

## TEST REPORT

**Applicant:** Astera LED-Technology GmbH

**Address of Applicant:** Stahlgruberring 36, 81829 Munich, Germany

**Manufacturer:** Astera Manufacturing Limited

**Address of Manufacturer:** Bldg. 3, CLT Science & Technology Park, No. 7, GanLiliu Road, Jihua subdistrict, Longgang District, Shenzhen, P.C.518112

**Equipment Under Test (EUT)**

Product Name: Pixel Bar

Model No.: AX2-100, AX2-50

Trade Mark: ASTERA

**FCC ID:** X55AX2

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247

**Date of sample receipt:** September 12, 2020

**Date of Test:** September 13, 2020-December 17, 2020

**Date of report issued:** December 17, 2020

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

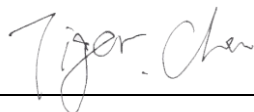
Robinson Lo  
Laboratory Manager

This 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 compiler and approver.

## 2 Version

Version No.	Date	Description
00	December 17, 2020	Original

Prepared By:

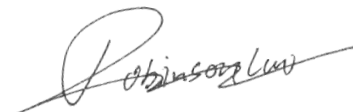


Project Engineer

Date:

December 17, 2020

Check By:



Reviewer

Date:

December 17, 2020

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## 4 Test Summary

Test Item	Section	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

*Remark : Test according to ANSI C63.10:2013.*

### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Pixel Bar
Model No.:	AX2-100, AX2-50
Test Model No:	AX2-100
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are power and model name for commercial purpose.	
Serial No.:	N/A
Hardware Version:	CT1-251_Vx
Software Version:	5.8.68
Test sample(s) ID:	GTS202009000128-1
Sample(s) Status	Engineer sample
Operation Frequency:	917.00MHz~922.20MHz
Channel numbers:	53
Channel separation:	0.1MHz
Modulation technology:	FHSS
Antenna Type:	Integral Antenna
Antenna gain:	-1dBi
Power supply:	AC 100-120V, 50/60Hz

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	917.0MHz	16	918.5MHz	31	920.0MHz	46	921.5MHz
2	917.1MHz	17	918.6MHz	32	920.1MHz	47	921.6MHz
3	917.2MHz	18	918.7MHz	33	920.2MHz	48	921.7MHz
4	917.3MHz	19	918.8MHz	34	920.3MHz	49	921.8MHz
5	917.4MHz	20	918.9MHz	35	920.4MHz	50	921.9MHz
6	917.5MHz	21	919.0MHz	36	920.5MHz	51	922.0MHz
7	917.6MHz	22	919.1MHz	37	920.6MHz	52	922.1MHz
8	917.7MHz	23	919.2MHz	38	920.7MHz	53	922.2MHz
9	917.8MHz	24	919.3MHz	39	920.8MHz		
10	917.9MHz	25	919.4MHz	40	920.9MHz		
11	918.0MHz	26	919.5MHz	41	921.0MHz		
12	918.1MHz	27	919.6MHz	42	921.1MHz		
13	918.2MHz	28	919.7MHz	43	921.2MHz		
14	918.3MHz	29	919.8MHz	44	921.3MHz		
15	918.4MHz	30	919.9MHz	45	921.4MHz		

## Test CH

Channel	Frequency
The lowest channel	917.0MHz
The middle channel	919.6MHz
The Highest channel	922.2MHz

## 5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
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Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and only worse case is reported.

## 5.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.4 Test Location

All other tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

## 5.5 Description of Support Units

None
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## 5.6 Deviation from Standards

None.
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## 5.7 Abnormalities from Standard Conditions

None.
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## 5.8 Additional Instructions

Software (Used for test) from client

Built-in by manufacturer, power set default.
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## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021



Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>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, 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.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
<b>EUT Antenna:</b>	
<p><i>The antenna is integral antenna, the best case gain of the antenna is -1dBi, reference to the appendix II for details.</i></p>	

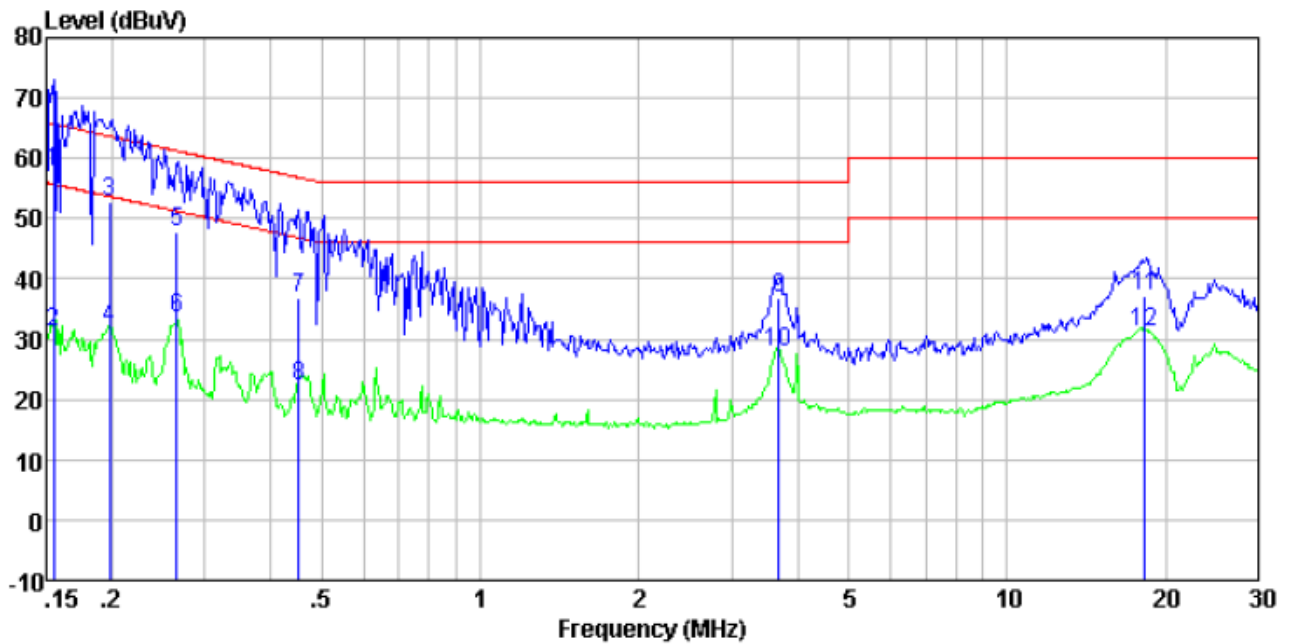
## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
	5-30		60		50	
* Decreases with the logarithm of the frequency.						
Test setup:	<div><div><div>Reference Plane</div><div><div><div>LISN</div><div>AUX Equipment</div><div>E.U.T</div></div><div>40cm</div><div>80cm</div><div><div>LISN</div><div>Filter</div><div>EMI Receiver</div></div><div>AC power</div></div><div>Test table/Insulation plane</div></div><div><div>Remark:</div><div>E.U.T: Equipment Under Test</div><div>LISN: Line Impedance Stabilization Network</div><div>Test table height=0.8m</div></div></div>					
Test procedure:	<div><div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div><div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div><div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</div></div>					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test results:	Pass					

### Measurement data:

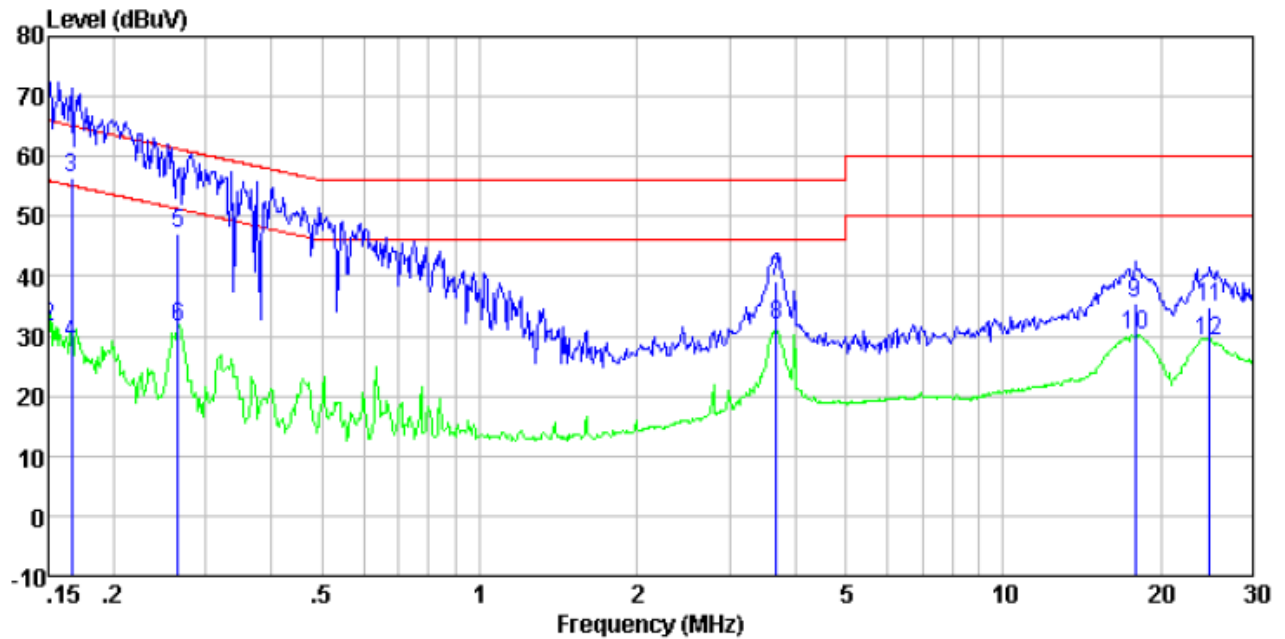
Remark: From high to low voltages have been tested to show only the worst low voltage test data.

Line:



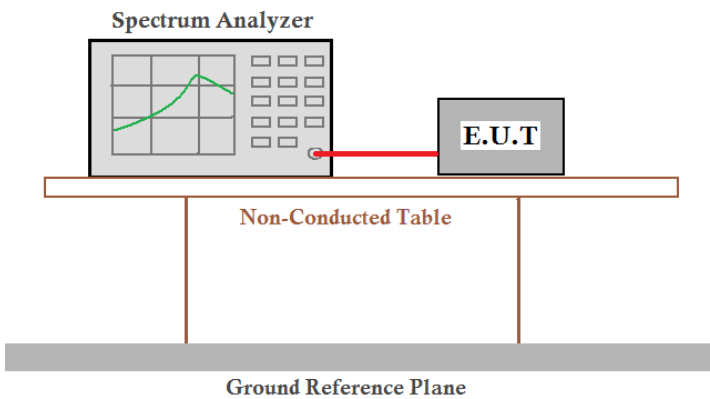
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	37.18	20.40	0.07	57.65	65.74	-8.09	QP
0.15	10.62	20.40	0.07	31.09	55.74	-24.65	Average
0.20	32.36	20.40	0.11	52.87	63.71	-10.84	QP
0.20	11.42	20.40	0.11	31.93	53.71	-21.78	Average
0.27	27.21	20.40	0.10	47.71	61.25	-13.54	QP
0.27	12.95	20.40	0.10	33.45	51.25	-17.80	Average
0.45	16.32	20.33	0.11	36.76	56.85	-20.09	QP
0.45	1.91	20.33	0.11	22.35	46.85	-24.50	Average
3.68	16.46	20.20	0.18	36.84	56.00	-19.16	QP
3.68	7.37	20.20	0.18	27.75	46.00	-18.25	Average
18.23	16.77	20.27	0.22	37.26	60.00	-22.74	QP
18.23	10.64	20.27	0.22	31.13	50.00	-18.87	Average

Neutral:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	38.93	20.40	0.07	59.40	66.00	-6.60	QP
0.15	10.96	20.40	0.07	31.43	56.00	-24.57	Average
0.17	35.81	20.40	0.08	56.29	65.16	-8.87	QP
0.17	8.51	20.40	0.08	28.99	55.16	-26.17	Average
0.27	26.73	20.40	0.10	47.23	61.25	-14.02	QP
0.27	11.03	20.40	0.10	31.53	51.25	-19.72	Average
3.68	18.77	20.20	0.18	39.15	56.00	-16.85	QP
3.68	11.39	20.20	0.18	31.77	46.00	-14.23	Average
17.85	15.18	20.26	0.22	35.66	60.00	-24.34	QP
17.85	9.67	20.26	0.22	30.15	50.00	-19.85	Average
24.79	14.10	20.35	0.23	34.68	60.00	-25.32	QP
24.79	8.52	20.35	0.23	29.10	50.00	-20.90	Average

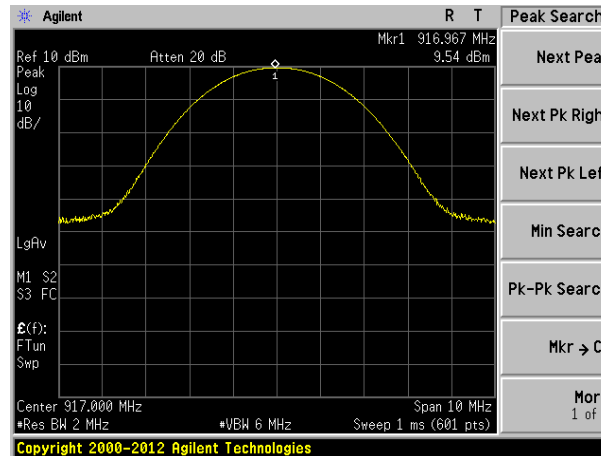
## 7.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013
Limit:	20.97dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

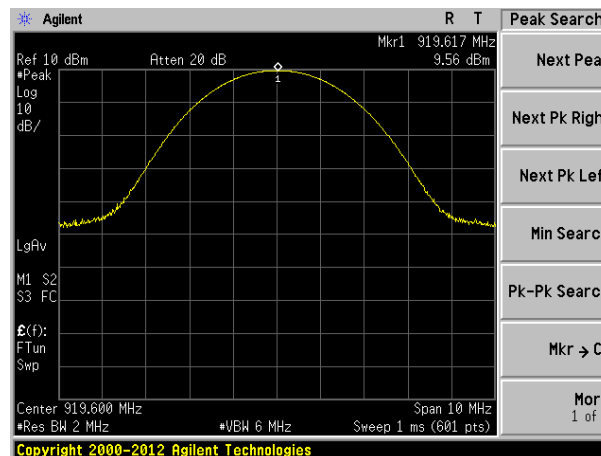
### Measurement Data

Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	9.54	20.97	Pass
Middle	9.56		
Highest	9.55		

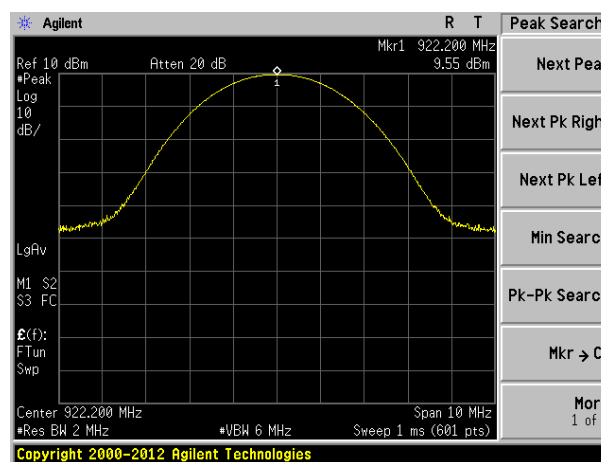
Test plot as follows:



Lowest channel

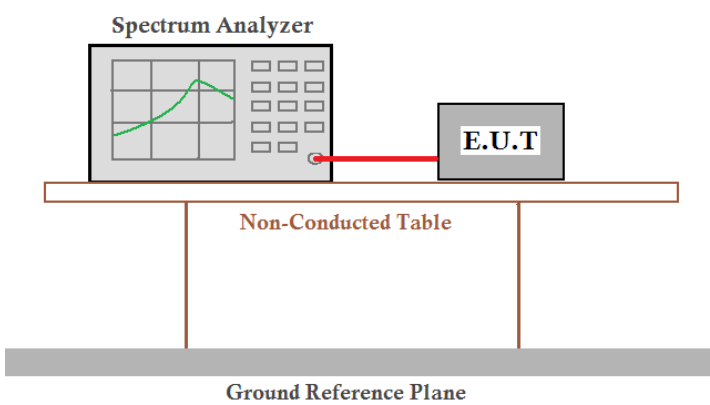


Middle channel



Highest channel

## 7.4 20dB Emission Bandwidth

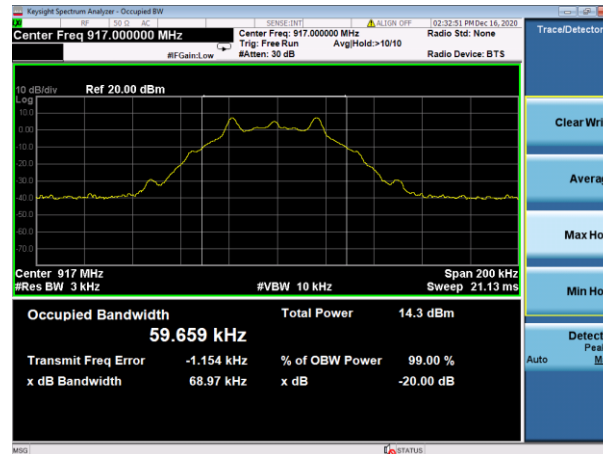
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Limit:	N/A
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

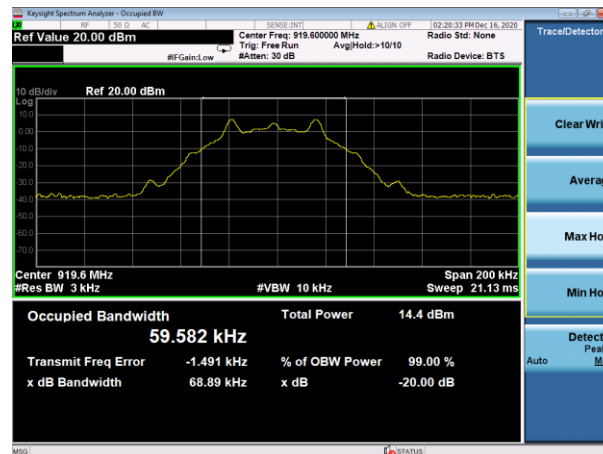
Test channel	20dB Emission Bandwidth (kHz)	Result
Lowest	68.97	Pass
Middle	68.89	
Highest	69.22	



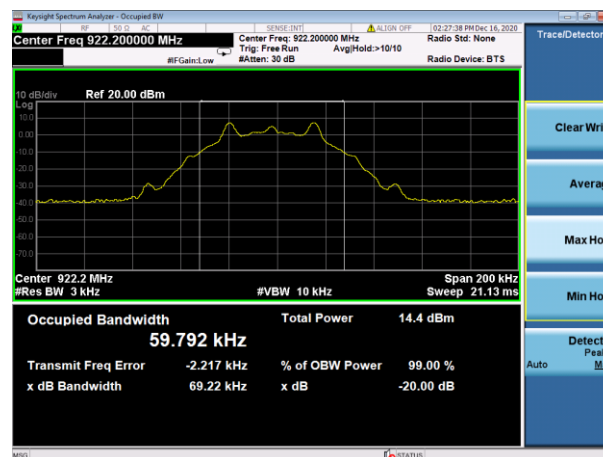
Test plot as follows:



Lowest channel

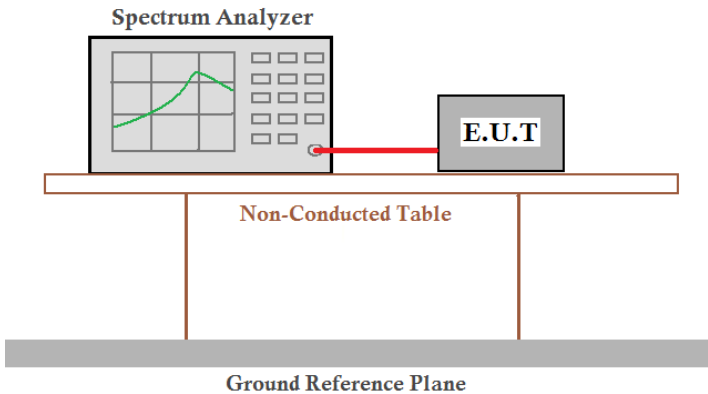


Middle channel



Highest channel

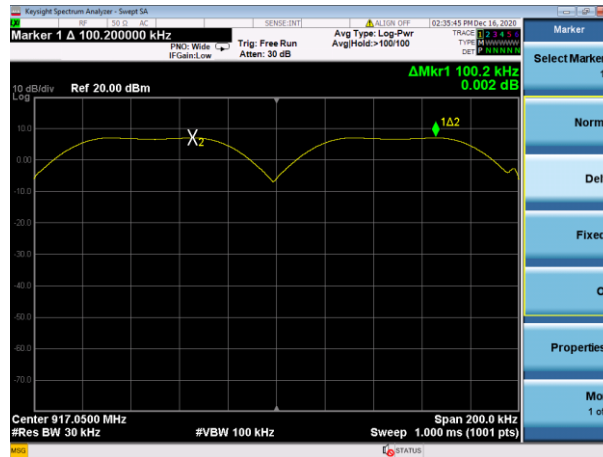
## 7.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247(a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	20dB bandwidth
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

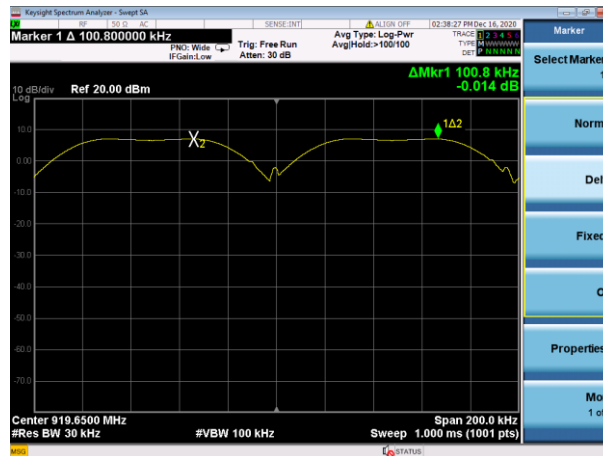
### Measurement Data

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	100.2	69.22	Pass
Middle	100.8	69.22	Pass
Highest	100.6	69.22	Pass

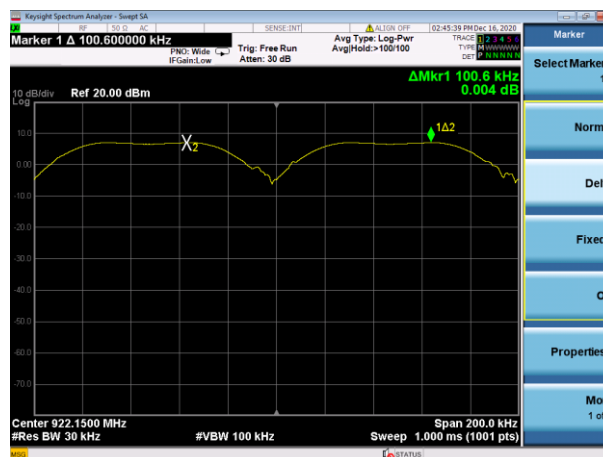
Test plot as follows:



Lowest channel

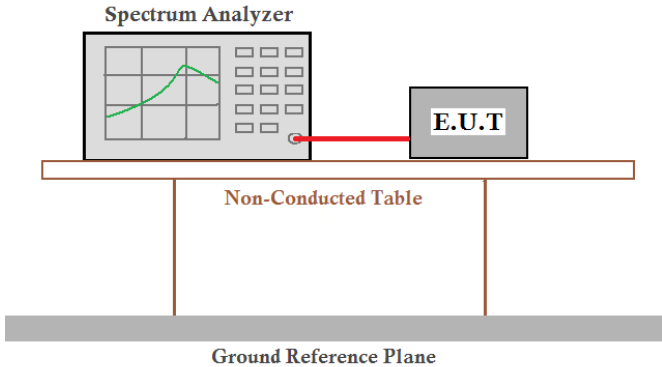


Middle channel



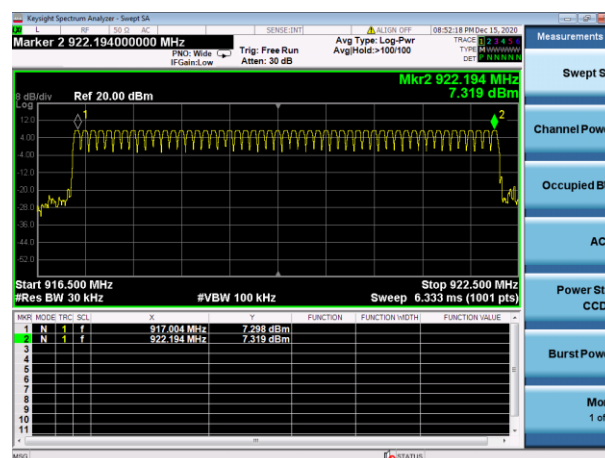
Highest channel

## 7.6 Hopping Channel Number

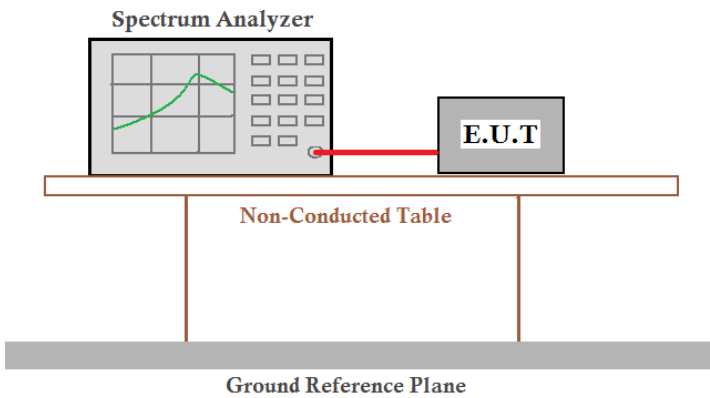
Test Requirement:	FCC Part15 C Section 15.247 (a)(1) (i)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30kHz, VBW=100kHz, Frequency range=916.5MHz-922.5MHz, Detector=Peak
Limit:	50 channels
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data:

Hopping channel numbers	Limit	Result
53	50	Pass



## 7.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247(a)(1) (i)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=10kHz, VBW=30kHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

Channel	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
Lowest	20.30	284.2	400	Pass
Middle	20.30	284.2	400	Pass
Highest	20.30	284.2	400	Pass

The formula as below:

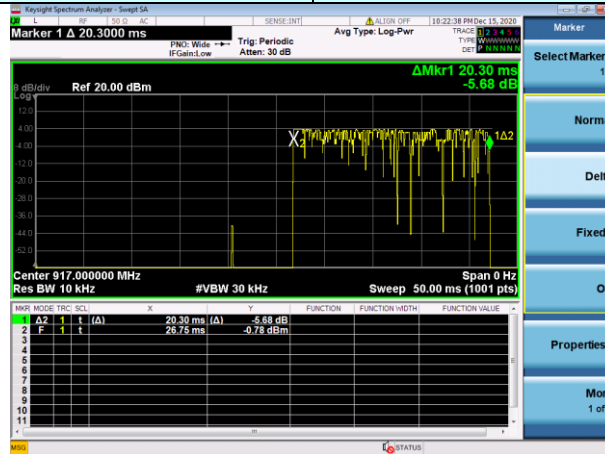
Lowest: Dwell time = Ton \* Ton times in 20s =20.3ms\*14=284.2ms

Middle: Dwell time = Ton \* Ton times in 20s =20.3ms\*14=284.2ms

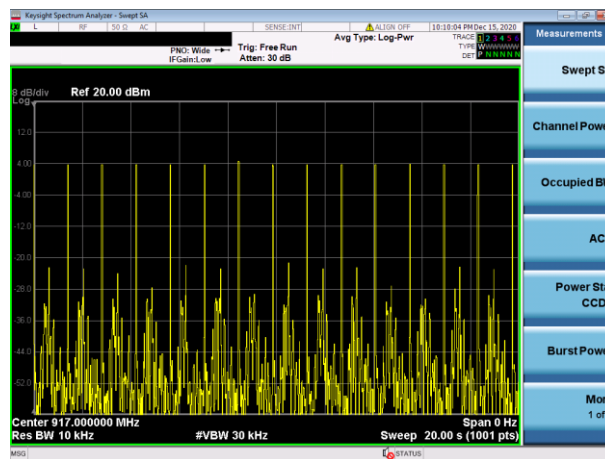
Highest: Dwell time = Ton \* Ton times in 20s =20.3ms\*14=284.2ms

Test plot as follows:

Channel	Lowest
---------	--------

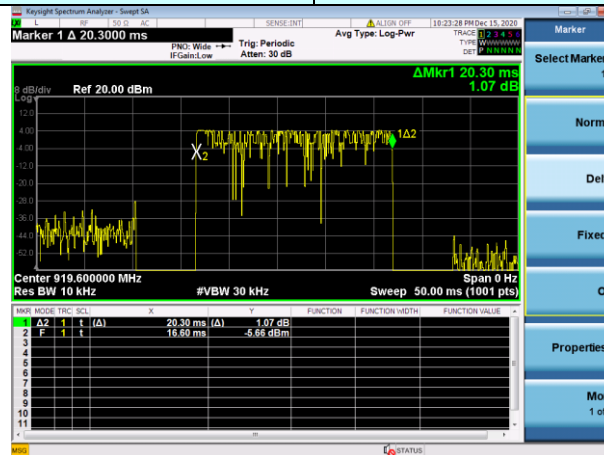


Ton

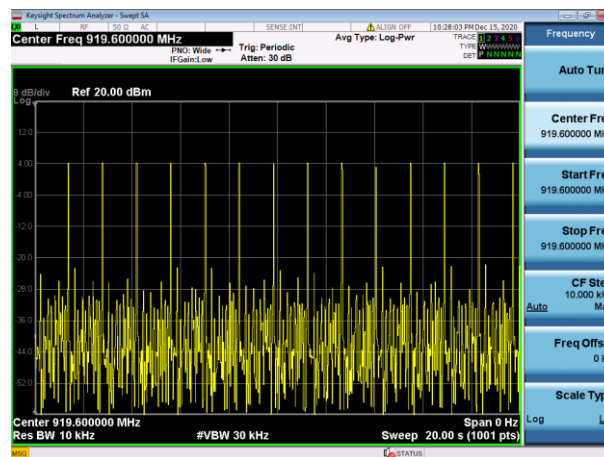


Ton times in 20s

Channel	Middle
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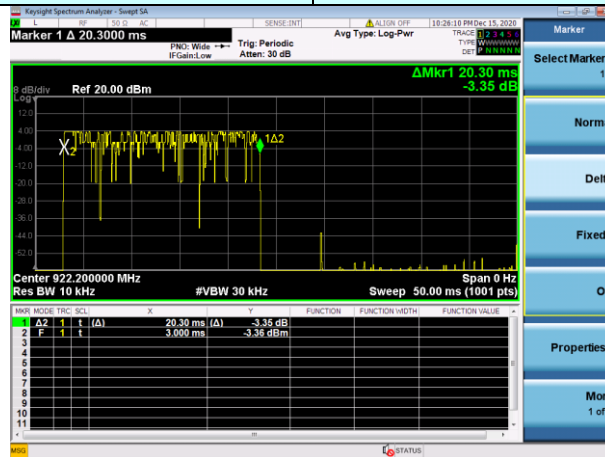


Ton

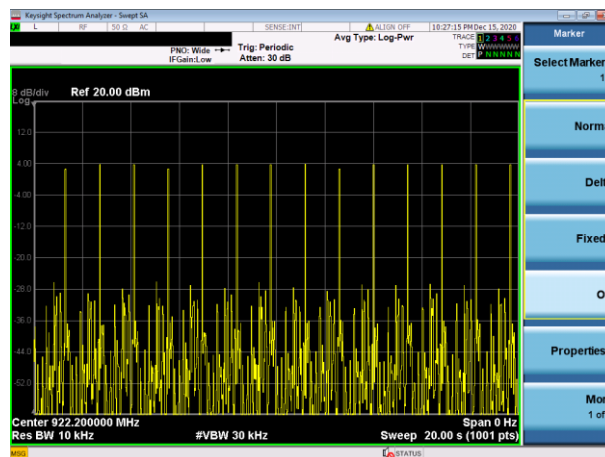


Ton times in 20s

Channel	Highest
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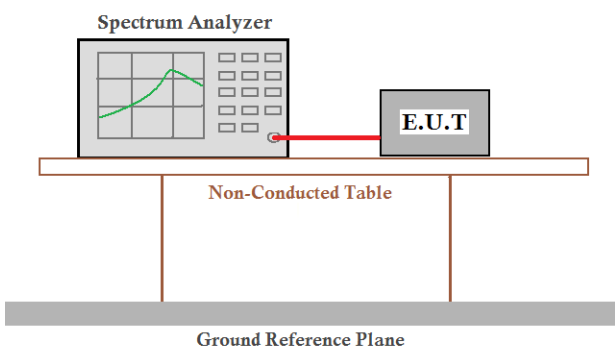
Ton



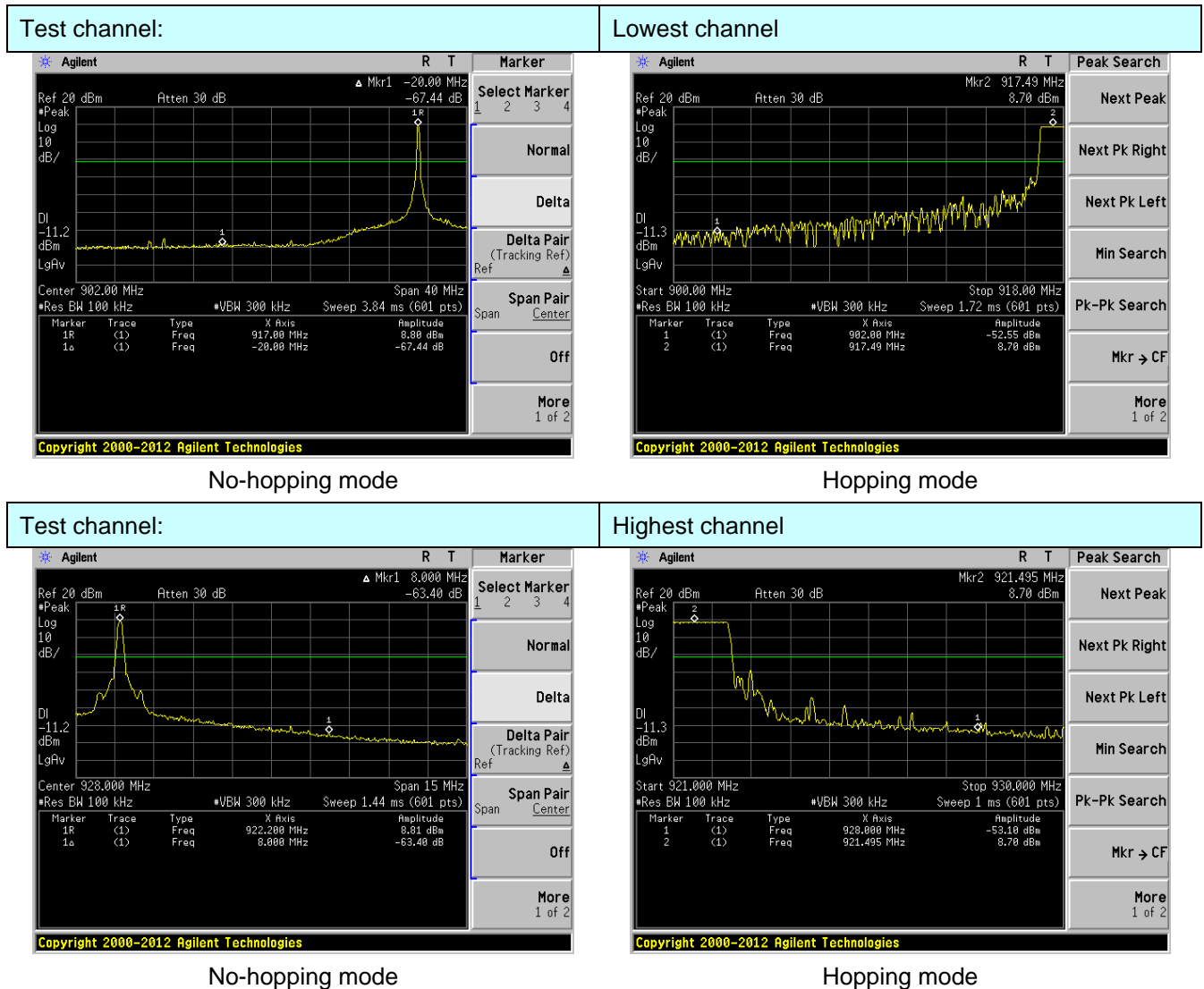
Ton times in 20s



## 7.8 Band Edge

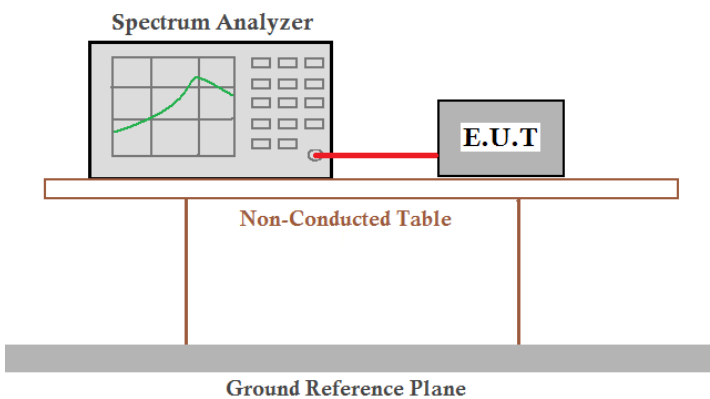
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

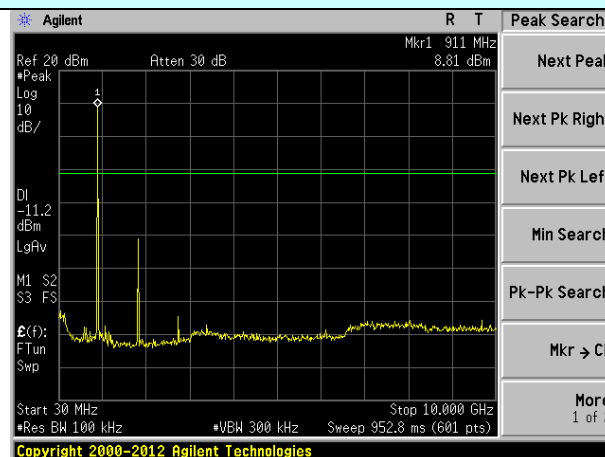


## 7.9 Spurious Emission

### 7.9.1 Conducted Emission Method

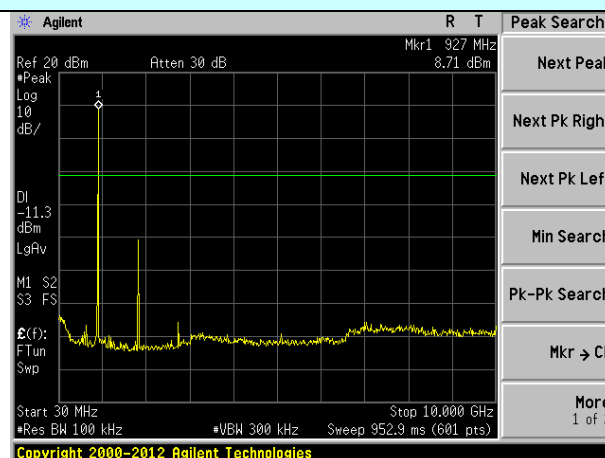
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Lowest channel



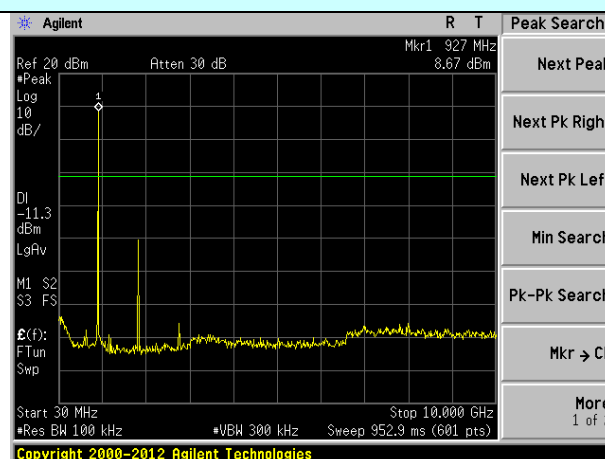
30MHz~25GHz

Middle channel



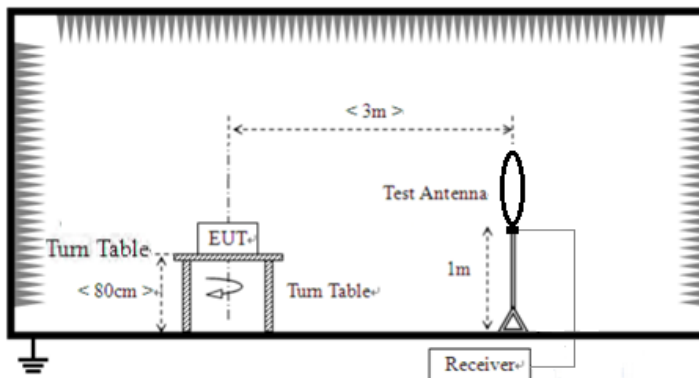
30MHz~25GHz

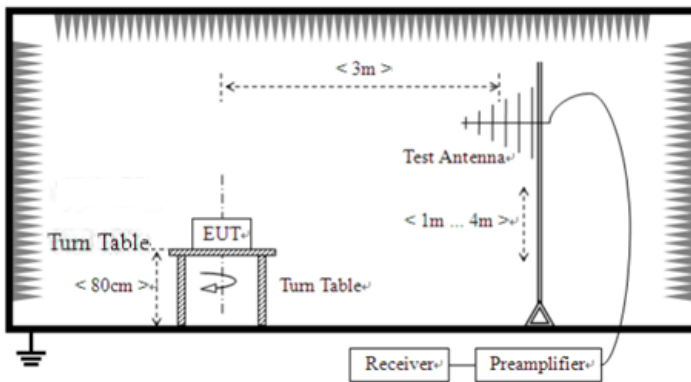
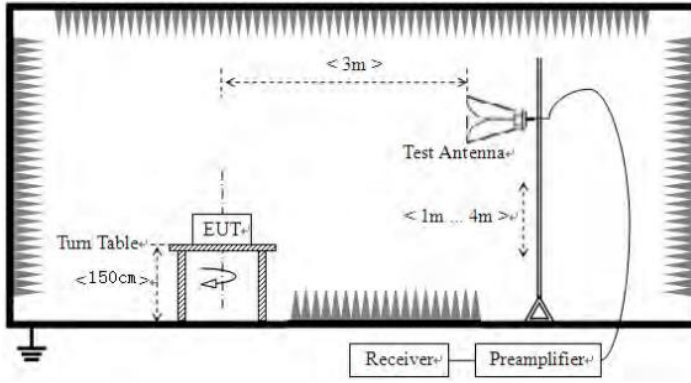
Highest channel



30MHz~25GHz

## 7.9.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	Below 30MHz				
	<div></div>				
	Below 1GHz				

	 <p>Above 1GHz</p> 
Test Procedure:	<ol style="list-style-type: none"><li>1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li></ol>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.2 for details
Temp. / Hum.	Temp.: 25 °C    Humid.: 52%    Press.: 1 012mbar

Test results:	Pass
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**Remark:**

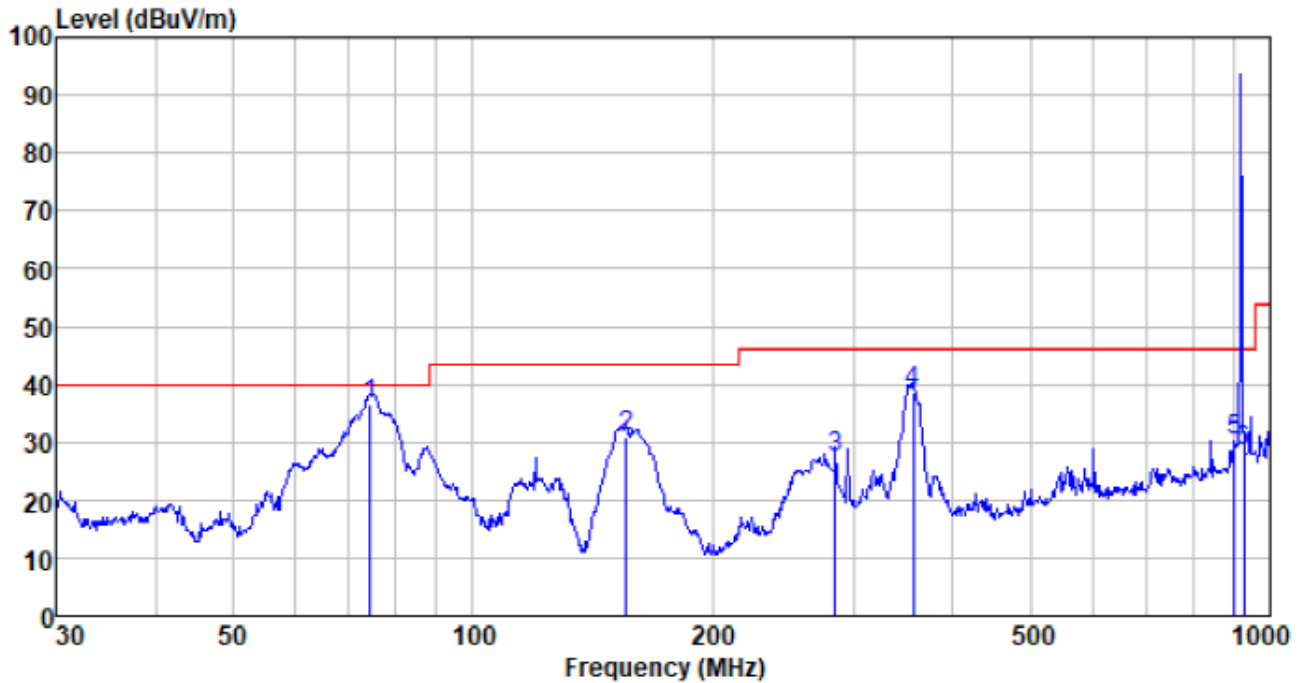
1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

**Measurement data:****■ Below 30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ 30MHz ~ 1GHz

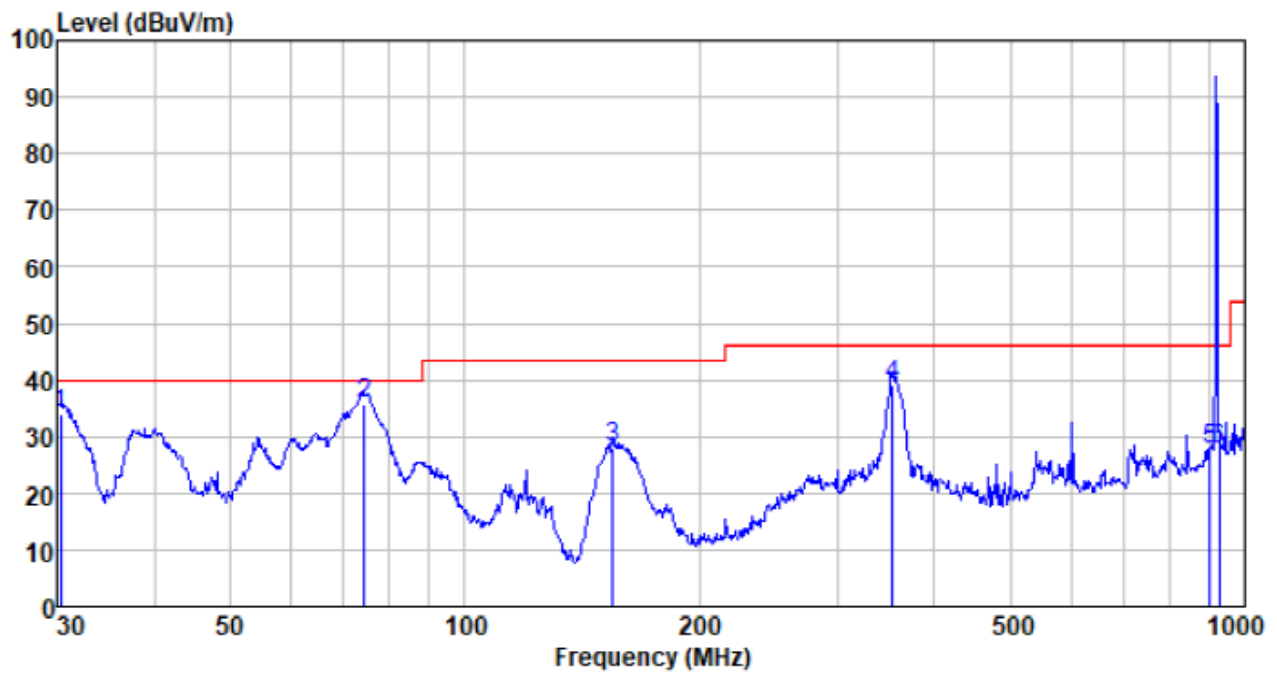
Test channel:	Lowest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
74.396	64.56	7.46	0.98	36.49	36.51	40.00	-3.49	QP
155.910	58.51	8.05	1.60	37.11	31.05	43.50	-12.45	QP
284.977	49.07	13.20	2.29	37.41	27.15	46.00	-18.85	QP
356.676	59.10	14.64	2.65	37.48	38.91	46.00	-7.09	QP
902.000	40.81	22.30	4.87	37.60	30.38	46.00	-15.62	QP
928.000	38.52	22.41	4.96	37.57	28.32	46.00	-17.68	QP

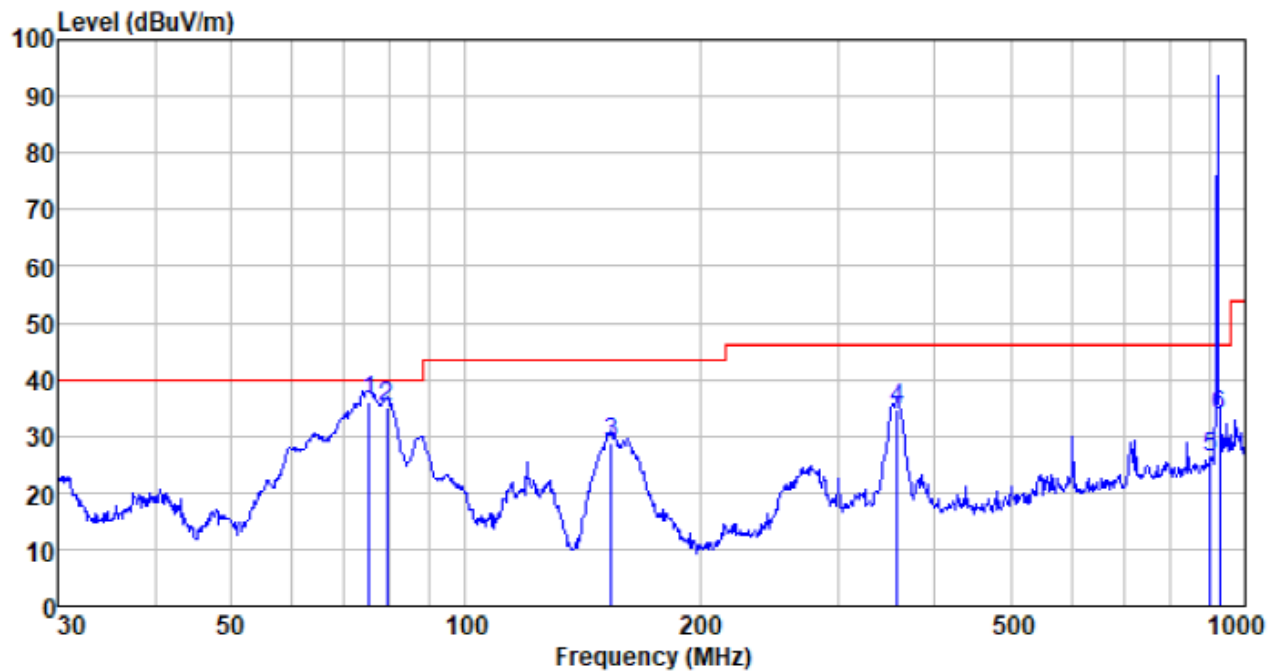


Test channel:	Lowest	Polarization:	Vertical
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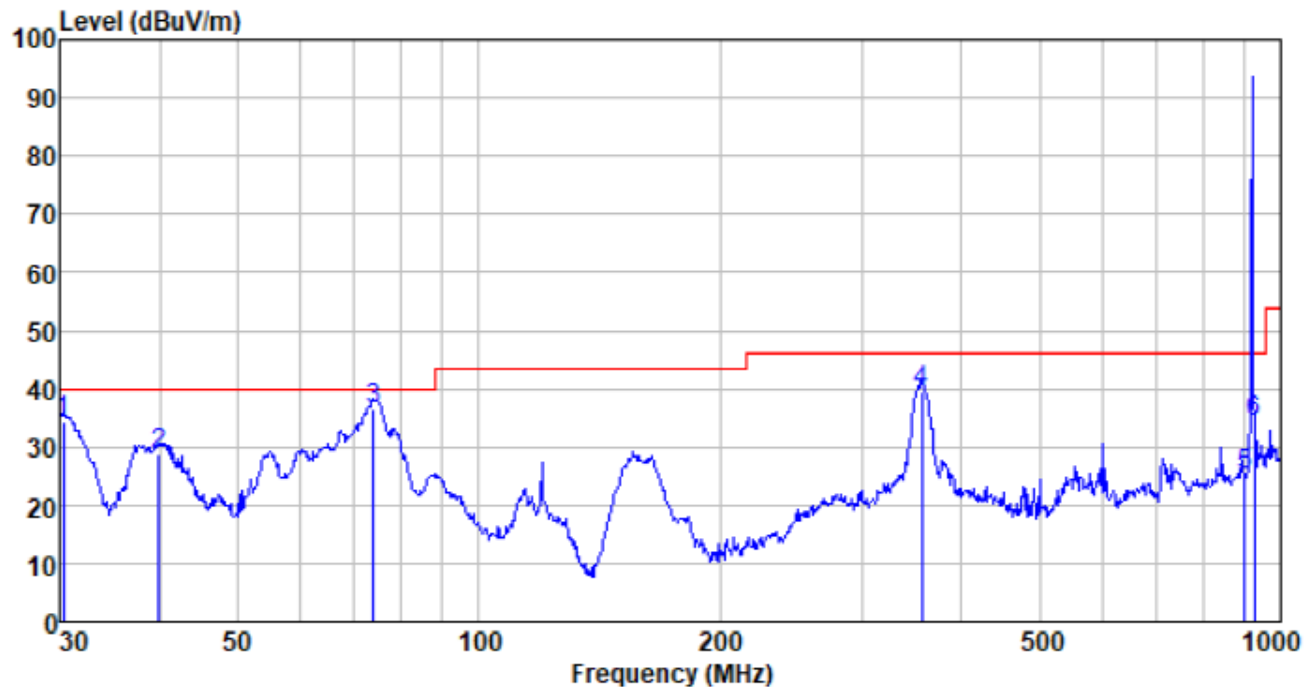
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
30.317	57.25	11.21	0.55	35.02	33.99	40.00	-6.01	QP
74.396	63.89	7.46	0.98	36.49	35.84	40.00	-4.16	QP
154.821	55.51	7.95	1.60	37.10	27.96	43.50	-15.54	QP
352.943	59.55	14.56	2.64	37.48	39.27	46.00	-6.73	QP
902.000	37.98	22.30	4.87	37.60	27.55	46.00	-18.45	QP
928.000	37.95	22.41	4.96	37.57	27.75	46.00	-18.25	QP

Test channel:	Middle	Polarization:	Horizontal
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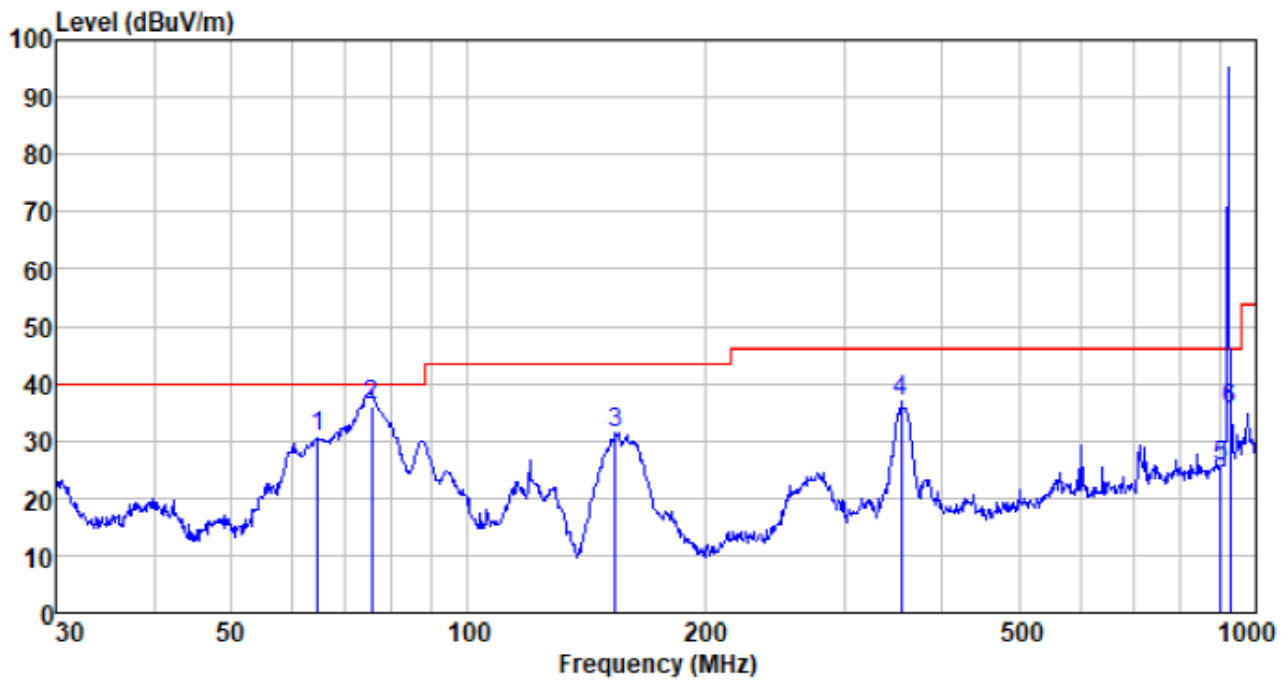
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
75.182	64.18	7.45	0.99	36.50	36.12	40.00	-3.88	QP
79.243	63.02	7.41	1.02	36.54	34.91	40.00	-5.09	QP
153.739	56.57	7.90	1.59	37.10	28.96	43.50	-14.54	QP
357.929	54.74	14.64	2.66	37.48	34.56	46.00	-11.44	QP
902.000	36.75	22.30	4.87	37.60	26.32	46.00	-19.68	QP
928.000	43.73	22.41	4.96	37.57	33.53	46.00	-12.47	QP

Test channel:	Middle	Polarization:	Vertical
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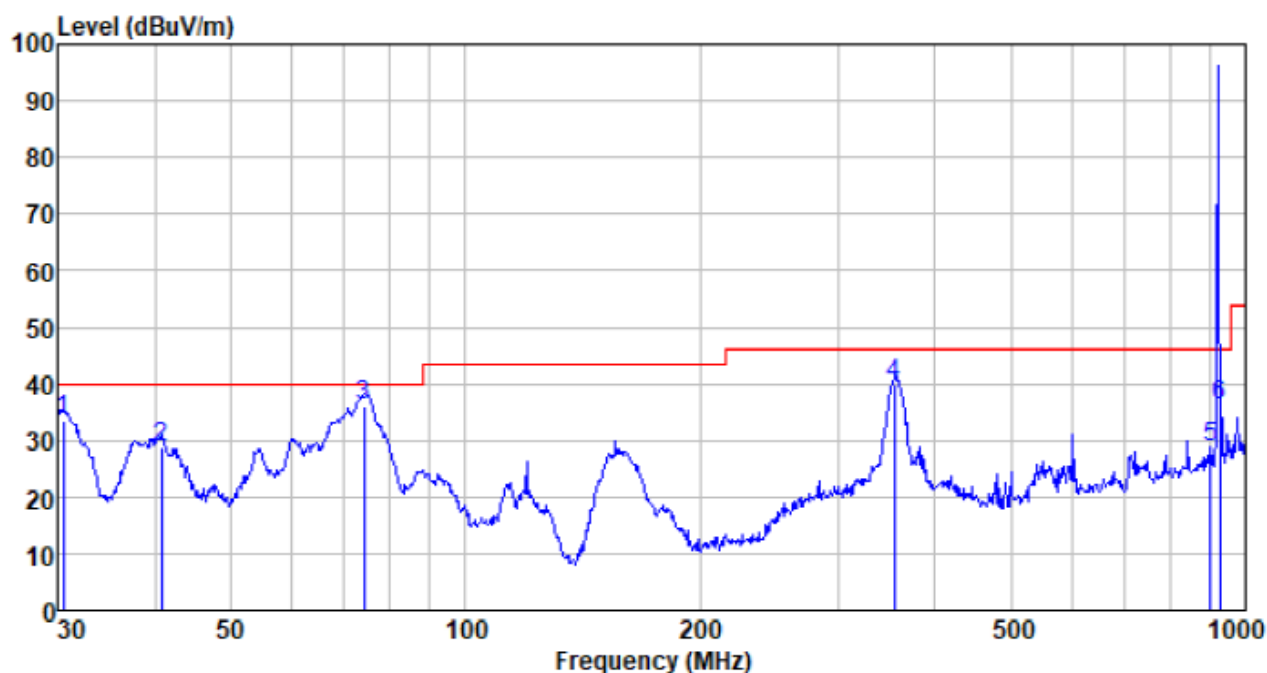
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
30.317	57.45	11.21	0.55	35.02	34.19	40.00	-5.81	QP
39.854	51.48	12.20	0.66	35.66	28.68	40.00	-11.32	QP
73.876	64.41	7.46	0.97	36.48	36.36	40.00	-3.64	QP
356.676	59.57	14.64	2.65	37.48	39.38	46.00	-6.62	QP
902.000	35.66	22.30	4.87	37.60	25.23	46.00	-20.77	QP
928.000	44.64	22.41	4.96	37.57	34.44	46.00	-11.56	QP

Test channel:	Highest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
64.433	56.71	9.57	0.90	36.38	30.80	40.00	-9.20	QP
75.446	64.30	7.44	0.99	36.50	36.23	40.00	-3.77	QP
153.739	58.89	7.90	1.59	37.10	31.28	43.50	-12.22	QP
354.183	57.33	14.59	2.64	37.48	37.08	46.00	-8.92	QP
902.000	36.06	22.30	4.87	37.60	25.63	46.00	-20.37	QP
928.000	45.60	22.41	4.96	37.57	35.40	46.00	-10.60	QP

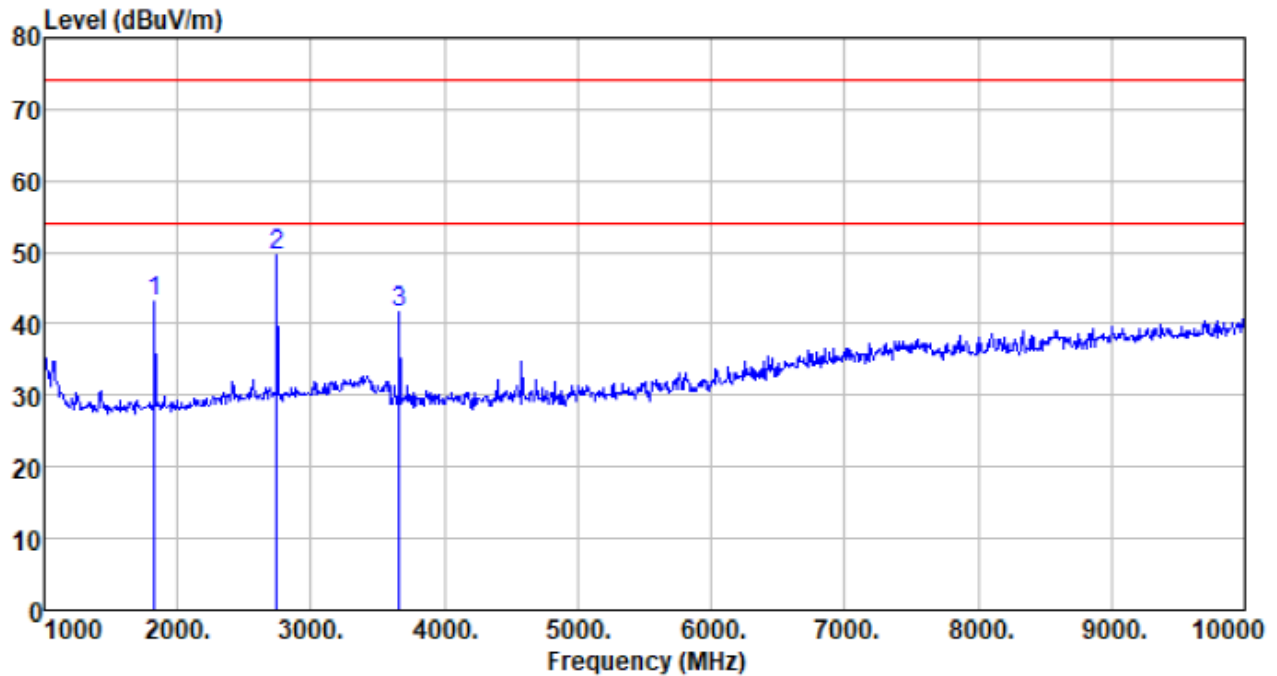
Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
30.531	56.75	11.21	0.56	35.04	33.48	40.00	-6.52	QP
40.702	51.77	12.21	0.67	35.70	28.95	40.00	-11.05	QP
74.135	64.33	7.46	0.98	36.49	36.28	40.00	-3.72	QP
354.183	59.99	14.59	2.64	37.48	39.74	46.00	-6.26	QP
902.000	39.23	22.30	4.87	37.60	28.80	46.00	-17.20	QP
928.000	46.20	22.41	4.96	37.57	36.00	46.00	-10.00	QP

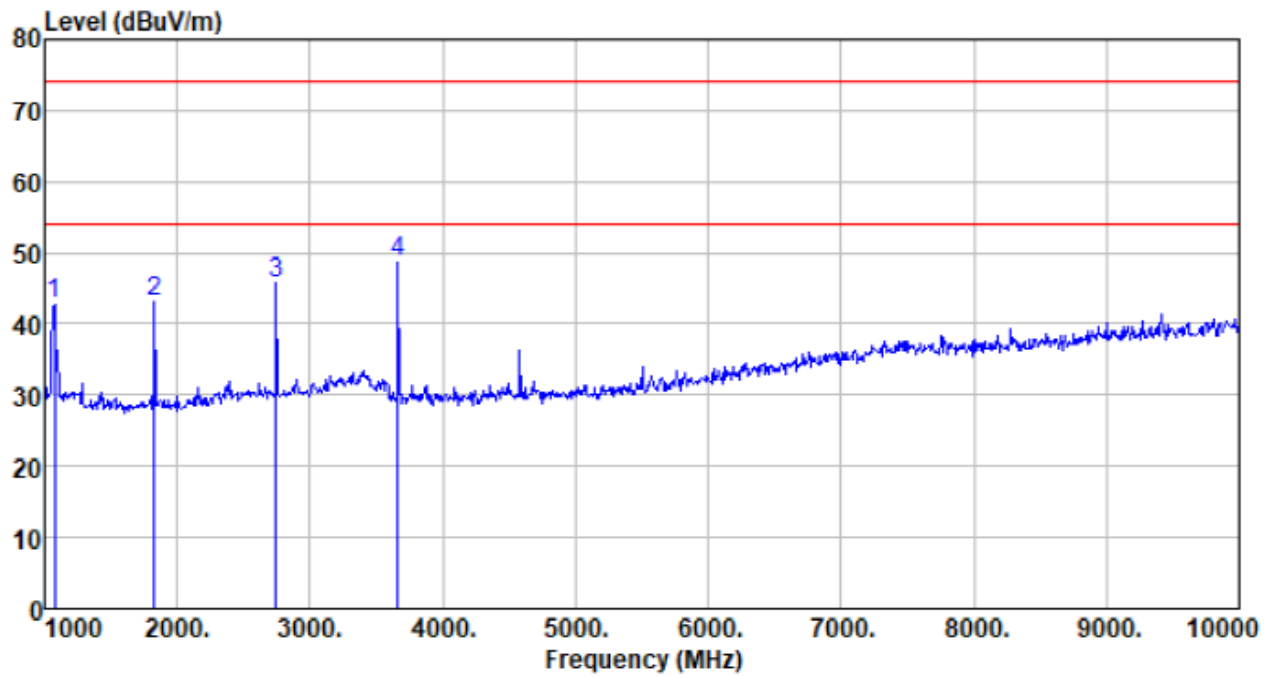
■ Above 1GHz

Test channel:	Lowest	Polarization:	Horizontal
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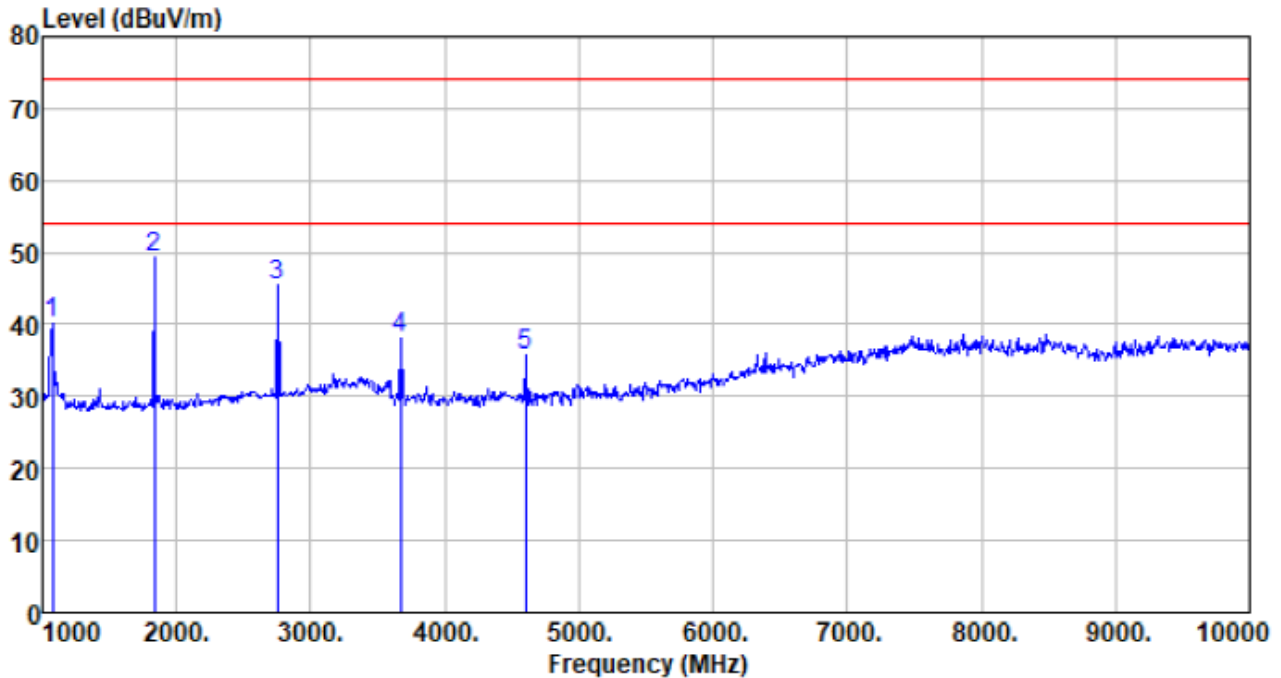
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1828.000	51.25	25.85	2.49	36.40	43.19	74.00	-30.81	Peak
2746.000	55.40	28.06	3.18	37.12	49.52	74.00	-24.48	Peak
3664.000	46.36	28.88	3.87	37.37	41.74	74.00	-32.26	Peak

Test channel:	Lowest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1072.000	51.90	24.55	2.04	35.78	42.71	74.00	-31.29	Peak
1828.000	51.14	25.85	2.49	36.40	43.08	74.00	-30.92	Peak
2746.000	51.70	28.06	3.18	37.12	45.82	74.00	-28.18	Peak
3664.000	53.34	28.88	3.87	37.37	48.72	74.00	-25.28	Peak

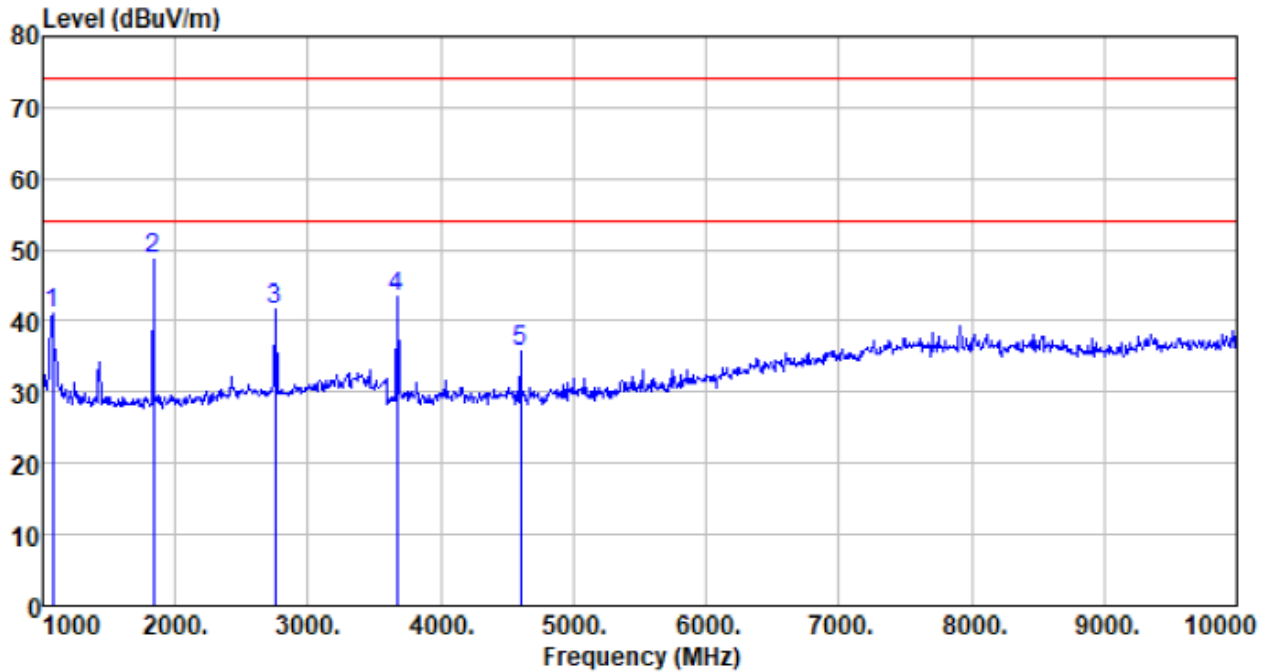
Test channel:	Middle	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1072.000	49.33	24.55	2.04	35.78	40.14	74.00	-33.86	Peak
1837.000	57.32	25.86	2.49	36.40	49.27	74.00	-24.73	Peak
2755.000	51.28	28.08	3.18	37.13	45.41	74.00	-28.59	Peak
3673.000	42.73	28.91	3.87	37.37	38.14	74.00	-35.86	Peak
4600.000	37.95	30.87	4.51	37.65	35.68	74.00	-38.32	Peak

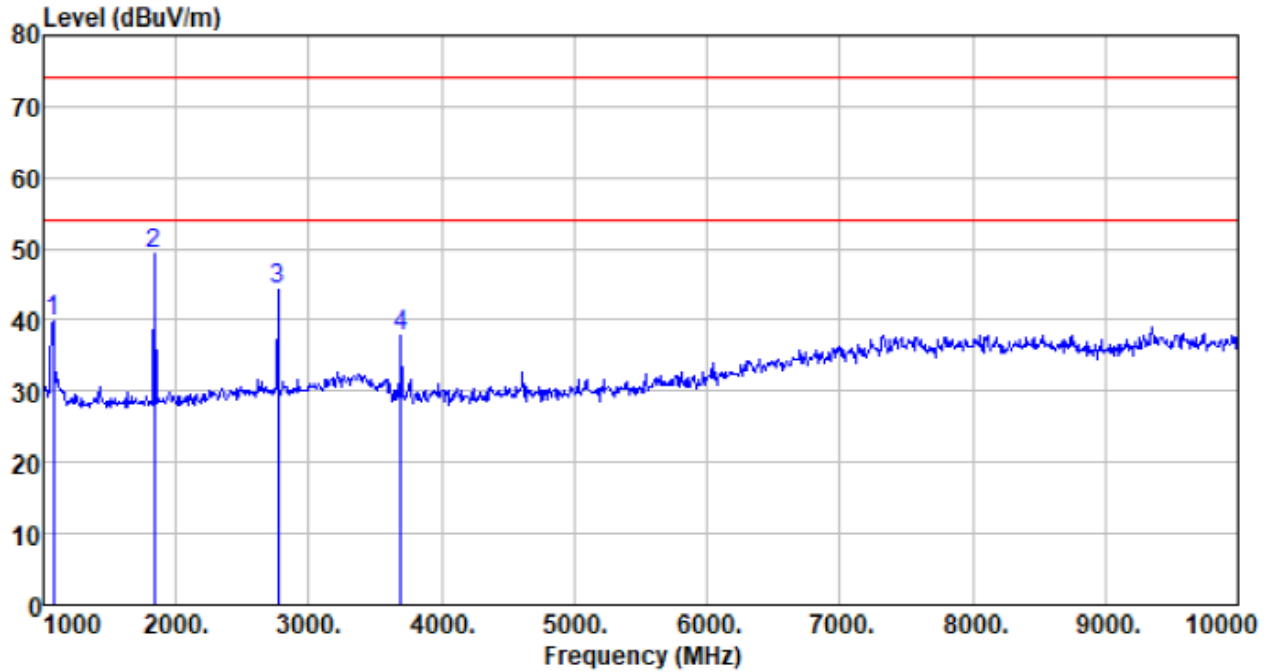


Test channel:	Middle	Polarization:	Vertical
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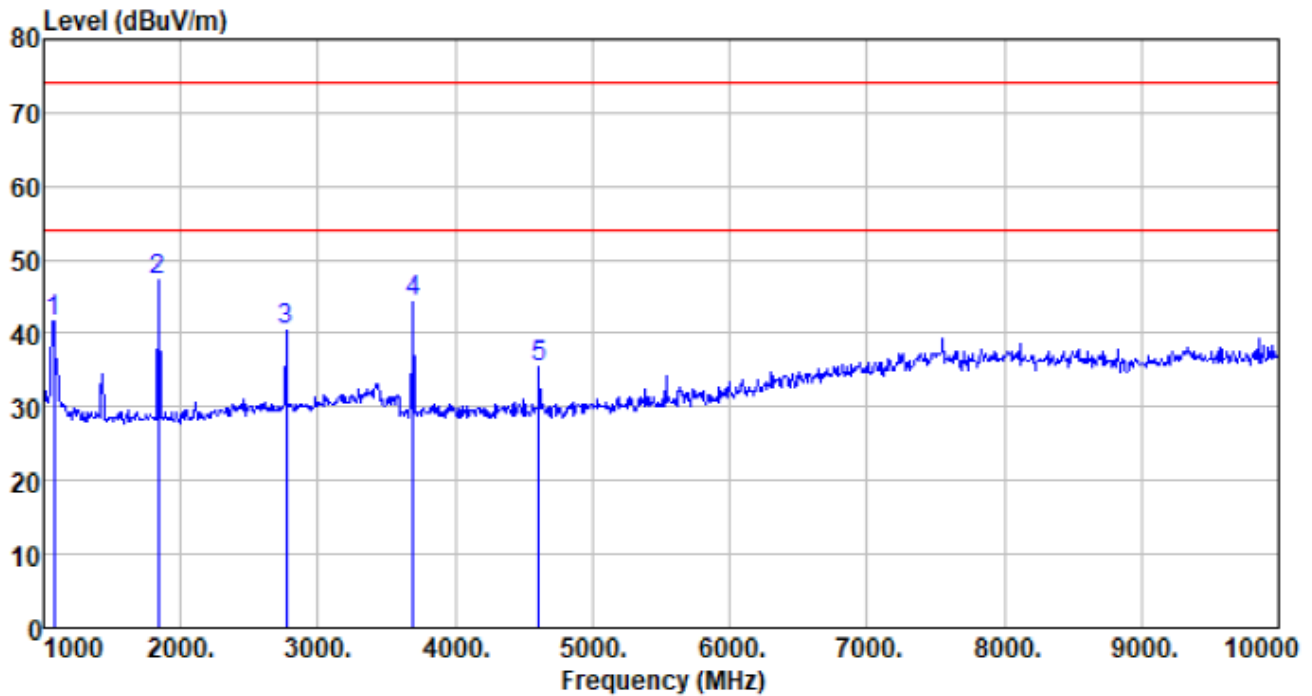
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1072.000	50.33	24.55	2.04	35.78	41.14	74.00	-32.86	Peak
1837.000	56.69	25.86	2.49	36.40	48.64	74.00	-25.36	Peak
2755.000	47.57	28.08	3.18	37.13	41.70	74.00	-32.30	Peak
3673.000	47.94	28.91	3.87	37.37	43.35	74.00	-30.65	Peak
4600.000	37.99	30.87	4.51	37.65	35.72	74.00	-38.28	Peak

Test channel:	Highest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1072.000	48.96	24.55	2.04	35.78	39.77	74.00	-34.23	Peak
1837.000	57.42	25.86	2.49	36.40	49.37	74.00	-24.63	Peak
2764.000	50.08	28.09	3.19	37.14	44.22	74.00	-29.78	Peak
3691.000	42.34	28.97	3.87	37.37	37.81	74.00	-36.19	Peak

Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1072.000	50.90	24.55	2.04	35.78	41.71	74.00	-32.29	Peak
1837.000	55.34	25.86	2.49	36.40	47.29	74.00	-26.71	Peak
2764.000	46.32	28.09	3.19	37.14	40.46	74.00	-33.54	Peak
3691.000	48.78	28.97	3.87	37.37	44.25	74.00	-29.75	Peak
4609.000	37.67	30.89	4.51	37.65	35.42	74.00	-38.58	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. No emission found in frequency above 18GHz.

## 8 Test Setup Photo

Reference to the **appendix I** for details.

## 9 EUT Constructional Details

Reference to the **appendix II** for details.

---End---