TEST ITEM	POWER SPECTRAL DENSITY
TEST MODE	802.11n 20 with data rate 6.5

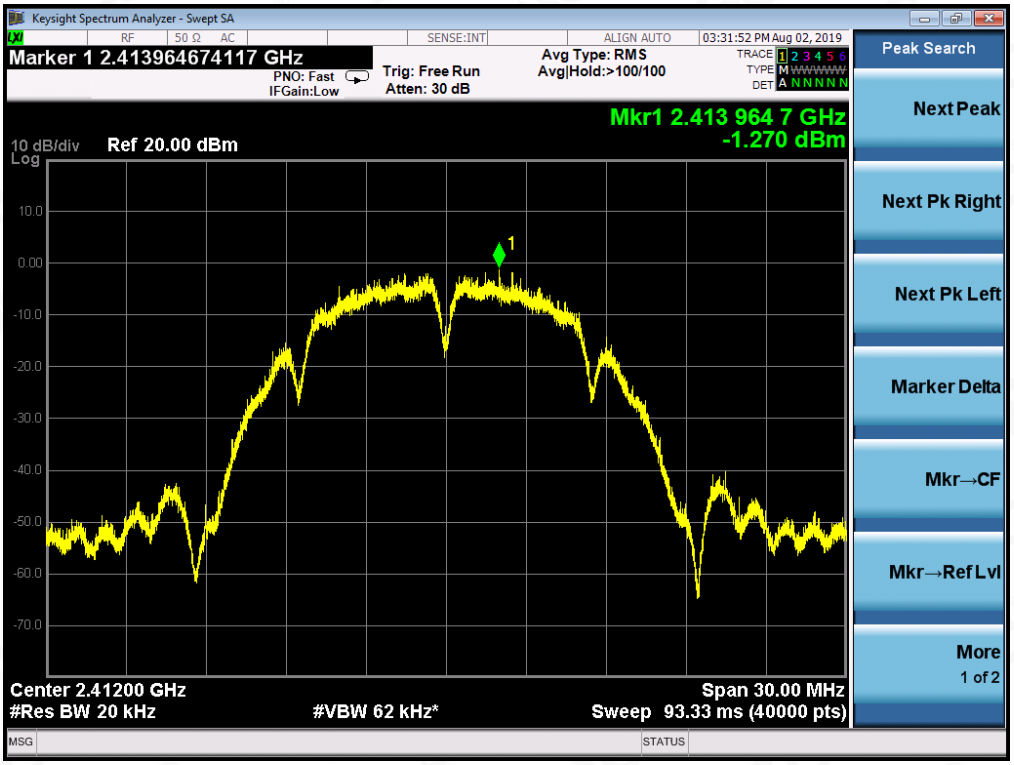
Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-7.405	8	Pass
Middle Channel	-7.038	8	Pass
High Channel	-7.343	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY
TEST MODE	802.11n 40 with data rate 13.5

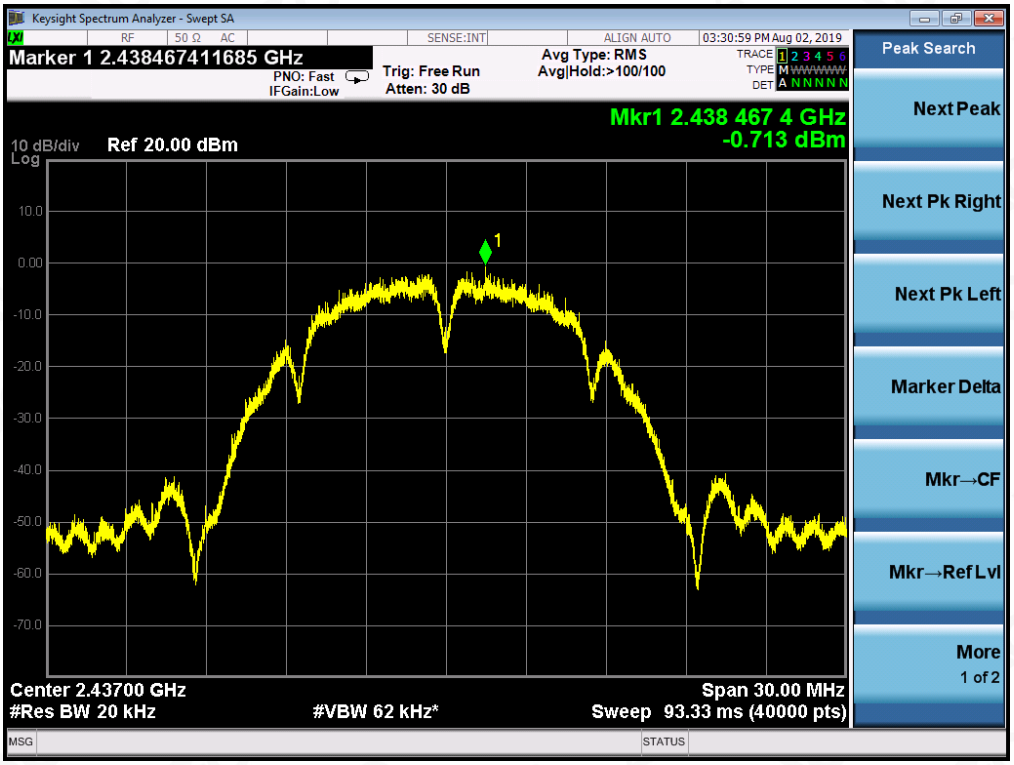
Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-8.850	8	Pass
Middle Channel	-10.397	8	Pass
High Channel	-9.287	8	Pass

802.11b TEST RESULT

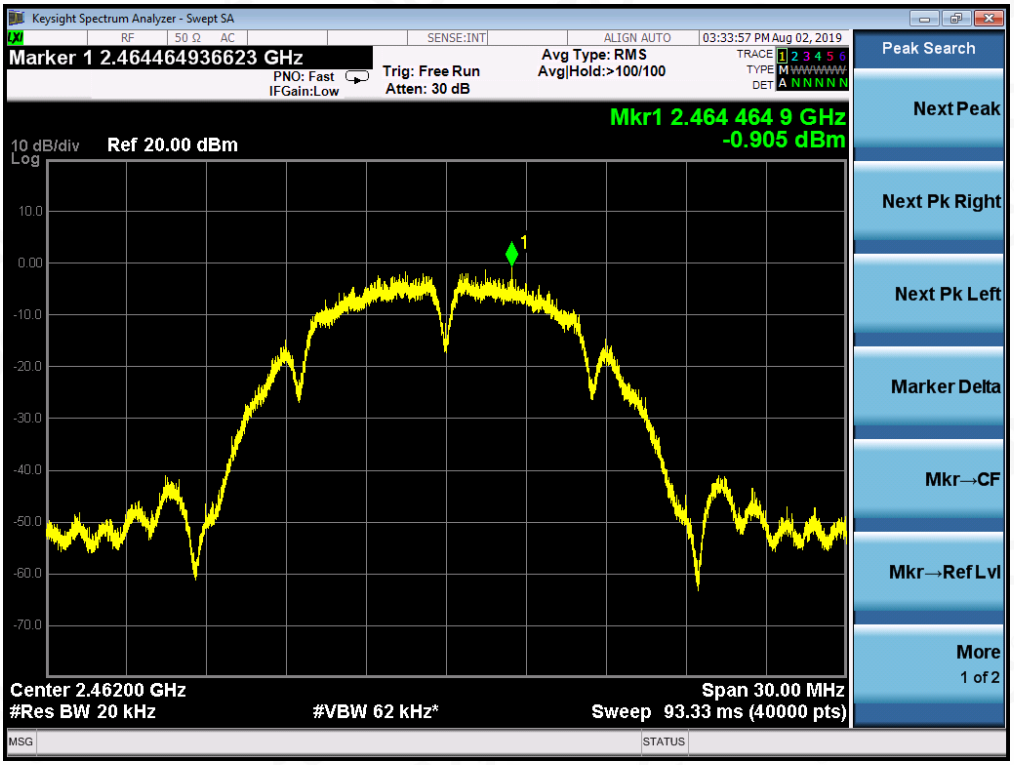
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

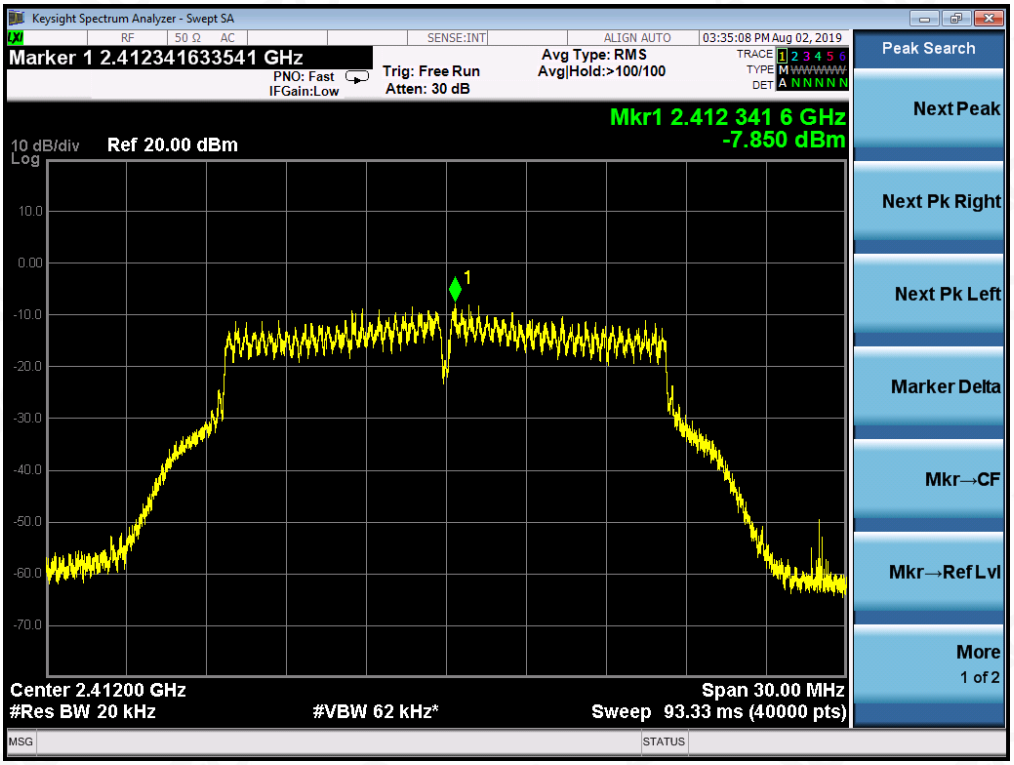


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

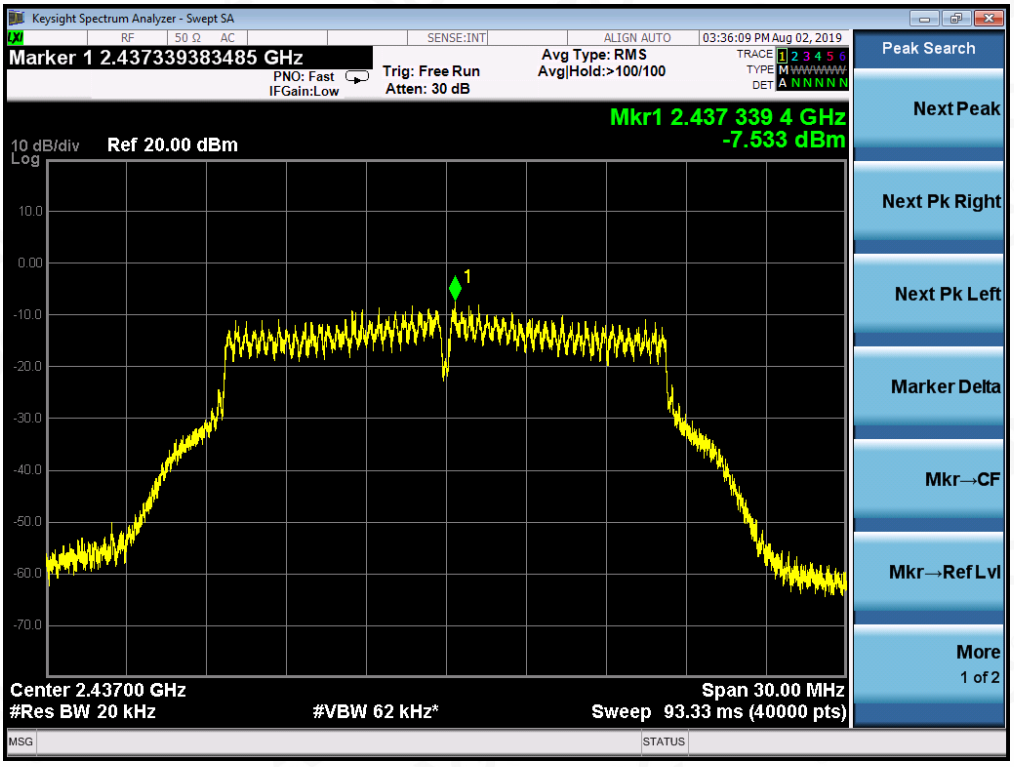


802.11g TEST RESULT

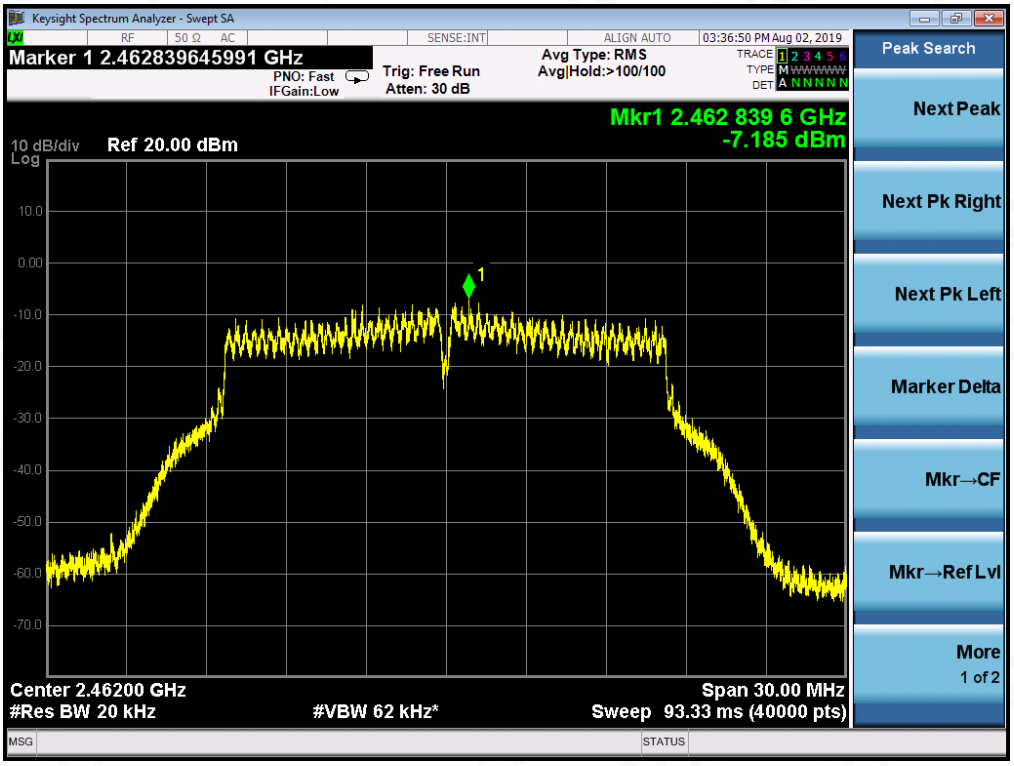
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

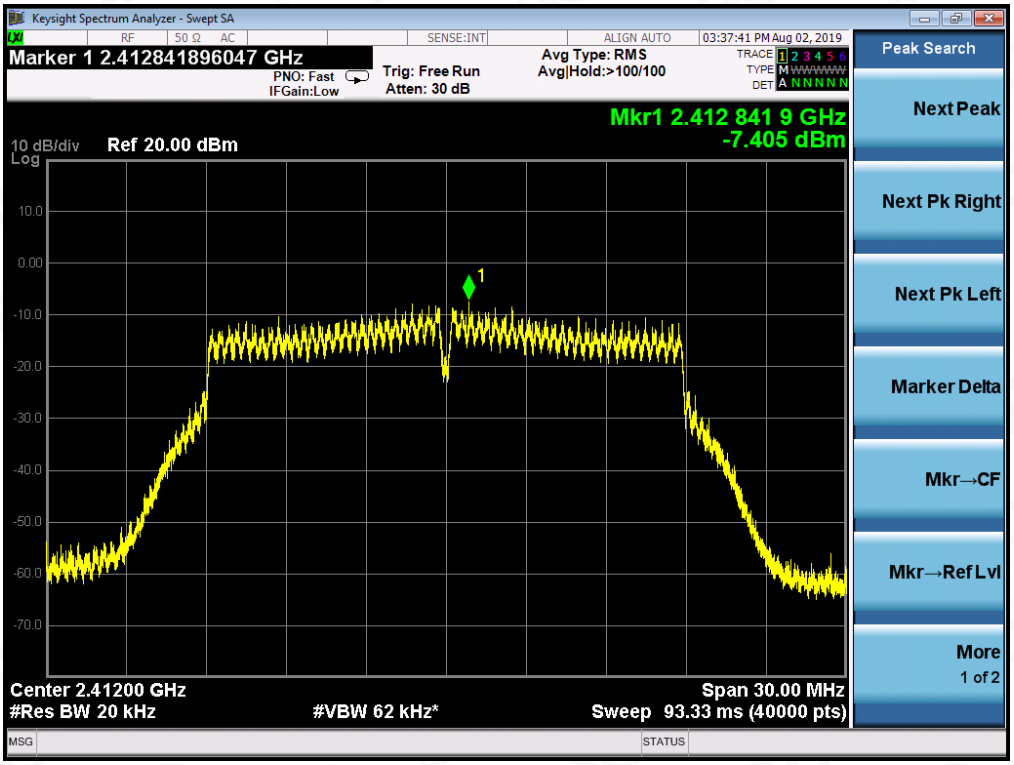


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

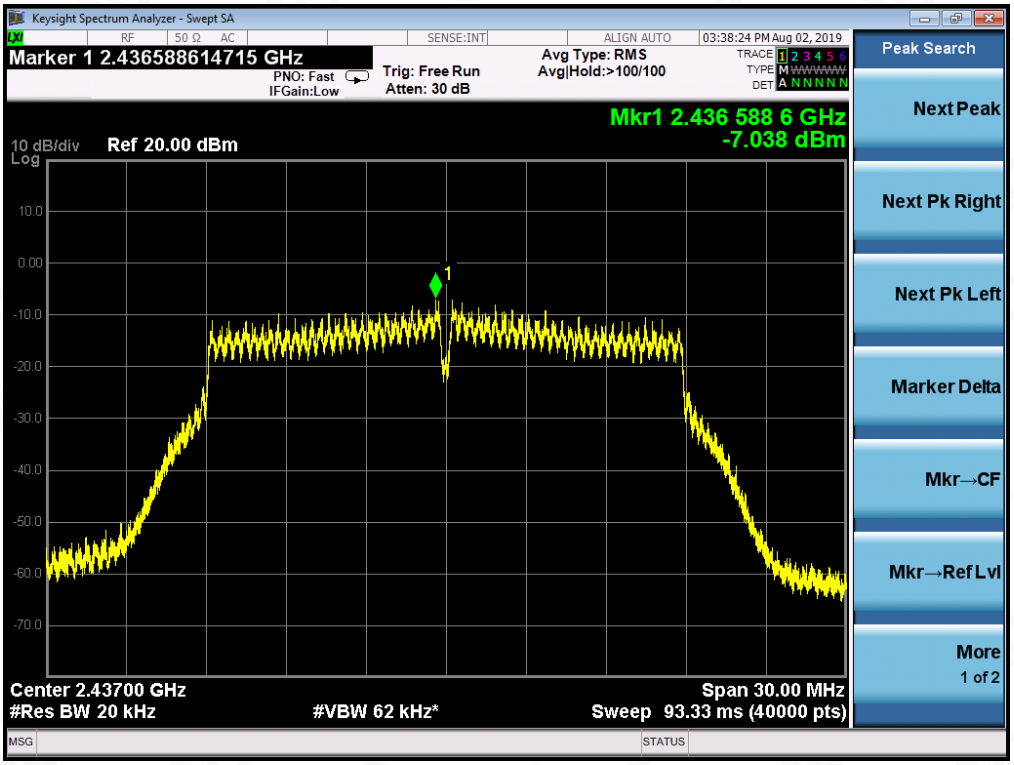


802.11n 20 TEST RESULT

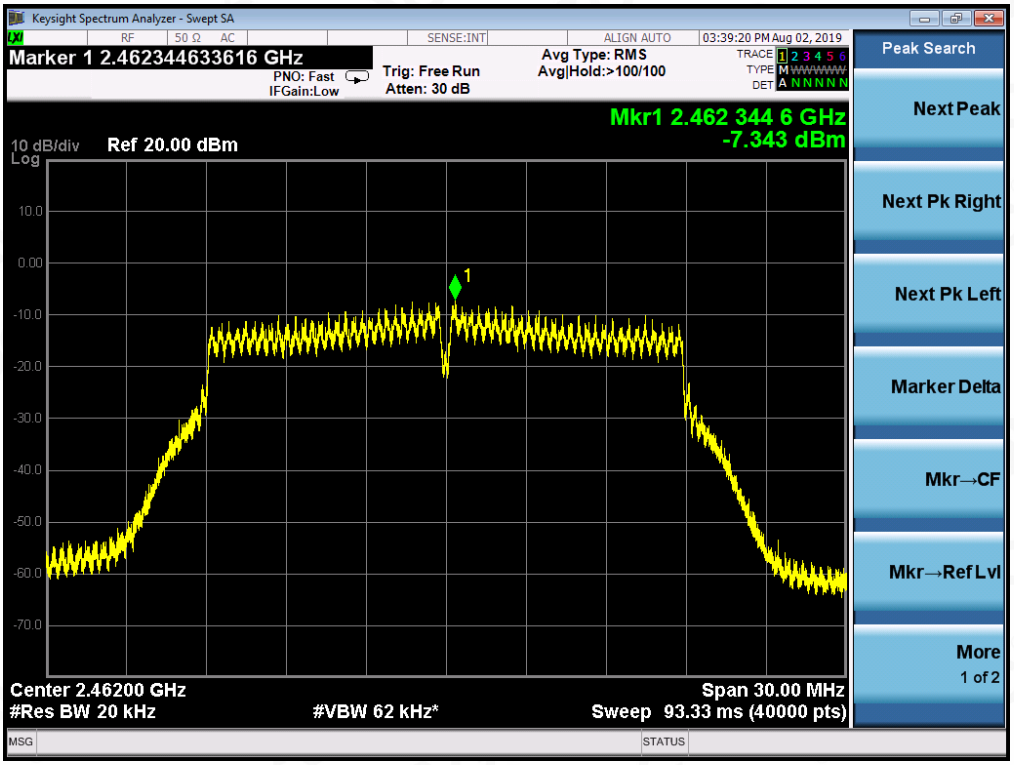
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

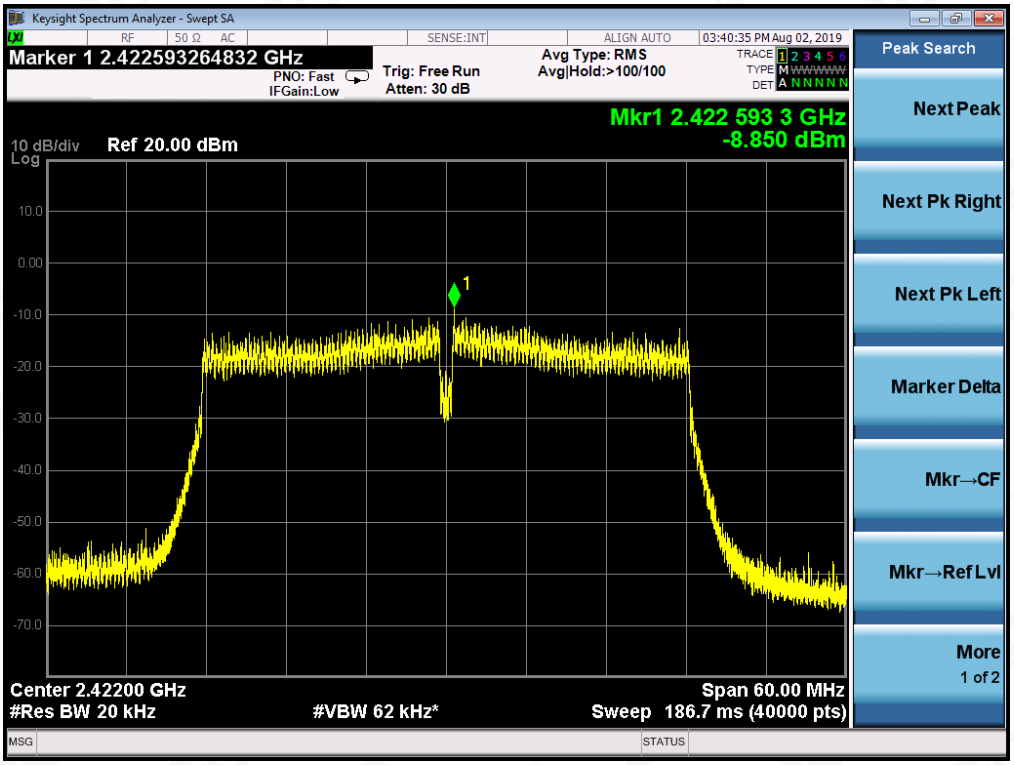


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

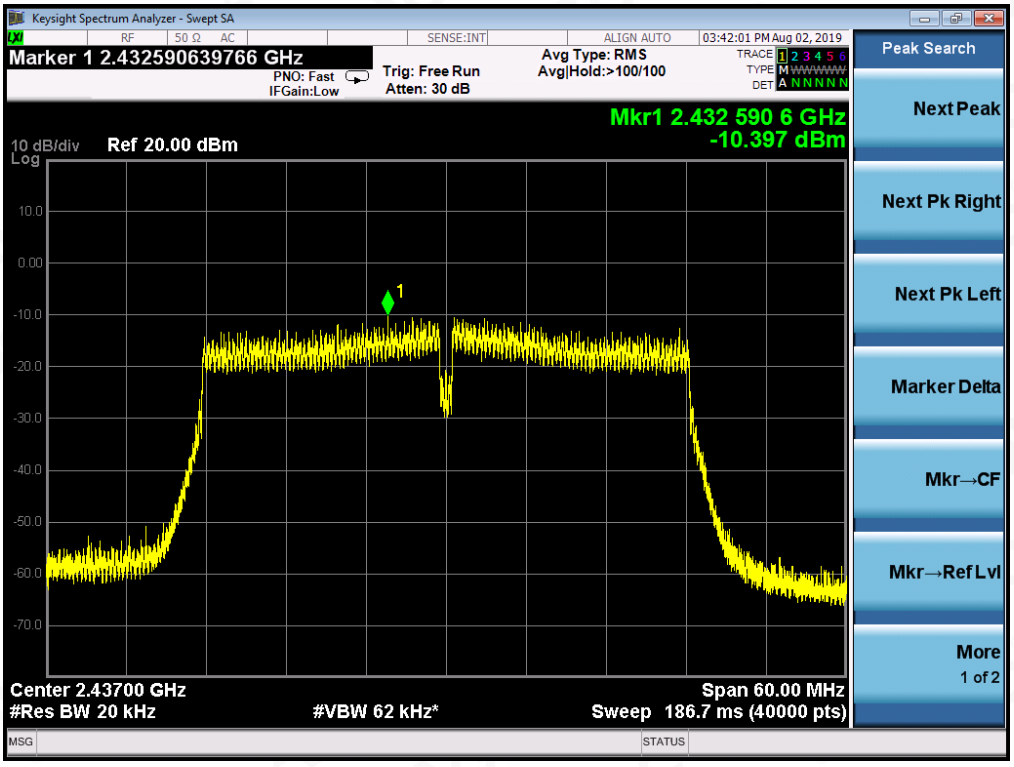


802.11n 40 TEST RESULT

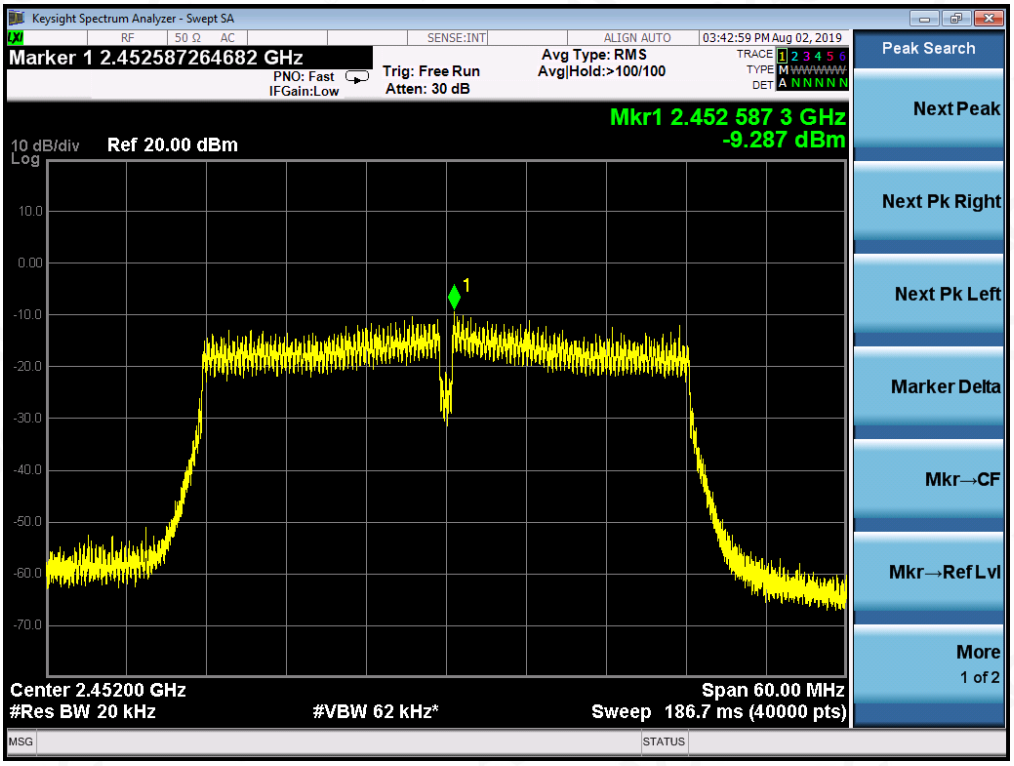
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



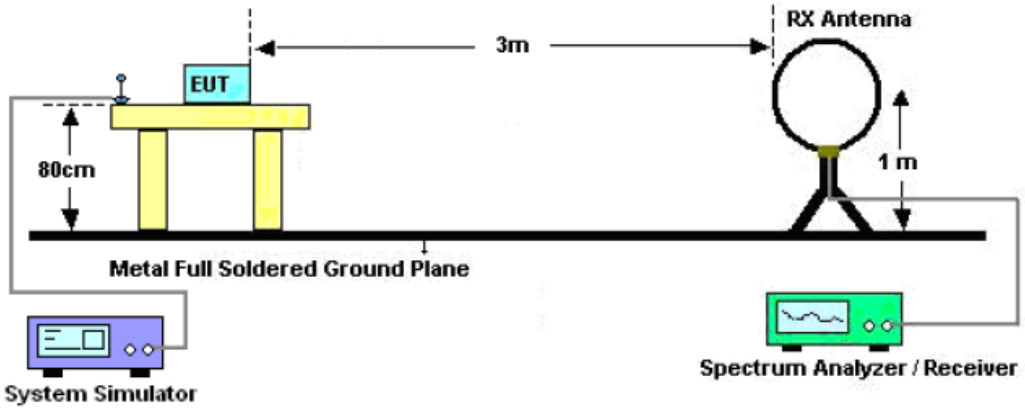
11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

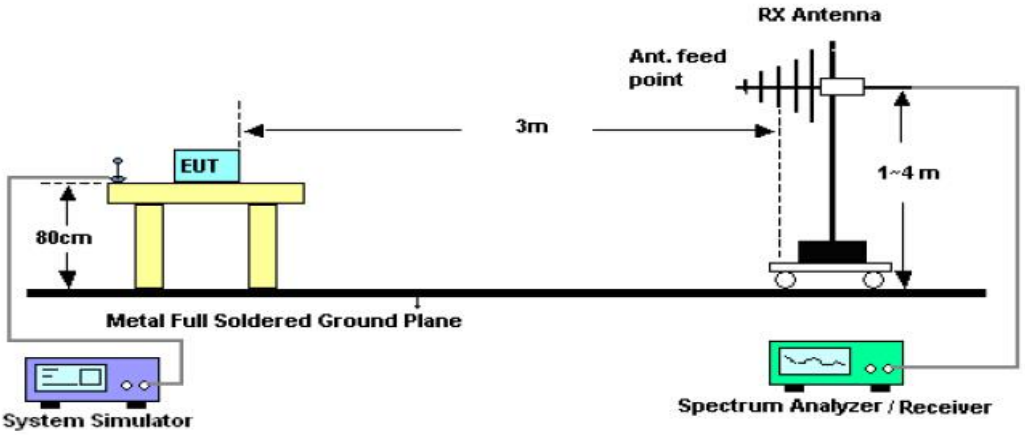
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

11.2. TEST SETUP

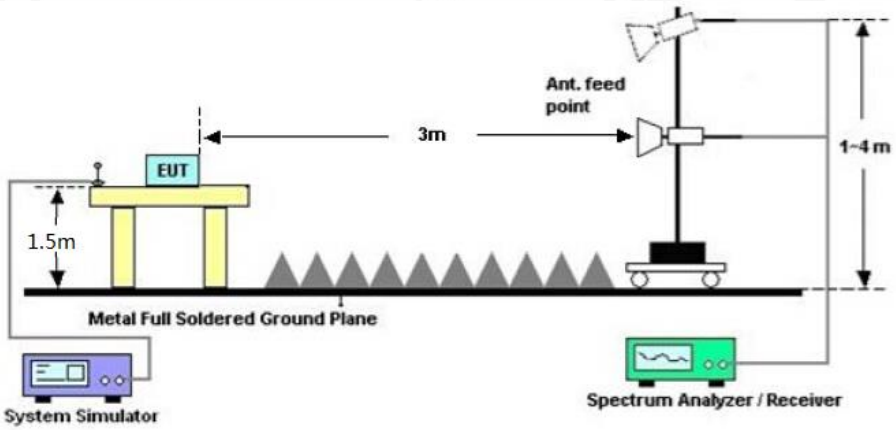
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



11.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

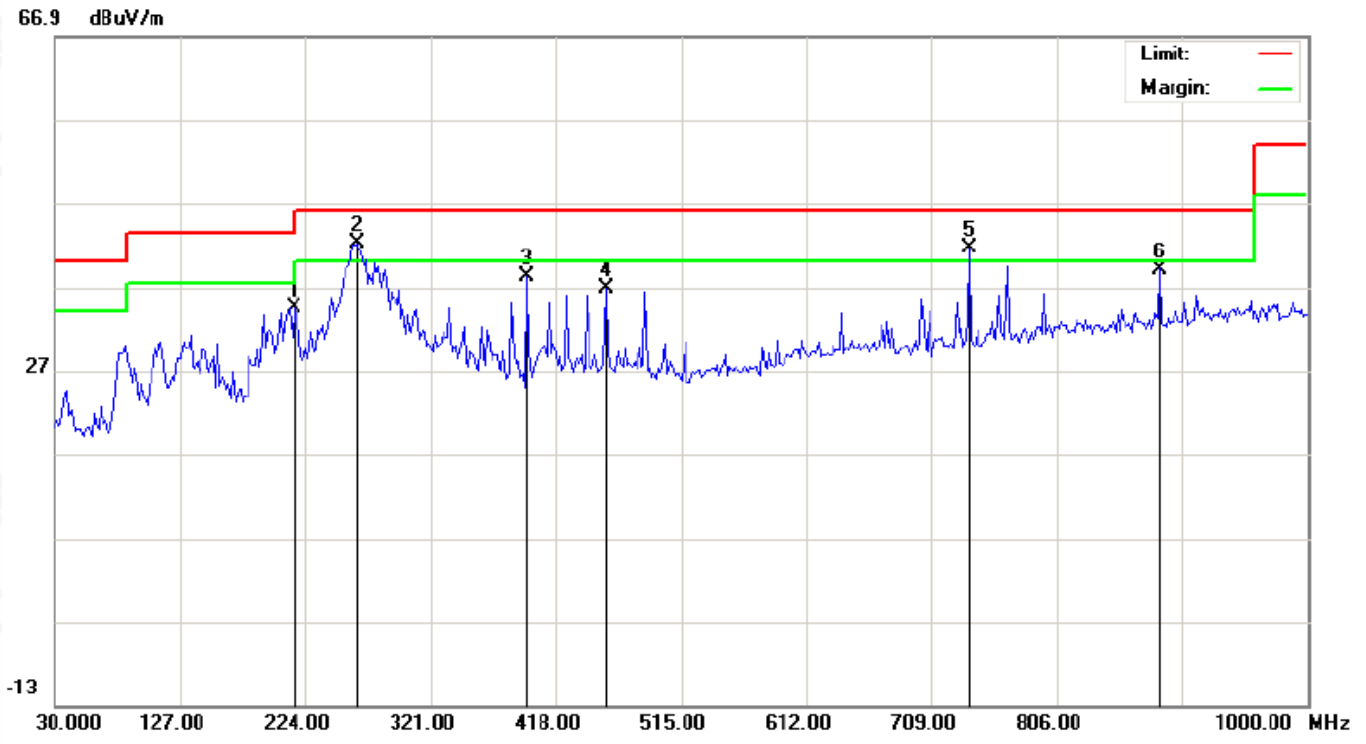
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ

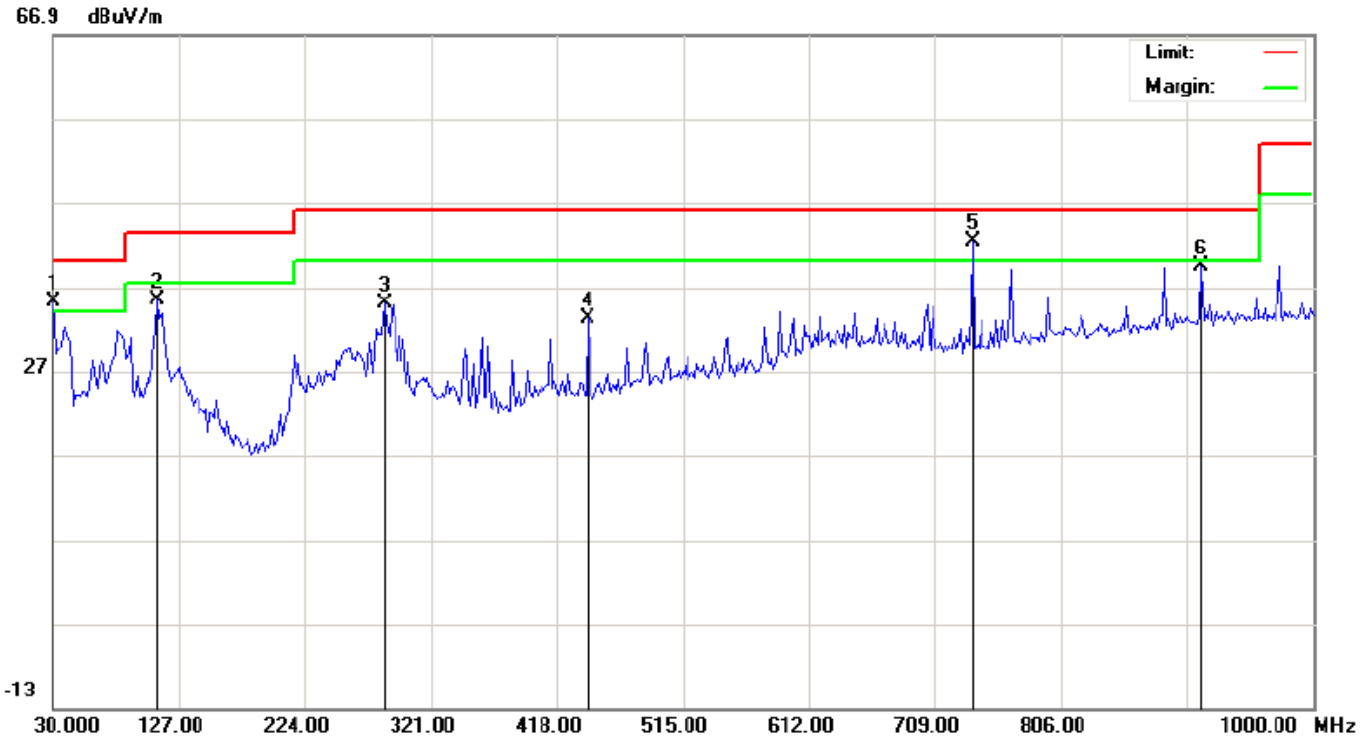
EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		215.9167	17.48	17.00	34.48	43.50	-9.02	peak			
2	*	264.4166	23.57	18.67	42.24	46.00	-3.76	peak			
3		395.3667	15.29	22.82	38.11	46.00	-7.89	peak			
4		456.8000	12.78	24.12	36.90	46.00	-9.10	peak			
5	!	738.1000	12.66	29.01	41.67	46.00	-4.33	peak			
6		885.2167	7.59	31.51	39.10	46.00	-6.90	peak			

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	30.0000	16.99	18.17	35.16	40.00	-4.84	peak			
2		110.8333	18.38	17.07	35.45	43.50	-8.05	peak			
3		285.4333	15.21	19.81	35.02	46.00	-10.98	peak			
4		442.2500	9.38	23.83	33.21	46.00	-12.79	peak			
5	*	738.1000	13.37	29.01	42.38	46.00	-3.62	peak			
6		914.3167	7.56	31.82	39.38	46.00	-6.62	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

RADIATED EMISSION ABOVE 1GHZ

EUT	UZIEN Integrated Plotter	**Model Name**	C210
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.064	51.64	3.72	55.36	74	-18.64	peak
4824.093	42.29	3.72	46.01	54	-7.99	AVG
7236.102	47.11	8.15	55.26	74	-18.74	peak
7236.106	37.68	8.15	45.83	54	-8.17	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	UZIEN Integrated Plotter	**Model Name**	C210
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.073	51.26	3.72	54.98	74	-19.02	peak
4824.11	41.53	3.72	45.25	54	-8.75	AVG
7236.071	47.37	8.15	55.52	74	-18.48	peak
7236.055	36.84	8.15	44.99	54	-9.01	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.063	53.21	3.75	56.96	74	-17.04	peak
4874.045	42.33	3.75	46.08	54	-7.92	AVG
7311.096	48.27	8.16	56.43	74	-17.57	peak
7311.109	36.87	8.16	45.03	54	-8.97	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.062	52.57	3.75	56.32	74	-17.68	peak
4874.022	42.46	3.75	46.21	54	-7.79	AVG
7311.026	48.15	8.16	56.31	74	-17.69	peak
7311.053	37.56	8.16	45.72	54	-8.28	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.063	52.22	3.81	56.03	74	-17.97	peak
4924.04	42.34	3.81	46.15	54	-7.85	AVG
7386.119	46.78	8.19	54.97	74	-19.03	peak
7386.061	37.29	8.19	45.48	54	-8.52	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.023	41.44	3.81	45.25	74	-28.75	peak
4924.051	41.52	3.81	45.33	54	-8.67	AVG
7386.062	48.67	8.19	56.86	74	-17.14	peak
7386.093	38.27	8.19	46.46	54	-7.54	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

Note: Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report.

12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

12.2. TEST SET-UP

same as 11.2

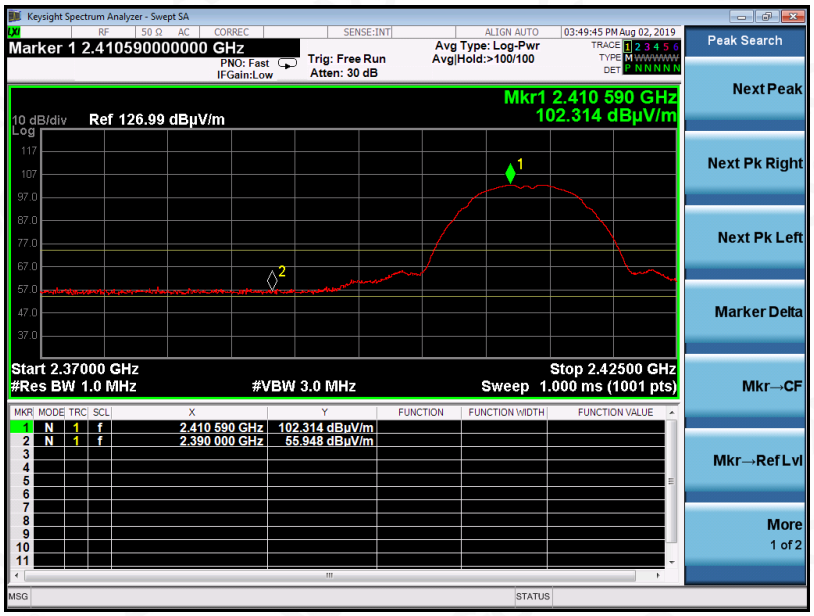
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

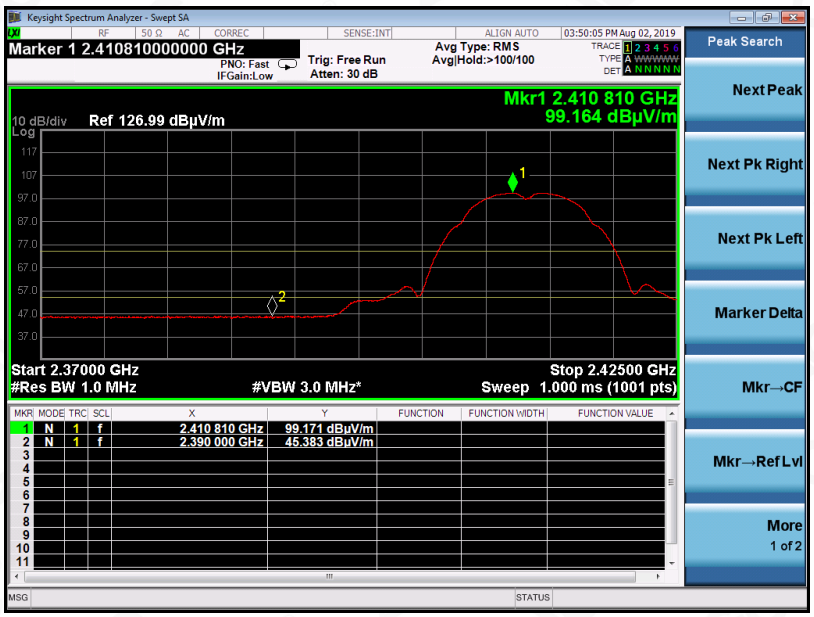
12.3. TEST RESULT

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal

PK



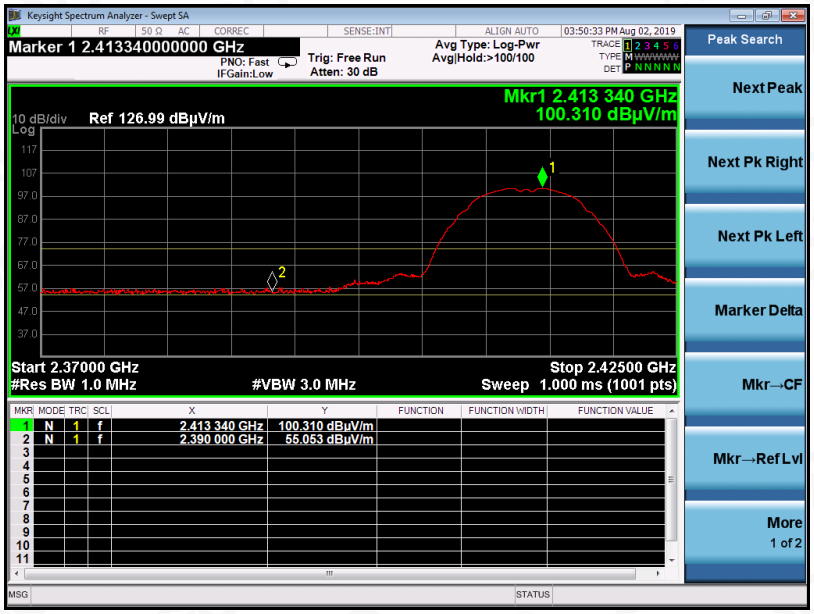
AV



RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Vertical

PK



AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Horizontal

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Vertical

PK

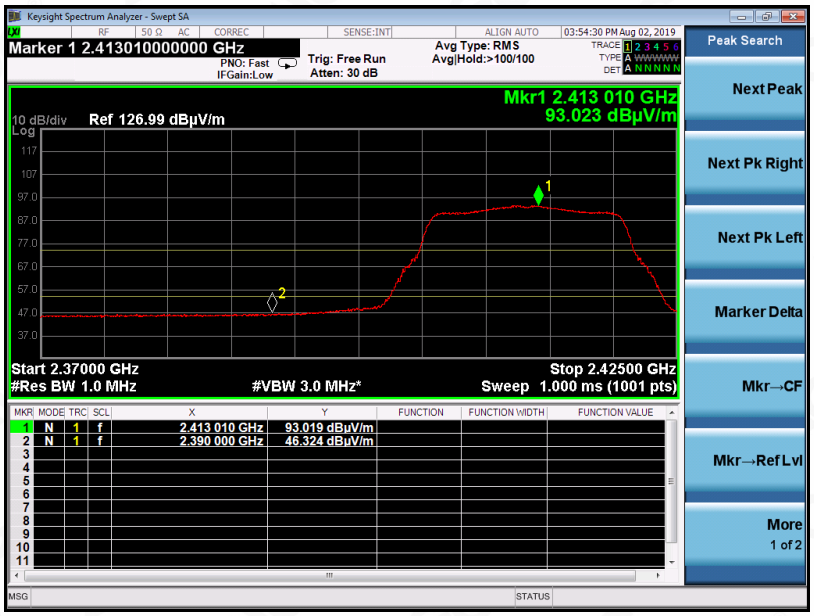
AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Horizontal

PK

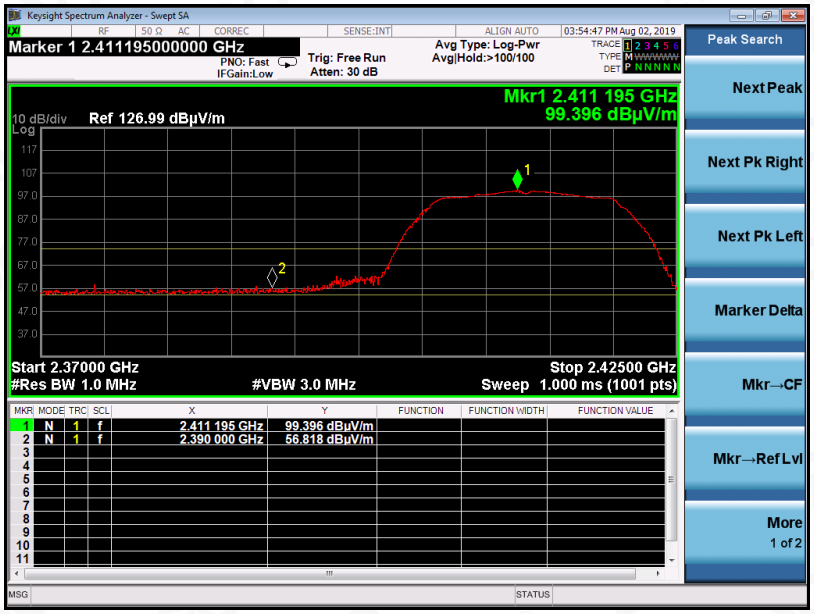
AV



RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Vertical

PK



AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Horizontal

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Vertical

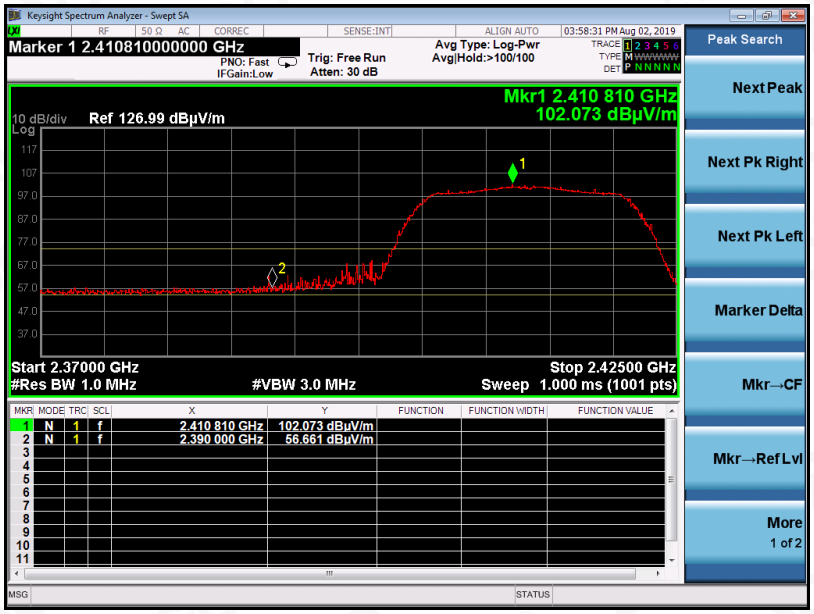
PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Horizontal

PK

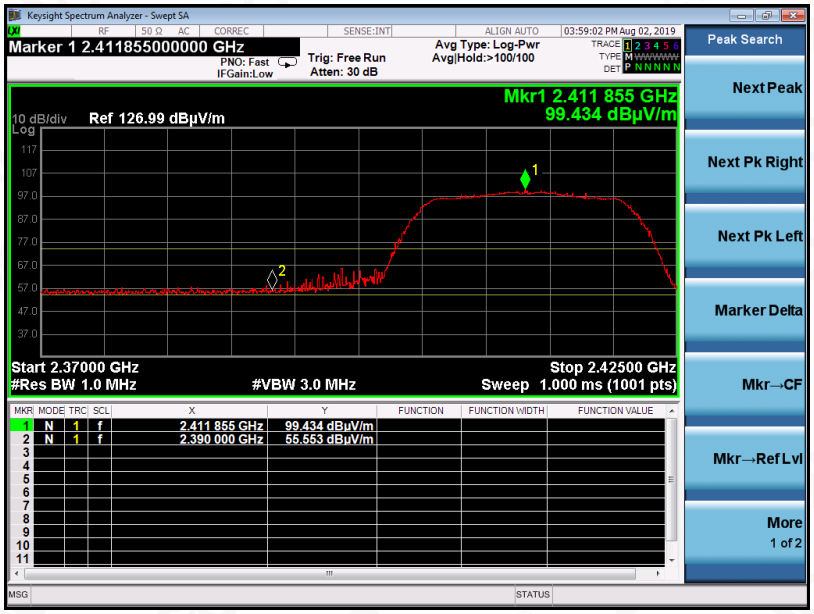


AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Vertical

PK



AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Horizontal

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Vertical

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	Antenna	Horizontal

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	Antenna	Vertical

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40with data rate 13.5 2452MHZ	Antenna	Horizontal

PK

AV

RESULT: PASS

EUT	UZIEN Integrated Plotter	Model Name	C210
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	Antenna	Vertical

PK

AV

RESULT: PASS

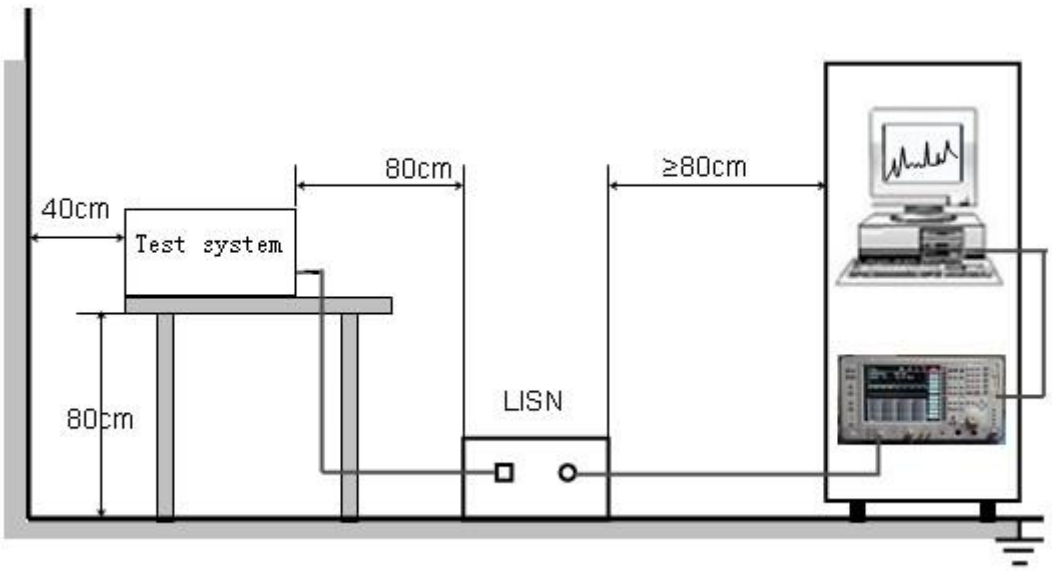
13. FCC LINE CONDUCTED EMISSION TEST

13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

13.2. BLOCK DIAGRAM OF TEST SETUP



13.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

(2) Support equipment, if needed, was placed as per ANSI C63.10.

(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

(4) The EUT received DC 24V power from adapter which received AC120V/60Hz power from a LISN.

(5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

(6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

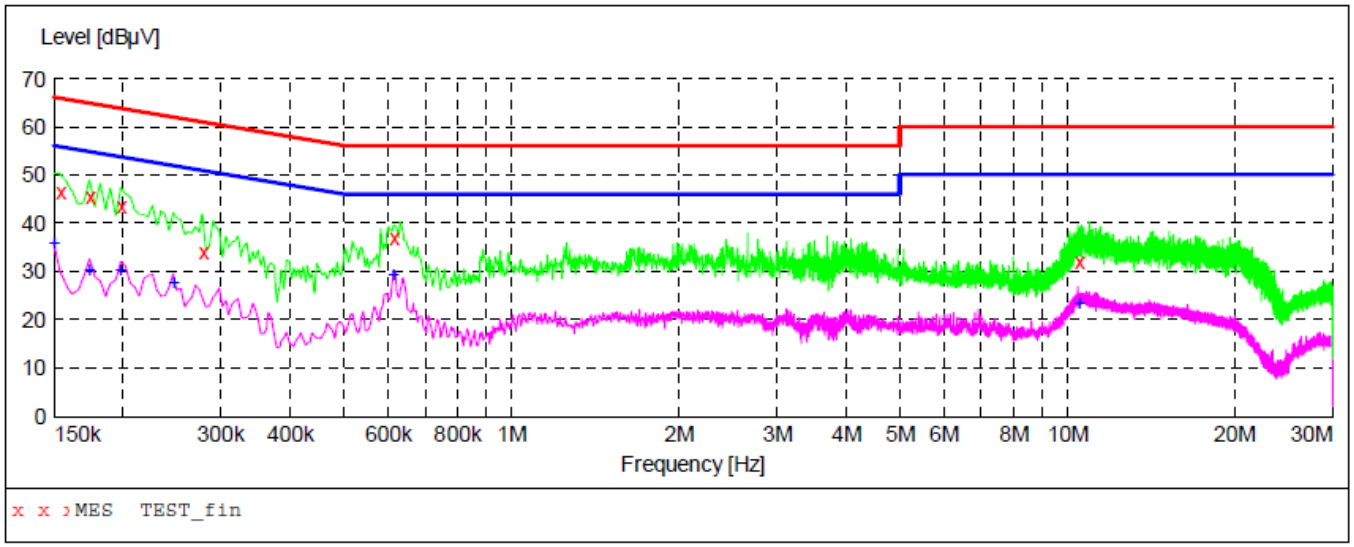
(7) During the above scans, the emissions were maximized by cable manipulation.

(8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.

(9) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

13.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L1（Worst Mode 4）



MEASUREMENT RESULT: "TEST_fin"

9/23/2019 9:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	46.70	10.8	66	19.1	QP	L1	FLO
0.174000	45.30	10.9	65	19.5	QP	L1	FLO
0.198000	43.80	10.9	64	19.9	QP	L1	FLO
0.278000	34.00	10.9	61	26.9	QP	L1	FLO
0.614000	36.90	10.7	56	19.1	QP	L1	FLO
10.494000	32.20	11.9	60	27.8	QP	L1	FLO

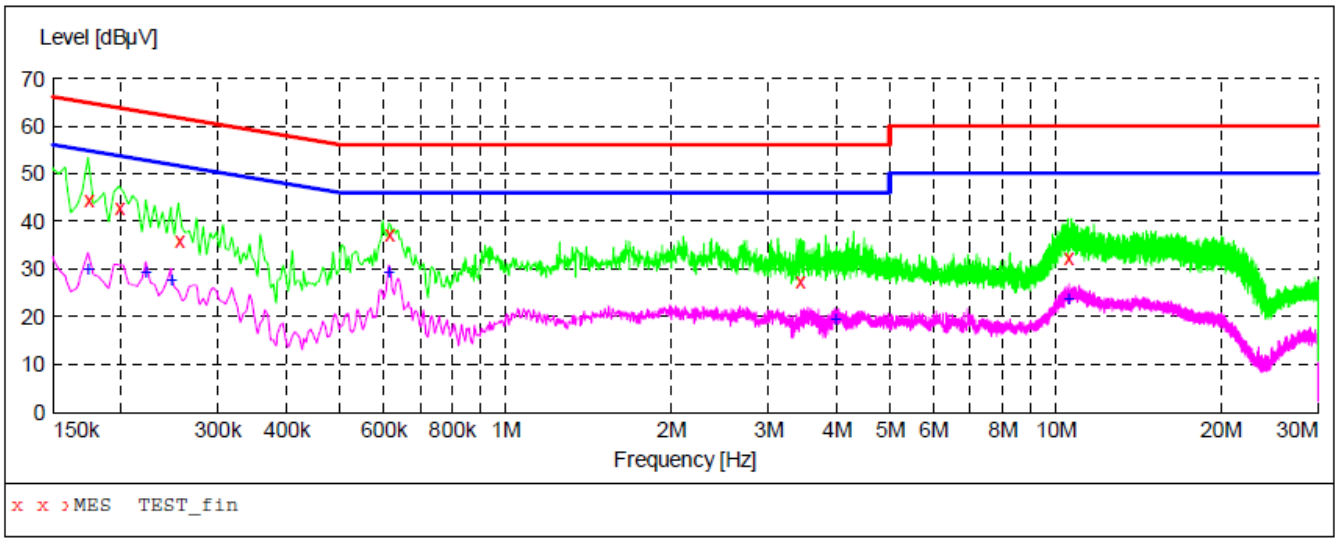
MEASUREMENT RESULT: "TEST_fin2"

9/23/2019 9:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	36.00	10.8	56	20.0	AV	L1	FLO
0.174000	30.40	10.9	55	24.4	AV	L1	FLO
0.198000	30.30	10.9	54	23.4	AV	L1	FLO
0.246000	27.90	10.9	52	24.0	AV	L1	FLO
0.614000	29.40	10.7	46	16.6	AV	L1	FLO
10.498000	23.70	11.9	50	26.3	AV	L1	FLO

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N（Worst Mode 4）



MEASUREMENT RESULT: "TEST_fin"

9/23/2019 9:29AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.174000	44.70	10.9	65	20.1	QP	N	FLO
0.198000	43.10	10.9	64	20.6	QP	N	FLO
0.254000	35.90	10.9	62	25.7	QP	N	FLO
0.614000	37.30	10.7	56	18.7	QP	N	FLO
3.422000	27.50	11.6	56	28.5	QP	N	FLO
10.542000	32.30	11.9	60	27.7	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

9/23/2019 9:29AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.174000	30.10	10.9	55	24.7	AV	N	FLO
0.222000	29.50	10.9	53	23.2	AV	N	FLO
0.246000	27.90	10.9	52	24.0	AV	N	FLO
0.614000	29.30	10.7	46	16.7	AV	N	FLO
3.982000	19.70	11.6	46	26.3	AV	N	FLO
10.542000	23.80	11.9	50	26.2	AV	N	FLO

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ

FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

FCC CONDUCTED EMISSION TEST SETUP

APPENDIX B: PHOTOGRAPHS OF EUT

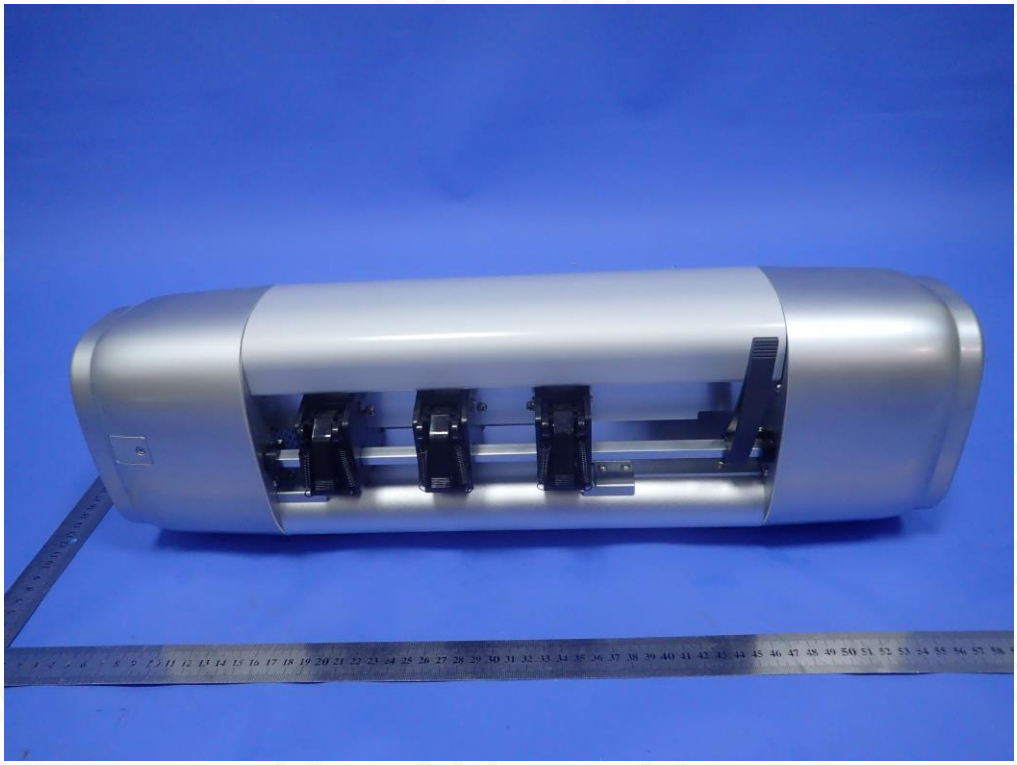
ALL VIEW OF EUT

TOP VIEW OF EUT

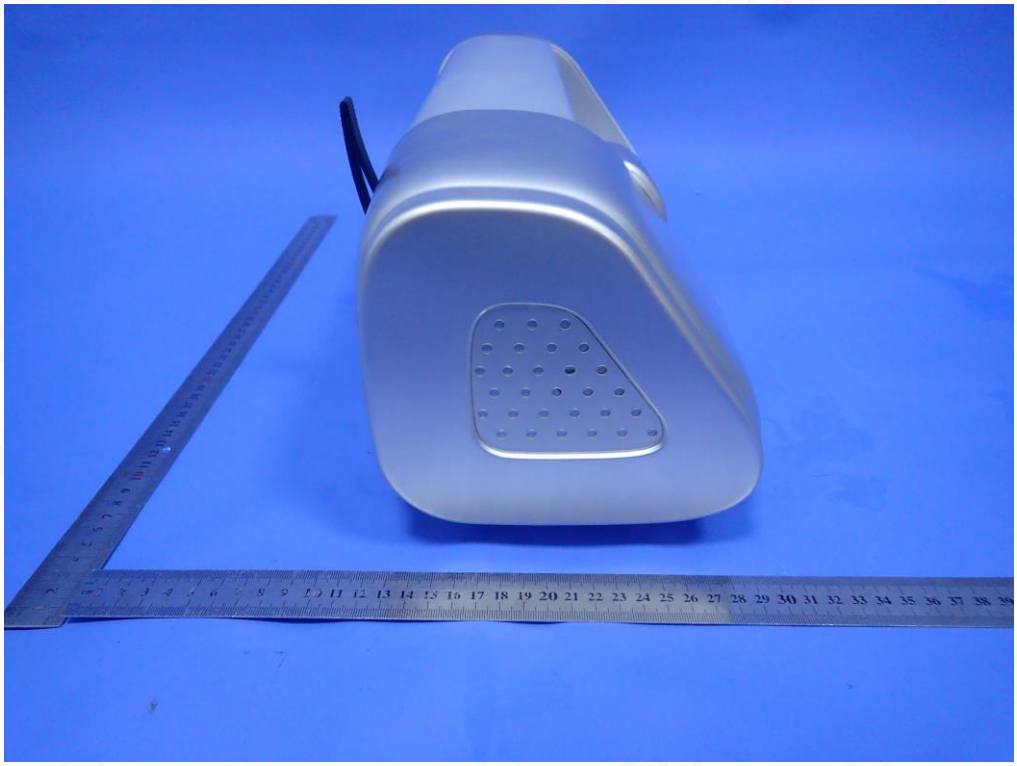
BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

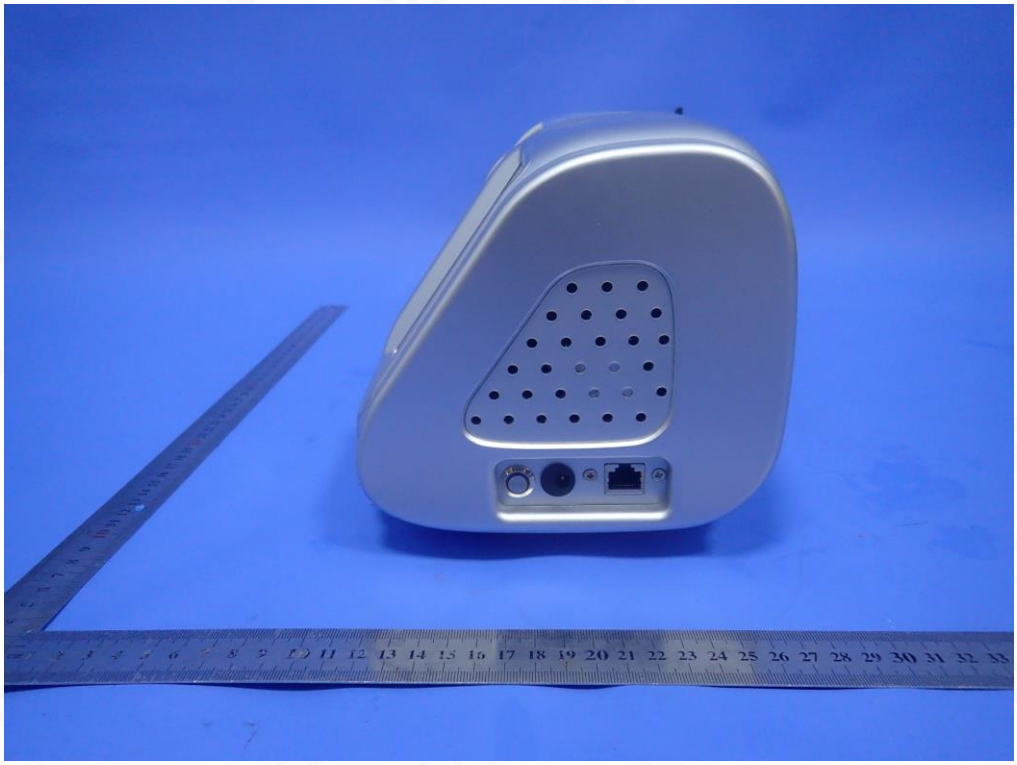
BACK VIEW OF EUT



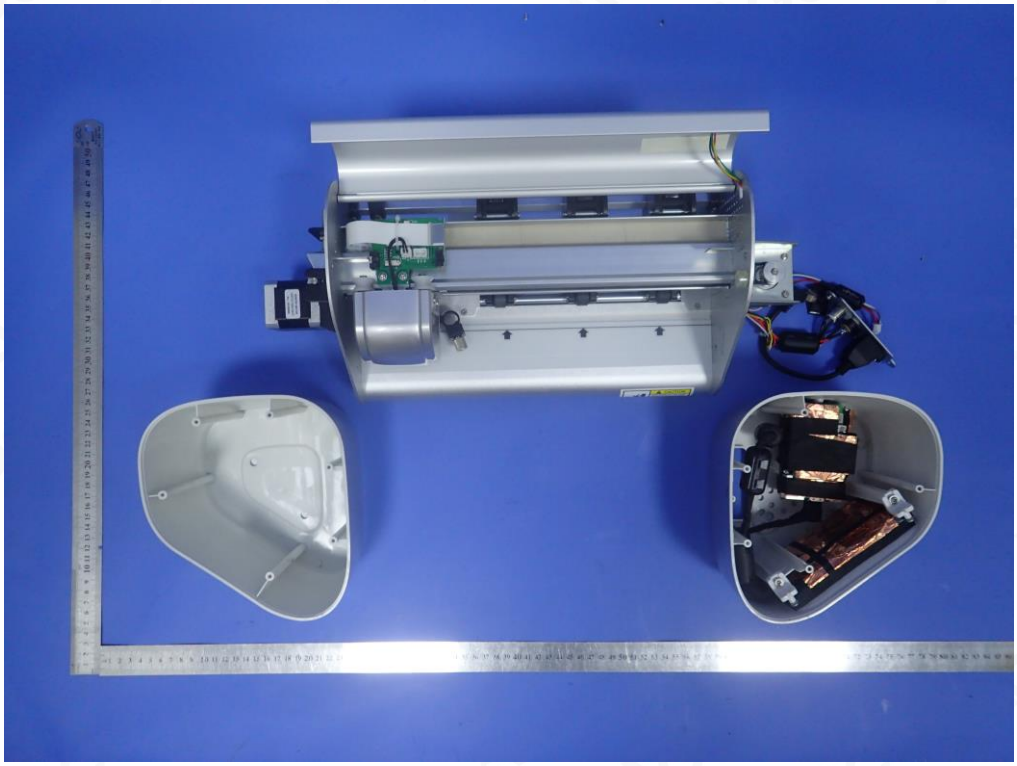
LEFT VIEW OF EUT



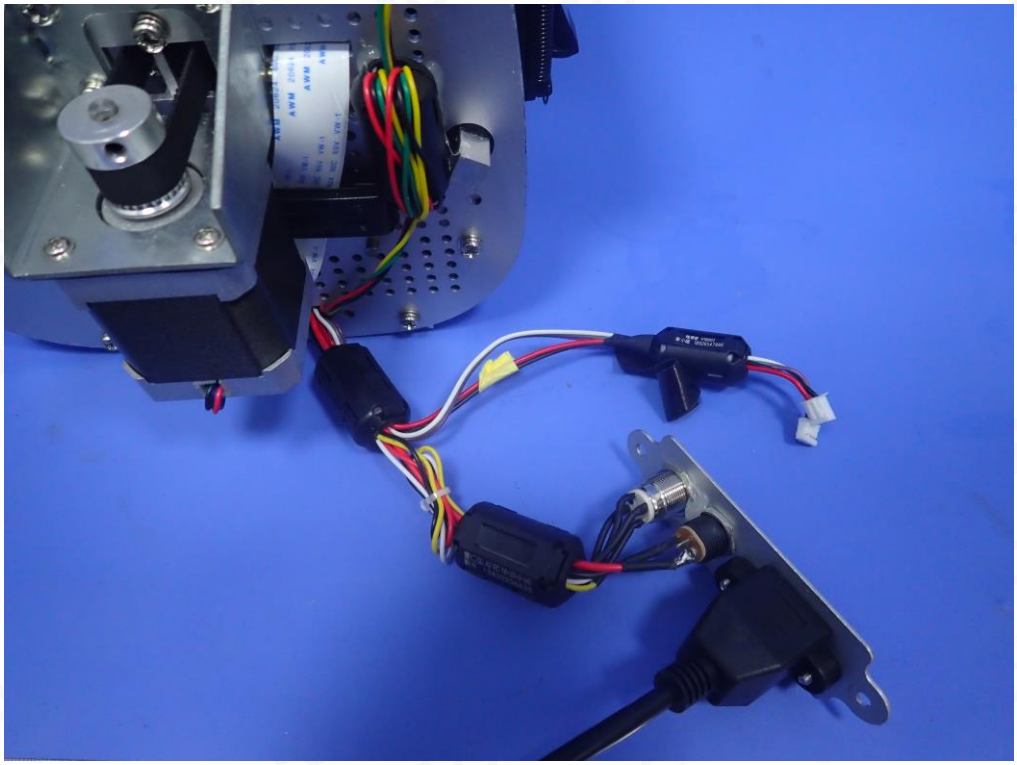
RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1



OPEN VIEW OF EUT-2



OPEN VIEW OF EUT-3