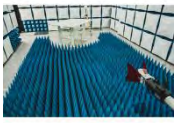
PCTEST
18855 Adams Court, Morgan Hill, CA 95037 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



MEASUREMENT REPORT
FCC PART 15.519 / ISED RSS-220 Ultra-Wideband

Applicant Name:
Apple Inc.
One Apple Park Way
Cupertino, CA 95014
United States

Date of Testing:
06/05/2020 - 08/22/2020
Test Site/Location:
PCTEST Lab. Morgan Hill, CA, USA
Test Report Serial No.:
1C2004270020-12.BCG

FCC ID:	**BCG-A2376**
IC:	**579C-A2376**
APPLICANT:	**Apple Inc.**

Application Type:	Certification
Model/HVIN:	A2376
EUT Type:	Watch
Operational Frequency:	6489.6MHz (Ch 5) and 7987.2MHz (Ch 9)
FCC Classification:	Ultra-Wideband Transmitter (UWB)
FCC Rule Part(s):	Part 15 Subpart F (15.519)
ISED Specification:	RSS-Gen Issue 5, RSS-220 Issue 1
RSS-220 Subclass:	5.3 Hand-held Communication Devices
Test Procedure(s):	ANSI C63.10-2013, KDB 393764 D01 v02

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013 and KDB 393764 D01 v02. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

ACCREDITED
CERT #2041.02

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Morgan Hill, CA 95037, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- PCTEST facility is a registered (22831) test laboratory with the site description on file with ISED.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Watch FCC ID: BCG-A2376**. The test data contained in this report pertains only to the emissions due to the EUT's Ultra-Wideband (UWB) transmitter.

Test Device Serial No.: GY6CP01QQ61F, GY6CQ028Q618

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n UNII, Bluetooth (1x, EDR, HDR4, HDR8, LE), NFC, UWB

For ISED, this device is under subclass 5.3 Hand-held Communication Devices of RSS-220

Data Port UWB Radio Terminal Access: No

Ch.	Frequency [MHz]	Config	Payload
5	6500	0	25
			65
			125
		1	45
			85
			125
		2	125
		3	125
		4	0
		5	0
9	8000	0	25
			65
			125
		1	45
			85
			125
		2	125
		3	125
		4	0
		5	0

Table 2-1. UWB Frequency / Channel Operations

Notes:

This device supports simultaneous multi radio transmission feature, which allows multiple radios to transmit simultaneously at the same antenna. The table below shows all the possible multi radio TX combinations:

Simultaneous Tx Config	Antenna FCM				
	WLAN	Bluetooth	LTE/WCDMA	UNII	UWB
	802.11 b/g/n	BDR, EDR, HDR4/8, LE	Mid band/ High band	802.11 a/n	Ch.5, Ch.9
Config 1	✓	×	×	×	✓
Config 2	×	✓	×	×	✓
Config 3	×	×	✓	×	✓
Config 4	×	✓	✓	×	×
Config 5	✓	×	✓	×	×
Config 6	×	×	✓	✓	×
Config 7	×	✓	×	✓	×
Config 8	✓	×	✓	×	✓
Config 9	×	✓	✓	×	✓
Config 10	×	✓	✓	✓	×

Table 2-2. Simultaneous Transmission Configurations

✓= Support; × = NOT Support

All above simultaneous configuration has been tested and worst case configuration was found to be config 10 (Bluetooth, UNII and LTE).

2.3 Antenna Description

Following antenna was used for the testing.

Frequency [MHz]	Antenna Gain (dBi)
6250-6750	-3.2
7750-8250	-5.1

Table 2-3. Highest Antenna Gain

2.4 Test Support Equipment

1	Apple MacBook	Model:	A1398	S/N:	C02QT94WG8WP
	w/AC/DC Adapter	Model:	A1435	S/N:	N/A
2	Apple USB Cable	Model:	Kanzi	S/N:	325316
	w/ Charging Dock	Model:	FAPS73	S/N:	17481001022
	w/ Dock	Model:	X241	S/N:	GW17F01ST22
3	USB Lightning Cable	Model:	N/A	S/N:	N/A
	w/ AC Adapter	Model:	A1385	S/N:	N/A
4	Wireless Charging Pad (WCP)	Model:	EVT	S/N:	DLC9223004YLNWL43
	Wireless Charging Pad (WCP)	Model:	EVT	S/N:	DLC9104001JLNWK18
7	Smart Phone	Model:	A2217	S/N:	C39Z600ANXM2

Table 2-4. Test Support Equipment List

2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013 and KDB 393764 D01 v02. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups.

The worst case configuration was investigated for all combinations of the three materials, aluminum, stainless steel, and Titanium and various types of wristbands, metal and non-metal wristbands. The store display sample was investigated and determined as not the worst case. The EUT was also investigated with and without wireless charger. The worst case configuration found was used for all testing.

For emissions from 960MHz – 18GHz, channel 5 and channel 9 were tested with highest power and worst case configuration. The emissions below 960MHz and above 18GHz were tested with the highest transmitting power and the worst case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

For AC line conducted emission and radiated emission below 960MHz, following configuration were investigated and the worst case was reported.

- EUT powered by AC/DC adaptor via USB cable with wireless charger
- EUT powered by host PC via USB cable with wireless charger

2.6 Software and Firmware

The test was conducted with firmware version wOS 7.0. installed on the EUT.

2.7 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 393764 D01 v02 were used in the measurement of the EUT.

Deviation from measurement procedure…….....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is EPCOS 2X60A Power Line Filter (100dB Attenuation, 14kHz-18GHz) and the two EPCOs 2X48A filters (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.8. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 10.50.40.

3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

Per KDB 414788, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was rotated about its vertical axis while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

- The antenna(s) of the EUT are **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

5.0 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 indicate a 95% level of confidence. The measurement uncertainty shown below meets or 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.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.30
Line Conducted Disturbance	2.34
Radiated Disturbance (<1GHz)	4.15
Radiated Disturbance (>1GHz)	4.59
Radiated Disturbance (>18GHz)	4.96

Parameter	Expanded Uncertainty
Time	± 0.02%

6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/4/2020	Annual	3/4/2021	MY49430244
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	10/29/2019	Annual	10/29/2020	T058701-02
COM-POWER	LIN-120A	LISN	3/4/2020	Annual	3/4/2021	241297
ETS-Lindgren	3142E–PA	Pre-Amplifier (30MHz - 6GHz)	9/19/2019	Annual	9/19/2020	213236
ETS-Lindgren	3142E	BiConiLog Antenna (30MHz - 6GHz)	1/6/2020	Annual	1/6/2021	224569
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	4/21/2020	Annual	4/21/2021	205956
Rohde & Schwarz	FSW85	EMI Test Receiver	12/11/2019	Annual	12/11/2020	101579
Rohde & Schwarz	ESW44	EMI Test Receiver	9/13/2019	Annual	9/13/2020	101570
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	9/19/2019	Annual	9/19/2020	100051
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Antenna (400MHz-18GHz)	11/14/2019	Annual	11/14/2020	101057
Rohde & Schwarz	HFH2-Z2	Loop Antenna	3/12/2020	Annual	3/12/2021	100546

Table 6-1. Test Equipment List

Note:

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

7.0 TEST RESULTS

7.1 Summary

Company Name: Apple Inc.

FCC ID: BCG-A2376

FCC Classification: Ultra-Wideband Transmitter

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
§15.503, §15.519 (b)	RSS-220 [2]	10dBc Bandwidth	≥ 500MHz	RADIATED	PASS	Section 7.2, 7.3
§ 2.1049	RSS-Gen [6.7]	Occupied Bandwidth	N/A		N/A	Section 7.3
§15.519 (e)	RSS-220 [5.3.1(g)]	Maximum Peak Power Spectral Density (Peak EIRP)	< 0 dBm/50MHz EIRP		PASS	Sections 7.4.1
§15.519 (c)	RSS-220 [5.3.1(d)]	Maximum Average Emission in the range of 3100 – 10600 MHz (Average EIRP)	< -41.3 dBm/MHz EIRP		PASS	Section 7.4.2
§15.519 (a)(1)	RSS-220 [5.3.1(b)]	Cease Transmission Time	See §15.519 (a)(1) for details		PASS	Section 7.5
§15.519 (c)	RSS-220 [5.3.1(d)]	Radiated Emissions Above 960MHz	See table in §15.519 (c) for details		PASS	Sections 7.6
§15.519 (d)	RSS-220 [5.3.1(e)]	Radiated Emissions in the 1164 – 1240Mhz and 1559 – 1610MHz GPS Bands	See table in §15.519 (d) for details		PASS	Sections 7.6
§15.519 (c), §15.209	RSS-220 [3.4] RSS-Gen [8.9]	Radiate Emissions Below 960MHz	Emissions in restricted bands must meet the radiated limits detailed in §15.209 (RSS-Gen [8.9])		PASS	Section 7.7
§15.207	RSS-Gen [8.8]	AC Line Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen [8.8])	AC LINE CONDUCTED	PASS	Section 7.8

Table 7-1. Summary of Test Results

Notes:

1. All modes of operation were investigated. The test results shown in the following sections represent the worst case emissions.
2. 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.

7.2 10dBc Bandwidth Measurement

§15.503 §15.519 (b)

Test Overview and Limit

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.

- The center frequency, F_C, equals $(F_H + F_L)/2$
- The fractional bandwidth equals $2(F_H - F_L) / (F_H + F_L)$

The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100MHz and 10,600MHz.

a) The minimum permissible 10dBc Bandwidth is 500 MHz
b) Fractional bandwidth is equal or greater than 0.20

Test Procedure Used

ANSI C63.10-2013 – Section 10.1
KDB 393764 D01 v02

Test Settings

1. RBW = 1MHz
2. VBW = 3MHz
3. Detector = Peak
4. Trace mode = max hold
5. Sweep = auto couple
6. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

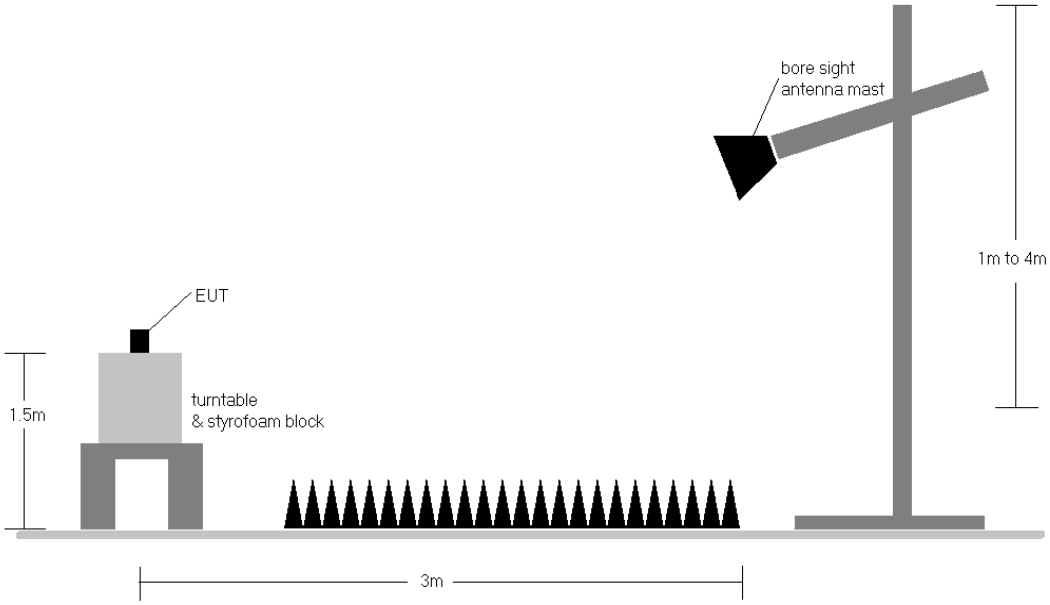


Figure 7-1. Test Setup

Test Notes

In those cases where the measured emission spectrum contains multiple (more than two) –10dBc points, the outermost points define the UWB bandwidth (i.e., the widest bandwidth is reported).

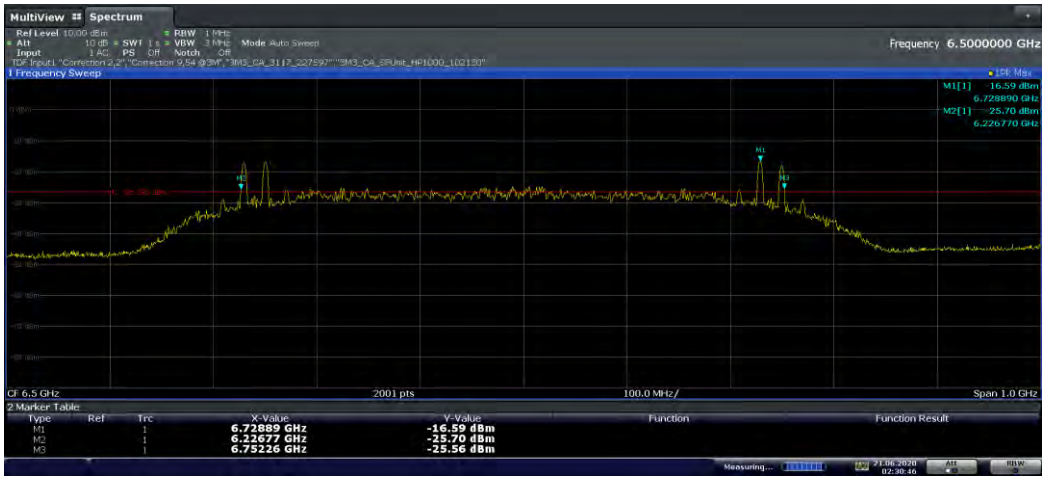
Frequency [GHz]	Channel	Config	Payload	F_M [GHz]	F_L [GHz]	F_H [GHz]	Fc [GHz]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
6.5	5	0	25	6.729	6.227	6.752	6.490	525.49	500	Pass
		0	65	6.251	6.227	6.752	6.490	525.49	500	Pass
		0	125	6.729	6.227	6.752	6.490	525.49	500	Pass
		1	45	6.251	6.227	6.752	6.489	525.63	500	Pass
		1	85	6.250	6.227	6.752	6.489	525.72	500	Pass
		1	125	6.251	6.227	6.753	6.490	525.99	500	Pass
		2	125	6.251	6.228	6.751	6.490	523.49	500	Pass
		3	125	6.729	6.228	6.751	6.490	522.71	500	Pass
		4	0	6.729	6.227	6.752	6.490	525.49	500	Pass
		5	0	6.728	6.226	6.753	6.490	527.49	500	Pass

Table 7-2. 10dBc Bandwidth Measurements (UWB, Ch.5, 6.5GHz)

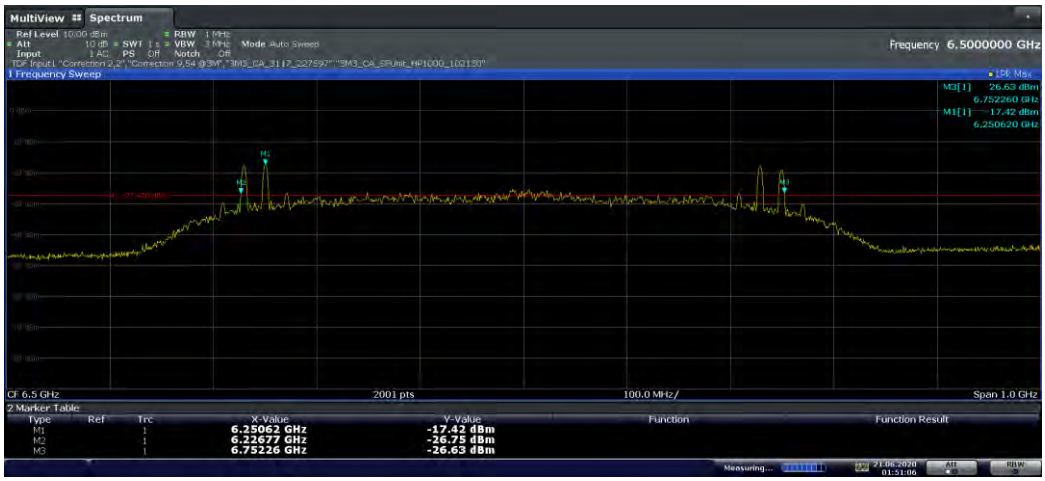
Frequency [GHz]	Channel	Config	Payload	F_M [GHz]	F_L [GHz]	F_H [GHz]	Fc [GHz]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
8.0	9	0	25	8.226	7.724	8.250	7.987	526.00	500	Pass
		0	65	8.226	7.724	8.250	7.987	526.00	500	Pass
		0	125	8.226	7.724	8.250	7.987	526.00	500	Pass
		1	45	8.226	7.724	8.250	7.987	526.00	500	Pass
		1	85	8.226	7.724	8.250	7.987	526.00	500	Pass
		1	125	7.747	7.724	8.250	7.987	526.00	500	Pass
		2	125	8.226	7.746	8.248	7.997	502.00	500	Pass
		3	125	8.226	7.726	8.249	7.988	523.00	500	Pass
		4	0	8.226	7.724	8.250	7.987	526.00	500	Pass
		5	0	8.226	7.723	8.251	7.987	528.00	500	Pass

Table 7-3. 10dBc Bandwidth Measurements (UWB, Ch.9, 8GHz)

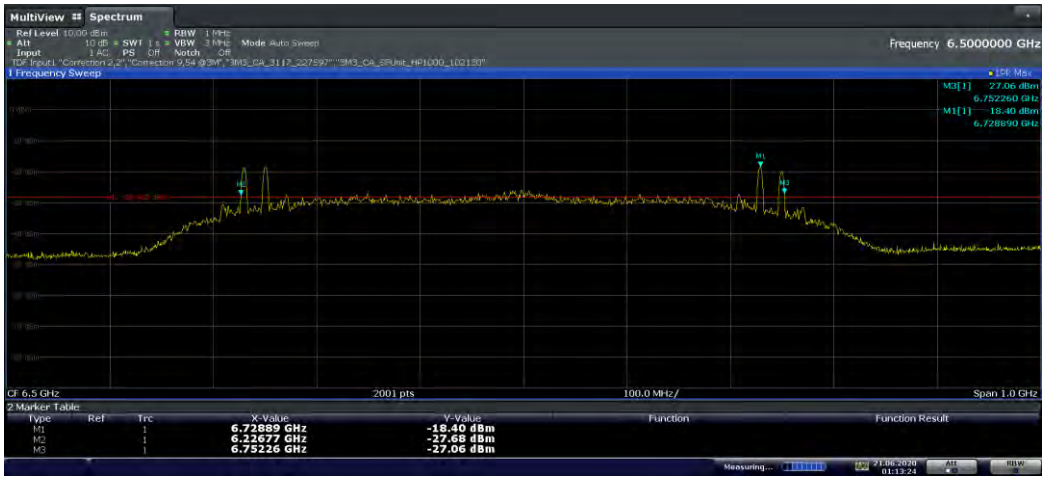
Channel 5, 10dBc BW:



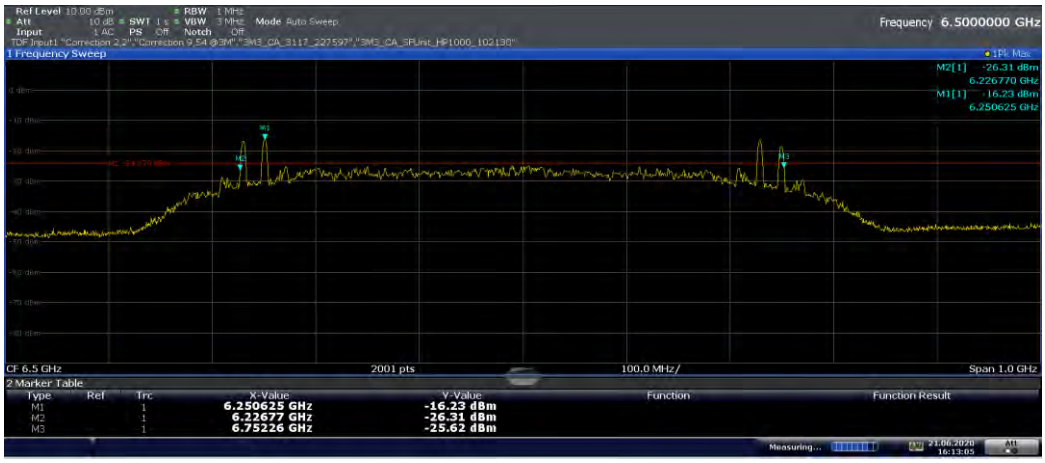
Plot 7-1. 10dBc Bandwidth (Ch. 5, Config 0/Payload 25)



Plot 7-2. 10dBc Bandwidth (Ch. 5, Config 0/Payload 65)

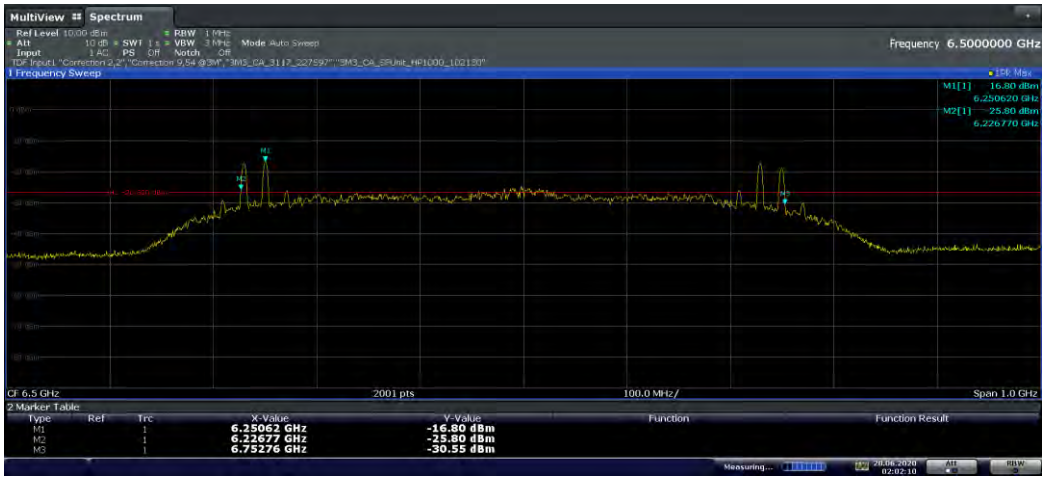


Plot 7-3. 10dBc Bandwidth (Ch. 5, Config 0/Payload 125)

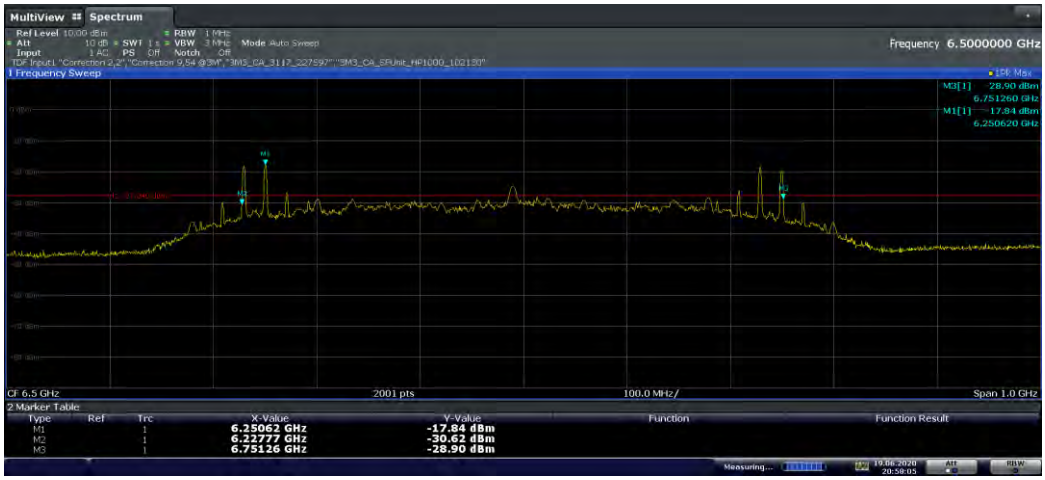


Plot 7-4. 10dBc Bandwidth (Ch. 5, Config 1/Payload 45)

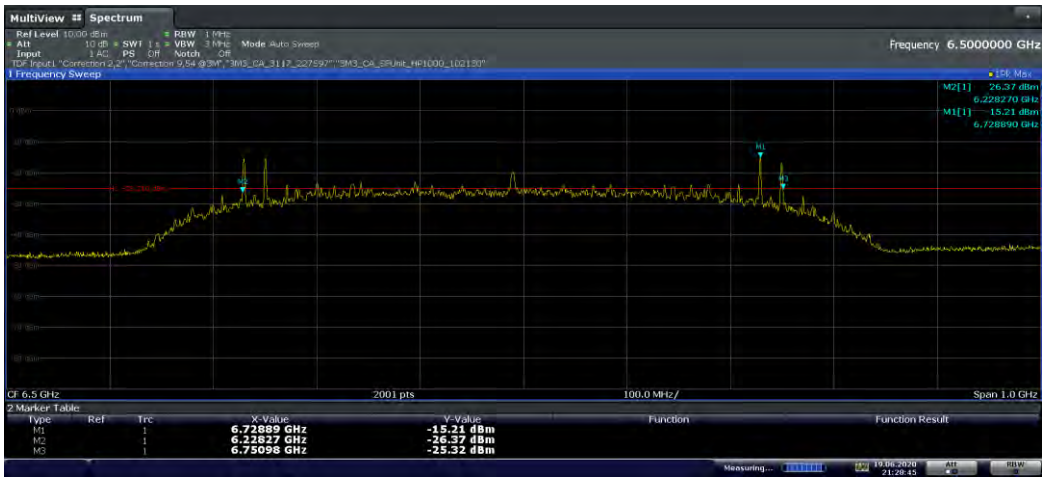
Plot 7-5. 10dBc Bandwidth (Ch. 5, Config 1/Payload 85)



Plot 7-6. 10dBc Bandwidth (Ch. 5, Config 1/Payload 125)

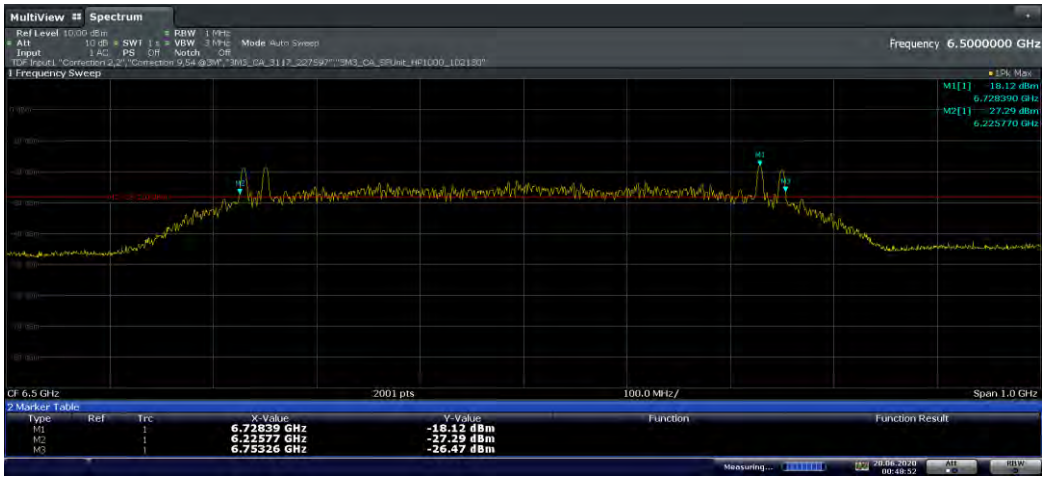


Plot 7-7. 10dBc Bandwidth (Ch. 5, Config 2/Payload 125)



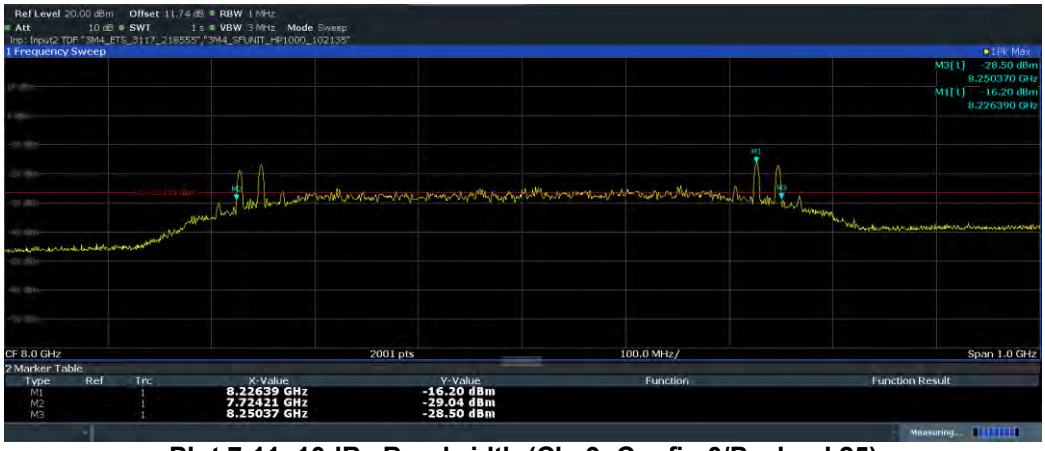
Plot 7-8. 10dBc Bandwidth (Ch. 5, Config 3/Payload 125)

Plot 7-9. 10dBc Bandwidth (Ch. 5, Config 4/Payload 0)

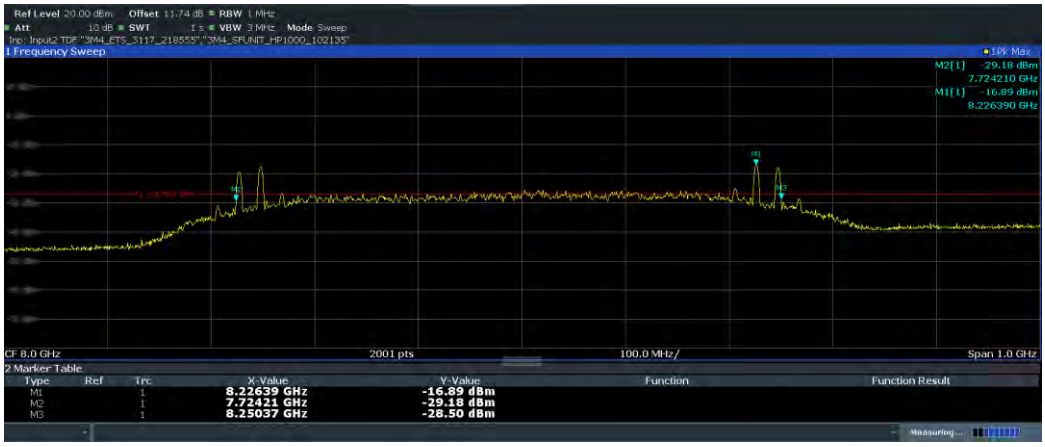


Plot 7-10. 10dBc Bandwidth (Ch. 5, Config 5/Payload 0)

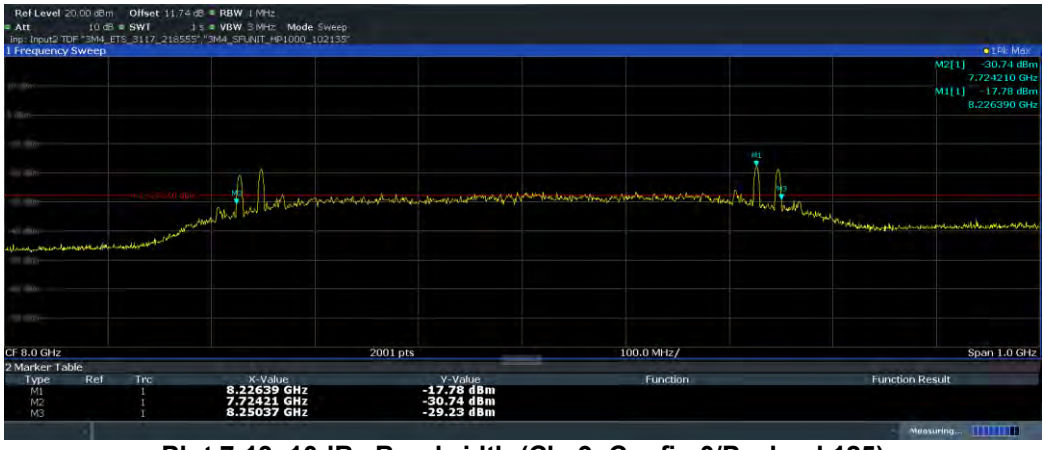
Channel 9, 10dBc BW:



Plot 7-11. 10dBc Bandwidth (Ch. 9, Config 0/Payload 25)

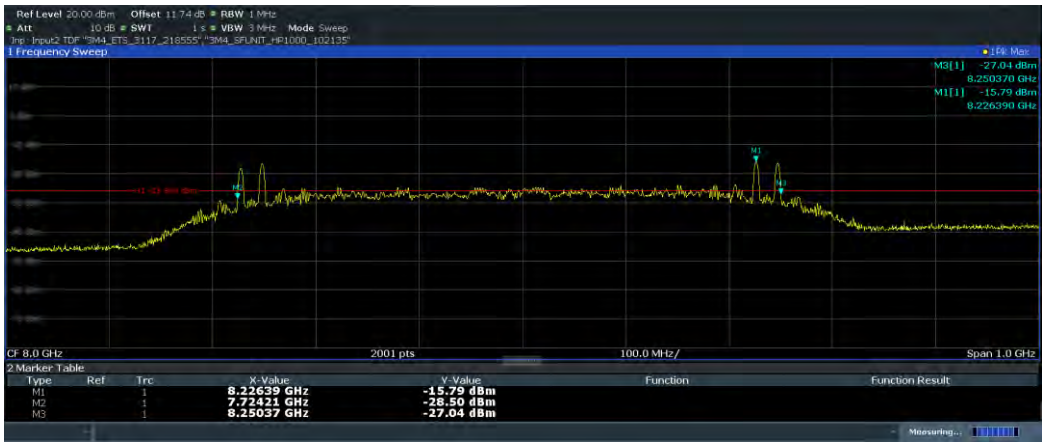


Plot 7-12. 10dBc Bandwidth (Ch. 9, Config 0/Payload 65)

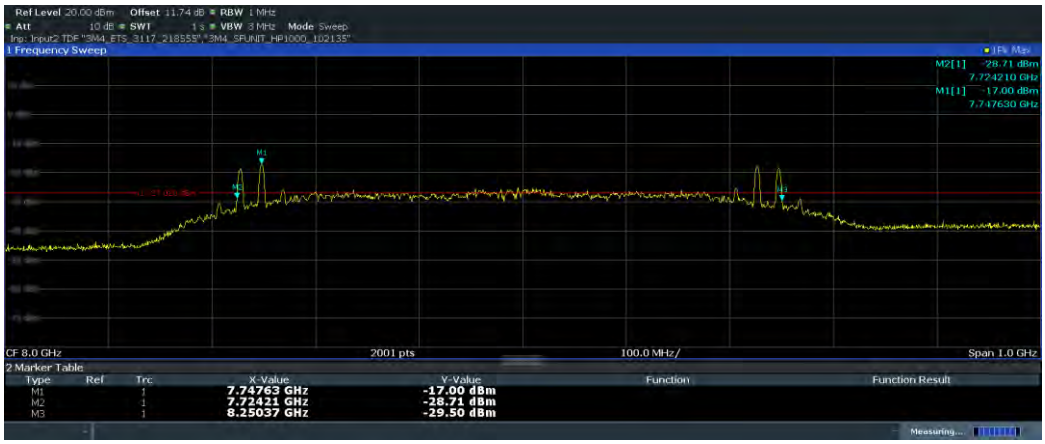


Plot 7-13. 10dBc Bandwidth (Ch. 9, Config 0/Payload 125)

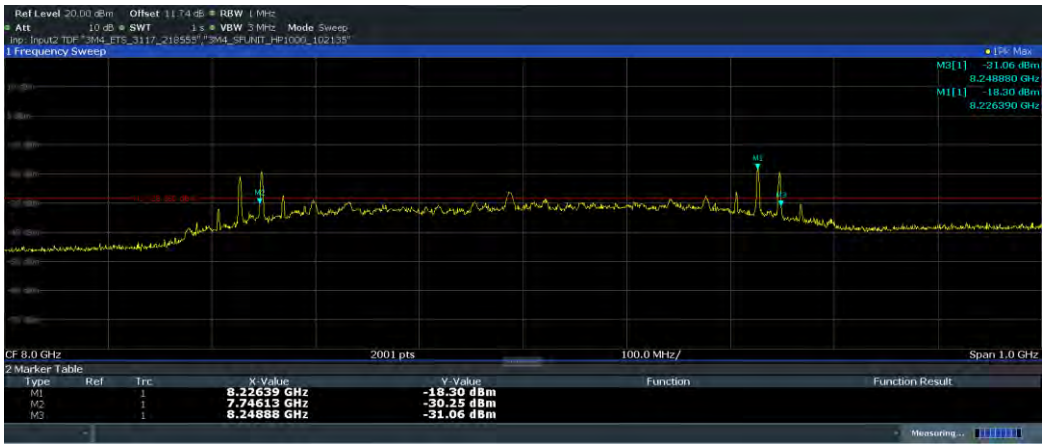
Plot 7-14. 10dBc Bandwidth (Ch. 9, Config 1/Payload 45)



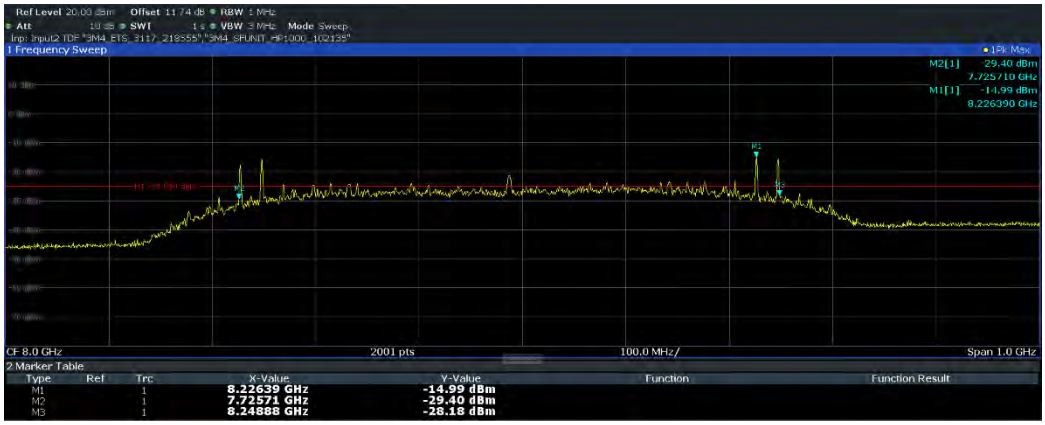
Plot 7-15. 10dBc Bandwidth (Ch. 9, Config 1/Payload 85)



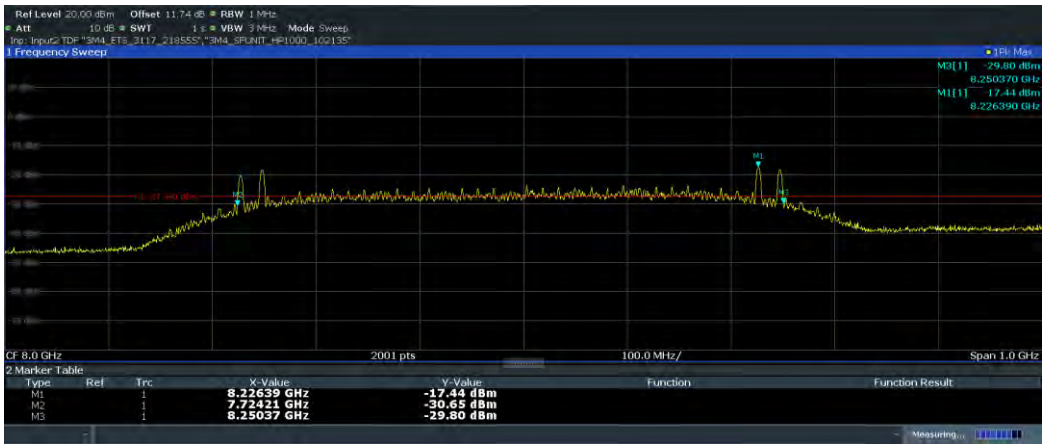
Plot 7-16. 10dBc Bandwidth (Ch. 9, Config 1/Payload 125)



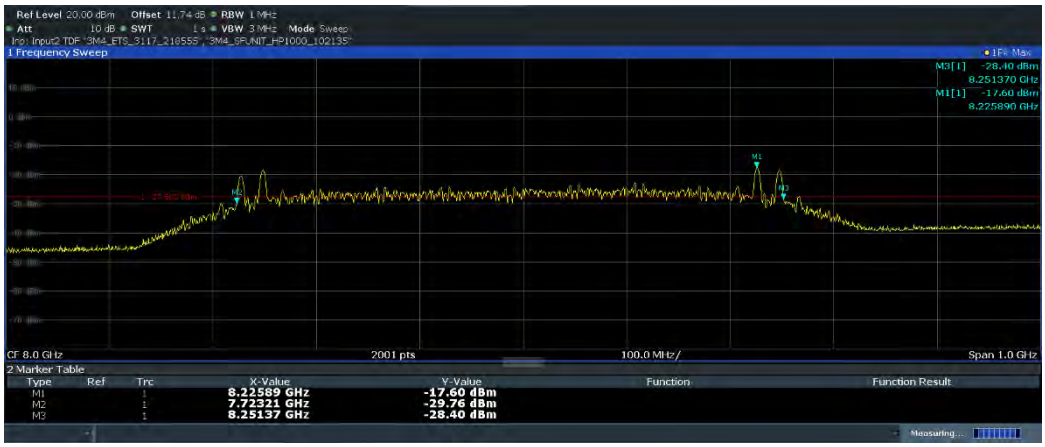
Plot 7-17. 10dBc Bandwidth (Ch. 9, Config 2/Payload 125)



Plot 7-18. 10dBc Bandwidth (Ch. 9, Config 3/Payload 125)



Plot 7-19. 10dBc Bandwidth (Ch. 9, Config 4/Payload 0)



Plot 7-20. 10dBc Bandwidth (Ch. 9, Config 5/Payload 0)

7.3 Occupied Bandwidth Measurement

RSS-220 [2], RSS-Gen [6.7]

Test Overview

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. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

ANSI C63.10-2013 – Section 6.9
RSS-Gen [6.7]

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 10dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

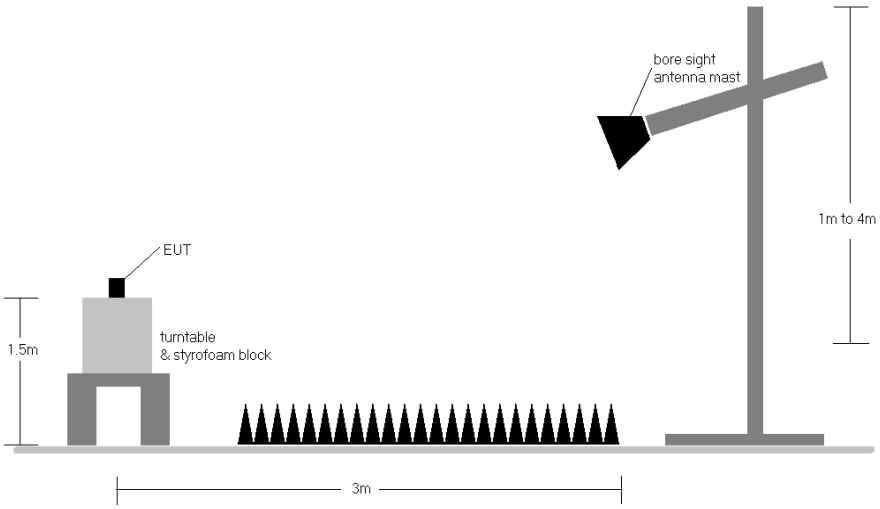


Figure 7-2. Test Setup

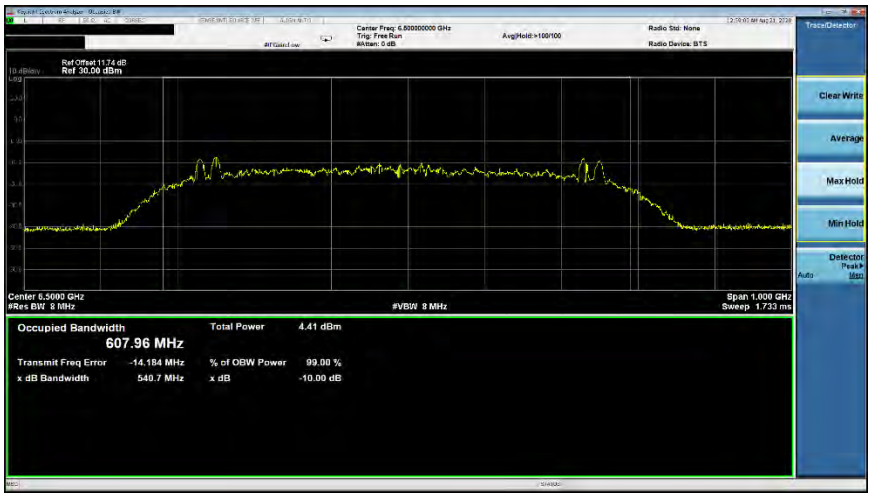
Frequency [GHz]	Channel	Config	Payload	10dBc Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
6.5	5	0	25	540.70	500	Pass
		0	65	540.20	500	Pass
		0	125	540.20	500	Pass
		1	45	540.80	500	Pass
		1	85	541.10	500	Pass
		1	125	540.50	500	Pass
		2	125	522.70	500	Pass
		3	125	524.70	500	Pass
		4	0	533.30	500	Pass
		5	0	534.90	500	Pass

Table 7-4. ISED 10dBc Bandwidth Measurements (UWB, Ch.5, 6.5GHz)

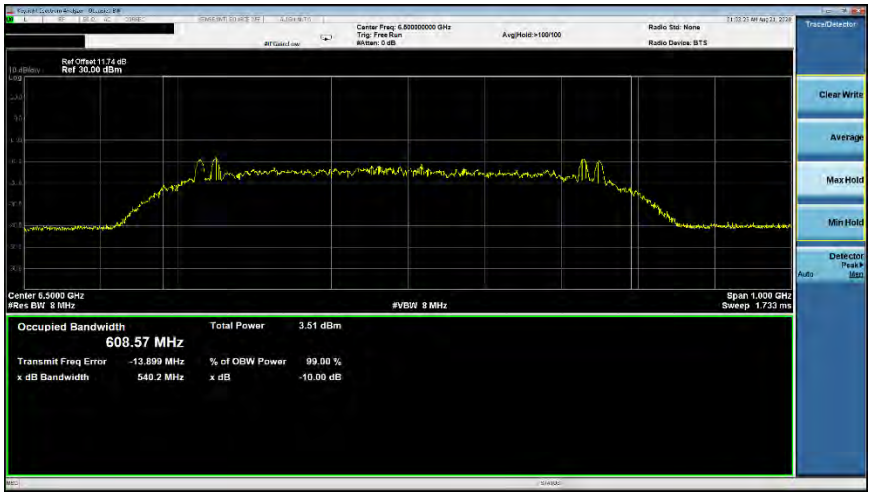
Frequency [GHz]	Channel	Config	Payload	10dBc Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
8.0	9	0	25	529.90	500	Pass
		0	65	529.60	500	Pass
		0	125	530.00	500	Pass
		1	45	530.20	500	Pass
		1	85	530.20	500	Pass
		1	125	532.60	500	Pass
		2	125	525.40	500	Pass
		3	125	526.90	500	Pass
		4	0	532.90	500	Pass
		5	0	533.90	500	Pass

Table 7-5. ISED 10dBc Bandwidth Measurements (UWB, Ch.9, 8GHz)

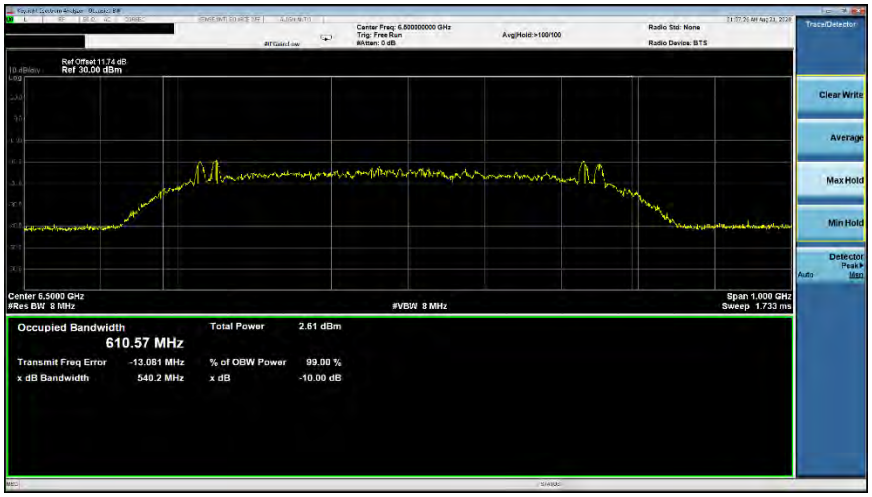
Channel 5, OBW:



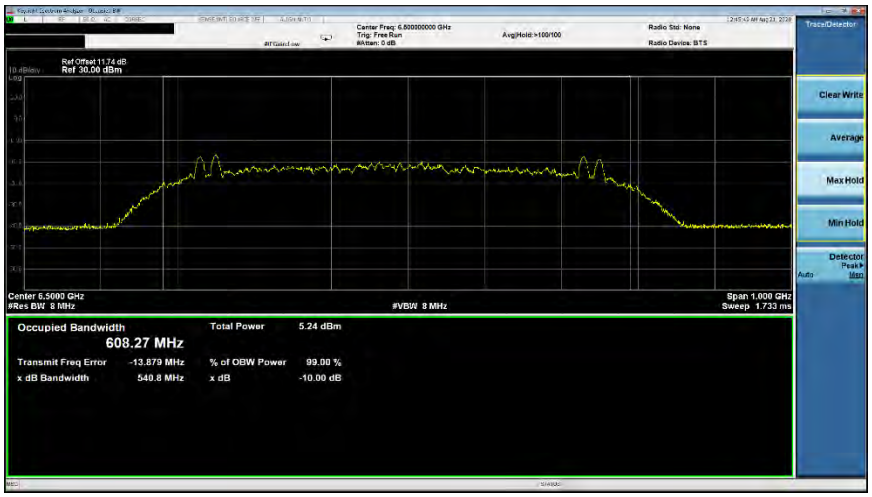
Plot 7-21. ISED Occupied Bandwidth (Ch. 5, Config 0/Payload 25)



Plot 7-22. ISED Occupied Bandwidth (Ch. 5, Config 0/Payload 65)

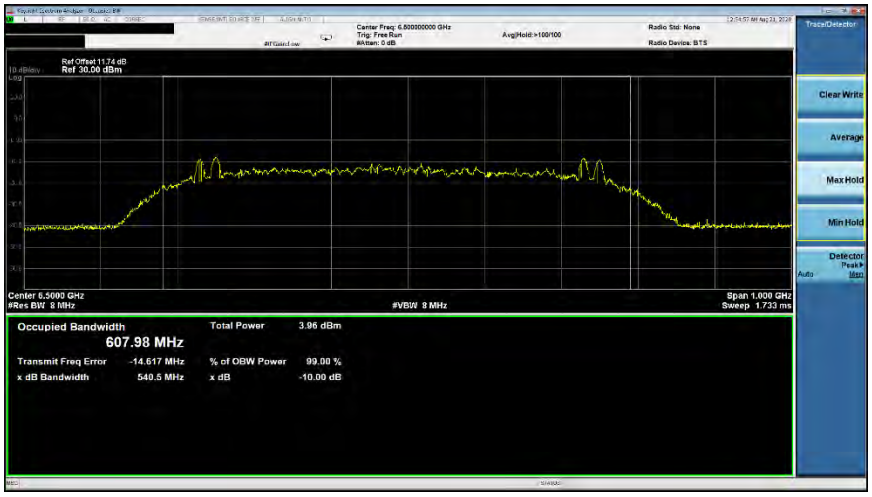


Plot 7-23. ISED Occupied Bandwidth (Ch. 5, Config 0/Payload 125)

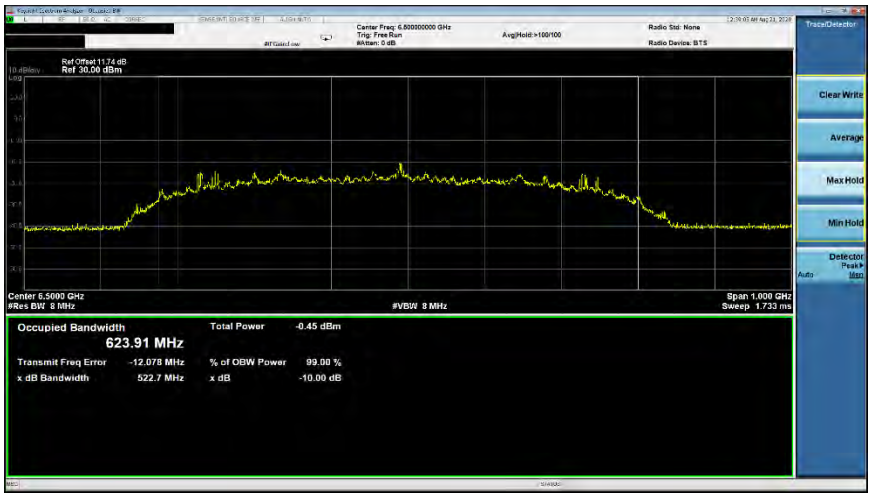


Plot 7-24. ISED Occupied Bandwidth (Ch. 5, Config 1/Payload 45)

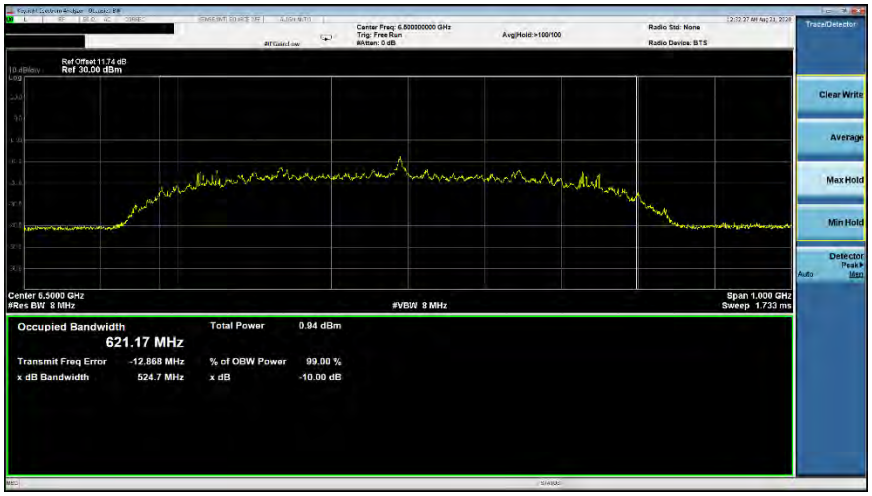
Plot 7-25. ISED Occupied Bandwidth (Ch. 5, Config 1/Payload 85)



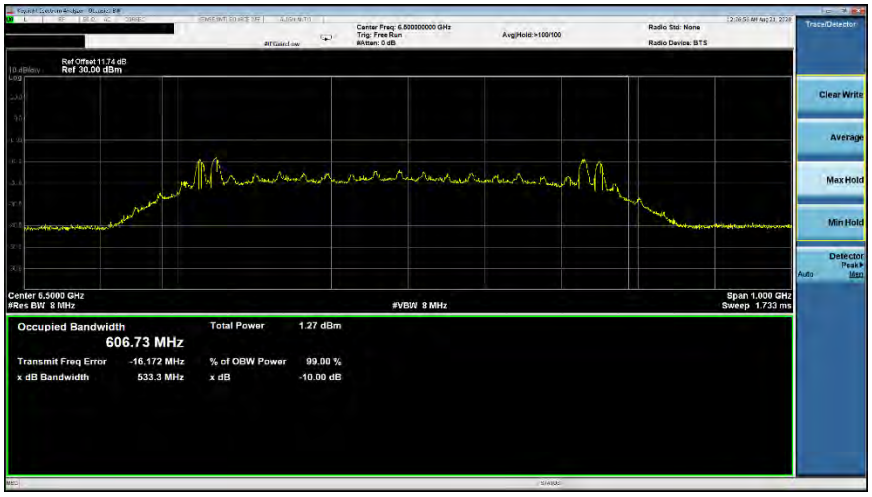
Plot 7-26. ISED Occupied Bandwidth (Ch. 5, Config 1/Payload 125)



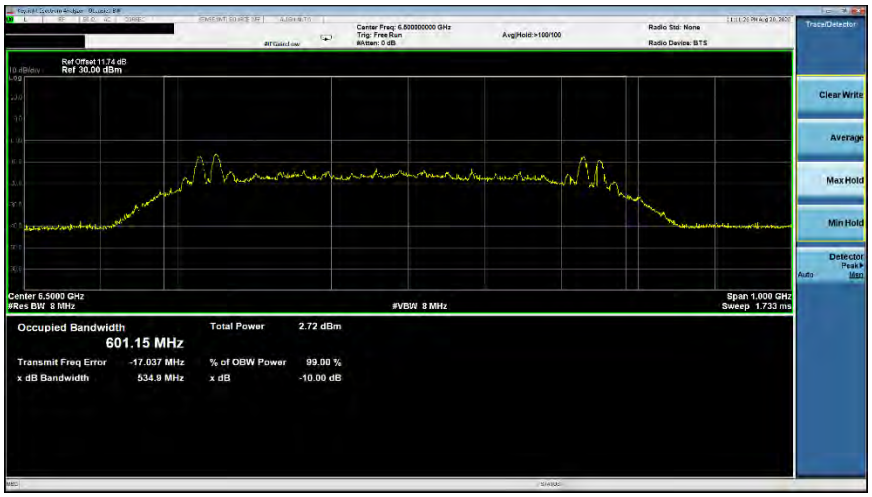
Plot 7-27. ISED Occupied Bandwidth (Ch. 5, Config 2/Payload 125)



Plot 7-28. ISED Occupied Bandwidth (Ch. 5, Config 3/Payload 125)

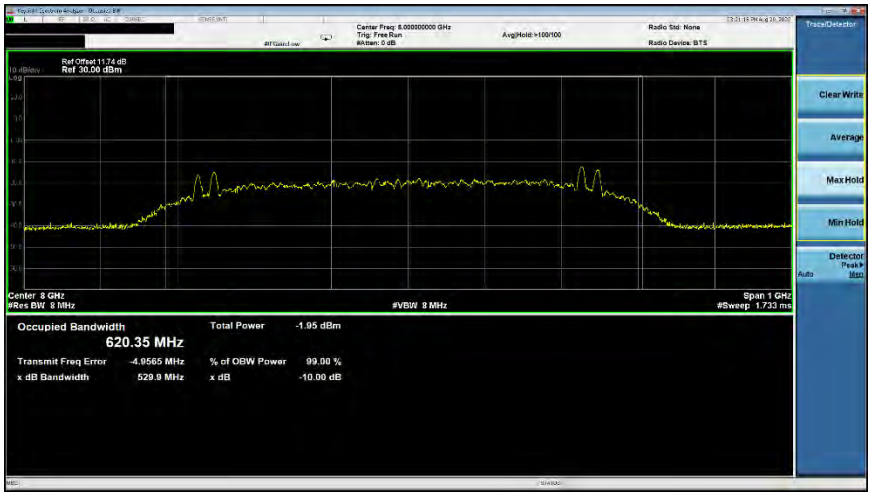


Plot 7-29. ISED Occupied Bandwidth (Ch. 5, Config 4/Payload 0)

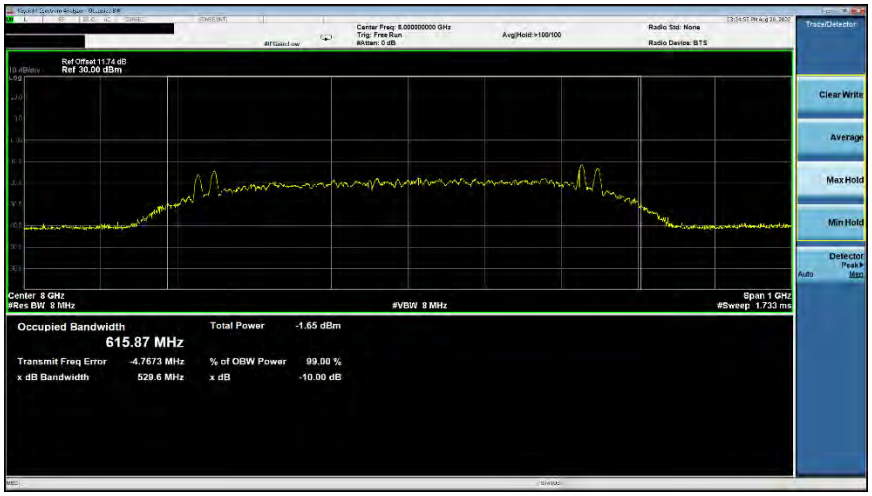


Plot 7-30. ISED Occupied Bandwidth (Ch. 5, Config 5/Payload 0)

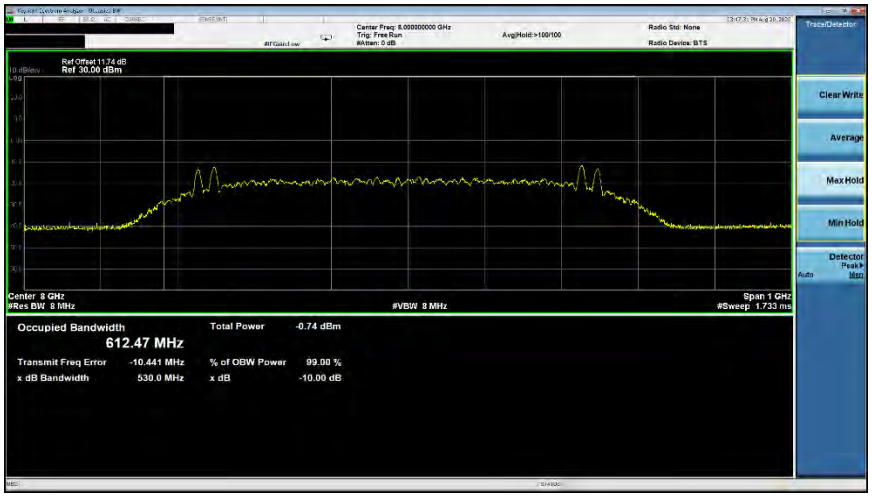
Channel 9, OBW:



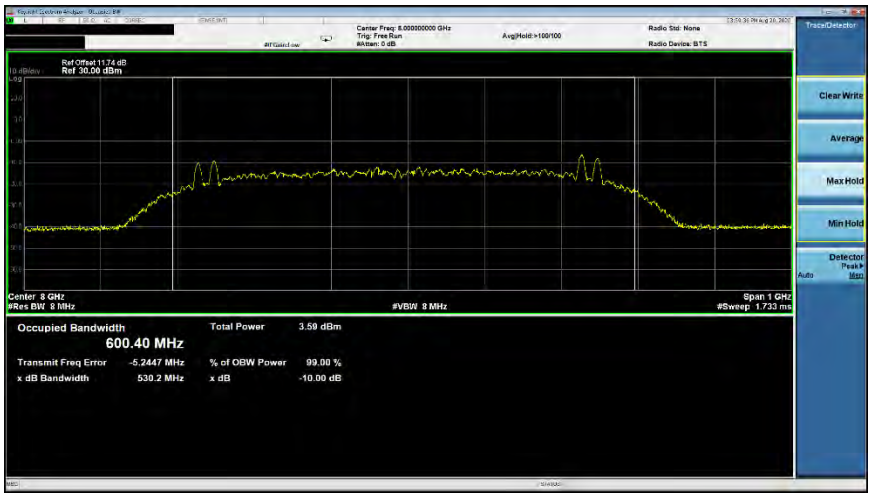
Plot 7-31. ISED Occupied Bandwidth (Ch. 9, Config 0/Payload 25)



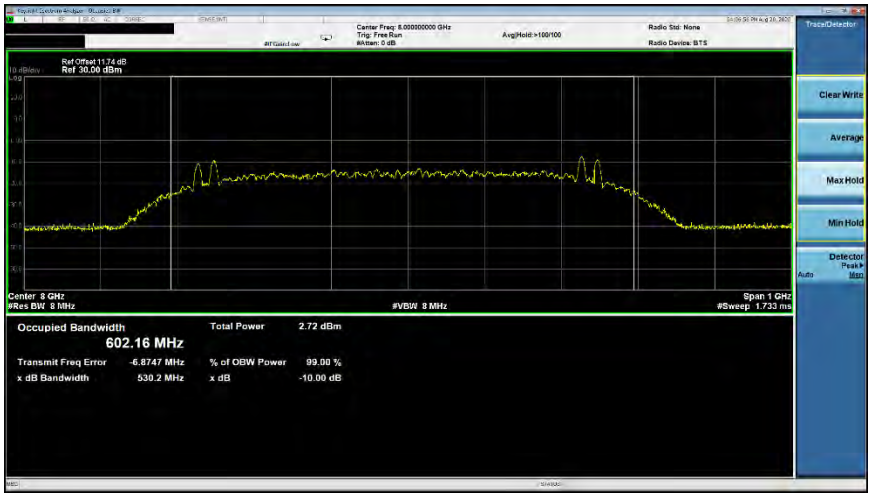
Plot 7-32. ISED Occupied Bandwidth (Ch. 9, Config 0/Payload 65)



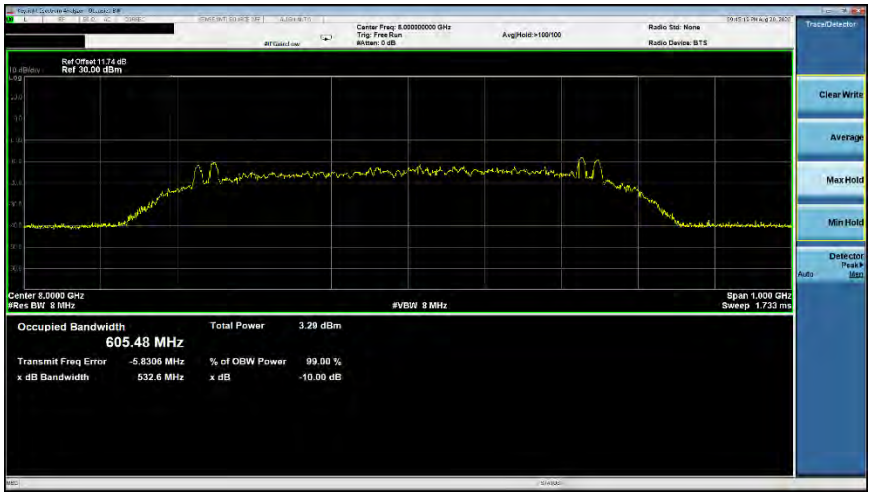
Plot 7-33. ISED Occupied Bandwidth (Ch. 9, Config 0/Payload 125)



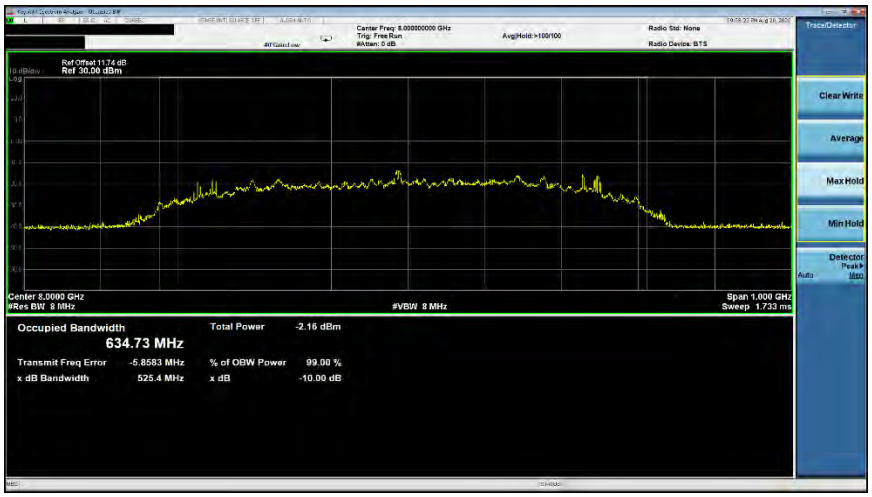
Plot 7-34. ISED Occupied Bandwidth (Ch. 9, Config 1/Payload 45)



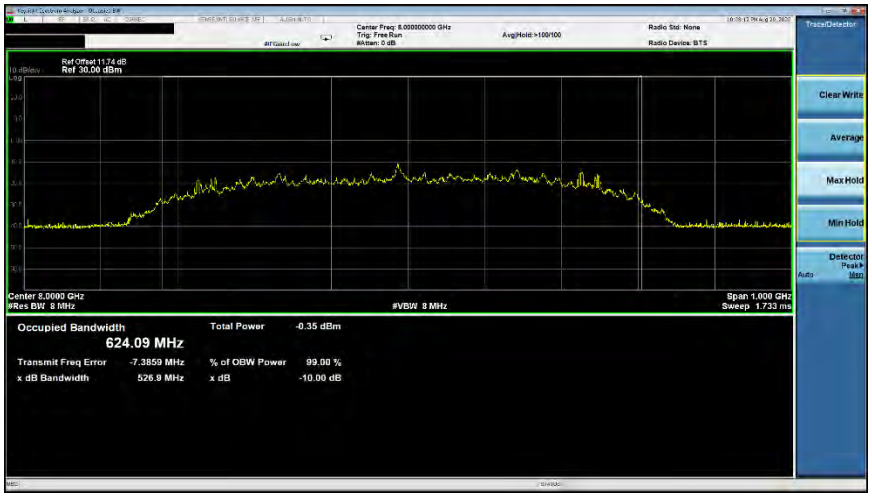
Plot 7-35. ISED Occupied Bandwidth (Ch. 9, Config 1/Payload 85)



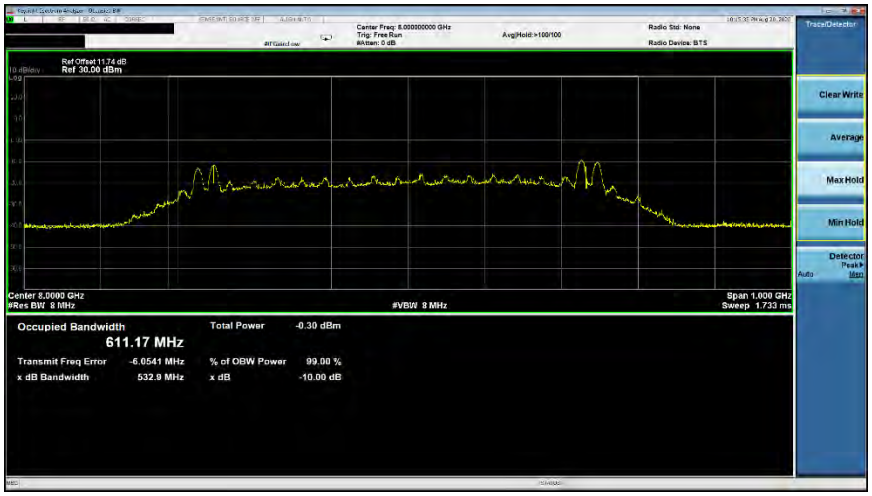
Plot 7-36. ISED Occupied Bandwidth (Ch. 9, Config 1/Payload 125)



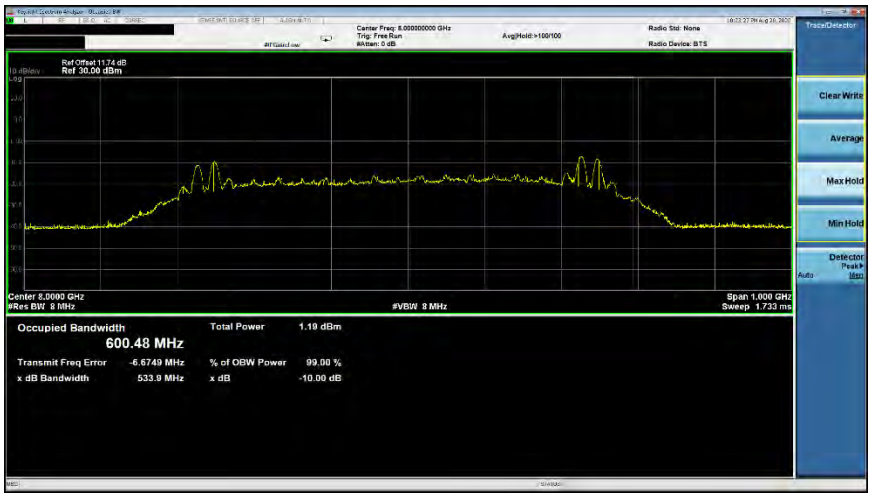
Plot 7-37. ISED Occupied Bandwidth (Ch. 9, Config 2/Payload 125)



Plot 7-38. ISED Occupied Bandwidth (Ch. 9, Config 3/Payload 125)



Plot 7-39. ISED Occupied Bandwidth (Ch. 9, Config 4/Payload 0)



Plot 7-40. ISED Occupied Bandwidth (Ch. 9, Config 5/Payload 0)

7.4 Maximum Peak and Average Radiated Power (EIRP)

§15.519 (c) §15.519 (e); RSS-220 [5.3.1(d)] RSS-220 [5.3.1(g)]

Test Overview and Limits

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

15.519 (c) The radiated emissions above 960 MHz 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 MHz:

Frequency [MHz]	EIRP [dBm]
3100-10600	−41.3

Table 7-6. Average EIRP limit

Test Procedure Used

ANSI C63.10-2013 – Section 10.3.5 and 10.3.7
KDB 393764 D01 v02

Test Settings

Average EIRP Measurements

1. RBW = 1MHz
2. VBW = 3MHz
3. Detector = Average (RMS)
4. Sweep time = No more than a 1 ms integration period over each measurement bin
5. Trace mode = Max hold
6. Trace was allowed to stabilize

Peak EIRP Measurements

1. RBW = 50MHz
2. VBW = 50MHz
3. Detector = Peak
4. Sweep time = auto couple
5. Trace mode = Max hold
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

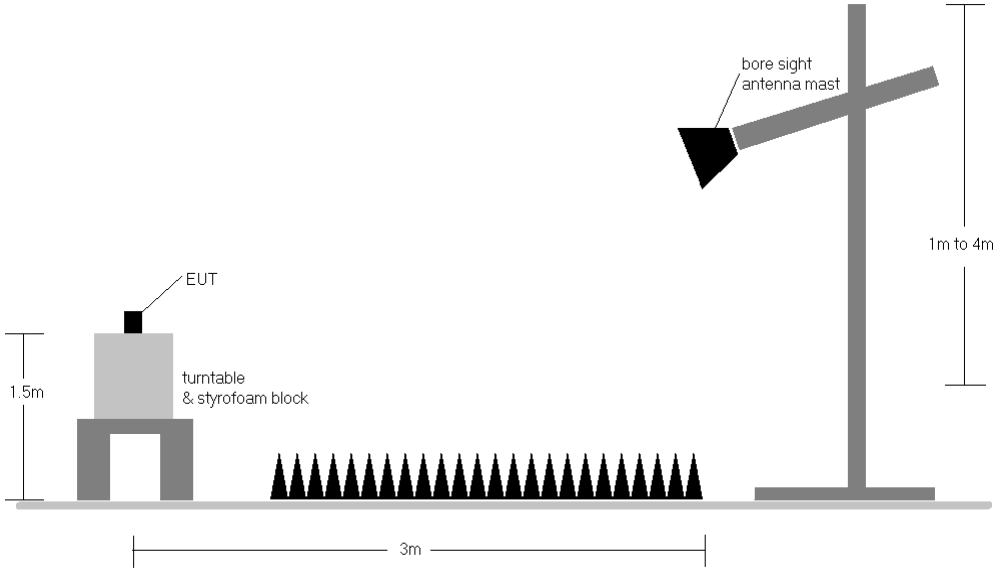


Figure 7-3. Test Setup

Test Notes

The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

7.4.1 Peak Radiated Power Measurement

§15.519 (e); RSS-220 [5.3.1(g)]

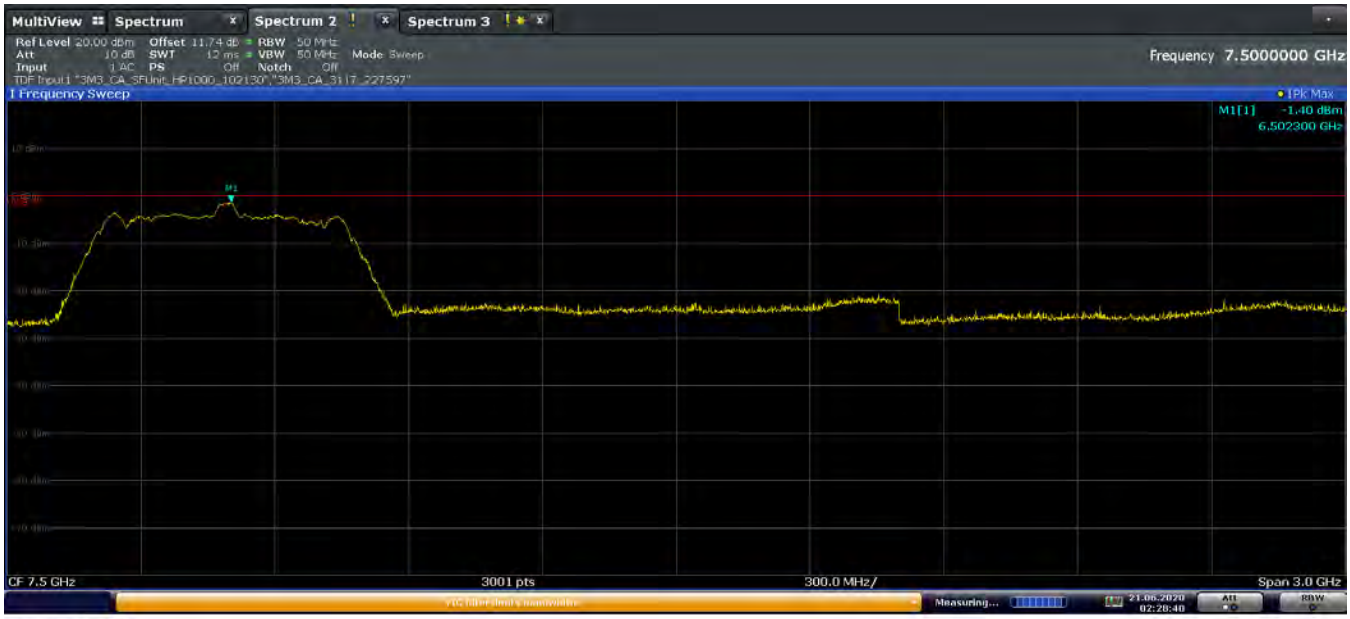
Frequency [GHz]	Channel	Config	Payload	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	F_M [GHz]	Peak EIRP [dBm/50MHz]	Peak EIRP Limit [dBm/50MHz]	Margin [dB]
6.5	5	0	25	V	253	210	6.502	-1.40	0	-1.40
		0	65	V	301	211	6.499	-2.41	0	-2.41
		0	125	V	290	215	6.500	-3.17	0	-3.17
		1	45	V	290	214	6.499	-1.15	0	-1.15
		1	85	V	290	212	6.500	-1.64	0	-1.64
		1	125	V	289	215	6.503	-2.11	0	-2.11
		2	125	V	289	215	6.492	-6.53	0	-6.53
		3	125	V	278	210	6.491	-6.37	0	-6.37
		4	0	V	292	206	6.241	-4.54	0	-4.54
		5	0	V	302	214	6.244	-3.06	0	-3.06

Table 7-7. Peak EIRP Measurements (UWB Ch. 5, 6.5GHz)

Frequency [GHz]	Channel	Config	Payload	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	F_M [GHz]	Peak EIRP [dBm/50MHz]	Peak EIRP Limit [dBm/50MHz]	Margin [dB]
8.0	9	0	25	V	242	288	7.974	-2.50	0	-2.50
		0	65	V	241	287	7.990	-3.07	0	-3.07
		0	125	V	241	287	7.986	-4.31	0	-4.31
		1	45	V	241	285	7.990	-1.17	0	-1.17
		1	85	V	242	286	7.989	-1.87	0	-1.87
		1	125	V	234	105	7.993	-2.33	0	-2.33
		2	125	V	241	284	7.979	-8.07	0	-8.07
		3	125	V	241	286	7.993	-7.23	0	-7.23
		4	0	V	243	286	8.238	-4.32	0	-4.32
		5	0	V	245	283	8.239	-2.80	0	-2.80

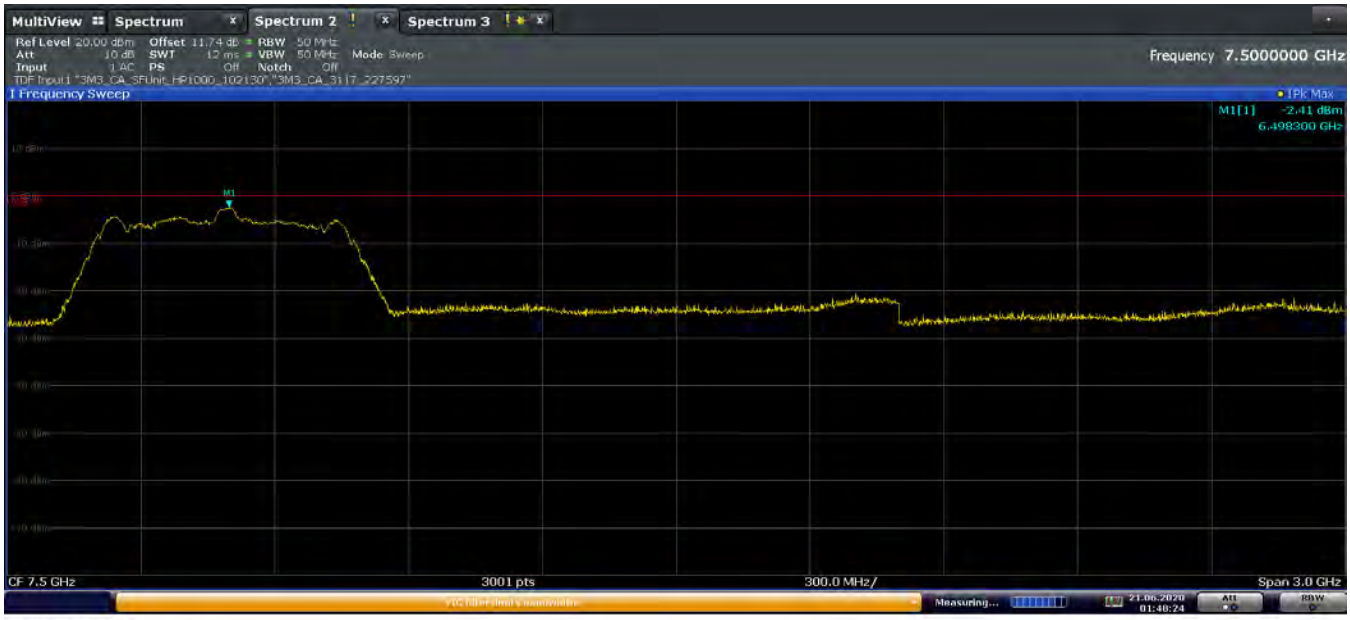
Table 7-8. Peak EIRP Measurements (UWB Ch. 9, 8GHz)

Channel 5 Peak Radiated Power:



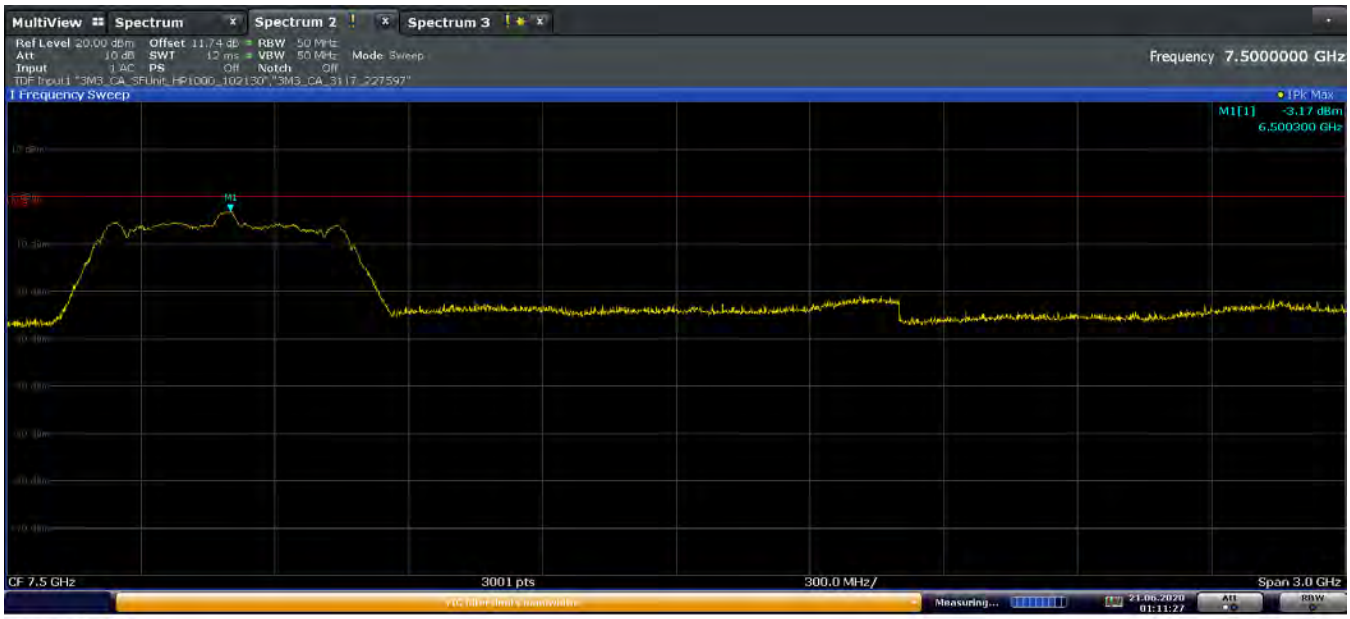
02:28:41 21.06.2020

Plot 7-41. Peak Radiated Power (Ch. 5, Config 0/Payload 25)



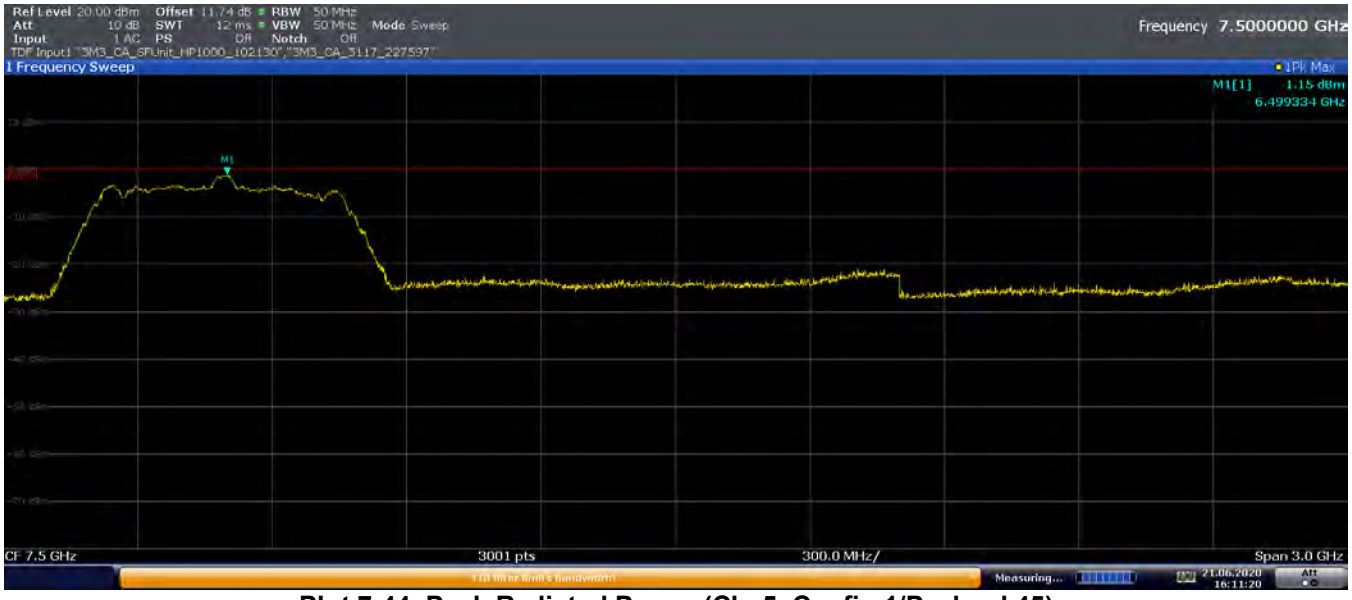
01:48:24 21.06.2020

Plot 7-42. Peak Radiated Power (Ch. 5, Config 0/Payload 65)

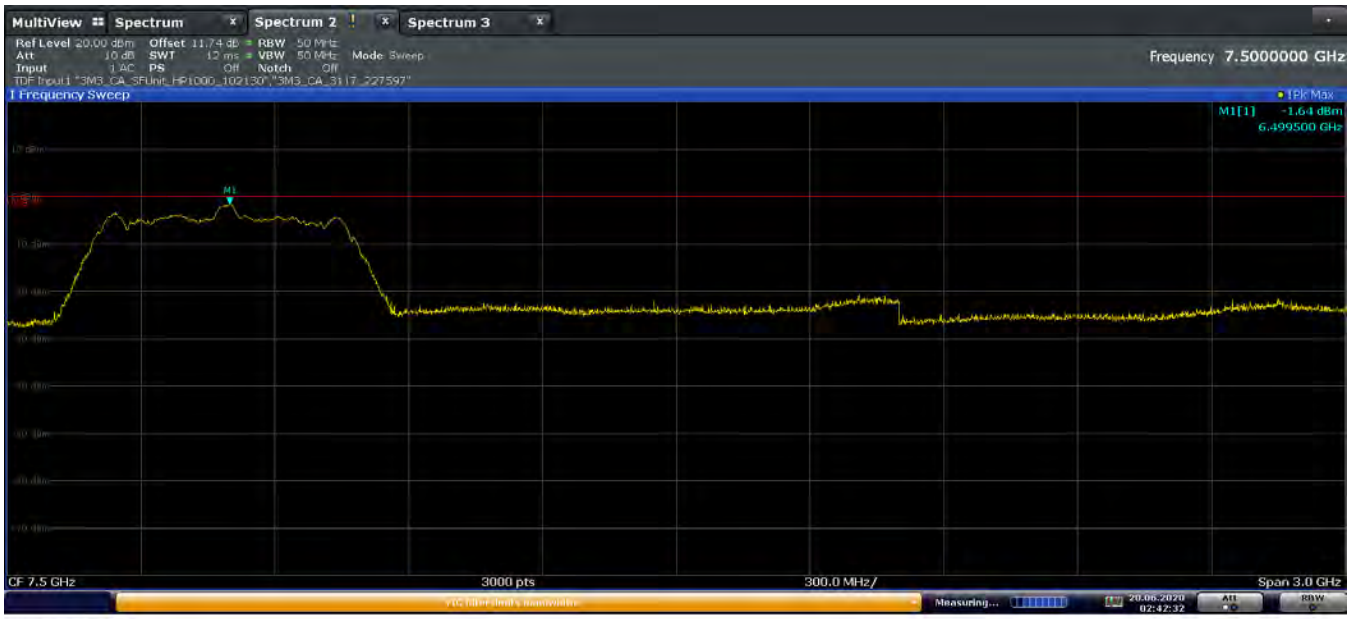


01:11:28 21.06.2020

Plot 7-43. Peak Radiated Power (Ch. 5, Config 0/Payload 125)

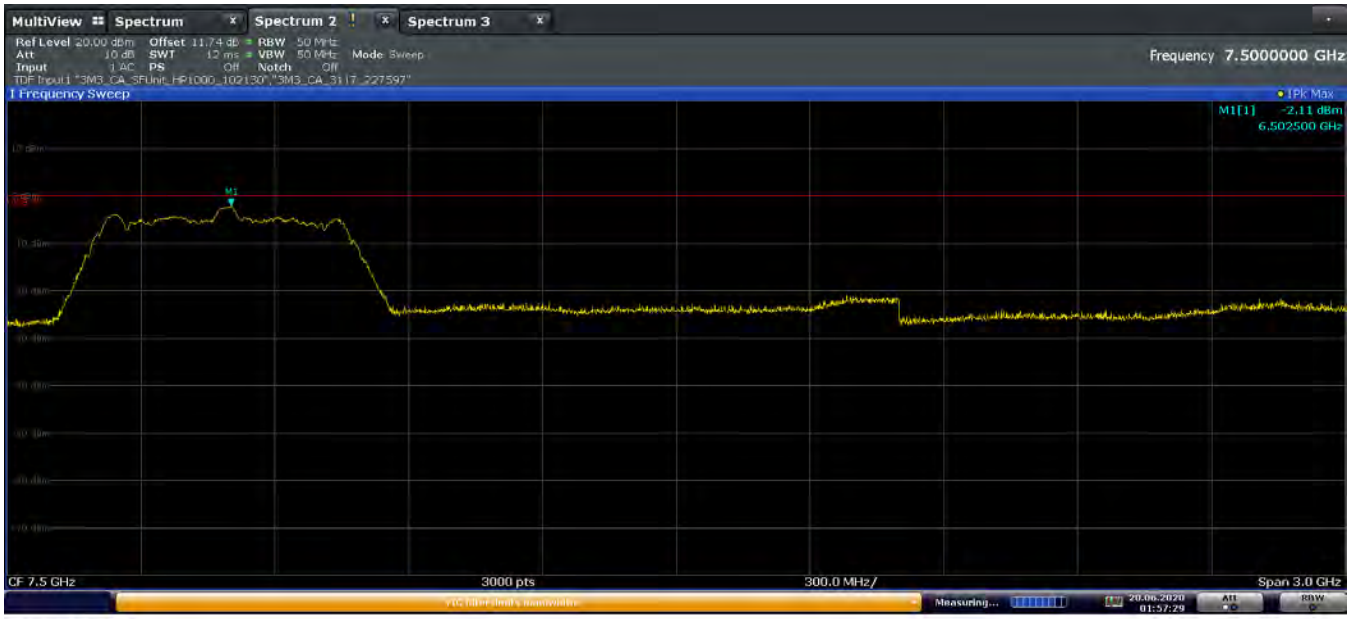


Plot 7-44. Peak Radiated Power (Ch. 5, Config 1/Payload 45)



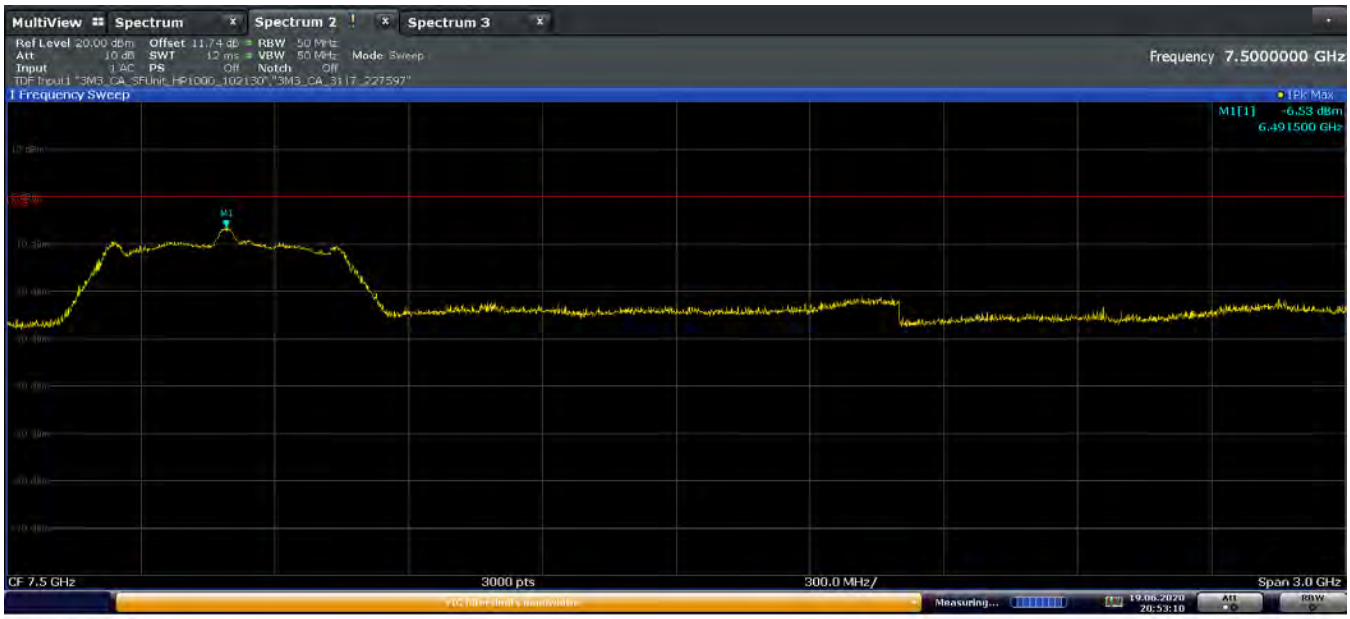
02:42:32 20.06.2020

Plot 7-45. Peak Radiated Power (Ch. 5, Config 1/Payload 85)



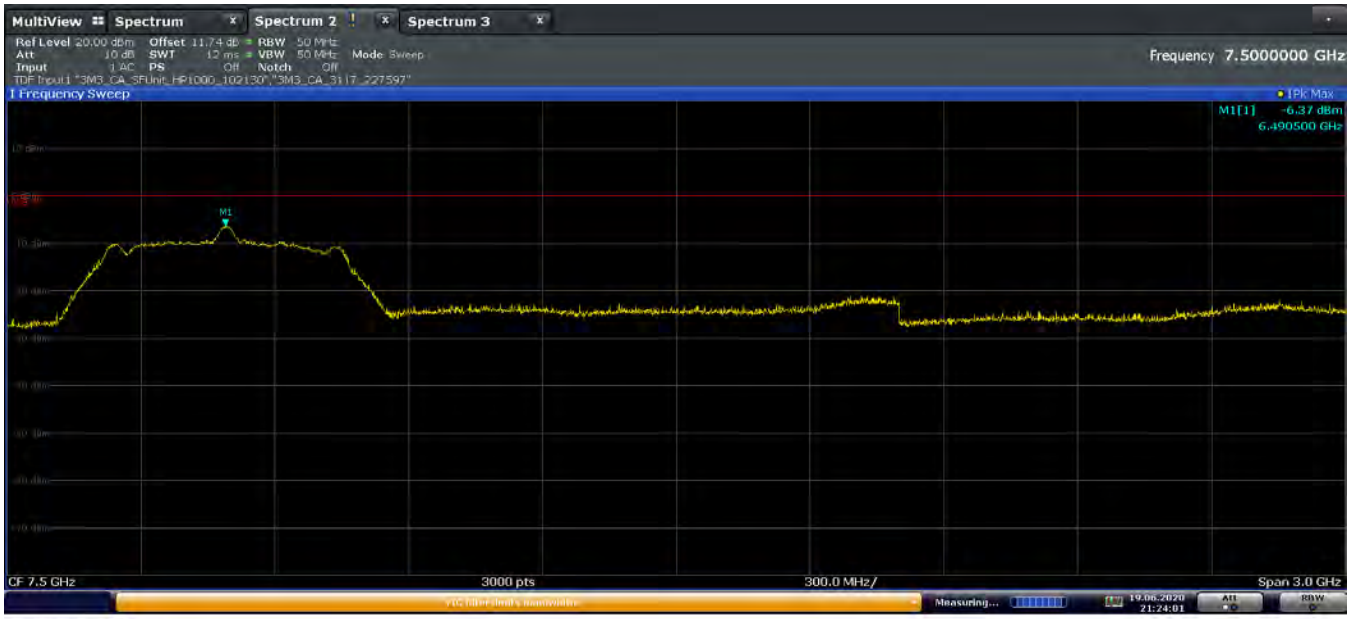
01:57:30 20.06.2020

Plot 7-46. Peak Radiated Power (Ch. 5, Config 1/Payload 125)



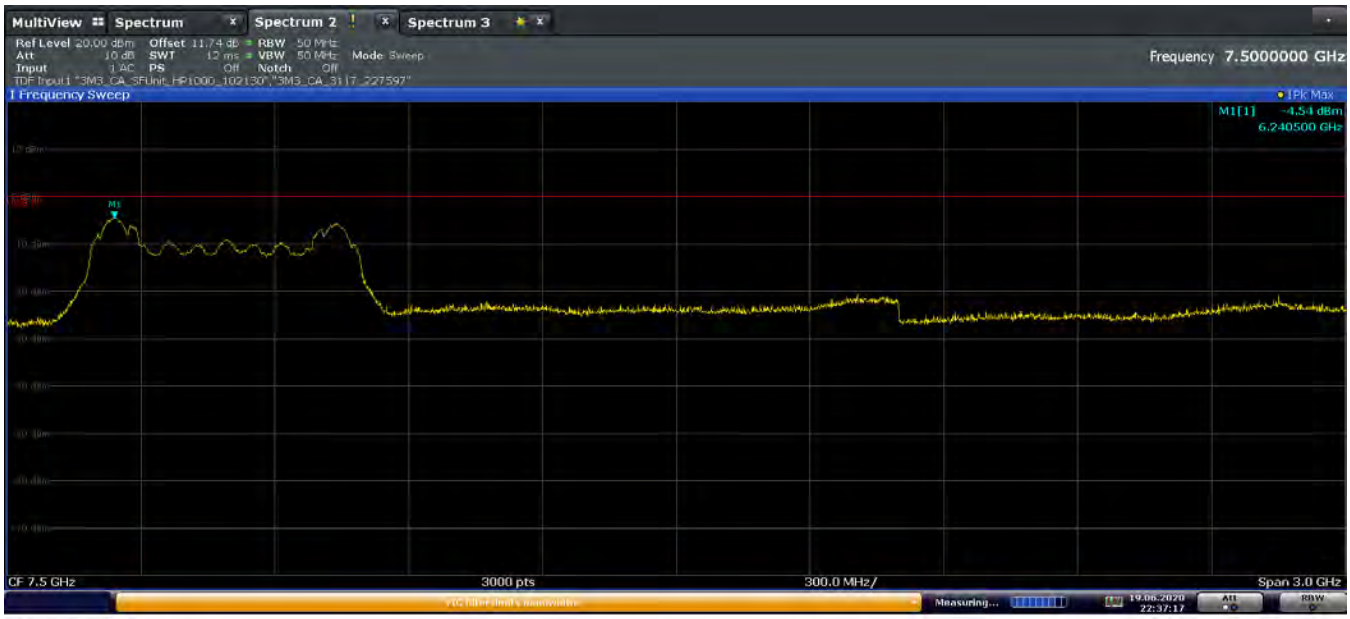
20:53:10 19.06.2020

Plot 7-47. Peak Radiated Power (Ch. 5, Config 2/Payload 125)



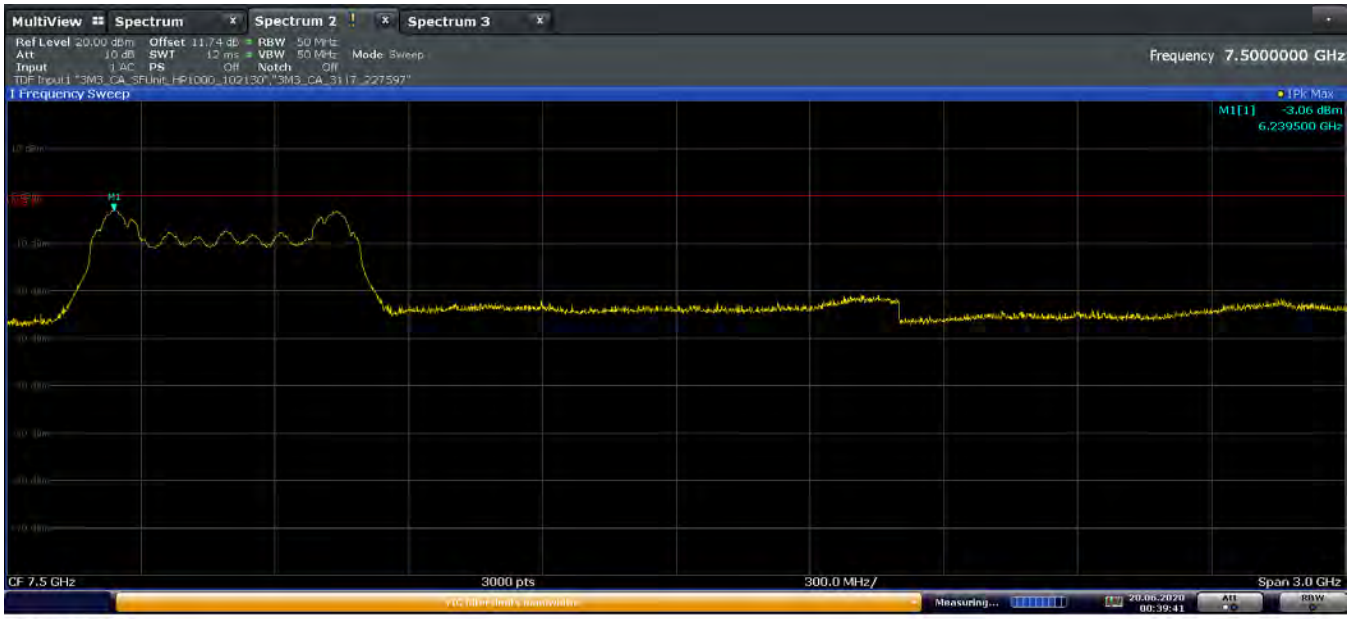
21:24:02 19.06.2020

Plot 7-48. Peak Radiated Power (Ch. 5, Config 3/Payload 125)



22:37:18 19.06.2020

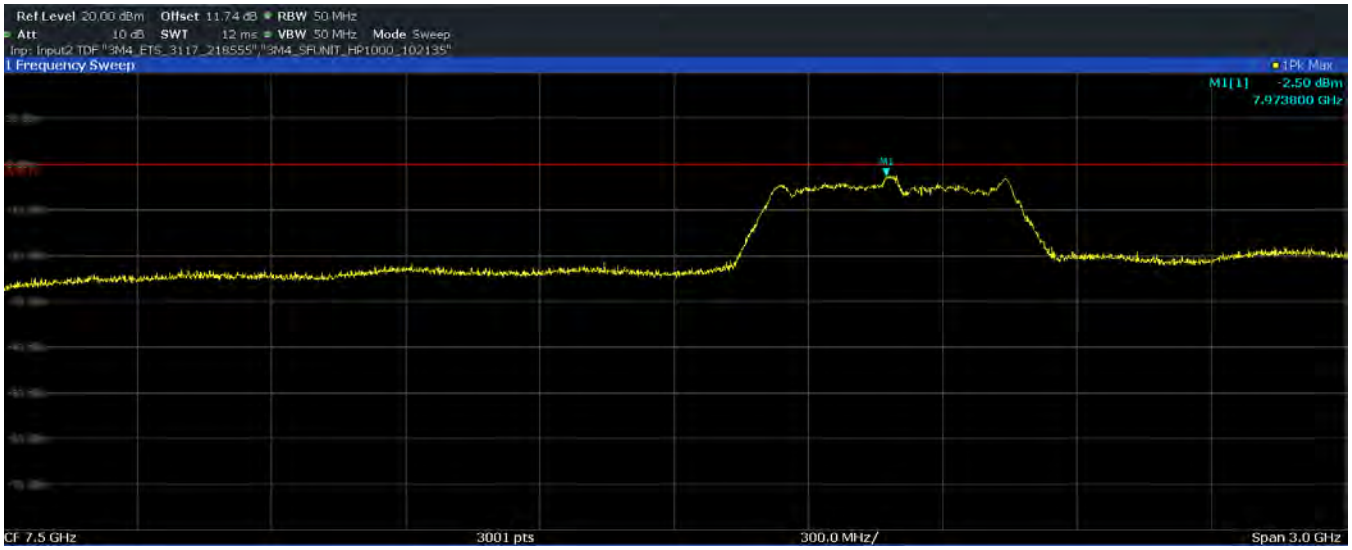
Plot 7-49. Peak Radiated Power (Ch. 5, Config 4/Payload 0)



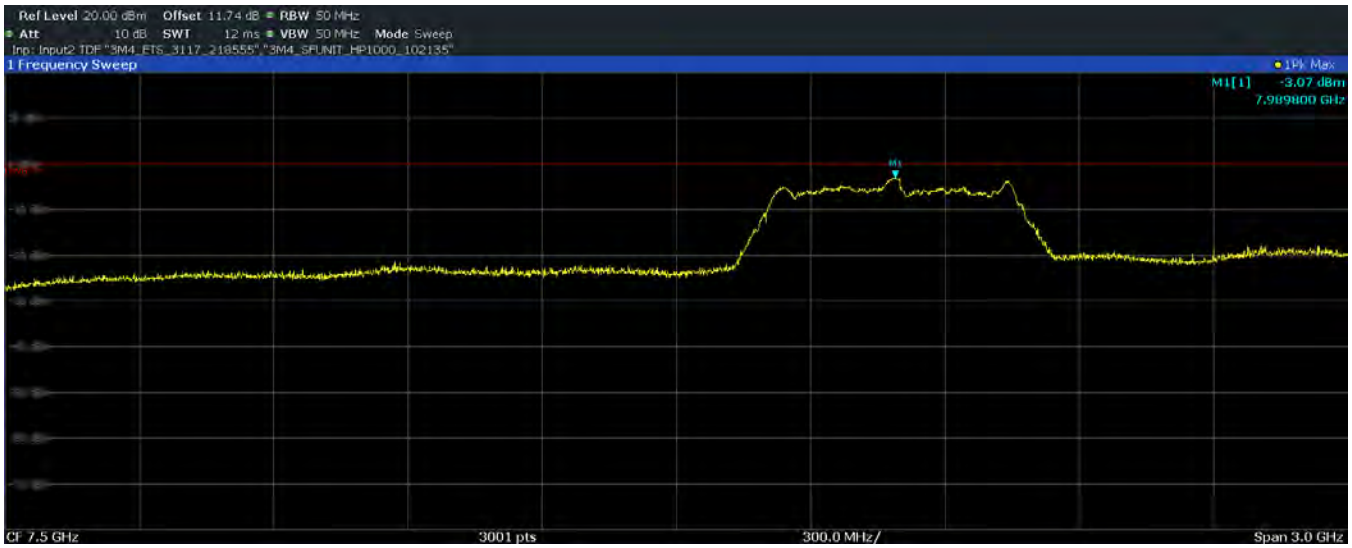
00:39:41 20.06.2020

Plot 7-50. Peak Radiated Power (Ch. 5, Config 5/Payload 0)

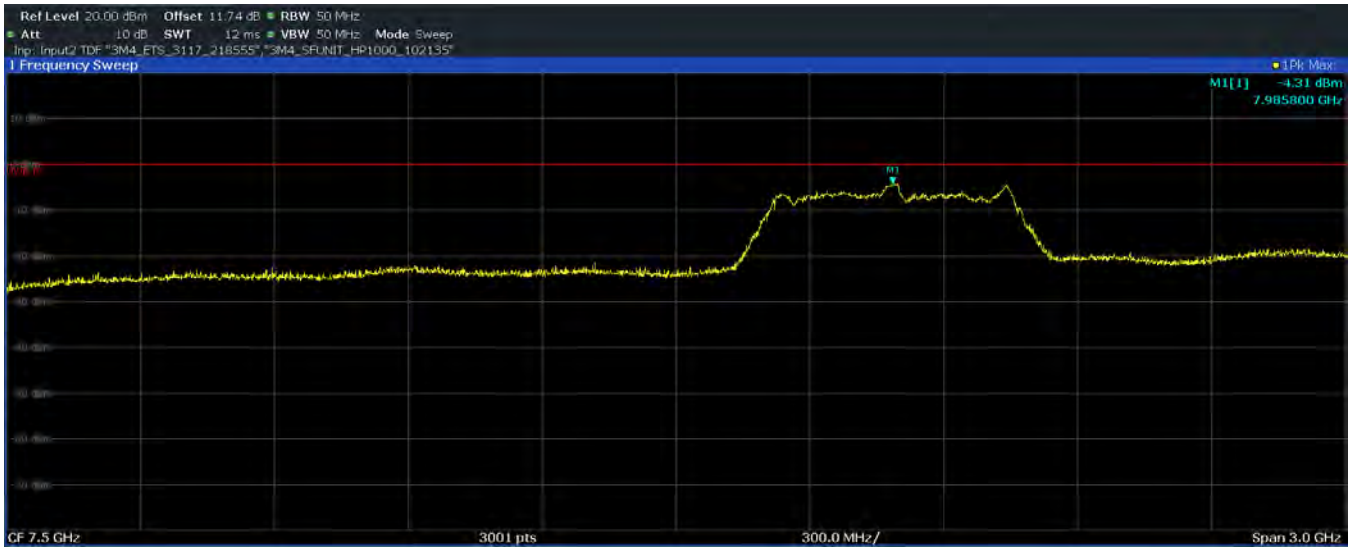
Channel 9 Peak Radiated Power:



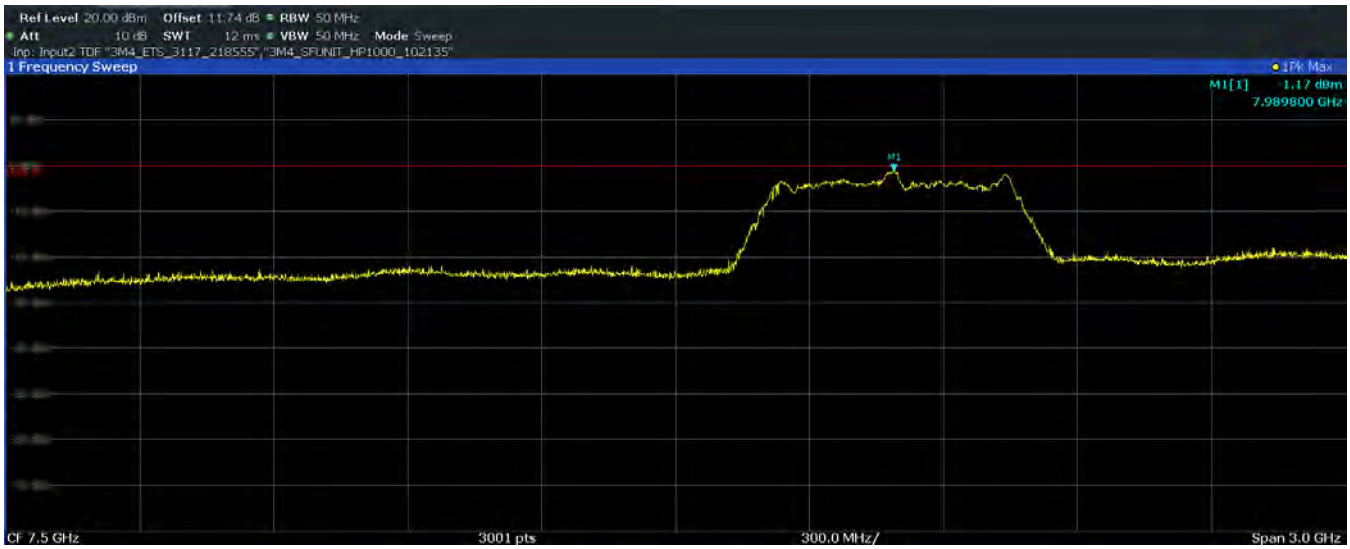
Plot 7-51. Peak Radiated Power (Ch. 9, Config 0/Payload 25)



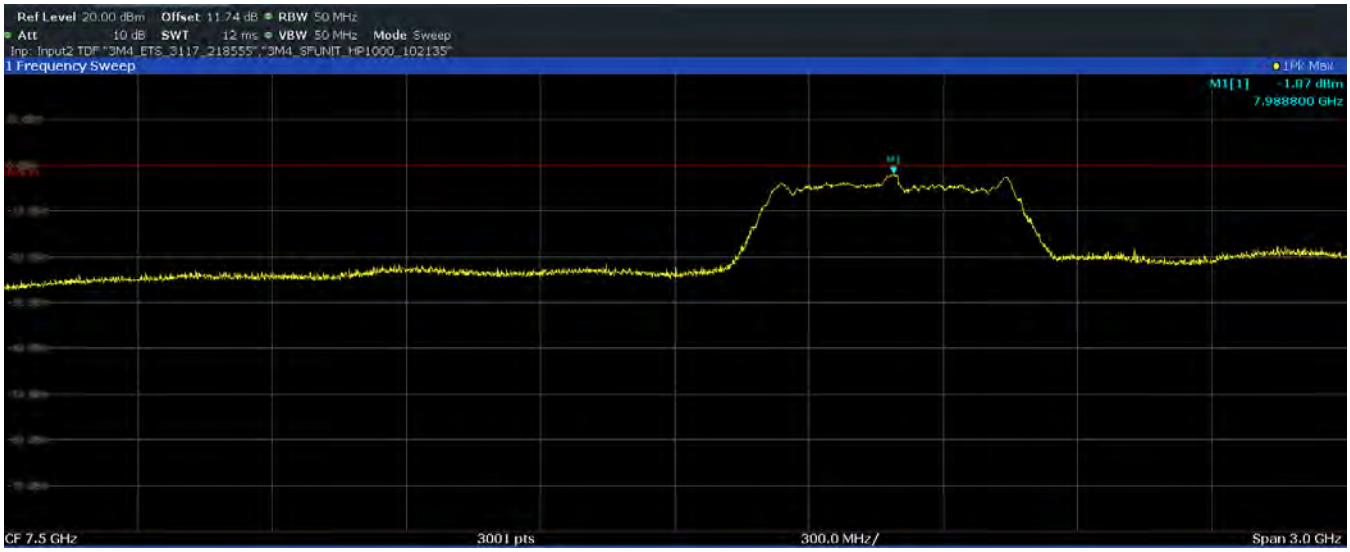
Plot 7-52. Peak Radiated Power (Ch. 9, Config 0/Payload 65)



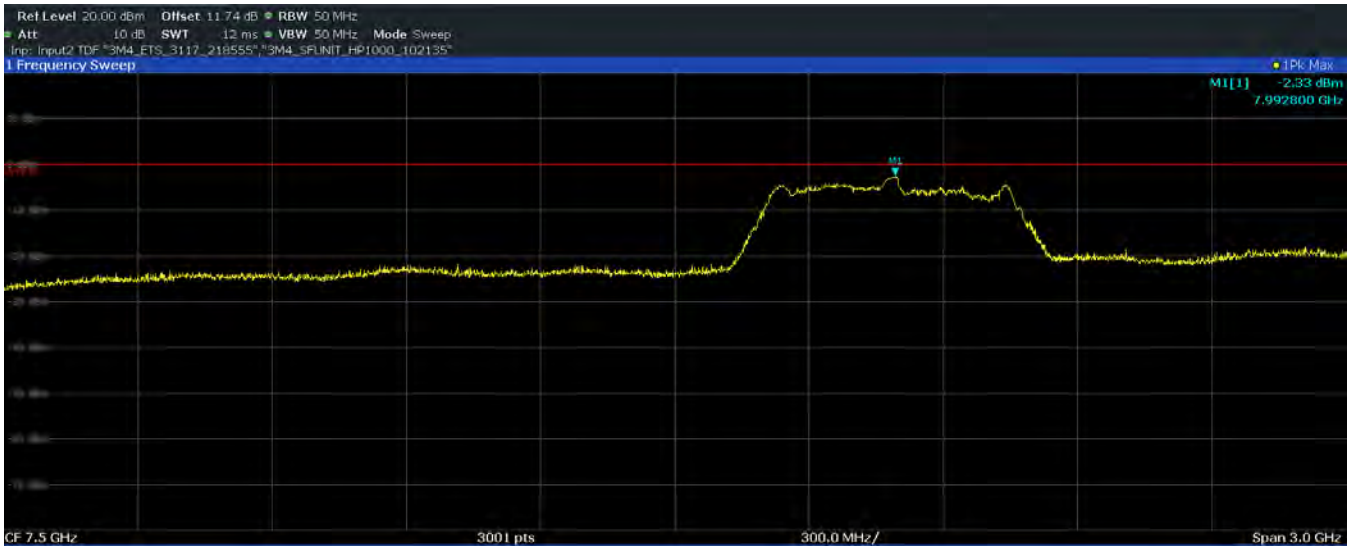
Plot 7-53. Peak Radiated Power (Ch. 9, Config 0/Payload 125)



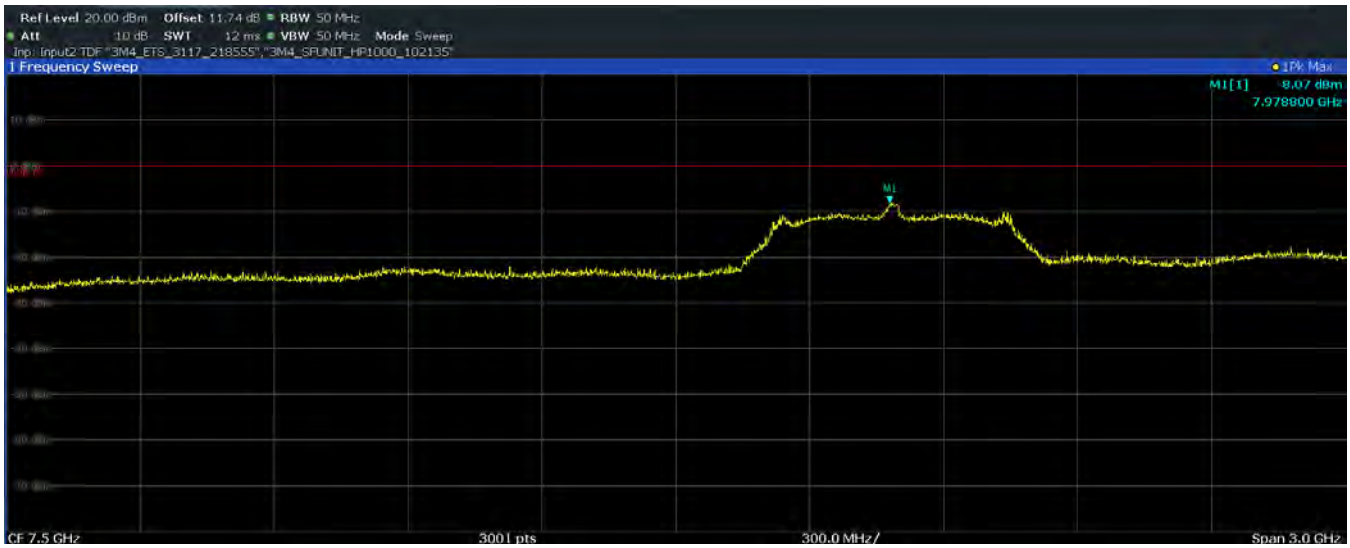
Plot 7-54. Peak Radiated Power (Ch. 9, Config 1/Payload 45)



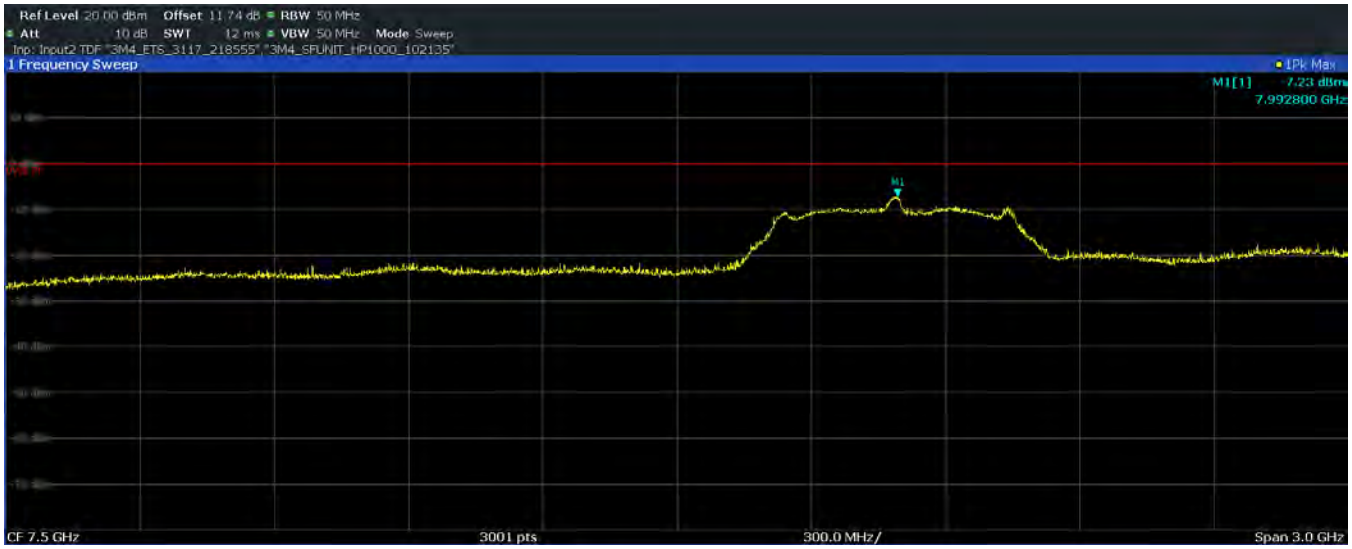
Plot 7-55. Peak Radiated Power (Ch. 9, Config 1/Payload 85)



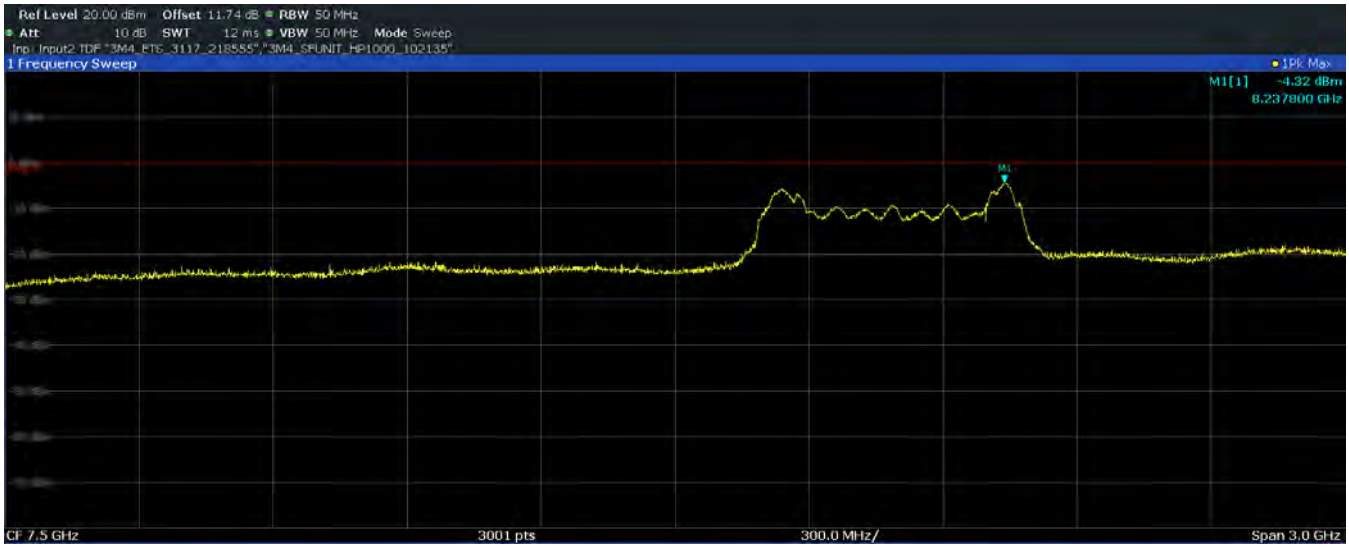
Plot 7-56. Peak Radiated Power (Ch. 9, Config 1/Payload 125)



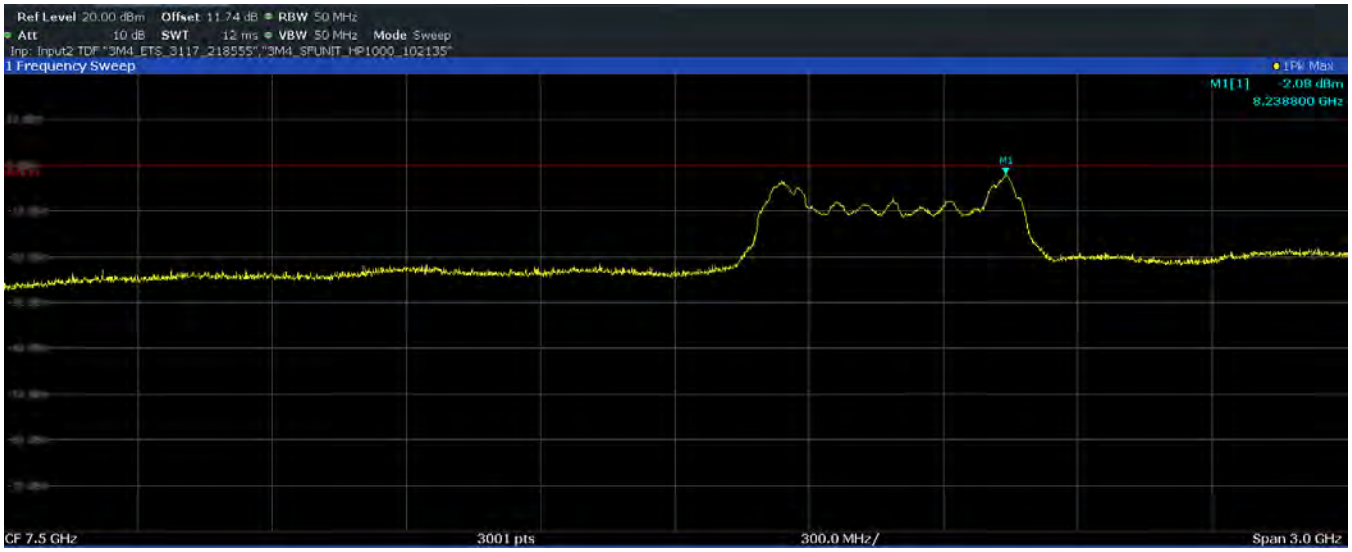
Plot 7-57. Peak Radiated Power (Ch. 9, Config 2/Payload 125)



Plot 7-58. Peak Radiated Power (Ch. 9, Config 3/Payload 125)



Plot 7-59. Peak Radiated Power (Ch. 9, Config 4/Payload 0)



Plot 7-60. Peak Radiated Power (Ch. 9, Config 5/Payload 0)

7.4.2 Average Radiated Power Measurement

§15.519 (e); RSS-220 [5.3.1(g)]

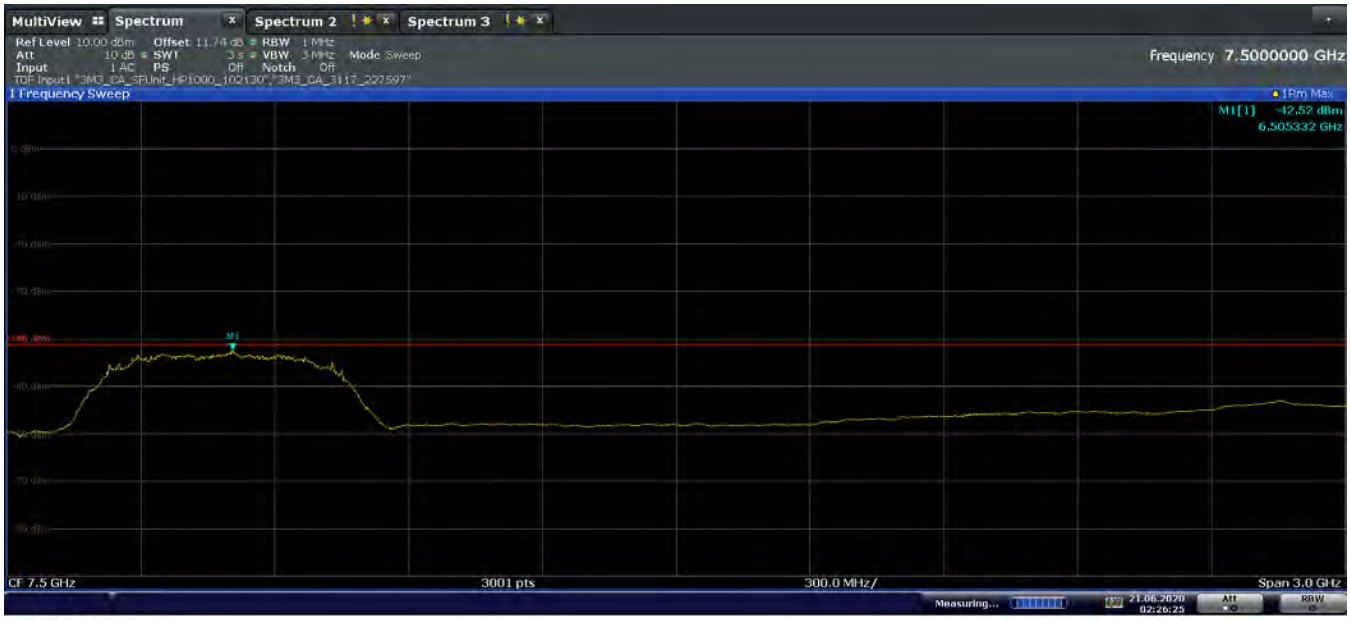
Frequency [GHz]	Channel	Config	Payload	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	F_M [GHz]	Average EIRP [dBm/MHz]	Average EIRP Limit [dBm/MHz]	Margin [dB]
6.5	5	0	25	V	253	210	6.505	-42.52	-41.30	-1.22
		0	65	V	301	211	6.498	-42.48	-41.30	-1.18
		0	125	V	290	215	6.498	-42.07	-41.30	-0.77
		1	45	V	290	214	6.504	-43.33	-41.30	-2.03
		1	85	V	290	212	6.499	-42.25	-41.30	-0.95
		1	125	V	289	215	6.505	-42.03	-41.30	-0.73
		2	125	V	289	215	6.508	-42.16	-41.30	-0.86
		3	125	V	278	210	6.507	-42.12	-41.30	-0.82
		4	0	V	292	206	6.506	-42.01	-41.30	-0.71
		5	0	V	302	214	6.506	-42.31	-41.30	-1.01

Table 7-9. Average EIRP Measurements (UWB Ch. 5, 6.5GHz)

Frequency [GHz]	Channel	Config	Payload	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	F_M [GHz]	Average EIRP [dBm/MHz]	Average EIRP Limit [dBm/MHz]	Margin [dB]
8.0	9	0	25	V	242	288	8.104	-42.64	-41.30	-1.34
		0	65	V	241	287	8.128	-42.41	-41.30	-1.11
		0	125	V	241	287	8.111	-42.39	-41.30	-1.09
		1	45	V	241	285	8.110	-42.21	-41.30	-0.91
		1	85	V	242	286	8.110	-42.18	-41.30	-0.88
		1	125	V	234	105	8.012	-42.26	-41.30	-0.96
		2	125	V	241	284	8.109	-42.67	-41.30	-1.37
		3	125	V	241	286	8.107	-42.32	-41.30	-1.02
		4	0	V	243	286	8.103	-42.40	-41.30	-1.10
		5	0	V	245	283	8.107	-42.60	-41.30	-1.30

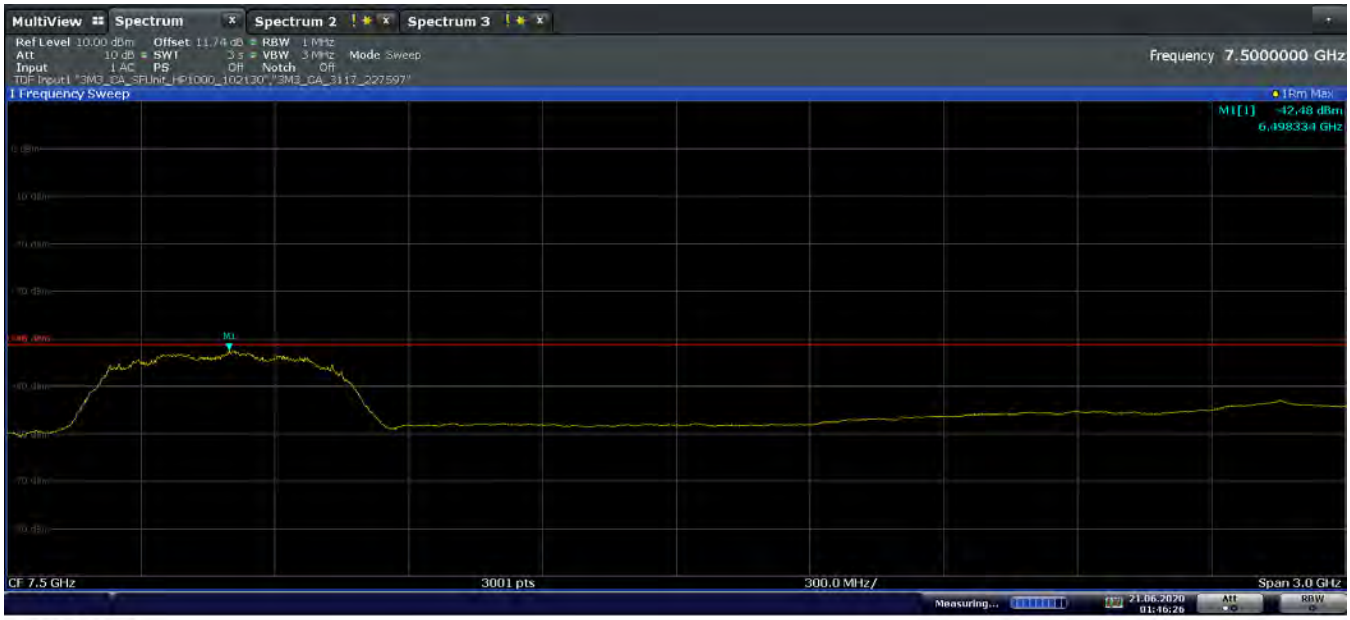
Table 7-10. Average EIRP Measurements (UWB Ch.9, 8GHz)

Channel 5 Average Radiated Power:



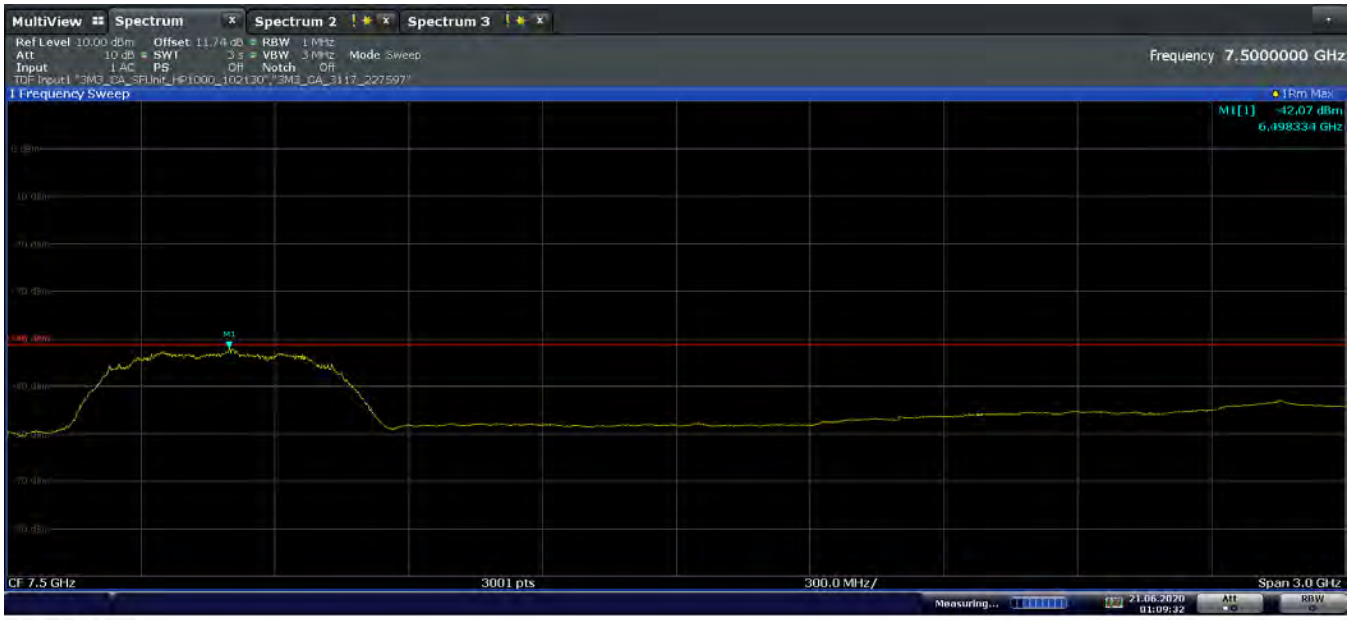
02:26:26 21.06.2020

Plot 7-61. Average Radiated Power (Ch. 5, Config 0/Payload 25)



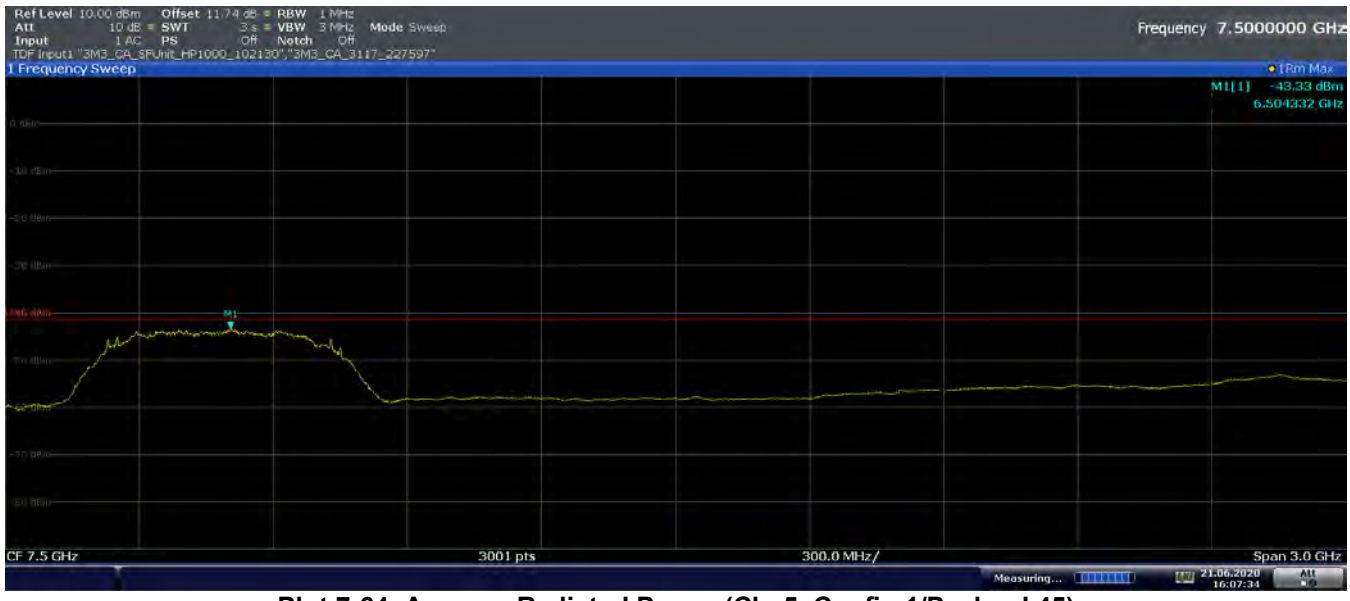
01:46:27 21.06.2020

Plot 7-62. Average Radiated Power (Ch. 5, Config 0/Payload 65)

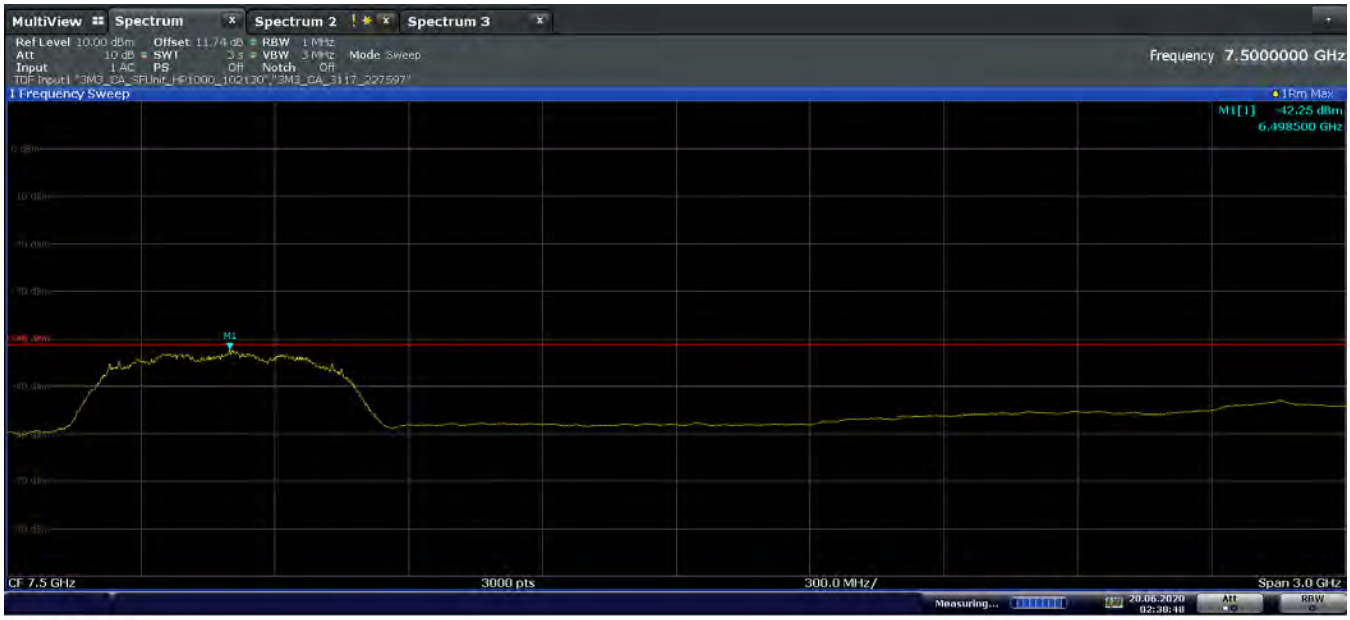


01:09:32 21.06.2020

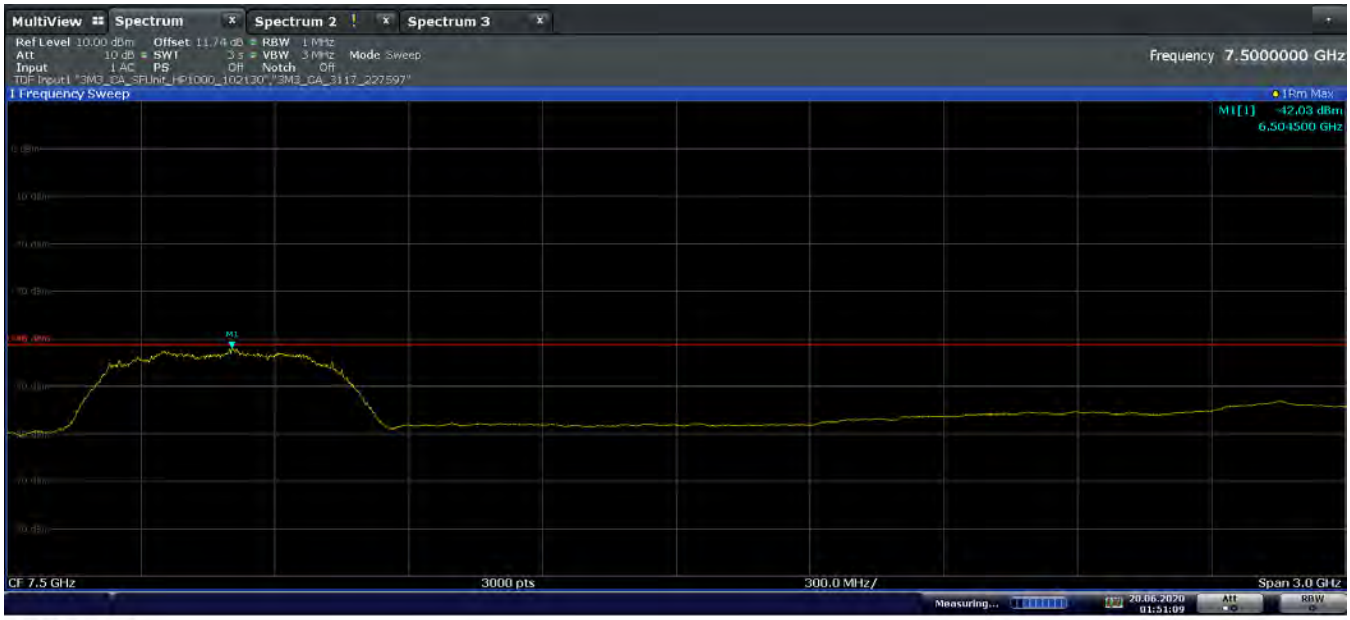
Plot 7-63. Average Radiated Power (Ch. 5, Config 0/Payload 125)



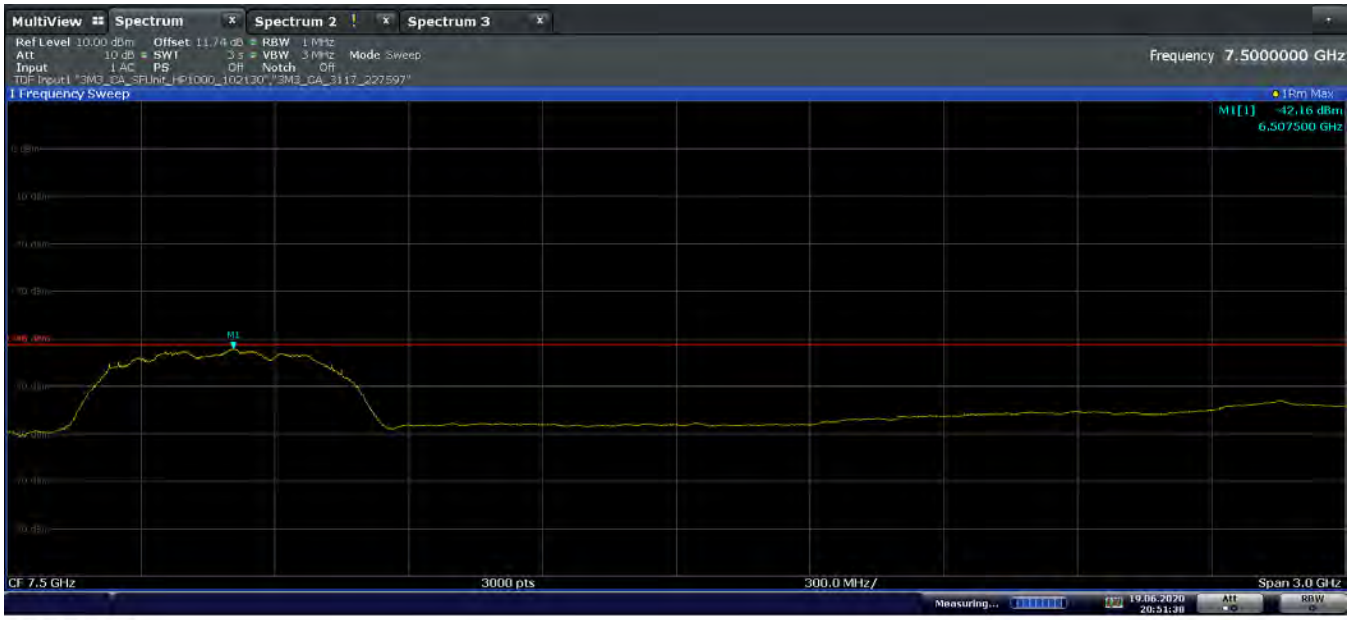
Plot 7-64. Average Radiated Power (Ch. 5, Config 1/Payload 45)



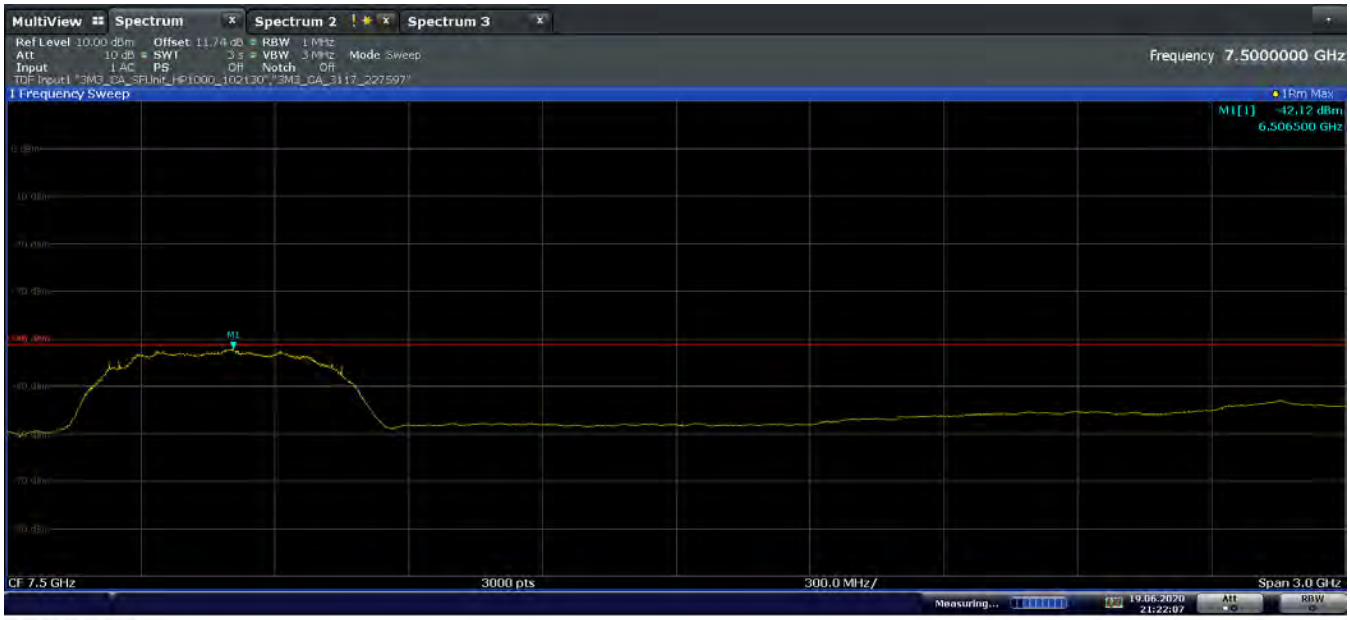
Plot 7-65. Average Radiated Power (Ch. 5, Config 1/Payload 85)



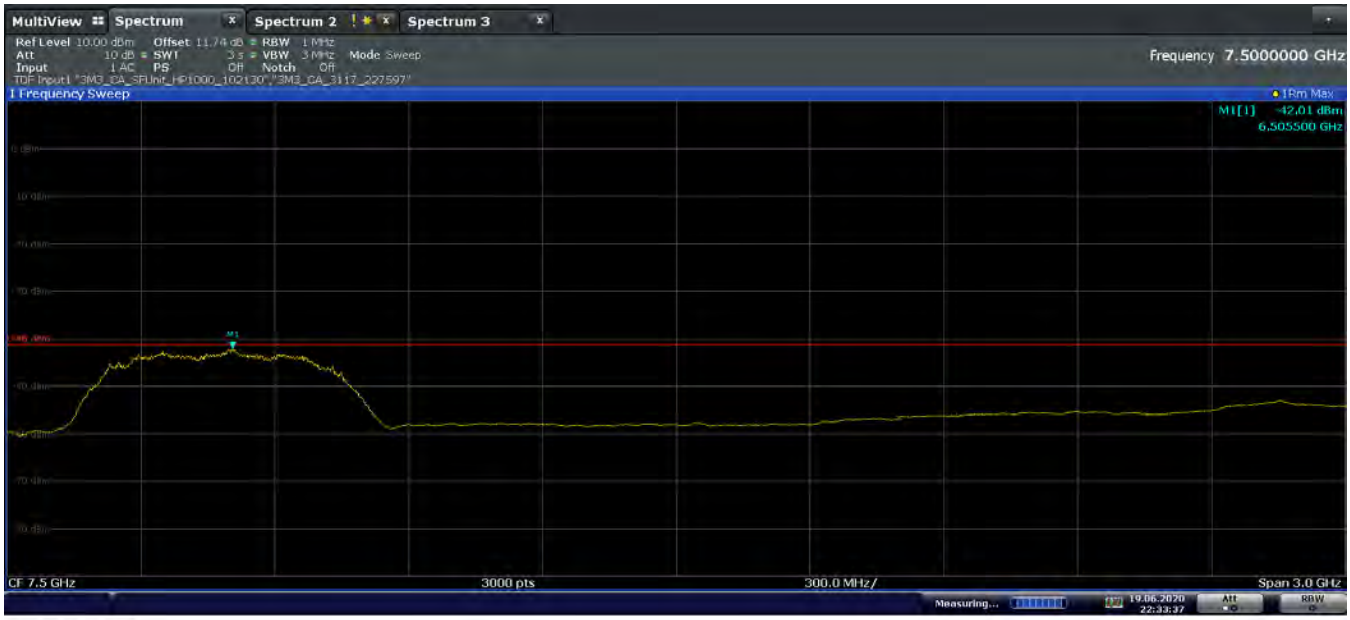
Plot 7-66. Average Radiated Power (Ch. 5, Config 1/Payload 125)



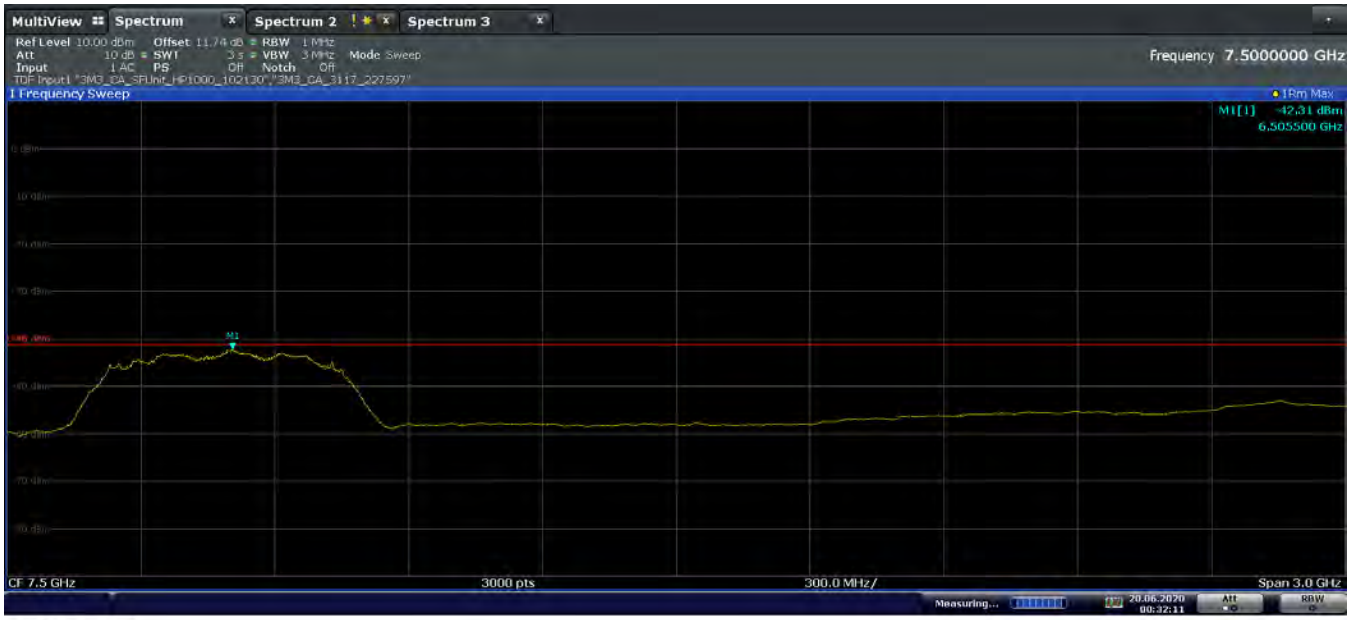
Plot 7-67. Average Radiated Power (Ch. 5, Config 2/Payload 125)



Plot 7-68. Average Radiated Power (Ch. 5, Config 3/Payload 125)

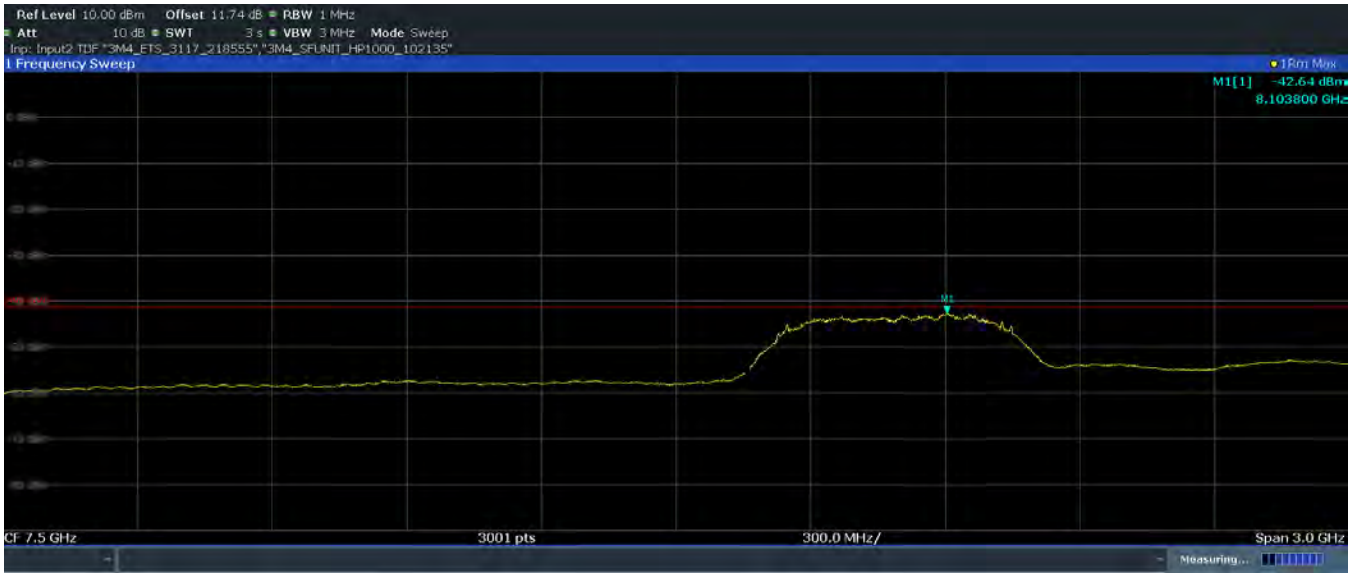


Plot 7-69. Average Radiated Power (Ch. 5, Config 4/Payload 0)

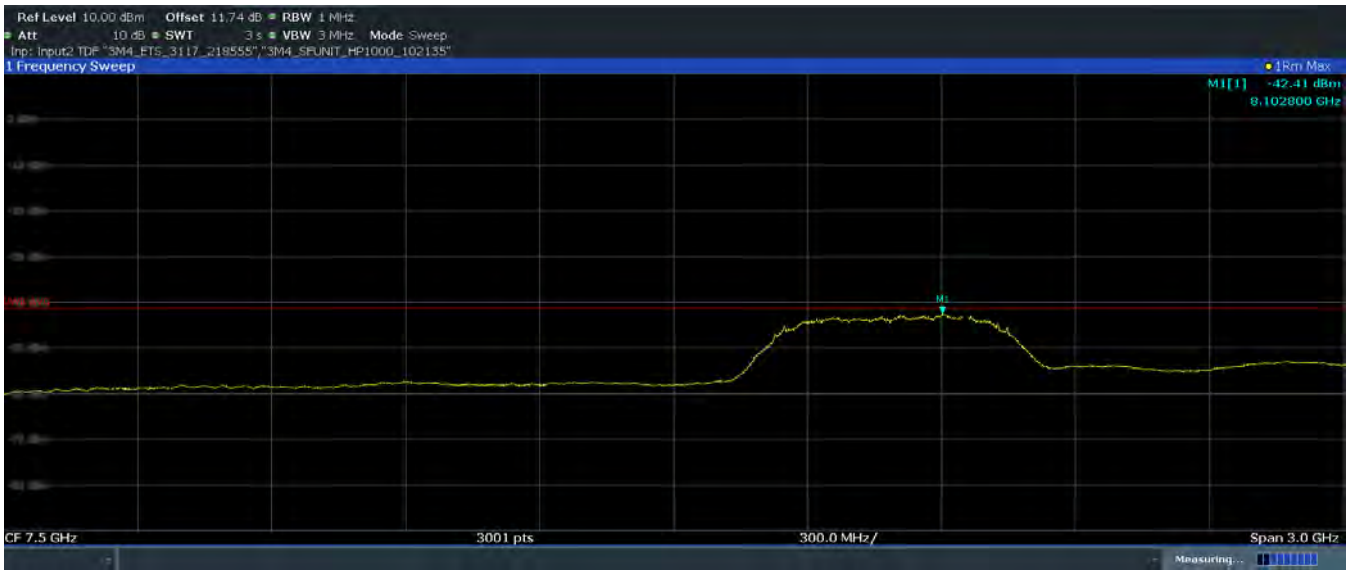


Plot 7-70. Average Radiated Power (Ch. 5, Config 5/Payload 0)

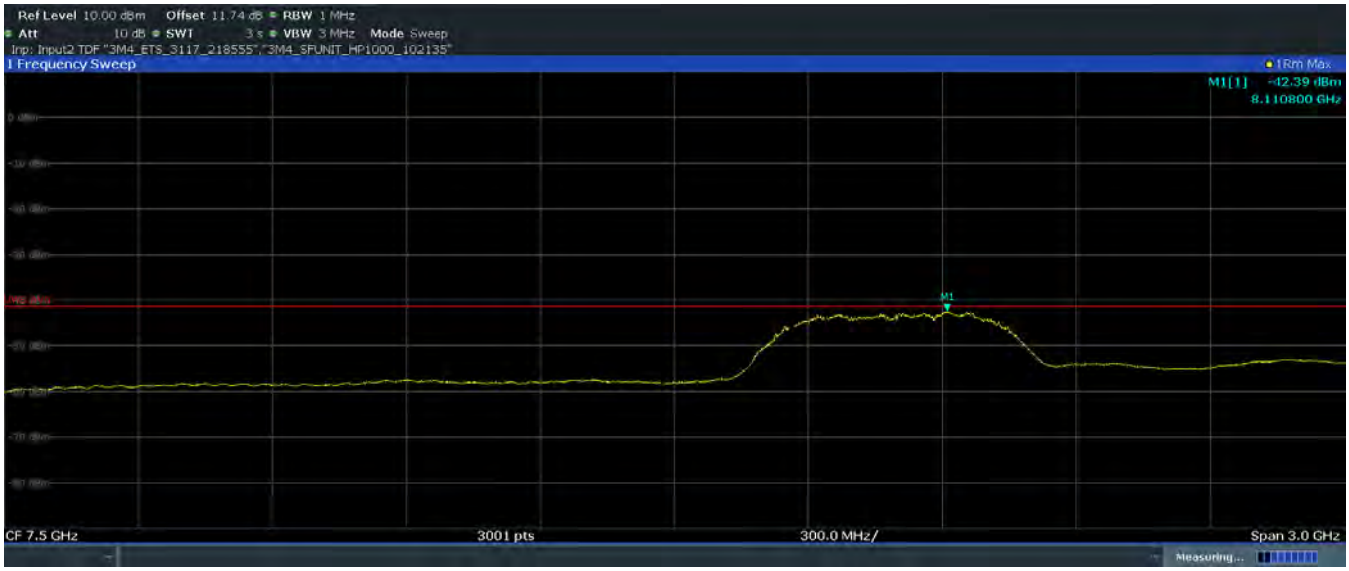
Channel 9 Average Radiated Power:



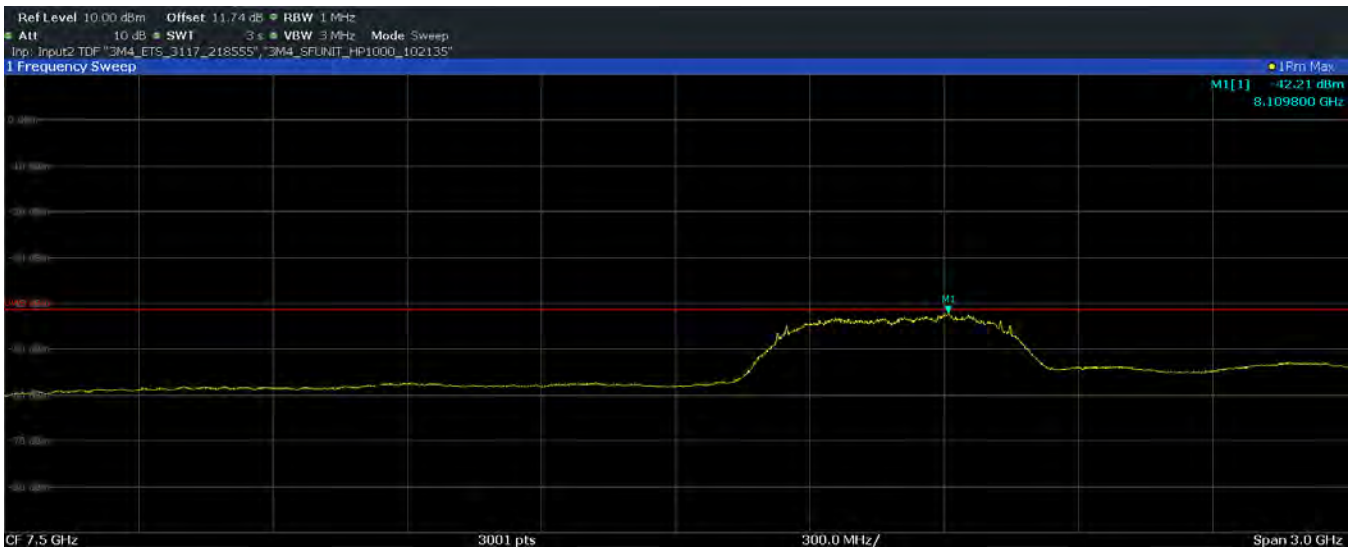
Plot 7-71. Average Radiated Power (Ch. 9, Config 0/Payload 25)



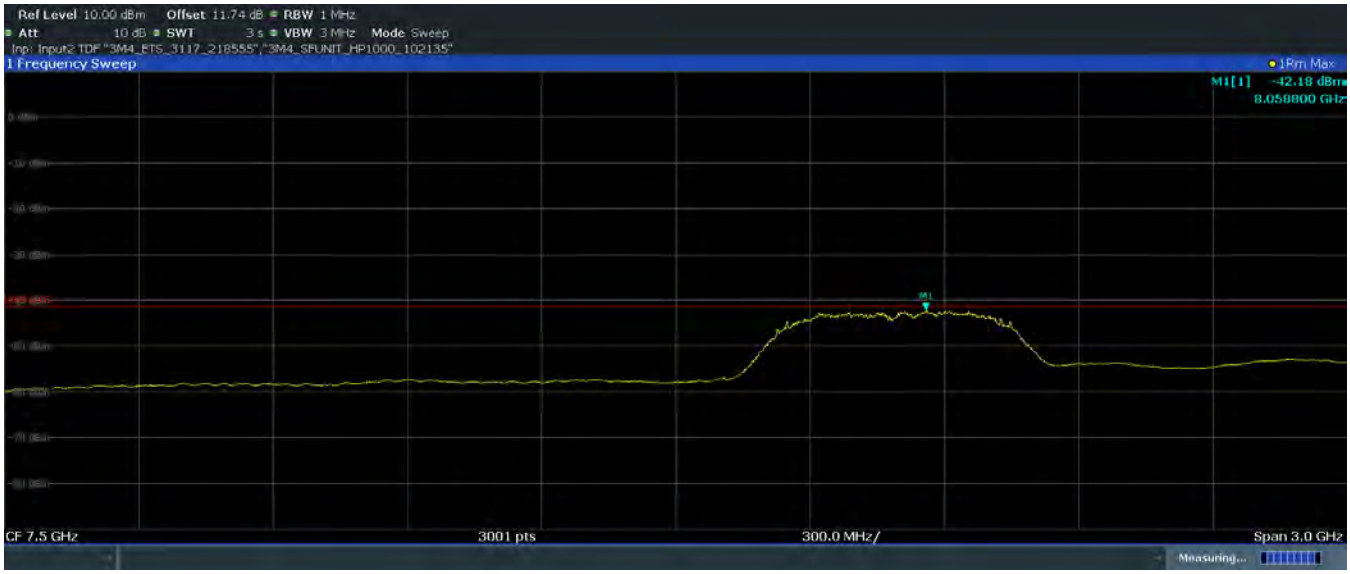
Plot 7-72. Average Radiated Power (Ch. 9, Config 0/Payload 65)



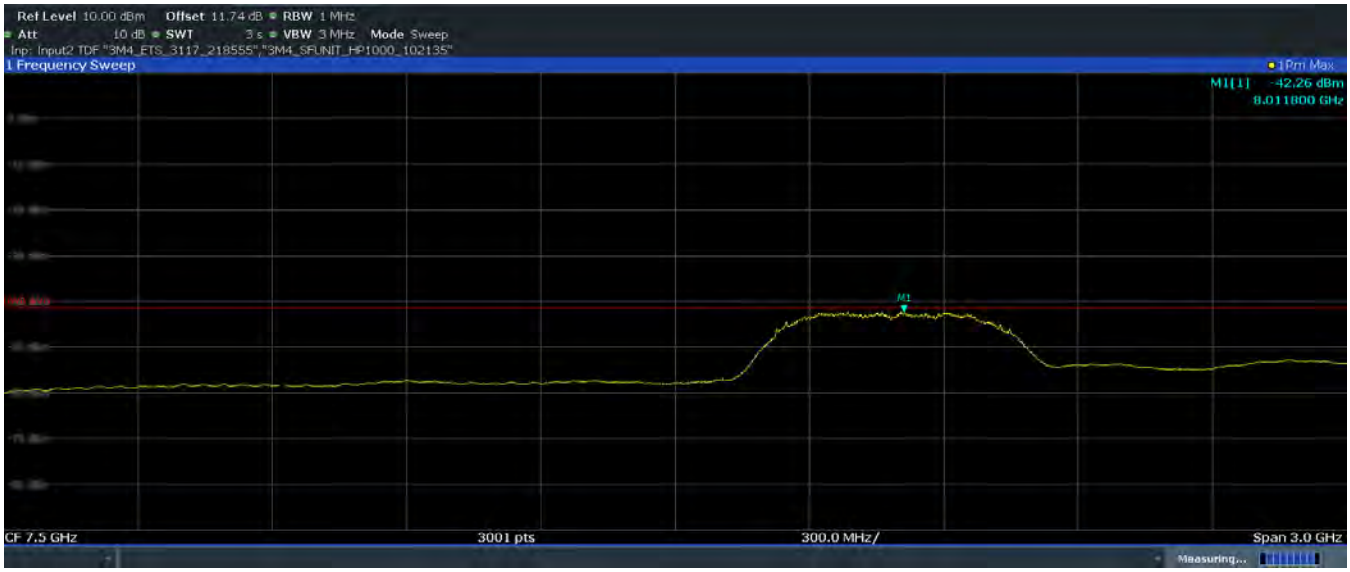
Plot 7-73. Average Radiated Power (Ch. 9, Config 0/Payload 125)



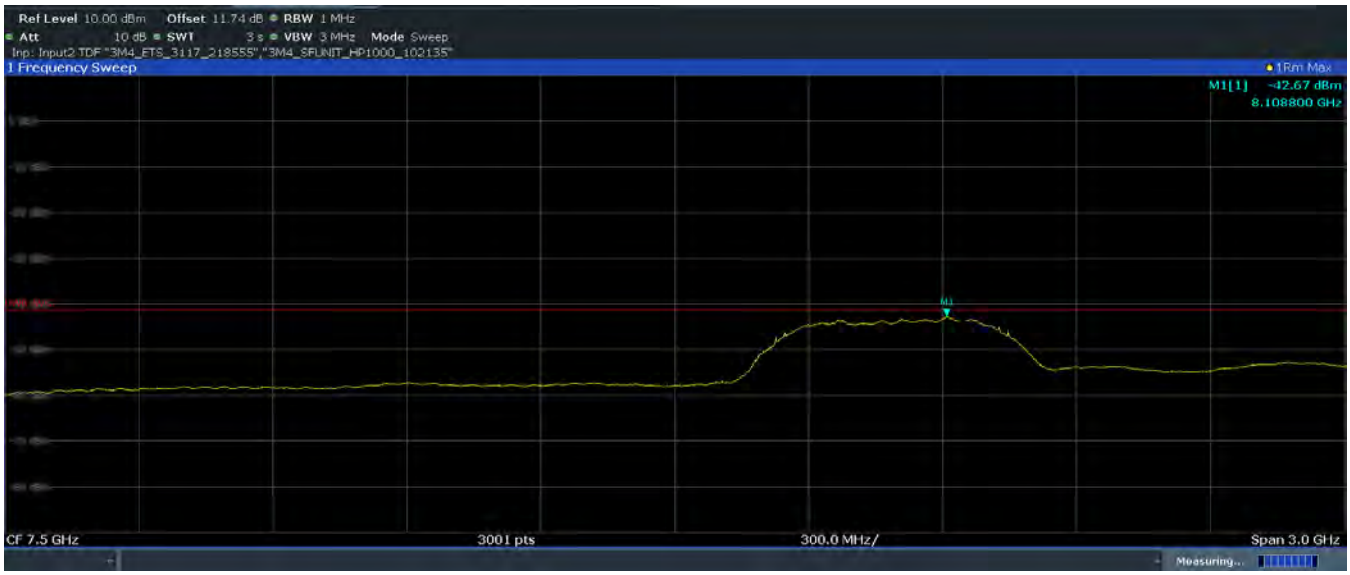
Plot 7-74. Average Radiated Power (Ch. 9, Config 1/Payload 45)



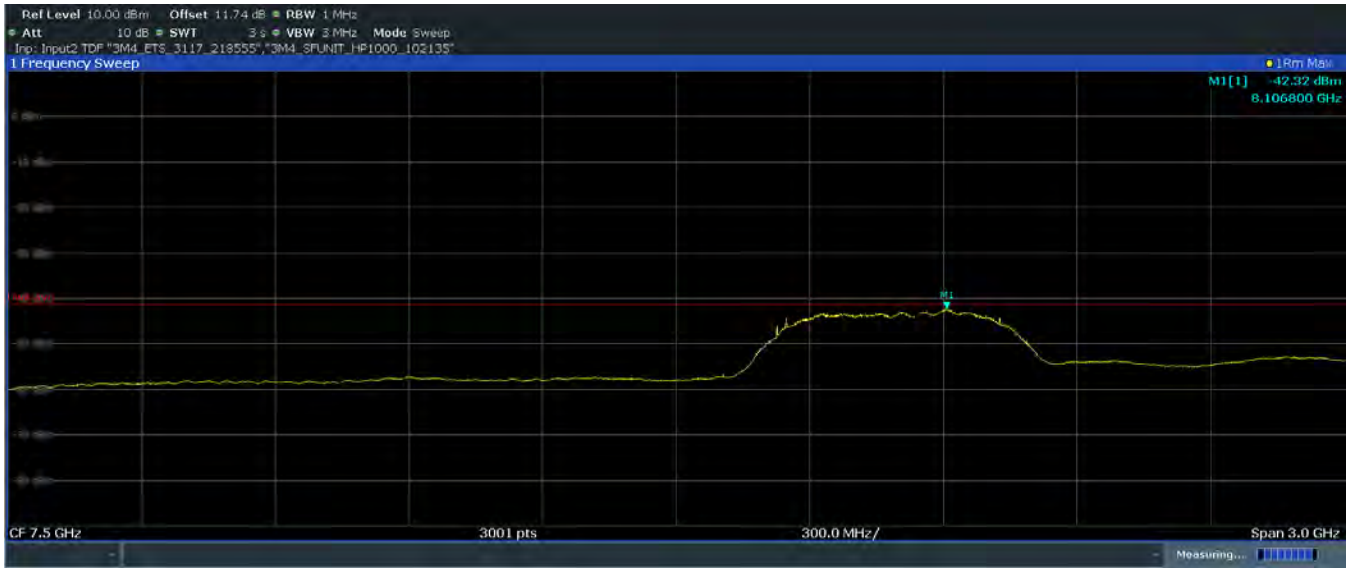
Plot 7-75. Average Radiated Power (Ch. 9, Config 1/Payload 85)



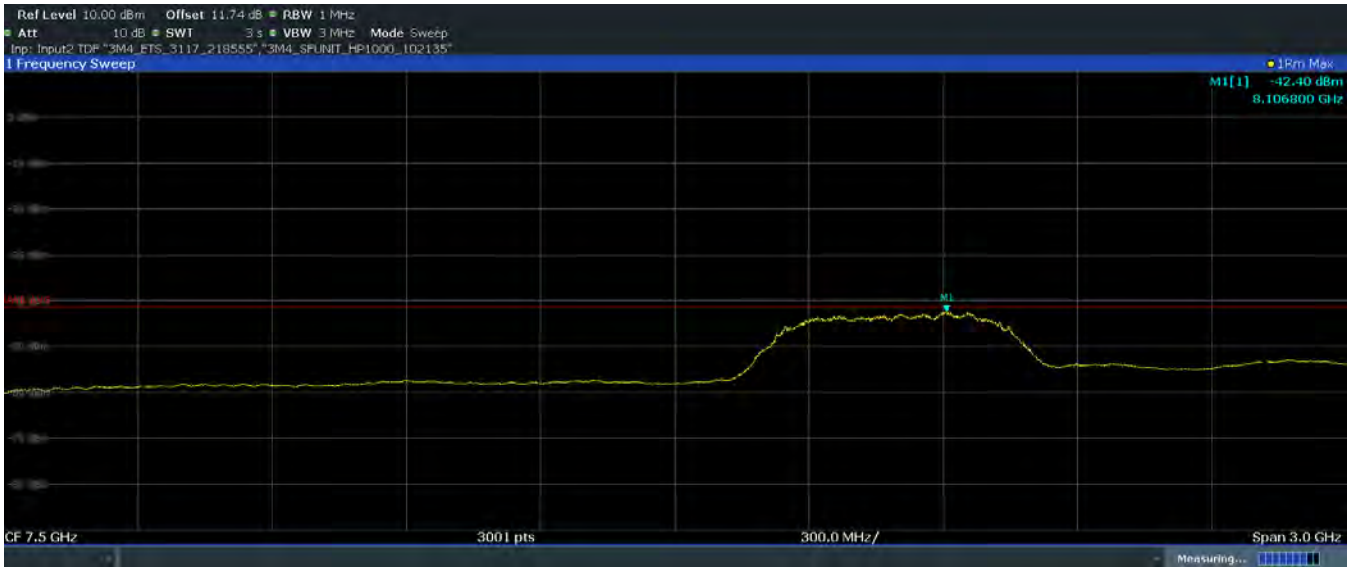
Plot 7-76. Average Radiated Power (Ch. 9, Config 1/Payload 125)



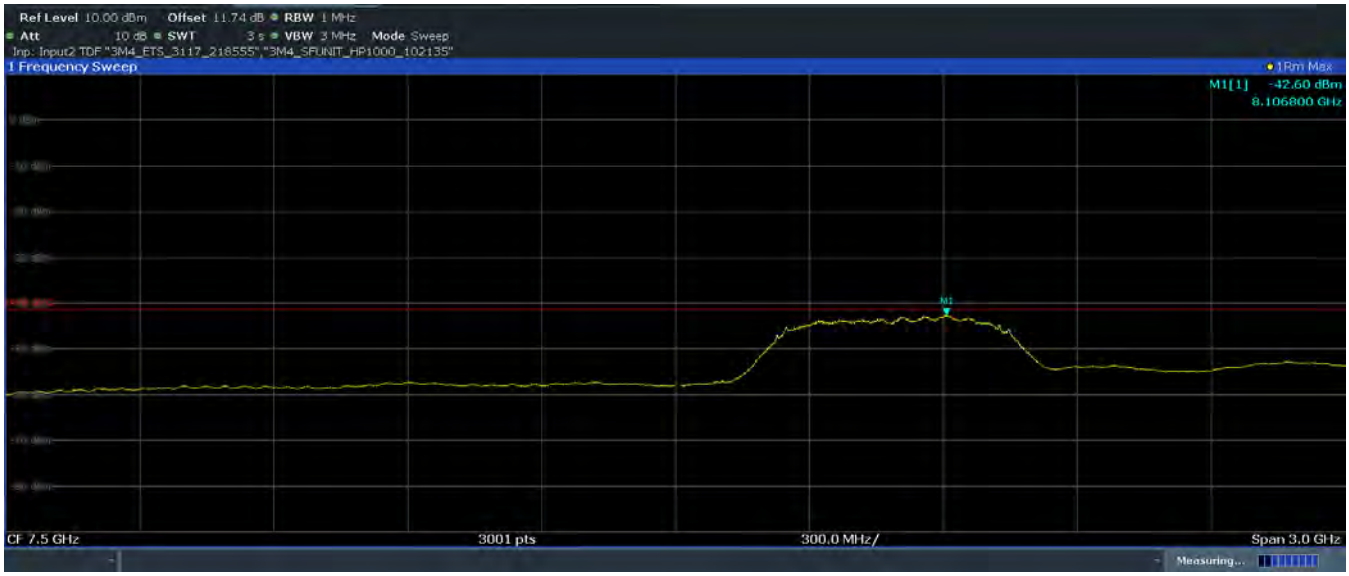
Plot 7-77. Average Radiated Power (Ch. 9, Config 2/Payload 125)



Plot 7-78. Average Radiated Power (Ch. 9, Config 3/Payload 125)



Plot 7-79. Average Radiated Power (Ch. 9, Config 4/Payload 0)



Plot 7-80. Average Radiated Power (Ch. 9, Config 5/Payload 0)

7.5 Cease Transmission Time

§15.519 (a)(1); RSS-220 [5.3.1(b)]

Test Overview and Limit

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.

Test Procedures Used

KDB 393764 D01 v02

Test Settings

1. RBW = 1MHz
2. VBW = 3MHz
3. Span = Zero Span Mode
4. Sweep time shall be sufficient to demonstrate EUTs compliance with the rule part.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

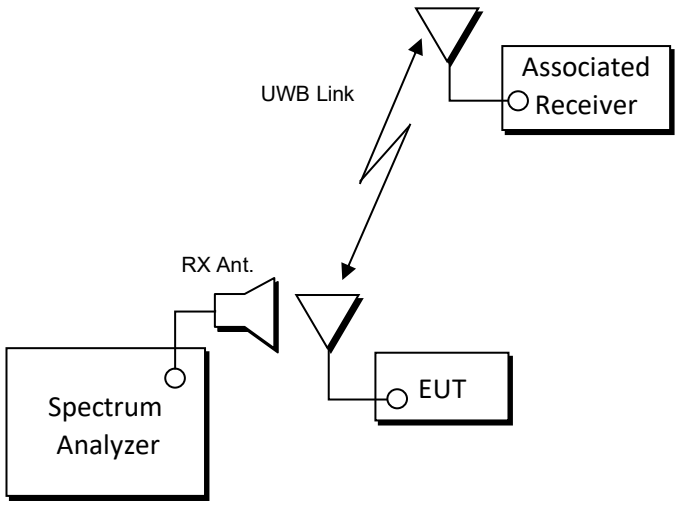


Figure 7-4. Test Setup

Test Configurations

The EUT was monitored in 2 different test configurations:

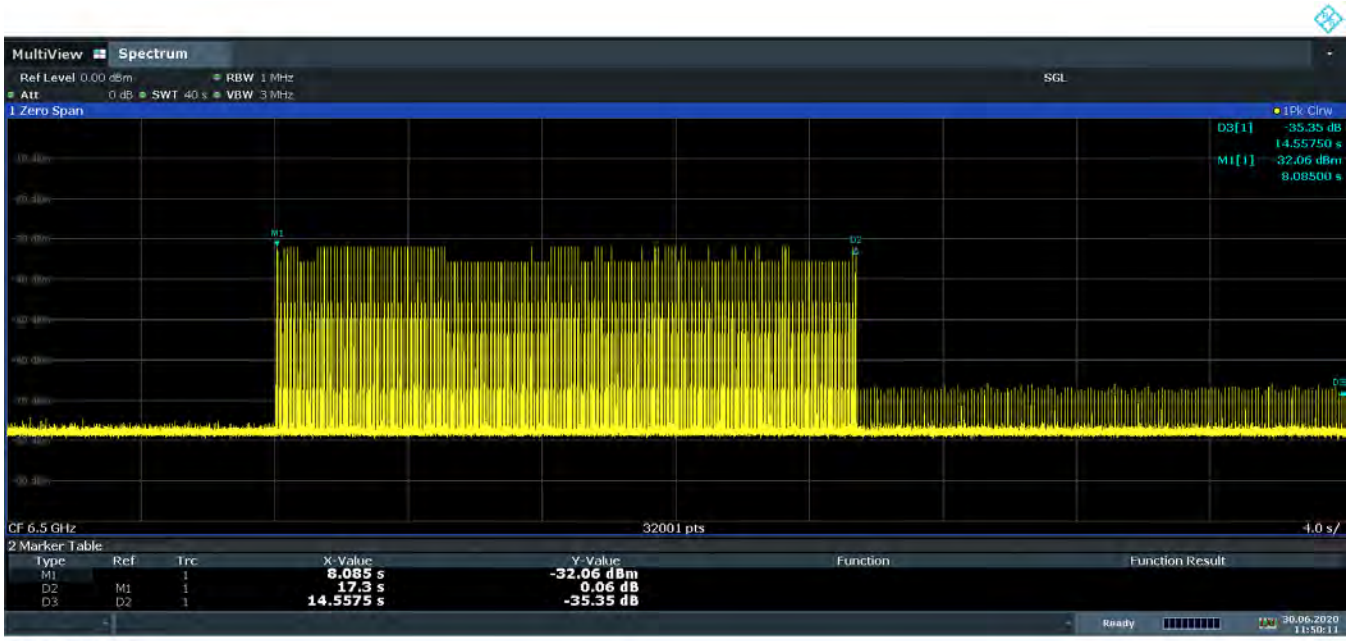
- Mode 1: EUT initiates the UWB link to the associated receiver (phone),
    - Associated receiver ends the link, and EUT ceases transmission of any information other than periodic signals (polling) for use in the establishment or re-establishment of a communications link with an associated receiver
- Mode 2: The associated receiver (phone) initiates the UWB link to the EUT
    - EUT ends the link, and stops sending acknowledgements to associated receiver

Result

Parameter	Limit	Result
Cessation Time - Mode1	1) The UWB intentional radiator shall cease transmission within 10 seconds 2) 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.	Pass
Cessation Time - Mode2	1) The UWB intentional radiator shall cease transmission within 10 seconds 2) 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.	Pass

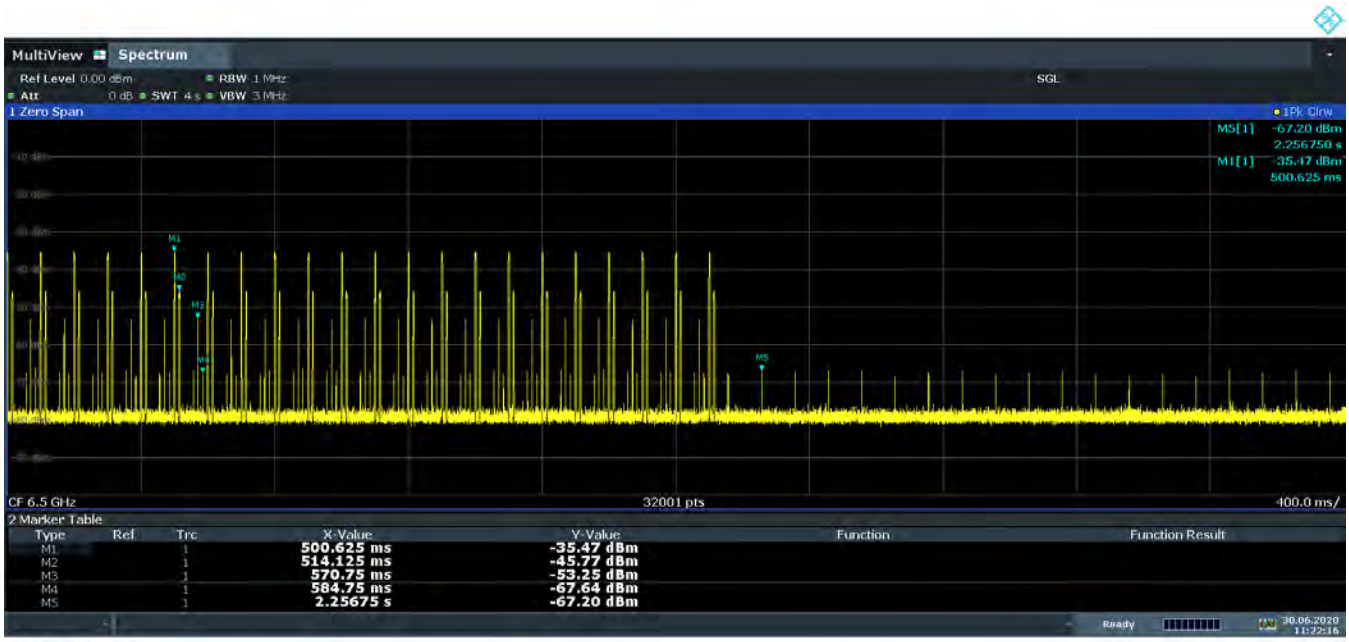
Plots Description

- Cessation Time - Mode1 (Mode2) plot:
    - Marker 1 shows start time of initiating UWB link
    - Marker 2 shows stop time of sending acknowledgement
- Zoom in Cessation Time - Mode1 plot:
    - Marker 1 shows EUT traffic level
    - Marker 2 shows Associated receiver (Phone) traffic level
    - Marker 3 shows Associated receiver (Phone) Acknowledgement signal
    - Marker 4 shows EUT Polling signal (Before ceasing transmission)
    - Marker 5 shows EUT Polling signal (After ceasing transmission)



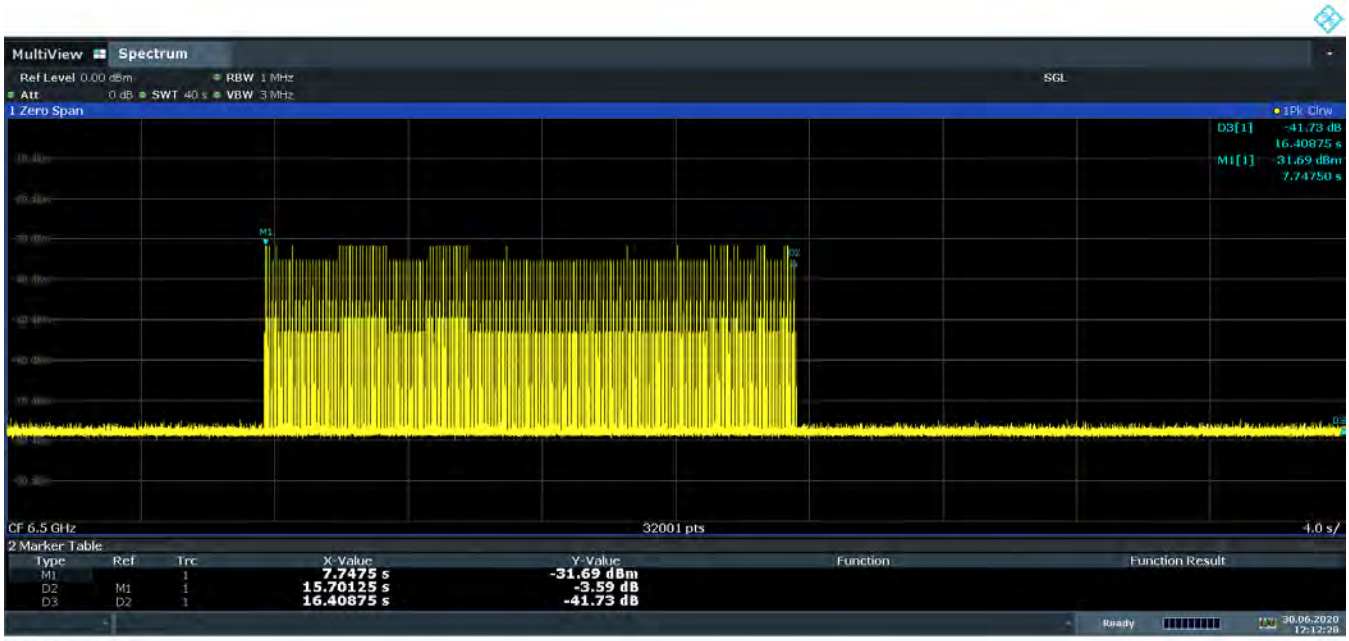
11:50:12 30.06.2020

Plot 7-81. Cessation Time – Mode1 (Ch. 5, 6.5 GHz)



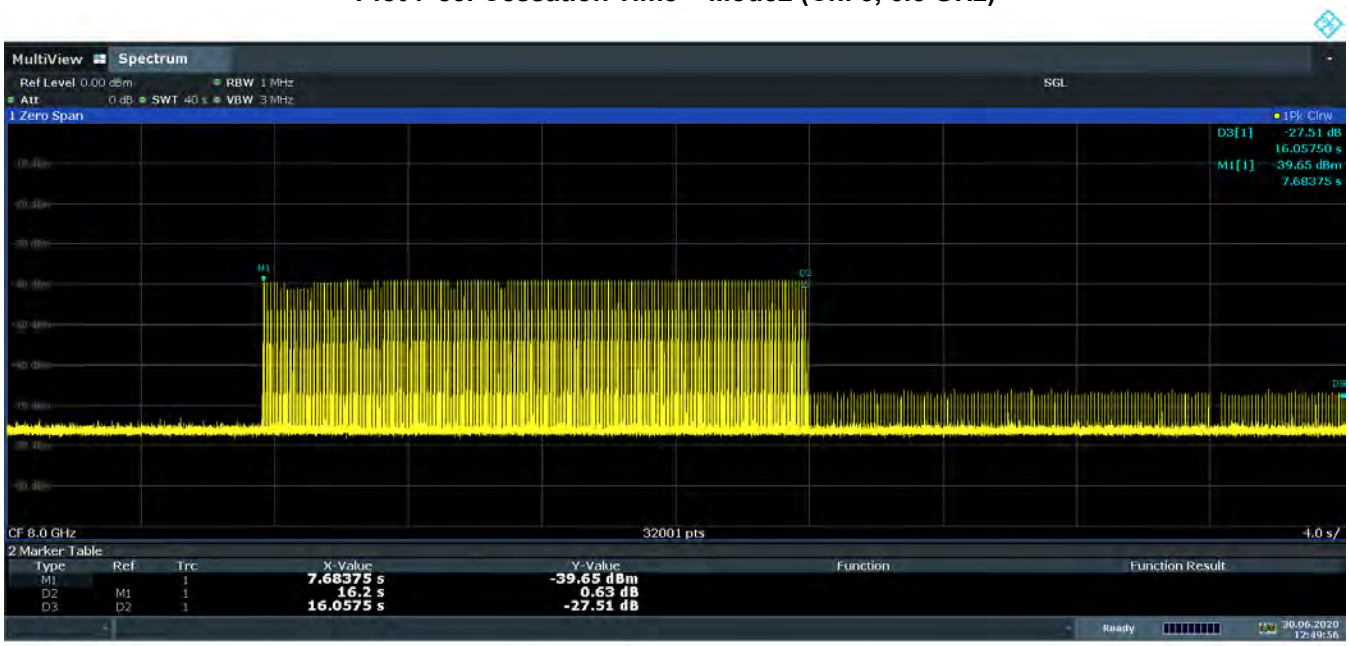
11:22:17 30.06.2020

Plot 7-82. Zoom in Cessation Time – Mode1 (Ch. 5, 6.5 GHz)



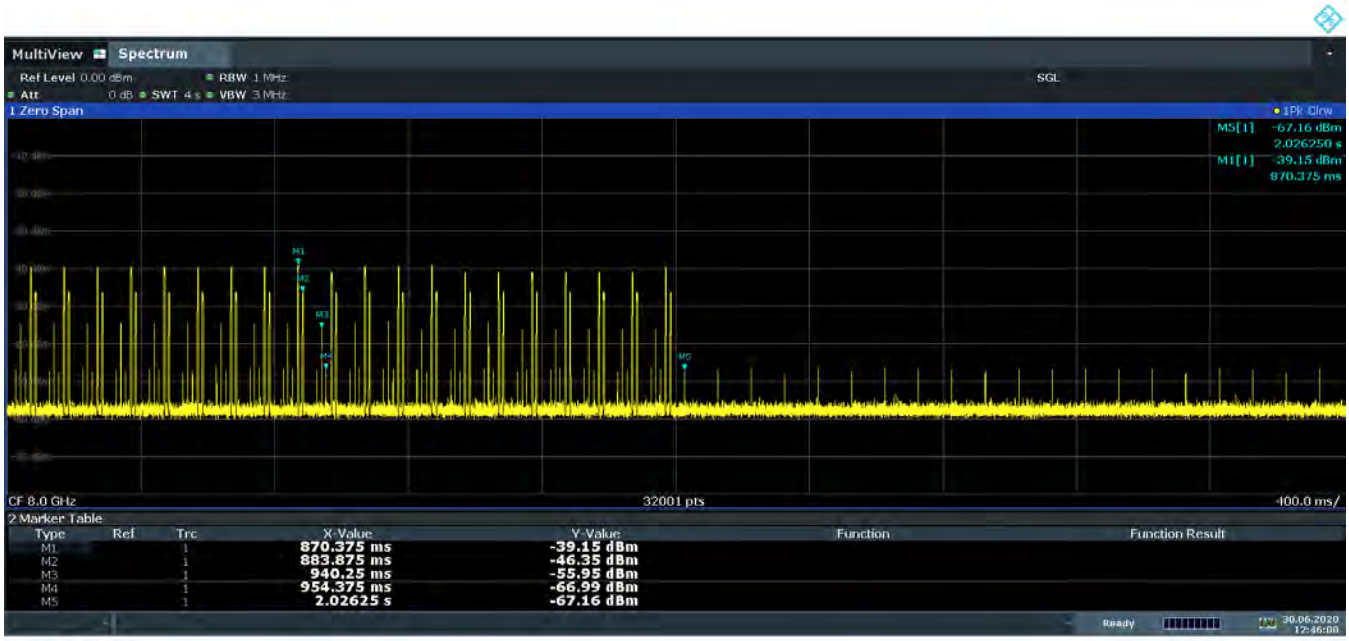
12:12:29 30.06.2020

Plot 7-83. Cessation Time – Mode2 (Ch. 5, 6.5 GHz)



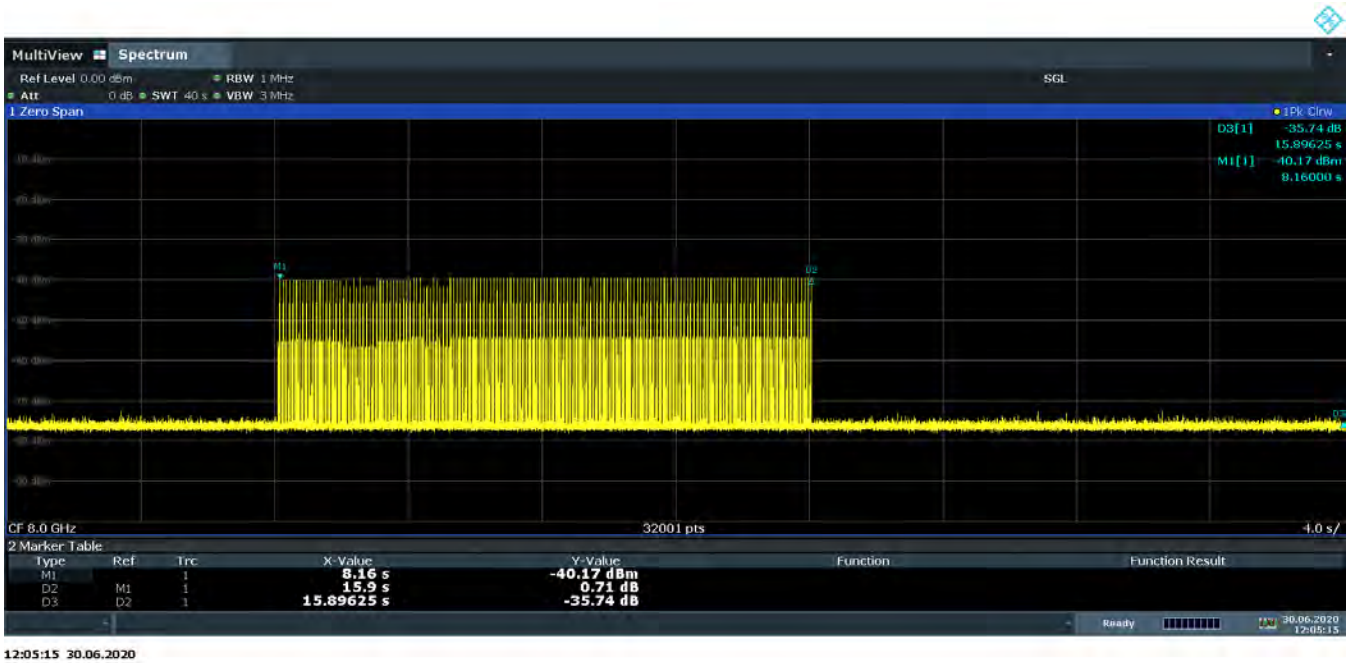
12:49:56 30.06.2020

Plot 7-84. Cessation Time – Mode1 (Ch. 9, 8 GHz)



12:46:08 30.06.2020

Plot 7-85. Zoom in Cessation Time – Mode1 (Ch. 9, 8 GHz)



12:05:15 30.06.2020

Plot 7-86. Cessation Time – Mode2 (Ch. 9, 8 GHz)

7.6 Radiated Spurious Emissions – Above 960MHz

§15.519 (c) §15.519 (d); RSS-220 [5.3.1(d)] RSS-220 [5.3.1(e)]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions must not exceed the average limits shown in Table 7-11 and Table 7-12 per Section 15.519 (C) and RSS-220[5.3.1(d)] when measured using a resolution bandwidth of 1 MHz:

Frequency [MHz]	EIRP [dBm]
960-1610	-75.3
1610-1990	-63.3
1990-3100	-61.3
3100-10600	-41.3
Above 10600	-61.3

Table 7-11. FCC 15.519 Radiated Spurious Emissions Limits

Frequency [MHz]	EIRP [dBm]
960-1610	-75.3
1610-4750	-70.0
4750-10600	-41.3
Above 10600	-61.3

Table 7-12. RSS-220 Radiated Spurious Emissions Limits

All out of band emissions must not exceed the average limits shown in Table 7-13 per Section 15.519 (d) and RSS-220(5.3.1)(e) when measured using a resolution bandwidth greater than or equal to 1 kHz. The measurements shall demonstrate compliance with the stated limits at whatever resolution bandwidth is used.

Frequency [MHz]	EIRP [dBm]
1164-1240	-85.3
1559-1610	-85.3

Table 7-13. FCC 15.519/RSS-220 Radiated Spurious Emissions Limits for GPS frequency bands

Test Procedures Used

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

Test Settings

Average RSE Measurements

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

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

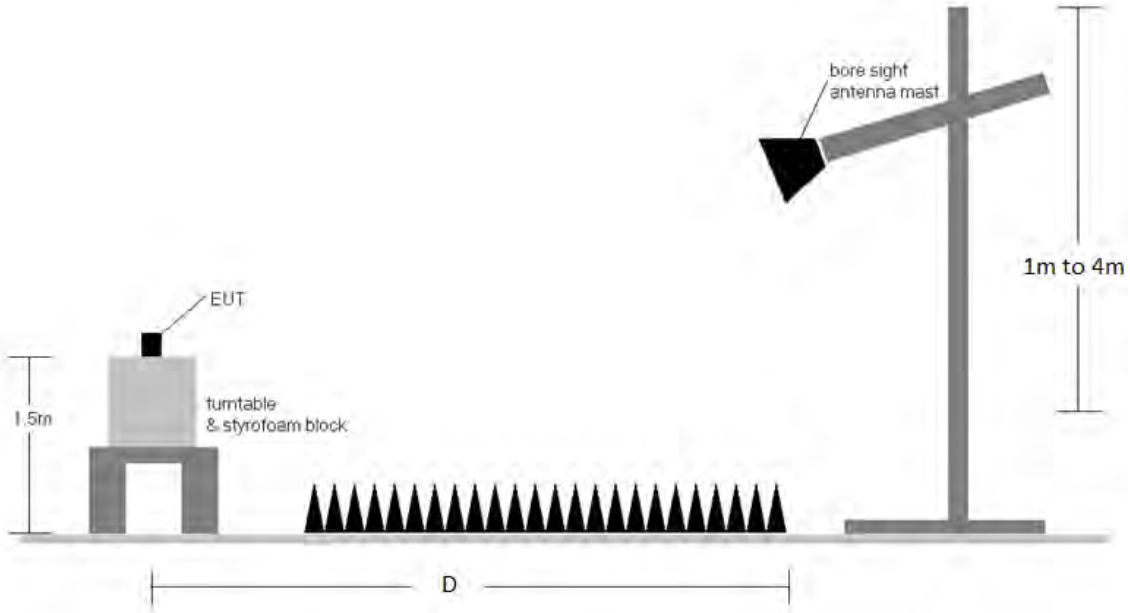


Figure 7-5. Radiated Measurement Setup - Above 960MHz

Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported.
2. This unit was tested with its standard battery.
3. The RBW for measurements in the GPS Bands were reduced to 30kHz in order to show compliance.
4. D is the measurement test distance and emissions from 960MHz - 18GHz were measured at a 0.6 meter test distance while emissions above 18GHz were measured at a 0.5 meter test distance with the application of a distance correction factor.
5. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
6. 6GHz - 9GHz RSE is covered in EIRP section (Section 7.4).

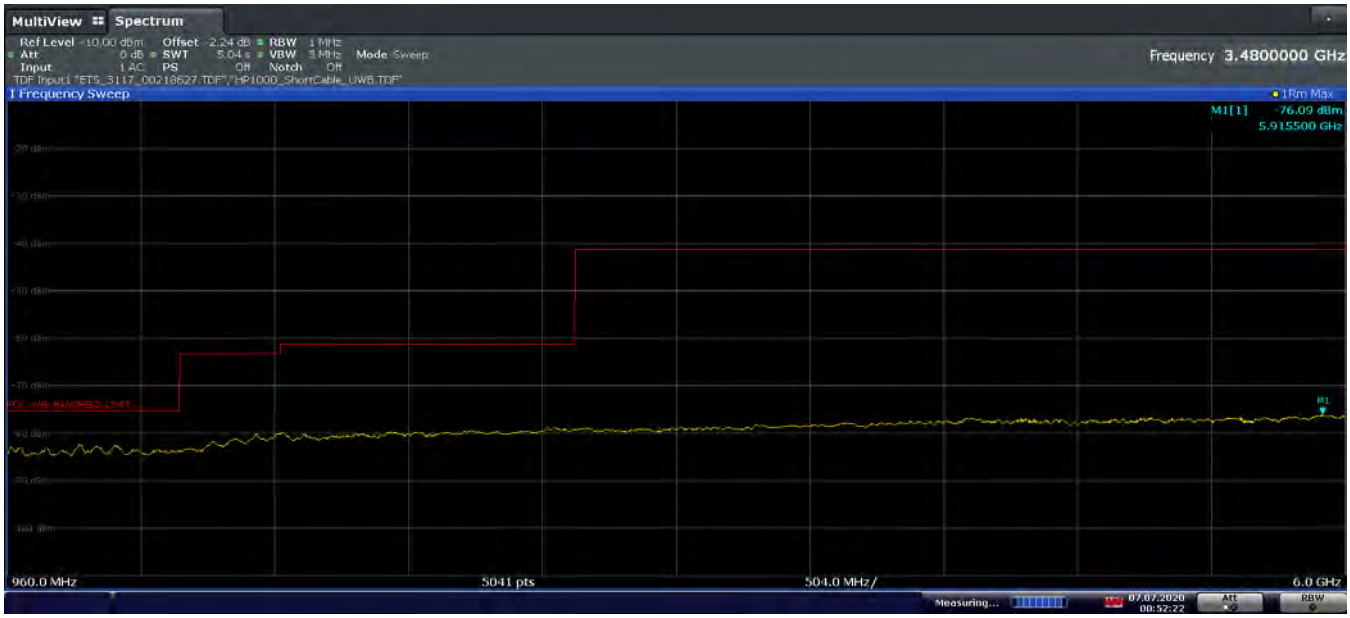
Sample Calculations

Determining Spurious Emissions Levels

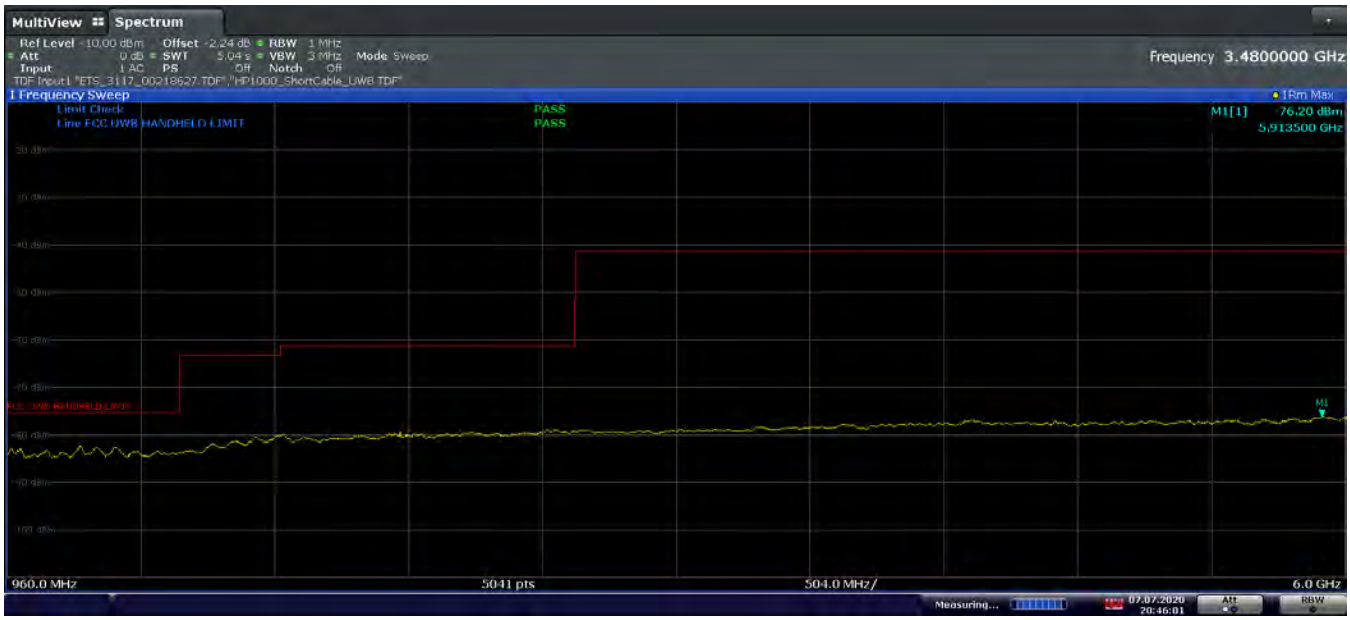
- $E_{[dB\mu V/m]} = \text{Analyzer level}_{[dBm]} + 107 + AFCL_{[dB/m]}$
- $\text{Spurious Emission Level}_{[dBm]} = E_{[dB\mu V/m]} + 20 \log (D_{Meas}) - 104.8$
- $\text{Spurious Emission Level}_{[dBm]} = \text{Analyzer Level}_{[dBm]} + AFCL_{[dB/m]} + \text{Conversion Factor}_{[dB]}$
- $AFCL_{[dB/m]} = (\text{Antenna Factor}_{[dB/m]} + \text{Cable Loss}_{[dB]} + \text{Attenuator}_{[dB]}) - \text{Preamplifier Gain}_{[dB]}$
- $\text{Conversion Factor}_{[dB]} = 107 - 104.8 + 20 \log (D_{Meas})$
- $\text{Margin}_{[dB]} = \text{Spurious Emission Level}_{[dBm]} - \text{Limit}_{[dBm]}$

Radiated Spurious Emission (960MHz – 18GHz)

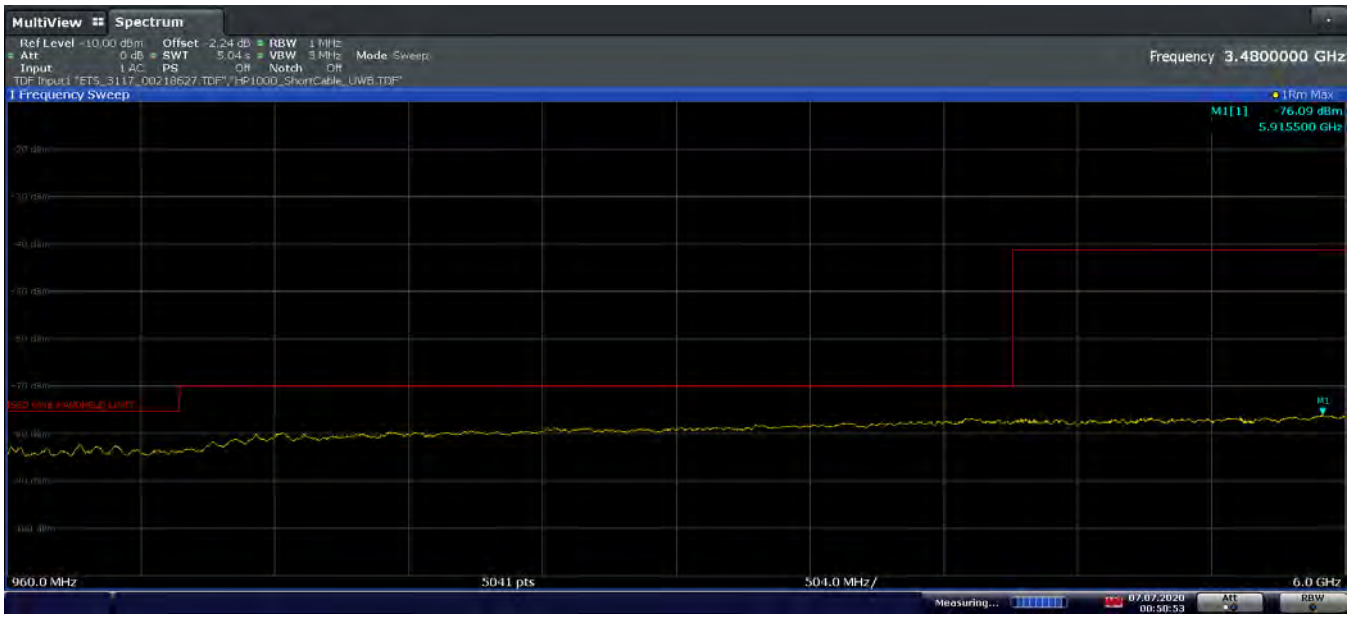
§15.519 (c); RSS-220 [5.3.1(d)]



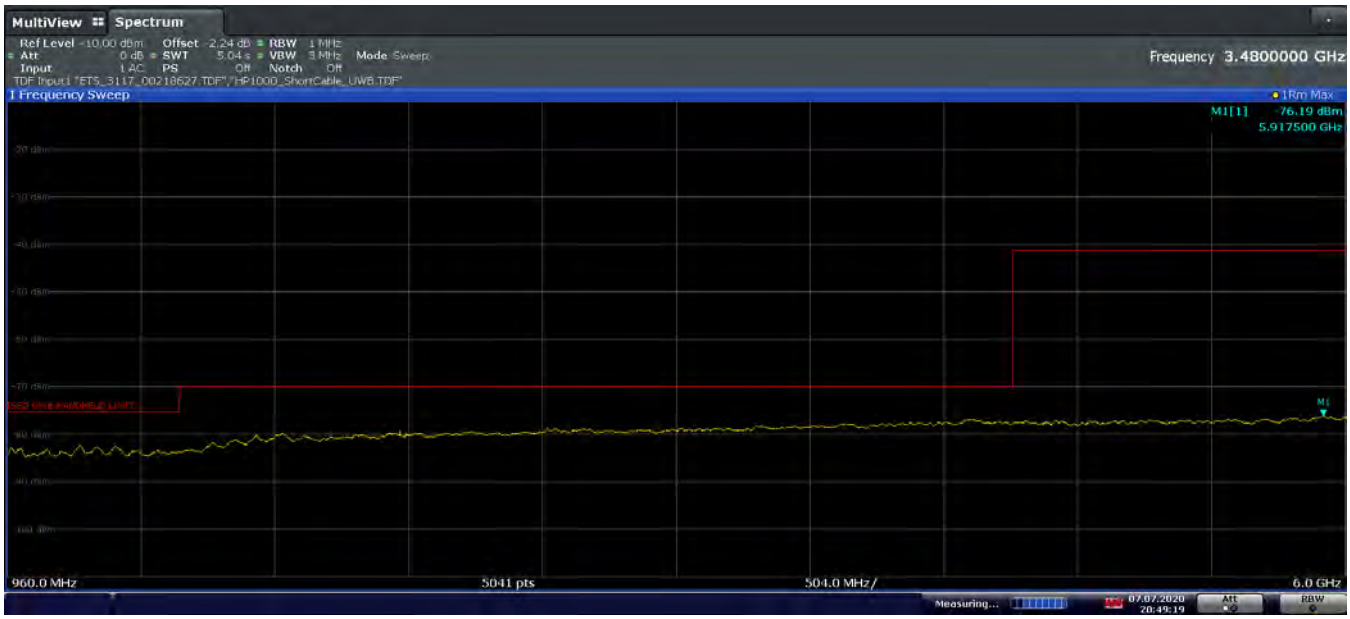
Plot 7-87. FCC Radiated Spurious Emission 960-6000MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)



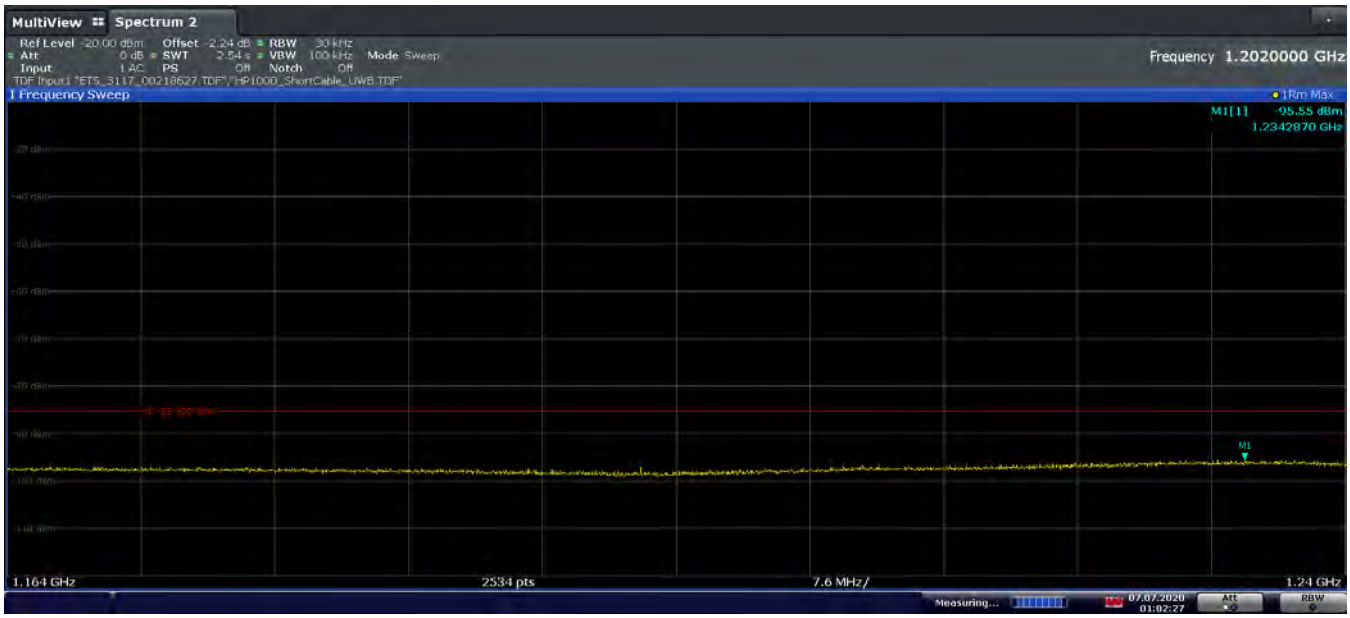
Plot 7-88. FCC Radiated Spurious Emissions 960-6000MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



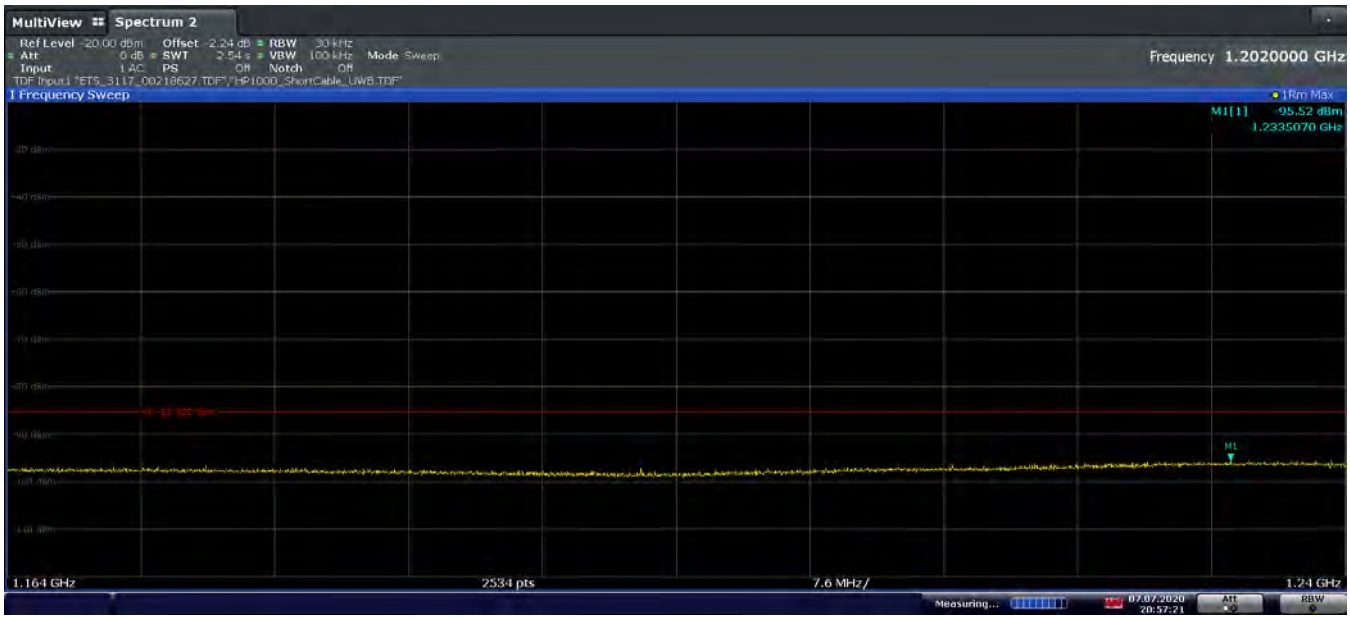
Plot 7-89. ISED Radiated Spurious Emission 960-6000MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)



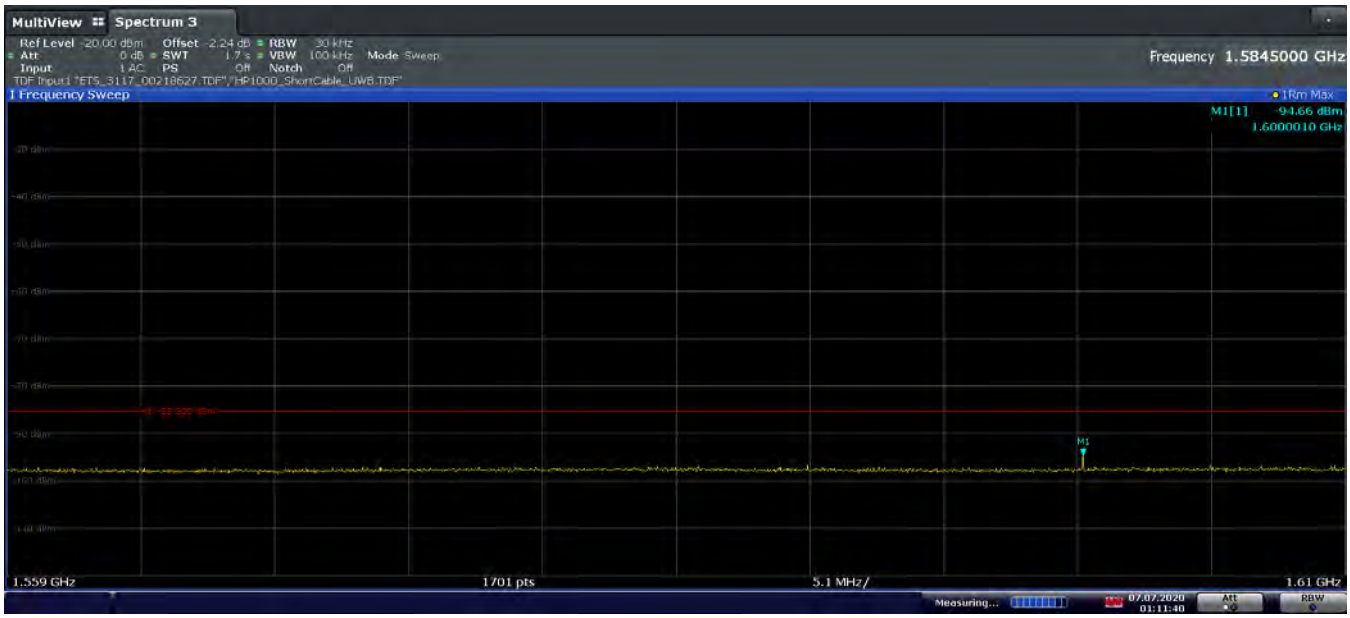
Plot 7-90. ISED Radiated Spurious Emission 960-6000MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



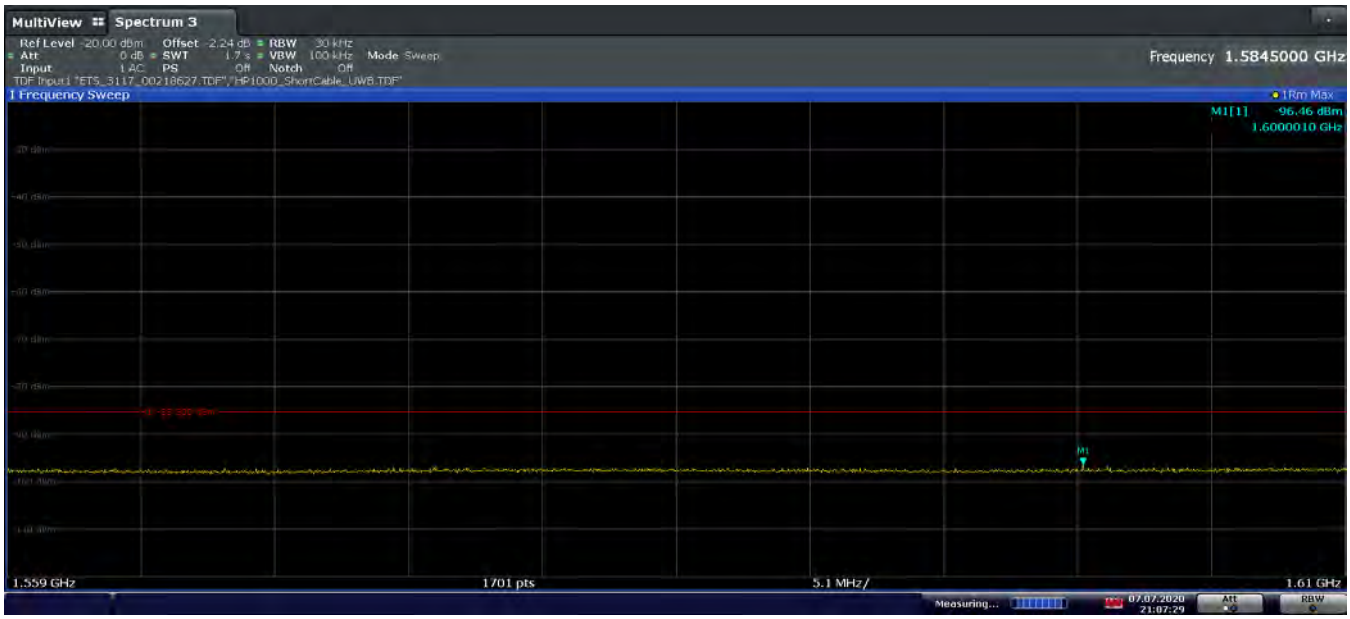
Plot 7-91. Radiated Spurious Emission 1164-1240MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)



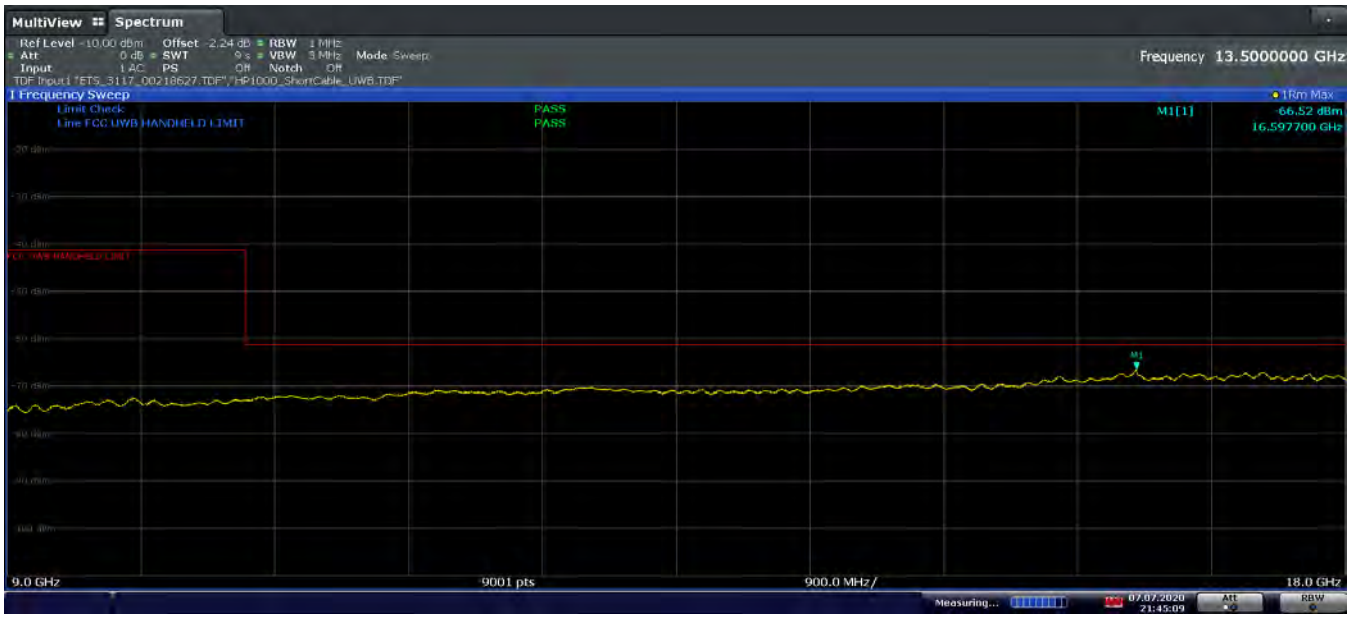
Plot 7-92. Radiated Spurious Emission 1164-1240MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



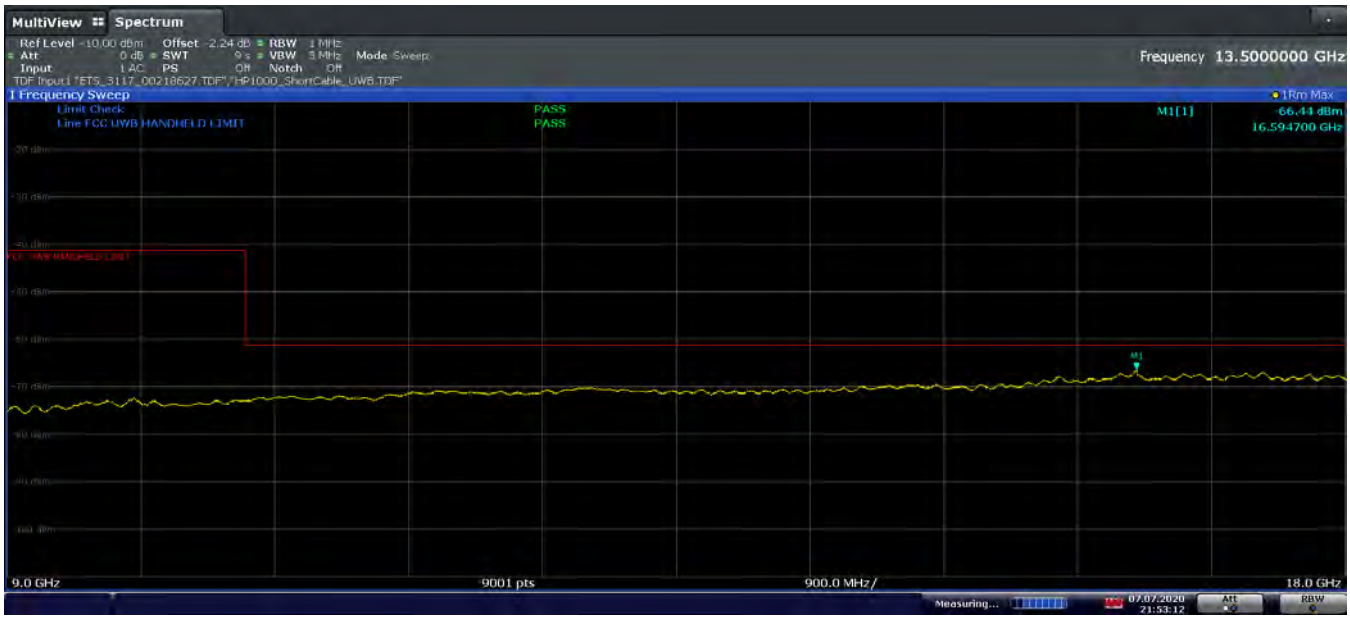
Plot 7-93. Radiated Spurious Emission 1559-1610MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)



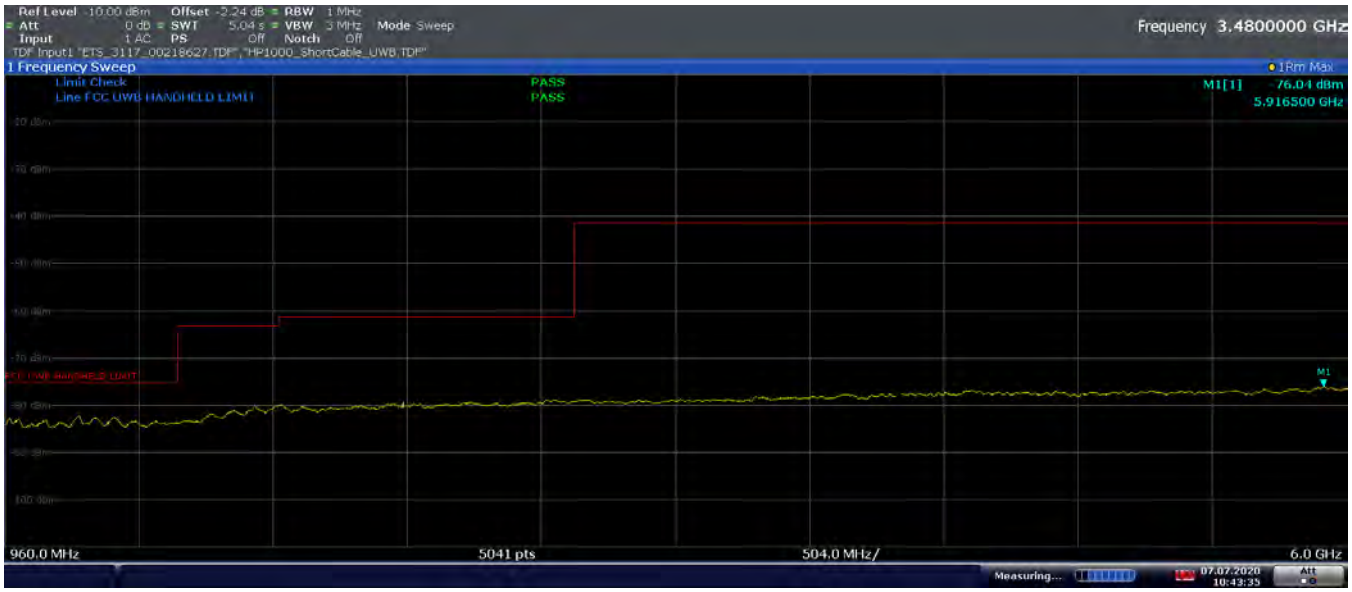
Plot 7-94. Radiated Spurious Emission 1559-1610MHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



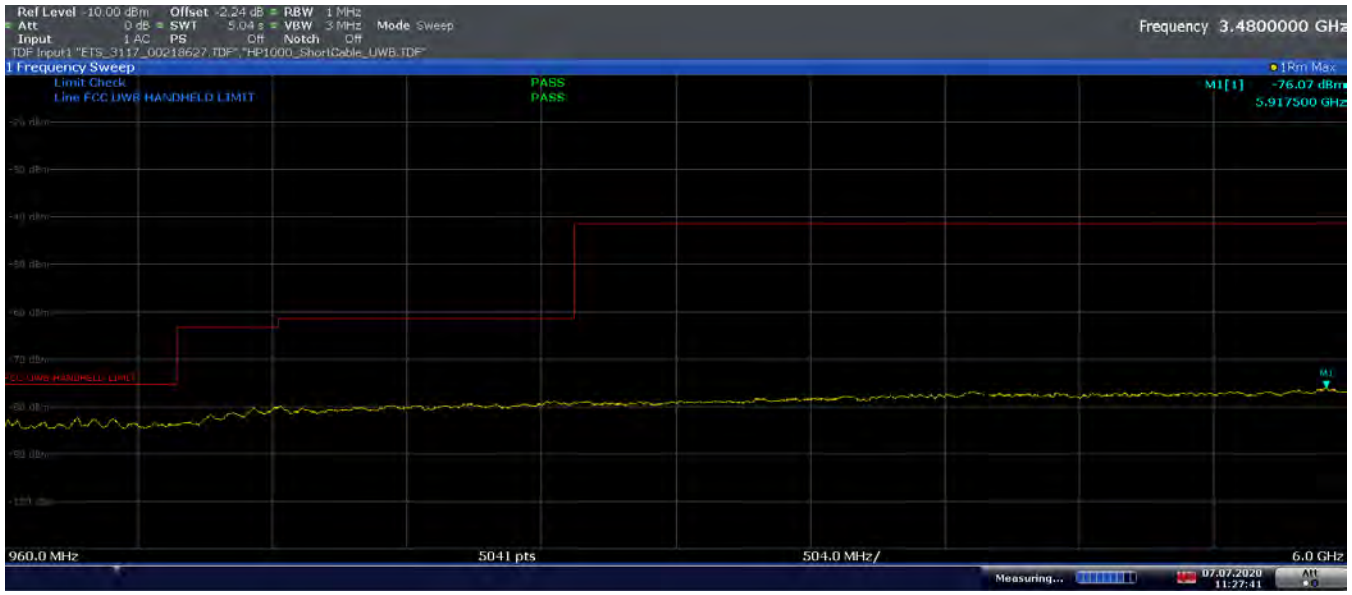
Plot 7-95. Radiated Spurious Emission 9-18GHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)



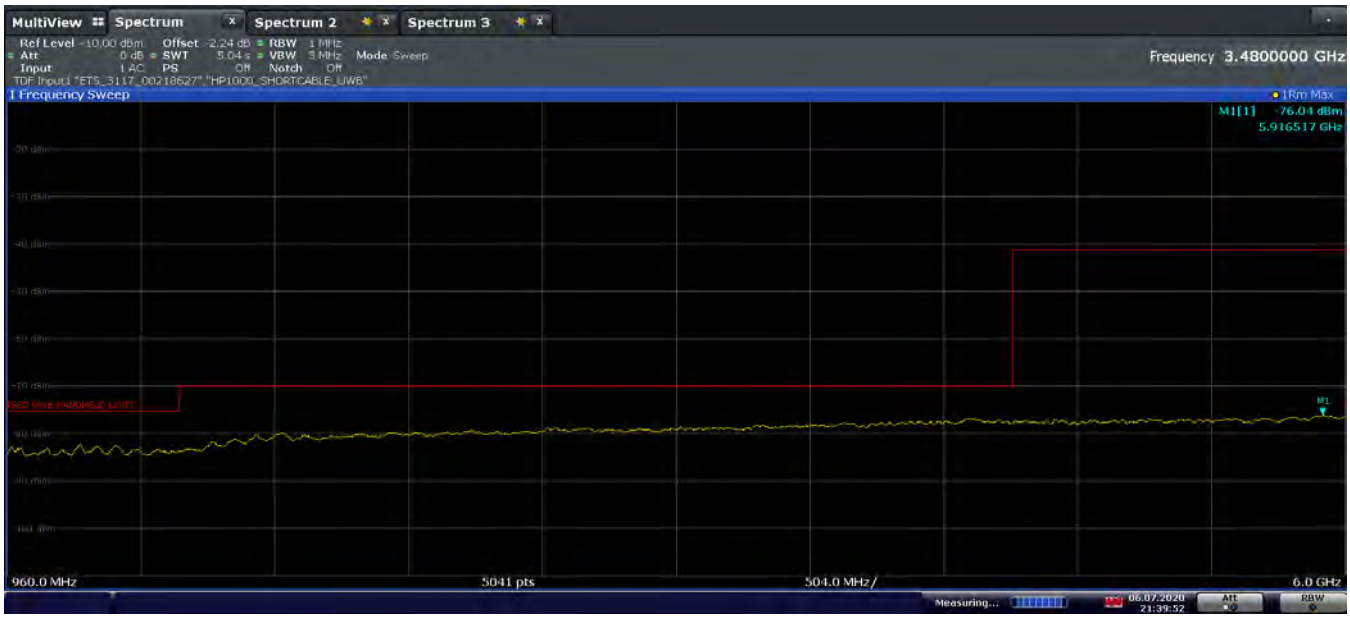
Plot 7-96. Radiated Spurious Emission 9-18GHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



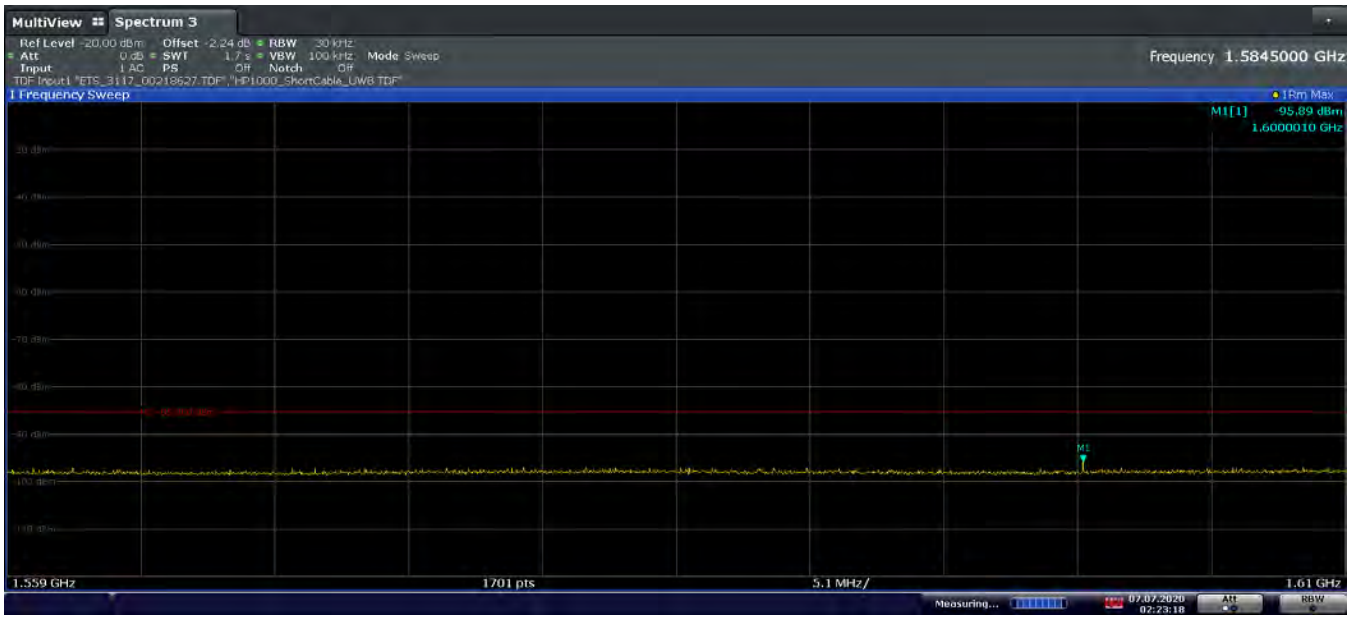
Plot 7-97. FCC Radiated Spurious Emission 960-6000MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



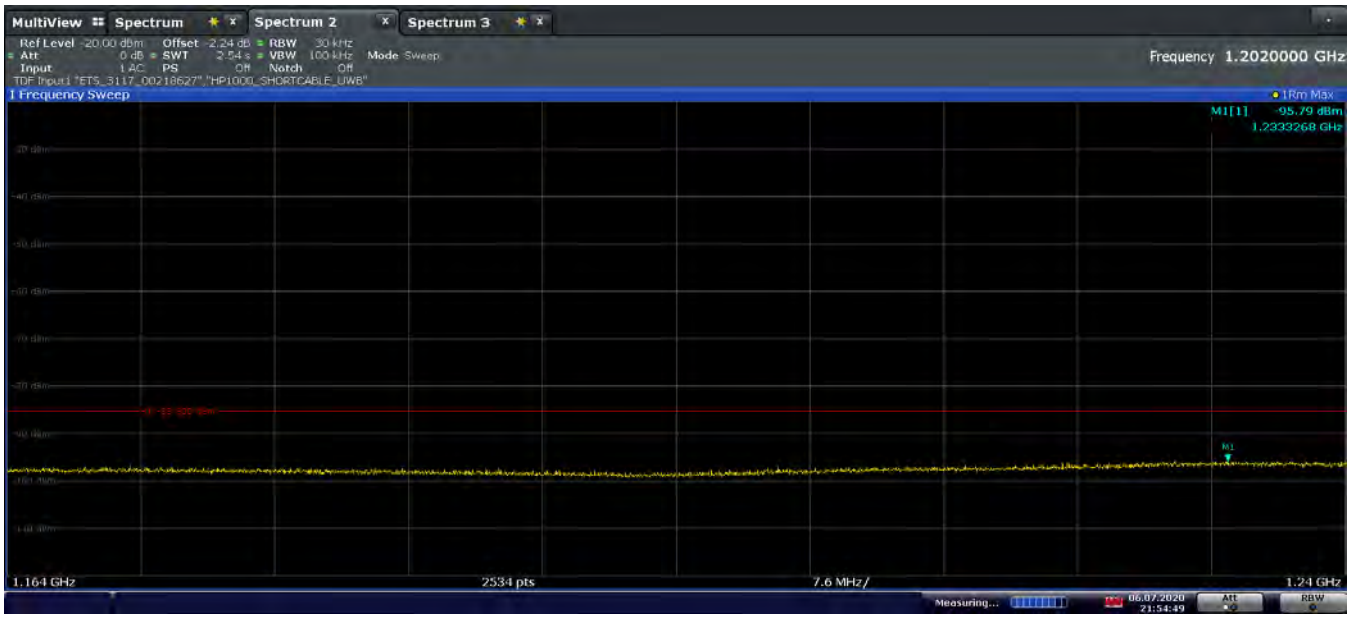
Plot 7-98. FCC Radiated Spurious Emission 960-6000MHz (Ch.9, Config 3, Payload 125 Ant. Pol. V)



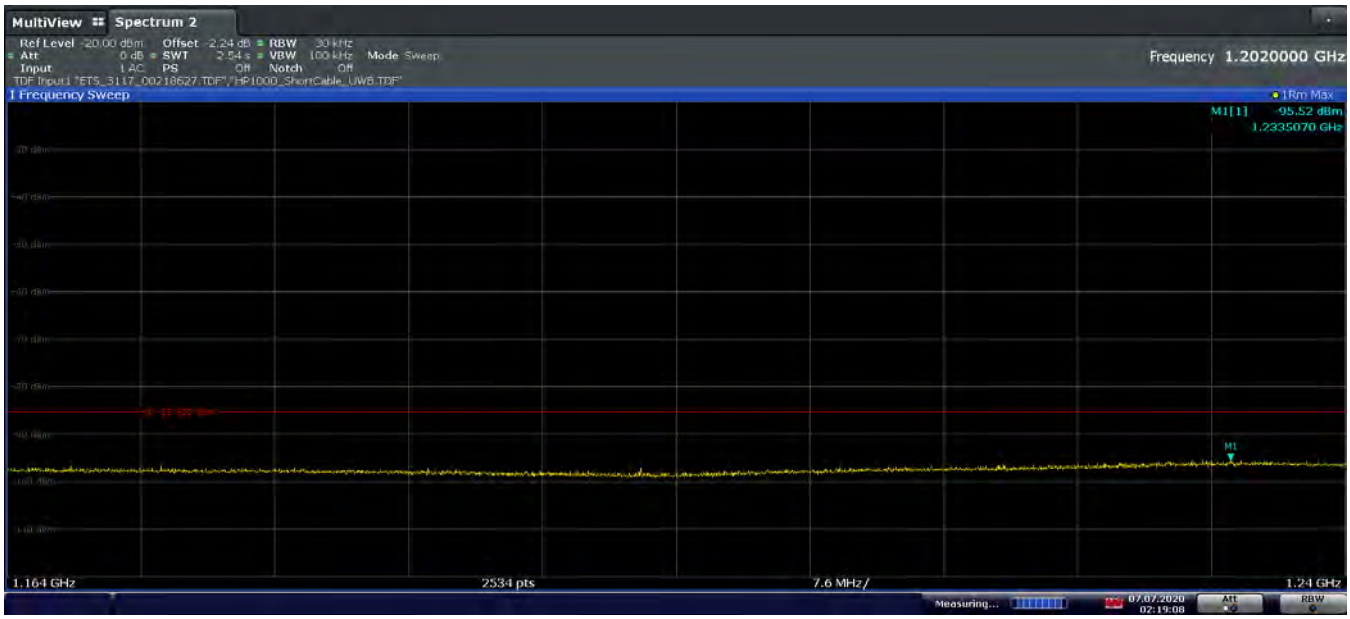
Plot 7-99. ISED Radiated Spurious Emission 960-6000MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



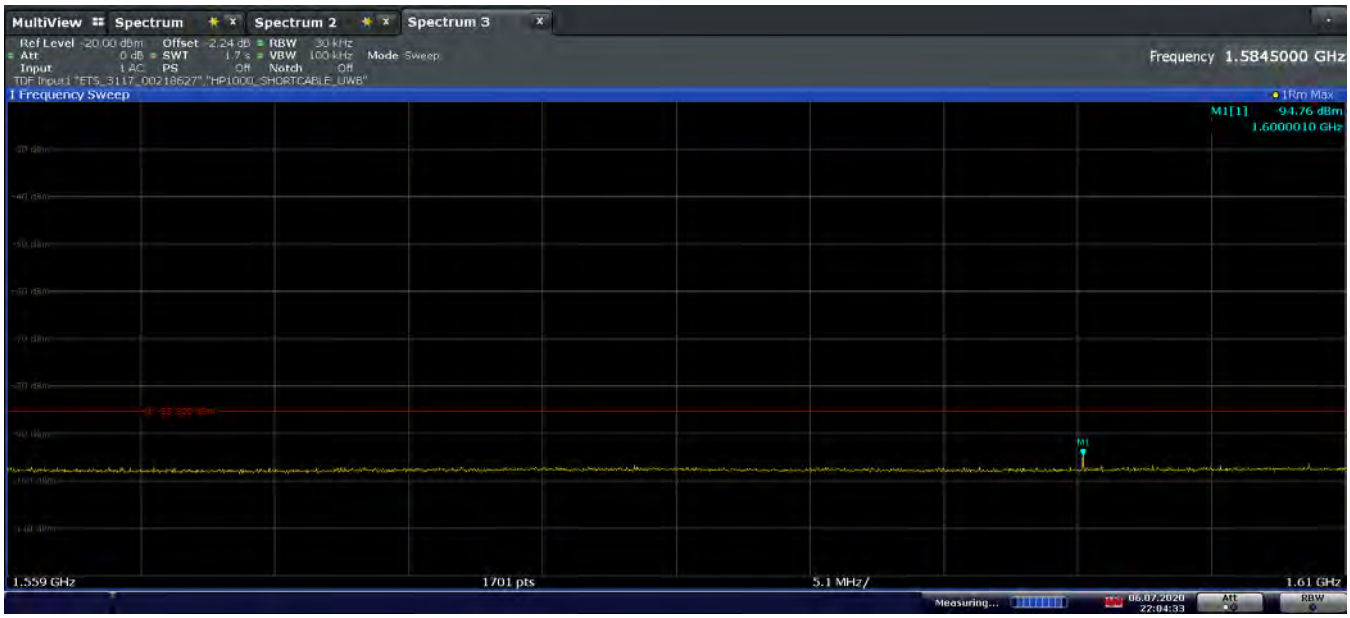
Plot 7-100. ISED Radiated Spurious Emission 960-6000MHz (Ch.9, Config 3, Payload 125 Ant. Pol. V)



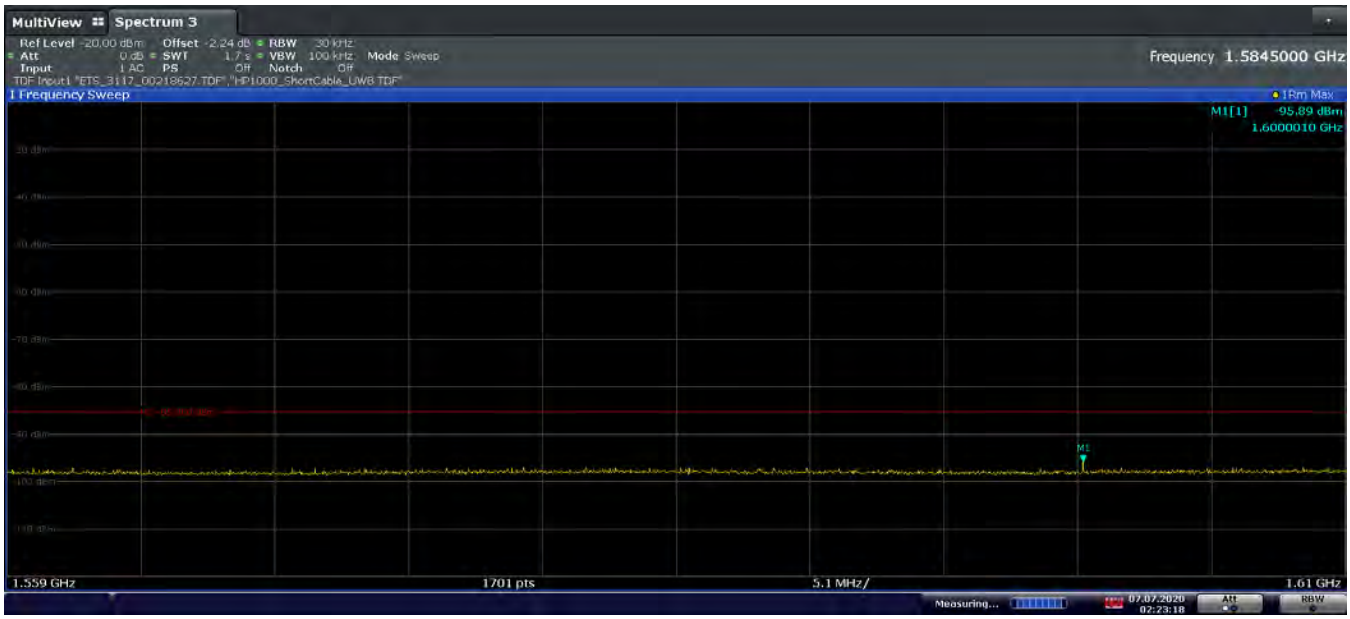
Plot 7-101. Radiated Spurious Emission 1164-1240MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



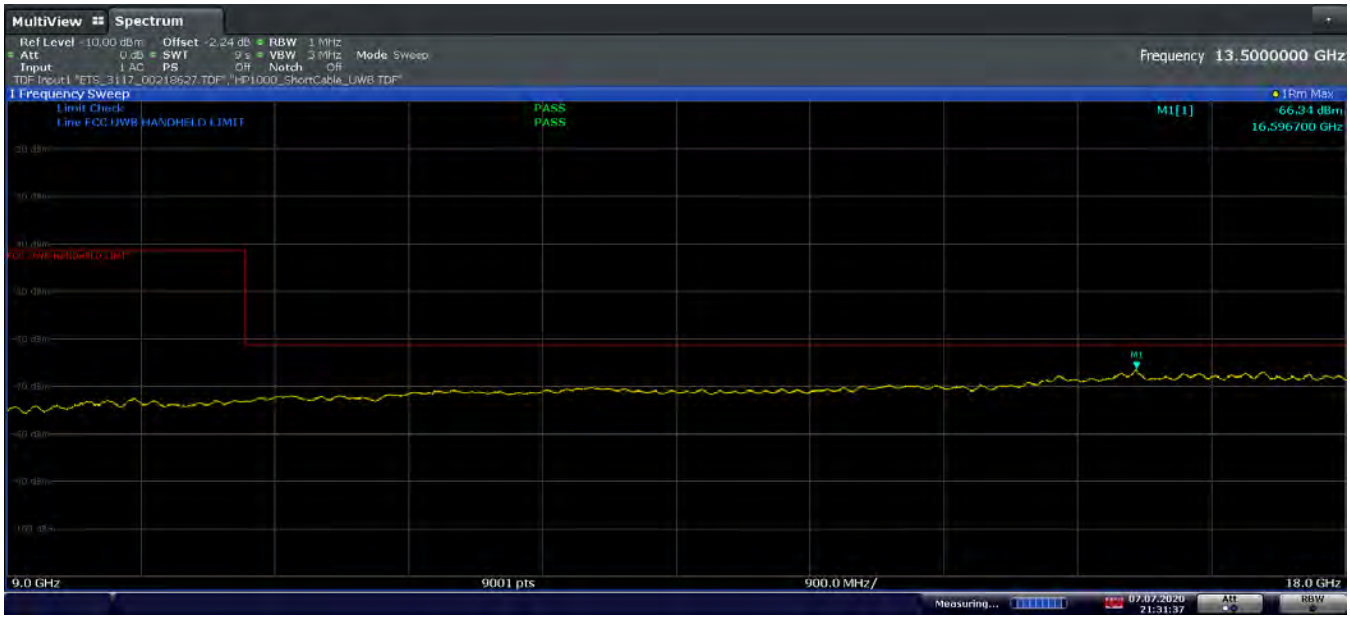
Plot 7-102. Radiated Spurious Emission 1164-1240MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. V)



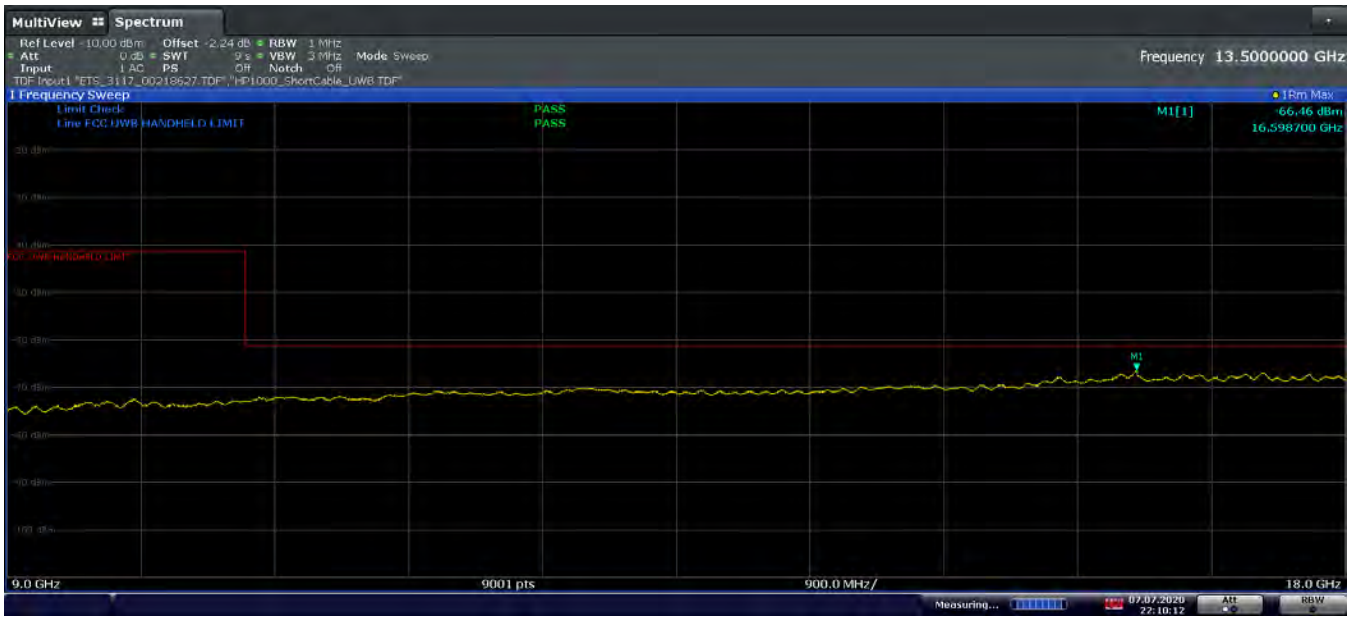
Plot 7-103. Radiated Spurious Emission 1559-1610MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



Plot 7-104. Radiated Spurious Emission 1559-1610MHz (Ch. 9, Config 3, Payload 125 Ant. Pol. V)



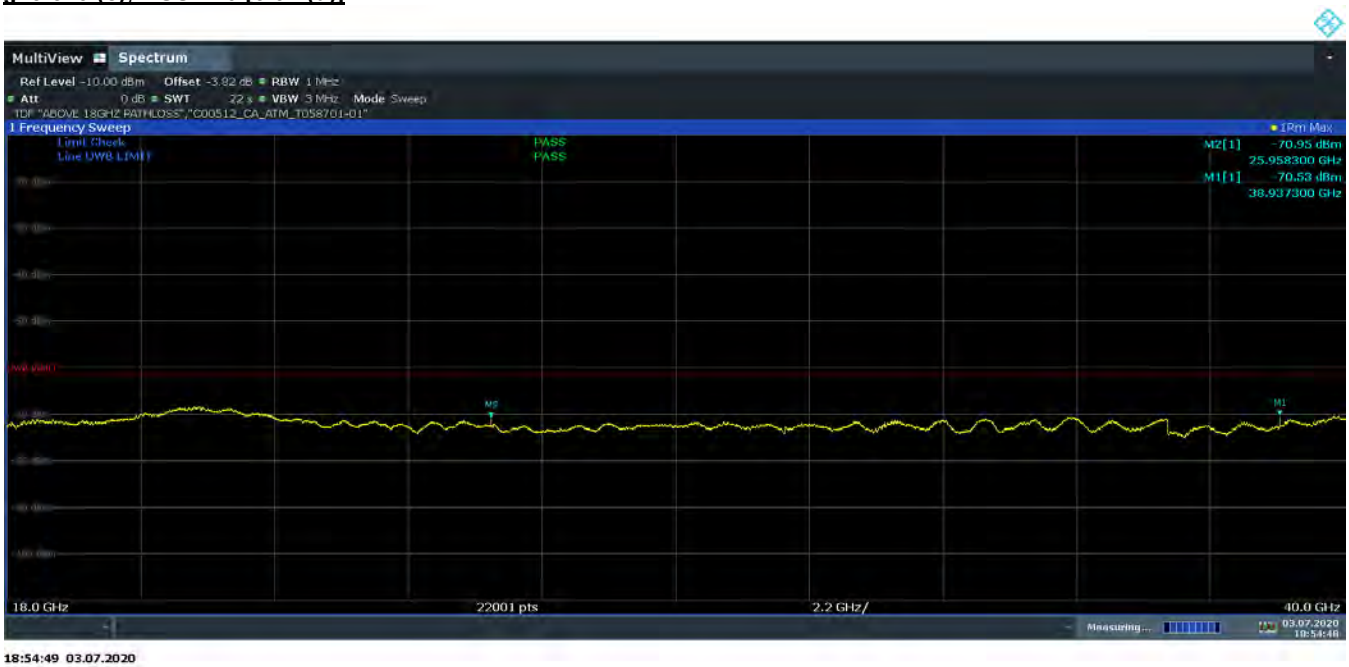
Plot 7-105. Radiated Spurious Emission 9-18GHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



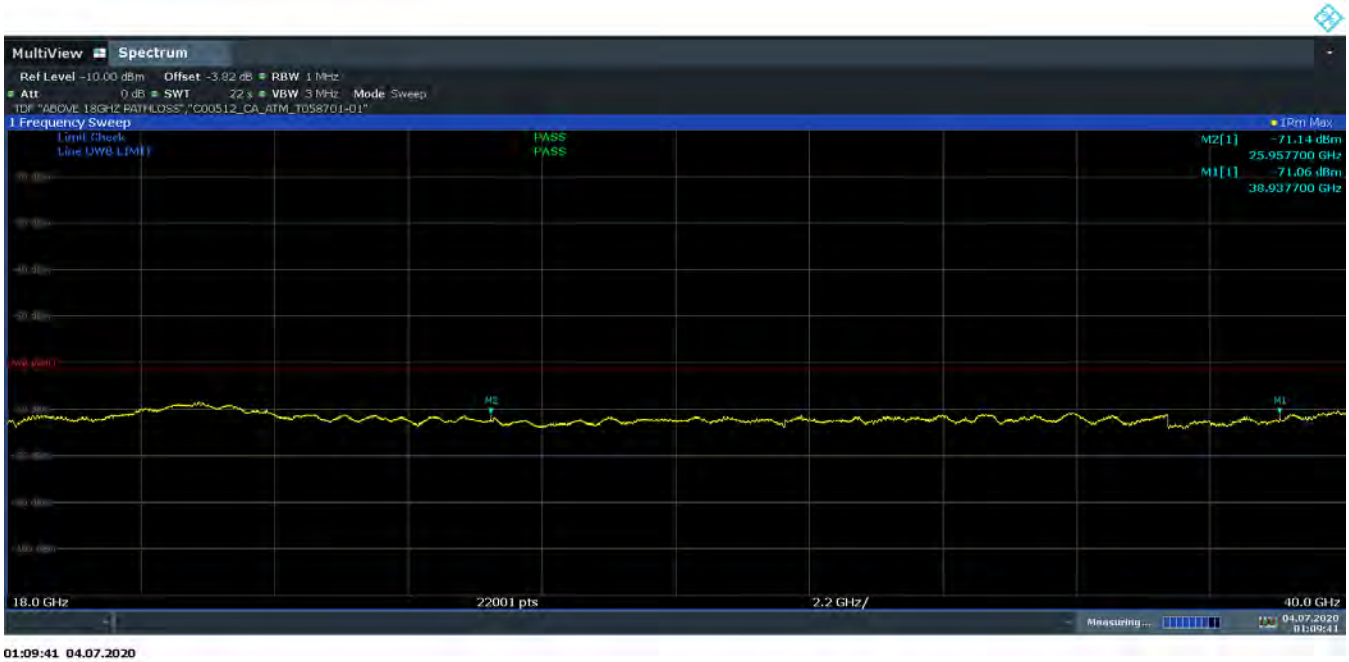
Plot 7-106. Radiated Spurious Emission 9-18GHz (Ch. 9, Config 3, Payload 125 Ant. Pol. V)

Radiated Spurious Emissions (Above 18GHz)

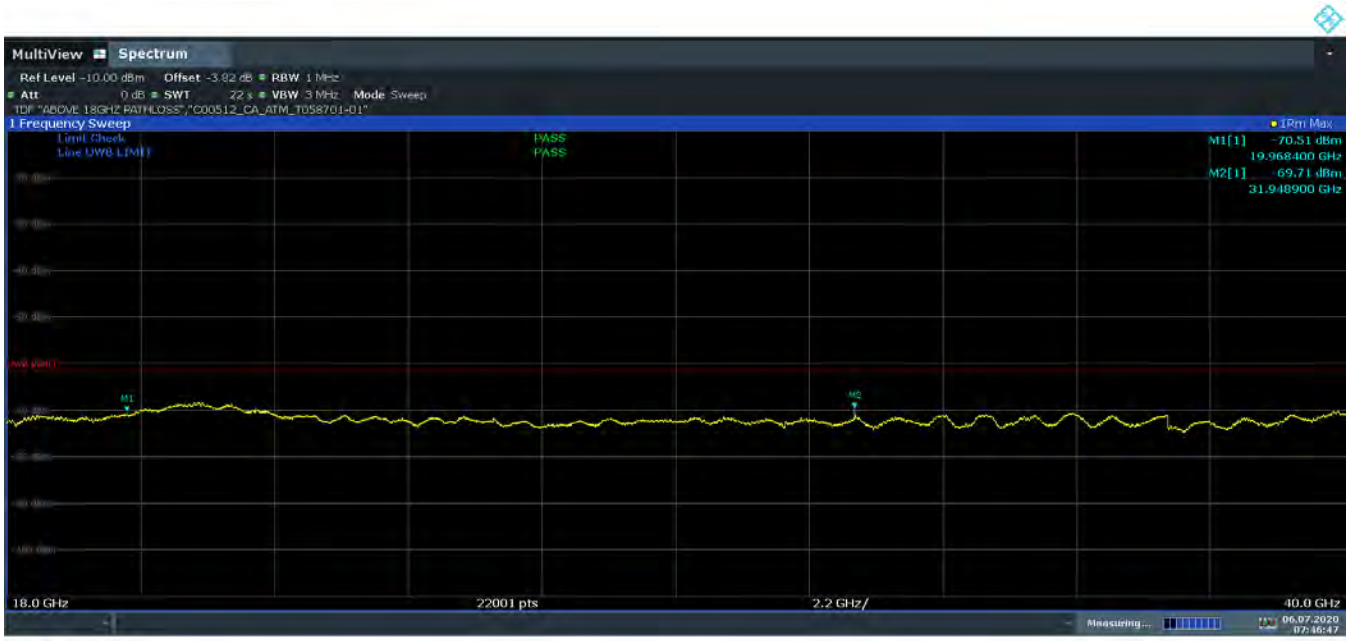
§15.519 (c); RSS-220 [5.3.1(d)]



Plot 7-107. Radiated Spurious Emission 18-40GHz (Ch. 5, Config 3, Payload 125 Ant. Pol. H)

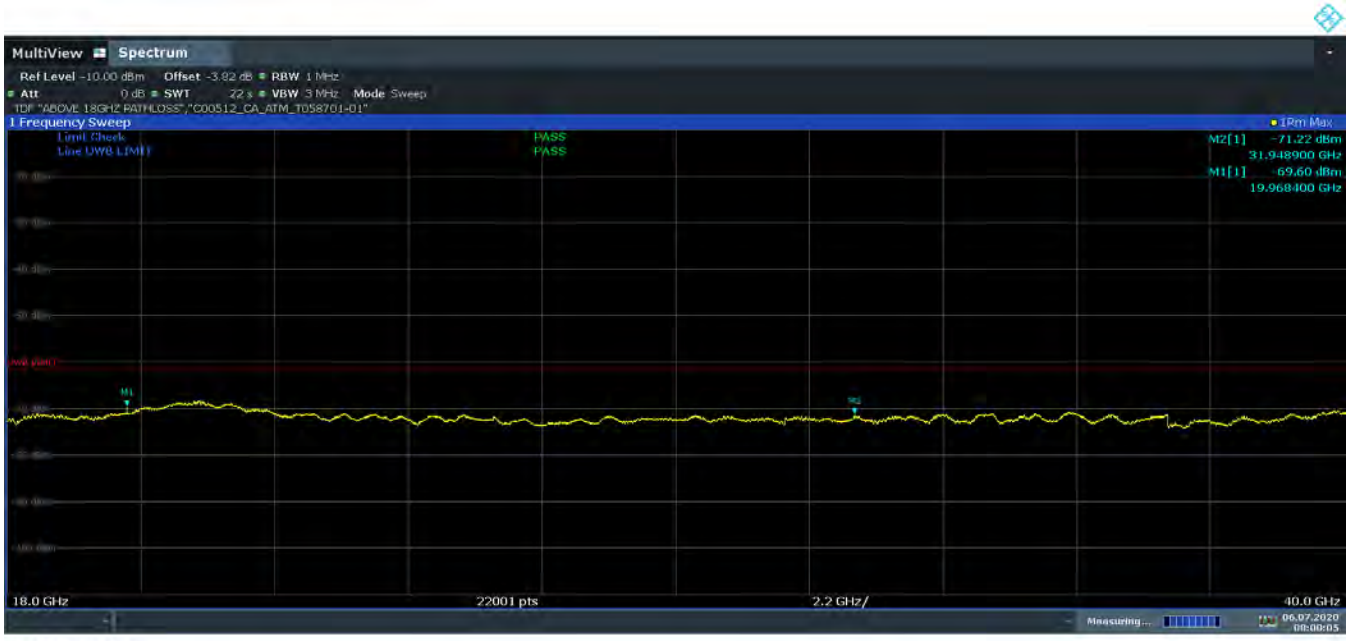


Plot 7-108. Radiated Spurious Emission 18-40GHz (Ch. 5, Config 3, Payload 125 Ant. Pol. V)



07:46:48 06.07.2020

Plot 7-109. Radiated Spurious Emission 18-40GHz (Ch. 9, Config 3, Payload 125 Ant. Pol. H)



08:00:06 06.07.2020

Plot 7-110. Radiated Spurious Emission 18-40GHz (Ch. 9, Config 3, Payload 125 Ant. Pol. V)

Radiated Spurious Emission Measurements (960MHz-18GHz)

§15.519 (c); RSS-220 [5.3.1(d)]

Distance of Measurements:	0.6 Meter
Operating Frequency:	6500 MHz
Channel:	5
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1234	Avg	V	-	-	-75.65	-4.34	-2.24	-82.23	-75.30	-6.93
1989	Avg	V	-	-	-76.77	-1.03	-2.24	-80.04	-63.30	-16.74
2453	Avg	V	-	-	-74.84	-0.03	-2.24	-77.11	-61.30	-15.81
3026	Avg	V	-	-	-77.19	0.61	-2.24	-78.82	-61.30	-17.52
13010	Avg	V	-	-	-76.77	8.89	-2.24	-70.12	-61.30	-8.82
16983	Avg	V	-	-	-76.51	11.80	-2.24	-66.95	-61.30	-5.65

Table 7-14. Radiated Spurious Emission Measurements 960MHz-18GHz (FCC)

Distance of Measurements:	0.6 Meter
Operating Frequency:	6500 MHz
Channel:	5
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1234	Avg	V	-	-	-75.65	-4.34	-2.24	-82.23	-75.30	-6.93
4593	Avg	V	-	-	-77.11	2.55	-2.24	-76.80	-70.00	-6.80
4596	Avg	V	-	-	-77.04	2.55	-2.24	-76.73	-70.00	-6.73
13010	Avg	V	-	-	-76.74	8.86	-2.24	-70.12	-61.30	-8.82
16980	Avg	V	-	-	-76.53	11.82	-2.24	-66.95	-61.30	-5.65
16983	Avg	V	-	-	-76.55	11.80	-2.24	-66.99	-61.30	-5.69

Table 7-15. Radiated Spurious Emission Measurements 960MHz-18GHz (ISED)

Radiated Spurious Emission Measurements (960MHz-18GHz)

§15.519 (c); RSS-220 [5.3.1(d)]

Distance of Measurements:	0.6 Meter
Operating Frequency:	8000 MHz
Channel:	9
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1236	Avg	V	-	-	-75.72	-4.37	-2.24	-82.33	-75.30	-7.03
1987	Avg	V	-	-	-76.80	-1.05	-2.24	-80.09	-63.30	-16.79
2994	Avg	V	-	-	-76.88	0.37	-2.24	-78.75	-61.30	-17.45
3020	Avg	V	-	-	-77.14	0.57	-2.24	-78.81	-61.30	-17.51
13013	Avg	V	-	-	-76.76	8.88	-2.24	-70.12	-61.30	-8.82
16979	Avg	V	-	-	-76.61	11.81	-2.24	-67.04	-61.30	-5.74

Table 7-16. Radiated Spurious Emission Measurements 960MHz-18GHz (FCC)

Distance of Measurements:	0.6 Meter
Operating Frequency:	8000 MHz
Channel:	9
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1236	Avg	V	-	-	-75.76	-4.33	-2.24	-82.33	-75.30	-7.03
4591	Avg	V	-	-	-77.09	2.55	-2.24	-76.78	-70.00	-6.78
4588	Avg	V	-	-	-77.22	2.54	-2.24	-76.92	-70.00	-6.92
13013	Avg	V	-	-	-76.74	8.86	-2.24	-70.12	-61.30	-8.82
16445	Avg	V	-	-	-76.63	11.23	-2.24	-67.64	-61.30	-6.34
16979	Avg	V	-	-	-76.61	11.81	-2.24	-67.04	-61.30	-5.74

Table 7-17. Radiated Spurious Emission Measurements 960MHz-18GHz (ISED)

Radiated Spurious Emission Measurements (Above 18GHz)

§15.519 (c); RSS-220 [5.3.1(d)]

Distance of Measurements:	0.5 Meter
Operating Frequency:	6500 MHz
Channel:	5
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
19500	Avg	V	-	-	-62.39	-5.19	-3.82	-71.40	-61.30	-10.10
26000	Avg	V	150	35	-60.42	-6.44	-3.82	-70.68	-61.30	-9.38
32500	Avg	V	-	-	-61.85	-6.30	-3.82	-71.97	-61.30	-10.67
39000	Avg	V	150	165	-59.13	-7.01	-3.82	-69.96	-61.30	-8.66

Table 7-18. Radiated Spurious Emission Measurements 18-40GHz

Distance of Measurements:	0.5 Meter
Operating Frequency:	8000 MHz
Channel:	9
Config	3
Payload	125

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Conversion Factor [dB]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
20000	Avg	V	150	230	-61.26	-4.31	-3.82	-69.39	-61.30	-8.09
24000	Avg	V	-	-	-60.57	-6.72	-3.82	-71.11	-61.30	-9.81
32000	Avg	V	150	48	-58.78	-6.08	-3.82	-68.68	-61.30	-7.38
40000	Avg	V	-	-	-62.21	-5.43	-3.82	-71.46	-61.30	-10.16

Table 7-19. Radiated Spurious Emission Measurements 18-40GHz

7.7 Radiated Spurious Emissions – Below 960MHz

§15.209; RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 7 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-20 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-20. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

7. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
8. RBW = 120kHz (for emissions from 30MHz – 1GHz)
9. Detector = quasi-peak
10. Sweep time = auto couple
11. Trace mode = max hold
12. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

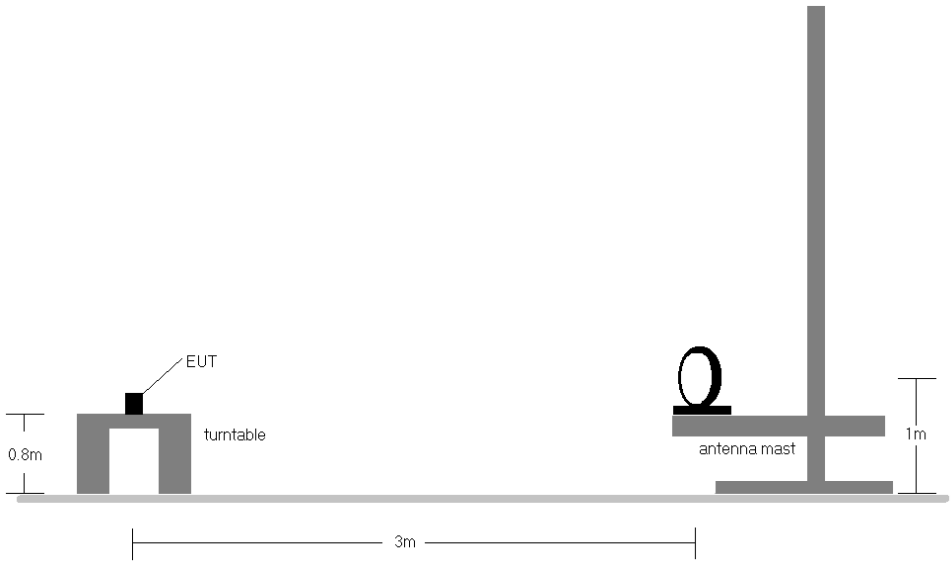


Figure 7-6. Radiated Test Setup < 30Mhz

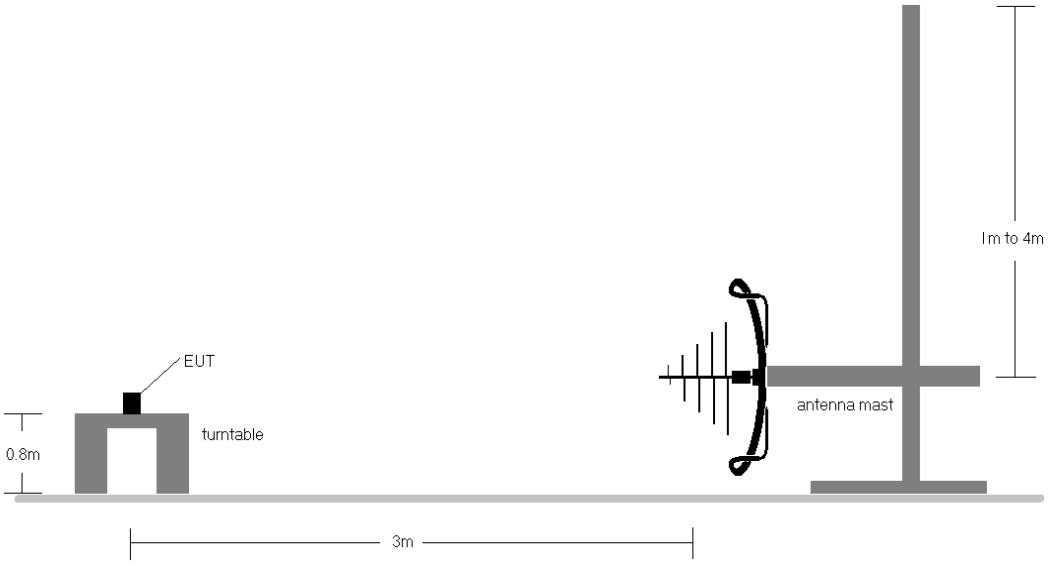


Figure 7-7. Radiated Test Setup < 1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen(8.10) are below the limit shown in Table 7-20.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector for emissions within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB cable with wireless charger
    b. EUT powered by host PC via USB cable with wireless charger
8. No spurious emissions were detected within 20dB of the limit below 30MHz.
9. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
10. The unit was tested with all possible mode and power schemes and only the highest emission is reported.

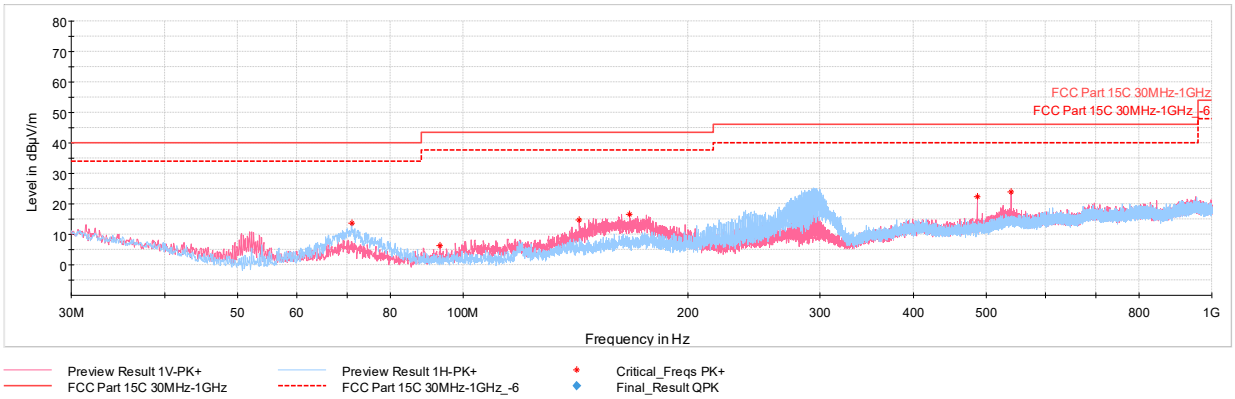
Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = (Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$ + Attenuator $_{[dB]}$) – Preamplifier Gain $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

Radiated Spurious Emissions (Below 960MHz)

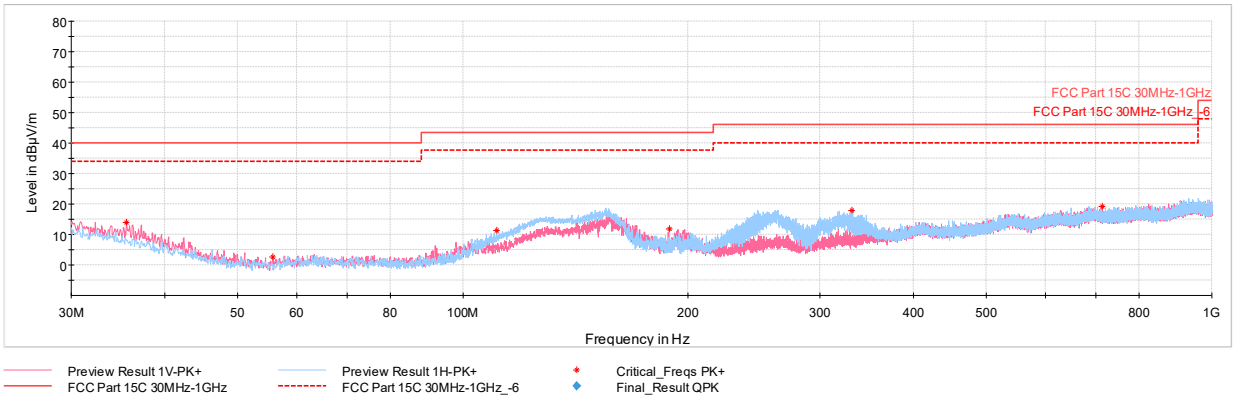
§15.209; RSS-Gen [8.9]



Plot 7-111. Radiated Spurious Emission 30-960MHz (Ch. 5, Config 3, Payload 125 with WCP + AC/DC Adapter)

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
52.21	Max-Peak	V	100	96	-74.32	-27.22	5.46	40.00	-34.54
78.21	Max-Peak	V	100	5	-73.68	-26.71	6.61	40.00	-33.39
115.51	Max-Peak	H	250	15	-67.96	-25.47	13.57	43.52	-29.95
159.06	Max-Peak	V	100	46	-71.47	-22.02	13.51	43.52	-30.01
329.49	Max-Peak	H	100	50	-74.41	-18.46	14.13	46.02	-31.89
778.06	Max-Peak	H	100	7	-78.22	-7.55	21.23	46.02	-24.79

Table 7-21. Radiated Spurious Emission 30-960MHz (Ch. 5, Config 3, Payload 125 with WCP + AC/DC Adapter)



Plot 7-112. Radiated Spurious Emission 30-960MHz (Ch. 9, Config 3, Payload 125 with WCP + AC/DC Adapter)

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
35.58	Max-Peak	V	100	8	-72.52	-20.65	13.83	40.00	-26.17
55.80	Max-Peak	V	100	140	-77.29	-27.17	2.54	40.00	-37.46
111.00	Max-Peak	H	250	60	-70.57	-25.09	11.34	43.52	-32.18
188.74	Max-Peak	H	100	159	-72.21	-22.89	11.90	43.52	-31.62
330.46	Max-Peak	H	100	42	-70.76	-18.40	17.84	46.02	-28.18
714.58	Max-Peak	V	250	265	-79.47	-8.26	19.27	46.02	-26.75

Table 7-22. Radiated Spurious Emission 30-960MHz (Ch. 9, Config 3, Payload 125 with WCP + AC/DC Adapter)

7.8 AC Line-Conducted Emission Measurement

§15.207; RSS-Gen [8.8]

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for AC Line conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-23. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Section 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

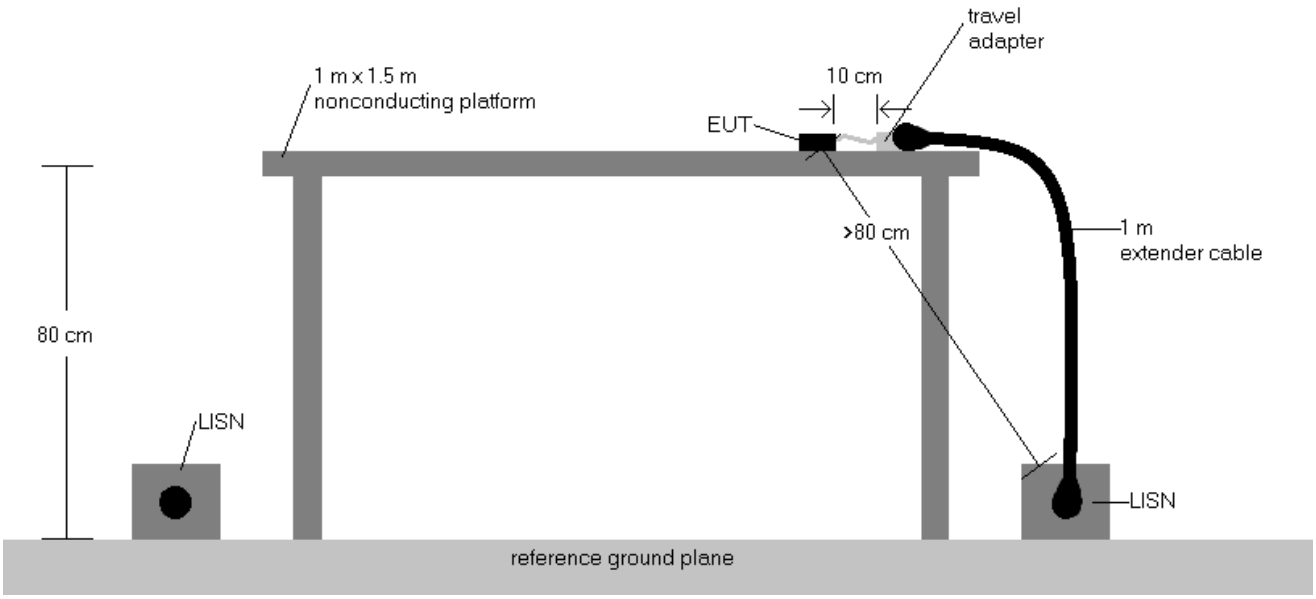
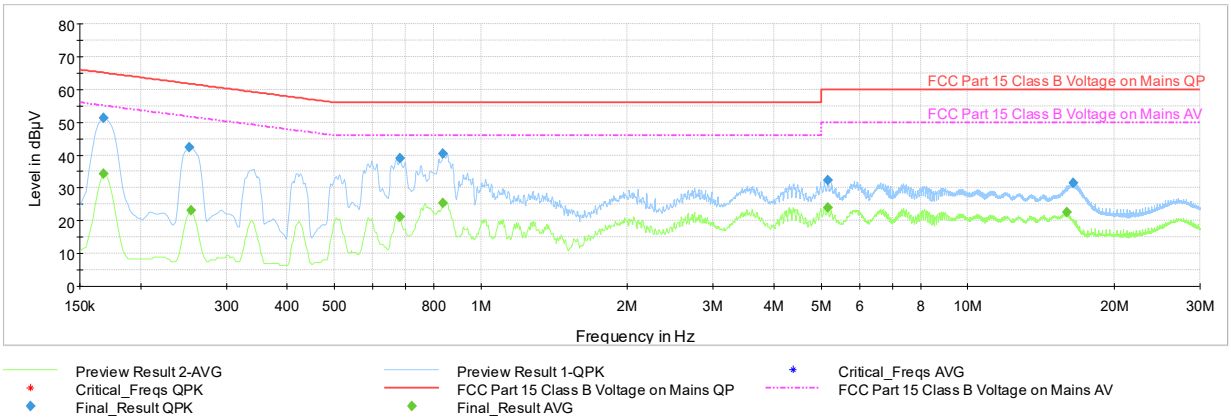


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

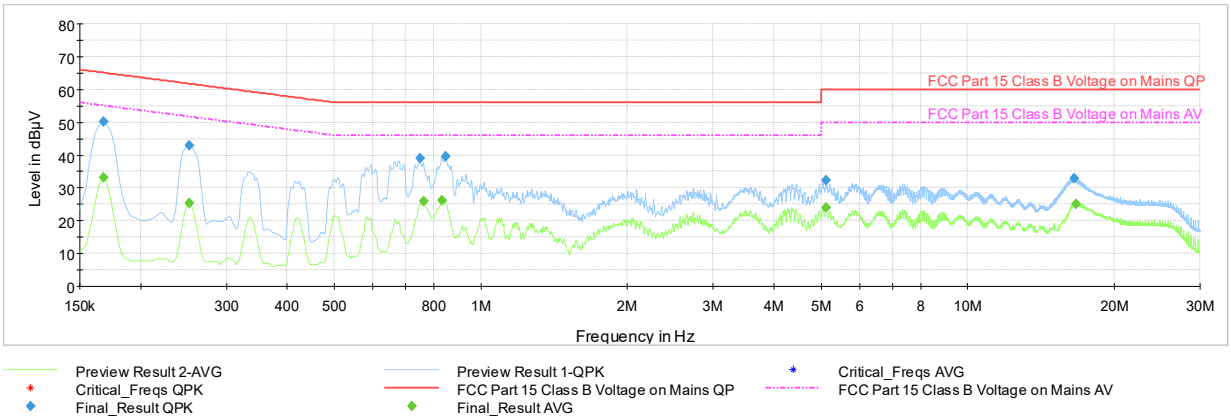
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Part 15.207 and RSS-Gen (8.8).
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (dB)
5. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
6. Traces shown in plot are made using a quasi-peak and average detectors
7. Both configurations below were investigated, and the worst case has been reported.
    a. EUT powered by AC/DC adaptor via USB cable with wireless charger
    b. EUT powered by host PC via USB cable with wireless charger
8. Deviations to the Specifications: None.



Plot 7-113. AC Line Conducted (Ch. 5, Config 3, Payload 125 L1, with WCP + AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.168	FINAL	51.2	—	65.06	-13.83	L1	GND
0.168	FINAL	—	34.18	55.06	-20.88	L1	GND
0.251	FINAL	42.3	—	61.72	-19.46	L1	GND
0.254	FINAL	—	23.25	51.64	-28.39	L1	GND
0.681	FINAL	—	21.18	46.00	-24.82	L1	GND
0.683	FINAL	39.0	—	56.00	-16.98	L1	GND
0.836	FINAL	—	25.25	46.00	-20.75	L1	GND
0.836	FINAL	40.5	—	56.00	-15.52	L1	GND
5.159	FINAL	—	24.10	50.00	-25.90	L1	GND
5.161	FINAL	32.4	—	60.00	-27.60	L1	GND
15.999	FINAL	—	22.44	50.00	-27.56	L1	GND
16.490	FINAL	31.4	—	60.00	-28.60	L1	GND

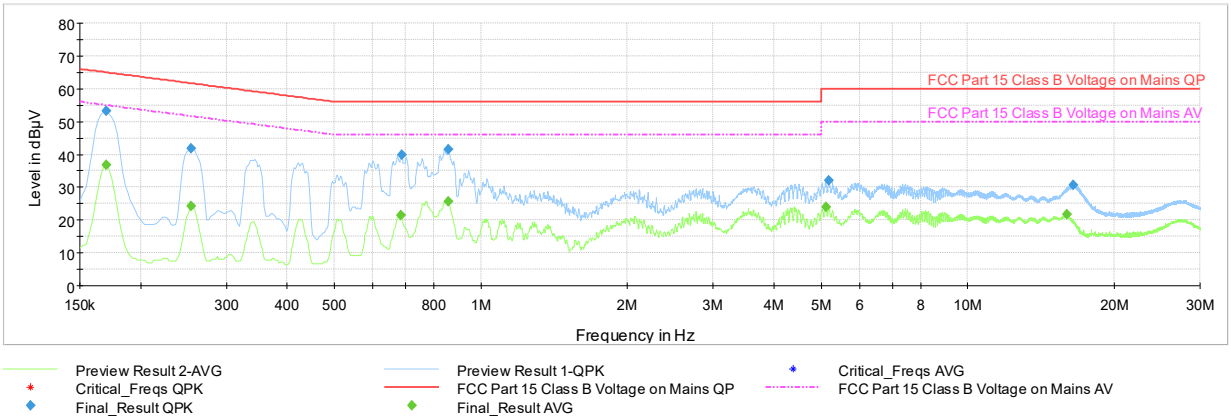
Table 7-24. AC Line Conducted Data (Ch. 5, Config 3, Payload 125 L1, with WCP + AC/DC Adapter)



Plot 7-114. AC Line Conducted (Ch. 5, Config 3, Payload 125 N, with WCP + AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.168	FINAL	50.1	—	65.06	-14.95	N	GND
0.168	FINAL	—	33.07	55.06	-21.99	N	GND
0.251	FINAL	42.8	—	61.72	-18.90	N	GND
0.251	FINAL	—	25.44	51.72	-26.28	N	GND
0.749	FINAL	39.0	—	56.00	-16.98	N	GND
0.762	FINAL	—	26.03	46.00	-19.97	N	GND
0.832	FINAL	—	26.28	46.00	-19.72	N	GND
0.848	FINAL	39.7	—	56.00	-16.31	N	GND
5.125	FINAL	—	23.89	50.00	-26.11	N	GND
5.125	FINAL	32.3	—	60.00	-27.71	N	GND
16.550	FINAL	33.0	—	60.00	-26.99	N	GND
16.665	FINAL	—	25.21	50.00	-24.79	N	GND

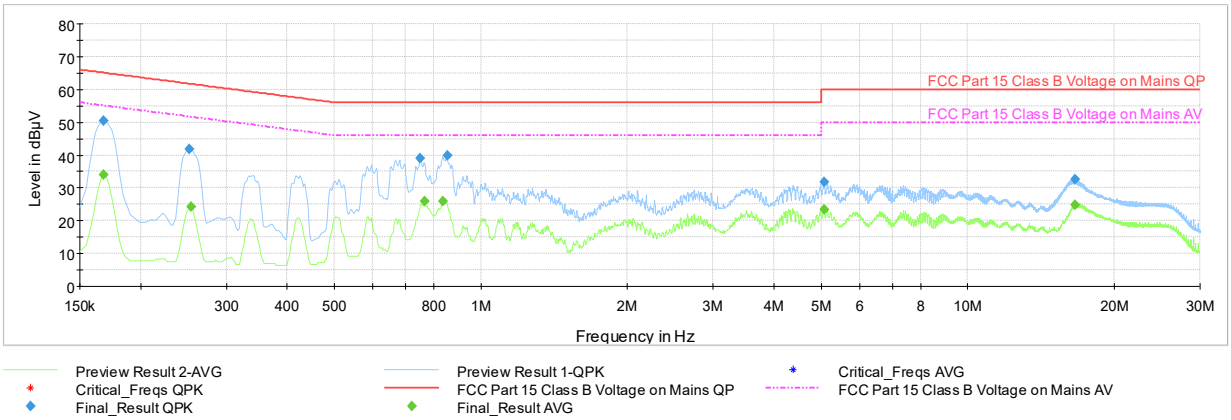
Table 7-25. AC Line Conducted Data (Ch. 5, Config 3, Payload 125 N, with WCP + AC/DC Adapter)



Plot 7-115. AC Line Conducted (Ch. 9, Config 3, Payload 125 L1, with WCP + AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.170	FINAL	53.3	—	64.95	-11.62	L1	GND
0.170	FINAL	—	36.79	54.95	-18.16	L1	GND
0.254	FINAL	41.9	—	61.64	-19.71	L1	GND
0.254	FINAL	—	24.14	51.64	-27.50	L1	GND
0.686	FINAL	—	21.46	46.00	-24.54	L1	GND
0.688	FINAL	39.8	—	56.00	-16.25	L1	GND
0.859	FINAL	—	25.69	46.00	-20.31	L1	GND
0.859	FINAL	41.7	—	56.00	-14.34	L1	GND
5.105	FINAL	—	23.89	50.00	-26.11	L1	GND
5.192	FINAL	32.2	—	60.00	-27.83	L1	GND
15.999	FINAL	—	21.77	50.00	-28.23	L1	GND
16.463	FINAL	30.8	—	60.00	-29.21	L1	GND

Table 7-26. AC Line Conducted Data (Ch. 9, Config 3, Payload 125 L1, with WCP + AC/DC Adapter)



Plot 7-116. AC Line Conducted Plot (Ch. 9, Config 3, Payload 125 N, with WCP + AC/DC Adapter)

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.168	FINAL	50.6	—	65.06	-14.48	N	GND
0.168	FINAL	—	33.97	55.06	-21.09	N	GND
0.251	FINAL	41.9	—	61.72	-19.86	N	GND
0.254	FINAL	—	24.26	51.64	-27.38	N	GND
0.751	FINAL	39.0	—	56.00	-16.99	N	GND
0.767	FINAL	—	25.87	46.00	-20.13	N	GND
0.836	FINAL	—	26.04	46.00	-19.96	N	GND
0.852	FINAL	39.9	—	56.00	-16.13	N	GND
5.062	FINAL	—	23.45	50.00	-26.55	N	GND
5.062	FINAL	31.7	—	60.00	-28.35	N	GND
16.620	FINAL	32.6	—	60.00	-27.39	N	GND
16.647	FINAL	—	24.92	50.00	-25.08	N	GND

Table 7-27. AC Line Conducted Data (Ch. 9, Config 3, Payload 125 N, with WCP + AC/DC Adapter)

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Watch FCC ID: BCG-A2376** is in compliance with Part 15 Subpart F (15.519) of the FCC Rules and RSS-220 of the Innovation, Science and Economic Development Canada Rules.