



TEST REPORT

Applicant: Loa Keo LLC
Address of Applicant: 13500 W Airport Blvd, Suite B PMB 1083, Sugar Land, TX 77498, USA
Manufacturer/Factory: Loa Keo LLC
Address of Manufacturer/Factory: 13500 W Airport Blvd, Suite B PMB 1083, Sugar Land, TX 77498, USA
Product Name: Wireless Microphone
Model No.: LK2in1,LKMSLX24PRO,LKMSM58PRO,LKM835PRO,LKM2120PRO,LKMBLX288PRO,LKMPG58PRO,LKMWMS40PRO,LKM1102PRO,LKM288PRO,LKMSM58PRO,LKM835PRO,LKM1311PRO,LKM24PRO,LKM835SPRO,LKMPGXD24PRO,LKM1102PRO,LKM112PRO,LKMQLXD24PRO,LKM2129PRO,LKMULXD24PRO
Trade Mark: LK LOVE KARAOKE
FCC ID: 2BBUY-LK2IN1PRO
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.236
Date of Test: Aug.15, 2023-Sep.18, 2023
Date of report issued: Sep.18, 2023
Test Result : PASS

Remark:

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

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 compiler and approver

Prepared By

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Report Revision History

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1 Test Summary

Test Item	Section in CFR 47	Result	Test by
Antenna requirement	15.203	Pass	/
AC Power Line Conducted Emission	15.207	N/A	/
Output power	15.236(d)(1)	Pass	Yvan Fan
Occupied Bandwidth	15.236(f)(2)	Pass	Yvan Fan
Necessary Bandwidth	15.236(g)	Pass	Yvan Fan
Spurious emissions	15.236 (g)	Pass	Qiao Li
Frequency Tolerance	15.236(f)(3)	Pass	Yvan Fan

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-1000MHz	±4.30 dB	(1)
Radiated Emission	1GHz-18GHz	±4.35 dB	(1)
Radiated Emission	18GHz-40GHz	±4.59 dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.02 dB	(1)
Occupied Channel Bandwidth	/	±0.55%	(1)

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

2 General Information

2.1 General Description of EUT

Product Name:	Wireless Microphone
Model No.:	LK2in1,LKMSLX24PRO,LKMSM58PRO,LKM835PRO,LKM2120PRO,LKMBLX288PRO,LKMPG58PRO,LKMWMS40PRO,LKM1102PRO,LKM288PRO,LKMSM58PRO,LKM835PRO,LKM1311PRO,LKM24PRO,LKM835SPRO,LKMPGXD24PRO,LKM1102PRO,LKM112PRO,LKMQLXD24PRO,LKM2129PRO,LKMULXD24PRO
Model of difference:	All the model are the same circuit and RF module, except the model names and colors
Test model:	LK2in1
Sample(s) Status:	Engineer sample
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	CHA:520.0-525.7MHz CHB:540.3-546.0MHz
Channel numbers:	40
Modulation type:	FM
Antenna Type:	PCB Antenna
Antenna gain:	3.65dBi
Power supply:	DC 3V

Operation Frequency each of channel							
CHA							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	520.00 MHz	6	521.50 MHz	11	523.00 MHz	16	524.50 MHz
2	520.30 MHz	7	521.80 MHz	12	523.30 MHz	17	524.80 MHz
3	520.60 MHz	8	522.10 MHz	13	523.60 MHz	18	525.10MHz
4	520.90 MHz	9	522.40 MHz	14	523.90 MHz	19	525.40 MHz
5	521.20 MHz	10	522.70 MHz	15	524.20 MHz	20	525.70 MHz
CHB							
21	540.30MHz	26	541.80 MHz	31	543.30 MHz	36	544.80 MHz
22	540.60 MHz	27	542.10 MHz	32	543.60MHz	37	545.10 MHz
23	540.90 MHz	28	542.40 MHz	33	543.90 MHz	38	545.40 MHz
24	541.20 MHz	29	542.70 MHz	34	544.20 MHz	39	545.70 MHz
25	541.50 MHz	30	543.00 MHz	35	544.50 MHz	40	546.00 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel A	Frequency
The lowest channel	520.00 MHz
The middle channel	522.70 MHz
The Highest channel	525.70MHz

Channel B	Frequency
The lowest channel	540.30 MHz
The middle channel	543.00 MHz
The Highest channel	546.00MHz

2.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: For battery operated equipment, the EUT was performed using a new DC 3.0V battery</i>	

2.3 Description of Support Units

Equipment	Model	S/N	Manufacturer
/	/	/	/
/	/	/	/

2.4 Deviation from Standards

None.

2.5 Abnormalities from Standard Conditions

None.

2.6 Test Facility

Test laboratory:	Shenzhen ETR Standard Technology Co., Ltd.
CNAS Registration Number:	L11864
A2LA Certificate Number:	6640.01
FCC Designation Number:	CN1326
FCC Test Firm Registration:	183064

2.7 Test Location

All tests were performed at:	
Laboratory location:	No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	+86 755 85259392
Fax:	+86 755 27219460

2.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

3 Test Instruments list

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESC17	100605	2023.3.02	2024.3.01
2	EMI Test Receiver	Rohde&schwarz	ESC13	102696	2023.3.02	2024.3.01
3	Loop Antenna	schwarabeck	FMZB 1519 B	FMZB 1519 B	2022.3.11	2024.3.10
4	Broadband antenna	schwarabeck	VULB9168	1064	2022.3.11	2024.3.10
5	Horn antenna	schwarabeck	BBHA9120D	9120D-1145	2022.3.11	2024.3.10
6	amplifier	EMtrace	RP01A	50117	2023.3.02	2024.3.01
7	Artificial power network	schwarabeck	NSLK8127	8127483	2023.3.02	2024.3.01
8	Artificial power network	ETS	3186/2NM	1132	2023.3.02	2024.3.01
9	10dB attenuator	HUBER+SUHNER	10dB	/	2023.3.02	2024.3.01
10	amplifier	Space-Dtronics	EWLAN0118 G-P40	19113001	2023.3.02	2024.3.01
11	Filter	Xingbo	XBLBQ-GTA19	210410-3-1	2023.3.06	2024.3.05
12	Spectrum analyzer	KEYSIGHT	N9020A	MY55370280	2023.3.02	2024.3.01
13	Power detector box	MWRFtest	MW100-PSB	MW201020JYT	2022.11.18	2023.11.17
14	Signal generator	Agilent	N5182A	MY49060455	2022.11.09	2023.11.08

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

Software Name	Manufacturer	Model	Version
RF test software	MWRFtest	MTS 8310	V2.0.0.0
Conducted test software	EZ-EMC	Farad	Ver.EMC-CON 3A1.1
Radiated test software	EZ-EMC	Farad	Ver.FA-03A2 RE

4 Test results and Measurement Data

4.1 Antenna requirement

Standard requirement: FCC Part15 C Section 15.203

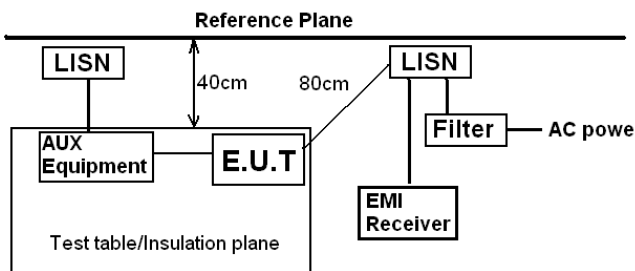
FCC part 15.203 requirement:

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.

EUT Antenna:

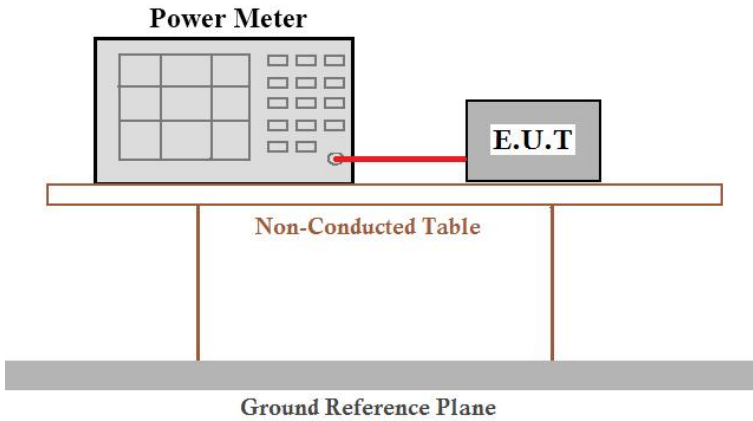
The antenna is PCB antenna, the best case gain of the antenna is 3.65dBi, reference to the appendix II for details.

4.2 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:	 <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> 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. 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). 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. 					
Test Instruments:	Refer to section 3.0 for details					
Test mode:	Refer to section 2.2 for details					
Test environment:	Temp.:	/ °C	Humid.:	/%	Press.:	/mbar
Test voltage:	/					
Result	N/A					

Remark: EUT Power by DC 3.0V from battery, so this test item is not applicable.

4.3 Output Power

Test Requirement :	FCC Part15 C Section 15.236(F)(1)					
Test Method :	ANSI C63.10:2013					
Limit:	50mW E.I.R.P.(17dBm)					
Test setup:						
Test Instruments:	Refer to section 3.0 for details					
Test mode:	Refer to section 2.2 for details					
Test environment:	Temp.:	23.8 °C	Humid.:	48%	Press.:	1012mbar
Test voltage:	DC 3V					
Test results:	Pass					

Measurement Data

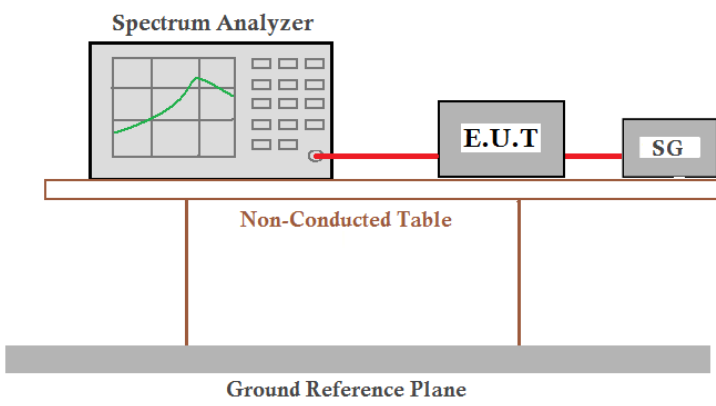
CHA:

Test channel	Frequency (MHz)	Output power (dBm)	ANT Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
1	520.00	1.24	3.65	4.89	17	pass
10	522.70	1.15	3.65	4.80		pass
20	525.70	1.44	3.65	5.09		pass

CHB:

Test channel	Frequency (MHz)	Output power (dBm)	ANT Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
21	540.30	1.56	3.65	5.21	17	pass
30	543.00	1.20	3.65	4.85		pass
40	546.00	1.10	3.65	4.75		pass

4.4 Occupied Bandwidth

Test Requirement:	FCC Part15 C Section 15.236(f)(2)				
Test Method:	ANSI C63.10:2013				
Limit:	<200KHz				
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, E.U.T (Equipment Under Test), and SG (Signal Generator) are connected in a line on a Non-Conducted Table. The Spectrum Analyzer is on the left, connected to the E.U.T, which is connected to the SG. The entire setup is on a Non-Conducted Table, which is positioned above a Ground Reference Plane.</p>				
Test Instruments:	Refer to section 3.0 for details				
Test mode:	Refer to section 2.2 for details				
Test environment:	Temp.:	23.8 °C	Humid.:	48%	Press.: 1012mbar
Test voltage:	DC 3V				
Test Mode:	TX				

Measurement Data

CHA:

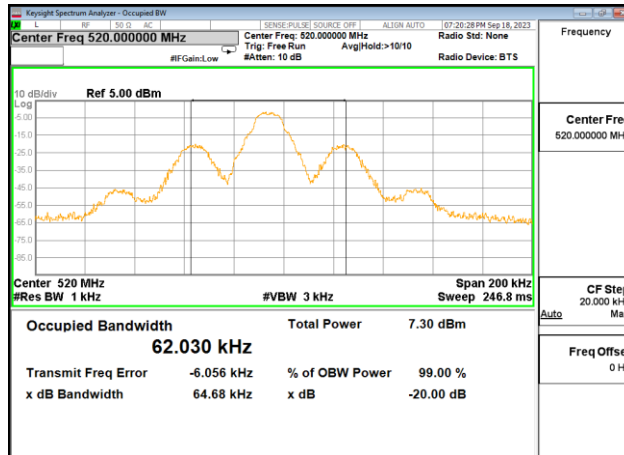
Test Frequency	99% bandwidth(KHz)	-20dB bandwidth(KHz)	Limit	Result
520.00	62.030	64.68	200KHz	Pass
522.70	62.640	62.89		
525.70	62.710	66.15		

CHB:

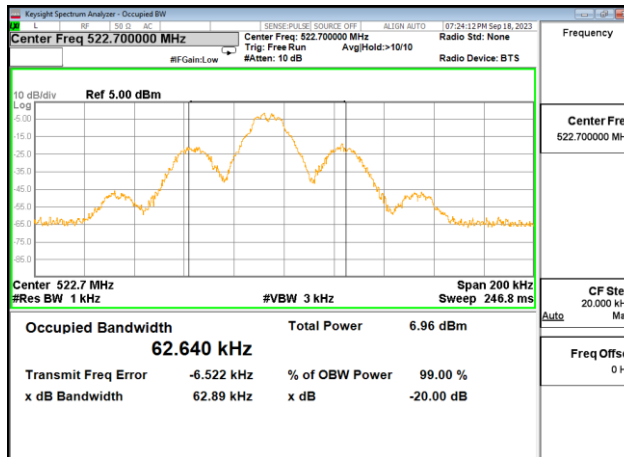
Test Frequency	99% bandwidth(KHz)	-20dB bandwidth(KHz)	Limit	Result
540.30	60.475	61.89	200KHz	Pass
543.00	60.816	60.13		
546.00	61.084	62.05		

Test plot as follows:

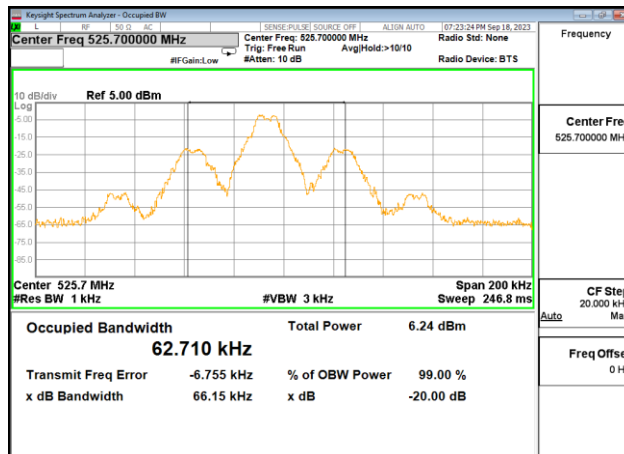
CHA:



Lowest channel

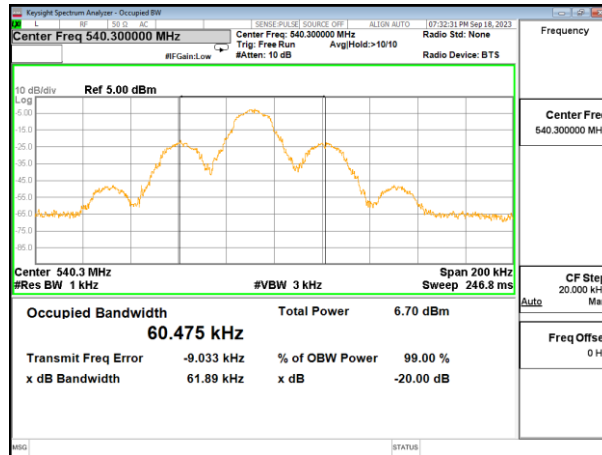


Middle channel

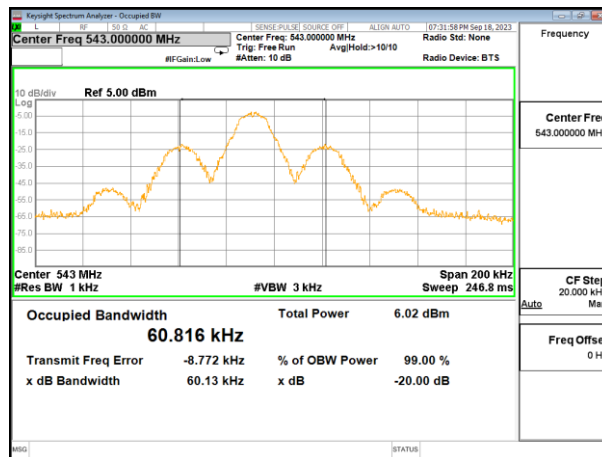


Highest channel

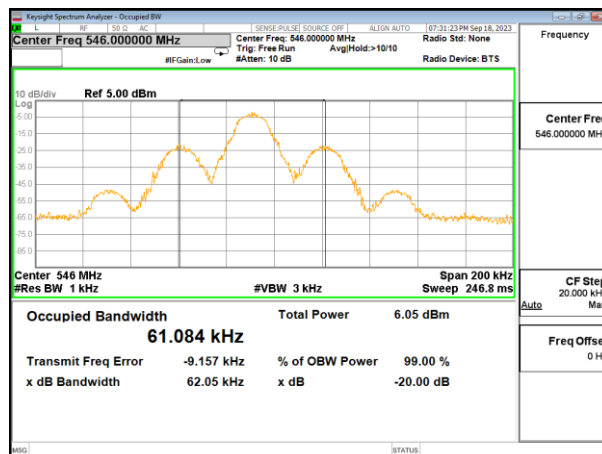
CHB:



Lowest channel

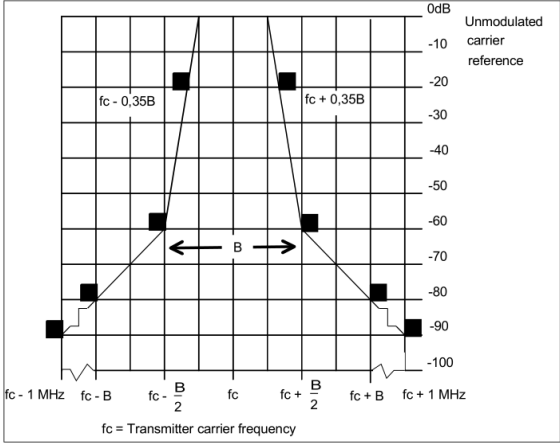
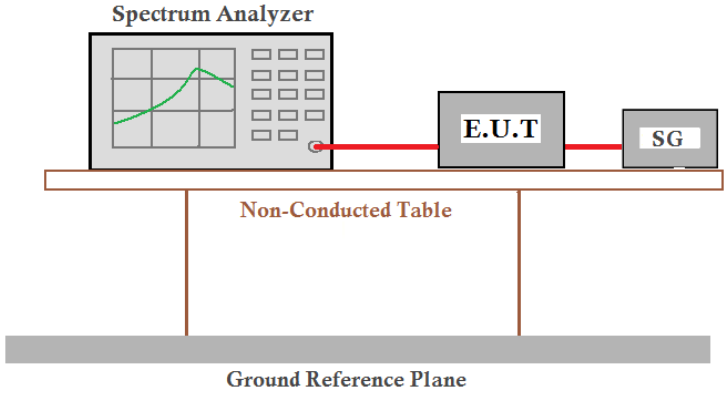


Middle channel



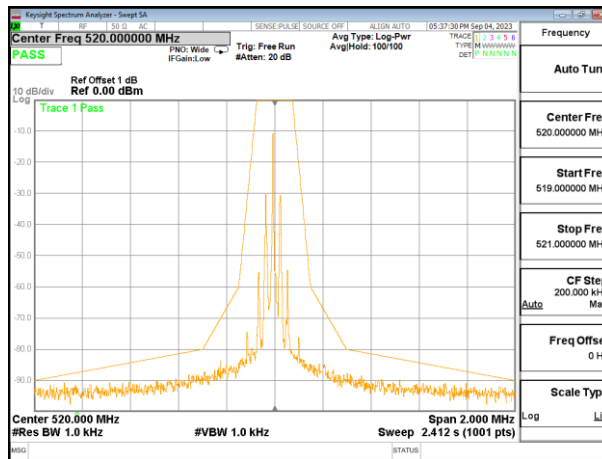
Highest channel

4.5 Necessary Bandwidth

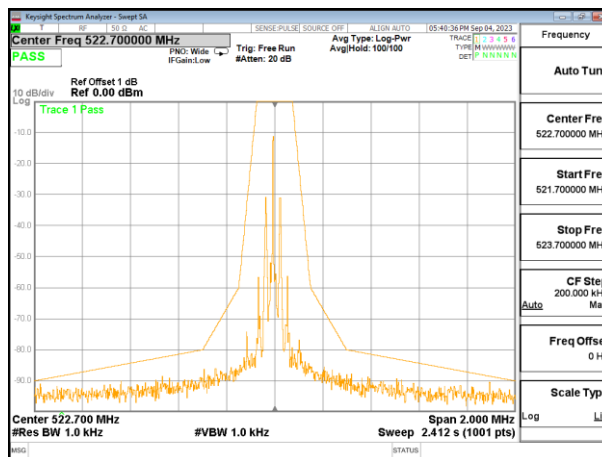
Test Requirement:	FCC Part15 C Section 15.236(g)
Test Method:	ETSI EN 300 422-1 V1.4.2 8.3.2
Limit:	
Test setup:	
Test Procedure:	<p>The transmitter RF output spectrum shall be measured, using a spectrum analyser with the following settings:</p> <ul style="list-style-type: none"> - centre frequency: f_c: Transmitter (Tx) nominal frequency; - dispersion (Span): $f_c - 1 \text{ MHz}$ to $f_c + 1 \text{ MHz}$; - Resolution BandWidth (RBW): 1 kHz; - Video BandWidth (VBW): 1 kHz; - detector: Peak hold.
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test environment:	Temp.: 23.8 °C Humid.: 48% Press.: 1012mbar
Test voltage:	DC 3V
Test Mode:	TX

Measurement Data

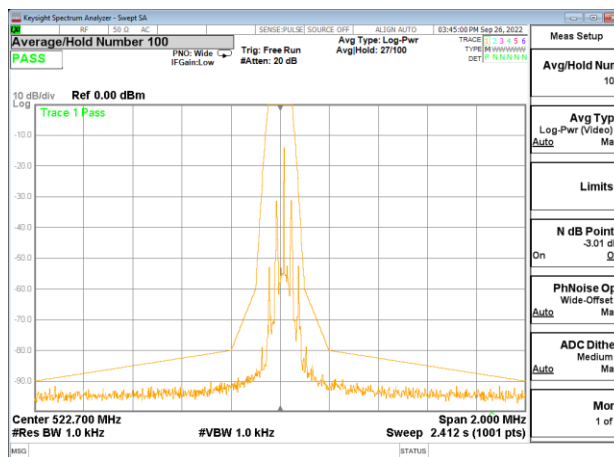
CHA



Lowest channel

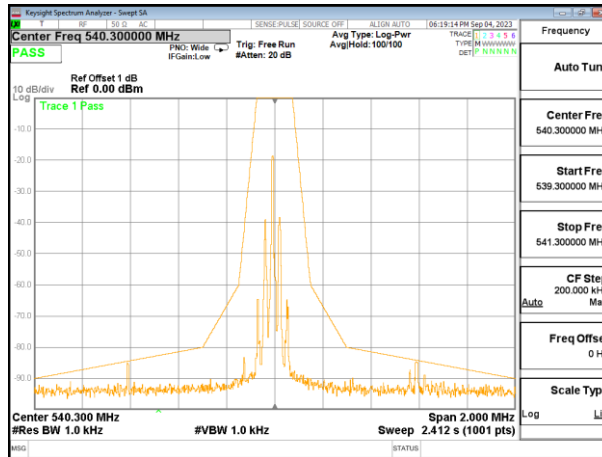


Middle channel

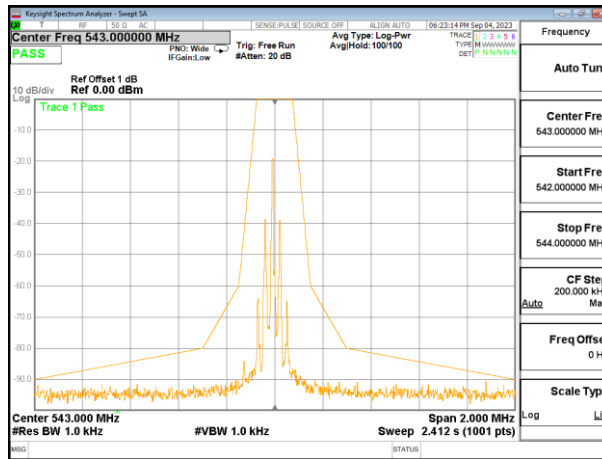


Highest channel

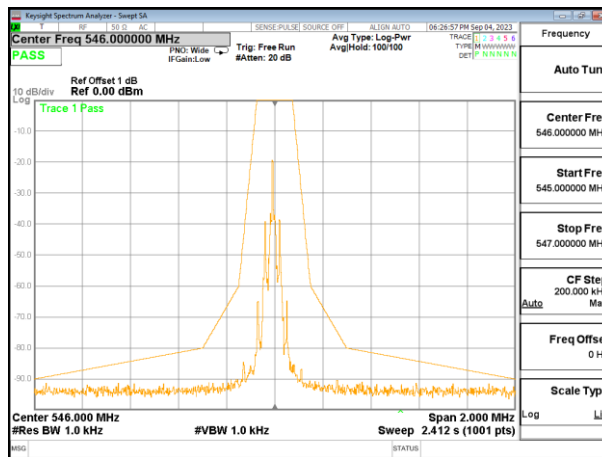
CHB



Lowest channel



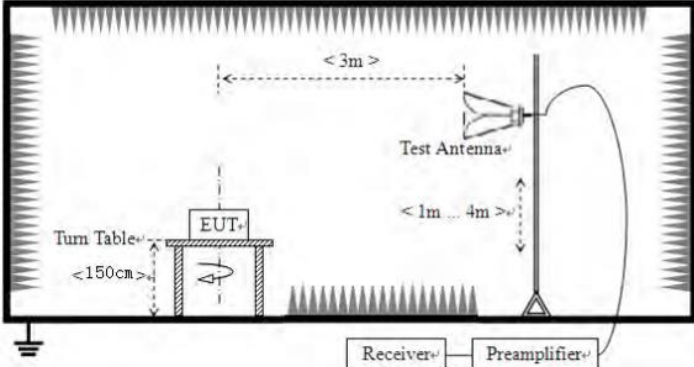
Middle channel



Highest channel

4.6 Spurious emissions

Test Requirement:	FCC Part15 C Section 15.236(g)				
Test Method:	ETSI EN 300 422-1 V1.4.2 8.4.2				
Test Frequency Range:	9kHz to 6GHz				
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:	State	Frequency			
		47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1000 MHz	
	Operation	4 nW	250 nW	1 μW	
	Standby	2 nW	2 nW	20 nW	
Test setup:	For radiated emissions from 9kHz to 30MHz				
	For radiated emissions from 30MHz to 1GHz				
For radiated emissions above 1GHz					

							
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 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. 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. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. 						
<p>Test Instruments:</p>	<p>Refer to section 3.0 for details</p>						
<p>Test mode:</p>	<p>Refer to section 2.2 for details</p>						
<p>Test voltage:</p>	<p>DC 3V</p>						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>23.8 °C</td> <td>Humid.:</td> <td>48%</td> <td>Press.:</td> <td>1012mbar</td> </tr> </table>	Temp.:	23.8 °C	Humid.:	48%	Press.:	1012mbar
Temp.:	23.8 °C	Humid.:	48%	Press.:	1012mbar		
<p>Test results:</p>	<p>Pass</p>						

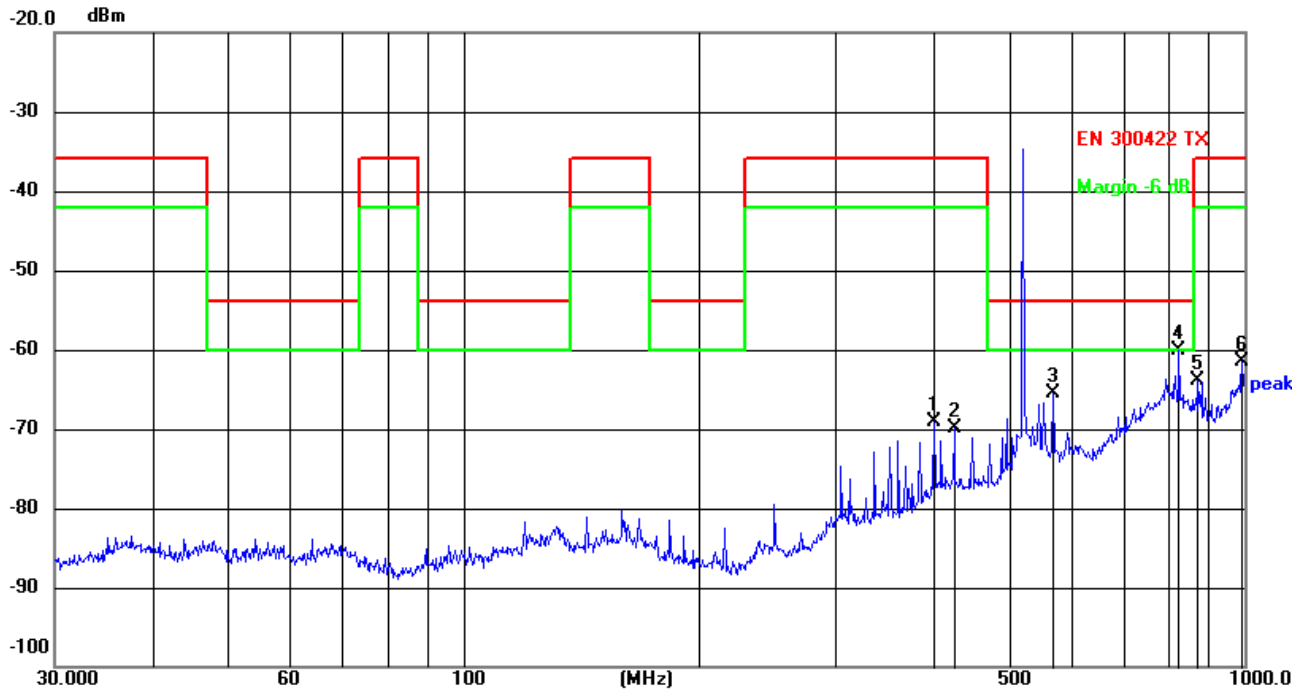
■ **Below 30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

■ **Below 1GHz**

CHA: 520.0MHz

Horizontal:

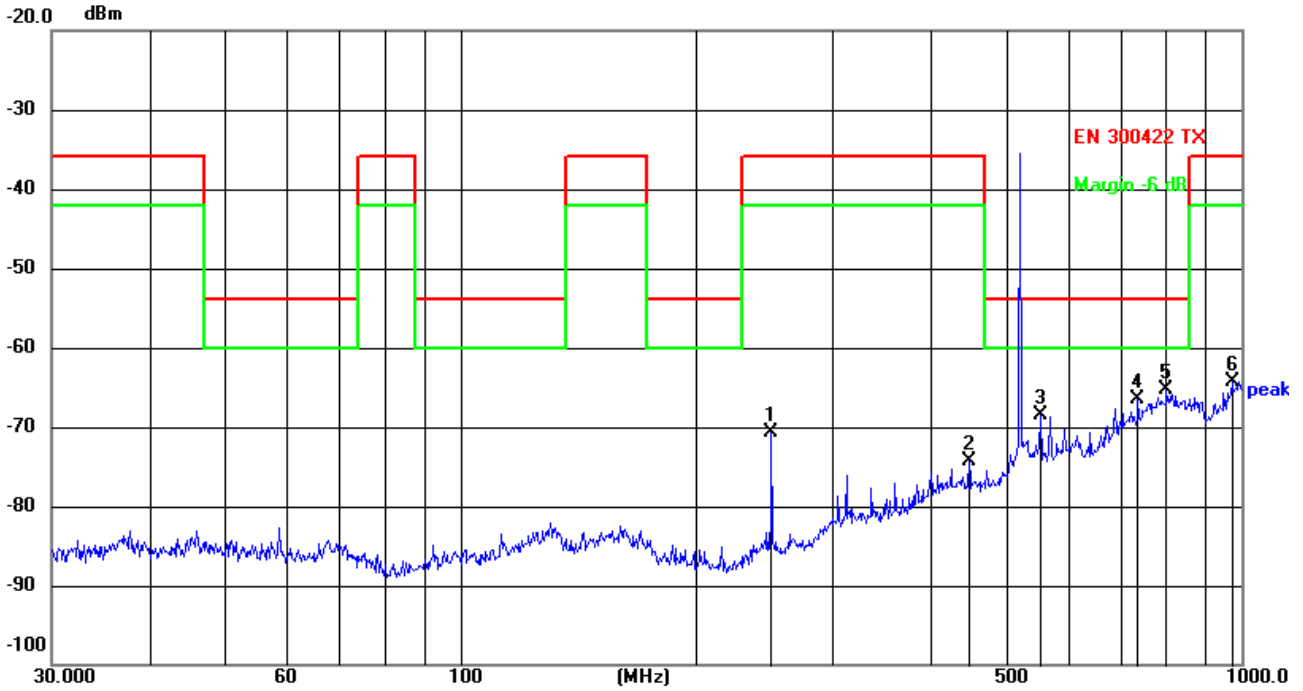


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	400.4318	-62.88	-6.15	-69.03	-36.00	-33.03	peak
2	425.0280	-64.91	-5.03	-69.94	-36.00	-33.94	peak
3	568.6126	-65.26	-0.16	-65.42	-54.00	-11.42	peak
4	824.5968	-66.20	6.02	-60.18	-54.00	-6.18	peak
5	872.1832	-69.84	5.85	-63.99	-36.00	-27.99	peak
6	993.0113	-70.42	9.01	-61.41	-36.00	-25.41	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Pre-amplifier Factor

Vertical:



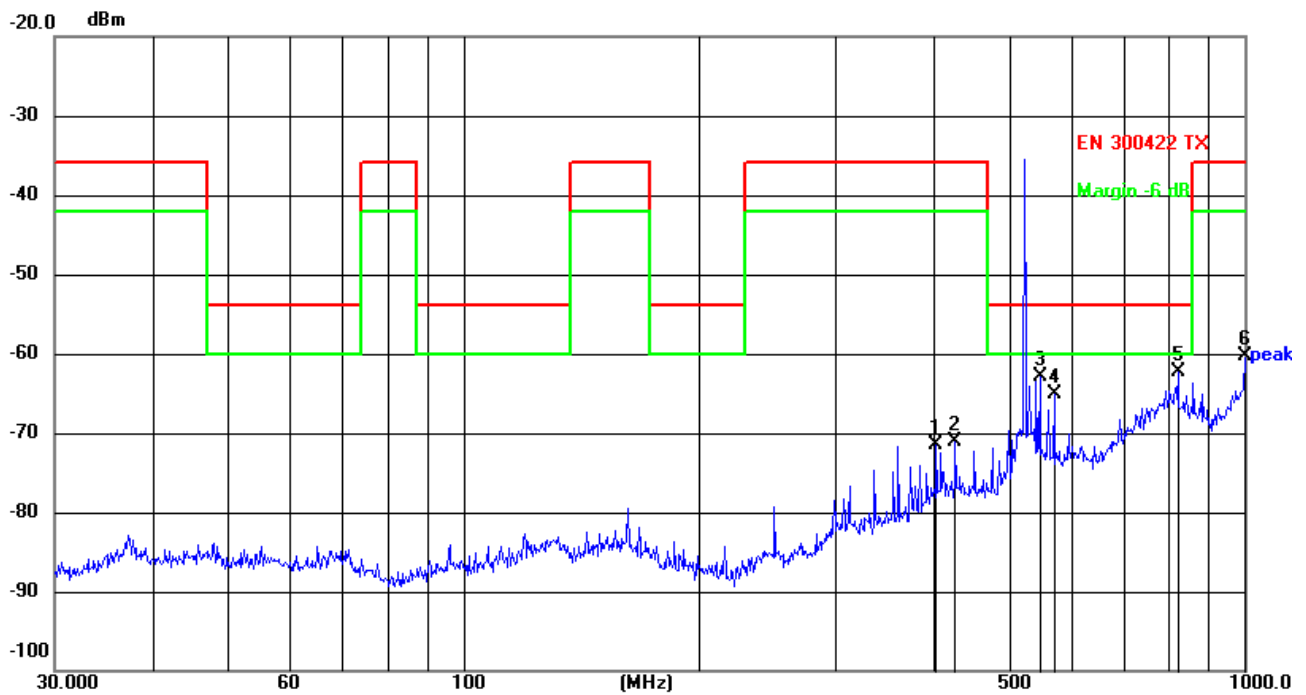
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	250.3010	-59.14	-11.55	-70.69	-36.00	-34.69	peak
2	447.9821	-70.44	-3.89	-74.33	-36.00	-38.33	peak
3	552.8832	-68.17	-0.32	-68.49	-54.00	-14.49	peak
4	737.0712	-71.34	4.78	-66.56	-54.00	-12.56	peak
5	801.7862	-72.27	6.89	-65.38	-54.00	-11.38	peak
6	972.3373	-72.35	8.06	-64.29	-36.00	-28.29	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHA: 522.7MHz

Horizontal:

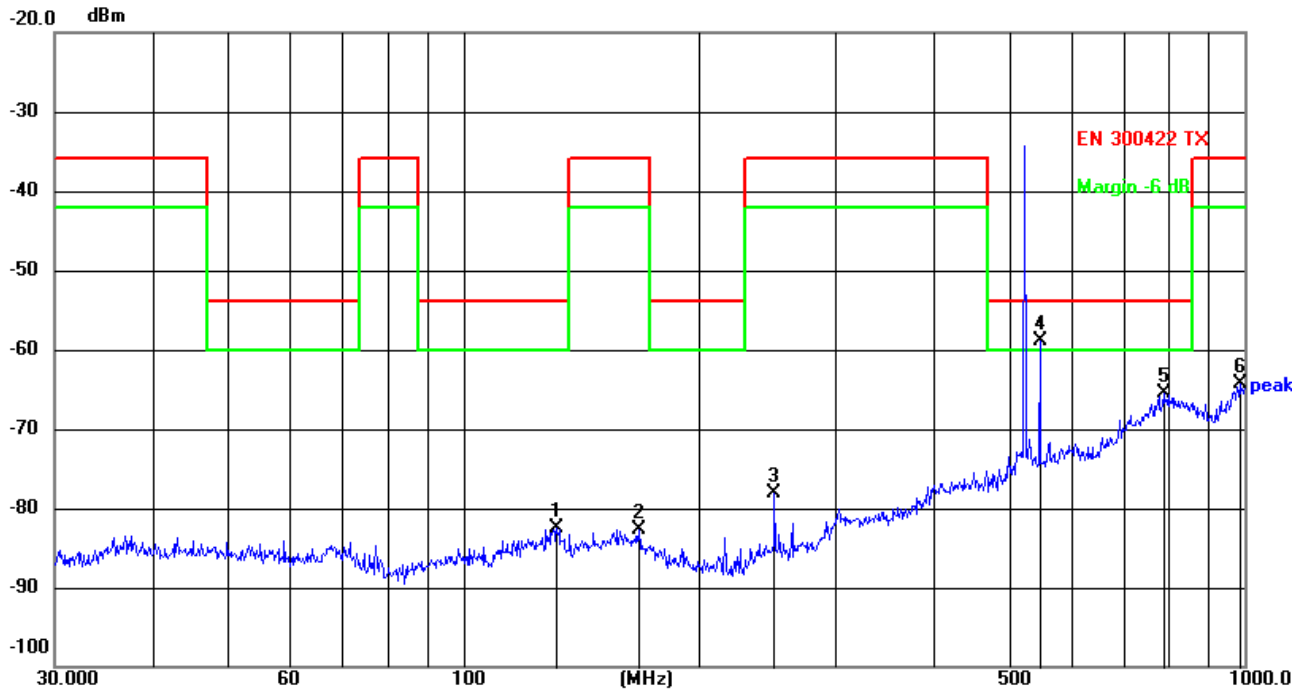


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	403.2500	-65.48	-6.02	-71.50	-36.00	-35.50	peak
2	426.5210	-66.04	-4.98	-71.02	-36.00	-35.02	peak
3	547.0976	-61.84	-1.03	-62.87	-54.00	-8.87	peak
4	570.6100	-65.01	-0.07	-65.08	-54.00	-11.08	peak
5	821.7103	-68.37	6.04	-62.33	-54.00	-8.33	peak
6	1000.0000	-69.44	9.07	-60.37	-36.00	-24.37	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



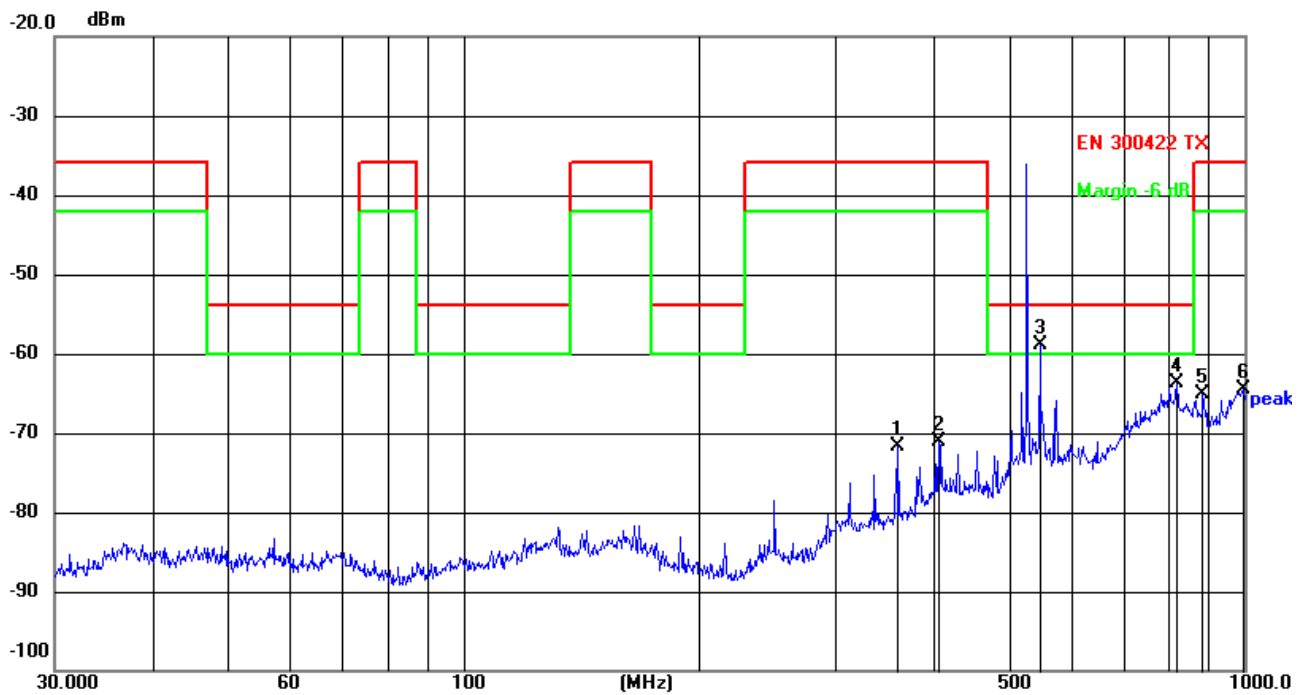
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	131.7576	-72.26	-10.25	-82.51	-54.00	-28.51	peak
2	167.8241	-71.79	-10.91	-82.70	-36.00	-46.70	peak
3	250.3010	-66.54	-11.55	-78.09	-36.00	-42.09	peak
4	547.0976	-58.52	-0.33	-58.85	-54.00	-4.85	peak
5	787.8511	-72.10	6.51	-65.59	-54.00	-11.59	peak
6	986.0715	-72.97	8.59	-64.38	-36.00	-28.38	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHA: 525.7MHz

Horizontal:

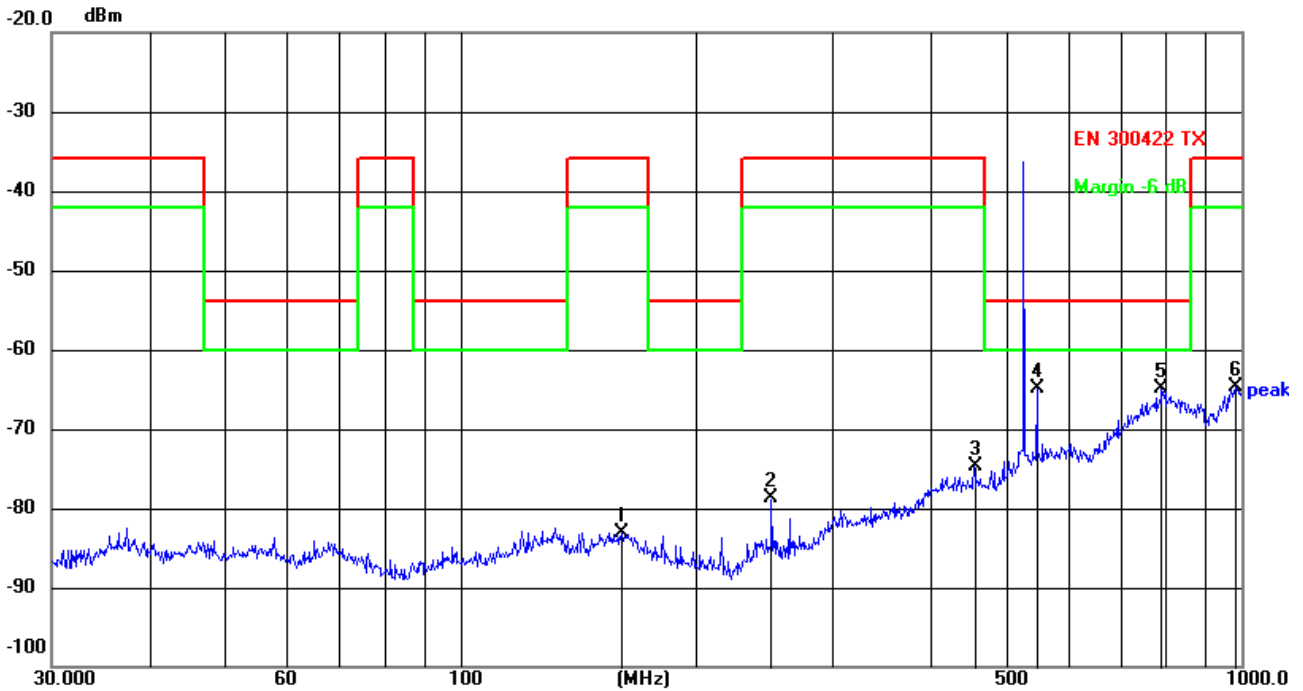


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	360.4476	-64.30	-7.41	-71.71	-36.00	-35.71	peak
2	406.0880	-65.17	-5.89	-71.06	-36.00	-35.06	peak
3	547.0976	-57.93	-1.03	-58.96	-54.00	-4.96	peak
4	818.8338	-69.68	6.06	-63.62	-54.00	-9.62	peak
5	884.5027	-70.75	5.67	-65.08	-36.00	-29.08	peak
6	996.4995	-73.62	9.04	-64.58	-36.00	-28.58	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:

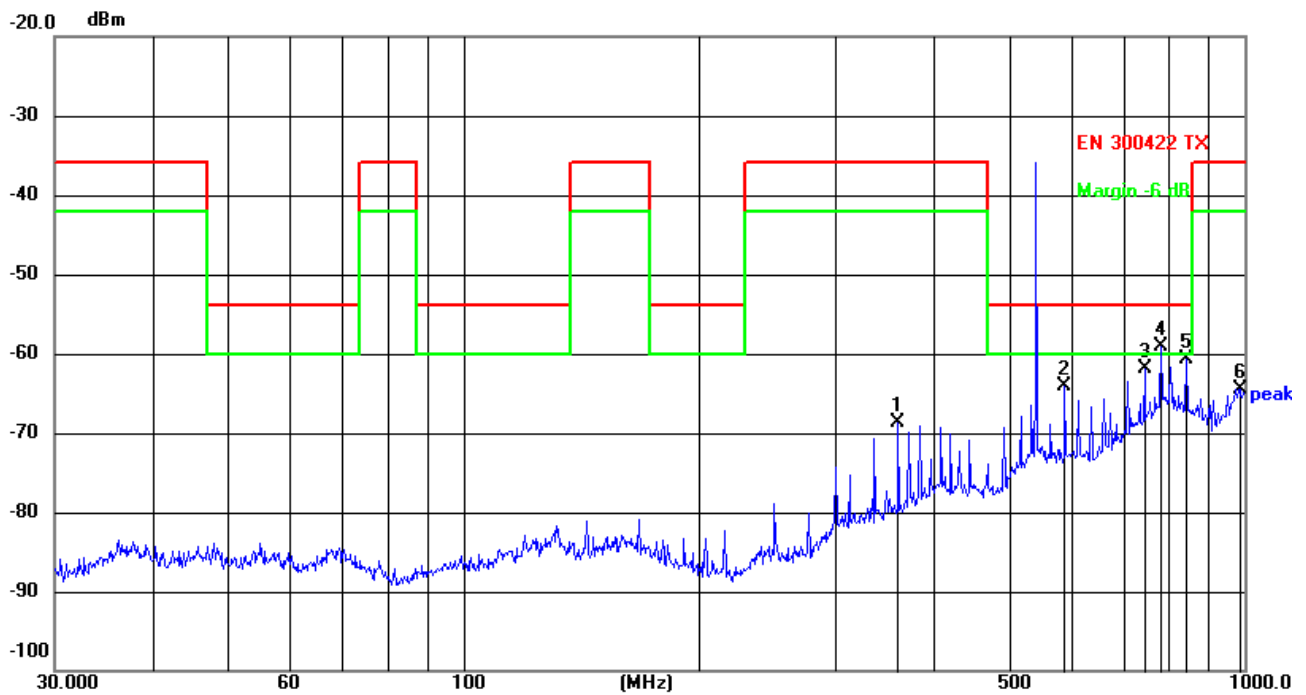


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	160.9088	-72.83	-10.20	-83.03	-36.00	-47.03	peak
2	250.3010	-67.25	-11.55	-78.80	-36.00	-42.80	peak
3	454.3100	-70.73	-3.91	-74.64	-36.00	-38.64	peak
4	547.0976	-64.64	-0.33	-64.97	-54.00	-10.97	peak
5	790.6186	-71.45	6.62	-64.83	-54.00	-10.83	peak
6	982.6200	-73.22	8.55	-64.67	-36.00	-28.67	peak

Level = Reading + Factor, Margin=level-Limit
 Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHB: 540.3MHz

Horizontal:

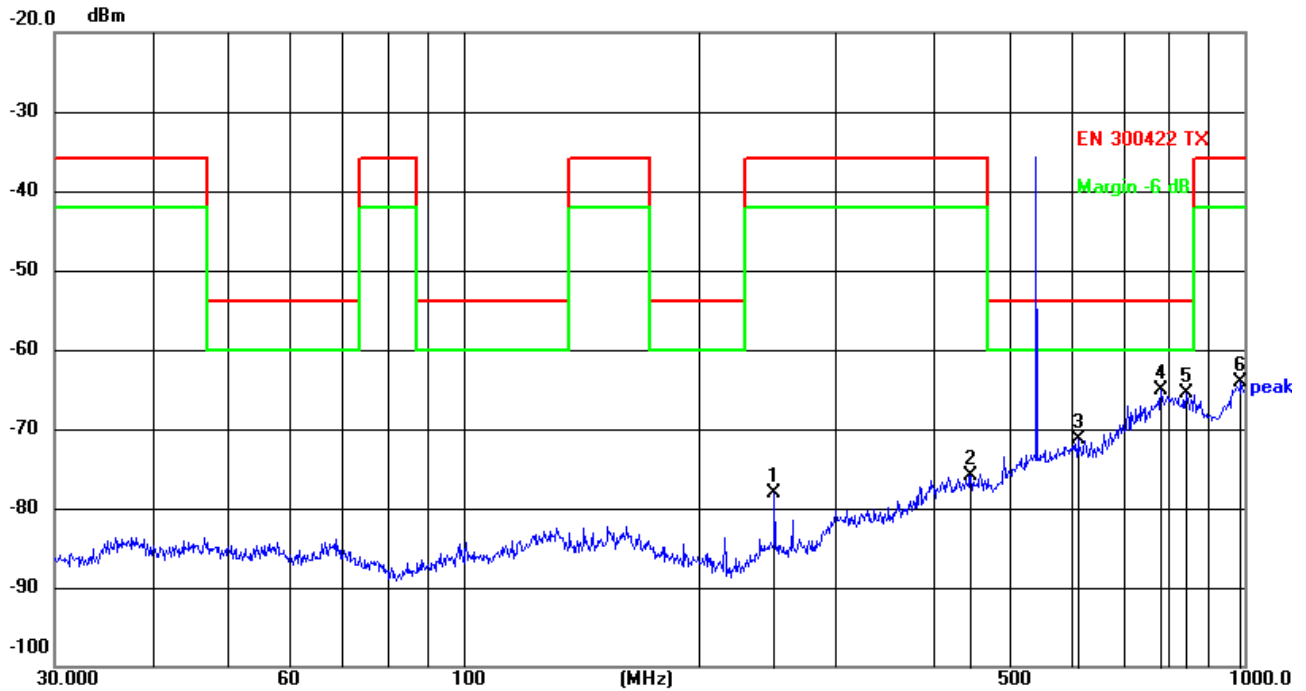


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	360.4476	-61.35	-7.41	-68.76	-36.00	-32.76	peak
2	588.9049	-64.06	0.03	-64.03	-54.00	-10.03	peak
3	744.8659	-66.48	4.55	-61.93	-54.00	-7.93	peak
4	782.3452	-64.80	5.64	-59.16	-54.00	-5.16	peak
5	842.1295	-66.67	5.89	-60.78	-54.00	-6.78	peak
6	986.0715	-73.41	8.96	-64.45	-36.00	-28.45	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



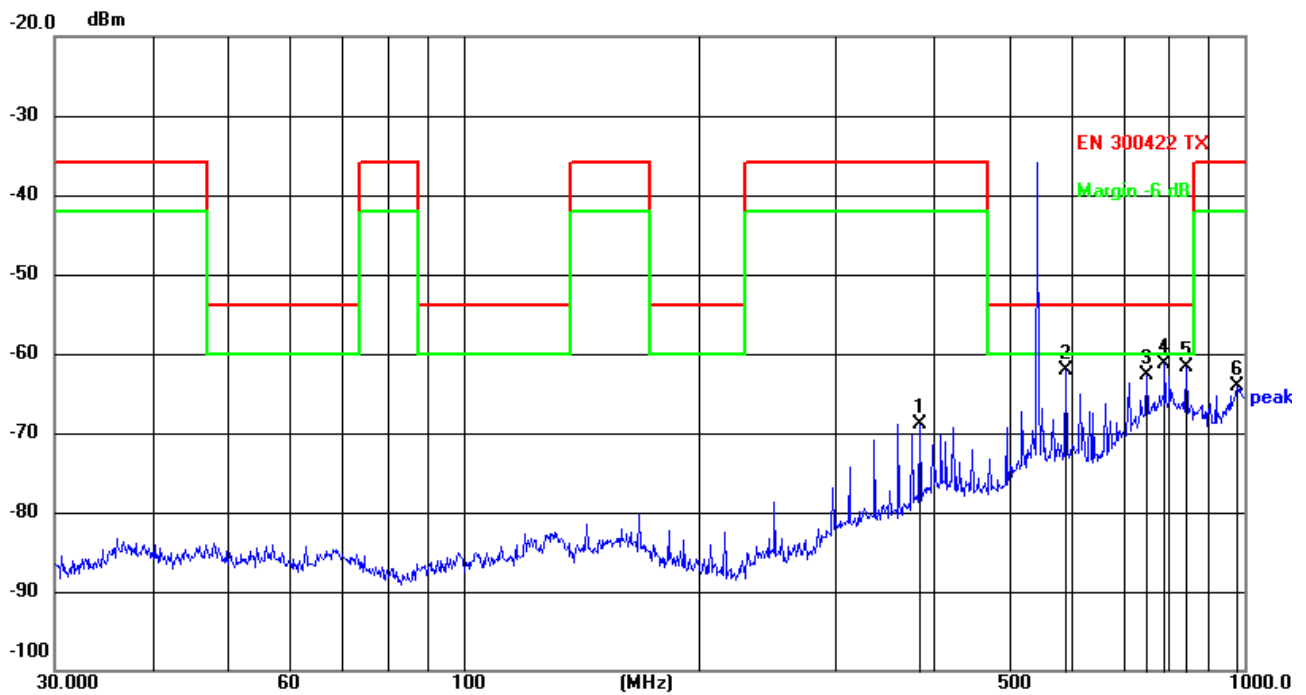
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	250.3010	-66.57	-11.55	-78.12	-36.00	-42.12	peak
2	446.4139	-72.02	-3.92	-75.94	-36.00	-39.94	peak
3	612.0641	-71.77	0.43	-71.34	-54.00	-17.34	peak
4	782.3452	-71.49	6.34	-65.15	-54.00	-11.15	peak
5	842.1295	-71.57	6.15	-65.42	-54.00	-11.42	peak
6	989.5353	-72.66	8.62	-64.04	-36.00	-28.04	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHB: 543.0MHz

Horizontal:

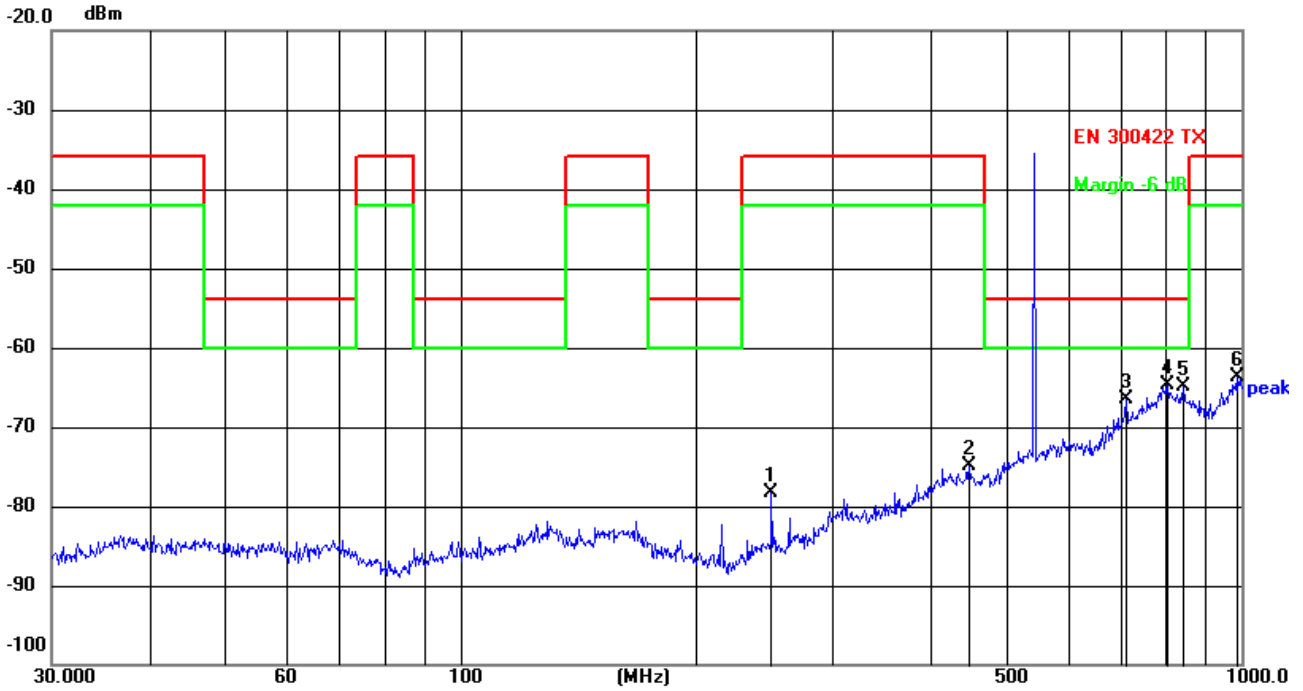


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	383.9318	-62.73	-6.18	-68.91	-36.00	-32.91	peak
2	590.9737	-62.11	-0.03	-62.14	-54.00	-8.14	peak
3	750.1082	-67.27	4.64	-62.63	-54.00	-8.63	peak
4	790.6186	-67.21	5.90	-61.31	-54.00	-7.31	peak
5	842.1295	-67.50	5.89	-61.61	-54.00	-7.61	peak
6	979.1803	-73.06	8.87	-64.19	-36.00	-28.19	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



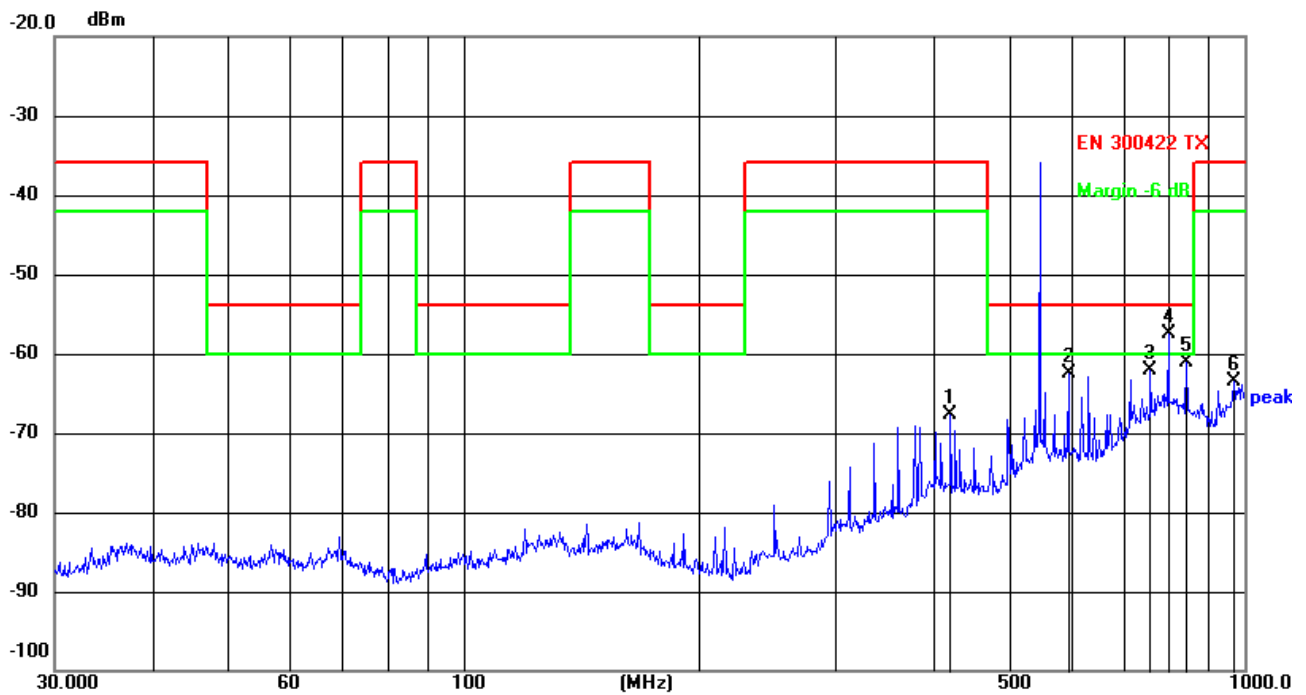
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	250.3010	-66.70	-11.55	-78.25	-36.00	-42.25	peak
2	447.9821	-71.05	-3.89	-74.94	-36.00	-38.94	peak
3	711.6734	-70.22	3.71	-66.51	-54.00	-12.51	peak
4	804.6027	-71.63	6.84	-64.79	-54.00	-10.79	peak
5	842.1295	-71.04	6.15	-64.89	-54.00	-10.89	peak
6	986.0715	-72.37	8.59	-63.78	-36.00	-27.78	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHB: 546.0MHz

Horizontal:

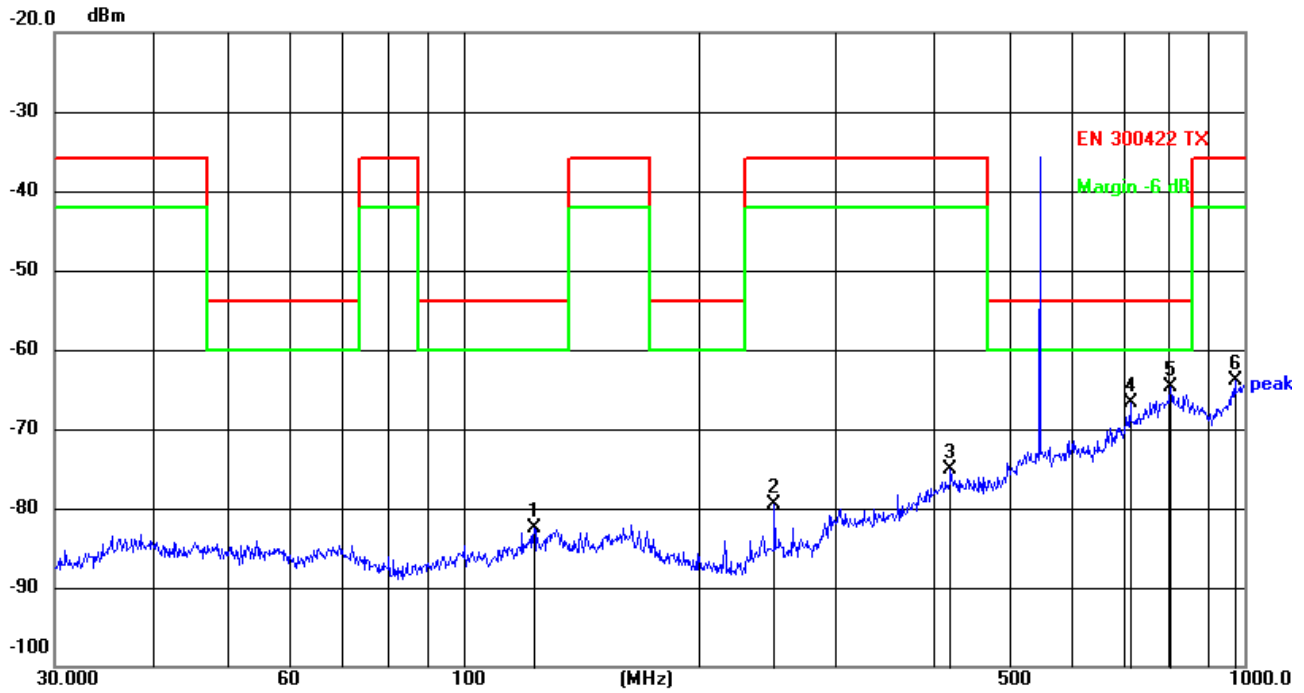


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	420.5803	-62.43	-5.24	-67.67	-36.00	-31.67	peak
2	595.1327	-62.34	-0.14	-62.48	-54.00	-8.48	peak
3	758.0407	-67.08	4.89	-62.19	-54.00	-8.19	peak
4	798.9796	-63.70	6.16	-57.54	-54.00	-3.54	peak
5	842.1295	-67.04	5.89	-61.15	-54.00	-7.15	peak
6	968.9337	-71.71	8.25	-63.46	-36.00	-27.46	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	123.2654	-71.71	-10.80	-82.51	-54.00	-28.51	peak
2	250.3011	-67.99	-11.55	-79.54	-36.00	-43.54	peak
3	420.5803	-70.79	-4.22	-75.01	-36.00	-39.01	peak
4	714.1733	-70.54	3.82	-66.72	-54.00	-12.72	peak
5	804.6027	-71.58	6.84	-64.74	-54.00	-10.74	peak
6	972.3373	-72.03	8.06	-63.97	-36.00	-27.97	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

■ Above 1GHz

Test channel:	CHA: 520.0MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1040.00	-34.69	-4.39	-39.08	-30.00	-9.08	Horizontal
1560.00	-35.80	-2.97	-38.77	-30.00	-8.77	Horizontal
2080.00	-34.84	-2.80	-37.64	-30.00	-7.64	Horizontal
2600.00	-42.93	-1.05	-43.98	-30.00	-13.98	Horizontal
3120.00	-40.26	0.34	-39.92	-30.00	-9.92	Horizontal
3640.00	-42.93	0.48	-42.45	-30.00	-12.45	Horizontal
4160.00	-45.86	0.99	-44.87	-30.00	-14.87	Horizontal
4680.00	-45.58	1.64	-43.94	-30.00	-13.94	Horizontal
5200.00	-56.83	3.41	-53.42	-30.00	-23.42	Horizontal
1040.00	-50.64	-4.10	-54.74	-30.00	-24.74	Vertical
1560.00	-44.55	-3.03	-47.58	-30.00	-17.58	Vertical
2080.00	-43.60	-3.45	-47.05	-30.00	-17.05	Vertical
2600.00	-36.79	-1.60	-38.39	-30.00	-8.39	Vertical
3120.00	-39.66	-0.31	-39.97	-30.00	-9.97	Vertical
3640.00	-47.64	-0.17	-47.81	-30.00	-17.81	Vertical
4160.00	-55.01	0.33	-54.68	-30.00	-24.68	Vertical
4680.00	-59.01	1.17	-57.84	-30.00	-27.84	Vertical
5200.00	-56.40	2.94	-53.46	-30.00	-23.46	Vertical

Remark:

1. Final Level = Receiver Read level + Correction Factor (Antenna Factor + Cable Loss – Preamplifier Factor)

Test channel:	CHA: 522.70MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1045.40	-33.92	-4.37	-38.29	-30.00	-8.29	Horizontal
1568.10	-36.33	-2.99	-39.32	-30.00	-9.32	Horizontal
2090.80	-38.04	-2.77	-40.81	-30.00	-10.81	Horizontal
2613.50	-37.38	-1.00	-38.38	-30.00	-8.38	Horizontal
3136.20	-39.28	0.33	-38.95	-30.00	-8.95	Horizontal
3658.90	-41.10	0.52	-40.58	-30.00	-10.58	Horizontal
4181.60	-46.31	1.00	-45.31	-30.00	-15.31	Horizontal
4704.30	-43.27	1.71	-41.56	-30.00	-11.56	Horizontal
5227.00	-57.65	3.50	-54.15	-30.00	-24.15	Horizontal
1045.40	-52.60	-4.08	-56.68	-30.00	-26.68	Vertical
1568.10	-41.02	-3.06	-44.08	-30.00	-14.08	Vertical
2090.80	-46.27	-3.42	-49.69	-30.00	-19.69	Vertical
2613.50	-36.47	-1.55	-38.02	-30.00	-8.02	Vertical
3136.20	-41.90	-0.32	-42.22	-30.00	-12.22	Vertical
3658.90	-51.07	-0.15	-51.22	-30.00	-21.22	Vertical
4181.60	-54.51	0.36	-54.15	-30.00	-24.15	Vertical
4704.30	-55.30	1.24	-54.06	-30.00	-24.06	Vertical
5227.00	-63.07	3.06	-60.01	-30.00	-30.01	Vertical

Remark:

1. *Final Level = Receiver Read level + Correction Factor (Antenna Factor + Cable Loss – Preamplifier Factor)*

Test channel:	CHA: 525.70MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1051.40	-35.93	-4.35	-40.28	-30.00	-10.28	Horizontal
1577.10	-35.71	-2.99	-38.70	-30.00	-8.70	Horizontal
2102.80	-39.72	-2.72	-42.44	-30.00	-12.44	Horizontal
2628.50	-39.12	-0.95	-40.07	-30.00	-10.07	Horizontal
3154.20	-40.95	0.34	-40.61	-30.00	-10.61	Horizontal
3679.90	-43.59	0.54	-43.05	-30.00	-13.05	Horizontal
4205.60	-46.62	1.02	-45.60	-30.00	-15.60	Horizontal
4731.30	-45.35	1.78	-43.57	-30.00	-13.57	Horizontal
5257.00	-58.43	3.67	-54.76	-30.00	-24.76	Horizontal
1051.40	-48.20	-4.07	-52.27	-30.00	-22.27	Vertical
1577.10	-38.48	-3.07	-41.55	-30.00	-11.55	Vertical
2102.80	-41.40	-3.37	-44.77	-30.00	-14.77	Vertical
2628.50	-38.12	-1.51	-39.63	-30.00	-9.63	Vertical
3154.20	-40.18	-0.31	-40.49	-30.00	-10.49	Vertical
3679.90	-45.35	-0.13	-45.48	-30.00	-15.48	Vertical
4205.60	-53.78	0.39	-53.39	-30.00	-23.39	Vertical
4731.30	-51.88	1.31	-50.57	-30.00	-20.57	Vertical
5788.79	-55.84	4.26	-51.58	-30.00	-21.58	Vertical

Remark:

1. *Final Level = Receiver Read level + Correction Factor (Antenna Factor + Cable Loss – Pre-amplifier Factor)*

Test channel:	CHB: 540.30MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1080.60	-35.75	-4.26	-40.01	-30.00	-10.01	Horizontal
1620.90	-36.31	-3.00	-39.31	-30.00	-9.31	Horizontal
2161.20	-34.89	-2.54	-37.43	-30.00	-7.43	Horizontal
2701.50	-40.90	-0.69	-41.59	-30.00	-11.59	Horizontal
3241.80	-42.32	0.33	-41.99	-30.00	-11.99	Horizontal
3782.10	-53.87	0.66	-53.21	-30.00	-23.21	Horizontal
4862.70	-43.78	2.11	-41.67	-30.00	-11.67	Horizontal
5403.00	-53.60	4.32	-49.28	-30.00	-19.28	Horizontal
1080.60	-35.74	-3.99	-39.73	-30.00	-9.73	Vertical
1620.90	-36.79	-3.15	-39.94	-30.00	-9.94	Vertical
2701.50	-38.06	-1.27	-39.33	-30.00	-9.33	Vertical
3241.80	-40.73	-0.32	-41.05	-30.00	-11.05	Vertical
3782.10	-48.06	-0.03	-48.09	-30.00	-18.09	Vertical
4322.40	-50.26	0.49	-49.77	-30.00	-19.77	Vertical
4862.70	-50.22	1.66	-48.56	-30.00	-18.56	Vertical
5403.00	-61.42	3.82	-57.60	-30.00	-27.60	Vertical

Remark:

2. *Final Level = Receiver Read level + Correction Factor (Antenna Factor + Cable Loss – Preamplifier Factor)*

Test channel:	CHB: 543.00MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1086.00	-40.23	-3.97	-44.20	-30.00	-14.20	Horizontal
1629.00	-37.36	-3.16	-40.52	-30.00	-10.52	Horizontal
2172.00	-51.68	-3.12	-54.80	-30.00	-24.80	Horizontal
2715.00	-39.01	-1.22	-40.23	-30.00	-10.23	Horizontal
3258.00	-39.70	-0.31	-40.01	-30.00	-10.01	Horizontal
3801.00	-49.28	-0.01	-49.29	-30.00	-19.29	Horizontal
4344.00	-46.59	0.51	-46.08	-30.00	-16.08	Horizontal
4887.00	-53.69	1.73	-51.96	-30.00	-21.96	Horizontal
5430.00	-59.09	3.93	-55.16	-30.00	-25.16	Horizontal
1086.00	-40.29	-3.97	-44.26	-30.00	-14.26	Vertical
1629.00	-37.91	-3.16	-41.07	-30.00	-11.07	Vertical
2172.00	-51.93	-3.12	-55.05	-30.00	-25.05	Vertical
2715.00	-40.68	-1.22	-41.90	-30.00	-11.90	Vertical
3258.00	-42.41	-0.31	-42.72	-30.00	-12.72	Vertical
3801.00	-48.93	-0.01	-48.94	-30.00	-18.94	Vertical
4344.00	-46.89	0.51	-46.38	-30.00	-16.38	Vertical
4887.00	-53.38	1.73	-51.65	-30.00	-21.65	Vertical
5430.00	-59.96	3.93	-56.03	-30.00	-26.03	Vertical

Remark:

2. *Final Level = Receiver Read level + Correction Factor (Antenna Factor + Cable Loss – Preamplifier Factor)*

Test channel:	CHB: 546.00MHz
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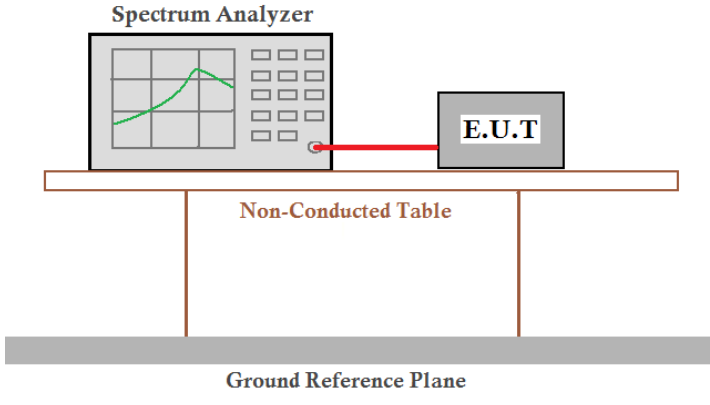
Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1092.00	-37.54	-4.23	-41.77	-30.00	-11.77	Horizontal
1638.00	-37.38	-3.01	-40.39	-30.00	-10.39	Horizontal
2184.00	-36.86	-2.46	-39.32	-30.00	-9.32	Horizontal
2730.00	-37.63	-0.60	-38.23	-30.00	-8.23	Horizontal
3276.00	-40.63	0.34	-40.29	-30.00	-10.29	Horizontal
3822.00	-45.75	0.70	-45.05	-30.00	-15.05	Horizontal
4368.00	-54.17	1.08	-53.09	-30.00	-23.09	Horizontal
4914.00	-47.84	2.25	-45.59	-30.00	-15.59	Horizontal
5460.00	-53.48	4.58	-48.90	-30.00	-18.90	Horizontal
1092.00	-34.81	-3.96	-38.77	-30.00	-8.77	Vertical
1638.00	-37.04	-3.17	-40.21	-30.00	-10.21	Vertical
2184.00	-45.23	-3.08	-48.31	-30.00	-18.31	Vertical
2730.00	-39.04	-1.18	-40.22	-30.00	-10.22	Vertical
3276.00	-44.00	-0.31	-44.31	-30.00	-14.31	Vertical
3822.00	-46.07	0.01	-46.06	-30.00	-16.06	Vertical
4368.00	-46.08	0.53	-45.55	-30.00	-15.55	Vertical
4914.00	-53.38	1.80	-51.58	-30.00	-21.58	Vertical
5460.00	-60.84	4.07	-56.77	-30.00	-26.77	Vertical

Remark:

Final Level = Receiver Read level + Correction Factor(Antenna Factor + Cable Loss – Preamplifier Factor

4.7 Frequency Tolerance

Test Requirement:	FCC Part15 C Section 15.236(f)(3)	
Test Method:	ETSI EN 300 422-1 V1.4.2 8.3.2	
Limit:	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.	
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 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.6°C	Humid.: 51%RH
Test voltage:	DC 3V	
Test results:	Pass	

Test Result

CHA:

Frequency MHz	Conditions		Measure Frequency	Frequency Error		Limited	Result
	Voltage	Temperature	MHz	MHz	ppm	ppm	
520.00	3V	-20°C	520.007	0.007	14.00	±50	pass
		+20°C	520.010	0.010	19.77	±50	pass
		+50°C	520.009	0.009	17.85	±50	pass
	2.55V	+20°C	520.010	0.010	19.77	±50	pass
	3.45V		520.010	0.010	19.77	±50	pass
522.70	3V	-20°C	522.708	0.008	15.78	±50	pass
		+20°C	522.710	0.010	19.61	±50	pass
		+50°C	522.710	0.010	19.61	±50	pass
	2.55V	+20°C	522.708	0.008	15.78	±50	pass
	3.45V		522.708	0.008	15.78	±50	pass
525.70	3V	-20°C	525.710	0.010	19.44	±50	pass
		+20°C	525.710	0.010	19.44	±50	pass
		+50°C	525.707	0.007	13.73	±50	pass
	2.55V	+20°C	525.709	0.009	17.53	±50	pass
	3.45V		525.710	0.010	19.44	±50	pass

CHB:

Frequency MHz	Conditions		Measure Frequency	Frequency Error		Limited	Result
	Voltage	Temperature	MHz	MHz	ppm	ppm	
540.30	3V	-20°C	540.314	0.014	27.81	±50	pass
		+20°C	540.312	0.012	23.96	±50	pass
		+50°C	540.313	0.013	25.88	±50	pass
	2.55V	+20°C	540.312	0.012	23.96	±50	pass
	3.45V		540.315	0.015	29.73	±50	pass
543.00	3V	-20°C	543.015	0.015	29.57	±50	pass
		+20°C	543.012	0.012	23.83	±50	pass
		+50°C	543.013	0.013	25.75	±50	pass
	2.55V	+20°C	543.014	0.014	27.66	±50	pass
	3.45V		543.012	0.012	23.83	±50	pass
546.00	3V	-20°C	546.013	0.013	25.59	±50	pass
		+20°C	546.012	0.012	23.69	±50	pass
		+50°C	546.012	0.012	23.69	±50	pass
	2.55V	+20°C	546.014	0.014	27.49	±50	pass
	3.45V		546.012	0.012	23.69	±50	pass

5 Test Setup Photo

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

6 EUT Constructional Details

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

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