

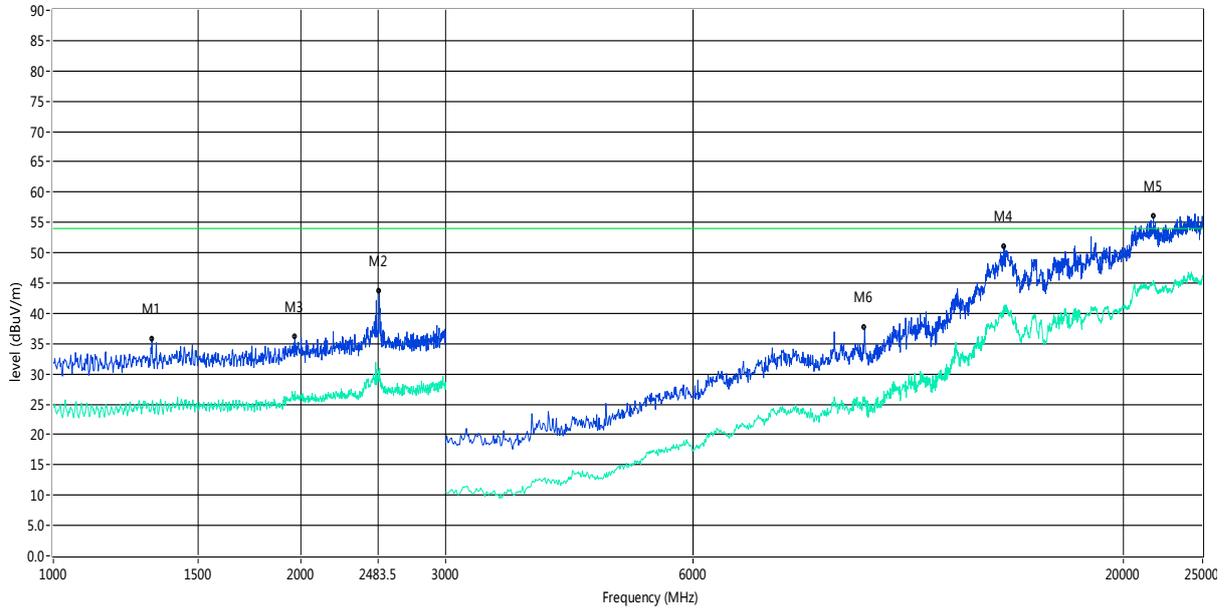


(1000MHz-25GHz) Restricted band and Spurious emission Requirements

Low channel

Horizontal

RSE_FCC Test Case_FCC 15C 1GHz-25GHz

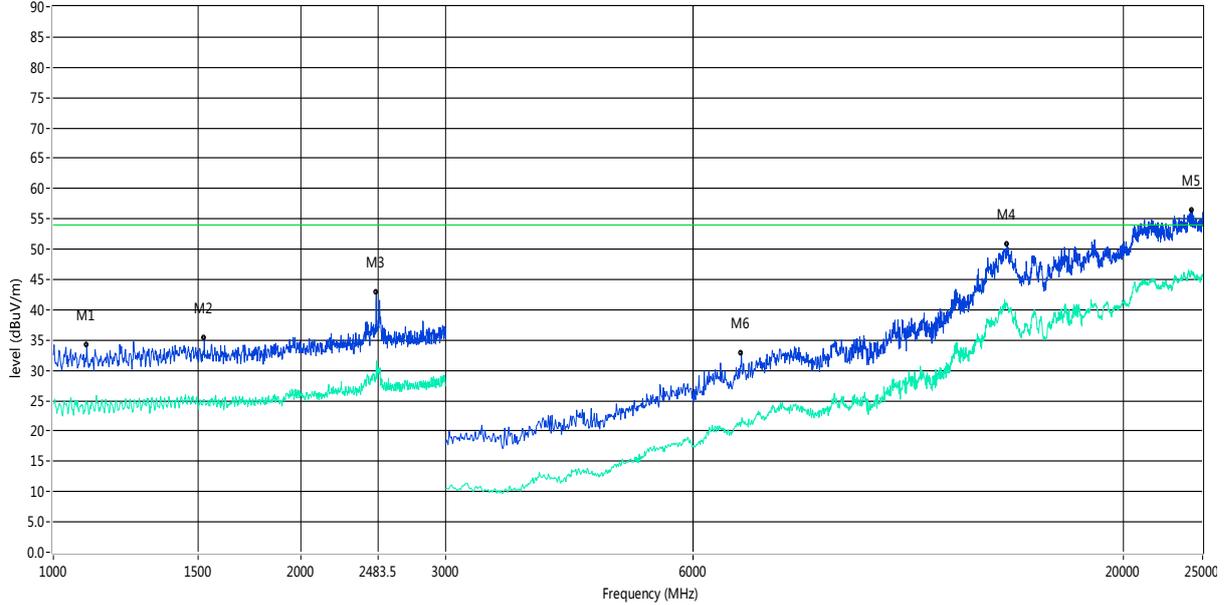


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	1318.000	25.05	-4.58	54.0	-28.95	AV	H	Pass
1	1318.000	35.82	-4.58	74.0	-38.18	Peak	H	Pass
2**	2492.000	29.32	1.57	54.0	-24.68	AV	H	Pass
2	2492.000	43.73	1.57	74.0	-30.27	Peak	H	Pass
3**	1966.000	25.55	-2.52	54.0	-28.45	AV	H	Pass
3	1966.000	36.12	-2.52	74.0	-37.88	Peak	H	Pass
4**	14320.000	41.19	24.92	54.0	-12.81	AV	H	Pass
4	14320.000	50.99	24.92	74.0	-23.01	Peak	H	Pass
5**	21784.001	45.40	23.94	54.0	-8.60	AV	H	Pass
5	21784.001	55.96	23.94	74.0	-18.04	Peak	H	Pass
6**	9700.000	26.20	13.01	54.0	-27.80	AV	H	Pass
6	9700.000	37.60	13.01	74.0	-36.40	Peak	H	Pass



Vertical

RSE_FCC Test Case_FCC 15C 1GHz-25GHz

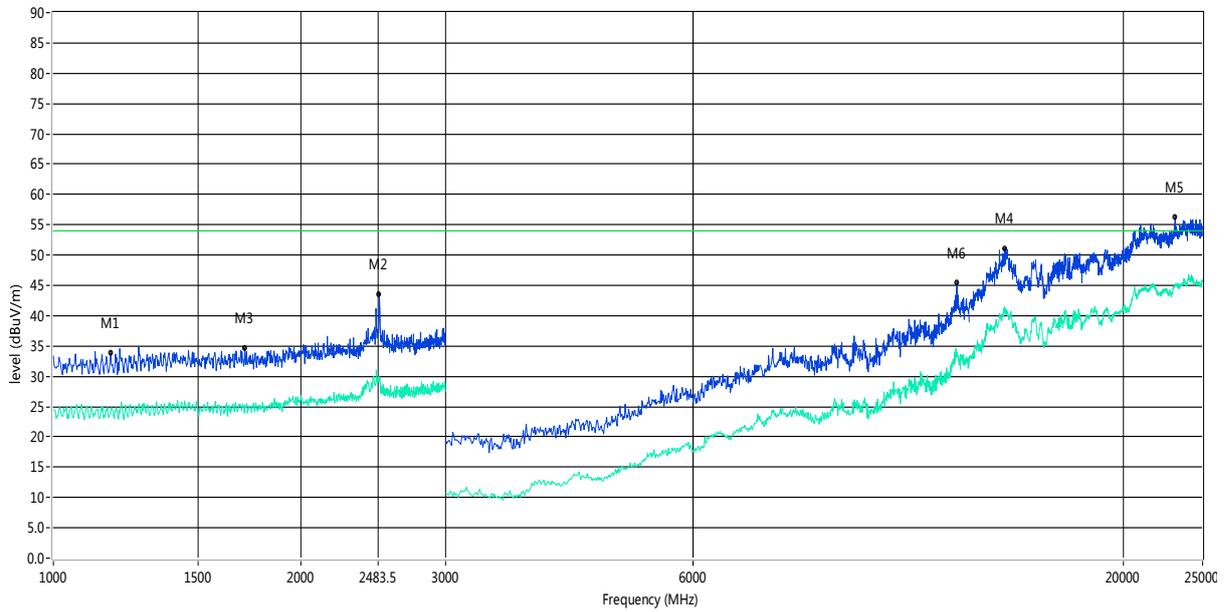


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	1098.000	24.42	-5.31	54.0	-29.58	AV	V	Pass
1	1098.000	34.14	-5.31	74.0	-39.86	Peak	V	Pass
2**	1526.000	25.18	-4.13	54.0	-28.82	AV	V	Pass
2	1526.000	35.34	-4.13	74.0	-38.66	Peak	V	Pass
3**	2470.000	30.68	1.31	54.0	-23.32	AV	V	Pass
3	2470.000	42.81	1.31	74.0	-31.19	Peak	V	Pass
4**	14464.000	41.05	24.63	54.0	-12.95	AV	V	Pass
4	14464.000	50.82	24.63	74.0	-23.18	Peak	V	Pass
5**	24231.999	46.30	23.23	54.0	-7.70	AV	V	Pass
5	24231.999	56.48	23.23	74.0	-17.52	Peak	V	Pass
6**	6870.000	21.49	7.56	54.0	-32.51	AV	V	Pass
6	6870.000	32.84	7.56	74.0	-41.16	Peak	V	Pass



Mid channel Horizontal

RSE_FCC Test Case_FCC 15C 1GHz-25GHz

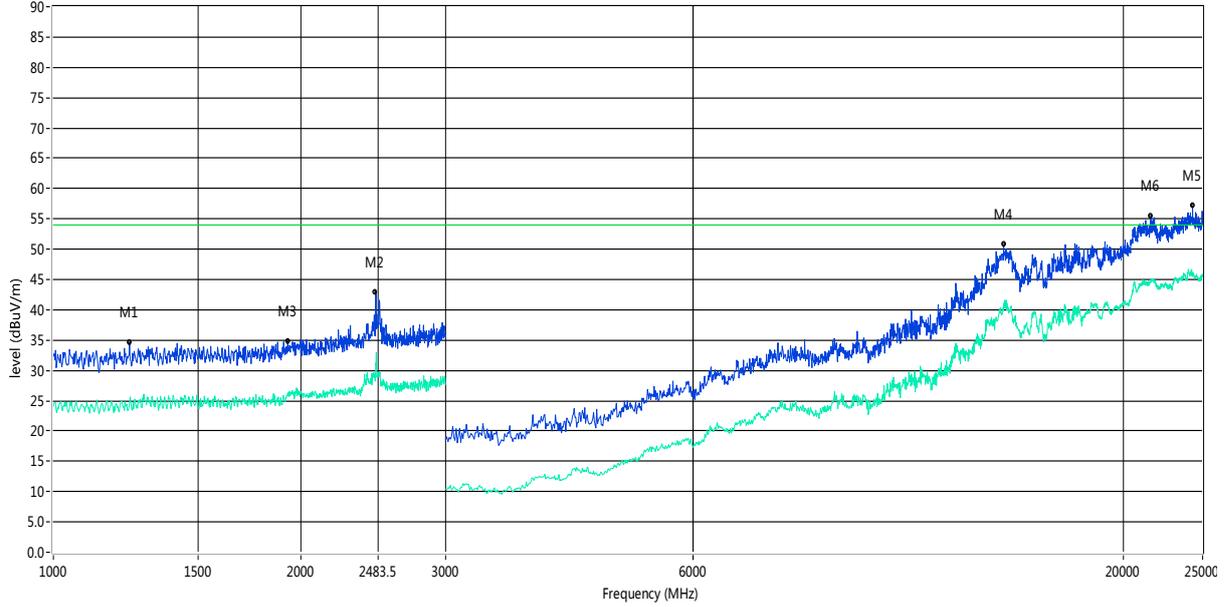


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	1174.000	23.90	-4.93	54.0	-30.10	AV	H	Pass
1	1174.000	33.87	-4.93	74.0	-40.13	Peak	H	Pass
2**	2492.000	29.54	1.57	54.0	-24.46	AV	H	Pass
2	2492.000	43.55	1.57	74.0	-30.45	Peak	H	Pass
3**	1710.000	25.19	-3.79	54.0	-28.81	AV	H	Pass
3	1710.000	34.61	-3.79	74.0	-39.39	Peak	H	Pass
4**	14368.000	41.37	24.92	54.0	-12.63	AV	H	Pass
4	14368.000	51.07	24.92	74.0	-22.93	Peak	H	Pass
5**	23140.000	45.01	23.58	54.0	-8.99	AV	H	Pass
5	23140.000	56.19	23.58	74.0	-17.81	Peak	H	Pass
6**	12560.000	33.95	19.50	54.0	-20.05	AV	H	Pass
6	12560.000	45.33	19.50	74.0	-28.67	Peak	H	Pass



Vertical

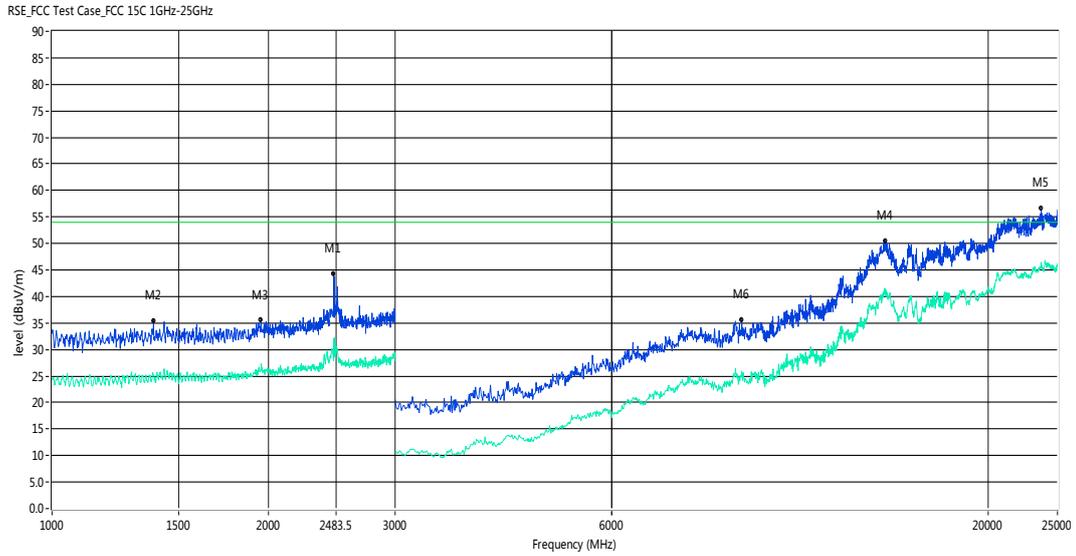
RSE_FCC Test Case_FCC 15C 1GHz-25GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	1238.000	24.67	-4.72	54.0	-29.33	AV	V	Pass
1	1238.000	34.63	-4.72	74.0	-39.37	Peak	V	Pass
2**	2466.000	31.21	1.29	54.0	-22.79	AV	V	Pass
2	2466.000	42.95	1.29	74.0	-31.05	Peak	V	Pass
3**	1928.000	26.27	-2.68	54.0	-27.73	AV	V	Pass
3	1928.000	34.78	-2.68	74.0	-39.22	Peak	V	Pass
4**	14320.000	41.09	24.92	54.0	-12.91	AV	V	Pass
4	14320.000	50.74	24.92	74.0	-23.26	Peak	V	Pass
5**	24304.001	46.14	23.21	54.0	-7.86	AV	V	Pass
5	24304.001	57.17	23.21	74.0	-16.83	Peak	V	Pass
6**	21616.001	44.50	23.98	54.0	-9.50	AV	V	Pass
6	21616.001	55.38	23.98	74.0	-18.62	Peak	V	Pass



High channel Horizontal

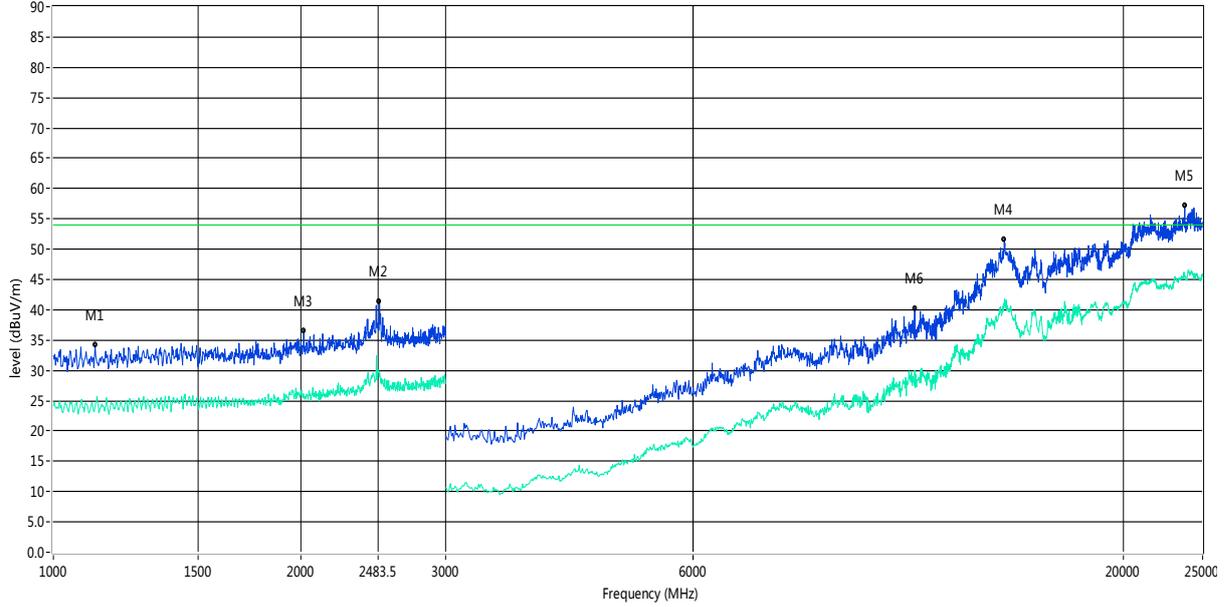


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	2464.000	28.51	1.28	54.0	-25.49	AV	H	Pass
1	2464.000	44.30	1.28	74.0	-29.70	Peak	H	Pass
2**	1384.000	25.16	-4.28	54.0	-28.84	AV	H	Pass
2	1384.000	35.40	-4.28	74.0	-38.60	Peak	H	Pass
3**	1952.000	26.06	-2.43	54.0	-27.94	AV	H	Pass
3	1952.000	35.45	-2.43	74.0	-38.55	Peak	H	Pass
4**	14416.000	41.42	25.52	54.0	-12.58	AV	H	Pass
4	14416.000	50.40	25.52	74.0	-23.60	Peak	H	Pass
5**	23728.001	46.26	23.39	54.0	-7.74	AV	H	Pass
5	23728.001	56.52	23.39	74.0	-17.48	Peak	H	Pass
6**	9100.000	25.67	13.19	54.0	-28.33	AV	H	Pass
6	9100.000	35.52	13.19	74.0	-38.48	Peak	H	Pass



Vertical

RSE_FCC Test Case_FCC 15C 1GHz-25GHz

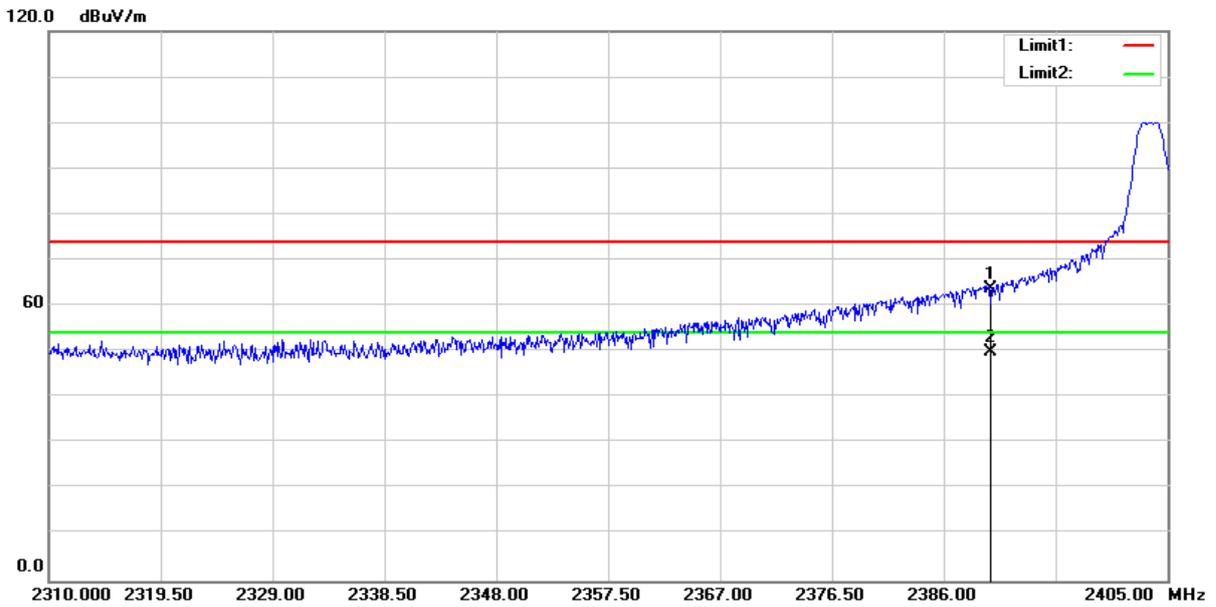


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1**	1124.000	24.28	-4.89	54.0	-29.72	AV	V	Pass
1	1124.000	34.12	-4.89	74.0	-39.88	Peak	V	Pass
2**	2492.000	28.94	1.57	54.0	-25.06	AV	V	Pass
2	2492.000	41.36	1.57	74.0	-32.64	Peak	V	Pass
3**	2016.000	25.90	-2.34	54.0	-28.10	AV	V	Pass
3	2016.000	36.50	-2.34	74.0	-37.50	Peak	V	Pass
4**	14343.999	40.72	24.17	54.0	-13.28	AV	V	Pass
4	14343.999	51.65	24.17	74.0	-22.35	Peak	V	Pass
5**	23776.000	45.44	23.38	54.0	-8.56	AV	V	Pass
5	23776.000	57.18	23.38	74.0	-16.82	Peak	V	Pass
6**	11160.001	30.06	16.70	54.0	-23.94	AV	V	Pass
6	11160.001	40.25	16.70	74.0	-33.75	Peak	V	Pass



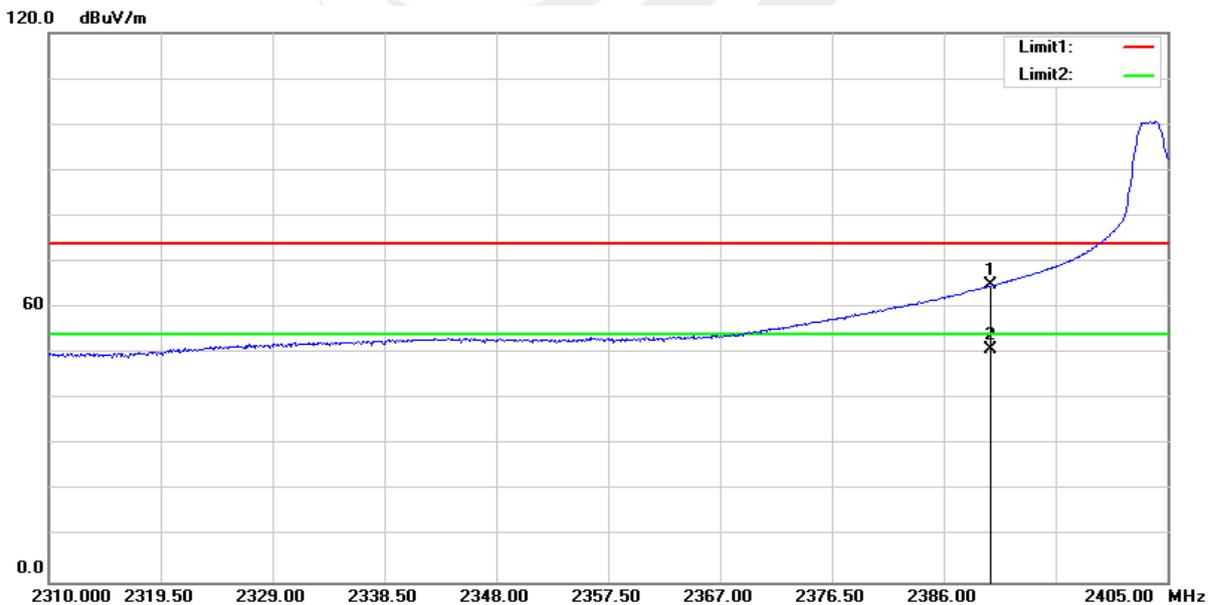
3.3.7 TEST RESULTS (RESTRICTED BAND)

Low Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	74.44	-10.75	63.69	74.00	-10.31	peak
2	2390.000	60.65	-10.75	49.90	54.00	-4.10	peak

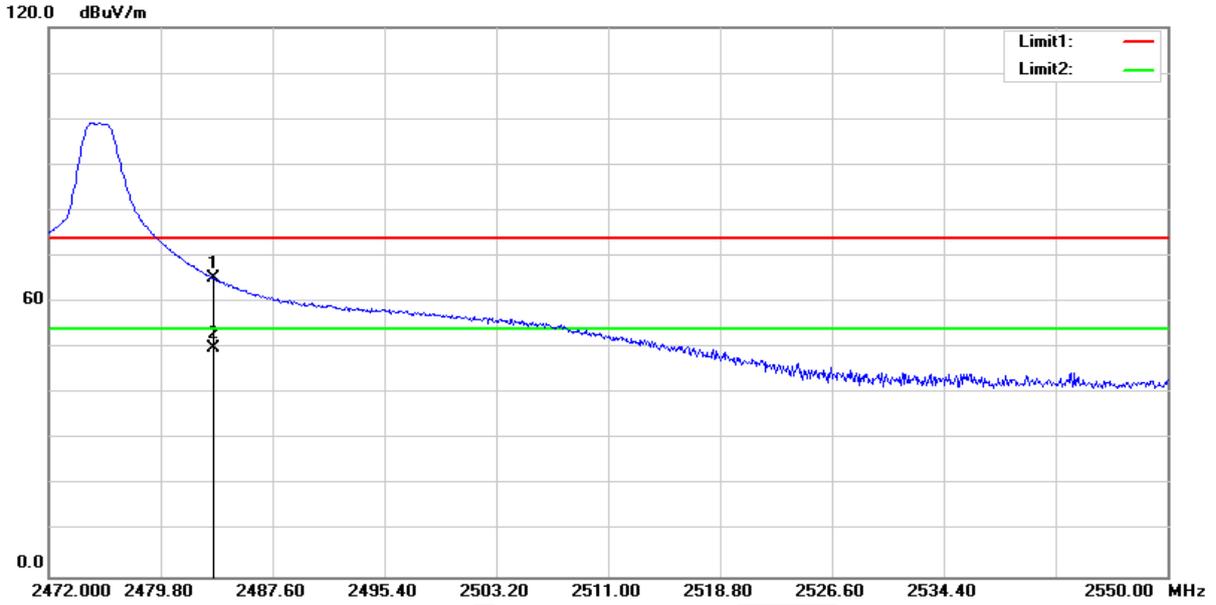
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	75.63	-10.75	64.88	74.00	-9.12	peak
2	2390.000	61.57	-10.75	50.82	54.00	-3.18	peak

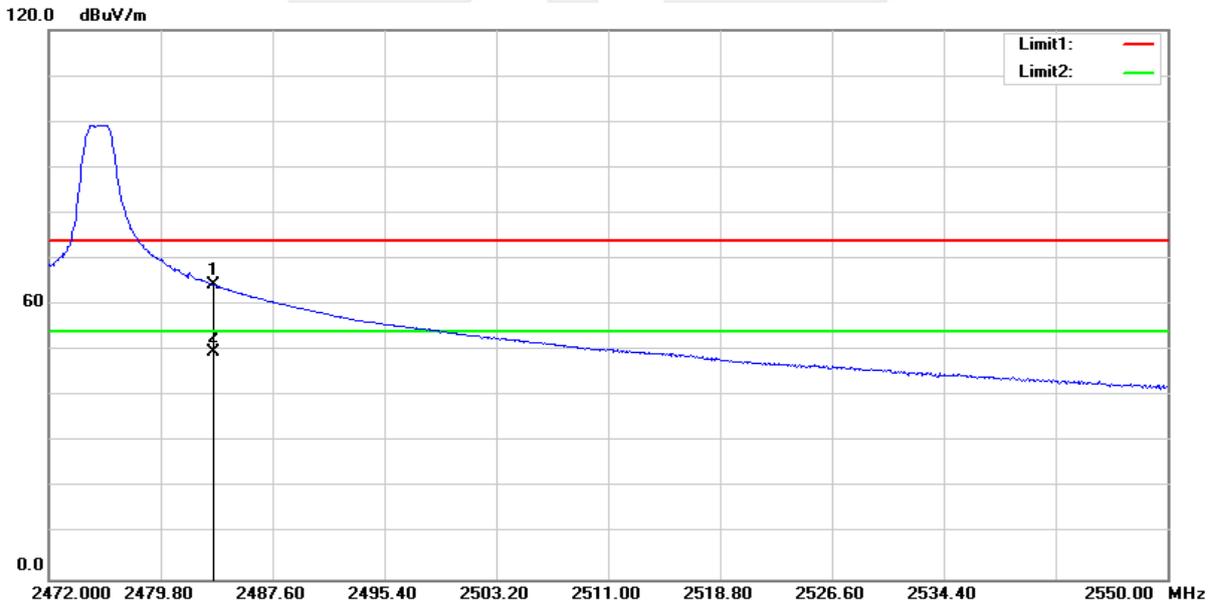


High
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	75.44	-10.29	65.15	74.00	-8.85	peak
2	2483.500	60.3	-10.29	50.01	54.00	-3.99	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	71.69	-10.29	64.40	74.00	-9.60	peak
2	2483.500	59.8	-10.29	49.51	54.00	-4.49	peak

4 CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 APPLIED PROCEDURES / LIMIT

According to FCC Part 15.247(d) and RSS-247 Clause 5.5, in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

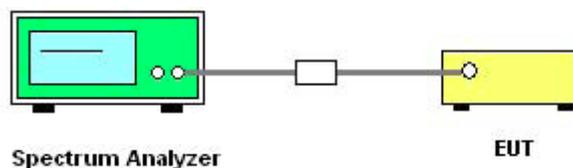
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 to 2422 MHz Upper Band Edge: 2452 to 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.5 EUT OPERATION CONDITIONS

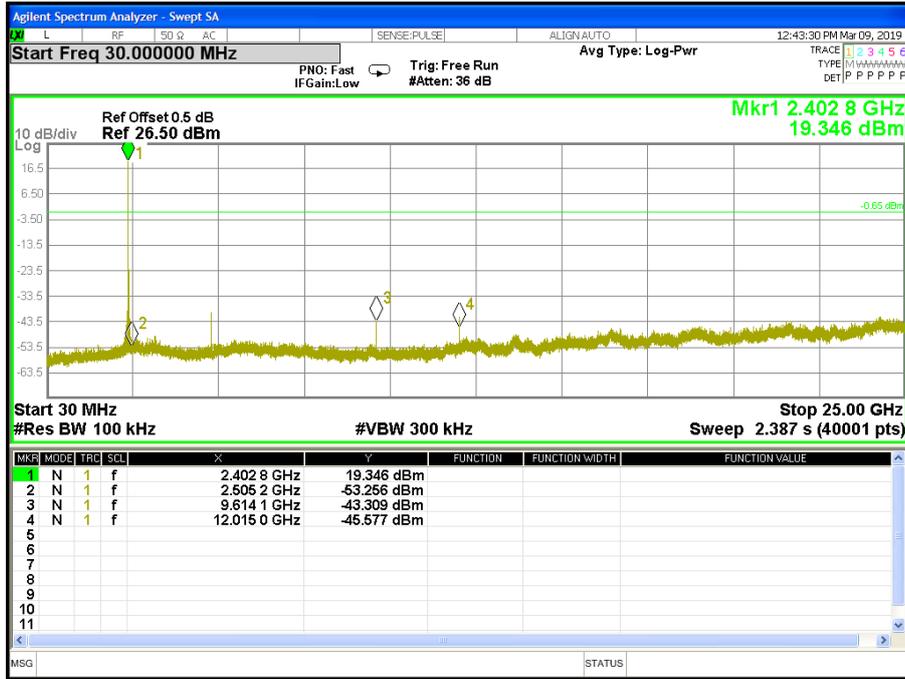
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



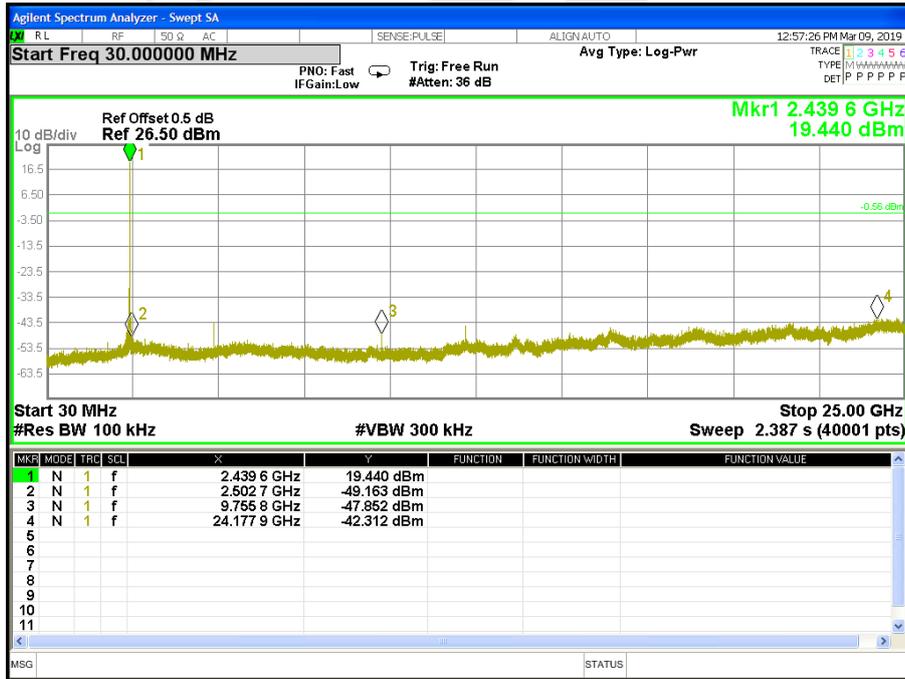
4.6 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	60%
Test Voltage :	AC 120V/60Hz	Test Mode :	TX Mode /CH01, CH06, CH09

CH 01

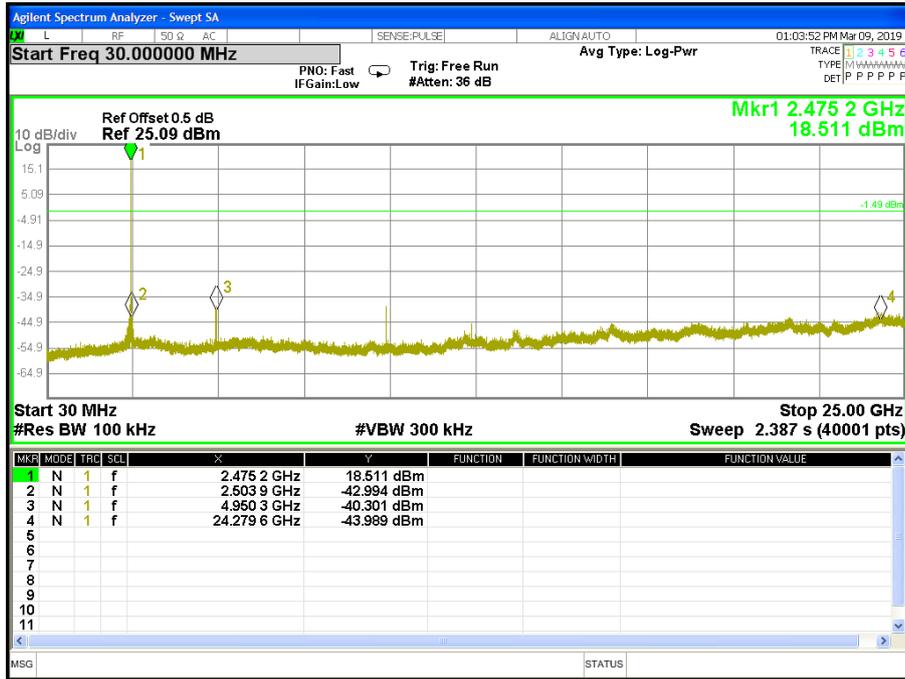


CH06





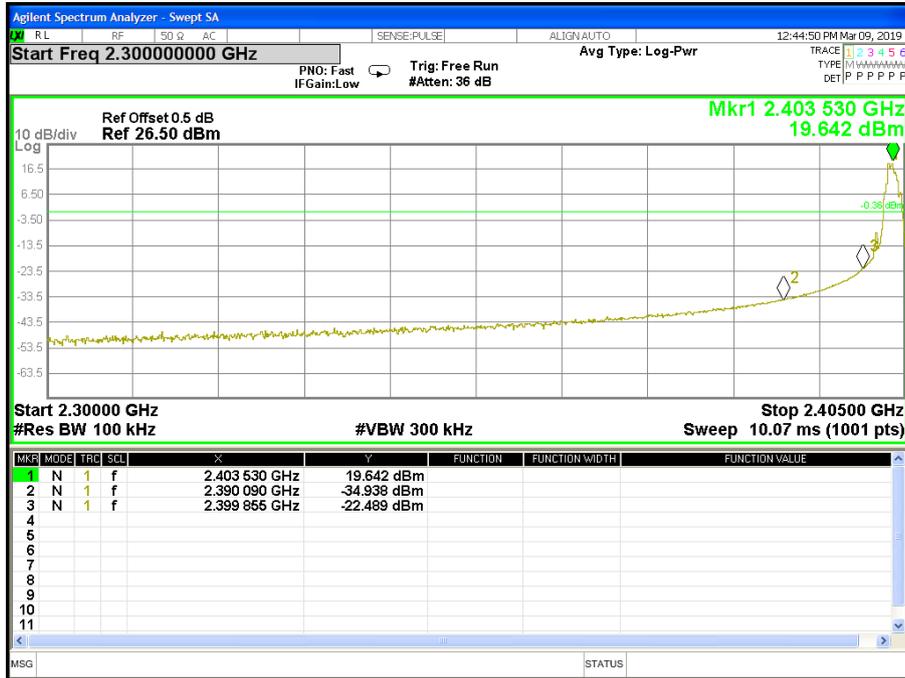
CH09



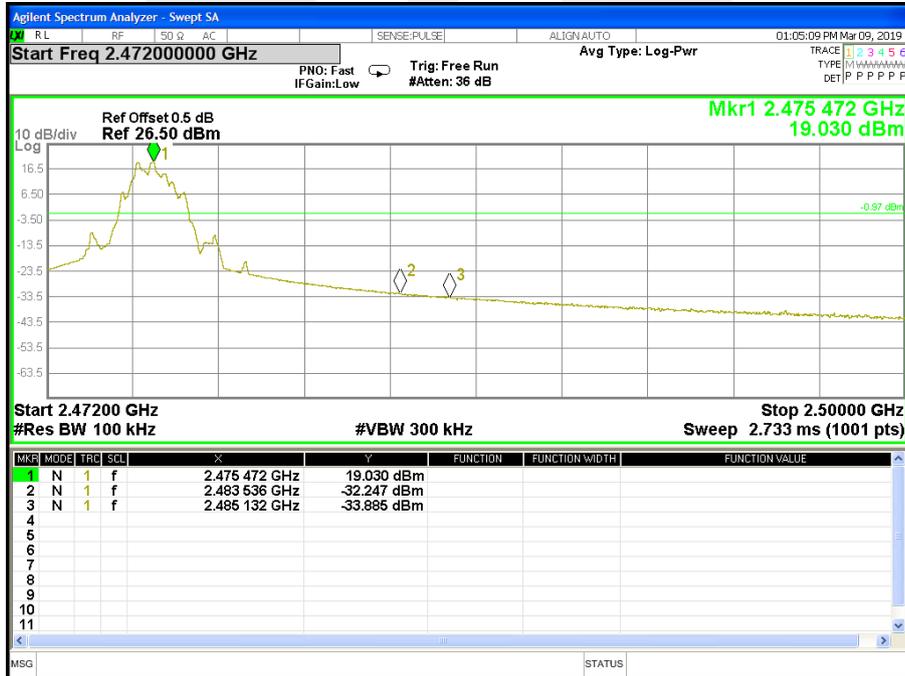


Band edge

CH 01



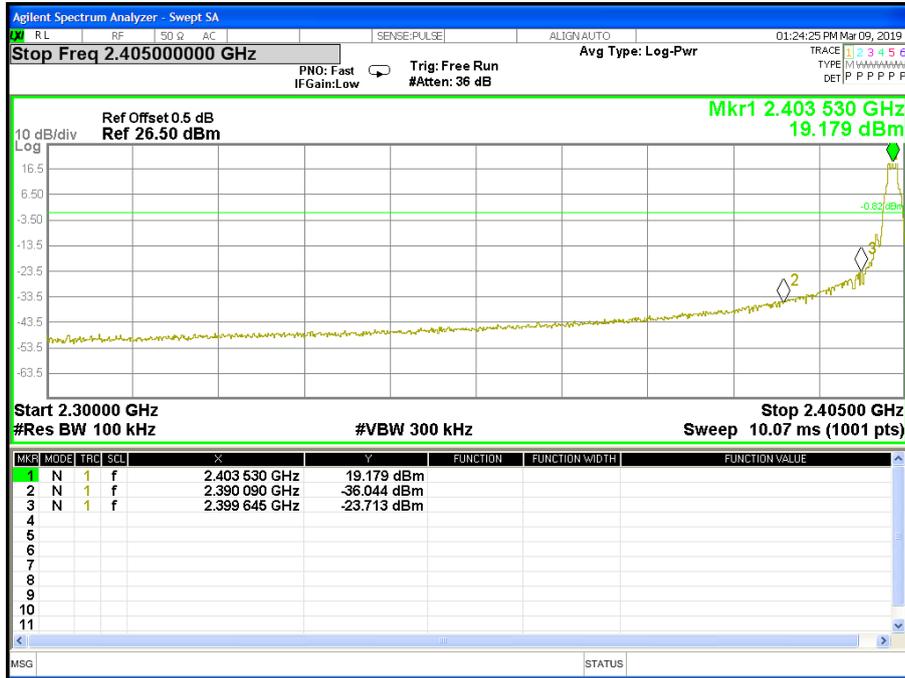
CH09



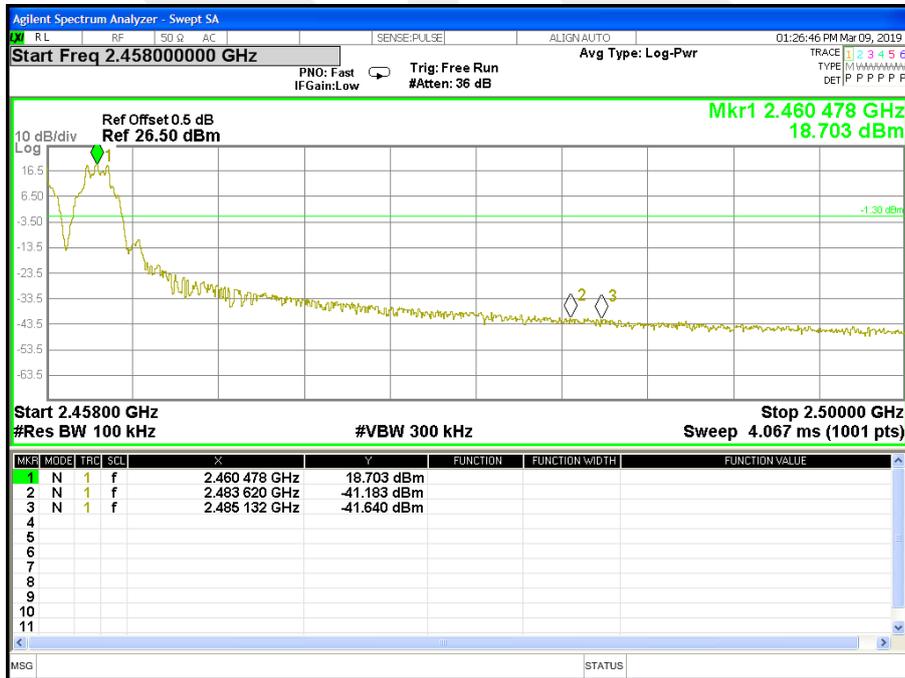


Hopping Band edge

CH 01



CH09



5 NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
FCC Part 15.247(a)(1) RSS-247 Clause 5.1(d)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	1MHz
VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

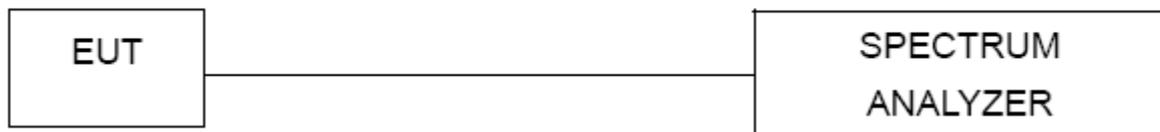
5.2 TEST PROCEDURE

- 1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below
- 2) Spectrum Setting : RBW= 1MHz, VBW=1MHz, Sweep time = Auto.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



5.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	AC 120V/60Hz	Test Mode:	Hopping mode

Measured Hopping Channels

37

Hopping channel





6 AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
FCC Part 15.247(a)(1) RSS-247 Clause 5.1(d)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

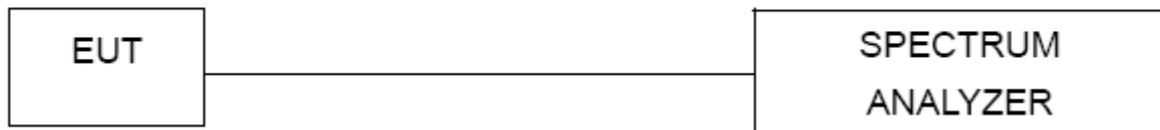
6.2 TEST PROCEDURE

- 1) The transmitter output (antenna port) was connected to the spectrum analyzer
- 2) Set RBW =1MHz/VBW =3MHz.
- 3) Use a video trigger with the trigger level set to enable triggering only on full pulses.
- 4) Sweep Time is more than once pulse time.
- 5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- 6) Measure the maximum time duration of one single pulse.
- 7) Measure the maximum burst number of one hopping period.
- 8) A Period Time = $49 \times 0.4 = 19.6$ S

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



6.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	AC 120V/60Hz	Test Mode:	Hopping mode

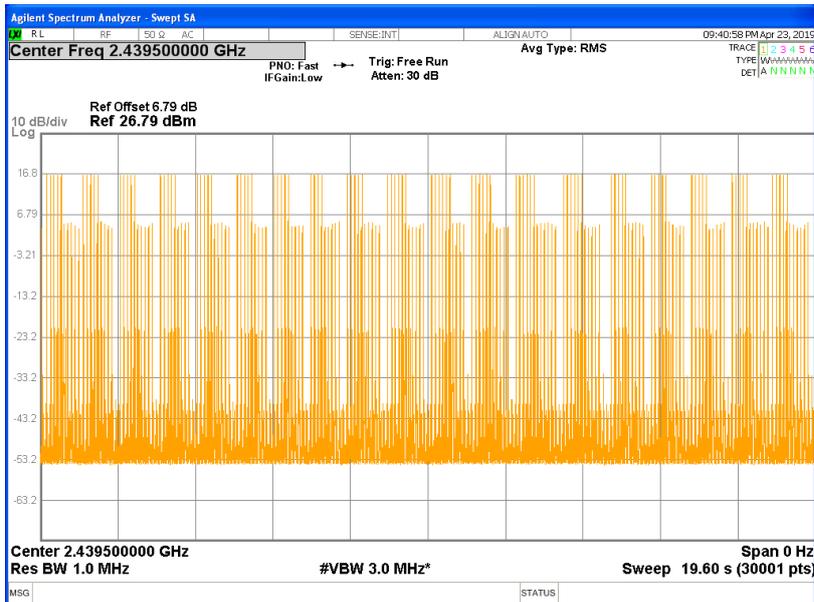
Frequency (MHz)	Pulse Duration(ms)	Pulse Number	Dwell Time(s)	Limits(s)
2439.5MHz	3.82	99	0.38	0.4

CH06

Pulse Duration



Pulse number



7 HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 20 dB Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- 1) The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- 2) The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- 3) The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



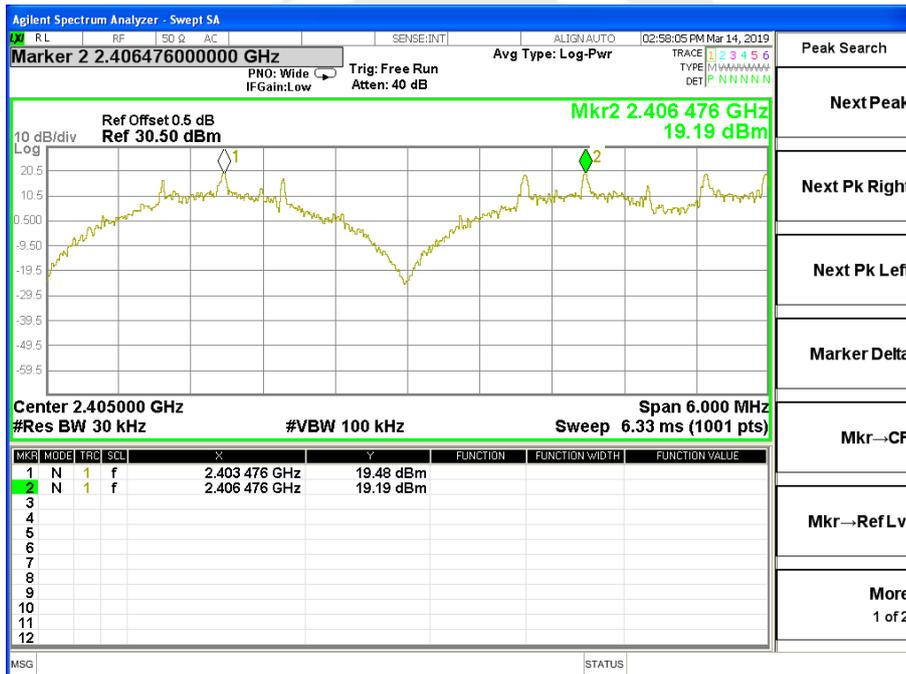
7.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	AC 120V/60Hz	Test Mode:	Hopping mode

Test Mode	Frequency	Ch. Separation (MHz)	Limit	Result
TX	2403.5 MHz	3.000	1.392	Complies
	2439.5 MHz	1.497	1.386	Complies
	2475.5 MHz	2.994	1.394	Complies

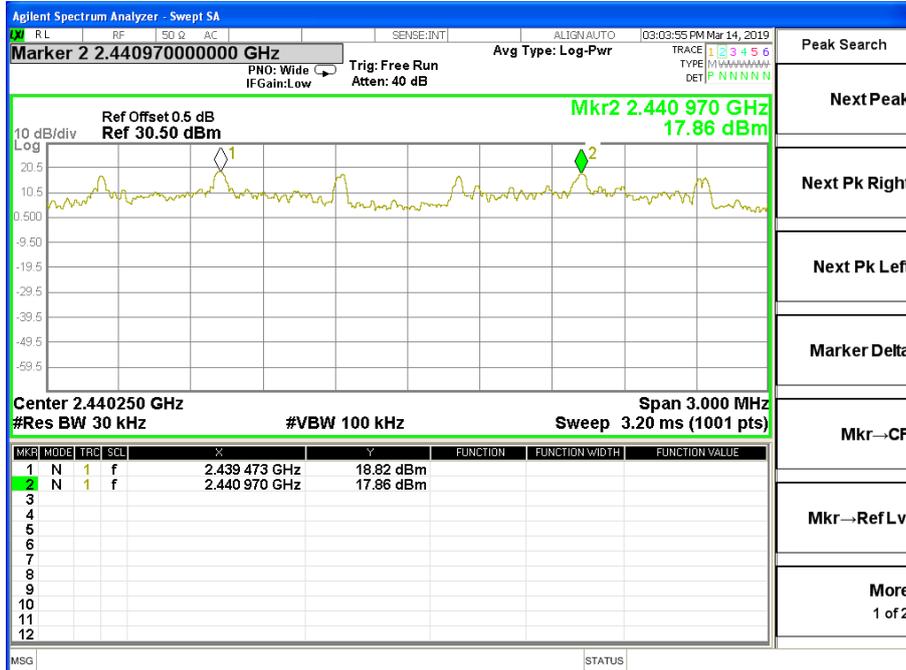
Ch. Separation Limits: > two-thirds 20dB bandwidth

Low Channel

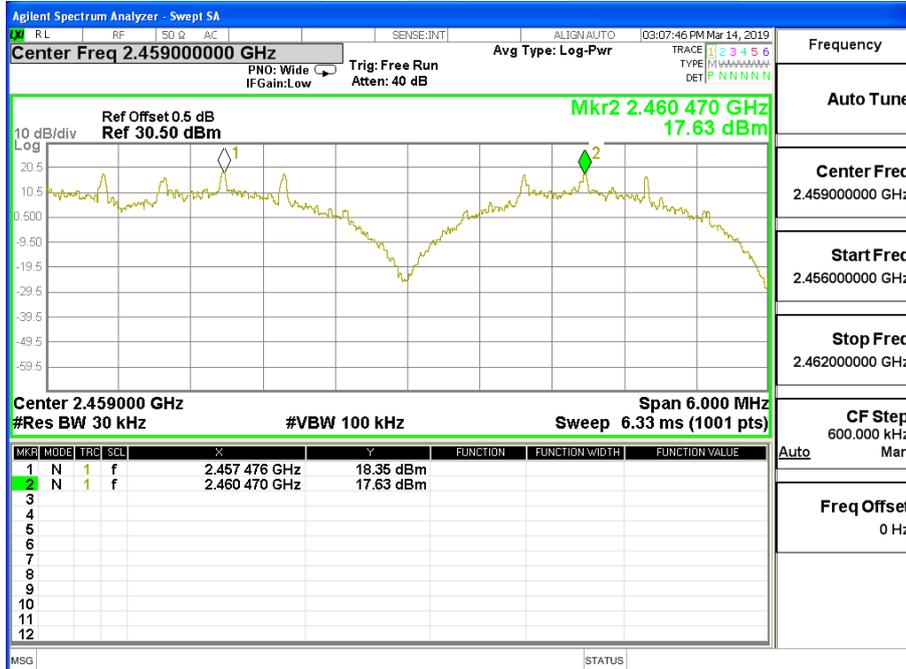




Middle Channel



High Channel





8 BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2 & RSS-Gen Issue 5				
Section	Test Item	Limit	Frequency Range (MHz)	Result
FCC Part 15.247(a)(1) RSS-247 Clause 5.1(b)	Bandwidth	(20dB Bandwidth)	2400-2483.5	PASS
RSS-Gen Clause 6.7	99% Bandwidth	-	2400-2483.5	PASS

8.2 TEST PROCEDURE

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 1% - 5% OBW, VBW \geq 3RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \geq 6 dB.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



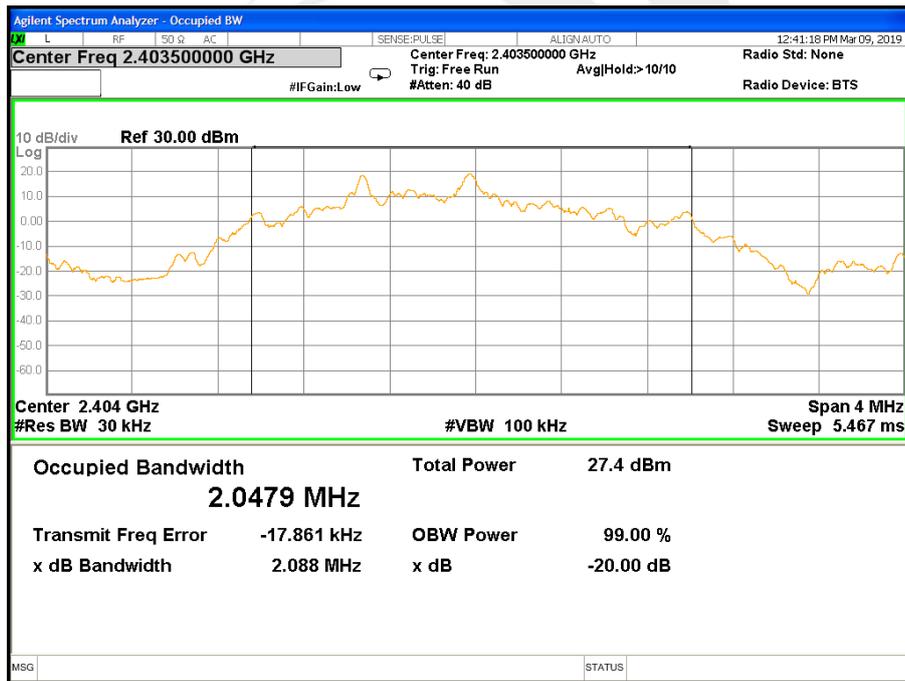
8.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	AC 120V/60Hz	Test Mode:	TX Mode /CH01, CH06, CH09

Remark: PEAK DETECTOR IS USED

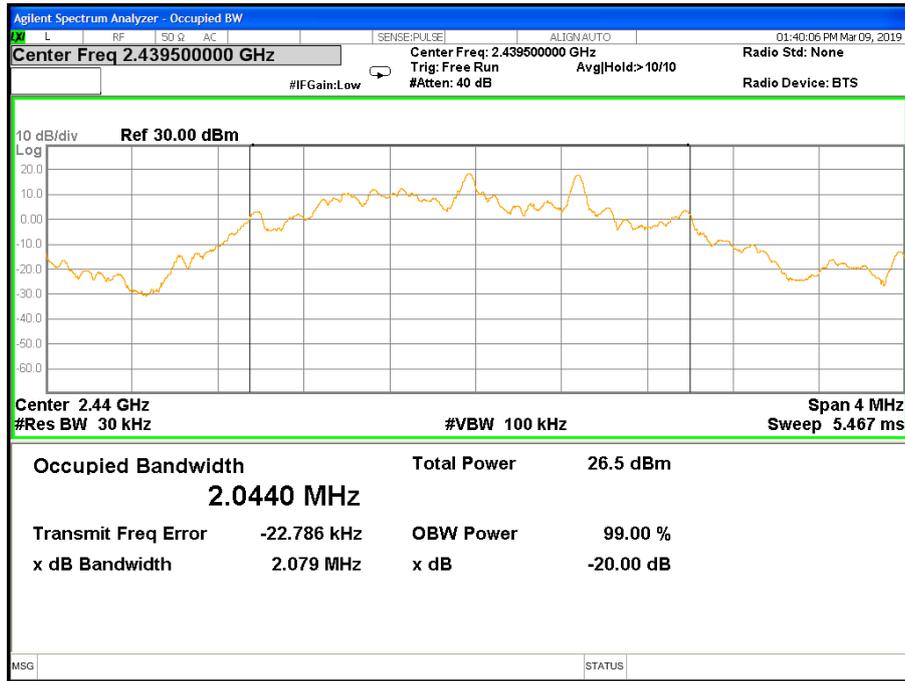
Test Mode	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit of 20dB Bandwidth (MHz)	Result
TX	2402.00	2.088	2.0479	N/A	PASS
	2440.00	2.079	2.0440	N/A	PASS
	2477.00	2.091	2.0397	N/A	PASS

Low Channel

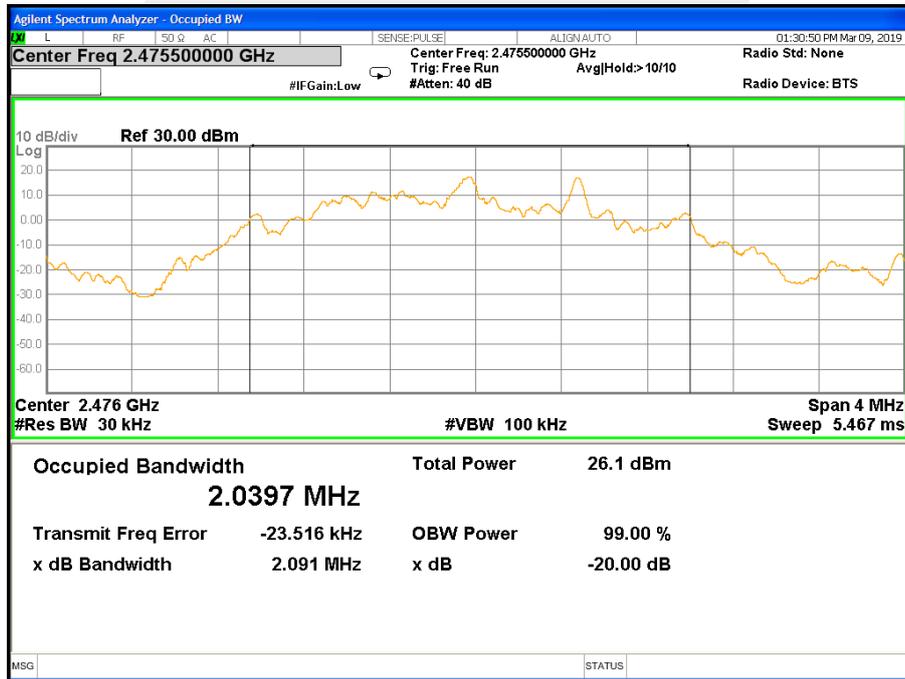




Middle Channel



High Channel





9 PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part 15.247,Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
FCC Part 15.247(a)(1) RSS-247 Clause 5.4(b)	Output Power	1 W or 0.125W if channel separation > 2/3 bandwidth provided the systems operate with an output power no greater than 125 mW(20.97dBm)	2400-2483.5	PASS

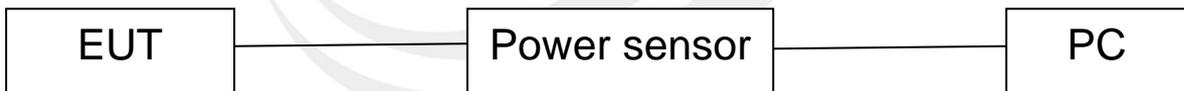
9.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power Sensor&PC

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



9.6 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	60%
Test Voltage :	AC 120V/60Hz		

Test Channel	Frequency (MHz)	Conducted Output Power		Limit (dBm)
		Peak(dBm)	AVG(dBm)	
CH01	2403.5	19.88	14.85	20.97
CH25	2439.5	19.71	14.52	20.97
CH49	2475.5	19.30	14.28	20.97

Note:

- 1) The cable loss and antenna gain are taken into account in results.
- 2) Antenna gain(G): 1.2 dBi





10 ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 and RSS-Gen Issue 5 requirement: For intentional device, according to 15.203 and RSS-Gen Issue 5: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is Integral antenna. It comply with the standard requirement.

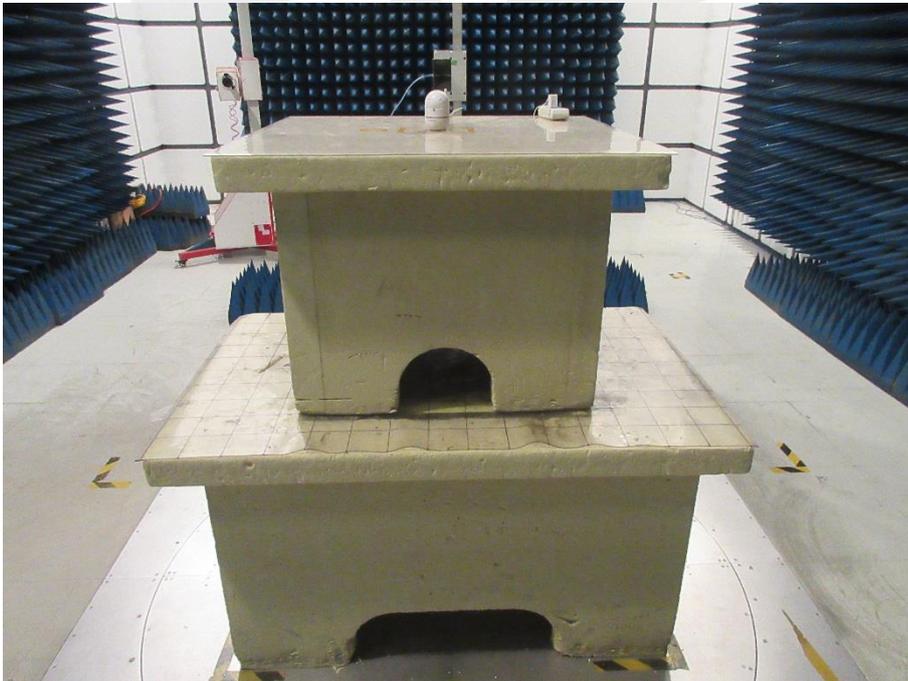


11 APPENDIX - PHOTOS OF TEST SETUP

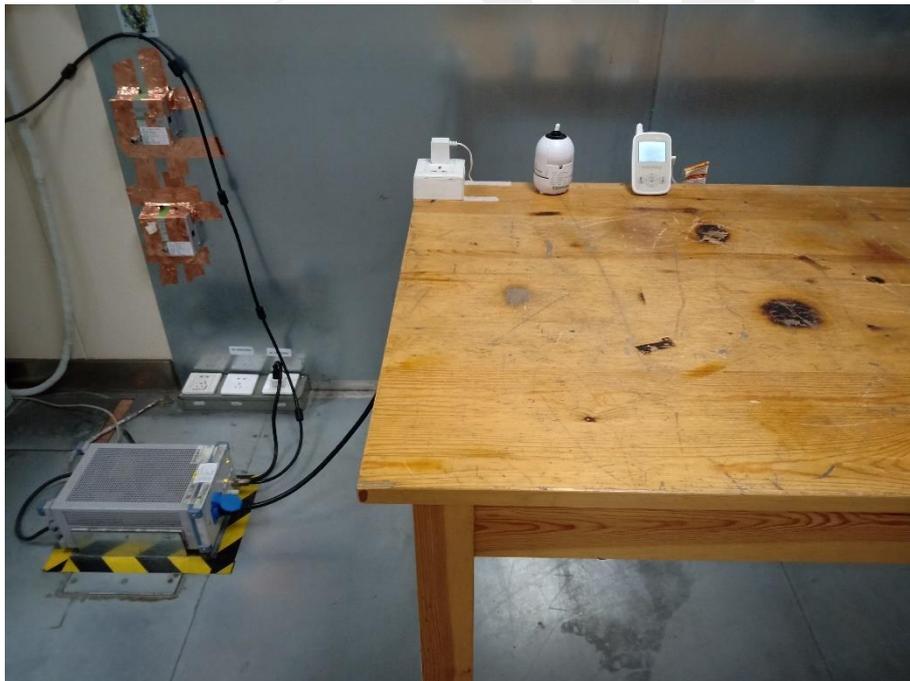
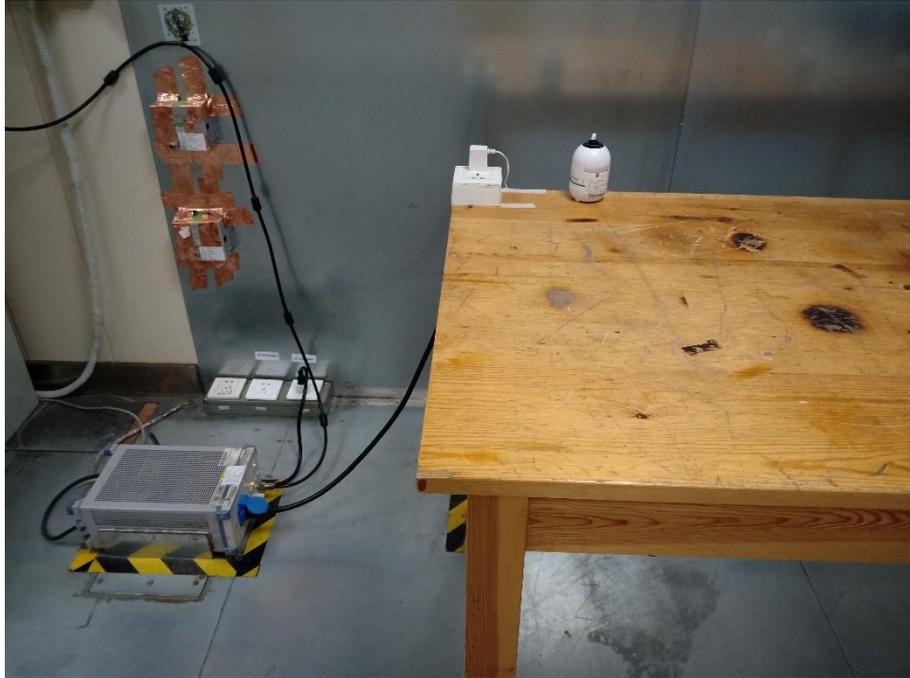
Radiated SPURIOUS EMISSION SET-UP PHOTOS, 30MHz ~ 1GHz



Radiated SPURIOUS EMISSION SET-UP PHOTOS, 1GHz ~ 25GHz



CONDUCTED EMISSION SET-UP PHOTOS



RADIATED EMISSION SET-UP PHOTOS, 30MHz ~ 1GHz



RADIATED EMISSION SET-UP PHOTOS, Above 1GHz



*****END OF THE REPORT*****