FCC Test Report
(Class II Permissive Change)

Product Name	LTE SOM Module
Model No	MS-01 PRO
FCC ID	2ABTU-MS01PRO

Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St., Neihu Dist., Taipei City, Taiwan

Date of Receipt	Mar. 30, 2020
Issued Date	Apr. 29, 2020
Report No.	2030820R-RFUSP52V00
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issued Date: Apr. 29, 2020
Report No.: 2030820R-RFUSP52V00

Product Name	LTE SOM Module
Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St., Neihu Dist., Taipei City, Taiwan
Manufacturer	RuggON Corporation
Model No.	MS-01 PRO
FCC ID.	2ABTU-MS01PRO
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V
Trade Name	RuggON
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v02
Test Result	Complied

Documented By : Anny Chou

(Senior Adm. Specialist / Anny Chou)

Tested By : Anson Kuo

(Engineer / Anson Kuo)

Approved By :

(Director / Vincent Lin)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	LTE SOM Module
Trade Name	RuggON
FCC ID.	2ABTU-MS01PRO
Model No.	MS-01 PRO
Frequency Range	802.11a/n/ac-20MHz: 5180-5320MHz, 5500-5720MHz, 5745-5825MHz 802.11n/ac-40MHz: 5190-5310, 5510-5710MHz, 5755-5795MHz 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz, 5775MHz
Number of Channels	802.11a/n/ac-20MHz: 21, 802.11n/ac-40MHz: 9, 802.11ac-80MHz: 5
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 300Mbps 802.11ac-80MHz: up to 866.7Mbps
Type of Modulation	802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	AnJie	AJDP1J-B0006	PIFA	4.37dBi for 5150-5250MHz 4.64dBi for 5250-5350MHz 4.58dBi for 5470-5725MHz 4.90dBi for 5725-5850MHz

802.11a/n/ac-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 120:	5600 MHz	Channel 124:	5620 MHz	Channel 128:	5640 MHz
Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 MHz	Channel 144:	5720 MHz
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

802.11n/ac-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 54:	5270 MHz	Channel 62:	5310 MHz
Channel 102:	5510 MHz	Channel 110:	5550 MHz	Channel 118:	5590 MHz	Channel 126:	5630 MHz
Channel 134:	5670 MHz	Channel 142:	5710 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz

802.11ac-80MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 58:	5290 MHz	Channel 106:	5530 MHz	Channel 138:	5690 MHz
Channel 155:	5775 MHz						

Note:

1. This device is an LTE SOM Module,contains functions WLAN (802.11a/b/g/n/ac) with Bluetooth (V5.0 and V3.0+HS, V2.1+EDR) combo card module transceiver,this report for 5GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
5. This is to request a Class II permissive change for FCC ID: 2ABTU-MS01PRO, originally granted on 06/26/2019.

   The major change filed under this application is:

   Change #1: Addition an new antenna, antenna type is different with the original application.

   (Antenna type: PIFA antenna)

Test Mode	Mode 1:802.11a Mode 2:802.11ac20 Mode 3:802.11ac40 Mode 4:802.11ac-80

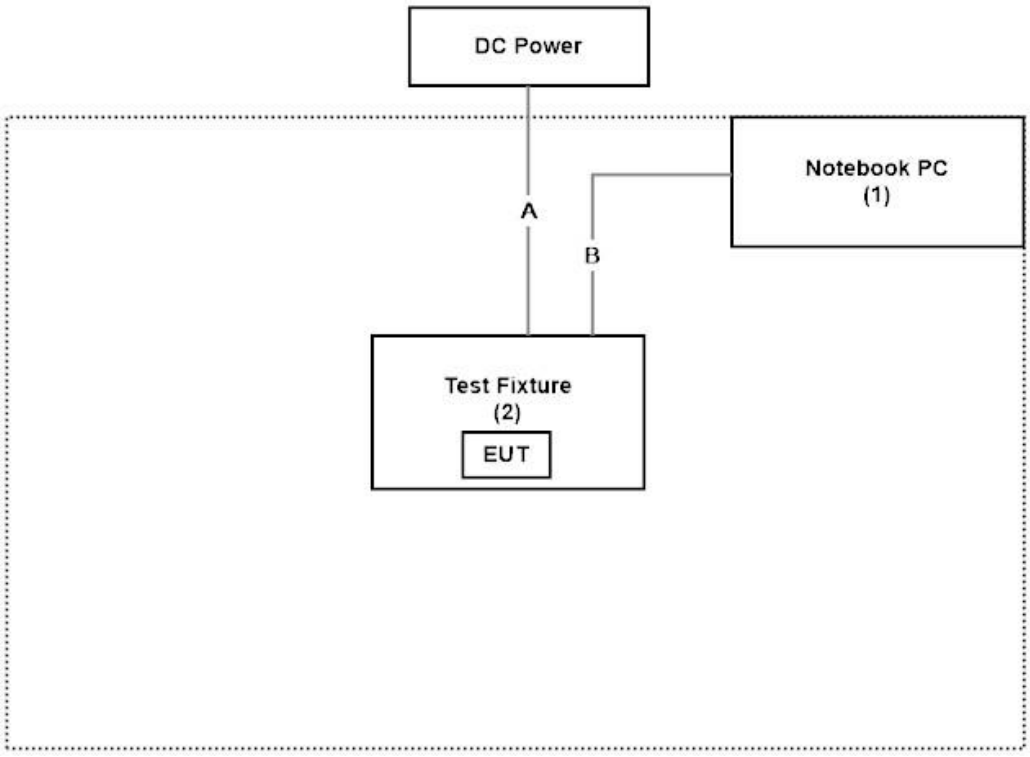
1.3. Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude 5580	2HRD7H2	Non-shielded, 0.8m
2	Test Fixture	RuggON	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1m
B	Power Cable	Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown on 1.4

(2) Execute software “QRCT3 V3.0.2680.0” on the EUT.

(3) Configure the test mode, the test channel, and the data rate.

(4) Start the continuous transmission.

(5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	24.7 °C
	Humidity (%RH)	10~90 %	63.7 %
Conductive	Temperature (°C)	10~40 °C	20.5 ℃
	Humidity (%RH)	10~90 %	59.6 %

USA : FCC Registration Number: TW3023
Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: http://www.dekra.com.tw

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2020/04/06	2021/04/05
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
X	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/19	2020/11/18
X	LISN	R&S	ENV216	101105	2020/04/09	2021/04/08
X	LISN	R&S	ESH3-Z5	836679/014	2020/04/09	2021/04/08
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/20	2020/06/19

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test SystemV9.0.5.

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Test Receiver	R&S	ESR7	101602	2019/12/16	2020/12/15
X	Signal Analyzer	R&S	FSV40	101869	2019/07/04	2020/07/03
X	Loop Antenna	Teseq	HLA6121	37133	2020/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2019/05/02	2020/05/01
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
X	Amplifier	EMCI	EMC051845SE	980632	2019/08/08	2020/08/07
X	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
X	Amplifier + Cable	EMCI	EMC184045SE	980369	2020/04/24	2021/04/23
	Bilog Antenna	Schaffner Chase	CBL6112B	2925	2020/02/20	2021/02/19
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2019/06/28	2020/06/27
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
X	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

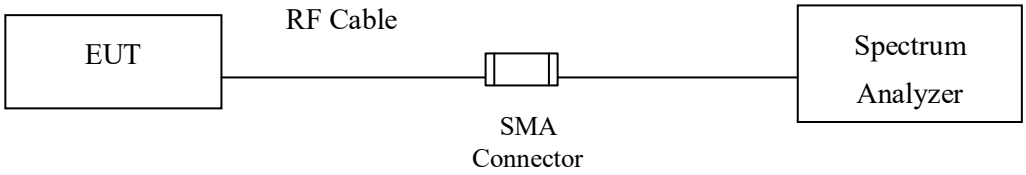
Note:

1. Loop Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Test SystemV1.1.

2. Maximun conducted output power

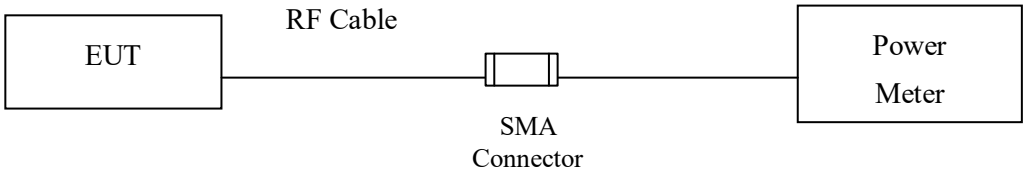
2.1. Test Setup

99% Occupied Bandwidth

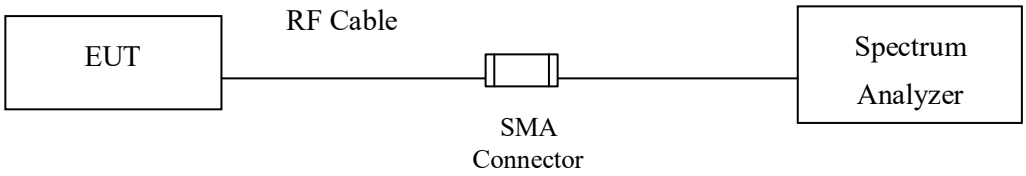


Conduction Power Measurement

Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



2.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor 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. provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) 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 provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points 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. Fixed point-topoint U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) 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 provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 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 99% emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

2.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW≦40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)
Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth.

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

2.4. Uncertainty

±1.27dB

2.5. Test Result of Maximum conducted output power

Product : LTE SOM Module
Test Item : Maximum conducted output power
Test Date : 2019/12/27
Test Mode : Transmit 802.11a

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	18.62	--	--	--	--	--	--	--	<24dBm
44	5220	18.58	18.51	18.43	18.36	18.28	18.21	18.15	18.07	<24dBm
48	5240	18.66	--	--	--	--	--	--	--	<24dBm
52	5260	18.56	--	--	--	--	--	--	--	<24dBm
60	5300	17.92	17.85	17.77	17.71	17.65	17.58	17.52	17.45	<24dBm
64	5320	18.10	--	--	--	--	--	--	--	<24dBm
100	5500	17.62	--	--	--	--	--	--	--	<24dBm
116	5580	17.68	17.61	17.55	17.47	17.41	17.35	17.28	17.22	<24dBm
140	5700	17.88	--	--	--	--	--	--	--	<24dBm
144(U-NII-2C)	5720	18.48	18.39	18.31	18.26	18.21	18.09	17.96	17.88	<24dBm
144(U-NII-3)	5720	11.62	11.55	11.46	11.34	11.25	11.15	11.09	10.99	<30dBm
149	5745	18.12	--	--	--	--	--	--	--	<30dBm
157	5785	18.02	17.95	17.88	17.82	17.76	17.68	17.62	17.55	<30dBm
165	5825	18.10	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	17.89	--	--	--	--	--	--	--	<24dBm
44	5220	18.26	18.18	18.11	18.05	17.97	17.91	17.85	17.78	<24dBm
48	5240	18.07	--	--	--	--	--	--	--	<24dBm
52	5260	18.01	--	--	--	--	--	--	--	<24dBm
60	5300	17.51	17.45	17.37	17.31	17.23	17.16	17.09	17.02	<24dBm
64	5320	17.42	--	--	--	--	--	--	--	<24dBm
100	5500	17.79	--	--	--	--	--	--	--	<24dBm
116	5580	17.93	17.87	17.81	17.75	17.67	17.61	17.55	17.47	<24dBm
140	5700	17.78	--	--	--	--	--	--	--	<24dBm
144(U-NII-2C)	5720	18.4	18.31	18.21	18.15	18.08	17.96	17.92	17.85	<24dBm
144(U-NII-3)	5720	11.65	11.56	11.5	11.45	11.34	11.27	11.19	11.12	<30dBm
149	5745	17.99	--	--	--	--	--	--	--	<30dBm
157	5785	18.14	18.07	18.01	17.95	17.88	17.81	17.73	17.66	<30dBm
165	5825	18.05	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

(CHAIN A+ B)

Channel Number	Frequency	99% Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	--	18.62	17.89	21.28	24	--
44	5220	--	18.58	18.26	21.43	24	--
48	5240	--	18.66	18.07	21.39	24	--
52	5260	25.500	18.56	18.01	21.30	24	25.07
60	5300	25.410	17.92	17.51	20.73	24	25.05
64	5320	25.170	18.10	17.42	20.78	24	25.01
100	5500	24.270	17.62	17.79	20.72	24	24.85
116	5580	25.100	17.68	17.93	20.82	24	25.00
140	5700	25.600	17.88	17.78	20.84	24	25.08
144(U-NII-2C)	5720	18.500	18.480	18.400	21.45	24	25.07
144(U-NII-3)	5720	--	11.620	11.650	14.65	30	--
149	5745	--	18.12	17.99	21.07	30	--
157	5785	--	18.02	18.14	21.09	30	--
165	5825	--	18.10	18.05	21.09	30	--

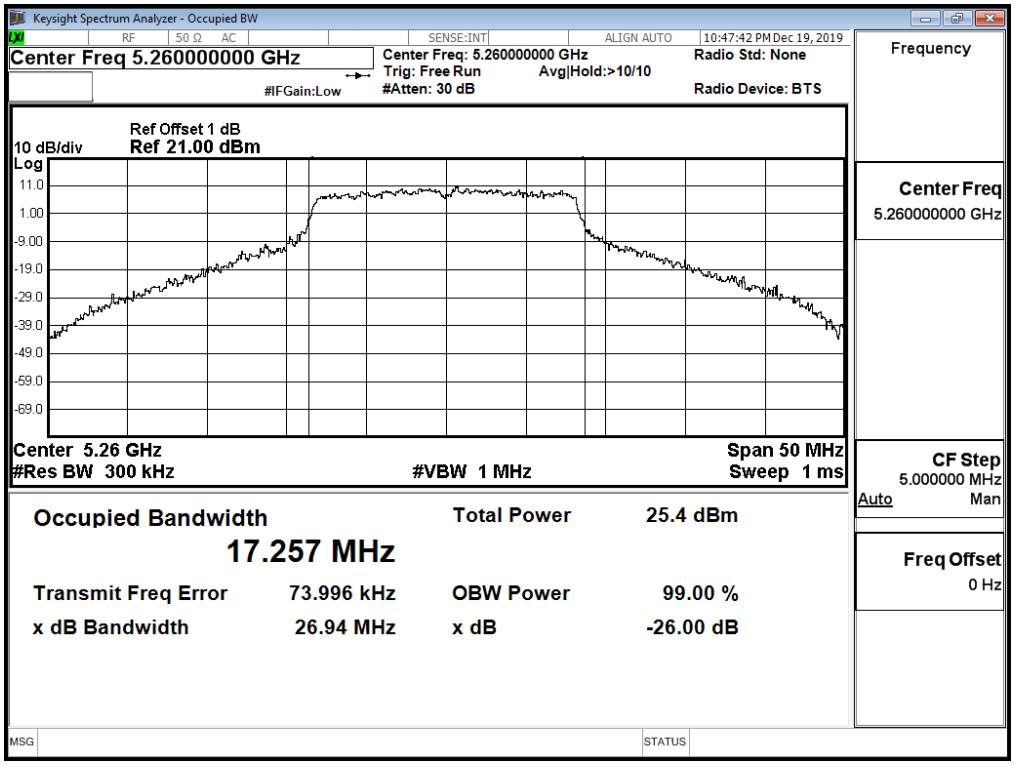
Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

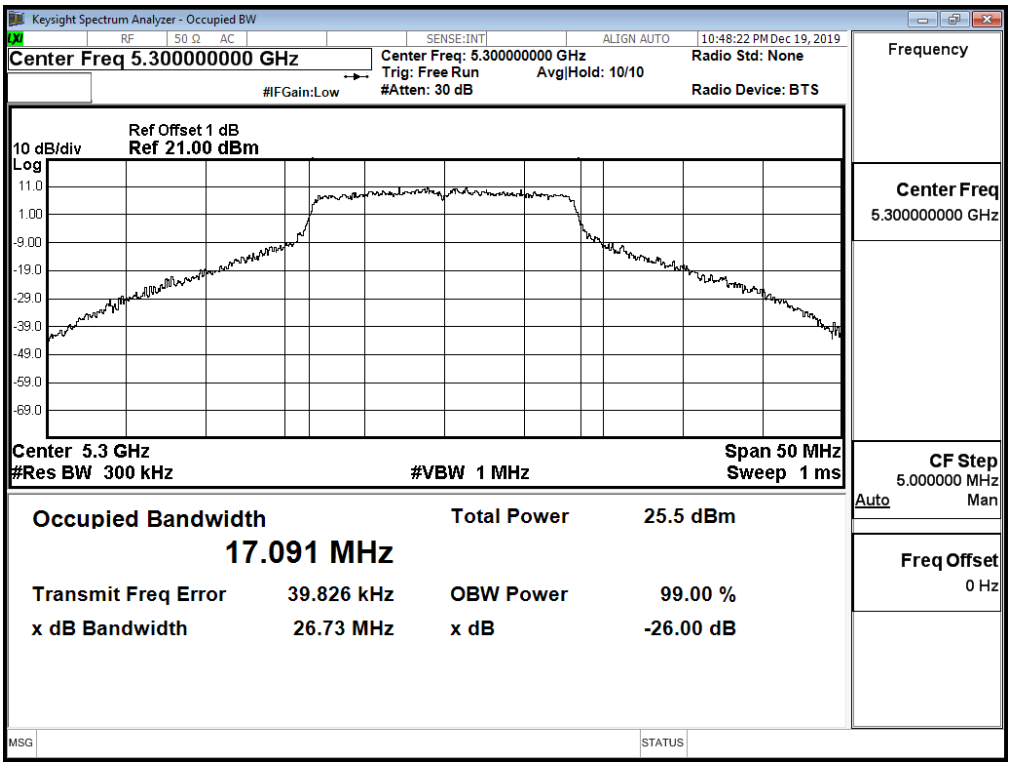
26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

99% Occupied Bandwidth:

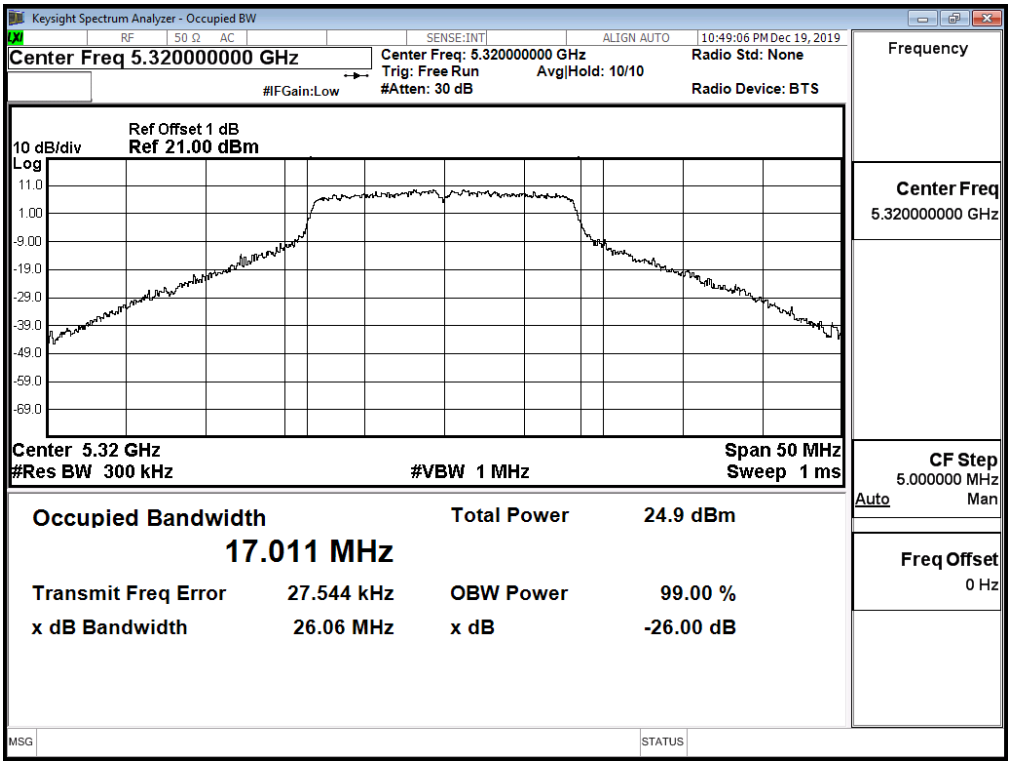
Channel 52 -Chain A



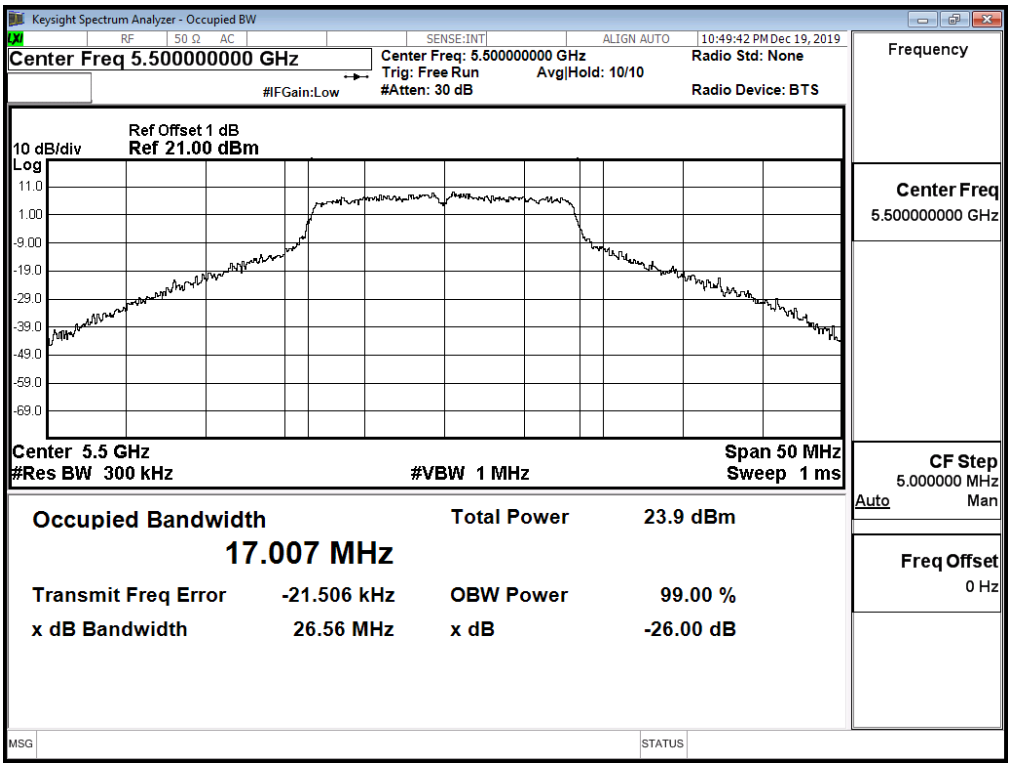
Channel 60 -Chain A



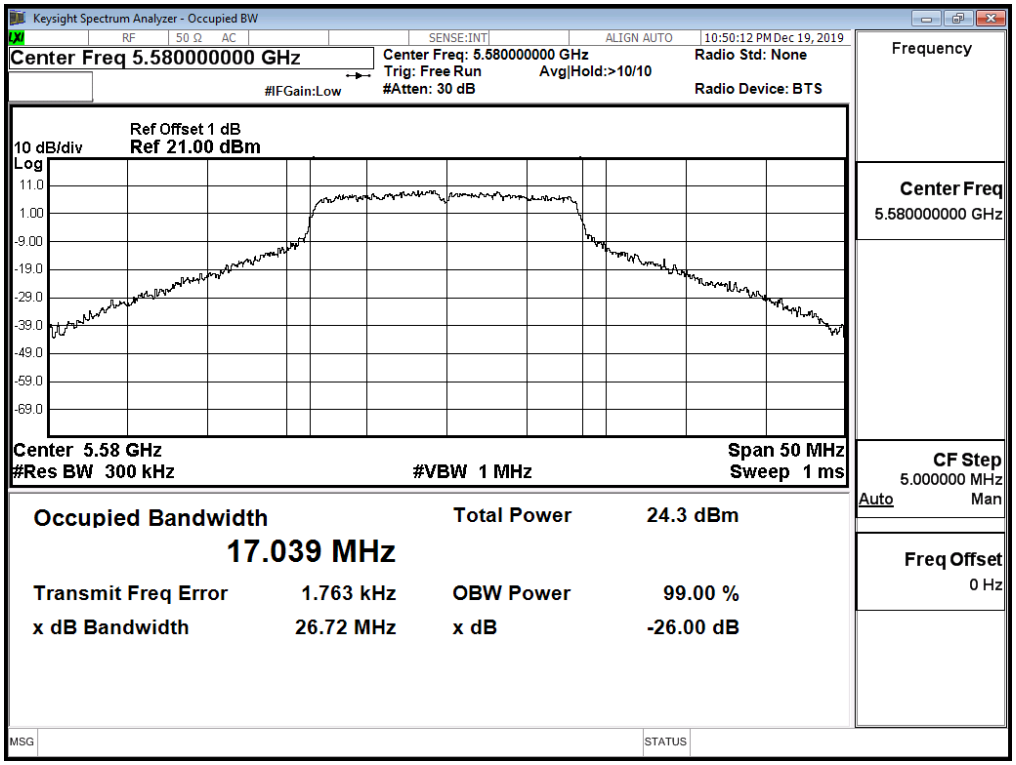
Channel 64 -Chain A



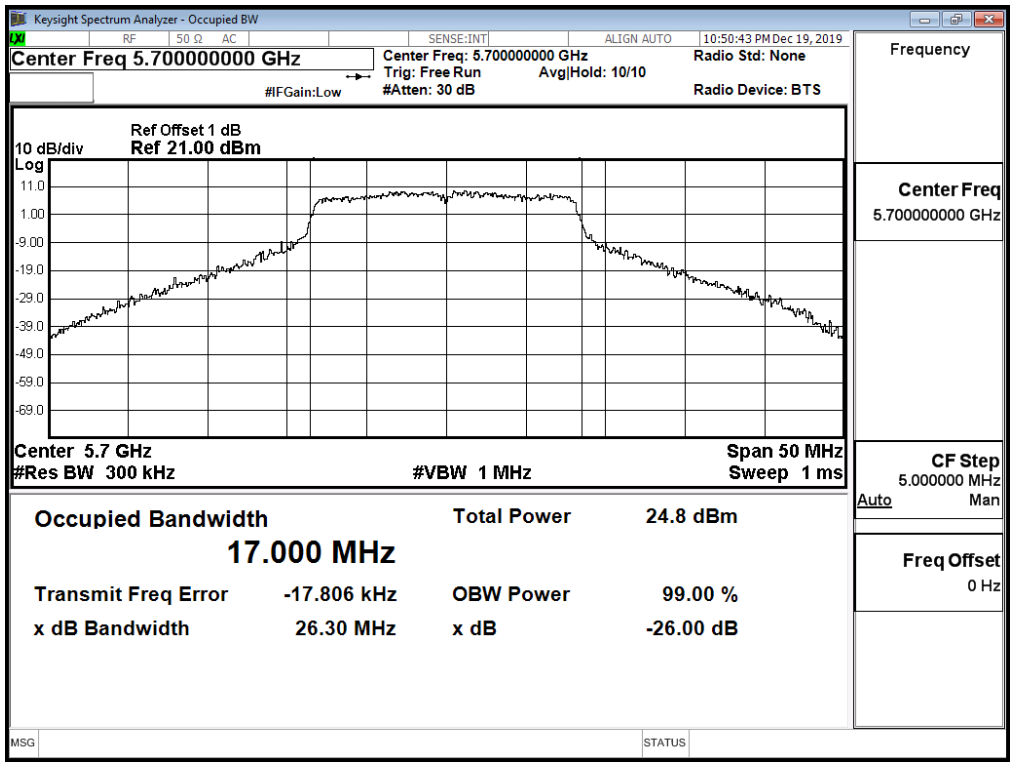
Channel 100 -Chain A



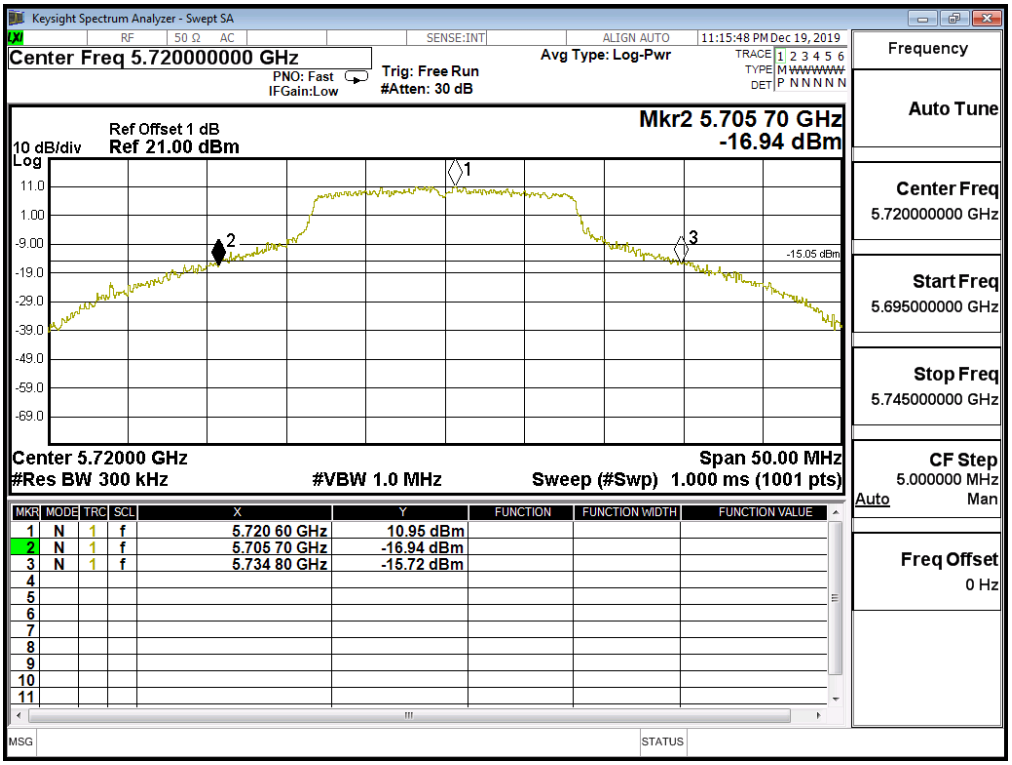
Channel 116 -Chain A



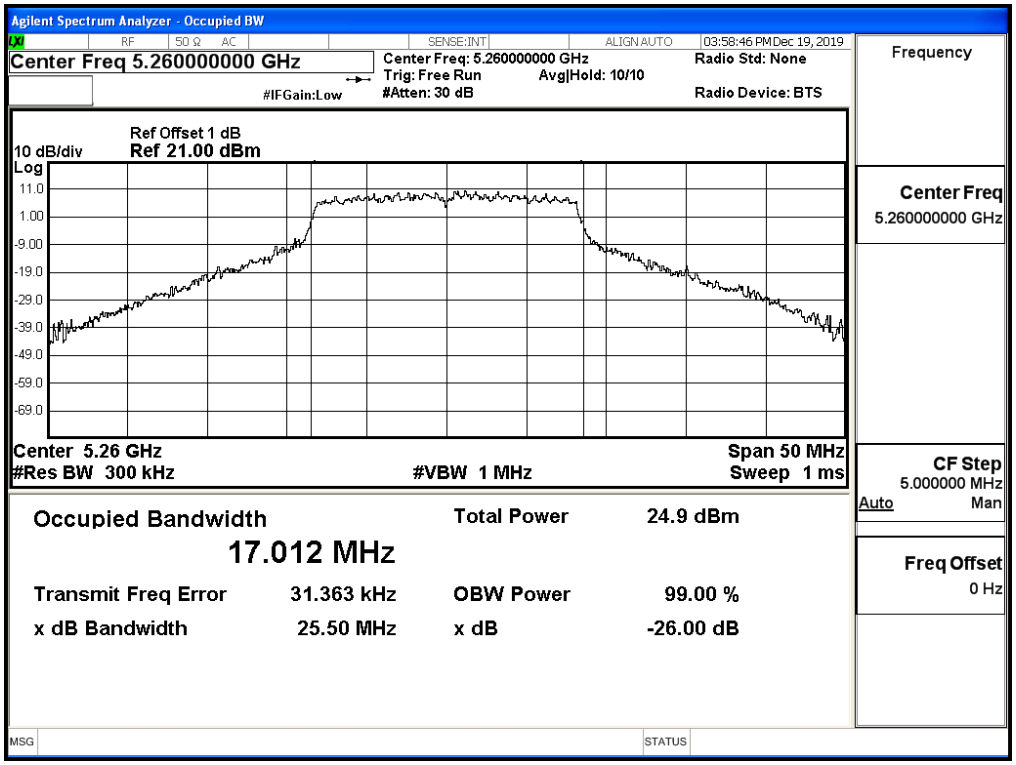
Channel 140 -Chain A



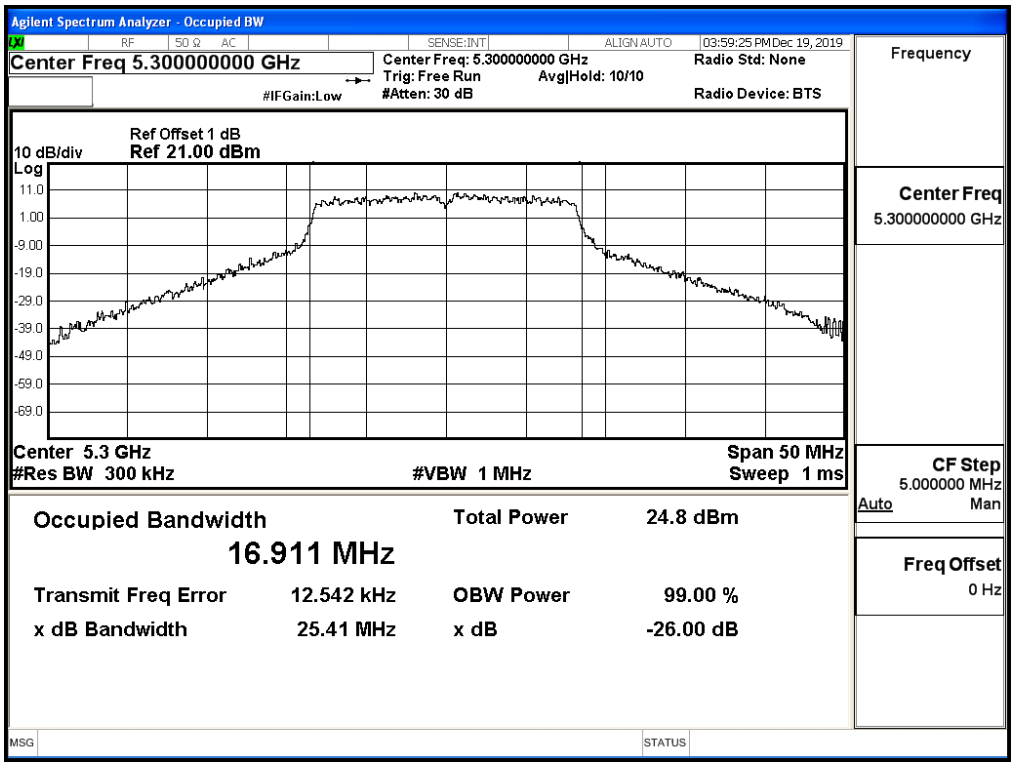
Channel 144 -Chain A



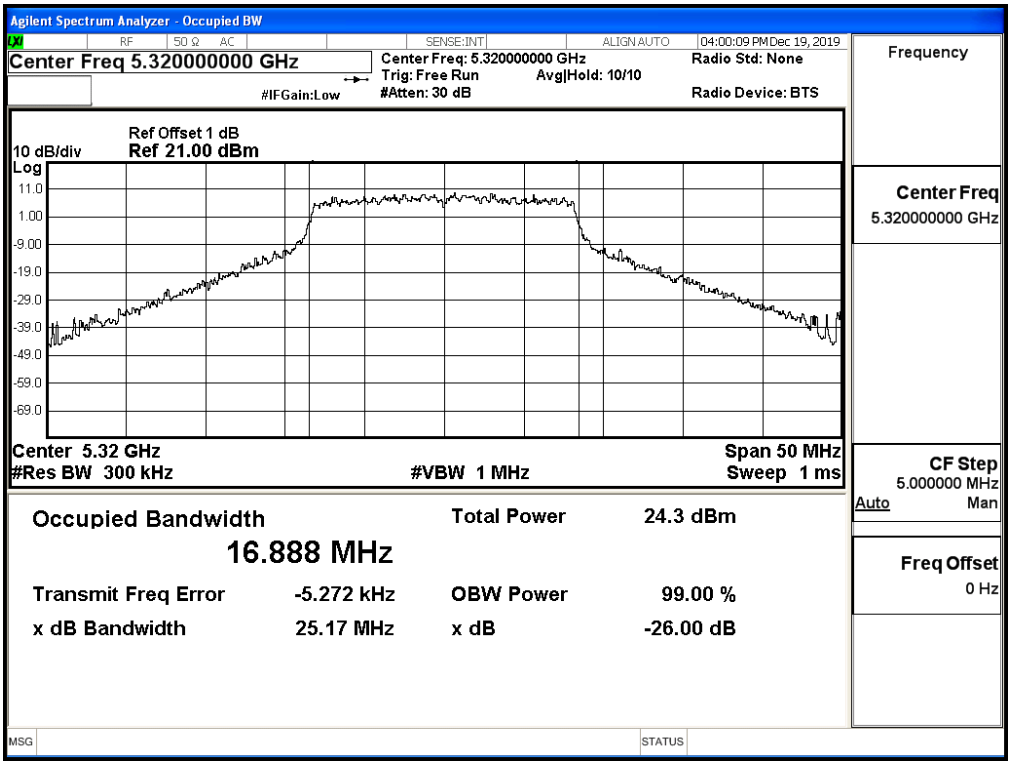
Channel 52 -Chain B



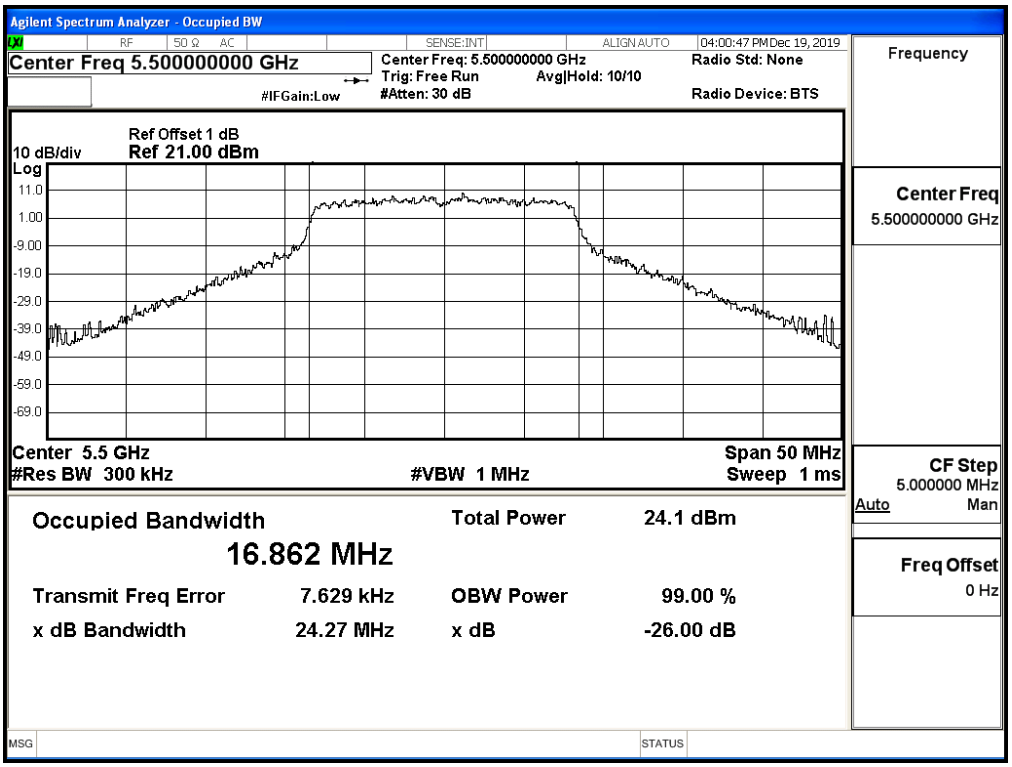
Channel 60 -Chain B



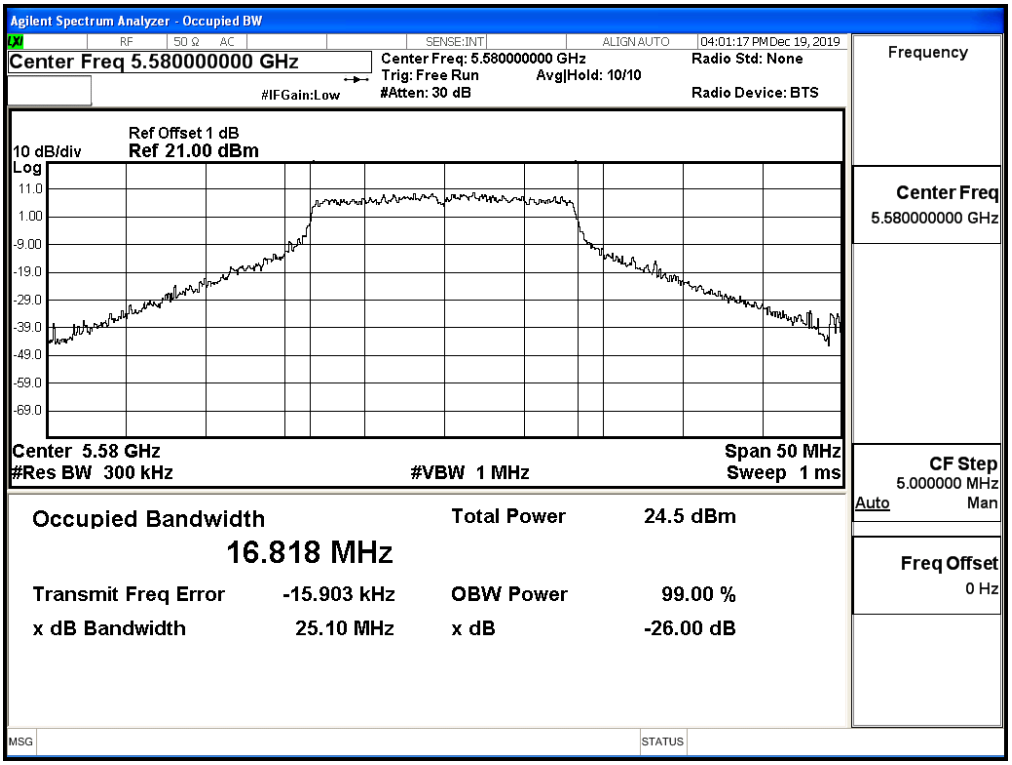
Channel 64 -Chain B



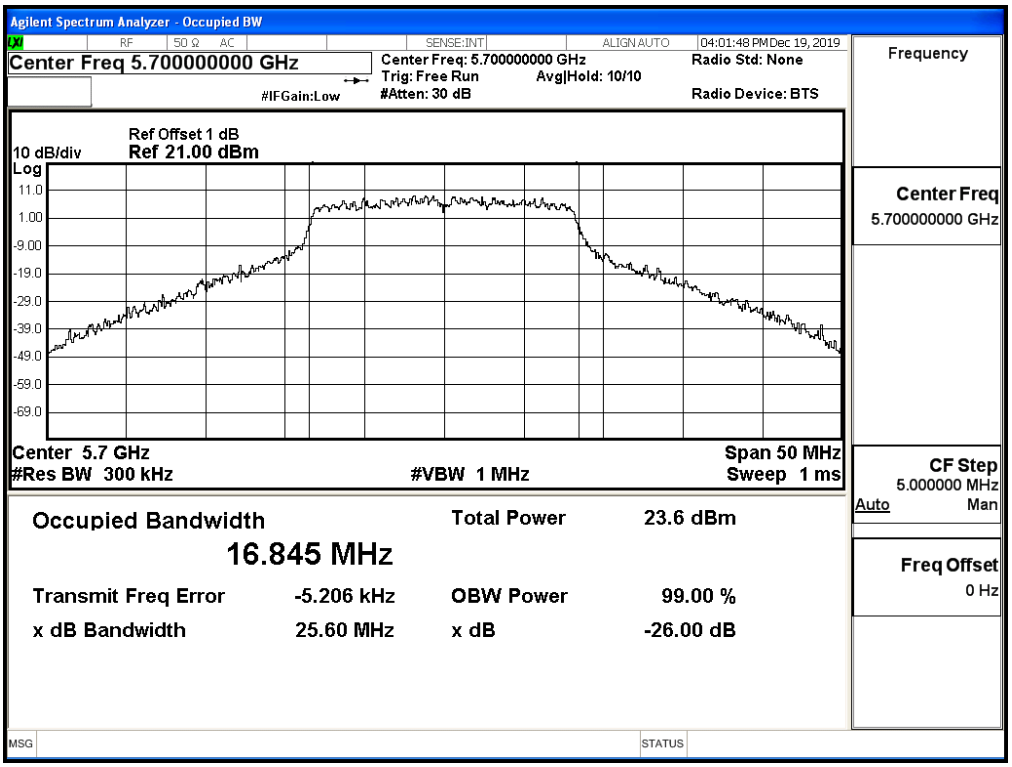
Channel 100 -Chain B



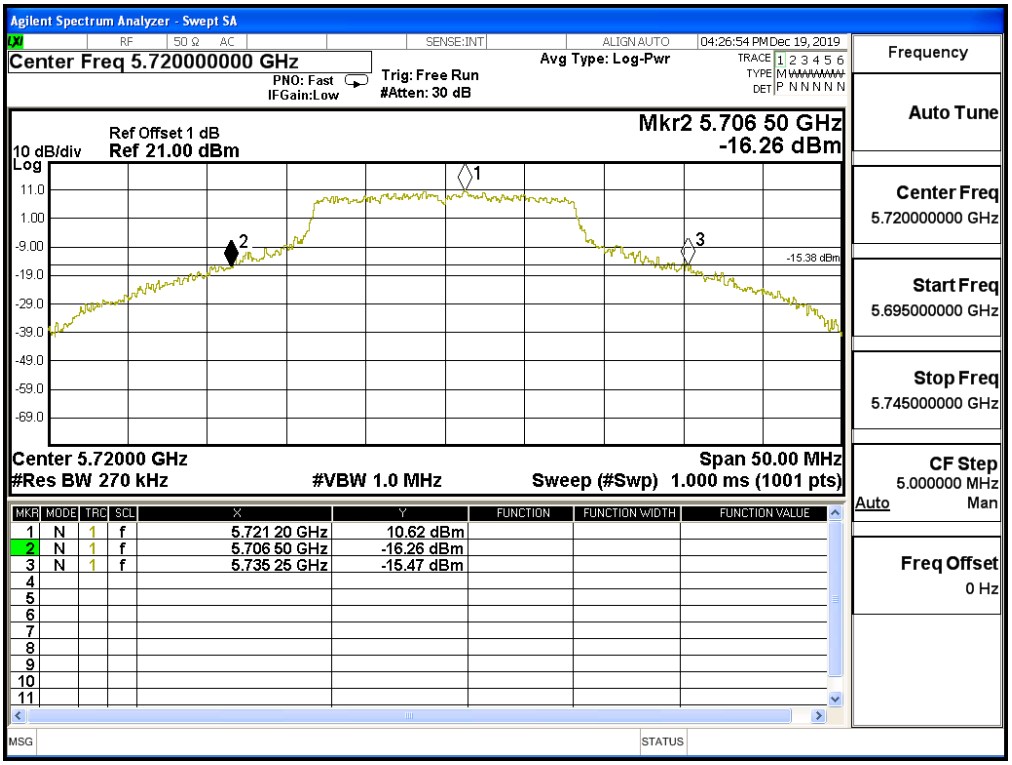
Channel 116 -Chain B



Channel 140 -Chain B



Channel 144 -Chain B



Product : LTE SOM Module
Test Item : Maximum conducted output power
Test Date : 2019/12/27
Test Mode : Transmit 802.11ac20

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
36	5180	17.06	--	--	--	--	--	--	--	<24dBm
44	5220	17.09	17.02	16.95	16.87	16.81	16.73	16.65	16.58	<24dBm
48	5240	17.03	--	--	--	--	--	--	--	<24dBm
52	5260	16.97	--	--	--	--	--	--	--	<24dBm
60	5300	17.49	17.42	17.35	17.27	17.21	17.15	17.08	17.02	<24dBm
64	5320	16.97	--	--	--	--	--	--	--	<24dBm
100	5500	16.62	--	--	--	--	--	--	--	<24dBm
116	5580	17.12	17.05	16.97	16.91	16.85	16.77	16.71	16.65	<24dBm
140	5700	16.68	--	--	--	--	--	--	--	<24dBm
144(U-NII-2C)	5720	16.67	16.59	16.47	16.44	16.37	16.28	16.20	16.10	<24dBm
144(U-NII-3)	5720	10.89	10.78	10.73	10.60	10.48	10.44	10.35	10.26	<30dBm
149	5745	17.01	--	--	--	--	--	--	--	<30dBm
157	5785	17.13	17.05	16.98	16.92	16.85	16.77	16.71	16.63	<30dBm
165	5825	16.56	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
36	5180	16.67	--	--	--	--	--	--	--	<24dBm
44	5220	16.87	16.81	16.73	16.65	16.57	16.51	16.43	16.36	<24dBm
48	5240	16.69	--	--	--	--	--	--	--	<24dBm
52	5260	16.66	--	--	--	--	--	--	--	<24dBm
60	5300	17.09	17.02	16.95	16.87	16.81	16.75	16.68	16.62	<24dBm
64	5320	16.6	--	--	--	--	--	--	--	<24dBm
100	5500	16.82	--	--	--	--	--	--	--	<24dBm
116	5580	17.57	16.51	16.43	16.35	16.28	16.22	16.15	16.07	<24dBm
140	5700	16.91	--	--	--	--	--	--	--	<24dBm
144(U-NII-2C)	5720	16.9	16.82	16.7	16.67	16.59	16.46	16.35	16.28	<24dBm
144(U-NII-3)	5720	10.26	10.2	10.1	10.02	9.98	9.85	9.79	9.66	<30dBm
149	5745	17.08	--	--	--	--	--	--	--	<30dBm
157	5785	17.06	16.98	16.92	16.85	16.78	16.72	16.65	16.57	<30dBm
165	5825	16.48	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

(**CHAIN A+ B)**

Channel Number	Frequency	99% Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	--	17.06	16.67	19.88	24	--
44	5220	--	17.09	16.87	19.99	24	--
48	5240	--	17.03	16.69	19.87	24	--
52	5260	23.820	16.97	16.66	19.83	24	24.77
60	5300	25.940	17.49	17.09	20.30	24	25.14
64	5320	25.110	16.97	16.60	19.80	24	25.00
100	5500	24.740	16.62	16.82	19.73	24	24.93
116	5580	25.540	17.12	17.57	20.36	24	25.07
140	5700	23.810	16.68	16.91	19.81	24	24.77
144(U-NII-2C)	5720	17.400	16.670	16.900	19.80	24	23.41
144(U-NII-3)	5720	--	10.890	10.260	13.60	30	--
149	5745	--	17.01	17.08	20.06	30	--
157	5785	--	17.13	17.06	20.11	30	--
165	5825	--	16.56	16.48	19.53	30	--

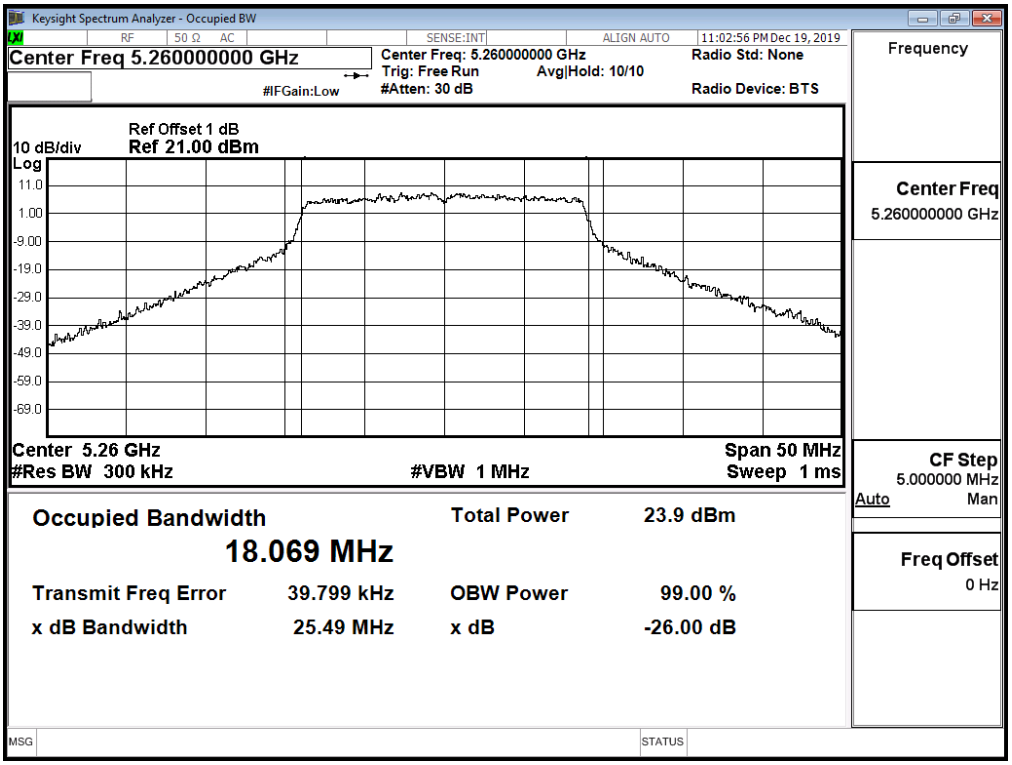
Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

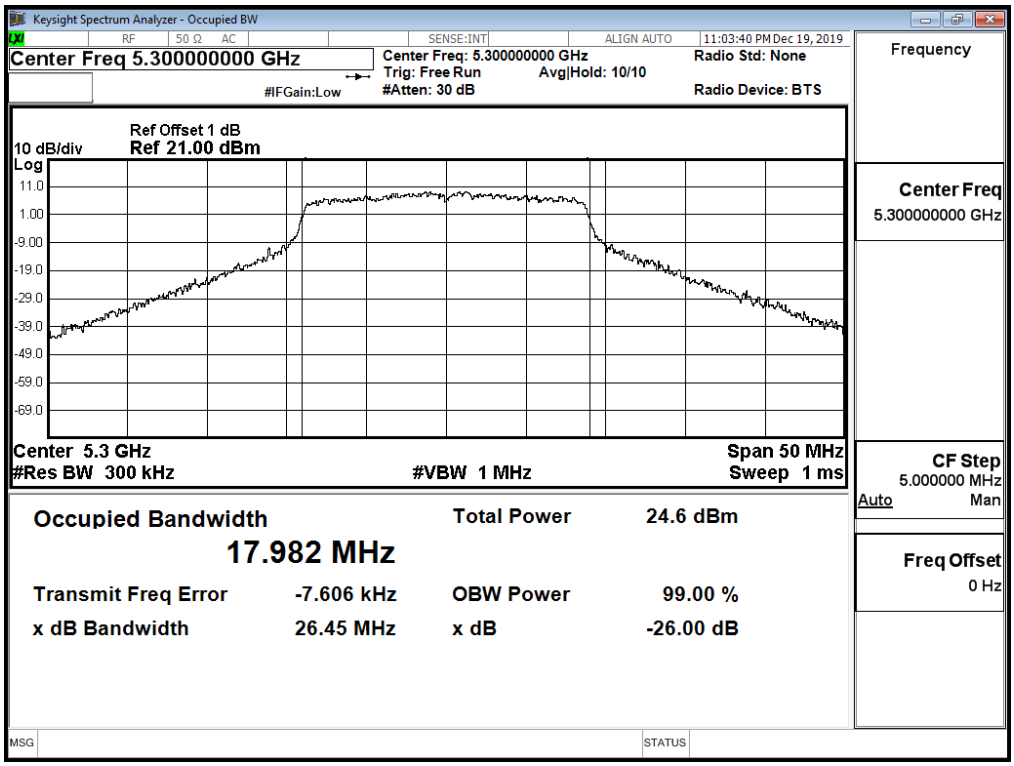
26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

99% Occupied Bandwidth:

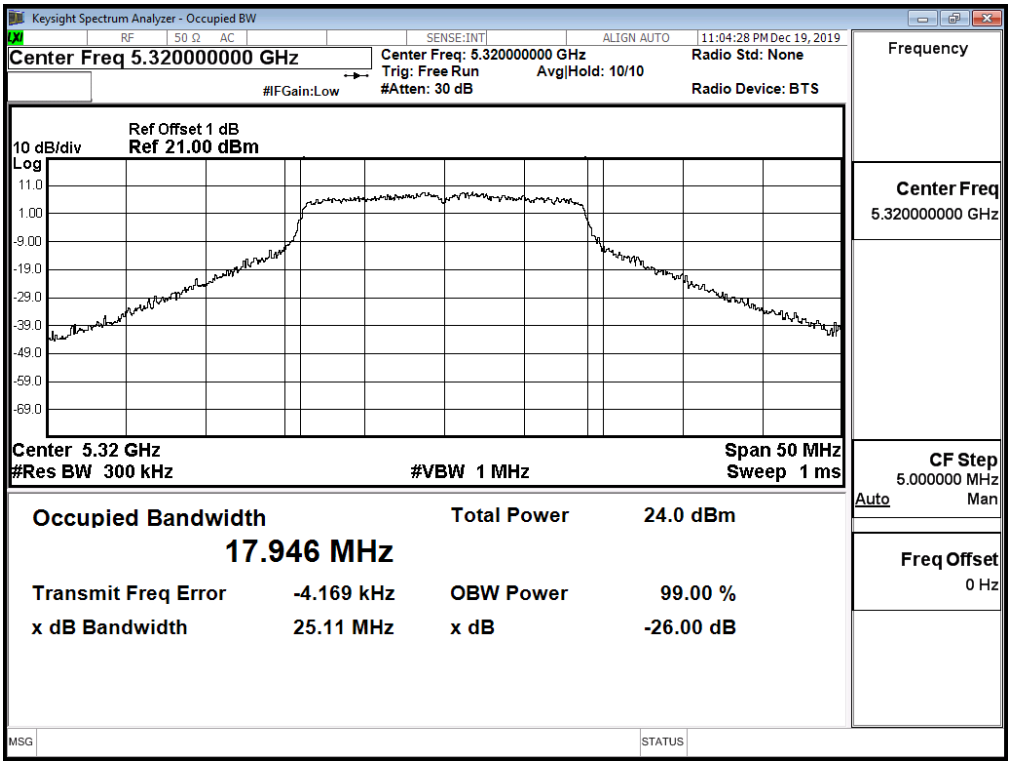
Channel 52 -Chain A



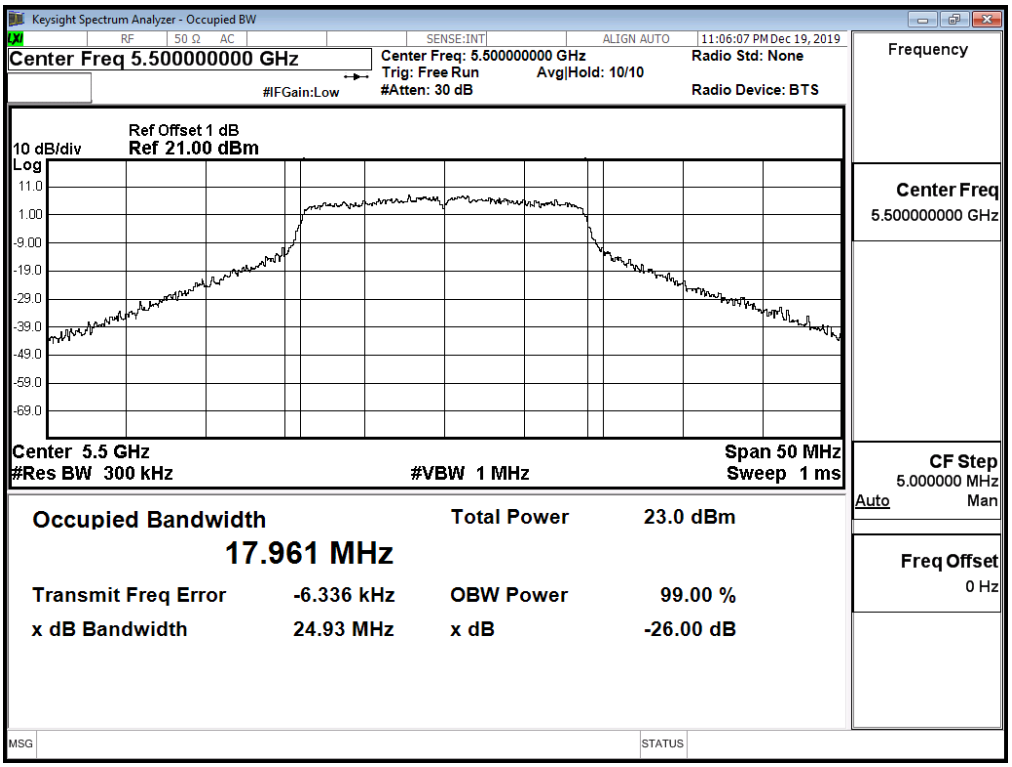
Channel 60 -Chain A



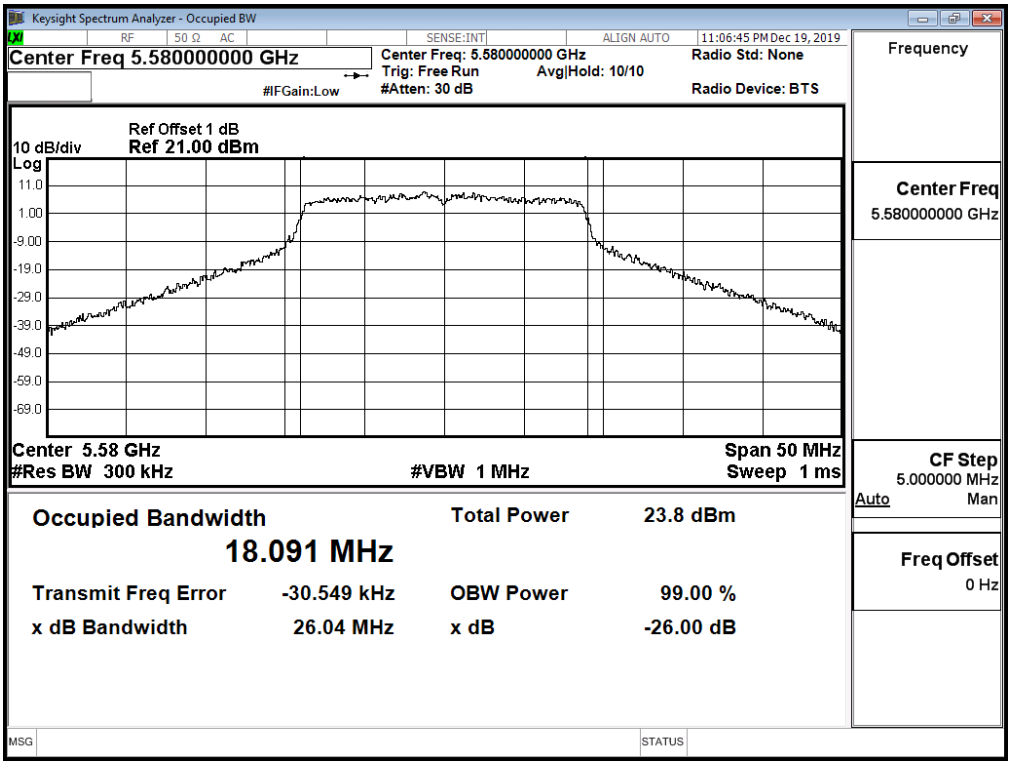
Channel 64 -Chain A



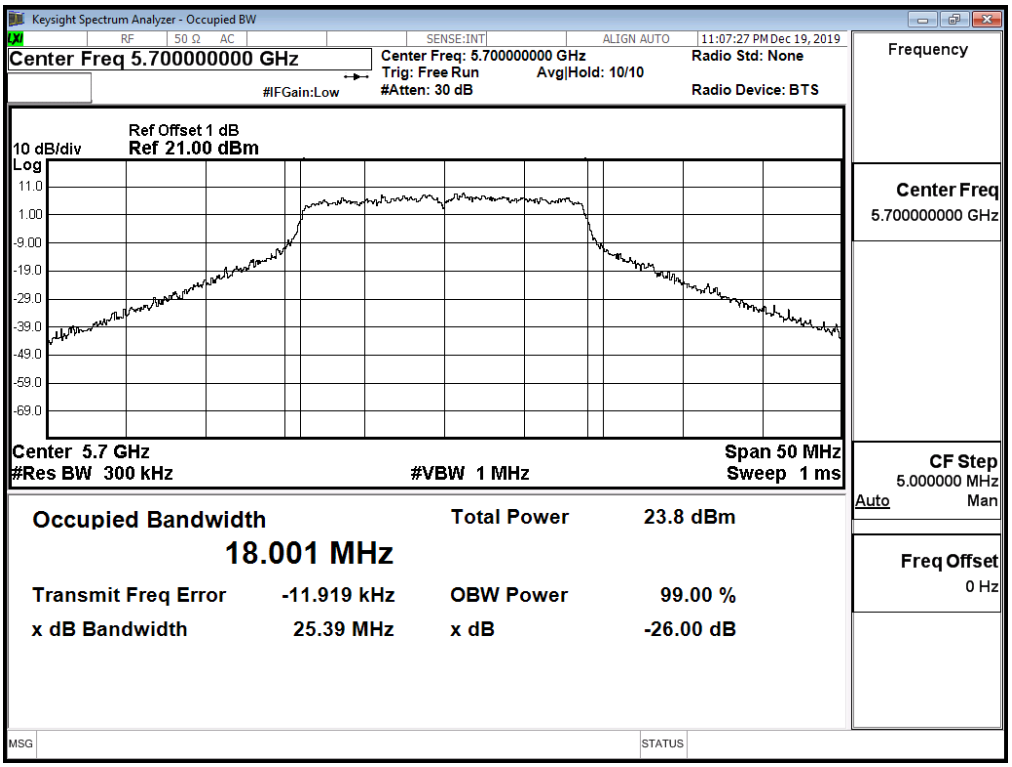
Channel 100 -Chain A



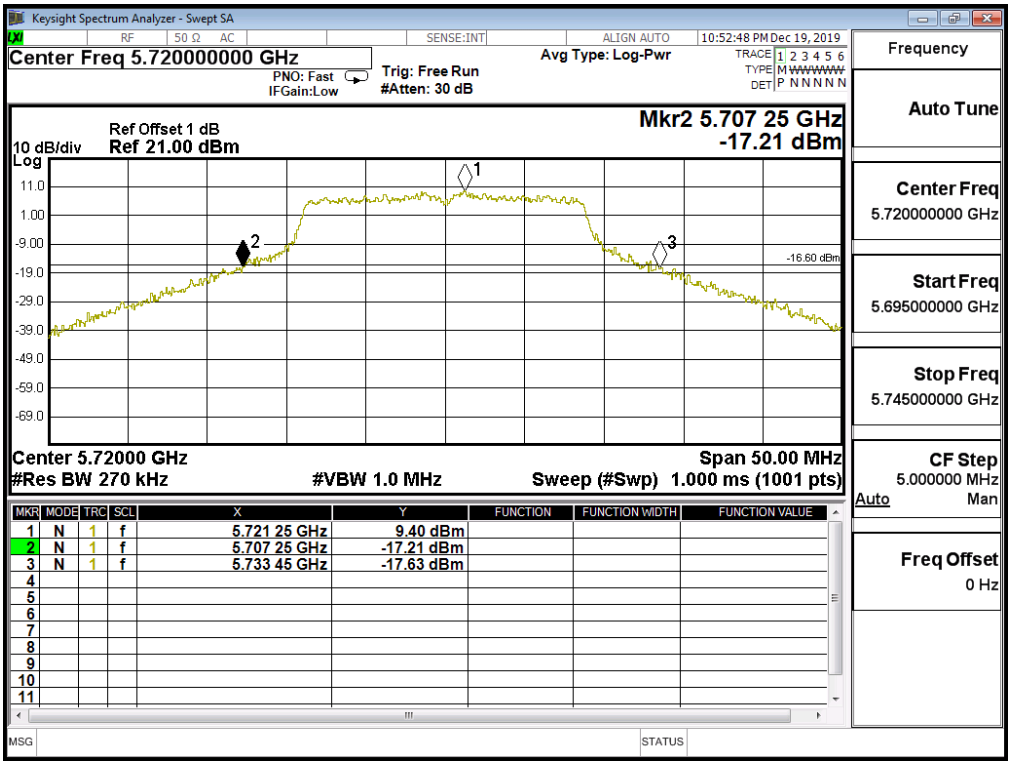
Channel 116 -Chain A



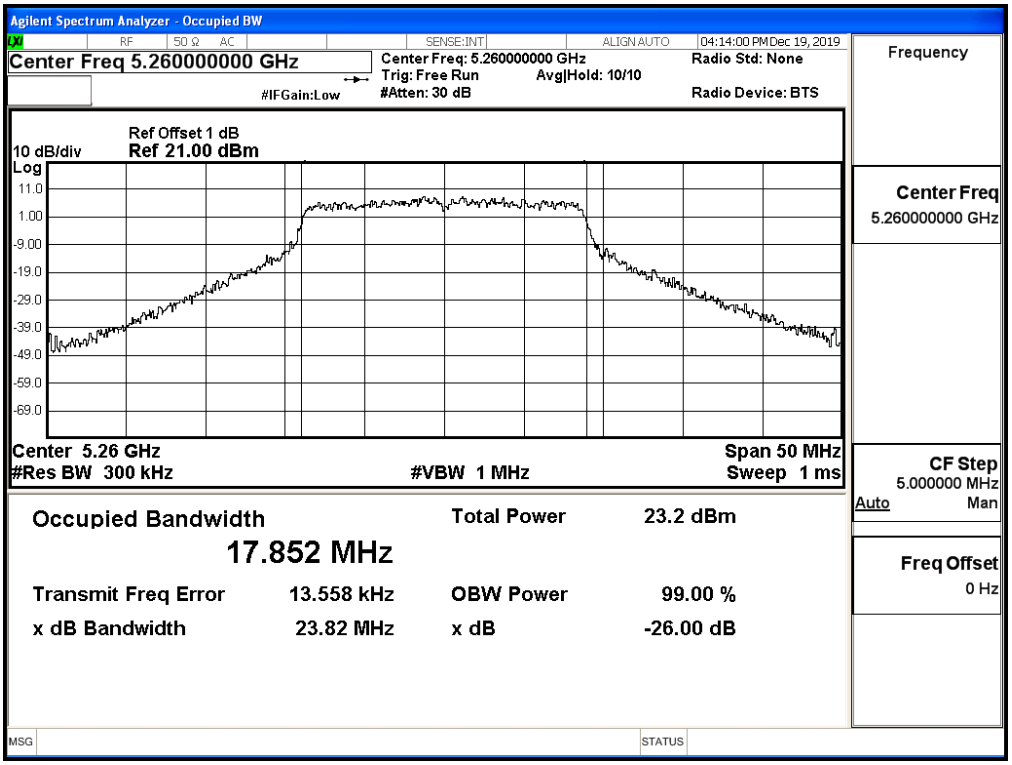
Channel 140 -Chain A



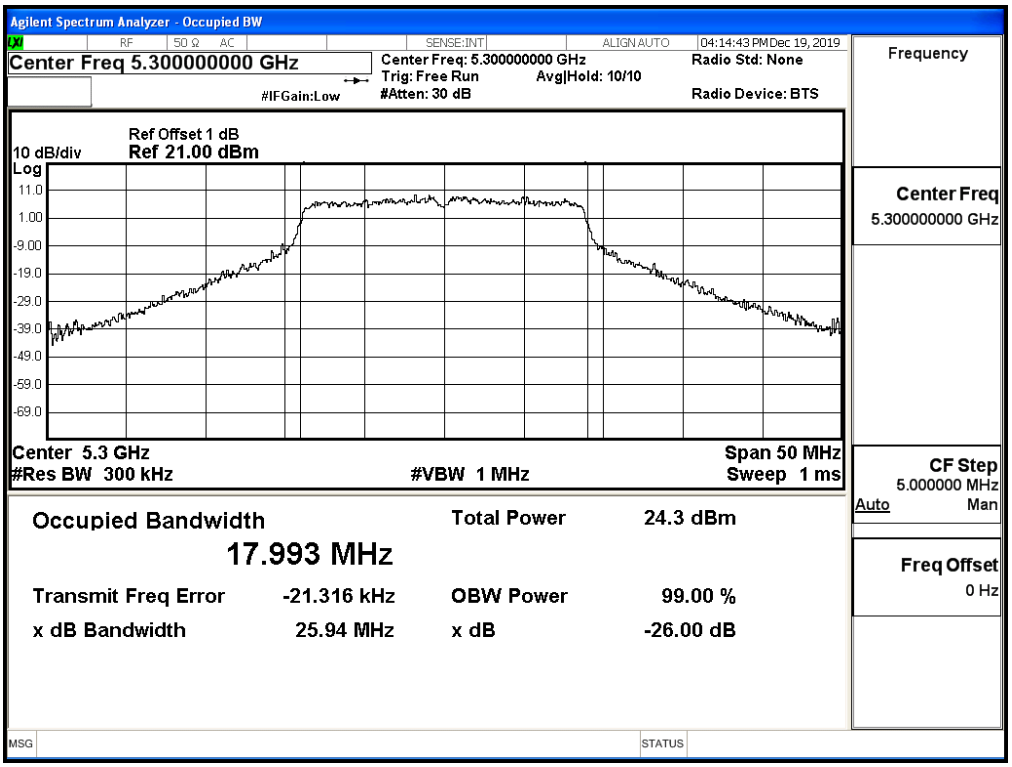
Channel 144 -Chain A



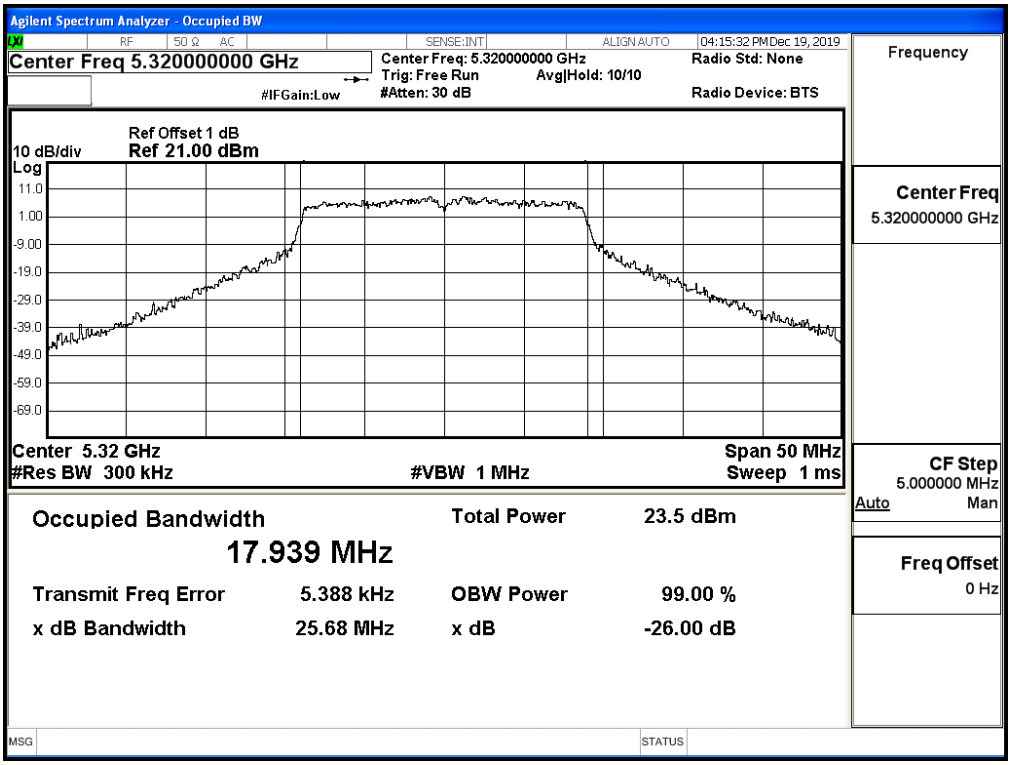
Channel 52 -Chain B



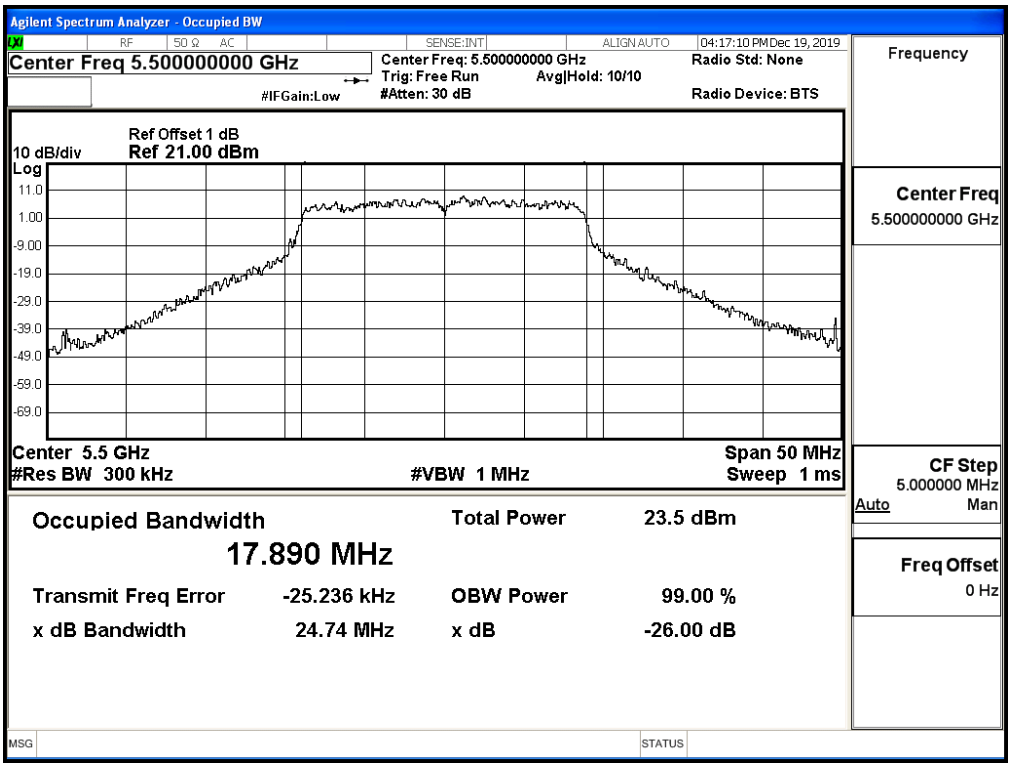
Channel 60 -Chain B



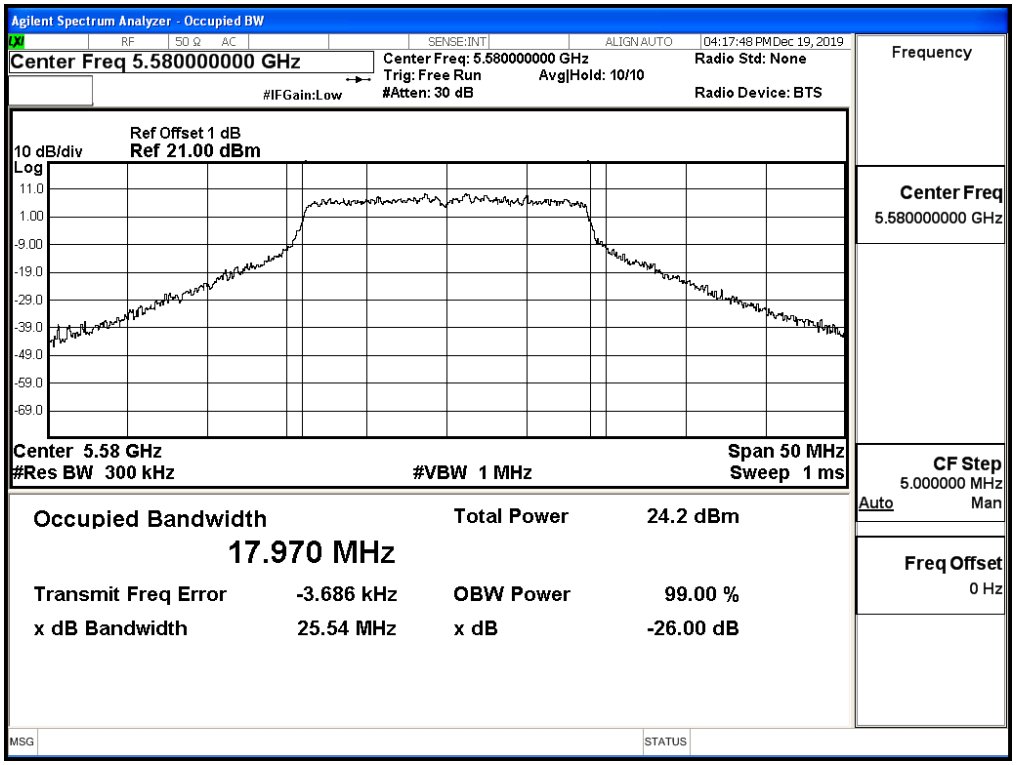
Channel 64 -Chain B



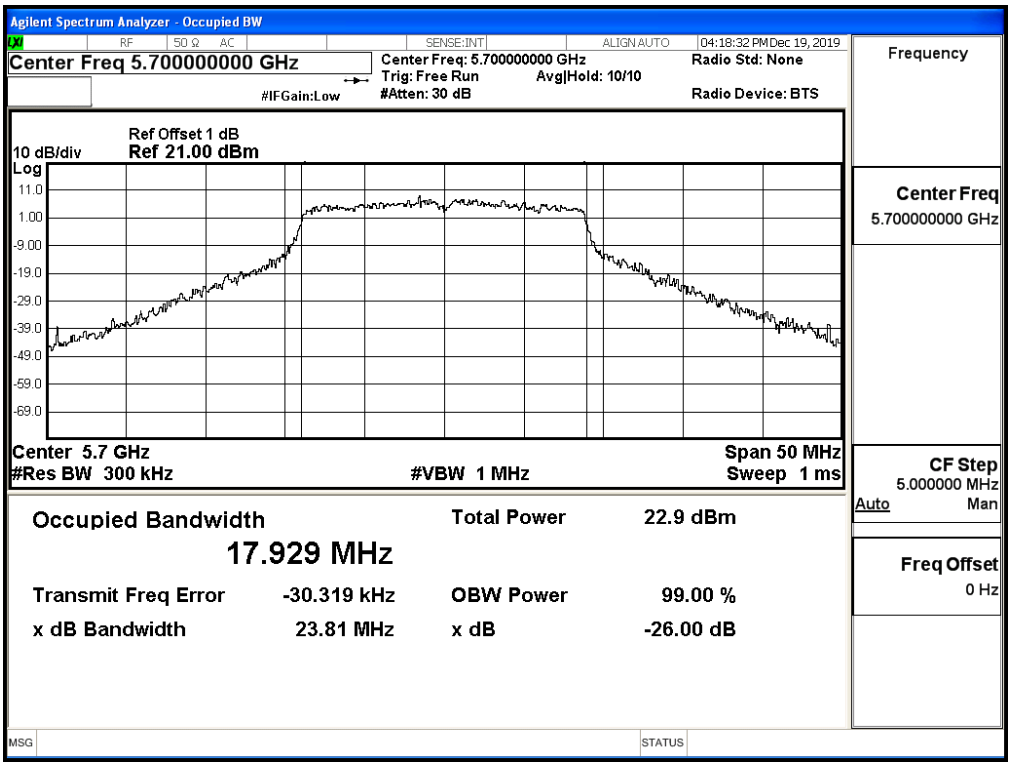
Channel 100 -Chain B



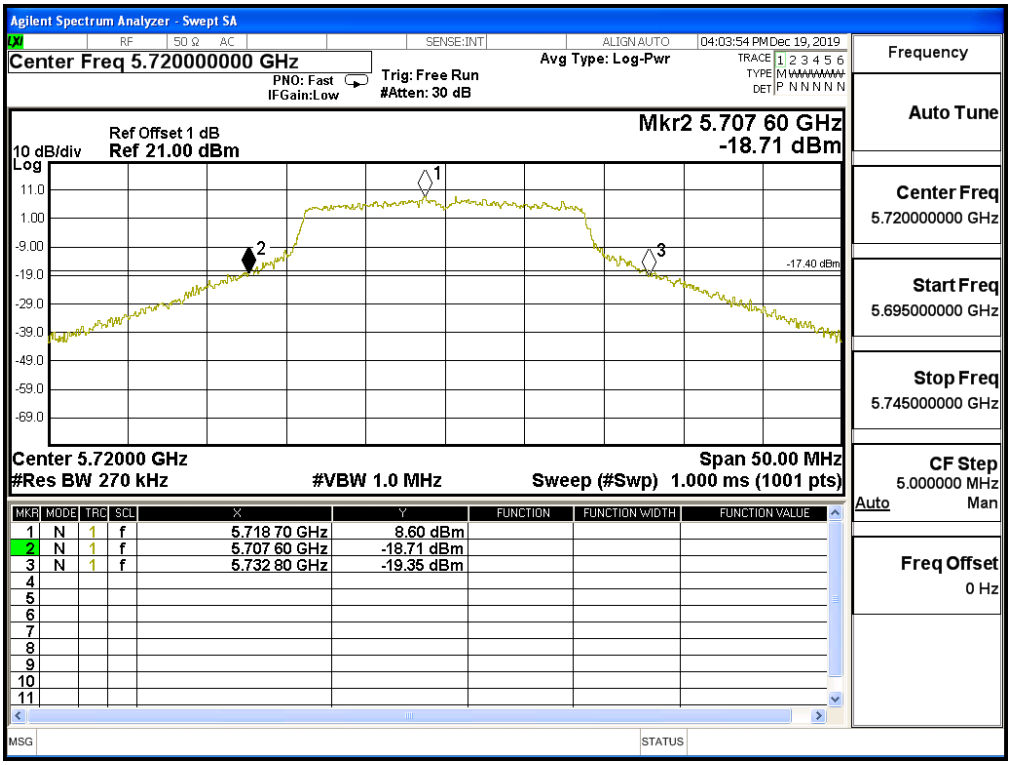
Channel 116 -Chain B



Channel 140 -Chain B



Channel 144 -Chain B



Product : LTE SOM Module
Test Item : Maximum conducted output power
Test Date : 2019/12/27
Test Mode : Transmit 802.11ac40

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
38	5190	17.47	--	--	--	--	--	--	--	<24dBm
46	5230	17.02	16.95	16.87	16.81	16.73	16.65	16.58	16.52	<24dBm
54	5270	17.03	--	--	--	--	--	--	--	<24dBm
62	5310	16.95	16.88	16.82	16.75	16.68	16.62	16.55	16.47	<24dBm
102	5510	16.51	--	--	--	--	--	--	--	<24dBm
110	5550	16.51	16.43	16.35	16.28	16.21	16.15	16.07	16.01	<24dBm
134	5670	17.21	--	--	--	--	--	--	--	<24dBm
142(U-NII-2C)	5710	16.95	16.87	16.82	16.72	16.69	16.57	16.50	16.43	<24dBm
142(U-NII-3)	5710	5.44	5.38	5.31	5.28	5.21	5.14	5.10	5.07	<30dBm
151	5755	16.63	--	--	--	--	--	--	--	<30dBm
159	5795	16.98	16.92	16.85	16.77	16.71	16.65	16.57	16.51	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
38	5190	17.05	--	--	--	--	--	--	--	<24dBm
46	5230	16.75	16.68	16.61	16.53	16.45	16.38	16.32	16.25	<24dBm
54	5270	16.59	--	--	--	--	--	--	--	<24dBm
62	5310	16.42	16.35	16.27	16.21	16.13	16.05	15.98	15.92	<24dBm
102	5510	16.79	--	--	--	--	--	--	--	<24dBm
110	5550	16.92	16.85	16.77	16.71	16.65	16.58	16.52	16.45	<24dBm
134	5670	17.29	--	--	--	--	--	--	--	<24dBm
142(U-NII-2C)	5710	17.02	16.91	16.8	16.7	16.62	16.59	16.49	16.41	<24dBm
142(U-NII-3)	5710	6.57	6.5	6.45	6.34	6.27	6.14	6.02	5.93	<30dBm
151	5755	16.61	--	--	--	--	--	--	--	<30dBm
159	5795	16.98	16.91	16.83	16.77	16.71	16.63	16.55	16.47	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

(CHAIN A+ B)

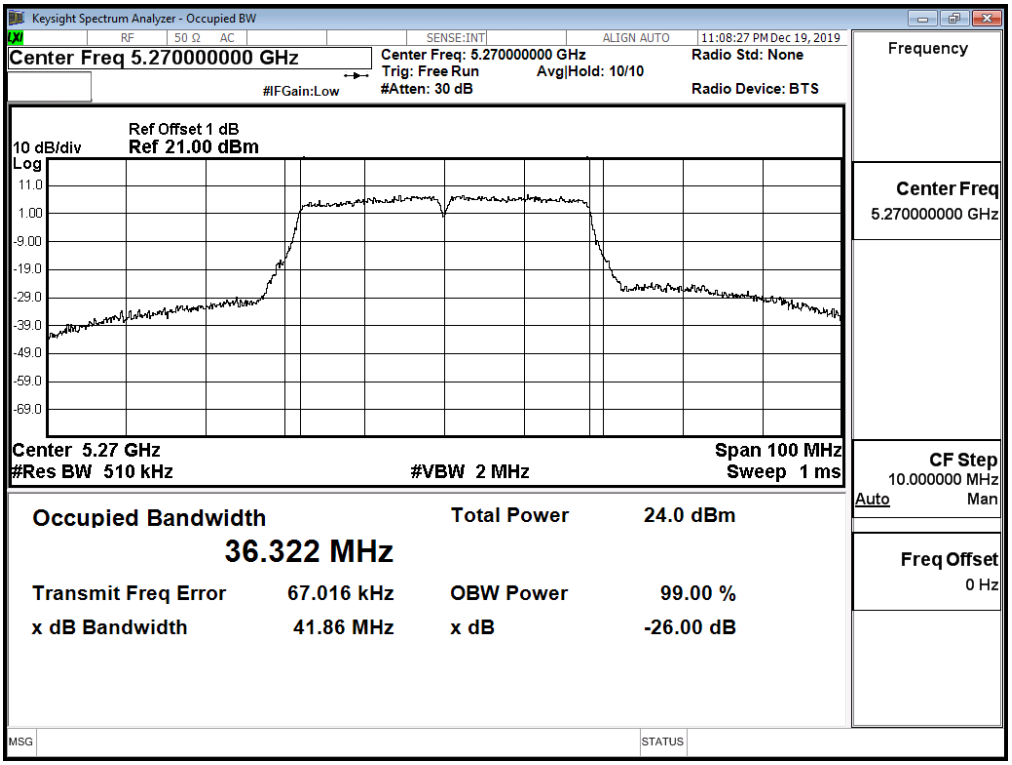
Channel Number	Frequency	99% Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
38	5190	--	17.47	17.05	20.28	24	--
46	5230	--	17.02	16.75	19.90	24	--
54	5270	41.190	17.03	16.59	19.83	24	27.15
62	5310	41.000	16.95	16.42	19.70	24	27.13
102	5510	41.110	16.51	16.79	19.66	24	27.14
110	5550	41.330	16.51	16.92	19.73	24	27.16
134	5670	41.170	17.21	17.29	20.26	24	27.15
142(U-NII-2C)	5710	35.800	16.950	17.020	20.00	24	26.54
142(U-NII-3)	5710	--	5.440	6.570	9.05	30	--
151	5755	--	16.63	16.61	19.63	30	--
159	5795	--	16.98	16.98	19.99	30	--

Note:

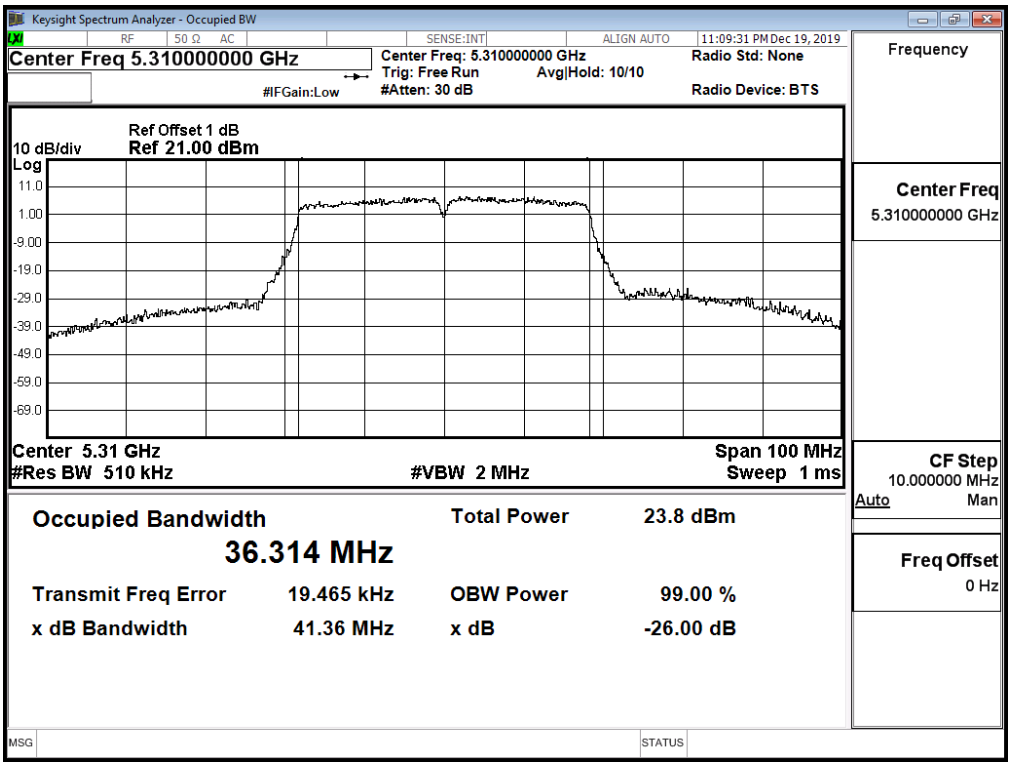
1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))
   26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

99% Occupied Bandwidth:

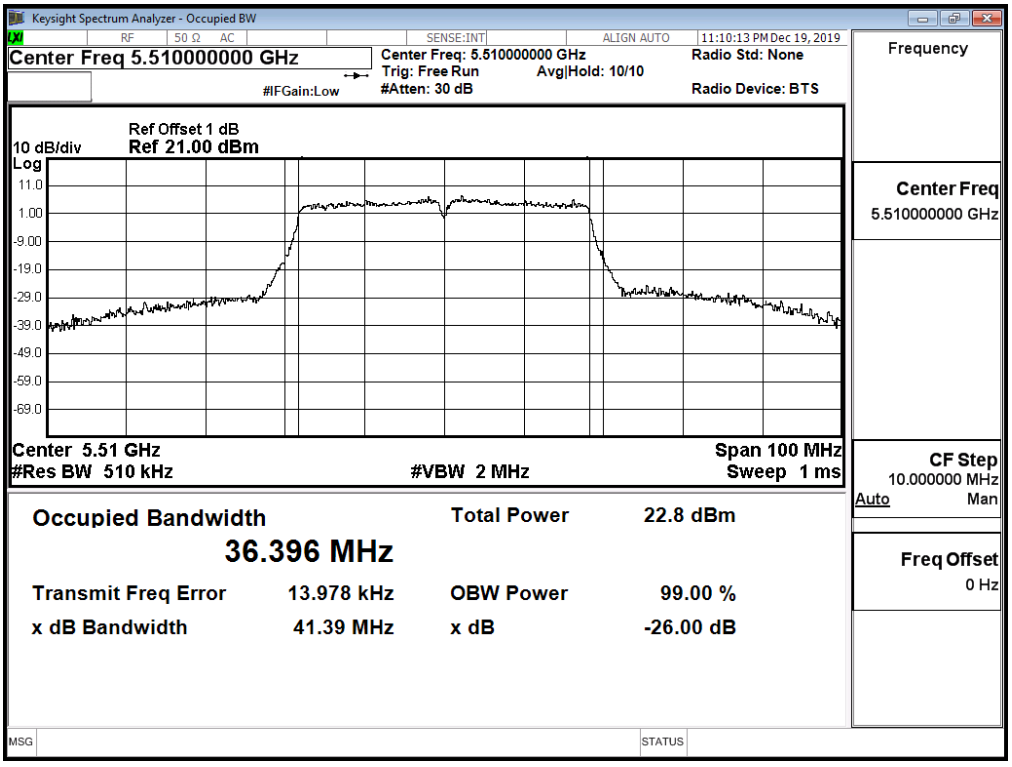
Channel 54 -Chain A



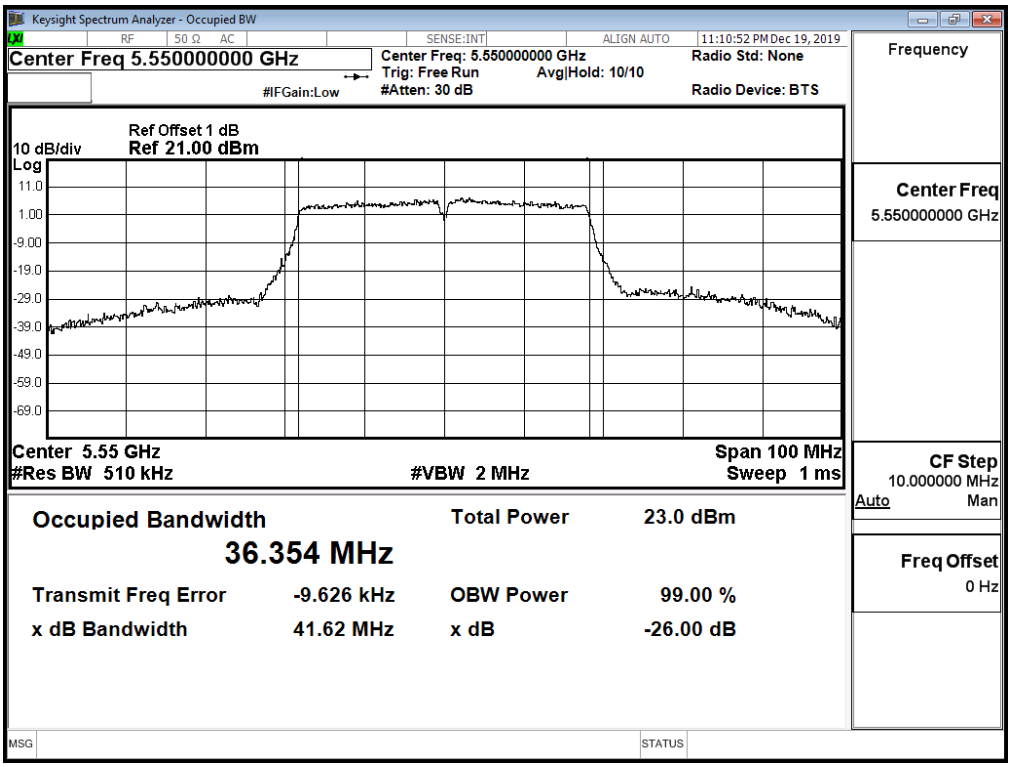
Channel 62 -Chain A



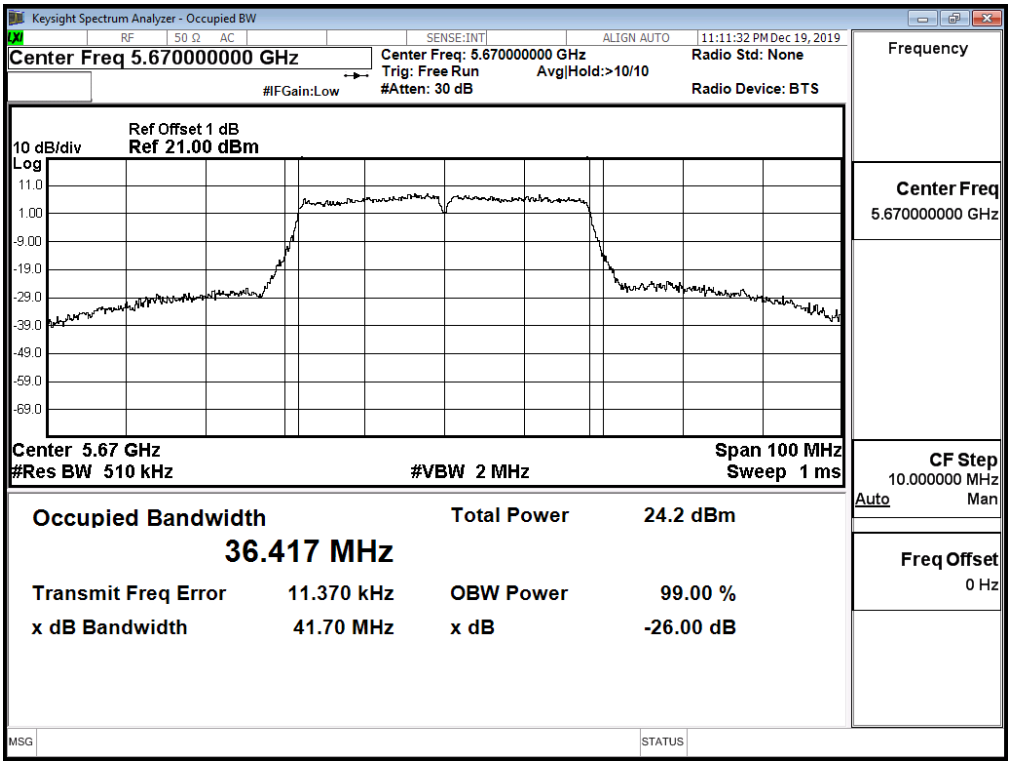
Channel 102 -Chain A



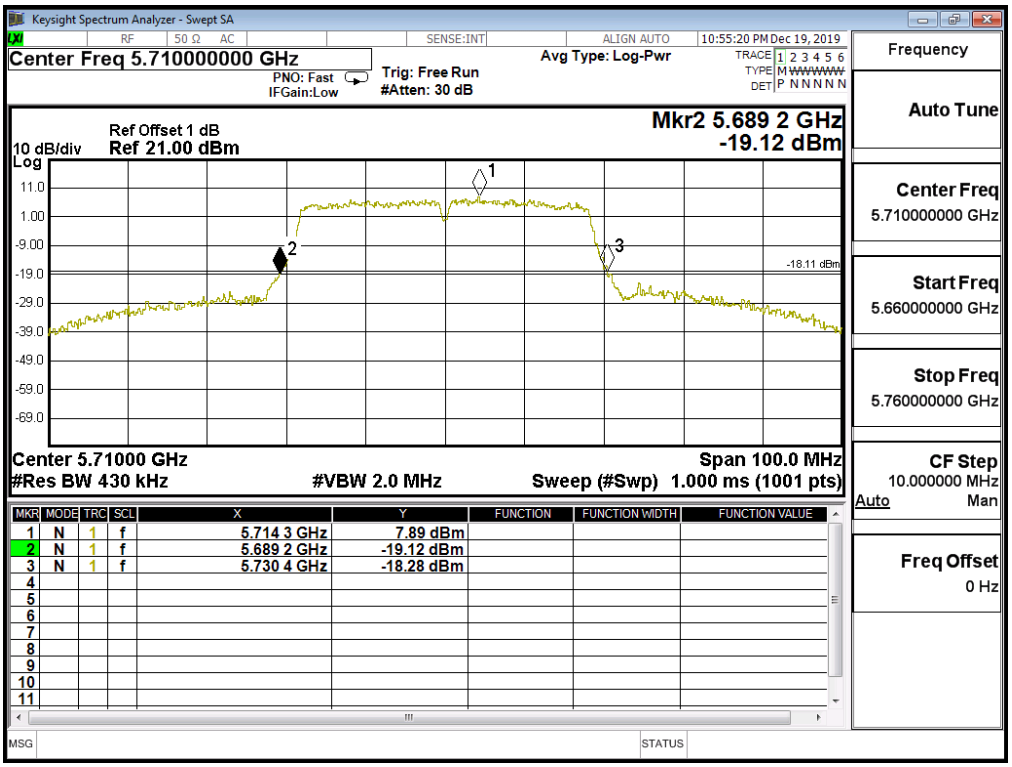
Channel 100 -Chain A



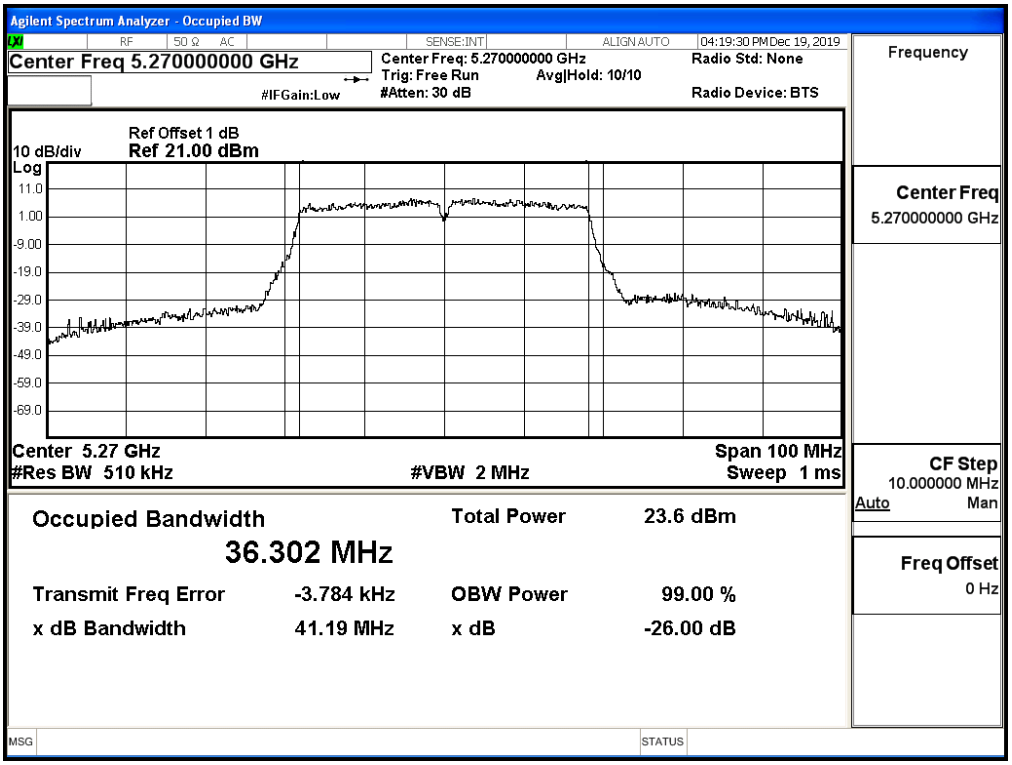
Channel 116 -Chain A



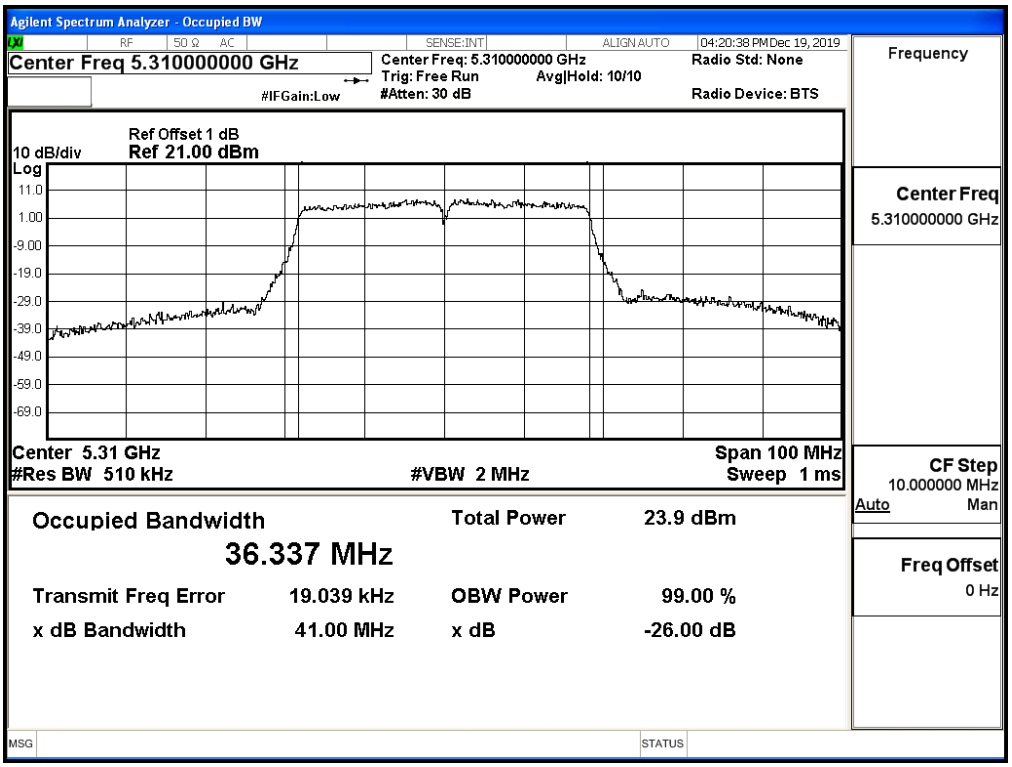
Channel 142 -Chain A



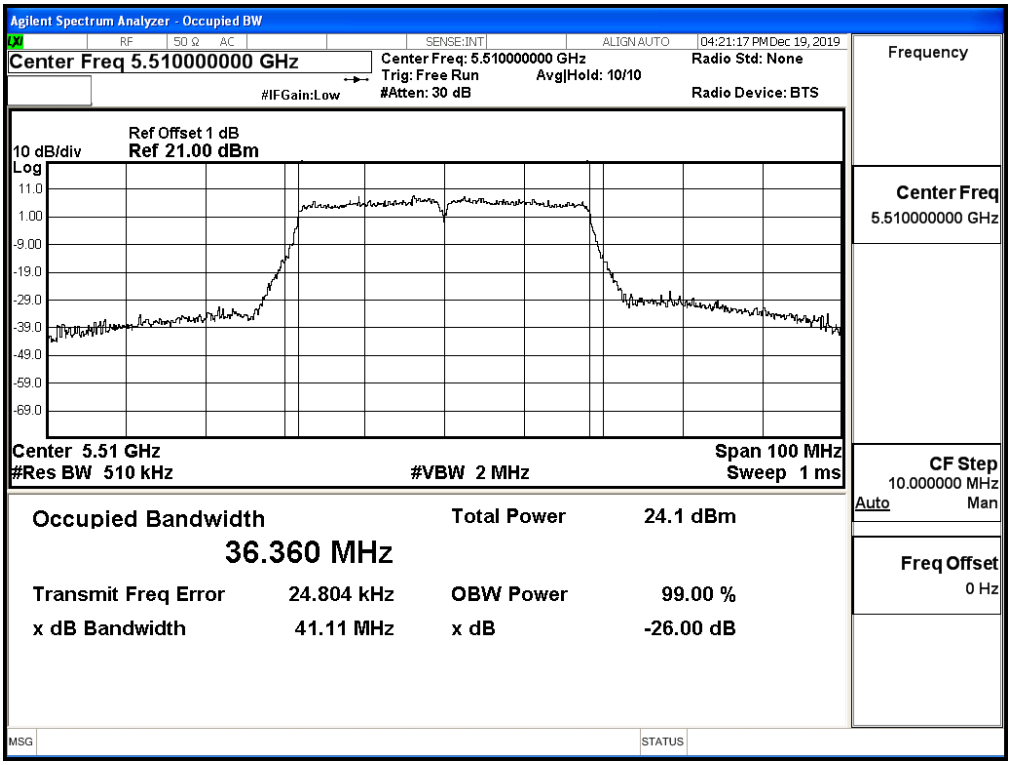
Channel 52 -Chain B



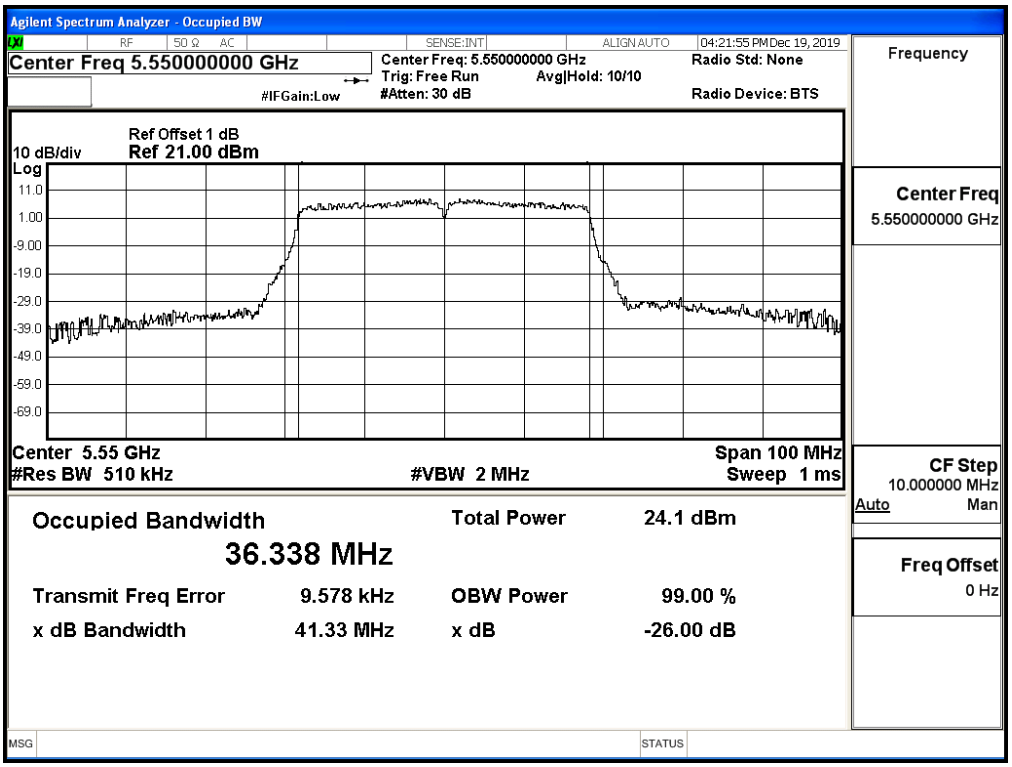
Channel 60 -Chain B



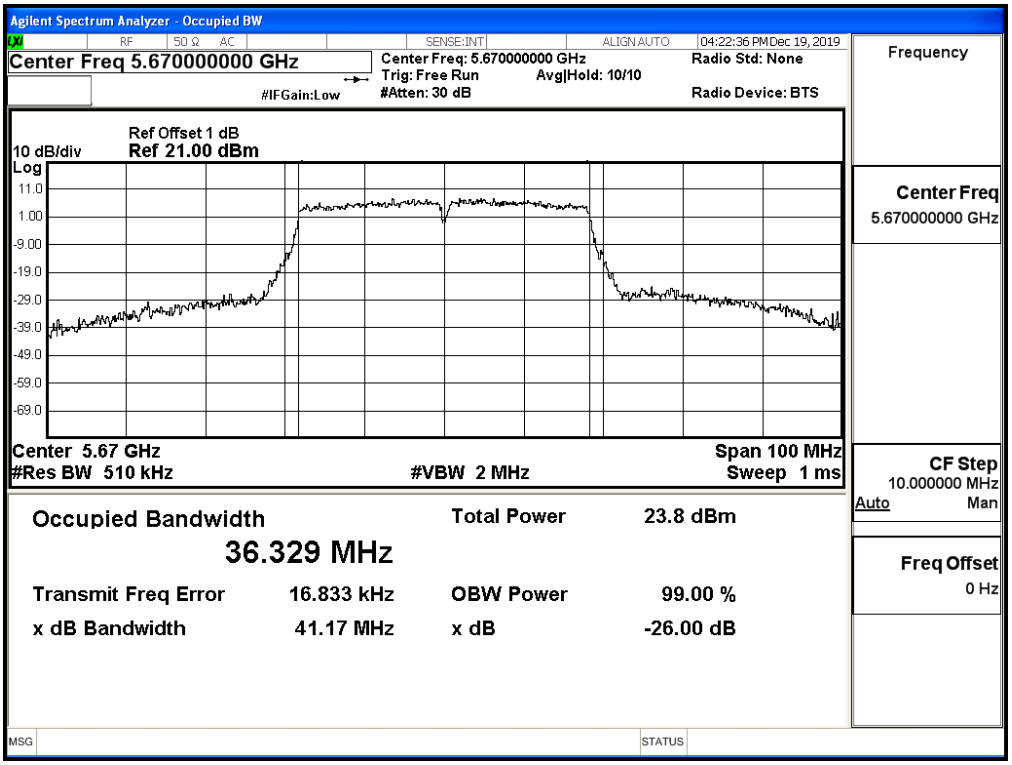
Channel 64 -Chain B



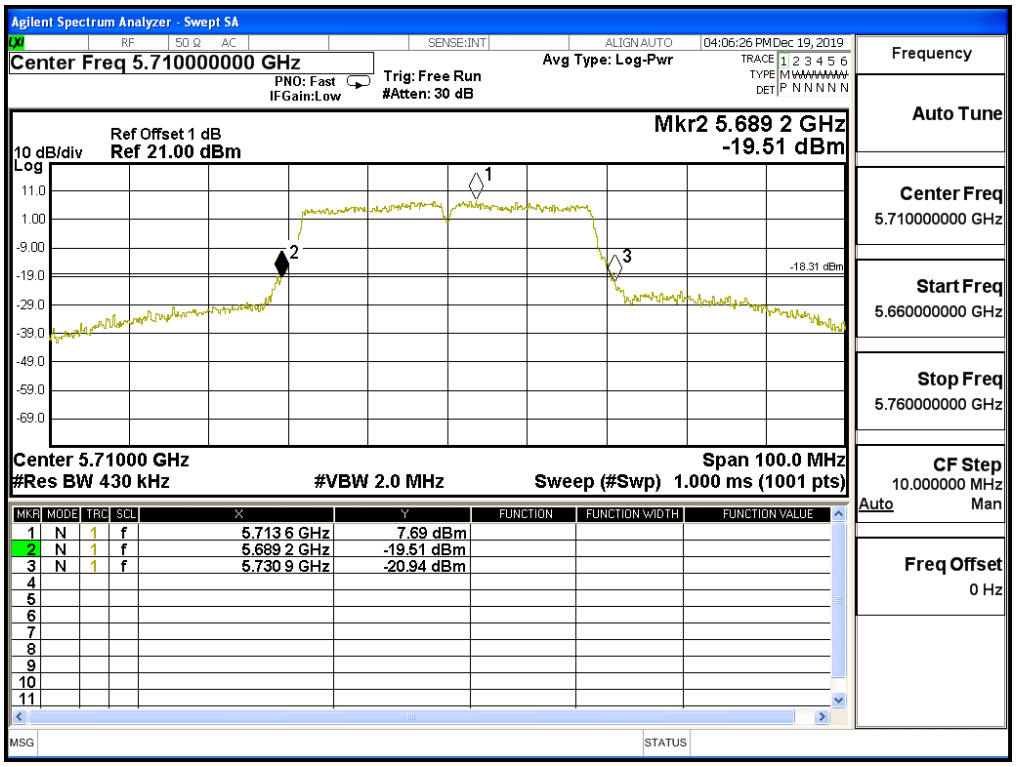
Channel 100 -Chain B



Channel 116 -Chain B



Channel 142 -Chain B



Product : LTE SOM Module
Test Item : Maximum conducted output power
Test Date : 2019/12/27
Test Mode : Transmit 802.11ac80

CHAIN A

Cable loss=1dB		Average Power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
42	5210	16.12	16.05	15.98	15.91	15.85	15.78	15.72	15.66	15.58	15.51	<24dBm
58	5290	15.98	15.92	15.86	15.77	15.71	15.63	15.58	15.52	15.45	15.37	<24dBm
106ac80	5530	15.89	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(Band2C)	5690	15.72	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(Band3)	5690	1.01	--	--	--	--	--	--	--	--	--	<24dBm
155ac80	5775	16.01	15.93	15.85	15.78	15.71	15.63	15.57	15.51	15.49	15.41	<30dBm

Note: Maximum conducted output power Value =Reading value on Spectrum Analyzer + cable loss

CHAIN B

Cable loss=1dB		Average Power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
42	5210	15.91	15.85	15.77	15.71	15.63	15.56	15.49	15.41	15.35	15.28	<24dBm
58	5290	15.78	15.71	15.63	15.57	15.51	15.45	15.38	15.31	15.25	15.18	<24dBm
106ac80	5530	16.04	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(U-NII-2C)	5690	15.84	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(U-NII-3)	5690	2.01	--	--	--	--	--	--	--	--	--	<24dBm
155ac80	5775	16.09	16.02	15.95	15.88	15.82	15.75	15.68	15.61	15.53	15.47	<30dBm

Note: Maximum conducted output power Value =Reading value on Spectrum Analyzer + cable loss

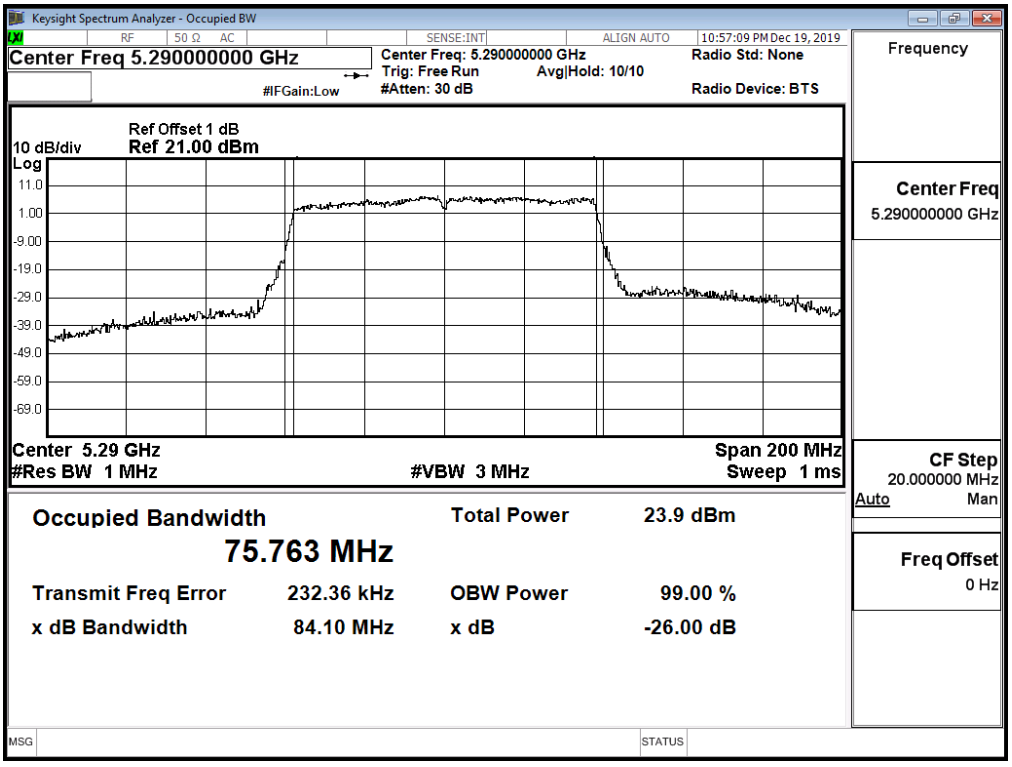
Maximum conducted output power Measurement:

(**CHAIN A+ B)**

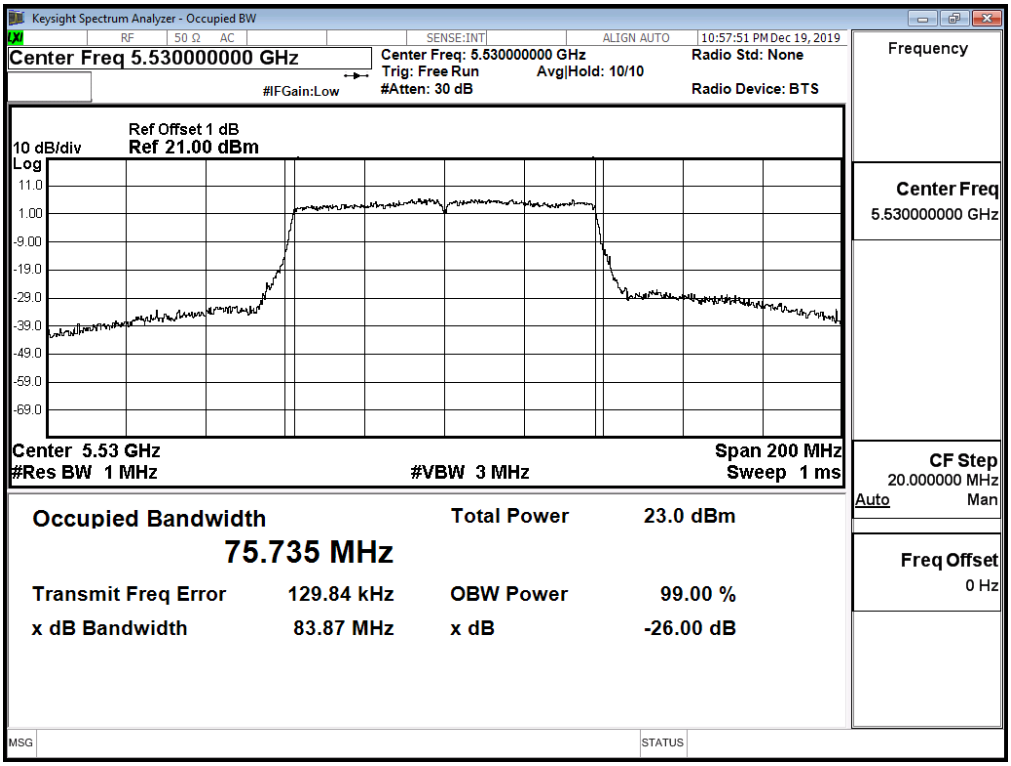
Channel Number	Frequency Range	99% Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
42	5210	--	16.120	15.910	19.03	24	--
58	5290	83.200	15.980	15.780	18.89	24	30.20
106	5530	82.940	15.890	16.040	18.98	24	30.19
138(U-NII-2C)	5690	76.400	15.720	15.840	18.79	24	29.83
138(U-NII-3)	5690	--	1.010	2.010	4.55	30	--
155	5775	--	16.010	16.090	19.06	30	--

99% Occupied Bandwidth:

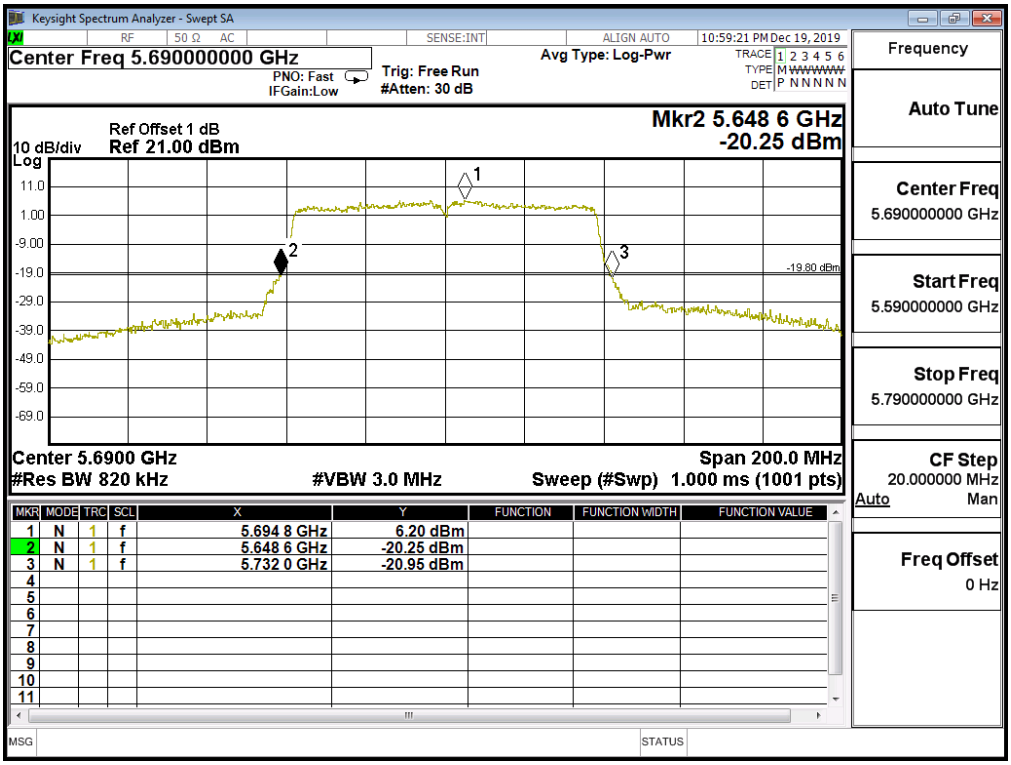
Channel 58 -Chain A



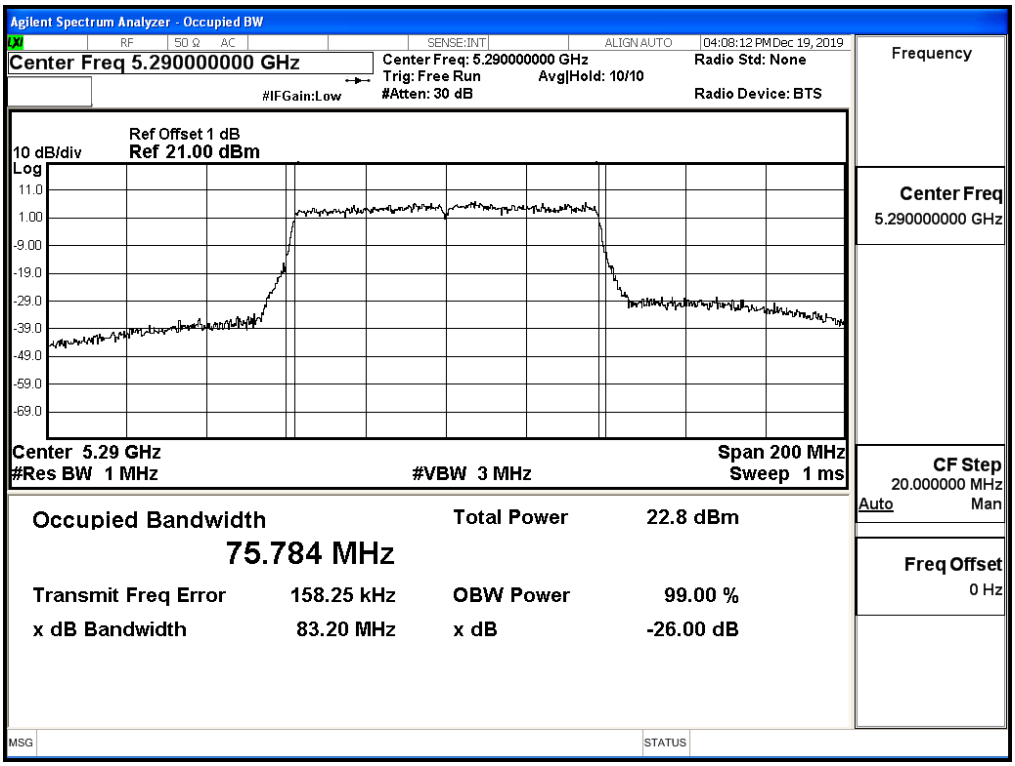
Channel 106 -Chain A



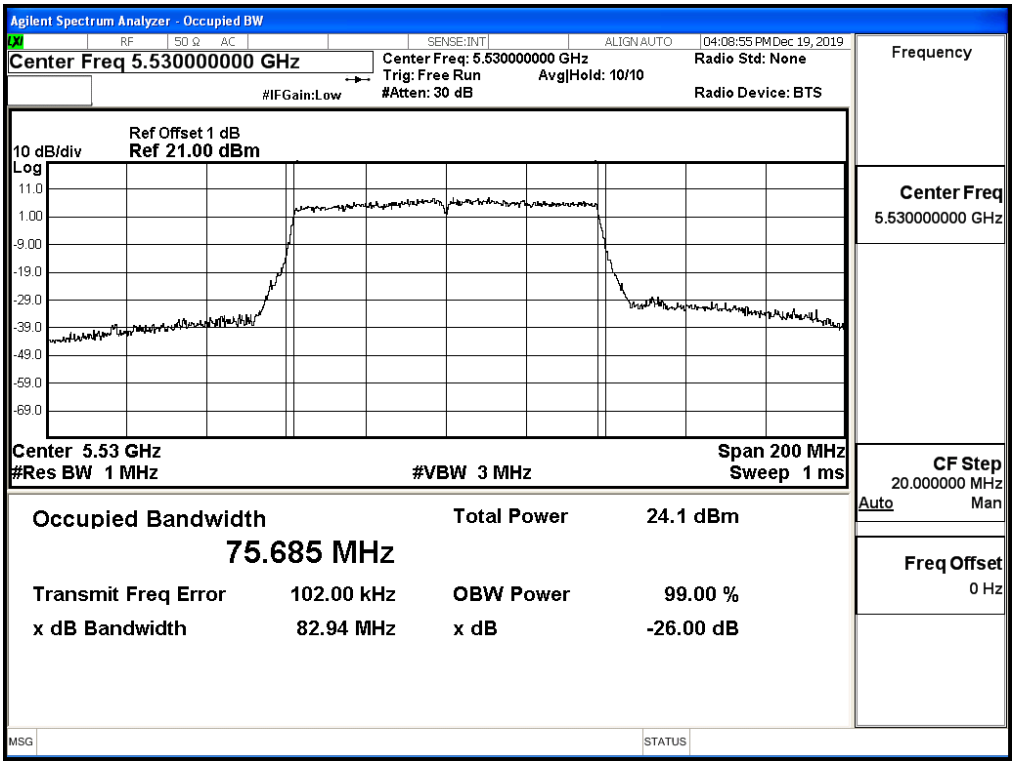
Channel 138 -Chain A



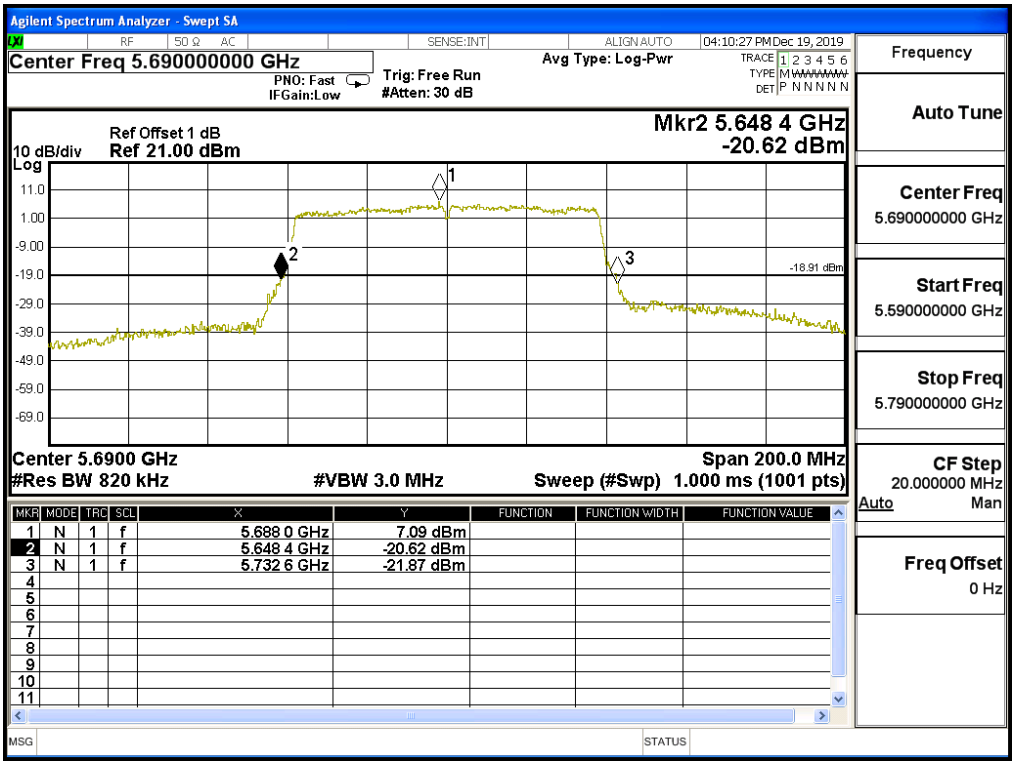
Channel 58 -Chain B



Channel 106 -Chain B

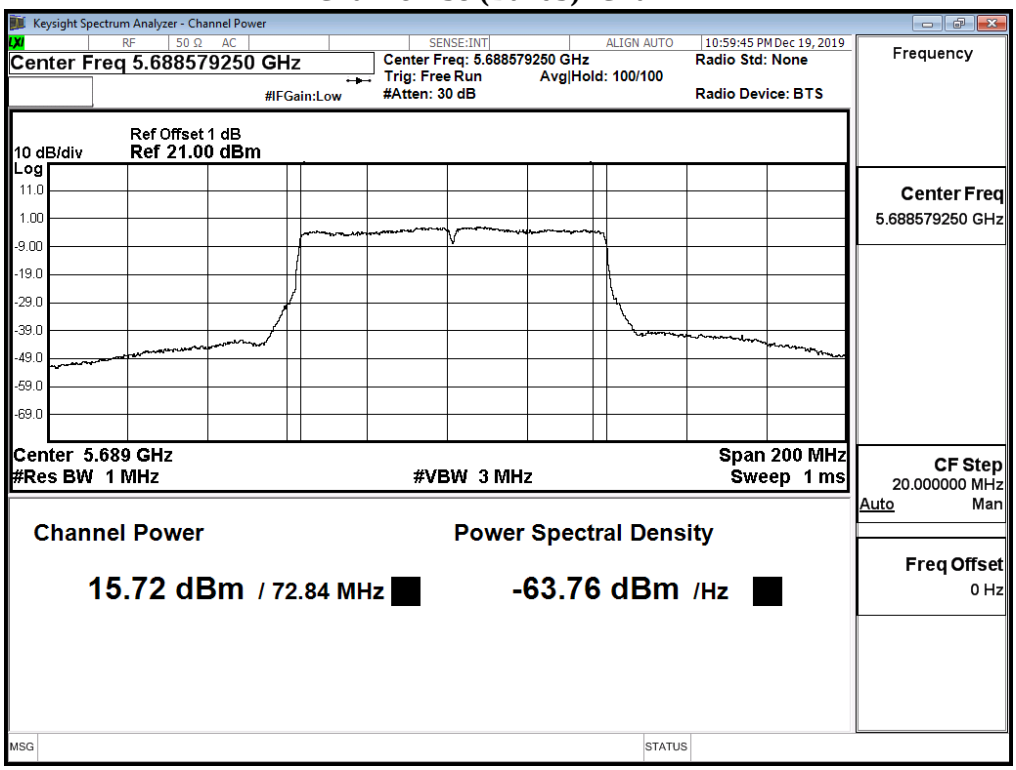


Channel 138 -Chain B



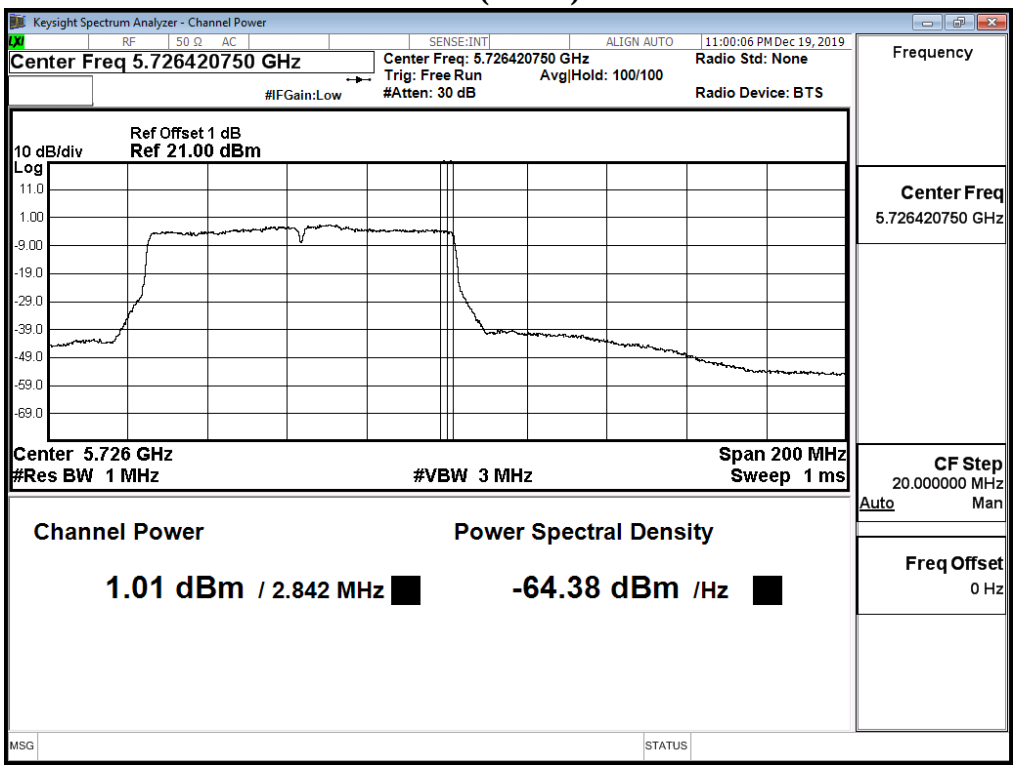
Maximum conducted output power:

Channel 138 (Band3) -Chain A



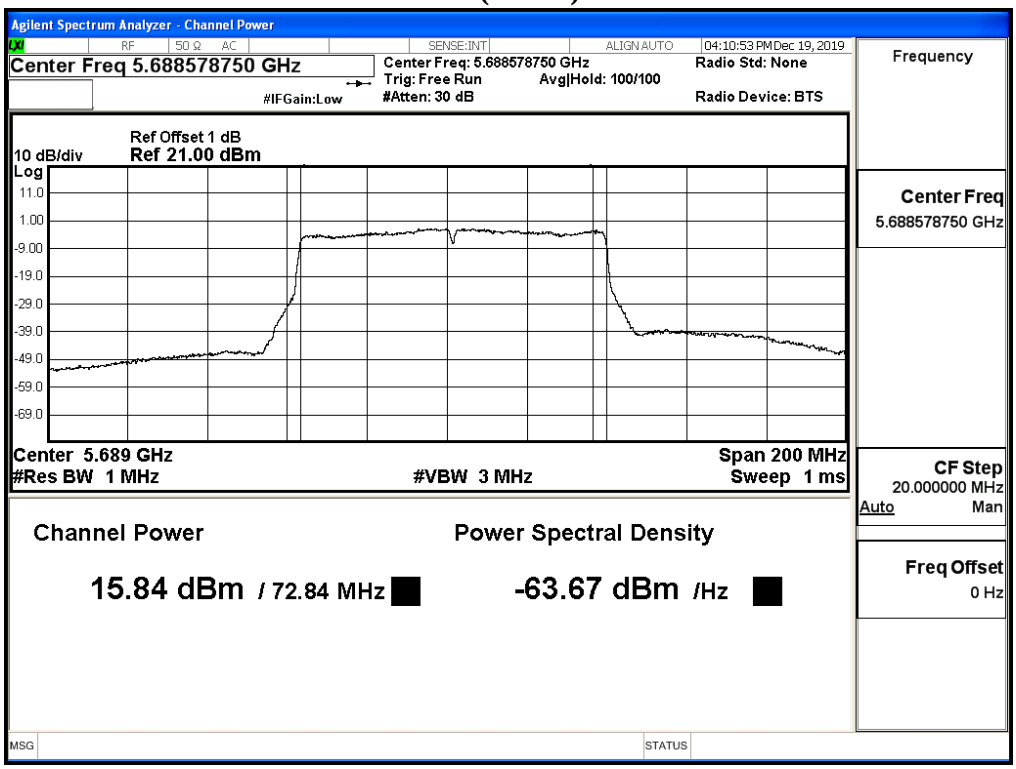
Maximum conducted output power:

Channel 138 (Band4) -Chain A



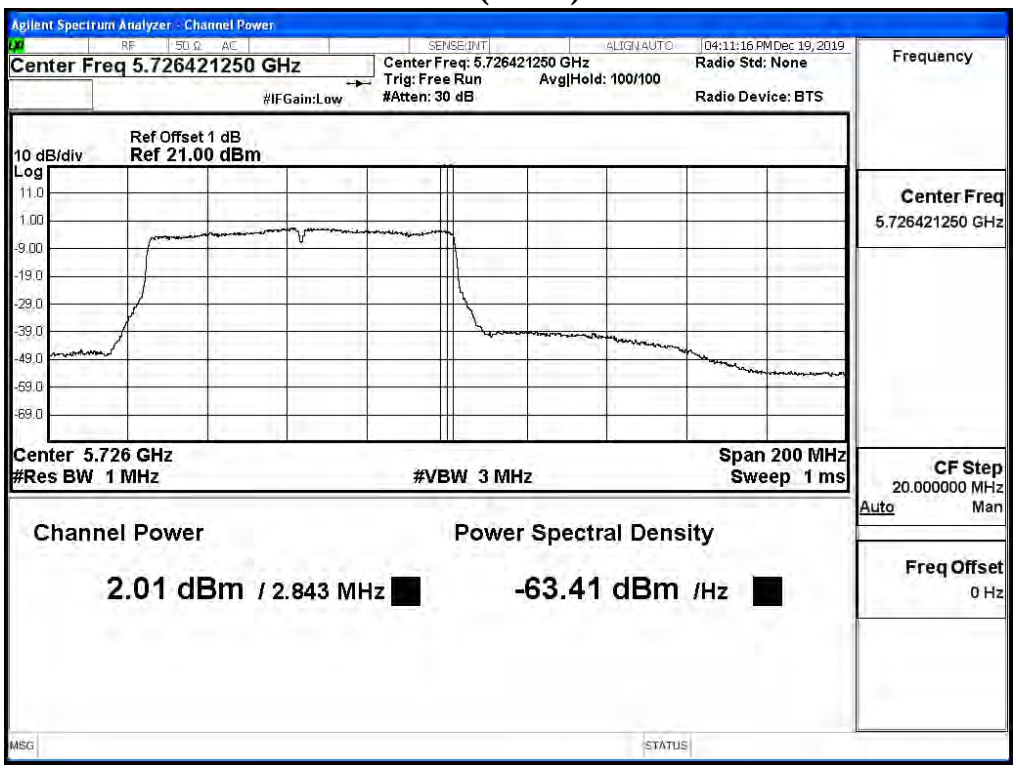
Maximum conducted output power:

Channel 138 (Band3) -Chain B



Maximum conducted output power:

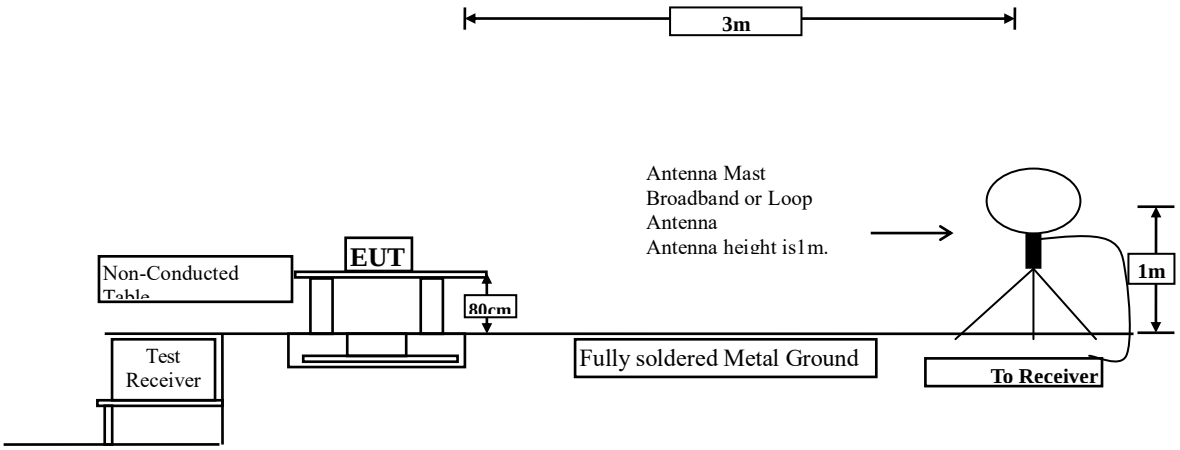
Channel 138 (Band4) -Chain B



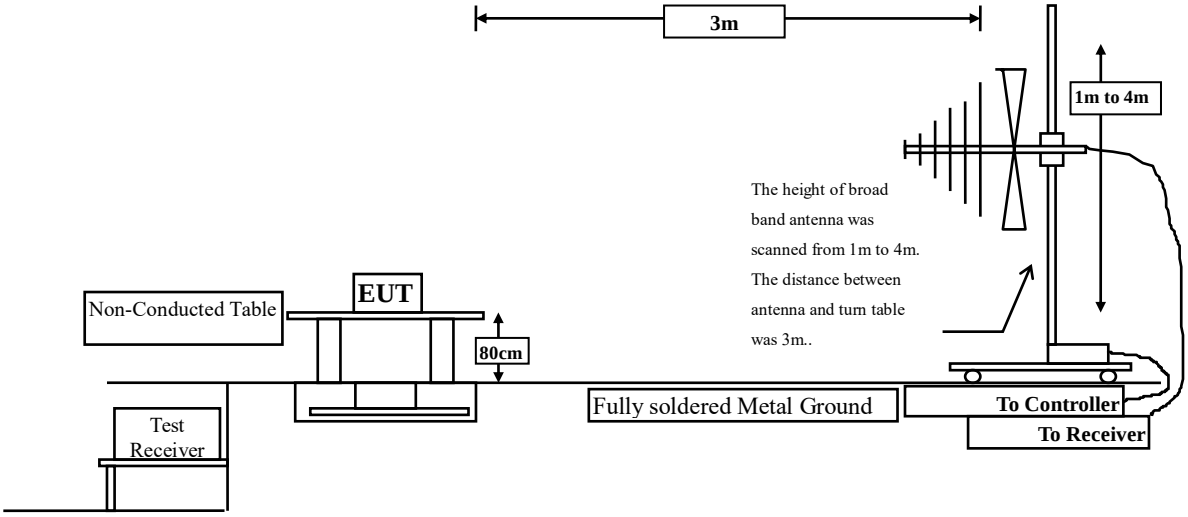
3. Radiated Emission

3.1. Test Setup

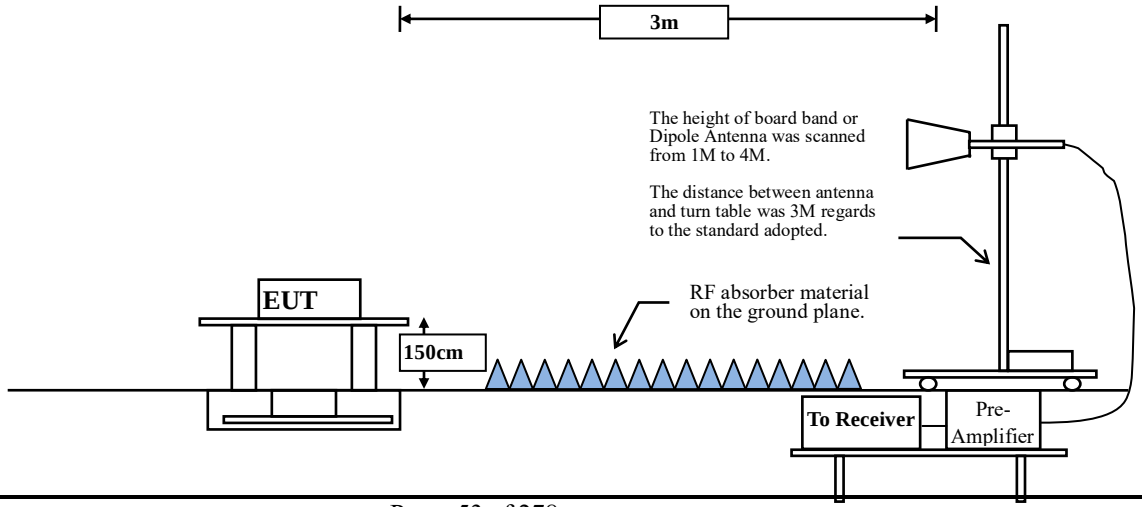
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV/m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW ≥ 3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to 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.)

5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11a	94.61	2.0362	491	500
802.11ac20	94.27	1.9058	525	1000
802.11ac40	86.81	0.9058	1104	2000
802.11ac80	78.38	0.4203	2379	3000

Note: Duty Cycle Refer to Section 5

3.4. Uncertainty

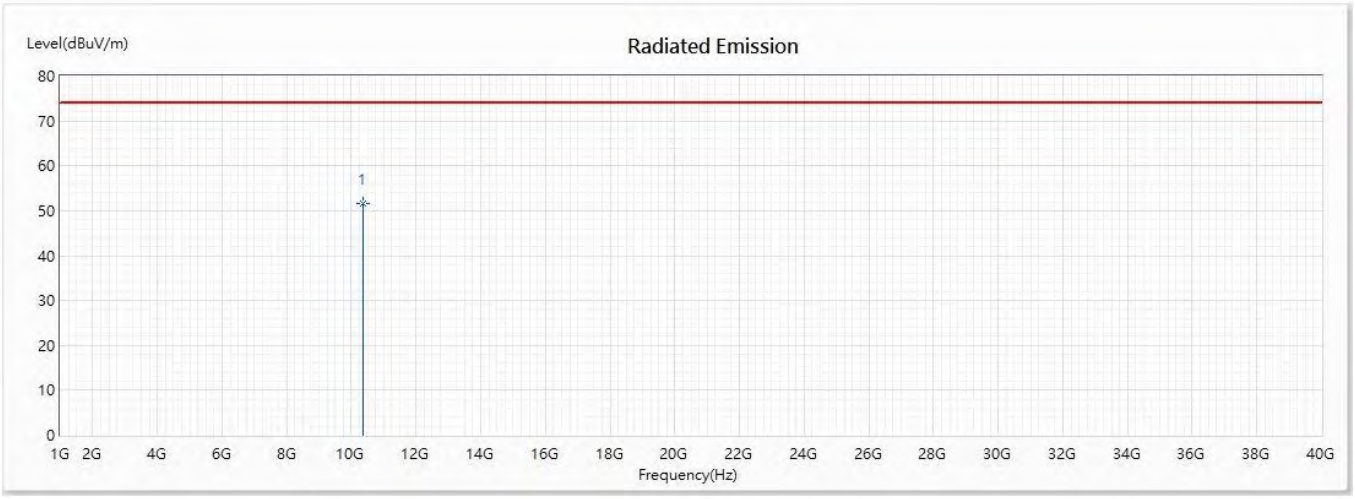
±4.08 dB below 1GHz

±4.22 dB above 1GHz

3.5. Test Result of Radiated Emission

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a(5180MHz)

Horizontal



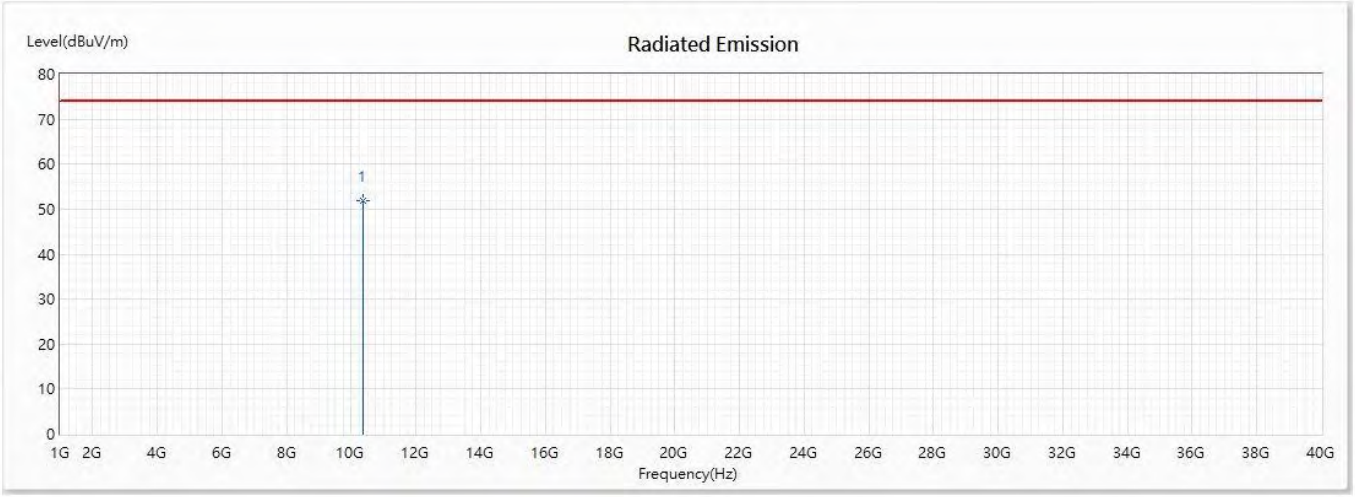
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10360	51.49	74.00	-22.51	38.10	13.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a(5180MHz)

Vertical



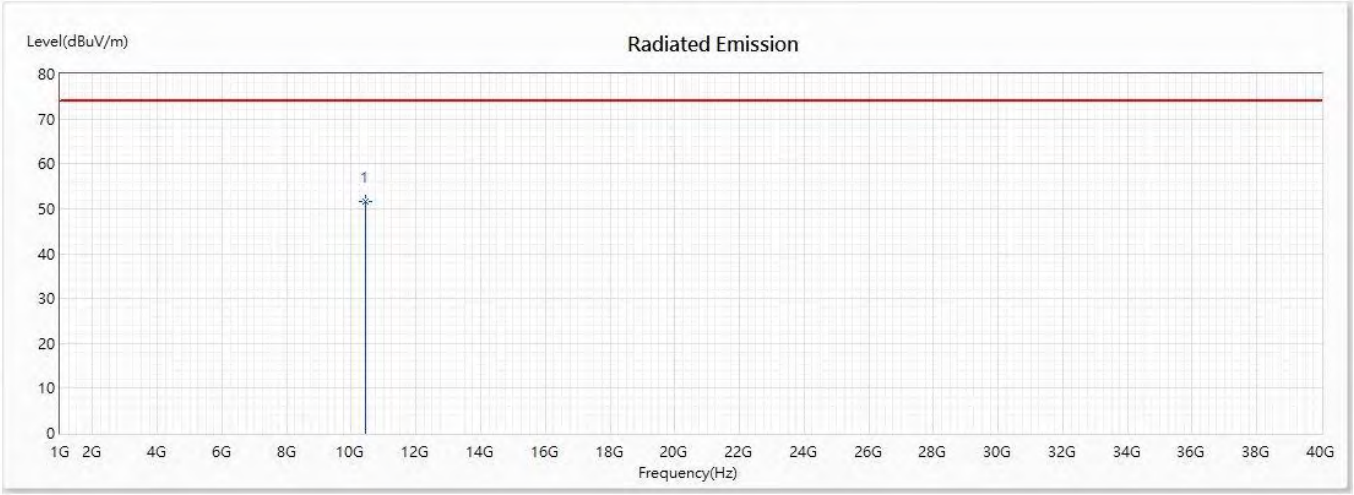
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10360	51.89	74.00	-22.11	38.50	13.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a(5220MHz)

Horizontal



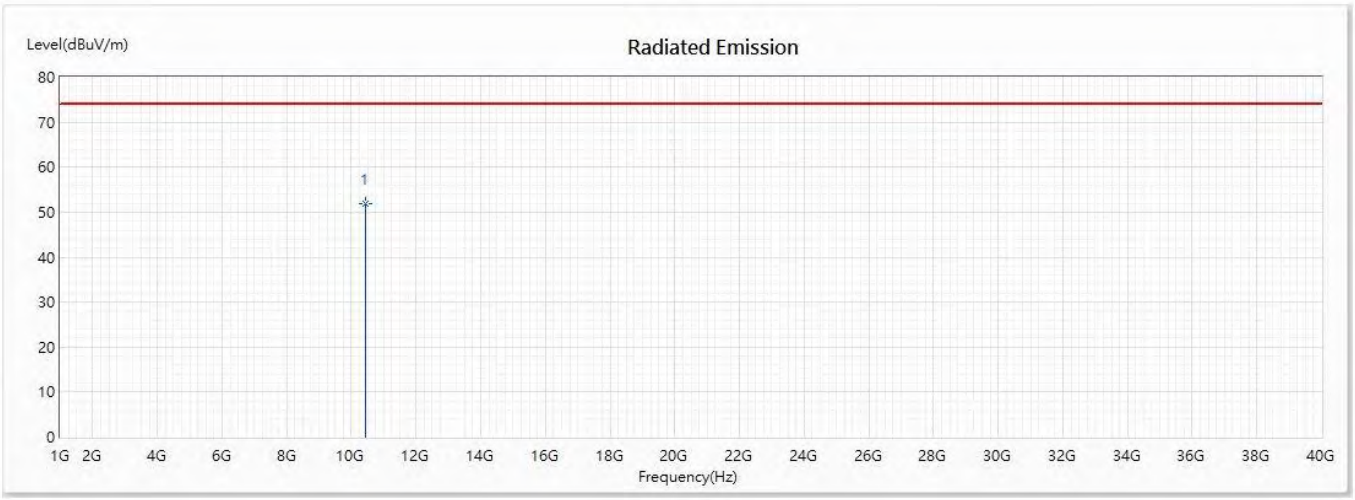
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10440	51.57	74.00	-22.43	38.34	13.23	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a (5220MHz)

Vertical



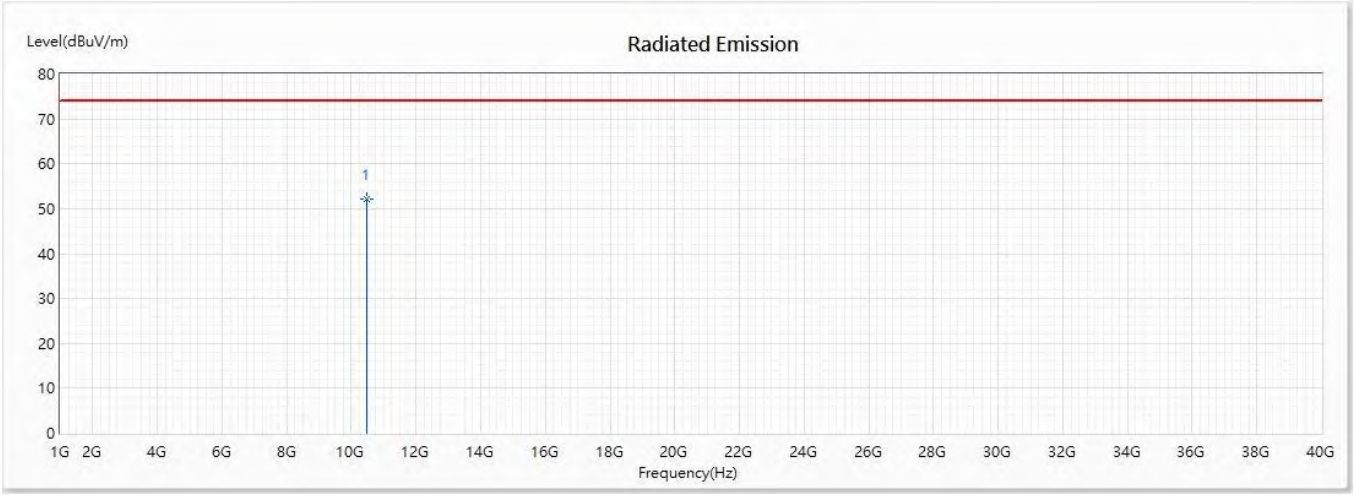
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10440	51.81	74.00	-22.19	38.58	13.23	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a(5240MHz)

Horizontal



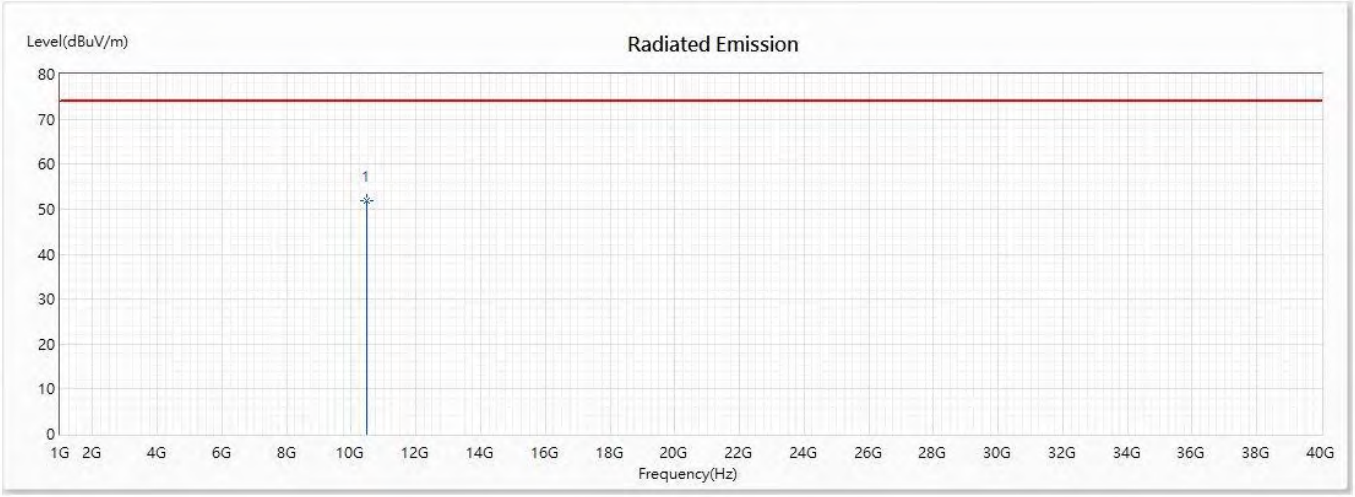
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10480	52.18	74.00	-21.82	39.03	13.15	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a(5240MHz)

Vertical



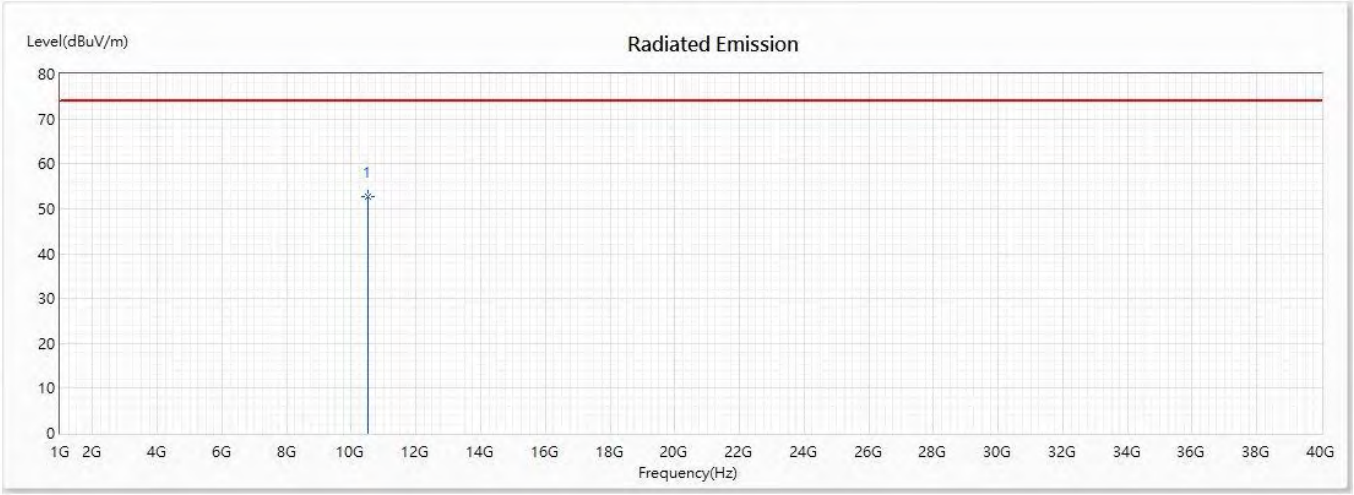
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10480	51.75	74.00	-22.25	38.60	13.15	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a(5260MHz)

Horizontal



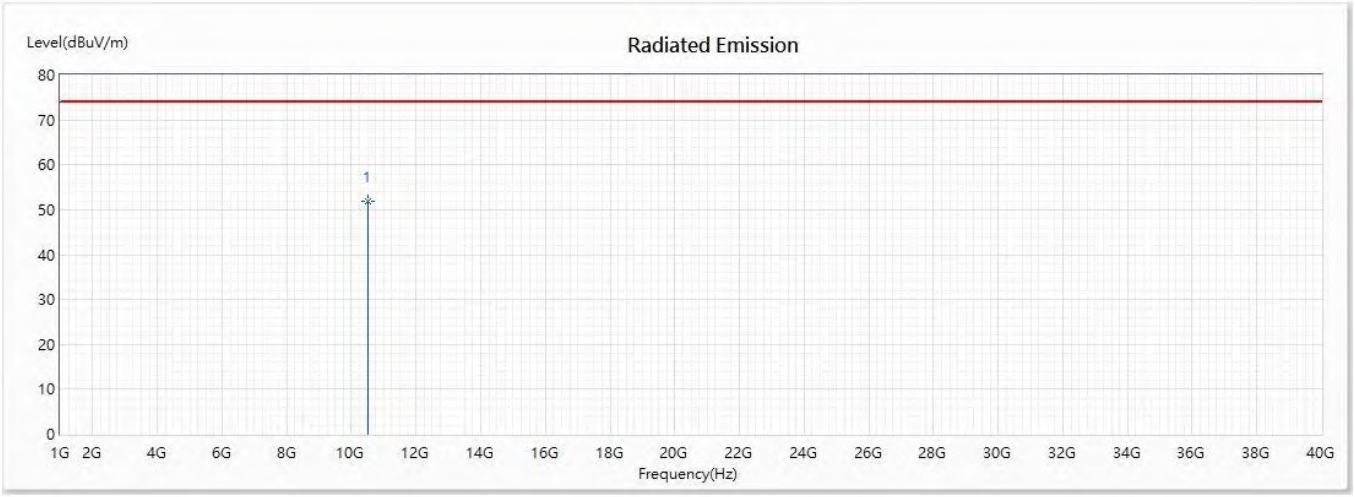
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10520	52.72	74.00	-21.28	39.60	13.12	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a(5260MHz)

Vertical



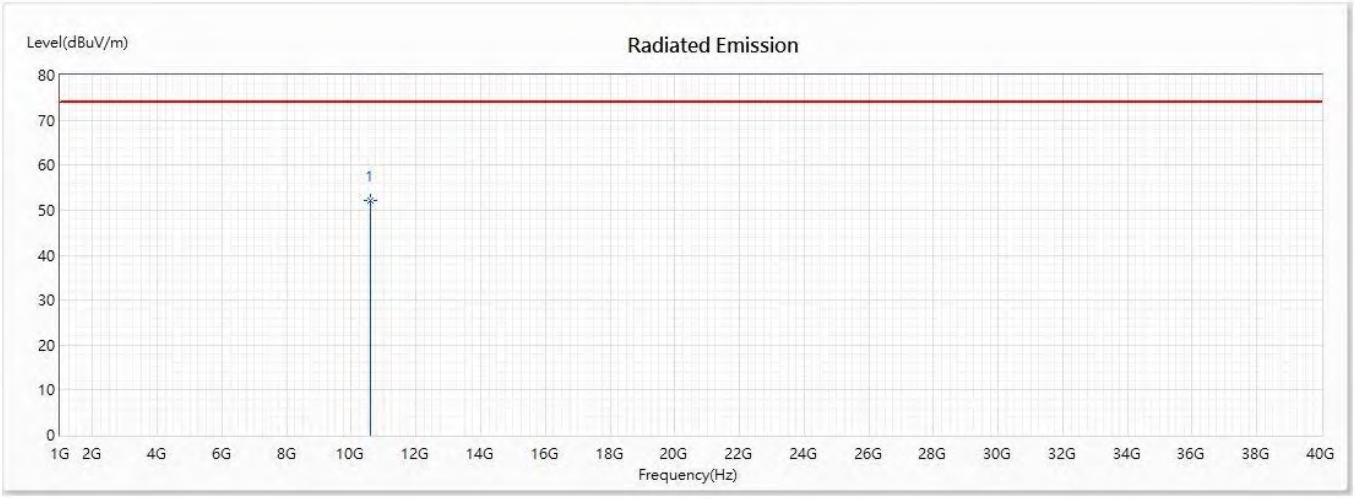
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10520	51.78	74.00	-22.22	38.66	13.12	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a (5300MHz)

Horizontal



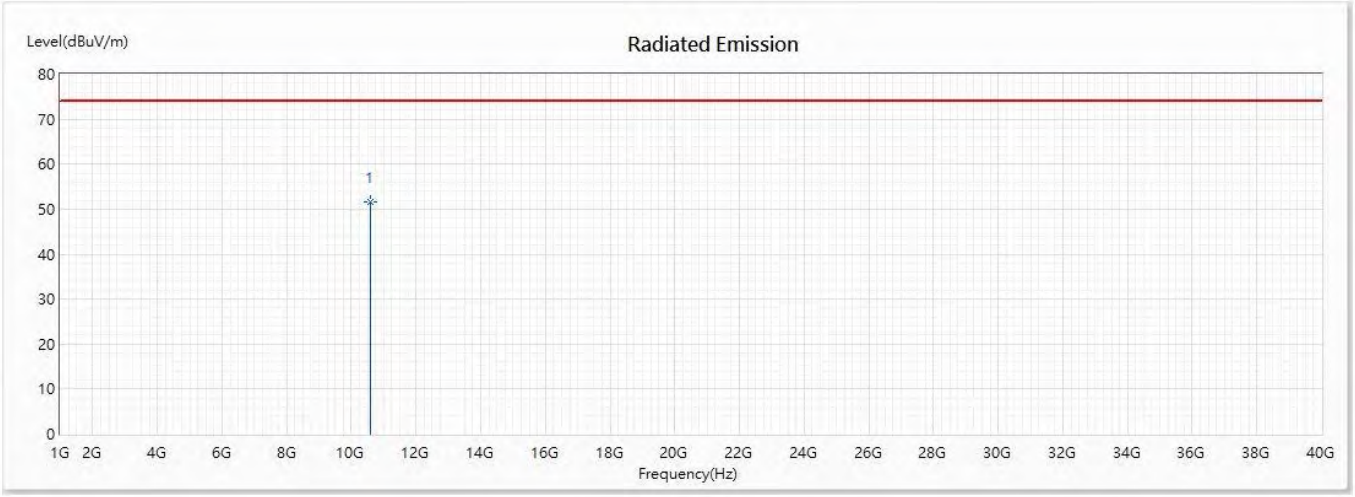
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10600	52.19	74.00	-21.81	39.07	13.12	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a (5300MHz)

Vertical



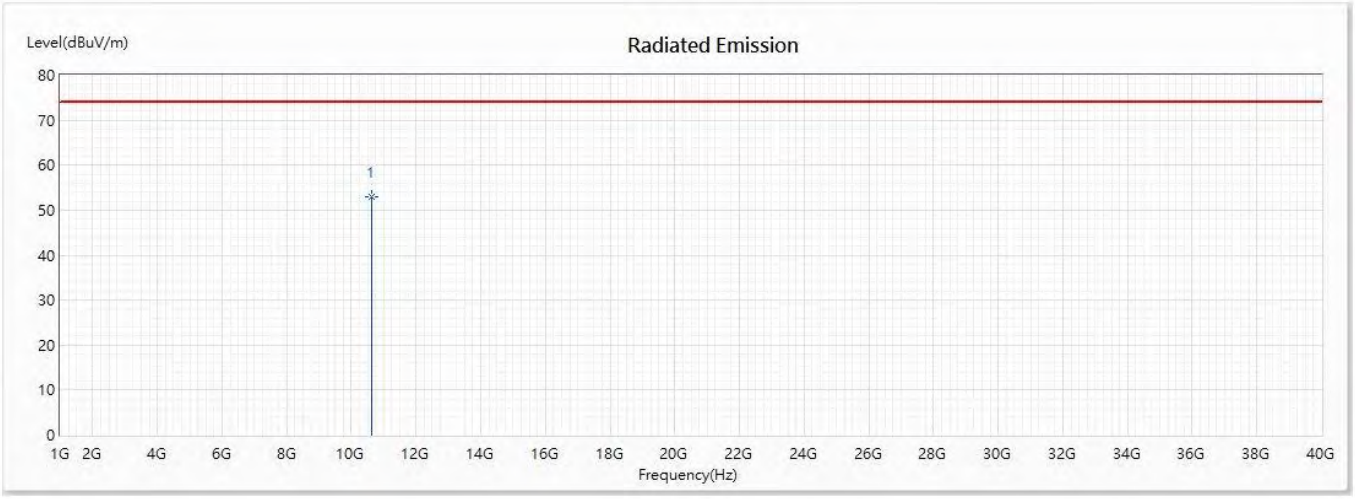
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10600	51.59	74.00	-22.41	38.47	13.12	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a (5320MHz)

Horizontal



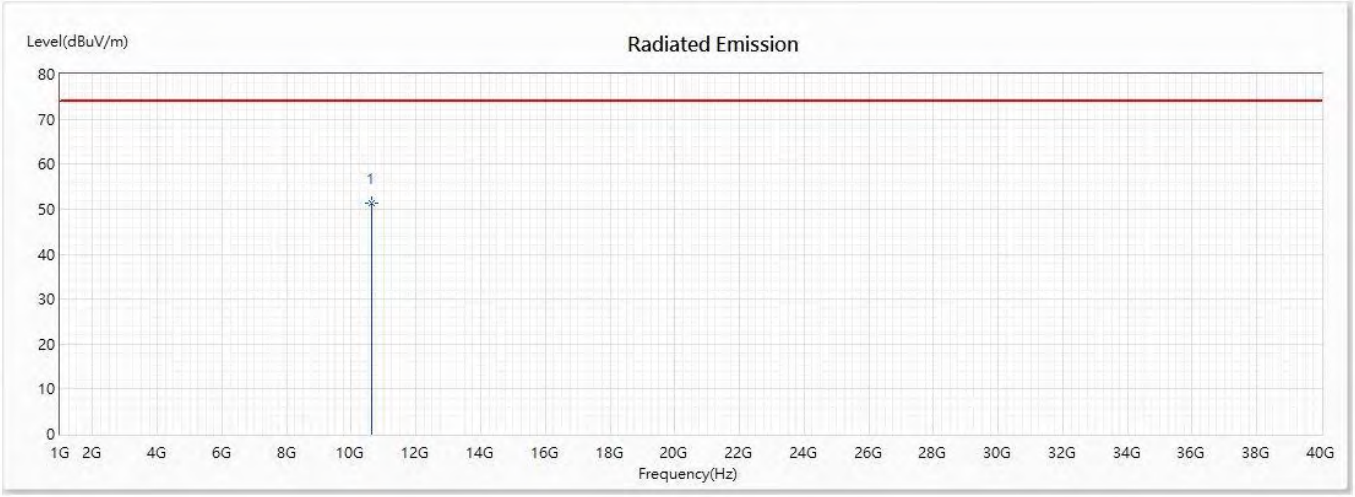
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10640	52.87	74.00	-21.13	39.73	13.14	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a (5320MHz)

Vertical



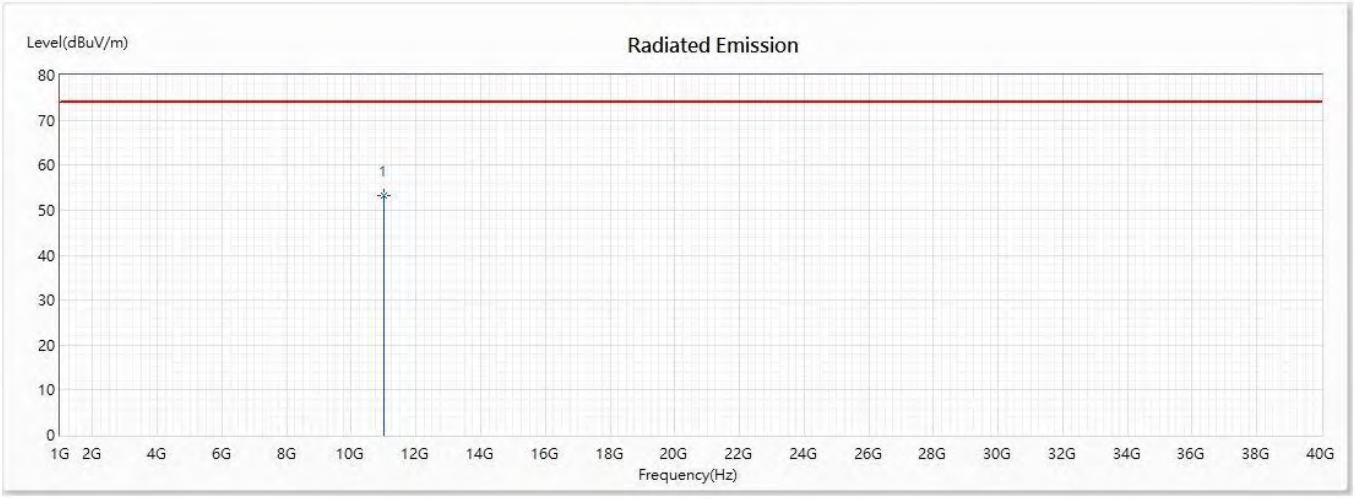
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	10640	51.28	74.00	-22.72	38.14	13.14	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	LTE SOM Module
Test Item	:	Harmonic Radiated Emission Data
Test Date	:	2020/04/20
Test Mode	:	Mode 1:802.11a (5500MHz)

Horizontal



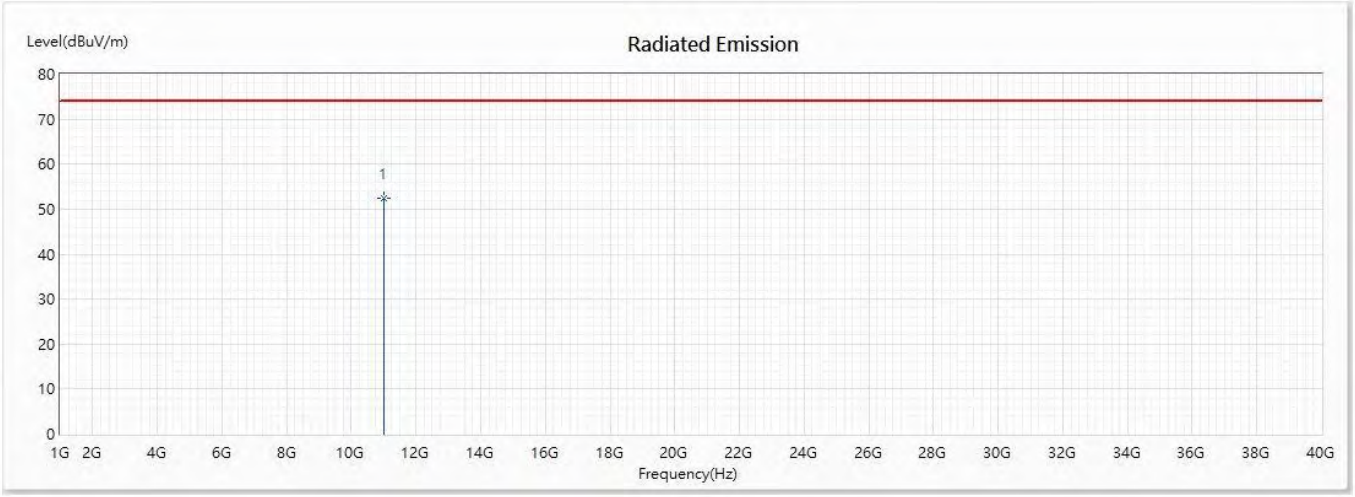
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11000	53.15	74.00	-20.85	39.52	13.63	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a (5500MHz)

Vertical



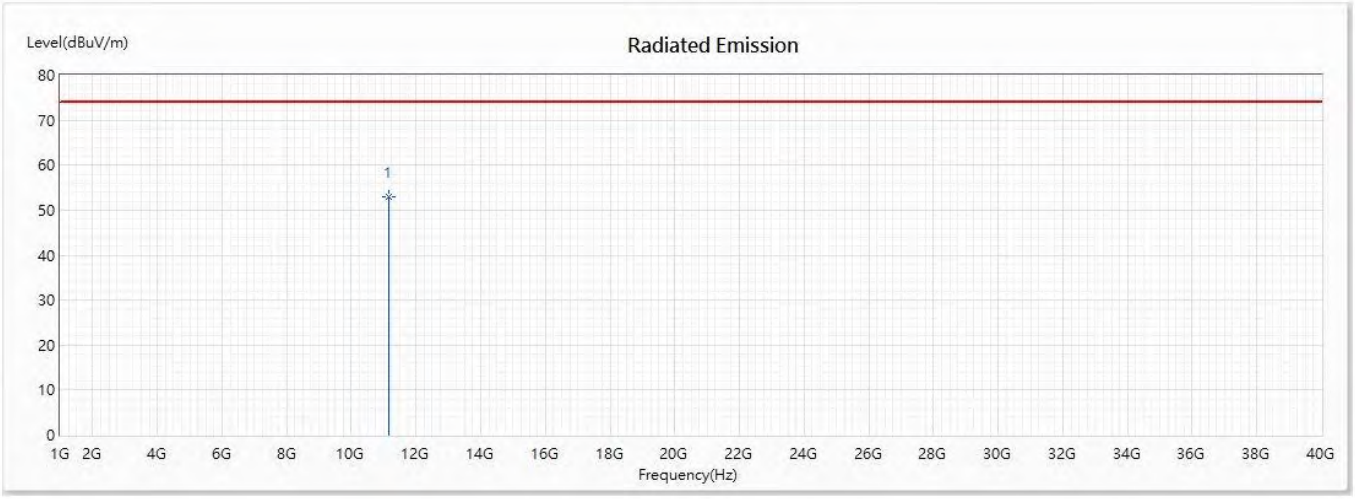
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11000	52.55	74.00	-21.45	38.92	13.63	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a (5580MHz)

Horizontal



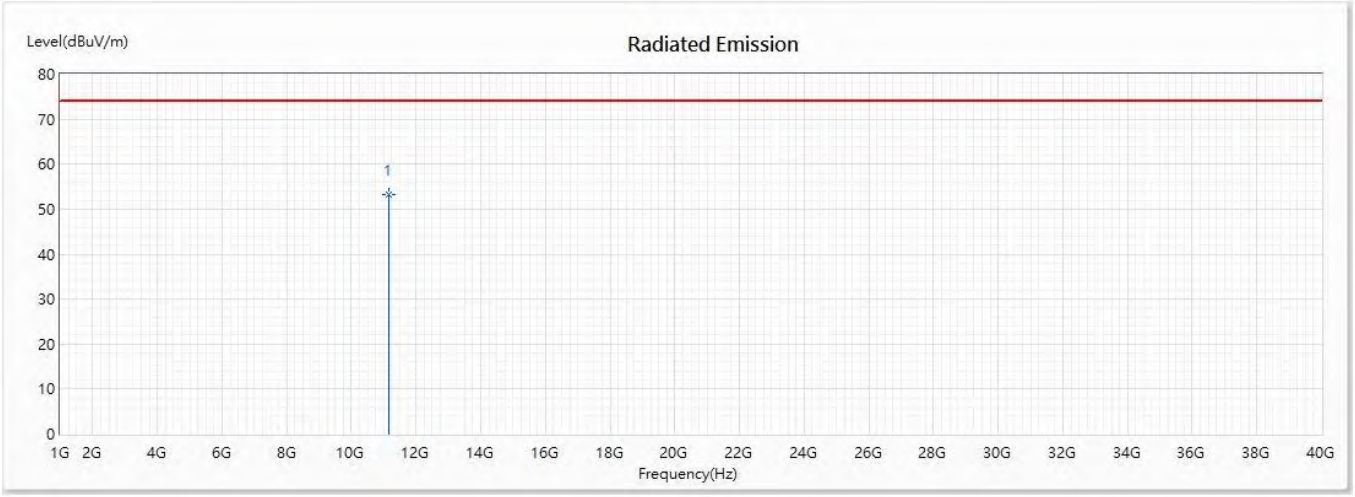
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11160	52.96	74.00	-21.04	38.56	14.40	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : LTE SOM Module
Test Item : Harmonic Radiated Emission Data
Test Date : 2020/04/20
Test Mode : Mode 1:802.11a (5580MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11160	53.37	74.00	-20.63	38.97	14.40	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.