

RF TEST REPORT

According to

FCC ID: 2BBLK-WL2179A

47 CFR FCC Part 15, Subpart E(Section 15.407)

ANSI C63.10:2013

Product description : WiFi+BT Module
Model No. : WL00018
Trade Mark : MTK
Product No. : POC230524018-S001
Applicant : Huizhou speed wireless technology co., ltd
No. 138 Huize Road, Hi-Tech Industrial Park of East River,
Zhongkai Hi-tech District, Huizhou City, Guangdong Province,
China
Receipt date : 2023.07.24
Test date : 2023.07.26~2023.08.16
Issued Date : 2023.08.16

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History of this test report

Original Report Issue Date: 2023.08.16

- No additional attachment
- Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Huizhou speed wireless technology co., ltd

No. 138 Huize Road, Hi-Tech Industrial Park of East River, Zhongkai Hi-tech District, Huizhou City, Guangdong Province, China

1.2 Manufacturer

Huizhou speed wireless technology co., ltd

No. 138 Huize Road, Hi-Tech Industrial Park of East River, Zhongkai Hi-tech District, Huizhou City, Guangdong Province, China

1.3 Basic Description of Equipment Under Test

Equipment Name	WiFi+BT Module	
Model Number	WL00018	
Trademark	MTK	
Power Supply	DC 3.3V~12V	
Software Version	/	
Hardware Version	V12	
Operating Temperature	0°C-60°C	
EUT Stage	○ Product Unit	● Final-Sample
Frequency Range	For 802.11ax-HE20: 5955 ~ 7115MHz For 802.11ax-HE40: 5965 ~ 7085MHz For 802.11ax-HE80: 5985 ~ 7025MHz	
Channel Number	For 5925 ~ 6425MHz band: Channel 1-93 For 6425 ~ 6525MHz band: Channel 97-119 For 6525 ~ 6875MHz band: Channel 117-187 For 6875 ~ 7125MHz band: Channel 189-233	
Modulation	OFDMA(BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)	
Data Rate (Mbps)	802.11ax: up to 1201Mbps	
Type of Device	Slave device	
Antenna gain	Ant1: 3.60dBi, Ant2: 3.50dBi	

1.4 Working Frequencies

U-NII 5 Band(5925-6425MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11ax-HE20					
01	5955 MHz	05	5975 MHz	09	5995 MHz
13	6015 MHz	17	6035 MHz	21	6055 MHz
25	6075 MHz	29	6095 MHz	33	6115 MHz
37	6135 MHz	41	6155 MHz	45	6175 MHz
49	6195 MHz	53	6215 MHz	57	6235 MHz
61	6255 MHz	65	6275 MHz	69	6295 MHz
73	6315 MHz	77	6335 MHz	81	6355 MHz
85	6375 MHz	89	6395 MHz	93	6415 MHz
802.11ax-HE40					
03	5965 MHz	11	6005 MHz	19	6045 MHz
27	6085 MHz	35	6125 MHz	43	6165 MHz
51	6205 MHz	59	6245 MHz	67	6285 MHz
75	6325 MHz	83	6365 MHz	91	6405 MHz
802.11ax-HE80					
07	5985 MHz	23	6065 MHz	39	6145 MHz
55	6225 MHz	71	6305 MHz	87	6385 MHz

U-NII 6 Band(6425-6525MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11ax-HE20					
97	6435 MHz	101	6455 MHz	105	6475 MHz
109	6495 MHz	113	6515 MHz	/	/
802.11ax-HE40					
99	6445 MHz	107	6485 MHz	115	6525 MHz
802.11ax-HE80					
103	6465 MHz	119	6545 MHz	/	/

U-NII 7 Band(6525-6875MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11ax-HE20					
117	6535 MHz	121	6555 MHz	125	6575 MHz
129	6595 MHz	133	6615 MHz	137	6635 MHz
141	6655 MHz	145	6675 MHz	149	6695 MHz
153	6715 MHz	157	6735 MHz	161	6755 MHz
165	6775 MHz	169	6795 MHz	173	6815 MHz
177	6835 MHz	181	6855 MHz	185	6875 MHz
802.11ax-HE40					
123	6565 MHz	131	6605 MHz	139	6645 MHz
147	6685 MHz	155	6725 MHz	163	6765 MHz
171	6805 MHz	179	6845 MHz	187	6885 MHz
802.11ax-HE80					
135	6625 MHz	151	6705 MHz	167	6785 MHz
183	6865 MHz	/	/	/	/

U-NII 8 Band(6875-7125MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11ax-HE20					
189	6895 MHz	193	6915 MHz	197	6935 MHz
201	6955 MHz	205	6975 MHz	209	6995 MHz
213	7015 MHz	217	7035 MHz	221	7055 MHz
225	7075 MHz	229	7095 MHz	233	7115 MHz
802.11ax-HE40					
195	6925 MHz	203	6965 MHz	211	7005 MHz
219	7045 MHz	227	7085 MHz	/	/
802.11ax-HE80					
199	6945 MHz	215	7025 MHz	/	/

2. Summary of Test Results

2.1 Summary of Test Items

FCC Section(s)	Test Description	Test Condition	Verdict
15.407(a)	26dB & 99% Bandwidth	Conducted	Pass
15.407(b)(7)	In-Band Emission		Pass
15.407(a)(5), (a)(6)	Transmitter power		Pass
15.407(a)(5), (a)(6)	Peak Power Spectral Density (E.I.R.P)		Pass
15.407(d)(6)	Contention-Based Protocol		Pass
15.407(g)	Frequency Stability		Pass
15.407(b)(6)	Unwanted Emissions	Radiated	Pass
15.207	AC Conducted Emissions	Line Conducted	Pass
15.203	Antenna Requirements	/	Note4

Remark:

- The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- Output power test was verified over all data rates of each mode, and then choose the maximum power output (low data rate) for final test of each channel.
- For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
- The EUT have 4 internal antennas arrangement which was permanently attached.
- EUT supports one configuration only in 802.11ax full RU mode.

2.2 Standards or specification

47CFR Part 15

ANSI C63.10(2013)

KDB 987594 D02 v01v01

KDB 789033 D02 v02r01

KDB 662911 D01 v02r01

KDB 414788 D01 v01r01

2.3 Test Instruments

Radiated Emissions						
No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	Test receiver	Rohde&Schwarz	ESU	100184	2023/5/3	2024/5/2
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-127 3	2023/4/23	2024/4/22
3	Low frequency amplifier	Unknown	LNA 0920N	2014	2023/5/3	2024/5/2
4	High frequency amplifier	Schwarzbeck	BBV 9718	284	2023/5/3	2024/5/2
5	Loop Antenna	Schwarzbeck	FMZB1519 B	00029	2022/7/4	2025/7/3
6	Log periodic antenna	Schwarzbeck	VULB 9168	1151	2023/4/23	2024/4/22
7	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-127 3	2022/5/5	2025/5/4
8	Horn Antenna	Schwarzbeck	BBHA 9170	9170#685	2022/7/4	2025/7/3
9	Temp&Humidity Recorder	Meideshi	JR900	/	2023/5/3	2024/5/2
10	RF cable(966 chamber)9kHz-1 GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2
11	RF cable(966 chamber)1GHz- 18GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2
12	RF cable(966 chamber)18GHz -40GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2
13	Test software	Farad Technology Co., Ltd	EZ-EMC	/	/	/
Conducted Emission						
1	Test receiver	Rohde&Schwarz	ESCI	100718	2023/5/3	2024/5/2
2	LISN	Rohde&Schwarz	ENV216	100075	2023/5/3	2024/5/2
3	Pulse limiter	Rohde&Schwarz	ESH3-Z2	102299	2023/5/3	2024/5/2
4	RF cable (9kHz-30MHz)	Unknown	Unknown	Unknown	2023/5/3	2024/5/2
5	Test software	Farad Technology Co., Ltd	EZ-EMC	/	/	/
RF Conducted Emission						
1	MXA Signal Analyzer	Keysight	N9021B	MY600801 69	2023/4/23	2024/4/22
2	RF Control Unit	dsusoft	JS0806-2	21G806044 9	2023/4/23	2024/4/22
3	power supply unit	dsusoft	JS0806-4A DC	N/A	2023/4/23	2024/4/22
4	VXG Signal Generator	Keysight	M9384B	MY612707 87	2023/4/23	2024/4/22
5	EXG Analog Signal Generator	Keysight	N5173B	MY591012 82	2023/4/23	2024/4/22
6	Test software	dsusoft	JS1120-3	/	/	/

2.4 Test Mode

The EUT was supplied by and it was run in TX mode that was controlled by Master provided RF testing program. The worst case test result was showed in the report.

Mode 1: Transmit by 802.11ax-HE20 (MCS0)
Mode 2: Transmit by 802.11ax-HE40 (MCS0)
Mode 3: Transmit by 802.11ax-HE80 (MCS0)

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
26dB & 99% Bandwidth	24.3°C, 51% RH	DC 5V	Jason Huang
In-Band Emission	24.2°C, 55% RH	DC 5V	Jason Huang
Contention-Based Protocol	24.2°C, 52% RH	DC 5V	Jason Huang
Frequency Stability	24.2°C, 52% RH	DC 5V	Jason Huang
Transmitter power	24.2°C, 52% RH	DC 5V	Jason Huang
Peak Power Spectral Density	24.2°C, 52% RH	DC 5V	Jason Huang
Unwanted Emissions	24.3°C, 54% RH	AC 120V/60Hz	Albert Fan
AC Conducted Emissions	24.3°C, 54% RH	AC 120V/60Hz	Albert Fan

Note: Adapter supply voltage AC 120V/60Hz.

The applicant declare the operating environment of EUT as below:

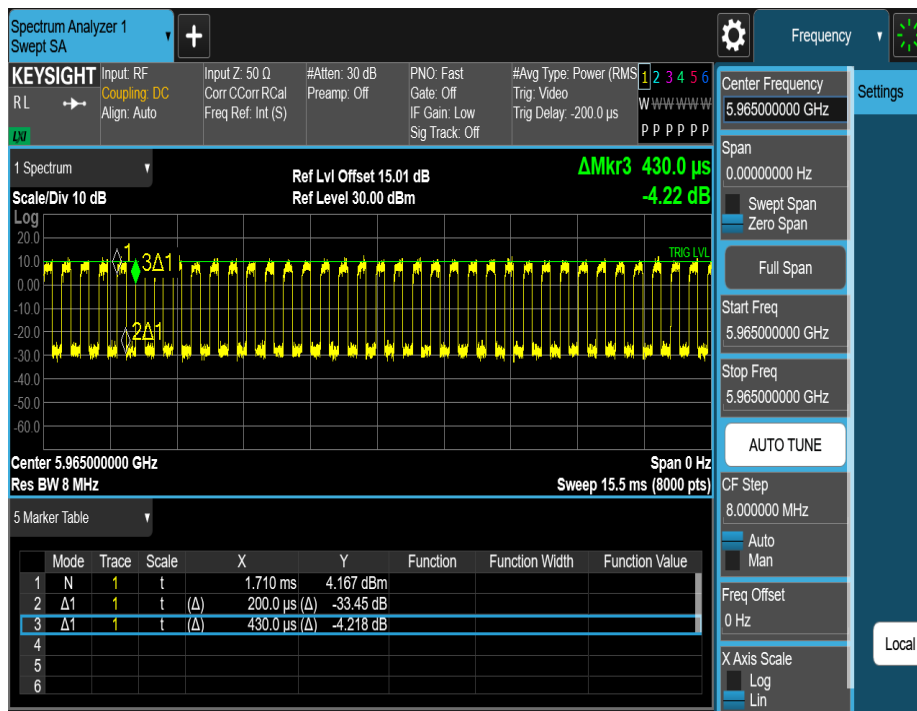
Normal conditions: DC 5V, 0~60°C

Extreme conditions: NV: 5V

NT: 20°C

LV: 4.5V

HV: 5.5V



NTNV-11AX40MIMO-Ant1-5965



NTNV-11AX80MIMO-Ant1-5985

2.7 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	± 143.88 kHz
Power Spectral Density	± 0.743 dB
Conducted Spurious Emission	± 1.328 dB
RF power conducted	± 0.384 dB
Conducted emission(9kHz~30MHz) AC main	± 2.72 dB
Radiated emission(9kHz~30MHz)	± 2.66 dB
Radiated emission (30MHz~1GHz)	± 4.62 dB
Radiated emission (1GHz~18GHz)	± 4.86 dB
Radiated emission (18GHz~40GHz)	± 3.80 dB

2.8 Test Location

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier:	CN0145
A2LA Certificate Number:	6823.01
Telephone:	0755-26024411

2.9 Deviation from Standards

None

2.10 Abnormalities from Standard Conditions

None

3. Test Procedure And Results

3.1 26dB & 99% Bandwidth Measurement

3.1.1 Limit

The upper and lower frequency limits of the transmitter 99 % emission power bandwidth shall at all times remain within the operating frequency limits.

Some transmitter categories require a specific limit for emission bandwidth. In such cases, the emission bandwidth shall be established by testing in accordance with the relevant specified Standard.

3.1.2 Test Procedure

KDB 789033 D02v02r01- Section II)C)1) (26dB Bandwidth)

KDB 789033 D02v02r01- Section II)D) (99% Bandwidth)

3.1.3 Test Setup

26dB Bandwidth

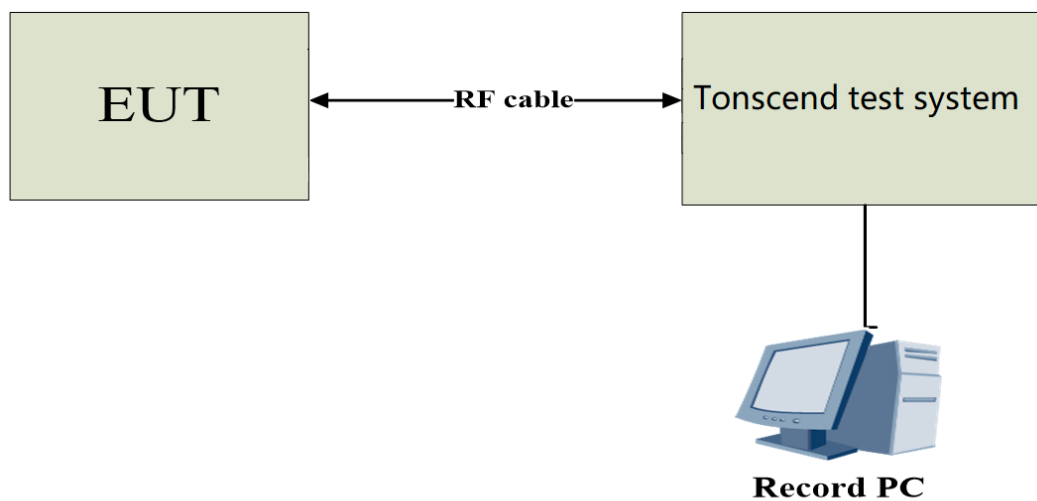
1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth
2. RBW = approximately 1% of the emission bandwidth.
3. VBW > RBW
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.

Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 1% to 5% of the OBW
3. $VBW \geq 3 \text{ RBW}$
4. Span = 1.5 times to 5 times the OBW
5. Detector = peak
6. Trace mode = max hold
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument.

3.1.4 Test Setup



3.1.5 Test Result

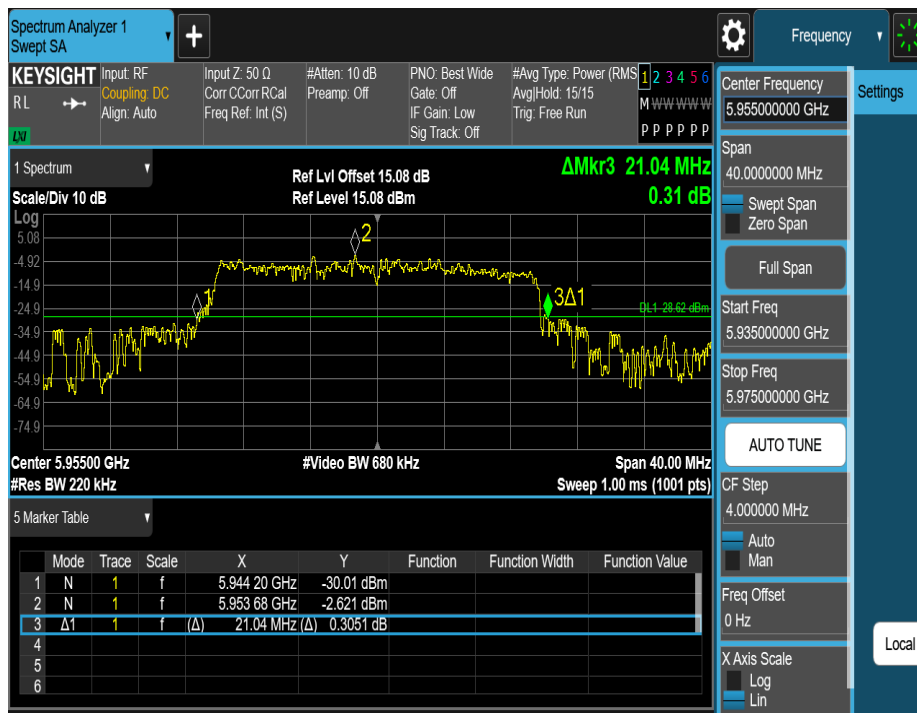
Emission Bandwidth

Test Mode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX20MIMO	Ant1	5955	21.040	5944.200	5965.240	---	---
	Ant2	5955	21.080	5944.520	5965.600	---	---
	Ant1	6175	21.800	6163.720	6185.520	---	---
	Ant2	6175	21.320	6163.920	6185.240	---	---
	Ant1	6415	22.000	6403.120	6425.120	---	---
	Ant2	6415	22.720	6404.440	6427.160	---	---
	Ant1	6435	21.040	6424.320	6445.360	---	---
	Ant2	6435	20.760	6424.840	6445.600	---	---
	Ant1	6475	20.920	6464.160	6485.080	---	---
	Ant2	6475	23.720	6461.520	6485.240	---	---
	Ant1	6515	20.360	6504.760	6525.120	---	---
	Ant2	6515	21.160	6503.920	6525.080	---	---
	Ant1	6535	23.800	6522.080	6545.880	---	---
	Ant2	6535	20.840	6524.720	6545.560	---	---
	Ant1	6695	20.600	6684.600	6705.200	---	---
	Ant2	6695	23.440	6683.000	6706.440	---	---
	Ant1	6855	21.920	6845.120	6867.040	---	---
	Ant2	6855	21.440	6843.720	6865.160	---	---
	Ant1	6875	21.120	6864.160	6885.280	---	---
	Ant2	6875	24.760	6860.960	6885.720	---	---
	Ant1	6895	22.800	6882.520	6905.320	---	---

	Ant2	6895	23.360	6882.640	6906.000	---	---
	Ant1	6995	21.560	6984.400	7005.960	---	---
	Ant2	6995	20.800	6984.840	7005.640	---	---
	Ant1	7115	21.080	7104.240	7125.320	---	---
	Ant2	7115	25.000	7103.320	7128.320	---	---
11AX40MIMO	Ant1	5965	39.200	5945.400	5984.600	---	---
	Ant2	5965	39.280	5945.400	5984.680	---	---
	Ant1	6165	39.360	6145.240	6184.600	---	---
	Ant2	6165	39.040	6145.400	6184.440	---	---
	Ant1	6405	39.120	6385.320	6424.440	---	---
	Ant2	6405	39.120	6385.400	6424.520	---	---
	Ant1	6445	39.600	6425.160	6464.760	---	---
	Ant2	6445	39.280	6425.160	6464.440	---	---
	Ant1	6485	39.280	6465.320	6504.600	---	---
	Ant2	6485	39.120	6465.320	6504.440	---	---
	Ant1	6525	39.280	6505.400	6544.680	---	---
	Ant2	6525	39.280	6505.160	6544.440	---	---
	Ant1	6565	39.280	6545.400	6584.680	---	---
	Ant2	6565	39.040	6545.400	6584.440	---	---
	Ant1	6685	39.040	6665.480	6704.520	---	---
	Ant2	6685	39.520	6665.240	6704.760	---	---
	Ant1	6845	39.280	6825.240	6864.520	---	---
	Ant2	6845	39.200	6825.480	6864.680	---	---
	Ant1	6885	39.440	6865.400	6904.840	---	---
	Ant2	6885	39.440	6865.000	6904.440	---	---
	Ant1	6925	39.280	6905.240	6944.520	---	---
	Ant2	6925	39.120	6905.400	6944.520	---	---
	Ant1	6965	39.280	6945.400	6984.680	---	---
	Ant2	6965	39.040	6945.400	6984.440	---	---
	Ant1	7085	39.120	7065.480	7104.600	---	---
	Ant2	7085	39.120	7065.480	7104.600	---	---
11AX80MIMO	Ant1	5985	79.680	5945.160	6024.840	---	---
	Ant2	5985	79.840	5945.000	6024.840	---	---
	Ant1	6145	79.840	6105.000	6184.840	---	---
	Ant2	6145	79.680	6105.160	6184.840	---	---
	Ant1	6385	80.160	6345.000	6425.160	---	---
	Ant2	6385	80.000	6344.840	6424.840	---	---
	Ant1	6465	80.000	6425.000	6505.000	---	---
	Ant2	6465	80.160	6424.840	6505.000	---	---
	Ant1	6545	79.840	6505.000	6584.840	---	---
	Ant2	6545	80.160	6505.000	6585.160	---	---
	Ant1	6625	79.840	6585.000	6664.840	---	---

	Ant2	6625	80.000	6584.840	6664.840	---	---
	Ant1	6705	79.840	6665.000	6744.840	---	---
	Ant2	6705	79.680	6665.160	6744.840	---	---
	Ant1	6785	79.840	6745.000	6824.840	---	---
	Ant2	6785	79.840	6745.000	6824.840	---	---
	Ant1	6865	80.160	6824.840	6905.000	---	---
	Ant2	6865	79.520	6825.160	6904.680	---	---
	Ant1	6945	80.000	6904.840	6984.840	---	---
	Ant2	6945	80.000	6904.840	6984.840	---	---
	Ant1	7025	79.680	6985.160	7064.840	---	---
	Ant2	7025	79.840	6985.000	7064.840	---	---

11AX20MIMO_Ant1_5955



11AX20MIMO_Ant2_5955



11AX20MIMO_Ant1_6175



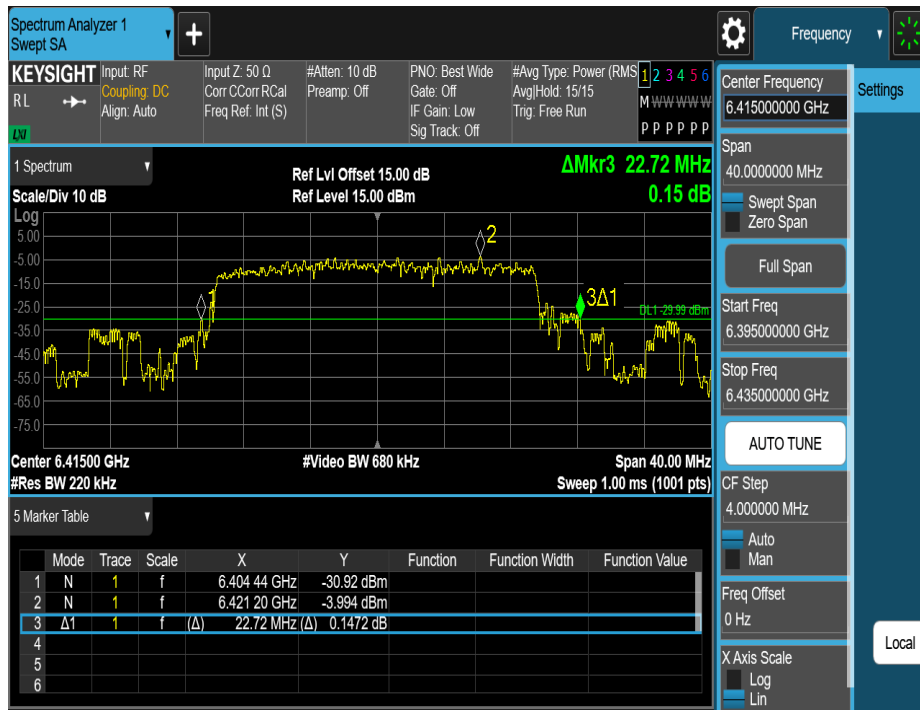
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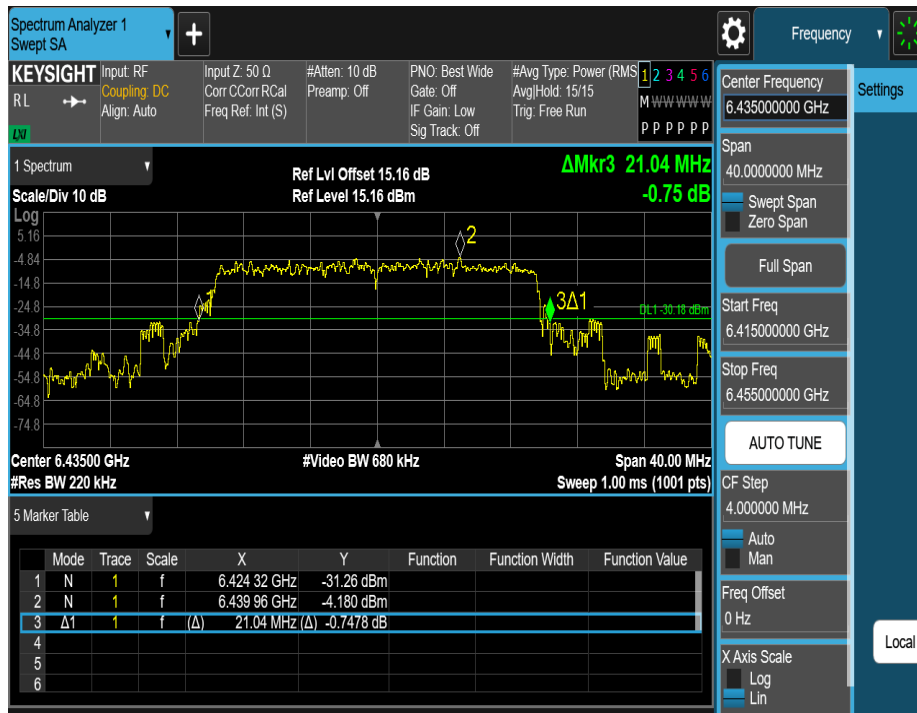
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11AX20MIMO_Ant2_6415



11AX20MIMO_Ant1_6435



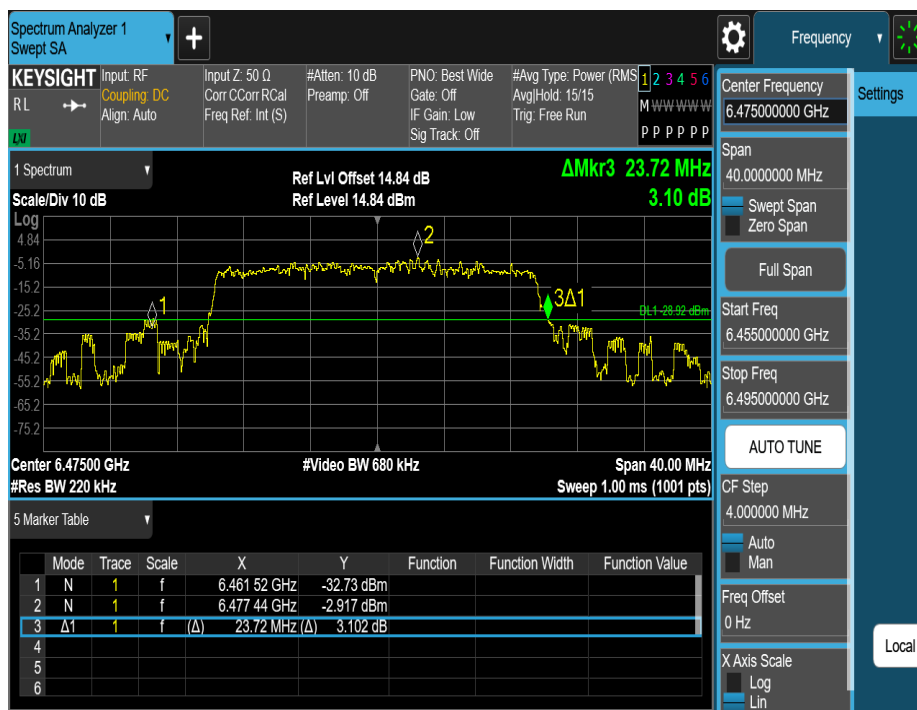
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11AX20MIMO_Ant1_6475



11AX20MIMO_Ant2_6475



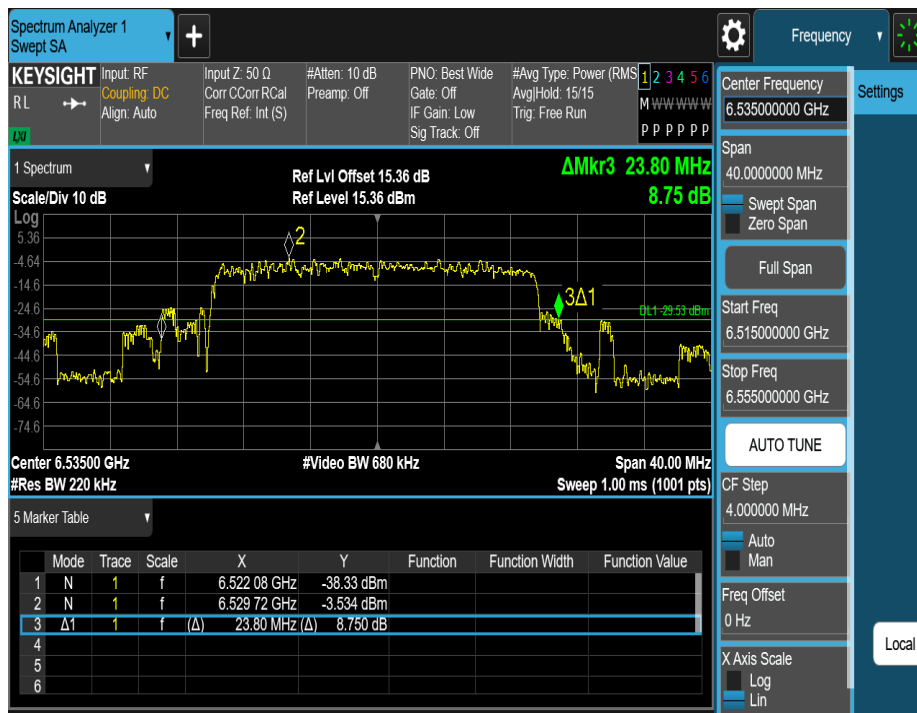
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11AX20MIMO_Ant2_6515

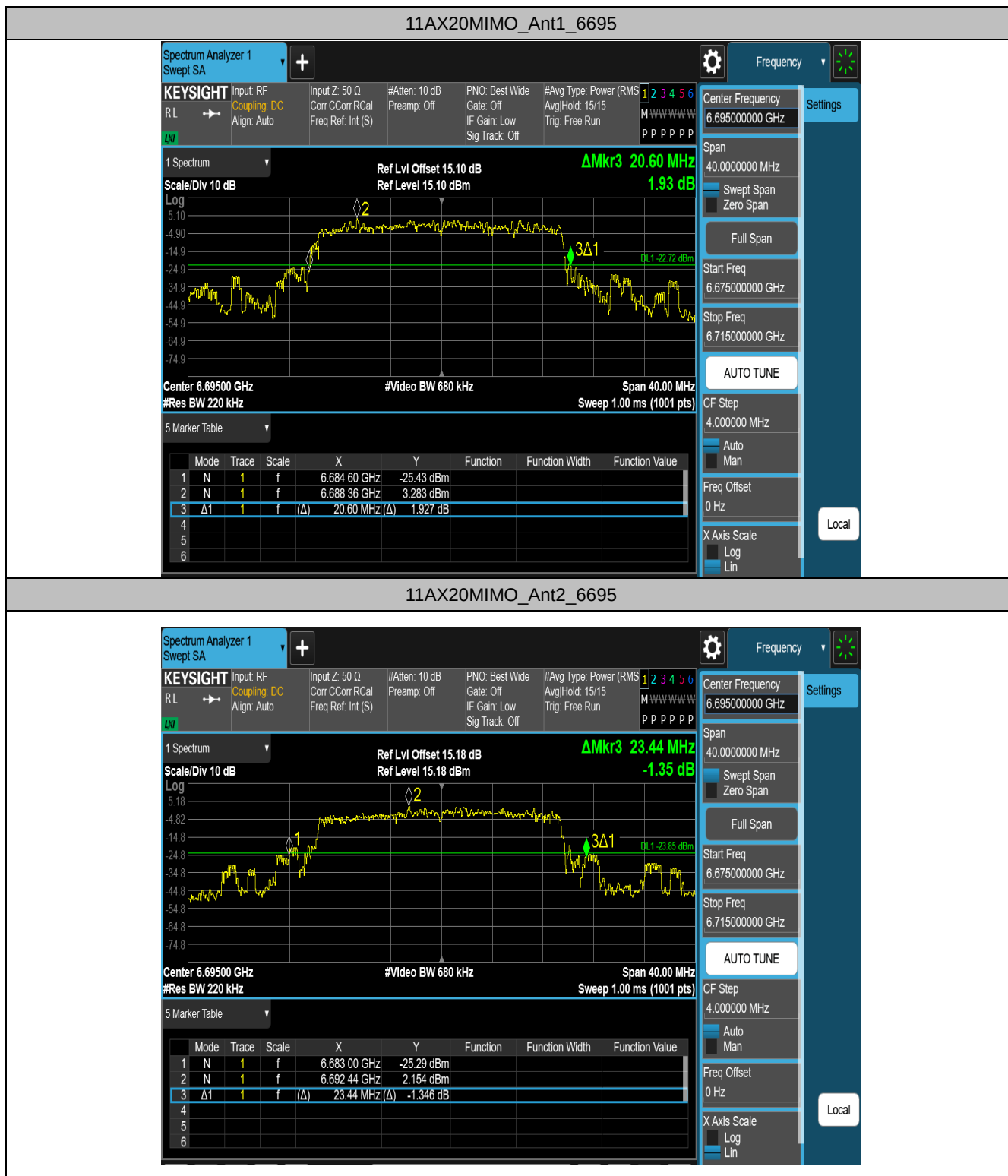


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11AX20MIMO_Ant2_6535





11AX20MIMO_Ant1_6855



11AX20MIMO_Ant2_6855



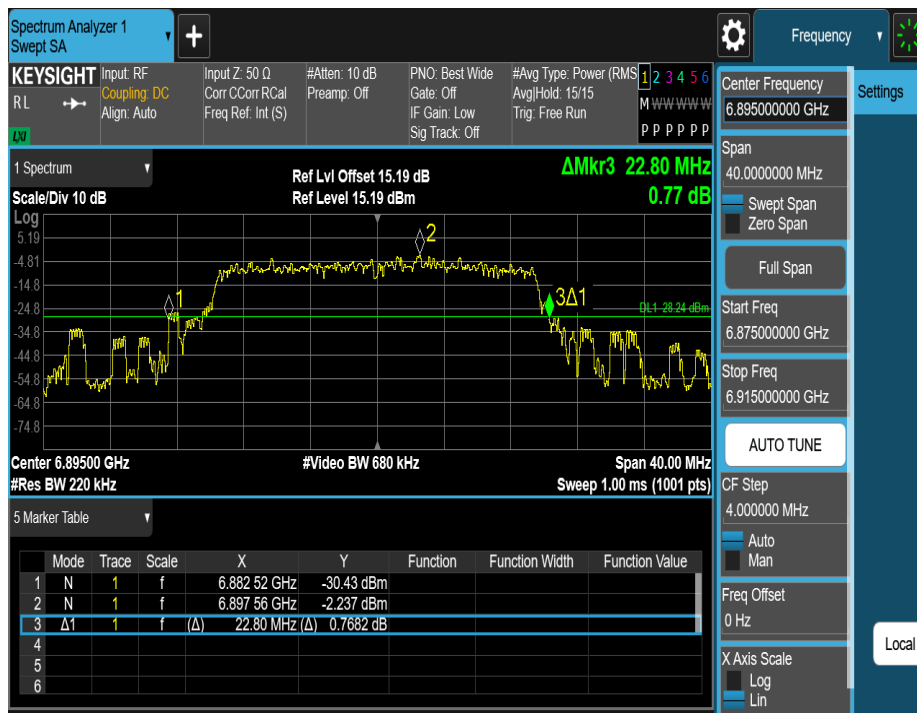
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11AX20MIMO_Ant2_6875



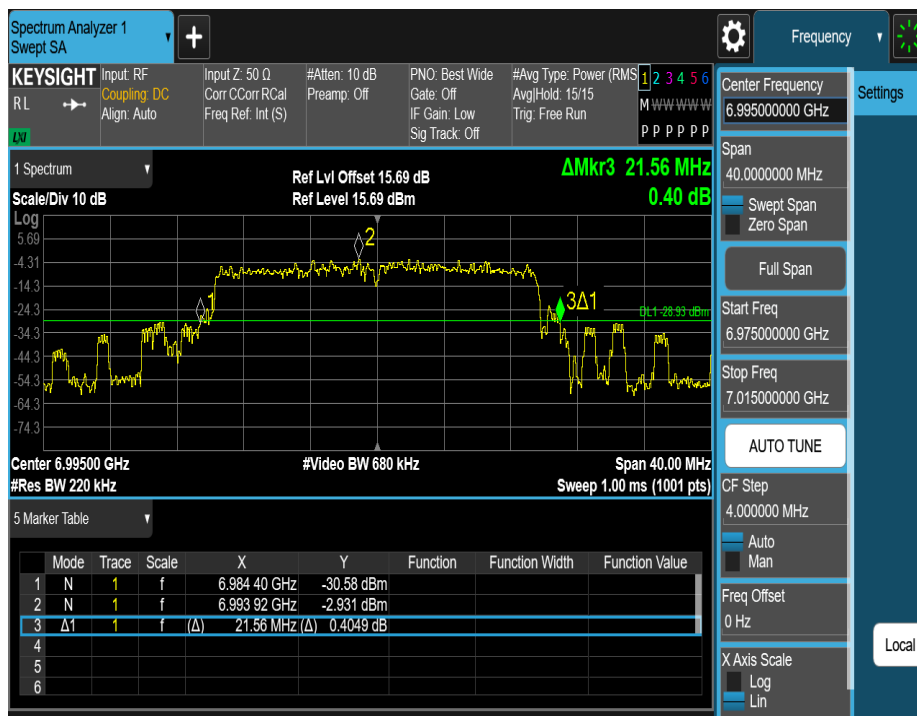
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11AX20MIMO_Ant2_6895



11AX20MIMO_Ant1_6995



11AX20MIMO_Ant2_6995



11AX20MIMO_Ant1_7115



11AX20MIMO_Ant2_7115

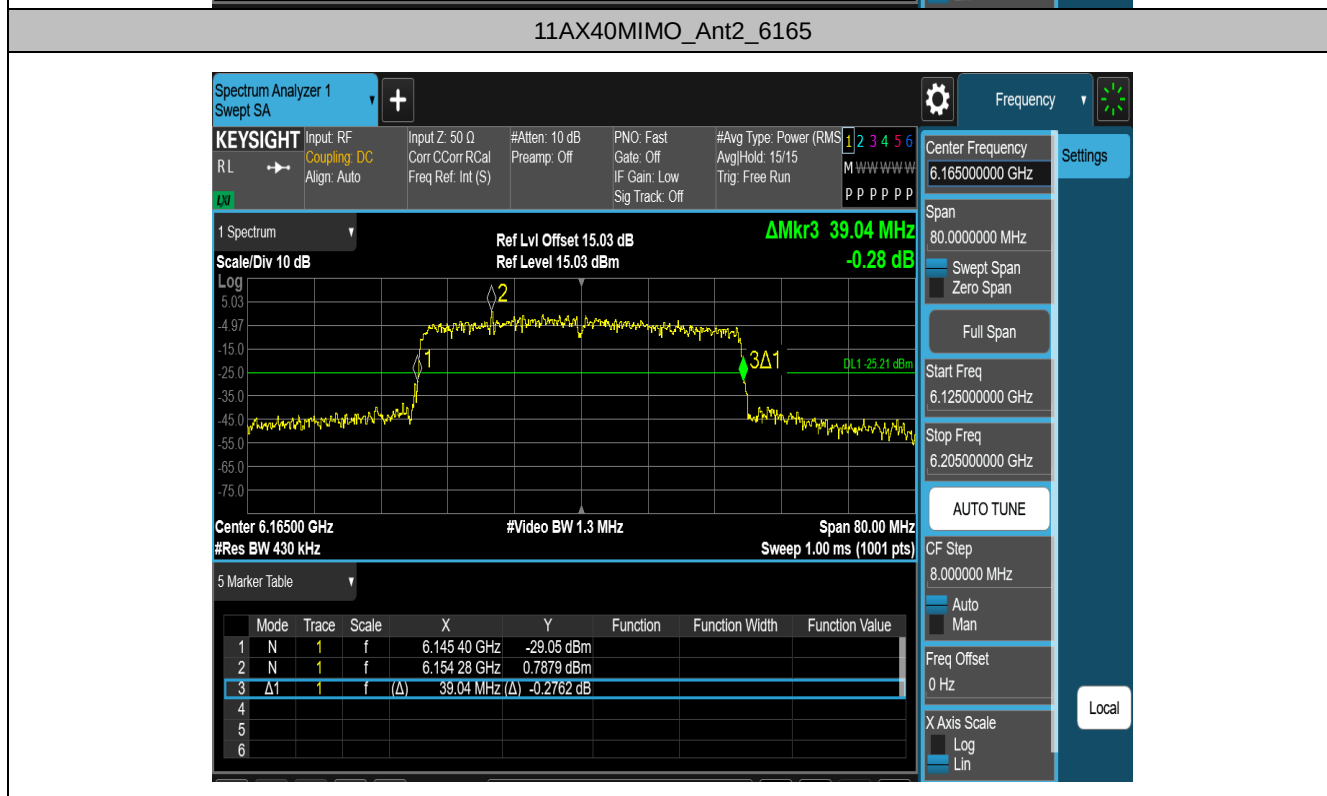
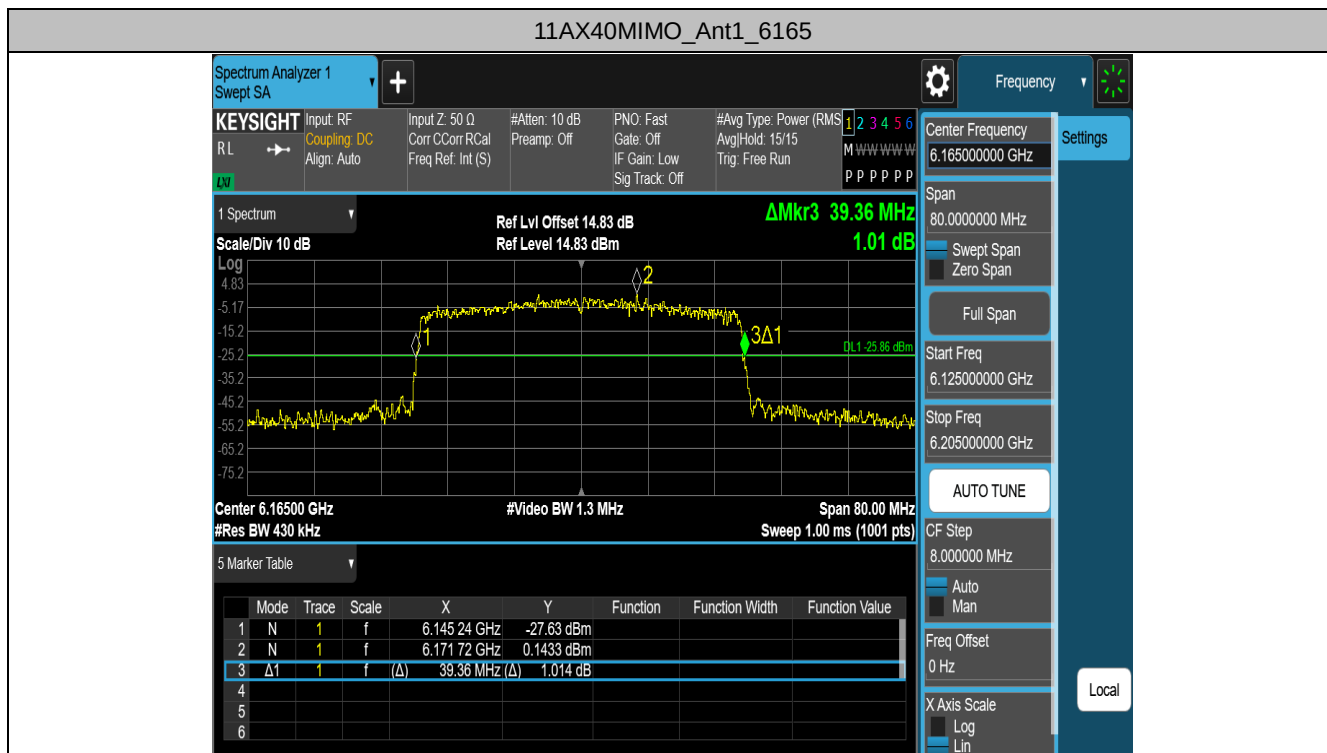


11AX40MIMO_Ant1_5965

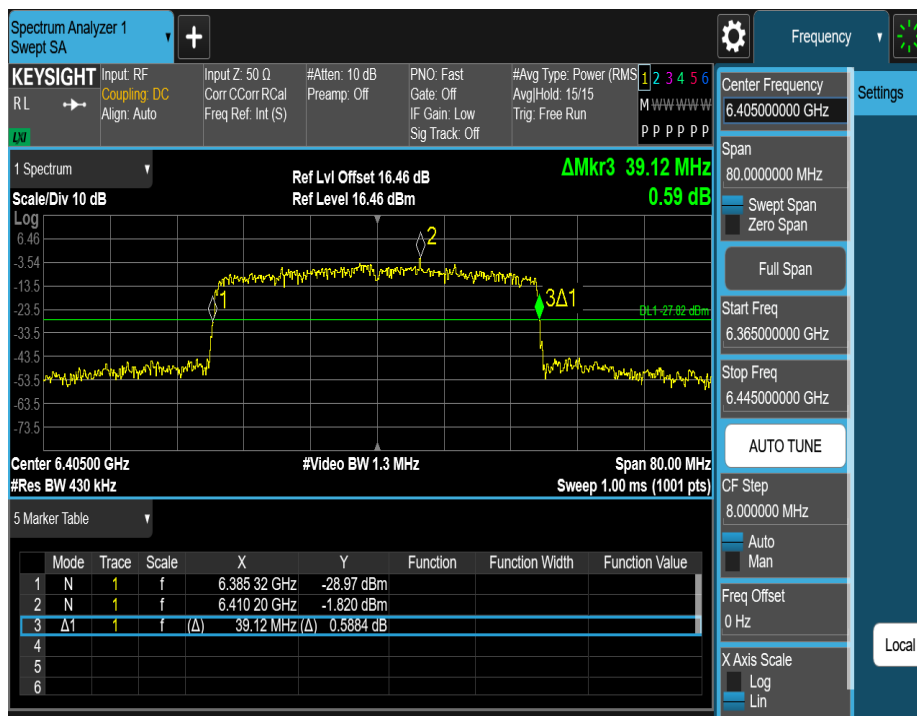


11AX40MIMO_Ant2_5965

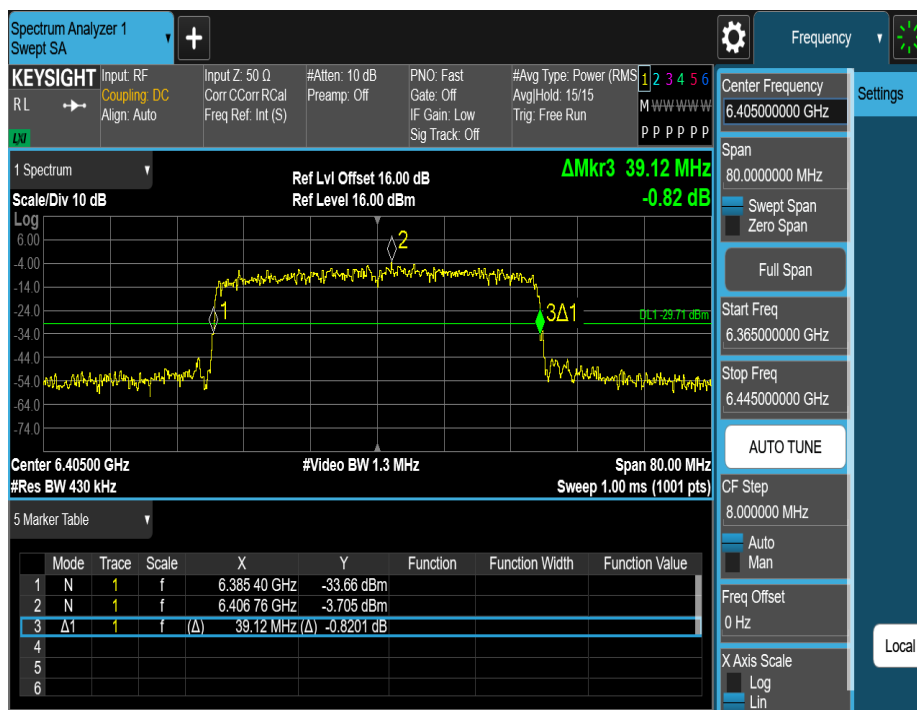




11AX40MIMO_Ant1_6405



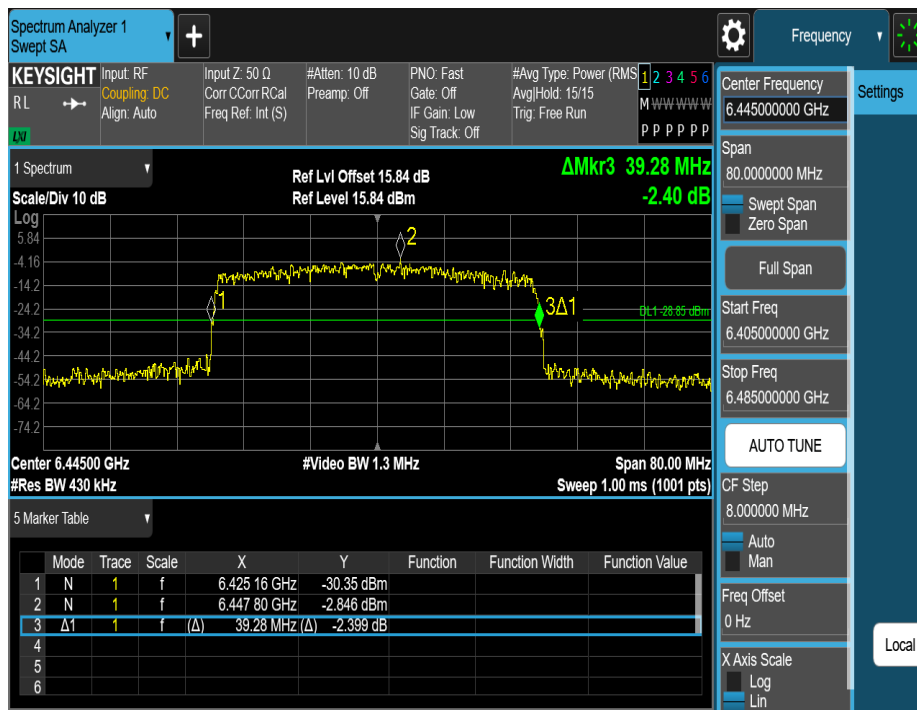
11AX40MIMO_Ant2_6405



11AX40MIMO_Ant1_6445



11AX40MIMO_Ant2_6445



11AX40MIMO_Ant1_6485



11AX40MIMO_Ant2_6485



11AX40MIMO_Ant1_6525



11AX40MIMO_Ant2_6525



11AX40MIMO_Ant1_6565



11AX40MIMO_Ant2_6565



11AX40MIMO_Ant1_6685



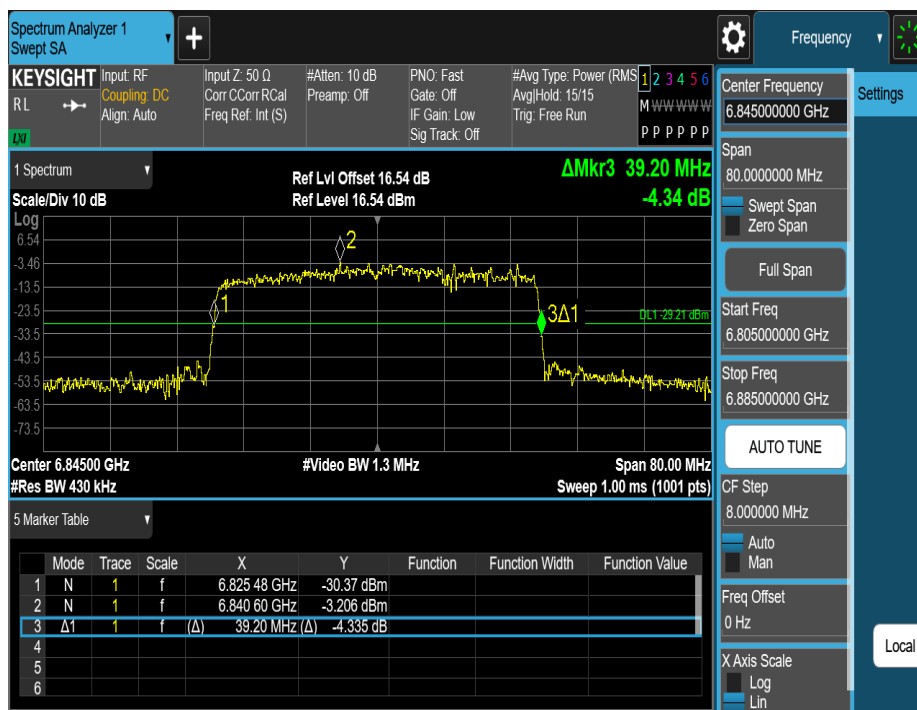
11AX40MIMO_Ant2_6685



11AX40MIMO_Ant1_6845



11AX40MIMO_Ant2_6845



11AX40MIMO_Ant1_6885



11AX40MIMO_Ant2_6885

