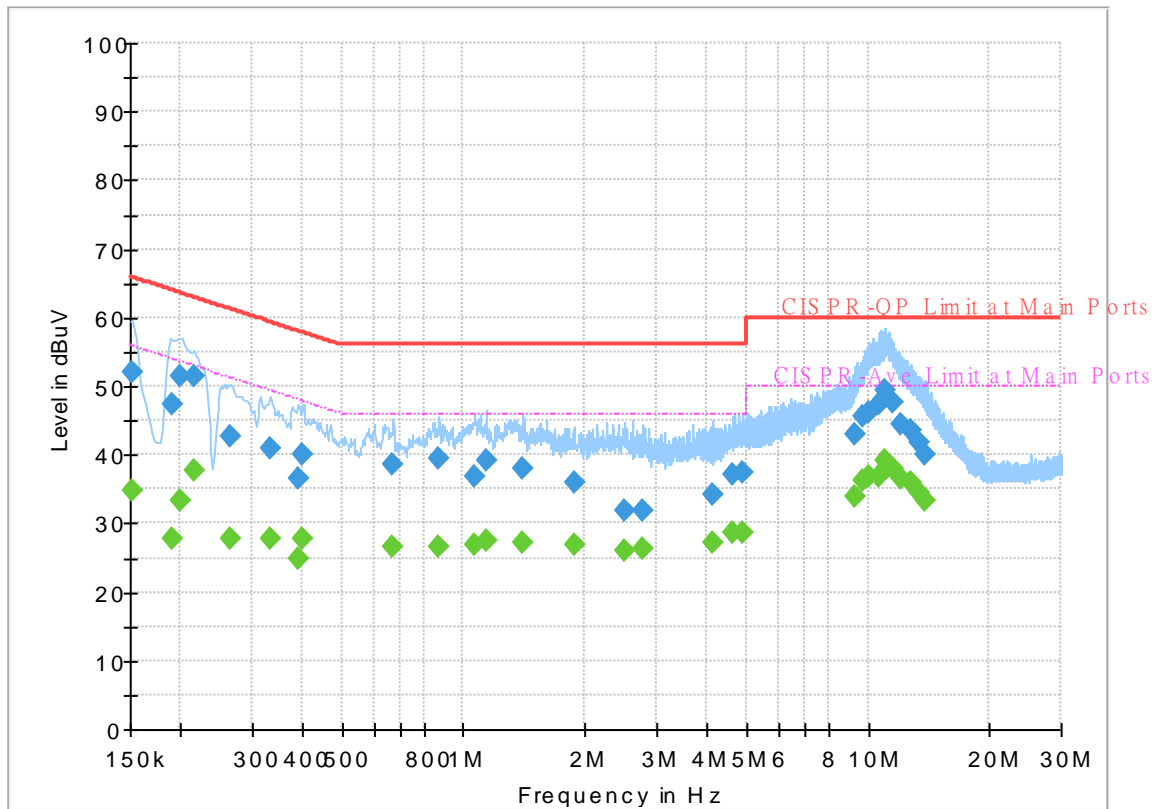
Appendix B. AC Conducted Emission Test Results

Test Engineer : Calvin Wang	Temperature : 23~26°C
	Relative Humidity : 45~55%

EUT Information

Report NO : 1D2409
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



Final_Result

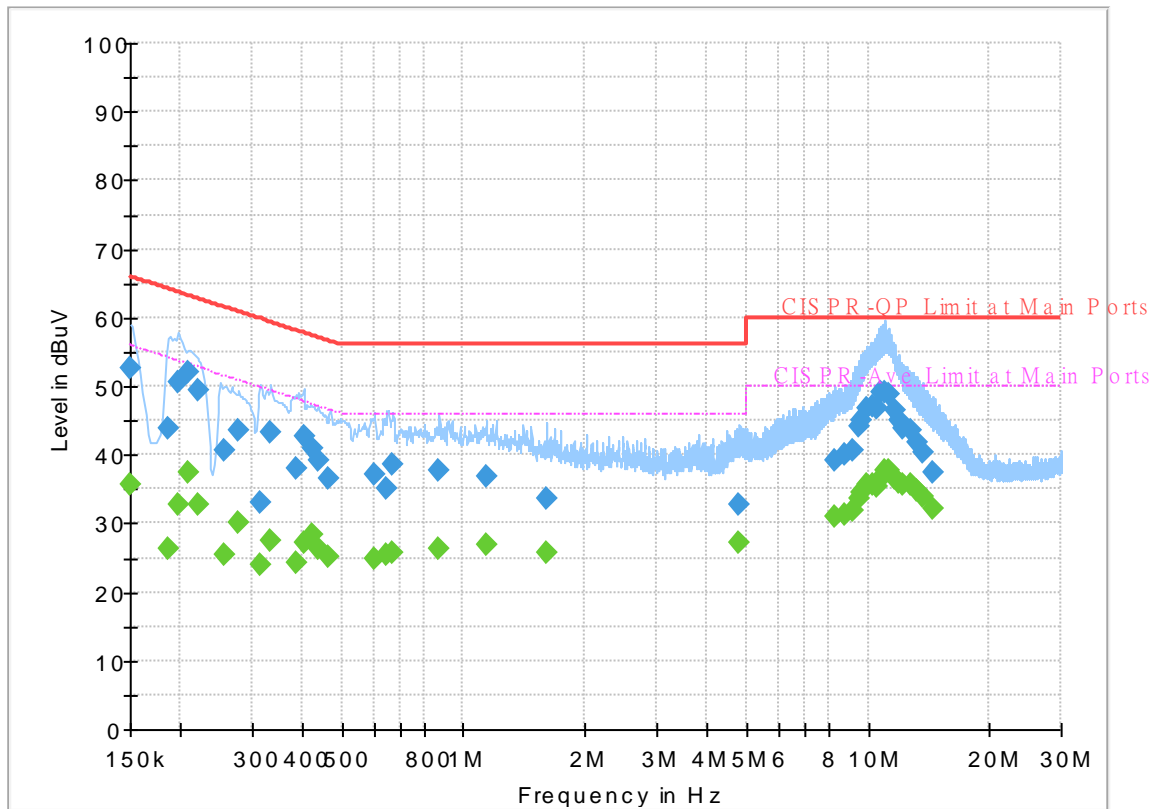
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	34.83	55.88	21.05	L1	OFF	19.8
0.152250	51.94	---	65.88	13.94	L1	OFF	19.8
0.190500	---	27.65	54.02	26.37	L1	OFF	19.8
0.190500	47.23	---	64.02	16.79	L1	OFF	19.8
0.199500	---	33.22	53.63	20.41	L1	OFF	19.8
0.199500	51.53	---	63.63	12.10	L1	OFF	19.8
0.215250	---	37.83	53.00	15.17	L1	OFF	19.8
0.215250	51.57	---	63.00	11.43	L1	OFF	19.8
0.264750	---	27.79	51.28	23.49	L1	OFF	19.8
0.264750	42.80	---	61.28	18.48	L1	OFF	19.8
0.334500	---	27.92	49.34	21.42	L1	OFF	19.8
0.334500	40.83	---	59.34	18.51	L1	OFF	19.8
0.388500	---	24.94	48.10	23.16	L1	OFF	19.8
0.388500	36.56	---	58.10	21.54	L1	OFF	19.8
0.399750	---	27.83	47.86	20.03	L1	OFF	19.8
0.399750	39.96	---	57.86	17.90	L1	OFF	19.8
0.669750	---	26.62	46.00	19.38	L1	OFF	19.9
0.669750	38.71	---	56.00	17.29	L1	OFF	19.9
0.870000	---	26.75	46.00	19.25	L1	OFF	19.9
0.870000	39.47	---	56.00	16.53	L1	OFF	19.9
1.068000	---	27.01	46.00	18.99	L1	OFF	19.9

1.068000	36.94	---	56.00	19.06	L1	OFF	19.9
1.137750	---	27.58	46.00	18.42	L1	OFF	19.9
1.137750	39.23	---	56.00	16.77	L1	OFF	19.9
1.405500	---	27.29	46.00	18.71	L1	OFF	19.9
1.405500	38.02	---	56.00	17.98	L1	OFF	19.9
1.873500	---	26.87	46.00	19.13	L1	OFF	19.9
1.873500	35.92	---	56.00	20.08	L1	OFF	19.9
2.505750	---	26.04	46.00	19.96	L1	OFF	19.9
2.505750	31.96	---	56.00	24.04	L1	OFF	19.9
2.787000	---	26.24	46.00	19.76	L1	OFF	19.9
2.787000	32.00	---	56.00	24.00	L1	OFF	19.9
4.148250	---	27.34	46.00	18.66	L1	OFF	20.0
4.148250	34.21	---	56.00	21.79	L1	OFF	20.0
4.616250	---	28.55	46.00	17.45	L1	OFF	20.0
4.616250	37.02	---	56.00	18.98	L1	OFF	20.0
4.884000	---	28.56	46.00	17.44	L1	OFF	20.0
4.884000	37.47	---	56.00	18.53	L1	OFF	20.0
9.233250	---	33.87	50.00	16.13	L1	OFF	20.2
9.233250	42.93	---	60.00	17.07	L1	OFF	20.2
9.764250	---	36.17	50.00	13.83	L1	OFF	20.3
9.764250	45.68	---	60.00	14.32	L1	OFF	20.3
10.032000	---	36.79	50.00	13.21	L1	OFF	20.3
10.032000	46.15	---	60.00	13.85	L1	OFF	20.3
10.632750	---	36.98	50.00	13.02	L1	OFF	20.3
10.632750	47.31	---	60.00	12.69	L1	OFF	20.3
11.040000	---	39.04	50.00	10.96	L1	OFF	20.3
11.040000	49.37	---	60.00	10.63	L1	OFF	20.3
11.575500	---	38.03	50.00	11.97	L1	OFF	20.3
11.575500	47.72	---	60.00	12.28	L1	OFF	20.3
12.086250	---	36.53	50.00	13.47	L1	OFF	20.4
12.086250	44.53	---	60.00	15.47	L1	OFF	20.4
12.720750	---	36.07	50.00	13.93	L1	OFF	20.4
12.720750	43.51	---	60.00	16.49	L1	OFF	20.4
13.287750	---	34.63	50.00	15.37	L1	OFF	20.4
13.287750	41.95	---	60.00	18.05	L1	OFF	20.4
13.821000	---	33.46	50.00	16.54	L1	OFF	20.4
13.821000	40.18	---	60.00	19.82	L1	OFF	20.4

EUT Information

Report NO : 1D2409
 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)
0.150000	---	35.65	56.00	20.35	N	OFF	19.8
0.150000	52.77	---	66.00	13.23	N	OFF	19.8
0.186000	---	26.27	54.21	27.94	N	OFF	19.8
0.186000	43.79	---	64.21	20.42	N	OFF	19.8
0.197250	---	32.72	53.73	21.01	N	OFF	19.8
0.197250	50.63	---	63.73	13.10	N	OFF	19.8
0.208500	---	37.32	53.27	15.95	N	OFF	19.8
0.208500	51.93	---	63.27	11.34	N	OFF	19.8
0.222000	---	32.67	52.74	20.07	N	OFF	19.8
0.222000	49.29	---	62.74	13.45	N	OFF	19.8
0.255750	---	25.34	51.57	26.23	N	OFF	19.8
0.255750	40.73	---	61.57	20.84	N	OFF	19.8
0.278250	---	29.99	50.87	20.88	N	OFF	19.8
0.278250	43.55	---	60.87	17.32	N	OFF	19.8
0.314250	---	24.03	49.86	25.83	N	OFF	19.8
0.314250	32.99	---	59.86	26.87	N	OFF	19.8
0.334500	---	27.48	49.34	21.86	N	OFF	19.8
0.334500	43.27	---	59.34	16.07	N	OFF	19.8
0.386250	---	24.27	48.14	23.87	N	OFF	19.8
0.386250	38.14	---	58.14	20.00	N	OFF	19.8
0.402000	---	27.26	47.81	20.55	N	OFF	19.8

0.402000	42.69	---	57.81	15.12	N	OFF	19.8
0.424500	---	28.41	47.36	18.95	N	OFF	19.8
0.424500	41.03	---	57.36	16.33	N	OFF	19.8
0.440250	---	26.23	47.06	20.83	N	OFF	19.8
0.440250	39.20	---	57.06	17.86	N	OFF	19.8
0.465000	---	25.25	46.60	21.35	N	OFF	19.8
0.465000	36.65	---	56.60	19.95	N	OFF	19.8
0.602250	---	24.76	46.00	21.24	N	OFF	19.8
0.602250	37.12	---	56.00	18.88	N	OFF	19.8
0.647250	---	25.45	46.00	20.55	N	OFF	19.8
0.647250	35.04	---	56.00	20.96	N	OFF	19.8
0.669750	---	25.60	46.00	20.40	N	OFF	19.8
0.669750	38.54	---	56.00	17.46	N	OFF	19.8
0.870000	---	26.39	46.00	19.61	N	OFF	19.9
0.870000	37.79	---	56.00	18.21	N	OFF	19.9
1.137750	---	26.95	46.00	19.05	N	OFF	19.9
1.137750	36.75	---	56.00	19.25	N	OFF	19.9
1.605750	---	25.83	46.00	20.17	N	OFF	19.9
1.605750	33.60	---	56.00	22.40	N	OFF	19.9
4.816500	---	27.24	46.00	18.76	N	OFF	20.0
4.816500	32.83	---	56.00	23.17	N	OFF	20.0
8.295000	---	31.08	50.00	18.92	N	OFF	20.2
8.295000	39.26	---	60.00	20.74	N	OFF	20.2
8.765250	---	31.24	50.00	18.76	N	OFF	20.2
8.765250	39.96	---	60.00	20.04	N	OFF	20.2
9.163500	---	31.82	50.00	18.18	N	OFF	20.2
9.163500	40.61	---	60.00	19.39	N	OFF	20.2
9.438000	---	33.50	50.00	16.50	N	OFF	20.2
9.438000	44.16	---	60.00	15.84	N	OFF	20.2
9.633750	---	34.43	50.00	15.57	N	OFF	20.3
9.633750	44.97	---	60.00	15.03	N	OFF	20.3
9.901500	---	35.63	50.00	14.37	N	OFF	20.3
9.901500	46.68	---	60.00	13.32	N	OFF	20.3
10.259250	---	35.55	50.00	14.45	N	OFF	20.3
10.259250	46.99	---	60.00	13.01	N	OFF	20.3
10.524750	---	35.47	50.00	14.53	N	OFF	20.3
10.524750	46.83	---	60.00	13.17	N	OFF	20.3
10.779000	---	36.61	50.00	13.39	N	OFF	20.3
10.779000	49.16	---	60.00	10.84	N	OFF	20.3
11.037750	---	37.84	50.00	12.16	N	OFF	20.3
11.037750	49.17	---	60.00	10.83	N	OFF	20.3
11.305500	---	37.82	50.00	12.18	N	OFF	20.3
11.305500	48.93	---	60.00	11.07	N	OFF	20.3
11.636250	---	36.63	50.00	13.37	N	OFF	20.3
11.636250	46.58	---	60.00	13.42	N	OFF	20.3
11.908500	---	35.85	50.00	14.15	N	OFF	20.4
11.908500	44.96	---	60.00	15.04	N	OFF	20.4
12.174000	---	35.61	50.00	14.39	N	OFF	20.4
12.174000	43.99	---	60.00	16.01	N	OFF	20.4
12.781500	---	35.53	50.00	14.47	N	OFF	20.4
12.781500	43.70	---	60.00	16.30	N	OFF	20.4
13.249500	---	34.70	50.00	15.30	N	OFF	20.4
13.249500	41.67	---	60.00	18.33	N	OFF	20.4
13.647750	---	33.84	50.00	16.16	N	OFF	20.4
13.647750	40.27	---	60.00	19.73	N	OFF	20.4
14.444250	---	32.24	50.00	17.76	N	OFF	20.5
14.444250	37.39	---	60.00	22.61	N	OFF	20.5



Appendix C. Radiated Spurious Emission

Test Engineer :	Mancy Chou, Jacky Hong and Rain Lee	Temperature :	20~25°C
		Relative Humidity :	50~60%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
Ant.		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11b CH 01 2412MHz		2320.08	56.23	-17.77	74	41.26	28.06	14	27.09	109	212	P	H	
		2388.225	44.57	-9.43	54	29.73	27.85	14.06	27.07	109	212	A	H	
	*	2412	108.59	-	-	93.77	27.8	14.08	27.06	109	212	P	H	
	*	2412	105.5	-	-	90.68	27.8	14.08	27.06	109	212	A	H	
													H	
													H	
			2383.395	55.54	-18.46	74	40.68	27.87	14.06	27.07	399	136	P	V
			2386.755	44.27	-9.73	54	29.43	27.85	14.06	27.07	399	136	A	V
	*		2412	104.01	-	-	89.19	27.8	14.08	27.06	399	136	P	V
	*		2412	100.8	-	-	85.98	27.8	14.08	27.06	399	136	A	V
														V
														V
802.11b CH 06 2437MHz		2354.8	55.35	-18.65	74	40.42	27.98	14.03	27.08	138	211	P	H	
		2389.94	44.52	-9.48	54	29.69	27.84	14.06	27.07	138	211	A	H	
	*	2437	112.49	-	-	97.64	27.8	14.1	27.05	138	211	P	H	
	*	2437	109.27	-	-	94.42	27.8	14.1	27.05	138	211	A	H	
			2497.21	55.37	-18.63	74	40.53	27.71	14.16	27.03	138	211	P	H
			2483.98	44.42	-9.58	54	29.58	27.73	14.15	27.04	138	211	A	H
			2323.86	55.53	-18.47	74	40.57	28.05	14	27.09	395	312	P	V
			2386.58	44.23	-9.77	54	29.39	27.85	14.06	27.07	395	312	A	V
	*		2437	104.67	-	-	89.82	27.8	14.1	27.05	395	312	P	V
	*		2437	101.41	-	-	86.56	27.8	14.1	27.05	395	312	A	V
			2486.14	55.58	-18.42	74	40.73	27.73	14.15	27.03	395	312	P	V
			2483.89	44.24	-9.76	54	29.4	27.73	14.15	27.04	395	312	A	V



802.11b CH 11 2462MHz	*	2462	108.7	-	-	93.83	27.78	14.13	27.04	110	213	P	H
	*	2462	105.53	-	-	90.66	27.78	14.13	27.04	110	213	A	H
		2487.6	55.8	-18.2	74	40.96	27.72	14.15	27.03	110	213	P	H
		2483.68	44.41	-9.59	54	29.57	27.73	14.15	27.04	110	213	A	H
													H
													H
	*	2462	102.73	-	-	87.86	27.78	14.13	27.04	368	163	P	V
	*	2462	99.66	-	-	84.79	27.78	14.13	27.04	368	163	A	V
		2485.96	55.44	-18.56	74	40.59	27.73	14.15	27.03	368	163	P	V
		2485.32	44.29	-9.71	54	29.44	27.73	14.15	27.03	368	163	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. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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	39.04	-34.96	74	58.17	31.4	6.78	57.31	-	-	P	H
													H
													H
													H
													H
													H
													H
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													H
													H
													H
													H
													H
													H
													H
													H
													H
			4824	38.79	-35.21	74	57.92	31.4	6.78	57.31	-	-	P
													V
													V
													V
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WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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		4874	39.39	-34.61	74	58.37	31.45	6.8	57.23	-	-	P	H
		7311	44.48	-29.52	74	56.22	37	8.59	57.33	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4874	39.62	-34.38	74	58.6	31.45	6.8	57.23	-	-	P
		7311	44.54	-29.46	74	56.28	37	8.59	57.33	-	-	P	V
													V
													V
													V
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													V
													V
													V



WiFi Ant. 0+1	Note	Frequency (MHz)	Level (dBµV/m)	Margin (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 11 2462MHz		4924	39.02	-34.98	74	57.8	31.55	6.83	57.16	-	-	P	H
		7386	44.25	-29.75	74	56.11	36.93	8.65	57.44	-	-	P	H
													H
													H
													H
													H
													H
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													H
													H
													H
			4924	39.31	-34.69	74	58.09	31.55	6.83	57.16	-	-	P
		7386	44.34	-29.66	74	56.2	36.93	8.65	57.44	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 												



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

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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		2390	57.93	-16.07	74	43.1	27.84	14.06	27.07	124	244	P	H	
		2390	46.82	-7.18	54	31.99	27.84	14.06	27.07	124	244	A	H	
	*	2412	110.23	-	-	95.41	27.8	14.08	27.06	124	244	P	H	
	*	2412	102.11	-	-	87.29	27.8	14.08	27.06	124	244	A	H	
													H	
													H	
			2350.845	55.81	-18.19	74	40.86	28	14.03	27.08	392	71	P	V
			2388.96	44.81	-9.19	54	29.98	27.84	14.06	27.07	392	71	A	V
	*		2412	105.09	-	-	90.27	27.8	14.08	27.06	392	71	P	V
	*		2412	97.22	-	-	82.4	27.8	14.08	27.06	392	71	A	V
														V
														V
802.11g CH 06 2437MHz		2333.94	55.67	-18.33	74	40.71	28.03	14.01	27.08	100	243	P	H	
		2389.52	44.86	-9.14	54	30.03	27.84	14.06	27.07	100	243	A	H	
	*	2437	112.72	-	-	97.87	27.8	14.1	27.05	100	243	P	H	
	*	2437	104.85	-	-	90	27.8	14.1	27.05	100	243	A	H	
			2498.65	55.05	-18.95	74	40.22	27.7	14.16	27.03	100	243	P	H
			2483.53	44.41	-9.59	54	29.57	27.73	14.15	27.04	100	243	A	H
			2383.36	55.95	-18.05	74	41.09	27.87	14.06	27.07	393	273	P	V
			2389.1	44.36	-9.64	54	29.53	27.84	14.06	27.07	393	273	A	V
	*		2437	106.47	-	-	91.62	27.8	14.1	27.05	393	273	P	V
	*		2437	98.54	-	-	83.69	27.8	14.1	27.05	393	273	A	V
			2488.12	55.33	-18.67	74	40.49	27.72	14.15	27.03	393	273	P	V
			2483.53	44.29	-9.71	54	29.45	27.73	14.15	27.04	393	273	A	V



802.11g CH 11 2462MHz	*	2462	107.93	-	-	93.06	27.78	14.13	27.04	100	254	P	H
	*	2462	98.49	-	-	83.62	27.78	14.13	27.04	100	254	A	H
		2490.76	55.64	-18.36	74	40.8	27.72	14.15	27.03	100	254	P	H
		2483.52	45.14	-8.86	54	30.3	27.73	14.15	27.04	100	254	A	H
													H
													H
	*	2462	103.27	-	-	88.4	27.78	14.13	27.04	368	152	P	V
	*	2468	95.27	-	-	80.42	27.76	14.13	27.04	368	152	A	V
		2485.44	55.96	-18.04	74	41.11	27.73	14.15	27.03	368	152	P	V
		2483.56	44.4	-9.6	54	29.56	27.73	14.15	27.04	368	152	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. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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	38.62	-35.38	74	57.75	31.4	6.78	57.31	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4824	39.44	-34.56	74	58.57	31.4	6.78	57.31	-	-	P
													V
													V
													V
													V
													V
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													V
													V
													V
													V
													V



WiFi Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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		4924	38.93	-35.07	74	57.71	31.55	6.83	57.16	-	-	P	H
		7386	44.75	-29.25	74	56.61	36.93	8.65	57.44	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4924	39.06	-34.94	74	57.84	31.55	6.83	57.16	-	-	P
		7386	44.8	-29.2	74	56.66	36.93	8.65	57.44	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 												



2.4GHz 2400~2483.5MHz
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)	
802.11ax HE20 Full CH 01 2412MHz		2389.8	60.44	-13.56	74	45.61	27.84	14.06	27.07	123	221	P	H	
		2390	49.48	-4.52	54	34.65	27.84	14.06	27.07	123	221	A	H	
	*	2412	109.8	-	-	94.98	27.8	14.08	27.06	123	221	P	H	
	*	2412	101.5	-	-	86.68	27.8	14.08	27.06	123	221	A	H	
													H	
														H
			2389.59	56.86	-17.14	74	42.03	27.84	14.06	27.07	400	142	P	V
			2390	46.52	-7.48	54	31.69	27.84	14.06	27.07	400	142	A	V
		*	2412	104.92	-	-	90.1	27.8	14.08	27.06	400	142	P	V
		*	2412	95.66	-	-	80.84	27.8	14.08	27.06	400	142	A	V
802.11ax HE20 Full CH 06 2437MHz		2320.92	56.3	-17.7	74	41.33	28.06	14	27.09	119	241	P	H	
		2389.94	44.95	-9.05	54	30.12	27.84	14.06	27.07	119	241	A	H	
		*	2437	115.1	-	-	100.25	27.8	14.1	27.05	119	241	P	H
		*	2437	104.83	-	-	89.98	27.8	14.1	27.05	119	241	A	H
			2496.22	55.26	-18.74	74	40.42	27.71	14.16	27.03	119	241	P	H
			2483.62	44.48	-9.52	54	29.64	27.73	14.15	27.04	119	241	A	H
			2319.94	55.85	-18.15	74	40.88	28.06	14	27.09	391	275	P	V
			2389.66	44.44	-9.56	54	29.61	27.84	14.06	27.07	391	275	A	V
		*	2437	109.02	-	-	94.17	27.8	14.1	27.05	391	275	P	V
		*	2437	99	-	-	84.15	27.8	14.1	27.05	391	275	A	V
		2487.31	55	-19	74	40.15	27.73	14.15	27.03	391	275	P	V	
		2484.61	44.31	-9.69	54	29.46	27.73	14.15	27.03	391	275	A	V	



WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)
802.11ax HE20 Full CH 11 2462MHz	*	2462	112.09	-	-	97.22	27.78	14.13	27.04	110	206	P	H
	*	2462	101.33	-	-	86.46	27.78	14.13	27.04	110	206	A	H
		2483.6	57.4	-16.6	74	42.56	27.73	14.15	27.04	110	206	P	H
		2483.52	46.97	-7.03	54	32.13	27.73	14.15	27.04	110	206	A	H
													H
													H
	*	2462	103.9	-	-	89.03	27.78	14.13	27.04	389	190	P	V
	*	2462	94.34	-	-	79.47	27.78	14.13	27.04	389	190	A	V
		2497.8	55.74	-18.26	74	40.91	27.7	14.16	27.03	389	190	P	V
		2483.68	44.29	-9.71	54	29.45	27.73	14.15	27.04	389	190	A	V
												V	
												V	
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)	
802.11ax HE20 Full CH 01 2412MHz		4824	39.15	-34.85	74	58.28	31.4	6.78	57.31	-	-	P	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4824	39.38	-34.62	74	58.51	31.4	6.78	57.31	-	-	P	V
														V
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	
													V	



WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBµV/m)	Margin (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)
802.11ax HE20 Full CH 06 2437MHz		4874	39.92	-34.08	74	58.9	31.45	6.8	57.23	-	-	P	H
		7311	44.85	-29.15	74	56.59	37	8.59	57.33	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4874	38.42	-35.58	74	57.4	31.45	6.8	57.23	-	-	P
		7311	44.27	-29.73	74	56.01	37	8.59	57.33	-	-	P	V
													V
													V
													V
													V
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													V
													V
													V



WiFi Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)
802.11ax HE20 Full CH 11 2462MHz		4924	39.24	-34.76	74	58.02	31.55	6.83	57.16	-	-	P	H
		7386	44.31	-29.69	74	56.17	36.93	8.65	57.44	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
	Remark	1. No other spurious found.											
2. All results are PASS against Peak and Average limit line.													
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.													



2.4GHz 2400~2483.5MHz
WIFI 802.11ax HE20 Partial 242 (Band Edge @ 3m)

WIFI Ant. 0+1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)	
802.11ax HE20 Partial 242/61 CH 01 2412MHz		2389.17	67.62	-6.38	74	52.79	27.84	4.13	27.07	306	224	P	H	
		2390	51.81	-2.19	54	36.98	27.84	4.13	27.07	306	224	A	H	
	*	2412	109.55	-	-	94.73	27.8	4.15	27.06	306	224	P	H	
	*	2412	100.99	-	-	86.17	27.8	4.15	27.06	306	224	A	H	
													H	
														H
			2390	63.41	-10.59	74	48.58	27.84	4.13	27.07	400	141	P	V
			2390	48.75	-5.25	54	33.92	27.84	4.13	27.07	400	141	A	V
	*		2412	103.81	-	-	88.99	27.8	4.15	27.06	400	141	P	V
	*		2412	95.92	-	-	81.1	27.8	4.15	27.06	400	141	A	V
													V	
													V	
802.11ax HE20 Partial 242/61 CH 11 2462MHz	*	2462	110.04	-	-	95.17	27.78	4.2	27.04	100	212	P	H	
	*	2462	101.18	-	-	86.31	27.78	4.2	27.04	100	212	A	H	
			2483.6	66.25	-7.75	74	51.41	27.73	4.22	27.04	100	212	P	H
			2483.52	51.8	-2.2	54	36.96	27.73	4.22	27.04	100	212	A	H
														H
														H
	*		2462	102.66	-	-	87.8	27.77	4.2	27.04	100	0	P	V
	*		2462	92.92	-	-	78.06	27.77	4.2	27.04	100	0	A	V
			2483.72	60.45	-13.55	74	45.61	27.73	4.22	27.04	100	0	P	V
			2483.52	46.89	-7.11	54	32.05	27.73	4.22	27.04	100	0	A	V
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Emission above 18GHz

2.4GHz WIFI 802.11ax HE20 (SHF)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11ax HE20 SHF		23292	41.25	-32.75	74	59.08	38.88	-2.59	54.12	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
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													H
													H
													H
													H
			24678	40.73	-33.27	74	57.16	39.03	-2.17	53.29	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												



Emission below 1GHz
2.4GHz WIFI 802.11ax HE20 (LF)

Table with 14 columns: WIFI, Note, Frequency, Level, Margin, Limit, Read, Antenna, Path, Preamp, Ant, Table, Peak, Pol. It contains multiple rows of test data for 2.4GHz WIFI 802.11ax HE20 LF.

Remark
1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.



Note symbol

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



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

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Margin(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. Margin (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. Margin (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 :	Mancy Chou, Jacky Hong and Rain Lee	Temperature :	20~25°C
		Relative Humidity :	50~60%

Note symbol

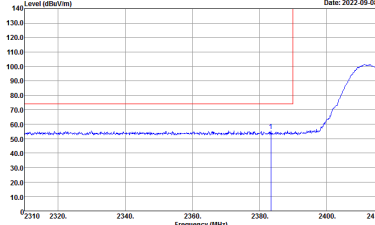
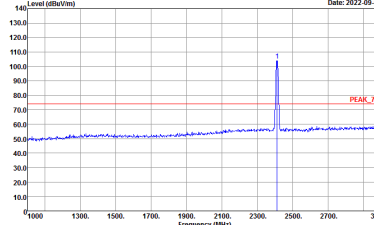
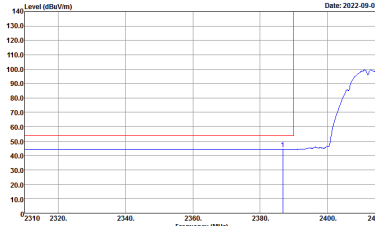
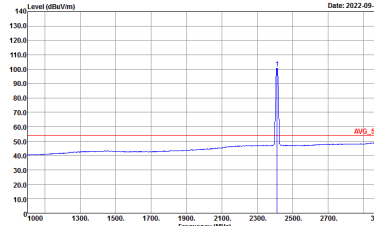
-L	Low channel location
-R	High channel location



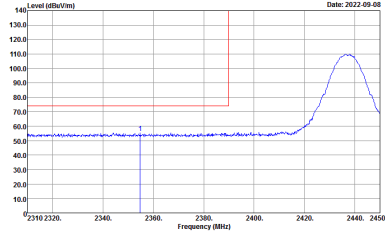
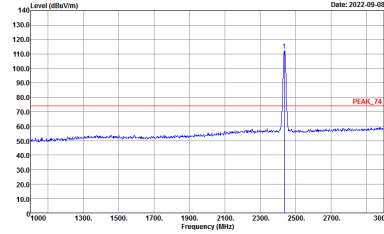
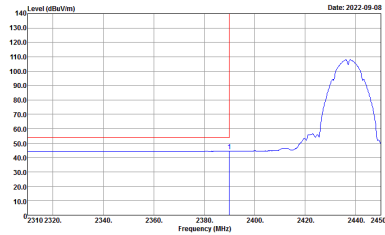
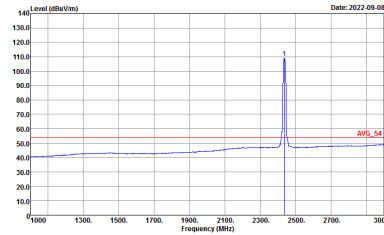
2.4GHz 2400~2483.5MHz
WIFI 802.11b (Band Edge @ 3m)

Table with 2 columns (WIFI, ANT) and 2 rows (0+1, Peak, Avg.). Each cell contains a spectral plot for Horizontal and Fundamental views. The Peak row shows a peak at 2412MHz. The Avg. row shows an average level at 2412MHz.

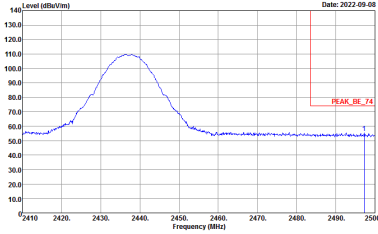
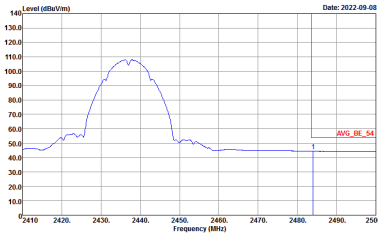


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
0+1	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

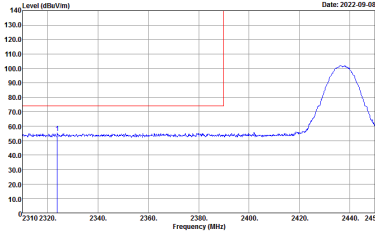
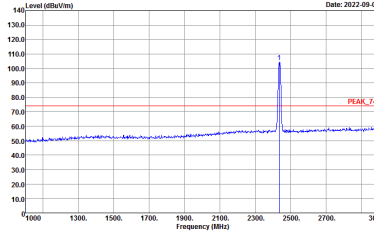
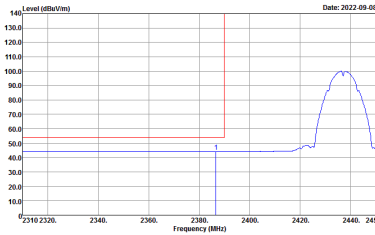
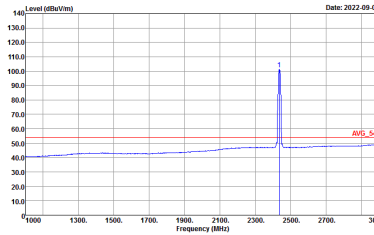


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
0+1	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

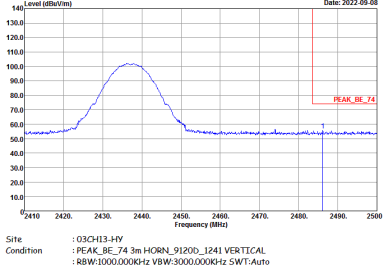
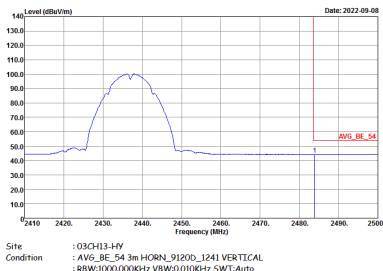


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
0+1	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWF:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.010KHz SWF:Auto</p>	Left blank

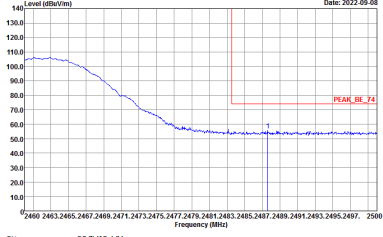
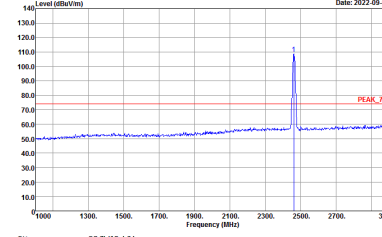
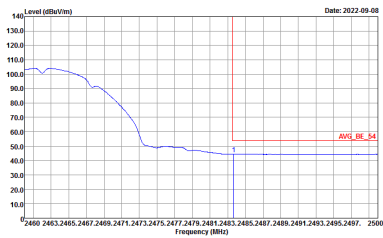
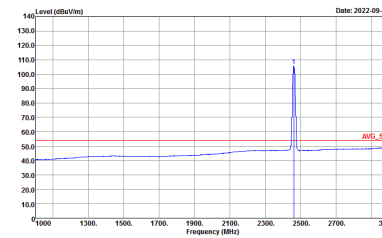


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
0+1	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

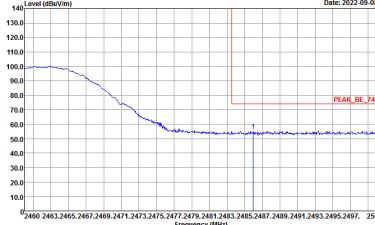
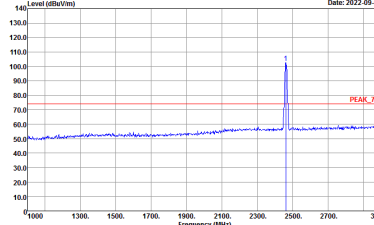
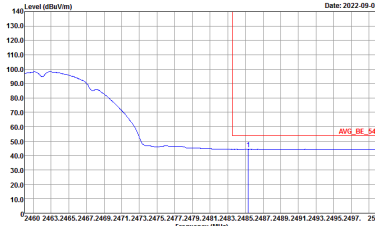
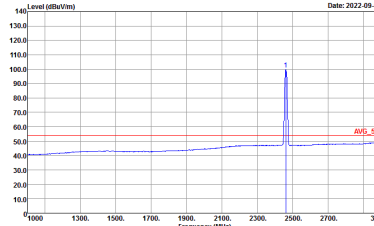


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
0+1	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWF:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3.010KHz SWF:Auto</p>	Left blank



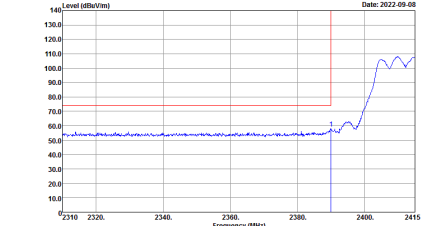
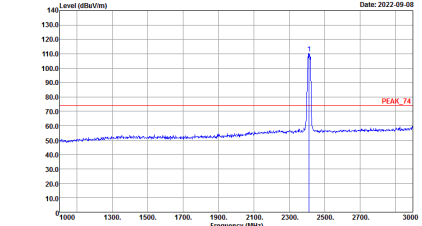
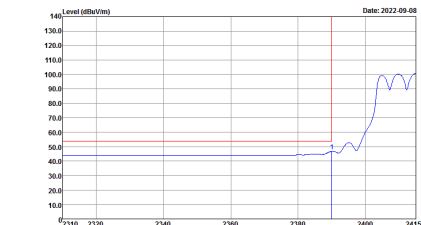
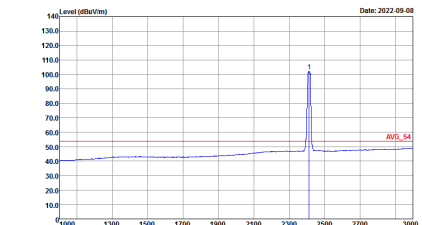
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
0+1	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
0+1	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



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

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
0+1	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>