4.5 Out-of-Band Emission at the Band Edge Measurement

4.5.1 Limits of Out-of Band Emission at the Band Edge Measurement

The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be −13 dBm/MHz or lower. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm/MHz or lower.

4.5.2 Test Instruments

Refer to section 4.5.2.

4.5.3 Test Procedures

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
b. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.
e. The requirements in 30.203 are expressed in terms of conductive power, and then conducted power will be calculated by EIRP-Array Gain.
f. Antenna Gain Information at the Band Edge :

   The following antenna gain information is provided to demonstrate the antenna performance of the 37~40 GHz band. These antenna gains were subtracted from the measured E.I.R.P levels at lower and upper band edge frequencies to determine an equivalent conductive power that was compared directly with the part 30.203 limits.

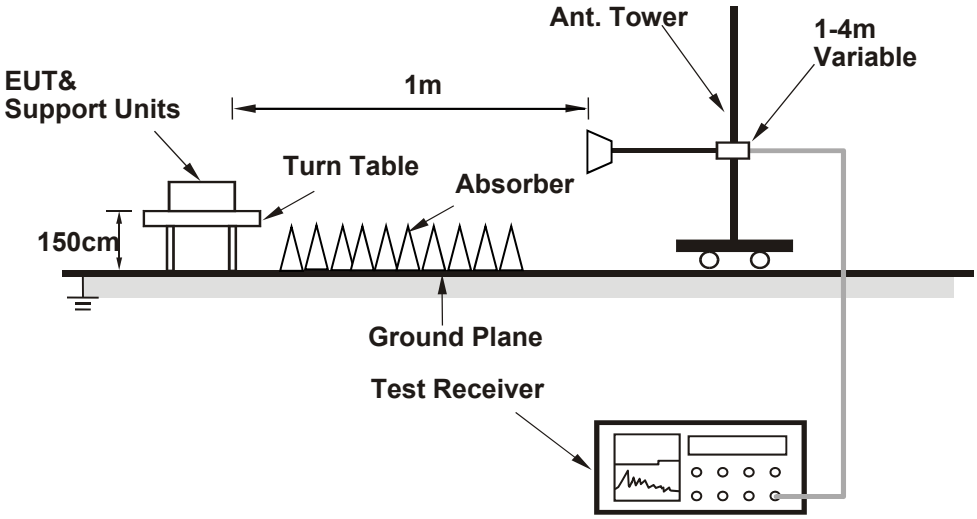
Frequency (GHz)	Gain (dBi)
37	10.60
37.5	10.95
38	11.27
38.5	11.10
39	10.90
39.5	10.70
40	10.51

Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.5.4 Deviation from Test Standard

No deviation.

4.5.5 Test Set Up



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.5.6 EUT Operating Conditions

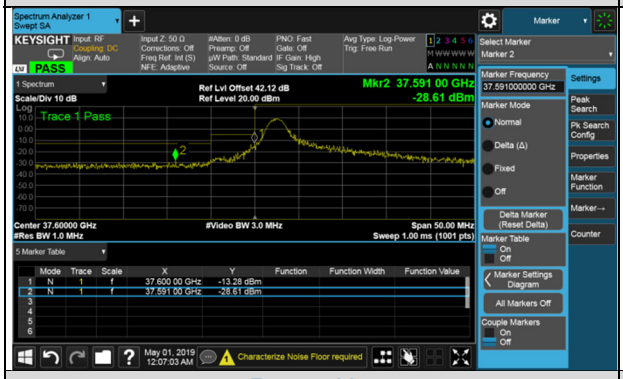
a. Connected the Adapter to EUT.
b. Prepared notebook to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

4.5.7 Test Results

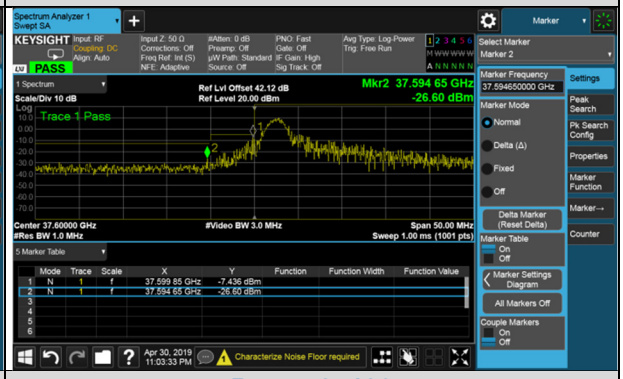
Channel 2239991							
QPSK / 1RB 0RB							
Beam ID	Frequency (GHz)	EIRP Value (dBm)	Array Gain (dBi)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
175	37.60000	-2.680	10.6	-13.280	-5	-8.28	Pass
	37.59100	-18.010	10.6	-28.610	-13	-15.61	Pass
180	37.59985	3.164	10.6	-7.436	-5	-2.436	Pass
	37.59465	-16.000	10.6	-26.600	-13	-13.6	Pass
185	37.60000	-5.940	10.6	-16.54	-5	-11.54	Pass
	37.57740	-18.240	10.6	-28.84	-13	-15.84	Pass
52+180	37.59970	-2.370	10.6	-12.97	-5	-7.97	Pass
	37.59480	-18.630	10.6	-29.23	-13	-16.23	Pass

Note: The Conducted Power = EIRP-Array Gain

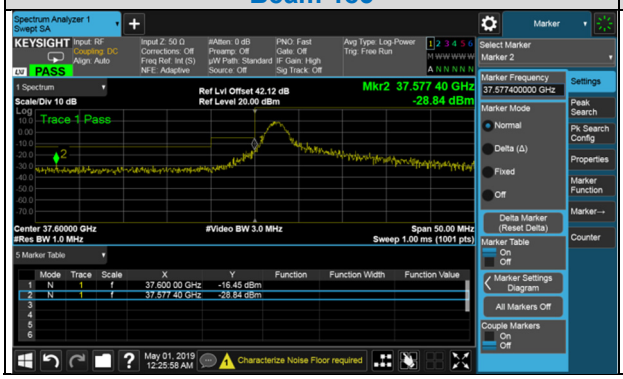
Beam 175



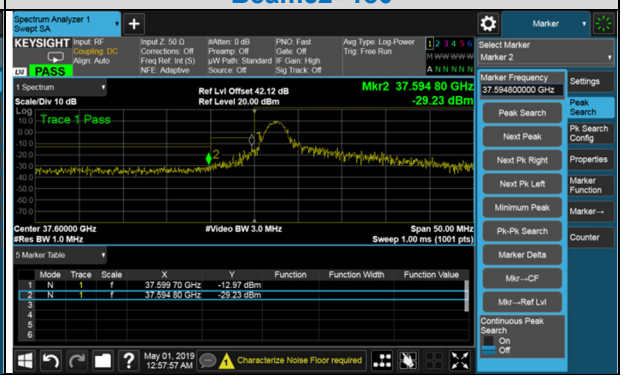
Beam 180



Beam 185



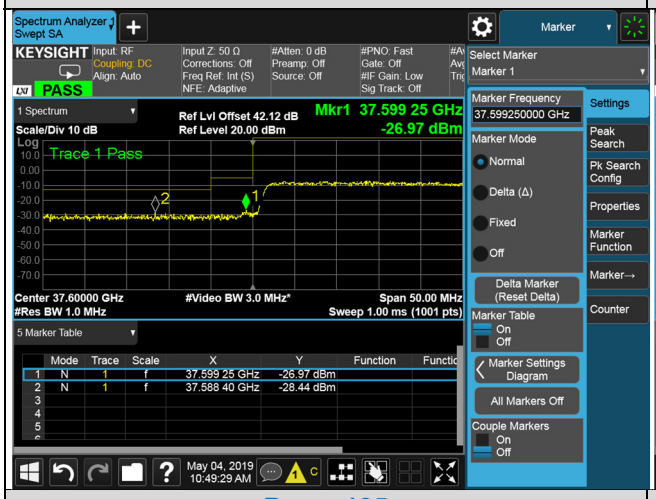
Beam52+180



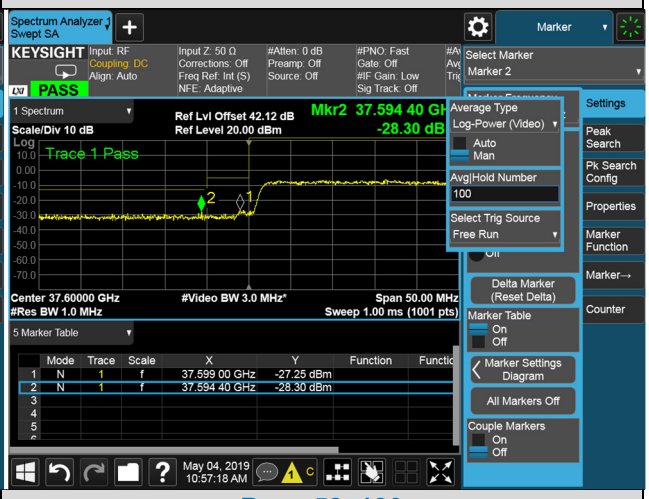
Channel 2239991							
QPSK / 66RB							
Beam ID	Frequency (GHz)	EIRP Value (dBm)	Array Gain (dBi)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
175	37.59925	-16.37	10.6	-26.97	-5	-21.97	Pass
	37.58840	-17.84	10.6	-28.44	-13	-15.44	Pass
180	37.59900	-16.65	10.6	-27.25	-5	-22.25	Pass
	37.59440	-17.7	10.6	-28.3	-13	-15.3	Pass
185	37.59910	-15.65	10.6	-26.25	-5	-21.25	Pass
	37.59295	-20.04	10.6	-30.64	-13	-17.64	Pass
52+180	37.59905	-16.01	10.6	-26.61	-5	-21.61	Pass
	37.59150	-18.4	10.6	-29.00	-13	-16	Pass

Note: The Conducted Power = EIRP-Array Gain

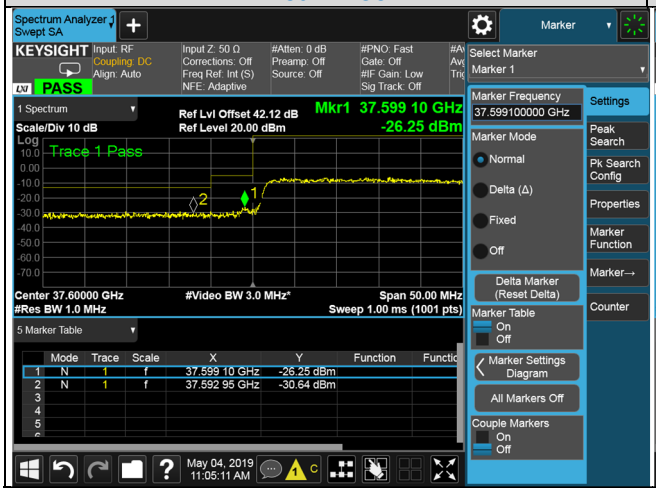
Beam 175



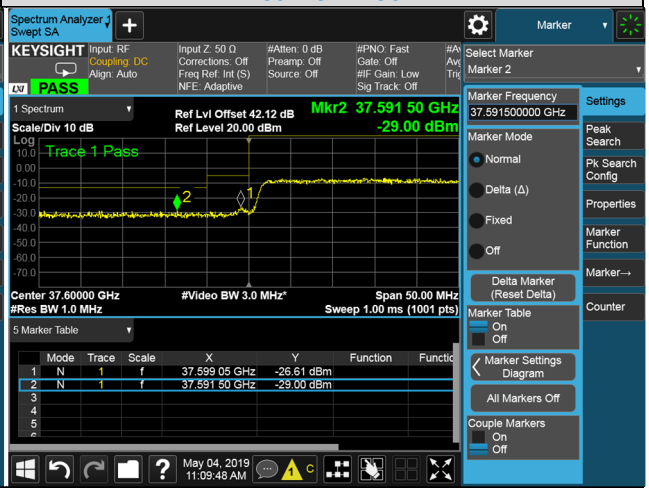
Beam 180



Beam 185



Beam52+180

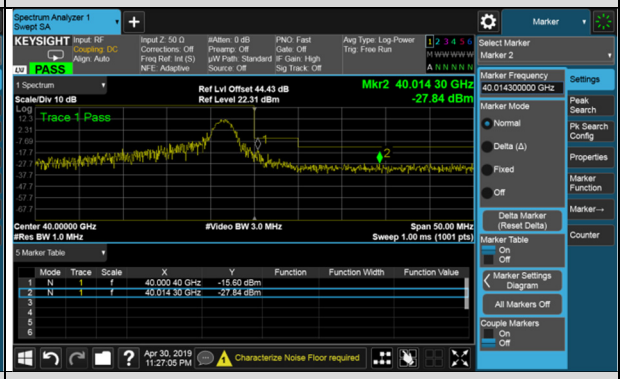


Channel 2278331							
QPSK / 1RB 65RB							
Beam ID	Frequency (GHz)	EIRP Value (dBm)	Array Gain (dBi)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
175	40.00010	-2.92	10.51	-13.43	-5	-8.43	Pass
	40.01470	-17.41	10.51	-27.92	-13	-14.92	Pass
180	40.00040	-5.09	10.51	-15.60	-5	-10.6	Pass
	40.01430	-17.33	10.51	-27.84	-13	-14.84	Pass
185	40.00035	-4.92	10.51	-15.43	-5	-10.43	Pass
	40.00620	-16.89	10.51	-27.40	-13	-14.4	Pass
52+180	40.00025	-3.49	10.51	-14.00	-5	-9	Pass
	40.00685	-15.32	10.51	-25.83	-13	-12.83	Pass

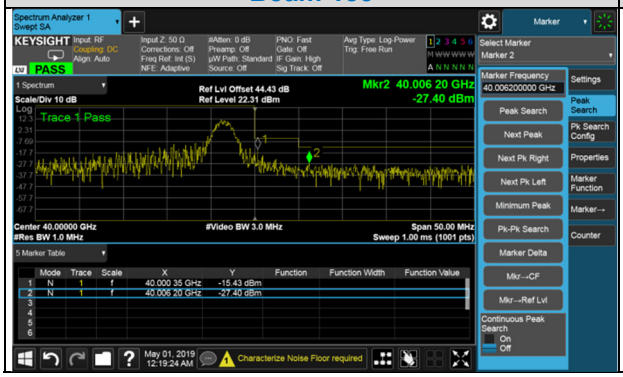
Note: The Conducted Power = EIRP-Array Gain

Beam 175

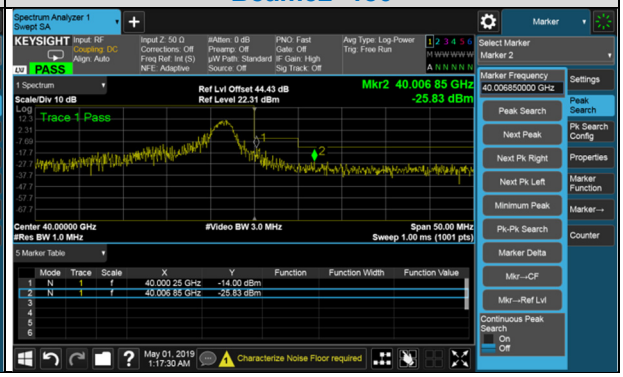
Beam 180



Beam 185



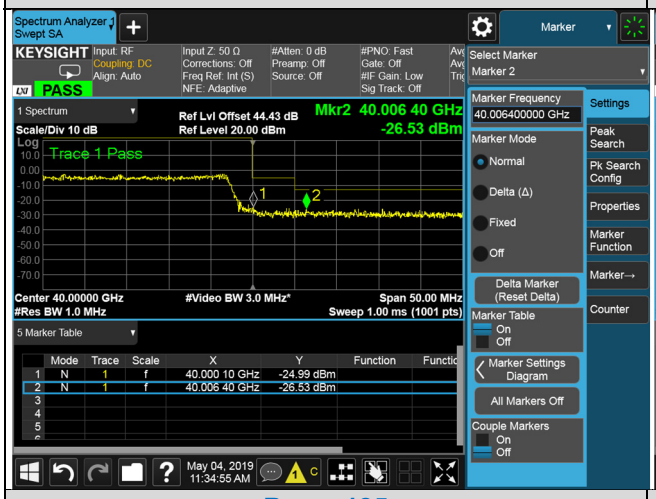
Beam52+180



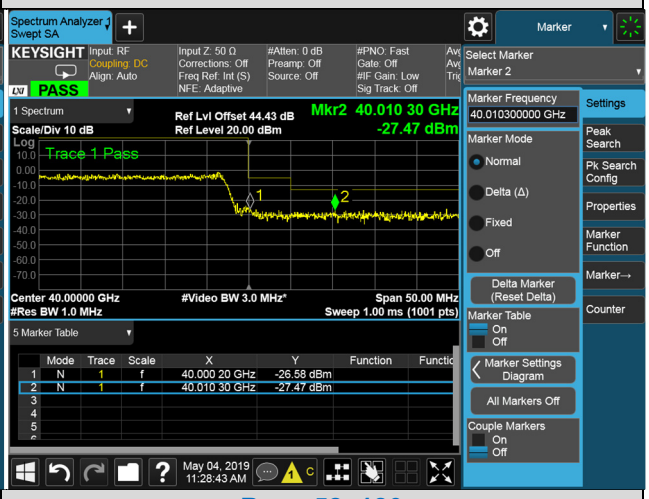
Channel 2278331							
QPSK / 66RB							
Beam ID	Frequency (GHz)	EIRP Value (dBm)	Array Gain (dBi)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
175	40.00010	-14.48	10.51	-24.99	-5	-19.99	Pass
	40.00640	-16.02	10.51	-26.53	-13	-13.53	Pass
180	40.00020	-16.07	10.51	-26.58	-5	-21.58	Pass
	40.01030	-16.96	10.51	-27.47	-13	-14.47	Pass
185	40.00015	-16.54	10.51	-27.05	-5	-22.05	Pass
	40.00780	-16.69	10.51	-27.20	-13	-14.2	Pass
52+180	40.00080	-15.03	10.51	-25.54	-5	-20.54	Pass
	40.00875	-14.77	10.51	-25.28	-13	-12.28	Pass

Note: The Conducted Power = EIRP-Array Gain

Beam 175

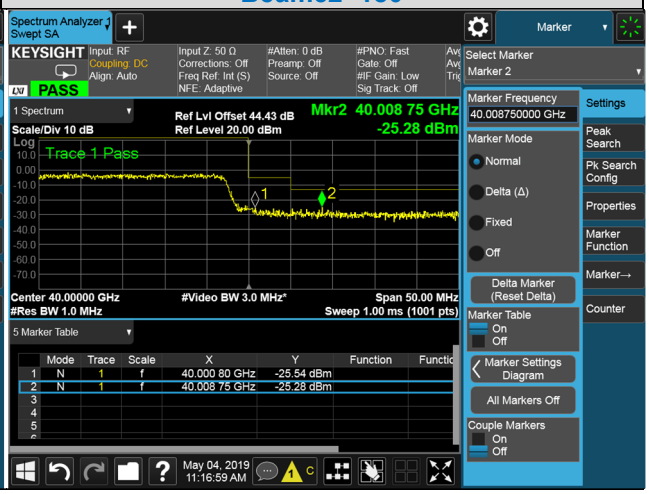


Beam 180



Beam 185

Beam52+180



4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency band.

4.6.2 Test Procedure

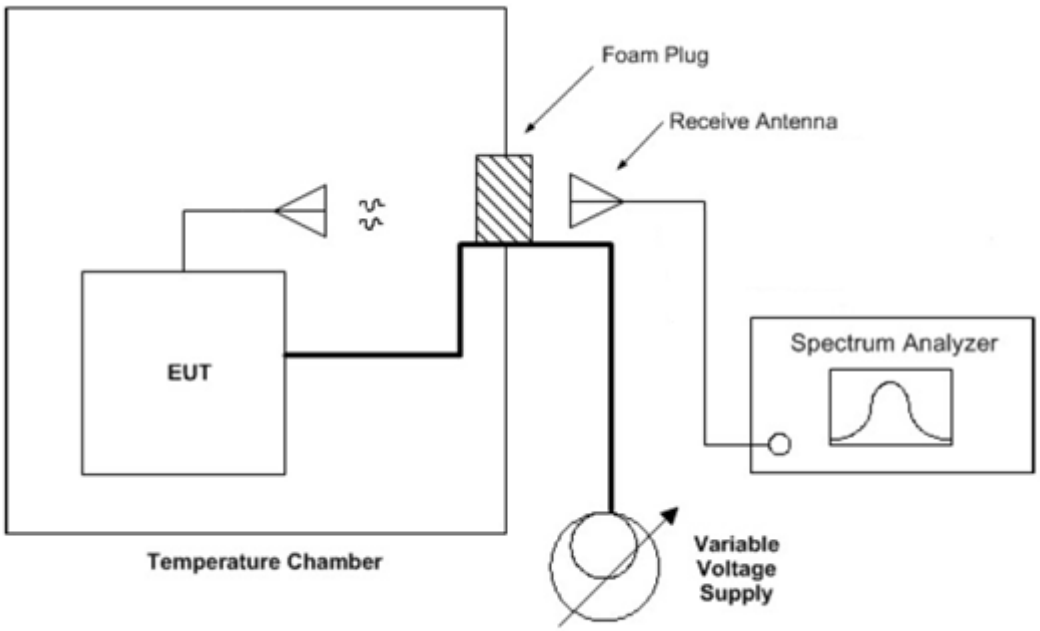
b. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

c. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

d. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded from the communication simulator.

4.6.3 Test Setup



4.6.4 Test Results

Frequency Stability Versus Temp.			
TEMP. (℃)	**Power Supply (Vac)**	**Measured Frequency (MHz)**	**Pass/Fail**
50	120	38850.240034	Pass
40	120	38850.240026	Pass
30	120	38850.240037	Pass
20	120	38850.240023	Pass
10	120	38850.240019	Pass
0	120	38850.240022	Pass
-10	120	38850.240026	Pass
-20	120	38850.240029	Pass
-30	120	38850.240028	Pass

Frequency Stability Versus Voltage			
TEMP. (℃)	**Power Supply (Vac)**	**Measured Frequency(MHz)**	**Pass/Fail**
20	138	38850.240039	Pass
	102	38850.240024	Pass

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

FCC accreditation scope:

Web Site:
https://apps.fcc.gov/oetcf/eas/reports/ViewTestFirmAccredScopes.cfm?calledFromFrame=N&RequestTimeout=500&regnum_specified=N&test_firm_id=7635

Scope	FCC Rule Parts	Maximum Assessed Frequency in Mhz	Status	Expiration Date	Recognition Date
Intentional Radiators	FCC Part 15 Subpart C	300000.00	Approved	08-14-2019	07-06-2017
U-NII without DFS Intentional Radiators	FCC Part 15, Subpart E	300000.00	Approved	08-14-2019	07-06-2017
U-NII with DFS Intentional Radiators	FCC Part 15, Subpart E	300000.00	Approved	08-14-2019	07-06-2017
UWB Intentional Radiators	FCC Part 15, Subpart F	300000.00	Approved	08-14-2019	07-06-2017
BPL Intentional Radiators	FCC Part 15, Subpart G	300000.00	Approved	08-14-2019	07-06-2017
White Space Device Intentional Radiators	FCC Part 15, Subpart H	300000.00	Approved	08-14-2019	07-06-2017
Commercial Mobile Services	Part 22 (cellular), Part 24, Part 25 (below 3 GHz), Part 27	300000.00	Approved	08-14-2019	07-06-2017
General Mobile Radio Services	Part 22 (non-cellular), Part 90 (below 3 GHz), Part 95 (below 3 GHz), Part 97 (below 3 GHz),Part 101 (below 3 GHz)	300000.00	Approved	08-14-2019	07-06-2017
Citizens Broadband Radio Services	Part 96	300000.00	Approved	08-14-2019	07-06-2017
Maritime and Aviation Radio Services	Part 80, Part 87	300000.00	Approved	08-14-2019	07-06-2017
Microwave and Millimeter Bands Radio Services	Part 25, Part 30, Part 74, Part 90 (90M DSRC, Y, Z), Part 95 (M & L), Part 101	300000.00	Approved	08-14-2019	07-06-2017
RF Exposure		6000.00	Approved	08-14-2019	07-06-2017
Hearing Aid Compatibility	Part 20	6000.00	Approved	08-14-2019	07-06-2017
Signal Boosters	Part 20, Part 90.219	300000.00	Approved	08-14-2019	07-06-2017

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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