



Sverige



Accred. no. 10363
Testing
ISO/IEC 17025

Report On

FCC Testing of the
Ericsson Remote Radio Unit LTE and NB-IoT IB and NB-IoT GB KRC
161 707/2, Radio 8843 B2 B66A (2100 MHz), with compatible Main
Unit in a Base Station configuration in accordance with FCC CFR 47
Part 2, FCC CFR 47 Part 27

COMMERCIAL-IN-CONFIDENCE

FCC: TA8AKRC161707-2

PREPARED BY

APPROVED BY

DATED

Maggie Whiting
Key Account Manager

Steve Scarfe
Authorised Signatory

09 July 2020

Document 75949355 Report 02 Issue 2

July 2020



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SECTION 1

REPORT INFORMATION



1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name & Product Number	Radio 8843 B2 B66A & KRC 161 707/2
Serial Number(s)	E238267455
Software Version	CXP9013268/15 Rec R81KM
Hardware Version	R1H
Non-tested Variant	Radio 8843 B2 B66A & KRC 161 707/1
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2019 FCC CFR 47 Part 27: 2019
Test Plan	test plan for IoT for 8843 B2 B66A rev 5
Start of Test	07 June 2020
Finish of Test	03 July 2020
Name of Engineer(s)	Raj Kumar Kallem Hector Trujillo Ashok Kumar
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47 Part 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

K. Rajkumar

Hector Trujillo

Ashok Kumar

Raj Kumar Kallem

Hector Trujillo

Ashok Kumar

This Report has been up issued to Issue 2 and should be read in place of Issue 1. This Report has been up issued to issue 2 to replace the Declaration of Build Status.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 27 is shown below.

Section	Specification Clause		Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 27		
2.1	2.1046	27.50	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (h)	Band Edge	Pass
2.4	2.1051	27.53 (h)	Transmitter Spurious Emissions	Pass
2.5	2.1053	27.53	Radiated Emissions	Pass

Testing in this Report covers only B66A (2100 MHz).

For additional configurations and test cases not contained within this test report, refer to the following reports:

75949355 Report 01 – Radio 8843 B2 B66A (1800 MHz, B2)

Measurement Uncertainty Decision Statement

Determination of conformity with the specification limits is based on the results of the compliance measurement and does not take into account measurement instrumentation uncertainty as defined in ANSI C63.26:2015 Clause 1.3.



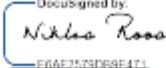
1.3 CONFIGURATION DESCRIPTION

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
1	LTE + NB-IoT GB	1	LTE 10 MHz + 2xNB IoT GB	2115.0	-	2175.0
			LTE 15 MHz + 2xNB IoT GB	2117.5	-	2172.5
			LTE 20 MHz + 2xNB IoT GB	2120.0	-	2170.0
2	LTE	2	LTE 20+20 MHz + 4xNB IoT GB	-	2150.0+2170.0	-
3	LTE	1	LTE 5 MHz + NB IoT IB	2112.5	-	2177.5
			LTE 20 MHz + NB IoT IB	2120.0	-	2170.0

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	Radio 8843 B2 B66A
PART NUMBER	KRC 161 707/2
IC Model Name	N/A
SERIAL NUMBER	E238267455
HARDWARE VERSION	R1H
SOFTWARE VERSION	CXP9013268/15
TRANSMITTER OPERATING RANGE	B2: 1930-1990 MHz B66A: 2110-2180 MHz
MODULATIONS	NR & LTE: QPSK, 16QAM, 64QAM, 256QAM
ITU DESIGNATION OF EMISSION	B2 LTE 5 MHz BW channel: 4M51W7D
	B2 LTE 10 MHz BW channel ¹ : 9M4W7D
	B2 LTE 15 MHz BW channel ¹ : 14M1W7D
	B2 LTE 20 MHz BW channel ¹ : 18M5W7D
	B2 LTE 20+20 MHz BW channel CA ¹ : 38M5W7D
	B66A LTE 5 MHz BW channel: 4M51W7D
	B66A LTE 10 MHz BW channel ¹ : 9M5W7D
	B66A LTE 15 MHz BW channel ¹ : 14M1W7D
	B66A LTE 20 MHz BW channel ¹ : 18M5W7D
	B66A LTE 20+20 MHz BW channel CA ¹ : 38M4W7D
	B2 NR 5 MHz BW channel: 4M47W7D
	B2 NR 10 MHz BW channel: 9M29W7D
	B2 NR 15 MHz BW channel: 14M1W7D
	B2 NR 20 MHz BW channel: 17M3W7D
	B2 NR 20+20 MHz BW channel CA: 38M8W7D
	B66A NR 5 MHz BW channel: 4M47W7D
	B66A NR 10 MHz BW channel: 9M29W7D
	B66A NR 15 MHz BW channel: 14M1W7D
	B66A NR 20 MHz BW channel: 17M3W7D
	B66A NR 20+20 MHz BW channel: 38M8W7D
OUTPUT POWER (RMS) (W or dBm)	B2: 4x40W or 2x60W B66A: 4x60W or 2x80W
FCC ID	TA8AKRC161707-2
IC ID	N/A
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Base Station Radio

¹ Including 2 NB-IoT GB carriers (4 with CA)

DocuSigned by:

 Signature
 Niklas Roos

Date 2020-07-08

No responsibility will be accepted by TÜV SÜD as to the accuracy of the information declared in this document by the manufacturer.

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

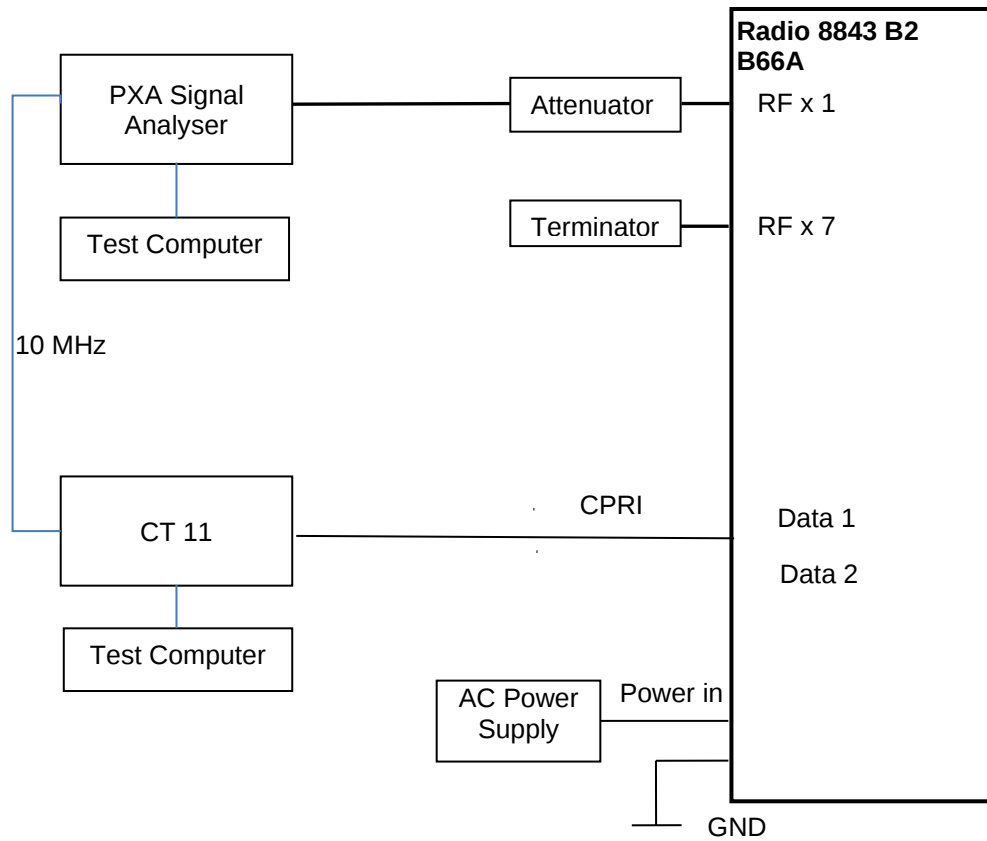
The Equipment Under Test (EUT) Radio 8843 B2 B66A is an Ericsson AB Radio Unit working in the public mobile service 2100 MHz band which provides communication connections to 2100MHz network. The Radio 8843 B2 B66A operates from a -48V DC supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

1.6 TEST SETUP





1.7 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated as described in the Test Method for each Test.

The EUT was powered from a -48V DC supply.

FCC Measurement Facility Registration Number
563983 Delta Test Laboratory, Vasteras
563983 Ericsson Test Laboratory, Kista

Under our group Swedac Accreditation, TÜV SÜD Sverige conducted the following tests Delta Test Lab, Vasteras.

Test Name	Name of Engineer(s)
Radiated Emissions	Hector Trujillo, Ashok Kumar

Under our group Swedac Accreditation, TÜV SÜD Sverige conducted the following tests Ericsson Test Lab, Kista.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Rajkumar Kallem
Occupied Bandwidth	Rajkumar Kallem
Band Edge	Rajkumar Kallem
Transmitter Spurious Emissions	Rajkumar Kallem

1.8 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.10 ADDITIONAL INFORMATION

Testing was performed in the presence of Tomas Johansson at Ericsson AB, Kista, Sweden.



SECTION 2

TEST DETAILS



2.1 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 27, Clause 27.50

2.1.2 Date of Test and Modification State

07 June 2020 - Modification State 0

2.1.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.4 Environmental Conditions

Ambient Temperature 22.7°C
Relative Humidity 32.6%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

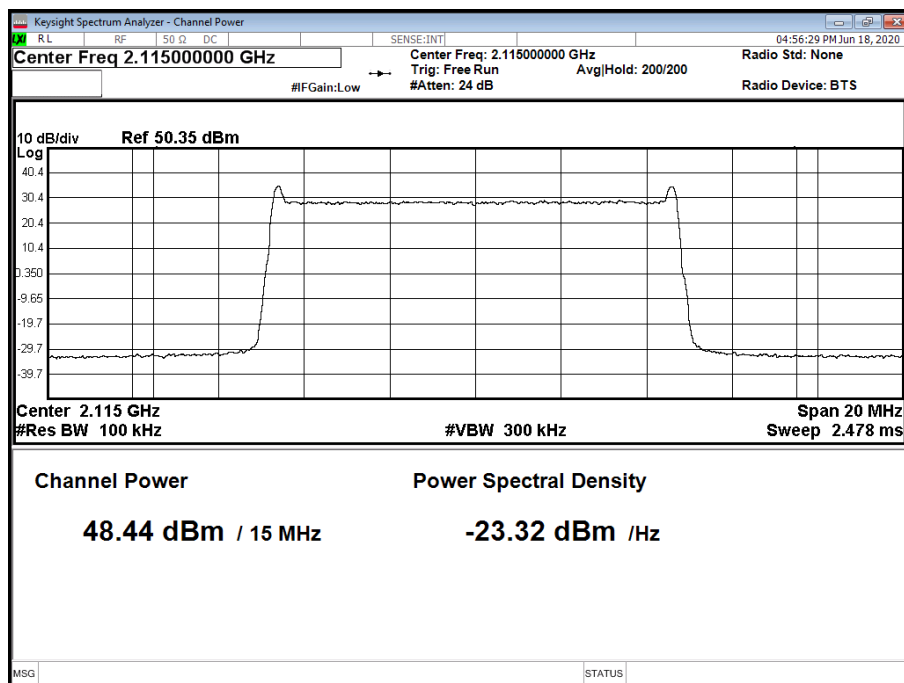
2.1.6 Test Results

Configuration 1

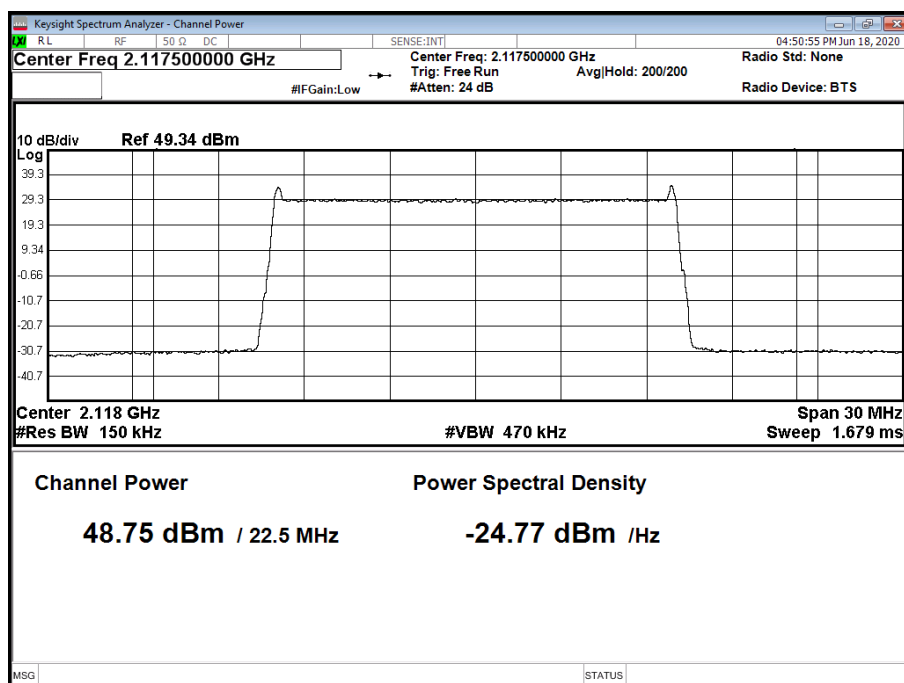
Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B _{RFBW}		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM / N:QPSK / N:QPSK	10.0 MHz +2xNB IoT GB	7.16	48.44	-
A	64QAM / N:QPSK / N:QPSK	15.0 MHz +2xNB IoT GB	7.14	48.75	-
A	64QAM / N:QPSK / N:QPSK	20.0 MHz +2xNB IoT GB	7.15	48.60	-

Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW

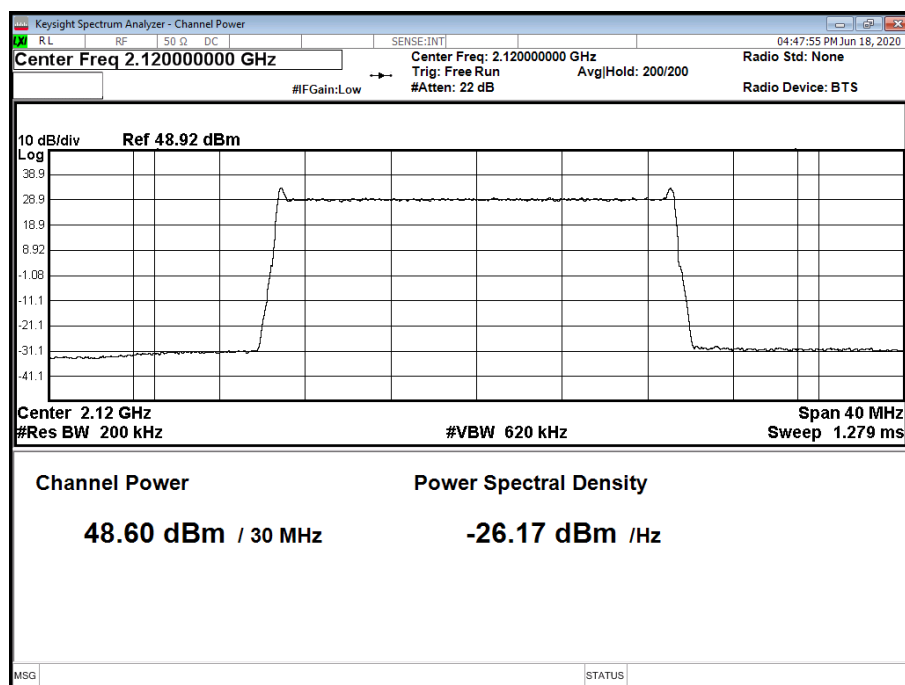


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW





Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW

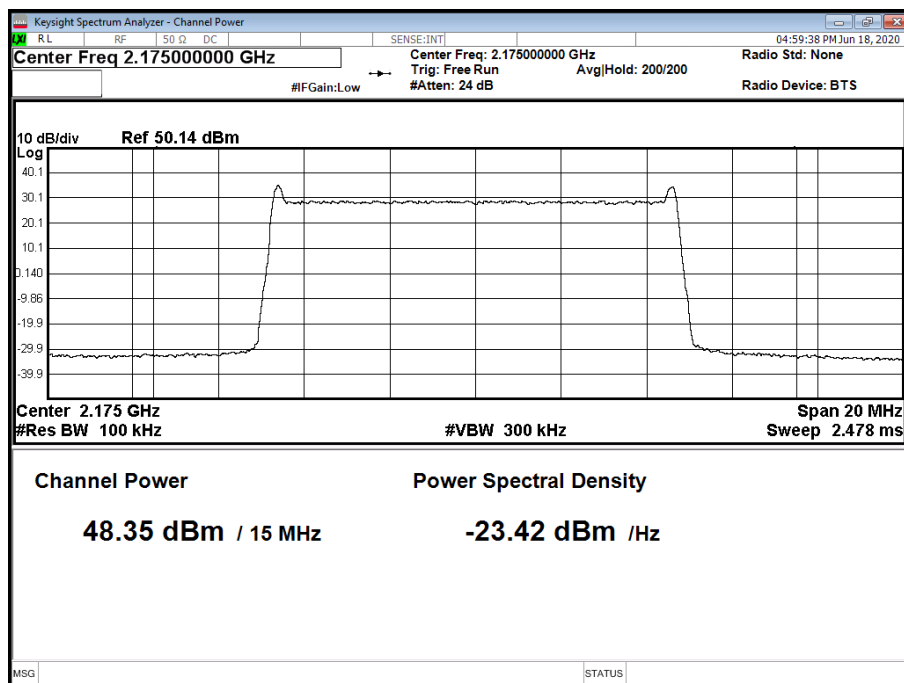


Configuration 1

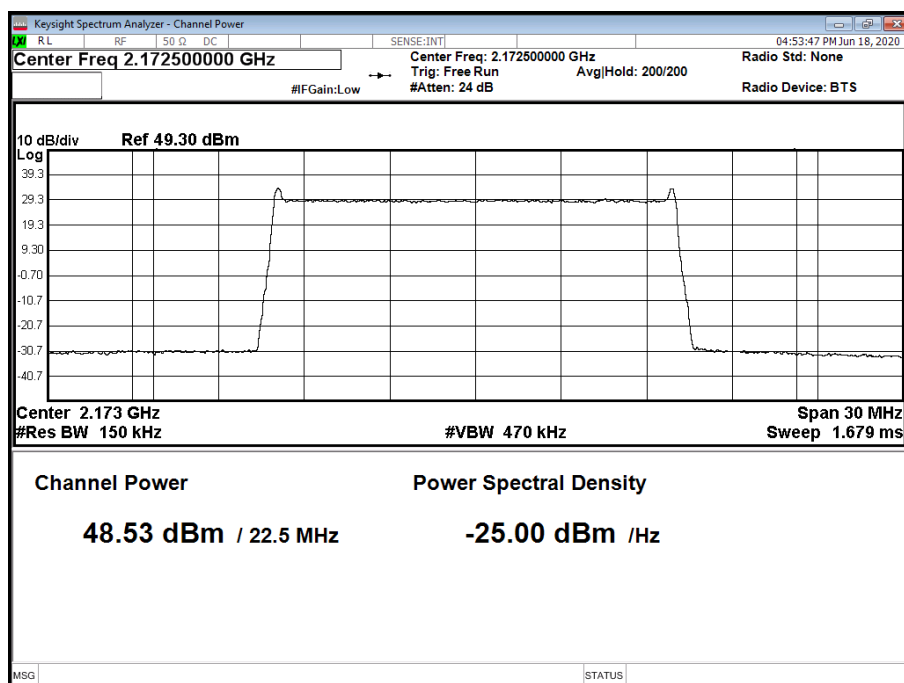
Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T _{RFBW}		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM / N:QPSK / N:QPSK	10.0 MHz +2xNB IoT GB	7.17	48.35	-
A	64QAM / N:QPSK / N:QPSK	15.0 MHz +2xNB IoT GB	7.17	48.53	-
A	64QAM / N:QPSK / N:QPSK	20.0 MHz +2xNB IoT GB	7.22	48.48	-

Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW

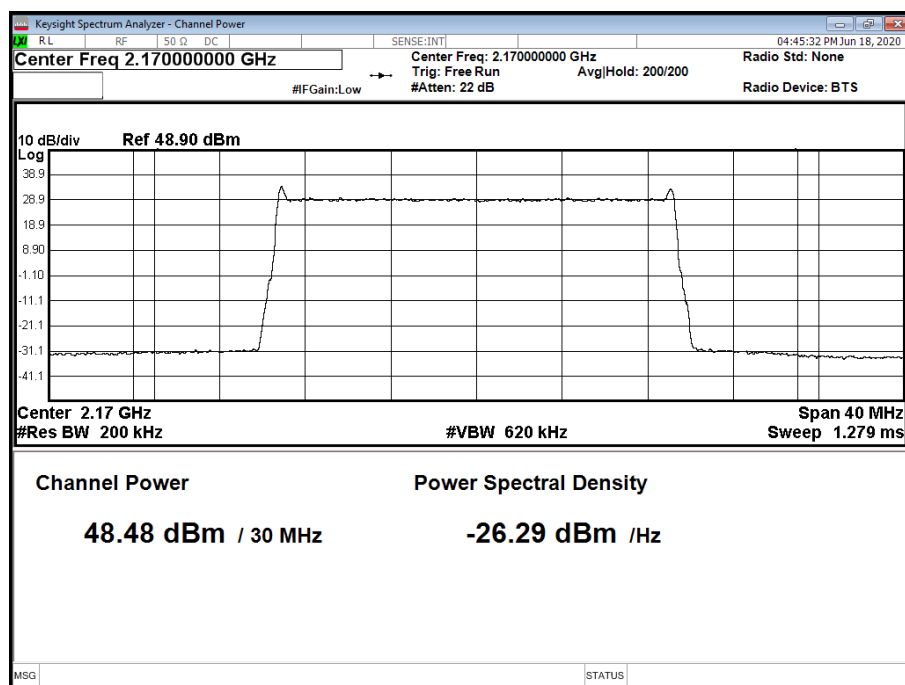


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW





Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW



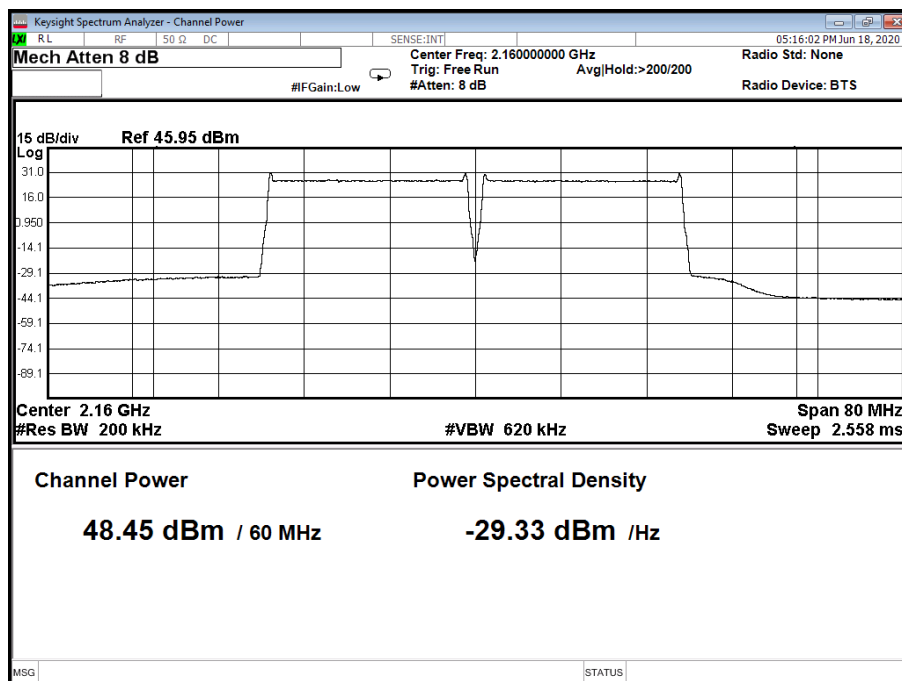
Configuration 2

Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M _{TRFBW}		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK	20 + 20.0 MHz +4xNB IoT GB	-	48.45	-



Antenna A - LTE / NB-IoT GB Modulation 64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK /
N:QPSK - LTE / NB-IoT GB Carrier Bandwidth 20 + 20.0 MHz +4xNB IoT GB - Channel Position
MRFBW



Configuration 3

Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT IB Modulation	LTE / NB-IoT IB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B _{RFBW}		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM / N:QPSK	LTE 5.0 MHz +NB-IoT IB	7.45	47.88	-
A	64QAM / N:QPSK	LTE 20.0 MHz +NB-IoT IB	7.42	48.18	-

Configuration 3

Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT IB Modulation	LTE / NB-IoT IB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T _{RFBW}		
			PAR (dB)	Average Power	
				dBm	dBm/MHz
A	64QAM / N:QPSK	LTE 5.0 MHz +NB-IoT IB	7.44	47.70	-
A	64QAM / N:QPSK	LTE 20.0 MHz +NB-IoT IB	7.45	48.22	-



Limit	
Peak Power	$\leq 1640 \text{ W/MHz}$ or $\leq +62.15 \text{ dBm}$
Peak to Average Ratio	13 dB



2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 27, Clause 27.53

2.2.2 Date of Test and Modification State

07 June 2020 - Modification State 0

2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.4 Environmental Conditions

Ambient Temperature 22.7°C
Relative Humidity 32.6%

2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

2.2.6 Test Results

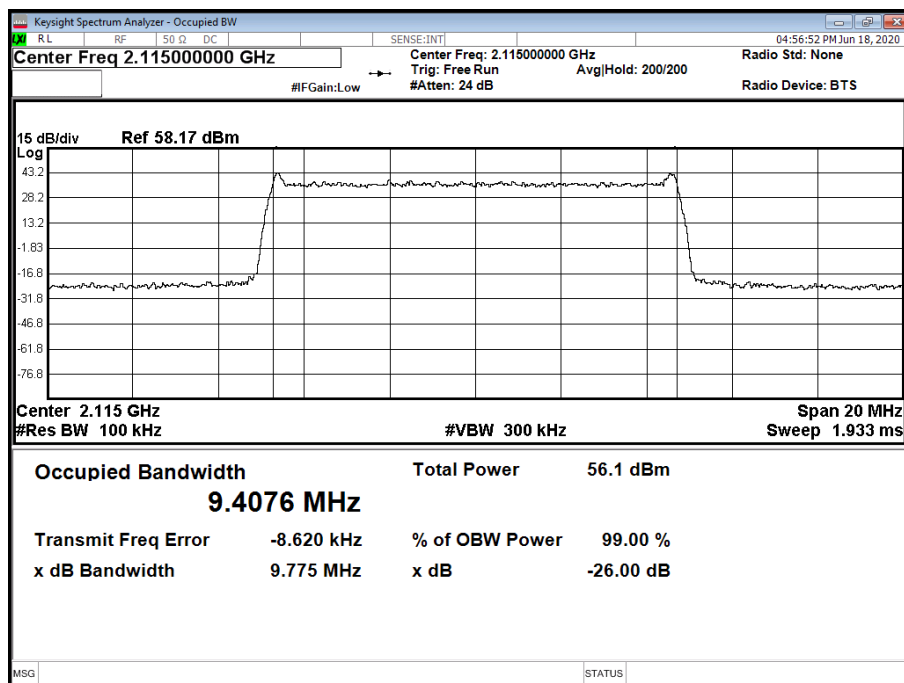
Configuration 1

Maximum Output Power 49 dBm

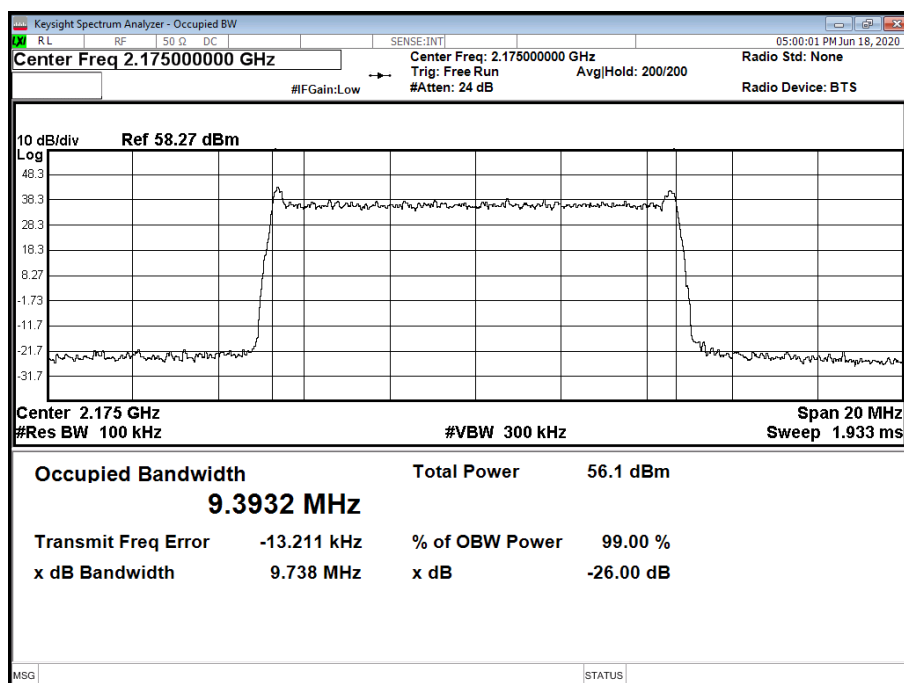
Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Result (MHz)					
			Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	64QAM / N:QPSK / N:QPSK	10.0 MHz +2xNB IoT GB	9.407	9.775	-	-	9.393	9.738
A	64QAM / N:QPSK / N:QPSK	15.0 MHz +2xNB IoT GB	14.007	14.635	-	-	14.051	14.639
A	64QAM / N:QPSK / N:QPSK	20.0 MHz +2xNB IoT GB	18.431	19.306	-	-	18.444	19.323



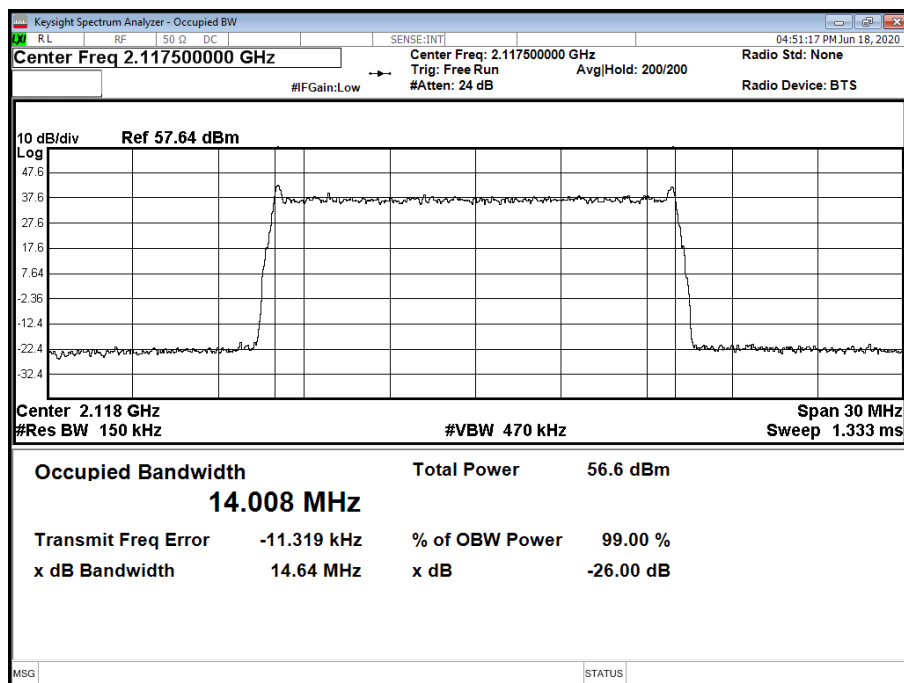
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW



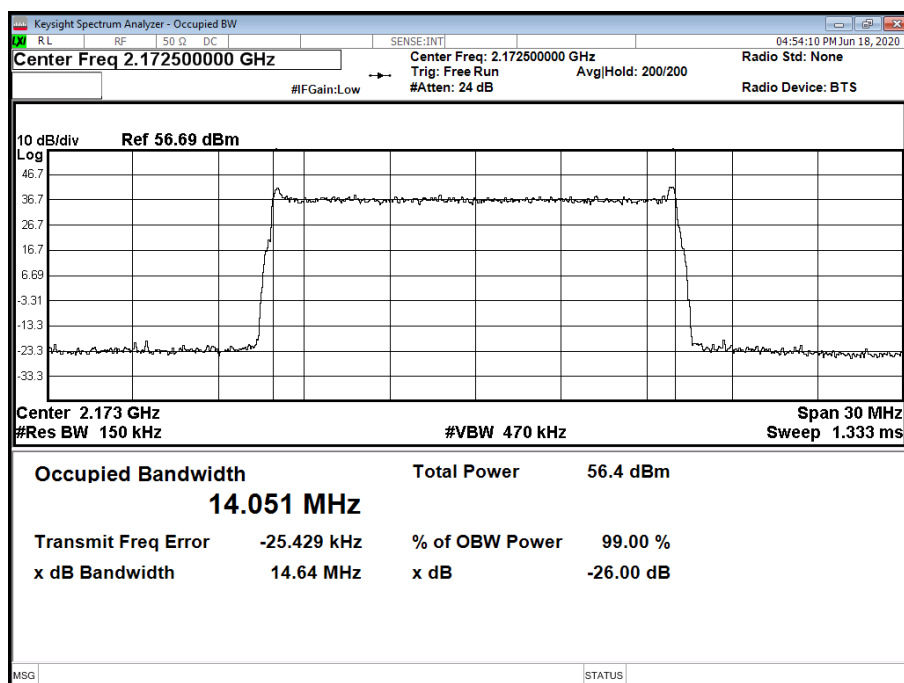
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW

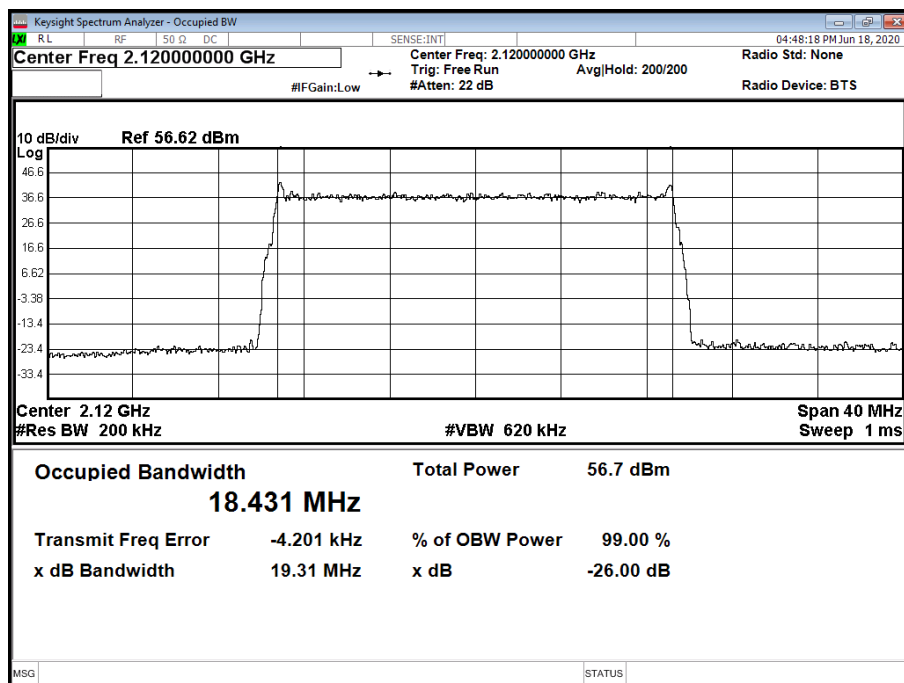


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW

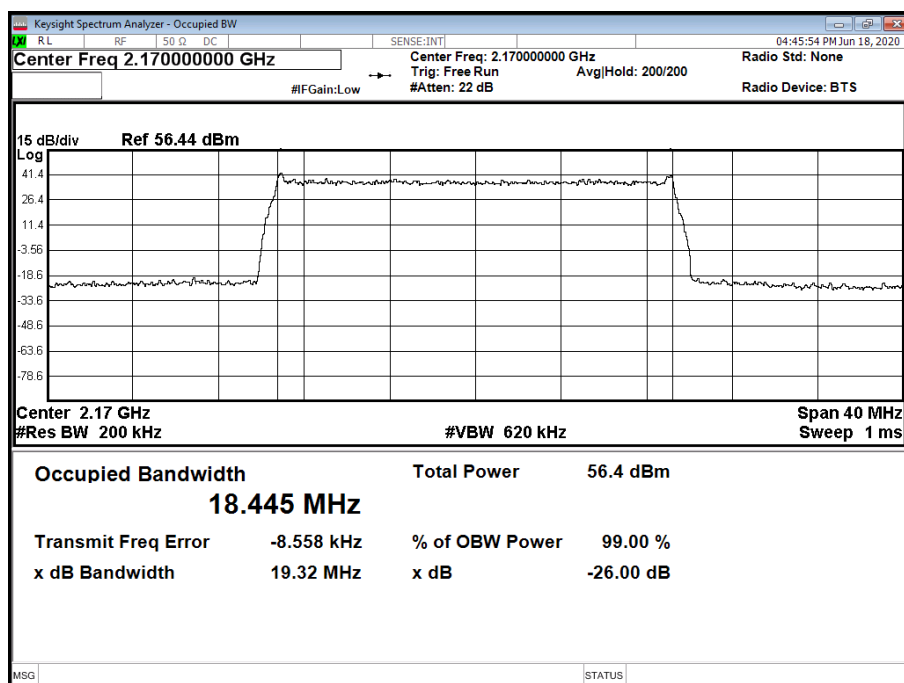




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW



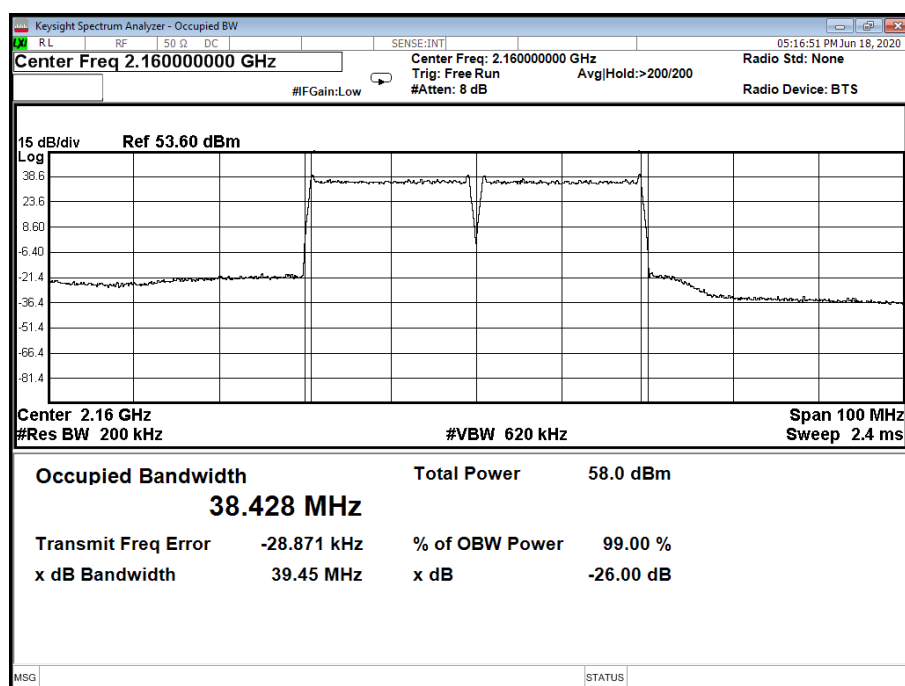


Configuration 2

Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Result (MHz)					
			Channel Position BRFBW		Channel Position MRFBW		Channel Position TRFBW	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK	20 + 20.0 MHz +4xNB IoT GB	-	-	38.43	38.43	-	-

Antenna A - LTE / NB-IoT GB Modulation 64QAM / 64QAM / N:QPSK / N:QPSK / N:QPSK / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth 20 + 20.0 MHz +4xNB IoT GB - Channel Position MRFBW





2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (h)

2.3.2 Date of Test and Modification State

07 June 2020 - Modification State 0

2.3.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.4 Environmental Conditions

Ambient Temperature 22.7°C
Relative Humidity 32.6%

2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by $10 * \log(N)$, where N is equal to the number of MIMO antenna ports.

For single port, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(1) = -13 \text{ dBm}$.

For four port, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(4) = -19 \text{ dBm}$.

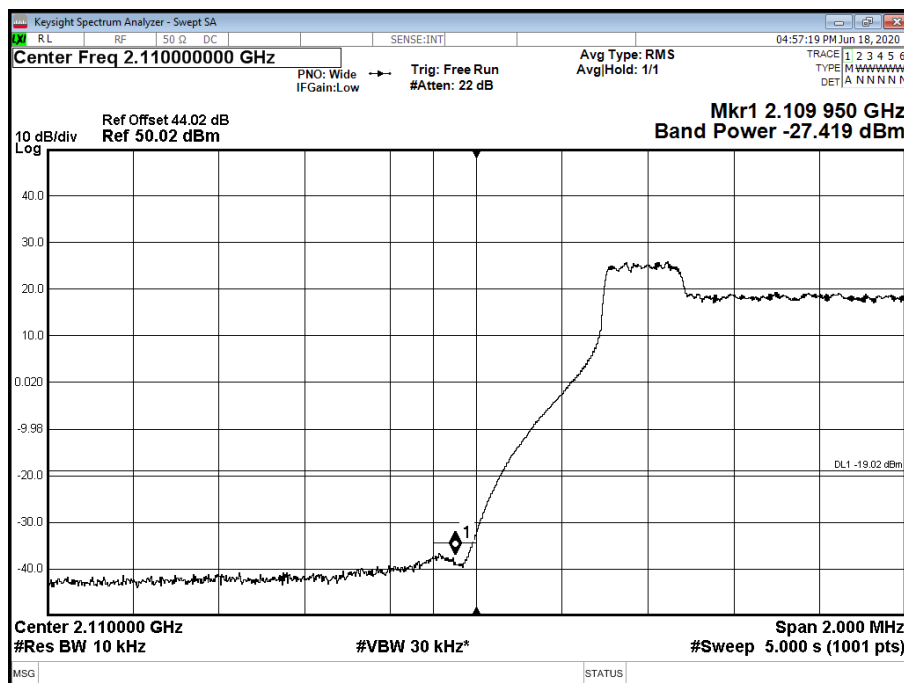
2.3.6 Test Results

Configuration 1

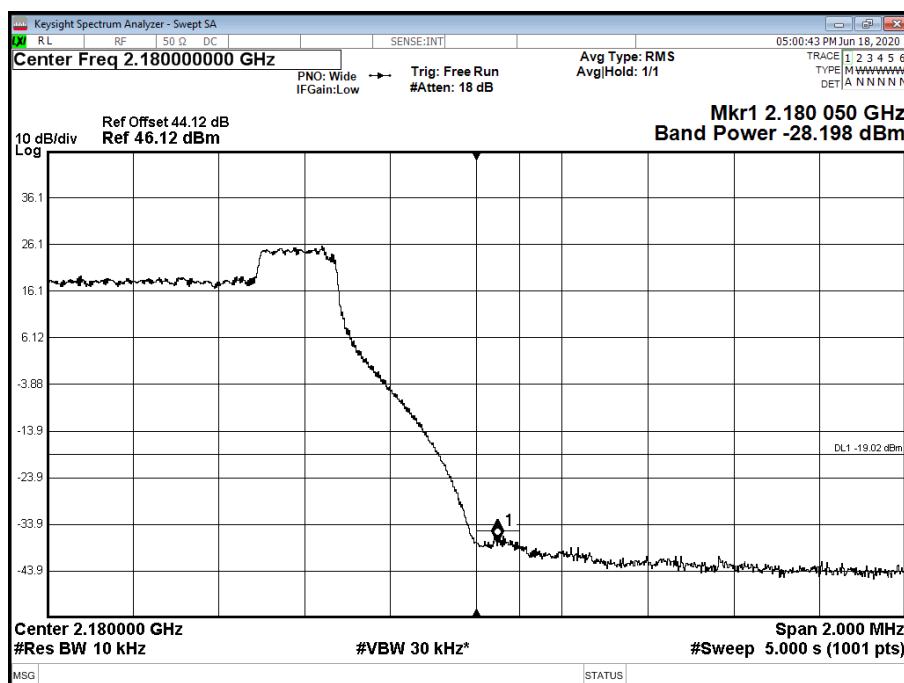
Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B _{RFBW}	Channel Position T _{RFBW}
A	64QAM / N:QPSK / N:QPSK	10.0 MHz +2xNB IoT GB	2115	2175
A	64QAM / N:QPSK / N:QPSK	15.0 MHz +2xNB IoT GB	2117.5	2172.5
A	64QAM / N:QPSK / N:QPSK	20.0 MHz +2xNB IoT GB	2120	2170

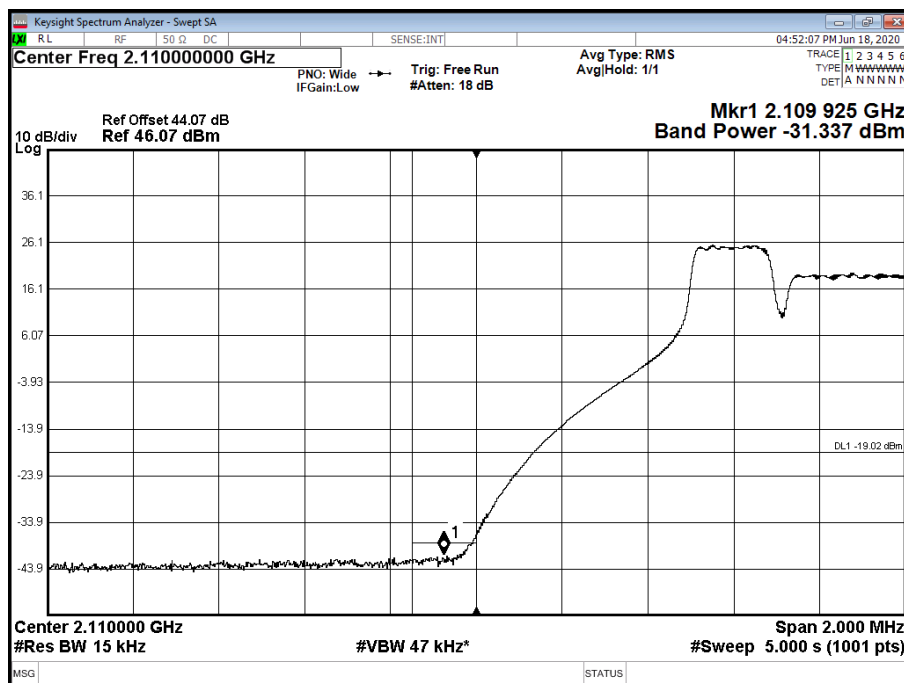
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW



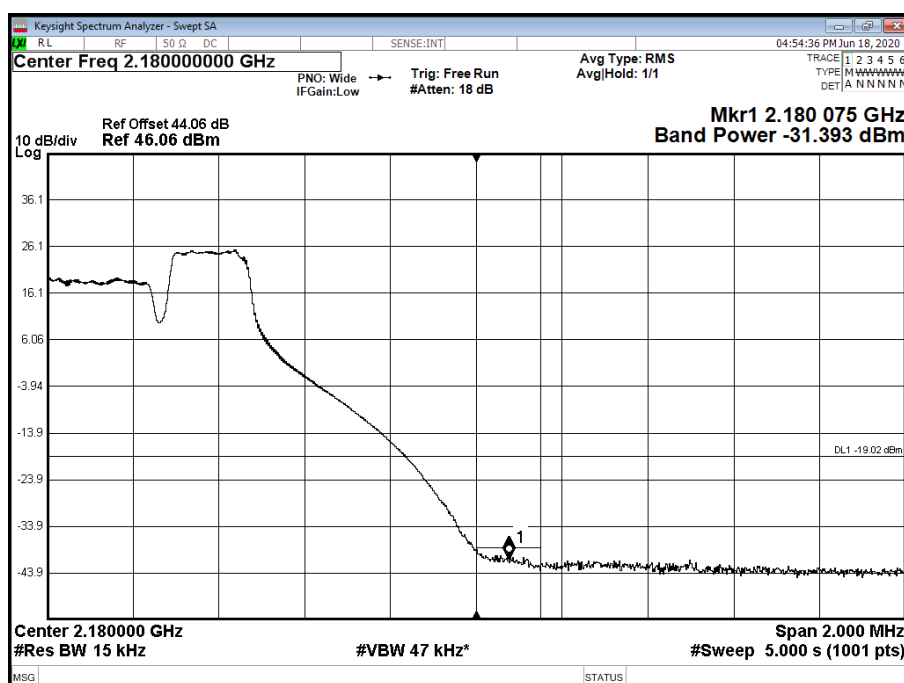
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW



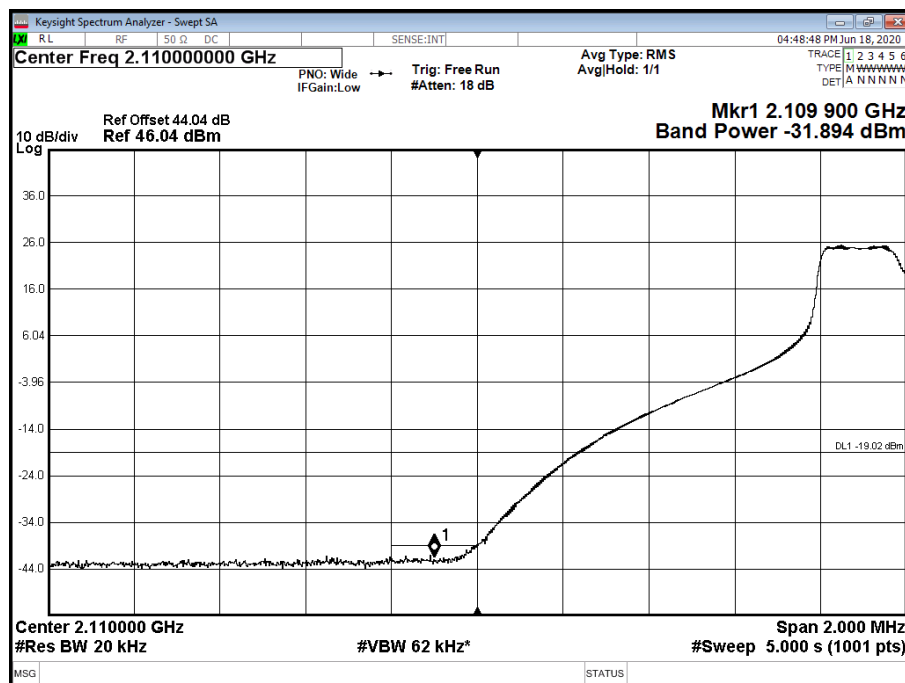
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW



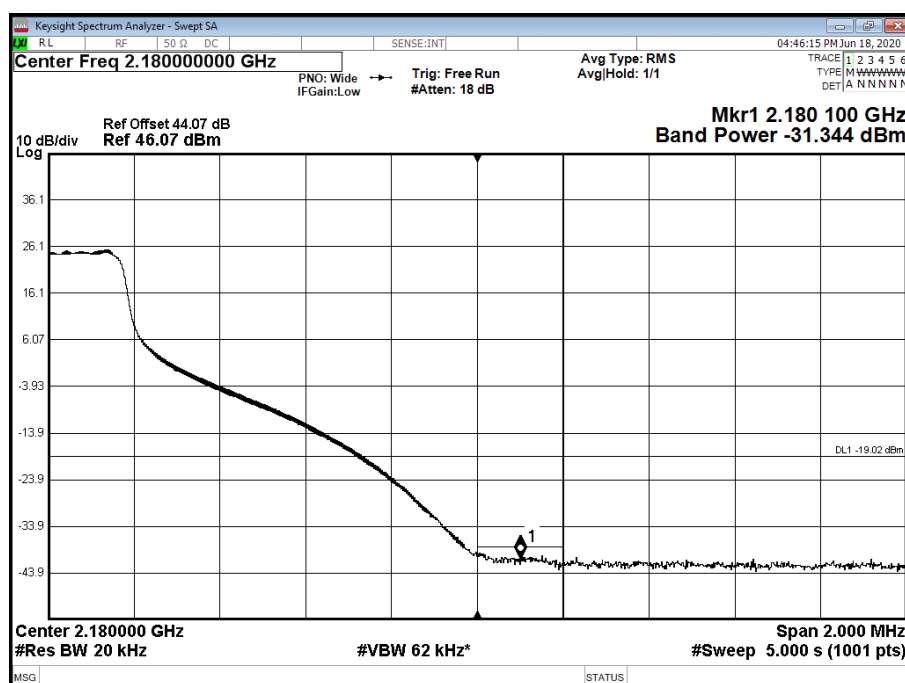
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW

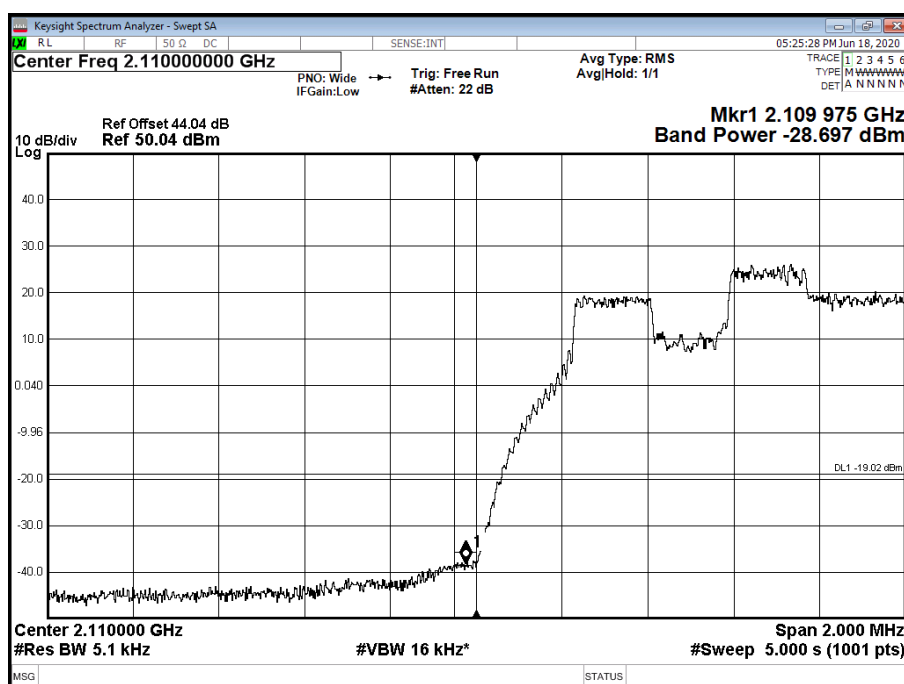


Configuration 3

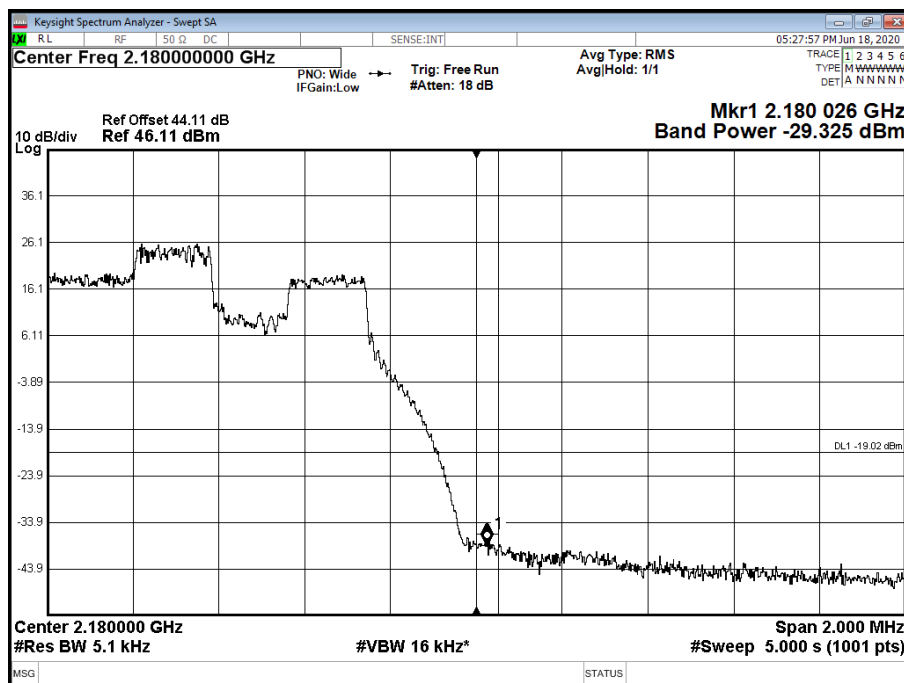
Maximum Output Power 49 dBm

Antenna	LTE / NB-IoT IB Modulation	LTE / NB-IoT IB Carrier Bandwidth	Band Edge (MHz)	
			Channel Position BRFBW	Channel Position TRFBW
A	64QAM / N:QPSK	LTE 5.0 MHz +NB-IoT IB	2112.5	2177.5
A	64QAM / N:QPSK	LTE 20.0 MHz +NB-IoT IB	2120	2170

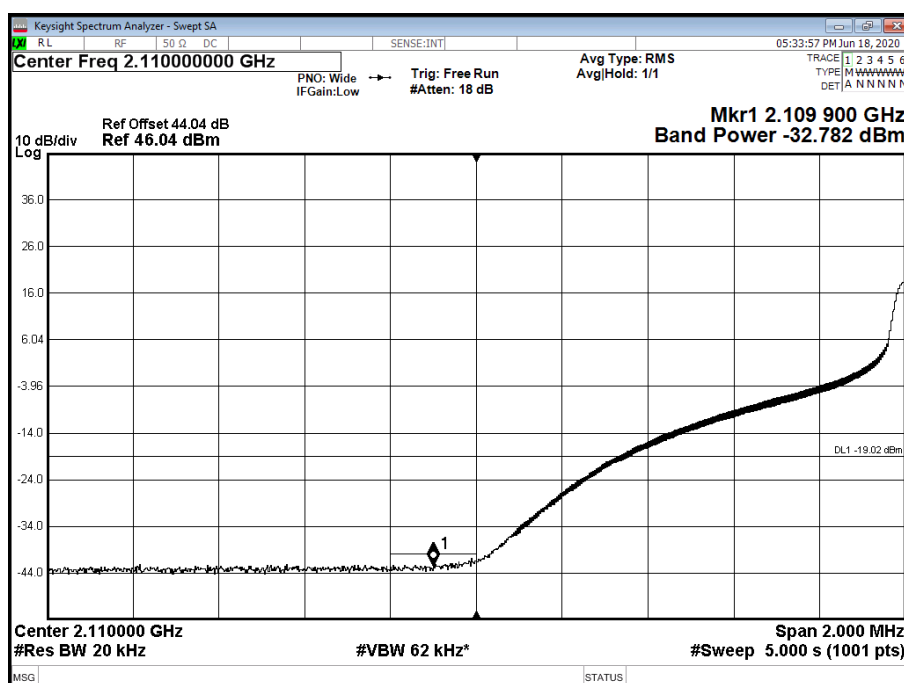
Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth LTE 5.0 MHz +NB-IoT IB - Channel Position BRFBW



Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth
LTE 5.0 MHz +NB-IoT IB - Channel Position TRFBW

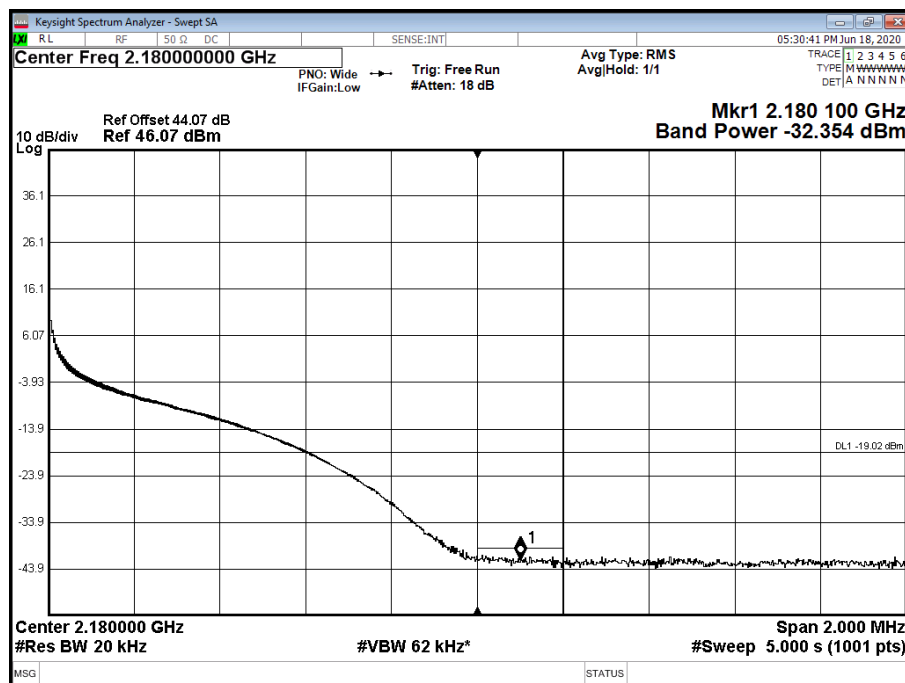


Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth
LTE 20.0 MHz +NB-IoT IB- Channel Position BRFBW





Antenna A - LTE / NB-IoT IB Modulation 64QAM / N:QPSK - LTE / NB-IoT IB Carrier Bandwidth
LTE 20.0 MHz +NB-IoT IB- Channel Position TRFBW



Limit	-19 dBm
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2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53 (h)

2.4.2 Date of Test and Modification State

13 June 2020 - Modification State 0

2.4.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.4 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	36.2 %

2.4.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01.

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by $10 * \log(N)$, where N is equal to the number of MIMO antenna ports.

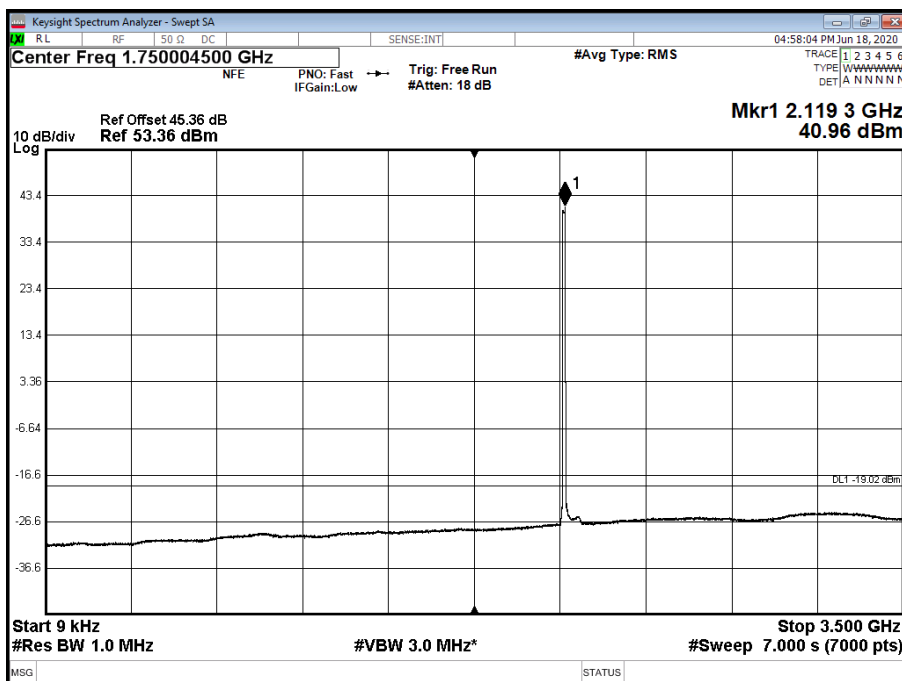
For four ports, the limit was calculated as being $-13 \text{ dBm} - 10 * \log(4) = -19 \text{ dBm}$.

2.4.6 Test Results

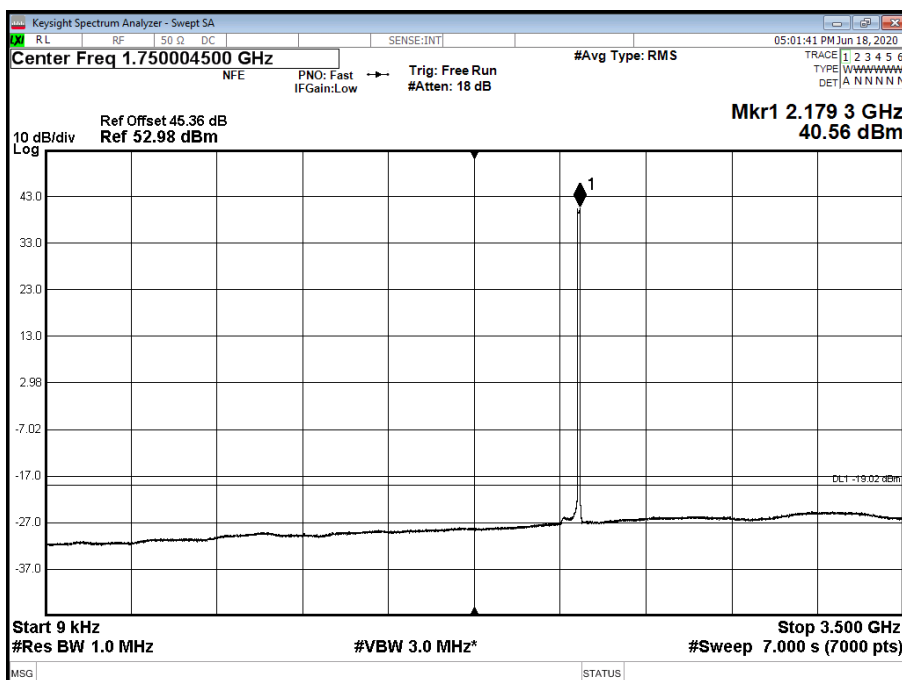
Configuration 1

Maximum Output Power 49 dBm

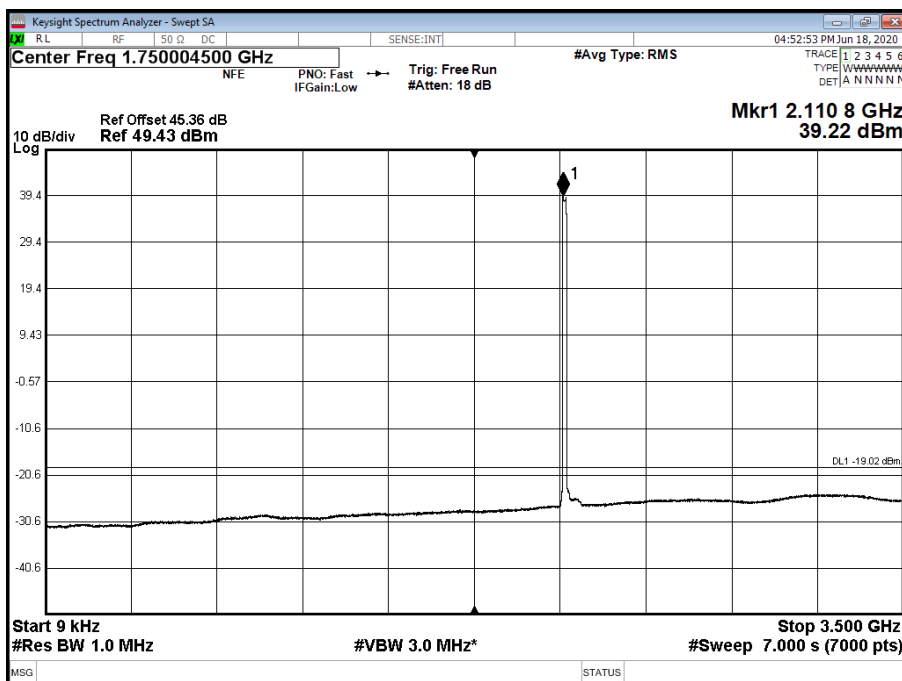
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 1 - Range 0.009
to 3500 MHz



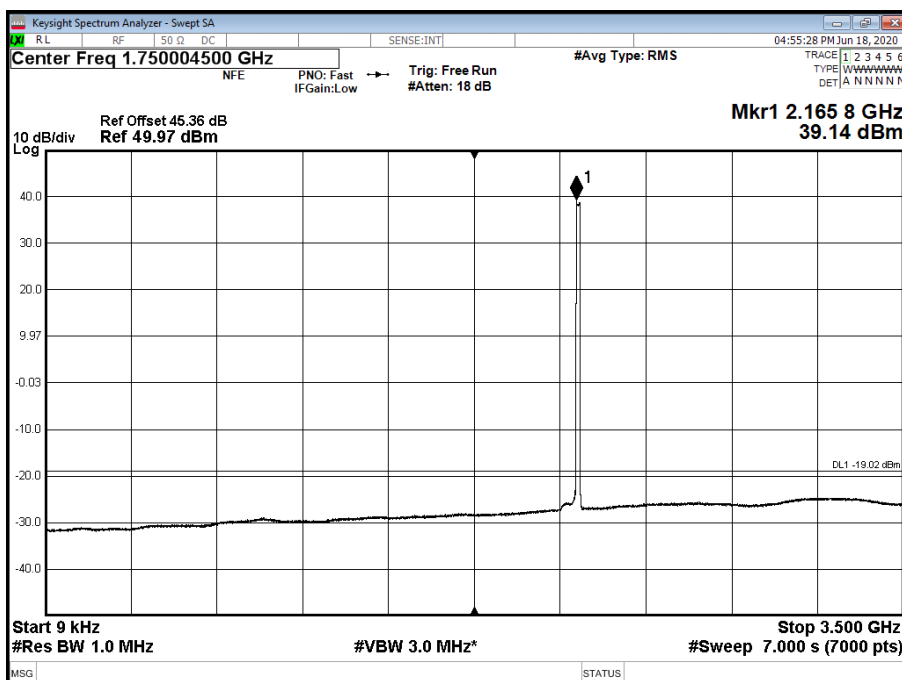
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 1 - Range 0.009
to 3500 MHz



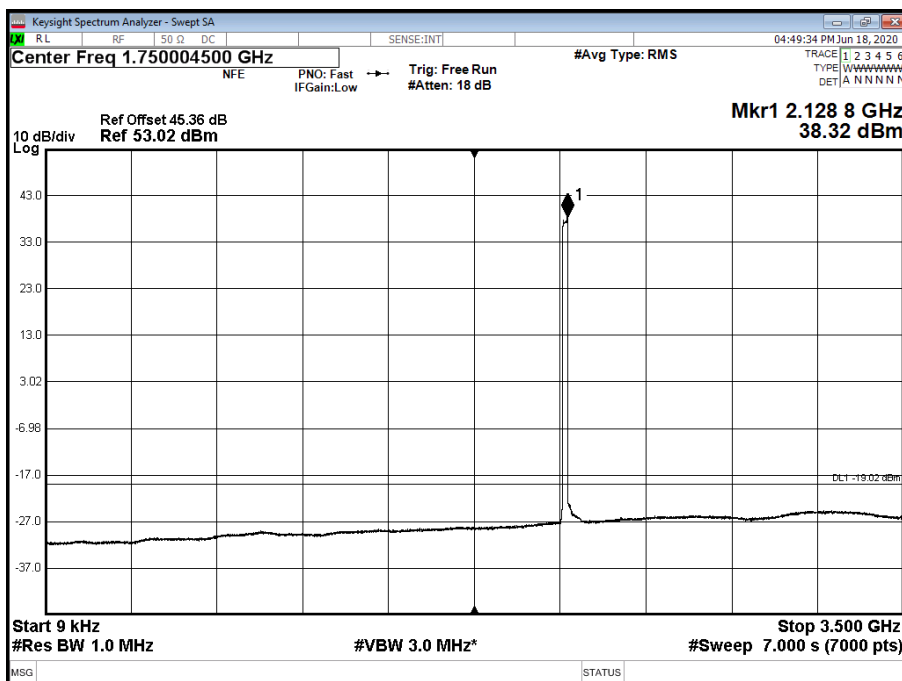
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 1 - Range 0.009
to 3500 MHz



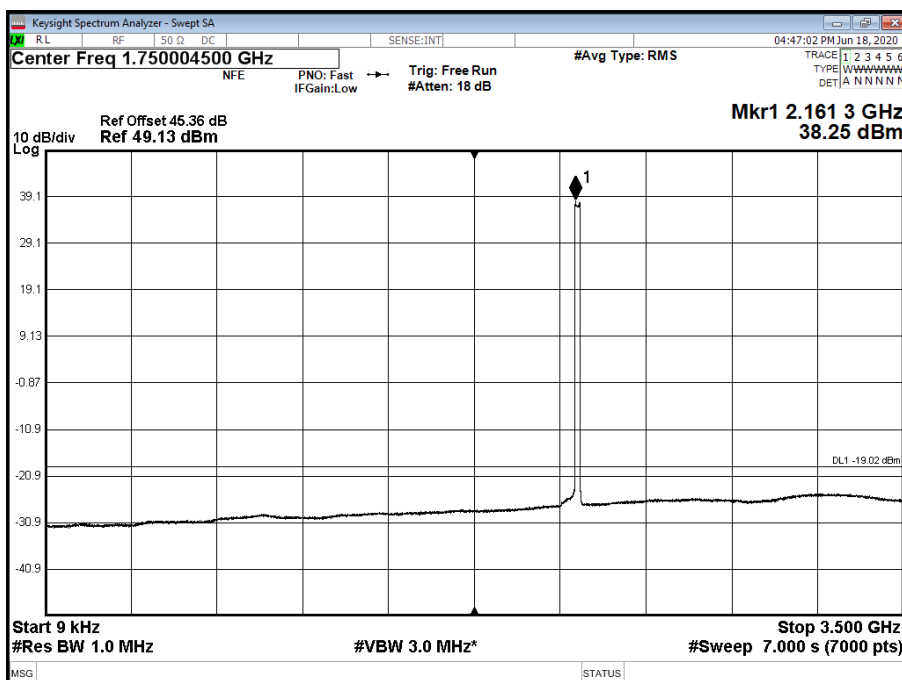
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 1 - Range 0.009
to 3500 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 1 - Range 0.009
to 3500 MHz

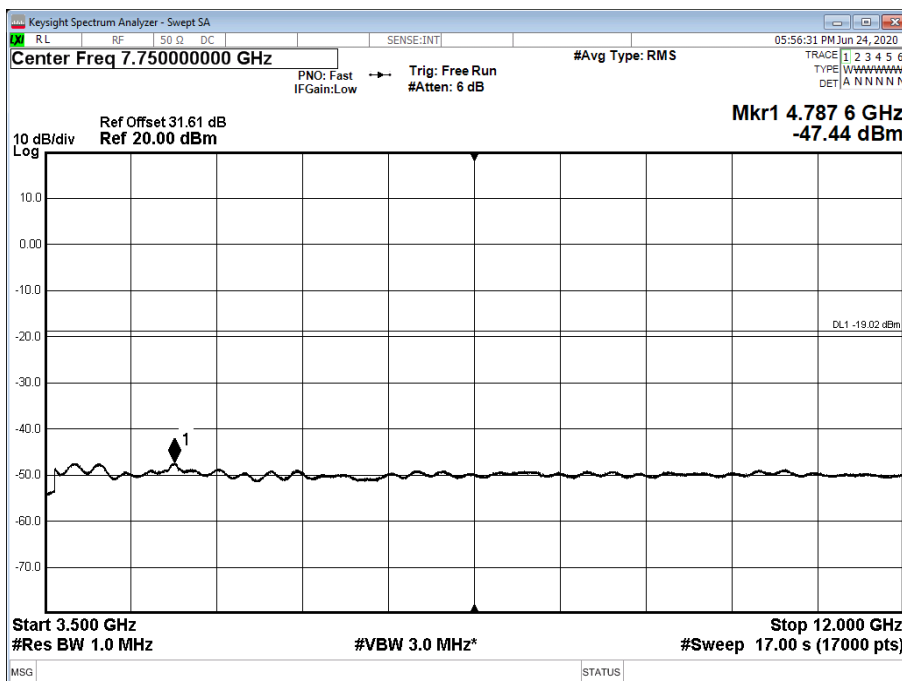


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 1 - Range 0.009
to 3500 MHz

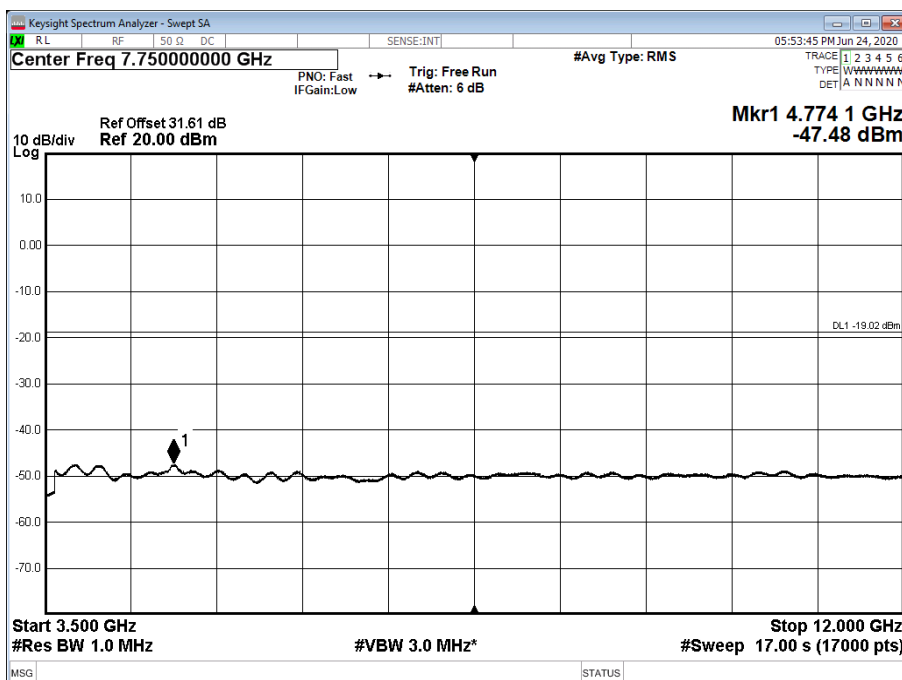




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500
to 12000 MHz

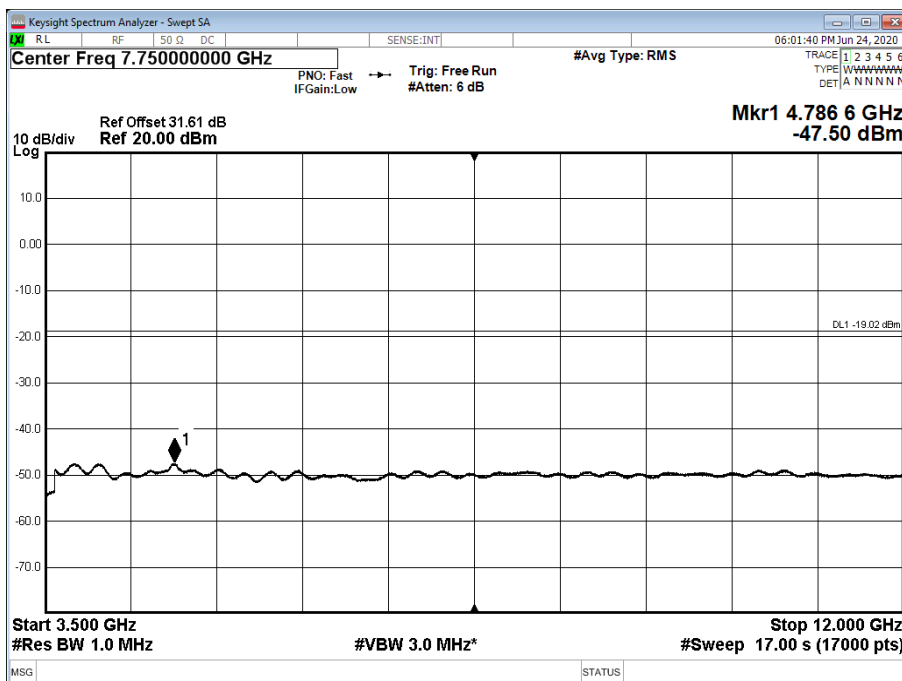


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500
to 12000 MHz

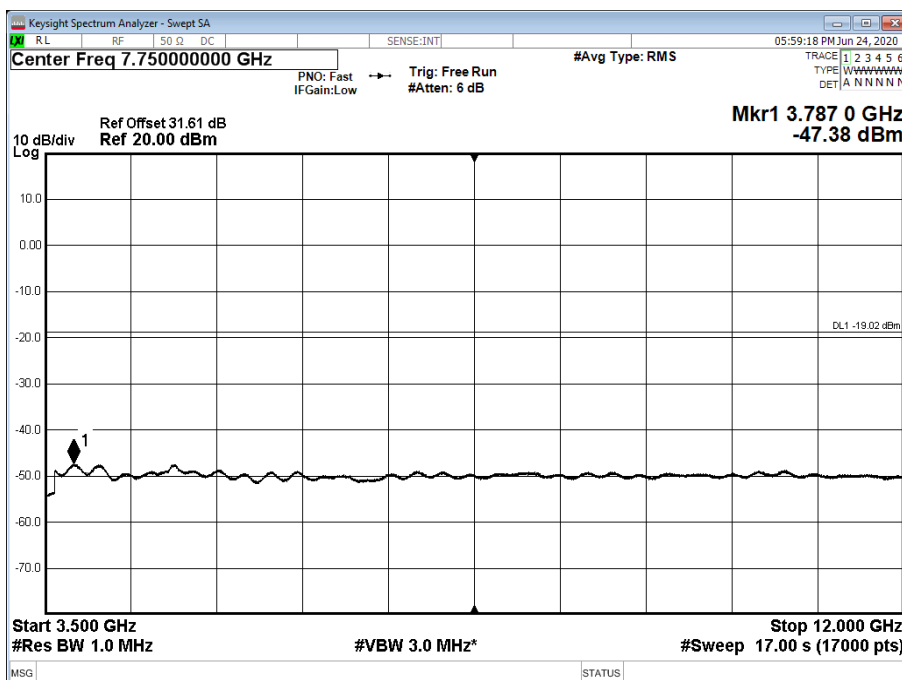




Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500
to 12000 MHz

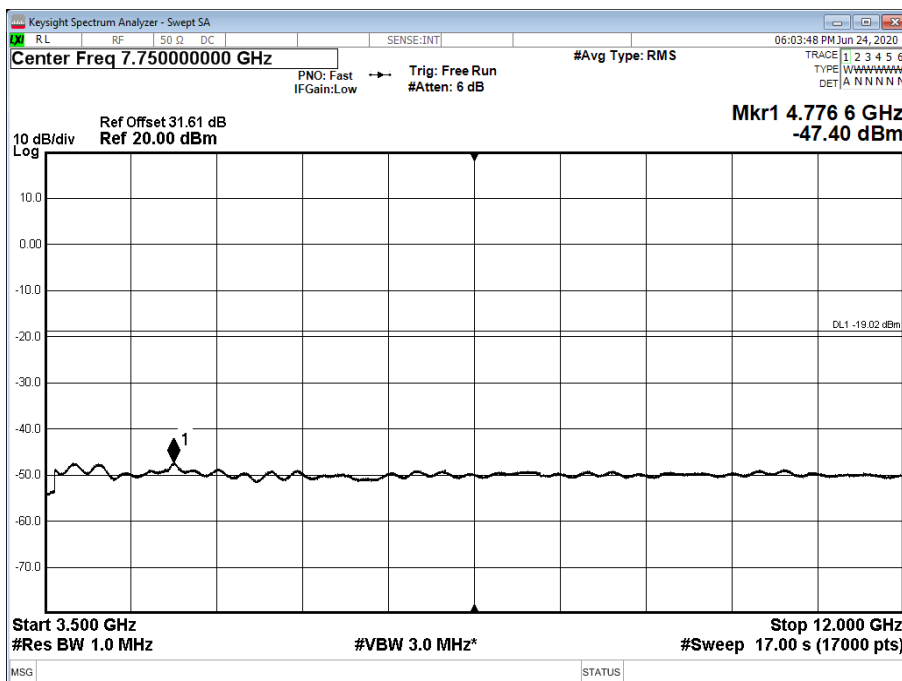


Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500
to 12000 MHz

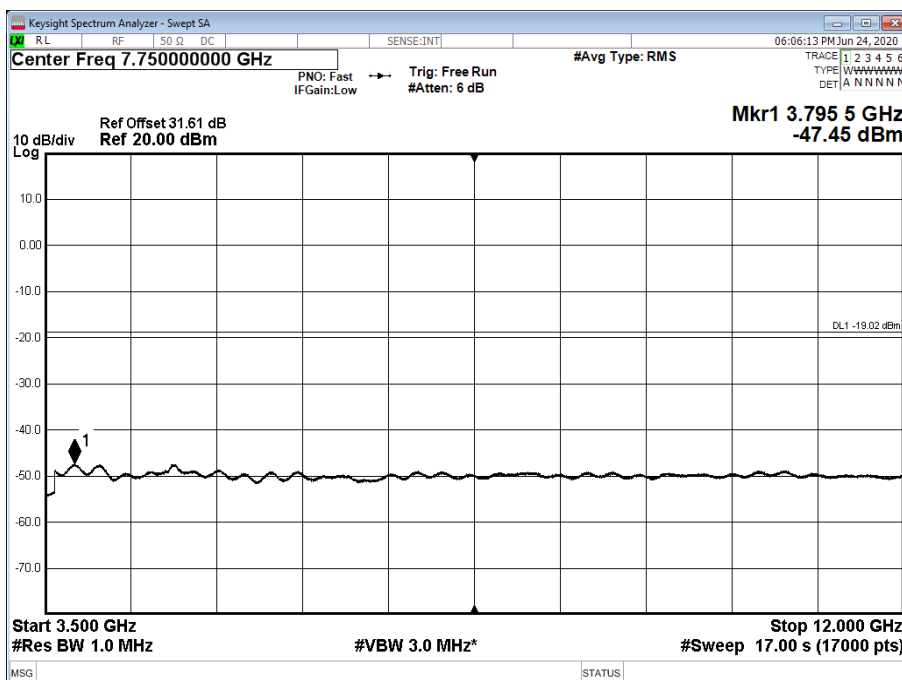




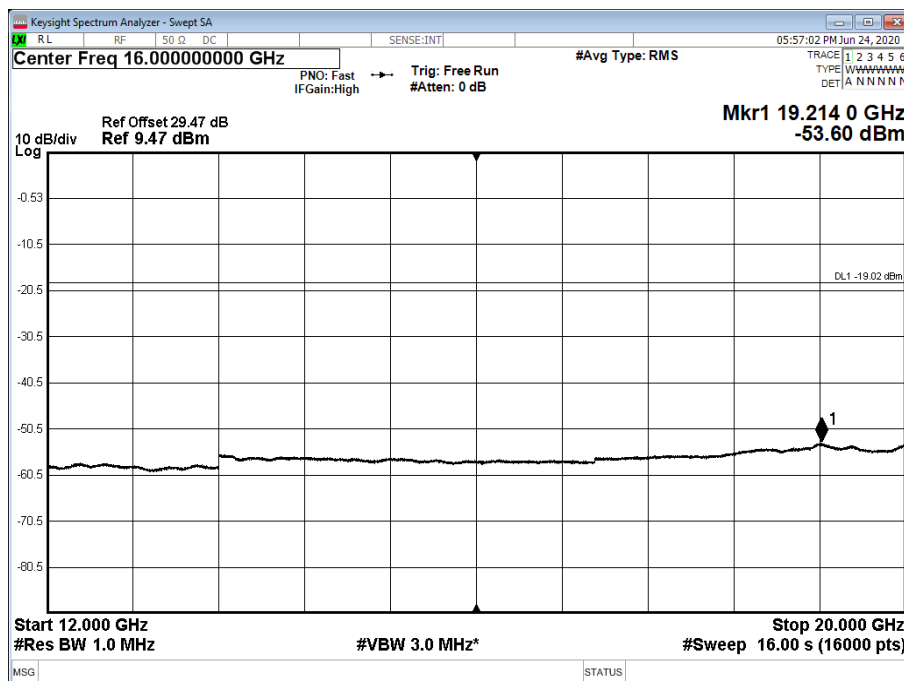
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 2 - Range 3500
to 12000 MHz



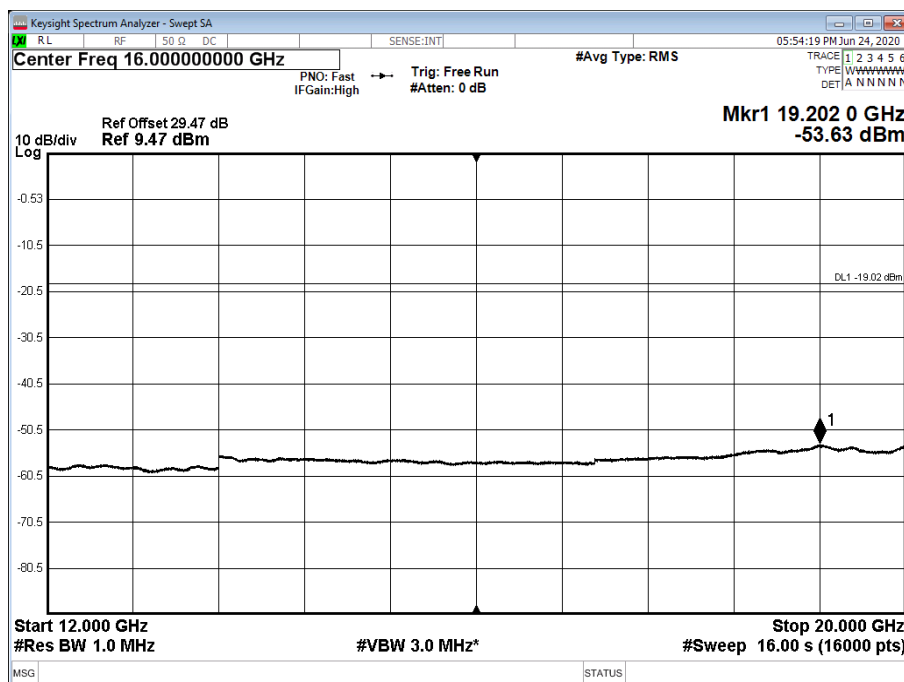
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 2 - Range 3500
to 12000 MHz



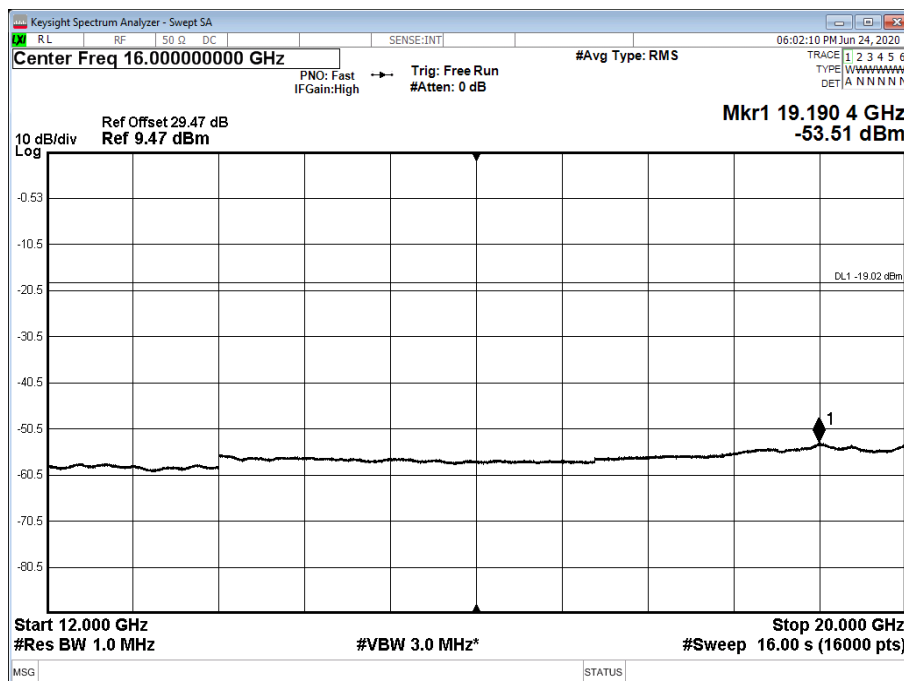
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range
12000 to 20000 MHz



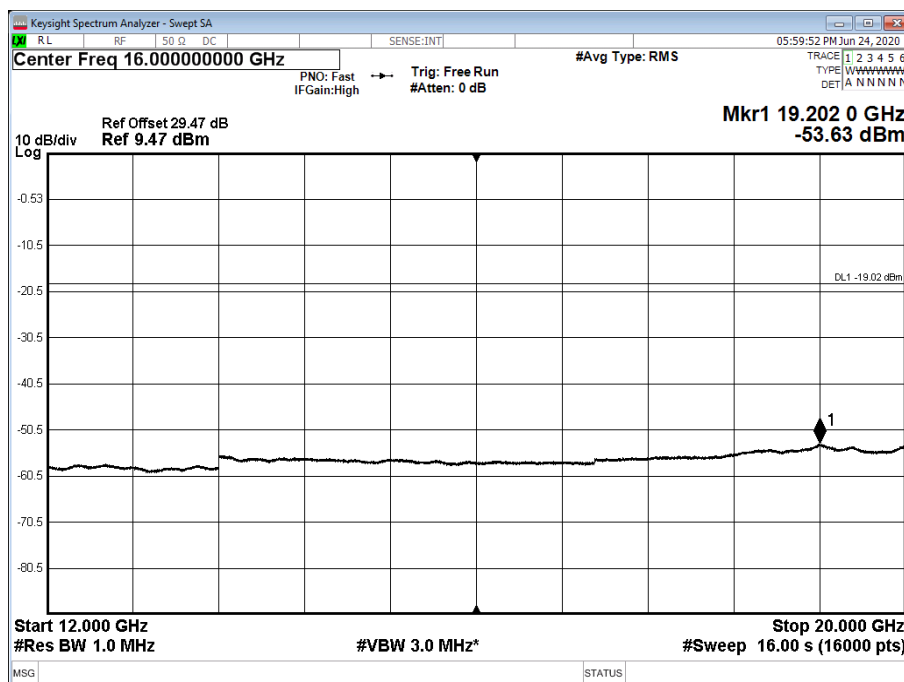
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range
12000 to 20000 MHz



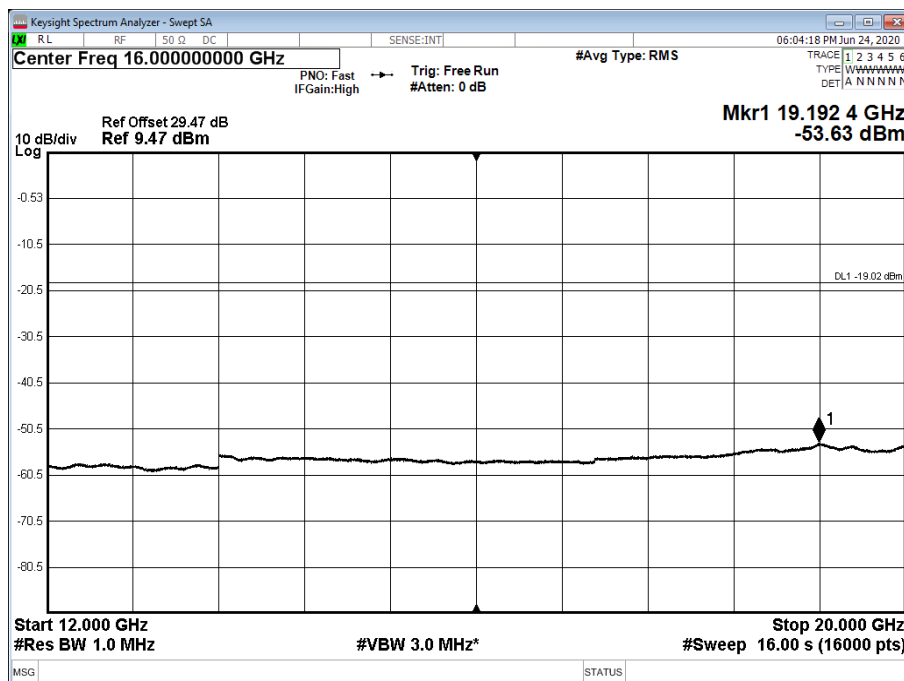
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range
12000 to 20000 MHz



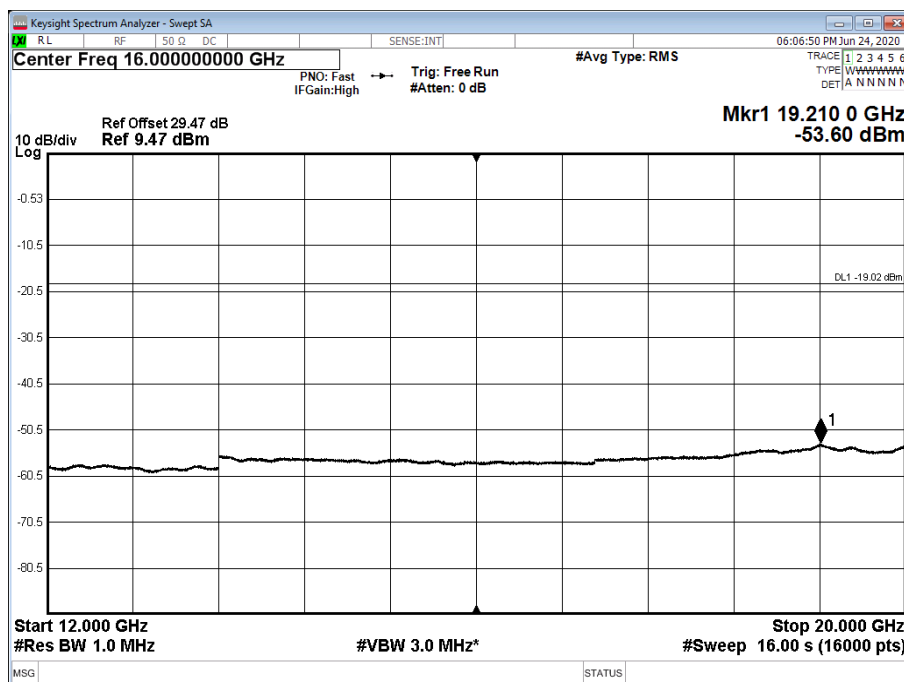
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range
12000 to 20000 MHz



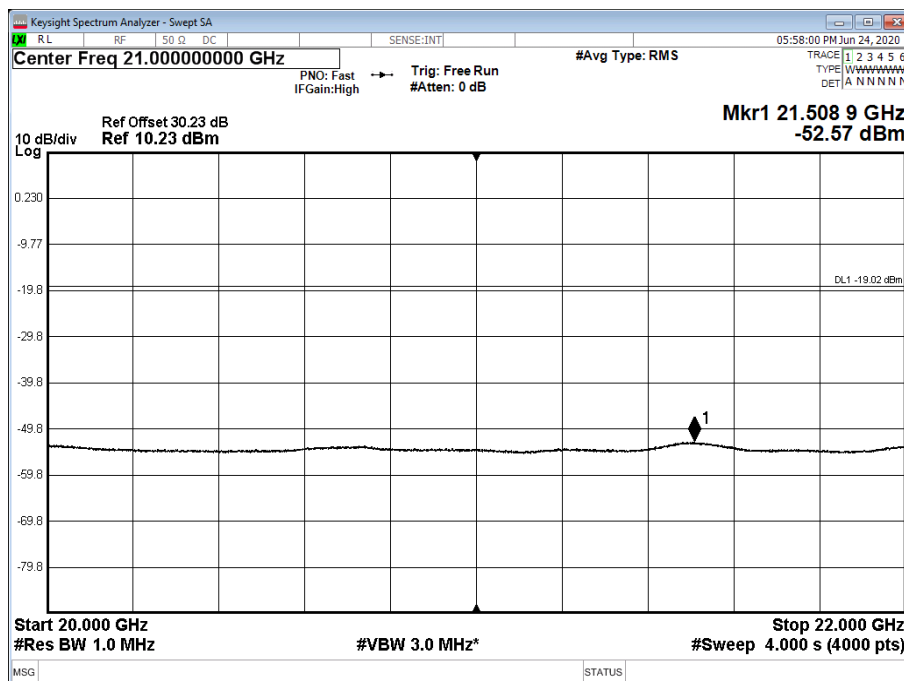
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 3 - Range
12000 to 20000 MHz



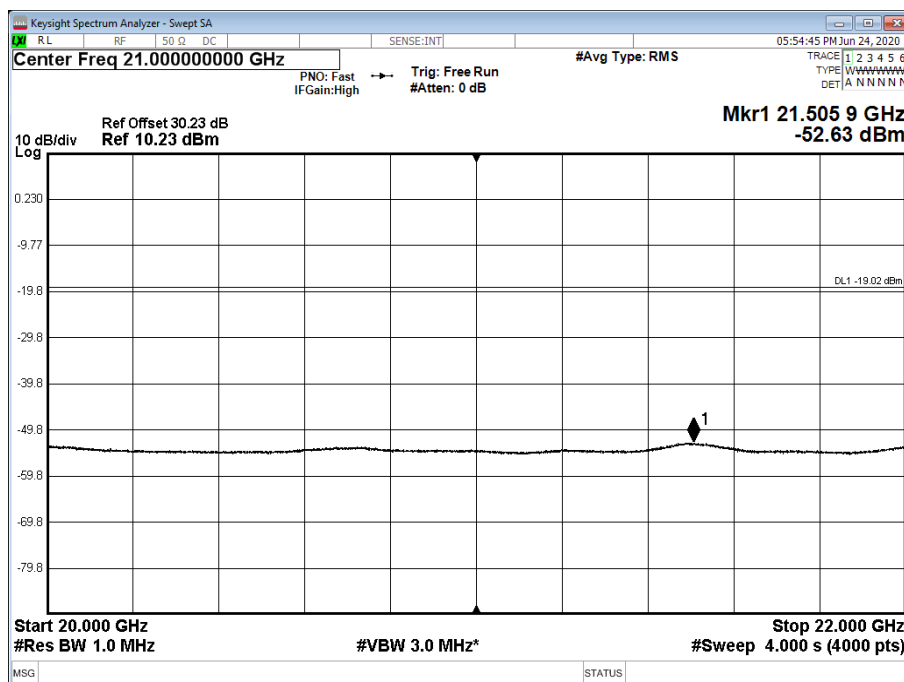
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 3 - Range
12000 to 20000 MHz



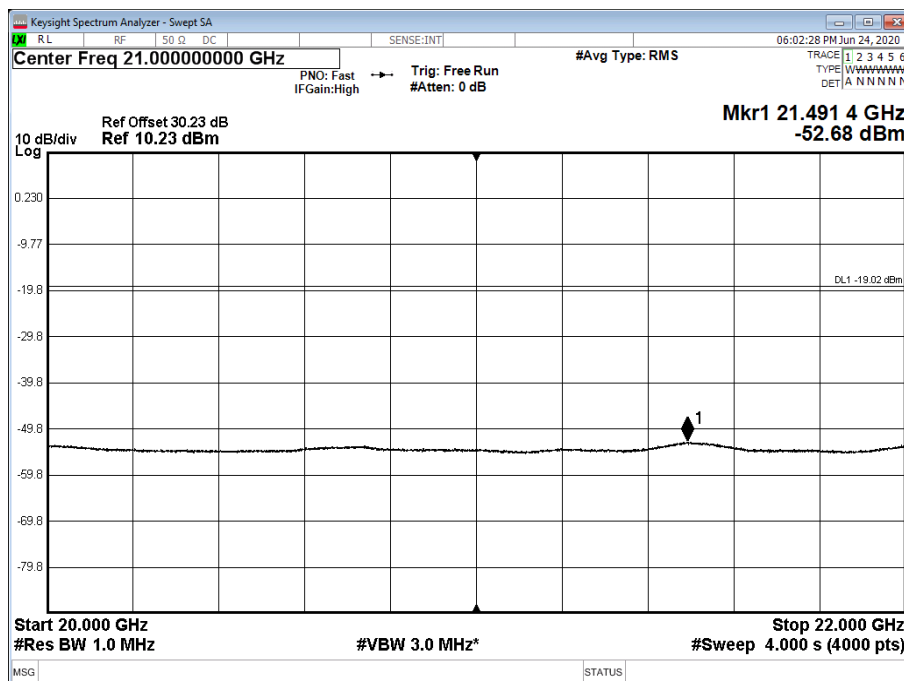
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 4 - Range
200000 to 22000 MHz



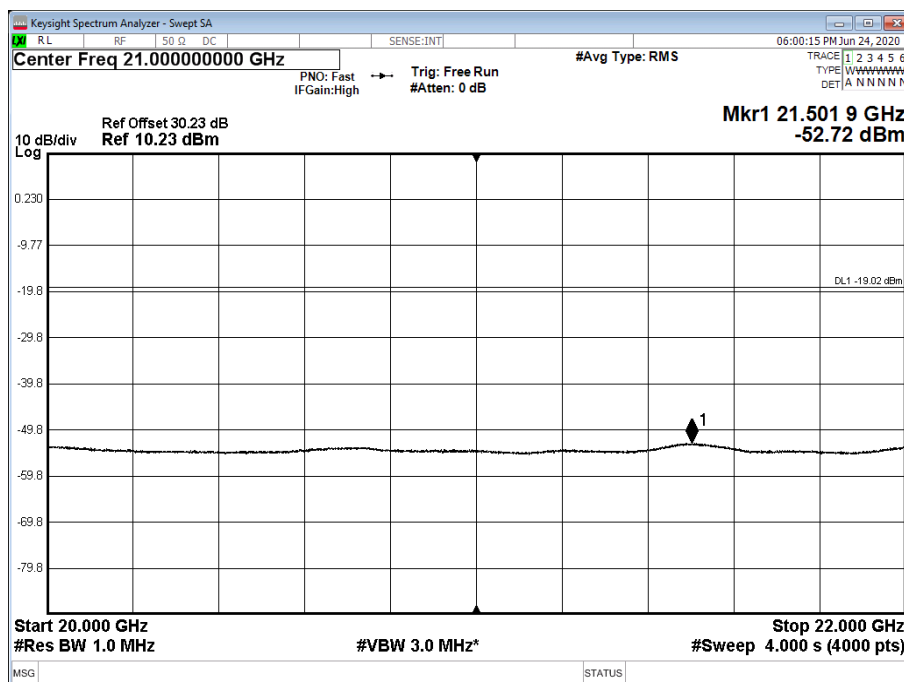
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 4 - Range
200000 to 22000 MHz



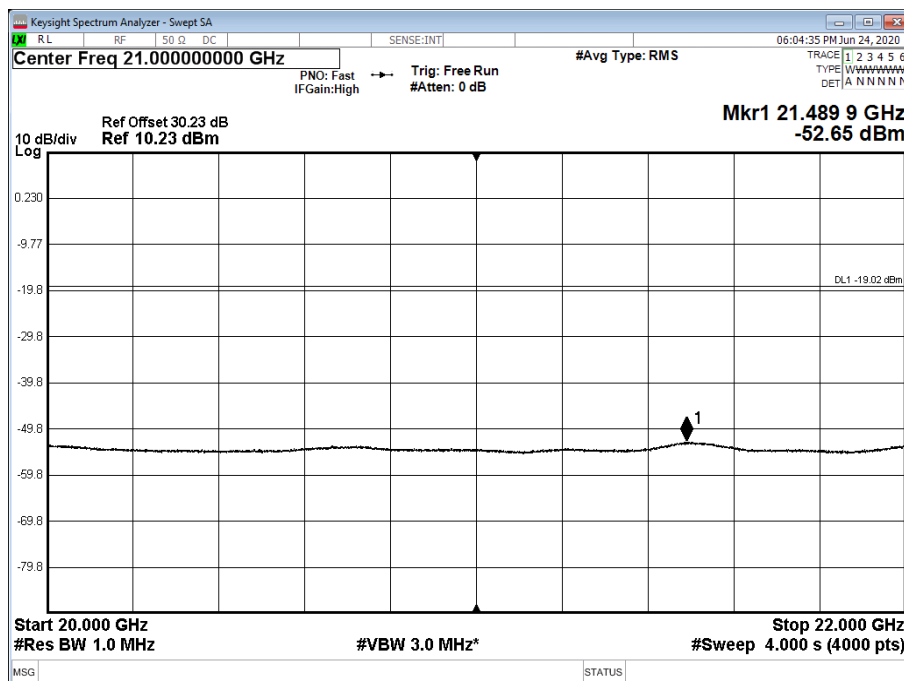
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 4 - Range
200000 to 22000 MHz



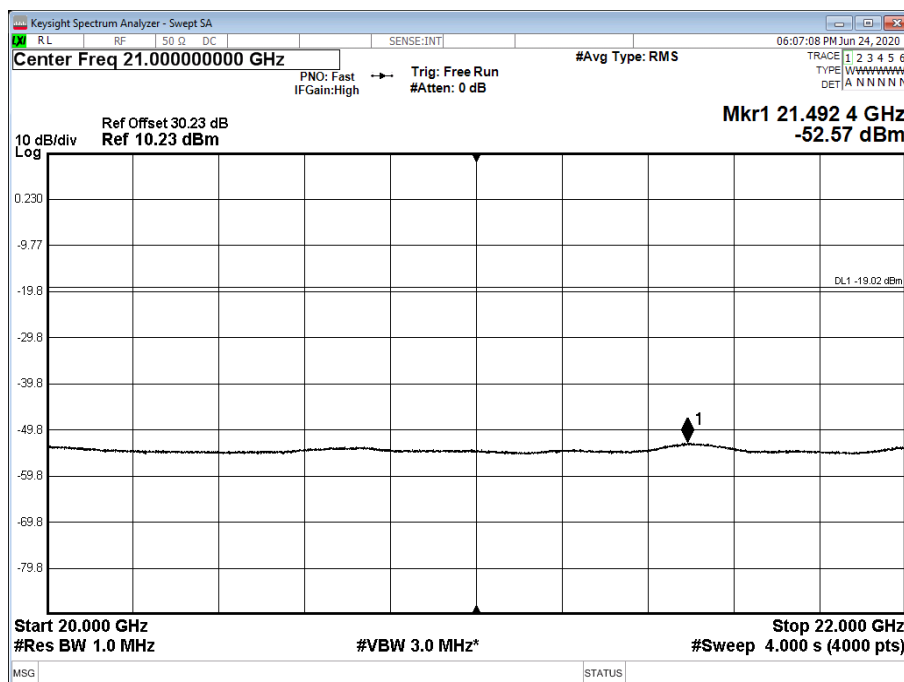
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 4 - Range
200000 to 22000 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position BRFBW - Band 4 - Range
200000 to 22000 MHz



Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz +2xNB IoT GB - Channel Position TRFBW - Band 4 - Range
200000 to 22000 MHz



Limit	-19dBm
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2.5 RADIATED EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 27, Clause 27.53

2.5.2 Date of Test and Modification State

30 June – 03 July 2020 - Modification State 0

2.5.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.4 Environmental Conditions

Ambient Temperature	20.3-21.4°C
Relative Humidity	44.1-47.2%

2.5.5 Test Method

The test was performed in accordance with ANSI C63.26 Clause 5. The EUT was configured as defined in ANSI C63.26, clause 5.5.2.3.2.

The EUT was set up on a support replicating typical installation conditions at a height of 1.5 m above the reference ground plane, (see setup photos) within a semi-anechoic chamber on a remotely controlled turntable.

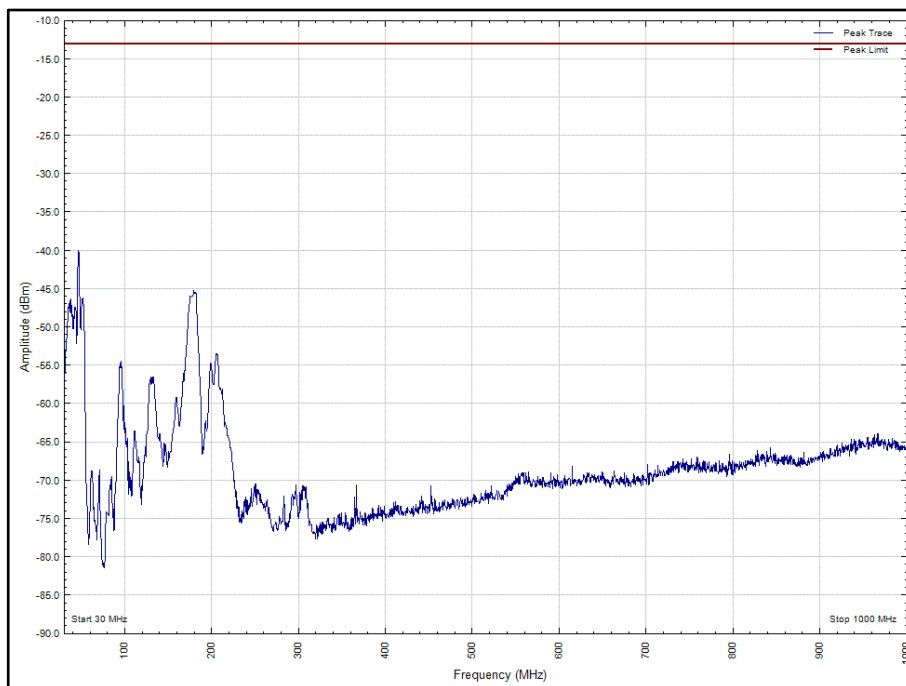
Pre-scan and final measurements were made using a Field Strength method in accordance with ANSI C63.26 Clause 5.5.4. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. Final results were then converted to eirp and are displayed in the plots below. The correction for field strength measurements to eirp at 3 m was 95.2 dB and at 1 m was 85.2 dB. An RBW of 1 MHz and VBW of 3 MHz was used for all measurements with a Peak detector and trace set to Max Hold. In all cases below where the limit line is exceeded – this is the intentional transmit frequency and is not subject to the limits defined in FCC Part 27(m). A high pass filter in conjunction with a pre-amplifier was used for the measurement ranges of 8 – 22 GHz.

2.5.6 Test Results

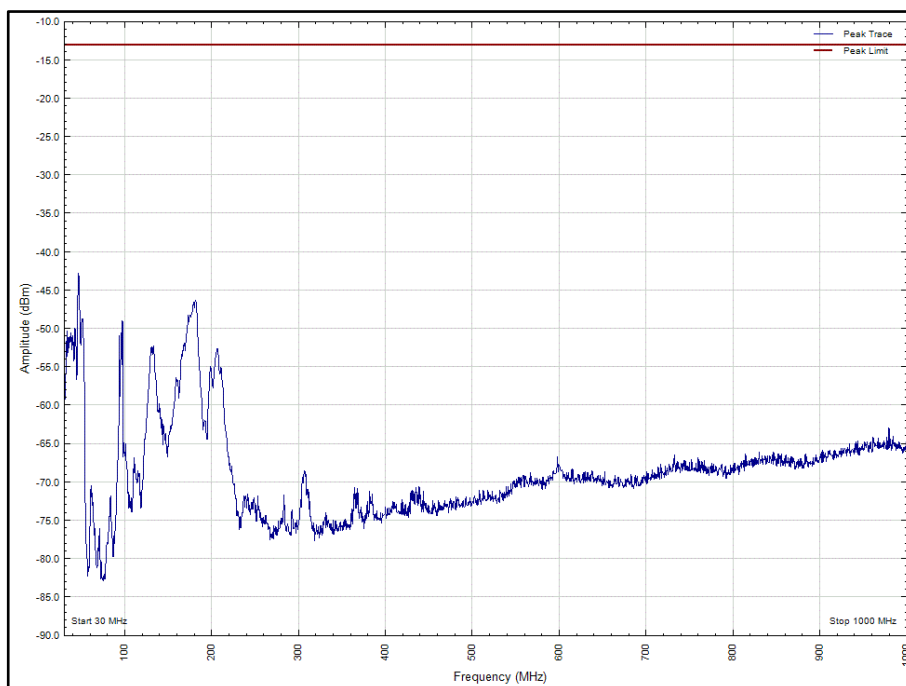
Configuration 1

Maximum Output Power 49 dBm

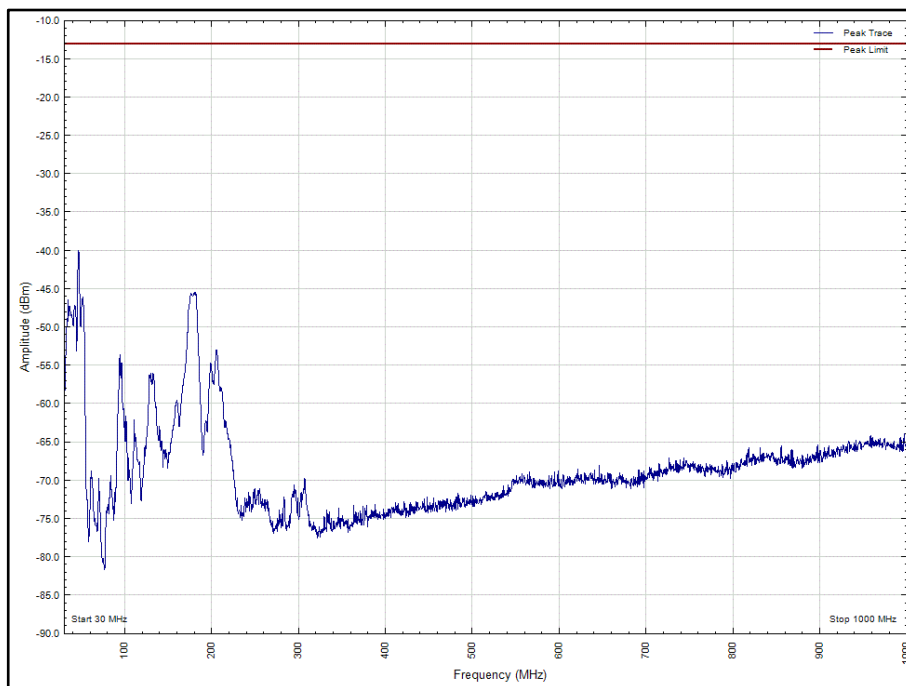
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



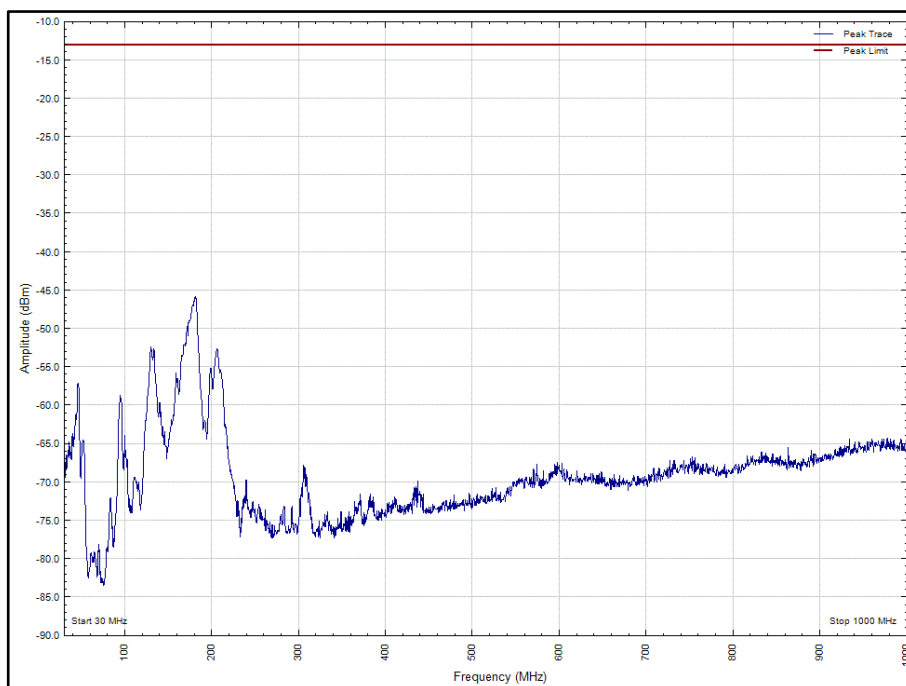
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



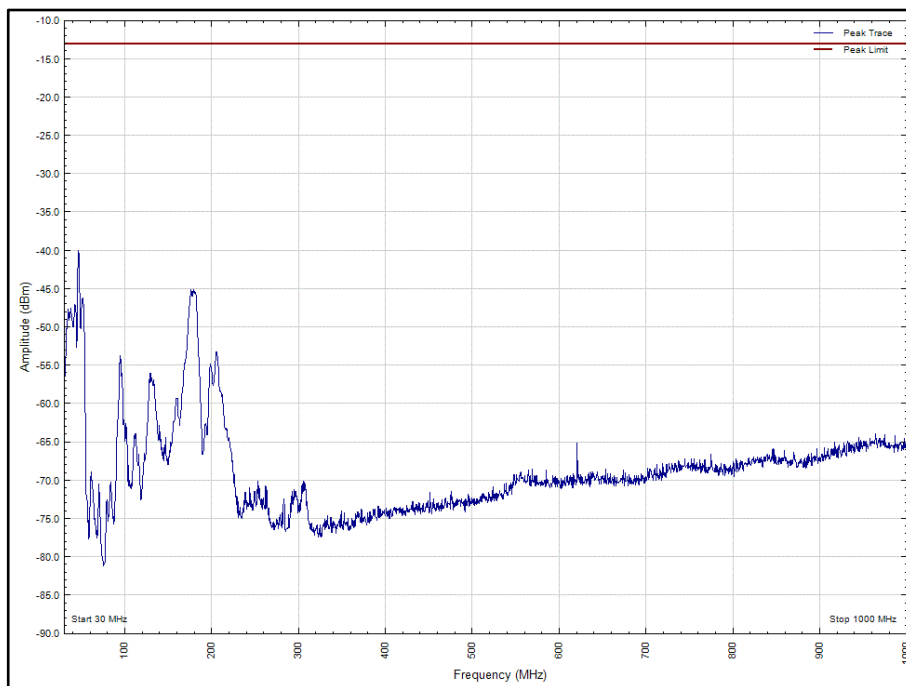
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



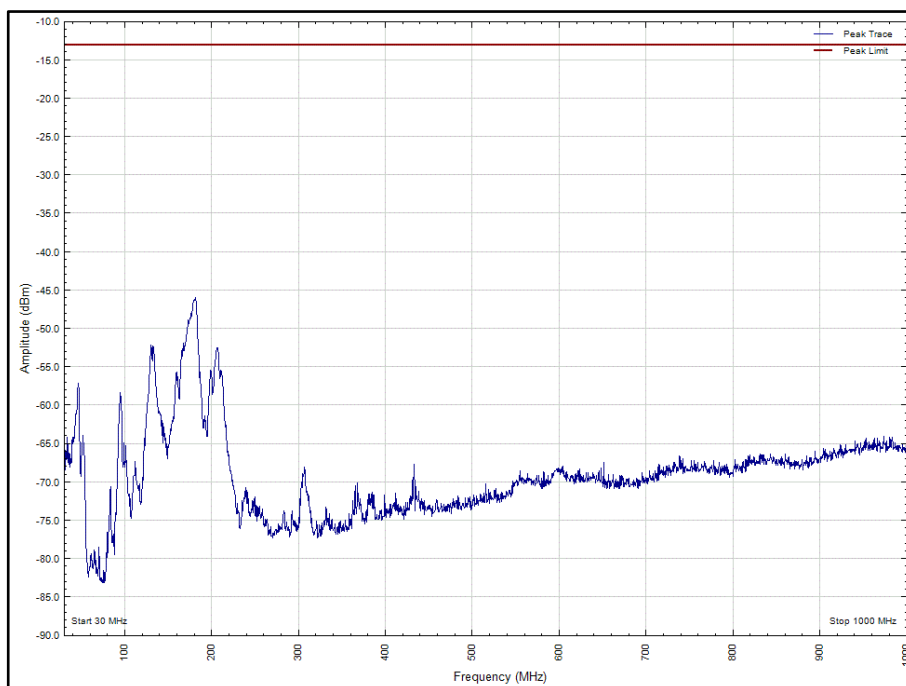
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



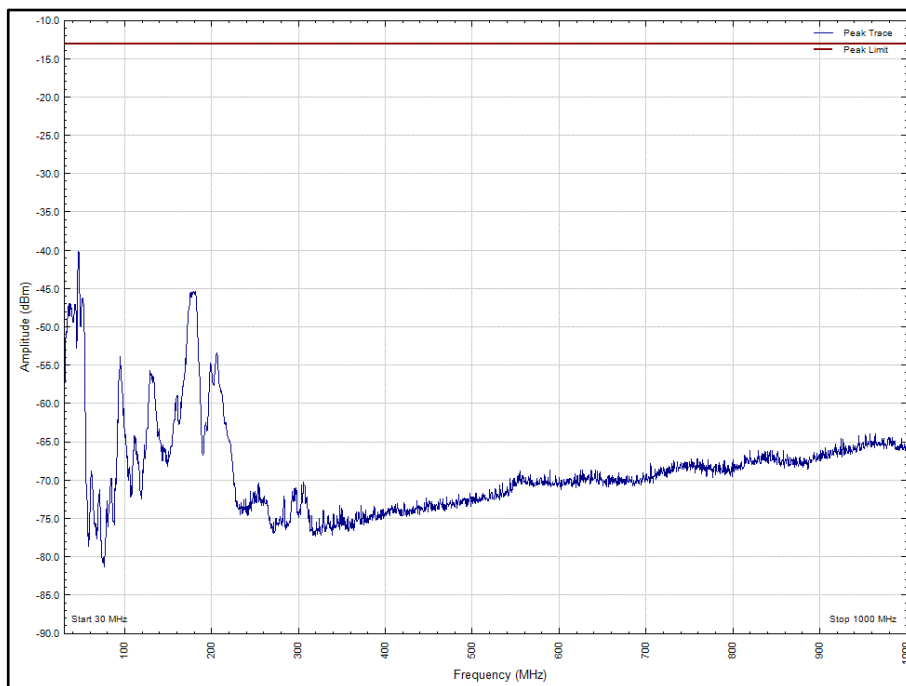
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



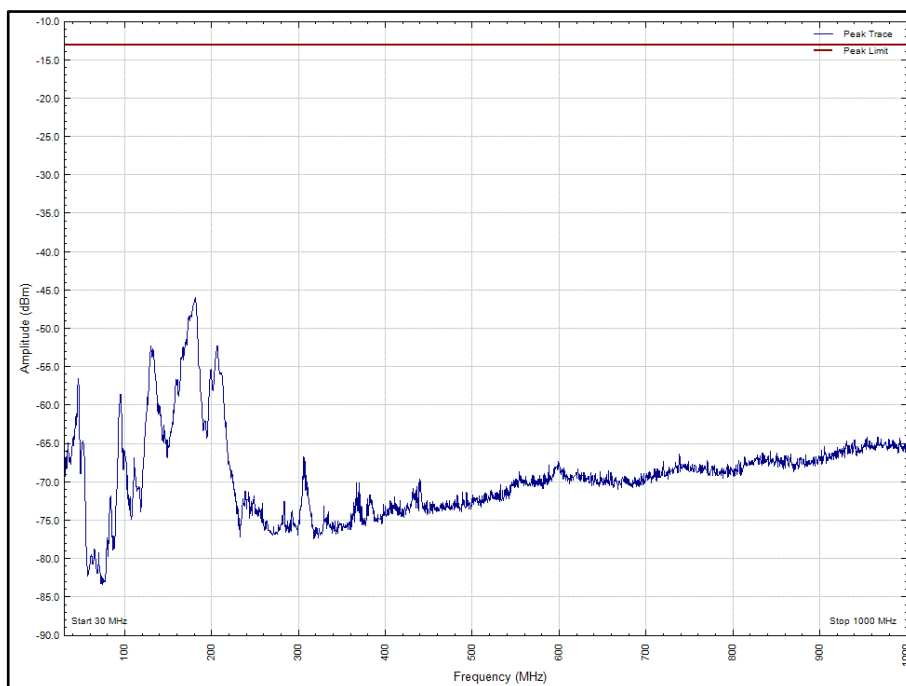
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



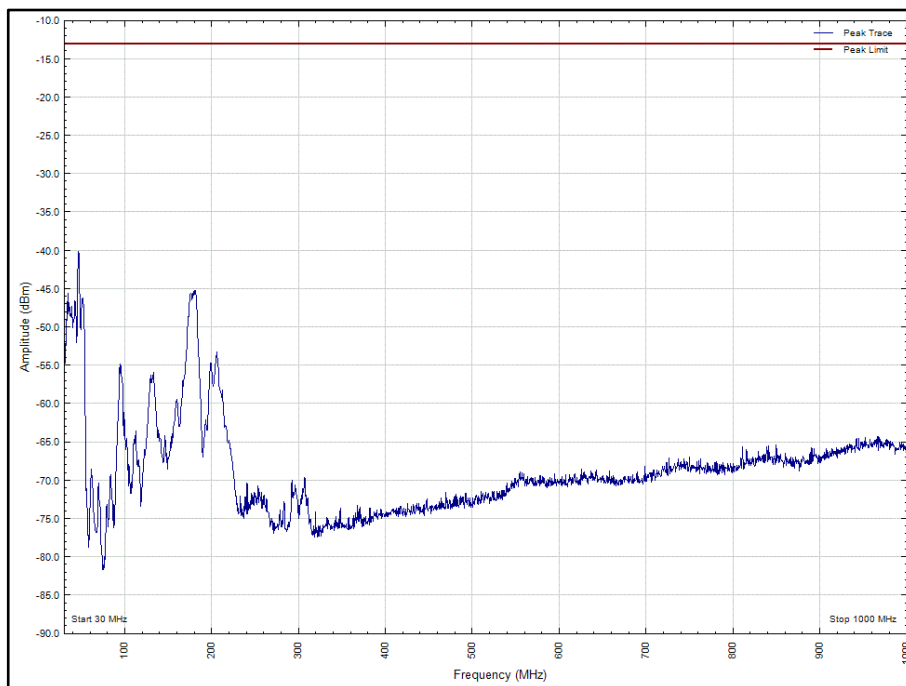
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
 Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
 - Band 66A - Range 30 - 1000 MHz



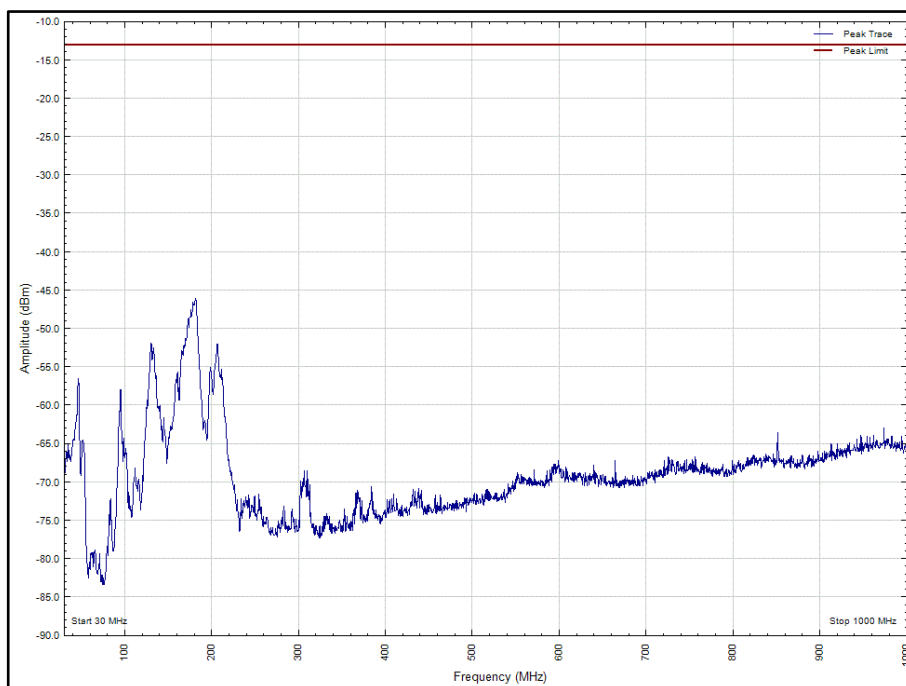
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
 Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
 - Band 66A - Range 30 - 1000 MHz



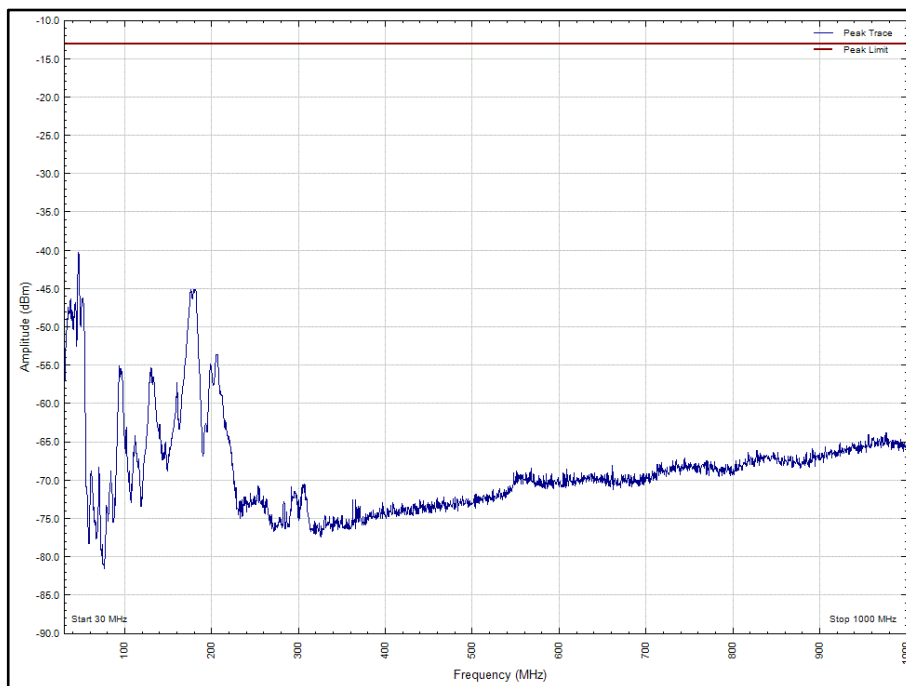
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
 Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
 - Band 66A - Range 30 - 1000 MHz



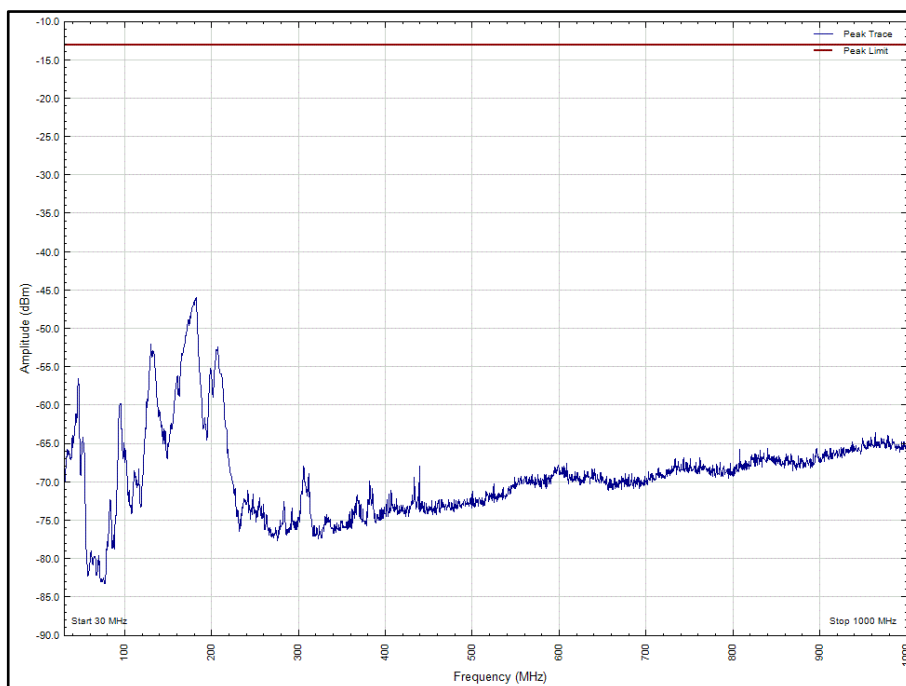
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
 Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
 - Band 66A - Range 30 - 1000 MHz



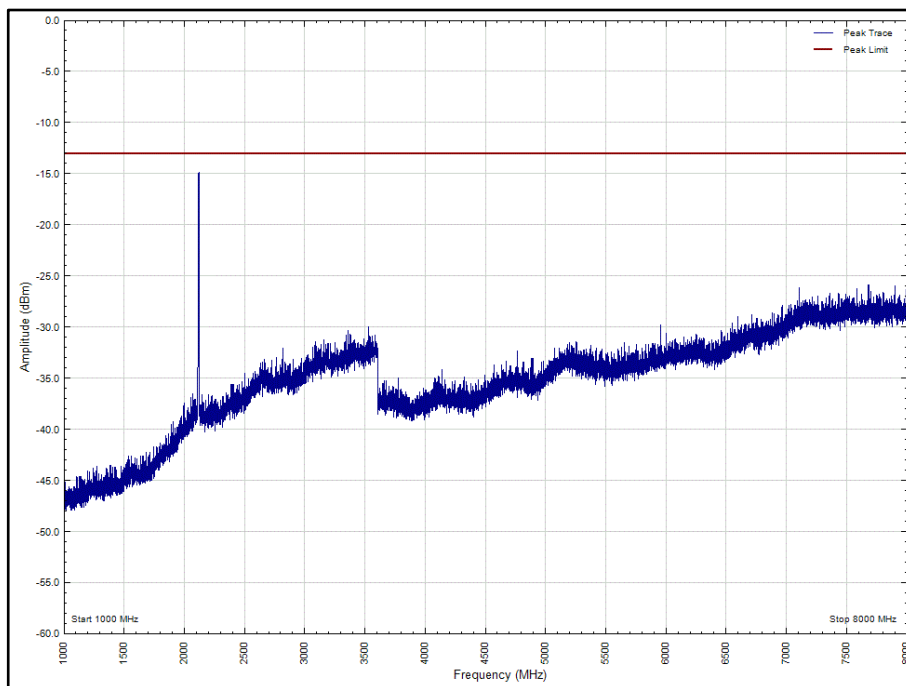
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



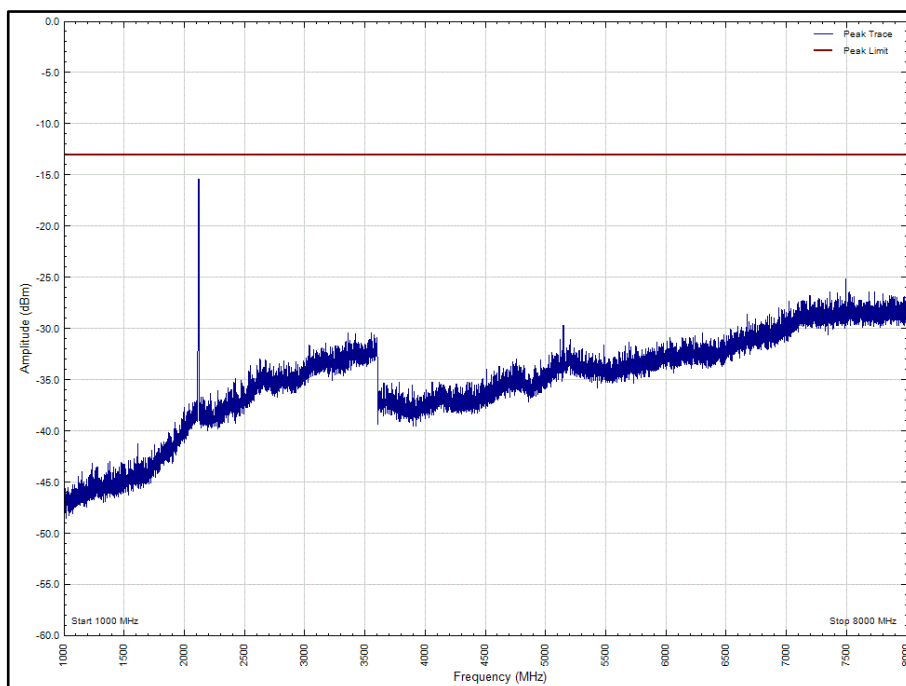
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 30 - 1000 MHz



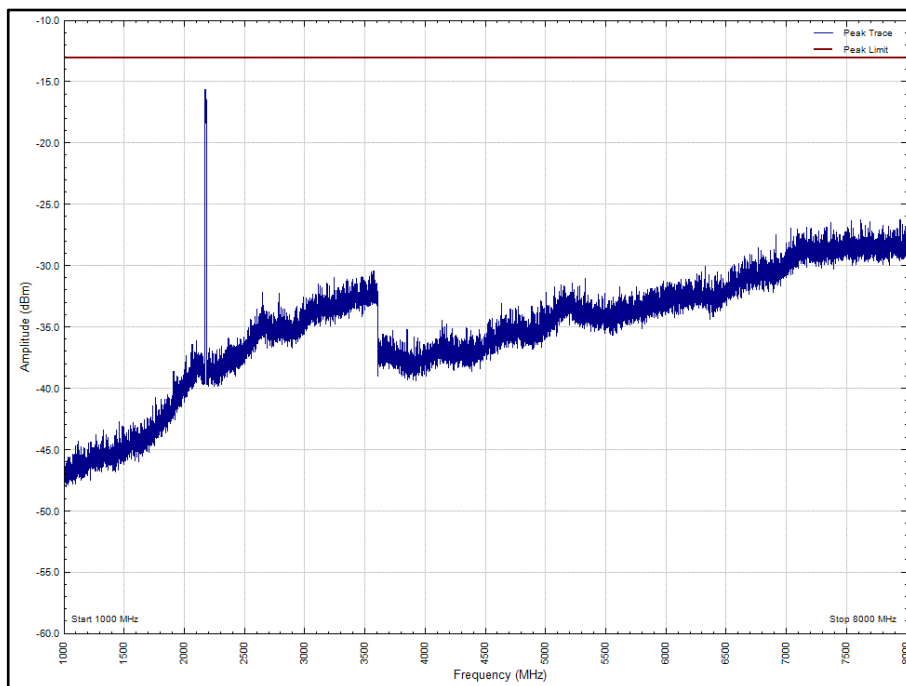
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 1000 - 8000 MHz



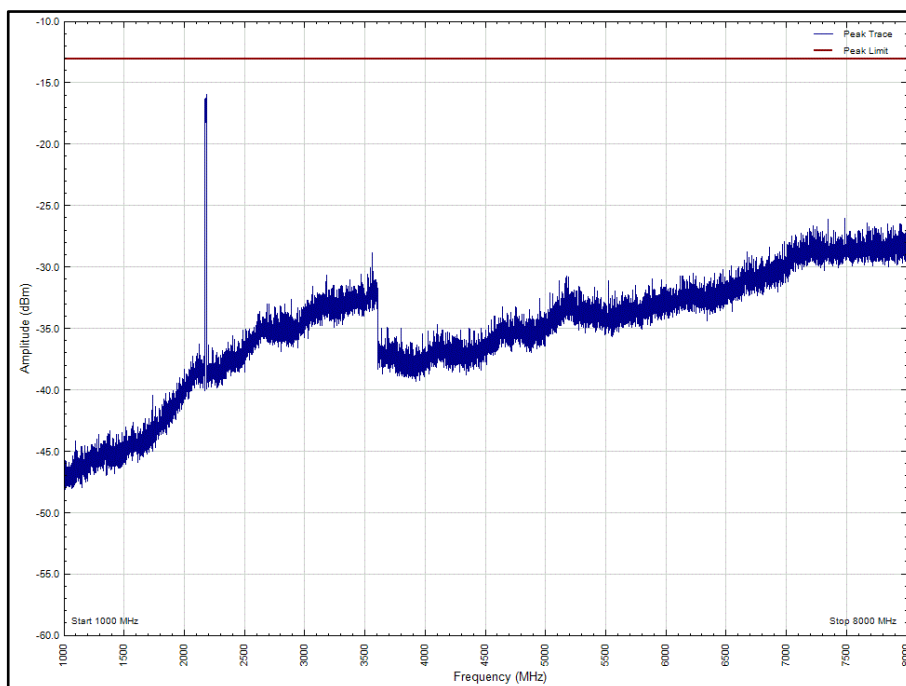
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 1000 - 8000 MHz



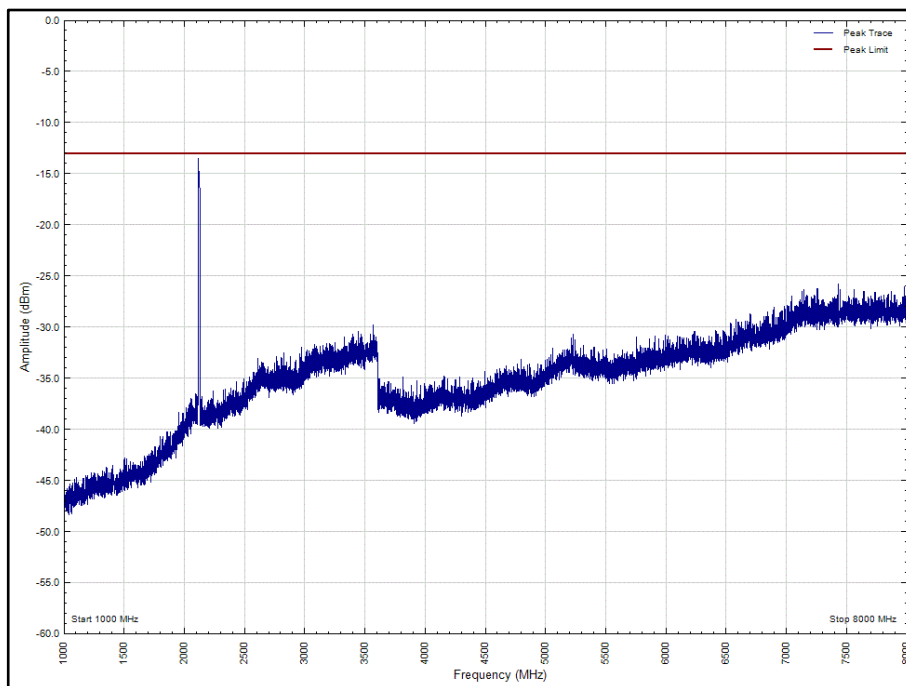
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 1000 - 8000 MHz



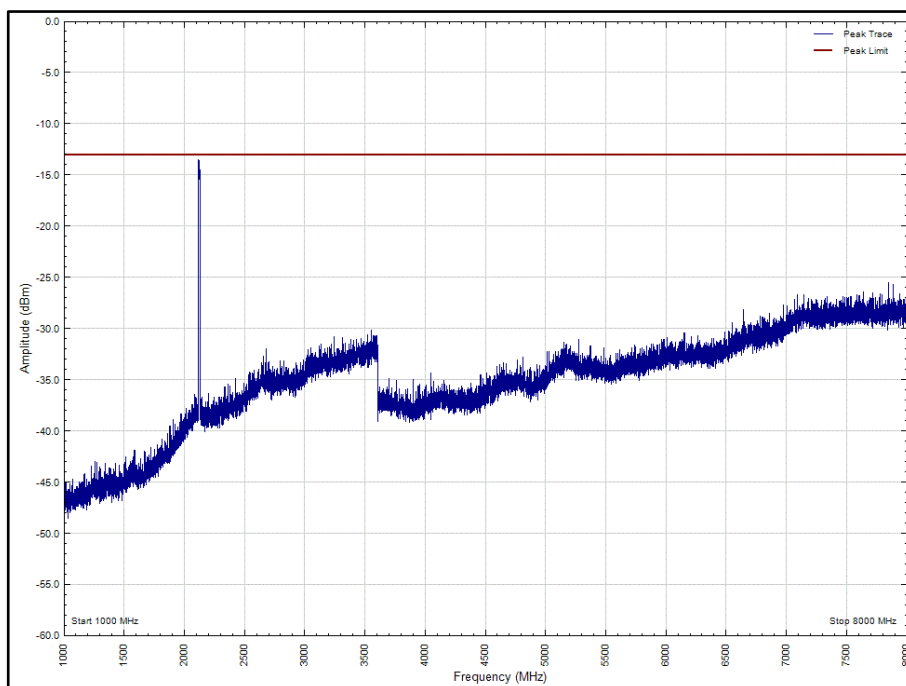
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 10.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
- Band 66A - Range 1000 - 8000 MHz



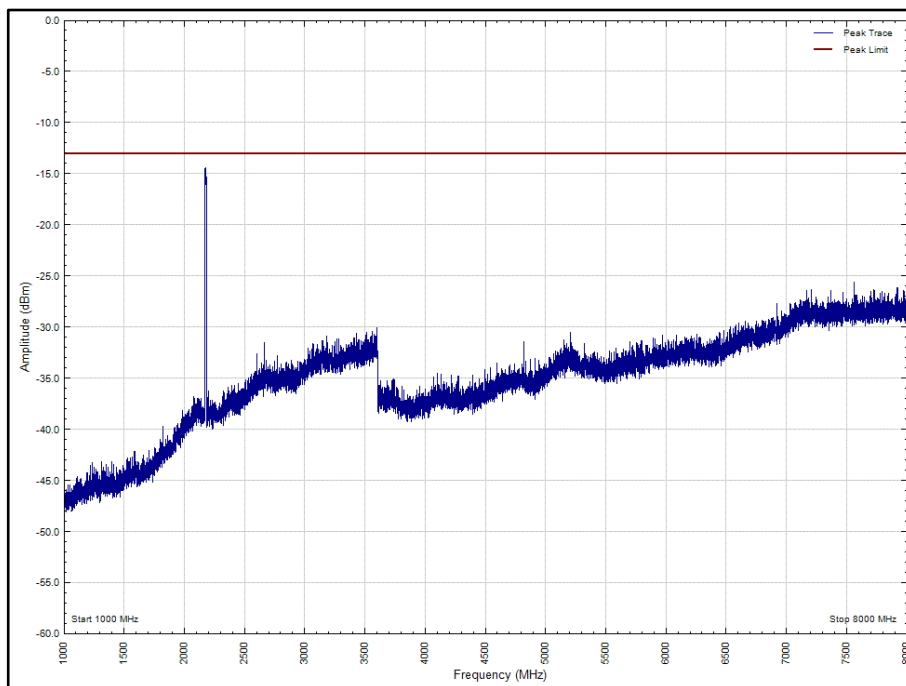
Antenna A - LTE / NB-IoT GB Modulation 64QAM / N:QPSK / N:QPSK - LTE / NB-IoT GB
Carrier Bandwidth 15.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position B<<SS>>RFBW<<SS>>
- Band 66A - Range 1000 - 8000 MHz



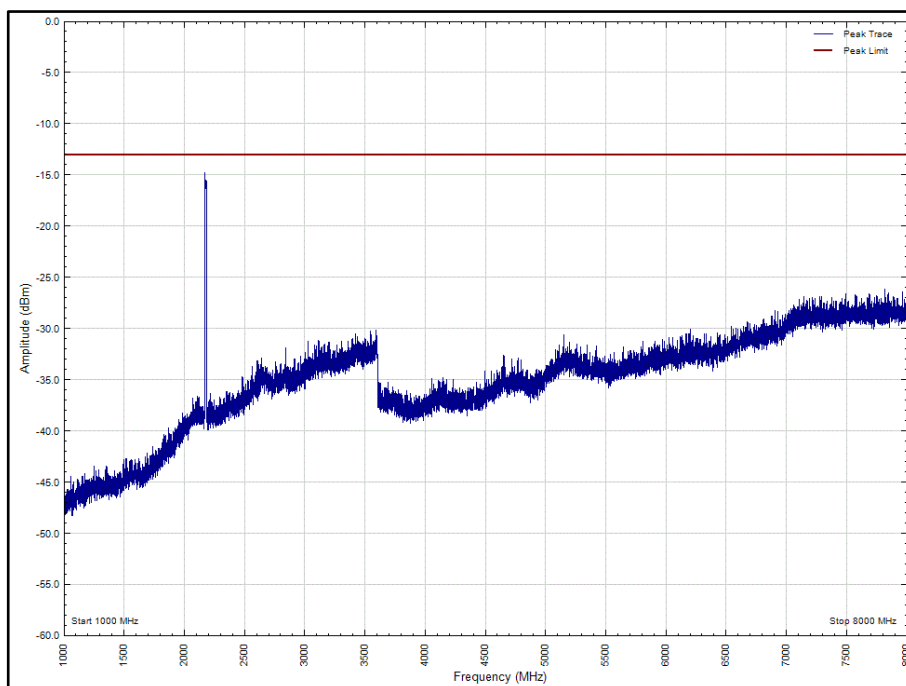
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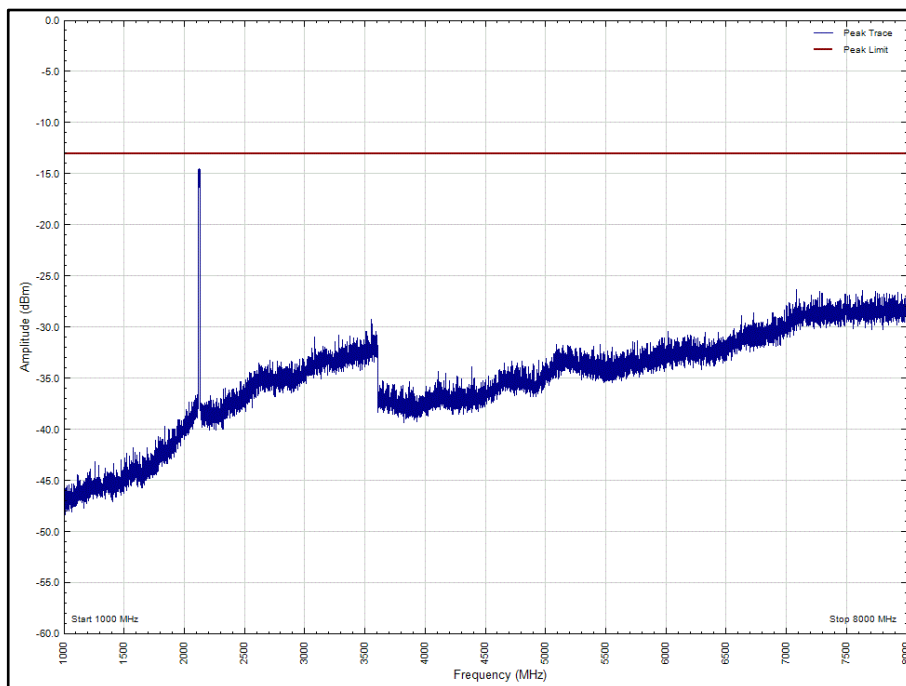
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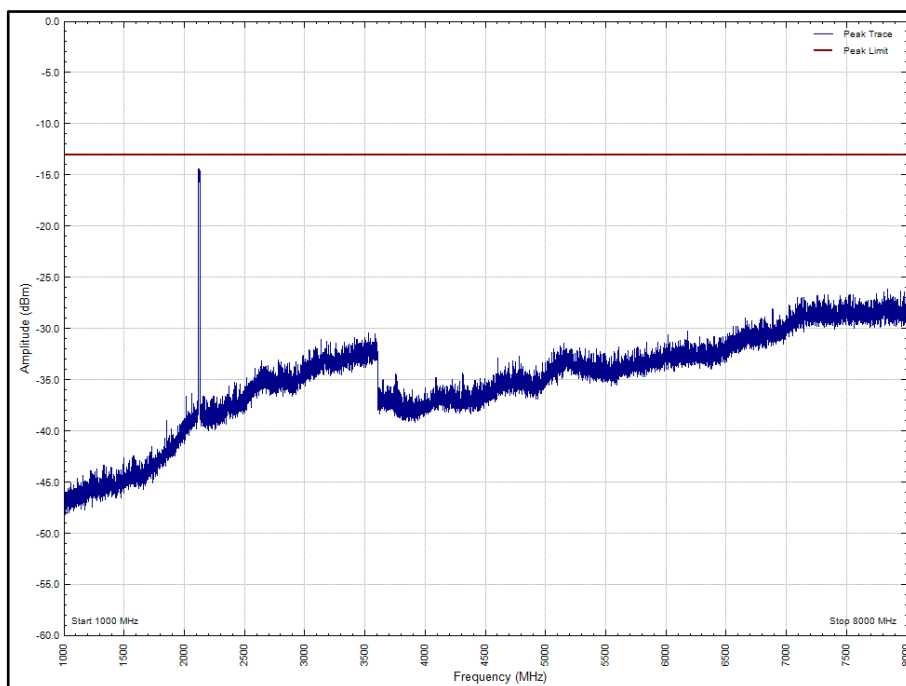
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- Band 66A - Range 1000 - 8000 MHz



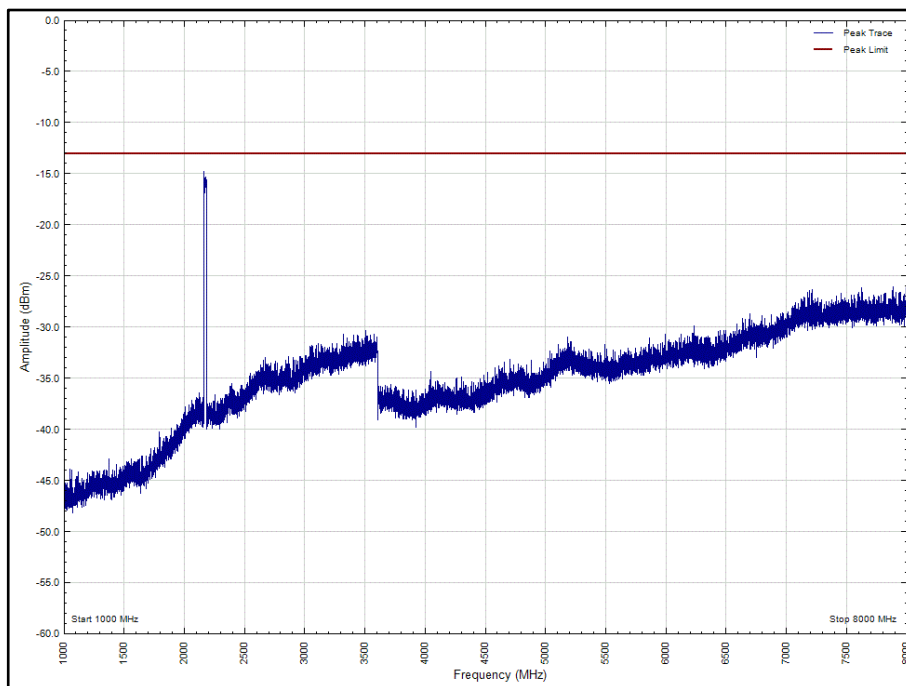
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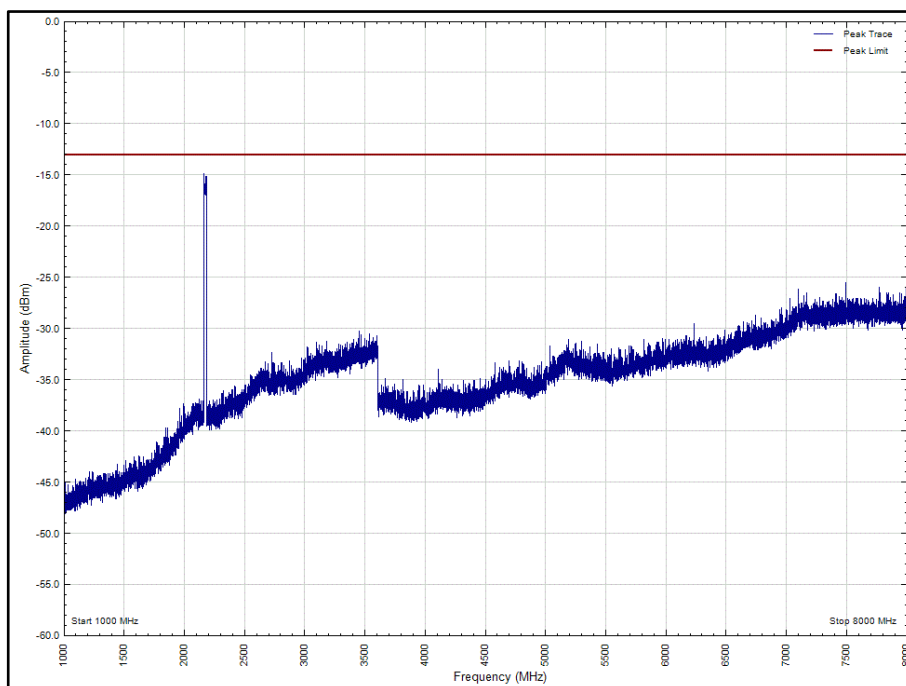
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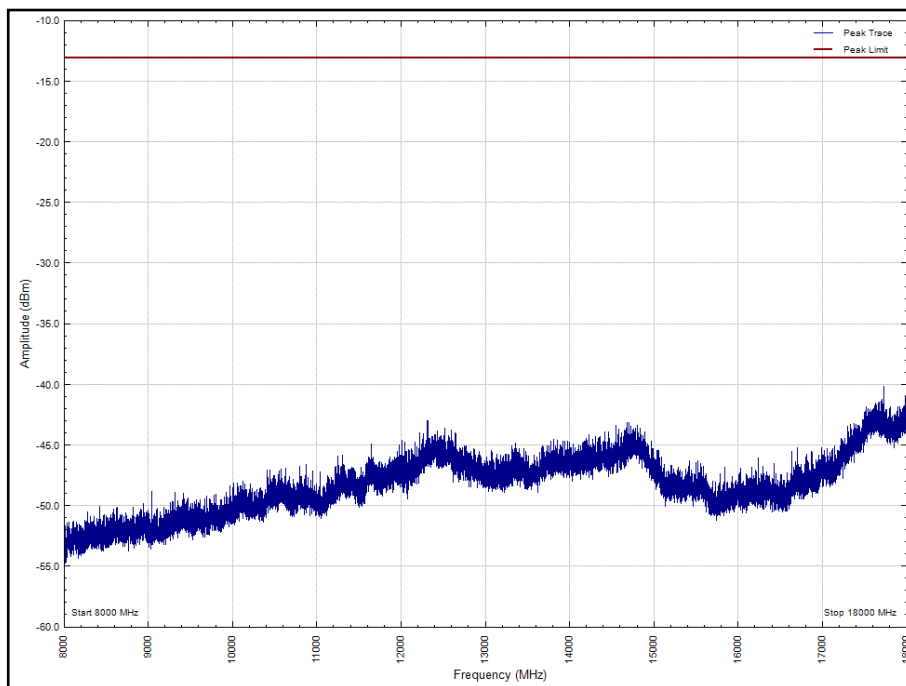
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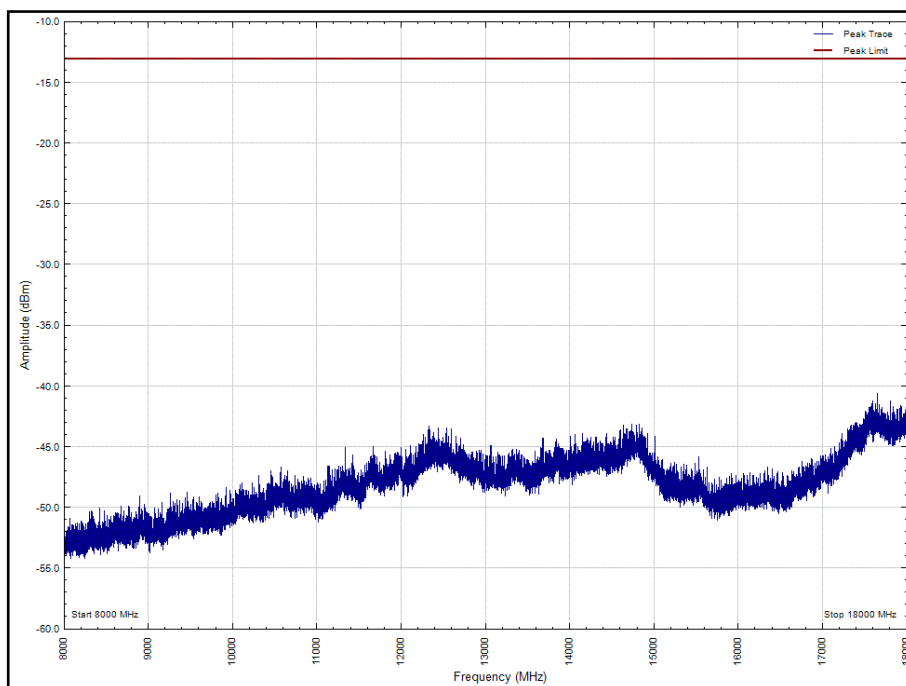
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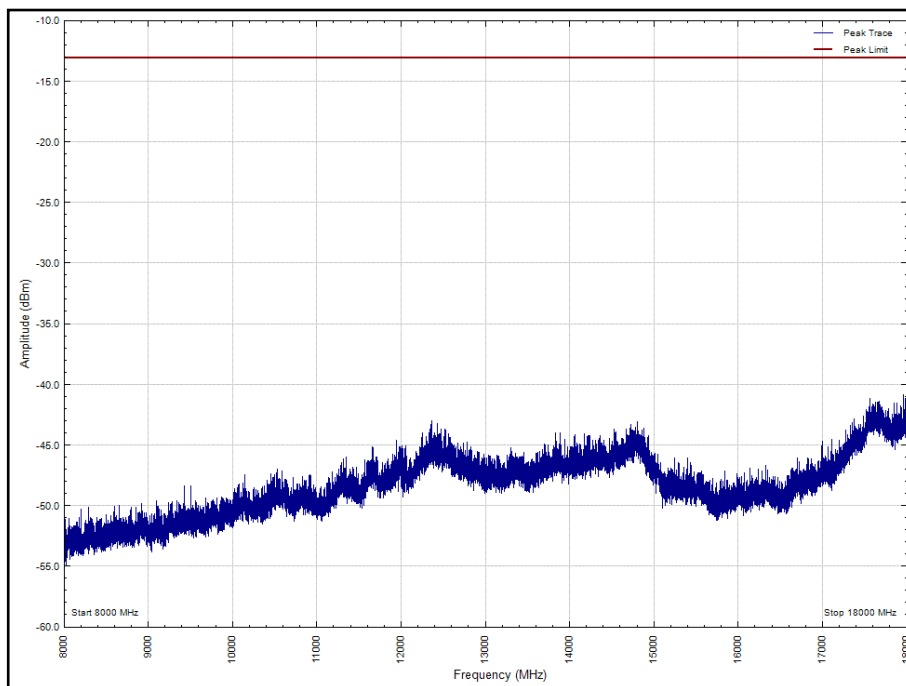
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- Band 66A - Range 8000 - 18000 MHz



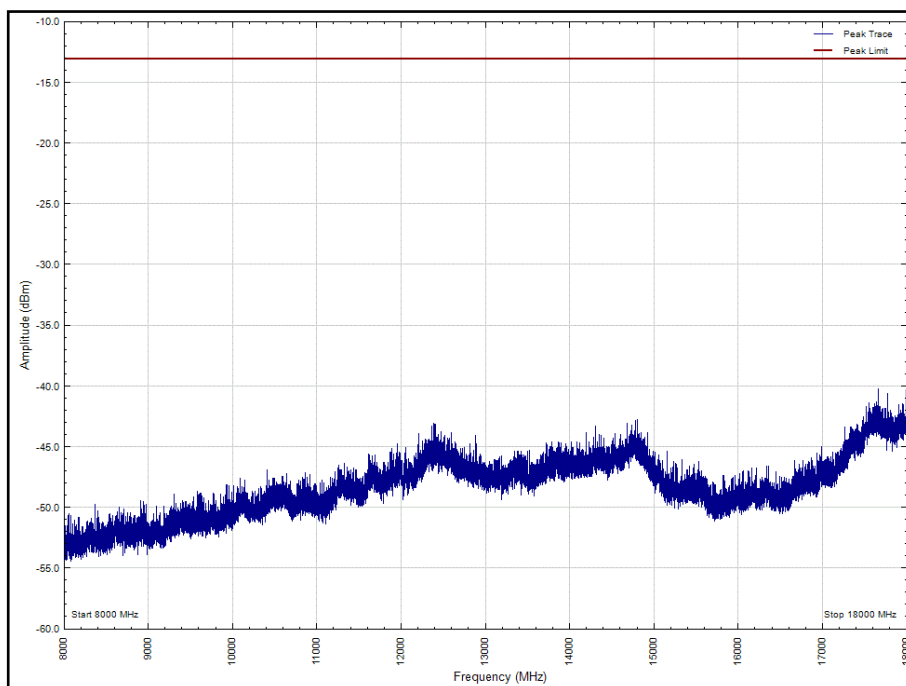
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- Band 66A - Range 8000 - 18000 MHz



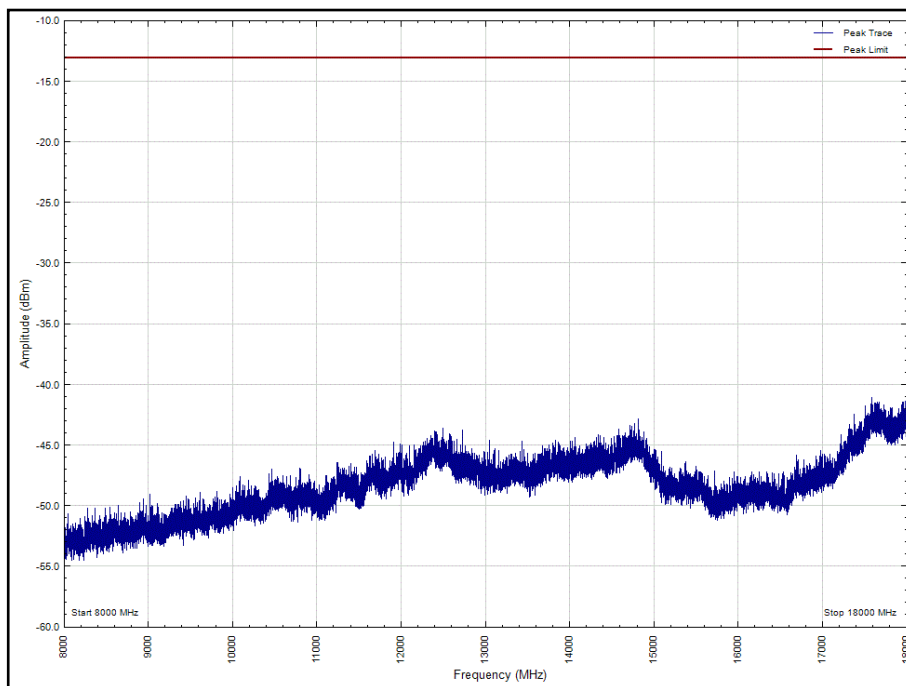
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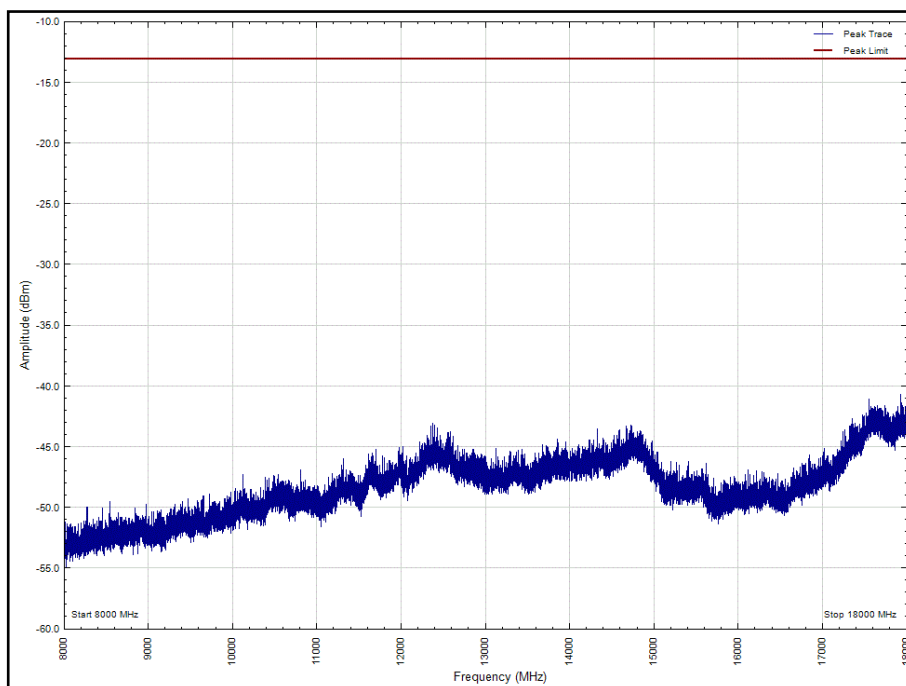
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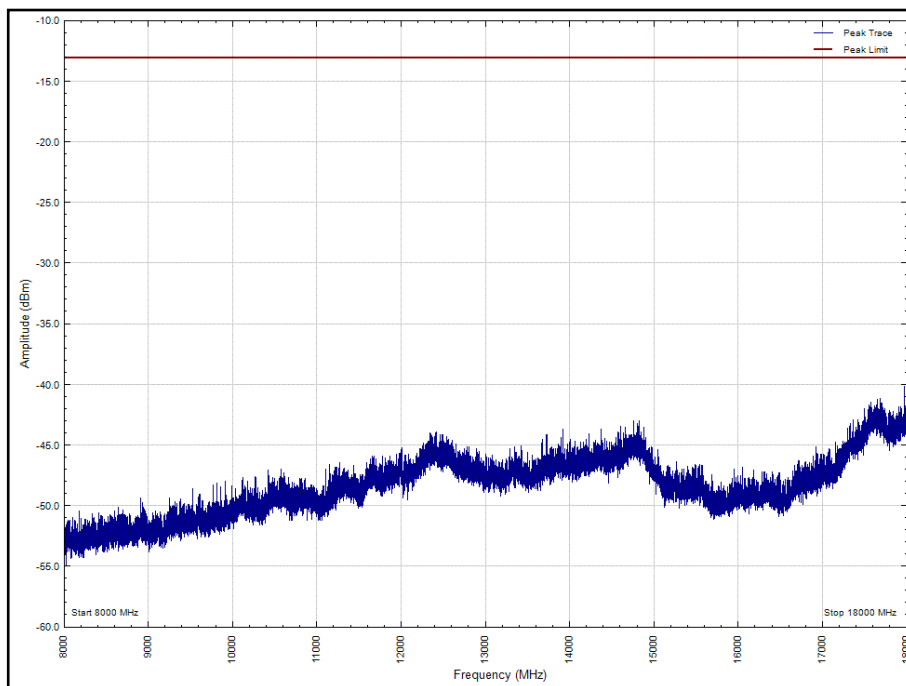
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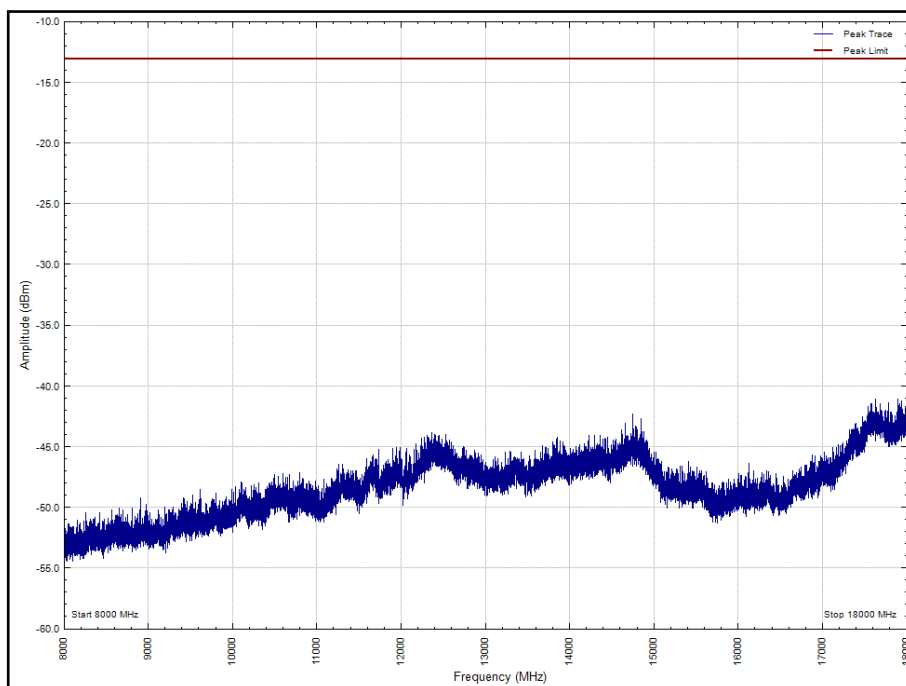
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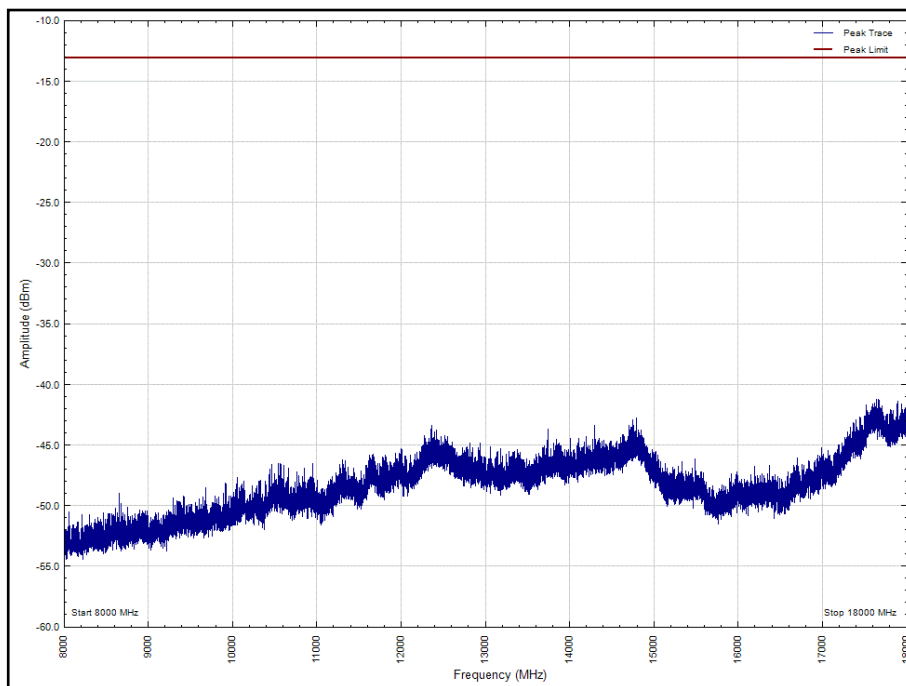
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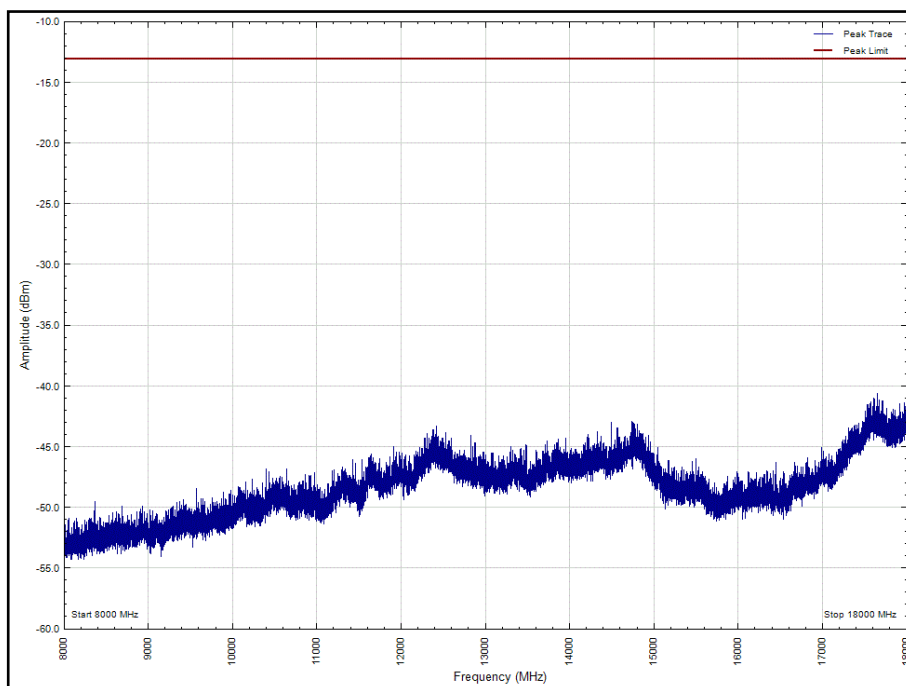
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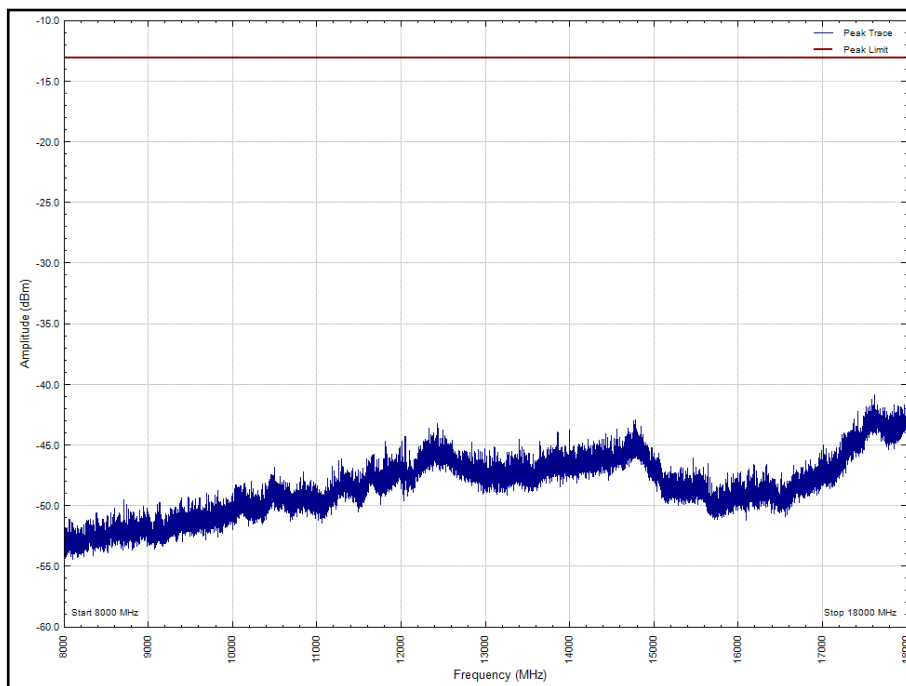
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- Band 66A - Range 8000 - 18000 MHz



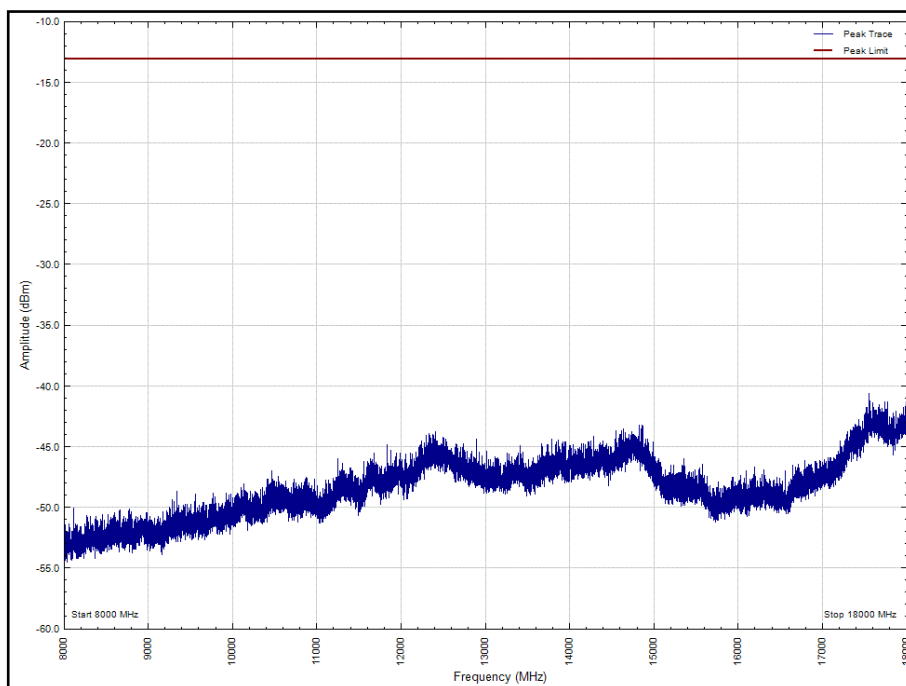
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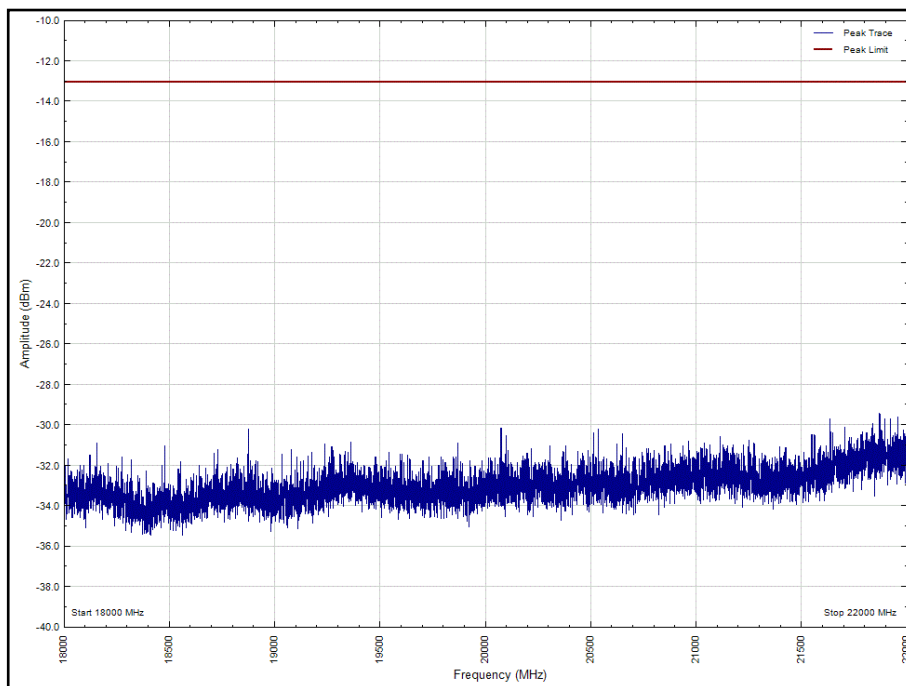
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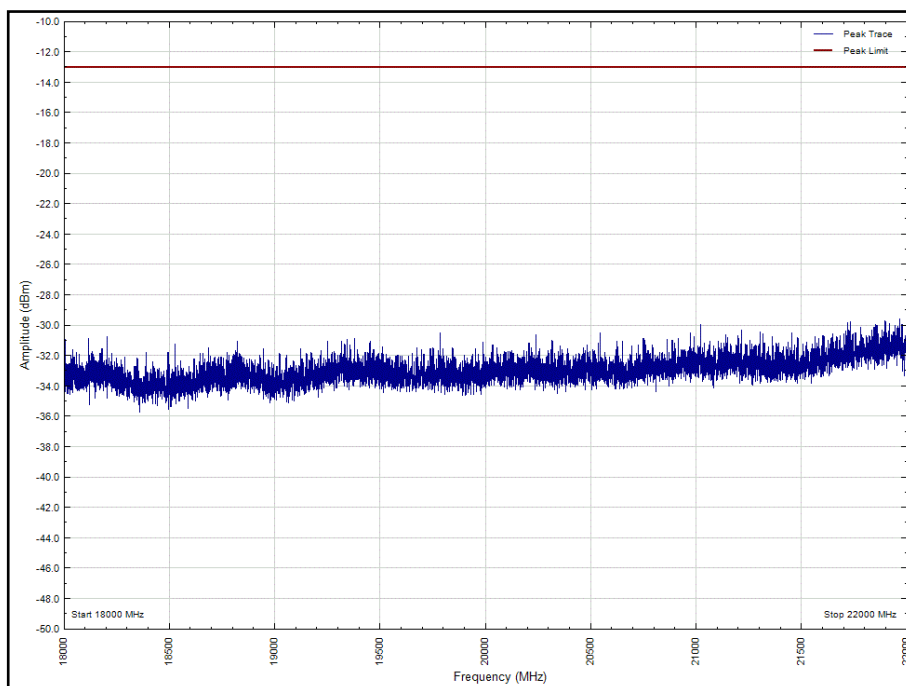
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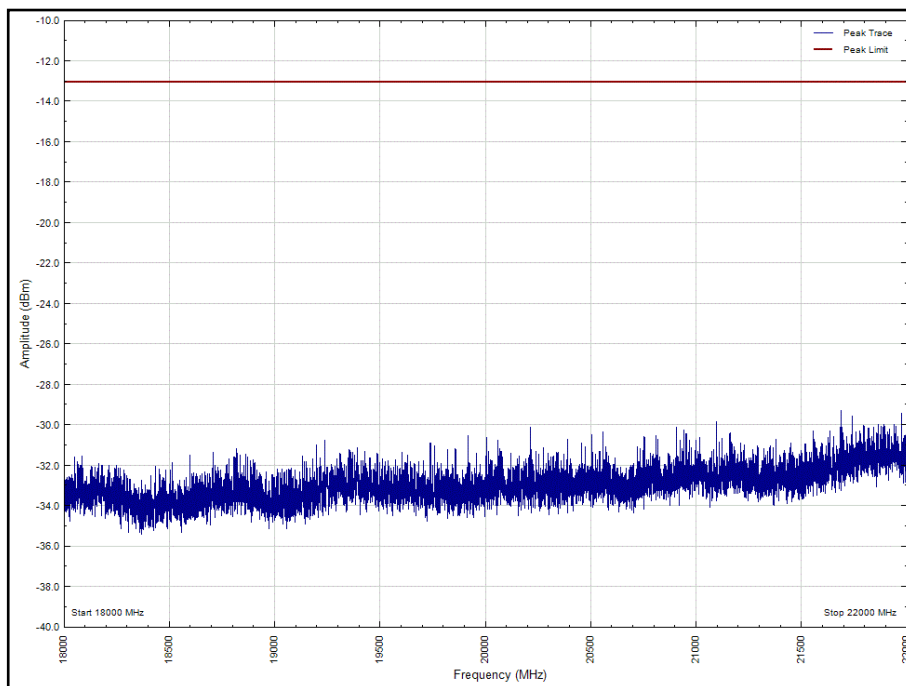
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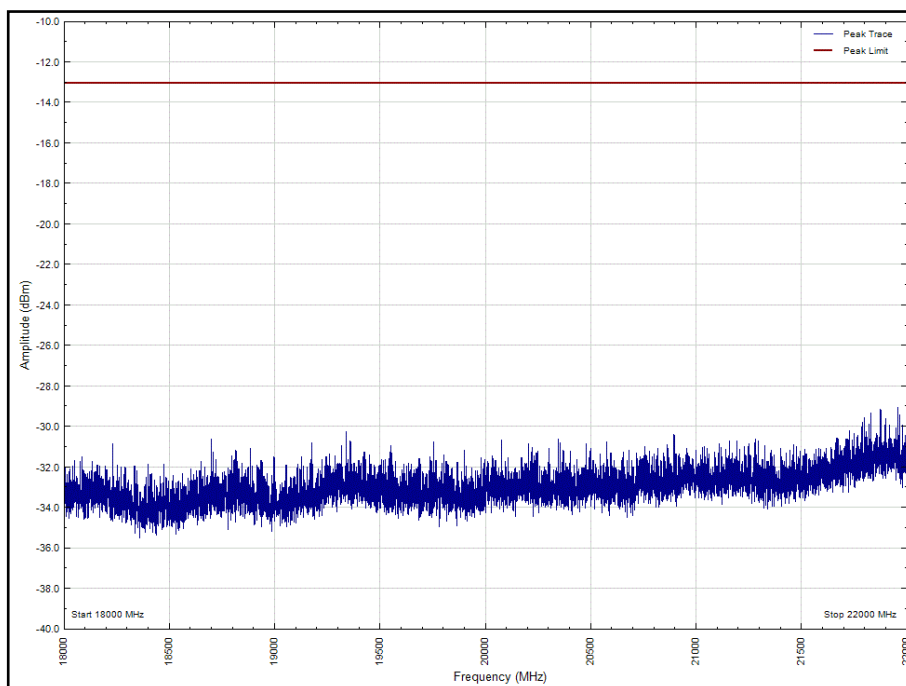
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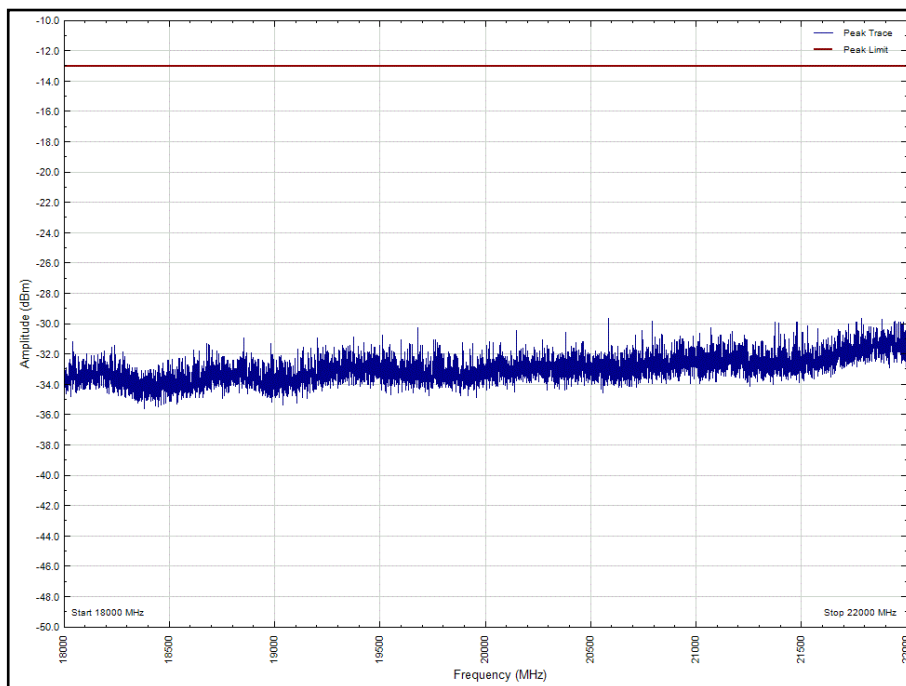
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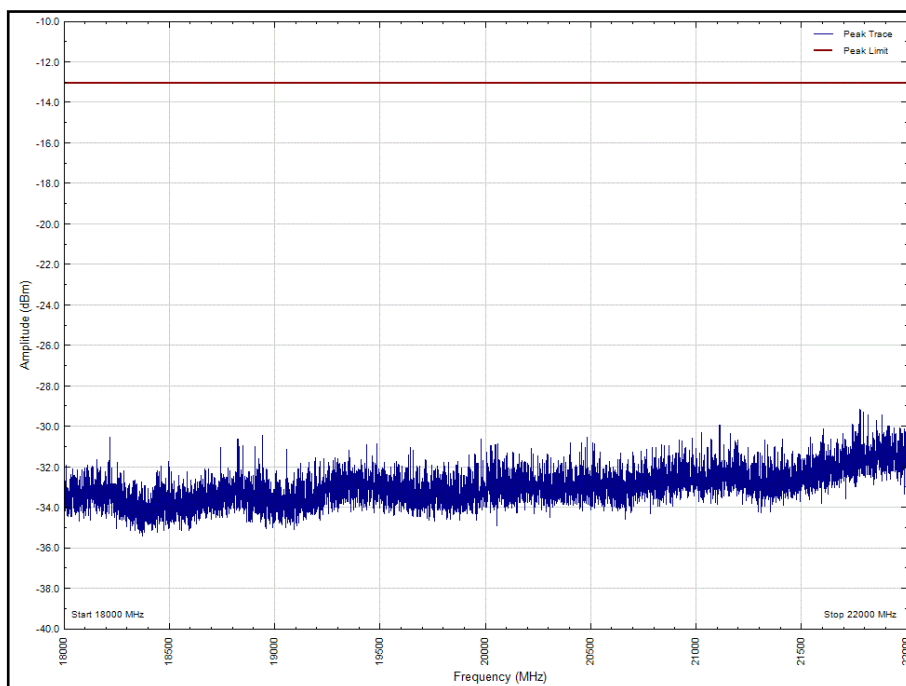
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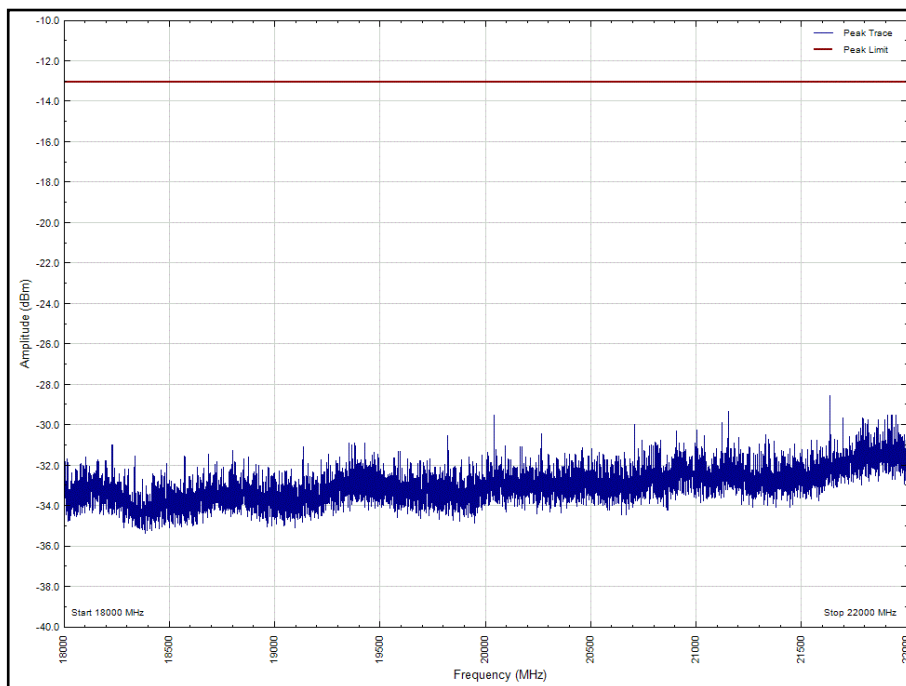
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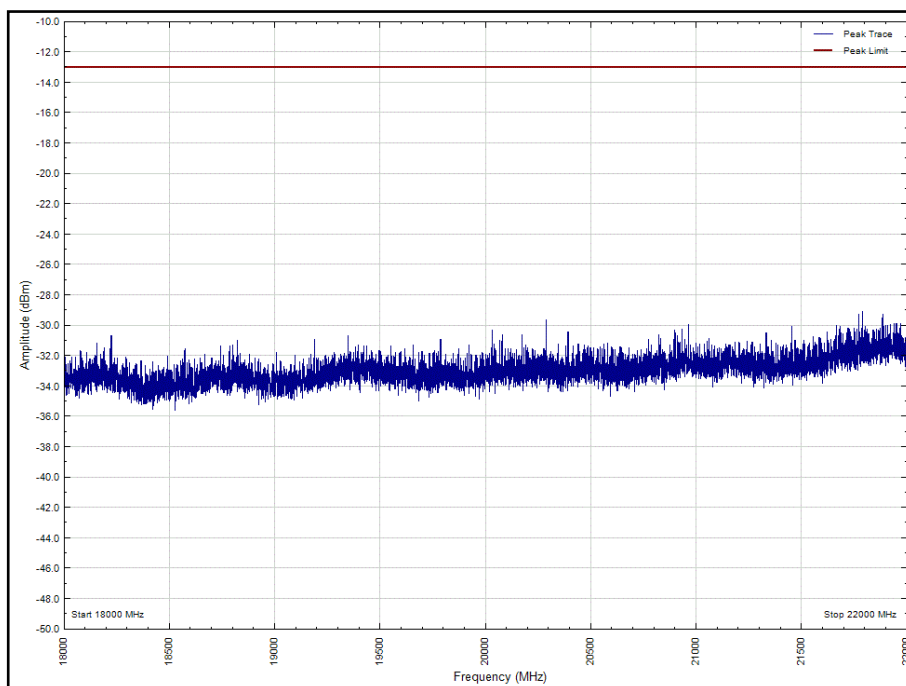
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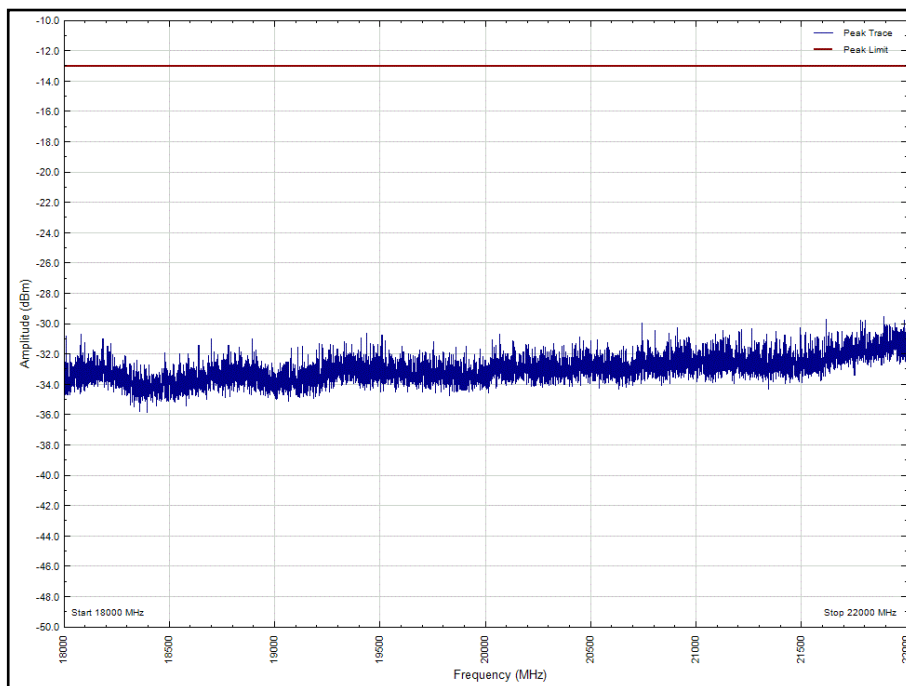
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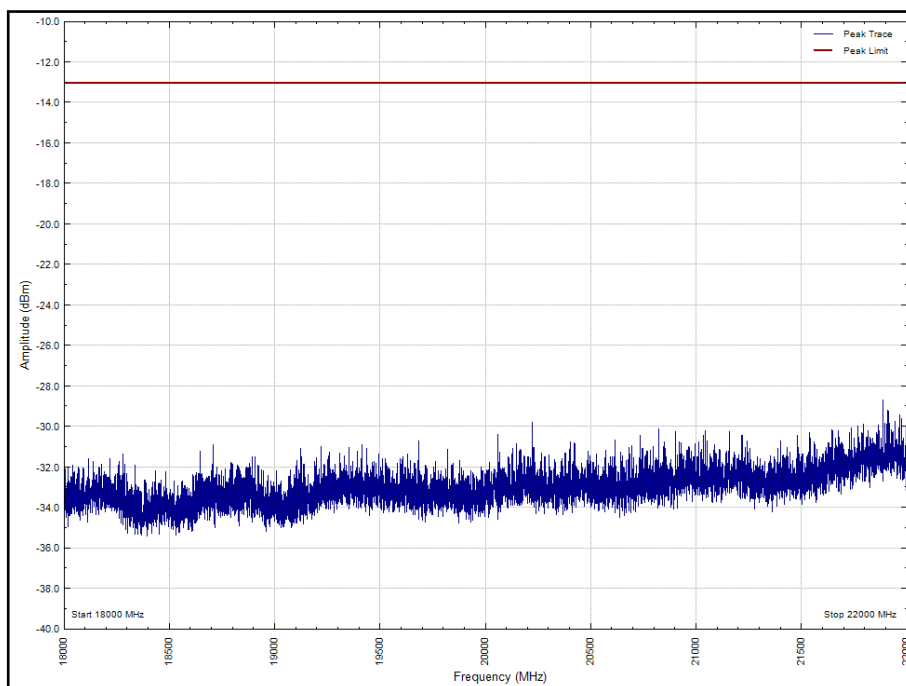
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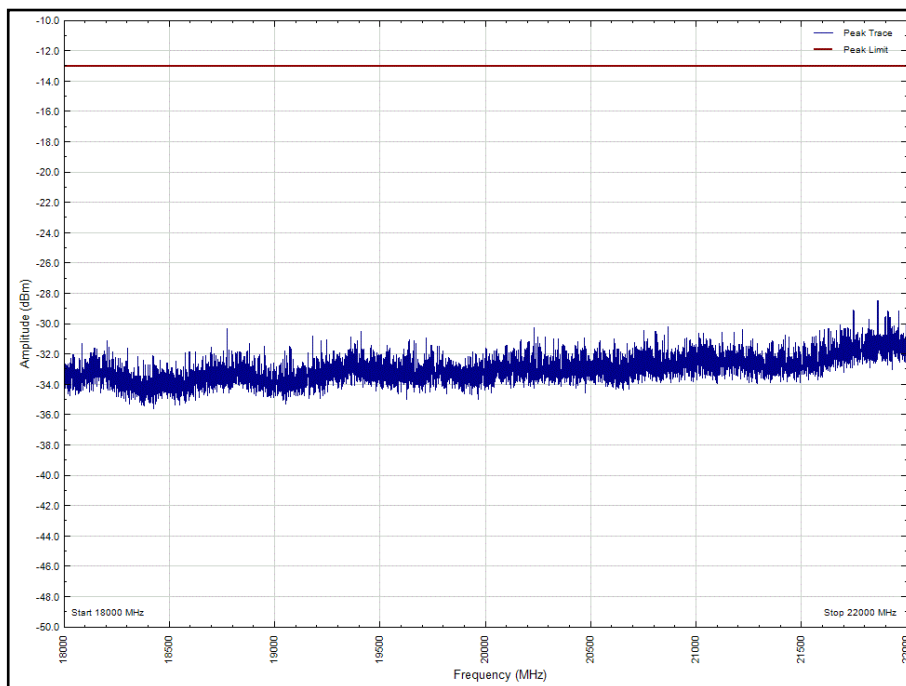
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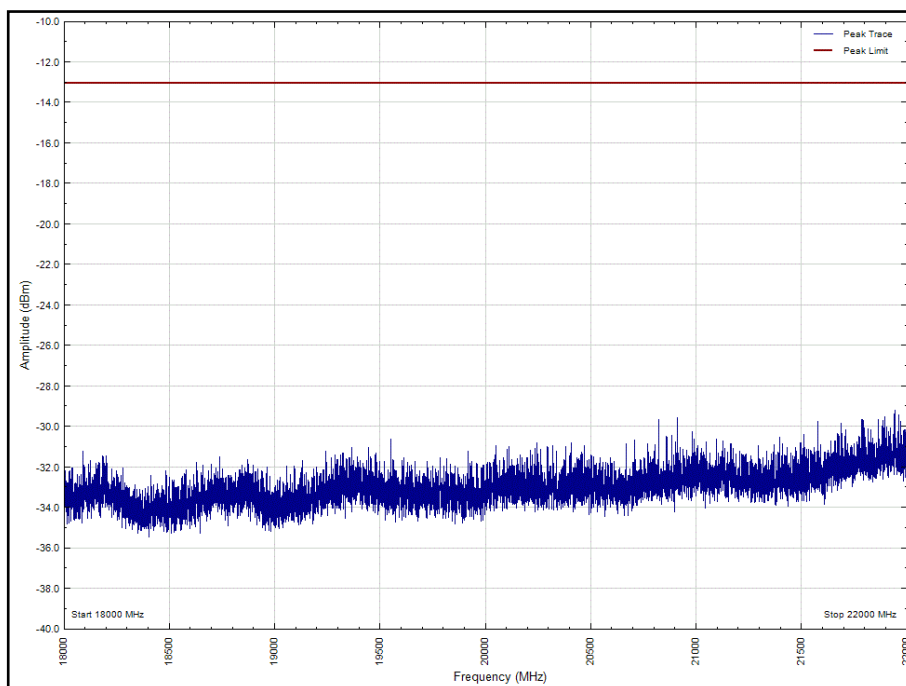
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 Carrier Bandwidth 20.0 MHz / 0.18 MHz / 0.18 MHz - Channel Position T<<SS>>RFBW<<SS>>
 - Band 66A - Range 18000 - 22000 MHz





Limit

Limit	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.
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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Maximum Peak Output Power and Peak to Average Ratio - Conducted					
Signal Analyser	Keysight	PXA	BAMS 1001562403	12	02-Dec-2020
Network Analyser	Agilent	N5230A	BAMS1000635869	12	22-Sep-2020
Electronic Calibration Module	Agilent	N4690-60003	BAMS1001752184	12	21-Jan-2021
Attenuator	Weinschel	6834-20-11	QM935	-	OP MON
Attenuator	Weinschel	56-3	T4390	-	OP MON
Attenuator	Weinschel	6834-20-11	QC181	-	OP MON
Power Supply	Delta Electronika	SM 52-30	BAMS 1000077230	-	OP MON
Hygrometer	Rotronic	TE5004	0463721	12	02-Oct-2020
Digital Voltmeter	Fluke	79	3057	12	19-Aug-2020
RF Load	Wienschel associates	WA49-40-33	A1855	-	OP MON
RF Load	Wienschel associates	WA49-40-34	S2393	-	OP MON
RF Load	Wienschel associates	WA49-40-35	SX810	-	OP MON
RF Load	Wienschel associates	WA49-40-36	A1810	-	OP MON
Occupied Bandwidth					
Signal Analyser	Keysight	PXA	BAMS 1002016870	12	02-Dec-2020
Network Analyser	Agilent	N5230A	BAMS1000635869	12	22-Sep-2020
Electronic Calibration Module	Agilent	N4690-60003	BAMS1001752184	12	21-Jan-2021
Attenuator	Weinschel	6834-20-11	QM935	-	OP MON
Attenuator	Weinschel	56-3	T4390	-	OP MON
Attenuator	Weinschel	6834-20-11	QC181	-	OP MON
Power Supply	Delta Electronika	SM 52-30	BAMS 1000077230	-	OP MON
Hygrometer	Rotronic	0463721	5004	12	02-Oct-2020
Digital Voltmeter	Fluke	79	3057	12	19-Aug-2020
RF Load	Wienschel associates	WA49-40-33	A1855	-	OP MON
RF Load	Wienschel associates	WA49-40-34	S2393	-	OP MON
RF Load	Wienschel associates	WA49-40-35	SX810	-	OP MON
RF Load	Wienschel associates	WA49-40-36	A1810	-	OP MON
Band Edge					
Signal Analyser	Keysight	PXA	BAMS 1002016870	12	02-Dec-2020
Network Analyser	Agilent	N5230A	BAMS1000635869	12	22-Sep-2020
Electronic Calibration Module	Agilent	N4690-60003	BAMS1001752184	12	21-Jan-2021
Attenuator	Weinschel	6834-20-11	QM935	-	OP MON
Attenuator	Weinschel	56-3	T4390	-	OP MON
RF Load	Wienschel associates	WA49-40-33	A1855	-	OP MON
RF Load	Wienschel associates	WA49-40-34	S2393	-	OP MON
RF Load	Wienschel associates	WA49-40-35	SX810	-	OP MON
RF Load	Wienschel associates	WA49-40-36	A1810	-	OP MON
Attenuator	Weinschel	6834-20-11	QC181	-	OP MON
Power Supply	Delta Electronika	SM 52-30	BAMS 1000077230	-	OP MON



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Hygrometer	Rotronic	0463721	5004	12	02-Oct-2020
Digital Voltmeter	Fluke	79	3057	12	19-Aug-2020
Transmitter Spurious Emissions					
Signal Analyser	Keysight	PXA	BAMS 1002016870	12	02-Dec-2020
Network Analyser	Agilent	N5230A	BAMS1000635869	12	22-Sep-2020
Electronic Calibration Module	Agilent	N4690-60003	BAMS1001752184	12	21-Jan-2021
Attenuator	Weinschel	6834-20-11	QM935	-	OP MON
High pass Filter	Wainwright	WHNX3.8/26.5G-6SS	SN11	-	OP MON
Attenuator	Weinschel	56-3	T4390	-	OP MON
RF Load	Wienschel associates	WA49-40-33	A1855	-	OP MON
RF Load	Wienschel associates	WA49-40-34	S2393	-	OP MON
RF Load	Wienschel associates	WA49-40-35	SX810	-	OP MON
RF Load	Wienschel associates	WA49-40-36	A1810	-	OP MON
Attenuator	Weinschel	6834-20-11	QC181	-	OP MON
Power Supply	Delta Elektronika	SM 52-30	BAMS 1000077230	-	OP MON
Hygrometer	Rotronic	0463721	5004	12	02-Oct-2020
Digital Voltmeter	Fluke	79	3057	12	19-Aug-2020
Radiated Emissions					
BiLog antenna	Chase	CBL6111A	IE-B928	12	24-Jul-2020
Cable	Unknown	N-Type	K:W18.03_3m	12	27-Aug-2020
Preamplifier <1GHz	Force	36-19067	36150	12	28-Aug-2020
Cable	Sucoflex	SMA	K_W53.07_7m	12	19-Apr-2021
7 GHz HiPass	Micro-Tronics	HPM15120	36068	12	13-Aug-2020
Amplifier	Quinstar	Unknown	36021	12	13-Aug-2020
Receiver	Rohde and Schwarz	ESU	36020	12	15-Jan-2021
Antenna	ARA	DRG-118/A	E-1839	-	-
Antenna	Seibersdorf Laboratories	A-2444	36099	-	-
Hygrometer	Rotronic	HP21	TE5004	12	02-Oct-2020
Digital Voltmeter	Fluke	79	TE3057	12	19-Aug-2020
Multimeter	Fluke	87	E-P754	-	27-May-2021

N/A – Not Applicable

O/P Mon – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter		MU
Conducted Maximum Peak Output Power	30 MHz to 20 GHz Amplitude		± 0.8895 dB
Conducted Emissions	9kHz to 22 GHz Amplitude		± 1.7835 dB
Occupied Bandwidth	LTE	10 MHz Bandwidth	± 67172 Hz
-	LTE	15 MHz Bandwidth	± 117076 Hz
-	LTE	20 MHz Bandwidth	± 145902 Hz
Band Edge	30 MHz to 20 GHz Amplitude		± 0.8895 dB
Radiated Spurious Emissions	30 MHz to 1GHz		± 5.2 dB
	1 GHz to 40GHz		± 6.3 dB

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Accred. no. 10363
Testing
ISO/IEC 17025

This report relates only to the actual item/items tested.

Our Swedac Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our Swedac Accreditation.

Results of tests not covered by our Swedac Accreditation Schedule are marked NSA
(Not Swedac Accredited).

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ANNEX A

MODULE LIST



Product	Product No	R-State	Serial No
CT11	LPC 102 487/1	R1C	T01F375047
Radio 8843 B2 B66A	KRC 161 707/2	R1H	E238267455
Software Version:	CXP9013268/15	Revision:	R81KM