



Test report No:
NIE: 61815RRF.001

Partial Test report

REFERENCE STANDARD:

USA FCC Part 22 & Part 24 & Part 27

CANADA RSS-130, RSS-132, RSS-133, RSS-139 &
RSS-199

(*) Identification of item tested	Tablet with WiFi/BT and Cellular connectivity
(*) Trademark	HP
(*) Model and /or type reference tested	HSN-C04C
Other identification of the product	FCC ID: B94HNC04PKCP2 IC: 466X-HNC04PK
(*) Features	Data not provided
Manufacturer	HP Inc. 1501 Page Mill Road Palo Alto, CA 94304, USA.
Test method requested, standard	USA FCC Part 22 10-1-18 Edition. USA FCC Part 24 10-1-18 Edition. USA FCC Part 27 10-1-18 Edition. CANADA RSS-130 Issue 1, Oct. 2013. CANADA RSS-132 Issue 3, Jan. 2013. CANADA RSS-133 Issue 6, Jan. 2013. CANADA RSS-139 Issue 3, Jul. 2015. CANADA RSS-199 Issue 3, Dec. 2016. ANSI C63.26-2015. ANSI/TIA-603-E: 2016. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	A. Llamas RF Lab. Manager
Date of issue	2019-07-18

Report template No	FDT08_22 (*) "Data provided by the client"
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Competences and guarantees

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DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

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Uncertainty

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

Data provided by the client

The sample consists of a tablet with WiFi/BT and Cellular connectivity.

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".

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.

Usage of samples

Samples undergoing test have been selected by: the client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
61815C/001	Tablet with WiFi/BT and Cellular connectivity	HSN-C04C	E5400348200052	2019-06-17
61815C/002	Keyboard tablet	---	---	2019-06-17
61815C/003	AC/DC power supply	---	---	2019-06-17
61815C/004	Power supply cable	---	---	2019-06-17

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

All radiated tests on WCDMA bands indicated in Appendixes A, B and C.

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
61815C/005	Tablet with WiFi/BT and Cellular connectivity	HSN-C04C	EPM200010016	2019-07-03
61815C/006	Keyboard tablet	---	---	2019-07-03
61815C/007	AC/DC power supply	---	---	2019-07-03
61815C/008	Power supply cable	---	---	2019-07-03

1. Sample S/02 has undergone the following test(s):

All radiated tests on LTE bands indicated in Appendixes A, B and C.

Test sample description

Ports..... :	Port name and description	Cable		
		Specified length [m]	Attached during test	Shielded
			☐	☐
			☐	☐
			☐	☐
			☐	☐

Supplementary information to the ports.....:	N/A						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐ AC:	☐	☐	☐	☐	☐	☐
☐ DC:							
Rated Power							
Clock frequencies.....:							
Other parameters							
Software version							
Hardware version							
Dimensions in cm (L x W x D).....:							
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	
	N/A						
Accessories (not part of the test item)	Description		Type			Manufacturer	
Documents as provided by the applicant	Description		File name			Issue date	

Identification of the client

HP Inc.
1501 Page Mill Road Palo Alto, CA 94304, USA.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-06-23
Date (finish)	2019-07-09

Document history

Report number	Date	Description
61815RRF.001	2019-07-18	First release

Environmental conditions

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

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

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The Tablet supports only UMTS and LTE, without UL carrier aggregation. The applicable frequency bands and operating modes are identified in the following table, where North America bands are shown in bold.

Mode	Bands	Supportes TX Mode			
		WCDMA	HSDPA	HSUPA	DC-HSDPA
WCDMA / HSPA +	FDD II (1850 to 1910 MHz)	X	X	X	X
	FDD IV (1710 to 1755 MHz)	X	X	X	X
	FDD V (824 to 849 MHz)	X	X	X	X
	FDD VIII (888 to 915 MHz)	X	X	X	X

Mode	Bands	Supportes Channel Bandwidth (MHz)					
		1.4	3	5	10	15	20
LTE FDD	Band 2 (1850 to 1910 MHz)	X	X	X	X	X	X
	Band 4 (1710 to 1755 MHz)	X	X	X	X	X	X
	Band 5 (824 to 849 MHz)	X	X	X	X		
	Band 7 (2500 to 2570 MHz)			X	X	X	X
	Band 12 (699 to 716 MHz)	X	X	X	X		
	Band 13 (777 to 787 MHz)			X	X		
	Band 14 (788 to 798 MHz)			X	X		
	Band 17 (704 to 716 MHz)			X	X		
	Band 18 (815 to 830 MHz)			X	X	X	
	Band 19 (830 to 845 MHz)			X	X	X	
	Band 25 (1850 to 1915 MHz)	X	X	X	X	X	X
	Band 26 (814 to 849 MHz)	X	X	X	X	X	
	Band 28 (703 to 748 MHz)		X	X	X	X	X
	Band 30 (2305 to 2315 MHz)			X	X		
	Band 66 (1710 to 1780 MHz)	X	X	X	X	X	X
LTE TDD	Band 38 (2570 to 2620 MHz)			X	X	X	X
	Band 40 (2300 to 2400 MHz)			X	X	X	X
	Band 41 (2496 to 2690 MHz)			X	X	X	X

The manufacturer declared that the worst cases were WCDMA II, IV, V and LTE 4, 12, 13, 25, 26, 41.

The tests have been performed by the technical personnel: Nicolas Salguero, Francisco J. Alcaide, Ignacio Cabra and Jose Carlos Luque.

Used instrumentation:

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2.	Multi Device Controller EMCO 2090	N.A.	N.A.
3.	AC Power Supply California Instruments 5001iM-400	2018/11	2020/11
4.	EMI Test Receiver ROHDE AND SCHWARZ ESR7	2017/08	2019/08
5.	RF Pre-amplifier, 38 dB, 30 MHz-6 GHz BONN ELEKTRONIK BLNA 0360-01N	2018/07	2019/07
6.	Biconical/Log Antenna 30 MHz-6 GHz ETS LINDGREN 3142E	2018/07	2021/07
7.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
8.	Pre-amplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-1M	2019/04	2020/04
9.	Broadband Horn antenna 1-18GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2016/11	2019/11
10.	Broadband Horn antenna 18-40GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07
11.	RF Pre-amplifier G>30dB, 18-40GHz BONN ELEKTRONIK BLMA 1840-1M	2018/02	2020/02
12.	Wideband Radio Communication Tester R&S CMW500	2019/02	2020/02
13.	Universal Communication Tester R&S CMU200	2018/07	2019/07

Testing verdicts

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

Summary

FCC PART 22/CANADA RSS-132 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 22.913/RSS-132 Clause 5.4: RF output power	N/M	(2)
Clause 2.1047/RSS-132 Clause 5.2: Modulation characteristics	N/M	(2)
Clause 22.355/RSS-132 Clause 5.3: Frequency stability	N/M	(2)
Clause 2.1049: Occupied Bandwidth	N/M	(2)
Clause 22.917/RSS-132 Clause 5.5: Spurious emissions at antenna terminals	N/M	(2)
Clause 22.917/RSS-132 Clause 5.5: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u> (1) HSDPA modulation mode has not been tested to prove USA FCC Part 22 and Part 24 compliance because it is an improved mode of operation only for Downlink (UE reception), but using the normal WCDMA mode for UL (Up Link, UE transmission). Therefore HSDPA has no associated a Power class or modulation scheme different than WCDMA mode for the UL transmission. Taking into account the above comments, testing in HSDPA modulation mode is redundant for FCC Part 22 and Part 24 as it is the same as WCDMA mode as long as UE transmission is concerned. WCDMA modulation mode has been tested as indicated on the present test report. (2) Test not requested.		

FCC PART 24/CANADA RSS-133 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 24.232/RSS-133 Clause 6.4: RF output power	N/M	(2)
Clause 2.1047/RSS-133 Clause 6.2: Modulation characteristics	N/M	(2)
Clause 24.235/RSS-133 Clause 6.3: Frequency stability	N/M	(2)
Clause 2.1049: Occupied Bandwidth	N/M	(2)
Clause 24.238/RSS-133 Clause 6.5: Spurious emissions at antenna terminals	N/M	(2)
Clause 24.238/RSS-133 Clause 6.5: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u> (1) HSDPA modulation mode has not been tested to prove USA FCC Part 22 and Part 24 compliance because it is an improved mode of operation only for Downlink (UE reception), but using the normal WCDMA mode for UL (Up Link, UE transmission). Therefore HSDPA has no associated a Power class or modulation scheme different than WCDMA mode for the UL transmission. Taking into account the above comments, testing in HSDPA modulation mode is redundant for FCC Part 22 and Part 24 as it is the same as WCDMA mode as long as UE transmission is concerned. WCDMA modulation mode has been tested as indicated on the present test report. (2) Test not requested.		

FCC PART 27/CANADA RSS-130 /CANADA RSS-139/CANADA RSS-199 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 27.50 / RSS-139 Clause 6.5. / RSS-130 Clause 4.4. / RSS-199 Clause 4.4: RF output power	N/M	(1)
Clause 2.1047 / RSS-139 Clause 6.2. / RSS-130 Clause 4.1./ RSS-199 Clause 4.1: Modulation characteristics	N/M	(1)
Clause 27.54 / RSS-139 Clause 6.4. / RSS-130 Clause 4.3. / RSS-199 Clause 4.3: Frequency stability	N/M	(1)
Clause 2.1049: Occupied Bandwidth	N/M	(1)
Clause 27.53 / RSS-139 Clause 6.6. / RSS-130 Clause 4.6. / RSS-199 Clause 4.5: Spurious emissions at antenna terminals	N/M	(1)
Clause 27.53 / RSS-139 Clause 6.6. / RSS-130 Clause 4.6. / RSS-199 Clause 4.5: Radiated emissions	P	
<u>Supplementary information and remarks:</u> (1) Test not requested.		

Appendix A: Test results for FCC PART 22 / CANADA RSS-132

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TEST CONDITIONS

Power supply (V):

V_{nom} = 120 Vac

V_{max} = N/A

V_{min} = N/A

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

Type of power supply = AC Voltage from AC/DC adapter.

Type of antenna = Internal antenna

WCDMA AND HSUPA MODULATION (Band V)

Lowest channel (4132): 826.4 MHz

Middle channel (4182): 836.4 MHz

Highest channel (4233): 846.6 MHz

824-849 MHz Band:

LTE. QPSK AND 16QAM MODULATION (BAND 26)

	Channel (Frequency, MHz)				
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz
Lowest	26797 (824.70)	26805 (825.50)	26815 (826.50)	26840 (829.00)	26865 (831.50)
Middle	26865 (831.50)	26865 (831.50)	26865 (831.50)	26865 (831.50)	26865 (831.50)
Highest	27033 (848.30)	27025 (847.50)	27015 (846.50)	26990 (844.00)	26965 (841.50)

Radiated emissions

SPECIFICATION

FCC § 22.917

RSS-132. Clause 5.5.

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 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 emission is substituted by the Substitution method, in accordance with the ANSI/TIA-603-E.

Measurement Limit:

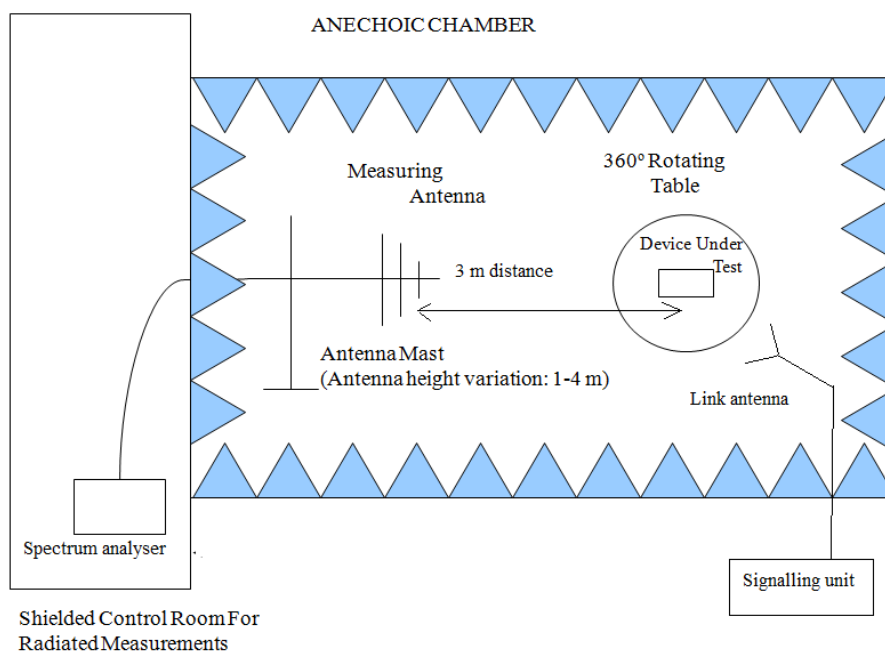
According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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

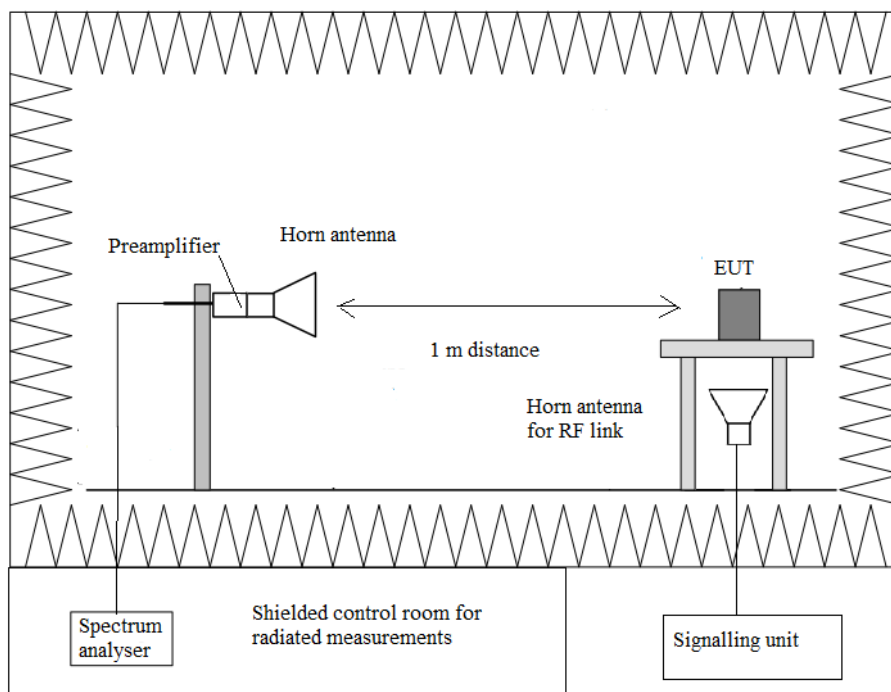
$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

TEST SETUP

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



WCDMA Band:

A preliminary scan determined the WCDMA BAND V - Middle channel - 836.6 MHz - BW 5 MHz QPSK modulation as the worst case. The following tables and plots show the results for QPSK modulation.

The following tables and plots show the results for this configuration.

1. 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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
1674.567	-37.56	Horizontal	-56.80	0.84	8.69	-65.11
2512.833	-44.07	Horizontal	-62.73	1.08	10.60	-60.32

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

Verdict: PASS

LTE Band:

LTE Band 26 QPSK AND 16QAM MODULATION. BW = 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15MHz.

A preliminary scan determined that the middle channel with QPSK modulation and 1.4 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 half offset.

The following tables and plots show the results for this configuration.

1. 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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
1662.160	-49.21	Horizontal	-68.44	0.84	8.68	-60.60
2493.233	-44.36	Horizontal	-63.03	1.08	10.59	-53.51

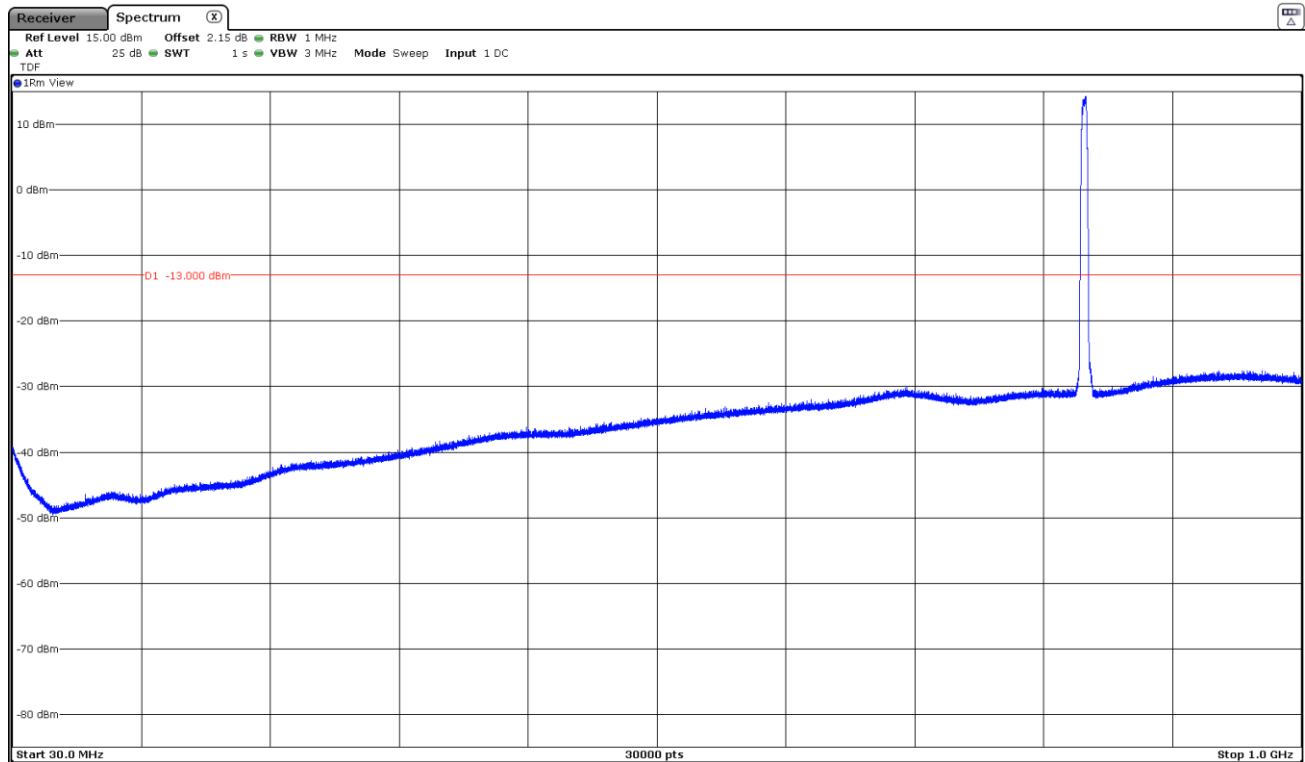
Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
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Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

WCDMA MODULATION (Band V)

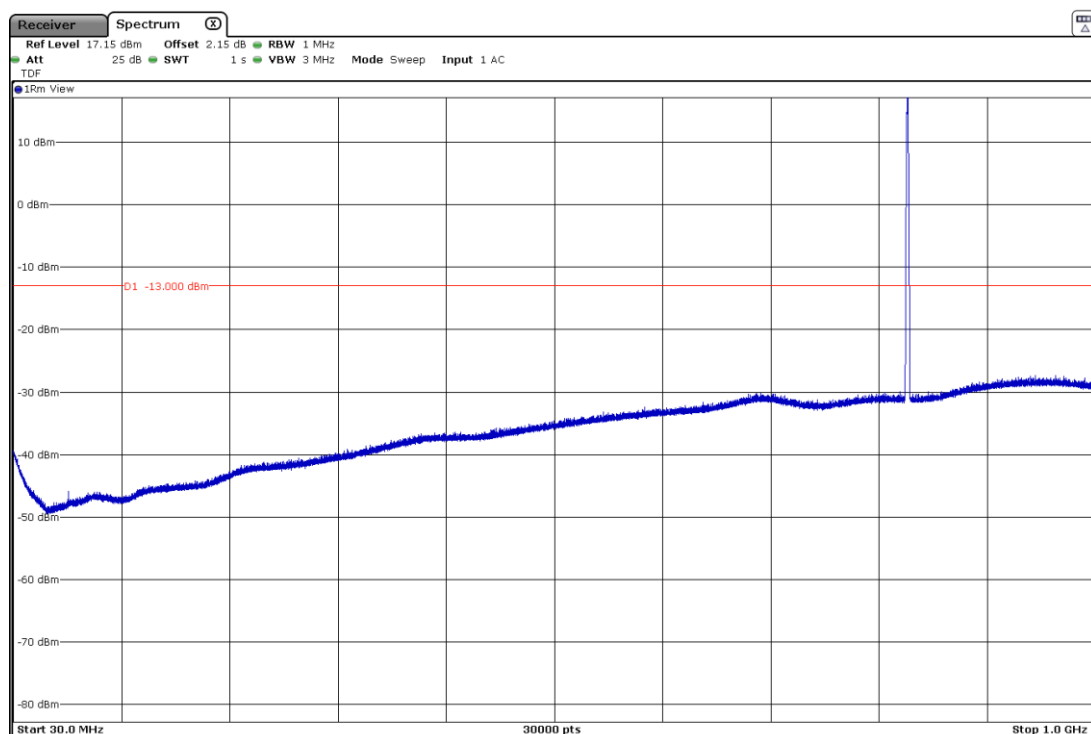
CHANNEL: MIDDLE



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

LTE Band 26 - QPSK MODULATION. BW=1.4 MHz

CHANNEL: MIDDLE

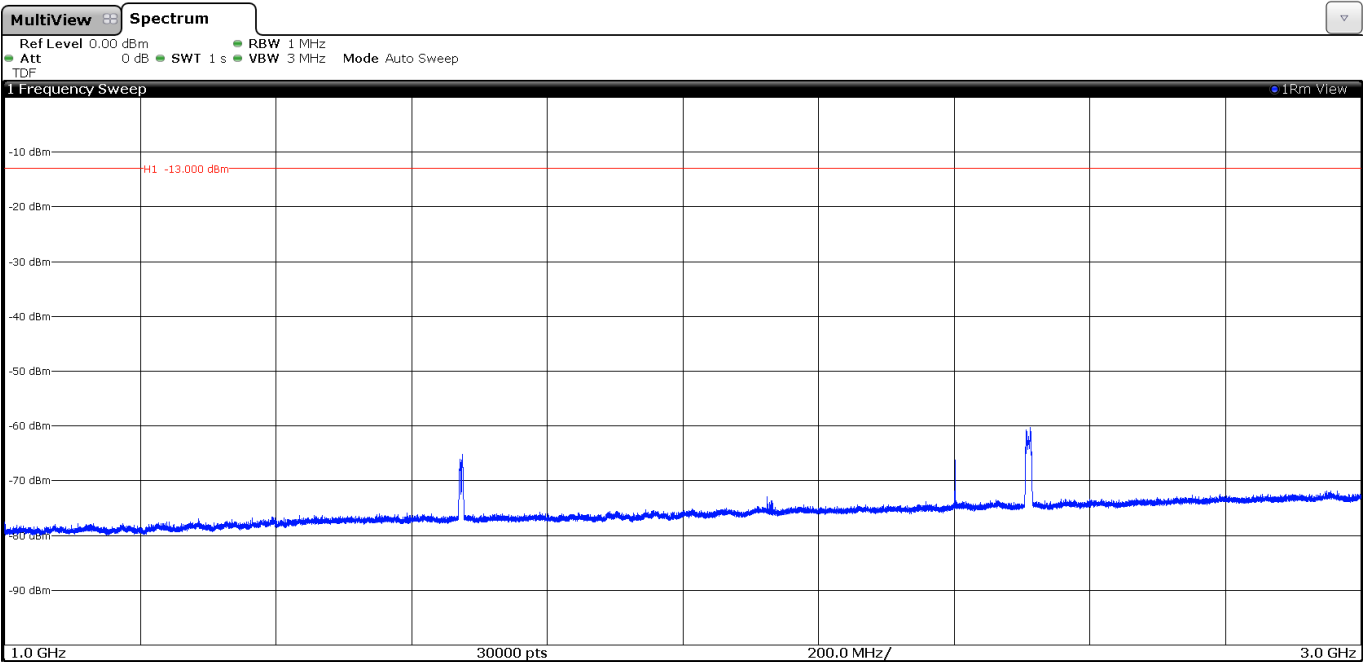


Note: The peak above the limit is the carrier frequency. The peak at 876.5MHz corresponds to the downlink signal

FREQUENCY RANGE 1 GHz to 3 GHz.

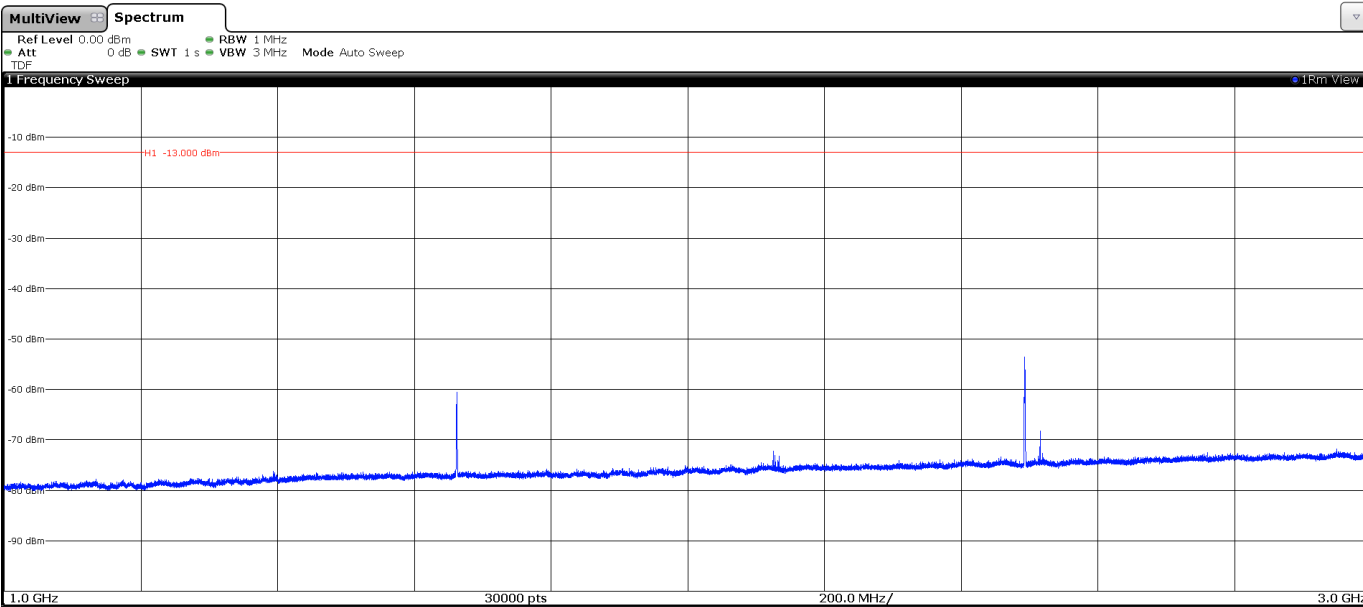
WCDMA MODULATION (Band V)

CHANNEL: MIDDLE



LTE Band 26 QPSK MODULATION. BW=1.4 MHz

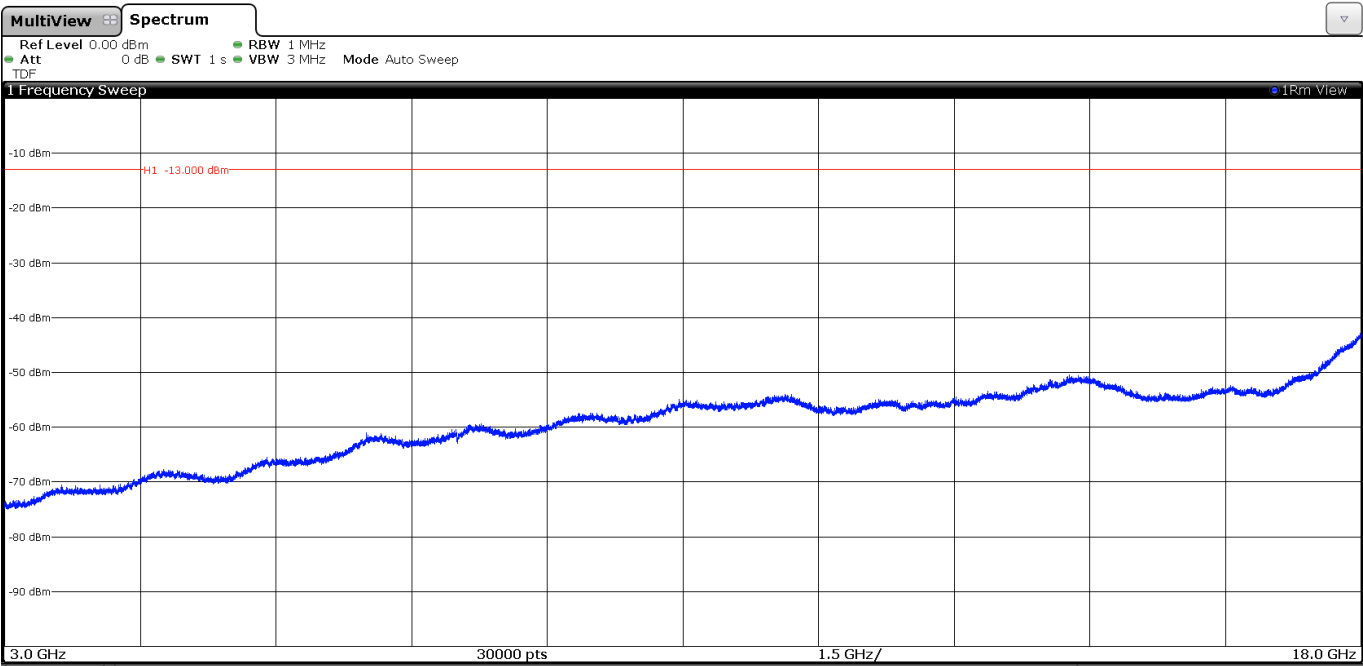
CHANNEL: MIDDLE



FREQUENCY RANGE 3 GHz to 18 GHz.

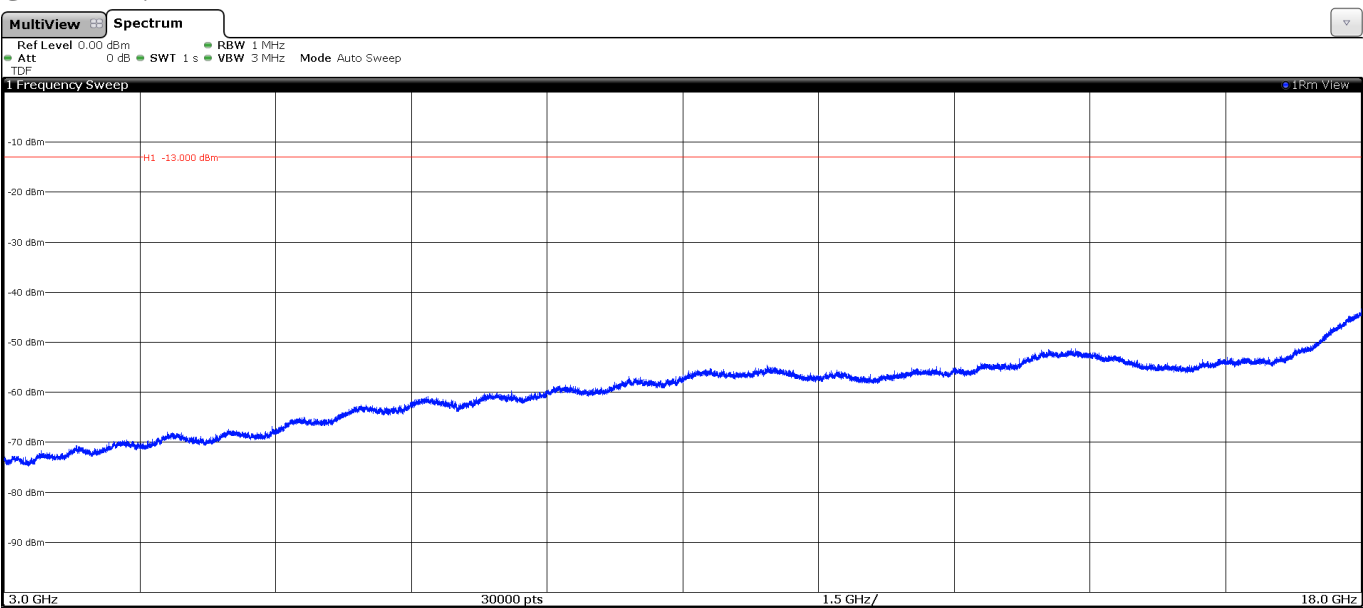
WCDMA MODULATION (Band V)

CHANNEL: MIDDLE



LTE Band 26 QPSK MODULATION. BW=1.4 MHz

CHANNEL: MIDDLE



Appendix B: Test results for FCC PART 24/ CANADA RSS-133

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TEST CONDITIONS

Power supply (V):

V_{nom} = 120 Vac

V_{max} = N/A

V_{min} = N/A

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

Type of power supply = AC Voltage from AC/DC adapter.

Type of antenna = Internal antenna

TEST FREQUENCIES:

WCDMA AND HSUPA MODULATION (Band II)

Lowest channel (9262): 1852.4 MHz

Middle channel (9400): 1880.0 MHz

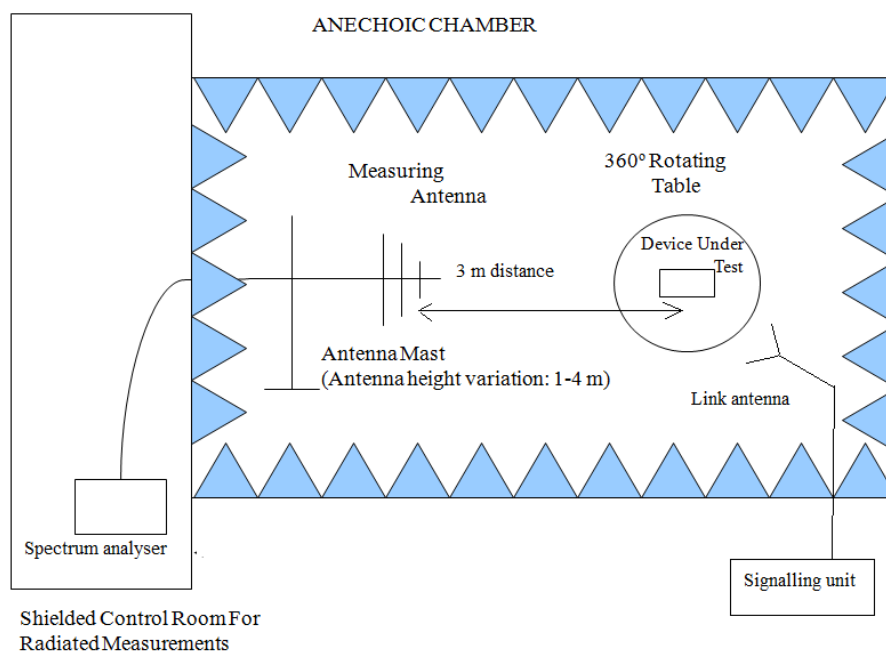
Highest channel (9538): 1907.6 MHz

LTE, QPSK AND 16QAM MODULATION (BAND 25)

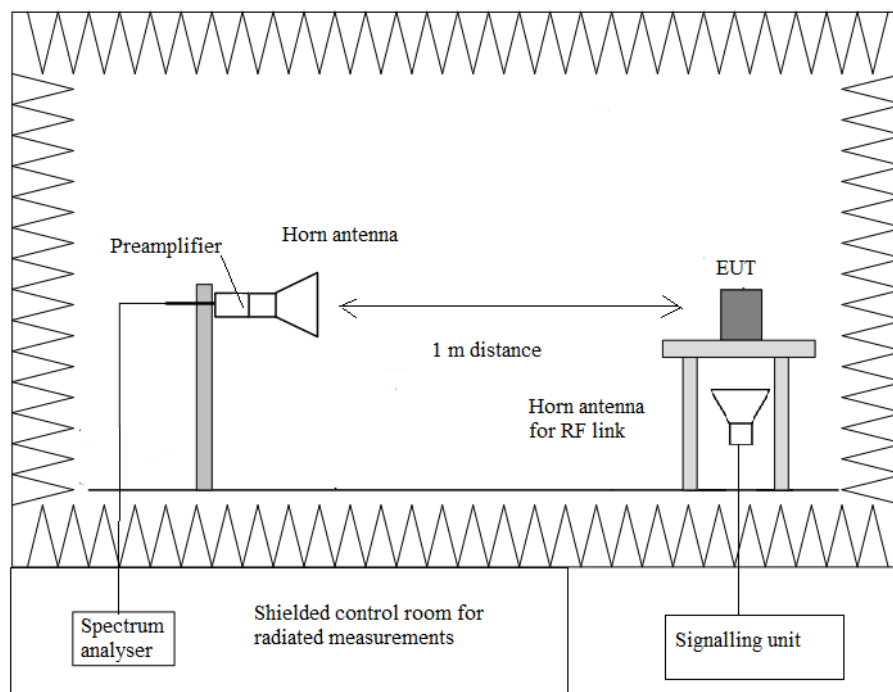
	Channel (Frequency. MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	26047 (1850.7)	26055 (1851.5)	26065 (1852.5)	26090 (1855)	26115 (1857.5)	26140 (1860)
Middle	26365 (1882.5)	26365 (1882.5)	26365 (1882.5)	26365 (1882.5)	26365 (1882.5)	26365 (1882.5)
Highest	26683 (1914.3)	26675 (1913.5)	26665 (1912.5)	26640 (1910)	26615 (1907.5)	26590 (1905)

TEST SETUP

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



Radiated emissions

SPECIFICATION

FCC § 24.238

RSS-132. Clause 5.5.

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 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 emission is substituted by the Substitution method, in accordance with the ANSI/TIA-603-E.

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:

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

WCDMA Band:

A preliminary scan determined the WCDMA BAND II –middle channel – 1880 MHz - BW 5 MHz QPSK modulation as the worst case. The following tables and plots show the results for QPSK modulation.

1. 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-18 GHz.

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

Frequency range 18 GHz-26.5 GHz.

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

Verdict: PASS

LTE Band:

LTE Band 25 QPSK AND 16QAM MODULATION. BW = 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15MHz and 20MHz.

A preliminary scan determined that the highest channel with QPSK modulation and 1.4 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 full offset.

The following tables and plots show the results for this configuration.

1. 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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
3827.790	-60.14	Vertical	-76.45	1.69	11.93	-66.21
5741.750	-56.79	Horizontal	-68.83	1.70	12.46	-58.07
10531.350	-61.92	Horizontal	-61.23	2.36	10.12	-53.47

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

Frequency range 18 GHz-26.5 GHz.

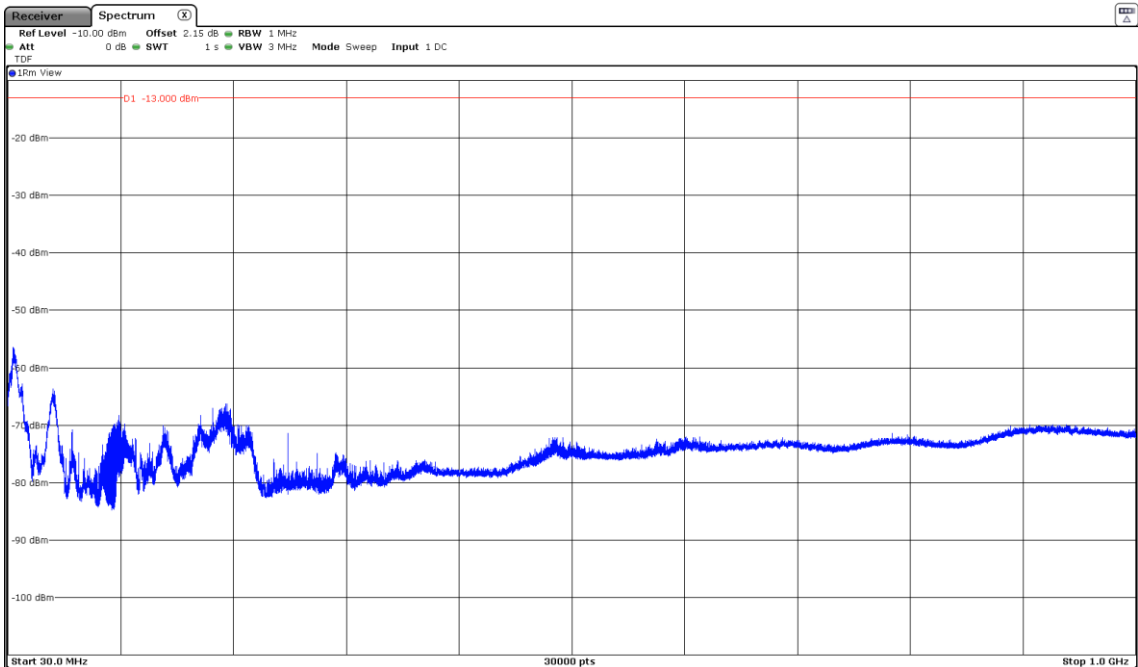
No radiated spurious signals were detected at less than 20 dB respect to the limit.

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

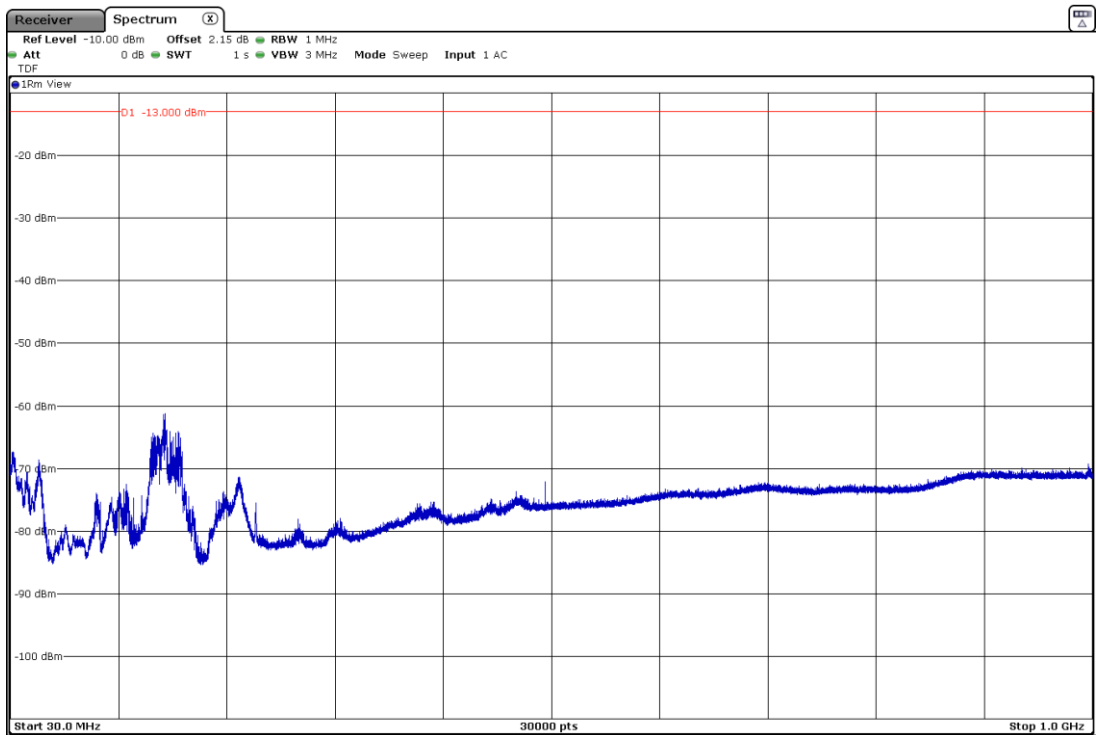
WCDMA MODULATION (Band II)

CHANNEL: MIDDLE



LTE Band 25 - QPSK MODULATION. BW=1.4 MHz

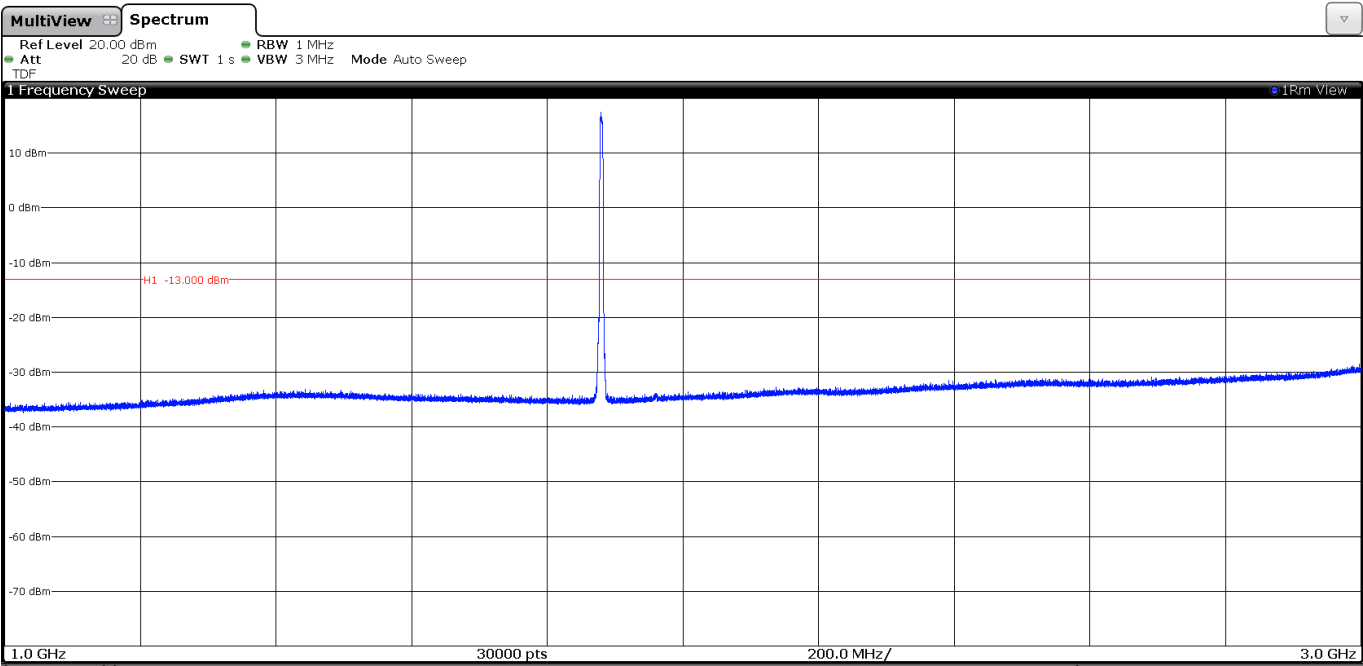
CHANNEL: HIGHEST



FREQUENCY RANGE 1 GHz to 3 GHz.

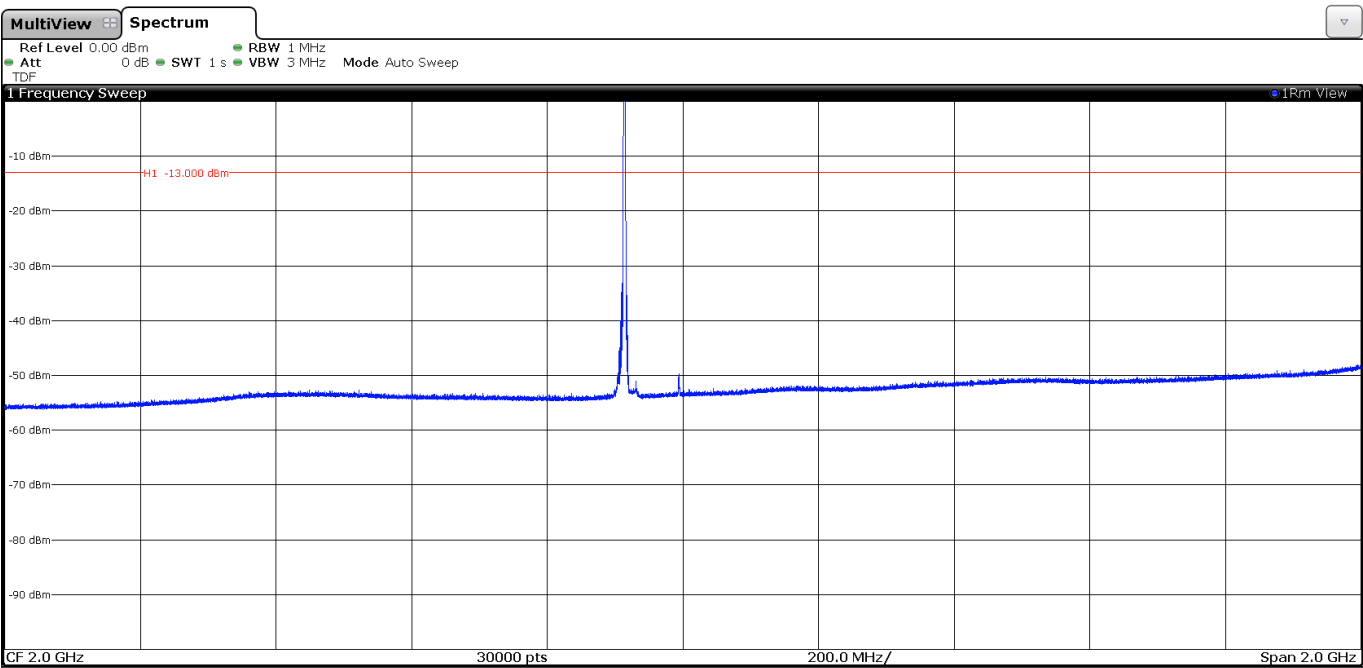
WCDMA MODULATION (Band II)

CHANNEL: MIDDLE



LTE Band 25 QPSK MODULATION. BW=1.4 MHz

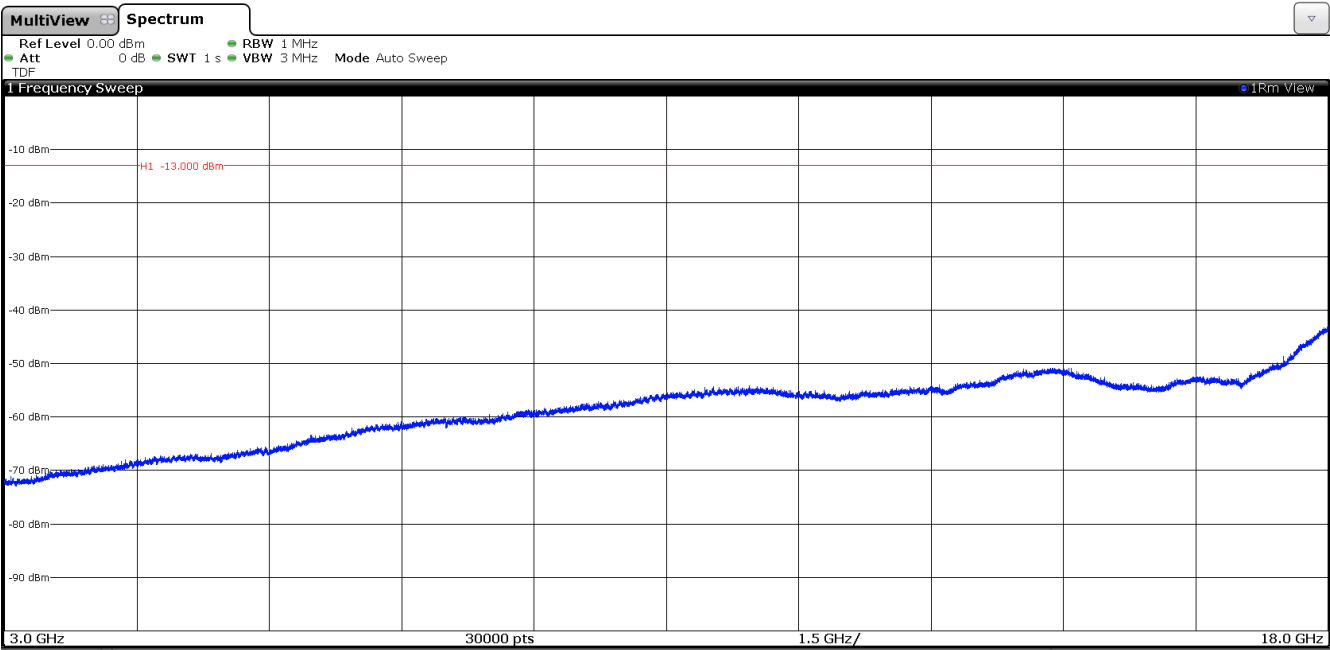
CHANNEL: HIGHEST



FREQUENCY RANGE 3 GHz to 18 GHz.

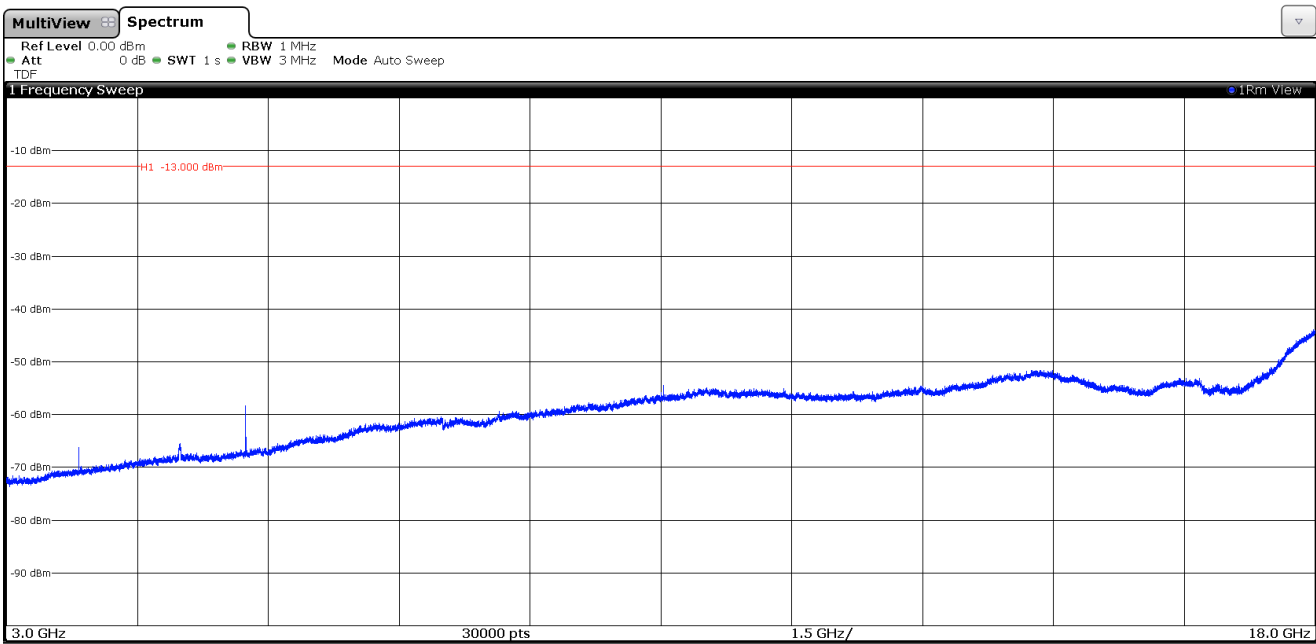
WCDMA MODULATION (Band II)

CHANNEL: MIDDLE



LTE Band 25 QPSK MODULATION. BW=1.4 MHz

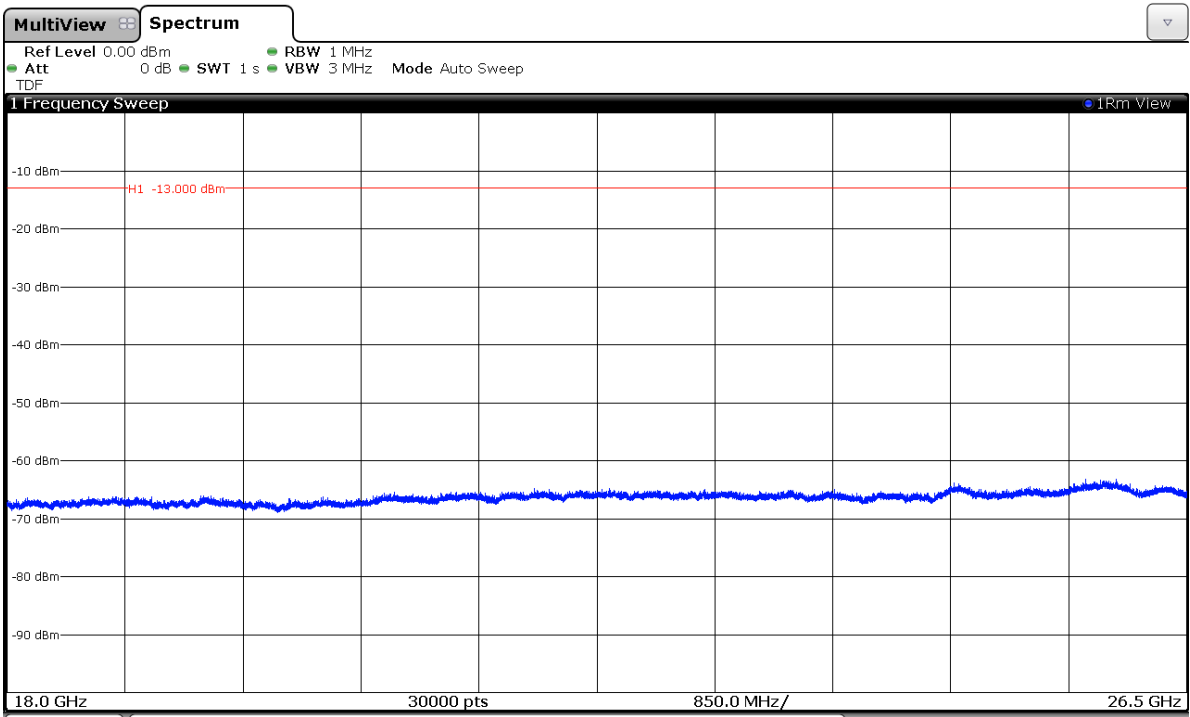
CHANNEL: HIGHEST



FREQUENCY RANGE 18 GHz to 26.5 GHz.

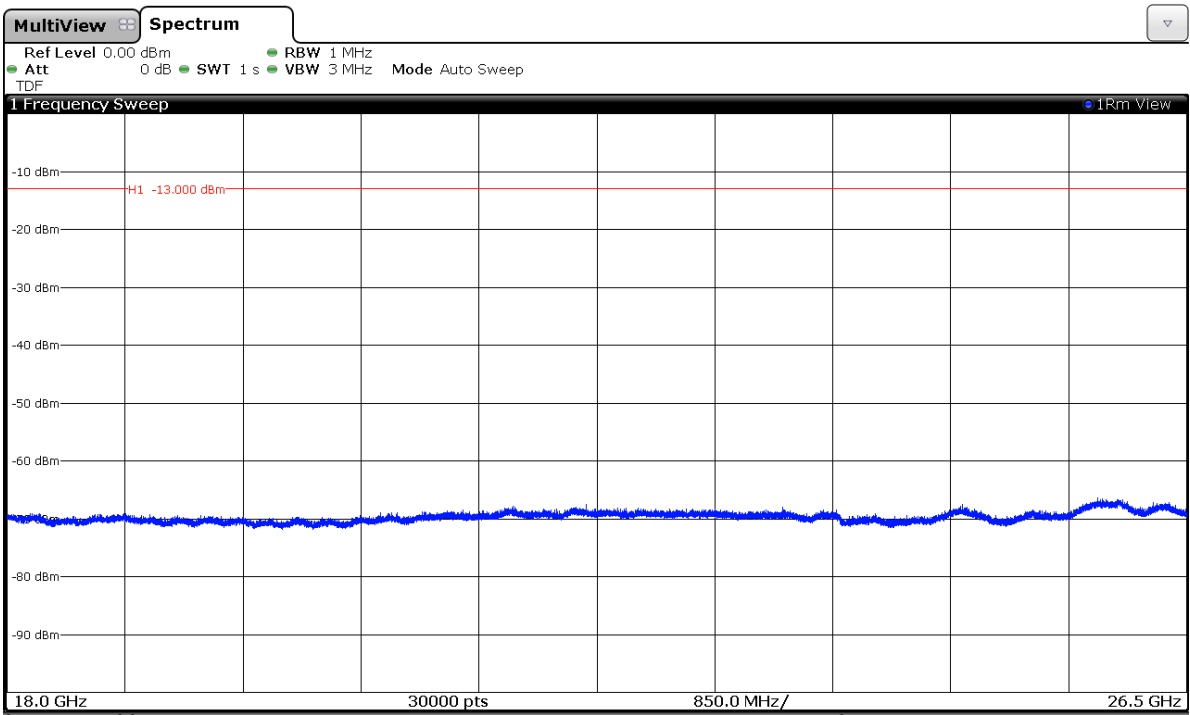
WCDMA MODULATION (Band II)

CHANNEL: MIDDLE



LTE Band 25 QPSK MODULATION. BW=1.4 MHz

CHANNEL: HIGHEST



Appendix C: Test results for FCC PART 27/CANADA RSS-130 & RSS-139 & RSS-199

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TEST CONDITIONS

Power supply (V):

$V_{nom} = 120 \text{ Vac}$

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

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

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

Type of power supply = AC Voltage from AC/DC adapter.

Type of antenna = Internal antenna

TEST FREQUENCIES:

WCDMA AND HSUPA MODULATION (Band IV)

Lowest channel (1312): 1712.4 MHz

Middle channel (1413): 1732.6 MHz

Highest channel (1513): 1752.6 MHz

LTE. QPSK AND 16QAM MODULATION (BAND 4)

	Channel (Frequency. MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	19957 (1710.7)	19965 (1711.5)	19975 (1712.5)	20000 (1715.0)	20025 (1717.5)	20050 (1720.0)
Middle	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)
Highest	20393 (1754.3)	20385 (1753.5)	20375 (1752.5)	20350 (1750.0)	20325 (1747.5)	20300 (1745.0)

LTE. QPSK AND 16QAM MODULATION (BAND 12)

	Channel (Frequency. MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Lowest	23017 (699.7)	23025 (700.5)	23035 (701.5)	23060 (704.0)
Middle	23095 (707.5)	23095 (707.5)	23095 (707.5)	23095 (707.5)
Highest	23173 (715.3)	23165 (714.5)	23155 (713.5)	23130 (711.0)

LTE. QPSK AND 16QAM MODULATION (BAND 13)

	Channel (Frequency, MHz)	
	BW = 5 MHz	BW = 10 MHz
Lowest	23205 (779.5)	N/A
Middle	23230 (782.0)	23230 (782.0)
Highest	23255 (784.5)	N/A

LTE. QPSK AND 16QAM MODULATION (BAND 41)

	Channel (Frequency. MHz)			
	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	39675 (2498.5)	39700 (2501.0)	39725 (2503.5)	39750 (2506.0)
Middle	40620 (2593.0)	40620 (2593.0)	40620 (2593.0)	40620 (2593.0)
Highest	41565 (2687.5)	41540 (2685.0)	41515 (2682.5)	41490 (2680.0)

Radiated emissions

SPECIFICATION

WCDMA BAND IV and LTE BAND 4.

FCC §27.53 (h). RSS-139 Clause 6.6.

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.

LTE BAND 12.

FCC §27.53 (g).

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

RSS-130 Clause 4.6.

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB.

LTE BAND 13.

FCC §27.53 (g) & (f).

On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW (-40 dBm)/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW (-50 dBm) EIRP for discrete emissions of less than 700 Hz bandwidth.

RSS-130 Clause 4.6.

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB.

The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment.

The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW (-40 dBm) /MHz for wideband signal and -80 dBW (-50 dBm) for discrete emission with bandwidth less than 700 Hz.

LTE BAND 41.

FCC §27.53 (m). RSS-199 Clause 4.5.

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz.

At P_o transmitting power, the specified minimum attenuation becomes $40+10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [40 + 10 \log (P_o \text{ in mwatts}) - 30] = -10 \text{ dBm.}$$

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

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

At P_o transmitting power, the specified minimum attenuation becomes $55+10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [55 + 10 \log (P_o \text{ in mwatts}) - 30] = -25 \text{ dBm.}$$

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.

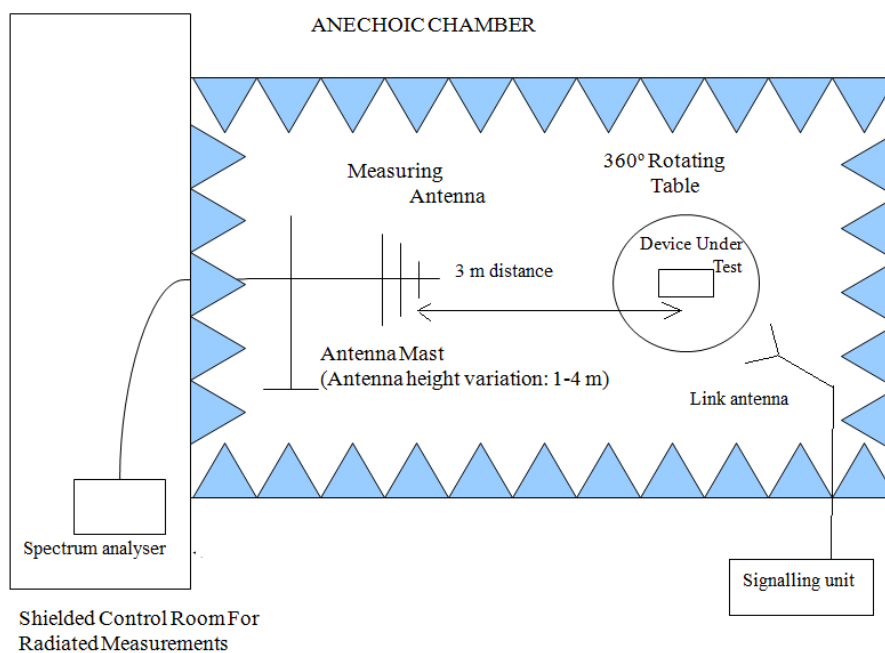
The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.

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.

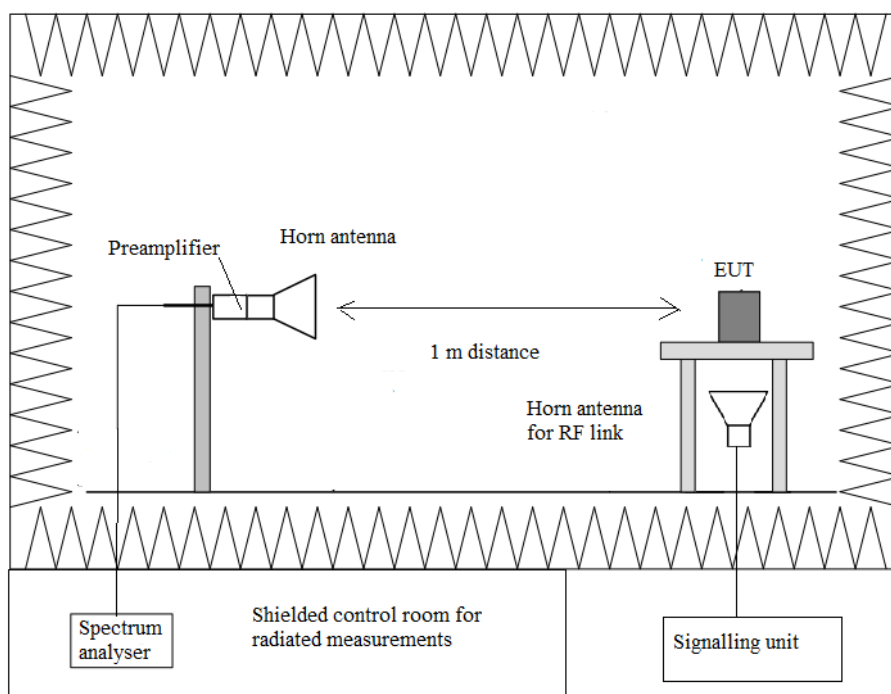
Each detected emission at less than 20 dB respect to the limit is substituted by the Substitution method in accordance with the ANSI/TIA-603-E.

TEST SETUP

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



RESULTS

WCDMA Band:

A preliminary scan determined the WCDMA BAND IV – middle channel – 1732.6 MHz - BW 5 MHz QPSK modulation as the worst case. The following tables and plots show the results for QPSK modulation.

1. 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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
5194.21	-61.41	Vertical	-73.79	2.78	12.07	-64.50

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

LTE Bands:

LTE QPSK AND 16QAM MODULATION. Band 4. BW = 1.4 MHz, 3MHz, 5MHz, 10MHz, 15MHz and 20 MHz.

A preliminary scan determined that the lowest channel with QPSK modulation and 1.4 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 no offset.

The following tables and plots show the results for this configuration.

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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
5130.75	-54.18	Vertical	-66.56	2.72	11.91	-57.36

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

LTE QPSK AND 16QAM MODULATION. Band 12. BW = 1.4 MHz, 3 MHz, 5 MHz. and 10 MHz.

A preliminary scan determined that the highest channel with QPSK modulation and 5 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 full offset.

The following tables and plots show the results for this configuration.

1. 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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
1431.3	-46.27	Vertical	-65.27	0.72	7.66	-58.34
2147.1	-38.31	Horizontal	-57.62	1.00	10.25	-48.37

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

LTE QPSK AND 16QAM MODULATION. Band 13. BW = 5 MHz. and 10 MHz.

A preliminary scan determined that the lowest channel with QPSK modulation and 5 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 no offset.

The following tables and plots show the results for this configuration.

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-18 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
1164.167	-56.24	Vertical	-74.76	0.59	6.32	-69.03
1256.300	-51.12	Vertical	-69.80	0.63	6.78	-63.65
2339.033	-51.55	Horizontal	-70.50	1.04	10.44	-61.10

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

Frequency range 1559 MHz-1610 MHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
1559.620	-52.55	Horizontal	-71.69	0.79	8.25	-64.23
1566.783	-56.66	Horizontal	-75.81	0.79	8.28	-68.32
1570.537	-47.08	Horizontal	-66.23	0.79	8.30	-58.73
1587.642	-45.64	Vertical	-64.81	0.80	8.37	-57.24
1600.328	-56.53	Vertical	-75.71	0.81	8.42	-68.10

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

LTE QPSK AND 16QAM MODULATION. Band 41. BW = 5 MHz, 10MHz, 15MHz and 20 MHz.

A preliminary scan determined that the highest channel with QPSK modulation and 5 MHz bandwidth as the worst case. The configuration of Resource Blocks was used RB=1 full offset.

The following tables and plots show the results for this configuration.

1. 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-3 GHz.

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

Frequency range 3 GHz-18 GHz.

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain G_i (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
2517.645	-28.39	Horizontal	-46.93	1.08	10.62	-37.39
5342.270	-60.56	Vertical	-74.24	1.64	12.42	-63.46
16026.380	-64.40	Vertical	-64.88	2.97	16.55	-51.30

Measurement uncertainty (dB)	$\leq \pm 4.87$ for $f \geq 1$ GHz up to 18 GHz
------------------------------	---

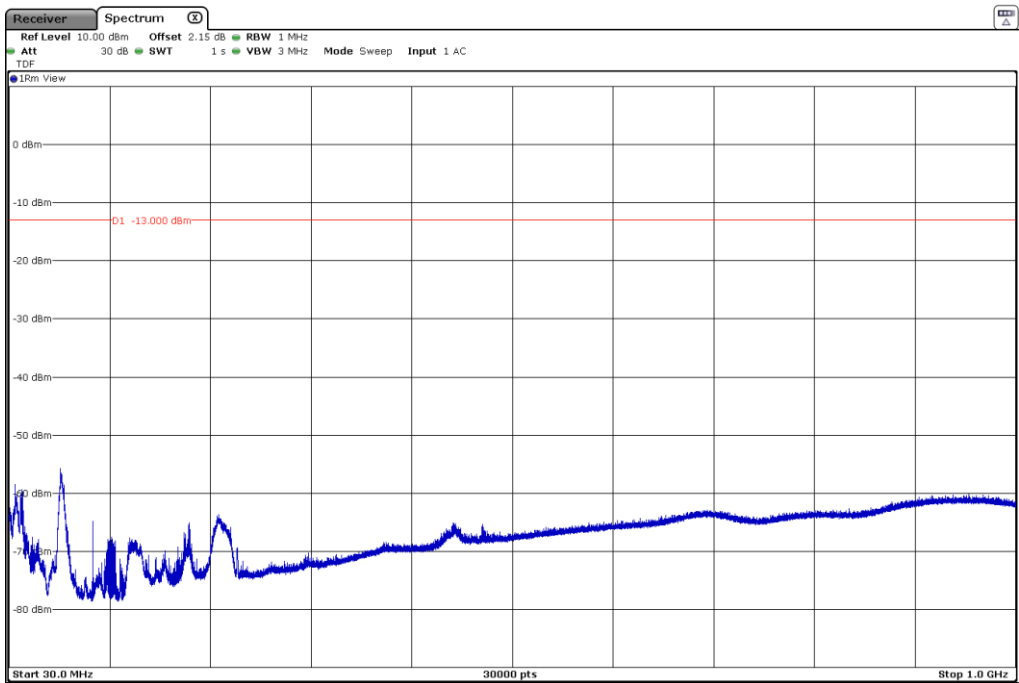
Frequency range 18 GHz-26.5 GHz.

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

FREQUENCY RANGE 30 MHz-1000 MHz.

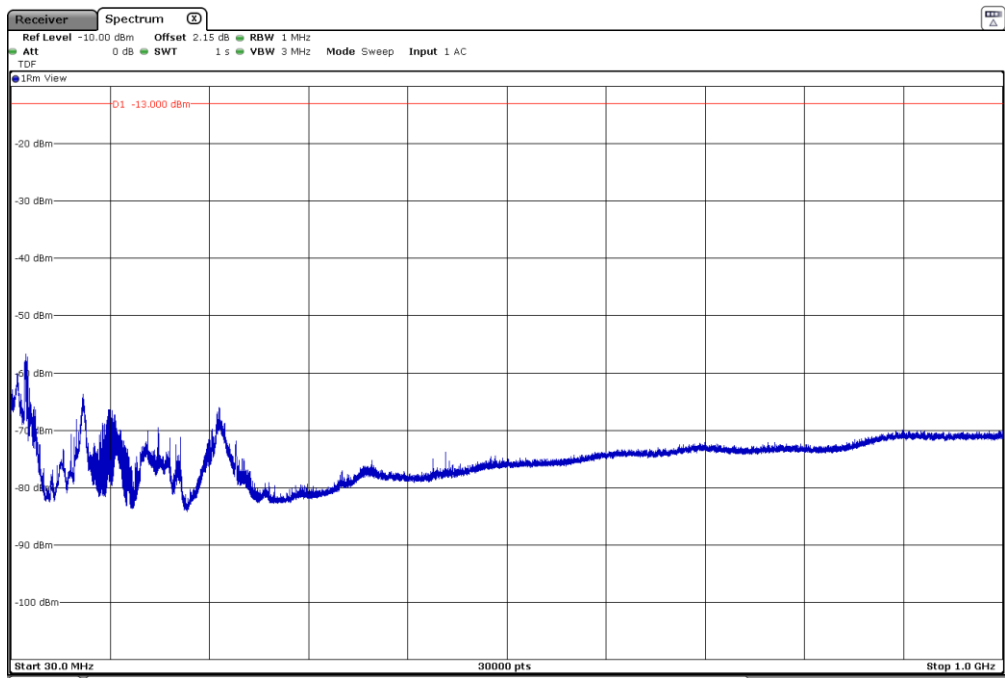
WCDMA MODULATION (Band IV)

CHANNEL: MIDDLE



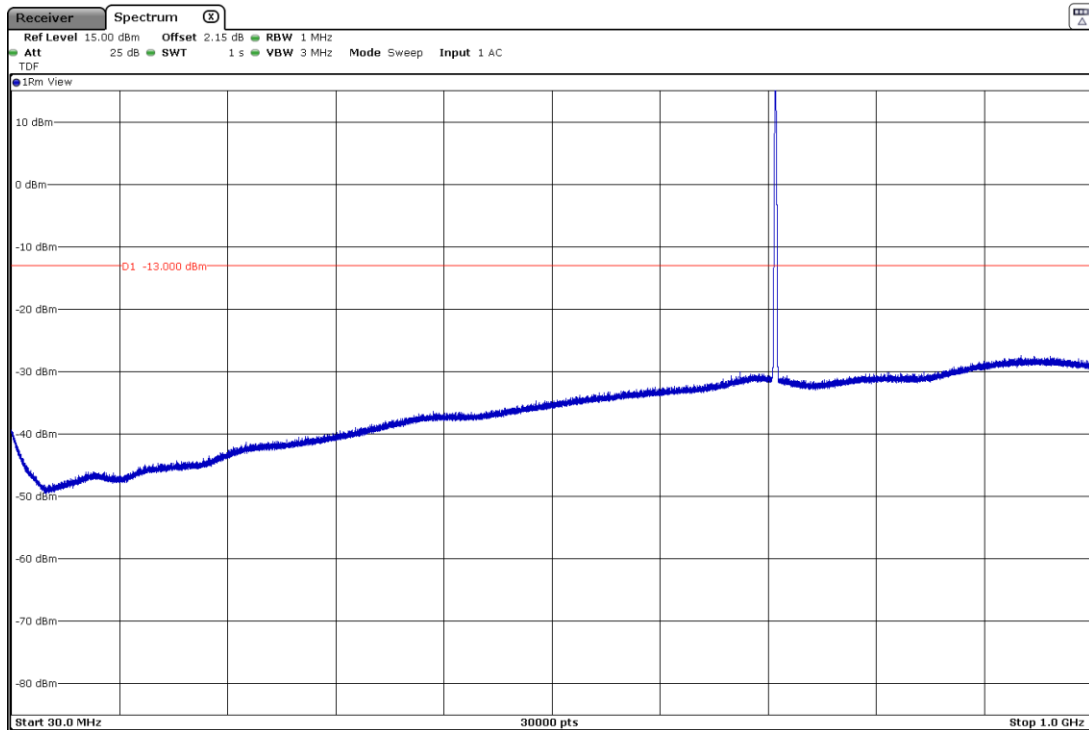
LTE Band 4 QPSK MODULATION. BW=1.4 MHz

CHANNEL: LOWEST



LTE Band 12 QPSK MODULATION. BW=5 MHz

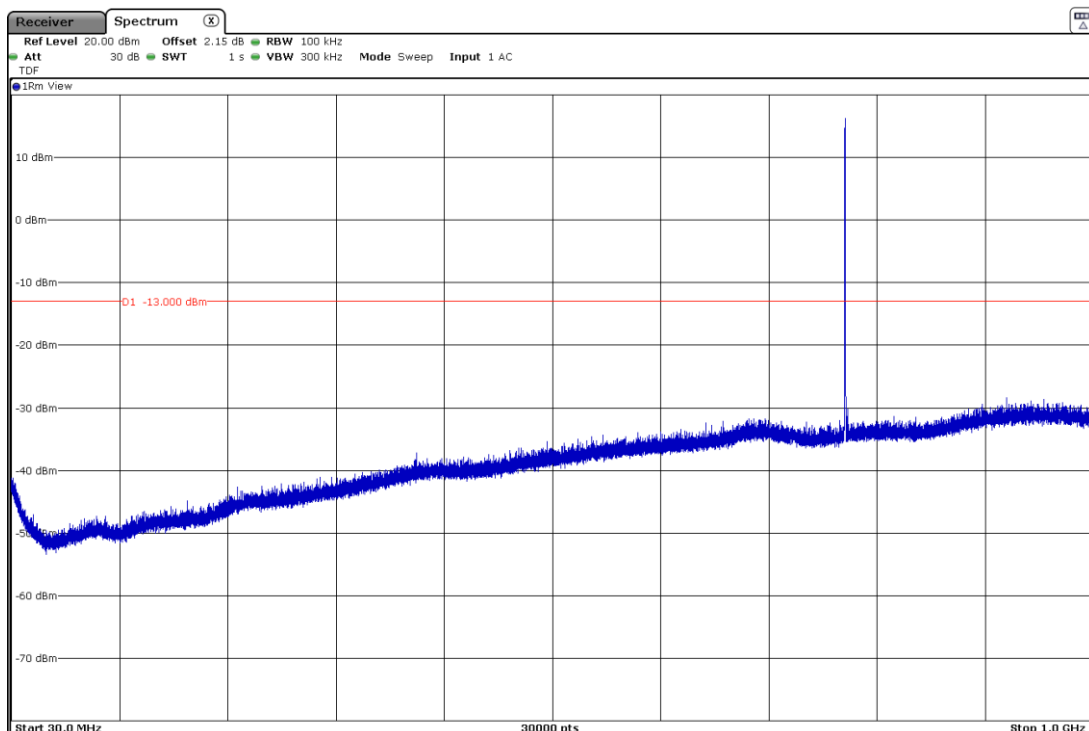
CHANNEL: HIGHEST



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

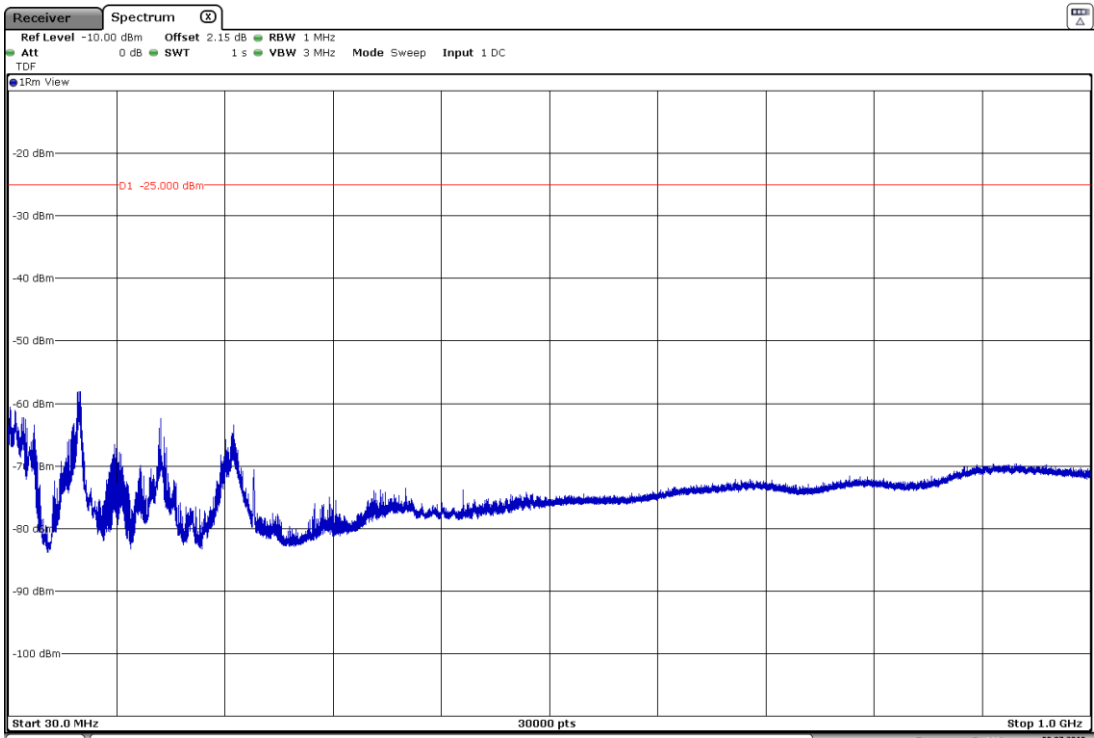
LTE Band 13 QPSK MODULATION. BW=5 MHz

CHANNEL: LOWEST

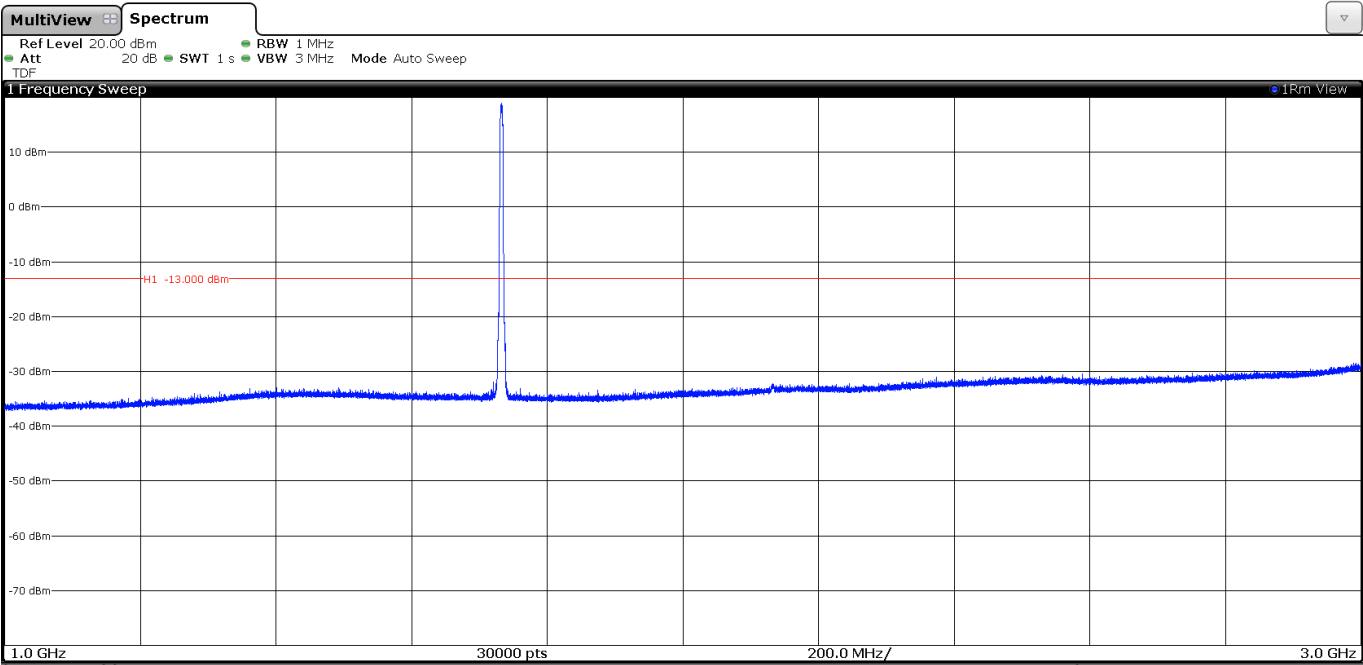


Note: The peak above the limit is the carrier frequency.

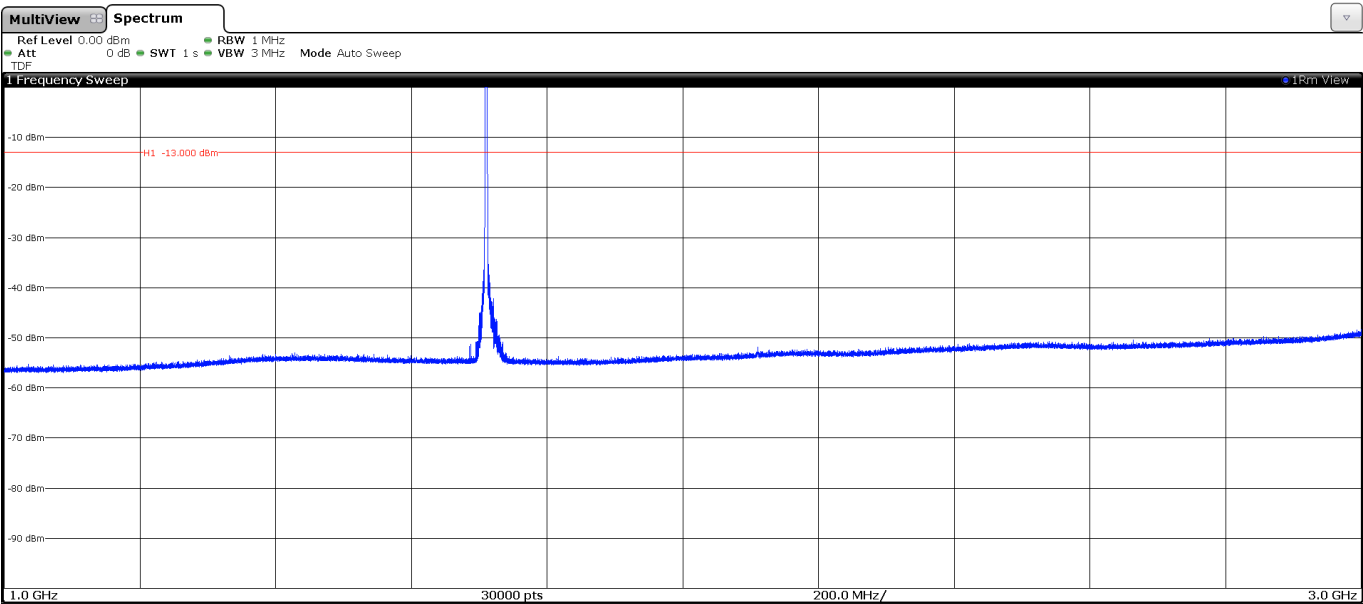
LTE Band 41. QPSK MODULATION. BW=5 MHz
CHANNEL: HIGHEST



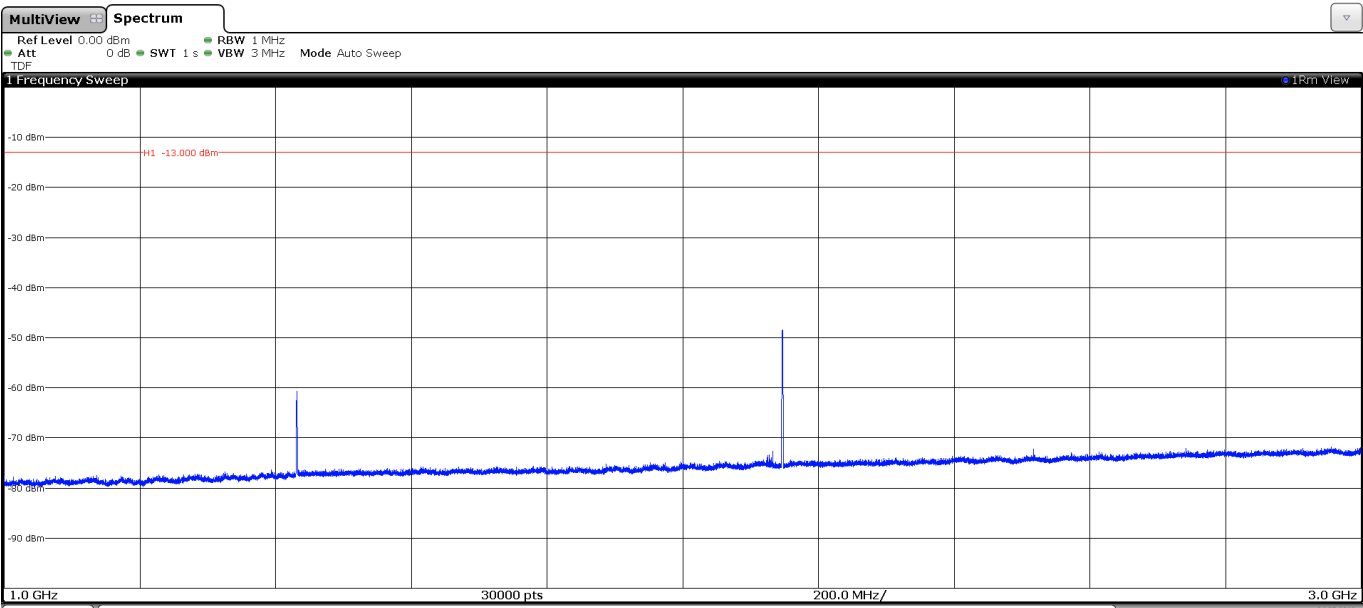
Frequency range 1 GHz to 3 GHz.
WCDMA MODULATION (Band IV)
CHANNEL: MIDDLE



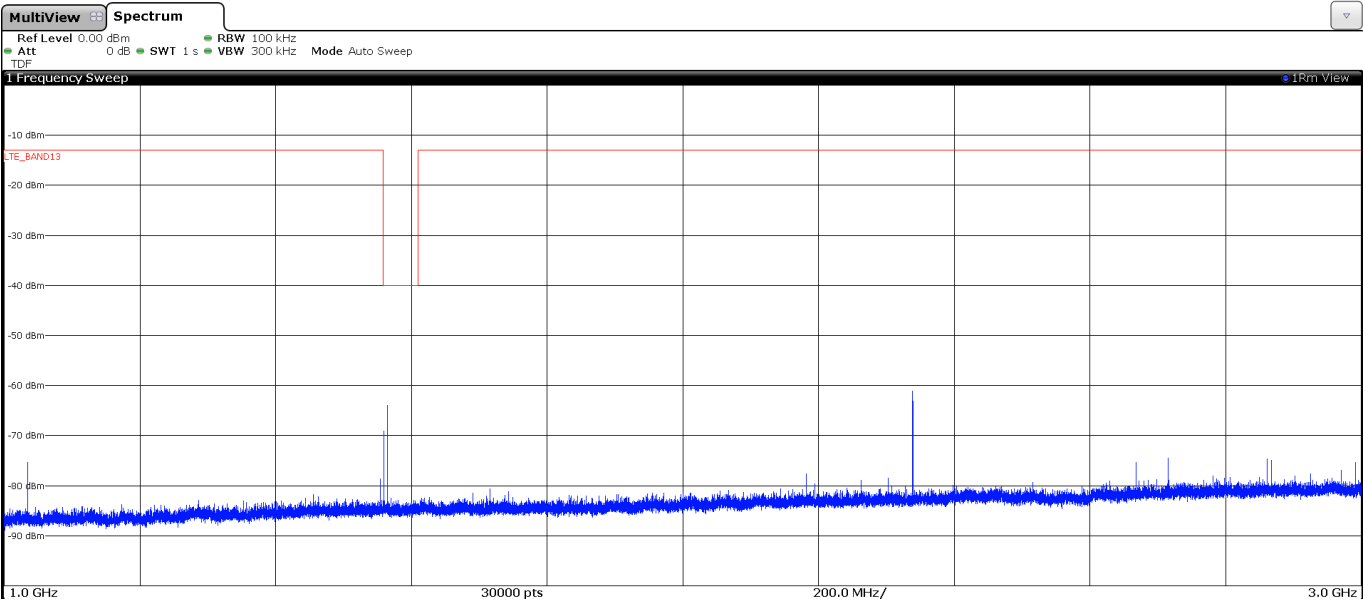
LTE Band 4 QPSK MODULATION. BW=1.4 MHz.
CHANNEL: LOWEST



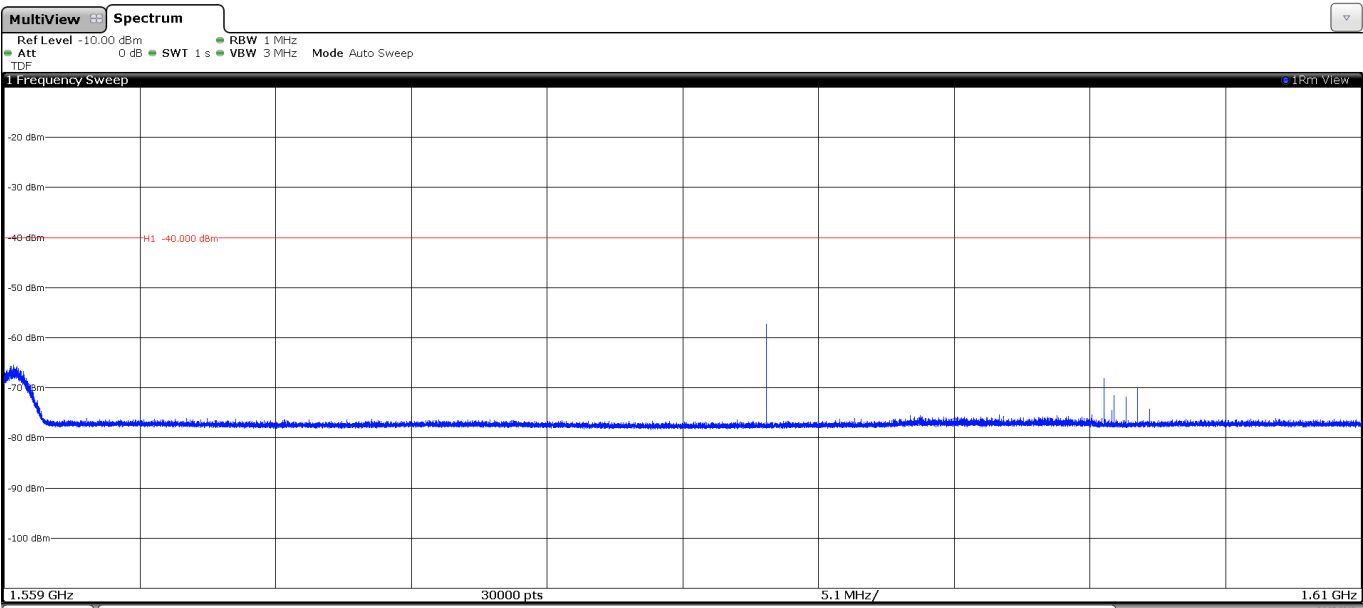
LTE Band 12 QPSK MODULATION. BW=5 MHz.
CHANNEL: HIGHEST



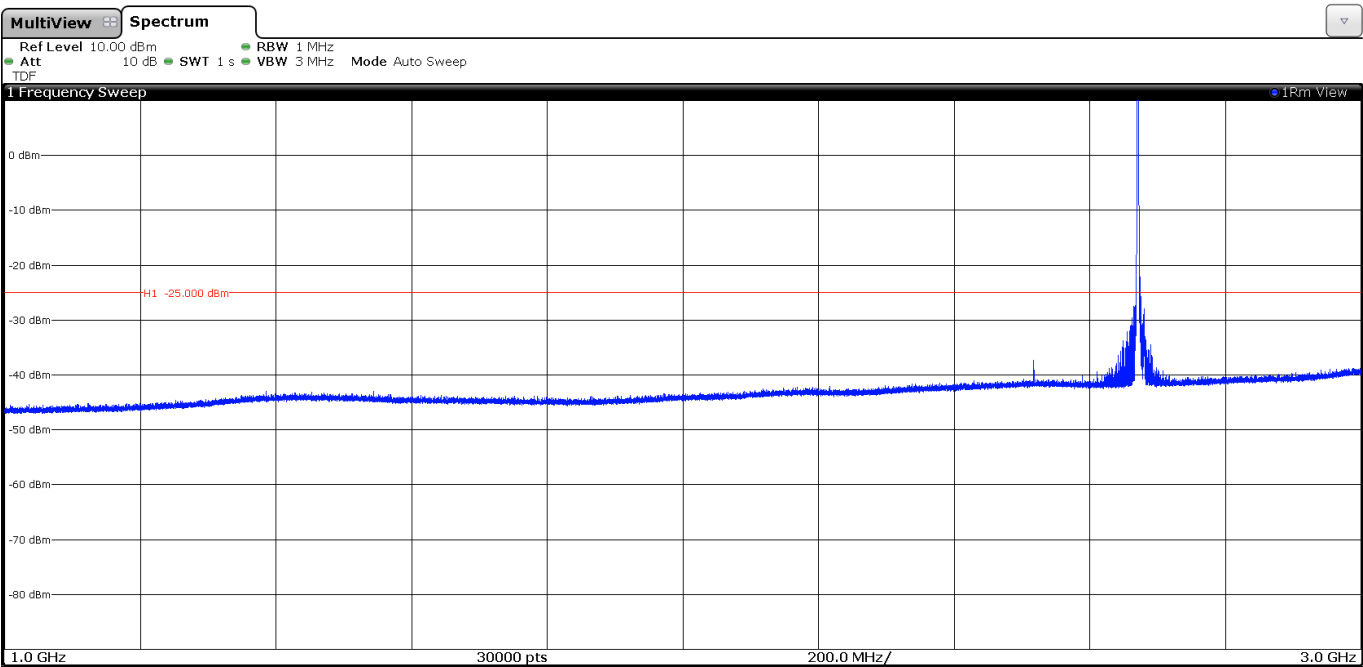
LTE Band 13 QPSK MODULATION. BW=5 MHz.
CHANNEL: LOWEST



LTE Band 13. Frequency range 1559 MHz to 1610 MHz.
CHANNEL: LOWEST



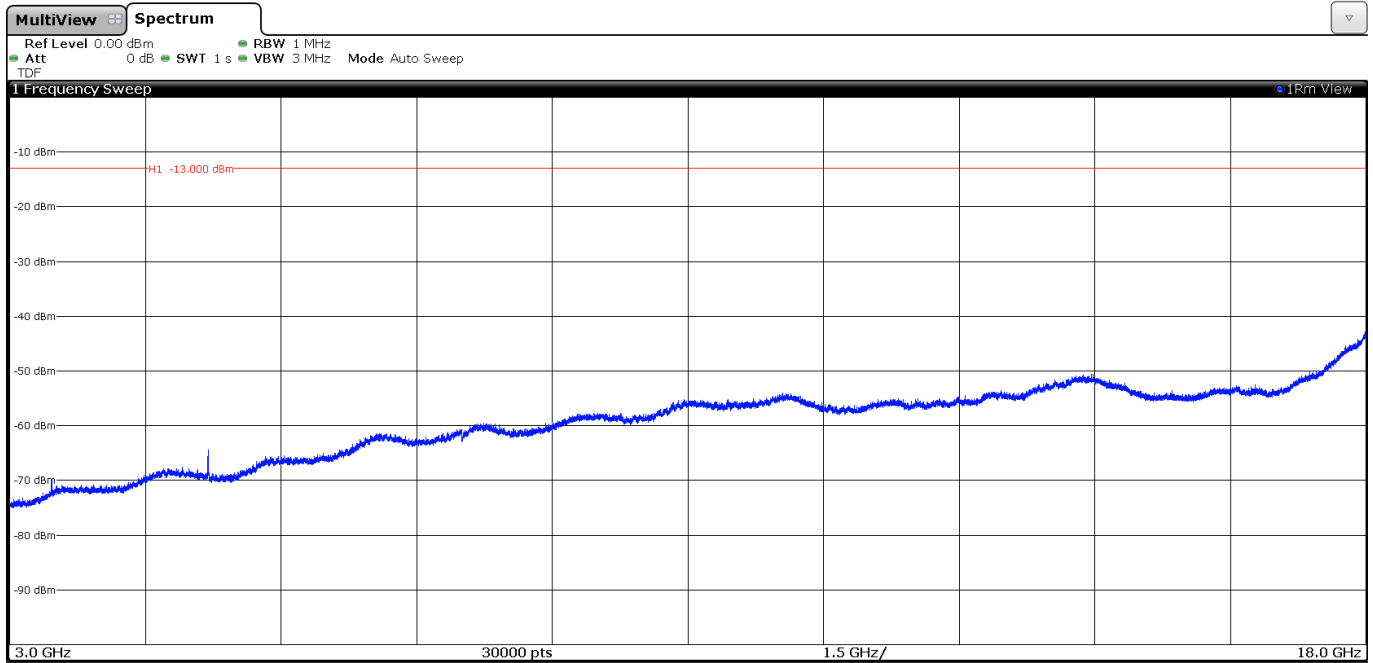
LTE Band 41 QPSK MODULATION. BW=5 MHz.
CHANNEL: HIGHEST



Frequency range 3 GHz to 18 GHz.

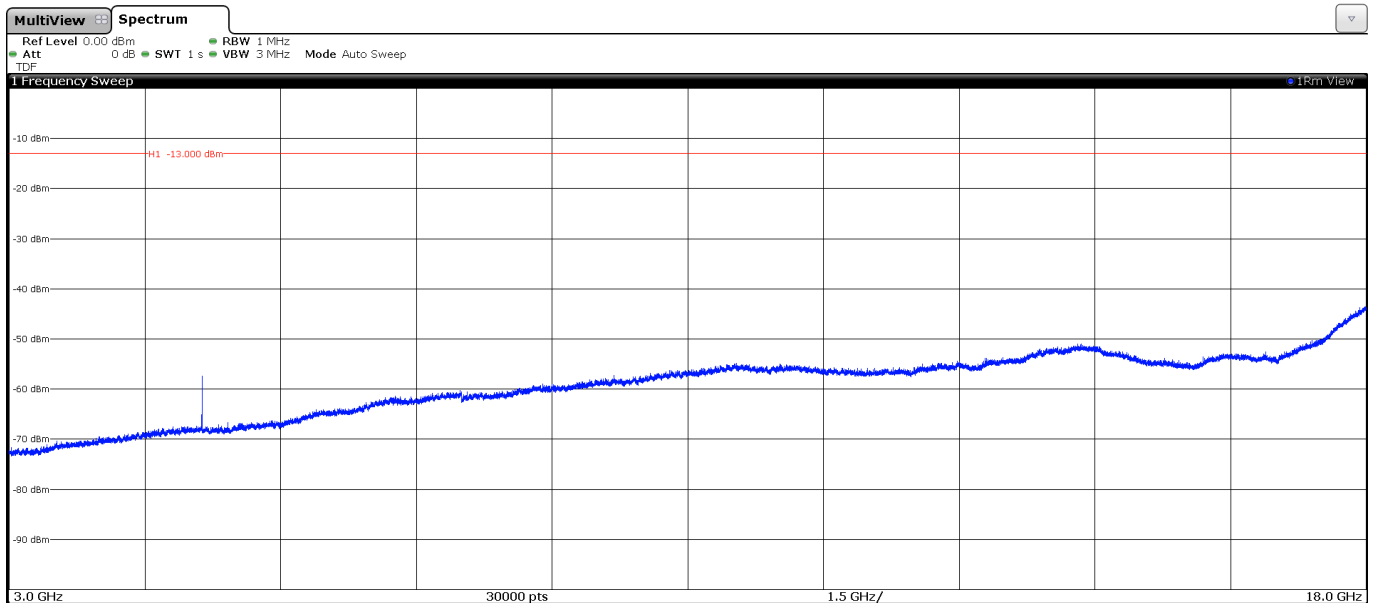
WCDMA MODULATION (Band IV)

CHANNEL: MIDDLE

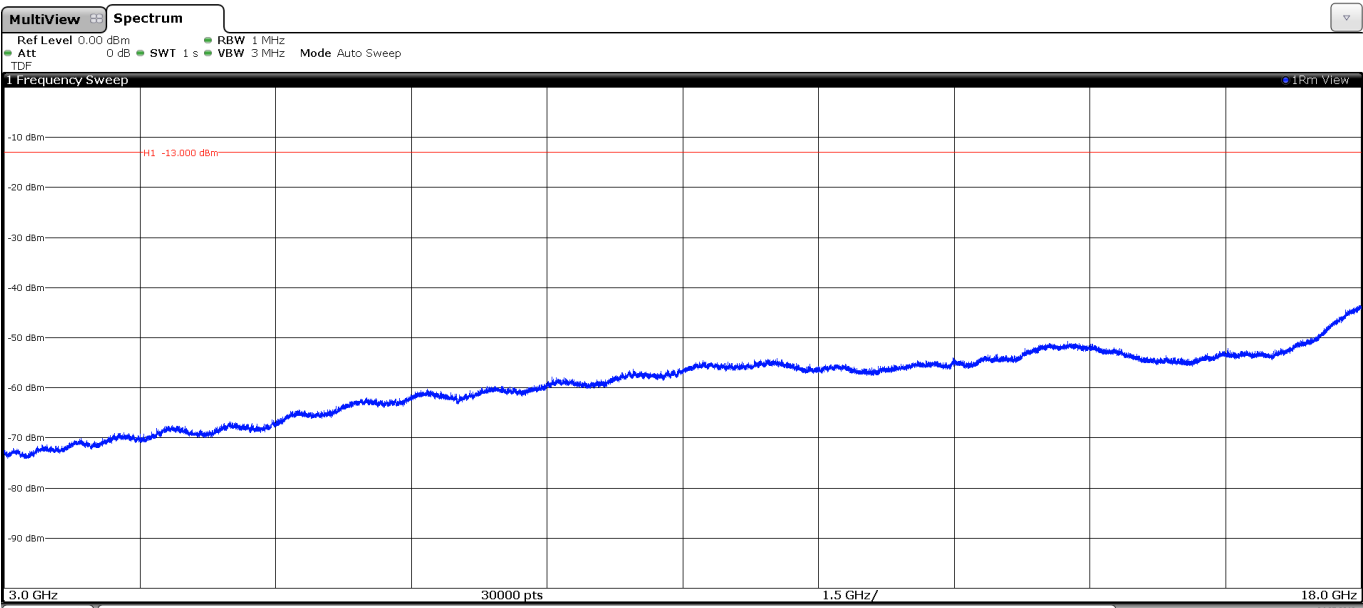


LTE Band 4 QPSK MODULATION. BW=1.4 MHz.

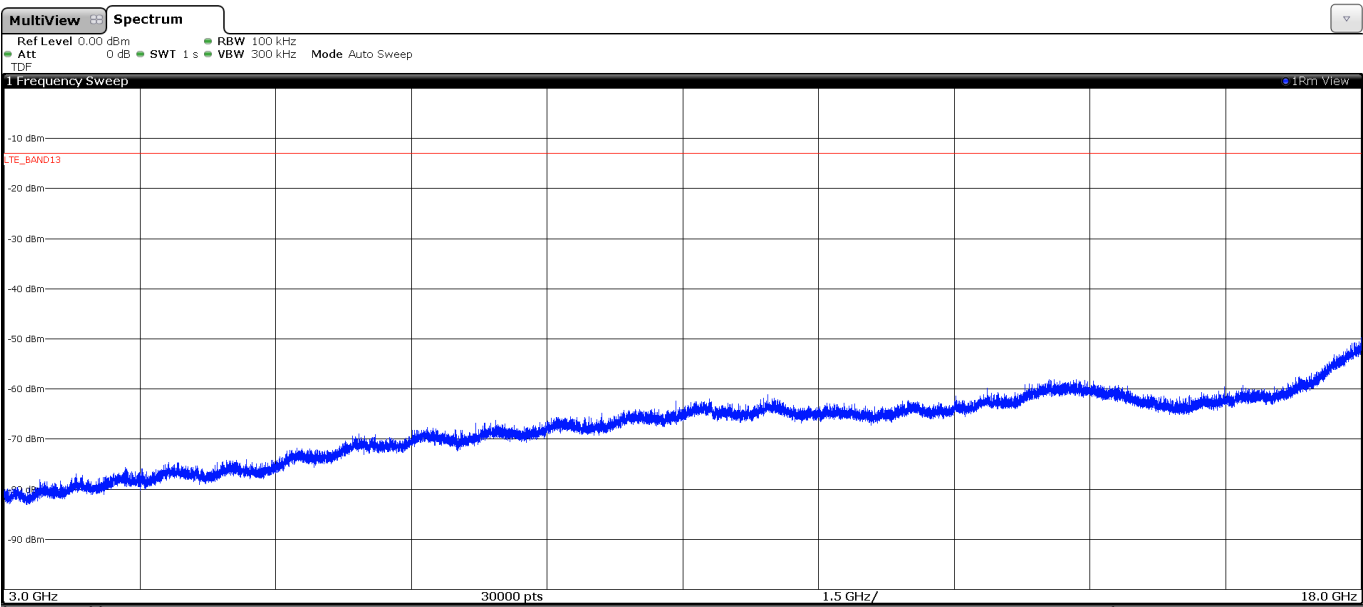
CHANNEL: LOWEST



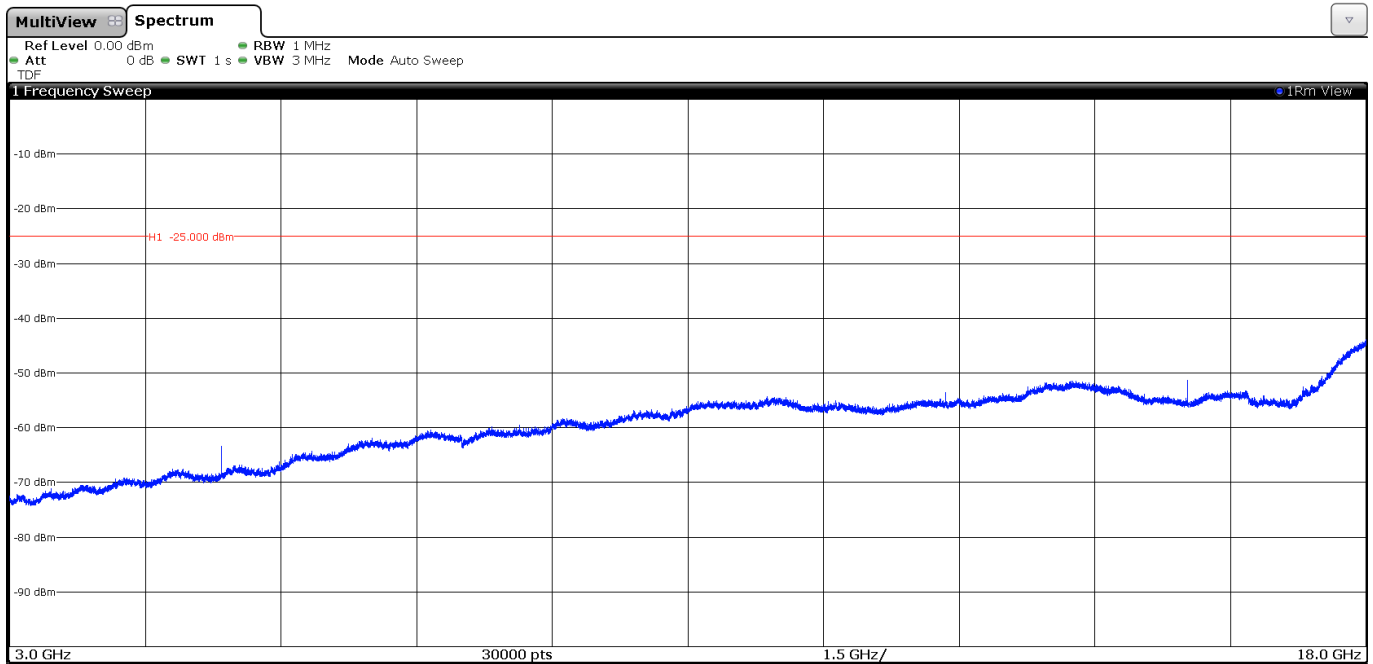
LTE Band 12 QPSK MODULATION. BW=5 MHz.
CHANNEL: HIGHEST



LTE Band 13 QPSK MODULATION. BW=5 MHz.
CHANNEL: LOWEST



LTE Band 41 QPSK MODULATION. BW=5 MHz.
CHANNEL: HIGHEST



Frequency range 18 GHz to 26.5 GHz.
LTE Band 41 QPSK MODULATION. BW=5 MHz.
CHANNEL: HIGHEST

