
FCC Test Report

Report No.:AGC00677200302FE04

FCC ID : 2ATS6N4PLUS
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : Smart Phone
BRAND NAME : Win
MODEL NAME : N4+
APPLICNAT : Smartech,C.A..
DATE OF ISSUE : Apr. 29, 2020
STANDARD(S) : FCC Part 15.247
TEST PROCEDURE(S) : KDB 558074 D01 DTS Meas Guidance v04
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr. 29, 2020	Valid	Initial Release



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1. VERIFICATION OF CONFORMITY

Applicant	Smartech,C.A..
Address	Manongo Avenue with Palma Real Street,C.C. Via Veneto,Milan Level,M32 Local,Manongo Valencia Venezuela
Manufacturer	United Creation Technology Corp.,Ltd
Address	Room 201, Block A, Science and technology buliding phase-2, Nanhai Road 1057, Shekou, Nanshan district, Shenzh
Factory	Shenzhen Liangyan Technology co., Ltd.
Address	256 xintian avenue, fuhai street, baoan district, shenzhen
Product Designation	Smart Phone
Brand Name	Win
Test Model	N4+
Date of test	Mar. 04, 2020~Apr. 29, 2020
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BGN/RF

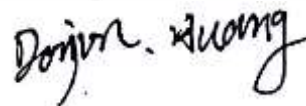
We hereby certify that:

The above equipment was tested by Attestation of Global Compliance(Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

The test results of this report relate only to the tested sample identified in this report.

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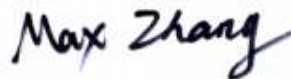
Prepared By



Donjon Huang
(Project Engineer)

Apr. 29, 2020

Reviewed By



Max Zhang
(Reviewer)

Apr. 29, 2020

Approved By



Forrest Lei
(Authorized Officer)

Apr. 29, 2020



2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “Smart Phone”. It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.412 GHz~2.462GHz
Output Power	IEEE 802.11b: 13.53 dBm, IEEE 802.11g: 10.80 dBm; IEEE 802.11n(20): 9.74 dBm, IEEE 802.11n(40): 9.45 dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11 Channels (IEEE802.11b/g/n20)& 7 Channels (IEEE802.11n40)
Hardware Version	JY8121_MB_V1
Software Version	Win_N4plus_V01_20200423_user
Antenna Designation	PIFA Antenna(Comply with requirements of the FCC part 15.203)
Antenna Gain	0dBi
Power Supply	DC 3.7V by Built-in Li-ion Battery

2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
	6	2437 MHZ
	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11
For 802.11n 40MHZ bandwidth system use Channel 3 to Channel 9.

2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Data rate(Mbps)			
					800nsGI		20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
					20MHz	40MHz						
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5		
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0		
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5		
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0		
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0		
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0		
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5		
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0		

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ATS6N4PLUS** filing to comply with the FCC Part 15 requirements.



2.5. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.247 rules KDB 558074 D01 DTS Meas Guidance v05.

2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



3. MEASUREMENT UNCERTAINTY

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating
<p>Note: Transmit by 802.11b with Data rate (1/2/5.5/11) Transmit by 802.11g with Data rate (6/9/12/18/24/36/48/54) Transmit by 802.11n (20MHz) with Data rate (6.5/13/19.5/26/39/52/58.5/65) Transmit by 802.11n (40MHz) with Data rate (13.5/27/40.5/54/81/108/121.5/135)</p>	

Note:

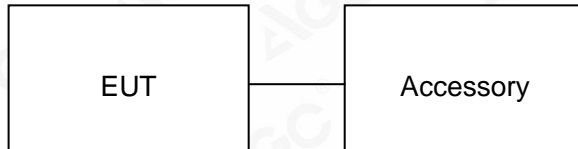
1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the eut is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.



5 SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart Phone	N4+	FCC ID: 2ATS6N4PLUS	EUT
2	Adapter	N4+	DC 5.0V 0.5A	AE
3	Battery	N4+	DC 3.7V 1400mAh	AE
4	USB Cable	N/A	N/A	AE
5	Earphone	N/A	N/A	AE

Note: All the accessories have been used during the test in conduction emission test.

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Output Power	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.247	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant



6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2019	Jun. 11, 2020
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020
Test software	R&S	ES-K1 (Ver V1.71)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2019	Jun. 11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 18, 2019	Dec. 17, 2020
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 12, 2019	Jun. 11, 2020
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2019	Jun. 11, 2020
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 14, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE	N/A	N/A	N/A



6. OUTPUT POWER

6.1. MEASUREMENT PROCEDURE

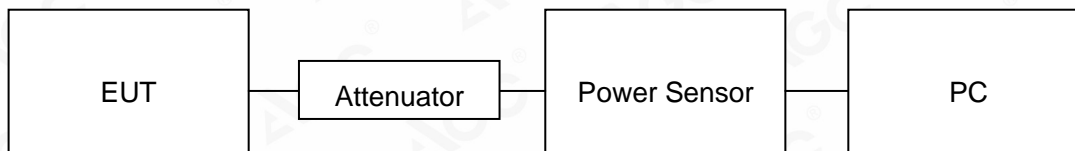
For max average conducted output power test:

1. Connect EUT RF output port to power probe through an RF attenuator.
2. Connect the power probe to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

Note : The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

6.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

AVERAGE POWER SETUP



6.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	OUTPUT POWER
TEST MODE	802.11b with data rate 1

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	12.56	30	Pass
2.437	13.50	30	Pass
2.462	13.53	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11g with data rate 6

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	10.15	30	Pass
2.437	10.79	30	Pass
2.462	10.80	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 20 with data rate 6.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	9.30	30	Pass
2.437	9.27	30	Pass
2.462	9.74	30	Pass



TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 40 with data rate 13.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	9.18	30	Pass
2.437	9.45	30	Pass
2.452	9.22	30	Pass



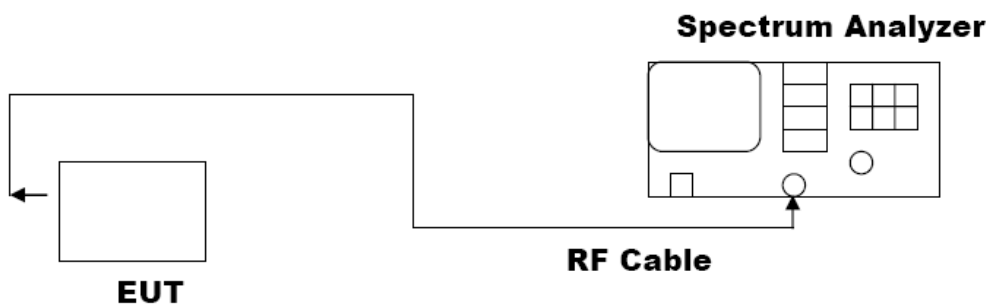
7. 6dB BANDWIDTH

7.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW \geq 3 \times RBW.
4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

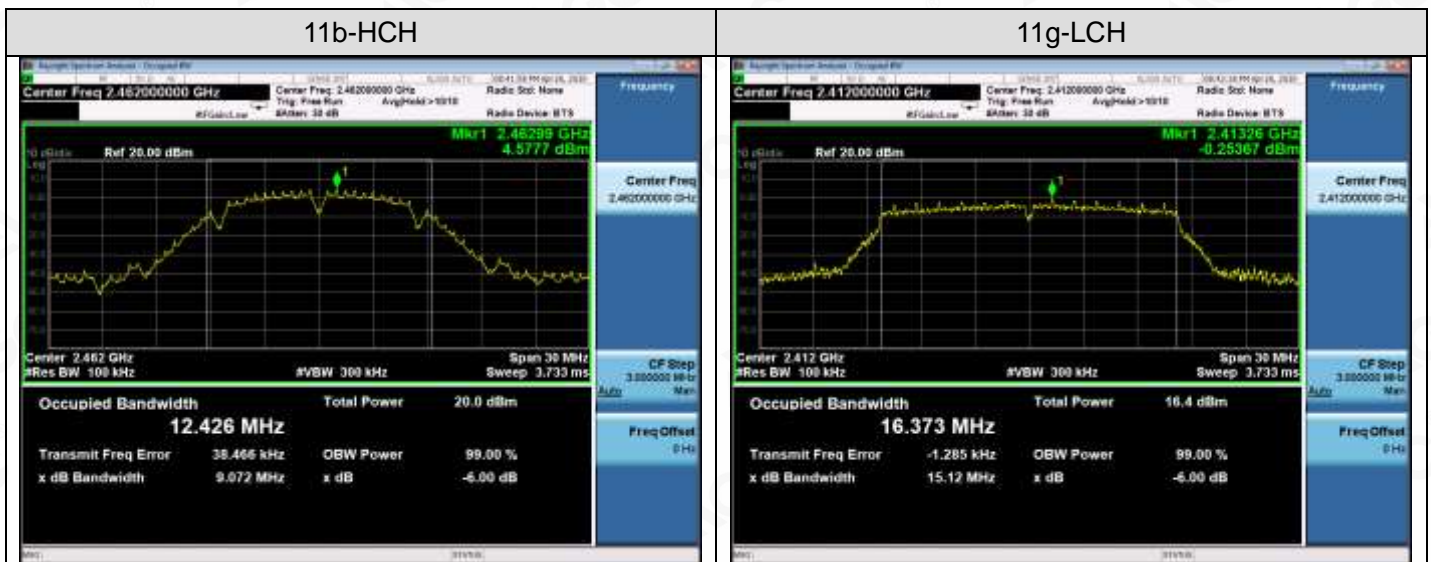
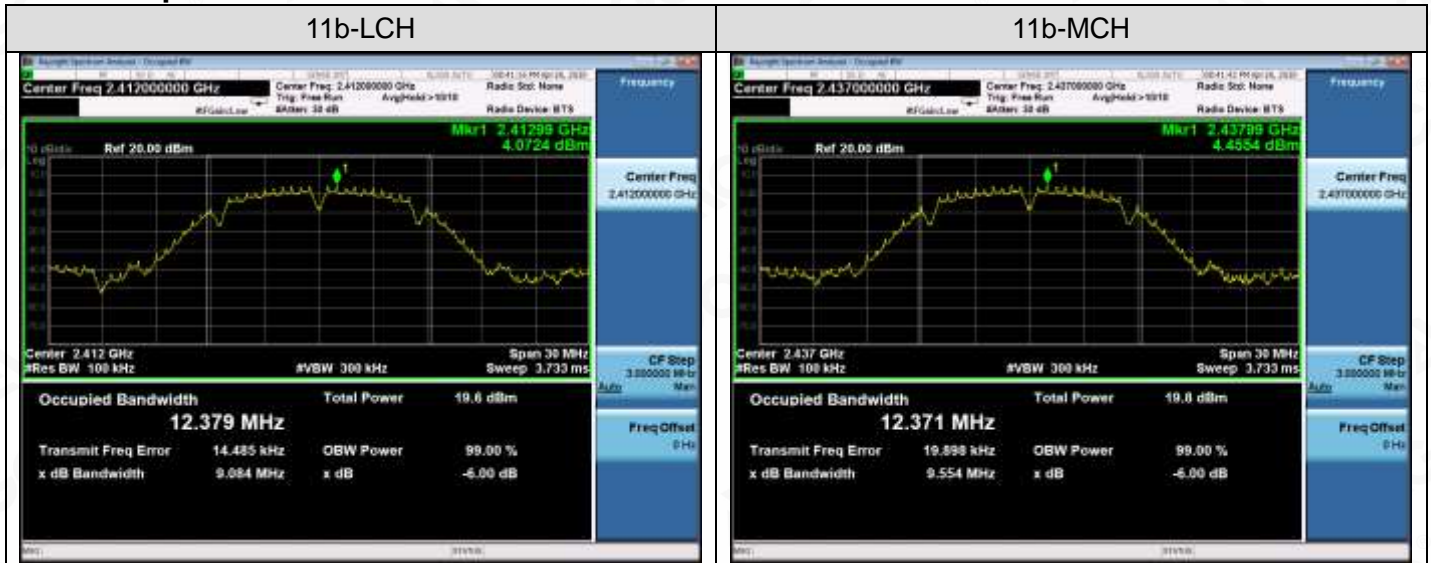


7.3. LIMITS AND MEASUREMENT RESULTS

Mode	Channel	6dB Bandwidth [MHz]	Verdict
11b	LCH	9.084	PASS
	MCH	9.554	PASS
	HCH	9.072	PASS
11g	LCH	15.12	PASS
	MCH	15.12	PASS
	HCH	15.44	PASS
11nHT20	LCH	15.45	PASS
	MCH	15.13	PASS
	HCH	15.14	PASS
11nHT40	LCH	35.16	PASS
	MCH	35.17	PASS
	HCH	35.16	PASS

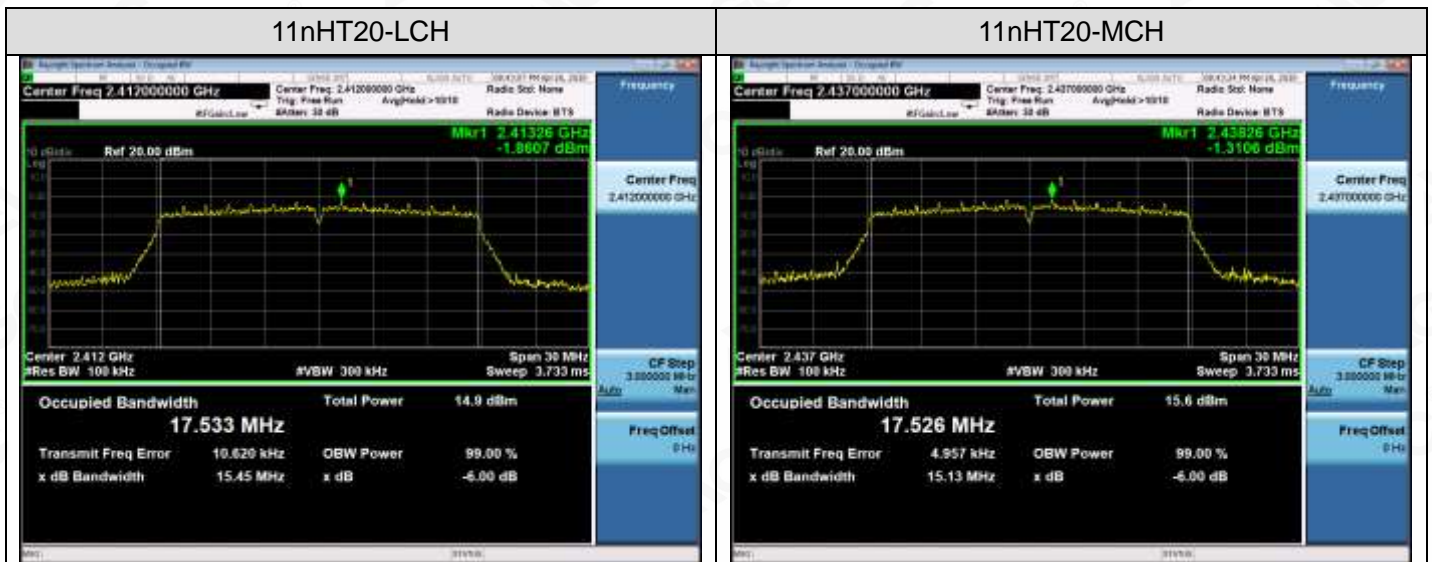
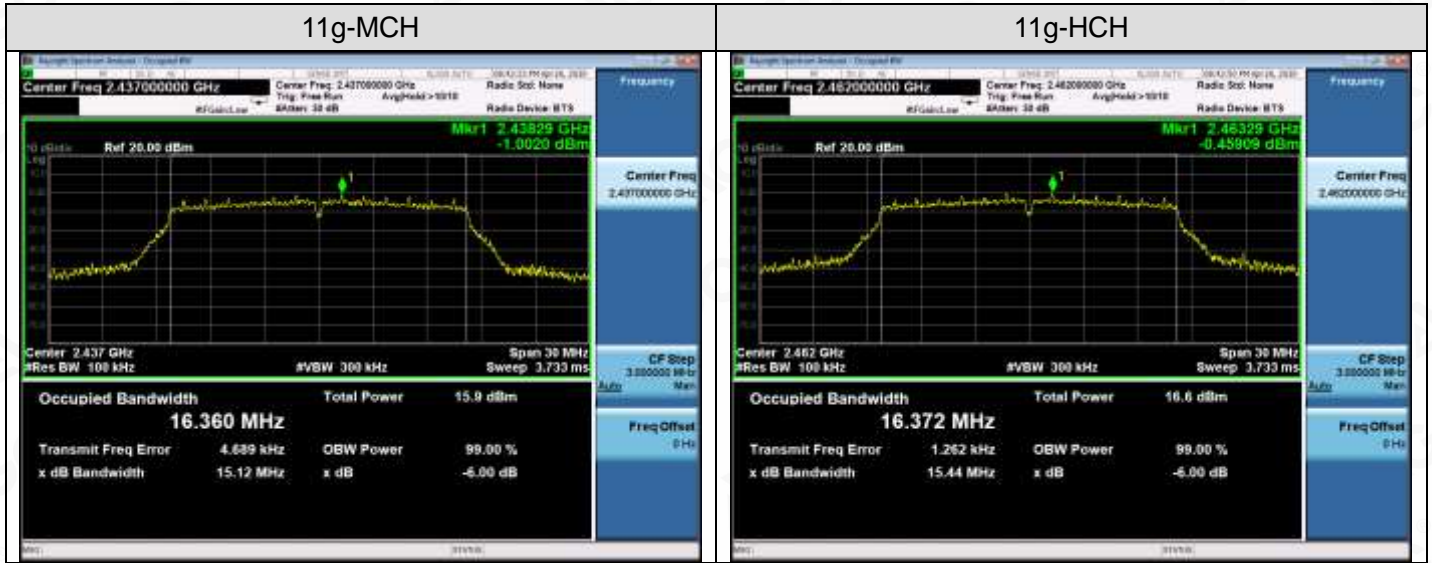


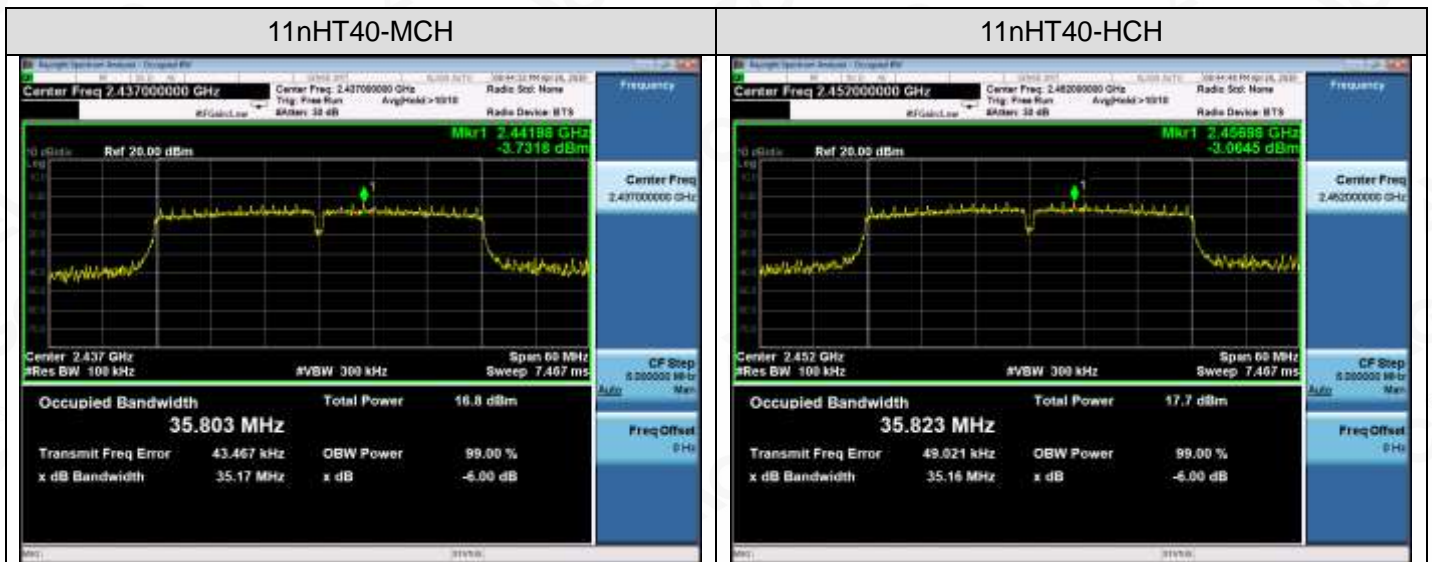
Test Graph



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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW > RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW > RBW) are conform to the requirement.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

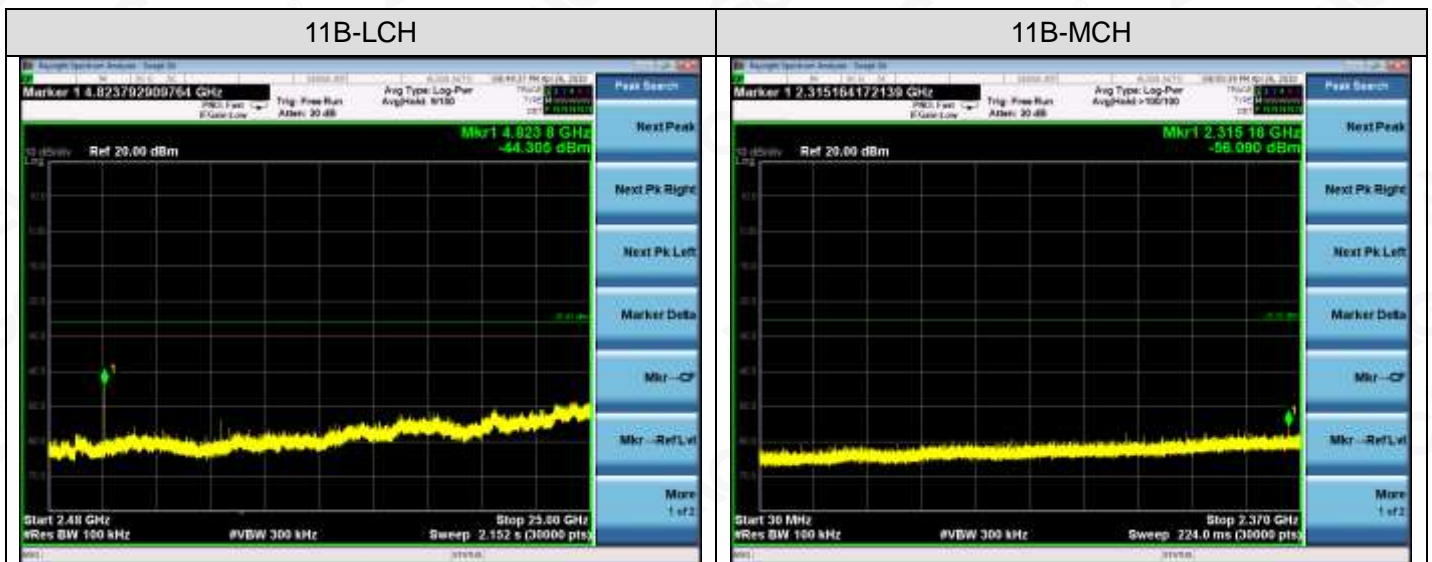
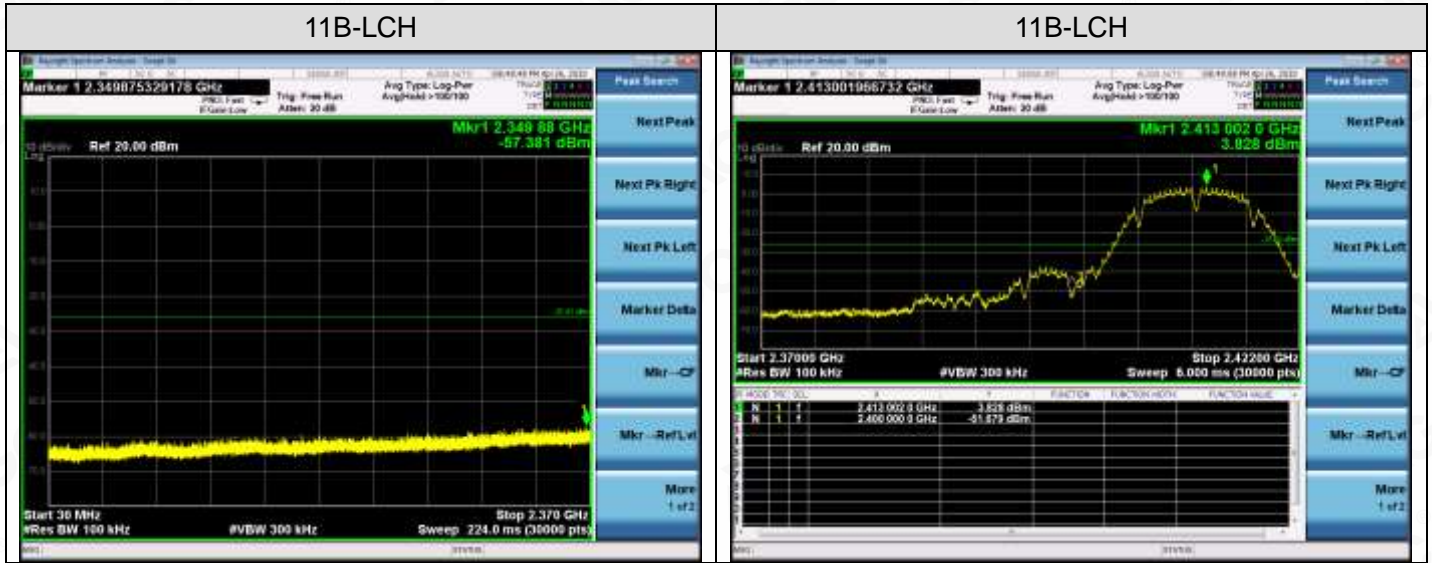


9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
<p>In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.</p> <p>In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))</p>	Refer Test Graph	PASS

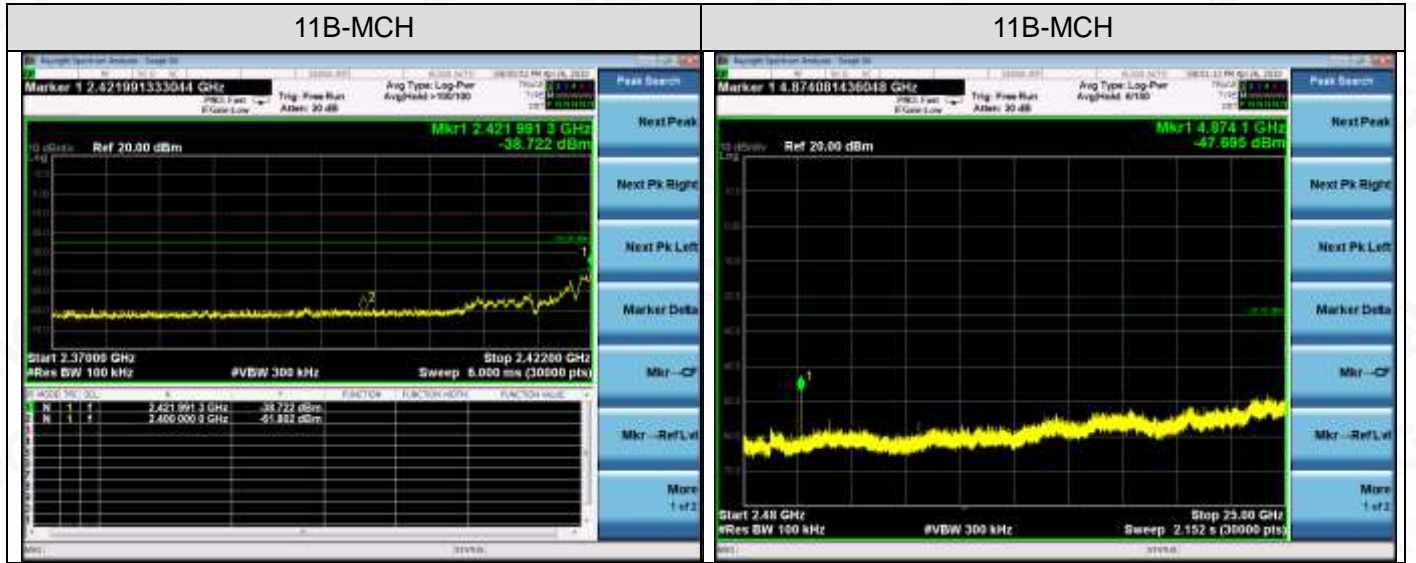


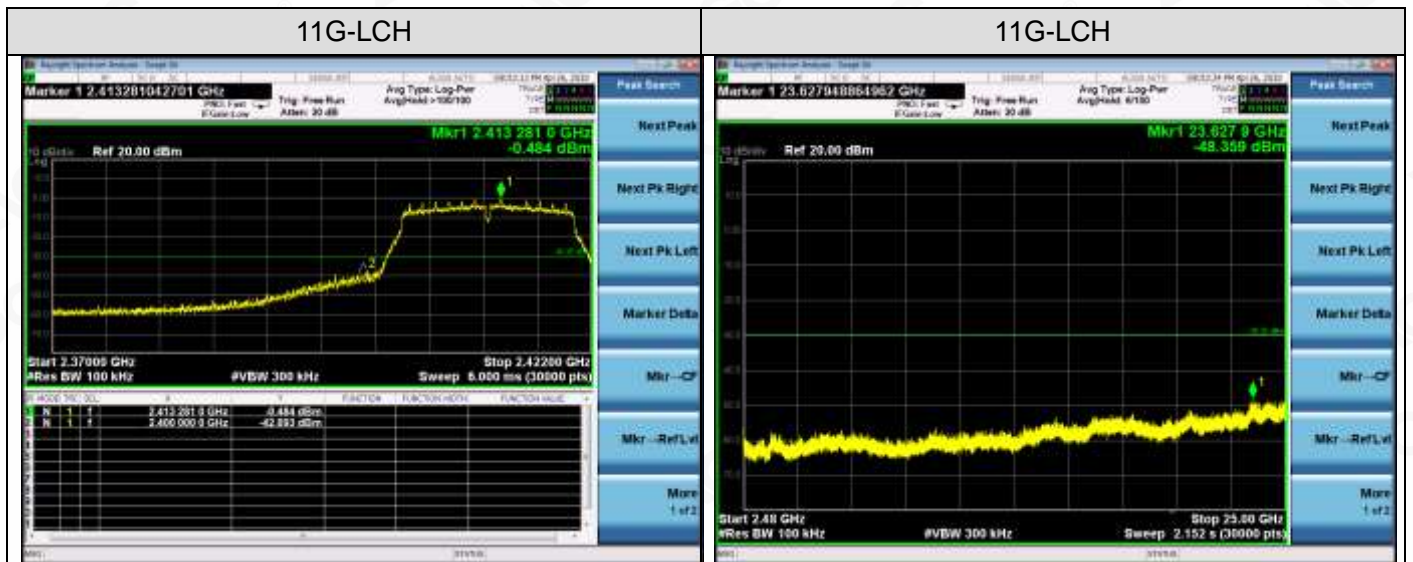
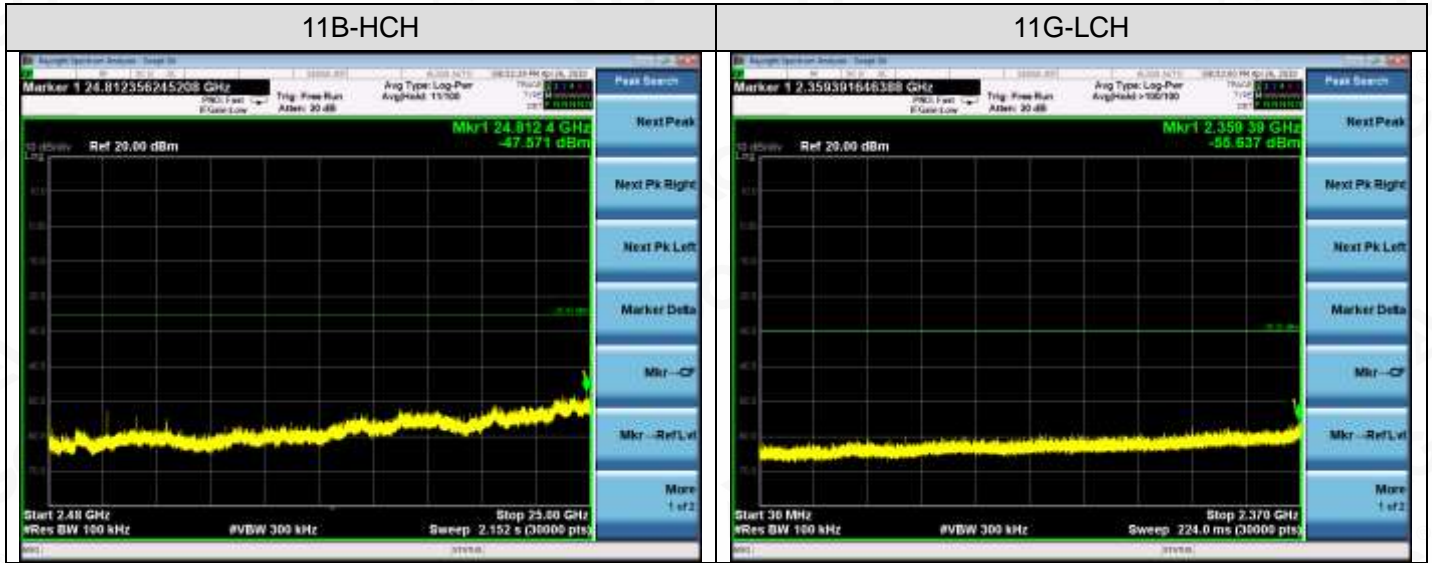
Test Graph



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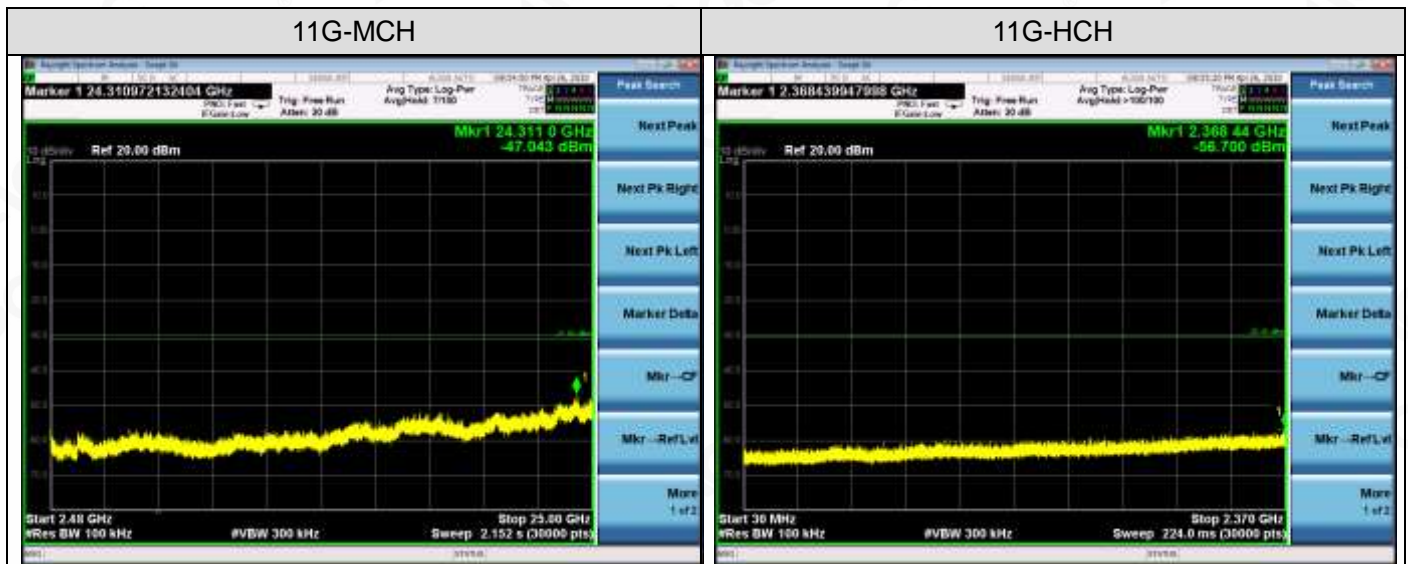
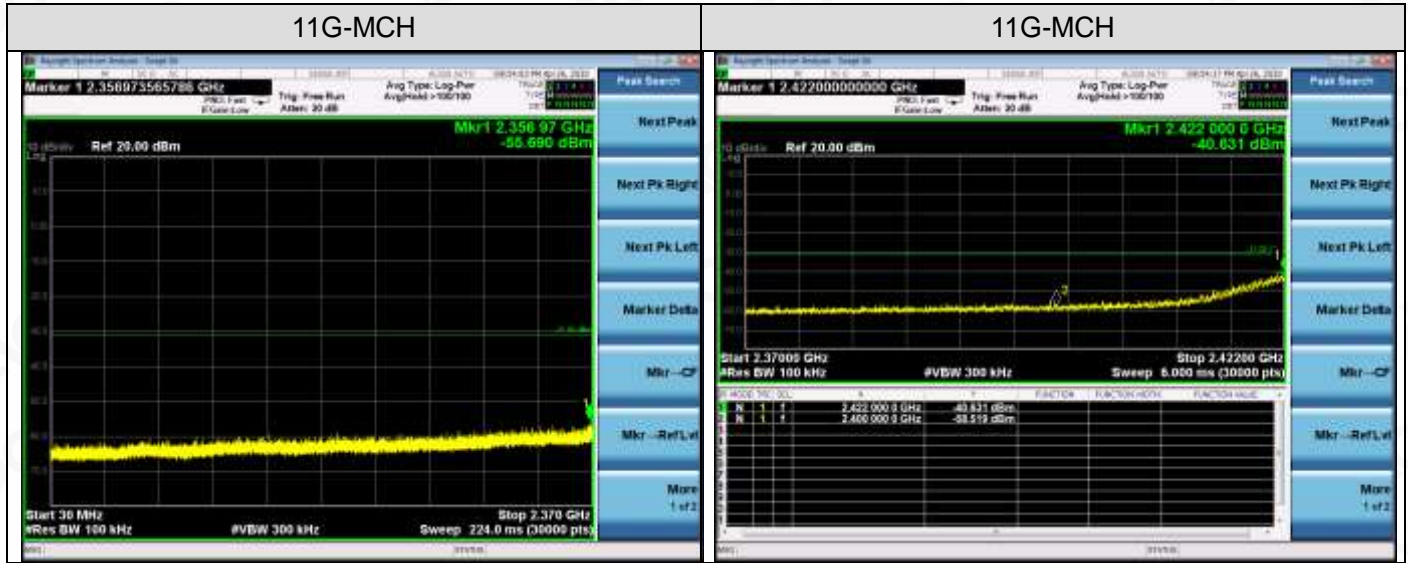
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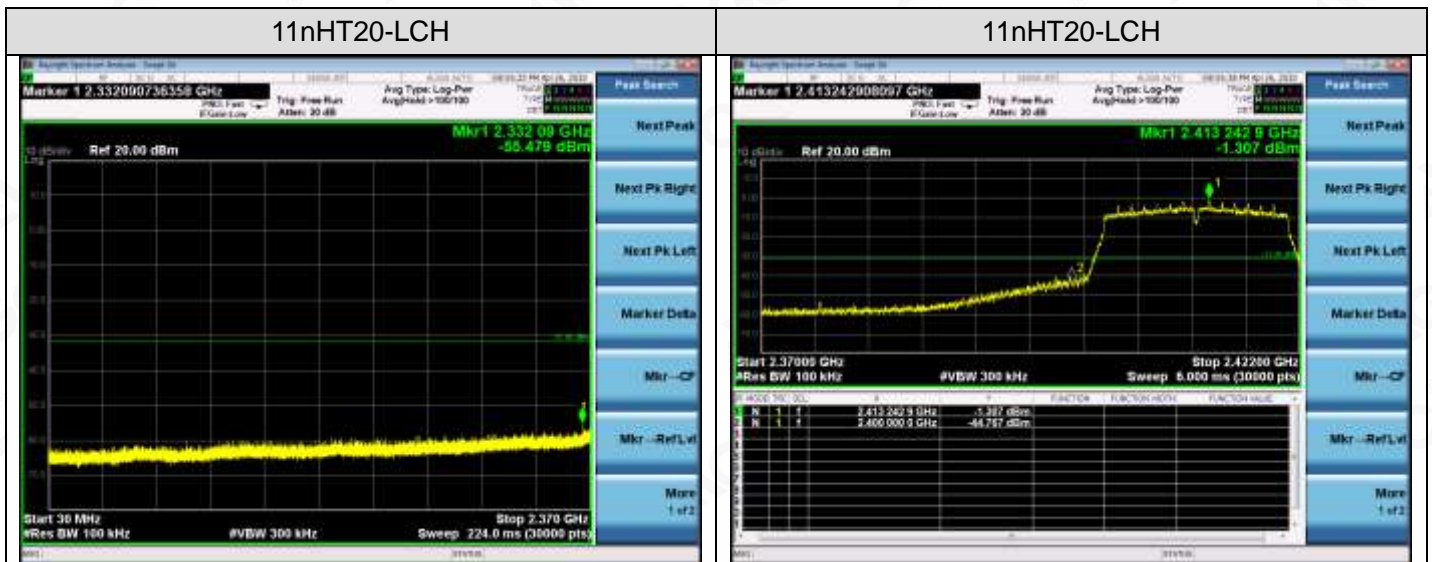
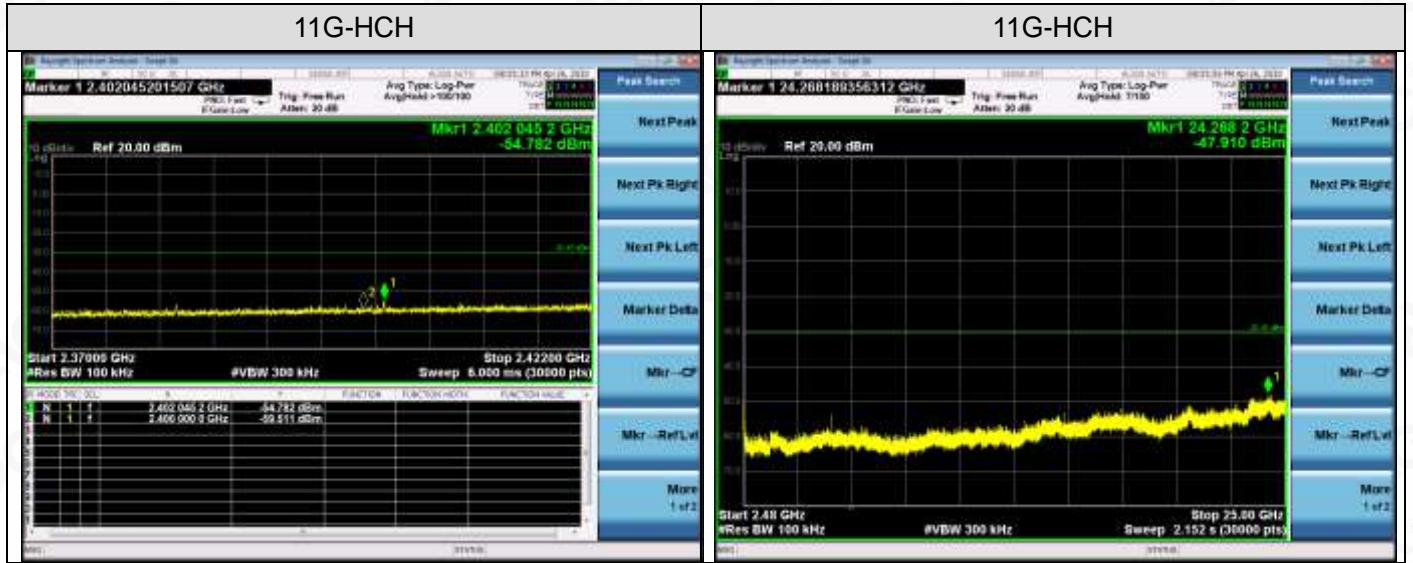
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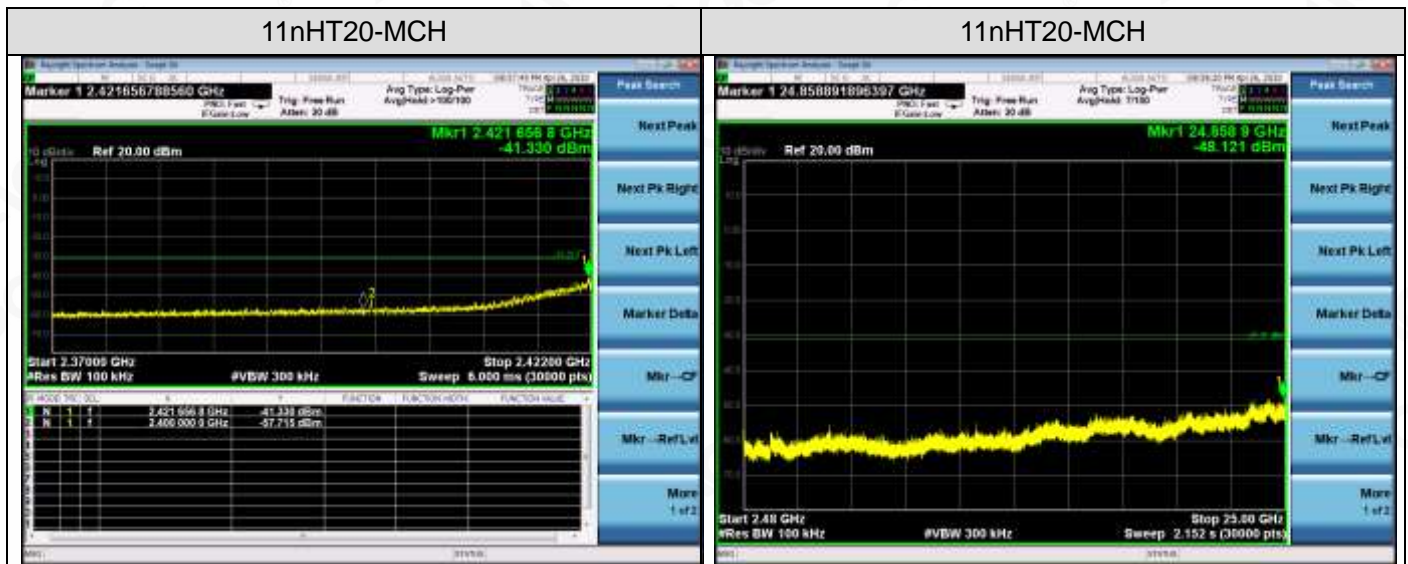
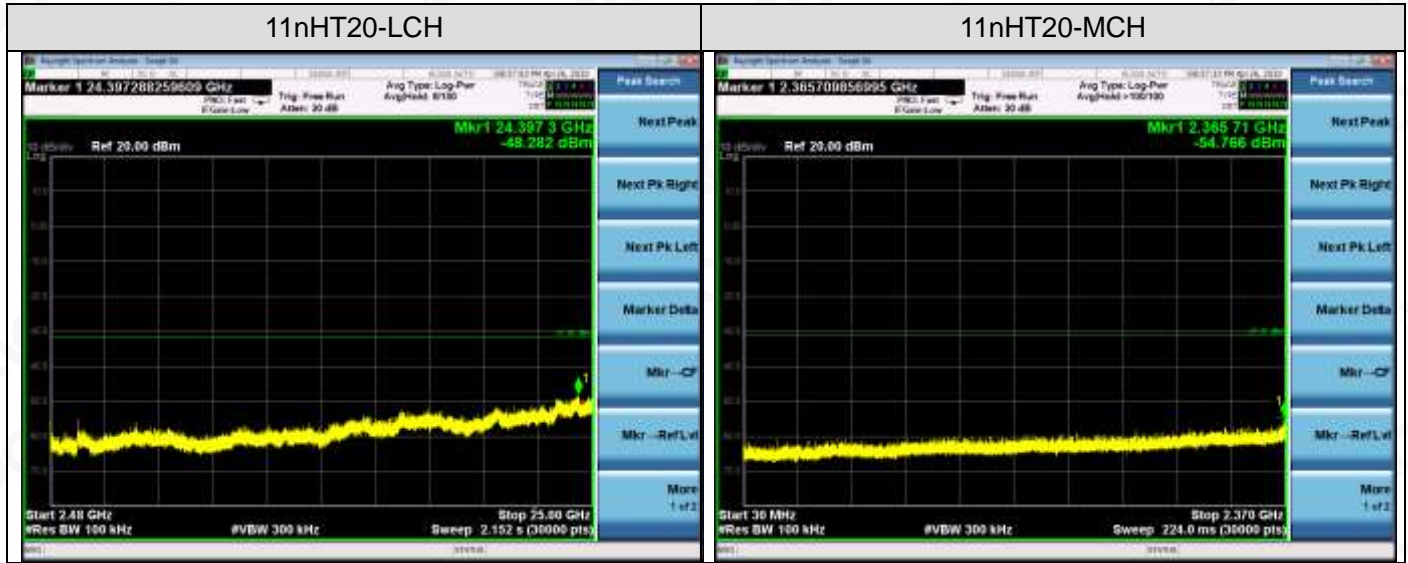
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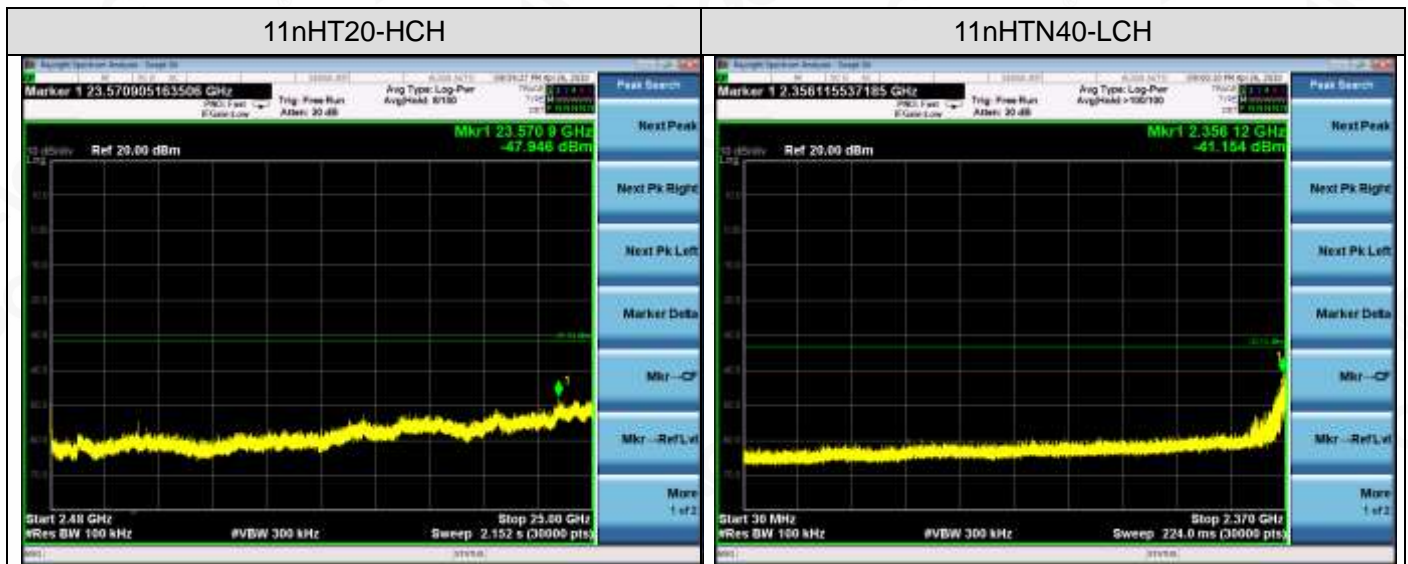
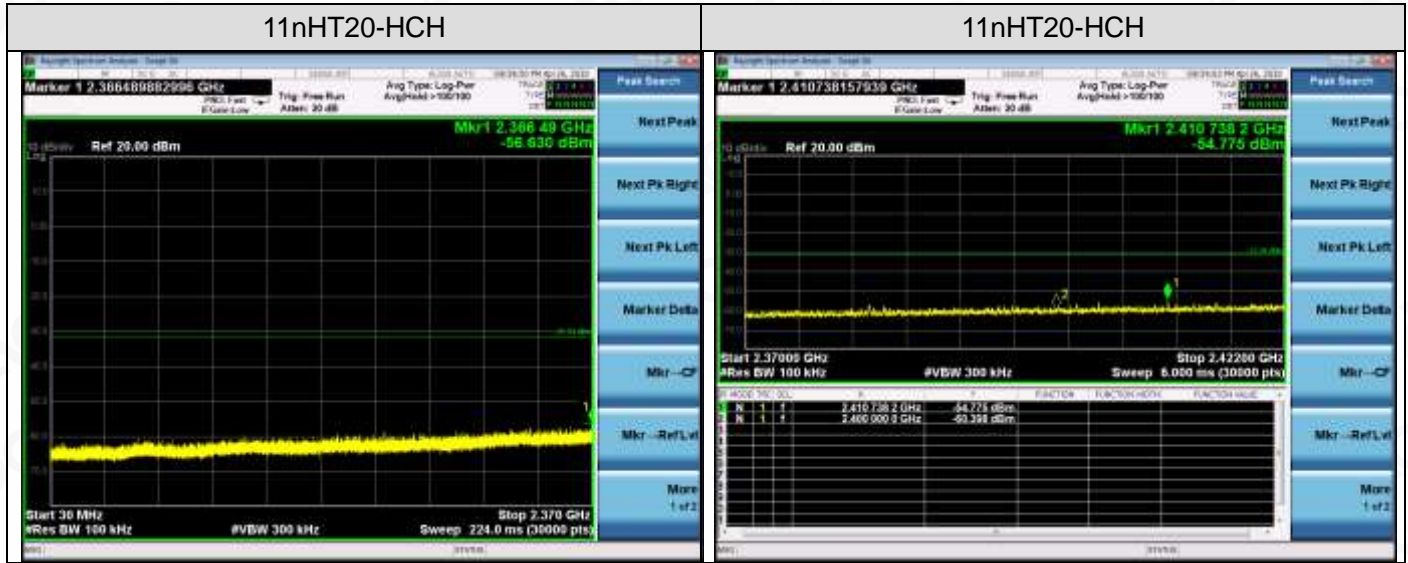
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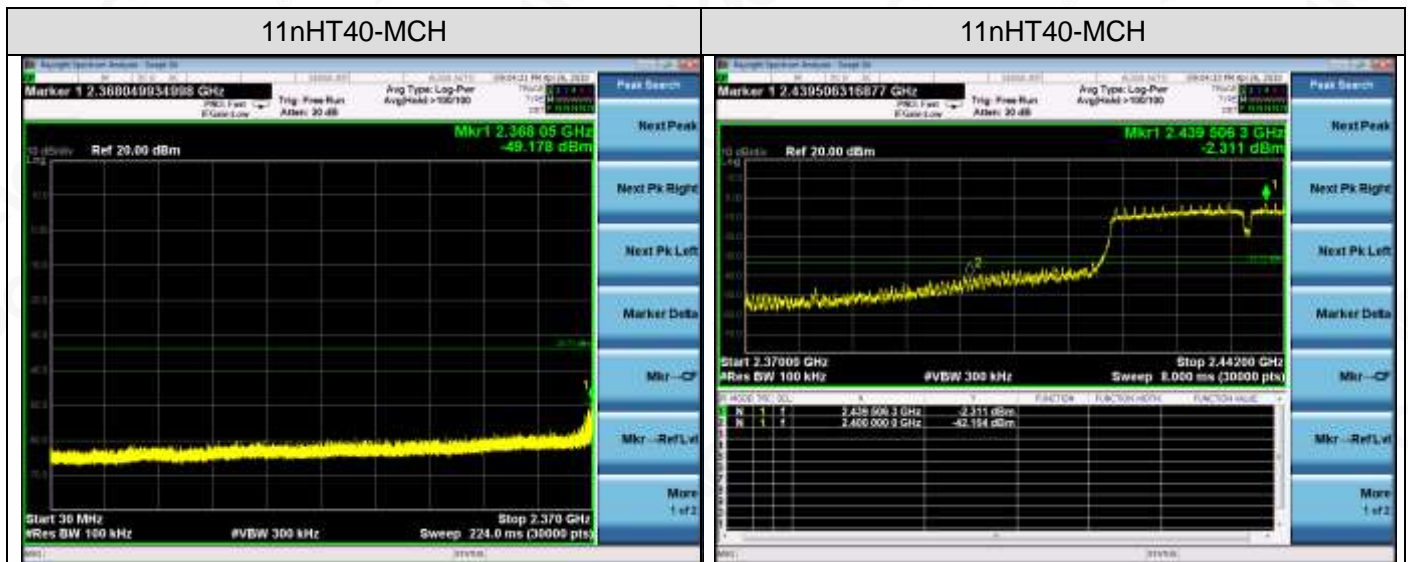
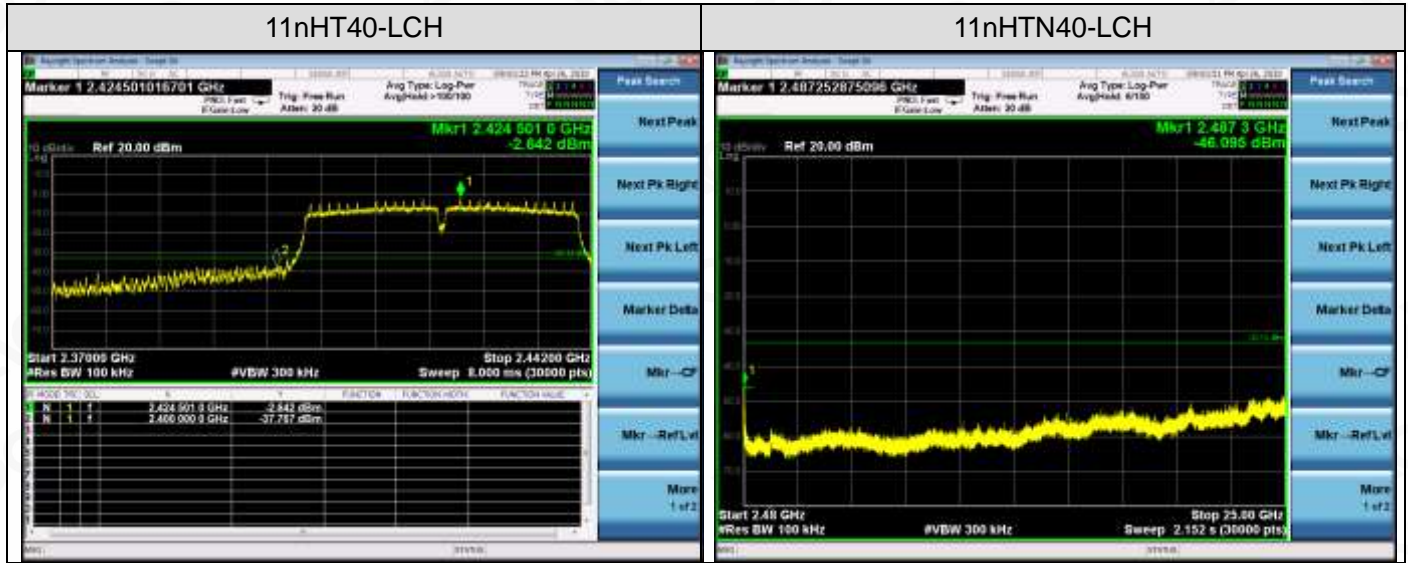


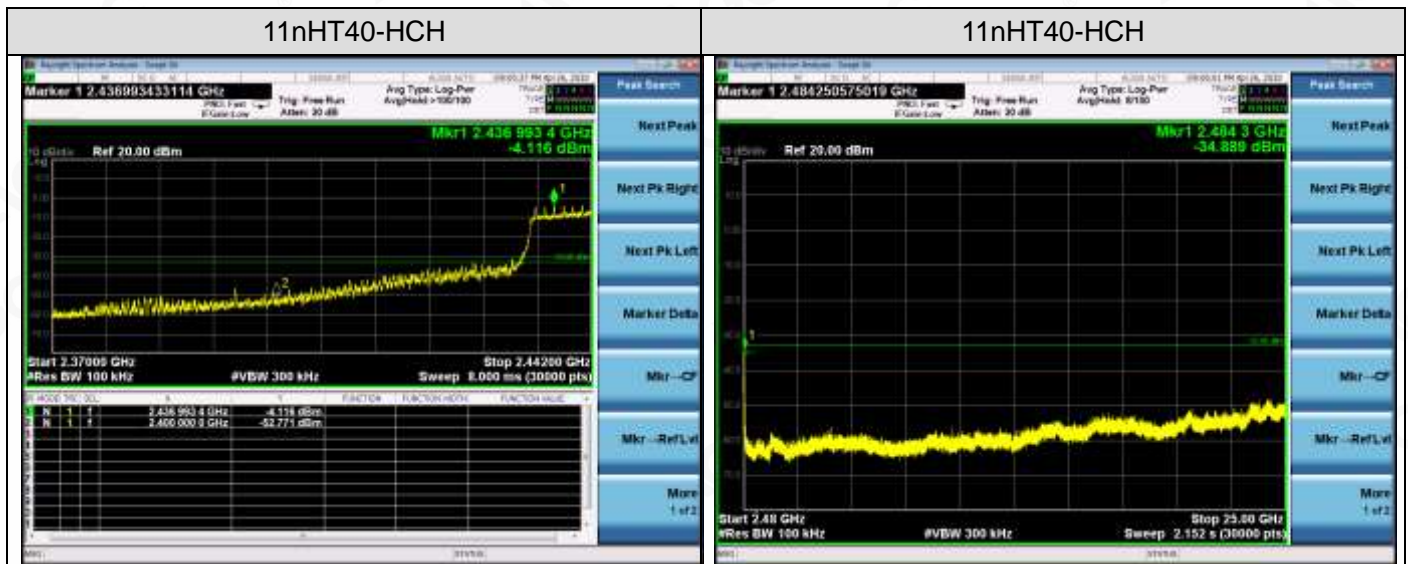
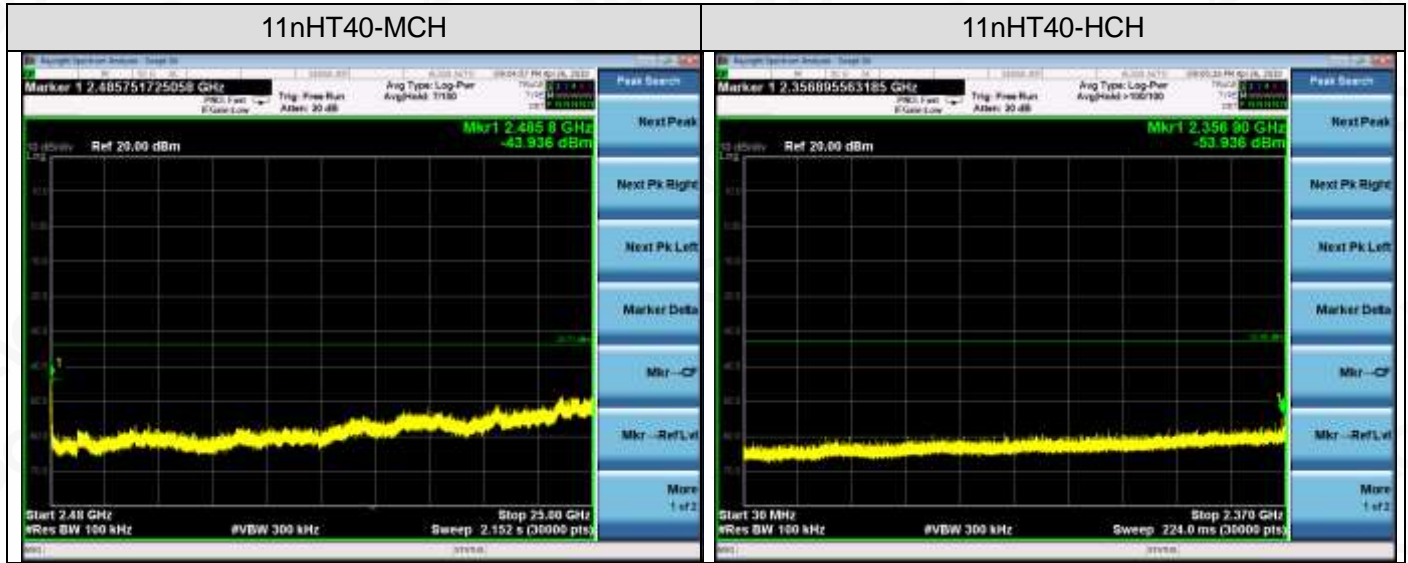




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10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of AVGPSD-1 in the ANSI C63.10 (2013) item 11.10 was used in this testing.

10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

10.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

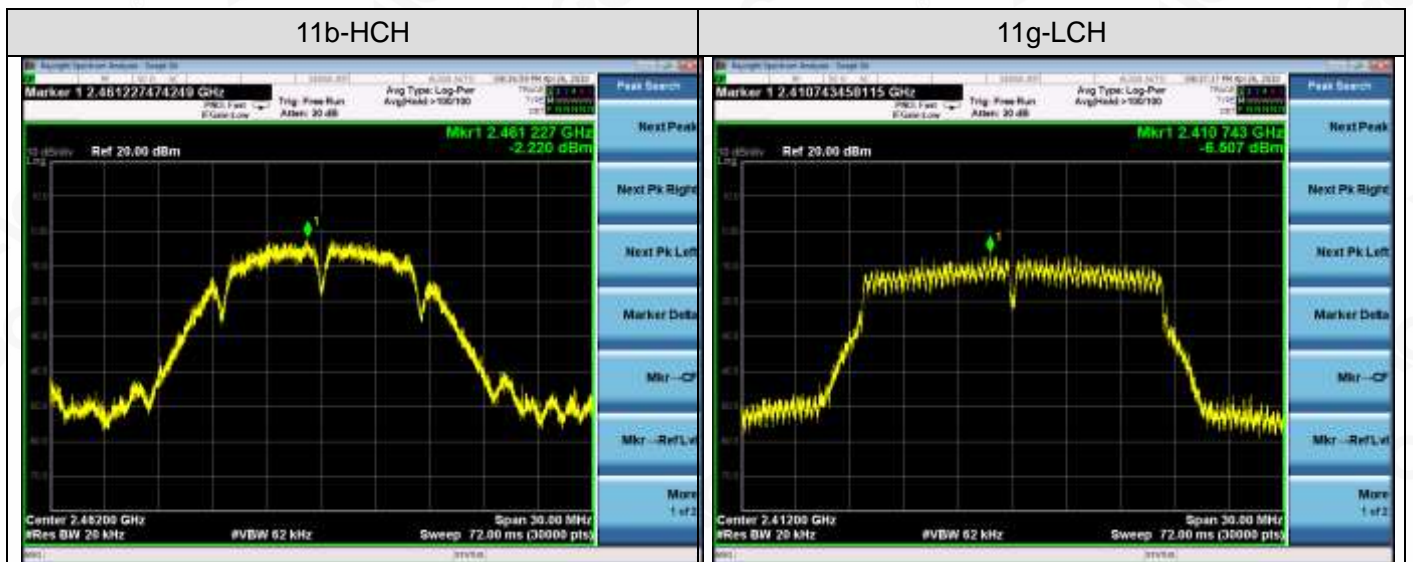


10.4 LIMITS AND MEASUREMENT RESULT

Mode	Channel	PSD [dBm/20kHz]	Limit[dBm/3kHz]	Verdict
11b	LCH	-0.640	8	PASS
	MCH	-0.768	8	PASS
	HCH	-2.220	8	PASS
11g	LCH	-6.507	8	PASS
	MCH	-4.978	8	PASS
	HCH	-6.504	8	PASS
11nHT20	LCH	-7.974	8	PASS
	MCH	-6.758	8	PASS
	HCH	-5.634	8	PASS
11nHT40	LCH	-7.876	8	PASS
	MCH	-7.202	8	PASS
	HCH	-7.065	8	PASS



Test Graph



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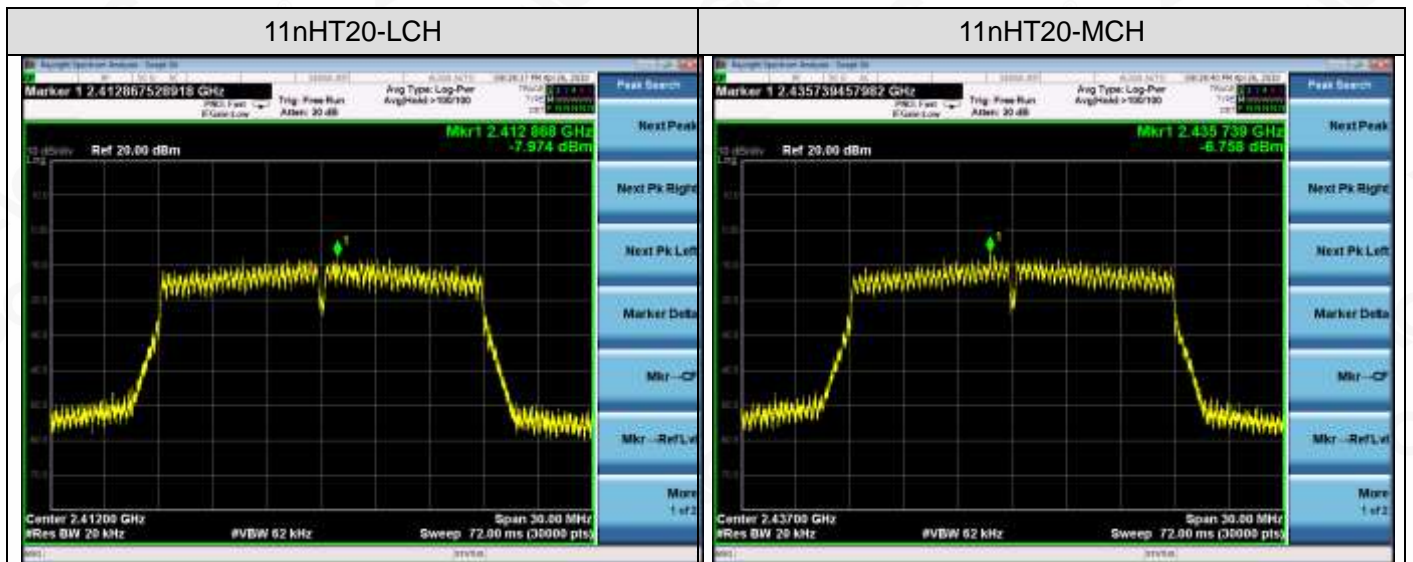
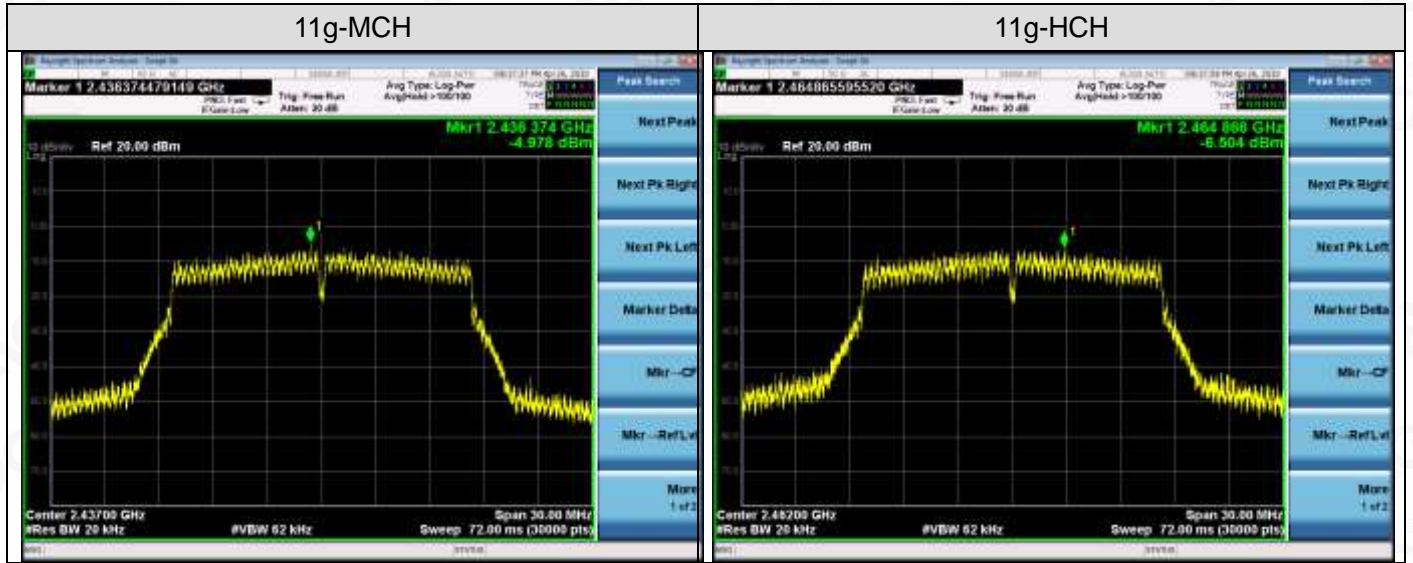
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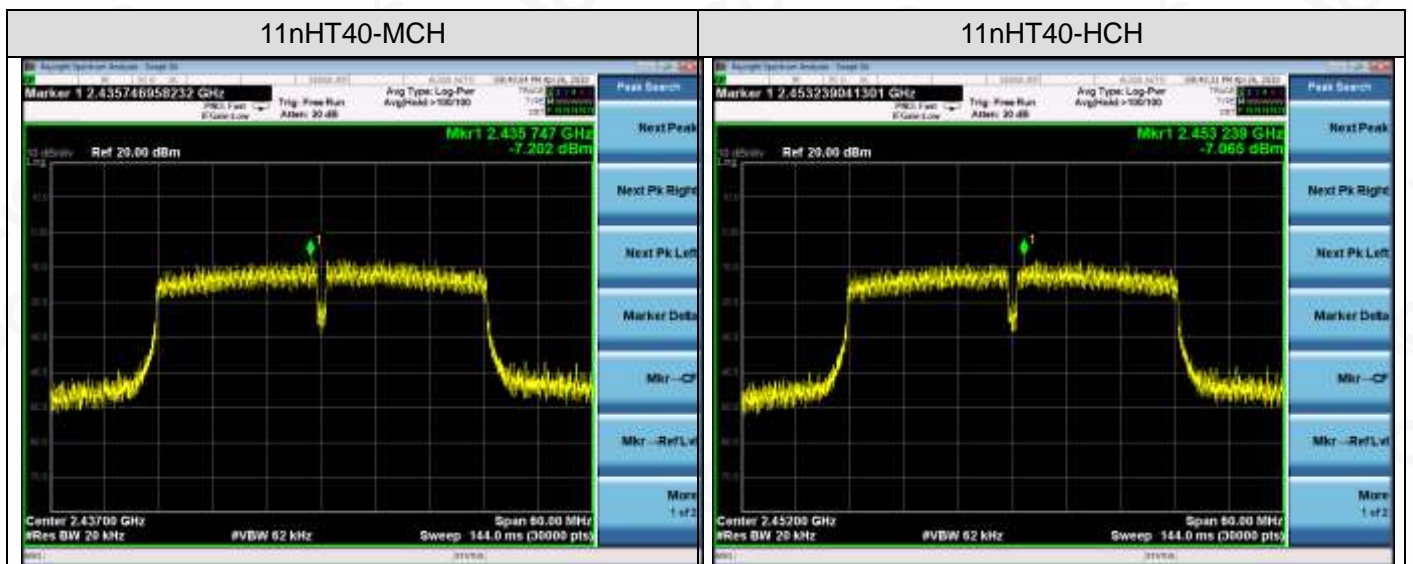
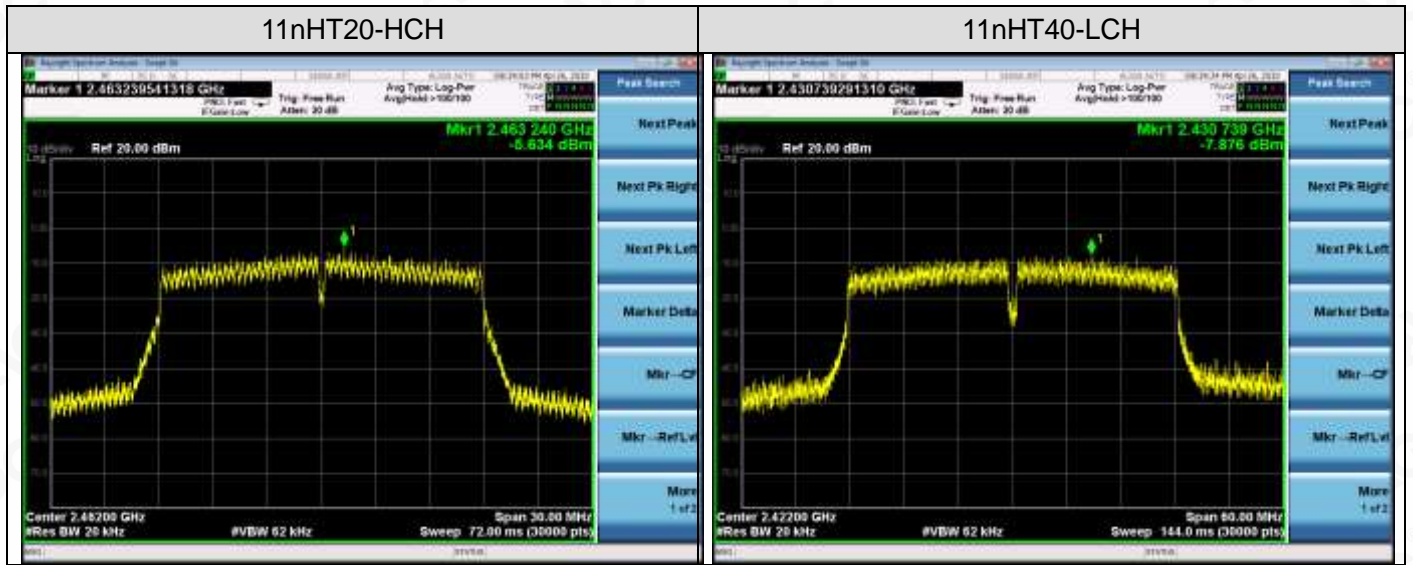
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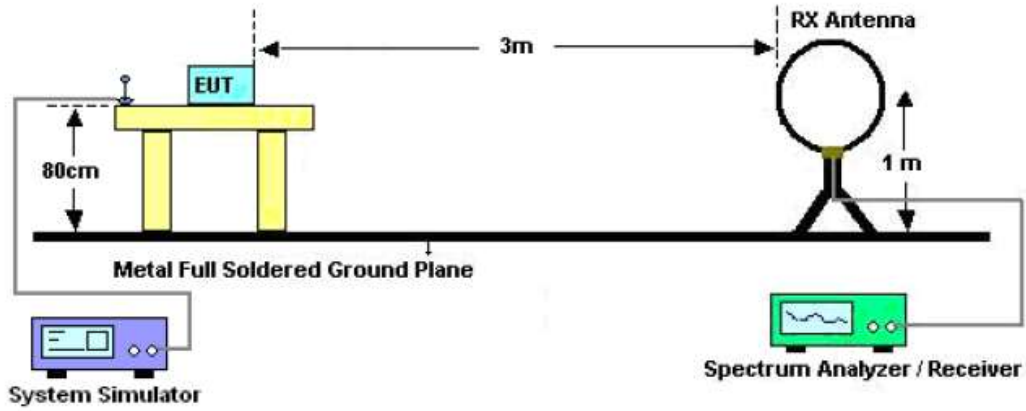
11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

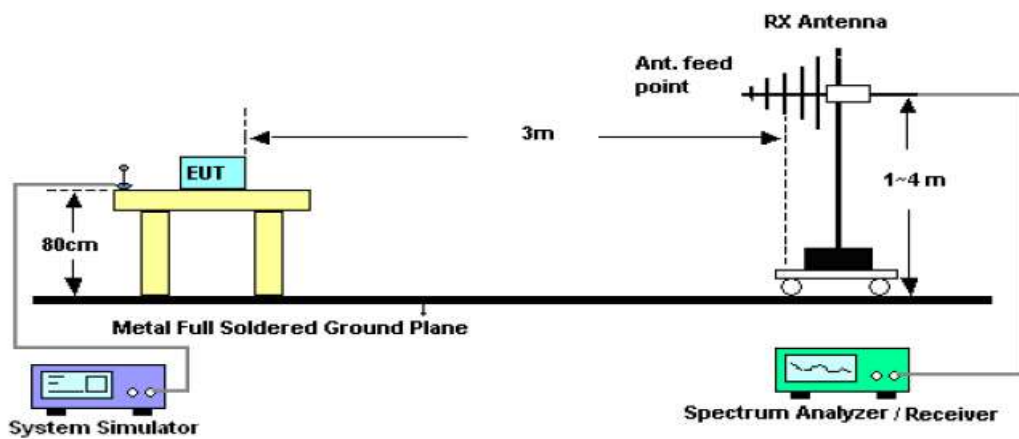
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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 VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. 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

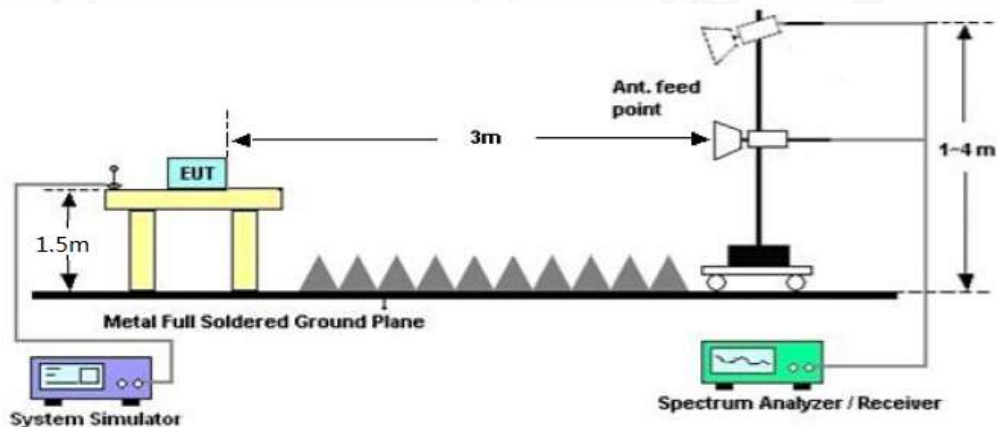
Radiated Emission Test-Setup Frequency Below 30MHz



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.



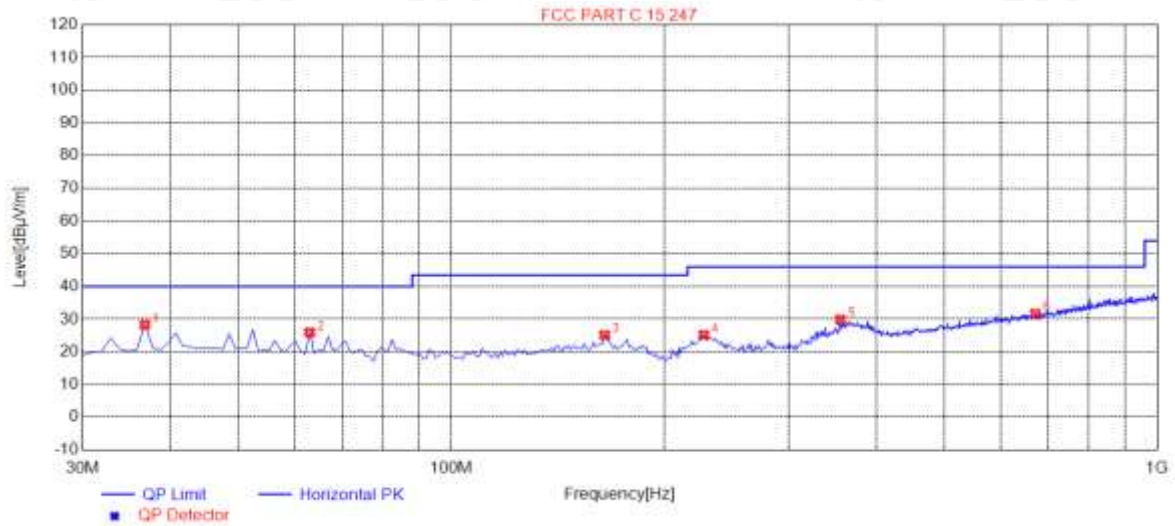
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

RADIATED EMISSION TEST- (30MHZ-1GHZ) -HORIZONTAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7900	28.27	14.16	40.00	11.73	100	10	Horizontal
2	62.9800	25.95	13.42	40.00	14.05	100	210	Horizontal
3	164.8300	25.14	14.45	43.50	18.36	200	217	Horizontal
4	227.8800	25.17	13.87	46.00	20.83	100	304	Horizontal
5	355.9200	29.84	18.05	46.00	16.16	100	285	Horizontal
6	672.1400	31.69	25.51	46.00	14.31	100	63	Horizontal

RESULT: PASS



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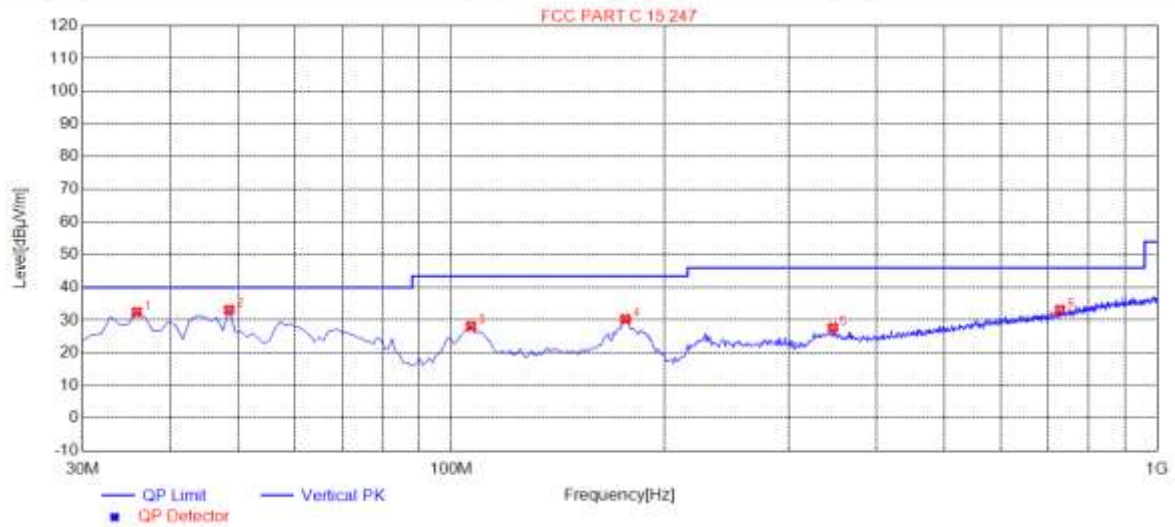
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RADIATED EMISSION TEST- (30MHZ-1GHZ) -VERTICAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.8200	32.48	13.93	40.00	7.52	100	182	Vertical
2	48.4300	33.15	14.71	40.00	6.85	100	209	Vertical
3	106.6300	28.15	12.07	43.50	15.35	100	306	Vertical
4	176.4700	30.32	13.34	43.50	13.18	100	359	Vertical
5	347.1900	27.67	17.75	46.00	18.33	100	139	Vertical
6	728.4000	33.16	26.67	46.00	12.84	100	257	Vertical

RESULT: PASS

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

Frequency (MHz)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Type	Comment
TX 11b 2412MHz					
4824	48.74	74	-25.26	Pk	Horizontal
4824	35.82	54	-18.18	AV	Horizontal
7236	50.64	74	-23.36	pk	Horizontal
7236	33.18	54	-20.82	AV	Horizontal
4824	51.59	74	-22.41	Pk	Vertical
4824	33.20	54	-20.8	AV	Vertical
7236	48.76	74	-25.24	Pk	Vertical
7236	38.28	54	-15.72	AV	Vertical
TX 11b 2437MHz					
4874	49.49	74	-24.51	Pk	Horizontal
4874	31.89	54	-22.11	AV	Horizontal
7311	46.71	74	-27.29	Pk	Horizontal
7311	33.44	54	-20.56	AV	Horizontal
4874	50.53	74	-23.47	Pk	Vertical
4874	38.81	54	-15.19	AV	Vertical
7311	46.23	74	-27.77	Pk	Vertical
7311	37.95	54	-16.05	AV	Vertical
TX 11b 2462MHz					
4924	49.27	74	-24.73	Pk	Horizontal
4924	31.69	54	-22.31	AV	Horizontal
7386	47.15	74	-26.85	Pk	Horizontal
7386	33.05	54	-20.95	AV	Horizontal
4924	50.98	74	-23.02	Pk	Vertical
4924	38.23	54	-15.77	AV	Vertical
7386	46.37	74	-27.63	Pk	Vertical
7386	37.46	54	-16.54	AV	Vertical

RESULT: PASS

Note:

1. Margin = Emission Level - Limit
- 2.1GHz-25GHz(All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report. No recording in the test report at least have 20dB margin).



12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

1) 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

2) Conducted Emissions at the bang edge

- a) The transmitter output was connected to the spectrum analyzer
- b) Set RBW=1MHz, VBW=3MHz
- c) Suitable frequency span including 100kHz bandwidth from band edge

12.2. TEST SET-UP

Radiated 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(μ V) to represent the Amplitude. Use the F dB(μ V/m) to represent the Field Strength. So A=F.



12.3. TEST RESULT

EUT	Smart Phone	Model Name	N4+
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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Vertical

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Horizontal

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Vertical

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Horizontal

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Vertical

PK



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RESULT: PASS



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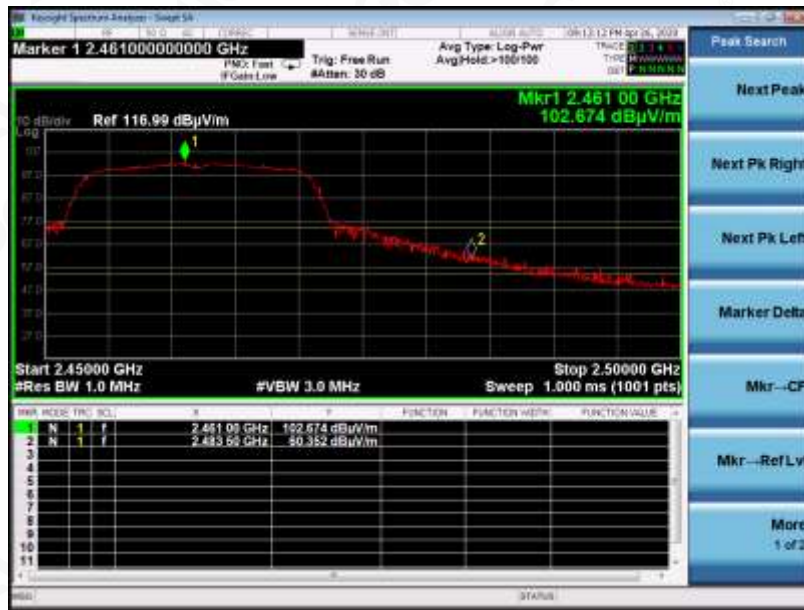
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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Horizontal

PK



AV



RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	Antenna	Horizontal

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	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



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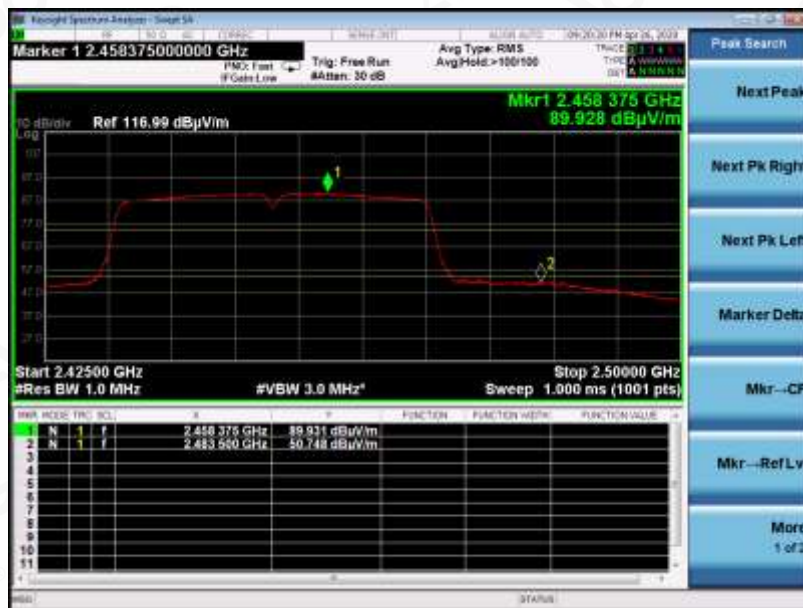
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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40with data rate 13.5 2452MHZ	Antenna	Horizontal

PK



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RESULT: PASS



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EUT	Smart Phone	Model Name	N4+
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	Antenna	Vertical

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RESULT: PASS



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13. FCC LINE CONDUCTED EMISSION TEST

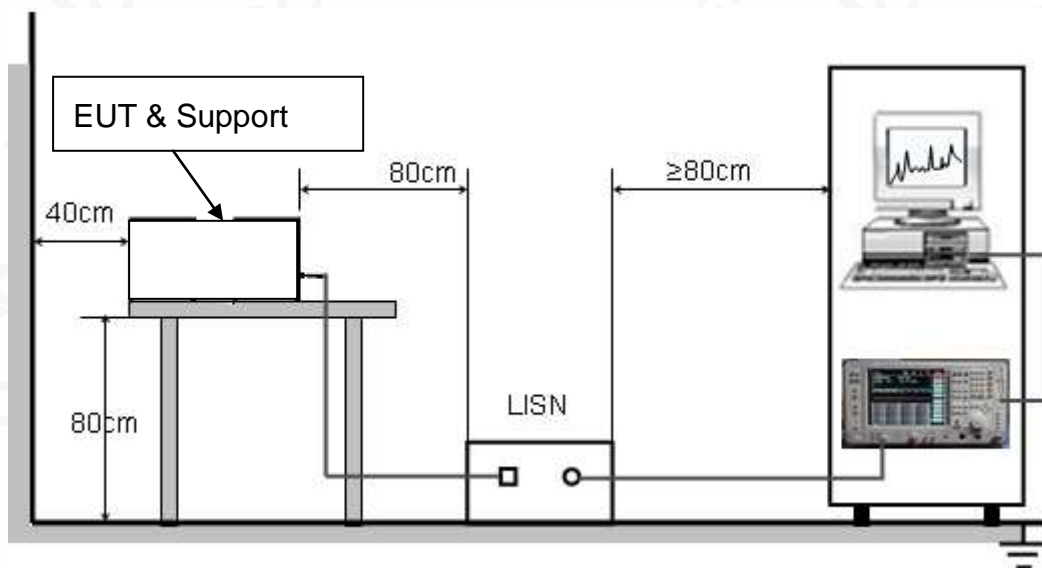
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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 0.50 MHz.

13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



13.3. PRELIMINARY 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 Smart Phoneop 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. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The 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.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.



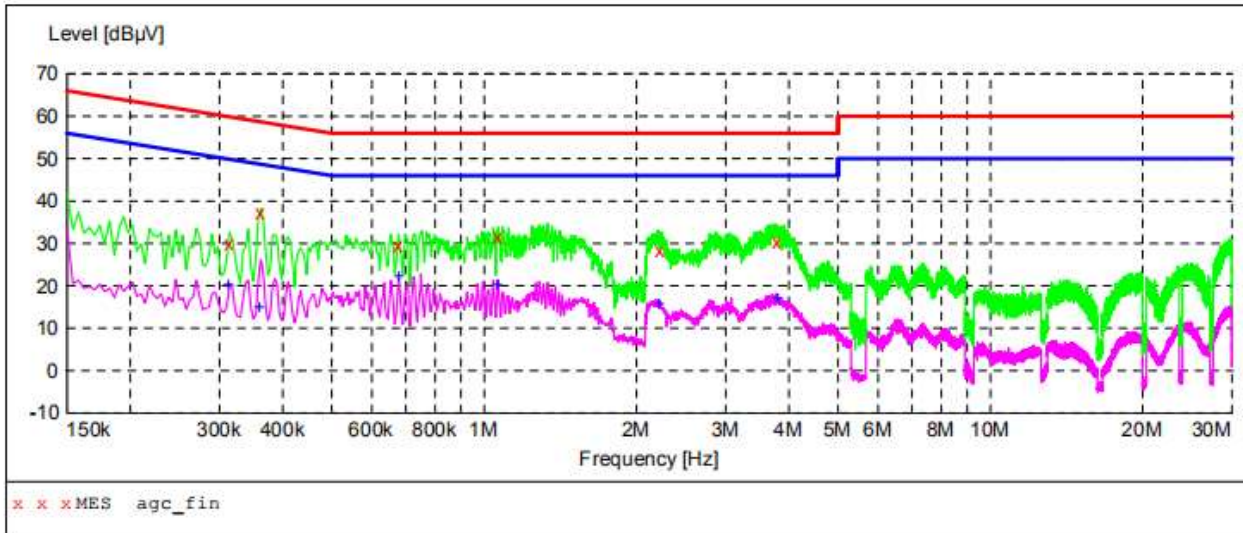
13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. 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.
3. The test data of the worst case condition(s) was reported on the Summary Data page.



13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST LINE 1-L



MEASUREMENT RESULT: "agc_fin"

2020/4/17 14:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.314000	30.10	11.3	60	29.8	QP	L1	FLO
0.362000	37.20	11.3	59	21.5	QP	L1	FLO
0.678000	29.60	11.3	56	26.4	QP	L1	FLO
1.066000	31.70	11.3	56	24.3	QP	L1	FLO
2.226000	28.40	11.3	56	27.6	QP	L1	FLO
3.802000	30.20	11.4	56	25.8	QP	L1	FLO

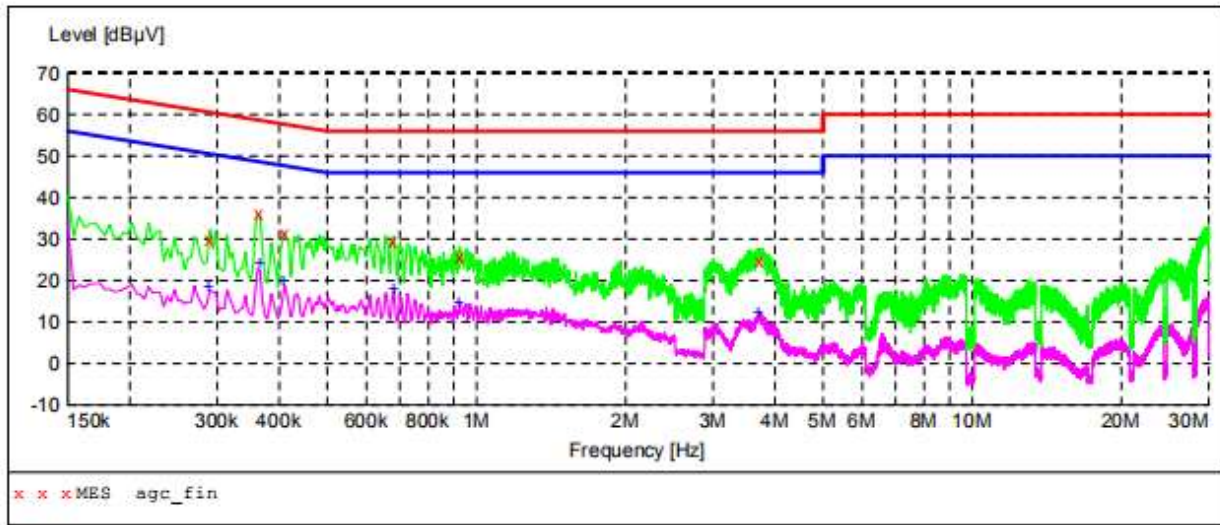
MEASUREMENT RESULT: "agc_fin2"

2020/4/17 14:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.314000	20.40	11.3	50	29.5	AV	L1	FLO
0.362000	15.10	11.3	49	33.6	AV	L1	FLO
0.678000	22.10	11.3	46	23.9	AV	L1	FLO
1.066000	20.30	11.3	46	25.7	AV	L1	FLO
2.226000	15.60	11.3	46	30.4	AV	L1	FLO
3.806000	16.80	11.4	46	29.2	AV	L1	FLO



Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2020/4/17 14:19

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	29.70	11.3	61	30.8	QP	N	FLO
0.366000	36.10	11.3	59	22.5	QP	N	FLO
0.410000	31.40	11.3	58	26.2	QP	N	FLO
0.682000	29.30	11.3	56	26.7	QP	N	FLO
0.926000	25.60	11.3	56	30.4	QP	N	FLO
3.730000	24.70	11.4	56	31.3	QP	N	FLO

MEASUREMENT RESULT: "agc_fin2"

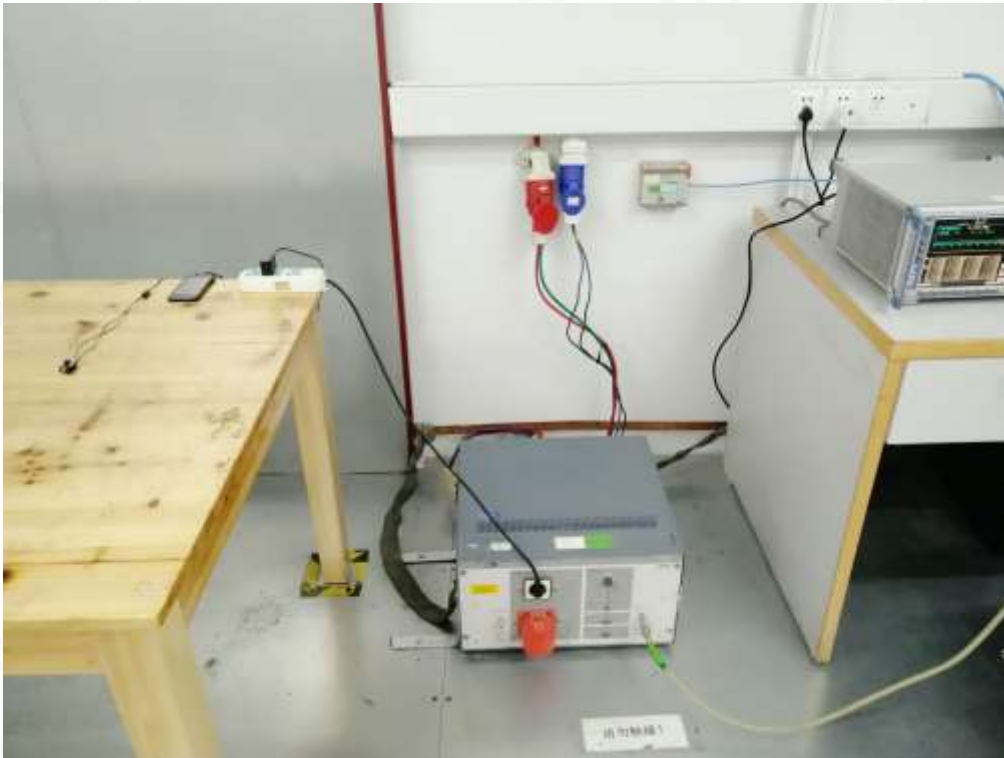
2020/4/17 14:19

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.290000	18.60	11.3	51	31.9	AV	N	FLO
0.366000	24.00	11.3	49	24.6	AV	N	FLO
0.410000	20.00	11.3	48	27.6	AV	N	FLO
0.682000	17.90	11.3	46	28.1	AV	N	FLO
0.926000	14.60	11.3	46	31.4	AV	N	FLO
3.730000	12.40	11.4	46	33.6	AV	N	FLO

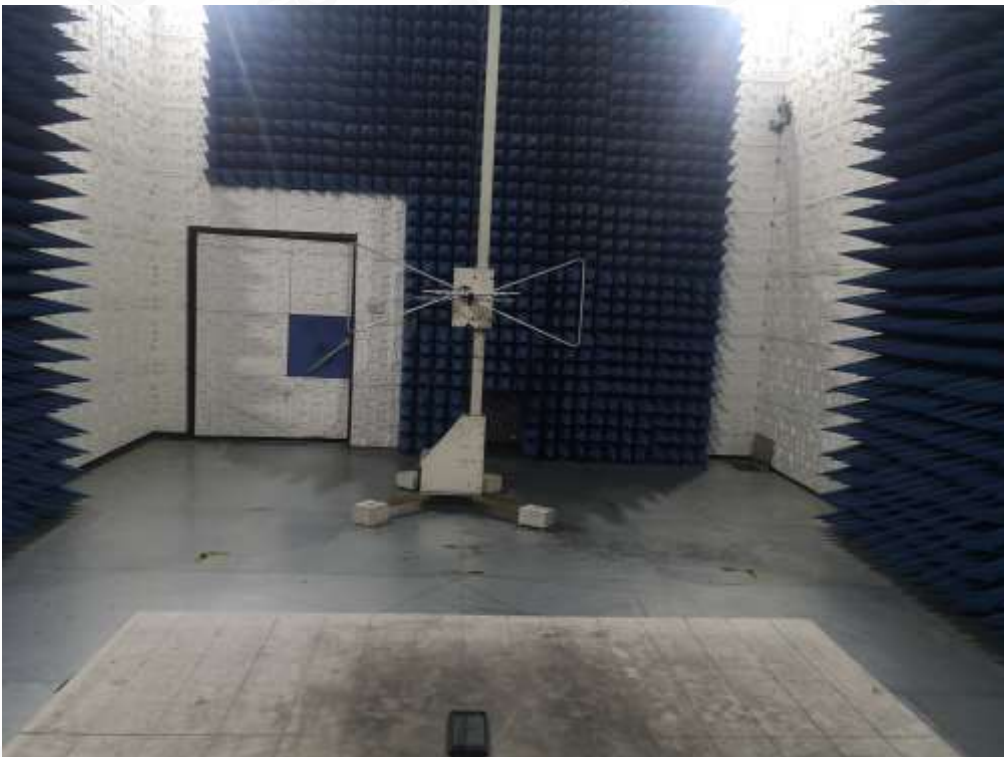


APPENDIX A: PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



RADIATED EMISSION ABOVE 1G TEST SETUP



----END OF REPORT----

