MEASUREMENT REPORT

FCC PART 24 Subpart E & PART 27 Subpart C

FCC ID:	2AD8UAHFID01
Application:	Nokia Solutions and Networks, OY

Application Type:	Certification
Product:	AirScale Indoor Radio ASiR-pRRH
Model No.:	AHFID
Brand Name:	Nokia
FCC Rule Part(s):	Part 24 Subpart E & Part 27 Subpart C
Test Procedure(s):	ANSI C63.26-2015, KDB 971168 D01v03r01
Test Date:	February 01, 2019 ~ August 03, 2020

Reviewed By: Paddy Chen (Paddy Chen)

Approved By: (Chenz Ker)

Testing Laboratory
3261

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2006TW0004-U1	Rev. 01	Initial Report	07-24-2020	Invalid
2006TW0004-U1	Rev. 02	Updated with TCB's comment	08-03-2020	Valid

Note: This report is prepared for FCC Class II permissive supplement to MRT Original report no. 1905TW0105, added NB-IoT technology and related data.

CONTENTS

Description Page

General Information

Applicant:	Nokia Solutions and Networks, OY
Applicant Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Manufacturer:	Nokia Solutions and Networks, OY
Manufacturer Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (Reg. No. TW3261) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.**
- **MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.**

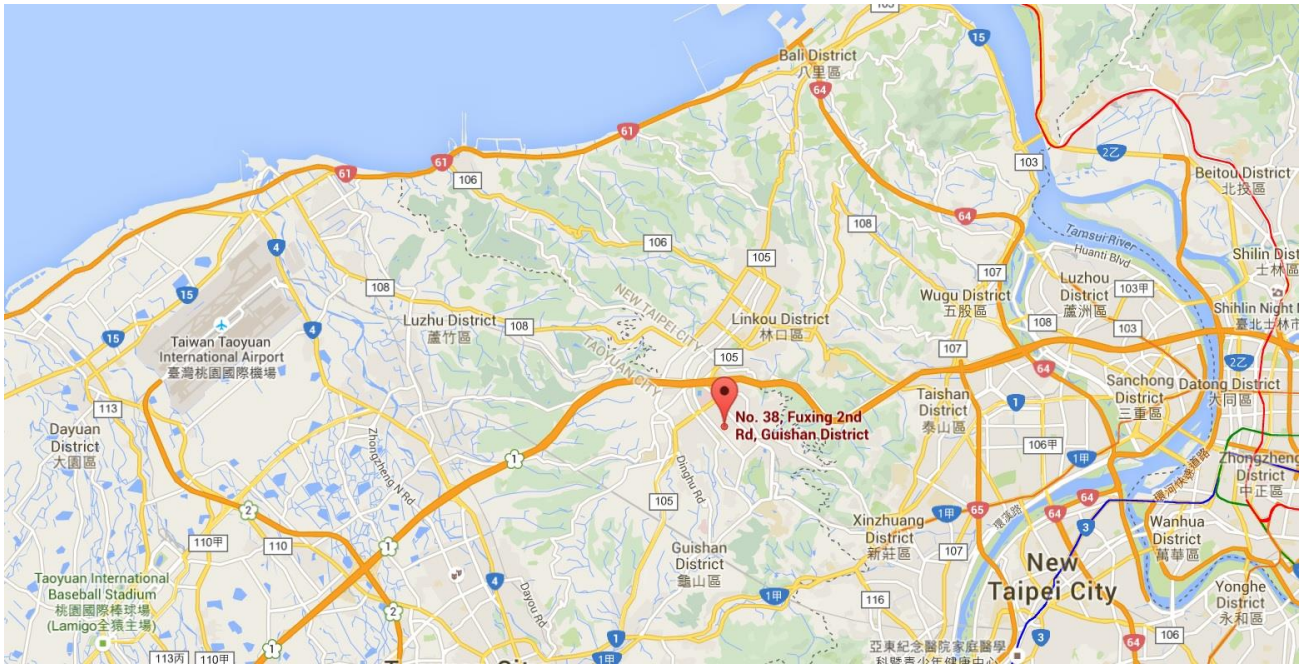
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	AirScale Indoor Radio ASiR-pRRH
Model No.:	AHFID
Brand Name:	Nokia
Test Device Serial No.:	NH201700001
Hardware Version:	X12
Software Version:	FL18A
Voltage Range:	PoE: 52 ~ 57Vdc
NB-IoT Operating Band (s):	FDD Band 2, Band 66
Sub Carrier Spacing:	15kHz
NB-IoT Operating Type:	Guard-band; In-band
Modulation Type:	QPSK
T_X Frequency Range:	Band 2: 1930 ~ 1990 MHz; Band 66: 2110~2180MHz
R_X Frequency Range:	Band 2: 1850 ~ 1910 MHz; Band 66: 1710~1780MHz
Emission Designator:	Refer to Section 2.2
Antenna Specification:	Refer to Section 2.3

2.2. Emission Designator

Bandwidth (MHz)	NB-IoT Band	Emission Designator
10	Band 2	9M23G7D
15		13M8G7D
20		18M3G7D
10	Band 66	9M22G7D
15		13M8G7D
20		18M2G7D

2.3. Description of Available Antennas

Band Support	Antenna Type	Model	Antenna Gain
LTE Band 2	Omni Internal Antenna	6744	ANT 0: 4.4dBi ANT 1: 4.9dBi
LTE Band 66			ANT 0: 5.5dBi ANT 1: 4.8dBi

Note: The transmit signals are completely uncorrelated with each other, directional gain = G_{ANT} dBi, G_{ANT} is the antenna gain in dBi.

2.4. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.5. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedure described in the document titled “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services ” (ANSI C63.10-2013) was used in the measurement.

3.2. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.
For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.
Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was

varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, which produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	SCHWARZBECK	VULB 9162	MRTSUE06022	1 year	2020/10/13
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTSUE06023	1 year	2020/10/13
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTSUE06024	1 year	2020/12/29
Broadband Coaxial Preamplifie	SCHWARZBECK	BBV 9718	MRTSUE06176	1 year	2020/11/15
Preamplifier	SCHWARZBECK	BBV 9721	MRTSUE06121	1 year	2021/06/11
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2020/07/31
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06559	1 year	2020/08/08
EMC Cable	HUBERSUHNER	SF106	MRTSUE06594	1 year	2020/11/14
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTSUE06362	1 year	2021/03/29

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTSUE06446	1 year	2020/06/30
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTSUE06446	1 year	2020/06/30
Wideband Radio Communication Taster	R&S	CMW 500	MRTSUE06243	1 year	2020/11/17
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06559	1 year	2020/08/08
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
DC Power Supply	GWINSTEK	SPS-606	MRTSUE06016	Check by TRUE RMS MULTIMETER	
TRUE RMS MULTIMETER	FLUKE	117	MRTSUE06080	1 year	2021/05/06
Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTSUE06051	1 year	2020/11/07
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTSUE06362	1 year	2021/03/29

Software	Version	Function
EMI Software	V3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Conducted Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.65dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 30MHz: 3.92dB 30MHz ~ 1GHz: 4.25dB 1GHz ~ 18GHz: 4.40dB

6. TEST RESULT

6.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046; 24.232(a)(2); 27.50(d)(2)	Equivalent Isotropically Radiated Power	Refer to Section 6.2	Conducted	Pass	Section 6.2
2.1049; 24.238(b); 27.53(h)	Emission Bandwidth	Refer to Section 6.3		Pass	Section 6.3
24.238(a); 27.53(h)	Band Edge Measurements	Refer to Section 6.4		Pass	Section 6.4

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) The NB-IoT conducted output power is less than LTE mode, so the EIRP power is reused the LTE mode.
3) The Channel Band-edge is presented the worst test data in the test report.

6.2. Equivalent Isotropically Radiated Power Measurement

6.2.1.Test Limit

The Radiated Equivalent Isotropically Power shall be according to the specific rule Part 24.232(a)(2) & 27.50(d)(2)(ii) that are limited to EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

6.2.2.Test Procedures Used

KDB 971168 D01v03r01 - Section 5.2.4 & 5.8

ANSI C63.26-2015 - Section 5.2.4.2 & 5.2.7

6.2.3.Test Setting

Average Power Measurement

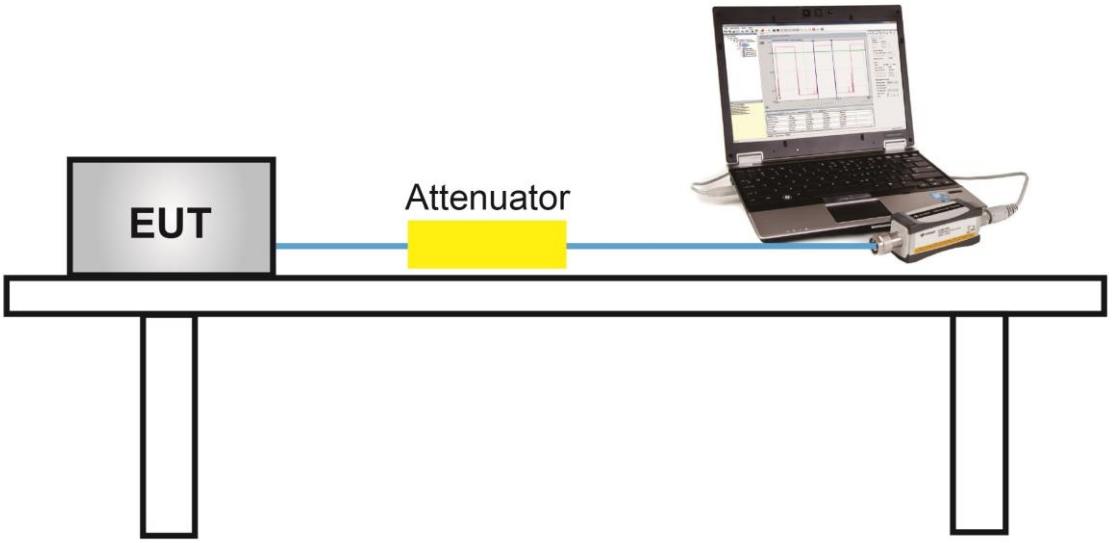
Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

Radiated Equivalent Isotropically Power Measurement

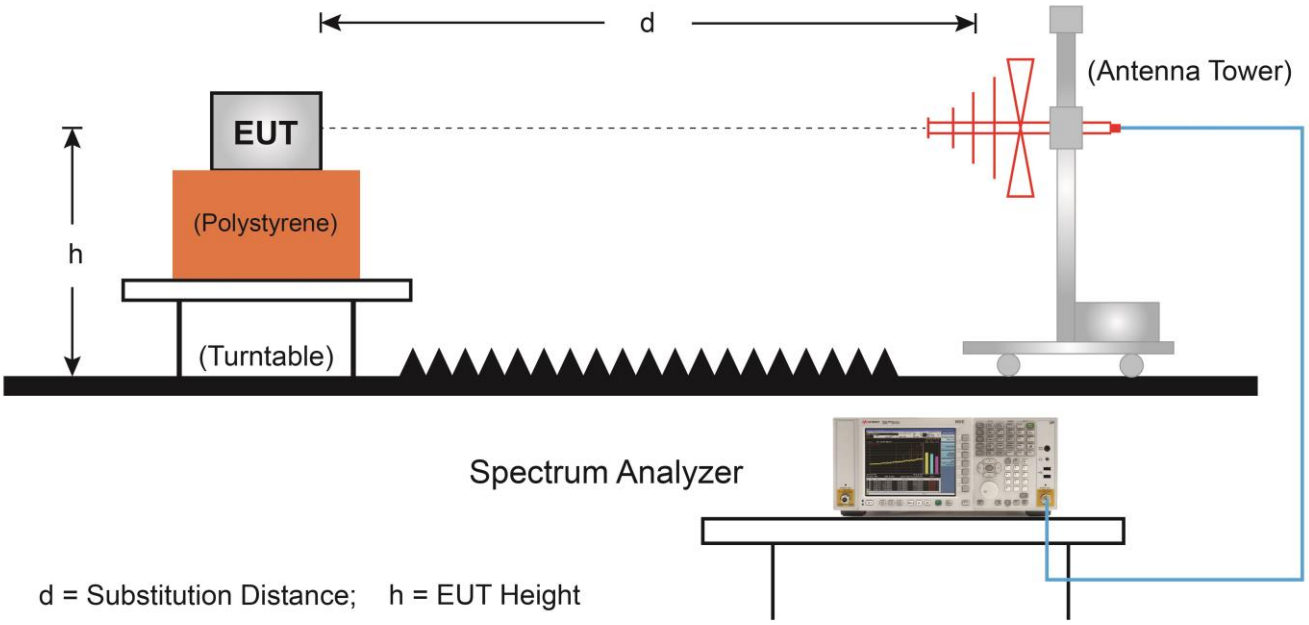
1. RBW ≥ OBW
2. VBW ≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = power averaging (rms)
5. Set sweep trigger to “free run”
6. If the EUT can be configured to transmit continuously, then set the trigger to free run
7. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time
8. The trace was allowed to stabilize
9. Use the peak marker function to determine the peak amplitude level.
10. EIRP = Output Power Level of S.G - T_X Cable Loss + Antenna Gain of Substitution Antenna.

6.2.4.Test Setup

Conducted Measurment of Output Power



Radiated Measurement of Equivalent Isotropically Radiated Power



6.2.5.Test Result

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2020/06/03
Test Configuration	NB-IoT Band 2		

Frequency (MHz)	Carrier Position (kHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
Guard band					
1935	-4597.5	10	23.48	23.25	26.38
	4597.5	10	23.82	23.54	26.69
1960	-4597.5	10	23.32	23.28	26.31
	4597.5	10	23.28	23.22	26.26
1985	-4597.5	10	23.78	23.85	26.83
	4597.5	10	23.86	24.08	26.98
1937.5	-6892.5	15	23.90	23.78	26.85
	6892.5	15	24.09	23.79	26.95
1960	-6892.5	15	23.46	23.56	26.52
	6892.5	15	23.49	23.45	26.48
1982.5	-6892.5	15	24.49	24.28	27.40
	6892.5	15	24.13	24.80	27.49
1940	-9097.5	20	23.30	23.62	26.47
	9097.5	20	23.70	23.37	26.55
1960	-9097.5	20	23.44	23.39	26.43
	9097.5	20	23.41	23.48	26.46
1980	-9097.5	20	23.53	23.98	26.77
	9097.5	20	23.88	23.95	26.93

Frequency (MHz)	Carrier Position (kHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
In band					
1935	4	10	23.35	23.18	26.28
	45	10	23.41	23.22	26.33
1960	4	10	22.88	22.89	25.90
	45	10	22.90	22.83	25.88
1985	4	10	23.32	23.30	26.32
	45	10	23.28	23.14	26.22
1937.5	2	15	23.63	23.52	26.59
	72	15	23.72	23.56	26.65
1960	2	15	23.00	22.98	26.00
	72	15	22.97	22.99	25.99
1982.5	2	15	23.66	23.78	26.73
	72	15	23.60	23.62	26.62
1940	4	20	23.31	23.22	26.28
	95	20	23.32	23.31	26.33
1960	4	20	23.00	22.94	25.98
	95	20	22.96	23.01	26.00
1980	4	20	23.01	23.60	26.33
	95	20	23.31	23.03	26.18

Note: Total Power (dBm) = $10*\log*\{10^{\wedge[\text{ANT 0 Power (dBm)} / 10]} + 10^{\wedge[\text{ANT 1 Power (dBm)} / 10]}\}$ (dBm).

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2020/06/04
Test Configuration	NB-IoT Band 66		

Frequency (MHz)	Carrier Position (kHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
Guard band					
2115	-4597.5	10	23.56	23.37	26.48
	4597.5	10	23.78	23.58	26.69
2145	-4597.5	10	23.32	23.71	26.53
	4597.5	10	23.58	23.89	26.75
2175	-4597.5	10	23.45	23.25	26.36
	4597.5	10	23.55	23.75	26.66
2117.5	-6892.5	15	23.86	23.54	26.69
	6892.5	15	23.97	23.79	26.89
2145	-6892.5	15	23.61	23.66	26.65
	6892.5	15	23.64	23.45	26.56
2172.5	-6892.5	15	23.30	23.26	26.29
	6892.5	15	23.47	23.24	26.37
2120	-9097.5	20	23.66	23.53	26.61
	9097.5	20	23.67	23.64	26.67
2145	-9097.5	20	23.45	23.66	26.57
	9097.5	20	23.44	23.68	26.57
2170	-9097.5	20	23.77	23.63	26.71
	9097.5	20	23.69	23.64	26.68

Frequency (MHz)	Carrier Position (kHz)	Channel Bandwidth (MHz)	Ant 0 Power (dBm)	Ant 1 Power (dBm)	Total Power (dBm)
In band					
2115	4	10	22.99	23.32	26.17
	45	10	23.00	23.30	26.16
2145	4	10	22.94	22.68	25.82
	45	10	22.90	22.80	25.86
2175	4	10	23.17	23.20	26.20
	45	10	23.06	23.16	26.12
2117.5	2	15	22.99	23.32	26.17
	72	15	23.00	23.30	26.16
2145	2	15	22.99	23.35	26.18
	72	15	22.97	23.42	26.21
2172.5	2	15	22.95	22.87	25.92
	72	15	22.99	22.80	25.91
2120	4	20	22.96	23.15	26.07
	95	20	23.00	23.08	26.05
2145	4	20	22.99	23.05	26.03
	95	20	22.95	22.90	25.94
2170	4	20	22.86	22.87	25.88
	95	20	23.24	23.36	26.31

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	AC1	Test Date	2020/08/03
Test Item	EIRP – NB-IoT Band 2		

Channel	Frequency (MHz)	Channel Bandwidth (MHz)	Reading Level (dBm)	Factor (dB)	EIRP (dBm)	Limit (dBm)
Guard band						
650	1935.0	10	27.71	4.90	32.61	< 62.15
900	1960.0	10	27.75	4.80	32.55	< 62.15
1150	1985.0	10	26.18	5.73	31.91	< 62.15
675	1937.5	15	27.31	4.84	32.15	< 62.15
900	1960.0	15	26.48	4.80	31.28	< 62.15
1125	1982.5	15	26.58	5.63	32.21	< 62.15
700	1940.0	20	27.46	4.78	32.24	< 62.15
900	1960.0	20	26.21	4.80	31.01	< 62.15
1100	1980.0	20	25.65	5.54	31.19	< 62.15
In band						
650	1935.0	10	27.68	4.90	32.58	< 62.15
900	1960.0	10	27.63	4.80	32.43	< 62.15
1150	1985.0	10	26.24	5.73	31.97	< 62.15
675	1937.5	15	27.33	4.84	32.17	< 62.15
900	1960.0	15	26.37	4.80	31.17	< 62.15
1125	1982.5	15	26.59	5.63	32.22	< 62.15
700	1940.0	20	27.45	4.78	32.23	< 62.15
900	1960.0	20	26.20	4.80	31.00	< 62.15
1100	1980.0	20	25.79	5.54	31.33	< 62.15

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	AC1	Test Date	2020/08/03
Test Item	EIRP Power – NB-IoT Band 66		

Channel	Frequency (MHz)	Channel Bandwidth (MHz)	Reading Level (dBm)	Factor (dB)	EIRP (dBm)	Limit (dBm)
Guard band						
66486	2115.0	10	25.14	6.04	31.18	< 62.15
66786	2145.0	10	25.23	6.39	31.62	< 62.15
67086	2175.0	10	25.40	6.30	31.70	< 62.15
66511	2117.5	15	24.24	6.07	30.31	< 62.15
66786	2145.0	15	24.29	6.39	30.68	< 62.15
67061	2172.5	15	23.61	6.32	29.93	< 62.15
66536	2120.0	20	24.02	6.10	30.12	< 62.15
66786	2145.0	20	23.55	6.39	29.94	< 62.15
67036	2170.0	20	23.44	6.34	29.78	< 62.15
In band						
66486	2115.0	10	25.10	6.04	31.14	< 62.15
66786	2145.0	10	25.19	6.39	31.58	< 62.15
67086	2175.0	10	25.44	6.30	31.74	< 62.15
66511	2117.5	15	24.21	6.07	30.28	< 62.15
66786	2145.0	15	24.25	6.39	30.64	< 62.15
67061	2172.5	15	23.65	6.32	29.97	< 62.15
66536	2120.0	20	24.03	6.10	30.13	< 62.15
66786	2145.0	20	23.56	6.39	29.95	< 62.15
67036	2170.0	20	23.50	6.34	29.84	< 62.15

6.3. Emission Bandwidth

6.3.1.Test Limit

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.3.2.Test Procedure

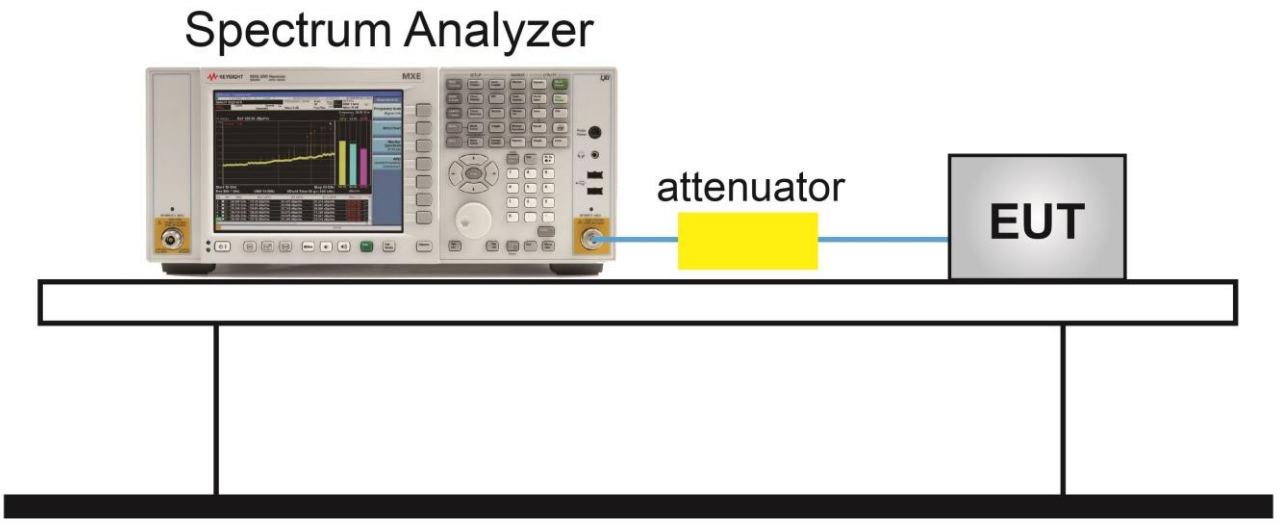
KDB 971168 D01v03r01 - Section 4.1 & 4.2

ANSI C63.26-2015 - Section 5.4.3 & 5.4.4

6.3.3.Test Setting

1. Set center frequency to the nominal EUT channel center frequency;
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW;
3. VBW ≥ 3 × RBW;
4. Detector = Peak;
5. Trace mode = max hold;
6. Sweep = auto couple;
7. Allow the trace to stabilize;
8. The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “−X dB” requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 26 dB below the reference level

6.3.4.Test Setup

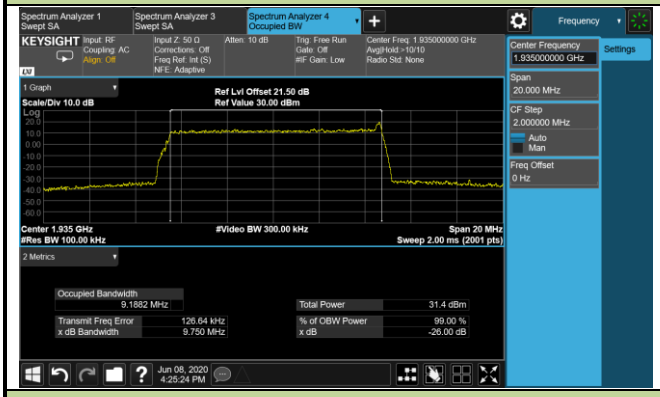
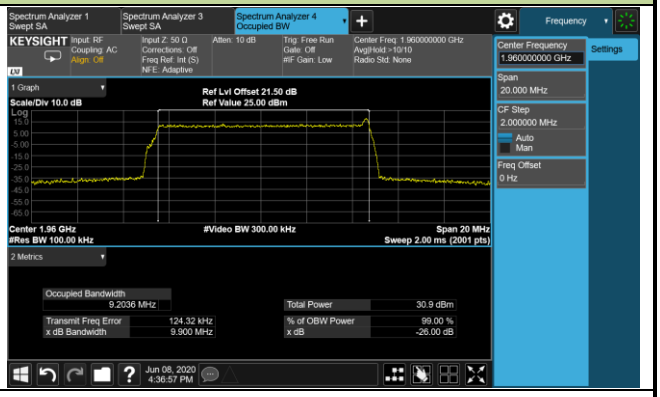
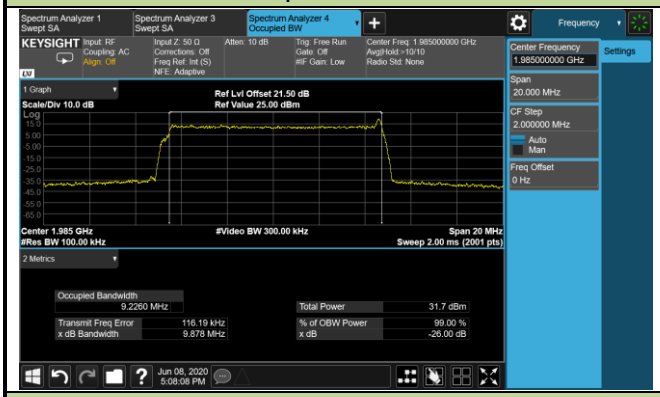
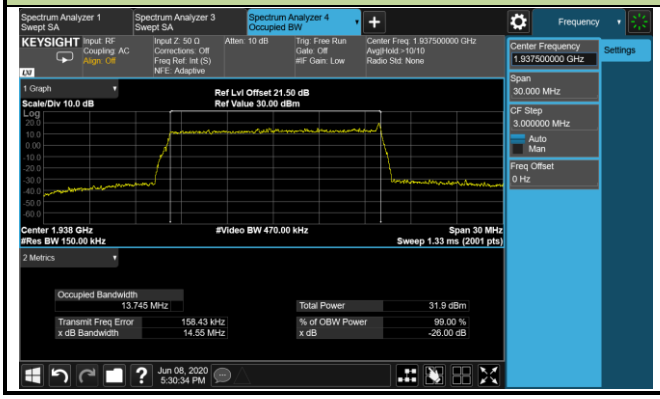
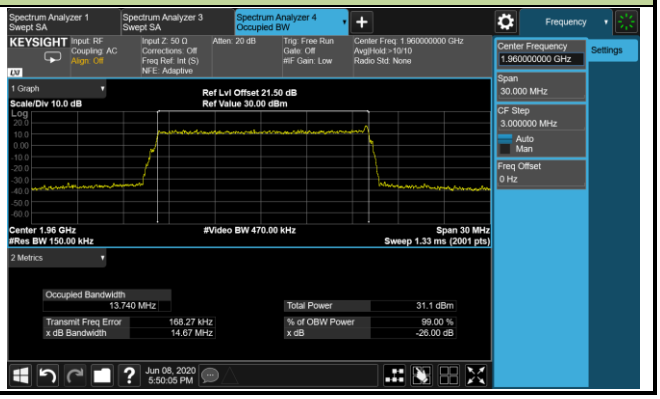


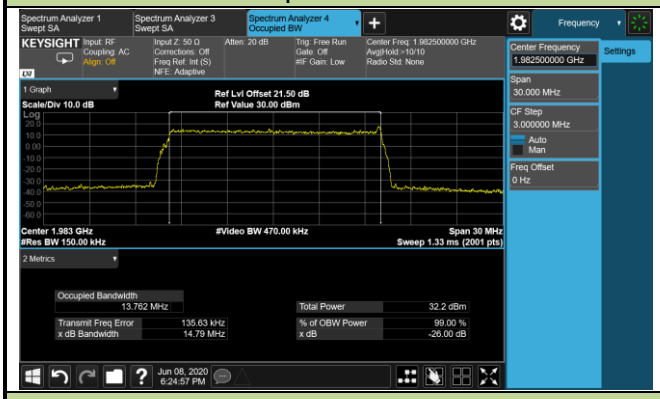
6.3.5.Test Result

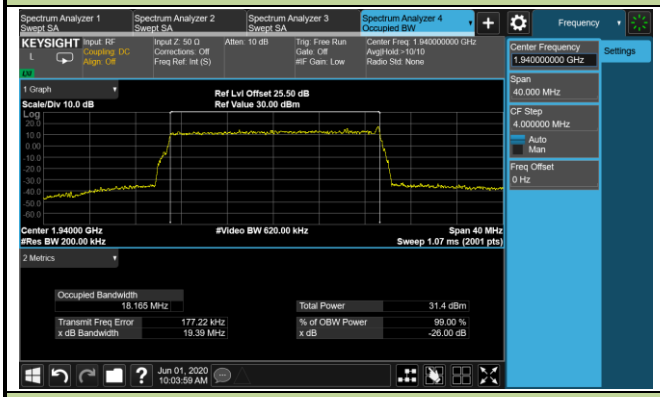
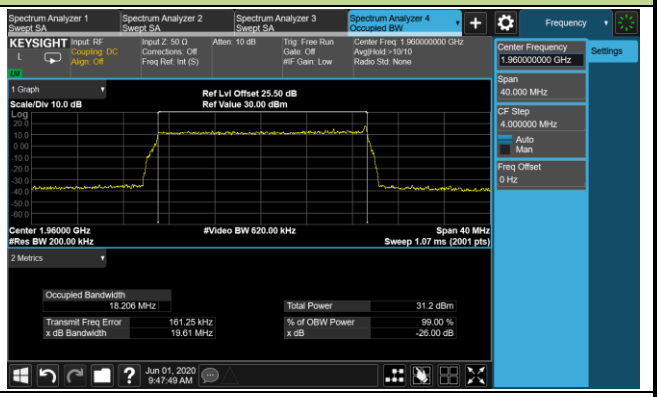
Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2020/06/06
Test Configuration	NB-IoT Band 2		

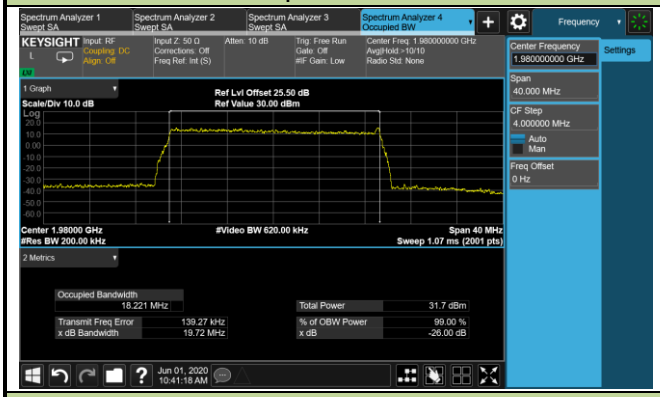
Frequency (MHz)	Carrier Position (kHz)	Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Guard band				
1935	-4597.5	10	9.88	9.22
	4597.5	10	9.75	9.19
1960	-4597.5	10	9.91	9.22
	4597.5	10	9.90	9.20
1985	-4597.5	10	9.76	9.19
	4597.5	10	9.88	9.23
1937.5	-6892.5	15	14.87	13.80
	6892.5	15	14.55	13.75
1960	-6892.5	15	14.88	13.76
	6892.5	15	14.67	13.74
1982.5	-6892.5	15	14.76	13.79
	6892.5	15	14.79	13.76
1940	-9097.5	20	19.73	18.18
	9097.5	20	19.39	18.17
1960	-9097.5	20	19.77	18.33
	9097.5	20	19.61	18.21
1980	-9097.5	20	19.63	18.18
	9097.5	20	19.72	18.22

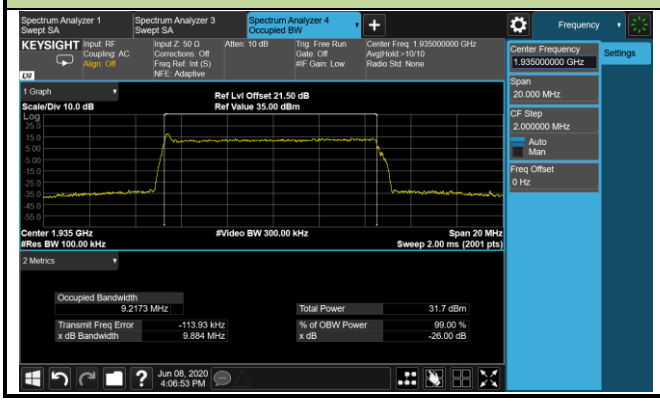
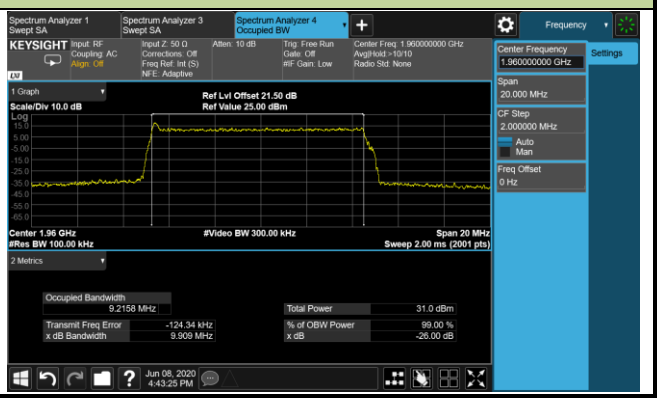
Frequency (MHz)	Carrier Position (kHz)	Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
In band				
1935	4	10	9.85	8.99
	45	10	9.78	8.99
1960	4	10	9.77	8.97
	45	10	9.86	8.98
1985	4	10	9.81	8.96
	45	10	9.83	8.99
1937.5	2	15	14.71	13.45
	72	15	14.68	13.49
1960	2	15	14.88	13.48
	72	15	14.66	13.48
1982.5	2	15	14.63	13.47
	72	15	14.88	13.53
1940	4	20	19.74	17.91
	95	20	19.41	17.88
1960	4	20	19.79	18.00
	95	20	19.52	17.93
1980	4	20	19.62	17.88
	95	20	19.60	17.92

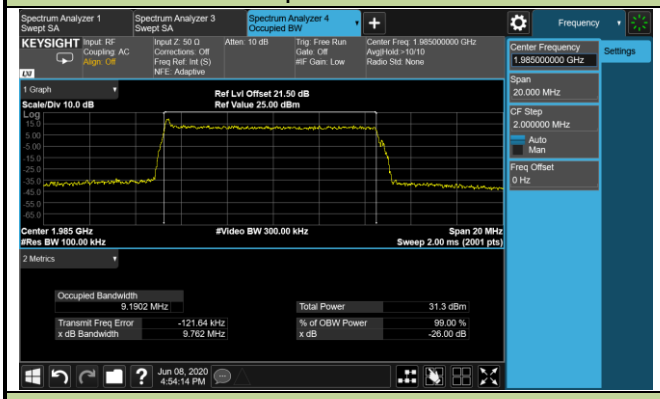
Band 2 Guard band	
10MHz Channel Bandwidth - Carrier Position 4597.5 kHz	
Bottom Channel	Middle Channel
	
Top Channel	
	
15MHz Channel Bandwidth - Carrier Position 6892.5 kHz	
Bottom Channel	Middle Channel
	

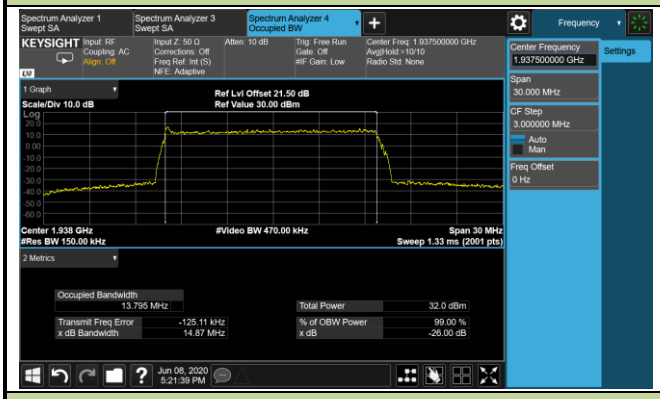
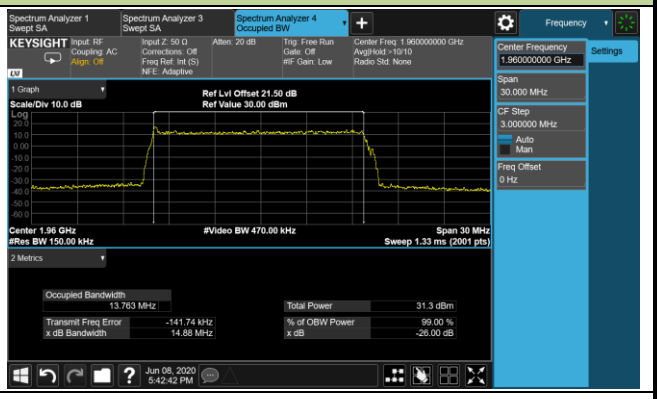
Top Channel	
	

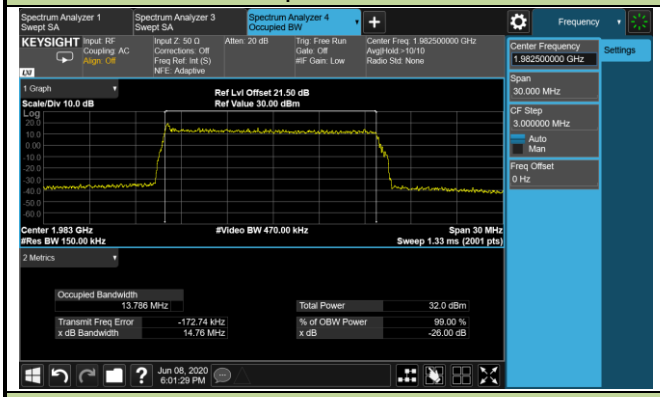
20MHz Channel Bandwidth - Carrier Position 9097.5 kHz	
Bottom Channel	Middle Channel
	

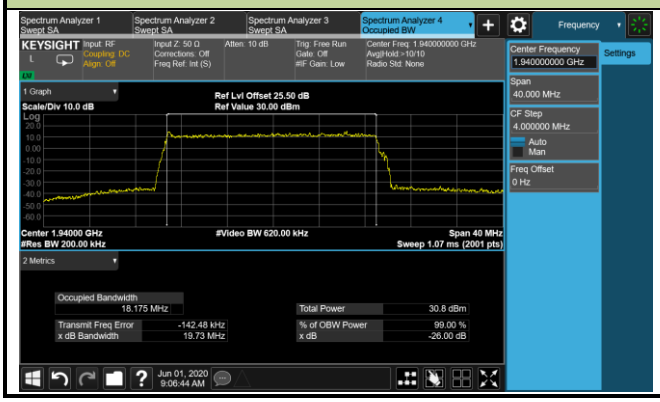
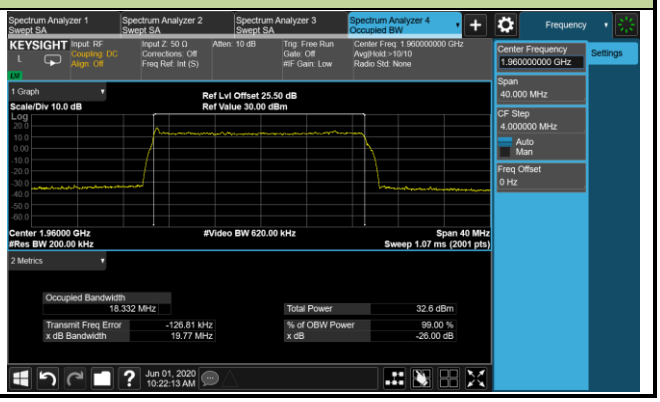
Top Channel	
	

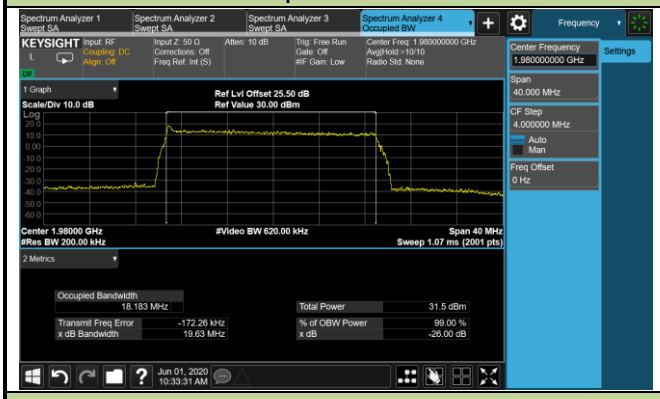
10MHz Channel Bandwidth - Carrier Position -4597.5 kHz	
Bottom Channel	Middle Channel
	

Top Channel	
	

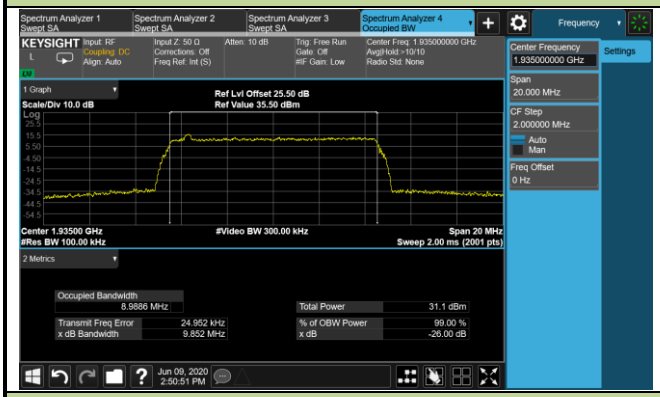
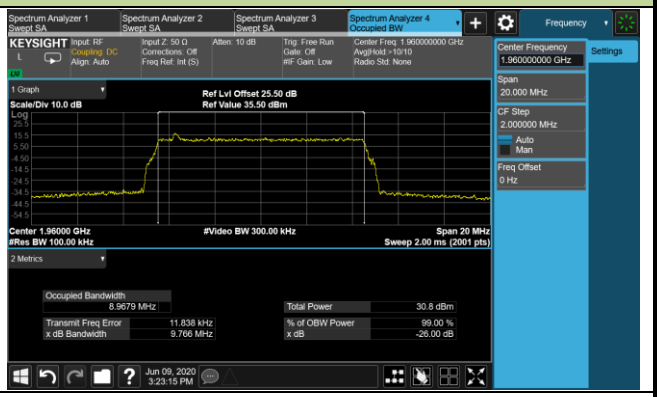
15MHz Channel Bandwidth - Carrier Position -6892.5 kHz	
Bottom Channel	Middle Channel
	

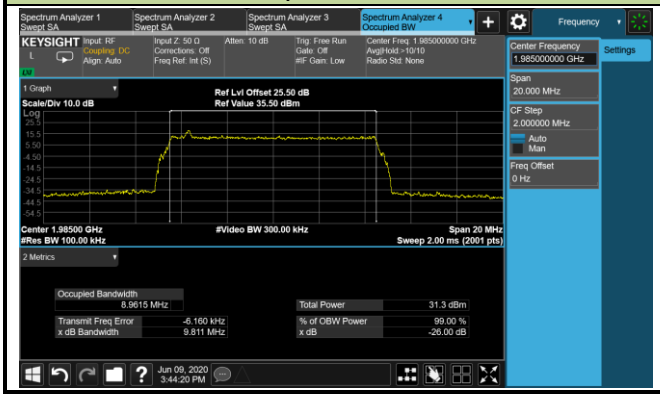
Top Channel	
	

20MHz Channel Bandwidth - Carrier Position -9097.5 kHz	
Bottom Channel	Middle Channel
	

Top Channel	
	

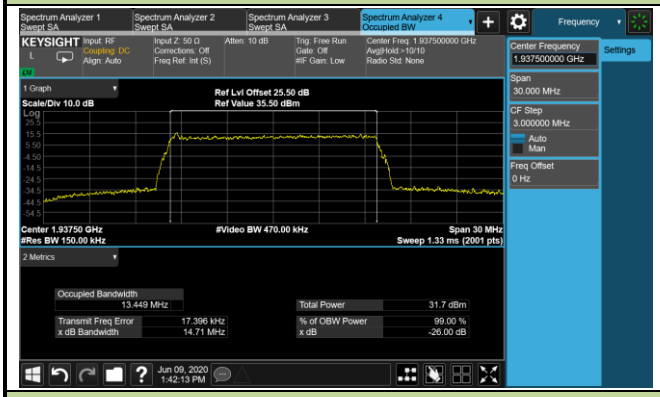
Band 2 In band
10MHz Channel Bandwidth - Carrier Position 4 kHz

Bottom Channel	Middle Channel
	

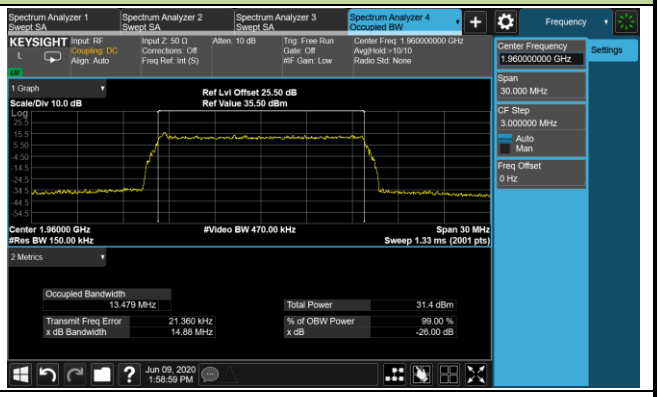
Top Channel	
	

15MHz Channel Bandwidth - Carrier Position 2 kHz

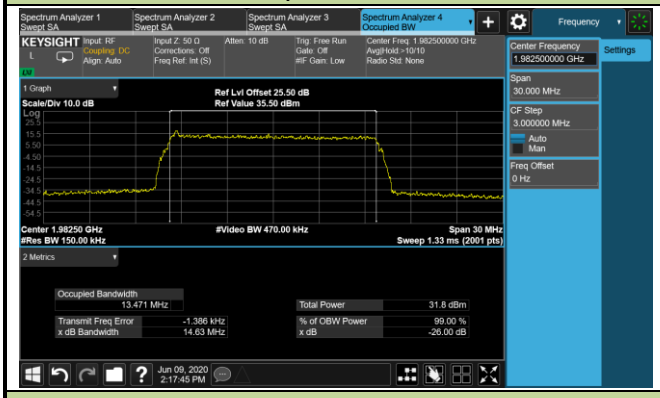
Bottom Channel



Middle Channel

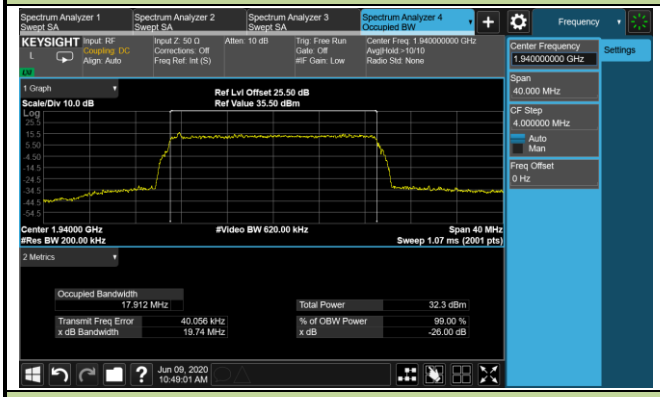


Top Channel

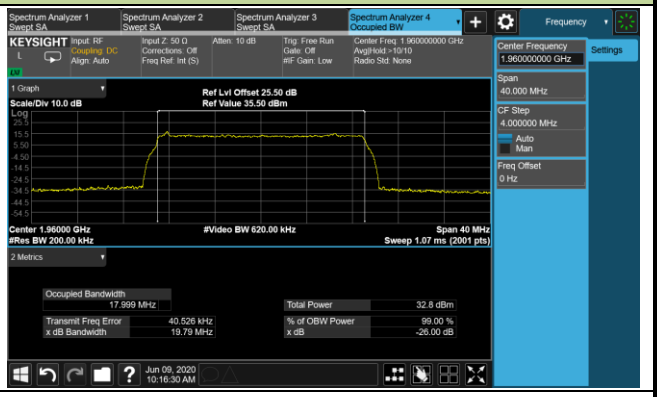


20MHz Channel Bandwidth - Carrier Position 4 kHz

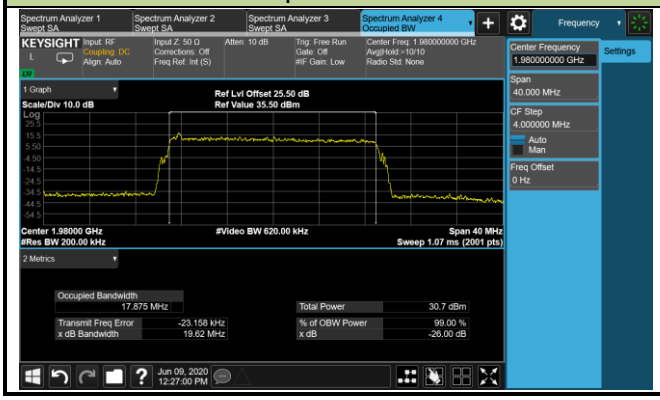
Bottom Channel



Middle Channel

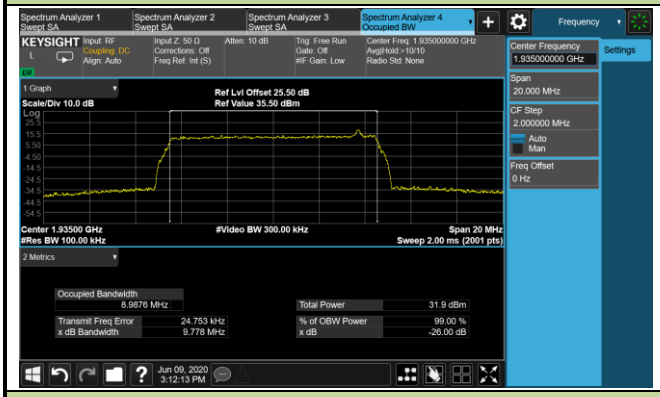


Top Channel

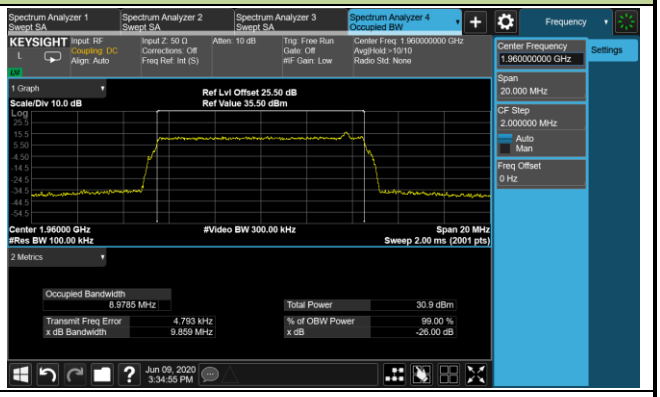


10MHz Channel Bandwidth - Carrier Position 45 kHz

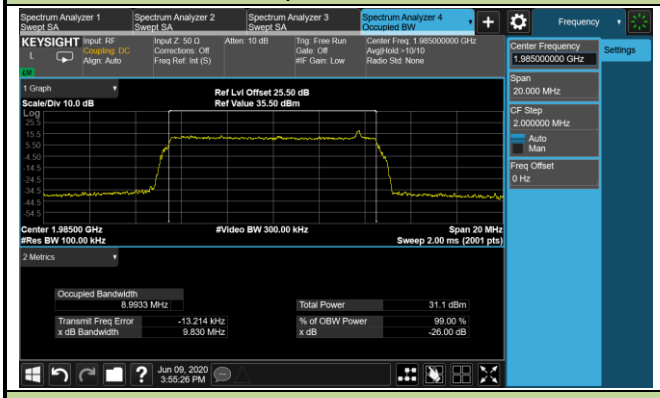
Bottom Channel



Middle Channel

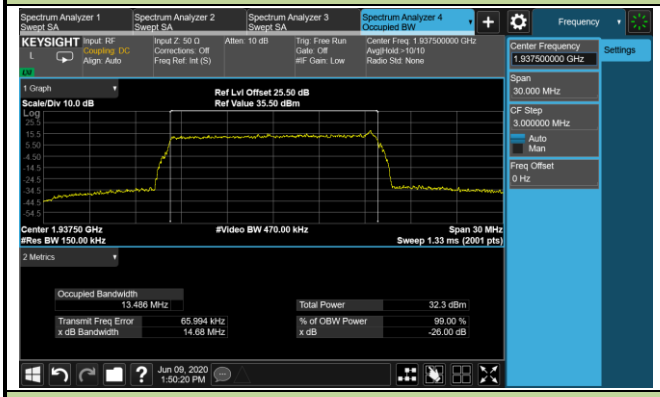


Top Channel

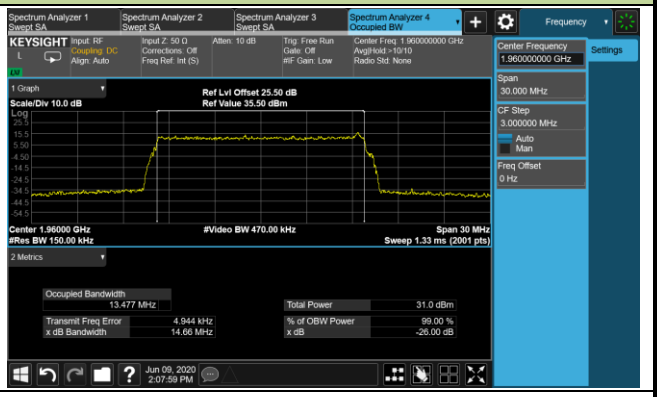


15MHz Channel Bandwidth - Carrier Position 72 kHz

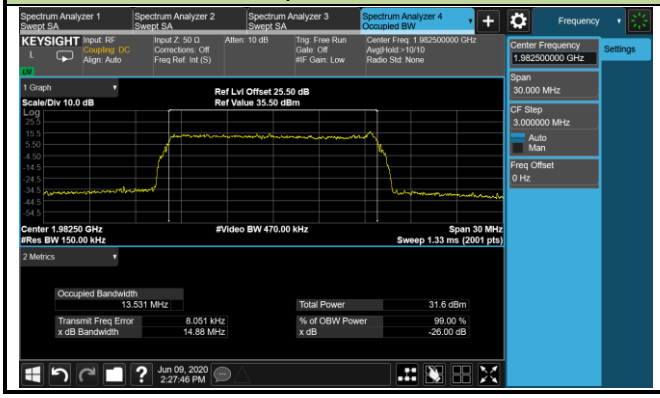
Bottom Channel

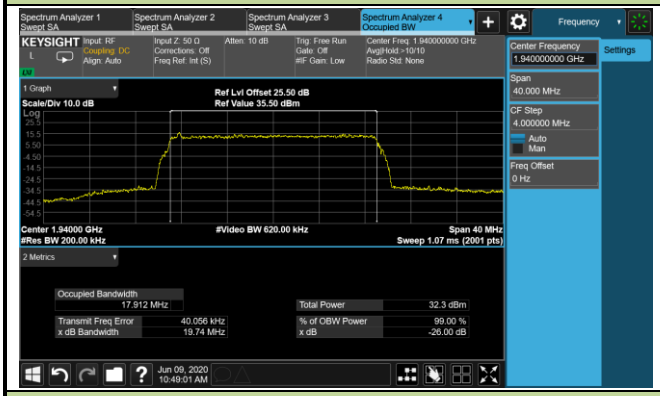
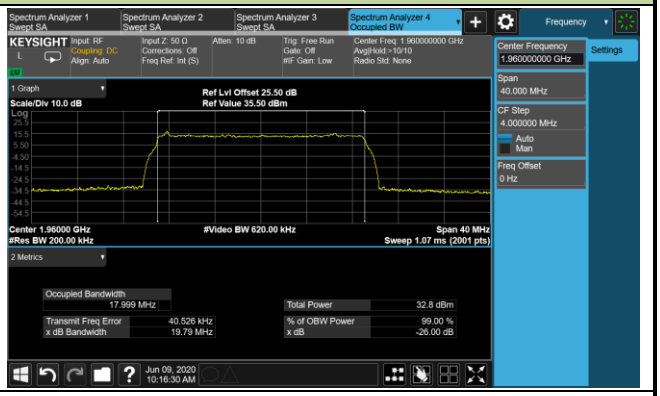
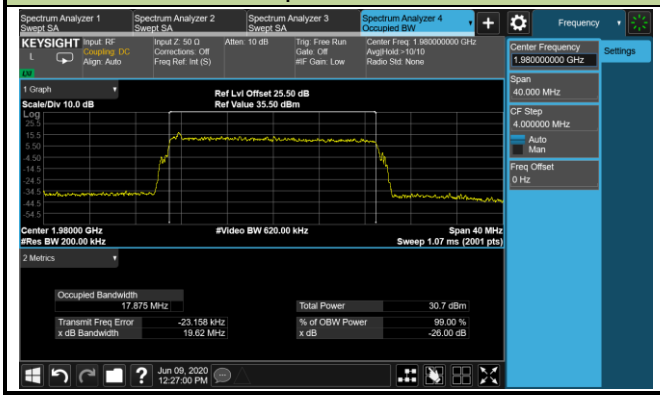


Middle Channel



Top Channel



20MHz Channel Bandwidth - Carrier Position 95 kHz	
Bottom Channel	Middle Channel
	
Top Channel	
	

Product	AirScale Indoor Radio ASiR-pRRH	Test Engineer	Peter Xu
Test Site	SR2	Test Date	2020/06/06
Test Configuration	NB-IoT Band 66		

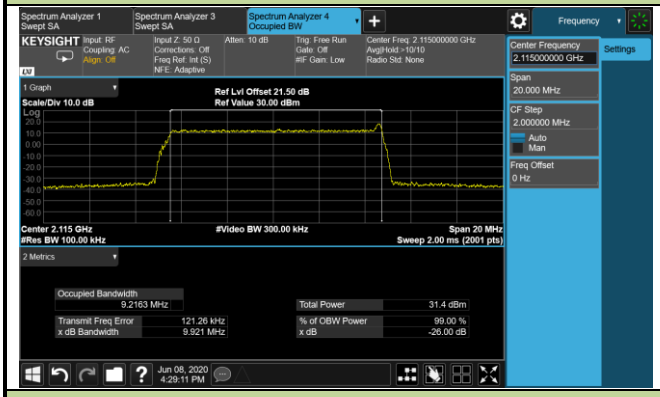
Frequency (MHz)	Carrier Position (kHz)	Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Guard band				
2115	-4597.5	10	9.82	9.22
	4597.5	10	9.92	9.22
2145	-4597.5	10	9.78	9.19
	4597.5	10	9.84	9.21
2175	-4597.5	10	9.82	9.20
	4597.5	10	9.83	9.22
2117.5	-6892.5	15	14.78	13.77
	6892.5	15	14.73	13.73
2145	-6892.5	15	14.81	13.76
	6892.5	15	14.69	13.76
2172.5	-6892.5	15	14.75	13.78
	6892.5	15	14.85	13.76
2120	-9097.5	20	19.76	18.23
	9097.5	20	19.61	18.22
2145	-9097.5	20	19.58	18.20
	9097.5	20	19.70	18.21
2170	-9097.5	20	19.80	18.24
	9097.5	20	19.53	18.23

Frequency (MHz)	Carrier Position (kHz)	Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
In band				
2115	4	10	9.80	8.96
	45	10	9.82	8.97
2145	4	10	9.85	8.97
	45	10	9.82	8.96
2175	4	10	9.76	8.97
	45	10	9.82	8.99
2117.5	2	15	14.67	13.47
	72	15	14.76	13.48
2145	2	15	14.78	13.46
	72	15	14.73	13.43
2172.5	2	15	14.78	13.45
	72	15	14.74	13.53
2120	4	20	19.68	17.95
	95	20	19.68	17.94
2145	4	20	19.59	17.94
	95	20	19.77	17.94
2170	4	20	19.64	17.93
	95	20	19.53	17.91

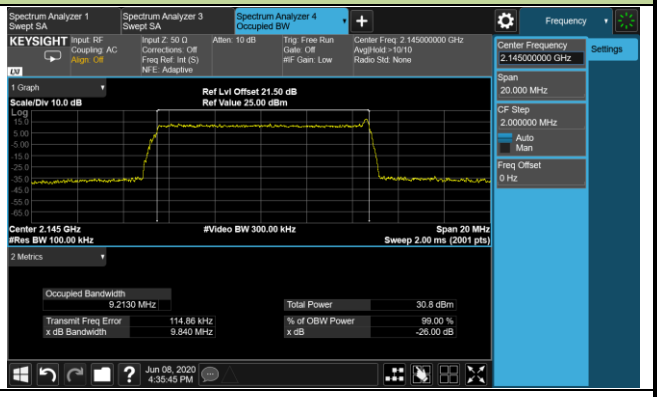
Band 66 Guard band

10MHz Channel Bandwidth - Carrier Position 4597.5 kHz

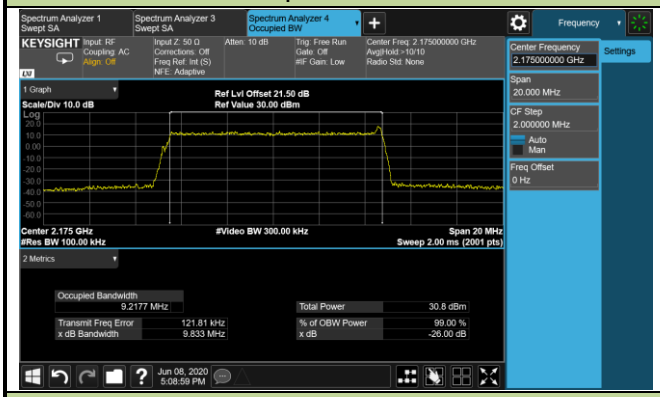
Bottom Channel



Middle Channel

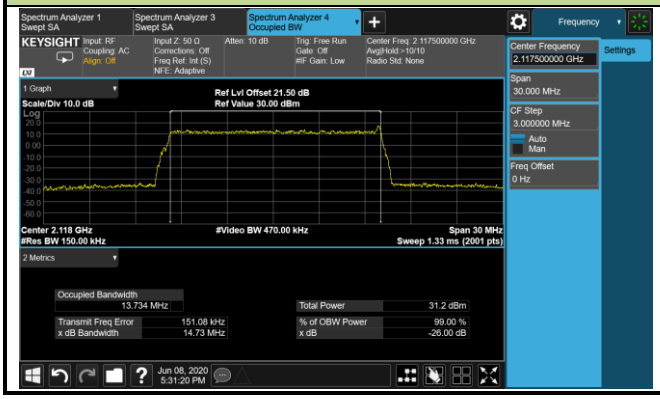


Top Channel

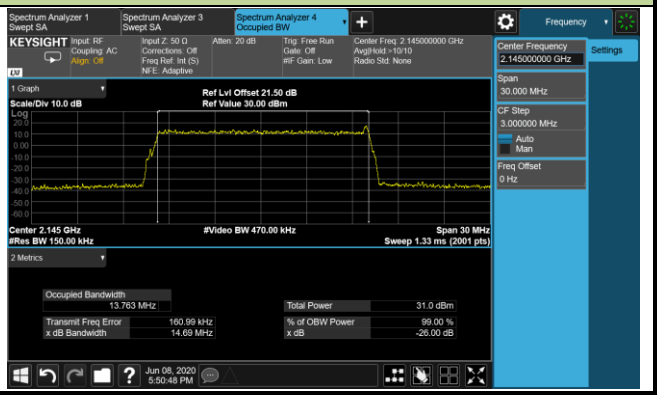


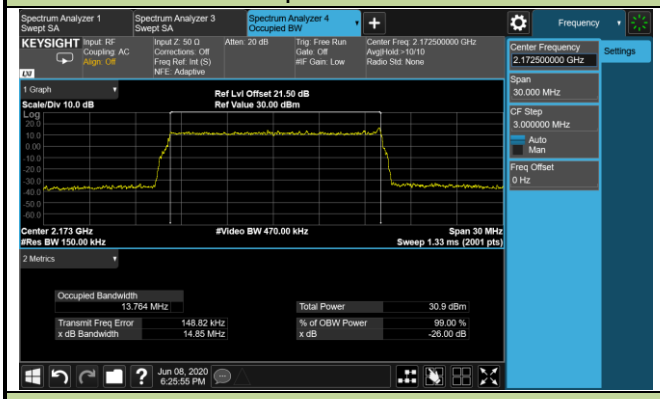
15MHz Channel Bandwidth -Carrier Position 6892.5kHz

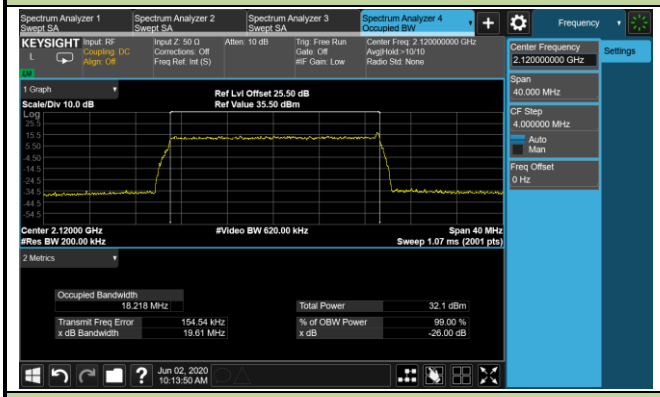
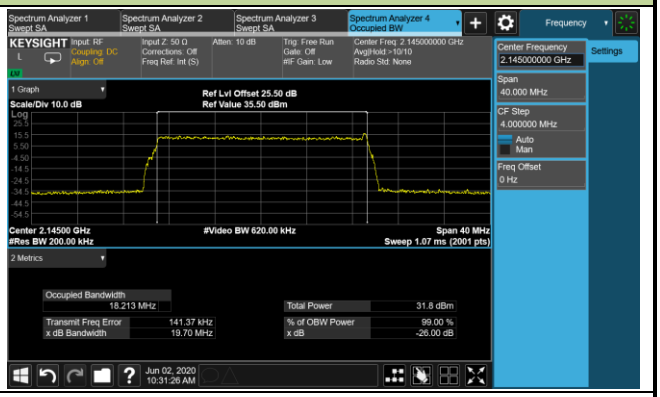
Bottom Channel

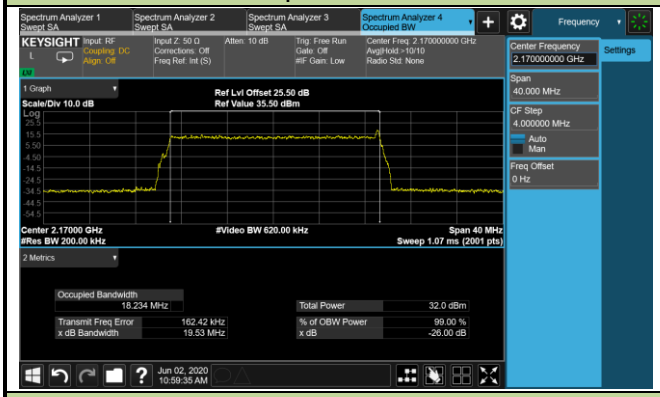


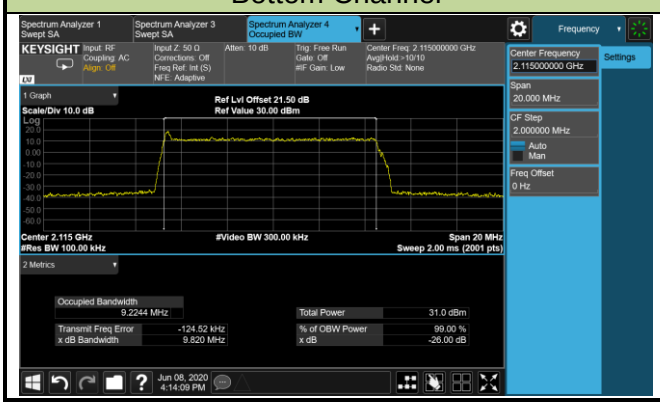
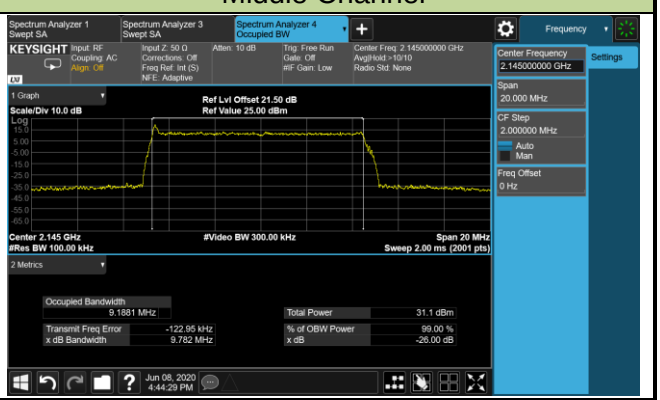
Middle Channel

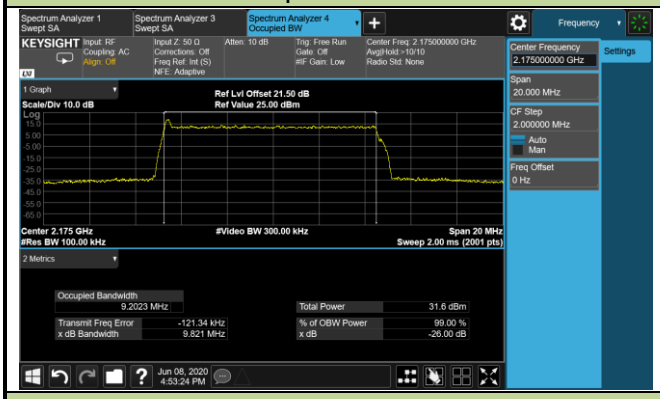


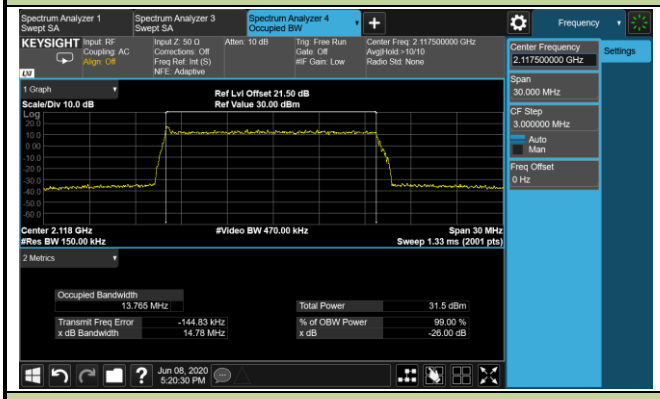
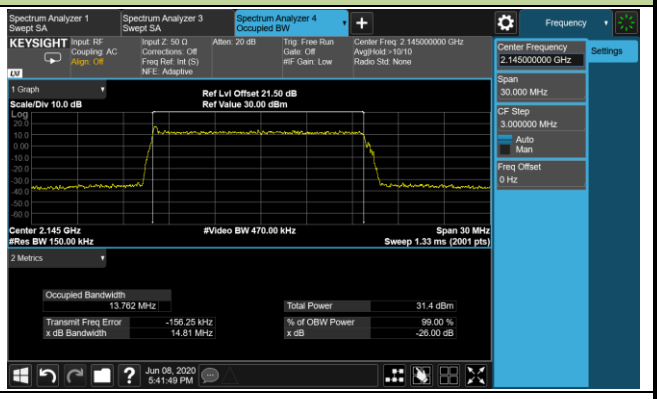
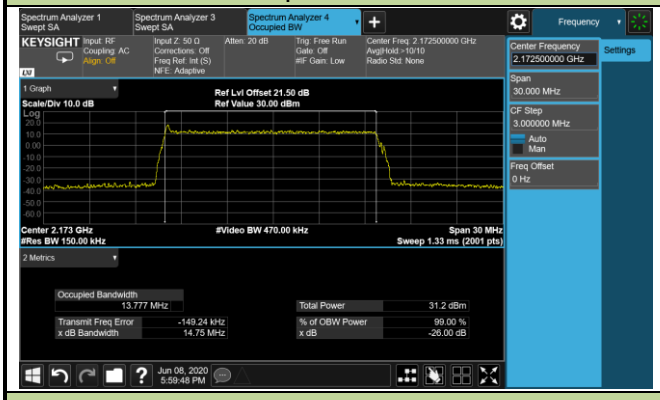
Top Channel	
	

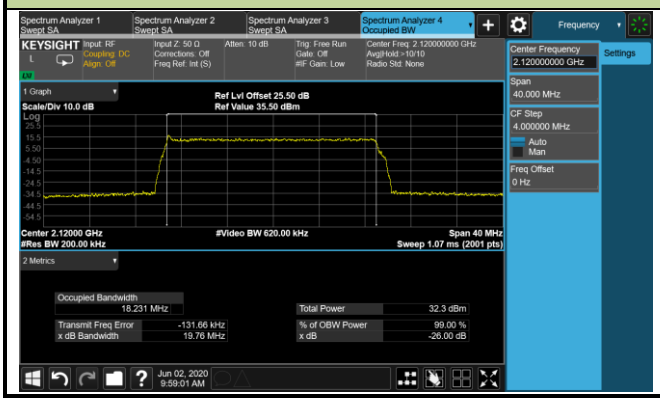
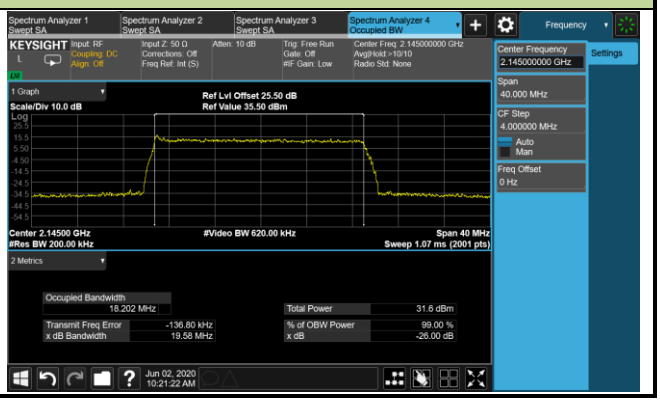
20MHz Channel Bandwidth - Carrier Position 9097.5 kHz	
Bottom Channel	Middle Channel
	

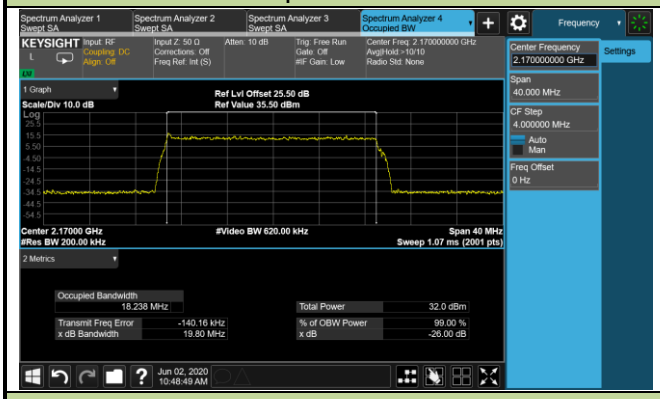
Top Channel	
	

10MHz Channel Bandwidth - Carrier Position -4597.5 kHz	
Bottom Channel	Middle Channel
	

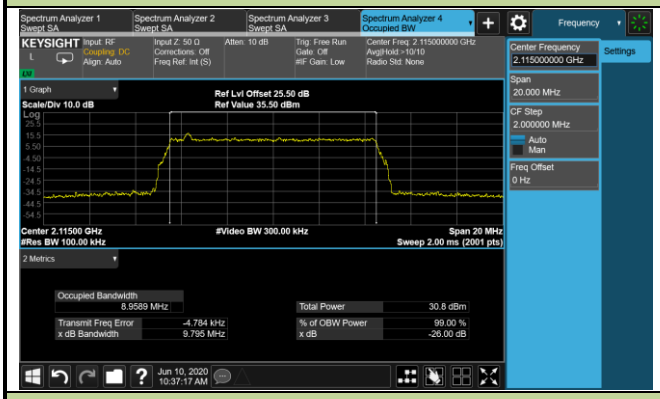
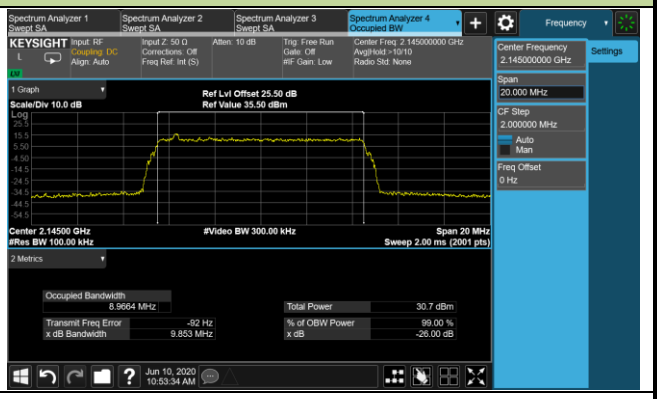
Top Channel	
	

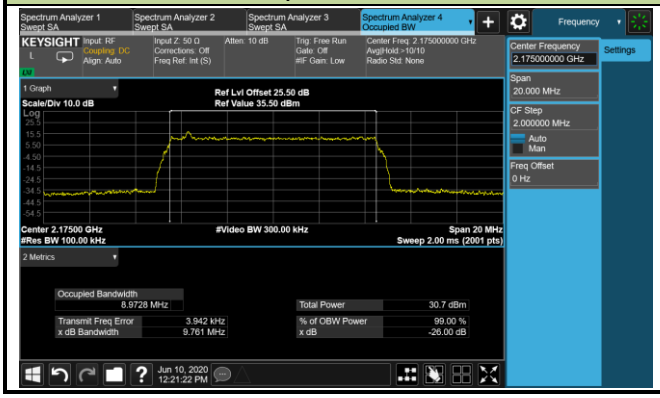
15MHz Channel Bandwidth - Carrier Position -6892.5 kHz	
Bottom Channel	Middle Channel
	
Top Channel	
	

20MHz Channel Bandwidth - Carrier Position -9097.5 kHz	
Bottom Channel	Middle Channel
	

Top Channel	
	

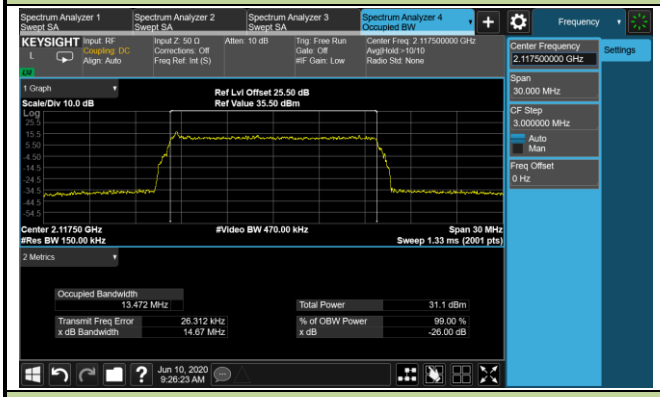
Band 66 In band
10MHz Channel Bandwidth - Carrier Position 4 kHz

Bottom Channel	Middle Channel
	

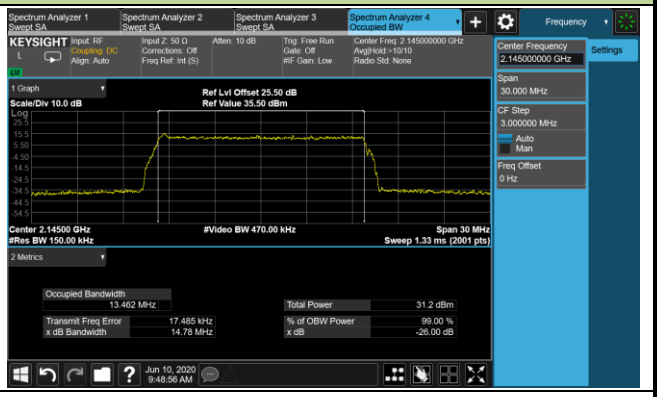
Top Channel	
	

15MHz Channel Bandwidth - Carrier Position 2 kHz

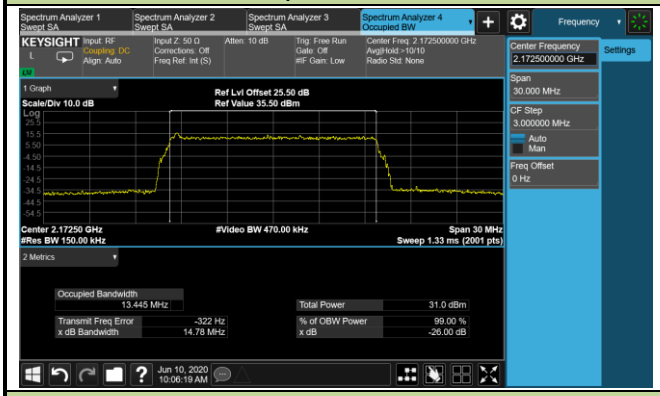
Bottom Channel



Middle Channel

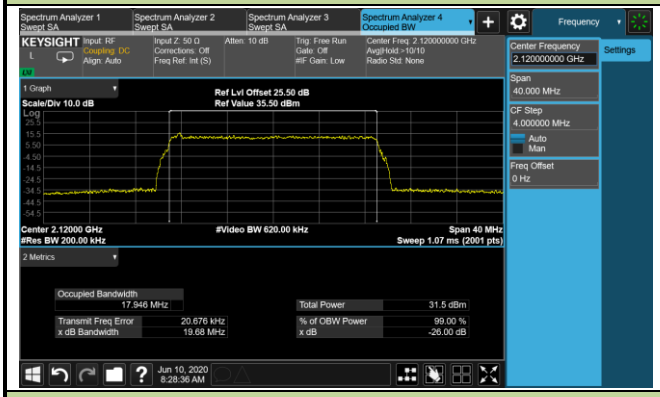


Top Channel

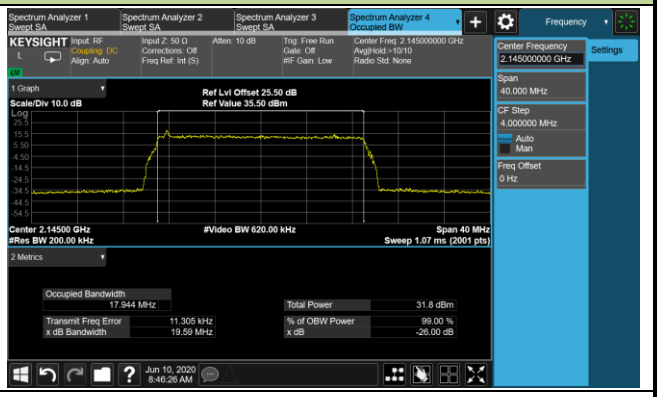


20MHz Channel Bandwidth - Carrier Position 4 kHz

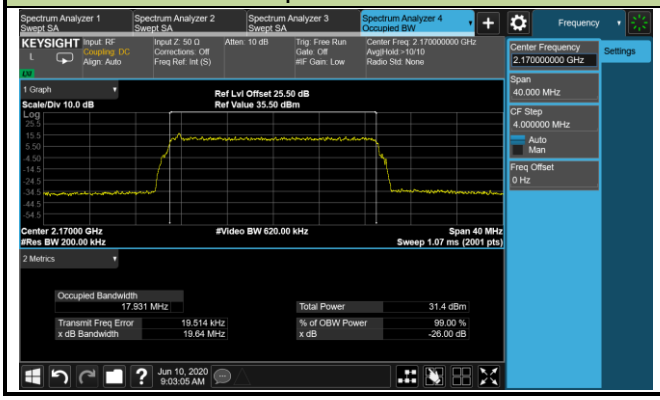
Bottom Channel



Middle Channel

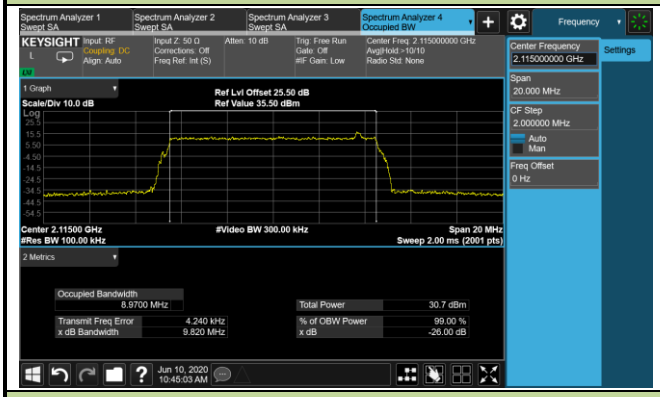


Top Channel

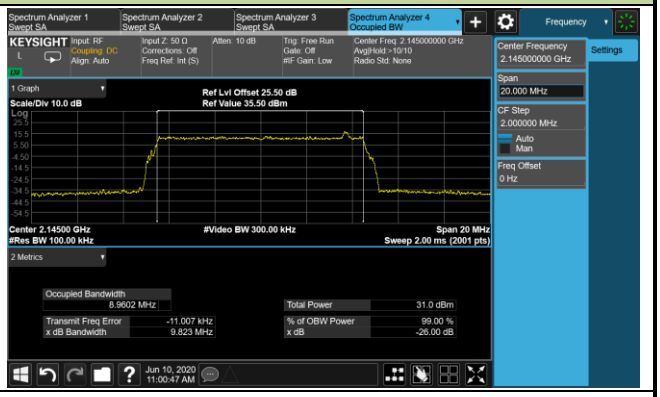


10MHz Channel Bandwidth - Carrier Position 45 kHz

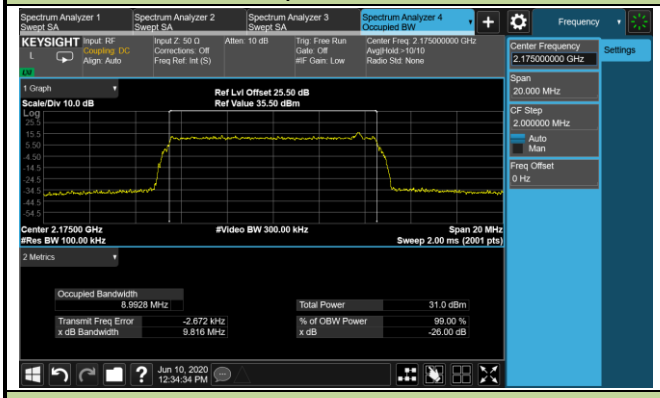
Bottom Channel



Middle Channel

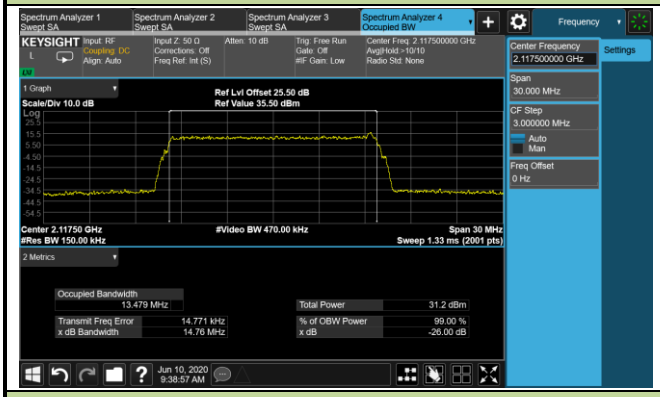


Top Channel

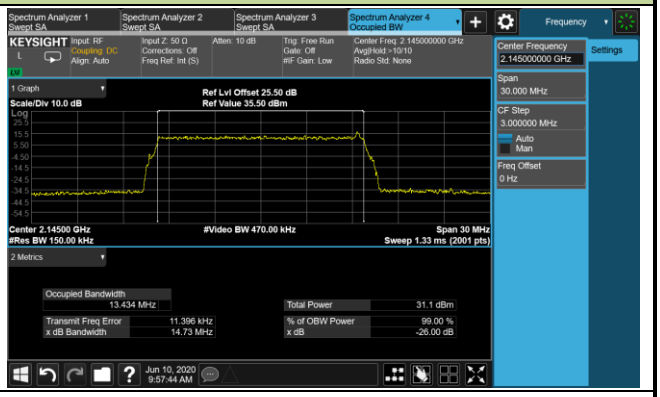


15MHz Channel Bandwidth - Carrier Position 72 kHz

Bottom Channel



Middle Channel



Top Channel