

# **TEST REPORT**

#### FCC Test for FR-R5G39AO38ADU

APPLICANT FRTEK CO., LTD.

REPORT NO. HCT-RF-2112-FC042-R1

DATE OF ISSUE January 25, 2022

> Tested by Kwang Il Yoon

Y W

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F-TP22-03(Rev.04)

1/161



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TEST REPORT FCC Test for FR- R5G39AO38ADU	REPORT NO. HCT-RF-2112-FC042-R1 DATE OF ISSUE January 25, 2022 Additional Model -
Applicant	<b>FRTEK CO., LTD.</b> 11-25, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea
FCC ID	2AFEG-R5G39AO38ADU
Product Name	PrimAer DU39
Model Name	FR-R5G39AO38ADU
Date of Test	November 29, 2021 ~ January 25, 2022
Test Standard Used	CFR 47 Part 2, Part 30
	The result shown in this test report refer only to the sample(s) tested unless otherwise stated. This test results were applied only to the test methods required by the standard.





#### **REVISION HISTORY**

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	December 24, 2021	Initial Release
1	January 25, 2022	Added the 1RB test results on section 5.4, 5.5, 5.6, 5.7.

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr



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#### **1. GENERAL INFORMATION**

#### **1.1. APPLICANT INFORMATION**

Company Name	FRTEK CO., LTD.
Company Address	1001, Doosan Venture Digm, 415, Heungandaero, Dongan-Gu, Anyang-Si, Gyenggi-do, 431-755 Korea

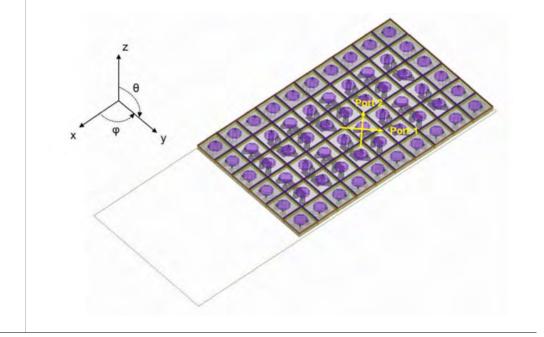
#### **1.2. PRODUCT INFORMATION**

EUT Type	PrimAer DU39			
EUT Serial Number	FRC39-21C-0001	FRC39-21C-0001		
Input Rating Power Port	-53.3 V			
Power Supply	DC -53.3 V (-48 ~ -53	DC -53.3 V (-48 ~ -53.3 V)		
Frequency Range	37 600 MHz ~ 40 000 MHz			
Modulation Type	QPSK, 16QAM, 64QAM			
	Mode	EIRP	Total (2 path)	
		(dBm)	(dBm)	
Output Power	1CC	38.5	41.5	
	10CC	38.5	41.5	
		Mode [W]		
Max EIRP Density	1CC		18.793	
	10CC 3.034			
Channel Dendwidthe	1CC: 100 MHz			
Channel Bandwidths	10CC: 1 000 MHz			



A high-performance 32-element (8x4) integrated antenna array is included in the SOB
A fight-performance 32-element (0x4) integrated antenna array is included in the 30D

Maximum Gain: 19.37 dBi	
Antenna pitch: 3.9 mm	
Antenna Size:	Length: 8 x 5.2 mm = 41.6 mm
	Width: 4 x 5.2 mm = 20.8 mm
Lattice:	Rectangular
Туре:	Patch



#### **1.3. TEST INFORMATION**

FCC Rule Parts	CFR 47 Part 2, Part 30	
Maaan waa ant at an dawda	ANSI C63.26-2015, KDB 935210 D05 v01r04, KDB 971168 D01 v03r01,	
Measurement standards	KDB 662911 D01 v02r01, KDB 662911 D02 v01, KDB 842590 D01 v01r02	
Place of Test	HCT CO., LTD.	
	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do,	
	17383, Rep. of KOREA	

Antenna Specification (Antenna Array)



#### 2. FACILITIES AND ACCREDITATIONS

#### 2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 (Version: 2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

#### 2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



#### **3. TEST SPECIFICATIONS**

#### 3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 30

Description	Reference	Results
AGC threshold	KDB 935210 D05 v01r04 3.2	Compliant
Out-of-band rejection	KDB 935210 D05 v01r04 3.3	Compliant
Occupied Bandwidth / Input-versus-output signal comparison	§ 2.1049	Compliant
EIRP Density	§ 30.202	Compliant
Equivalent Isotropic Radiated Power / Mean output power and amplifier/booster gain	§2.1046	Compliant
Out-of-band/out-of-block emissions (Band Edge)	§2.1051, §30.203	Compliant
Radiated Spurious Emissions	§2.1051, §30.203	Compliant
Frequency Stability	§2.1055	Compliant



#### **3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST**

- The test was generally based on the method of KDB 935210 D05 v01r04 and only followed ANSI C63.26-2015 if there was no test method in KDB standard.
- All NR modulation types (QPSK, 16QAM, 64QAM) have been tested. But this report contains only worst case data.
- Except for the following cases, EUT was tested under normal operating conditions. : Out-of-band rejection test requires maximum gain condition without AGC.
- All tests is performed by radiated measurement and applied below conditions.

: Used measurement distance with far field of test such as AGC threshold, Out-of-band rejection, OBW, EIRP and Band edge are as follow.

> Wavelength = Speed of light / Measurement frequency = 30 / 4 000 = 0.0075 m (2 X (EUT Antenna dimension)<sup>2</sup>) / Wavelength = (2 X (0.04651)<sup>2</sup>) / 0.0075 = 0.58 m (2 X (Measurement Antenna dimension)<sup>2</sup>) / Wavelength = (2 X (0.09605)<sup>2</sup>) / 0.0075 = 2.46 m

In case of far-field distance for fundamental, we applied the measurement antenna dimension because the measurement antenna is bigger than the EUT antenna dimension. So, measurement distance is 3 m.

: Spurious emissions measurement distance is shown in table below(Reference : Measurement Antenna Dimension).			
Frequency Rage (GHz)	Wavelength (cm)	Far Field Distance (m)	Measurement Distance(m)
18~40	0.75	2.460	3.00
40 ~ 50	0.60	1.130	1.50
50 ~ 60	0.50	1.354	1.50
60 ~90	0.33	0.856	1.00

0.572

0.332

0.214

0.15

90~140

140 ~ 200

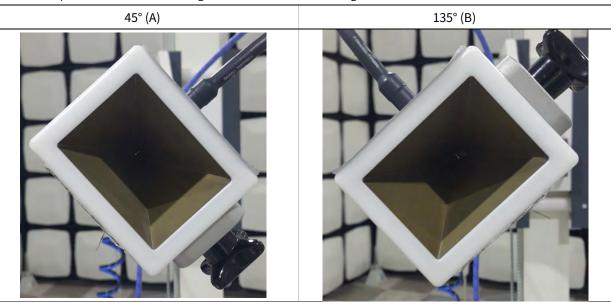
1.00

1.00





Radiated test is performed on various angle of antenna and following location is worst test case.



- CC means component carriers and EUT support 1CC ~ 10CC.
- Test was performed the carrier 1 and 10 case having maximum output power and maximum PSD(It means the worst case.).
- Unwanted radiated emissions test was performed on state of all EUT antenna path is operated with a maximum output power level.
- Testing was completed with a signal generator creating a representative mmWave 5G NR signal, using DFT-s-OFDM scheme, various modulations including  $\pi/2$ -BPSK, QPSK, and QAM, 120kHz subcarrier spacing, with one and ten carrier configurations using 100MHz and 1000MHz bandwidths, full and single resource block allocations.
- Transmitter output signals are correlated.
- EUT was tested with following modulated signals provide by applicant.
   : NR 100 MHz (1CC, 10CC)



#### **3.3. MAXIMUM MEASUREMENTUNCERTAINTY**

Description	Condition	Uncertainty
	9 kHz ~ 30 MHz	± 3.40 dB
	30 MHz ~ 1 GHz	± 4.80 dB
Radiated Disturbance	1 GHz ~ 18 GHz	± 5.70 dB
	18 GHz ~ 40 GHz	$\pm$ 5.05 dB

Coverage factor k=2, Confidence levels of 95 %

#### 3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	+15 °C to +35 °C	
Relative humidity:	30 % to 60 %	
Air pressure	860 mbar to 1 060 mbar	

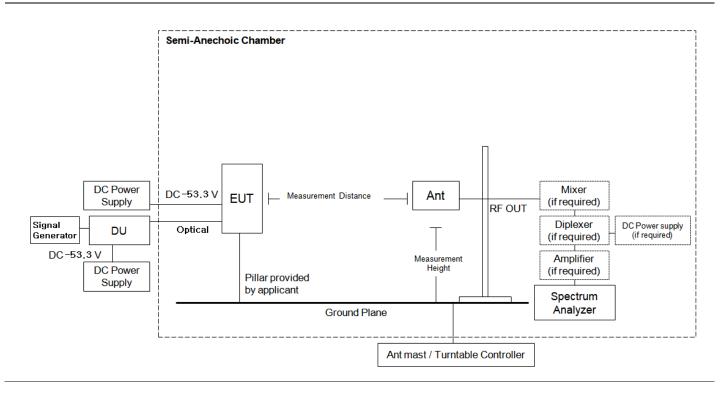




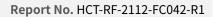
#### **3.5. TEST DIAGRAMS**

#### AGC / OOBR / Occupied Bandwidth / EIRP / Band Edge / Radiated Spurious Emissions in 1 GHz to 40 GHz Semi-Anechoic Chamber DC Power Mixer Ant DC-53.3 V EUT Measurement Distance Supply (if required) RF OUT Signal Diplexer DC Power supply (if required) Optical DU Generator (if required) DC-53.3 V Amplifier Measurement Height DC Power (if required) Pillar provided Supply by applicant Spectrum Analyzer Ground Plane Ant mast / Turntable Controller

#### Radiated Spurious Emissions in other bands







## 4. TEST EQUIPMENTS

HCT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
PXA Signal Analyzer	N9030B	Agilent	MY60070602	10/22/2022	Annual
Spectrum Analyzer	FSW	Rohde & Schwarz	101256	11/11/2022	Annual
Vector Signal Generator	SMW200A	Rohde & Schwarz	100988	03/15/2022	Annual
DC Power Supply	PWR800L	KIKUSUI	RE001154	03/04/2022	Annual
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Turn Table	DS2000-S	Innco systems	N/A	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	N/A	N/A	N/A
Low Noise Amplifier	LLAU1183540Q	LTC Microwave	100	2022-09-16	Annual
Loop Antenna	Loop Antenna	Schwarzbeck	1513-175	06/04/2023	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02296	05/19/2022	Biennial
Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170541	11/16/2023	Biennial
Horn Antenna	WR-19 Horn Antenna	OML INC.	M19RH-160419-1	04/23/2022	Biennial
Horn Antenna	WR-19 Horn Antenna	OML INC.	M19RH-160419-2	04/23/2022	Biennial
Horn Antenna	WR-12 Horn Antenna	OML INC.	M12RH-160419-1	04/23/2022	Biennial
Horn Antenna	WR-12 Horn Antenna	OML INC.	M12RH-160419-2	04/23/2022	Biennial
Horn Antenna	WR-08 Horn Antenna	OML INC.	M08RH-160419-2	04/23/2022	Biennial
Horn Antenna	WR-08 Horn Antenna	OML INC.	M08RH-160419-1	04/23/2022	Biennial
Horn Antenna	WR-05 Horn Antenna	OML INC.	M05RH-160419-1	04/23/2022	Biennial
Horn Antenna	WR-05 Horn Antenna	OML INC.	M05RH-160419-2	04/23/2022	Biennial
SA Extension Module	WR19SAX-M	VDI	SAX771	03/17/2022	Annual
SA Extension Module	WR12SAX-M	VDI	SAX773	04/02/2022	Annual
SA Extension Module	WR8.0SAX-M	VDI	SAM779	04/02/2022	Annual
SA Extension Module	WR5.1SAX-M	VDI	SAX 774	04/02/2022	Annual
Source Module	WR-19	OML INC.	S19MS-A-160516-1	09/02/2022	Annual
Source Module	WR-12	OML INC.	S12MS-A-160419-1	09/02/2022	Annual
Source Module	WR-08	OML INC.	S08MS-A-160419-1	09/09/2022	Annual
Source Module	WR-05	OML INC.	S05MS-A-160419-1	09/07/2022	Annual
Temperature and Humidity Chamber	PL-4KP	ESPEC	14021890	08/11/2022	Annual

#### Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.

2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.



#### **5. TEST RESULT**

5.1. AGC THRESHOLD

### Test Requirement:

#### KDB 935210 D05 v01r04

Testing at and above the AGC threshold is required.

#### Test Procedures:

Measurements were in accordance with the test methods section 3.2 of KDB 935210 D05 v01r04.

In the case of fiber-optic distribution systems, the RF input port of the equipment under test (EUT) refers to the RF input of the supporting equipment RF to optical convertor; see also descriptions and diagrams for typical DAS booster systems in KDB Publication 935210 D02

Devices intended to be directly connected to an RF source (donor port) only need to be evaluated for any over-the-air transmit paths.

- a) Connect a signal generator to the input of the EUT.
- b) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- c) The signal generator should initially be configured to produce either of the required test signals.
- d) Set the signal generator frequency to the center frequency of the EUT operating band.
- e) While monitoring the output power of the EUT, measured using the methods of ANSI C63.26-2015 subclause 5.2.4.4.1, increase the input level until a 1 dB increase in the input signal power no longer causes a 1 dB increase in the output signal power.
- f) Record this level as the AGC threshold level.
- g) Repeat the procedure with the remaining test signal.

Output power measurement in subclause 5.2.4.4.1 of ANSI C63.26

- a) Set span to  $2 \times to 3 \times the OBW$ .
- b) Set RBW = 1% to 5% of the OBW.
- c) Set VBW  $\geq$  3 × RBW.
- d) Set number of measurement points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- e) Sweep time: auto-couple
- f) Detector = power averaging (rms).
- g) If the EUT can be configured to transmit continuously, then set the trigger to free run.
- h) Omit
- i) 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 multiple symbols, 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.
- j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power



measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

#### Note:

- 1. Test distance is determined to 3.0 m by far field condition; see test descriptions on section 3.2.
- 2. The angle of antenna is set as maximum radiated power conditions.
- 3. EIRP is calculated from measured value according to section 5.2.7 of ANSI C63.26-2015, and the formula is as follow.

#### $EIRP(dBm) = E(dB\mu V/m) + 20log(D) - 104.77$

4.  $E(dB\mu V/m)$  value is considered Antenna Factor and Cable Loss (AFCL), and it as follow.

*E (dBμV/m) = measurement value (dBμV) + AFCL* 

#### **Test Results:**

Dath		Center Frequency	AGC Threshold Level	Measured Level	Result
Path CC		(GHz)	(dBm)	(dBuV)	(dBm)
٨	1	38.800	-71.50	79.84	39.01
A	10	38.800	-71.50	79.72	38.89
D	1	38.800	-71.50	81.30	40.47
В	10	38.800	-71.50	81.22	40.39



#### **5.2. OUT-OF-BAND REJECTION**

#### Test Requirement:

#### KDB 935210 D05 v01r04

Out-of-band rejection required.

#### Test Procedures:

Measurements were in accordance with the test methods section 3.3 of KDB 935210 D05 v01r04.

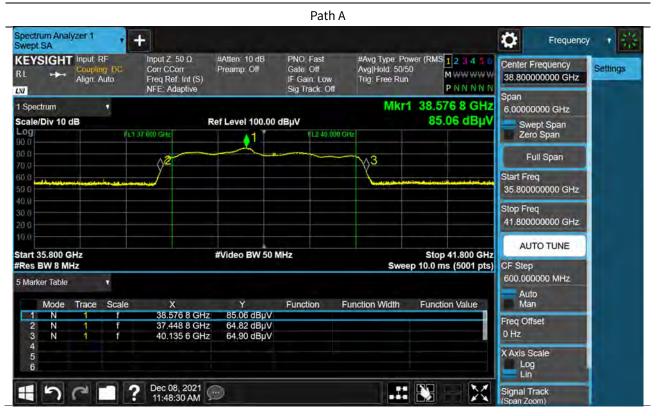
A signal booster shall reject amplification of other signals outside of its passband. Adjust the internal gain control of the EUT (if so equipped) to the maximum gain for which equipment certification is sought.

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
  - 1) Frequency range =  $\pm 250$  % of the passband, for each applicable CMRS band.
  - 2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.
  - 3) Dwell time = approximately 10 ms.
  - 4) Number of points = SPAN/(RBW/2).
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.
- e) Set the resolution bandwidth (RBW) of the spectrum analyzer to be 1 % to 5 % of the EUT passband, and the video bandwidth (VBW) shall be set to ≥ 3 × RBW.
- f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.
- g) Place a marker to the peak of the frequency response and record this frequency as f<sub>0</sub>.
- h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the -20 dB down amplitude, to determine the 20 dB bandwidth.
- i) Capture the frequency response of the EUT.
- j) Repeat for all frequency bands applicable for use by the EUT.





#### Test Results:



#### Path B





#### 5.3. OCCUPIED BANDWIDTH / INPUT-VERSUS-OUTPUT SIGNAL COMPARISON

#### **Test Requirement:**

#### § 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

#### Test Procedures:

#### Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01r04.

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal; alternatively, the 99% OBW can be measured and used. See KDB Publication 971168 for more information on measuring OBW.

- a) Connect a signal generator to the input of the EUT.
- b) Configure the signal generator to transmit the signal.
- c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.
- d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 times to 5 times the emission bandwidth (EBW) or alternatively, the OBW.
- f) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be  $\ge 3 \times$  RBW.
- g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level. Steps f) and g) may require iteration to enable adjustments within the specified tolerances.
- h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.
- i) Set spectrum analyzer detection function to positive peak.
- j) Set the trace mode to max hold.
- k) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency as f0.
- l) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the -26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the -26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the -26 dB down amplitude point.
- m) Repeat steps e) to l) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).
- n) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step l) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.
- o) Repeat the procedure [steps e) to n)] with the input signal amplitude set to +3 dB above the AGC threshold.
- p) Repeat steps e) to o) with the signal generator set to the narrowband signal.
- q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.





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#### **Test Results:**

#### Tabular Data of Output Occupied Bandwidth

Path	сс	CC Center Frequency (GHz) 99% OBW	
•	1	38.800	94.276
Α	10	38.800	986.22
D	1	38.800	94.396
В	10	38.800	990.26

#### Tabular Data of Input Occupied Bandwidth

Path	СС	Center Frequency (GHz)	99% OBW (MHz)
	1	38.800	94.210
A	10	38.800	996.22
P	1	38.800	94.059
В	10	38.800	998.01

#### Tabular Data of +3 dB above the AGC threshold Output Occupied Bandwidth

Path	сс	Center Frequency (GHz)	99% OBW (MHz)
Δ.	1	38.800	94.216
А	10	38.800	985.61
D	1	38.800	94.474
В	10	38.800	990.26

#### Tabular Data of +3 dB above the AGC threshold Input Occupied Bandwidth

Path	СС	Center Frequency (GHz)	99% OBW (MHz)
	1	38.800	94.138
A	10	38.800	992.59
В	1	38.800	94.182
D	10	38.800	992.34



#### Measured Occupied Bandwidth Comparison

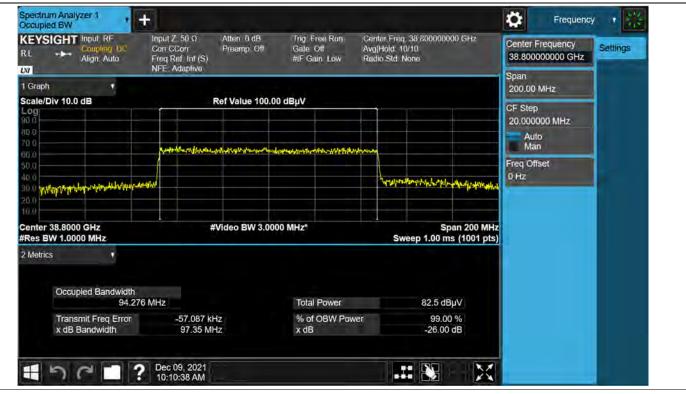
Path	сс	Variant of Input and output Occupied Bandwidth (%)	Variant of Input and +3 dB above the AGC threshold output Occupied Bandwidth (%)
•	1	0.070	0.083
A	10	-1.003	-0.703
D	1	0.358	0.310
В	10	-0.777	-0.210

\* Change in input-output OBW is less than  $\pm 5$  %.

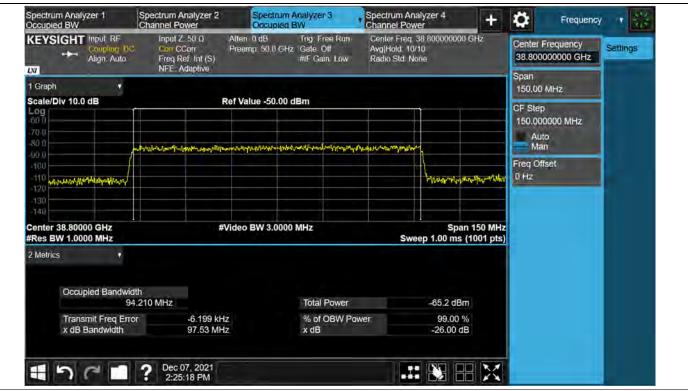


#### Plot Data of RF Occupied Bandwidth

#### Output / Path A / 1cc

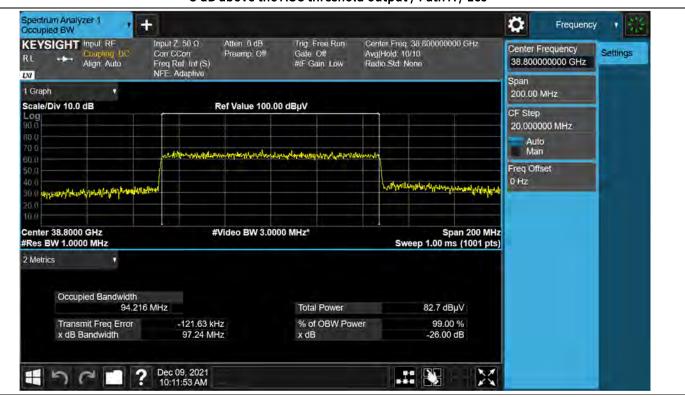


Input / Path A / 1cc



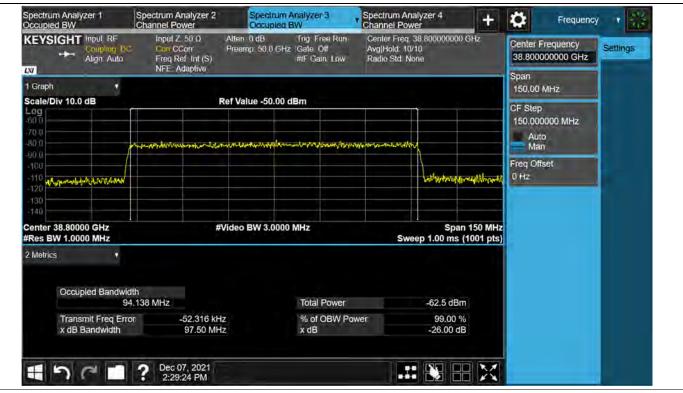




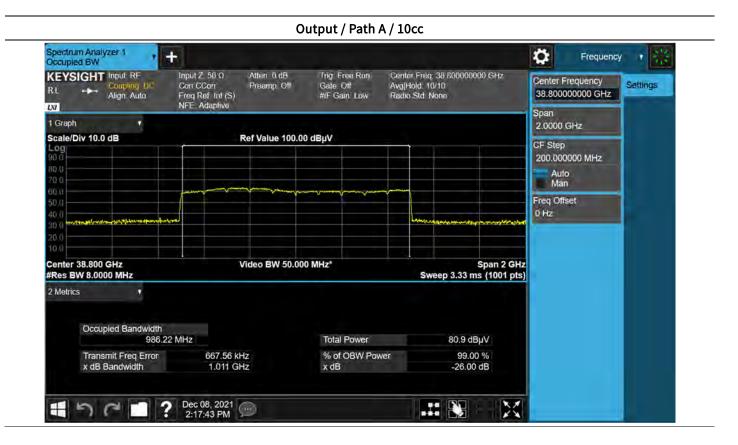


#### +3 dB above the AGC threshold output / Path A / 1cc

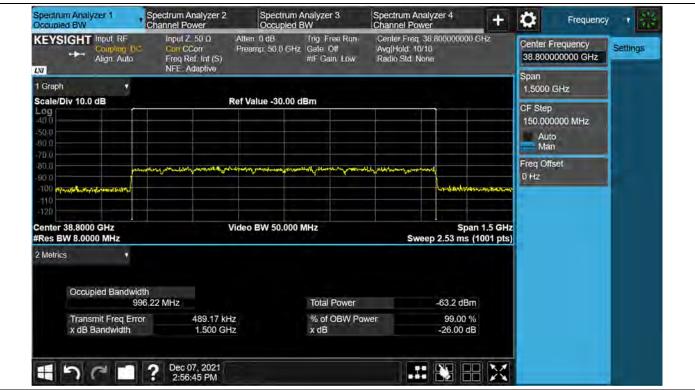
#### +3 dB above the AGC threshold Input / Path A / 1cc





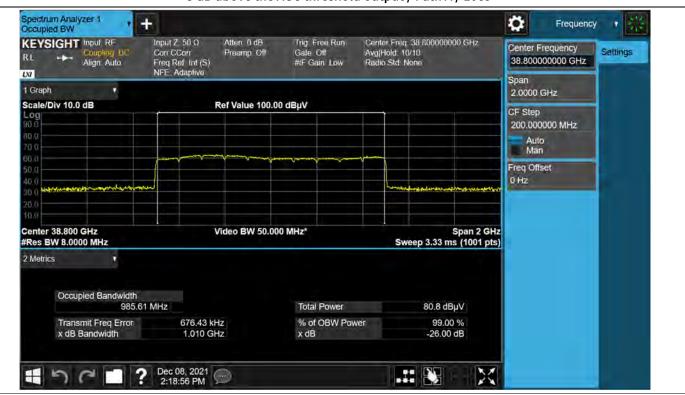


#### Input / Path A / 10cc









#### +3 dB above the AGC threshold output / Path A / 10cc

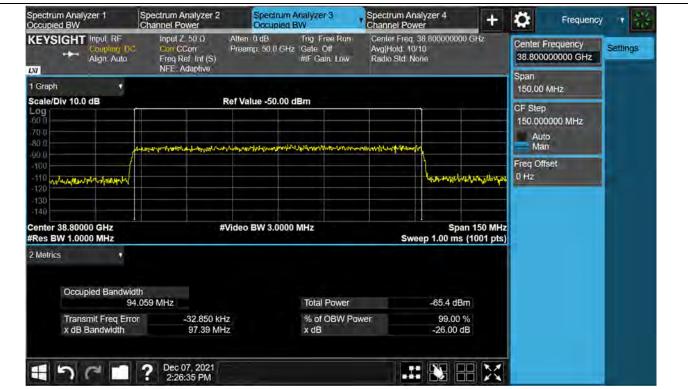
+3 dB above the AGC threshold Input / Path A / 10cc





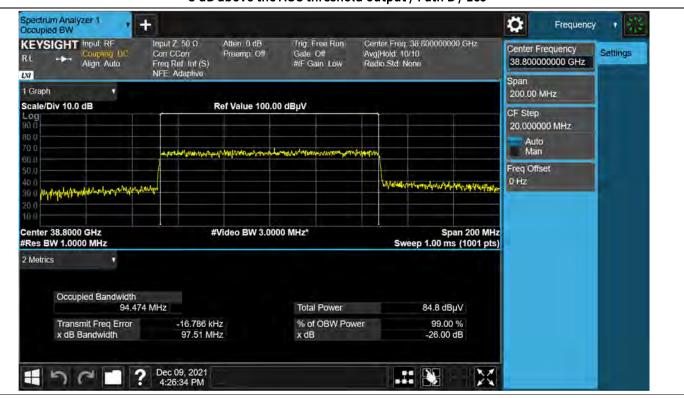
#### Output / Path B / 1cc Spectrum Analyzer 1 Occupied BW 쁥 Ö + Frequency Center Freq: 38.80000000 GHz Avg[Hold: 10/10 Input Z: 50 Ω Corr CCorr KEYSIGHT Input: RF Atten: 0 dB Trig: Free Run Center Frequency Preamp: Off Settings Gate Off Align: Auto Freq Ref Int (S) NFE: Adaptive 38.800000000 GHz Radio Std: None #IF Gain Low LNI Span 1 Graph 7 200.00 MHz Ref Value 100.00 dBµV Scale/Div 10.0 dB CF Step Log 20.000000 MHz Auto Man wellow and we have been and the at all part the part of the pa mapple Freq Offset 50.0 advanted and the prove the second product 0 Hz 10 0 manyahan Jan AMALINAN 30.0 Center 38.8000 GHz #Video BW 3.0000 MHz\* Span 200 MHz #Res BW 1.0000 MHz Sweep 1.00 ms (1001 pts) 2 Metrics Occupied Bandwidth 94.396 MHz Total Power 84.8 dBµV -9.907 kHz 99.00 % Transmit Freq Error % of OBW Power 97.59 MHz -26.00 dB x dB Bandwidth x dB Dec 09, 2021 4:26:21 PM X ? H 50

Input / Path B / 1cc



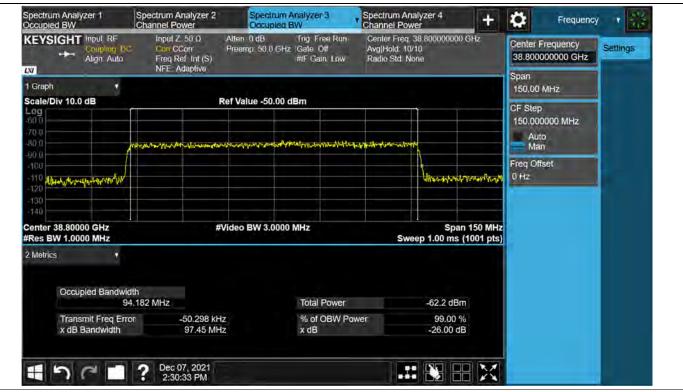




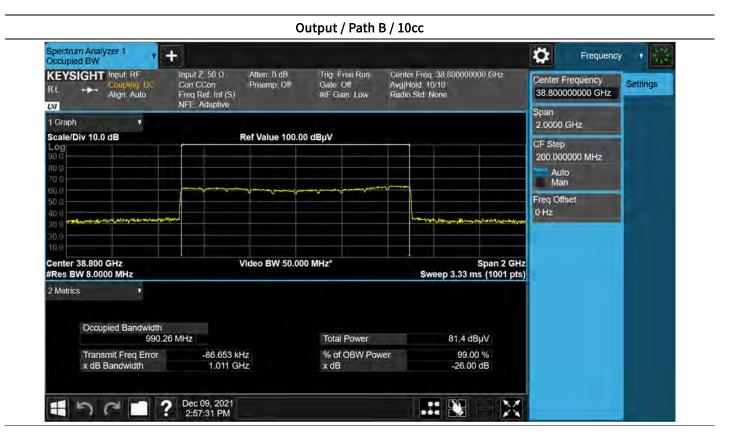


#### +3 dB above the AGC threshold output / Path B / 1cc

#### +3 dB above the AGC threshold Input / Path B / 1cc







Input / Path B / 10cc









#### +3 dB above the AGC threshold output / Path B / 10cc

+3 dB above the AGC threshold Input / Path B / 10cc







#### **5.4. EIRP DENSITY**

#### **Test Requirements:**

#### § 30.202 Power limits.

(a) For fixed and base stations operating in connection with mobile systems, the average power of the sum of all antenna elements is limited to an equivalent isotopically radiated power (EIRP) density of +75dBm/100 MHz. For channel bandwidths less than 100 megahertz the EIRP must be reduced proportionally and linearly based on the bandwidth relative to 100 megahertz.

#### Test Procedures:

The measurement is performed in accordance with Section 5.2.4.4.2 of ANSI C63.26.

- a) Set span to  $2 \times to 3 \times the OBW$ .
- b) Set RBW = 1% to 5% of the OBW.
- c) Set VBW  $\geq$  3 × RBW.
- d) Set number of measurement points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- e) Sweep time:
  - 1) Set = auto-couple, or
  - 2) Set  $\geq$  [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.
- f) Detector = power averaging (rms).
- g) Set sweep trigger to "free run."
- h) 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.
- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function with band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- j) Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.





#### Note:

- 1. Test distance is determined to 3.0 m by far field condition; see test descriptions on section 3.2.
- 2. The angle of antenna is set as maximum radiated power conditions.
- 3. EIRP is calculated from measured value according to section 5.2.7 of ANSI C63.26-2015, and the formula is as follows.

4. E (dB $\mu$ V/m) value is considered Antenna Factor and Cable Loss (AFCL), and it as follow.

E (dBμV/m) = measurement value (dBμV) + AFCL

5. Sample calculation:

81.24 dBµV (measured Value) – 95.2 + 54.396(AFCL) = 40.40 dBm (Final EIRP)



#### **Test Results:**

#### Tabular Data of EIRP Density per path

Dette	66	Channel	Frequency	Measured Level	Calculated EIRP	Limit
Path	CC	Channel	(GHz)	(dBuV)	(dBm/100MHz)	(dBm/100MHz)
		Low	37.650	78.72	36.84	
	1	Middle	38.800	79.77	38.94	_
٨		High	39.950	79.52	37.35	
A	10	Low	38.550	72.56	31.67	
		Middle	38.650	69.54	28.61	
		High	39.250	69.98	28.65	- 75
	1	Low	37.650	80.63	38.75	- 15
		Middle	38.800	81.24	40.40	
В		High	39.950	79.72	37.54	
D		Low	38.550	72.82	31.93	
	10	Middle	39.250	71.57	30.24	
		High	39.950	70.88	28.71	

#### MIMO Tabular Data of EIRP Density

Path	СС	Channel	Frequency (GHz)	Path A EIRP (dBm/100MHz)	Path B EIRP (dBm/100MHz)	Calculated EIRP (dBm/100MHz)	
		Low	37.650	36.84	38.75	40.90	
	1	1	Middle	38.800	38.94	40.40	42.74
		High	39.950	37.35	37.54	40.46	
A+B		Low	38.550	31.67	31.93	34.82	
	10	Middle	38.650	28.61	30.24	32.51	
		High	39.250	28.65	28.71	31.69	





	- ab atai		Penerg per p				
Path	СС	Channel	RB	Frequency	Measured Level	Calculated EIRP	Limit
- atri	the conditiet		Size/Offset	(GHz)	(dBuV)	(dBm/100MHz)	(dBm/100MHz)
		Low	1/0	37.603	77.74	55.15	
	1	Middle	1/32	38.799	78.70	57.87	
А		High	1/65	39.997	77.05	54.69	
А		Low	1/0	38.602	72.12	41.89	
	10	Middle	1/32	38.652	71.20	41.24	
	Hi	High	1/65	39.193	72.82	42.48	- 75
		Low	1/0	37.603	77.04	54.45	15
	1	Middle	1/32	38.799	77.43	56.60	
P		High	1/65	39.997	75.99	53.63	
В	10	Low	1/0	38.503	73.25	43.48	
		Middle	1/32	39.250	71.07	40.71	
		High	1/65	39.799	71.19	40.22	

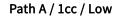
#### [1 RB] Tabular Data of EIRP Density per path

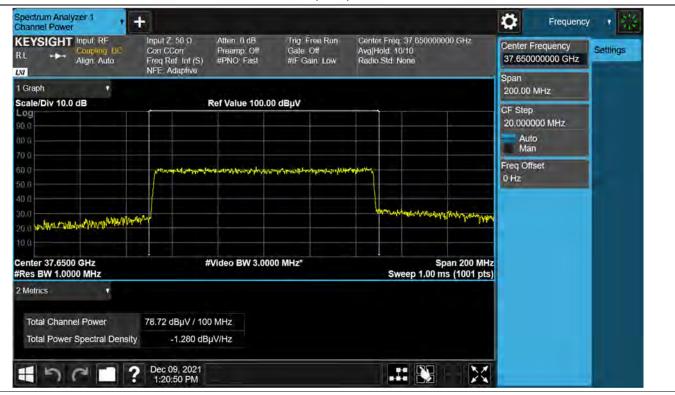
#### [1 RB] MIMO Tabular Data of EIRP Density

Path	сс	Channel	Frequency (GHz)	Path A EIRP (dBm/100MHz)	Path B EIRP (dBm/100MHz)	Calculated EIRP (dBm/100MHz)
		Low	37.650	55.15	54.45	57.83
	1	Middle	38.800	57.87	56.60	60.29
		High	39.950	54.69	53.63	57.20
A+B		Low	38.550	41.89	43.48	45.77
	10	Middle	38.650	41.24	40.71	43.99
		High	39.250	42.48	40.22	44.51



#### [Full RB] Plot Data of EIRP Density Tabular per path





#### Path A / 1cc / Middle







#### Path A / 1cc / High



#### Path A / 10cc / Low





#### Path A / 10cc / Middle Spectrum Analyzer 1 Channel Power · 22 Ö + Frequency Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive Atten: 0 dB Preamp: Off #PNO: Fast Trig: Free Run Gale: Off Center Freq. 38.650000000 GHz Avg[Hold: 10/10 Radio Std: None KEYSIGHT Input: RF Center Frequency Settings Align: Auto RL 38.650000000 GHz #IF Gain Low LXI Span 1 Graph 200.00 MHz Scale/Div 10.0 dB Ref Value 100.00 dBµV CF Step Log 20.000000 MHz Auto Man Freq Offset 0 Hz Center 38.6500 GHz Video BW 50.000 MHz\* Span 200 MHz #Res BW 8.0000 MHz Sweep 1.00 ms (1001 pts) 2 Metrics ۲ Total Channel Power 69.54 dBµV / 100 MHz Total Power Spectral Density -10.46 dBµV/Hz Dec 08, 2021 9:56:28 AM X ? うつ

#### Path A / 10cc / High

R L + Align: Auto	Input Z 50 Q Corr CCorr Freq Ref. Int (S) NFE. Adaptive	Atten: 0 dB Preamp: Off #PNO: Fast	Trig: Free Run Gate Off #IF Gain: Low	Center Freq 39 250000000 GHz Avg[Hold: 10/10 Radio Std: None	Center Frequency 39.250000000 GHz Settings
1 Graph 🔹		augan saba			Span 200.00 MHz
Scale/Div 10.0 dB		Ref Value 100.0	0 dBµV		CF Step 20.000000 MHz Auto Man
70 0 60 0 50 0 40 0 20 0					Freq Offset 0 Hz
10:0 Center 39.2500 GHz #Res BW 8.0000 MHz		Video BW 50.00	0 MHz*	Span 200 Mł Sweep 1.00 ms (1001 pt	
2 Metrics   Total Channel Power Total Power Spectral Dens	69.98 dBµV / 10/ ity -10.02 dB				
1501	2 Dec 09, 2021 1:45:52 PM	A. 1			





#### Path B / 1cc / Low



#### Path B / 1cc / Middle







### Path B / 1cc / High



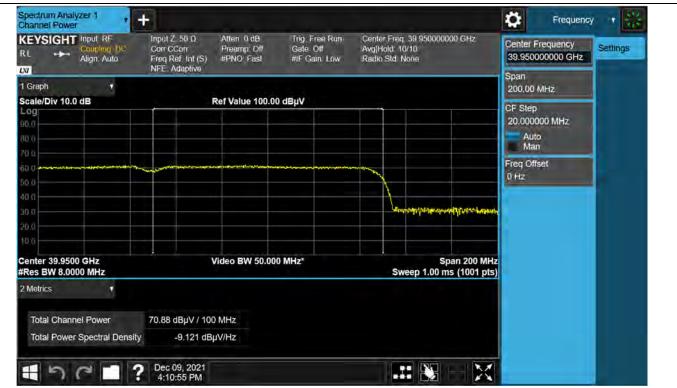
#### Path B / 10cc / Low

R L + Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Atten 0 dB Preamp Off #PNO: Fast	Trig: Free Run Gate Off #IF Gain: Low	Center Freq 38.550000000 GHz Avg Hold: 10/10 Radio Std: None	Center Frequency 38.55000000 GHz Settings
1 Graph					200.00 MHz
Scale/Div 10.0 dB		Ref Value 100.0	0 dBµV		CF Step 20.000000 MHz Auto Man
60.0 50.0			nange den nangen betreft an aan de se		Freq Offset 0 Hz
40 0 30 0 20 0				pantel many pulling and a particular	<b>*</b>
10.0 Center 38,5500 GHz #Res BW 8,0000 MHz		Video BW 50.00	0 MHz*	Span 200 Mi Sweep 1.00 ms (1001 pi	
2 Metrics				З <del>исе</del> р 1.00 ms (100 гр.	5
Total Channel Power Total Power Spectral Densi	72.82 dBµV / 100				
50	Dec 09, 2021 3:27:48 PM	a - 1			



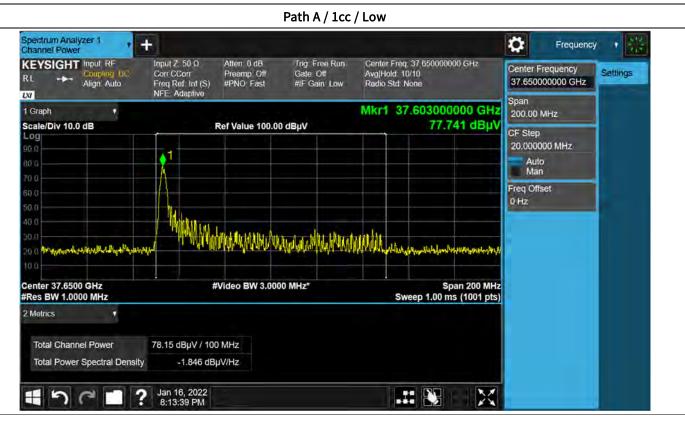
#### Path B / 10cc / Middle Spectrum Analyzer 1 Channel Power 쁥 Ö + Frequency Input Z: 50 Ω Corr CCorr Trig: Free Run Gale: Off Center Freq. 39.250000000 GHz Avg[Hold: 10/10 Radio Std: None KEYSIGHT Input RF Atten: 0 dB Center Frequency Settings Preamp: Off #PNO: Fast Align: Auto Freq Ref Int (S) NFE: Adaptive 39.250000000 GHz #IF Gain Low DA Span 1 Graph 7 200.00 MHz Scale/Div 10.0 dB Ref Value 100.00 dBµV CF Step Log 20.000000 MHz Auto Man Freq Offset 0 Hz 40.0 -ATA-ANARAMANAMANA Center 39.2500 GHz Video BW 50.000 MHz\* Span 200 MHz #Res BW 8.0000 MHz Sweep 1.00 ms (1001 pts) 2 Metrics 7 Total Channel Power 71.57 dBµV / 100 MHz Total Power Spectral Density -8.428 dBµV/Hz Dec 09, 2021 2:56:59 PM X H 50 ?

### Path B / 10cc / High

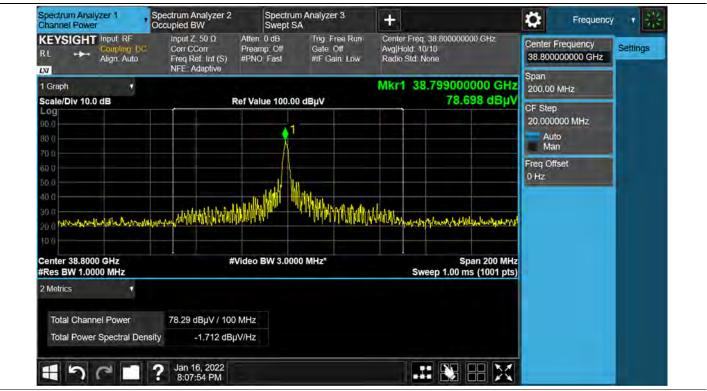




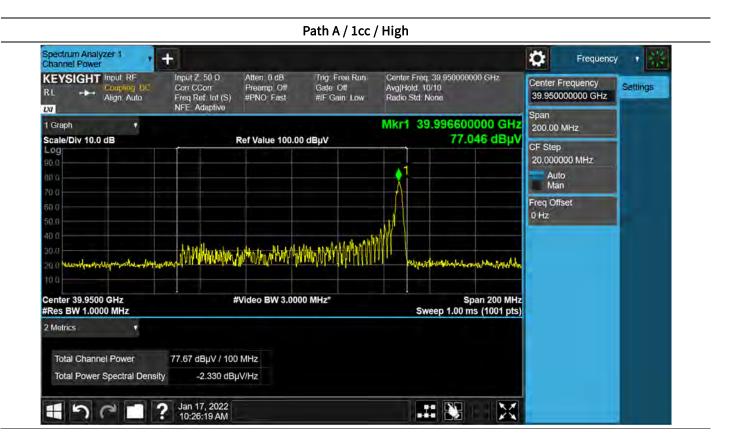
### [1 RB] Plot Data of EIRP Density Tabular per path



### Path A / 1cc / Middle



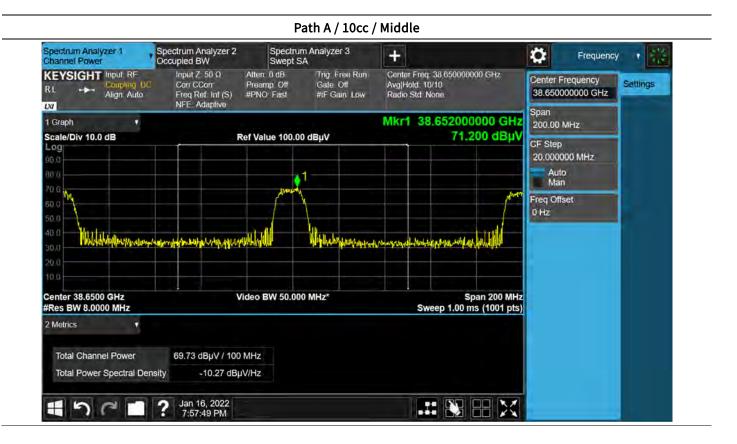




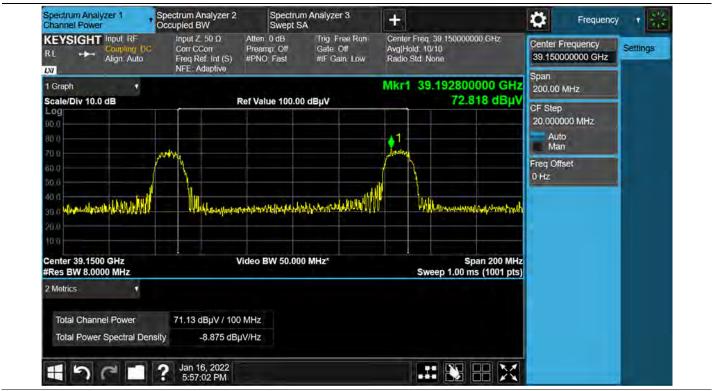
### Path A / 10cc / Low







### Path A / 10cc / High





#### Path B / 1cc / Low Spectrum Analyzer 1 Channel Power 쁥 Ö Frequency + Input Z: 50 Ω Corr CCorr Center Freq. 37 650000000 GHz Avg[Hold: 10/10 Radio Std: None KEYSIGHT Input: RF Atten: 0 dB Trig: Free Run Center Frequency Settings Preamp Off #PNO: Fast Gate Off Align: Auto Freq Ref. Int (S) NFE. Adaptive 37.650000000 GHz #IF Gain: Low LXI Span Mkr1 37.603200000 GHz 1 Graph 7 200.00 MHz Ref Value 100.00 dBµV 77.040 dBµV Scale/Div 10.0 dB CF Step Log 20.000000 MHz Auto Man Freq Offset 0 Hz 10.0 "Vin Handreson Maria California and Andreson Maria and Maria Jul Halles Center 37.6500 GHz #Video BW 3.0000 MHz\* Span 200 MHz #Res BW 1.0000 MHz Sweep 1.00 ms (1001 pts) 2 Metrics 7 Total Channel Power 77.74 dBµV / 100 MHz Total Power Spectral Density -2.255 dBµV/Hz Jan 17, 2022 10:43:29 AM X H 50 ?

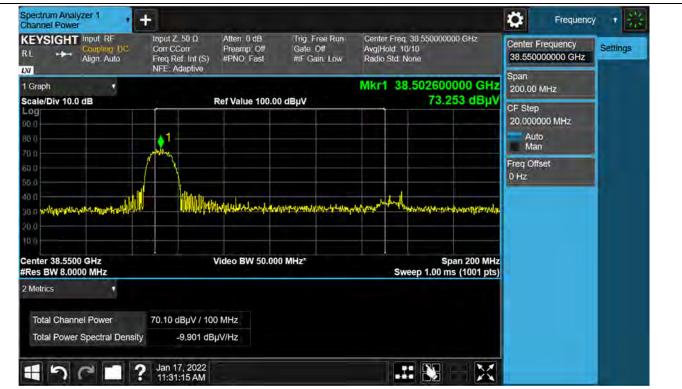
### Path B / 1cc / Middle





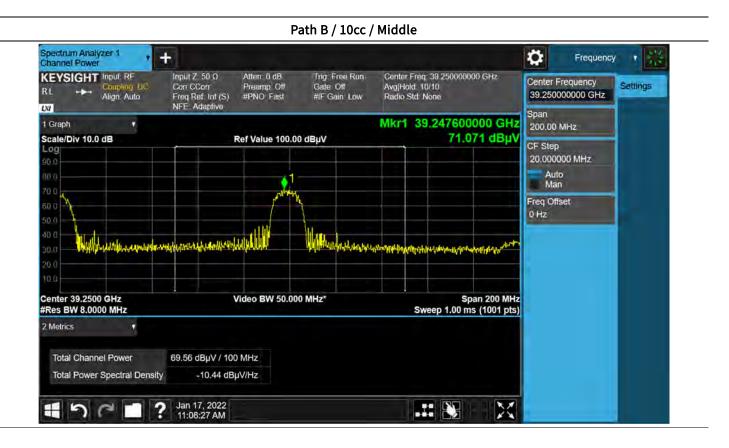
#### Path B / 1cc / High Spectrum Analyzer 1 Channel Power 쁥 Ö + Frequency Input Z: 50 Ω Corr CCorr Center Freq: 39.950000000 GHz Avg[Hold: 10/10 Radio Std: None KEYSIGHT Input: RF Atten: 0 dB Trig: Free Run Center Frequency Settings Preamp. Off #PNO: Fast Gate Off Align: Auto Freq Ref. Int (S) NFE: Adaptive 39.950000000 GHz #IF Gain: Low LXI Span Mkr1 39.996800000 GHz 1 Graph 7 200.00 MHz Ref Value 100.00 dBµV 75.989 dBµV Scale/Div 10.0 dB CF Step Log 20.000000 MHz 90.0 Auto Man Freq Offset 0 Hz 10.0 Alimitation and Alimitation and Manifeldin Minister and Alimitation and electrolightyp warmarks 144 sh. lanb Center 39.9500 GHz #Video BW 3.0000 MHz\* Span 200 MHz #Res BW 1.0000 MHz Sweep 1.00 ms (1001 pts) 2 Metrics 7 Total Channel Power 77.16 dBµV / 100 MHz **Total Power Spectral Density** -2.843 dBµV/Hz Jan 17, 2022 10:28:36 AM X H 50 ?

### Path B / 10cc / Low

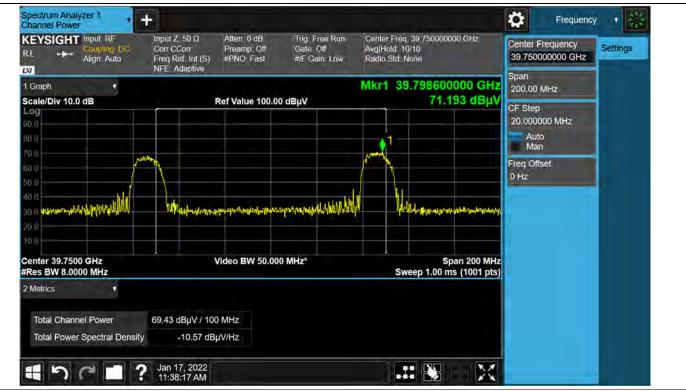




# 고 객 비 밀 CUSTOMER SECRET



### Path B / 10cc / High





### 5.5. EQUIVALENT ISOTROPIC RADIATED POWER / MEAN OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN

#### FCC Rules

**Test Requirements:** 

### § 2.1046 Measurements required: RF power output.

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.
- (b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.
- (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

#### Test Procedures:

Measurements were in accordance with the test methods section 3.5 of KDB 935210 D05 v01r04.

Adjust the internal gain control of the EUT to the maximum gain for which the equipment certification is being sought. Any EUT attenuation settings shall be set to their minimum value.

Input power levels (uplink and downlink) should be set to maximum input ratings while confirming that the device is not capable of operating in saturation (non-linear mode) at the rated input levels, including during the performance of the input/output power measurements.

3.5.2 Measuring the EUT mean input and output power

- a) Connect a signal generator to the input of the EUT.
- b) Configure to generate the test signal.
- c) The frequency of the signal generator shall be set to the frequency f<sub>0</sub> as determined from out-of-band rejection test.
- d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold, but not more than 0.5 dB below.
- f) Measure and record the output power of the EUT; use ANSI C63.26-2015 subclause 5.2.4.4.1, for power measurement.
- g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.



- h) Repeat steps f) and g) with input signal amplitude set to +3 dB above the AGC threshold level.
- i) Repeat steps e) to h) with the narrowband test signal.
- j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

3.5.5 Calculating amplifier, repeater, or industrial booster gain

After the input and output power levels have been measured as described in the preceding subclauses, the gain of the EUT can be determined from:

Gain (dB) = output power (dBm) - input power (dBm).

Report the gain for each authorized operating frequency band, and each test signal stimulus.

#### Note:

- 1. If f0 that determined from out-of-band test is smaller or greater than difference of test signal's center frequency and operation band block, test is performed at the lowest or the highest frequency that test signals can be passed.
- 2. Sample calculation:

81.49 dBμV (measured Value) – 95.2 + 54.27(AFCL) = 40.54 dBm (Final EIRP)



### **Test Results:**

## [Full RB] Tabular Data of Input & Output Power (E.I.R.P.) and Gain

		f₀ Frequency	Input Power Output F		Power	Gain (dB)	
Path CC		(MHz)	Measured Level (dBm)	Measured Level (dBuV)	Calculated EIRP (dBm)		
A	1	38.577	-71.45	80.25	39.16	110.61	
A	10	38.577	-71.47	80.23	39.13	110.60	
B	1	38.528	-71.50	81.49	40.54	112.04	
В –	10	38.528	-71.49	81.42	40.46	111.95	

### [Full RB] MIMO Tabular Data of Input & Output Power (E.I.R.P.)

Path	сс	Path A EIRP (dBm)	Path B EIRP (dBm)	Calculated EIRP (dBm)
	1	39.16	40.54	42.91
A+B	10	39.13	40.46	42.86

### [Full RB] Tabular Data of +3 dB above AGC threshold Input & Output Power (E.I.R.P.)

		f₀ Frequency	Input Power	Output Power		
Path	CC	(MHz)	Measured Level	Measured Level	Calculated EIRP	
_		(10112)	(dBm)	(dBuV)	(dBm)	
А	1	38.577	-68.51	80.21	39.12	
A	10	38.577	-68.47	80.11	39.01	
В	1	38.528	-68.45	81.43	40.48	
D	10	38.528	-68.50	81.25	40.29	

### [Full RB] MIMO Tabular Data of +3 dB above AGC threshold Input & Output Power (E.I.R.P.)

Path	сс	Path A EIRP (dBm)	Path B EIRP (dBm)	Calculated EIRP (dBm)
	1	39.12	40.48	42.86
A+B	10	39.01	40.29	42.71



	Path CC RB Size/Of	DR	f₀ Frequency	Input Power	Output Power		Gain
Path		Size/Offset	(MHz)	Measured Level (dBm)	Measured Level (dBuV)	Calculated EIRP (dBm)	(dB)
A	1	1/32	38.577	-71.45	78.37	37.27	108.72
A	10	1/32	38.577	-71.47	79.07	37.97	109.44
В	1	1/32	38.528	-71.50	78.71	37.75	109.25
D	10	1/32	38.528	-71.49	78.65	37.69	109.18

### [1 RB] Tabular Data of Input & Output Power (E.I.R.P.) and Gain

### [1 RB] MIMO Tabular Data of Input & Output Power (E.I.R.P.)

Path	СС	Path A EIRP (dBm)	Path B EIRP (dBm)	Calculated EIRP (dBm)
	1	37.27	37.75	40.53
A+B	10	37.97	37.69	40.85

## [1 RB] Tabular Data of +3 dB above AGC threshold Input & Output Power (E.I.R.P.)

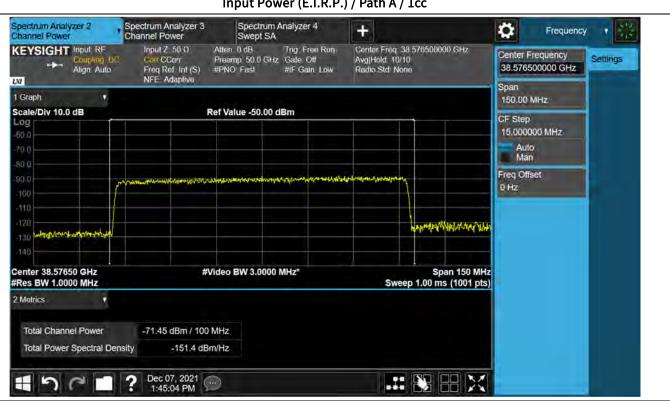
	RB		f. Froquency	Input Power	Output	Power
Path	СС	Size/Offset	f₀ Frequency (MHz)	Measured Level	Measured Level	Calculated EIRP
_	Size/Offset	(1112)	(dBm)	(dBuV)	(dBm)	
А	1	1/32	38.577	-68.51	78.32	37.22
A	10	1/32	38.577	-68.47	78.74	37.64
В	1	1/32	38.528	-68.45	78.80	37.84
D	10	1/32	38.528	-68.50	78.55	37.59

### [1 RB] MIMO Tabular Data of +3 dB above AGC threshold Input & Output Power (E.I.R.P.)

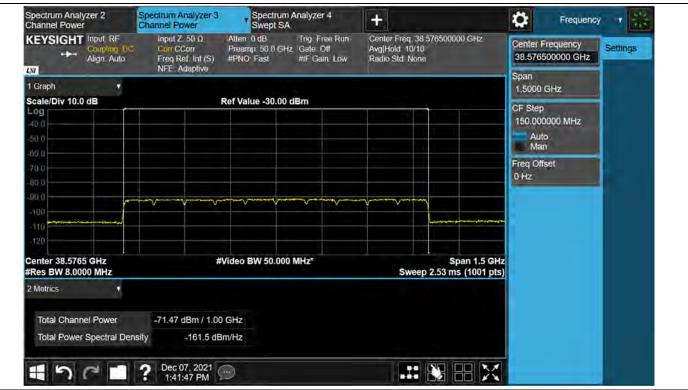
Path	СС	Path A EIRP (dBm)	Path B EIRP (dBm)	Calculated EIRP (dBm)
	1	37.22	37.84	40.55
A+B	10	37.64	37.59	40.63



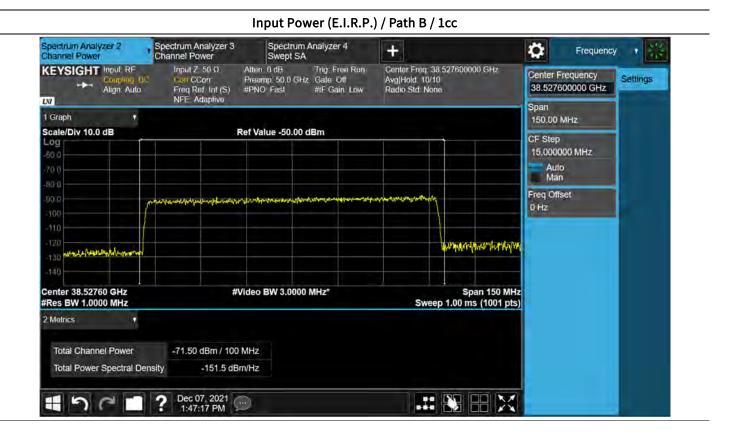
### [Full RB] Plot Data of Input & Output Power (E.I.R.P.)



### Input Power (E.I.R.P.) / Path A / 10cc





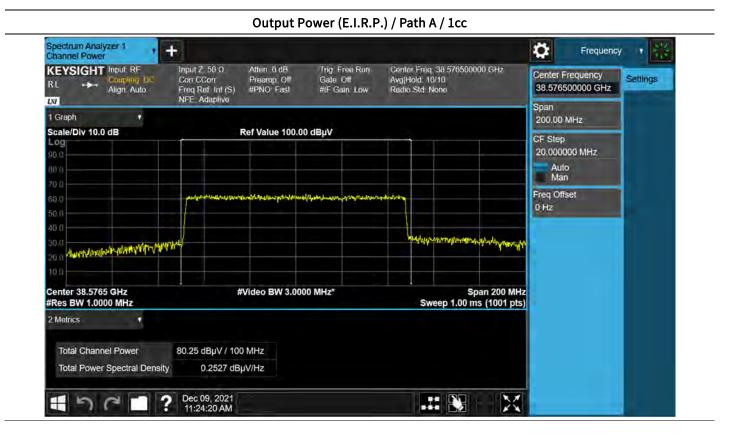


### Input Power (E.I.R.P.) / Path B / 10cc

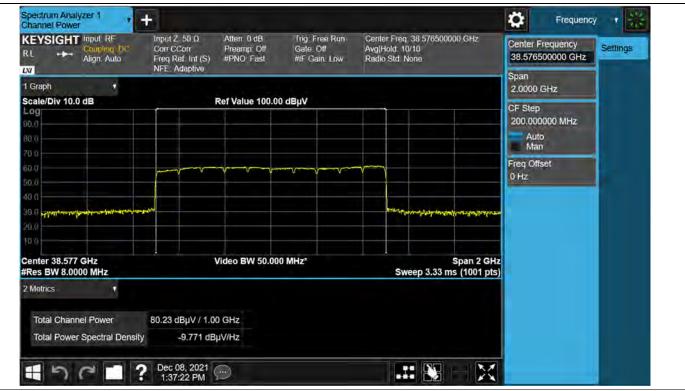






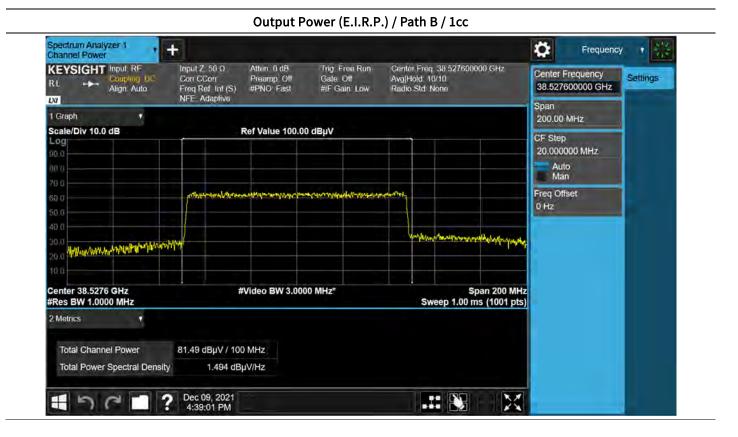


### Output Power (E.I.R.P.) / Path A / 10cc

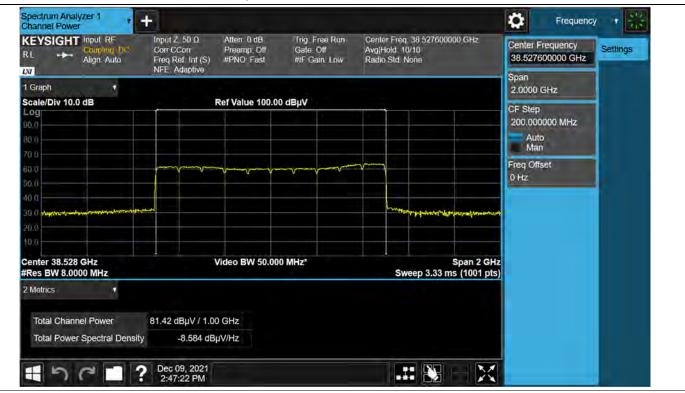








### Output Power (E.I.R.P.) / Path B / 10cc

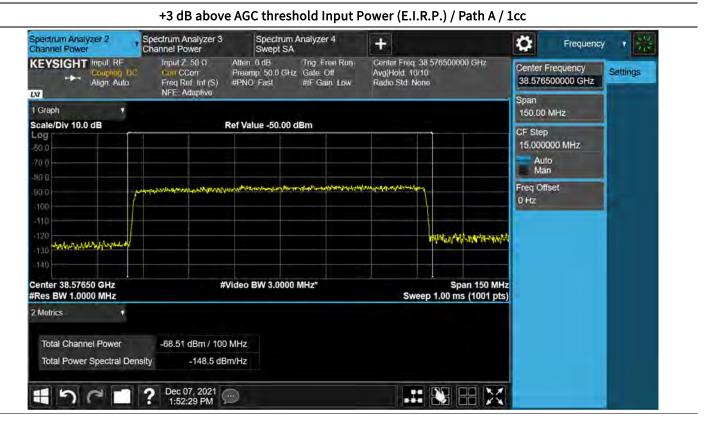




# 고 객 비 밀 CUSTOMER SECRET

Report No. HCT-RF-2112-FC042-R1

### [Full RB] Tabular Data of +3 dB above AGC threshold Input & Output Power (E.I.R.P.)

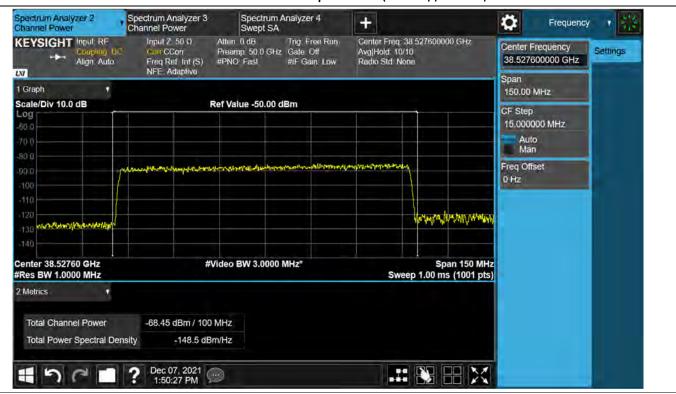


#### +3 dB above AGC threshold Input Power (E.I.R.P.) / Path A / 10cc

Align: Auto	Freq Ref. Int (S) NFE: Adaptive	#PNO: Fast #IF Gain: Low	Radio Std. None	Span 1.5000 GHz	
Scale/Div 10.0 dB		tef Value -30.00 dBm		CF Step 150.000000 MHz Auto Man	
-100 -110 -120	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Freq Offset 0 Hz	
Lenter 38.5765 GHz #Res BW 8.0000 MHz	#\	′ideo BW 50.000 MHz⁵	Span 1.5 GF Sweep 2.53 ms (1001 pt		
2 Metrics Total Channel Power Total Power Spectral De					



# 고 객 비 밀 CUSTOMER SECRET



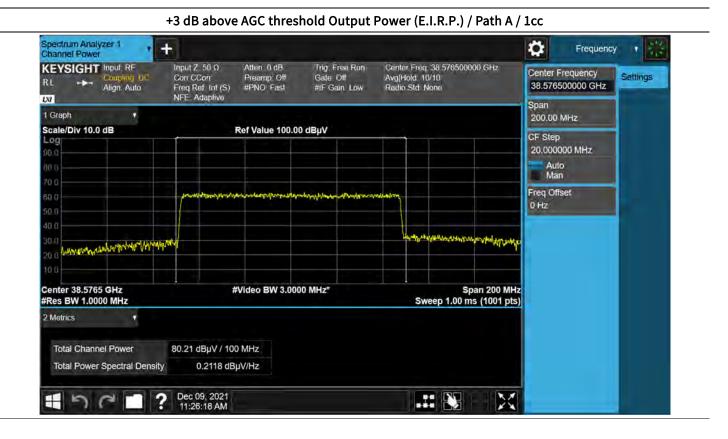
#### +3 dB above AGC threshold Input Power (E.I.R.P.) / Path B / 1cc

#### +3 dB above AGC threshold Input Power (E.I.R.P.) / Path B / 10cc

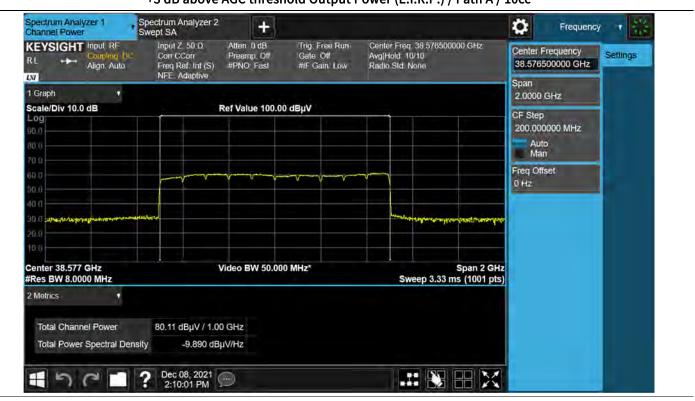
KEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Atten: 0 dB Trig: Free Run Preamp: 50.0 GHz Gate Off #PNO: Fast #IF Gain: Low	Center Freq 38.527600000 GHz Avg[Hold: 10/10 Radio Std: None	Center Frequency 38.527600000 GHz	Settings
1 Graph 🔹	ML Audpuve			Span 1.5000 GHz	
Cale/Div 10.0 dB		Ref Value -30.00 dBm		CF Step 150.000000 MHz Auto Man	
60 0 70.0 80.0 90.0 -100 -110 -120		· · · · · · · · · · · · · · · · · · ·		Freq Offset 0 Hz	
Center 38.5276 GHz #Res BW 8.0000 MHz		Video BW 50.000 MHz*	Span 1.5 GF Sweep 2.53 ms (1001 pt		
2 Metrics   Total Channel Power Total Power Spectral Der	-68.50 dBm / 1.0 sity -158.5 df				
1501	? Dec 07, 2021 2:03:32 PM				



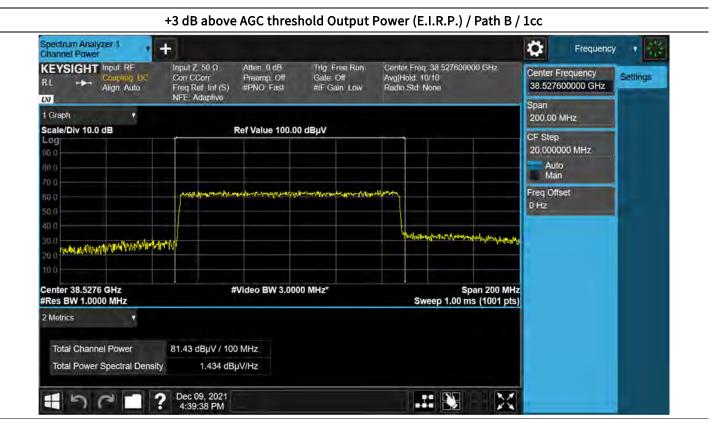




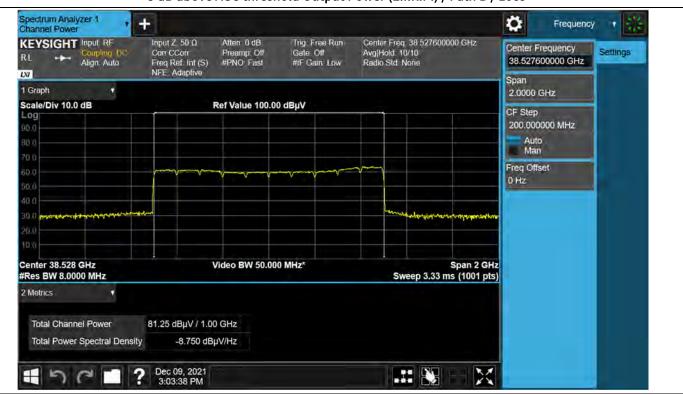
# +3 dB above AGC threshold Output Power (E.I.R.P.) / Path A / 10cc



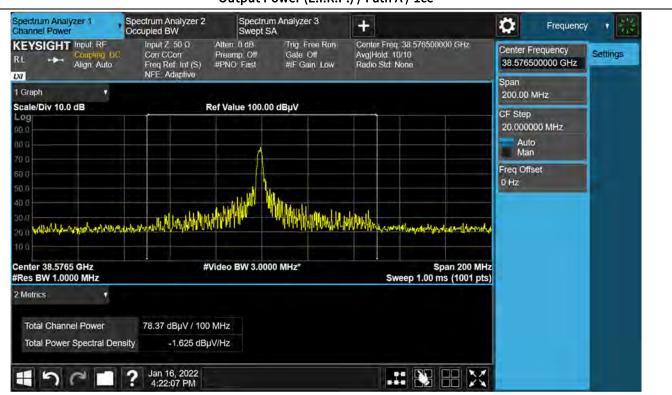




### +3 dB above AGC threshold Output Power (E.I.R.P.) / Path B / 10cc

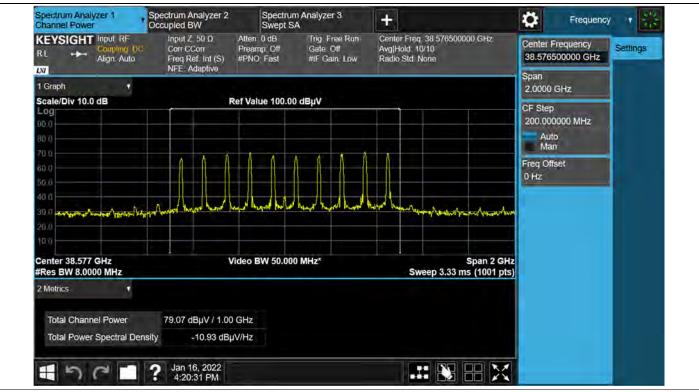






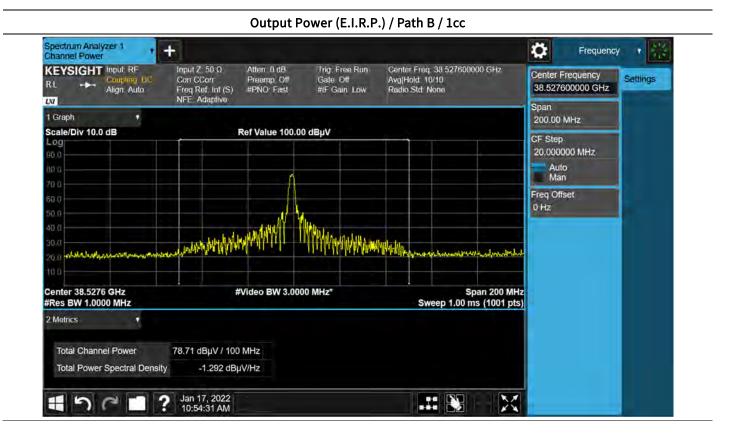
## Output Power (E.I.R.P.) / Path A / 1cc

### Output Power (E.I.R.P.) / Path A / 10cc

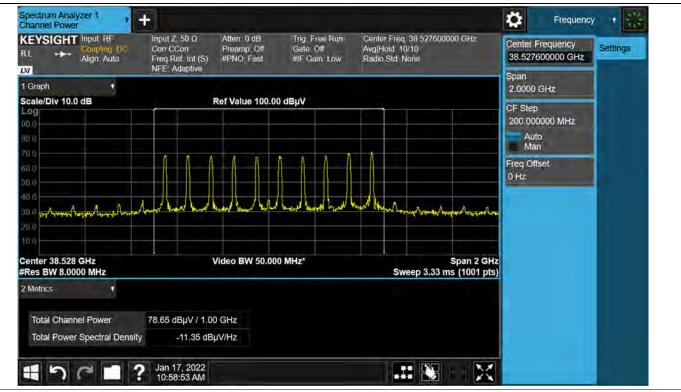




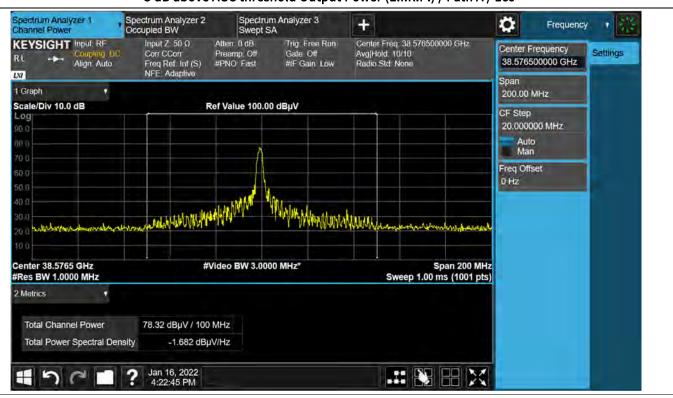




### Output Power (E.I.R.P.) / Path B / 10cc

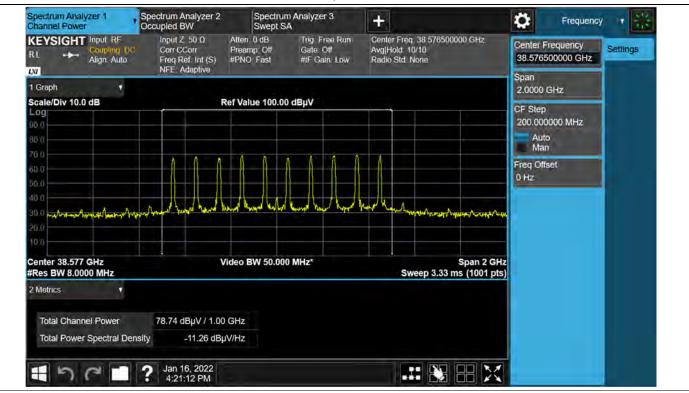




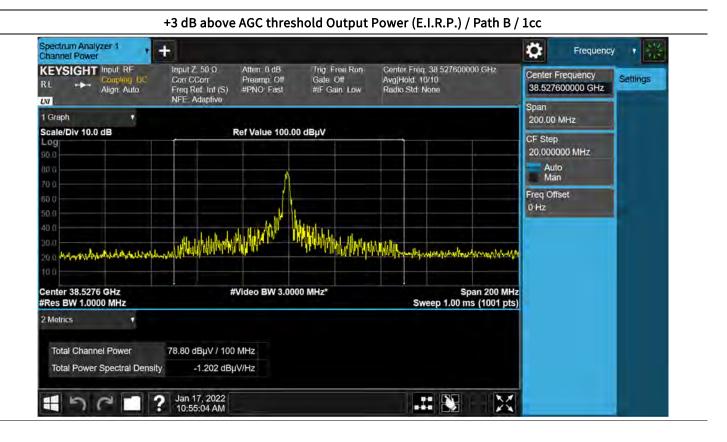


### +3 dB above AGC threshold Output Power (E.I.R.P.) / Path A / 1cc

### +3 dB above AGC threshold Output Power (E.I.R.P.) / Path A / 10cc







#### +3 dB above AGC threshold Output Power (E.I.R.P.) / Path B / 10cc







### 5.6. BAND EDGE / OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS

### Test Requirements:

### § 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

#### § 30.203 Emission limits.

- (a) 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.
- (b) (1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges as the design permits.

(3) The measurements of emission power can be expressed in peak or average values.

#### Test Procedures:

Measurements were in accordance with the test methods section 3.6 of KDB 935210 D05 v01r04.

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

- a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;
- b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

The measurement is performed in accordance with Section 5.7.3 of ANSI C63.26.

5.7.3 Out-of-band unwanted emissions measurements

- a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency.
- b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set



the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained.

- c) Set the number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows:
  - 1), 2) Omitted

3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a free running sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation  $\leq \pm 2\%$ ).

4) Omitted

- e) The test report shall include the plots of the measuring instrument display and the measured data.
- f) See Annex I for example emission mask plots.

### Note:

- 1. In the band edge test of path A, B are individually operated and measured at the maximum emission position of each path, and the respective measurement results are summed.
- 2. Band edge value is calculated as follows.

Band Edge = Measured Value + AFCL + 20log(D) – 104.77 – Ant. Gain

3. Sample calculation:

30.659 dBμV (measured Value) – 95.2 + 52.867(AFCL) – 19.37 (Ant. Gain) = 40.54 dBm

- 4. Antenna Gain of the above formula was applied from actual measurement data of the radiation pattern document.
- 5. Intermodulation test is not performed for 10CC (1 000 MHz) signal, because the specification cannot accommodate two signals. (BW 1GHz among 37.6 GHz~40 GHz)



### **Test Results:**

# [Full RB] Tabular Data of Band Edge (Two Adjacent Test Signal)

Path	Path Distance cc		cc Channel	Channel Pol.	Pol Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
				(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)	
			Low	Со	37.599	25.700	-15.789	18.46	-34.249	
А	3.00	1	LOW	Cross	37.590	23.306	-18.183	18.46	-36.643	-5
A	A 5.00	High	Lliah	Со	40.004	28.712	-13.649	19.37	-33.019	-5
			піgн	Cross	40.018	22.860	-19.501	19.37	-38.871	

Path	Distance	сс	Channel	Pol.	Frequency	Measured	EIRP	Ant. Gain	Result	Limit
	(m)	cc	channet	100	(GHz)	(dBuV)	Level         Attraction         Attraction </td <td>(dBm/MHz)</td>	(dBm/MHz)		
В			Low	Со	37.589	24.628	-16.861	18.46	-35.321	
	3.00	1	LOW	Cross	37.588	22.652	-18.837	18.46		F
	5.00	T	High	Со	40.001	28.518	-13.843 19.	19.37	-33.213	5
			High	Cross	40.000	23.404	-18.957	19.37	-38.327	

# [Full RB] MIMO Tabular Data of Band Edge (Two Adjacent Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
			Low Co -31.741 Cross -33.947 High	-31.741
	1	LOW		-33.947
A+B		Lliah	Со	-30.104
		High		-35.580





### [Full RB] Tabular Data of +3 dB above AGC threshold Band Edge (Two Adjacent Test Signal)

Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit	
	(m)		channet	101.	(GHz)	(dBuV)	(dBm)	(dBi)	Result (dBm) -34.617 -37.629 -33.397 -37.189	(dBm/MHz)	
				Low	Со	37.597	25.332	-16.157	18.46	-34.617	
А	3.00	1	LOW	Cross	37.582	2 22.320 -19.169	-19.169	18.46	-37.629	5	
A	5.00	T	High	Со	40.014	28.334	-14.027	19.37	-33.397	-5	
				Cross	40.011	24.542	-17.819	19.37	-37.189		

Path	Distance	сс	Channel	Pol.	Frequency (GHz)	Measured Level	EIRP	Ant. Gain	Result	Limit
i atti	(m)		Charmer	1 0 0		(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.598	25.119	-16.370	18.46	-34.830	
В	3.00	1	LOW	Cross	37.599	22.174	-19.315	18.46	-37.775	F
D	5.00	00 1	I High	Со	40.004	28.078	-14.283	19.37	-33.653	5
				Cross	40.008	22.638	-19.723	19.37	-39.093	

### [Full RB] MIMO Tabular Data of +3 dB above AGC threshold Band Edge (Two Adjacent Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
		EdgePol.LowCoCrossHighCoCross	Со	-31.711
A+B	1	LOW	Co         -31.711           Cross         -34.691           Co         -30.512	-34.691
A+D	L	High	Со	-30.512
		підії	Cross	-35.027





## [Full RB] Tabular Data of Band Edge (Single Test Signal)

Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
Fatti	(m)		Channet	Ρ0ι.	(ĠHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.594	26.460	-15.029	18.46	18.46 -33.489	
		1	LOW	Cross	37.600	22.590	-18.899	18.46	-37.359	
		T	High	Со	40.001	31.221	-11.140	19.37 -30.510		
А	3.00		ingn	Cross	40.005	25.604	5.604 -16.757		-36.127	5
A	5.00		Low	Со	37.541	23.562	-18.706	18.46	-37.166	-5
		10	LOW	Cross	37.529	22.445	-19.823	18.46	-38.283	
_		10	10 High	Со	40.054	24.351	-18.010	19.37	-37.380	
				Cross	40.035	22.487	-19.874	19.37	-39.244	

Path	Path Distance (m)	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
	(11)		$\begin{array}{c c c c c c c c c c c c c c c c c c c $	(dBm)	(dBm/MHz)					
			Low	Со	37.593	27.487	-14.002	18.46	-32.462	
		1	LOW	Cross	37.591	22.630	-18.859	18.46	-37.319	
		T	High	Со	40.008	30.659	-11.702	19.37	-31.072	
В	3.00		Ingh	Cross	40.002	23.047	-19.314	19.37	-38.684	5
Б	5.00		Low	Со	37.524	24.717	-17.551	18.46 -36.011	-36.011	5
		10	LOW	Cross	37.600	21.828	-19.661	18.46	-38.121	
		10	High	Со	40.023	24.802	-17.559	19.37	-36.929	
				Cross	40.000	22.689	-19.672	19.37	-39.042	

# [Full RB] MIMO Tabular Data of Band Edge (Single Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
		L e u	Со	-29.934
	1	LOW	Cross	-34.328
	1 High	Lliah	Со	-27.771
ALD		підн	Low Cross -34.328 Co -29.934	-34.209
A+B		Lew.		-33.539
	10	LOW	Cross	-35.191
	10	High	Со	-34.138
		підн	Cross	-36.131





## [Full RB] Tabular Data of +3 dB above AGC threshold Band Edge (Single Test Signal)

Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
· uur	(m)		onamet	1 011	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.598	26.118	-15.371	18.46	-33.831	
		1	LOW	Cross	39.596	22.412	-19.077	18.46	-37.537	
		T	High	Со	40.000	29.645	-12.716	19.37	9.37 -32.086	
Path A	3.00		riigii	Cross	40.004	24.994	.994 -17.367 1	19.37	-36.737	5
Fatti A	5.00		Low	Со	37.560	23.930	-18.775	18.46	-37.235	-5
		10	LOW	Cross	37.563	22.214	-20.491	18.46	-38.951	
		10	10 High	Со	40.070	24.103	-18.258	19.37	-37.628	
				Cross	40.066	23.007	-19.354	19.37	-38.724	

Path	Distance (m)	сс	Channel	Pol.	Frequency (GHz)	Measured Level (dBuV)	EIRP (dBm)	Ant. Gain (dBi)	Result (dBm)	Limit (dBm/MHz)
			Low	Co 37.598 28.367	-13.122	18.46	-31.582			
		1	Low	Cross	37.592	22.934	-18.555	18.46 -37.015		
		T	High	Со	40.000	30.522	-11.839	1.839 19.37	-31.209	5
Path B	3.00		riigii	Cross	40.007	23.739	-18.622	19.37	-37.992	
Fattib	5.00			Со	37.597	24.809	-16.680	18.46	-35.140	-5
		10	Low	Cross	37.566	22.164	-20.541	18.46	-39.001	
		10	Lliah	Со	40.019	24.899	-17.462	19.37	-36.832	
			High	Cross	40.055	23.216	-19.145	19.37	-38.515	

# [Full RB] MIMO Tabular Data of +3 dB above AGC threshold Band Edge (Single Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
	ath cc	Low	Со	-29.552
	1	LOW	Cross	-34.257
	T	Low Cross Co High Co	-28.615	
		півц	Co         -29.552           Low         Cross         -34.257           High         Co         -28.615           Cross         -34.309         -34.309           Low         Co         -33.052           Low         Cross         -35.965	-34.309
A+B		Low		-33.052
	10	LOW	Cross	-35.965
	10	Lligh	Со	-34.201
		підн	Cross	-35.608





### [1 RB] Tabular Data of Band Edge (Two Adjacent Test Signal)

			0 (		<u> </u>					
Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
	(m)	ce	channet	100	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.600	26.602	-14.887	18.46	-33.347	
٨	3.00	1	LOW	Cross	37.583	23.525	-17.964		-36.424	F
A	5.00	T	High	Со	40.009	25.105	-17.256		-36.626	5
			High	Cross	40.016	23.442	-18.919	19.37	-38.289	

Path	Distance	сс	Channel	Pol.	Frequency (GHz)	Measured Level (dBuV)	EIRP	Ant. Gain	Result	Limit
	(m)	cc	channet				(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.581	22.428	-19.061	18.46	-37.521	
В	D 2.00 1	1	LOW	Cross	37.582	23.920	-17.569	18.46	-36.029	E
D	3.00	T	High	Со	40.000	28.071	-14.290	19.37	-33.660	5
		High	Cross	40.010	25.379	-16.982	19.37	-36.352		

# [1 RB] MIMO Tabular Data of Band Edge (Two Adjacent Test Signal)

Path	сс	Edge	Pol.	Result (dBm)	
		Low	Со	-31.940	
ALD	1	Low	Cross	-33.211	
A+B	1	High	Со	-31.884	
		High	Cross	-34.203	



### [1 RB] Tabular Data of +3 dB above AGC threshold Band Edge (Two Adjacent Test Signal)

					-	-				
Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
- dell	(m)		onamet	1 0 1	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
		Low	Со	37.597	25.254	-16.235	18.46	-34.695		
^	3.00	1 —	LOW	Cross	37.581	23.560	-17.929	18.46	-36.389	F
A	A 3.00		Lliob	Со	40.002	25.584	-16.777	19.37	-36.147	5
		High –	Cross	40.004	23.280	-19.081	19.37	-38.451		

Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
- util	(m)	cc	channet	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)	
			Low	Со	37.596	22.550	-18.939	18.46	-37.399	
В	B 3.00 1	1	LOW	Cross	37.592	23.935	-17.554	18.46	-36.014	-5
D	5.00	T	Lligh	Со	40.000	27.611	-14.750	19.37	-34.120	-5
		High	Cross	40.019	26.194	-16.167	19.37	-35.537		

### [1 RB] MIMO Tabular Data of +3 dB above AGC threshold Band Edge (Two Adjacent Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
		Low	Со	-32.829
A+B	1	Low	Cross	-33.187
ATD	T	High	Со	-32.006
		High	Cross	-33.743





### [1 RB] Tabular Data of Band Edge (Single Test Signal)

Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit
raui	(m)	cc	Channet	FOI.	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
			Low	Со	37.600	26.343	-15.146	18.46	-33.606	
		LOW	Cross	37.599	23.405	-18.084	18.46	-36.544		
		1	High	Со	40.000	25.541	-16.820	19.37	-36.190	
A	3.00			Cross	40.004	23.164	-19.197	19.37	-38.567	5
A	5.00		Low	Со	37.600	36.244	-6.024	18.46	-24.484	-5
			LOW	Cross	37.599	23.949	-18.319	18.46	-36.779	
	10 —	High	Со	40.000	36.085	-6.276	19.37	-25.646		
			High		40.000	26.589	-15.772	19.37	-35.142	

Path	Distance (m)	сс	Channel	Pol.	Frequency (GHz)	Measured Level	EIRP	Ant. Gain	Result	Limit
	(11)				(0112)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)
		Low	Со	37.600	24.927	-16.562	18.46	-35.022		
		1	LOW	Cross	37.600	21.823	-19.666	18.46	-38.126	
		10	High	Со	40.000	29.003	-13.358	19.37	-32.728	
В	3.00		Ingh	Cross	40.001	23.907	-18.454	19.37	-37.824	5
Б	5.00		Low	Со	37.600	40.319	-1.949	18.46	-20.409	-5
			LOW	Cross	37.503	23.938	-17.551	18.46	-36.011	
	10	High	Со	40.002	37.359	-5.002	19.37	-24.372		
			High	Cross	40.019	23.608	-18.753	19.37	-38.123	

# [1 RB] MIMO Tabular Data of Band Edge (Single Test Signal)

Path	сс	Edge	Pol.	Result (dBm)
		Low	Со	-31.246
	1	Low	Cross	-34.253
	T	Lliah	Со	-31.112
		High	Cross	-35.169
A+B		Low	Со	-18.974
	10	Low	Cross	-33.367
	10	High	Со	-21.952
		High	Cross	-33.371





### [1 RB] Tabular Data of +3 dB above AGC threshold Band Edge (Single Test Signal)

· ·					5										
Path	Distance	сс	Channel	Pol.	Frequency	Measured Level	EIRP	Ant. Gain	Result	Limit					
- au	(m)	cc	channet	101.	(GHz)	(dBuV)	(dBm)	(dBi)	(dBm)	(dBm/MHz)					
			Low	Со	37.600	25.860	-15.629	18.46	-34.089						
	1	LOW	Cross	37.599	23.449	-18.040	18.46	-36.500							
		T	High	Со	40.000	25.618	-16.743	19.37	-36.113						
Path A	3.00		Ingh	Cross	40.009	22.419	-19.942	19.37	-39.312	F					
FalliA	5.00							Low	Со	37.599	32.123	-10.582	18.46	-29.042	-5
			LOW	Cross	37.548	23.318	-19.387	18.46	-37.847						
	10		Со	40.001	36.305	-6.056	19.37	-25.426							
			High	Cross	40.001	28.424	-13.937	19.37	-33.307						

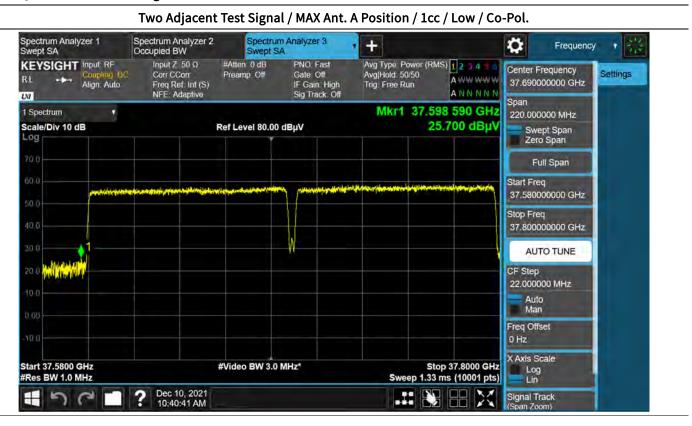
Path	Distance (m)	сс	Channel	Pol.	Frequency (GHz)	Measured Level (dBuV)	EIRP (dBm)	Ant. Gain (dBi)	Result (dBm)	Limit (dBm/MHz)
		Low	Со	37.600	26.630	-14.859	18.46	-33.319		
	1	Low	Cross	37.599	22.573	-18.916	18.46	-37.376		
		10	High	Со	40.001	26.088	-16.273	19.37	-35.643	
Path B	3.00		riigii	Cross	40.008	22.630	-19.731	19.37	-39.101	5
Fallid	5.00		Low	Со	37.503	39.687	-1.802	18.46	-20.262	-5
			LOW	Cross	37.600	26.235	-16.470	18.46	-34.930	
	10 —	High	Со	40.000	40.302	-2.059	19.37	-21.429		
			Cross	40.001	24.904	-17.457	19.37	-36.827		

# [1 RB] MIMO Tabular Data of +3 dB above AGC threshold Band Edge (Single Test Signal)

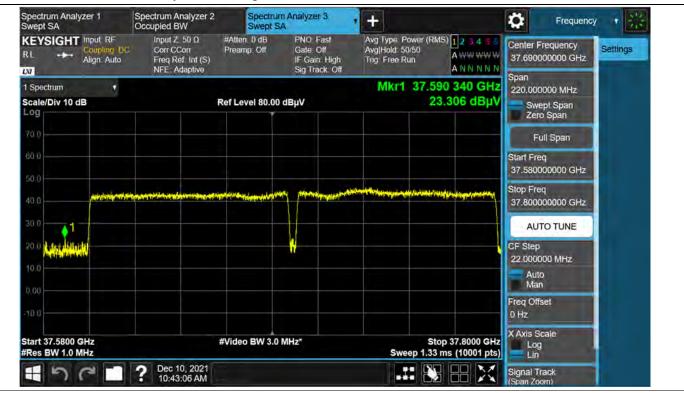
Path	сс	Edge	Pol.	Result (dBm)
		Low	Со	-30.676
	1	Low	Cross	-33.905
	1	Lliab	Со	-32.861
		High	Cross	-36.194
A+B		Laur	Со	-19.721
	10	Low	Cross	-33.137
	10	High	Со	-19.972
		High	Cross	-31.709



### [Full RB] Plot data of Band Edge



Two Adjacent Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.









Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.

RL +++ Align: Auto	Input Z 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain: High Sig Track: Off	Ing: Free Run	3455 www.w NNNN	Center Frequency 39.910000000 GHz	Settings
Spectrum r cale/Div 10 dB		Ref Level 80.00	dBµV	Mkr1 40.017 77 22.860		Span 220.000000 MHz Swept Span Zero Span	
0.0					_	Full Span	
50.0						Start Freq 39.800000000 GHz	
10.0 <b>/ 77</b>	un an	enderstring physically	n galanan talahan ana jaan ja	hitelassanan ana ana ana ana ana ana ana ana		Stop Freq 40.020000000 GHz	
30.0					-1	AUTO TUNE	
20.0						CF Step 22.000000 MHz	
0.00						Auto Man	
10 0						Freq Offset 0 Hz	
tart 39.8000 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 40.0 Sweep 1.33 ms (10		X Axis Scale Log Lin	
45CI	? Dec 10, 2021 11:00:08 AM	-			X	Signal Track (Span Zoom)	



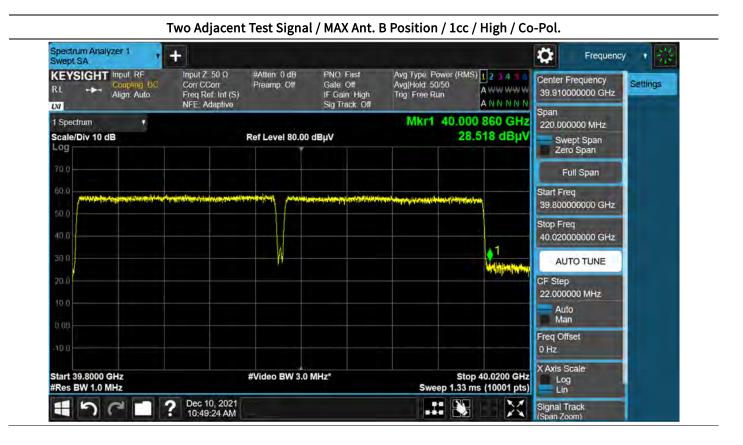


# Two Adjacent Test Signal / MAX Ant. B Position / 1cc / Low / Cross-Pol.





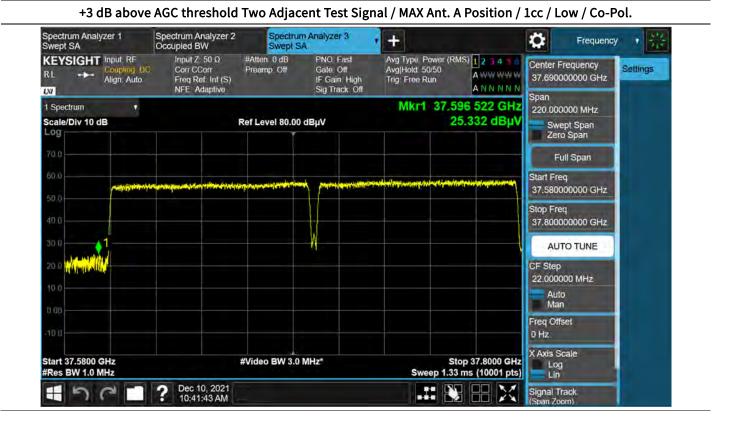




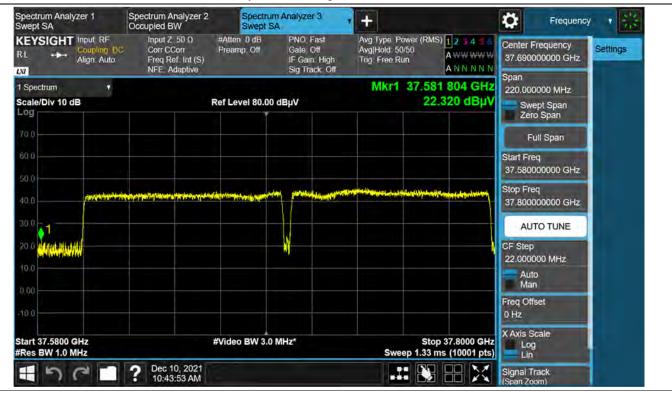
### Two Adjacent Test Signal / MAX Ant. B Position / 1cc / High / Cross-Pol.

KEYSIGHT Input: RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain: High Sig Track: Off	Avg Type: Power (RMS Avg[Hold: 50/50 Trig: Free Run	123455 AWWWWW ANNNNN	Center Frequency 39.910000000 GHz	Settings
Spectrum r cale/Div 10 dB	,	Ref Level 80.00	dBµV	Mkr1 40.000 23.	222 GHz 404 dBµV	Span 220.000000 MHz Swept Span Zero Span	
0.0					-	Full Span	
50.0						Start Freq 39.800000000 GHz	
10.0 <b></b>	way want to the the start of the	marine pining	nie in Name (hadenie and angeland	and the second	-	Stop Freq 40.020000000 GHz	
30.0					1-	AUTO TUNE	
20.0		-			<b>Vehnikasud elikus</b>	CF Step 22.000000 MHz	
10.0						Auto Man	
0,00 10 Q						Freq Offset 0 Hz	
tart 39.8000 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*		40.0200 GHz s (10001 pts)	X Axis Scale Log	
Res BW 1.0 MHz	P Dec 10, 2021 10:55:32 AM			Sweep 1.33 m		Lin Signal Track (Span Zoom)	



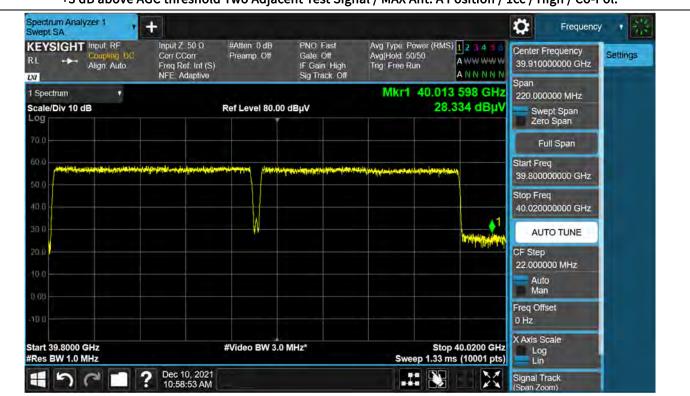


+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.









### +3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Co-Pol.

+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.

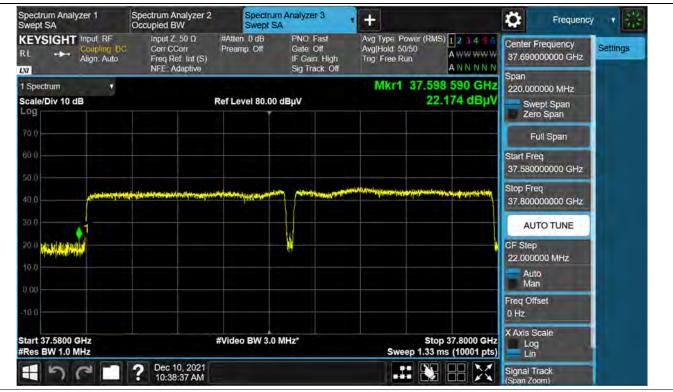
Mkr1 40.010 848 GHz 220.000000 MHz Scale/Div 10 dB Ref Level 80.00 dBµV 24.542 dBµV 200 700 600 600 600 600 600 600 600 600 6	Settings	39.910000000 GHz	AWWWWW	Avg Type: Power (RI Avg Hold: 50/50 Trig: Free Run	PNO Fast Gate Off IF Gain: High Sig Track: Off	#Atten: 0 dB Preamp: Off	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Input RF Coupling DC Align: Auto	KEYSIGHT
Start Freq 39.00 40.0 40.0 40.0 40.0 40.0 40.0 40.0		Swept Span	10 848 GHz		dBµV	Ref Level 80.00		† iB	cale/Div 10 d
39.80000000 GHz Stop Freq 40.02000000 GHz AUTO TUNE CF Step 22.000000 MHz Auto Man Freq Offset		Full Span							70.0
43.0 Hereit y an effective and a strategy of the second strategy of									
20.0 Lui Muturi CF Step 22.000000 MHz Auto Man Freq Offset		and the second se		ale and a grant for all an all and the second	anite and the second	augenterios programa	ng bang mengengan sama ng sama	taina intichen anticipation and	Mandalaas
10.0 0.00		AUTO TUNE	1-						30.0
0.00 Freq Offset			Veter Party State			W			
Freq Offset									
		Freq Offset 0 Hz							
ttart 39.8000 GHz #Video BW 3.0 MHz* Stop 40.0200 GHz Log Res BW 1.0 MHz Sweep 1.33 ms (10001 pts)		Log	op 40.0200 GHz		MHz*	#Video BW 3.0			





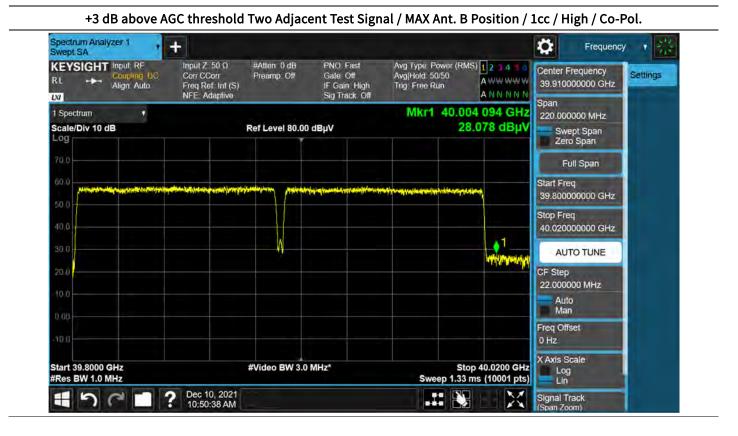
#### +3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. B Position / 1cc / Low / Co-Pol.

+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. B Position / 1cc / Low / Cross-Pol.







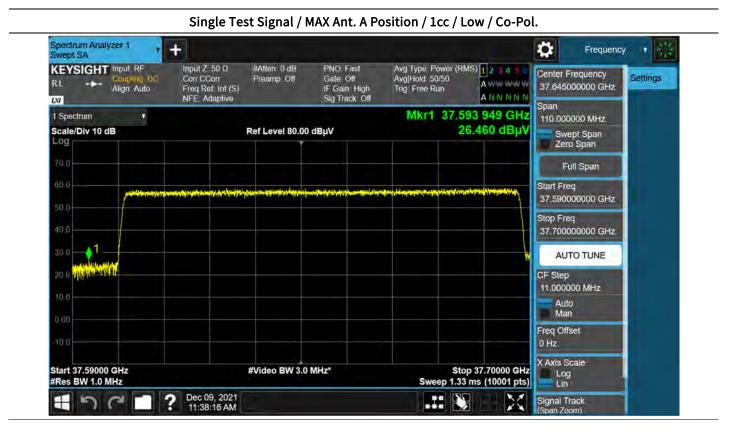


# +3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. B Position / 1cc / High / Cross-Pol.

Coupling DC Corr C Align: Auto Freq F	Z 50 Ω #Atten: 0 dB Corr Preamp: Off Ref: Int (S) Adaptive	PNO Fast Gate Off IF Gain High Sig Track: Off	Avg Type: Power (RMS) 1 2 3 Avg[Hold: 50/50 Trig: Free Run A N N	39.91000000 GHz
:trum + /Div 10 dB	Ref Level 80.00	dBµV	Mkr1 40.007 944 22.638 d	GHz 220,000000 MHz
				Full Span
				Start Freq 39.80000000 GHz
Manufacture of the state of the	antaritioning mentalities in production	with the structure of the second s	the second s	Stop Freq 40.020000000 GHz
				1 AUTO TUNE
	N N		in the second	CF Step 22.000000 MHz
				Auto Man
				Freq Offset 0 Hz
39.8000 GHz BW 1.0 MHz	#Video BW 3.0	MHz*	Stop 40.020 Sweep 1.33 ms (1000	





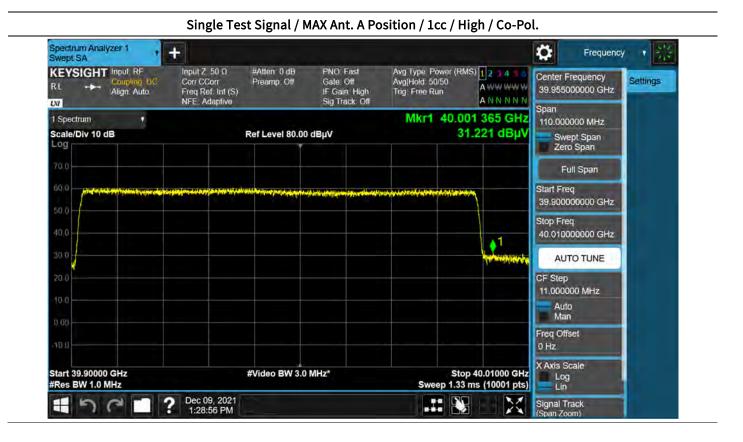


### Single Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.

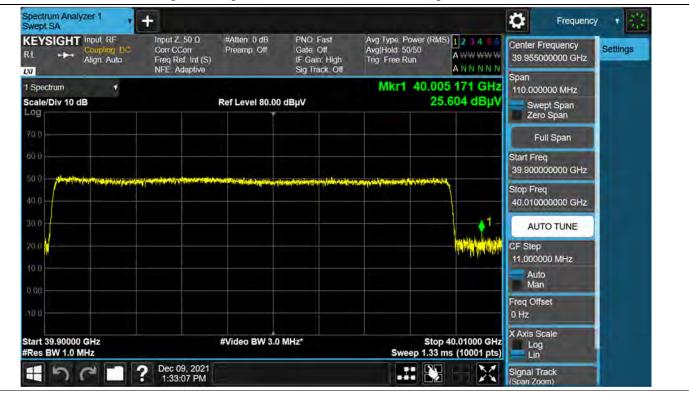
KEYSIGHT RL +++ Coupling DC Align: Auto		#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain High Sig Track: Off	Avg Type Power (RMS) 1 2 3 4 5 5 Avg(Hold: 50/50 Trig: Free Run A N N N N N	37.043000000 GHZ	Settings
Spectrum • cale/Div 10 dB	R	ef Level 80.00	dBµV	Mkr1 37.599 559 GH2 22.590 dBµ\	110.000000 1111 112	
0.0					Full Span	
50.0					Start Freq 37.590000000 GHz	
	*****		handaria karana kara	and the second state and the	Stop Freq 37.700000000 GHz	1
30. Ó					AUTO TUNE	
20.0 a High and A					CF Step 11.000000 MHz	
0.0					Auto Man	
10 0					Freq Offset 0 Hz	1
tart 37.59000 GHz Res BW 1.0 MHz	#	Video BW 3.0	MHz*	Stop 37.70000 GH Sweep 1.33 ms (10001 pts		
1501	2 Dec 09, 2021 11:48:30 AM				Signal Track (Span Zoom)	





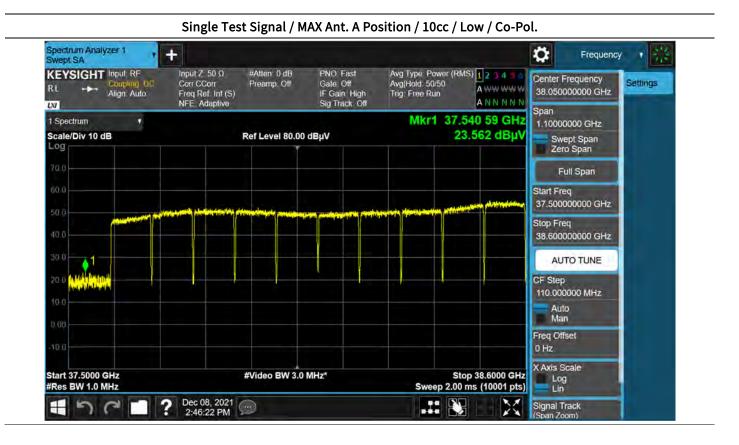


### Single Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.

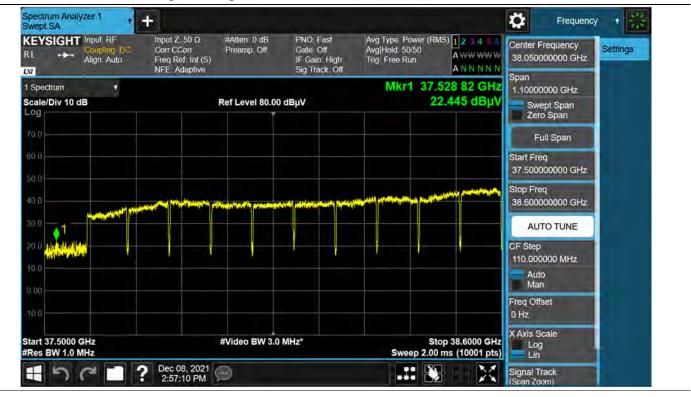






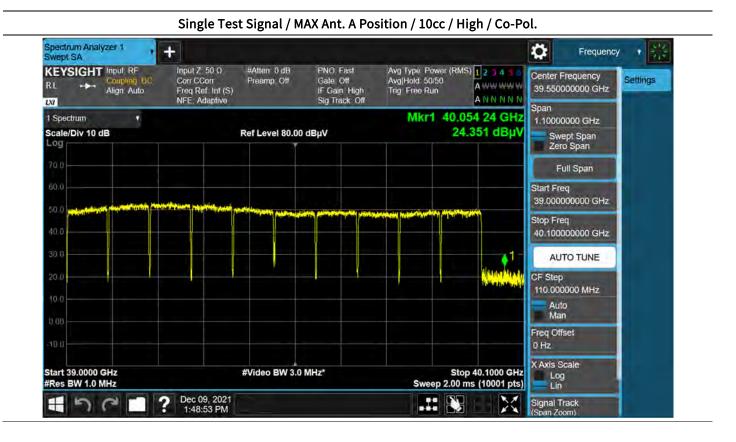


#### Single Test Signal / MAX Ant. A Position / 10cc / Low / Cross-Pol.







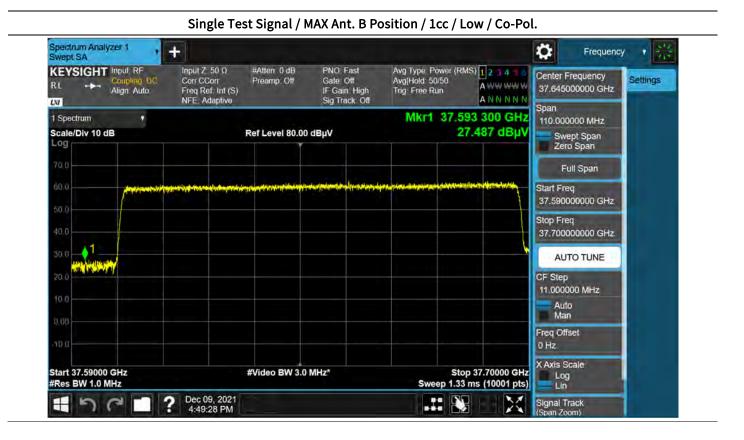


### Single Test Signal / MAX Ant. A Position / 10cc / High / Cross-Pol.







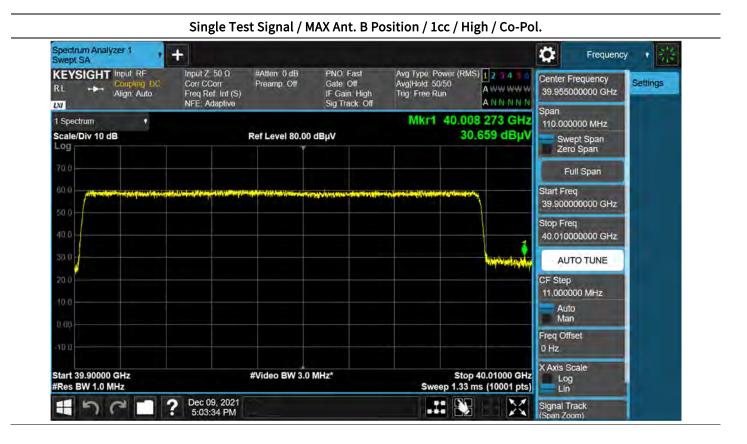


### Single Test Signal / MAX Ant. B Position / 1cc / Low / Cross-Pol.

KEYSIGHT Input RI Coupling Align: Au	DC Corr CCorr	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain: High Sig Track: Off	Avg Type: Power (RM Avg(Hold: 50/50 Trig: Free Run	IS) 12 3 4 5 5 A WW WW W A N N N N N	Center Frequency 37.645000000 GHz	Settings
Spectrum cale/Div 10 dB		Ref Level 80.00	dBµV	Mkr1 37.59	90 693 GHz 2.630 dBµV		
0.0						Full Span	
0 0						Start Freq 37.590000000 GHz	
0.0	ana mana ana mana ang ana ang ana ang ang ang ang ang	-manalaritheritismenayahada	e gate cate of the second s	makinethistentilenseethi	And the second se	Stop Freq 37.700000000 GHz	
ia.a _1						AUTO TUNE	
						CF Step 11.000000 MHz	
0.0						Auto Man	
10 a						Freq Offset 0 Hz	
tart 37.59000 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*		o 37.70000 GHz ms (10001 pts)		
50	Dec 09, 2021 4:57:30 PM					Signal Track (Span Zoom)	





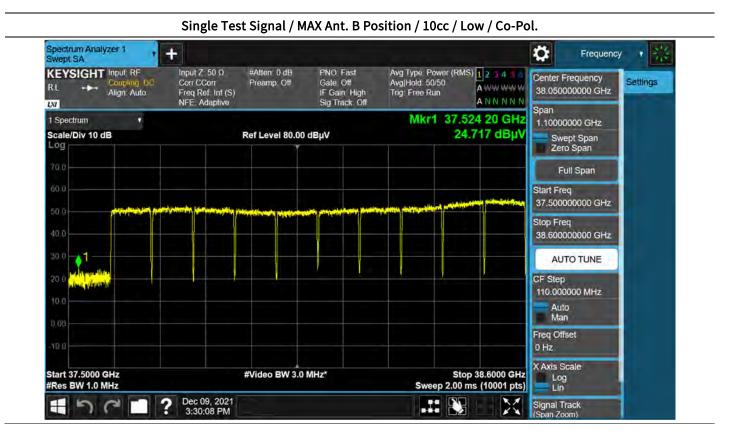


### Single Test Signal / MAX Ant. B Position / 1cc / High / Cross-Pol.

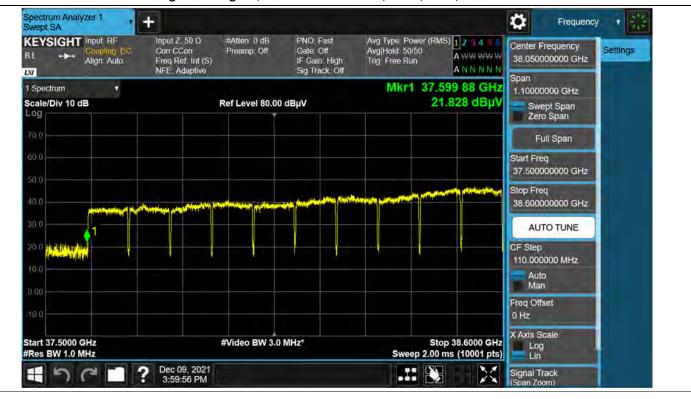
RL +++ Align: Auto	Input Z 50 Ω #Atten Corr CCorr Pream Freq Ref. Int (S) NFE: Adaptive		Avg Type: Power (RMS) 12 34 58 Avg Hold: 50/50 Trig: Free Run A N N N N	39.955000000 GHz	Settings
Spectrum + cale/Div 10 dB	Ref Lev	el 80.00 dBµV	Mkr1 40.001 530 GH 23.047 dBµ		
70.0				Full Span	
50.0				Start Freq 39.90000000 GHz	
	uniterior and assessed to have been a th	with a state of the state of th	10 Hill produce any file gradelik ang 10 may a sharanga	Stop Freq 40.010000000 GHz	
30.0				AUTO TUNE	
20.0			den and a second se	CF Step 11.000000 MHz	
0.00				Auto Man	
10 Q				Freq Offset 0 Hz	
Start 39.90000 GHz Res BW 1.0 MHz	#Video	BW 3.0 MHz*	Stop 40.01000 GH Sweep 1.33 ms (10001 pts		
1501	2 Dec 09, 2021 5:11:08 PM			Signal Track	





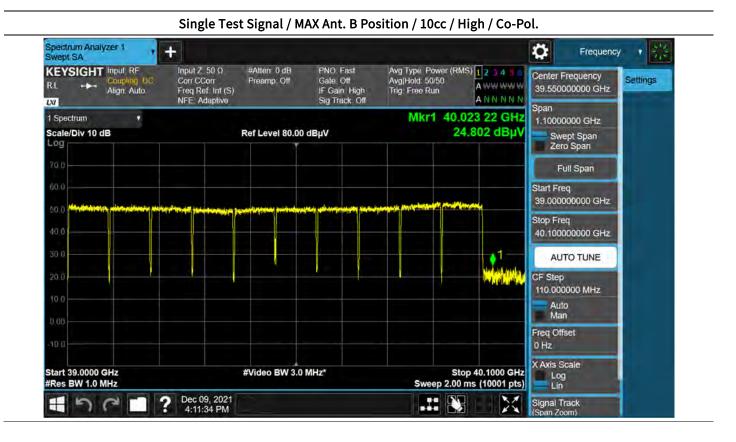


#### Single Test Signal / MAX Ant. B Position / 10cc / Low / Cross-Pol.





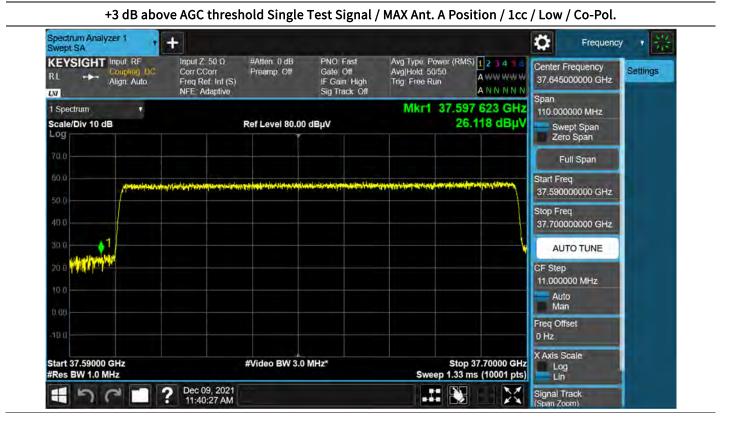




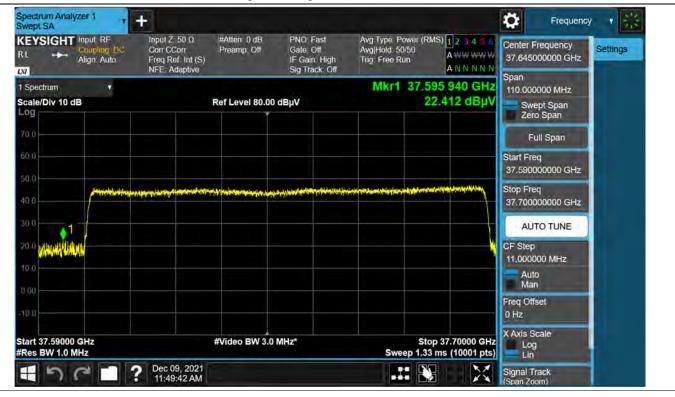
### Single Test Signal / MAX Ant. B Position / 10cc / High / Cross-Pol.



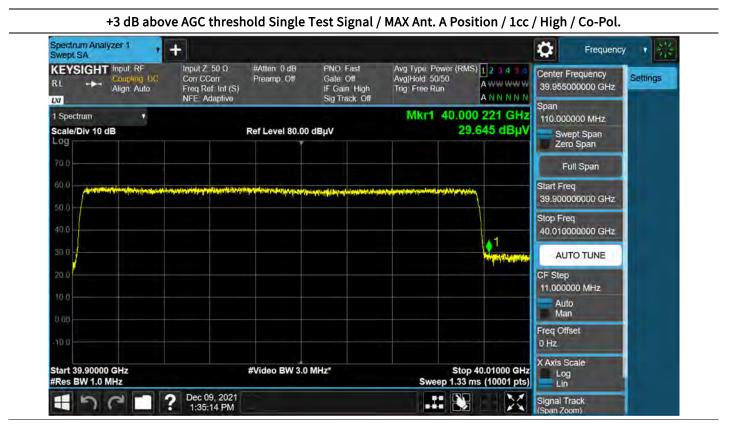




+3 dB above AGC threshold Single Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.





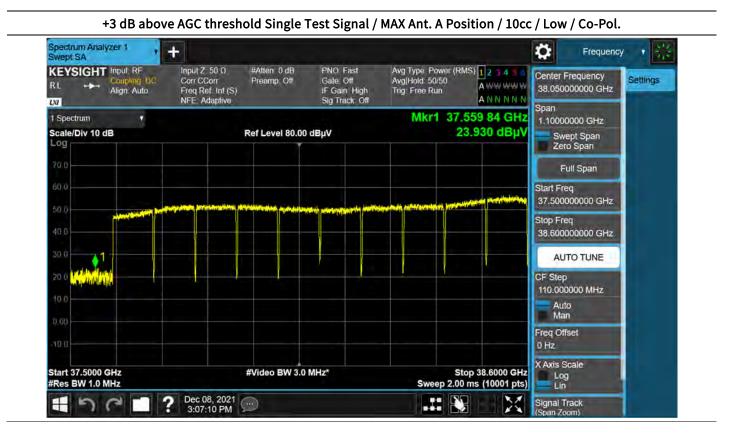


### +3 dB above AGC threshold Single Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.

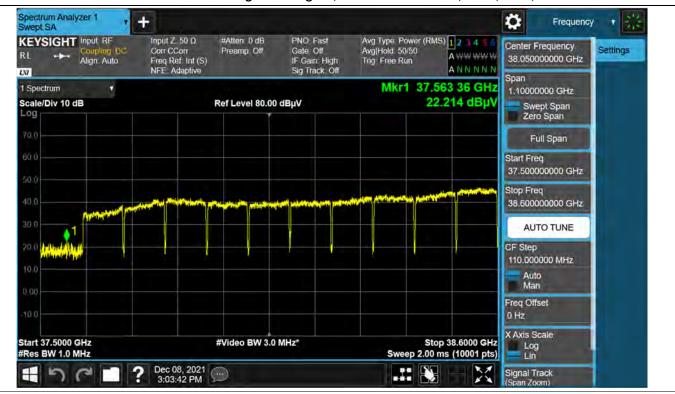
CEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω #Atten: 0 dB Corr CCorr Preamp: Off Freq Ref: Int (S) NFE: Adaptive	PNO Fast Gate Off IF Gain: High Sig Track: Off	Avg Type:         Power (RMS)         1         2         3         4         5         5           Avg[Hold:         50/50         A         A         WW WW         4         N	Center Frequency 39.955000000 GHz	Settings
Spectrum v cale/Div 10 dB	Ref Level 80	.00 dBµV	Mkr1 40.003 906 GHz 24.994 dBµV	Span 110.000000 MHz Swept Span Zero Span	
0.0				Full Span	
30 0				Start Freq 39.90000000 GHz	
10.0	de anna a fha lann. Tha ann an tha th' dhaon a' bhair an tha an tha anna ann an tha ann ann an tha ann an tha a	n de la construir de la constru La construir de la construir de		Stop Freq 40.010000000 GHz	
30.0				AUTO TUNE	
				CF Step 11.000000 MHz	
0.00				Auto Man	
10 a				Freq Offset 0 Hz	
tart 39.90000 GHz Res BW 1.0 MHz	#Video BW	3.0 MHz*	Stop 40.01000 GHz Sweep 1.33 ms (10001 pts)		
150	2 Dec 09, 2021 1:33:45 PM			Signal Track (Span Zoom)	





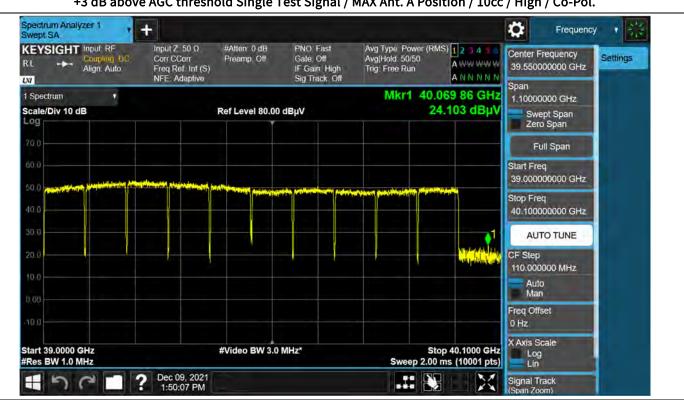


+3 dB above AGC threshold Single Test Signal / MAX Ant. A Position / 10cc / Low / Cross-Pol.







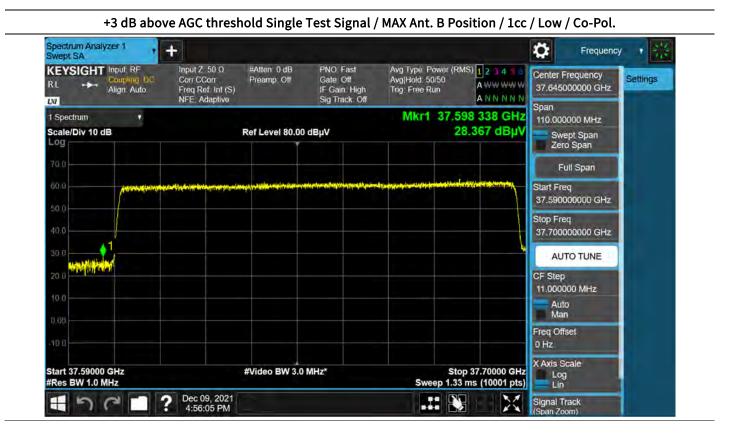


### +3 dB above AGC threshold Single Test Signal / MAX Ant. A Position / 10cc / High / Co-Pol.

+3 dB above AGC threshold Single Test Signal / MAX Ant. A Position / 10cc / High / Cross-Pol.



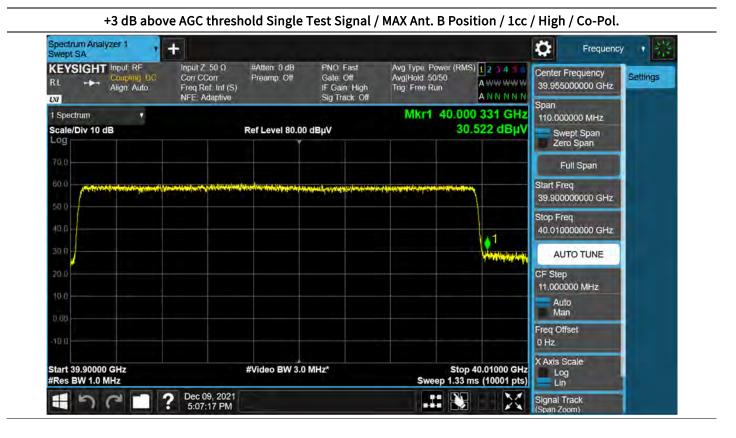




## +3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 1cc / Low / Cross-Pol.

	put RE oupling DC lign: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain High Sig Track: Off	Avg Type Power (RMS) 1 2 3 4 5 5 Avg(Hold: 50/50 Trig: Free Run A N N N N N	Center Frequency 37.645000000 GHz	Settings
Spectrum cale/Div 10 dB			Ref Level 80.00	dBµV	Mkr1 37.592 310 GHz 22.934 dBµV	Span 110.000000 MHz Swept Span Zero Span	
0.0						Full Span	
0.0						Start Freq 37.590000000 GHz	
ο.α	April and a series	laad voor men gester geven die de bester voor die m	nfine and a supported that a	ortenalleterational guident the second	Horan cares in the many strategy and an and an	Stop Freq 37.700000000 GHz	
ia.o						AUTO TUNE	
						CF Step 11.000000 MHz Auto Man	
ιο ά 10 ά						Freq Offset 0 Hz	
tart 37.59000 G Res BW 1.0 MH			#Video BW 3.0	MHz*	Stop 37.70000 GHz Sweep 1.33 ms (10001 pts)		
50		2 Dec 09, 2021 4:58:11 PM			.# 🕷  🕅	Signal Track (Span Zoom)	



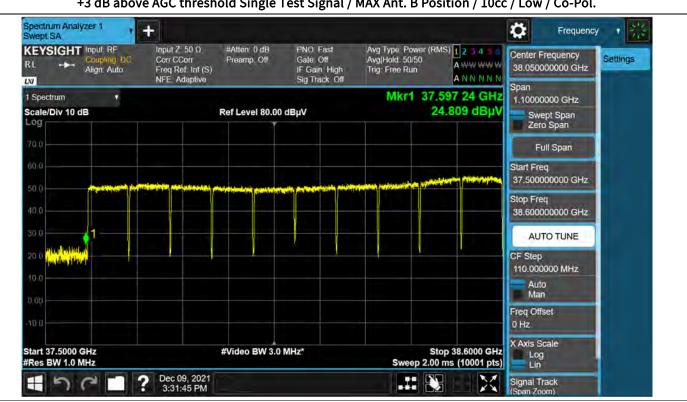


# +3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 1cc / High / Cross-Pol.

EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain: High Sig Track: Off	Avg Type: Power (RMS) Avg[Hold: 50/50 Trig: Free Run	123455 AWWWWW ANNNNN	Center Frequency 39.955000000 GHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 80.00	dBµV	Mkr1 40.007 23.1	052 GHz 739 dBµV	Span 110.000000 MHz Swept Span Zero Span	
0.0					-	Full Span	
50.0						Start Freq 39.90000000 GHz	
	n hatan taini tan ang ang ang ang ang ang ang ang ang a	and the second	unan na ana ana ana ana	ter er fallet an starting and the start of the		Stop Freq 40.010000000 GHz	
30.0						AUTO TUNE	
20.0					hiperteriller	CF Step 11.000000 MHz	
0.00						Auto Man	
10 q						Freq Offset 0 Hz	
tart 39.90000 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*	Stop 4 Sweep 1.33 m	40.01000 GHz s (10001 pts)	X Axis Scale Log	
1501	2 Dec 09, 2021 5:11:47 PM					Signal Track (Span Zoom)	







+3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 10cc / Low / Co-Pol.

+3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 10cc / Low / Cross-Pol.









### +3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 10cc / High / Co-Pol.

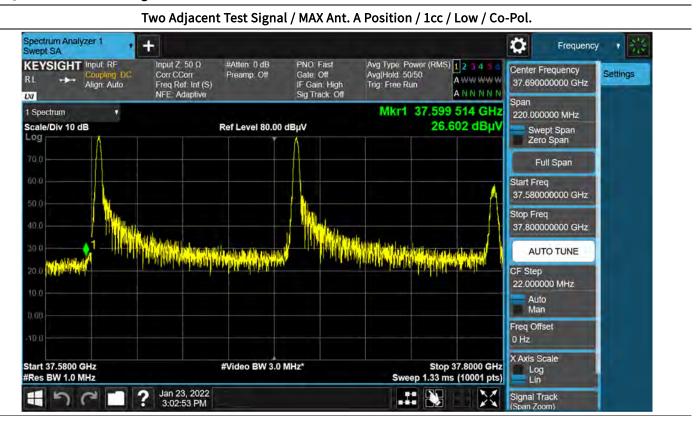
+3 dB above AGC threshold Single Test Signal / MAX Ant. B Position / 10cc / High / Cross-Pol.



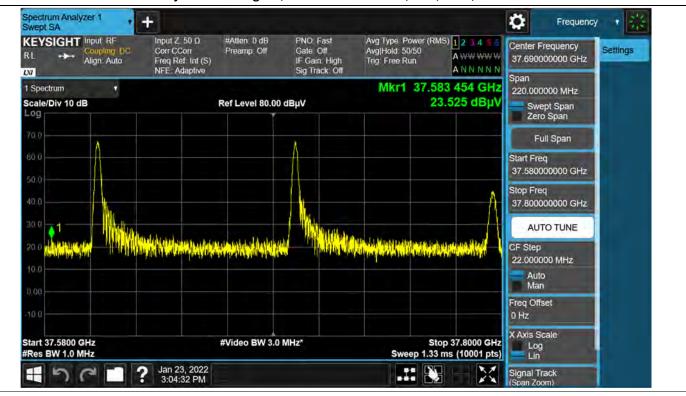




## [1 RB] Plot data of Band Edge

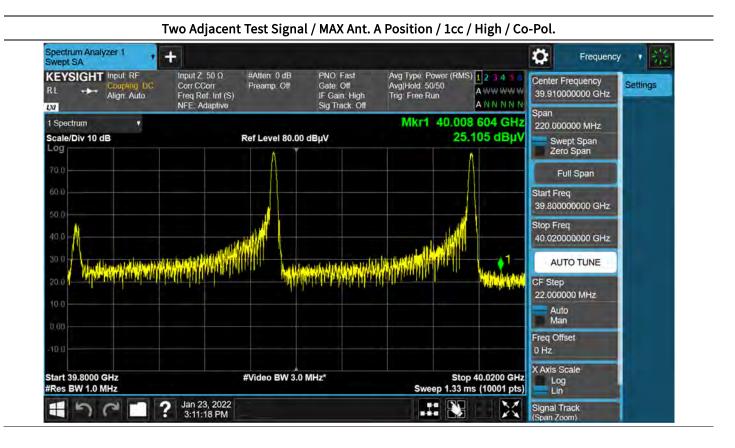


Two Adjacent Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.

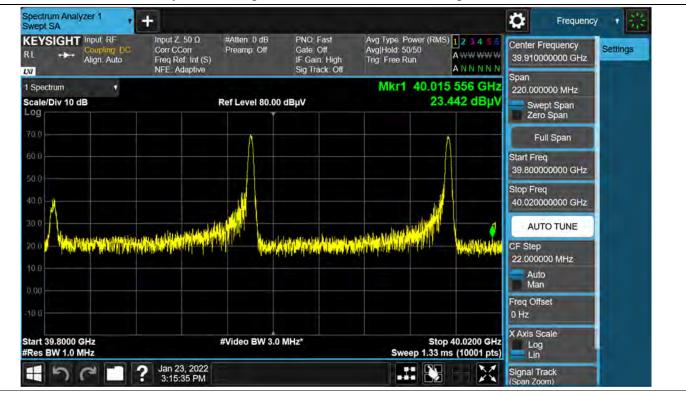






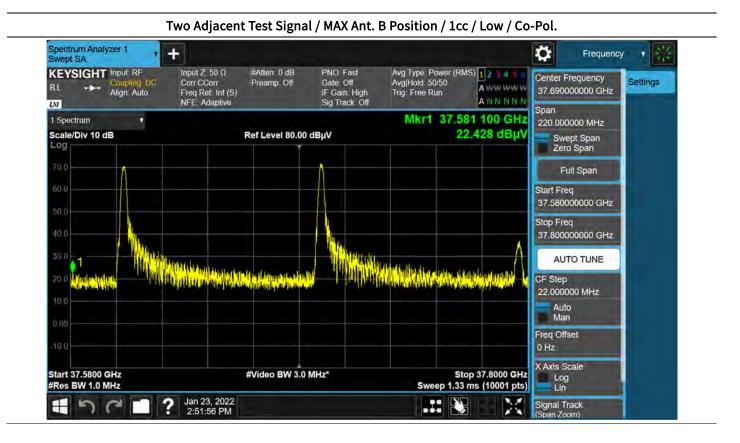


### Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.









Two Adjacent Test Signal / MAX Ant. B Position / 1cc / Low / Cross-Pol.

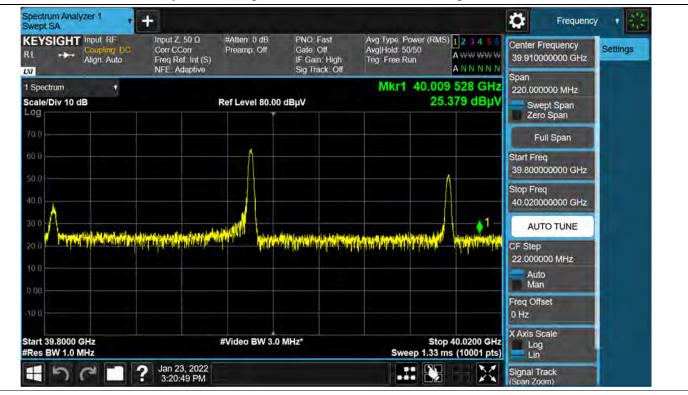
	pling DC n: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten: 0 dB Preamp: Off	PNO Fast Gate Off IF Gain: High Sig Track: Off	Avg Type Power ( Avg Hold: 50/50 Trig: Free Run	RMS) 1 2 3 4 5 5 A WW WWW A N N N N N	Center Frequency 37.690000000 GHz	Settings
Spectrum cale/Div 10 dB	1		Ref Level 80.00 d	ΒμV		581 892 GHz 23.920 dBµV	Span 220.000000 MHz Swept Span Zero Span	
70.0							Full Span	
50.0				$\wedge$			Start Freq 37.580000000 GHz	
40.0							Stop Freq 37.800000000 GHz	
30.0 1 20.0 1		hahiyi dalah kuta kara	ha han pir dia dia kana mining	Manadaparta	lisetralisetti) (sitette estatio	un and a state of the	AUTO TUNE CF Step 22.000000 MHz	
10.0							Auto Man	
10.0							Freq Offset 0 Hz	
tart 37.5800 GHz Res BW 1.0 MHz			#Video BW 3.0 M	Hz*		Stop 37.8000 GHz 33 ms (10001 pts)	X Axis Scale Log Lin	
	2	Jan 23, 2022 2:52:22 PM	~		Sweep 1.		Lin Signal Track (Span Zoom)	



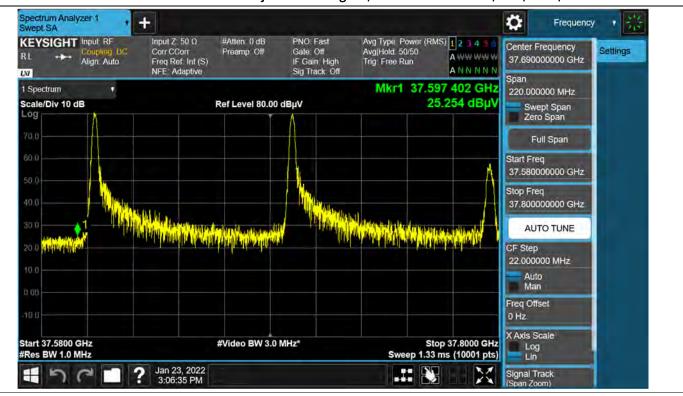




Two Adjacent Test Signal / MAX Ant. B Position / 1cc / High / Cross-Pol.

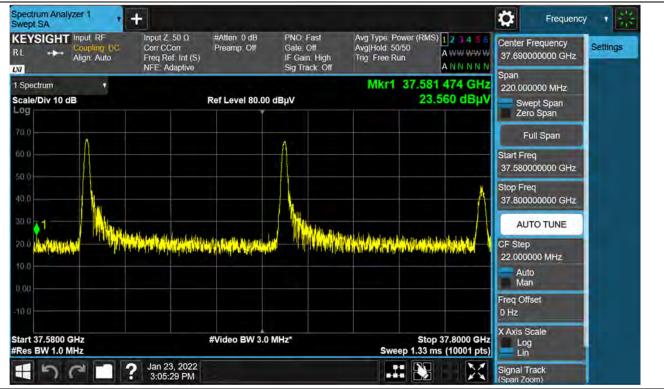




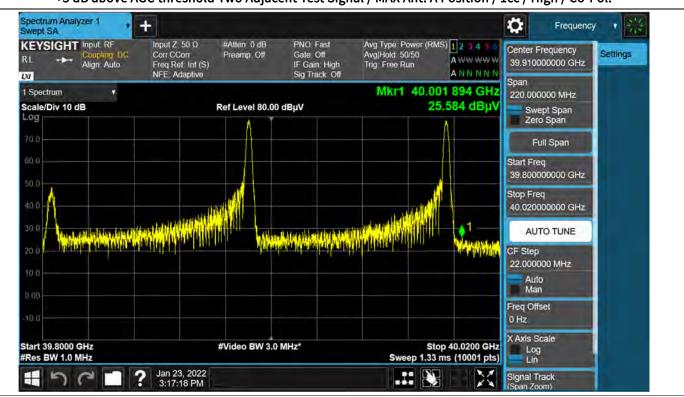


+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / Low / Co-Pol.

+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / Low / Cross-Pol.







### +3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Co-Pol.

+3 dB above AGC threshold Two Adjacent Test Signal / MAX Ant. A Position / 1cc / High / Cross-Pol.

