FCC Test Report

Product Name	5G CPE
Model No.	FWAR
FCC ID.	NKR-LAA2

Applicant	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan

Date of Receipt	Nov. 16, 2020
Issued Date	Jan. 13, 2021
Report No.	20B0401R-E3032160657
Report Version	V1.1

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.
The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Jan. 13, 2021
Report No.: 20B0401R-E3032160657

Product Name	5G CPE
Applicant	Wistron NeWeb Corporation
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
Manufacturer	Wistron NeWeb Corporation
Model No.	FWAR
FCC ID.	NKR-LAA2
EUT Adapter Rated Voltage	AC 100-240V / 50-60Hz
EUT Adapter Test Voltage	AC 120V / 60Hz
Trade Name	WNC
Applicable Standard	FCC 47 CFR Part 30
Test Result	Complied

Documented By : Joanne Lin

(Senior Adm. Specialist / Joanne Lin)

Tested By : Paul Jiang

(Senior Engineer / Paul Jiang)

Approved By :

(Director / Vincent Lin)

Revision History

Report No.	Version	Description	Issued Date
20B0401R-E3032160657	V1.0	Initial issue of report	2020-12-04
20B0401R-E3032160657	V1.1	Added the description of DFT-s-OFDM and CP-OFDM scheme in page 6 and 10	2021-01-13

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Description Page

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	5G CPE
Trade Name	WNC
Model No.	FWAR
FCC ID.	NKR-LAA2
Frequency Range	37 GHz – 40 GHz
Type of Modulation	DFT-s-OFDM: Pi/2 BPSK, QPSK, 16QAM, 64QAM CP-OFDM: QPSK, 16QAM, 64QAM
Subcarrier Spacing (SCS)	120 kHz
Component Carrier (CC)	1CC, 2CC
Channel Bandwidth	50 MHz, 100 MHz
E.I.R.P. Power (dBm)	n260(50MHz): 49.8 dBm ; 2CC MIMO (50MHz): 43.68 dBm n260(100MHz): 50.2 dBm ; 2CC MIMO (100MHz): 45.09 dBm
Antenna Type	Patch array Antenna
Channel Control	FTM (Factory Test Mode) by test software

Accessories Information	
Power Adapter (1) (White/Black/Gray)	MFR: Delta, M/N: ADP-120VH D Input: AC 100-240V~2.5A, 50-60Hz Output: 20V, 6A Cable Out: Non-Shielded, 3.0m Power Cord: Non-Shielded, 1.8m
Power Adapter (2) (White/Black/Gray)	MFR: Delta, M/N: ADP-65JH HB Input: AC 100-240V~2.5A, 50-60Hz Output: 19V, 3.42A Cable Out: Non-Shielded, 3.0m Power Cord: Non-Shielded, 1.8m
Power Adapter (3) (White/Black/Gray)	MFR: Delta, M/N: ADH-90AR B Input: AC 100-240V~2.0A, 50-60Hz Output: 56V, 1.61A Power Cord: Non-Shielded, 1.8m

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110108, 20A0435R-E3032160657 is housing and software.

The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.

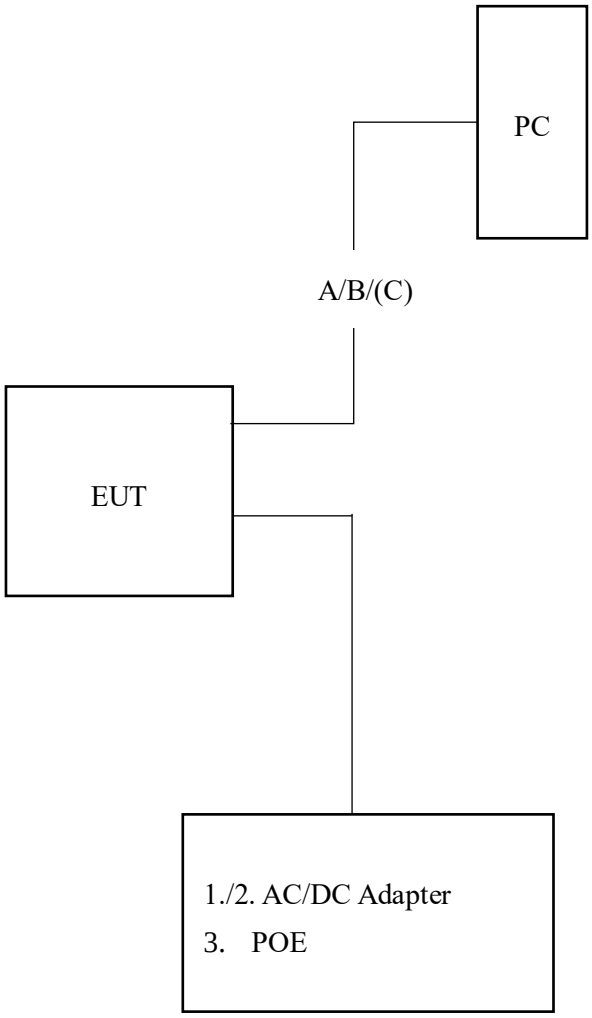
1.2. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1.	AC/DC Power Supply	Delta	ADP-120VH D	N/A	Non-shieded, 1.8m
2.	AC/DC Power Supply	Delta	ADP-65JH HB	N/A	Non-shieded, 1.8m
3.	POE power	Delta	ADH-90AR B	N/A	Non-shieded, 1.8m

Signal Cable Type		Signal cable Description
A.	RJ45 Lan cable	Non-shielded, 10m
B.	RJ45 Lan cable (for POE mode)	Shielded, 2m (2pcs) Non-shielded, 10m
C.	Type C cable (Only for RF software)	Non-shielded, 0.8m

1.3. Configuration of Test System



1.4. EUT Exercise Software

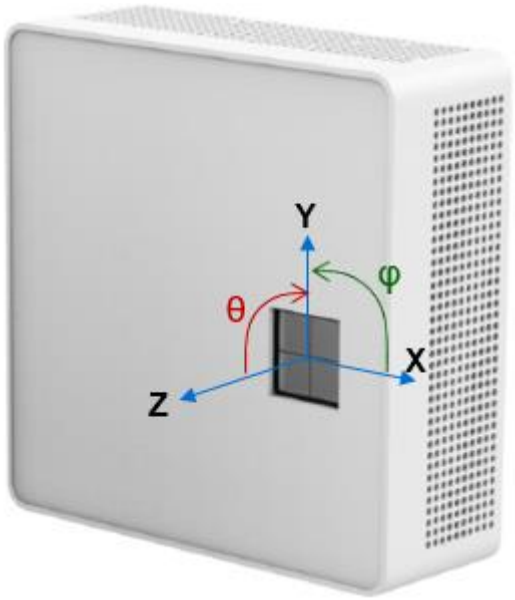
1. Setup the EUT as shown in Section 1.3.
2. Execute “QRCT.exe (v4.0.00166.0)” on the PC.
3. Configure the test mode, the test band, antenna beam, channel, RB, modulation and continuous Tx operation with maximum duty cycle.
4. Press “Tx control” to start the continuous Transmit at maximum uplink duty cycle of 100%
5. Verify that the EUT works properly.

1.5. EUT description

- ✓ Support n260 (39 GHz)
- ✓ There are four QTM’s 5G array antenna modules
- ✓ Support dual polarization transmitting

These four 5G arrays antenna modules can operate simultaneously, and support up to 64 element arrays to reach high gain performance. As for beam-steering/beam-forming mechanism, the wide beam-width on the best array, sweeps begin to improve link, and beam-width then reduces on best beam location.

1.5.1. Antenna location



1.5.2. Antenna information

There are four QTM's 5G array antenna modules, and each 5G array antenna module consists of two sub-arrays which means V+H beam pair beam for 2x2 UL MIMO. These 5G arrays antenna modules can operate simultaneously. As for beam-steering/beam-forming mechanism, the wide beam-width on the best array, sweeps begin to improve link, and beam-width then reduces on best beam location. The codebook of antenna array configuration can find 4-element, 16-element, 32-element and 64-element patch antenna combination beam, Vertical and Horizontal beam can operate at the same time.

1.5.3. Antenna Gain at the Band Edge

Test Band	Frequency (GHz)	Antenna Gain (dBi)
n260	37	19.84
	40	19.66

1.6. Test modes of EUT

The EUT was found the worst case, then used the below for final measurements.

Pre-Test Mode
Mode 1: Adapter mode
Mode 2: POE mode
Final Test mode
Mode 1: Adapter mode

NOTE: The adapter mode and the PoE mode pre-scanning radiation has determined by the adapter mode is the worst case.

n260-1CC

Test Items	BW (MHz)		Modulations				Ch.	RB				Beam ID		Axis (X,Y,Z)
	50	100	BPSK	QPSK	16 QAM	64 QAM		1	10/20	30/64	Full	Single	MIMO	
Occupied Bandwidth	□	□	□	□	□	□	L,M,H	□	□	□	□	Note 5	Note 5	Note 5
EIRP	■	■	■	□	□	□	M,H	□	■	□	□		63+319(19+147)	Y
Radiated Spurious Emission	□	■	■	□	□	□	H	□	■	□	□		63+319(19+147)	Y
Band Edge	□	□	□	□	□	□	L,H	□	□	□	□		Note 5	Note 5
Frequency Stability	□	□	CW				M	□	□	□	□		Note 5	Note 5

n260-2CC

Test Items	BW (MHz)		Modulations				Ch.	RB				Beam ID		Axis (X,Y,Z)
	50	100	BPSK	QPSK	16 QAM	64 QAM		1	10/20	30/64	Full	Single	MIMO	
Occupied Bandwidth	□	□	□	□	□	□	L,M,H	□	□	□	□	Note 5	Note 5	Note 5
EIRP	■	■	■	■	□	□	M,H	□	□	■	■		63+319(19+147) 50M: QPSK_Full RB 100M: BPSK_64RB	Y
Radiated Spurious Emission	□	□	□	□	□	□	H	□	□	□	□		Note 5	Note 5
Band Edge	□	□	□	□	□	□	L,H	□	□	□	□		Note 5	Note 5
Frequency Stability	□	□	CW				M	□	□	□	□		Note 5	Note 5

Note:

1. ■: Chosen for final testing
2. CC: Component Carrier
3. RB: 10RB: Bandwidth 50 MHz/20RB: Bandwidth 100 MHz; 30RB: Bandwidth 50 MHz with All Modulations/64RB: Bandwidth 100 MHz with All Modulations.
4. The EUT support DFT-s-OFDM and CP-OFDM scheme, pre-scanning has been determined by the worst-case scenario of transmission scheme is DFT-s-OFDM.
5. Band edge of QPSK modulation only used the Full RB mode for final testing.
6. This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110108, 20A0435R-E3032160657 is housing and software. The software changes as following:
   1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
   2) Close 5G FR2 band n261 by software.

   According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-70
Barometric pressure (mbar)	860-1060	950-1000

USA : FCC Registration Number: TW0023

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan, R.O.C.
Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286
Email address : info.tw@dekra.com
Website : http://www.dekra.com.tw

1.8. List of Test Equipment

For Radiated measurements ACB1 (30MHz to 40GHz)

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-953	2020.01.03	2021.01.02
X	Horn Antenna	ETS-Lindgren	3117	203800	2019.12.12	2020.12.11
X	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980316	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version: DEKRA Testing System V1.2

For Radiated measurements ACB1 (40GHz to 220GHz)

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	Keysight	N9030B	MY56320509	2020/8/10	2021/8/9
X	Spectrum Analyzer	Keysight	N9030B	MY60070579	2020/10/1	2021/9/30
X	50GHz Cable 3m	Woken	STI03-9703-300	W2016930001	2020/6/2	2023/6/1
X	Horn Antenna with waveguide adapter	QuinStar	QWH-QPRR00/QWA-22R24F00(33-50GHz)	--/ 1231900028	C.O.C.	C.O.C
X	Horn Antenna	VDI	N9029AH15	RCH015RL	C.O.C.	C.O.C
X	Horn Antenna	VDI	N9029AH12	RCH012RL	C.O.C.	C.O.C
X	Horn Antenna	VDI	N9029AH08	RCH08RL	C.O.C.	C.O.C
X	Horn Antenna	VDI	N9029AH05	RCH05RL	C.O.C.	C.O.C
X	Down Convertor (SAX405)	VDI	N9029AV15 (AT0-55847)	US54250164	C.O.C.	C.O.C
X	Down Convertor(SAX404)	VDI	N9029AV12 (AT0-59570)	US54250170	C.O.C.	C.O.C
X	Down Convertor(SAX403)	VDI	N9029AV08 (AT0-59571)	US53250012	C.O.C.	C.O.C
X	Down Convertor(SAX402)	VDI	N9029AV05 (AT0-60029)	US53250019	C.O.C.	C.O.C

Note:
1. The euipments are calibrated every one (S.G. and Spectrum) or three year.
2. The test instruments marked with “X” are used to measure the final test results.
3. C.O.C: Certificate Of Conformance

1.9. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Items	Measurement Uncertainty (MU)
Occupied Bandwidth	±462kHz
Equivalent Isotopically Radiated Power	±3.73dB
Radiated Spurious Emission	30MHz - 1GHz: ±4.06dB (ACB1) 1GHz - 18GHz: ±3.71dB (ACB1) 18GHz - 40GHz: ±3.73dB(ACB1) 40GHz - 50GHz: ±3.75dB 50GHz - 325GHz: ±4.39dB
Band Edge	18GHz - 40GHz: ±3.73dB 40GHz - 50GHz: ±3.75dB
Frequency Tolerance	±3621Hz

1.10. Caculations

1.10.1. E.I.R.P. Caculation

The filed strength (dBuV/m) method have converted to E.I.R.P. test results by the section 5.8.4 of KDB 971168 D01.

Example:

E (dBuV/m) = Measurement amplitude level (dBm) + 107+ Cable Loss (dB) + Antenna Factor (dB/m)

E (dBuV/m) = EIRP (dBm) - 20 log D +104.8

EIRP (dBm) = Measurement result (dBm) + Fact (dB/m) + 107 + 20 log D-104.8

= -10 dBm + 48.13+ 107+ 20log (1m) - 104.8

= -10 dBm + 50.33 dB (50.33 dB= 48.14(Fact (dB/m)) + 107 - 104.8=Correction factor for 1m)

= 40.33dBm

1.10.2. MIMO Power Caculation

According to KDB 662911 D01 and D02, the cross-polarization the two field strengths must be combined as vectors with one oriented at a 90 degree angle with respect to the other. The combined field strength has a magnitude equal to the square root of the sum of the squares of the two field strengths, or, equivalently, the square of the combined field strength is equal to the sum of the squares of the two individual field strengths. Since EIRP and ERP are proportional to the square of the field strength, the combined EIRP or ERP is equal to the sum of the individual EIRPs or ERPs.

Example:

MIMO E.I.R.P = 10 log (linear Value-E.R.I.P $_{\text{H-polarization}}$ + linear E.I.R.P V $_{\text{V-polarization}}$)

= 10 log (100 mW+100 mW)

= 23 dBm

1.10.3. Minimum Measurement Distance Evaluation

According to KDB842590 D01, the all measurements of the fundamental emission, out of band, harmonics and spurious emissions shall be made in the far field of the measurement antenna. The far-field boundary for mmW antennas is greater than or equal to $2D^2/\lambda$ (with D being the largest dimension of the antenna, and λ the wavelength of the emission). When the selected far-field measurement distance is different than the distance at which the applicable limit is specified, a linear inverse distance attenuation factor (20 dB/decade of distance change for field strength) shall be applied.

For fundamental or out-of-band emissions the largest far-field distance of either the EUT antenna or measurement antenna shall be used. For spurious emissions the far-field distance will be based on the measurement antenna.

1. Fundamental &Band edge:

Measurement Frequency Range (GHz)	Antenna Dimension (EUT)			Far filed distance (m)	Measurement Distance (m)
	Length (mm)	Width (mm)	Thick (mm)		
27.5-40	35	35	3	0.147-0.327	2

2. Spurious emissions

Measurement Frequency Range (GHz)	Measurement Antenna Model	Antenna Dimension (Measurement Antenna)		Far filed distance (m)	Measurement Distance (m)
		Length (mm)	Width (mm)		
18-40	AH-1840	71	56	0.605-1.344	3
40-50	QWH-QPRR00	56.6	43.7	0.854-1.068	2
50-75	RCH015	25	25	0.208-0.313	1
75-110	RCH010	18	18	0.162-0.238	1
90-140	RCH08	14	14	0.118-0.183	1
140-220	RCH05	9	9	0.076-0.119	1

1.11. Overview of results

Requirement – Test item	Basic standard(s)	Result
Occupied Bandwidth	CFR47 CFR Part 2, Clause 2.1049	Note
Equivalent Isotopically Radiated Power	FCC 47 CFR Part 30, clause 30.202	Pass
Radiated Spurious Emission	CFR47 CFR Part 2, Clause 2.1053 FCC 47 CFR Part 30, clause 30.203	Pass
Band Edge	CFR47 CFR Part 2, Clause 2.1053 FCC 47 CFR Part 30, clause 30.203	Note
Frequency Tolerance	CFR47 CFR Part 2, Clause 2.1055	Note

Supplementary information:

1) ANSI 63.26-2015
2) KDB 842590 D01 Upper Microwave Flexible Use Service v01r01
3) KDB 971168 D01 Power Meas License Digital System v03r01
4) KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 662911 D02 MIMO with Cross Polarized Antenna v01

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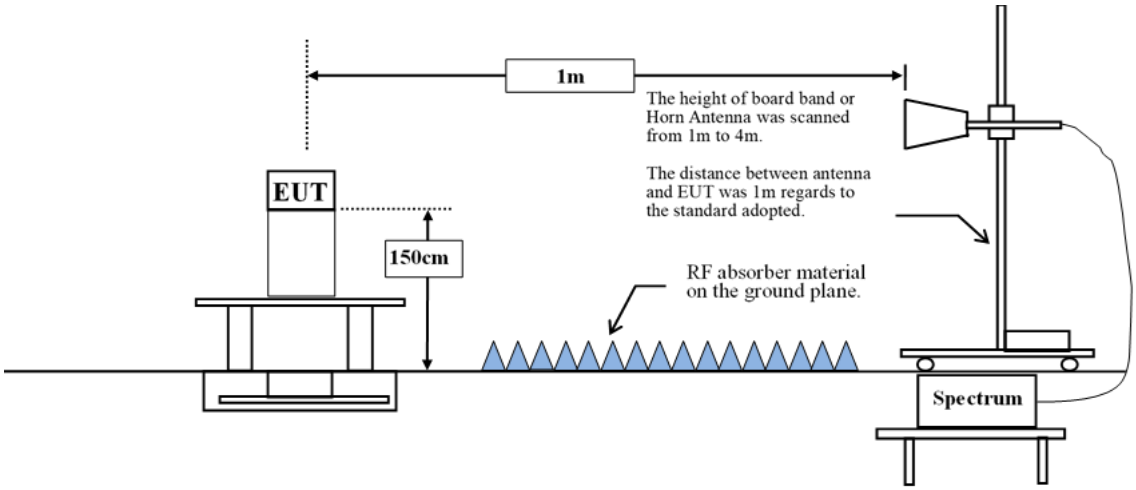
According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.

2. Occupied Bandwidth

2.1. Test Setup



2.2. Limits

N/A

2.3. Test Procedure

1. The spectrum analyzer center Frequency is set to the nominal EUT channel center Frequency. And the spectrum analyzer used the 99% OBW function for testing.
2. Set (IF filter 3dB) RBW = 1% to 5% of the OBW and the VBW shall be set ≥ 3 × RBW.
3. Set Detector = Peak
4. Set Trace = Max hold
5. Seep = auto couple
6. Set span >=1.5 x OBW
7. Repeat the step 2 to 6 until it would be within 1% to 5% of the 99% OBW

2.4. Test Results

N/A

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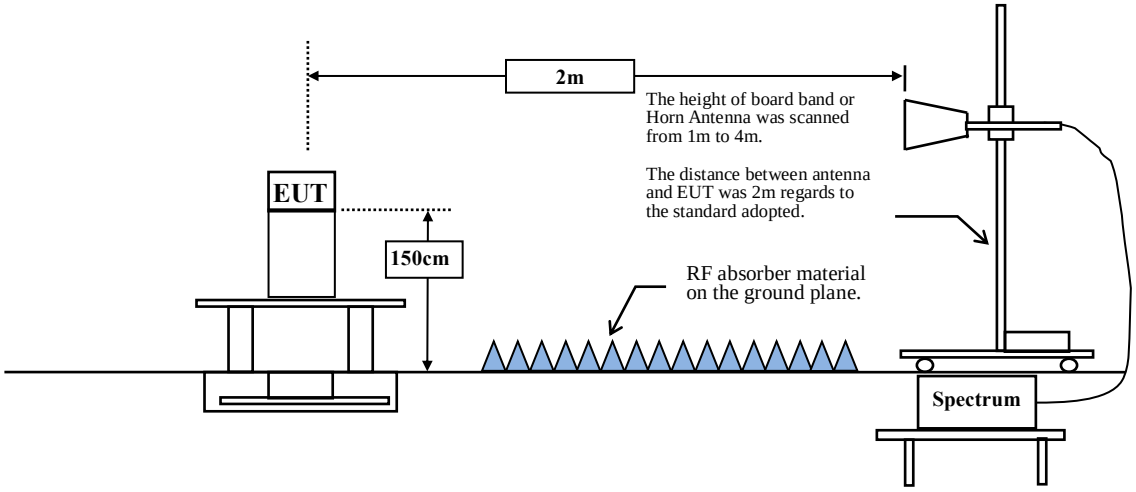
3. Equivalent Isotropically Radiated Power

3.1. Test Setup



3.2. Limits

For transportable stations, as defined in §30.2, the average power of the sum of all antenna elements is limited to a maximum EIRP of +55 dBm.

3.3. Test Procedure

1. Set the spectrum analyzer on the channel power measurement function for testing.
2. Set span to 2 × to 3 × the OBW.
3. Set RBW = 1% to 5% of the OBW and VBW ≥ 3 × RBW.
4. Number of sweep points ≥ 2 × span / RBW.
5. Sweep time = auto-couple
6. Detector = power averaging (rms).
7. The integration bandwidth of the channel power set equal to the OBW of the signal
8. Trace average at least 100 traces
9. If the EUT can be configured to transmit continuously, then set the trigger to free run.
10. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).

3.4. Test Results

Bandwidth (MHz)	CC	Modulation	Channel	RB	Beam ID	Center of Frequency (MHz)	Ant. Pol. (H/V)	SISO EIRP (dBm)	MIMO EIRP (dBm)	Limit (dBm)	Margin (dB)
50	1	BPSK	Middle	10RB11	63+319	38499.670	H	31.25	47.77	55	-7.23
							V	47.47			
100		BPSK	High	20RB22		39948.100	H	32.19	47.61	55	-7.39
							V	47.48			
50	2	QPSK	High	Full RB		39925.08+39975	H	37.66	40.73	55	-14.27
							V	37.78			
100		BPSK	High	64RB2		39851.2+39950.46	H	27.81	41.99	55	-13.01
							V	41.82			

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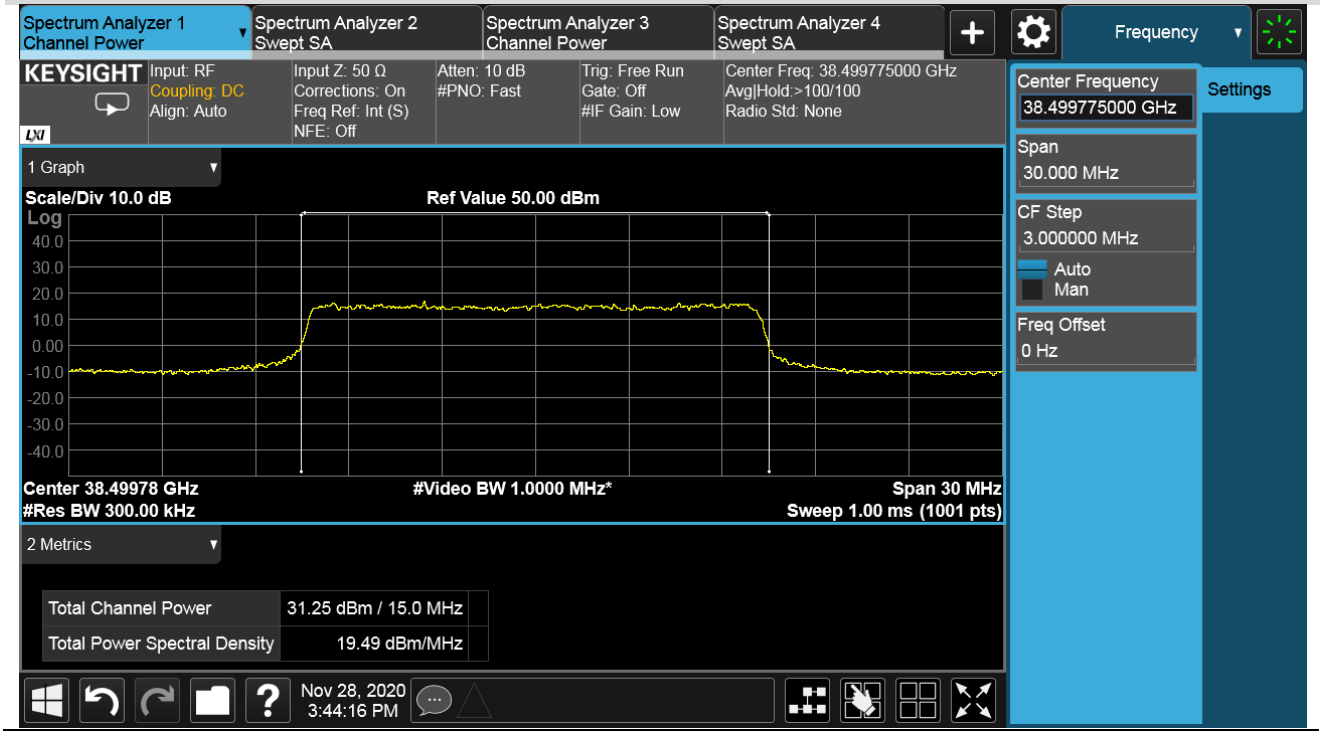
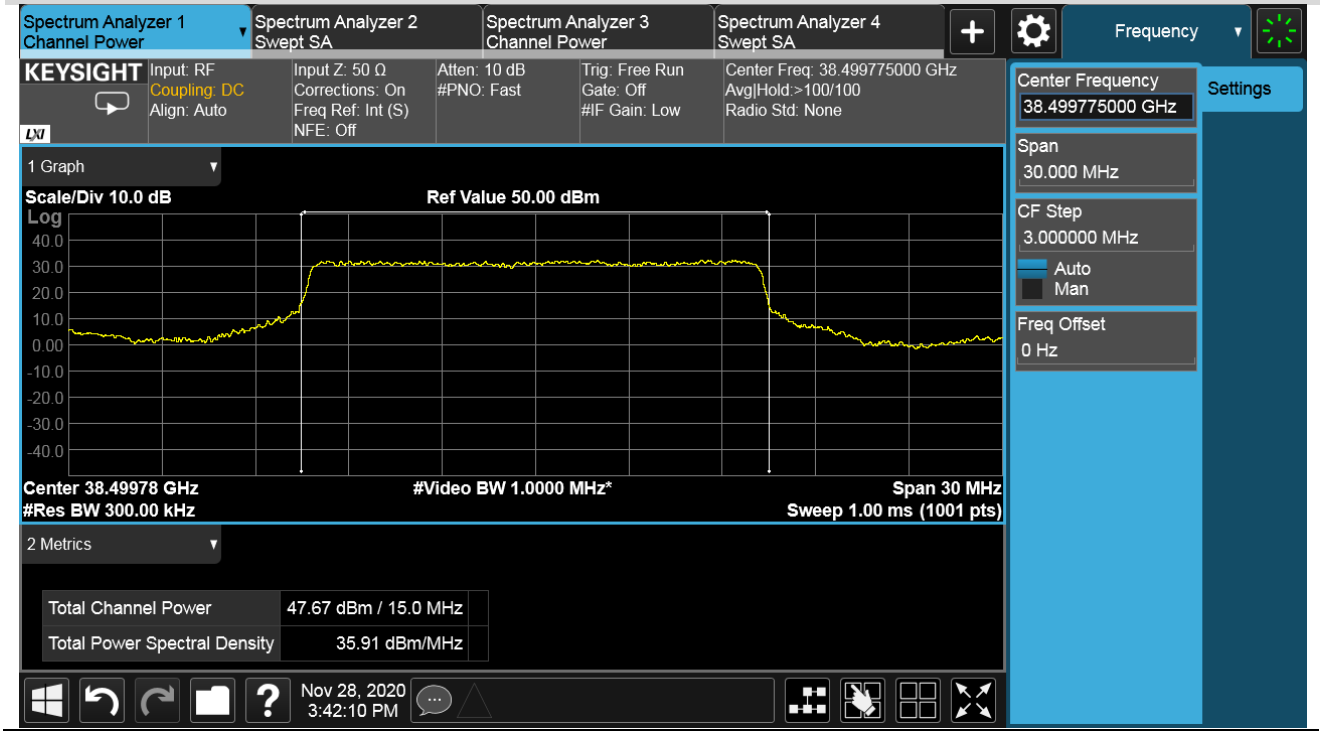
n260-BW:50MHz-1CC-BPSK- 10RB11-Beam ID 63+319

Middle Channel-Horizontal Polarization



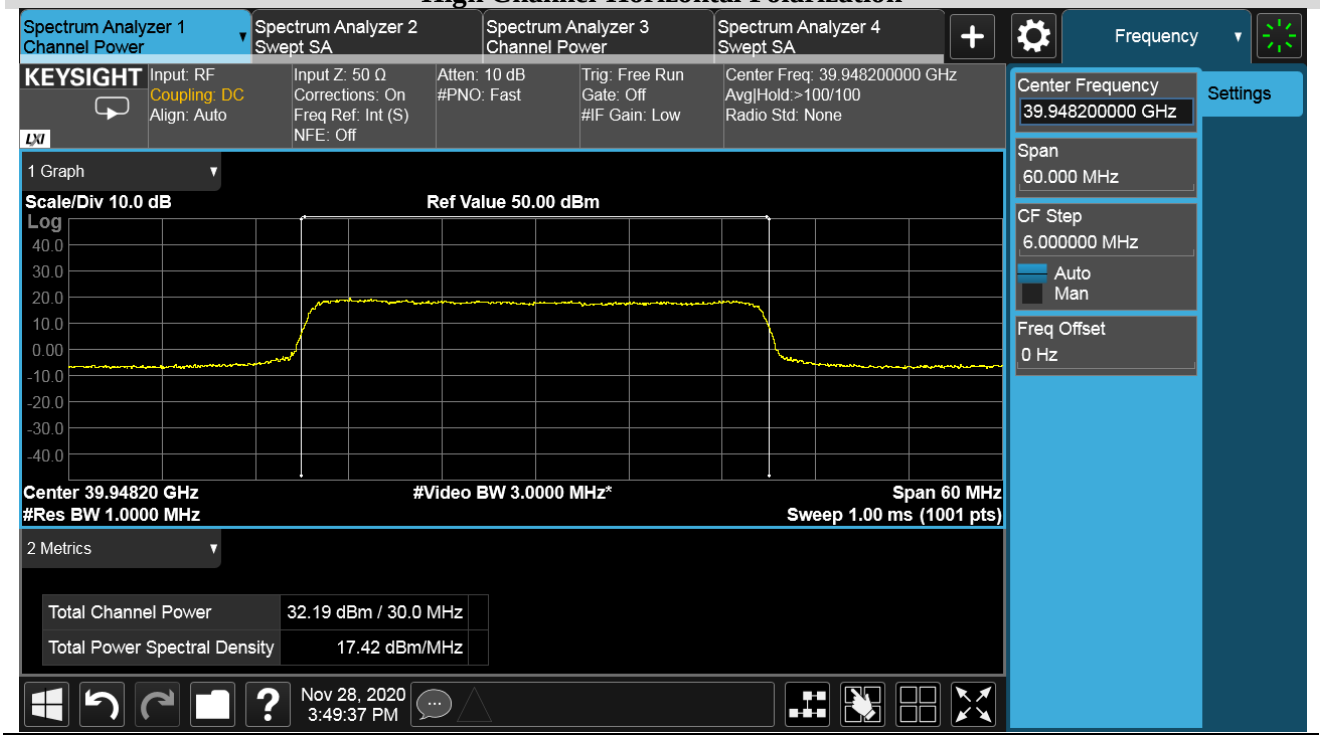
n260-BW:50MHz-1CC-BPSK- 10RB11-Beam ID 63+319

Middle Channel-Vertical Polarization



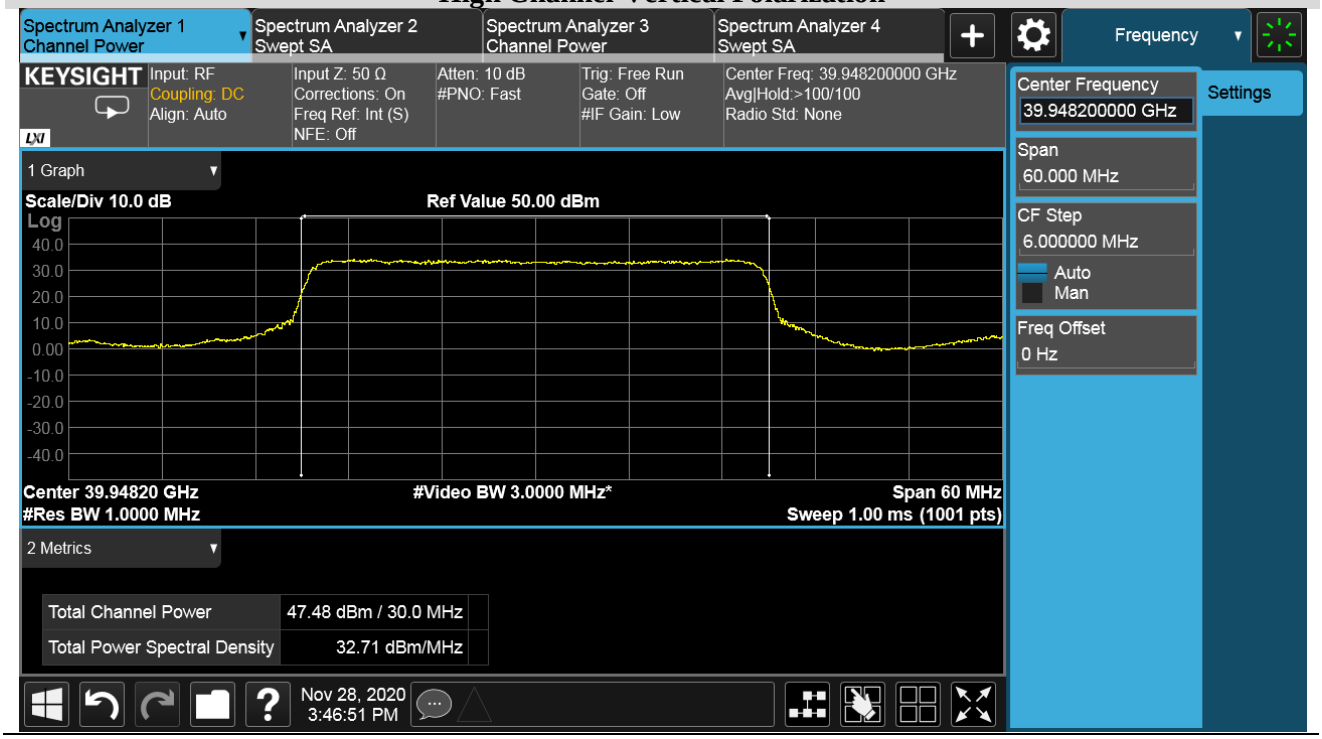
n260-BW:100MHz-1CC-BPSK- 20RB22-Beam ID 63+319

High Channel-Horizontal Polarization



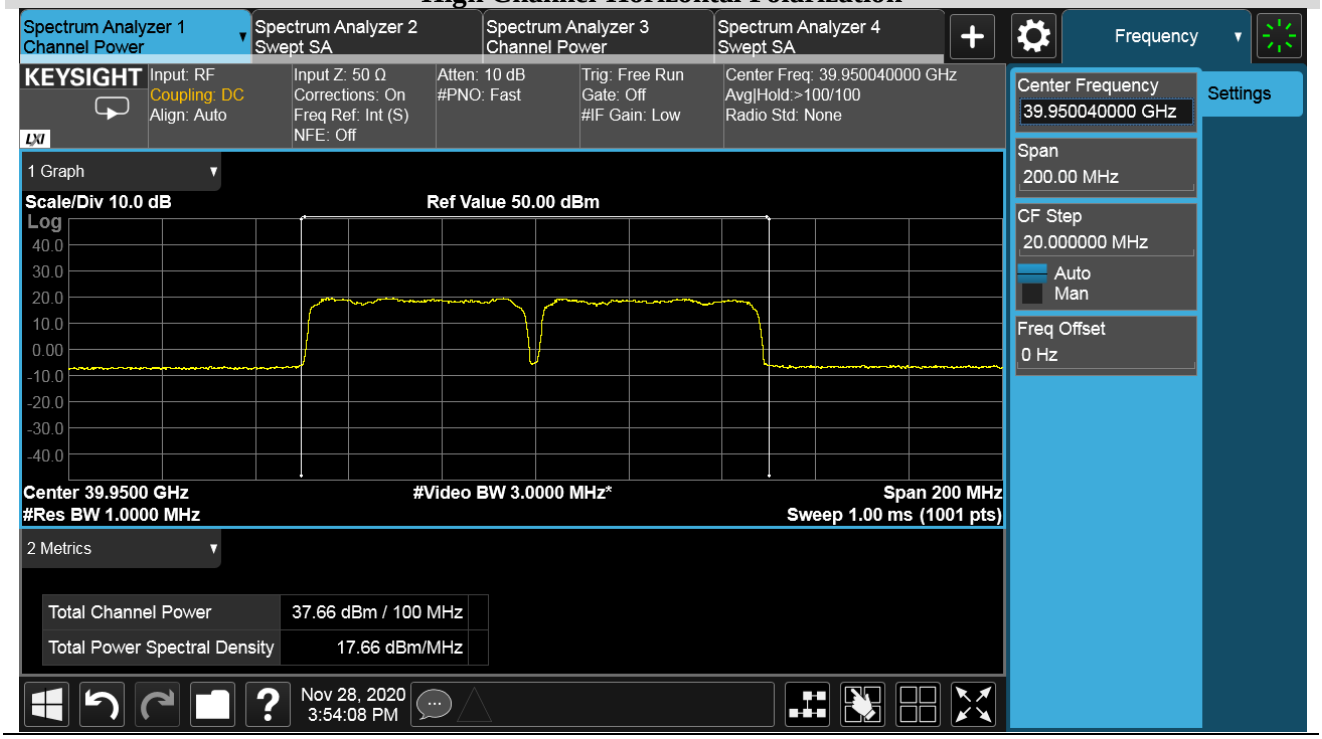
n260-BW:100MHz-1CC-BPSK- 20RB22-Beam ID 63+319

High Channel-Vertical Polarization



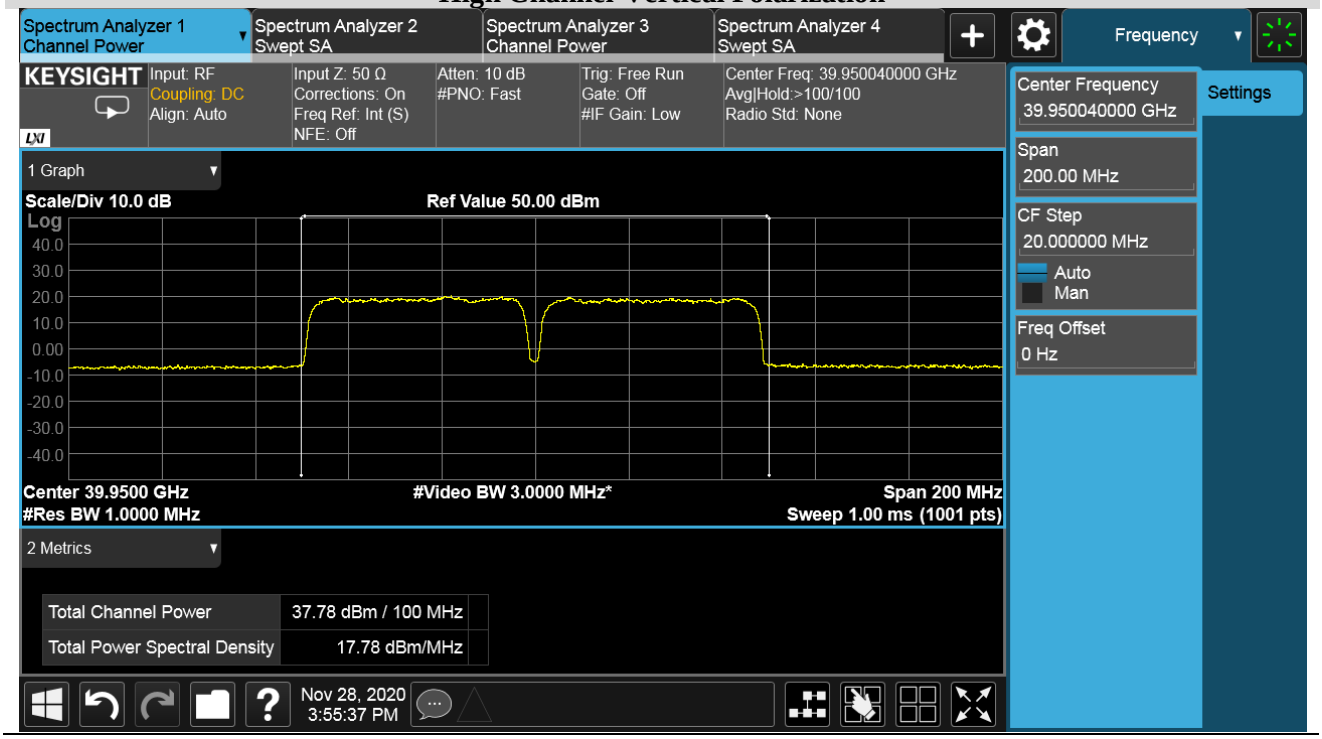
n260-BW:50MHz-2CC-QPSK- Full RB-Beam ID 63+319

High Channel-Horizontal Polarization



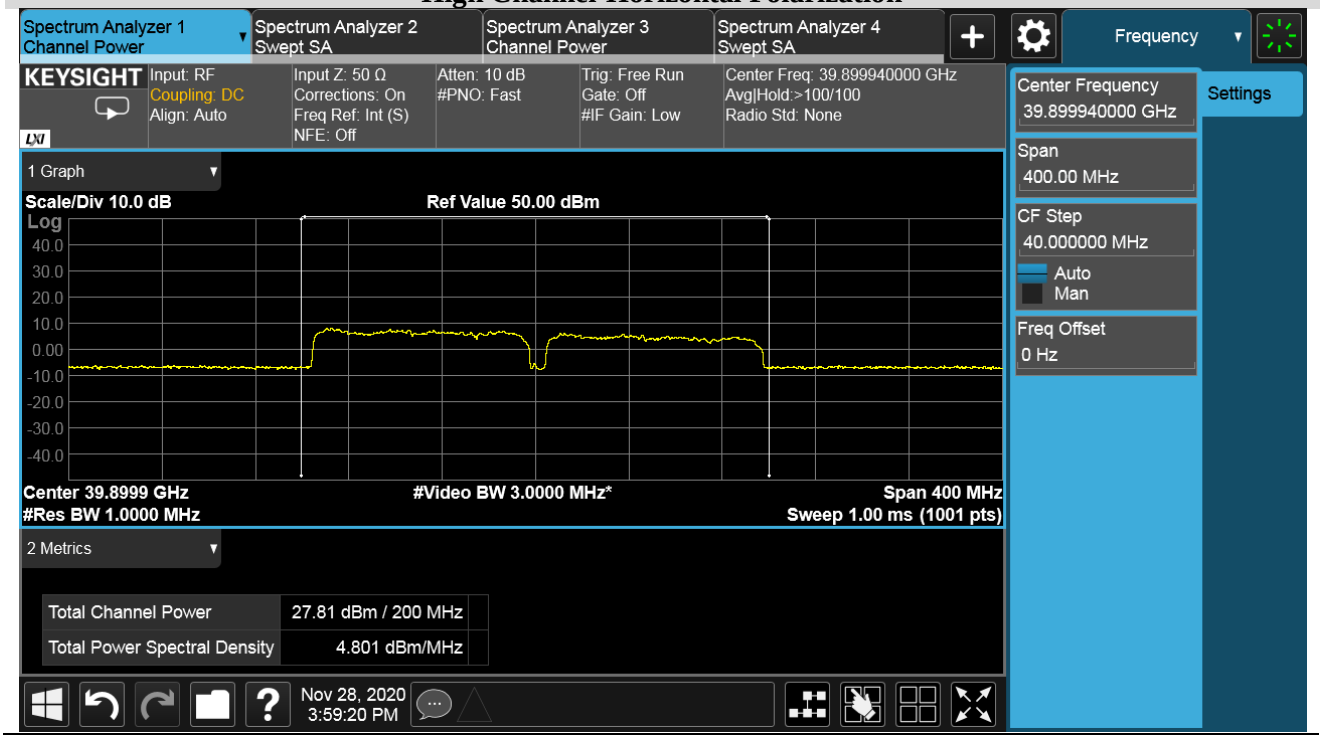
n260-BW:50MHz-2CC-QPSK- Full RB-Beam ID 63+319

High Channel-Vertical Polarization



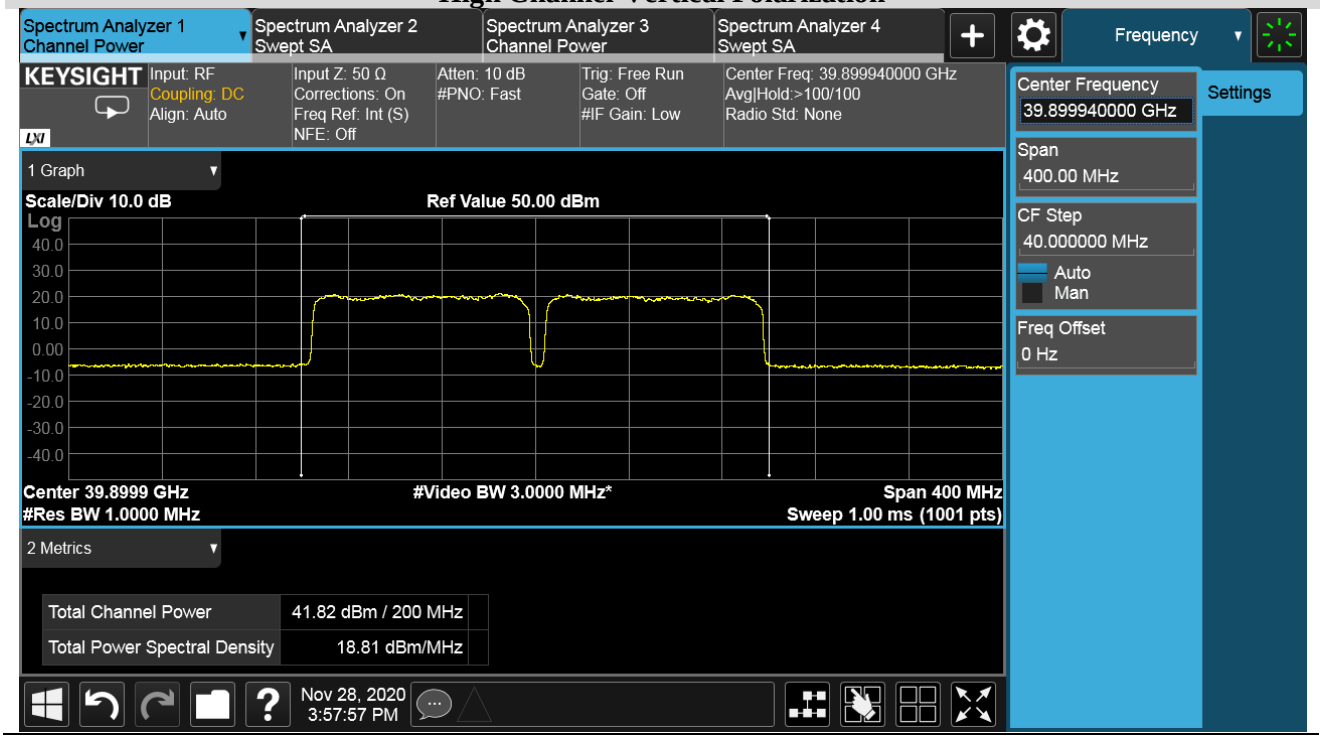
n260-BW:100MHz-2CC-BPSK- 64RB2-Beam ID 63+319

High Channel-Horizontal Polarization



n260-BW:100MHz-2CC-BPSK- 64RB2-Beam ID 63+319

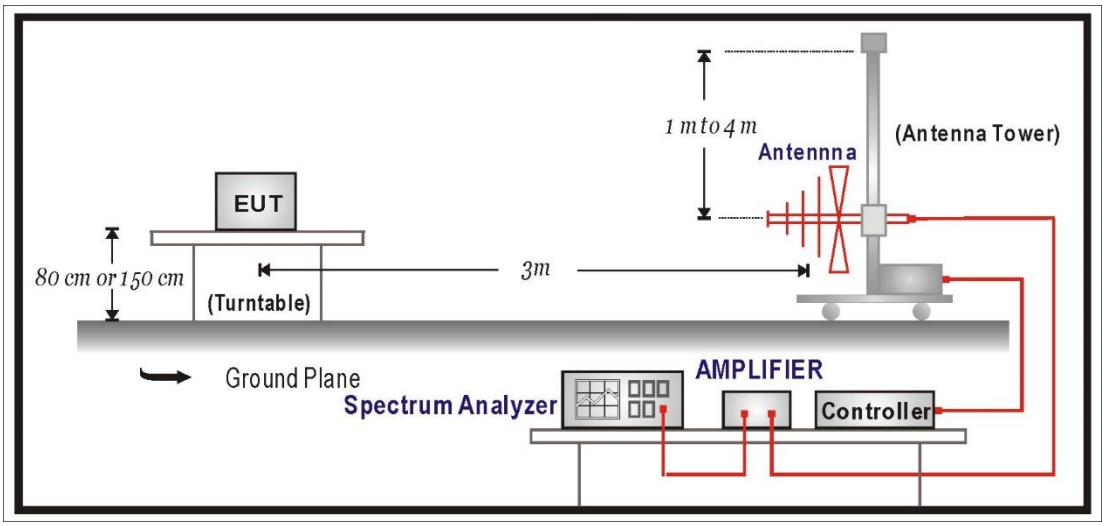
High Channel-Vertical Polarization



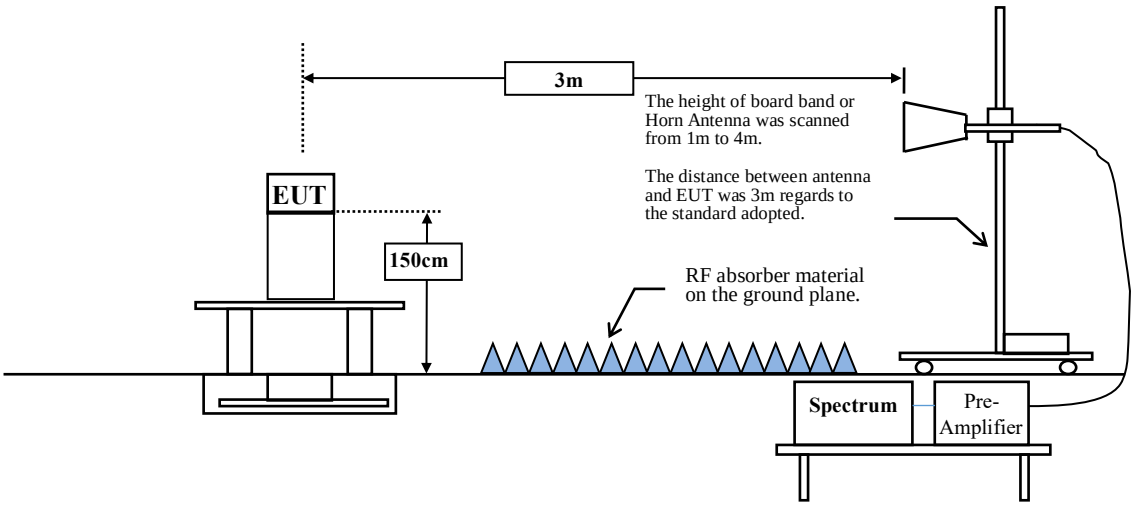
4. Radiated Spurious Emissions

4.1. Test Setup

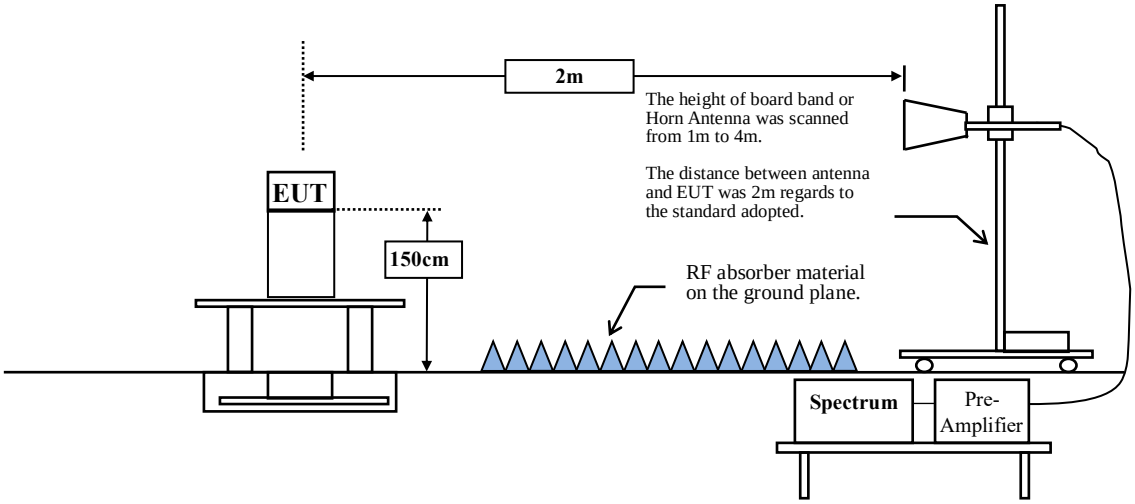
Radiated Emission Below 1GHz-Field strength method



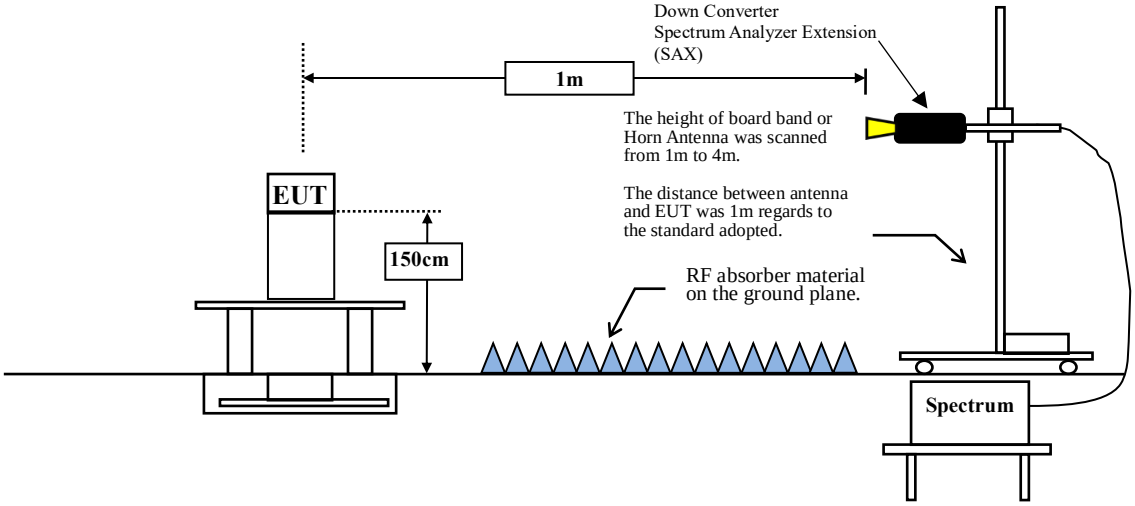
Radiated Emission 1 GHz to 40 GHz-Field strength method



Radiated Emission 40 GHz to 50 GHz-Field strength method



Radiated Emission 50 GHz to 200 GHz-Field strength method



4.2. Limits

The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be −13 dBm/MHz or lower.

Test Band	Test Frequency Range	Limit	
		TRP (dBm)	Field strength at 3m (dBuV/m)
n260	30 MHz to 200 GHz	-13	82.2

4.3. Test Procedure

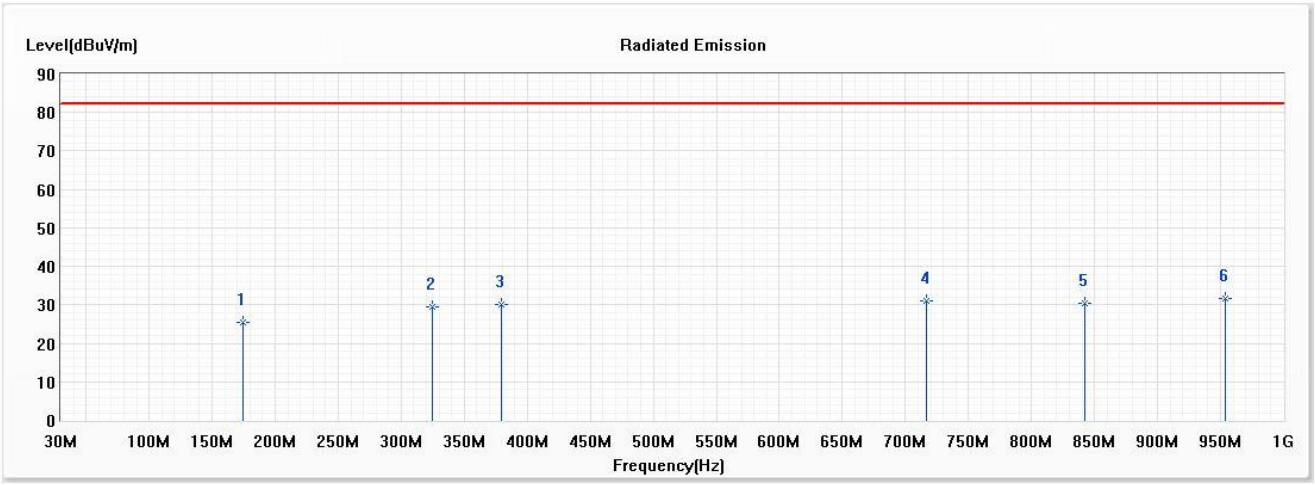
The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the axis of the maximum emission level.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 or C63.4: 2014 on radiated measurement.

Spectrum setting:
1. Start Frequency was set to 30MHz and stop Frequency was set to 200 GHz for n260 and 100 GHz for n261. Several plots are used to show investigations in this entire span.
2. Detector = RMS
3. Trace mode = trace average
4. Sweep time = auto couple
5. Number of sweep points ≥ 2 x Span/RBW
6. The trace was allowed to stabilize
7. RBW = 1MHz, VBW = 3MHz

4.4. Test Results

n260:1CC-BW100MHz-RSE 30MHz to 1GHz

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Horizontal	Temperature (℃)	21.2
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.8
Note	n260 1CC Beam ID:63+319 20RB22,High Channel ,Delta ADP-65JH HB		

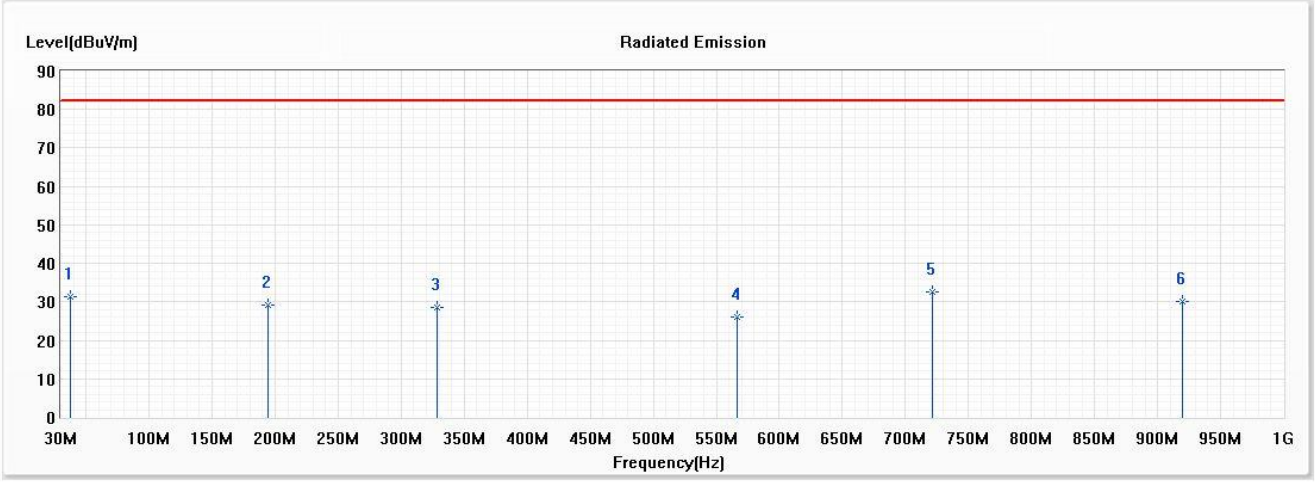


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	174.530	25.36	82.20	-56.84	36.46	-11.10	PK
2	324.880	29.59	82.20	-52.61	38.25	-8.66	PK
3	379.200	30.17	82.20	-52.03	37.64	-7.47	PK
4	716.760	31.08	82.20	-51.12	32.52	-1.44	PK
5	841.890	30.55	82.20	-51.65	30.39	0.16	PK
* 6	953.440	31.61	82.20	-50.59	29.93	1.68	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Vertical	Temperature (°C)	21.2
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.8
Note	n260 1CC Beam ID:63+319 20RB22,High Channel ,Delta ADP-65JH HB		

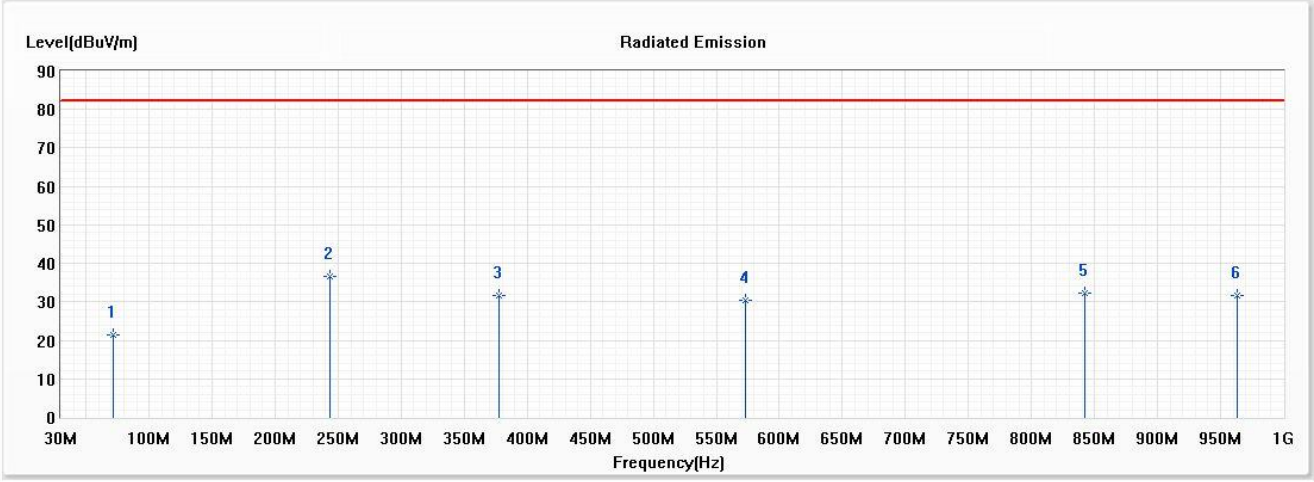


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	37.760	31.20	82.20	-51.00	42.47	-11.27	PK
2	193.930	29.21	82.20	-52.99	41.59	-12.38	PK
3	328.760	28.60	82.20	-53.60	37.18	-8.58	PK
4	566.410	25.96	82.20	-56.24	29.70	-3.74	PK
* 5	721.610	32.59	82.20	-49.61	33.96	-1.37	PK
6	919.490	29.97	82.20	-52.23	28.78	1.19	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Horizontal	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel ,Delta ADP-120VH D		

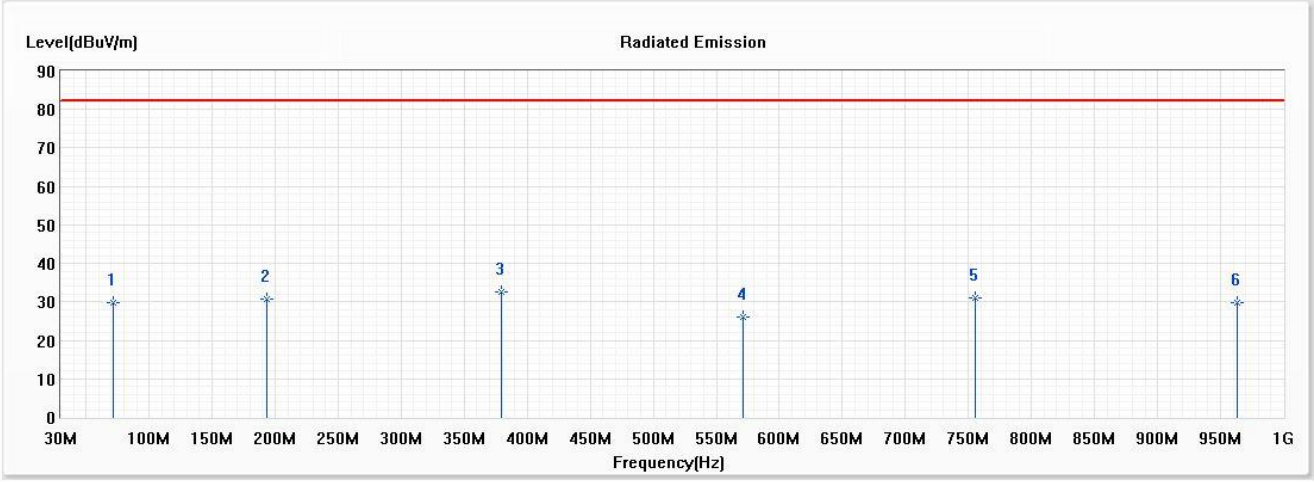


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	71.710	21.45	82.20	-60.75	34.89	-13.44	PK
* 2	243.400	36.72	82.20	-45.48	48.16	-11.44	PK
3	377.260	31.67	82.20	-50.53	39.17	-7.50	PK
4	573.200	30.54	82.20	-51.66	34.20	-3.66	PK
5	841.890	32.40	82.20	-49.80	32.24	0.16	PK
6	963.140	31.75	82.20	-50.45	29.90	1.85	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Vertical	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel ,Delta ADP-120VH D		



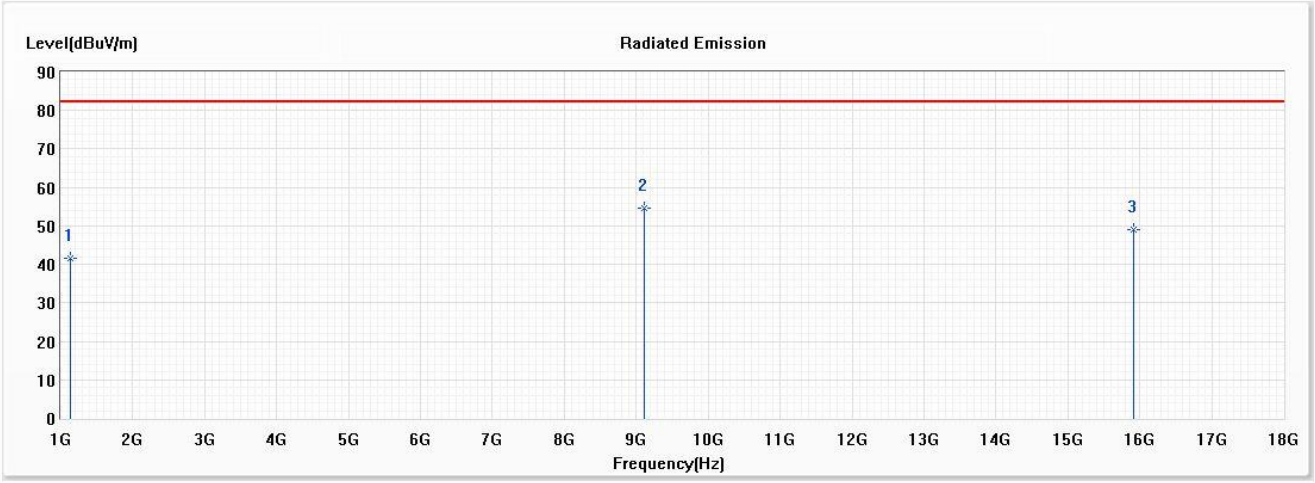
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	71.710	29.71	82.20	-52.49	43.15	-13.44	PK
2	192.960	30.84	82.20	-51.36	43.23	-12.39	PK
* 3	379.200	32.50	82.20	-49.70	39.97	-7.47	PK
4	571.260	26.16	82.20	-56.04	29.82	-3.66	PK
5	755.560	30.92	82.20	-51.28	31.58	-0.66	PK
6	963.140	29.71	82.20	-52.49	27.86	1.85	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

n260:1CC-BW100MHz-RSE 1GHz to 18GHz

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Horizontal	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel		

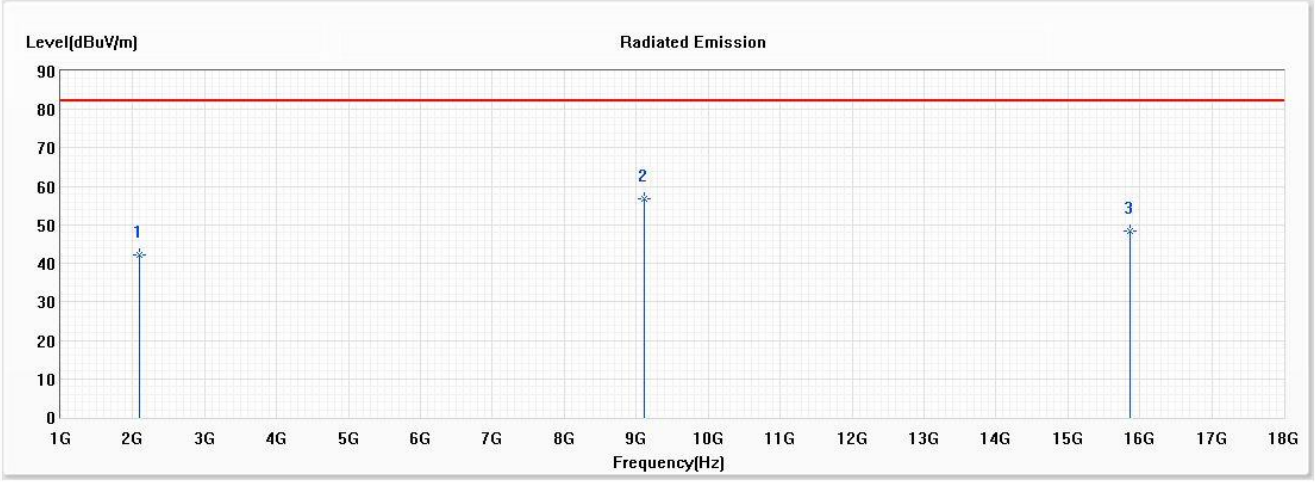


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	1135.000	41.66	82.20	-40.54	62.62	-20.96	PK
* 2	9118.823	54.77	82.20	-27.43	66.24	-11.47	PK
3	15921.000	49.14	82.20	-33.06	52.37	-3.23	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Vertical	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel		



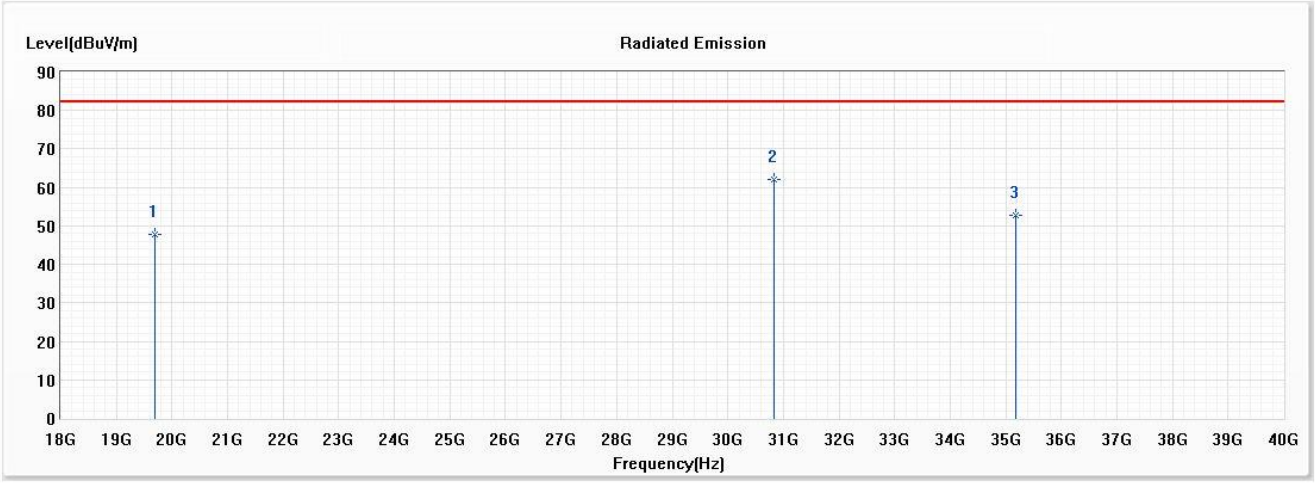
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2095.000	42.14	82.20	-40.06	58.96	-16.82	PK
* 2	9119.000	56.67	82.20	-25.53	68.14	-11.47	PK
3	15872.000	48.33	82.20	-33.87	51.64	-3.31	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

n260:1CC-BW100MHz-RSE 18GHz to 40GHz

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Horizontal	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel		

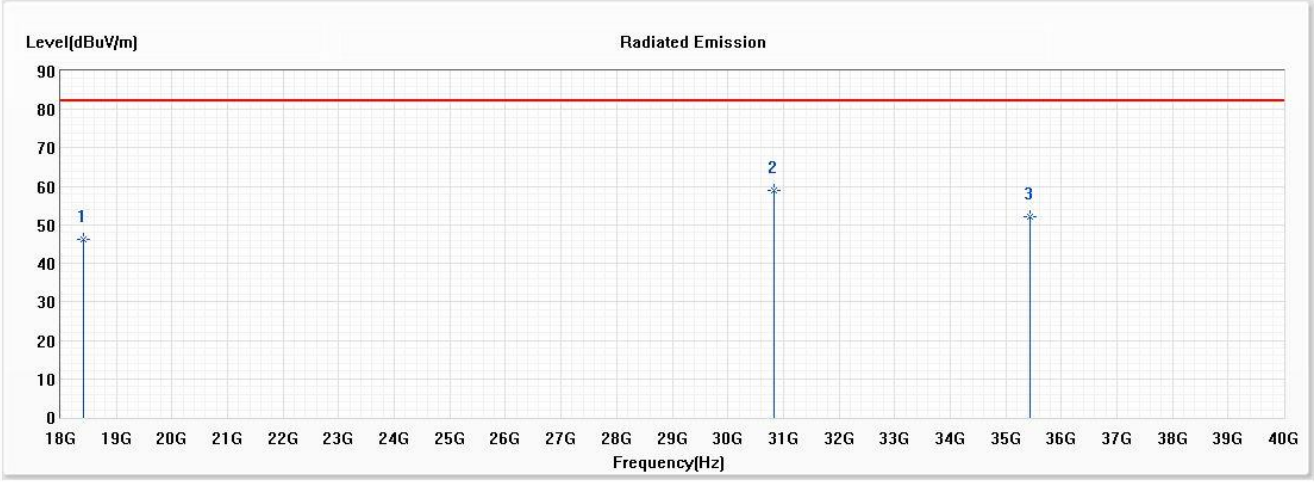


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	19703.000	47.82	82.20	-34.38	48.08	-0.26	PK
* 2	30822.128	62.13	82.20	-20.07	55.12	7.01	PK
3	35177.000	52.71	82.20	-29.49	44.06	8.65	PK

Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Model No	FWAR	Site	ACB1
Test Voltage	AC 120 V / 60 Hz	Test Date	2020/11/28
Test Mode	Mode 1: Transmit	Engineer	Paul Jiang
Polarity	Vertical	Temperature (°C)	20.4
Test Condition	RE-TX BPSK_100M	Humidity (%RH)	69.3
Note	n260 1CC Beam ID:63+319 20RB22,High Channel		



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	18398.000	46.22	82.20	-35.98	48.61	-2.39	PK
* 2	30822.432	59.11	82.20	-23.09	52.10	7.01	PK
3	35431.000	52.05	82.20	-30.15	43.16	8.89	PK

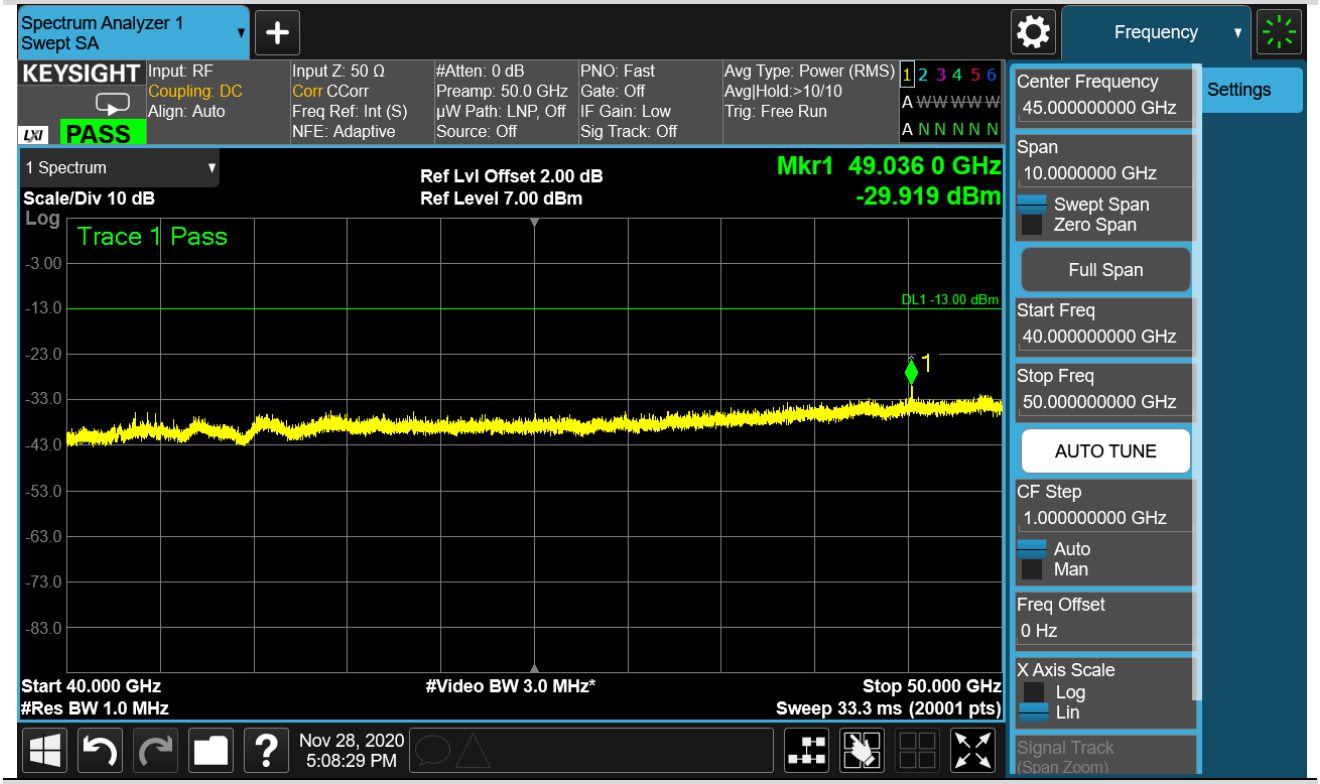
Remark:

1. "*" means this data is the worst emission level;
   "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

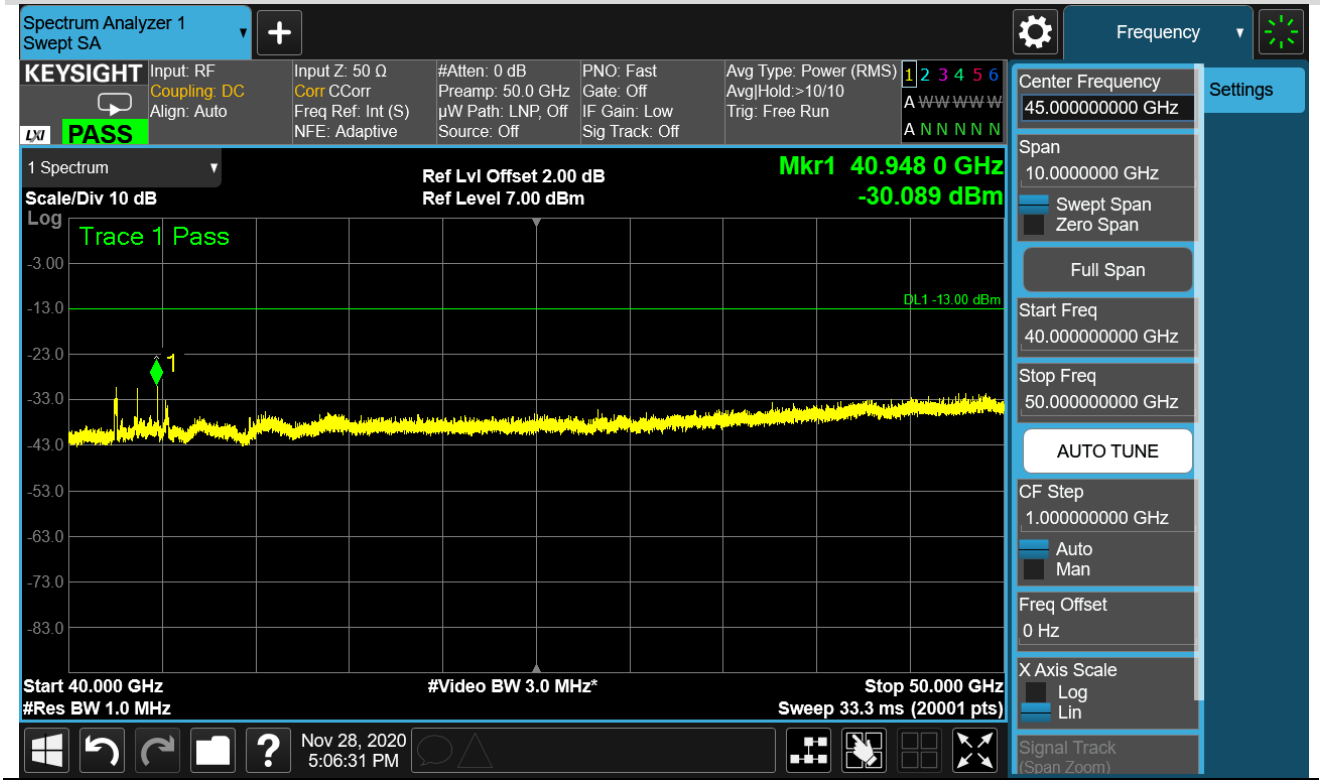
n260:1CC-BW100MHz-RSE 40GHz to 50GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



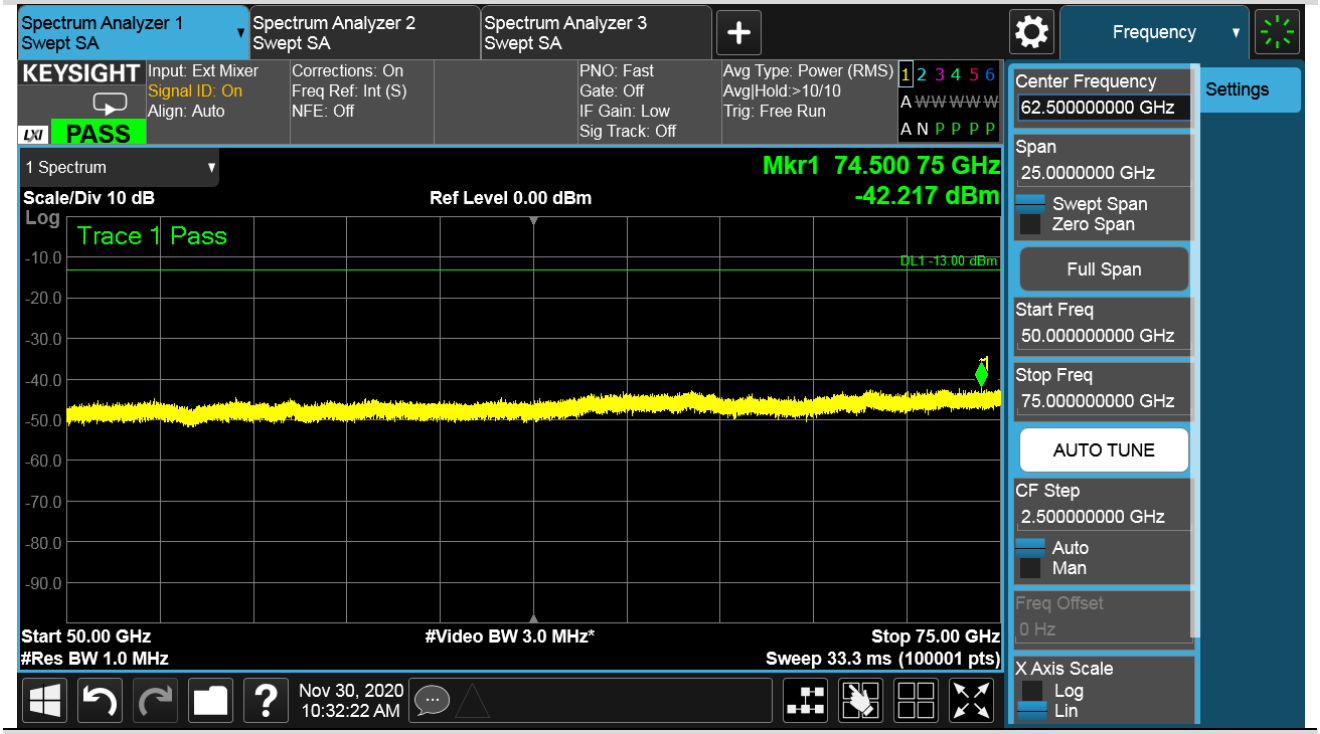
20RB22-Vertical Polarization



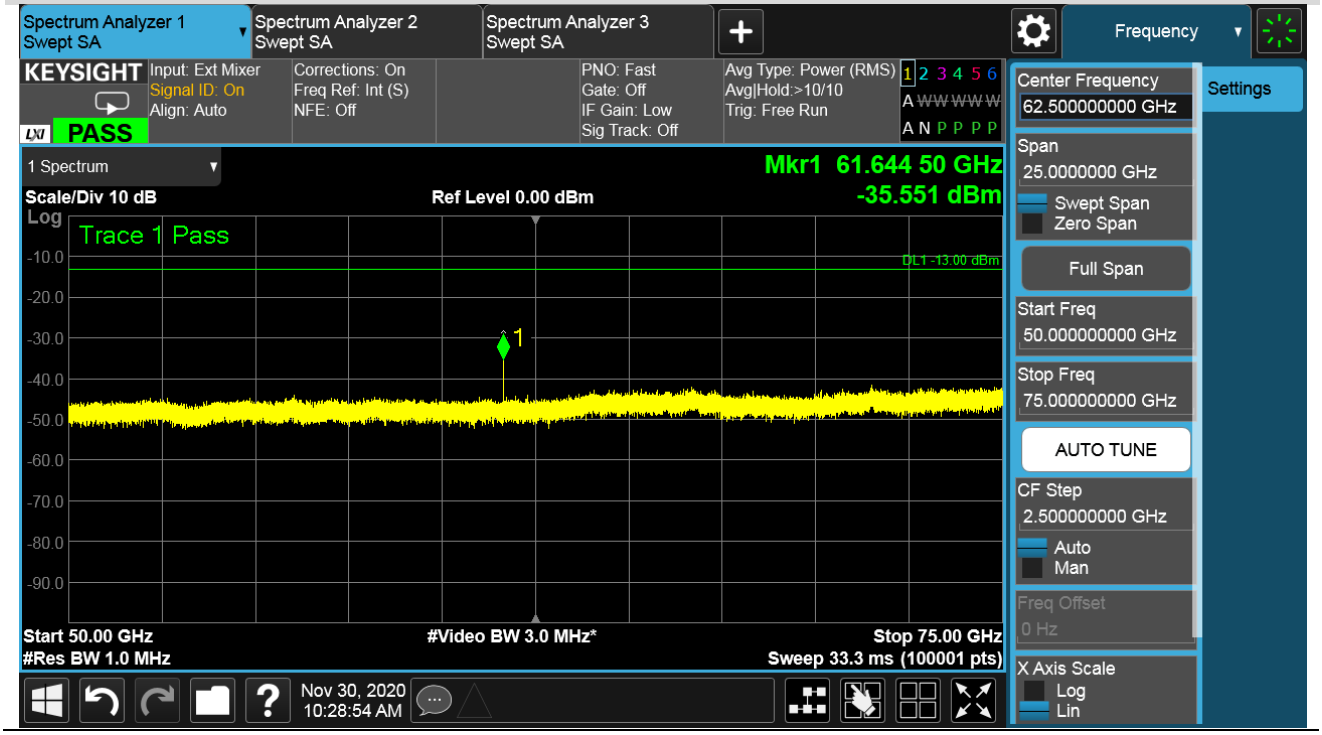
n260:1CC-BW100MHz-RSE 50GHz to 75GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



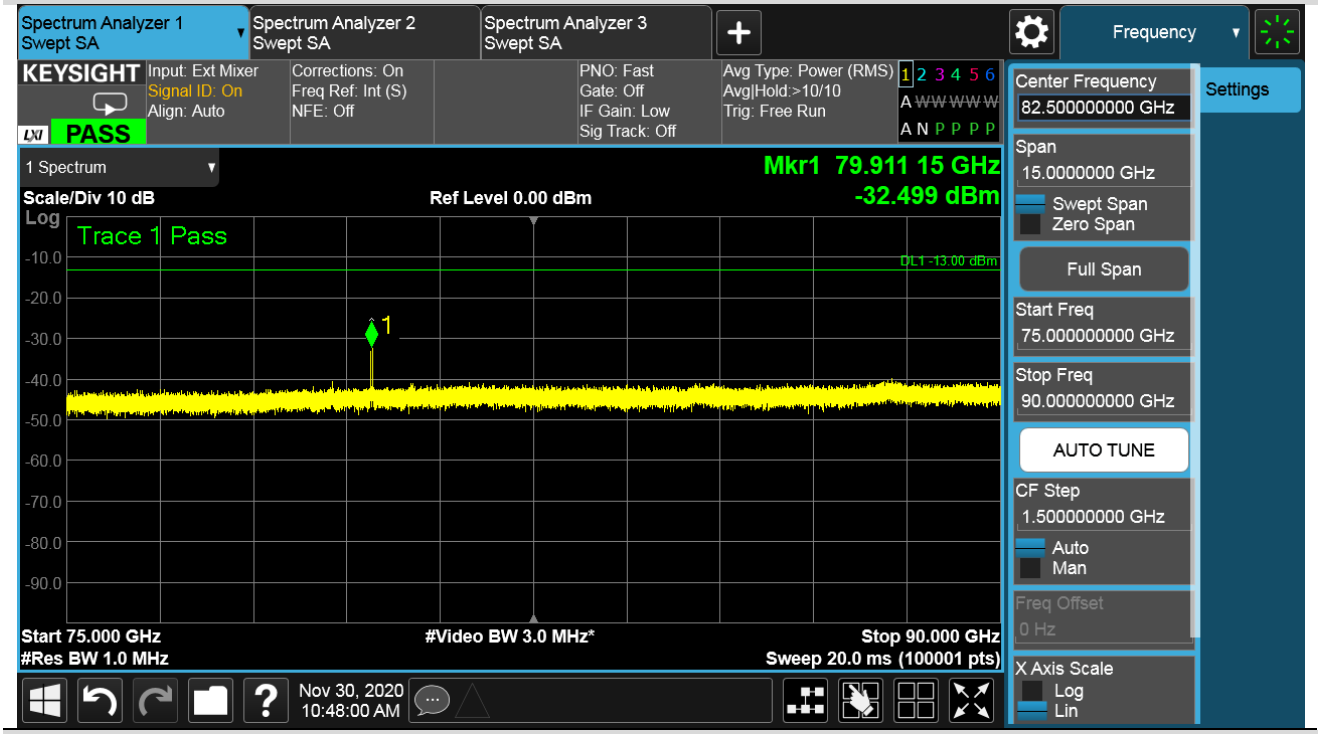
20RB22-Vertical Polarization



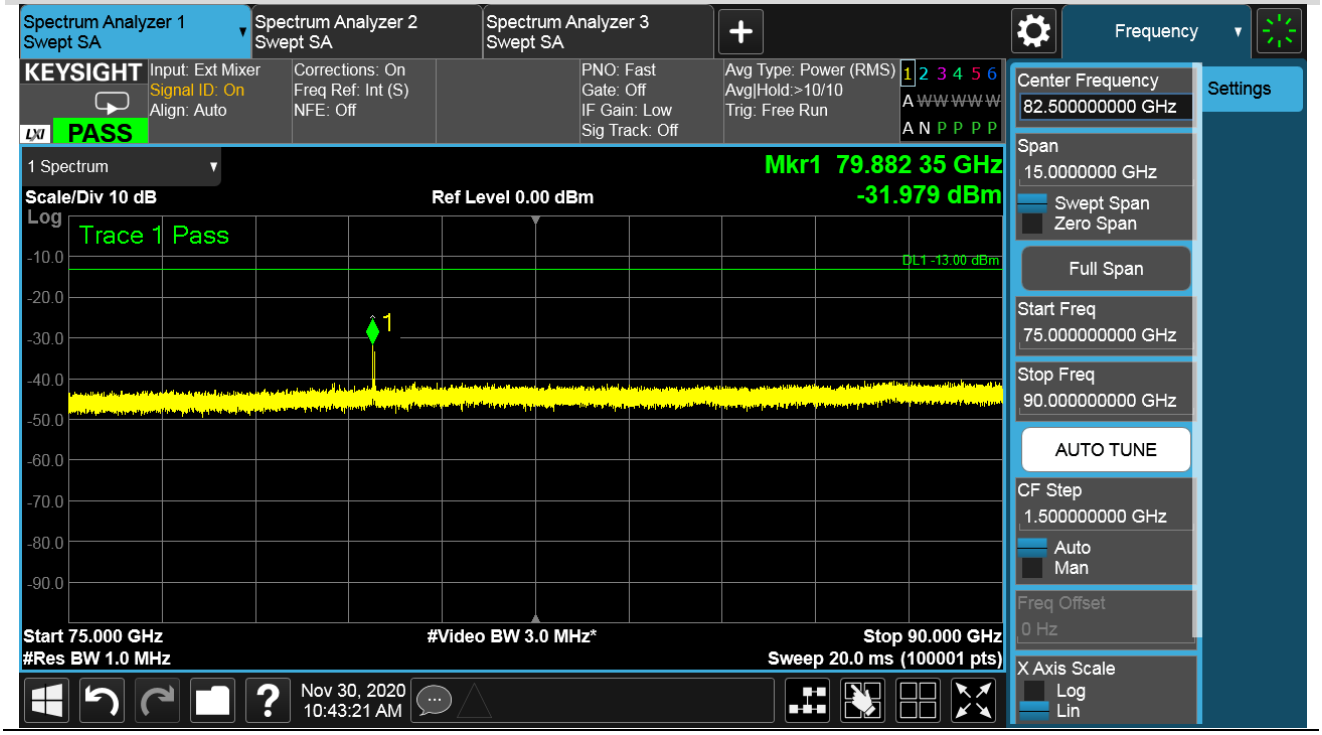
n260:1CC-BW100MHz-RSE 75GHz to 90GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



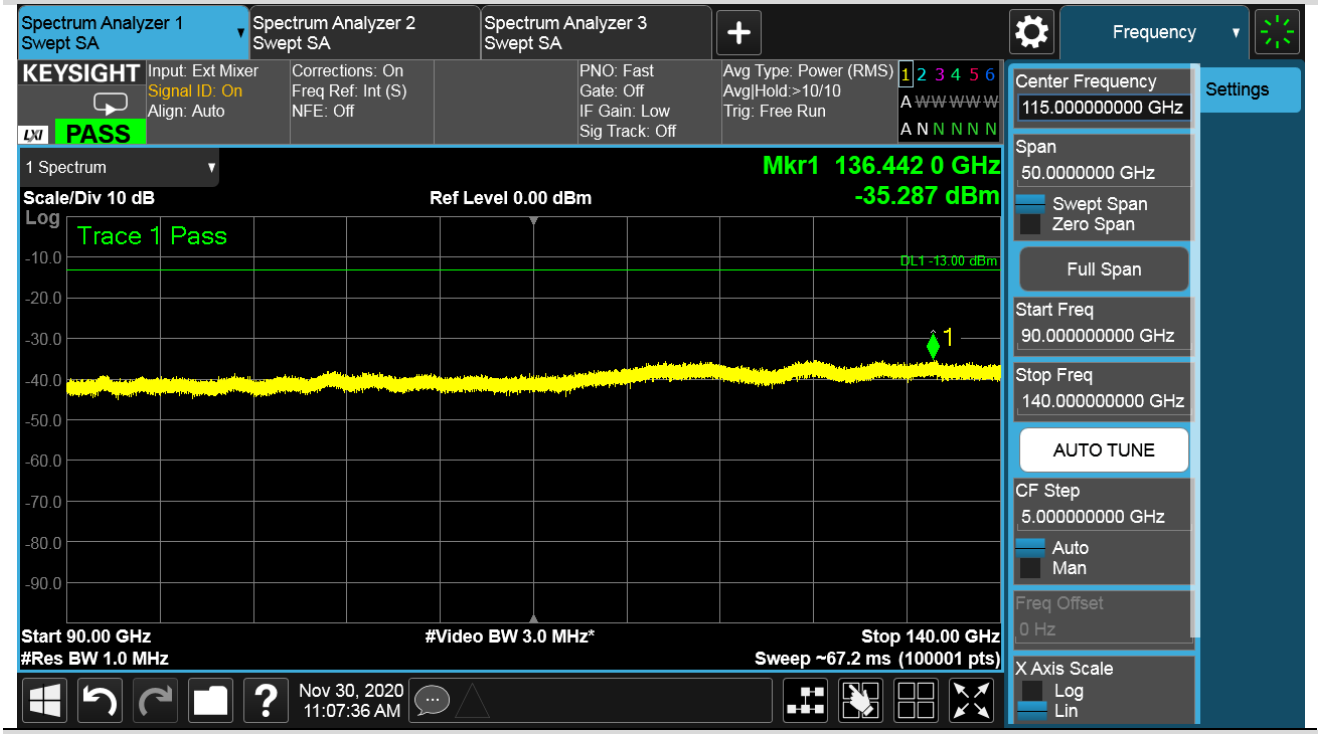
20RB22-Vertical Polarization



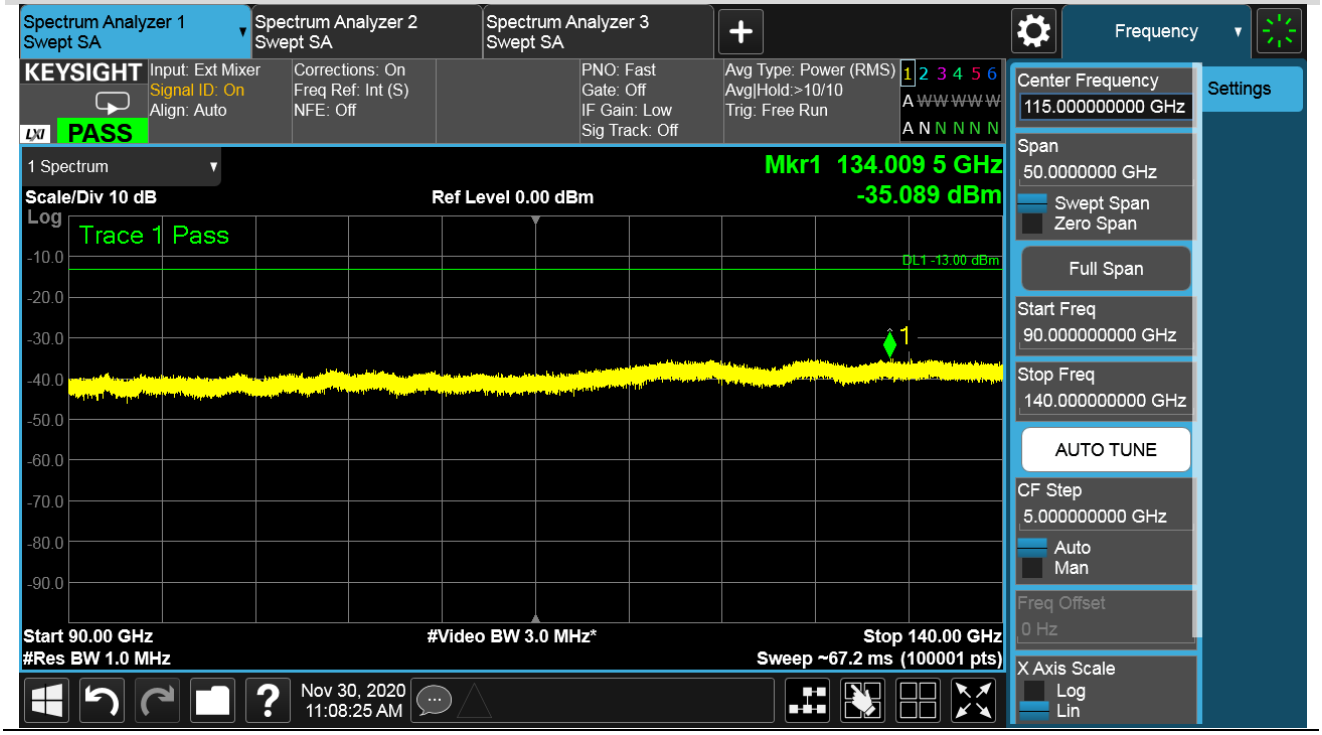
n260:1CC-BW100MHz-RSE 90GHz to 140GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



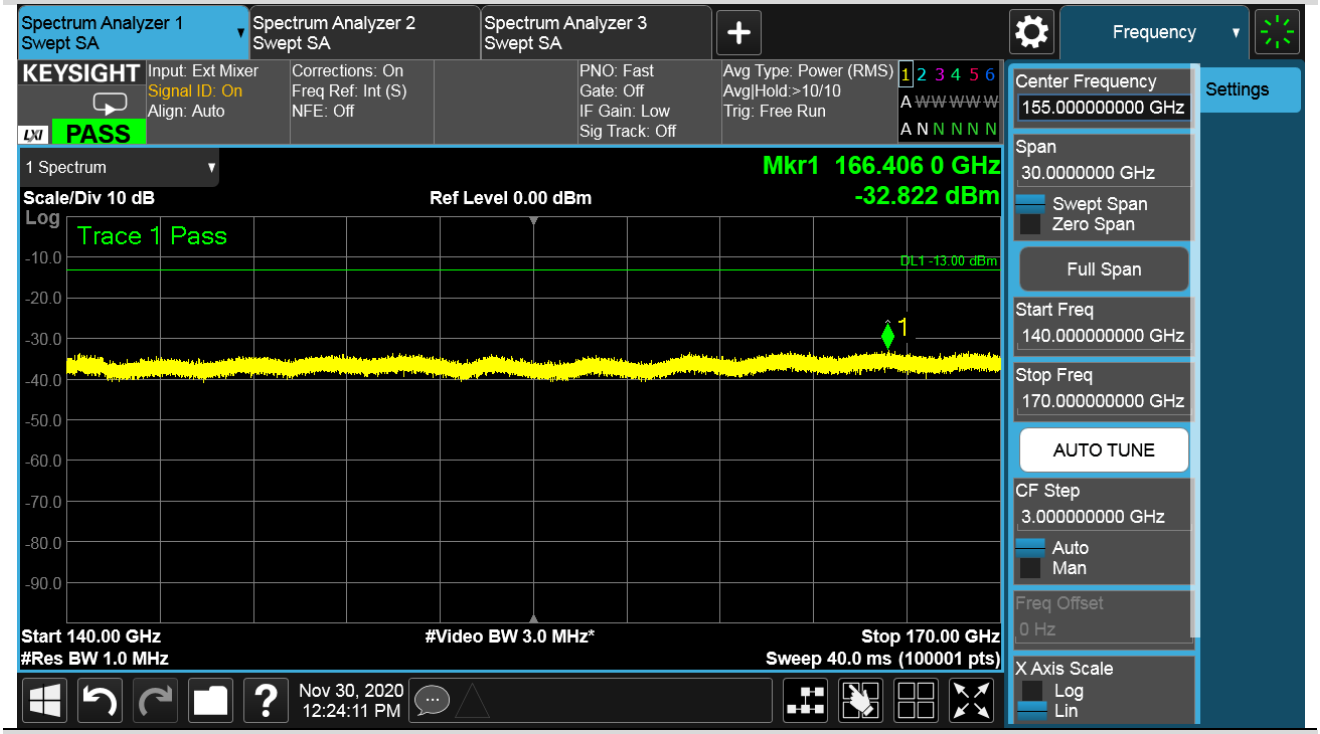
20RB22-Vertical Polarization



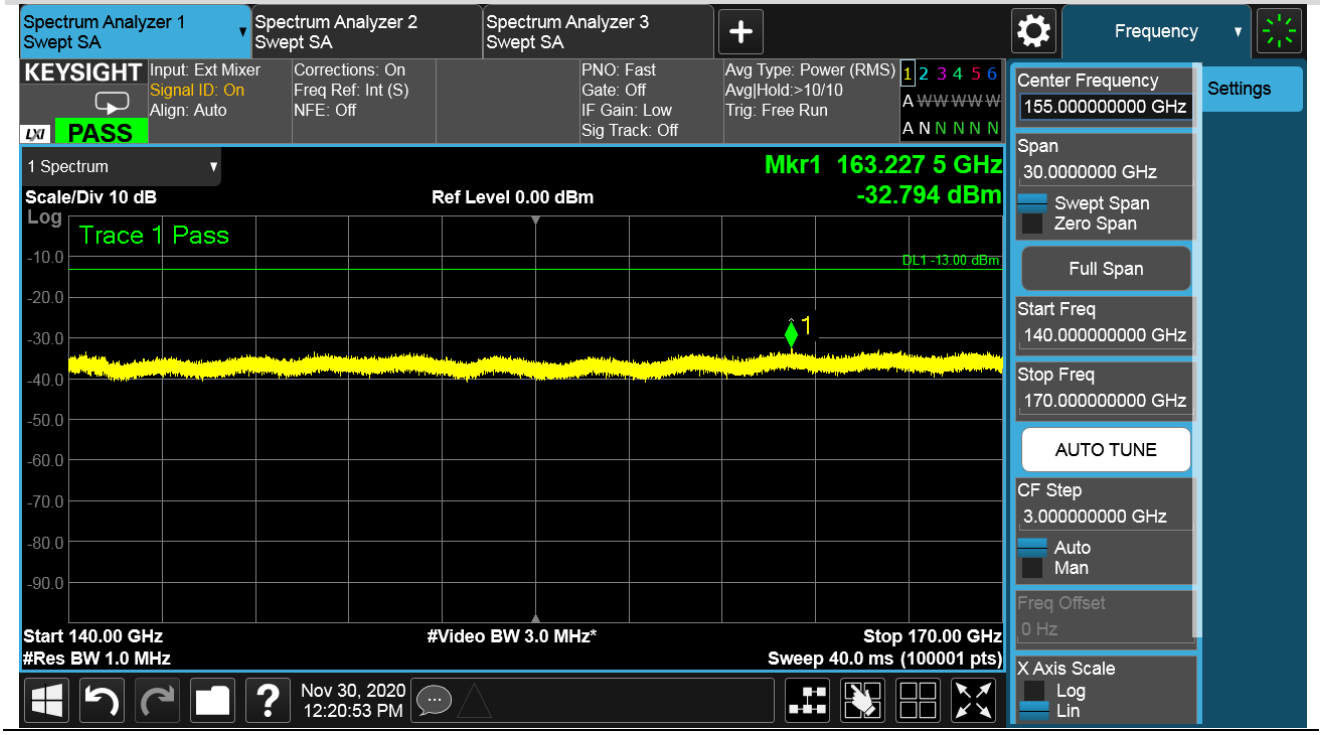
n260:1CC-BW100MHz-RSE 140GHz to 170GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



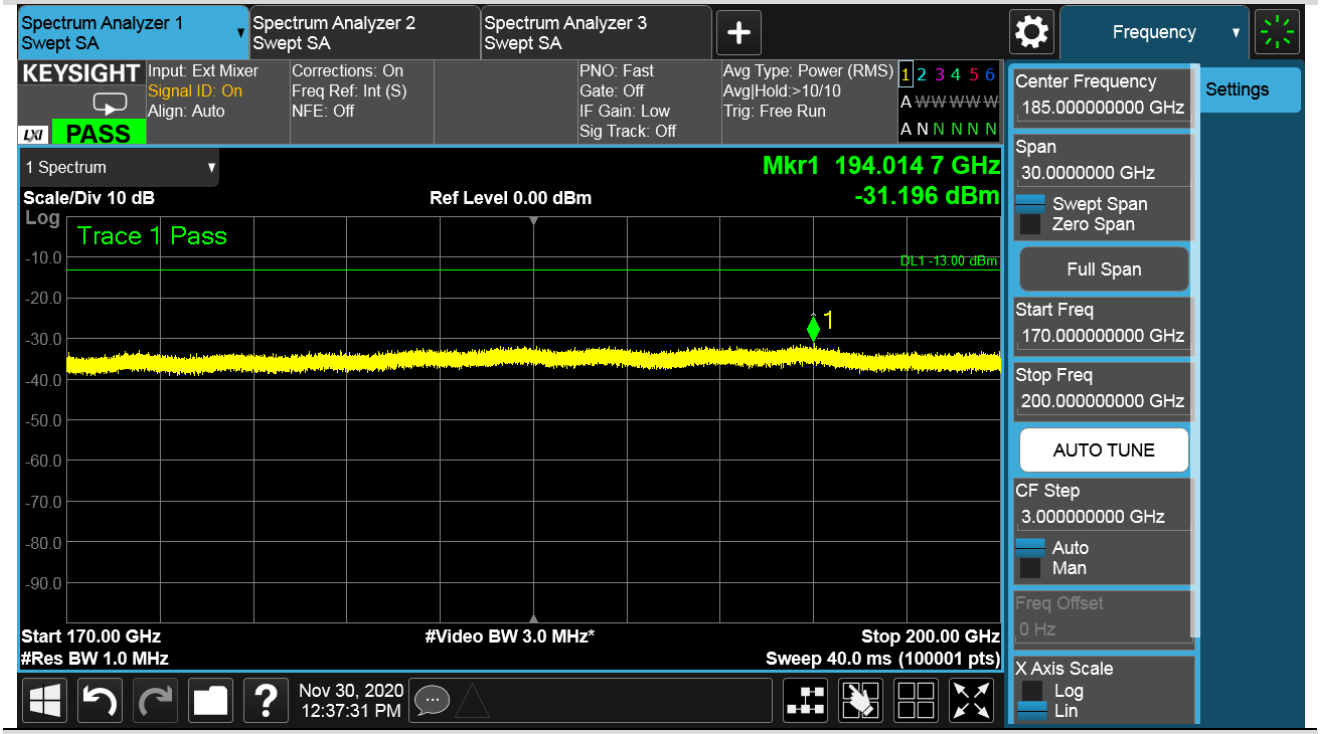
20RB22-Vertical Polarization



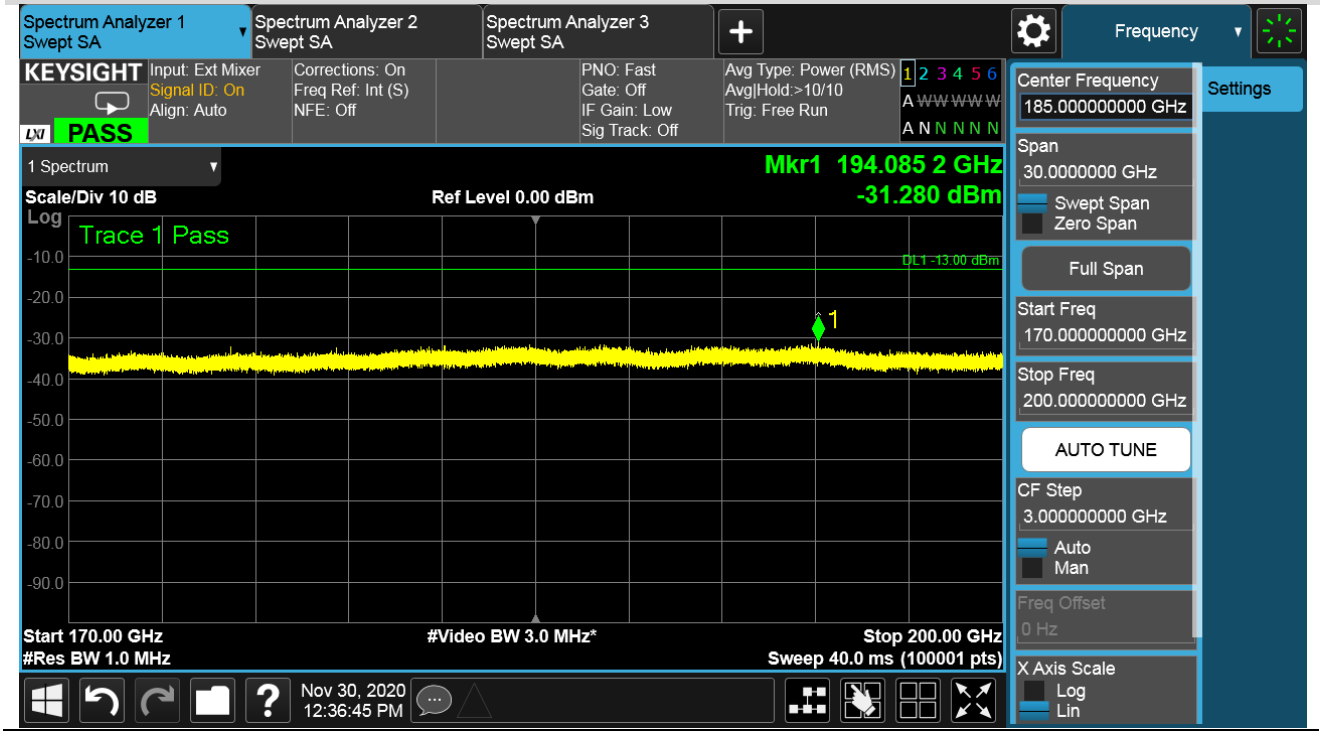
n260:1CC-BW100MHz-RSE 170GHz to 200GHz

High channel: n260-BW:100MHz-1CC-BPSK-Beam ID 63+319 (40 GHz to 50 GHz)

20RB22-Horizontal Polarization



20RB22-Vertical Polarization



Note:

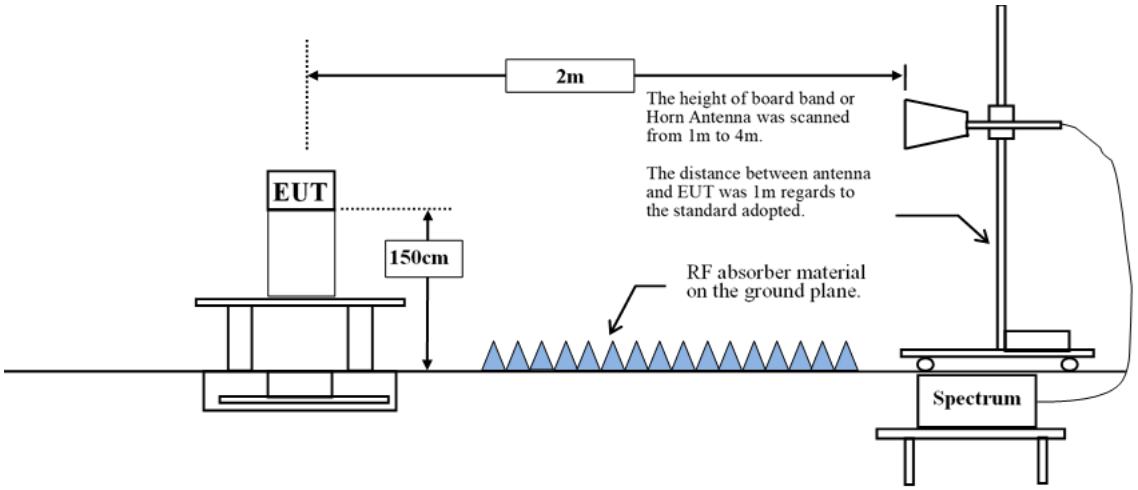
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110108, 20A0435R-E3032160657 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.

5. Band Edge

5.1. Test Setup



5.2. Limits

The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be −13 dBm/MHz or lower. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm/MHz or lower.

5.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the axis of the maximum emission level.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 or C63.4: 2014 on radiated measurement.

Spectrum setting:

1. Start and stop frequency was set such that both lowest and highest band edges are measured.
2. Span = set to large enough so as to measure all out of band emissions near the band edge.
3. Detector = RMS
4. Trace mode = trace average
5. Sweep time = auto couple
6. Number of sweep points ≥ 2 x Span/RBW
7. The trace was allowed to stabilize
8. RBW = 1MHz, VBW = 3MHz
9. Antnena Gain at Band Edege:
   The conductive power should obttained from EIRP test result reduce to the below antenna gain.

Test Band	Frequency (GHz)	Antenna Gain (dBi)
n260	37	19.84
	40	19.66

5.4. Test Results

N/A

Note:

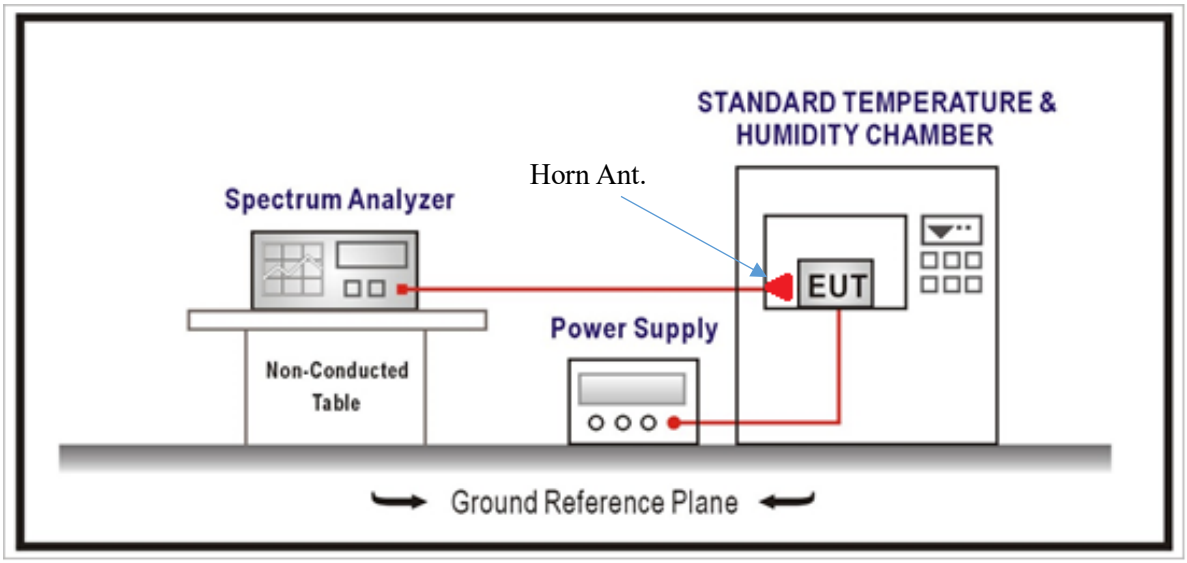
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110108, 20A0435R-E3032160657 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.

6. Frequency Stability

6.1. Test Setup



6.2. Limits

The fundamental emissions within the authorized frequency band by variation the temperature from -30℃ to +50℃ and variation the primary voltage from 85% to 115% of the nominal supply voltage.

6.3. Test Procedure

Frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

1. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier Frequency of the transmitter is made within one minute after applying power to the transmitter.

2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

6.4. Test Results

N/A

Note:
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110108, 20A0435R-E3032160657 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Equivalent Isotropically Radiated Power (EIRP) and Radiated Spurious Emissions (RSE) worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report.