Spot Check Evaluation

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2437-3
FCC ID	:	IHDT56AS9
STANDARD	:	47 CFR Part 2, 22, 24, 27, 90S 47 CFR Part 15 Subpart C §15.225 47 CFR Part 15 Subpart C §15.247 47 CFR Part 15 Subpart E §15.407
TEST DATE(S)	:	Aug. 05, 2024 ~ Aug. 21, 2024

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR471919-01E	Rev. 01	Initial issue of report	Sep. 03, 2024

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2437-3
FCC ID	IHDT56AS9
IMEI Code	Conducted/DFS/CBP: 359867620008119/359867620008127 Radiation: 359867620006634 Conduction: 359867620006899/359867620006907
HW Version	DVT2
SW Version	U4UQ34.39
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Modification of EUT

No modifications are made to the EUT during all test items.

1.5 Specification of Accessory

Accessories Information				
AC Adapter 1(US)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-331L
AC Adapter 1(EU)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-332L
AC Adapter 1(UK)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-333L
AC Adapter 1(AU)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-335L
AC Adapter 1(AR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-336L
AC Adapter 1(BR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-337L
AC Adapter 1((CHILE))	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-339L
AC Adapter 1(KR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-330L
AC Adapter 2(US)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-331L
AC Adapter 2(EU)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-332L
AC Adapter 2(UK)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-333L
AC Adapter 2(AR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-336L
AC Adapter 2(BR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-337L
Battery 1	**Brand Name**	Motorola(ATL)	**Model Name**	RW50
Earphone 1	**Brand Name**	Motorola(Lyand)	**Model Name**	SH38D62338
Earphone 2	**Brand Name**	Motorola(Juwei)	**Model Name**	S928E43096
USB Cable 1	**Brand Name**	Motorola(Washin)	**Model Name**	S928D92375
USB Cable 2	**Brand Name**	Motorola(Saibao)	**Model Name**	S928D95755
Wireless Earphones	**Brand Name**	Motorola	**Model Name**	XT2443-1

1.6 Testing Site

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH03-KS 03CH02-KS 03CH06-KS TH01-KS DFS01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH03-KS	AUDIX	E3	210616
3.	03CH02-KS	AUDIX	E3	6.2009-8-24al
4.	03CH06-KS	AUDIX	E3	210616
5.	DFS01-KS	Sporton	Test Tools	1.0
6.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC KDB 484596 D01 Referencing Test Data v02r03
- 47 CFR Part 2, 22, 24, 27, 90S, 90S
- 47 CFR Part 15 Subpart C §15.225
- 47 CFR Part 15 Subpart C §15.247
- 47 CFR Part 15 Subpart E §15.407
- ANSI C63.10-2013
- ANSI C63.26-2015

2 Re-use of Measured Data

2.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2437-3, FCC ID: IHDT56AS9) is electrically identical to the reference device (Model: XT2437-1, XT2437-2, FCC ID: IHDT56AS8) for the portions of the circuitry corresponding to the data being re-used, following the FCC KDB 484596 D01 Referencing Test Data v02r03.

ECR Data Referencing Inquiry has been approved by FCC, and the data referencing and spot check test plan includes RF/EMC, the details are presented in section 2.3 of this report.
For Conducted items of 5G NR bands please refer to report number: TR-24ADRTCC7017.
For SAR Reference detail, please refer to FCC SAR report FA471919-01.

The criteria set in section 3 of KDB 484596 D01 v02r03 is followed to determine whether the data referencing is justified. For SAR, the higher between the referenced value and the spot check value is used to determine compliance in both standalone and simultaneous transimission conditions

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: IHDT56AS9 .

2.2 Model Difference Information

The **main** difference between FCC ID: IHDT56AS8 and FCC ID: IHDT56AS9 is as below:

- Remove WCDMA IV and LTE B4/12/13/17/25/66 and 5G NR n2/n66.
- Add LTE B20/32 and 5G NR n8/n20/n38/n41/n77.

Other differences and all the details of similarity and difference can be found in the confidential documents (IHDT56AS9 Operational Description of Product Equality Declaration).

2.3 Reference detail Section:

Rule Part	Equipment Class	Frequency Band (MHz)	Reference FCC ID (Parent)	Reference on test	Reference Title	FCC ID Filling (Variant)	Test on the variant	Data Referencing (Y/N)
15C	DSS (BR/EDR)	2400~2483.5	IHDT56AS8	Full test	FR471919A	IHDT56AS9	Spot check	Y, All test items
	DTS (BLE)	2400~2483.5	IHDT56AS8	Full test	FR471919B	IHDT56AS9	Spot check	Y, All test items
	DTS (WLAN)	2400~2483.5	IHDT56AS8	Full test	FR471919C	IHDT56AS9	Spot check	Y, All test items
	DXX (NFC)	13.56	IHDT56AS8	Full test	FR471919D	IHDT56AS9	Spot check	Y, All test items
15E	U-NII	5180~5240	IHDT56AS8	Full test	FR471919E	IHDT56AS9	Spot check	Y, All test items
		5260~5320	IHDT56AS8	Full test	FR471919E	IHDT56AS9	Spot check	Y, All test items
		5500~5720	IHDT56AS8	Full test	FR471919E	IHDT56AS9	Spot check	Y, All test items
		5745~5825	IHDT56AS8	Full test	FR471919E	IHDT56AS9	Spot check	Y, All test items
		5260~5320 5500~5720	IHDT56AS8	Full test	FZ471919	IHDT56AS9	Spot check	Y, All test items
	6XD	5925~7125	IHDT56AS8	Full test	FR471919F	IHDT56AS9	Spot check	Y, All test items
22 24	PCE (GSM, WCDMA)	GSM 850/1900 WCDMA B2/B5	IHDT56AS8	Full test	FG471919A	IHDT56AS9	Spot check	Y, All test items
22 24 27 90	PCE (LTE)	LTE B2/B5/B7/B7C/ B26/B38/B38C/ B42/B42C	IHDT56AS8	Full test	FG471919B FG471919C FG471919D FG471919E FG471919F	IHDT56AS9	Spot check	Y, All test items
22 27	PCE (NR)	5G NR n5/n7/n26	IHDT56AS8	Full test	FG471919G	IHDT56AS9	Spot check	Y, RSE item.

Y: Pointer to spot-check exhibit; N: Pointer to full test exhibit.

2.4 Spot Check Verification Data Section

All test items test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.
All test procedures follow the related section of parent report.

Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, show a deviation d_{dB} from the reference data no larger than 3 dB:

$$d_{dB} = | V_{dB} – R_{dB} | \leq 3 \text{ dB} \quad (1)$$

V_{dB}, the variant spot-check level
R_{dB}, the corresponding measurement level for the reference model

An alternative to the limit of eq. (1) is available, and is based on considering how far the reference data R_{dB} is from the compliance threshold C_{dB} (also expressed in dB), for the particular test under consideration. In this case, if $M_{dB} =|C_{dB} – R_{dB}|$ is the margin in dB from the compliance limit, a spot check may be considered acceptable when the deviation ddB from the reference data satisfies the following condition:

$$d_{dB} = | V_{dB} – R_{dB} | \leq (3 + M_{dB} /20) \text{ dB} \text{ , for } 0 \leq M_{dB} \leq 60 \text{ dB}$$

$$d_{dB} = | V_{dB} – R_{dB} | = 6 \text{ dB} \text{ , for } M_{dB} > 60 \text{ dB} \quad (2)$$

where “| |” is the absolute value of the measured quantity.
When using the option in eq. (2), d_{dB} increases linearly from 3 dB to 6 dB.

Summary for spot check for each rule entry and technology is listed as below:

Mode	Test Item	IHDT56AS8 Parent Worst mode Test Result	IHDT56AS9 Variant Check Test Result	Deviation	Deviation Limit
BT 1Mbps (CH78)	Number of Channels (N)	79	79	0.00	3
	Hopping Channel Separation (MHz)	1.009	1.003	0.01	3
	Dwell Time of Each Channel(s)	0.31	0.31	0.00	3
	20dB Bandwidth(MHz)	0.95	0.94	0.01	3
	99% Bandwidth(MHz)	0.836	0.836	0.00	3
	Conducted Band Edges(dBm)	-52.28	-51.03	1.25	3
	Conducted Spurious Emission(dBm)	-43.36	-45.96	2.60	3
BT 1Mbps (CH78)	Radiated Band Edges and Radiated Spurious Emission (dBuV/m)	56.36	57.48	-1.12	3
BT	AC Conducted Emission (dBuV)	46.04	44.68	1.36	3
BLE 1Mbps (CH39)	6dB Bandwidth (MHz)	0.67	0.67	0.00	3
	99% Bandwidth (MHz)	1.02	1.02	0.00	3
	Power Spectral Density (dBm/3KHz)	-9.35	-9.50	0.15	3
	Conducted Band Edges and Spurious Emission (dBm)	-55.57	-52.79	2.78	3
	Conducted Spurious Emission (dBm)	-50.79	-49.64	1.15	3
BLE 2Mbps (CH39)	Radiated Band Edges and Spurious Emission (dBuV/m)	45.97	46.01	-0.04	3
BLE	AC Conducted Emission (dBuV)	46.04	44.68	1.36	3
WIFI 2.4G (802.11b CH11)	6dB Bandwidth (MHz)	8.06	8.02	0.04	3
	99% Bandwidth (MHz)	12.895	13.287	0.39	3
	Power Spectral Density (dBm/3KHz)	-0.08	-0.15	0.07	3
	Conducted Band Edges and Spurious Emission (dBm)	-34.75	-36.73	1.98	3
	Conducted Spurious Emission (dBm)	-50.78	-49.45	1.33	3
WIFI 2.4G (802.11ax HE40 CH03)	Radiated Band Edges and Spurious Emission (dBuV/m)	50.69	48.16	2.53	3
WIFI 2.4G	AC Conducted Emission (dBuV)	46.04	44.68	1.36	3
WIFI 5G (802.11a CH149)	26dB Emission Bandwidth (MHz)	20.91	20.45	0.46	3
	99% Occupied Bandwidth (MHz)	16.69	16.38	0.31	3
	Power Spectral Density (dBm/MHz)	8.39	7.80	0.59	3
	DFS (s)	0.763225	0.972832	0.209607	3
WIFI 5G (11ax HE40_Ch62)	Radiated Band Edges and Spurious Emission (dBuV/m)	50.80	50.41	0.39	3

WIFI 5G	AC Conducted Emission (dBuV)	36.87	36.45	0.42	3
WIFI 6G UNII-8 (802.11ax HE80 CH199)	26dB Emission Bandwidth (MHz)	81.18	80.99	0.19	3
	99% Occupied Bandwidth (MHz)	76.952	76.876	0.08	3
	Fundamental Maximum EIRP (dBm)	11.34	11.06	0.28	3
	Fundamental Power Spectral Density (dBm/MHz)	-2.05	-2.56	0.51	3
	In-Band Emissions (Channel Mask) (dB)	-37.39	-37.15	0.24	3
WIFI 6G UNII-7 (802.11ax HE160 CH199)	Contention Based Protocol (dBm)	-69.05	-68.09	0.96	3
WIFI 6G (11ax HE160_Ch15)	Radiated Band Edges and Spurious Emission (dBuV/m)	50.62	50.46	0.16	3
WLAN 6G	AC Conducted Emission (dBuV)	43.18	45.05	1.87	3
Part 15C NFC	20dB Emission Bandwidth (KHz)	2.49	2.49	0	3
	99% Occupied Bandwidth (KHz)	2.11	2.10	0.01	3
	Field Strength of Fundamental (dBuV/m @ 30m)	9.36	11.95	2.59	3
	Radiated Spurious Emissions (dBuV/m)	29.5	30.68	1.18	3
	AC Power Line Conducted Emissions(dBuV)	45.12	43.97	1.15	3
Part 22/24/27/90 (Worst LTE Band 7C)	Conducted Power(dBm)	23.01	22.85	0.16	3
	Equivalent Isotropic Radiated Power(dBm)	20.84	20.68	0.16	3
	Peak-to-Average Ratio (dB)	6.46	6.34	0.12	3
	Occupied Bandwidth(MHz)	37.80	38.12	0.32	3
	Conducted Band Edge (dBm)	-26.52	-28.49	1.97	3
	Conducted Spurious Emission(dBm)	-50.27	-51.26	0.99	3
	Frequency Stability (ppm)	0.0029	0.0026	0.00	3

Test Item	Mode	IHDT56AS8 Parent Worst mode Test Result	IHDT56AS9 Variant Check Test Result	Deviation (dB)	Deviation Limit (dB)
Conducted Power (dBm)	BT BR/EDR	14.05	13.76	0.29	3
	BLE 1Mbps	5.69	5.39	0.3	3
	BLE 2Mbps	5.94	5.49	0.45	3
	11b, 2.4GHz	24.78	24.42	0.36	3
	11g, 2.4GHz	27.79	27.65	0.14	3
	11n HT20, 2.4GHz	27.88	27.25	0.63	3
	11n HT40, 2.4GHz	26.14	25.2	0.94	3
	11ax 20, 2.4GHz	28.03	27.41	0.62	3
	11ax 40, 2.4GHz	26.19	25.29	0.9	3
	11a, 5.2GHz	19.36	19.01	0.35	3
	11a, 5.3GHz	20.05	19.86	0.19	3
	11a, 5.5GHz	19.69	19.12	0.57	3
	11a, 5.8GHz	21.09	20.81	0.28	3
	11n HT20, 5.2GHz	19.54	19.12	0.42	3
	11n HT20, 5.3GHz	19.66	19.25	0.41	3
	11n HT20, 5.5GHz	19.92	19.34	0.58	3
	11n HT20, 5.8GHz	20.91	20.53	0.38	3
	11ac VHT20, 5.2GHz	19.59	19.24	0.35	3
	11ac VHT20, 5.3GHz	19.72	19.34	0.38	3
	11ac VHT20, 5.5GHz	19.74	19.62	0.12	3
	11ac VHT20, 5.8GHz	20.92	20.63	0.29	3
	11ax HE20, 5.2GHz	19.67	19.08	0.59	3
	11ax HE20, 5.3GHz	19.80	19.71	0.09	3
	11ax HE20, 5.5GHz	20.02	19.27	0.75	3
	11ax HE20, 5.8GHz	21.05	20.75	0.3	3
	11n HT40, 5.2GHz	19.82	19.33	0.49	3
	11n HT40, 5.3GHz	19.60	19.17	0.43	3
	11n HT40, 5.5GHz	19.99	19.27	0.72	3
	11n HT40, 5.8GHz	19.74	19.31	0.43	3
	11ac VHT40, 5.2GHz	19.96	19.56	0.4	3
	11ac VHT40, 5.3GHz	19.71	19.22	0.49	3
	11ac VHT40, 5.5GHz	19.99	19.54	0.45	3
	11ac VHT40, 5.8GHz	19.83	19.32	0.51	3
	11ax HE40, 5.2GHz	20.37	20.02	0.35	3
	11ax HE40, 5.3GHz	20.06	19.54	0.52	3
	11ax HE40, 5.5GHz	20.39	19.98	0.41	3
	11ax HE40, 5.8GHz	20.31	19.98	0.33	3
	11ac VHT80, 5.2GHz	17.13	16.88	0.25	3
	11ac VHT80, 5.3GHz	17.56	17.11	0.45	3
	11ac VHT80, 5.5GHz	18.95	18.45	0.5	3
	11ac VHT80, 5.8GHz	18.69	18.19	0.5	3
	11ax HE80, 5.2GHz	17.19	16.84	0.35	3
	11ax HE80, 5.3GHz	17.63	17.38	0.25	3
	11ax HE80, 5.5GHz	19.63	19.31	0.32	3
	11ax HE80, 5.8GHz	19.21	18.96	0.25	3
	11ac VHT160, 5.2GHz	15.34	14.98	0.36	3
	11ac VHT160, 5.5GHz	14.75	14.32	0.43	3
	11ax HE160, 5.2GHz	15.36	15.13	0.23	3
	11ax HE160, 5.5GHz	14.76	14.35	0.41	3
	11ax HE20, U-NII-5	10.00	9.23	0.77	3

	11ax HE20, U-NII-6	9.31	8.7	0.61	3
	11ax HE20, U-NII-7	9.42	9.03	0.39	3
	11ax HE20, U-NII-8	10.04	9.82	0.22	3
	11ax HE40, U-NII-5	13.09	12.62	0.47	3
	11ax HE40, U-NII-6	12.27	12.04	0.23	3
	11ax HE40, U-NII-7	12.49	11.89	0.60	3
	11ax HE40, U-NII-8	13.39	13.13	0.26	3
	11ax HE80, U-NII-5	15.01	14.24	0.77	3
	11ax HE80, U-NII-6	14.70	14.22	0.48	3
	11ax HE80, U-NII-7	14.44	13.66	0.78	3
	11ax HE80, U-NII-8	15.64	15.36	0.28	3
	11ax HE160, U-NII-5	16.44	15.68	0.76	3
	11ax HE160, U-NII-6	16.22	15.78	0.44	3
	11ax HE160, U-NII-7	16.31	15.75	0.56	3
	11ax HE160, U-NII-8	15.37	15.17	0.2	3
	GSM 850	32.84	32.82	0.02	3
	GSM 1900	29.16	28.93	0.23	3
	WCDMA 850	23.03	22.93	0.1	3
	WCDMA1900	22.81	22.79	0.02	3
	LTE B2	22.92	22.61	0.31	3
	LTE B5	22.94	22.92	0.02	3
	LTE B26 (Part 22H)	23.06	23.05	0.01	3
	LTE B26 (Part 90S)	22.82	22.71	0.11	3
	LTE B7	23.03	23.01	0.02	3
	LTE B7C	23.01	22.85	0.16	3
	LTE B38	23.16	23.12	0.04	3
	LTE B38C	23.11	22.81	0.30	3
	LTE B42	23.15	23.02	0.13	3
	LTE B42C	23.04	22.96	0.08	3

Conclusion:
All test items test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

Based on the spot check test result, the test data from the original model is representative for the variant model. All spot check test data are shown within expected level compliant to limit line.

We are using power and ERP/EIRP measurements from the original parent model reports to list on the grant.

The same detection mechanism/software/antenna gain is used in the variant of DFS/CBP. Hence, all test cases refer to parent report.

We confirm that the test data referencing policy of FCC KDB 484596 D01 Referencing Test Data v02r03 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

3 List of Measuring Equipment

For BT/WIFI:

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Aug. 16, 2024~ Aug. 18, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 02, 2024	Aug. 16, 2024~ Aug. 18, 2024	Jan. 01, 2025	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 02, 2024	Aug. 16, 2024~ Aug. 18, 2024	Jan. 01, 2025	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Jan. 02, 2024	Aug. 15, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY60242126	10Hz-44GHz	Oct. 11, 2023	Aug. 15, 2024	Oct. 10, 2024	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11, 2023	Aug. 15, 2024	Sep. 10, 2024	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	59915	30MHz-1GHz	Aug. 19, 2023	Aug. 15, 2024	Aug. 18, 2024	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 11, 2024	Aug. 15, 2024	Apr. 10, 2025	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 06, 2024	Aug. 15, 2024	Jan. 05, 2025	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	372171	9KHz ~1GHZ	Jan. 02, 2024	Aug. 15, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
Amplifier	EM	EM18G40GA	060728	18~40GHz	Jan. 02, 2024	Aug. 15, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082395	1Ghz-18Ghz	Jan. 02, 2024	Aug. 15, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270319	500MHz~26.5GHz	Oct. 11, 2023	Aug. 15, 2024	Oct. 10, 2024	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 15, 2024	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Aug. 15, 2024	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Aug. 15, 2024	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 18, 2024	Aug. 08, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 18, 2024	Aug. 08, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Conduction (CO01-KS)
Spectrum Analyzer	R&S	FSV7	101632	10Hz~7GHz	Jan. 03, 2024	Aug. 05, 2024	Jan. 02, 2025	DFS (DFS01-KS)
Signal Generator	KEYSIGHT	N5182B	MY53050604	9KHz~6GHz	Apr. 17, 2024	Aug. 05, 2024	Apr. 16, 2025	DFS (DFS01-KS)
Combiner	MTJ Cooperation	MTJ7112	N/A	0.4-6GHz	NCR	Aug. 05, 2024	NCR	DFS (DFS01-KS)
Signal Analyzer	R&S	FSV7	101472	10Hz~7GHz	Jan. 02, 2024	Aug. 21, 2024	Jan. 01, 2025	CBP (DFS01-KS)
MXG-B RF Vector Signal Genertor	Keysight	5182B /5182BX07	MY56200417 /MY59360210	9kHz~7.2GHz	Apr. 17, 2024	Aug. 21, 2024	Apr. 16, 2025	CBP (DFS01-KS)

NCR: No Calibration Required.

For NFC:

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	10Hz~30GHz	Jan. 05, 2024	Aug. 18, 2024	Jan. 04, 2025	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Aug. 18, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 04, 2024	Aug. 18, 2024	Jul. 03, 2025	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 11, 2023	Aug. 15, 2024	Oct. 10, 2024	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11, 2023	Aug. 15, 2024	Sep. 10, 2024	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 06, 2023	Aug. 15, 2024	Dec. 05, 2024	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 03, 2024	Aug. 15, 2024	Jan. 02, 2025	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Aug. 15, 2024	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 15, 2024	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 15, 2024	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 18, 2024	Aug. 08, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 18, 2024	Aug. 08, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Conduction (CO01-KS)

NCR: No Calibration Required

For WWAN Bands:

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Aug. 16, 2024~ Aug. 18, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Aug. 16, 2024~ Aug. 18, 2024	NCR	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 04, 2024	Aug. 16, 2024~ Aug. 18, 2024	Jul. 03, 2025	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11, 2023	Aug. 08, 2024	Sep. 10, 2024	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-1GHz	Dec. 06, 2023	Aug. 08, 2024	Dec. 05, 2024	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 23, 2023	Aug. 08, 2024	Oct. 22, 2024	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101115	18GHz~40GHz	Oct. 15, 2023	Aug. 08, 2024	Oct. 14, 2024	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	413740	30MHz ~1000MHz	Jan. 03, 2024	Aug. 08, 2024	Jan. 02, 2025	Radiation (03CH03-KS)
Amplifier	EM	EM18G40GA	060851	18~40GHz	Jan. 03, 2024	Aug. 08, 2024	Jan. 02, 2025	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082394	1Ghz-18Ghz	Jan. 03, 2024	Aug. 08, 2024	Jan. 02, 2025	Radiation (03CH03-KS)
Amplifier	Keysight	83017A	MY53270319	1GHz~26.5GHz	Oct. 11, 2023	Aug. 08, 2024	Oct. 10, 2024	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 08, 2024	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Aug. 08, 2024	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Aug. 08, 2024	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required.

4 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement (BT/WIFI2.4G/5G)

Conducted Spurious Emission & Bandedge	**±2.22 dB**
Occupied Channel Bandwidth	**±0.1%**
Conducted Power	**±0.50 dB**
Conducted Power Spectral Density	**±0.90 dB**
Frequency	**±0.4 Hz**

Uncertainty of Conducted Measurement (WIFI 6G)

Conducted Spurious Emission & Bandedge	**±2.22 dB**
Occupied Channel Bandwidth	**±0.1%**
Conducted Power	**±0.50 dB**
Conducted Power Spectral Density	**±0.90 dB**
Frequency	**±0.4 Hz**
Conducted Generated signal Levels	**±0.56 dB**
Conducted Time	**0.54%**

Uncertainty of Conducted Measurement (NFC)

Test Item	Uncertainty
Occupied Channel Bandwidth	**±0.1%**
Frequency	**±0.4 Hz**

Uncertainty of Conducted Measurement (DFS)

Conducted Generated signal Levels	±0.56 dB
Conducted Time	0.38%

Uncertainty of Conducted Measurement (WWAN)

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±2.22 dB
Occupied Channel Bandwidth	±0.1%
Conducted Power	±0.50 dB
Peak to Average Ratio	±0.46 dB
Frequency Stability	±0.4 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.84 dB

03CH06-KS(BT/WIF):

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.30 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.06 dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.18 dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.38 dB

03CH02-KS(NFC):

Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.30dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.04dB

03CH03-KS(WWAN):

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.84dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.84dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.83dB

-THE END-

Appendix A. Radiated Spurious Emission Test Data

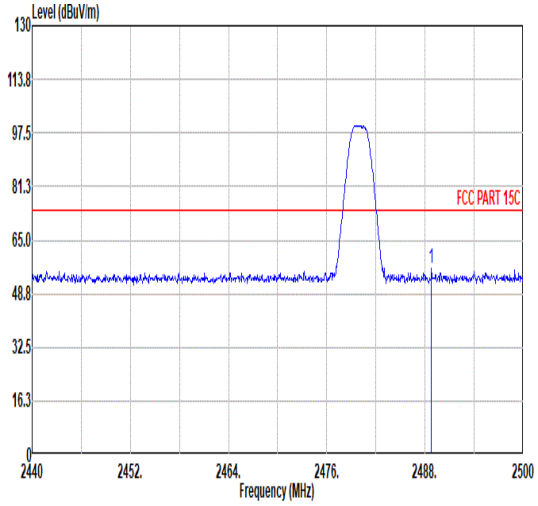
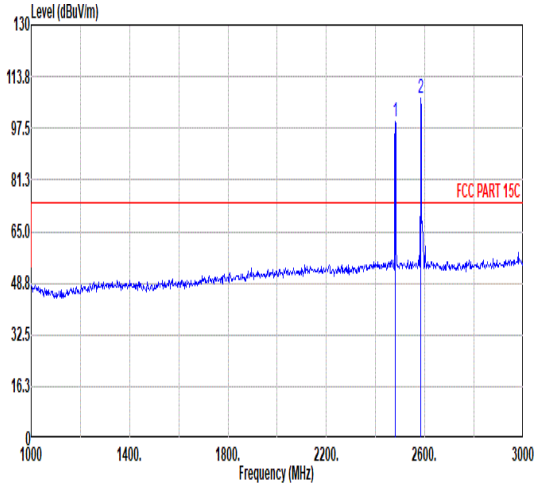
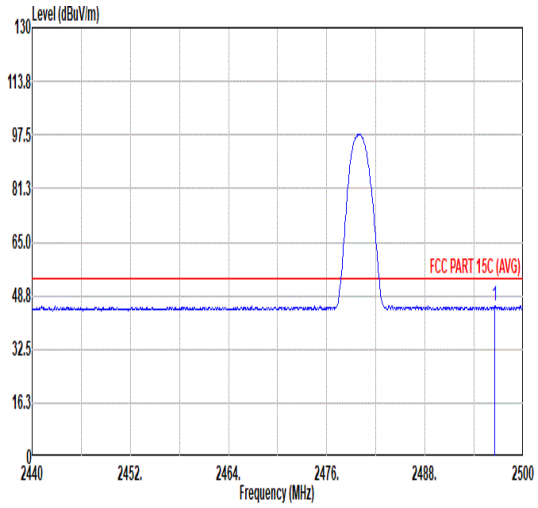
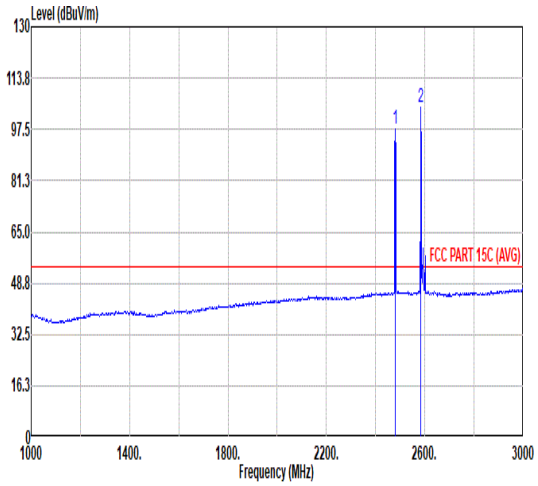
Test Engineer :	levi zhao	**Relative Humidity :**	22 ~ 23 ℃
		Temperature :	41 ~ 42 %

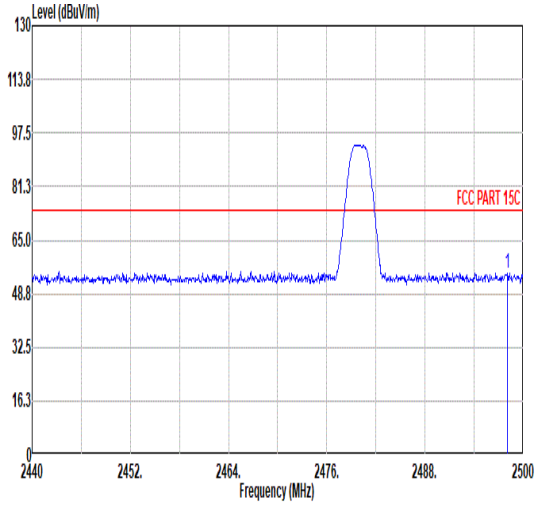
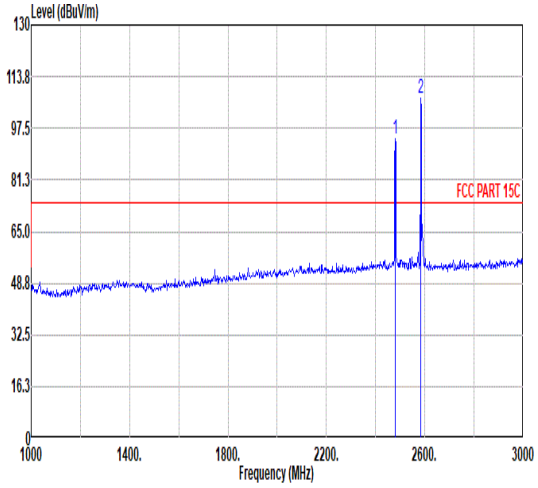
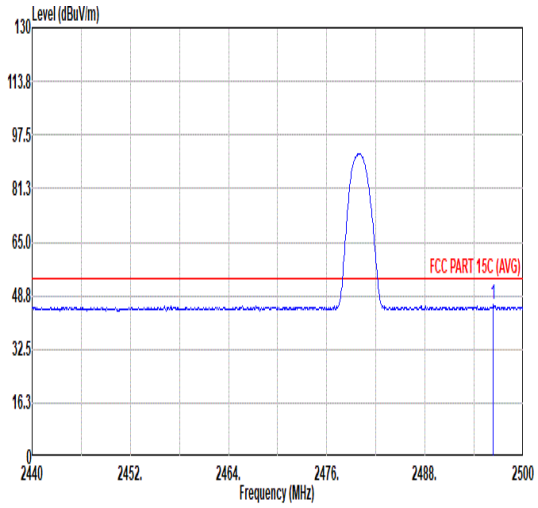
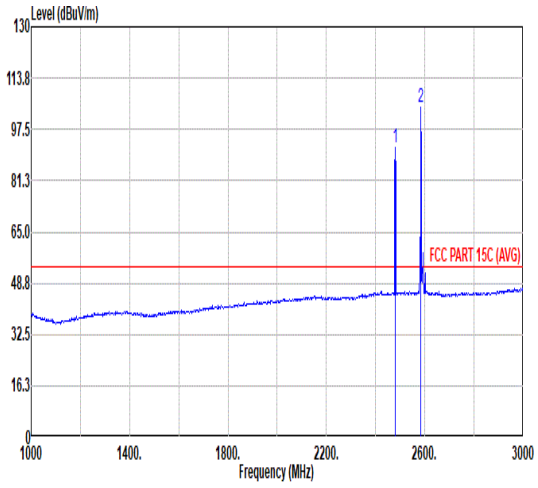
Radiated Spurious Emission Test Modes

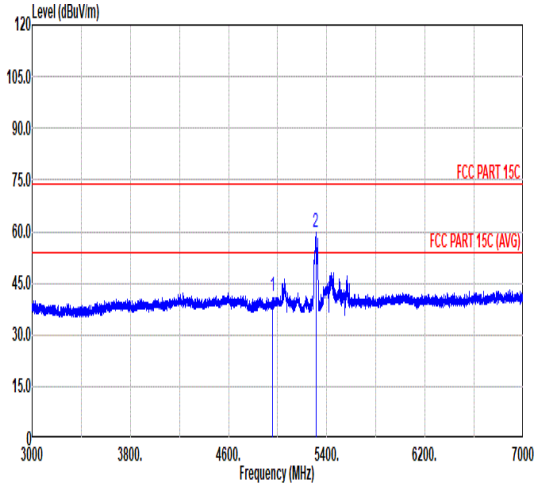
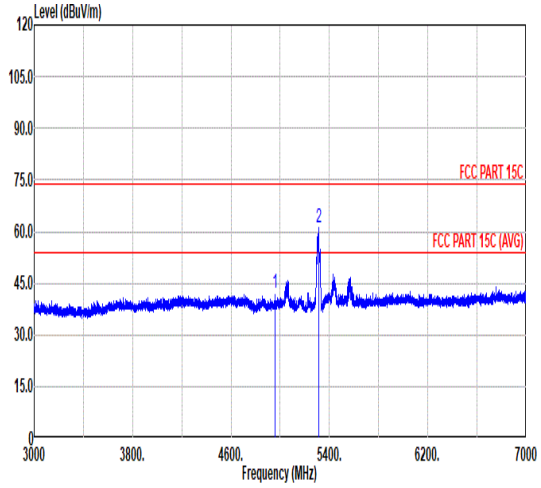
Mode	Band	Band (GHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	2400-2483.5	6	Bluetooth-LE_GSFK	39	2480	2Mbps	Full	-
	U-NII-2A	5.25-5.35	CDD 6+8	802.11ax HE40	62	5310	MCS0	Full	-
	Part 27M B41 BW=20M								
	NFC on								

Summary of each worse mode

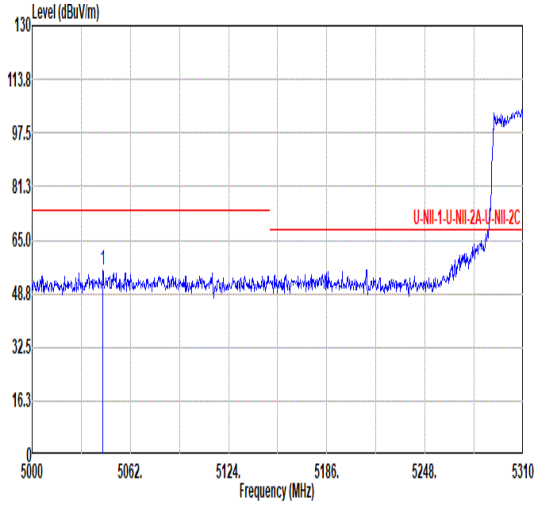
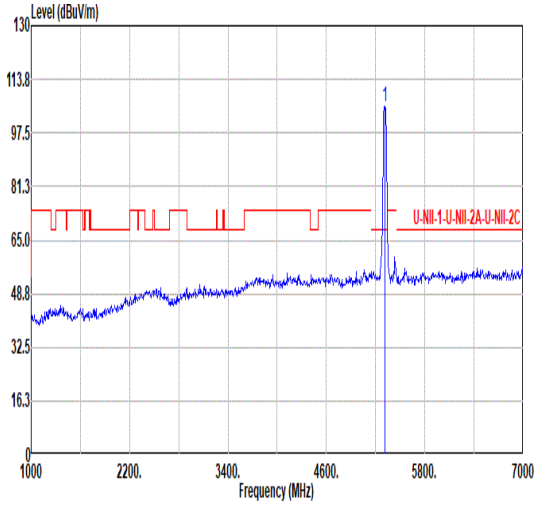
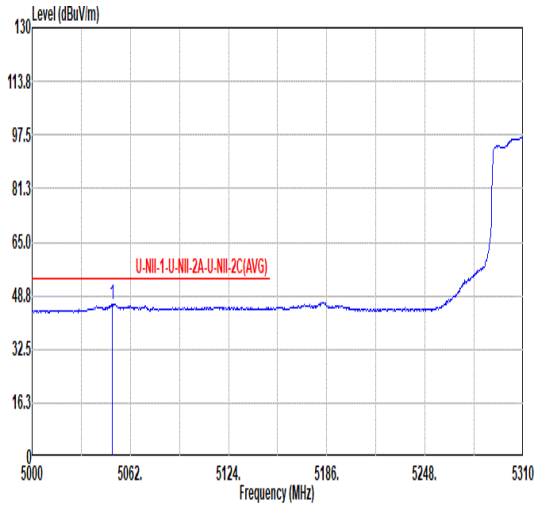
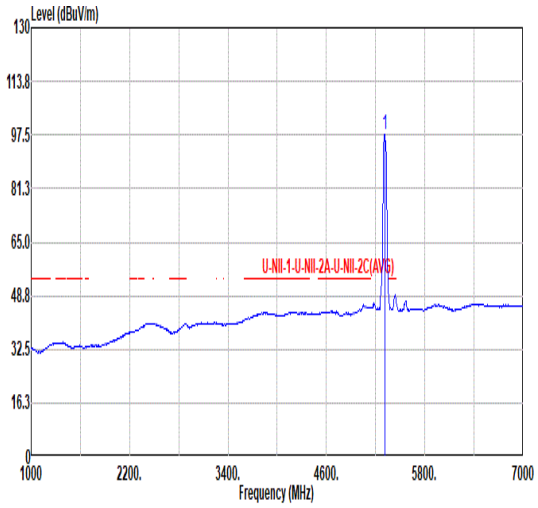
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth-LE_GSFK	39	2496.34	46.04	54.00	-7.96	V	AVERAGE	Pass	Band Edge
	Bluetooth-LE_GSFK	39	4960.00	41.94	74.00	-32.06	V	PEAK	Pass	Harmonic
	802.11ax HE40	62	5350.20	50.85	54.00	-3.15	H	Average	Pass	Band Edge
	802.11ax HE40	62	7752.40	62.37	70.20	-7.83	V	Peak	Pass	Harmonic

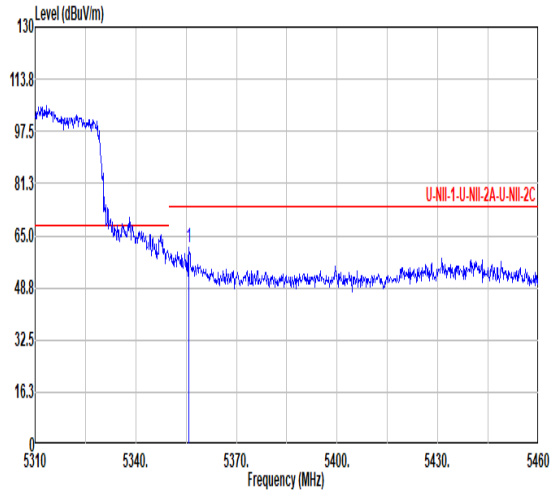
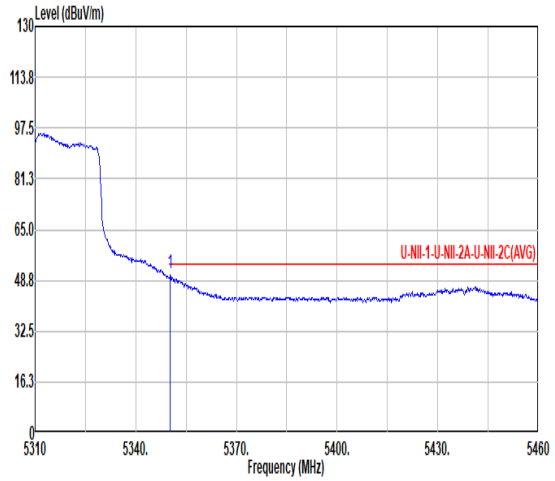
Mode	1	
	Co-location Band Edge	
	Bluetooth-LE_GSFK_CH39_2480MHz_Full	
ANT	6	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2488.78 56.44 74.00 -17.56 43.31 32.63 6.74 32.24 6.00 307 309 PEAK	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 99.82 ------ ------ 86.74 32.58 6.73 32.23 6.00 307 309 Peak 2 2584.00 106.92 ------ ------ 93.93 32.36 6.87 32.24 6.00 307 309 Peak
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2496.52 45.66 54.00 -8.34 32.47 32.68 6.75 32.24 6.00 307 309 AVERAGE	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 97.66 ------ ------ 84.58 32.58 6.73 32.23 6.00 307 309 Average 2 2584.00 104.57 ------ ------ 91.58 32.36 6.87 32.24 6.00 307 309 Average

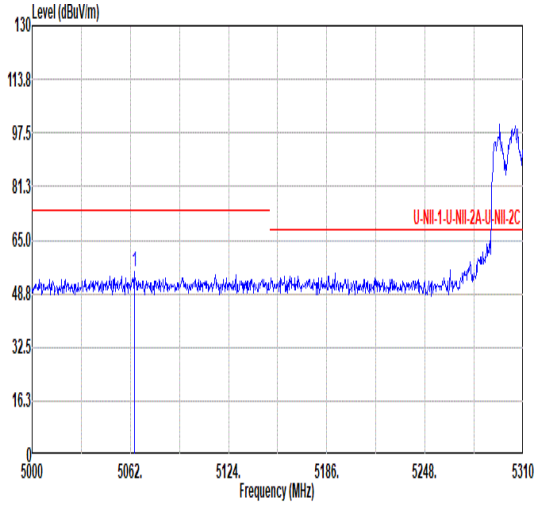
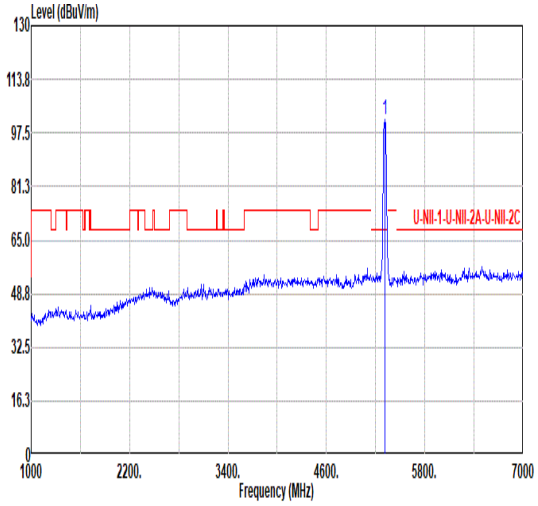
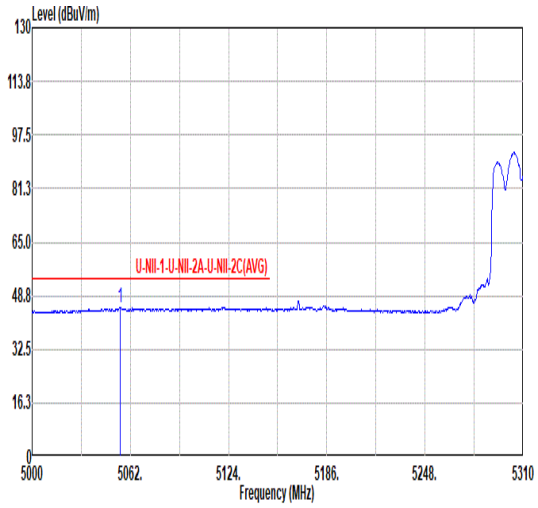
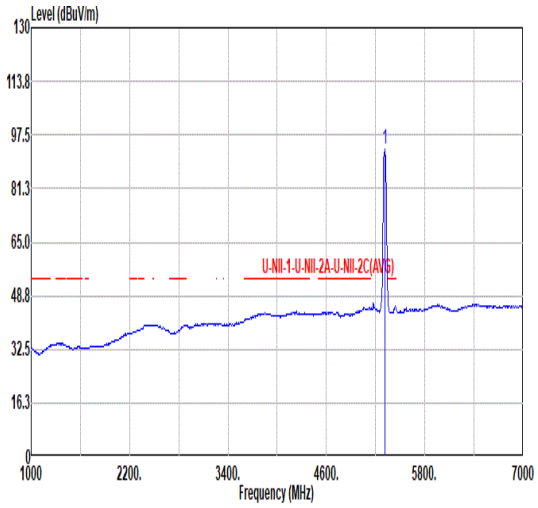
Mode	1	
	Co-location Band Edge	
	Bluetooth-LE_GSFK_CH39_2480MHz_Full	
ANT	6	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2498.02 55.14 74.00 -18.86 41.94 32.69 6.75 32.24 6.00 245 0 PEAK	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 94.01 ------ ------ 80.93 32.58 6.73 32.23 6.00 245 0 Peak 2 2584.00 106.81 ------ ------ 93.82 32.36 6.87 32.24 6.00 245 0 Peak
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2496.34 46.04 54.00 -7.96 32.85 32.68 6.75 32.24 6.00 245 0 AVERAGE	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 91.80 ------ ------ 78.72 32.58 6.73 32.23 6.00 245 0 Average 2 2584.00 104.50 ------ ------ 91.51 32.36 6.87 32.24 6.00 245 0 Average

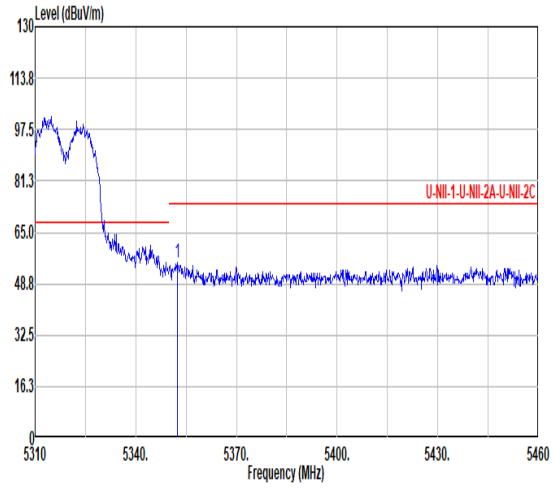
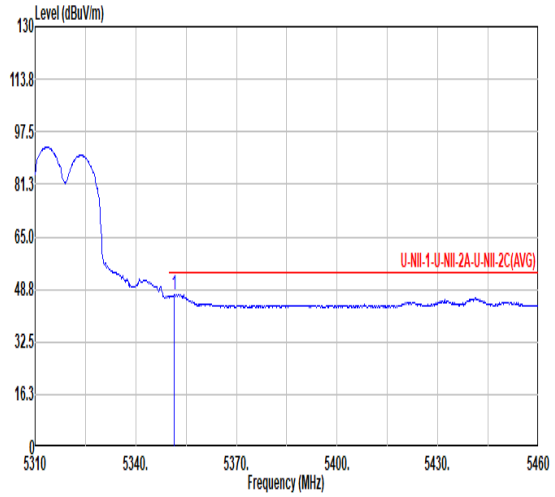
Mode	1	
	Co-location Harmonic	
	Bluetooth-LE_GSFK_CH39_2480MHz_Full	
ANT	6	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 41.34 74.00 -32.66 58.89 34.00 9.61 61.16 0.00 --- --- PEAK 2 5310.40 59.83 74.00 -14.17 76.23 34.52 9.89 60.81 0.00 --- --- Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 41.94 74.00 -32.06 59.49 34.00 9.61 61.16 0.00 --- --- PEAK 2 5313.20 60.97 74.00 -13.03 77.36 34.53 9.89 60.81 0.00 --- --- Peak

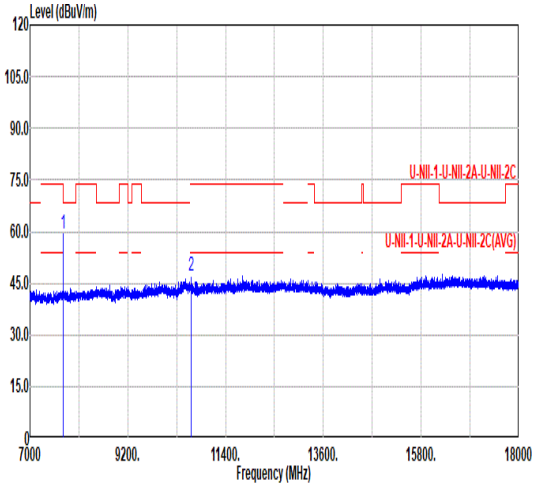
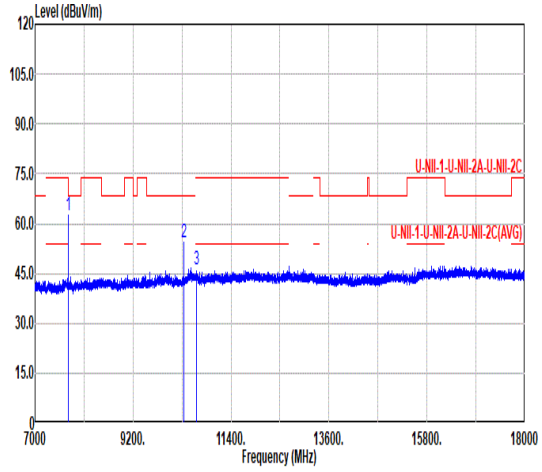
Note: #2 is co-location of WLAN 5G_CH62 TX fundamental signal.

Mode	1	
	Co-location Band Edge	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5044.64 55.88 74.00 -18.12 44.14 34.00 9.69 31.95 0.00 100 334 PEAK	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5310.00 105.68 ------ ------ 93.06 34.53 9.89 31.80 0.00 100 334 PEAK
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5050.53 46.27 54.00 -7.73 34.51 34.00 9.70 31.94 0.00 100 334 AVERAGE	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5310.00 97.53 ------ ------ 84.93 34.52 9.89 31.81 0.00 100 334 AVERAGE

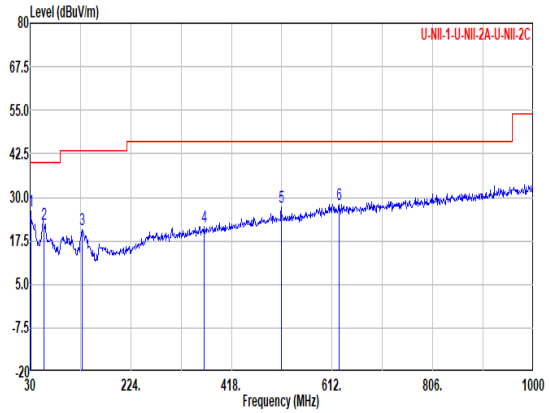
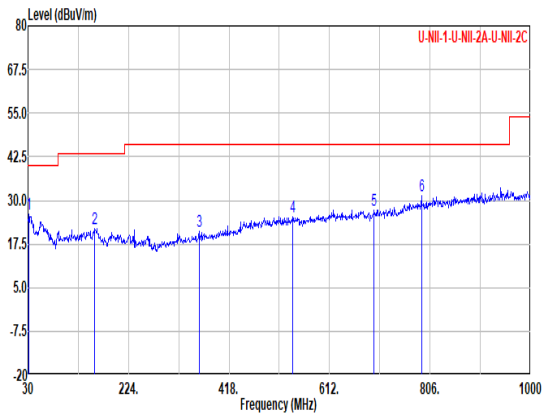
Mode	1	
	Co-location Band Edge	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5355.90 61.36 74.00 -12.64 48.62 34.61 9.91 31.78 0.00 100 334 PEAK	Blank
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5350.20 50.85 54.00 -3.15 38.12 34.60 9.91 31.78 0.00 100 334 Average	Blank

Mode	1	
	Co-location Band Edge	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5064.48 55.25 74.00 -18.75 43.45 34.03 9.71 31.94 0.00 300 311 PEAK	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5310.00 101.35 ------ ------ 88.73 34.53 9.89 31.80 0.00 300 311 PEAK
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5055.49 45.23 54.00 -8.77 33.46 34.01 9.70 31.94 0.00 300 311 AVERAGE	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5310.00 93.01 ------ ------ 80.39 34.53 9.89 31.80 0.00 300 311 AVERAGE

Mode	1	
	Co-location Band Edge	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5352.45 55.61 74.00 -18.39 42.88 34.60 9.91 31.78 0.00 300 311 PEAK	Blank
Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 5351.55 47.26 54.00 -6.74 34.53 34.60 9.91 31.78 0.00 300 311 AVERAGE	Blank

Mode	1	
	Co-location Harmonic	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 7752.40 59.18 70.20 -11.02 71.84 35.90 12.10 60.66 0.00 100 262 Peak 2 10620.00 46.88 74.00 -27.12 55.95 37.88 14.31 61.26 0.00 --- --- PEAK	 Freq Level Limit Line Over Limit Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 7752.40 62.37 70.20 -7.83 75.03 35.90 12.10 60.66 0.00 100 265 Peak 2 10336.30 54.56 68.20 -13.64 64.36 37.37 14.11 61.28 0.00 100 91 Peak 3 10620.00 46.28 74.00 -27.72 55.35 37.88 14.31 61.26 0.00 --- --- PEAK

Note: #1 is the 3rd harmonic from LTE B41, the limit should be -25dBm and converted to field strength limit 70.2dBµV/m @3m distance, the test results is Pass.

Mode	1	
	30-1G	
	802.11ax HE40_CH62_5310MHz_Full	
ANT	CDD 6+8	
Pol.	Horizontal	Vertical
Peak		

	Freq	Level	Limit Line	Over Limit	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	30.97	25.90	40.00	-14.10	33.01	25.09	0.76	32.96	0.00	---	---	Peak
2	57.16	22.33	40.00	-17.67	41.19	12.85	1.04	32.75	0.00	---	---	Peak
3	130.88	20.91	43.50	-22.59	34.37	17.56	1.69	32.71	0.00	---	---	Peak
4	364.65	21.59	46.00	-24.41	30.88	20.98	2.83	33.10	0.00	---	---	Peak
5	514.03	27.10	46.00	-18.90	33.04	24.33	3.15	33.42	0.00	---	---	Peak
6	625.58	27.94	46.00	-18.06	31.46	26.32	3.69	33.53	0.00	---	---	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	31.94	25.95	40.00	-14.05	33.76	24.39	0.76	32.96	0.00	---	---	Peak
2	159.01	21.96	43.50	-21.54	36.23	16.57	1.84	32.68	0.00	---	---	Peak
3	360.77	20.98	46.00	-25.02	30.36	20.88	2.81	33.07	0.00	---	---	Peak
4	540.22	25.32	46.00	-20.68	30.76	24.90	3.18	33.52	0.00	---	---	Peak
5	698.33	27.11	46.00	-18.89	30.02	26.71	3.95	33.57	0.00	---	---	Peak
6	789.51	31.24	46.00	-14.76	32.30	28.04	4.19	33.29	0.00	---	---	Peak

Appendix C. Reference Report

FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2437-1, XT2437-2
FCC ID	:	IHDT56AS8
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Jul. 13, 2024 ~ Aug. 14, 2024

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR471919E	Rev. 01	Initial issue of report	Aug. 21, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit for U-NII-1/2A/2C	Limit for U-NII-3	Result	Remark
3.1	2.1049 & 15.403(i)	6dB, 26dB & 99% Bandwidth	-	6dB Bandwidth > 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm/MHz	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.20 dB at 5351.25 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	15.207(a)	Pass	Under limit 11.16 dB at 0.391 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	15.203 & 15.407(a)	15.203 & 15.407(a)	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2437-1, XT2437-2
FCC ID	IHDT56AS8
IMEI Code	Conducted: 357931300017436/357931300017444 Conduction: 355709740016651/355709740016669 Radiation: 355709740016578/355709740016586
HW Version	DVT2
SW Version	U4UQ34.39
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The two model names are only for market segment, no other difference.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz 5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna	**MIMO <Ant. 5 + 8>** **<5180 MHz ~ 5240 MHz>** 802.11a : 19.36 dBm / 0.0863 W 802.11n HT20 : 19.54 dBm / 0.0899 W 802.11n HT40 : 19.82 dBm / 0.0959 W 802.11ac VHT20: 19.59 dBm / 0.0910 W 802.11ac VHT40: 19.96 dBm / 0.0991 W 802.11ac VHT80: 17.13 dBm / 0.0516 W 802.11ax HE20: 19.67 dBm / 0.0927 W 802.11ax HE40: 20.37 dBm / 0.1089 W 802.11ax HE80: 17.19 dBm / 0.0524 W **<5260 MHz ~ 5320 MHz>** 802.11a : 20.05 dBm / 0.1012 W 802.11n HT20 : 19.66 dBm / 0.0925 W 802.11n HT40 : 19.60 dBm / 0.0912 W 802.11ac VHT20: 19.72 dBm / 0.0938 W 802.11ac VHT40: 19.71 dBm / 0.0935 W 802.11ac VHT80: 17.56 dBm / 0.0570 W 802.11ac VHT160: 15.34 dBm / 0.0342 W 802.11ax HE20: 19.80 dBm / 0.0955 W 802.11ax HE40: 20.06 dBm / 0.1014 W 802.11ax HE80: 17.63 dBm / 0.0579 W 802.11ax HE160: 15.36 dBm / 0.0344 W **<5500 MHz ~ 5720 MHz >** 802.11a : 19.69 dBm / 0.0931 W 802.11n HT20 : 19.92 dBm / 0.0982 W 802.11n HT40 : 19.30 dBm / 0.0851 W 802.11ac VHT20: 19.74 dBm / 0.0942 W 802.11ac VHT40: 19.99 dBm / 0.0998 W 802.11ac VHT80: 18.95 dBm / 0.0785 W 802.11ac VHT160: 14.75 dBm / 0.0299 W 802.11ax HE20: 20.02 dBm / 0.1005 W 802.11ax HE40: 20.39 dBm / 0.1094 W 802.11ax HE80: 19.63 dBm / 0.0918 W 802.11ax HE160: 14.76 dBm / 0.0299 W **<5745 MHz ~ 5825 MHz>** 802.11a : 21.09 dBm / 0.1285 W 802.11n HT20 : 20.91 dBm / 0.1233 W 802.11n HT40 : 19.74 dBm / 0.0942 W 802.11ac VHT20: 20.92 dBm / 0.1236 W 802.11ac VHT40: 19.83 dBm / 0.0962 W 802.11ac VHT80: 18.69 dBm / 0.0740 W 802.11ax HE20: 21.05 dBm / 0.1274 W 802.11ax HE40: 20.31 dBm / 0.1074 W 802.11ax HE80: 19.21 dBm / 0.0834 W

99% Occupied Bandwidth	**<5180 MHz ~ 5240 MHz>** 802.11a : 16.610 MHz 802.11ax HE20: 19.067 MHz 802.11ax HE40: 37.981 MHz 802.11ax HE80: 76.800 MHz **<5260 MHz ~ 5320 MHz>** 802.11a : 18.210 MHz 802.11ax HE20: 19.124 MHz 802.11ax HE40: 37.943 MHz 802.11ax HE80: 76.952 MHz 802.11ax HE160: 155.733 MHz **<5500 MHz ~ 5720 MHz>** 802.11a : 18.876 MHz 802.11ax HE20: 19.333 MHz 802.11ax HE40: 37.867 MHz 802.11ax HE80: 78.095 MHz 802.11ax HE160: 155.733 MHz **<5745 MHz ~ 5825 MHz>** 802.11a : 18.095 MHz 802.11ax HE20: 20.190 MHz 802.11ax HE40: 37.867 MHz 802.11ax HE80: 77.943 MHz
Antenna Type / Gain	**<5180 MHz ~ 5240 MHz>** <Ant. 5> : Monopole Antenna with gain -4.38 dBi <Ant. 8> : IFA Antenna with gain -4.50 dBi **<5260 MHz ~ 5320 MHz>** <Ant. 5> : Monopole Antenna with gain -5.00 dBi <Ant. 8> : IFA Antenna with gain -4.90 dBi **<5500 MHz ~ 5720 MHz>** <Ant. 5> : Monopole Antenna with gain -4.77 dBi <Ant. 8> : IFA Antenna with gain -4.90 dBi **<5745 MHz ~ 5825 MHz>** <Ant. 5> : Monopole Antenna with gain -4.85 dBi <Ant. 8> : IFA Antenna with gain -5.20 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

Note:

1. WLAN support CDD MIMO mode only.
2. For 802.11n/11ac & 11ax mode, the whole testing have assessed only 802.11ax HE20 / HE40 / HE80 / HE160 by referring to the higher output power.
3. 802.11ax support full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) are tested for conducted power/PSD/RSE, the full RU power > partial RU, therefore the full RU perform full test and Partial RU verified power/PSD/RSE.
4. The device does not support 11ax channel puncturing mode.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Specification of Accessory

Accessories Information				
AC Adapter 1(US)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-331L
AC Adapter 1(EU)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-332L
AC Adapter 1(UK)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-333L
AC Adapter 1(AU)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-335L
AC Adapter 1(AR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-336L
AC Adapter 1(BR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-337L
AC Adapter 1((CHILE))	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-339L
AC Adapter 1(KR)	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-330L
AC Adapter 2(US)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-331L
AC Adapter 2(EU)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-332L
AC Adapter 2(UK)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-333L
AC Adapter 2(AR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-336L
AC Adapter 2(BR)	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-337L
Battery 1	**Brand Name**	Motorola(ATL)	**Model Name**	RW50
USB Cable 1	**Brand Name**	Motorola(Washin)	**Model Name**	S928D92375
USB Cable 2	**Brand Name**	Motorola(Saibao)	**Model Name**	S928D95755
Wireless Earphones	**Brand Name**	Motorola	**Model Name**	XT2443-1

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH06-KS	AUDIX	E3	210616
3.	CO01-KS	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq.(MHz)	Channel	Freq. (MHz)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210	50##	5250

Frequency Band	Channel	Freq.(MHz)	Channel	Freq. (MHz)
5260-5320 MHz U-NII-2A	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58#	5290	-	-

Frequency Band	Channel	Freq.(MHz)	Channel	Freq. (MHz)
5500-5720MHz U-NII-2C	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106#	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq.(MHz)	Channel	Freq. (MHz)
5745-5825 MHz U-NII-3	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Frequency Band	Channel	Freq.(MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122#	5610	128	5640
	-	-	114##	5570

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138#	5690	144	5720
	142*	5710	-	-

Note:

1. The above Frequency and Channel in "*" are 40MHz bandwidth.
2. The above Frequency and Channel in "#" are 80MHz bandwidth.
3. The above Frequency and Channel in "##" are 160MHz bandwidth.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

MIMO Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20 (Covered by HE20)	MCS0
802.11n HT40 (Covered by HE40)	MCS0
802.11n VHT20 (Covered by HE20)	MCS0
802.11n VHT40 (Covered by HE40)	MCS0
802.11n VHT80 (Covered by HE80)	MCS0
802.11n VHT160 (Covered by HE160)	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0

AC Conducted Emission	Mode 1 : GSM850 Idle + WLAN 5G Link + Bluetooth LInk + AC Adapter 1
Remark: For Radiated Test Cases, The tests were performance with Adapter 1	

Simultaneous transmission
Bluetooth-LE_CH39_ANT 6_TX + 802.11ax HE40_CH62_Full RU_ANT (5+8)TX + 5G NR n7 Link
Bluetooth-LE_CH39_ANT 8_TX + 802.11ax HE40_CH62_Full RU_ANT (5+8)TX + 5G NR n7 Link

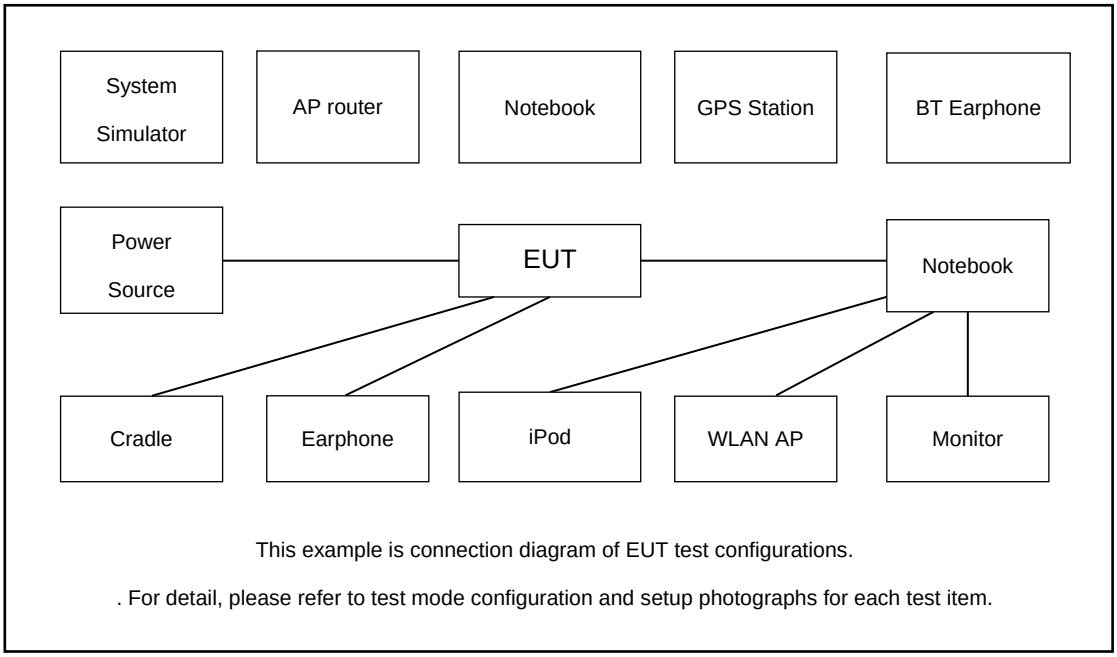
Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		20M BW	20M BW	20M BW	20M BW
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165
Straddle		-	-	144	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		40M BW	40M BW	40M BW	40M BW
L	Low	38	54	102	151
M	Middle	-	-	110	-
H	High	46	62	134	159
Straddle		-	-	142	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		80M BW	80M BW	80M BW	80M BW
L	Low	-	-	106	-
M	Middle	42	58	-	155
H	High	-	-	122	-
Straddle		-	-	138	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		160M BW		160M BW	160M BW
M	Middle	50		114	-

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	Unshielded AC I/P cable 1.8m

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 14.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 14.2 + 10 = 24.2 (dB)

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

3.1.2 Measuring Instruments

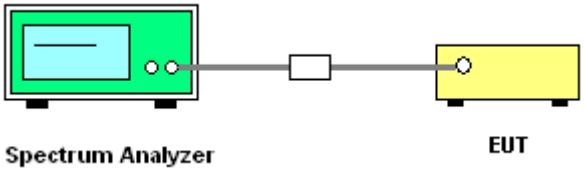
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

☒	Section C) Bandwidth Measurement 1. Emission Bandwidth (EBW) and 99% OBW
	1. Set RBW = approximately 1% of the emission bandwidth. **2.** Set the VBW > RBW. **3.** Detector = Peak. **4.** Trace mode = max hold **5.** Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. **6.** For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set to 1%~5% of the OBW and set the Video bandwidth (VBW) ≥ 3 * RBW. **7.** Measure and record the results in the test report.
☒	Section C) Bandwidth Measurement 2. Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz
	1. Set RBW = 100kHz. **2.** Set the VBW ≥ 3 x RBW. **3.** Detector = Peak. **4.** Trace mode = max hold **5.** Measure the maximum width of the emission that is 6 dB down from the peak of the emission. **6.** Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm +10 $\log_{10}$ B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

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3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

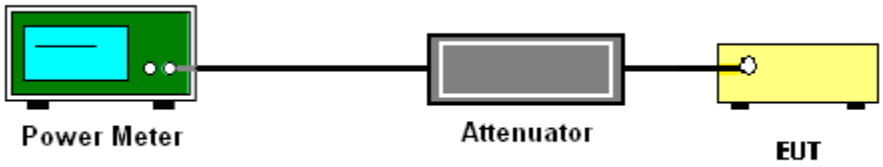
1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty

factor, 10 log(1/x), where x is the duty cycle.

4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04. Section F) Maximum power spectral density.

For devices operating in the bands UNII-1/2A/2C

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

For devices operating in the band UNII-3

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

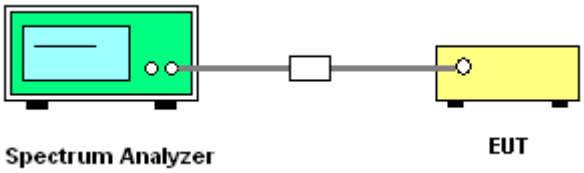
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500KHz (or 300 kHz if the SA can’t set RBW=500KHz).
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- If the SA can’t set RBW=500KHz, then add 10 log(500kHz/RBW) to the test result.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (b): Measure and sum spectral maxima across the outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band:
15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(3) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/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

(4) EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.2

Note: The following formula is used to convert the EIRP to field strength.

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m

d_{Meas} is the measurement distance, in m

(4) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

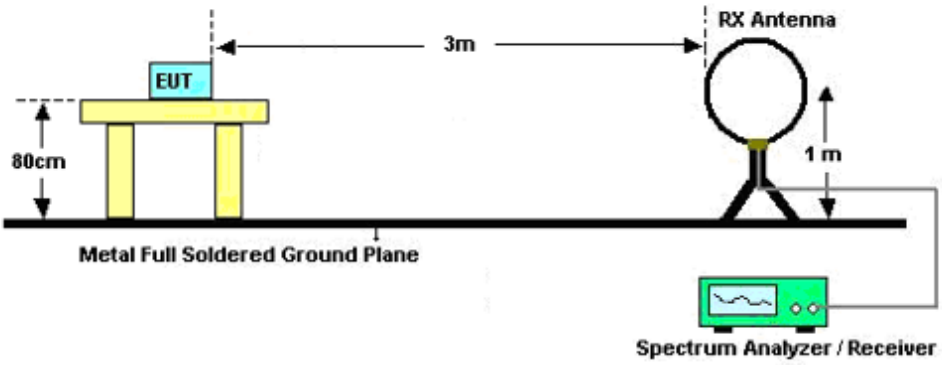
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on.

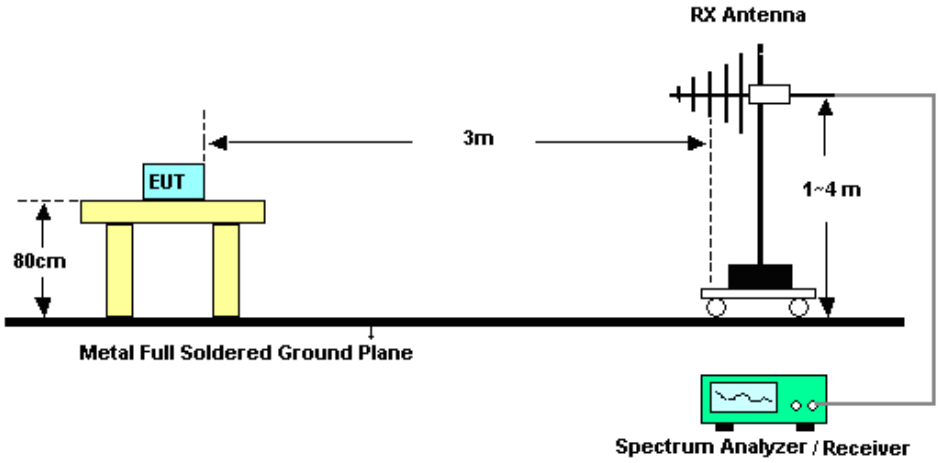
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

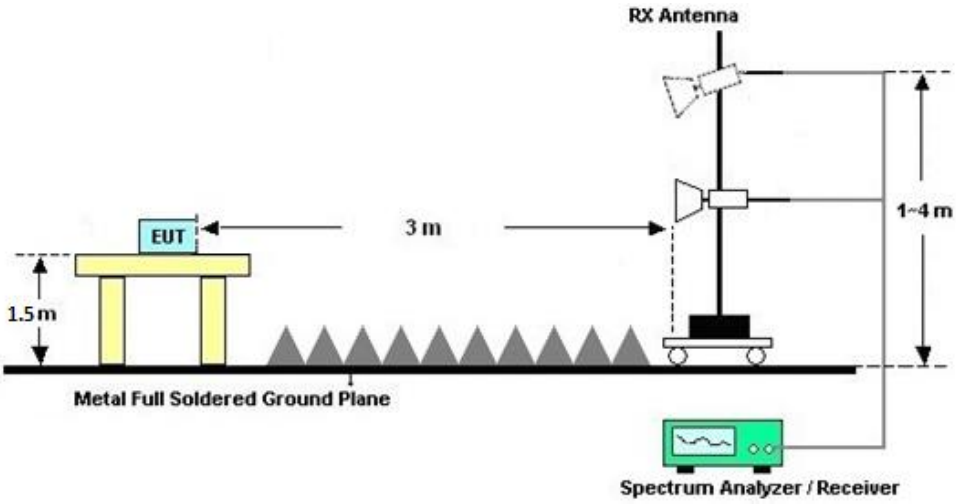
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

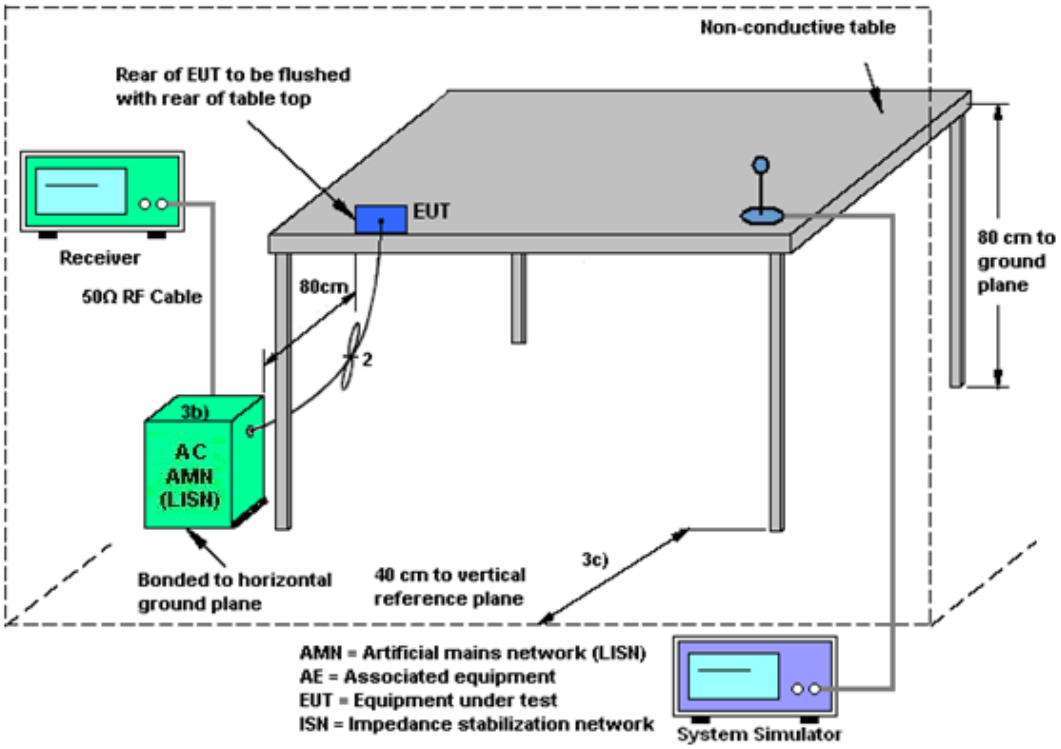
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>

	Ant. 5 (dBi)	Ant. 8 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
UNII-1	-4.38	-4.50	-4.38	-1.43	0.00	0.00
UNII-2A	-5.00	-4.90	-4.90	-1.94	0.00	0.00
UNII-2C	-4.77	-4.90	-4.77	-1.82	0.00	0.00
UNII-3	-4.85	-5.20	-4.85	-2.01	0.00	0.00

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Jul. 23, 2024 ~Aug. 13, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 02, 2024	Jul. 23, 2024 ~Aug. 13, 2024	Jan. 01, 2025	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1435004	50MHz Bandwidth	Jan. 02, 2024	Jul. 23, 2024 ~Aug. 13, 2024	Jan. 01, 2025	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Jan. 02, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY60242126	10Hz-44GHz	Oct. 11, 2023	Jul. 13, 2024 ~Aug. 14, 2024	Oct. 10, 2024	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11, 2023	Jul. 13, 2024 ~Aug. 14, 2024	Sep. 10, 2024	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	59915	30MHz-1GHz	Aug. 19, 2023	Jul. 13, 2024 ~Aug. 14, 2024	Aug. 18, 2024	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 11, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Apr. 10, 2025	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 06, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Jan. 05, 2025	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	372171	9KHz ~1GHZ	Jan. 02, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
Amplifier	EM	EM18G40GA	060728	18~40GHz	Jan. 02, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082395	1Ghz-18Ghz	Jan. 02, 2024	Jul. 13, 2024 ~Aug. 14, 2024	Jan. 01, 2025	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270319	500MHz~26.5GHz	Oct. 11, 2023	Jul. 13, 2024 ~Aug. 14, 2024	Oct. 10, 2024	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 13, 2024 ~Aug. 14, 2024	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 13, 2024 ~Aug. 14, 2024	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 13, 2024 ~Aug. 14, 2024	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr 18, 2024	Jul. 26, 2024	Apr 17, 2025	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Jul. 26, 2024	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr 18, 2024	Jul. 26, 2024	Apr 17, 2025	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Jul. 26, 2024	Oct. 10, 2024	Conduction (CO01-KS)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Conducted Spurious Emission & Bandedge	**±2.26 dB**
Occupied Channel Bandwidth	**±0.1%**
Conducted Power	**±0.46 dB**
Conducted Power Spectral Density	**±0.88 dB**
Frequency	**±0.4 Hz**

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.84dB**

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.30dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.06dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.18dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.38dB**

---------- THE END ----------

Appendix A. Conducted Test Results

A1. Conducted Test Results

Test Engineer:	Jiang Jun	Temperature:	21~25	°C
Test Date:	2024.7.23~2024.8.13	Relative Humidity:	51~54	%

Report Number : FR471919E

TEST RESULTS DATA
Average Power Table

FCC U-NII-1 MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
11a	6Mbps	2	36	5180	0.64	0.64	16.18	16.32	19.26	30.00		-4.38			Pass
11a	6Mbps	2	44	5220	0.64	0.64	16.12	16.39	19.27	30.00		-4.38			Pass
11a	6Mbps	2	48	5240	0.64	0.64	16.38	16.33	19.36	30.00		-4.38			Pass
HT20	MCS0	2	36	5180	0.62	0.64	15.31	15.07	18.21	30.00		-4.38			Pass
HT20	MCS0	2	44	5220	0.62	0.64	16.37	16.55	19.47	30.00		-4.38			Pass
HT20	MCS0	2	48	5240	0.62	0.64	16.51	16.55	19.54	30.00		-4.38			Pass
HT40	MCS0	2	38	5190	0.65	0.68	14.99	14.55	17.79	30.00		-4.38			Pass
HT40	MCS0	2	46	5230	0.65	0.68	17.15	16.43	19.82	30.00		-4.38			Pass
VHT20	MCS0	2	36	5180	0.62	0.62	15.37	15.11	18.26	30.00		-4.38			Pass
VHT20	MCS0	2	44	5220	0.62	0.62	16.43	16.61	19.54	30.00		-4.38			Pass
VHT20	MCS0	2	48	5240	0.62	0.62	16.58	16.56	19.59	30.00		-4.38			Pass
VHT40	MCS0	2	38	5190	0.68	0.64	15.06	14.52	17.81	30.00		-4.38			Pass
VHT40	MCS0	2	46	5230	0.68	0.64	17.37	16.49	19.96	30.00		-4.38			Pass
VHT80	MCS0	2	42	5210	0.68	0.69	14.29	13.93	17.13	30.00		-4.38			Pass
VHT160	MCS0	2	50	5250	0.70	0.70	12.68	11.94	15.34	30.00		-4.38			Pass

TEST RESULTS DATA
Average Power Table

FCC U-NII-2A MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
11a	6Mbps	2	52	5260	0.64	0.64	16.05	16.12	19.09	23.69		-4.90		30.00	Pass
11a	6Mbps	2	60	5300	0.64	0.64	16.07	16.14	19.11	23.69		-4.90		30.00	Pass
11a	6Mbps	2	64	5320	0.64	0.64	17.02	17.06	20.05	23.75		-4.90		30.00	Pass
HT20	MCS0	2	52	5260	0.62	0.64	16.32	16.50	19.42	23.98		-4.90		30.00	Pass
HT20	MCS0	2	60	5300	0.62	0.64	16.29	16.30	19.31	23.98		-4.90		30.00	Pass
HT20	MCS0	2	64	5320	0.62	0.64	16.61	16.69	19.66	23.98		-4.90		30.00	Pass
HT40	MCS0	2	54	5270	0.65	0.68	16.97	16.17	19.60	23.98		-4.90		30.00	Pass
HT40	MCS0	2	62	5310	0.65	0.68	15.12	15.07	18.11	23.98		-4.90		30.00	Pass
VHT20	MCS0	2	52	5260	0.62	0.62	16.40	16.54	19.49	23.98		-4.90		30.00	Pass
VHT20	MCS0	2	60	5300	0.62	0.62	16.36	16.37	19.38	23.98		-4.90		30.00	Pass
VHT20	MCS0	2	64	5320	0.62	0.62	16.69	16.72	19.72	23.98		-4.90		30.00	Pass
VHT40	MCS0	2	54	5270	0.68	0.64	17.21	16.12	19.71	23.98		-4.90		30.00	Pass
VHT40	MCS0	2	62	5310	0.68	0.64	15.16	15.05	18.12	23.98		-4.90		30.00	Pass
VHT80	MCS0	2	58	5290	0.68	0.69	14.52	14.58	17.56	23.98		-4.90		30.00	Pass
VHT160	MCS0	2	50	5250	0.70	0.70	12.68	11.94	15.34	23.98		-4.90		30.00	Pass

TEST RESULTS DATA
Average Power Table

FCC U-NII-2C MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
11a	6Mbps	2	100	5500	0.64	0.64	16.39	15.98	19.20	23.75		-4.77		30.00	Pass
11a	6Mbps	2	116	5580	0.64	0.64	16.50	16.21	19.37	23.75		-4.77		30.00	Pass
11a	6Mbps	2	140	5700	0.64	0.64	15.43	14.96	18.21	23.77		-4.77		30.00	Pass
HT20	MCS0	2	100	5500	0.62	0.64	15.22	15.20	18.22	23.98		-4.77		30.00	Pass
HT20	MCS0	2	116	5580	0.62	0.64	16.74	16.57	19.67	23.98		-4.77		30.00	Pass
HT20	MCS0	2	140	5700	0.62	0.64	14.82	14.21	17.54	23.98		-4.77		30.00	Pass
HT40	MCS0	2	102	5510	0.65	0.68	14.11	13.92	17.03	23.98		-4.77		30.00	Pass
HT40	MCS0	2	110	5550	0.65	0.68	16.75	15.78	19.30	23.98		-4.77		30.00	Pass
HT40	MCS0	2	134	5670	0.65	0.68	14.95	14.02	17.52	23.98		-4.77		30.00	Pass
VHT20	MCS0	2	100	5500	0.62	0.62	15.25	15.22	18.25	23.98		-4.77		30.00	Pass
VHT20	MCS0	2	116	5580	0.62	0.62	16.82	16.59	19.72	23.98		-4.77		30.00	Pass
VHT20	MCS0	2	140	5700	0.62	0.62	14.91	14.23	17.60	23.98		-4.77		30.00	Pass
VHT40	MCS0	2	102	5510	0.68	0.64	14.18	13.92	17.06	23.98		-4.77		30.00	Pass
VHT40	MCS0	2	110	5550	0.68	0.64	16.81	15.94	19.41	23.98		-4.77		30.00	Pass
VHT40	MCS0	2	134	5670	0.68	0.64	15.03	14.01	17.56	23.98		-4.77		30.00	Pass
VHT80	MCS0	2	106	5530	0.68	0.69	14.15	13.52	16.86	23.98		-4.77		30.00	Pass
VHT80	MCS0	2	122	5610	0.68	0.69	15.83	15.31	18.59	23.98		-4.77		30.00	Pass
VHT160	MCS0	2	114	5570	0.70	0.70	12.00	11.46	14.75	23.98		-4.77		30.00	Pass

FCC U-NII-2C straddle channel MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
11a	6Mbps	2	144	5720	0.64	0.64	17.06	16.27	19.69	23.79		-4.77		30.00	Pass
HT20	MCS0	2	144	5720	0.62	0.64	17.26	16.51	19.92	23.98		-4.77		30.00	Pass
HT40	MCS0	2	142	5710	0.65	0.68	17.11	16.30	19.74	23.98		-4.77		30.00	Pass
VHT20	MCS0	2	144	5720	0.62	0.62	17.32	16.54	19.96	23.98		-4.77		30.00	Pass
VHT40	MCS0	2	142	5710	0.68	0.64	17.46	16.43	19.99	23.98		-4.77		30.00	Pass
VHT80	MCS0	2	138	5690	0.68	0.69	16.35	15.48	18.95	23.98		-4.77		30.00	Pass

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TEST RESULTS DATA
Average Power Table

FCC U-NII-1 MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
						Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
HE20	MCS0	2	36	5180	Full	0.64	0.62	15.48	15.17	18.34	30.00		-4.38			Pass
HE20	MCS0	2	36	5180	26/0	0.00	0.60	7.72	7.35	10.55	30.00		-4.38			Pass
HE20	MCS0	2	36	5180	52/37	0.60	0.60	11.64	11.38	14.52	30.00		-4.38			Pass
HE20	MCS0	2	36	5180	106/53	0.64	0.64	13.28	12.73	16.02	30.00		-4.38			Pass
HE20	MCS0	2	44	5220	Full	0.64	0.62	16.50	16.69	19.61	30.00		-4.38			Pass
HE20	MCS0	2	44	5220	26/0	0.64	0.62	8.30	8.44	11.38	30.00		-4.38			Pass
HE20	MCS0	2	44	5220	52/37	0.64	0.62	11.65	11.16	14.42	30.00		-4.38			Pass
HE20	MCS0	2	44	5220	106/53	0.64	0.62	14.69	14.53	17.62	30.00		-4.38			Pass
HE20	MCS0	2	48	5240	Full	0.64	0.62	16.67	16.64	19.67	30.00		-4.38			Pass
HE20	MCS0	2	48	5240	26/8	0.64	0.62	8.70	8.62	11.67	30.00		-4.38			Pass
HE20	MCS0	2	48	5240	52/40	0.64	0.62	11.73	11.38	14.57	30.00		-4.38			Pass
HE20	MCS0	2	48	5240	106/54	0.64	0.62	14.72	14.65	17.69	30.00		-4.38			Pass
HE40	MCS0	2	38	5190	Full	0.68	0.68	15.26	14.94	18.11	30.00		-4.38			Pass
HE40	MCS0	2	46	5230	Full	0.68	0.68	17.71	16.97	20.37	30.00		-4.38			Pass
HE80	MCS0	2	42	5210	Full	0.69	0.69	14.36	14.01	17.19	30.00		-4.38			Pass
HE160	MCS0	2	50	5250	Full	0.68	0.68	12.72	11.95	15.36	30.00		-4.38			Pass

TEST RESULTS DATA
Average Power Table

FCC U-NII-2A MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
						Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
HE20	MCS0	2	52	5260	Full	0.64	0.62	16.50	16.60	19.56	23.98		-4.90		30.00	Pass
HE20	MCS0	2	52	5260	26/0	0.64	0.62	8.26	8.50	11.39	23.98		-4.90		30.00	Pass
HE20	MCS0	2	52	5260	52/37	0.64	0.62	11.57	11.25	14.42	23.98		-4.90		30.00	Pass
HE20	MCS0	2	52	5260	106/53	0.64	0.62	14.46	14.38	17.43	23.98		-4.90		30.00	Pass
HE20	MCS0	2	60	5300	Full	0.64	0.62	16.41	16.45	19.44	23.98		-4.90		30.00	Pass
HE20	MCS0	2	60	5300	26/0	0.64	0.62	8.36	8.83	11.61	23.98		-4.90		30.00	Pass
HE20	MCS0	2	60	5300	52/37	0.64	0.62	10.91	11.43	14.19	23.98		-4.90		30.00	Pass
HE20	MCS0	2	60	5300	106/53	0.64	0.62	13.81	14.37	17.10	23.98		-4.90		30.00	Pass
HE20	MCS0	2	64	5320	Full	0.64	0.62	16.76	16.81	19.80	23.98		-4.90		30.00	Pass
HE20	MCS0	2	64	5320	26/8	0.00	0.60	8.08	8.95	11.55	23.98		-4.90		30.00	Pass
HE20	MCS0	2	64	5320	52/40	0.60	0.60	12.19	12.76	15.50	23.98		-4.90		30.00	Pass
HE20	MCS0	2	64	5320	106/54	0.64	0.64	14.03	14.83	17.45	23.98		-4.90		30.00	Pass
HE40	MCS0	2	54	5270	Full	0.68	0.68	17.44	16.62	20.06	23.98		-4.90		30.00	Pass
HE40	MCS0	2	62	5310	Full	0.68	0.68	15.25	15.15	18.21	23.98		-4.90		30.00	Pass
HE80	MCS0	2	58	5290	Full	0.69	0.69	14.62	14.62	17.63	23.98		-4.90		30.00	Pass
HE160	MCS0	2	50	5250	Full	0.68	0.68	12.72	11.95	15.36	23.98		-4.90		30.00	Pass

TEST RESULTS DATA
Average Power Table

FCC U-NII-2C MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
						Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
HE20	MCS0	2	100	5500	Full	0.00	0.00	15.32	15.28	18.31	23.98		-4.77		30.00	Pass
HE20	MCS0	2	100	5500	26/0	0.00	0.60	7.02	7.58	10.32	23.98		-4.77		30.00	Pass
HE20	MCS0	2	100	5500	52/37	0.60	0.60	11.41	10.59	14.03	23.98		-4.77		30.00	Pass
HE20	MCS0	2	100	5500	106/53	0.64	0.64	12.64	12.93	15.79	23.98		-4.77		30.00	Pass
HE20	MCS0	2	116	5580	Full	0.00	0.00	16.88	16.64	19.77	23.98		-4.77		30.00	Pass
HE20	MCS0	2	116	5580	26/0	0.00	0.00	8.60	8.75	11.68	23.98		-4.77		30.00	Pass
HE20	MCS0	2	116	5580	52/37	0.00	0.00	11.46	11.26	14.37	23.98		-4.77		30.00	Pass
HE20	MCS0	2	116	5580	106/53	0.00	0.00	14.85	14.54	17.70	23.98		-4.77		30.00	Pass
HE20	MCS0	2	140	5700	Full	0.00	0.00	15.06	14.31	17.71	23.98		-4.77		30.00	Pass
HE20	MCS0	2	140	5700	26/8	0.00	0.60	6.54	6.36	9.46	23.98		-4.77		30.00	Pass
HE20	MCS0	2	140	5700	52/40	0.60	0.60	10.80	11.45	14.15	23.98		-4.77		30.00	Pass
HE20	MCS0	2	140	5700	106/54	0.64	0.64	12.74	12.40	15.58	23.98		-4.77		30.00	Pass
HE40	MCS0	2	102	5510	Full	0.68	0.68	14.19	14.03	17.12	23.98		-4.77		30.00	Pass
HE40	MCS0	2	110	5550	Full	0.68	0.68	17.36	16.48	19.95	23.98		-4.77		30.00	Pass
HE40	MCS0	2	134	5670	Full	0.68	0.68	15.00	14.34	17.69	23.98		-4.77		30.00	Pass
HE80	MCS0	2	106	5530	Full	0.69	0.69	14.23	13.59	16.93	23.98		-4.77		30.00	Pass
HE80	MCS0	2	122	5610	Full	0.69	0.69	15.86	15.32	18.60	23.98		-4.77		30.00	Pass
HE160	MCS0	2	114	5570	Full	0.68	0.68	12.02	11.47	14.76	23.98		-4.77		30.00	Pass

FCC U-NII-2C straddle channel MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
						Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8		
HE20	MCS0	2	144	5720	Full	0.00	0.00	17.40	16.58	20.02	23.98		-4.77		30.00	Pass
HE20	MCS0	2	144	5720	26/8	0.00	0.60	9.26	8.68	11.99	23.98		-4.77		30.00	Pass
HE20	MCS0	2	144	5720	52/40	0.60	0.60	12.27	11.50	14.91	23.98		-4.77		30.00	Pass
HE20	MCS0	2	144	5720	106/54	0.64	0.64	14.96	13.85	17.45	23.98		-4.77		30.00	Pass
HE40	MCS0	2	142	5710	Full	0.68	0.68	17.82	16.89	20.39	23.98		-4.77		30.00	Pass
HE80	MCS0	2	138	5690	Full	0.68	0.68	16.91	16.32	19.63	23.98		-4.77		30.00	Pass

TEST RESULTS DATA
Average Power Table

U-NII-3 MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8	
11a	6Mbps	2	149	5745	0.64	0.64	18.28	17.68	21.00	30.00		-4.85		Pass
11a	6Mbps	2	157	5785	0.64	0.64	18.25	17.74	21.01	30.00		-4.85		Pass
11a	6Mbps	2	165	5825	0.64	0.64	18.44	17.69	21.09	30.00		-4.85		Pass
HT20	MCS0	2	149	5745	0.62	0.64	17.98	17.35	20.69	30.00		-4.85		Pass
HT20	MCS0	2	157	5785	0.62	0.64	17.96	17.60	20.80	30.00		-4.85		Pass
HT20	MCS0	2	165	5825	0.62	0.64	18.30	17.46	20.91	30.00		-4.85		Pass
HT40	MCS0	2	151	5755	0.65	0.68	17.22	16.04	19.68	30.00		-4.85		Pass
HT40	MCS0	2	159	5795	0.65	0.68	17.15	16.27	19.74	30.00		-4.85		Pass
VHT20	MCS0	2	149	5745	0.65	0.68	17.97	17.41	20.71	30.00		-4.85		Pass
VHT20	MCS0	2	157	5785	0.62	0.62	18.03	17.63	20.85	30.00		-4.85		Pass
VHT20	MCS0	2	165	5825	0.62	0.62	18.30	17.47	20.92	30.00		-4.85		Pass
VHT40	MCS0	2	151	5755	0.62	0.62	17.34	16.14	19.79	30.00		-4.85		Pass
VHT40	MCS0	2	159	5795	0.68	0.64	17.29	16.29	19.83	30.00		-4.85		Pass
VHT80	MCS0	2	155	5775	0.68	0.69	16.34	14.89	18.69	30.00		-4.85		Pass

TEST RESULTS DATA
Average Power Table

U-NII-3 MIMO															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Duty Factor (dB)		Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
						Ant 5	Ant 8	Ant 5	Ant 8	SUM	Ant 5	Ant 8	Ant 5	Ant 8	
HE20	MCS0	2	149	5745	Full	0.64	0.62	18.11	17.49	20.82	30.00		-4.85		Pass
HE20	MCS0	2	149	5745	26/0	0.60	0.60	10.81	9.11	13.05	30.00		-4.85		Pass
HE20	MCS0	2	149	5745	52/37	0.60	0.60	13.41	12.44	15.96	30.00		-4.85		Pass
HE20	MCS0	2	149	5745	106/53	0.64	0.64	16.05	14.71	18.44	30.00		-4.85		Pass
HE20	MCS0	2	157	5785	Full	0.64	0.62	18.13	17.79	20.98	30.00		-4.85		Pass
HE20	MCS0	2	157	5785	26/0	0.60	0.60	10.86	9.34	13.17	30.00		-4.85		Pass
HE20	MCS0	2	157	5785	52/37	0.60	0.60	13.30	12.23	15.81	30.00		-4.85		Pass
HE20	MCS0	2	157	5785	106/53	0.64	0.64	15.76	14.91	18.36	30.00		-4.85		Pass
HE20	MCS0	2	165	5825	Full	0.64	0.62	18.40	17.63	21.05	30.00		-4.85		Pass
HE20	MCS0	2	165	5825	26/8	0.60	0.60	10.13	9.15	12.68	30.00		-4.85		Pass
HE20	MCS0	2	165	5825	52/40	0.60	0.60	12.99	11.90	15.49	30.00		-4.85		Pass
HE20	MCS0	2	165	5825	106/54	0.64	0.64	15.78	14.53	18.21	30.00		-4.85		Pass
HE40	MCS0	2	151	5755	Full	0.68	0.68	17.86	16.54	20.26	30.00		-4.85		Pass
HE40	MCS0	2	159	5795	Full	0.68	0.68	17.81	16.73	20.31	30.00		-4.85		Pass
HE80	MCS0	2	155	5775	Full	0.69	0.69	16.53	15.85	19.21	30.00		-4.85		Pass

Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]
11A-CDD	Ant5	5180	18.58	5170.78	5189.36
	Ant8	5180	20.25	5169.97	5190.22
	Ant5	5220	18.48	5210.83	5229.31
	Ant8	5220	19.63	5210.11	5229.74
	Ant5	5240	18.53	5230.73	5249.27
	Ant8	5240	20.82	5229.07	5249.89
	Ant5	5260	18.58	5250.69	5269.27
	Ant8	5260	22.92	5247.21	5270.12
	Ant5	5300	18.58	5290.73	5309.31
	Ant8	5300	20.63	5289.78	5310.41
	Ant5	5320	18.82	5310.59	5329.41
	Ant8	5320	24.96	5306.21	5331.17
	Ant5	5500	18.82	5490.54	5509.36
	Ant8	5500	34.30	5483.21	5517.51
	Ant5	5580	18.82	5570.50	5589.31
	Ant8	5580	19.72	5570.07	5589.79
	Ant5	5700	18.91	5690.45	5709.36
	Ant8	5700	18.91	5690.50	5709.41
	Ant5	5720	19.01	5710.45	5729.46
	Ant8	5720	19.15	5710.45	5729.60
	Ant5	5745	20.44	5734.97	5755.41
	Ant8	5745	20.91	5733.78	5754.70
	Ant5	5785	23.25	5771.54	5794.79
	Ant8	5785	20.53	5774.26	5794.79
	Ant5	5825	29.39	5811.59	5840.98
	Ant8	5825	19.01	5815.64	5834.65
11AX20MIMO	Ant5	5180	20.58	5169.83	5190.41
	Ant8	5180	20.82	5169.54	5190.36
	Ant5	5220	20.49	5209.97	5230.46
	Ant8	5220	20.72	5209.54	5230.27
	Ant5	5240	20.58	5229.69	5250.27
	Ant8	5240	21.77	5228.59	5250.36
	Ant5	5260	20.53	5249.64	5270.17
	Ant8	5260	22.53	5247.92	5270.46
	Ant5	5300	20.77	5289.73	5310.51
	Ant8	5300	23.54	5286.83	5310.36
	Ant5	5320	20.63	5309.73	5330.36
	Ant8	5320	22.06	5308.92	5330.98
	Ant5	5500	20.72	5489.59	5510.31
	Ant8	5500	32.21	5485.11	5517.32
	Ant5	5580	20.63	5569.78	5590.41
	Ant8	5580	21.25	5569.26	5590.51
	Ant5	5700	20.77	5689.49	5710.27

	Ant8	5700	20.63	5689.59	5710.22
	Ant5	5720	20.39	5709.73	5730.12
	Ant8	5720	20.72	5709.64	5730.36
	Ant5	5745	28.20	5729.21	5757.41
	Ant8	5745	24.54	5731.21	5755.74
	Ant5	5785	21.58	5774.35	5795.93
	Ant8	5785	21.87	5773.73	5795.60
	Ant5	5825	30.78	5811.59	5842.37
	Ant8	5825	20.58	5814.78	5835.36
11AX40MIMO	Ant5	5190	39.92	5170.04	5209.96
	Ant8	5190	40.21	5170.04	5210.25
	Ant5	5230	40.02	5209.94	5249.96
	Ant8	5230	47.26	5202.89	5250.15
	Ant5	5270	40.02	5250.04	5290.06
	Ant8	5270	40.30	5250.04	5290.34
	Ant5	5310	40.02	5290.04	5330.06
	Ant8	5310	40.40	5289.85	5330.25
	Ant5	5510	40.02	5490.04	5530.06
	Ant8	5510	40.21	5489.85	5530.06
	Ant5	5550	39.83	5530.13	5569.96
	Ant8	5550	42.21	5529.28	5571.49
	Ant5	5670	39.83	5650.13	5689.96
	Ant8	5670	40.30	5649.94	5690.25
	Ant5	5710	40.21	5690.04	5730.25
	Ant8	5710	40.50	5689.94	5730.44
	Ant5	5755	40.69	5734.37	5775.06
	Ant8	5755	39.92	5735.04	5774.96
	Ant5	5795	40.11	5774.94	5815.06
	Ant8	5795	40.02	5775.04	5815.06
11AX80MIMO	Ant5	5210	81.18	5169.50	5250.69
	Ant8	5210	81.56	5169.50	5251.07
	Ant5	5290	81.75	5249.31	5331.07
	Ant8	5290	81.56	5249.50	5331.07
	Ant5	5530	81.18	5489.31	5570.50
	Ant8	5530	81.56	5489.12	5570.69
	Ant5	5610	81.94	5569.12	5651.07
	Ant8	5610	81.56	5569.50	5651.07
	Ant5	5690	81.37	5649.50	5730.88
	Ant8	5690	80.99	5649.50	5730.50
	Ant5	5775	81.37	5734.50	5815.88
	Ant8	5775	93.95	5726.88	5820.83
11AX160MIMO	Ant5	5250	165.03	5168.25	5333.28
	Ant8	5250	163.13	5168.63	5331.75
	Ant5	5570	163.51	5488.25	5651.75
	Ant8	5570	163.51	5487.87	5651.37

Test Graphs

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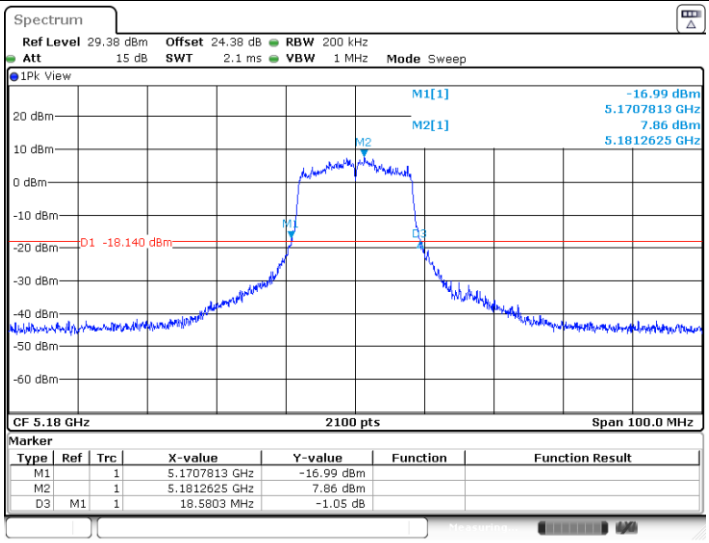
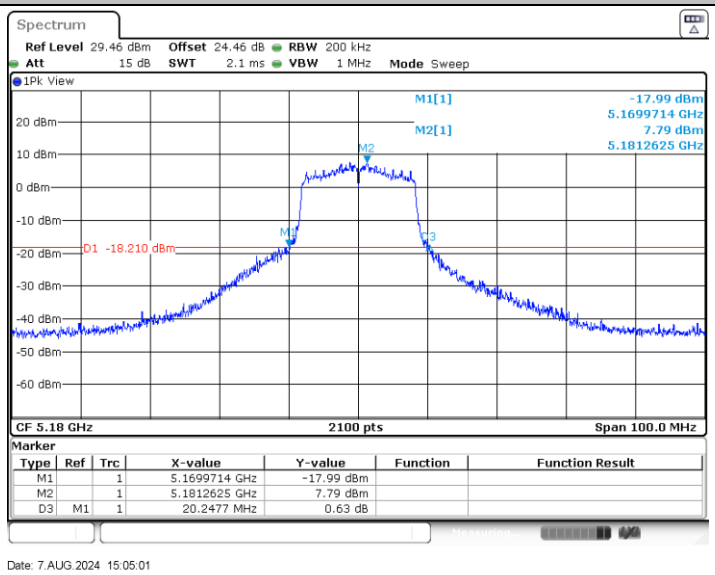


11A-CDD_Ant8_5180



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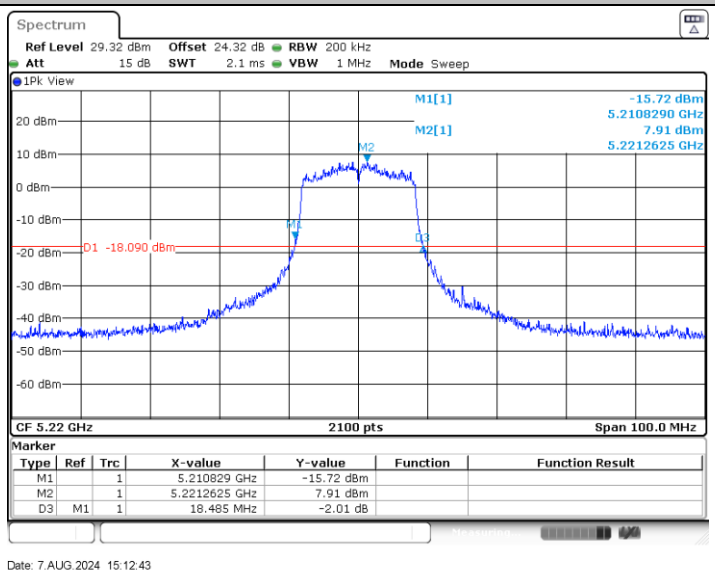

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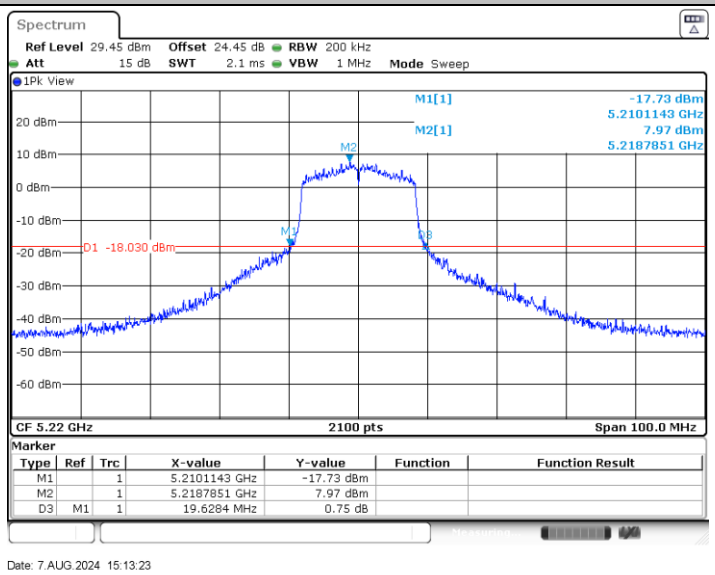

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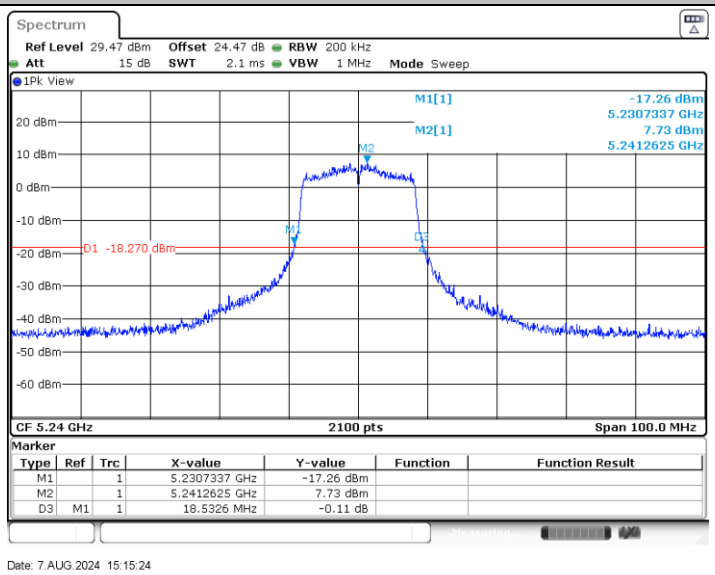

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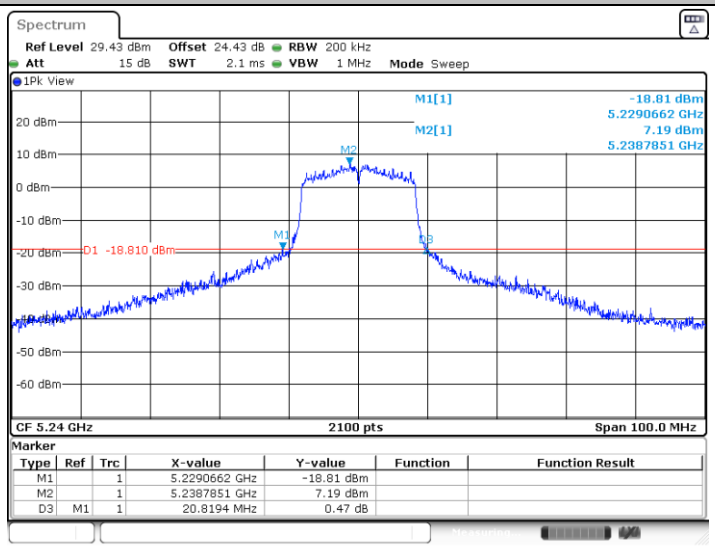

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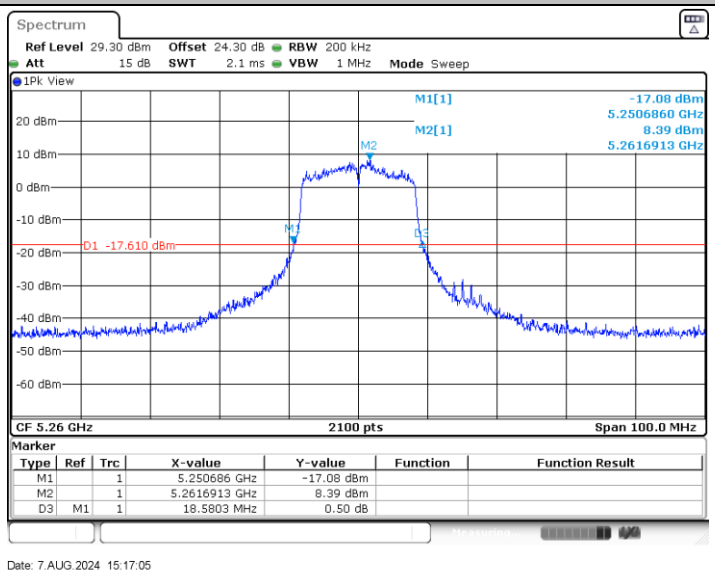

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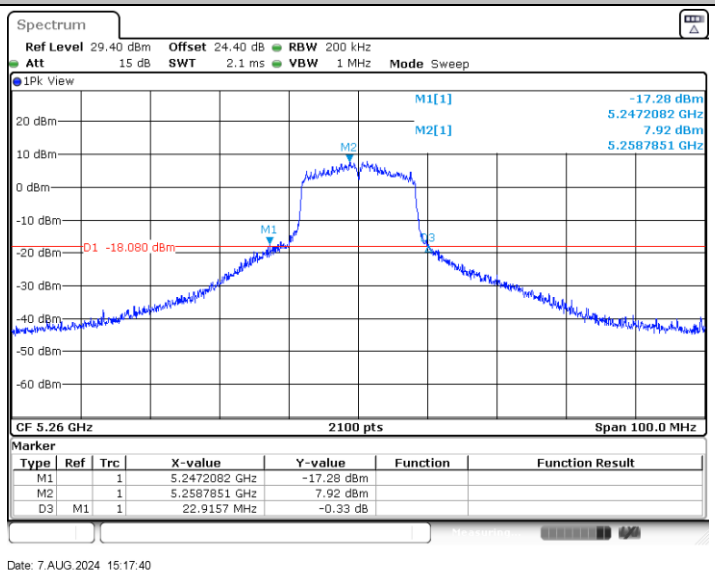

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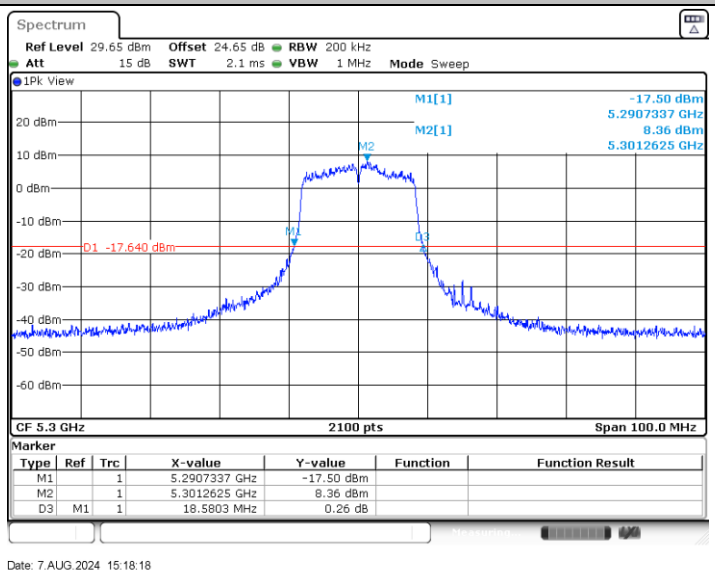

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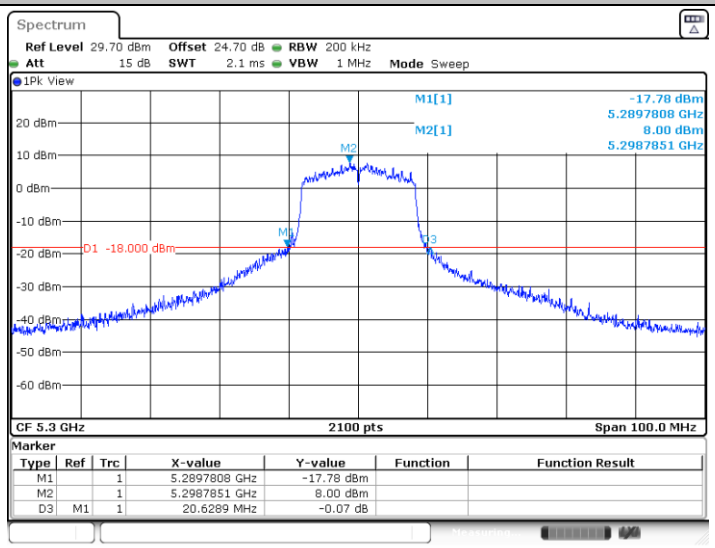

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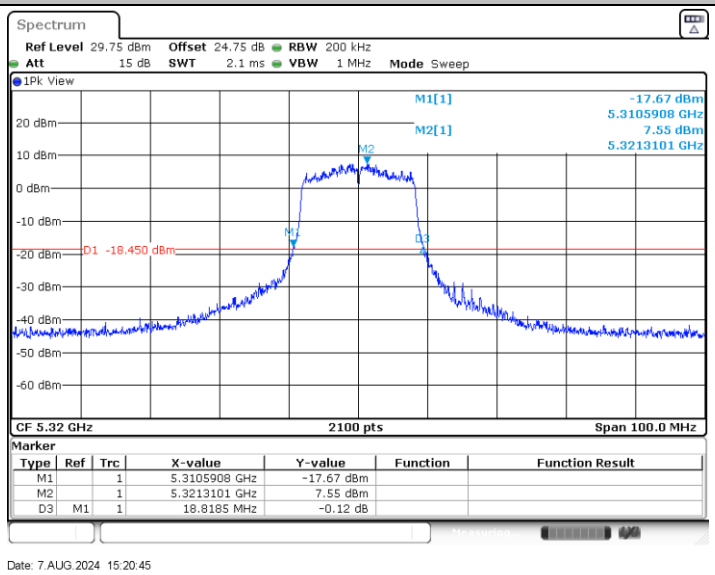

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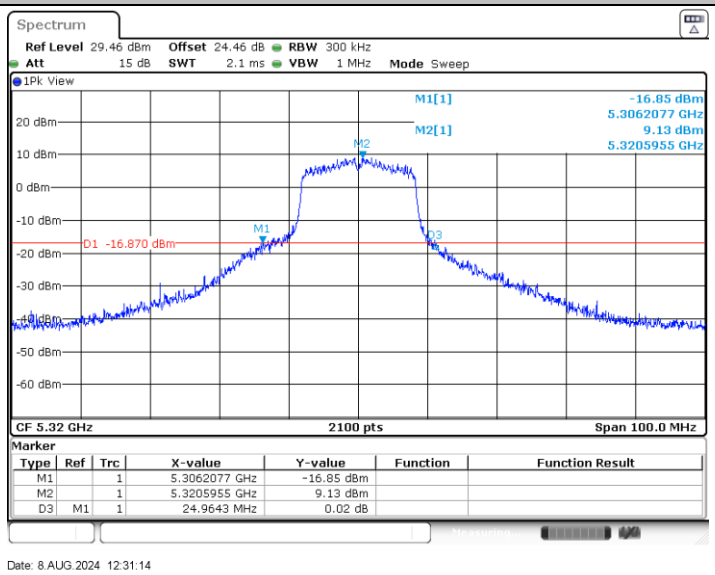

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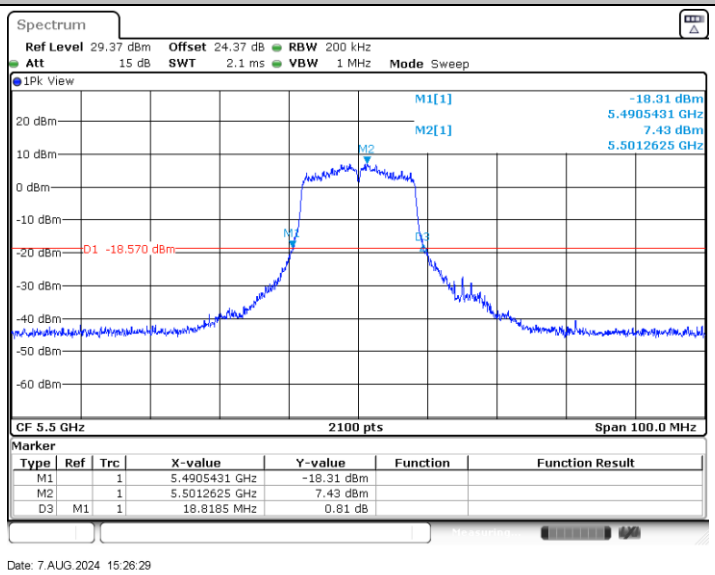

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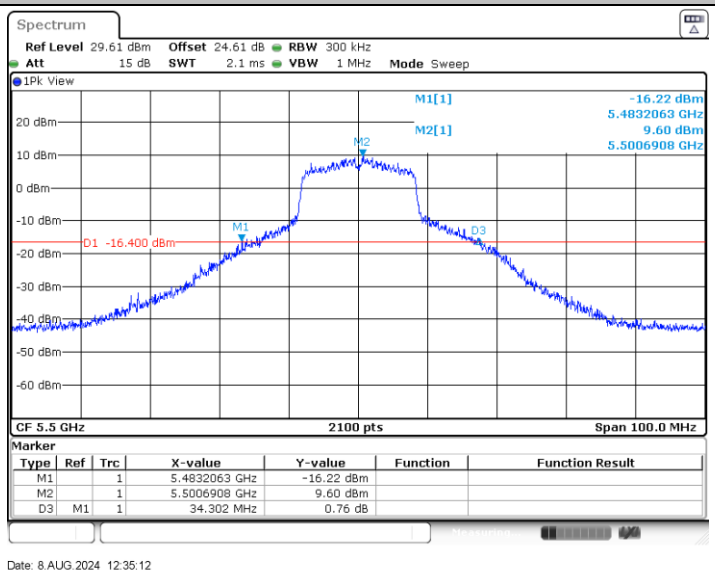

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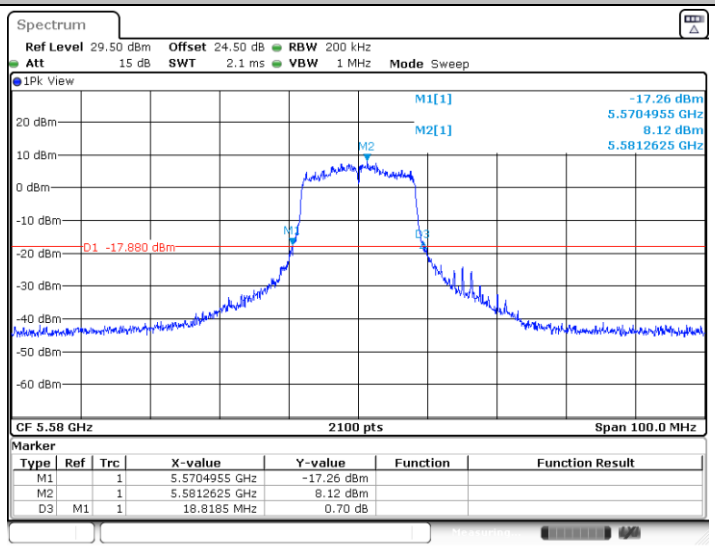

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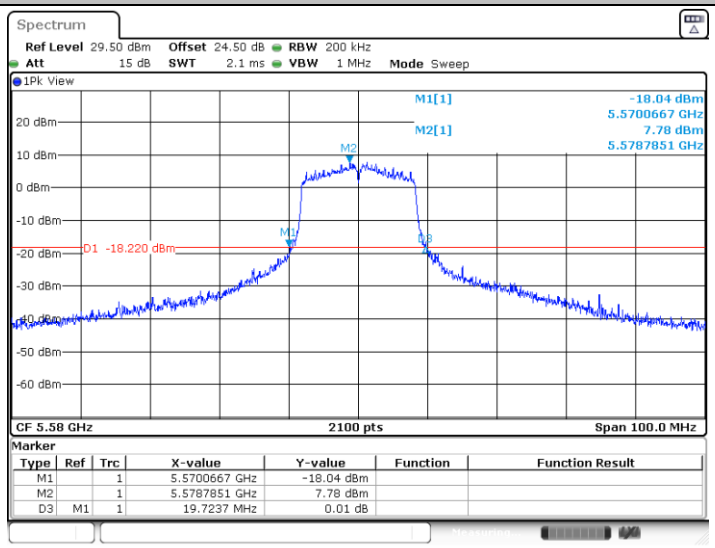

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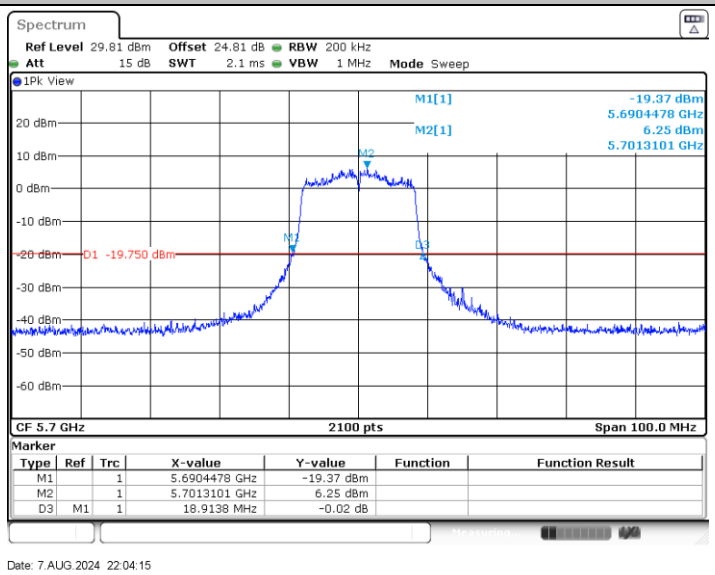

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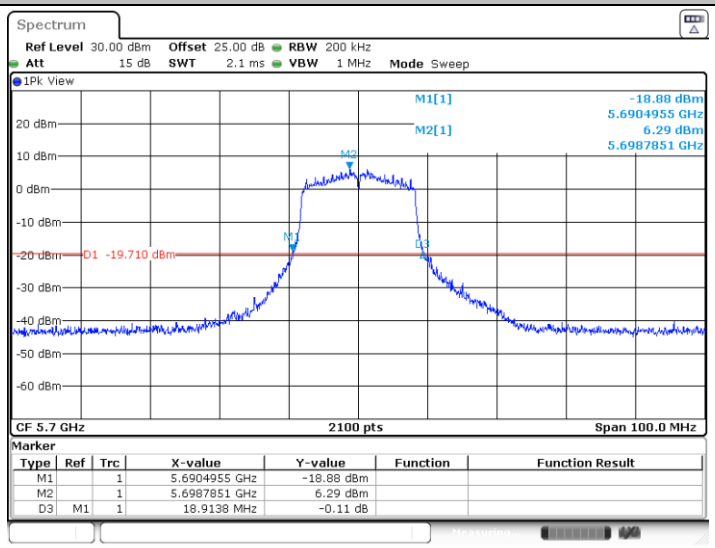

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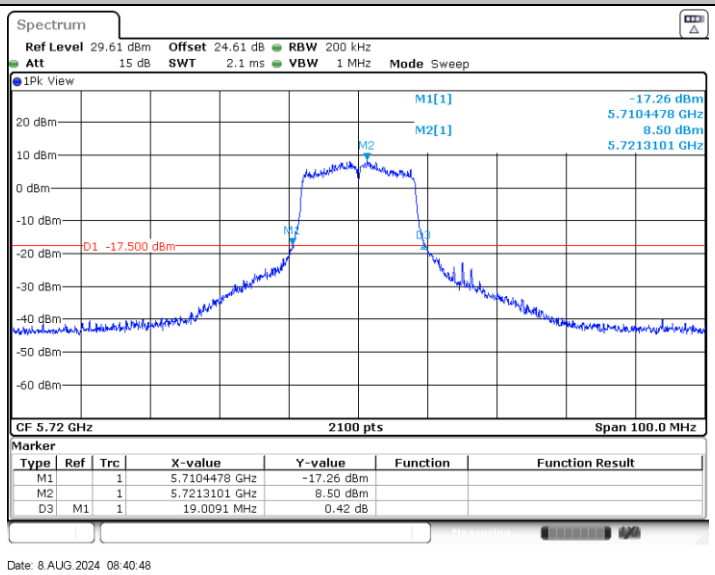

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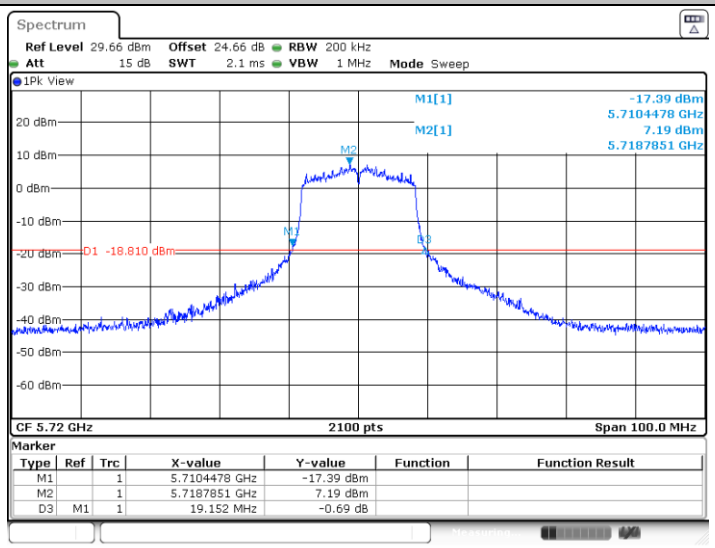

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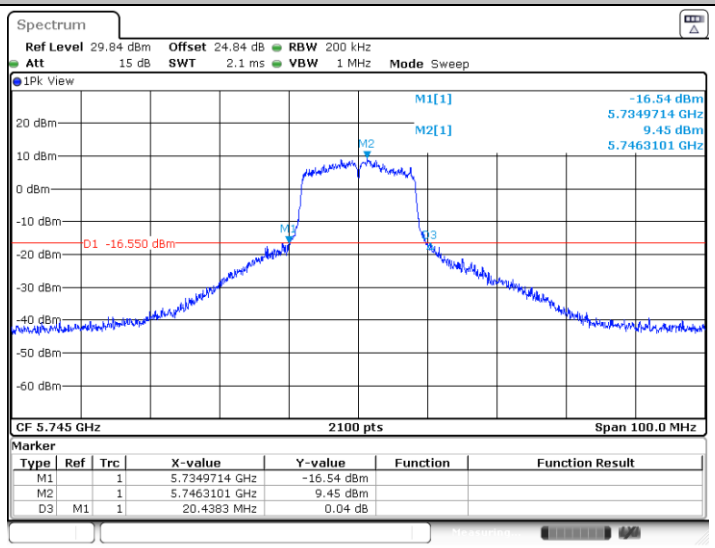

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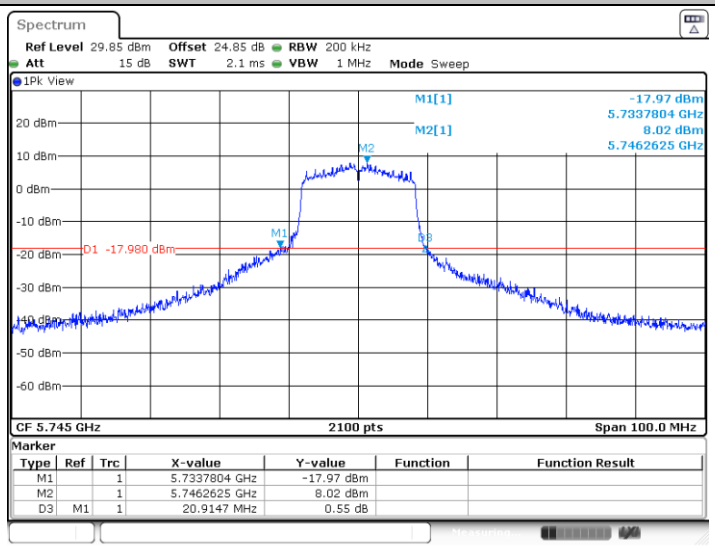

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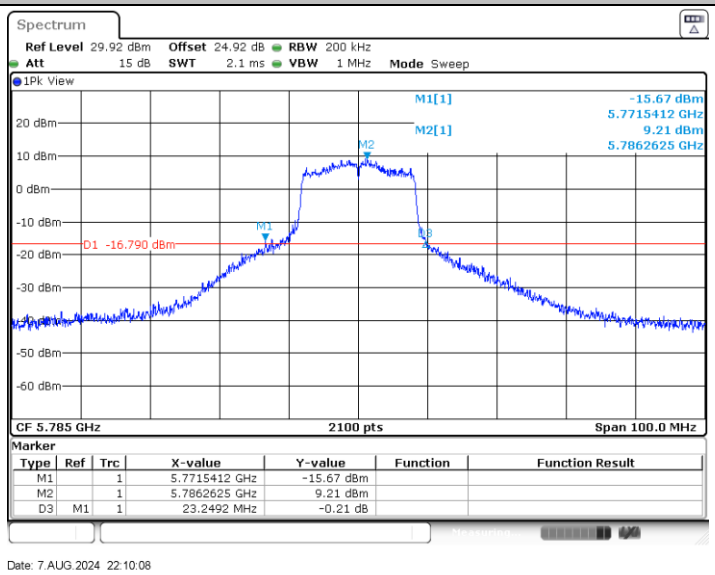

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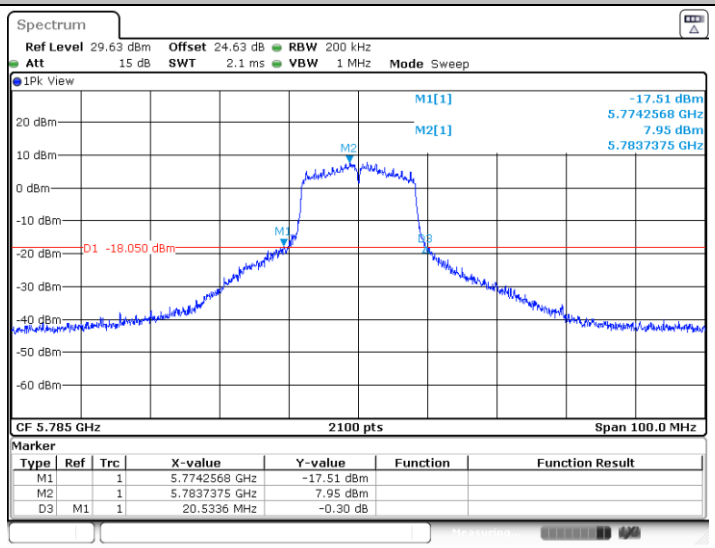

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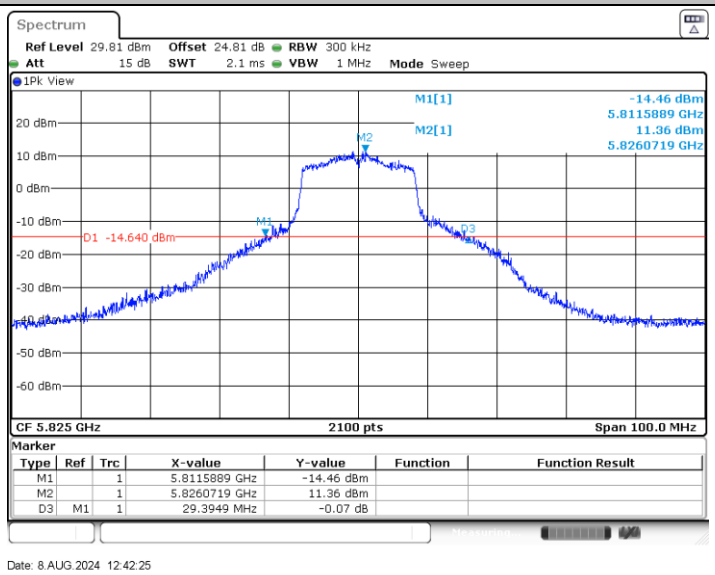

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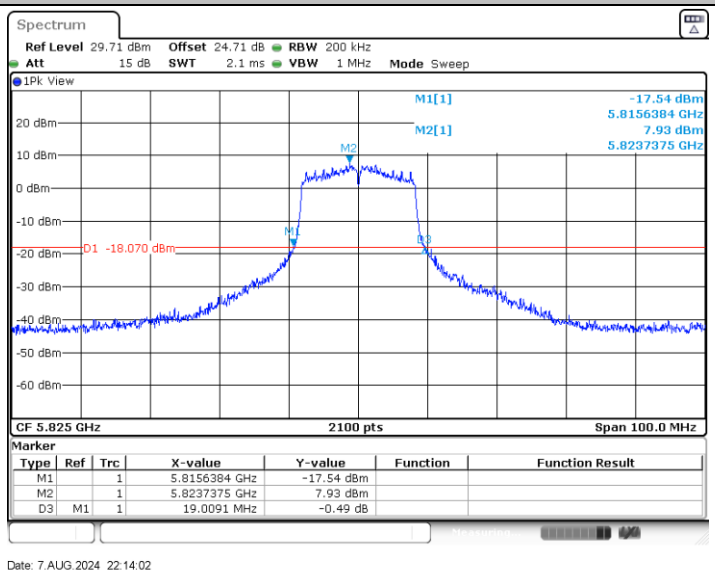

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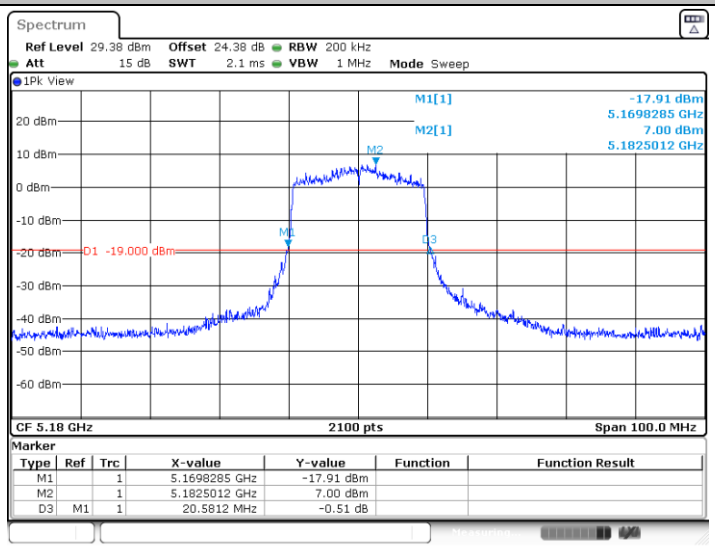

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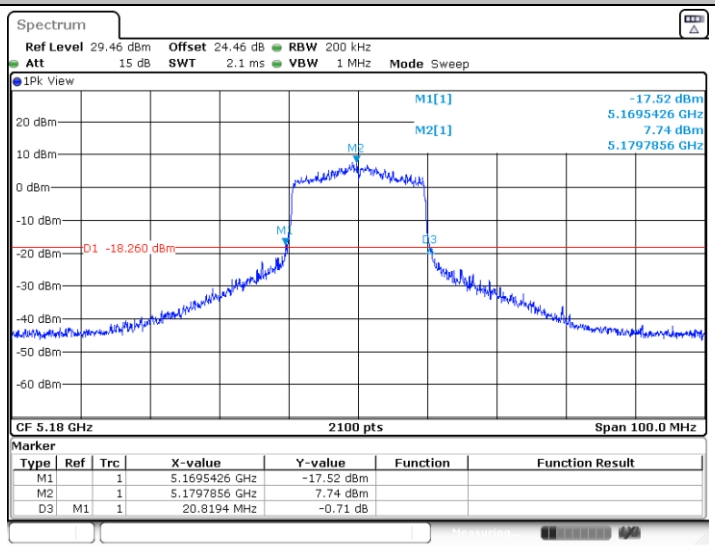

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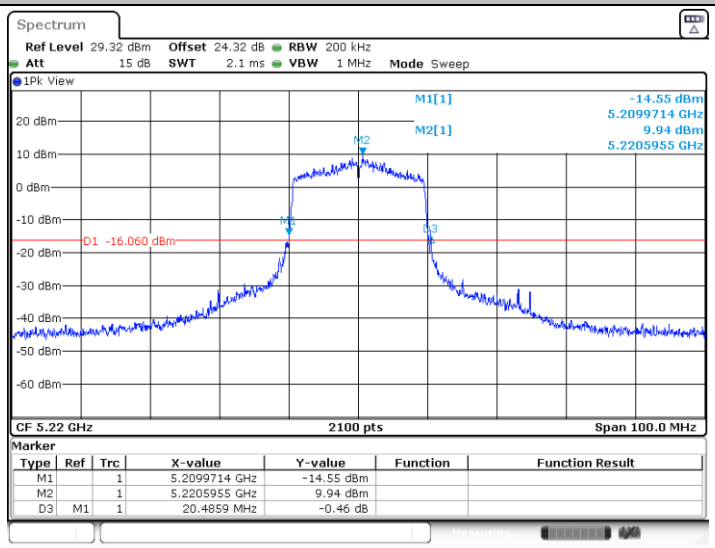

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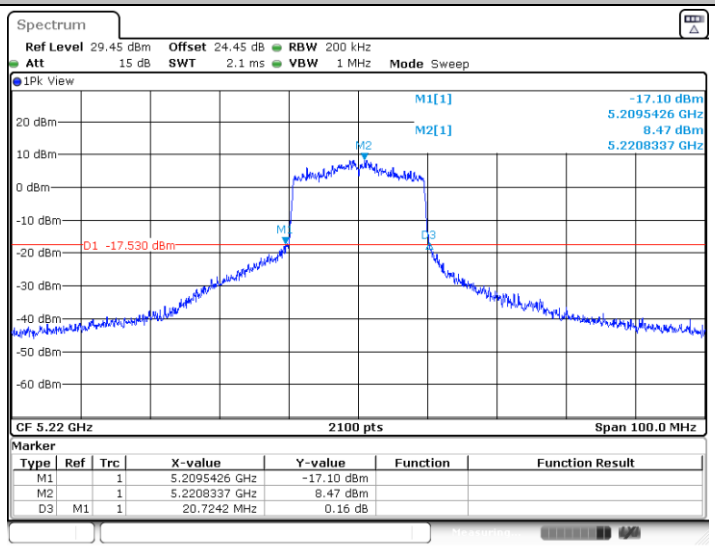

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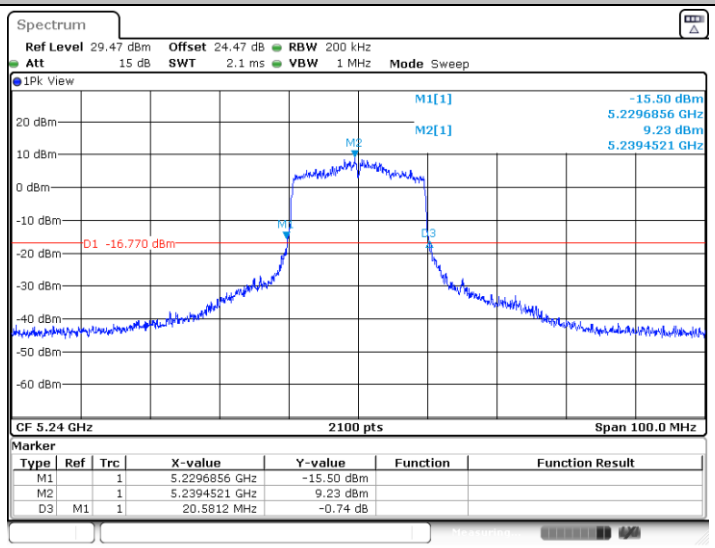

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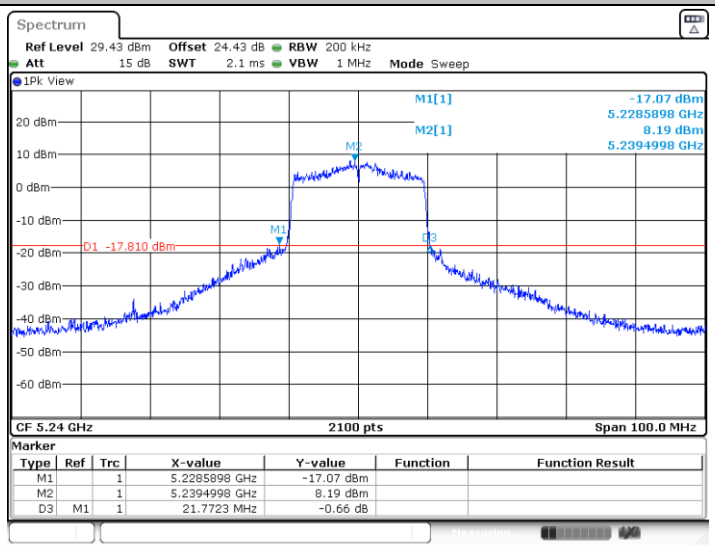

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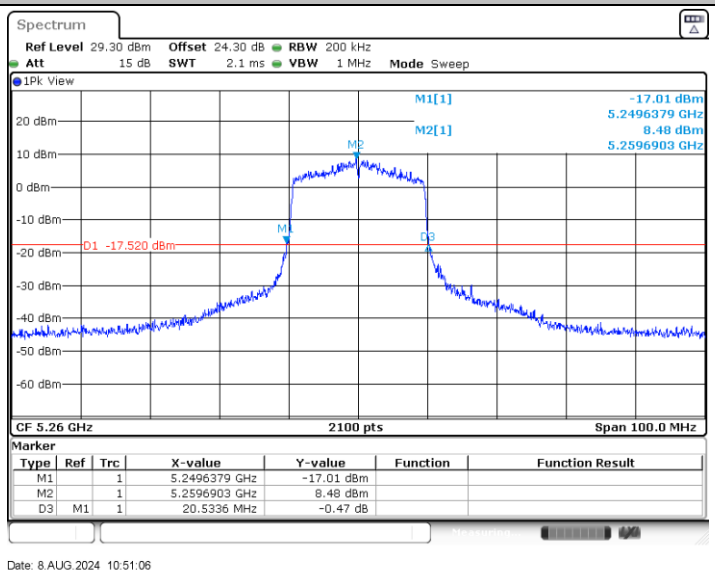

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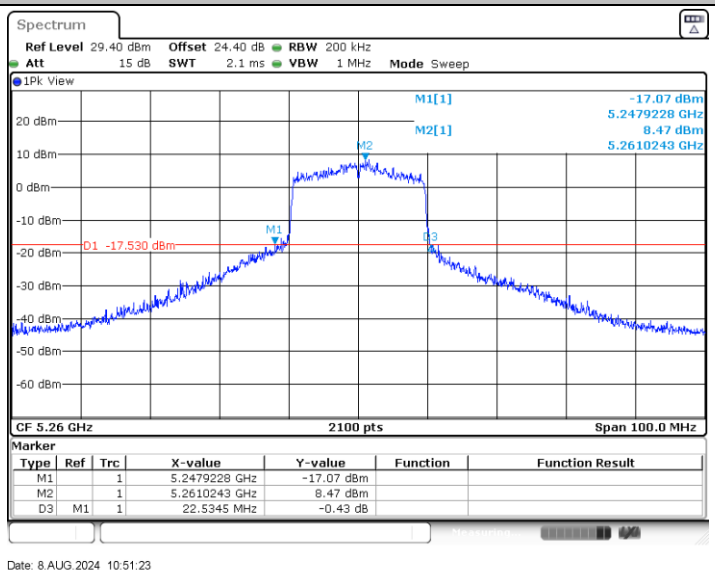

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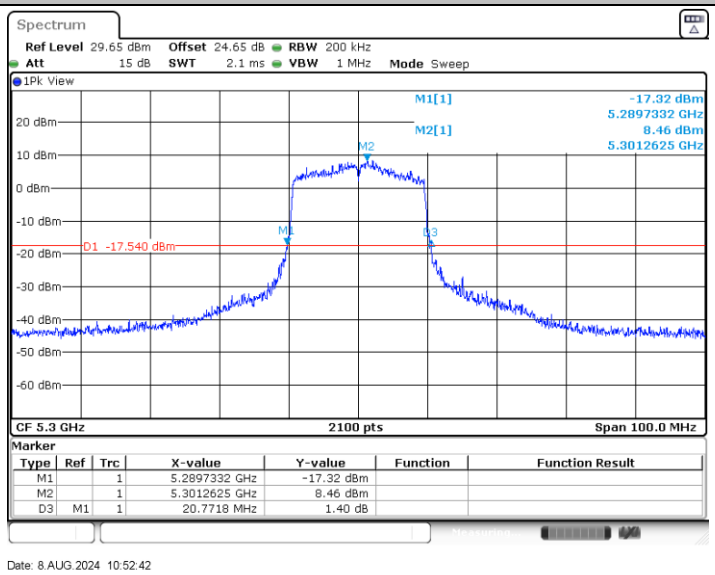

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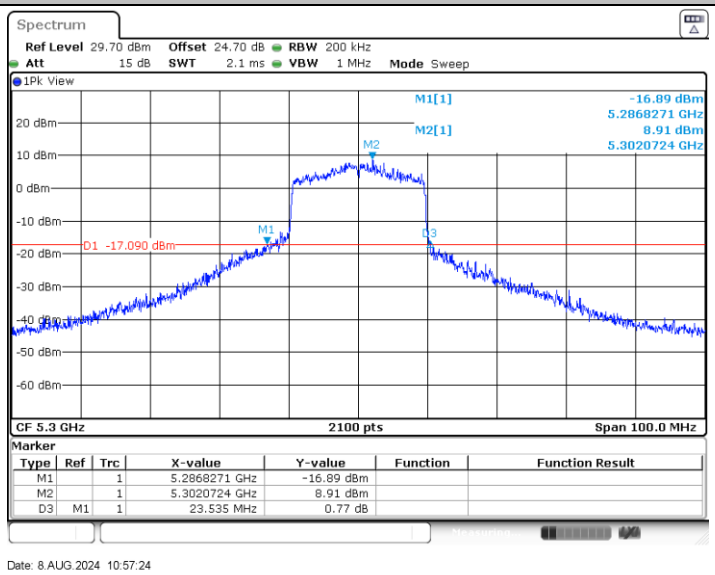

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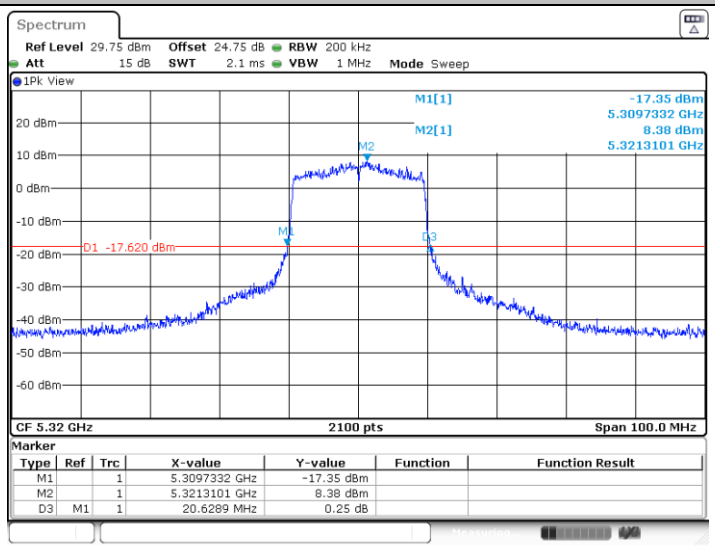

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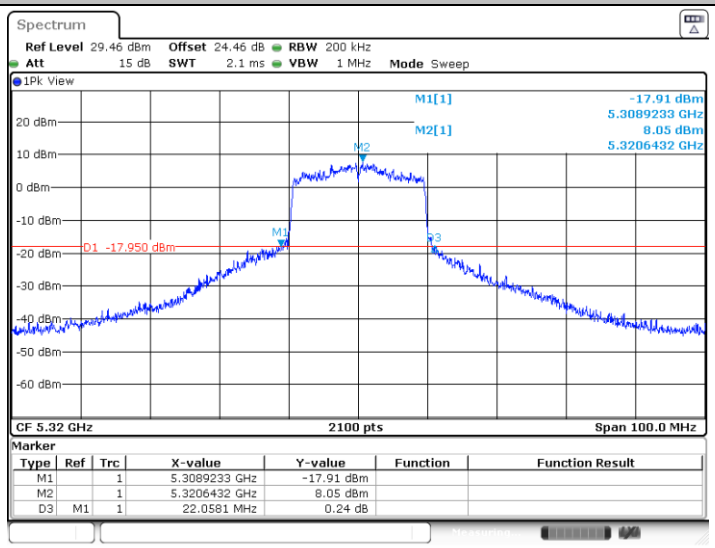

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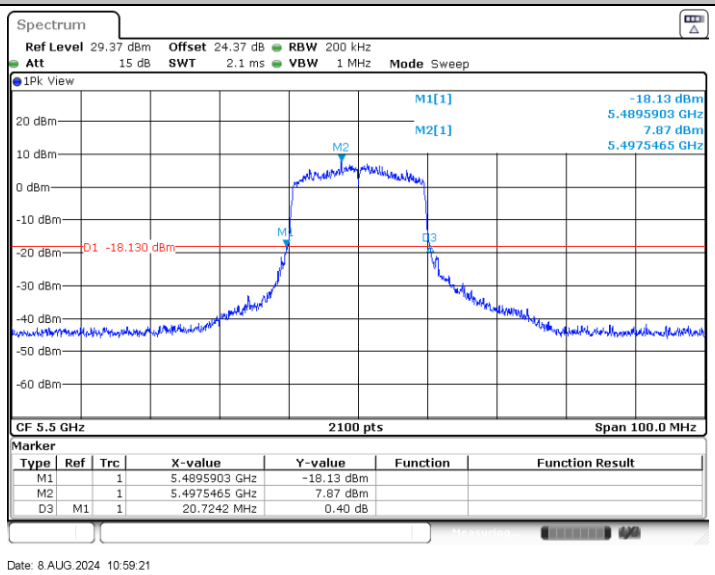

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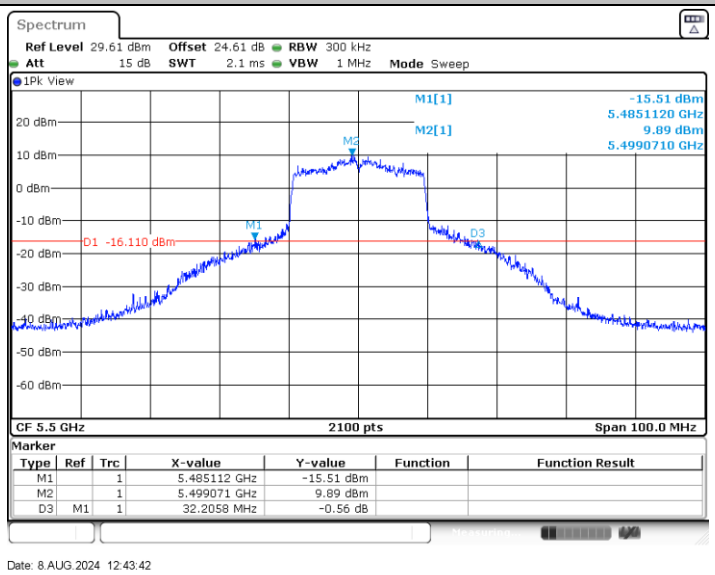

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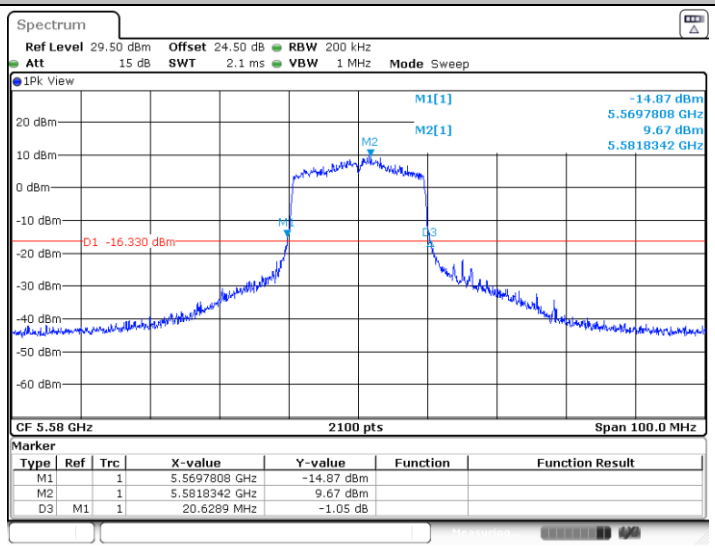

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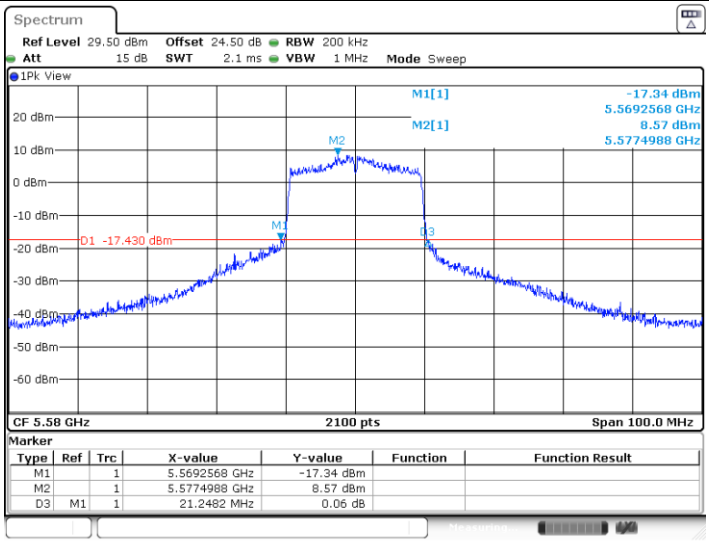

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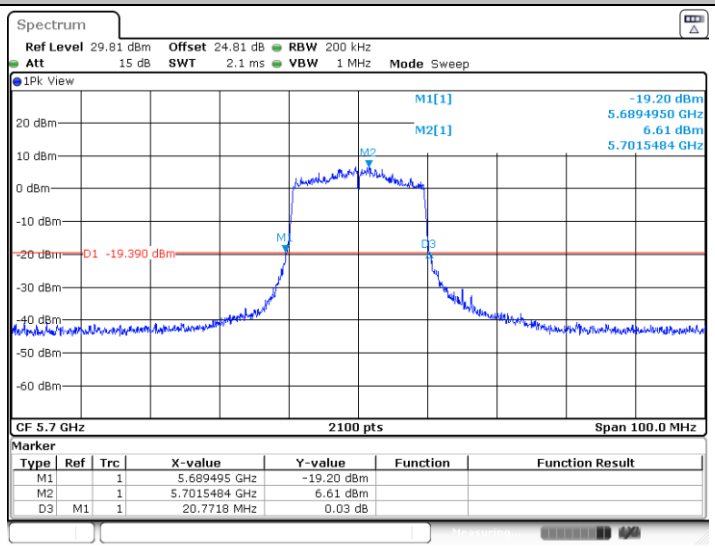

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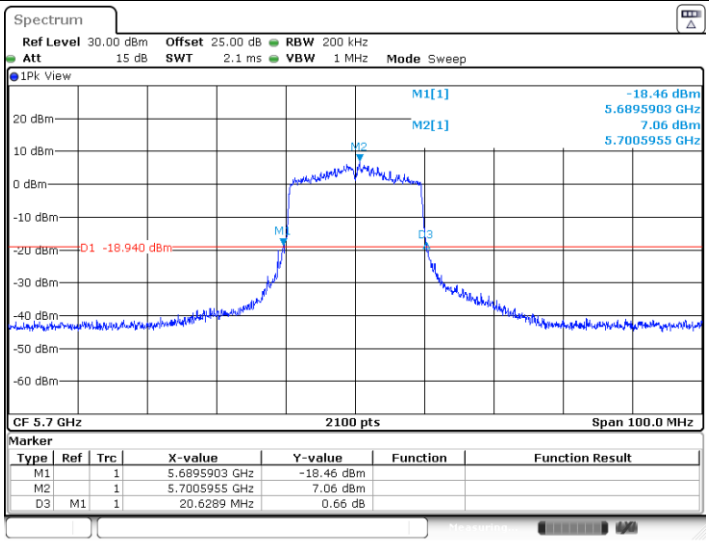

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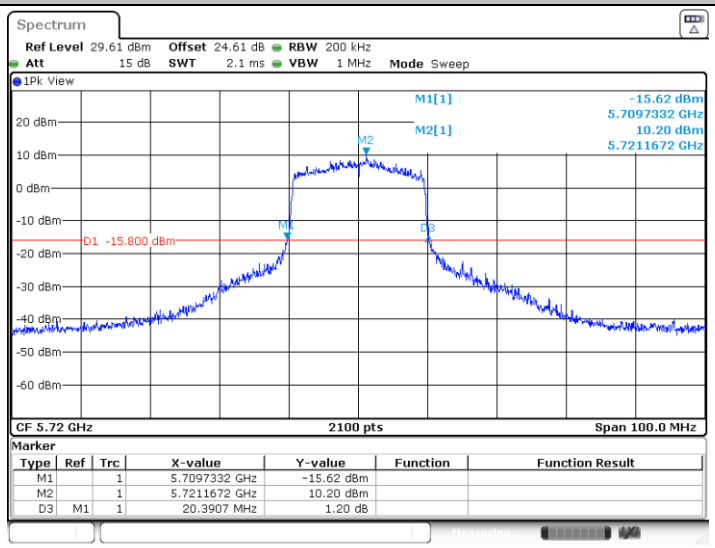

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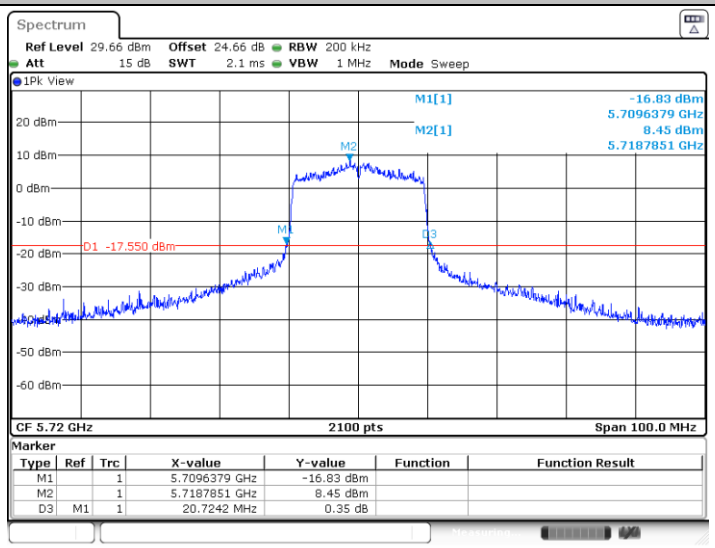

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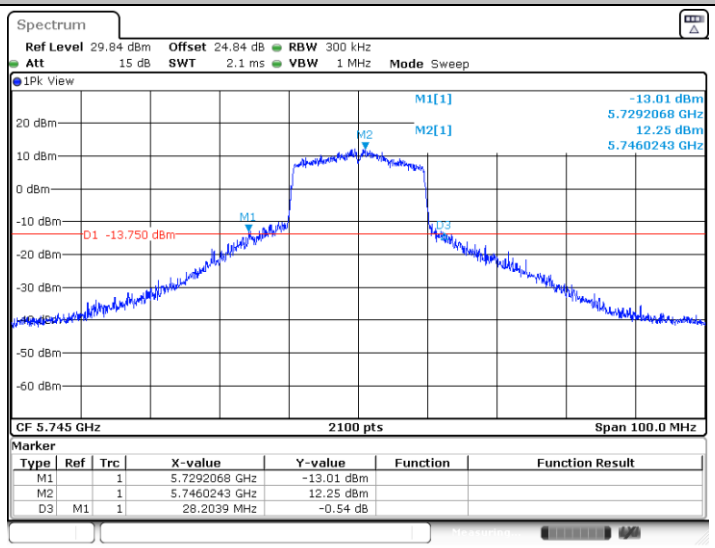

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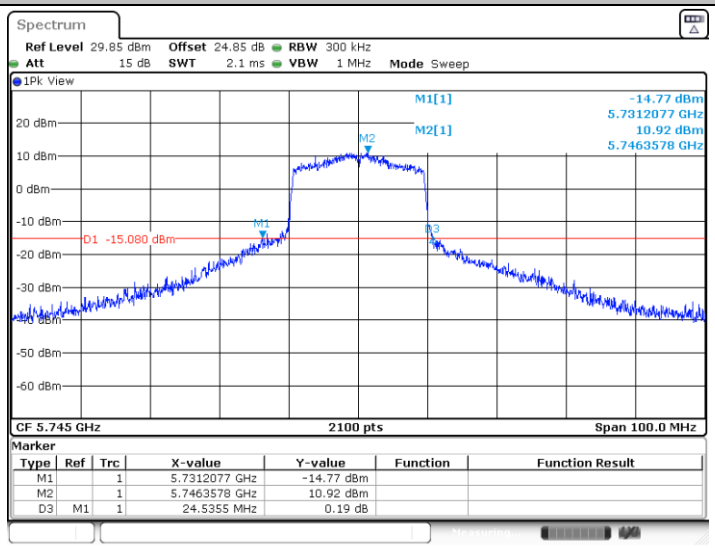

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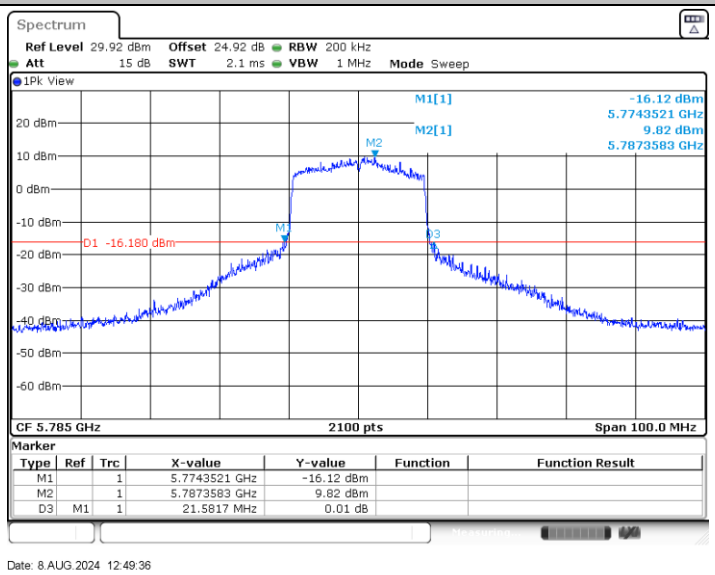

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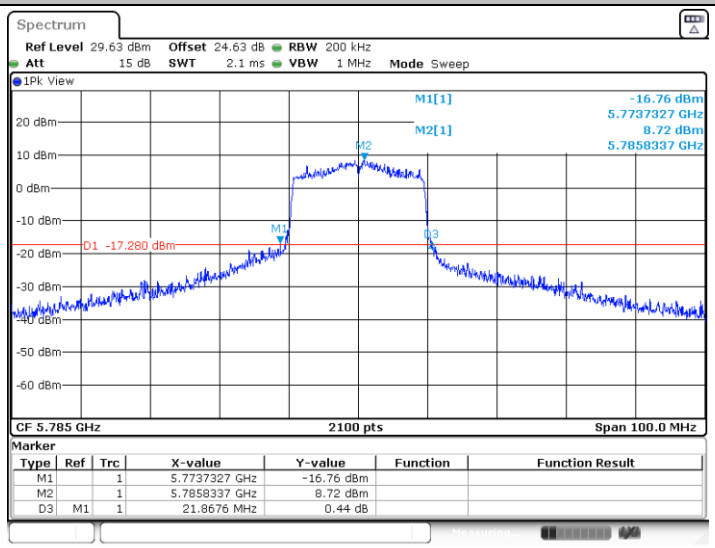

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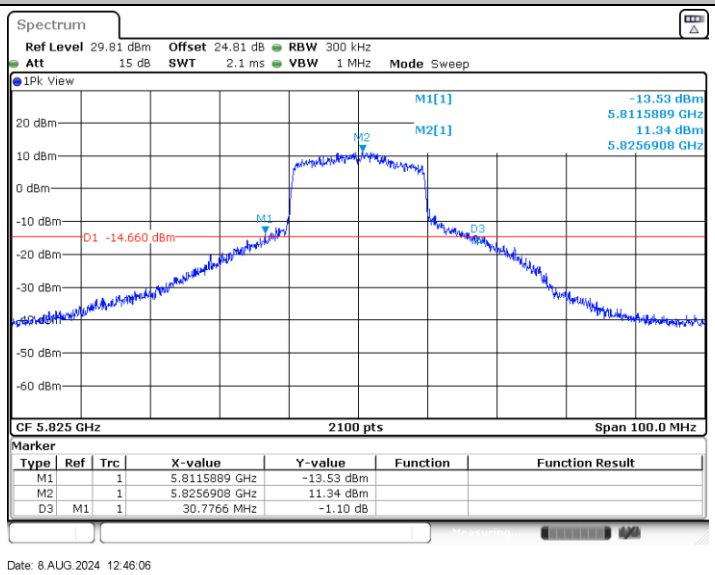

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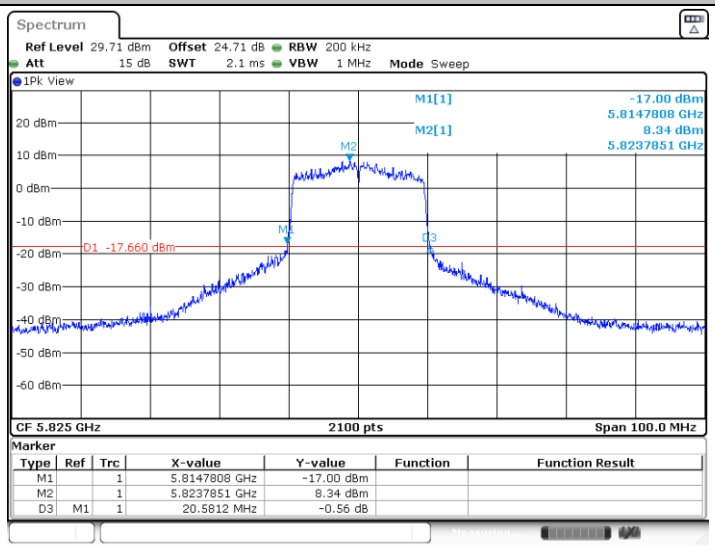

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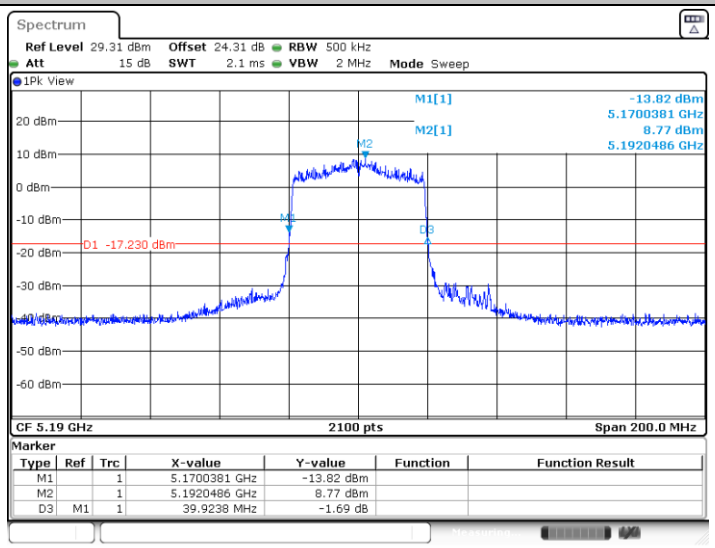

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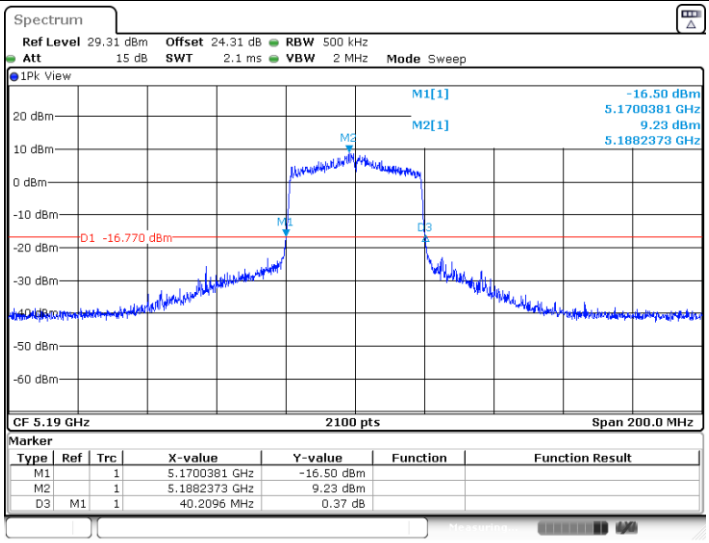

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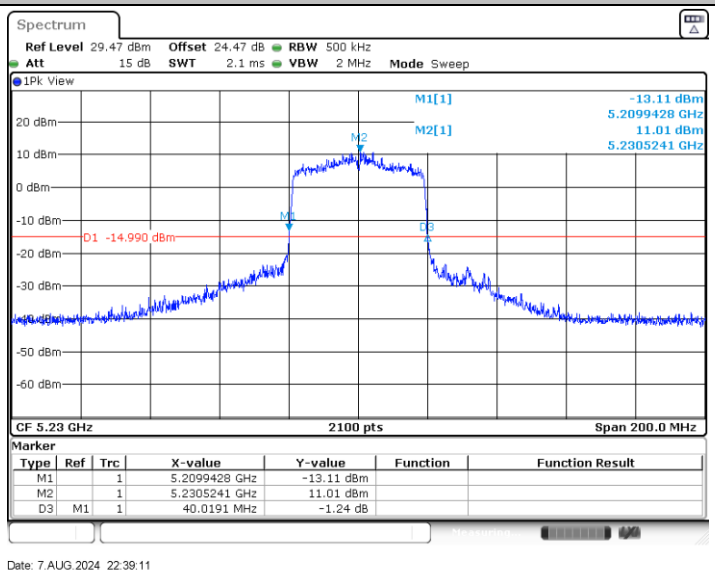

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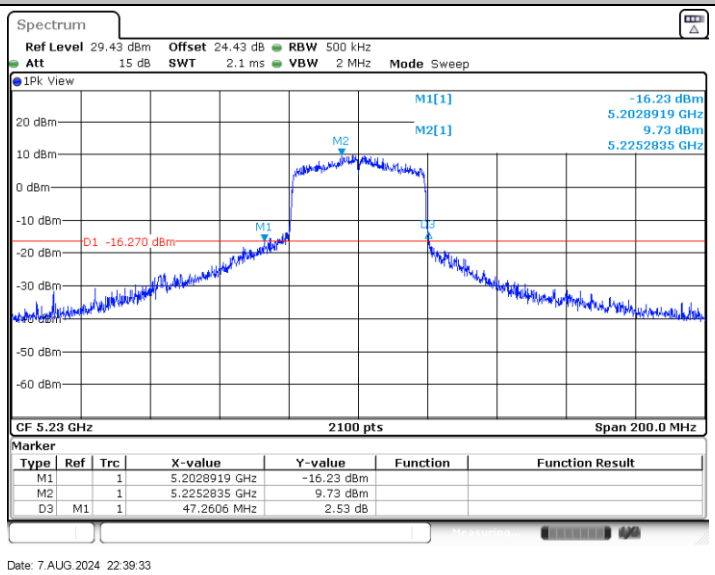

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