



FCC RADIO TEST REPORT

FCC ID : UZ7MC3401
Equipment : Mobile Computer
Brand Name : ZEBRA
Model Name : MC3401
Applicant : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Manufacturer : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Standard : FCC Part 15 Subpart C §15.247

The product was received on Apr. 30, 2024 and testing was performed from May 07, 2024 to Jun. 20, 2024. 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.

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
FR443061B	01	Initial issue of report	Jul. 01, 2024



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)(3) 15.247(b)(4)	Output Power	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	6.42 dB under the limit at 32.43 MHz
3.6	15.207	AC Conducted Emission	Pass	16.13 dB under the limit at 0.30 MHz
3.7	15.203	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer:

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

Reviewed by: Keven Cheng
Report Producer: Mila Chen



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Computer
Brand Name	ZEBRA
Model Name	MC3401
FCC ID	UZ7MC3401
Sample 1	SKU 13 (Brick+SE5800+38 Keypad)
Sample 2	SKU 9 (Gun+SE5500+47 Keypad)
Sample 3	SKU 8 (Brick+SE4770+38 Keypad)
EUT supports Radios application	NFC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
HW Version	EV
MFD	23MAR24
EUT Stage	Identical Prototype

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

SKU List									
Configuration	SKU 5	SKU 6	SKU 7	SKU 8	SKU 9	SKU 10	SKU 11	SKU 12	SKU 13
WW/WL	WLAN	WLAN	WLAN	WLAN	WLAN	WLAN	WLAN	WLAN	WLAN
Form Factor	FA	FA	FA	FA	FA	FA	FA	FA	FA
SKU	Prem	Prem	Prem	Prem	Prem+	Prem+	Prem+	Prem+	Prem+
Brick / Gun	Gun	Gun	Gun	Brick	Gun	Gun	Gun	Brick	Brick
DDR size	6GB	6GB	6GB	6GB	6GB	6GB	6GB	6GB	6GB
UFS size	64GB	64GB	64GB	64GB	128GB	128GB	128GB	128GB	128GB
Scan engine	SE4770	SE5500	SE5800	SE4770	SE5500	SE5800	SE5800	SE5800	SE5800
FF Camera	None	None	None	None	5MP (PN)	5MP (PN)	5MP (PN)	5MP (PN)	5MP (PN)
RF Camera					13MP (PN)	13MP (PN)	13MP (PN)	13MP (PN)	13MP (PN)
Keypad	38	38	47	38	47	47	47	38	38
Battery	7000mAh	7000mAh	7000mAh	7000mAh	7000mAh	7000mAh + BLE	7000mAh	7000mAh	7000mAh
Region (ROW or NA)	RW	RW	NA	RW	RW	NA	RW	NA	RW

Specification of Accessories				
Adapter USB Wall Charger	Brand Name	Zebra	Model Number	PWR-WUA5V12W0US
Battery 1 Standard Battery (7000mAh)	Brand Name	Zebra	Model Number	BT-000375
			Manufacturer	TWS
Battery 2 Standard Battery (7000mAh)	Brand Name	Zebra	Model Number	BT-000375
			Manufacturer	Inventus
Battery 3 BLE Battery (7000mAh)	Brand Name	Zebra	Model Number	BT-000444
Type C USB Cable	Brand Name	Zebra	Model Number	CBL-TC5X-USBC2A-01
USB Cable Cup	Brand Name	Zebra	Model Number	CBL-MC33-USBCHG-01
Soft Holster for Gun Type	Brand Name	Zebra	Model Number	SG-MC3021212-01R
Soft Holster for Brick Type	Brand Name	Zebra	Model Number	SG-MC3X-SHLSTB-01
USB-C PTT Headset	Brand Name	Zebra	Model Number	HDST-USBC-PTT1-01
USB-C to 3.5mm adapter	Brand Name	Zebra	Model Number	ADP-USBC-35MM1-01
3.5mm To Quick Disconnect (QD) Adapter Cable	Brand Name	Zebra	Model Number	ADP-35M-QDCBL1-01
3.5mm PTT Headset	Brand Name	Zebra	Model Number	HDST-35MM-PTT1-01
3.5mm PTT HS2100 Headset	Brand Name	Zebra	Model Number	HS2100
Quick Disconnect (QD) Cable	Brand Name	Zebra	Model Number	CBL-HS2100-QDC1-01

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx/Rx Frequency Range	2412 MHz ~ 2462 MHz
Maximum Output Power to Antenna	<Ant. 6> Bluetooth-LE (1Mbps): 6.38 dBm (0.0043 W) Bluetooth-LE (2Mbps): 6.28 dBm (0.0042 W) <Ant. 7> Bluetooth-LE (1Mbps): 4.38 dBm (0.0027 W) Bluetooth-LE (2Mbps): 4.38 dBm (0.0027 W)
99% Occupied Bandwidth	<Ant. 6> Bluetooth-LE (1Mbps): 1.017 MHz Bluetooth-LE (2Mbps): 1.998 MHz <Ant. 7> Bluetooth-LE (1Mbps): 1.019 MHz Bluetooth-LE (2Mbps): 1.998 MHz
Antenna Type / Gain	<Ant. 6> : PIFA Antenna with gain 2.00 dBi <Ant. 7> : PIFA Antenna with gain 1.69 dBi
Type of Modulation	Bluetooth LE: GFSK

Remark: The above EUT's information was declared by manufacturer. Please refer to Disclaimer in report summary.

1.3 Modification of EUT

No modifications made to the EUT during the testing.



1.4 Testing Location

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, CO07-HY, 03CH22-HY

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

FCC designation No.: TW3786

1.5 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
- ♦ 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

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
20	2442	-	-	



2.2 Test Mode

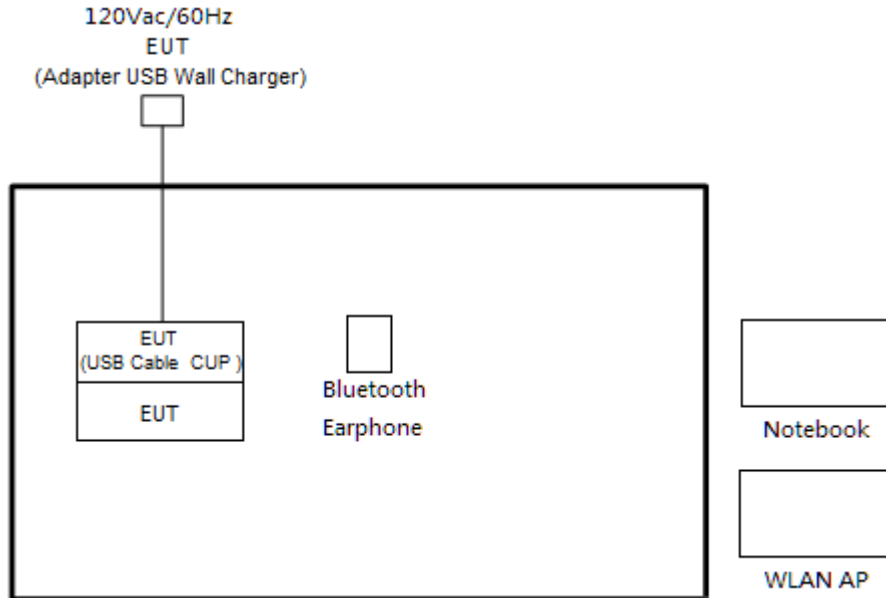
- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental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

The following summary table is showing all test modes to demonstrate in compliance with the standard.

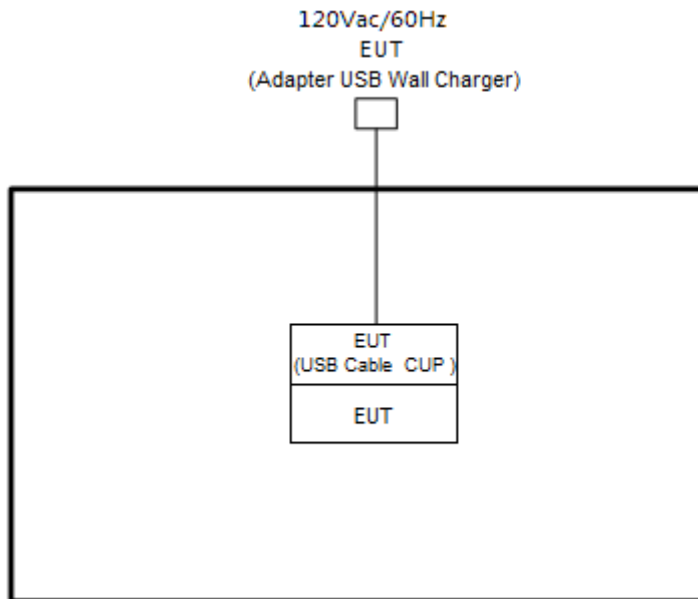
Summary table of Test Cases	
Test Item	Data Rate / Modulation
Conducted Test Cases	Bluetooth – LE / GFSK
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps
Radiated Test Cases	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps
AC Conducted Emission	Mode 1: WLAN (2.4GHz) Link + Bluetooth Link + MPEG4 + USB Cable Cup (Charging from Adapter USB Wall Charger) + Battery 1 Standard Battery (7000mAh) for Sample 1
Remark:	
1. For Radiated Test Cases, the tests were performed with Battery 1 Standard Battery (7000mAh) and Sample 1.	
2. 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>



<Bluetooth-LE 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.	Bluetooth Earphone	Sony	SBH20	PY7-RD0010	N/A	N/A
2.	WLAN AP	Netgear	RAXE500	PY320300508	N/A	Unshielded, 1.8 m
3.	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 “QRCT Version 4.0.211.0” 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.

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

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

3.1.2 Measuring Instruments

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 6dB 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 Bandwidth

Please refer to Appendix A.

3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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 of 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.

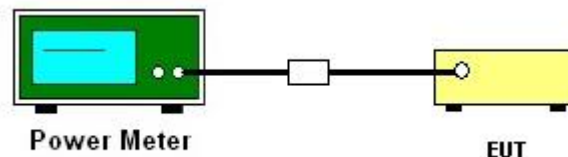
3.2.2 Measuring Instruments

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 AVGP-M-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator.
3. The path loss is compensated to the results for each measurement.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

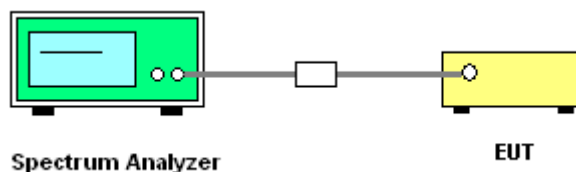
3.3.2 Measuring Instruments

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. (6 dB 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. The Measured power density (dBm)/ 100 kHz is a reference level and is used as 20 dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 30 dB down from the highest emission level within the authorized band.

3.4.2 Measuring Instruments

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

3.4.3 Test Procedure

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.
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 Plots

Please refer to Appendix A.

3.4.6 Test Result of Conducted Spurious Emission Plots

Please refer to Appendix A.



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

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 transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required 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

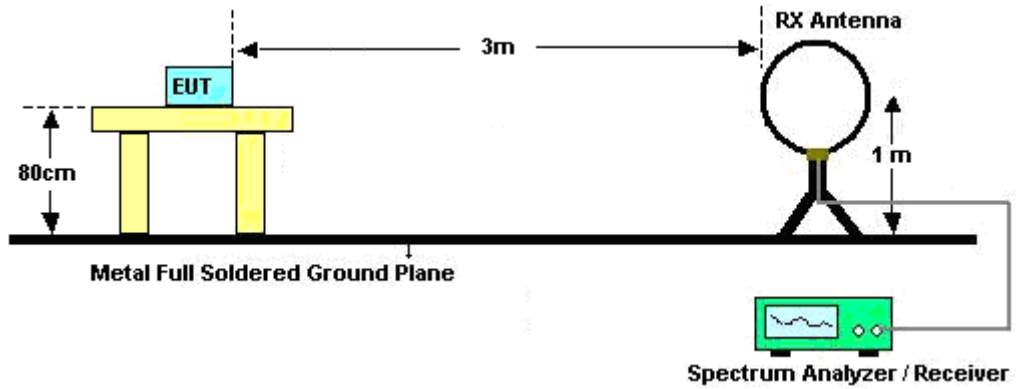
Please refer to the measuring equipment list in this test report.

**3.5.3 Test Procedures**

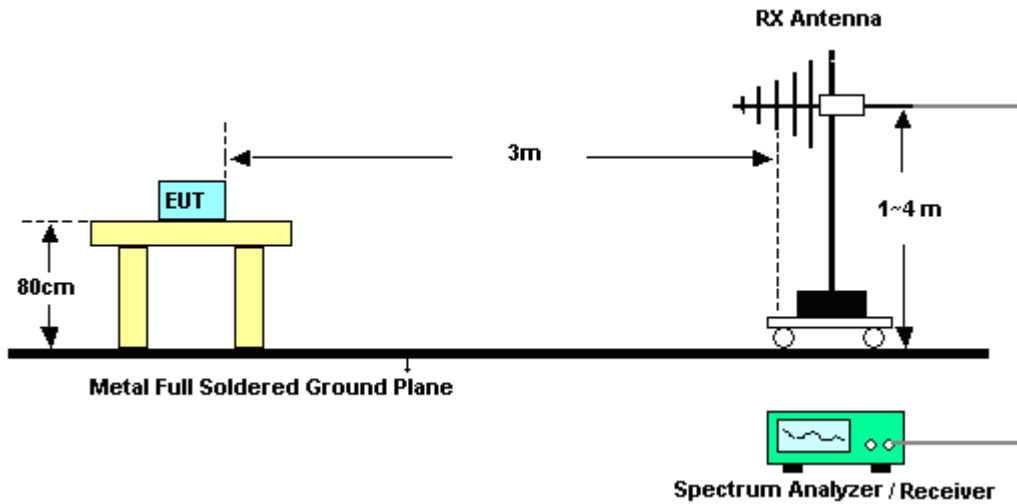
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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

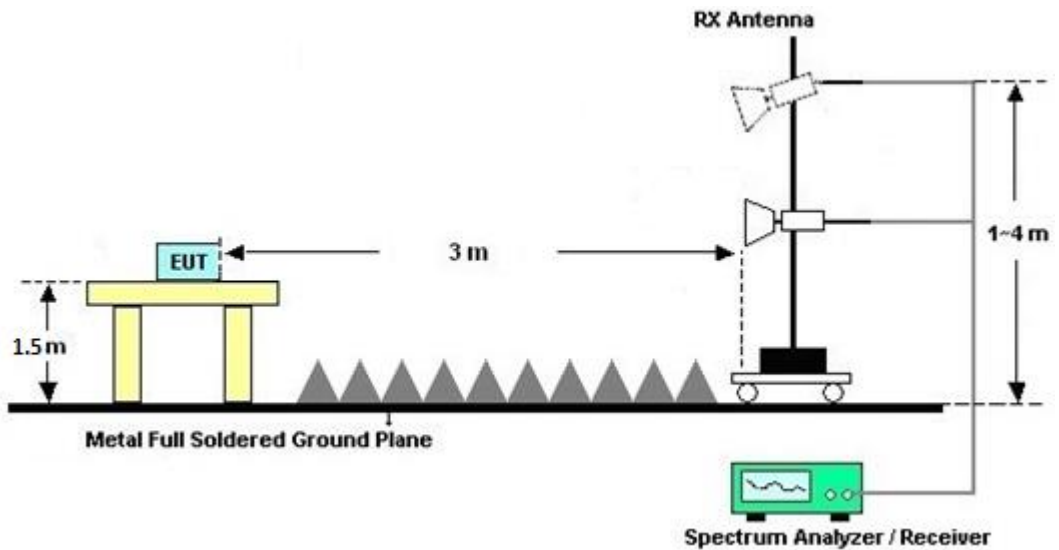
For radiated test below 30MHz



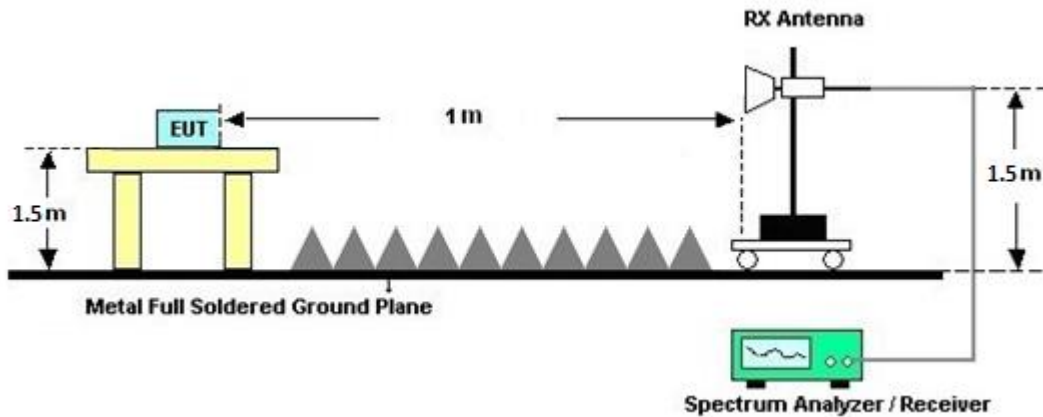
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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 (30 MHz ~ 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.

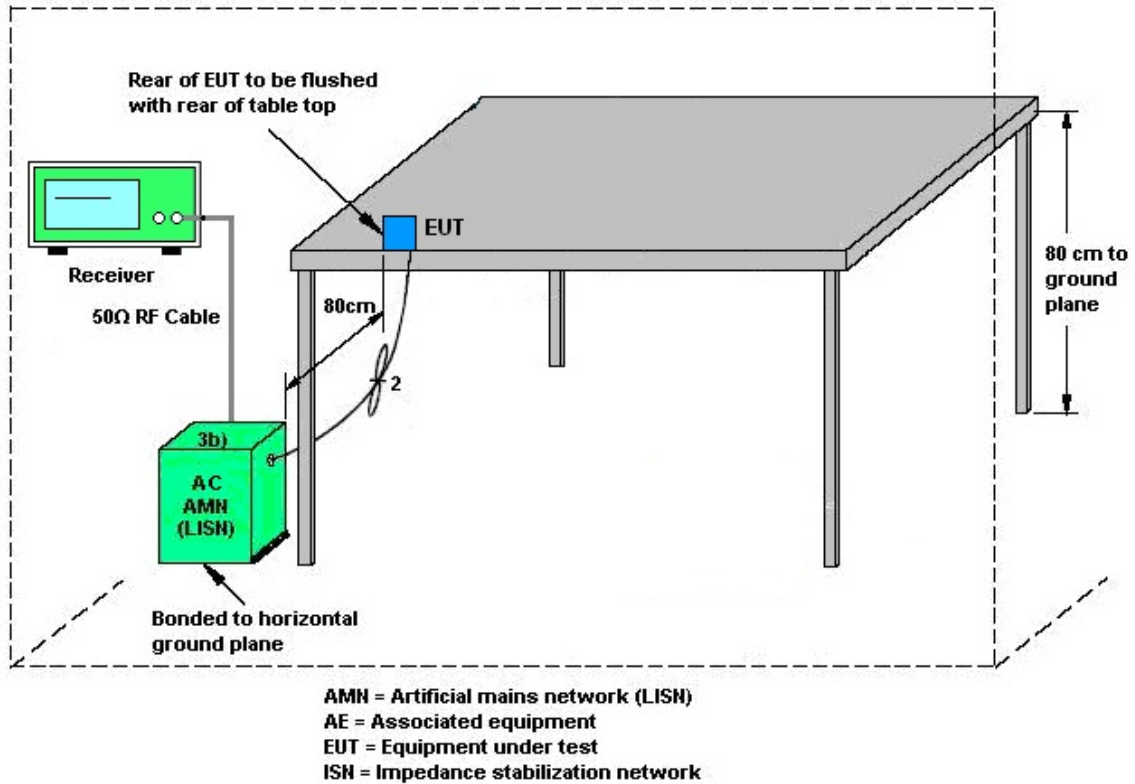
3.6.2 Measuring Instruments

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 = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

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
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	May 20, 2024	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 20, 2024	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 20, 2023	May 20, 2024	Oct. 19, 2024	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 14, 2024	May 20, 2024	Mar. 13, 2025	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 10, 2024	May 20, 2024	Mar. 09, 2025	Conduction (CO07-HY)
Four-Line V-Network	TESEQ	NNB 52	36122	N/A	Mar. 07, 2024	May 20, 2024	Mar. 06, 2025	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 20, 2023	May 20, 2024	Sep. 19, 2024	Conduction (CO07-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	May 31, 2024~Jun. 07, 2024	Nov. 06, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	17I00015SNO 35 (NO:109)	10MHz~6GHz	Jan. 15, 2024	May 31, 2024~Jun. 07, 2024	Jan. 14, 2025	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 23, 2023	May 31, 2024~Jun. 07, 2024	Aug. 22, 2024	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9kHz~30MHz	Sep. 12, 2023	May 07, 2024~Jun. 20, 2024	Sep. 11, 2024	Radiation (03CH22-HY)
Bilog Antenna with 6dB	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63304 & 002	30MHz~1GHz	Oct. 15, 2023	May 07, 2024~Jun. 20, 2024	Oct. 14, 2024	Radiation (03CH22-HY)
Amplifier	SONOMA	310N	421581	N/A	Jul. 15, 2023	May 07, 2024~Jun. 20, 2024	Jul. 14, 2024	Radiation (03CH22-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C04A18E N	1GHz~18GHz	Jul. 12, 2023	May 07, 2024~Jun. 20, 2024	Jul. 11, 2024	Radiation (03CH22-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1224	18GHz-40GHz	Jul. 10, 2023	May 07, 2024~Jun. 20, 2024	Jul. 09, 2024	Radiation (03CH22-HY)
Amplifier	EMEC	EM01G18GA	060877	N/A	Sep. 28, 2023	May 07, 2024~Jun. 20, 2024	Sep. 27, 2024	Radiation (03CH22-HY)
Preamplifier	EMEC	EM18G40G	060872	18-40GHz	Sep. 06, 2023	May 07, 2024~Jun. 20, 2024	Sep. 05, 2024	Radiation (03CH22-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Aug. 31, 2023	May 07, 2024~Jun. 20, 2024	Aug. 30, 2024	Radiation (03CH22-HY)
EMI Test Receiver	Keysight	N9038B	MY62210111	20Hz~8.4GHz	Aug. 23, 2023	May 07, 2024~Jun. 20, 2024	Aug. 22, 2024	Radiation (03CH22-HY)
Hygrometer	TECPEL	DTM-303A	TP211469	N/A	Jan. 03, 2024	May 07, 2024~Jun. 20, 2024	Jan. 02, 2025	Radiation (03CH22-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	May 07, 2024~Jun. 20, 2024	N/A	Radiation (03CH22-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	May 07, 2024~Jun. 20, 2024	N/A	Radiation (03CH22-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	May 07, 2024~Jun. 20, 2024	N/A	Radiation (03CH22-HY)
Software	Audix	E3 6.09824_2019122	RK-002347	N/A	N/A	May 07, 2024~Jun. 20, 2024	N/A	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 06, 2024	May 07, 2024~Jun. 20, 2024	Mar. 05, 2025	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804390/2,804611/2,804615/2	N/A	Oct. 24, 2023	May 07, 2024~Jun. 20, 2024	Oct. 23, 2024	Radiation (03CH22-HY)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.44 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.5 dB
---	--------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
---	--------

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
---	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.4 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Willy Chang	Temperature:	21~25	°C
Test Date:	2024/5/31~2024/6/7	Relative Humidity:	51~54	%

<Ant. 6>

TEST RESULTS DATA 6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.015	0.673	0.50	Pass
BLE	1Mbps	1	19	2440	1.015	0.676	0.50	Pass
BLE	1Mbps	1	39	2480	1.017	0.671	0.50	Pass

TEST RESULTS DATA Average Power Table

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
BLE	1Mbps	1	0	2402	6.18	30.00	2.00	8.18	36.00	Pass
BLE	1Mbps	1	19	2440	6.18	30.00	2.00	8.18	36.00	Pass
BLE	1Mbps	1	39	2480	6.38	30.00	2.00	8.38	36.00	Pass

TEST RESULTS DATA Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	5.59	-8.72	2.00	8.00	Pass
BLE	1Mbps	1	19	2440	5.40	-8.87	2.00	8.00	Pass
BLE	1Mbps	1	39	2480	5.81	-8.50	2.00	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	1.998	1.148	0.50	Pass
BLE	2Mbps	1	19	2440	1.998	1.151	0.50	Pass
BLE	2Mbps	1	39	2480	1.994	1.148	0.50	Pass

TEST RESULTS DATA
Average Power Table

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
BLE	2Mbps	1	0	2402	6.08	30.00	2.00	8.08	36.00	Pass
BLE	2Mbps	1	19	2440	6.18	30.00	2.00	8.18	36.00	Pass
BLE	2Mbps	1	39	2480	6.28	30.00	2.00	8.28	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	5.52	-11.73	2.00	8.00	Pass
BLE	2Mbps	1	19	2440	5.41	-11.77	2.00	8.00	Pass
BLE	2Mbps	1	39	2480	5.75	-11.47	2.00	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

<Ant. 7>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.017	0.672	0.50	Pass
BLE	1Mbps	1	19	2440	1.019	0.673	0.50	Pass
BLE	1Mbps	1	39	2480	1.017	0.674	0.50	Pass

TEST RESULTS DATA
Average Power Table

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
BLE	1Mbps	1	0	2402	3.58	30.00	1.69	5.27	36.00	Pass
BLE	1Mbps	1	19	2440	4.38	30.00	1.69	6.07	36.00	Pass
BLE	1Mbps	1	39	2480	3.98	30.00	1.69	5.67	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	2.88	-11.41	1.69	8.00	Pass
BLE	1Mbps	1	19	2440	3.50	-10.76	1.69	8.00	Pass
BLE	1Mbps	1	39	2480	3.42	-10.88	1.69	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	1.998	1.153	0.50	Pass
BLE	2Mbps	1	19	2440	1.998	1.155	0.50	Pass
BLE	2Mbps	1	39	2480	1.998	1.150	0.50	Pass

TEST RESULTS DATA
Average Power Table

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
BLE	2Mbps	1	0	2402	3.48	30.00	1.69	5.17	36.00	Pass
BLE	2Mbps	1	19	2440	4.38	30.00	1.69	6.07	36.00	Pass
BLE	2Mbps	1	39	2480	3.88	30.00	1.69	5.57	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.90	-14.32	1.69	8.00	Pass
BLE	2Mbps	1	19	2440	3.53	-13.65	1.69	8.00	Pass
BLE	2Mbps	1	39	2480	3.38	-13.84	1.69	8.00	Pass

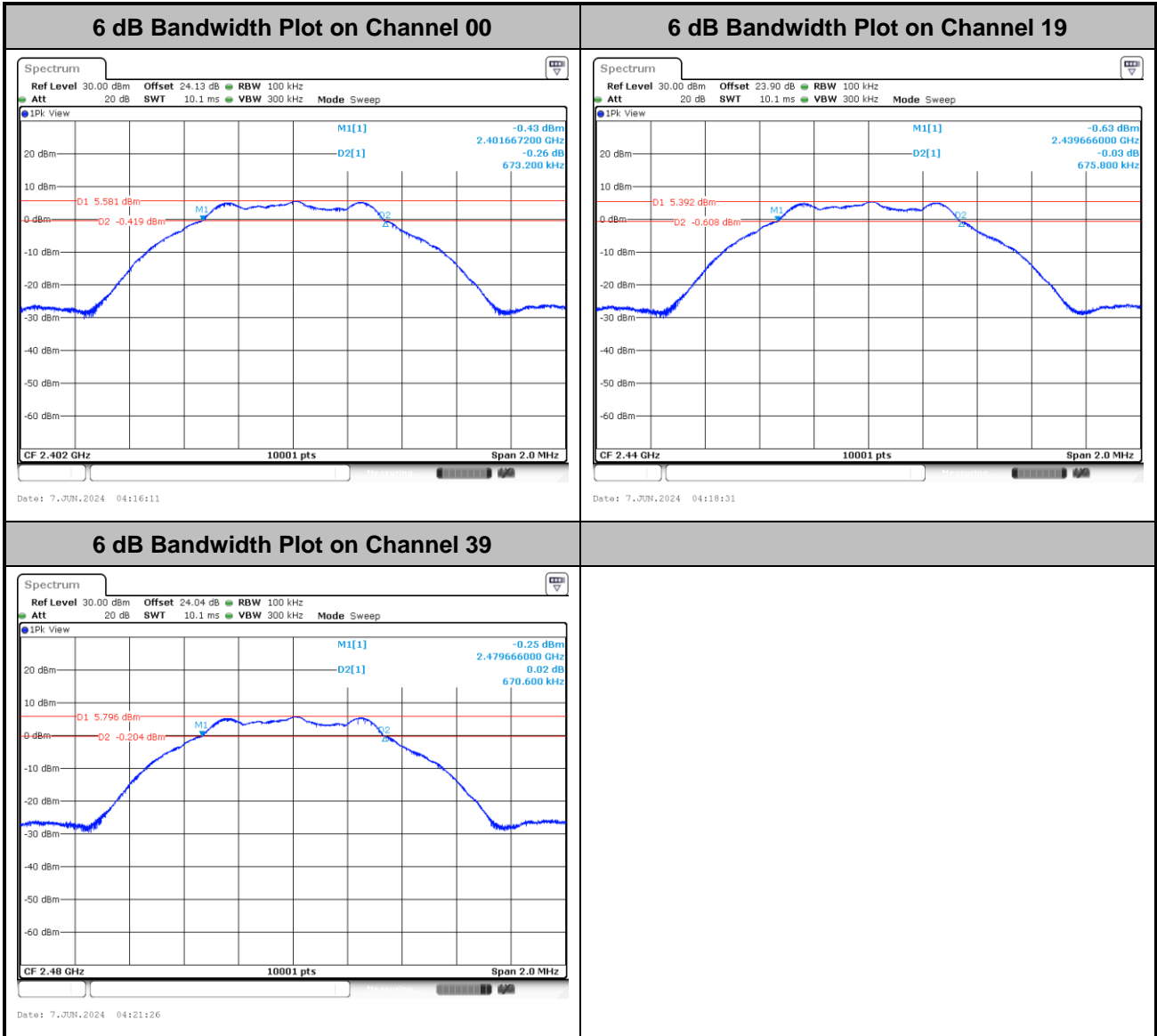
Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.



<Ant. 6>

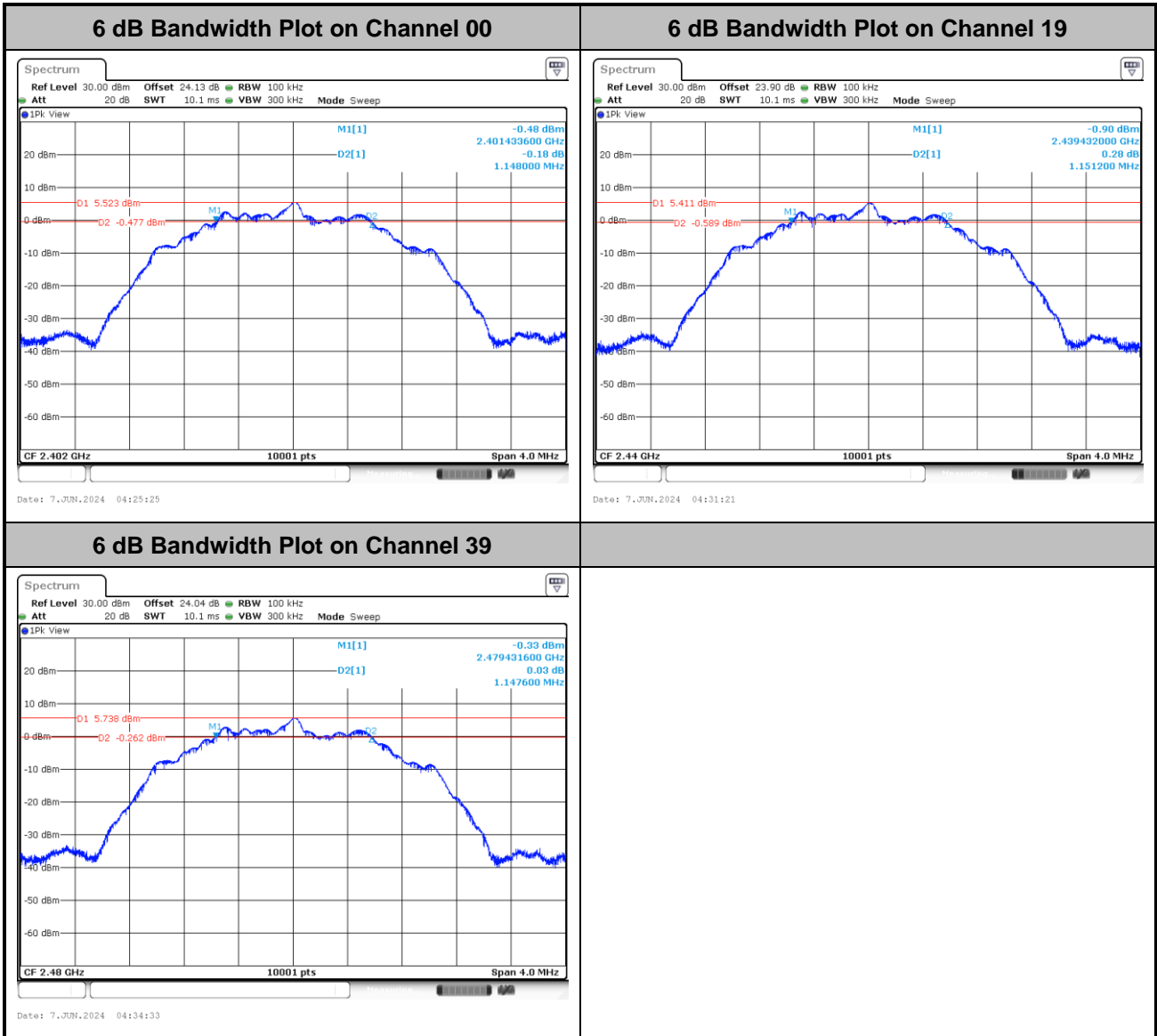
6dB Bandwidth

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<2Mbps>

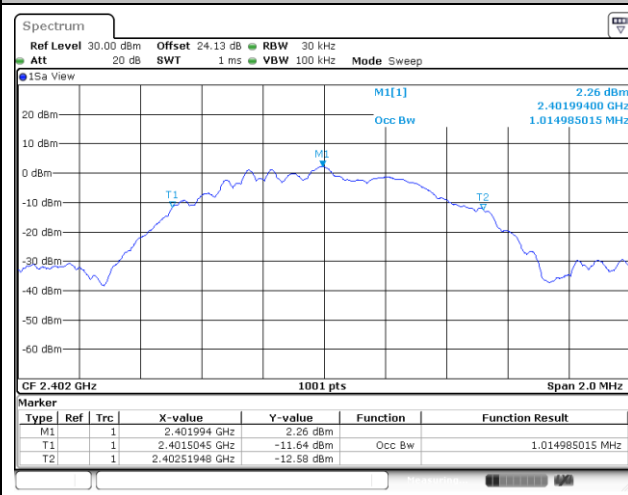




99% Occupied Bandwidth

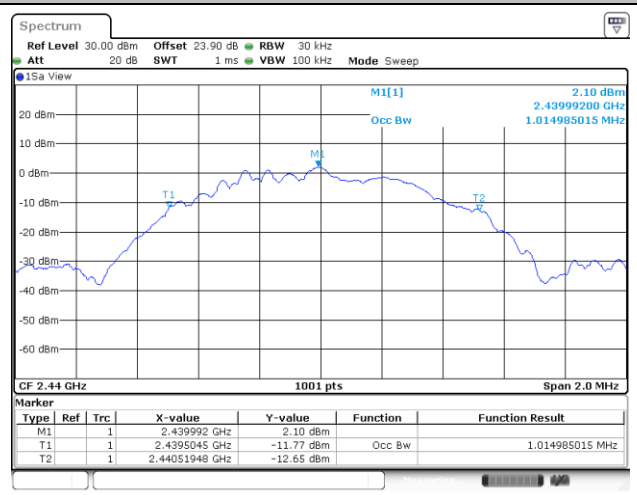
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99% Occupied Bandwidth Plot on Channel 00



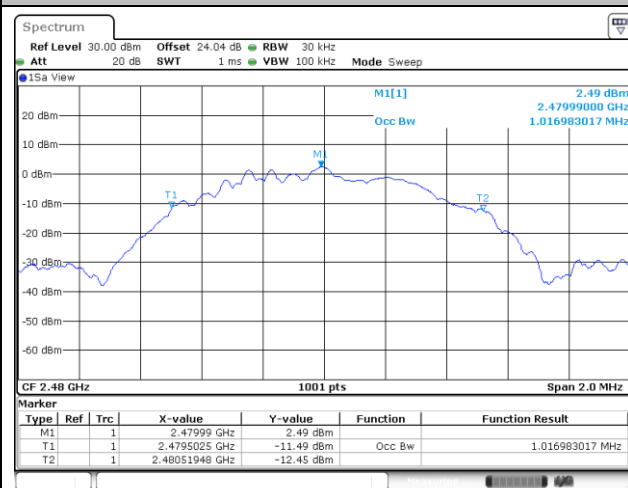
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99% Occupied Bandwidth Plot on Channel 19



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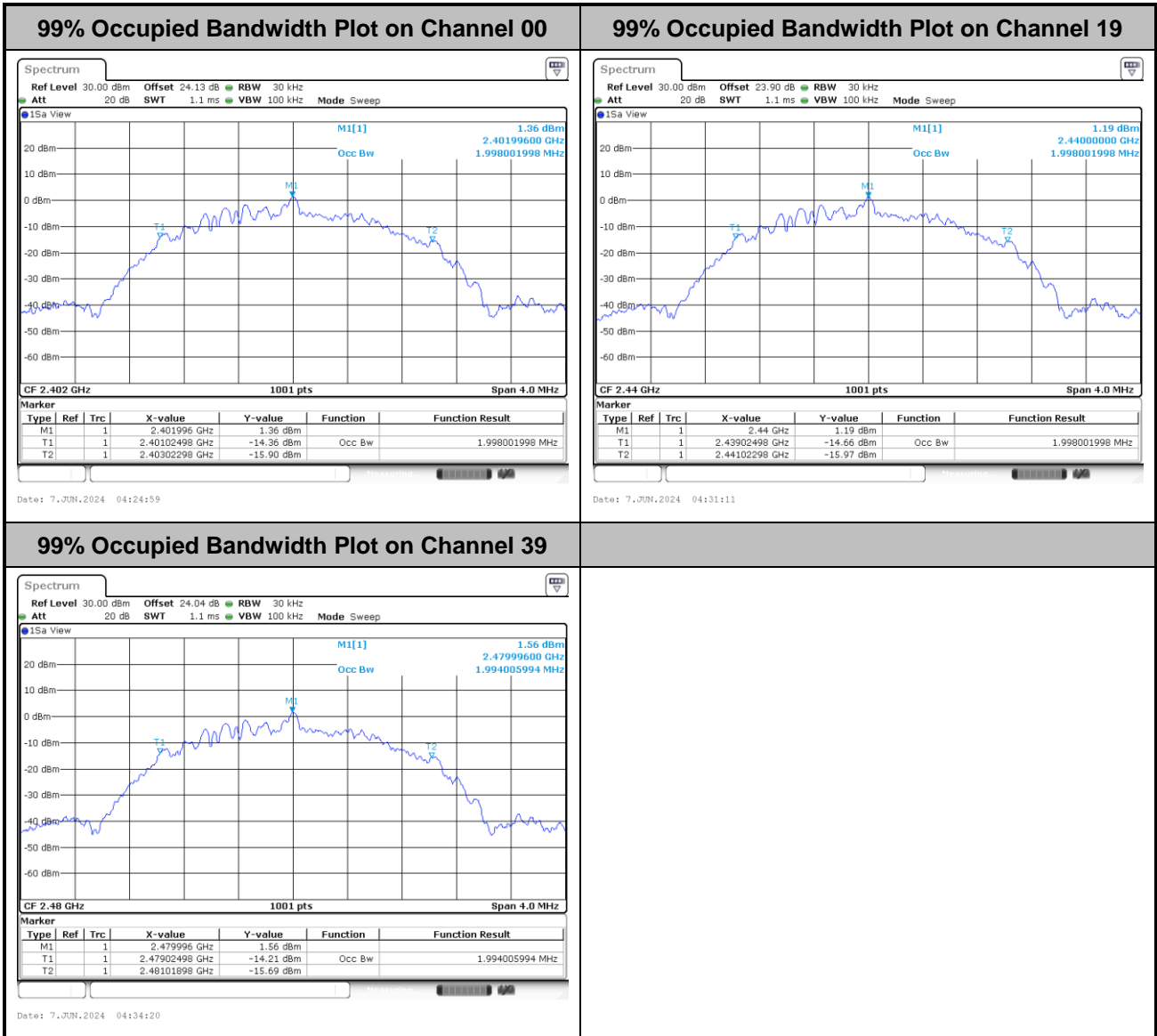
99% Occupied Bandwidth Plot on Channel 39



Date: 7.JUN.2024 04:21:08



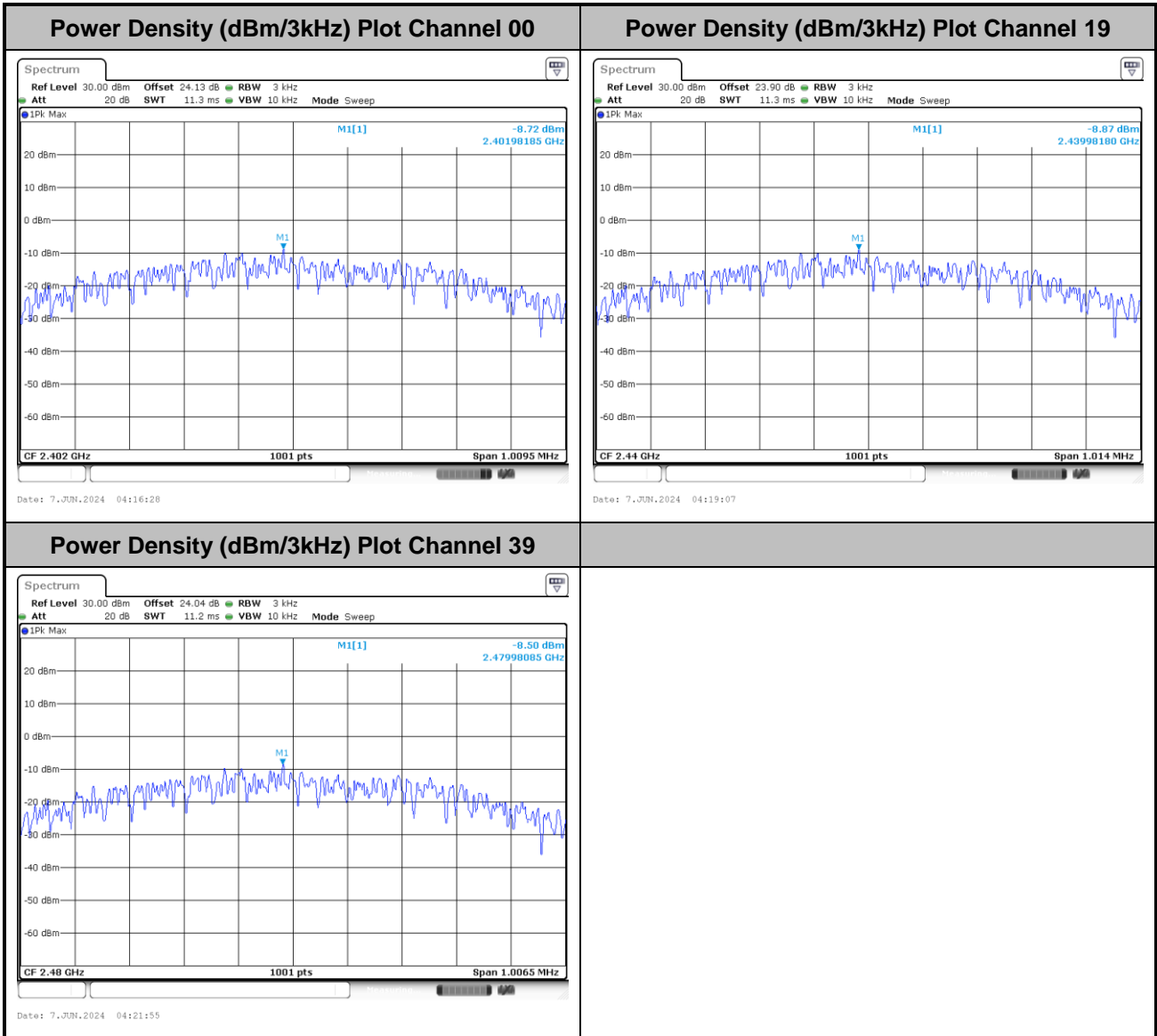
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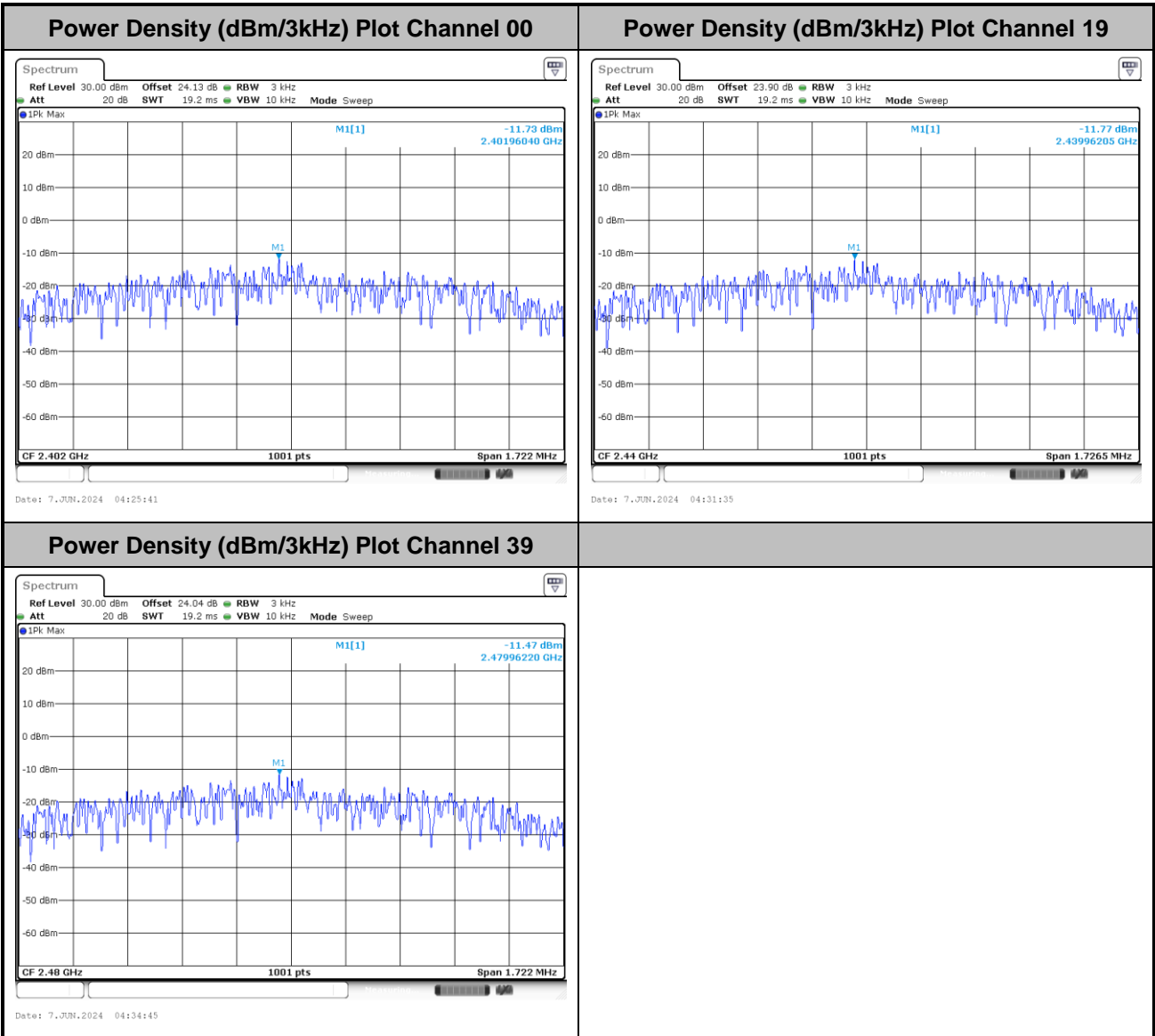
Power Spectral Density (dBm/3kHz)

<1Mbps>





<2Mbps>



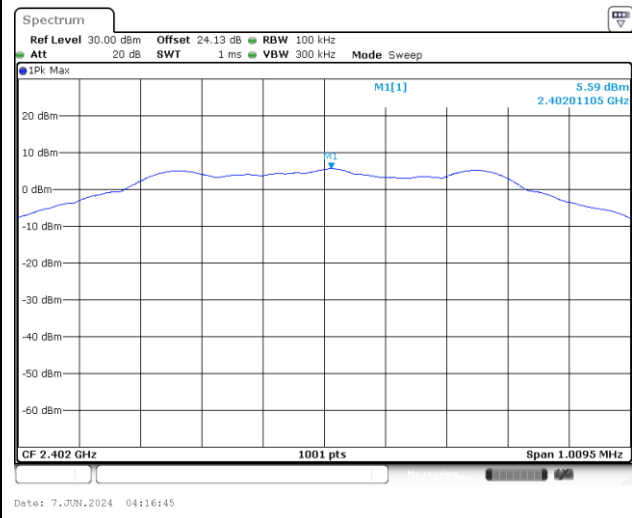


Band Edge and Conducted Spurious Emission

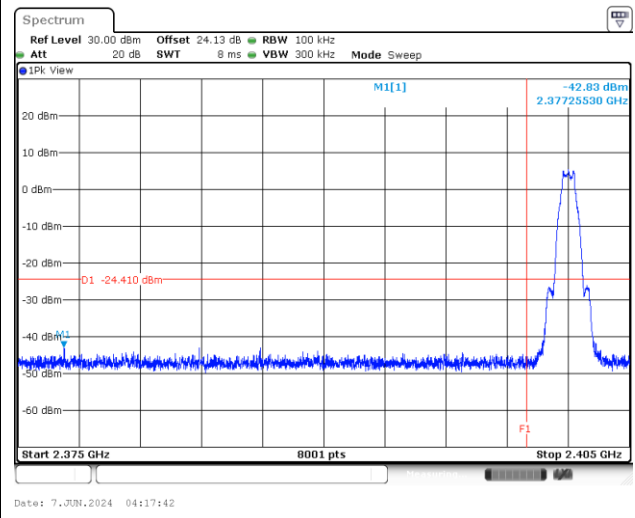
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Channel 00

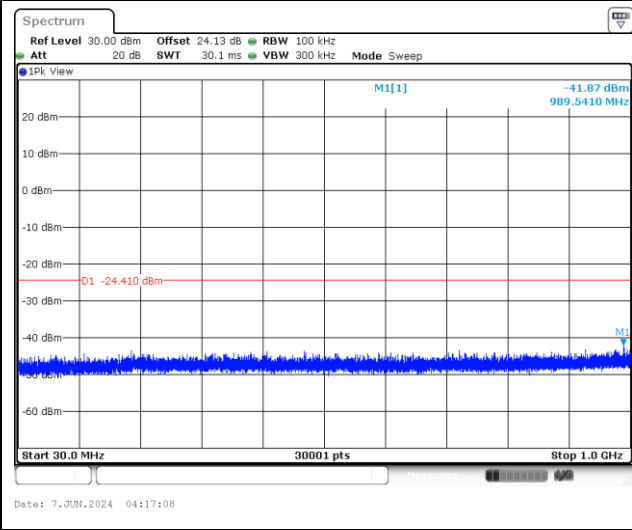
100kHz PSD reference Level Plot



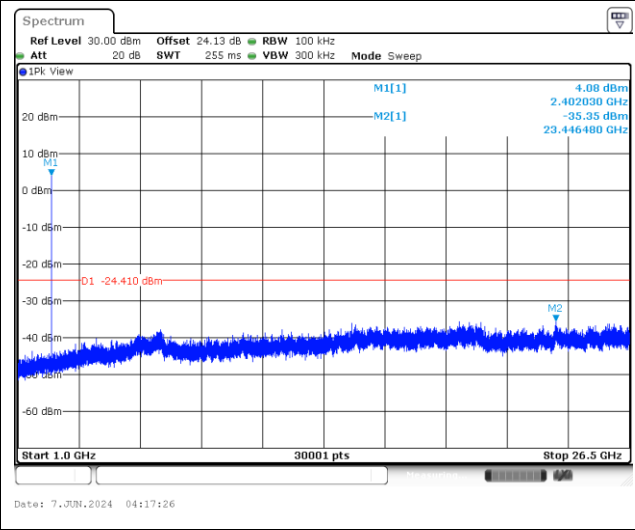
Low Channel Plot



Spurious Emission 30MHz~1GHz Plot



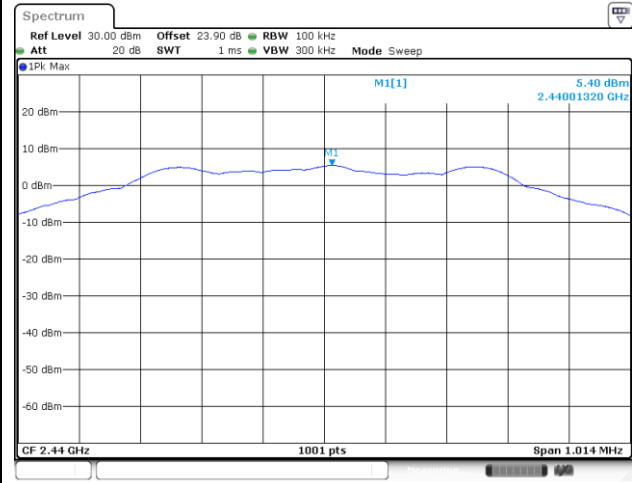
Spurious Emission 1GHz~26.5GHz Plot





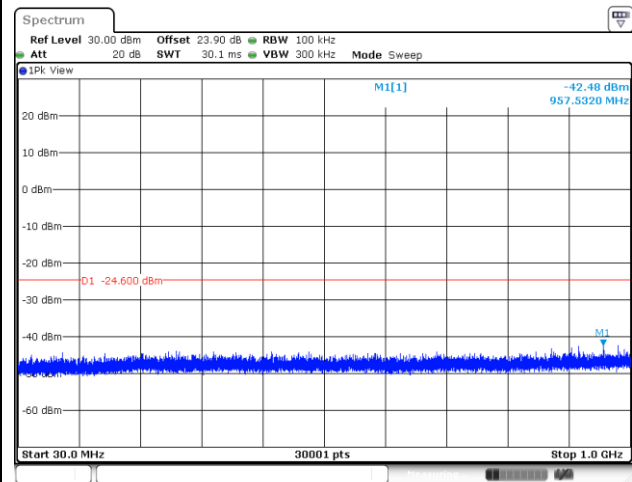
Channel 19

100kHz PSD reference Level Plot

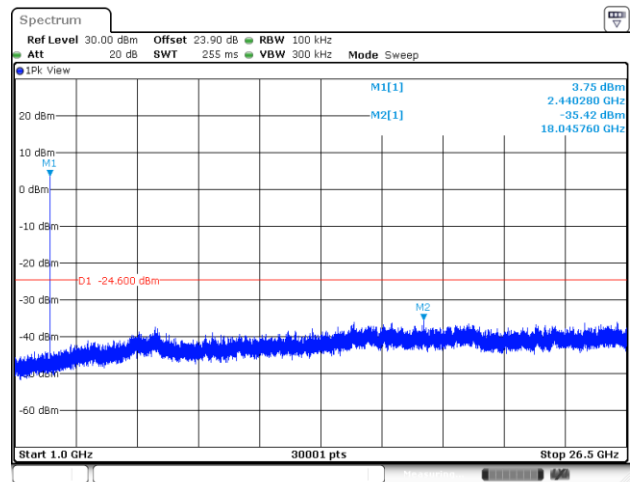


Mid Channel Plot

Spurious Emission 30MHz~1GHz Plot



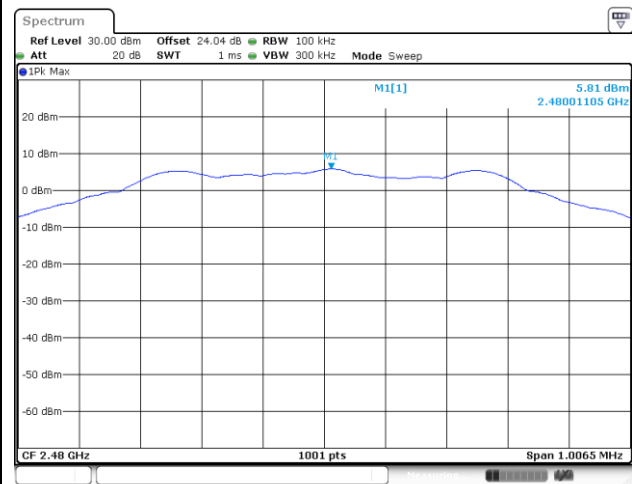
Spurious Emission 1GHz~26.5GHz Plot





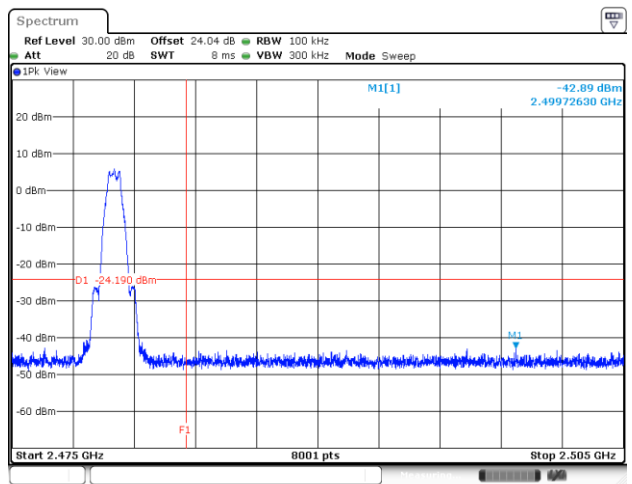
Channel 39

100kHz PSD reference Level Plot



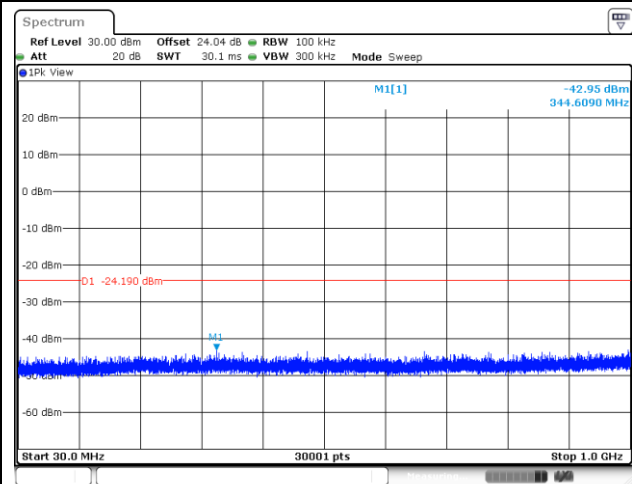
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High Channel Plot



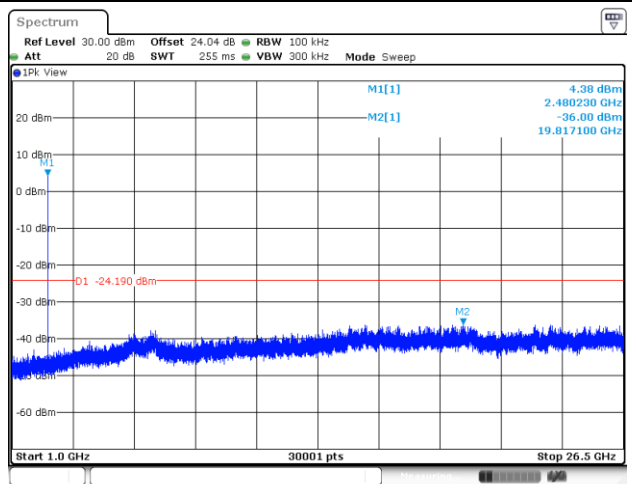
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Spurious Emission 30MHz~1GHz Plot



Date: 7.JUN.2024 04:22:53

Spurious Emission 1GHz~26.5GHz Plot



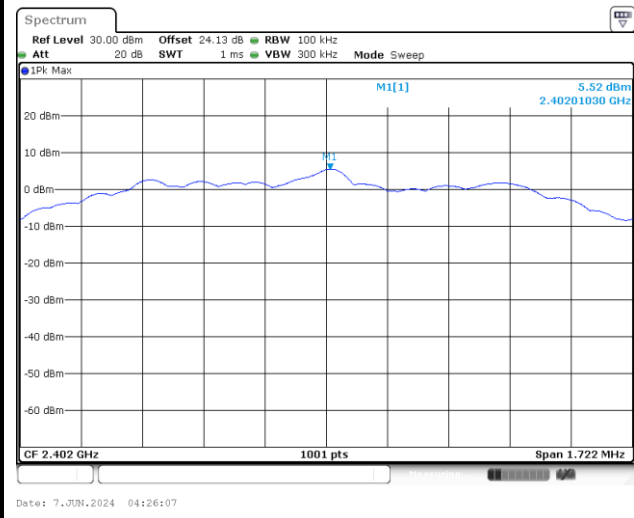
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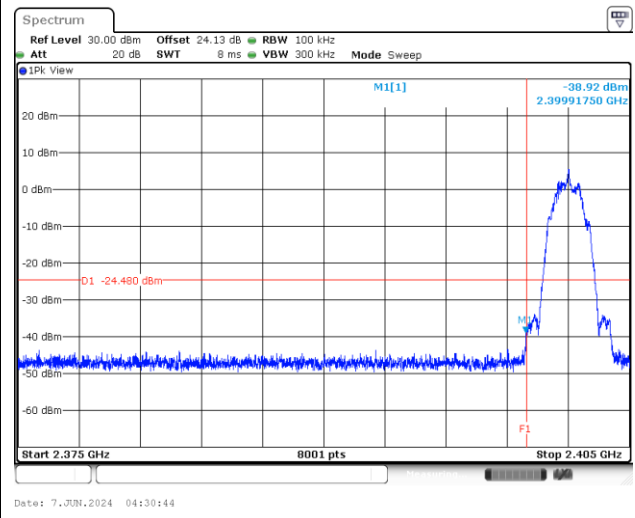
<2Mbps>

Channel 00

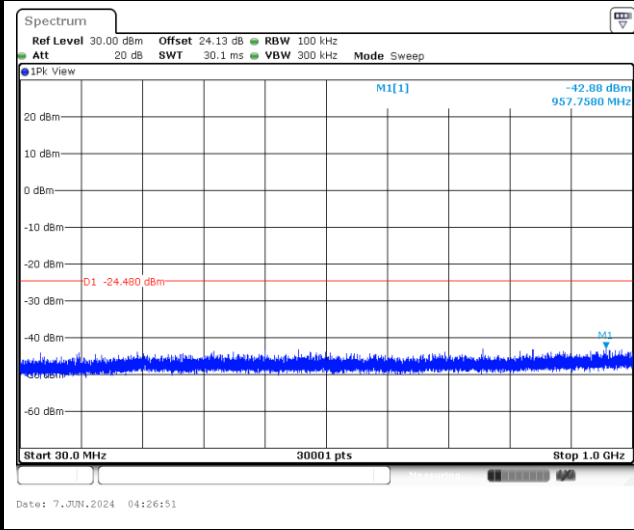
100kHz PSD reference Level Plot



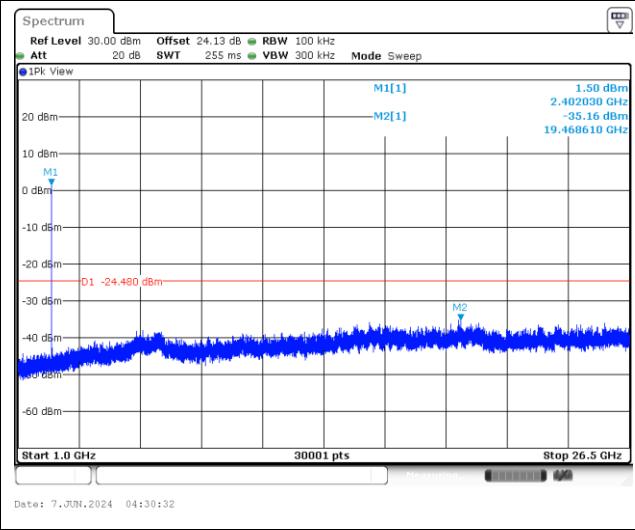
Low Channel Plot



Spurious Emission 30MHz~1GHz Plot



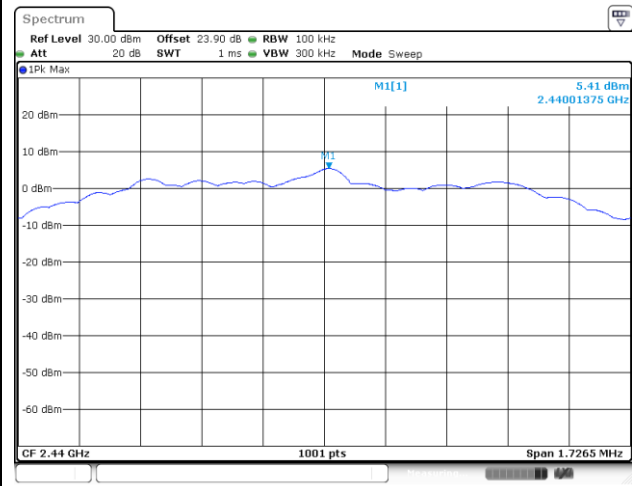
Spurious Emission 1GHz~26.5GHz Plot





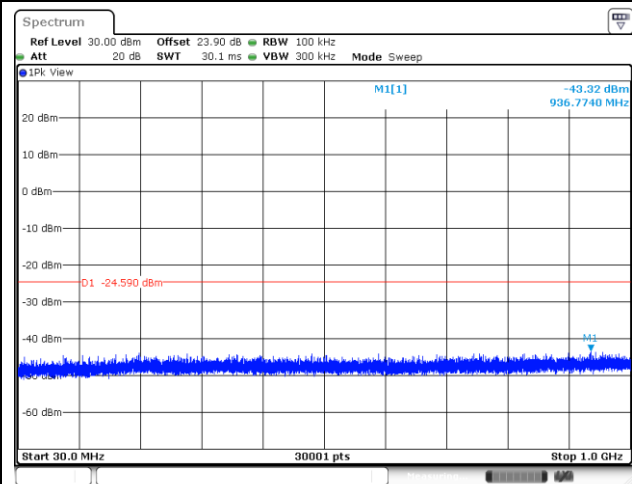
Channel 19

100kHz PSD reference Level Plot

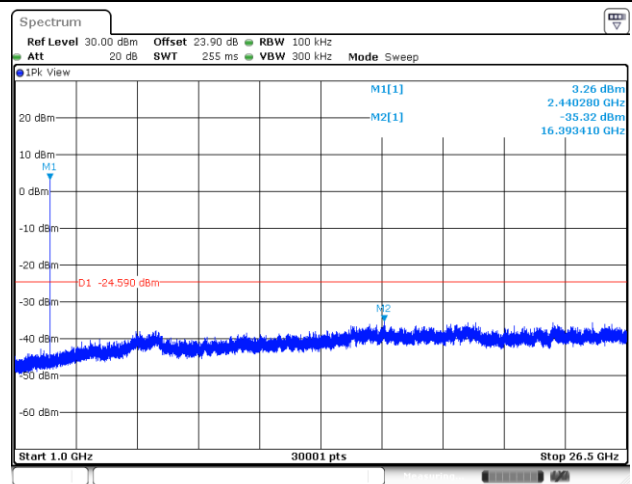


Mid Channel Plot

Spurious Emission 30MHz~1GHz Plot



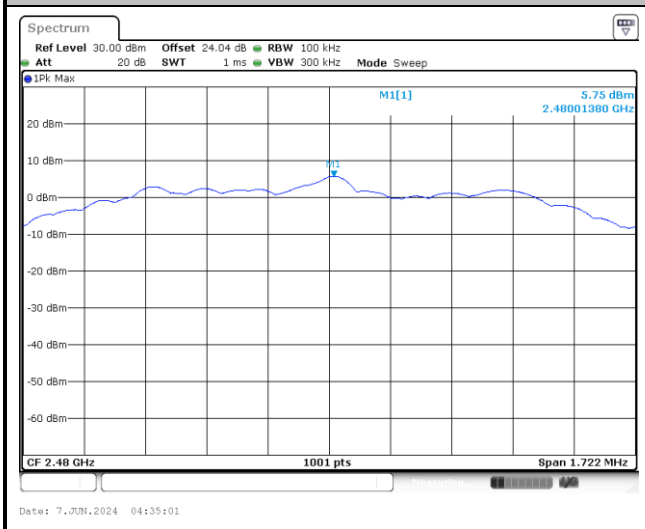
Spurious Emission 1GHz~26.5GHz Plot



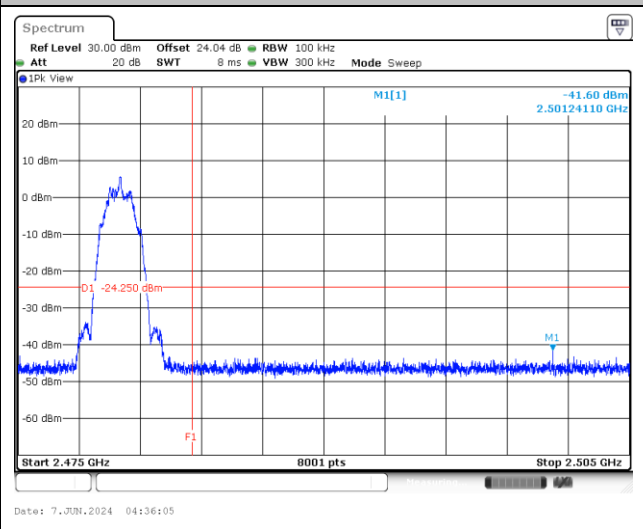


Channel 39

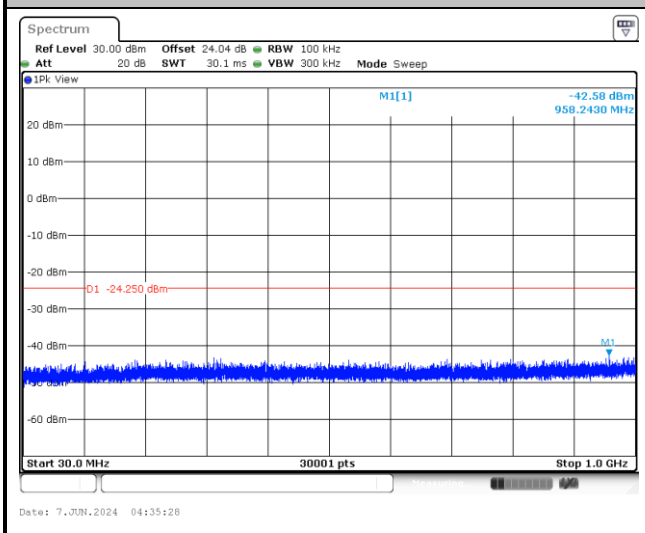
100kHz PSD reference Level Plot



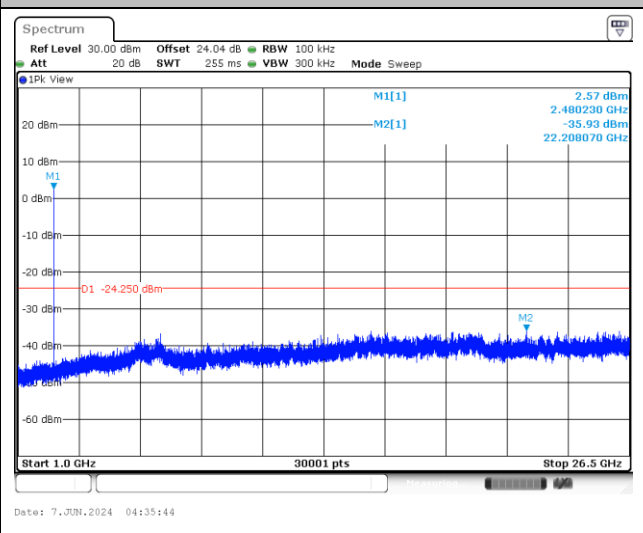
High Channel Plot



Spurious Emission 30MHz~1GHz Plot



Spurious Emission 1GHz~26.5GHz Plot

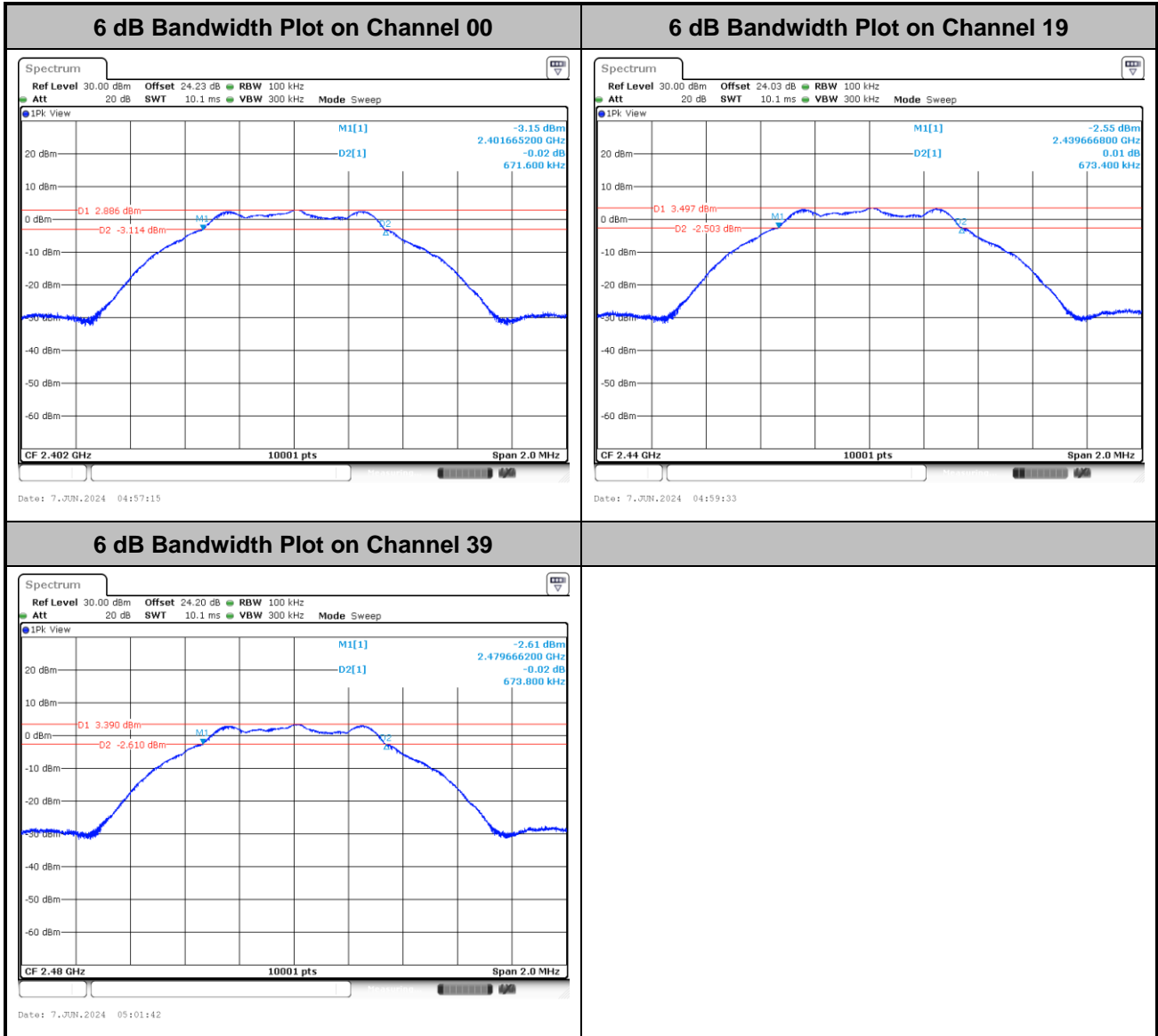




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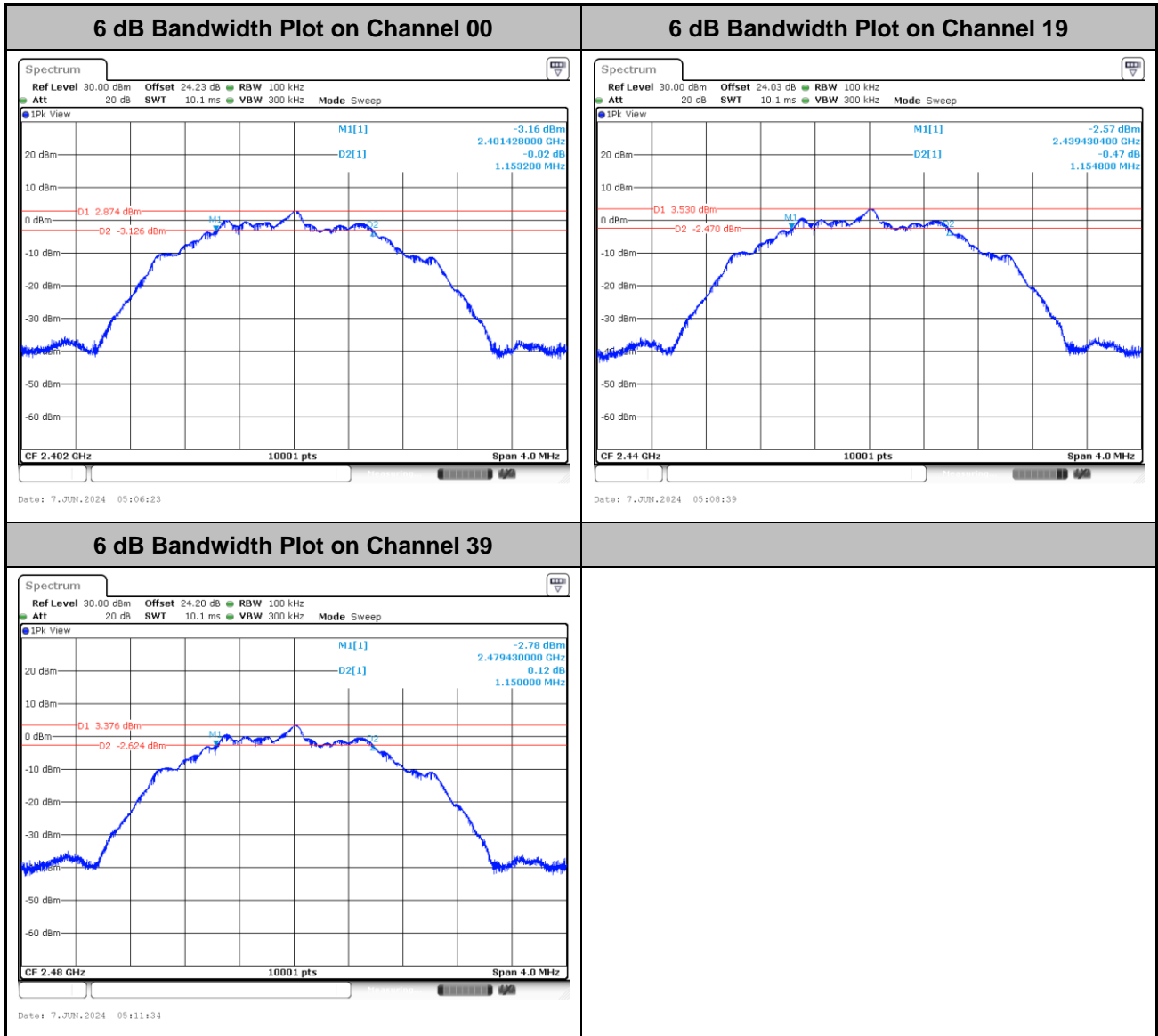
6dB Bandwidth

<1Mbps>





<2Mbps>

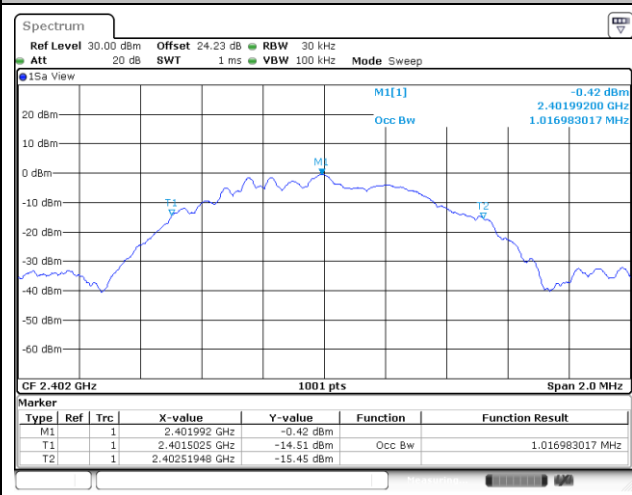




99% Occupied Bandwidth

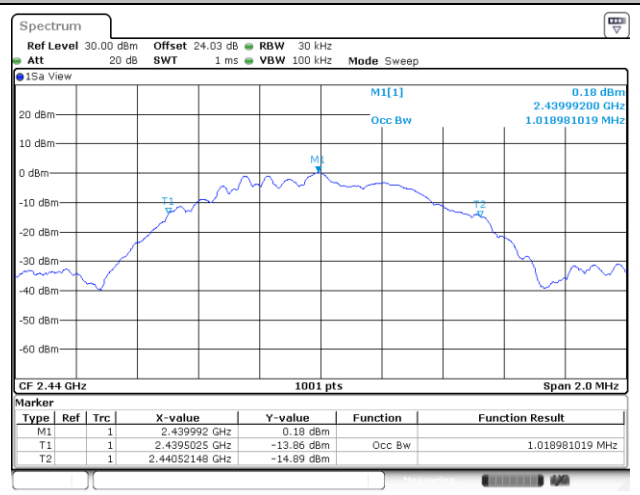
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99% Occupied Bandwidth Plot on Channel 00



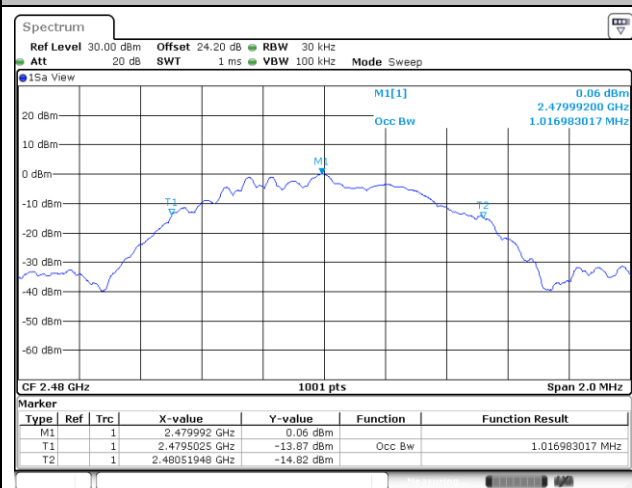
Date: 7.JUN.2024 04:57:02

99% Occupied Bandwidth Plot on Channel 19



Date: 7.JUN.2024 04:59:13

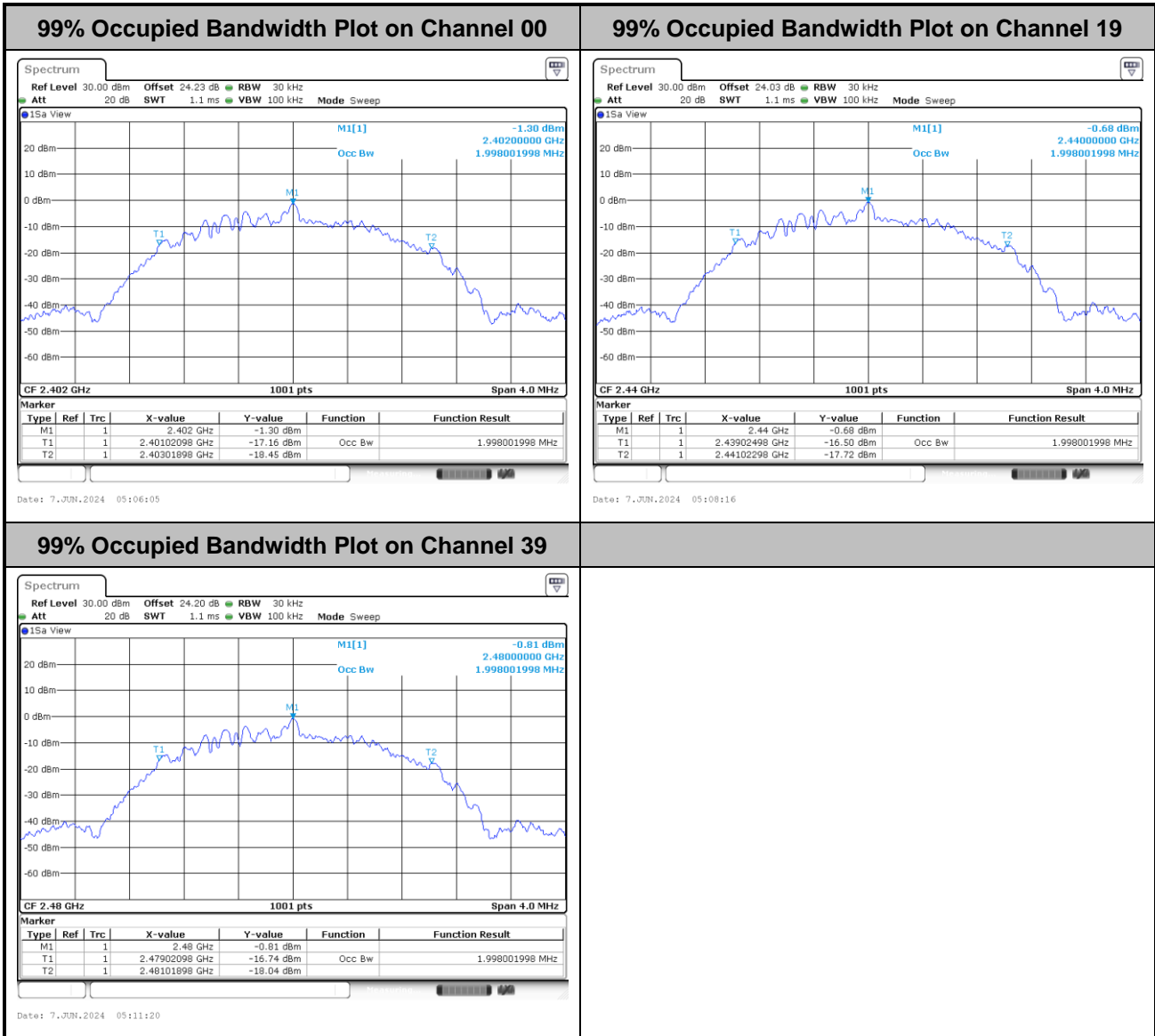
99% Occupied Bandwidth Plot on Channel 39



Date: 7.JUN.2024 05:01:26



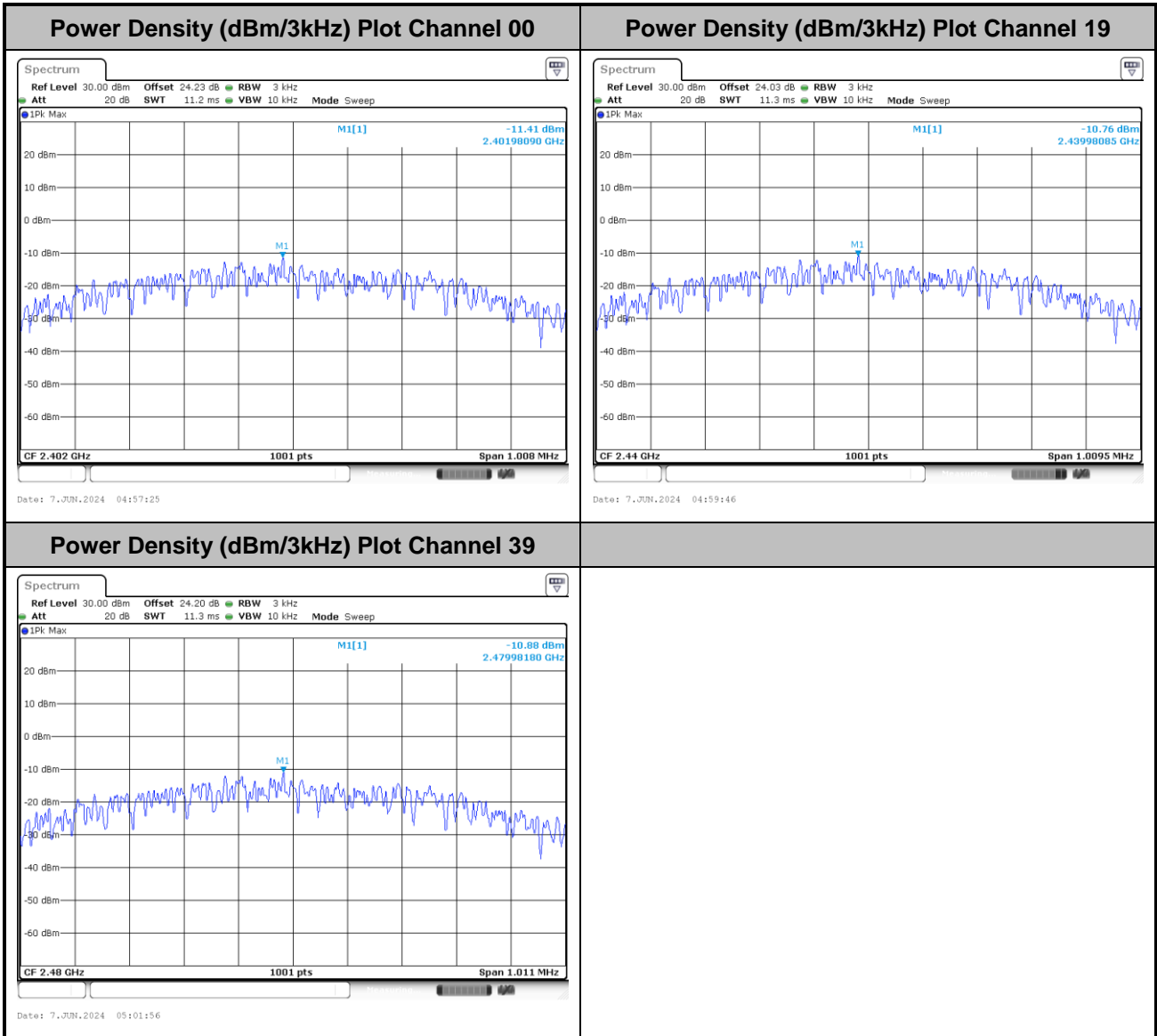
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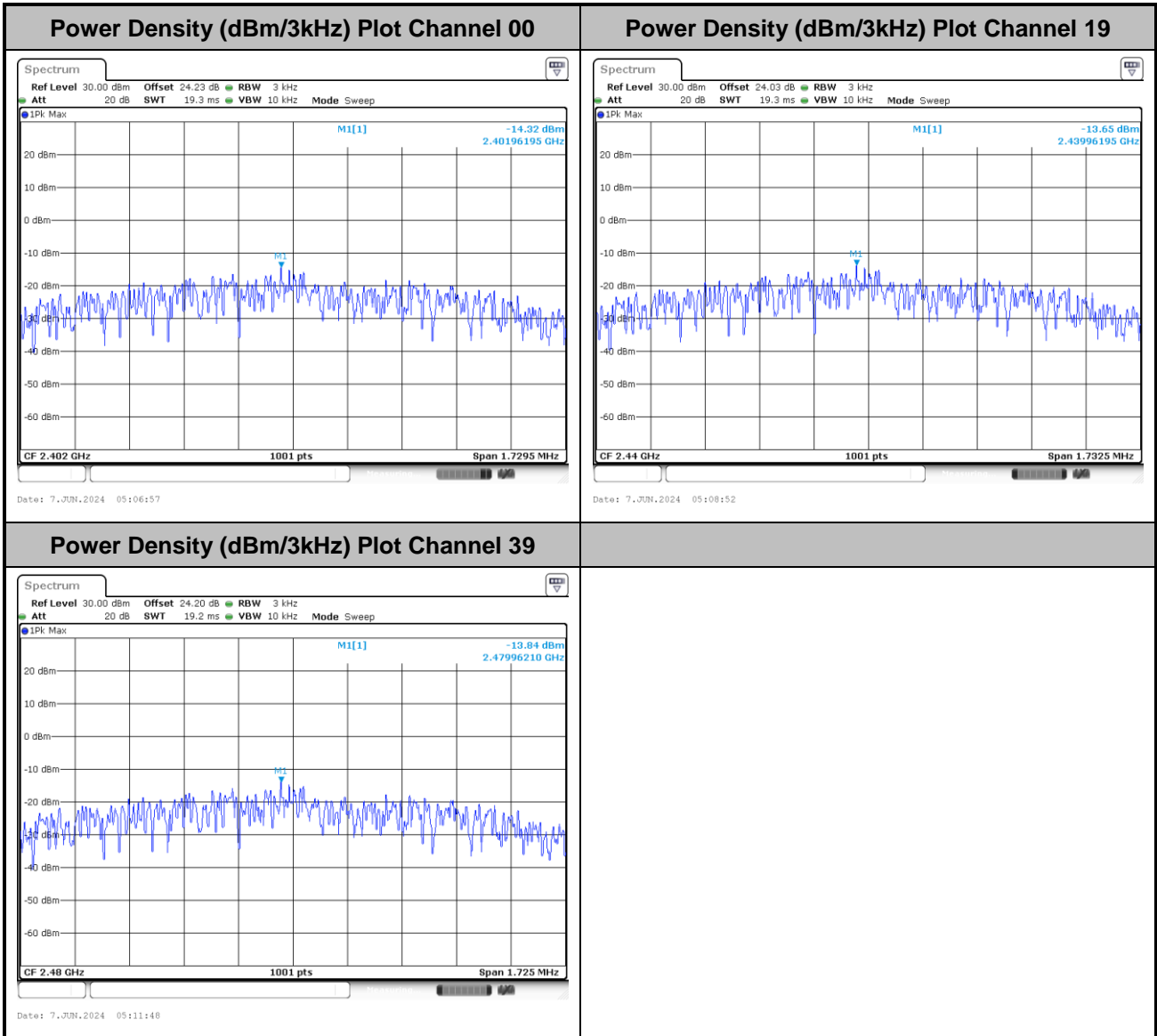
Power Spectral Density (dBm/3kHz)

<1Mbps>





<2Mbps>



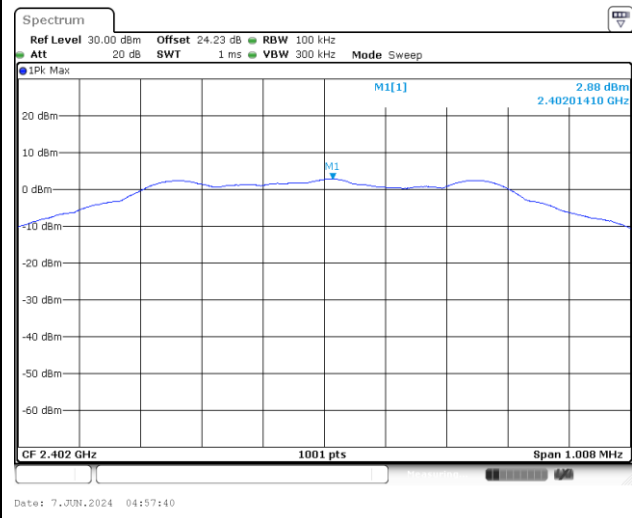


Band Edge and Conducted Spurious Emission

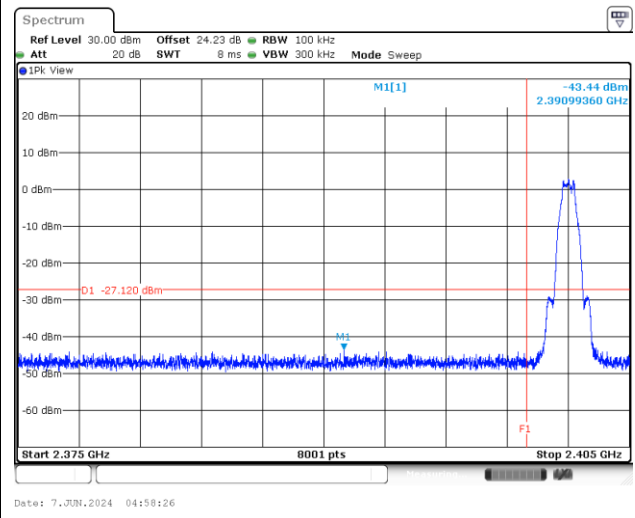
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Channel 00

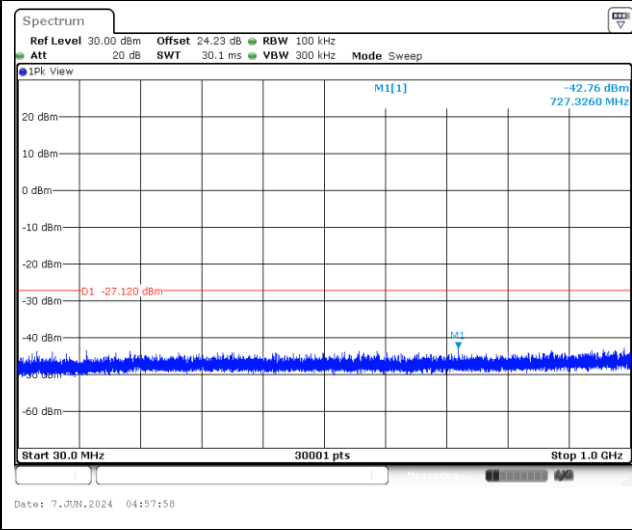
100kHz PSD reference Level Plot



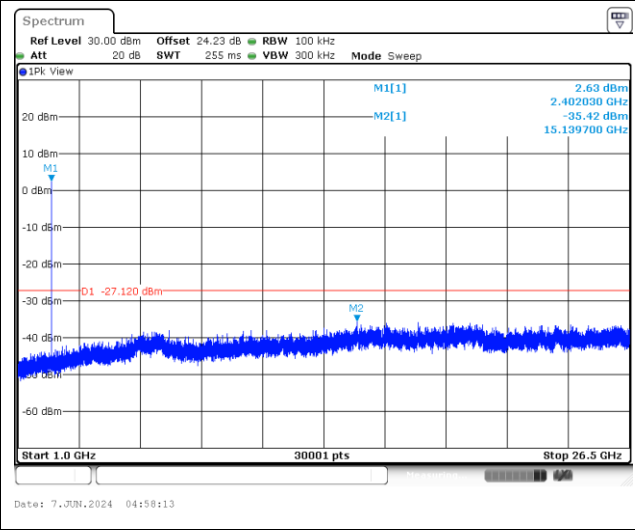
Low Channel Plot



Spurious Emission 30MHz~1GHz Plot



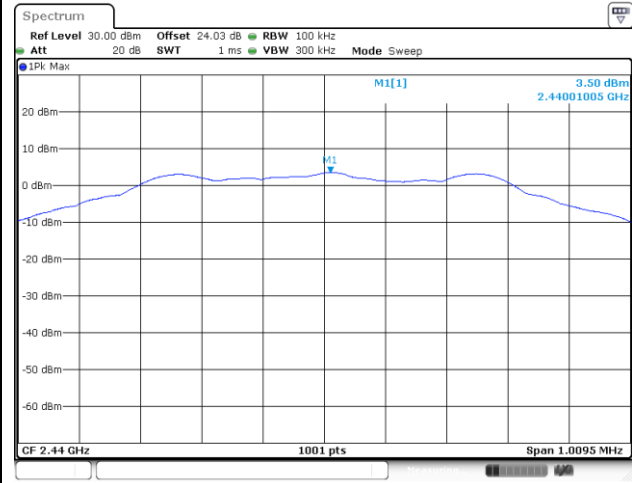
Spurious Emission 1GHz~26.5GHz Plot





Channel 19

100kHz PSD reference Level Plot

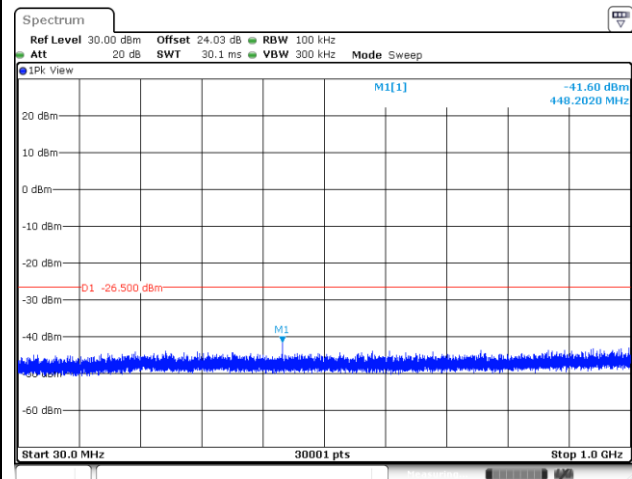


Date: 7.JUN.2024 05:00:08

Mid Channel Plot

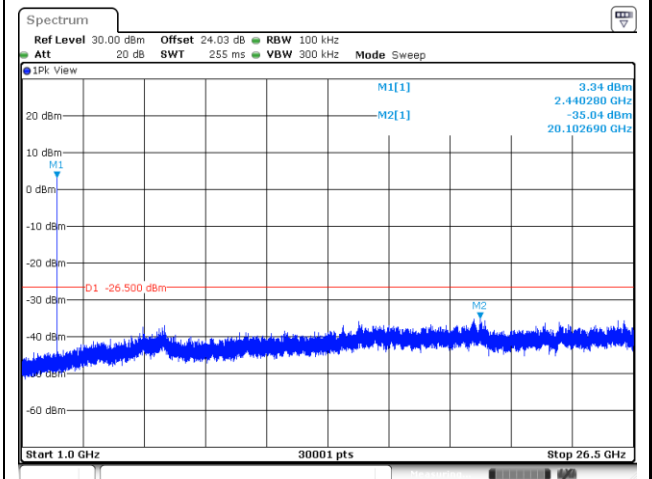


Spurious Emission 30MHz~1GHz Plot



Date: 7.JUN.2024 05:00:34

Spurious Emission 1GHz~26.5GHz Plot

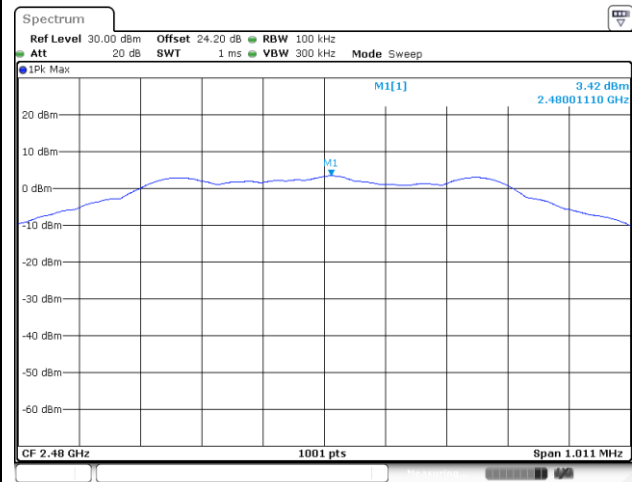


Date: 7.JUN.2024 05:00:54



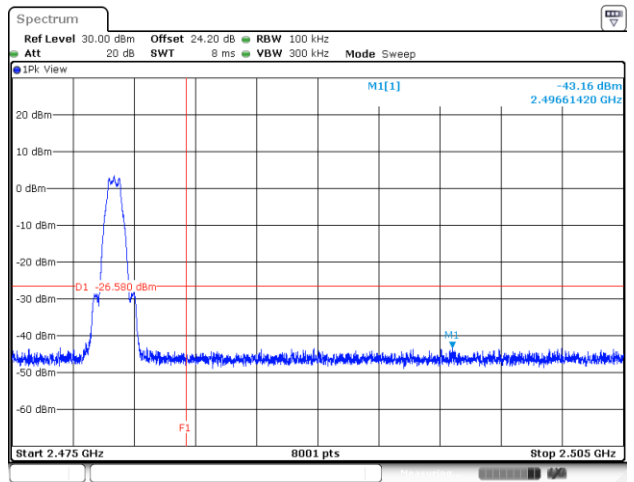
Channel 39

100kHz PSD reference Level Plot



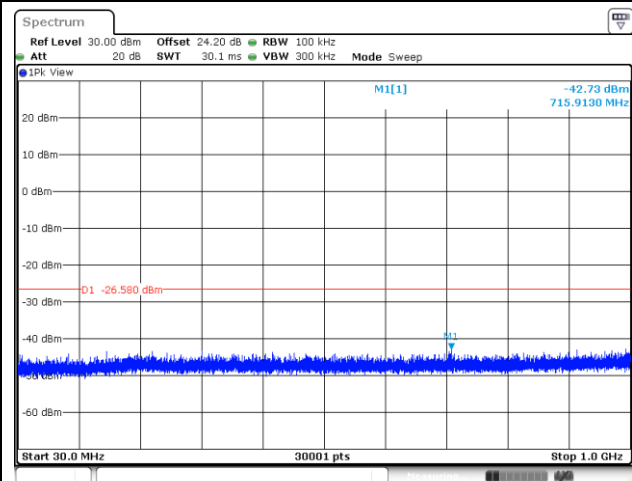
Date: 7.JUN.2024 05:02:15

High Channel Plot



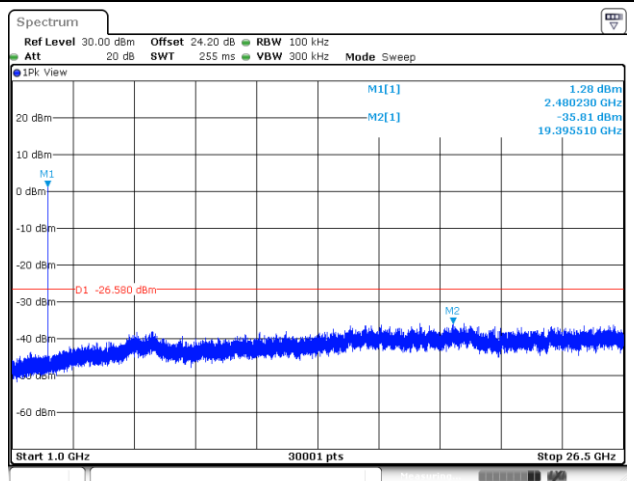
Date: 7.JUN.2024 05:03:29

Spurious Emission 30MHz~1GHz Plot



Date: 7.JUN.2024 05:02:37

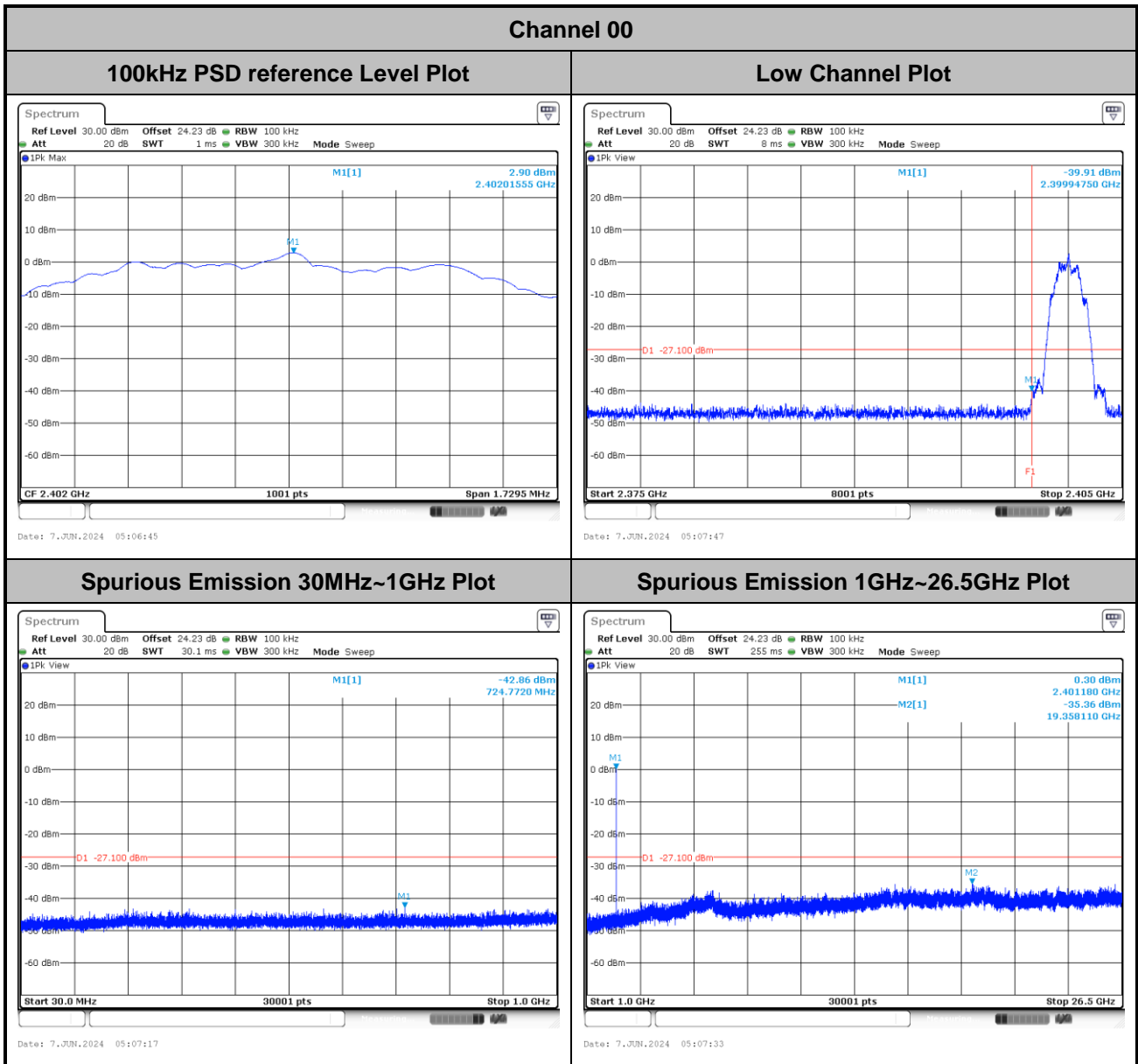
Spurious Emission 1GHz~26.5GHz Plot



Date: 7.JUN.2024 05:03:05



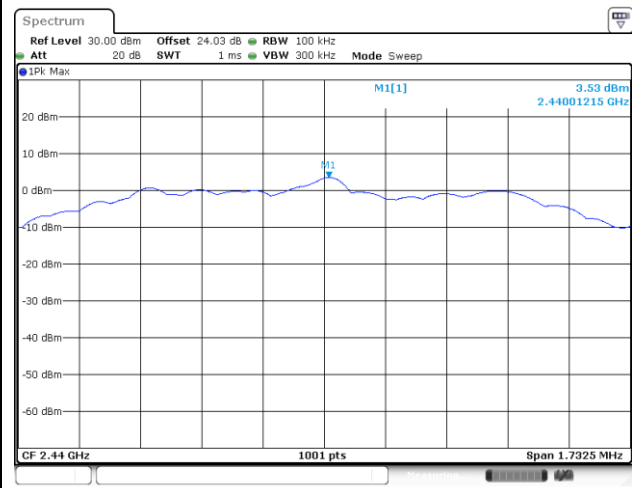
<2Mbps>





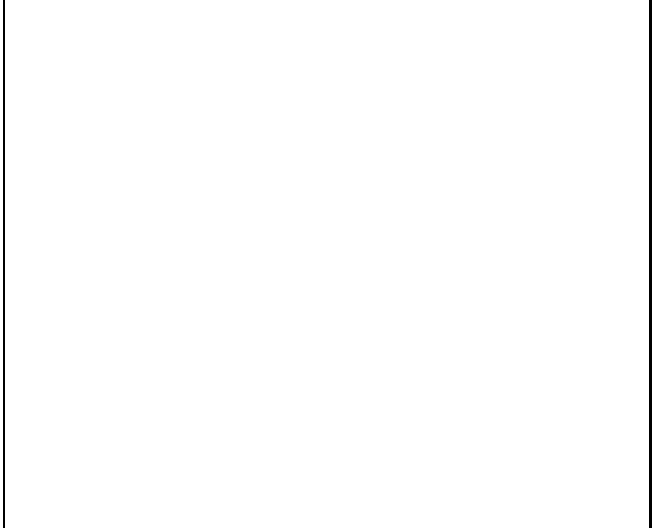
Channel 19

100kHz PSD reference Level Plot

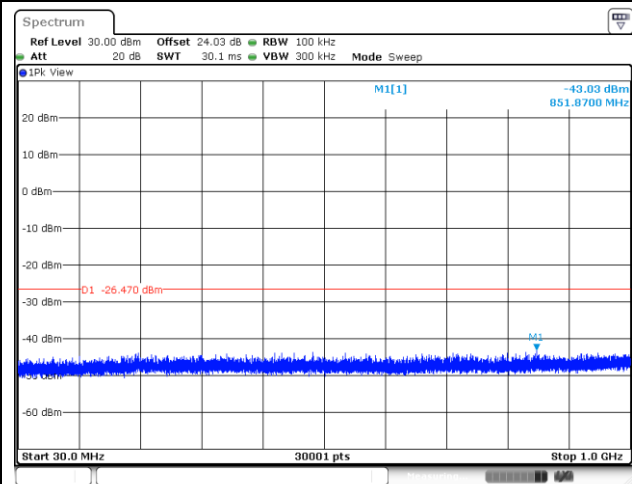


Date: 7.JUN.2024 05:09:09

Mid Channel Plot

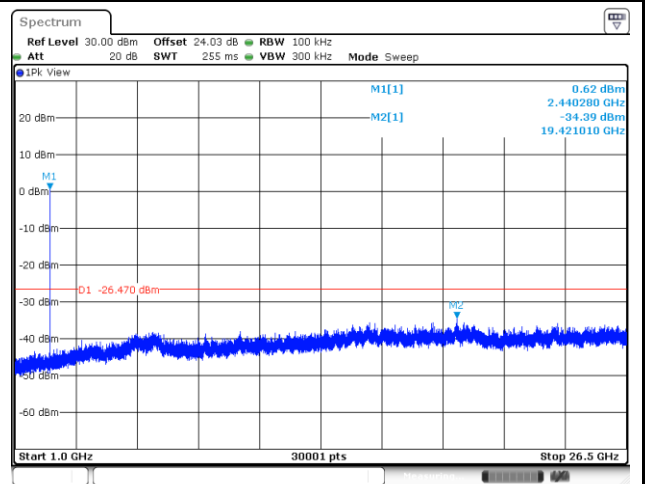


Spurious Emission 30MHz~1GHz Plot



Date: 7.JUN.2024 05:09:33

Spurious Emission 1GHz~26.5GHz Plot

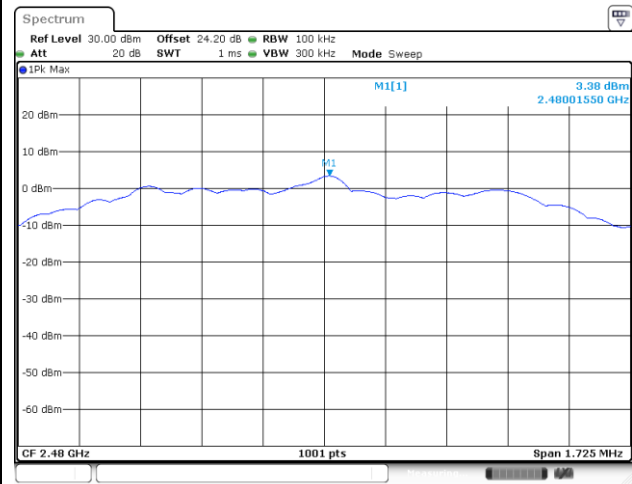


Date: 7.JUN.2024 05:10:40

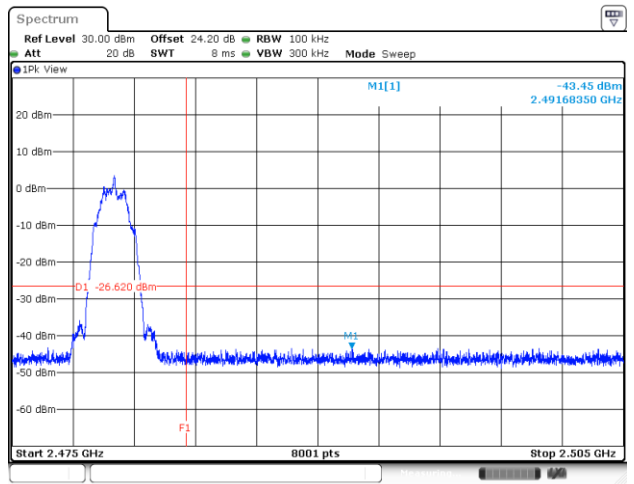


Channel 39

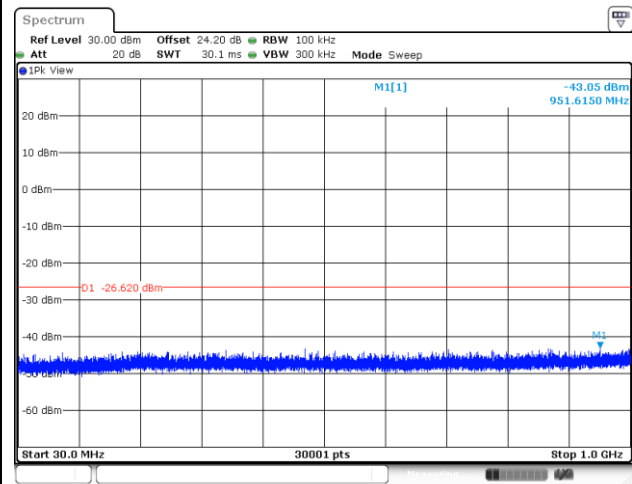
100kHz PSD reference Level Plot



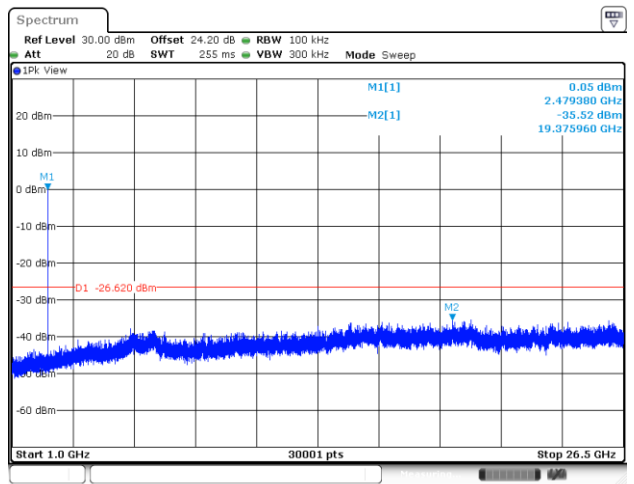
High Channel Plot



Spurious Emission 30MHz~1GHz Plot



Spurious Emission 1GHz~26.5GHz Plot





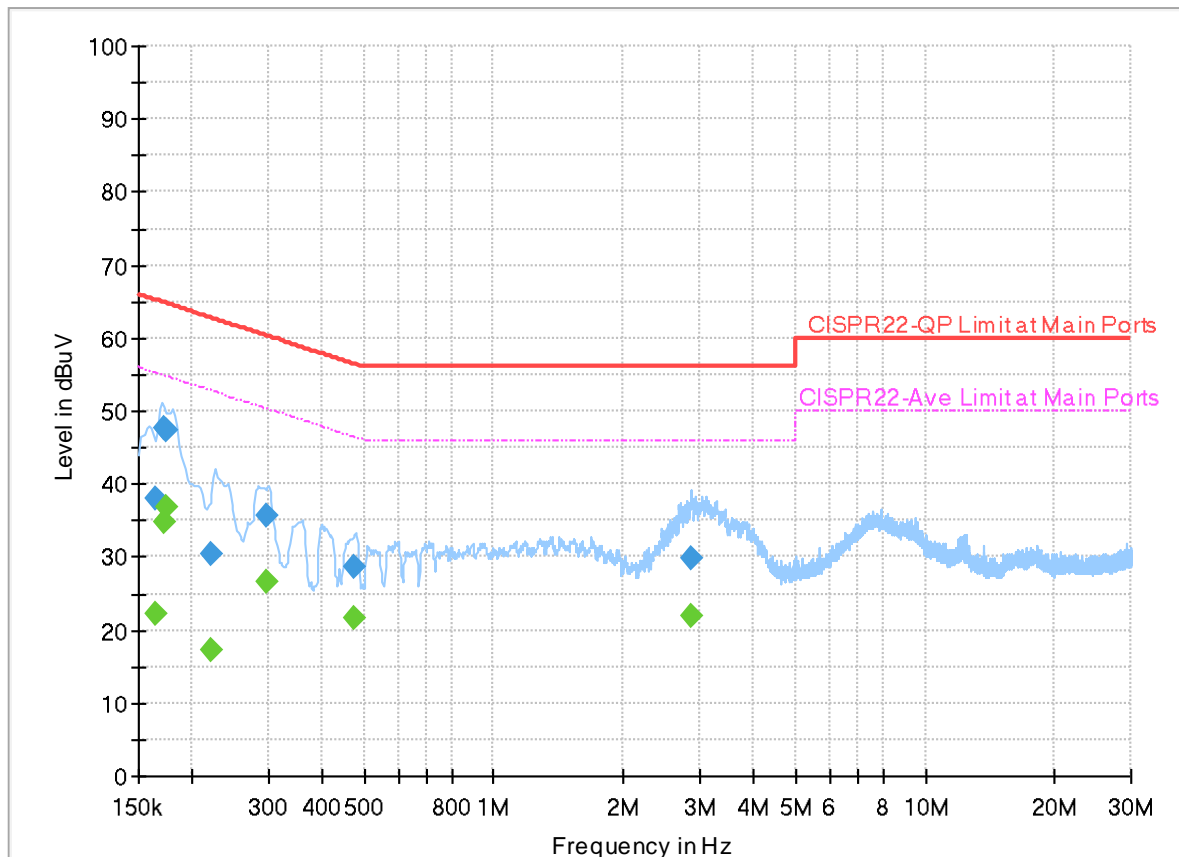
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	Temperature :	24.3~26.8°C
		Relative Humidity :	55.5~67.1%

EUT Information

Report NO : 443061
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



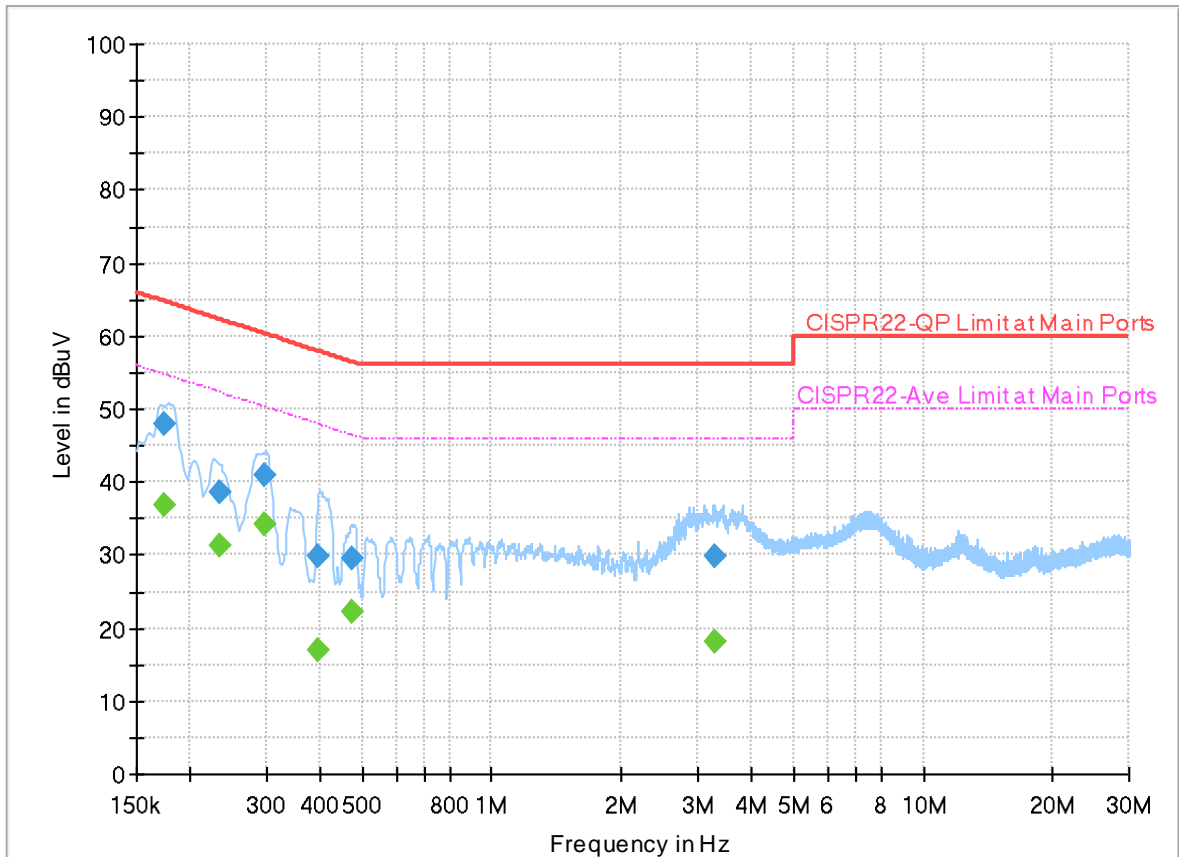
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.163500	---	22.08	55.28	33.20	L1	OFF	19.9
0.163500	38.04	---	65.28	27.24	L1	OFF	19.9
0.171690	---	34.71	54.88	20.17	L1	OFF	19.9
0.171690	47.66	---	64.88	17.22	L1	OFF	19.9
0.174750	---	36.88	54.73	17.85	L1	OFF	19.9
0.174750	47.40	---	64.73	17.33	L1	OFF	19.9
0.222000	---	17.14	52.74	35.60	L1	OFF	19.9
0.222000	30.35	---	62.74	32.39	L1	OFF	19.9
0.296250	---	26.62	50.35	23.73	L1	OFF	19.9
0.296250	35.61	---	60.35	24.74	L1	OFF	19.9
0.474000	---	21.65	46.44	24.79	L1	OFF	19.9
0.474000	28.54	---	56.44	27.90	L1	OFF	19.9
2.877000	---	22.04	46.00	23.96	L1	OFF	20.0
2.877000	29.76	---	56.00	26.24	L1	OFF	20.0

EUT Information

Report NO : 443061
 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)
0.173130	---	36.85	54.81	17.96	N	OFF	19.9
0.173130	48.04	---	64.81	16.77	N	OFF	19.9
0.233250	---	31.39	52.33	20.94	N	OFF	19.9
0.233250	38.61	---	62.33	23.72	N	OFF	19.9
0.296250	---	34.22	50.35	16.13	N	OFF	19.9
0.296250	40.87	---	60.35	19.48	N	OFF	19.9
0.393000	---	16.82	48.00	31.18	N	OFF	19.9
0.393000	29.80	---	58.00	28.20	N	OFF	19.9
0.476250	---	22.28	46.40	24.12	N	OFF	19.9
0.476250	29.62	---	56.40	26.78	N	OFF	19.9
3.275250	---	18.25	46.00	27.75	N	OFF	20.0
3.275250	29.79	---	56.00	26.21	N	OFF	20.0



Appendix C. Radiated Spurious Emission

Test Engineer :	Bank Lin, Fred Tseng, and Karl Hou	Temperature :	21.5~24.9°C
		Relative Humidity :	50.1~60.9%

<Ant. 6>

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
BLE CH 00 2402MHz		2328.69	50.79	-23.21	74	37.76	27.1	18.25	32.32	100	73	P	H	
		2338.77	41.33	-12.67	54	28.37	27.01	18.27	32.32	100	73	A	H	
	*	2402	102.74	-	-	89.72	27	18.38	32.36	100	73	P	H	
	*	2402	102.17	-	-	89.15	27	18.38	32.36	100	73	A	H	
													H	
			2357.775	51.23	-22.77	74	38.26	27	18.3	32.33	100	96	P	V
			2380.245	41.31	-12.69	54	28.32	27	18.34	32.35	100	96	A	V
	*		2402	106.43	-	-	93.41	27	18.38	32.36	100	96	P	V
	*		2402	105.89	-	-	92.87	27	18.38	32.36	100	96	A	V
													V	
BLE CH 19 2440MHz		2348.08	50.32	-23.68	74	37.37	27	18.28	32.33	100	73	P	H	
		2355.12	40.99	-13.01	54	28.02	27	18.3	32.33	100	73	A	H	
	*	2440	102.55	-	-	89.68	26.8	18.45	32.38	100	73	P	H	
	*	2440	101.99	-	-	89.12	26.8	18.45	32.38	100	73	A	H	
			2488.24	50.69	-23.31	74	37.66	26.9	18.54	32.41	100	73	P	H
			2494	41.29	-12.71	54	28.22	26.94	18.55	32.42	100	73	A	H
			2313.52	50.73	-23.27	74	37.78	27.04	18.22	32.31	100	96	P	V
			2347.44	41.09	-12.91	54	28.14	27	18.28	32.33	100	96	A	V
	*		2440	106.33	-	-	93.46	26.8	18.45	32.38	100	96	P	V
	*		2440	105.75	-	-	92.88	26.8	18.45	32.38	100	96	A	V
			2488.96	50.37	-23.63	74	37.34	26.9	18.54	32.41	100	96	P	V
			2491.36	41.3	-12.7	54	28.26	26.91	18.54	32.41	100	96	A	V



BLE CH 39 2480MHz	*	2480	102.99	-	-	89.98	26.9	18.52	32.41	100	296	P	H
	*	2480	102.43	-	-	89.42	26.9	18.52	32.41	100	296	A	H
		2492.4	51.29	-22.71	74	38.24	26.92	18.55	32.42	100	296	P	H
		2484.04	41.41	-12.59	54	28.39	26.9	18.53	32.41	100	296	A	H
													H
													H
	*	2480	105.64	-	-	92.63	26.9	18.52	32.41	100	82	P	V
	*	2480	105.11	-	-	92.1	26.9	18.52	32.41	100	82	A	V
		2487.52	50.51	-23.49	74	37.48	26.9	18.54	32.41	100	82	P	V
		2483.64	41.54	-12.46	54	28.52	26.9	18.53	32.41	100	82	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
BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	44.85	-29.15	74	33	32.32	13.03	33.5	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4804	44.1	-29.9	74	32.25	32.32	13.03	33.5	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	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)	
BLE CH 19 2440MHz		4880	45.42	-28.58	74	33.28	32.56	13.07	33.49	-	-	P	H	
		7320	49.51	-24.49	74	31.85	37.5	16.01	35.85	-	-	P	H	
		7320	40.29	-13.71	54	22.63	37.5	16.01	35.85	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4880	44.99	-29.01	74	32.85	32.56	13.07	33.49	-	-	P	V
			7320	50.05	-23.95	74	32.39	37.5	16.01	35.85	-	-	P	V
			7320	40.43	-13.57	54	22.77	37.5	16.01	35.85	-	-	A	V
														V
														V
														V
														V
														V
													V	
													V	



BLE	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)	
BLE CH 39 2480MHz		4960	45.8	-28.2	74	33.46	32.7	13.11	33.47	-	-	P	H	
		7440	49.41	-24.59	74	31.87	37.32	16.15	35.93	-	-	P	H	
		7440	39.37	-14.63	54	21.83	37.32	16.15	35.93	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	45.68	-28.32	74	33.34	32.7	13.11	33.47	-	-	P	V
			7440	48.98	-25.02	74	31.44	37.32	16.15	35.93	-	-	P	V
			7440	39.45	-14.55	54	21.91	37.32	16.15	35.93	-	-	A	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. 													



Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
2.4GHz BLE LF		33.51	23.81	-16.19	40	32.45	23.15	0.96	32.75	-	-	P	H	
		111	30.23	-13.27	43.5	44.12	16.93	1.9	32.72	-	-	P	H	
		140.43	27.38	-16.12	43.5	40.57	17.42	2.09	32.7	-	-	P	H	
		587.7	27.8	-18.2	46	30.55	25.71	4.37	32.83	-	-	P	H	
		826.4	31.79	-14.21	46	30.72	28.26	5.15	32.34	-	-	P	H	
		965.7	34.96	-19.04	54	29.66	30.93	5.61	31.24	-	-	P	H	
														H
														H
														H
														H
														H
														H
			32.97	31.25	-8.75	40	39.57	23.48	0.95	32.75	100	43	Q	V
			39.99	29.98	-10.02	40	41.61	20.03	1.08	32.74	-	-	P	V
			110.19	28.99	-14.51	43.5	42.95	16.87	1.89	32.72	-	-	P	V
			729.1	29.54	-16.46	46	29.72	27.72	4.82	32.72	-	-	P	V
			876.1	32.83	-13.17	46	30.53	29.07	5.25	32.02	-	-	P	V
			997.9	35.05	-18.95	54	29.79	30.41	5.73	30.88	-	-	P	V
														V
														V
													V	
													V	
													V	
													V	

Remark

- No other spurious found.
- All results are PASS against limit line.
- 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.



<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2369.01	50.66	-23.34	74	37.68	27	18.32	32.34	100	70	P	H
		2377.725	39.4	-14.6	54	26.41	27	18.34	32.35	100	70	A	H
	*	2402	103.07	-	-	90.05	27	18.38	32.36	100	70	P	H
	*	2402	100.38	-	-	87.36	27	18.38	32.36	100	70	A	H
													H
		2361.66	51.34	-22.66	74	38.37	27	18.31	32.34	100	94	P	V
		2380.77	39.39	-14.61	54	26.41	26.99	18.34	32.35	100	94	A	V
	*	2402	106.77	-	-	93.75	27	18.38	32.36	100	94	P	V
	*	2402	103.96	-	-	90.94	27	18.38	32.36	100	94	A	V
BLE CH 19 2440MHz		2370.48	50.94	-23.06	74	37.95	27	18.33	32.34	100	65	P	H
		2381.2	39.43	-14.57	54	26.44	26.99	18.35	32.35	100	65	A	H
	*	2440	103.22	-	-	90.35	26.8	18.45	32.38	100	65	P	H
	*	2440	100.49	-	-	87.62	26.8	18.45	32.38	100	65	A	H
		2496.32	50.51	-23.49	74	37.42	26.96	18.55	32.42	100	65	P	H
		2498.96	39.71	-14.29	54	26.58	26.99	18.56	32.42	100	65	A	H
		2324.4	50.91	-23.09	74	37.88	27.1	18.24	32.31	100	90	P	V
		2378.96	39.43	-14.57	54	26.44	27	18.34	32.35	100	90	A	V
	*	2440	106.28	-	-	93.41	26.8	18.45	32.38	100	90	P	V
	*	2440	103.56	-	-	90.69	26.8	18.45	32.38	100	90	A	V
		2483.92	51.12	-22.88	74	38.1	26.9	18.53	32.41	100	90	P	V
		2496.4	39.7	-14.3	54	26.61	26.96	18.55	32.42	100	90	A	V



BLE CH 39 2480MHz	*	2480	103.04	-	-	90.03	26.9	18.52	32.41	100	295	P	H
	*	2480	100.36	-	-	87.35	26.9	18.52	32.41	100	295	A	H
		2483.52	51.87	-22.13	74	38.85	26.9	18.53	32.41	100	295	P	H
		2483.52	40.15	-13.85	54	27.13	26.9	18.53	32.41	100	295	A	H
													H
													H
	*	2480	105.83	-	-	92.82	26.9	18.52	32.41	100	91	P	V
	*	2480	103.06	-	-	90.05	26.9	18.52	32.41	100	91	A	V
		2483.64	52.98	-21.02	74	39.96	26.9	18.53	32.41	100	91	P	V
		2483.52	40.55	-13.45	54	27.53	26.9	18.53	32.41	100	91	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
BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	44.41	-29.59	74	32.56	32.32	13.03	33.5	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4804	45.2	-28.8	74	33.35	32.32	13.03	33.5	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	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)	
BLE CH 19 2440MHz		4880	45.74	-28.26	74	33.6	32.56	13.07	33.49	-	-	P	H	
		7320	49.8	-24.2	74	32.14	37.5	16.01	35.85	-	-	P	H	
		7320	40.65	-13.35	54	22.99	37.5	16.01	35.85	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4880	45.65	-28.35	74	33.51	32.56	13.07	33.49	-	-	P	V
			7320	50.16	-23.84	74	32.5	37.5	16.01	35.85	-	-	P	V
			7320	40.81	-13.19	54	23.15	37.5	16.01	35.85	-	-	A	V
														V
														V
														V
														V
														V
													V	
													V	



BLE	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)	
BLE CH 39 2480MHz		4960	46.01	-27.99	74	33.67	32.7	13.11	33.47	-	-	P	H	
		7440	49.32	-24.68	74	31.78	37.32	16.15	35.93	-	-	P	H	
		7440	40.65	-13.35	54	23.11	37.32	16.15	35.93	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	45.79	-28.21	74	33.45	32.7	13.11	33.47	-	-	P	V
			7440	49.78	-24.22	74	32.24	37.32	16.15	35.93	-	-	P	V
			7440	40.76	-13.24	54	23.22	37.32	16.15	35.93	-	-	A	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. 													



<Ant. 7>

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2337.195	50.73	-23.27	74	37.76	27.03	18.26	32.32	100	69	P	H
		2377.83	41.05	-12.95	54	28.06	27	18.34	32.35	100	69	A	H
	*	2402	103.05	-	-	90.03	27	18.38	32.36	100	69	P	H
	*	2402	102.43	-	-	89.41	27	18.38	32.36	100	69	A	H
													H
		2354.1	51	-23	74	38.03	27	18.3	32.33	106	95	P	V
		2380.98	41.2	-12.8	54	28.22	26.99	18.34	32.35	106	95	A	V
	*	2402	106.82	-	-	93.8	27	18.38	32.36	106	95	P	V
	*	2402	106.2	-	-	93.18	27	18.38	32.36	106	95	A	V
													V
BLE CH 19 2440MHz		2342.16	51.2	-22.8	74	38.26	27	18.27	32.33	100	68	P	H
		2361.04	41.11	-12.89	54	28.14	27	18.31	32.34	100	68	A	H
	*	2440	102.82	-	-	89.95	26.8	18.45	32.38	100	68	P	H
	*	2440	102.2	-	-	89.33	26.8	18.45	32.38	100	68	A	H
		2487.84	50.13	-23.87	74	37.1	26.9	18.54	32.41	100	68	P	H
		2494.64	41.29	-12.71	54	28.21	26.95	18.55	32.42	100	68	A	H
		2310.16	51.16	-22.84	74	38.26	27	18.21	32.31	105	93	P	V
		2385.68	40.98	-13.02	54	28.04	26.94	18.35	32.35	105	93	A	V
	*	2440	106.86	-	-	93.99	26.8	18.45	32.38	105	93	P	V
	*	2440	106.25	-	-	93.38	26.8	18.45	32.38	105	93	A	V
		2486.08	50.67	-23.33	74	37.65	26.9	18.53	32.41	105	93	P	V
		2487.36	41.23	-12.77	54	28.2	26.9	18.54	32.41	105	93	A	V



BLE CH 39 2480MHz	*	2480	100.76	-	-	87.75	26.9	18.52	32.41	123	303	P	H
	*	2480	100.24	-	-	87.23	26.9	18.52	32.41	123	303	A	H
		2484.28	50.41	-23.59	74	37.39	26.9	18.53	32.41	123	303	P	H
		2488.8	41.38	-12.62	54	28.35	26.9	18.54	32.41	123	303	A	H
													H
													H
	*	2480	102.66	-	-	89.65	26.9	18.52	32.41	188	90	P	V
	*	2480	102.1	-	-	89.09	26.9	18.52	32.41	188	90	A	V
		2493.84	51.01	-22.99	74	37.94	26.94	18.55	32.42	188	90	P	V
		2483.92	41.58	-12.42	54	28.56	26.9	18.53	32.41	188	90	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
BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	45.48	-28.52	74	33.63	32.32	13.03	33.5	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4804	44.78	-29.22	74	32.93	32.32	13.03	33.5	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	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)	
BLE CH 19 2440MHz		4880	45.48	-28.52	74	33.34	32.56	13.07	33.49	-	-	P	H	
		7320	49.28	-24.72	74	31.62	37.5	16.01	35.85	-	-	P	H	
		7320	40.64	-13.36	54	22.98	37.5	16.01	35.85	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4880	45.57	-28.43	74	33.43	32.56	13.07	33.49	-	-	P	V
			7320	50.37	-23.63	74	32.71	37.5	16.01	35.85	-	-	P	V
			7320	40.88	-13.12	54	23.22	37.5	16.01	35.85	-	-	A	V
														V
														V
														V
														V
														V
													V	
													V	



BLE	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)	
BLE CH 39 2480MHz		4960	45.86	-28.14	74	33.52	32.7	13.11	33.47	-	-	P	H	
		7440	49.42	-24.58	74	31.88	37.32	16.15	35.93	-	-	P	H	
		7440	40.62	-13.38	54	23.08	37.32	16.15	35.93	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	45.79	-28.21	74	33.45	32.7	13.11	33.47	-	-	P	V
			7440	49.02	-24.98	74	31.48	37.32	16.15	35.93	-	-	P	V
			7440	40.67	-13.33	54	23.13	37.32	16.15	35.93	-	-	A	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. 													



Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
2.4GHz BLE LF		33.24	24.02	-15.98	40	32.51	23.31	0.95	32.75	-	-	P	H	
		111	29.3	-14.2	43.5	43.19	16.93	1.9	32.72	-	-	P	H	
		139.08	27.66	-15.84	43.5	40.82	17.46	2.08	32.7	-	-	P	H	
		721.4	29.66	-16.34	46	30.31	27.31	4.78	32.74	-	-	P	H	
		897.1	33.27	-12.73	46	30.86	29.02	5.26	31.87	-	-	P	H	
		993	35.13	-18.87	54	29.87	30.49	5.71	30.94	-	-	P	H	
														H
														H
														H
														H
														H
														H
			32.43	33.58	-6.42	40	41.55	23.84	0.94	32.75	-	-	P	V
			39.72	30.02	-9.98	40	41.52	20.17	1.07	32.74	-	-	P	V
			111.27	28.53	-14.97	43.5	42.41	16.94	1.9	32.72	-	-	P	V
			567.4	28.04	-17.96	46	30.32	26.27	4.32	32.87	-	-	P	V
			671.7	33.61	-12.39	46	35.46	26.38	4.58	32.81	-	-	P	V
			966.4	34.69	-19.31	54	29.38	30.93	5.61	31.23	-	-	P	V
														V
														V
													V	
													V	
													V	

Remark

- No other spurious found.
- All results are PASS against limit line.
- 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.



<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2365.86	51.06	-22.94	74	38.08	27	18.32	32.34	130	301	P	H
		2377.41	39.38	-14.62	54	26.39	27	18.34	32.35	130	301	A	H
	*	2402	100.22	-	-	87.2	27	18.38	32.36	130	301	P	H
	*	2402	97.45	-	-	84.43	27	18.38	32.36	130	301	A	H
													H
		2383.08	50.81	-23.19	74	37.84	26.97	18.35	32.35	169	89	P	V
		2380.035	39.41	-14.59	54	26.42	27	18.34	32.35	169	89	A	V
	*	2402	104.24	-	-	91.22	27	18.38	32.36	169	89	P	V
	*	2402	101.43	-	-	88.41	27	18.38	32.36	169	89	A	V
BLE CH 19 2440MHz		2331.44	50.9	-23.1	74	37.88	27.09	18.25	32.32	157	301	P	H
		2379.12	39.41	-14.59	54	26.42	27	18.34	32.35	157	301	A	H
	*	2440	101.28	-	-	88.41	26.8	18.45	32.38	157	301	P	H
	*	2440	98.53	-	-	85.66	26.8	18.45	32.38	157	301	A	H
		2485.76	50.96	-23.04	74	37.94	26.9	18.53	32.41	157	301	P	H
		2499.36	39.69	-14.31	54	26.56	26.99	18.56	32.42	157	301	A	H
		2332.72	51.65	-22.35	74	38.64	27.07	18.26	32.32	170	88	P	V
		2372.08	39.4	-14.6	54	26.41	27	18.33	32.34	170	88	A	V
	*	2440	103.56	-	-	90.69	26.8	18.45	32.38	170	88	P	V
	*	2440	100.82	-	-	87.95	26.8	18.45	32.38	170	88	A	V
		2492.64	50.48	-23.52	74	37.42	26.93	18.55	32.42	170	88	P	V
		2499.76	39.69	-14.31	54	26.55	27	18.56	32.42	170	88	A	V



BLE CH 39 2480MHz	*	2480	101.51	-	-	88.5	26.9	18.52	32.41	156	301	P	H
	*	2480	98.7	-	-	85.69	26.9	18.52	32.41	156	301	A	H
		2488.4	50.96	-23.04	74	37.93	26.9	18.54	32.41	156	301	P	H
		2483.52	39.86	-14.14	54	26.84	26.9	18.53	32.41	156	301	A	H
													H
													H
	*	2480	102.91	-	-	89.9	26.9	18.52	32.41	191	91	P	V
	*	2480	100.1	-	-	87.09	26.9	18.52	32.41	191	91	A	V
		2497.8	51.45	-22.55	74	38.33	26.98	18.56	32.42	191	91	P	V
		2483.52	39.96	-14.04	54	26.94	26.9	18.53	32.41	191	91	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
BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	44.17	-29.83	74	32.32	32.32	13.03	33.5	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			4804	44.72	-29.28	74	32.87	32.32	13.03	33.5	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	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)	
BLE CH 19 2440MHz		4880	45.11	-28.89	74	32.97	32.56	13.07	33.49	-	-	P	H	
		7320	49.82	-24.18	74	32.16	37.5	16.01	35.85	-	-	P	H	
		7320	40.81	-13.19	54	23.15	37.5	16.01	35.85	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4880	45.49	-28.51	74	33.35	32.56	13.07	33.49	-	-	P	V
			7320	50.68	-23.32	74	33.02	37.5	16.01	35.85	-	-	P	V
			7320	40.99	-13.01	54	23.33	37.5	16.01	35.85	-	-	A	V
														V
														V
														V
														V
														V
													V	
													V	



BLE	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)	
BLE CH 39 2480MHz		4960	45.02	-28.98	74	32.68	32.7	13.11	33.47	-	-	P	H	
		7440	49.2	-24.8	74	31.66	37.32	16.15	35.93	-	-	P	H	
		7440	40.48	-13.52	54	22.94	37.32	16.15	35.93	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	45.3	-28.7	74	32.96	32.7	13.11	33.47	-	-	P	V
			7440	49.18	-24.82	74	31.64	37.32	16.15	35.93	-	-	P	V
			7440	40.73	-13.27	54	23.19	37.32	16.15	35.93	-	-	A	V
														V
														V
														V
														V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Note symbol

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



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

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
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 :	Bank Lin, Fred Tseng, and Karl Hou	Temperature :	21.5~24.9°C
		Relative Humidity :	50.1~60.9%

Note symbol

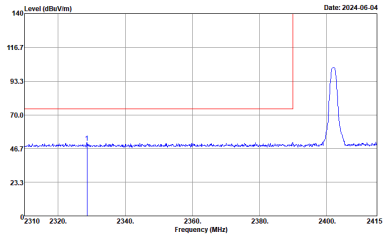
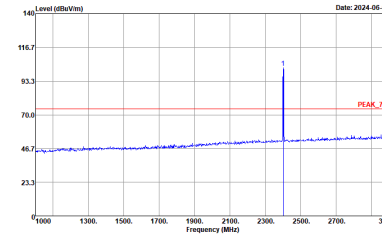
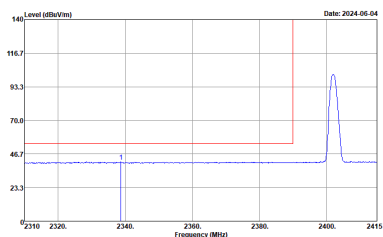
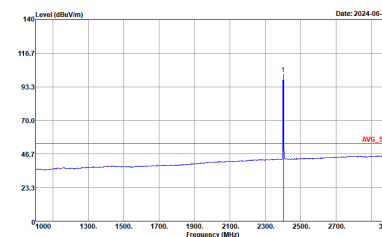
-L	Low channel location
-R	High channel location



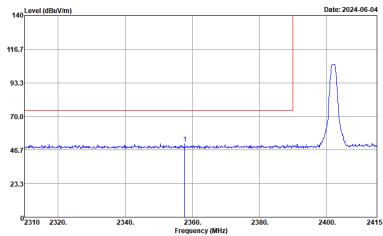
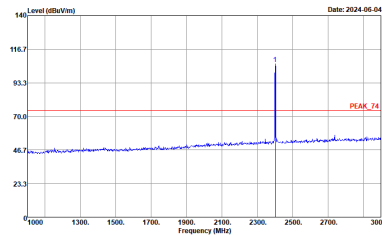
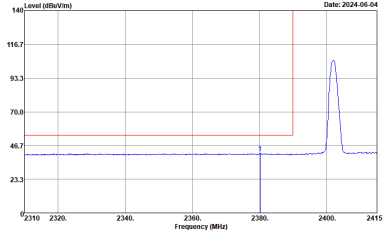
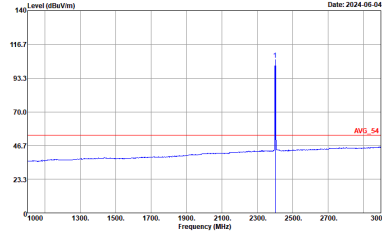
<Ant. 6>
<1Mbps>

2.4GHz 2400~2483.5MHz

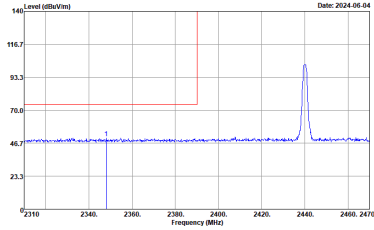
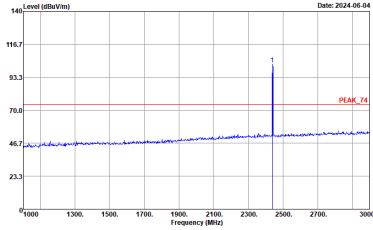
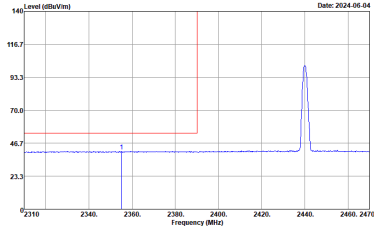
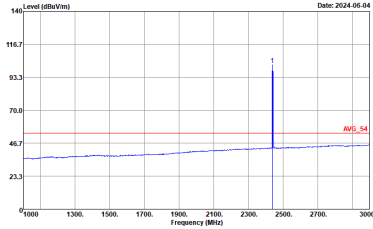
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : PEAK_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH22-HY Condition : AV6_BE_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : AV6_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>

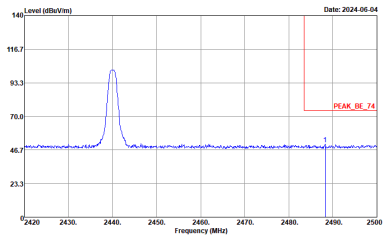
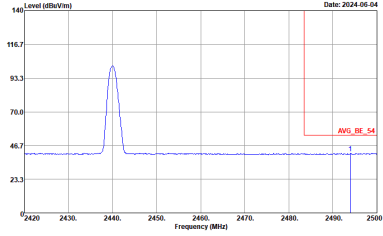


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Peak Vertical. The plot shows a sharp peak at approximately 2402 MHz. The y-axis ranges from 0 to 140 dBm/1m, and the x-axis ranges from 2310 to 2415 MHz. A red horizontal line is drawn at approximately 70 dBm/1m. The date is 2024-06-04.</p> <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Peak Fundamental. The plot shows a sharp peak at approximately 2402 MHz. The y-axis ranges from 0 to 140 dBm/1m, and the x-axis ranges from 1000 to 3000 MHz. A red horizontal line is drawn at approximately 70 dBm/1m. The date is 2024-06-04.</p> <p>Site : 03CH22-HY Condition : PEAK_74 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Avg Vertical. The plot shows a sharp peak at approximately 2402 MHz. The y-axis ranges from 0 to 140 dBm/1m, and the x-axis ranges from 2310 to 2415 MHz. A red horizontal line is drawn at approximately 70 dBm/1m. The date is 2024-06-04.</p> <p>Site : 03CH22-HY Condition : AV6_BE_54 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Avg Fundamental. The plot shows a sharp peak at approximately 2402 MHz. The y-axis ranges from 0 to 140 dBm/1m, and the x-axis ranges from 1000 to 3000 MHz. A red horizontal line is drawn at approximately 70 dBm/1m. The date is 2024-06-04.</p> <p>Site : 03CH22-HY Condition : AV6_54 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>

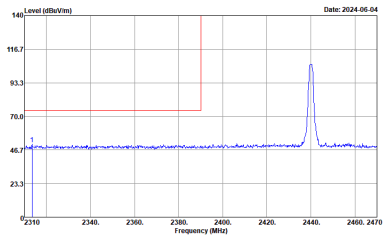
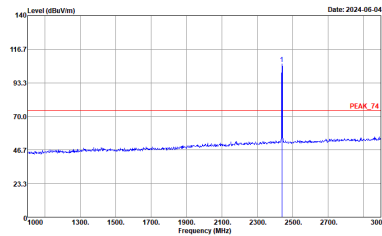
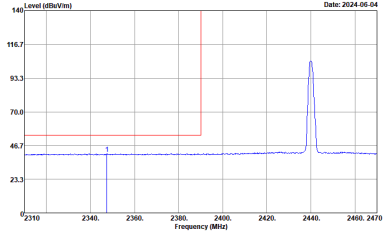
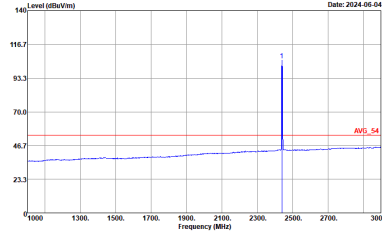


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 <p>Date: 2024-06-04</p> <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2024-06-04</p> <p>Site : 03CH22-HY Condition : PEAK_74 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2024-06-04</p> <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:2.700KHz SWT:Auto</p>	 <p>Date: 2024-06-04</p> <p>Site : 03CH22-HY Condition : AVG_54 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:2.700KHz SWT:Auto</p>

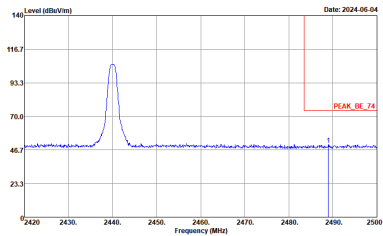
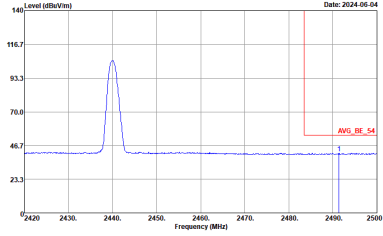


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
<p>Peak</p>	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LE2C04A18EN_230712 HORIZONTAL : RBW:1000.000kHz VBW:2700kHz SWT:Auto</p>	<p>Left blank</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : PEAK_74 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH22-HY Condition : AV6_BE_54 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : AV6_54 3m LEZ004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:2700KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
	Vertical	Fundamental
<p>Peak</p>	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LE2C04A18EN_230712 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LE2C04A18EN_230712 VERTICAL : RBW:1000.000kHz VBW:2700kHz SWT:Auto</p>	<p>Left blank</p>