

TEST REPORT

Reference No...... : WTX22X02024069W
FCC ID : 2A45Q-WM300
Applicant : Shenzhen Kingkono electronic&technology co., ltd
Address..... : Room 615, Building No.2, Western District Block 1, Heshuikou New Village,
Heshuikou Community, Matian Street, Guangming, Shenzhen
Manufacturer : The same as Applicant
Address..... : The same as Applicant
Product Name : wireless lavalier microphone
Model No...... : WM300
Standards : FCC Part 15.236
Date of Receipt sample : 2022-02-22
Date of Test..... : 2022-02-22 to 2022-03-07
Date of Issue : 2022-03-07
Test Report Form No. : WTX_Part 15_236W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

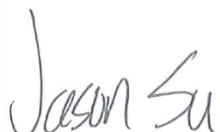
Prepared By:

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Tested by:



Jason Su

Approved by:



Silin Chen

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Report version

Version No.	Date of issue	Description
Rev.00	2022-03-07	Original
/	/	/

1. GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	wireless lavalier microphone
Trade Name:	BALILA, HUUSMOT
Model No.:	WM300
Adding Model(s):	WM600
Rated Voltage:	DC3.7V
<p><i>Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model WM300, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p>	

Items	Description
RF Output Power:	570MHz-579.5MHz: Max. -6.043dBm (Conducted) 580MHz -589.5MHz: Max. -6.200dBm (Conducted)
Frequency Range:	570MHz-579.5MHz 580MHz -589.5MHz
Modulation:	FM
Antenna Type:	External Antenna
Antenna Gain:	2dBi
<p><i>Note: The Antenna Gain is provided by the customer and can affect the validity of results. For more information refer to the circuit diagram form and the user's manual.</i></p>	

570-579.5MHz

Frequency List					
No.	Frequency(MHz)	No.	Frequency(MHz)	No.	Frequency(MHz)
1	570	9	574	17	578
2	570.5	10	574.5	18	578.5
3	571	11	575	19	579
4	571.5	12	575.5	20	579.5
5	572	13	576	/	/
6	572.5	14	576.5	/	/
7	573	15	577	/	/
8	573.5	16	577.5	/	/

580-589.5MHz

Frequency List					
No.	Frequency(MHz)	No.	Frequency(MHz)	No.	Frequency(MHz)
1	580	9	584	17	588
2	580.5	10	584.5	18	588.5
3	581	11	585	19	589
4	581.5	12	585.5	20	589.5
5	582	13	586	/	/
6	582.5	14	586.5	/	/
7	583	15	587	/	/
8	583.5	16	587.5	/	/

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.236: Operation of wireless microphones in the bands 54-72MHz, 76-88MHz, 174-216 MHz, 470-608MHz and 614-698MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

ETSI EN 300 422-2 V2.1.2 (2017-01): Wireless Microphones; Audio PMSE up to 3GHz; Part 1: Class A Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with FCC Rules Part 15.236.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

Test Mode List		
Test Mode	Description	Remark
TM1	Transmitting	570MHz, 575MHz, 579.5MHz(Low Middle High)
TM2	Transmitting	580MHz, 585MHz, 589.5MHz(Low Middle High)

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~56 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	0.3	Unshielded	Without Ferrite
3.5mm Audio input Cable	1.2	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
AC ADAPTER	XIAOMI	MDY-08-ES	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	---	$\pm 1 \times 10^{-7}$
Frequency Stability	2.3%	$\pm 5\%$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2021-03-27	2022-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2021-03-27	2022-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2021-03-27	2022-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2021-03-27	2022-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2021-03-27	2022-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2021-03-27	2022-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2021-03-27	2022-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2021-03-27	2022-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
<input checked="" type="checkbox"/> Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2021-04-12	2022-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-19	2023-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-19	2023-03-18
<input checked="" type="checkbox"/> Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2021-04-12	2022-04-11
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
SEMT-1169	Pre-amplifier	Direction	PAP-2640	14145-14153	2021-04-27	2022-04-26

		Systems Inc.				
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2021-03-27	2022-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2021-03-27	2022-03-26
<input type="checkbox"/> Chamber B: Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2021-04-12	2022-04-11
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2021-05-06	2022-05-05
<input type="checkbox"/> Chamber C: Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2021-12-03	2022-12-02
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2021-04-15	2022-04-14

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.207	Conducted Emission	Compliant
§15.236(d)(1)	Output Power Measurement	Compliant
§15.236(f)(2)	Occupied Bandwidth Emission	Compliant
§15.236(g)/ ETSI EN 300 422-1	Necessary Bandwidth Spurious emissions	Compliant
§15.236(d)(2)	Radiated Spurious Emission	Compliant
§15.236(d)(2)	Spurious Emission at Antenna Port	Compliant
§15.236(f)(3)	Frequency Stability	Compliant

Note: N/A mean not applicable.

3. RF OUTPUT POWER

3.1 Standard Applicable

According to FCC 15.236(d)(1), for low power auxiliary station operating in the 470-608MHz, and 614-698MHz bands, In the bands allocated and assigned for broadcast television and in the 600MHz service band: 50mW EIRP.

3.2 Test Procedure

- a) Set $RBW \geq EBW$
- b) Set the video bandwidth (VBW) $\geq 3 \times RBW$.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Recorded the test data

3.3 Summary of Test Results/Plots

Please refer to Appendix A

4. OCCUPIED BANDWIDTH

4.1 Standard Applicable

According to FCC 15.236(f), the operating frequency within a permissible band of operation as defined in paragraph (c) must comply with the following requirements.

- (1) The frequency selection shall be offset from the upper or lower band limits by 25kHz or an integral multiple thereof.
- (2) One or more adjacent 25kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200kHz. The operating bandwidth shall not exceed 200kHz. Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in Section 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08) (incorporated by reference, see §15.38). Emissions outside this band shall comply with the limit specified at the edges of the ETSI mask.

4.2 Test Procedure

Refer to ANSI C63.10:2013 - Clause 6.9 for measurement methods

4.4 Summary of Test Results/Plots

Please refer to Appendix B

5. RADIATED SPURIOUS EMISSION

5.1 Standard Applicable

According to FCC 15.236(g), emission within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the Spurious emissions in Section 8.4 of ETSI EN 300422-1. Emissions outside this band shall comply with the limit specified at the edges of the ETSI mask.

5.2 Test Procedure

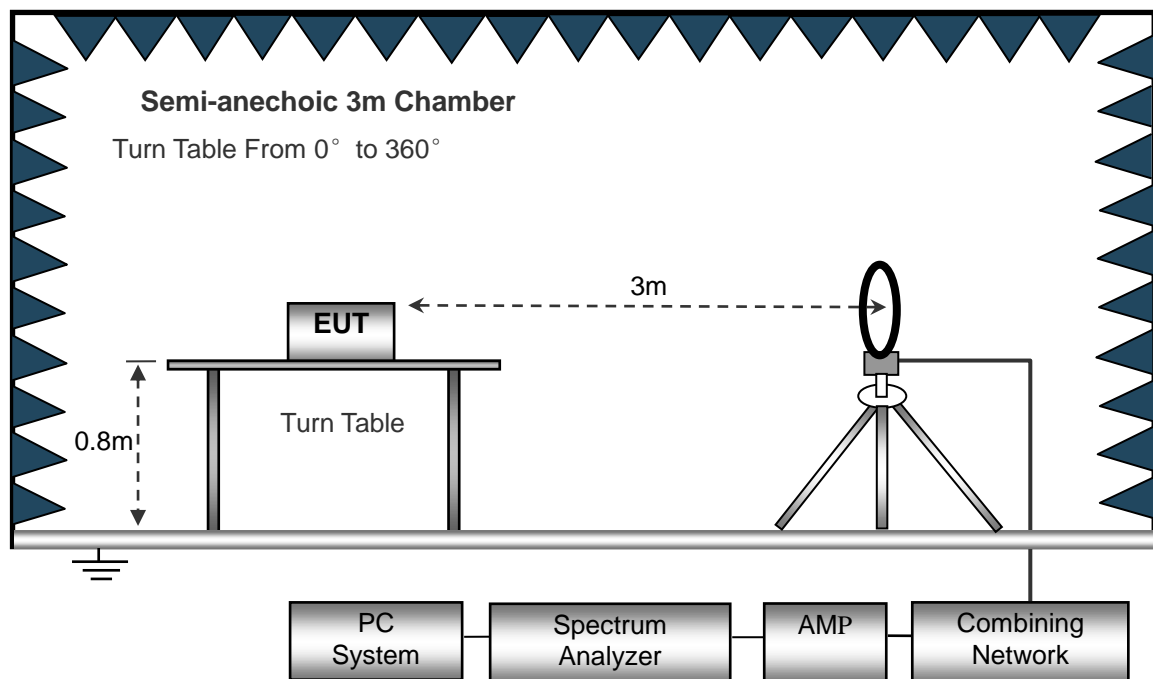
The setup of EUT is according with ANSI C63.10-2013 measurement procedure.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

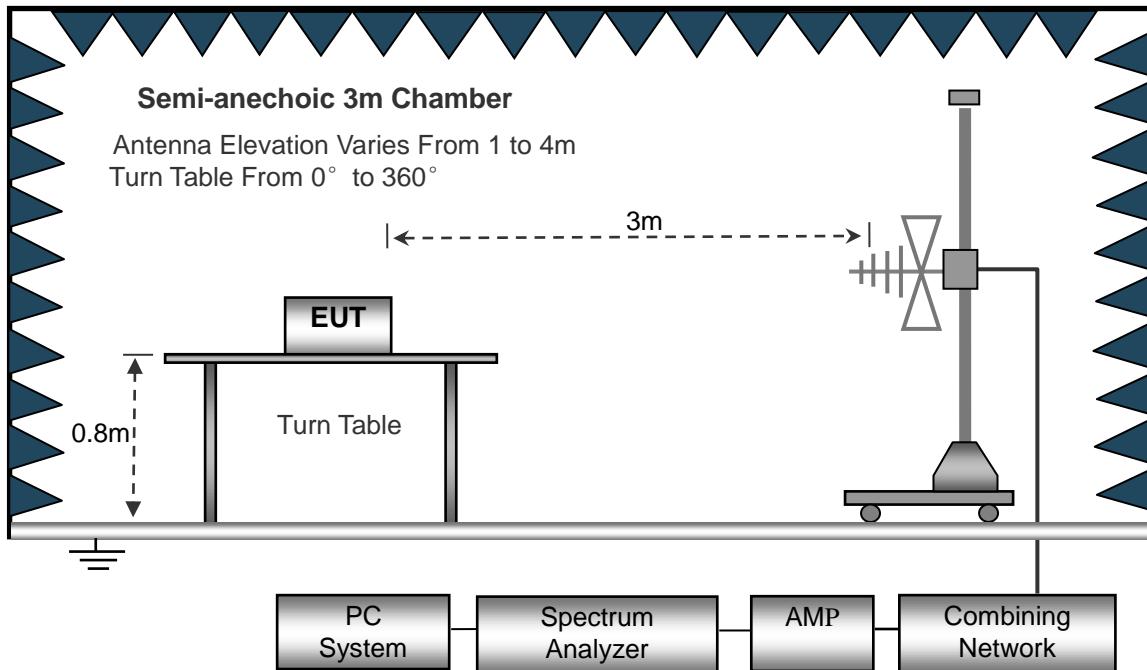
The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

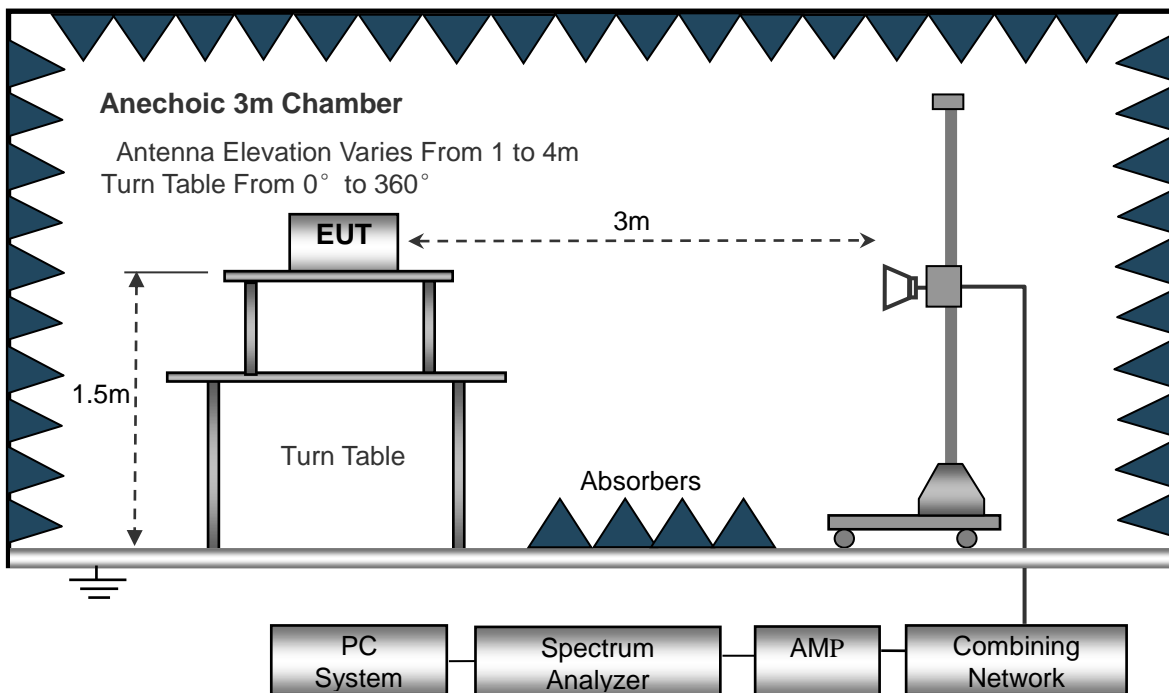
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz
 RBW=10KHz,
 VBW =30KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak

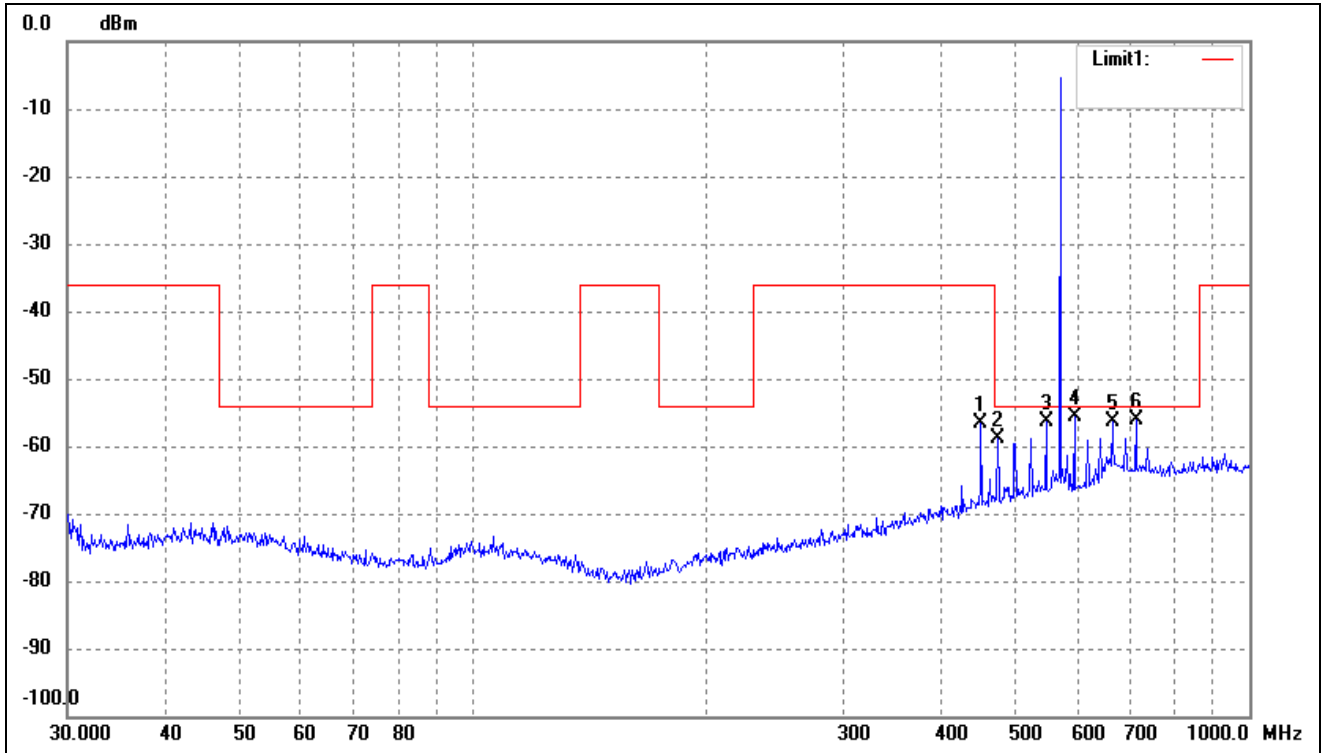
Frequency :30MHz-1GHz
 RBW=120KHz,
 VBW=300KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, QP

Frequency :Above 1GHz
 RBW=1MHz,
 VBW=3MHz(Peak), 10Hz(AV)
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, AV

5.3 Summary of Test Results/Plots

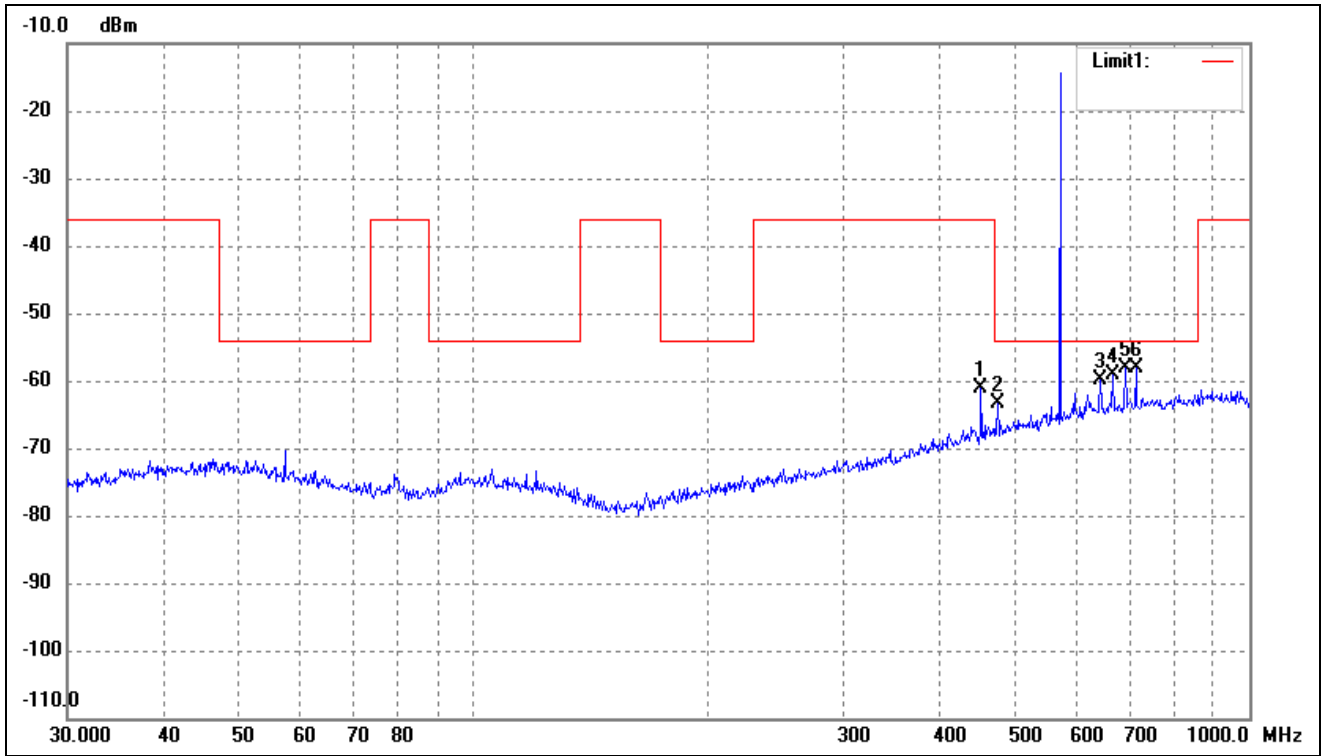
According to the data below, the FCC Part 15.236 standards, and had the worst margin of:
570-579.5MHz

Test Channel	Low	Polarity:	Horizontal
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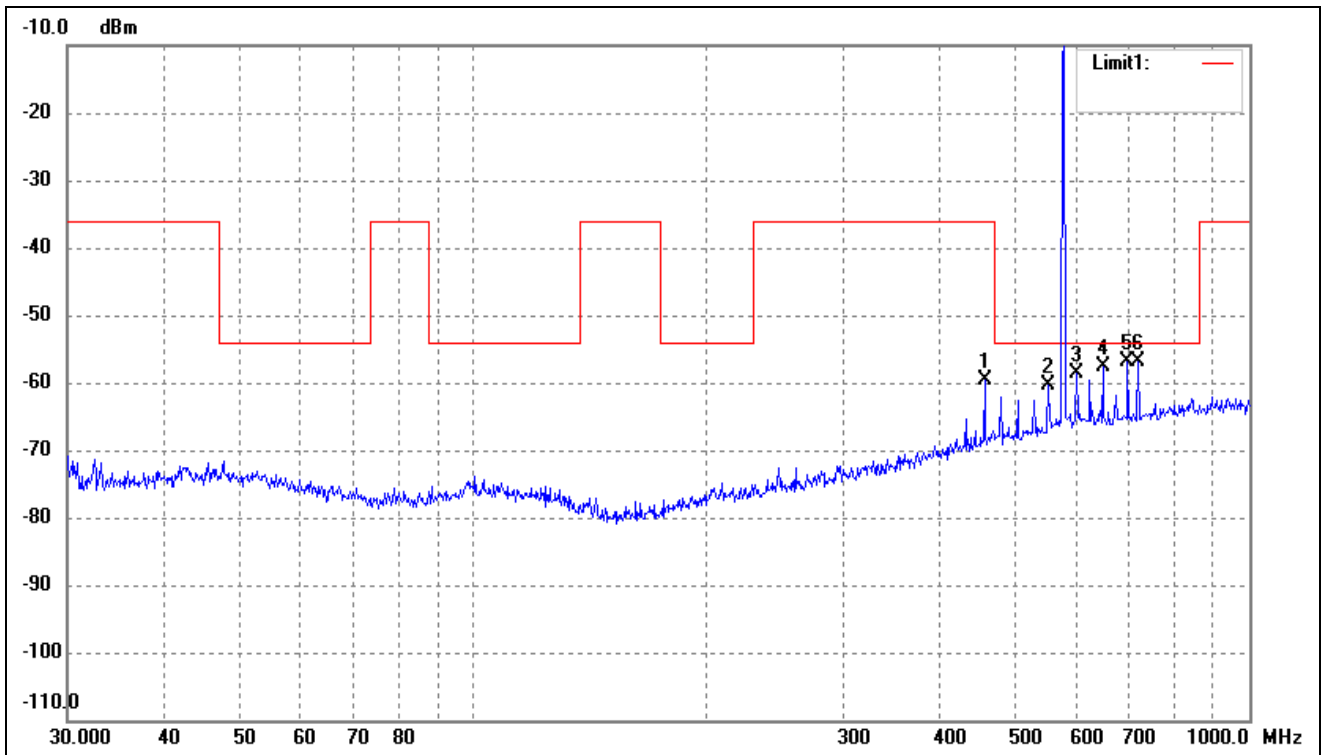
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	451.1350	-65.83	9.27	-56.56	-36.00	-20.56	-	-	peak
2	473.8347	-68.75	9.84	-58.91	-54.00	-4.91	-	-	peak
3	547.0977	-67.64	11.28	-56.36	-54.00	-2.36	-	-	peak
4	595.1329	-67.65	12.09	-55.56	-54.00	-1.56	-	-	peak
5	665.8035	-69.36	12.88	-56.48	-54.00	-2.48	-	-	peak
6	714.1734	-69.51	13.32	-56.19	-54.00	-2.19	-	-	peak

Test Channel	Low	Polarity:	Vertical
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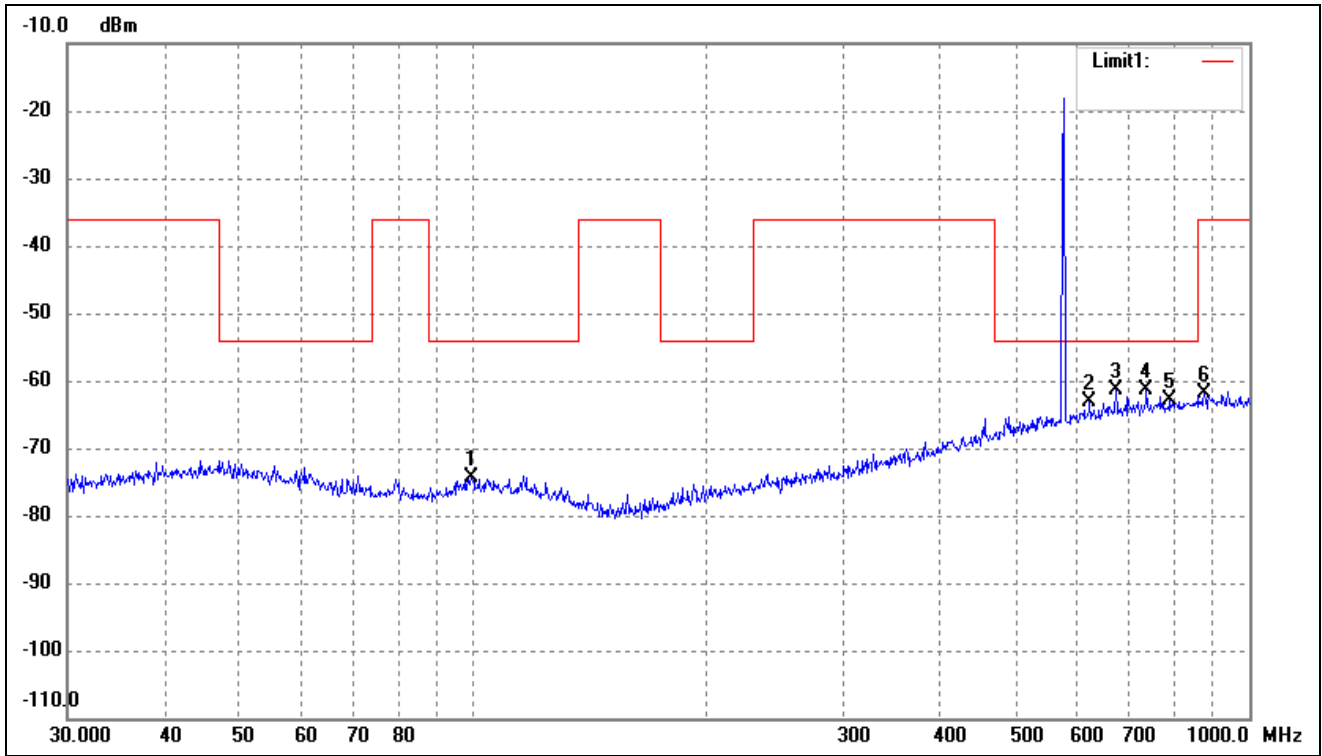
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	451.1350	-70.49	9.27	-61.22	-36.00	-25.22	-	-	peak
2	473.8347	-73.28	9.84	-63.44	-54.00	-9.44	-	-	peak
3	642.8613	-72.57	12.64	-59.93	-54.00	-5.93	-	-	peak
4	665.8035	-71.92	12.88	-59.04	-54.00	-5.04	-	-	peak
5	691.9867	-71.17	13.14	-58.03	-54.00	-4.03	-	-	peak
6	714.1734	-71.38	13.32	-58.06	-54.00	-4.06	-	-	peak

Test Channel	Middle	Polarity:	Horizontal
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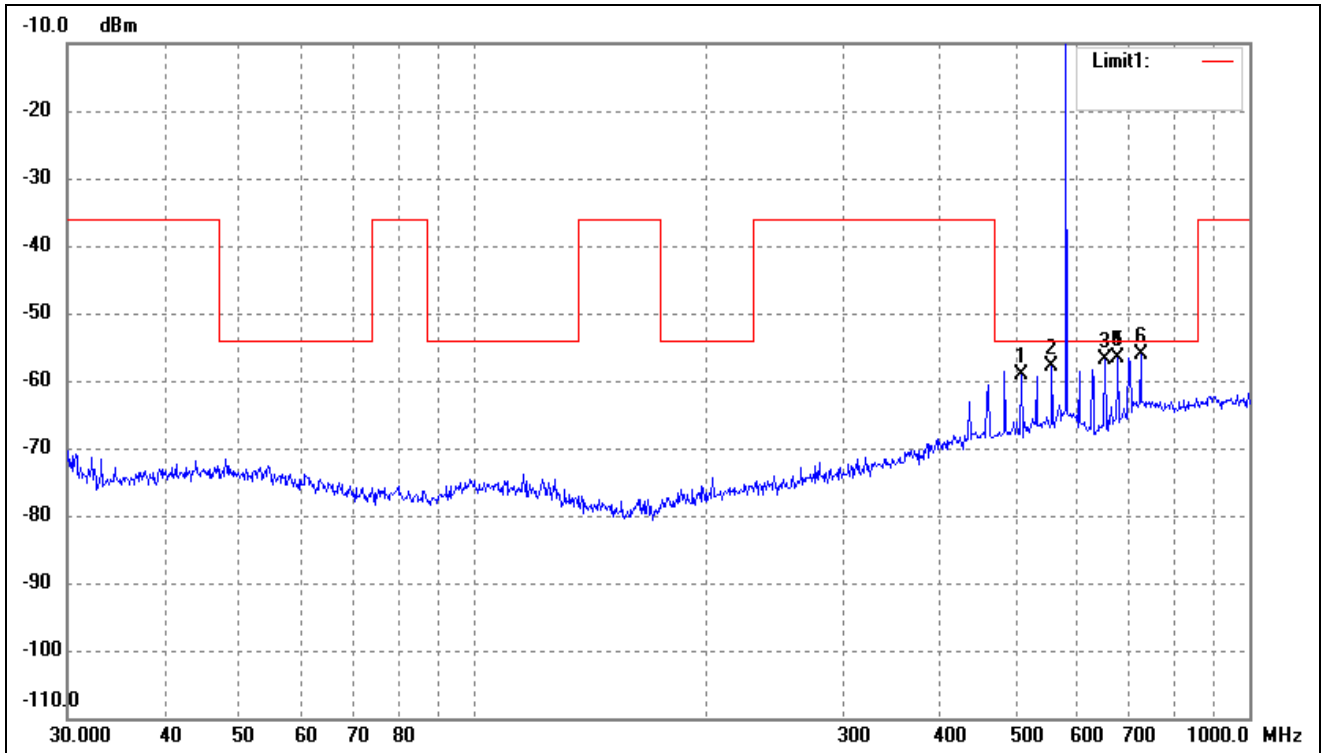
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	455.9058	-69.06	9.39	-59.67	-36.00	-23.67	-	-	peak
2	550.9480	-71.80	11.35	-60.45	-54.00	-6.45	-	-	peak
3	599.3213	-70.89	12.16	-58.73	-54.00	-4.73	-	-	peak
4	647.3856	-70.25	12.69	-57.56	-54.00	-3.56	-	-	peak
5	696.8567	-70.11	13.20	-56.91	-54.00	-2.91	-	-	peak
6	719.1995	-70.26	13.35	-56.91	-54.00	-2.91	-	-	peak

Test Channel	Middle	Polarity:	Vertical
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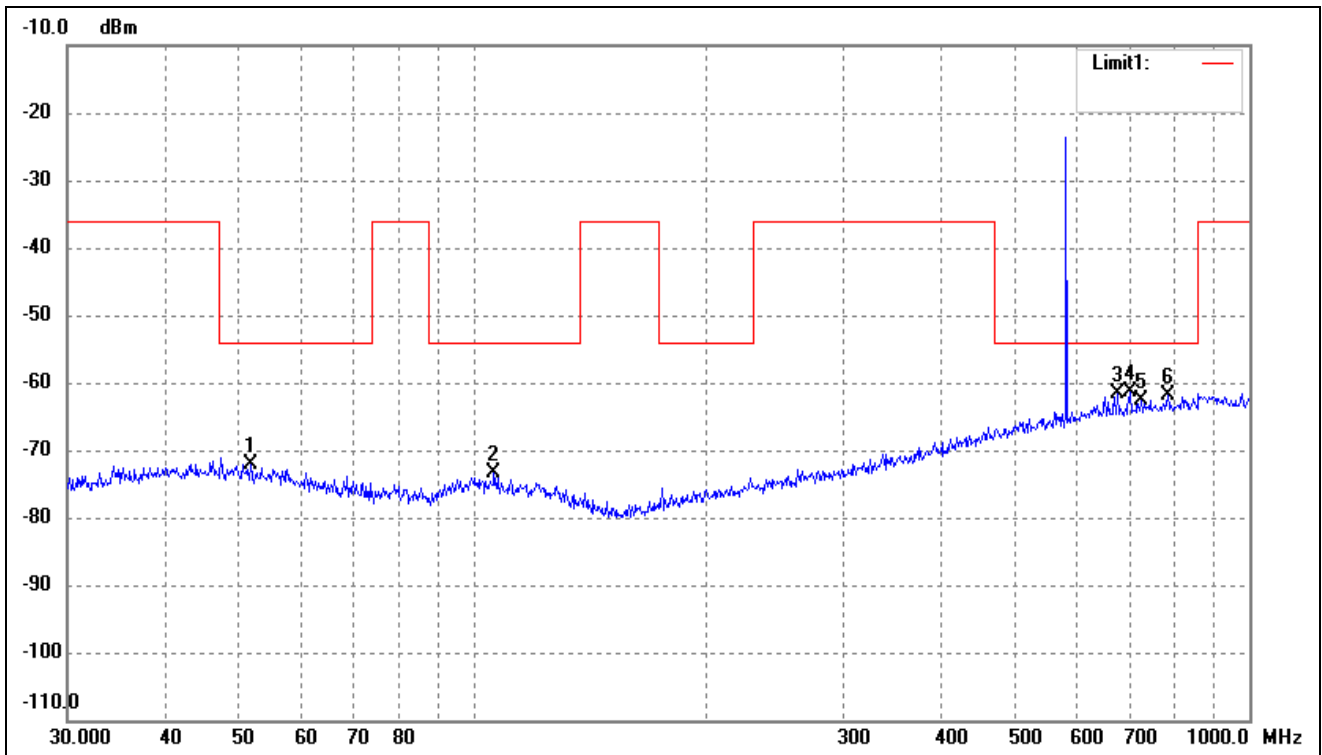
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	99.5281	-77.30	2.99	-74.31	-54.00	-20.31	-	-	peak
2	622.8900	-75.62	12.42	-63.20	-54.00	-9.20	-	-	peak
3	672.8445	-74.44	12.95	-61.49	-54.00	-7.49	-	-	peak
4	737.0714	-74.82	13.47	-61.35	-54.00	-7.35	-	-	peak
5	790.6188	-76.61	13.83	-62.78	-54.00	-8.78	-	-	peak
6	875.2470	-76.30	14.37	-61.93	-36.00	-25.93	-	-	peak

Test Channel	High	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	508.2582	-69.75	10.64	-59.11	-54.00	-5.11	-	-	peak
2	556.7744	-69.22	11.45	-57.77	-54.00	-3.77	-	-	peak
3	651.9417	-69.58	12.74	-56.84	-54.00	-2.84	-	-	peak
4	677.5798	-69.64	13.00	-56.64	-54.00	-2.64	-	-	peak
5	677.5798	-69.64	13.00	-56.64	-54.00	-2.64	-	-	peak
6	724.2611	-69.48	13.39	-56.09	-54.00	-2.09	-	-	peak

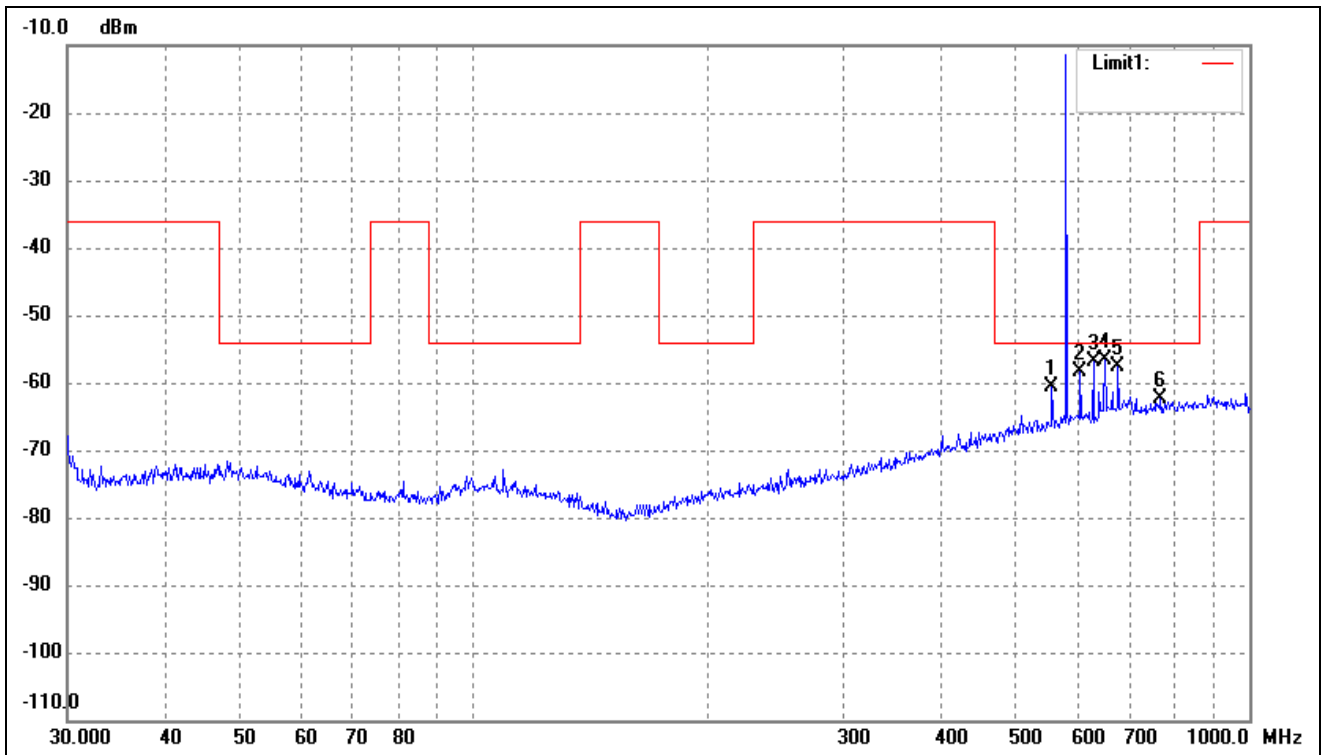
Test Channel	High	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	51.6616	-76.80	4.60	-72.20	-54.00	-18.20	-	-	peak
2	106.3850	-76.43	2.98	-73.45	-54.00	-19.45	-	-	peak
3	677.5798	-74.61	13.00	-61.61	-54.00	-7.61	-	-	peak
4	701.7610	-74.70	13.24	-61.46	-54.00	-7.46	-	-	peak
5	726.8052	-76.00	13.41	-62.59	-54.00	-8.59	-	-	peak
6	785.0935	-75.70	13.80	-61.90	-54.00	-7.90	-	-	peak

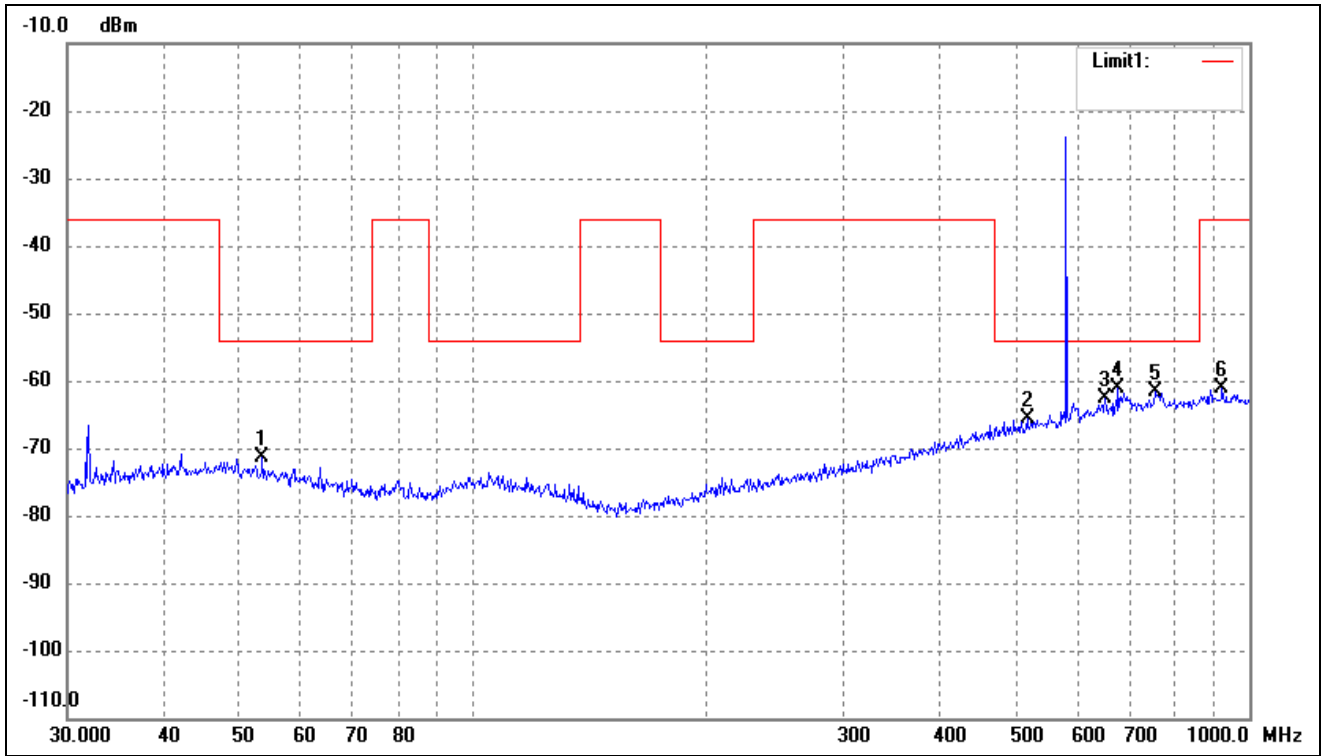
580-589.5MHz

Test Channel	Low	Polarity:	Horizontal
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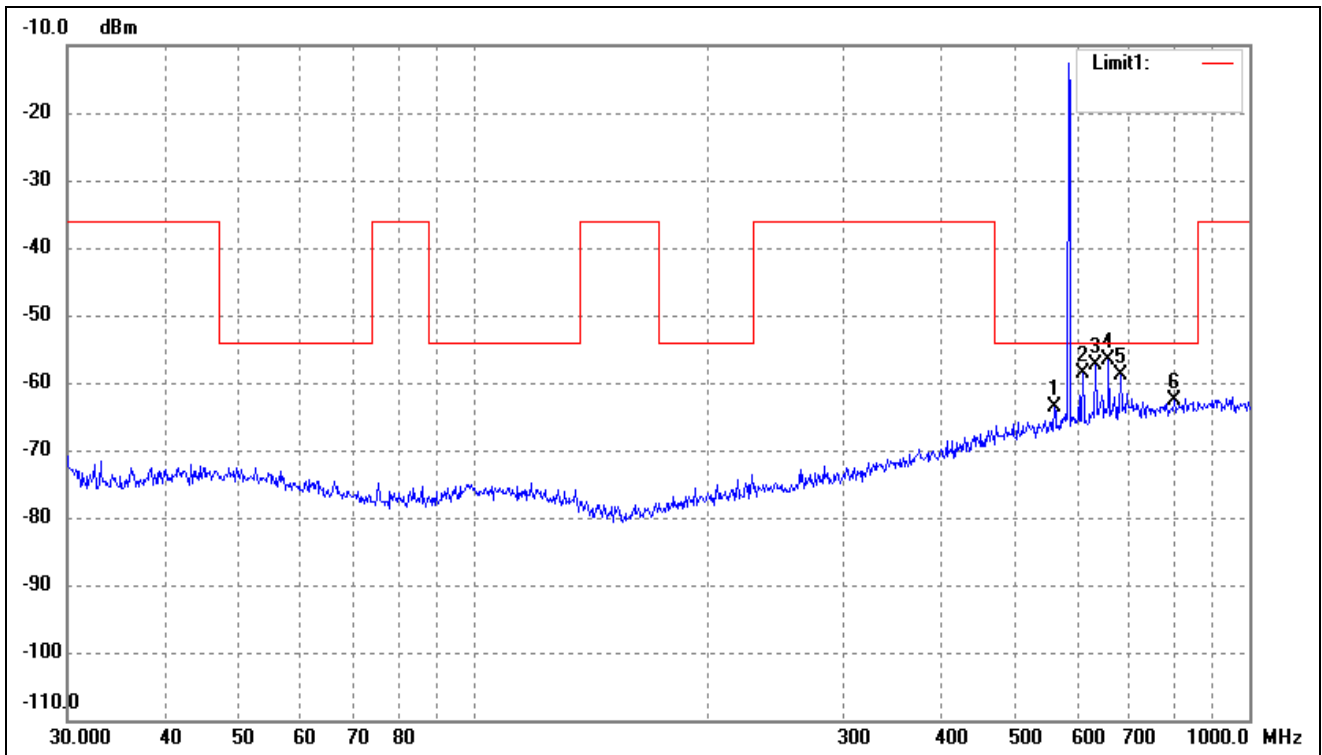
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	556.7744	-72.13	11.45	-60.68	-54.00	-6.68	-	-	peak
2	605.6592	-70.60	12.23	-58.37	-54.00	-4.37	-	-	peak
3	629.4772	-69.27	12.49	-56.78	-54.00	-2.78	-	-	peak
4	651.9417	-69.44	12.74	-56.70	-54.00	-2.70	-	-	peak
5	677.5798	-70.58	13.00	-57.58	-54.00	-3.58	-	-	peak
6	768.7482	-75.98	13.69	-62.29	-54.00	-8.29	-	-	peak

Test Channel	Low	Polarity:	Vertical
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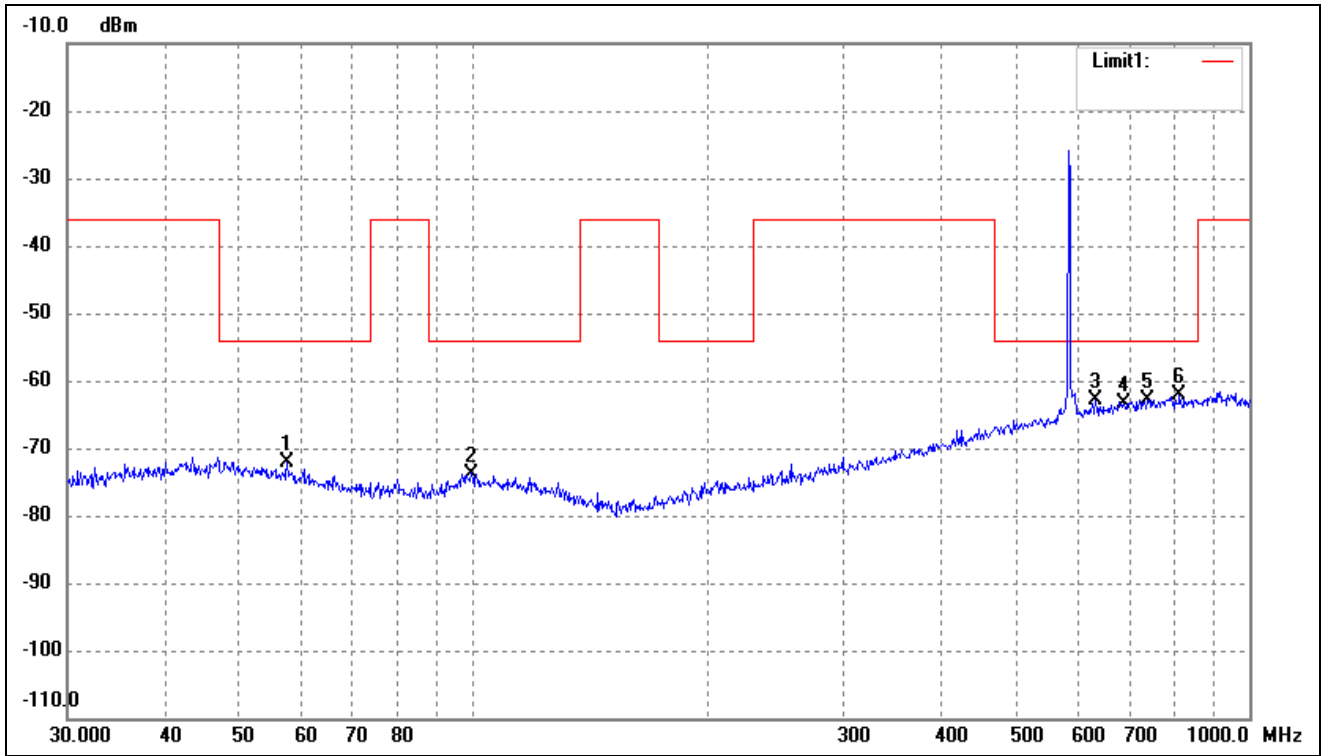
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	53.5052	-75.61	4.33	-71.28	-54.00	-17.28	-	-	peak
2	517.2480	-76.48	10.78	-65.70	-54.00	-11.70	-	-	peak
3	651.9416	-75.27	12.74	-62.53	-54.00	-8.53	-	-	peak
4	677.5797	-74.23	13.00	-61.23	-54.00	-7.23	-	-	peak
5	755.3872	-75.31	13.60	-61.71	-54.00	-7.71	-	-	peak
6	922.5157	-75.68	14.47	-61.21	-36.00	-25.21	-	-	peak

Test Channel	Middle	Polarity:	Horizontal
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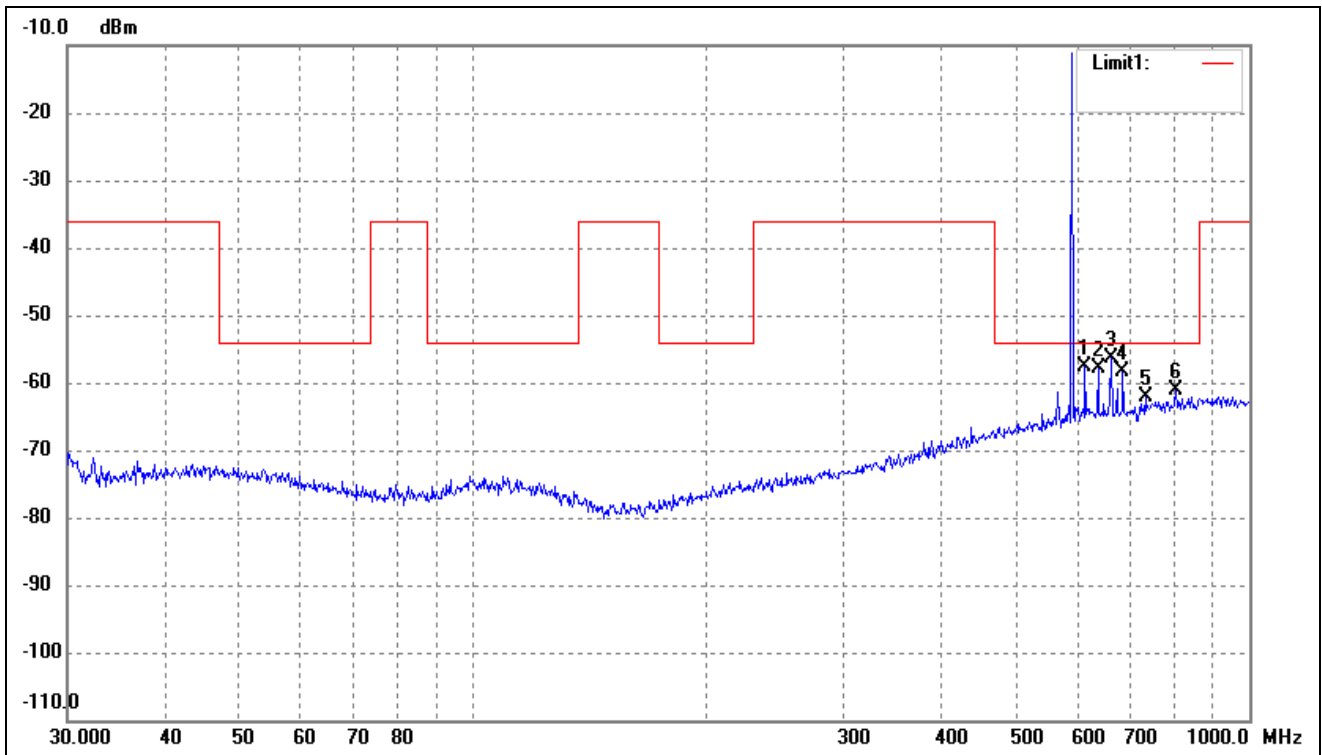
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	560.6928	-75.14	11.51	-63.63	-54.00	-9.63	-	-	peak
2	609.9217	-70.79	12.28	-58.51	-54.00	-4.51	-	-	peak
3	633.9073	-69.92	12.54	-57.38	-54.00	-3.38	-	-	peak
4	658.8362	-69.50	12.81	-56.69	-54.00	-2.69	-	-	peak
5	682.3485	-71.93	13.05	-58.88	-54.00	-4.88	-	-	peak
6	801.7863	-76.45	13.90	-62.55	-54.00	-8.55	-	-	peak

Test Channel	Middle	Polarity:	Vertical
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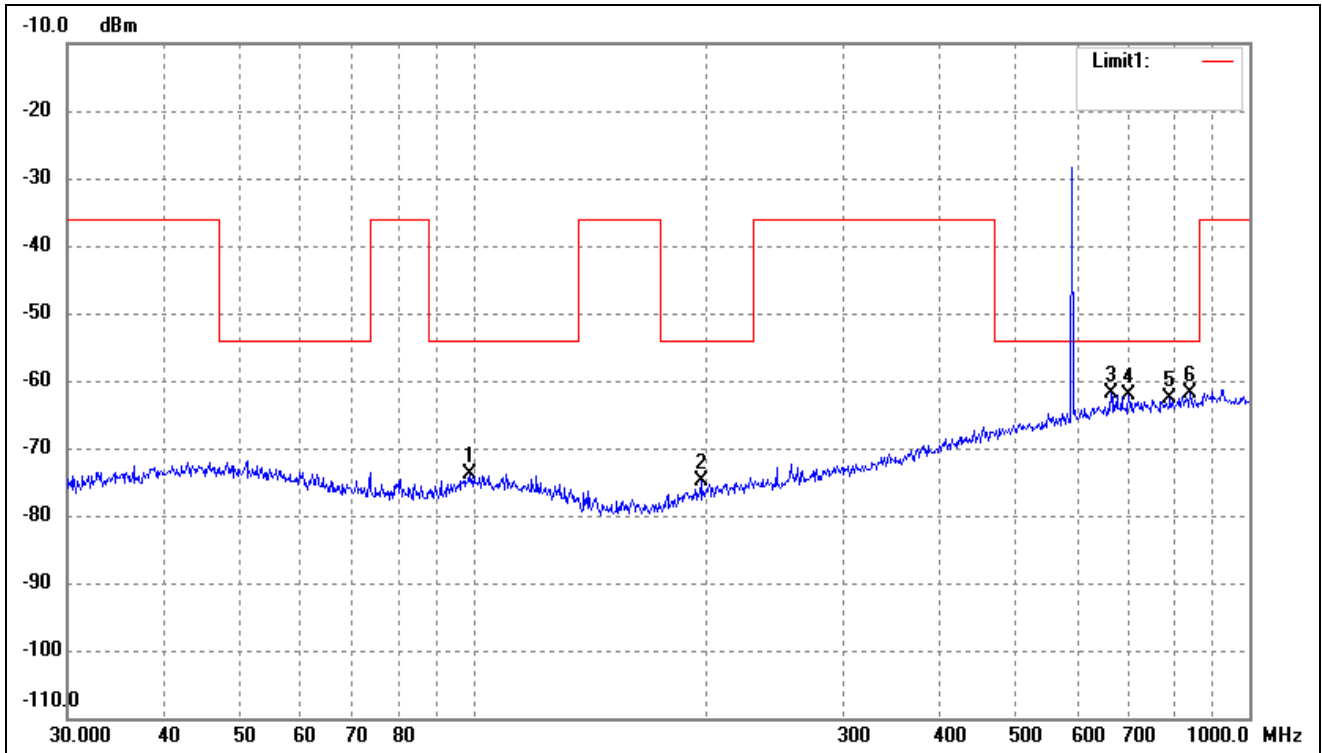
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	57.5939	-75.92	3.73	-72.19	-54.00	-18.19	-	-	peak
2	99.5281	-76.74	2.99	-73.75	-54.00	-19.75	-	-	peak
3	633.9073	-75.45	12.54	-62.91	-54.00	-8.91	-	-	peak
4	689.5644	-76.48	13.13	-63.35	-54.00	-9.35	-	-	peak
5	739.6605	-76.29	13.49	-62.80	-54.00	-8.80	-	-	peak
6	813.1116	-76.11	13.97	-62.14	-54.00	-8.14	-	-	peak

Test Channel	High	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	614.2142	-69.91	12.33	-57.58	-54.00	-3.58	-	-	peak
2	638.3686	-70.35	12.59	-57.76	-54.00	-3.76	-	-	peak
3	663.4729	-69.18	12.86	-56.32	-54.00	-2.32	-	-	peak
4	687.1507	-71.39	13.10	-58.29	-54.00	-4.29	-	-	peak
5	734.4913	-75.47	13.45	-62.02	-54.00	-8.02	-	-	peak
6	804.6028	-75.16	13.92	-61.24	-54.00	-7.24	-	-	peak

Test Channel	High	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	98.8326	-76.83	2.86	-73.97	-54.00	-19.97	-	-	peak
2	196.5098	-76.91	1.99	-74.92	-54.00	-20.92	-	-	peak
3	663.4729	-74.74	12.86	-61.88	-54.00	-7.88	-	-	peak
4	699.3046	-75.31	13.22	-62.09	-54.00	-8.09	-	-	peak
5	790.6188	-76.57	13.83	-62.74	-54.00	-8.74	-	-	peak
6	839.1818	-76.03	14.12	-61.91	-54.00	-7.91	-	-	peak

Remark: '- 'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

570-579.5MHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel-570MHz						
1140.000	-32.26	-2.69	-34.95	-30.00	-4.95	H
1710.000	-41.59	-0.26	-41.85	-30.00	-11.85	H
2280.000	-54.39	0.94	-53.45	-30.00	-23.45	H
1140.000	-43.95	-2.69	-46.64	-30.00	-16.64	V
1710.000	-50.69	-0.26	-50.95	-30.00	-20.95	V
2280.000	-54.47	0.94	-53.53	-30.00	-23.53	V
Middle Channel-575MHz						
1149.995	-35.88	-2.64	-38.52	-30.00	-8.52	H
1724.082	-51.36	-0.23	-51.59	-30.00	-21.59	H
2300.000	-54.22	0.97	-53.25	-30.00	-23.25	H
1150.000	-56.69	-2.63	-59.32	-30.00	-29.32	V
1725.000	-57.19	-0.22	-57.41	-30.00	-27.41	V
2300.000	-55.74	0.97	-54.77	-30.00	-24.77	V
High Channel-579.5MHz						
1158.266	-37.43	-2.59	-40.02	-30.00	-10.02	H
1738.500	-45.79	-0.19	-45.98	-30.00	-15.98	H
2318.000	-55.26	1.00	-54.26	-30.00	-24.26	H
1159.000	-55.04	-2.59	-57.63	-30.00	-27.63	V
1738.500	-53.36	-0.19	-53.55	-30.00	-23.55	V
2318.000	-54.66	1.00	-53.66	-30.00	-23.66	V

580-589.5MHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel-570MHz						
1160.000	-36.16	-2.57	-38.73	-30.00	-8.73	H
1740.000	-44.16	-0.18	-44.34	-30.00	-14.34	H
2320.000	-54.58	1.00	-53.58	-30.00	-23.58	H
1160.000	-48.80	-2.57	-51.37	-30.00	-21.37	V
1750.000	-45.82	-0.15	-45.97	-30.00	-15.97	V
2320.000	-53.79	1.00	-52.79	-30.00	-22.79	V
Middle Channel-585MHz						
1168.689	-36.49	-2.53	-39.02	-30.00	-9.02	H
1755.000	-43.45	-0.13	-43.58	-30.00	-13.58	H
2340.000	-55.05	1.03	-54.02	-30.00	-24.02	H
1170.000	-53.86	-2.52	-56.38	-30.00	-26.38	V
1755.000	-53.74	-0.13	-53.87	-30.00	-23.87	V
2340.000	-56.45	1.03	-55.42	-30.00	-25.42	V
High Channel-589.5MHz						
1179.000	-36.24	-2.48	-38.72	-30.00	-8.72	H
1767.877	-40.06	-0.10	-40.16	-30.00	-10.16	H
2358.000	-52.51	1.05	-51.46	-30.00	-21.46	H
1179.000	-50.39	-2.48	-52.87	-30.00	-22.87	V
1768.500	-56.96	-0.10	-57.06	-30.00	-27.06	V
2358.000	-55.43	1.05	-54.38	-30.00	-24.38	V

6. NECESSARY BANDWIDTH

6.1 Standard Applicable

According to §15.236(g), emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in §8.3 of ETSI EN 300 422-1, Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25MHz to 3GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1.

According to ETSI EN 300 422-2 V2.1.1 section 8.3, the transmitter output spectrum shall be within the mask defined in the following figure.



Spectrum mask for digital systems below 2GHz

For the measurement uncertainty, see clause 10. The -90 dBc point shall be $fc \pm 5B$ from fc measured with an average detector.

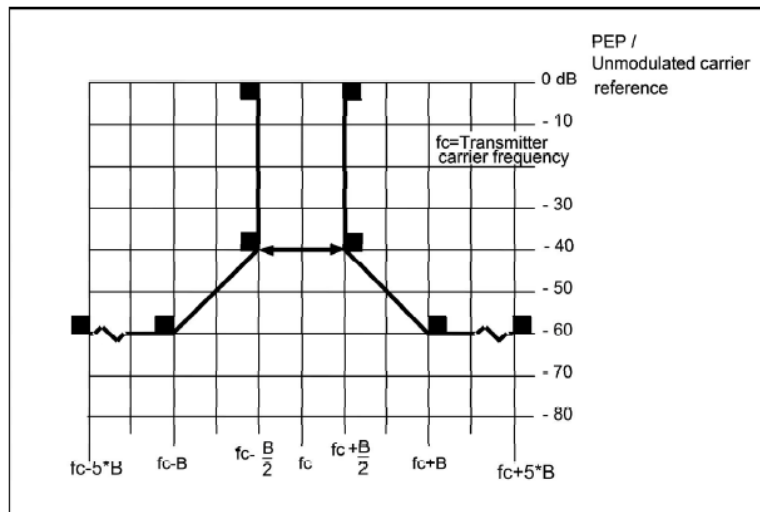


Figure 5: Spectrum mask for digital systems above 2 GHz

Reference No.: WTX22X02024069W

6.2 Test Procedure

Please refer to ETSI EN 300 422-2 V2.1.1 section 8.3

6.3 Summary of Test Results/Plots

Please refer to Appendix C

7. FREQUENCY STABILITY

7.1 Standard Applicable

According to FCC 15.236(f)(3), the frequency tolerance of the carrier signal shall be maintained within $\pm 0.005\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. Battery operated equipment shall be tested using a new battery.

7.2 Test Procedure

1. Setup the configuration of the ambient temperature from -30 °C to 50 °C with sufficient time. And measure the different power of the EUT with an artificial power from highest to end point voltage.
2. Set frequency counter center frequency to the right frequency needs to be measured.

7.3 Test Results/Plots

Please refer to Appendix D

8. Conducted Emissions

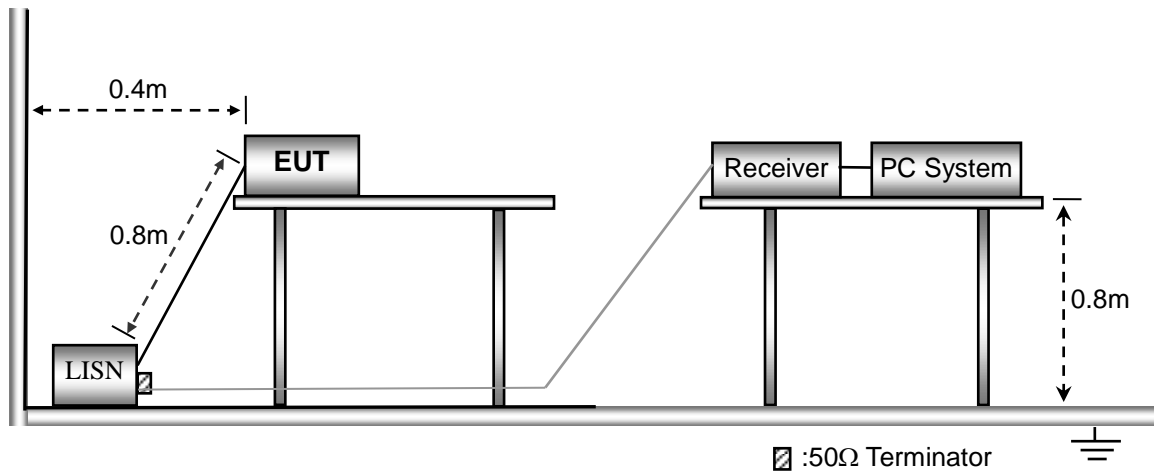
8.1 Test Procedure

The setup of EUT is according with per ANSI C63.10:2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

8.2 Basic Test Setup Block Diagram



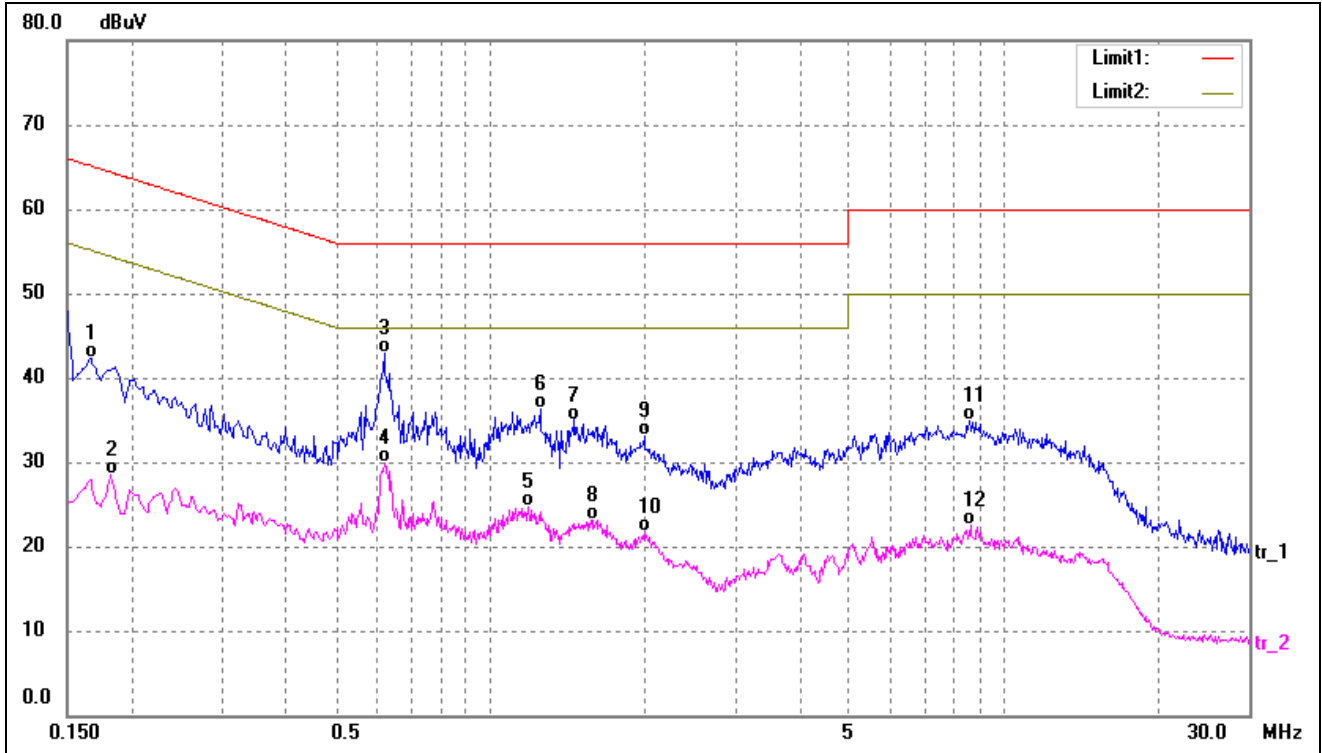
8.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Quasi-Peak Adapter Bandwidth	9kHz
Quasi-Peak Adapter Mode	Normal

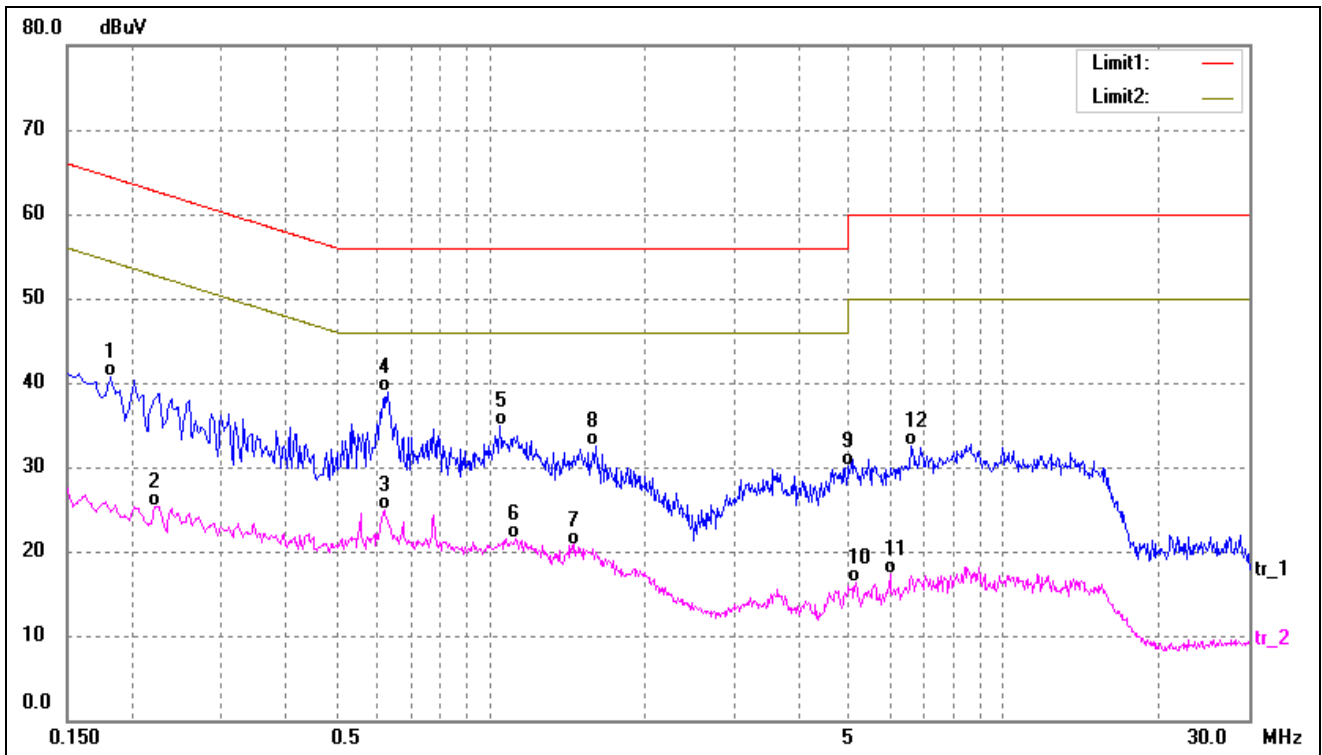
8.4 Summary of Test Results/Plots

Test Mode	TM1(AC120V 60Hz)	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	31.86	10.37	42.23	65.15	-22.92	QP
2	0.1819	18.15	10.37	28.52	54.39	-25.87	AVG
3*	0.6220	32.64	10.33	42.97	56.00	-13.03	QP
4	0.6220	19.57	10.33	29.90	46.00	-16.10	AVG
5	1.1860	14.15	10.48	24.63	46.00	-21.37	AVG
6	1.2500	25.78	10.45	36.23	56.00	-19.77	QP
7	1.4620	24.63	10.37	35.00	56.00	-21.00	QP
8	1.5859	12.89	10.31	23.20	46.00	-22.80	AVG
9	1.9940	22.89	10.13	33.02	56.00	-22.98	QP
10	1.9940	11.57	10.13	21.70	46.00	-24.30	AVG
11	8.5740	24.92	9.91	34.83	60.00	-25.17	QP
12	8.6059	12.53	9.91	22.44	50.00	-27.56	AVG

Test Mode	TM1(AC120V 60Hz)	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1820	30.39	10.37	40.76	64.39	-23.63	QP
2	0.2220	14.94	10.36	25.30	52.74	-27.44	AVG
3	0.6220	14.53	10.33	24.86	46.00	-21.14	AVG
4*	0.6300	28.48	10.34	38.82	56.00	-17.18	QP
5	1.0460	24.42	10.54	34.96	56.00	-21.04	QP
6	1.1220	10.94	10.51	21.45	46.00	-24.55	AVG
7	1.4580	10.43	10.37	20.80	46.00	-25.20	AVG
8	1.6020	22.26	10.30	32.56	56.00	-23.44	QP
9	4.9900	20.12	10.00	30.12	56.00	-25.88	QP
10	5.1460	6.22	10.00	16.22	50.00	-33.78	AVG
11	5.9940	7.29	9.97	17.26	50.00	-32.74	AVG
12	6.6060	22.56	9.96	32.52	60.00	-27.48	QP

APPENDIX SUMMARY

Project No.	WTX22X02024069W	Test Engineer	Dashan
Start date	2022/02/25	Finish date	2022/03/04
Temperature	23°C	Humidity	34%
RF specifications	570-579.5MHz; 580-589.5MHz		

APPENDIX	Description of Test Item	Result
A	RF OUTPUT POWER	Compliant
B	OCCUPIED BANDWIDTH	Compliant
C	NECESSARY BANDWIDTH	Compliant
D	FREQUENCY STABILITY	Compliant

APPENDIX A

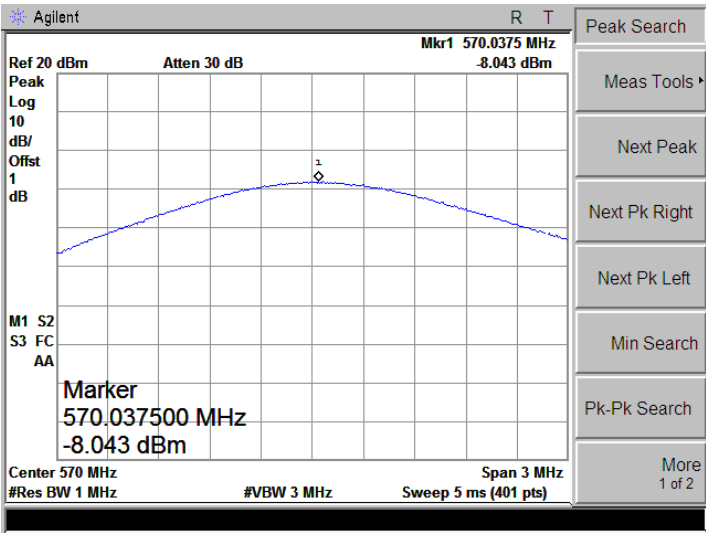
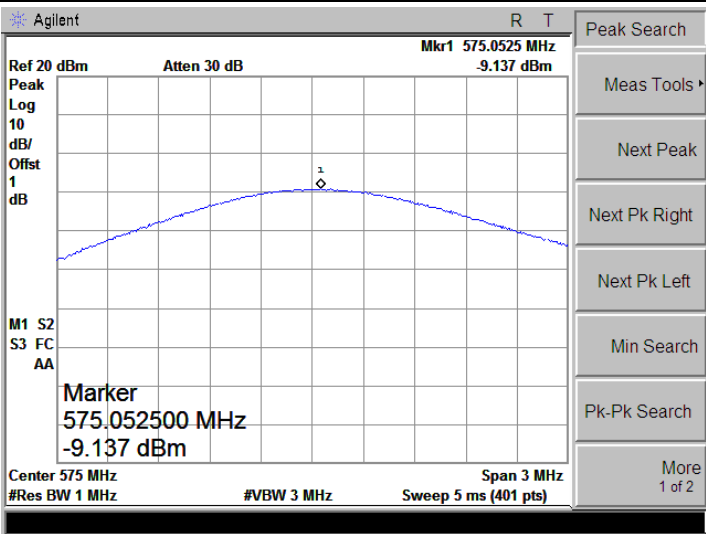
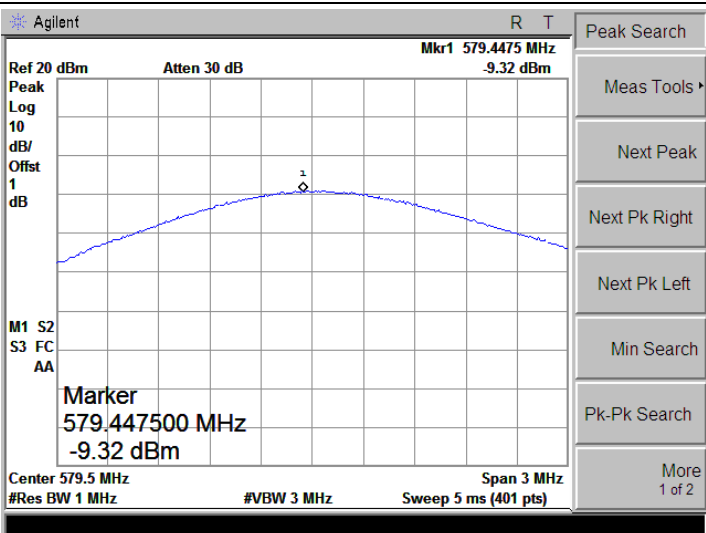
570-579.5MHz

Channel	Frequency (MHz)	Measured Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
Low	570	-8.043	2	-6.043	17
Middle	575	-9.137	2	-7.137	17
High	579.5	-9.320	2	-7.320	17

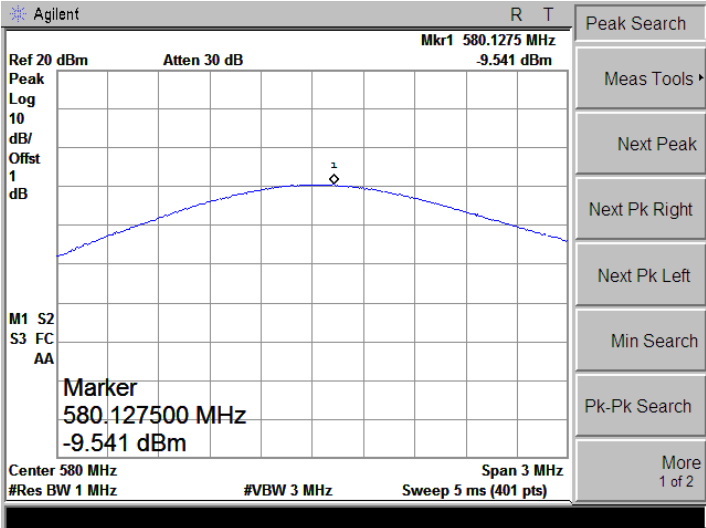
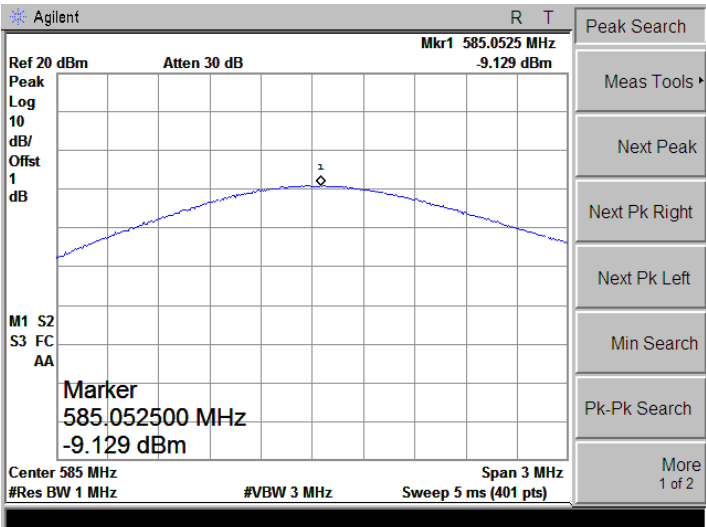
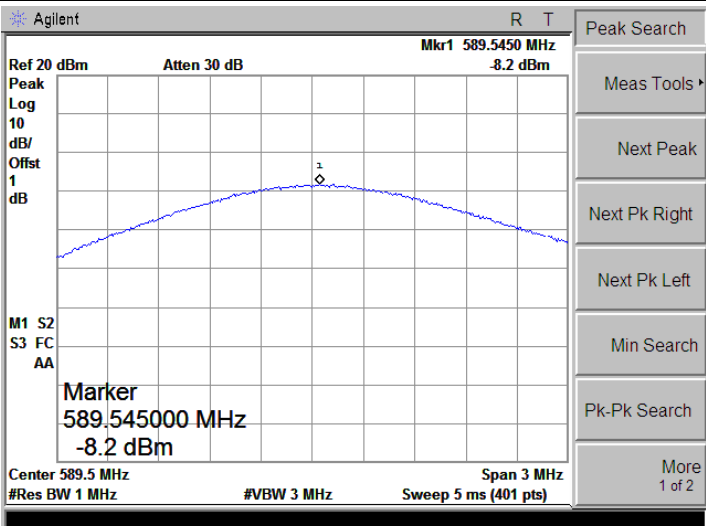
580-589.5MHz

Channel	Frequency (MHz)	Measured Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
Low	580	-9.541	2	-7.541	17
Middle	585	-9.129	2	-7.129	17
High	589.5	-8.200	2	-6.200	17

570-579.5MHz

<p>Low</p>	 <p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 570.0375 MHz -8.043 dBm Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2 M1 S2 S3 FC AA Marker 570.037500 MHz -8.043 dBm Center 570 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>
<p>Middle</p>	 <p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 575.0525 MHz -9.137 dBm Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2 M1 S2 S3 FC AA Marker 575.052500 MHz -9.137 dBm Center 575 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>
<p>High</p>	 <p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 579.4475 MHz -9.32 dBm Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2 M1 S2 S3 FC AA Marker 579.447500 MHz -9.32 dBm Center 579.5 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>

580-589.5MHz

<p>Low</p>	 <p>Agilent R T</p> <p>Ref 20 dBm Atten 30 dB Mkr1 580.1275 MHz -9.541 dBm</p> <p>Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2</p> <p>Marker 580.127500 MHz -9.541 dBm</p> <p>Center 580 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>
<p>Middle</p>	 <p>Agilent R T</p> <p>Ref 20 dBm Atten 30 dB Mkr1 585.0525 MHz -9.129 dBm</p> <p>Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2</p> <p>Marker 585.052500 MHz -9.129 dBm</p> <p>Center 585 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>
<p>High</p>	 <p>Agilent R T</p> <p>Ref 20 dBm Atten 30 dB Mkr1 589.5450 MHz -8.2 dBm</p> <p>Peak Search Meas Tools Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search More 1 of 2</p> <p>Marker 589.545000 MHz -8.2 dBm</p> <p>Center 589.5 MHz Span 3 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 5 ms (401 pts)</p>

APPENDIX B

570-579.5MHz

Test Channel	Frequency (MHz)	-26dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)
Low	570	174.381	130.6167	200
Middle	575	175.757	131.6993	200
High	579.5	172.651	130.0731	200

580-589.5MHz

Test Channel	Frequency (MHz)	-26dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)
Low	580	174.870	128.6544	200
Middle	585	175.073	130.1014	200
High	589.5	170.998	130.1269	200

570-579.5MHz

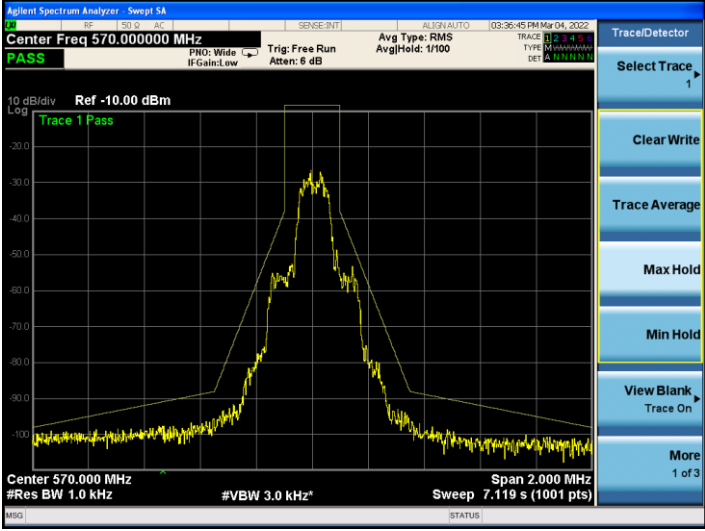
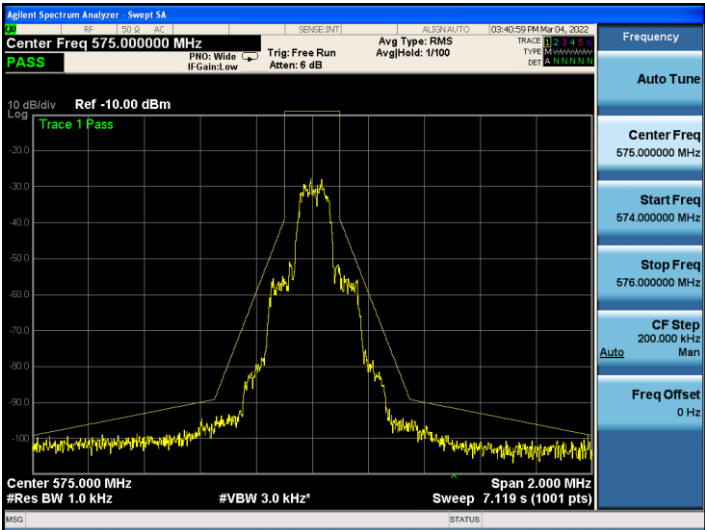
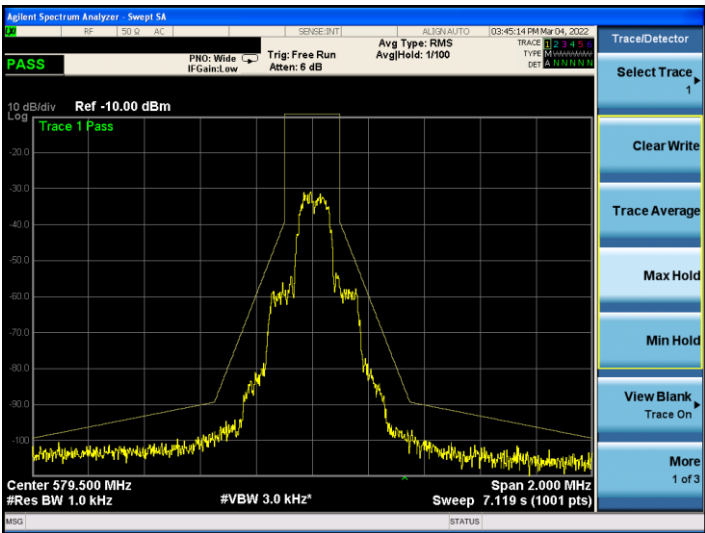
<p>Low</p>	
<p>Middle</p>	
<p>High</p>	

580-589.5MHz

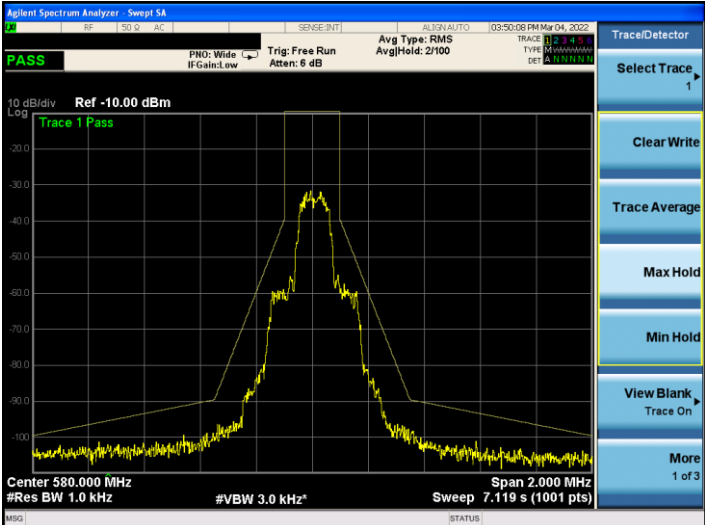
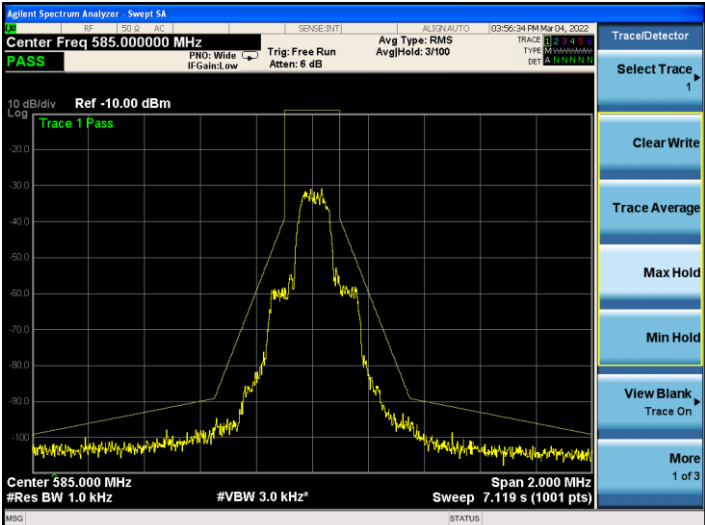
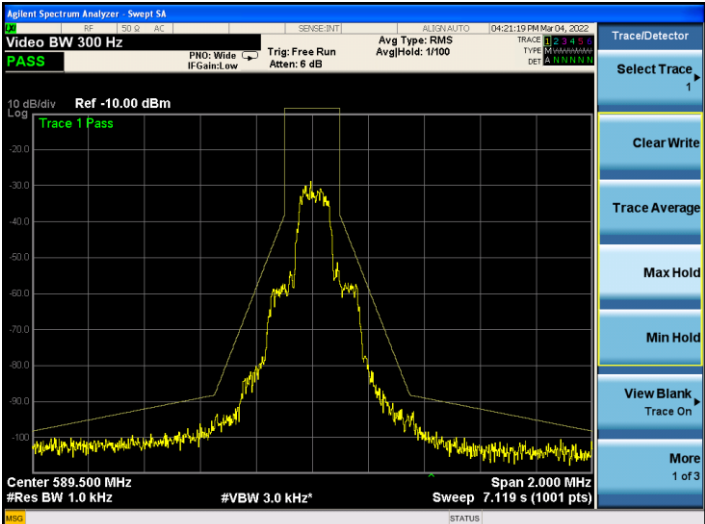
<p>Low</p>	<p>Agilent R T</p> <p>Ch Freq 580 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Center 580.000000 MHz</p> <p>Ref 10 dBm Atten 15 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 580 MHz Span 500 kHz #Res BW 10 kHz #VBW 30 kHz Sweep 7.433 ms (401 pts)</p> <p>Occupied Bandwidth 128.6544 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 6.473 kHz x dB Bandwidth 174.870 kHz</p> <p>Freq/Channel</p> <p>Center Freq 580.000000 MHz</p> <p>Start Freq 579.750000 MHz</p> <p>Stop Freq 580.250000 MHz</p> <p>CF Step 50.000000 kHz Auto Man</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>
<p>Middle</p>	<p>Agilent R T</p> <p>Ch Freq 585 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Center 585.000000 MHz</p> <p>Ref 10 dBm Atten 15 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 585 MHz Span 500 kHz #Res BW 10 kHz #VBW 30 kHz Sweep 7.433 ms (401 pts)</p> <p>Occupied Bandwidth 130.1014 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 7.120 kHz x dB Bandwidth 175.073 kHz</p> <p>Trace/View</p> <p>Trace 1 2 3</p> <p>Clear Write</p> <p>Max Hold</p> <p>Min Hold</p> <p>View</p> <p>Blank</p> <p>More 1 of 2</p>
<p>High</p>	<p>Agilent R T</p> <p>Ch Freq 589.5 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Center 589.500000 MHz</p> <p>Ref 10 dBm Atten 15 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 589.5 MHz Span 500 kHz #Res BW 10 kHz #VBW 30 kHz Sweep 7.433 ms (401 pts)</p> <p>Occupied Bandwidth 130.1269 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 6.803 kHz x dB Bandwidth 170.998 kHz</p> <p>Trace/View</p> <p>Trace 1 2 3</p> <p>Clear Write</p> <p>Max Hold</p> <p>Min Hold</p> <p>View</p> <p>Blank</p> <p>More 1 of 2</p>

APPENDIX C

570-579.5MHz

<p>Low</p>	
<p>Middle</p>	
<p>High</p>	

580-589.5MHz

<p>Low</p>	
<p>Middle</p>	
<p>High</p>	

APPENDIX D

570-579.5MHz

Test conditions		Frequency Error		
		570MHz	575MHz	579.5MHz
Tmin (20°C)	Vmin(3.5V)	570.0105	575.0115	579.5105
	Vmax(4.2V)	570.0109	575.0112	579.5103
T(-20°C)	Vnom(3.7V)	570.0111	575.0097	579.5113
T(-10°C)	Vnom(3.7V)	570.0115	575.0094	579.5116
T(0°C)	Vnom(3.7V)	570.0122	575.0105	579.5117
T(10°C)	Vnom(3.7V)	570.0097	575.0113	579.5119
Tnom(20°C)	Vnom(3.7V)	570.0125	575.0120	579.5123
T(30°C)	Vnom(3.7V)	570.0097	575.0115	579.5119
T(40°C)	Vnom(3.7V)	570.0122	575.0108	579.5117
T(50°C)	Vnom(3.7V)	570.0107	575.0104	579.5102
Tmax(20°C)	Vmin(3.5V)	570.0101	575.0106	579.5115
	Vmax(4.2V)	570.0093	575.0106	579.5110
Max. frequency error (ppm)		21.93	20.87	21.23
Limit (ppm)		±50ppm		
End Point		DC 3.7V		

580-589.5MHz

Test conditions		Frequency Error		
		580MHz	585MHz	589.5MHz
Tmin (20°C)	Vmin(3.5V)	580.0122	585.0120	589.5118
	Vmax(4.2V)	580.0115	585.0118	589.5115
T(-20°C)	Vnom(3.7V)	580.0116	585.0115	589.5114
T(-10°C)	Vnom(3.7V)	580.0118	585.0116	589.5122
T(0°C)	Vnom(3.7V)	580.0120	585.0118	589.5120
T(10°C)	Vnom(3.7V)	580.0121	585.0119	589.5122
Tnom(20°C)	Vnom(3.7V)	580.0127	585.0122	589.5125
T(30°C)	Vnom(3.7V)	580.0125	585.0115	589.5120
T(40°C)	Vnom(3.7V)	580.0125	580.0112	589.5119
T(50°C)	Vnom(3.7V)	580.0120	580.0112	589.5116
Tmax(20°C)	Vmin(3.5V)	580.0120	580.0114	589.5117
	Vmax(4.2V)	580.0118	580.0110	589.5113
Max. frequency error (ppm)		21.90	20.85	21.20
Limit (ppm)		±50ppm		
End Point		DC 3.7V		

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

******* END OF REPORT *******