



FCC LISTED, REGISTRATION  
 NUMBER: 2764.01

ISED LISTED REGISTRATION  
 NUMBER: 23595-1

Test report No:  
 3825ERM.004A1

**Partial Test report**  
**USA FCC Part 15.247, 15.249, 15.209**  
**CANADA RSS-247, RSS-210, RSS-Gen**

(*) Identification of item tested	Detects Audio Levels
(*) Trademark	Alarm.com
(*) Model and /or type reference tested	Smart Noise Monitor
Other identification of the product	FCC ID: YL6-143N10N IC ID: 9111A-143N10N
(*) Features	Z-Wave
Manufacturer	Alarm.com, Inc 8281 Greensboro Dr, Suite 100 Tyson, VA 22102 USA
Test method requested, standard	USA FCC Part 15.247, 10-1-20 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.249 10-1-20 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, 5725 - 5875 MHz, and 24.0 – 24.25 GHz. USA FCC Part 15.209 10-1-20 Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-210 Issue 9 (August 2016). CANADA RSS-Gen Issue 5 (April 2018). 558074 D01 15.247 Meas Guidance v05r02. Guidance for Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under section §15.247 of the FCC Rules ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	See Appendix A
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	10-04-2022
Report template No	FDT08_23 (* ) “Data provided by the client”

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## Competences and guarantees

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DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Certification internal document PODT000.

Test case	Frequency (MHz)	U (k=2)	Units
Radiated Spurious Emission	30-180	4.27	dB
	180-1000	3.14	dB
	1000-18000	3.30	dB
	18000-40000	3.49	dB

## Data provided by the client

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The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. Noise Monitor that detects audio levels and communicates data via Z-Wave to a controller.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

## Usage of samples

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Samples used for test have been selected by: The client.

Sample S/01 is composed of the following elements:

Id	Control Number	Description	Manufacturer/Model	Serial N°	Date of Reception	Application
S/01	3825/05	Radiated Sample (Z-wave + BT)	Alarm.com / ADC-N10-N	32465	2022-08-11	Element Under Test
S/01	3825/04	USB debug cable	-	-	2022-09-15	Accessory

1. Sample S/01 was used for the test(s): All Radiated tests indicated in appendix B.

## Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description		Cable				
			Specified length [m]	Attached during test	Shielded	Coupled to patient	
	No Data Provided			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Supplementary information to the ports..... :	No Data Provided						
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input checked="" type="checkbox"/>	AC: 86~305VAC, 47-63Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DC:					
<input type="checkbox"/>	DC:						
Rated Power.....:	2W						
Clock frequencies.....:	32.768 kHz , 100 kHz , 3 MHz						
Other parameters .....	No Data Provided						
Software version .....	1						
Hardware version .....	1						
Dimensions in cm (W x H x D) .....	No Data Provided						
Mounting position .....	<input type="checkbox"/>	<i>Table top equipment</i>					
	<input type="checkbox"/>	<i>Wall/Ceiling mounted equipment</i>					
	<input type="checkbox"/>	<i>Floor standing equipment</i>					
	<input type="checkbox"/>	<i>Hand-held equipment</i>					
	<input type="checkbox"/>	<i>Other: Plugged into wall outlet</i>					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	ZGM130S037HGN2R	Z-Wave	Silicon Labs
	WSM-BL241-ADA-008	Bluetooth	Murata
Accessories (not part of the test item) .....	Description	Type	Manufacturer
	No Data Provided		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Declaration Equipment Data	Alarm.com ADC-N10-N - FDT30_18 Declaration Equipment Data v3	12/13/2022
<b>Copy of marking plate:</b>			
No marking plate found			

## Identification of the client

Alarm.com, Inc  
 8281 Greensboro Dr, Suite 100  
 Tyson, VA 22102  
 USA

## Testing period and place

<b>Test Location</b>	DEKRA Certification Inc.
<b>Date (start)</b>	08-22-2022
<b>Date (finish)</b>	08-25-2022

## Document history

Report number	Date	Description
3825ERM.004	10-04-2022	First release
3825ERM.004A1	10-04-2022	Second release. Z-Wave antenna gain value updated. This modification of the test report cancels and replaces the test report 3825ERM.004.

## Environmental conditions

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In the control chamber, the following limits were not exceeded during the test:

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 30 % Max. = 75 %
<b>Air pressure</b>	Min. = 860 mbar Max. = 1060 mbar

In the semi anechoic chamber, the following limits were not exceeded during the test.

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 30 % Max. = 75 %
<b>Air pressure</b>	Min. = 860 mbar Max. = 1060 mbar

## Remarks and comments

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1. The tests have been performed by the technical personnel: Nasir Khan, Qi Zhang and Koji Nishimoto.

## Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

## Summary

### Z-Wave

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
FCC 2.1049 / RSS-GEN 6.7	99dBw Occupied Channel Bandwidth 99%	N/M	Refer 1
RSS-247 5.2 (a) / FCC 15.247 (a) (2)	6dB Bandwidth	N/M	Refer 1
RSS-247 5.4 (d) / FCC 15.247 (b) (3)	Maximum Peak Conducted output power & Antenna gain	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Band-edge emissions compliance (Transmitter) - Conducted	N/M	Refer 1
RSS-247 5.2 (b) / FCC 15.247 (d)	Power Spectral Density	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Emissions compliance (Transmitter) - Conducted	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Emissions compliance (Transmitter) - Radiated	Pass	N/A
<b>Supplementary information and remarks:</b>			
1. Only multi-transmitter radiated spurious emission test was requested.			

### Bluetooth

Requirement – Test case	FCC PART 15 PARAGRAPH / RSS-247	Verdict	Remark
RSS-247 5.1 (b) / FCC 15.247 (a) (1)	20 dB Bandwidth	N/M	Refer 1
FCC 2.1049 / 99dBw	Occupied Channel Bandwidth 99%	N/M	Refer 1
RSS-247 5.1 (b) / FCC 15.247 (a) (1)	Carrier Frequency Separation	N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii)	Time of Occupancy (Dwell Time)	N/M	Refer 1
RSS-247 5.1 (d) / FCC 15.247 (a) (1) (iii)	Number of hopping channels	N/M	Refer 1
RSS-247 5.4 (b) / FCC 15.247 (b) (1)	Maximum Peak Conducted output power & Antenna gain	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Band-edge emissions compliance (Transmitter) - Conducted	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Emissions compliance (Transmitter) - Conducted	N/M	Refer 1
RSS-247 5.5 / FCC 15.247 (d)	Emissions compliance (Transmitter) - Radiated	Pass	N/A
<b>Supplementary information and remarks:</b>			
1. Only multi-transmitter radiated spurious emission test was requested.			



## List of equipment used during the test

### Radiated Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
981	RF pre-amplifier	Bonn Elektronik	BLMA0118-2A	2020/11	2022/11
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2022/04	2024/04
1014	FSV40 Signal Analyzer 40GHz	Rohde & Schwarz	FSV40	2021/05	2023/05
1056	3116C Double-Ridged Waveguide Horn Antennas	ETS Lindgren	3116C	2020/01	2023/01
1057	Double-ridge Waveguide Horn antenna	ETS Lindgren	3115	2020/06	2023/06
1065	Biconical Log antenna	ETS Lindgren	3142E	2020/08	2023/08
1108	Ethernet SNMP Thermometer- CR Room	HW Group	HWg-STE Plain	2020/09	2022/09
1111	Ethernet SNMP T Thermometer	HW Group	HWg-STE Plain	2020/09	2022/09
1179	Semi anechoic Absorber Lined Chamber	Frankonia	SAC 3 plus "L"	N/A	N/A
1314	Wireless Measurement Software R&S EMC32	Rohde & Schwarz	N/A	N/A	N/A

## Appendix A: Test results (Multi-transmitter)

## Appendix A Content

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## PRODUCT INFORMATION

Information	Description
Modulation	Z-Wave Mesh: FSK, GFSK Z-Wave Long Range: O-QPSK Bluetooth: GFSK
Operation mode 1: Z-wave and BT antenna separately	
- Operating Frequency Range	Z-Wave Mesh: 908.4 - 916 MHz Z-Wave Long Range: 912 - 920 MHz Bluetooth: 2400 - 2483.5 MHz
- Nominal Channel Bandwidth	Z-Wave Mesh: 100 kHz Z-Wave Long Range: 1 MHz Bluetooth: 1 MHz / 2 MHz
- RF Output Power	Z-Wave Mesh: 1 dBm Z-Wave Long Range: 14 dBm BR/EDR: 4 dBm
Antenna type	Z-Wave (Mesh & Long Range): Copper Wire Bluetooth: Printed Trace Antenna
Antenna gain	Z-Wave (Mesh & Long Range): -0.96 dBi Peak Bluetooth: -2.5 dBi
Nominal Voltage	
- Supply Voltage	120 Vac
- Type of power source	AC voltage
Equipment type	Z-Wave, and Bluetooth

## DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION												
TC#01 <sup>(1)</sup>	<p><u>Power supply (V):</u> DC 120 Vac</p> <p><u>Test Frequencies for Radiated tests:</u></p> <table border="1" data-bbox="516 625 1291 753"> <thead> <tr> <th>Technology</th> <th>Tested Frequency (MHz)</th> <th>BW (MHz)</th> <th>Modulation</th> </tr> </thead> <tbody> <tr> <td>Z-Wave Mesh</td> <td>916</td> <td>0.1</td> <td>GFSK</td> </tr> <tr> <td>Bluetooth</td> <td>2402</td> <td>2</td> <td>GFSK</td> </tr> </tbody> </table> <p>The test was performed with the equipment transmitting with Z-Wave Mesh, and Bluetooth radios simultaneously. These measurements have been performed in order to check the impact of the multi-transmitter of all radio interfaces that can be transmitting simultaneously.</p>	Technology	Tested Frequency (MHz)	BW (MHz)	Modulation	Z-Wave Mesh	916	0.1	GFSK	Bluetooth	2402	2	GFSK
Technology	Tested Frequency (MHz)	BW (MHz)	Modulation										
Z-Wave Mesh	916	0.1	GFSK										
Bluetooth	2402	2	GFSK										
TC#02 <sup>(1)</sup>	<p><u>Power supply (V):</u> DC 120 Vac</p> <p><u>Test Frequencies for Radiated tests:</u></p> <table border="1" data-bbox="516 1287 1291 1415"> <thead> <tr> <th>Technology</th> <th>Tested Frequency (MHz)</th> <th>BW (MHz)</th> <th>Modulation</th> </tr> </thead> <tbody> <tr> <td>Z-Wave LR</td> <td>920</td> <td>1</td> <td>O-QPSK</td> </tr> <tr> <td>Bluetooth</td> <td>2402</td> <td>2</td> <td>GFSK</td> </tr> </tbody> </table> <p>The test was performed with the equipment transmitting with Z-Wave LR, and Bluetooth radios simultaneously. These measurements have been performed in order to check the impact of the multi-transmitter of all radio interfaces that can be transmitting simultaneously.</p>	Technology	Tested Frequency (MHz)	BW (MHz)	Modulation	Z-Wave LR	920	1	O-QPSK	Bluetooth	2402	2	GFSK
Technology	Tested Frequency (MHz)	BW (MHz)	Modulation										
Z-Wave LR	920	1	O-QPSK										
Bluetooth	2402	2	GFSK										

Note (1): The following tables and plots show the results for the worst case in Z-Wave, and Bluetooth.

## TEST A.1: EMISSION LIMITATIONS RADIATED (TRANSMITTER)

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247, Part 15.31(h), and RSS-247
	Test standard:	Part 15 Subpart C §15.247 (d) and RSS-Gen 8.9 and 8.10

### LIMITS

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

### TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antenna), and 1m for the frequency range 18 GHz- 26 GHz (Double ridge horn antenna).

For radiated emissions in the range 18 - 26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

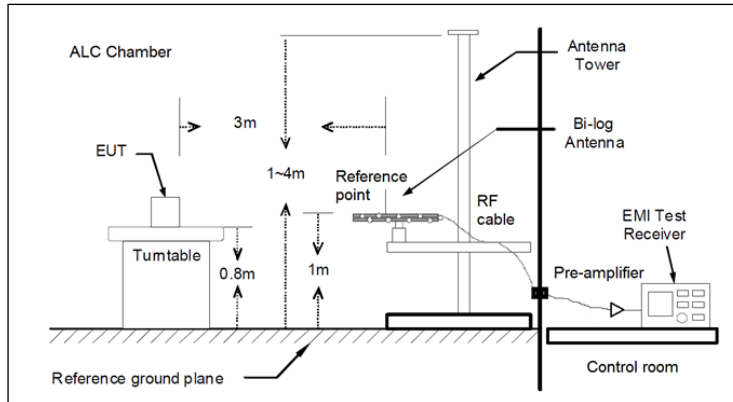
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

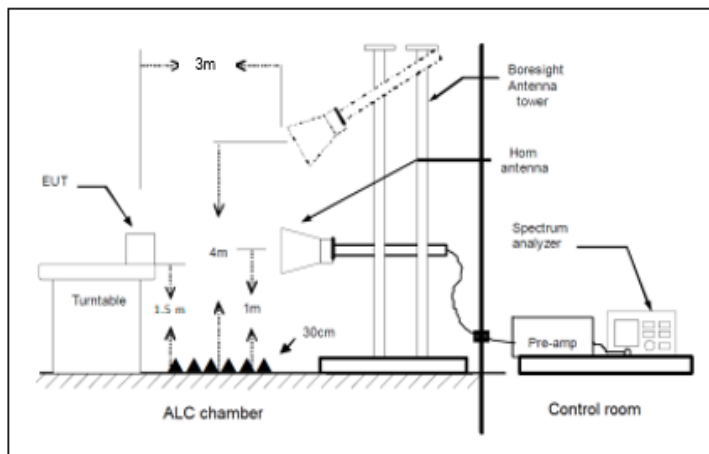
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

**TEST SETUP (CONT.)**

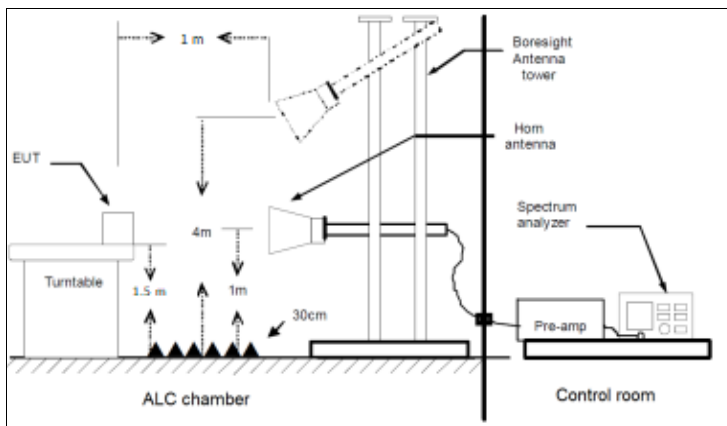
Radiated measurements Setup  $f < 1$  GHz



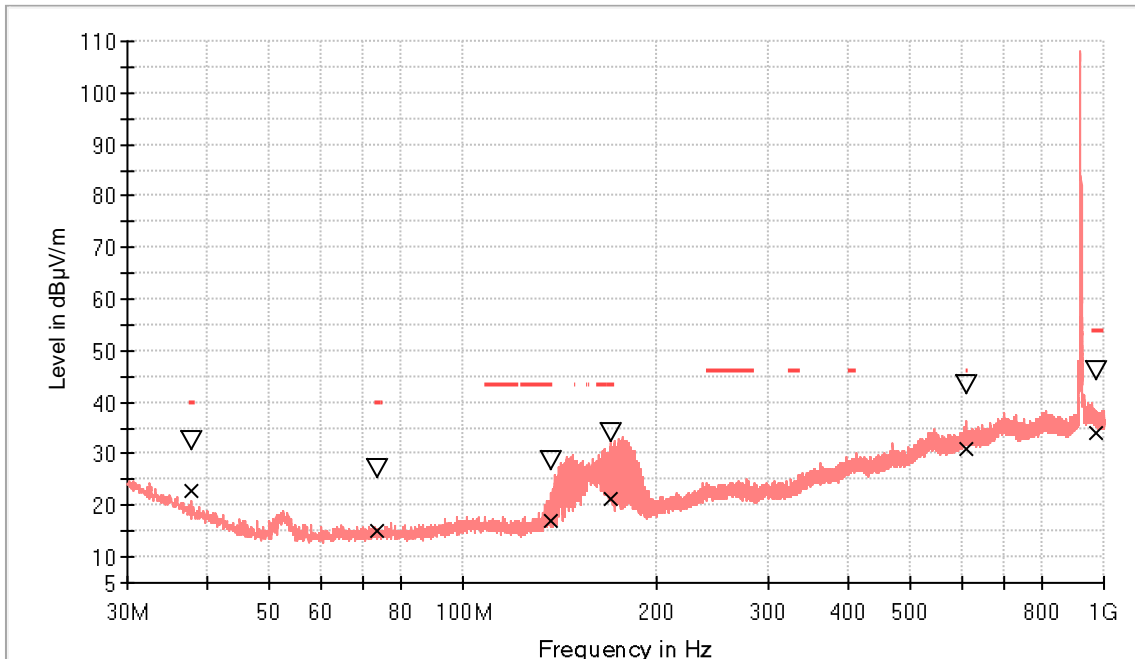
Radiated measurements setup  $f > 1-18$  GHz



Radiated measurements setup  $f > 18$  GHz



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS :</b>	30-1000 MHz



- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Limit
- × QuasiPeak-QPK (Single)

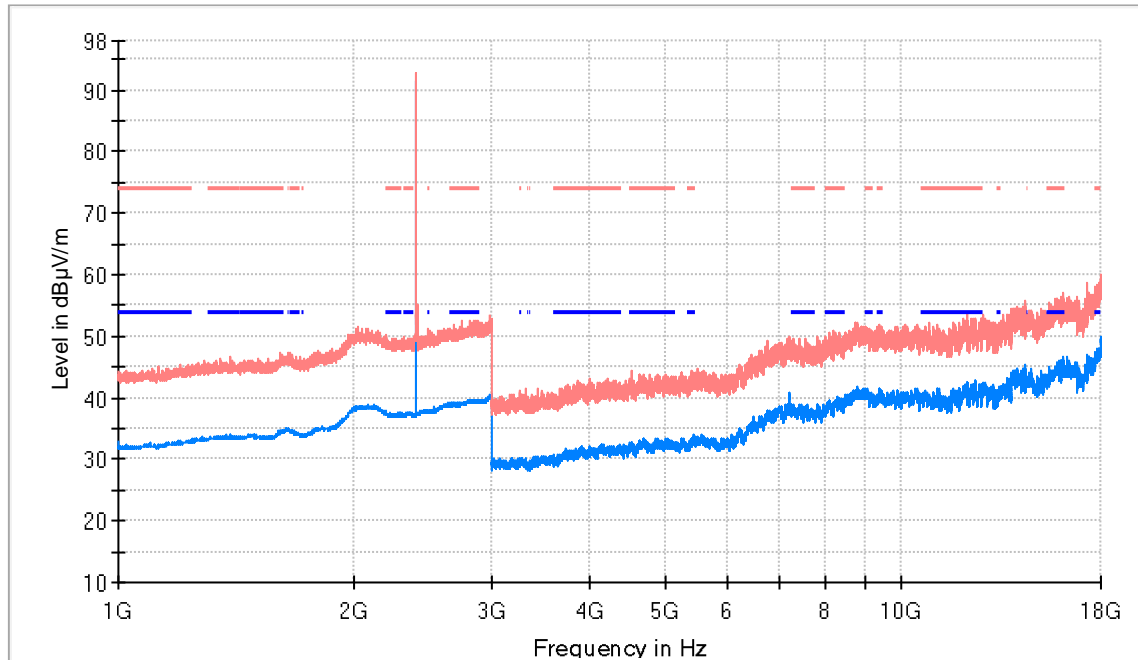
### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
37.760000	26.6	13.9	V	13.4	40.0	
139.949500	31.6	17.9	V	---	---	
168.758500	34.0	19.6	V	9.5	43.5	
284.867500	35.6	22.9	V	10.4	46.0	
613.406500	42.2	29.5	H	3.8	46.0	
916.046500	93.1	92.9	V	---	---	Fundamental



**TEST RESULTS (Cont.):**

1-18 GHz



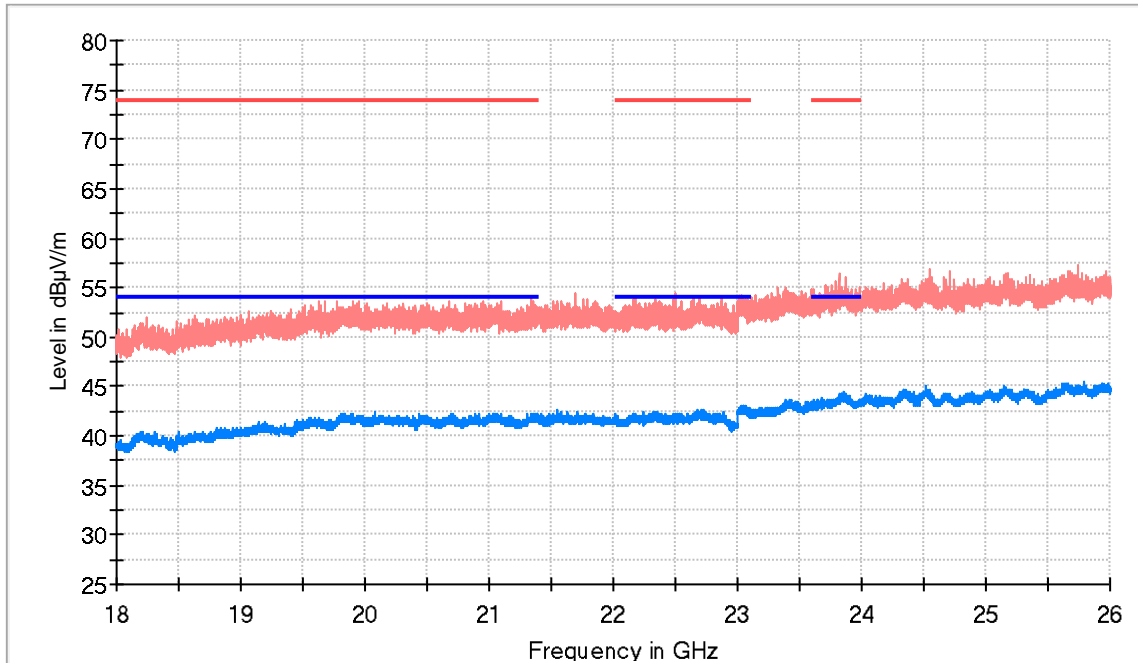
- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

**Final Result**

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	92.8	91.6	H	---	---	Fundamental
12128.000000	52.1	42.5	H	11.5	54.0	
17989.500000	58.8	50.0	H	4.0	54.0	

**TEST RESULTS (Cont.):**

18-26 GHz



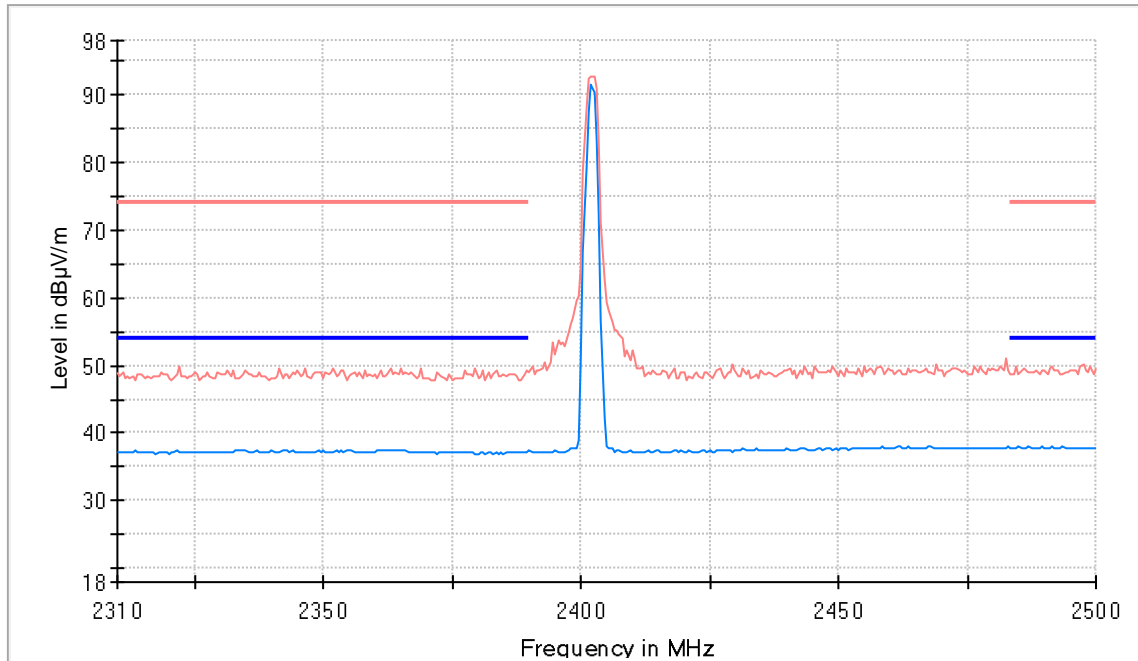
- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

**Final Result**

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23844.500000	54.7	44.4	H	9.6	54.0

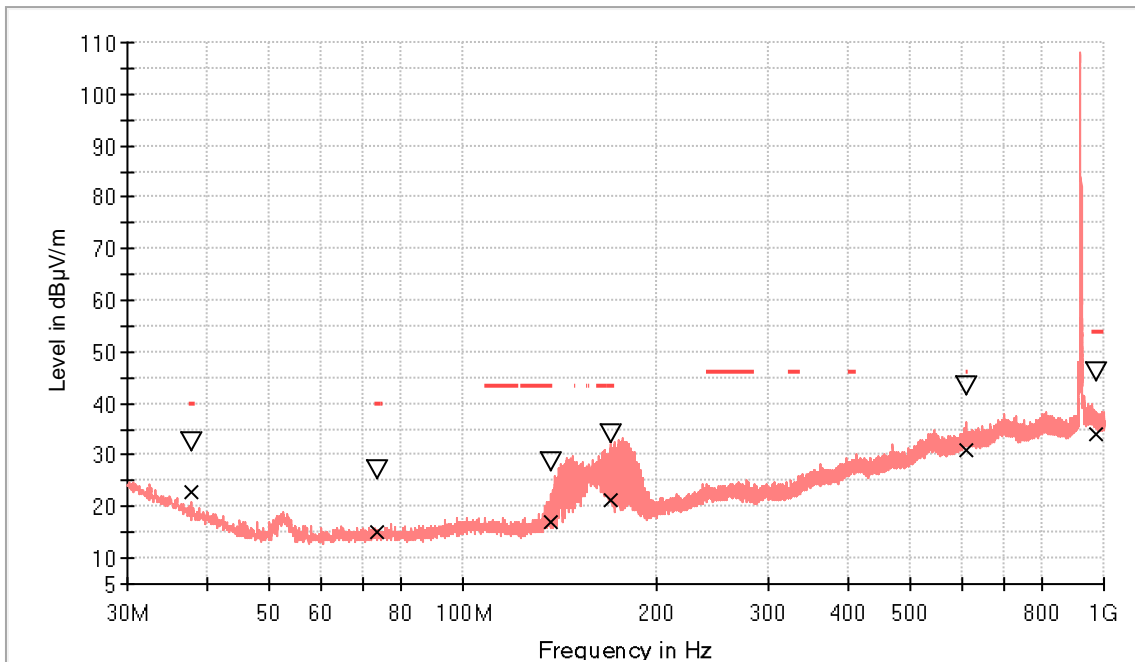
TEST RESULTS (Cont.):

Restricted Bands (2.31 GHz – 2.5 GHz)



- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02
<b>TEST RESULTS :</b>	30-1000 MHz



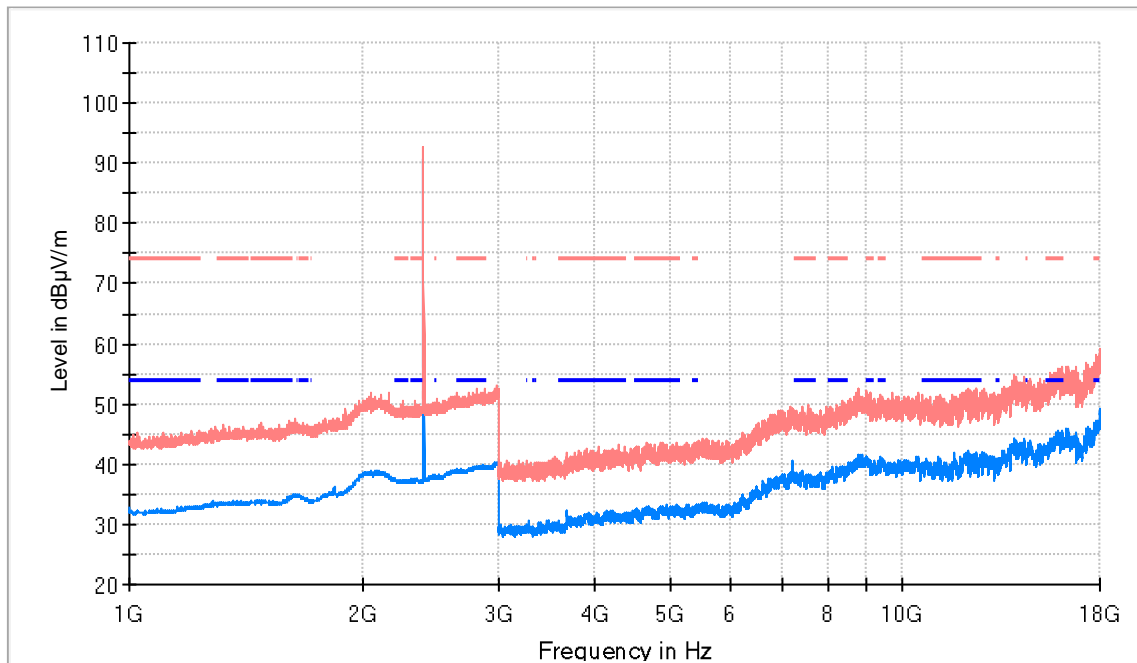
- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Limit
- × QuasiPeak-QPK (Single)

### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
37.711500	32.7	22.9	H	17.1	40.0	
73.310500	26.9	14.9	H	25.1	40.0	
137.427500	28.6	17.0	V	26.5	43.5	
170.407500	34.1	21.4	V	22.1	43.5	
609.138500	43.5	30.8	H	15.2	46.0	
973.276500	46.1	34.1	V	19.9	54.0	Fundamental

**TEST RESULTS (Cont.):**

1-18 GHz



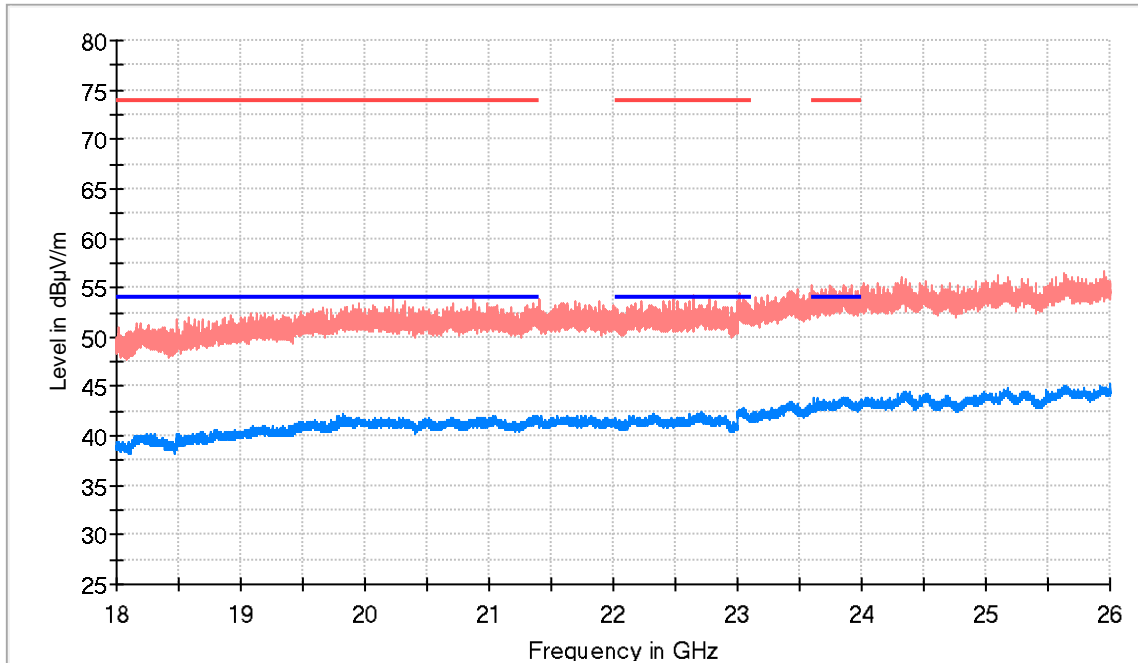
- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

**Final Result**

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2402.000000	92.5	90.7	H	---	---	Fundamental
6666.500000	44.6	35.0	H	---	---	
12333.000000	48.0	39.7	H	14.3	54.0	
18000.000000	58.3	47.9	H	6.1	54.0	

**TEST RESULTS (Cont.):**

18-26 GHz



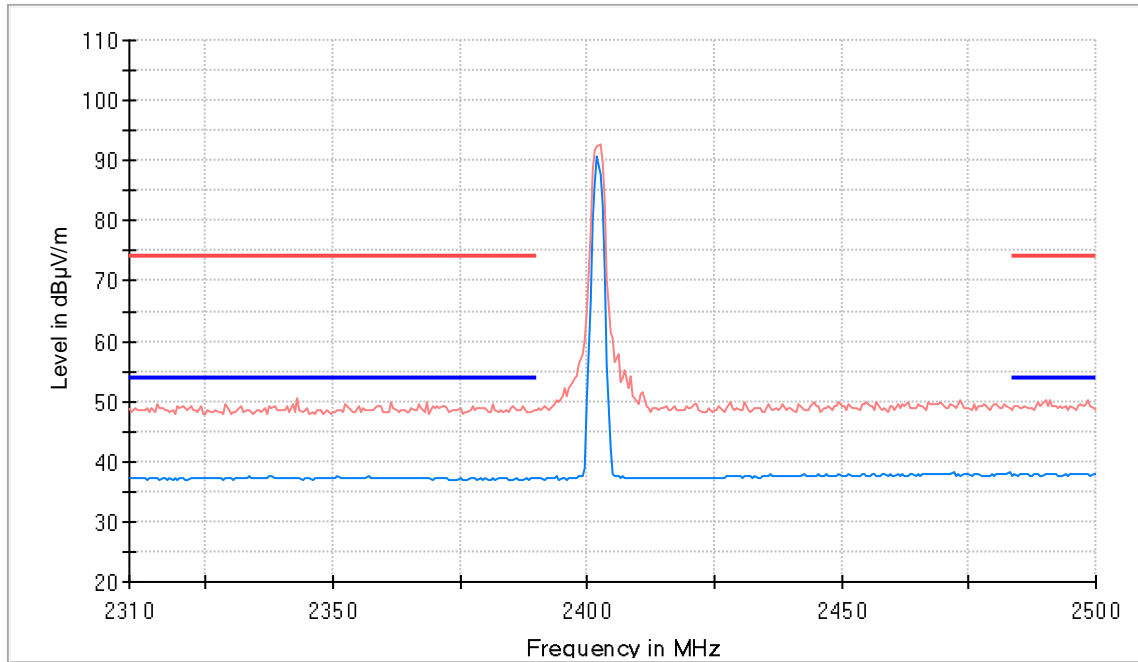
- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

**Final Result**

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23887.500000	53.1	43.9	H	10.1	54.0

TEST RESULTS (Cont.):

Restricted Bands (2.3 GHz – 2.5 GHz)



- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit