FCC RADIO TEST REPORT

FCC ID	:	PY7-34943G
Equipment	:	GSM/WCDMA/LTE PHONE WITH BT, DTS/UNII a/b/g/n/ac, NFC and GNSS
Brand Name	:	SONY
Applicant	:	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Manufacturer	:	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Standard	:	FCC Part 15 Subpart E §15.407
Test Date(s)	:	Dec. 20, 2021 ~ Jan. 28, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR1D0310E	01	Initial issue of report	Feb. 14, 2022
FR1D0310E	02	1. Update section 2 (a) test configuration description and section 2.2 test mode remark 2. Update Appendix E duty cycle test result 3. Update Appendix A PSD limit for UNII-3 to 30dBm	Feb. 21, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i)	26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)	Maximum Conducted Output Power	Pass	-
3.3	15.407(a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	Under limit 3.14 dB at 5141.600 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 13.75 dB at 0.214 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 15.407(a)	Antenna Requirement	Pass	-

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.

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII a/b/g/n/ac, NFC and GNSS.

Product Specification subjective to this standard	
Antenna Type / Gain	**For Ant 6:** **<5150 MHz ~ 5250 MHz>** PIFA Antenna with gain 2.5 dBi **<5250 MHz ~ 5350 MHz>** PIFA Antenna with gain 2.9 dBi **<5470 MHz ~ 5725 MHz>** PIFA Antenna with gain 1.0 dBi **For Ant 7:** **<5150 MHz ~ 5250 MHz>** PIFA Antenna with gain -0.1 dBi **<5250 MHz ~ 5350 MHz>** PIFA Antenna with gain 0.9 dBi **<5470 MHz ~ 5725 MHz>** PIFA Antenna with gain 1.4 dBi

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

EUT Information List			
HW Version	**SW Version**	**IMEI Code**	**Performed Test Item**
A	0.549	004402543107464/004402543107472	RF conducted measurement
	0.549	004402543253961/004402543253979	Radiated Spurious Emission
	0.549	004402543254142/004402543254159	AC Conducted Emission

Note: For other wireless features of this EUT, test report will be issued separately.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.4 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Y plane as worst plane. The worst case position of the EUT was investigated under two configurations: EUT with AC adapter and earphone, EUT with standalone. The EUT with standalone configuration was determined to be worst-case configurations; therefore, all final tests were performed on the EUT with standalone.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58#	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz Band 3 (U-NII-2C)	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106#	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122#	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138#	5690	144	5720
	142*	5710		

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	**6 Mbps**
802.11n HT20 (Covered by VHT20)	**MCS0**
802.11n HT40 (Covered by VHT40)	**MCS0**
802.11ac VHT20	**MCS0**
802.11ac VHT40	**MCS0**
802.11ac VHT80	**MCS0**

Remark: Since the verify power, the same operating range bandwidth and smaller power can be covered by the higher power.

Co-location Mode
WWAN LTE 41 Link + WLAN 5GHz 11a CH36(Ant.6) + BLE 2Mbps CH39(Ant.6)
WWAN LTE 41 Link + WLAN 5GHz 11a CH36(Ant.7) + BLE 2Mbps CH39(Ant.6)
WWAN LTE 41 Link + WLAN 5GHz 11a CH36(Ant.6+7) + BLE 2Mbps CH39(Ant.6)

Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable 1(Charging from AC Adapter)

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

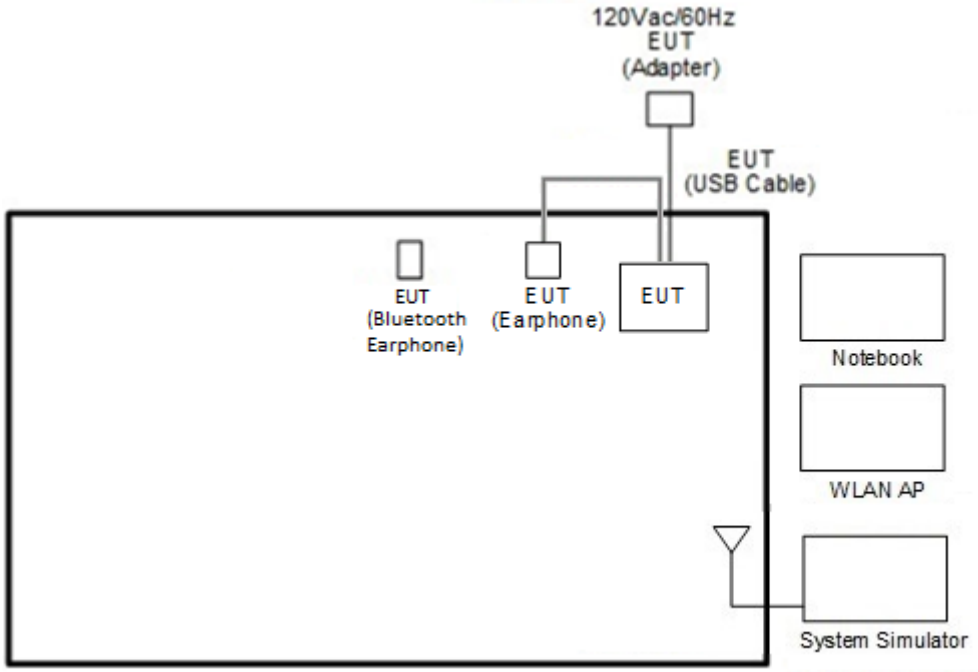
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	122
Straddle		-	-	138

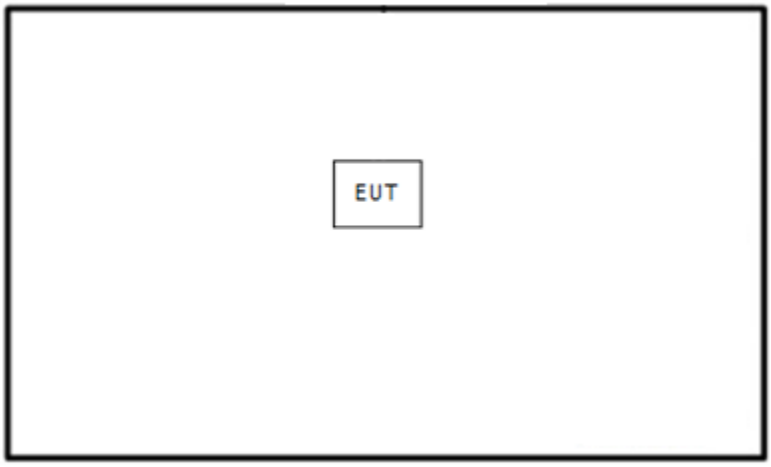
Remark: For WLAN radiated test, according to the conducted power and verify test the SISO & MIMO mode, the worst-case is MIMO mode, therefore, all final test are performed in MIMO mode and reported.

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<WLAN TX Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
4.	Bluetooth Earphone	Sony	SBH82D	PY7-33726V	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “FTM” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.7 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 6.7 + 10 = 16.7 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

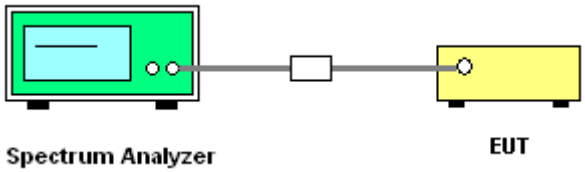
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

■ For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

For the 5.25–5.725 GHz bands:

■ The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

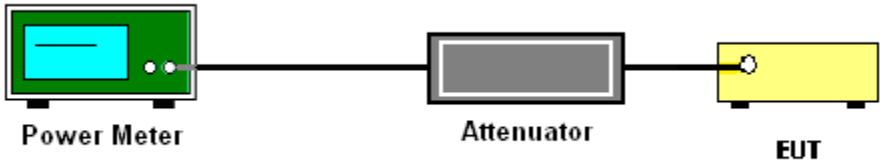
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For the 5.15–5.25 GHz bands:

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1.0 MHz band. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1.0 MHz band.

For the 5.25–5.725 GHz bands:

The maximum power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

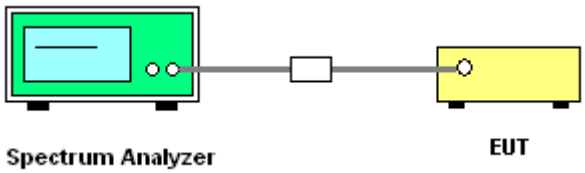
See list of measuring equipment of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Section F. Maximum power spectral density.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of −27 dBm/MHz.
(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000 MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

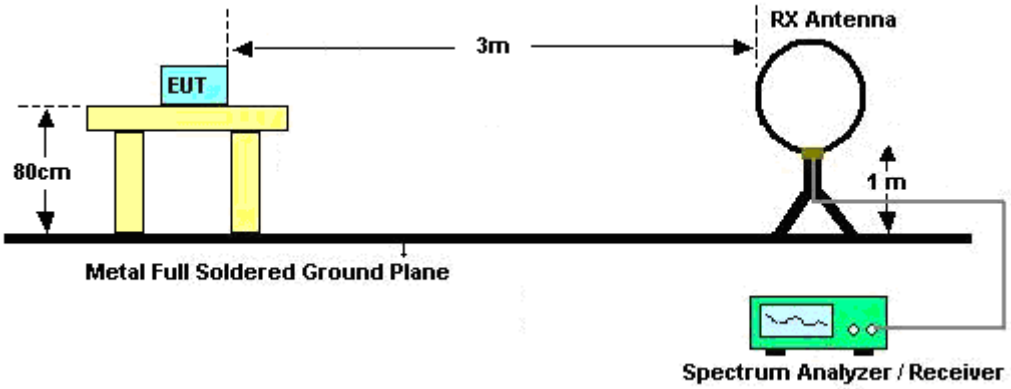
(3) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

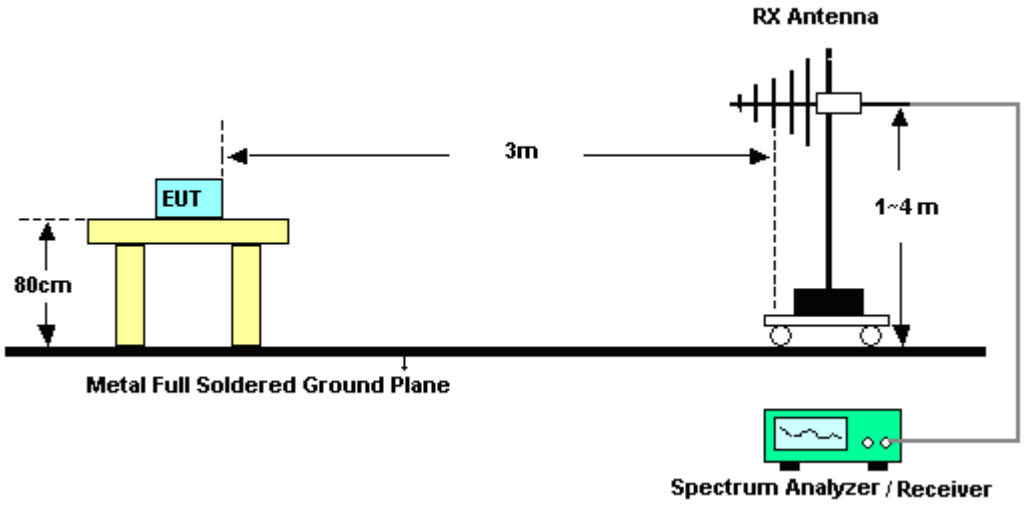
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1 GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

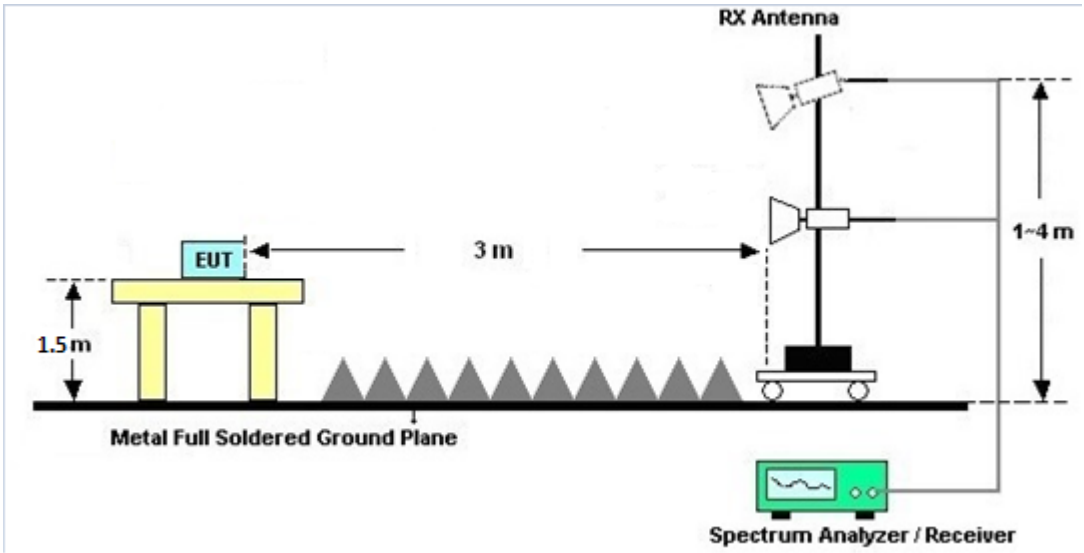
For radiated emissions below 30MHz



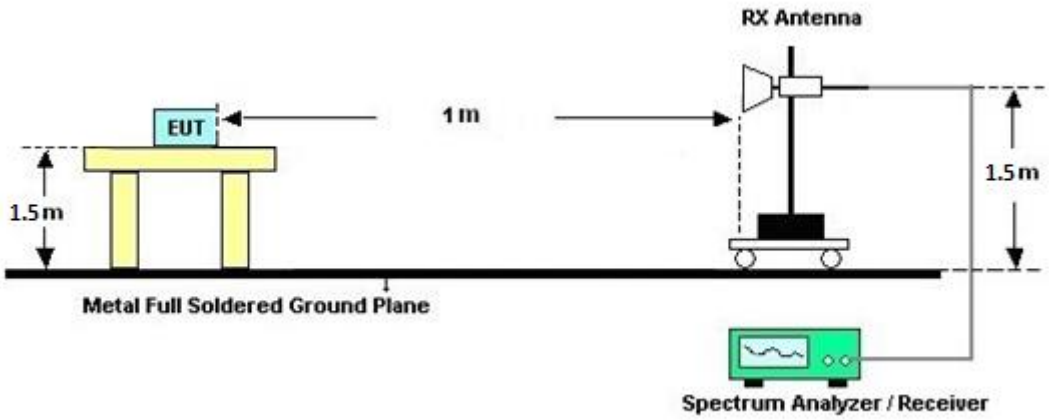
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.4.7 Duty Cycle

Please refer to Appendix E.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

*Decreases with the logarithm of the frequency.

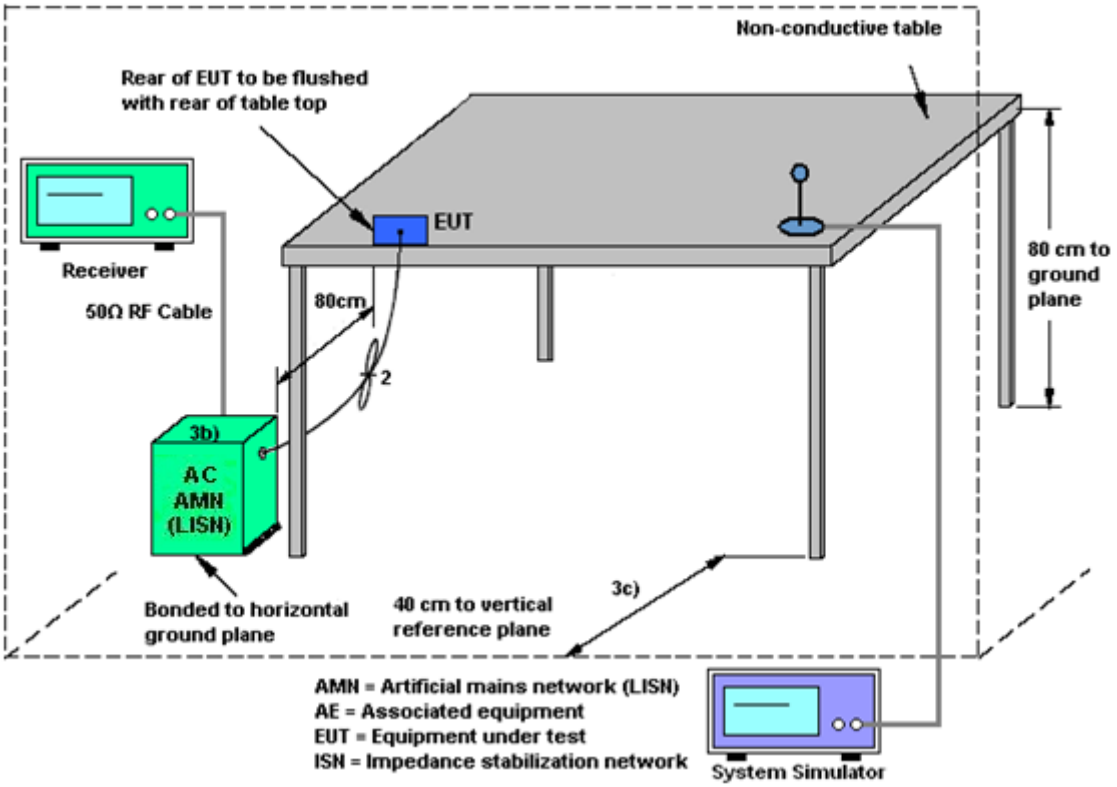
3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>

	Ant. 6 (dBi)	Ant. 7 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	2.50	-0.10	2.50	4.31	0.00	0.00
Band II	2.90	0.90	2.90	4.97	0.00	0.00
Band III	1.00	1.40	1.40	4.21	0.00	0.00

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Jan. 19, 2022~ Jan. 21, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2022	Jan. 19, 2022~ Jan. 21, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2022	Jan. 19, 2022~ Jan. 21, 2022	Jan. 04, 2023	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 16, 2021	Jan. 28, 2022	Oct. 15, 2022	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 12, 2021	Jan. 28, 2022	Apr.11, 2022	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Jan. 28, 2022	Oct. 29, 2022	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 27, 2021	Jan. 28, 2022	May 26, 2022	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	Jan. 28, 2022	Apr. 24, 2022	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 05, 2022	Jan. 28, 2022	Jan. 04, 2023	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	Jan. 28, 2022	Apr. 11, 2022	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Jan. 28, 2022	Jan. 04, 2023	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Jan. 28, 2022	Jul. 29, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	Jan. 28, 2022	Apr. 12, 2022	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 28, 2022	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 28, 2022	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 28, 2022	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Dec. 20, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Dec. 20, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 14, 2021	Dec. 20, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Dec. 20, 2021	Oct. 13, 2022	Conduction (CO01-KS)

NCR: No Calibration Required.

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.9dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Appendix A. Conducted Test Results

Report Number : FR1D0310E

Test Engineer:	Jack Fan	Temperature:	21~25	°C
Test Date:	2022/1/19~2022/1/21	Relative Humidity:	51~54	%

Report Number : FR1D0310E

TEST RESULTS DATA
Average Power Table

FCC U-NII-1															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 6	Ant 7	Ant 6	Ant 7	SUM	Ant 6	Ant 7	Ant 6	Ant 7		
11a	6Mbps	2	36	5180			11.90	11.89	14.91	23.98		2.50			Pass
11a	6Mbps	2	44	5220			11.75	11.05	14.42	23.98		2.50			Pass
11a	6Mbps	2	48	5240			11.73	10.95	14.37	23.98		2.50			Pass
HT20	MCS0	2	36	5180			11.87	11.73	14.81	23.98		2.50			Pass
HT20	MCS0	2	44	5220			11.67	10.94	14.33	23.98		2.50			Pass
HT20	MCS0	2	48	5240			11.71	10.93	14.35	23.98		2.50			Pass
HT40	MCS0	2	38	5190	0.16	0.16	10.69	10.44	13.58	23.98		2.50			Pass
HT40	MCS0	2	46	5230	0.16	0.16	10.75	10.05	13.43	23.98		2.50			Pass
VHT20	MCS0	2	36	5180			11.90	11.85	14.89	23.98		2.50			Pass
VHT20	MCS0	2	44	5220			11.71	10.98	14.37	23.98		2.50			Pass
VHT20	MCS0	2	48	5240			11.72	10.96	14.37	23.98		2.50			Pass
VHT40	MCS0	2	38	5190	0.16	0.16	10.71	10.48	13.61	23.98		2.50			Pass
VHT40	MCS0	2	46	5230	0.16	0.16	10.78	10.09	13.46	23.98		2.50			Pass
VHT80	MCS0	2	42	5210	0.31	0.31	9.99	9.07	12.57	23.98		2.50			Pass

Report Number : FR1D0310E

TEST RESULTS DATA
Average Power Table

FCC U-NII-2A															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 6	Ant 7	Ant 6	Ant 7	SUM	Ant 6	Ant 7	Ant 6	Ant 7		
11a	6Mbps	2	52	5260			11.66	10.99	14.35	23.98		2.90		26.99	Pass
11a	6Mbps	2	60	5300			11.81	11.53	14.68	23.98		2.90		26.99	Pass
11a	6Mbps	2	64	5320			11.68	11.44	14.57	23.98		2.90		26.99	Pass
HT20	MCS0	2	52	5260			11.65	10.94	14.32	23.98		2.90		26.99	Pass
HT20	MCS0	2	60	5300			11.76	11.37	14.58	23.98		2.90		26.99	Pass
HT20	MCS0	2	64	5320			11.61	11.35	14.49	23.98		2.90		26.99	Pass
HT40	MCS0	2	54	5270	0.16	0.16	10.59	10.18	13.40	23.98		2.90		26.99	Pass
HT40	MCS0	2	62	5310	0.16	0.16	10.93	10.38	13.68	23.98		2.90		26.99	Pass
VHT20	MCS0	2	52	5260			11.67	11.05	14.38	23.98		2.90		26.99	Pass
VHT20	MCS0	2	60	5300			11.78	11.38	14.59	23.98		2.90		26.99	Pass
VHT20	MCS0	2	64	5320			11.63	11.39	14.52	23.98		2.90		26.99	Pass
VHT40	MCS0	2	54	5270	0.16	0.16	10.64	10.21	13.44	23.98		2.90		26.99	Pass
VHT40	MCS0	2	62	5310	0.16	0.16	10.99	10.40	13.72	23.98		2.90		26.99	Pass
VHT80	MCS0	2	58	5290	0.31	0.31	9.78	9.39	12.60	23.98		2.90		26.99	Pass

Report Number : FR1D0310E

TEST RESULTS DATA
Average Power Table

FCC U-NII-2C															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 6	Ant 7	Ant 6	Ant 7	SUM	Ant 6	Ant 7	Ant 6	Ant 7		
11a	6Mbps	2	100	5500			11.87	10.96	14.45	23.98		1.40		26.99	Pass
11a	6Mbps	2	116	5580			11.74	10.93	14.36	23.98		1.40		26.99	Pass
11a	6Mbps	2	140	5700			11.74	11.06	14.42	23.98		1.40		26.99	Pass
11a	6Mbps	2	144	5720			11.79	10.96	14.41	23.98		1.40		26.99	Pass
HT20	MCS0	2	100	5500			11.89	10.95	14.46	23.98		1.40		26.99	Pass
HT20	MCS0	2	116	5580			11.74	10.94	14.37	23.98		1.40		26.99	Pass
HT20	MCS0	2	140	5700			11.73	11.03	14.40	23.98		1.40		26.99	Pass
HT20	MCS0	2	144	5720			11.77	11.01	14.42	23.98		1.40		26.99	Pass
HT40	MCS0	2	102	5510	0.16	0.16	10.95	10.03	13.53	23.98		1.40		26.99	Pass
HT40	MCS0	2	110	5550	0.16	0.16	10.92	10.02	13.51	23.98		1.40		26.99	Pass
HT40	MCS0	2	134	5670	0.16	0.16	10.77	10.13	13.47	23.98		1.40		26.99	Pass
HT40	MCS0	2	142	5710	0.16	0.16	10.82	10.11	13.49	23.98		1.40		26.99	Pass
VHT20	MCS0	2	100	5500			11.90	10.97	14.47	23.98		1.40		26.99	Pass
VHT20	MCS0	2	116	5580			11.76	10.95	14.38	23.98		1.40		26.99	Pass
VHT20	MCS0	2	140	5700			11.74	10.96	14.38	23.98		1.40		26.99	Pass
VHT20	MCS0	2	144	5720			11.83	10.94	14.42	23.98		1.40		26.99	Pass
VHT40	MCS0	2	102	5510	0.16	0.16	10.97	10.04	13.54	23.98		1.40		26.99	Pass
VHT40	MCS0	2	110	5550	0.16	0.16	10.96	10.02	13.53	23.98		1.40		26.99	Pass
VHT40	MCS0	2	134	5670	0.16	0.16	10.80	10.18	13.51	23.98		1.40		26.99	Pass
VHT40	MCS0	2	142	5710	0.16	0.16	10.86	10.15	13.53	23.98		1.40		26.99	Pass
VHT80	MCS0	2	106	5530	0.31	0.31	9.70	9.08	12.41	23.98		1.40		26.99	Pass
VHT80	MCS0	2	122	5610	0.31	0.31	9.83	9.03	12.46	23.98		1.40		26.99	Pass
VHT80	MCS0	2	138	5690	0.31	0.31	9.92	9.34	12.65	23.98		1.40		26.99	Pass

Emission Bandwidth

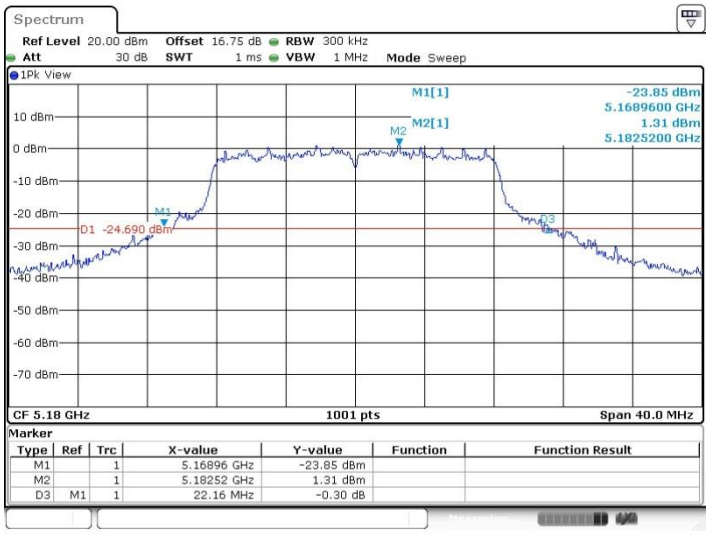
Test Result

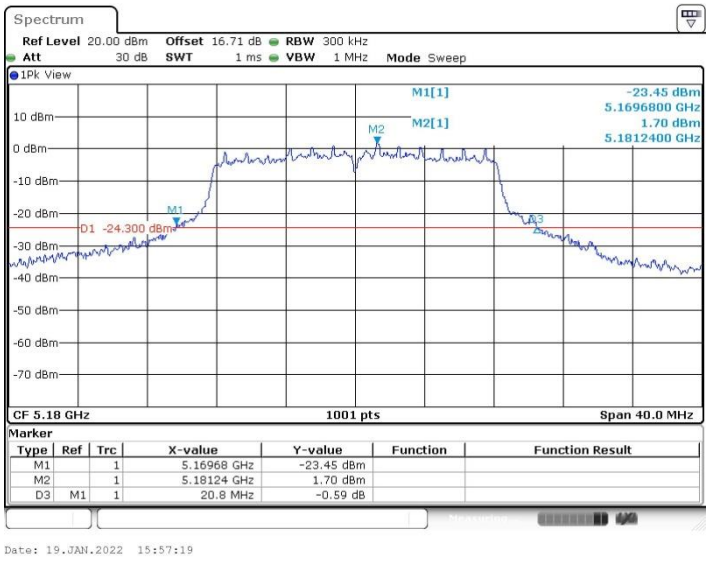
TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-CDD	Ant6	5180	22.16	5168.96	5191.12	---	---
	Ant7	5180	20.80	5169.68	5190.48	---	---
	Ant6	5220	21.96	5209.00	5230.96	---	---
	Ant7	5220	21.64	5209.04	5230.68	---	---
	Ant6	5240	22.04	5229.00	5251.04	---	---
	Ant7	5240	22.56	5229.60	5252.16	---	---
	Ant6	5260	22.44	5248.28	5270.72	---	---
	Ant7	5260	21.12	5249.36	5270.48	---	---
	Ant6	5300	22.04	5289.00	5311.04	---	---
	Ant7	5300	21.00	5289.48	5310.48	---	---
	Ant6	5320	22.04	5309.44	5331.48	---	---
	Ant7	5320	22.04	5308.68	5330.72	---	---
	Ant6	5500	21.80	5488.92	5510.72	---	---
	Ant7	5500	21.12	5489.56	5510.68	---	---
	Ant6	5580	22.08	5568.92	5591.00	---	---
	Ant7	5580	21.04	5569.60	5590.64	---	---
	Ant6	5700	21.52	5689.52	5711.04	---	---
	Ant7	5700	20.88	5689.60	5710.48	---	---
	Ant6	5720	20.84	5709.60	5730.44	---	---
	Ant7	5720	22.04	5709.04	5731.08	---	---
	Ant6	5720_UNII-2C	15.4	5709.60	5725	---	---
	Ant7	5720_UNII-2C	15.96	5709.04	5725	---	---
	Ant6	5720_UNII-3	5.44	5725	5730.44	---	---
	Ant7	5720_UNII-3	6.08	5725	5731.08	---	---
11AC20-CDD	Ant6	5180	21.80	5168.96	5190.76	---	---
	Ant7	5180	22.48	5169.08	5191.56	---	---
	Ant6	5220	21.80	5208.96	5230.76	---	---
	Ant7	5220	22.60	5208.52	5231.12	---	---
	Ant6	5240	21.48	5229.32	5250.80	---	---
	Ant7	5240	22.36	5229.24	5251.60	---	---
	Ant6	5260	22.12	5248.68	5270.80	---	---
	Ant7	5260	21.72	5249.00	5270.72	---	---
	Ant6	5300	21.60	5289.00	5310.60	---	---
	Ant7	5300	21.40	5289.32	5310.72	---	---

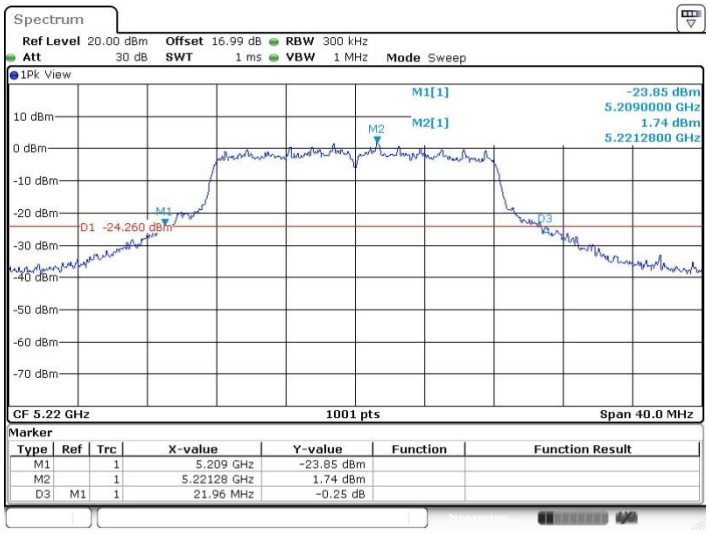
	Ant6	5320	22.76	5308.96	5331.72	---	---
	Ant7	5320	22.28	5308.48	5330.76	---	---
	Ant6	5500	21.96	5489.04	5511.00	---	---
	Ant7	5500	22.80	5488.08	5510.88	---	---
	Ant6	5580	22.32	5568.68	5591.00	---	---
	Ant7	5580	22.24	5568.88	5591.12	---	---
	Ant6	5700	21.64	5689.12	5710.76	---	---
	Ant7	5700	21.44	5689.32	5710.76	---	---
	Ant6	5720	22.56	5708.48	5731.04	---	---
	Ant7	5720	22.32	5708.72	5731.04	---	---
	Ant6	5720_UNII-2C	16.52	5708.48	5725	---	---
	Ant7	5720_UNII-2C	16.28	5708.72	5725	---	---
	Ant6	5720_UNII-3	6.04	5725	5731.04	---	---
	Ant7	5720_UNII-3	6.04	5725	5731.04	---	---
11AC40-CDD	Ant6	5190	41.84	5169.12	5210.96	---	---
	Ant7	5190	41.60	5169.36	5210.96	---	---
	Ant6	5230	42.40	5208.80	5251.20	---	---
	Ant7	5230	42.00	5209.12	5251.12	---	---
	Ant6	5270	42.32	5248.72	5291.04	---	---
	Ant7	5270	41.92	5249.12	5291.04	---	---
	Ant6	5310	42.72	5288.56	5331.28	---	---
	Ant7	5310	41.84	5288.96	5330.80	---	---
	Ant6	5510	42.32	5488.88	5531.20	---	---
	Ant7	5510	41.76	5489.36	5531.12	---	---
	Ant6	5550	42.08	5528.88	5570.96	---	---
	Ant7	5550	41.76	5529.20	5570.96	---	---
	Ant6	5670	41.84	5648.96	5690.80	---	---
	Ant7	5670	41.52	5649.44	5690.96	---	---
	Ant6	5710	41.68	5689.44	5731.12	---	---
	Ant7	5710	42.24	5688.80	5731.04	---	---
	Ant6	5710_UNII-2C	35.56	5689.44	5725	---	---
	Ant7	5710_UNII-2C	36.2	5688.80	5725	---	---
	Ant6	5710_UNII-3	6.12	5725	5731.12	---	---
	Ant7	5710_UNII-3	6.04	5725	5731.04	---	---
11AC80-CDD	Ant6	5210	84.96	5167.76	5252.72	---	---
	Ant7	5210	100.80	5168.56	5269.36	---	---
	Ant6	5290	85.44	5247.12	5332.56	---	---
	Ant7	5290	84.32	5248.24	5332.56	---	---
	Ant6	5530	85.28	5487.28	5572.56	---	---
	Ant7	5530	84.00	5488.08	5572.08	---	---

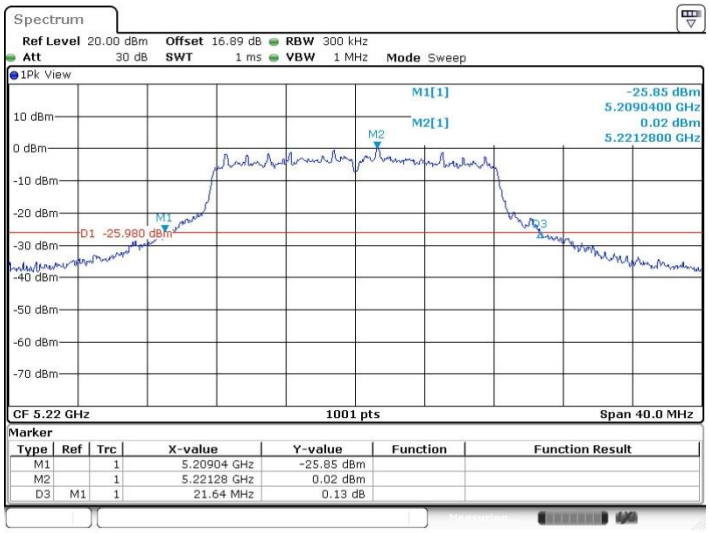
	Ant6	5610	84.80	5567.12	5651.92	---	---
	Ant7	5610	83.52	5568.40	5651.92	---	---
	Ant6	5690	84.48	5648.24	5732.72	---	---
	Ant7	5690	84.96	5647.60	5732.56	---	---
	Ant6	5690_UNII-2C	76.76	5648.24	5725	---	---
	Ant7	5690_UNII-2C	77.4	5647.60	5725	---	---
	Ant6	5690_UNII-3	7.72	5725	5732.72	---	---
	Ant7	5690_UNII-3	7.56	5725	5732.56	---	---

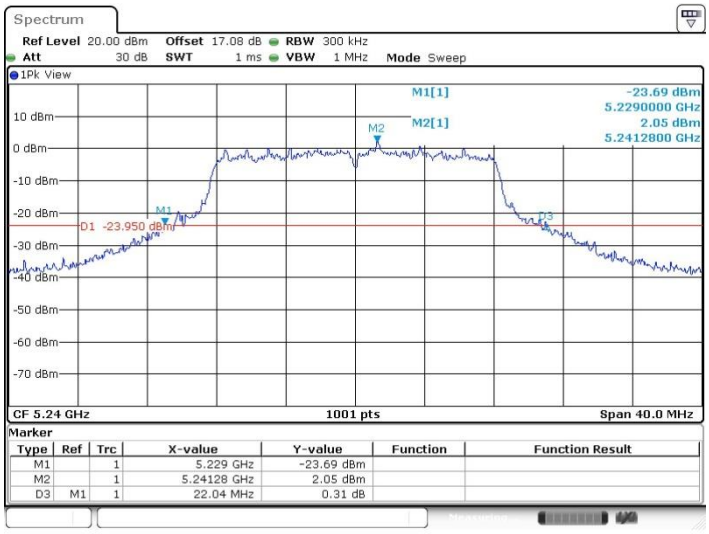
Test Graphs

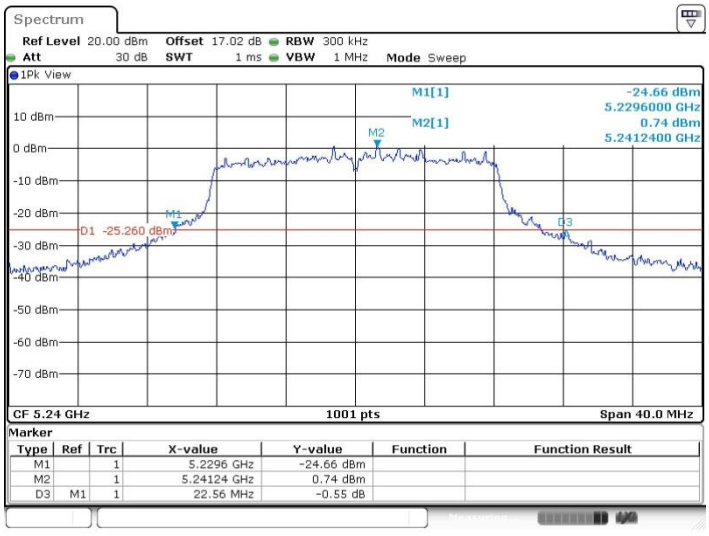
11A-CDD_Ant6_5180


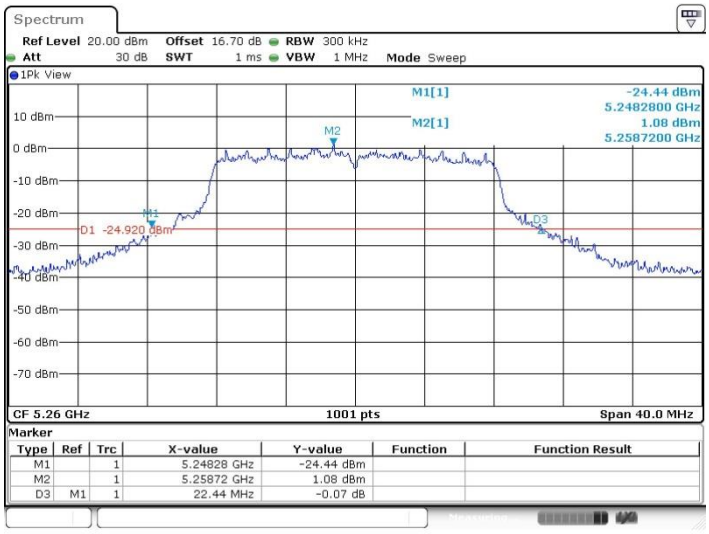
11A-CDD_Ant7_5180


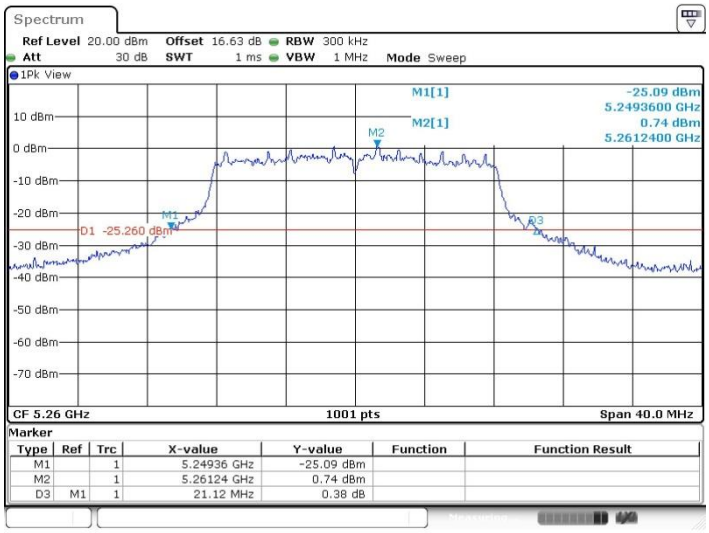
11A-CDD_Ant6_5220


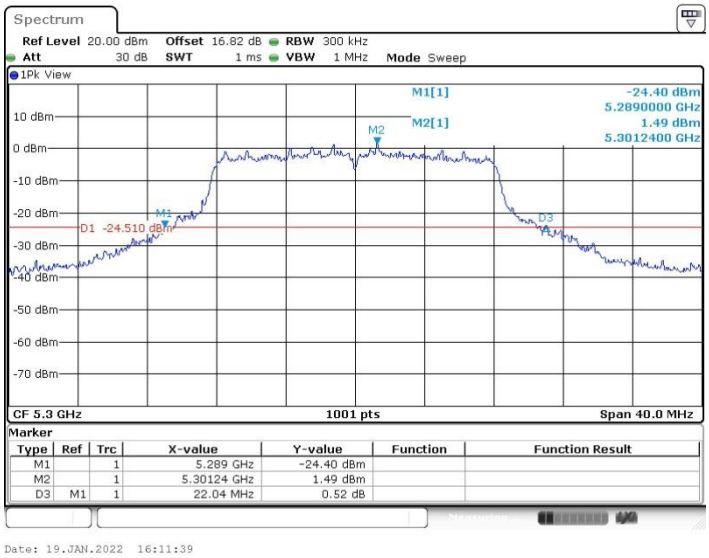
11A-CDD_Ant7_5220


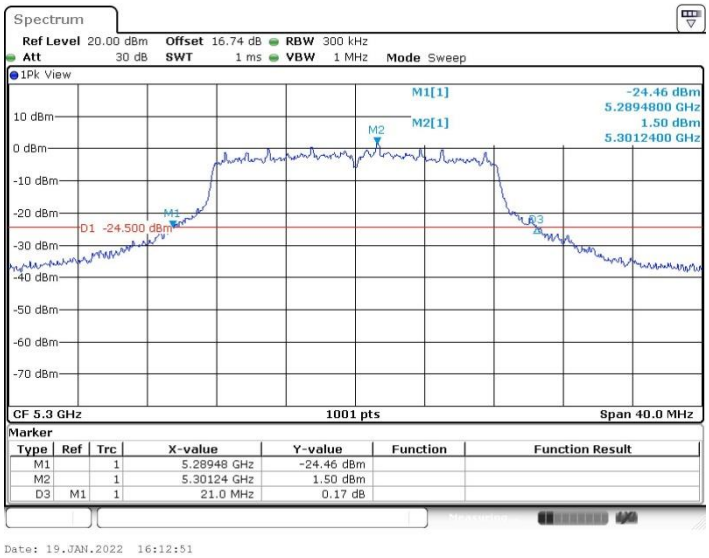
11A-CDD_Ant6_5240


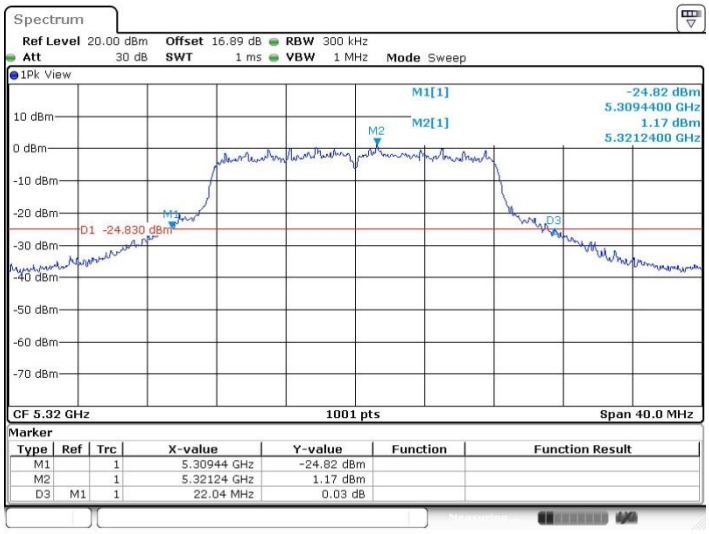
11A-CDD_Ant7_5240


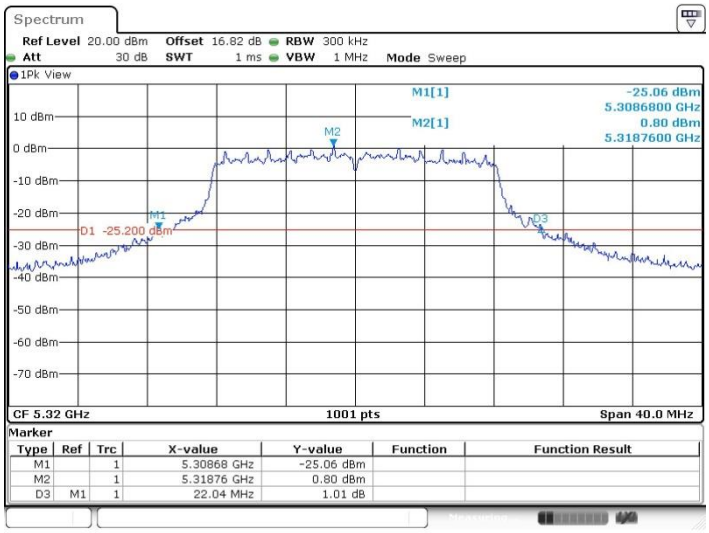
11A-CDD_Ant6_5260


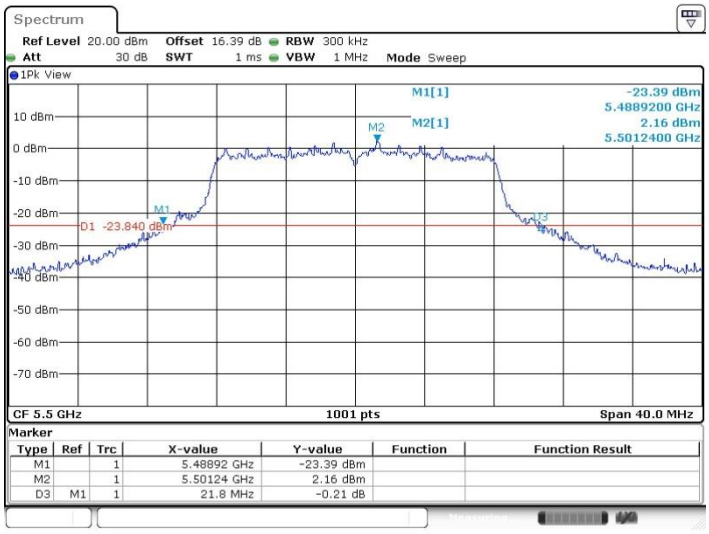
11A-CDD_Ant7_5260


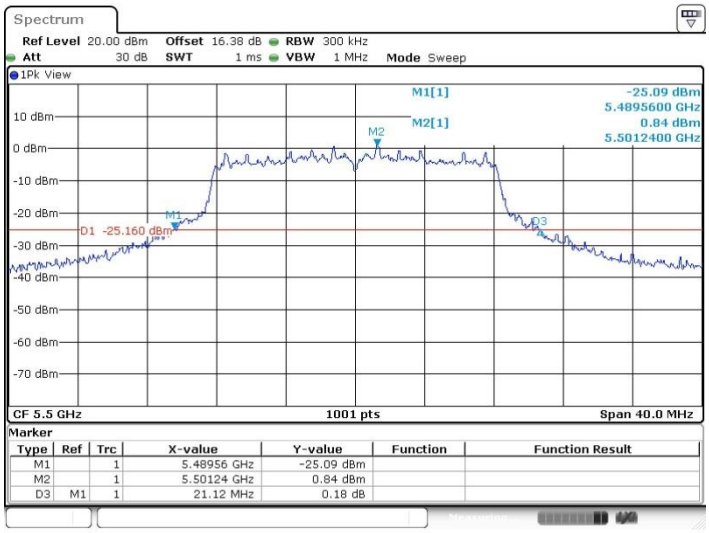
11A-CDD_Ant6_5300


11A-CDD_Ant7_5300


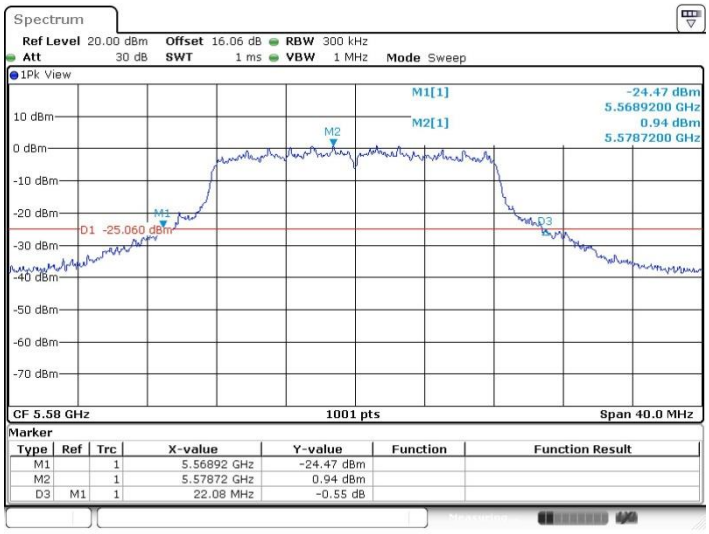
11A-CDD_Ant6_5320


11A-CDD_Ant7_5320


11A-CDD_Ant6_5500


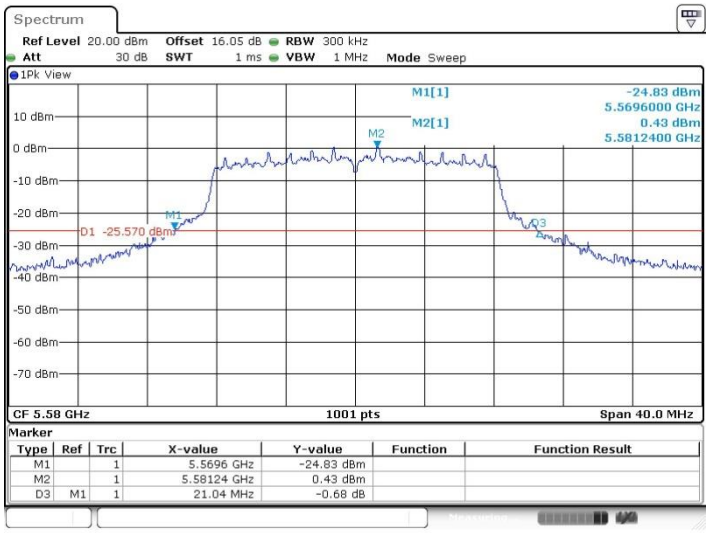
11A-CDD_Ant7_5500


11A-CDD_Ant6_5580

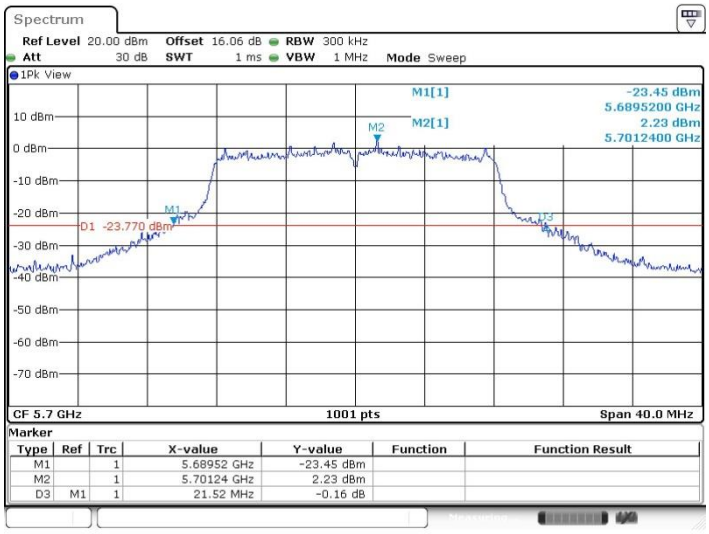


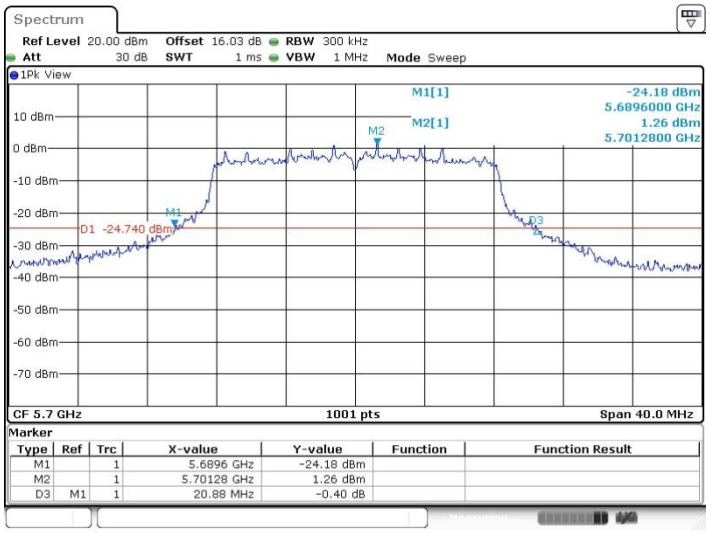
Date: 19.JAN.2022 16:19:52

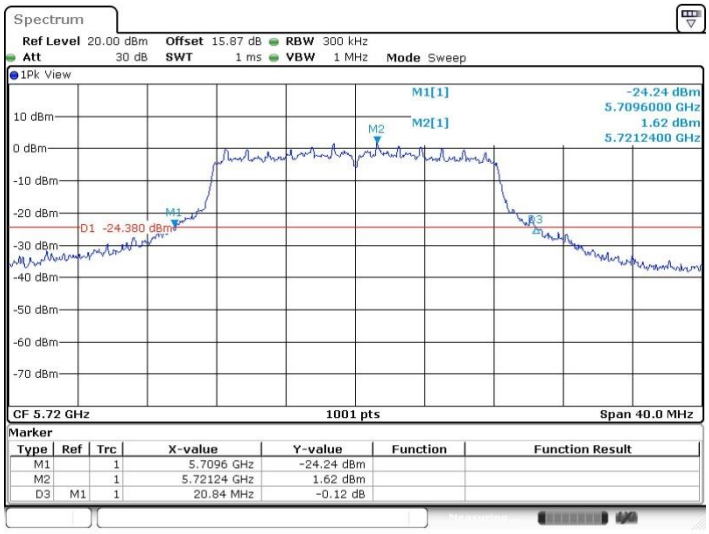
11A-CDD_Ant7_5580

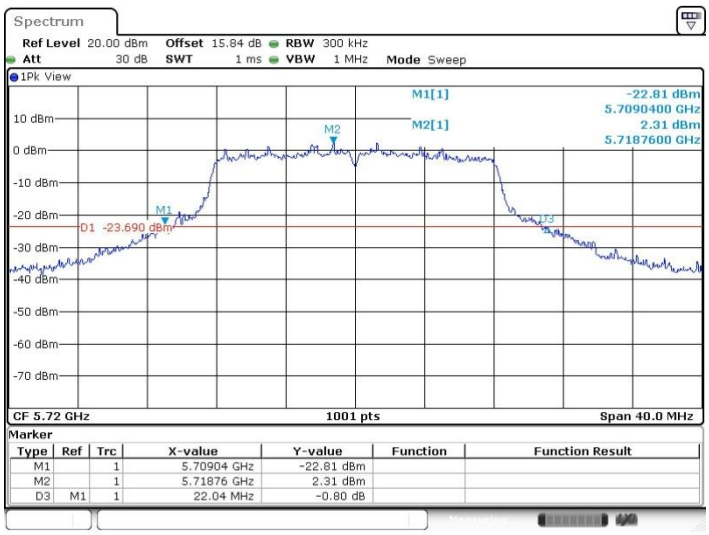


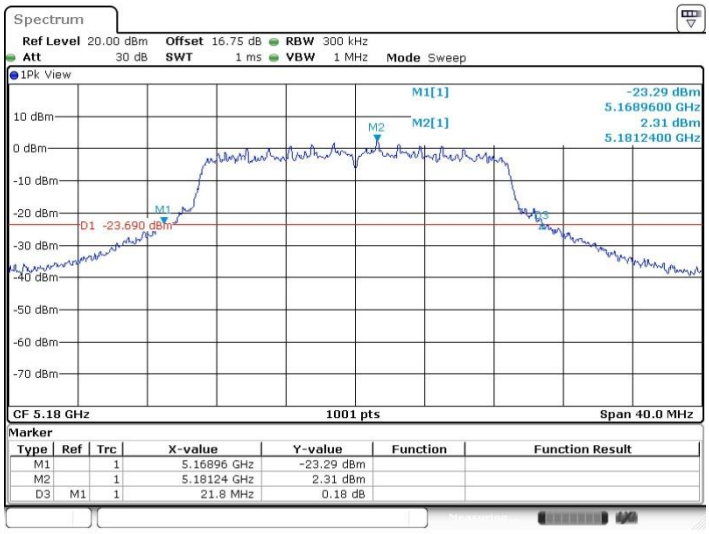
Date: 19.JAN.2022 16:21:06

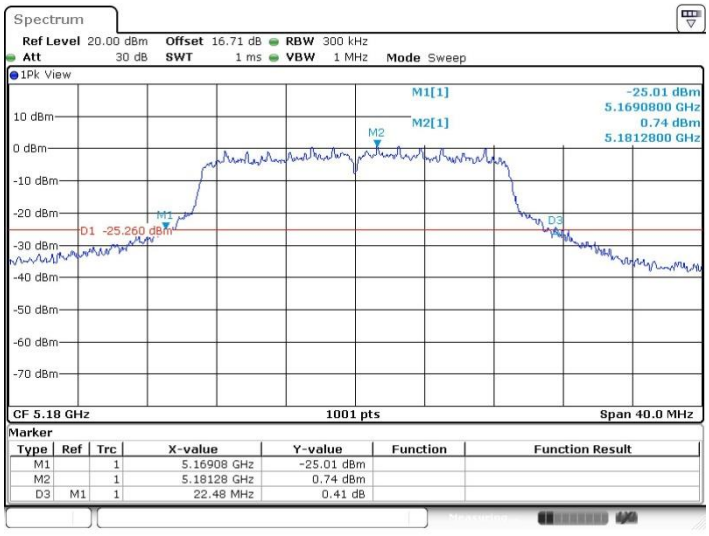
11A-CDD_Ant6_5700


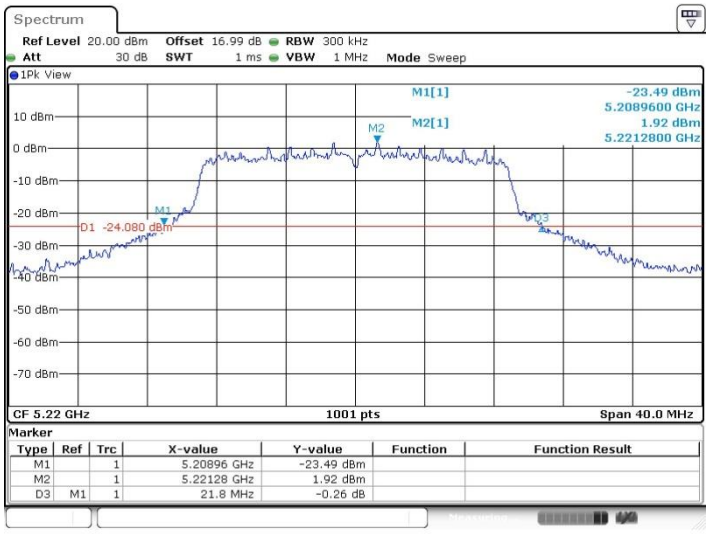
11A-CDD_Ant7_5700


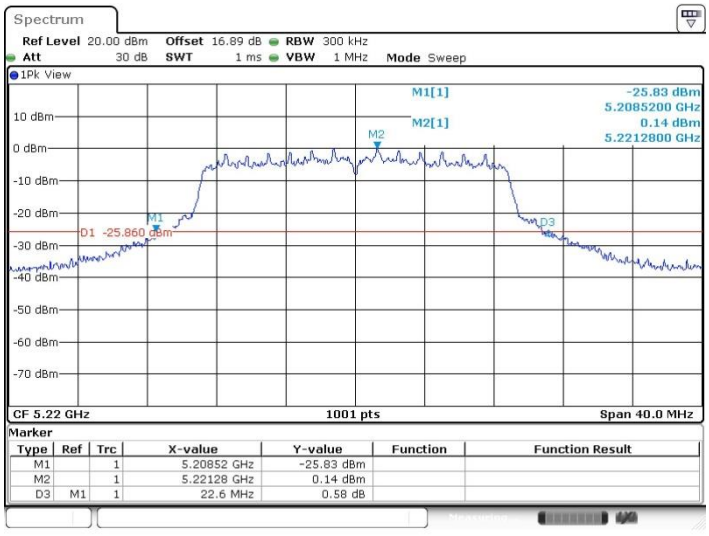
11A-CDD_Ant6_5720


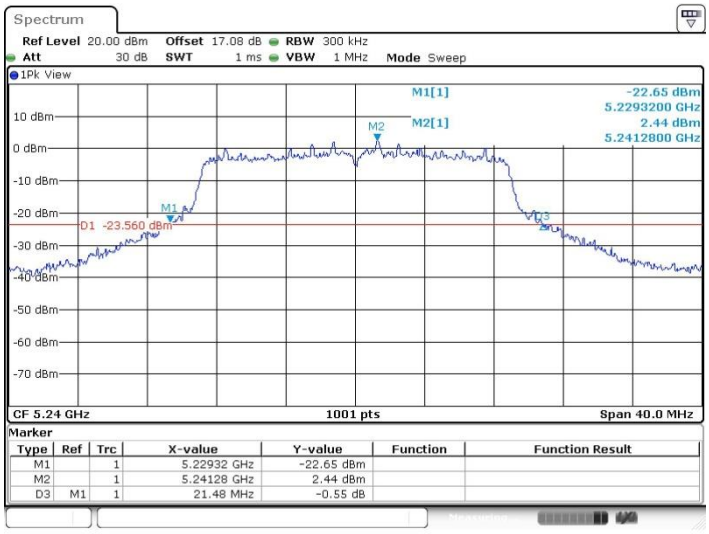
11A-CDD_Ant7_5720


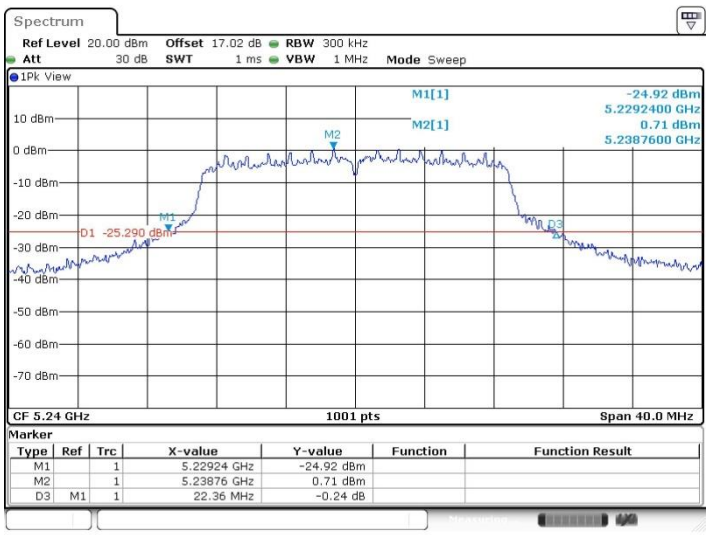
11AC20-CDD_Ant6_5180


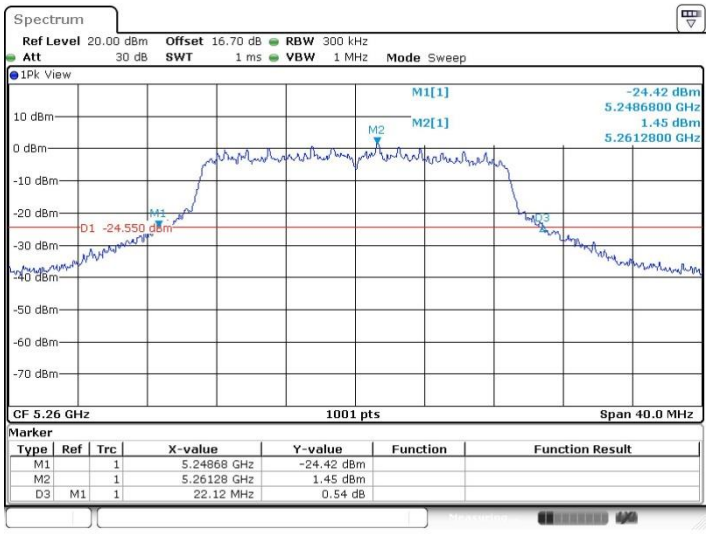
11AC20-CDD_Ant7_5180


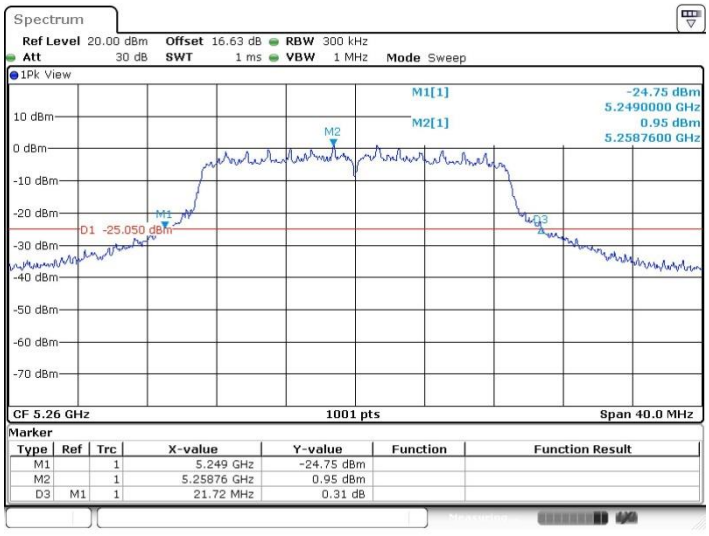
11AC20-CDD_Ant6_5220


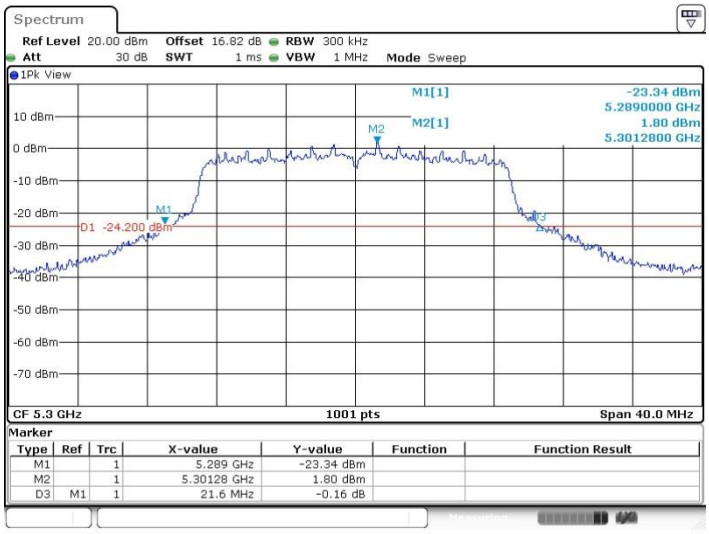
11AC20-CDD_Ant7_5220


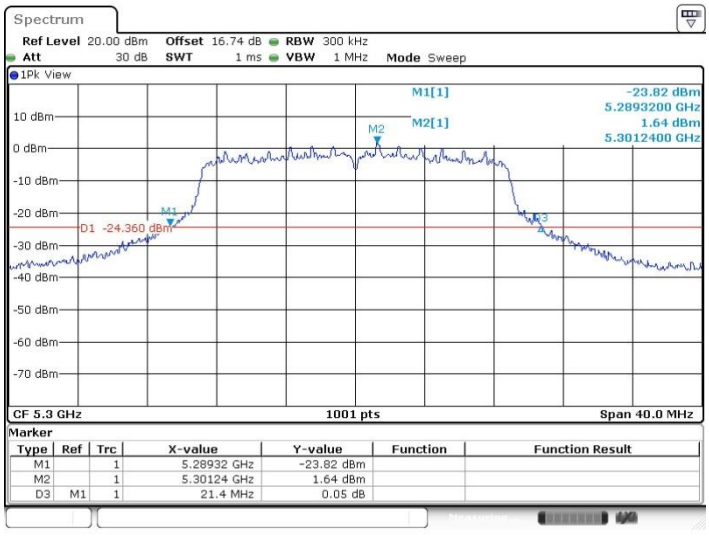
11AC20-CDD_Ant6_5240


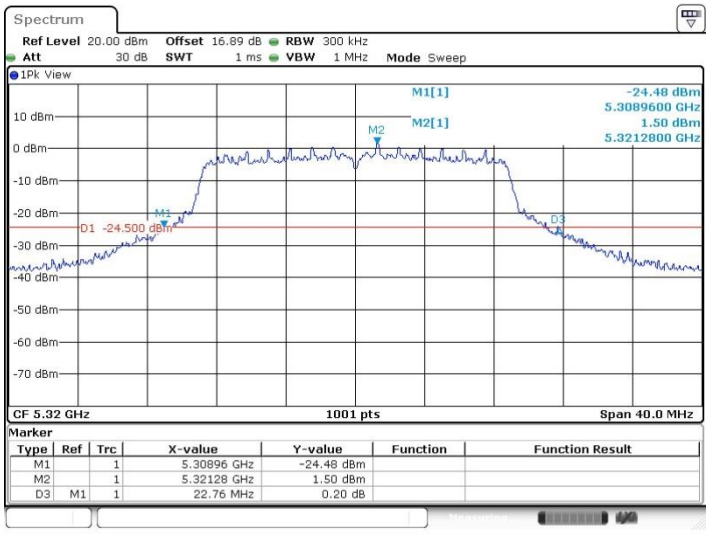
11AC20-CDD_Ant7_5240


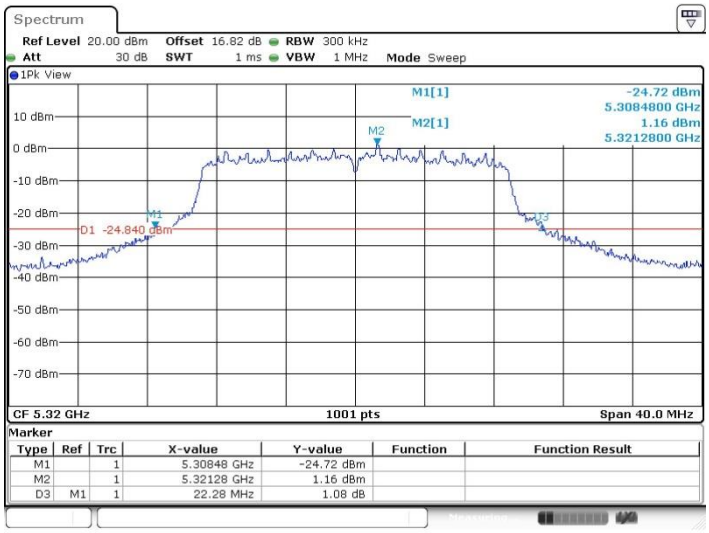
11AC20-CDD_Ant6_5260


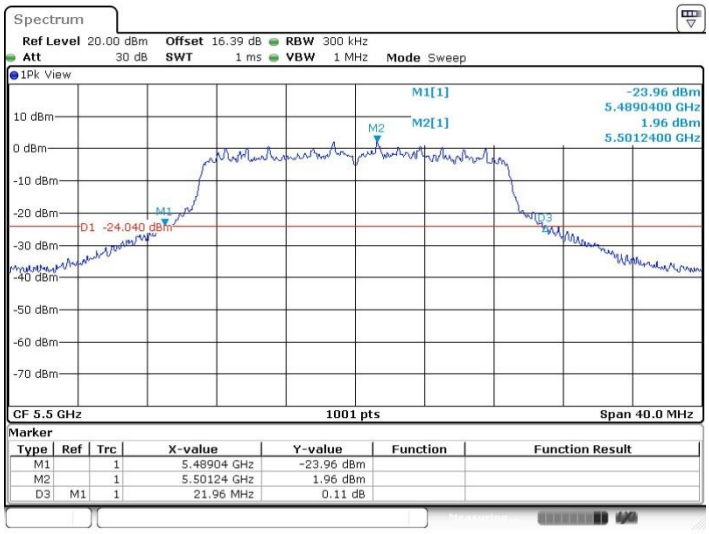
11AC20-CDD_Ant7_5260


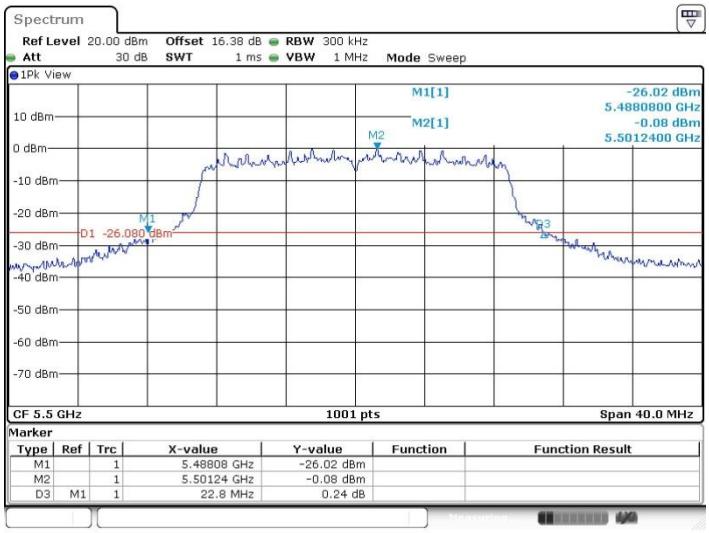
11AC20-CDD_Ant6_5300


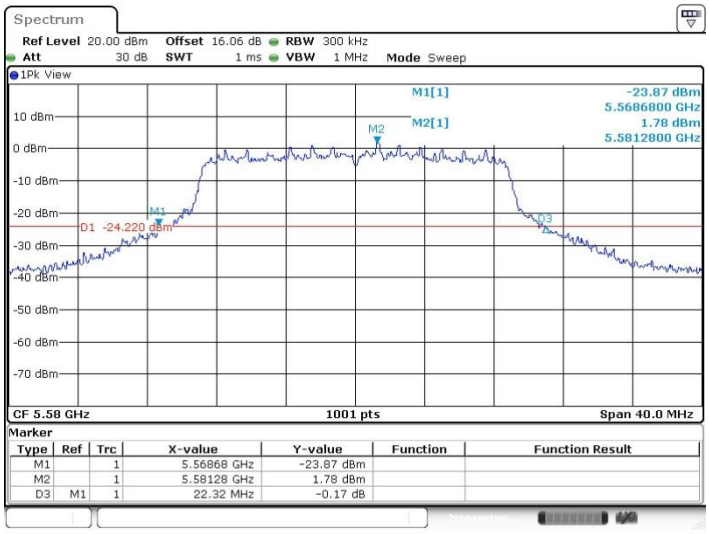
11AC20-CDD_Ant7_5300


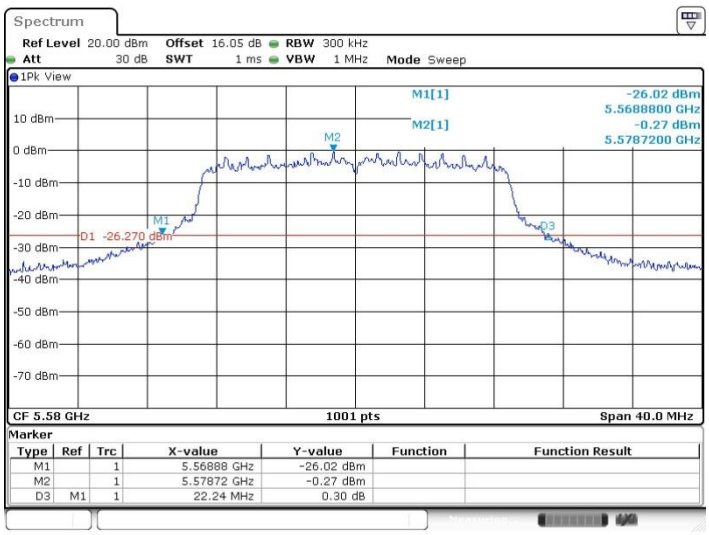
11AC20-CDD_Ant6_5320


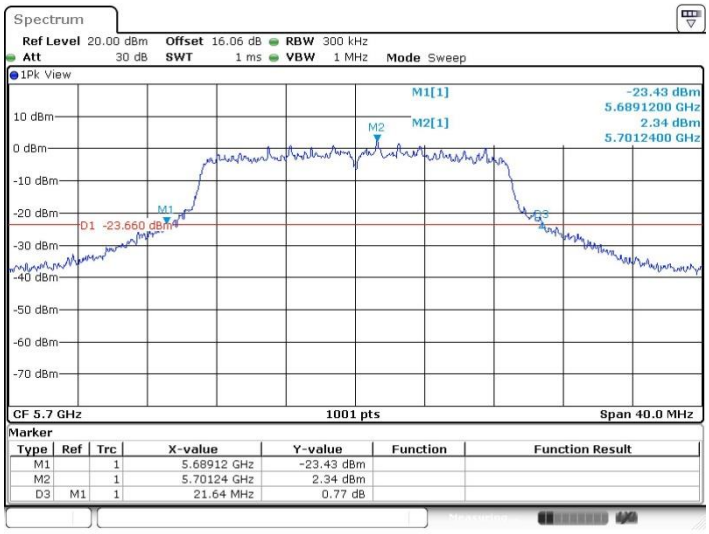
11AC20-CDD_Ant7_5320


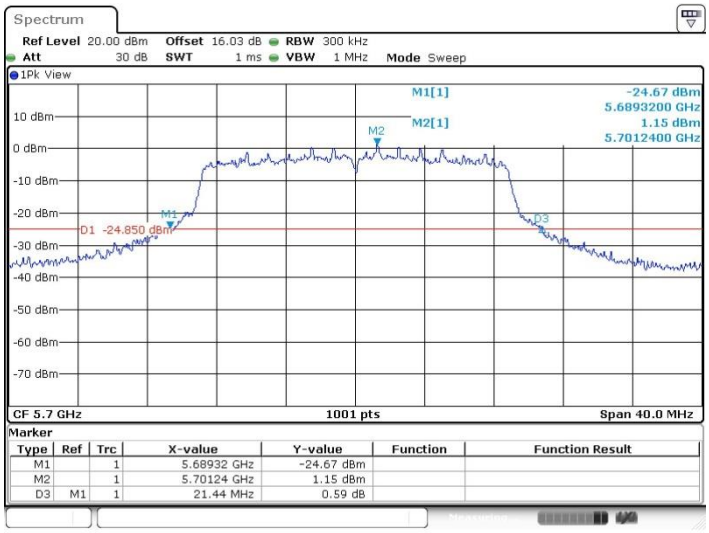
11AC20-CDD_Ant6_5500


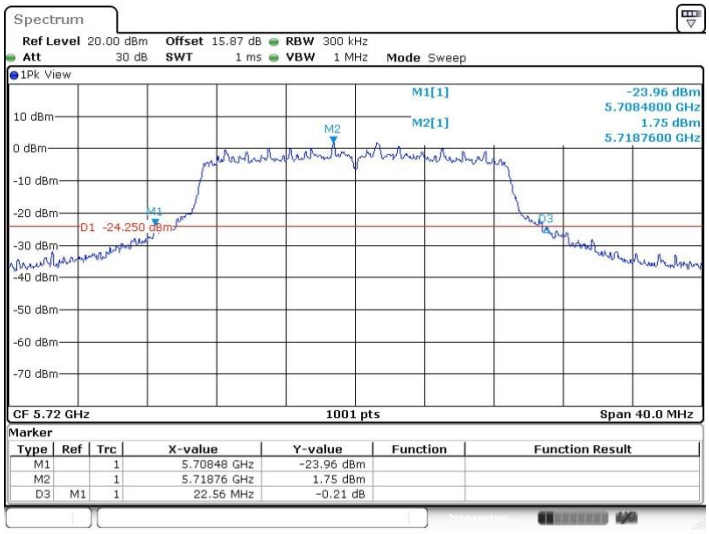
11AC20-CDD_Ant7_5500


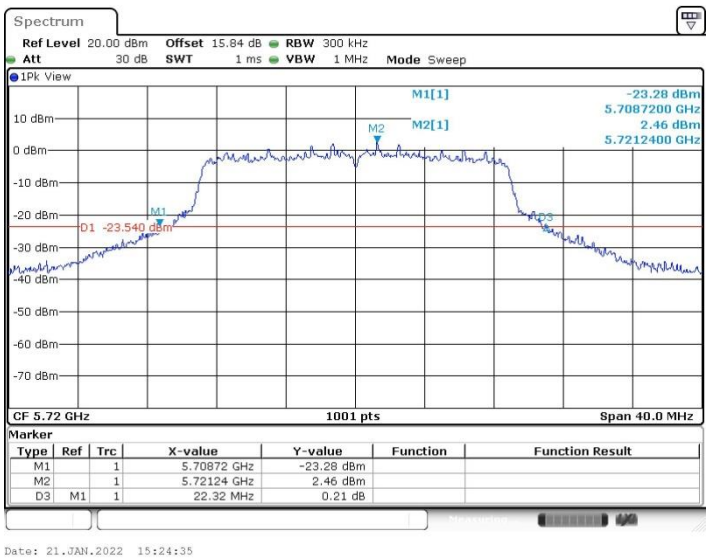
11AC20-CDD_Ant6_5580


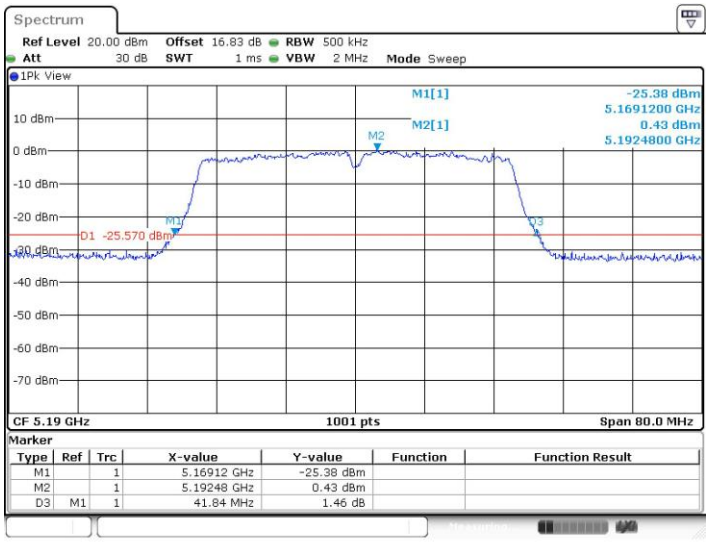
11AC20-CDD_Ant7_5580


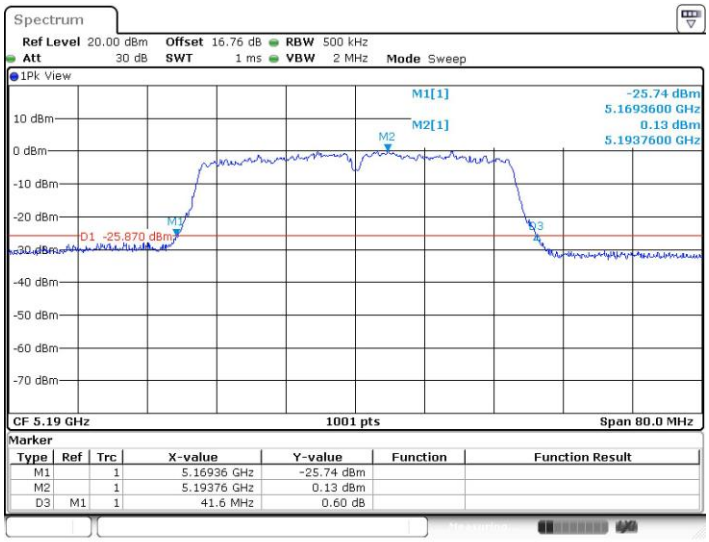
11AC20-CDD_Ant6_5700


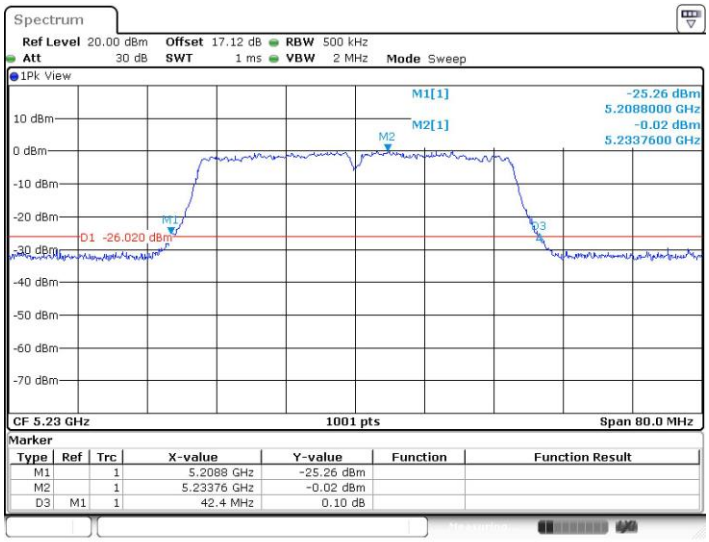
11AC20-CDD_Ant7_5700


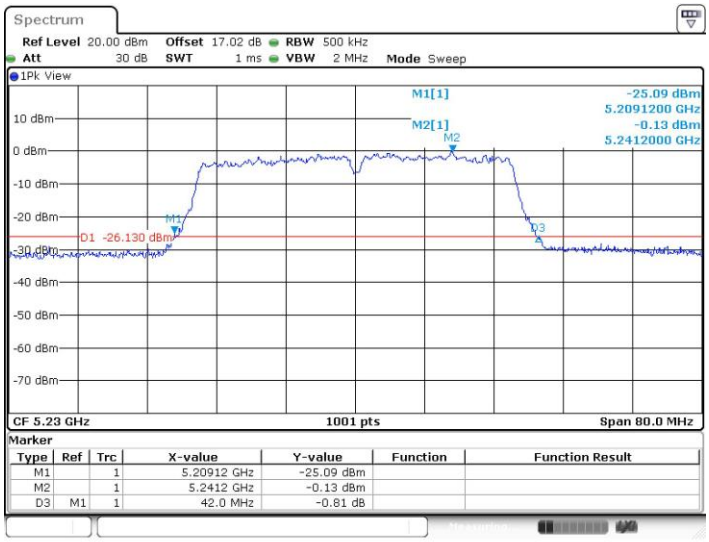
11AC20-CDD_Ant6_5720


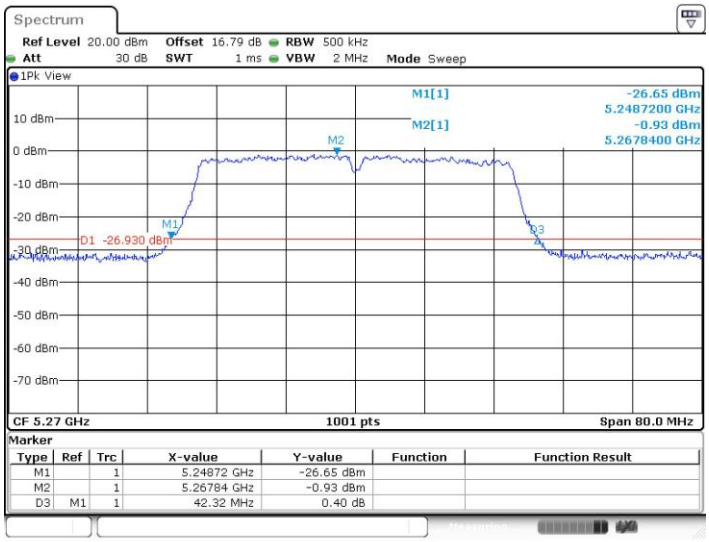
11AC20-CDD_Ant7_5720


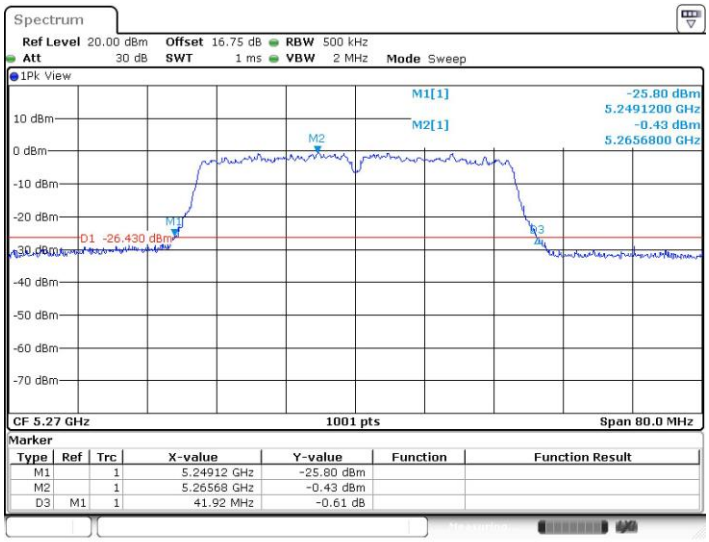
11AC40-CDD_Ant6_5190


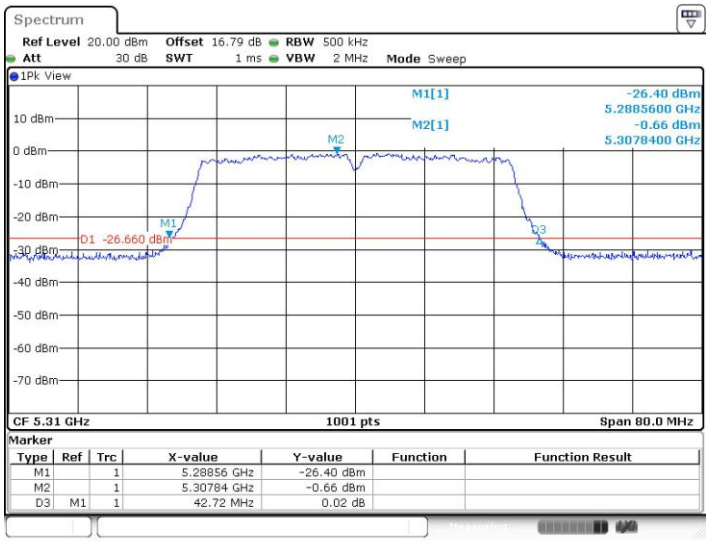
11AC40-CDD_Ant7_5190


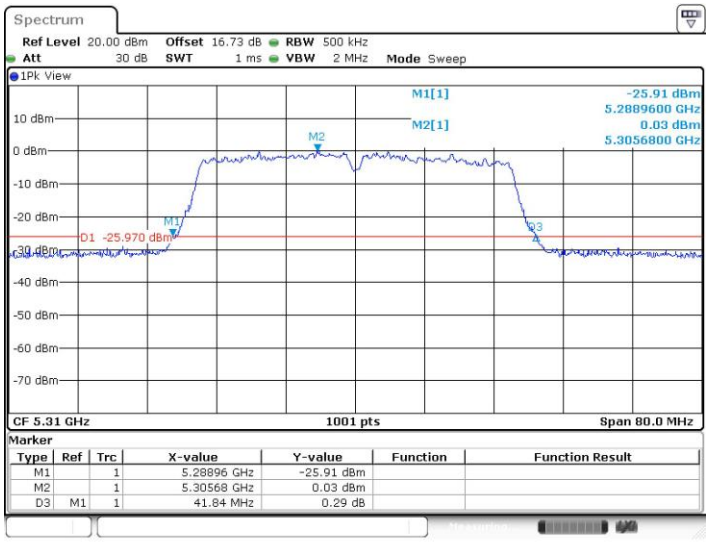
11AC40-CDD_Ant6_5230


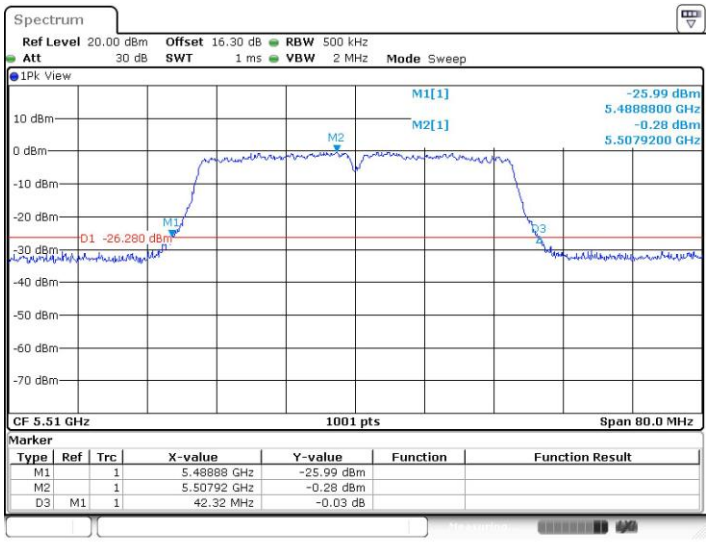
11AC40-CDD_Ant7_5230


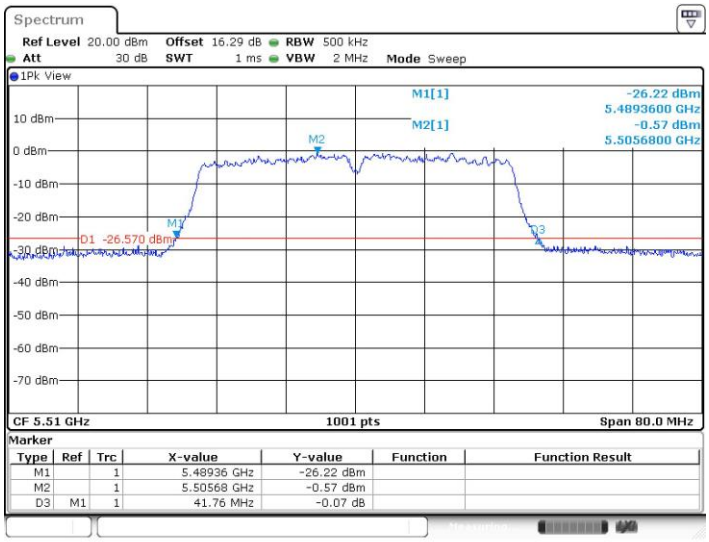
11AC40-CDD_Ant6_5270


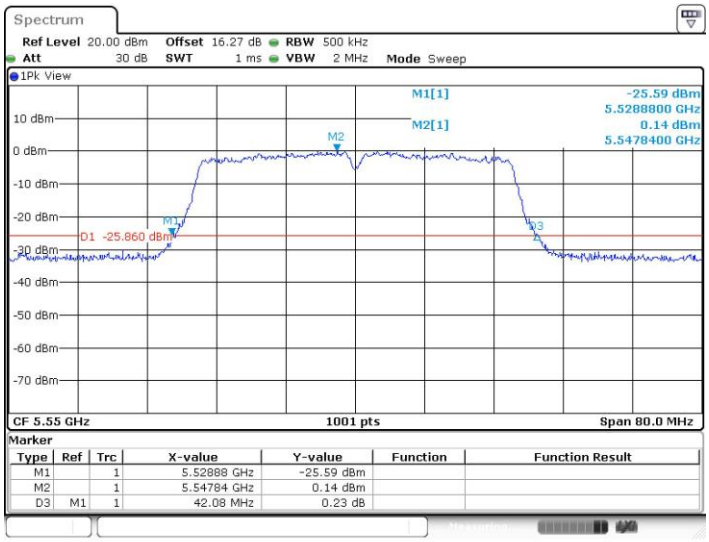
11AC40-CDD_Ant7_5270


11AC40-CDD_Ant6_5310


11AC40-CDD_Ant7_5310


11AC40-CDD_Ant6_5510


11AC40-CDD_Ant7_5510


11AC40-CDD_Ant6_5550


11AC40-CDD_Ant7_5550