DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
2579ERM.003

Partial Test report

Reference Standard: USA FCC Part 24 and 27

Identification of item tested	GPS Tracker
Trademark	Automile
Model and /or type reference	Automile Tracker Mini
Other identification of the product	FCC ID: 2AUAJATMV1 Contains FCC ID: XPY1DIQN3NN
Features	Bluetooth, GPS/Glonass, LTE Band 12, 4, 2
Manufacturer	AUTOMILE AB, Sergels Torg 12, Floor 7, 11157 Stockholm, SWEDEN.
Test method requested, standard	USA FCC Part 24 10-1-18 Edition USA FCC Part 27 10-1-18 Edition. Measurement Guidance 971168 D01 v02r02 for certification of Licensed Digital Transmitters. ANSI C63.26 – 2015. ANSI/TIA-603-D (2010).
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2019.08.22 21:06:48 -04'00'
Date of issue	08-08-2019
Report template No	FDT08_21

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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 particular item under test established in this document.

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.

Frequency (MHz)	U(k=2)	Units
30-180	3.82	dB
180-1000	2.61	dB
1000-18000	2.92	dB
18000-40000	2.15	dB

Data provided by the client

GPS based asset tracker with internal battery and 5VDC power input via USB-C.

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 undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
2579.003	Automile Tracker mini	---	IMEI:356935082279909	07/08/2019

Following accessories were used with Sample S/01 to perform the testing

Control Nº	Description	Model	Serial Nº	Date of reception
2579.011	USB to Type C Cable	---	---	07/08/2019

1. Sample S/01 has undergone following test(s):

   All radiated tests indicated in appendix A.

   .

Test sample description

Ports..... :	Port name and description		Cable			
			Specified length [m]	Attached during test	Shielded	
	Data not provided			☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
Supplementary information to the ports..... :	*Data not provided*					
Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	☐	AC: 230Vac / 50Hz.	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☐	DC:					
	☒	DC: Battery powered (5Vdc)					
Rated Power .....:	*Data not provided*						
Clock frequencies .....:	*Data not provided*						
Other parameters.....:	*Data not provided*						
Software version .....:	1						
Hardware version.....:	B1						
Dimensions in cm (L x W x D) ....:	*Data not provided*						
Mounting position.....:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					
Modules/parts .....:	Module/parts of test item		Type		Manufacturer		
	Data not provided						
Accessories (not part of the test item).....:	Description		Type		Manufacturer		
	Data not provided						
Documents as provided by the applicant.....:	Description		File name		Issue date		
	Data not provided						

Copy of marking plate:

Identification of the client

HALTIAN LTD

Yrttipellontie 1D, 90230 Oulu, FINLAND.

Testing period and place

Test Location	DEKRA Certification, Inc.
Date (start)	07-12-2019
Date (finish)	07-19-2019

Document history

Report number	Date	Description
2579ERM.003	08-05-2019	First release

Environmental conditions

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto & Poojita Bhattu.

Testing verdicts

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

Summary

FCC PART 24				
Report Section	**Spec Clause**	**Test Description**	**Verdict**	**Remark**
-	§ 24.232	RF Output power	N/M	Note 1
-	§ 2.1047	Modulation characteristics	N/M	Note 1
-	§ 24.235	Frequency stability	N/M	Note 1
-	§ 2.1049	Occupied Bandwidth	N/M	Note 1
-	§ 24.238	Spurious emissions at antenna terminals	N/M	Note 1
B.1	§ 24.238 / RSS-133 Clause 6.5	Radiated emissions	P	N/A
Supplementary information and remarks: Note 1: Test not performed. Only co-location radiated spurious emission test was requested.				

FCC PART 27				
Report Section	**Spec Clause**	**Test Description**	**Verdict**	**Remark**
-	§2.1046 and §27.50	RF Output power	N/M	Note 1
-	§2.1047 and §27.50	Modulation characteristics	N/M	Note 1
-	§2.1055 and § 27.54	Frequency stability	N/M	Note 1
-	§ 2.1049	Occupied Bandwidth	N/M	Note 1
-	§2.1051 and §27.53	Spurious emissions at antenna terminals	N/M	Note 1
	§27.53	Spurious emissions at antenna terminals at Block edges	N/M	Note 1
B.1	§2.1053 and §27.53	Radiated emissions	P	N/A
Supplementary information and remarks: Note 1: Test not performed. Only co-location radiated spurious emission test was requested.				

List of equipment used during the test

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	LAST CALIBRATION	NEXT CALIBRATION
1179	Semi anechoic Absorber Lined Chamber Frankonia SAC 3 plus “L”	N/A	N/A
1064	BiconicalLog antenna ETS LINDGREN 3142E	2017/03	2020/03
1057	Double-ridge Waveguide Horn antenna 1-18 GHz	2017/03	2020/03
1012	EMI Test Receiver	2018/09	2020/09
1014	Spectrum analyzer Rohde & Schwarz FSV40	2019/04	2021/04
0981	RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-2A	2018/10	2020/10
1015, 1017, 1019, 1020	Rohde & Schwarz EMC32 software	N/A	N/A

Appendix A: FCC 24 Results

Description of Test Conditions

The worst case was found when positioned as the table below. Following channels were selected for the final test as listed below:

<table>
<tr><th>TEST CONDITIONS</th><th>DESCRIPTION</th></tr>
<tr><td>TC#01</td><td>
Type of power supply:
Battery Powered.
Test Frequencies for Radiated tests:
<table>
<tr><th>Available Frequencies (MHz)</th><th>Tested Frequency (MHz)</th><th>Mode</th></tr>
<tr><td>1850 – 1910</td><td>1880.2</td><td>LTE Band 2</td></tr>
<tr><td>2402-2480</td><td>2440</td><td>BLE</td></tr>
</table>
The test was performed with the equipment transmitting with cellular and BLE radios simultaneously. These measurements have been performed in order to check the impact of the co-location of all radio interfaces that can be transmitting simultaneously.
</td></tr>
</table>

Test A.1: RADIATED EMISSIONS (PART 24)

LIMITS:	Product standard:	FCC Part 24
	Test standard:	FCC §2.1053 and §24.238

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. P in watts.

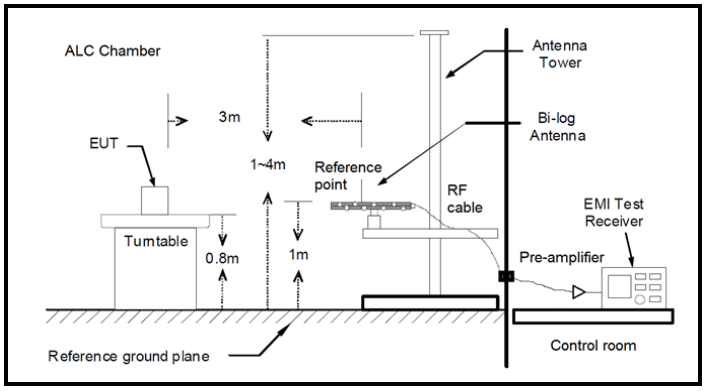
At Po (dBm) transmitting power. the specified minimum attenuation is 43+10log (Po) and the limit level in dBm is as follows:

Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

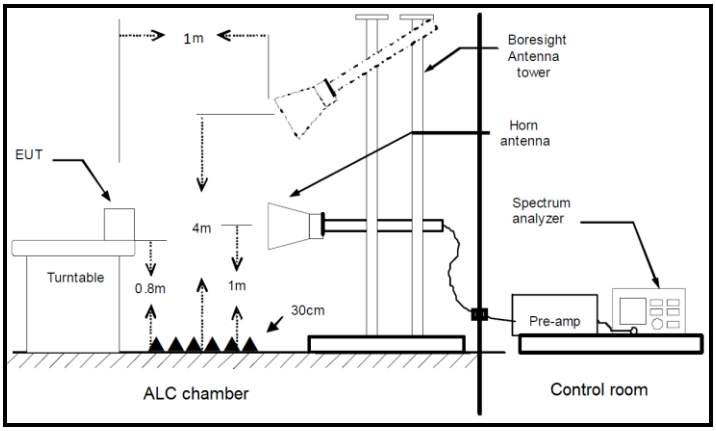
TEST SETUP

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.
The EUT was placed on a non-conductive stand at a 3-meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

Radiated measurements < 1GHz



Radiated measurements > 1GHz

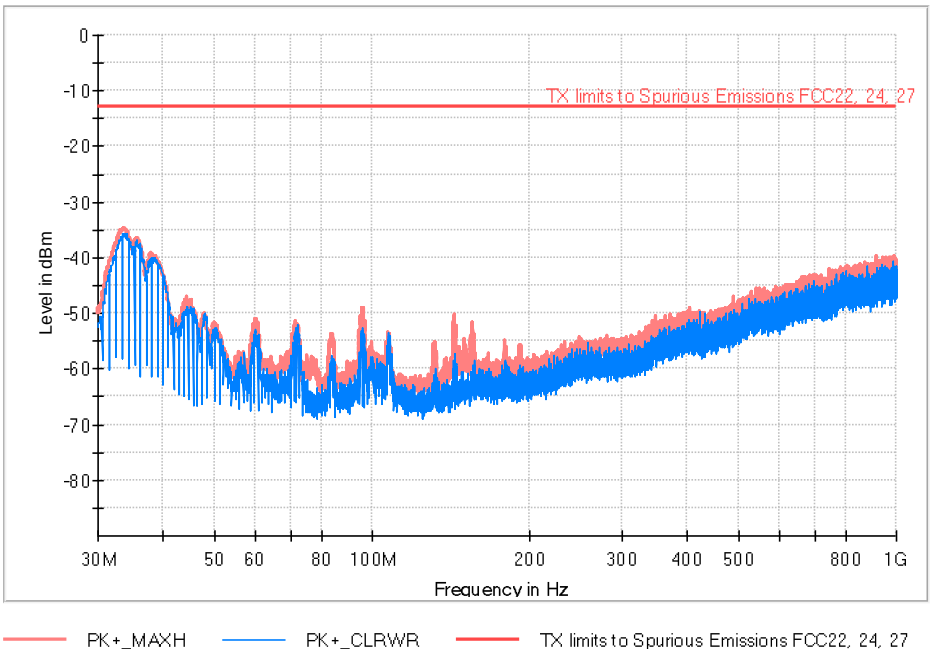


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE FDD 2 Middle channel 1880.2 MHz and BLE 2440 MHz

FREQUENCY RANGE: 30-1000 MHz

The radiated spurious signal was detected below 30 dB below the limit.

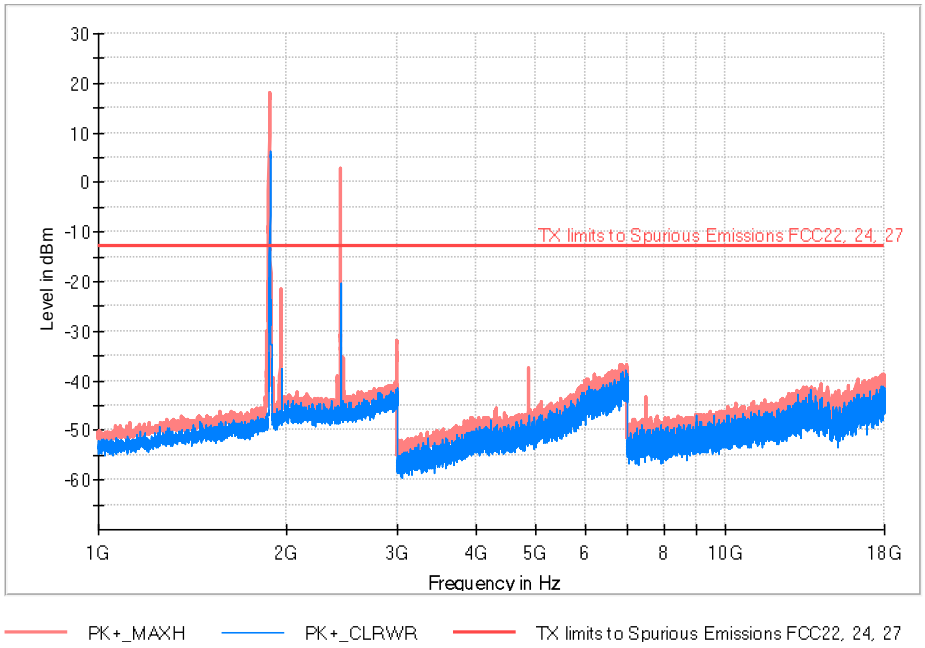


Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Azimuth (deg)
33.750667	-35.71	-34.77	V	-122.0
95.798333	-54.85	-49.10	V	99.0
143.942667	-62.17	-50.14	V	29.0

TEST RESULTS (Cont):	

FREQUENCY RANGE: 1-18 GHz

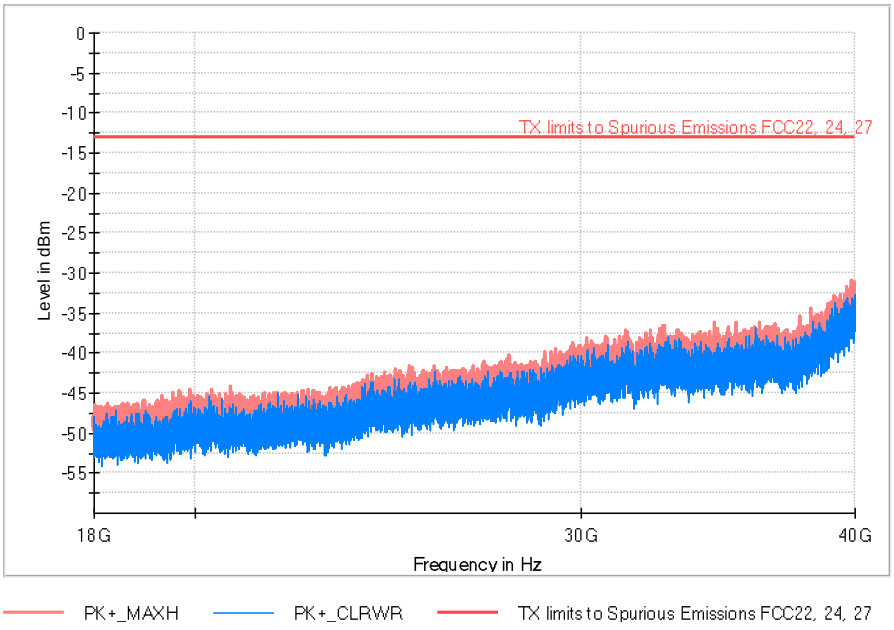


Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Comment
1881.500000	5.04	17.89	H	fundamental
1958.500000	-38.83	-21.59	H	
2440.500000	-20.63	2.57	H	fundamental
2998.000000	-42.85	-31.96	H	
4880.000000	-51.26	-37.47	H	
7519.500000	-50.93	-43.29	H	

TEST RESULTS (Cont):	

FREQUENCY RANGE: 18-40 GHz



Appendix B: FCC 27 Results

Description of Test Conditions

The worst case was found when positioned as the table below. Following channels were selected for the final test as listed below:

<table>
<tr><th>TEST CONDITIONS</th><th>DESCRIPTION</th></tr>
<tr><td>TC#01</td><td>Type of power supply:
Battery Powered.
Test Frequencies for Radiated tests:
<table><tr><th>Available Frequencies (MHz)</th><th>Tested Frequency (MHz)</th><th>Mode</th></tr><tr><td>1710 – 1755</td><td>1732.5</td><td>LTE Band 4</td></tr><tr><td>2402-2480</td><td>2440</td><td>BLE</td></tr></table>The test was performed with the equipment transmitting with cellular and BLE radios simultaneously. These measurements have been performed in order to check the impact of the co-location of all radio interfaces that can be transmitting simultaneously.</td></tr>
<tr><td>TC#02</td><td>Type of power supply:
Battery Powered.
Test Frequencies for Radiated tests:
<table><tr><th>Available Frequencies (MHz)</th><th>Tested Frequency (MHz)</th><th>Mode</th></tr><tr><td>699-716 MHz</td><td>707.5</td><td>LTE Band 12</td></tr><tr><td>2402-2480</td><td>2440</td><td>BLE</td></tr></table>The test was performed with the equipment transmitting with cellular and BLE radios simultaneously. These measurements have been performed in order to check the impact of the co-location of all radio interfaces that can be transmitting simultaneously.</td></tr>
</table>

Test A.1: RADIATED EMISSIONS (PART 27)

LIMITS:	Product standard:	FCC Part 27
	Test standard:	FCC §2.1046 and §27.50

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. P in watts.

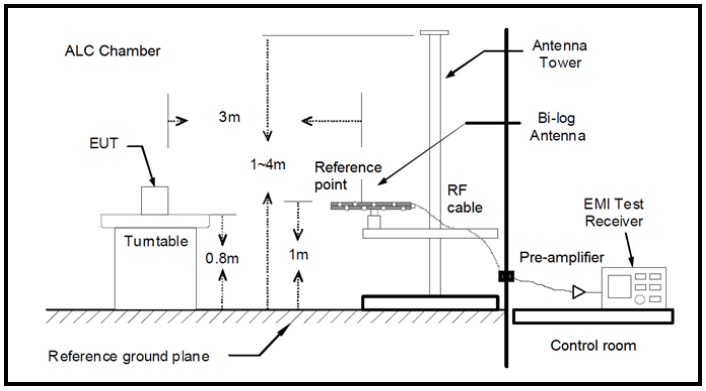
At Po (dBm) transmitting power. the specified minimum attenuation is 43+10log (Po) and the limit level in dBm is as follows:

Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

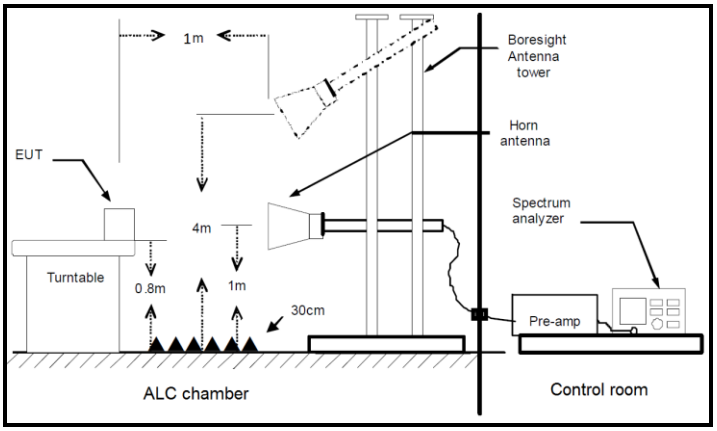
TEST SETUP

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.
The EUT was placed on a non-conductive stand at a 3-meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

Radiated measurements < 1GHz



Radiated measurements > 1GHz

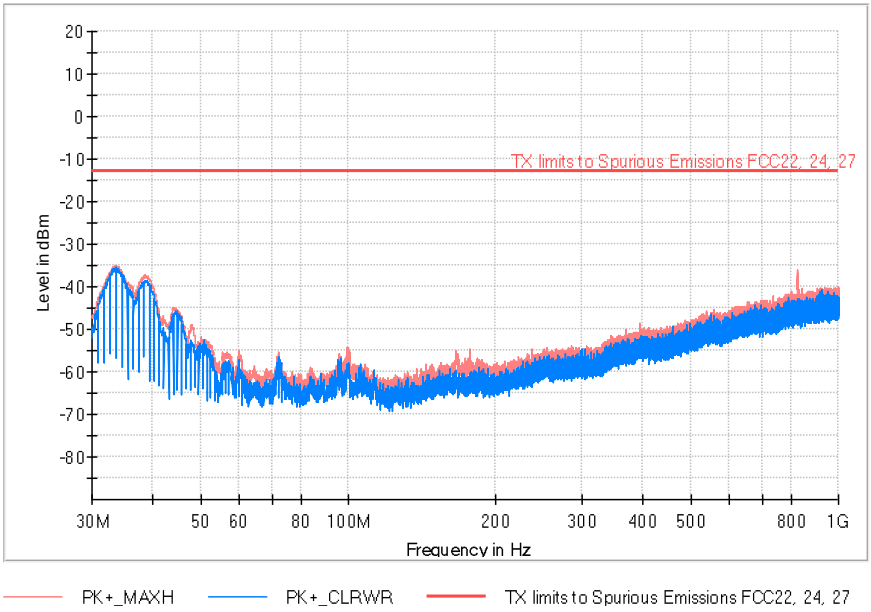


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE FDD 4 Middle channel 1732.5 MHz and BLE 2440 MHz

FREQUENCY RANGE: 30-1000 MHz

The radiated spurious signal was detected below 30 dB below the limit.

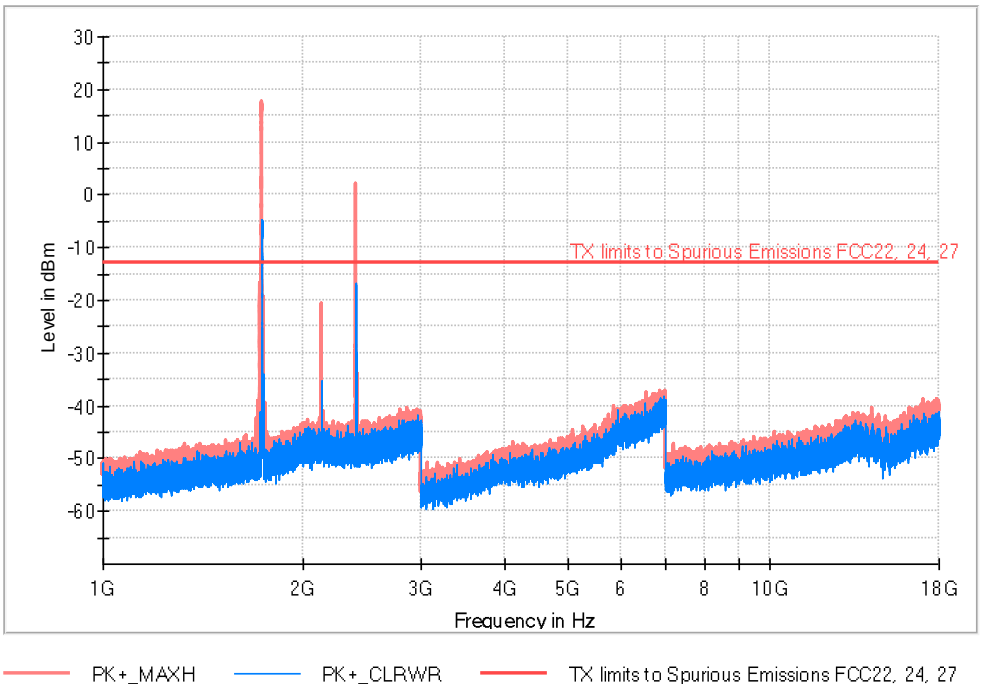


Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Azimuth (deg)
33.556667	-36.07	-35.10	V	1.0
71.936333	-58.47	-55.36	V	-175.0
99.937000	-59.83	-54.18	V	72.0
827.566333	-46.26	-36.12	V	109.0

TEST RESULTS (Cont):	

FREQUENCY RANGE: 1-18 GHz

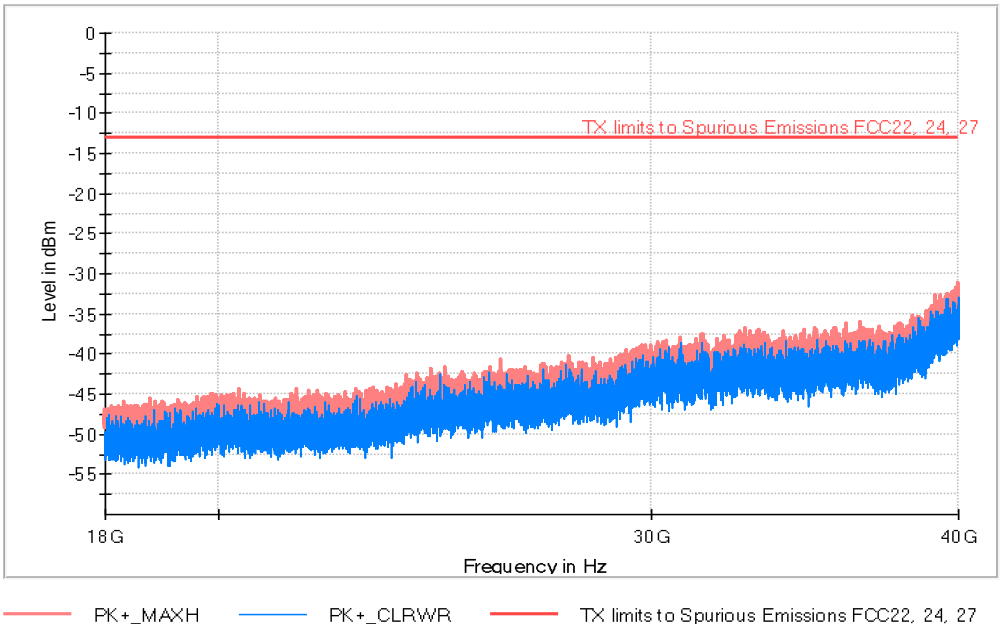


Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Comment
1730.600000	-6.89	17.59	H	fundamental
2131.333333	-36.97	-20.56	H	
2401.666667	**-49.60**	**1.95**	**H**	**fundamental**

TEST RESULTS (Cont):	

FREQUENCY RANGE: 18-40 GHz

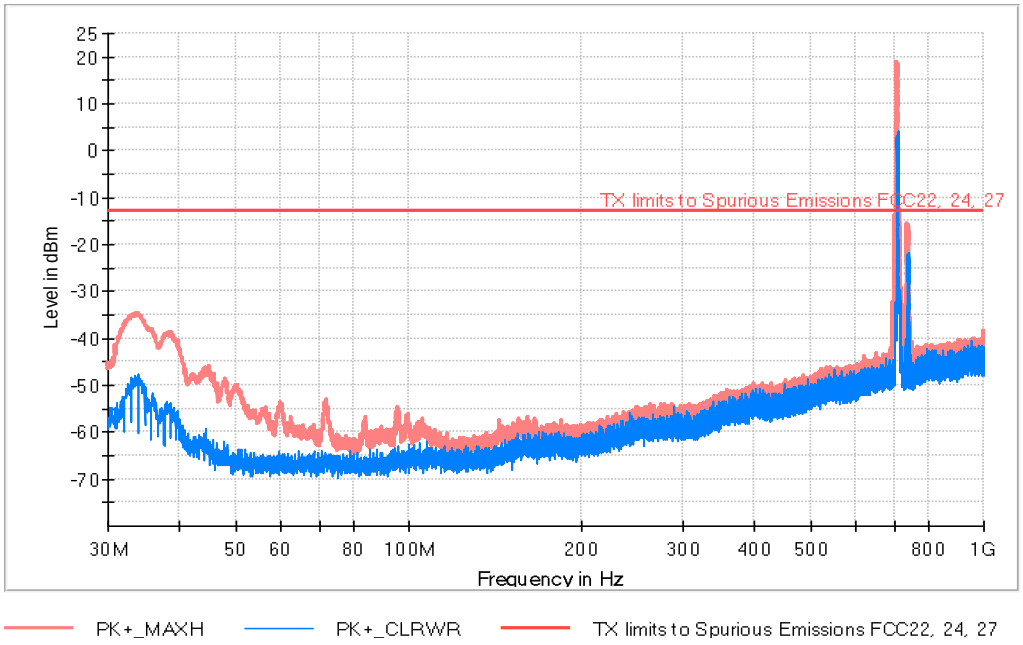


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

LTE FDD 12 Middle channel 707.5 MHz and BLE 2440 MHz

FREQUENCY RANGE: 30-1000 MHz

The radiated spurious signal was detected below 30 dB below the limit.

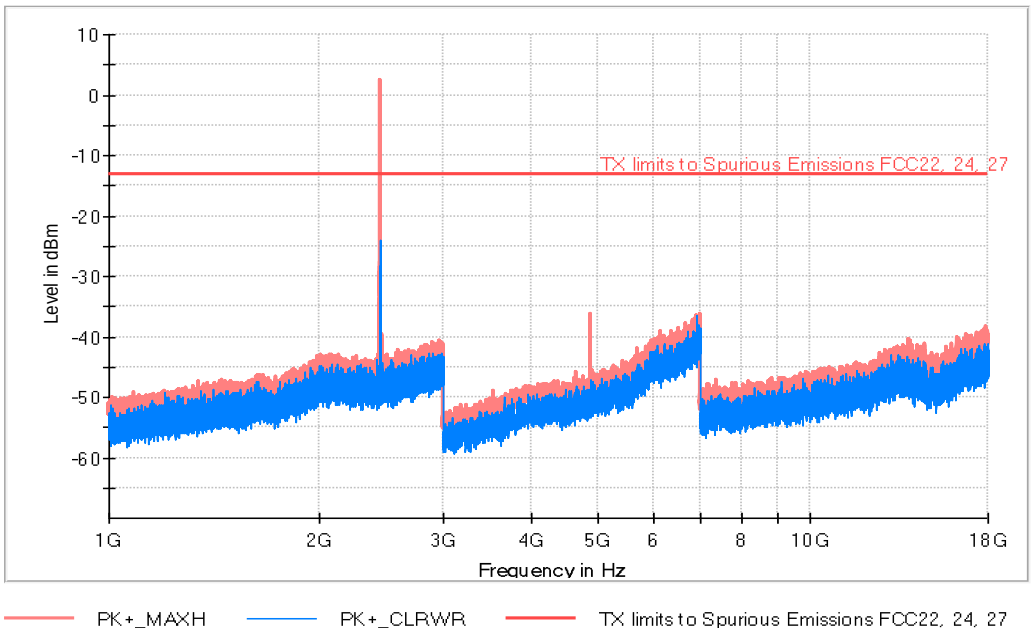


Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Azimuth (deg)	Comment
33.750667	-49.37	-34.69	V	-66.0	
72.227333	-66.55	-52.94	V	180.0	
705.443333	1.91	19.03	H	59.0	fundamental
737.938333	-25.45	-15.62	H	-60.0	

TEST RESULTS (Cont):	

FREQUENCY RANGE: 1-18 GHz



Maximizations

Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Pol	Comment
2440.200000	-23.99	2.49	H	fundamental
4880.000000	-47.85	-36.35	H	

TEST RESULTS (Cont):	

FREQUENCY RANGE: 18-40 GHz