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TEST REPORT

KCTL KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.: KR21-SRF0032-B

KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2020-10-19

2. Use of Report : Certification

3. Name of Product / Model : Galaxy SmartTag+ / EI-T7300

4. Manufacturer / Country of Origin : AMOTECH CO., LTD / Korea

5. FCC ID : A3LEIT7300

6. IC Certificate No. : 649E-EIT7300

7. Date of Test : 2021-02-26 to 2021-03-22

8. Location of Test : ■ Permanent Testing Lab □ On Site Testing (Address: Address of testing location)

9. Test method used : FCC Part 15 Subpart F, 15.519
RSS-220 Issue 1 July 2018
RSS-Gen Issue 5 March 2019

10. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Heesu Ahn (Signature)	Technical Manager Name : Hyeonsu Jang (Signature)

2021-03-24

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2021-03-12	Originally issued	-
2021-03-23	Update	1,2,3,4,12,13, 15-19,21, 22-24
2021-03-24	Add FCC ID	21

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Note : The report No. KR21-SRF0032-A is superseded by the report No. KR21-SRF0032-B

General remarks for test reports

Nothing significant to report.

CONTENTS

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1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	AMOTECH CO., LTD
Address	:	(Namchon-dong, 5BL-1LOT), 380, Namdongseo-ro, Namdong-gu, Incheon, Korea
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 Industry Canada Registration No. : 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Galaxy SmartTag+
Model	:	EI-T7300
Modulation technique	:	GFSK (Bluetooth Low Energy) OFDM (Ultra-Wideband)
Number of channels	:	40 ch (Bluetooth Low Energy) 1 ch (Ultra-Wideband)
Power source	:	DC 3.0 V
Antenna type	:	PCB pattern Antenna (Bluetooth Low Energy) FPCB Antenna (Ultra-Wideband)
Antenna gain	:	1.87 dBi (Bluetooth Low Energy) -0.44 dBi (Ultra-Wideband)
Frequency range	:	2 402 ㎒ ~ 2 480 ㎒ (Bluetooth Low Energy) 7.5 ㎓ ~ 8.5 ㎓ (Ultra-Wideband)
Software version	:	Version 1.1
Hardware version	:	Version 1.1
Test device serial No.	:	N/A
Operation temperature	:	-20 ℃ ~ 50 ℃

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2.1. Frequency/channel operations

This device contains the following capabilities:
Bluetooth Low Energy / Ultra-Wideband

Ch.	Frequency (㎒)
9	7 987.2

Table 2.1.1. Ultra-Wideband

2.2. EUT Description

Channel	Configuration	Packet Length	Preamble
9	SP0	BPRF 4	9
			11
			12
		BPRF 20	9
			11
			12
	SP3	-	9
			11
			12

Notes:
Worst case Preamble :
(Peak : SP0_BPRF4_Preamble 9 / Average : SP3_Preamble 9)

3. Antenna requirement

Requirement of FCC part section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Requirement of RSS-Gen Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.
For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).
When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

- The transmitter has permanently attached FPCB antenna(internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203.

4. Summary of tests

FCC Part section(s)	IC Rule Reference	Parameter	Test Condition	Test results
15.503(a)	RSS-220(2)	10 dB Bandwidth	Radiated	Pass
-	RSS-Gen(6.7)	Occupied Bandwidth		Pass
15.519(c)(e)	RSS-220(5)	Peak Power & Maximum Average Emission		Pass
15.519(c)	RSS-220(5)	Radiated Emissions Above 960 ㎒		Pass
15.519(d)	RSS-220(5)	Radiated Emission in the 1 164 – 1 240 ㎒ and 1 559 – 1 610 ㎒ GPS Bands		Pass
15.209	RSS-220(3) RSS-Gen(8)	Radiated Emissions Below 960 ㎒		Pass
15.519(a)(1)	RSS-220(5)	Cease Transmission Time		Pass
15.207	RSS-Gen(8)	AC Line Conducted Emission		N/A(Note5)

Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
3. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation
4. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
   - KDB 393764 D01 UWB FAQ v02
5. This test is not applicable because the EUT uses battery and it's not to be connected to the public utility(AC) power line

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	9 ㎑ ~ 30 ㎒:	2.3 dB
	30 ㎒ ~ 300 ㎒	5.4 dB
	300 ㎒ ~ 1 000 ㎒	5.5 dB
	Above 1 ㎓	6.7 dB
Conducted emissions	9 ㎑ ~ 150 ㎑	3.7 dB
	150 ㎑ ~ 30 ㎒	3.3 dB

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6. Test results

6.1. 10 dB Bandwidth

Limit

FCC

According to §15.503(a), For the purpose of this subpart, the UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated f_H and the lower boundary is designated f_L. The frequency at which the highest radiated emission occurs is designated f_M.

Center frequency. The center frequency, f_C, equals $(f_H + f_L) / 2$.

Fractional bandwidth. The fractional bandwidth equals $2(f_H - f_L) / (f_H + f_L)$.

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 ㎒, regardless of the fractional bandwidth.

According to §15.519(b), The UWB bandwidth of a device operating under the provisions of this section must be contained between 3 100 ㎒ and 10 600 ㎒.

IC

According to §RSS-220(2), Ultra-wideband is a short-range radiocommunication technology involving the intentional generation and transmission of radio frequency energy that spreads over a very large frequency range, which may overlap several frequency bands allocated to various radiocommunication services.

A UWB device is an intentional radiator that has either a -10 dB bandwidth[1] of at least 500 ㎒ or a -10 dB fractional bandwidth2 greater than 0.2. There are eight distinct subclasses of UWB device.

Test procedure

ANSI C63.10 - Section 10.1

Test settings

RBW	1 ㎒
VBW	1 ㎒ or greater.
Detector	Peak
Trace mode	Max-hold
Sweep	Auto couple

The trace was allowed to stabilize

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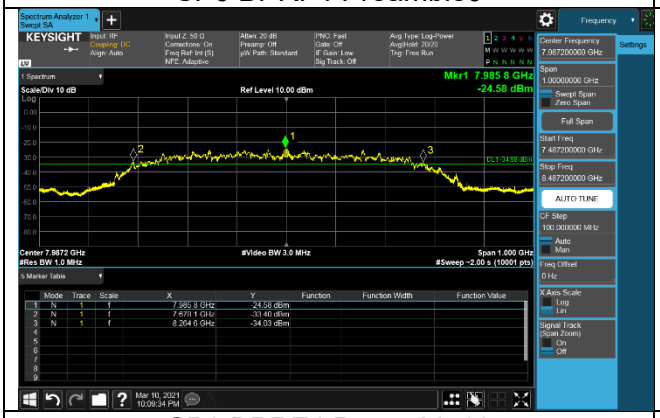
Test results

Channel	Configure	Packet length [Bytes]	Preamble	F_L [MHz]	F_H [MHz]	F_C [MHz]	BW [MHz]
9	SP0	4	9	7 678.10	8 264.60	7 971.35	586.50
			11	7 673.80	8 267.50	7 970.65	593.70
			12	7 678.70	8 263.90	7 971.30	585.20
		20	9	7 676.60	8 264.40	7 970.50	587.80
			11	7 675.80	8 285.50	7 980.65	609.70
			12	7 679.00	8 266.50	7 972.75	587.50
	SP3	-	9	7 706.40	8 268.20	7 987.30	561.80
			11	7 706.50	8 268.10	7 987.30	561.60
			12	7 706.40	8 267.90	7 987.15	561.50

CH9

SP0 BPRF4 Preamble9



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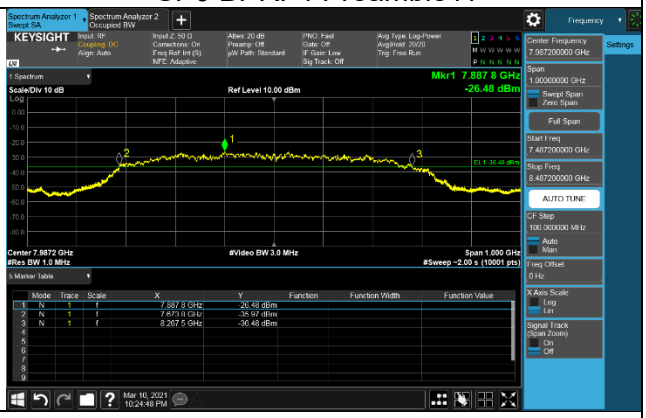

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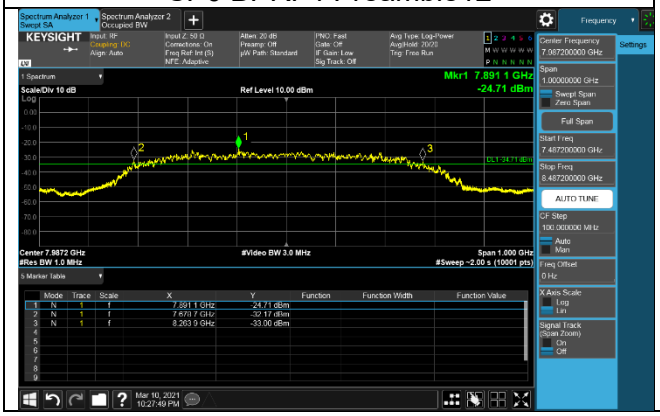

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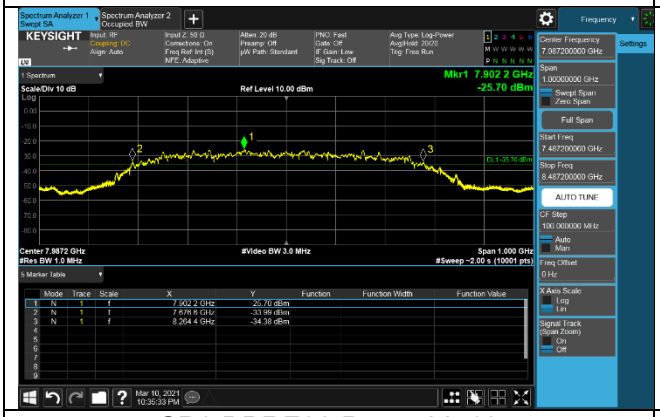

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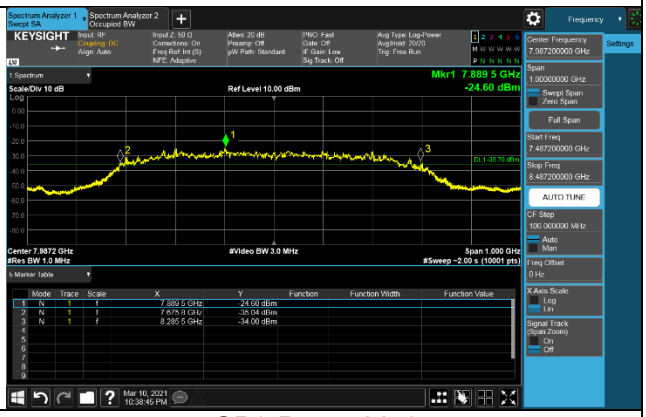

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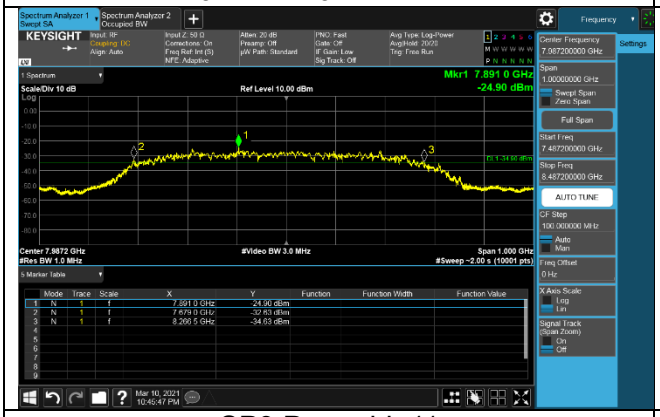
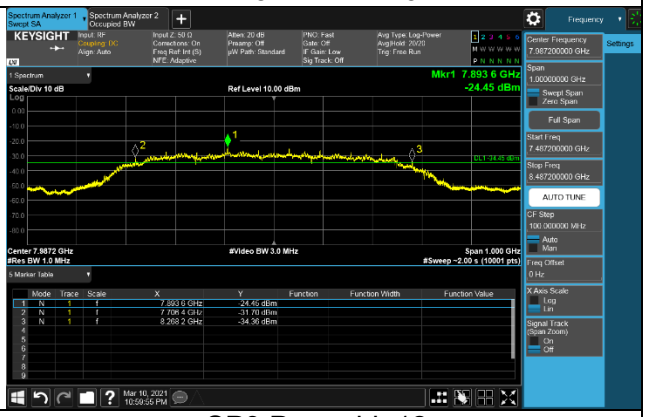


SP3 Preamble9



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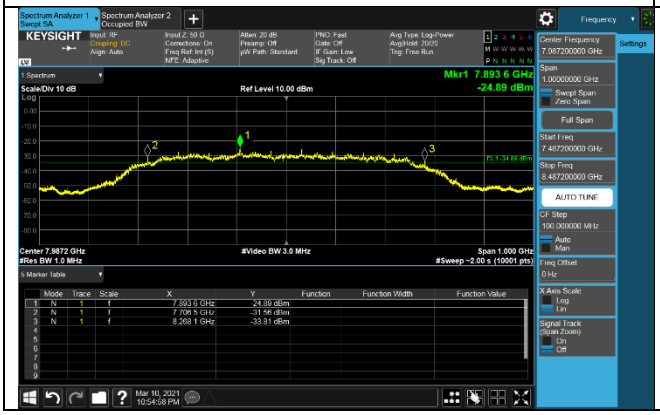

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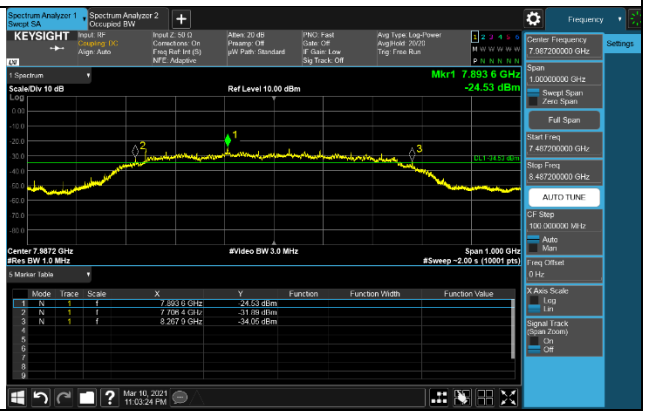

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6.2. Occupied Bandwidth

Limit

IC

According to §RSS-Gen(6.7) For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

Test procedure

ANSI C63.10 - Section 6.9

Test settings

The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 10 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

RBW	1 – 5% of the actual occupied / x dB
VBW	RBW X 3
Detector	Peak
Trace mode	Max-hold
Sweep	Auto couple

The trace was allowed to stabilize

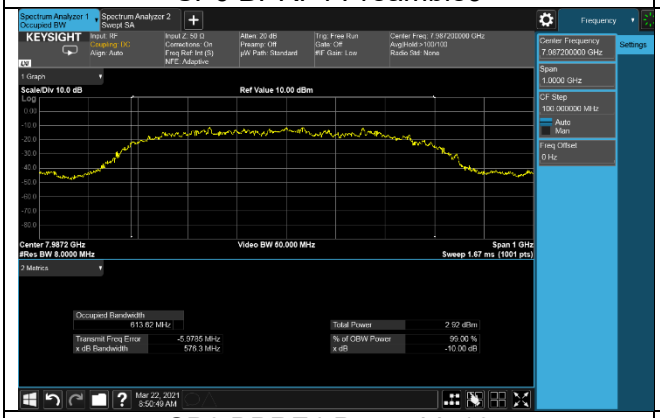
It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

Test results

Channel	Configure	Packet length [Bytes]	Preamble	Occupied Bandwidth [MHz]	Minimum Bandwidth [MHz]
9	SP0	4	9	613.62	500.00
			11	613.25	
			12	613.82	
		20	9	615.62	
			11	613.12	
			12	613.35	
	SP3	-	9	619.51	
			11	621.46	
			12	621.45	

CH9

SP0 BPRF4 Preamble9



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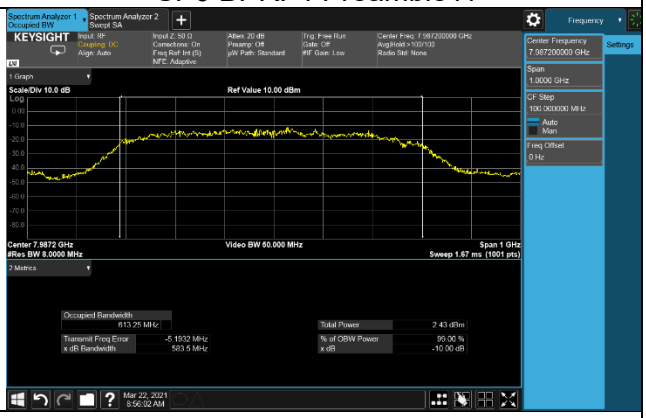

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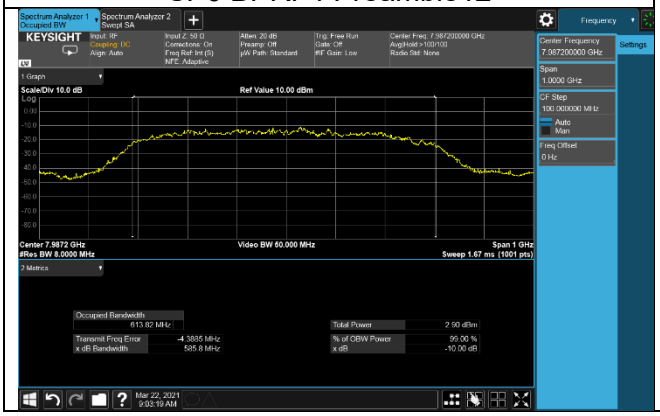

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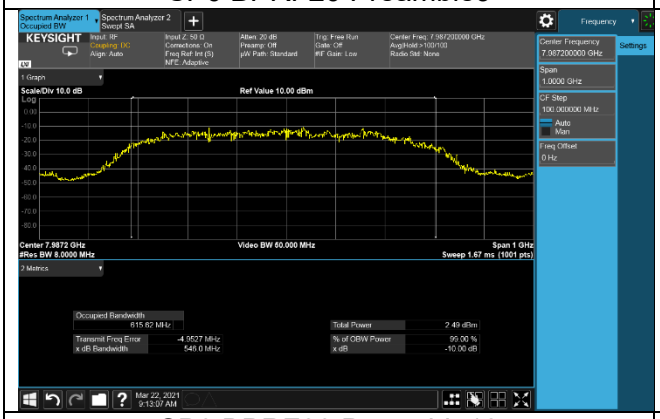

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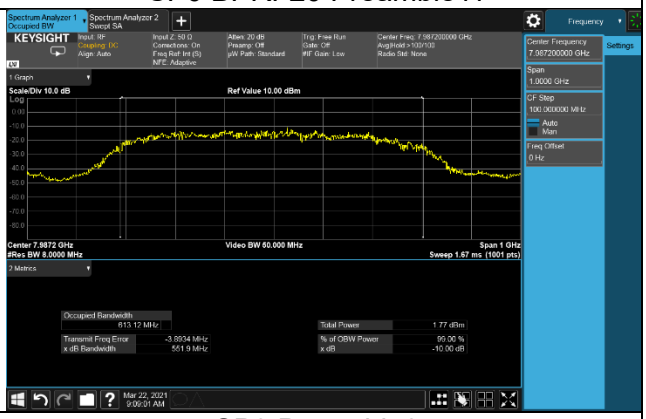

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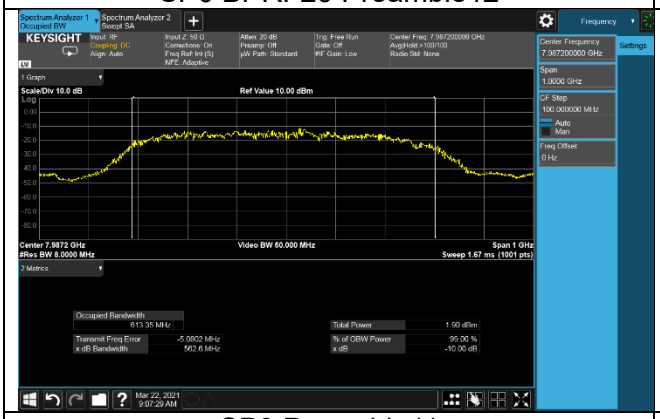
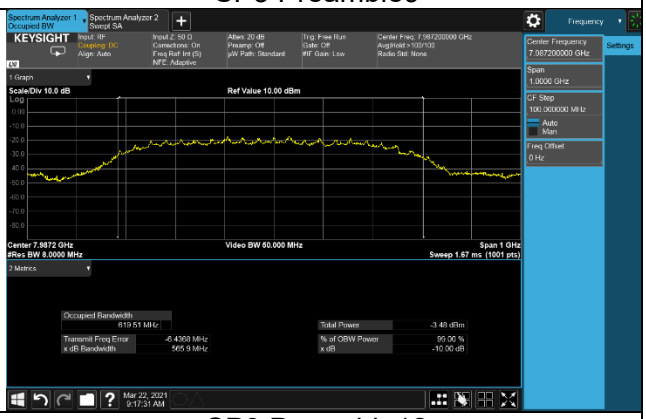
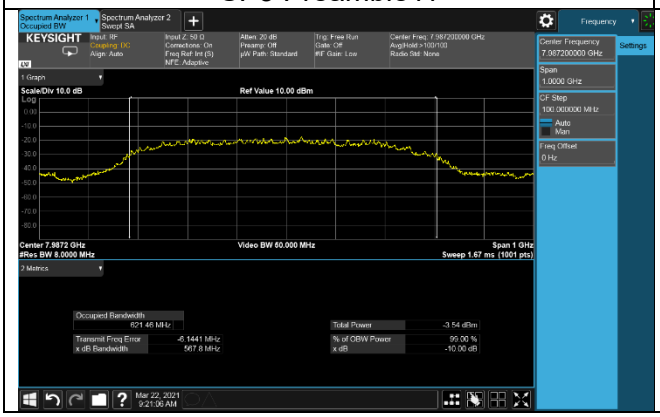


SP3 Preamble9



SP3 Preamble11



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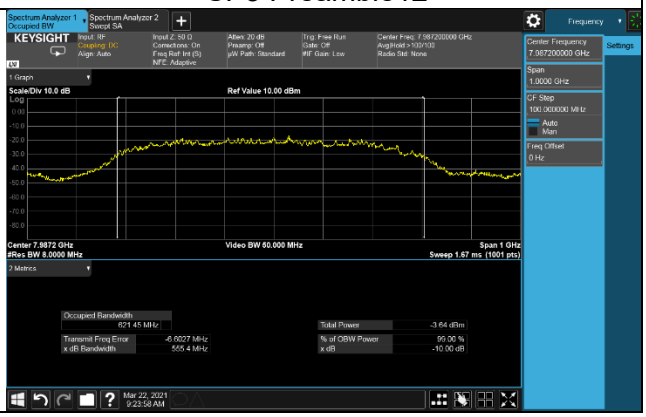


6.3. Peak Power & Maximum Average Emission

Limit

According to §15.519(c)and RSS-247(5.2), The radiated emissions at or below 960 ㎒ from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 ㎒ from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 ㎒:

Frequency in ㎒	EIRP in dBm
3 100-10 600	**-41.3**

According to §15.519(e)peak level of the emissions contained within a 50 ㎒ bandwidth centered on the frequency at which the highest radiated emission occurs, f_M. That limit is 0 dBm EIRP

Test procedure

ANSI C63.10 – Section 10.3.5 and 10.3.7

Test settings

Peak EIRP Measurements

RBW	50 ㎒
VBW	50 ㎒
Detector	Peak
Trace mode	Max-hold
Sweep	Auto couple

The trace was allowed to stabilize

Average EIRP Measurements

RBW	1 ㎒
VBW	3 ㎒
Detector	Average(RMS)
Trace mode	Max-hold
Sweep time	No more than a 1 ms integration period over each measurement bin

The trace was allowed to stabilize

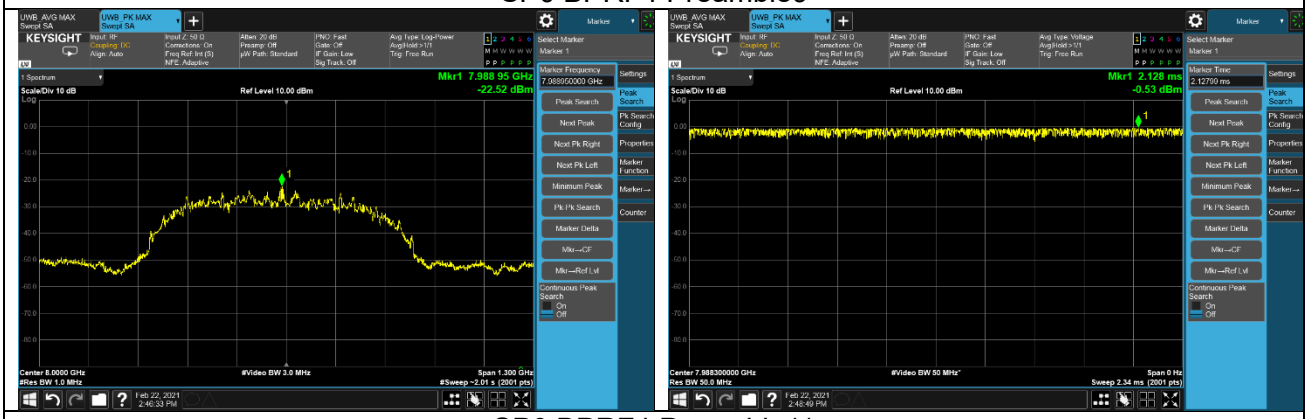
Test results

CH.	Config.	Packet length [Bytes]	Preamble	Peak power [dBm/50MHz]	Peak limit [dBm/50MHz]	Margin [dB]	AV power [dBm/MHz]	AV limit [dBm/MHz]	Margin [dB]
9	SP0	4	9	-0.53	0.00	0.53	-44.28	-41.30	2.98
			11	-5.14		5.14	-44.41		3.11
			12	-3.78		3.78	-44.53		3.23
		20	9	-3.64		3.64	-44.09		2.79
			11	-4.34		4.34	-43.97		2.67
			12	-3.65		3.65	-44.12		2.82
	SP3	-	9	-12.91		12.91	-43.26		1.96
			11	-13.49		13.49	-43.49		2.19
			12	-13.24		13.24	-43.42		2.12

Peak power

CH9

SP0 BPRF4 Preamble9



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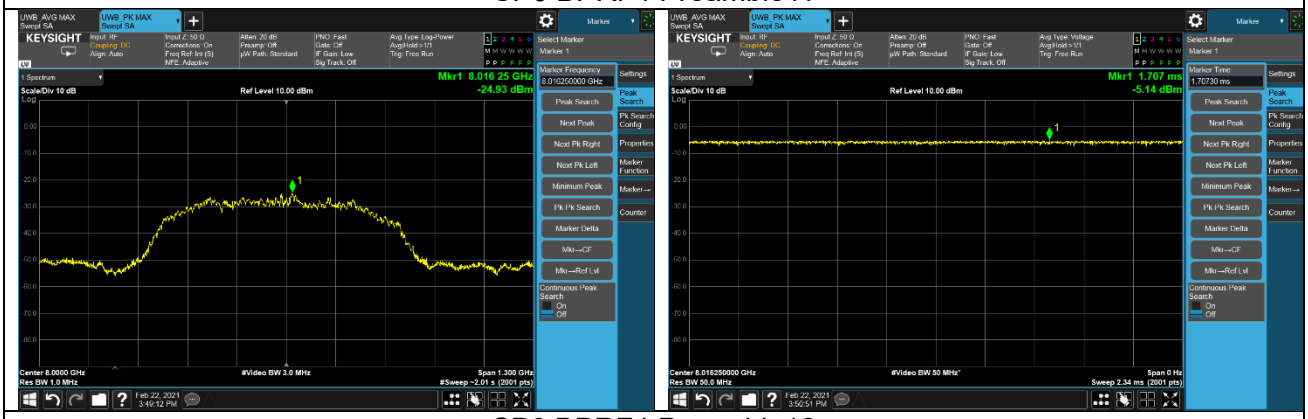

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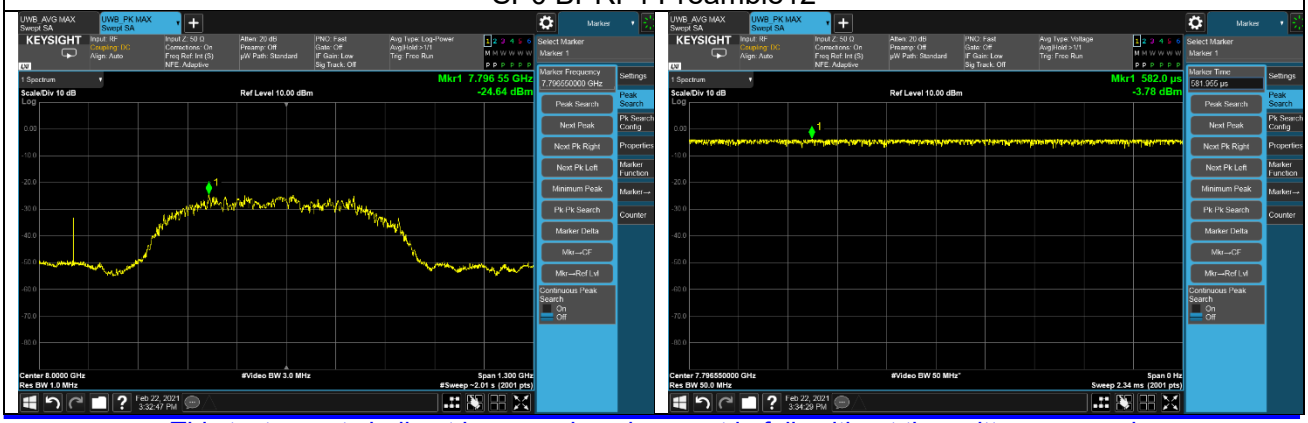

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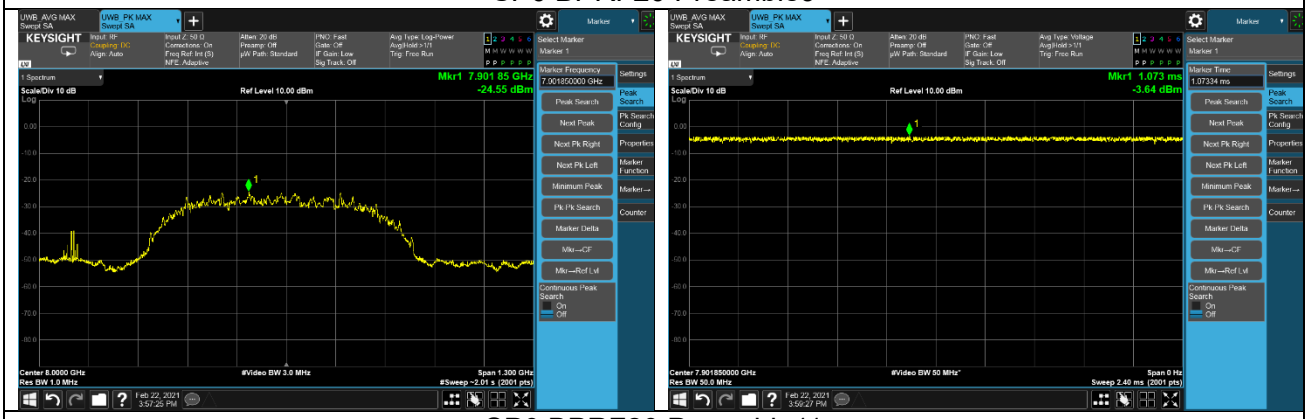
SP0 BPRF20 Preamble9



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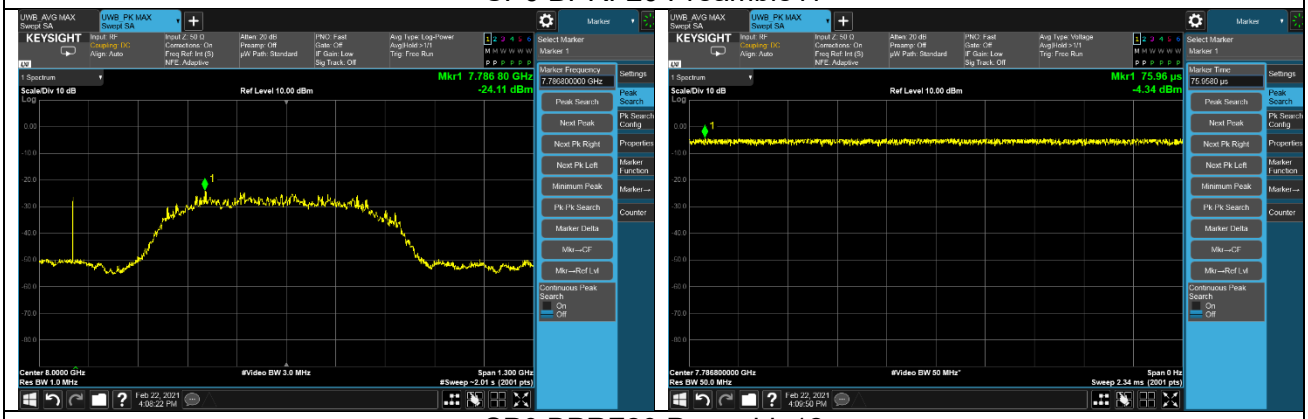

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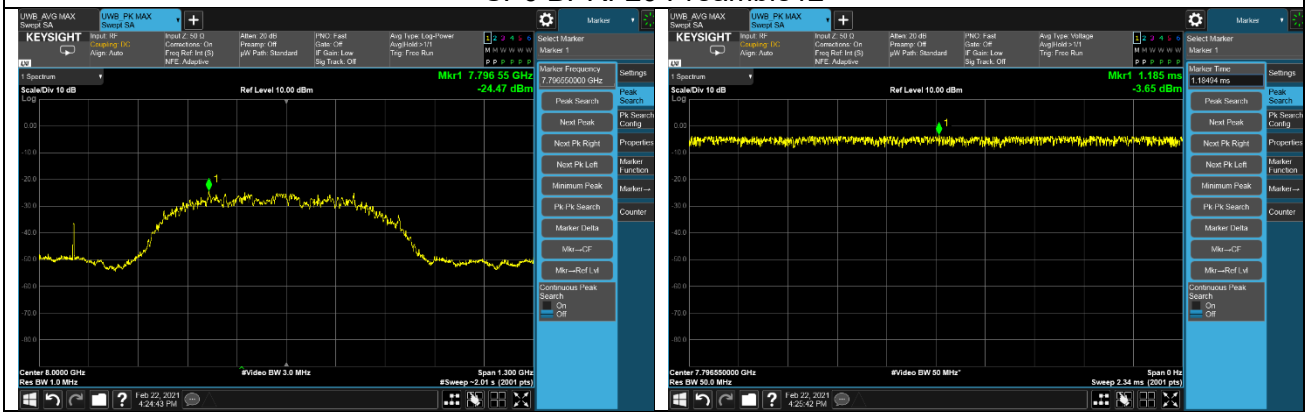

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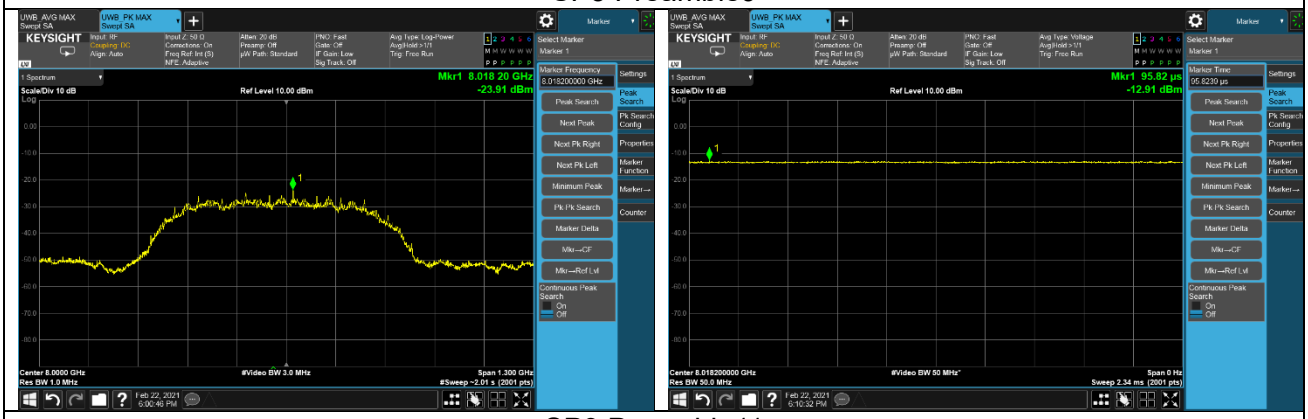
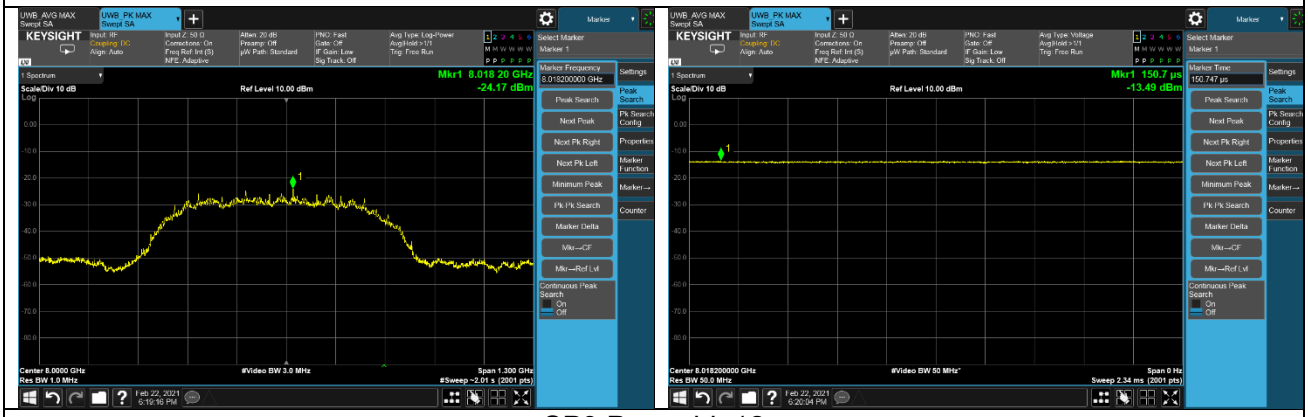
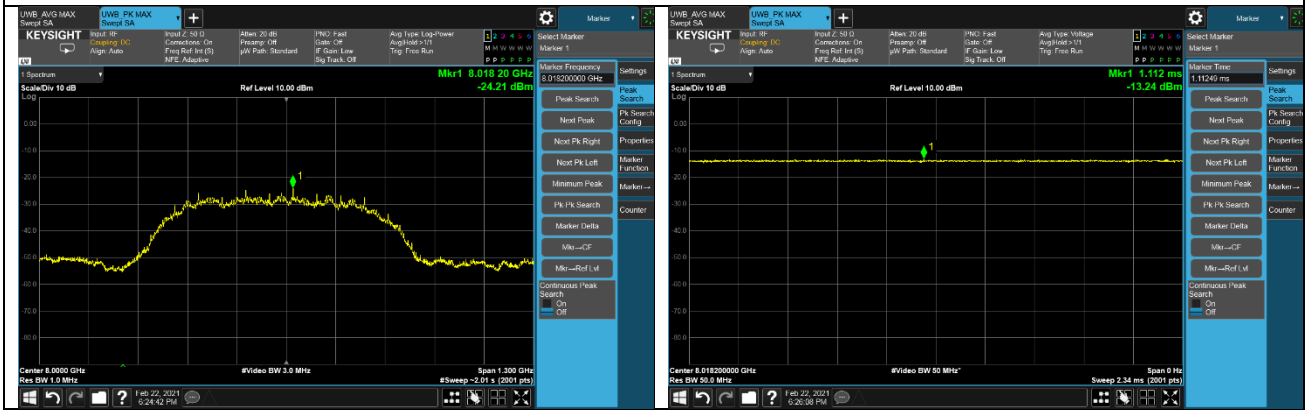
SP3 Preamble9



SP3 Preamble11



SP3 Preamble12



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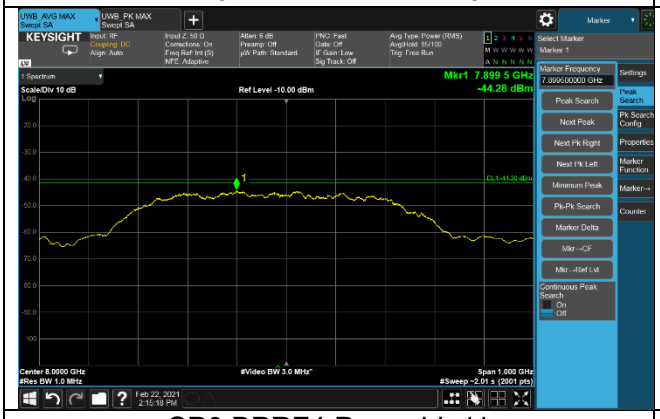
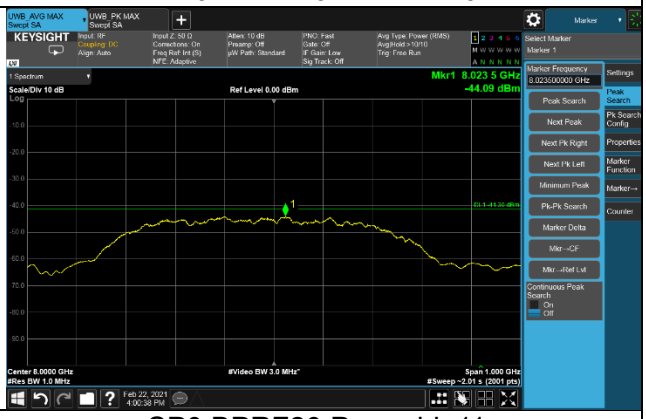
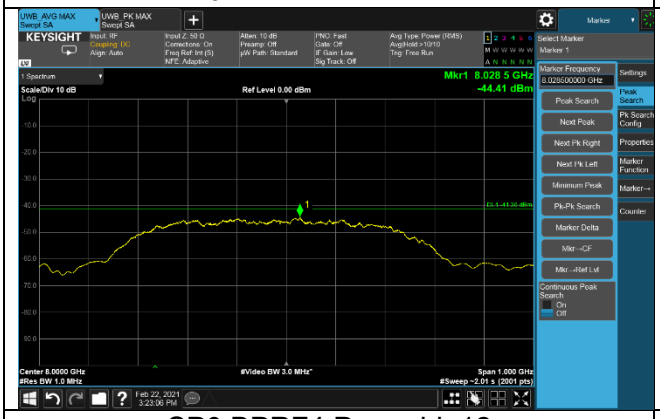
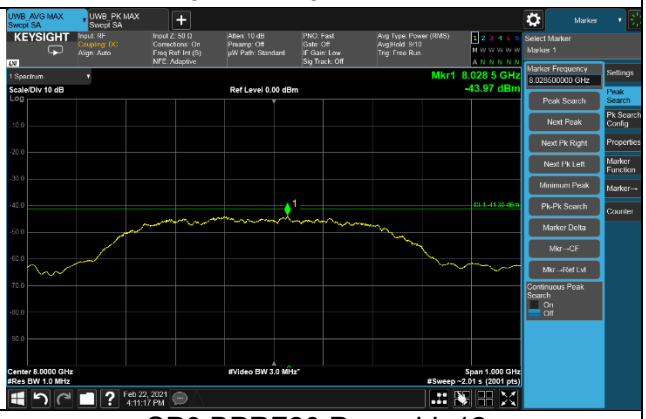
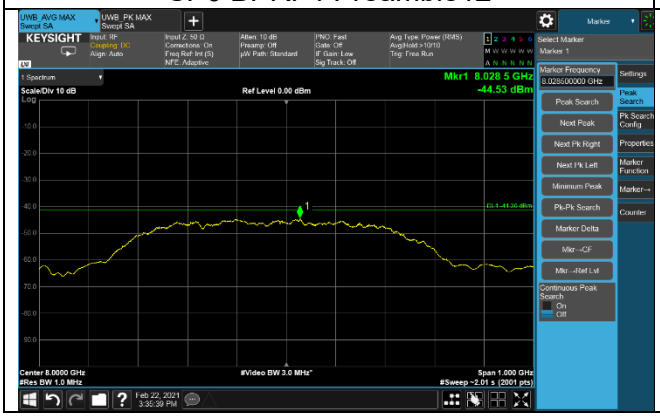
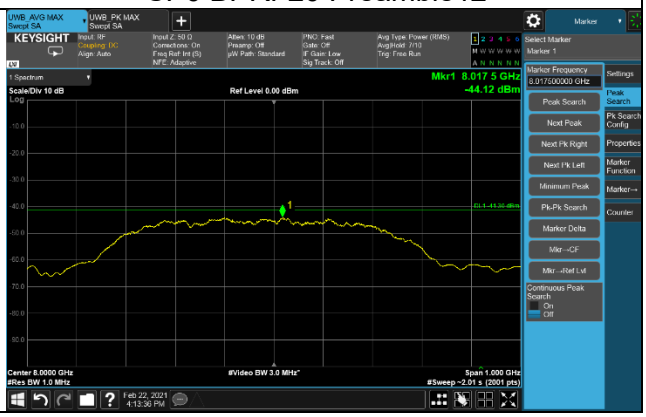
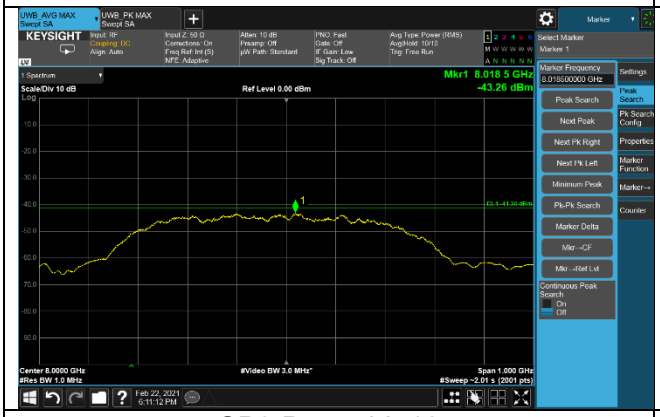
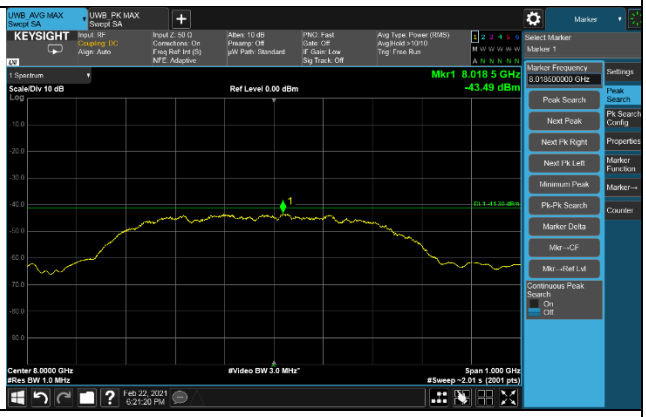
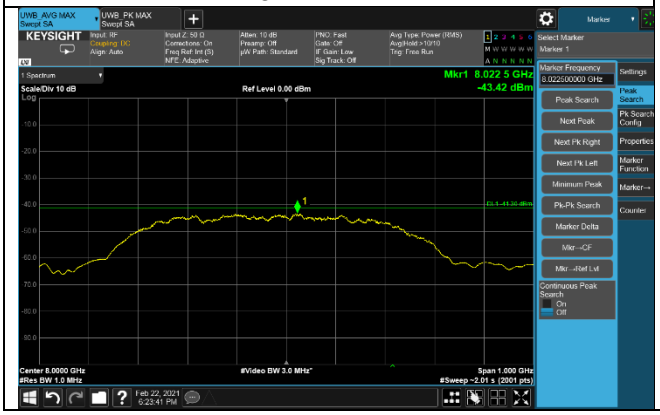
Average power

CH9	
SP0 BPRF4 Preamble9	SP0 BPRF20 Preamble9
	
SP0 BPRF4 Preamble11	SP0 BPRF20 Preamble11
	
SP0 BPRF4 Preamble12	SP0 BPRF20 Preamble12
	

SP3 Preamble9	SP3 Preamble11
	
SP3 Preamble12	
	Blank

6.4. Cease Transmission Time

Limit

FCC

According to section §15.519(a)(1), A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

IC

According to §RSS-220(5), The device is to transmit only when it is sending information to an associated receiver. The device shall cease transmission of information within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB device at least every 10 seconds or the UWB device shall cease transmitting any information other than periodic signals used for the establishment or re-establishment of a communication link with an associated receiver.

Test Procedure

KDB 393764 D01 v02

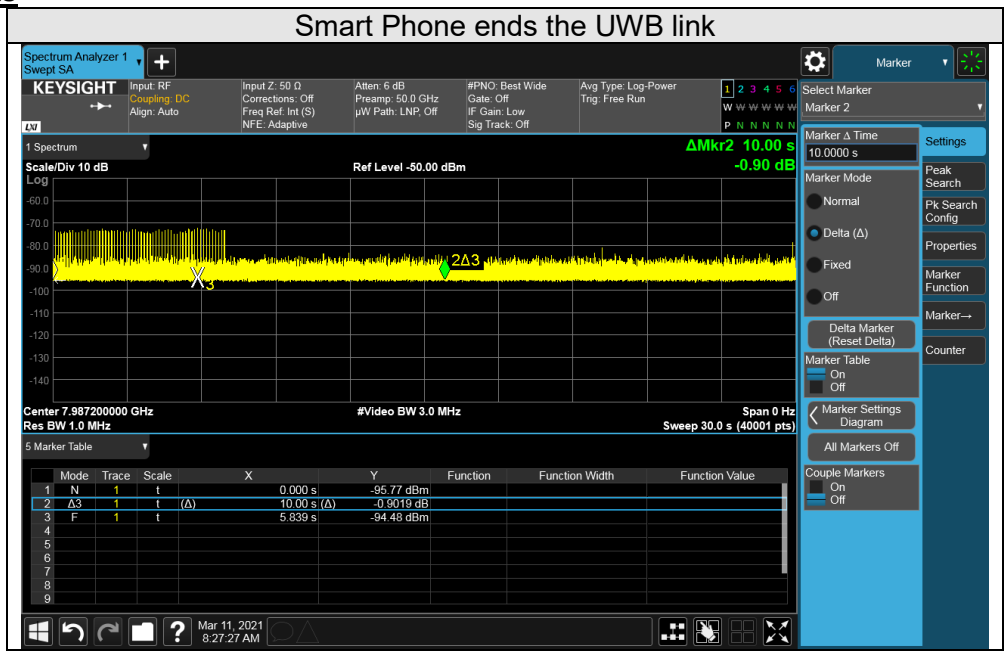
Test settings

RBW	1 ㎒
VBW	3 ㎒
Span	Zero Span Mode

Sweep time shall be sufficient to demonstrate EUT’s compliance with the rule part.

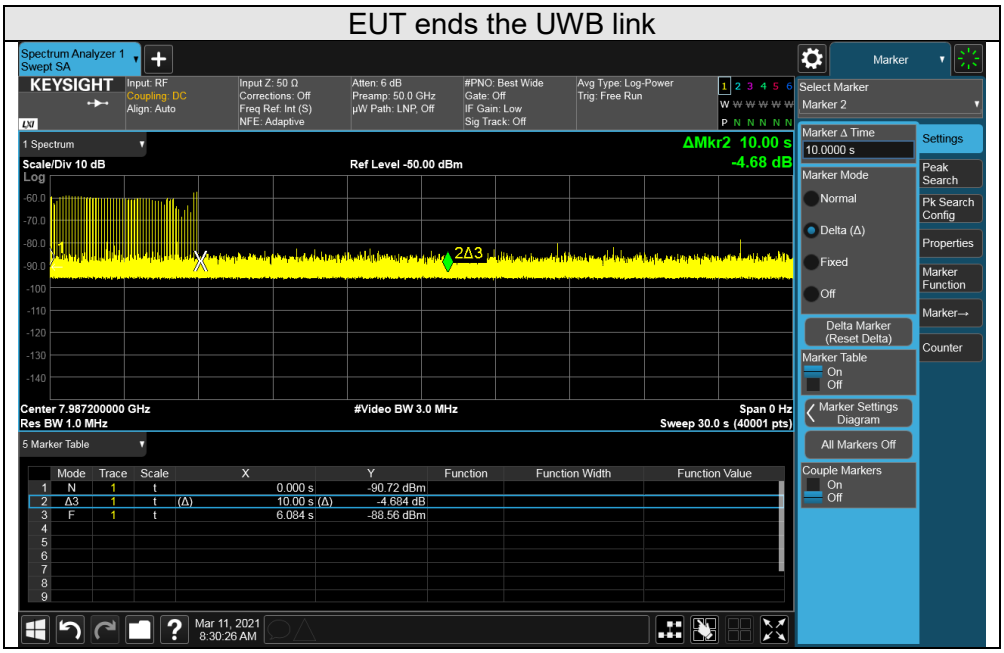
Test results

Smart Phone ends the UWB link



*Marker 1 : EUT and smart phone are linked.
*Marker 3 : Smart phone ends UWB link.
*Marker 2Δ3 : “10s” after EUT ends UWB link.
EUT detects “Smart Phone ends UWB link” and ceases transmitting within 10 seconds.

EUT ends the UWB link



*Marker 1 : EUT and smart phone are linked.
*Marker 3 : EUT ends UWB link.
*Marker 2Δ3 : “10s” after EUT ends UWB link.
EUT ceases transmitting within 10 seconds.

- **Companion Device information**

Equipment name	Manufacturer	Model No.	FCC ID	Serial No.
Mobile Phone	Samsung Electronics Co., Ltd.	SM-N986B	A3LSMN986B	R3CN40CDBSH

6.5. Radiated Spurious Emission – Above 960 ㎒

Limit

According to §15.519(c) and RSS-220(5), The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 ㎒ from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 ㎒:

Frequency[㎒]	EIRP[㏈m]
960-1 610	-75.3
1 610-1 990	-63.3
1 990-3 100	-61.3
3 100-10 600	-41.3
Above 10 600	-61.3

***FCC Radiated Spurious Emission Limit**

Frequency[㎒]	EIRP[㏈m]
960-1 610	-75.3
1 610-4 750	-70.0
4 750-10 600	-41.3
Above 10 600	-61.3

***IC Radiated Spurious Emission Limit**

Frequency[㎒]	EIRP[㏈m]
1 164-1 240	-85.3
1 559-1 610	-85.3

***FCC/IC Radiated Spurious Emission Limit for GPS Frequency bands**

Test procedure

ANSI C63.10-2013 - Section 10.3
KDB 393764 D01 v02

*The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1 ㎓ and 150 cm for above 1 ㎓. The antenna to EUT distance is 0.5 or 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

Test settings

RBW	1 ㎒ (30 ㎑ for emissions in the GPS band)
VBW	3 ㎒ (100 ㎑ for emissions in the GPS band)
Detector	Average (RMS)
Trace mode	Max-hold
Sweep time	No more than a 1ms integration period over each measurement bin
The trace was allowed to stabilize	

*Emission was scanned up to 40 ㎓; No emissions were detected above the noise floor which was at least 20 ㏈ below the specification limit.
* It was recorded for the SP3_Preamble 9 mode.

Test results

960 ㎒ ~ 6 000 ㎒

Frequency [㎒]	Pol. [V/H]	Reading [dBm]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1 595.05	H	-78.15	28.47	-58.11	-3.82	-81.97	-75.30	6.67
1 596.35	V	-76.37	28.47	-58.11	-3.82	-80.19	-75.30	4.89
1 985.82	H	-78.99	31.20	-57.45	-3.82	-82.81	-63.30	19.51
1 882.46	V	-77.51	30.48	-57.63	-3.82	-81.33	-63.30	18.03
3 082.20	H	-76.22	33.50	-55.96	-3.82	-80.04	-61.30	18.74
2 425.10	V	-74.72	31.90	-56.51	-3.82	-78.54	-61.30	17.24
5 434.50	H	-72.28	35.01	-51.00	-3.82	-76.10	-41.30	34.80
5 518.60	V	-72.36	35.10	-50.74	-3.82	-76.18	-41.30	34.88

9 000 ㎒ ~ 18 000 ㎒

Frequency [㎒]	Pol. [V/H]	Reading [dBm]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
9 702.40	H	-65.17	37.00	-49.71	-3.82	-68.99	-41.30	27.69
9 659.20	V	-68.10	36.96	-49.55	-3.82	-71.92	-41.30	30.62
15 972.40	H	-59.39	40.38	-46.99	-3.82	-63.21	-61.30	1.91
12 916.20	V	-64.64	39.07	-45.20	-3.82	-68.46	-61.30	7.16

1 610 ㎒ ~ 6 000 ㎒_(*IC : 1 610 ~ 4 750 ㎒ and 4 750 ~ 6 000 ㎒)

Frequency [㎒]	Pol. [V/H]	Reading [dBm]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
4 405.00	H	-74.34	33.89	-53.34	-3.82	-78.16	-70.00	8.16
4 408.00	V	-74.37	33.89	-53.33	-3.82	-78.19	-70.00	8.19
4 802.50	H	-68.03	34.24	-53.09	-3.82	-71.85	-41.30	30.55
6 000.00	V	-70.98	35.10	-52.21	-3.82	-74.80	-41.30	33.50

Notes:

Conversion Factor [dB] = 107 - 104.8 + 20*log(D_{Meas}) = -3.82 dB

D_{meas} = 0.5 m

Reading [dB**m**] = Analyzer Level + Ant. Factor + Amp. + Cable Loss

Result [dB**m**] = Reading + Conv. Factor

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1 164 ㎒ ~ 1 240 ㎒_(For GPS Band)

Frequency [㎒]	Pol. [V/H]	Reading [dBm]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1 164.08	H	-92.18	28.00	-58.77	-3.82	-96.00	-85.30	10.70
1 239.62	V	-91.43	27.96	-58.66	-3.82	-95.25	-85.30	9.95

1 559 ㎒ ~ 1 610 ㎒_(For GPS Band)

Frequency [㎒]	Pol. [V/H]	Reading [dBm]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1 559.55	H	-87.22	28.22	-58.17	-3.82	-91.04	-85.30	5.74
1 595.06	V	-87.21	28.47	-58.11	-3.82	-91.03	-85.30	5.73

Notes:

Conversion Factor [dB] = 107 - 104.8 + 20*log(D_{Meas}) = -3.82 dB

D_{meas} = 0.5 m

Reading [dB**m**] = Analyzer Level + Ant. Factor + Amp. + Cable Loss

Result [dB**m**] = Reading + Conv. Factor

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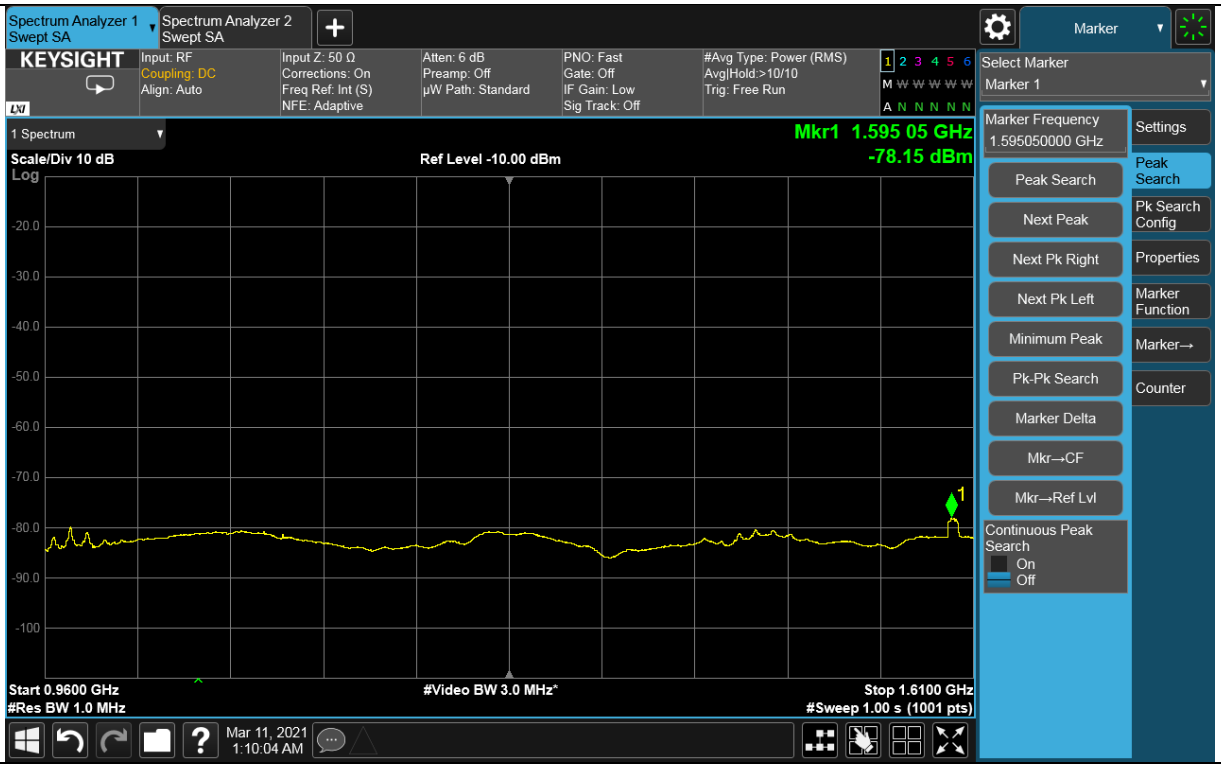
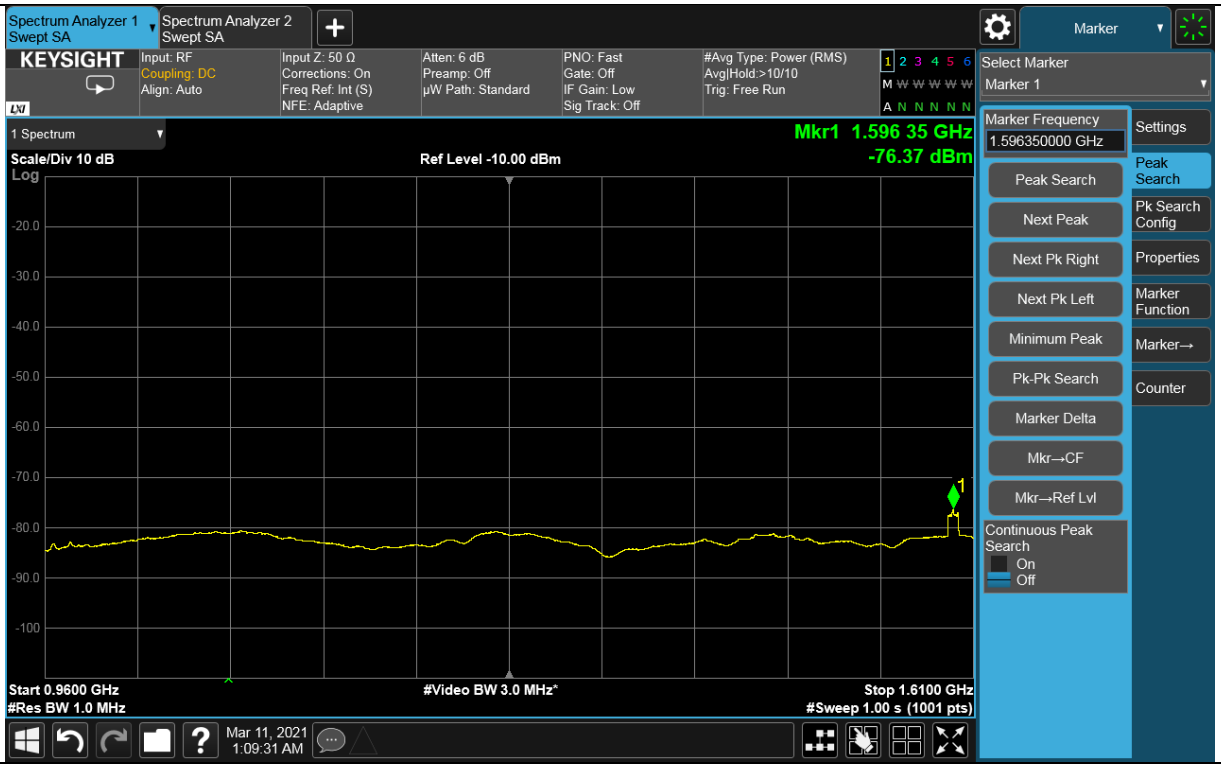
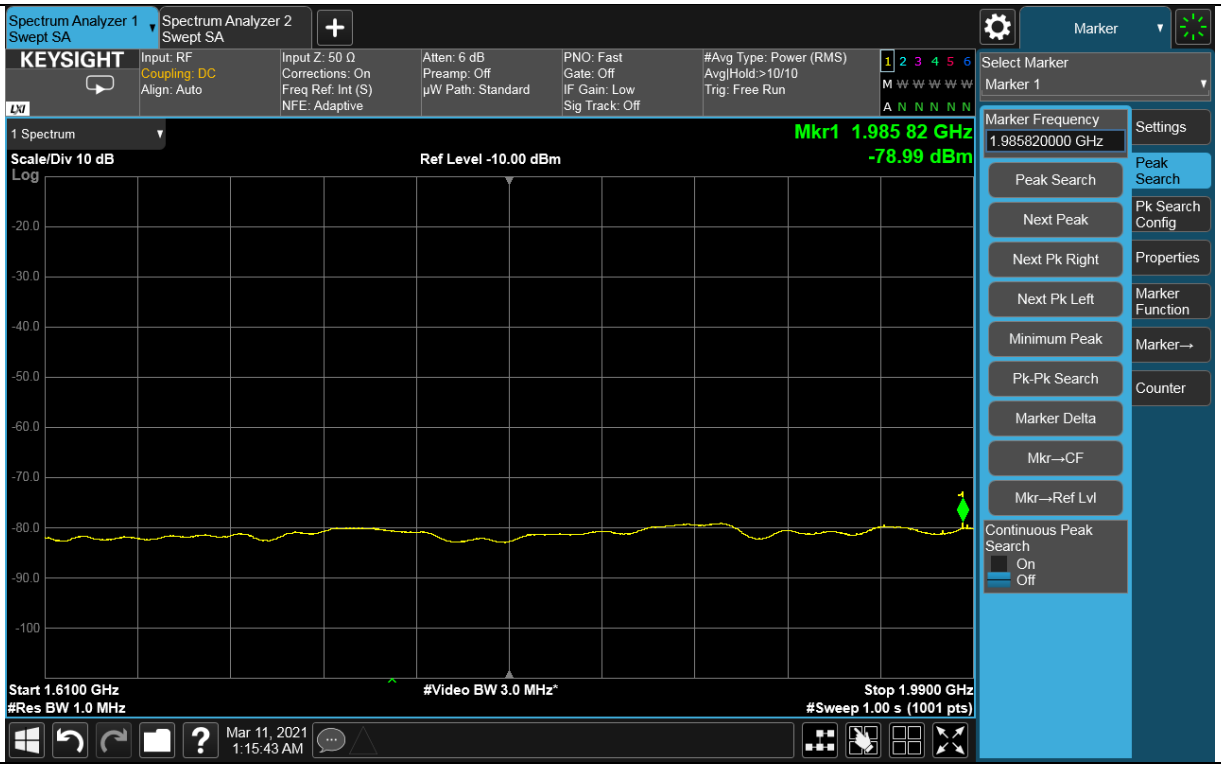
960 ㎒ ~ 1 610 ㎒ Horizontal



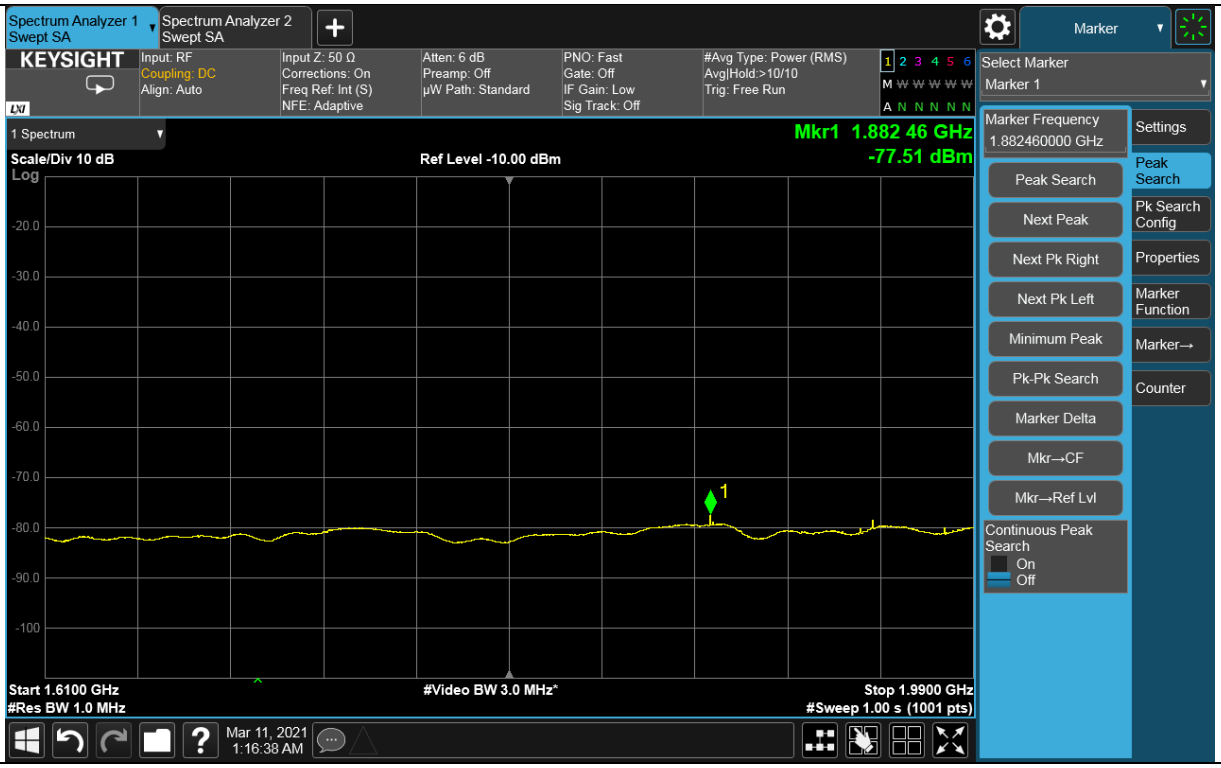
960 ㎒ ~ 1 610 ㎒ Vertical



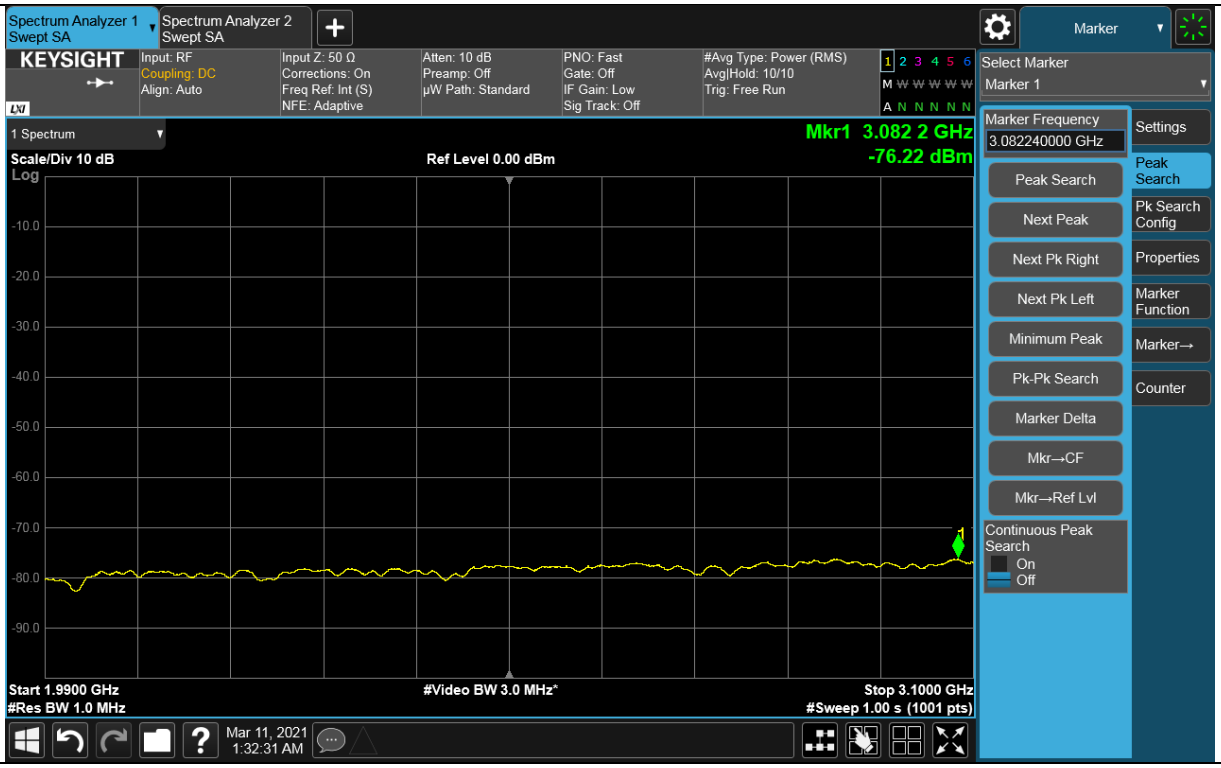
1 610 ㎒ ~ 1 990 ㎒ Horizontal



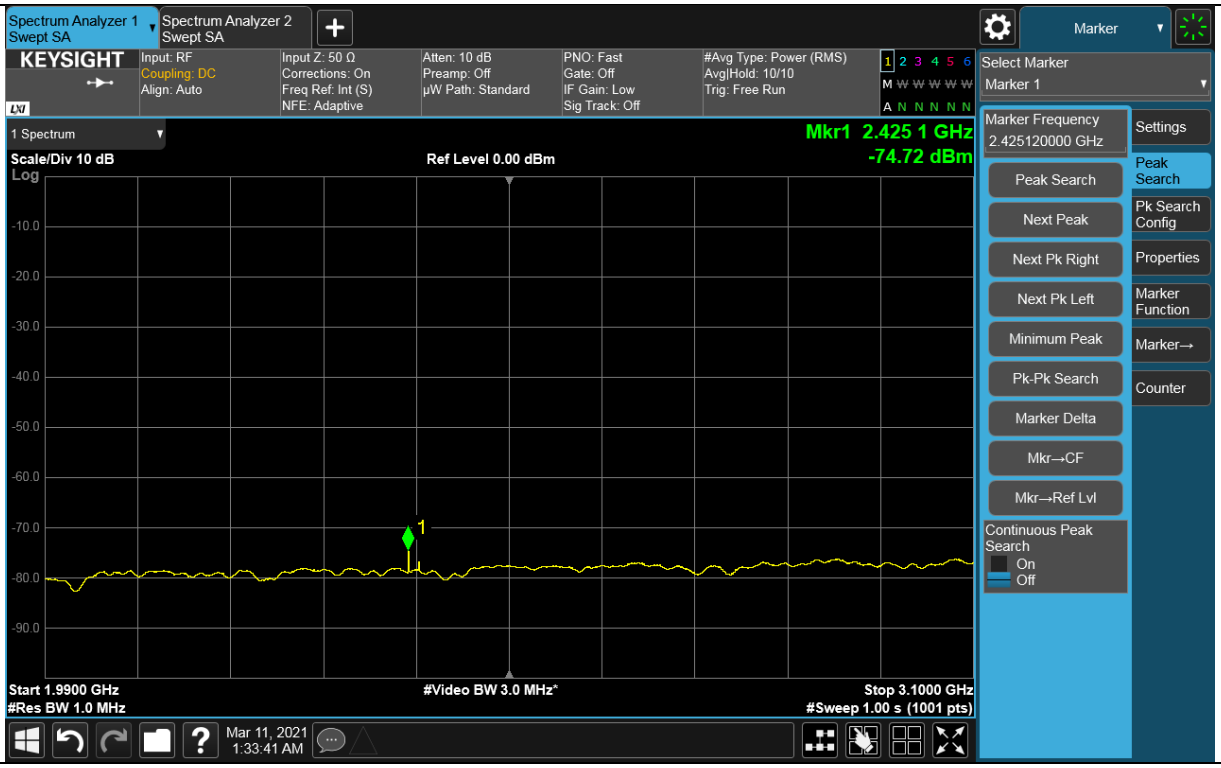
1 610 ㎒ ~ 1 990 ㎒ Vertical



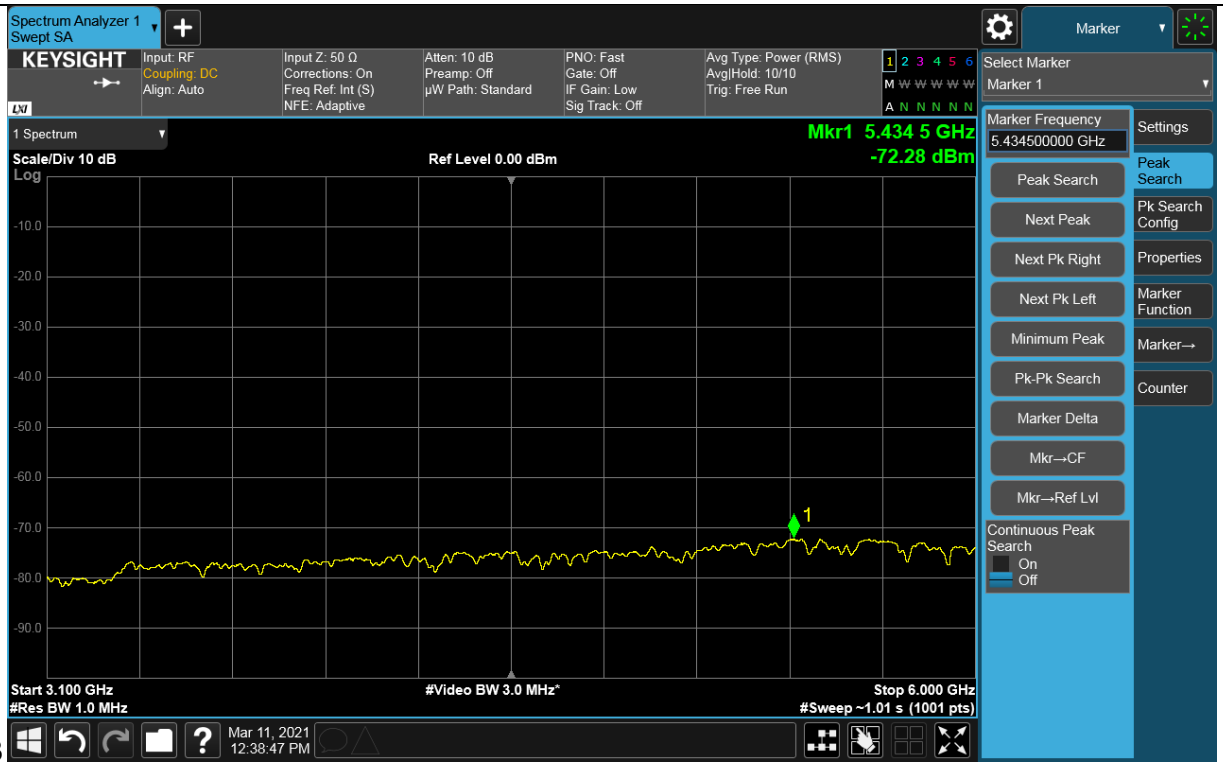
1 990 ㎒ ~ 3 100 ㎒ Horizontal



1 990 ㎒ ~ 3 100 ㎒ Vertical



3 100 ㎒ ~ 6 000 ㎒ Horizontal



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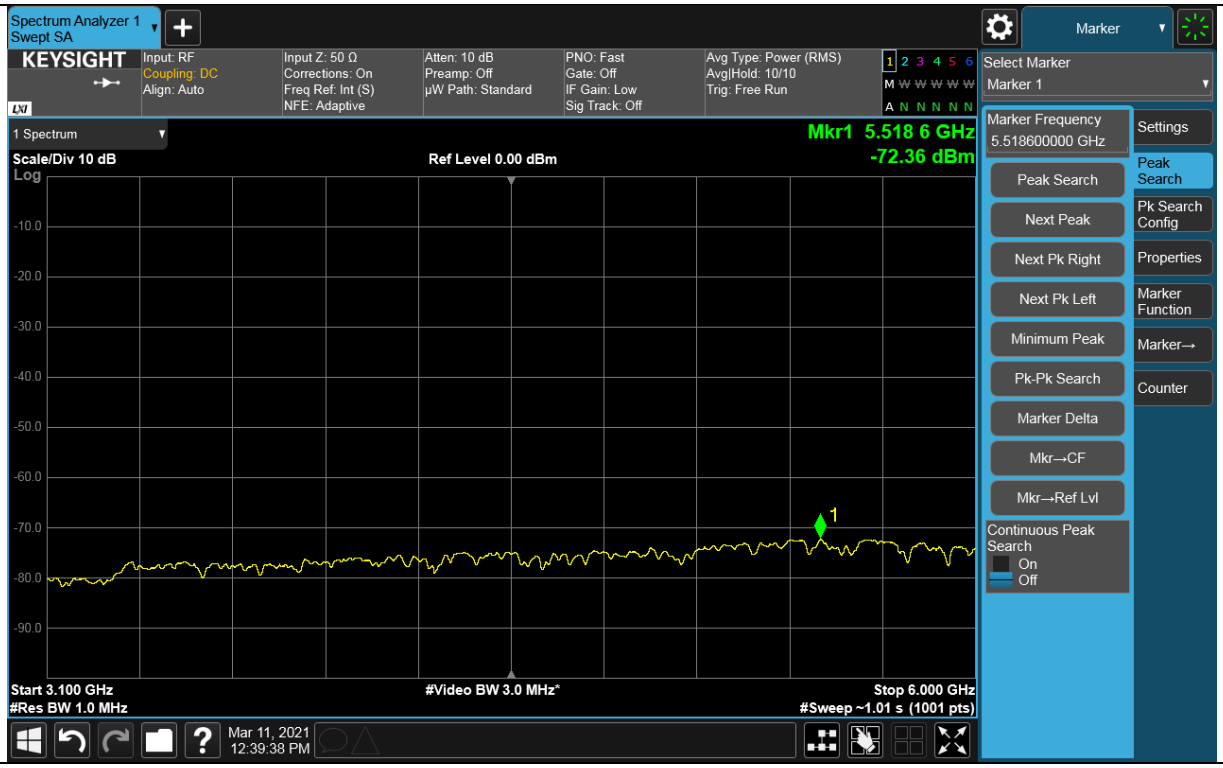
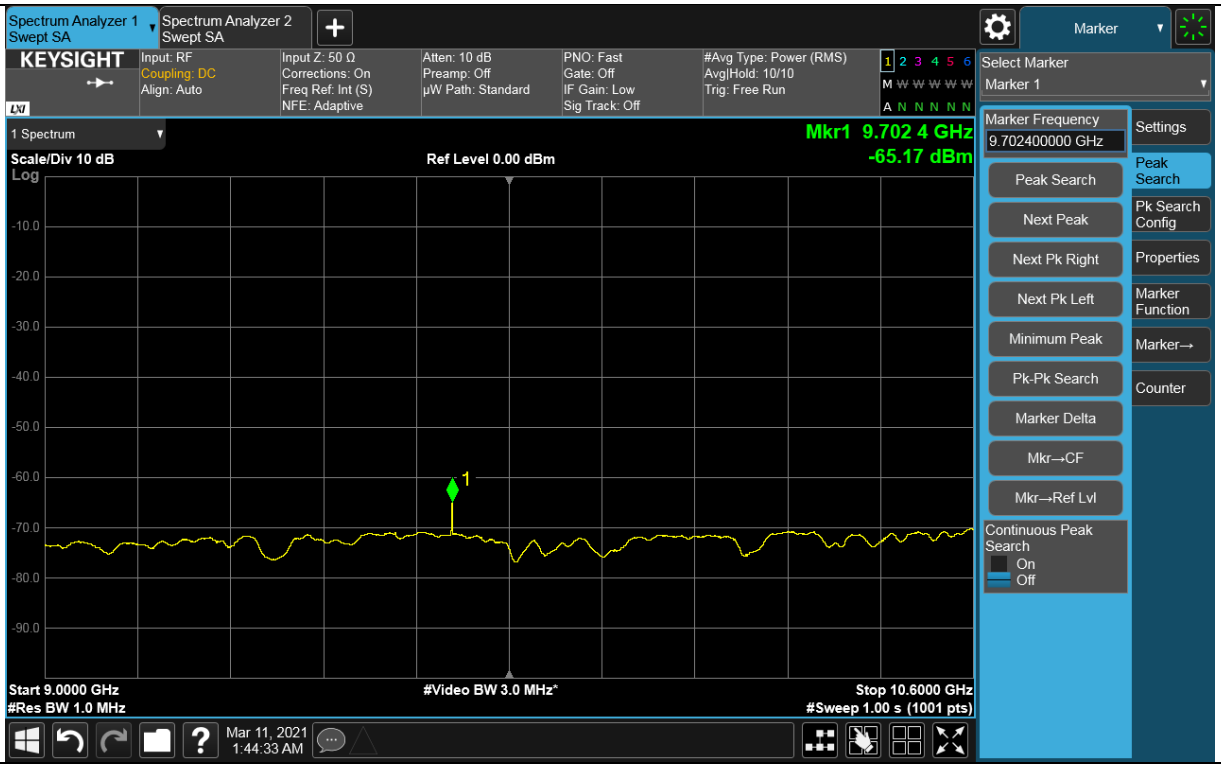
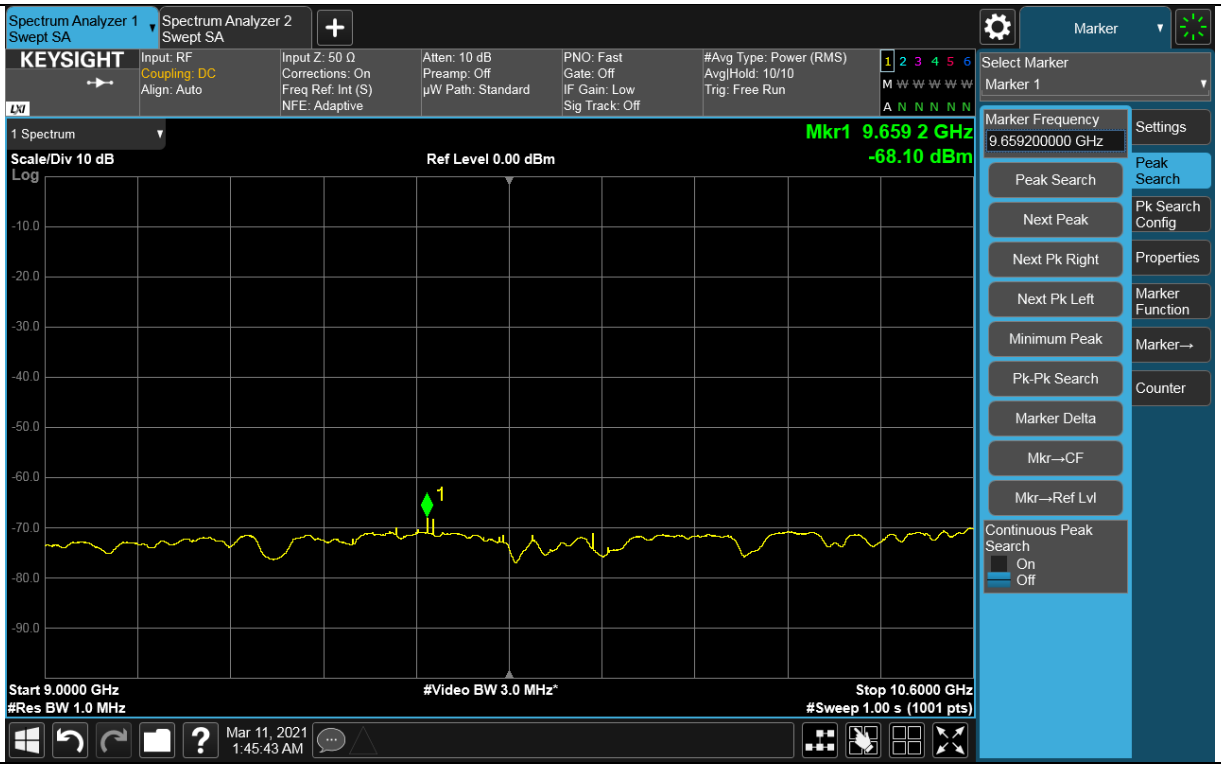
3 100 ㎒ ~ 6 000 ㎒ Vertical



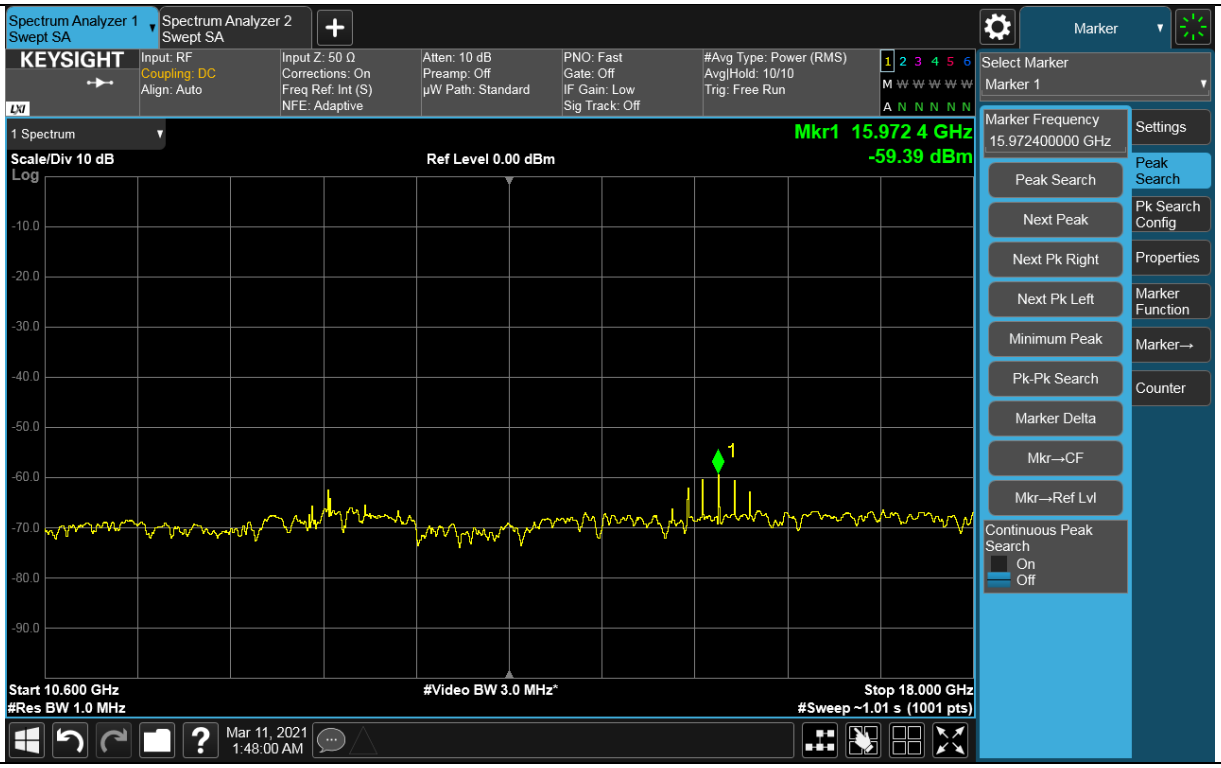
9 000 ㎒ ~ 10 600 ㎒ Horizontal



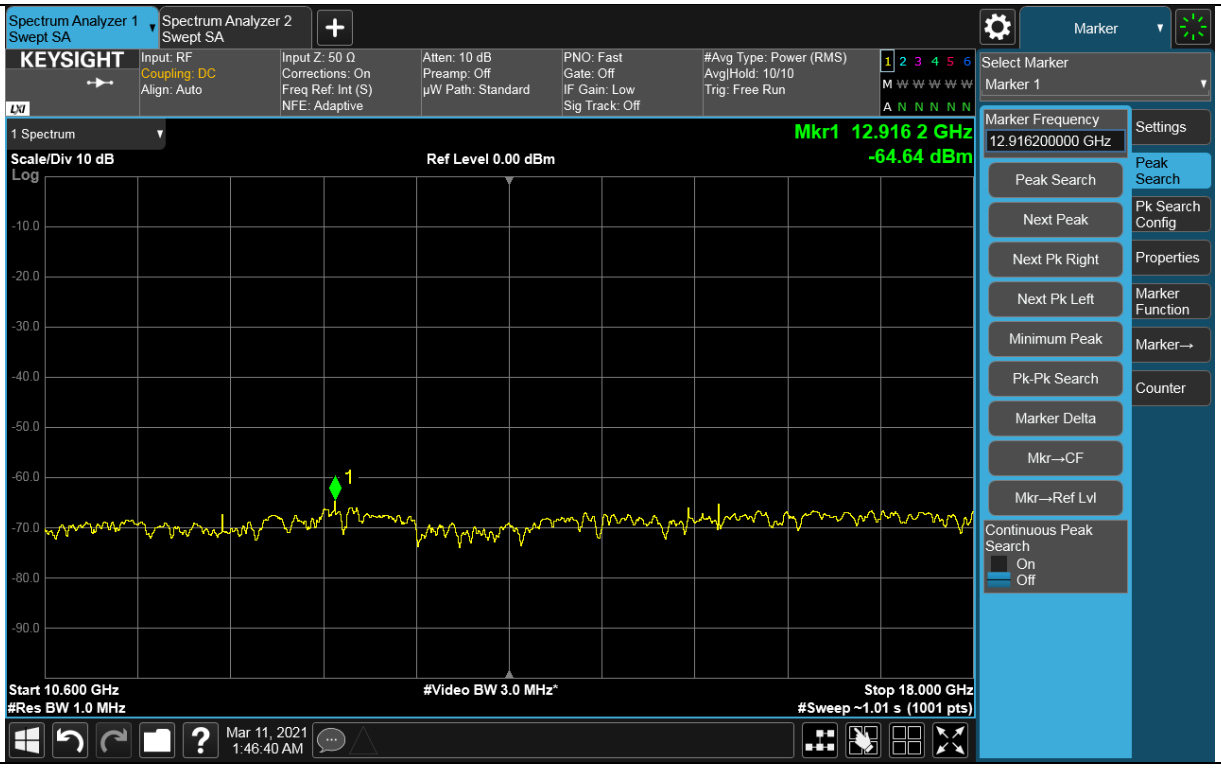
9 000 ㎒ ~ 10 600 ㎒ Vertical



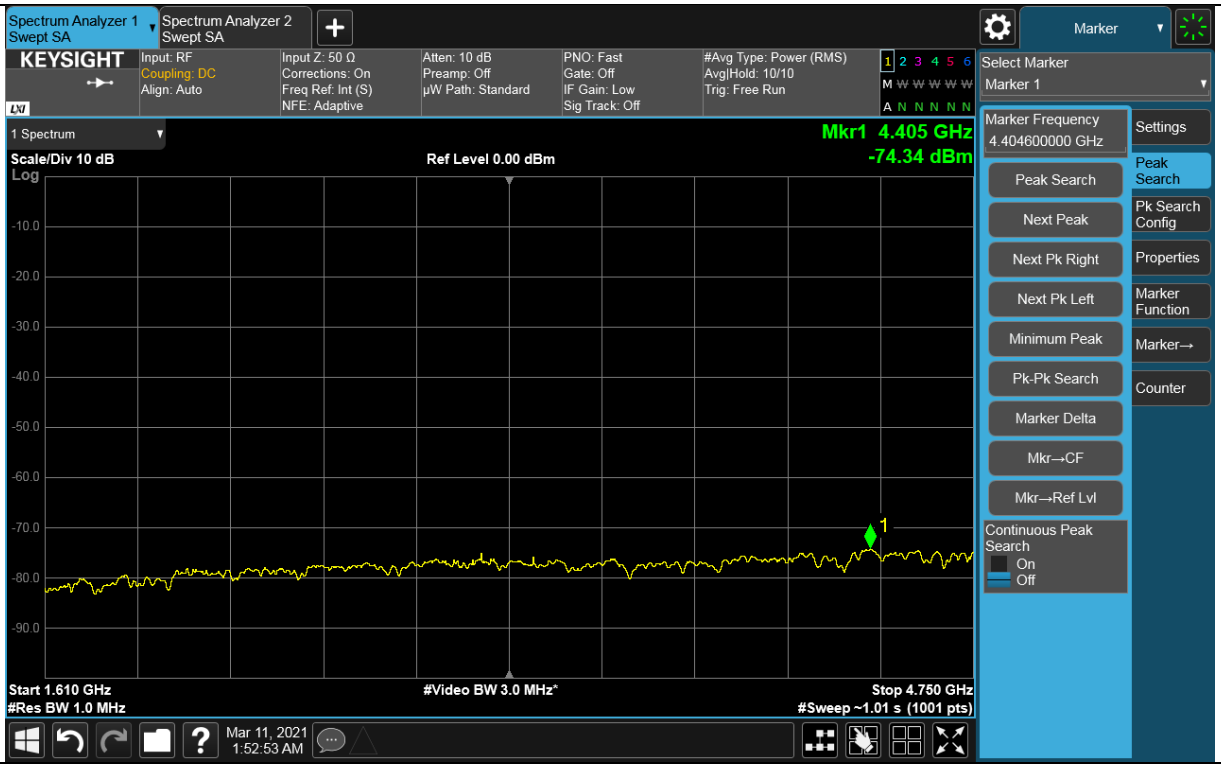
10 600 ㎒ ~ 18 000 ㎒ Horizontal



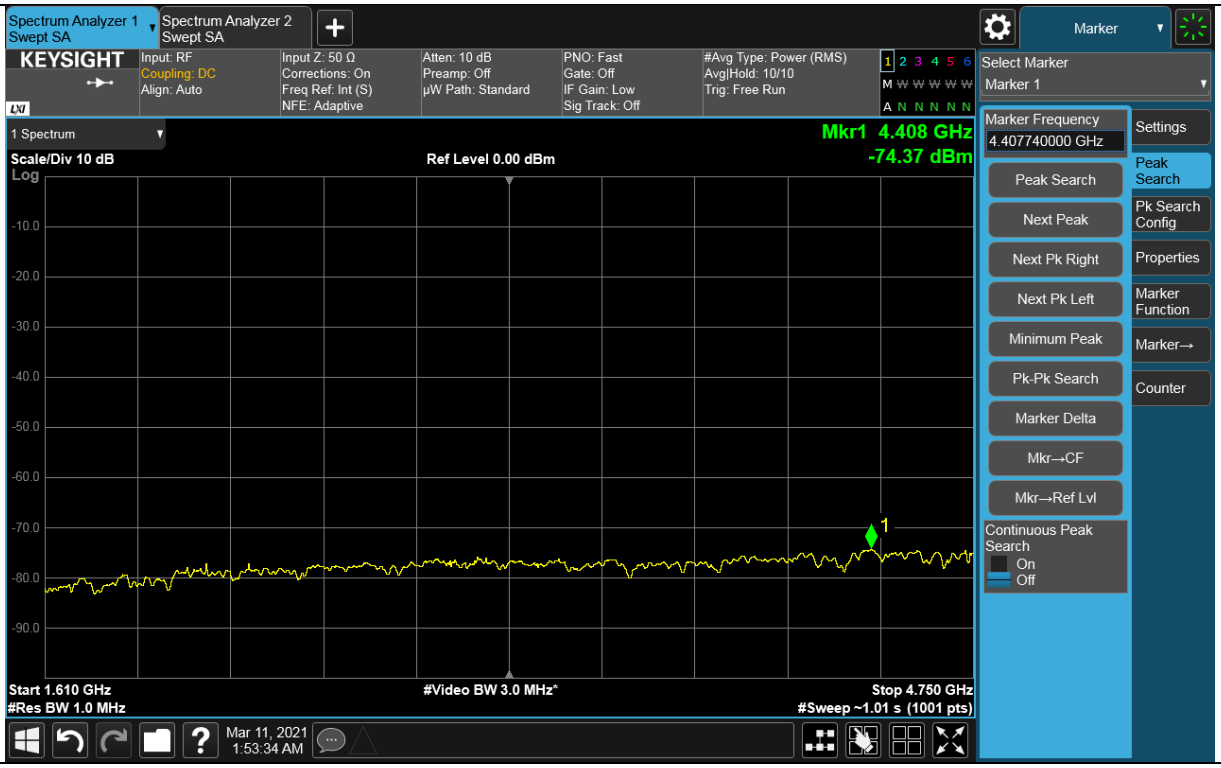
10 600 ㎒ ~ 18 000 ㎒ Vertical



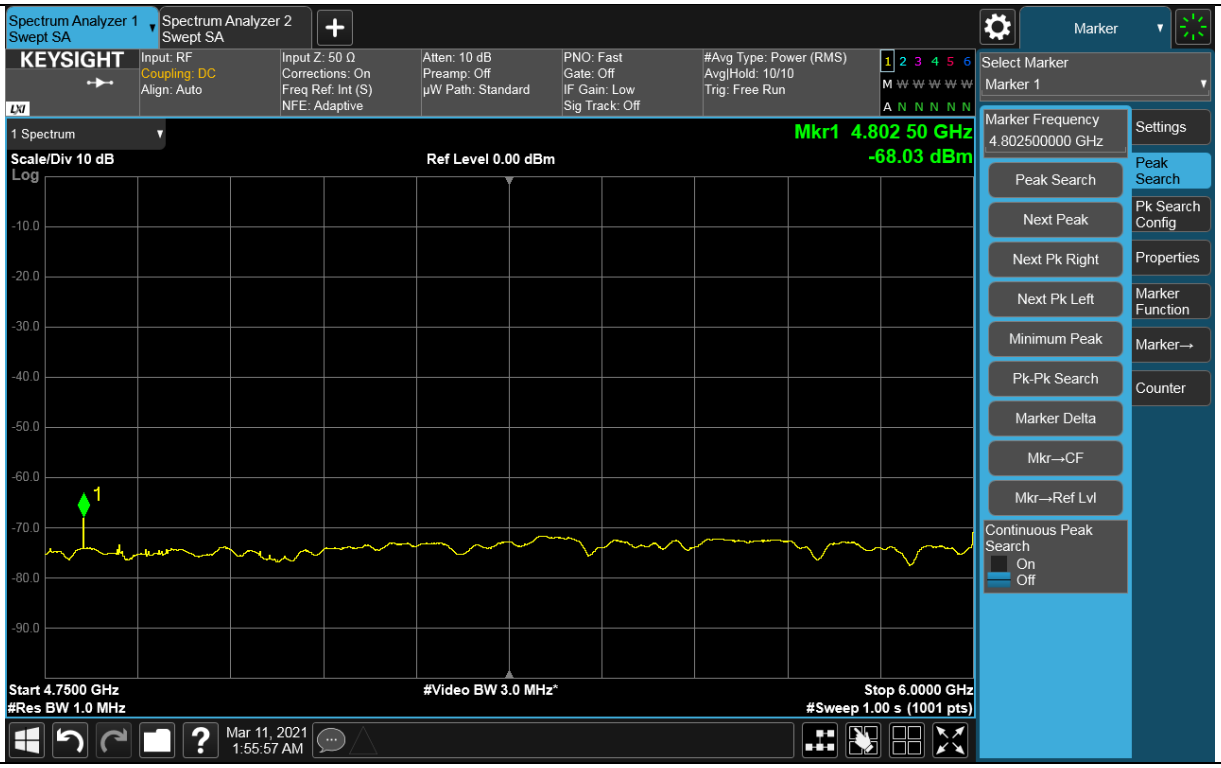
1 610 ㎒ ~ 4 750 ㎒ Horizontal



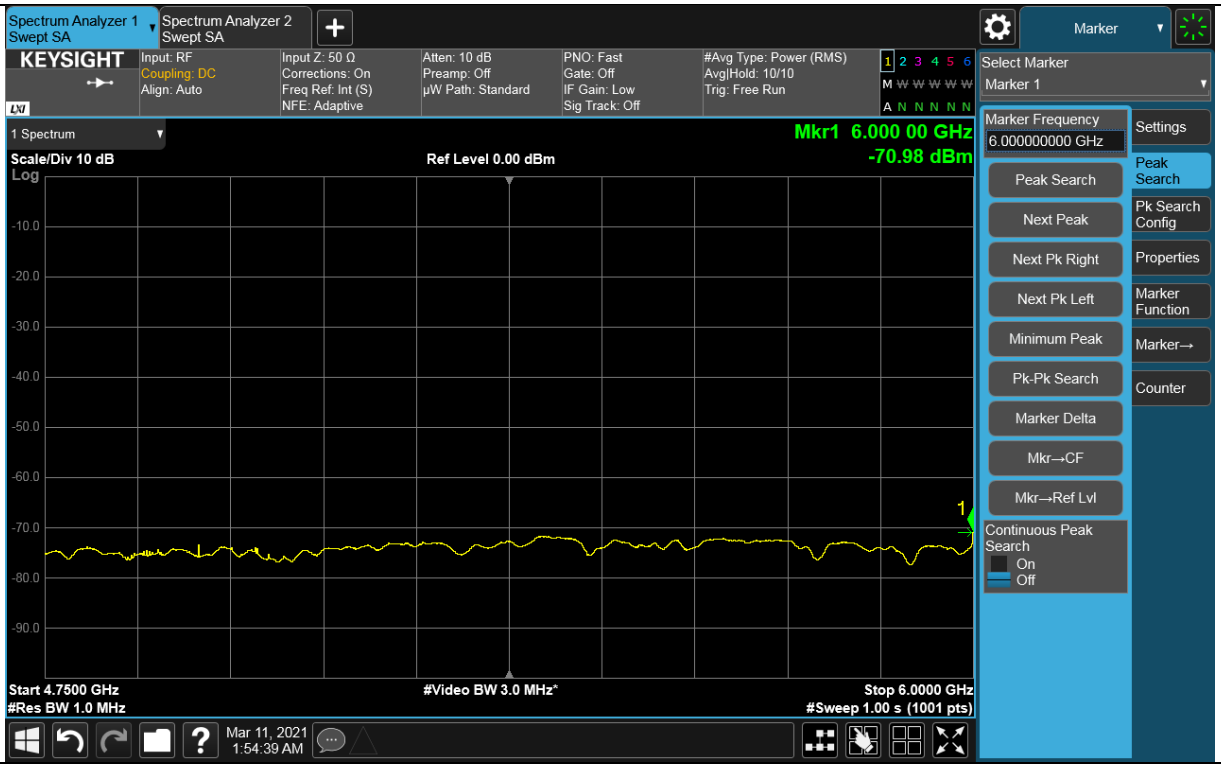
1 610 ㎒ ~ 4 750 ㎒ Vertical



4 750 ㎒ ~ 6 000 ㎒ Horizontal



4 750 ㎒ ~ 6 000 ㎒ Vertical



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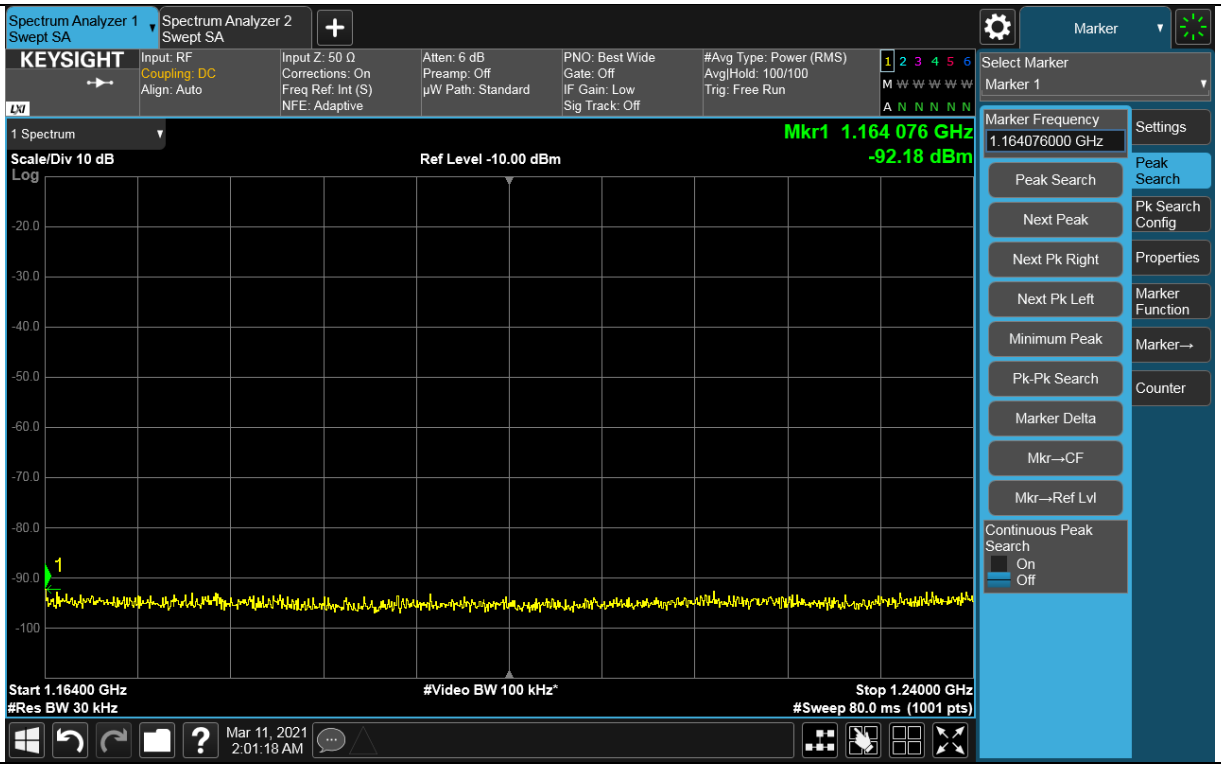
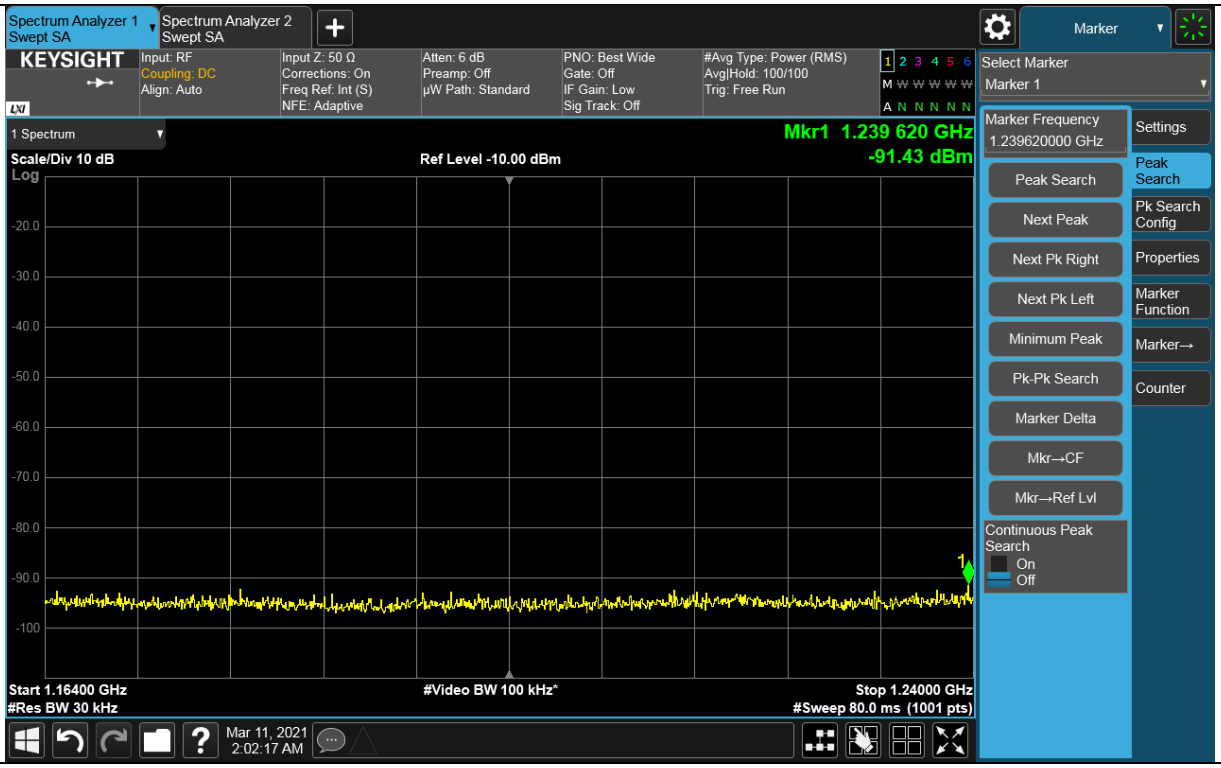
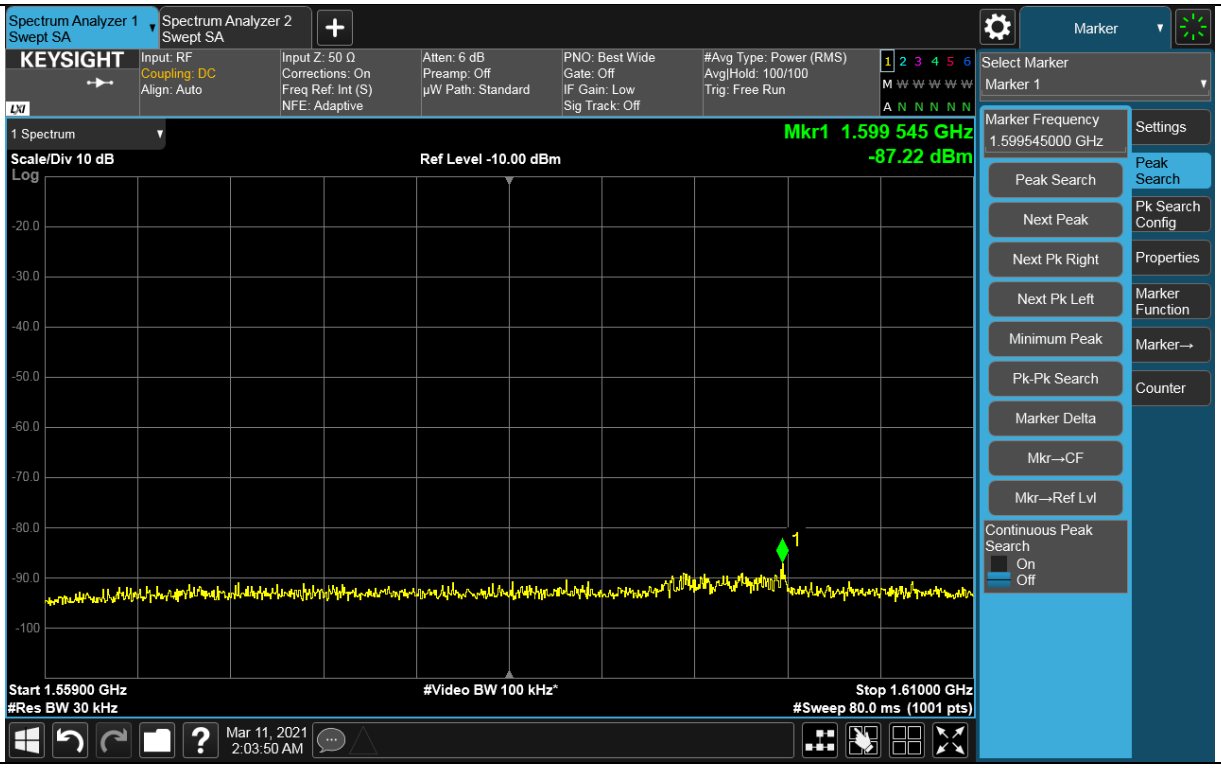
1 164 ㎒ ~ 1 240 ㎒ Horizontal



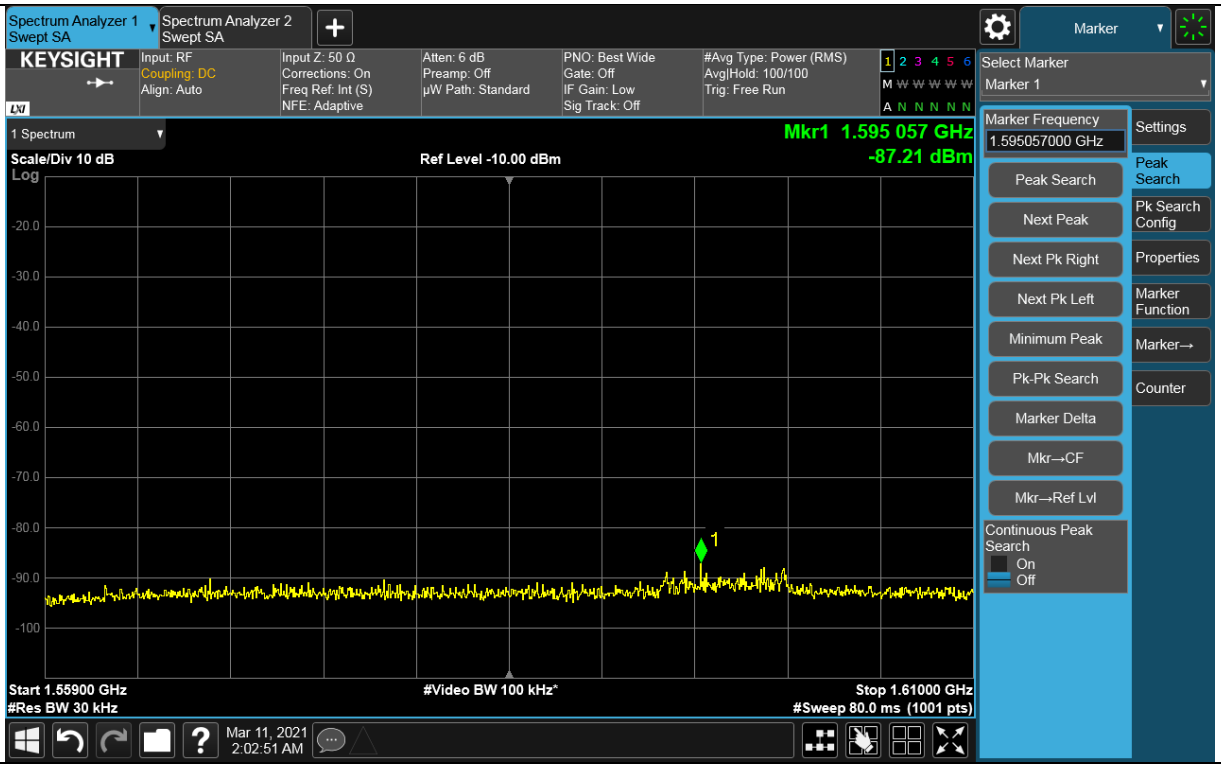
1 164 ㎒ ~ 1 240 ㎒ Vertical



1 559 ㎒ ~ 1 610 ㎒ Horizontal



1 559 ㎒ ~ 1 610 ㎒ Vertical



6.6. Radiated Spurious Emission – Below 960 ㎒

Limit

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency[㎒]	Field strength [㎶/m]	Measurement distance[m]
0.009-0.490	2400/F	300
0.490-1.705	24000/F	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

***Radiated Limit**

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 ㎒, 76-88 ㎒, 174-216 ㎒ or 470-806 ㎒. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

Test procedure

ANSI C63.10-2013

Test settings

Below 30 ㎒

RBW	120 ㎑ (for emissions from 30 ㎒ – 1 ㎓)
Detector	Quasi-peak
Trace mode	Max-hold
Sweep time	Auto couple
The trace was allowed to stabilize	

Below 960 ㎒

RBW	120 ㎑ (for emissions from 30 ㎒ – 1 ㎓)
VBW	300 ㎑
Detector	Peak
Trace mode	Max-hold
Sweep time	Auto couple
The trace was allowed to stabilize	

*The Limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field Strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X ㎑ resulted in a level of Y ㏈(㎶/m), which is equivalent to Y-51.5 = Z ㏈(㎂/m), which has the same margin, W ㏈, to the corresponding RSS-GEN Table 6 limit as it has to the 15.209(a) limit

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Test results

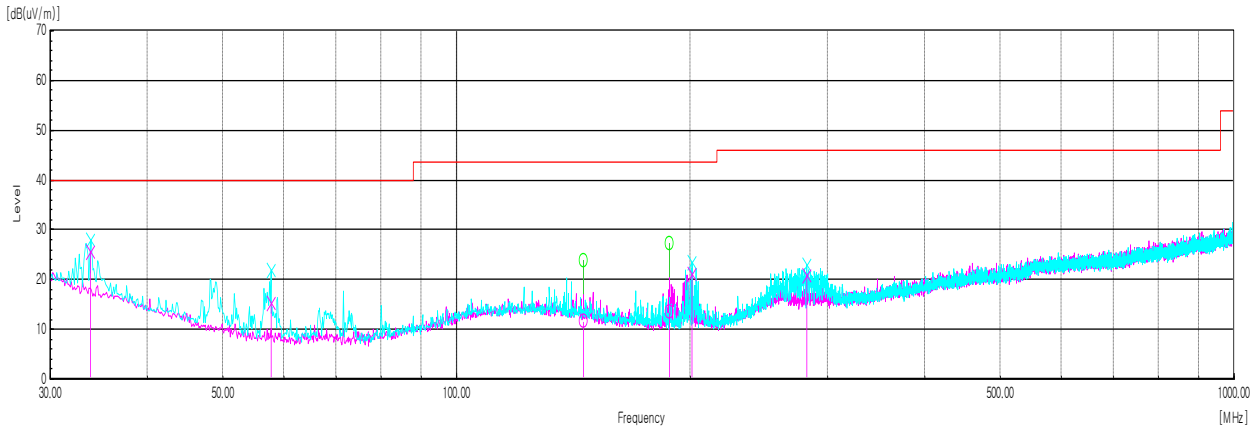
Worst case(Below 30 ㎒) : SP0 BPRF4 Preamble 9

Frequency [㎒]	Pol. [V/H]	Reading [dB(㎶)]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dB(㎶/m]	Limit [dB(㎶/m]	Margin [dB]
No spurious emissions were detected within 20 ㏈ of the limit.								

Worst case(Below 960 ㎒) : SP0 BPRF4 Preamble 9

Frequency [㎒]	Pol. [V/H]	Reading [dB(㎶)]	Ant. Factor [dB]	Amp. + Cable [dB]	Conv. Factor [dB]	Result [dB(㎶/m]	Limit [dB(㎶/m]	Margin [dB]
33.76	V	33.40	22.52	-30.44	-	25.48	40.00	14.52
57.65	V	32.80	12.68	-29.82	-	15.66	40.00	24.34
145.55	H	23.20	16.87	-28.37	-	11.70	43.50	31.80
187.75	H	26.50	15.02	-27.88	-	13.64	43.50	29.86
200.96	V	33.70	15.26	-27.69	-	21.27	43.50	22.23
281.84	V	28.90	18.85	-26.76	-	20.99	46.00	25.01

Horizontal/Vertical



7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
PXA Signal Analyzer	KEYSIGHT	N9040B	US56050101	21.07.29
Attenuator	Weinschel ENGINEERING	56-10	51395	22.01.22
Signal Generator	R&S	SMB100A	176206	22.01.20
Vector Signal Generator	R&S	SMBV100A	257566	21.07.13
Power Sensor	R&S	NRP-Z81	1137.9009.02-106223-bB	21.05.25
DC Power Supply	AGILENT	E3632A	MY40001543	21.05.11
Spectrum Analyzer	R&S	FSV40	100989	21.12.23
EMI TEST RECEIVER	R&S	ESCI3	101408	21.08.20
Bi-Log Antenna	SCHWARZBECK	VULB9168	583	22.04.23
Amplifier	SONOMA INSTRUMENT	310N	284608	21.08.20
COAXIAL FIXED ATTENUATOR	Agilent	8491B-003	2708A18758	21.04.23
Horn antenna	ETS.lindgren	3117	155787	21.10.28
Horn antenna	ETS.lindgren	3116	00086632	22.01.29
Attenuator	API Inmet	40AH2W-10	12	21.05.12
Broadband PreAmplifier	SCHWARZBECK	BBV9718	216	21.07.28
AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-01001800 -22-10P	2003683	21.08.28
AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000996	22.01.21
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	DT2000	79	-
Antenna Mast	Innco Systems	MA4000-EP	303	-
Turn Table	Innco Systems	DT2000	79	-
Highpass Filter	WT	WT-A1698-HS	WT160411001	21.05.11
Cable Assembly	RadiAll	2301761768000PJ	1724.659	-
Cable Assembly	gigalane	RG-400	-	-
Cable Assembly	HUER+SUHNER	SUCOFLEX 104	MY4342/4	-

End of test report

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