

COOLER MASTER TECHNOLOGY INC.

TEST REPORT

Model:
IXC-SX1

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221000224THC-001

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Radio Spectrum TEST REPORT

Applicant:	COOLER MASTER TECHNOLOGY INC. 7F., No. 398, Xinhua 1st Rd., Neihu Dist. Taipei City 114065, Taiwan
Product:	Synk X
Model No.:	IXC-SX1
FCC ID:	2AR8X-IXC-SX1
Test Method/ Standard:	47 CFR FCC Part 15.247 & ANSI C63.10 2013 KDB 558074 D01 v05r02
Test By:	Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan



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Revision History

Report No.	Issue Date	Revision Summary
221000224THC-001	Dec. 13, 2022	Original report

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Summary of Test Data

Test Requirement	Applicable Rule (Section 15.247)	Result
20dB Bandwidth Test	15.247(a)(1)	Pass
Carrier Frequency Separation Test	15.247(a)(1)	Pass
Number of Hopping Frequencies Test	15.247(a)(1)	Pass
Time of Occupancy (Dwell Time) Test	15.247(a)(1)(iii)	Pass
Maximum Output Power Test	15.247(b)	Pass
RF Antenna Conducted Spurious Test	15.247(d)	Pass
Radiated Spurious Emission Test	15.205, 15.209	Pass
Emission on the Band Edge Test	15.247(d)	Pass
AC Power Line Conducted Emission Test	15.207	Pass
Antenna Requirement	15.203	Pass

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.
 Other Testing: the specification, standard and not taking into account the measurement uncertainty.

1. General Information

1.1 Identification of the EUT

Product:	Synk X
Model No.:	IXC-SX1
Operating Frequency:	2402 MHz ~ 2480 MHz
Channel Number:	79 channels
Frequency of Each Channel:	2402+1 k, k=0 ~ 78
Rated Power:	DC 14.4V from battery DC 19V from adapter
Power Cord:	N/A
Sample receiving date:	2022/11/02
Sample condition:	Workable
Test Date(s):	2022/11/04 ~ 2022/11/18

1.2 Adapter information

The EUT will be supplied with a power supply from below list:

No.	Model no.	Specification
Adapter	MKC-0502000DEXD	I/P: 100-240V~, 50-60Hz, 0.8A O/P: 19Vdc, 1.8A, 34.2W

1.3 Antenna description

Antenna Gain : 1.2 dBi
 Antenna Type : PCB antenna
 Connector Type : Fixed

1.4 Operation mode

Connected to Notebook PC via USB Cable, executing "BT_Tool V1.0.5" and enter command to select different frequency and modulation.

TEST REPORT**1.5 Peripherals equipment**

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	HP	HP ProBook 440 G3	5CD8021S9H	USB shielded cable 1.5m
Smart phone	SAMSUNG	GT-I9100	00009d5c92ef46f	Audio cable 1.8m
5.8GHz Wireless Tactile Transmission System	Cooler master	IXC-ST1	N/A	N/A
Earphone	N/A	N/A	N/A	Earphone cable 1.5m

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2. 20dB Bandwidth Test

2.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The 20dB bandwidth per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set \geq 1% of 20dB Bandwidth, the video bandwidth \geq RBW, and the SPAN may equal to approximately 2 to 3 times the 20dB bandwidth. The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

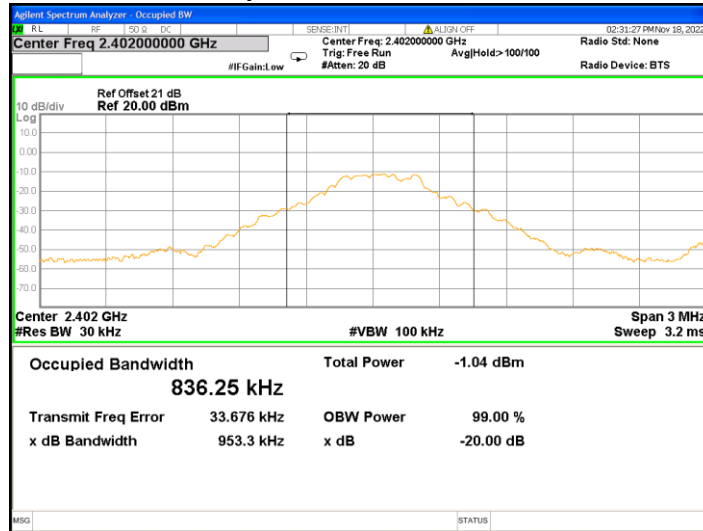
2.2 Operating Environment Condition

Temperature (°C) :	27
Relative Humidity (%) :	56

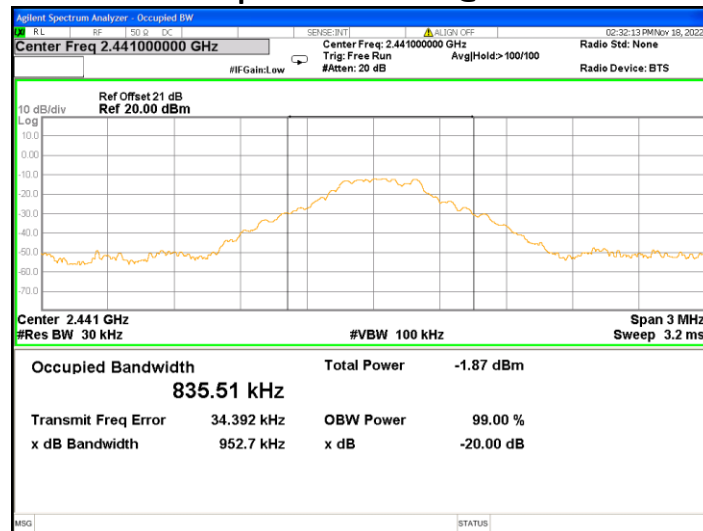
2.3 Test Results

Mode	Channel	Frequency (MHz)	20dB Bandwidth (MHz)
DH5	0	2402	0.953
	39	2441	0.952
	78	2480	0.951
2DH5	0	2402	1.325
	39	2441	1.328
	78	2480	1.326
3DH5	0	2402	1.298
	39	2441	1.297
	78	2480	1.302

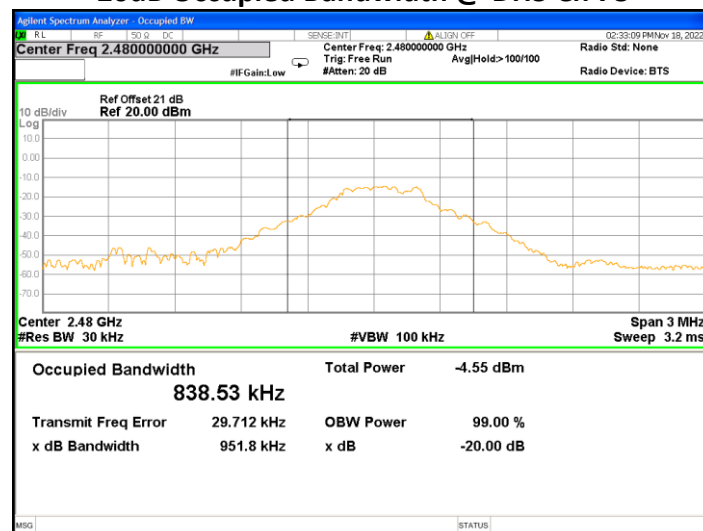
20dB Occupied Bandwidth @ DH5 Ch 0



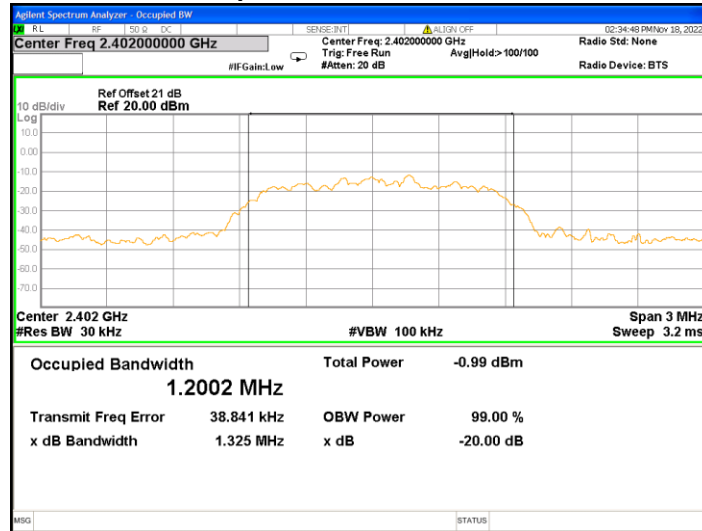
20dB Occupied Bandwidth @ DH5 Ch 39



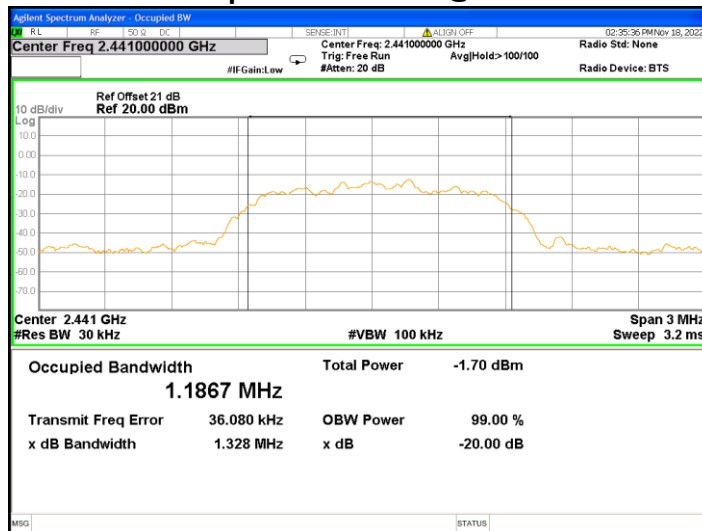
20dB Occupied Bandwidth @ DH5 Ch 78



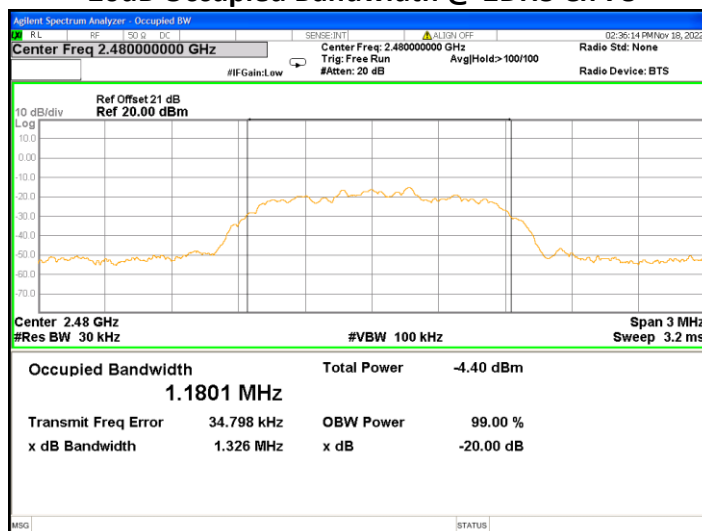
20dB Occupied Bandwidth @ 2DH5 Ch 0



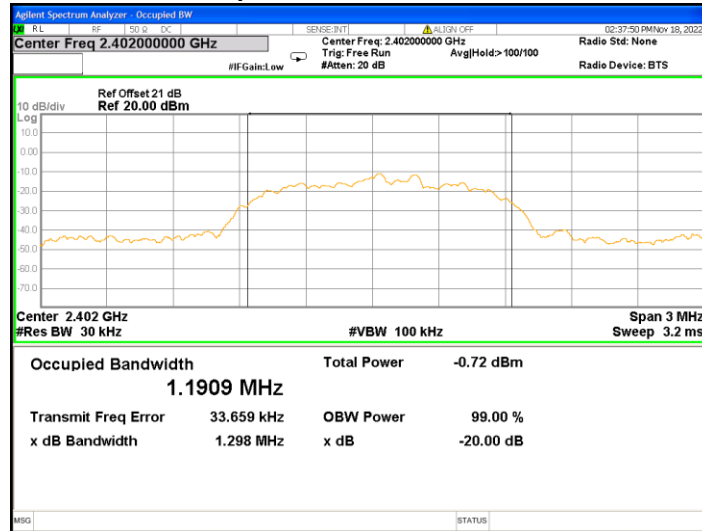
20dB Occupied Bandwidth @ 2DH5 Ch 39



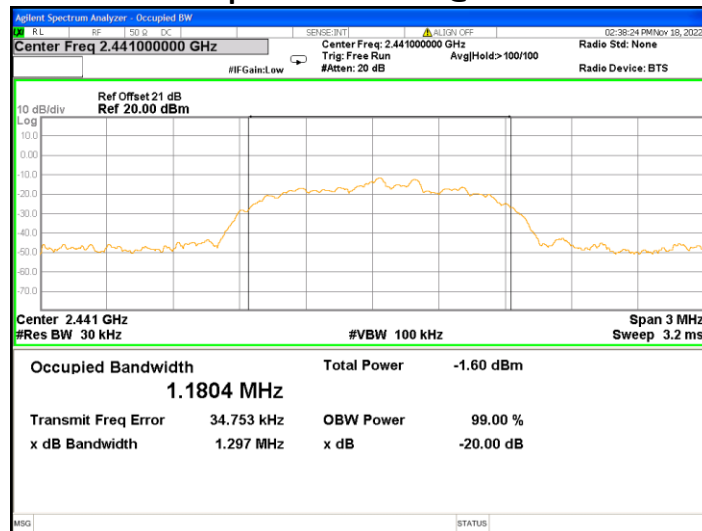
20dB Occupied Bandwidth @ 2DH5 Ch 78



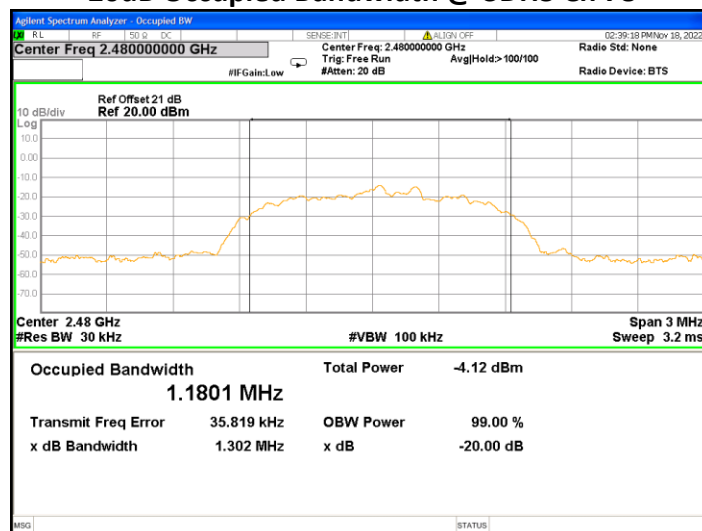
20dB Occupied Bandwidth @ 3DH5 Ch 0



20dB Occupied Bandwidth @ 3DH5 Ch 39



20dB Occupied Bandwidth @ 3DH5 Ch 78



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3. Carrier Frequency Separation Test

3.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The carrier frequency separation per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at $\geq 1\%$ of the span, the video bandwidth \geq RBW, and the SPAN was wide enough to capture the peaks of two adjacent channels. The carrier frequency separation result is in the following Table.

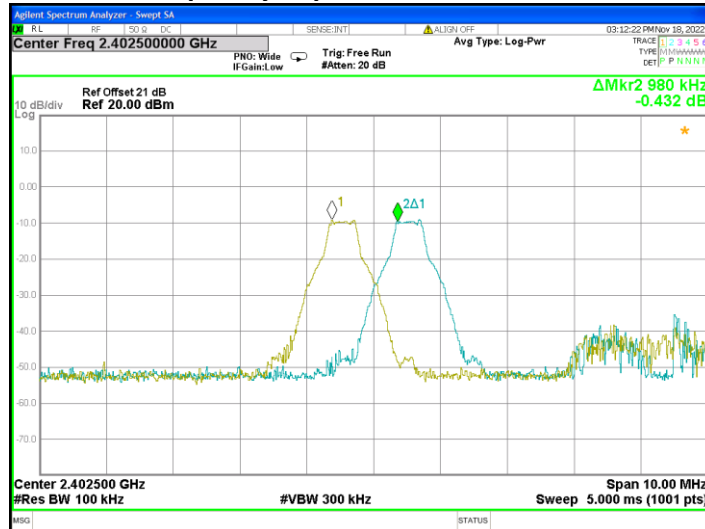
3.2 Operating Environment Condition

Temperature (°C) :	27
Relative Humidity (%) :	56

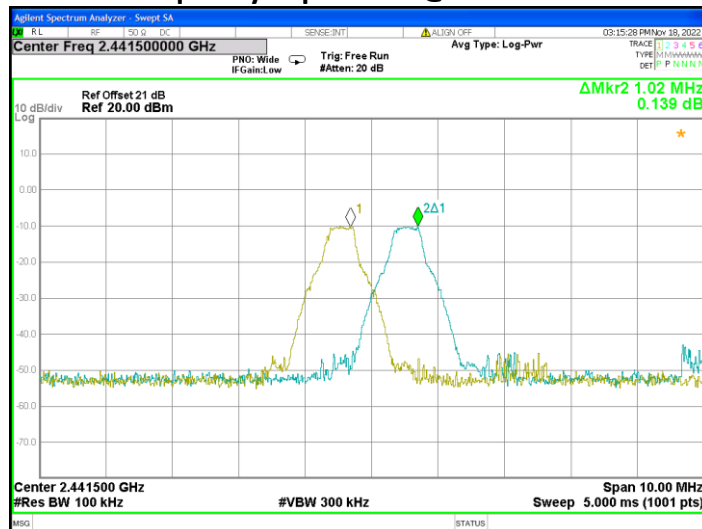
3.3 Test Results

Mode	Channel	Frequency (MHz)	Adjacent channel separation (MHz)	Limit (MHz)
DH5	0	2402	0.980	0.636
	39	2441	1.020	0.635
	78	2480	1.000	0.634
2DH5	0	2402	1.000	0.883
	39	2441	1.000	0.885
	78	2480	1.020	0.884
3DH5	0	2402	0.990	0.865
	39	2441	1.000	0.865
	78	2480	1.000	0.868

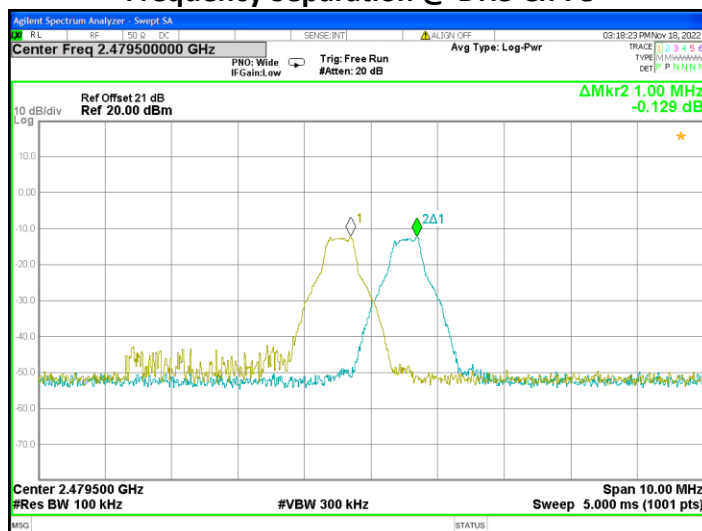
Frequency Separation @ DH5 Ch 0



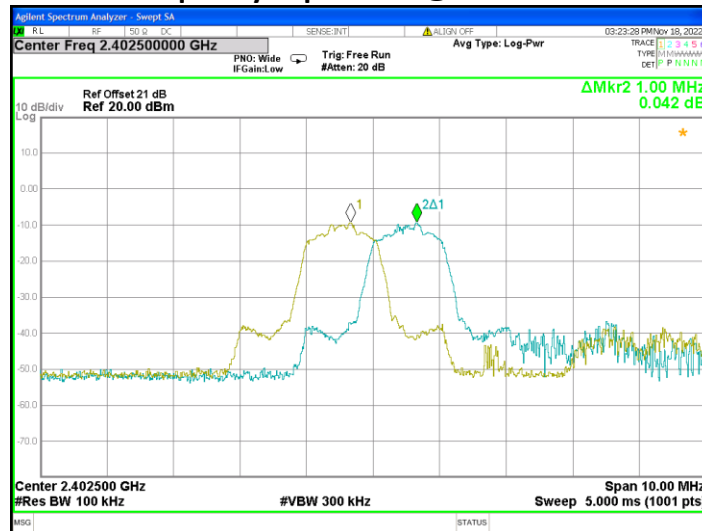
Frequency Separation @ DH5 Ch 39



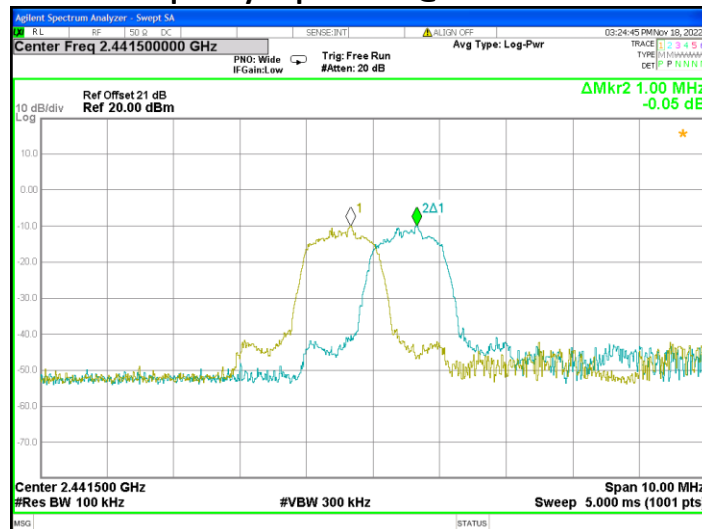
Frequency Separation @ DH5 Ch 78



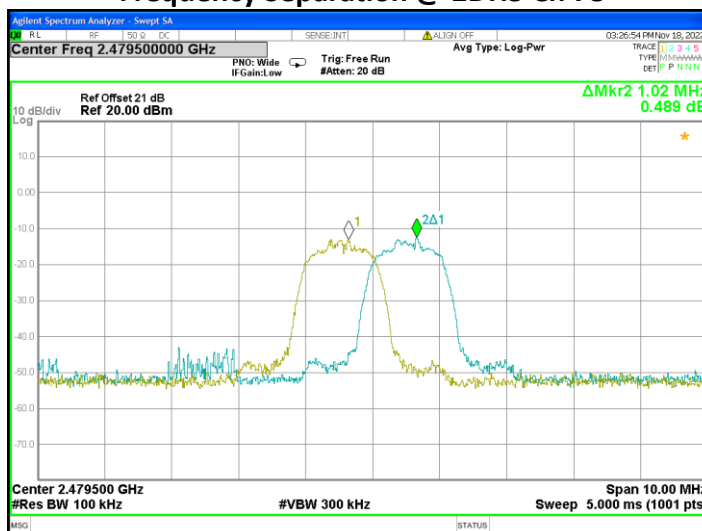
Frequency Separation @ 2DH5 Ch 0



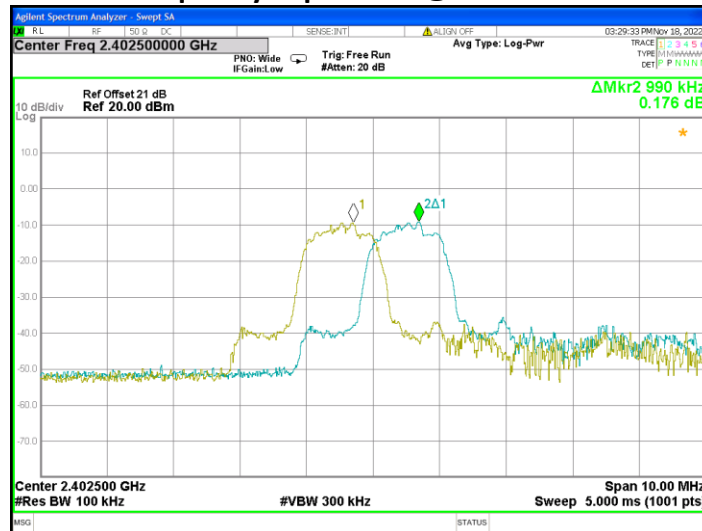
Frequency Separation @ 2DH5 Ch 39



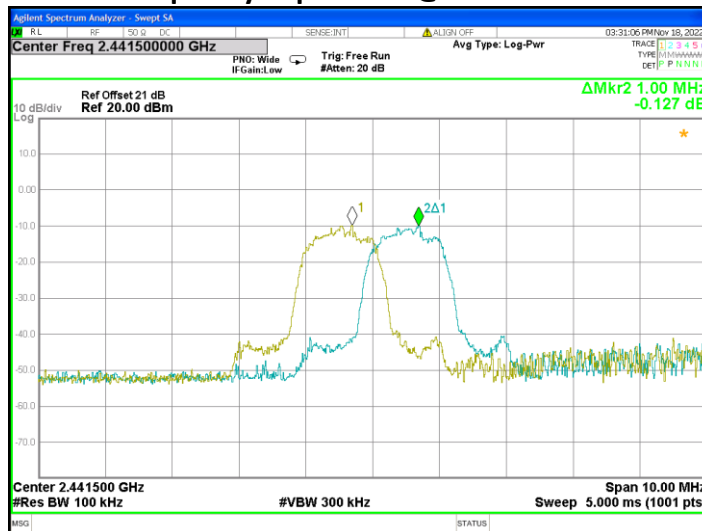
Frequency Separation @ 2DH5 Ch 78



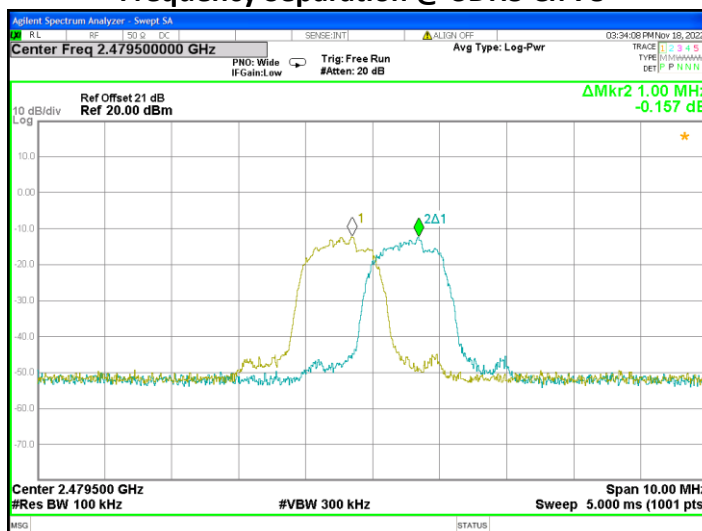
Frequency Separation @ 3DH5 Ch 0



Frequency Separation @ 3DH5 Ch 39



Frequency Separation @ 3DH5 Ch 78



4. Number of Hopping Frequencies Test

4.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The number of hopping frequencies per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at $\geq 1\%$ of the span, the video bandwidth \geq RBW, and the SPAN was the frequency band of operation. The carrier frequency separation result is in the following Table.

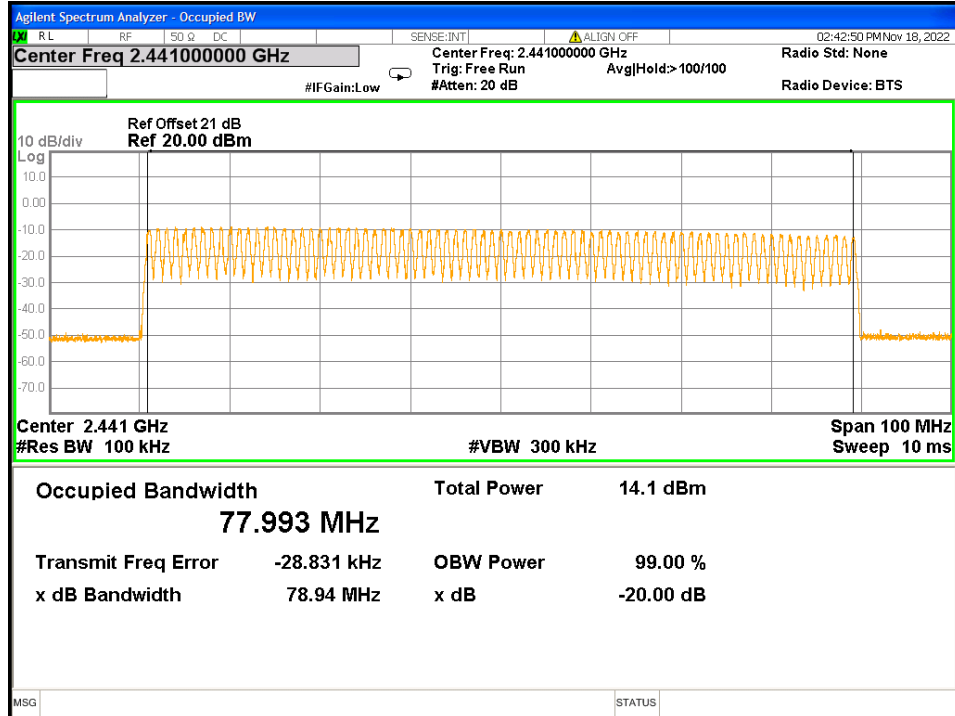
4.2 Operating Environment Condition

Temperature (°C) :	27
Relative Humidity (%) :	56

4.3 Test Results

Frequency Range (MHz)	Hopping Channels
2402~2480	79

Number of Hopping Frequencies @ DH5 Hopping Mode



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5. Time of Occupancy (Dwell Time)

5.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The time of occupancy (dwell time) per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth \geq RBW, and the zero span function of spectrum analyzer was enable. The EUT has its hopping function enable.

5.2 Operating Environment Condition

Temperature (°C) :	27
Relative Humidity (%) :	56

5.3 Test Results

The total sweep time is 0.4×79 Channels =31.6 seconds

Due to the number of hops in the 31.6s sweep, we determined to reduce the sweep time to 5s, count the number of hops and multiply by 6.32. The total number of hops will be multiplied by the measured time of one pulse.

Mode	Pulse duration (ms)	Measure time (s)	Dwell time (s)	Limit (s)	Test Results
DH1	0.382	31.6	0.122	0.4	Pass
DH3	1.639	31.6	0.262	0.4	Pass
DH5	2.887	31.6	0.308	0.4	Pass
2DH1	0.392	31.6	0.125	0.4	Pass
2DH3	1.646	31.6	0.263	0.4	Pass
2DH5	2.890	31.6	0.308	0.4	Pass
3DH1	0.394	31.6	0.126	0.4	Pass
3DH3	1.641	31.6	0.263	0.4	Pass
3DH5	2.897	31.6	0.309	0.4	Pass

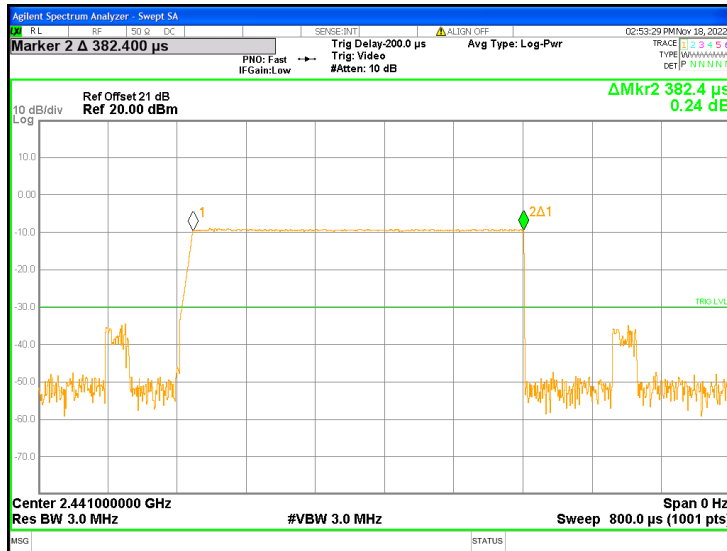
Note: (1) Dwell time = $1600 \div (79 \times N) \times$ Pulse duration \times Measure time

(2) DH1, N=2

DH3, N=4

DH5, N=6

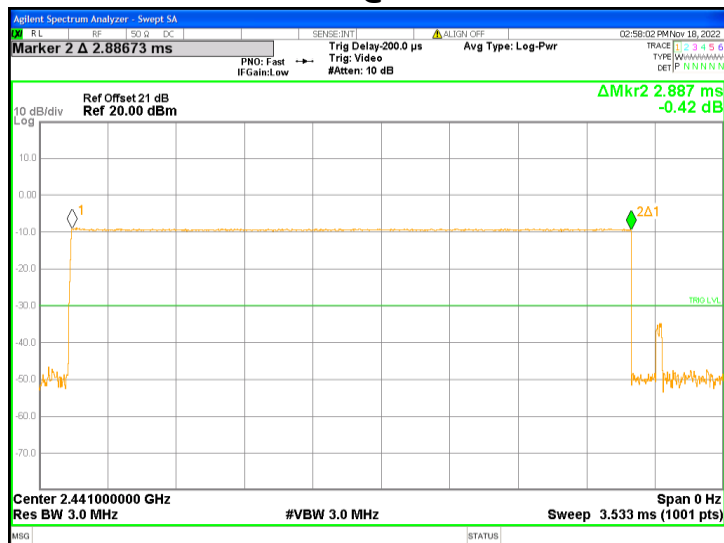
Dwell Time @ DH1 Ch 39



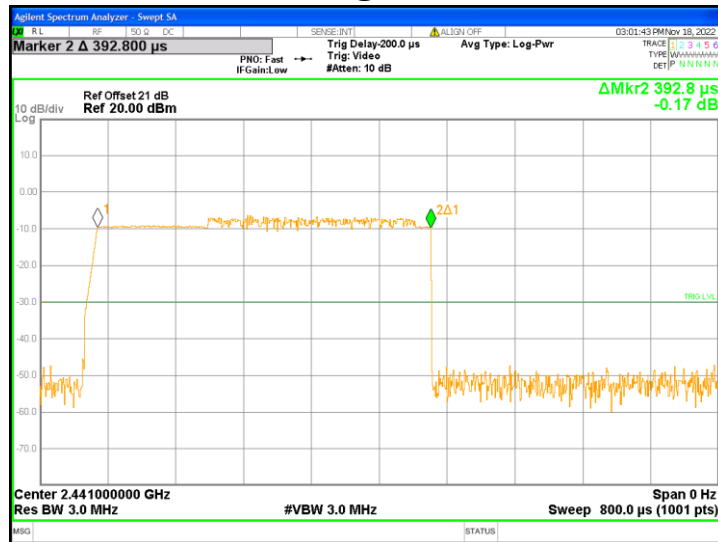
Dwell Time @ DH3 Ch 39



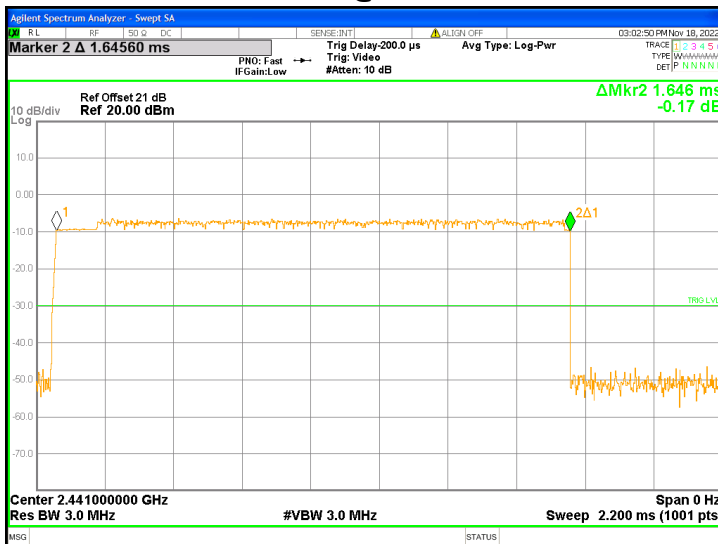
Dwell Time @ DH5 Ch 39



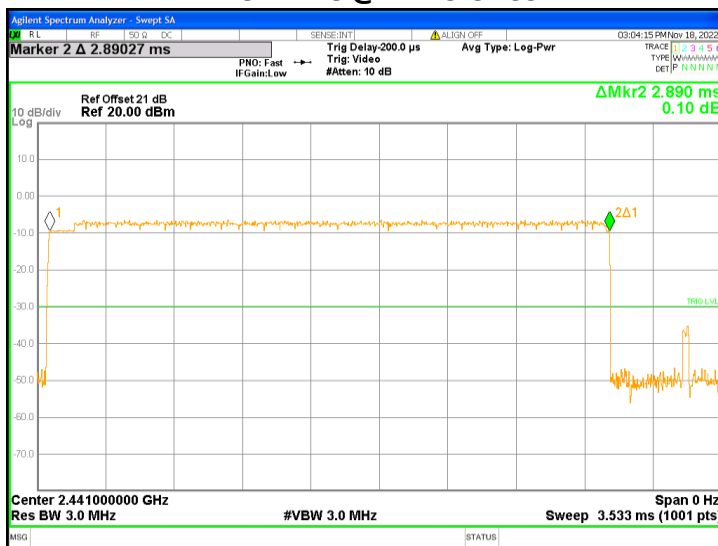
Dwell Time @ 2DH1 Ch 39



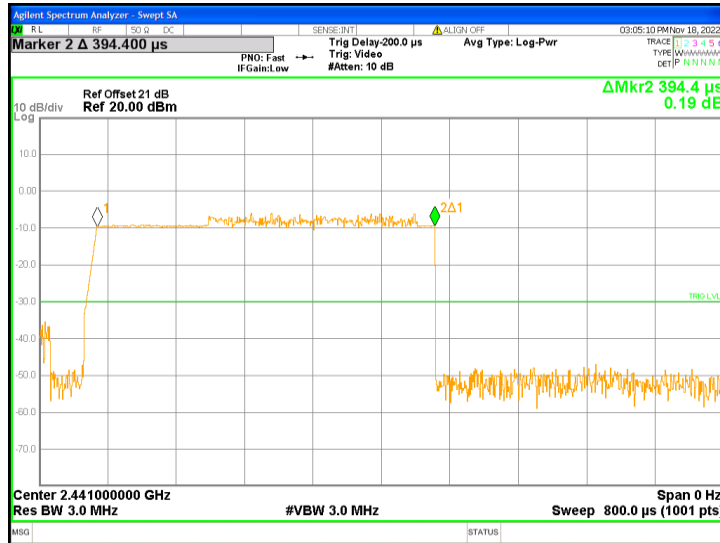
Dwell Time @ 2DH3 Ch 39



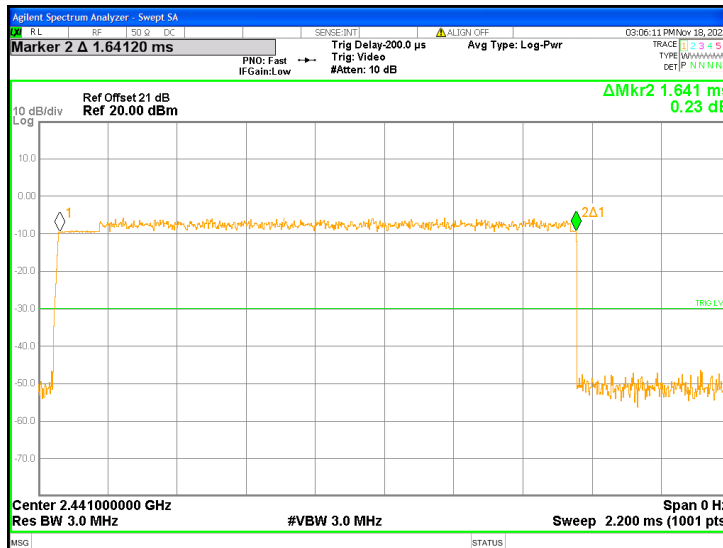
Dwell Time @ 2DH5 Ch 39



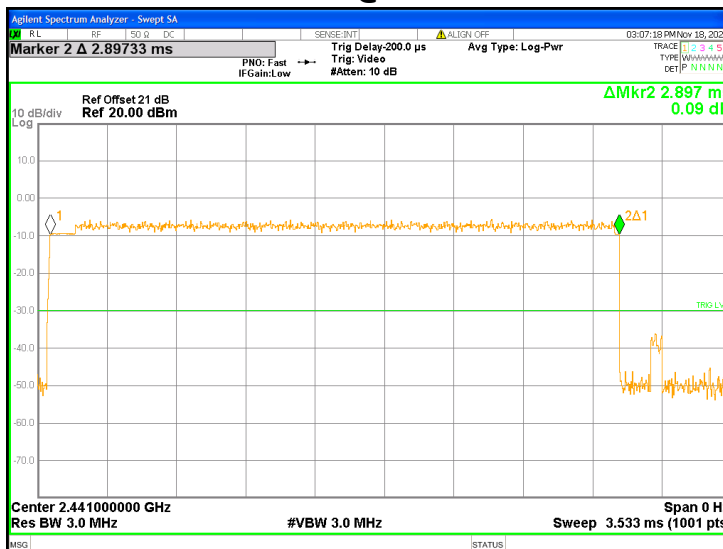
Dwell Time @ 3DH1 Ch 39



Dwell Time @ 3DH3 Ch 39



Dwell Time @ 3DH5 Ch 39



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6. Maximum Output Power Test

6.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (2 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

6.2 Operating Environment Condition

Temperature (°C) :	27
Relative Humidity (%) :	56

6.3 Test Results

Mode	Channel	Frequency (MHz)	Output Power (AV) (dBm)	Total Power (AV) (mW)	Maximum power (PK) (dBm)	Maximum power (PK) (mW)	Limit (dBm)	Margin (dB)
DH5	0	2402	-8.22	0.15	-2.62	0.55	30	-32.62
	39	2441	-7.24	0.19	-2.06	0.62	30	-32.06
	78	2480	-7.06	0.20	-2.62	0.55	30	-32.62
2DH5	0	2402	-7.56	0.18	-1.95	0.64	21	-22.95
	39	2441	-6.86	0.21	-1.62	0.69	21	-22.62
	78	2480	-6.71	0.21	-1.51	0.71	21	-22.51
3DH5	0	2402	-7.14	0.19	-2.18	0.61	21	-23.18
	39	2441	-8.71	0.13	-2.69	0.54	21	-23.69
	78	2480	-10.45	0.09	-3.34	0.46	21	-24.34

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7. RF Antenna Conducted Spurious Test

7.1 Test Setup & Procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.

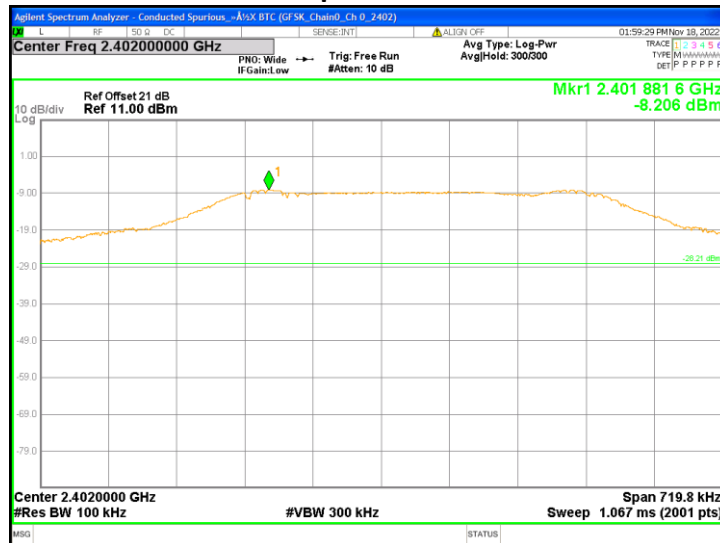
Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

7.2 Operating Environment Condition

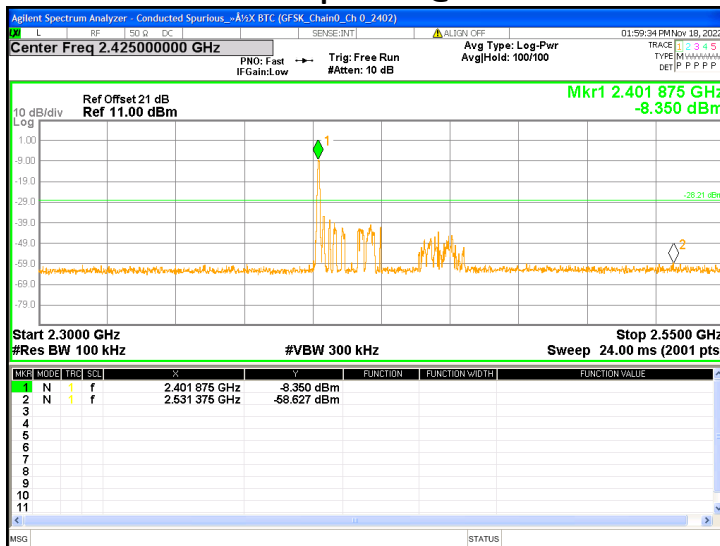
Temperature (°C) :	27
Relative Humidity (%) :	56

7.3 Test Results

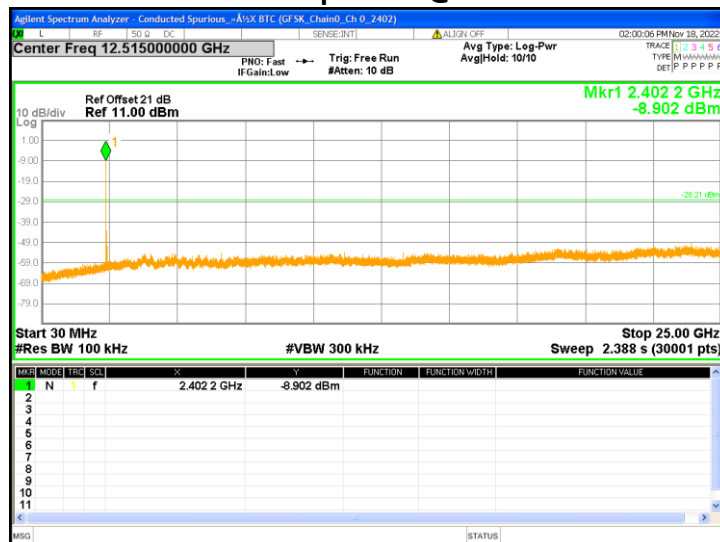
Conducted Spurious @ DH5 Ch 0



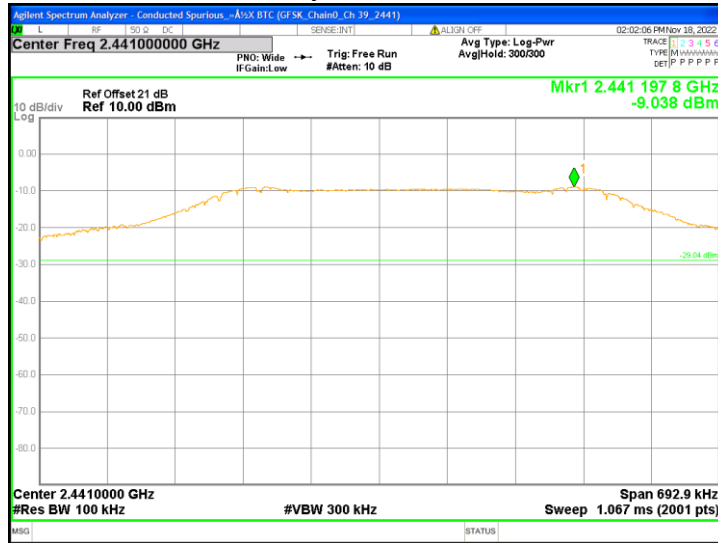
Conducted Spurious @ DH5 Ch 0



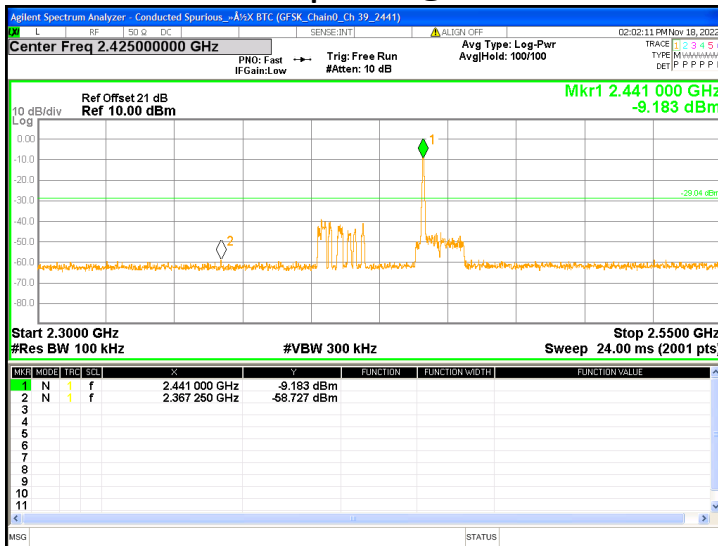
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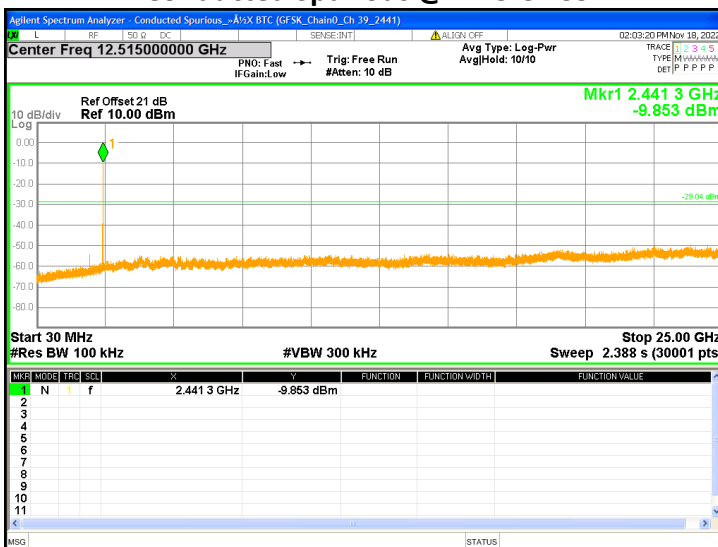
Conducted Spurious @ DH5 Ch 39



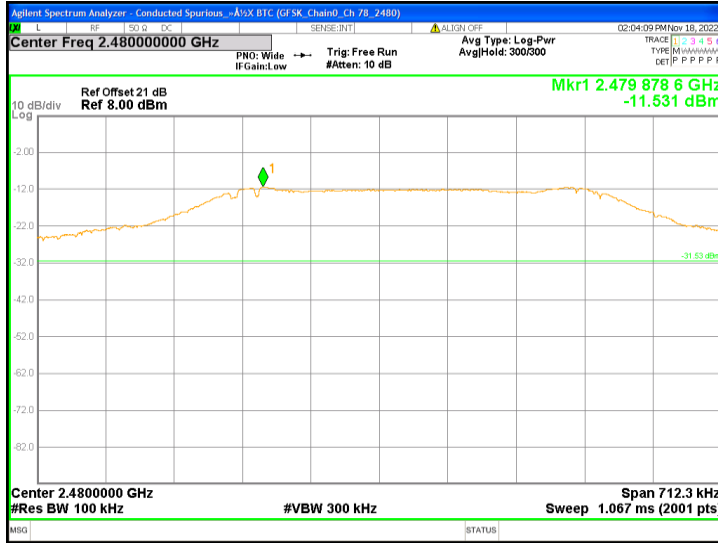
Conducted Spurious @ DH5 Ch 39



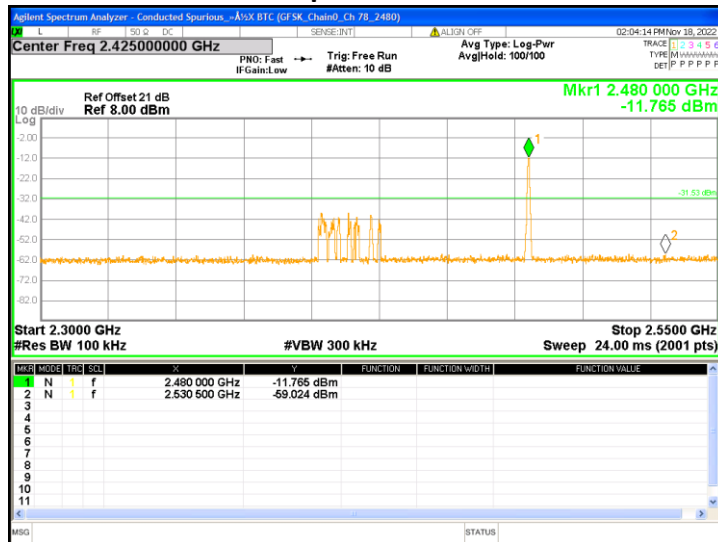
Conducted Spurious @ DH5 Ch 39



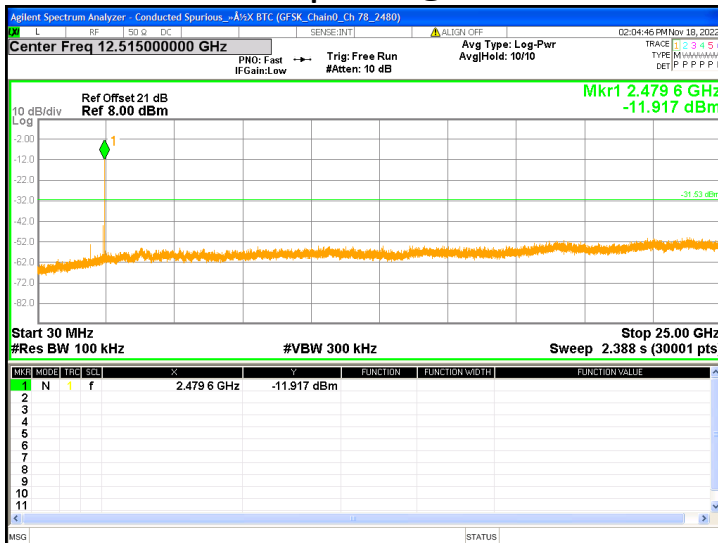
Conducted Spurious @ DH5 Ch 78



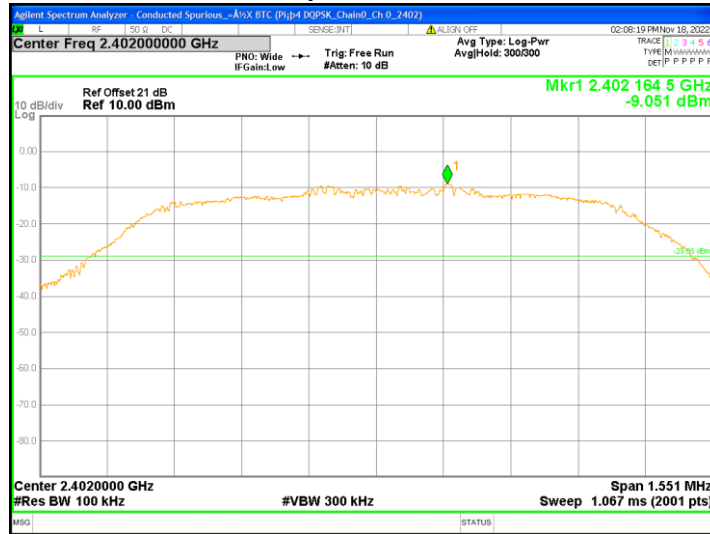
Conducted Spurious @ DH5 Ch 78



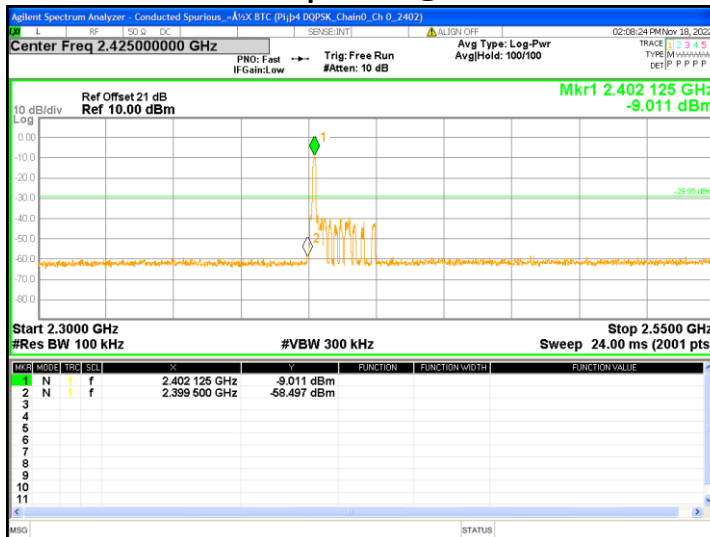
Conducted Spurious @ DH5 Ch 78



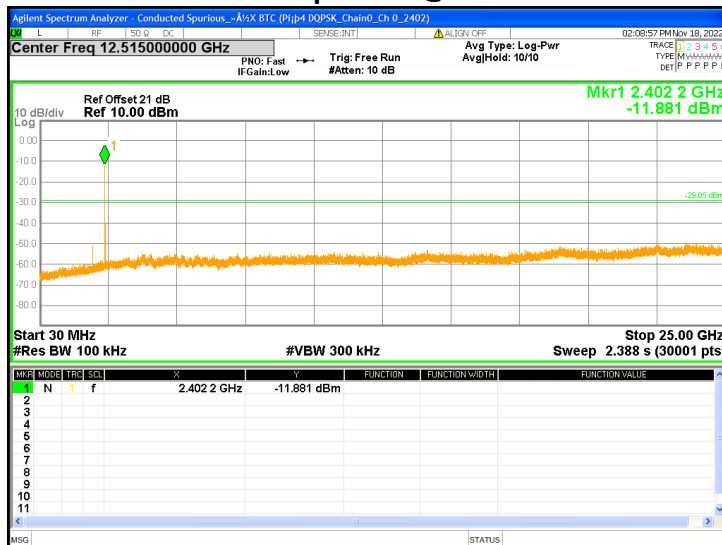
Conducted Spurious @ 2DH5 Ch 0



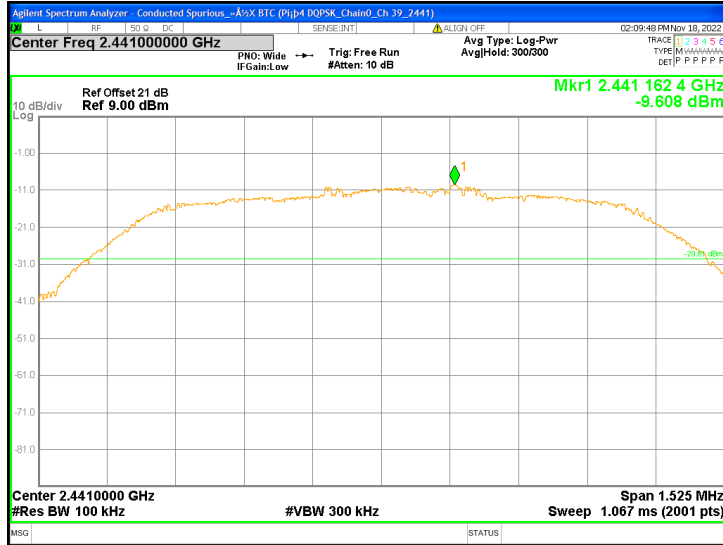
Conducted Spurious @ 2DH5 Ch 0



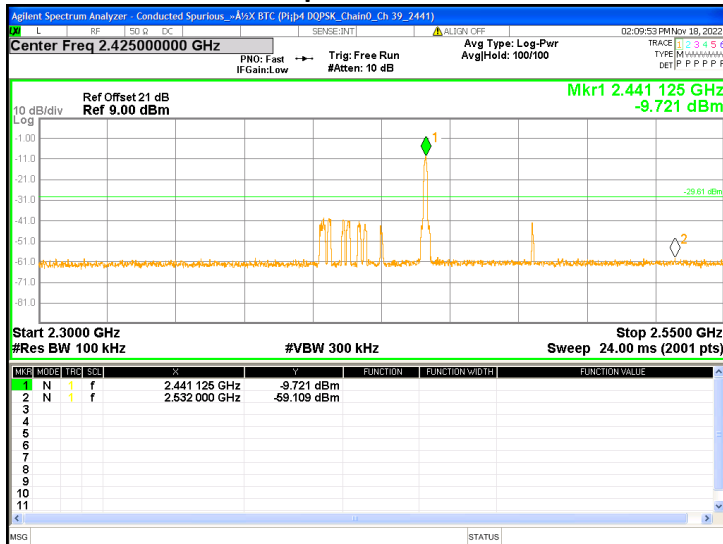
Conducted Spurious @ 2DH5 Ch 0



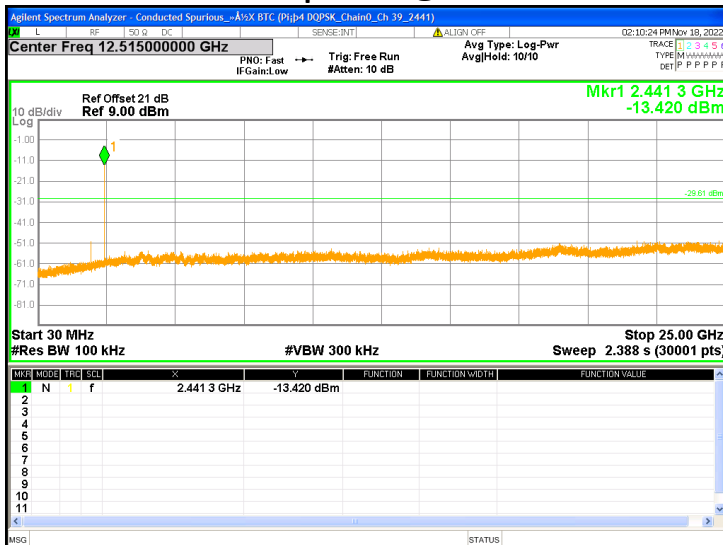
Conducted Spurious @ 2DH5 Ch 39



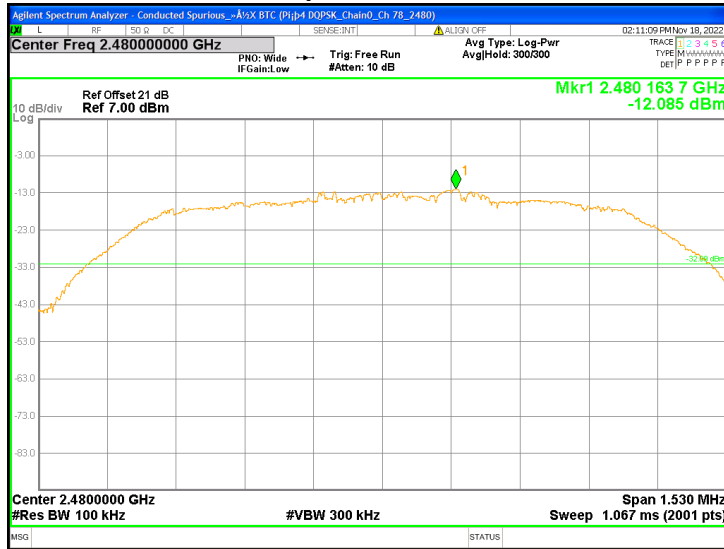
Conducted Spurious @ 2DH5 Ch 39



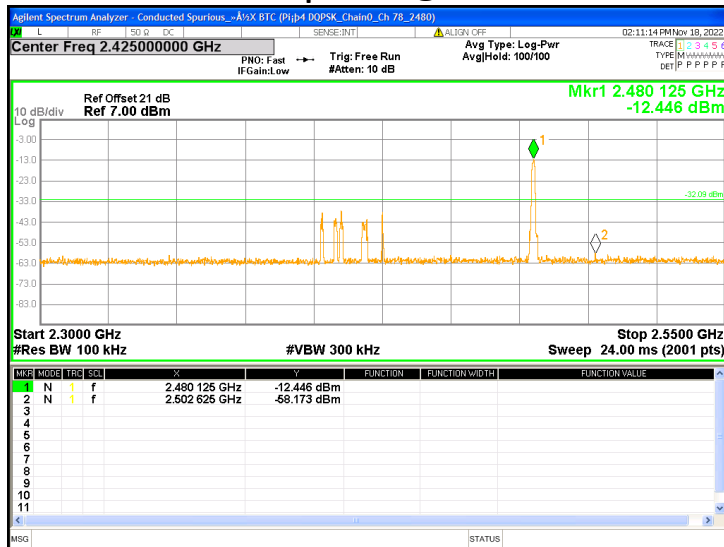
Conducted Spurious @ 2DH5 Ch 39



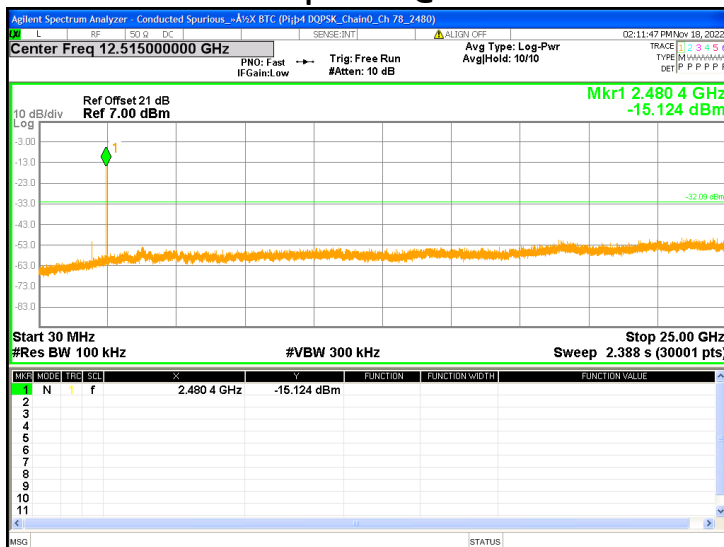
Conducted Spurious @ 2DH5 Ch 78



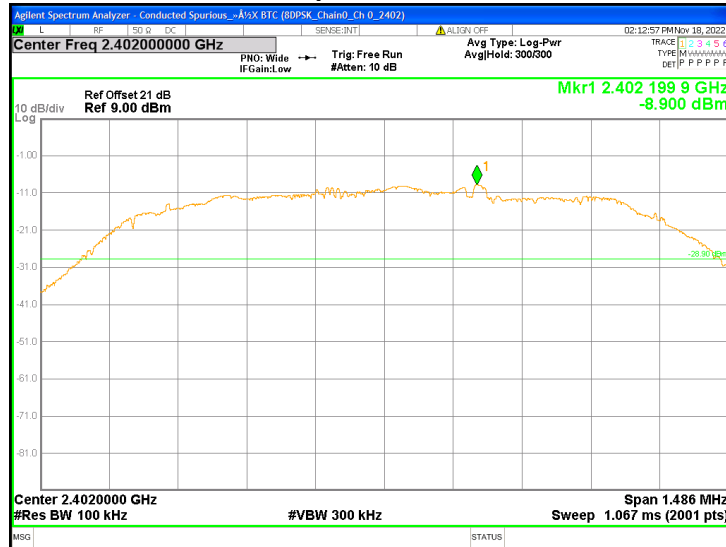
Conducted Spurious @ 2DH5 Ch 78



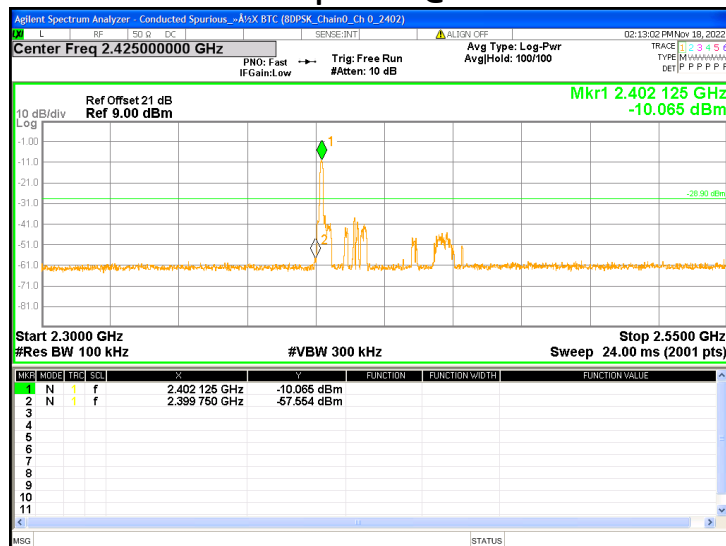
Conducted Spurious @ 2DH5 Ch 78



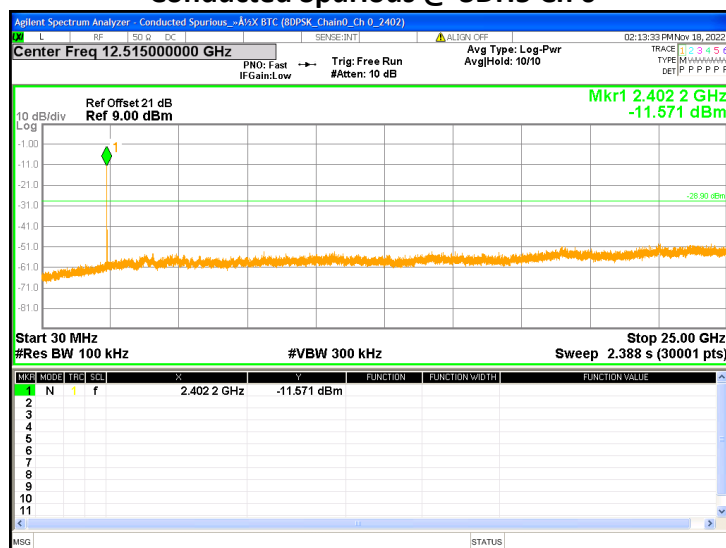
Conducted Spurious @ 3DH5 Ch 0



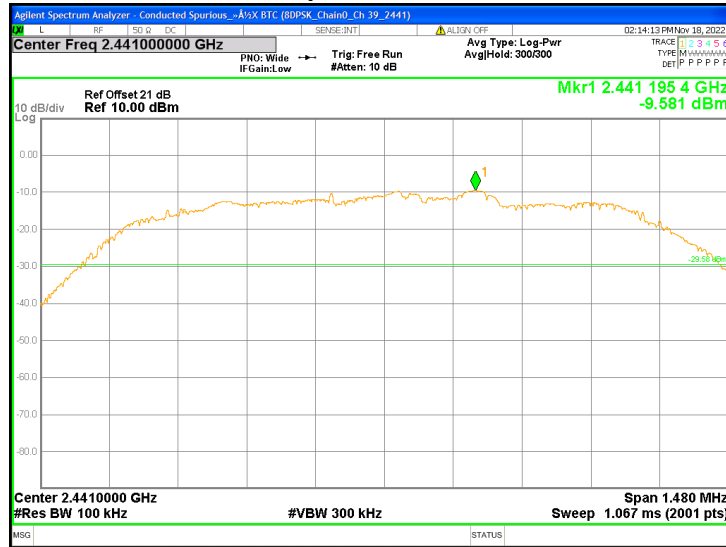
Conducted Spurious @ 3DH5 Ch 0



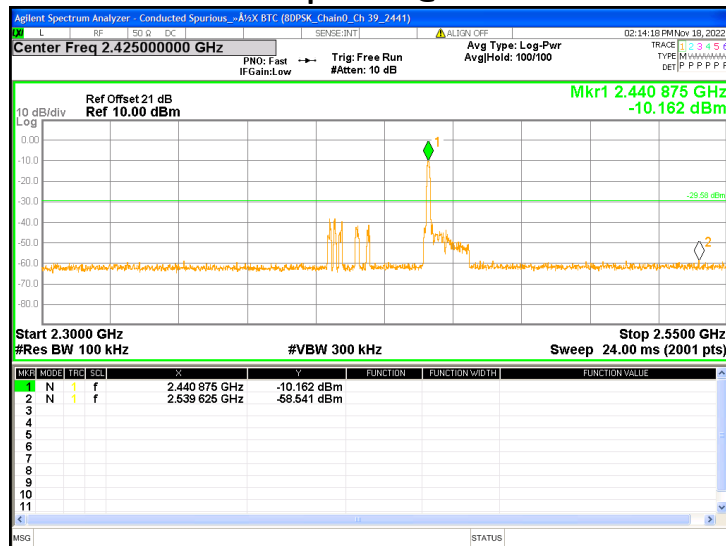
Conducted Spurious @ 3DH5 Ch 0



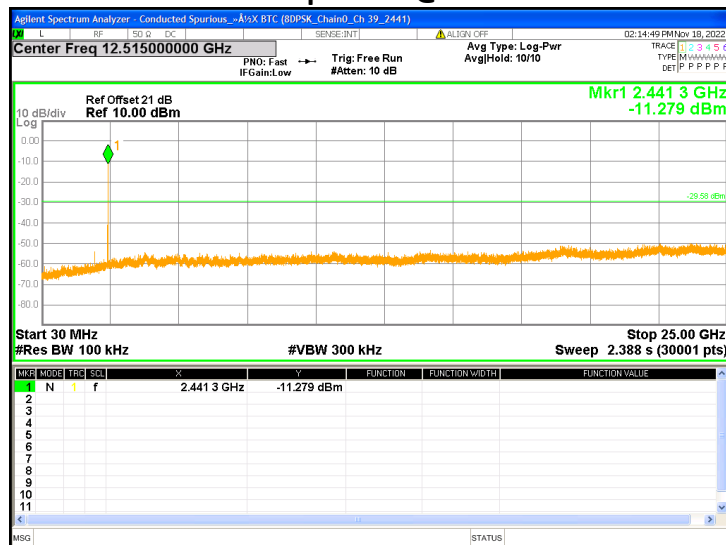
Conducted Spurious @ 3DH5 Ch 39



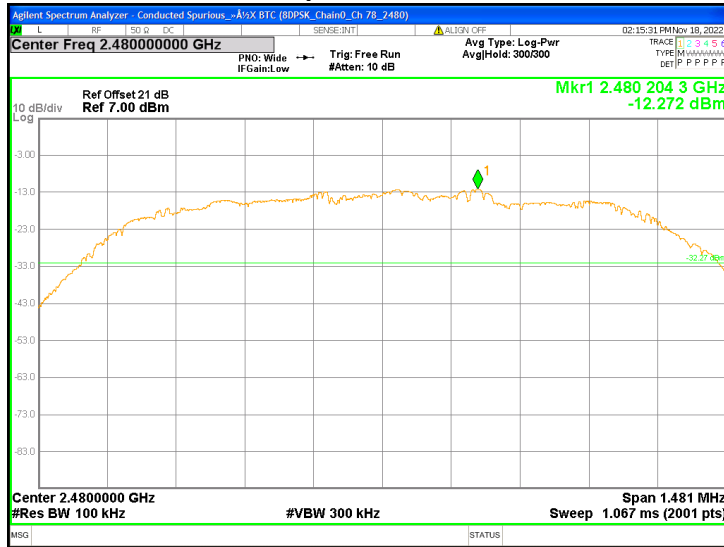
Conducted Spurious @ 3DH5 Ch 39



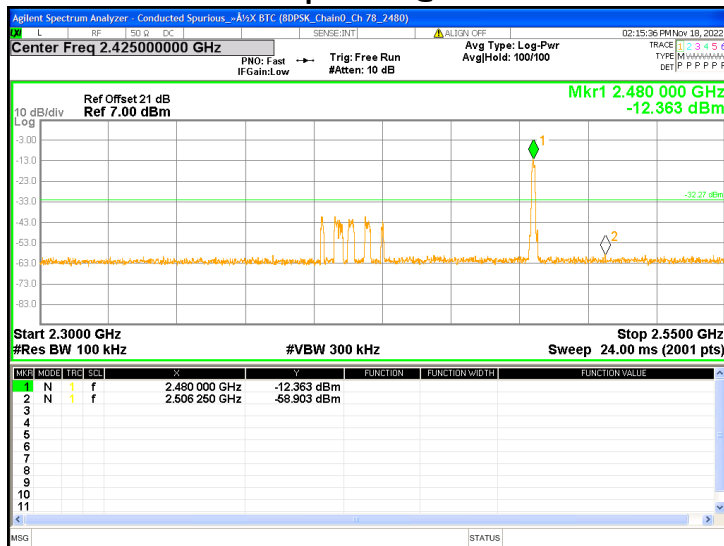
Conducted Spurious @ 3DH5 Ch 39



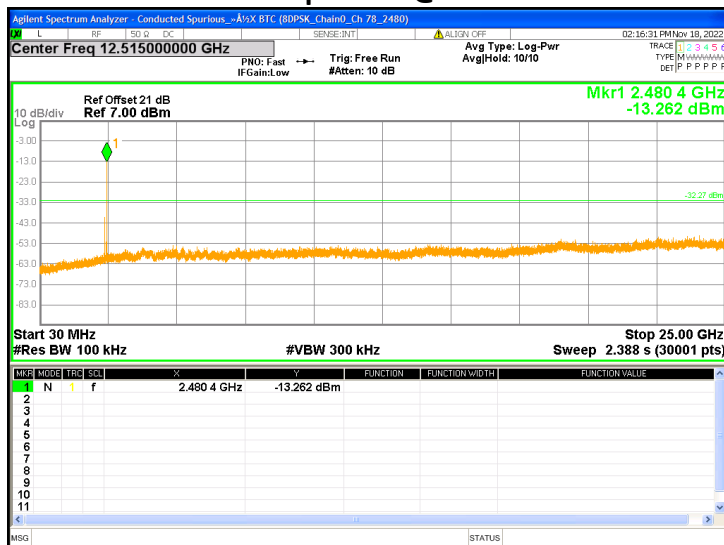
Conducted Spurious @ 3DH5 Ch 78



Conducted Spurious @ 3DH5 Ch 78



Conducted Spurious @ 3DH5 Ch 78



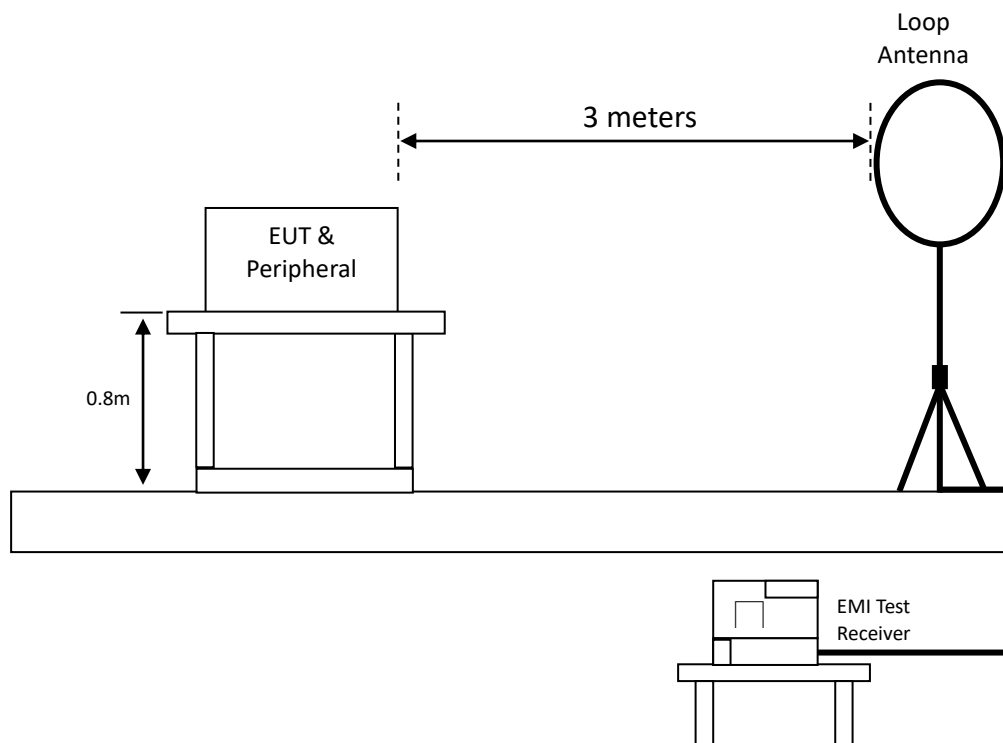
8. Emissions in Restricted Frequency Bands (Radiated emission measurements)

8.1 Instrument Setting

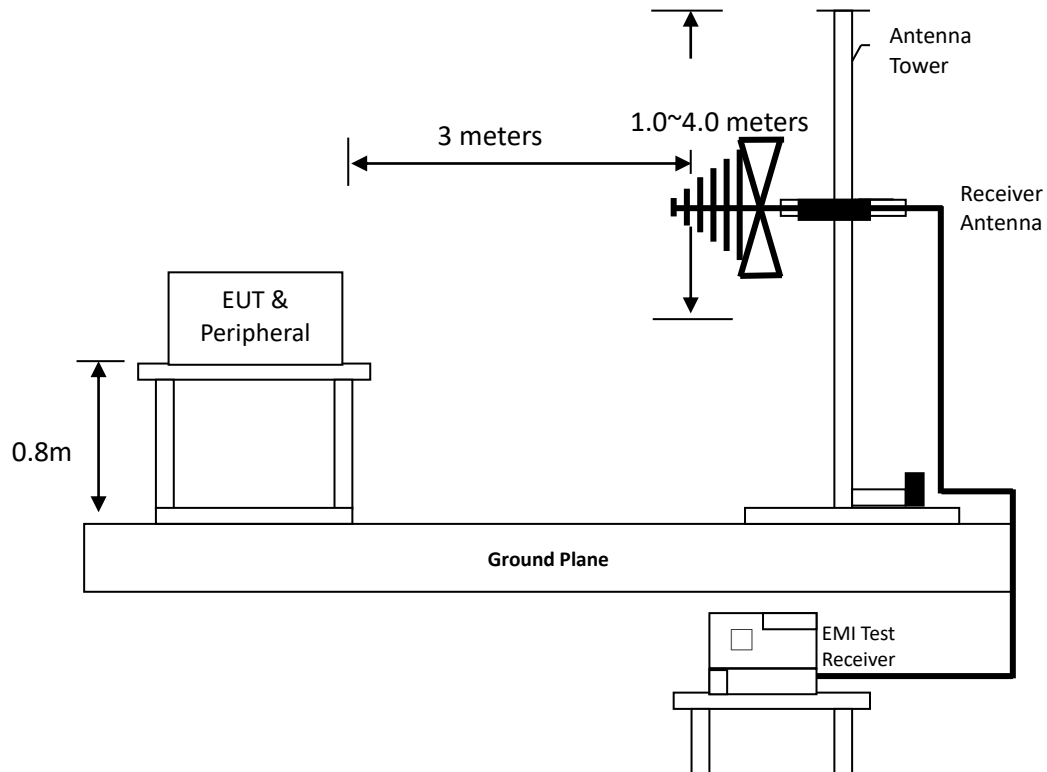
Receiver Function	Setting (Below 1GHz)	Setting (Above 1GHz)
Detector	QP	Peak and Average
RBW	9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz	1MHz
VBW	$\geq 3 \times \text{RBW}$	3MHz & 1/T Minimum VBW
Sweep	Auto couple	Auto couple
Start Frequency	9 kHz	1GHz
Stop Frequency	1 GHz	Tenth harmonic
Attenuation	Auto	Auto

8.2 Test setup & procedure

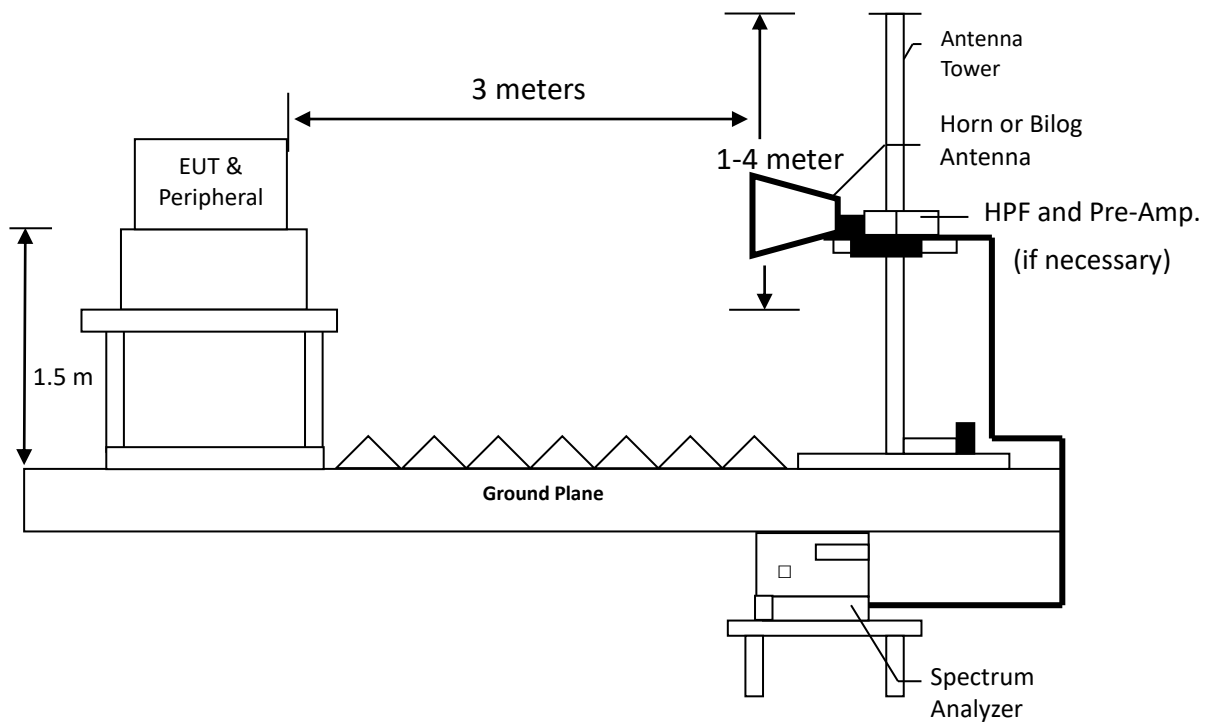
Radiated emission from 9kHz to 30MHz uses Loop Antenna:



Radiated emission below 1GHz using Bilog Antenna



Radiated emission above 1GHz using Horn Antenna



TEST REPORT

Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/ 3 MHz VBW) recorded also on the report.

The EUT for testing is arranged on a turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

8.3 Limit

Frequency(MHz)	Field Strength(uV/m)	Measurement distance(m)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

8.4 Operating Environment Condition

Temperature (°C) :	23
Relative Humidity (%) :	58

TEST REPORT

8.5 Test Result

8.5.1 Measurement results: frequencies 9kHz to 30MHz

The test was performed on EUT under continuously transmitting mode. The worst case occurred at 1DH5 Ch 0.

Ant Polarity	Frequency (MHz)	Detector	Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Perpendicular	0.009	AV	18.11	60.22	78.33	128.52	-50.19
Perpendicular	0.279	AV	18.55	37.27	55.82	98.73	-42.91
Perpendicular	0.429	AV	18.74	32.68	51.42	94.97	-43.55
Perpendicular	0.579	QP	18.85	36.50	55.35	72.38	-17.03
Perpendicular	0.699	QP	18.92	32.11	51.03	70.81	-19.78
Perpendicular	1.209	QP	19.10	29.21	48.31	65.96	-17.65

Remark: Corr. Factor = Antenna Factor + Cable Loss

Ant Polarity	Frequency (MHz)	Detector	Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Parallel	0.009	AV	18.11	56.49	74.60	128.52	-53.92
Parallel	0.309	AV	18.63	33.19	51.82	97.82	-46.00
Parallel	0.459	AV	18.76	33.43	52.19	94.38	-42.19
Parallel	0.609	QP	18.86	34.01	52.87	71.93	-19.06
Parallel	0.909	QP	19.04	28.50	47.54	68.49	-20.95
Parallel	1.239	QP	19.10	27.02	46.12	65.76	-19.64

Remark: Corr. Factor = Antenna Factor + Cable Loss

Ant Polarity	Frequency (MHz)	Detector	Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Ground-parallel	0.009	AV	18.11	54.72	72.83	128.52	-55.69
Ground-parallel	0.309	AV	18.63	27.28	45.91	97.82	-51.91
Ground-parallel	0.519	QP	18.81	24.83	43.64	73.34	-29.70
Ground-parallel	0.609	QP	18.86	27.05	45.91	71.93	-26.02
Ground-parallel	0.909	QP	19.04	19.60	38.64	68.49	-29.85
Ground-parallel	1.209	QP	19.10	20.27	39.37	65.96	-26.59

Remark: Corr. Factor = Antenna Factor + Cable Loss

TEST REPORT

8.5.2 Measurement results: frequencies below 1 GHz

The test was performed on EUT under continuously transmitting mode. The worst case occurred at 1DH5 Ch 0.

Ant Polarity	Frequency (MHz)	Detector	Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Vertical	43.58	QP	20.22	18.11	38.33	40.00	-1.67
Vertical	95.96	QP	15.44	21.87	37.31	43.50	-6.19
Vertical	119.24	QP	17.73	14.49	32.22	43.50	-11.28
Vertical	143.49	QP	20.16	22.34	42.50	43.50	-1.00
Vertical	191.02	QP	17.87	22.05	39.92	43.50	-3.58
Vertical	238.55	QP	19.26	14.74	34.00	46.00	-12.00

Ant Polarity	Frequency (MHz)	Detector	Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Horizontal	95.96	QP	15.44	23.05	38.49	43.50	-5.01
Horizontal	119.24	QP	17.73	15.52	33.25	43.50	-10.25
Horizontal	143.49	QP	20.16	21.30	41.46	43.50	-2.04
Horizontal	191.99	QP	17.78	24.15	41.93	43.50	-1.57
Horizontal	238.55	QP	19.26	19.69	38.95	46.00	-7.05
Horizontal	262.80	QP	20.55	13.47	34.02	46.00	-11.98

Remark: Corr. Factor = Antenna Factor + Cable Loss

TEST REPORT

8.5.3 Measurement results: frequency above 1GHz to 25GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
DH5_Ch0	4804	PK	H	-6.59	50.46	43.87	74	-30.13
	5340	PK	H	-5.13	52.53	47.40	74	-26.60
	4804	PK	V	-6.59	49.61	43.02	74	-30.98
DH5_Ch39	4882	PK	H	-6.09	49.86	43.77	74	-30.23
	4260	PK	V	-8.40	54.35	45.95	74	-28.05
	4882	PK	V	-6.09	46.31	40.22	74	-33.78
DH5_Ch78	4960	PK	H	-6.04	47.66	41.62	74	-32.38
	4960	PK	V	-6.04	44.25	38.21	74	-35.79
2DH5_Ch0	4804	PK	H	-6.59	55.08	48.49	74	-25.51
	4260	PK	V	-8.40	52.89	44.49	74	-29.51
	4804	PK	V	-6.59	48.27	41.68	74	-32.32
2DH5_Ch39	4882	PK	H	-6.09	50.43	44.34	74	-29.66
	4260	PK	V	-8.40	56.19	47.79	74	-26.21
	4882	PK	V	-6.09	47.16	41.07	74	-32.93
2DH5_Ch78	4960	PK	H	-6.04	45.68	39.64	74	-34.36
	4260	PK	V	-8.40	54.92	46.52	54	-54.00
	4960	PK	V	-6.04	44.82	38.78	54	-54.00
3DH5_Ch0	4804	PK	H	-6.60	54.12	47.52	74	-26.48
	4260	PK	V	-8.40	54.29	45.89	74	-28.11
	4804	PK	V	-6.63	51.05	44.42	74	-29.58
3DH5_Ch39	4882	PK	H	-6.09	51.19	45.10	74	-28.90
	3990	PK	V	-8.87	55.05	46.18	74	-27.82
	4882	PK	V	-6.09	46.18	40.09	74	-33.91
3DH5_Ch78	4960	PK	H	-6.04	46.97	40.93	74	-33.07
	3990	PK	V	-8.87	54.93	46.06	74	-27.94
	4960	PK	V	-6.04	44.78	38.74	74	-35.26

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

9. Emission on Band Edge

9.1 Instrument Setting

Spectrum Function	Setting
Detector	Peak and Average
RBW	1MHz
VBW	3MHz & 1/T Minimum VBW
Sweep	Auto couple
Restrict bands	2310 MHz ~ 2390 MHz 2483.5 MHz ~ 2500 MHz
Attenuation	Auto

9.2 Test Procedure

The test procedure is the same as Emissions in Restricted Frequency Bands (Radiated emission measurements).

9.3 Operating Environment Condition

Temperature (°C) :	23
Relative Humidity (%) :	58

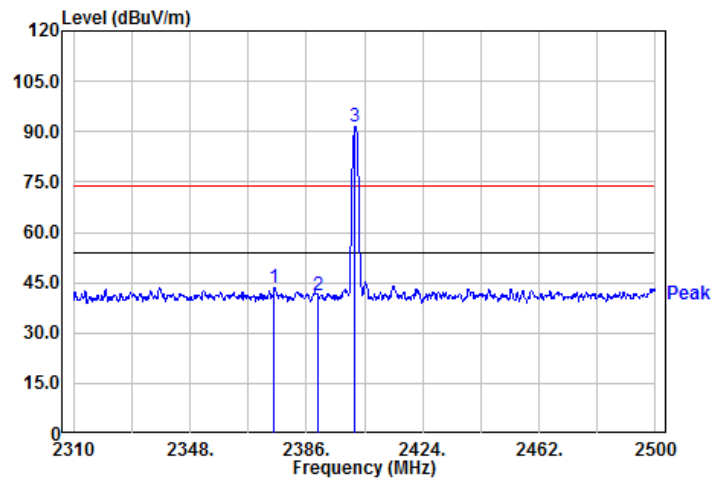
TEST REPORT

9.4 Test Results

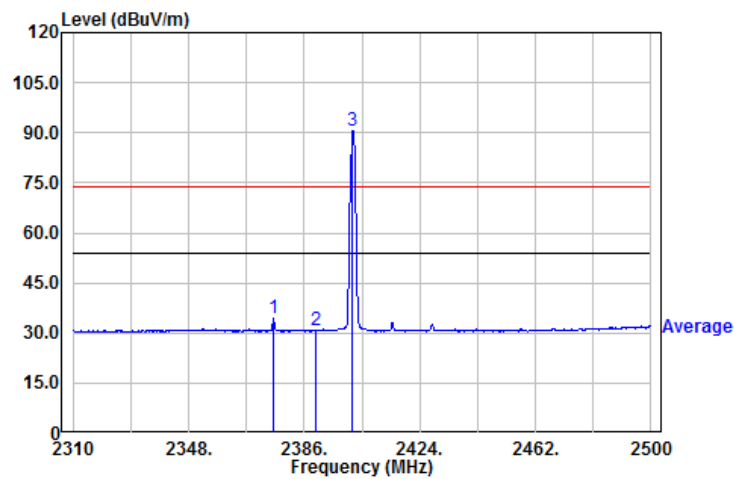
Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
DH5	2375.55	PK	H	34.32	9.04	43.36	74	-30.64	2310~2390
	2375.93	AV	H	34.32	-0.03	34.29	54	-19.71	
	2490.31	PK	H	34.64	7.47	42.11	74	-31.89	2483.5~2500
	2499.24	AV	H	34.73	-3.40	31.33	54	-22.67	
2DH5	2390.00	PK	H	34.25	9.89	44.14	74	-29.86	2310~2390
	2388.85	AV	H	34.26	-1.23	33.03	54	-20.97	
	2499.43	PK	H	34.73	7.54	42.27	74	-31.73	2483.5~2500
	2483.50	AV	H	34.58	-3.52	31.06	54	-22.94	
3DH5	2382.96	PK	H	34.29	9.74	44.03	74	-29.97	2310~2390
	2375.93	AV	H	34.32	-1.43	32.89	54	-21.11	
	2497.72	PK	H	34.71	8.41	43.12	74	-30.88	2483.5~2500
	2495.06	AV	H	34.68	-2.20	32.48	54	-21.52	

Remark: Correction Factor = Antenna Factor + Cable Loss

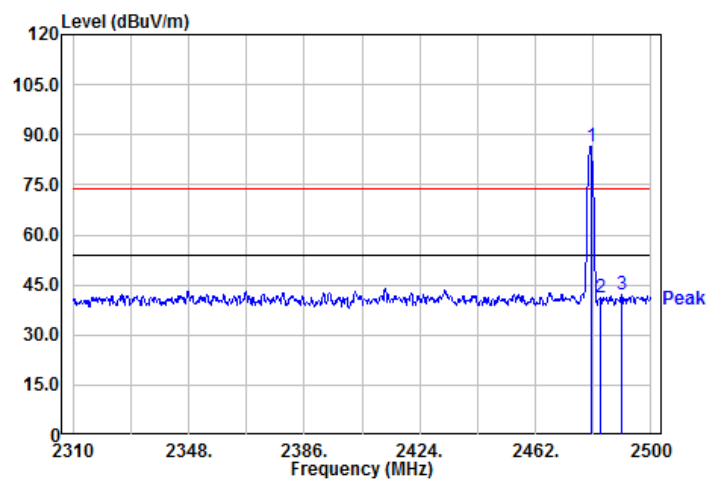
Chain 0: Restricted Band Bandedge @ DH5 Mode Ch0 PK



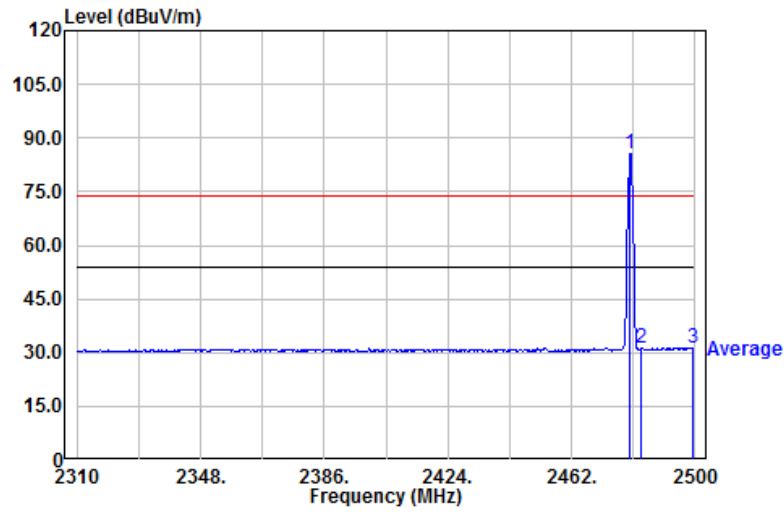
Chain 0: Restricted Band Bandedge @ DH5 Mode Ch0 AV



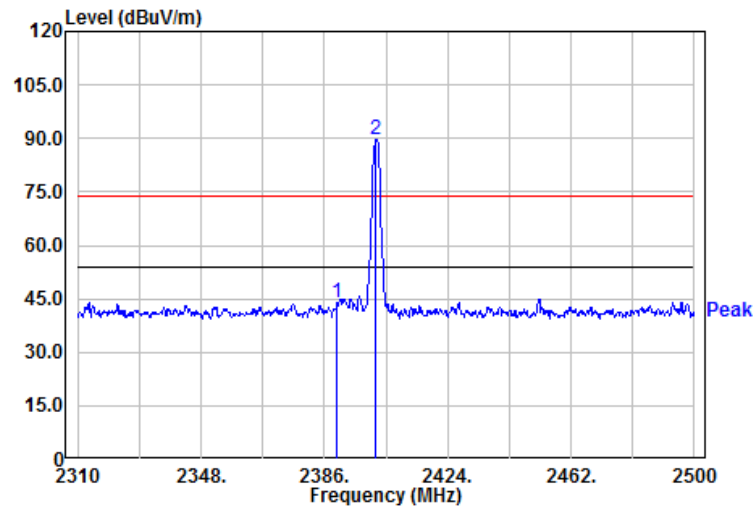
Chain 0: Restricted Band Bandedge @ DH5 Mode Ch78 PK



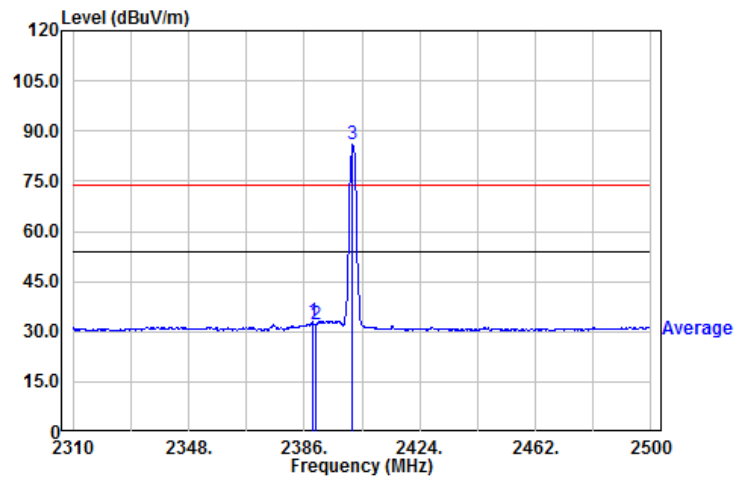
Chain 0: Restricted Band Bandedge @ DH5 Mode Ch78 AV



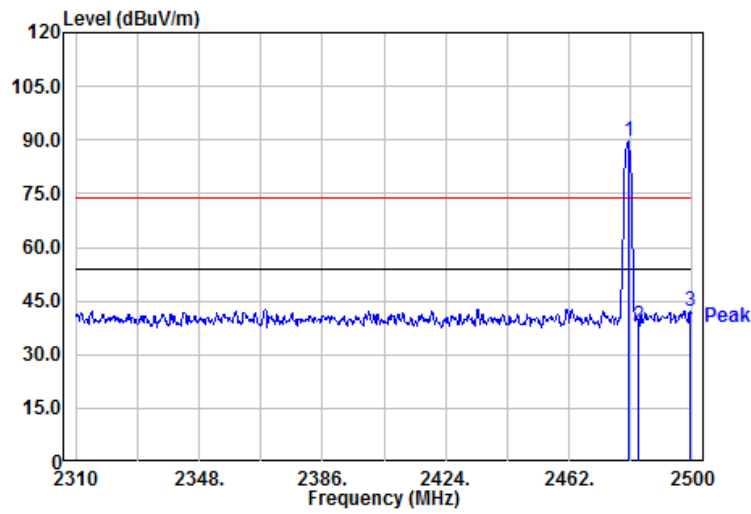
Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch0 PK



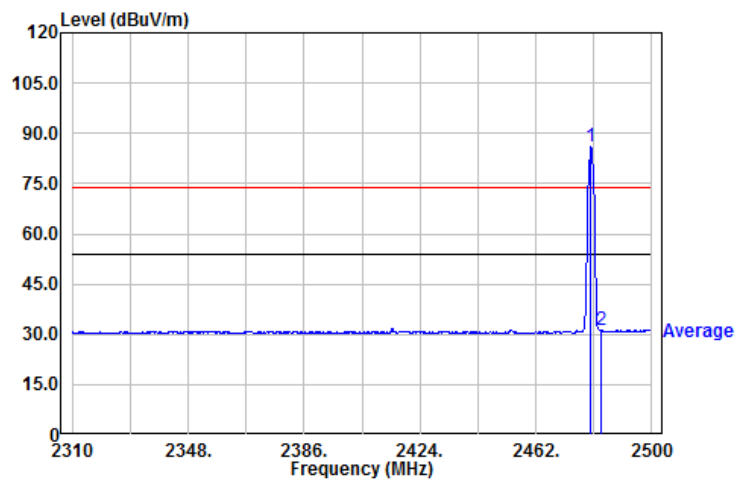
Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch0 AV



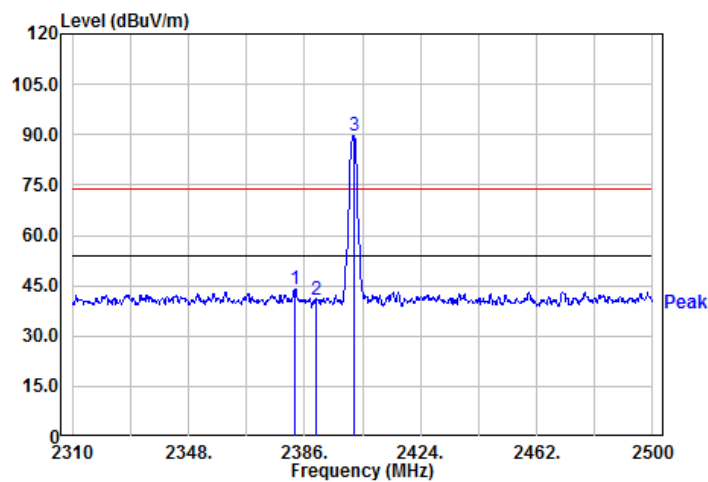
Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch78 PK



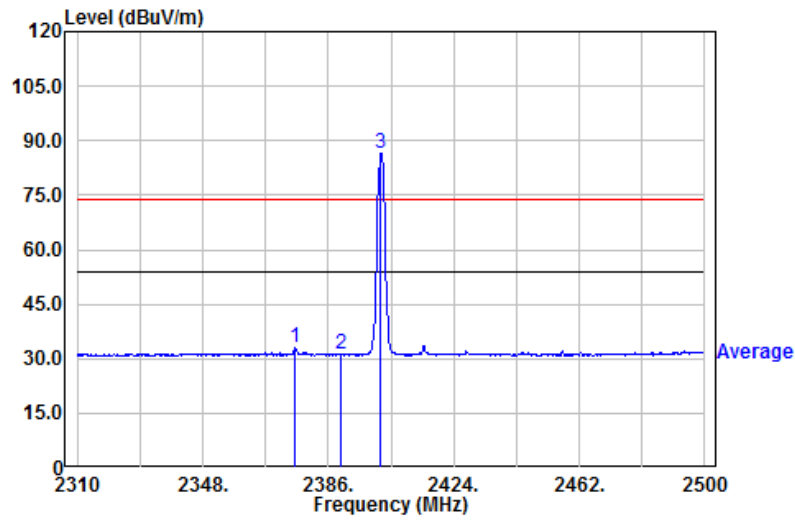
Chain 0: Restricted Band Bandedge @ 2DH5 Mode Ch78 AV



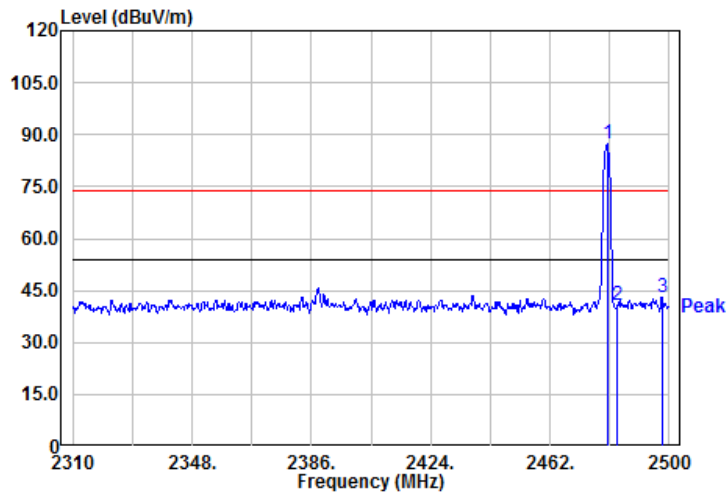
Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch0 PK



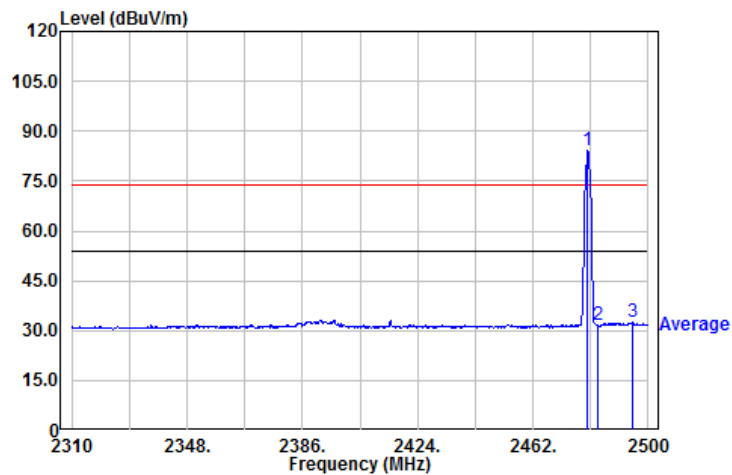
Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch0 AV



Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch78 PK



Chain 0: Restricted Band Bandedge @ 3DH5 Mode Ch78 AV



10. AC Power Line Conducted Emission

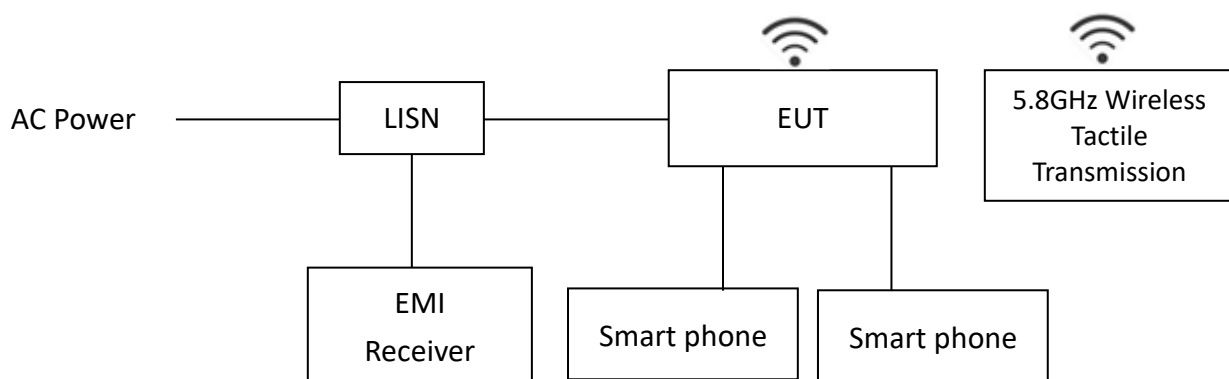
10.1 Measuring instrument setting

Receiver Function	Setting
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

10.2 Test Procedure

Step 1	Configure the EUT according to ANSI C63.10:2013. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
Step 2	Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
Step 3	All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
Step 4	The frequency range from 150 kHz to 30MHz was searched.
Step 5	Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
Step 6	The measurement has to be done between each power line and ground at the power terminal.

10.3 Test Diagram



TEST REPORT**10.4 Limit**

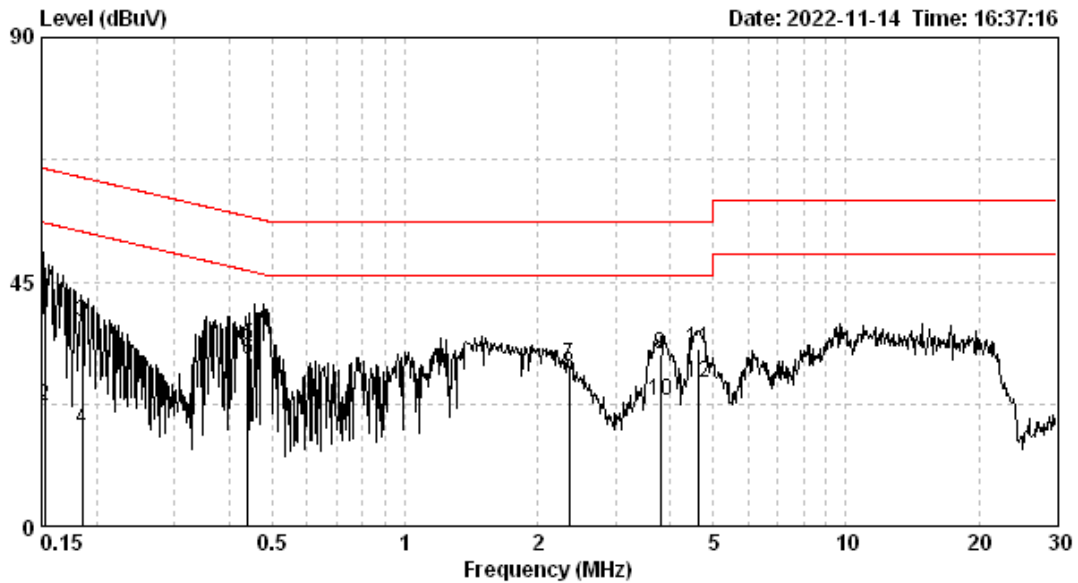
Frequency (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56	56 – 46
0.50~5.00	56	46
5.00~30.0	60	50

10.5 Operating Environment Condition

Temperature (°C) :	24
Relative Humidity (%) :	55
Atmospheric Pressure (hPa) :	1009

TEST REPORT

10.6 Test Results



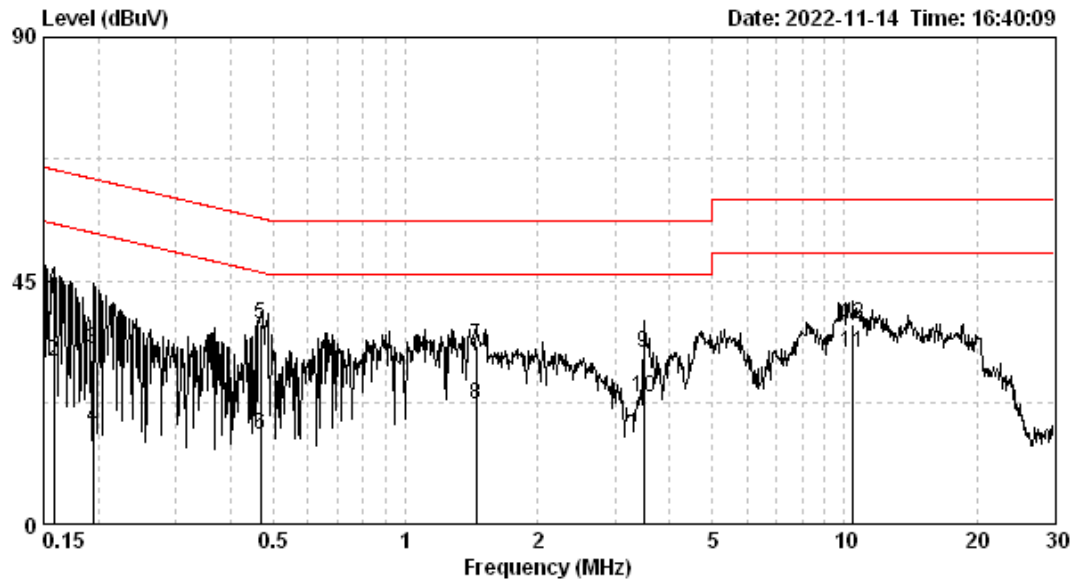
Test voltage : AC 120V/60Hz
 Temp. / R.H. : 24°C / 55%RH
 Atmospheric pressure : 1009 hPa

Phase	Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB)	
									QP	AV
LINE	0.152	9.66	35.16	44.81	65.87	12.45	22.11	55.87	-21.06	-33.76
LINE	0.185	9.65	28.05	37.70	64.24	8.31	17.96	54.24	-26.54	-36.28
LINE	0.440	9.66	23.74	33.40	57.07	21.02	30.68	47.07	-23.67	-16.39
LINE	2.358	9.70	20.02	29.72	56.00	18.34	28.04	46.00	-26.28	-17.96
LINE	3.799	9.70	21.98	31.68	56.00	13.21	22.91	46.00	-24.32	-23.09
LINE	4.647	9.71	22.83	32.53	56.00	16.72	26.42	46.00	-23.47	-19.58

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

TEST REPORT



Test voltage : AC 120V/60Hz
 Temp. / R.H. : 24°C / 55%RH
 Atmospheric pressure : 1009 hPa

Phase	Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB)	
									QP	AV
NEUTRAL	0.158	9.67	31.92	41.58	65.56	20.20	29.86	55.56	-23.98	-25.70
NEUTRAL	0.194	9.66	22.77	32.43	63.84	8.31	17.97	53.84	-31.41	-35.88
NEUTRAL	0.469	9.67	27.20	36.88	56.54	6.71	16.38	46.54	-19.66	-30.16
NEUTRAL	1.449	9.71	23.23	32.94	56.00	12.33	22.04	46.00	-23.06	-23.96
NEUTRAL	3.491	9.72	21.89	31.61	56.00	13.59	23.31	46.00	-24.39	-22.69
NEUTRAL	10.452	9.82	27.18	37.00	60.00	21.74	31.57	50.00	-23.00	-18.43

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

TEST REPORT

Appendix A: Test equipment list

Test Equipment/ Test site	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	Rohde & Schwarz	ESR7	101822	2022/08/09	2023/08/08
Signal Analyzer	Agilent	N9030A	MY51380492	2022/08/09	2023/08/08
Active Loop Antenna	SCHWARZBECK MESS-ELEKTRONIK C	FMZB1519	1519-067	2022/04/13	2023/04/12
Broadband Antenna	SHWARZBECK	VULB 9168	9168-172	2022/01/20	2023/01/19
Horn Antenna	EMCO	BBHA 9120 D	9120D-456	2022/01/21	2023/01/20
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170159	2021/04/08	2024/04/07
Broadband Amplifier	SGH	SGH118(45dB)	20220105-1	2022/01/07	2023/01/06
Pre-amplifier	SGH	SGH184	20201124-1	2021/12/06	2022/12/05
Power Meter	Anritsu	ML2495A	0844001	2022/07/04	2023/07/03
Power Sensor	Anritsu	MA2491A	031543	2022/03/07	2023/03/06
966-2(A) Cable	SUHNER	SMA / EX 100	N/A	2022/03/04	2023/03/03
966-2(B) Cable	SUHNER	SUCOFLEX 104P	CB0005	2022/03/04	2023/03/03
966-2 Cable	SUHNER	SUCOFLEX 104P	9403/4P	2021/11/30	2022/11/29
966-2_3m Semi-Anechoic Chamber	966_2	CEM-966_2	N/A	2022/01/14	2023/01/13
Hight Pass Filter	Reactel	7HS-3G/18G-S1 1	N/A	2022/05/25	2023/05/24
20dB Attenuator	Mini-Circuits	BW-S20W5+	N/A	2022/05/25	2023/05/24
Test software	Audix	e3	V9	NCR	NCR

Note: No Calibration Required (NCR).

TEST REPORT

Test Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESCI	100018	2022/11/07	2023/11/06
LISN	R&S	ENV216	101160	2022/07/13	2023/07/12
CON-2 Cable	SUHNER	EMCCFD300-B M-NM-6000	170502	2022/04/29	2023/04/28
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

TEST REPORT

Appendix B: Measurement Uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2.0$.

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.16 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.02 dB
Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	5.17 dB
Vertically polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Horizontally polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m	3.70 dB
Emission on the Band Edge Test	4.32 dB
RF Antenna Conducted Spurious Test	1.27 dB
Maximum Output Power Test	0.44 dB
Occupied Bandwidth Test	7.78 %
Carrier Frequency Separation Test	1.27 dB
Number of Hopping Frequencies Test	1.27 dB
Time of Occupancy (Dwell Time) Test	1.27 dB
AC Power Line Conducted Emission	3.08 dB