3.6 AC Conducted Emission Measurement

3.6.1 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.

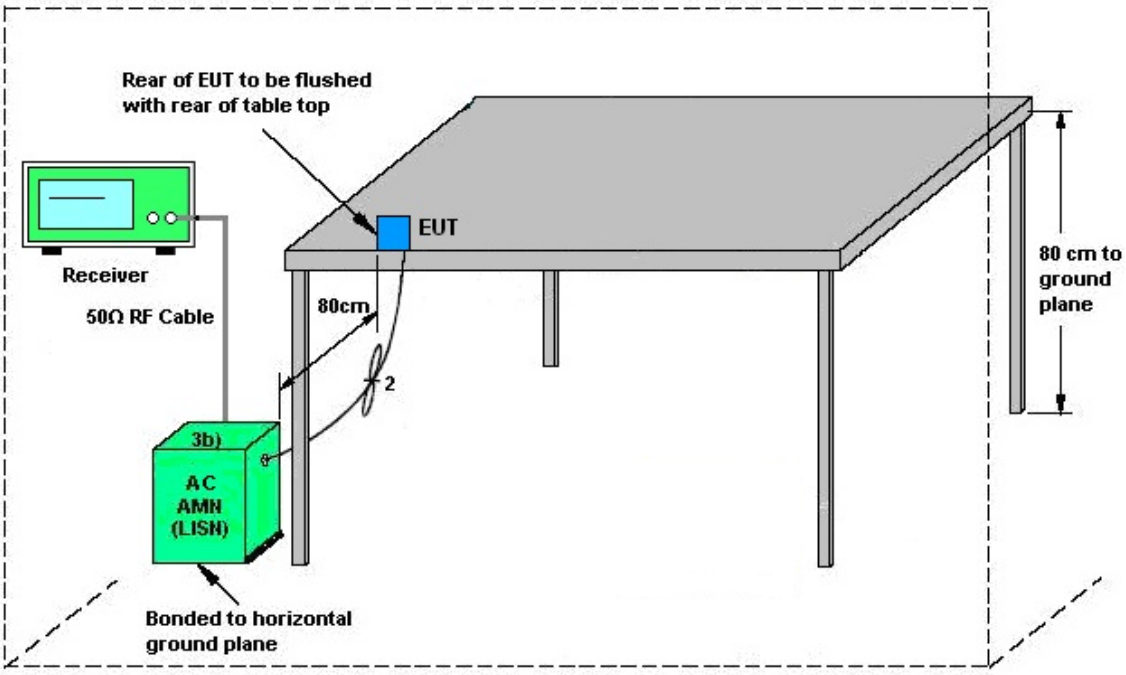
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9 kHz) with Maximum Hold Mode.

3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For power measurements on IEEE 802.11 devices,

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

G_{ANT} is set equal to the gain of the antenna having the highest gain.

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

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

As minimum N_{SS}=1 is supported by EUT, the formula can be simplified as:

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

Where G1, G2….GN denote single antenna gain.

For example: If a device has two antenna, G_{ANT1}= 3.6dBi; G_{ANT2}=4.2dBi

Directional gain of power measurement = max(3.6, 4.2) + 0 = 4.2 dBi

Directional gain of PSD measurement = 10 * log[$(10^{3.6/20} + 10^{4.2/20})^2$ / 2] = 6.92 dBi

The directional gain of EUT is listed in the following table.

<CDD Modes>						
			DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	Ant. 6 (dBi)	Ant. 7 (dBi)	(dBi)	(dBi)	(dB)	(dB)
2.4 GHz	0.30	1.20	1.20	3.77	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

Calculation example:

For the DG for PSD is derived from formula is

10 x log { { [10^ (0.30 dBi / 20) + 10^ (1.20 dBi / 20)] ^ 2 } / 2 }

= 3.77 dBi

TXBF modes

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports beamforming modes.

The directional gain calculation is following F)2)e)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.

	Ant. 6 (dBi)	Ant. 7 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	0.30	1.20	3.77	3.77	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

Calculation example:

For the DG for PSD is derived from formula is

10 x log { { [10^ (0.30 dBi / 20) + 10^ (1.20 dBi / 20)] ^ 2 } / 2 }

= 3.77 dBi

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 07, 2021	Mar. 25, 2022~ May 26, 2022	Sep. 06, 2022	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N -06	47020 & 06	30MHz to 1GHz	Oct. 09, 2021	Mar. 25, 2022~ May 26, 2022	Oct. 08, 2022	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1G~18GHz	Aug. 04, 2021	Mar. 25, 2022~ May 26, 2022	Aug. 03, 2022	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00993	18GHz ~40GHz	Nov. 30, 2021	Mar. 25, 2022~ May 26, 2022	Nov. 29, 2022	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1G	Jul. 05, 2021	Mar. 25, 2022~ May 26, 2022	Jul. 04, 2022	Radiation (03CH16-HY)
Amplifier	EMCI	EMC051845SE	980729	1-18GHz	Jul. 09, 2021	Mar. 25, 2022~ May 26, 2022	Jul. 08, 2022	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Mar. 25, 2022~ May 26, 2022	Jun. 21, 2022	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 09, 2021	Mar. 25, 2022~ May 26, 2022	Dec. 08, 2022	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec.15, 2021	Mar. 25, 2022~ May 26, 2022	Dec. 14, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11680/4PE	NA	Aug. 28, 2021	Mar. 25, 2022~ May 26, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11688/4PE	NA	Aug. 28, 2021	Mar. 25, 2022~ May 26, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	NA	Aug. 28, 2021	Mar. 25, 2022~ May 26, 2022	Aug. 27, 2022	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Mar. 25, 2022~ May 26, 2022	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Mar. 25, 2022~ May 26, 2022	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Mar. 25, 2022~ May 26, 2022	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Mar. 25, 2022~ May 26, 2022	N/A	Radiation (03CH16-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Apr. 23, 2022	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Apr. 23, 2022	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 29, 2021	Apr. 23, 2022	Oct. 28, 2022	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 16, 2022	Apr. 23, 2022	Mar. 15, 2023	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 16, 2022	Apr. 23, 2022	Feb. 15, 2023	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI7	100724	9kHz~7GHz	Fed. 24, 2022	Apr. 23, 2022	Feb. 23, 2023	Conduction (CO07-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Mar. 24, 2022~ Jun. 03, 2022	Nov. 15, 2022	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12 (NO:113)	10MHz~6GHz	Dec. 16, 2021	Mar. 24, 2022~ Jun. 03, 2022	Dec. 15, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Mar. 24, 2022~ Jun. 03, 2022	Aug. 29, 2022	Conducted (TH05-HY)
Switch Control Mainframe	E-IUSTRUMENT	ETF-1405-0	EC1900067 (BOX7)	N/A	Aug. 12, 2021	Mar. 24, 2022~ Jun. 03, 2022	Aug. 11, 2022	Conducted (TH05-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.8 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.2 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

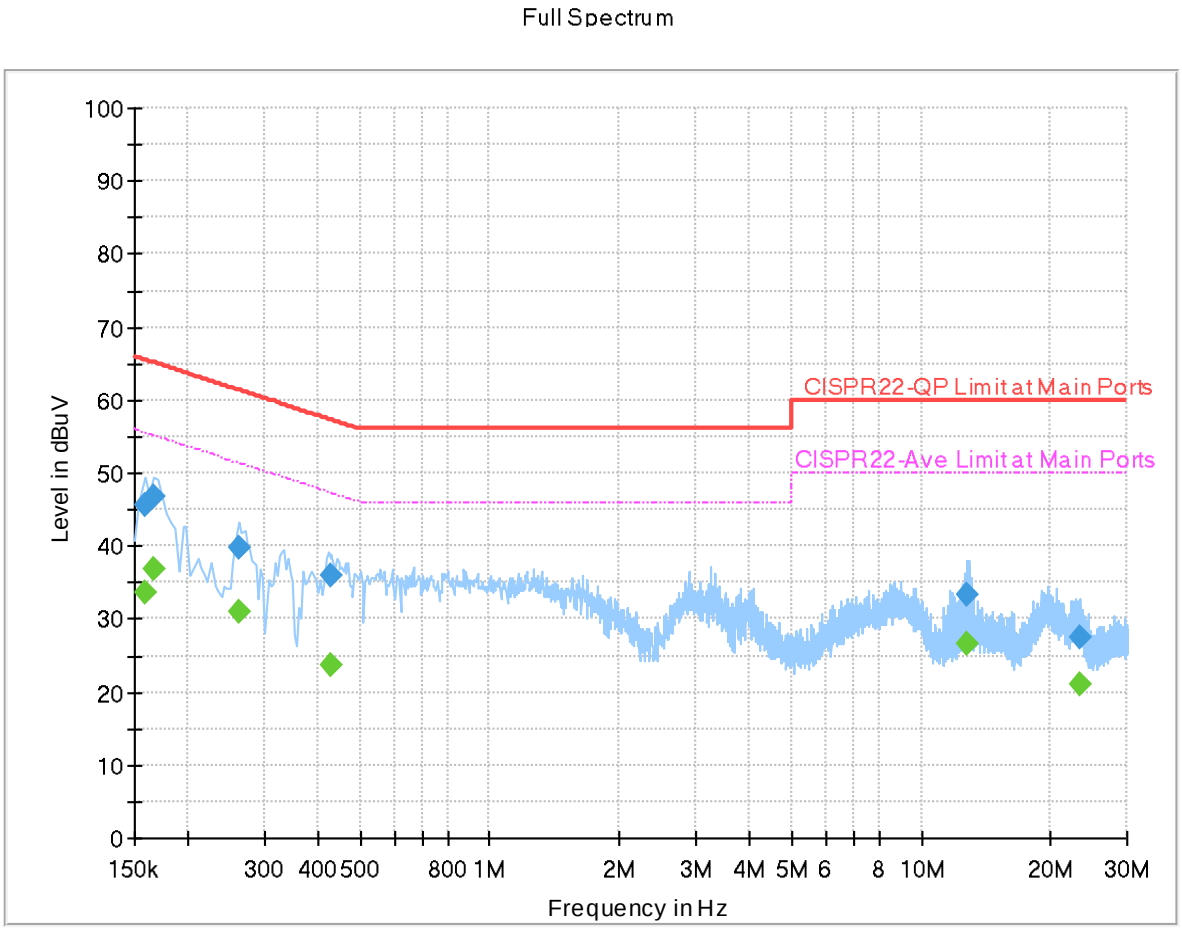
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.8 dB

Appendix A. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	**Temperature :**	28.6~29.5℃
		Relative Humidity :	43.9~46.7%

EUT Information

Report NO :	222229
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

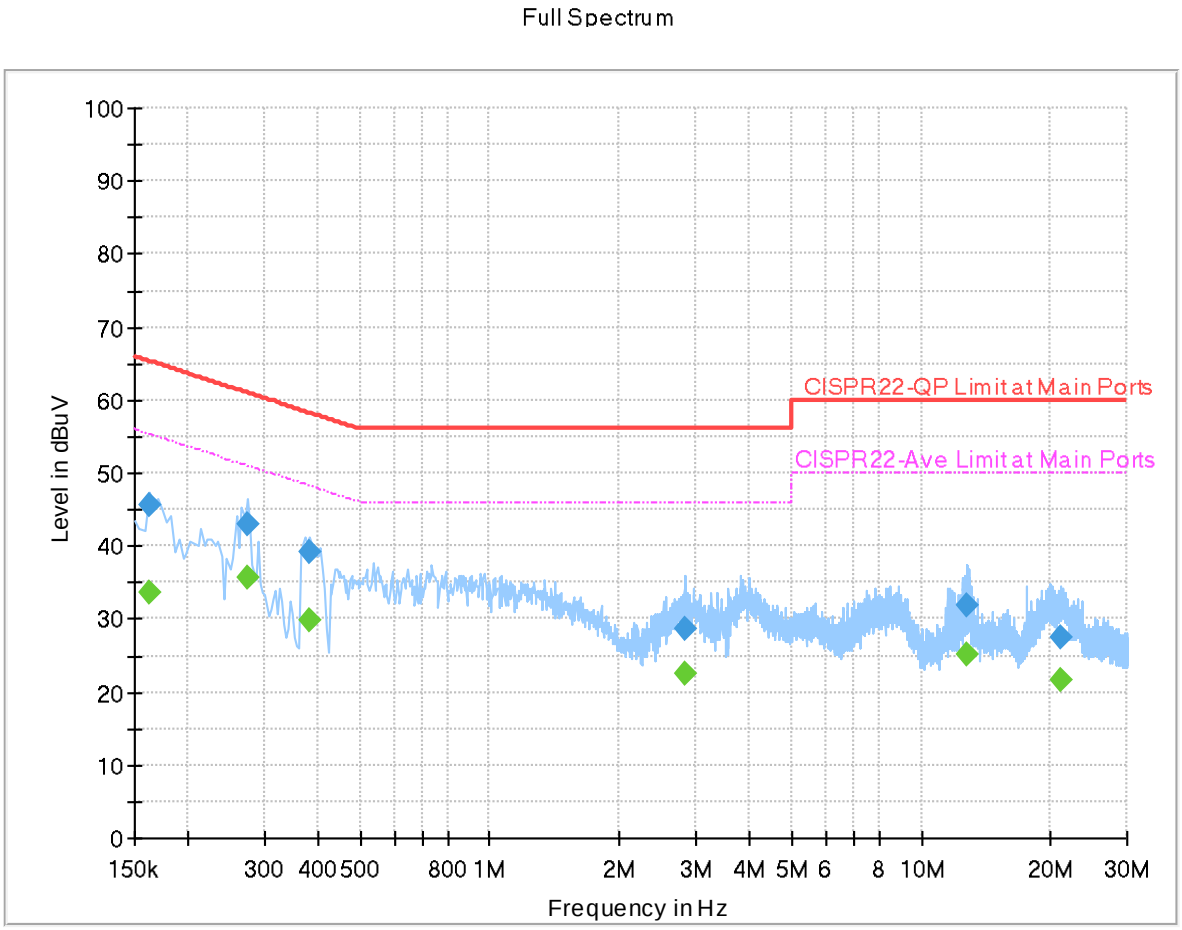


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	---	33.50	55.57	22.07	L1	OFF	20.0
0.158000	45.64	---	65.57	19.93	L1	OFF	20.0
0.166000	---	36.70	55.16	18.46	L1	OFF	20.0
0.166000	46.70	---	65.16	18.46	L1	OFF	20.0
0.262000	---	30.95	51.37	20.42	L1	OFF	20.0
0.262000	39.91	---	61.37	21.46	L1	OFF	20.0
0.430000	---	23.76	47.25	23.49	L1	OFF	20.0
0.430000	36.00	---	57.25	21.25	L1	OFF	20.0
12.770000	---	26.71	50.00	23.29	L1	OFF	20.2
12.770000	33.32	---	60.00	26.68	L1	OFF	20.2
23.334000	---	21.05	50.00	28.95	L1	OFF	20.3
23.334000	27.40	---	60.00	32.60	L1	OFF	20.3

EUT Information

Report NO :	222229
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	33.70	55.36	21.66	N	OFF	20.0
0.162000	45.47	---	65.36	19.89	N	OFF	20.0
0.274000	---	35.60	51.00	15.40	N	OFF	20.0
0.274000	43.05	---	61.00	17.95	N	OFF	20.0
0.382000	---	29.96	48.24	18.28	N	OFF	20.0
0.382000	39.17	---	58.24	19.07	N	OFF	20.0
2.846000	---	22.66	46.00	23.34	N	OFF	20.0
2.846000	28.55	---	56.00	27.45	N	OFF	20.0
12.762000	---	25.23	50.00	24.77	N	OFF	20.2
12.762000	32.00	---	60.00	28.00	N	OFF	20.2
21.162000	---	21.69	50.00	28.31	N	OFF	20.3
21.162000	27.35	---	60.00	32.65	N	OFF	20.3

Appendix B. Radiated Spurious Emission

Test Engineer :	Andy Yang, Karl Hou, Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

<CDD Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
6+7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.905	58.96	-15.04	74	43.45	27.36	18.22	30.07	125	270	P	H
		2390	51.81	-2.19	54	36.3	27.36	18.22	30.07	125	270	A	H
	*	2412	113.03	-	-	97.39	27.45	18.26	30.07	125	270	P	H
	*	2412	109.84	-	-	94.2	27.45	18.26	30.07	125	270	A	H
													H
		2389.905	56.64	-17.36	74	41.13	27.36	18.22	30.07	366	1	P	V
		2390	49.02	-4.98	54	33.51	27.36	18.22	30.07	366	1	A	V
	*	2412	110.19	-	-	94.55	27.45	18.26	30.07	366	1	P	V
	*	2412	106.8	-	-	91.16	27.45	18.26	30.07	366	1	A	V
													V
													V
802.11b CH 06 2437MHz		2379.16	55.98	-18.02	74	40.54	27.32	18.2	30.08	143	165	P	H
		2388.4	45.67	-8.33	54	30.17	27.35	18.22	30.07	143	165	A	H
	*	2437	113.95	-	-	98.15	27.55	18.31	30.06	143	165	P	H
	*	2437	110.84	-	-	95.04	27.55	18.31	30.06	143	165	A	H
		2485.44	58.9	-15.1	74	42.74	27.81	18.39	30.04	143	165	P	H
		2485.58	50.56	-3.44	54	34.4	27.81	18.39	30.04	143	165	A	H
		2378.74	55.82	-18.18	74	40.39	27.31	18.2	30.08	372	180	P	V
		2388.54	44.48	-9.52	54	28.98	27.35	18.22	30.07	372	180	A	V
	*	2437	111.84	-	-	96.04	27.55	18.31	30.06	372	180	P	V
	*	2437	108.59	-	-	92.79	27.55	18.31	30.06	372	180	A	V
		2490.9	57.75	-16.25	74	41.54	27.85	18.4	30.04	372	180	P	V
		2485.72	48.14	-5.86	54	31.98	27.81	18.39	30.04	372	180	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz	*	2462	112.05	-	-	96.08	27.67	18.35	30.05	100	158	P	H
	*	2462	109.02	-	-	93.05	27.67	18.35	30.05	100	158	A	H
		2487.32	60.42	-13.58	74	44.24	27.82	18.4	30.04	100	158	P	H
		2483.52	52.49	-1.51	54	36.34	27.8	18.39	30.04	100	158	P	H
													H
													H
	*	2462	108.74	-	-	92.77	27.67	18.35	30.05	316	190	P	V
	*	2462	105.7	-	-	89.73	27.67	18.35	30.05	316	190	A	V
		2483.52	59.15	-14.85	74	43	27.8	18.39	30.04	316	190	P	V
		2483.52	51.33	-2.67	54	35.18	27.8	18.39	30.04	316	190	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	44.73	-29.27	74	55.21	32.45	12.34	55.27	-	-	P	H
													H
													H
													H
													H
													H
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													H
													H
													H
		4824	41.5	-32.5	74	51.98	32.45	12.34	55.27	-	-	P	V
													V
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WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 06 2437MHz		4874	39.8	-34.2	74	50.21	32.6	12.32	55.33	-	-	P	H
		7311	52.72	-21.28	74	55.76	36.78	15.83	55.65	354	18	P	H
		7311	46.9	-7.1	54	49.94	36.78	15.83	55.65	354	18	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	40.05	-33.95	74	50.46	32.6	12.32	55.33	-	-	P	V
		7311	54.51	-19.49	74	57.55	36.78	15.83	55.65	100	89	P	V
		7311	49.72	-4.28	54	52.76	36.78	15.83	55.65	100	89	A	V
													V
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WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz		4924	41.22	-32.78	74	51.47	32.84	12.3	55.39	-	-	P	H
		7386	46.35	-27.65	74	49.35	36.41	16.25	55.66	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4924	42.15	-31.85	74	52.4	32.84	12.3	55.39	-	-	P	V
		7386	46.5	-27.5	74	49.5	36.41	16.25	55.66	-	-	P	V
													V
													V
													V
													V
													V
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													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.695	63.78	-10.22	74	48.27	27.36	18.22	30.07	107	160	P	H
		2389.905	52.44	-1.56	54	36.93	27.36	18.22	30.07	107	160	A	H
	*	2412	111.72	-	-	96.08	27.45	18.26	30.07	107	160	P	H
	*	2412	104.09	-	-	88.45	27.45	18.26	30.07	107	160	A	H
													H
													H
		2389.8	64.32	-9.68	74	48.81	27.36	18.22	30.07	377	200	P	V
		2390	49.99	-4.01	54	34.48	27.36	18.22	30.07	377	200	A	V
	*	2412	109.08	-	-	93.44	27.45	18.26	30.07	377	200	P	V
	*	2412	101.57	-	-	85.93	27.45	18.26	30.07	377	200	A	V
													V
													V
802.11g CH 02 2417MHz		2388.68	68.34	-5.66	74	52.84	27.35	18.22	30.07	100	165	P	H
		2389.94	52.11	-1.89	54	36.6	27.36	18.22	30.07	100	165	A	H
	*	2417	112.66	-	-	96.95	27.5	18.27	30.06	100	165	P	H
	*	2417	105.18	-	-	89.47	27.5	18.27	30.06	100	165	A	H
		2389.66	64.75	-9.25	74	49.24	27.36	18.22	30.07	385	179	P	V
		2389.94	49.71	-4.29	54	34.2	27.36	18.22	30.07	385	179	A	V
	*	2417	110.17	-	-	94.46	27.5	18.27	30.06	385	179	P	V
	*	2417	102.47	-	-	86.76	27.5	18.27	30.06	385	179	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 06 2437MHz		2389.24	56.45	-17.55	74	40.94	27.36	18.22	30.07	125	159	P	H
		2389.8	46.9	-7.1	54	31.39	27.36	18.22	30.07	125	159	A	H
	*	2437	115.03	-	-	99.23	27.55	18.31	30.06	125	159	P	H
	*	2437	108.3	-	-	92.5	27.55	18.31	30.06	125	159	A	H
		2486.77	61.7	-12.3	74	45.52	27.82	18.4	30.04	125	159	P	H
		2483.55	52.08	-1.92	54	35.93	27.8	18.39	30.04	125	159	A	H
		2387.7	57.48	-16.52	74	41.98	27.35	18.22	30.07	369	173	P	V
		2389.8	46.2	-7.8	54	30.69	27.36	18.22	30.07	369	173	A	V
	*	2437	112.08	-	-	96.28	27.55	18.31	30.06	369	173	P	V
	*	2437	104.59	-	-	88.79	27.55	18.31	30.06	369	173	A	V
		2485.02	60.15	-13.85	74	43.99	27.81	18.39	30.04	369	173	P	V
		2483.69	49.48	-4.52	54	33.33	27.8	18.39	30.04	369	173	A	V
802.11g CH 09 2452MHz	*	2452	112.5	-	-	96.51	27.71	18.33	30.05	100	169	P	H
	*	2452	105.42	-	-	89.43	27.71	18.33	30.05	100	169	A	H
		2483.5	65.44	-8.56	74	49.26	27.83	18.39	30.04	100	169	P	H
		2483.56	51.68	-2.32	54	35.5	27.83	18.39	30.04	100	169	A	H
	*	2452	110.36	-	-	94.37	27.71	18.33	30.05	354	184	P	V
	*	2452	103	-	-	87.01	27.71	18.33	30.05	354	184	A	V
		2483.5	64.56	-9.44	74	48.38	27.83	18.39	30.04	354	184	P	V
		2483.5	50.32	-3.68	54	34.14	27.83	18.39	30.04	354	184	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 10 2457MHz	*	2457	111.93	-	-	95.91	27.73	18.34	30.05	100	169	P	H
	*	2457	104.39	-	-	88.37	27.73	18.34	30.05	100	169	A	H
		2483.56	70	-4	74	53.82	27.83	18.39	30.04	100	169	P	H
		2483.5	52.43	-1.57	54	36.25	27.83	18.39	30.04	100	169	A	H
	*	2457	109.33	-	-	93.64	27.4	18.34	30.05	360	178	P	V
	*	2457	101.75	-	-	86.06	27.4	18.34	30.05	360	178	A	V
		2485.06	66.02	-7.98	74	50.27	27.4	18.39	30.04	360	178	P	V
		2483.5	51.8	-2.2	54	36.05	27.4	18.39	30.04	360	178	A	V
802.11g CH 11 2462MHz	*	2462	110.17	-	-	94.2	27.67	18.35	30.05	100	269	P	H
	*	2462	102.57	-	-	86.6	27.67	18.35	30.05	100	269	A	H
		2483.88	69.43	-4.57	74	53.28	27.8	18.39	30.04	100	166	P	H
		2483.56	52.18	-1.82	54	36.03	27.8	18.39	30.04	100	166	A	H
													H
													H
	*	2462	107.34	-	-	91.37	27.67	18.35	30.05	400	178	P	V
	*	2462	99.82	-	-	83.85	27.67	18.35	30.05	400	178	A	V
		2483.68	62.4	-11.6	74	46.25	27.8	18.39	30.04	400	178	P	V
		2483.52	50.11	-3.89	54	33.96	27.8	18.39	30.04	400	178	A	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	40.14	-33.86	74	50.62	32.45	12.34	55.27	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	39.88	-34.12	74	50.36	32.45	12.34	55.27	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4874	42.42	-31.58	74	52.83	32.6	12.32	55.33	-	-	P	H
		7311	50.3	-23.7	74	53.34	36.78	15.83	55.65	100	355	P	H
		7311	40.58	-13.42	54	43.62	36.78	15.83	55.65	100	355	A	H
													H
													H
													H
													H
													H
													H
													H
													H
802.11g CH 06 2437MHz		4874	39.19	-34.81	74	49.6	32.6	12.32	55.33	-	-	P	V
		7311	56.41	-17.59	74	59.45	36.78	15.83	55.65	121	96	P	V
		7311	45.1	-8.9	54	48.14	36.78	15.83	55.65	121	96	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz		4924	39.91	-34.09	74	50.16	32.84	12.3	55.39	-	-	P	H
		7386	46.61	-27.39	74	49.61	36.41	16.25	55.66	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4924	39.94	-34.06	74	50.19	32.84	12.3	55.39	-	-	P	V
		7386	46.13	-27.87	74	49.13	36.41	16.25	55.66	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2388.75	65.24	-8.76	74	49.74	27.35	18.22	30.07	104	160	P	H
		2390	51.87	-2.13	54	36.36	27.36	18.22	30.07	104	160	A	H
	*	2412	110.96	-	-	95.33	27.44	18.26	30.07	104	160	P	H
	*	2412	102.04	-	-	86.38	27.46	18.27	30.07	104	160	A	H
802.11ax													H
HE20 Full													H
CH 01		2389.695	61.9	-12.1	74	46.39	27.36	18.22	30.07	389	206	P	V
2412MHz		2390	49.42	-4.58	54	33.91	27.36	18.22	30.07	389	206	A	V
	*	2412	107.46	-	-	91.82	27.45	18.26	30.07	389	206	P	V
	*	2412	99.41	-	-	83.77	27.45	18.26	30.07	389	206	A	V
													V
													V
		2389.52	70.71	-3.29	74	55.2	27.36	18.22	30.07	100	157	P	H
		2389.66	52.36	-1.64	54	36.85	27.36	18.22	30.07	100	157	A	H
	*	2417	112.99	-	-	97.28	27.5	18.27	30.06	100	157	P	H
	*	2417	104.95	-	-	89.24	27.5	18.27	30.06	100	157	A	H
802.11ax													
HE20 Full													
CH 02		2389.66	63.34	-10.66	74	47.83	27.36	18.22	30.07	393	193	P	V
2417MHz		2389.94	50.57	-3.43	54	35.06	27.36	18.22	30.07	393	193	A	V
	*	2417	110.41	-	-	94.7	27.5	18.27	30.06	393	193	P	V
	*	2417	101.73	-	-	86.02	27.5	18.27	30.06	393	193	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 06 2437MHz		2389.38	57.06	-16.94	74	41.55	27.36	18.22	30.07	126	166	P	H
		2389.94	47.32	-6.68	54	31.81	27.36	18.22	30.07	126	166	A	H
	*	2437	112.6	-	-	96.8	27.55	18.31	30.06	126	166	P	H
	*	2437	104.5	-	-	88.7	27.55	18.31	30.06	126	166	A	H
		2483.55	63.98	-10.02	74	47.83	27.8	18.39	30.04	126	166	P	H
		2483.5	52.35	-1.65	54	36.2	27.8	18.39	30.04	126	166	A	H
		2384.62	55.64	-18.36	74	40.16	27.34	18.21	30.07	350	179	P	V
		2389.24	45.35	-8.65	54	29.84	27.36	18.22	30.07	350	179	A	V
	*	2437	108.97	-	-	93.17	27.55	18.31	30.06	350	179	P	V
	*	2437	100.69	-	-	84.89	27.55	18.31	30.06	350	179	A	V
		2488.1	59.47	-14.53	74	43.28	27.83	18.4	30.04	350	179	P	V
		2483.5	49.72	-4.28	54	33.57	27.8	18.39	30.04	350	179	A	V
802.11ax HE20 Full CH 09 2452MHz	*	2452	114.04	-	-	98.05	27.71	18.33	30.05	100	302	P	H
	*	2452	105.1	-	-	89.11	27.71	18.33	30.05	100	302	A	H
		2486.5	66.4	-7.6	74	50.19	27.85	18.4	30.04	100	302	P	H
		2484.94	51.54	-2.46	54	35.35	27.84	18.39	30.04	100	302	A	H
	*	2452	110.95	-	-	94.96	27.71	18.33	30.05	400	173	P	V
	*	2452	101.53	-	-	85.54	27.71	18.33	30.05	400	173	A	V
		2483.5	64.5	-9.5	74	48.32	27.83	18.39	30.04	400	31	P	V
		2486.2	50.45	-3.55	54	34.25	27.84	18.4	30.04	400	31	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
	*	2457	110.89	-	-	94.87	27.73	18.34	30.05	100	168	P	H
	*	2457	102.4	-	-	86.38	27.73	18.34	30.05	100	168	A	H
		2483.62	69.23	-4.77	74	53.05	27.83	18.39	30.04	100	168	P	H
		2483.5	51.77	-2.23	54	35.59	27.83	18.39	30.04	100	168	A	H
802.11ax													
HE20 Full													
CH 10	*	2457	109.17	-	-	93.15	27.73	18.34	30.05	361	178	P	V
2457MHz	*	2457	100.09	-	-	84.07	27.73	18.34	30.05	361	178	A	V
		2483.86	66.79	-7.21	74	50.6	27.84	18.39	30.04	361	178	P	V
		2483.5	49.92	-4.08	54	33.74	27.83	18.39	30.04	361	178	A	V
	*	2462	110.78	-	-	94.81	27.67	18.35	30.05	145	271	P	H
	*	2462	101.75	-	-	85.78	27.67	18.35	30.05	145	271	A	H
		2484	65.27	-8.73	74	49.12	27.8	18.39	30.04	100	167	P	H
		2483.52	51.28	-2.72	54	35.13	27.8	18.39	30.04	100	167	A	H
802.11ax													H
HE20 Full													H
CH 11	*	2462	107.28	-	-	91.31	27.67	18.35	30.05	400	177	P	V
2462MHz	*	2462	98.9	-	-	82.93	27.67	18.35	30.05	400	177	A	V
		2484	66.17	-7.83	74	50.02	27.8	18.39	30.04	400	177	P	V
		2483.52	49.69	-4.31	54	33.54	27.8	18.39	30.04	400	177	A	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4824	40.12	-33.88	74	50.6	32.45	12.34	55.27	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 01		4824	40.48	-33.52	74	50.96	32.45	12.34	55.27	-	-	P	V
2412MHz													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBµV/m)	Margin Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4874	40.03	-33.97	74	50.44	32.6	12.32	55.33	-	-	P	H
		7311	53.34	-20.66	74	56.38	36.78	15.83	55.65	400	17	P	H
		7311	40.69	-13.31	54	43.73	36.78	15.83	55.65	400	17	A	H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 06		4874	39.27	-34.73	74	49.68	32.6	12.32	55.33	-	-	P	V
2437MHz		7311	58.28	-15.72	74	61.32	36.78	15.83	55.65	100	90	P	V
		7311	43.92	-10.08	54	46.96	36.78	15.83	55.65	100	90	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBµV/m)	Margin Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4924	40.78	-33.22	74	51.03	32.84	12.3	55.39	-	-	P	H
		7386	46.47	-27.53	74	49.47	36.41	16.25	55.66	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 11		4924	40.93	-33.07	74	51.18	32.84	12.3	55.39	-	-	P	V
2462MHz		7386	45.96	-28.04	74	48.96	36.41	16.25	55.66	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Partial 106 (Band Edge @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Partial 106/53 CH 01 2412MHz		2389.695	65.97	-8.03	74	50.46	27.36	18.22	30.07	115	347	P	H
		2390	52.12	-1.88	54	36.61	27.36	18.22	30.07	115	347	A	H
	*	2412	115.18	-	-	99.54	27.45	18.26	30.07	115	347	P	H
	*	2412	105.86	-	-	90.22	27.45	18.26	30.07	115	347	A	H
													H
													H
		2389.275	62.79	-11.21	74	47.28	27.36	18.22	30.07	388	200	P	V
		2390	47.42	-6.58	54	31.91	27.36	18.22	30.07	388	200	A	V
	*	2412	112.56	-	-	96.92	27.45	18.26	30.07	388	200	P	V
	*	2412	102.45	-	-	86.81	27.45	18.26	30.07	388	200	A	V
													V
													V
802.11ax HE20 Partial 106/54 CH 11 2462MHz	*	2462	112.39	-	-	96.42	27.67	18.35	30.05	100	164	P	H
	*	2462	103.39	-	-	87.42	27.67	18.35	30.05	100	164	A	H
		2483.72	71.01	-2.99	74	54.86	27.8	18.39	30.04	100	164	P	H
		2483.52	49.7	-4.3	54	33.55	27.8	18.39	30.04	100	164	A	H
													H
													H
	*	2462	110.94	-	-	94.97	27.67	18.35	30.05	361	178	P	V
	*	2462	100.87	-	-	84.9	27.67	18.35	30.05	361	178	A	V
		2483.88	68.55	-5.45	74	52.4	27.8	18.39	30.04	361	178	P	V
		2483.52	48.29	-5.71	54	32.14	27.8	18.39	30.04	361	178	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
2.4GHz 802.11g LF		38.73	28.07	-11.93	40	39.24	20.15	0.98	32.3	-	-	P	H
		94.99	27.4	-16.1	43.5	42.81	15.2	1.7	32.31	-	-	P	H
		134.76	26.92	-16.58	43.5	39.41	17.61	2.17	32.27	-	-	P	H
		251.16	31.7	-14.3	46	42.32	18.73	2.89	32.24	-	-	P	H
		331.67	32.6	-13.4	46	41.73	19.93	3.19	32.25	-	-	P	H
		722.58	38.24	-7.76	46	38.7	27.28	4.63	32.37	-	-	P	H
													H
													H
													H
													H
													H
													H
		37.76	33.28	-6.72	40	43.84	20.79	0.95	32.3	-	-	P	V
		50.37	30.73	-9.27	40	47.66	14.14	1.23	32.3	-	-	P	V
		78.5	26.26	-13.74	40	43.72	13.26	1.58	32.3	-	-	P	V
		177.44	27.49	-16.01	43.5	42.11	15.23	2.37	32.22	-	-	P	V
		330.7	26.24	-19.76	46	35.39	19.9	3.2	32.25	-	-	P	V
		662.44	28.75	-17.25	46	30.58	26.18	4.46	32.47	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.												

<TXBF Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
6+7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.905	65.59	-8.41	74	50.08	27.36	18.22	30.07	100	156	P	H
		2390	52.08	-1.92	54	36.57	27.36	18.22	30.07	100	156	A	H
	*	2412	110.44	-	-	94.8	27.45	18.26	30.07	100	156	P	H
	*	2412	101.94	-	-	86.3	27.45	18.26	30.07	100	156	A	H
802.11ax													H
HE20 Full													H
CH 01		2389.38	59.45	-14.55	74	43.94	27.36	18.22	30.07	252	210	P	V
2412MHz		2389.695	45.14	-8.86	54	29.63	27.36	18.22	30.07	202	210	A	V
	*	2412	106.92	-	-	91.28	27.45	18.26	30.07	202	210	P	V
	*	2412	91.07	-	-	75.43	27.45	18.26	30.07	202	210	A	V
													V
													V
		2389.94	68.72	-5.28	74	53.21	27.36	18.22	30.07	100	158	P	H
		2389.94	51.63	-2.37	54	36.12	27.36	18.22	30.07	100	158	A	H
	*	2417	113.38	-	-	97.67	27.5	18.27	30.06	100	158	P	H
	*	2417	105.11	-	-	89.4	27.5	18.27	30.06	100	158	A	H
802.11ax													
HE20 Full													
CH 02		2389.24	62.62	-11.38	74	47.11	27.36	18.22	30.07	383	196	P	V
2417MHz		2389.1	48.02	-5.98	54	32.51	27.36	18.22	30.07	383	196	A	V
	*	2417	111.46	-	-	95.75	27.5	18.27	30.06	383	196	P	V
	*	2417	103.14	-	-	87.43	27.5	18.27	30.06	383	196	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 06 2437MHz		2325.26	55.51	-18.49	74	40.36	27.15	18.09	30.09	100	167	P	H
		2389.66	45.35	-8.65	54	29.84	27.36	18.22	30.07	100	167	A	H
	*	2437	112.23	-	-	96.43	27.55	18.31	30.06	100	167	P	H
	*	2437	104.37	-	-	88.57	27.55	18.31	30.06	100	167	A	H
		2483.83	59.88	-14.12	74	43.73	27.8	18.39	30.04	100	167	P	H
		2483.5	49.3	-4.7	54	33.15	27.8	18.39	30.04	100	167	A	H
		2318.82	56.14	-17.86	74	41.01	27.14	18.08	30.09	400	180	P	V
		2389.94	44.65	-9.35	54	29.14	27.36	18.22	30.07	400	180	A	V
	*	2437	110.45	-	-	94.65	27.55	18.31	30.06	400	180	P	V
	*	2437	102.06	-	-	86.26	27.55	18.31	30.06	400	180	A	V
		2483.5	59.88	-14.12	74	43.73	27.8	18.39	30.04	400	180	P	V
		2483.5	48.3	-5.7	54	32.15	27.8	18.39	30.04	400	180	A	V
802.11ax HE20 Full CH 09 2452MHz	*	2452	112.67	-	-	96.68	27.71	18.33	30.05	110	162	P	H
	*	2452	103.43	-	-	87.44	27.71	18.33	30.05	110	162	A	H
		2485.96	64.61	-9.39	74	48.42	27.84	18.39	30.04	110	162	P	H
		2483.5	51.84	-2.16	54	35.66	27.83	18.39	30.04	110	162	A	H
	*	2452	110.96	-	-	94.97	27.71	18.33	30.05	400	177	P	V
	*	2452	102.15	-	-	86.16	27.71	18.33	30.05	400	177	A	V
		2484.46	64	-10	74	47.81	27.84	18.39	30.04	400	177	P	V
		2483.62	50.14	-3.86	54	33.96	27.83	18.39	30.04	400	177	A	V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 10 2457MHz	*	2457	111.94	-	-	95.92	27.73	18.34	30.05	100	161	P	H
	*	2457	102.26	-	-	86.24	27.73	18.34	30.05	100	161	A	H
		2484.7	66.51	-7.49	74	50.32	27.84	18.39	30.04	100	161	P	H
		2483.5	51.73	-2.27	54	35.55	27.83	18.39	30.04	100	161	A	H
	*	2457	108.81	-	-	92.79	27.73	18.34	30.05	400	172	P	V
	*	2457	100.07	-	-	84.05	27.73	18.34	30.05	400	172	A	V
		2484.34	62.29	-11.71	74	46.1	27.84	18.39	30.04	400	172	P	V
		2483.5	49.45	-4.55	54	33.27	27.83	18.39	30.04	400	172	A	V
802.11ax HE20 Full CH 11 2462MHz	*	2462	110.44	-	-	94.47	27.67	18.35	30.05	100	267	P	H
	*	2462	100.62	-	-	84.65	27.67	18.35	30.05	100	267	A	H
		2484.28	66.84	-7.16	74	50.68	27.81	18.39	30.04	100	267	P	H
		2483.52	52.16	-1.84	54	36.01	27.8	18.39	30.04	100	267	A	H
													H
													H
	*	2462	105.59	-	-	89.62	27.67	18.35	30.05	397	180	P	V
	*	2462	98.18	-	-	82.21	27.67	18.35	30.05	397	180	A	V
		2483.6	66.5	-7.5	74	50.35	27.8	18.39	30.04	397	180	P	V
		2483.52	51.27	-2.73	54	35.12	27.8	18.39	30.04	397	180	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4824	40.09	-33.91	74	50.57	32.45	12.34	55.27	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 01		4824	40.49	-33.51	74	50.97	32.45	12.34	55.27	-	-	P	V
2412MHz													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBµV/m)	Margin Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4874	40.08	-33.92	74	50.49	32.6	12.32	55.33	-	-	P	H
		7311	45.59	-28.41	74	48.63	36.78	15.83	55.65	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 06		4874	39.83	-34.17	74	50.24	32.6	12.32	55.33	-	-	P	V
2437MHz		7311	47.28	-26.72	74	50.32	36.78	15.83	55.65	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

WIFI Ant. 6+7	Note	Frequency (MHz)	Level (dBμV/m)	Margin Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4924	40.83	-33.17	74	51.08	32.84	12.3	55.39	-	-	P	H
		7386	46.08	-27.92	74	49.08	36.41	16.25	55.66	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
802.11ax													H
HE20 Full													H
CH 11		4924	40.57	-33.43	74	50.82	32.84	12.3	55.39	-	-	P	V
2462MHz		7386	46.09	-27.91	74	49.09	36.41	16.25	55.66	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **Margin limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
6+7		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Margin Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Radiated Spurious Emission Plots

Test Engineer :	Andy Yang, Karl Hou, Wilson Wu	**Temperature :**	20~25°C
		Relative Humidity :	50~60%

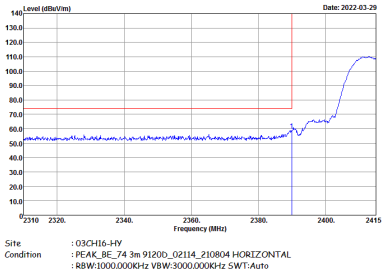
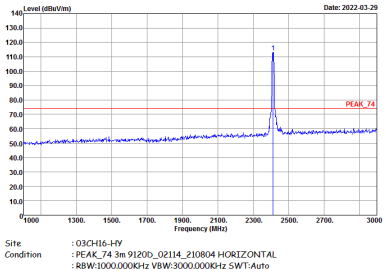
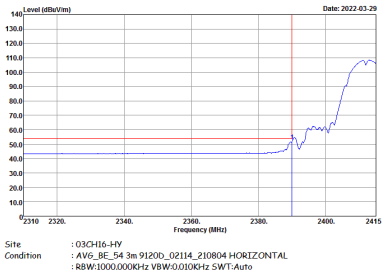
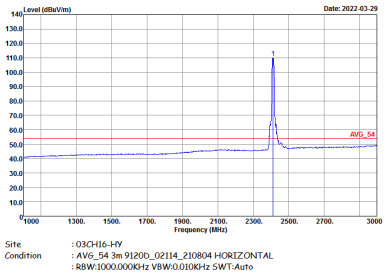
Note symbol

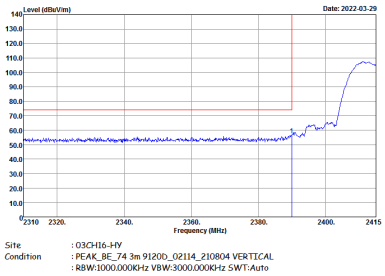
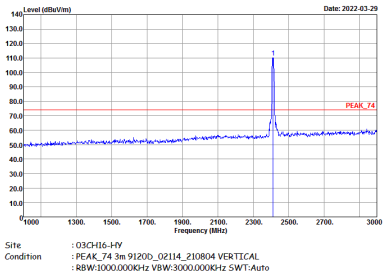
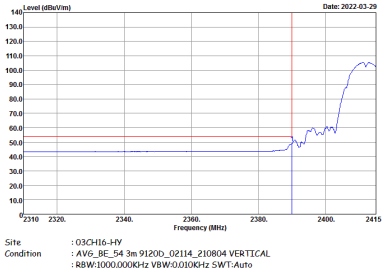
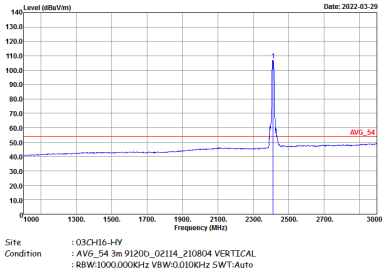
-L	**Low channel location**
-R	**High channel location**

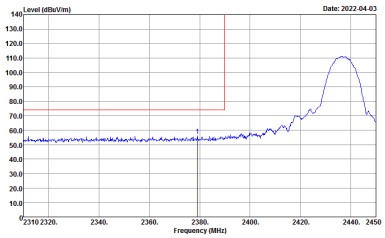
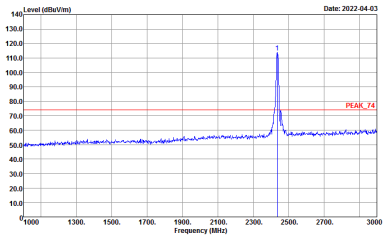
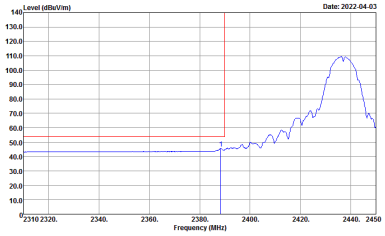
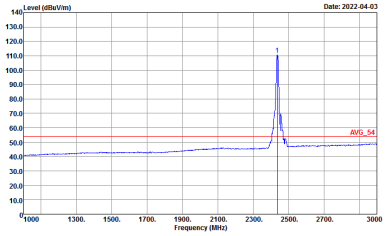
<CDD Mode>

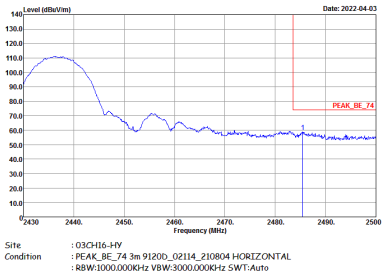
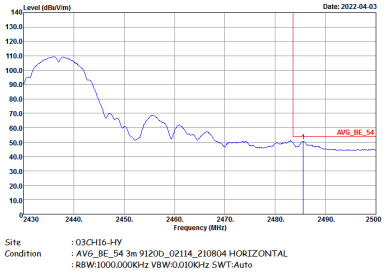
2.4GHz 2400~2483.5MHz

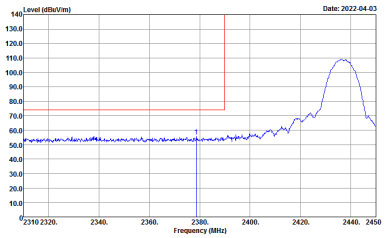
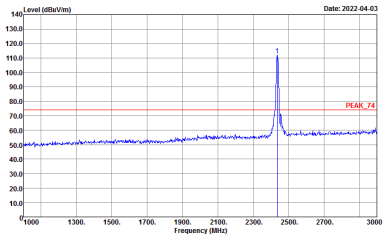
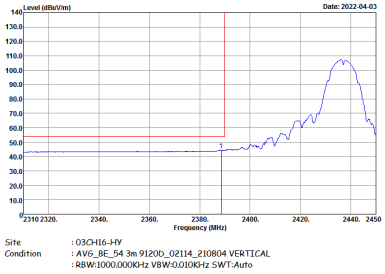
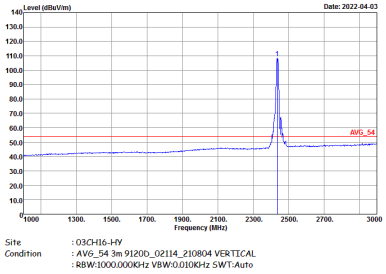
WIFI 802.11b (Band Edge @ 3m)

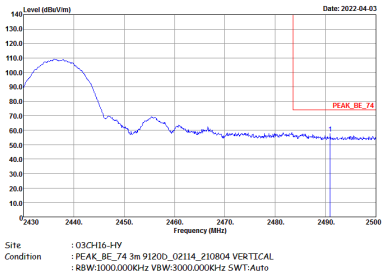
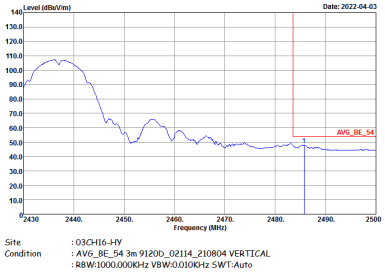
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

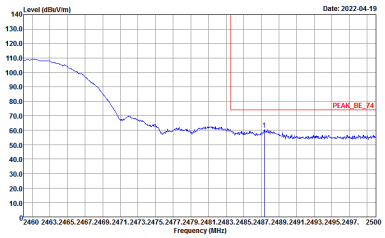
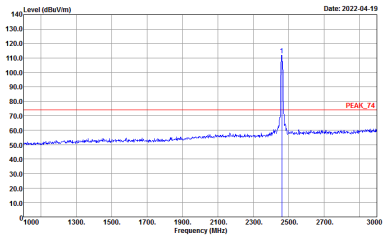
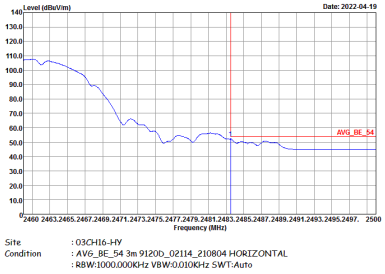
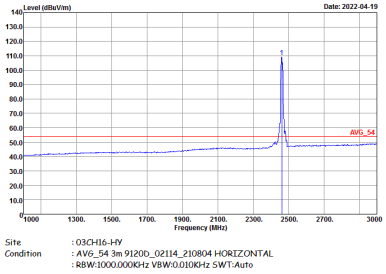
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

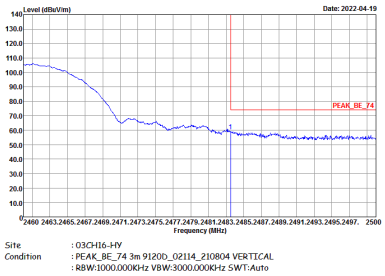
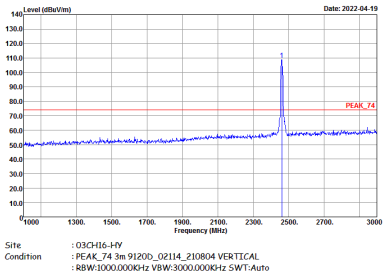
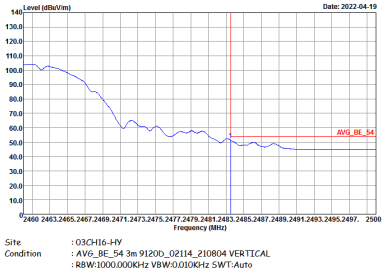
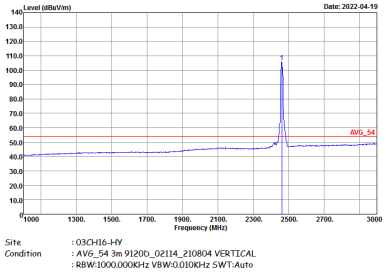
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
6+7	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
6+7	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
6+7	Vertical	Fundamental
Peak		
Avg.		

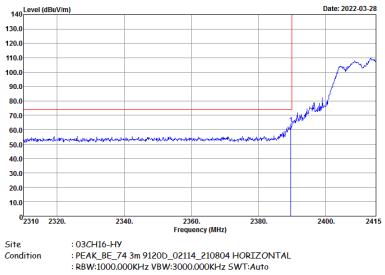
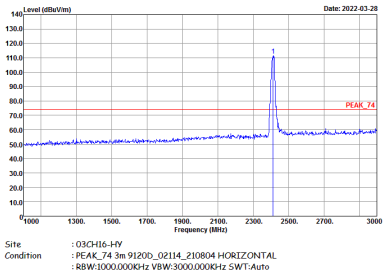
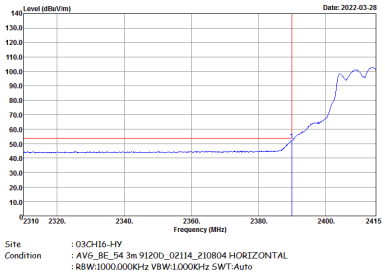
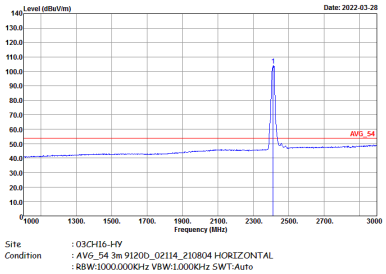
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
6+7	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

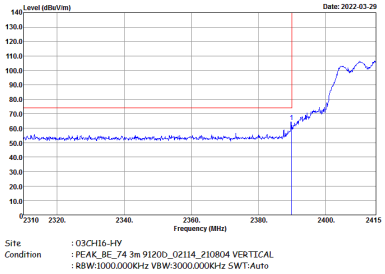
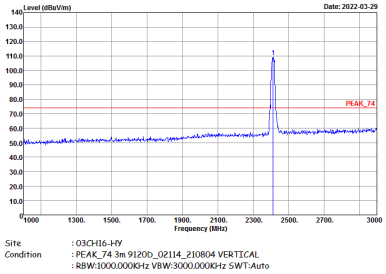
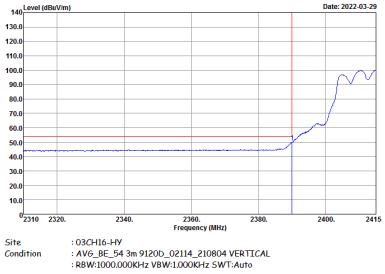
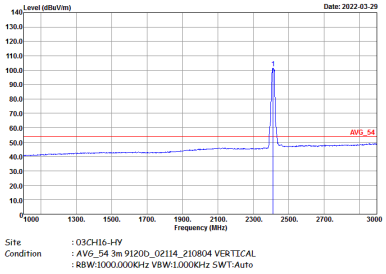
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

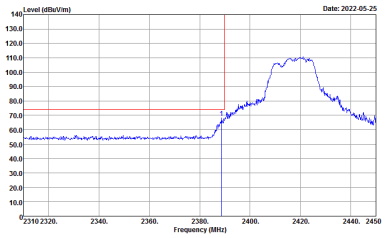
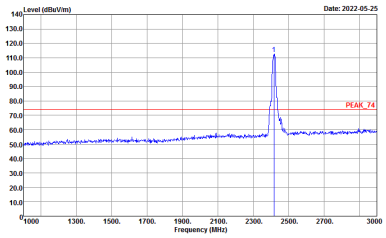
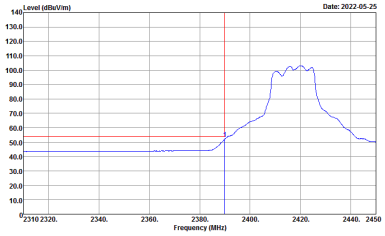
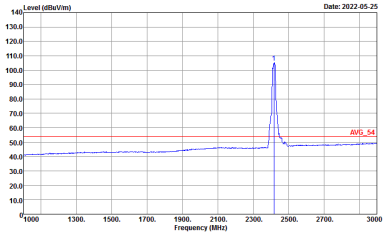
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

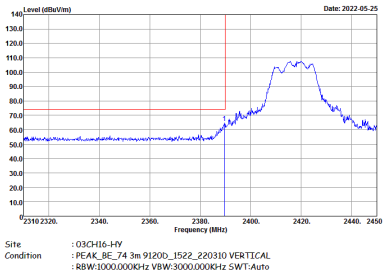
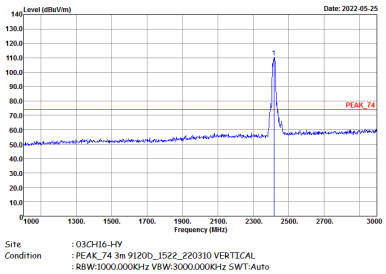
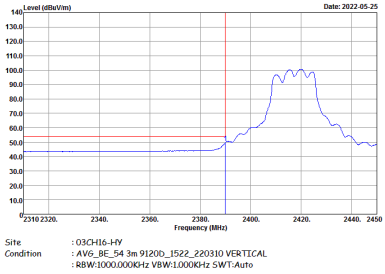
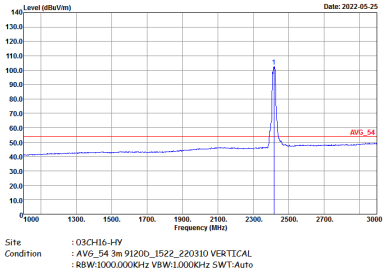
2.4GHz 2400~2483.5MHz

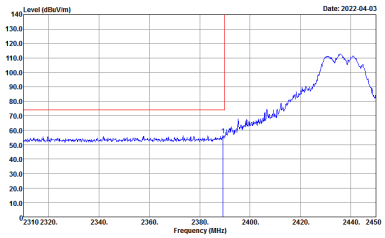
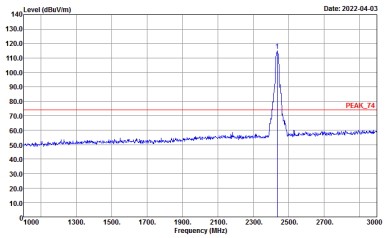
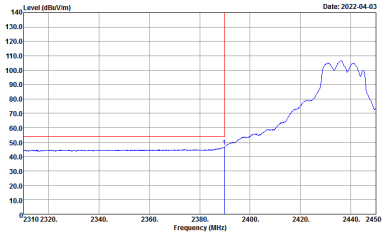
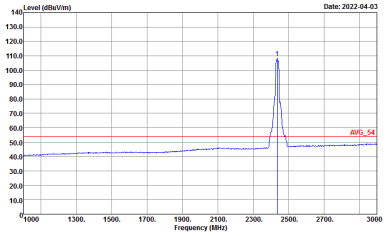
WIFI 802.11g (Band Edge @ 3m)

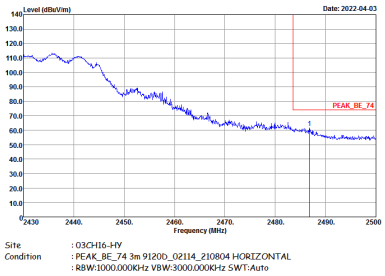
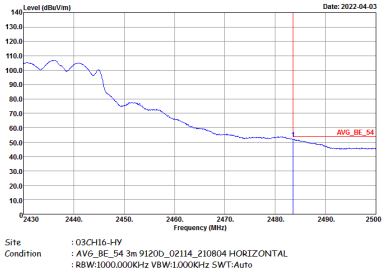
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

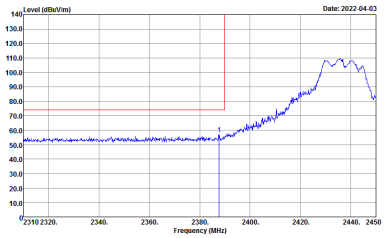
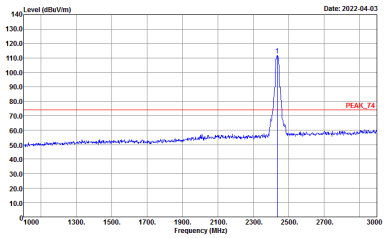
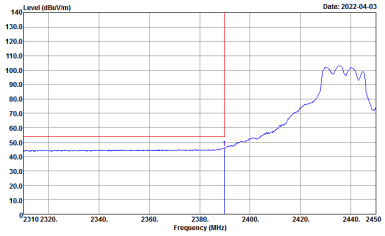
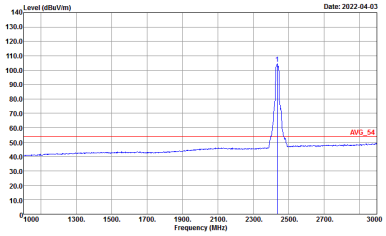
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

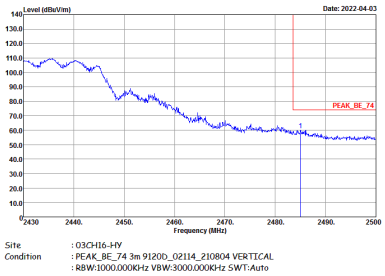
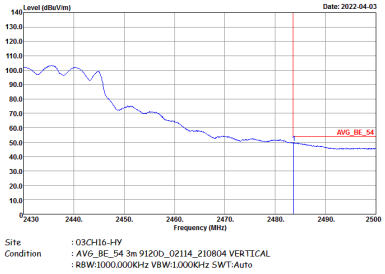
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

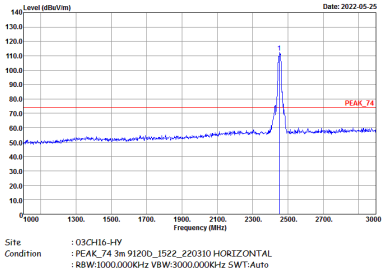
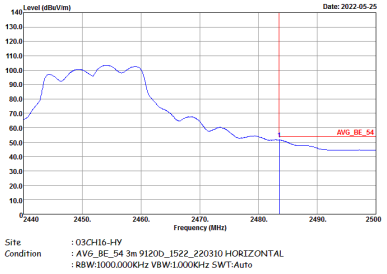
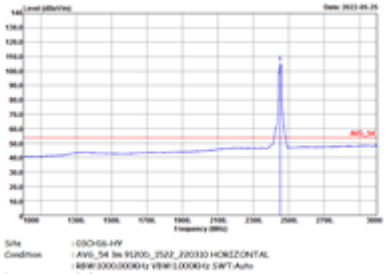
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

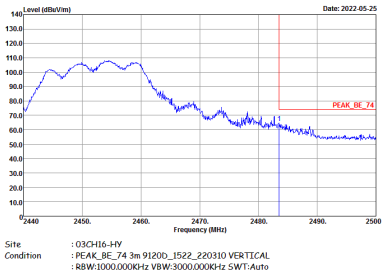
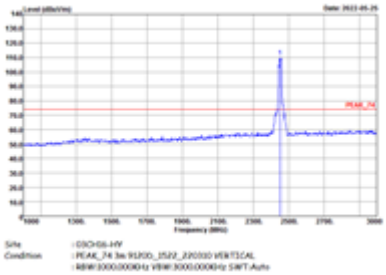
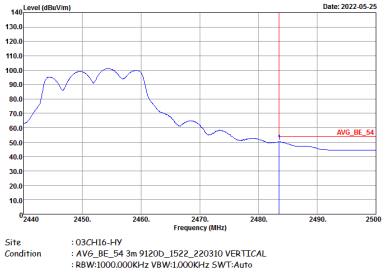
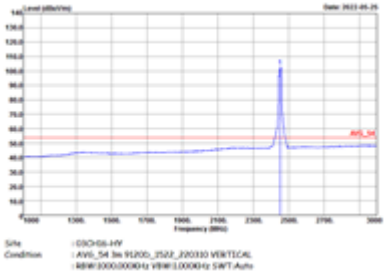
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
6+7	Horizontal	Fundamental
Peak		
Avg.		

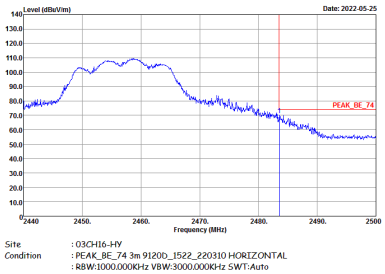
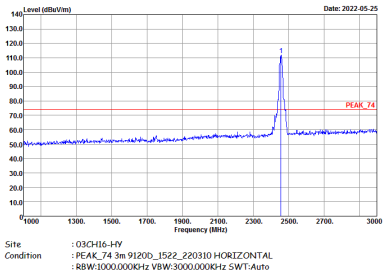
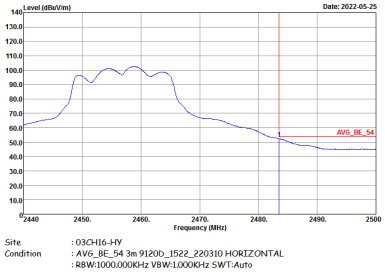
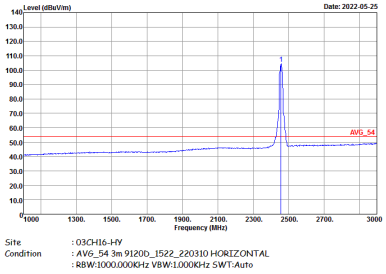
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
6+7	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

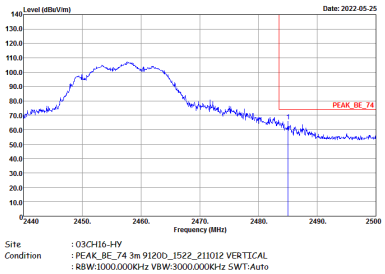
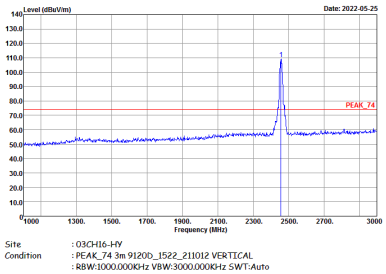
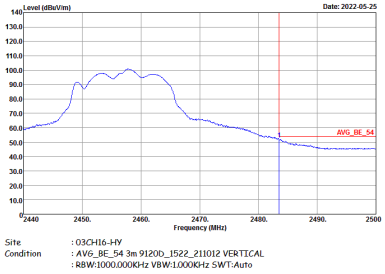
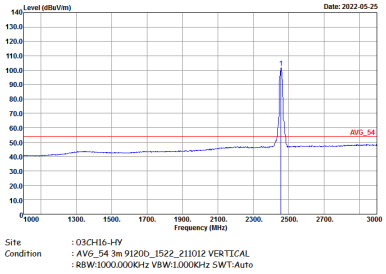
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
6+7	Vertical	Fundamental
Peak		
Avg.		

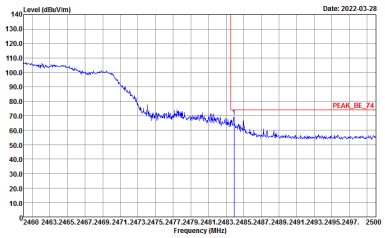
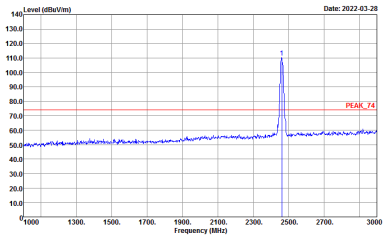
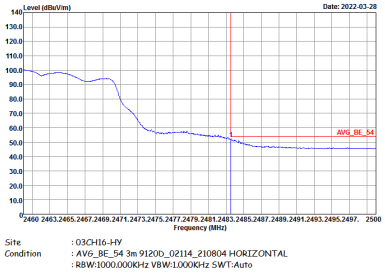
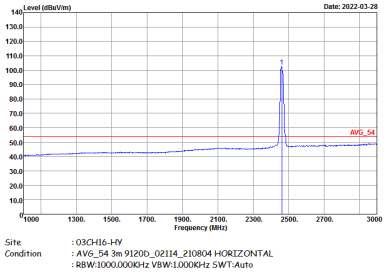
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
6+7	Vertical	Fundamental
Peak		Left Blank
Avg.		Left Blank

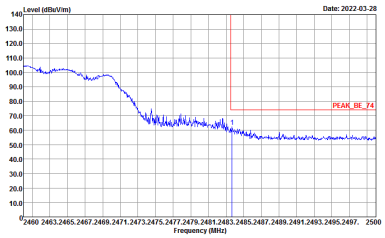
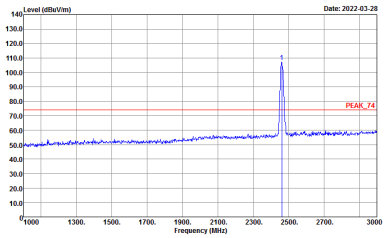
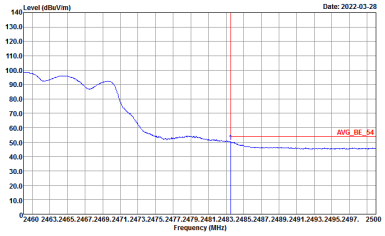
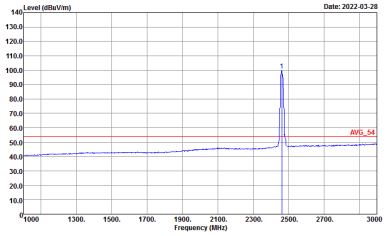
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH09 2452MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH09 2452MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

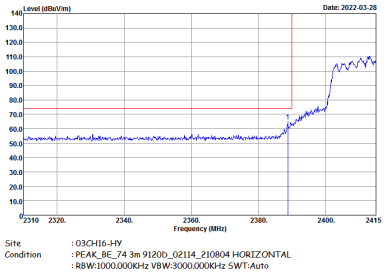
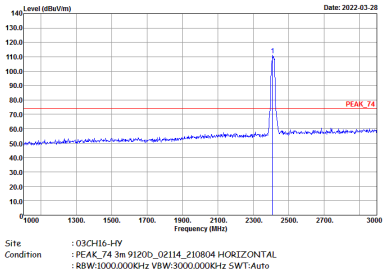
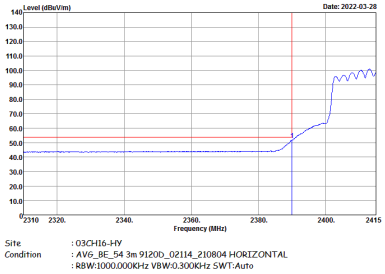
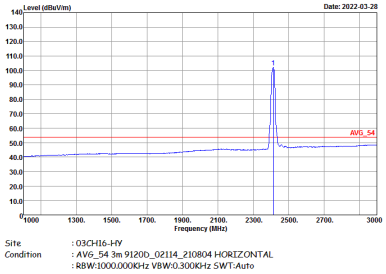
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

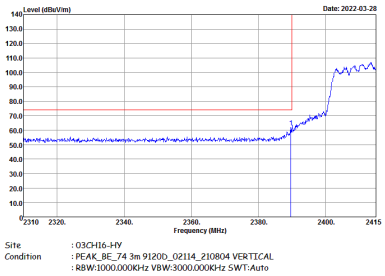
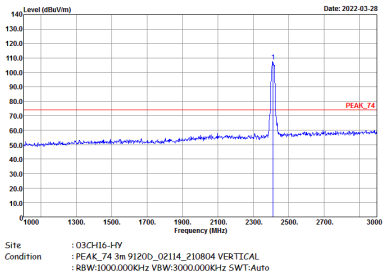
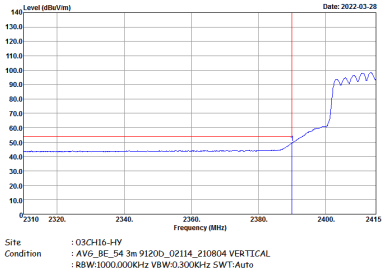
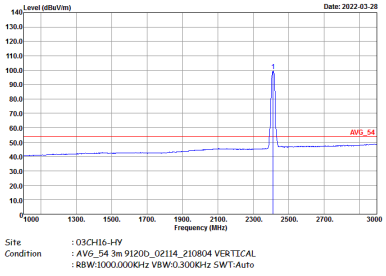
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

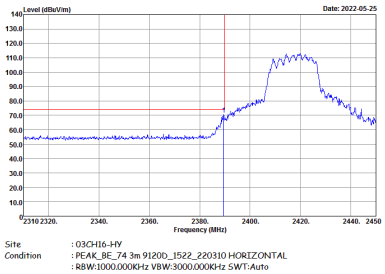
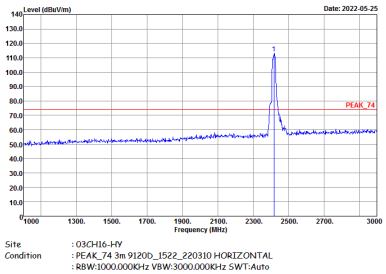
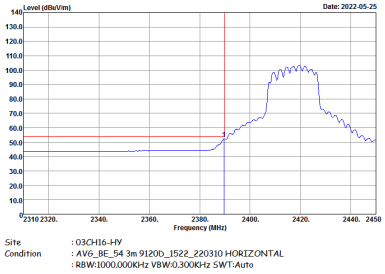
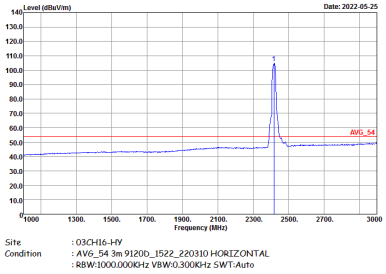
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

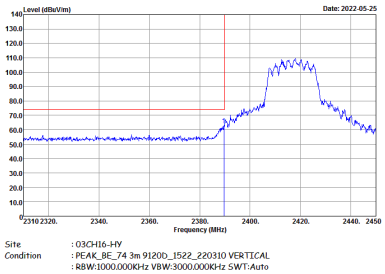
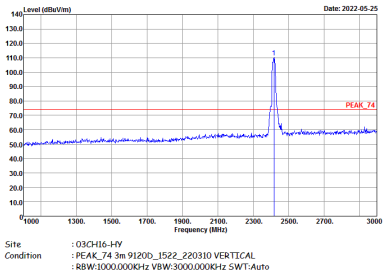
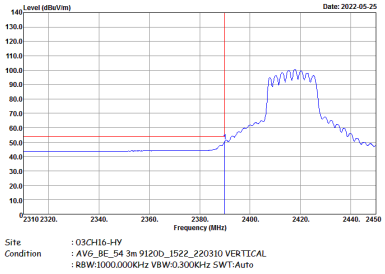
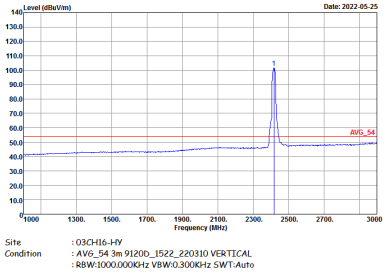
2.4GHz 2400~2483.5MHz

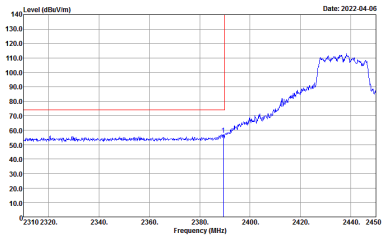
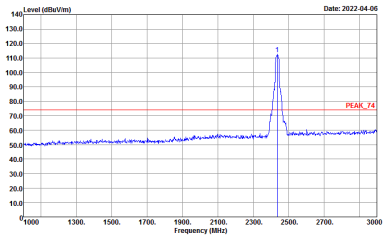
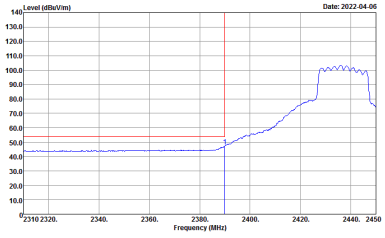
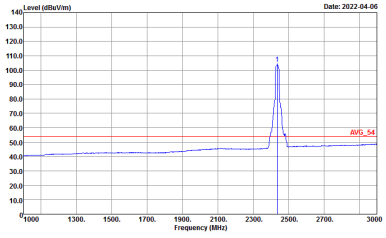
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

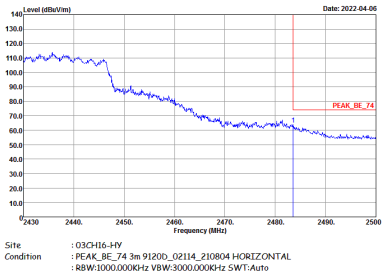
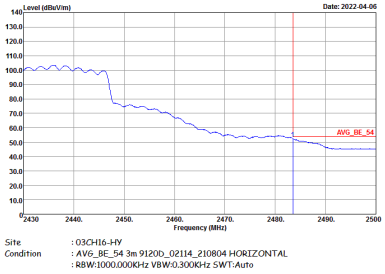
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH01 2412MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

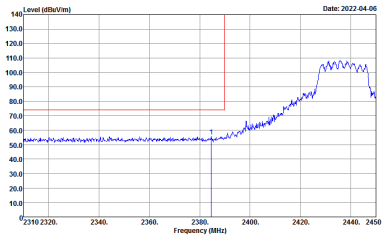
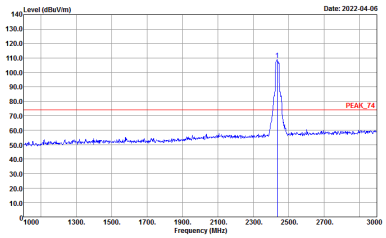
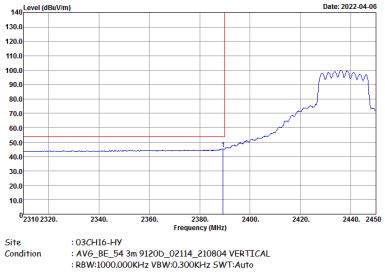
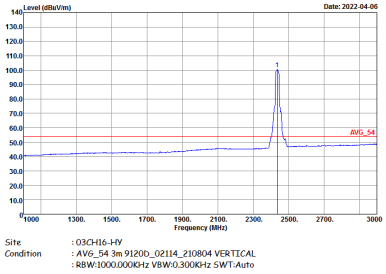
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH01 2412MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

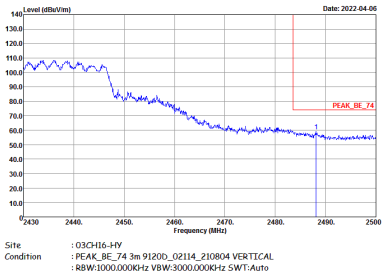
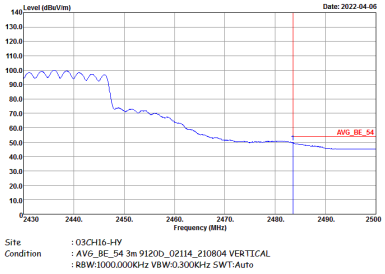
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH02 2417MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

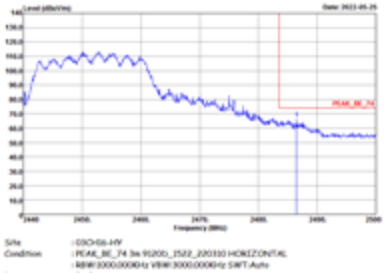
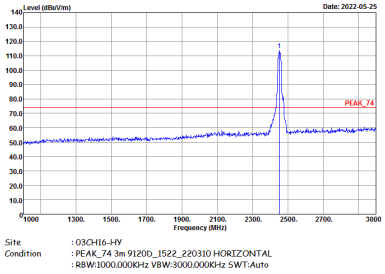
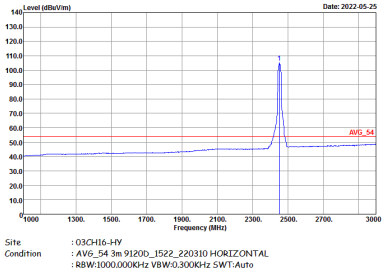
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH02 2417MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

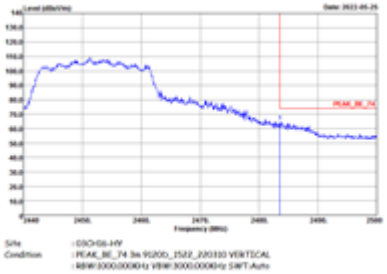
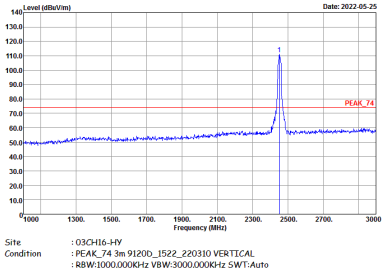
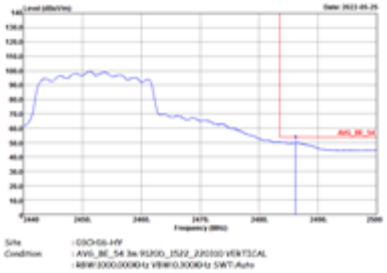
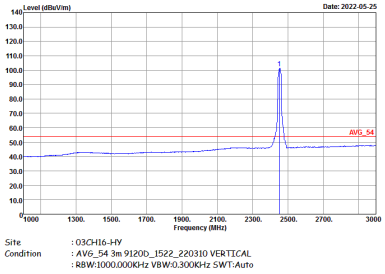
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - L	
6+7	Horizontal	Fundamental
Peak		
Avg.		

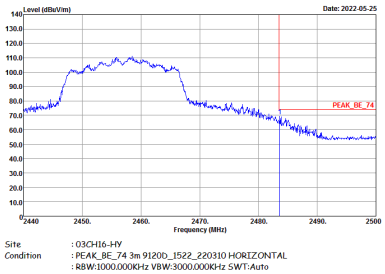
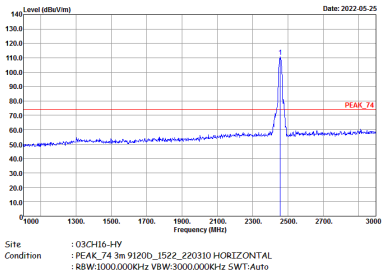
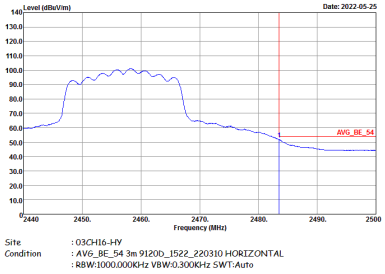
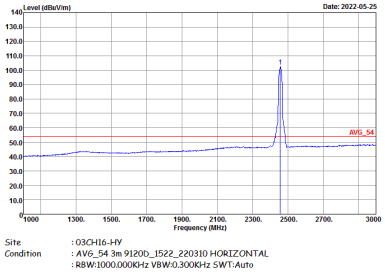
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - R	
6+7	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

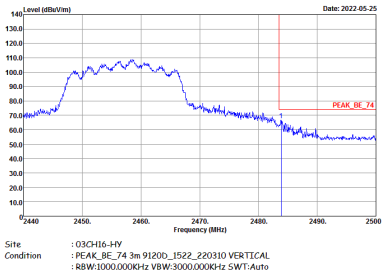
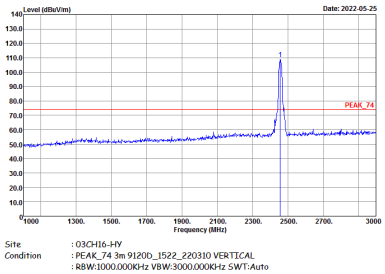
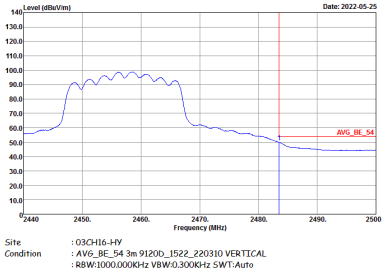
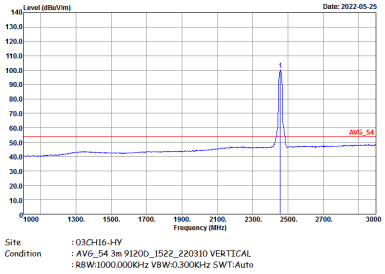
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - L	
6+7	Vertical	Fundamental
Peak		
Avg.		

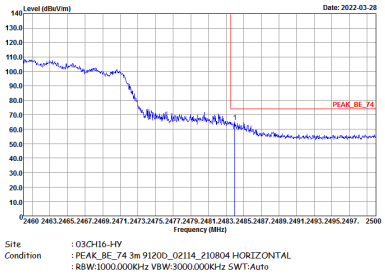
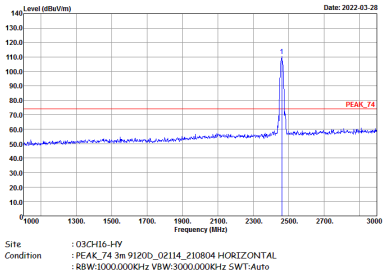
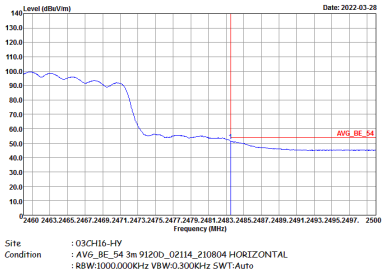
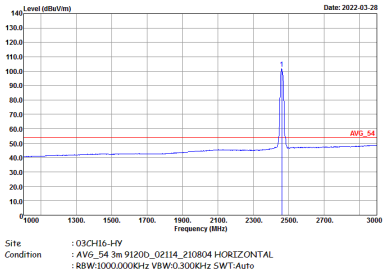
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - R	
6+7	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

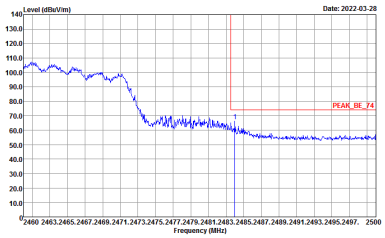
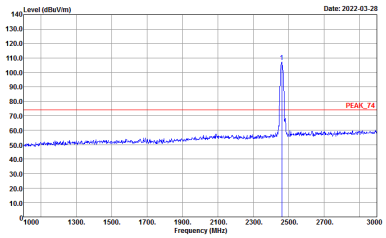
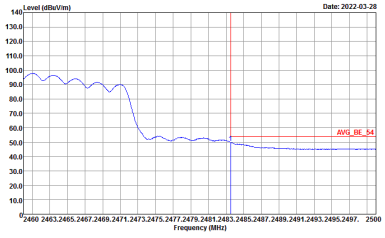
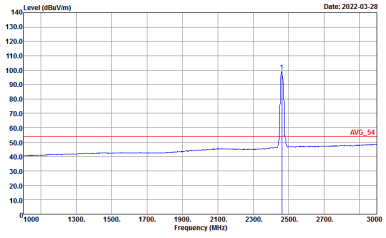
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH09 2452MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH09 2452MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH10 2457MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

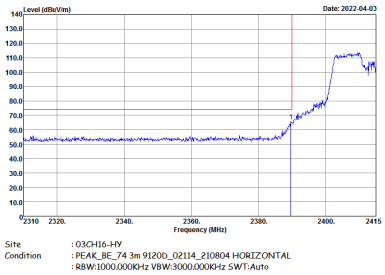
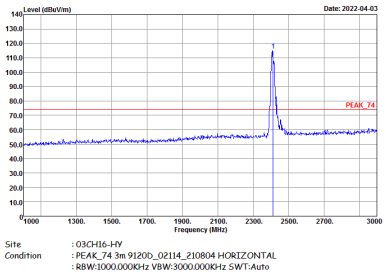
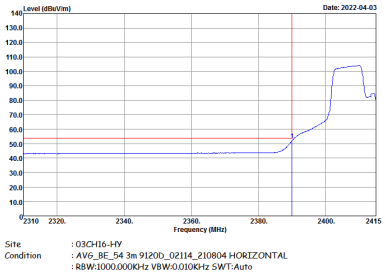
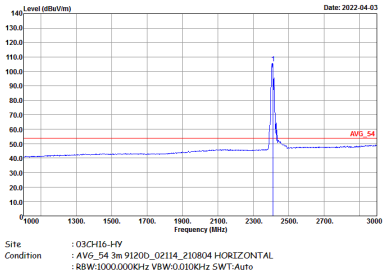
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH10 2457MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

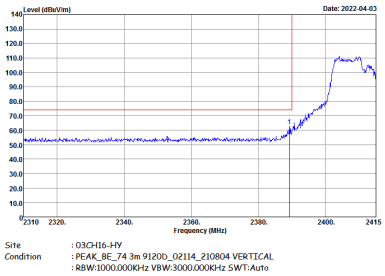
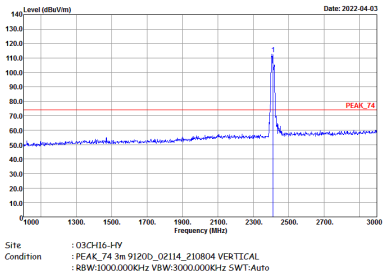
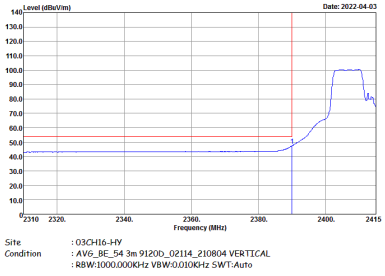
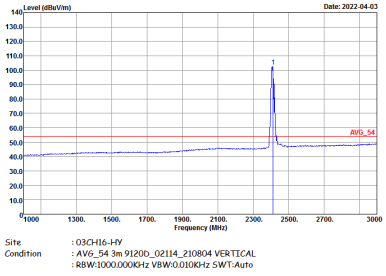
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH11 2462MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

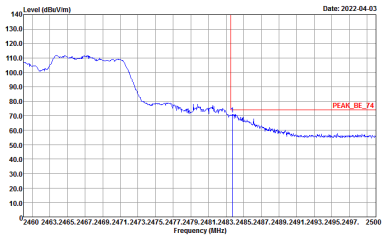
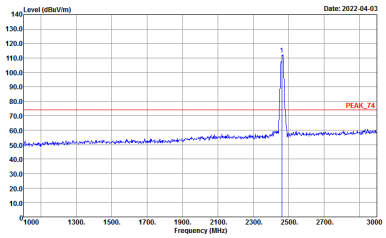
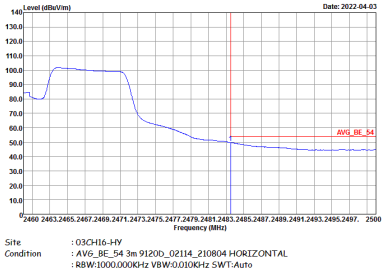
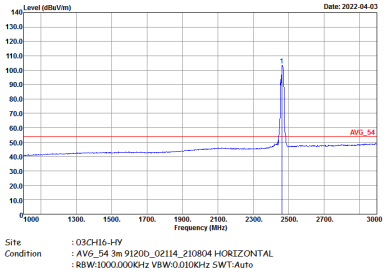
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH11 2462MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

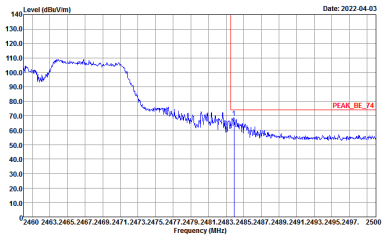
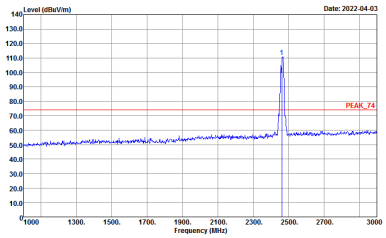
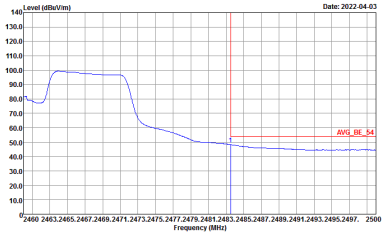
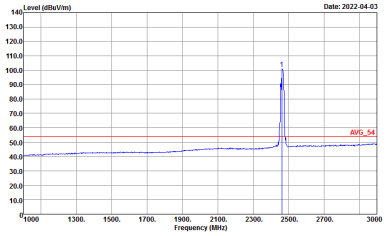
2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE20 Partial 106 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Partial 106/53 CH01 2412MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

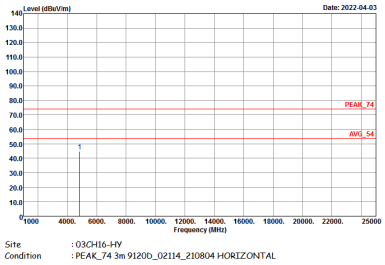
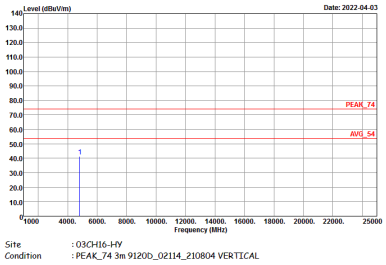
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Partial 106/53 CH01 2412MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

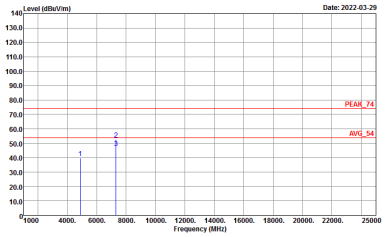
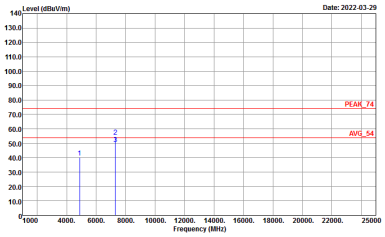
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Partial 106/54 CH11 2462MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

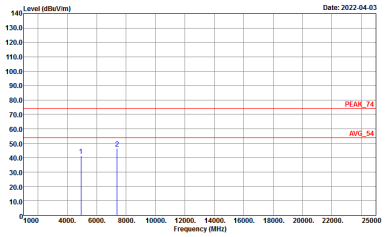
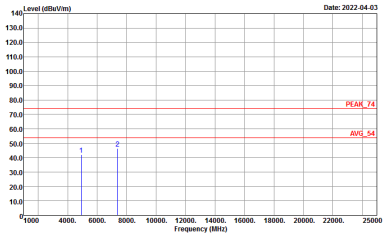
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Partial 106/54 CH11 2462MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

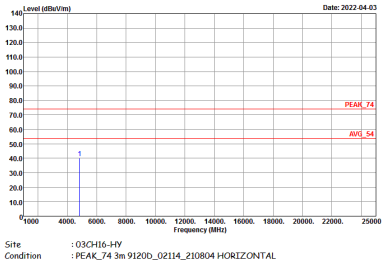
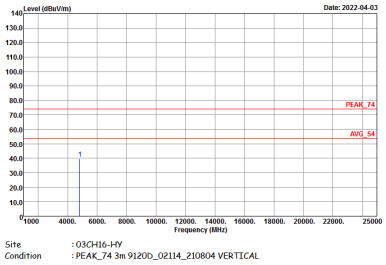
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
6+7	Horizontal	Vertical
Peak Avg.		

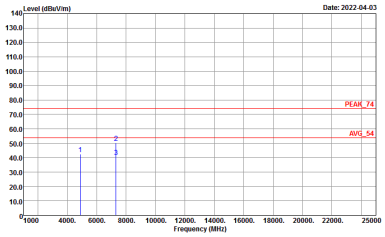
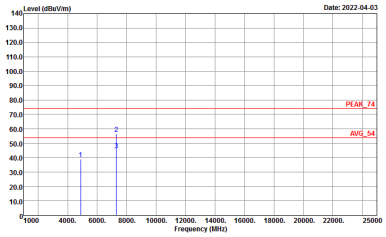
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
6+7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 VERTICAL

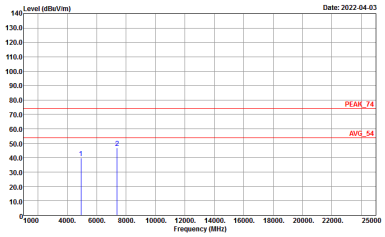
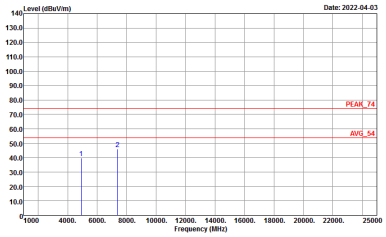
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
6+7	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

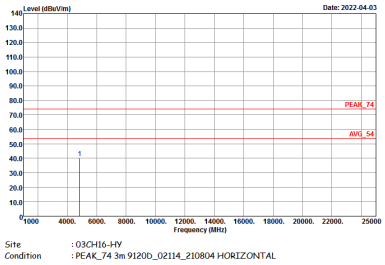
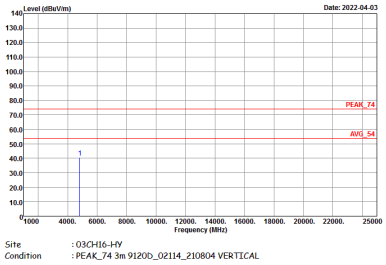
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
6+7	Horizontal	Vertical
Peak Avg.		

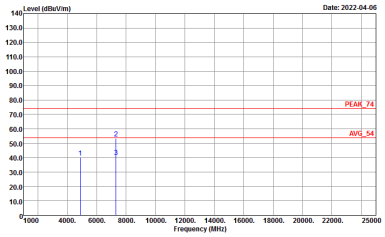
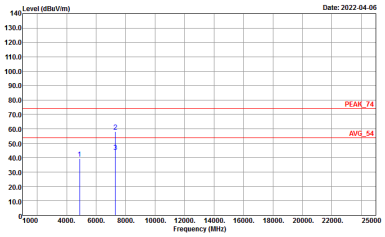
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
6+7	Horizontal	Vertical
Peak Avg.		

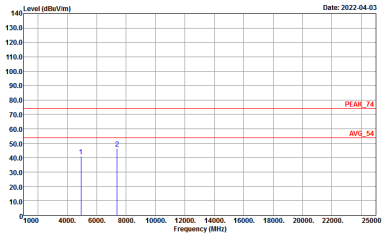
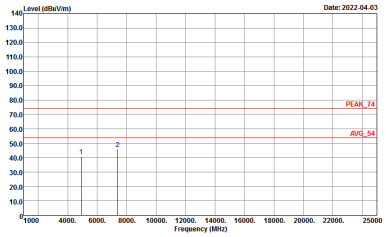
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
6+7	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

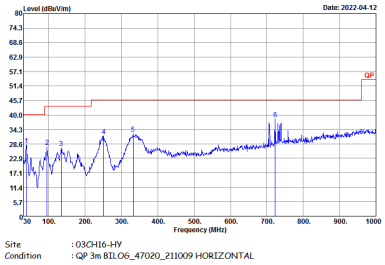
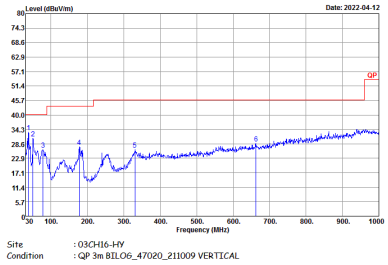
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH01 2412MHz	
6+7	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH06 2437MHz	
6+7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 VERTICAL

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH11 2462MHz	
6+7	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

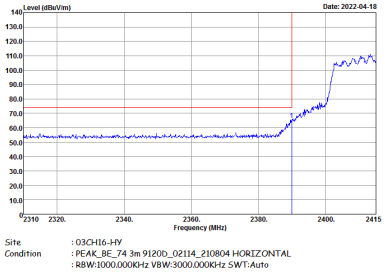
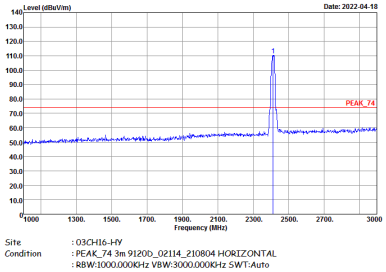
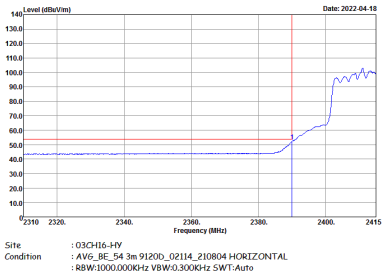
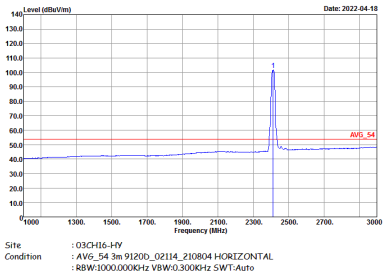
2.4GHz WIFI 802.11g (LF)

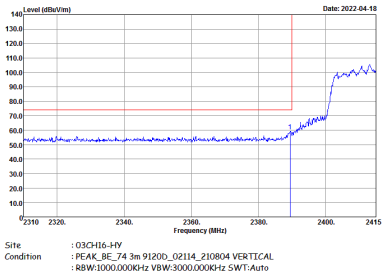
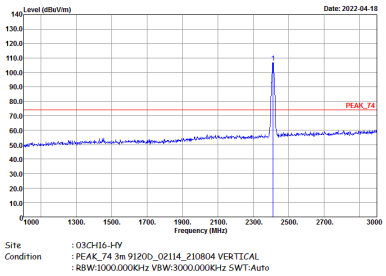
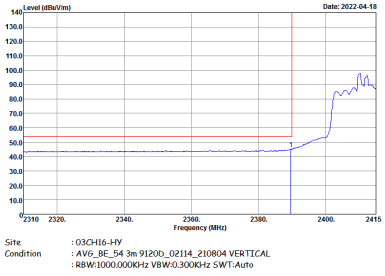
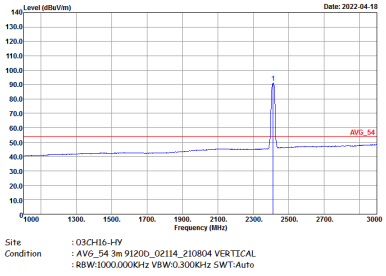
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
6+7	Horizontal	Vertical
QP / Peak		

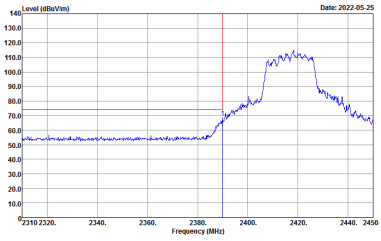
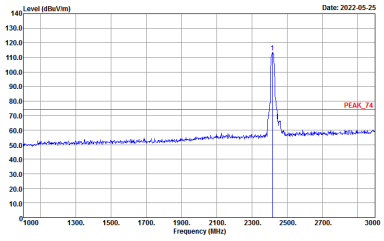
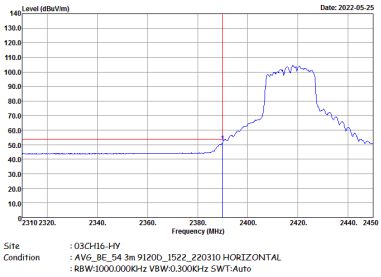
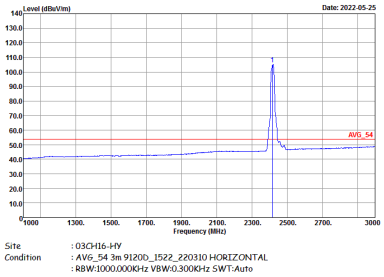
<Tx BF Mode>

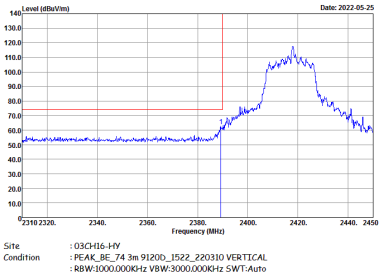
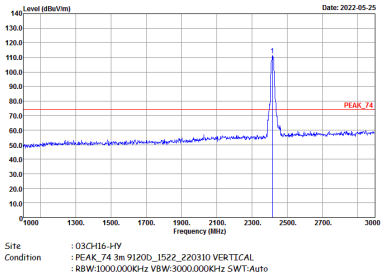
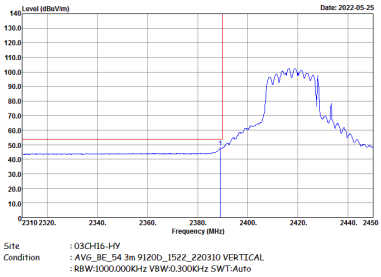
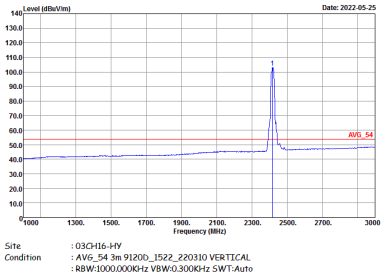
2.4GHz 2400~2483.5MHz

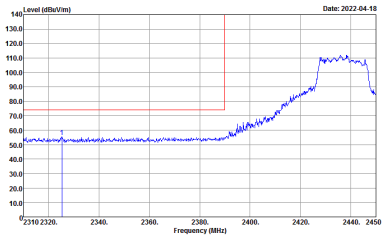
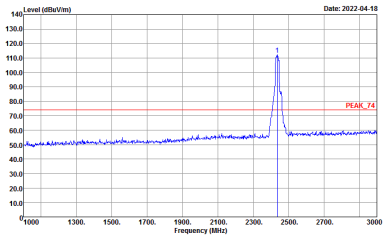
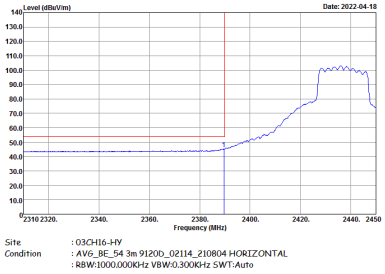
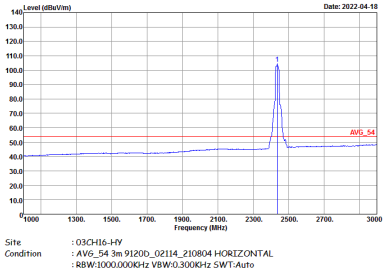
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

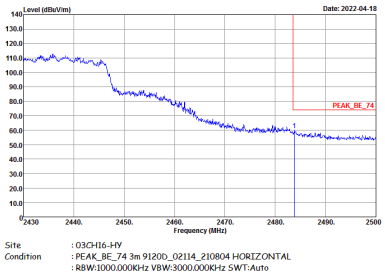
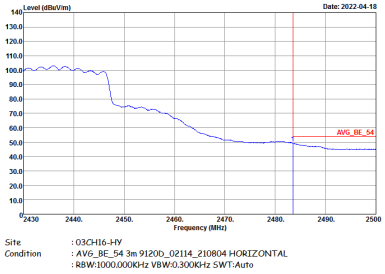
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH01 2412MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

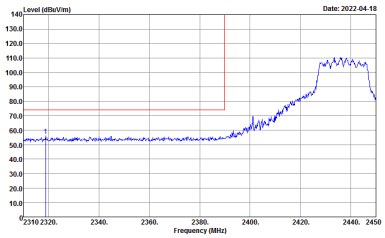
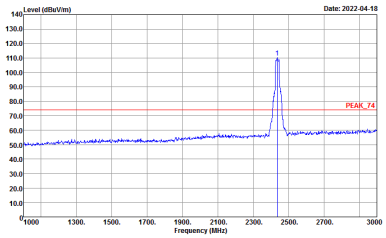
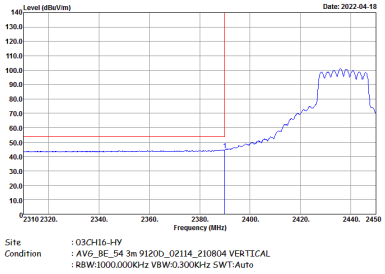
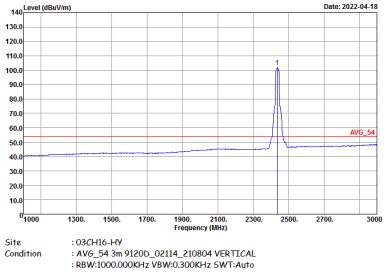
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH01 2412MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

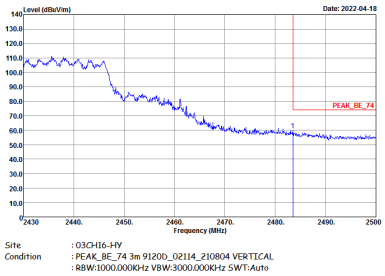
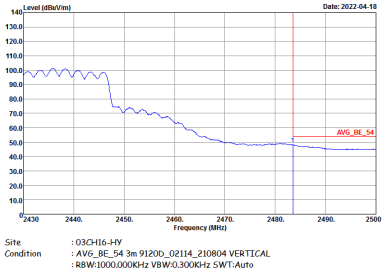
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH02 2417MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

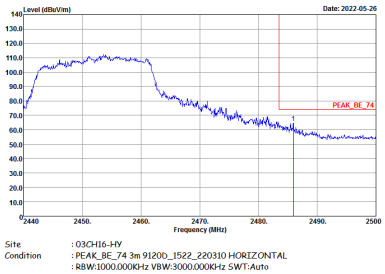
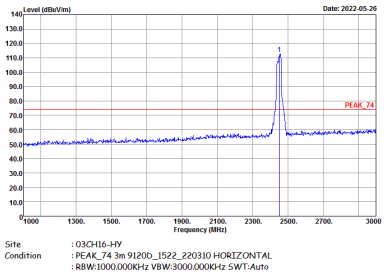
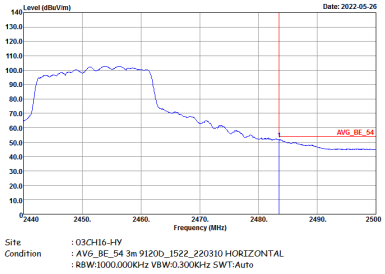
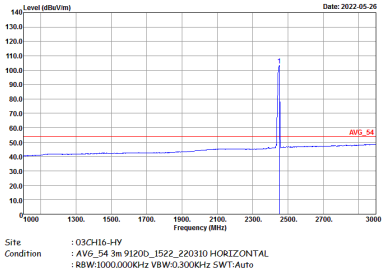
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH02 2417MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

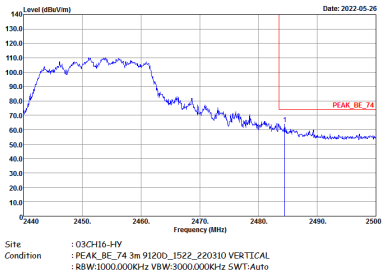
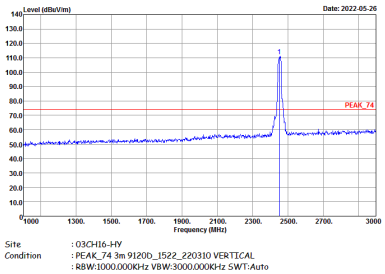
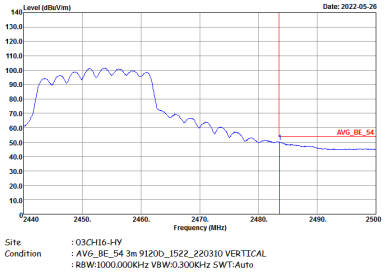
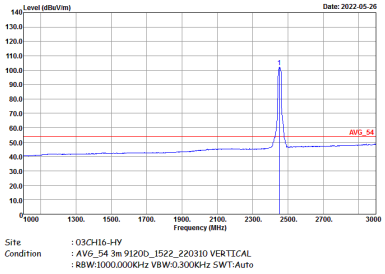
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - L	
6+7	Horizontal	Fundamental
Peak		
Avg.		

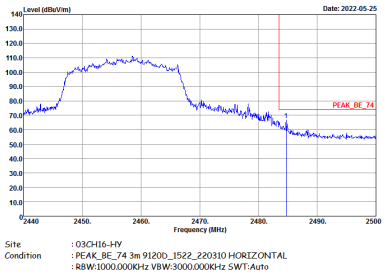
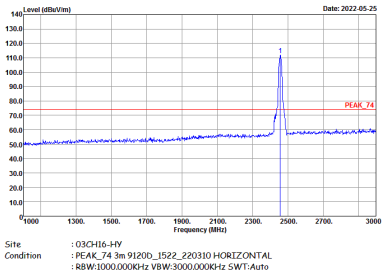
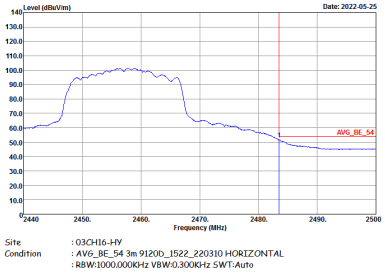
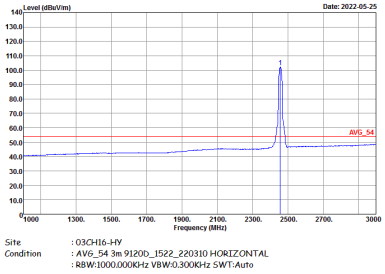
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - R	
6+7	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

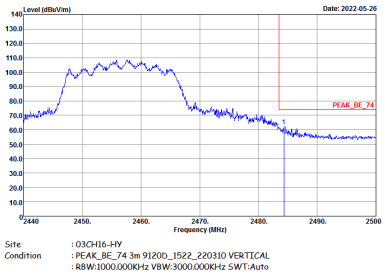
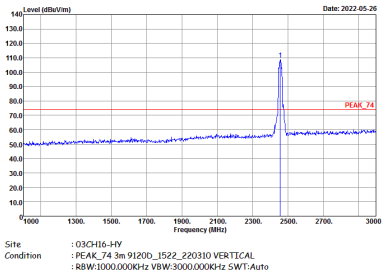
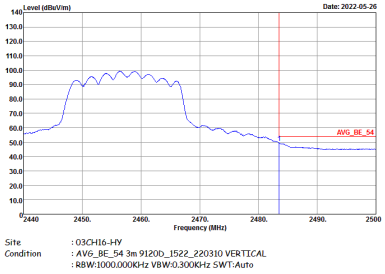
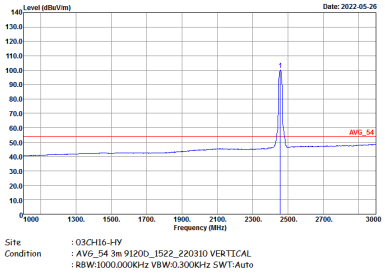
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - L	
6+7	Vertical	Fundamental
Peak		
Avg.		

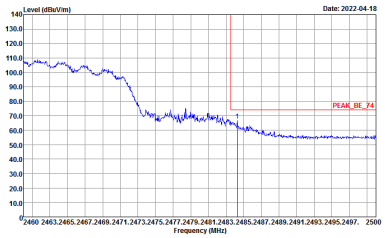
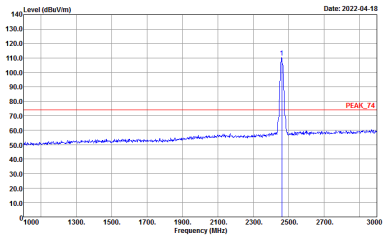
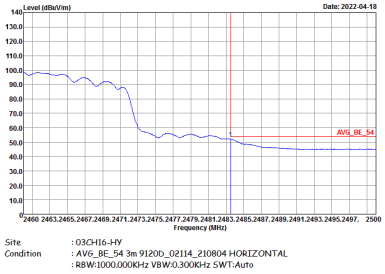
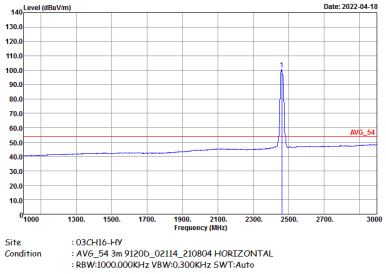
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH06 2437MHz - R	
6+7	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

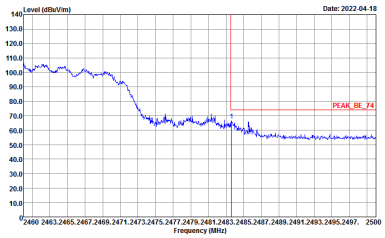
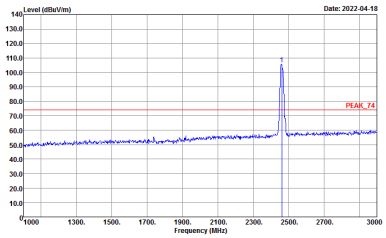
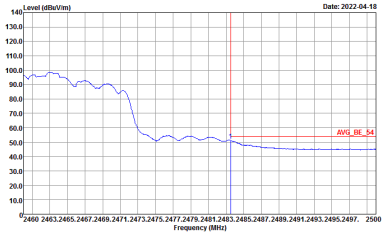
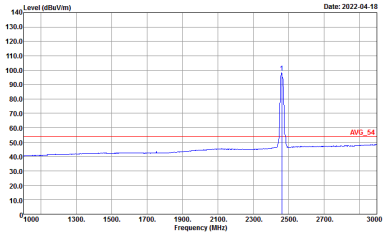
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH09 2452MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH09 2452MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH10 2457MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

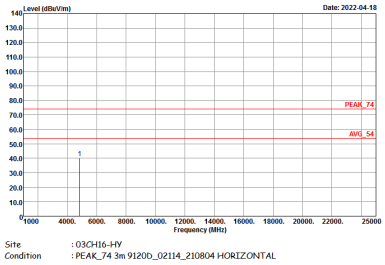
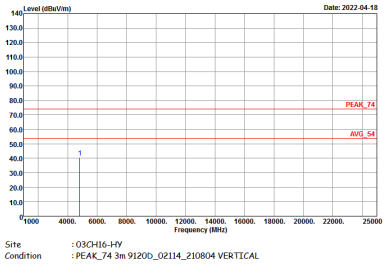
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH10 2457MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

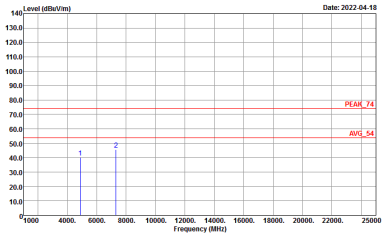
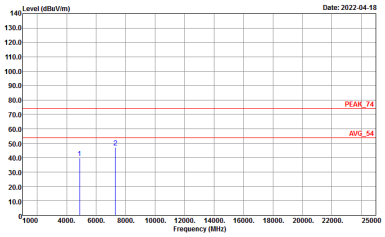
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH11 2462MHz	
6+7	Horizontal	Fundamental
Peak		
Avg.		

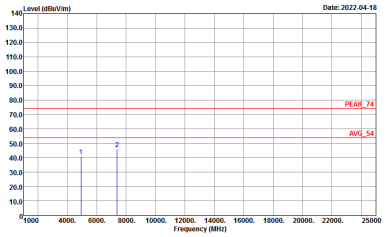
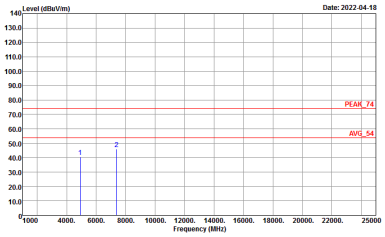
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH11 2462MHz	
6+7	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH01 2412MHz	
6+7	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH06 2437MHz	
6+7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 VERTICAL

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11 ax HE20 Full CH11 2462MHz	
6+7	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 VERTICAL

Appendix D. Duty Cycle Plots

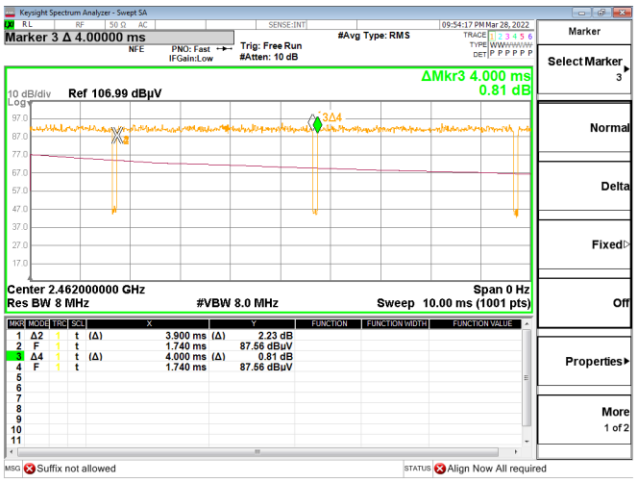
<CDD Mode>

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
6+7	802.11b	99.28	-	-	10Hz
6+7	802.11g	95.15	2058	0.49	1kHz
6+7	2.4GHz 802.11ax HE20 Full RU	97.50	3900	0.26	300Hz
6+7	2.4GHz 802.11ax HE20 106 RU	100.00	-	-	10Hz

MIMO <Ant. 6+7>

802.11b

802.11g

802.11ax HE20 Full RU	802.11ax HE20 106 RU
	

<TXBF Mode>

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
6+7	2.4GHz 802.11ax HE20 Full RU	96.45	5295	0.19	300Hz

MIMO <Ant. 6+7>

802.11ax HE20 Full RU	-
	-