MEASUREMENT REPORT

FCC PART 27

FCC ID:	2AD8UAWHQN01
Application:	Nokia Solutions and Networks, OY
Application Type:	Certification
Product:	AirScale Micro RRH
Model No.:	AWHQN
Brand Name:	Nokia
FCC Rule Part(s):	Part 27
Test Procedure(s):	ANSI C63.26: 2015
Test Date:	December 20, 2021 ~ January 19, 2022

Reviewed By: Paddy Chen

Approved By: Chenz Ker

Testing Laboratory
3261

Revision History

Report No.	Version	Description	Issue Date	Note
2201TW0001-U1	Rev. 01	Initial Report	02-09-2022	Valid

CONTENTS

General Information

Applicant:	Nokia Solutions and Networks, OY
Applicant Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Manufacturer:	Nokia Solutions and Networks, OY
Manufacturer Address:	2000 W. Lucent Lane, Naperville, Illinois, United States, 60563
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (Reg. No. 153292) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.**
- **MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.**

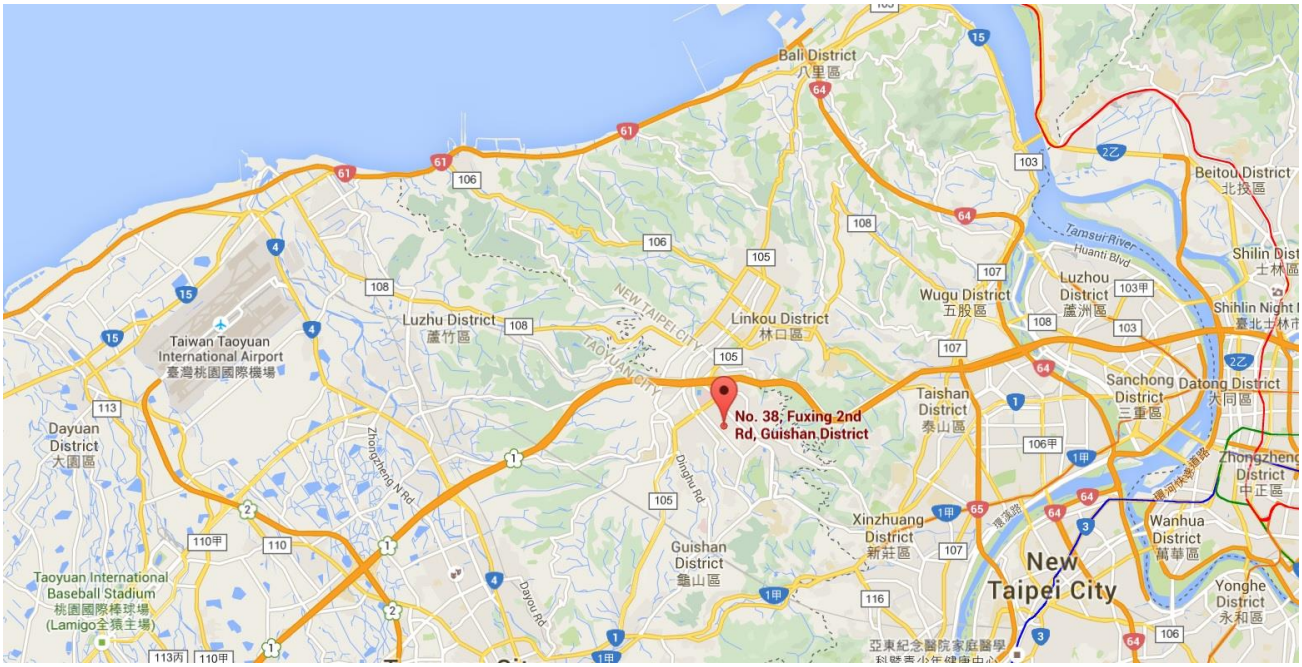
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	AirScale Micro RRH
Model No.	AWHQN
Brand Name	Nokia
Test Device Serial No.	EB2144R0553
Operating Band (s)	5G NR: n77
Power Supply Rating	48Vdc or AC to DC Adapter
Accessories	
AC to DC Adapter	Model: BLP0554FPXXXZ01A Input: 100-240V ~ 50/60Hz, 7.0A Output: 54V⎓9.3A
The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

2.2. Radio Specification under Test

LTE Band Specification	
Single Band	5G NR n77
T_X Frequency Range	3700 ~ 3800 MHz
R_X Frequency Range	3700 ~ 3800 MHz
Modulation	QPSK, 16QAM, 64QAM, 256QAM
Max Conducted Power	40 MHz: 49.41 dBm; 100 MHz: 49.18dBm
Antenn Gain	Less than 26dBi

2.3. Antenna Information

Band Support	Antenna Type	Nokia Code	Antenna Gain
n77	Directional Antenna (Internal)	P567454	14.5dBi

Remark:

1. The transmit signals are completely uncorrelated with each other, directional gain = G_{ANT} dBi, G_{ANT} is the antenna gain in dBi;
2. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.

2.4. Test Mode

Test Item	Channel Bandwidth	Modulation
Equivalent Isotropically Radiated Power	40MHz, 100MHz	QPSK, 16QAM, 64QAM, 256QAM
Emission Bandwidth		
Conducted Spurious Emissions		QPSK
Band Edge Measurements		QPSK
Radiated Spurious Emissions	40MHz	QPSK
Peak to Average Ratio	40MHz, 100MHz	QPSK
Frequency Stability	100MHz	QPSK

2.5. EMI Suppression Device(s)/Modifications

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

2.6. Labeling Requirements

Per 2.1074; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device.

2.7. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20% ~ 75%RH

3. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2022/10/03
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2022/05/06
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2022/04/21
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2022/04/28
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2022/04/21
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2022/04/26
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2022/03/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/03/24
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2022/10/12
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/07/13
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2022/06/15
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2022/05/26
Cable	Rosnol	K1K50-UP0264-K1K50-4M	MRTTWE00012	1 year	2022/06/20

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2022/04/23
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2022/03/25
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2022/10/01
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/07/10
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2022/03/23
DC Power Supply	GWINSTEK	SPS-606	MRTTWA00034	Check by TRUE RMS MULTIMETER	
TRUE RMS MULTIMETER	FLUKE	117	MRTTWA00022	1 year	2022/05/05
Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTTWA00036	1 year	2022/11/04
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2022/03/08

Software	Version	Function
EMI Software	V3	EMI Test Software

4. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~30MHz: ± 3.92dB 30MHz~1GHz: ± 4.25dB 1GHz~18GHz: ± 4.40dB 18GHz~40GHz: ± 4.45dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 2.65 dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 0.84dB
Frequency Error
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±78.4Hz
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.3%

5. TEST RESULT

5.1. Summary

FCC Section(s)	Test Description	Test Condition	Test Result
2.1046; 27.50(j)(2)	Equivalent Isotropically Radiated Power	Conducted	Pass
2.1055; 27.54	Frequency Stability		Pass
2.1049	Emission Bandwidth		Pass
2.1046; 27.50(j)(4)	Peak to Average Ratio		Pass
27.53(l)(1)	Transmitter unwanted emissions (Band Edge)		Pass
2.1051; 27.53(l)(1)	Out-of-frequency Band unwanted Emissions	Conducted & Radiated	Pass

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

2) The Occupied Bandwidth, Frequency Stability and Conducted & Radiated Spurious Emission were presented the worst test data of modultation & antenna port in the test report.

5.2. Equivalent Isotropically Radiated Power Measurement

5.2.1.Test Limit

The Radiated Equivalent Isotropically Power shall be according to the specific rule Part 27.50(j)(2) that are limited to EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

5.2.2.Test Procedures Used

ANSI C63.26-2015 - Section 5.2.4.2 & 5.2.5.5

5.2.3.Test Setting

Average Power Measurement

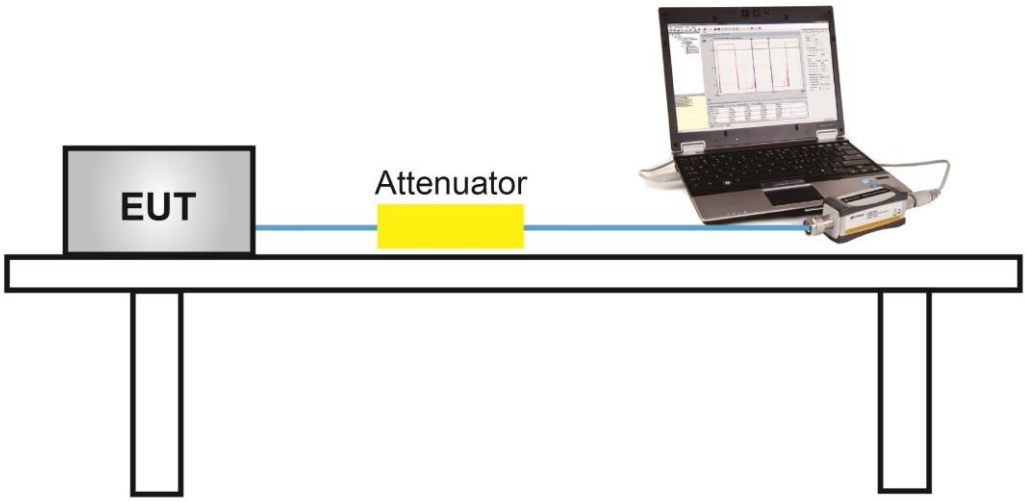
Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

Average Power Spectral Density Measurement

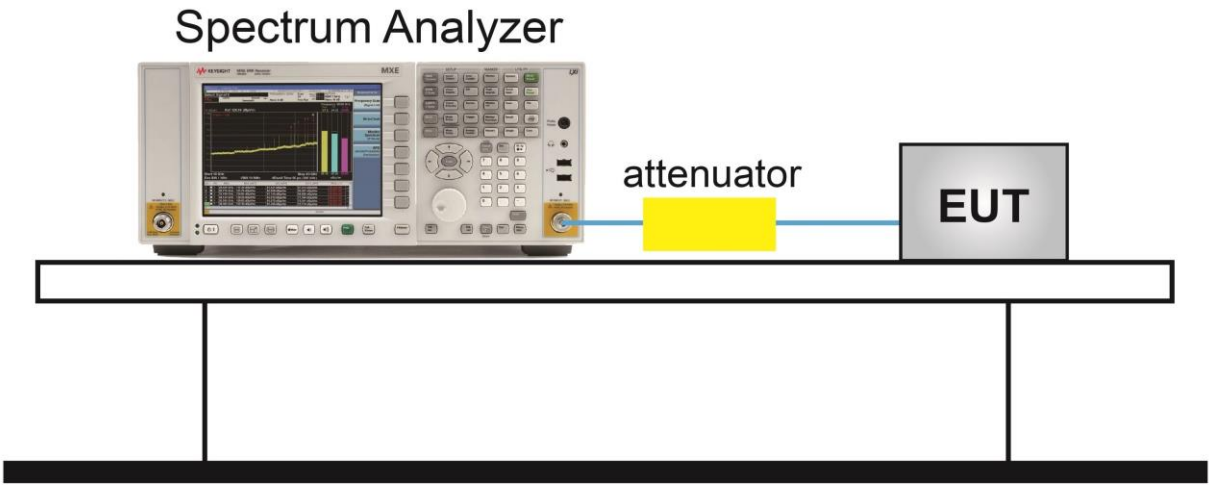
1. Span to 2 × to 3 × the OBW
2. RBW ≥1% to 5% of the OBW
3. VBW≥ 3*RBW
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run”
7. If the EUT can be configured to transmit continuously, then set the trigger to free run
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple.
9. The trace was allowed to stabilize
10. Compute the power by integrating the spectrum across the OBW of the signal using the Instrument’s band power measurement function, with the band/channel limits set equal to the OBW band edges.
11. EIRP = Output Power Level of S.G - T_X Cable Loss + Antenna Gain of Substitution Antenna.

5.2.4.Test Setup

Conducted Output Power



Conducted Power Density



5.2.5.Test Result

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/20 ~ 2022/01/08	Test Configuration	n77
Test Item	EIRP Density		

Frequency (MHz)	Channel BW (MHz)	Output Power Density (dBm/MHz)				Total Power Density (dBm/MHz)	EIRP (dBm/MHz)	Limit (dBm/MHz)
		Ant 1	Ant 2	Ant 3	Ant 4			
QPSK								
3720.00	40	29.57	30.22	30.26	30.02	36.04	50.54	< 62.15
3750.00	40	29.18	29.82	29.78	29.73	35.66	50.16	< 62.15
3780.00	40	29.32	29.81	29.90	29.90	35.76	50.26	< 62.15
3750.00	100	25.69	26.10	26.31	26.10	32.08	46.58	< 62.15
16QAM								
3720.00	40	29.40	29.92	29.98	29.79	35.80	50.30	< 62.15
3750.00	40	29.35	29.96	29.95	29.88	35.81	50.31	< 62.15
3780.00	40	29.08	29.62	29.74	29.60	35.54	50.04	< 62.15
3750.00	100	25.37	25.93	25.97	25.80	31.79	46.29	< 62.15
64QAM								
3720.00	40	27.73	28.31	28.28	28.12	34.13	48.63	< 62.15
3750.00	40	27.70	28.35	28.38	28.24	34.20	48.70	< 62.15
3780.00	40	27.61	28.24	28.16	28.14	34.07	48.57	< 62.15
3750.00	100	23.81	24.42	24.33	24.47	30.29	44.79	< 62.15
256QAM								
3720.00	40	27.62	28.42	28.38	28.18	34.18	48.68	< 62.15
3750.00	40	27.50	28.16	28.24	28.02	34.01	48.51	< 62.15
3780.00	40	27.34	27.91	27.90	29.94	34.41	48.91	< 62.15
3750.00	100	23.53	24.28	24.34	24.33	30.15	44.65	< 62.15

Note 1: Total Power Density(dBm/MHz) = 10*log*{$10^{\wedge[\text{ANT 1 Power (dBm/MHz) / 10}]}$ + $10^{\wedge[\text{ANT 2 Power (dBm/MHz) / 10}]}$ + $10^{\wedge[\text{ANT 3 Power (dBm/MHz) / 10}]}$ + $10^{\wedge[\text{ANT 4 Power (dBm/MHz) / 10}]}$} (dBm/MHz).

Note 2: The EIRP (dBm/MHz) = Total Power Density (dBm/MHz) + Antenna Gain (dBi)

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/20 ~ 2022/01/08	Test Configuration	n77
Test Item	Output Power (Reported only)		

Frequency (MHz)	Channel BW (MHz)	Output Power (dBm)				Total Power (dBm)
		Ant 1	Ant 2	Ant 3	Ant 4	
QPSK						
3720.00	40	42.86	43.44	43.46	43.27	49.28
3750.00	40	42.56	43.07	43.18	42.96	48.97
3780.00	40	42.48	43.09	43.10	42.97	48.94
3750.00	100	42.78	43.32	43.36	43.16	49.18
16QAM						
3720.00	40	42.84	43.33	43.36	43.18	49.20
3750.00	40	42.82	43.45	43.51	43.37	49.32
3780.00	40	42.00	43.10	43.28	43.09	48.92
3750.00	100	42.73	43.29	43.32	43.21	49.16
64QAM						
3720.00	40	42.49	43.44	43.47	43.25	49.20
3750.00	40	42.97	43.55	43.57	43.46	49.41
3780.00	40	42.61	43.22	43.27	43.15	49.09
3750.00	100	42.69	43.28	43.29	43.15	49.13
256QAM						
3720.00	40	42.77	43.49	43.48	43.20	49.27
3750.00	40	42.67	43.30	43.31	43.22	49.15
3780.00	40	42.60	43.13	43.20	43.14	49.04
3750.00	100	42.62	43.33	43.33	43.26	49.17

Note: Total Power (dBm) = $10*\log*\{10^{[\text{ANT 1 Power (dBm) / 10}]} + 10^{[\text{ANT 2 Power (dBm) / 10}]} + 10^{[\text{ANT 3 Power (dBm) / 10}]} + 10^{[\text{ANT 4 Power (dBm) / 10}]}\}$ (dBm).

5.3. Frequency Stability Measurement

5.3.1.Test Limit

N/A

5.3.2.Test Procedures Used

ANSI C63.26-2015 - Section 5.6

5.3.3.Test Setting

Frequency Stability Under Temperature Variations:

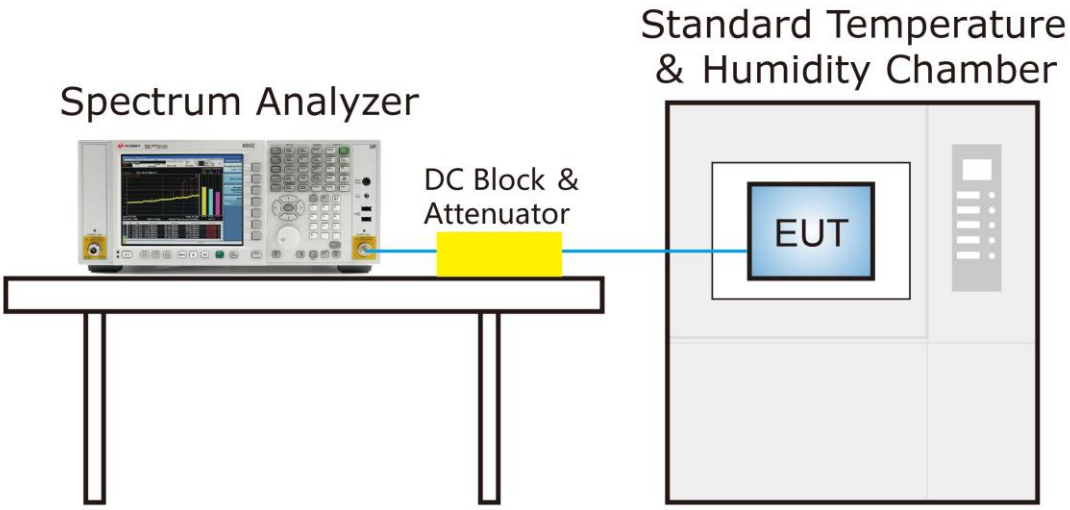
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

5.3.4.Test Setup



5.3.5.Test Result

Test Engineer	Peter Xu	Test Site	SR3
Test Date	2021/12/25		
Test Configuration	n77, 100MHz Bandwidth		

Voltage	Temp(°C)	Frequency Tolerance(ppm)
AC 120V	- 30	0.0008
	- 20	-0.0002
	- 10	-0.0003
	0	-0.0003
	+ 10	0.0003
	+ 20	-0.0001
	+ 30	0.0001
	+ 40	0.0004
	+ 50	0.0006
AC 138V	+ 20	-0.0027
AC 102V	+ 20	-0.0054

5.4. Emission Bandwidth Measurement

5.4.1.Test Limit

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

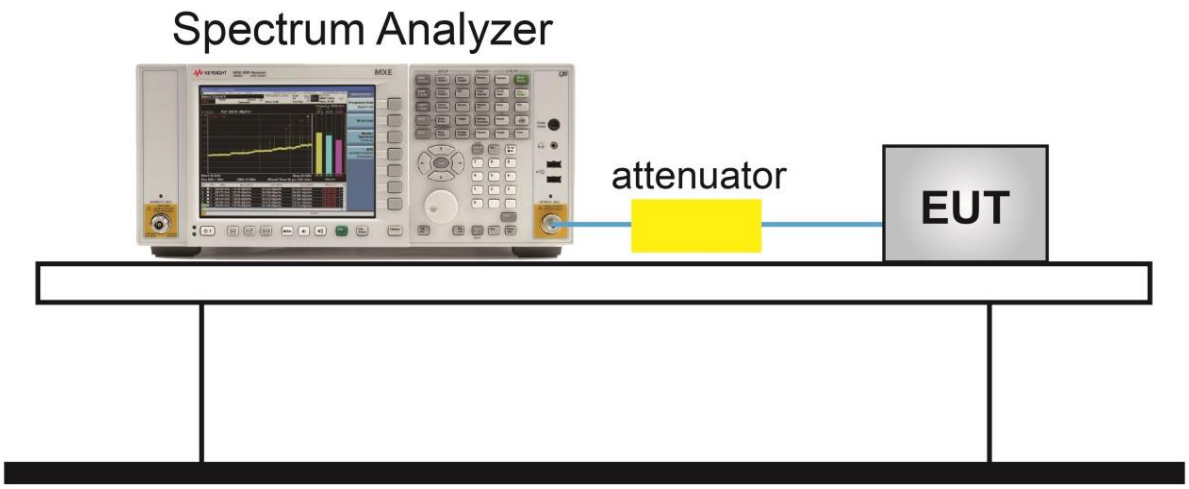
5.4.2.Test Procedure

ANSI C63.26-2015 - Section 5.4.4

5.4.3.Test Setting

1. Set center frequency to the nominal EUT channel center frequency;
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW;
3. VBW ≥ 3 × RBW;
4. Detector = Peak;
5. Trace mode = max hold;
6. Sweep = auto couple;
7. Allow the trace to stabilize;
8. User the 99% OBW function to recored the OBW measurement result.

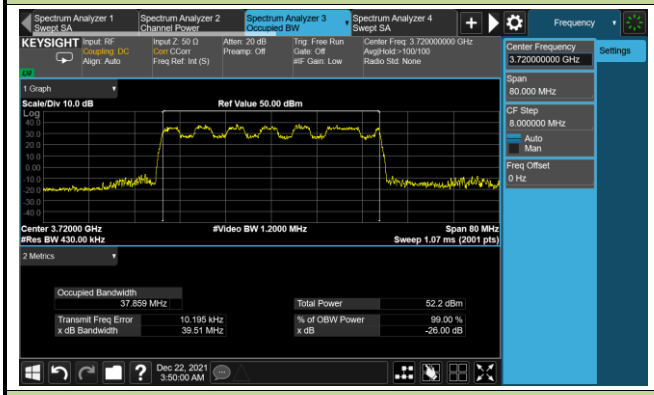
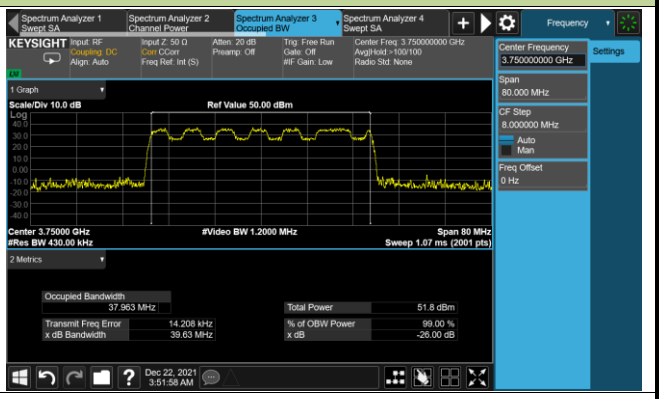
5.4.4.Test Setup



5.4.5.Test Result

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/22 ~ 2021/12/23	Test Configuration	n77

Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK					
3720.00	40	37.86	3780.00	40	37.87
3750.00	40	37.96	3750.00	100	97.22
16QAM					
3720.00	40	37.94	3780.00	40	37.87
3750.00	40	37.96	3750.00	100	97.24
64QAM					
3720.00	40	37.85	3780.00	40	37.84
3750.00	40	37.85	3750.00	100	97.34
256QAM					
3720.00	40	37.86	3780.00	40	37.78
3750.00	40	37.82	3750.00	100	97.32

40MHz Channel Bandwidth - QPSK	
3720.00 MHz	3750.00 MHz
	
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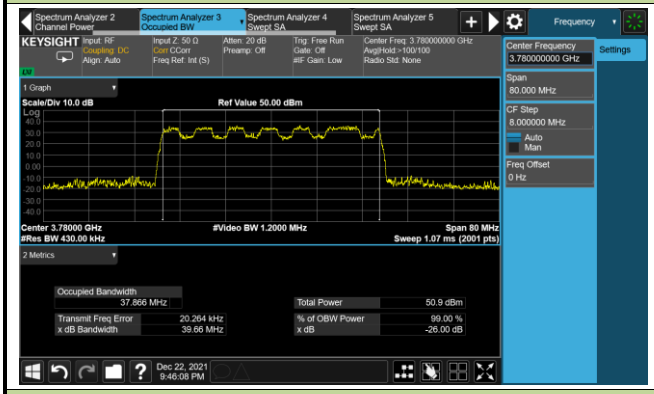
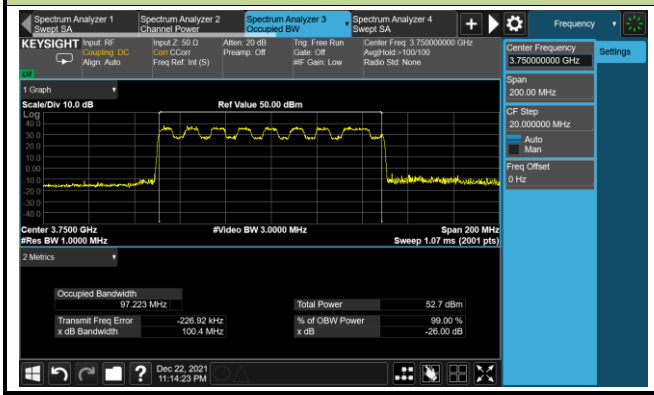
	
100MHz Channel Bandwidth - QPSK	
3750.00 MHz	
	

40MHz Channel Bandwidth - 16QAM	
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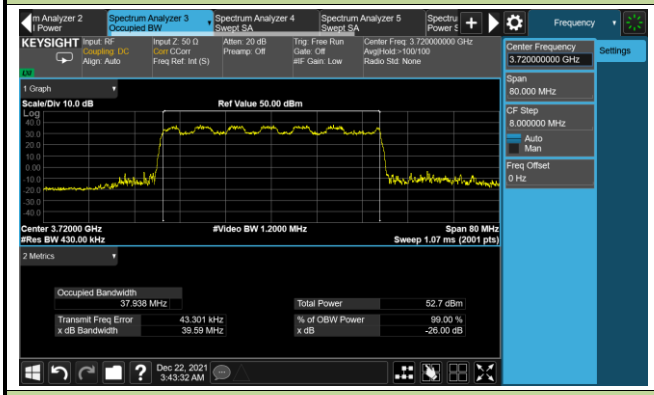	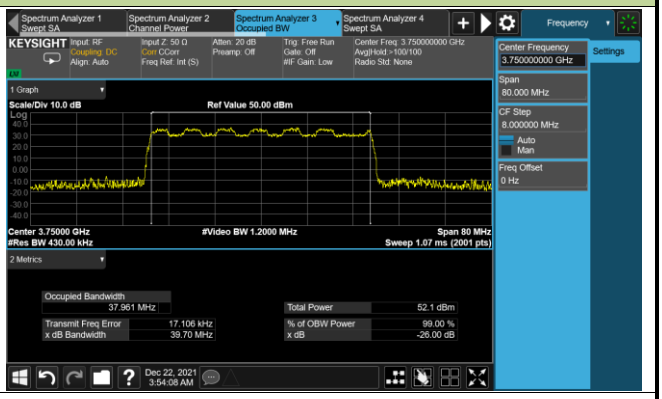
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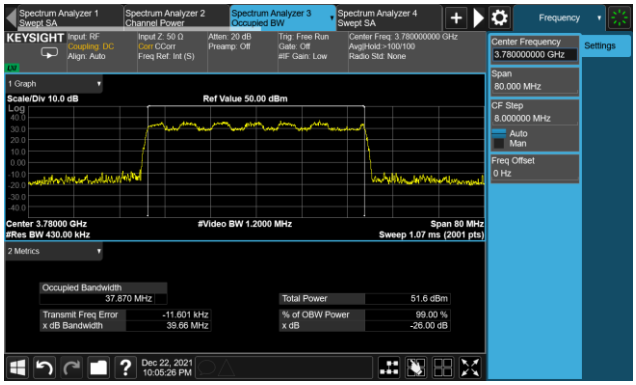	
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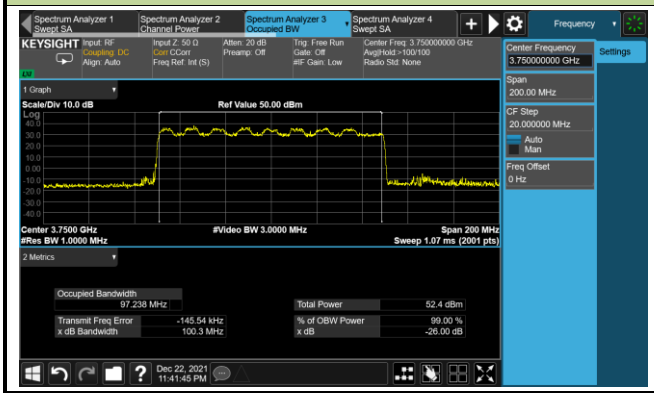
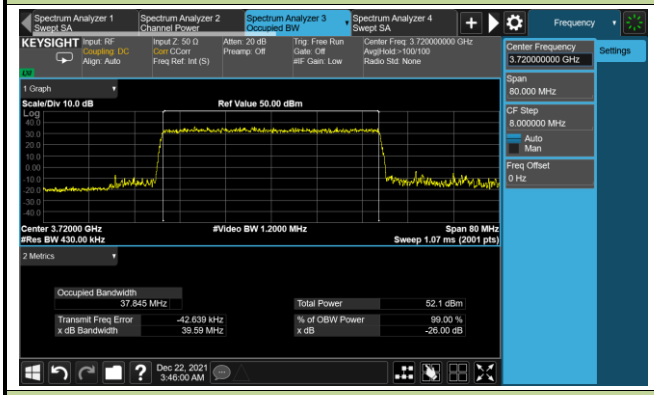
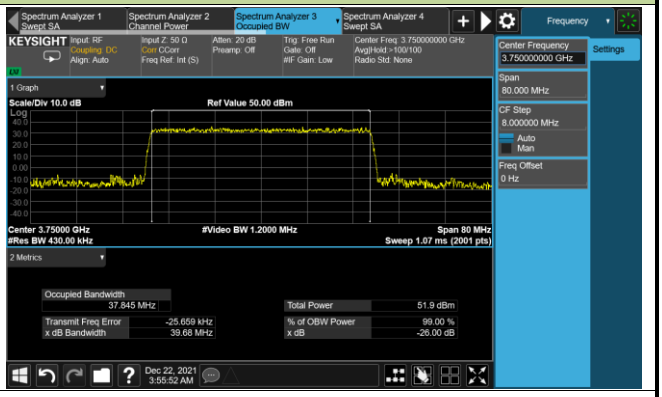
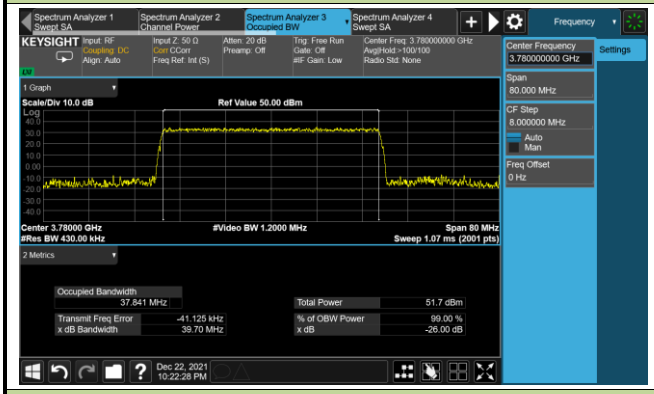
	

40MHz Channel Bandwidth - 64QAM	
3720.00 MHz	3750.00 MHz
	
3780.00 MHz	
	
100MHz Channel Bandwidth - 64QAM	
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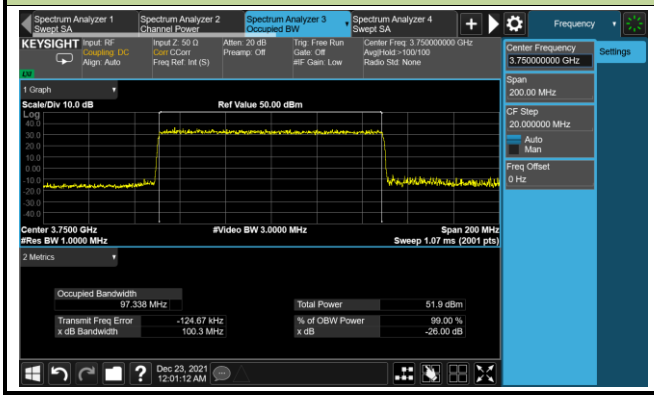
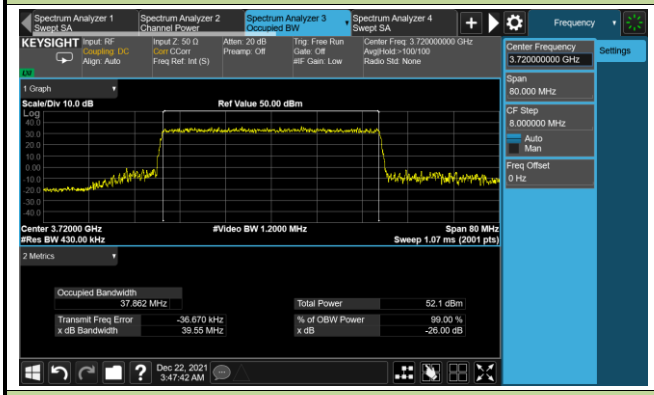
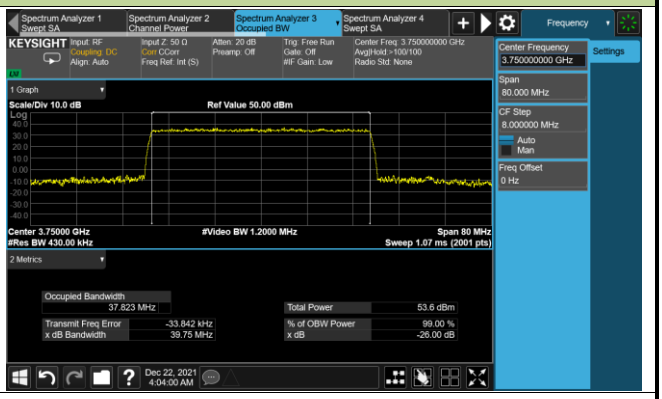
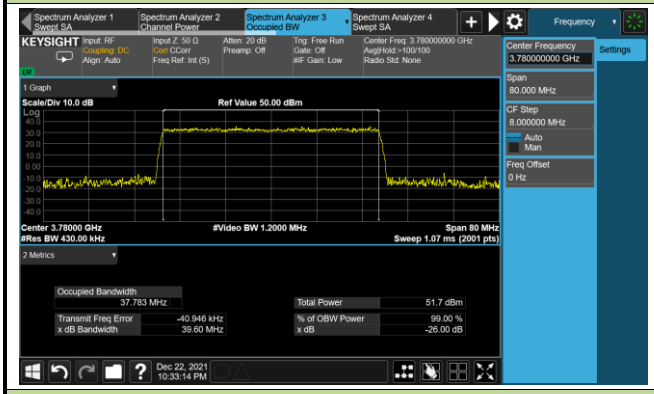
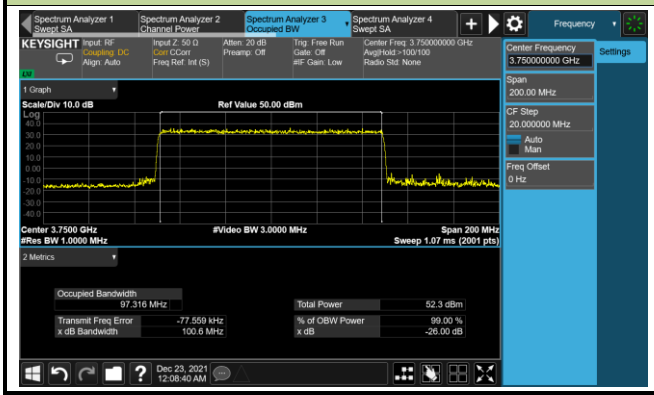
	

40MHz Channel Bandwidth - 256QAM	
3720.00 MHz	3750.00 MHz
	
3780.00 MHz	
	
100MHz Channel Bandwidth - 256QAM	
3750.00 MHz	
	

5.5. Peak to Average Ratio Measurement

5.5.1.Test Limit

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

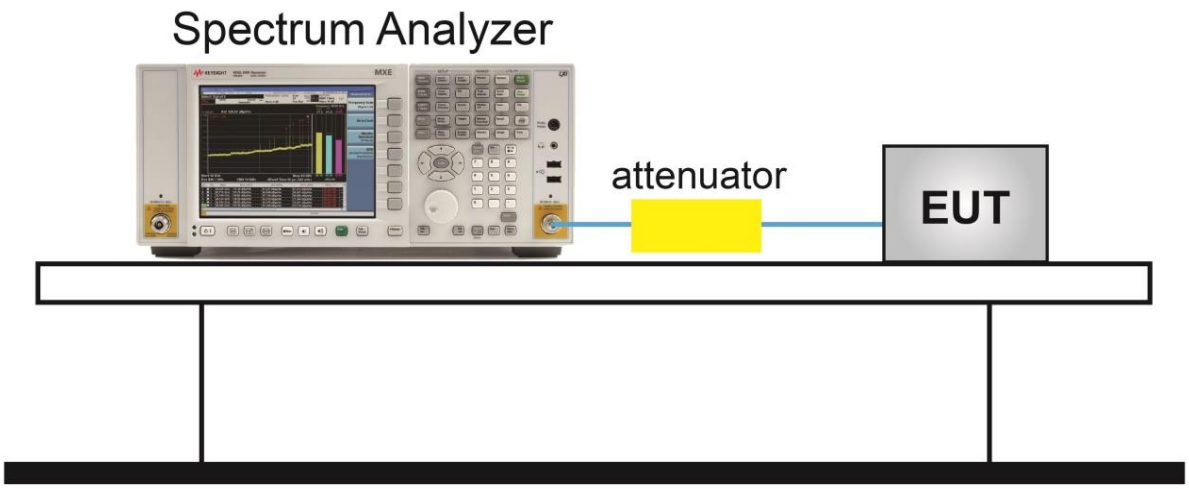
5.5.2.Test Procedure Used

ANSI C63.26-2015 - Section 5.2.3.4 (CCDF).

5.5.3.Test Setting

1. Set the resolution / measurement bandwidth ≥ signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PARR level associated with a probability of 0.1%

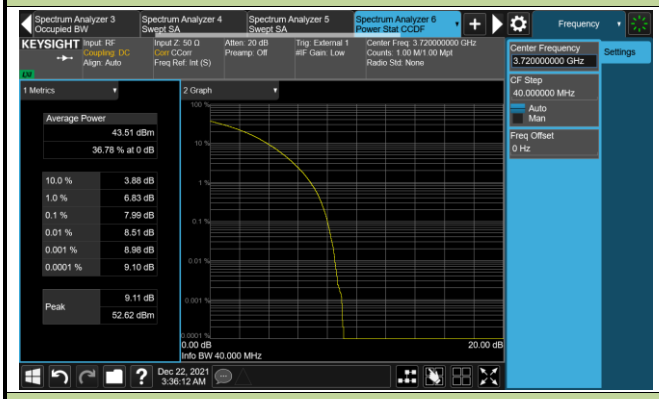
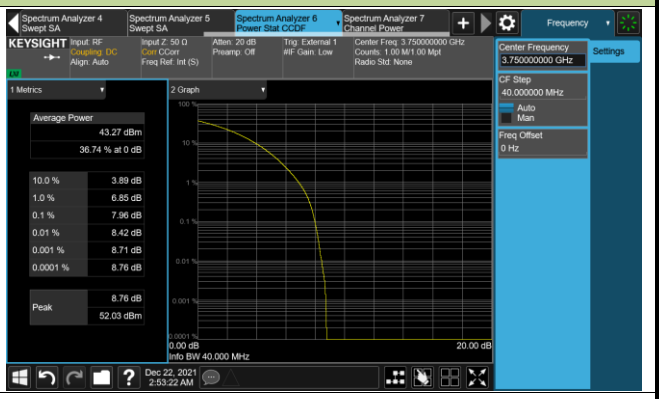
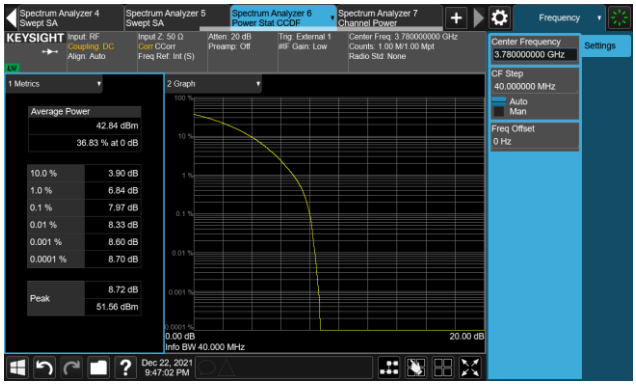
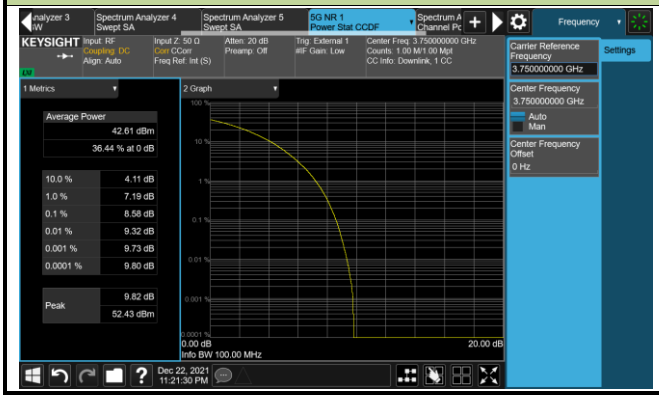
5.5.4.Test Setup



5.5.5.Test Result

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/22	Test Configuration	n77

Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
3720.00	40	7.99	≤ 13.00	Pass
3750.00	40	7.96	≤ 13.00	Pass
3780.00	40	7.97	≤ 13.00	Pass
3750.00	100	8.58	≤ 13.00	Pass

40MHz Channel Bandwidth	
3720.00 MHz	3750.00 MHz
	
3780.00 MHz	
	
100MHz Channel Bandwidth	
3750.00 MHz	
	

5.6. Transmitter Unwanted Emission (Band Edge) Measurement

5.6.1.Test Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

This device can be impelement MIMO function, so the limit of spurious emissions needs to be reduced by 10*log($Numbers_{Ant}$) according to FCC KDB 662911 D01 guidance.

The limit is adjusted to -13 dBm - 10*log (4) = -19.02dBm

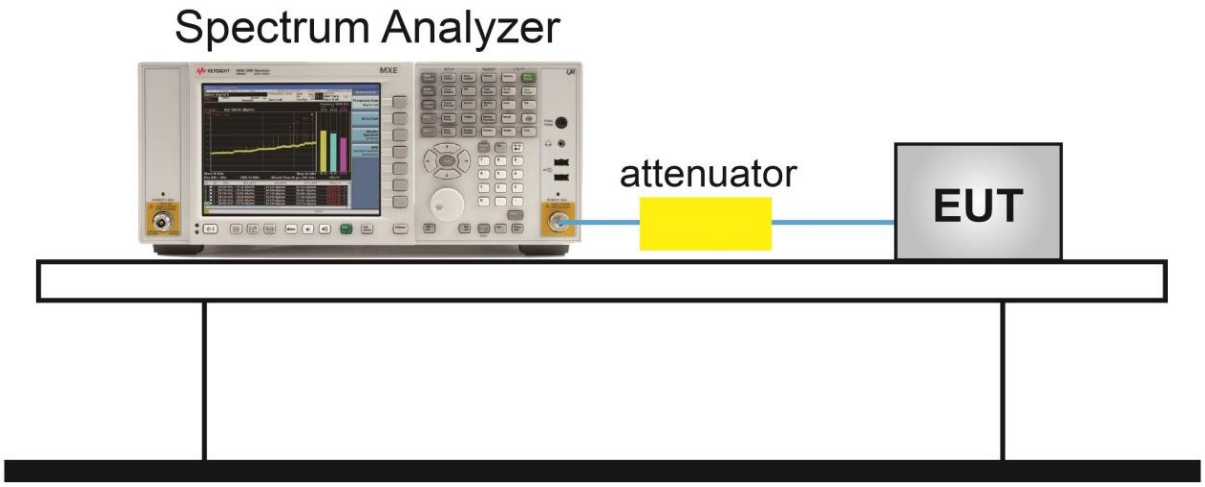
5.6.2.Test Procedure Used

ANSI C63.26-2015 - Section 5.7

5.6.3.Test Setting

1. Set the analyzer frequency to low or high channel.
2. RBW = The nominal RBW shall be in the range of 1% of the anticipated OBW;
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
9. Used power integration when using a measurement bandwidth smaller than the specified bandwidth.

5.6.4.Test Setup



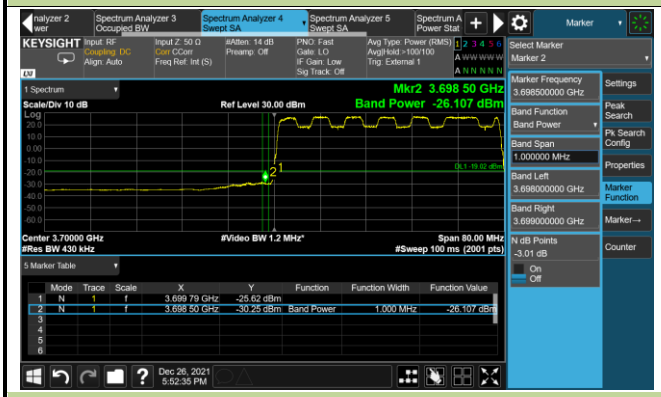
5.6.5.Test Result

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/26	Test Configuration	n77

Unwanted Emission - Ant 1

40MHz Channel Bandwidth

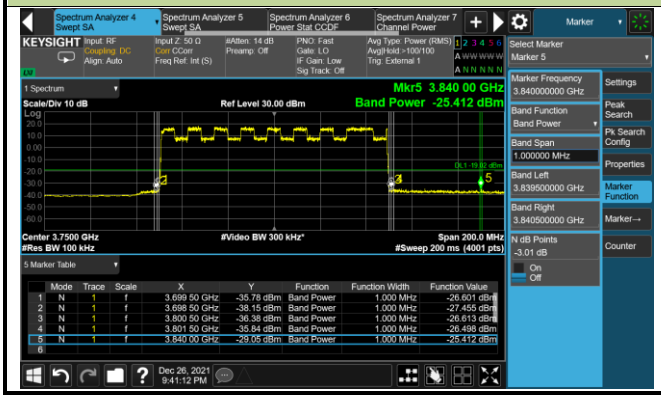
3720.00 MHz

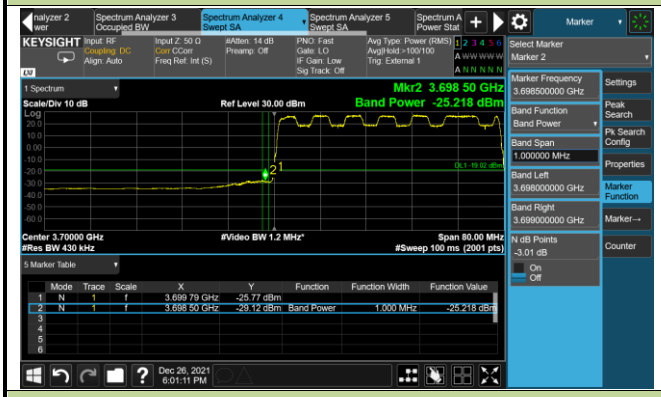
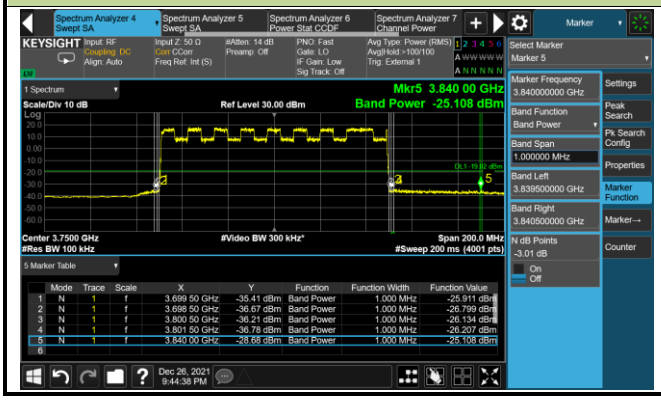


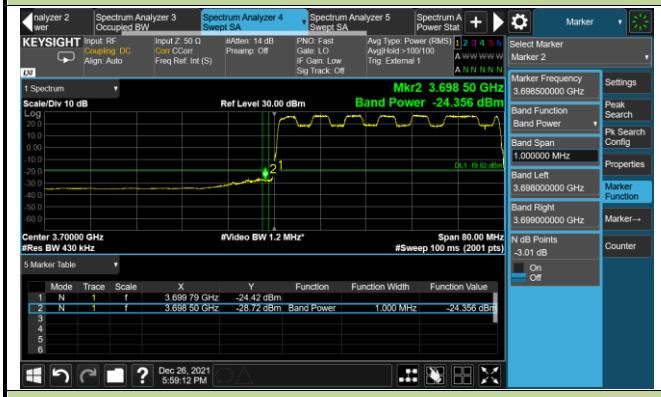
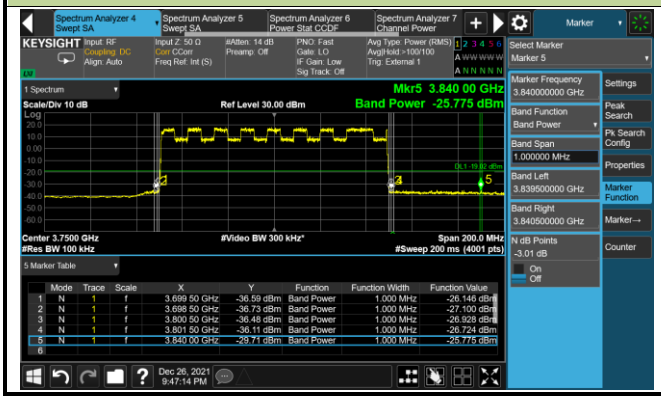
3780.00 MHz

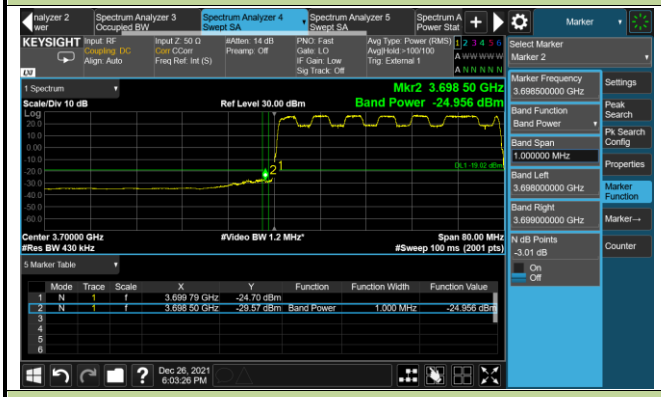
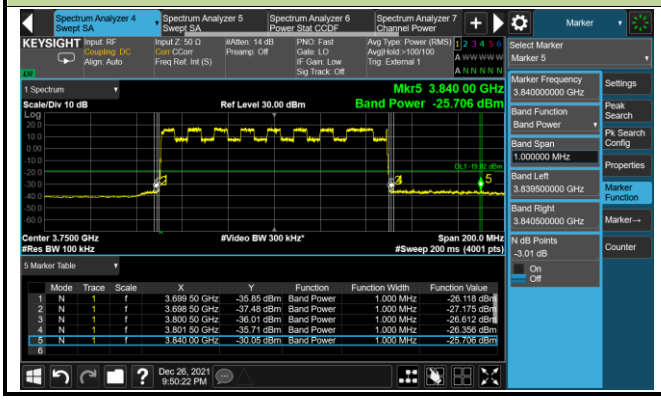
100MHz Channel Bandwidth

3750.00 MHz



Unwanted Emission - Ant 2	
40MHz Channel Bandwidth	
3720.00 MHz	3780.00 MHz
	
100MHz Channel Bandwidth	
3750.00 MHz	
	

Unwanted Emission - Ant 3	
40MHz Channel Bandwidth	
3720.00 MHz	3780.00 MHz
	
100MHz Channel Bandwidth	
3750.00 MHz	
	

Unwanted Emission - Ant 4	
40MHz Channel Bandwidth	
3720.00 MHz	3780.00 MHz
	
100MHz Channel Bandwidth	
3750.00 MHz	
	

5.7. Out-of-frequency Band unwanted Emissions Measurement

5.7.1.Test Limit

After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

Note: This device can be impelement MIMO function, so the limit os spurious emissions needs to be reduced 10*log($Numbers_{Ant}$) according to FCC KDB 662911 D01 guidance.

The limit is adjusted to -13dBm - 10 * log(4) = -19.02dBm

E (dBμV/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dBμV/m.

5.7.2.Test Procedure Used

ANSI C63.26-2015 - Section 5.7 & Section 5.5

5.7.3.Test Setting

Conducted Measurement

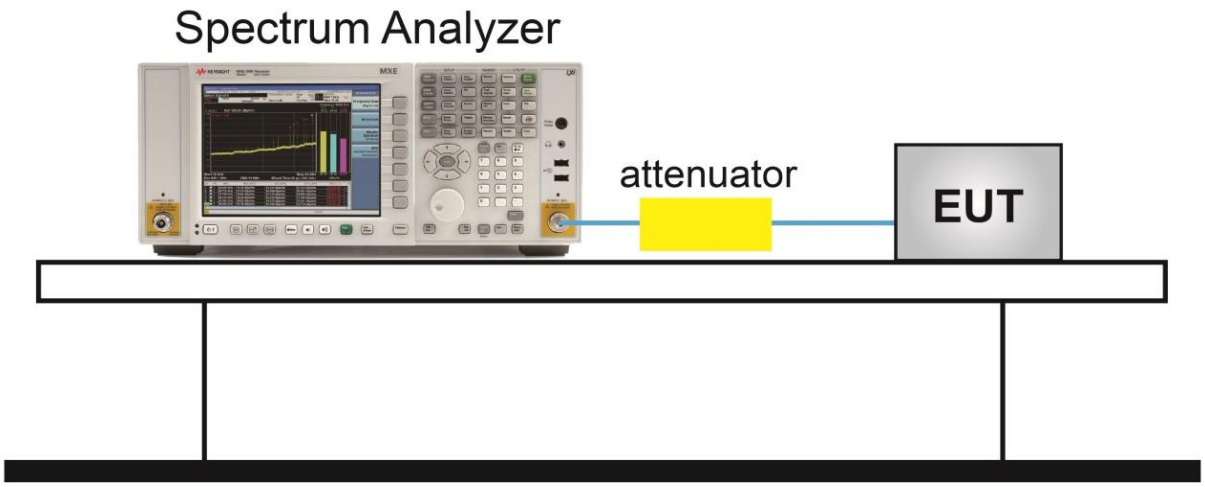
1. Set the analyzer frequency to low or high channel.
2. RBW = 1MHz
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to "free run."
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power.
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

Radiated Measurement

1. RBW = 1MHz
2. VBW ≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

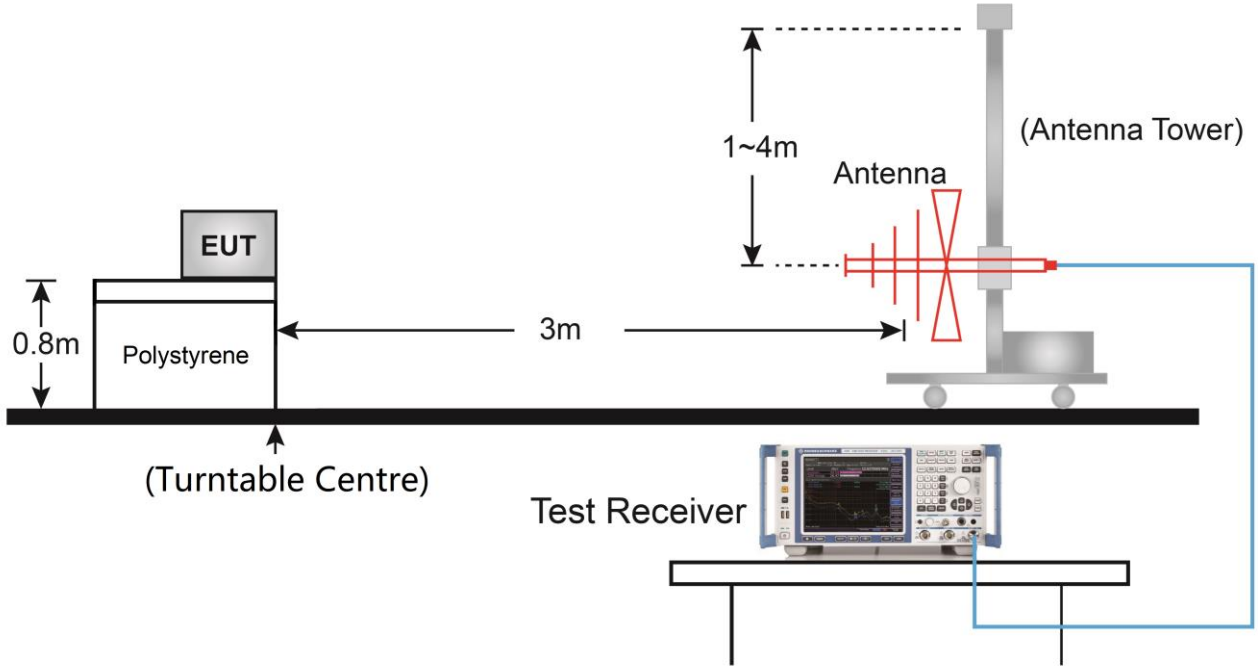
5.7.4.Test Setup

Conducted Measurement

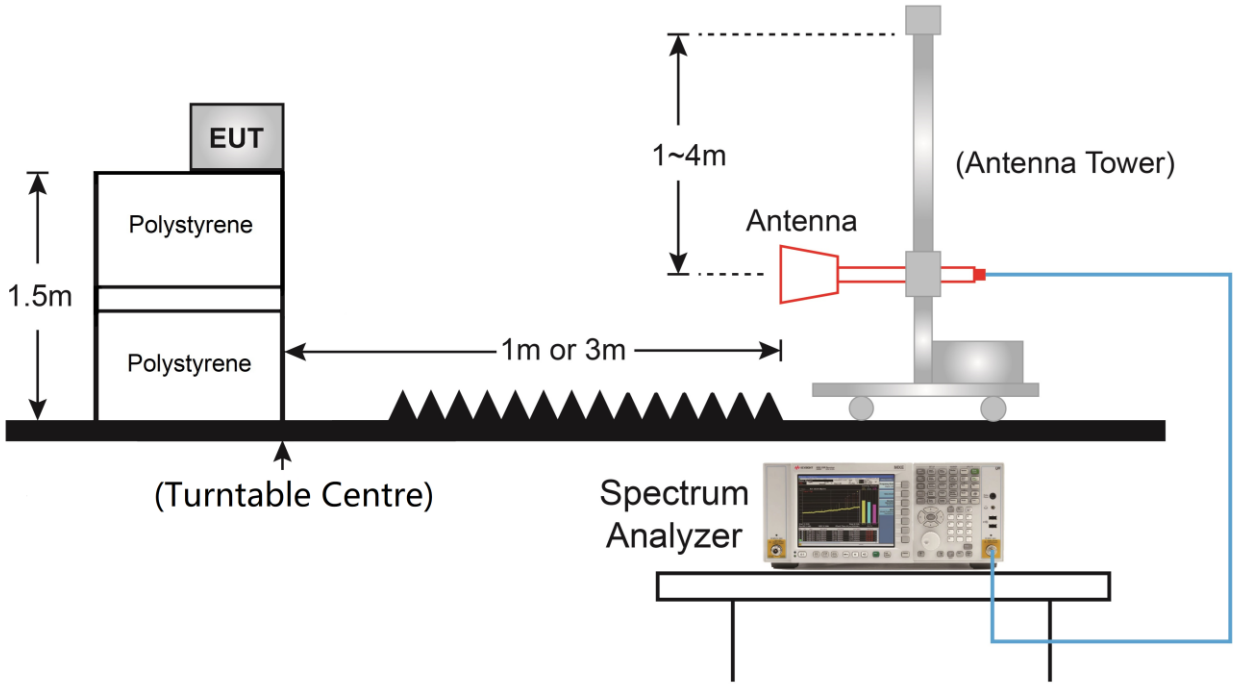


Radiated Measurement

Below 1GHz Test Setup:



Above 1GHz Test Setup:

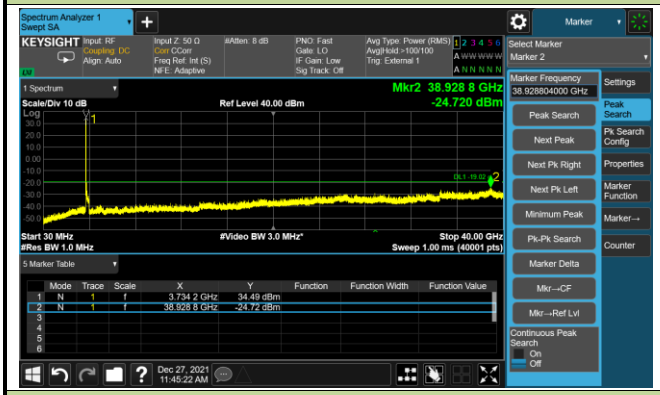


5.7.5.Test Result

Conducted Spurious Test Result

Test Engineer	Peter Xu	Test Site	SR2
Test Date	2021/12/27	Test Configuration	n77

Frequency (MHz)	Channel BW(MHz)	Frequency Range (MHz)	Max Spurious Emissions (dBm)	Limit (dBm)	Result
3720.00	40	30 ~ 40000	-24.72	≤ -19.02	Pass
3750.00	40	30 ~ 40000	-23.40	≤ -19.02	Pass
3780.00	40	30 ~ 40000	-24.66	≤ -19.02	Pass
3750.00	100	30 ~ 40000	-26.91	≤ -19.02	Pass

40MHz Channel Bandwidth	
3720.00 MHz	3750.00 MHz
	
3780.00 MHz	
	
100MHz Channel Bandwidth	
3750.00 MHz	
	

Radiated Spurious Test Result

Test Engineer	Kevin Ker	Test Site	AC1
Test Date	2022/01/19	Test Configuration	n77, BW=40MHz

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Bottom Channel							
307.42	19.40	21.60	41.00	82.30	-41.30	Peak	Horizontal
903.97	17.17	31.64	48.81	82.30	-33.49	Peak	Horizontal
33.88	26.97	18.22	45.18	82.30	-37.12	Peak	Vertical
885.54	9.23	31.43	40.66	82.30	-41.64	Peak	Vertical
7440.00	38.37	5.11	43.48	82.30	-38.82	Peak	Horizontal
11160.00	41.70	5.00	46.70	82.30	-35.60	Peak	Horizontal
7440.00	38.71	5.11	43.82	82.30	-38.48	Peak	Vertical
11160.00	43.89	5.00	48.88	82.30	-33.42	Peak	Vertical
Middle Channel							
307.42	20.97	21.60	42.57	82.30	-39.73	Peak	Horizontal
973.81	7.10	31.86	38.97	82.30	-43.33	Peak	Horizontal
40.67	24.52	20.59	45.11	82.30	-37.19	Peak	Vertical
885.54	8.87	31.43	40.30	82.30	-42.00	Peak	Vertical
7500.00	38.22	5.01	43.23	82.30	-39.07	Peak	Horizontal
11250.00	41.26	5.09	46.35	82.30	-35.95	Peak	Horizontal
7500.00	39.08	5.01	44.09	82.30	-38.21	Peak	Vertical
11250.00	40.16	5.09	45.25	82.30	-37.05	Peak	Vertical
Top Channel							
306.45	20.47	21.57	42.04	82.30	-40.26	Peak	Horizontal
885.54	8.08	31.43	39.51	82.30	-42.79	Peak	Horizontal
299.66	14.84	21.35	36.19	82.30	-46.11	Peak	Vertical
371.44	12.47	23.42	35.89	82.30	-46.41	Peak	Vertical
7560.00	39.72	4.91	44.63	82.30	-37.67	Peak	Horizontal
11340.00	39.73	5.14	44.88	82.30	-37.42	Peak	Horizontal
7560.00	39.68	4.91	44.60	82.30	-37.70	Peak	Vertical
11340.00	40.45	5.14	45.59	82.30	-36.71	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) -Pre_Amplifier Gain (dB)

6. CONCLUSION

The data collected relate only the item(s) tested and show that the unit is compliance with FCC Rules.

The End