



FCC LISTED, REGISTRATION  
NUMBER: 2764.01

ISED LISTED REGISTRATION  
NUMBER: 23595-1

Test report No:  
**3825ERM.002A1**

## Test report

**USA FCC Part 15.249, 15.209  
CANADA RSS-210, RSS-Gen  
Radio Frequency Devices. Operation within the bands 902 - 928  
MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.**

(*) 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 15.249 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-210 Issue 9 (August 2016). CANADA RSS-Gen Issue 5 (April 2018). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	12-14-2022
Report template No	FDT08_23 (*) "Data provided by the client"

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## Competences and guarantees

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 item under test established in this document.

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## General conditions

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

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

Test case	Frequency (MHz)	U (k=2)	Units
Occupied Bandwidth	908-916	1.87	%
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

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

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

Sample S/01 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer/Model	Serial N°	Date of Reception	Application
S/01	3825/03	Radiated Sample	Alarm.com / ADC-N10-N	46819	2022-08-11	Element Under Test
S/01	3825/04	USB debug cable	-	-	2022-09-15	Accessory

Sample S/01, was used for the following test(s): All Radiated test indicated in appendix A.

Sample S/02 is composed of the following elements, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer/Model	Serial N°	Date of Reception	Application
S/02	3825/09	Radiated Sample	Alarm.com / ADC-N10-N	49177	2022-08-11	Element Under Test
S/02	3825/04	USB debug cable	-	-	2022-09-15	Accessory

Sample S/02, was used for the following test(s): All Conducted test indicated in appendix A.

## 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"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input type="checkbox"/>	Other: Plugged into wall outlet					

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	12/14/2022
<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>	08-08-2022
<b>Date (finish)</b>	09-20-2022

## Document history

Report number	Date	Description
3825ERM.002	09-28-2022	First release
3825ERM.002A1	12-14-2022	Second release. Antenna gain value updated. This modification of the test report cancels and replaces the test report 3825ERM.002.

## 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 semianechoic 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 chamber for conducted measurements, 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. = 60 %
<b>Air pressure</b>	Min. = 860 mbar Max. = 1060 mbar

## Remarks and comments

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The tests have been performed by the technical personnel: Lakshmi Gollamudi, Juliana Cherry, Yuri Barone, Nasir Khan, Qi Zhang, and Koji Nishimoto.

## Testing verdicts

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

## Summary

FCC PART 15.249 PARAGRAPH / RSS-249 (Z-wave)					
Report Section	FCC Spec Clause	RSS Spec Clause	Test Description	Verdict	Remark
A.1	§ 2.1049	RSS-Gen 6.7	99% Occupied Bandwidth	P	N/A
A.2	§ 15.249 (a)	RSS-210 B.10 (a)	Field Strength of fundamental	P	N/A
A.3	§ 15.249 (d)	RSS-210 B.10 (b)	Emission limitations radiated (Transmitter)	P	N/A
<u>Supplementary information and remarks:</u>					
None.					



## List of equipment used during the test

### Conducted Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1039	FSV40 Signal analyzer 40 GHz	Rohde & Schwarz	FSV40	2020/09	2022/09
1107	Ethernet SNMP Thermometer- SAC	HW Group	HWg-STE Plain	2020/09	2022/09

### 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	ESR 26	2022/04	2024/04
1014	Spectrum analyzer	Rohde & Schwarz	FSV40	2021/05	2023/05
1057	Double-ridge Waveguide Horn antenna 1-18 GHz	ETS LINDGREN	3115	2020/06	2023/06
1065	Biconical Log antenna	ETS LINDGREN	3142E	2020/08	2023/08
1111	ETHERNET SNMP 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 (Z-wave)

## Appendix A Content

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## PRODUCT INFORMATION

The following information is provided by the client

Information	Description
Modulation	GFSK/FSK
Operation mode	
- Operating Frequency Range	908.4/916 MHz
- RF Output Power	1 dBm
Antenna type	Copper Wire
Antenna gain	-0.96 dBi (Peak)
Nominal Voltage	
- Supply Voltage	120 Vac
- Type of power source	AC Power
Equipment type	Z-wave Mesh

## DESCRIPTION OF TEST CONDITIONS

(\*): Data provided by the client.

TEST CONDITIONS	DESCRIPTION
TC#01	<p><u>Power supply (V):</u>  <math>V_{\text{nominal}} = 120 \text{ Vac}</math></p> <p><u>Modulation:</u>            GFSK/FSK</p> <p><u>Test Frequencies for Conducted/ Radiated tests:</u>            Channel 0: 916.0 MHz - Baud Rate (100kbps)            Channel 1: 908.4 MHz - Baud Rate (40kbps)            Channel 2: 908.4 MHz - Baud Rate (9.6kbps)</p>

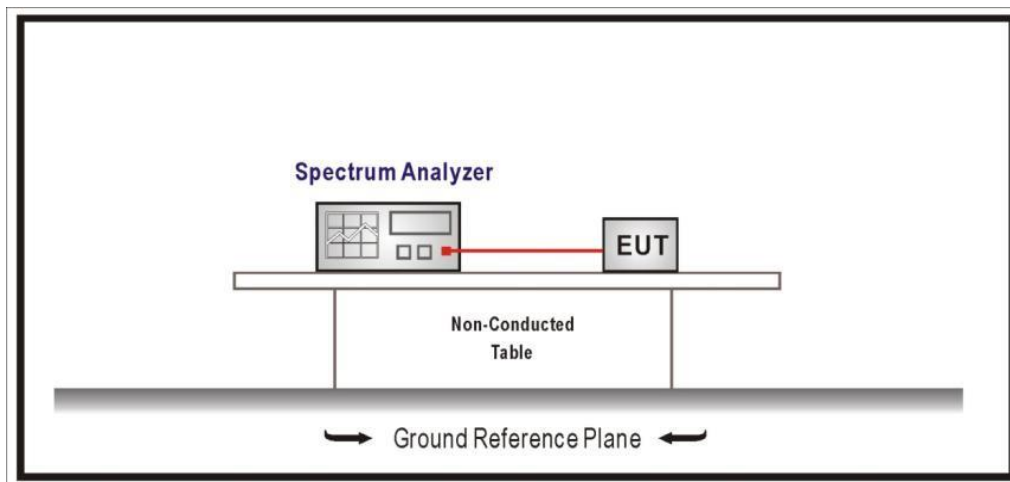
## TEST A.1: 99% OCCUPIED BANDWIDTH

<b>LIMITS:</b>	Product standard:	§ 2.1049 and RSS-Gen
	Test standard:	§ 2.1049 and RSS-Gen 6.7

### LIMITS

The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

### TEST SETUP

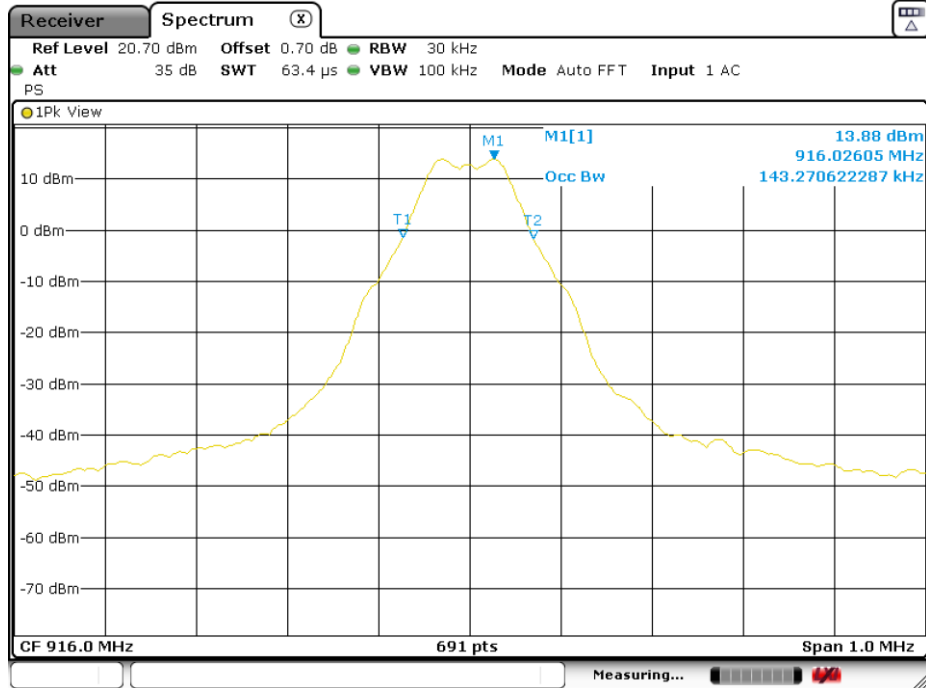


<b>TESTED SAMPLES:</b>	S/02
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

	Channel 0 916 MHz	Channel 1 908.4 MHz	Channel 2 908.4 MHz
99% bandwidth (kHz)	143.27	124.46	123.01

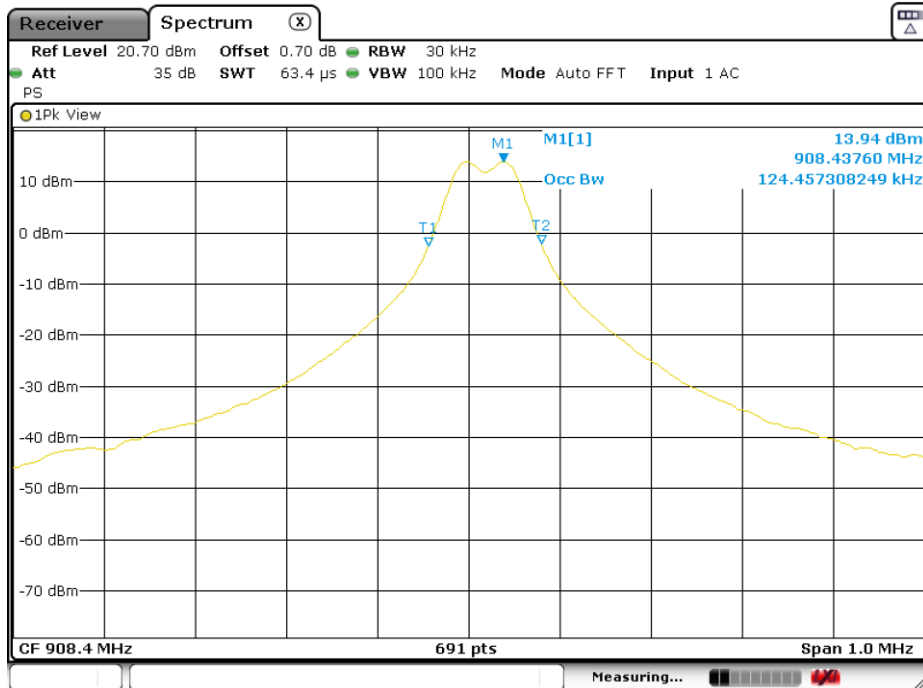
## TEST RESULTS (Cont.):

### Channel 0



Date: 20.SEP.2022 00:39:11

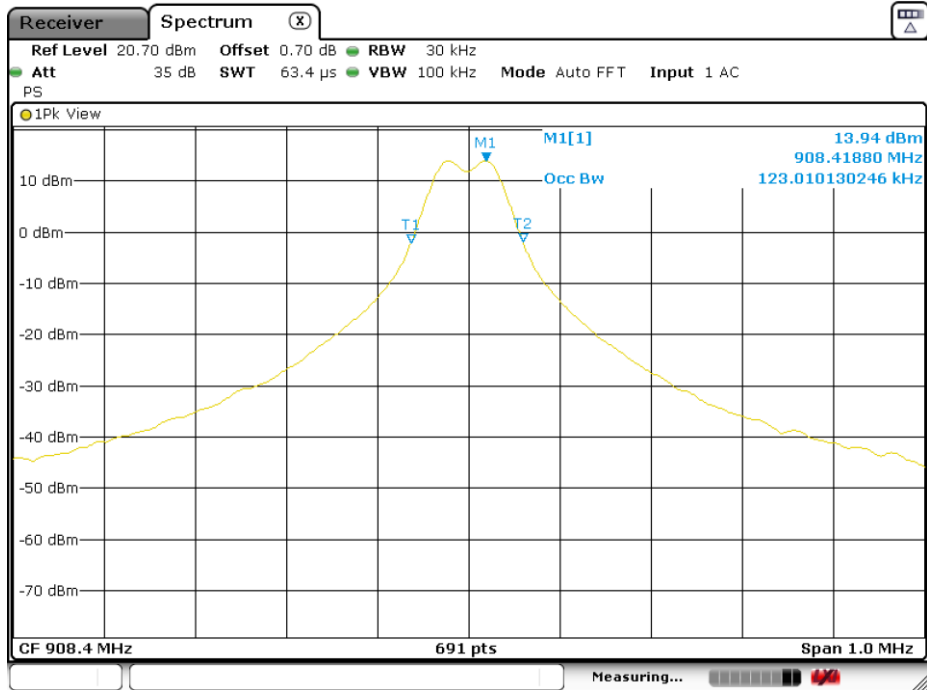
### Channel 1



Date: 20.SEP.2022 00:43:46

### TEST RESULTS (Cont.):

#### Channel 2



Date: 20.SEP.2022 00:46:05

## TEST A.2: FUNDAMENTAL FIELD STRENGTH

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.249 and RSS-210
	Test standard:	Part 15 Subpart C §15.249(a) and RSS-210 B.10(a)

### LIMITS

The field strength of emissions in this band shall not exceed 2500 millivolts/meter. The field strength of emissions from intentional radiators shall comply with the following

Frequency Range (MHz)	Field strength of fundamental (mV/m)	Field strength (dBµV/m)	Measurement distance (m)
902 - 928	50	93.98	3
2400 – 2483.5	50	93.98	3
5725 - 5875	50	93.98	3
24000-24250	250	107.96	3

For frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

RSS-210. The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively. Attenuation below the general field strength limits specified in RSS-Gen is not required



## TEST SETUP

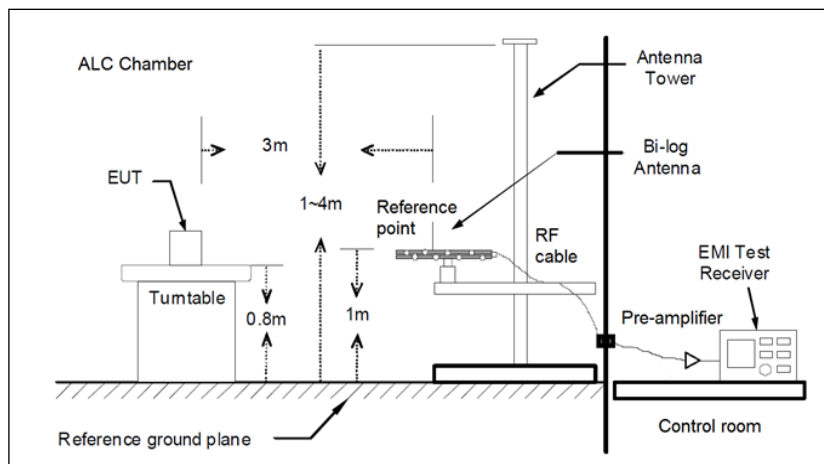
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-1000 MHz (Bilog antenna).

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 and cable loss.

Radiated measurements setup  $f < 1$  GHz

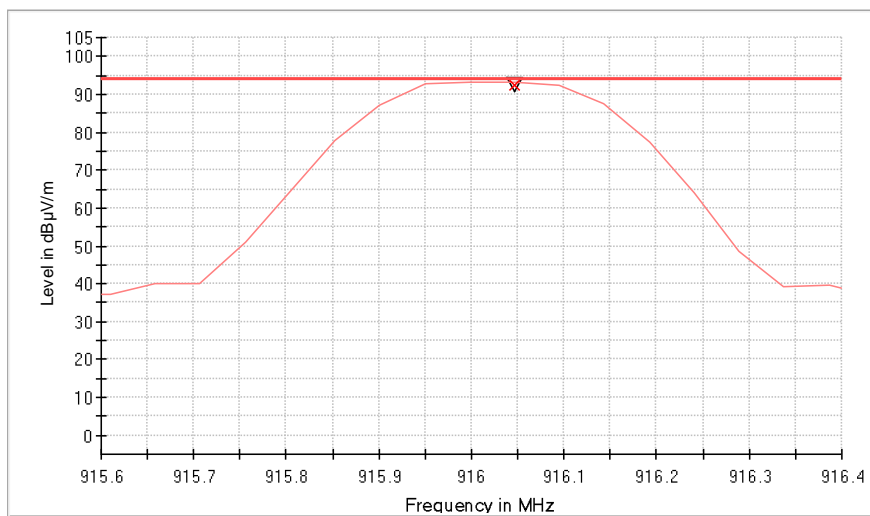


<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

	Channel 0 916 MHz	Channel 1 908.4 MHz	Channel 2 908.4 MHz
Field strength (dB $\mu$ V/m)	92.3	91.8	91.8

**TEST RESULTS (Cont.):**

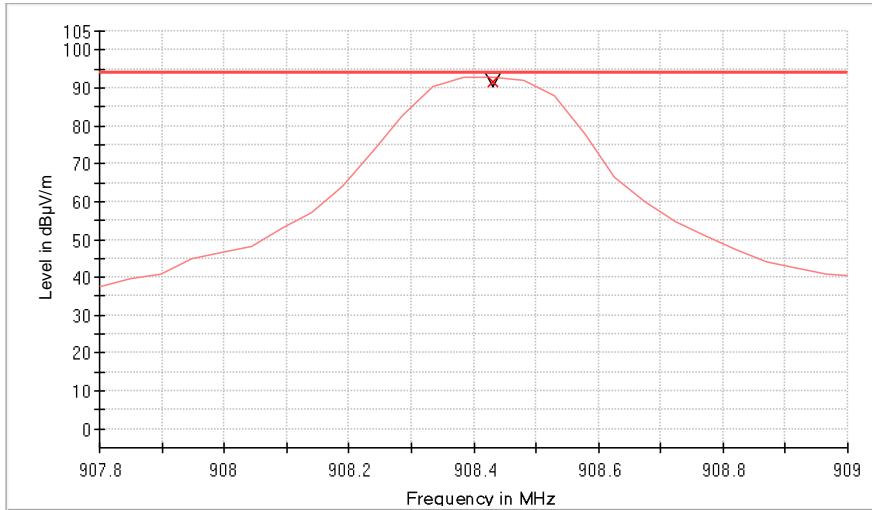
**Channel 0**



- ▽ MaxPeak-PK+ (Single)
- PK+ \_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- × QuasiPeak-QPK (Single)

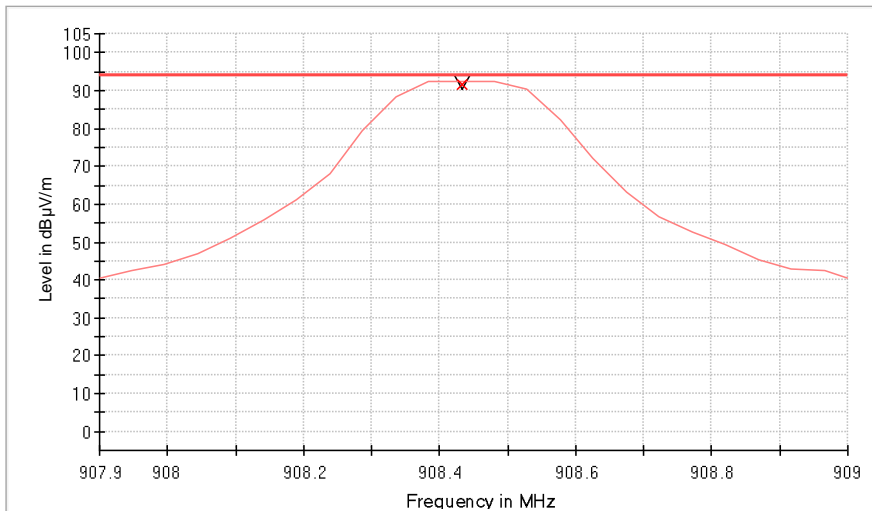
**TEST RESULTS (Cont.):**

**Channel 1**



- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- × QuasiPeak-QPK (Single)

**Channel 2**



- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- × QuasiPeak-QPK (Single)

## TEST A.3: EMISSION LIMITATIONS RADIATED (TRANSMITTER)

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.249 and RSS-210
	Test standard:	Part 15 Subpart C §15.249(b), RSS-210 and RSS-Gen 8.9 and 8.10

### LIMITS

The field strength of harmonics from intentional radiators shall comply with section 15.249 mentioned as the following:

Frequency Range (MHz)	Field strength of fundamental (mV/m)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
902 - 928	50	93.98	3
2400 – 2483.5	50	93.98	3
5725 - 5875	50	93.98	3
24000-24250	250	107.96	3

Radiated emissions outside of the specific frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits specified in section 15.209:

Frequency Range (MHz)	Field strength ( $\mu$ V/m)	Field strength (dB $\mu$ V/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

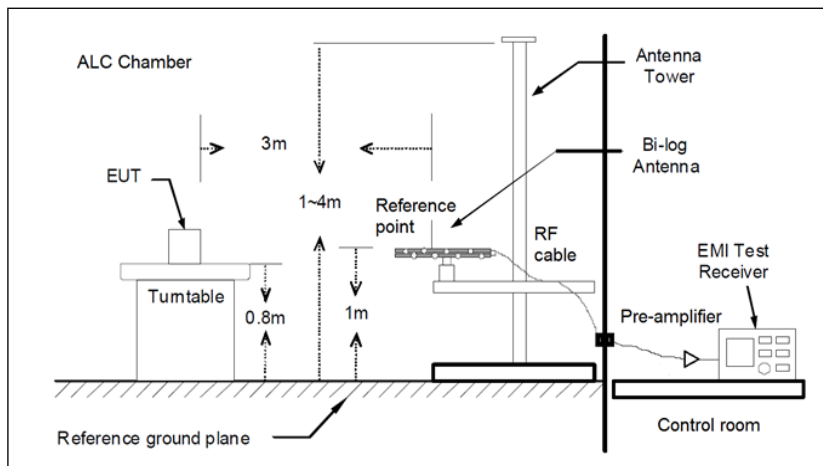
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-1000 MHz (Bi-log antenna) and 1 GHz-18 GHz (Double ridge horn antenna).

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.

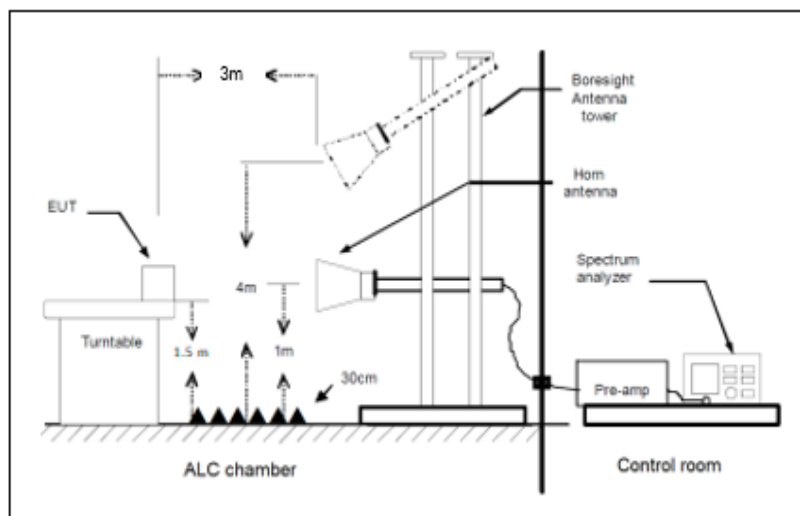
Measurements were made in both horizontal and vertical planes of polarization.

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.

### Radiated measurements Setup $f < 1$ GHz

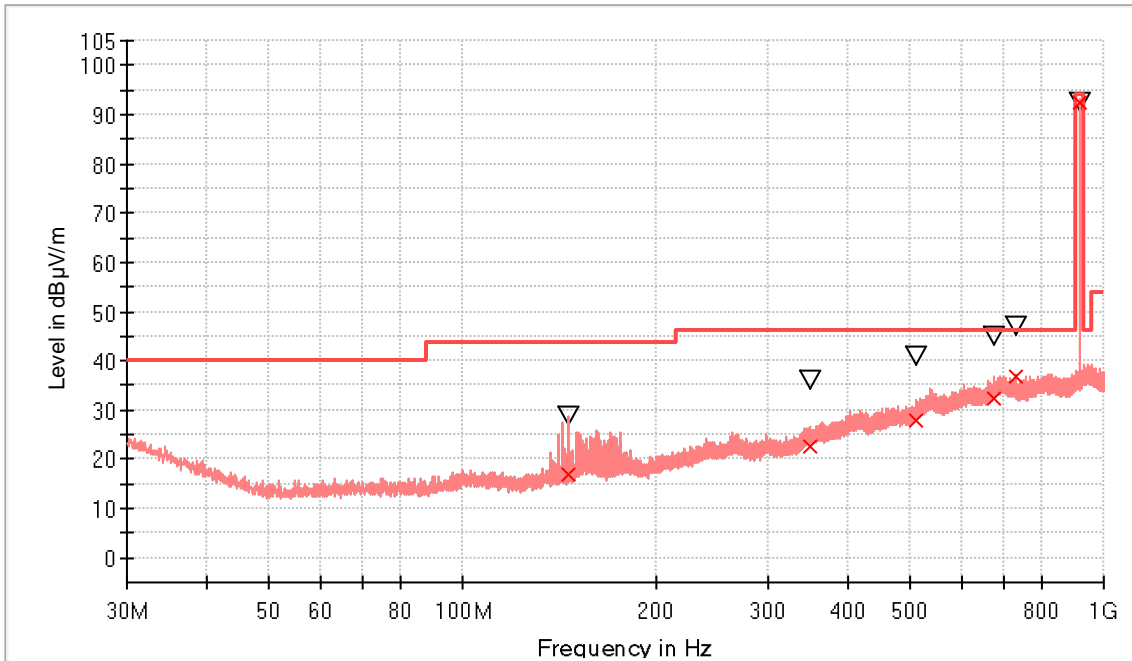


### Radiated measurements setup $f > 1$ GHz



<b>TESTED SAMPLES:</b>	S/02
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

**Channel 0**



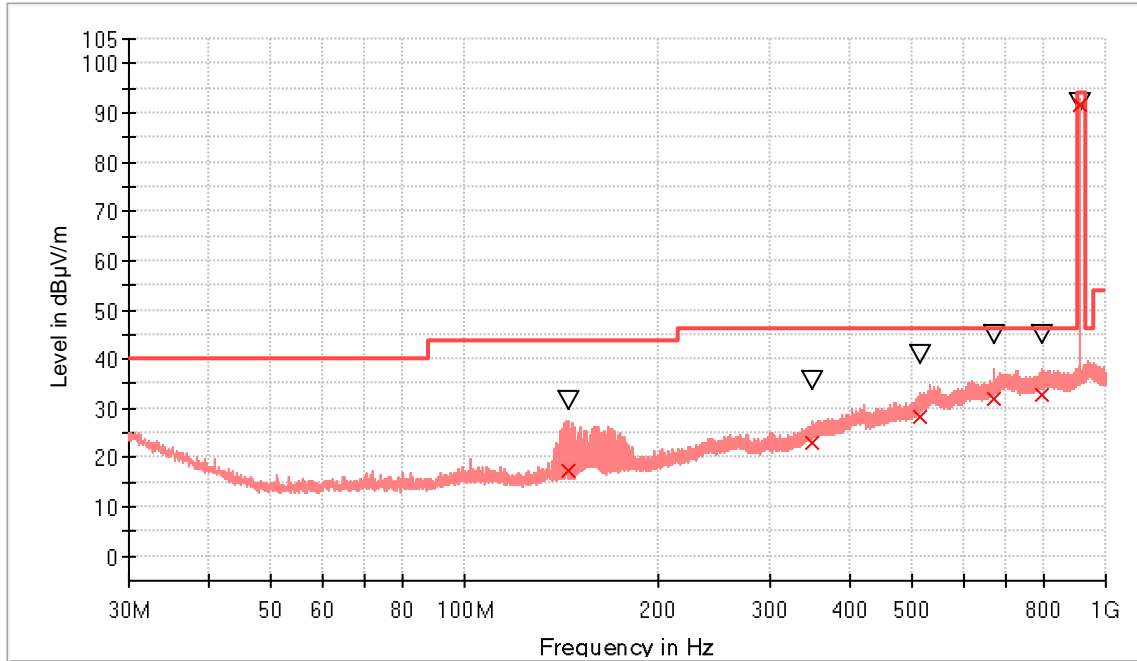
- ▽ MaxPeak-PK+ (Single)
- PK+ \_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- x QuasiPeak-QPK (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
146.109000	28.6	16.9	H	26.7	43.5	
348.208500	35.9	22.7	V	23.3	46.0	
511.362500	41.0	28.0	V	18.0	46.0	
676.408000	44.9	32.4	H	13.6	46.0	
726.945000	47.1	36.9	H	9.1	46.0	
916.046500	92.6	92.3	V	1.6	94.0	Fundamental

TEST RESULTS (Cont.):

30-1000 MHz

Channel 1



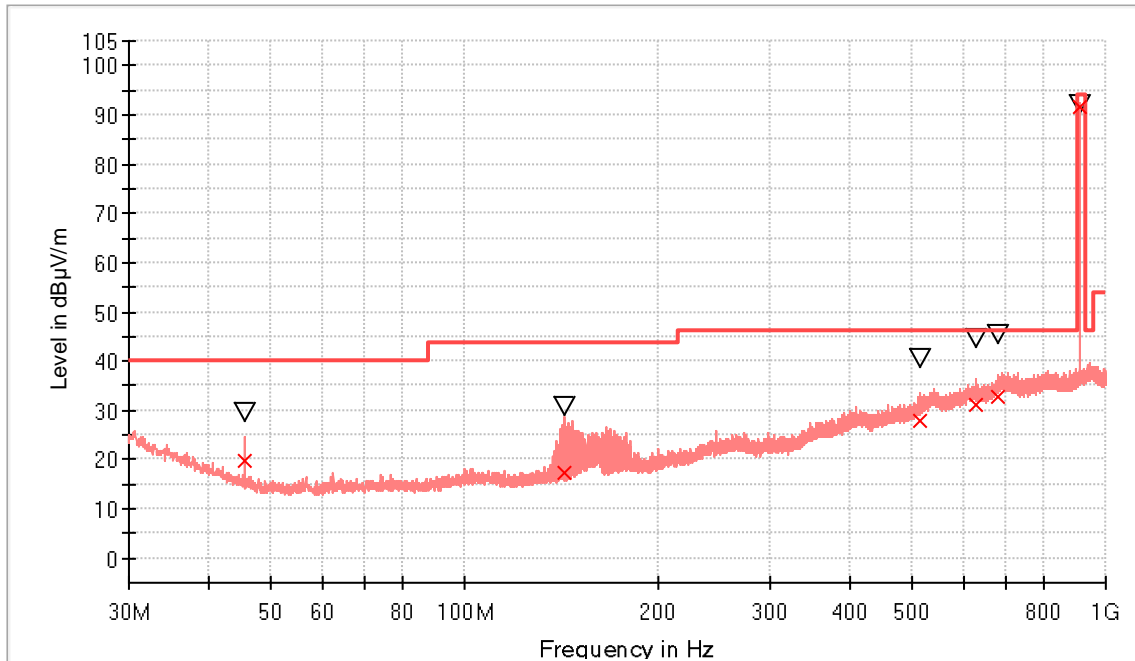
- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- × QuasiPeak-QPK (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
144.799500	31.6	17.5	V	26.0	43.5	
349.712000	35.6	22.9	H	23.1	46.0	
513.399500	40.7	28.2	V	17.8	46.0	
667.920500	44.8	31.8	H	14.2	46.0	
795.766500	44.9	32.6	H	13.4	46.0	
908.432000	92.0	91.8	V	2.2	94.0	Fundamental

TEST RESULTS (Cont.):

30-1000 MHz

Channel 2



- ▽ MaxPeak-PK+ (Single)
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.249 (30MHz to 1GHz) 902-928MHz+15.209 QPK Limit
- × QuasiPeak-QPK (Single)

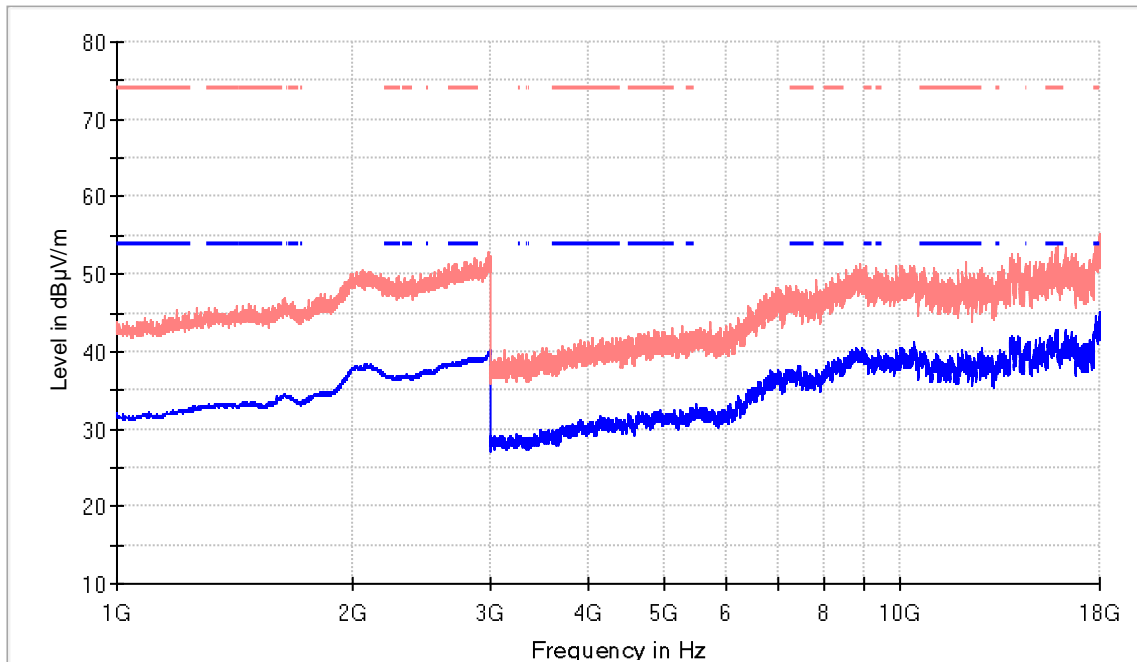
Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
45.374500	29.5	19.9	H	20.1	40.0	
143.199000	30.8	17.2	V	26.3	43.5	
513.254000	40.6	28.1	V	17.9	46.0	
627.132000	44.7	31.0	H	15.0	46.0	
679.948500	45.2	32.7	H	13.3	46.0	
908.432000	91.9	91.8	V	2.2	94.0	Fundamental



**TEST RESULTS (Cont.):**

**1-18 GHz**

**Channel 0**



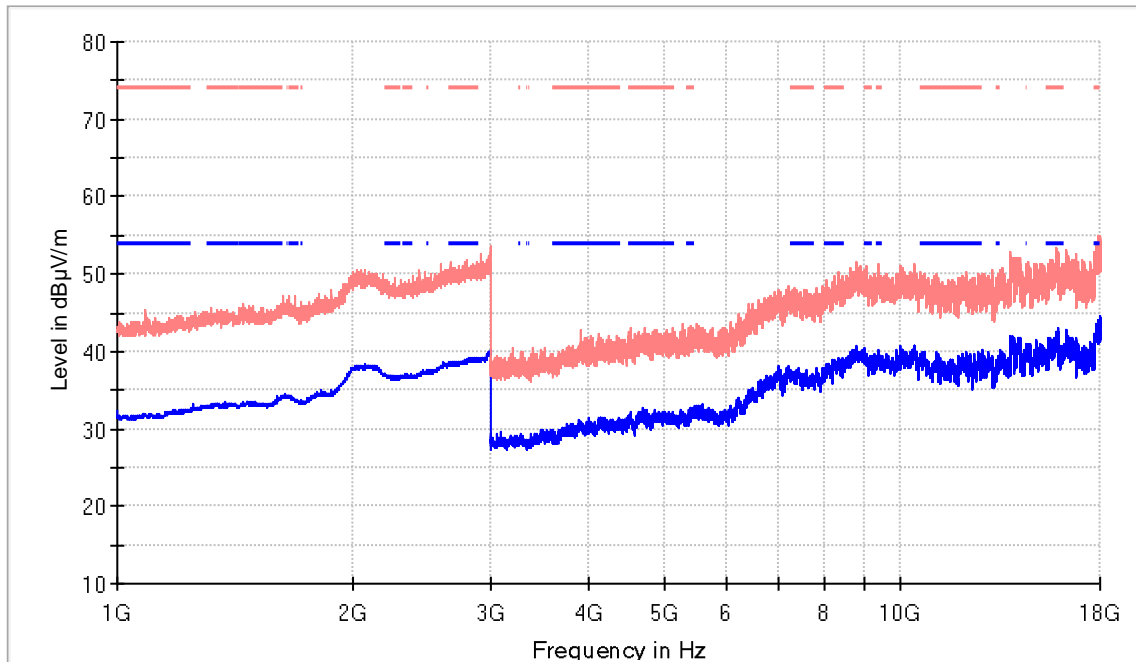
- AVG\_MAXH
- PK+\_MAXH
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- - - TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
17992.500000	55.0	45.1	V	8.9	54.0

**TEST RESULTS (Cont.):**

**1-18 GHz**

**Channel 1**



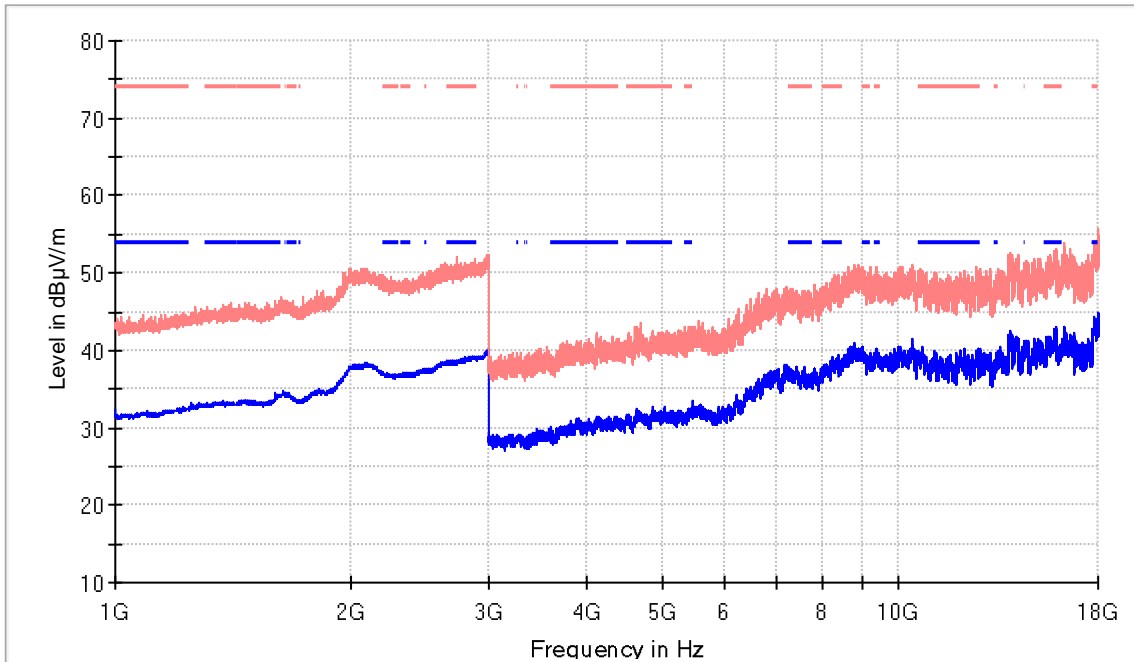
- AVG\_MAXH
- PK+\_MAXH
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
17998.000000	54.0	44.5	V	9.5	54.0

TEST RESULTS (Cont.):

1-18 GHz

Channel 2



- 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

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
17983.000000	53.3	5.0	V	9.0	54.0