

JAPAN DFS TEST REPORT

Equipment : Wireless AC3000 Tri Band Gigabit Router
Brand Name : ASUS
Model Name : CT8
Applicant : ASUSTeK COMPUTER INC.
No. 15, Li-Te Rd., Peitou District, Taipei 112, Taiwan,
R.O.C.
Manufacturer (1) : Compal Networking (KunShan) Co., LTD.
No. 520, Nanbang Rd., Economic & Technical
Development Zone Kunshan, Jiangsu Province China
Manufacturer (2) : ASKEY TECHNOLOGY (JIANG SU) LTD
NO1388, Jiao Tong Road, Wujiang Economic
Technological Development Area
Jiangsu Province 215200 China
Standard : MIC Certification Rule, Article 2 Paragraph 1 Item 19-3
MIC Certification Rule, Article 2 Paragraph 1 Item 19-3-2

The product was received on Jun. 07, 2019, and testing was started from Aug. 30, 2019 and completed on Aug. 30, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in MIC Notice No.88 Appendix No.45 and shown compliance with the applicable MIC Ordinance Regulating Radio Equipment Article 49.20 and ARIB STD-T71 technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Appendix A. Test Photos

Photographs of EUT v01



TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB Ver1.0



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	NT No.368,2011	Channel Availability Check (CAC)	PASS	-
3.3	NT No.368,2011	In-service Monitoring	PASS	-
3.4	NT No.368,2011	Channel Shutdown and Non-Occupancy Period	PASS	-
RLE: Radio Law Enforcement Regulations ORE: Ordinance Regulating Radio Equipment TR: Terminal and Other Equipment Regulations NT: Notification of the Ministry of Internal Affairs and Communications				

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan

1 General Description

1.1 Information

1.1.1 DFS General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5250-5350	a, n (HT20), ac (VHT20)	5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5250-5350	n (HT40), ac (VHT40)	5270-5310	54-62 [2]
5470-5725		5510-5670	102-134 [5]
5250-5350	ac (VHT80)	5290	58 [1]
5470-5725		5530-5610	106-122 [2]

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 and VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

1.1.2 Frequency Band

Frequency Band	
<input checked="" type="checkbox"/>	W53:
<input checked="" type="checkbox"/>	(20MHz) - 5260, 5280, 5300, 5320MHz
<input checked="" type="checkbox"/>	(40MHz) - 5270, 5310MHz
<input checked="" type="checkbox"/>	(80MHz) - 5290MHz
<input type="checkbox"/>	W52+W53:
<input type="checkbox"/>	(160MHz) contiguous – 5250MHz
<input checked="" type="checkbox"/>	W56:
<input checked="" type="checkbox"/>	(20MHz) - 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5700MHz
<input checked="" type="checkbox"/>	(40MHz) - 5510, 5550, 5590, 5630, 5670MHz
<input checked="" type="checkbox"/>	(80MHz) - 5530, 5610MHz
<input type="checkbox"/>	(160MHz) contiguous - 5570MHz
<input type="checkbox"/>	W52+W56: (80+80 MHz) non-contiguous - 5210, 5530MHz or 5210, 5610MHz
<input type="checkbox"/>	W53+W56: (80+80 MHz) non-contiguous - 5290, 5530MHz or 5290, 5610MHz
Note: The EUT supports 802.11a/n/ac.	

1.1.3 Antenna Information

Set	Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	1	PSA	RFDPA230505IMLB901	Dipole Antenna	I-PEX	Note 1
	2	2	PSA	RFDPA230510IMLB901	Dipole Antenna	I-PEX	
	3	3	PSA	RFDPA100610IM5B901	Dipole Antenna	I-PEX	
	4	4	PSA	RFDPA100607IM5B901	Dipole Antenna	I-PEX	
	5	5	PSA	RFDPA100608IM5B901	Dipole Antenna	I-PEX	
	6	6	PSA	RFDPA100605IM5B901	Dipole Antenna	I-PEX	
	7	1	PSA	-	Printed Antenna	N/A	
2	1	1	Whayu	C660-510478-A ANT1 2_5G	Dipole Antenna	I-PEX	
	2	2	Whayu	C660-510478-A ANT2 2_5G	Dipole Antenna	I-PEX	
	3	3	Whayu	C660-510478-A_ANT 3 5G	Dipole Antenna	I-PEX	
	4	4	Whayu	C660-510478-A_ANT 4 5G	Dipole Antenna	I-PEX	
	5	5	Whayu	C660-510478-A_ANT 5 5G	Dipole Antenna	I-PEX	
	6	6	Whayu	C660-510478-A_ANT 6 5G	Dipole Antenna	I-PEX	
3	1	1	Airgain	M2440DMCT-PK1-HSR3-LB1X52BU	Dipole Antenna	I-PEX	
	2	2	Airgain	M2440DMCT-PK1-HSY3-LB1X102BU	Dipole Antenna	I-PEX	
	3	3	Airgain	M5X30CT-PK1-HSE3-LBIX102BU	Dipole Antenna	I-PEX	
	4	4	Airgain	M5X30CT-PK1-HSA3-LB1X75BU	Dipole Antenna	I-PEX	
	5	5	Airgain	M5X30CT-PK1-HSW3-LB 1X85BU	Dipole Antenna	I-PEX	
	6	6	Airgain	M5X30CT-PK1-HSB3-LBIX52BU	Dipole Antenna	I-PEX	

Note 1:

Set	Ant.	Port	Gain (dBi) - CDD				
			2.4GHz	5GHz Band 1	5GHz Band 2	5GHz Band 3	Bluetooth
1	1	1	1.36	1.74	2.09	-	-
	2	2	1.36	1.74	2.09	-	-
	3	1	-	-	-	0.82	-
	4	2	-	-	-	0.82	-
	5	3	-	-	-	0.82	-
	6	4	-	-	-	0.82	-
	7	1	-	-	-	-	-2.93
2	1	1	1.17	1.69	1.48	-	-
	2	2	1.17	1.69	1.48	-	-
	3	1	-	-	-	0.45	-
	4	2	-	-	-	0.45	-
	5	3	-	-	-	0.45	-
	6	4	-	-	-	0.45	-
3	1	1	0.80	1.47	1.47	-	-
	2	2	0.80	1.47	1.47	-	-
	3	1	-	-	-	0.18	-
	4	2	-	-	-	0.18	-
	5	3	-	-	-	0.18	-
	6	4	-	-	-	0.18	-

Note2: The above information was declared by manufacturer.

The EUT has three sets of WLAN antenna and there are six antennas for each set.

There are three sets antenna are the same type antennas, only the higher gain antennas "Set 1" was tested and recorded in the report.

For 2.4GHz function:

For IEEE 802.11b/g/n/VHT mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz Band 1 and Band 2 function:

For IEEE 802.11a/n/ac mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz Band 3 function:

For IEEE 802.11a/n/ac mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Bluetooth function

Only Port 1 can be used as transmitting/receiving antenna.

1.2 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	Type	Rating
Adapter	ASUS	AD2088320	010-5LF	Input: 100-240V~50/60Hz, 0.8A Output: 19V, 1.75A
Equipment Name	Brand Name	Model Name	Remark	
RJ-45 cable	NIEN-YI	NYT976	Non-Shielding:1.5m	

1.3 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	NA
B	Notebook	DELL	E4300	NA
C	WLAN Dongle	Abocom	AU7520	2AA9A-AU7520

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- MIC Ordinance Regulating Radio Equipment Article 49.20
- MIC Notice No.88 Appendix No.45

1.5 Testing Location Information

Testing Location				
<input type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973		
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
DFS Site	DF02-CB	Nyle Chang	24~25.4°C / 64~67%	Aug. 30, 2019

2 Test Configuration of EUT

2.1 EUT Information

EUT Information				
Operating Mode	<input checked="" type="checkbox"/>	Master		
	<input type="checkbox"/>	Slave with radar detection		
	<input type="checkbox"/>	Slave without radar detection		
Software / Firmware Version	9.0.0.4.386_254-g520db68			
Communication Mode	<input checked="" type="checkbox"/>	IP Based (Load Based)	<input type="checkbox"/>	Frame Based
TPC Function	<input checked="" type="checkbox"/>	With TPC	<input type="checkbox"/>	Without TPC

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
Frequency Range (MHz)	IEEE Std. 802.11	Test Channel Freq. (MHz)
5250-5350MHz	ac (VHT20)	5300
5470-5725MHz	ac (VHT20)	5500
5250-5350MHz	ac (VHT40)	5310
5470-5725MHz	ac (VHT40)	5510
5250-5350MHz	ac (VHT80)	5290
5470-5725MHz	ac (VHT80)	5530

2.3 The Worst Case Measurement Configuration

Tests Item	Dynamic Frequency Selection (DFS)
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11ac (VHT20), 11ac (VHT40), 11ac (VHT80)
<input checked="" type="checkbox"/>	For conducted tests, antenna ports are used for the tests and Master lowest antenna gain that was used to set the DFS Detection Threshold level during calibration of the test setup.
<input type="checkbox"/>	For radiated tests, the DFS test should be performed with lowest antenna gain (regardless of antenna type).
Modulation modes consist of below configuration: 11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac	

3 Dynamic Frequency Selection (DFS) Test Result

3.1 General DFS Information

3.1.1 DFS Parameters

DFS requirement values	
Parameter	Value
Channel Availability Check Time	60 sec
Channel Move Time	10 sec
Channel Closing Transmission Time	260 ms
Non-occupancy period	Minimum 30 minutes

W53: Parameters DFS radar test signal				
Test Signal (#)	Pulse width [μ s]	Pulse repetition frequency PRF [Hz]	Pulses per burst [PPB]	Detection Probability (%)
1	1	700	18	≥ 60
2	2.5	260	18	≥ 60

W56: Un-modulation Parameters DFS radar test signal				
Test Signal (#)	Pulse width [μ s]	Pulse repetition frequency PRF [Hz]	Pulses per burst [PPB]	Detection Probability (%)
1	0.5	720	18	≥ 60
2	1.0	700	18	≥ 60
3	2.0	250	18	≥ 60
4	1~5 (step 1)	200-500 (step 1)	23~29	≥ 60
5	6~10 (step 1)	2000-5000 (step 1)	16~18	≥ 60
6	11~20 (step 1)	2000-5000 (step 1)	12~16	≥ 60
Aggregate (Radar Types 1-6)				≥ 80

W56: Chirp Modulation (5~20MHz) Parameters DFS radar test signal					
Test Signal (#)	Pulse width [μ s]	Pulse repetition frequency PRF [Hz]	Number of Pulses per Burst	Number of Bursts	Detection Probability (%)
7	50-100 (step 1)	500-1000 (step 1)	1-3	8-20	≥ 80

W56: 5250-5724 MHz Frequency Hopping Modulation Parameters DFS radar test signal					
Test Signal (#)	Pulse width [μ s]	Pulse repetition frequency PRF [Hz]	Number of Pulses per Burst	Hopping Length (ms)	Detection Probability (%)
8	1	3000	9 (3ms)	300	≥ 70

3.1.2 DFS Threshold Level

DFS Threshold Level	
DFS Threshold level: -64 dBm	<input checked="" type="checkbox"/> at the antenna connector
	<input type="checkbox"/> in front of the antenna
Note 1: The DFS Detection Threshold Level is chosen the worse Interference Detection Threshold level (-64dBm) as the test parameter. Note 2: maximum EIRP < 200mW (23dBm). DFS Detection Threshold Level is (-62dBm) + G_{ANT} maximum EIRP \geq 200mW (23dBm). DFS Detection Threshold Level is (-64dBm) + G_{ANT}	

3.1.3 User Access Restrictions

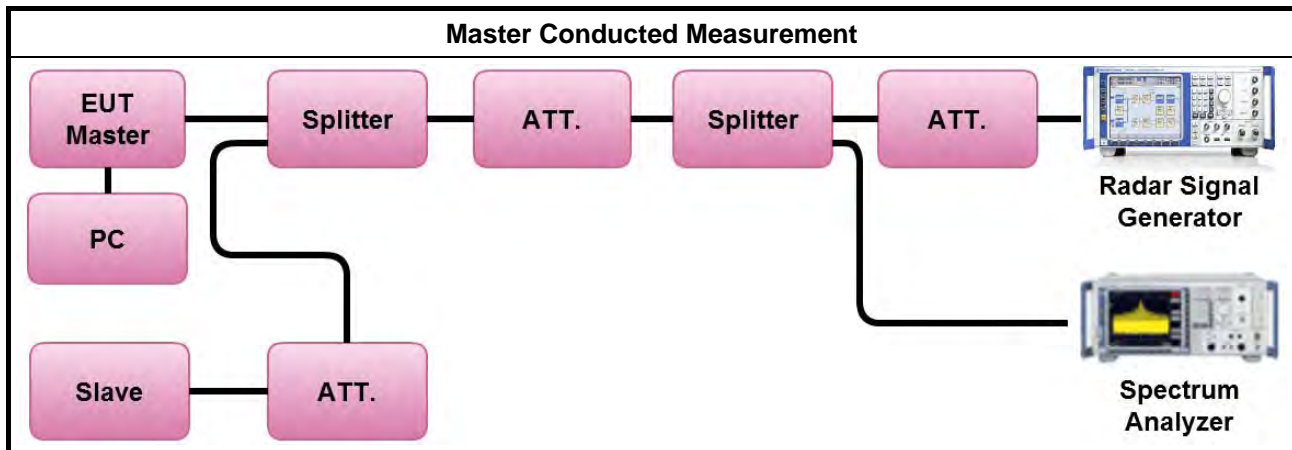
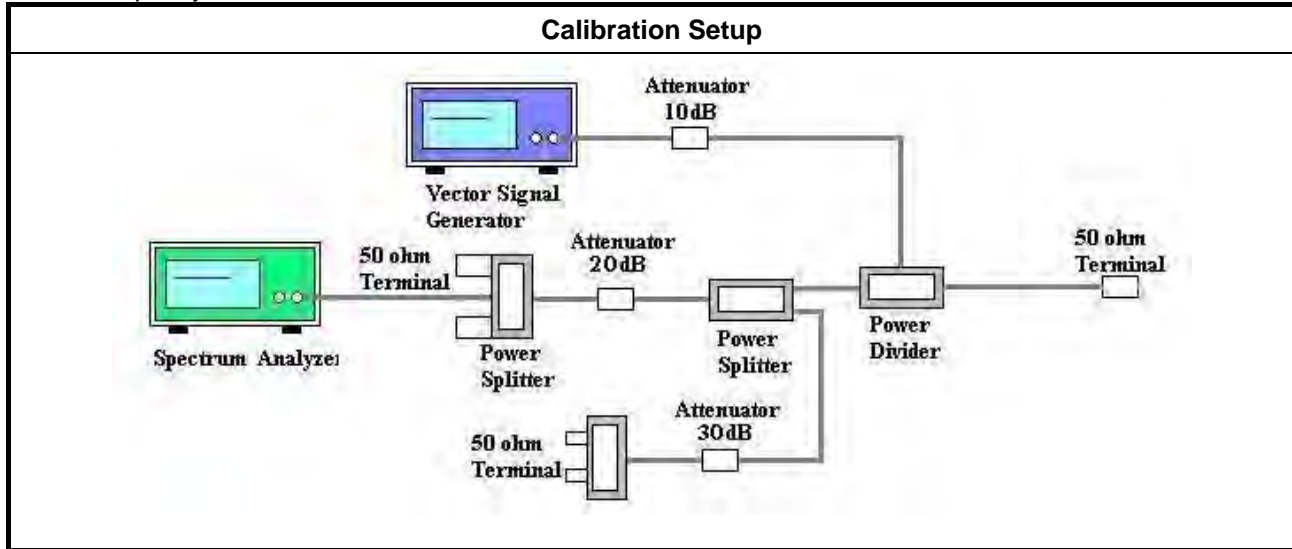
User Access Restrictions
<input checked="" type="checkbox"/> DFS controls (hardware or software) related to radar detection are NOT accessible to the user

3.1.4 Channel Loading/Data Streaming

<input checked="" type="checkbox"/> Test transmission sequence is from the Master to the Slave.
<input checked="" type="checkbox"/> For W53 band (5250-5350 MHz) Monitoring of operating channel with about 50% loading over maximum signal transmission speed.
<input checked="" type="checkbox"/> For W56 band (5470-5725 MHz) Monitoring of operating channel with about 17% loading over maximum signal transmission speed.
<input checked="" type="checkbox"/> No transmissions on channels being checked during a Channel Availability Check and Confirming Available Channels.

3.1.5 Test Setup and Calibration Setup

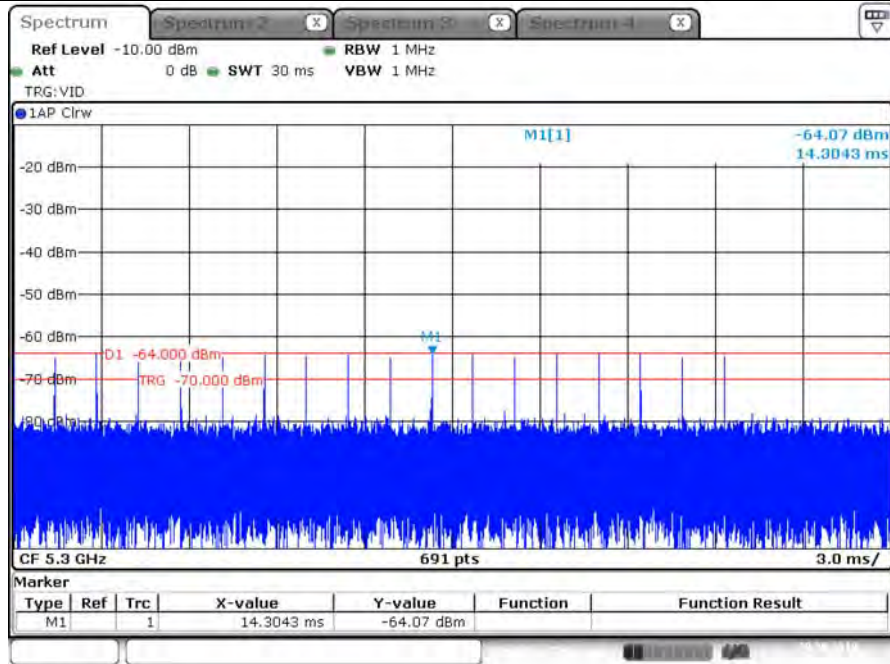
A spectrum analyzer is used as a monitor to verify that the EUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move.



3.1.6 Radar Waveform calibration Plot

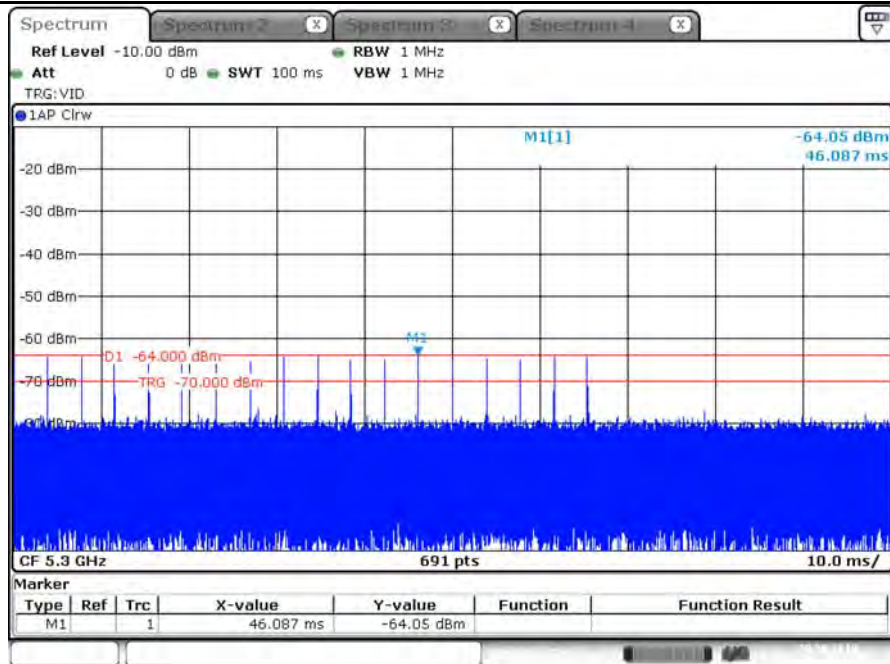
W53 band (5250-5350 MHz)

Radar #1 DFS detection threshold level and the burst of pulses on the Channel frequency

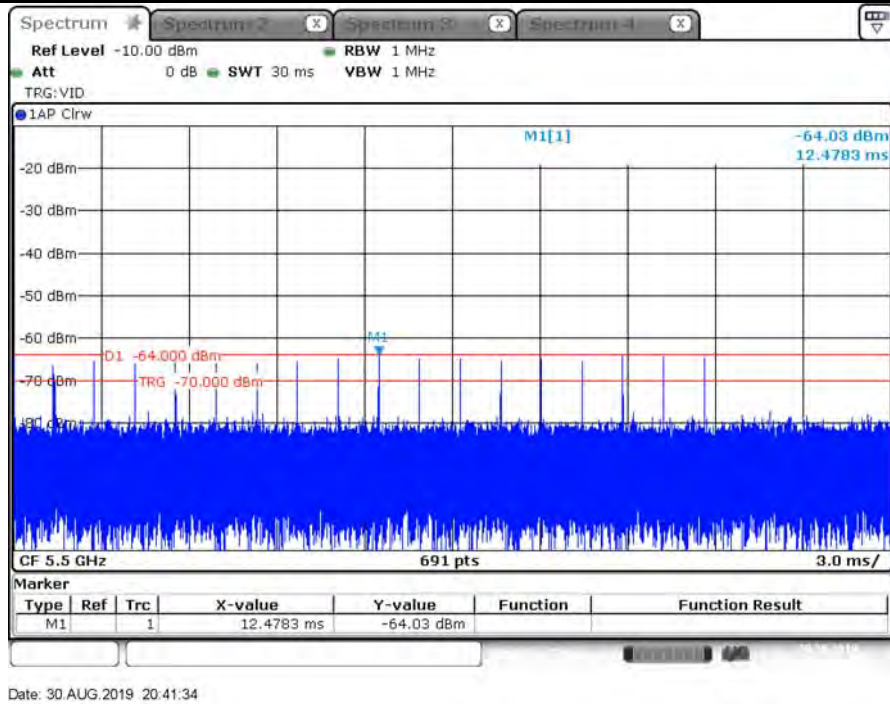
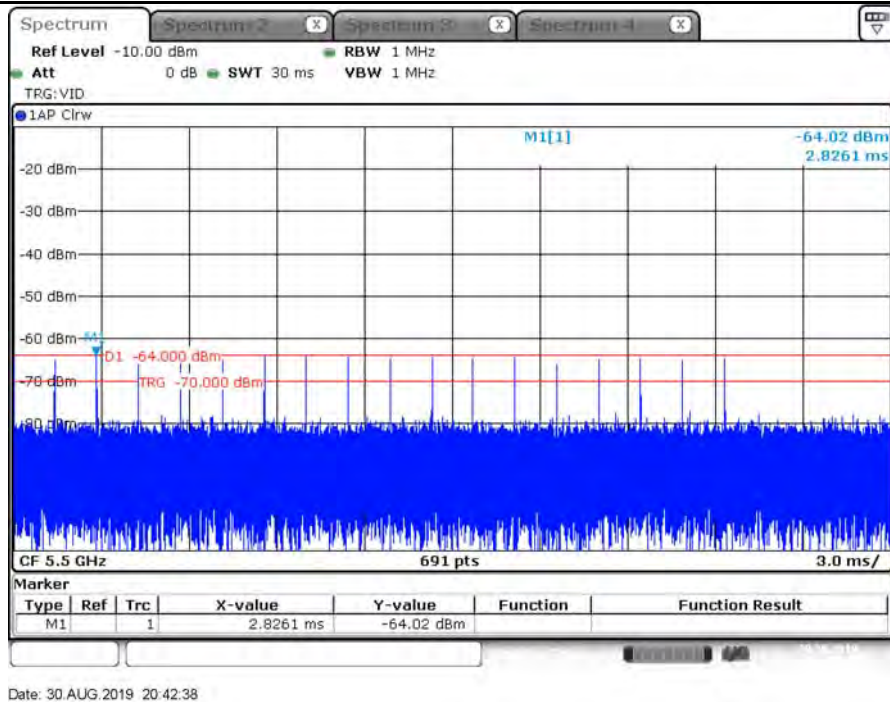


Date: 30 AUG. 2019 20:39:00

Radar #2 DFS detection threshold level and the burst of pulses on the Channel frequency

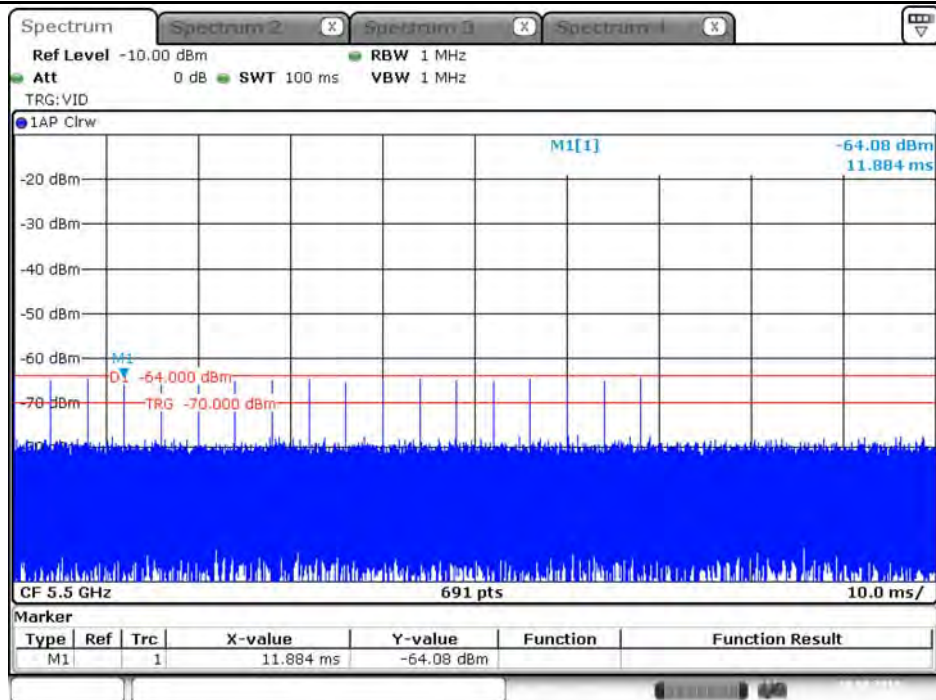


Date: 30 AUG. 2019 20:39:52

W56 band (5470-5725 MHz)
Radar #1 DFS detection threshold level and the burst of pulses on the Channel frequency

Radar #2 DFS detection threshold level and the burst of pulses on the Channel frequency


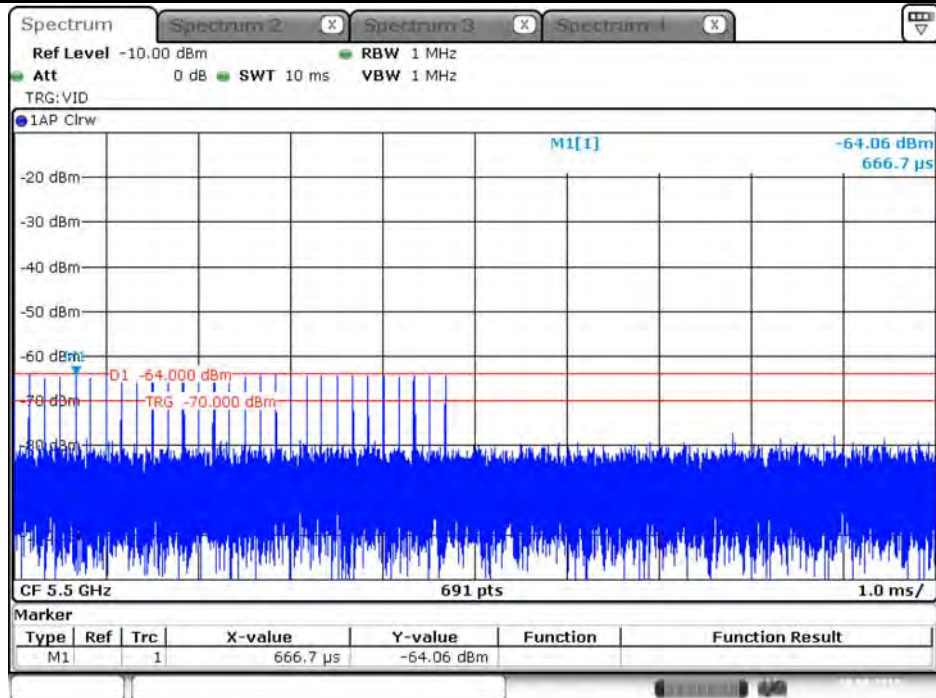


Radar #3 DFS detection threshold level and the burst of pulses on the Channel frequency

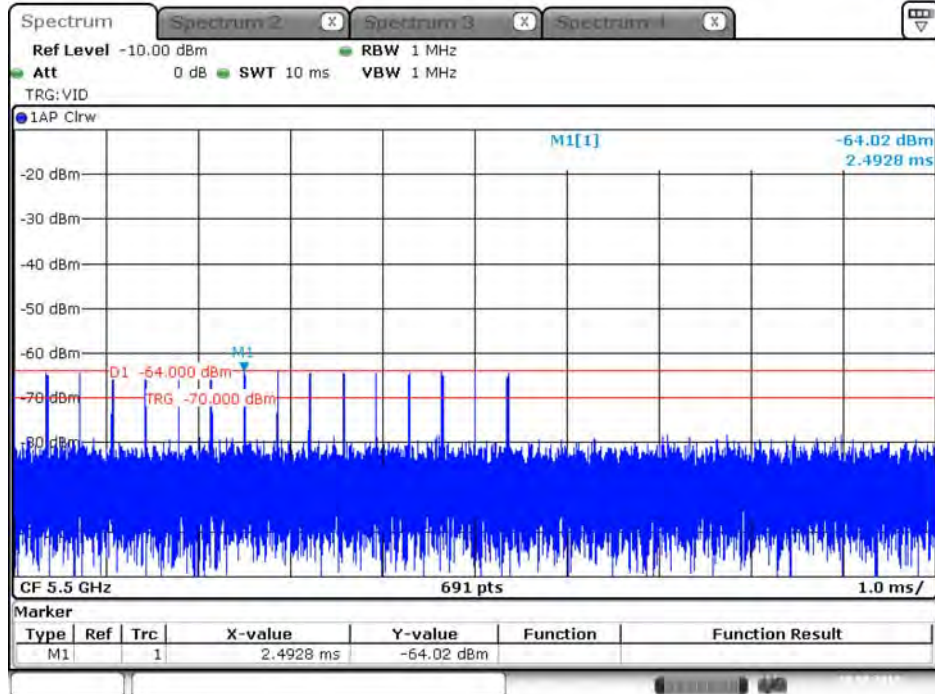


Date: 30.AUG.2019 20:43:25

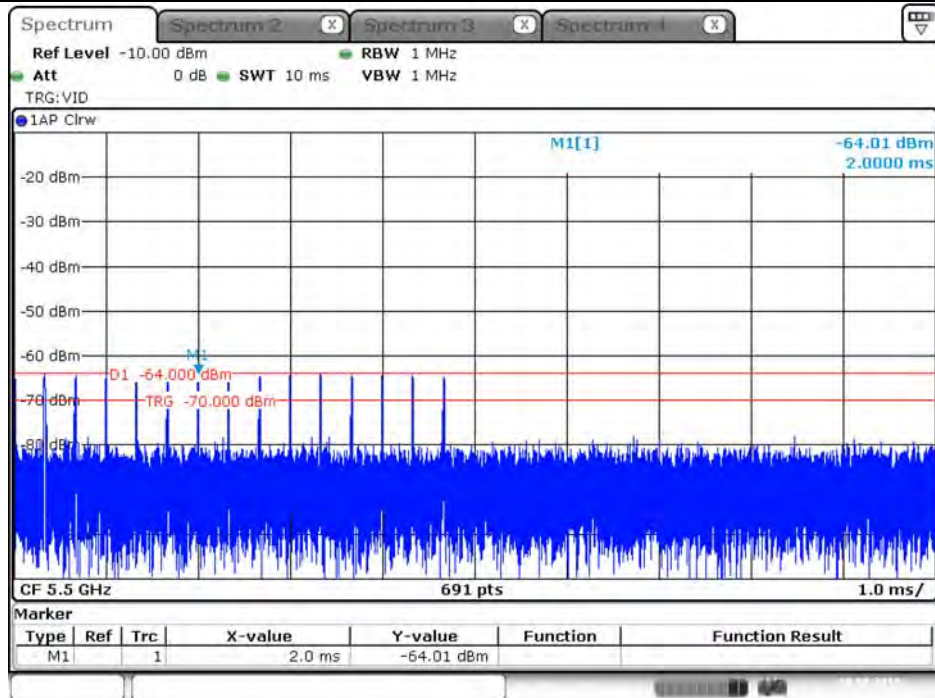
Radar #4 DFS detection threshold level and the burst of pulses on the Channel frequency



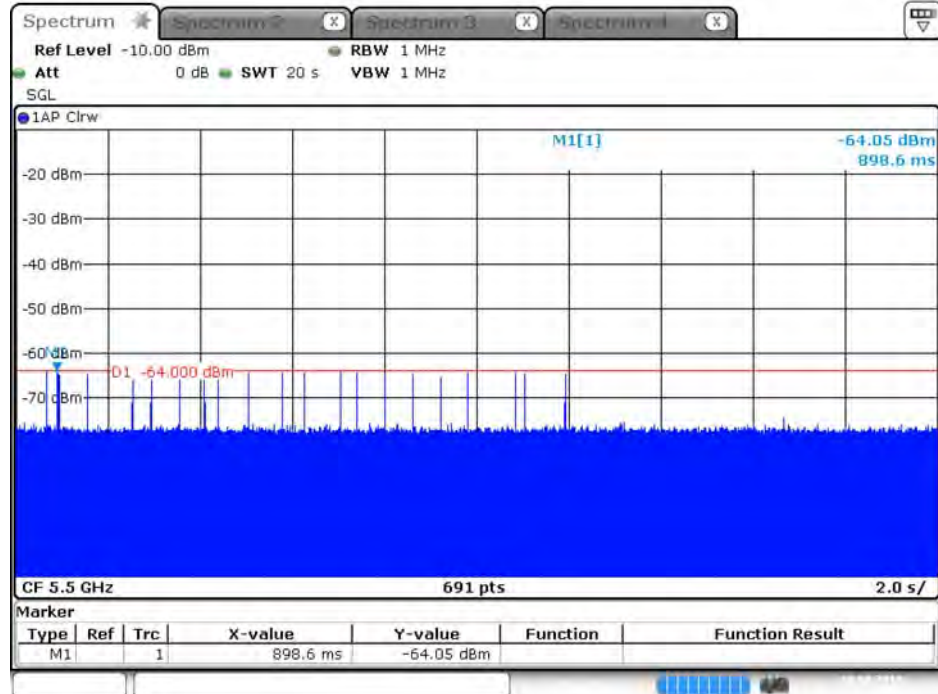
Date: 30.AUG.2019 20:44:27

Radar #5 DFS detection threshold level and the burst of pulses on the Channel frequency


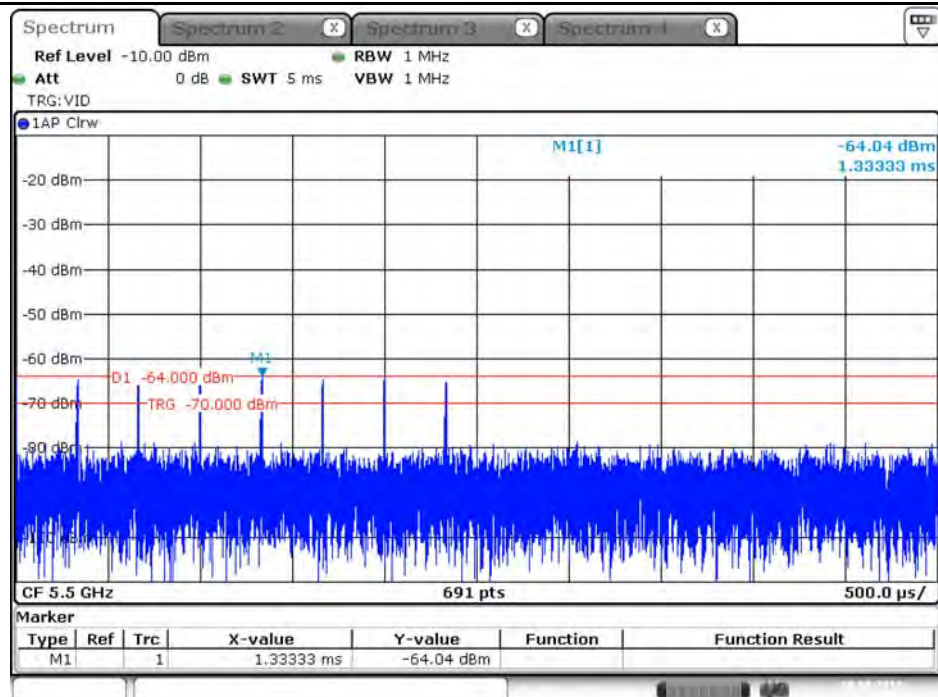
Date: 30.AUG.2019 20:45:16

Radar #6 DFS detection threshold level and the burst of pulses on the Channel frequency


Date: 30.AUG.2019 20:46:22

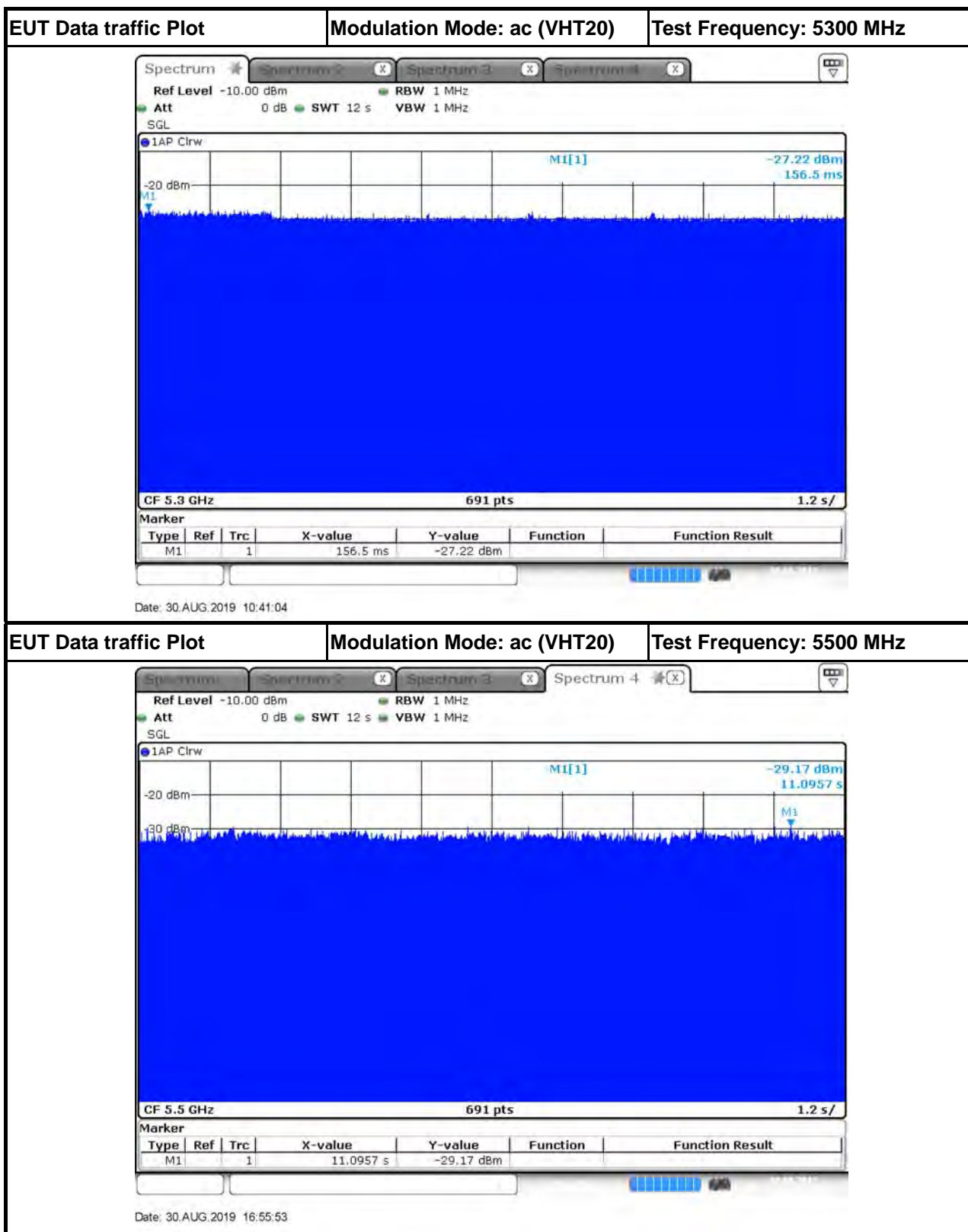
Radar #7 DFS detection threshold level and the burst of pulses on the Channel frequency


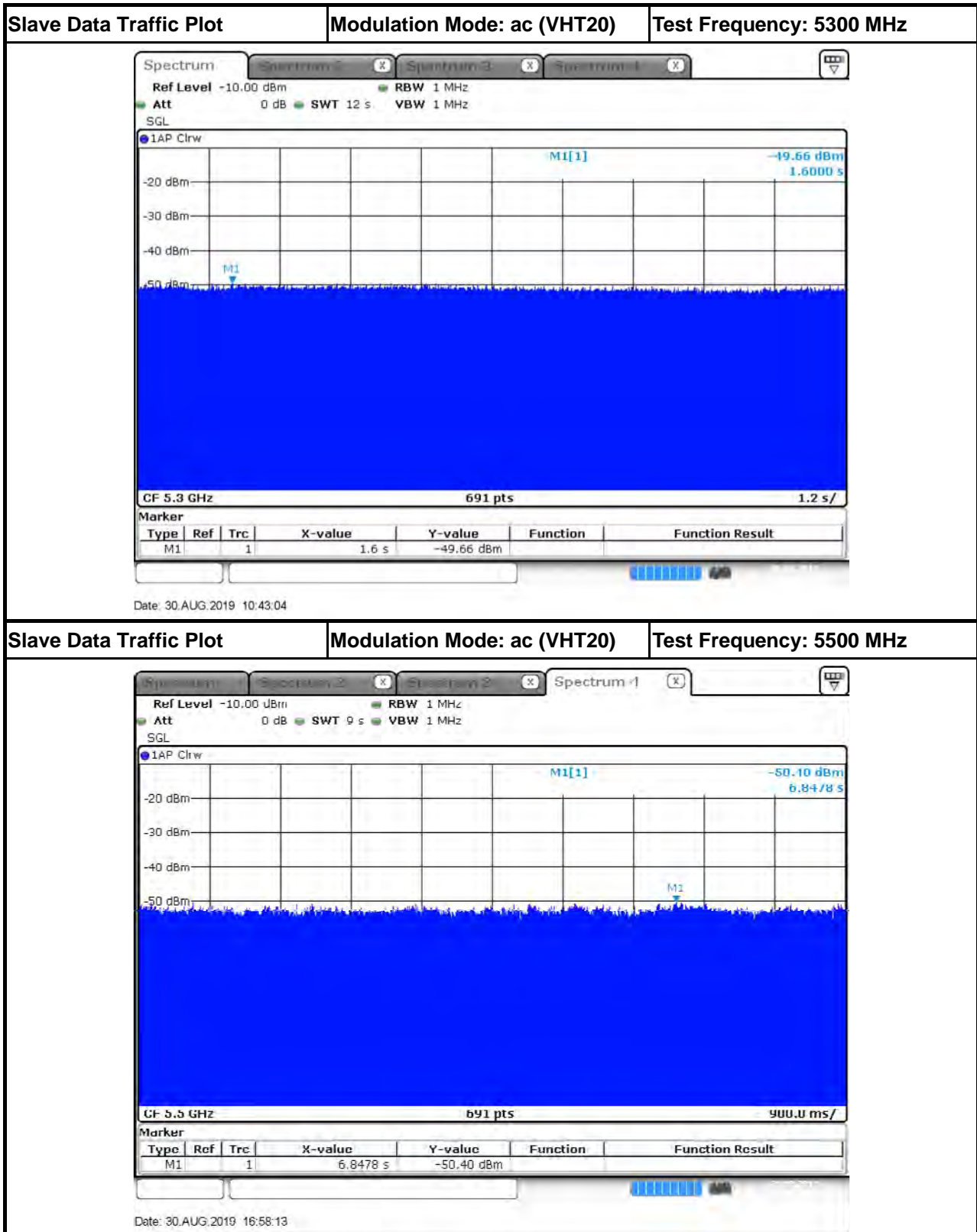
Date: 30.AUG.2019 20:48:21

Radar #8 DFS detection threshold level and a single hop (9 pulses) on the Channel frequency within UNII detection bandwidth.


Date: 30.AUG.2019 20:49:38

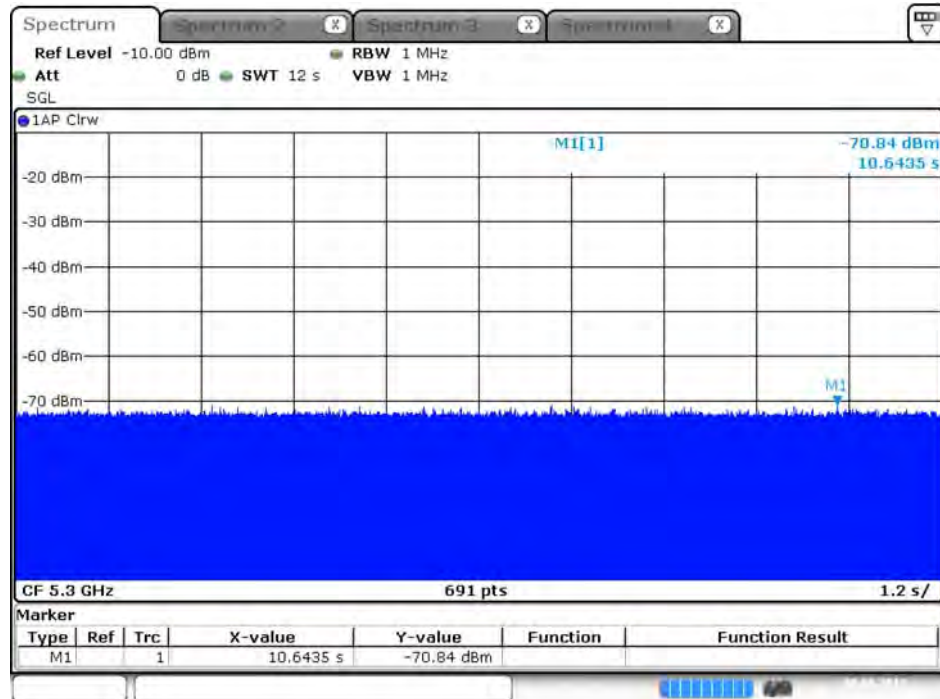
3.1.7 Data traffic Plot





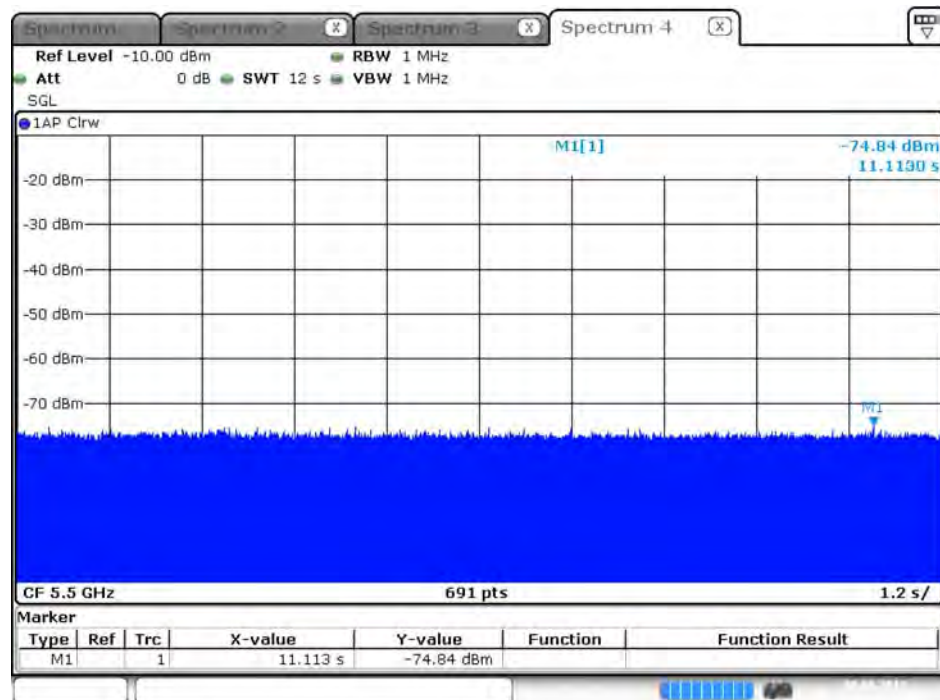


Without Data Traffic Plot Modulation Mode: ac (VHT20) Test Frequency: 5300 MHz



Date: 30.AUG.2019 10:42:29

Without Data Traffic Plot Modulation Mode: ac (VHT20) Test Frequency: 5500 MHz



Date: 30.AUG.2019 16:56:45

3.2 Channel Availability Check (CAC)

3.2.1 Channel Availability Check Limit

Channel Availability Check Limit	
<input checked="" type="checkbox"/>	The EUT shall perform a Channel Availability Check to ensure that there is no radar operating on the channel. After power-up sequence, receive at least 1 minute (60 sec) on the intended operating frequency.

3.2.2 Measuring Instruments

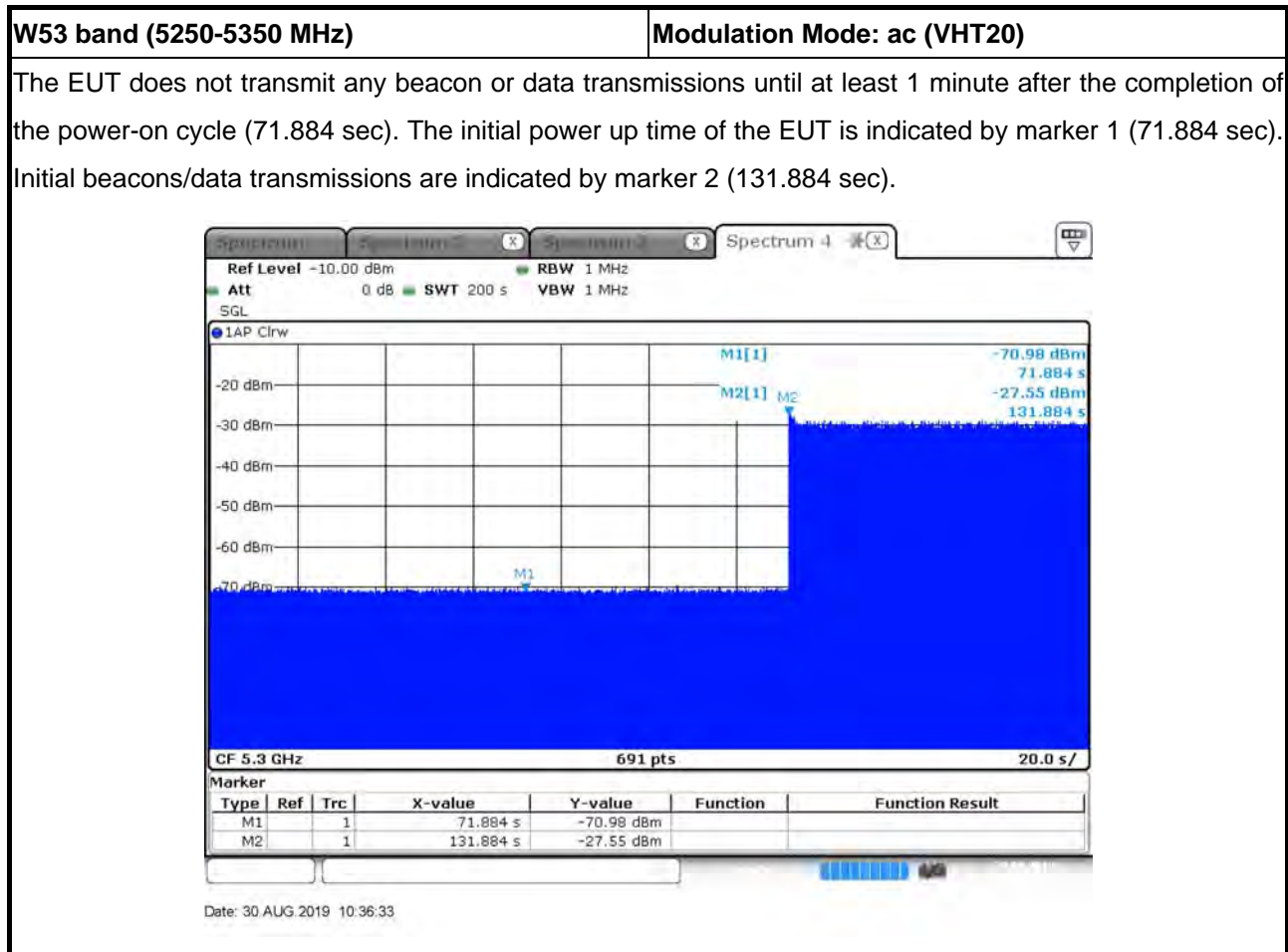
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method for W53	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/26.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/26.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/26.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/26.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/26.6

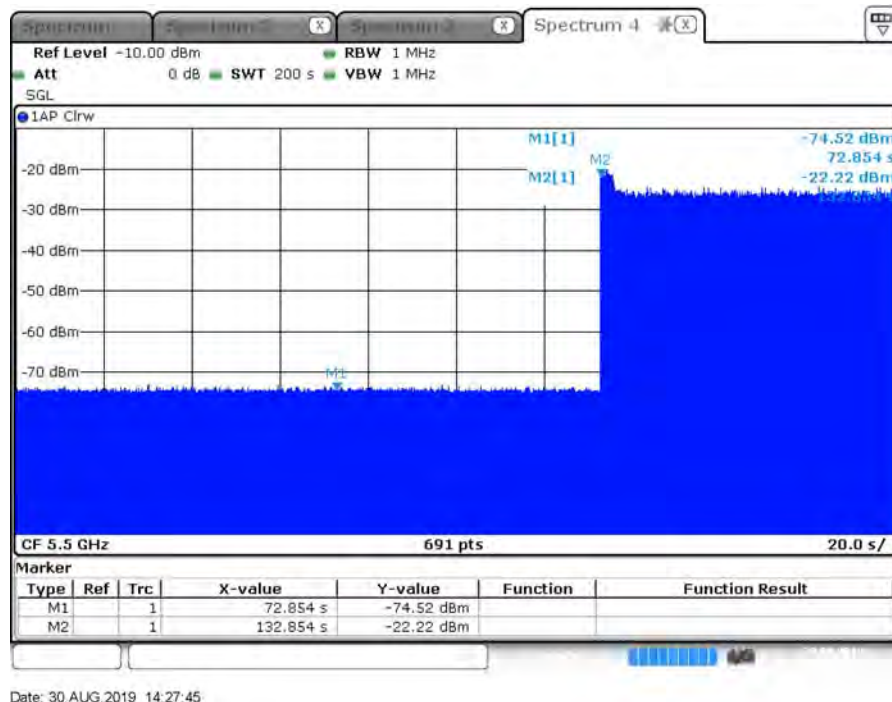
Test Method for W56	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/27.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/27.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/27.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/27.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/27.6

3.2.4 Radar Detection Threshold (Initial Channel Availability Check) Result



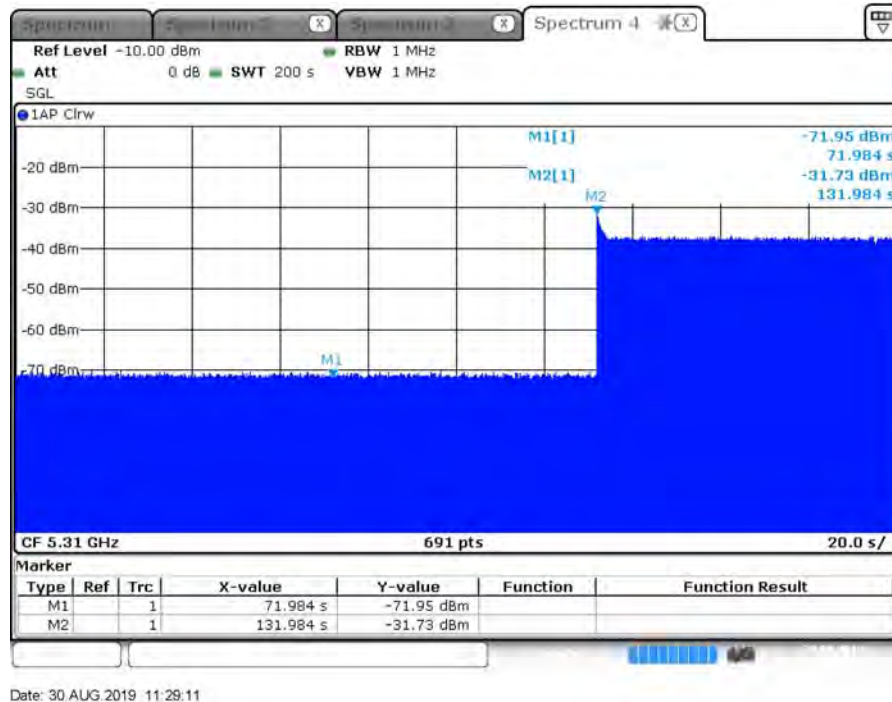
W56 band (5470-5725 MHz)
Modulation Mode: ac (VHT20)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (72.85 sec). The initial power up time of the EUT is indicated by marker 1 (72.854 sec). Initial beacons/data transmissions are indicated by marker 2 (132.854 sec).



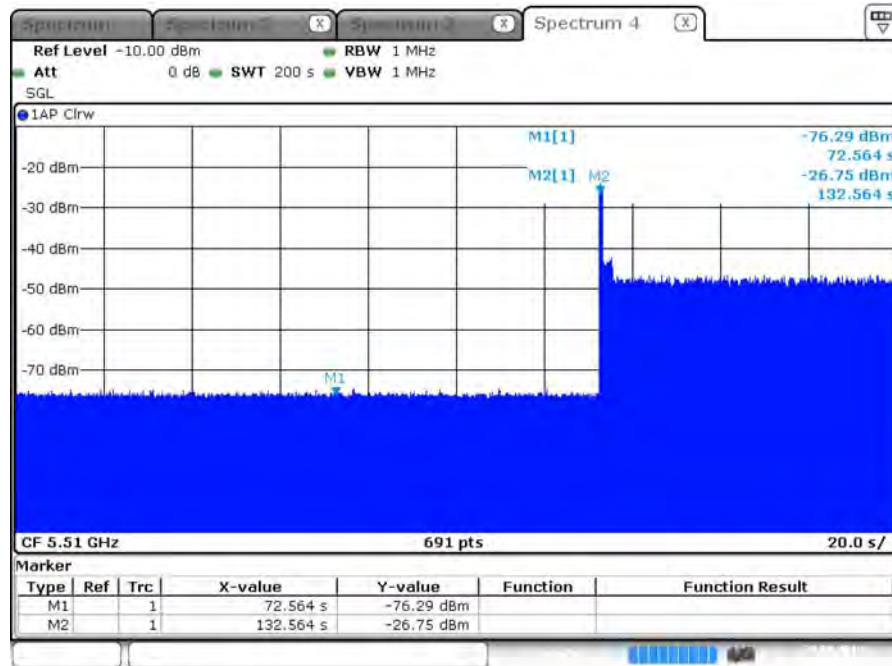
W53 band (5250-5350 MHz)
Modulation Mode: ac (VHT40)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (71.984 sec). The initial power up time of the EUT is indicated by marker 1 (71.984 sec). Initial beacons/data transmissions are indicated by marker 2 (131.984 sec).



W56 band (5470-5725 MHz)
Modulation Mode: ac (VHT40)

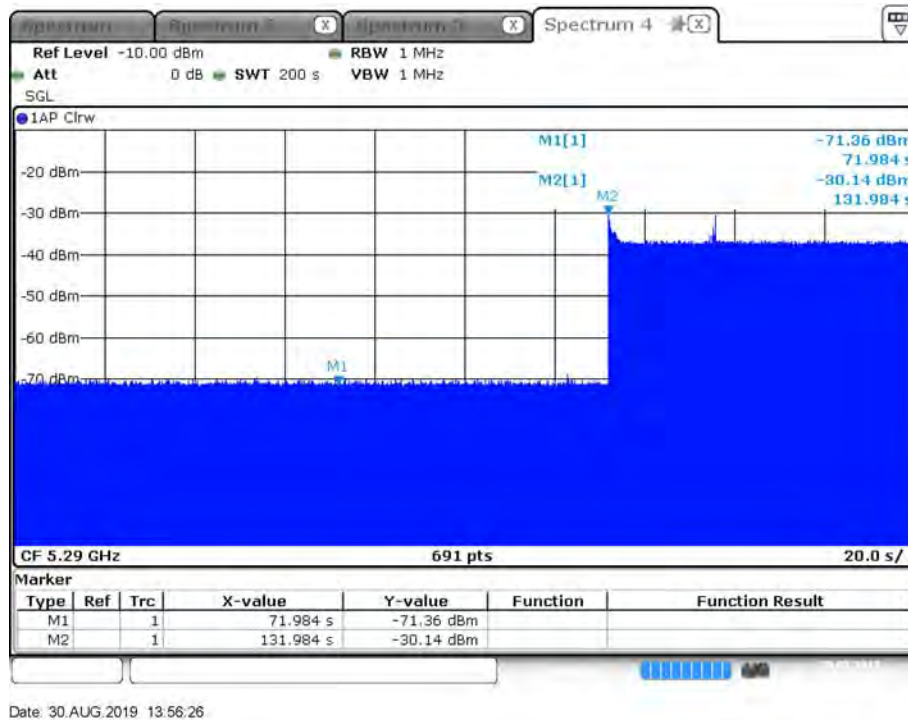
The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (72.564 sec). The initial power up time of the EUT is indicated by marker 1 (72.564 sec). Initial beacons/data transmissions are indicated by marker 2 (132.564 sec).



Date: 30 AUG 2019 15:21:13

W53 band (5250-5350 MHz)
Modulation Mode: ac (VHT80)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (71.984 sec). The initial power up time of the EUT is indicated by marker 1 (71.984 sec). Initial beacons/data transmissions are indicated by marker 2 (131.984 sec).

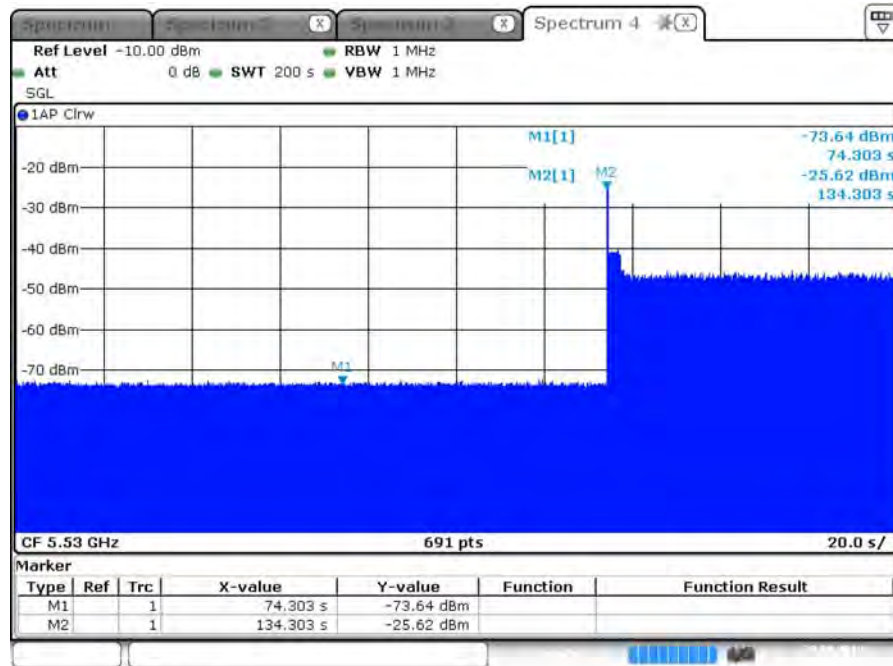




W56 band (5470-5725 MHz)

Modulation Mode: ac (VHT80)

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (74.303 sec). The initial power up time of the EUT is indicated by marker 1 (74.303 sec). Initial beacons/data transmissions are indicated by marker 2 (134.303 sec).



Date: 30 AUG 2019 16:17:02

3.2.5 Radar Detection Threshold (during the Channel Availability Check) Result

Radar Detection Threshold (during the Channel Availability Check) Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 4)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT20)	5300	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
ac (VHT20)	5500	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
		3 - Fixed	4	100	100
		4 - Variable	4	100	100
		5 - Variable	4	100	100
		6 - Variable	4	100	100
		7 - Chirp	4	100	100
		8 - Hopping	4	100	100
Result		PASS			

Radar Detection Threshold (during the Channel Availability Check) Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 4)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT40)	5310	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
ac (VHT40)	5510	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
		3 - Fixed	4	100	100
		4 - Variable	4	100	100
		5 - Variable	4	100	100
		6 - Variable	4	100	100
		7 - Chirp	4	100	100
		8 - Hopping	4	100	100
Result		PASS			

Radar Detection Threshold (during the Channel Availability Check) Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 4)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT80)	5290	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
ac (VHT80)	5530	1 - Fixed	4	100	100
		2 - Fixed	4	100	100
		3 - Fixed	4	100	100
		4 - Variable	4	100	100
		5 - Variable	4	100	100
		6 - Variable	4	100	100
		7 - Chirp	4	100	100
		8 - Hopping	4	100	100
Result		PASS			

3.3 In-service Monitoring

3.3.1 In-service Monitoring Limit

In-service Monitoring Limit	
<input checked="" type="checkbox"/>	The <i>In-Service Monitoring</i> shall be used to monitor an <i>Operating Channel</i> .
<input checked="" type="checkbox"/>	The <i>In-Service-Monitoring</i> shall start immediately after the EUT has started transmissions on a channel. During the <i>In-Service Monitoring</i> , the EUT shall be capable of detecting any of the radar test signals that fall within the started transmissions ranges and with a level above the <i>Radar Detection Threshold</i> .
<input checked="" type="checkbox"/>	The minimum required detection probability is defined in clause 3.1.1 DFS Parameters.

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method for W53	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/26.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/26.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/26.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/26.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/26.6

Test Method for W56	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/27.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/27.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/27.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/27.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/27.6

3.3.4 Test Result of In-service Monitoring

In-service Monitoring Result					
Detection Threshold Level (dBm)			-64 (DFS Detection Threshold)		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT20)	5300	1 - Fixed	18	90	60
		2 - Fixed	18	90	60
ac (VHT20)	5500	1 - Fixed	18	90	60
		2 - Fixed	19	95	60
		3 - Fixed	18	90	60
		4 - Variable	18	90	60
		5 - Variable	19	95	60
		6 - Variable	18	90	60
		7 - Chirp	18	90	80
		8 - Hopping	19	95	70
Result		PASS			

In-service Monitoring Result					
Detection Threshold Level (dBm)			-64 (DFS Detection Threshold)		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT40)	5310	1 - Fixed	19	95	60
		2 - Fixed	18	90	60
ac (VHT40)	5510	1 - Fixed	18	90	60
		2 - Fixed	19	95	60
		3 - Fixed	18	90	60
		4 - Variable	17	85	60
		5 - Variable	18	90	60
		6 - Variable	19	95	60
		7 - Chirp	18	90	80
		8 - Hopping	19	95	70
Result		PASS			

In-service Monitoring Result					
Detection Threshold Level (dBm)			-64 (DFS Detection Threshold)		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT80)	5290	1 - Fixed	19	95	60
		2 - Fixed	18	90	60
ac (VHT80)	5530	1 - Fixed	18	90	60
		2 - Fixed	18	90	60
		3 - Fixed	19	95	60
		4 - Variable	18	90	60
		5 - Variable	18	90	60
		6 - Variable	19	95	60
		7 - Chirp	18	90	80
		8 - Hopping	19	95	70
Result		PASS			



In-service Monitoring Result				
Detection Threshold Level (dBm)			-64 (DFS Detection Threshold)	
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Detection Probability (%)	Detection Probability Limit (%)
ac (VHT20)	5500	1 - Fixed	90	60
		2 - Fixed	95	
		3 - Fixed	90	
		4 - Variable	90	
		5 - Variable	95	
		6 - Variable	90	
		Total	92	80
ac (VHT40)	5510	1 - Fixed	90	60
		2 - Fixed	95	
		3 - Fixed	90	
		4 - Variable	85	
		5 - Variable	90	
		6 - Variable	95	
		Total	91	80
ac (VHT80)	5530	1 - Fixed	90	60
		2 - Fixed	90	
		3 - Fixed	95	
		4 - Variable	90	
		5 - Variable	90	
		6 - Variable	95	
		Total	92	80
Result		PASS		

3.4 Channel Shutdown and Non-Occupancy Period

3.4.1 Channel Shutdown and Non-Occupancy Period Limit

Channel Shutdown and Non-Occupancy Period Limit	
Channel Move Time	10 sec
Channel Closing Transmission Time	260 ms in Channel Move Time 10 sec period.
Non-occupancy period	Minimum 30 minutes

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method for W53	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/26.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/26.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/26.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/26.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/26.6

Test Method for W56	
Measuring Equipment Conditions	MIC Notice No.88 Appendix No.45, clause 13.2/27.2
Conditions of Equipment under Test	MIC Notice No.88 Appendix No.45, clause 13.3/27.3
Measuring Operation Procedures	MIC Notice No.88 Appendix No.45, clause 13.4/27.4
Presentation of Results	MIC Notice No.88 Appendix No.45, clause 13.5/27.5
Other Conditions	MIC Notice No.88 Appendix No.45, clause 13.6/27.6

3.4.4 Test Result of Channel Shutdown

Channel Shutdown and Non-Occupancy Period Result				
Detection Threshold Level (dBm)			-64	
Modulation Mode	Freq. (MHz)	Radar Test Signal	Channel Closing Transmission Time (ms)	Channel Move Time (s)
ac (VHT20)	5300	1 - Fixed	26.086	0.400
ac (VHT20)	5500	2 - Fixed	28.985	0.417
ac (VHT40)	5310	1 - Fixed	26.086	0.487
ac (VHT40)	5510	2 - Fixed	20.289	0.452
ac (VHT80)	5290	1 - Fixed	20.289	0.469
ac (VHT80)	5530	2 - Fixed	20.289	0.452
Limit			260 ms	10 sec
Result			PASS	

3.4.5 Channel Shutdown Plots

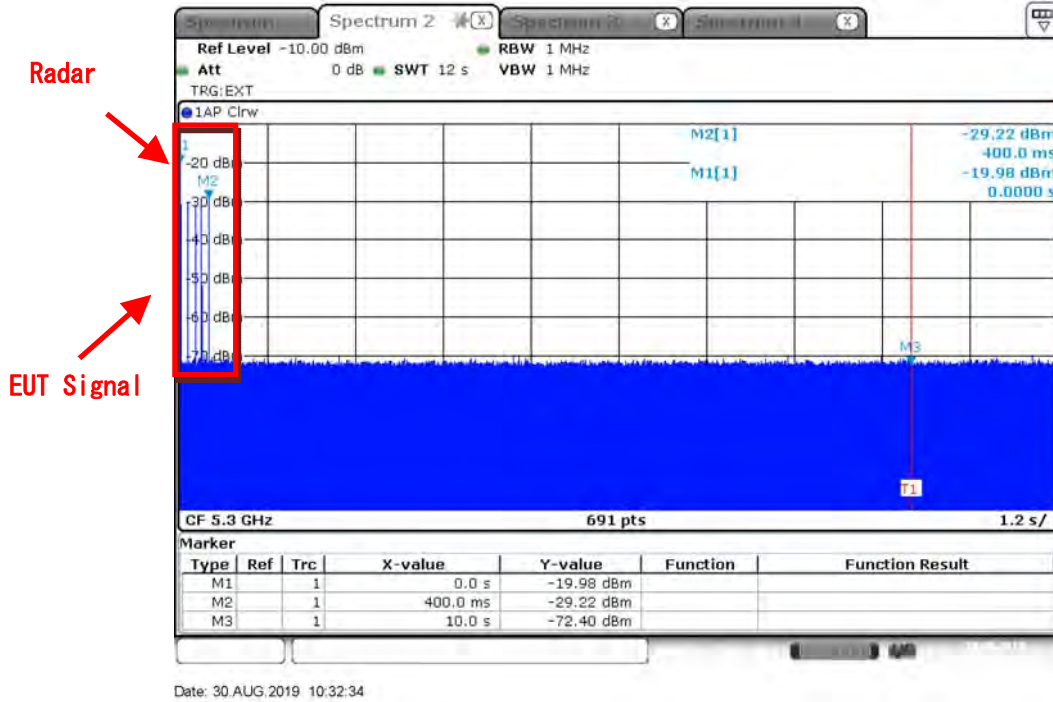
W53 band (5250-5350 MHz)

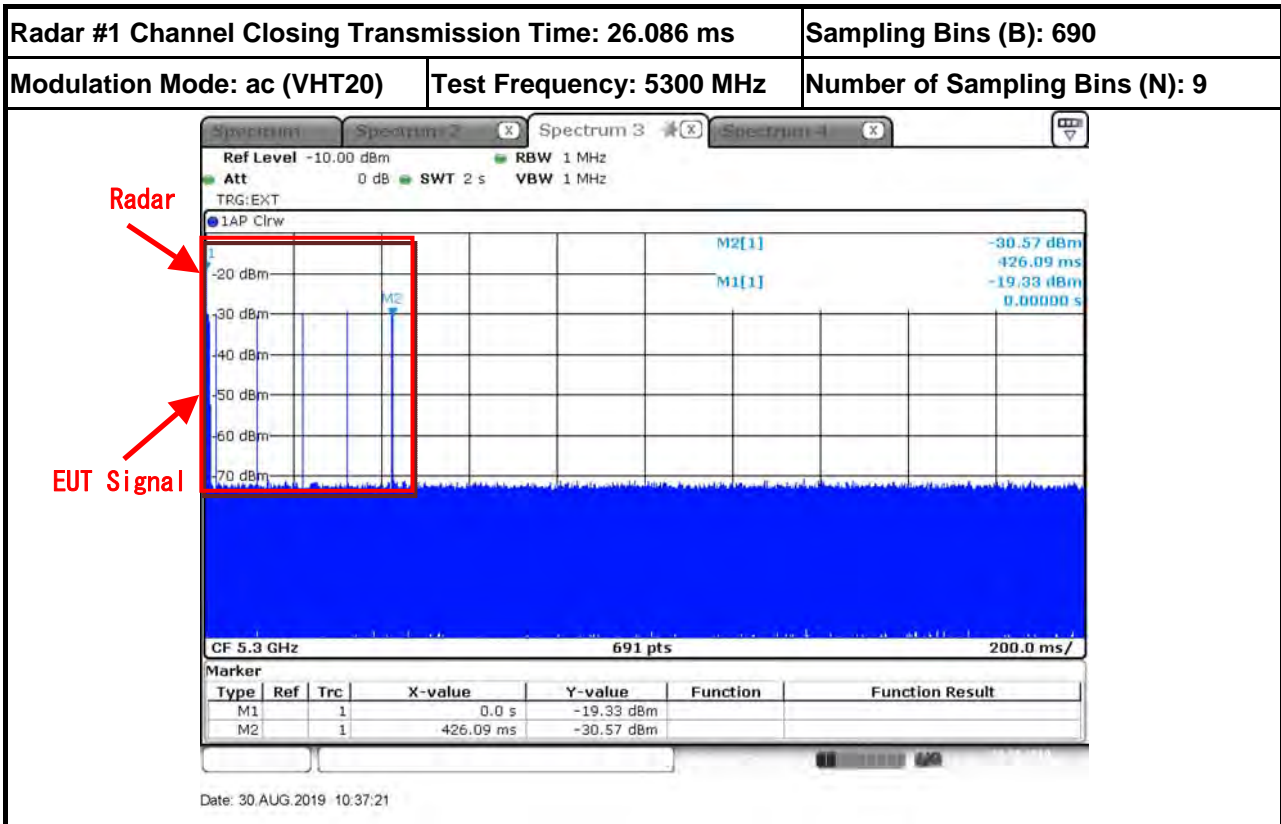
Radar #1 Channel Move Time: < 10 sec

Modulation Mode: ac (VHT20)

Test Frequency: 5300 MHz

Channel Move Time: 0.400 s





R&S
Agilent

VISA session

1/0 GPIB0::20: ▼

Threshold (dBm)

-65

Marker 1 (sec)

0

Space Time of Point

0.002899

No. of Pulse

9

Mean Level (dBm)

-30.29

Marker 2 (sec)

2

Mark 1 Point

1

Close TX Time(sec)

26.086957m

RMS Level (dBm)

-30.25

Total Trace of Points

691

Mark 2 Point

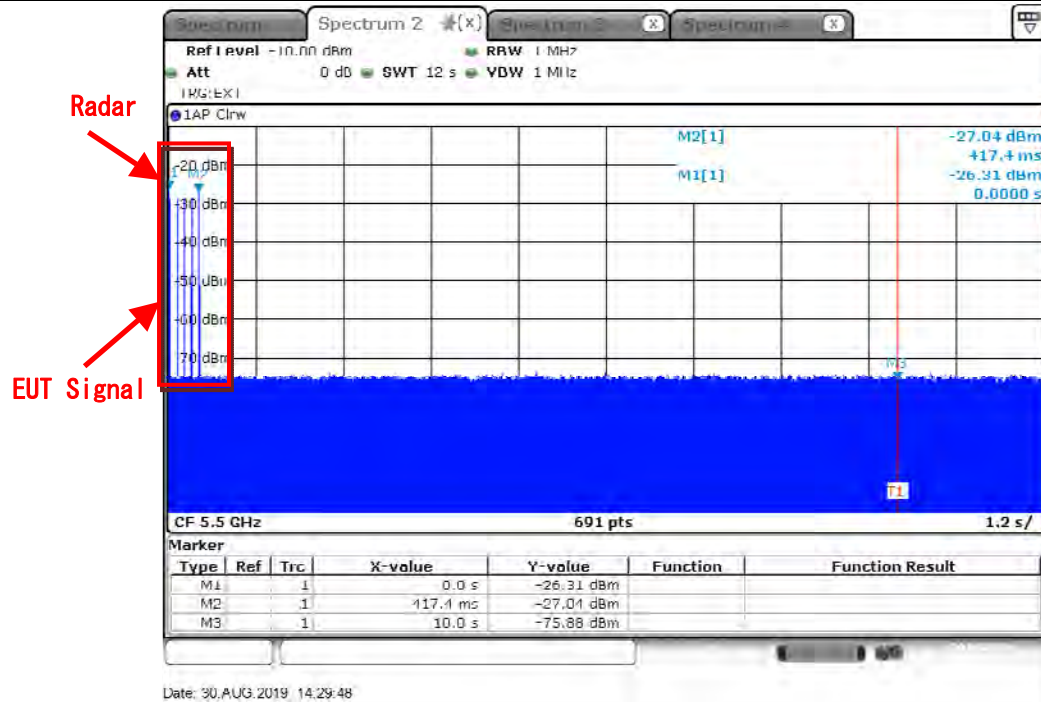
691

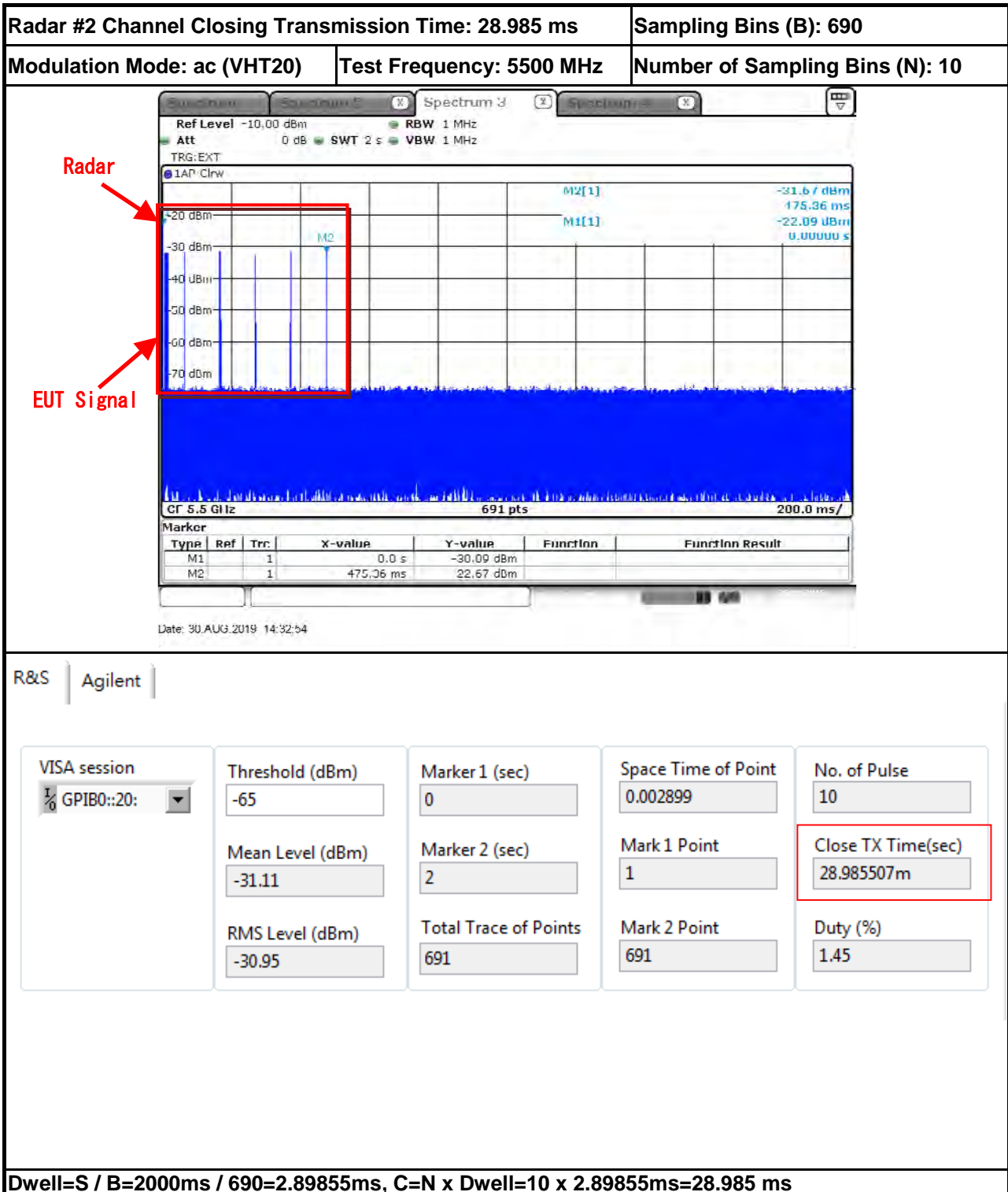
Duty (%)

1.3

Dwell=S / B=2000ms / 690=2.89855ms, C=N x Dwell=9 x 2.89855ms=26.086 ms

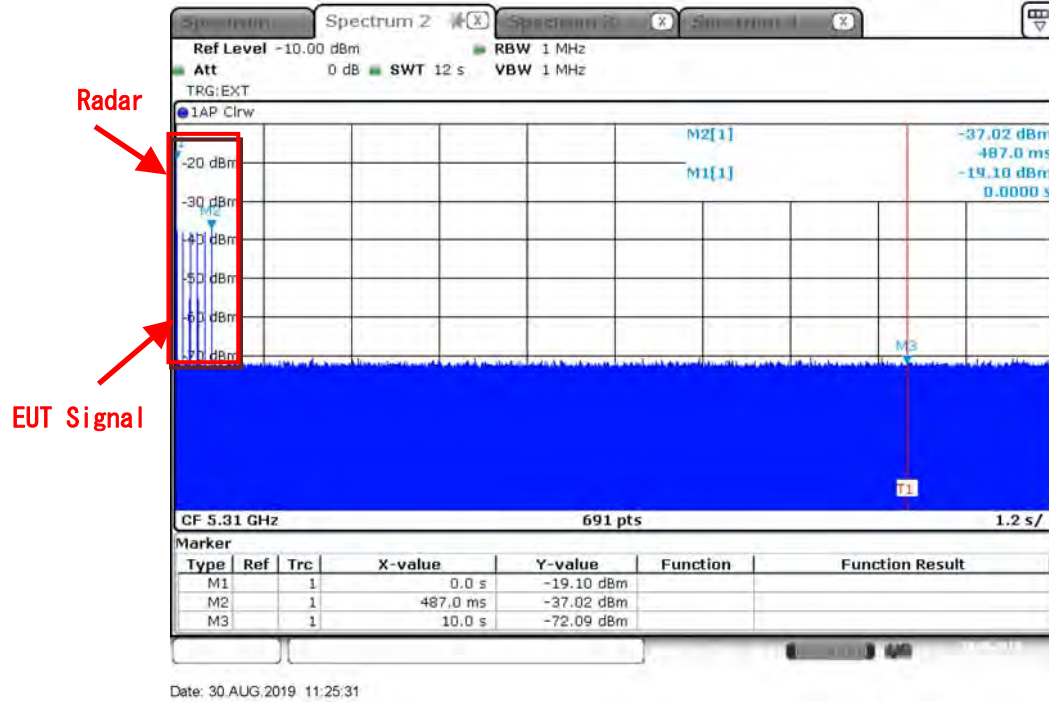
Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.
The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1)
where N is the number of spectrum analyzer sampling bins.

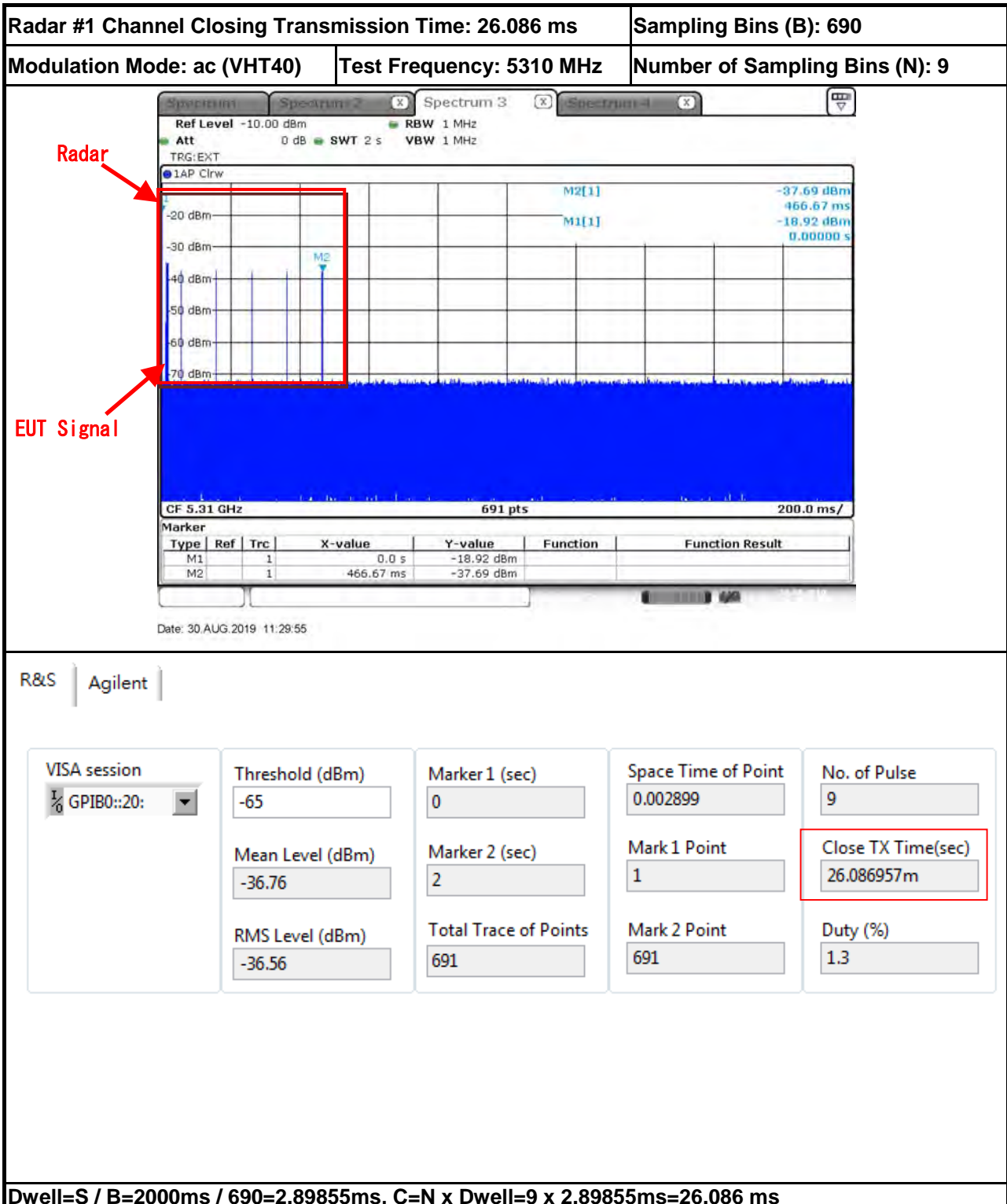
W56 band (5470-5725 MHz)
Radar #2 Channel Move Time: < 10 sec
Modulation Mode: ac (VHT20)
Test Frequency: 5500 MHz
Channel Move Time: 0.417 s




Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.

The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1) where N is the number of spectrum analyzer sampling bins.

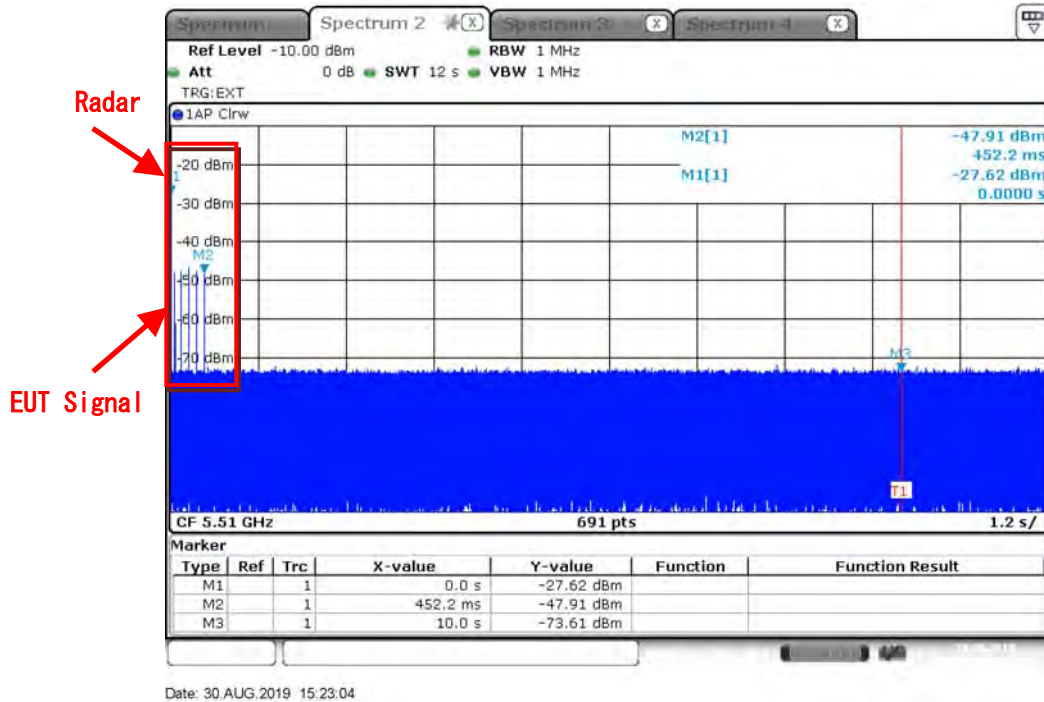
W53 band (5250-5350 MHz)
Radar #1 Channel Move Time: < 10 sec
Modulation Mode: ac (VHT40)
Test Frequency: 5310 MHz
Channel Move Time: 0.487 s




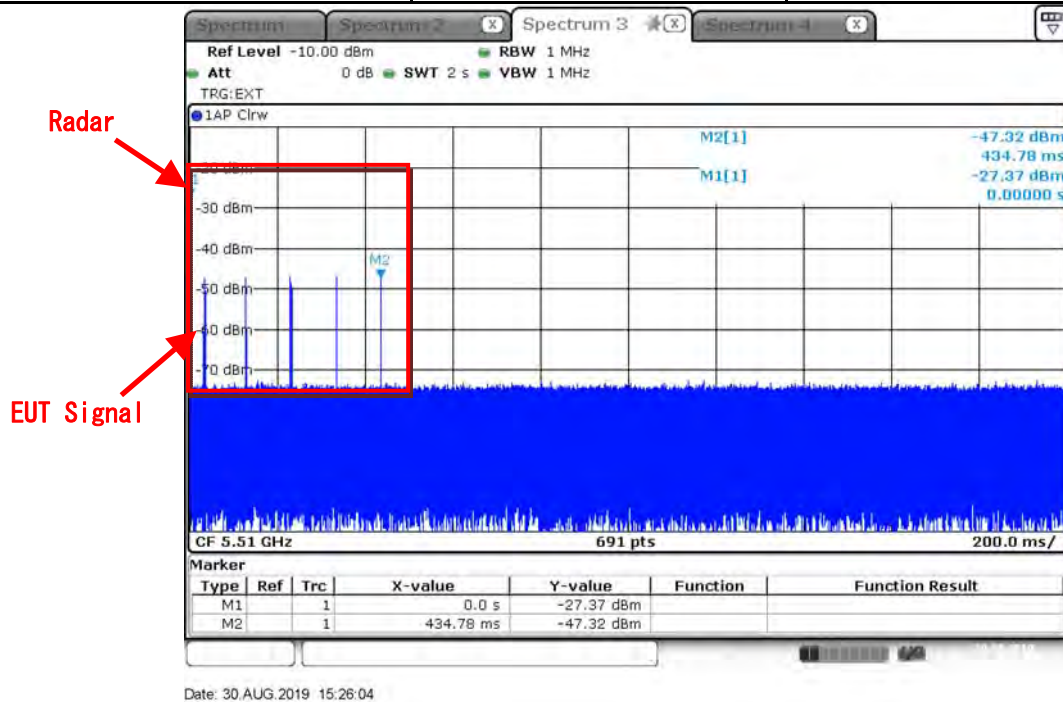
Dwell=S / B=2000ms / 690=2.89855ms, C=N x Dwell=9 x 2.89855ms=26.086 ms

Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.

The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1)
where N is the number of spectrum analyzer sampling bins.

W56 band (5470-5725 MHz)
Radar #2 Channel Move Time: < 10 sec
Modulation Mode: ac (VHT40)
Test Frequency: 5510 MHz
Channel Move Time: 0.452 s


Radar #2 Channel Closing Transmission Time: 20.289 ms		Sampling Bins (B): 690
Modulation Mode: ac (VHT40)	Test Frequency: 5510 MHz	Number of Sampling Bins (N): 7

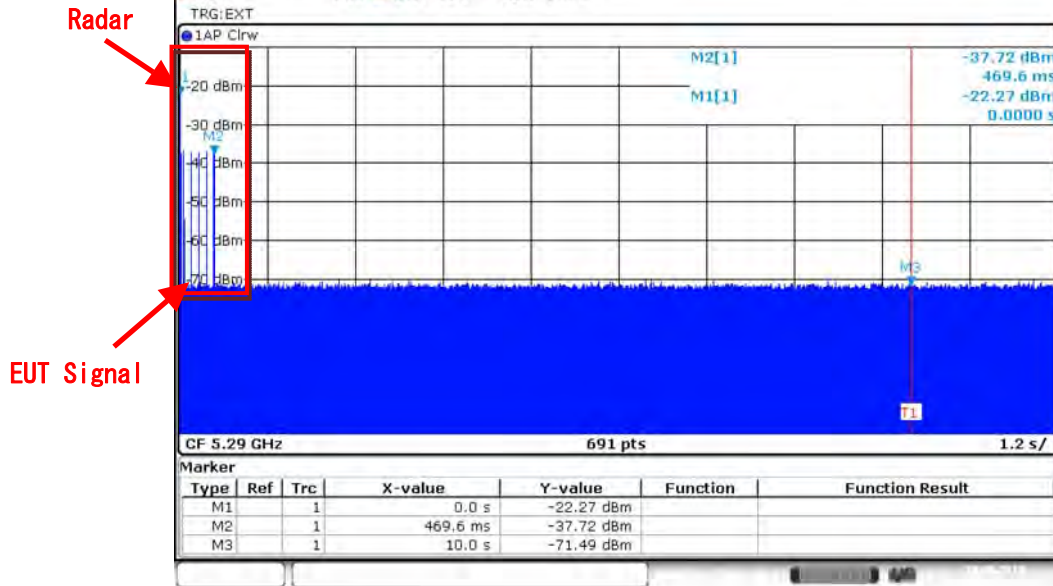


R&S		Agilent	
VISA session 1 GPIB0::20:		Threshold (dBm) -65	Marker 1 (sec) 0
		Mean Level (dBm) -47.81	Marker 2 (sec) 2
		RMS Level (dBm) -47.66	Total Trace of Points 691
		Space Time of Point 0.002899	No. of Pulse 7
		Mark 1 Point 1	Close TX Time(sec) 20.289855m
		Mark 2 Point 691	Duty (%) 1.01

Dwell=S / B=2000ms / 690=2.89855ms, C=N x Dwell=7 x 2.89855ms=20.289 ms

Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.

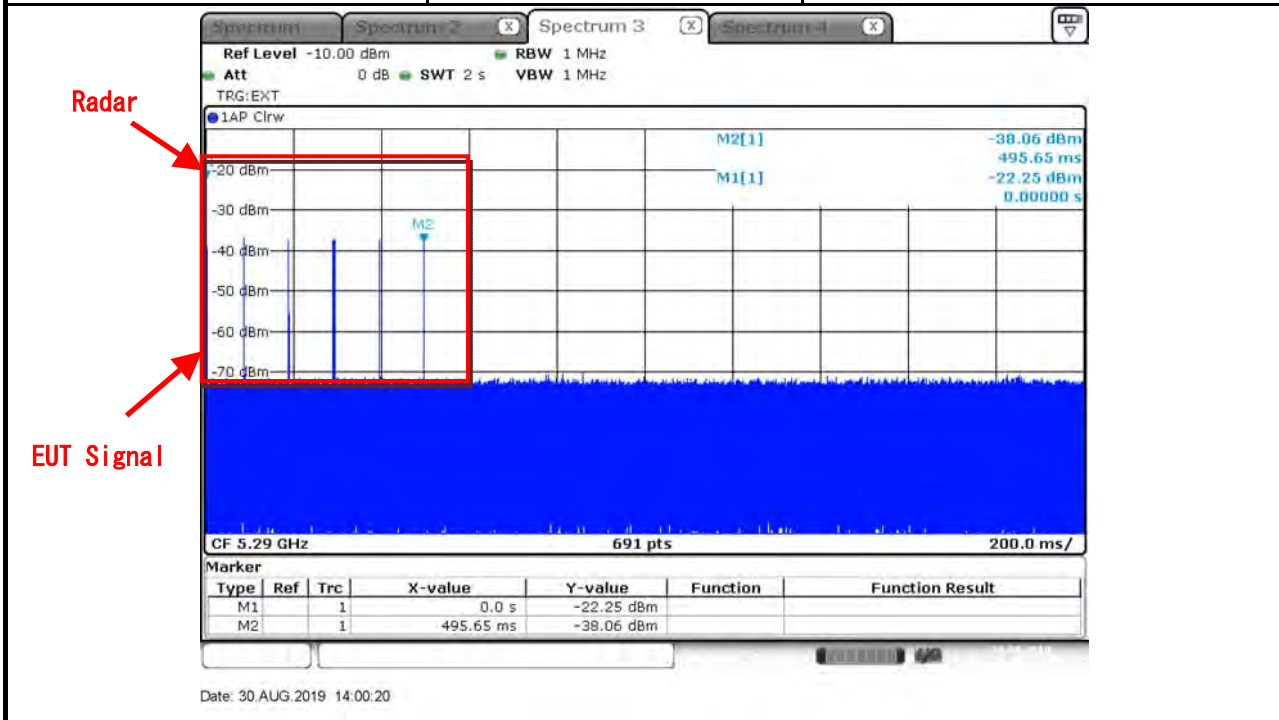
The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1) where N is the number of spectrum analyzer sampling bins.

W53 band (5250-5350 MHz)
Radar #1 Channel Move Time: < 10 sec
Modulation Mode: ac (VHT80)
Test Frequency: 5290 MHz
Channel Move Time: 0.469 s


Date: 30 AUG.2019 13:57:23



Radar #1 Channel Closing Transmission Time: 20.289 ms		Sampling Bins (B): 690
Modulation Mode: ac (VHT80)	Test Frequency: 5290 MHz	Number of Sampling Bins (N): 7

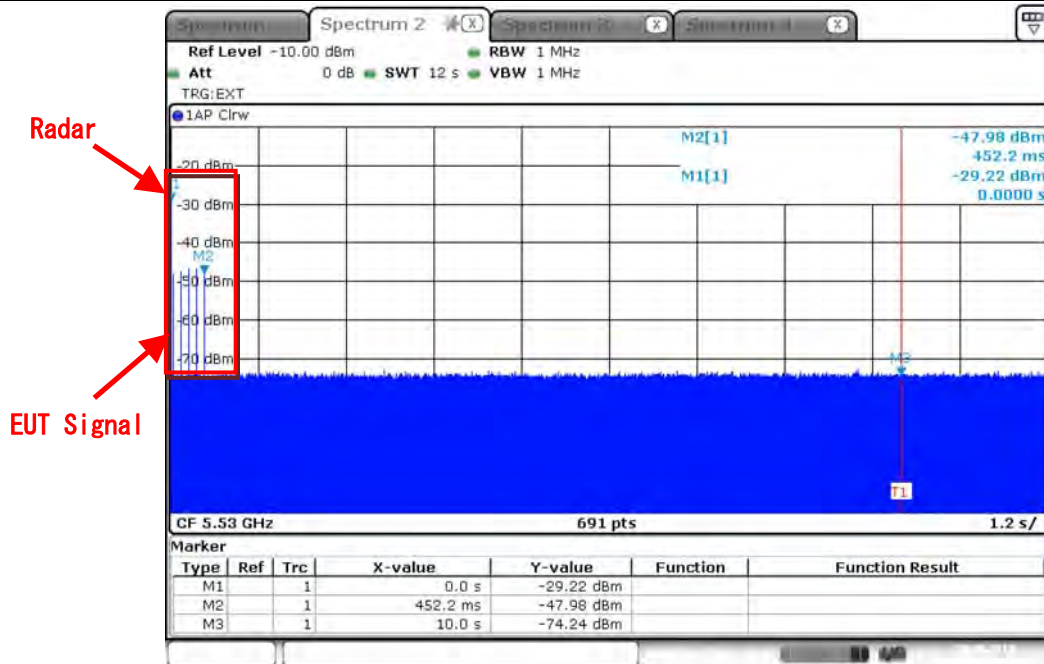


R&S Agilent

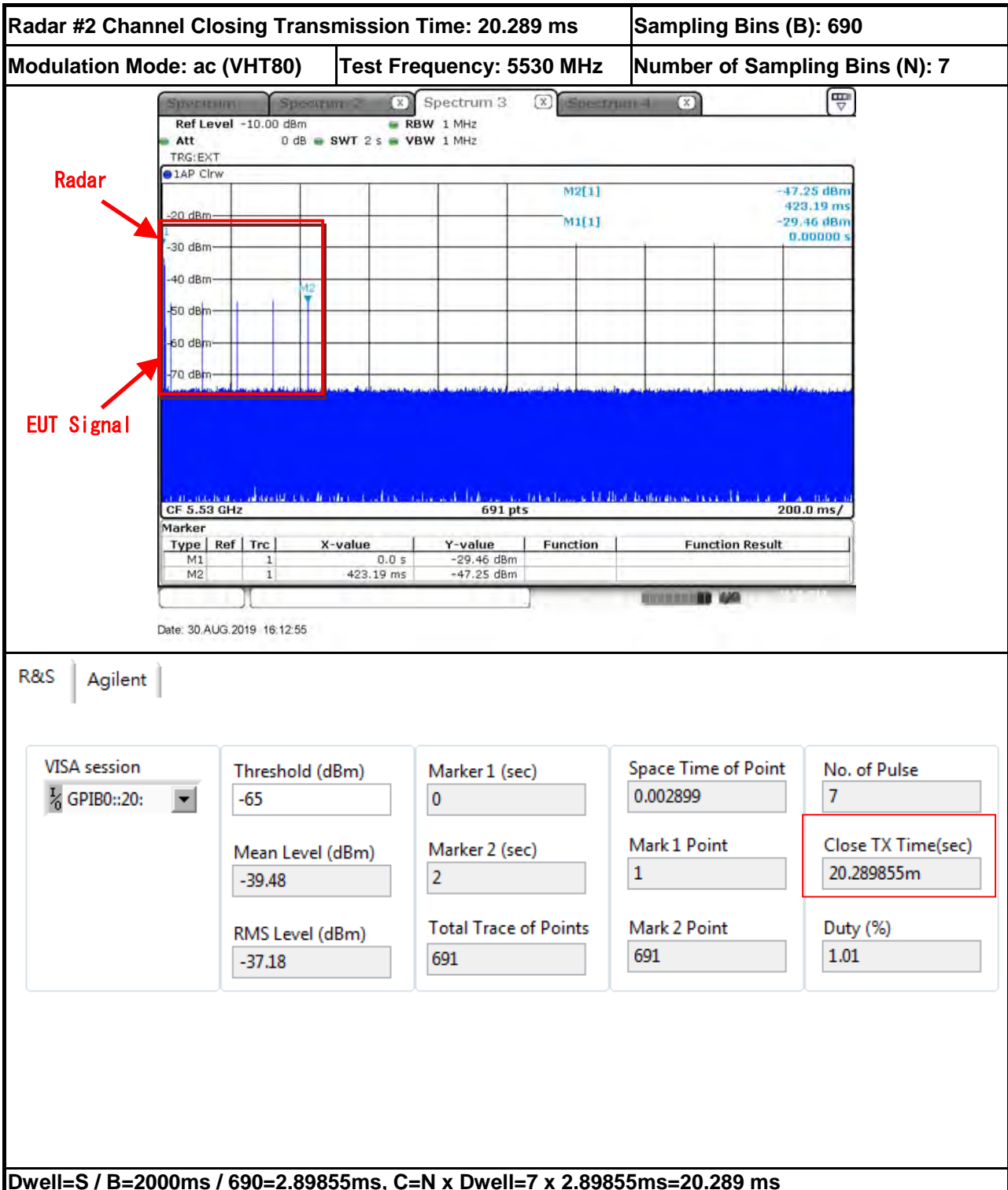
VISA session 1 GPIB0::20:	Threshold (dBm) -65	Marker 1 (sec) 0	Space Time of Point 0.002899	No. of Pulse 7
	Mean Level (dBm) -37.64	Marker 2 (sec) 2	Mark 1 Point 1	Close TX Time(sec) 20.289855m
	RMS Level (dBm) -37.59	Total Trace of Points 691	Mark 2 Point 691	Duty (%) 1.01

Dwell=S / B=2000ms / 690=2.89855ms, C=N x Dwell=7 x 2.89855ms=20.289 ms

Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.
The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1)
where N is the number of spectrum analyzer sampling bins.

W56 band (5470-5725 MHz)
Radar #2 Channel Move Time: < 10 sec
Modulation Mode: ac (VHT80)
Test Frequency: 5530 MHz
Channel Move Time: 0.452 s


Date: 30.AUG.2019 16:08:52



Dwell=S / B=2000ms / 690=2.89855ms, C=N x Dwell=7 x 2.89855ms=20.289 ms

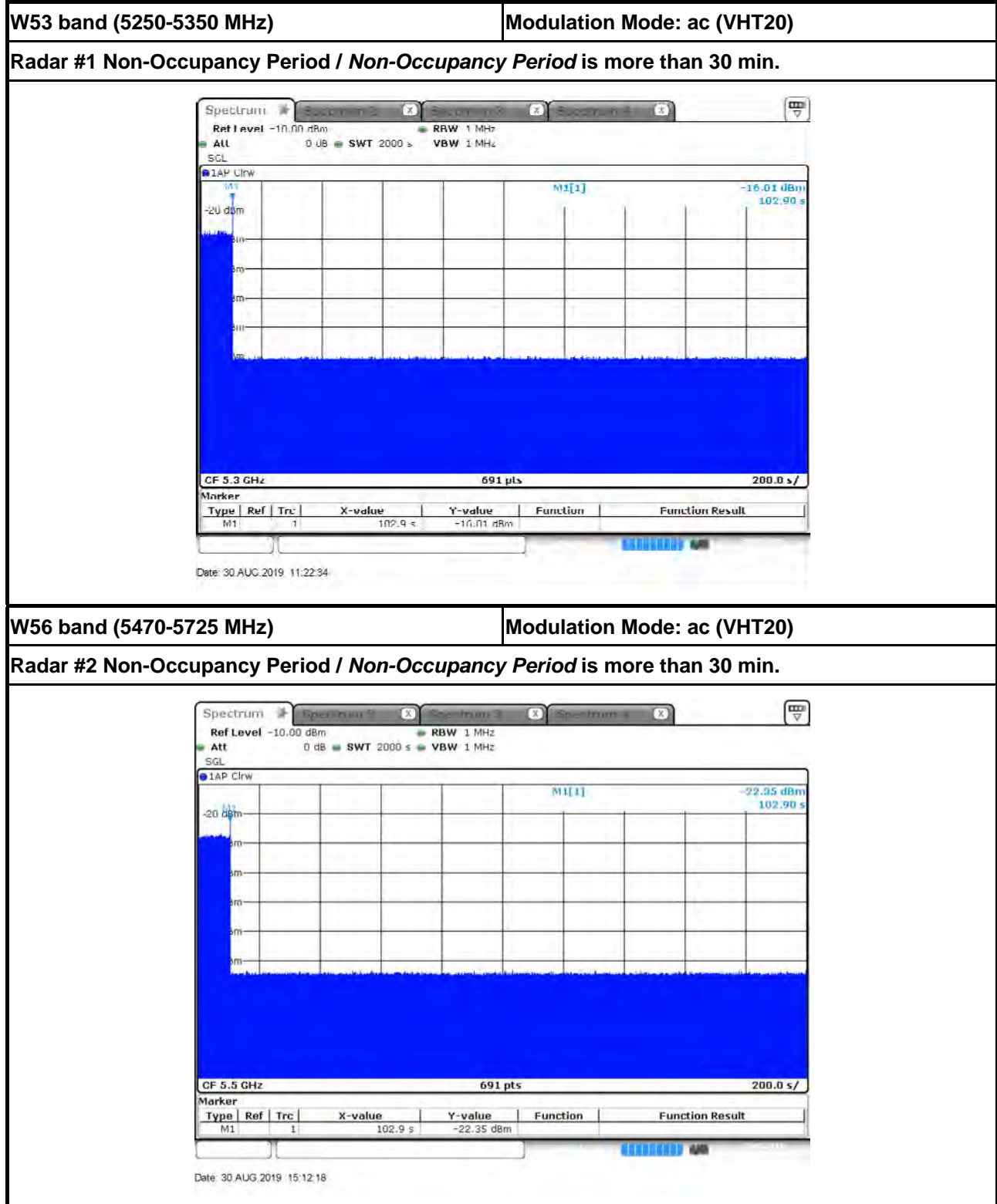
Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.

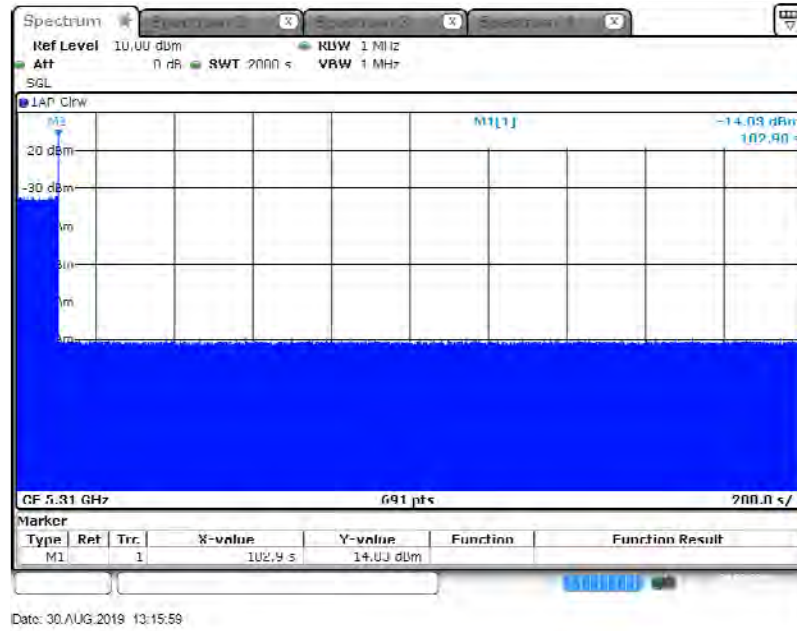
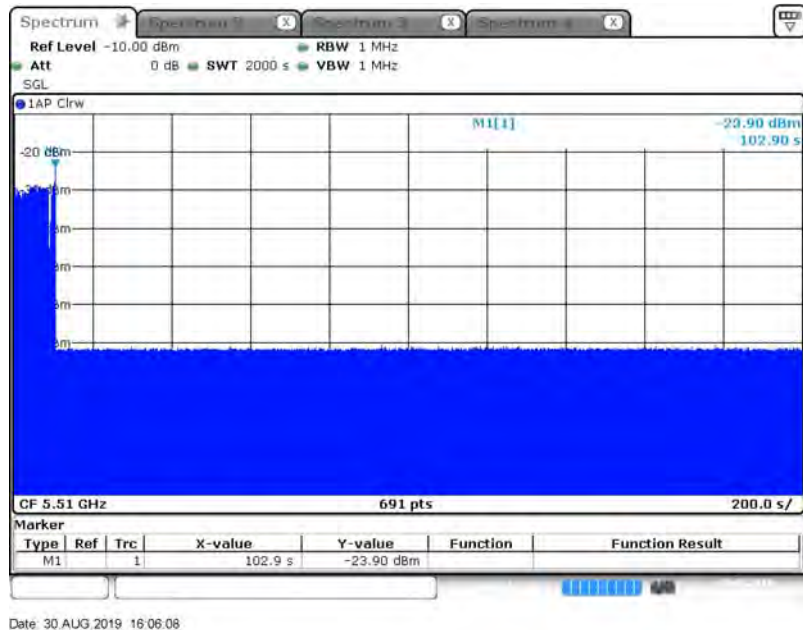
The Channel Closing Transmission Time is calculated by Closing Time = N*(Sweep time/Sweep Point-1) where N is the number of spectrum analyzer sampling bins.

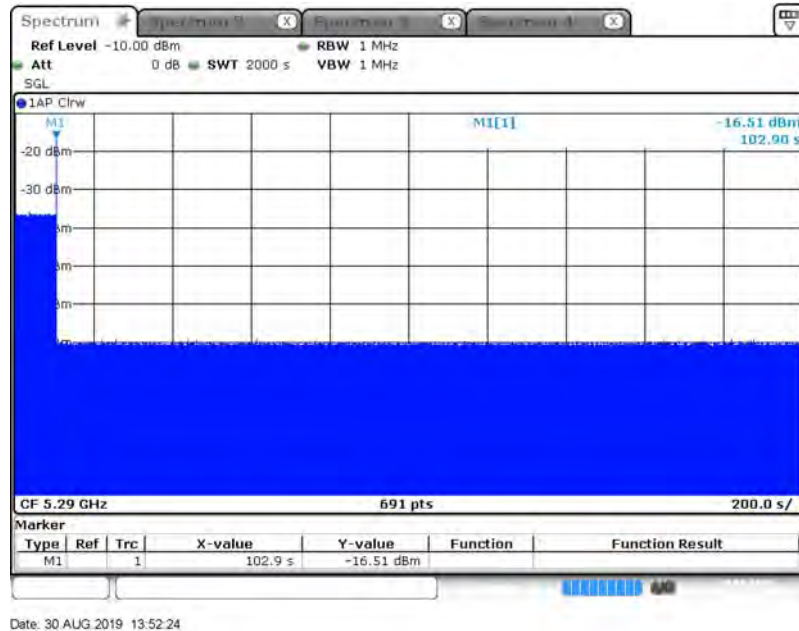
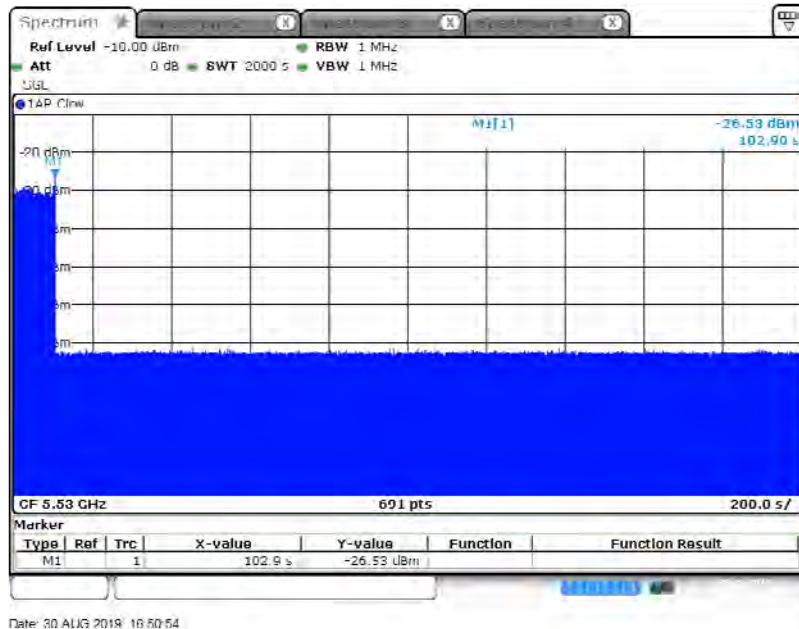
3.4.6 Test Result of Non-Occupancy Period

Non-Occupancy Period Result			
Detection Threshold Level (dBm)			-64
Modulation Mode	Freq. (MHz)	Radar Test Signal	Non-Occupancy Period (min)
ac (VHT20)	5300	1 - Fixed	>30
ac (VHT20)	5500	2 - Fixed	>30
ac (VHT40)	5310	1 - Fixed	>30
ac (VHT40)	5510	2 - Fixed	>30
ac (VHT80)	5290	1 - Fixed	>30
ac (VHT80)	5530	2 - Fixed	>30
Limit			30 min
Result			PASS

3.4.7 Non-Occupancy Period Plots



W53 band (5250-5350 MHz)
Modulation Mode: ac (VHT40)
Radar #1 Non-Occupancy Period / Non-Occupancy Period is more than 30 min.

W56 band (5470-5725 MHz)
Modulation Mode: ac (VHT40)
Radar #2 Non-Occupancy Period / Non-Occupancy Period is more than 30 min.


W53 band (5250-5350 MHz)
Modulation Mode: ac (VHT80)
Radar #1 Non-Occupancy Period / Non-Occupancy Period is more than 30 min.

W56 band (5470-5725 MHz)
Modulation Mode: ac (VHT80)
Radar #2 Non-Occupancy Period / Non-Occupancy Period is more than 30 min.


4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Calibration Method	Calibration Agent Name	Remark
Spectrum Analyzer	R&S	FSV40	101025	9kHz ~ 40GHz	Jul. 30, 2019	Jul. 29, 2020	c)	C	Conducted (DF02-CB)
Vector Signal generator	R&S	SMU200A	105352	25MHz-6GHz	Nov. 01, 2018	Oct. 31, 2019	c)	A	Conducted (DF02-CB)
RF Power Divider	Woken	2 Way	DFS02-DV-01	2GHz ~ 18GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Power Divider	Woken	2Way	DFS02-DV-03	2GHz ~ 18GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Power Divider	Woken	4 Way	DFS02-DV-02	2GHz ~ 18GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-61	1 GHz – 18 GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-62	1 GHz – 18 GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-63	1 GHz – 18 GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-66	1 GHz – 18 GHz	Oct. 08, 2018	Oct. 07, 2019	c)	B	Conducted (DF02-CB)

Note:

- Calibration Interval of instruments listed above is one year.
- N.C.R. means Non-Calibration required.
- Calibration Agent Name: Describe calibration agent name with its country name, and symbols in "Calibration Agent Name" shows the agent names as follows,
A: Electronics Testing Center, Taiwan.
B: Sporton International Inc., Taiwan.
C: ROHDE&SCHWARZ, Taiwan.
- Calibration Method
a) : Calibration conducted by the National Institute of Information and Communications Technology or a designated calibration agency under Article 102-18 paragraph (1)
b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)
d) : Calibration conducted by using other equipment that listed above from a) to c)



5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission	2.4 dB	Confidence levels of 95%