



TEST REPORT

Applicant: LOVE KARAOKE USA LLC
Address of Applicant: 523 Sullivan Way, Mountain House, CA 95391, USA
Manufacturer/Factory: LOVE KARAOKE USA LLC
Address of Manufacturer/Factory: 523 Sullivan Way, Mountain House, CA 95391, USA
Product Name: Portable Speakers
Model No.: LKM15A-PRO
Trade Mark: LK LOVE KARAOKE
FCC ID: 2A8QW-LKM15A
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.236
Date of Test: Apr.25, 2023-May.10, 2023
Date of report issued: May 22, 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

Shenzhen ETR Standard Technology Co., Ltd.

Address: No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Compiled by:

Project Engineer

Reviewed by:

Project Manager

Approved by:

Authorized Signature



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(f)(3)	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:	Portable Speakers
Model No.:	LKM15A-PRO
Model of difference:	N/A
Test model:	LKM15A-PRO
Sample(s) Status:	Engineer sample
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	CHA:521.0-526.7MHz CHB:527.0-532.7MHz
Channel numbers:	40
Modulation type:	FM
Antenna Type:	Monopole Antenna
Antenna gain:	3.0dBi
Power supply:	DC 3V

Operation Frequency each of channel							
CHA							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	521.00 MHz	6	522.50 MHz	11	524.00 MHz	16	525.50 MHz
2	521.30 MHz	7	522.80 MHz	12	524.30 MHz	17	525.80 MHz
3	521.60 MHz	8	523.10 MHz	13	524.60 MHz	18	526.10MHz
4	521.90 MHz	9	523.40 MHz	14	524.90 MHz	19	526.40 MHz
5	522.20 MHz	10	523.70 MHz	15	525.20 MHz	20	526.70 MHz
CHB							
21	527.00 MHz	26	528.50 MHz	31	530.00 MHz	36	531.50 MHz
22	527.30 MHz	27	528.80 MHz	32	530.30 MHz	37	531.80 MHz
23	527.60 MHz	28	529.10 MHz	33	530.60 MHz	38	532.10 MHz
24	527.90 MHz	29	529.40 MHz	34	530.90 MHz	39	532.40 MHz
25	528.20 MHz	30	529.70 MHz	35	531.20 MHz	40	532.70 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	521.00 MHz
The middle channel	523.70 MHz
The Highest channel	526.70MHz

Channel B	Frequency
The lowest channel	527.00 MHz
The middle channel	529.70 MHz
The Highest channel	532.70MHz

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
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

2.7 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

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

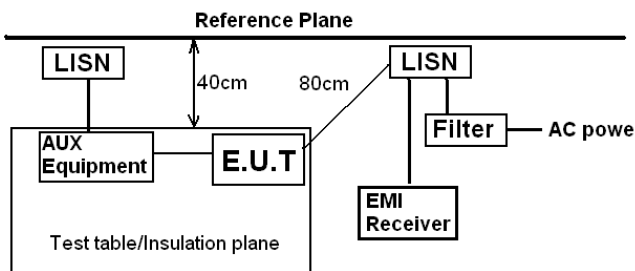
FCC part 15.203 requirement:

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:

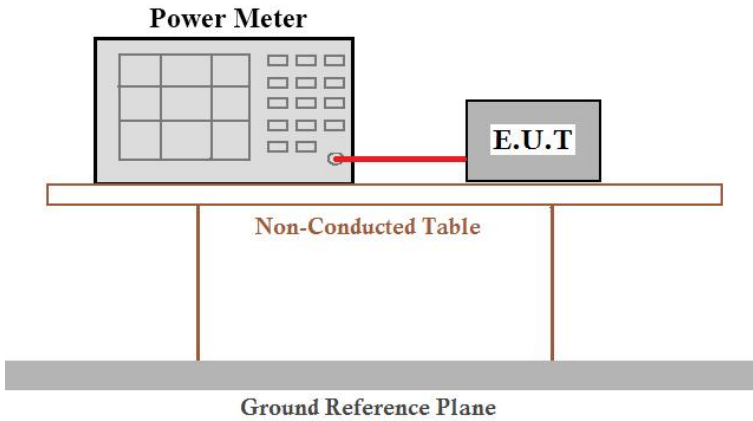
The antenna is Monopole Antenna, the best case gain of the antenna is 3.0dBi, reference to the appendix II for details.

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					

Note: EUT power supply is DC 3V 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.:	22.8 °C	Humid.:	57%	Press.:	1012mbar
Test voltage:	DC 3V					
Test results:	Pass					

Measurement Data

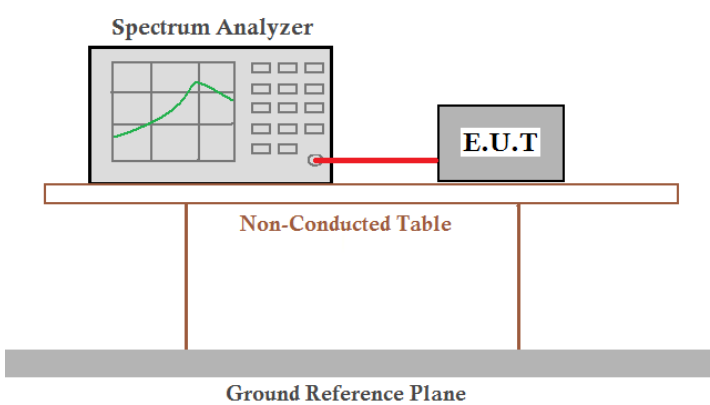
CHA:

Test channel	Frequency (MHz)	Output power (dBm)	ANT Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
1	521.00	-6.74	3.0	-3.74	17	pass
10	523.70	-8.09	3.0	-5.09		pass
20	526.70	-8.90	3.0	-5.90		pass

CHB:

Test channel	Frequency (MHz)	Output power (dBm)	ANT Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
21	527.00	-7.97	3.0	-4.97	17	pass
30	529.70	-7.95	3.0	-4.95		pass
40	532.70	-7.02	3.0	-4.02		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:					
Test Instruments:	Refer to section 3.0 for details				
Test mode:	Refer to section 2.2 for details				
Test environment:	Temp.:	22.8 °C	Humid.:	57%	Press.: 1012mbar
Test voltage:	DC 3V				
Test Mode:	TX				

Measurement Data

CHA:

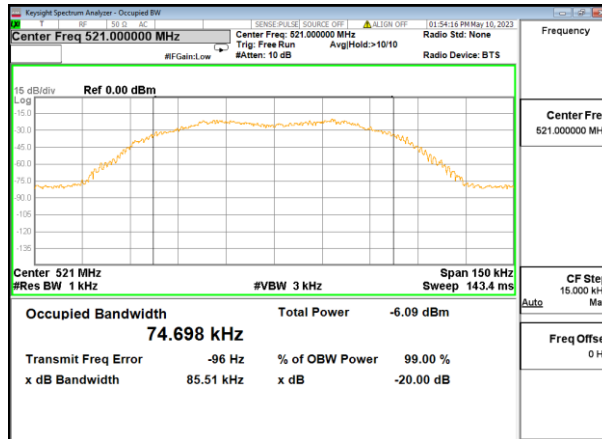
Test Frequency	99% bandwidth(KHz)	-20dB bandwidth(KHz)	Limit	Result
521.00	74.698	85.51	200KHz	Pass
523.70	75.906	85.92		
526.70	73.234	84.63		

CHB:

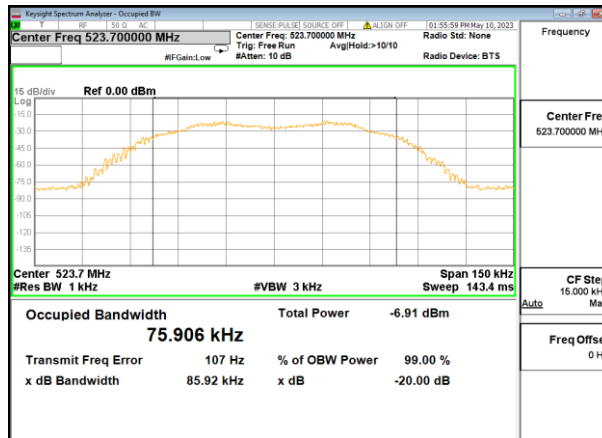
Test Frequency	99% bandwidth(KHz)	-20dB bandwidth(KHz)	Limit	Result
527.00	61.205	66.11	200KHz	Pass
529.70	61.039	66.03		
532.70	79.911	82.83		

Test plot as follows:

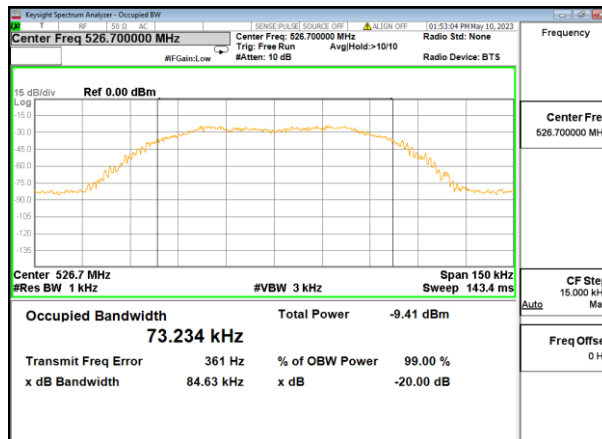
CHA:



Lowest channel

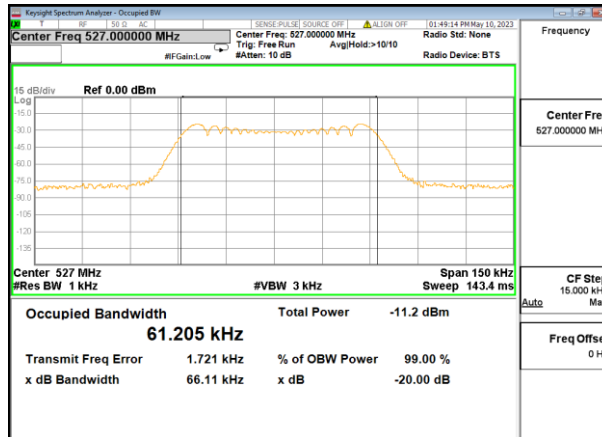


Middle channel

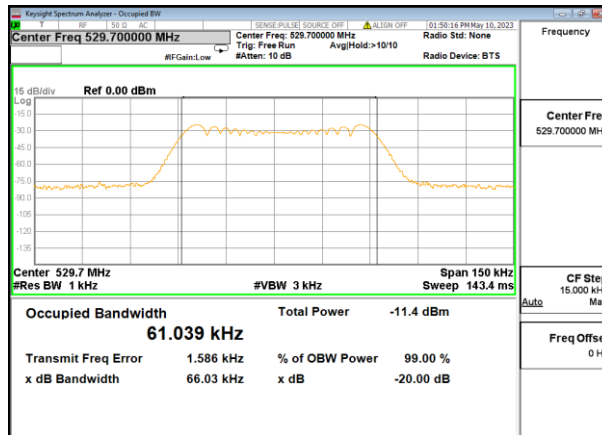


Highest channel

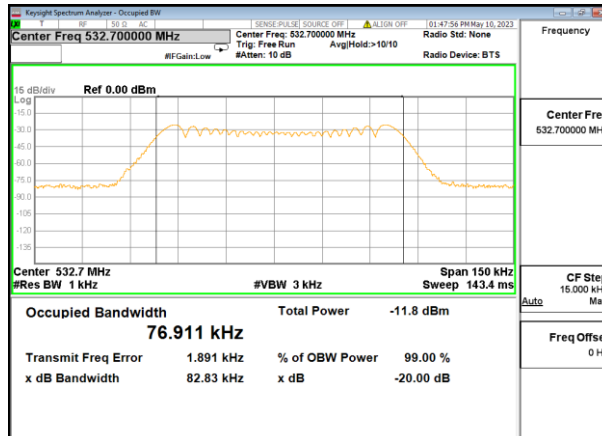
CHB:



Lowest channel

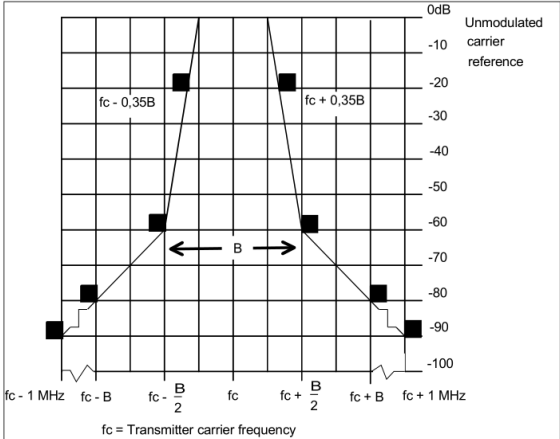
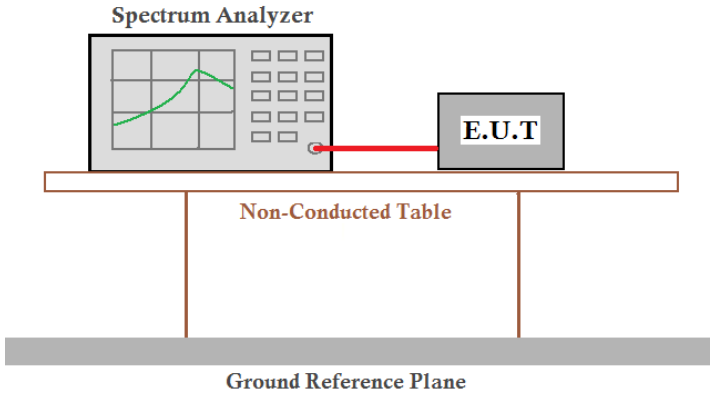


Middle channel



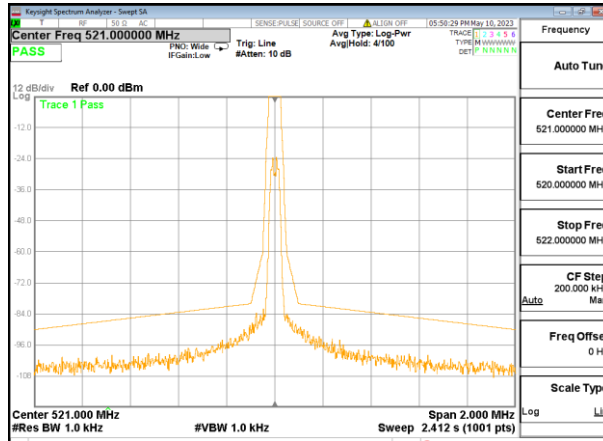
Highest channel

4.5 Necessary Bandwidth

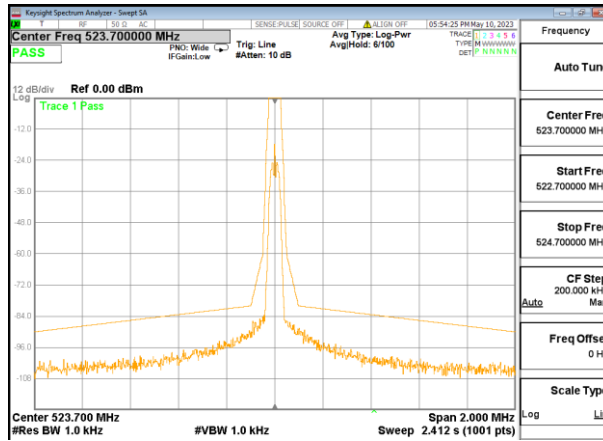
Test Requirement:	FCC Part15 C Section 15.236(g)					
Test Method:	ETSI EN 300 422-1 V1.4.2 8.3.2					
Limit:						
Test setup:						
Test Procedure:	<p>The transmitter RF output spectrum shall be measured, using a spectrum analyser with the following settings:</p> <ul style="list-style-type: none"> - centre frequency: f_c: Transmitter (Tx) nominal frequency; - dispersion (Span): $f_c - 1$ MHz to $f_c + 1$ 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.:	22.8 °C	Humid.:	57%	Press.:	1012mbar
Test voltage:	DC 3V					
Test Mode:	TX					

Measurement Data

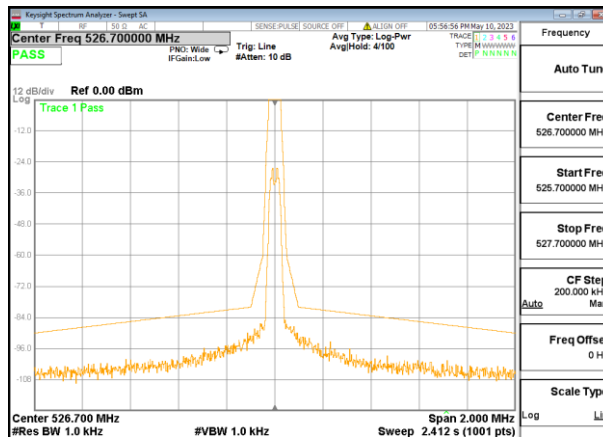
CHA



Lowest channel

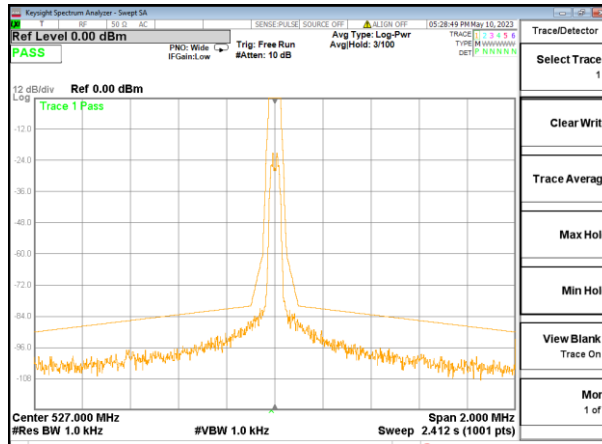


Middle channel

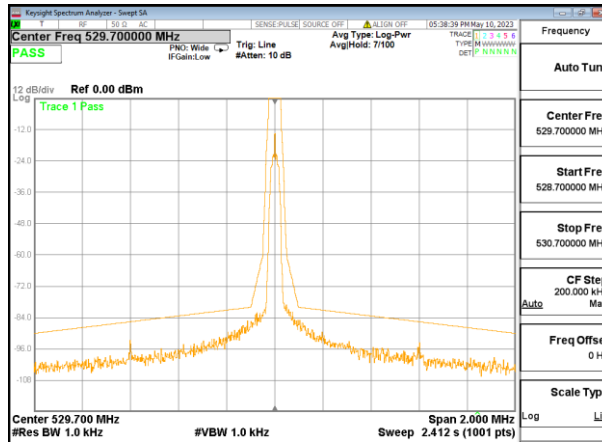


Highest channel

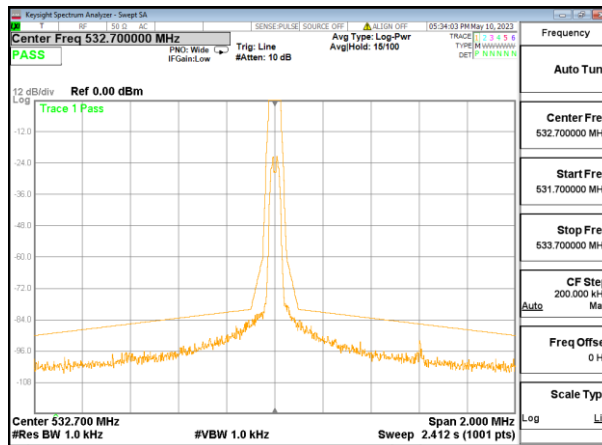
CHB



Lowest channel

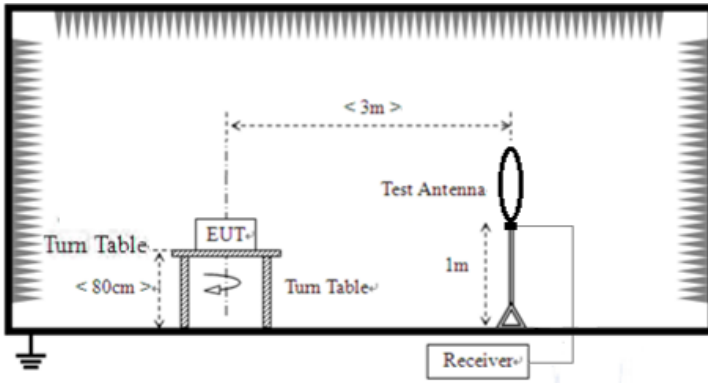
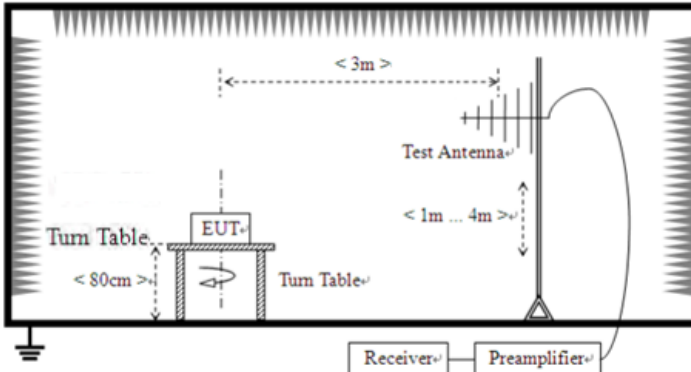


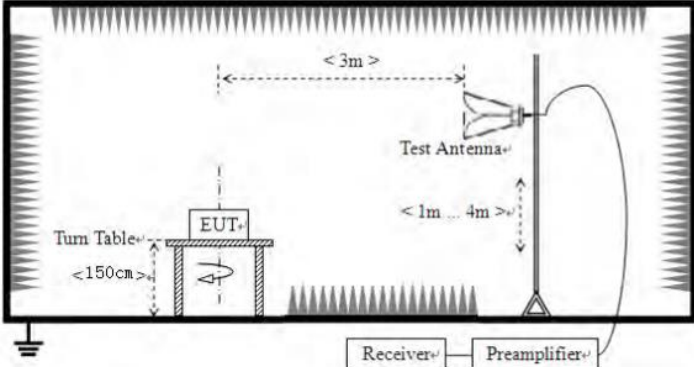
Middle channel



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>22.8 °C</td> <td>Humid.:</td> <td>57%</td> <td>Press.:</td> <td>1012mbar</td> </tr> </table>	Temp.:	22.8 °C	Humid.:	57%	Press.:	1012mbar
Temp.:	22.8 °C	Humid.:	57%	Press.:	1012mbar		
<p>Test results:</p>	<p>Pass</p>						

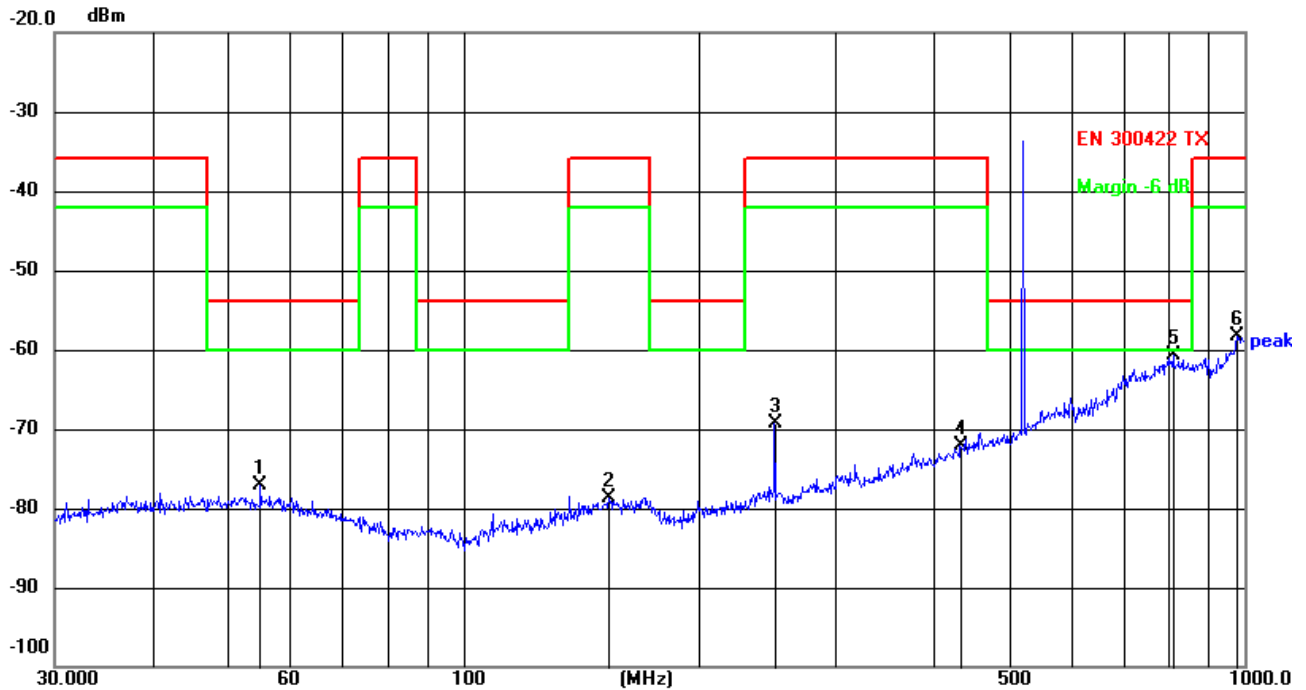
■ **Below 30MHz**

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: 521.0MHz

Horizontal:

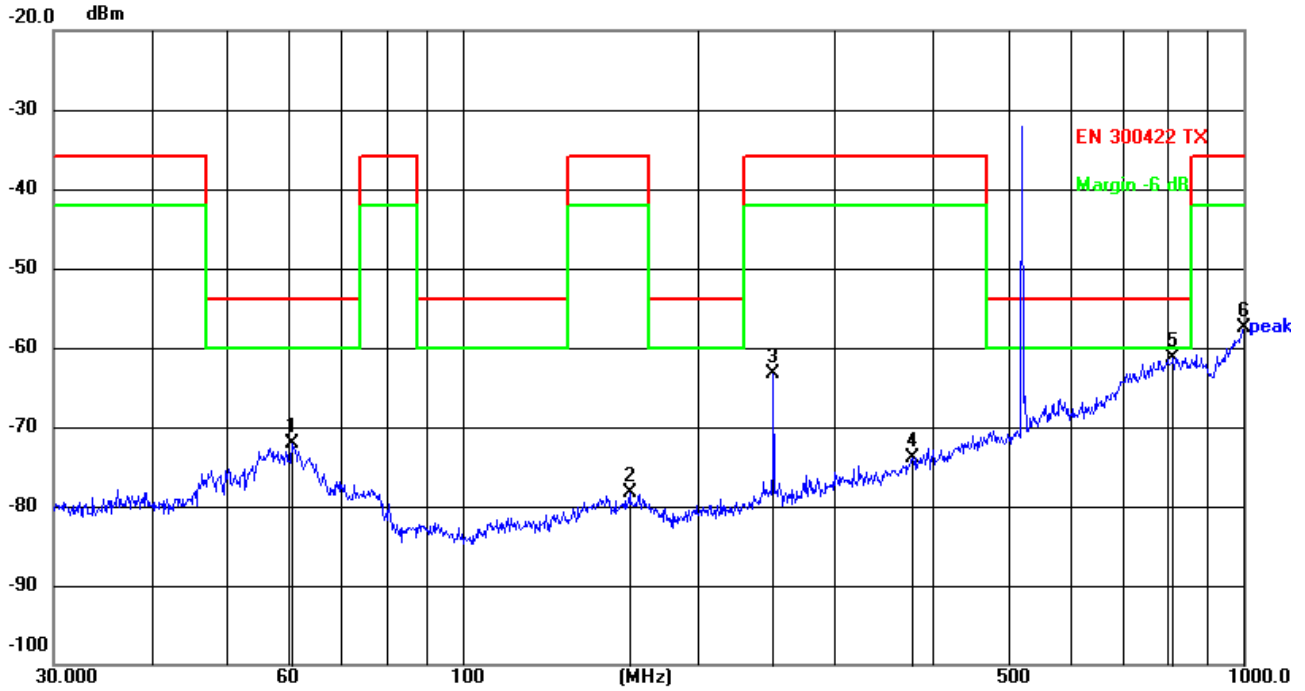


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	55.0274	-65.75	-11.39	-77.14	-54.00	-23.14	peak
2	153.7385	-67.37	-11.37	-78.74	-36.00	-42.74	peak
3	250.3012	-59.35	-9.89	-69.24	-36.00	-33.24	peak
4	432.5457	-67.33	-4.81	-72.14	-36.00	-36.14	peak
5	810.2654	-66.68	6.06	-60.62	-54.00	-6.62	peak
6	979.1804	-67.24	8.88	-58.36	-36.00	-22.36	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



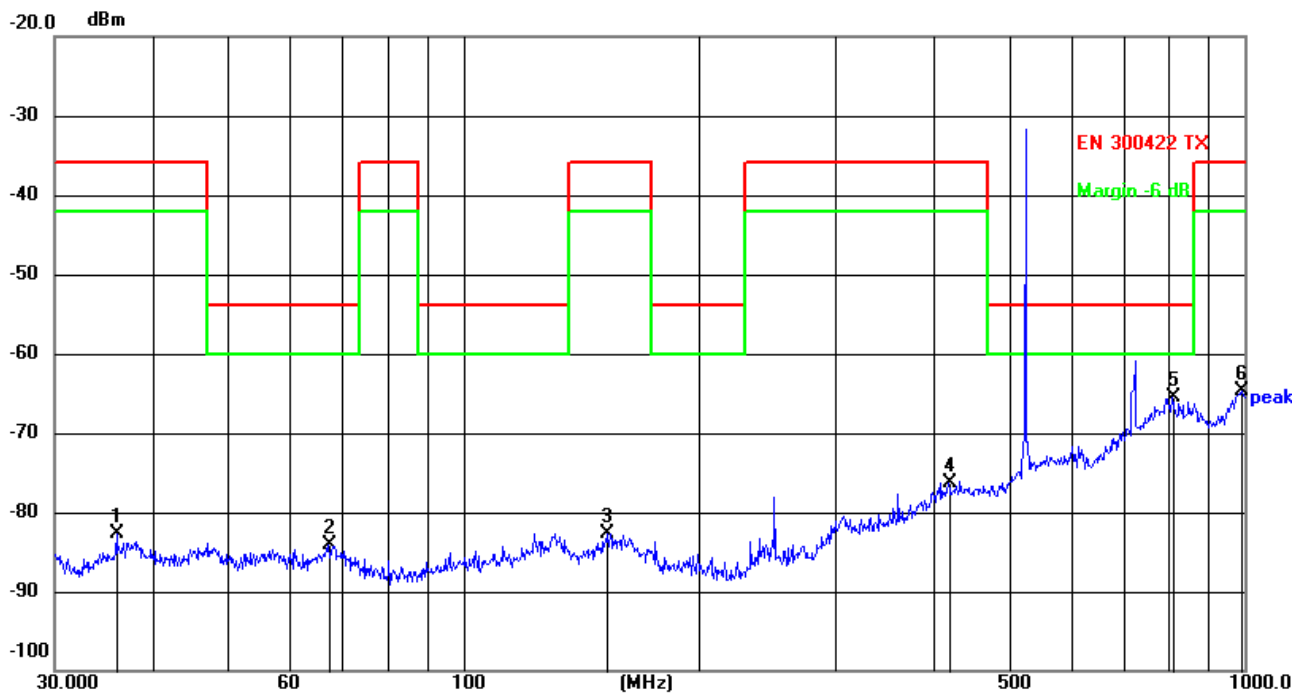
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	60.4918	-59.19	-12.83	-72.02	-54.00	-18.02	peak
2	163.7549	-67.84	-10.55	-78.39	-36.00	-42.39	peak
3	250.3011	-51.75	-11.60	-63.35	-36.00	-27.35	peak
4	377.2590	-67.12	-6.74	-73.86	-36.00	-37.86	peak
5	813.1115	-67.97	6.61	-61.36	-54.00	-7.36	peak
6	1000.0000	-66.19	8.74	-57.45	-36.00	-21.45	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHA: 523.7MHz

Horizontal:

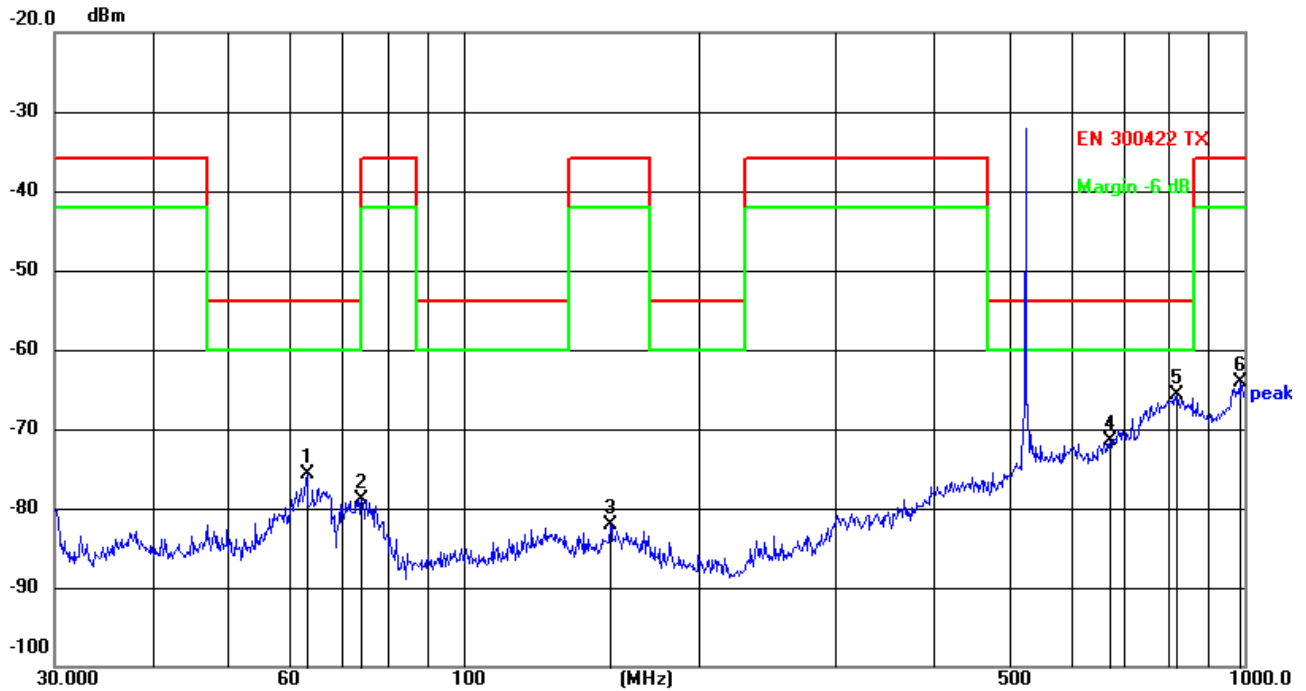


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	36.0007	-71.10	-11.63	-82.73	-36.00	-46.73	peak
2	67.2022	-71.21	-12.91	-84.12	-54.00	-30.12	peak
3	152.6641	-71.30	-11.36	-82.66	-36.00	-46.66	peak
4	417.6411	-70.91	-5.39	-76.30	-36.00	-40.30	peak
5	807.4291	-71.64	6.07	-65.57	-54.00	-11.57	peak
6	993.0114	-73.77	9.03	-64.74	-36.00	-28.74	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



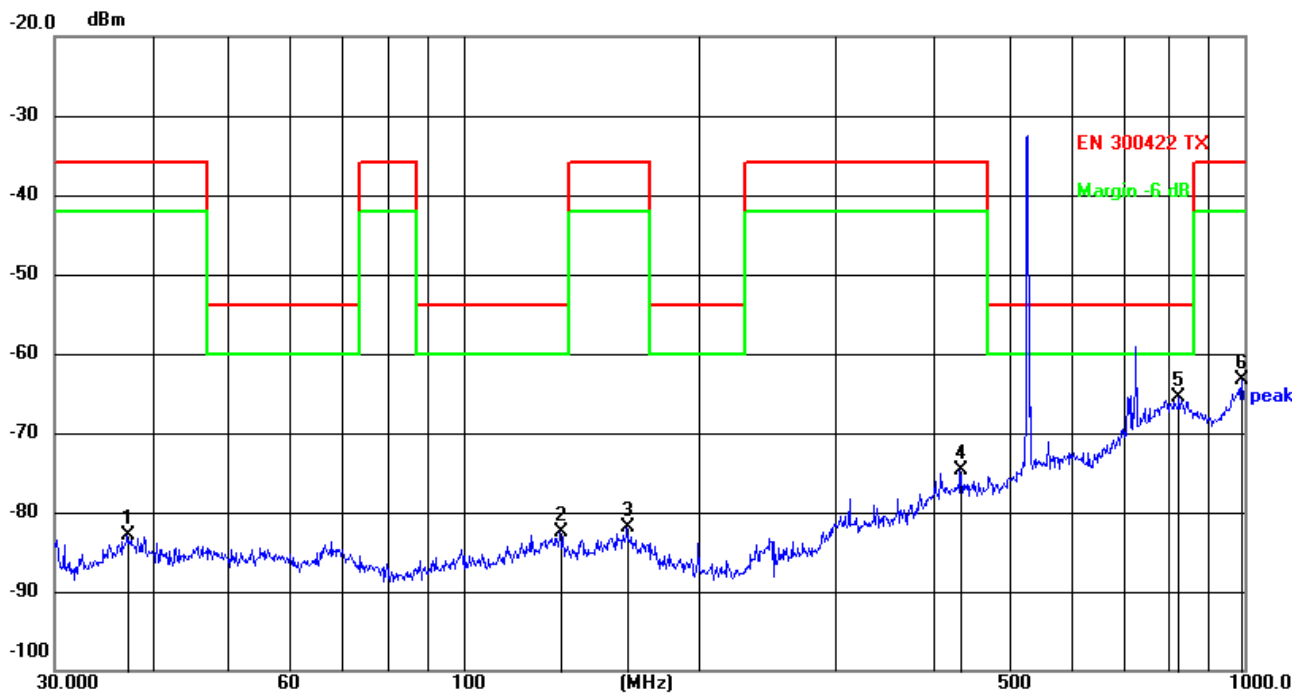
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	63.0916	-62.92	-12.69	-75.61	-54.00	-21.61	peak
2	74.1351	-65.48	-13.46	-78.94	-36.00	-42.94	peak
3	154.2785	-71.72	-10.47	-82.19	-36.00	-46.19	peak
4	672.8444	-73.05	1.47	-71.58	-54.00	-17.58	peak
5	818.8340	-72.26	6.53	-65.73	-54.00	-11.73	peak
6	989.5354	-72.69	8.64	-64.05	-36.00	-28.05	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHA: 526.7MHz

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	37.1550	-71.41	-11.51	-82.92	-36.00	-46.92	peak
2	133.1511	-69.63	-12.93	-82.56	-54.00	-28.56	peak
3	162.0414	-70.45	-11.40	-81.85	-36.00	-45.85	peak
4	432.5457	-69.96	-4.81	-74.77	-36.00	-38.77	peak
5	824.5968	-71.53	5.96	-65.57	-54.00	-11.57	peak
6	993.0114	-72.42	9.03	-63.39	-36.00	-27.39	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:

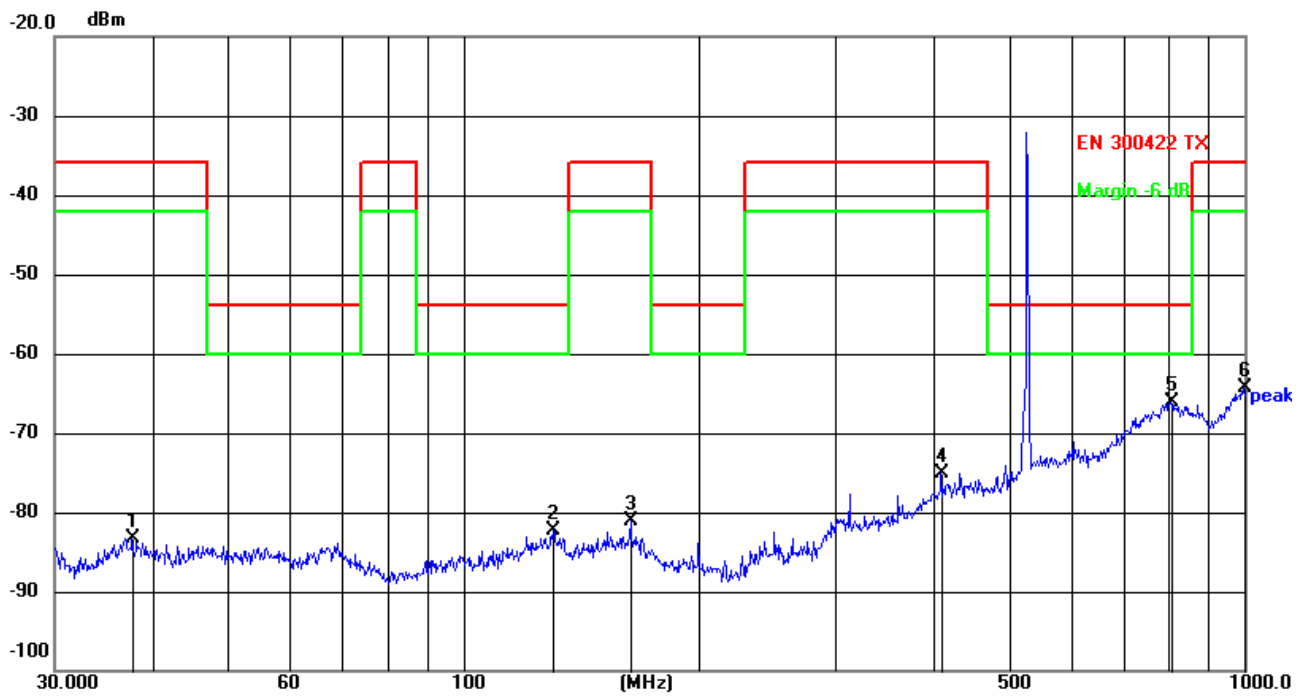


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	66.4989	-67.33	-12.52	-79.85	-54.00	-25.85	peak
2	132.2206	-72.07	-10.35	-82.42	-54.00	-28.42	peak
3	438.6554	-72.51	-4.05	-76.56	-36.00	-40.56	peak
4	616.3718	-71.98	0.37	-71.61	-54.00	-17.61	peak
5	785.0935	-72.28	6.36	-65.92	-54.00	-11.92	peak
6	975.7529	-72.38	8.28	-64.10	-36.00	-28.10	peak

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

CHB: 527.0MHz

Horizontal:

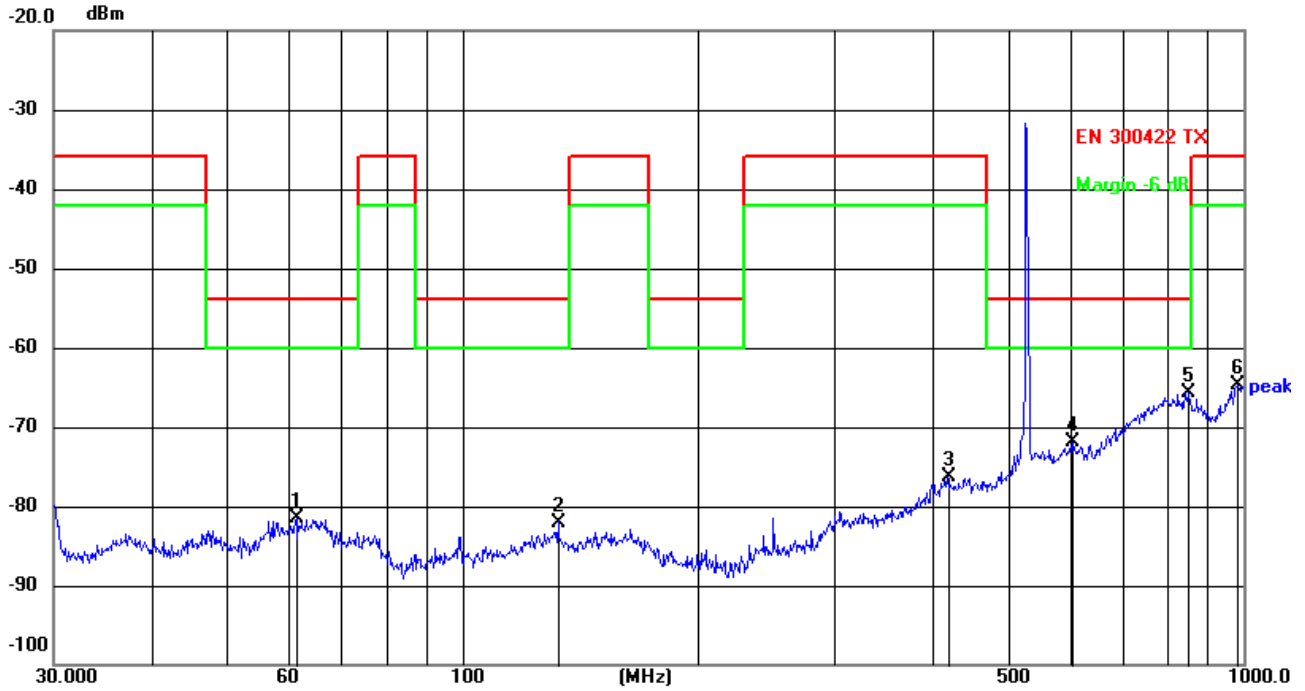


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	37.6798	-71.85	-11.46	-83.31	-36.00	-47.31	peak
2	130.3789	-69.02	-13.23	-82.25	-54.00	-28.25	peak
3	163.7550	-69.78	-11.37	-81.15	-36.00	-45.15	peak
4	408.9460	-69.26	-5.77	-75.03	-36.00	-39.03	peak
5	804.6028	-72.25	6.09	-66.16	-54.00	-12.16	peak
6	996.4996	-73.38	9.06	-64.32	-36.00	-28.32	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



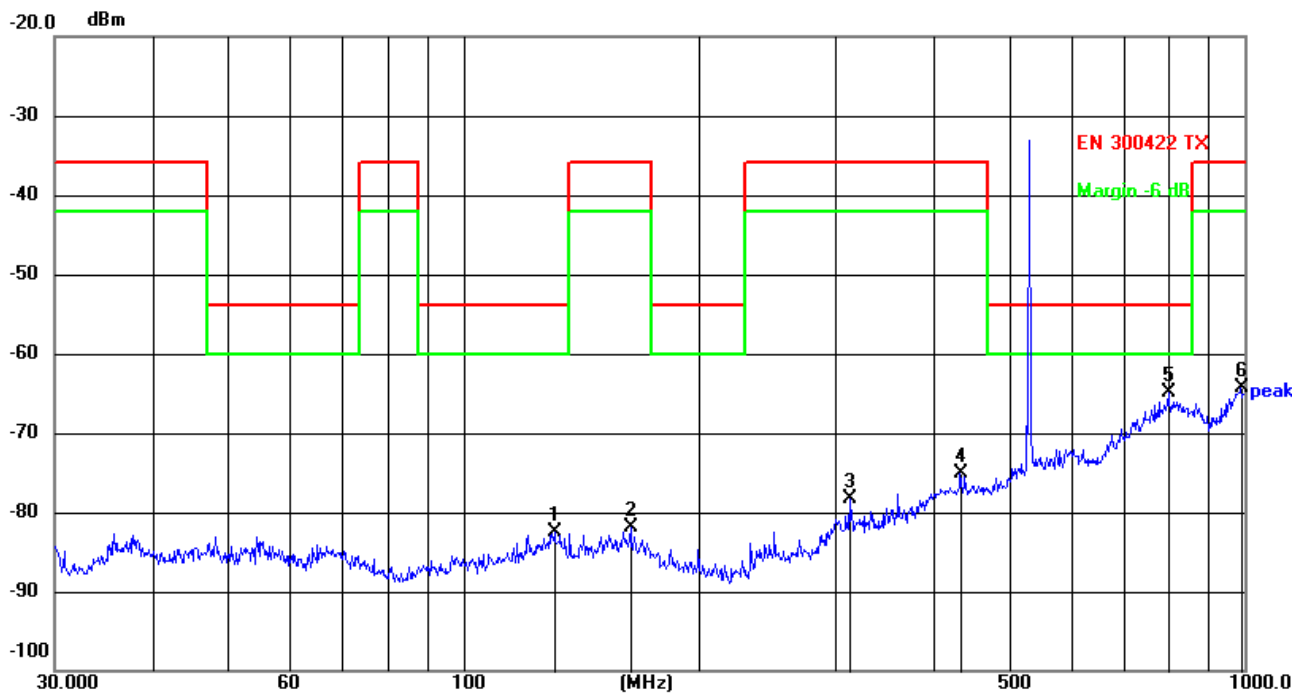
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	61.3463	-68.68	-12.79	-81.47	-54.00	-27.47	peak
2	132.6850	-71.57	-10.43	-82.00	-54.00	-28.00	peak
3	417.6411	-72.10	-4.29	-76.39	-36.00	-40.39	peak
4	605.6592	-72.30	0.39	-71.91	-54.00	-17.91	peak
5	851.0353	-71.55	5.90	-65.65	-54.00	-11.65	peak
6	982.6200	-73.24	8.57	-64.67	-36.00	-28.67	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHB: 529.70MHz

Horizontal:

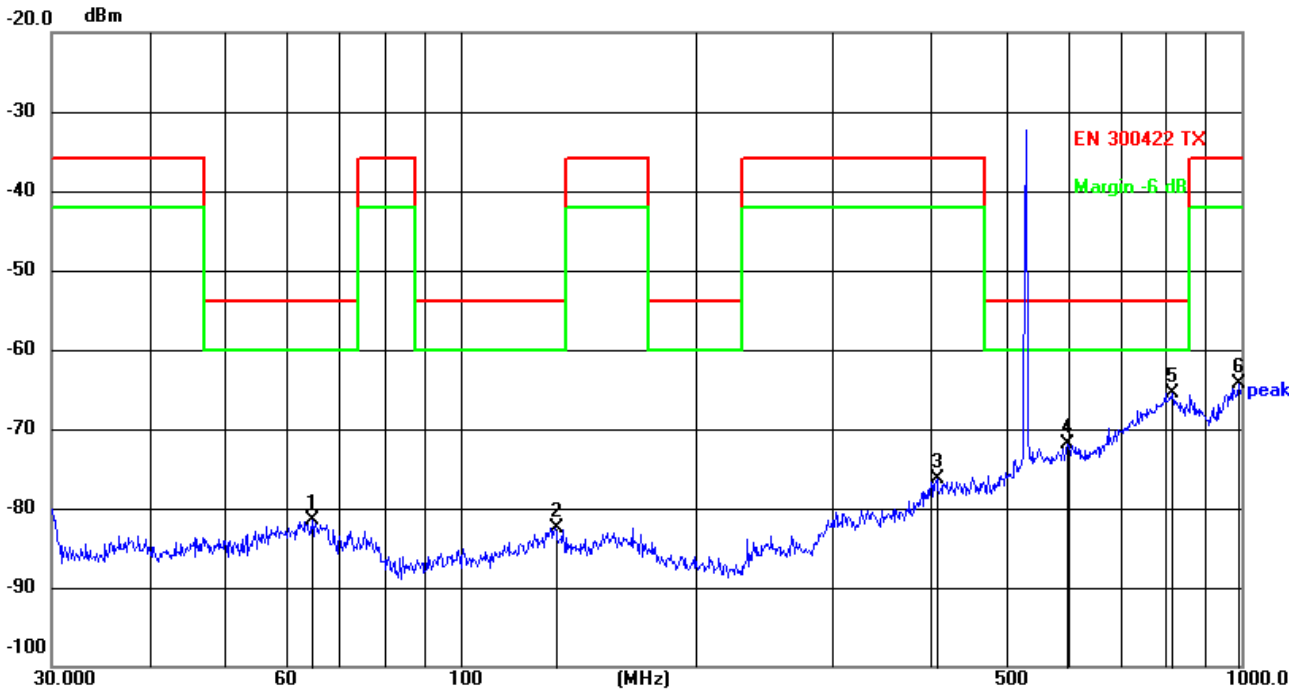


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	130.8369	-69.31	-13.16	-82.47	-54.00	-28.47	peak
2	163.7550	-70.51	-11.37	-81.88	-36.00	-45.88	peak
3	312.1794	-69.82	-8.40	-78.22	-36.00	-42.22	peak
4	432.5457	-70.20	-4.81	-75.01	-36.00	-39.01	peak
5	798.9797	-71.06	6.09	-64.97	-54.00	-10.97	peak
6	989.5355	-73.38	9.01	-64.37	-36.00	-28.37	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

Vertical:



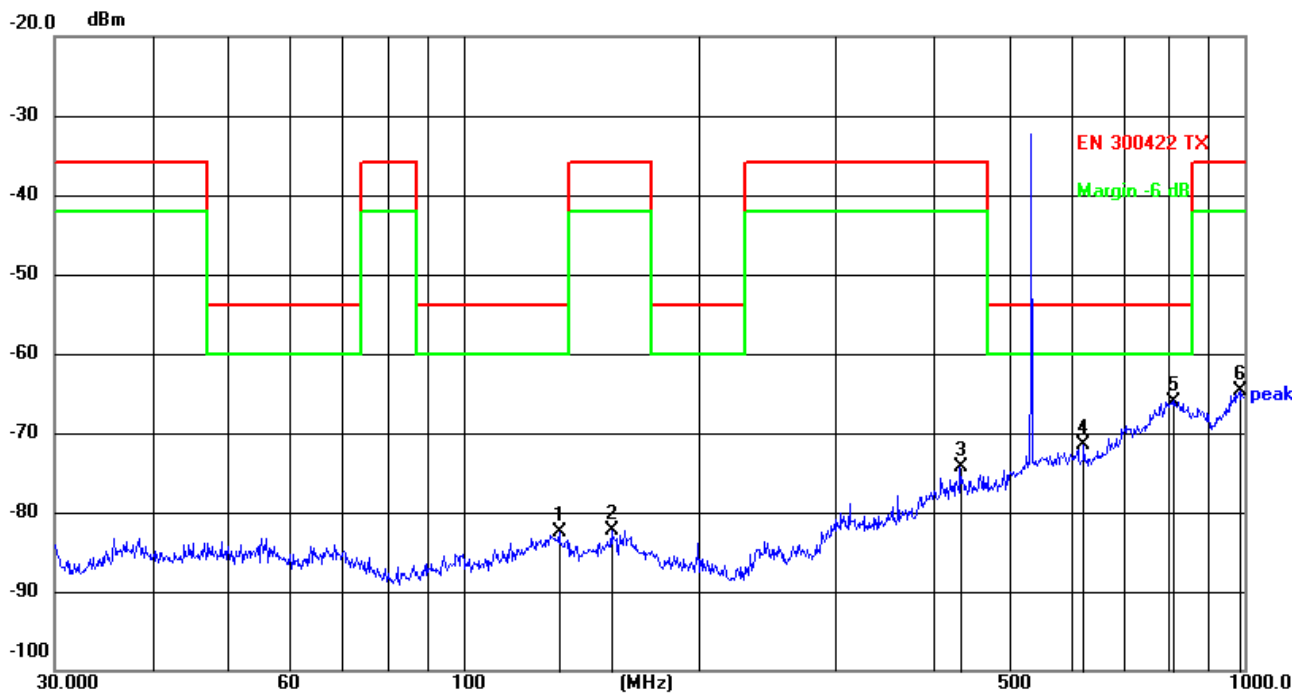
No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	64.6594	-68.84	-12.61	-81.45	-54.00	-27.45	peak
2	132.2206	-72.16	-10.35	-82.51	-54.00	-28.51	peak
3	407.5145	-71.75	-4.49	-76.24	-36.00	-40.24	peak
4	599.3212	-72.21	0.39	-71.82	-54.00	-17.82	peak
5	815.9678	-71.98	6.57	-65.41	-54.00	-11.41	peak
6	993.0114	-73.06	8.67	-64.39	-36.00	-28.39	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

CHB:532.70MHz

Horizontal:

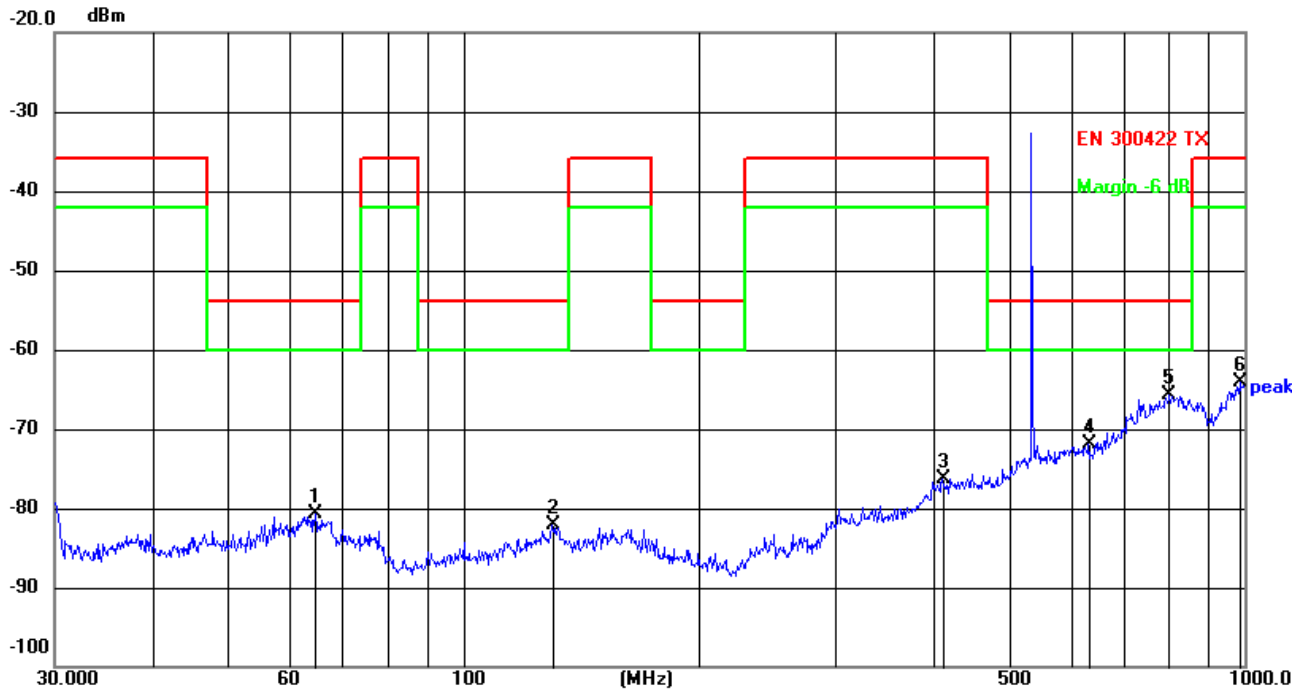


No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector
1	132.6850	-69.48	-13.00	-82.48	-54.00	-28.48	peak
2	154.8204	-70.85	-11.39	-82.24	-36.00	-46.24	peak
3	432.5457	-69.54	-4.81	-74.35	-36.00	-38.35	peak
4	622.8900	-71.92	0.34	-71.58	-54.00	-17.58	peak
5	813.1115	-72.03	6.03	-66.00	-54.00	-12.00	peak
6	986.0717	-73.63	8.98	-64.65	-36.00	-28.65	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	64.6594	-68.10	-12.61	-80.71	-54.00	-26.71	peak
2	129.9226	-72.04	-10.02	-82.06	-54.00	-28.06	peak
3	410.3825	-71.88	-4.44	-76.32	-36.00	-40.32	peak
4	631.6884	-72.11	0.14	-71.97	-54.00	-17.97	peak
5	801.7863	-72.51	6.82	-65.69	-54.00	-11.69	peak
6	986.0717	-72.75	8.61	-64.14	-36.00	-28.14	peak

Level = Reading + Factor, Margin=level-Limit

Factor= Antenna Factor + Cable Loss – Preamplifier Factor

■ Above 1GHz

Test channel:	CHA: 521.000MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1562.283	-42.52	-2.39	-44.91	-30.00	-14.91	Horizontal
2603.351	-44.42	-0.51	-44.93	-30.00	-14.93	Horizontal
3125.390	-36.84	0.95	-35.89	-30.00	-5.89	Horizontal
3646.072	-46.56	1.53	-45.03	-30.00	-15.03	Horizontal
4170.485	-46.00	2.39	-43.61	-30.00	-13.61	Horizontal
5635.286	-53.97	6.51	-47.46	-30.00	-17.46	Horizontal
3125.390	-40.13	0.30	-39.83	-30.00	-9.83	Vertical
4170.485	-48.88	1.74	-47.14	-30.00	-17.14	Vertical
5466.224	-54.09	5.76	-48.33	-30.00	-18.33	Vertical
5575.028	-54.05	5.91	-48.14	-30.00	-18.14	Vertical
5665.659	-53.60	5.92	-47.68	-30.00	-17.68	Vertical
5747.456	-53.99	5.92	-48.07	-30.00	-18.07	Vertical

Remark:

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

Test channel:	CHA: 523.70MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1570.703	-45.60	-2.40	-48.00	-30.00	-18.00	Horizontal
2617.383	-47.10	-0.47	-47.57	-30.00	-17.57	Horizontal
3142.235	-37.26	0.97	-36.29	-30.00	-6.29	Horizontal
3665.723	-51.00	1.58	-49.42	-30.00	-19.42	Horizontal
4192.963	-52.78	2.42	-50.36	-30.00	-20.36	Horizontal
5675.819	-54.62	6.54	-48.08	-30.00	-18.08	Horizontal
1260.032	-53.62	-2.90	-56.52	-30.00	-26.52	Vertical
1845.558	-54.24	-2.95	-57.19	-30.00	-27.19	Vertical
2617.383	-50.03	-1.02	-51.05	-30.00	-21.05	Vertical
3142.235	-49.72	0.32	-49.40	-30.00	-19.40	Vertical
4230.695	-52.84	1.83	-51.01	-30.00	-21.01	Vertical
5625.198	-54.20	5.91	-48.29	-30.00	-18.29	Vertical

Remark:

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

Test channel:	CHA: 526.70MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
3159.171	-40.14	0.32	-39.82	-30.00	-9.82	Horizontal
3685.480	-49.39	0.95	-48.44	-30.00	-18.44	Horizontal
4215.562	-49.01	1.80	-47.21	-30.00	-17.21	Horizontal
5273.809	-52.48	4.94	-47.54	-30.00	-17.54	Horizontal
5696.195	-54.18	5.92	-48.26	-30.00	-18.26	Horizontal
5799.177	-53.84	5.92	-47.92	-30.00	-17.92	Horizontal
2636.209	-43.36	-0.41	-43.77	-30.00	-13.77	Vertical
3159.171	-34.20	0.97	-33.23	-30.00	-3.23	Vertical
3685.480	-49.94	1.62	-48.32	-30.00	-18.32	Vertical
4215.562	-49.27	2.43	-46.84	-30.00	-16.84	Vertical
5595.042	-54.10	6.49	-47.61	-30.00	-17.61	Vertical
5799.177	-54.77	6.62	-48.15	-30.00	-18.15	Vertical

Remark:

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

Test channel:	CHB: 527.00MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1562.283	-47.98	-2.46	-50.44	-30.00	-20.44	Horizontal
2603.351	-48.57	-1.06	-49.63	-30.00	-19.63	Horizontal
3125.390	-40.13	0.30	-39.83	-30.00	-9.83	Horizontal
4170.485	-48.88	1.74	-47.14	-30.00	-17.14	Horizontal
5273.809	-52.32	4.94	-47.38	-30.00	-17.38	Horizontal
5685.998	-53.55	5.92	-47.63	-30.00	-17.63	Horizontal
1579.169	-50.64	-2.40	-53.04	-30.00	-23.04	Vertical
2636.209	-53.93	-0.41	-54.34	-30.00	-24.34	Vertical
3164.836	-44.66	0.99	-43.67	-30.00	-13.67	Vertical
3692.090	-48.89	1.64	-47.25	-30.00	-17.25	Vertical
4215.562	-48.67	2.43	-46.24	-30.00	-16.24	Vertical
5675.819	-53.63	6.54	-47.09	-30.00	-17.09	Vertical

Remark:

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

Test channel:	CHB: 529.70MHz
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Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
3181.894	-40.74	1.00	-39.74	-30.00	-9.74	Horizontal
3711.989	-46.62	1.67	-44.95	-30.00	-14.95	Horizontal
4238.283	-47.33	2.45	-44.88	-30.00	-14.88	Horizontal
5302.233	-53.60	5.55	-48.05	-30.00	-18.05	Horizontal
5595.042	-54.04	6.49	-47.55	-30.00	-17.55	Horizontal
5645.392	-54.20	6.52	-47.68	-30.00	-17.68	Horizontal
1587.680	-54.29	-2.50	-56.79	-30.00	-26.79	Vertical
2118.582	-52.62	-2.80	-55.42	-30.00	-25.42	Vertical
2650.417	-49.74	-0.92	-50.66	-30.00	-20.66	Vertical
3181.894	-42.30	0.35	-41.95	-30.00	-11.95	Vertical
4238.283	-49.46	1.83	-47.63	-30.00	-17.63	Vertical
5302.233	-52.10	5.06	-47.04	-30.00	-17.04	Vertical

Remark:

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

Test channel:	CHB: 532.70MHz
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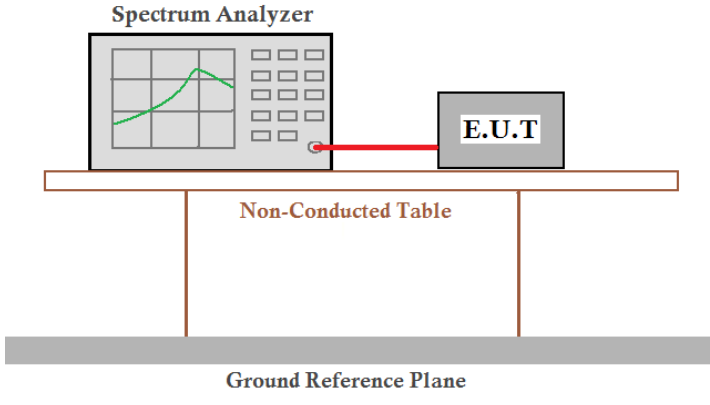
Peak value:

Frequency (MHz)	Read Level (dBm)	Correction Factor (dB)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	polarization
1480.523	-54.51	-2.43	-56.94	-30.00	-26.94	Horizontal
1596.237	-48.47	-2.40	-50.87	-30.00	-20.87	Horizontal
2664.702	-48.91	-0.30	-49.21	-30.00	-19.21	Horizontal
3199.044	-41.31	1.01	-40.30	-30.00	-10.30	Horizontal
3731.996	-48.76	1.71	-47.05	-30.00	-17.05	Horizontal
4261.126	-46.89	2.48	-44.41	-30.00	-14.41	Horizontal
1251.033	-52.88	-2.92	-55.80	-30.00	-25.80	Vertical
2069.805	-53.83	-2.99	-56.82	-30.00	-26.82	Vertical
2664.703	-48.76	-0.87	-49.63	-30.00	-19.63	Vertical
3199.044	-41.39	0.36	-41.03	-30.00	-11.03	Vertical
4261.126	-49.91	1.88	-48.03	-30.00	-18.03	Vertical
5605.076	-52.76	5.90	-46.86	-30.00	-16.86	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.: 22.8°C	Humid.: 57%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	
521.00	3V	-20°C	521.010	0.010	19.19	±50	pass
		+20°C	521.012	0.012	23.03	±50	pass
		+50°C	521.012	0.012	23.03	±50	pass
	2.55V	+20°C	521.013	0.013	24.95	±50	pass
	3.45V		521.014	0.014	26.87	±50	pass
523.70	3V	-20°C	523.713	0.013	24.82	±50	pass
		+20°C	523.711	0.011	21.00	±50	pass
		+50°C	523.709	0.009	17.19	±50	pass
	2.55V	+20°C	523.708	0.008	15.28	±50	pass
	3.45V		523.712	0.012	22.91	±50	pass
526.70	3V	-20°C	526.711	0.011	20.88	±50	pass
		+20°C	526.712	0.012	22.78	±50	pass
		+50°C	526.713	0.013	24.68	±50	pass
	2.55V	+20°C	526.716	0.016	30.38	±50	pass
	3.45V		526.716	0.016	30.38	±50	pass

CHB:

Frequency MHz	Conditions		Measure Frequency	Frequency Error		Limited	Result
	Voltage	Temperature	MHz	MHz	ppm	ppm	
527.00	3V	-20°C	527.015	0.015	28.46	±50	pass
		+20°C	527.013	0.013	24.67	±50	pass
		+50°C	527.015	0.015	28.46	±50	pass
	2.55V	+20°C	527.013	0.013	24.67	±50	pass
	3.45V		527.015	0.015	28.46	±50	pass
529.70	3V	-20°C	529.726	0.012	22.65	±50	pass
		+20°C	529.723	0.013	24.54	±50	pass
		+50°C	529.724	0.012	22.65	±50	pass
	2.55V	+20°C	529.725	0.012	22.65	±50	pass
	3.45V		529.721	0.011	20.77	±50	pass
532.70	3V	-20°C	532.714	0.014	26.28	±50	pass
		+20°C	532.713	0.013	24.40	±50	pass
		+50°C	532.713	0.013	24.40	±50	pass
	2.55V	+20°C	532.716	0.016	30.04	±50	pass
	3.45V		532.713	0.013	24.40	±50	pass

5 Test Setup Photo

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

6 EUT Constructional Details

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

-----End-----