

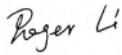
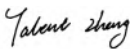


FCC CERTIFICATION TEST REPORT

Applicant:	Guangzhou Shirui Electronics Co., Ltd
Address:	192 Kezhu Road, Sciencetech Park, guangzhou Economic Technology Development District, Guangzhou, China
Manufacturer:	Guangzhou Shirui Electronics Co., Ltd
Address:	192 Kezhu Road, Sciencetech Park, guangzhou Economic Technology Development District, Guangzhou, China
Product Description:	ePaper
Brand Name:	MAXHUB
Tested Model:	SN03
FCC ID:	2AFG6-SN03
Report No.:	JCF230323201-003
Received Date:	Apr. 06. 2023
Tested Date:	Apr. 06. 2023 - May. 11. 2023
Issued Date:	May. 17. 2023
Test Standards:	FCC Rules and Regulations Part 15 Subpart C
Test Procedure :	ANSI C63.10:2013
Test Result:	Pass
Prepared By:	
 <u>Kennys Zhang/Engineer</u>	
 Date: May. 17. 2023	
Reviewed By:	
 <u>Roger Li/Engineer</u>	
Date: May. 17. 2023	
Approved By:	
 <u>Talent Zhang/Engineer</u>	
Date: May. 17. 2023	

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Guangzhou Jingce Testing Technology Co., Ltd. the test report shall not be reproduced except in full.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May. 17. 2023	Original Report	/

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1. Test Report Declare

Applicant:	Guangzhou Shirui Electronics Co., Ltd
Address:	192 Kezhu Road, Sciencetech Park, Guangzhou Economic Technology Development District, Guangzhou, China
Manufacturer:	Guangzhou Shirui Electronics Co., Ltd
Address:	192 Kezhu Road, Sciencetech Park, Guangzhou Economic Technology Development District, Guangzhou, China
Product Name	ePaper
Brand Name:	MAXHUB
Model Name:	SN03
Difference Description:	N/A

We Declare:

The equipment described above is tested by Guangzhou Jingce Testing Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangzhou Jingce Testing Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

2. Summary of Test Results

Summary of Test Results			
Clause	Test Items	FCC/ISED Rules	Test Results
1	6dB Bandwidth	FCC Part 15.247 (a) (2)	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3)	Pass
3	Power Spectral Density	FCC Part 15.247 (e)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d)	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205	Pass
6	Conducted Emission Test For AC Power Port	FCC Part 15.207	Pass
7	Antenna Requirement	FCC Part 15.203	Pass

3. Test Laboratory

Guangzhou Jingce Testing Technology Co., Ltd.
Add.: No.192, Kezhu Road, Huangpu District, Guangzhou, Guangdong, China
Association for Laboratory Accreditation(A2LA). Certificate Number: 6594.01
FCC Designation Number:CN1331. Test Firm Registration Number: 360543
IC Test Firm Registration Number: 28796
Conformity Assessment Body identifier: CN0138

4. Equipment Under Test

4.1. Description of EUT

EUT Name:	ePaper
Model Number:	SN03
EUT Function Description:	Please reference user's manual
Power Supply:	5V ⁼⁼ 1.5A
Hardware Version:	/
Software Version:	/
Radio Specification:	IEEE802.11b/g/n
Operation Frequency:	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n (HT20/40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 7.2, 14.2, 21.7, 28.9, 43.3, 57.8, 65, 72.2 Mbps IEEE 802.11n HT40: 15, 30, 45, 60, 90, 120, 135, 150 Mbps
Antenna Type:	FPC Antenna, -2.83 dBi

Note 1: EUT is the ab. of equipment under test.

Note 2: The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.

4.2. Channel List

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452	/	/
2	2417	6	2437	10	2457	/	/
3	2422	7	2442	11	2462	/	/
4	2427	8	2447	/	/	/	/

Channel List for 802.11n (40 MHz)					
Channel	Frequency (MHz)	Channel	Frequency(MHz)	Channel	Frequency (MHz)
3	2422	7	2442	/	/
4	2427	8	2447	/	/
5	2432	9	2452	/	/
6	2437	/	/	/	/

4.3. Test Channel Configuration

Tested mode, channel and rand data rate information			
Mode	Data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11b	1MHz	Low: CH1	2412
	1MHz	Middle: CH6	2437
	1MHz	High: CH11	2462
IEEE 802.11g	6 MHz	Low: CH1	2412
	6 MHz	Middle: CH6	2437
	6 MHz	High: CH11	2462
IEEE 802.11n HT20	MCS0	Low: CH1	2412
	MCS0	Middle: CH6	2437
	MCS0	High: CH11	2462
IEEE 802.11n HT40	MCS0	Low: CH3	2422
	MCS0	Middle: CH6	2437
	MCS0	High: CH9	2452

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

4.4. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25 °C
Humidity range:	40-75%
Pressure range:	86-106 kPa

4.5. Description of Available Antennas

The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band			
Test Software		N/A	
Modulation Mode	Transmit Antenna Number	Test Software Setting Value	
		ANT1	Channel
802.11b	1	10.5	CH1
		10.5	CH6
		10.5	CH11
802.11g	1	8.5	CH1
		8.5	CH6
		8.5	CH11
802.11HT20	1	8.5	CH1
		8.5	CH6
		8.5	CH11
802.11n HT40	1	7.5	CH3
		7.5	CH6
		7.5	CH9

4.6. Description of Available Antennas

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11g	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT40	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.

5. Description of Test Setup

5.1. Accessory

Description of Accessories	Manufacturer	Model Number	Description	Remark
USB-C Cable	/	/	0.8m	Shielded

5.2. Support Equipment

Equipment	Brand Name	Model Name	P/N
PC	Lenovo	T480	/
Adapter	HUAWEI	HW-200325CP0	/

5.3. Test Setup

The EUT can work in engineering mode.

5.4. Setup Diagram for Tests



6. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
AC Power Conduction emission	1.37 dB
All Radiated emissions	5.4dB
Conducted emissions	3.09 dB
Occupied Channel Bandwidth	1.1%
Conducted Output power	0.82dB
Power Spectral Density	0.82dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k = 2$.

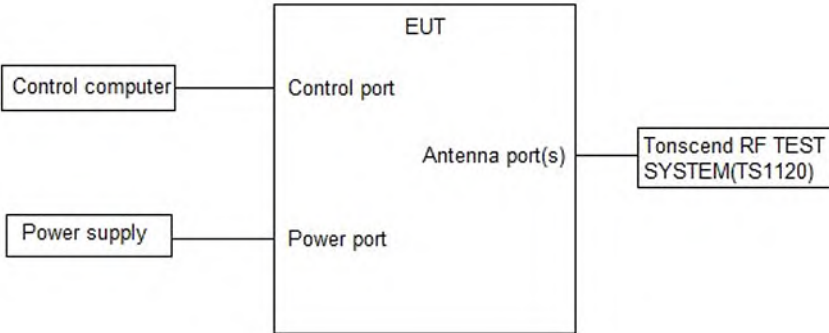
7. Measuring Instrument and Software Used

TS Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☺	Spectrum Analyzer	Keysight	N9030B	MY5632051 2	Jul. 25, 2022	Jul. 24, 2023
☺	Vector Signal Generator	Keysight	N5182B	MY5730033 4	Nov. 24, 2022	Nov. 23, 2023
☺	Signal Generator	Keysight	N5171B	MY5728063 9	Nov. 24, 2022	Nov. 23, 2023
☺	DC POWER	Keysight	E342A	MY5902035 6	Jul. 25, 2022	Jul. 24, 2023
☺	Incubator thermometer	GWS	EL-02JA	21107288	Nov. 03, 2022	Nov. 02, 2023
☺	Control unit(Power sensor)	Tonscend	JS0806-2	/	Jul. 25, 2022	Jul. 24, 2023
☺	Spectrum Analyzer	Keysight	N9020B	MY6011220 6	Nov. 24, 2022	Nov. 23, 2023
☺	Control unit(Power sensor)	Tonscend	JS0806-2	21H806046 5	Nov. 25, 2022	Nov. 24, 2023
Software						
Used	Description	Manufacturer	Name		Version	
☺	Test software	TS+	JS1120-3		V3.2.11	
RSE Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date

⚙	EMI Receiver	R&S	ESW	101685	Jul. 24, 2022	Jul. 23, 2023
⚙	Bilog Antenna	Schwarzbeck	VULB 9163	01361	Aug. 05, 2022	Aug. 04, 2023
⚙	Horn Antenna 1	Schwarzbeck	BBHA 9120 D	02411	May. 30, 2022	May. 29, 2023
⚙	Horn Antenna 2	ETS	3116C	00217677	Sep. 19, 2022	Sep. 18, 2023
⚙	Signal Pre-Amplifier	Tonscend	TAP01018050	AP21C806122	Aug. 08, 2022	Aug. 07, 2023
⚙	Signal Pre-Amplifier	Tonscend	TAP9K3G32	AP20K806104	Aug. 08, 2022	Aug. 07, 2023
⚙	Signal Pre-Amplifier	ETS	3116C-PA	00217677	Sep. 02, 2022	Sep. 01, 2023
⚙	Wideband radio communication tester	R&S	CMW500	163478	Jul. 25, 2022	Jul. 24, 2023
⚙	3m Fully-anechoic Chamber	ETS	RFD-100	/	Apr. 24, 2021	Apr. 23, 2024
Software						
Used	Description	Manufacturer	Name		Version	
⚙	Test software	TS+	TS+		V3.0.0.4	
Conducted Emission Test For AC Power Port						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
⚙	LISN	R&S	ENV216	102154	Jul. 24, 2022	Jul. 23, 2023
⚙	EMI Receiver	R&S	ESR3	102509	Jul. 24, 2022	Jul. 23, 2023
Software						
Used	Description	Manufacturer	Name		Version	
⚙	Test software	EZ	EZ-EMC		EMEC-3A1	
Other Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
⚙	Temperature & Humidity	Temperature	HTC-1	/	Nov. 25, 2022	Nov. 24, 2023

8. On Time and Duty Cycle

8.1. Block diagram of test setup



8.2. Limits

None; for reporting purposes only

8.3. Procedure

KDB 558074 Zero-Span Spectrum Analyzer Method

8.4. Results

Test Mode	Ant.	Freq. [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	8.39	8.42	99.64
		2437	8.39	8.42	99.64
		2462	8.38	8.43	99.41
11G	Ant1	2412	1.39	1.44	96.53
		2437	1.39	1.43	97.20
		2462	1.40	1.44	97.22
11N20SISO	Ant1	2412	1.30	1.34	97.01
		2437	1.30	1.35	96.30
		2462	1.30	1.34	97.01
11N40SISO	Ant1	2422	0.64	0.69	92.75
		2437	0.65	0.69	94.20
		2452	0.64	0.69	92.75

Note: Duty Cycle Correction Factor = 10log (1/x).

Where: x is Duty Cycle (Linear)

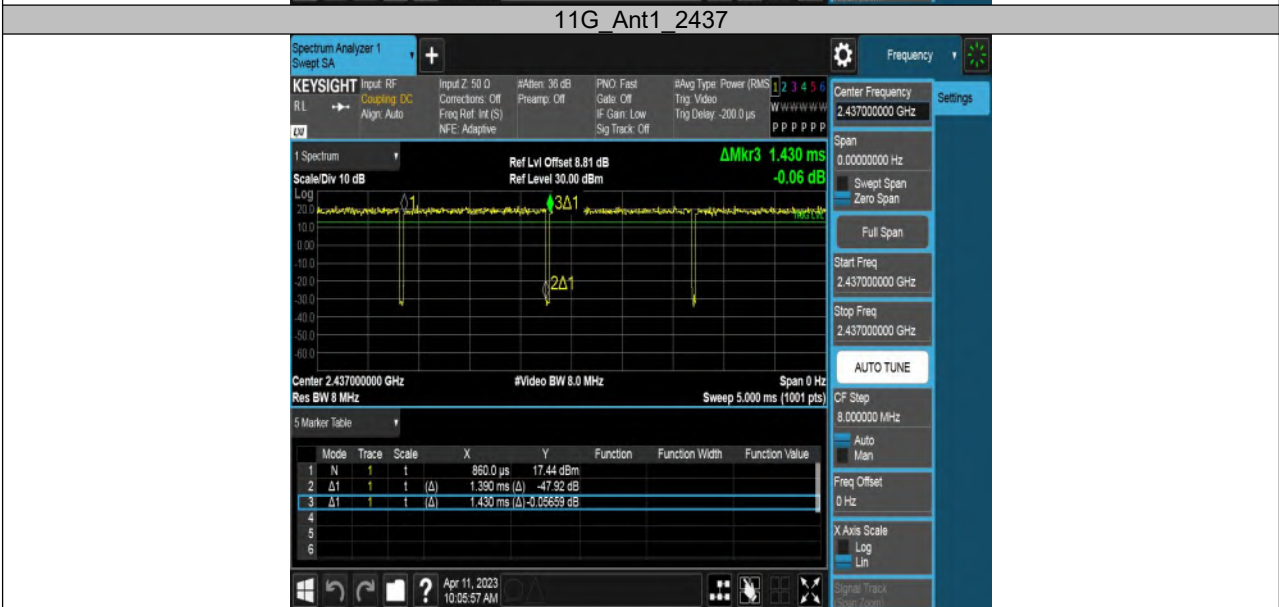
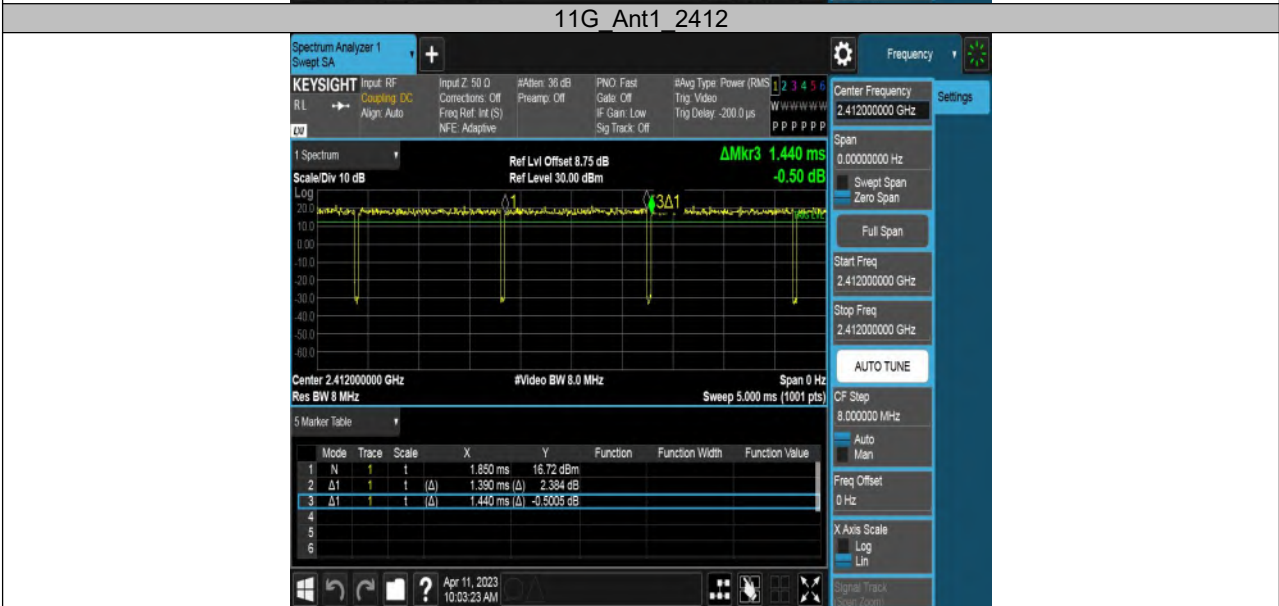
Where: T is On Time

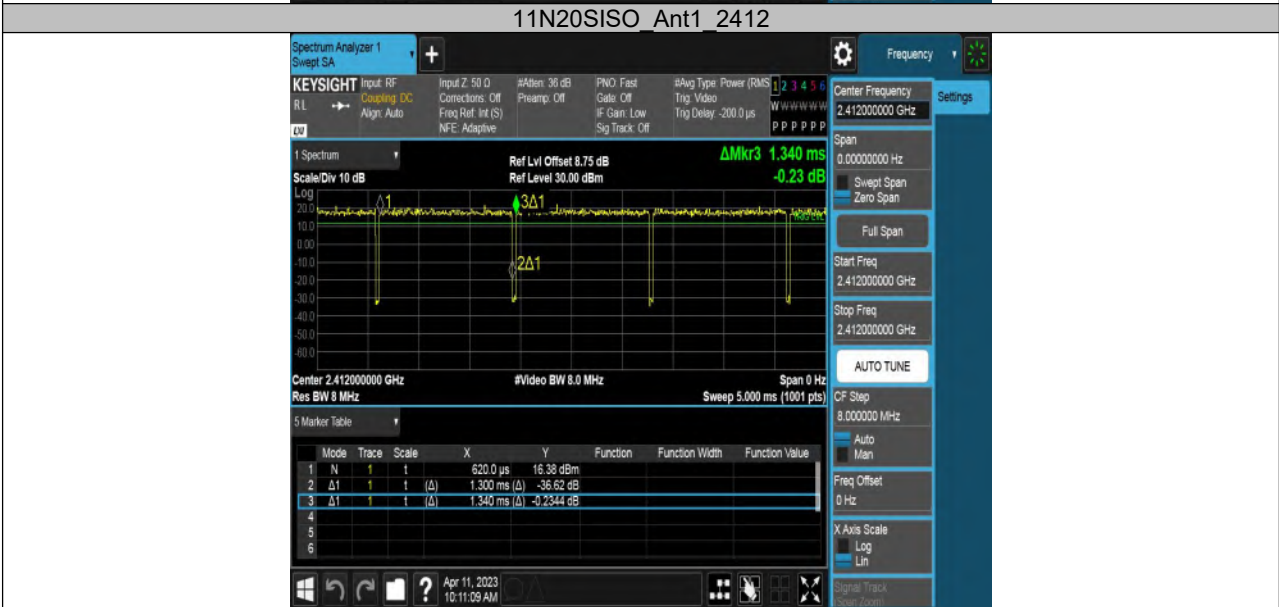
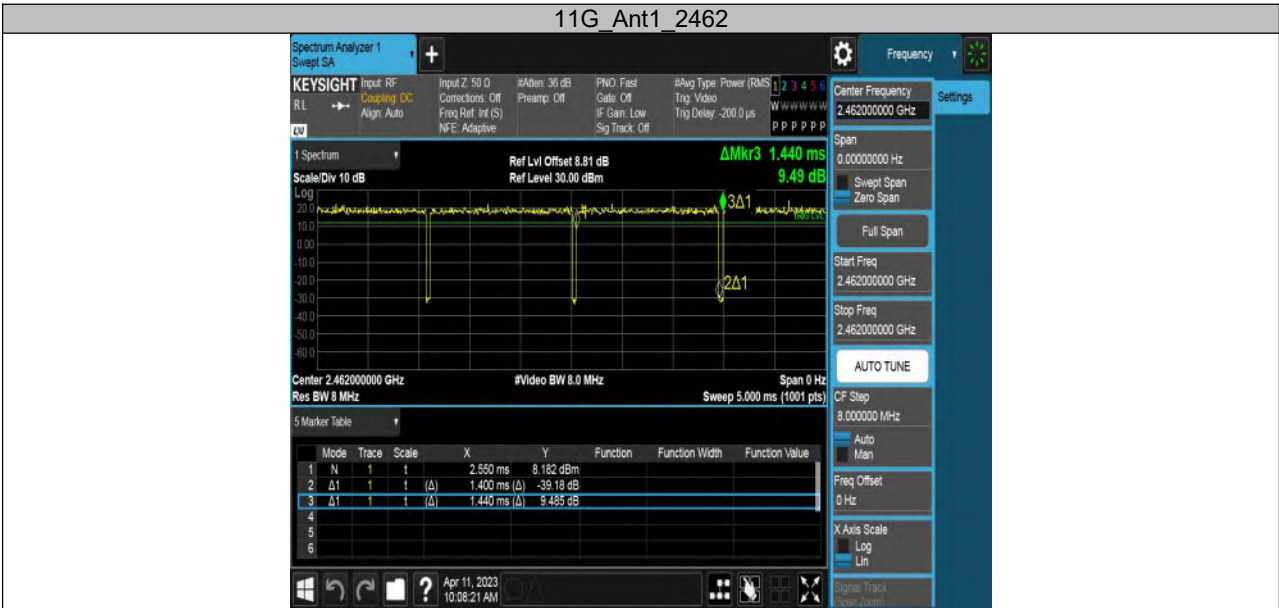
If that calculated VBW is not available on the analyzer, then the next higher value should be used.

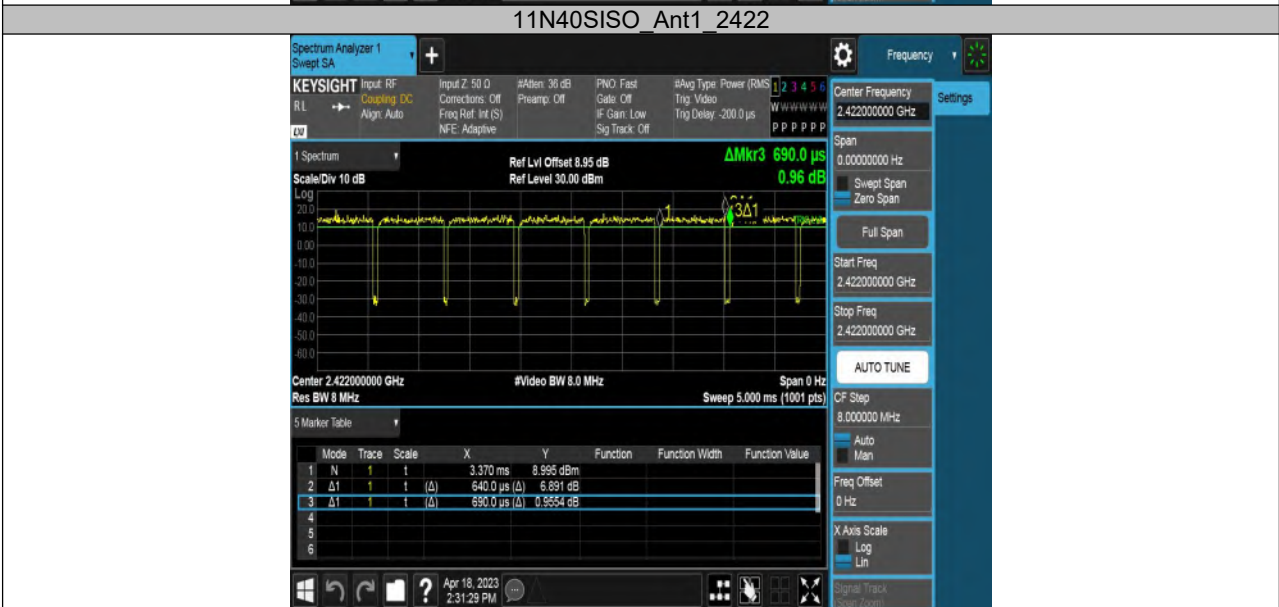
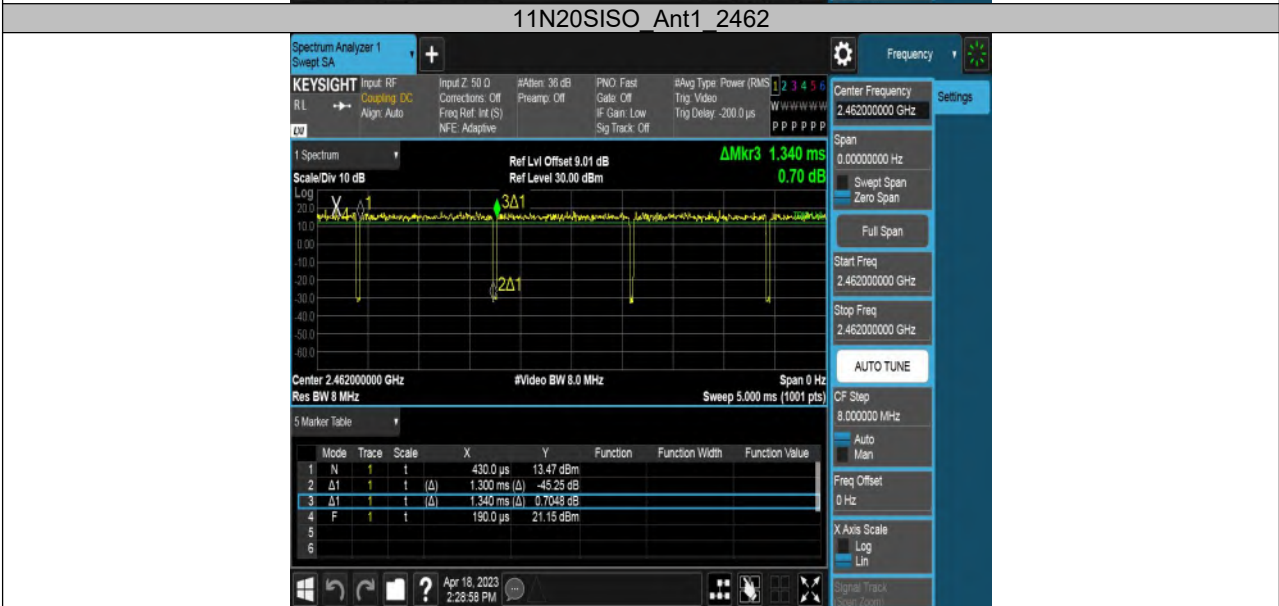
For mode 11b, the duty cycle is greater than 98 %, so it can set VBW to 10 Hz.

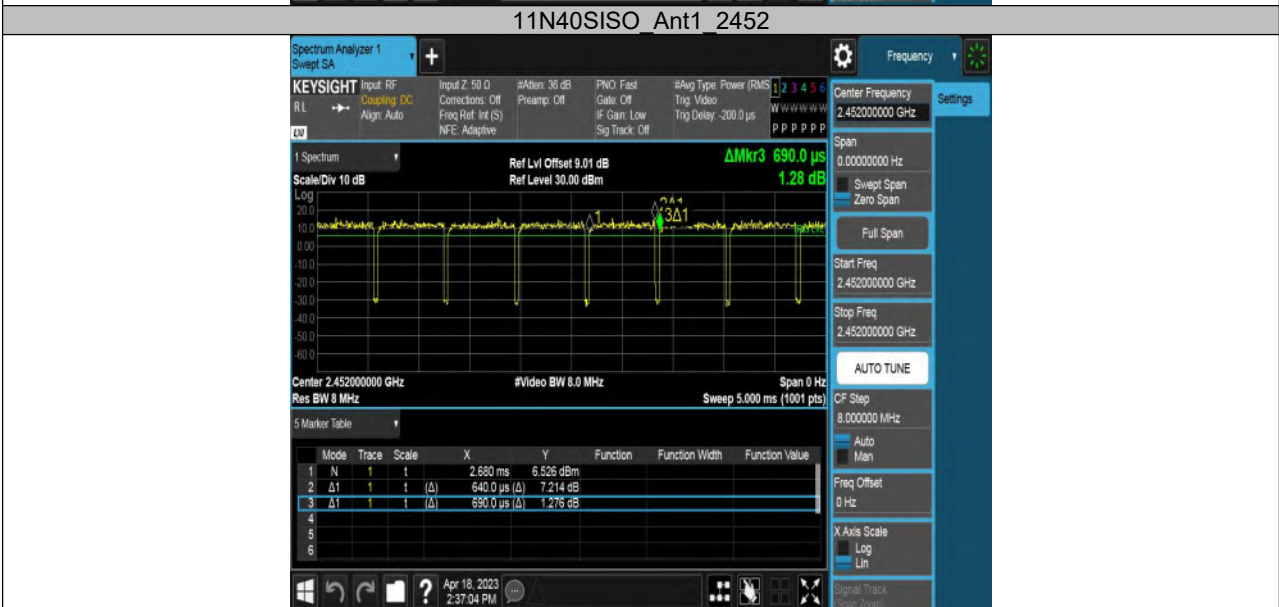
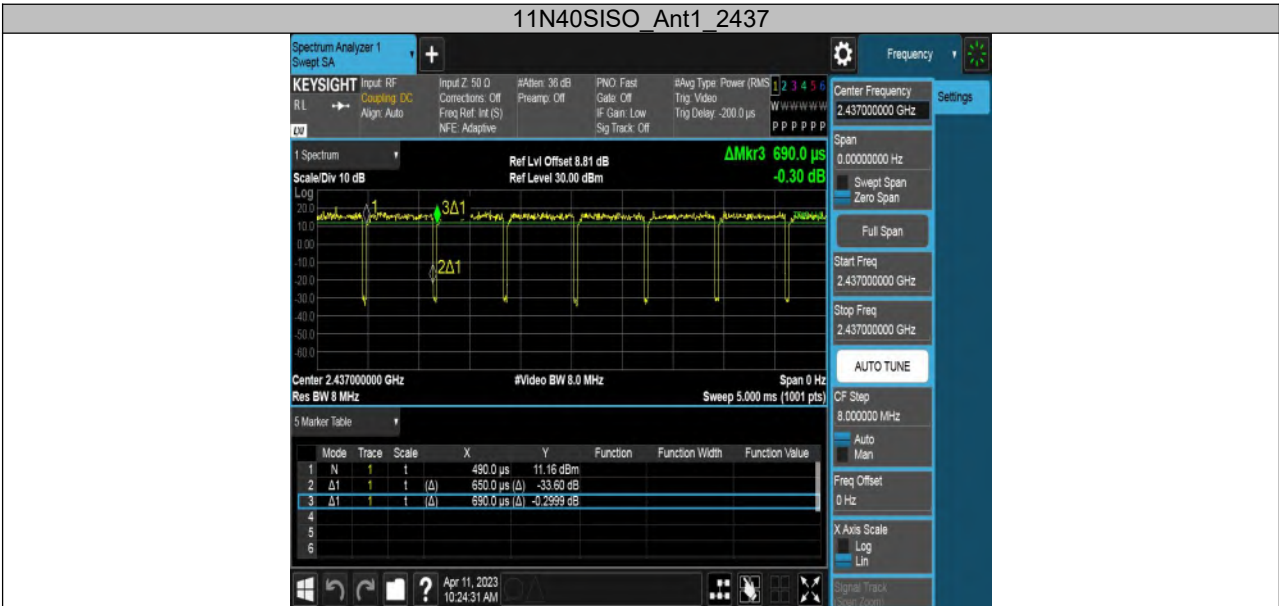
8.5. Original test data











9. 6 dB DTS Bandwidth

9.1. Block diagram of test setup

Same as section 8.1

9.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6 dB Bandwidth	≥ 500 kHz	2400-2483.5

9.3. Test Procedure

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100 kHz
VBW	For 6 dB Bandwidth: ≥ 3 × RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB.

9.4. Results

Test Mode	Ant.	Freq. [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	8.040	2408.040	2416.080	0.5	PASS
		2437	8.040	2433.480	2441.520	0.5	PASS
		2462	8.560	2458.000	2466.560	0.5	PASS
11G	Ant1	2412	15.920	2404.280	2420.200	0.5	PASS
		2437	15.120	2429.480	2444.600	0.5	PASS
		2462	15.080	2454.520	2469.600	0.5	PASS
11N20SISO	Ant1	2412	16.320	2404.480	2420.800	0.5	PASS
		2437	16.880	2428.920	2445.800	0.5	PASS
		2462	13.160	2456.400	2469.560	0.5	PASS
11N40SISO	Ant1	2422	33.840	2405.760	2439.600	0.5	PASS
		2437	35.040	2419.560	2454.600	0.5	PASS
		2452	35.040	2434.560	2469.600	0.5	PASS

9.5. Original test data

6dB bandwidth:





11G Ant1 2412



11G Ant1 2437



11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO Ant1 2462



11N40SISO Ant1 2422





10. Conducted Output Power

10.1. Block diagram of test setup

Same as section 8.1

10.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Output Power	1 watt or 30 dBm	2400-2483.5

10.3. Test Procedure

Place the EUT on the table and set it in the transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

Measure peak power each channel.

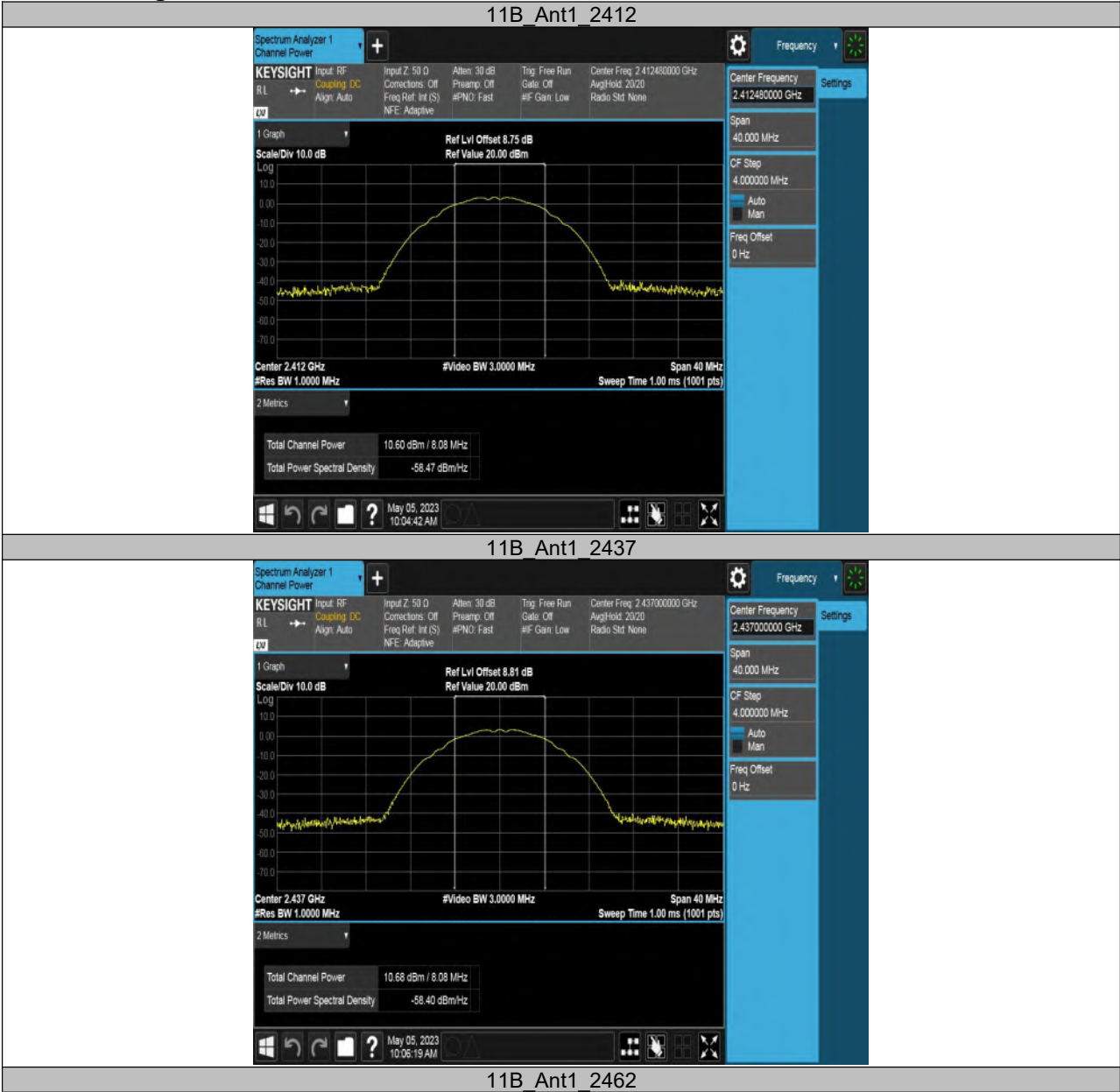
Peak Detector use for Peak result.

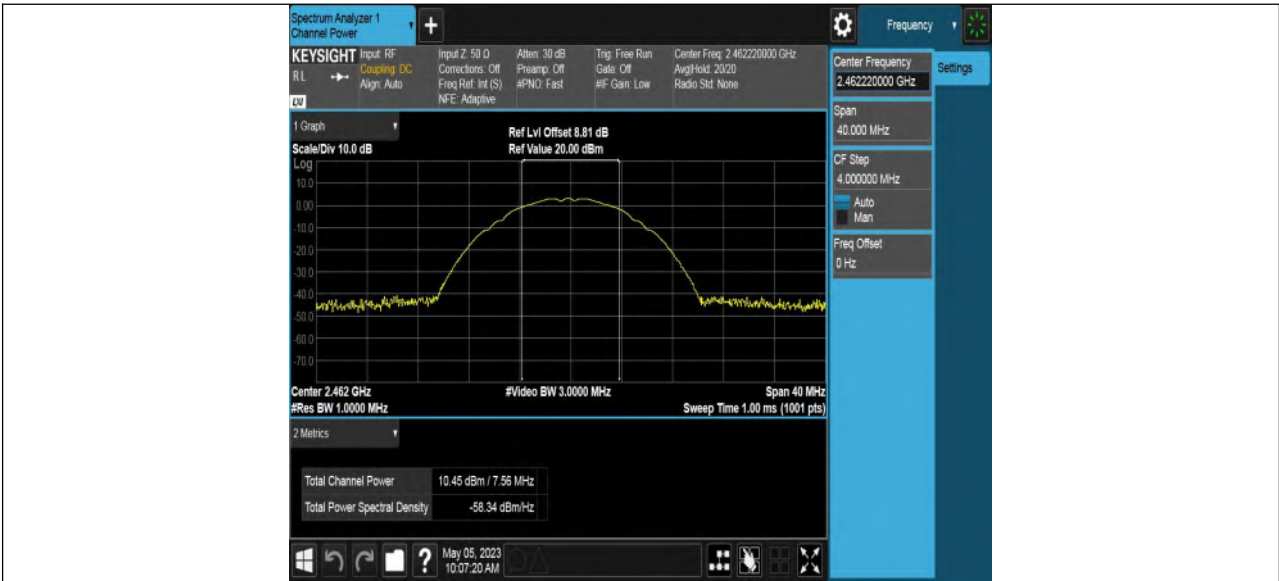
AVG Detector use for AVG result.

10.4. Results

Test Mode	Ant.	Freq. [MHz]	Peak Power [dBm]	Conducted Limit [dBm]	Verdict
11B	Ant1	2412	10.60	≤30.00	PASS
		2437	10.68	≤30.00	PASS
		2462	10.45	≤30.00	PASS
11G	Ant1	2412	11.24	≤30.00	PASS
		2437	11.05	≤30.00	PASS
		2462	11.38	≤30.00	PASS
11N20SISO	Ant1	2412	10.67	≤30.00	PASS
		2437	10.66	≤30.00	PASS
		2462	11.05	≤30.00	PASS
11N40SISO	Ant1	2422	10.65	≤30.00	PASS
		2437	10.55	≤30.00	PASS
		2452	10.52	≤30.00	PASS

10.5. Original test data

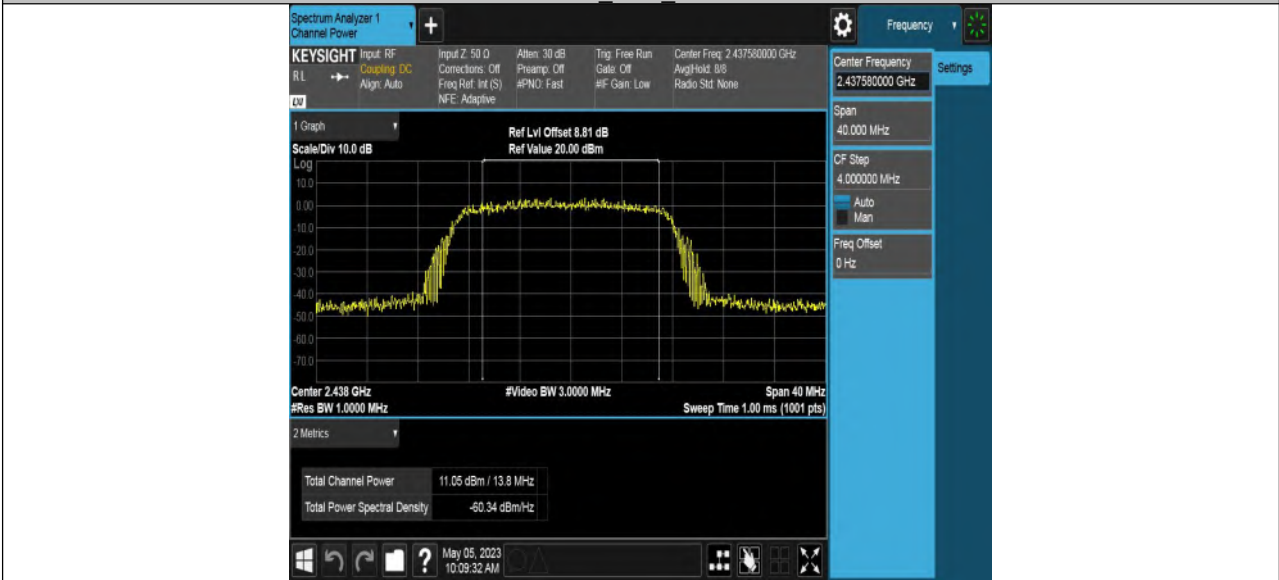


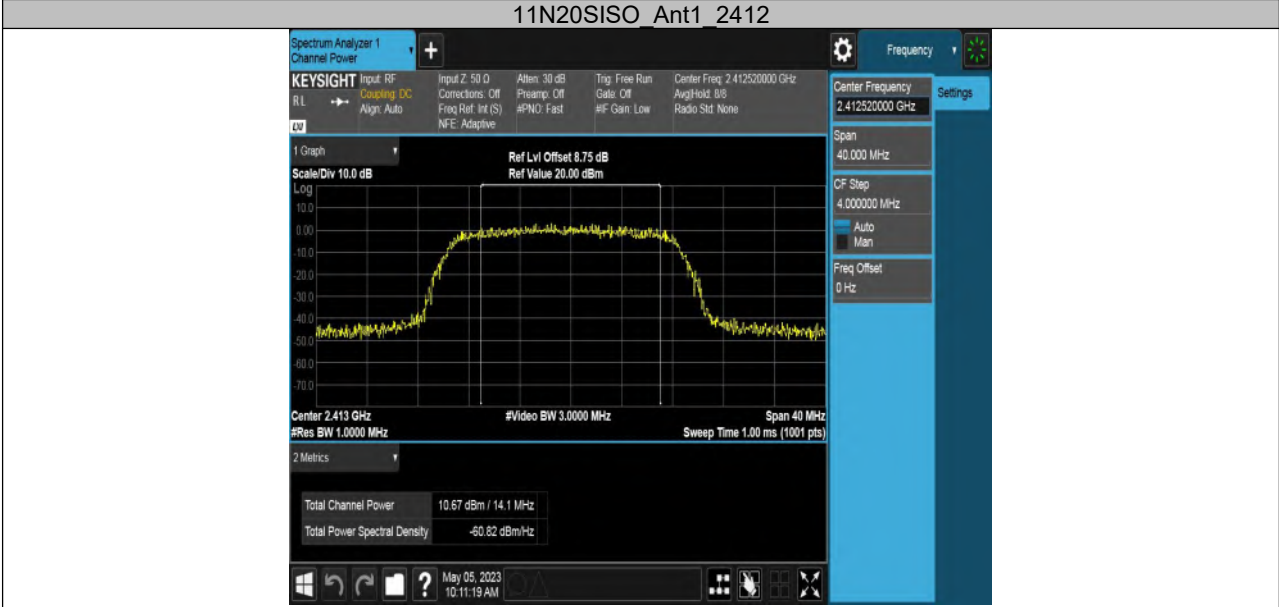
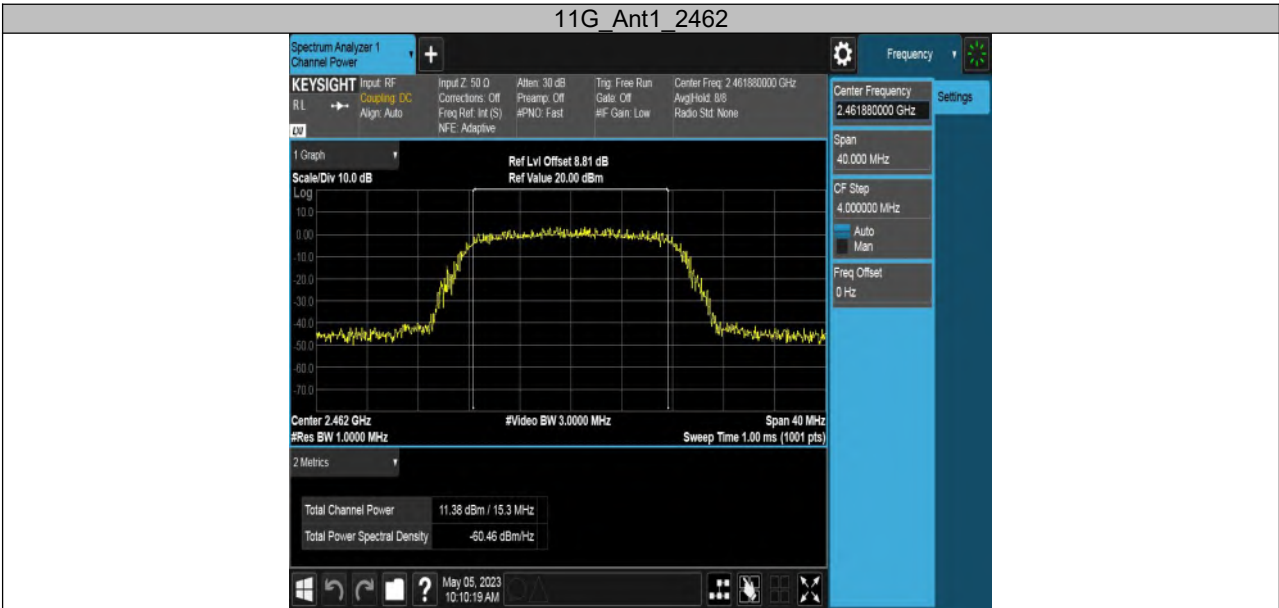


11G Ant1 2412



11G Ant1 2437

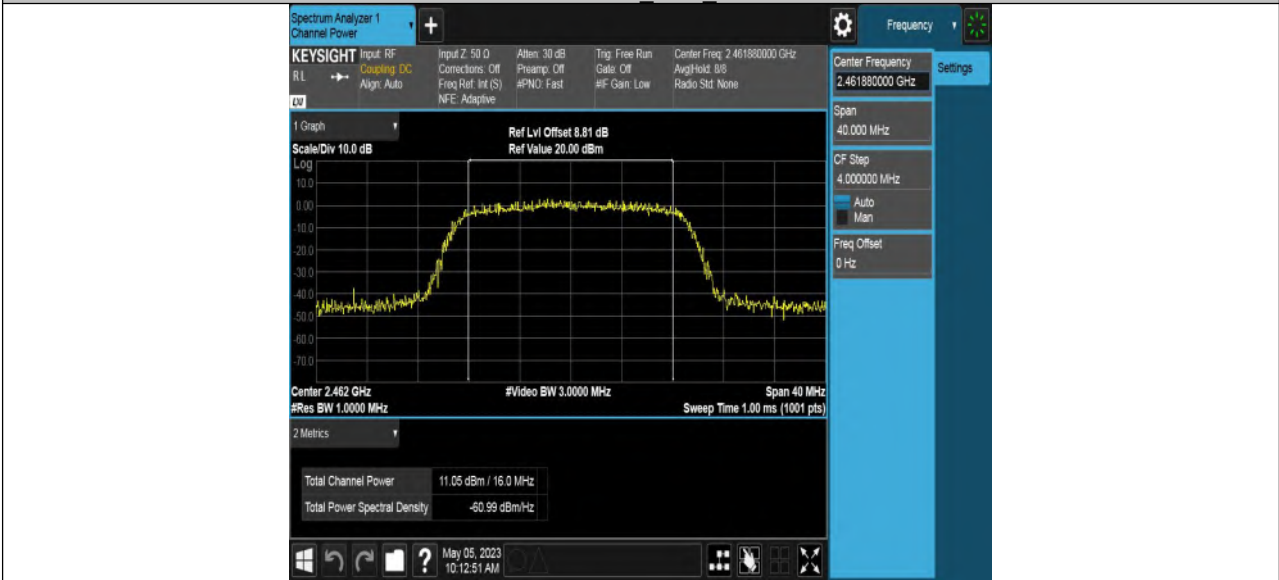




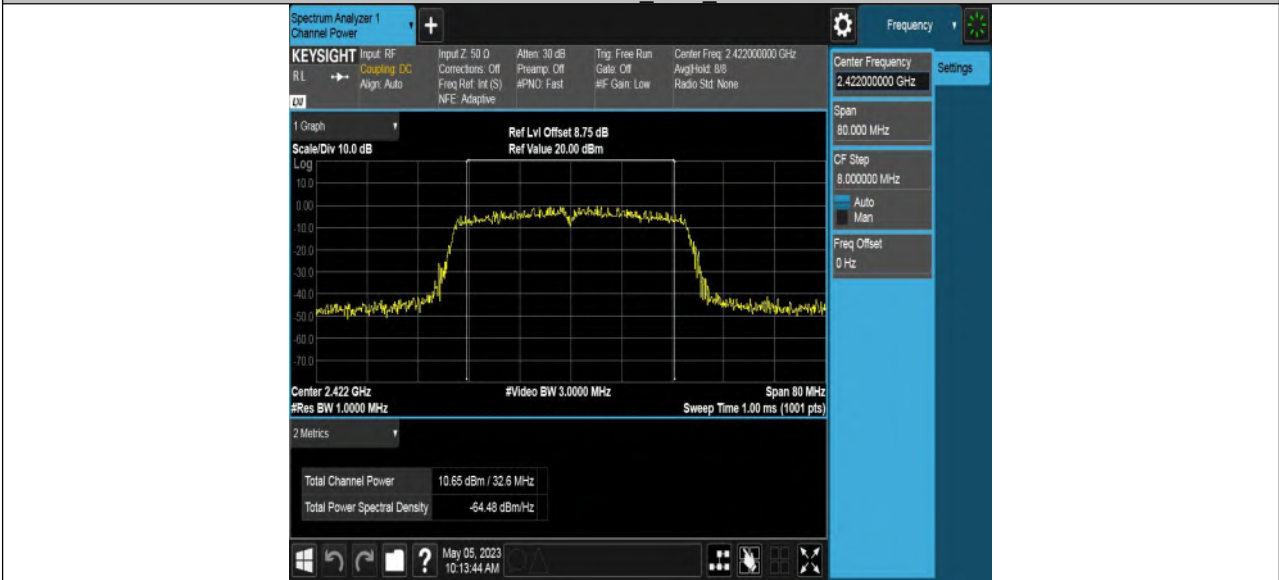
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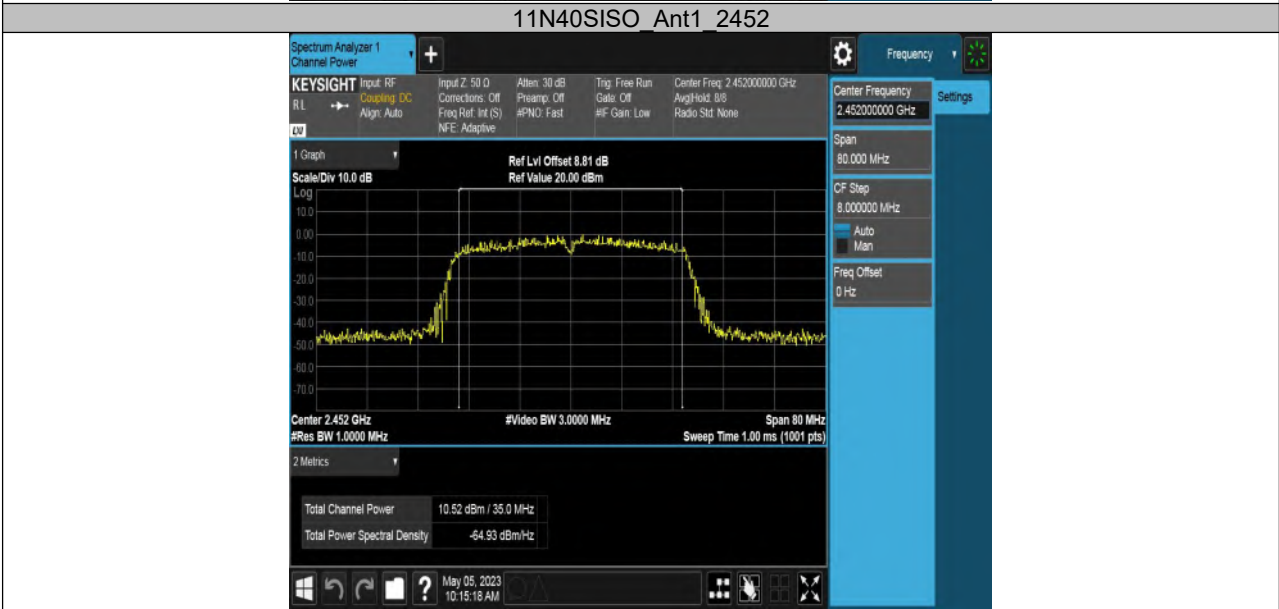
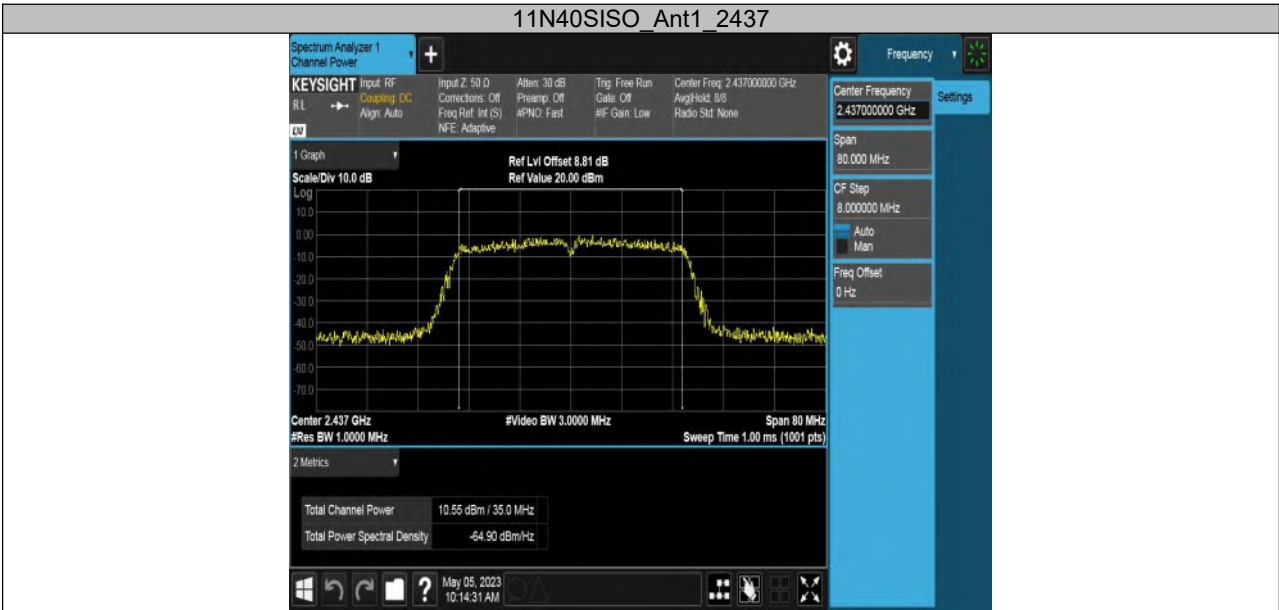


11N20SISO Ant1 2462



11N40SISO Ant1 2422





11. Power Spectral Density

11.1. Block diagram of test setup

Same as section 8.1

11.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm/3 kHz	2400-2483.5

11.3. Test Procedure

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

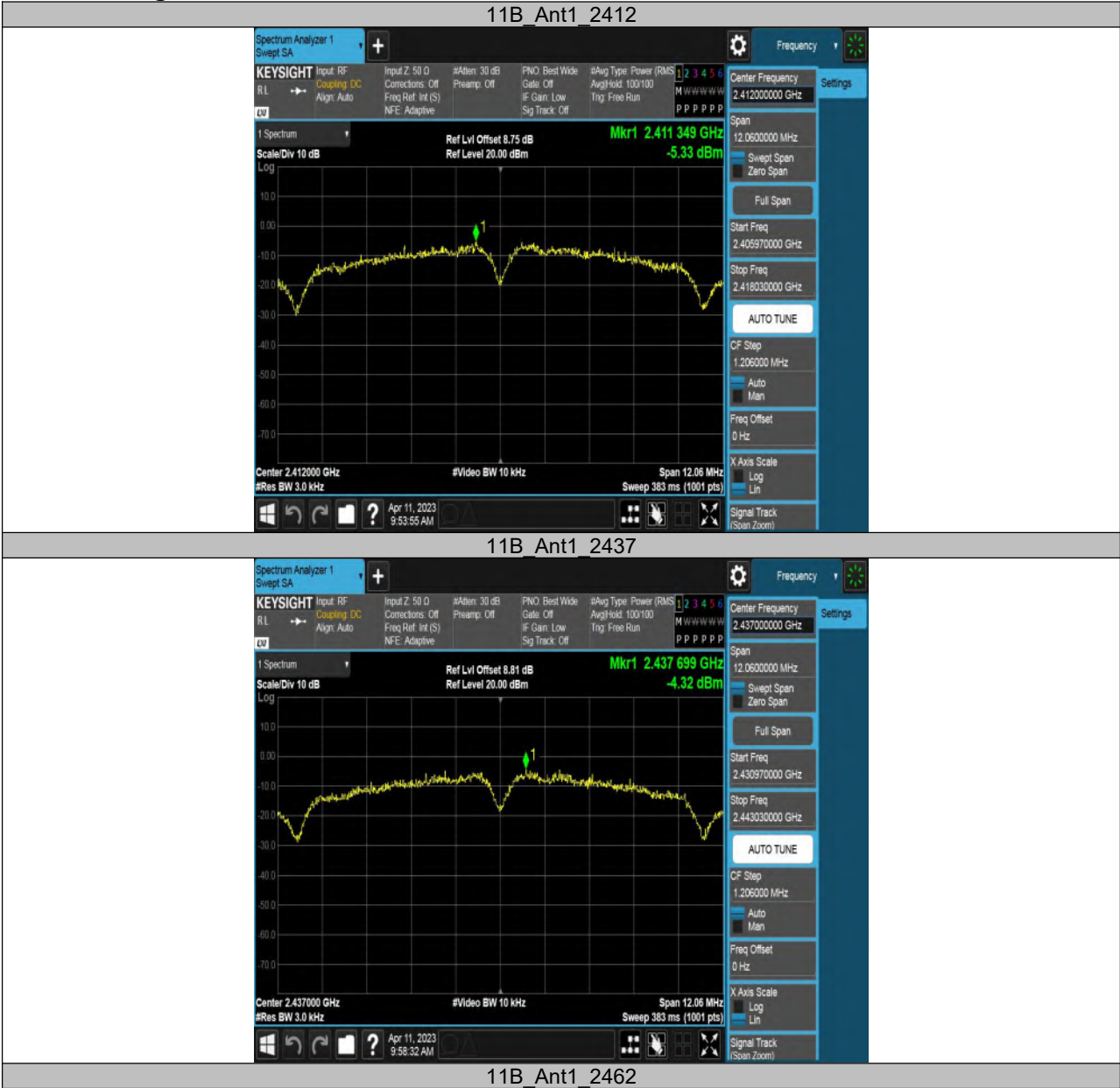
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

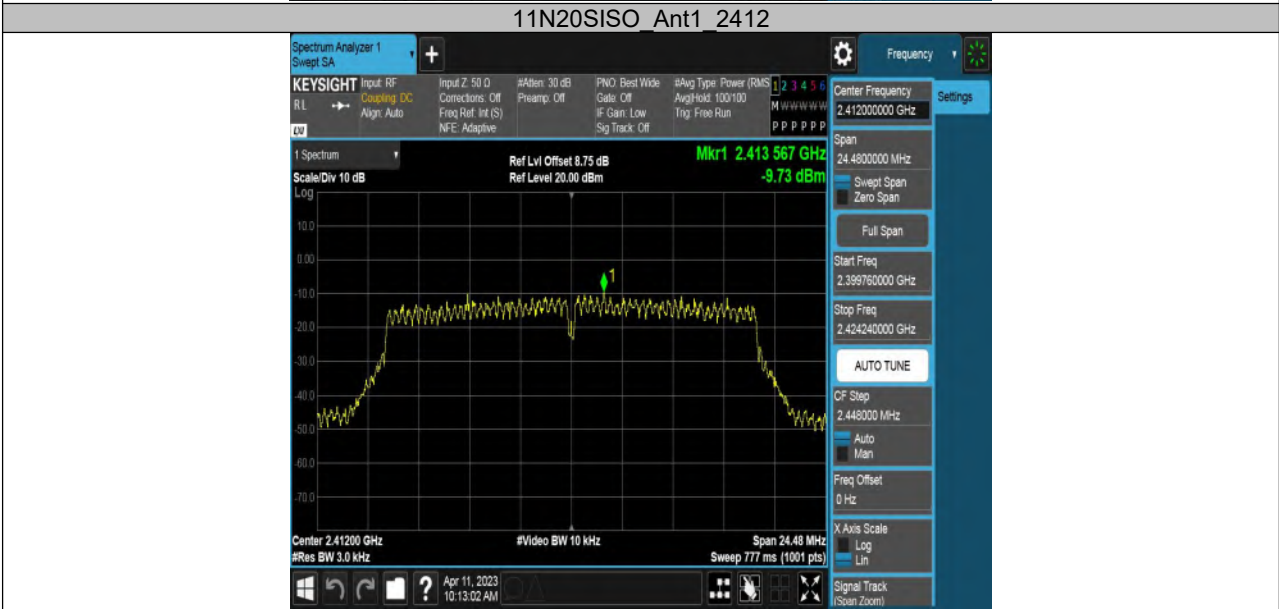
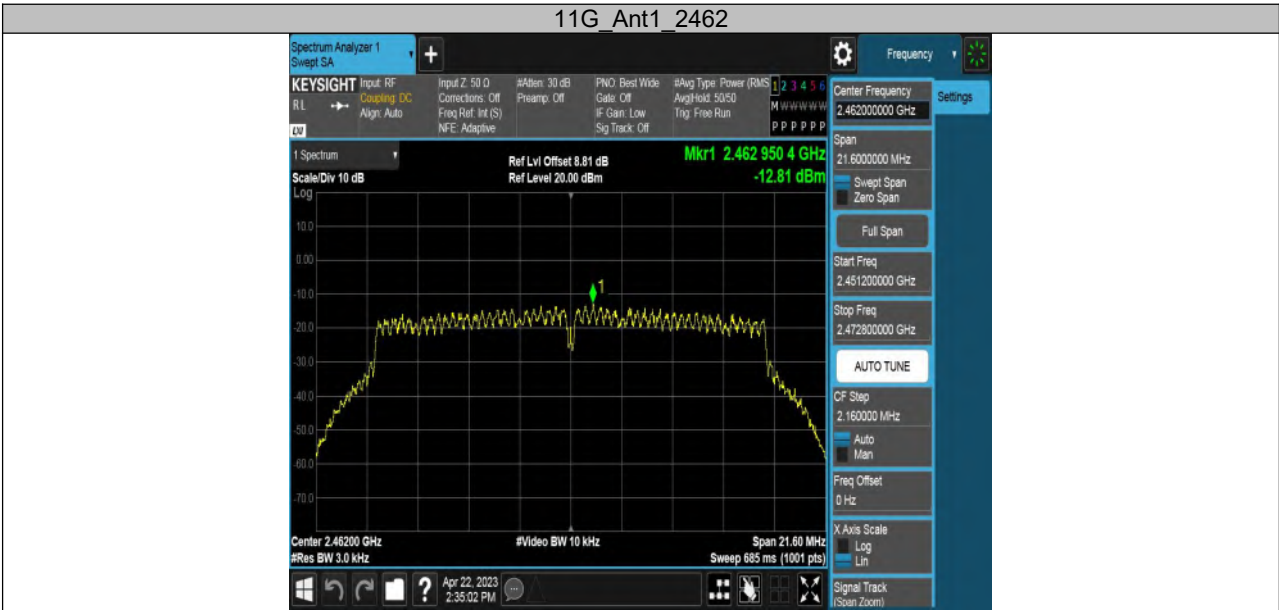
11.4. Results

Test Mode	Ant.	Freq. [MHz]	Result [dBm/3-100kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-5.33	≤ 8.00	PASS
		2437	-4.32	≤ 8.00	PASS
		2462	-5.15	≤ 8.00	PASS
11G	Ant1	2412	-9.38	≤ 8.00	PASS
		2437	-8.01	≤ 8.00	PASS
		2462	-12.81	≤ 8.00	PASS
11N20SISO	Ant1	2412	-9.73	≤ 8.00	PASS
		2437	-9.38	≤ 8.00	PASS
		2462	-13.44	≤ 8.00	PASS
11N40SISO	Ant1	2422	-14.95	≤ 8.00	PASS
		2437	-12.62	≤ 8.00	PASS
		2452	-13.61	≤ 8.00	PASS

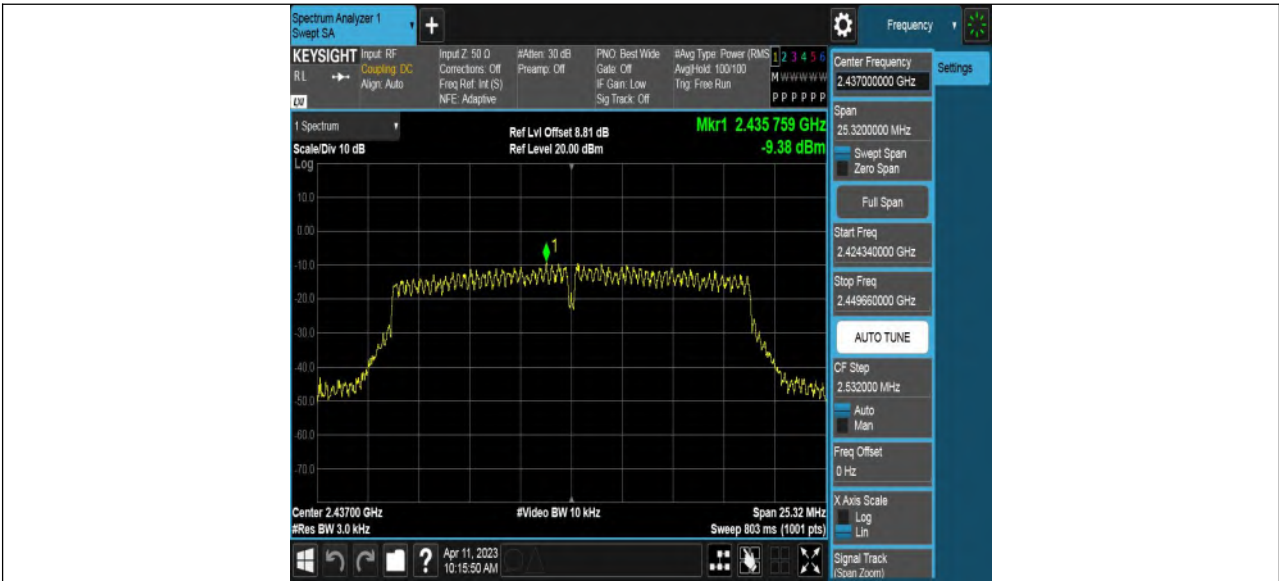
11.5. Original test data







11N20SISO_Ant1_2437





12. Conducted Band edge and Spurious Emissions

12.1. Block diagram of test setup

Same as section 8.1

12.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

12.3. Test Procedure

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Connect the UUT to the spectrum analyser and use the following settings:
Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

12.4. Test result

Test Mode	Ant.	Ch Name	Freq. [MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	7.41	-40.14	≤-12.59	PASS
		High	2462	7.92	-47.95	≤-12.08	PASS
11G	Ant1	Low	2412	3.03	-30.32	≤-16.97	PASS
		High	2462	3.66	-43.27	≤-16.34	PASS
11N20SISO	Ant1	Low	2412	2.97	-27.16	≤-17.03	PASS
		High	2462	0.51	-49.65	≤-19.49	PASS
11N40SISO	Ant1	Low	2422	-0.30	-37.97	≤-20.3	PASS
		High	2452	-2.51	-43.76	≤-22.51	PASS

Test Mode	Ant.	Freq. [MHz]	Freq Range [Mhz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	7.41	-64.21	≤-12.59	PASS
			1000~26500	7.41	-44.81	≤-12.59	PASS
		2437	30~1000	7.97	-64.82	≤-12.03	PASS
			1000~26500	7.97	-45.93	≤-12.03	PASS
		2462	30~1000	7.92	-64.3	≤-12.08	PASS
			1000~26500	7.92	-47.78	≤-12.08	PASS
11G	Ant1	2412	30~1000	3.03	-63.54	≤-16.97	PASS
			1000~26500	3.03	-55.11	≤-16.97	PASS
		2437	30~1000	2.98	-63.91	≤-17.02	PASS
			1000~26500	2.98	-54.89	≤-17.02	PASS
		2462	30~1000	3.66	-63.56	≤-16.34	PASS
			1000~26500	3.66	-54.96	≤-16.34	PASS
11N20SISO	Ant1	2412	30~1000	2.97	-62.41	≤-17.03	PASS
			1000~26500	2.97	-54.7	≤-17.03	PASS
		2437	30~1000	4.24	-62.89	≤-15.76	PASS
			1000~26500	4.24	-54.66	≤-15.76	PASS
		2462	30~1000	0.51	-62.97	≤-19.49	PASS
			1000~26500	0.51	-55.15	≤-19.49	PASS
11N40SISO	Ant1	2422	30~1000	-0.30	-63.6	≤-20.3	PASS
			1000~26500	-0.30	-55.24	≤-20.3	PASS
		2437	30~1000	1.24	-64.46	≤-18.76	PASS
			1000~26500	1.24	-54.66	≤-18.76	PASS
		2452	30~1000	-2.51	-64.43	≤-22.51	PASS
			1000~26500	-2.51	-53.88	≤-22.51	PASS

12.5. Original test data

Reference level







11N20SISO_Ant1_2437

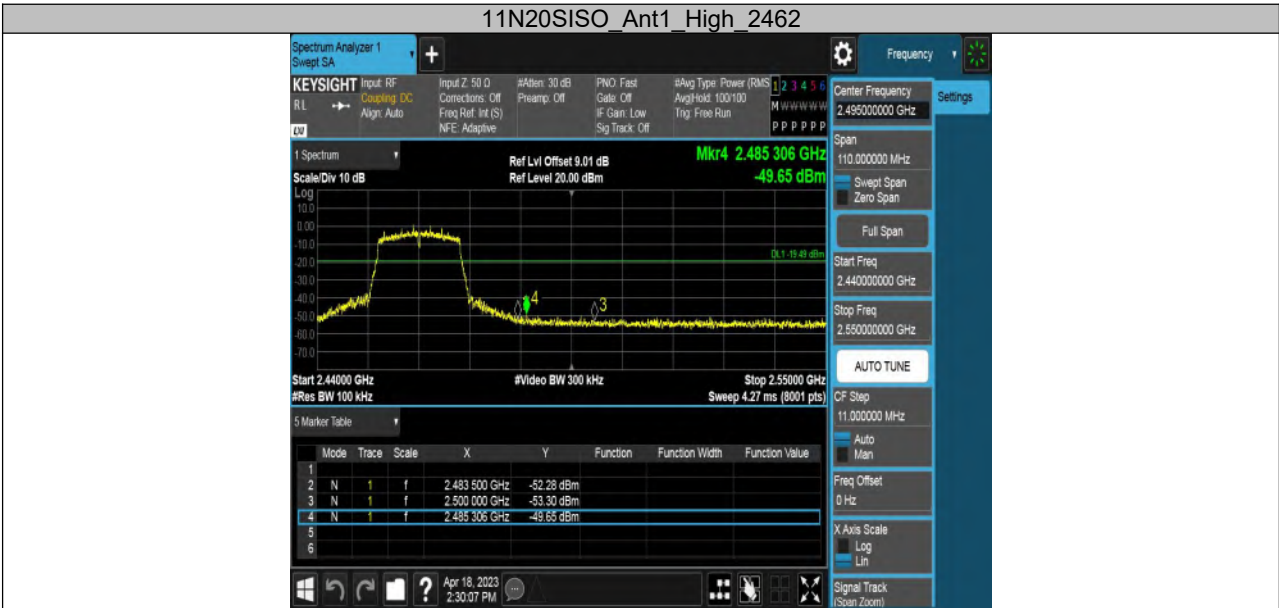




Band edge:



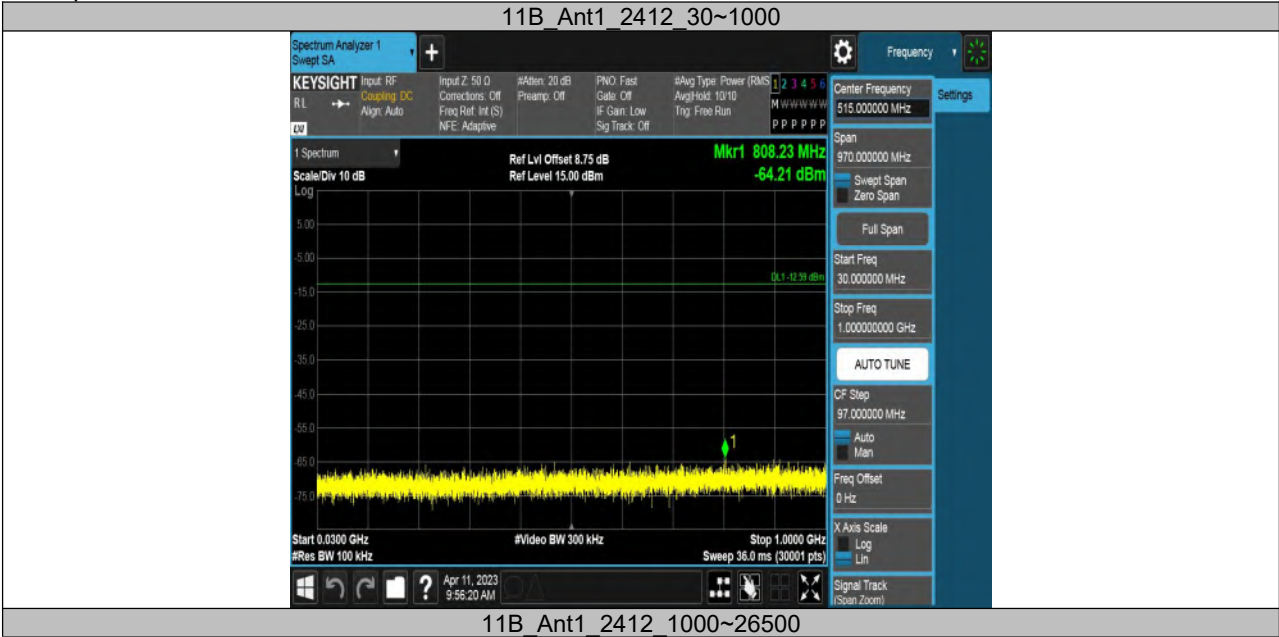




11N40SISO Ant1 High 2452

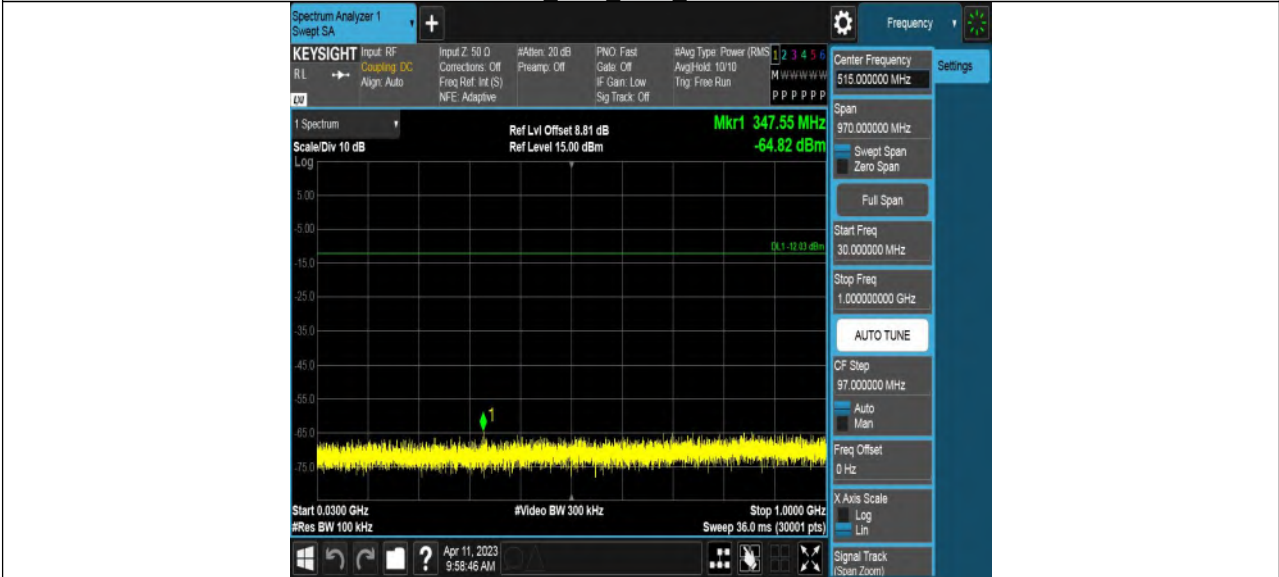


Spurious Emission:



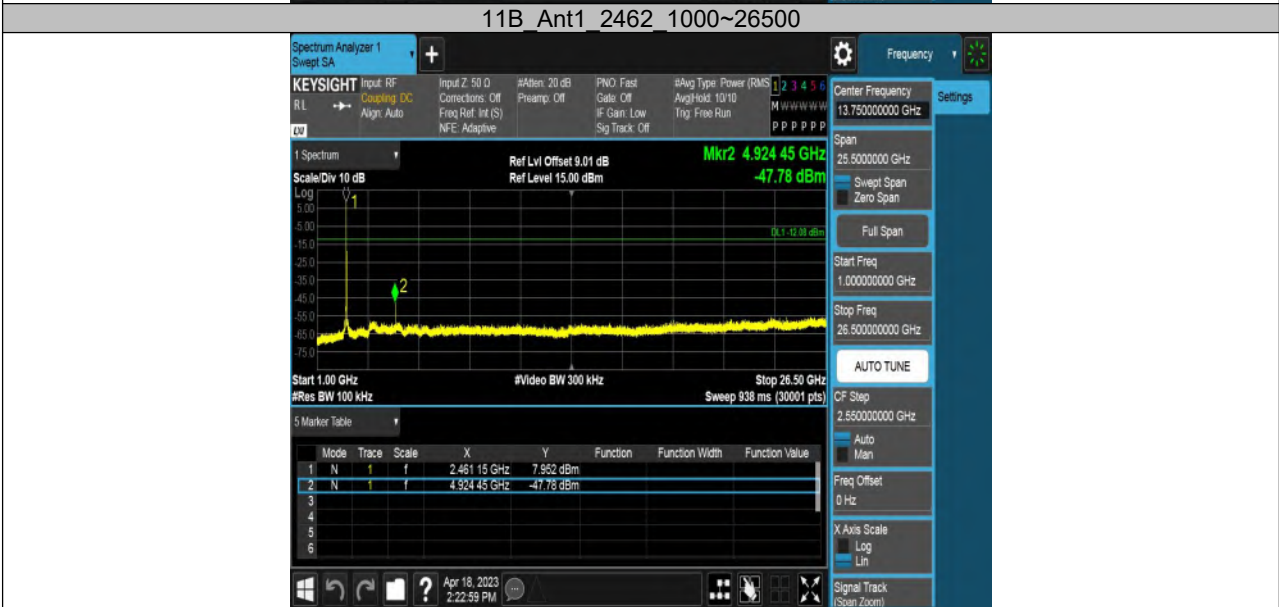
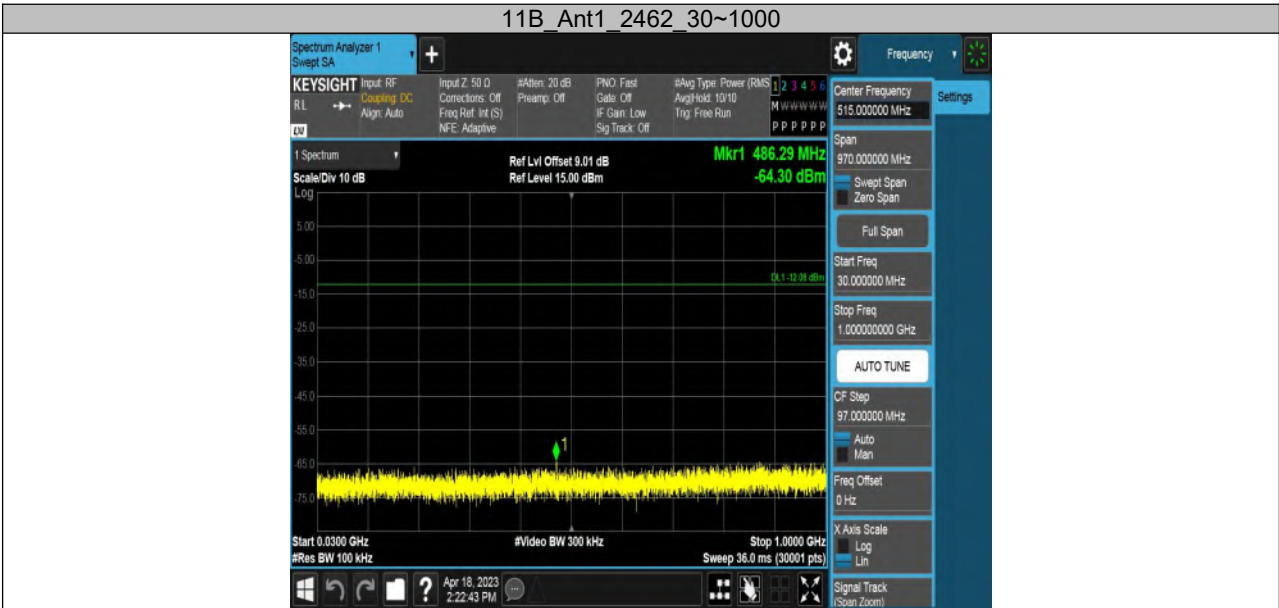


11B Ant1 2437 30~1000

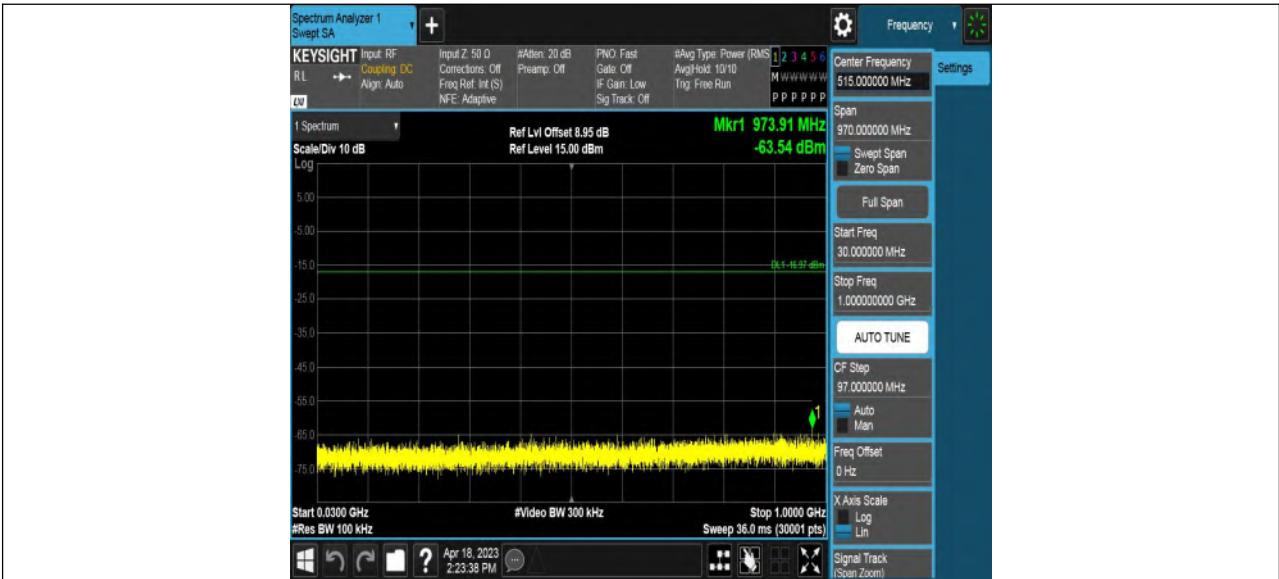


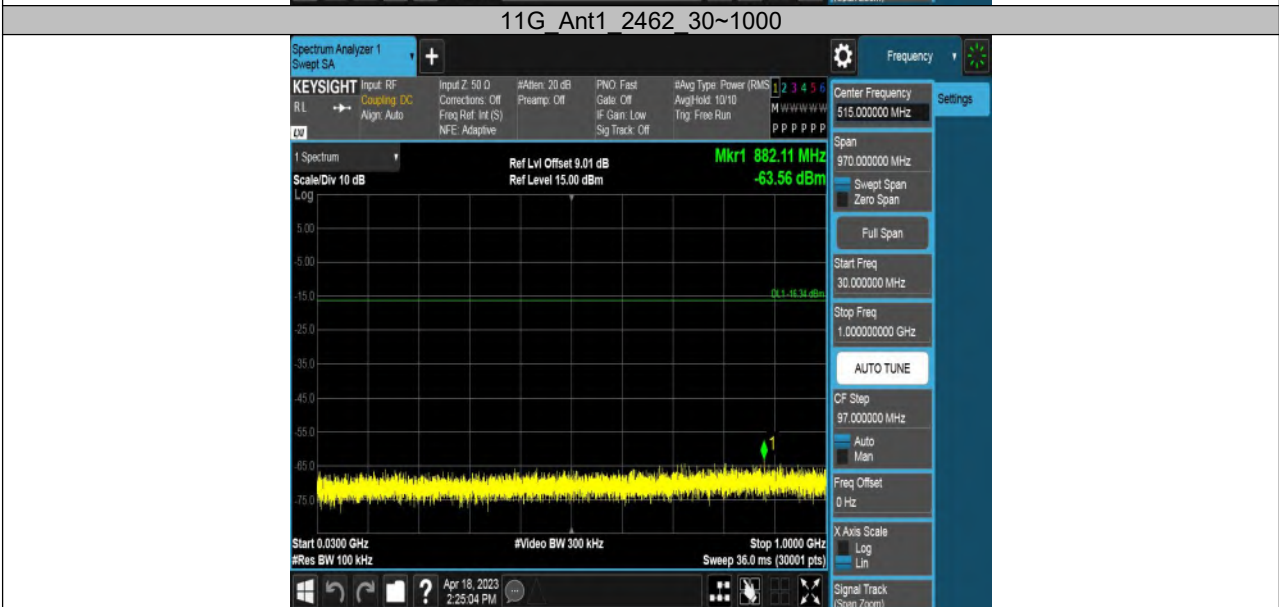
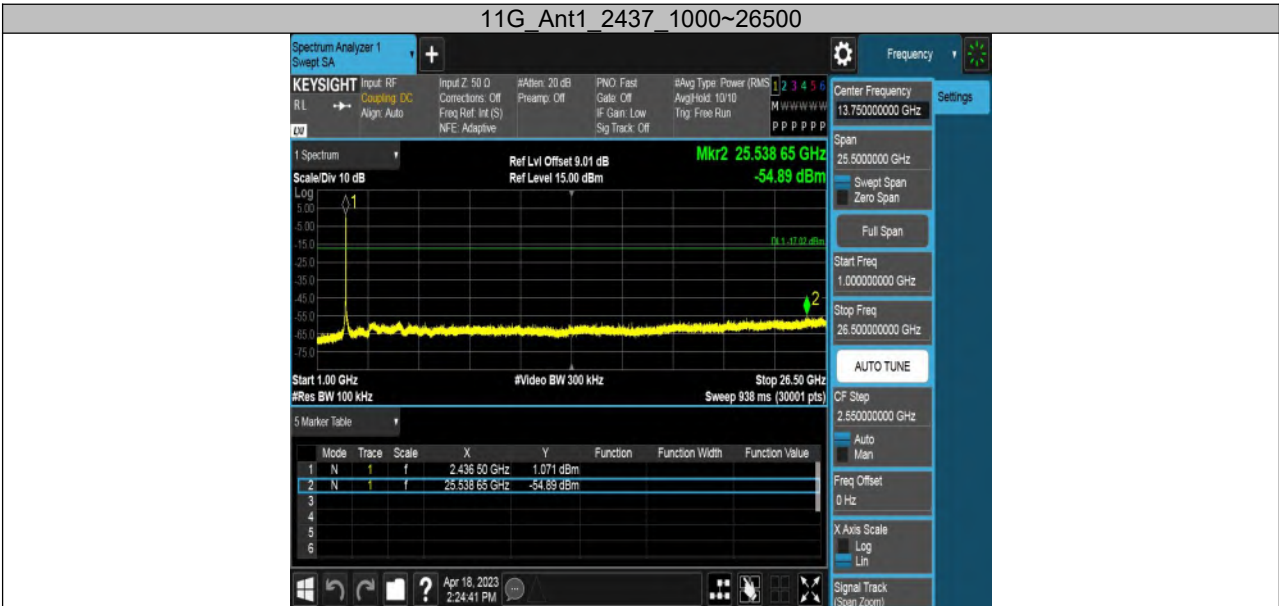
11B Ant1 2437 1000~26500



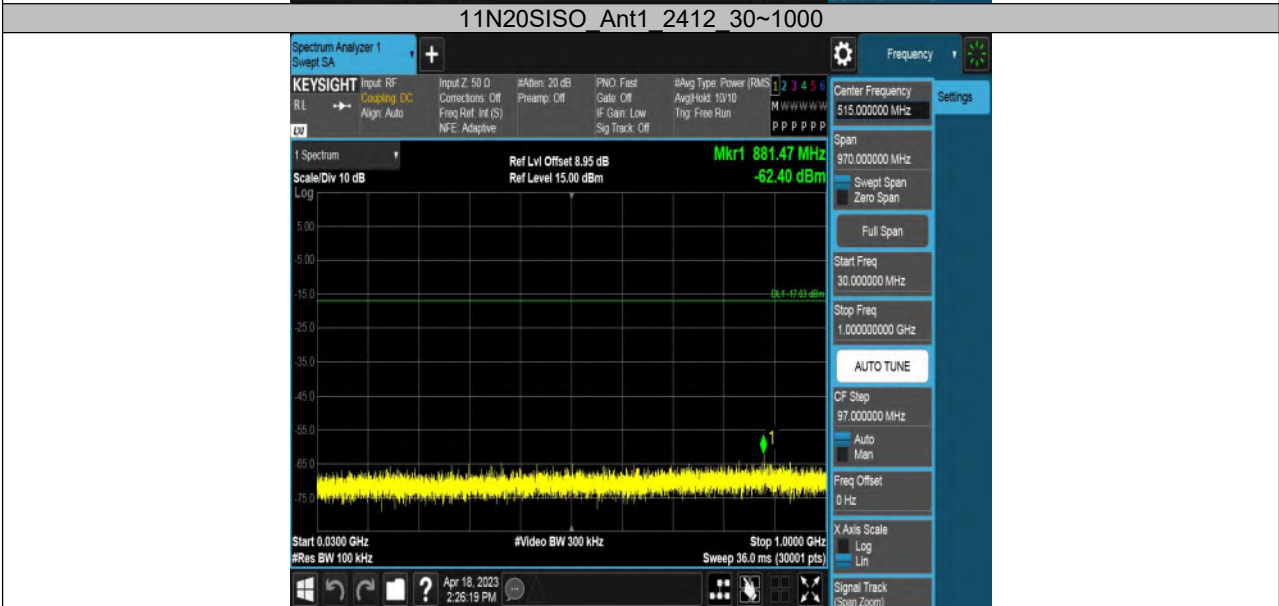


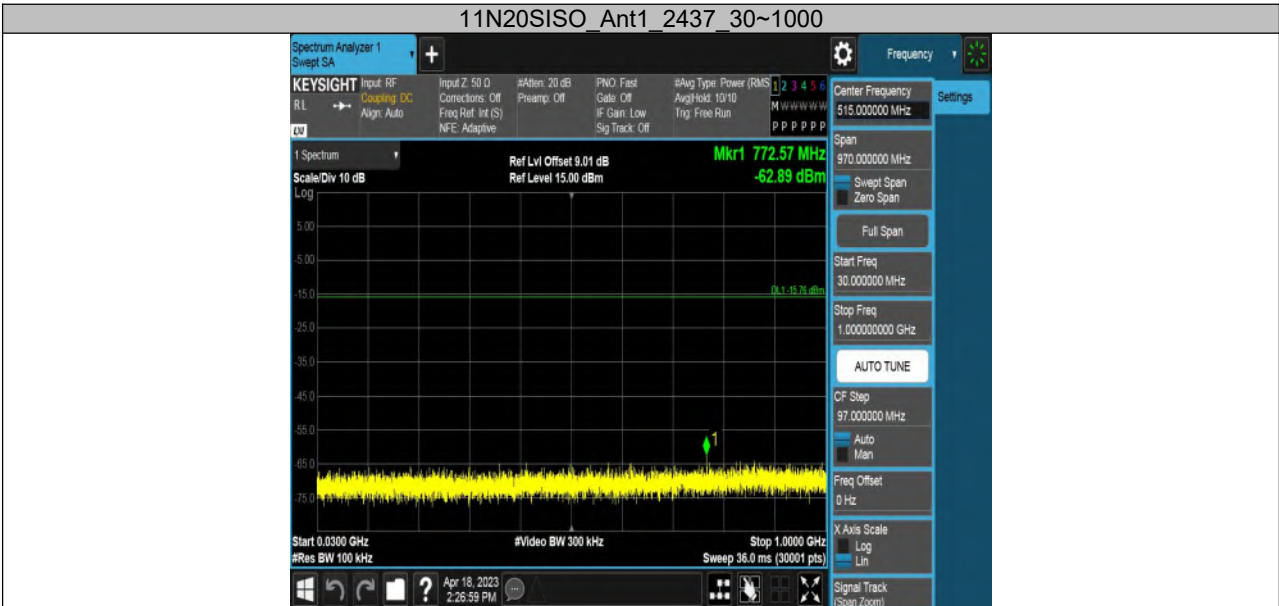
11G Ant1_2412_30~1000



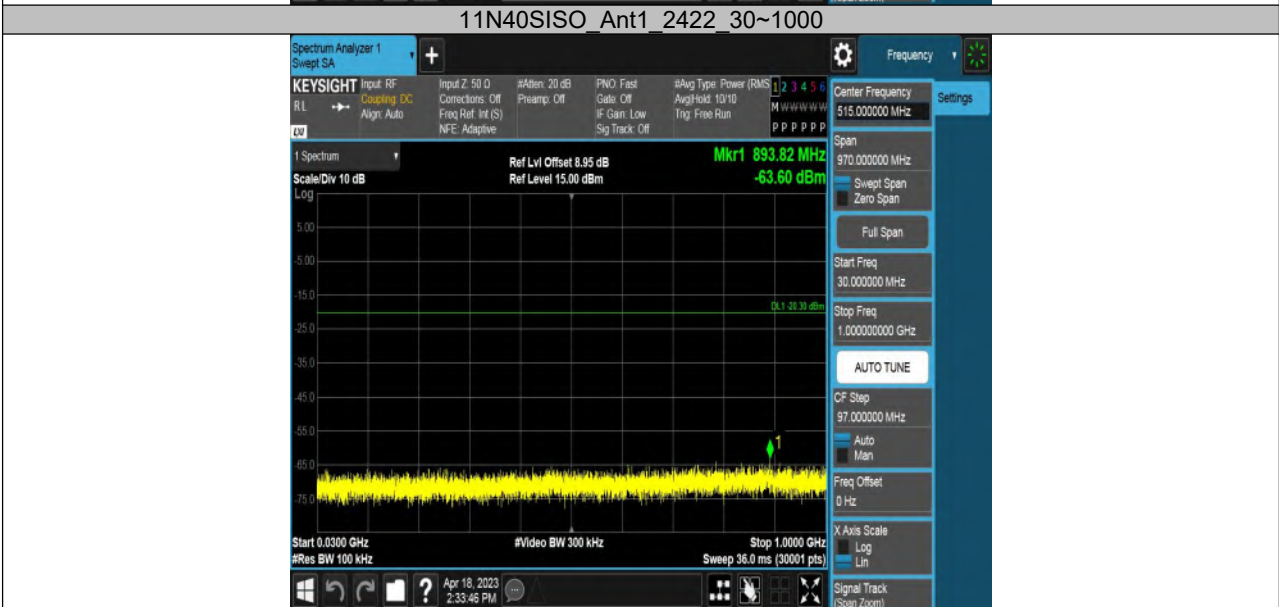
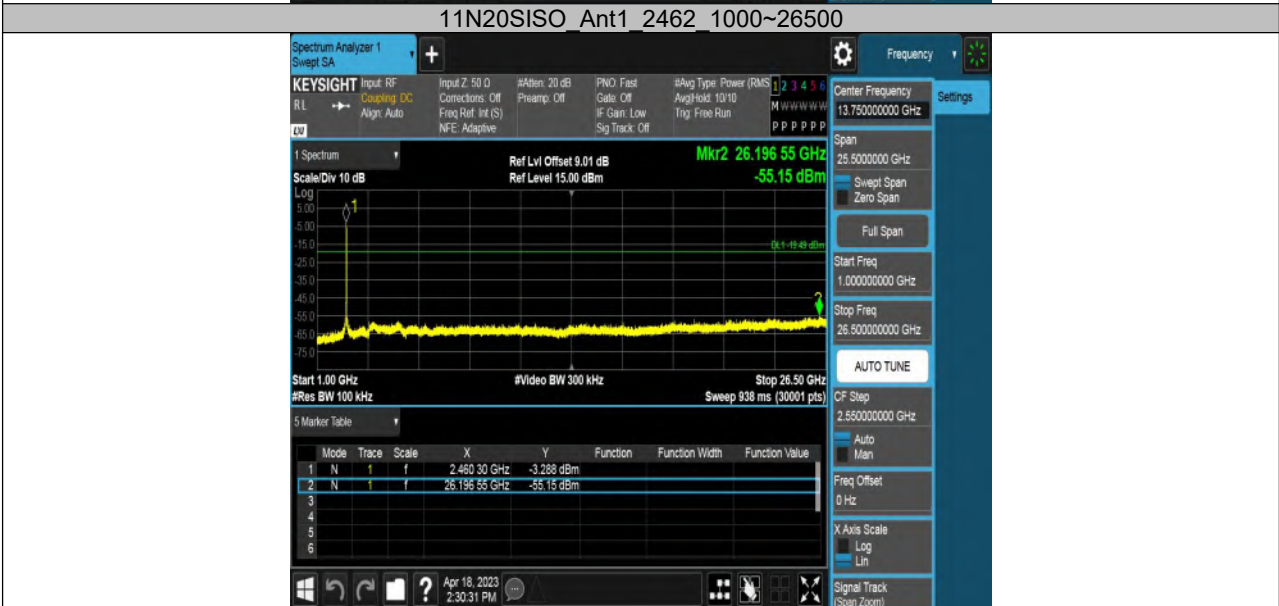
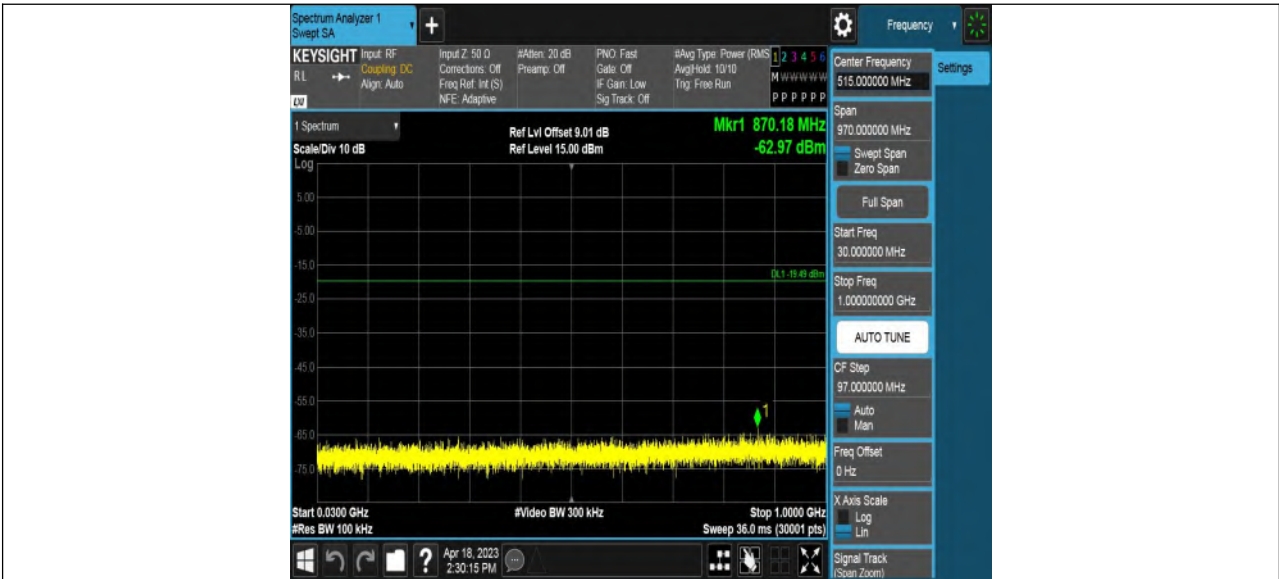


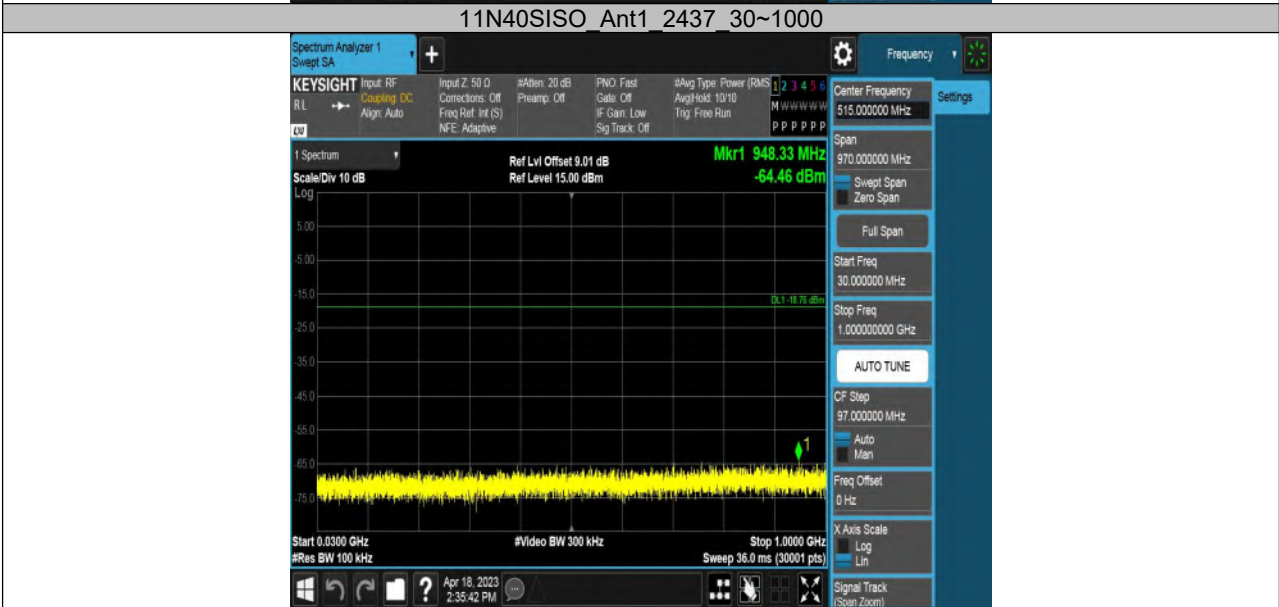
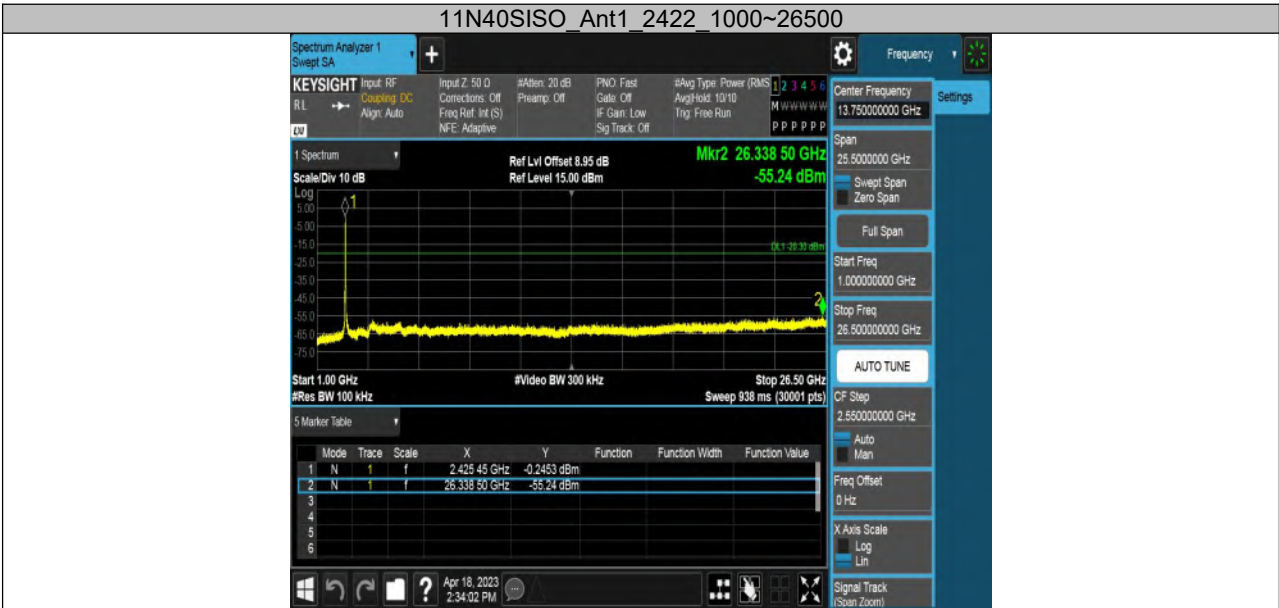
11G_Ant1_2462_1000~26500



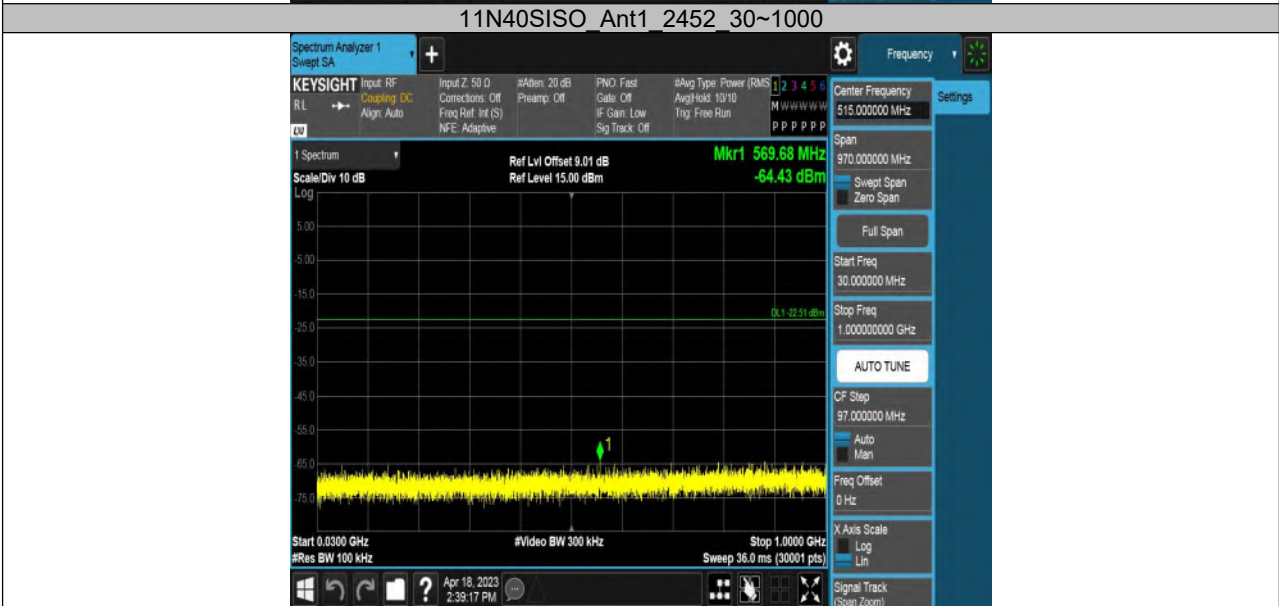


11N20SISO_Ant1_2462_30~1000





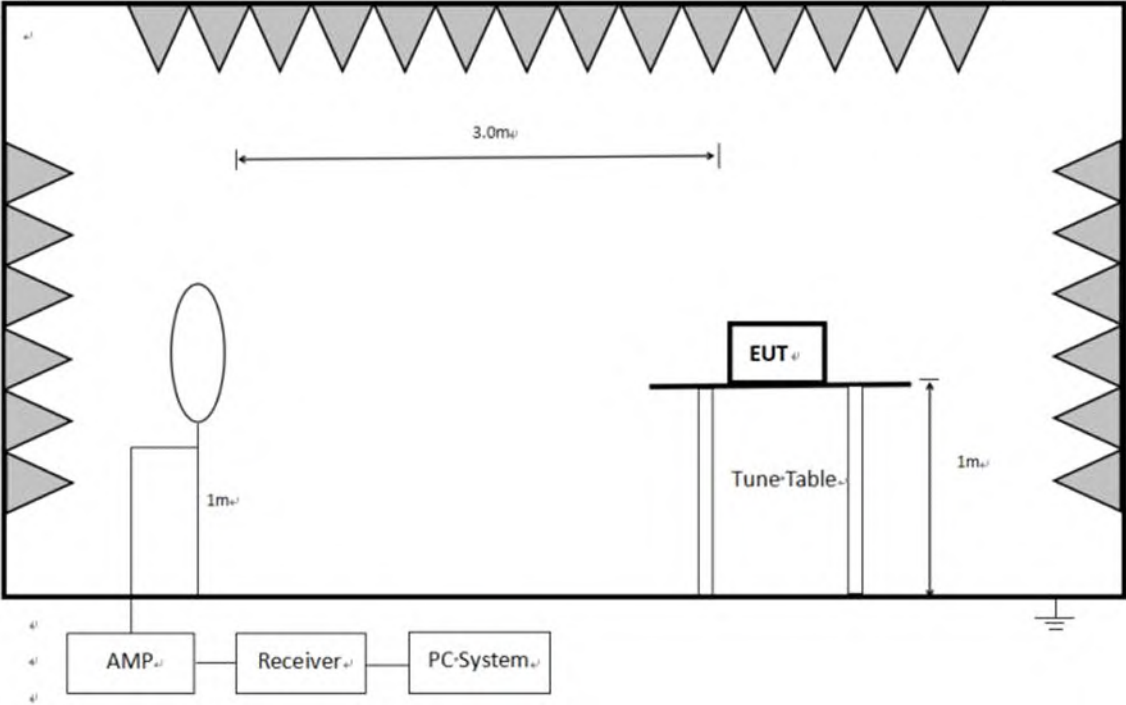
11N40SISO_Ant1_2437_1000~26500



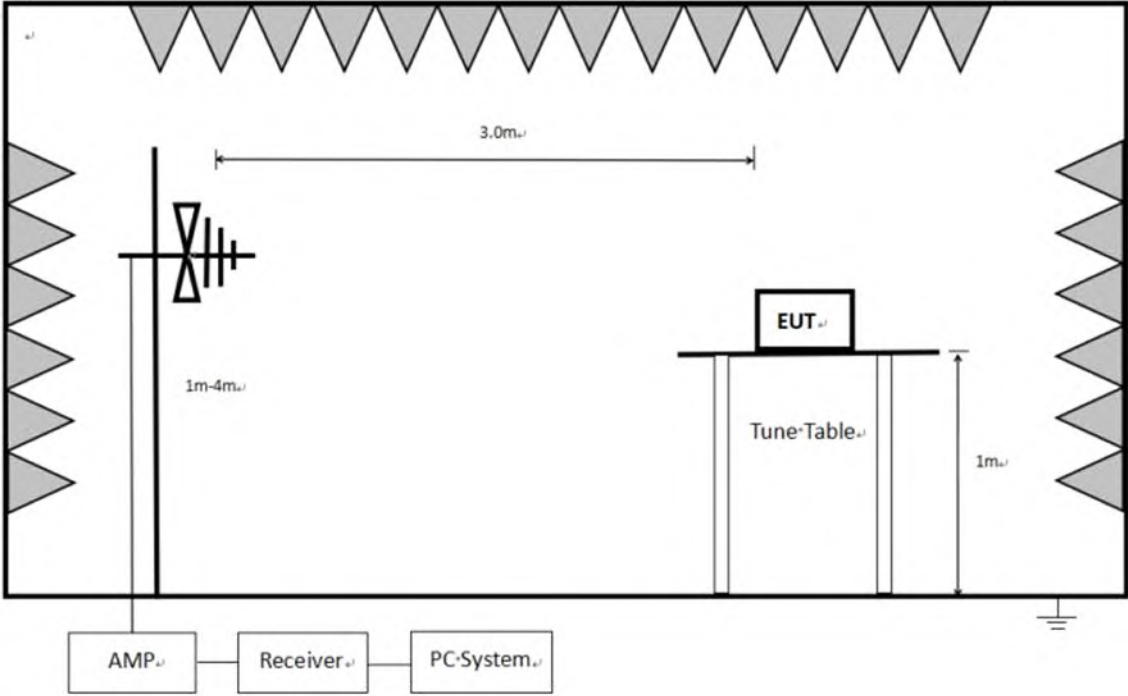
13. Radiated Emission

13.1. Block diagram of test setup

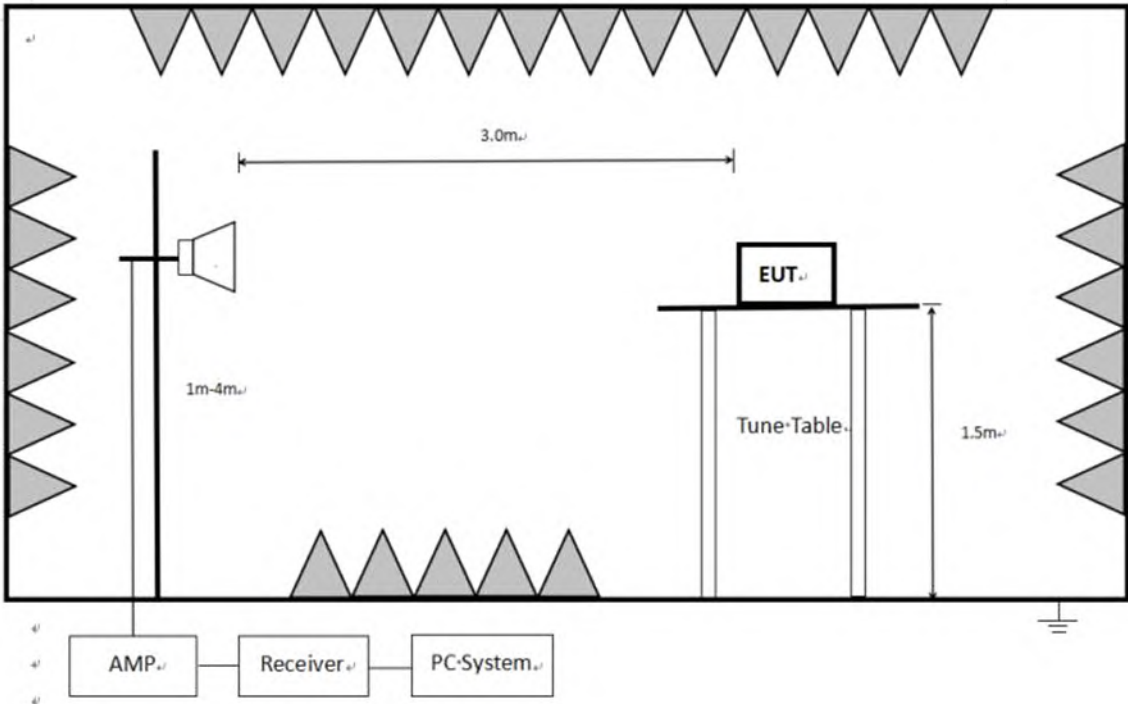
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

13.2. Limit

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

(2) FCC 15.209 Limit.

Frequency MHz	Distance Meters	Field Strengths Limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$	$67.6-20\log(F)$
0.490 ~ 1.705	30	$24000/F(\text{kHz})$	$87.6-20\log(F)$
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: (1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

About Restricted bands of operation please refer to FCC § 15.205(a).

13.3. Test Procedure

Below 30 MHz:

The setting of the spectrum Analyzer

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then 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. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of 1 meter height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

Below 1 GHz and above 30 MHz:
The setting of the spectrum Analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1 GHz:

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for AVG measurements. For the Duty Cycle please refer to clause 8.1.ON TIME AND DUTY CYCLE.

7. Restriction band: Investigated frequency range from 2310 MHz to 2430 MHz and 2445 MHz to 2500 MHz, 2310 MHz to 2450 MHz and 2425 MHz to 2500MHz.

All restriction band should comply with 15.209, other emission should be at least 20 dB below the fundamental.

Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT does not support simultaneous transmission.

Note 3: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

13.4. Results

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz, so the final test was performed with frequency range from 30 MHz to 26 GHz and recorded in below.

Note2: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 11G, Tx CH6 mode.

Note3: For emissions above 1 GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

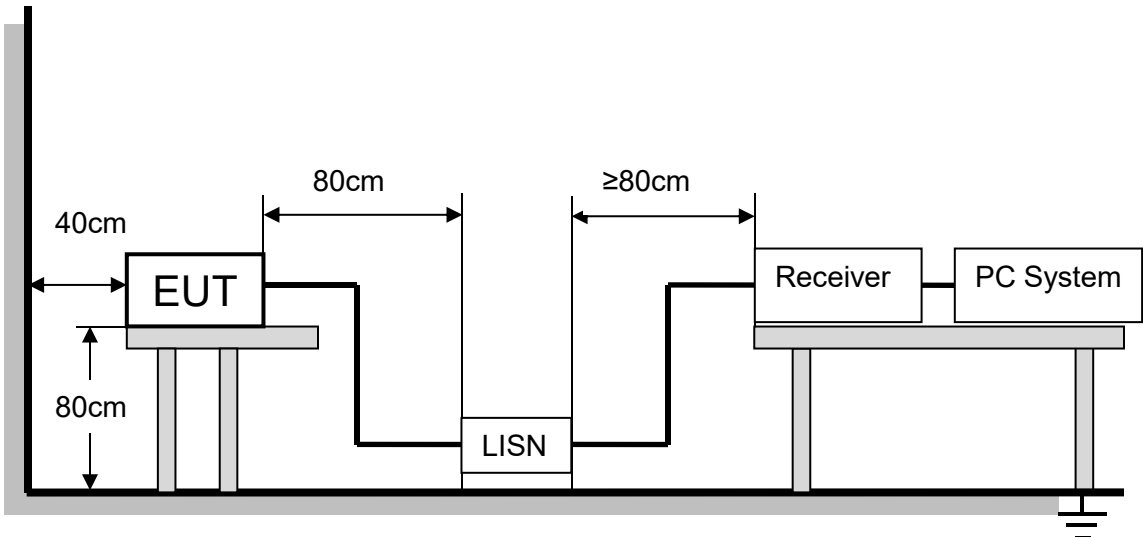
13.5. Original test data

Below 1 GHz and above 30 MHz test data Refer to appendix A

Above 1 GHz test data Refer to appendix B

14. AC Power Line Conducted Emissions

14.1. Block diagram of test setup



The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

14.2. Limits

Please refer to CFR 47 FCC § 15.207 (a).

Frequency (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

14.3. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

14.4. Test result

Pass. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worse case.

14.5. Original test data

Refer to appendix C

15. Antenna Requirements

15.1. Applicable Requirements

Please refer to FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

15.2. Result

The antenna used for this product is FPC antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is -2.83 dBi

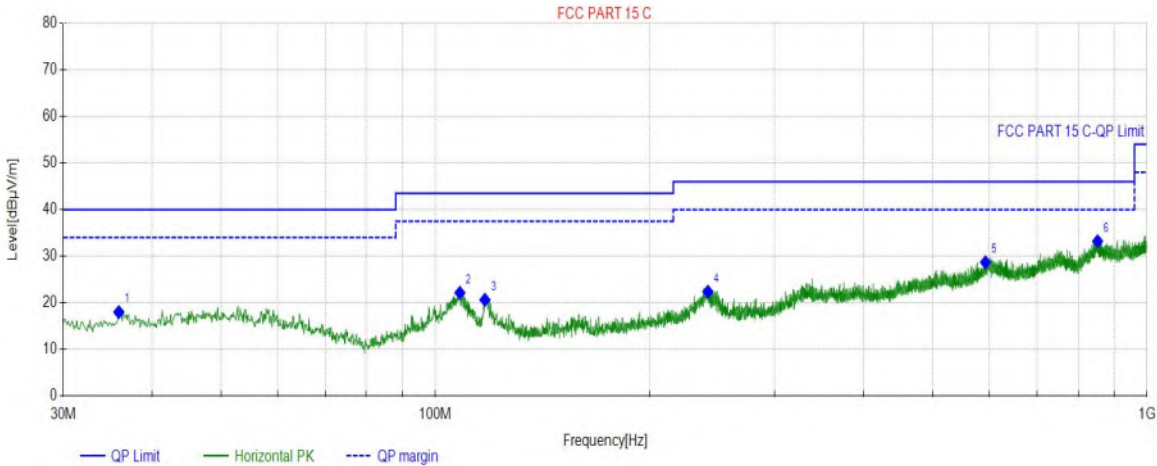
APPENDIX A – Radiated Emission Below 1GHz Test Data

Test Report

Project Information			
EUT:	ePaper	Environment:	21.1°C 47%
Model:	SN03	SN:	
Mode:	11G_2437	Voltage:	DC5V 1.5A
Customer:		Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-20 16:25:39

Test Graph



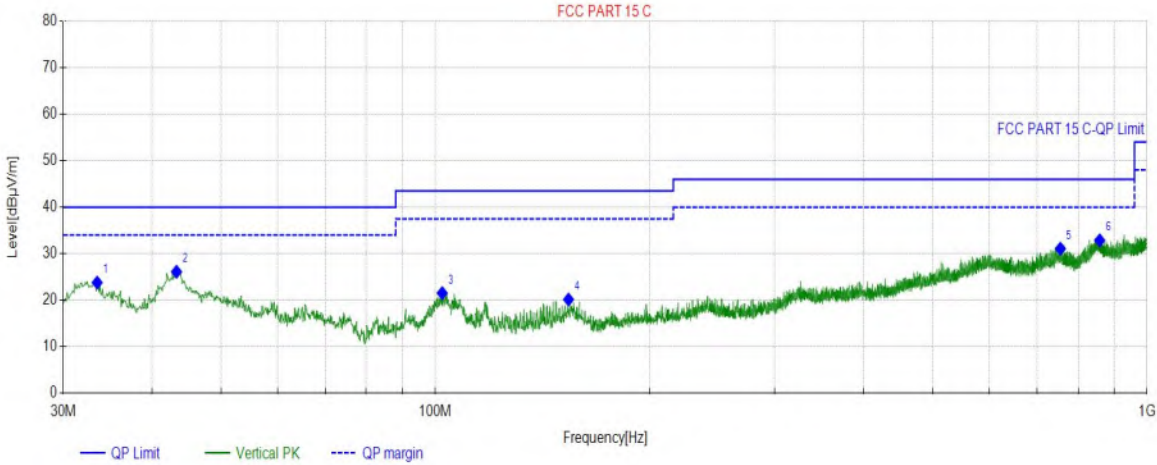
Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.9176	13.47	17.98	40.00	22.02	100	36	Horizontal
2	108.2868	14.34	22.12	43.50	21.38	100	102	Horizontal
3	117.4057	13.06	20.63	43.50	22.87	100	96	Horizontal
4	241.5782	16.11	22.37	46.00	23.63	100	264	Horizontal
5	593.0443	24.60	28.68	46.00	17.32	100	342	Horizontal
6	852.2542	29.60	33.21	46.00	12.79	100	154	Horizontal

Test Report

Project Information			
EUT:	ePaper	Environment:	21.1°C 47%
Model:	SN03	SN:	
Mode:	11G_2437	Voltage:	DC5V 1.5A
Customer:		Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-20 16:26:24

Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.4923	12.93	23.78	40.00	16.22	100	2	Vertical
2	43.2903	14.98	26.10	40.00	13.90	100	251	Vertical
3	102.2722	14.75	21.51	43.50	21.99	100	334	Vertical
4	153.8814	11.60	20.13	43.50	23.37	100	251	Vertical
5	755.6326	26.88	31.06	46.00	14.94	100	320	Vertical
6	857.9778	29.41	32.86	46.00	13.14	100	39	Vertical

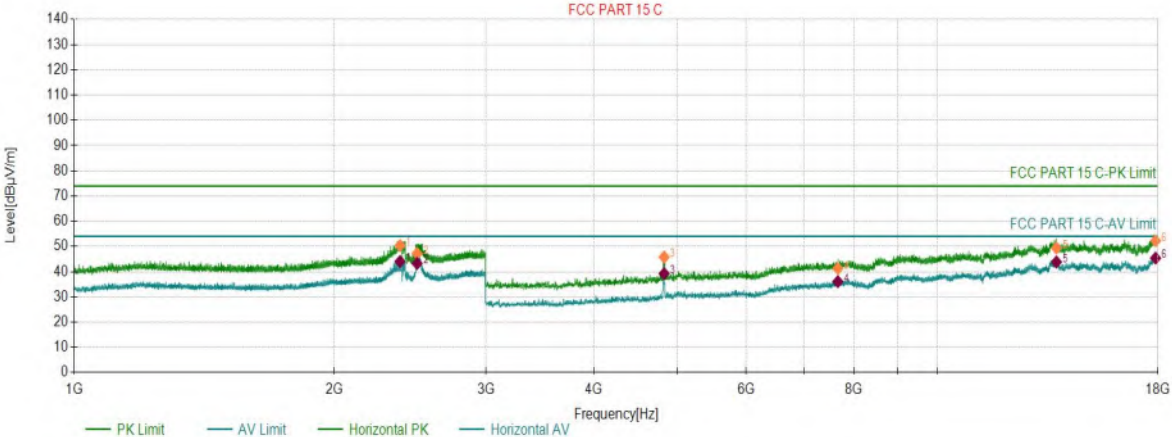
APPENDIX B – Radiated Emission Above 1GHz Test Data

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:33:07

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.9385	6.90	50.37	74.00	23.63	150	64	Horizontal
2	2495.9496	7.22	47.22	74.00	26.78	150	360	Horizontal
3	4822.6823	-9.84	45.78	74.00	28.22	150	301	Horizontal
4	7663.9664	-1.11	41.30	74.00	32.70	150	0	Horizontal
5	13727.5728	11.24	49.40	74.00	24.60	150	102	Horizontal
6	17882.9883	15.06	52.23	74.00	21.77	150	323	Horizontal

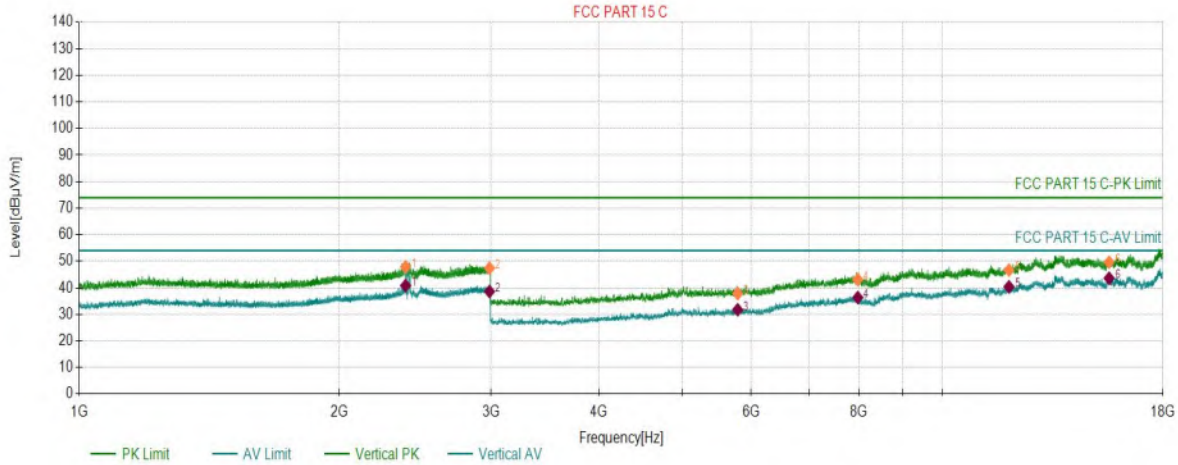
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.9385	6.90	44.04	54.00	9.96	150	64	Horizontal
2	2495.9496	7.22	43.24	54.00	10.76	150	360	Horizontal
3	4822.6823	-9.84	39.23	54.00	14.77	150	301	Horizontal
4	7663.9664	-1.11	36.07	54.00	17.93	150	0	Horizontal
5	13727.5728	11.24	43.83	54.00	10.17	150	102	Horizontal
6	17882.9883	15.06	45.39	54.00	8.61	150	323	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:34:35

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2388.3388	7.10	47.89	74.00	26.11	150	296	Vertical
2	2986.9987	9.19	47.45	74.00	26.55	150	10	Vertical
3	5790.2790	-6.62	37.85	74.00	36.15	150	153	Vertical
4	7975.9976	-0.51	43.13	74.00	30.87	150	254	Vertical
5	11936.3936	5.24	46.69	74.00	27.31	150	187	Vertical
6	15590.7591	11.57	49.70	74.00	24.30	150	212	Vertical

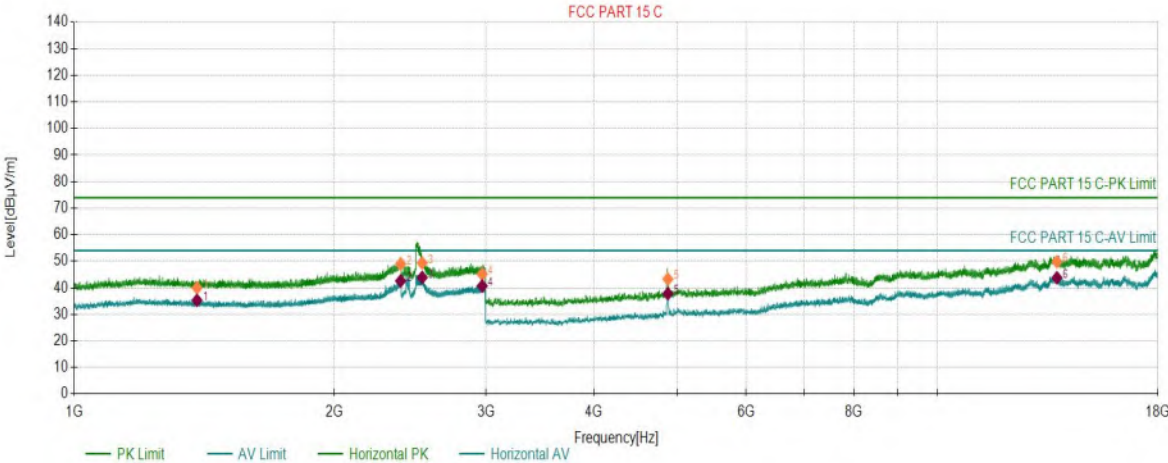
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2388.3388	7.10	40.85	54.00	13.15	150	296	Vertical
2	2986.9987	9.19	38.63	54.00	15.37	150	10	Vertical
3	5790.2790	-6.62	31.76	54.00	22.24	150	153	Vertical
4	7975.9976	-0.51	36.34	54.00	17.66	150	254	Vertical
5	11936.3936	5.24	40.39	54.00	13.61	150	187	Vertical
6	15590.7591	11.57	43.60	54.00	10.40	150	212	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2437	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:37:33

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1387.6388	2.45	40.00	74.00	34.00	150	187	Horizontal
2	2388.7389	7.17	48.99	74.00	25.01	150	59	Horizontal
3	2529.9530	7.65	49.39	74.00	24.61	150	360	Horizontal
4	2969.1969	9.09	45.16	74.00	28.84	150	15	Horizontal
5	4870.6871	-9.55	43.31	74.00	30.69	150	355	Horizontal
6	13748.5749	11.02	49.80	74.00	24.20	150	224	Horizontal

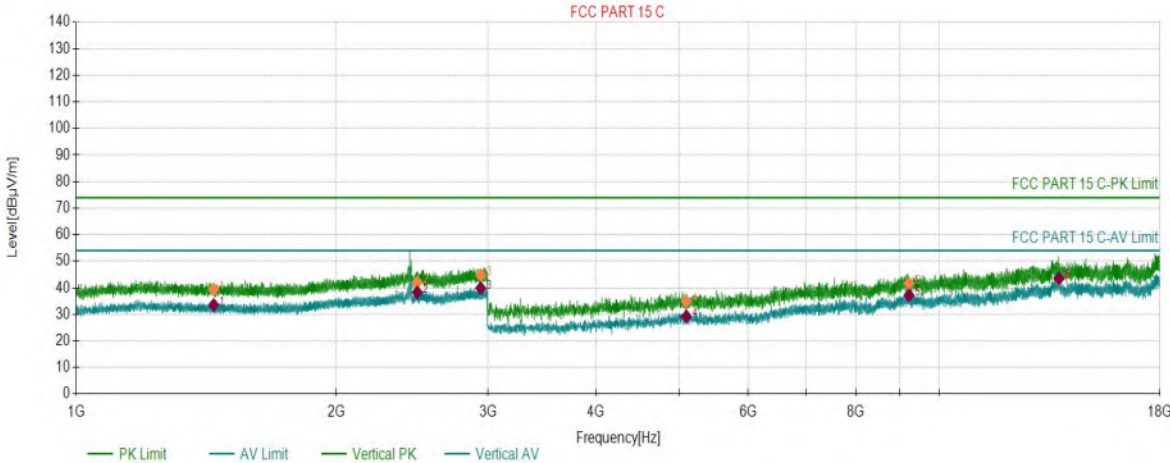
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1387.6388	2.45	35.29	54.00	18.71	150	187	Horizontal
2	2388.7389	7.17	42.62	54.00	11.38	150	59	Horizontal
3	2529.9530	7.65	43.90	54.00	10.10	150	360	Horizontal
4	2969.1969	9.09	40.71	54.00	13.29	150	15	Horizontal
5	4870.6871	-9.55	37.78	54.00	16.22	150	355	Horizontal
6	13748.5749	11.02	43.77	54.00	10.23	150	224	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2437	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:39:00

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1443.2443	2.56	39.46	74.00	34.54	150	0	Vertical
2	2482.9483	7.75	42.04	74.00	31.96	150	0	Vertical
3	2941.1941	8.93	44.81	74.00	29.19	150	0	Vertical
4	5089.7090	-8.50	34.87	74.00	39.13	150	0	Vertical
5	9216.6217	3.27	41.67	74.00	32.33	150	0	Vertical
6	13748.5749	11.02	43.29	74.00	30.71	150	0	Vertical

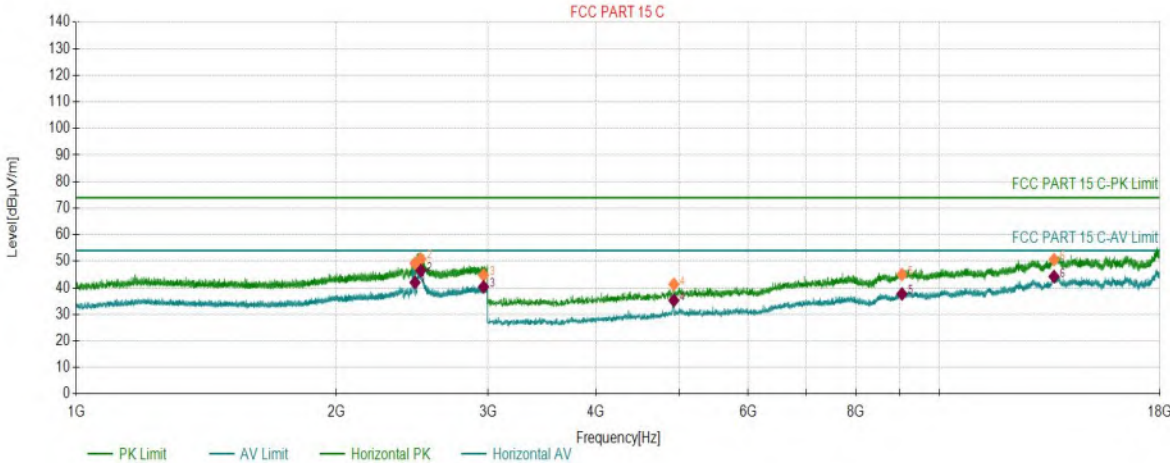
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1443.2443	2.56	33.55	54.00	20.45	150	0	Vertical
2	2482.9483	7.75	38.28	54.00	15.72	150	0	Vertical
3	2941.1941	8.93	39.87	54.00	14.13	150	0	Vertical
4	5089.7090	-8.50	29.27	54.00	24.73	150	0	Vertical
5	9216.6217	3.27	37.16	54.00	16.84	150	0	Vertical
6	13748.5749	11.02	43.58	54.00	10.42	150	0	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 16:09:09

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2468.7469	7.69	49.22	74.00	24.78	150	0	Horizontal
2	2507.3507	7.73	50.91	74.00	23.09	150	0	Horizontal
3	2963.7964	9.06	44.75	74.00	29.25	150	257	Horizontal
4	4923.1923	-9.22	41.34	74.00	32.66	150	2	Horizontal
5	9044.1044	2.35	45.02	74.00	28.98	150	89	Horizontal
6	13568.5569	10.70	50.65	74.00	23.35	150	123	Horizontal

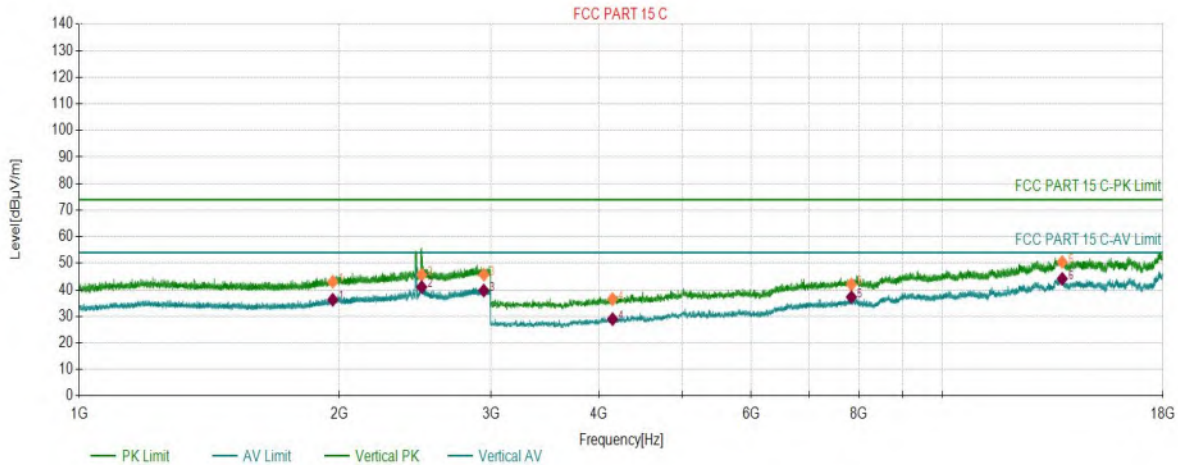
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2468.7469	7.69	42.02	54.00	11.98	150	0	Horizontal
2	2507.3507	7.73	46.49	54.00	7.51	150	0	Horizontal
3	2963.7964	9.06	40.37	54.00	13.63	150	257	Horizontal
4	4923.1923	-9.22	35.28	54.00	18.72	150	2	Horizontal
5	9044.1044	2.35	37.71	54.00	16.29	150	89	Horizontal
6	13568.5569	10.70	44.24	54.00	9.76	150	123	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 16:10:28

Test Graph



PK Final Data List								
NO.	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1966.6967	4.68	43.04	74.00	30.96	150	136	Vertical
2	2493.1493	7.65	45.67	74.00	28.33	150	68	Vertical
3	2941.9942	8.94	45.71	74.00	28.29	150	221	Vertical
4	4147.6148	-12.72	36.53	74.00	37.47	150	198	Vertical
5	7840.9841	-0.74	42.07	74.00	31.93	150	265	Vertical
6	13757.5758	10.93	50.48	74.00	23.52	150	148	Vertical

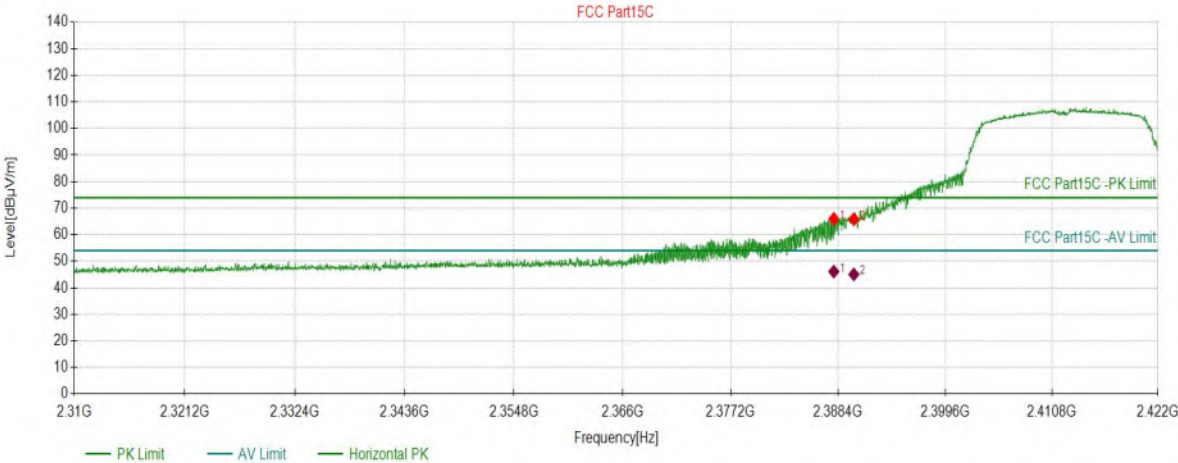
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1966.6967	4.68	36.26	54.00	17.74	150	136	Vertical
2	2493.1493	7.65	41.05	54.00	12.95	150	68	Vertical
3	2941.9942	8.94	39.74	54.00	14.26	150	221	Vertical
4	4147.6148	-12.72	28.98	54.00	25.02	150	198	Vertical
5	7840.9841	-0.74	37.28	54.00	16.72	150	265	Vertical
6	13757.5758	10.93	44.14	54.00	9.86	150	148	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:16:42

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2387.9406	65.94	5.95	74.00	8.06	150	55	PK	Horizont
2	2390.0320	65.83	5.94	74.00	8.17	150	335	PK	Horizont

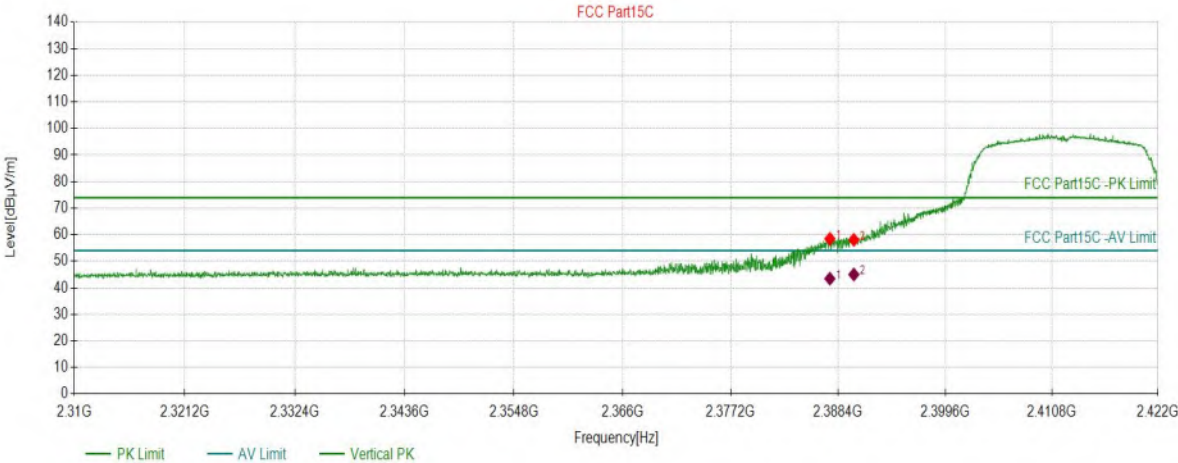
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.9406	5.95	46.12	54.00	7.88	150	55	Horizontal
2	2390.0320	5.94	45.06	54.00	8.94	150	335	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-17 15:17:27

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2387.5298	58.45	5.95	74.00	15.55	150	293	PK	Vertical
2	2390.0320	58.08	5.94	74.00	15.92	150	319	PK	Vertical

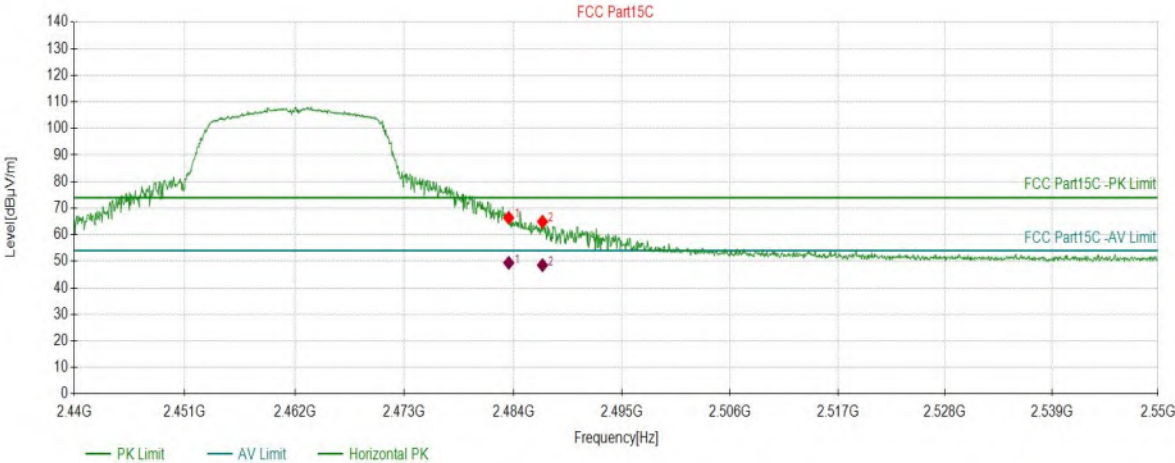
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.5298	5.95	43.45	54.00	10.55	150	293	Vertical
2	2390.0320	5.94	45.04	54.00	8.96	150	319	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 14		
Test Standard:			

Start of Test: 2023-04-17 16:18:07

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5268	66.34	6.37	74.00	7.66	150	355	PK	Horizont
2	2486.9385	64.91	6.39	74.00	9.09	150	351	PK	Horizont

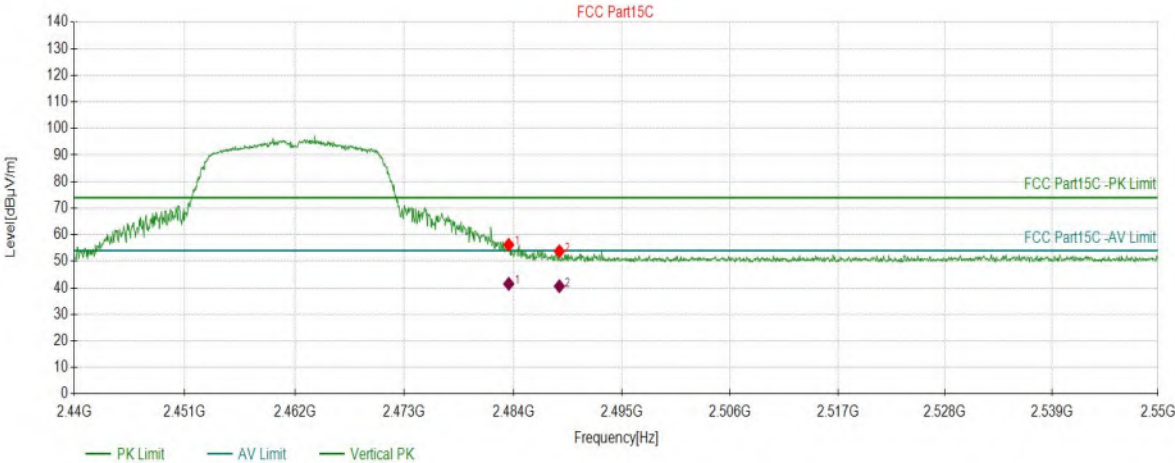
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5268	6.37	49.40	54.00	4.60	150	355	Horizontal
2	2486.9385	6.39	48.54	54.00	5.46	150	351	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N20_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 14		
Test Standard:			

Start of Test: 2023-04-17 16:18:44

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5268	56.21	6.37	74.00	17.79	150	326	PK	Vertical
2	2488.6443	53.77	6.40	74.00	20.23	150	181	PK	Vertical

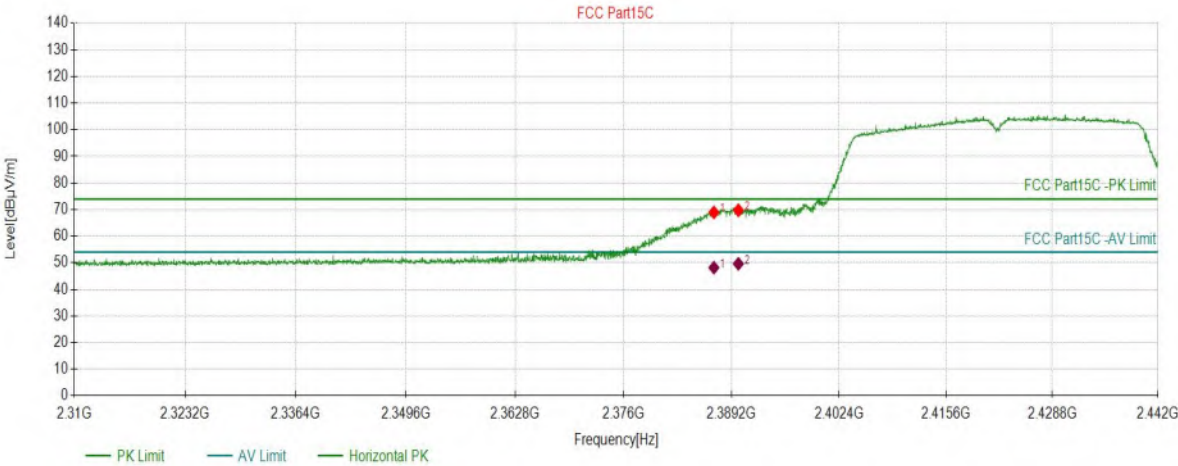
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5268	6.37	41.49	54.00	12.51	150	326	Vertical
2	2488.6443	6.40	40.61	54.00	13.39	150	181	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N40_2422	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 15		
Test Standard:			

Start of Test: 2023-04-17 16:35:17

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2387.0257	68.94	5.95	74.00	5.06	150	348	PK	Horizont
2	2390.0187	69.74	5.94	74.00	4.26	150	284	PK	Horizont

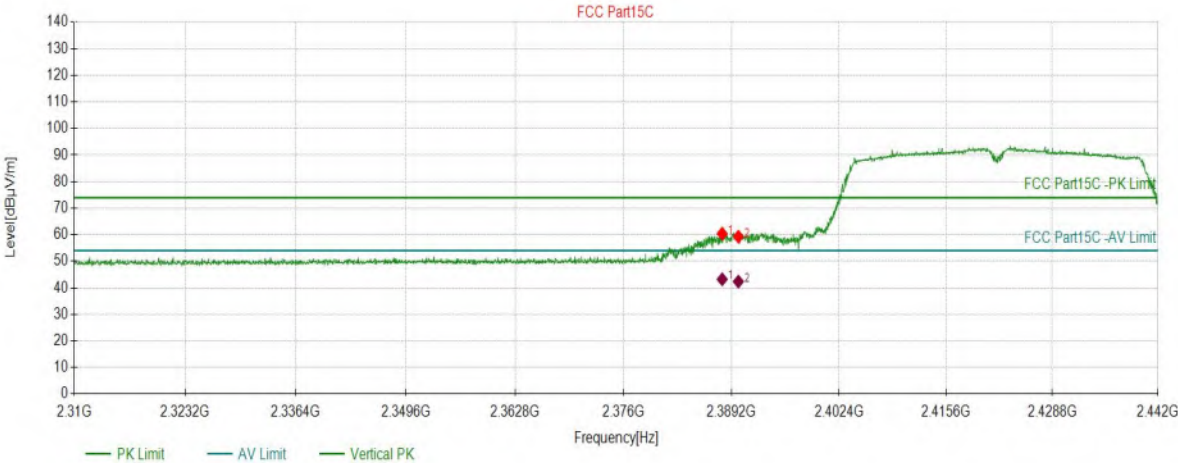
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.0257	5.95	48.18	54.00	5.82	150	348	Horizontal
2	2390.0187	5.94	49.62	54.00	4.38	150	284	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N40_2422	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 15		
Test Standard:			

Start of Test: 2023-04-17 16:36:02

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2388.0380	60.39	5.95	74.00	13.61	150	8	PK	Vertical
2	2390.0187	59.30	5.94	74.00	14.70	150	33	PK	Vertical

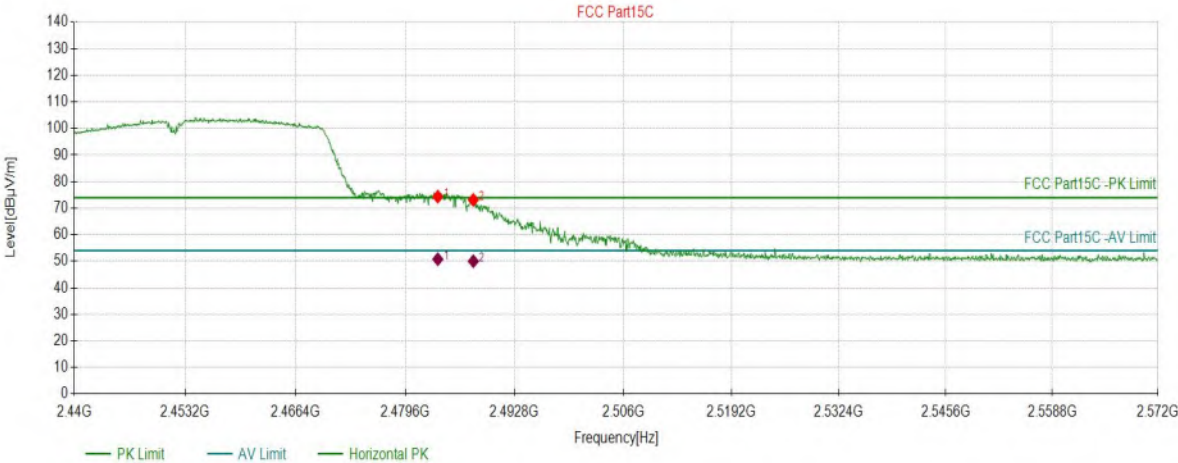
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2388.0380	5.95	43.21	54.00	10.79	150	8	Vertical
2	2390.0187	5.94	42.36	54.00	11.64	150	33	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N40_2452	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 13		
Test Standard:			

Start of Test: 2023-04-17 17:19:06

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5158	74.33	6.37	74.00	-0.33	150	358	PK	Horizont
2	2487.8079	73.10	6.40	74.00	0.90	150	346	PK	Horizont

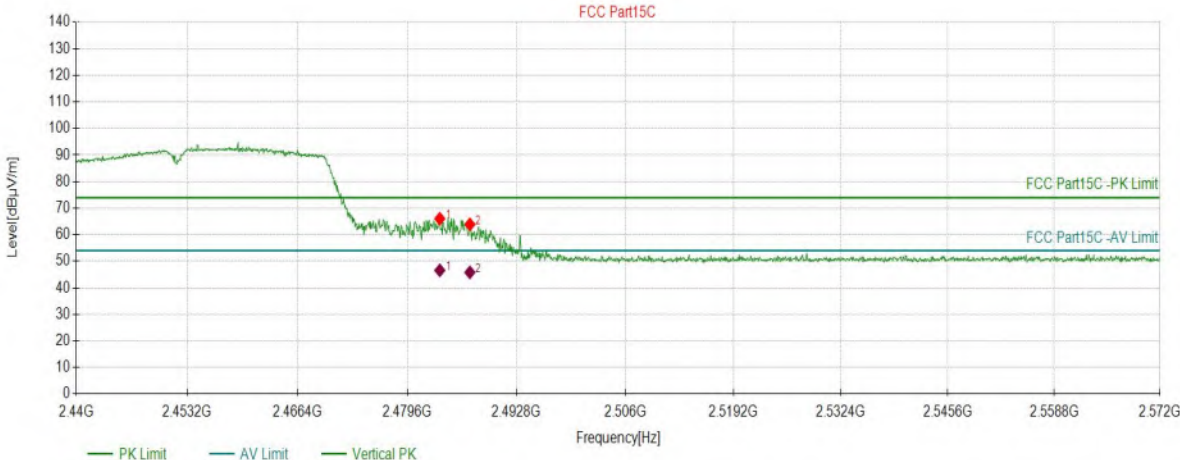
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5158	6.37	50.78	54.00	3.22	150	358	Horizontal
2	2487.8079	6.40	50.02	54.00	3.98	150	346	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11N40_2452	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 13		
Test Standard:			

Start of Test: 2023-04-17 17:19:42

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5158	66.02	6.37	74.00	7.98	150	274	PK	Vertical
2	2487.1476	63.89	6.39	74.00	10.11	150	274	PK	Vertical

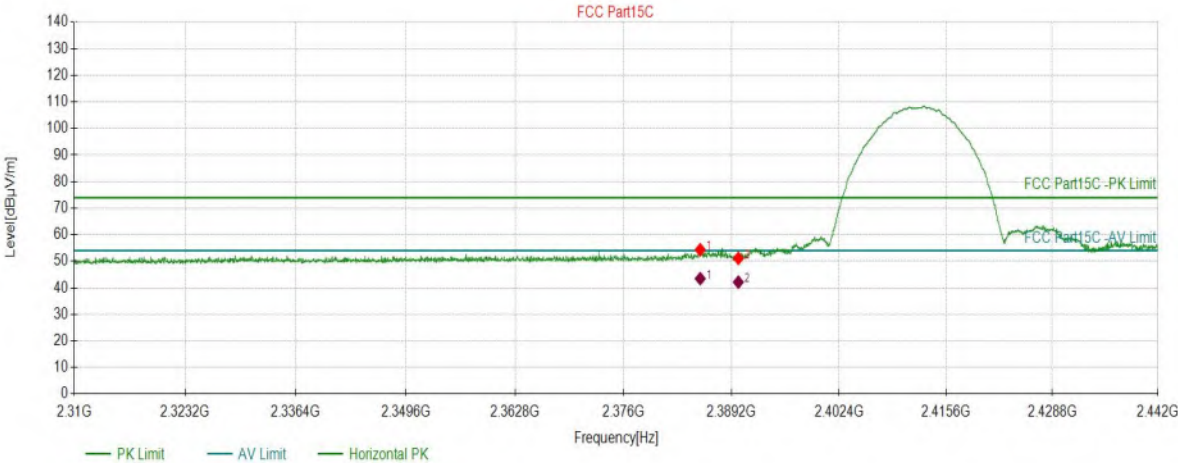
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5158	6.37	46.58	54.00	7.42	150	274	Vertical
2	2487.1476	6.39	45.82	54.00	8.18	150	274	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11B_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 19.5		
Test Standard:			

Start of Test: 2023-04-17 17:40:22

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2385.3531	54.33	5.95	74.00	19.67	150	290	PK	Horizont
2	2390.0187	51.11	5.94	74.00	22.89	150	344	PK	Horizont

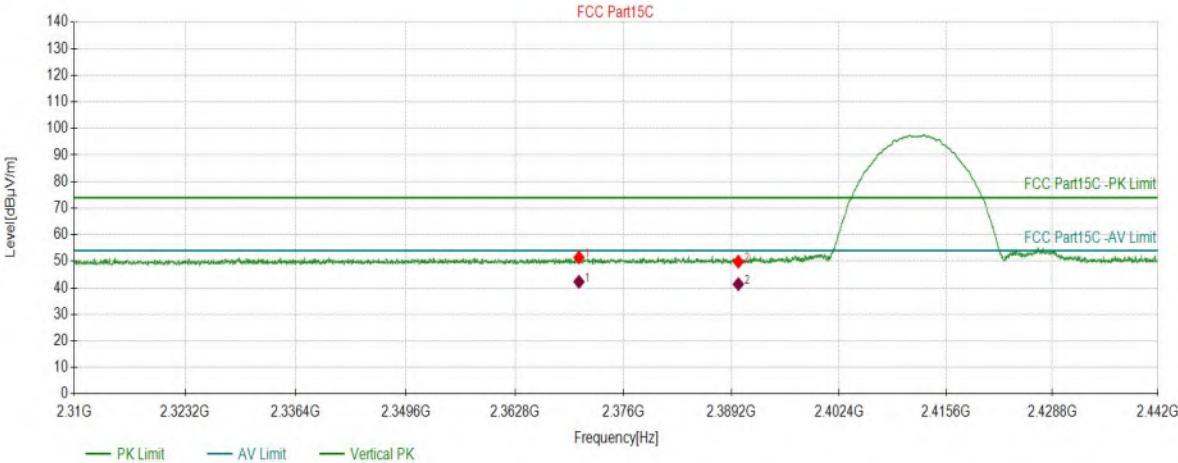
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.3531	5.95	43.46	54.00	10.54	150	290	Horizontal
2	2390.0187	5.94	42.16	54.00	11.84	150	344	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11B_2412	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 19.5		
Test Standard:			

Start of Test: 2023-04-17 17:41:07

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2370.5642	51.44	5.95	74.00	22.56	150	22	PK	Vertical
2	2390.0187	49.86	5.94	74.00	24.14	150	344	PK	Vertical

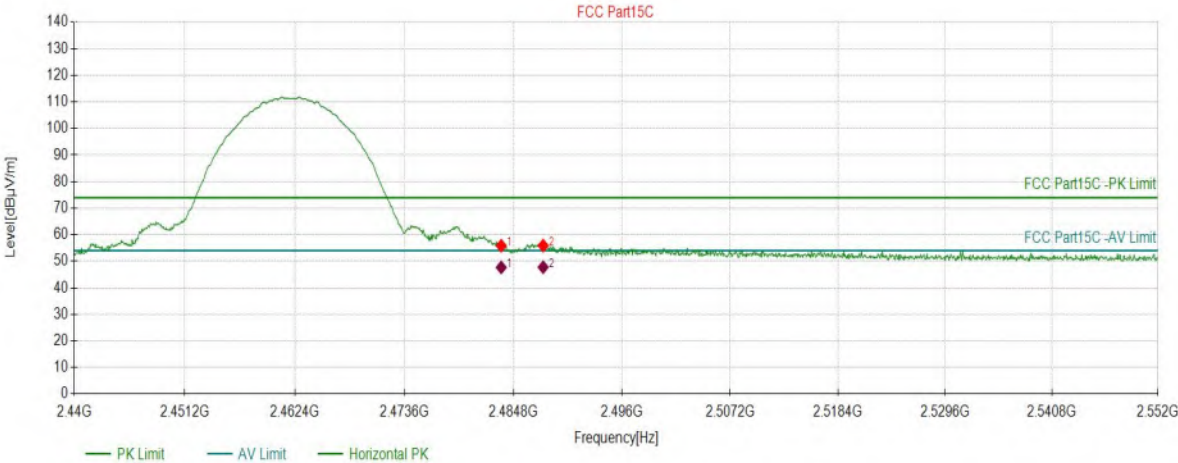
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2370.5642	5.95	42.28	54.00	11.72	150	22	Vertical
2	2390.0187	5.94	41.40	54.00	12.60	150	344	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11B_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 19.5		
Test Standard:			

Start of Test: 2023-04-17 17:48:02

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5338	55.85	6.37	74.00	18.15	150	352	PK	Horizont
2	2487.8479	55.89	6.40	74.00	18.11	150	349	PK	Horizont

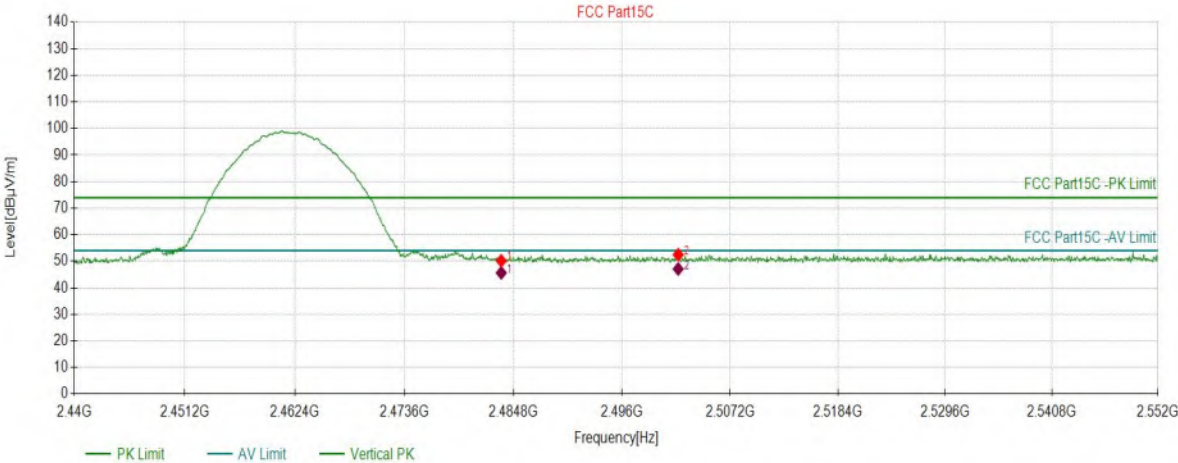
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5338	6.37	47.69	54.00	6.31	150	352	Horizontal
2	2487.8479	6.40	47.78	54.00	6.22	150	349	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11B_2462	Voltage:	DC5V 1.5A
Environment:	21.1°C 47%	Engineer:	Kennys
Remark:	Power Set : 19.5		
Test Standard:			

Start of Test: 2023-04-17 17:48:39

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5338	50.18	6.37	74.00	23.82	150	75	PK	Vertical
2	2501.7989	52.48	6.46	74.00	21.52	150	287	PK	Vertical

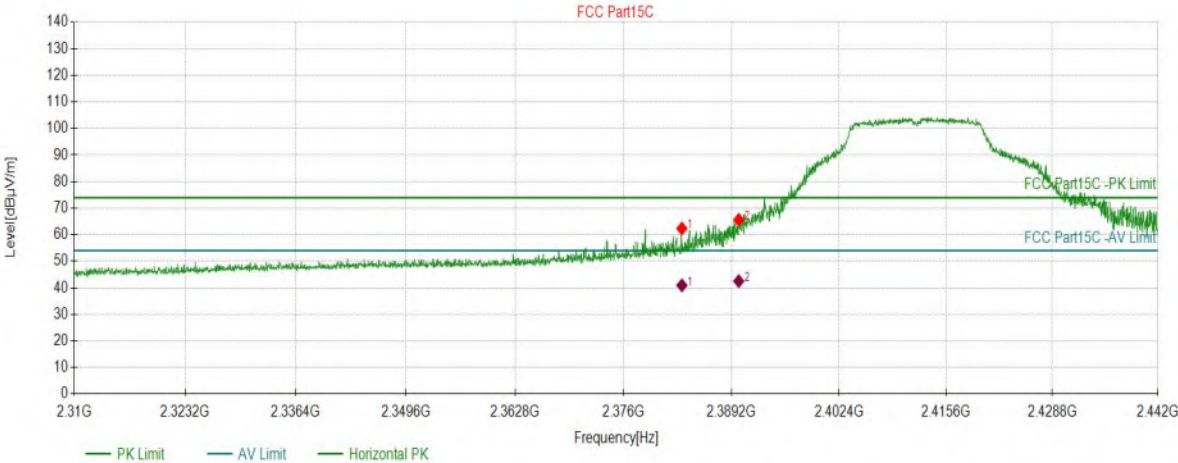
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5338	6.37	45.64	54.00	8.36	150	75	Vertical
2	2501.7989	6.46	47.11	54.00	6.89	150	287	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11G_2412	Voltage:	DC5V 1.5A
Environment:	23°C/57%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-23 11:16:37

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2383.1084	62.36	5.67	74.00	11.64	150	86	PK	Horizont
2	2390.0627	65.62	5.65	74.00	8.38	150	101	PK	Horizont

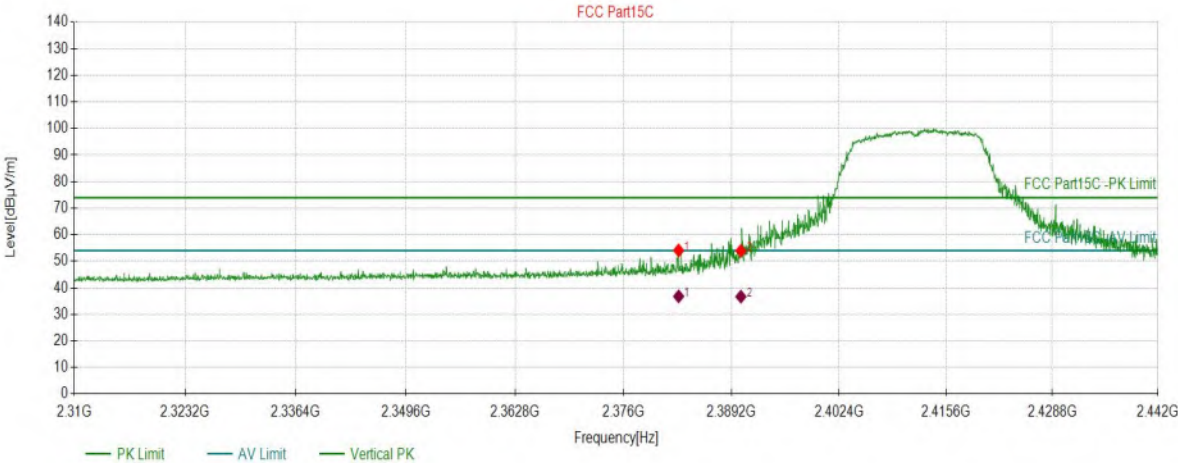
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.1084	5.67	40.93	54.00	13.07	150	86	Horizontal
2	2390.0627	5.65	42.54	54.00	11.46	150	101	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11G_2412	Voltage:	DC5V 1.5A
Environment:	23°C/57%	Engineer:	Kennys
Remark:	Power Set : 17.5		
Test Standard:			

Start of Test: 2023-04-23 11:17:30

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2382.7122	54.09	5.67	74.00	19.91	150	107	PK	Vertical
2	2390.3268	53.91	5.65	74.00	20.09	150	22	PK	Vertical

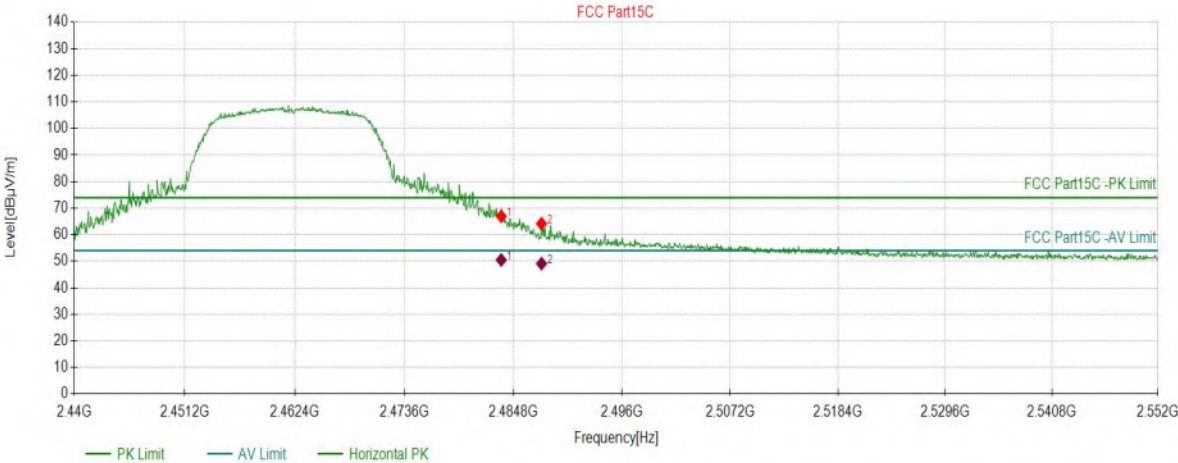
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.7122	5.67	36.80	54.00	17.20	150	107	Vertical
2	2390.3268	5.65	36.69	54.00	17.31	150	22	Vertical

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11G_2462	Voltage:	DC5V 1.5A
Environment:	23°C/57%	Engineer:	Kennys
Remark:	Power Set : 14		
Test Standard:			

Start of Test: 2023-04-23 12:04:20

Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5338	66.95	6.28	74.00	7.05	150	358	PK	Horizont
2	2487.6798	64.14	6.32	74.00	9.86	150	360	PK	Horizont

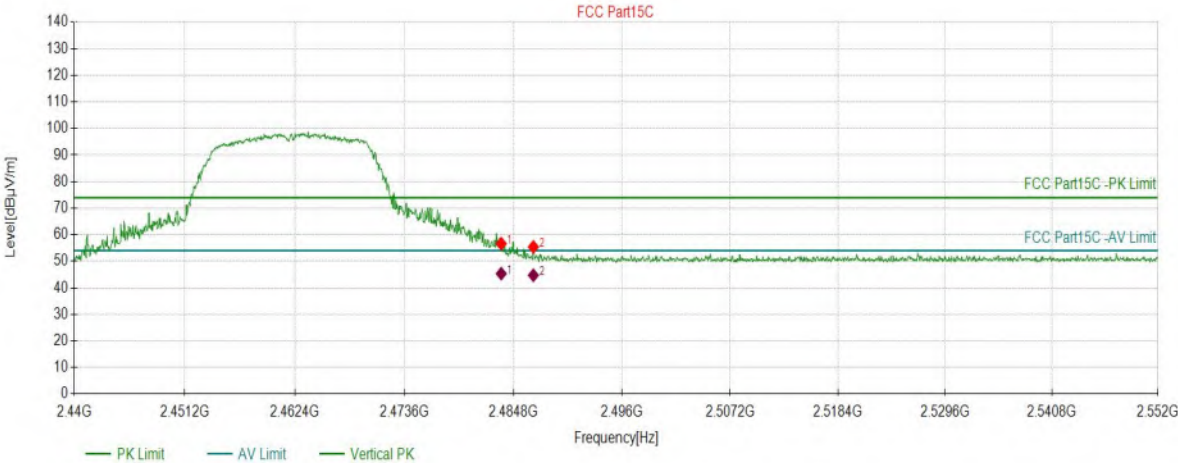
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5338	6.28	50.49	54.00	3.51	150	358	Horizontal
2	2487.6798	6.32	49.13	54.00	4.87	150	360	Horizontal

Test Report

Project Information			
Customer:		EUT:	ePaper
Model:	SN03	SN:	
Mode:	11G_2462	Voltage:	DC5V 1.5A
Environment:	23°C/57%	Engineer:	Kennys
Remark:	Power Set : 14		
Test Standard:			

Start of Test: 2023-04-23 12:05:04

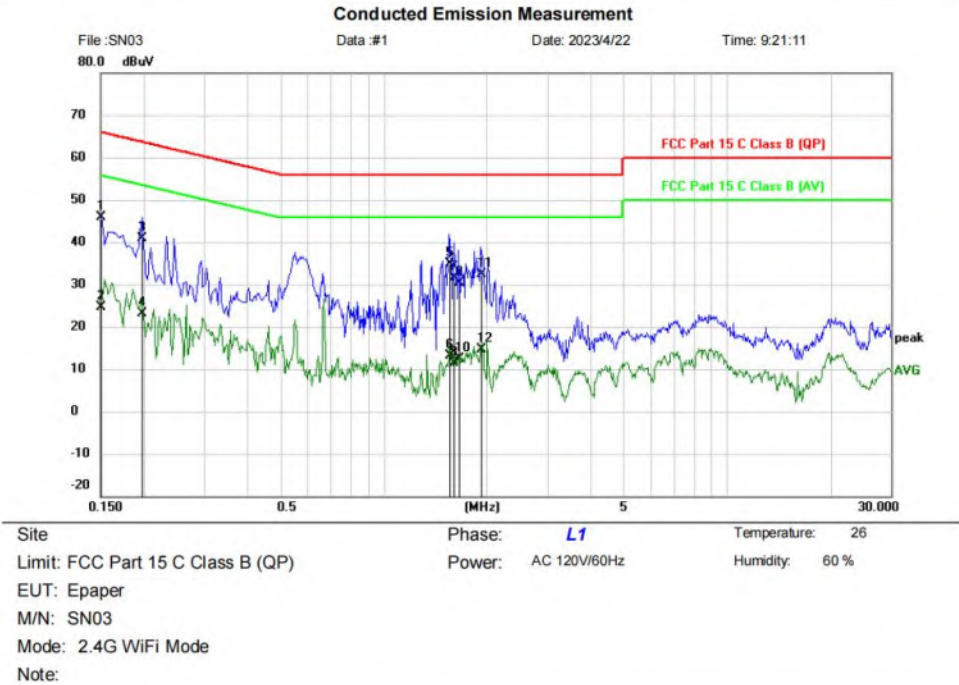
Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	2483.5338	56.66	6.28	74.00	17.34	150	51	PK	Vertical
2	2486.8394	55.41	6.31	74.00	18.59	150	79	PK	Vertical

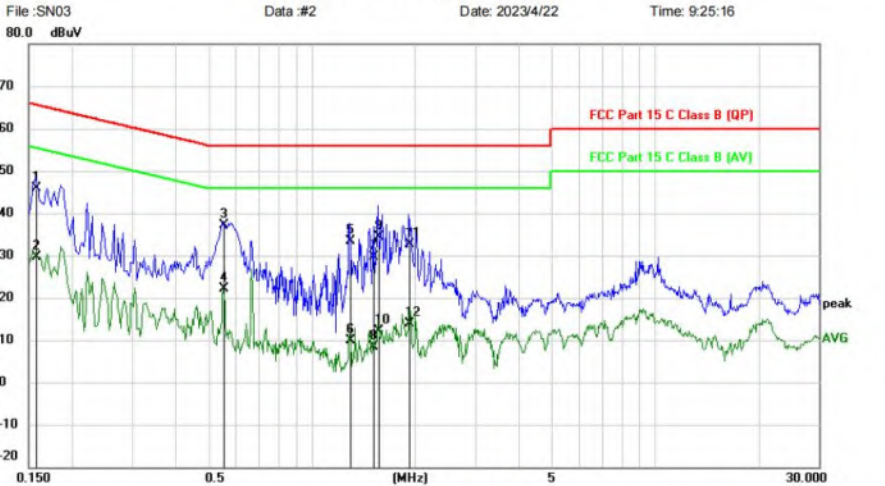
AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5338	6.28	45.35	54.00	8.65	150	51	Vertical
2	2486.8394	6.31	44.75	54.00	9.25	150	79	Vertical

APPENDIX C – AC Power Line Conducted Emission Test Data



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1 *	0.1500	36.27	9.64	45.91	66.00	-20.09	QP	
2	0.1500	14.95	9.64	24.59	56.00	-31.41	AVG	
3	0.1980	31.21	9.65	40.86	63.69	-22.83	QP	
4	0.1980	13.56	9.65	23.21	53.69	-30.48	AVG	
5	1.5580	25.13	9.76	34.89	56.00	-21.11	QP	
6	1.5580	3.36	9.76	13.12	46.00	-32.88	AVG	
7	1.6019	21.94	9.76	31.70	56.00	-24.30	QP	
8	1.6019	1.71	9.76	11.47	46.00	-34.53	AVG	
9	1.6540	20.58	9.76	30.34	56.00	-25.66	QP	
10	1.6540	2.69	9.76	12.45	46.00	-33.55	AVG	
11	1.9260	22.71	9.75	32.46	56.00	-23.54	QP	
12	1.9260	4.89	9.75	14.64	46.00	-31.36	AVG	

Conducted Emission Measurement



File :SN03 Data :#2 Date: 2023/4/22 Time: 9:25:16

Site Phase: **N** Temperature: 26
 Limit: FCC Part 15 C Class B (QP) Power: AC 120V/60Hz Humidity: 60 %
 EUT: Epaper
 M/N: SN03
 Mode: 2.4G WiFi Mode
 Note:

No.	Mk.	Reading		Correct Factor	Measurement		Limit	Over	Detector	Comment
		Freq.	Level		dBuV	dB				
1		0.1580	36.19	9.65	45.84	65.57	-19.73	QP		
2		0.1580	19.94	9.65	29.59	55.57	-25.98	AVG		
3	*	0.5540	27.27	9.76	37.03	56.00	-18.97	QP		
4		0.5540	12.48	9.76	22.24	46.00	-23.76	AVG		
5		1.2900	23.68	9.75	33.43	56.00	-22.57	QP		
6		1.2900	0.06	9.75	9.81	46.00	-36.19	AVG		
7		1.5180	19.87	9.75	29.62	56.00	-26.38	QP		
8		1.5180	-1.37	9.75	8.38	46.00	-37.62	AVG		
9		1.5620	24.64	9.75	34.39	56.00	-21.61	QP		
10		1.5620	2.29	9.75	12.04	46.00	-33.96	AVG		
11		1.9260	22.98	9.74	32.72	56.00	-23.28	QP		
12		1.9260	4.25	9.74	13.99	46.00	-32.01	AVG		

END OF REPORT