

**FCC LISTED, REGISTRATION
NUMBER: 720267**

Test report No:

**IC LISTED REGISTRATION
NUMBER IC 4621A-1**

NIE: 43846RRF.001

Test report

REFERENCE STANDARD: USA FCC Part 22 & Part 24 CANADA IC RSS-132, RSS-133

Identificación del objeto ensayado.....: Identification of item tested	EGSM/GPRS Module
Marca Trade	Telit
Modelo y/o referencia tipo Model and /or type reference	GE866-QUAD
Other identification of the product	Commercial name: GE866-QUAD FCC ID: RI7GE866 IC: 5131A-GE866
Final HW version	1
Final SW version	16.01.200
IMEI TAC	356306059400094
Características Features	EGSM-GPRS cellular 850/1900 MHz, DC power supplied
Peticionario Applicant	TELIT COMMUNICATIONS SPA Viale Stazione di Prosecco 5/B, 34010 Sgonico (TS). Italy. VAT: 03711600266 Contact person: Antonino Sgroi Telephone: +39 0404192111 / Fax: +39 040 4192 383 e-mail: antonino.sgroi@telit.com
Método de ensayo solicitado, norma.....: Test method requested, standard	USA FCC Part 22 10-01-13 Edition: 22.917. Radiated emissions USA FCC Part 24 10-01-13 Edition: 24.238. Radiated emissions CANADA IC RSS-132 Issue 3, Jan. 2013. CANADA IC RSS-133 Issue 6, Jan. 2013. Measurement Guidance 971168 D01 v02r01 for certification of Licensed Digital Transmitters
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	A. Llamas RF Lab. Manager
Fecha de realización Date of issue	2014-11-17
Formato de informe No.: Report template No	FDT08_15

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Competences and guarantees

AT4 wireless is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

AT4 wireless is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621A-1.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless 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 AT4 wireless at the time of performance of the test.

AT4 wireless 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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of AT4 wireless.

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 AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the AT4 wireless internal document PODT000.

Usage of samples

Samples undergoing test have been selected by: **the client**.

Sample M/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
43846/003	EGSM GPRS module	GE866-QUAD	IMEI: 356306059400094	2014-10-21
43846/005	Test board	---	113990002537	2014-10-21
34074/013	Antenna	---	---	2011-10-27

1. Sample M/01 has undergone the test(s).
All radiated tests indicated in appendix A.

Test sample description

The test sample consists of a test board with EGPRS/GSM cellular module operating in the 850 MHz and 1900 MHz bands.

Test samples supplier

TELIT COMMUNICATIONS SPA

Viale Stazione di Prosecco 5/B, 34010 Sgonico (TS). Italy.

VAT: 03711600266

Contact person: Antonino Sgroi

Telephone: +39 0404192111 / Fax: +39 040 4192 383

e-mail: antonino.sgroi@telit.com

Testing period

The performed test started on 2014-10-31 and finished on 2014-11-03.

The tests have been performed at AT4 wireless.

Environmental conditions

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

Temperature	Min. = 21.66 °C Max. = 22.18 °C
Relative humidity	Min. = 43.65 % Max. = 44.32 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber the following limits were not exceeded during the test.

Temperature	Min. = 19.86 °C Max. = 20.20 °C
Relative humidity	Min. = 41.61 % Max. = 44.14 %
Air pressure	Min. = 1010 mbar Max. = 1014 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

Remarks and comments

1: Used instrumentation.

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2.	BiconicalLog antenna ETS LINDGREN 3142E	2014/03	2017/03
3.	Multi Device Controller EMCO 2090	N.A.	N.A.
4.	Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D	2013/11	2016/11
5.	SHF-EHF Horn antenna 15-40 GHz Schwarbeck BBHA 9170	2014/03	2017/03
6.	EMI Test Receiver R&S ESU 26	2013/08	2015/08
7.	Spectrum analyser Rohde & Schwarz FSW50	2013/10	2015/10
8.	RF pre-amplifier 10 MHz-6 GHz SCHWARZBECK BBV9743	2014/02	2015/02
9.	RF pre-amplifier 1-18 GHz Schwarbeck BBV 9718	2014/02	2015/02
10.	RF pre-amplifier BONN BLMA 1840-1M 18-40 GHz.	2014/02	2016/02
11.	Universal Radio communication Tester R&S CMU200	2014-02	2016-02

2. GSM mode has not been tested to prove USA FCC Part 22 and Part 24 and Canada IC RSS-132 and RSS-133 compliance because the modulation scheme and the power maximum levels are the same as for GPRS mode.

Taking into account the above comments, testing in GSM mode is redundant for FCC Parts 22 and Part 24 and IC RSS-132 and RSS-133 as it is the same as GPRS mode. GPRS mode has been tested as indicated on the present test report.

3. Test not requested.

Testing verdicts

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

FCC PART 22/IC RSS-132 PARAGRAPH	VERDICT			
	NA	P	F	NM
Clause 22.913/RSS-132 Clause 4.4: RF output power				NM ³
Clause 2.1047/RSS-132 Clause 4.2: Modulation characteristics				NM ³
Clause 22.355/RSS-132 Clause 4.3: Frequency stability				NM ³
Clause 2.1049: Occupied Bandwidth				NM ³
Clause 22.917/RSS-132 Clause 4.5: Spurious emissions at antenna terminals				NM ³
Clause 22.917/RSS-132 Clause 4.5: Radiated emissions		P		

3: See section "Remarks and comments".

FCC PART 24/IC RSS-133 PARAGRAPH	VERDICT			
	NA	P	F	NM
Clause 24.232/RSS-133 Clause 6.4: RF output power				NM ³
Clause 2.1047/RSS-133 Clause 6.2: Modulation characteristics				NM ³
Clause 24.235/RSS-133 Clause 6.3: Frequency stability				NM ³
Clause 2.1049: Occupied Bandwidth				NM ³
Clause 24.238/RSS-133 Clause 6.5: Spurious emissions at antenna terminals				NM ³
Clause 24.238/RSS-133 Clause 6.5: Radiated emissions		P		

3: See section "Remarks and comments".

Appendix A – Test result for FCC Part 22 & 24

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TEST RESULTS FOR FCC PART 22 AND IC RSS-132

TEST CONDITIONS

Power supply (V):

$$V_{\text{nom}} = 3.8 \text{ Vdc}$$

$$V_{\text{max}} = \text{N/A}$$

$$V_{\text{min}} = \text{N/A}$$

The subscripts nom, min and max indicate voltage test conditions (nominal, minimum and maximum respectively, as declared by the applicant).

N/A: Not Applicable

Type of power supply = DC Voltage from external power supply

Type of antenna = External connectable antenna

TEST FREQUENCIES:

Lowest channel (128): 824.2 MHz

Middle channel (190): 836.6 MHz

Highest channel (251): 848.8 MHz

Radiated emissions

SPECIFICATION

§ 22.917

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 highest frequency generated within the equipment.

The EUT was placed on a 1 meter high non-conductive stand at a 3 meters 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. The radiated emissions were measured with peak detector and 1 MHz bandwidth.

Each detected emission is substituted by the Substitution method, in accordance with the ANSI/TIA/EIA-603-C: 2004.

Measurement Limit:

According to specification, 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.

At P_o transmitting power, the specified minimum attenuation becomes $43 + 10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

RESULTS

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

Frequency range 1 GHz-12.75 GHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

Frequency range 1 GHz-12.75 GHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST

Frequency range 30 MHz-1000 MHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

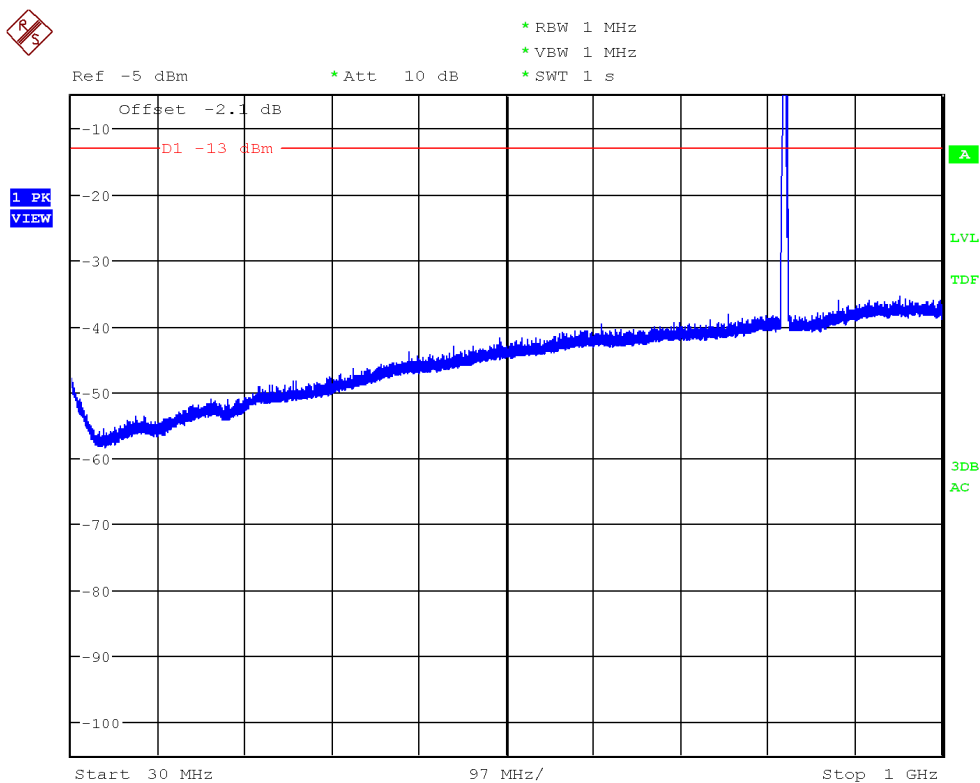
Frequency range 1 GHz-12.75 GHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

Verdict: PASS

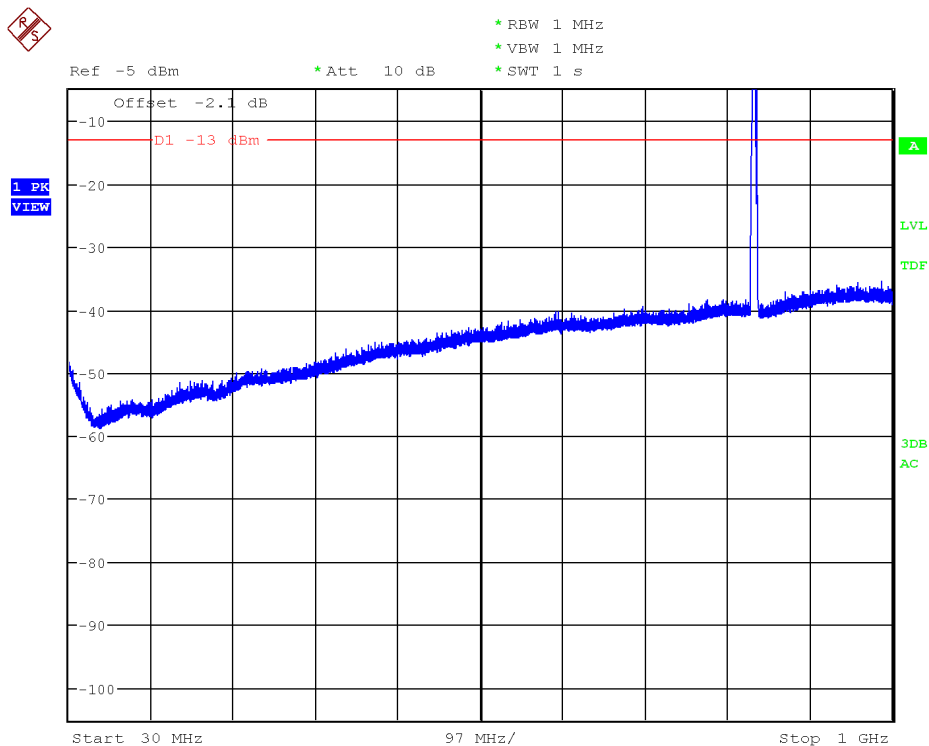
FREQUENCY RANGE 30 MHz-1000 MHz.

CHANNEL: LOWEST



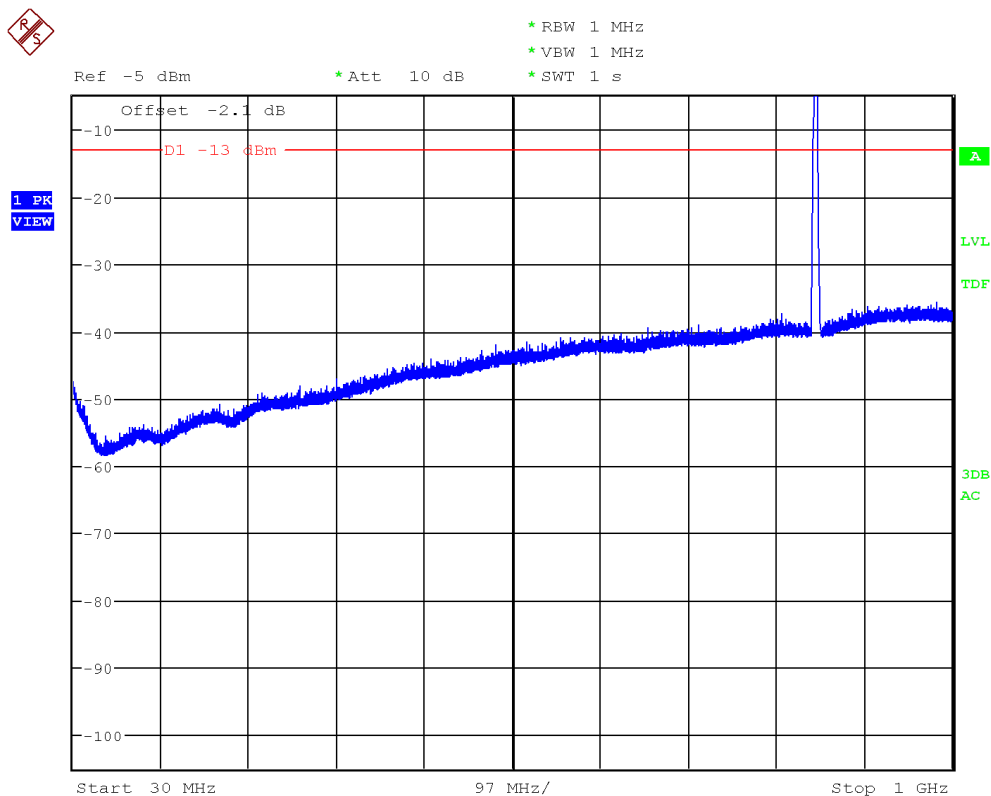
Note: The peak above the limit is the carrier frequency.

CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

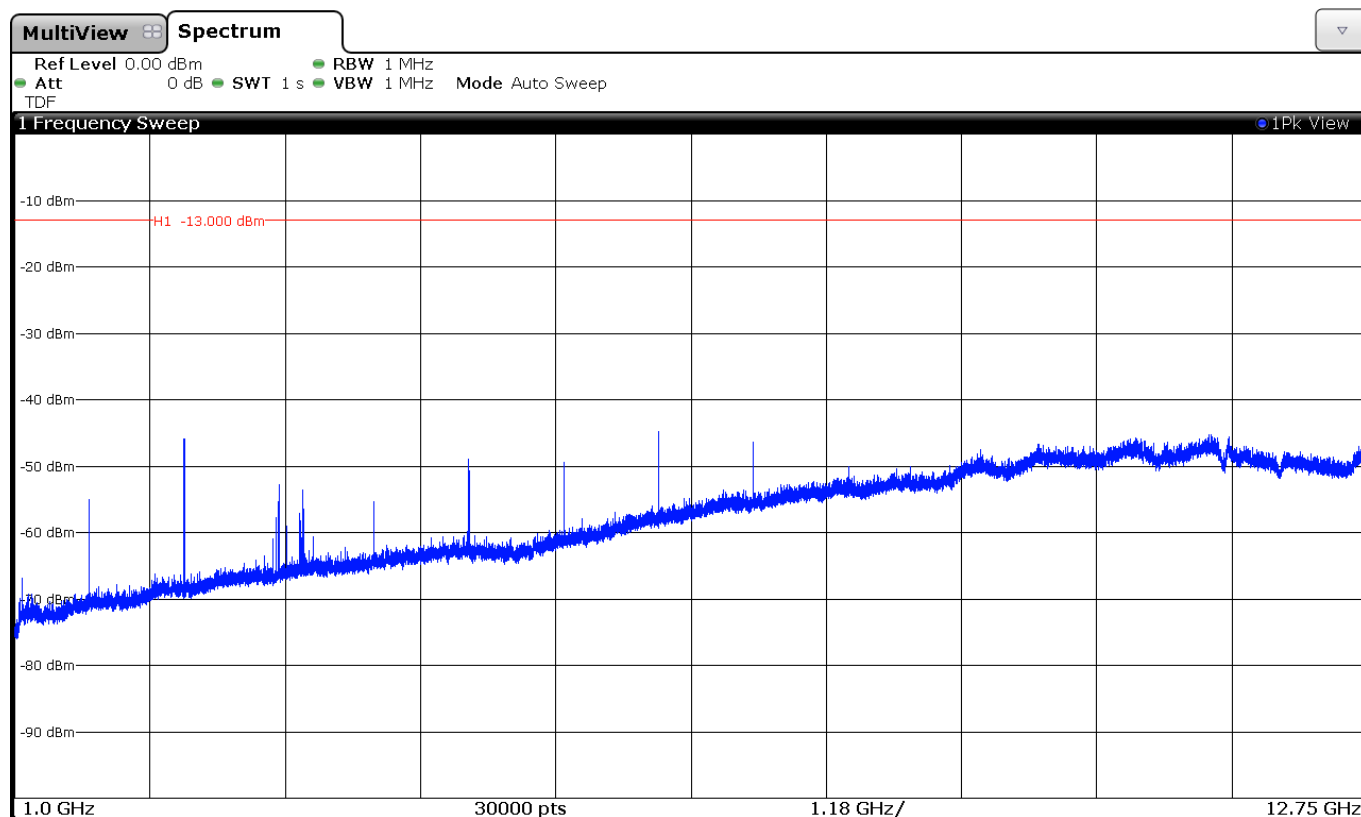
CHANNEL: HIGHEST



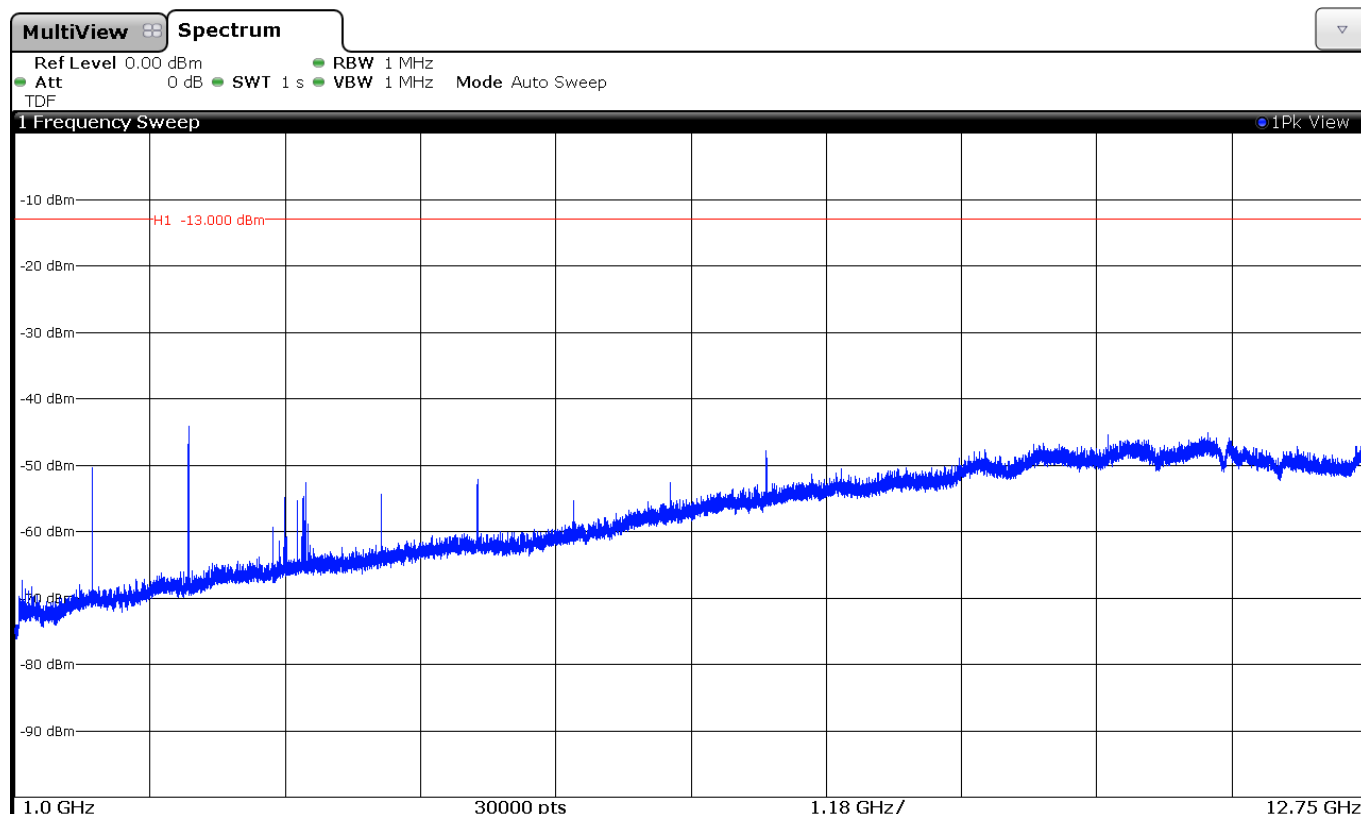
Note: The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 GHz to 12.75 GHz.

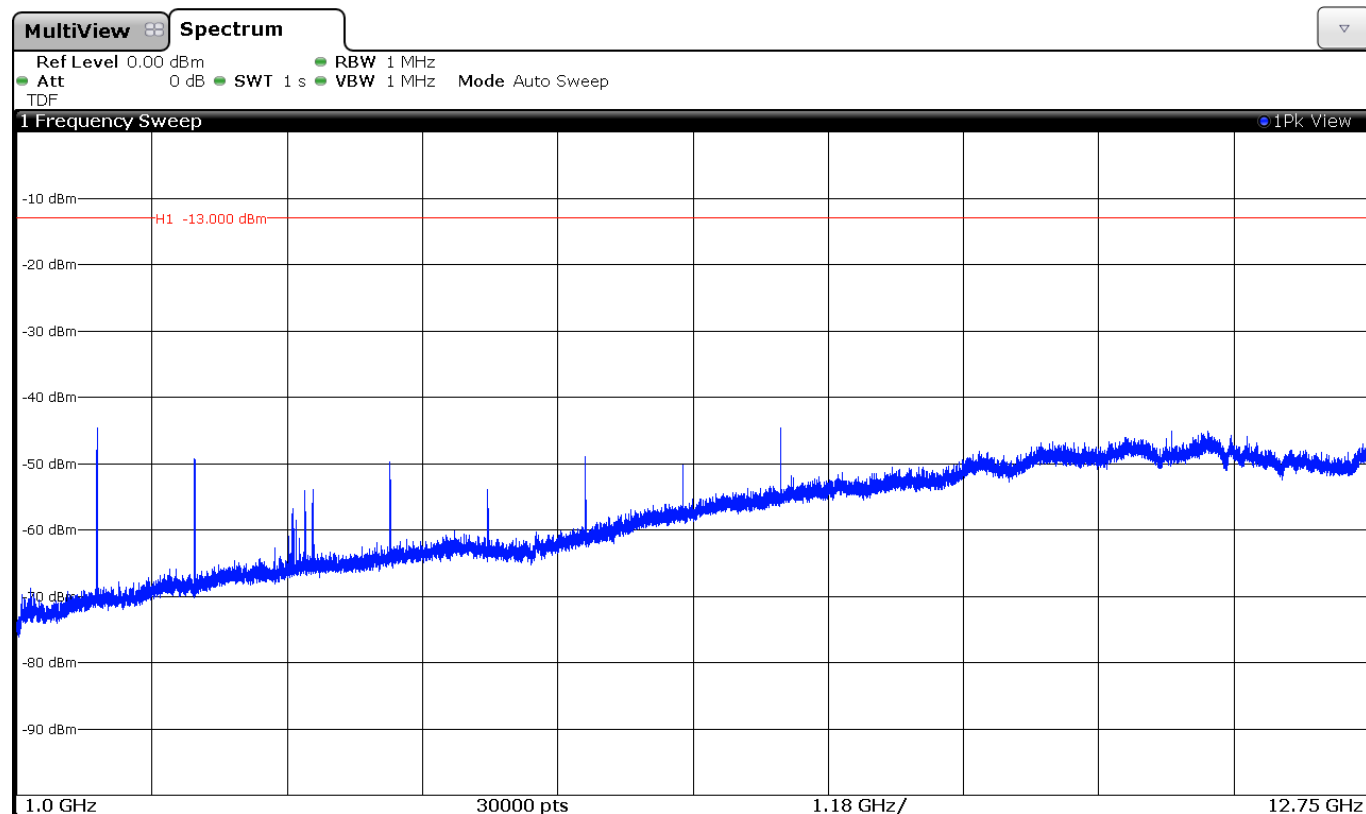
CHANNEL: LOWEST



CHANNEL: MIDDLE



CHANNEL: HIGHEST



TEST RESULTS FOR FCC PART 24 AND RSS-133

TEST CONDITIONS

Power supply (V):

$$V_{\text{nom}} = 3.8 \text{ Vdc}$$

$$V_{\text{max}} = \text{N/A}$$

$$V_{\text{min}} = \text{N/A}$$

The subscripts nom, min and max indicate voltage test conditions (nominal, minimum and maximum respectively, as declared by the applicant).

N/A: Not Applicable

Type of power supply = DC Voltage from external power supply

Type of antenna = External connectable antenna

TEST FREQUENCIES:

Lowest channel (512): 1850.2 MHz

Middle channel (662): 1880.2 MHz

Highest channel (810): 1909.8 MHz

Radiated emissions

SPECIFICATION

§ 24.238

METHOD

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a 1 meter high 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. The radiated emissions were measured with peak detector and 1 MHz bandwidth.

Each detected emissions were substituted by the Substitution method, in accordance with the ANSI/TIA/EIA-603-C: 2004.

Measurement Limit:

According to specification, 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.

At P_o transmitting power, the specified minimum attenuation becomes $43 + 10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

RESULTS

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.

No spurious signals were found in all the range.

Frequency range 1 GHz-20 GHz.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.

No spurious signals were found in all the range.

Frequency range 1 GHz-20 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain Gi (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
5640.75	-35.93	Vertical	-37.08	7.38	13.20	-31.26

3. CHANNEL: HIGHEST

Frequency range 30 MHz-1000 MHz.

No spurious signals were found in all the range.

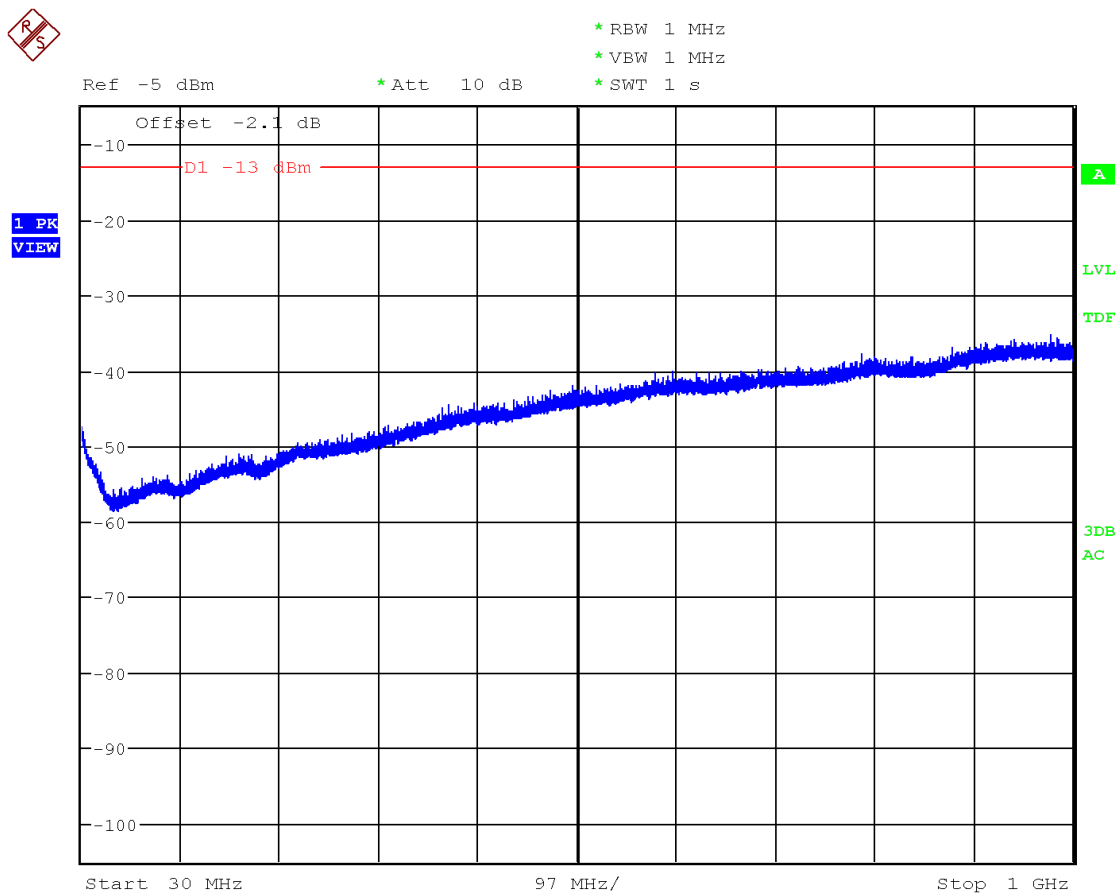
Frequency range 1 GHz-20 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain Gi (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
5729.25	-36.41	Vertical	-37.56	7.38	13.20	-31.74

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

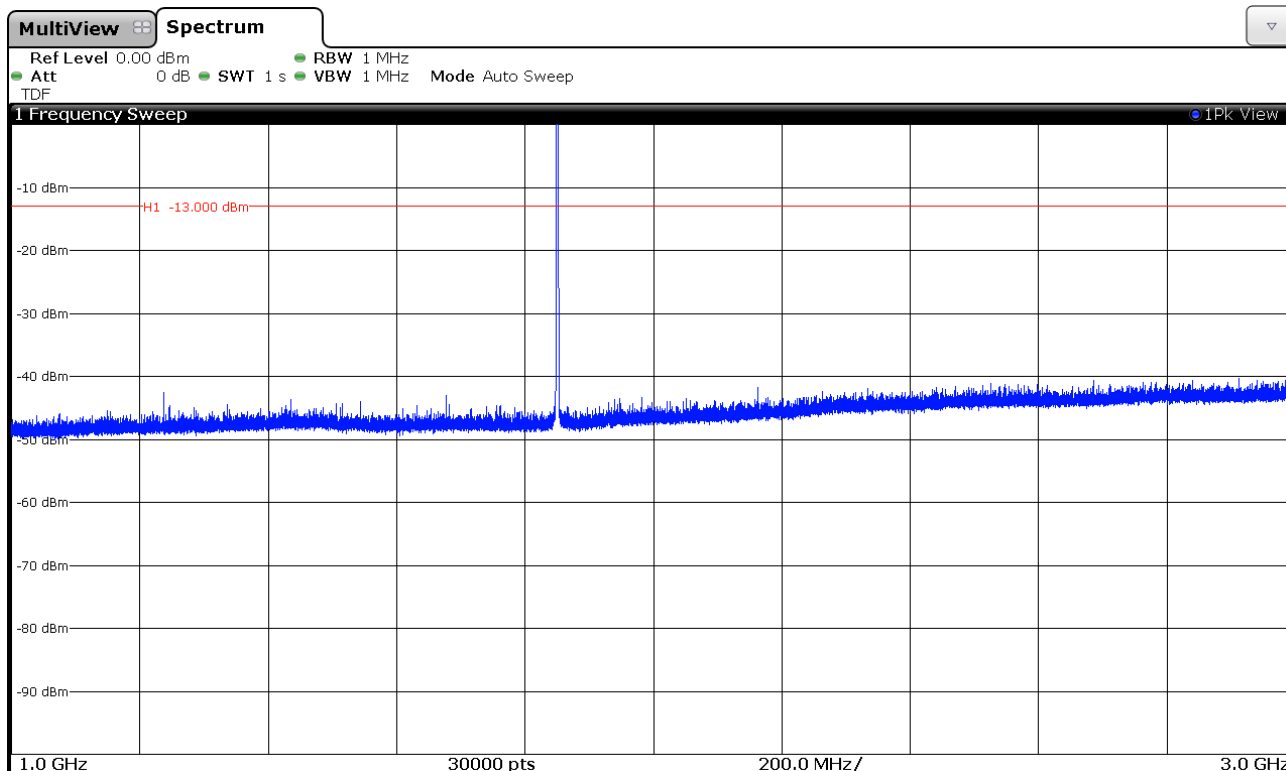


(This plot is valid for all three channels)

FREQUENCY RANGE 1 GHz to 3 GHz.

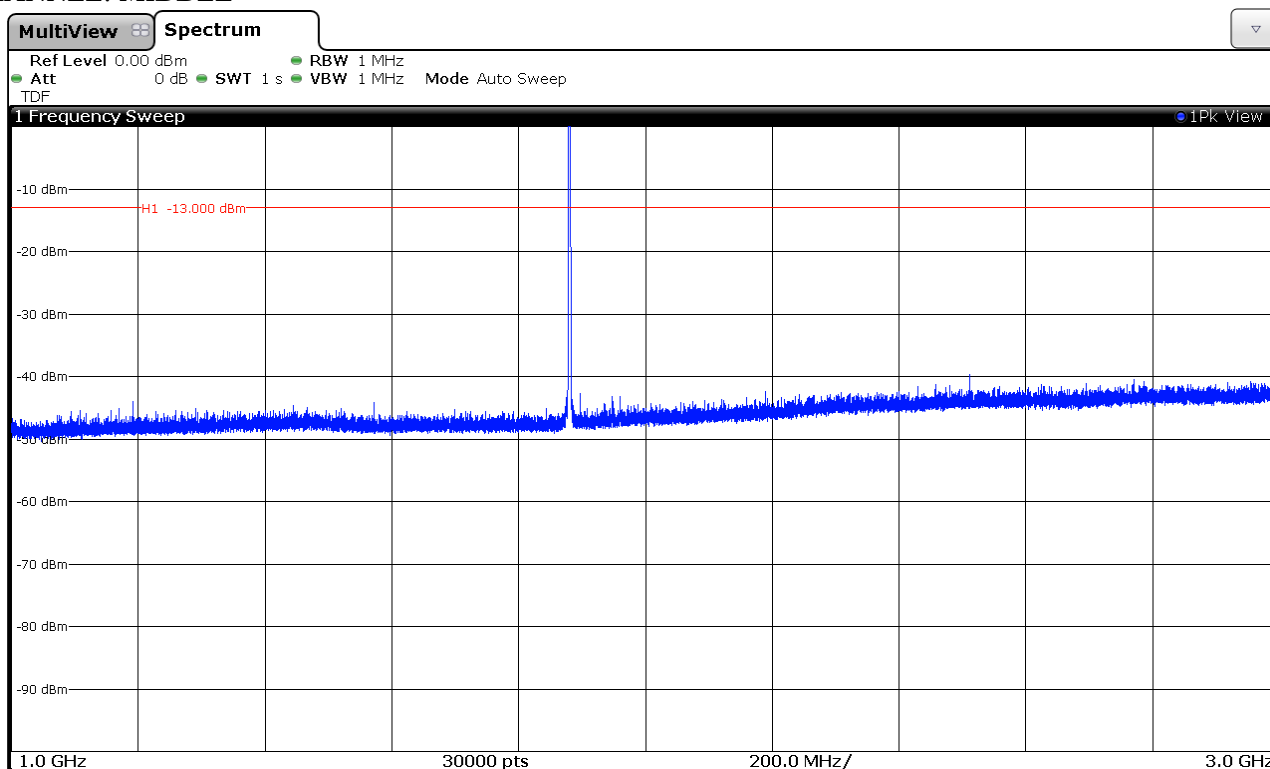
GPRS MODULATION

CHANNEL: LOWEST



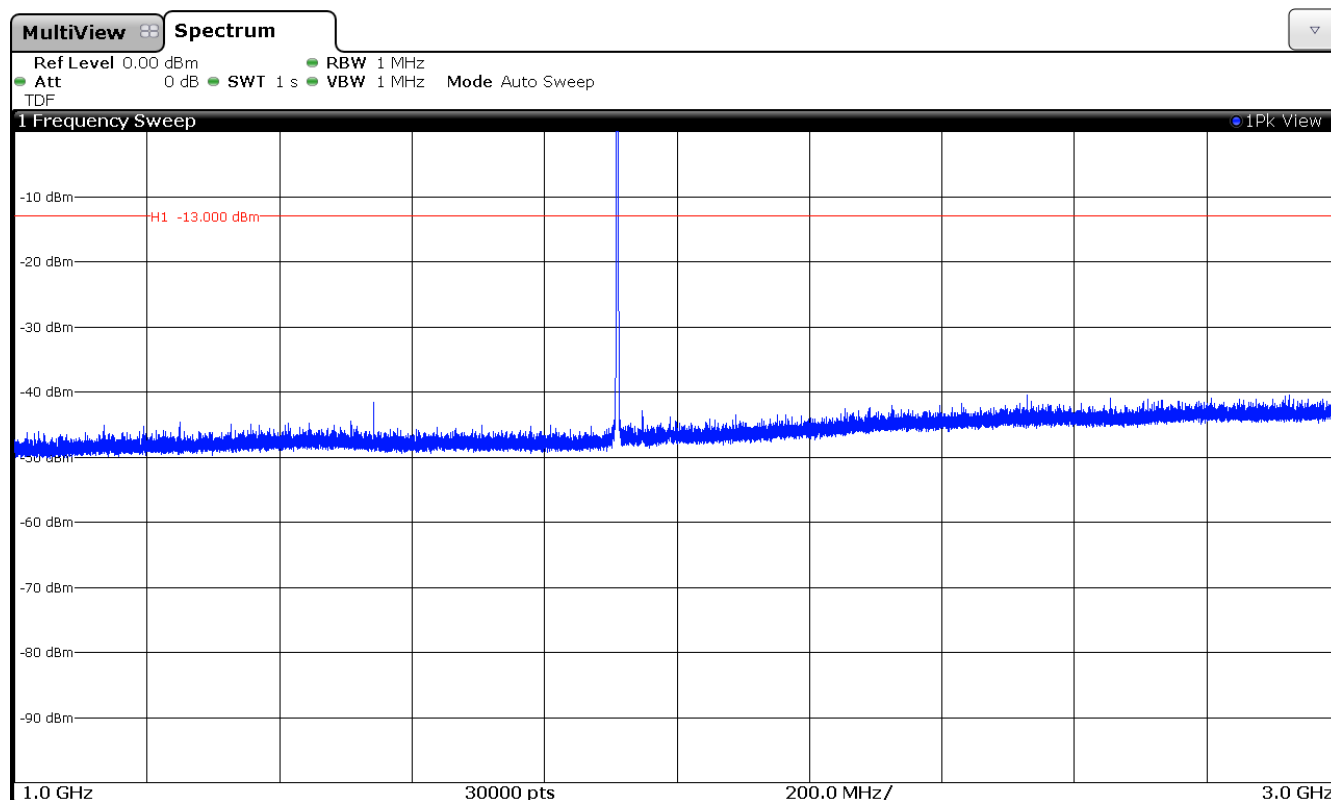
Note: The peak above the limit is the carrier frequency.

CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

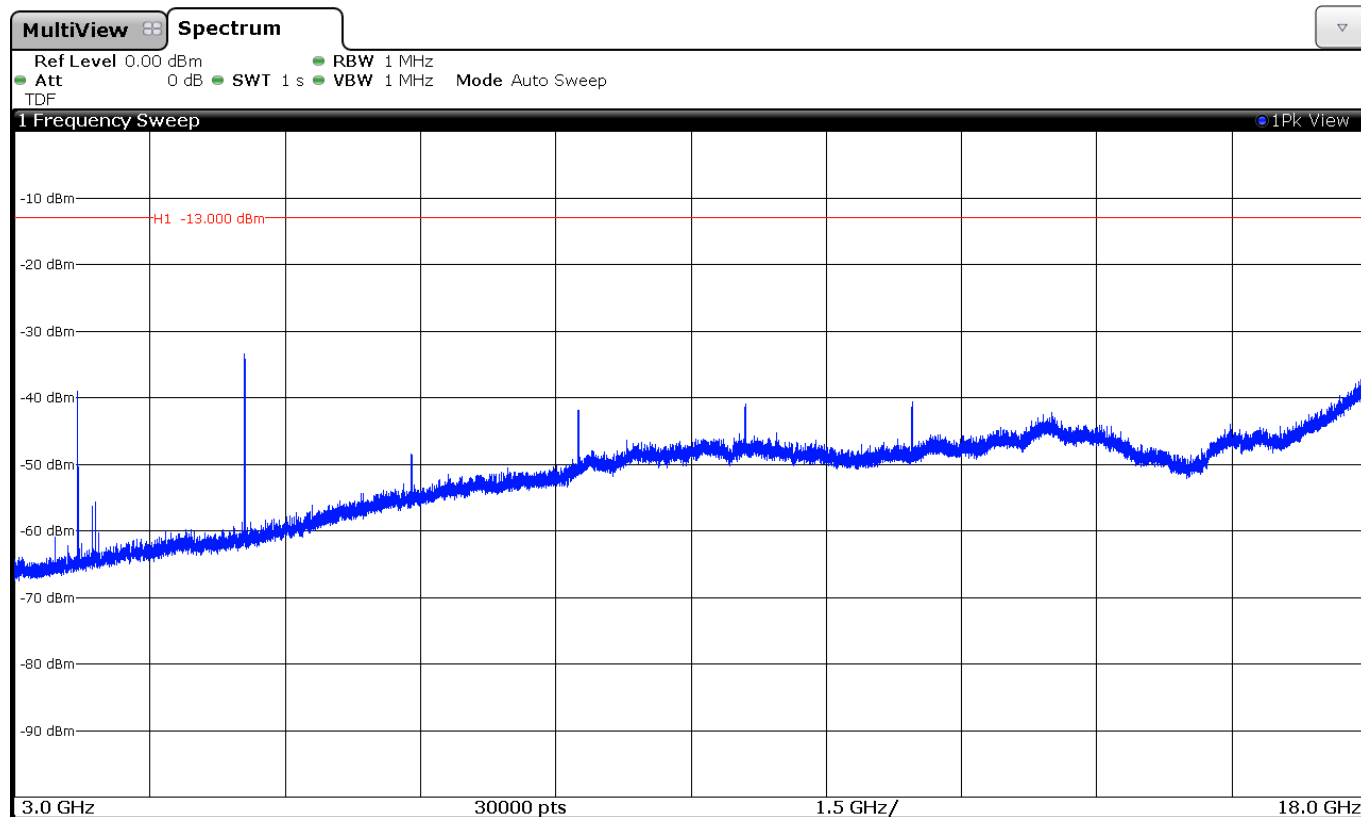
CHANNEL: HIGHEST



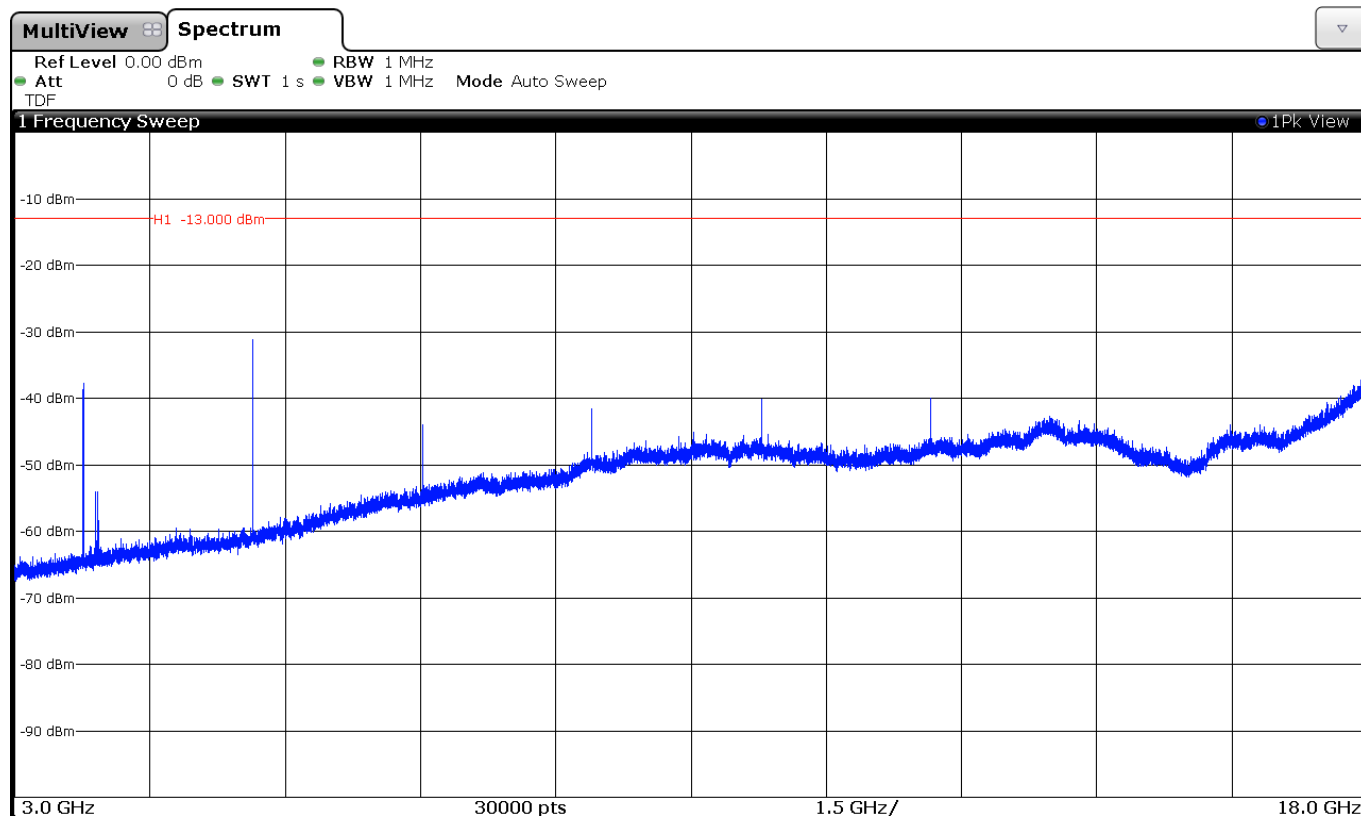
Note: The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 GHz to 18 GHz.

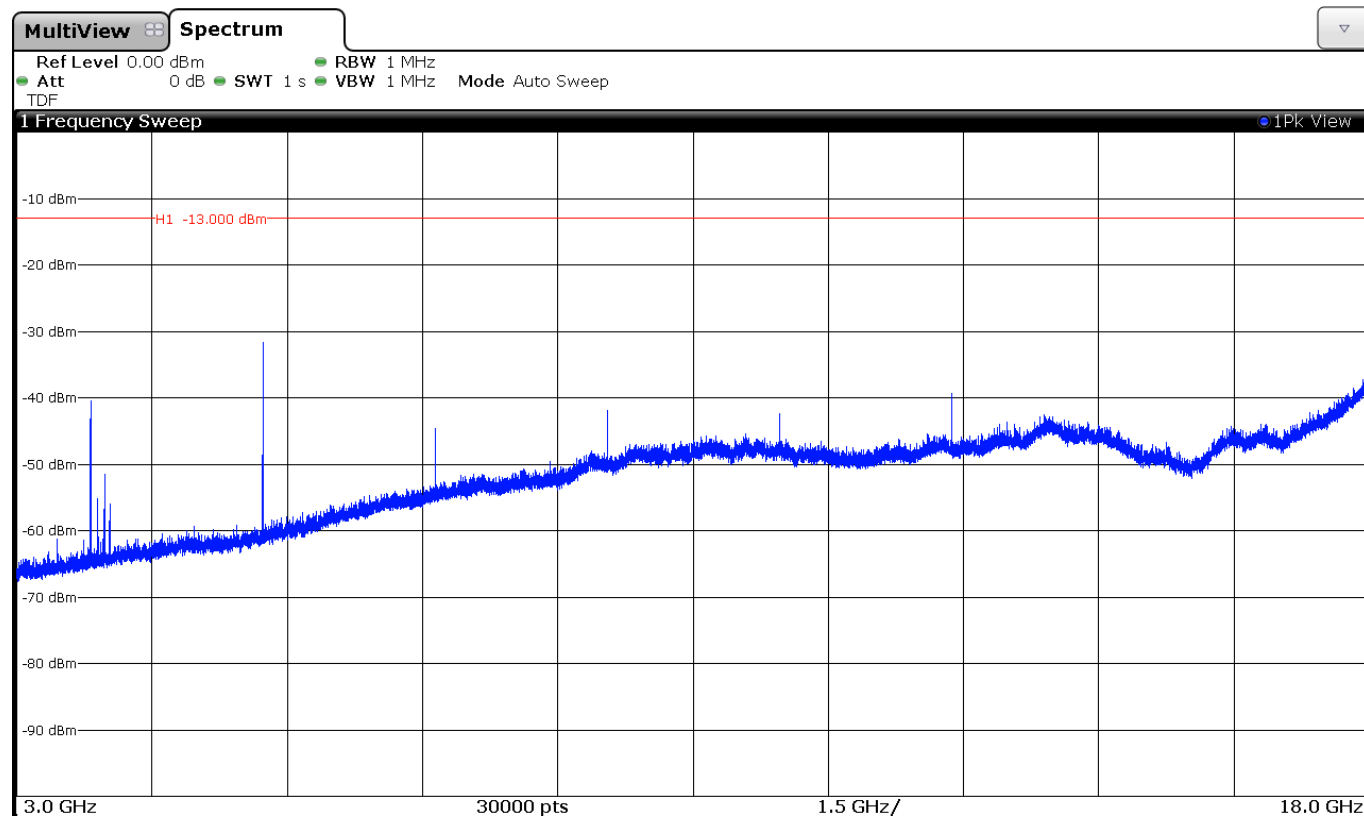
CHANNEL: LOWEST



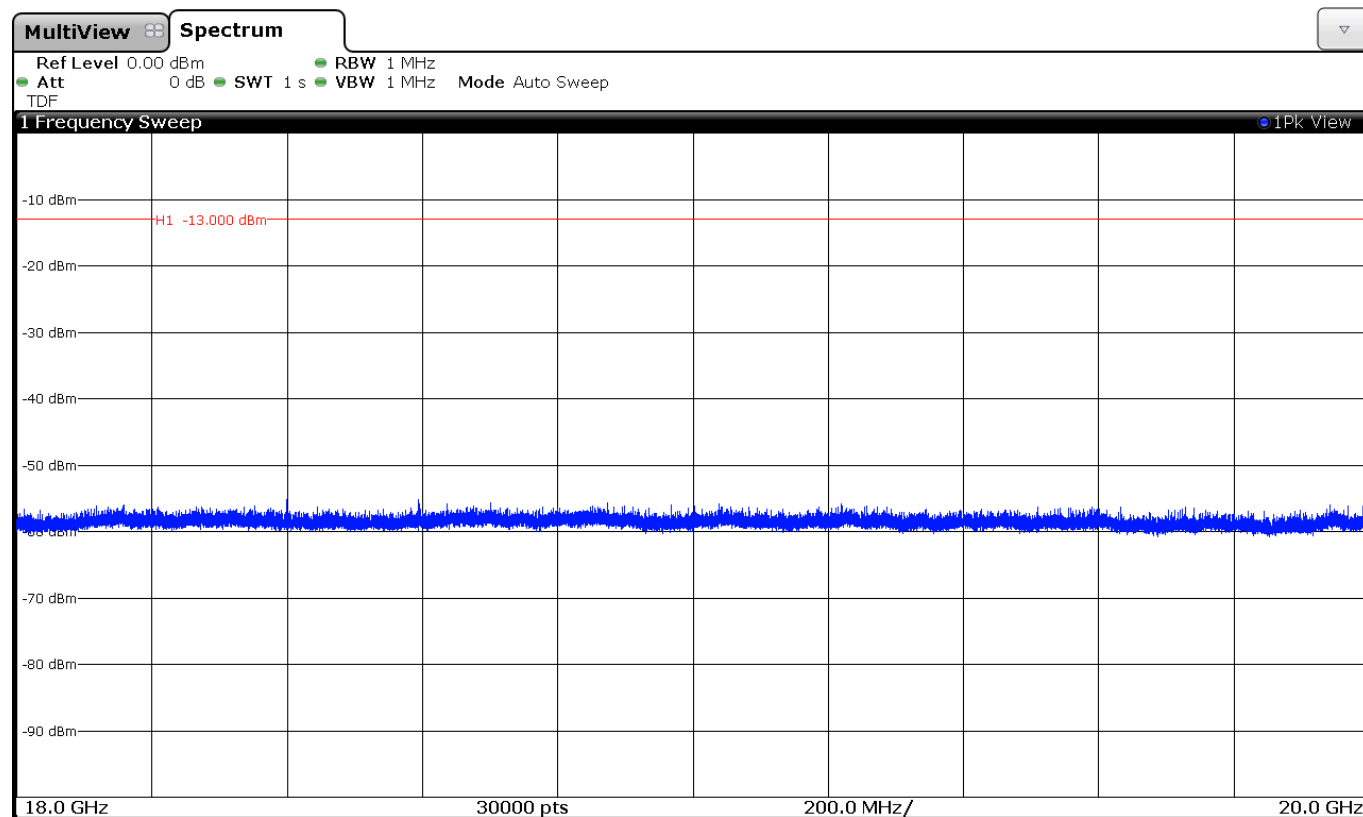
CHANNEL: MIDDLE



CHANNEL: HIGHEST



FREQUENCY RANGE 18 GHz TO 20 GHz.



(This plot is valid for all three channels)