DEKRA Testing and Certification, S.A.U.
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C.I.F. A29507456

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
79045RRF.004A1

Partial Test Report
USA FCC Part 24
CANADA RSS-133

(*) Identification of item tested	Device to track Pet using LTE, BLE, WiFi and GNSS
(*) Trademark	DATAMARS, Kippy
(*) Model and /or type reference	PetLinkDOG US v1
(*) Derived model not tested	PetLinkDOG US a1
Other identification of the product	FCC ID: NDX-PLDOG1 IC: 8521A-PLDOG1
(*) Features	LTE CAT-M1, Bluetooth LE, GNSS, WIFI scan (RX ONLY) HW version: 6V2 US SW version: 10.4.64
Applicant	DATAMARS SA via Industria 16, Lamone, N/A 6814 Switzerland
Test method requested, standard	USA FCC Part 24 (10-1-23 Edition). CANADA RSS-133 Issue 7, July 2024. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2024-11-12
Report template No.	FDT08_25 (*) "Data provided by the client"

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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

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. The sample consists of a Pet tracker. Device to track Pet using LTE, BLE, WiFi and GNSS.

3. Declaration of Similarity/Family:

Declaration of Similarity – PetLinkDOG US a1 and PetLinkDOG US v1

Lamone, 19 Aug 2024

Datamars SA, with its registered office at Via Industria 16, 6814 Lamone, Switzerland, declares that the following products:

- PetLinkDOG US a1
- PetLinkDOG US v1

have exactly the same features, except that have a different SIM provider.

The models are identical from the RF point of view, and the difference described above do not lead to different RF performance or behaviour between the devices.

Datamars SA

Damien Pachoud
Chief Production and Technology Officer

DR003759

DATAMARS

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	79045B_23.1	Device to track Pet	PetLinkDOG US v1	-	2024-07-08	Element Under Test
	79045B_2.1	USB Charging cable	-	-	2024-04-22	Auxiliary Element
S/02	79045B_17.1	Device to track Pet	PetLinkDOG US v1	-	2024-06-17	Element Under Test
	79045B_1.1	USB Charging cable	-	-	2024-04-22	Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for conducted tests.
S/02	Samples used for radiated tests.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)		
	serial com on USB	1.5 m	[X]	[ ]	[ ]		
	SMA cable	0.03 m	[X]	[ ]	[ ]		
Supplementary information to the ports..... :	.....						
Rated power supply ..... :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: Li-ion polymer 4.4 max voltage, 650mAh, Feten Energy, FTN-P952525					
Rated Power..... :	3W						
Clock frequencies..... :	32 MHz, 32.768 kHz, 26 MHz						
Other parameters ..... :	.....						
Software version..... :	10.4.64						
Hardware version ..... :	6V2 US						
Dimensions in cm (W x H x D) ... :	65x34x21mm3						
Mounting position ..... :	[ ]	Table top equipment					
	[ ]	Wall/Ceiling mounted equipment					
	[ ]	Floor standing equipment					
	[ ]	Hand-held equipment					
	[X]	Other:					
Modules/parts..... :	Module/parts of test item		Type	Manufacturer			
	Modem LTE		ME310G1WW0	Telit			
	GNSS receiver		MIA-M10Q	UBLOX			
	BLE		nRF52832	Nordic Semi			
	WIFI scanner		ESP8684H2	Espressif Systems			
Accessories (not part of the test item) ..... :	Description		Type	Manufacturer			
	USB charging cable EU		CMA-052022-0	CFE Electronic Co			
	USB charging cable US		CMA-052021-0	CFE Electronic Co			
Documents as provided by the applicant..... :	Description		File name	Issue date			
	.....		.....	.....			

(3) Only for Medical Equipment

Identification of the client

DATAMARS SA
via Industria 16, Lamone, N/A 6814 Switzerland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-06-18
Date (finish)	2024-07-08

Document history

Report number	Date	Description
79045RRF.004	2024-09-10	First release.
79045RRF.004A1	2024-11-12	Second release. It is modified to correct antenna gain value. This modification test report cancels and replaces the test report 79045RRF.004

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. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: José Manuel Jiménez, Sergio Carrasco, Valentín Andarias and Carmen Vázquez.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
06791	SEMIANECHOIC ABSORBER LINED	FACT 3 200 STP	ETS LINDGREN	N/A
06792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06609	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-22
06615	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
06496	HORN ANTENNA 1-18 GHz	BBHA 9120 D	SCHWARZBECK	2026-12-01
03783	PRE-AMPLIFIER G>30 dB 1-18 GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-02-07
08866	EMI TEST RECEIVER 2 Hz-44 GHz	ESW44	ROHDE AND SCHWARZ	2026-06-12
08849	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE AND SCHWARZ	2025-10-11
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
08849	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE AND SCHWARZ	2025-10-11
05850	DIGITAL MULTIMETER	179	FLUKE	2024-11-02

Testing verdicts

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

Summary

Appendix A: LTE Cat-M1 Band 2.

FCC 24 / RSS-133		
Requirement – Test case	**Verdict**	**Remark**
FCC 24.232 / RSS-133 5.5: RF Output Power	P	
FCC 2.1047 / RSS-133 5.3: Modulation characteristics	N/M	(1)
FCC 24.235 / RSS-133 5.4: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 24.238 / RSS-133 5.6: Spurious emissions at antenna terminals	N/M	(1)
FCC 24.238 / RSS-133 5.6: Spurious emissions at antenna terminals at Block Edges	N/M	(1)
FCC 24.238 / RSS-133 5.6: Radiated Emissions	P	
Supplementary information and remarks: (1) Test not requested.		

Appendix A: Test results for FCC 24 / RSS-133: LTE Cat-M1 Band 2

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TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnominal: 3.85 Vdc

Type of Power Supply: Li-ion external battery.

ANTENNA (*):

Technologies	Antenna Gain (dBi)	Type of Antenna
LTE Cat-M1 Band 2	-2.26	Monopole on Flex PCB

TEST FREQUENCIES:

LTE Cat-M1 Band 2. QPSK and 16QAM:

	Channel per BW=(Frequency, MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	18607 (1850.7)	18615 (1851.5)	18625 (1852.5)	18650 (1855)	18675 (1857.5)	18700 (1860)
Middle	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)
High	19193 (1909.3)	19185 (1908.5)	19175 (1907.5)	19150 (1905)	19125 (1902.5)	19100 (1900)

RF Output Power

Limits

* FCC § 2.1046 and § 24.232:

Mobile/portable stations are limited to 2 Watts (33 dBm) Effective Isotropic Radiated Power (E.I.R.P.).

* RSS-133 Clause 5.5:

Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.

Method

The conducted RF output power measurements were made at the RF output terminals of the EUT using the power meter of the Universal Radio Communication tester CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

The maximum equivalent isotropically radiated power (e.i.r.p.) is calculated by adding the declared maximum antenna gain (dBi).

The maximum effective radiated power e.r.p. is calculated from the maximum equivalent isotropically radiated power (e.i.r.p.) by subtracting 2.15 dB:

E.R.P. = E.I.R.P. - 2.15 dB

Test Setup

CONDUCTED AVERAGE POWER:

Results

CONDUCTED AVERAGE POWER:

LTE Cat-M1 Band 2:

A preliminary scan determined the BW=5 MHz, QPSK, Low Channel, RB Size=1, RB Offset=0, Narrowband=0 as the worst case.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
5	Low 18625	1852.5	QPSK	1	0	22.67
				1	5	22.27
				3	3	22.30
				6	0	21.32
			16-QAM	1	0	22.22
				1	5	22.51
				3	3	21.61
				5	0	21.47
	Middle 18900	1880	QPSK	1	0	21.98
				1	5	21.73
				3	3	21.88
				6	0	20.93
			16-QAM	1	0	21.95
				1	5	22.21
				3	3	21.22
				5	0	20.97
	High 19175	1907.5	QPSK	1	0	22.07
				1	5	21.93
				3	3	21.96
				6	0	20.95
			16-QAM	1	0	22.27
				1	5	22.16
				3	3	20.60
				5	0	20.85

Measurement uncertainty (dB) <±0.941

Verdict

Pass

Radiated Emissions

Limits

1. LTE Cat-M1 Band 2. FCC §2.1051, §24.238 (a) (b) / RSS-133:

FCC §24.238 (a) (b):

(a) The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RSS-133:

5.6. Unwanted emission limits

Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified in table 3, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 MHz bands immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 MHz bands, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the table 3.

Table 3: Unwanted emission limits for all equipment

Offset frequency from the edge of the frequency block group (MHz)	Unwanted emission limit
≤ 1	-13 dBm/(1% of OBW)
> 1	-13 dBm/MHz

Method

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 High frequency generated within the equipment.

The EUT was placed on a non-conductive stand at 3-meter distance from the measuring antenna for measurements up to 17 GHz. Measurements above 17 GHz require the distance to be reduced to 1.5 meters.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the height and polarization of the measuring antenna. The maximum meter reading was recorded.

Measurement Limit:

At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po) and the level in dBm relative Po becomes:

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

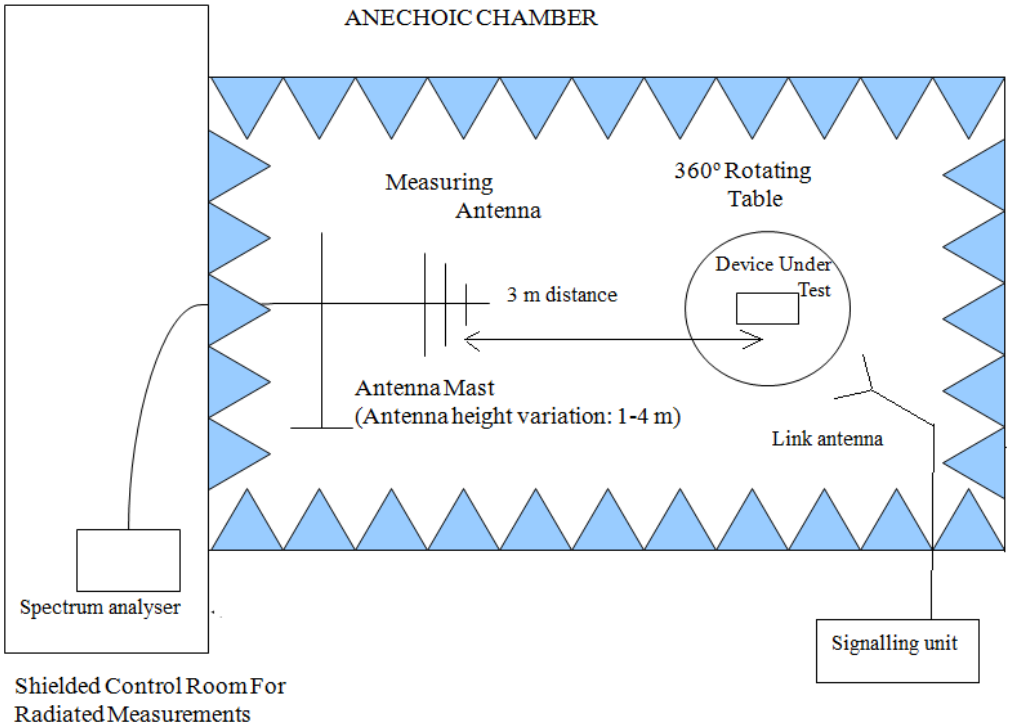
The maximum field strength (dBµV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$EIRP\ (dBm) = E\ (dB\mu V/m) + 20 \log(D) - 104.8;$$

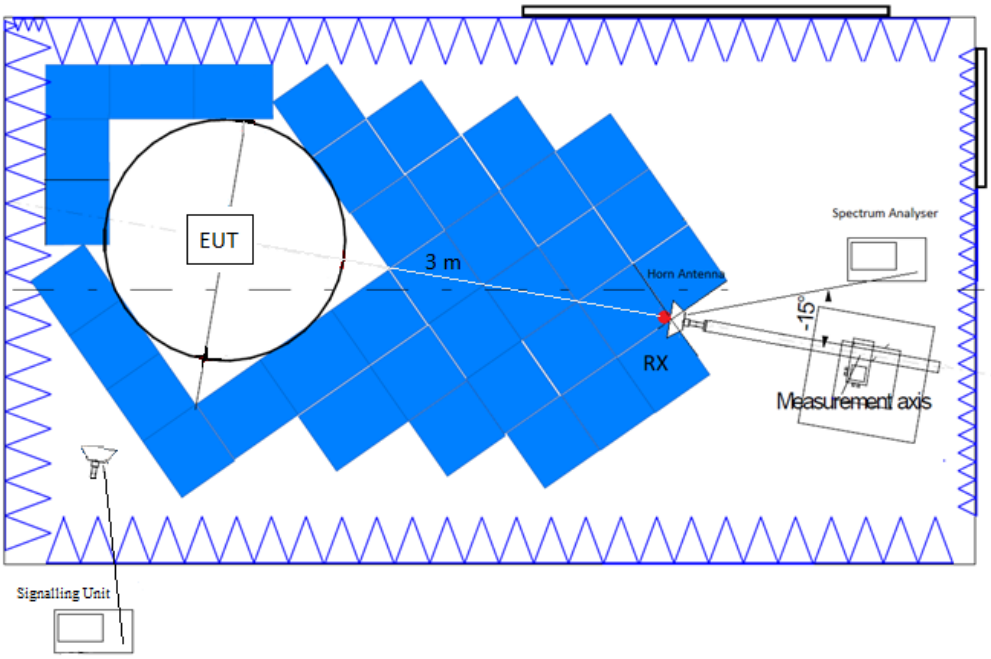
where D is the measurement distance (in the far field region) in m.

Test Setup

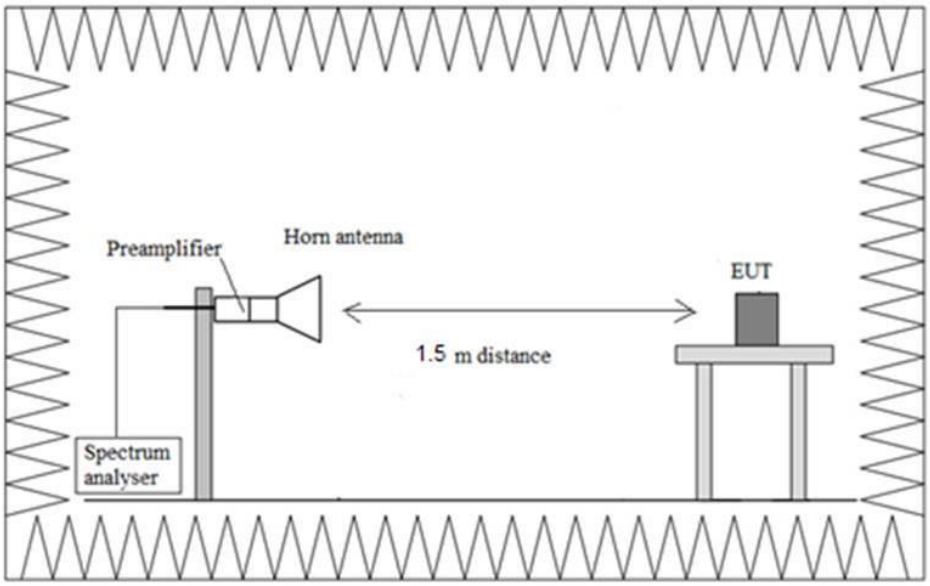
Radiated measurements below 1 GHz:



Radiated measurements above 1 GHz up to 17 GHz:



Radiated measurements above 17 GHz:



Results

LTE Cat-M1 Band 2:

A preliminary scan determined the BW=5 MHz, 16QAM, RB Size=1, RB Offset=0, Narrowband=0 as the worst case. The following results are for this worst-case configuration.

Frequency Range 30 MHz - 1 GHz:

- Low Channel:

No spurious signals were found at less than 20 dB below the limit.

- Middle Channel:

No spurious signals were found at less than 20 dB below the limit.

- High Channel:

No spurious signals were found at less than 20 dB below the limit.

Frequency Range 1 - 20 GHz:

- Low Channel:

No spurious signals were found at less than 20 dB below the limit.

- Middle Channel:

Spurious signals were found at less than 20 dB below the limit:

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Polarization
2401.562500	-17.39	-13.00	H

- High Channel:

Spurious signals were found at less than 20 dB below the limit:

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Polarization
2401.625000	-18.49	-13.00	H

Measurement uncertainty (dB)	<± 5.03 for f < 1 GHz <± 4.32 for f ≥ 1 GHz up to 17 GHz <± 4.58 for f ≥ 17 GHz up to 20 GHz

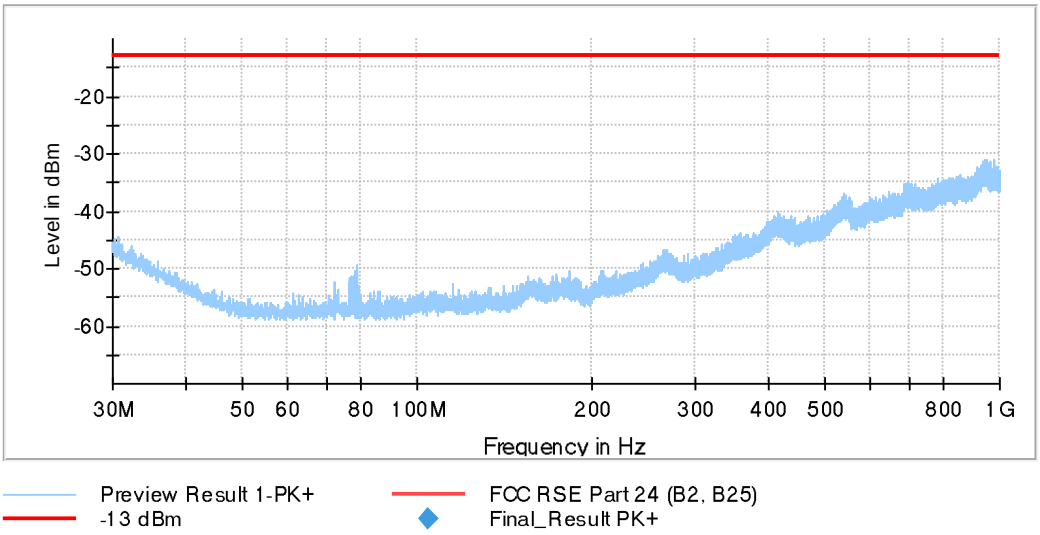
Verdict

Pass

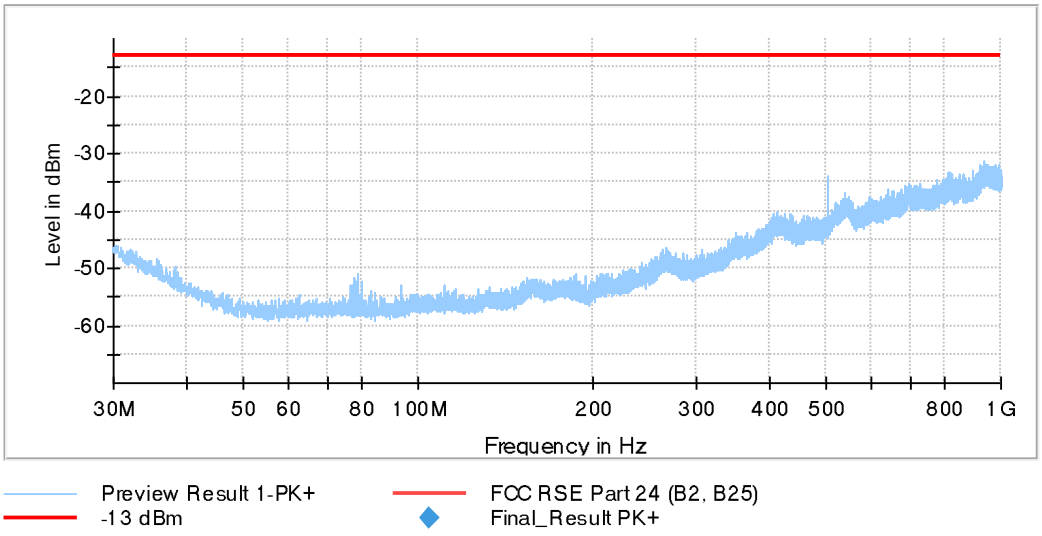
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30.312 kHz	PK+	100 kHz	Coupled	0 dB
1 GHz - 3 GHz	62.5 kHz	PK+	1 MHz	1 s	0 dB
3 GHz - 17 GHz	437.5 kHz	PK+	1 MHz	1 s	0 dB
17 GHz - 20 GHz	93.75 kHz	PK+	1 MHz	1 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz:

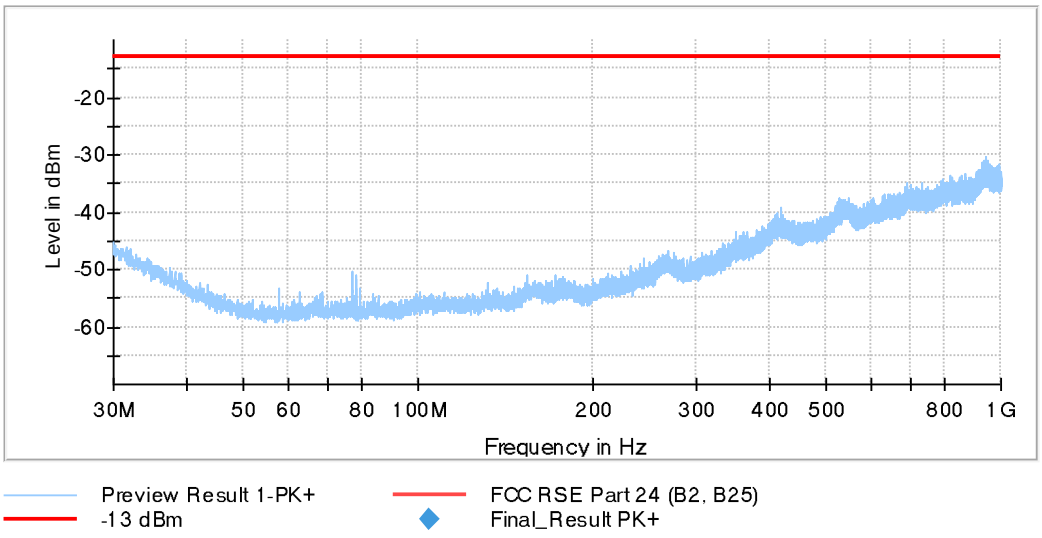
- Low Channel:



- Middle Channel:

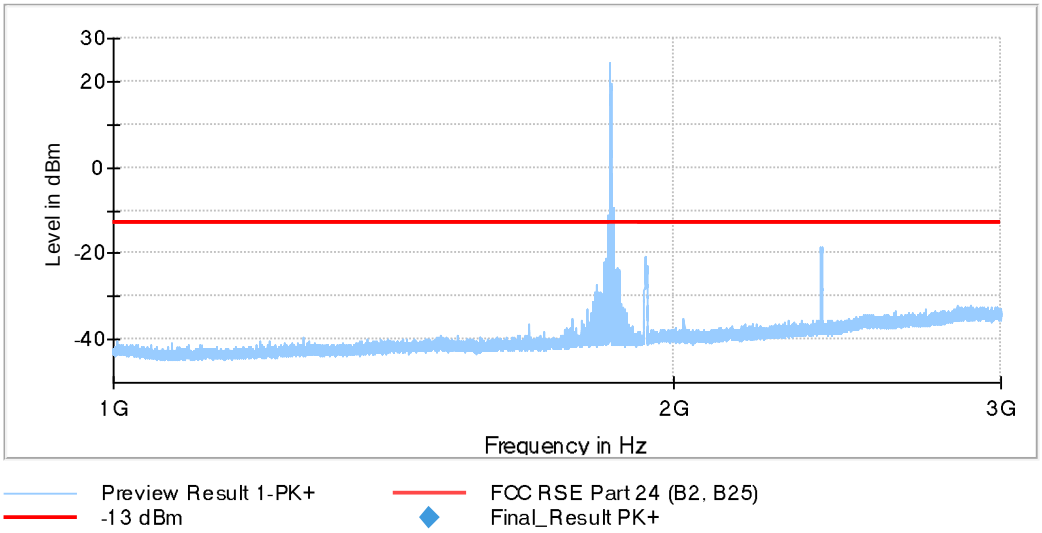


- High Channel:

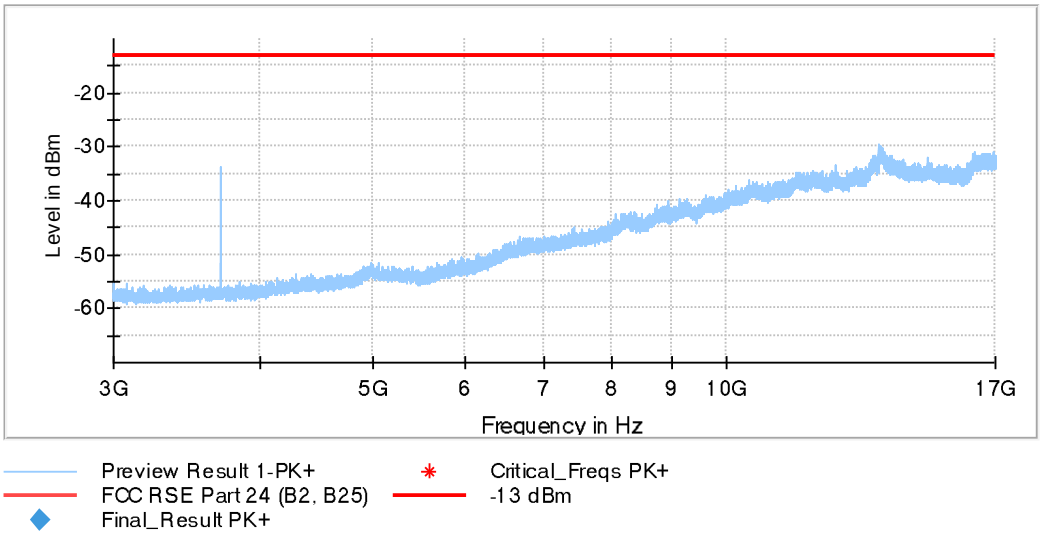


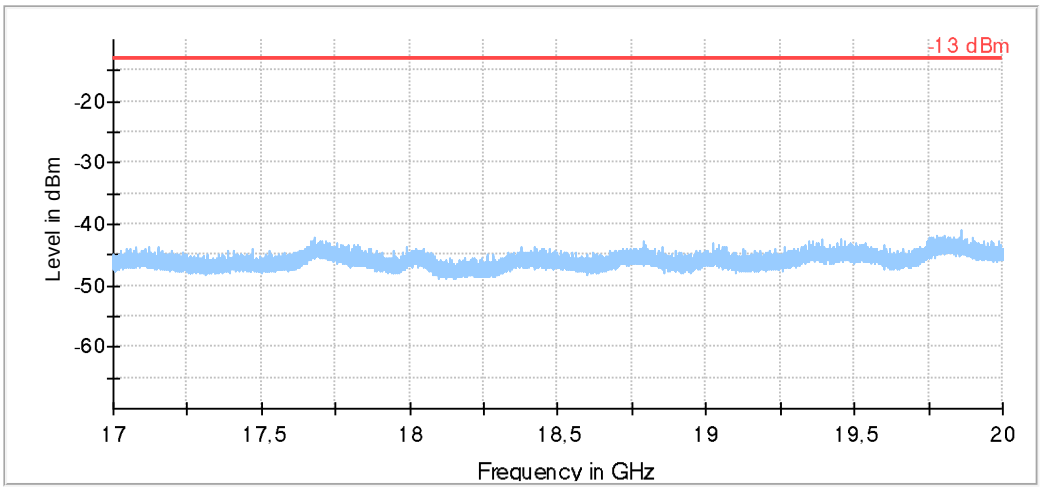
FREQUENCY RANGE 1 - 20 GHz:

- Low Channel:

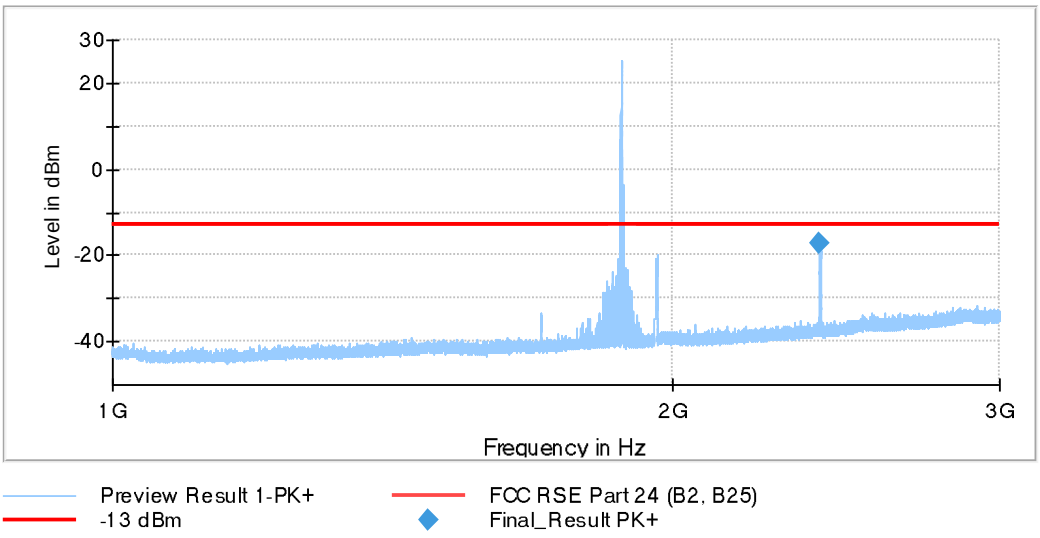


The peak above the limit is the carrier frequency.

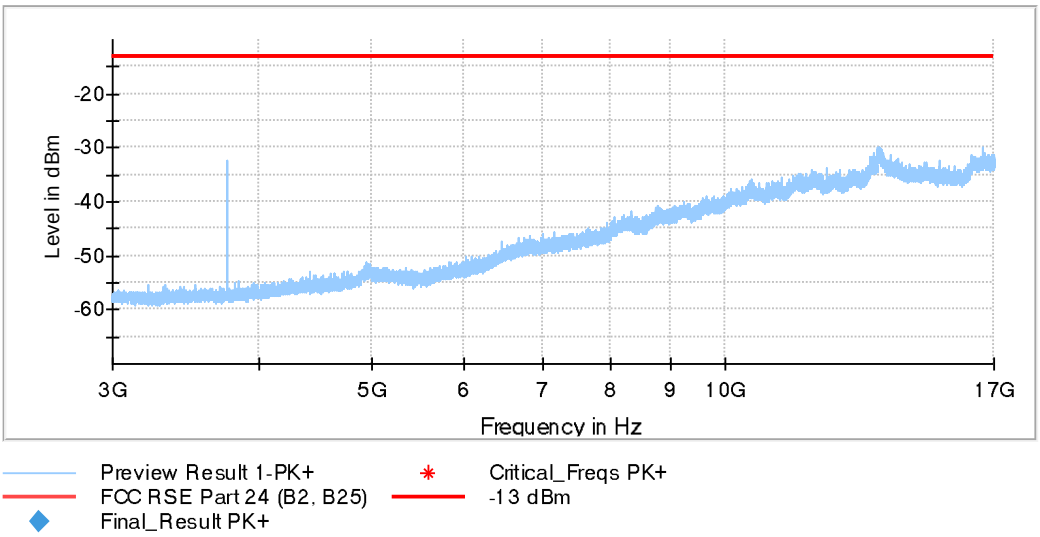


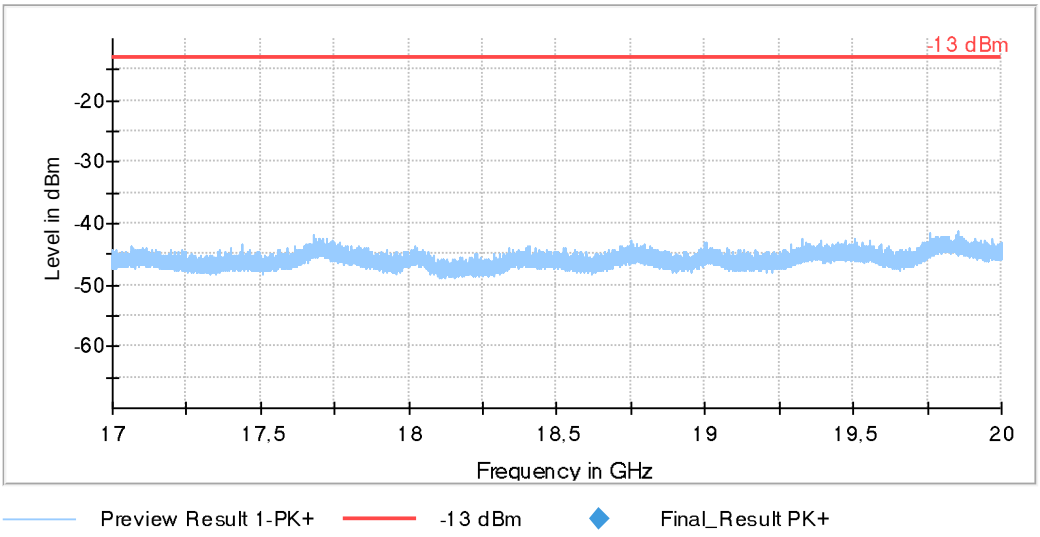


- Middle Channel:

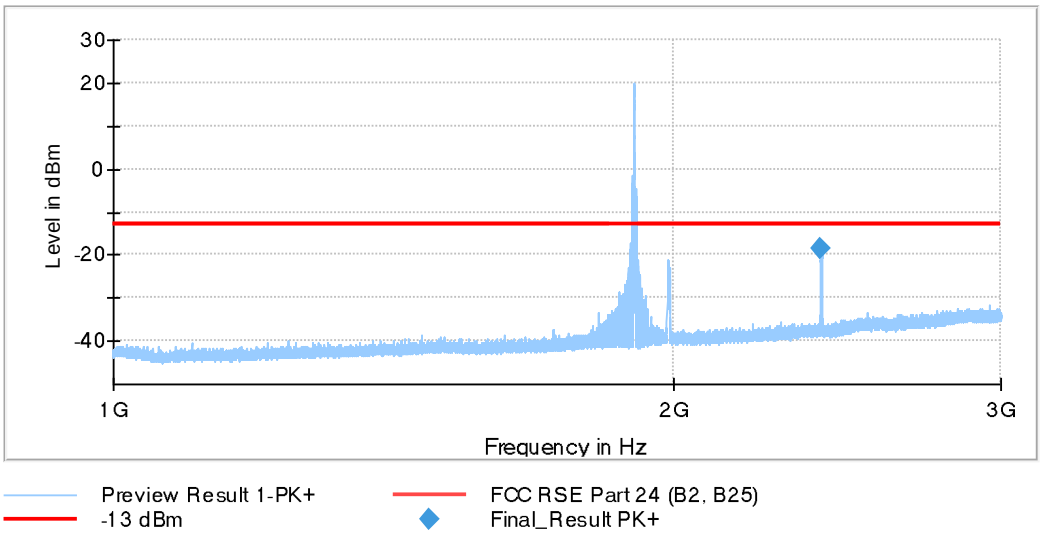


The peak above the limit is the carrier frequency.





- High Channel:



The peak above the limit is the carrier frequency.