DFS PORTION of FCC 47 CFR PART 15 SUBPART E
DFS PORTION of ISED CANADA RSS-247 ISSUE 3

CERTIFICATION ADDENDUM TEST REPORT (CHANNEL PUNCTURING)

FOR

SMARTPHONE

MODEL NUMBER: A3286 (PARENT MODEL)
A3287, A3288 (VARIANT MODELS)

FCC ID: BCG-E8689A (PARENT MODEL)
BCG-E8690A, BCG-E8691A (VARIANT MODELS)

ISED ID: 579C-E8689A (PARENT MODEL)
579C-E8690A, 579C-E8691A (VARIANT MODELS)

REPORT NUMBER: 14982485-E28V2 ADDENDUM*

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ACCREDITED
CERT #0751.05

*This addendum provides timing data to demonstrate that this client device follows an AP that supports channel puncturing and will stop transmitting on the sub-channel that has been punctured within the channel close / move times required for DFS.

Master Device used for DFS Channel Puncturing testing:

Device Type	Manufacturer	Model Number	Serial Number	FCC ID
802.11be Tri-Band Reference Design Router (Master Device 3; Channel Puncturing)	Broadcom	BCM94916REF2_P404	2B2256TG1267	None
AC Adapter (Master Device 3)	AC Adapter Technology	ATS065T-P120	No Serial Number	DoC

For all other details such as test equipment, support equipment, measurement uncertainty … etc, refer to the original report 14982485-E26V2.

1. CHANNEL PUNCTURING CHANNEL MOVE AND CLOSE TIME

1.1. TEST CONFIGURATION

Devices that support channel puncturing are required to be evaluated for channel move and closing times for any two punctured Sub-Channels within the operational channel bandwidth. The test must be performed to verify compliant performance of the first Sub-Channel and then repeated on a second Sub-Channel.

At this time the lack of availability of a suitable Access Point that can be configured to force the operating channel, operating bandwidth and ensure that it will use channel puncturing in response to detection of radar within the operating channel precludes an evaluation of channel move and closing times based on the AP (Master Device) detecting radar. To verify the timing of the Client Device to follow the AP in switching from using the full channel to using a punctured channel a notebook PC is used to manually trigger the AP to puncture a channel and inhibit transmissions on a specific Sub-Channel.

Two sets of plots are provided for each test performed . The first are spectrum plots for AP and Client Device before and after the command is issued to puncture the channel. These plots show both AP and Client Device utilizing the full channel and then utilizing the same Sub-Channels.

The second set of plots show the timing for the Client Device to vacate the Sub-Channel that is inhibited by the puncture command from the laptop to the AP. In zero span, centered on the Sub-Channel that will not be used for transmission, a sweep is started on the spectrum analyzer. A reference marker is set at the time the puncture command is issued. The delta marker is set at the end of the last WLAN transmission following the reference marker. This delta is the channel move time.

The Aggregate Channel Closing Transmission Time is calculated as follows:

Aggregate Closing Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the Aggregate Time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

Measurements are performed for both 80MHz and 160 MHz channel bandwidths with two different puncturing configurations for each channel bandwidth.

1.2. TEST CHANNELS

Tests were performed on an 80MHz channel and a 160 MHz channel.

For the 80 MHz channel a channel center frequency of 5290 MHz was used, and the test was performed twice, one with the Sub-Channel 1 at 5280 MHz disabled and then with the Sub-Channel at 5260 MHz disabled.

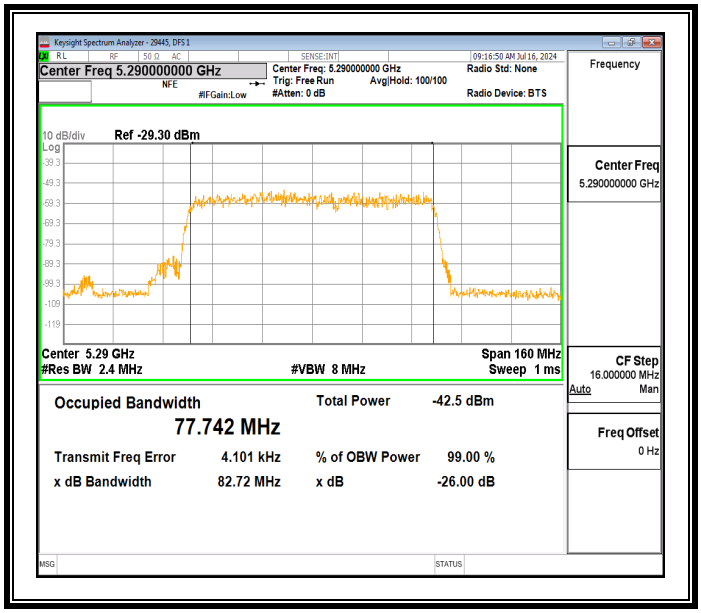
For the 160 MHz channel a channel center frequency of 5250 MHz was used, and the test was performed twice, one with the Sub-Channel 1 at 5300 MHz disabled and then with the Sub-Channel at 5320 MHz disabled.

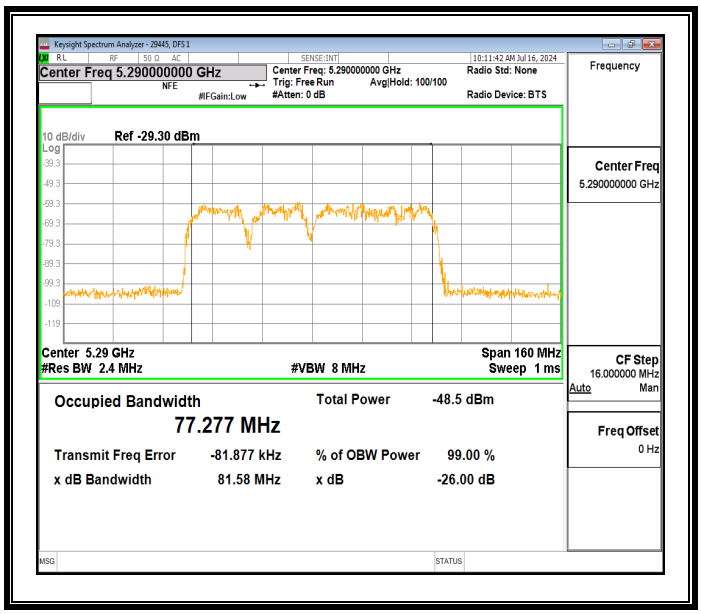
1.3. CHANNEL USAGE BEFORE AND AFTER PUNCTURING

1.3.1. 80 MHz CHANNEL

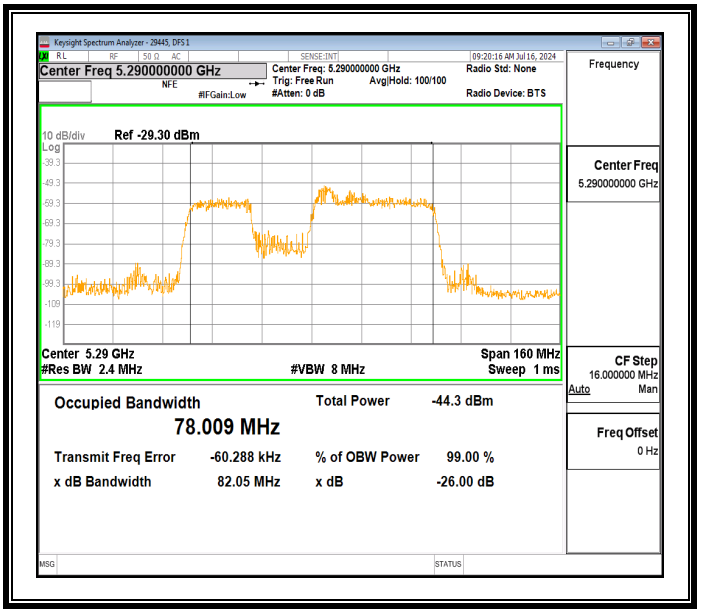
Plots show the Master Device (AP) on the left and Client Device on the right.

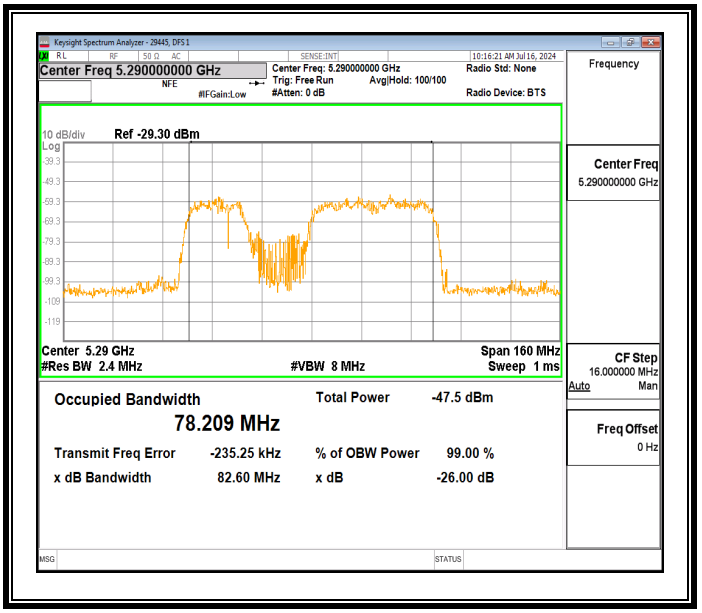
All Sub-Channels are being used by both AP and Client Device prior to the command to puncture is issued.



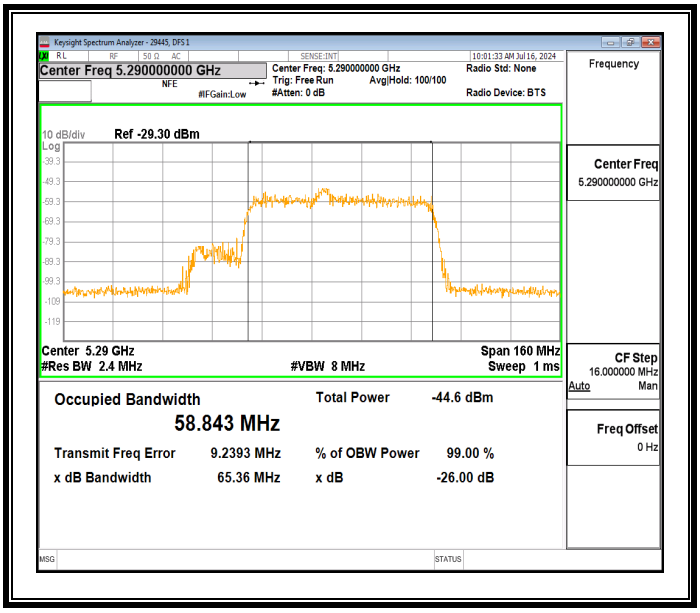


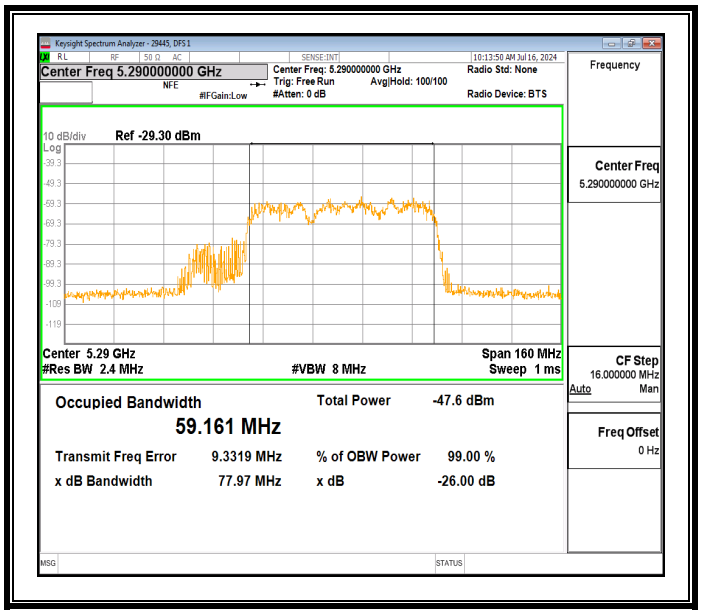
After the puncture command the same 20 MHz Sub-Channel centered at 5280 MHz is disabled by both AP and Client Device.





After the puncture command the same 20 MHz Sub-Channel centered at 5260 MHz is disabled by both AP and Client Device.

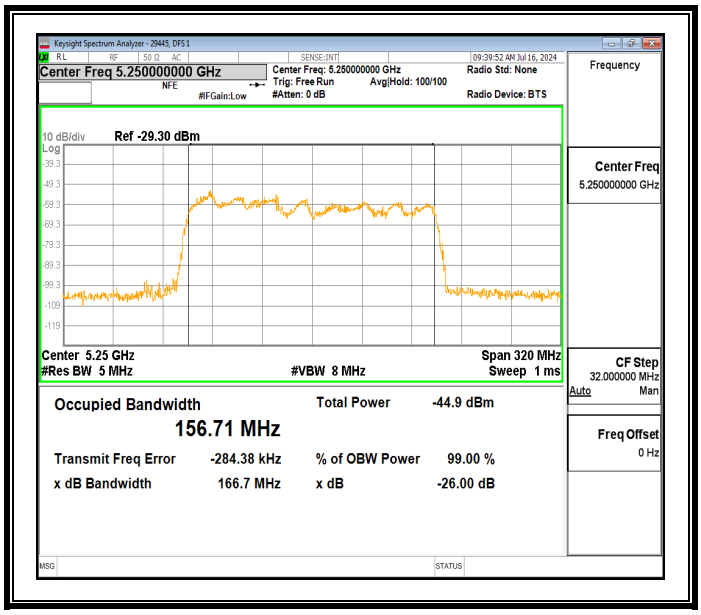


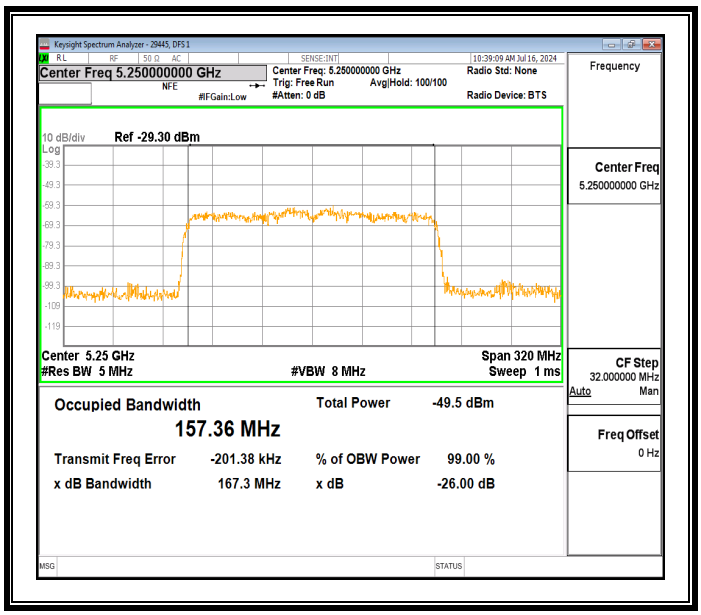


1.3.2. 160 MHz CHANNEL

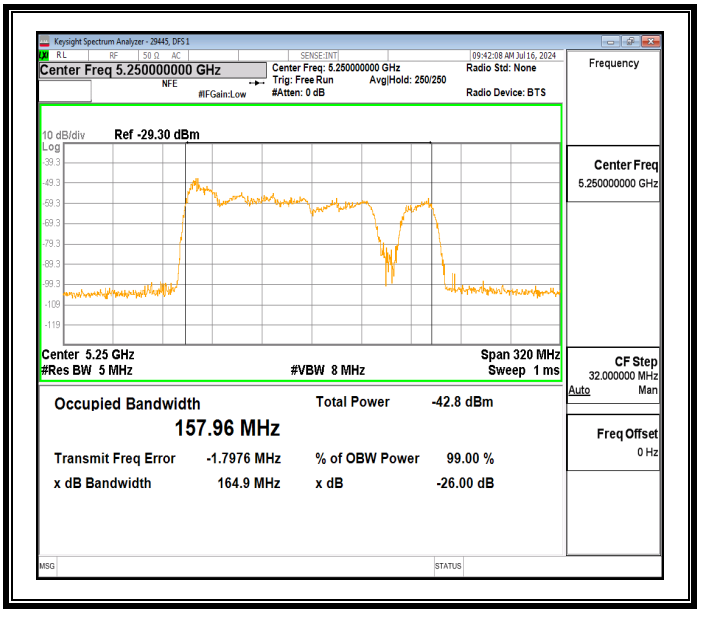
Plots show the Master Device (AP) on the left and Client Device on the right.

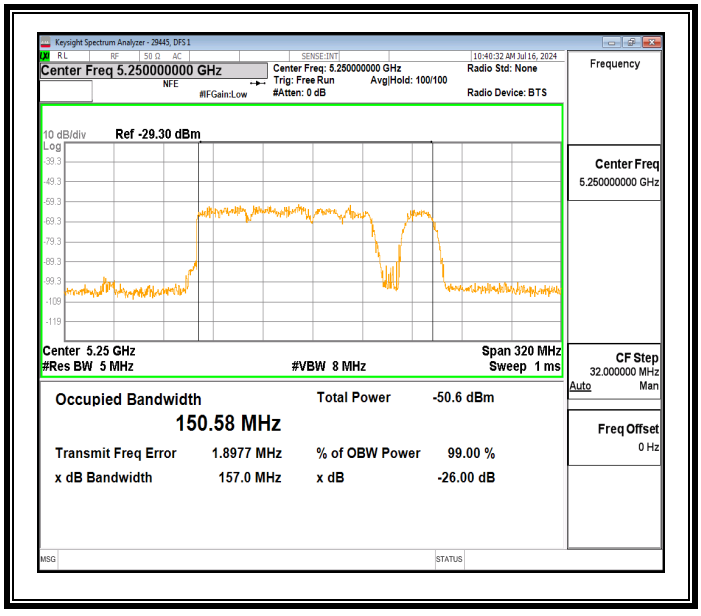
All Sub-Channels are being used by both AP and Client Device prior to the command to puncture is issued.



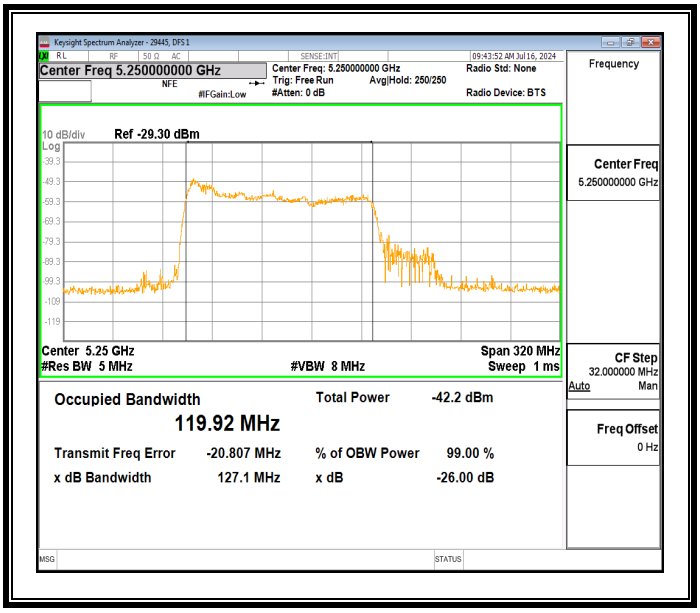


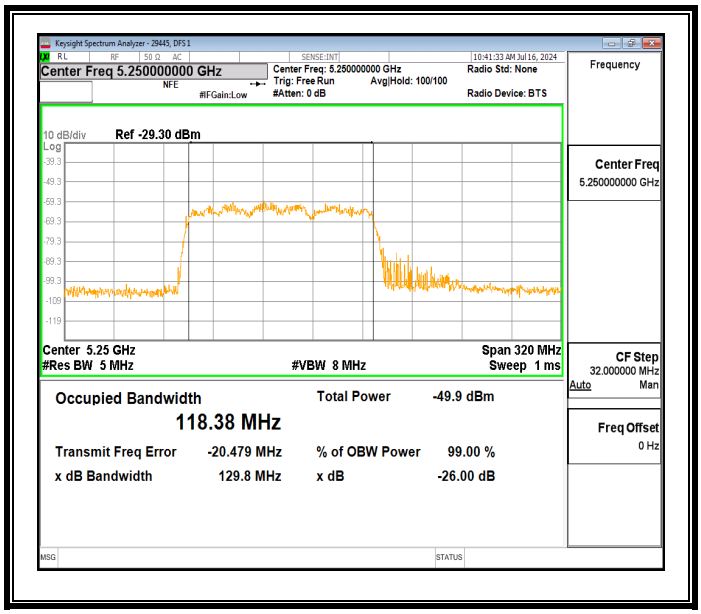
After the puncture command the same 20 MHz Sub-Channel centered at 5300 MHz is disabled by both AP and Client Device.





After the puncture command the same 20 MHz Sub-Channel centered at 5320 MHz is disabled by both AP and Client Device.





1.4. CHANNEL MOVE AND CLOSING TIME

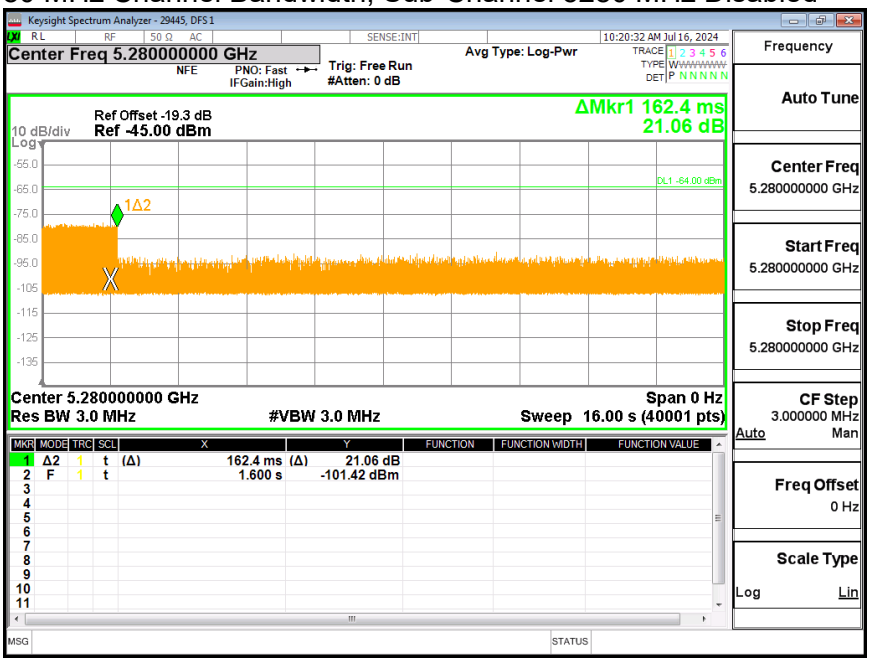
1.4.1. SUMMARY

Channel (Bandwidth / Frequency)	Sub-Channel (MHz)	Move Time (Sec)		Aggregate Closing Time (mSec)	
		Measured	Limit	Measured	Limit
80 MHz / 5290 MHz	5280	0.1624	**10**	0.0	**60**
	5260	0.1384		0.0	
160 MHz / 5250 MHz	5300	0.1280	**10**	0.0	**60**
	5320	0.0452		0.0	

The Client Device follows the AP within 200ms and therefore the closing transmission time is 0ms.

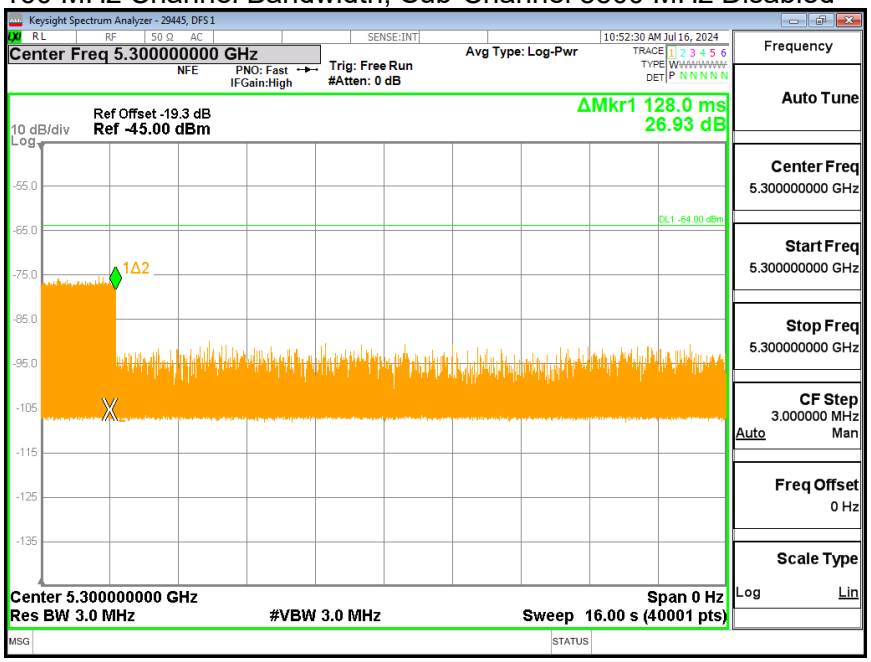
1.4.2. CHANNEL MOVE TIME PLOTS

80 MHz Channel Bandwidth, Sub-Channel 5280 MHz Disabled

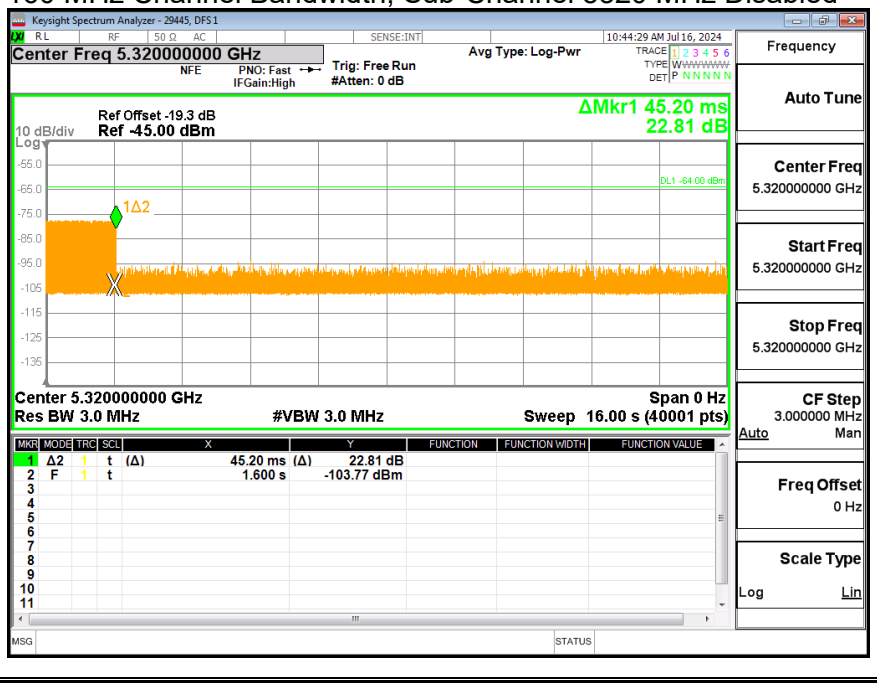


80 MHz Channel Bandwidth, Sub-Channel 5260 MHz Disabled

160 MHz Channel Bandwidth, Sub-Channel 5300 MHz Disabled

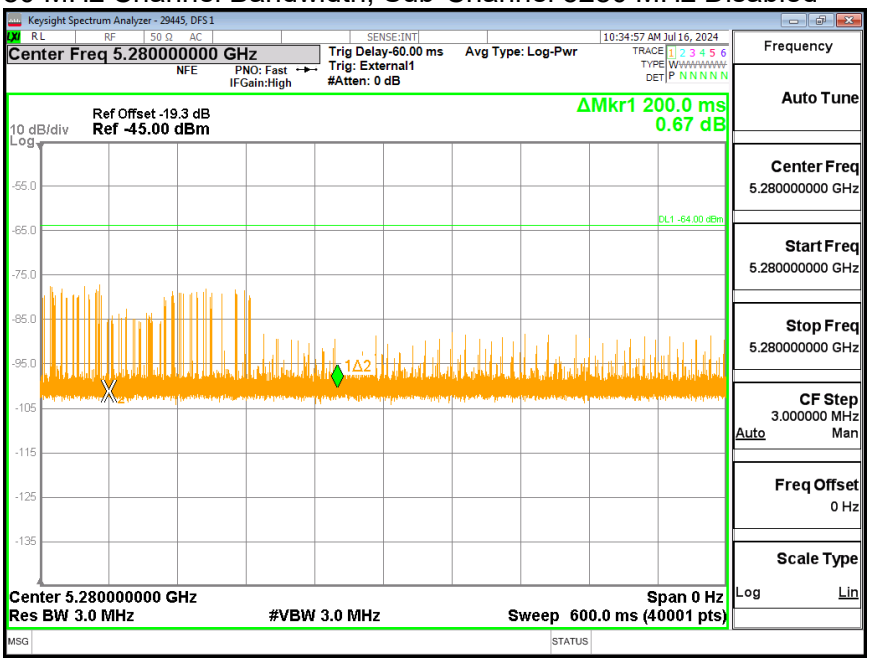


160 MHz Channel Bandwidth, Sub-Channel 5320 MHz Disabled

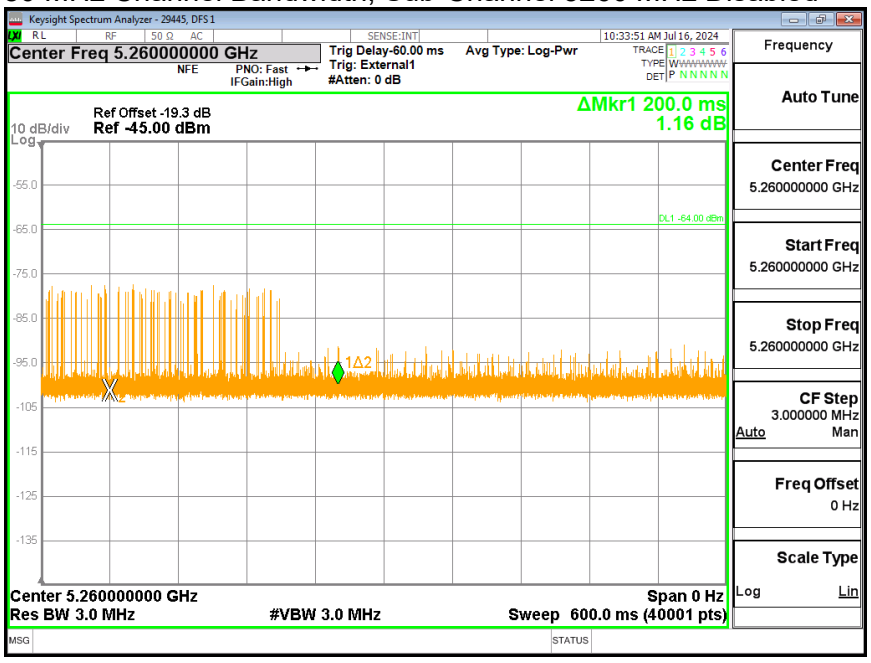


1.4.3. CHANNEL CLOSING TIME PLOTS

80 MHz Channel Bandwidth, Sub-Channel 5280 MHz Disabled

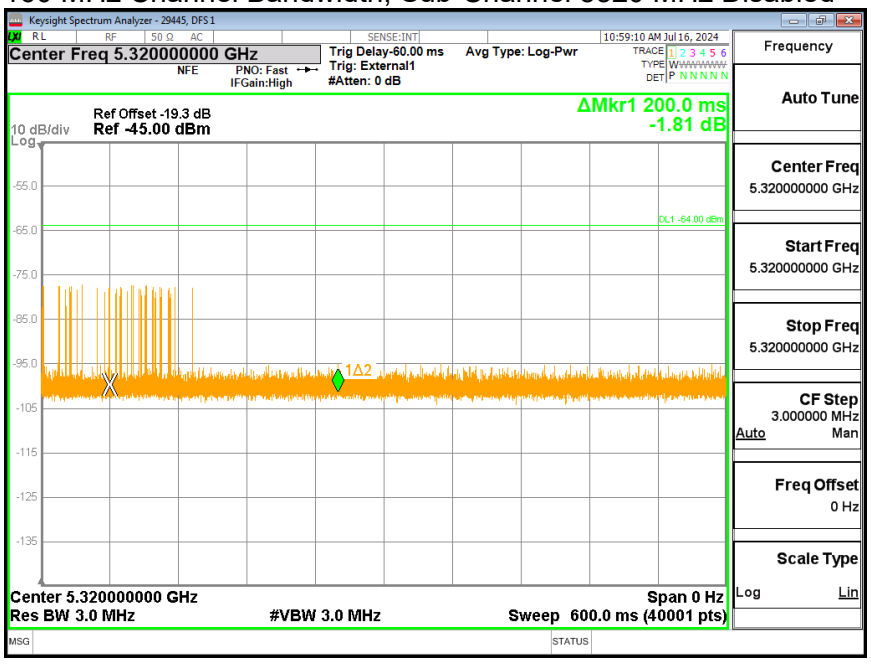


80 MHz Channel Bandwidth, Sub-Channel 5260 MHz Disabled



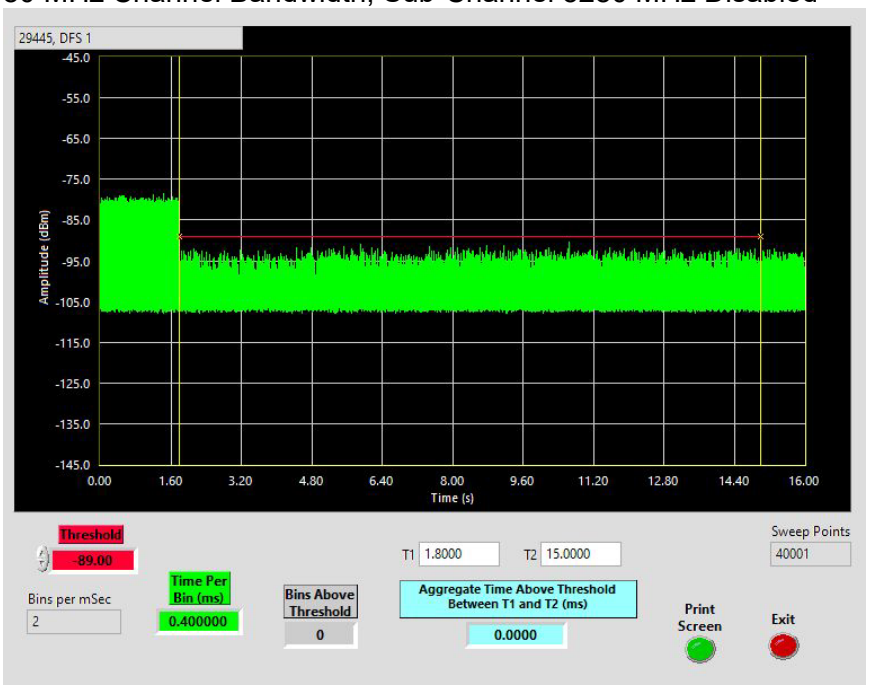
160 MHz Channel Bandwidth, Sub-Channel 5300 MHz Disabled

160 MHz Channel Bandwidth, Sub-Channel 5320 MHz Disabled

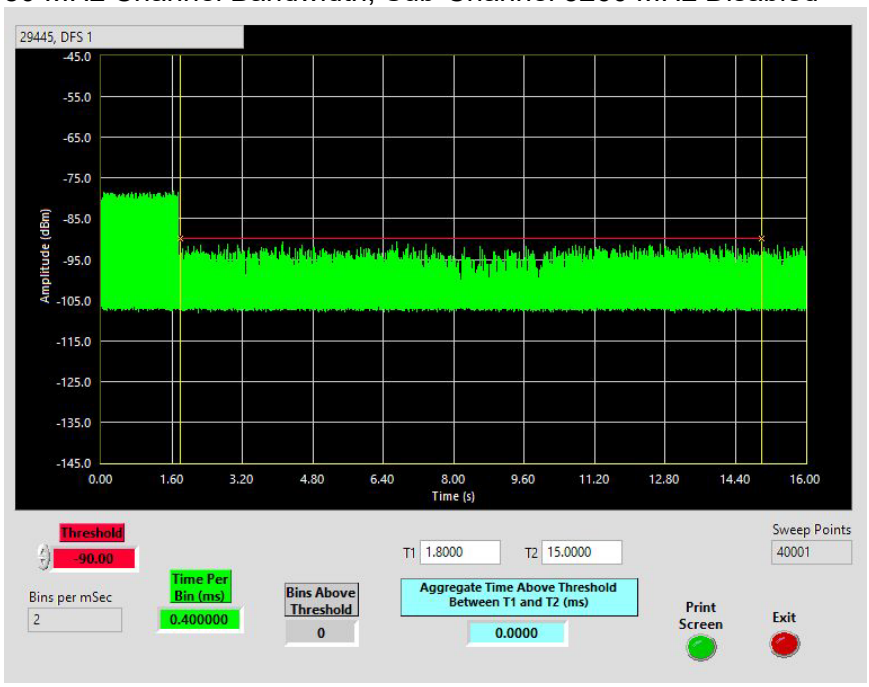


1.4.4. AGGREGATE CHANNEL CLOSING TRANSMISSION TIME PLOTS

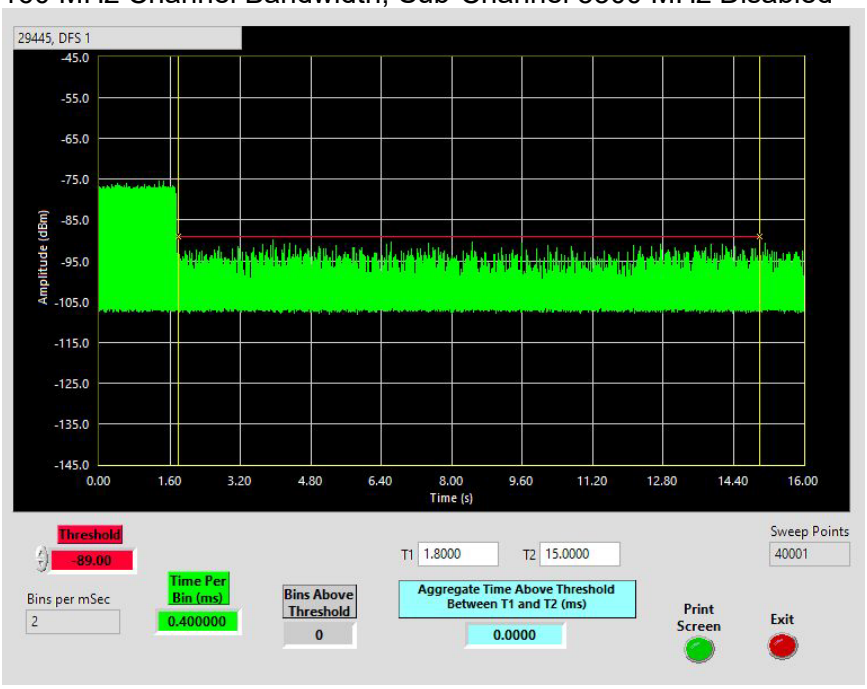
80 MHz Channel Bandwidth, Sub-Channel 5280 MHz Disabled



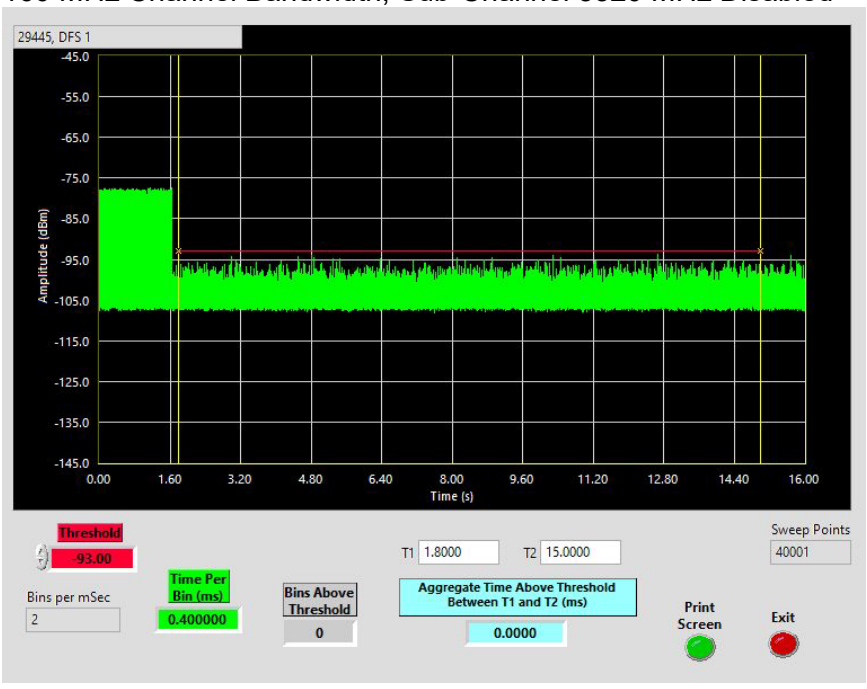
80 MHz Channel Bandwidth, Sub-Channel 5260 MHz Disabled



160 MHz Channel Bandwidth, Sub-Channel 5300 MHz Disabled



160 MHz Channel Bandwidth, Sub-Channel 5320 MHz Disabled



END OF ADDENDUM TEST REPORT