Dynamic Frequency Selection (DFS)

Test Report

Product Name : Secure Smartphone
Trade Name : Bittium
Model No. : Tough Mobile 2
FCC ID. : V27SD-61

Applicant : BITTIUM WIRELESS OY
Address : Ritaharjuntie 1, 90590 Oulu, Finland

Date of Receipt : Jan. 03, 2019
Issued Date : Dec. 16, 2019
Report No. : 1910040R-RFUSP15V00
Report Version : V3.0

Testing Laboratory
3024

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
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The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

DFS Test Report

Issued Date: Dec. 16, 2019
Report No.: 1910040R-RFUSP15V00

Product Name	:	Secure Smartphone
Applicant	:	BITTIUM WIRELESS OY
Address	:	Ritaharjuntie 1, 90590 Oulu, Finland
Manufacturer	:	BITTIUM WIRELESS OY
Model No.	:	Tough Mobile 2
FCC ID.	:	V27SD-61
EUT Voltage	:	DC 3.8V
Testing Voltage	:	DC 3.8V
Trade Name	:	Bittium
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2018 ANSI C63.10: 2013 KDB 789033 D02 v02r01 KDB 662911 D01 v02r01
Laboratory Name	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Documented By : Lyla Yang

(Lyla Yang / Engineering Adm. Specialist)

Tested By : Neil Yeh

(Neil Yeh / Senior Engineer)

Approved By : Louis Hsu

(Louis Hsu / Deputy Manager)

Revision History

Report No.	Version	Description	Issued Date
1910040R-RFUSP15V00	V1.0	Initial issue of report.	Jun. 28, 2019
1910040R-RFUSP15V00	V2.0	1. Revise voltage to DC 3.8V 2. Verify Initial Channel Availability Check Time, Radar Burst at the Beginning of the Channel Availability Check Time, Radar Burst at the End of the Channel Availability Check Time. 3. Correct the Radar type 5 of "Statistical Performance Check tested"	Nov. 29, 2019
1910040R-RFUSP15V00	V3.0	1. Revise Antenna Gain to -1.1 dBi. 2. Renew U-NII device maximum power (E.I.R.P).	Dec. 16, 2019

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1. General Information

1.1. EUT Description

Product Name	Secure Smartphone	
Trade Name	Bittium	
Model No.	Tough Mobile 2	
DFS Frequency Range / Number of DFS Channels	IEEE 802.11a/ IEEE 802.11n (20MHz)/ IEEE 802.11ac (20MHz)	5180~5240MHz / 4 Channels 5260~5320MHz / 4 Channels 5500~5700MHz / 11 Channels
Type of Modulation	802.11a/n/ac	Orthogonal Frequency Division Multiplexing (OFDM)
Data Rate	IEEE 802.11a	6, 9,12, 18, 24, 36, 48, 54Mbps
	IEEE 802.11n (20MHz)	Support a subset of the combination of GI, MCS 0~MCS 15 and bandwidth defined in 802.11n
	IEEE 802.11ac (20MHz)	Support a subset of the combination of GI, MCS 0~MCS 9 and bandwidth defined in 802.11ac
Channel Control	Auto	
Channel Bandwidth	20 MHz	
DFS Function	■ Master ■ Slave	
TPC Function	■ <500mW not required □ ≧ 500mW employ a TPC*	
Communication Mode	■ IP Based Systems □ Frame Based System □ Other System	
Antenna Gain	Refer to the table “Antenna List”	
Hw version	0302	
Sw version	40.1	

*Note: The TPC test by U-NII report.

Antenna Information	
Antenna Type	monopole antenna
Effective Antenna Gain	Antenna 0: -1.1 dBi Antenna 1: -1.1 dBi

IEEE 802.11a/n (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
52	5260 MHz	56	5280 MHz	60	5300 MHz	64	5320 MHz
100	5500 MHz	104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz	140	5700 MHz		

Test Mode	Mode 1: Transmit Mode

Note:

1. This device is an Secure Smartphone including 5GHz a/n/ac transmitting functions.
2. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.

1.2. Standard Requirement

FCC Part 15.407:

U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30dBm. A TPC mechanism is not required for systems with an E.I.R.P. of less than 500mW.

U-NII devices operating in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

1.3. UNII Device Description

(1) The EUT operates in the following DFS band:

1. 5250-5350 MHz
2. 5470-5725 MHz

(2) The U-NII device maximum power is 20.622dBm (E.I.R.P).
Below are the available 50 ohm antenna assemblies and their corresponding gains. 0dBi gain was used to set the -63 dBm threshold level (-64dBm +1 dB) during calibration of the test setup.

(3) WLAN traffic is generated by the test software “Iperf.exe” from the Master device to the Slave device in the transfer data rate >17%.

(4) For the 5250-5350 MHz and 5470-5725 MHz bands, the Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

1.4. Test Equipment

DFS / SR11-H

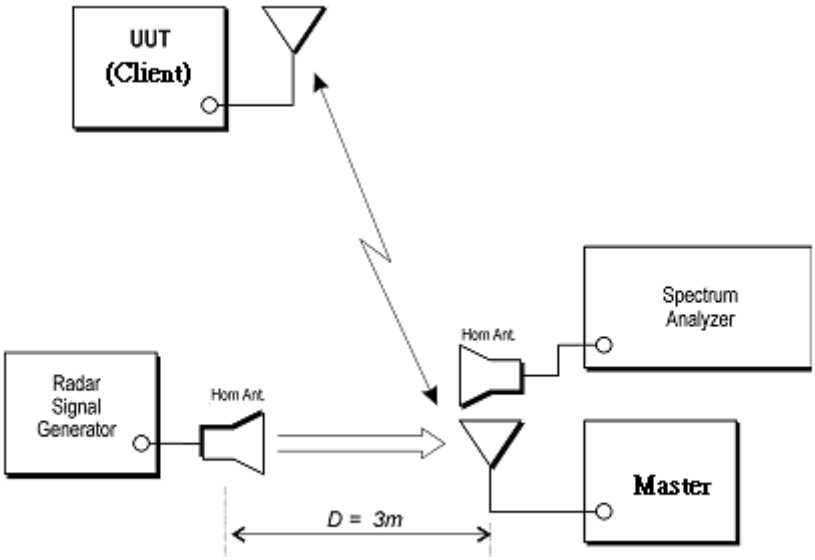
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2018/07/18	2019/07/17
ESG Vector Signal Generator	Agilent	E4438C	MY45095759	2019/05/21	2020/05/20
MXG Vector Signal Generator	Keysight	N5182B	MY53052548	2019/03/14	2020/03/13
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/12/21	2019/12/20
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2019/03/15	2020/03/14
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2019/05/28	2020/05/27
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2018/10/17	2019/10/16
Spectrum Analyzer	Keysight	N9030B	MY57140404	2018/06/26	2019/06/25

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

Instrument	Manufacturer	Type No.	Serial No
Laptop PC	DELL	Vostro A860	CD8BMH1
Laptop PC	ASUS	K45VD	0343G3110M
ATT (Qty: 3)	Mini-Circuits	BW-S3W2 DC-18GHz	0025
RF Cable (Qty: 6)	Schaffner		25494/6

Software	Manufacturer	Function
Agilent Signal Studio for DFS_V1.0.0	Agilent	Radar Signal Generation Software
Magic iPerf_V1.0	NextDoorDeveloper	iPerf Tool

1.5. Test Setup



1.6. DFS Detection Thresholds

(1) Interference Threshold value, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥200 milliwatt	-64dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

(2) DFS Response requirement values

Parameter	Value
Non-Occupancy Period	Minimum 30 Minutes
Channel Availability Check Time	60 Seconds
Channel Move Time	10 Seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 seconds period (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the 99% power bandwidth See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

1.7. Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

(1) Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

(2) Long Pulse Radar Test Signal

Radar Waveform	Bursts	Number of Pulses Per Burst	Pulse Width (usec)	Chirp Width (MHz)	PRI (usec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the long pulse radar test signal. If more than 30 waveforms are used for the long pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

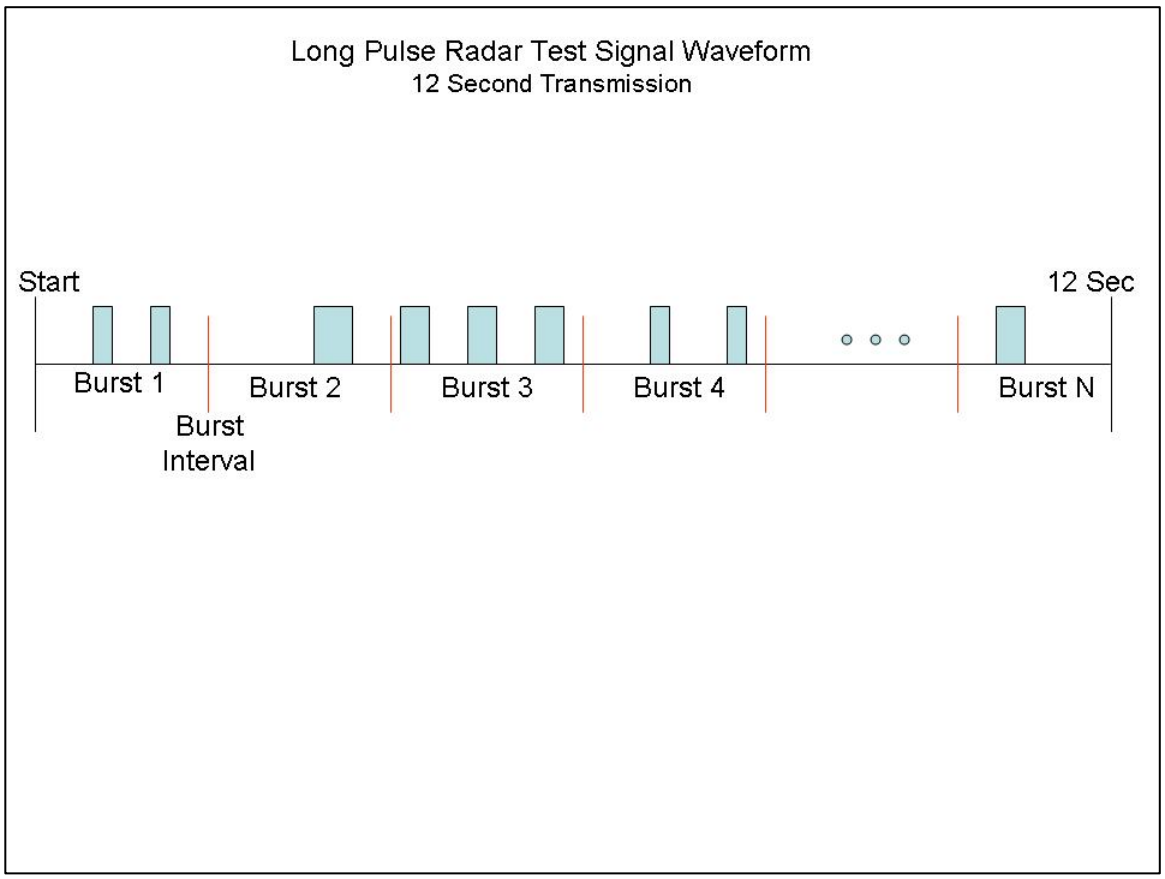
Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a transmission period will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 Bursts are randomly generated for the Burst_Count.
3) Burst 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) Bursts 2 through 8 are generated using steps 3 – 5.
7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Graphical Representation of a Long Pulse radar Test Waveform



(3) Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (μsec)	PRI (μsec)	Hopping Sequence Length (msec)	Pulses Per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	0.333	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected[1] from the hopping sequence defined by the following algorithm:

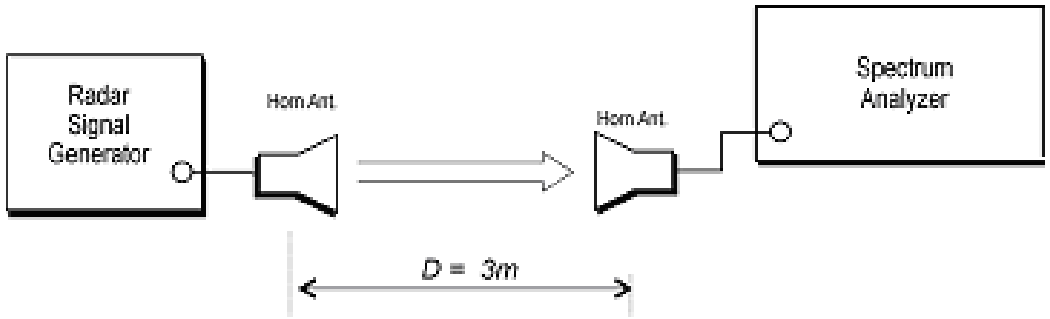
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

1.8. Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted radar waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were replace 50ohm terminal from master and client device and no transmissions by either the master or client device. The spectrum analyzer was switched to the zero span (time domain) at the frequency of the radar waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 1MHz and 1MHz.

The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63dBm due to the interference threshold level is not required.

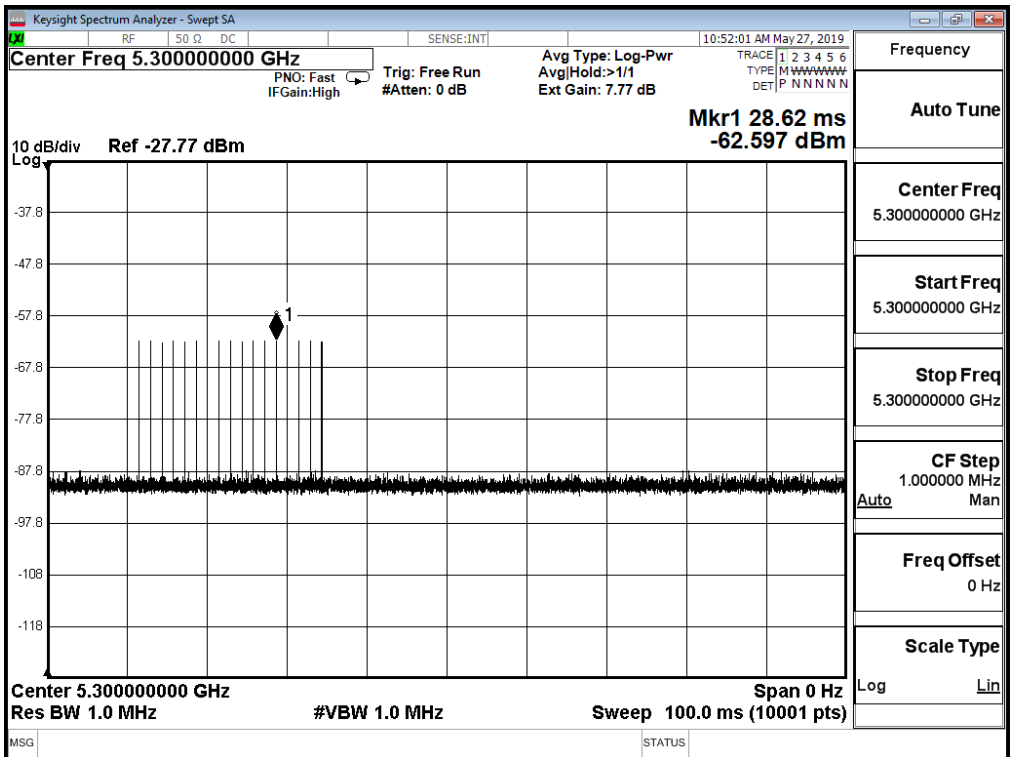
Radiated Calibration Setup



1.9. Radar Waveform Calibration Result

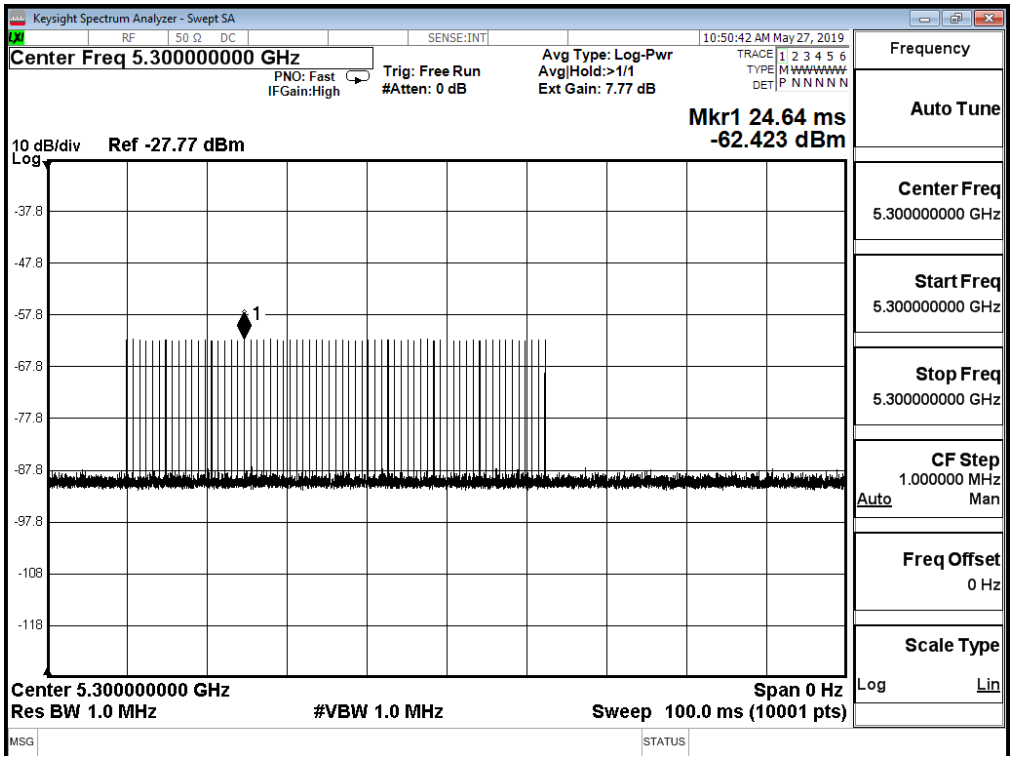
Radar Type 0

Calibration Plot (5300MHz)_20BW



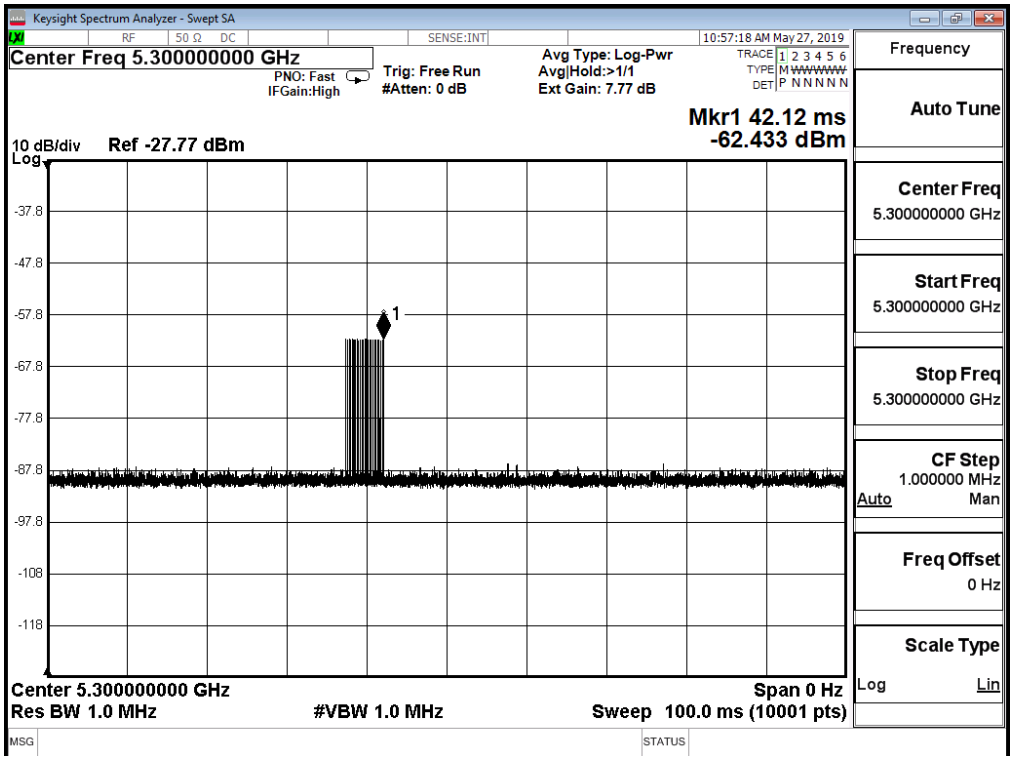
Radar Type 1

Calibration Plot (5300MHz)_20BW



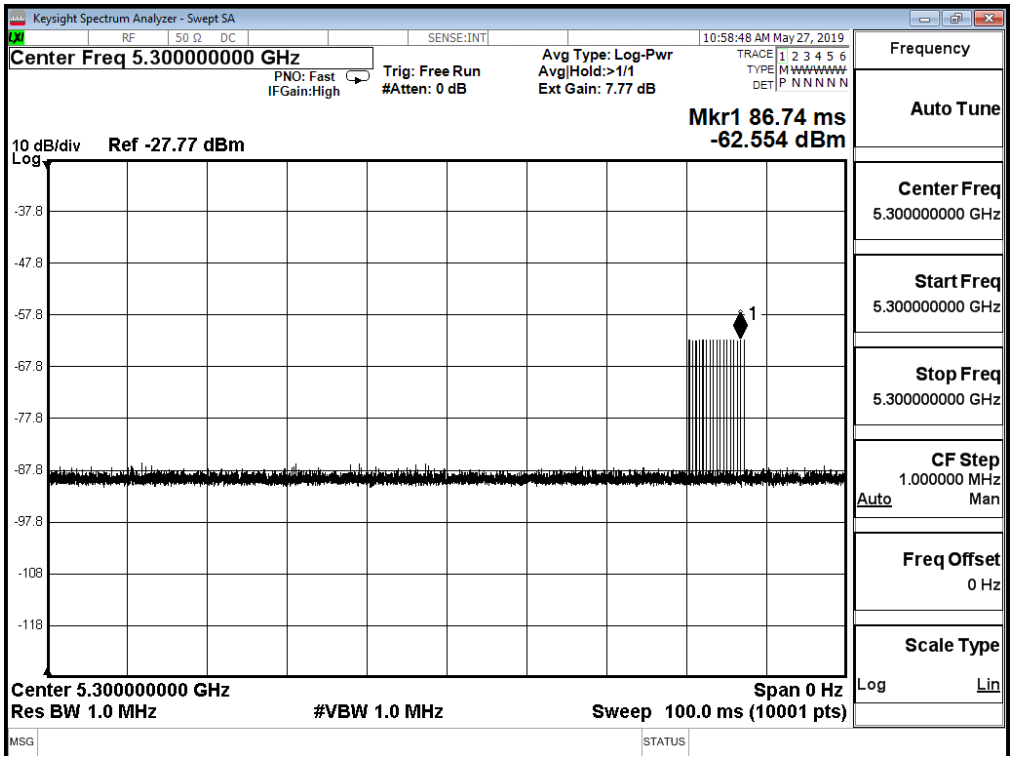
Radar Type 2

Calibration Plot (5300MHz)_20BW



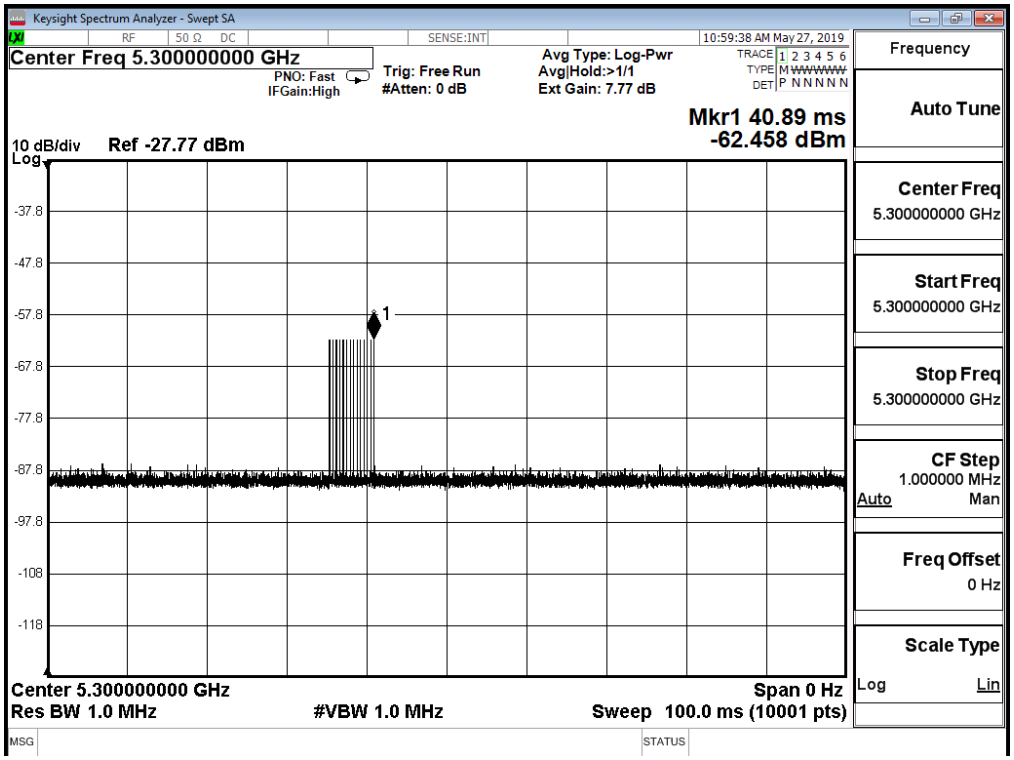
Radar Type 3

Calibration Plot (5300MHz)_20BW



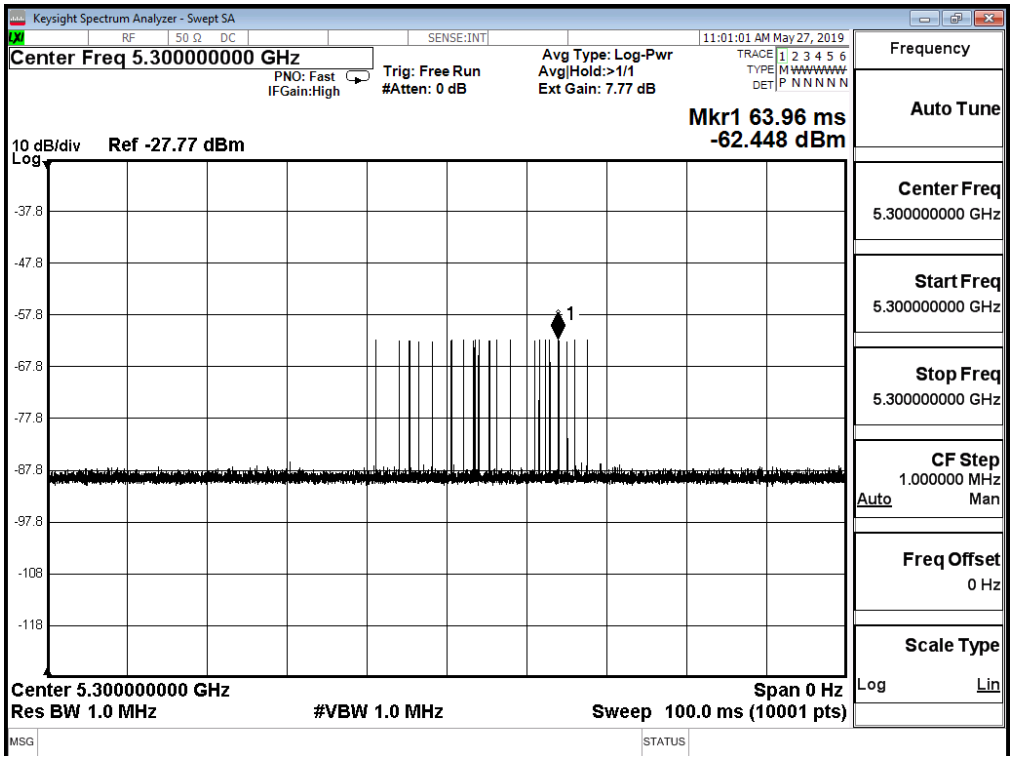
Radar Type 4

Calibration Plot (5300MHz)_20BW



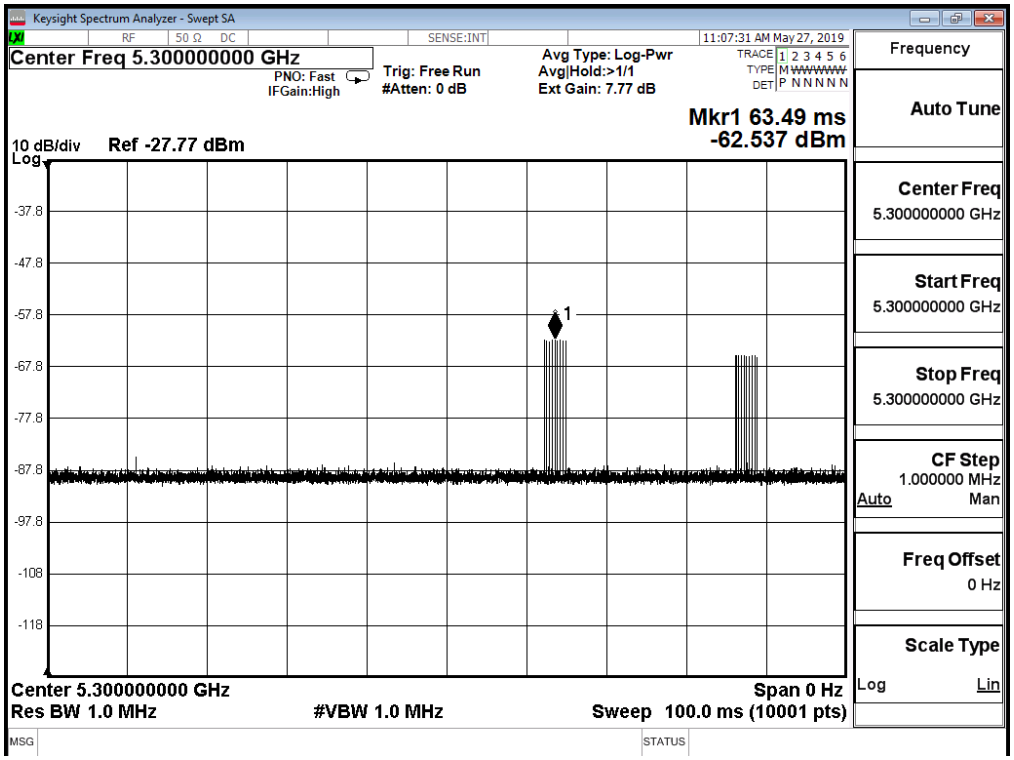
Radar Type 5

Calibration Plot (5300MHz)_20BW



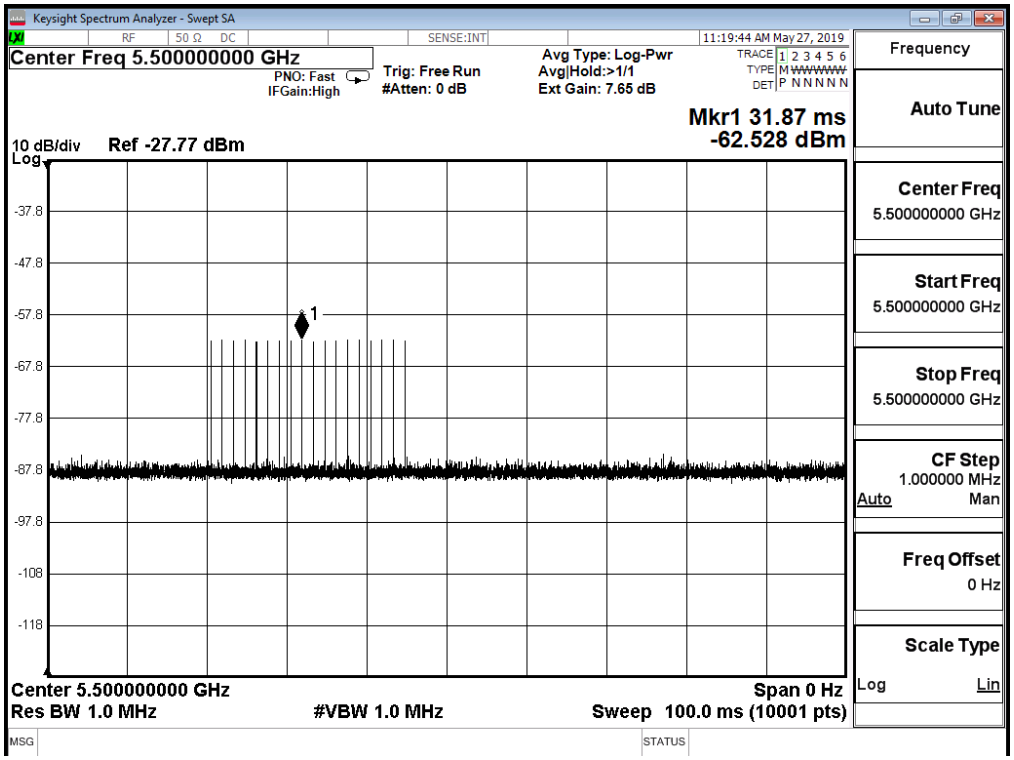
Radar Type 6

Calibration Plot (5300MHz)_20BW



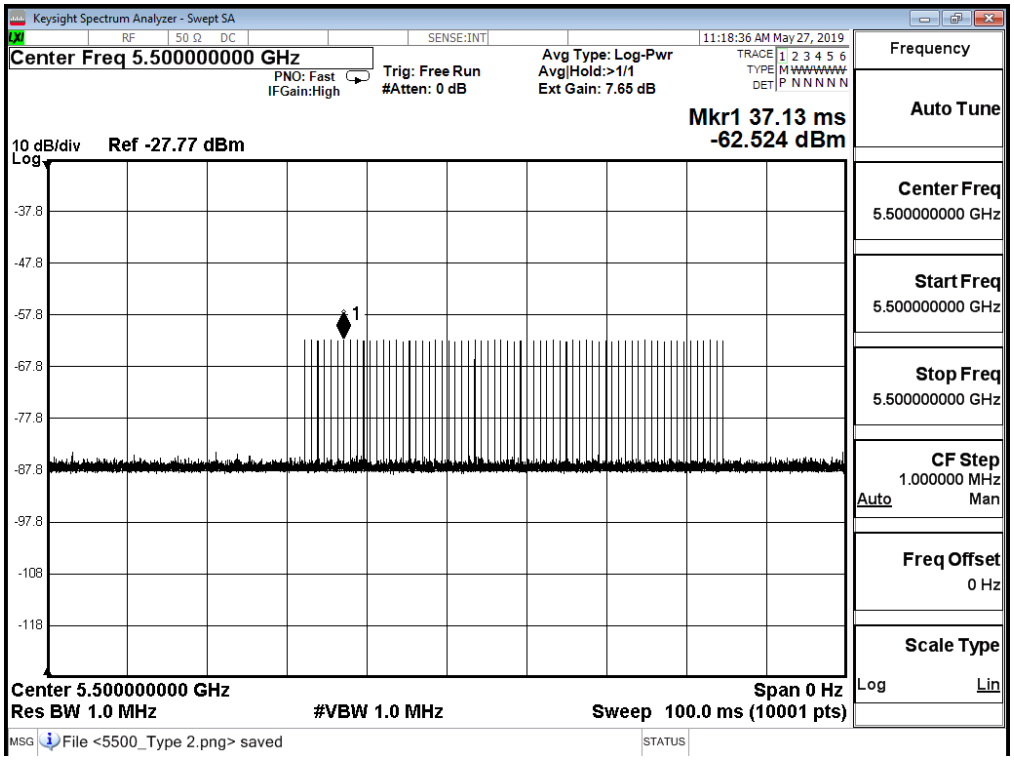
Radar Type 0

Calibration Plot (5500MHz)_20BW



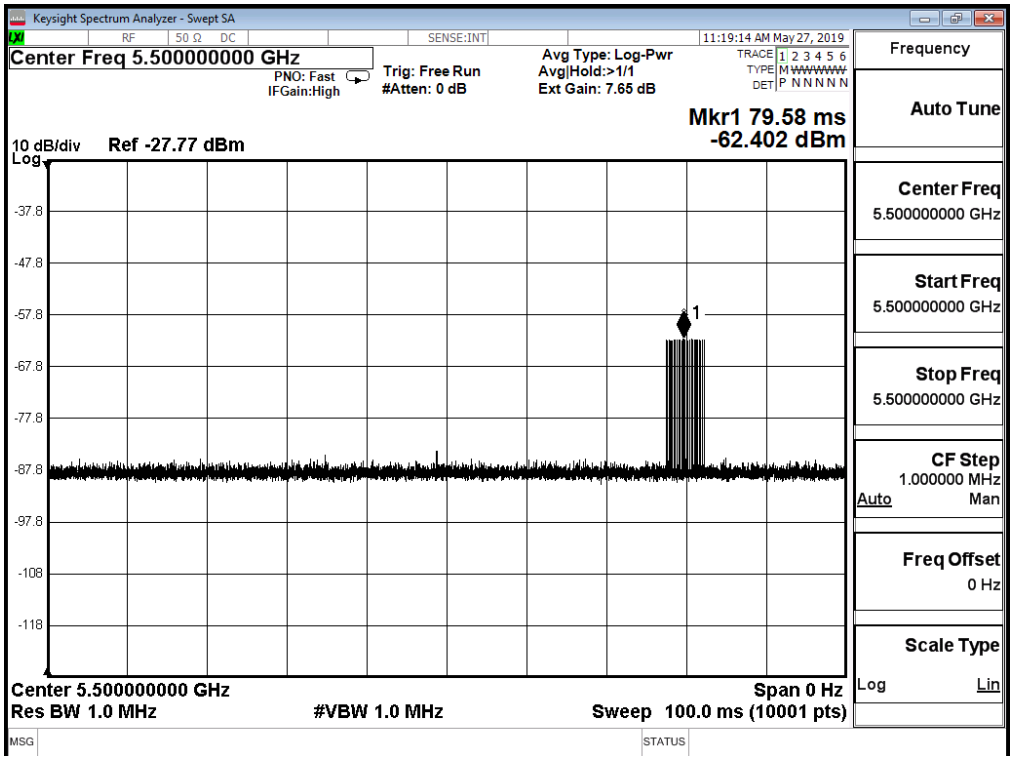
Radar Type 1

Calibration Plot (5500MHz)_20BW



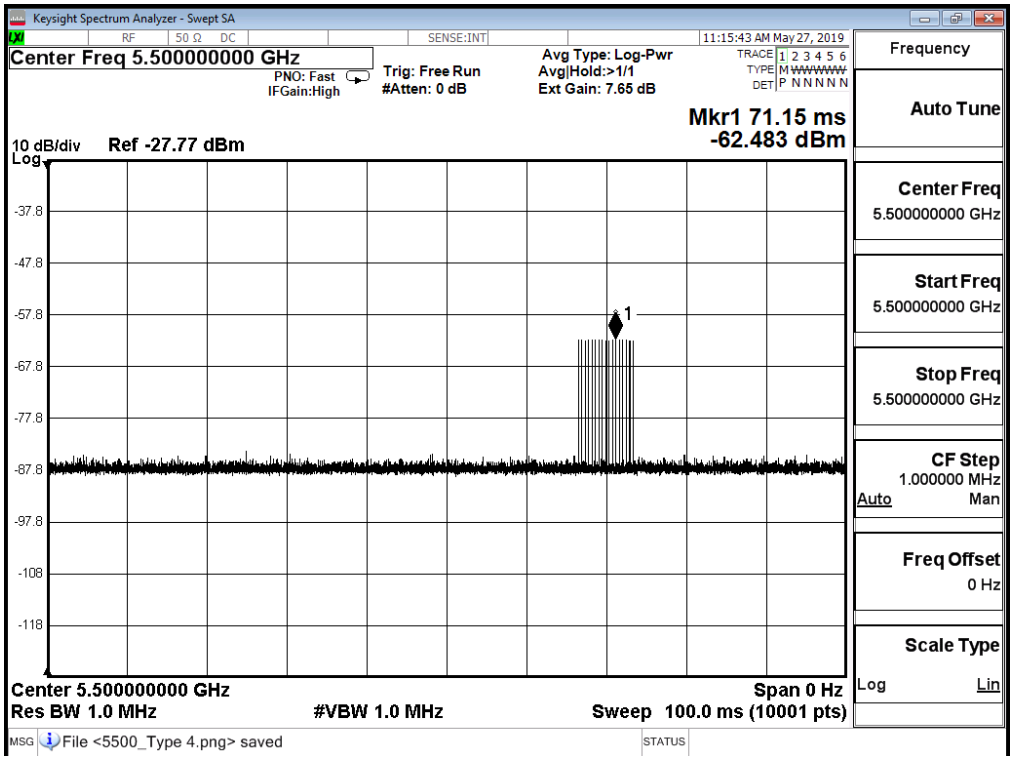
Radar Type 2

Calibration Plot (5500MHz)_20BW



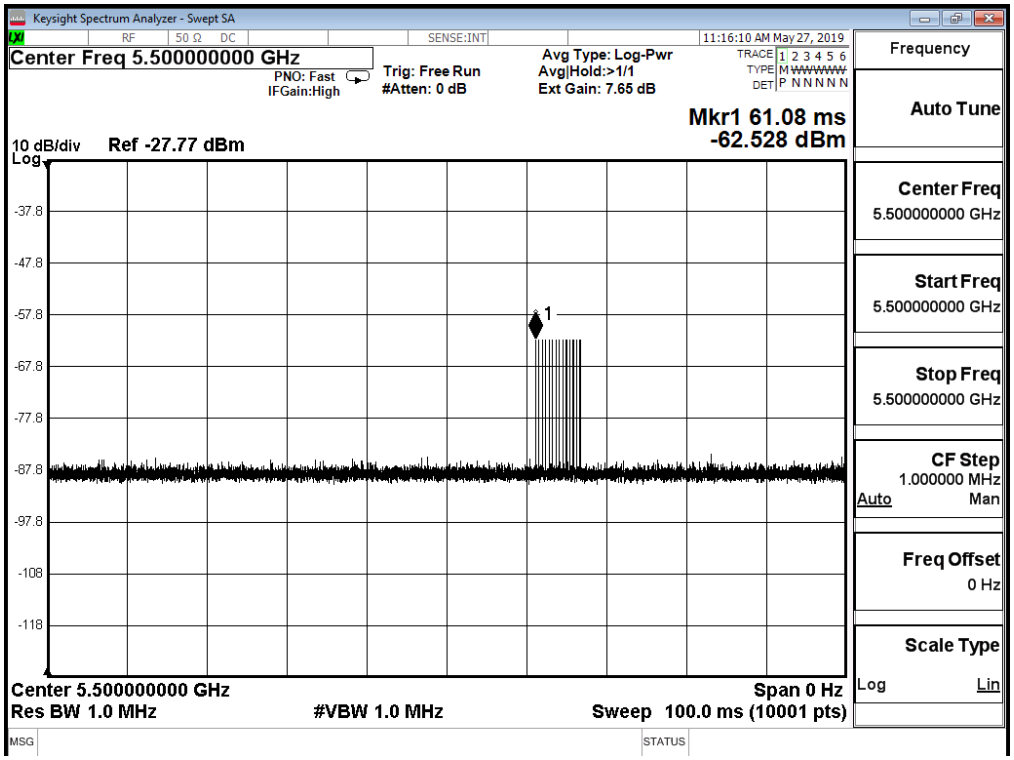
Radar Type 3

Calibration Plot (5500MHz)_20BW



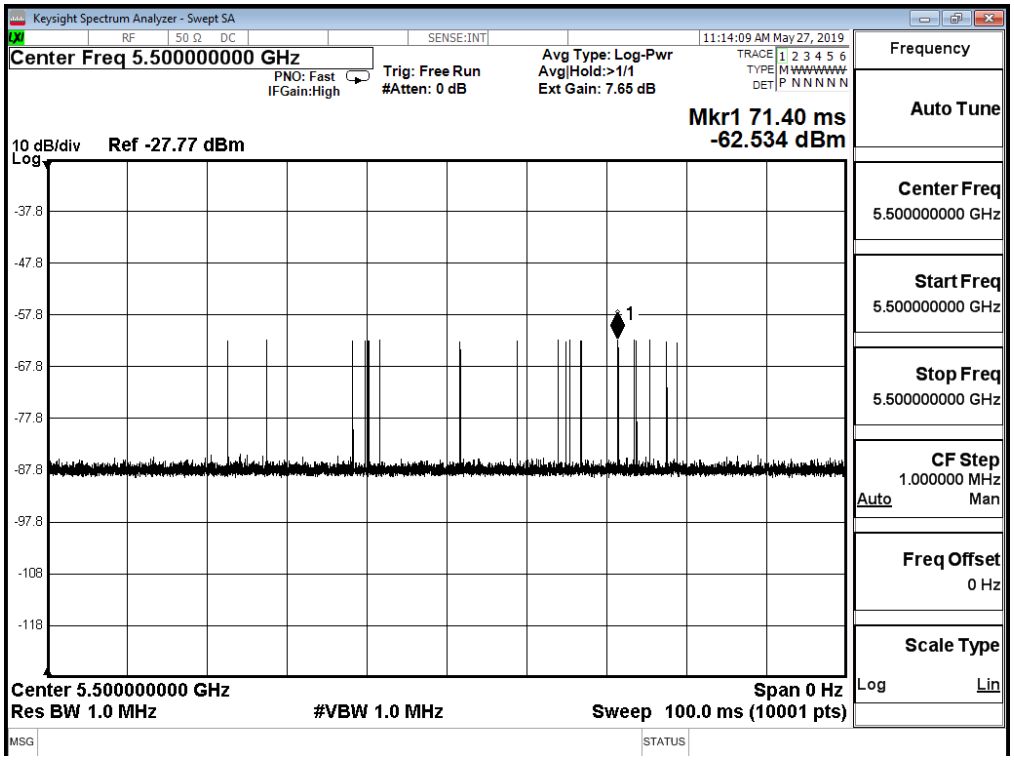
Radar Type 4

Calibration Plot (5500MHz)_20BW



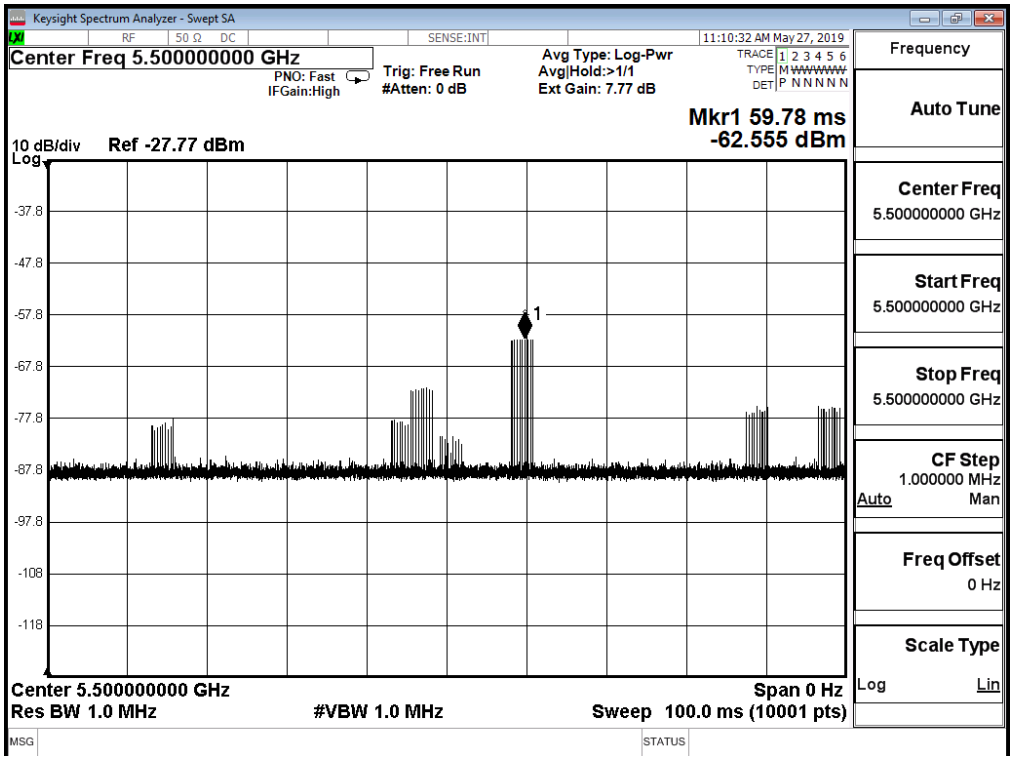
Radar Type 5

Calibration Plot (5500MHz)_20BW



Radar Type 6

Calibration Plot (5500MHz)_20BW



2. UNII Detection Bandwidth

2.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR

15.407 requirements.

The generating equipment is configured as shown in the radiated Test Setup above. A single *Burst* of the short pulse radar type 0 is produced at 5300MHz and 5510 at a -63dBm level. The EUT is set up as a standalone device (no associated Client and no traffic).

A single radar Burst is generated for a minimum of 10 trials, and the response of the EUT is noted.

The EUT must detect the Radar Waveform 90% or more of the time. The radar frequency is increased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The highest frequency at which detection is greater than or equal to 90% is denoted as FH.

The radar frequency is decreased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The lowest frequency at which detection is greater than or equal to 90% is denoted as FL.

The U-NII Detection Bandwidth is calculated as follows:

U-NII Detection Bandwidth = FH – FL

The U-NII Detection Bandwidth must be at least 100% of the EUT transmitter 99% power, otherwise, the EUT does not comply with DFS requirements.

2.2. Test Requirement

All UNII 20MHz channels for this device also have identical Channel bandwidths. Therefore, all DFS testing was done at 5300MHz and 5500MHz. The 99% channel bandwidth for 20MHz signals is 16.907MHz.

2.3. Uncertainty

± 1ms.

2.4. Test Result of UNII Detection Bandwidth

Product : Secure Smartphone
Test Item : UNII Detection Bandwidth
Radar Type : Type 0
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Test Channel: 5300MHz (20MHz BW)											
Radar Frequency	DFS Detection Trials (1= Detection, 0= No Detection)										Detection Rate
(MHz)	1	2	3	4	5	6	7	8	9	10	(%)
5290 (FL)	1	0	1	1	1	1	1	1	1	1	90
5291	1	1	1	1	1	1	1	1	1	1	100
5292	1	1	1	1	1	1	1	1	1	1	100
5293	1	1	1	1	1	1	1	1	1	1	100
5294	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5296	1	1	1	1	1	1	1	1	1	1	100
5297	1	1	1	1	1	1	1	1	1	1	100
5298	1	1	1	1	1	1	1	1	1	1	100
5299	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5301	1	1	1	1	1	1	1	1	1	1	100
5302	1	1	1	1	1	1	1	1	1	1	100
5303	1	1	1	1	1	1	1	1	1	1	100
5304	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5306	1	1	1	1	1	1	1	1	1	1	100
5307	1	1	1	1	1	1	1	1	1	1	100
5308	1	1	1	1	1	1	1	1	1	1	100
5309	1	1	1	1	1	1	1	1	1	1	100
5310 (FH)	1	1	1	1	1	1	1	1	1	1	100
Detection Bandwidth = FH - FL =5310MHz - 5290MHz = 20MHz											
EUT 99% Bandwidth = 16.907 MHz											
UNII Detection Bandwidth Min. Limit = 16.907MHz * 100% = 16.907MHz											

Product : Secure Smartphone
Test Item : UNII Detection Bandwidth
Radar Type : Type 0
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Test Channel: 5500MHz (20MHz BW)											
Radar Frequency	DFS Detection Trials (1= Detection, 0= No Detection)										Detection Rate
(MHz)	1	2	3	4	5	6	7	8	9	10	(%)
5490 (FL)	1	1	1	1	1	1	1	1	1	1	100
5491	1	1	1	1	1	1	1	1	1	1	100
5492	1	1	1	1	1	1	1	1	1	1	100
5493	1	1	1	1	1	1	1	1	1	1	100
5494	1	1	1	1	1	1	1	1	1	1	100
5495	1	1	1	1	1	1	1	1	1	1	100
5496	1	1	1	1	1	1	1	1	1	1	100
5497	1	1	1	1	1	1	1	1	1	1	100
5498	1	1	1	1	1	1	1	1	1	1	100
5499	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5501	1	1	1	1	1	1	1	1	1	1	100
5502	1	1	1	1	1	1	1	1	1	1	100
5503	1	1	1	1	1	1	1	1	1	1	100
5504	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
5506	1	1	1	1	1	1	1	1	1	1	100
5507	1	1	1	1	1	1	1	1	1	1	100
5508	1	1	1	1	1	1	1	1	1	1	100
5509	1	1	1	1	1	1	1	1	1	1	100
5510 (FH)	1	1	1	1	1	1	1	1	1	1	100
Detection Bandwidth = FH - FL =5510MHz - 5490MHz = 20MHz											
EUT 99% Bandwidth = 16.903MHz											
UNII Detection Bandwidth Min. Limit = 16.903MHz * 100% = 16.903MHz											

3. Initial Channel Availability Check Time

3.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR 15.407 requirements.

The U-NII device is powered on and instructed to operate at 5300 and 5500MHz. At the same time the UUT is powered on, the spectrum analyzer is set to zero span mode with a 1 MHz resolution bandwidth at 5300MHz and 5500MHz with a 100s sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

The EUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

The initial power up time of the EUT is indicated by marker2 in the plot, Initial beacons/data transmissions are indicated by marker 1.

3.2. Test Requirement

The EUT shall perform a channel availability check to ensure that there is no radar operation on the channel, after power-up sequence, receiver at least 1 minute on the intended operation frequency.

3.3. Uncertainty

± 1ms.

3.4. Test Result of Initial Channel Availability Check Time

Product : Secure Smartphone

Test Item : Initial Channel Availability Check Time

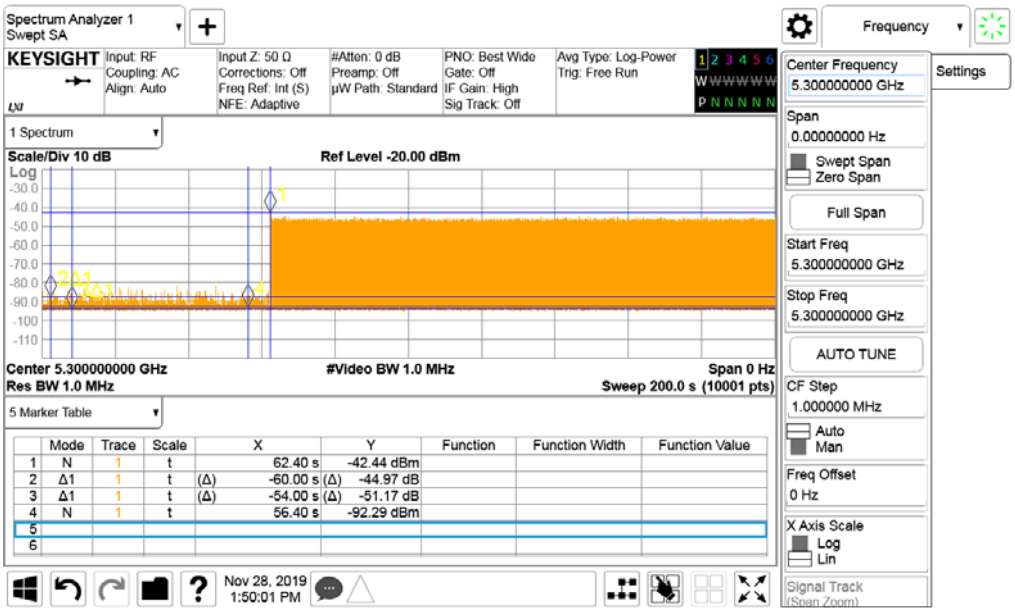
Radar Type : Type 1

Test Date : 2019/11/28

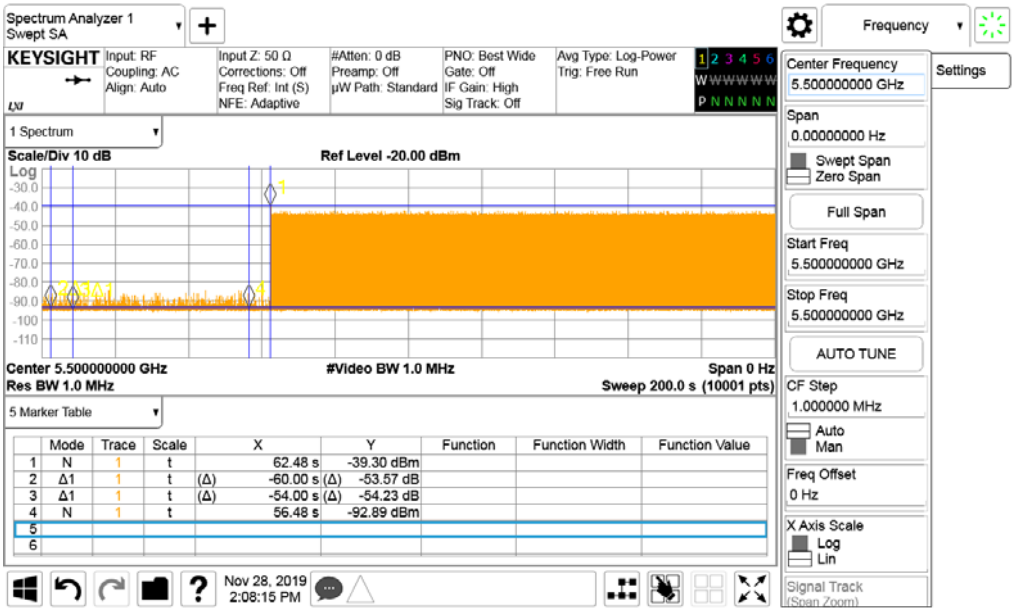
Test Mode : Mode 1: Transmit Mode

The EUT does not transmit any beacon or data transmission until at least 1 minute after the completion of the power-on cycle (63.50sec). The initial power up time of the EUT is indicated by Marker 1 (63.50 sec) – CAC (60 sec).

5300 MHz



5500 MHz



4. Radar Burst at the Beginning of the Channel Availability Check Time

4.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR 15.407 requirements.

The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB (-63dBm) occurs at the beginning of the Channel Availability Check Time.

The EUT is powered on at T0. T1 denotes the instant when the EUT has completed its power-up

sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds.

A single Burst of short pulse of radar type 1 at -63dBm will commence within a 6 second window starting at T1.

Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5300MHz and 5500MHz will continue for 2.5 minutes after the radar Burst, Verify that during the 2.5 minute measurement window no EUT transmissions occurred at 5300MHz and 5500MHz.

4.2. Test Requirement

In beginning of the Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC that channel.

4.3. Uncertainty

± 1ms.

4.4. Test Result of Radar Burst at the Beginning of the Channel Availability Check Time

Product : Secure Smartphone

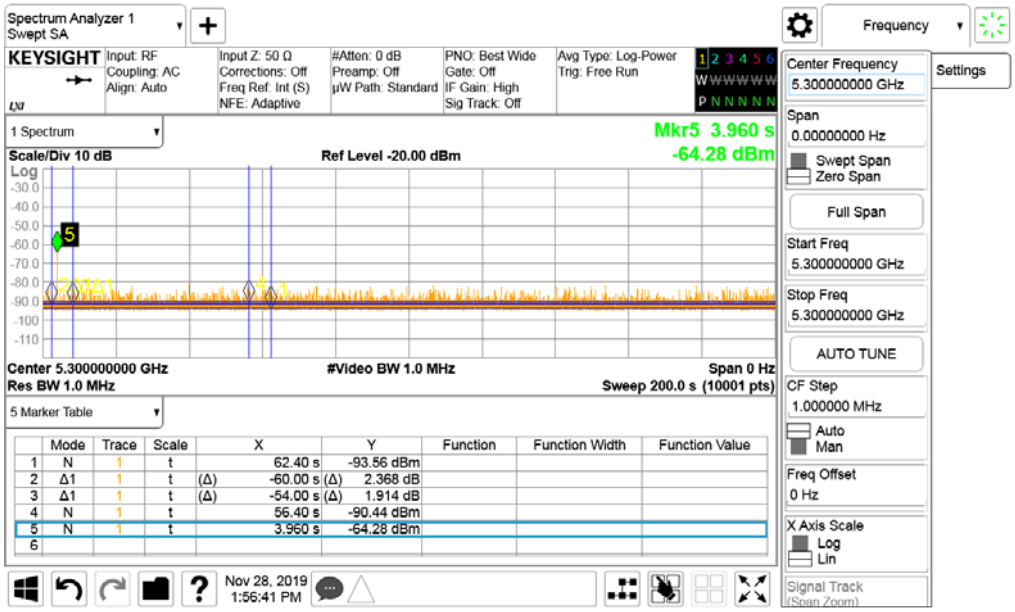
Test Item : Radar Burst at the Beginning of the Channel Availability Check Time

Radar Type : Type 0

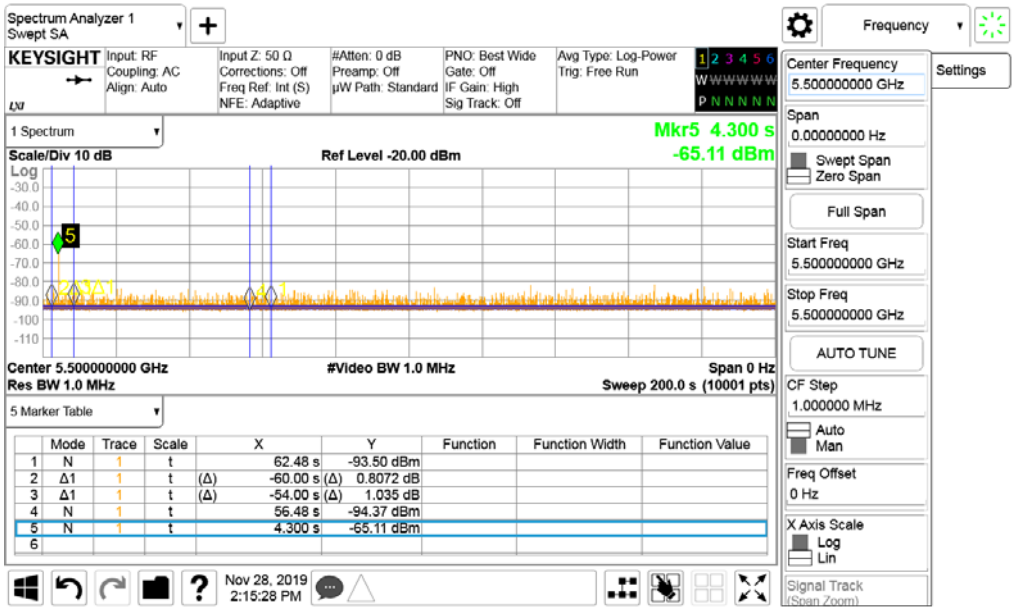
Test Date : 2019/11/28

Test Mode : Mode 1: Transmit Mode

5300MHz



5500MHz



5. Radar Burst at the End of the Channel Availability Check Time

5.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR 15.407 requirements.

The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB (-63dBm) occurs at the end of the Channel Availability Check Time.

The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds. A single Burst of short pulse of radar type 1 at -63 dBm will commence within a 6 second window starting at T1+ 54 seconds.

Visual indication on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5300MHz/5510MHz and 5630MHz will continue for 2.5 minutes after the radar Burst

has been generated.

Verify that during the 2.5 minute measurement window no UUT transmissions occurred at 5300MHz /5510MHz and 5630MHz.

5.2. Test Requirement

In the end of Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC that channel.

5.3. Uncertainty

± 1ms.

5.4. Test Result of Radar Burst at the End of the Channel Availability Check Time

Product : Secure Smartphone

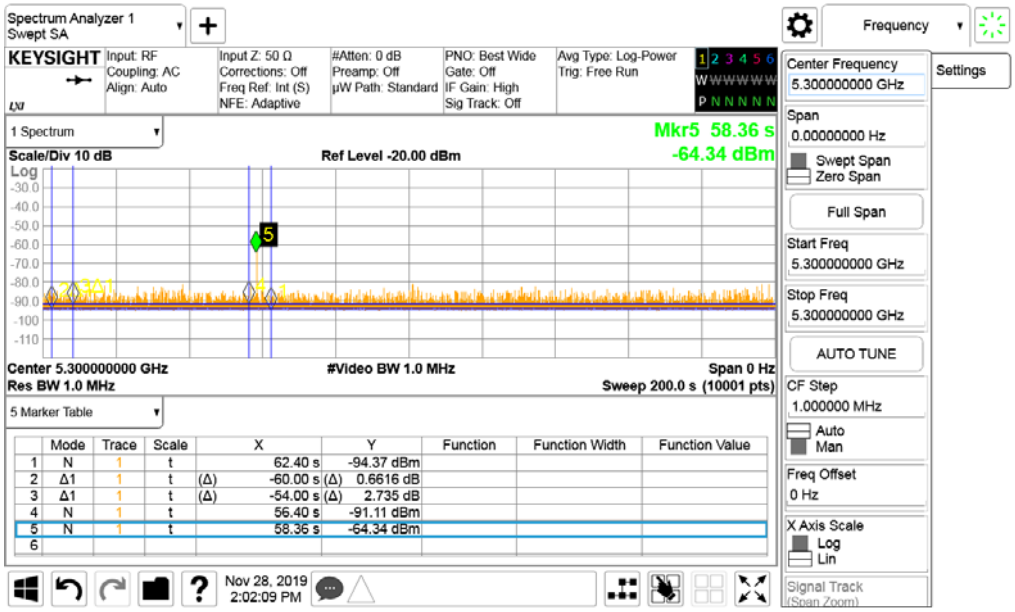
Test Item : Radar Burst at the End of the Channel Availability Check Time

Radar Type : Type 0

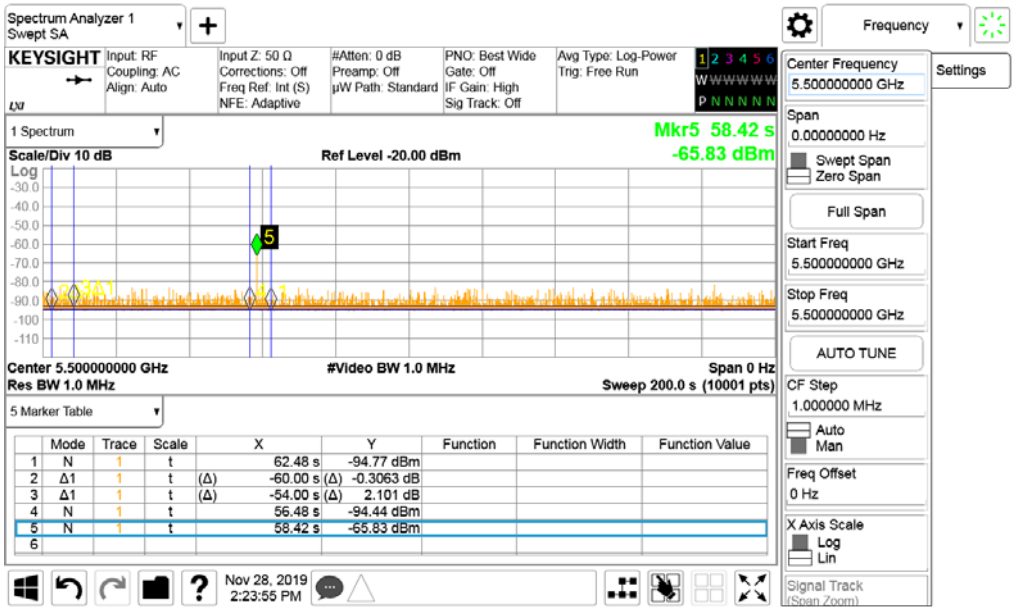
Test Date : 2019/11/28

Test Mode : Mode 1: Transmit Mode

5300MHz



5500MHz



6. In-Service Monitoring for Channel Move Time and Channel Closing Transmission Time and Non-Occupancy Period

6.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR 15.407 requirements.

These tests define how the following DFS parameters are verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time, and Non-Occupancy Period.. The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB (-63dBm) is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5300MHz/ 5510MHz and 5630MHz.

Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

At time T0 the Radar Waveform generator sends a Burst of pulses for each of the radar types at -63dBm.

Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the DFS Response requirement values table.

Measure the UUT for more than 30 minutes following the channel close/move time to verify that the UUT does not resume any transmissions on this Channel.

6.2. Test Requirement

Parameter	Value
Channel Move Time	10 Seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 seconds period
Non-Occupancy Period	Minimum 30 minutes

6.3. Uncertainty

± 1ms.

6.4. Test Result of Channel Move Time and Channel Closing Transmission Time and Non-Occupancy Period

Product : Secure Smartphone

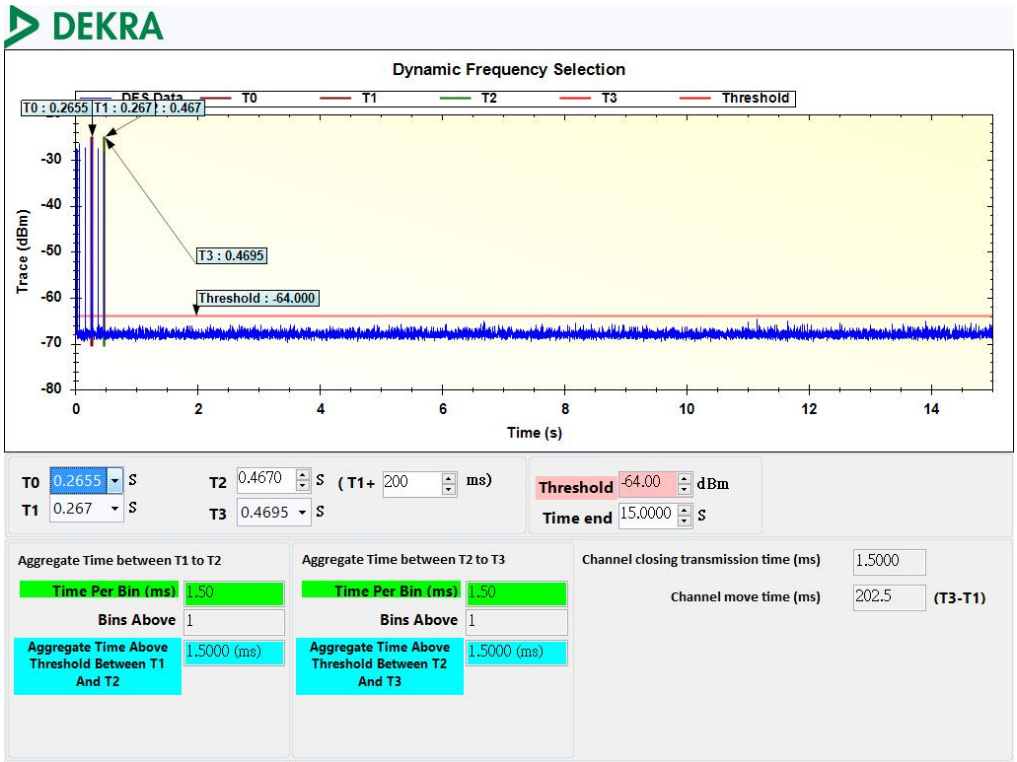
Test Item : Channel Move Time

Radar Type : Type 0

Test Date : 2019/05/28

Test Mode : Mode 1: Transmit Mode

Channel Move Time for Radar Test Type 0 at 5300MHz

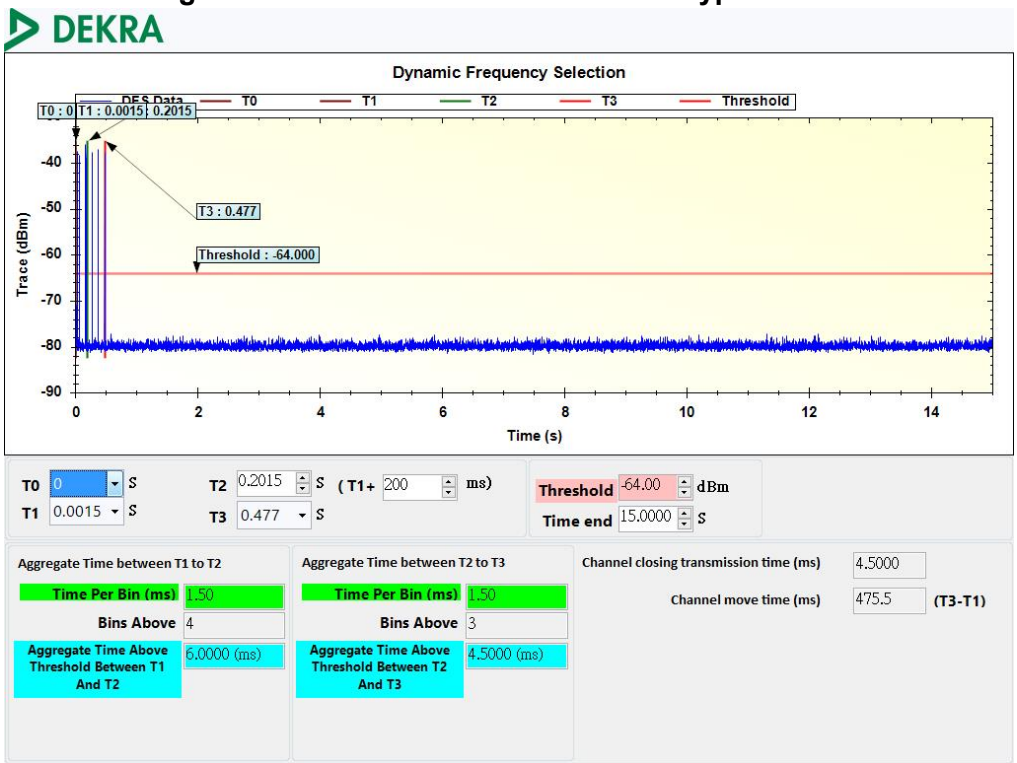


Test Item	Test Result (Sec)	Limit (Sec)
Channel Move Time	0.203	10
Channel Closing Transmission	0.0015	200 milliseconds + approx. 60 milliseconds over remaining 10 seconds period

The results showed that after radar signal injected the channel move time was less than 10 seconds.

Product : Secure Smartphone
Test Item : Channel Closing Transmission Time Test
Radar Type : Type 0
Test Date : 2019/05/29
Test Mode : Mode 1: Transmit Mode

Channel Closing Transmission Time for Radar Test Type 0 at 5500 MHz

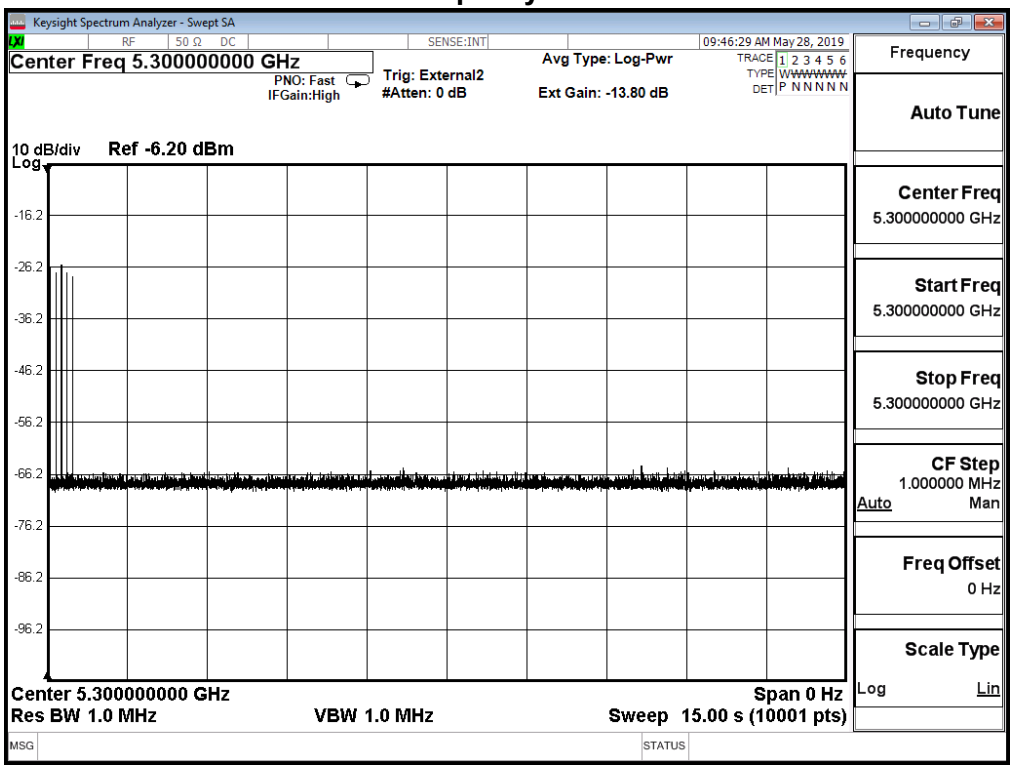


Test Item	Test Result (Sec)	Limit (Sec)
Channel Move Time	0.475	10
Channel Closing Transmission	4.50	200 milliseconds + approx. 60 milliseconds over remaining 10 seconds period

The results showed that after radar signal injected the channel move time was less than 10 seconds.

Product	:	Secure Smartphone
Test Item	:	Non-Occupancy Period
Radar Type	:	Type 0
Test Date	:	2019/06/28
Test Mode	:	Mode 1: Transmit Mode

Non-Occupancy Period at 5300 MHz

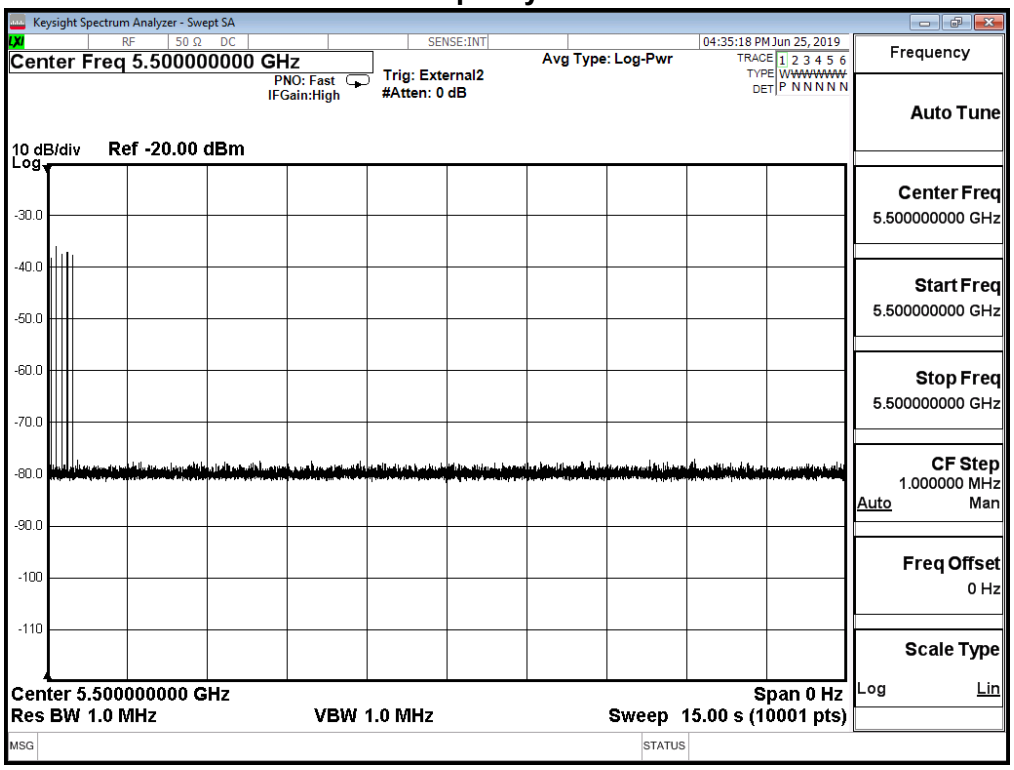


Test Item	Test Result (Minutes)	Limit (Minutes)
Non-Occupancy Period	>30	>30

*No EUT transmissions were observed on the test channel during 30 minutes observation time.

Product	:	Secure Smartphone
Test Item	:	Non-Occupancy Period
Radar Type	:	Type 0
Test Date	:	2019/06/25
Test Mode	:	Mode 1: Transmit Mode

Non-Occupancy Period at 5500 MHz



Test Item	Test Result (Minutes)	Limit (Minutes)
Non-Occupancy Period	>30	>30

*No EUT transmissions were observed on the test channel during 30 minutes observation time.

7. Statistical Performance Check

7.1. Test Procedure

The EUT was tested according to U-NII test procedure of KDB905462 D02 for compliance to FCC 47CFR 15.407 requirements.

The steps below define the procedure to determine the minimum percentage of detection when a radar burst with a level equal to the DFS Detection Threshold + 1dB (-63dBm) is generated on the

Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at5300MHz 、5510MHz and 5630MHz..

Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

The Radar Waveform generator sends the individual waveform for each of the radar types 1-6 at

-63dbm. Statistical data will be gathered to determine the ability of the device to detect the radar test waveforms. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs.

7.2. Test Requirement

The minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Minimum percentage of successful detections

Radar Type	Minimum Percentage of Successful Detection	Minimum Number of Trials
1	60%	30
2	60%	30
3	60%	30
4	60%	30
Aggregate (Radar Types 1-4)	80%	120
5	80%	30
6	70%	30

The percentage of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100$$ =Probability of Detection Radar Waveform

In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$

7.3. Uncertainty

± 1ms.

7.4. Test Result of Statistical Performance Check

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 1
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5300	1	818	65	1
2	5300	1	3066	18	1
3	5300	1	838	63	1
4	5300	1	798	67	1
5	5300	1	518	102	1
6	5300	1	858	62	1
7	5300	1	898	59	1
8	5300	1	938	57	1
9	5300	1	558	95	1
10	5300	1	598	89	1
11	5300	1	638	83	1
12	5300	1	918	58	1
13	5300	1	878	61	1
14	5300	1	778	68	1
15	5300	1	758	70	1
16	5300	1	1372	39	1
17	5300	1	3044	18	0
18	5300	1	2270	24	1
19	5300	1	2332	23	0
20	5300	1	2383	23	1
21	5300	1	2194	25	1
22	5300	1	1107	48	1
23	5300	1	1503	36	1
24	5300	1	1985	27	0
25	5300	1	1009	53	1
26	5300	1	1244	43	1
27	5300	1	3058	18	1
28	5300	1	2043	26	1
29	5300	1	538	99	1
30	5300	1	1004	53	1
Detection Percentage(%)					90.00%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 1
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5500	1	818	65	1
2	5500	1	3066	18	1
3	5500	1	838	63	1
4	5500	1	798	67	1
5	5500	1	518	102	1
6	5500	1	858	62	1
7	5500	1	898	59	1
8	5500	1	938	57	1
9	5500	1	558	95	1
10	5500	1	598	89	1
11	5500	1	638	83	1
12	5500	1	918	58	1
13	5500	1	878	61	1
14	5500	1	778	68	1
15	5500	1	758	70	1
16	5500	1	1372	39	1
17	5500	1	3044	18	1
18	5500	1	2270	24	1
19	5500	1	2332	23	1
20	5500	1	2383	23	1
21	5500	1	2194	25	1
22	5500	1	1107	48	1
23	5500	1	1503	36	1
24	5500	1	1985	27	1
25	5500	1	1009	53	1
26	5500	1	1244	43	1
27	5500	1	3058	18	1
28	5500	1	2043	26	1
29	5500	1	538	99	1
30	5500	1	1004	53	1
Detection Percentage(%)					100%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 2
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5300	2.6	198	25	1
2	5300	1.6	228	24	0
3	5300	3.1	202	26	1
4	5300	3.3	177	27	1
5	5300	3.9	229	27	1
6	5300	2.9	165	26	1
7	5300	3.5	166	27	1
8	5300	3.6	178	27	1
9	5300	1.1	186	23	1
10	5300	1.9	199	24	1
11	5300	3.6	224	27	1
12	5300	1.6	205	24	1
13	5300	4.9	189	29	0
14	5300	2.1	214	24	1
15	5300	1.7	159	24	1
16	5300	1.2	151	23	0
17	5300	4.2	180	28	1
18	5300	1.6	161	24	1
19	5300	3.9	160	28	1
20	5300	2.9	155	26	1
21	5300	2.9	181	26	1
22	5300	3.5	218	27	1
23	5300	2.3	184	25	1
24	5300	1.9	217	24	1
25	5300	3.2	222	26	1
26	5300	2.1	191	24	1
27	5300	3.8	153	27	1
28	5300	1.2	173	23	1
29	5300	3.5	210	27	1
30	5300	2	200	24	1
Detection Percentage(%)					90.00%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 2
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5500	2.6	198	25	1
2	5500	1.6	228	24	0
3	5500	3.1	202	26	1
4	5500	3.3	177	27	1
5	5500	3.9	229	27	1
6	5500	2.9	165	26	1
7	5500	3.5	166	27	1
8	5500	3.6	178	27	1
9	5500	1.1	186	23	1
10	5500	1.9	199	24	1
11	5500	3.6	224	27	1
12	5500	1.6	205	24	1
13	5500	4.9	189	29	1
14	5500	2.1	214	24	1
15	5500	1.7	159	24	1
16	5500	1.2	151	23	1
17	5500	4.2	180	28	1
18	5500	1.6	161	24	1
19	5500	3.9	160	28	1
20	5500	2.9	155	26	1
21	5500	2.9	181	26	1
22	5500	3.5	218	27	1
23	5500	2.3	184	25	1
24	5500	1.9	217	24	1
25	5500	3.2	222	26	1
26	5500	2.1	191	24	1
27	5500	3.8	153	27	1
28	5500	1.2	173	23	1
29	5500	3.5	210	27	1
30	5500	2	200	24	0
Detection Percentage(%)					93.33%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 3
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5300	7.6	429	17	0
2	5300	6.6	333	16	1
3	5300	8.1	316	17	1
4	5300	8.3	443	17	1
5	5300	8.9	272	18	1
6	5300	7.9	343	17	1
7	5300	8.5	229	17	1
8	5300	8.6	241	17	1
9	5300	6.1	207	16	0
10	5300	6.9	216	16	1
11	5300	8.6	299	17	1
12	5300	6.6	492	16	1
13	5300	9.9	297	18	1
14	5300	7.1	225	16	1
15	5300	6.7	449	16	1
16	5300	6.2	408	16	1
17	5300	9.2	364	18	1
18	5300	6.6	369	16	1
19	5300	8.9	374	18	1
20	5300	7.9	387	17	1
21	5300	7.9	485	17	1
22	5300	8.5	370	17	1
23	5300	7.3	217	16	1
24	5300	6.9	431	16	1
25	5300	8.2	396	17	1
26	5300	7.1	200	16	1
27	5300	8.8	465	18	1
28	5300	6.2	413	16	0
29	5300	8.5	285	17	1
30	5300	7	447	16	1
Detection Percentage(%)					90.00%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 3
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5500	7.6	429	17	1
2	5500	6.6	333	16	1
3	5500	8.1	316	17	1
4	5500	8.3	443	17	1
5	5500	8.9	272	18	0
6	5500	7.9	343	17	1
7	5500	8.5	229	17	1
8	5500	8.6	241	17	1
9	5500	6.1	207	16	1
10	5500	6.9	216	16	1
11	5500	8.6	299	17	1
12	5500	6.6	492	16	1
13	5500	9.9	297	18	1
14	5500	7.1	225	16	1
15	5500	6.7	449	16	1
16	5500	6.2	408	16	1
17	5500	9.2	364	18	1
18	5500	6.6	369	16	1
19	5500	8.9	374	18	1
20	5500	7.9	387	17	1
21	5500	7.9	485	17	1
22	5500	8.5	370	17	1
23	5500	7.3	217	16	0
24	5500	6.9	431	16	1
25	5500	8.2	396	17	1
26	5500	7.1	200	16	1
27	5500	8.8	465	18	1
28	5500	6.2	413	16	0
29	5500	8.5	285	17	1
30	5500	7	447	16	1
Detection Percentage(%)					90.00%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 4
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5300	14.7	429	14	1
2	5300	12.4	333	12	1
3	5300	15.7	316	14	1
4	5300	16.2	443	14	1
5	5300	17.4	272	15	1
6	5300	15.2	343	14	1
7	5300	16.7	229	15	1
8	5300	16.9	241	15	1
9	5300	11.3	207	12	1
10	5300	13.1	216	13	1
11	5300	16.8	299	15	1
12	5300	12.3	492	12	1
13	5300	19.8	297	16	1
14	5300	13.5	225	13	0
15	5300	12.6	449	12	1
16	5300	11.6	408	12	1
17	5300	18.2	364	15	0
18	5300	12.4	369	12	1
19	5300	17.5	374	15	1
20	5300	15.2	387	14	1
21	5300	15.3	485	14	1
22	5300	16.6	370	15	1
23	5300	13.9	217	13	0
24	5300	13.2	431	13	1
25	5300	15.9	396	14	1
26	5300	13.5	200	13	1
27	5300	17.4	465	15	1
28	5300	11.5	413	12	1
29	5300	16.7	285	15	1
30	5300	13.2	447	13	1
Detection Percentage(%)					90.00%

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 4
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	Pulse Width (us)	PRI (us)	Pulses/Burs	1= Detection 0= No Detection
1	5500	14.7	429	14	1
2	5500	12.4	333	12	1
3	5500	15.7	316	14	1
4	5500	16.2	443	14	1
5	5500	17.4	272	15	1
6	5500	15.2	343	14	1
7	5500	16.7	229	15	1
8	5500	16.9	241	15	1
9	5500	11.3	207	12	1
10	5500	13.1	216	13	1
11	5500	16.8	299	15	1
12	5500	12.3	492	12	1
13	5500	19.8	297	16	1
14	5500	13.5	225	13	1
15	5500	12.6	449	12	1
16	5500	11.6	408	12	1
17	5500	18.2	364	15	1
18	5500	12.4	369	12	1
19	5500	17.5	374	15	1
20	5500	15.2	387	14	1
21	5500	15.3	485	14	1
22	5500	16.6	370	15	1
23	5500	13.9	217	13	1
24	5500	13.2	431	13	1
25	5500	15.9	396	14	1
26	5500	13.5	200	13	1
27	5500	17.4	465	15	1
28	5500	11.5	413	12	1
29	5500	16.7	285	15	0
30	5500	13.2	447	13	1
Detection Percentage(%)					96.67%

5300MHz

Total Type 1~4 Radar Statistical Performance			
Radar Type	Detection Percentage (%)	Limit (%)	Result
1	90.00	>60%	Pass
2	90.00	>60%	Pass
3	90.00	>60%	Pass
4	90.00	>60%	Pass
Total Type 1~4	90.00	>80%	Pass

5500MHz

Total Type 1~4 Radar Statistical Performance			
Radar Type	Detection Percentage (%)	Limit (%)	Result
1	100.00	>60%	Pass
2	93.33	>60%	Pass
3	90.00	>60%	Pass
4	96.67	>60%	Pass
Total Type 1~4	95.00	>80%	Pass

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 5
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Center Freq: 5300MHz				Low Edge: 5290MHz	High Edge: 5310MHz
Trial #	**Number of Bursts**	**Burst Period**	**VSG Frequency (MHz)**	***Filename**	1= Detection 0= No Detection
1	20	0.600000	5300	Statistical_Check_RandParm_For_Radar_Type_5_1_trail	1
2	14	0.857142	5300	Statistical_Check_RandParm_For_Radar_Type_5_2_trail	1
3	11	1.090909	5300	Statistical_Check_RandParm_For_Radar_Type_5_3_trail	1
4	14	0.857142	5300	Statistical_Check_RandParm_For_Radar_Type_5_4_trail	1
5	16	0.750000	5300	Statistical_Check_RandParm_For_Radar_Type_5_5_trail	1
6	13	0.923076	5300	Statistical_Check_RandParm_For_Radar_Type_5_6_trail	1
7	19	0.631578	5300	Statistical_Check_RandParm_For_Radar_Type_5_7_trail	1
8	14	0.857142	5300	Statistical_Check_RandParm_For_Radar_Type_5_8_trail	1
9	15	0.800000	5300	Statistical_Check_RandParm_For_Radar_Type_5_9_trail	1
10	17	0.705882	5300	Statistical_Check_RandParm_For_Radar_Type_5_10_trail	1
11	13	0.923076	5294	Statistical_Check_RandParm_For_Radar_Type_5_11_trail	0
12	20	0.600000	5298	Statistical_Check_RandParm_For_Radar_Type_5_12_trail	0
13	10	1.200000	5293	Statistical_Check_RandParm_For_Radar_Type_5_13_trail	1
14	10	1.200000	5293	Statistical_Check_RandParm_For_Radar_Type_5_14_trail	0
15	9	1.333333	5292	Statistical_Check_RandParm_For_Radar_Type_5_15_trail	1
16	18	0.666666	5297	Statistical_Check_RandParm_For_Radar_Type_5_16_trail	0
17	10	1.200000	5293	Statistical_Check_RandParm_For_Radar_Type_5_17_trail	1
18	15	0.800000	5296	Statistical_Check_RandParm_For_Radar_Type_5_18_trail	0
19	14	0.857142	5295	Statistical_Check_RandParm_For_Radar_Type_5_19_trail	1
20	20	0.600000	5298	Statistical_Check_RandParm_For_Radar_Type_5_20_trail	1
21	19	0.631578	5302	Statistical_Check_RandParm_For_Radar_Type_5_21_trail	0
22	15	0.800000	5305	Statistical_Check_RandParm_For_Radar_Type_5_22_trail	1
23	13	0.923076	5306	Statistical_Check_RandParm_For_Radar_Type_5_23_trail	1
24	15	0.800000	5305	Statistical_Check_RandParm_For_Radar_Type_5_24_trail	1
25	8	1.500000	5308	Statistical_Check_RandParm_For_Radar_Type_5_25_trail	1
26	20	0.600000	5302	Statistical_Check_RandParm_For_Radar_Type_5_26_trail	1
27	17	0.705882	5304	Statistical_Check_RandParm_For_Radar_Type_5_27_trail	1
28	14	0.857142	5305	Statistical_Check_RandParm_For_Radar_Type_5_28_trail	1
29	13	0.923076	5305	Statistical_Check_RandParm_For_Radar_Type_5_29_trail	1
30	15	0.800000	5304	Statistical_Check_RandParm_For_Radar_Type_5_30_trail	1
Detection Percentage (%)					80.00%
Limit					≧80

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 5
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Center Freq: 5500MHz				Low Edge: 5490MHz	High Edge: 5510MHz
Trial #	Number of Bursts	Burst Period	**VSG Frequency (MHz)**	***Filename**	1= Detection 0= No Detection
1	20	0.600000	5500	Statistical_Check_RandParm_For_Radar_Type_5_1_trail	1
2	14	0.857142	5500	Statistical_Check_RandParm_For_Radar_Type_5_2_trail	1
3	11	1.090909	5500	Statistical_Check_RandParm_For_Radar_Type_5_3_trail	1
4	14	0.857142	5500	Statistical_Check_RandParm_For_Radar_Type_5_4_trail	1
5	16	0.750000	5500	Statistical_Check_RandParm_For_Radar_Type_5_5_trail	1
6	13	0.923076	5500	Statistical_Check_RandParm_For_Radar_Type_5_6_trail	1
7	19	0.631578	5500	Statistical_Check_RandParm_For_Radar_Type_5_7_trail	1
8	14	0.857142	5500	Statistical_Check_RandParm_For_Radar_Type_5_8_trail	1
9	15	0.800000	5500	Statistical_Check_RandParm_For_Radar_Type_5_9_trail	1
10	17	0.705882	5500	Statistical_Check_RandParm_For_Radar_Type_5_10_trail	1
11	13	0.923076	5494	Statistical_Check_RandParm_For_Radar_Type_5_11_trail	0
12	20	0.600000	5498	Statistical_Check_RandParm_For_Radar_Type_5_12_trail	1
13	10	1.200000	5493	Statistical_Check_RandParm_For_Radar_Type_5_13_trail	1
14	10	1.200000	5493	Statistical_Check_RandParm_For_Radar_Type_5_14_trail	0
15	9	1.333333	5492	Statistical_Check_RandParm_For_Radar_Type_5_15_trail	1
16	18	0.666666	5497	Statistical_Check_RandParm_For_Radar_Type_5_16_trail	1
17	10	1.200000	5493	Statistical_Check_RandParm_For_Radar_Type_5_17_trail	0
18	15	0.800000	5496	Statistical_Check_RandParm_For_Radar_Type_5_18_trail	1
19	14	0.857142	5495	Statistical_Check_RandParm_For_Radar_Type_5_19_trail	0
20	20	0.600000	5498	Statistical_Check_RandParm_For_Radar_Type_5_20_trail	0
21	19	0.631578	5502	Statistical_Check_RandParm_For_Radar_Type_5_21_trail	1
22	15	0.800000	5505	Statistical_Check_RandParm_For_Radar_Type_5_22_trail	1
23	13	0.923076	5506	Statistical_Check_RandParm_For_Radar_Type_5_23_trail	1
24	15	0.800000	5505	Statistical_Check_RandParm_For_Radar_Type_5_24_trail	1
25	8	1.500000	5508	Statistical_Check_RandParm_For_Radar_Type_5_25_trail	1
26	20	0.600000	5502	Statistical_Check_RandParm_For_Radar_Type_5_26_trail	1
27	17	0.705882	5504	Statistical_Check_RandParm_For_Radar_Type_5_27_trail	1
28	14	0.857142	5505	Statistical_Check_RandParm_For_Radar_Type_5_28_trail	1
29	13	0.923076	5505	Statistical_Check_RandParm_For_Radar_Type_5_29_trail	1
30	15	0.800000	5504	Statistical_Check_RandParm_For_Radar_Type_5_30_trail	1
Detection Percentage (%)					83.33%
Limit					≧80

Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 6
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	***Filename**	1= Detection 0= No Detection
1	5300	Statistical_Check_Hopping Frequency _List_For_Radar_Type_6_1_trail	1
2	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_2_trail	1
3	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_3_trail	1
4	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_4_trail	1
5	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_5_trail	1
6	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_6_trail	1
7	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_7_trail	1
8	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_8_trail	1
9	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_9_trail	1
10	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_10_trail	1
11	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_11_trail	1
12	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_12_trail	1
13	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_13_trail	1
14	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_14_trail	1
15	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_15_trail	1
16	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_16_trail	1
17	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_17_trail	1
18	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_18_trail	1
19	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_19_trail	1
20	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_20_trail	1
21	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_21_trail	1
22	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_22_trail	1
23	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_23_trail	1
24	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_24_trail	1
25	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_25_trail	1
26	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_26_trail	1
27	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_27_trail	1
28	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_28_trail	0
29	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_29_trail	1
30	5300	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_30_trail	1
Detection Percentage (%)			96.67%
Limit			>70

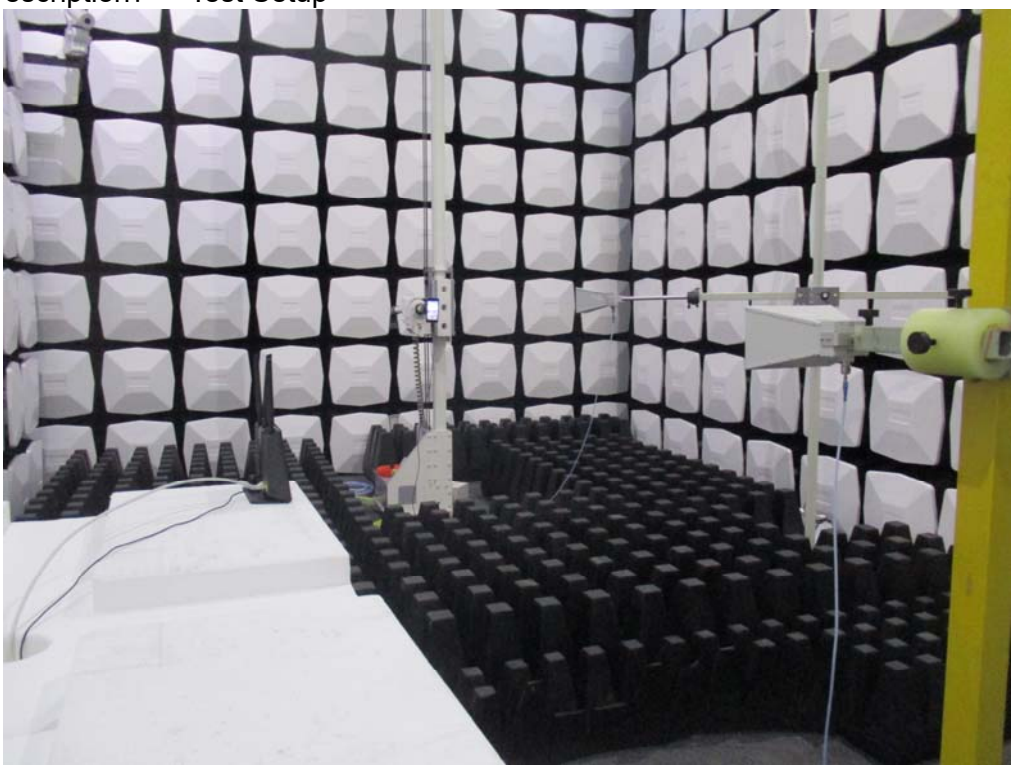
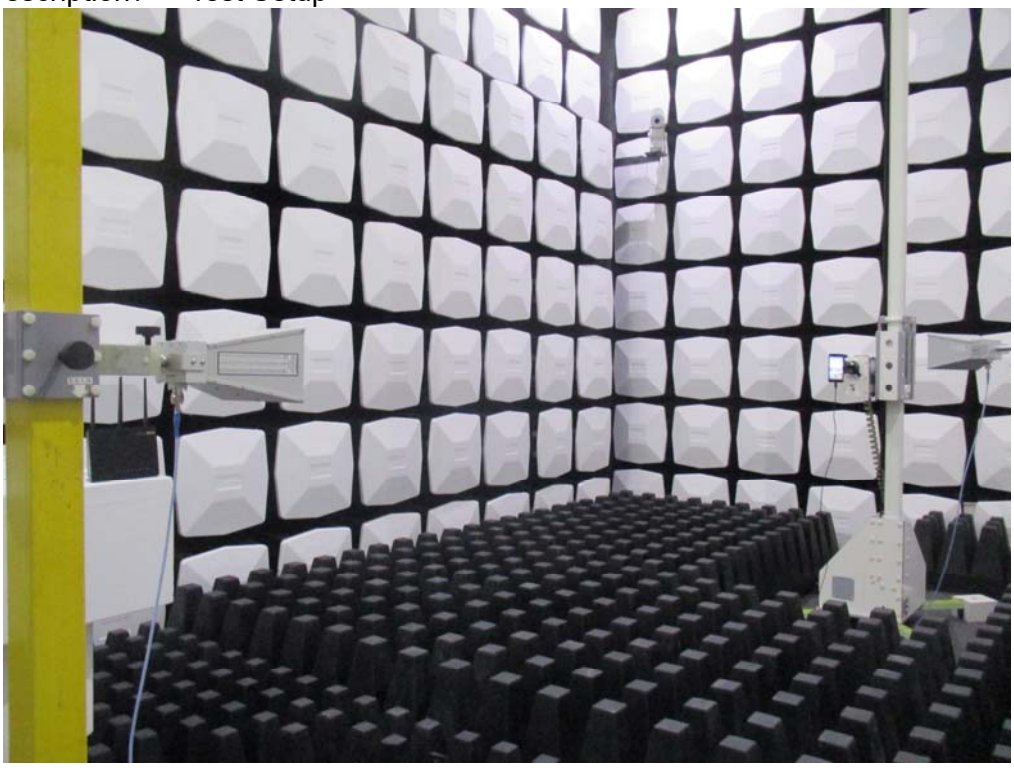
Product : Secure Smartphone
Test Item : Statistical Performance Check
Radar Type : Type 6
Test Date : 2019/05/27
Test Mode : Mode 1: Transmit Mode

Trial #	Frequency (MHz)	***Filename**	1= Detection 0= No Detection
1	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_1_trail	1
2	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_2_trail	1
3	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_3_trail	0
4	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_4_trail	1
5	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_5_trail	1
6	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_6_trail	1
7	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_7_trail	1
8	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_8_trail	1
9	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_9_trail	1
10	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_10_trail	1
11	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_11_trail	1
12	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_12_trail	1
13	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_13_trail	1
14	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_14_trail	1
15	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_15_trail	0
16	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_16_trail	1
17	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_17_trail	1
18	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_18_trail	1
19	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_19_trail	1
20	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_20_trail	1
21	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_21_trail	1
22	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_22_trail	1
23	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_23_trail	1
24	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_24_trail	1
25	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_25_trail	1
26	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_26_trail	1
27	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_27_trail	1
28	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_28_trail	1
29	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_29_trail	1
30	5500	Statistical_Check_Hopping Frequency List_For_Radar_Type_6_30_trail	1
Detection Percentage (%)			93.33%
Limit			>70

Attachment 1

- **Test Setup Photograph**

Description: Test Setup



Description: Test Setup