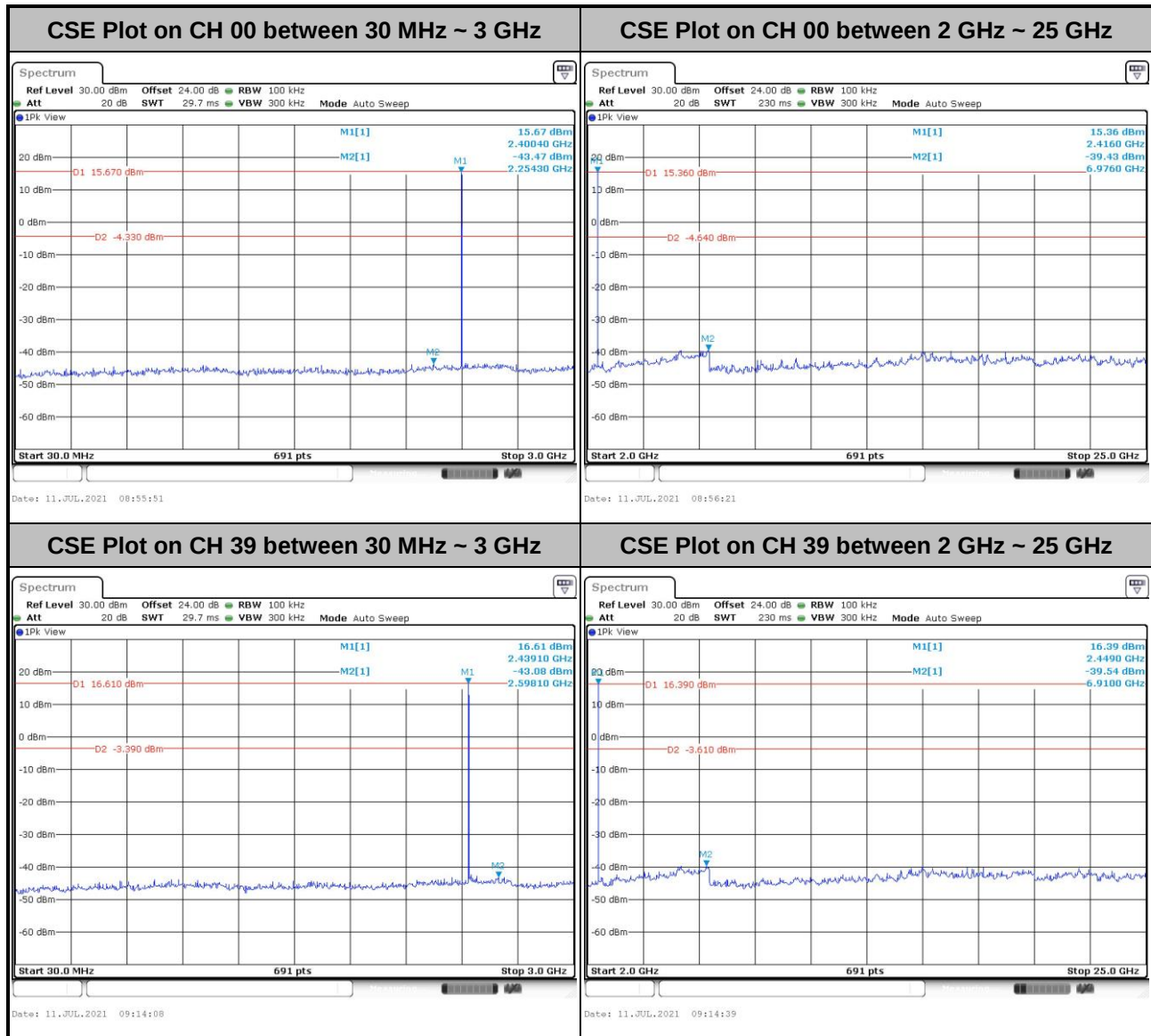
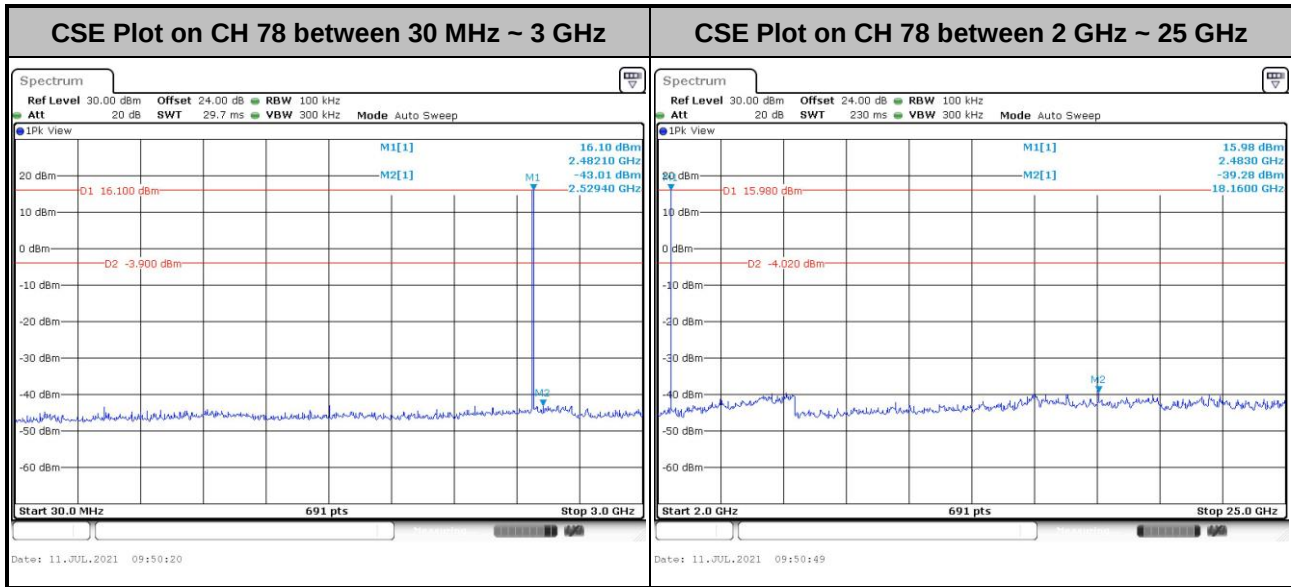




MIMO <Ant. 4>

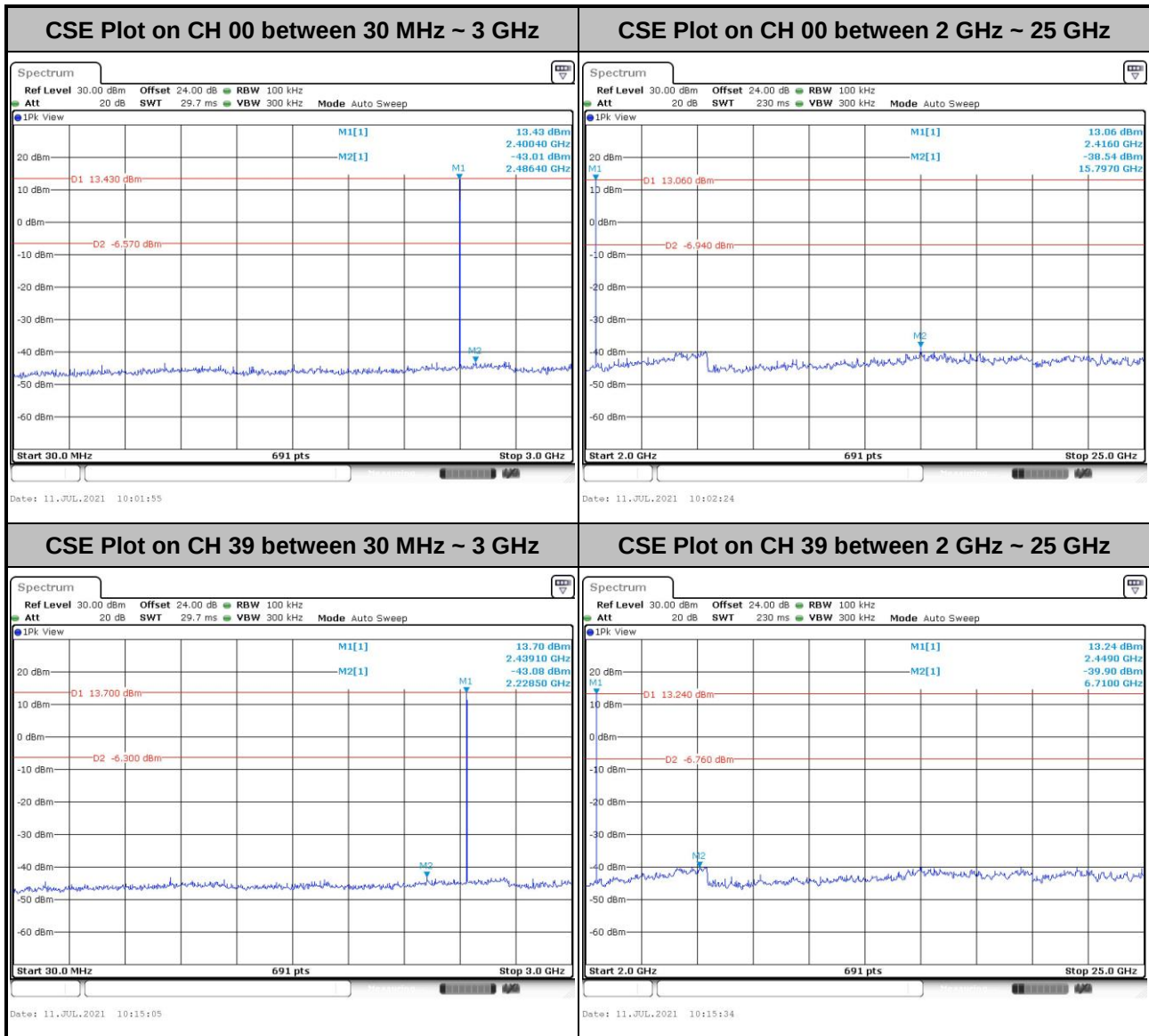
<1Mbps>

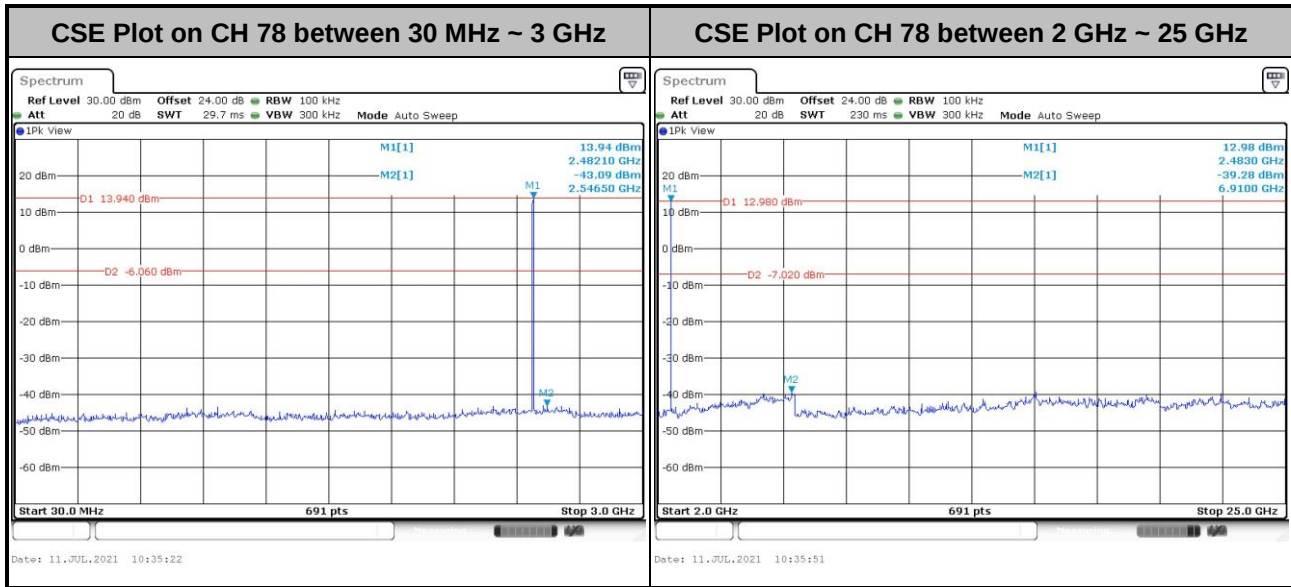






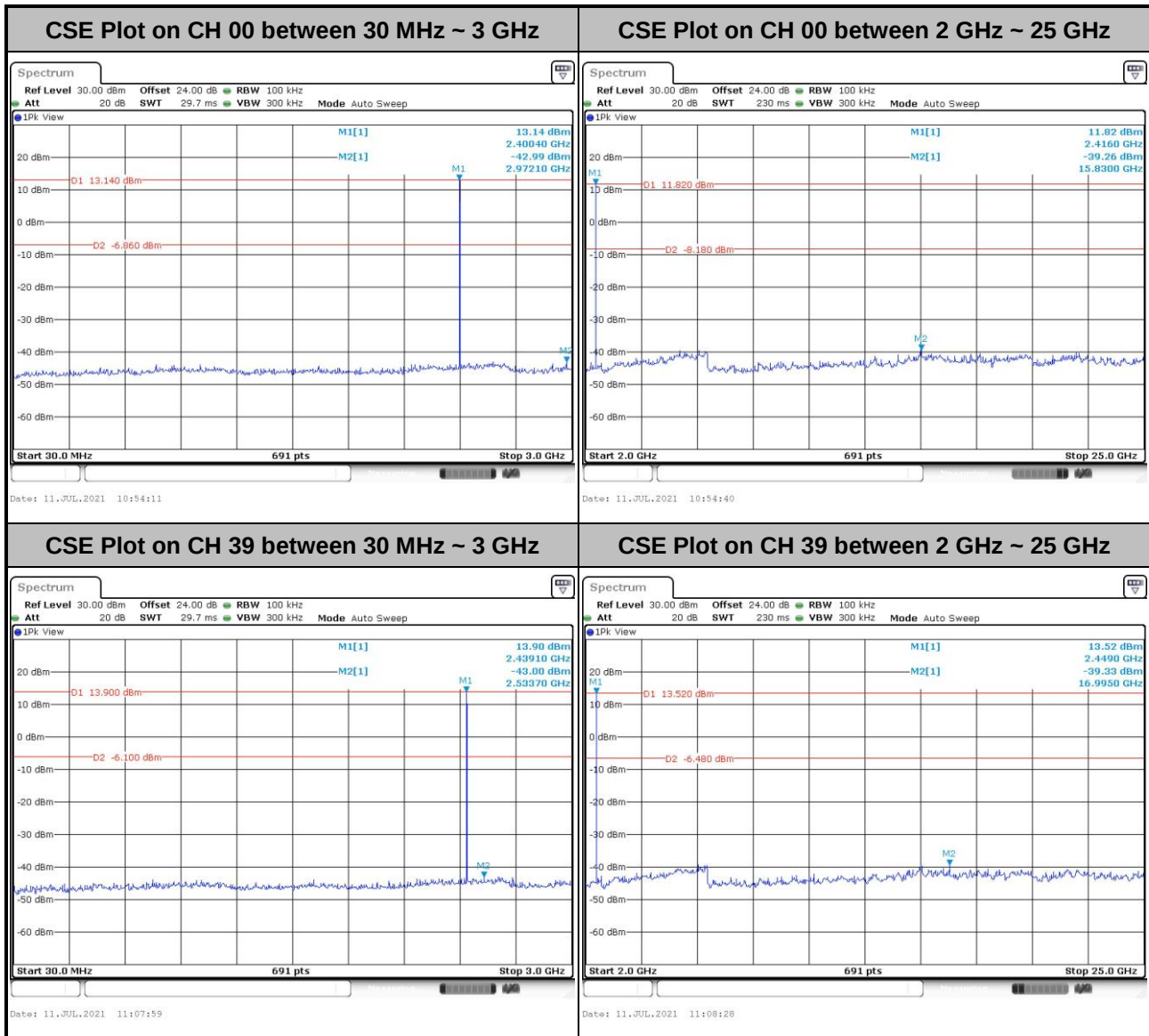
<2Mbps>

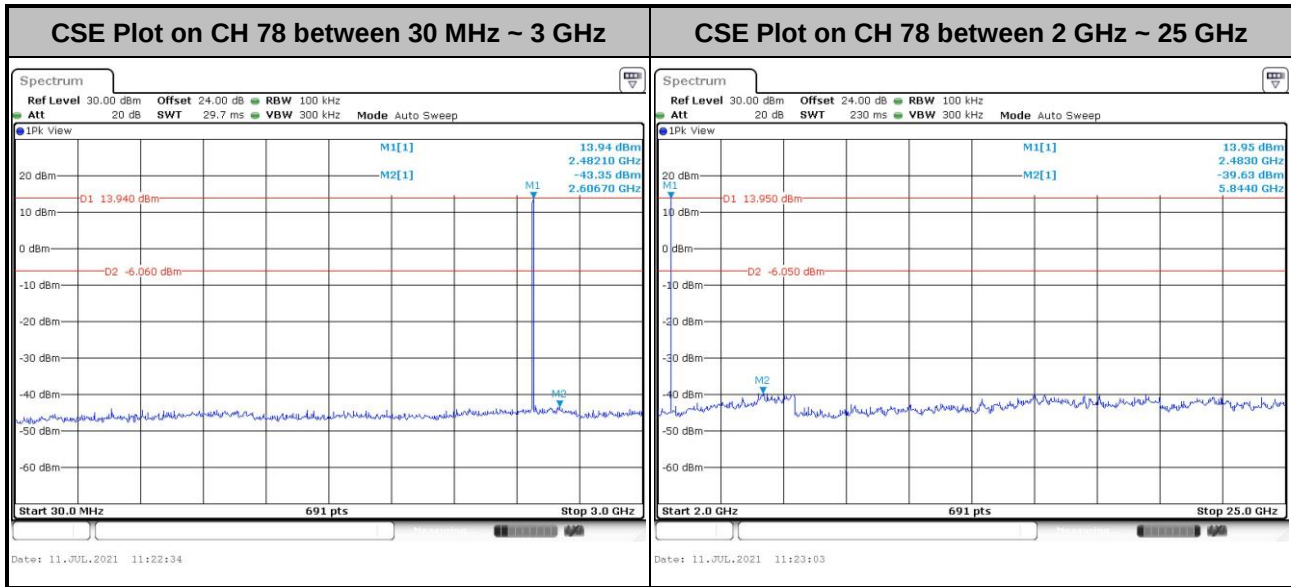






<3Mbps>

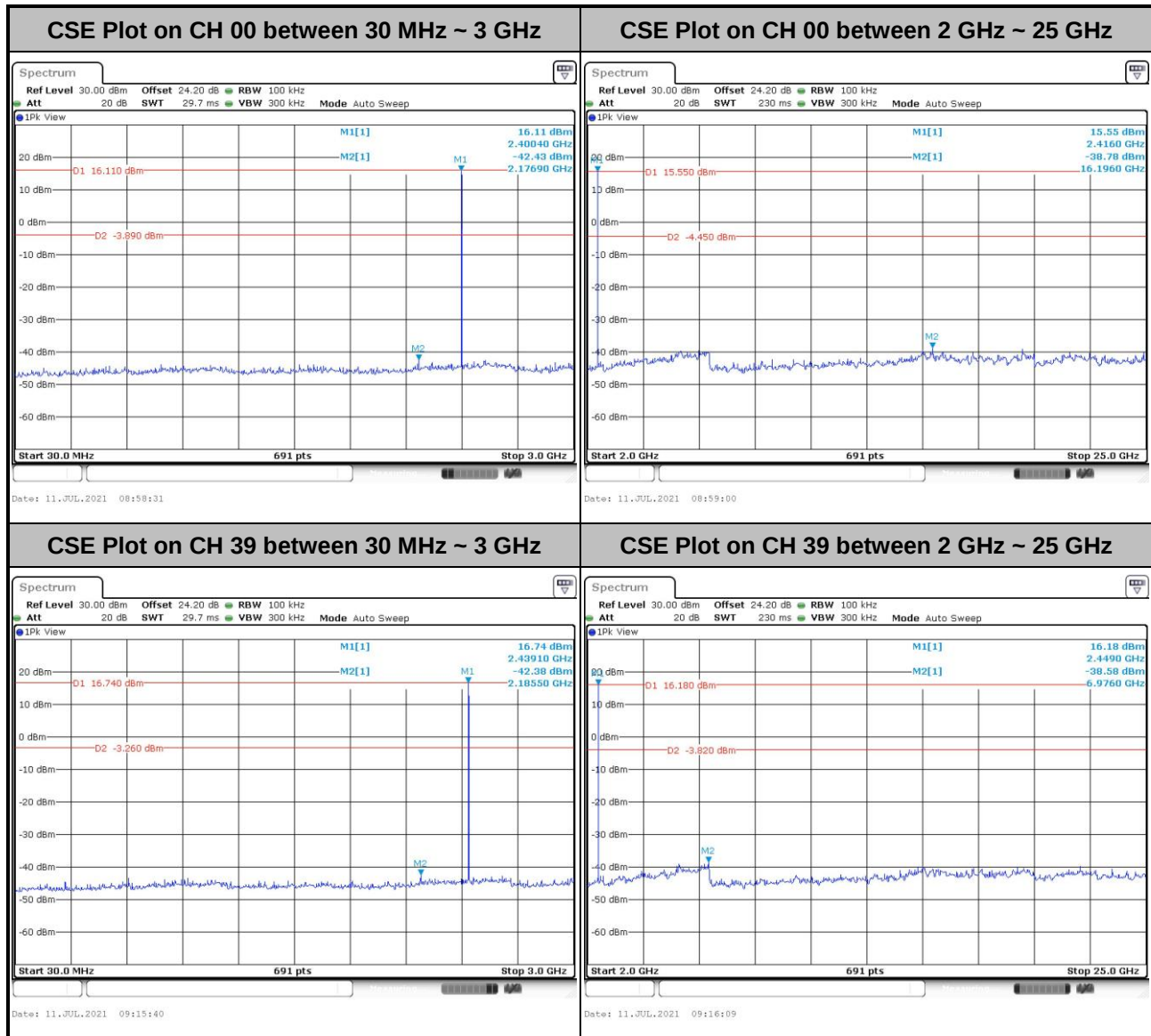


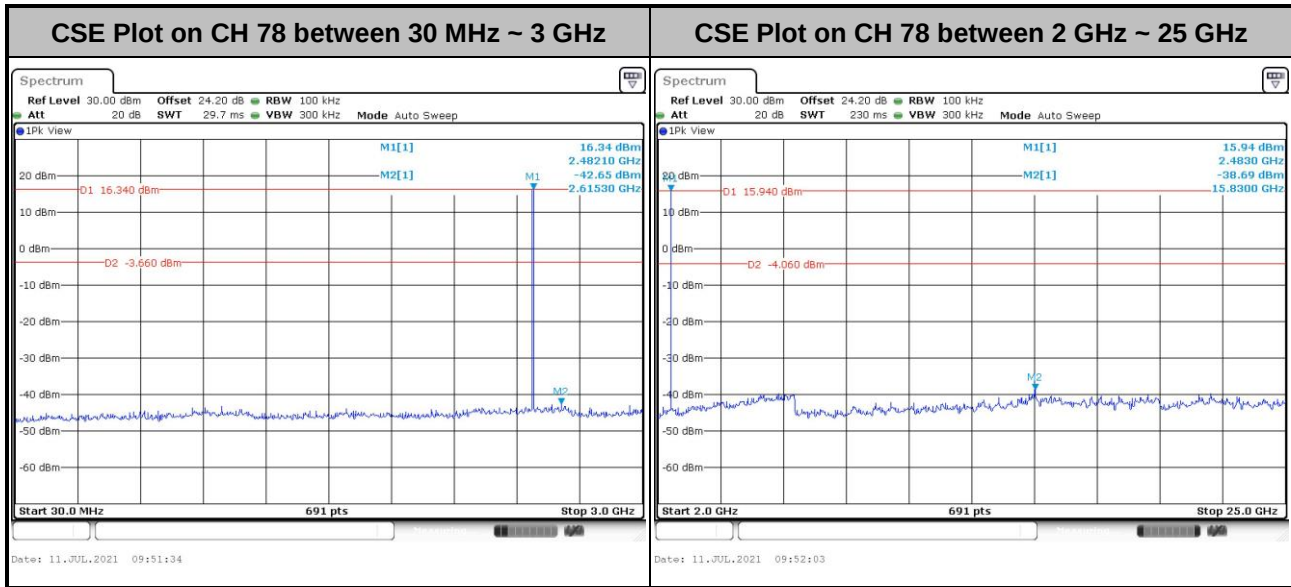




MIMO <Ant. 3>

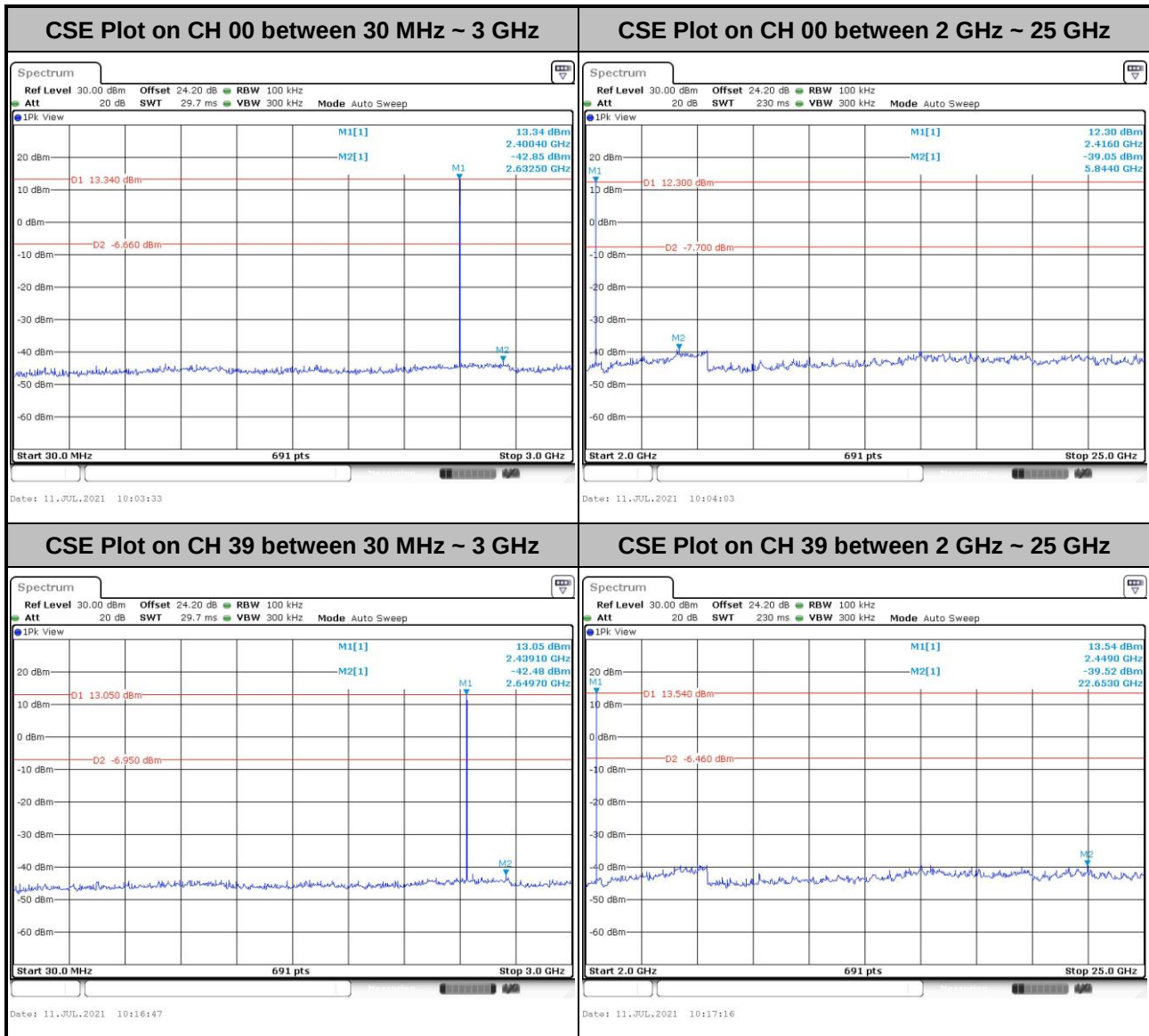
<1Mbps>

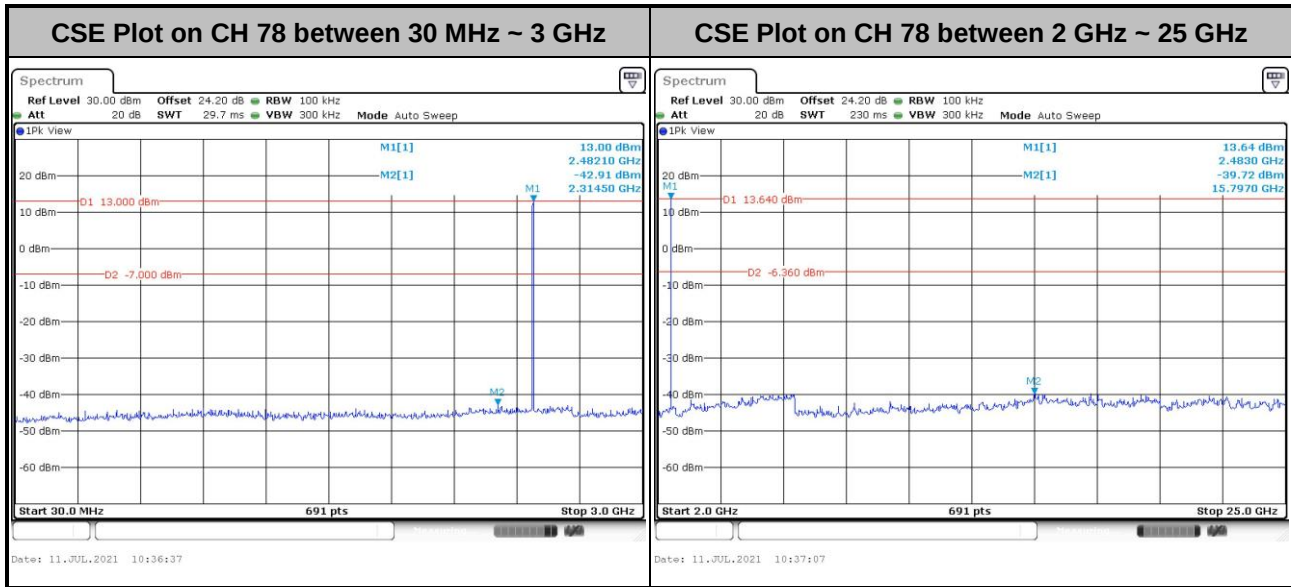






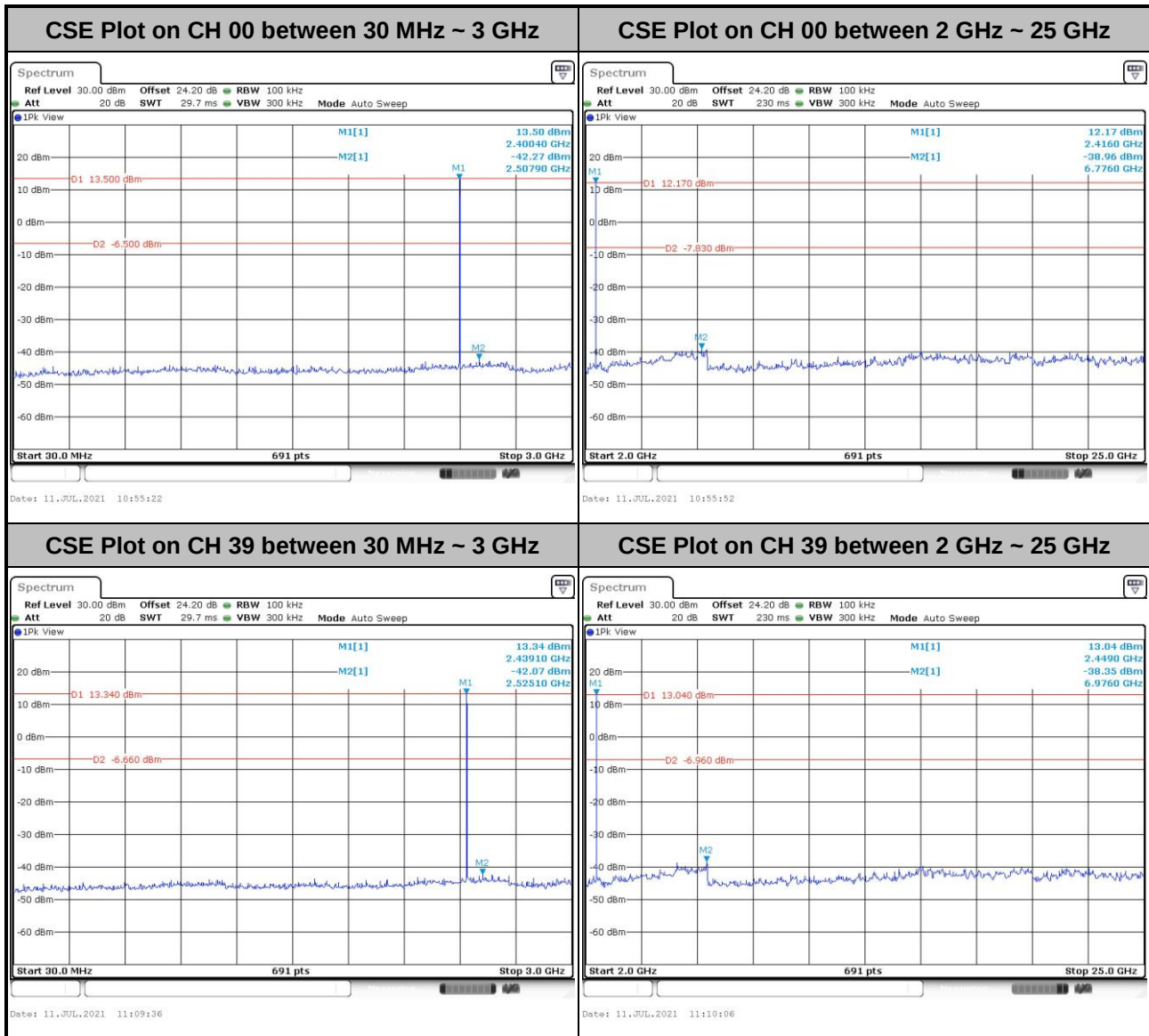
<2Mbps>

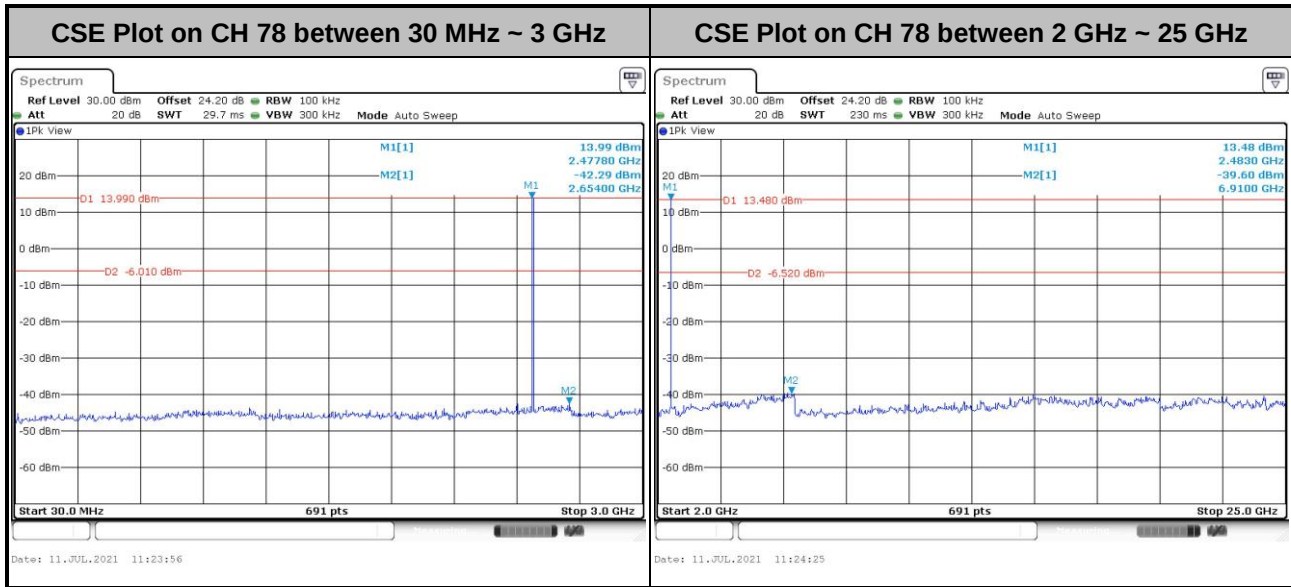






<3Mbps>





3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics / spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.8.2 Measuring Instruments

See list of measuring equipment of this test report.

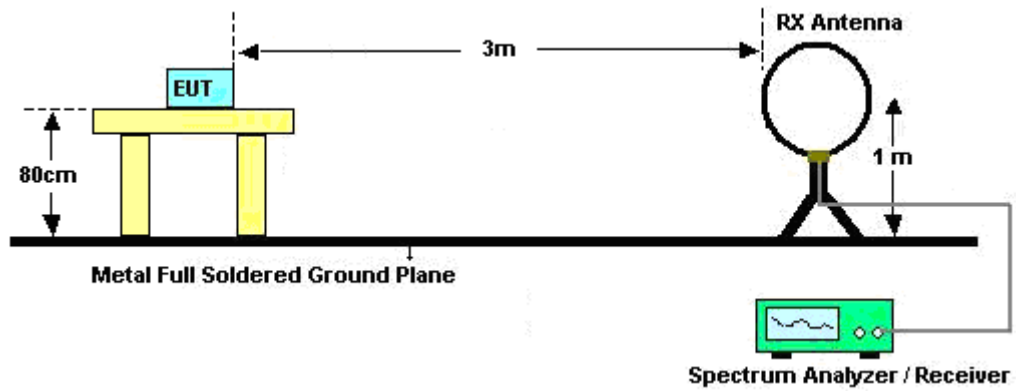
3.8.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW = 100 kHz for $f < 1$ GHz, RBW = 1 MHz for $f > 1$ GHz ; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. For testing below 1 GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

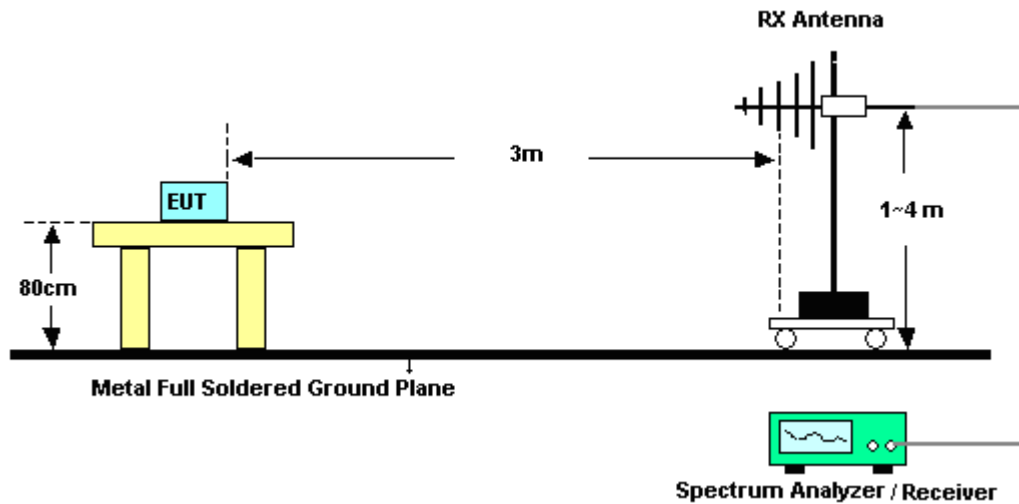
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.8.4 Test Setup

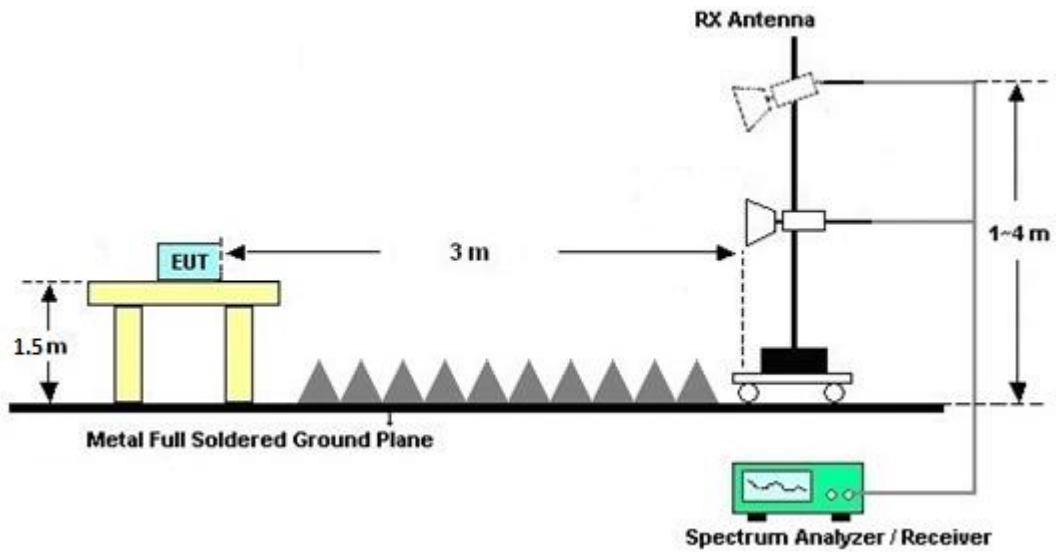
For radiated test below 30MHz



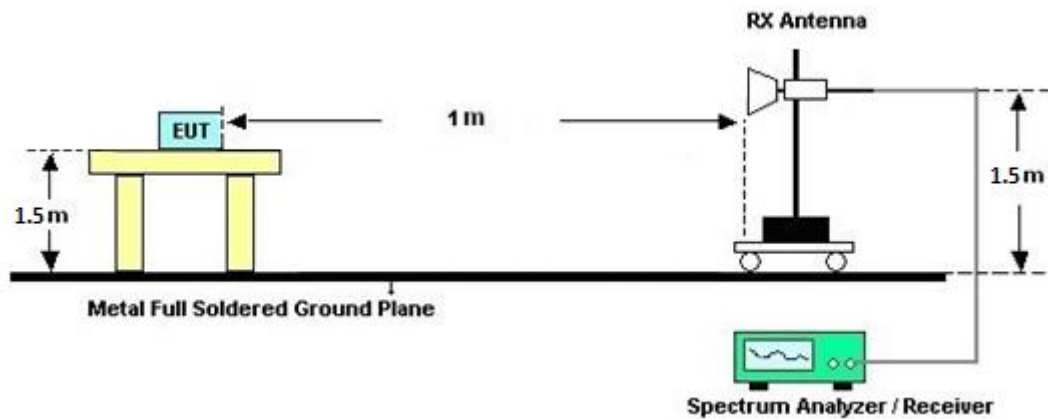
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.8.7 Duty Cycle

Please refer to Appendix E.

3.8.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.9 AC Conducted Emission Measurement

3.9.1 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 (dB μ V)	
	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.

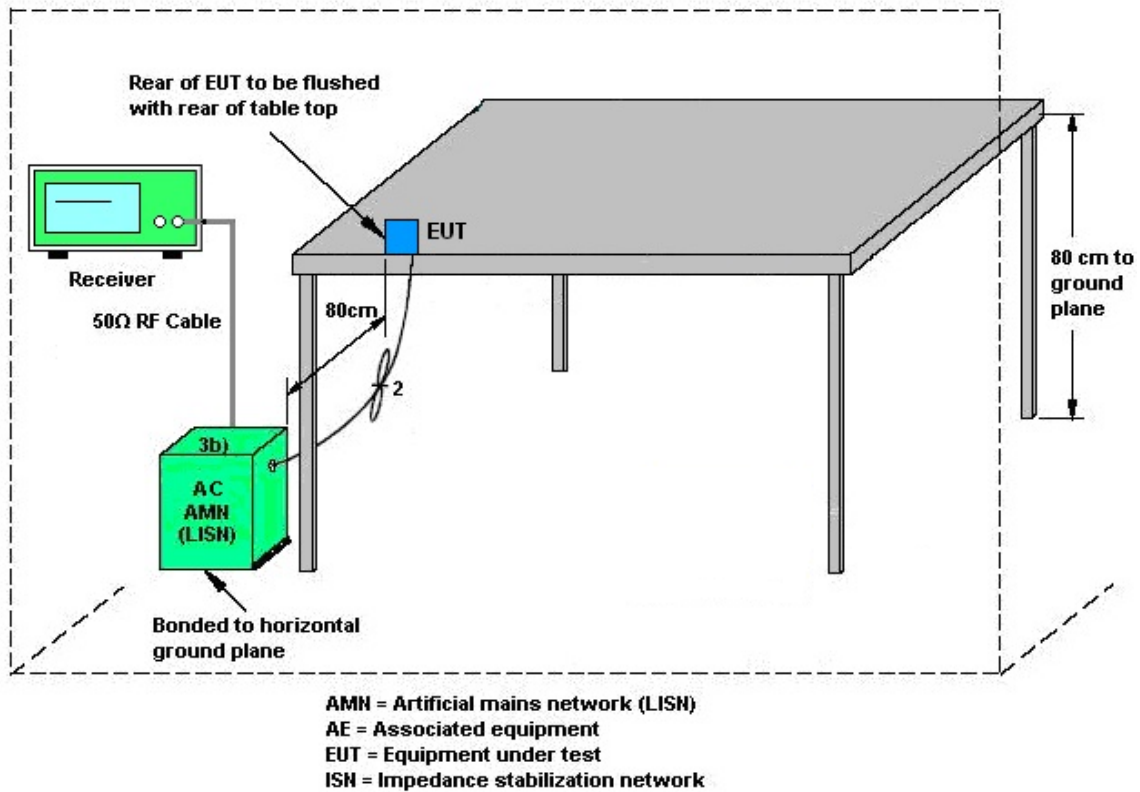
3.9.2 Measuring Instruments

See list of measuring equipment of this test report.

3.9.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.10 Antenna Requirements

3.10.1 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.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



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	100315	9 kHz~30 MHz	Jan. 04, 2021	Jun. 09, 2021~ Jul. 28, 2021	Jan. 03, 2022	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 16, 2020	Jun. 09, 2021~ Jul. 28, 2021	Dec. 15, 2021	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jul. 15, 2020	Jun. 09, 2021~ Jul. 13, 2021	Jul. 14, 2021	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jul. 13, 2021	Jul. 13, 2021~ Jul. 28, 2021	Jul. 12, 2022	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-001 01800-30-10 P	1590074	1GHz~18GHz	May 18, 2021	Jun. 09, 2021~ Jul. 28, 2021	May 17, 2022	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 28, 2020	Jun. 09, 2021~ Jul. 28, 2021	Oct. 27, 2021	Radiation (03CH13-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Jan. 31, 2021	Jun. 09, 2021~ Jul. 28, 2021	Jan. 30, 2022	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 18, 2021	Jun. 09, 2021~ Jul. 28, 2021	Mar. 17, 2022	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 09, 2021~ Jul. 28, 2021	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500 -B	N/A	1m~4m	N/A	Jun. 09, 2021~ Jul. 28, 2021	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 09, 2021~ Jul. 28, 2021	N/A	Radiation (03CH13-HY)
Software	Audix	E3 6.2009-8-24	RK-000992	N/A	N/A	Jun. 09, 2021~ Jul. 28, 2021	N/A	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 11, 2020	Jun. 09, 2021~ Jul. 28, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Feb. 10, 2021	Jun. 09, 2021~ Jul. 28, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30M-18G	Feb. 10, 2021	Jun. 09, 2021~ Jul. 28, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 22, 2021	Jun. 09, 2021~ Jul. 28, 2021	Feb. 21, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 11, 2021	Jun. 09, 2021~ Jul. 28, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M-18G	Feb. 10, 2021	Jun. 09, 2021~ Jul. 28, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Jun. 09, 2021~ Jul. 28, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA91705 84	18GHz- 40GHz	Dec. 11, 2020	Jun. 09, 2021~ Jul. 28, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP200879	N/A	Oct. 22, 2020	Jun. 09, 2021~ Jul. 28, 2021	Oct. 21, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-587 2.5-6750-180 00-40ST	Sn5	6.75GHz High Pass Filter	Mar. 11, 2021	Jun. 09, 2021~ Jul. 28, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-27 00-3000-180 00-60SS	SN2	3GHz High Pass Filter	May 17, 2021	Jul. 12, 2021~ Jul. 28, 2021	May 16, 2022	Radiation (03CH13-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 02, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 30, 2020	Jul. 02, 2021	Nov. 29, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	Jul. 02, 2021	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	Jul. 02, 2021	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jul. 02, 2021	N/A	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Feb. 25, 2021	Jul. 02, 2021	Feb. 24, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	Jul. 02, 2021	Dec. 30, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2021	Jun. 16, 2021~ Jul. 11, 2021	Mar. 01, 2022	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Jan. 14, 2021	Jun. 16, 2021~ Jul. 11, 2021	Jan. 13, 2022	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Jan. 14, 2021	Jun. 16, 2021~ Jul. 11, 2021	Jan. 13, 2022	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz ~ 40GHz	Jul. 22, 2020	Jun. 16, 2021~ Jul. 11, 2021	Jul. 21, 2021	Conducted (TH02-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2021	Jun. 16, 2021~ Jul. 11, 2021	Mar. 16, 2022	Conducted (TH02-HY)

5 Uncertainty of Evaluation

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

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% ($U = 2Uc(y)$)	5.3 dB
---	--------

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
---	--------

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu	Temperature:	22.5~25.2	°C
Test Date:	2021/6/16~2021/7/11	Relative Humidity:	46.5~58.7	%

<Ant. 4>

TEST RESULTS DATA**20dB and 99% Occupied Bandwidth and Hopping Channel Separation**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	1.013	0.909	1.003	0.6753	Pass
DH	1Mbps	1	39	2441	1.016	0.906	1.003	0.6773	Pass
DH	1Mbps	1	78	2480	1.016	0.906	0.999	0.6773	Pass
2DH	2Mbps	1	0	2402	1.294	1.181	1.003	0.8625	Pass
2DH	2Mbps	1	39	2441	1.294	1.184	0.999	0.8625	Pass
2DH	2Mbps	1	78	2480	1.289	1.181	0.994	0.8596	Pass
3DH	3Mbps	1	0	2402	1.255	1.161	1.003	0.8365	Pass
3DH	3Mbps	1	39	2441	1.250	1.164	0.999	0.8336	Pass
3DH	3Mbps	1	78	2480	1.250	1.164	0.999	0.8336	Pass

TEST RESULTS DATA**Dwell Time**

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Nomal	79	106.67	2.90	0.31	0.4	Pass
AFH	20	53.33	2.90	0.15	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH1	0	1	20.42	20.97	Pass
	39	1	20.95	20.97	Pass
	78	1	20.55	20.97	Pass
2DH1	0	1	20.39	20.97	Pass
	39	1	20.79	20.97	Pass
	78	1	20.53	20.97	Pass
3DH1	0	1	20.04	20.97	Pass
	39	1	20.29	20.97	Pass
	78	1	20.22	20.97	Pass

TEST RESULTS DATA**Average Power Table
(Reporting Only)**

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	19.00	5.15
	39	1	19.56	5.15
	78	1	19.44	5.15
2DH1	0	1	17.32	5.05
	39	1	17.86	5.05
	78	1	17.84	5.05
3DH1	0	1	16.53	5.08
	39	1	16.85	5.08
	78	1	16.81	5.08

TEST RESULTS DATA**Number of Hopping Frequency**

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

<Ant. 3>

TEST RESULTS DATA**20dB and 99% Occupied Bandwidth and Hopping Channel Separation**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	1.013	0.906	0.999	0.6753	Pass
DH	1Mbps	1	39	2441	1.013	0.906	1.003	0.6753	Pass
DH	1Mbps	1	78	2480	1.016	0.906	1.003	0.6773	Pass
2DH	2Mbps	1	0	2402	1.289	1.184	1.003	0.8596	Pass
2DH	2Mbps	1	39	2441	1.294	1.184	1.003	0.8625	Pass
2DH	2Mbps	1	78	2480	1.294	1.181	0.999	0.8625	Pass
3DH	3Mbps	1	0	2402	1.250	1.161	1.003	0.8336	Pass
3DH	3Mbps	1	39	2441	1.250	1.161	1.003	0.8336	Pass
3DH	3Mbps	1	78	2480	1.250	1.161	0.999	0.8336	Pass

TEST RESULTS DATA**Dwell Time**

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Nomal	79	106.67	2.90	0.31	0.4	Pass
AFH	20	53.33	2.90	0.15	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH1	0	1	20.55	20.97	Pass
	39	1	20.65	20.97	Pass
	78	1	20.56	20.97	Pass
2DH1	0	1	20.53	20.97	Pass
	39	1	20.63	20.97	Pass
	78	1	20.55	20.97	Pass
3DH1	0	1	20.05	20.97	Pass
	39	1	20.15	20.97	Pass
	78	1	20.12	20.97	Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	19.50	5.15
	39	1	19.78	5.15
	78	1	19.65	5.15
2DH1	0	1	17.67	5.07
	39	1	17.82	5.07
	78	1	17.79	5.07
3DH1	0	1	16.38	5.08
	39	1	16.43	5.08
	78	1	16.41	5.08

TEST RESULTS DATA**Number of Hopping Frequency**

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

MIMO <Ant. 4+3>

TEST RESULTS DATA**20dB and 99% Occupied Bandwidth and Hopping Channel Separation**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	2	0	2402	1.013	0.889	1.003	0.6753	Pass
DH	1Mbps	2	39	2441	1.016	0.906	1.003	0.6773	Pass
DH	1Mbps	2	78	2480	1.016	0.886	1.159	0.6773	Pass
2DH	2Mbps	2	0	2402	1.294	1.181	1.003	0.8625	Pass
2DH	2Mbps	2	39	2441	1.289	1.181	1.007	0.8596	Pass
2DH	2Mbps	2	78	2480	1.294	1.181	0.999	0.8625	Pass
3DH	3Mbps	2	0	2402	1.250	1.158	0.999	0.8336	Pass
3DH	3Mbps	2	39	2441	1.250	1.161	1.003	0.8336	Pass
3DH	3Mbps	2	78	2480	1.250	1.161	1.003	0.8336	Pass

TEST RESULTS DATA**Dwell Time**

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Nomal	79	106.67	2.90	0.31	0.4	Pass
AFH	20	53.33	2.90	0.15	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

DH	CH.	NTX	Peak Power (dBm)	Peak Power Ant 3 (dBm)	Peak Power Total (dBm)	Power Limit (dBm)	Test Result
DH1	0	2	17.78	17.90	20.85	20.97	Pass
	39	2	17.89	17.92	20.92	20.97	Pass
	78	2	17.90	18.00	20.96	20.97	Pass
2DH1	0	2	17.25	17.33	20.30	20.97	Pass
	39	2	17.65	17.70	20.69	20.97	Pass
	78	2	17.70	17.75	20.74	20.97	Pass
3DH1	0	2	17.74	17.87	20.82	20.97	Pass
	39	2	17.85	17.90	20.89	20.97	Pass
	78	2	17.87	17.93	20.91	20.97	Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

DH	CH.	NTX	Average Power (dBm)	Average Power Ant 3 (dBm)	Average Power Total (dBm)	Duty Factor (dB)
DH1	0	2	16.50	16.99	19.76	5.15
	39	2	16.90	17.11	20.02	5.15
	78	2	16.92	17.14	20.04	5.15
2DH1	0	2	14.30	14.47	17.40	5.05
	39	2	14.70	14.72	17.72	5.05
	78	2	14.73	14.77	17.76	5.05
3DH1	0	2	14.34	14.48	17.42	5.05
	39	2	14.72	14.74	17.74	5.05
	78	2	14.78	14.79	17.80	5.05

TEST RESULTS DATA**Number of Hopping Frequency**

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass



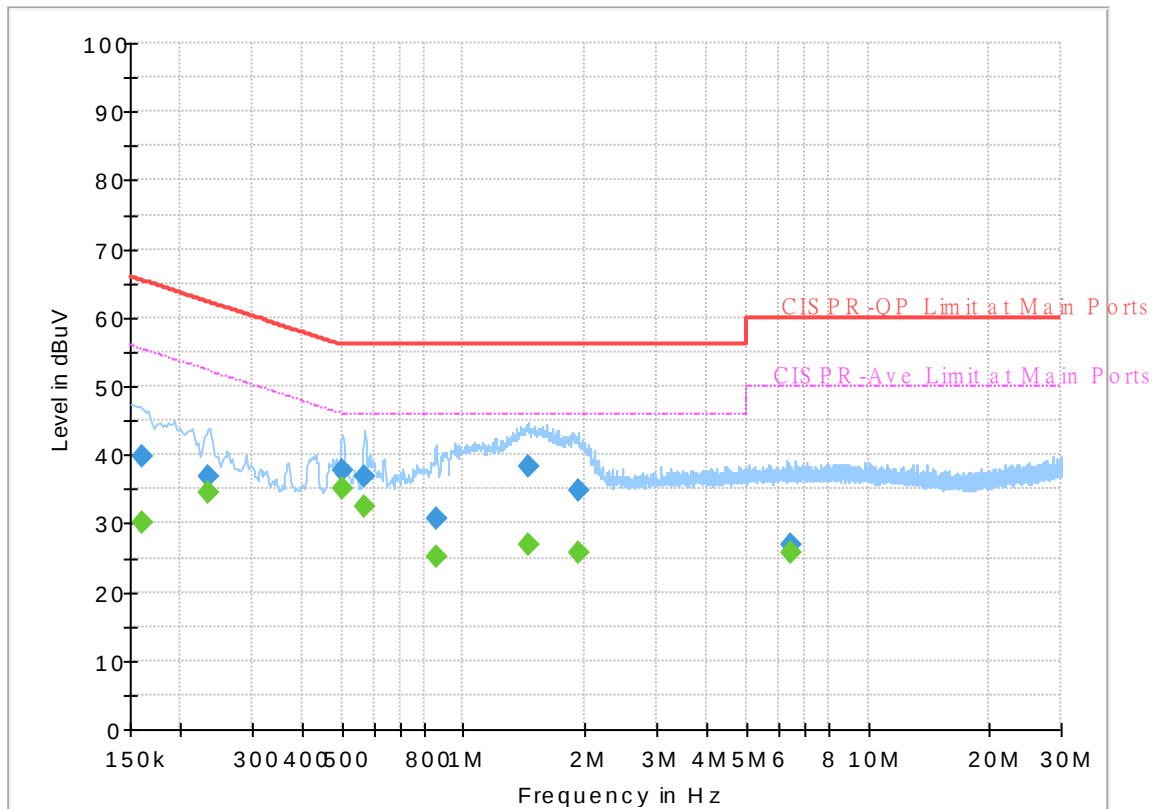
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Howard Huang	Temperature :	23~26°C
		Relative Humidity :	40~50%

EUT Information

Report NO : 0D2942-04
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



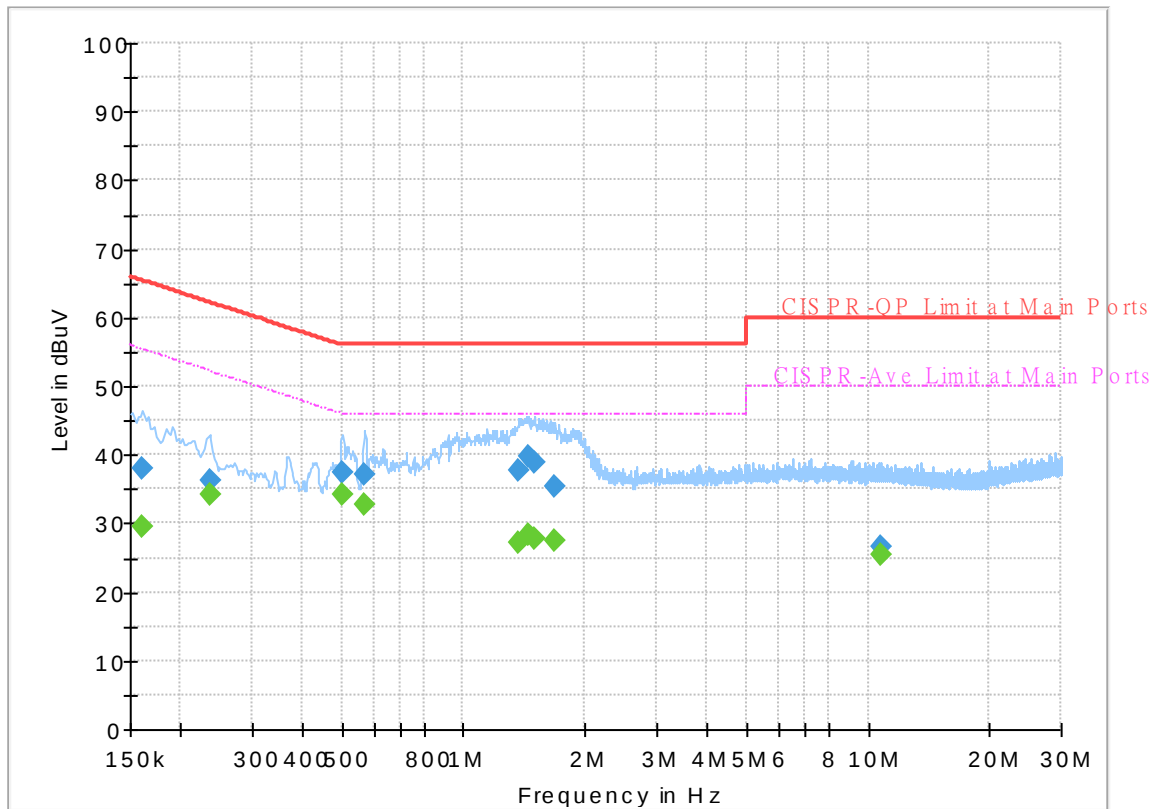
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.161250	---	30.13	55.40	25.27	L1	OFF	19.5
0.161250	39.90	---	65.40	25.50	L1	OFF	19.5
0.233250	---	34.54	52.33	17.79	L1	OFF	19.5
0.233250	36.85	---	62.33	25.48	L1	OFF	19.5
0.501000	---	35.17	46.00	10.83	L1	OFF	19.7
0.501000	37.76	---	56.00	18.24	L1	OFF	19.7
0.568500	---	32.49	46.00	13.51	L1	OFF	19.7
0.568500	36.76	---	56.00	19.24	L1	OFF	19.7
0.854250	---	25.02	46.00	20.98	L1	OFF	20.0
0.854250	30.82	---	56.00	25.18	L1	OFF	20.0
1.446000	---	26.86	46.00	19.14	L1	OFF	20.0
1.446000	38.16	---	56.00	17.84	L1	OFF	20.0
1.923000	---	25.67	46.00	20.33	L1	OFF	20.0
1.923000	34.66	---	56.00	21.34	L1	OFF	20.0
6.450000	---	25.67	50.00	24.33	L1	OFF	19.9
6.450000	26.96	---	60.00	33.04	L1	OFF	19.9

EUT Information

Report NO : 0D2942-04
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.161250	---	29.59	55.40	25.81	N	OFF	19.5
0.161250	38.15	---	65.40	27.25	N	OFF	19.5
0.235500	---	34.22	52.25	18.03	N	OFF	19.5
0.235500	36.21	---	62.25	26.04	N	OFF	19.5
0.503250	---	34.30	46.00	11.70	N	OFF	19.7
0.503250	37.38	---	56.00	18.62	N	OFF	19.7
0.568500	---	32.65	46.00	13.35	N	OFF	19.8
0.568500	37.13	---	56.00	18.87	N	OFF	19.8
1.374000	---	27.13	46.00	18.87	N	OFF	20.0
1.374000	37.61	---	56.00	18.39	N	OFF	20.0
1.446000	---	28.22	46.00	17.78	N	OFF	20.0
1.446000	39.79	---	56.00	16.21	N	OFF	20.0
1.500000	---	27.77	46.00	18.23	N	OFF	20.0
1.500000	38.84	---	56.00	17.16	N	OFF	20.0
1.686750	---	27.49	46.00	18.51	N	OFF	20.0
1.686750	35.40	---	56.00	20.60	N	OFF	20.0
10.749750	---	25.41	50.00	24.59	N	OFF	20.1
10.749750	26.71	---	60.00	33.29	N	OFF	20.1



Appendix C. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Jacky Hong and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	40~60%

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2388.96	45.05	-28.95	74	41.08	27.62	4.19	27.84	115	303	P	H
		2388.96	20.26	-33.74	54	-	-	-	-	-	-	A	H
	*	2402	104.57	-	-	100.61	27.6	4.2	27.84	115	303	P	H
	*	2402	79.78	-	-	-	-	-	-	-	-	A	H
													H
													H
		2367.54	45.51	-28.49	74	41.53	27.66	4.17	27.85	313	4	P	V
		2367.54	20.72	-33.28	54	-	-	-	-	-	-	A	V
	*	2402	100.62	-	-	96.66	27.6	4.2	27.84	313	4	P	V
	*	2402	75.83	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2334.92	45.83	-28.17	74	41.82	27.73	4.13	27.85	141	305	P	H
		2334.92	21.04	-32.96	54	-	-	-	-	-	-	A	H
	*	2441	106.91	-	-	102.99	27.52	4.23	27.83	141	305	P	H
	*	2441	82.12	-	-	-	-	-	-	-	-	A	H
		2493.84	45.24	-28.76	74	41.28	27.5	4.28	27.82	141	305	P	H
		2493.84	20.45	-33.55	54	-	-	-	-	-	-	A	H
		2313.92	44.82	-29.18	74	40.8	27.77	4.11	27.86	301	17	P	V
		2313.92	20.03	-33.97	54	-	-	-	-	-	-	A	V
	*	2441	99.93	-	-	96.01	27.52	4.23	27.83	301	17	P	V
	*	2441	75.14	-	-	-	-	-	-	-	-	A	V
		2484.53	44.59	-29.41	74	40.64	27.5	4.27	27.82	301	17	P	V
		2484.53	19.8	-34.2	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	106.79	-	-	102.85	27.5	4.26	27.82	114	301	P	H
	*	2480	82	-	-	-	-	-	-	-	-	A	H
		2483.52	49.44	-24.56	74	45.49	27.5	4.27	27.82	114	301	P	H
		2483.52	24.65	-29.35	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	100.39	-	-	96.45	27.5	4.26	27.82	297	22	P	V
	*	2480	75.6	-	-	-	-	-	-	-	-	A	V
		2483.64	46.54	-27.46	74	42.59	27.5	4.27	27.82	297	22	P	V
		2483.64	21.75	-32.25	54	-	-	-	-	-	-	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****BT (Harmonic @ 3m)**

BT ANT 4	Note	Frequency (MHz)	Level (dBμV/m)	Over 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)
BT CH 00 2402MHz		4804	38.14	-35.86	74	57.61	31.11	6.51	57.09	100	0	P	H
		4804	13.35	-40.65	54	-	-	-	-	-	-	A	H
		17985	55.83	-18.17	74	51.7	47.68	13.17	56.72	100	0	P	H
		17985	31.04	-22.96	54	-	-	-	-	-	-	A	H
		4804	38.48	-35.52	74	57.95	31.11	6.51	57.09	100	0	P	V
		4804	13.69	-40.31	54	-	-	-	-	-	-	A	V
		17955	55.6	-18.4	74	52.33	46.84	13.15	56.72	100	0	P	V
		17955	30.81	-23.19	54	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		4882	40.09	-33.91	74	59	31.2	6.84	56.95	100	0	P	H
		4882	15.3	-38.7	54	-	-	-	-	-	-	A	H
		7323	44.8	-29.2	74	56.25	36.75	8.72	56.92	100	0	P	H
		7323	20.01	-33.99	54	-	-	-	-	-	-	A	H
		17970	55.68	-18.32	74	51.98	47.26	13.16	56.72	100	0	P	H
		17970	30.89	-23.11	54	-	-	-	-	-	-	A	H
		4882	40.3	-33.7	74	59.21	31.2	6.84	56.95	100	0	P	V
		4882	15.51	-38.49	54	-	-	-	-	-	-	A	V
		7323	44.55	-29.45	74	56	36.75	8.72	56.92	100	0	P	V
		7323	19.76	-34.24	54	-	-	-	-	-	-	A	V
		17970	55.89	-18.11	74	52.19	47.26	13.16	56.72	100	0	P	V
		17970	31.1	-22.9	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz		4960	40.69	-33.31	74	58.91	31.42	7.17	56.81	100	0	P	H
		4960	15.9	-38.1	54	-	-	-	-	-	-	A	H
		7440	45.1	-28.9	74	56.75	36.82	8.7	57.17	100	0	P	H
		7440	20.31	-33.69	54	-	-	-	-	-	-	A	H
		17970	55.58	-18.42	74	51.88	47.26	13.16	56.72	100	0	P	H
		17970	30.79	-23.21	54	-	-	-	-	-	-	A	H
		4960	39.65	-34.35	74	57.87	31.42	7.17	56.81	100	0	P	V
		4960	14.86	-39.14	54	-	-	-	-	-	-	A	V
		7440	45.24	-28.76	74	56.89	36.82	8.7	57.17	100	0	P	V
		7440	20.45	-33.55	54	-	-	-	-	-	-	A	V
		17970	55.39	-18.61	74	51.69	47.26	13.16	56.72	100	0	P	V
		17970	30.6	-23.4	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2335.2	45.81	-28.19	74	41.79	27.73	4.14	27.85	150	34	P	H
		2335.2	21.02	-32.98	54	-	-	-	-	-	-	A	H
	*	2402	105.76	-	-	101.8	27.6	4.2	27.84	150	34	P	H
	*	2402	80.97	-	-	-	-	-	-	-	-	A	H
													H
													H
		2342.76	45.71	-28.29	74	41.71	27.71	4.14	27.85	393	115	P	V
		2342.76	20.92	-33.08	54	-	-	-	-	-	-	A	V
	*	2402	100.58	-	-	96.62	27.6	4.2	27.84	393	115	P	V
	*	2402	75.79	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2347.66	44.96	-29.04	74	40.96	27.7	4.15	27.85	100	297	P	H
		2347.66	20.17	-33.83	54	-	-	-	-	-	-	A	H
	*	2441	105.98	-	-	102.06	27.52	4.23	27.83	100	297	P	H
	*	2441	81.19	-	-	-	-	-	-	-	-	A	H
		2486.91	44.28	-29.72	74	40.33	27.5	4.27	27.82	100	297	P	H
		2486.91	19.49	-34.51	54	-	-	-	-	-	-	A	H
		2374.82	45.18	-28.82	74	41.21	27.65	4.17	27.85	379	113	P	V
		2374.82	20.39	-33.61	54	-	-	-	-	-	-	A	V
	*	2441	99.94	-	-	96.02	27.52	4.23	27.83	379	113	P	V
	*	2441	75.15	-	-	-	-	-	-	-	-	A	V
		2496.92	44.67	-29.33	74	40.71	27.5	4.28	27.82	379	113	P	V
		2496.92	19.88	-34.12	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	105.76	-	-	101.82	27.5	4.26	27.82	109	298	P	H
	*	2480	80.97	-	-	-	-	-	-	-	-	A	H
		2483.52	50.53	-23.47	74	46.58	27.5	4.27	27.82	109	298	P	H
		2483.52	25.74	-28.26	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	100.26	-	-	96.32	27.5	4.26	27.82	373	114	P	V
	*	2480	75.47	-	-	-	-	-	-	-	-	A	V
		2483.6	46.29	-27.71	74	42.34	27.5	4.27	27.82	373	114	P	V
		2483.6	21.5	-32.5	54	-	-	-	-	-	-	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

BT (Harmonic @ 3m)

BT ANT 3	Note	Frequency (MHz)	Level (dBμV/m)	Over 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)
BT CH 00 2402MHz		4804	37.61	-36.39	74	57.08	31.11	6.51	57.09	100	0	P	H
		4804	12.82	-41.18	54	-	-	-	-	-	-	A	H
		18000	56.47	-17.53	74	51.91	48.1	13.18	56.72	100	0	P	H
		18000	31.68	-22.32	54	-	-	-	-	-	-	A	H
		4804	36.97	-37.03	74	56.44	31.11	6.51	57.09	100	0	P	V
		4804	12.18	-41.82	54	-	-	-	-	-	-	A	V
		18000	55.89	-18.11	74	51.33	48.1	13.18	56.72	100	0	P	V
		18000	31.1	-22.9	54	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		4882	38.87	-35.13	74	57.78	31.2	6.84	56.95	100	0	P	H
		4882	14.08	-39.92	54	-	-	-	-	-	-	A	H
		7323	44.28	-29.72	74	55.73	36.75	8.72	56.92	100	0	P	H
		7323	19.49	-34.51	54	-	-	-	-	-	-	A	H
		18000	57	-17	74	52.44	48.1	13.18	56.72	100	0	P	H
		18000	32.21	-21.79	54	-	-	-	-	-	-	A	H
		4882	38.41	-35.59	74	57.32	31.2	6.84	56.95	100	0	P	V
		4882	13.62	-40.38	54	-	-	-	-	-	-	A	V
		7323	45.17	-28.83	74	56.62	36.75	8.72	56.92	100	0	P	V
		7323	20.38	-33.62	54	-	-	-	-	-	-	A	V
		18000	56.73	-17.27	74	52.17	48.1	13.18	56.72	100	0	P	V
		18000	31.94	-22.06	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz		4960	39.86	-34.14	74	58.08	31.42	7.17	56.81	100	0	P	H
		4960	15.07	-38.93	54	-	-	-	-	-	-	A	H
		7440	44.41	-29.59	74	56.06	36.82	8.7	57.17	100	0	P	H
		7440	19.62	-34.38	54	-	-	-	-	-	-	A	H
		18000	56.16	-17.84	74	51.6	48.1	13.18	56.72	100	0	P	H
		18000	31.37	-22.63	54	-	-	-	-	-	-	A	H
		4960	39.29	-34.71	74	57.51	31.42	7.17	56.81	100	0	P	V
		4960	14.5	-39.5	54	-	-	-	-	-	-	A	V
		7440	44.69	-29.31	74	56.34	36.82	8.7	57.17	100	0	P	V
		7440	19.9	-34.1	54	-	-	-	-	-	-	A	V
		17970	56.59	-17.41	74	52.89	47.26	13.16	56.72	100	0	P	V
		17970	31.8	-22.2	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2358.615	45.94	-28.06	74	41.95	27.68	4.16	27.85	213	32	P	H
		2358.615	21.15	-32.85	54	-	-	-	-	-	-	A	H
	*	2402	107.41	-	-	103.45	27.6	4.2	27.84	213	32	P	H
	*	2402	82.62	-	-	-	-	-	-	-	-	A	H
													H
													H
		2365.65	45.26	-28.74	74	41.27	27.67	4.17	27.85	400	115	P	V
		2365.65	20.47	-33.53	54	-	-	-	-	-	-	A	V
	*	2402	105.64	-	-	101.68	27.6	4.2	27.84	400	115	P	V
	*	2402	80.85	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2360.4	45.19	-28.81	74	41.2	27.68	4.16	27.85	173	302	P	H
		2360.4	20.4	-33.6	54	-	-	-	-	-	-	A	H
	*	2441	105.94	-	-	102.02	27.52	4.23	27.83	173	302	P	H
	*	2441	81.15	-	-	-	-	-	-	-	-	A	H
		2486.84	45.76	-28.24	74	41.81	27.5	4.27	27.82	173	302	P	H
		2486.84	20.97	-33.03	54	-	-	-	-	-	-	A	H
		2380.98	45.01	-28.99	74	41.03	27.64	4.18	27.84	346	33	P	V
		2380.98	20.22	-33.78	54	-	-	-	-	-	-	A	V
	*	2441	101.37	-	-	97.45	27.52	4.23	27.83	346	33	P	V
	*	2441	76.58	-	-	-	-	-	-	-	-	A	V
		2489.57	44.7	-29.3	74	40.75	27.5	4.27	27.82	346	33	P	V
		2489.57	19.91	-34.09	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	112.11	-	-	108.17	27.5	4.26	27.82	294	77	P	H
	*	2480	87.32	-	-	-	-	-	-	-	-	A	H
		2484.16	46.64	-27.36	74	42.69	27.5	4.27	27.82	294	77	P	H
		2484.16	21.85	-32.15	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	106.26	-	-	102.32	27.5	4.26	27.82	375	113	P	V
	*	2480	81.47	-	-	-	-	-	-	-	-	A	V
		2495.76	46.01	-27.99	74	42.05	27.5	4.28	27.82	375	113	P	V
		2495.76	21.22	-32.78	54	-	-	-	-	-	-	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

BT (Harmonic @ 3m)

BT ANT 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over 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)
BT CH 00 2402MHz		4804	38.9	-35.1	74	58.37	31.11	6.51	57.09	100	0	P	H
		4804	14.11	-39.89	54	-	-	-	-	-	-	A	H
		17985	55.74	-18.26	74	51.61	47.68	13.17	56.72	100	0	P	H
		17985	30.95	-23.05	54	-	-	-	-	-	-	A	H
		4804	37.93	-36.07	74	57.4	31.11	6.51	57.09	100	0	P	V
		4804	13.14	-40.86	54	-	-	-	-	-	-	A	V
		17970	56.24	-17.76	74	52.54	47.26	13.16	56.72	100	0	P	V
		17970	31.45	-22.55	54	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		4882	39.17	-34.83	74	58.08	31.2	6.84	56.95	100	0	P	H
		4882	14.38	-39.62	54	-	-	-	-	-	-	A	H
		7323	44.51	-29.49	74	55.96	36.75	8.72	56.92	100	0	P	H
		7323	19.72	-34.28	54	-	-	-	-	-	-	A	H
		17985	56.52	-17.48	74	52.39	47.68	13.17	56.72	100	0	P	H
		17985	31.73	-22.27	54	-	-	-	-	-	-	A	H
		4882	38.26	-35.74	74	57.17	31.2	6.84	56.95	100	0	P	V
		4882	13.47	-40.53	54	-	-	-	-	-	-	A	V
		7323	44.2	-29.8	74	55.65	36.75	8.72	56.92	100	0	P	V
		7323	19.41	-34.59	54	-	-	-	-	-	-	A	V
		17970	56.25	-17.75	74	52.55	47.26	13.16	56.72	100	0	P	V
		17970	31.46	-22.54	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz		4960	40.02	-33.98	74	58.24	31.42	7.17	56.81	100	0	P	H
		4960	15.23	-38.77	54	-	-	-	-	-	-	A	H
		7440	44.6	-29.4	74	56.25	36.82	8.7	57.17	100	0	P	H
		7440	19.81	-34.19	54	-	-	-	-	-	-	A	H
		17940	55.52	-18.48	74	52.68	46.42	13.14	56.72	100	0	P	H
		17940	30.73	-23.27	54	-	-	-	-	-	-	A	H
		4960	39.11	-34.89	74	57.33	31.42	7.17	56.81	100	0	P	V
		4960	14.32	-39.68	54	-	-	-	-	-	-	A	V
		7440	44.61	-29.39	74	56.26	36.82	8.7	57.17	100	0	P	V
		7440	19.82	-34.18	54	-	-	-	-	-	-	A	V
		17955	54.89	-19.11	74	51.62	46.84	13.15	56.72	100	0	P	V
		17955	30.1	-23.9	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

2.4GHz BT (SHF)

[illegible]

Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamplifier	Ant.	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		30	21.43	-18.57	40	28.57	24.57	0.51	32.22	-	-	P	H
		167.74	24.46	-19.04	43.5	39.72	15.78	1.22	32.26	-	-	P	H
		271.53	22.92	-23.08	46	34.45	18.94	1.51	31.98	-	-	P	H
		551.86	28.9	-17.1	46	34.11	24.98	2.09	32.28	-	-	P	H
		846.74	31.61	-14.39	46	31.56	28.61	2.63	31.19	-	-	P	H
		944.71	32.63	-13.37	46	30.78	29.88	2.79	30.82	100	0	P	H
													H
													H
													H
													H
													H
													H
													H
		30	32.78	-7.22	40	39.92	24.57	0.51	32.22	100	0	P	V
		96.93	33.82	-9.68	43.5	49.56	15.57	0.92	32.23	-	-	P	V
		167.74	25.92	-17.58	43.5	41.18	15.78	1.22	32.26	-	-	P	V
		271.53	24.14	-21.86	46	35.67	18.94	1.51	31.98	-	-	P	V
		551.86	26.79	-19.21	46	32	24.98	2.09	32.28	-	-	P	V
		901.06	33.92	-12.08	46	33.64	28.61	2.71	31.04	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	3. No other spurious found. 4. All results are PASS against limit line.												



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 over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 00 2402MHz		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. Over 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. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

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



Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Daniel Lee, Jacky Hong and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	40~60%

Note symbol

-L	Low channel location
-R	High channel location

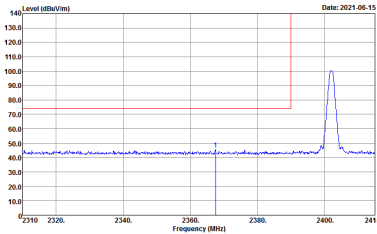
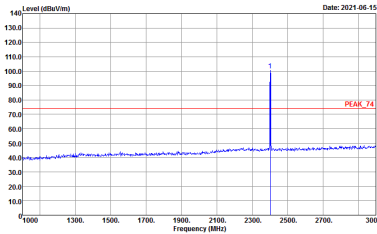


2.4GHz 2400~2483.5MHz

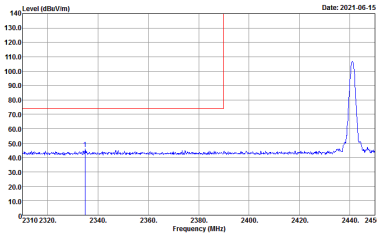
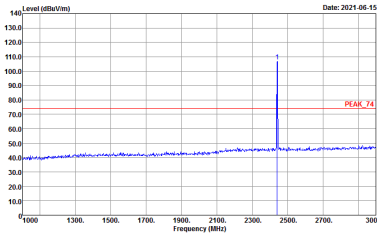
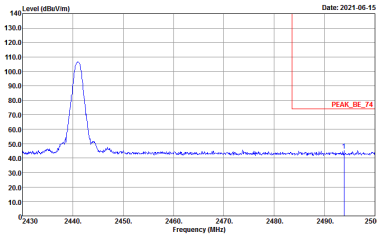
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4	Horizontal	Fundamental
Peak	Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Site : 03CH13-HV Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

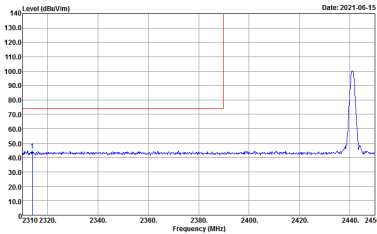
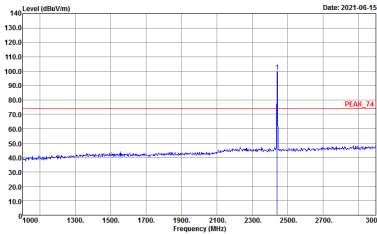
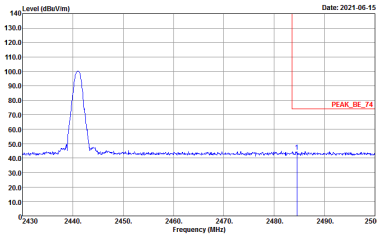


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

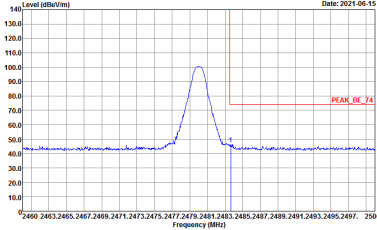
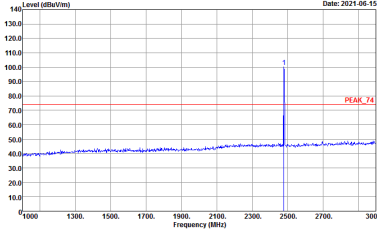


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
4	Horizontal	Fundamental
Peak	Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 HORIZONTA : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTA : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

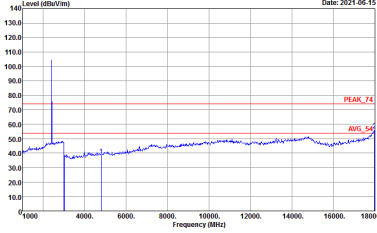
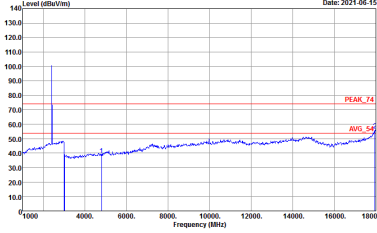


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
4	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

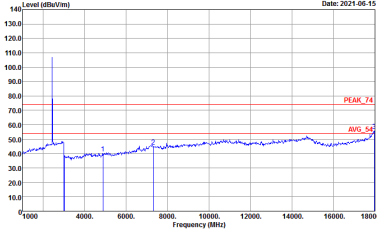
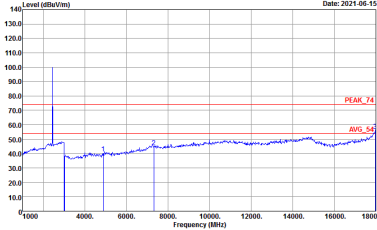


2.4GHz 2400~2483.5MHz

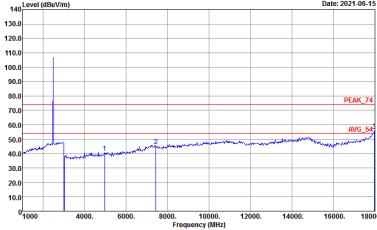
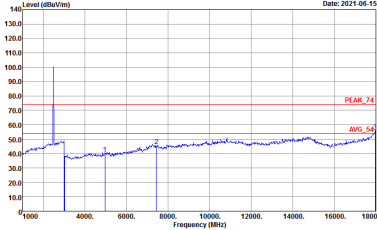
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
4	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH39 2441MHz	
4	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak

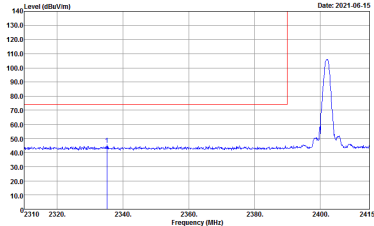
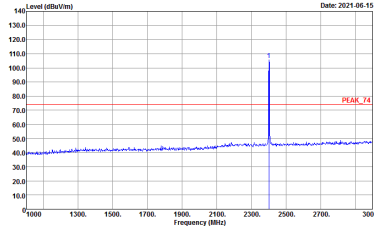


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
4	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak

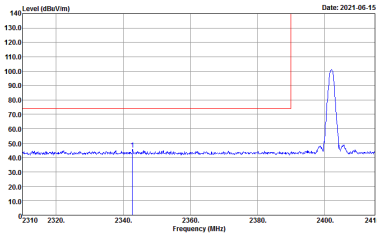
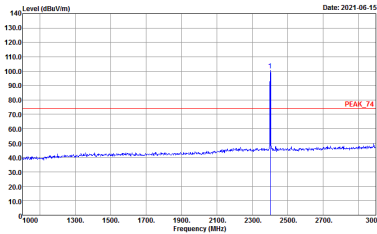


2.4GHz 2400~2483.5MHz

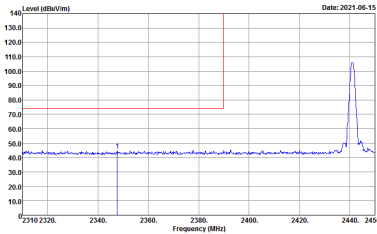
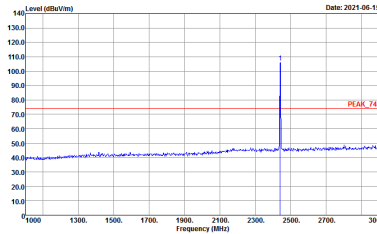
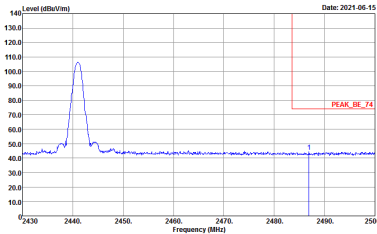
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
3	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

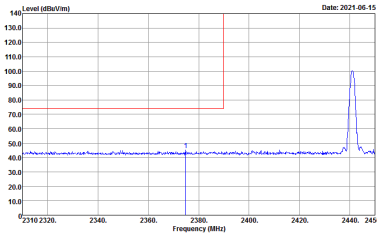
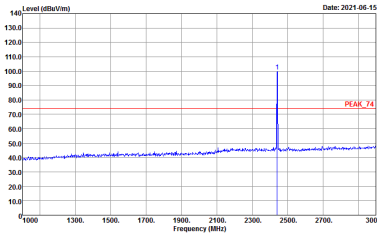
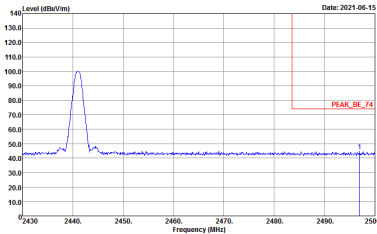


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
3	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

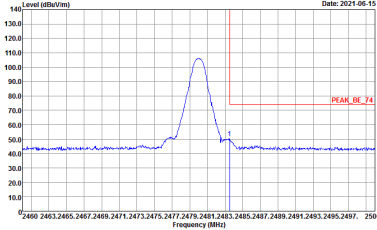
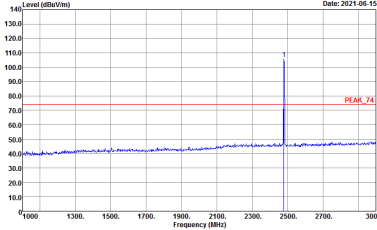


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
3	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank

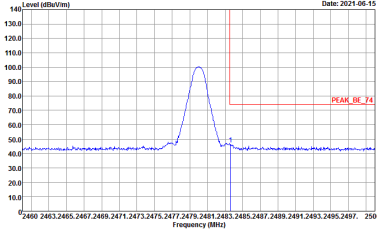
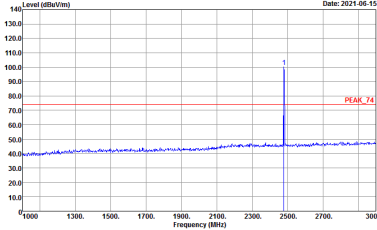


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
3	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
3	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
3	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



2.4GHz 2400~2483.5MHz

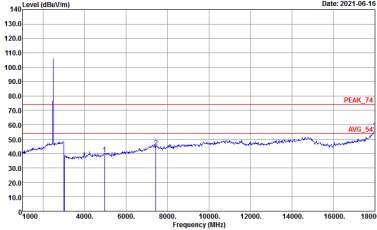
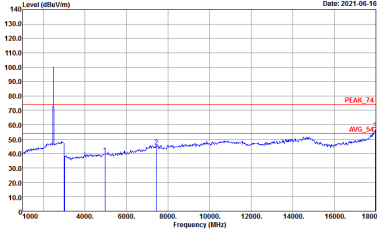
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
3	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2021-06-16 PEAK 74 AVG 54 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	Level (dBuV/m) Date: 2021-06-16 PEAK 74 AVG 54 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH39 2441MHz	
3	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2021-06-16 PEAK_74 AVG_54 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak	Level (dBuV/m) Date: 2021-06-16 PEAK_74 AVG_54 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak

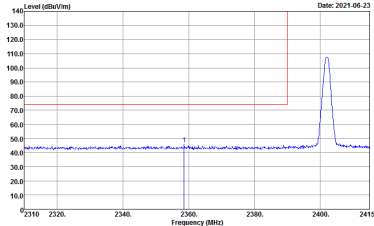
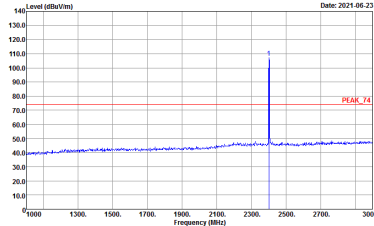


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
3	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak

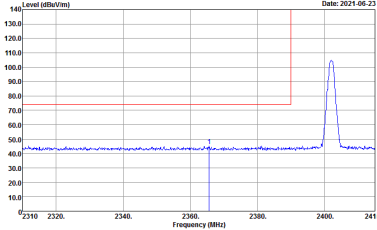
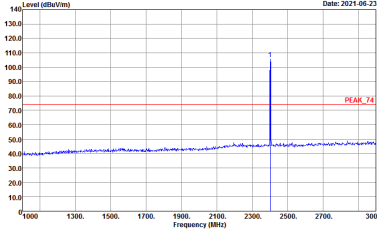


2.4GHz 2400~2483.5MHz

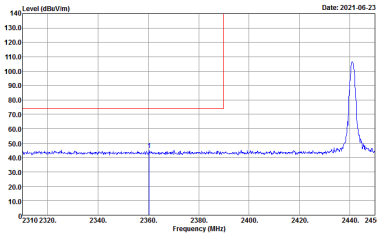
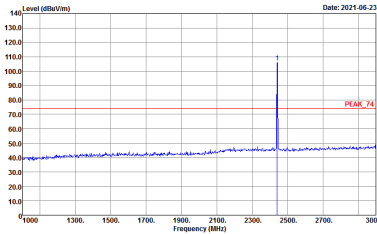
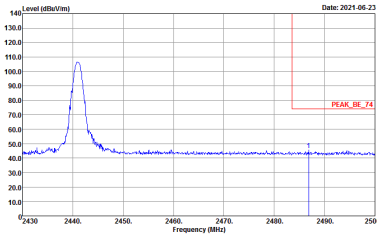
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH13-HV Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

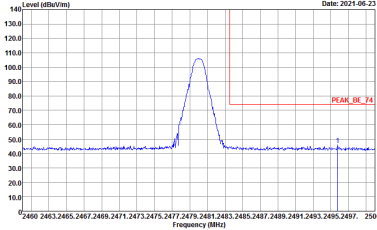
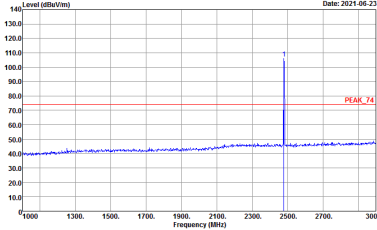


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4+3	Vertical	Fundamental
Peak	Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
4+3	Horizontal	Fundamental
Peak	Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BC_74 3m HORAL_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORAL_91200_1241 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

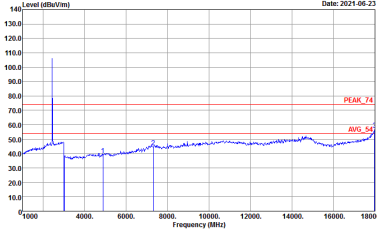
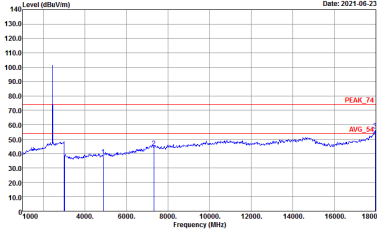


2.4GHz 2400~2483.5MHz

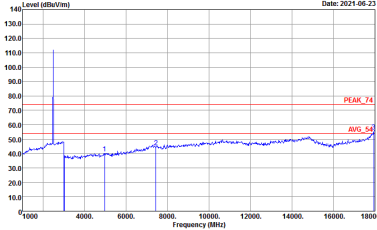
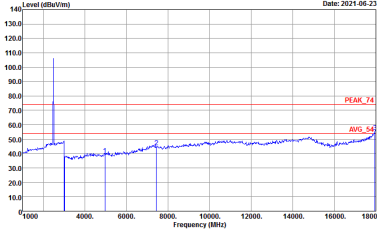
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
4+3	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2021-06-23 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	Level (dBuV/m) Date: 2021-06-23 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH39 2441MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak



Emission above 18GHz

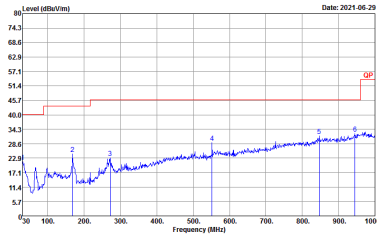
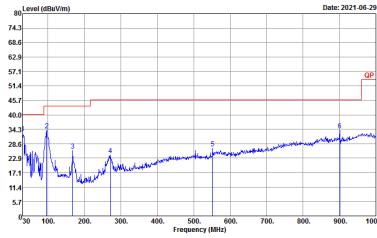
2.4GHz BT (SHF)

BT	2.4GHz 2400~2483.5MHz	
	BT SHF	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2021-07-28 PEAK_74 AVG_54 Site : 03CH13-HY Condition : PEAK_74 1m SHF_00991_210512 HORIZONTAL Detector : Peak	Level (dBuV/m) Date: 2021-07-28 PEAK_74 AVG_54 Site : 03CH13-HY Condition : PEAK_74 1m SHF_00991_210512 VERTICAL Detector : Peak



Emission below 1GHz

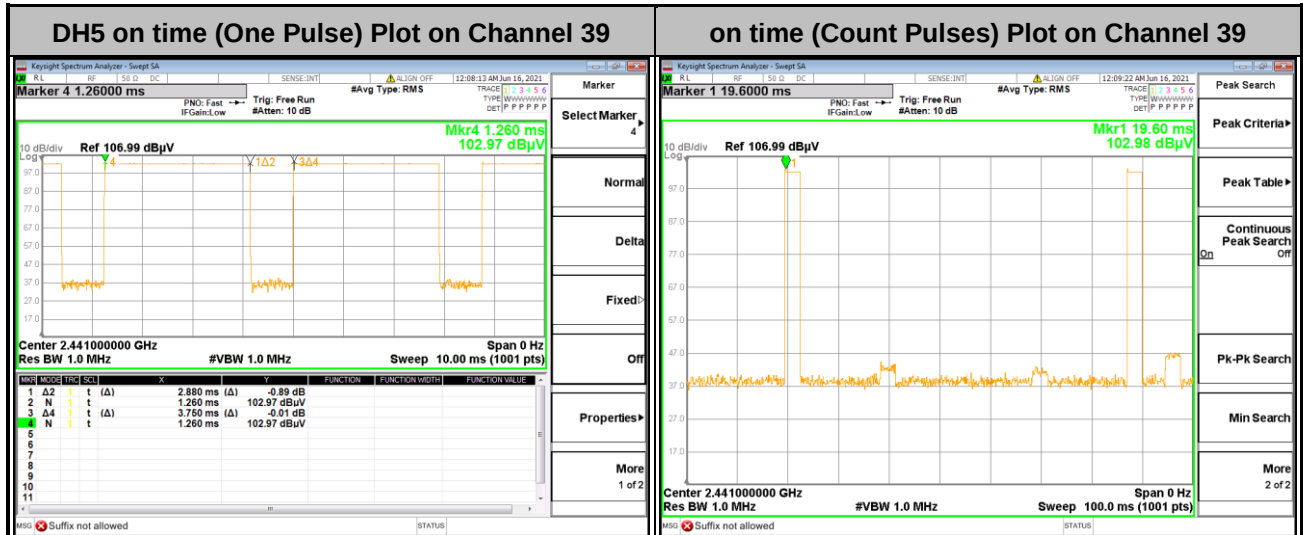
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH13-HY Condition : QP 3m BIL06_40103 HORIZONTAL Detector : Peak	 Site : 03CH13-HY Condition : QP 3m BIL06_40103 VERTICAL Detector : Peak



Appendix E. Duty Cycle Plots

<Ant. 4>



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 \times 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 \times \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100 \text{ ms} / 57.6 \text{ ms}] = 2 \text{ hops}$

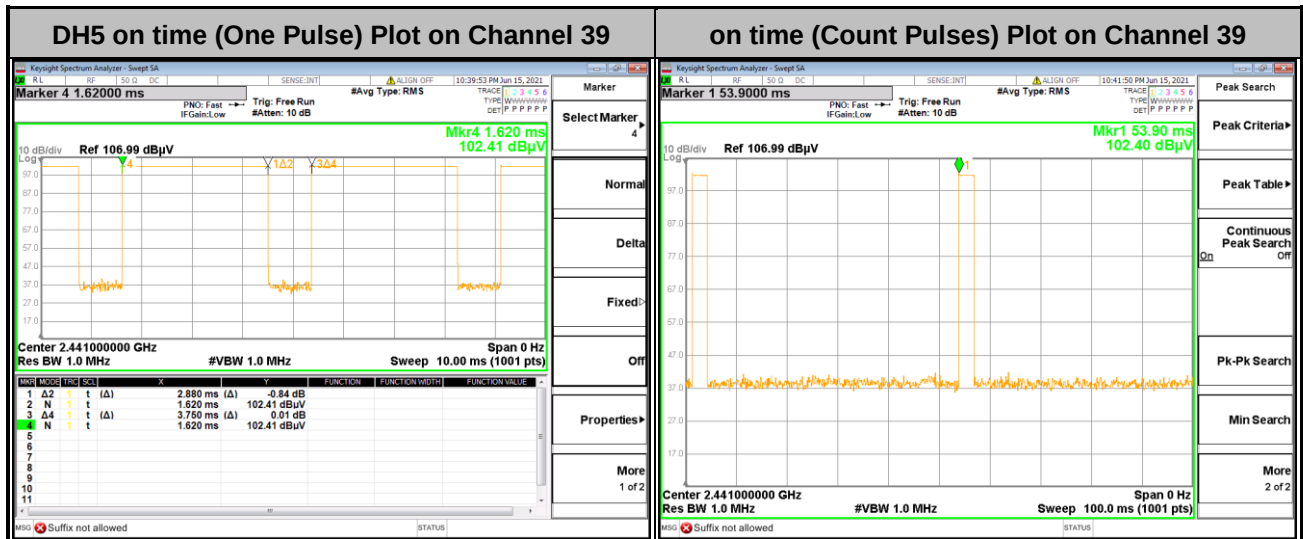
Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100 \text{ ms}) = -24.79 \text{ dB}$$

<Ant. 3>



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 \times 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 \times \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. **DH5** has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100 \text{ ms} / 57.6 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

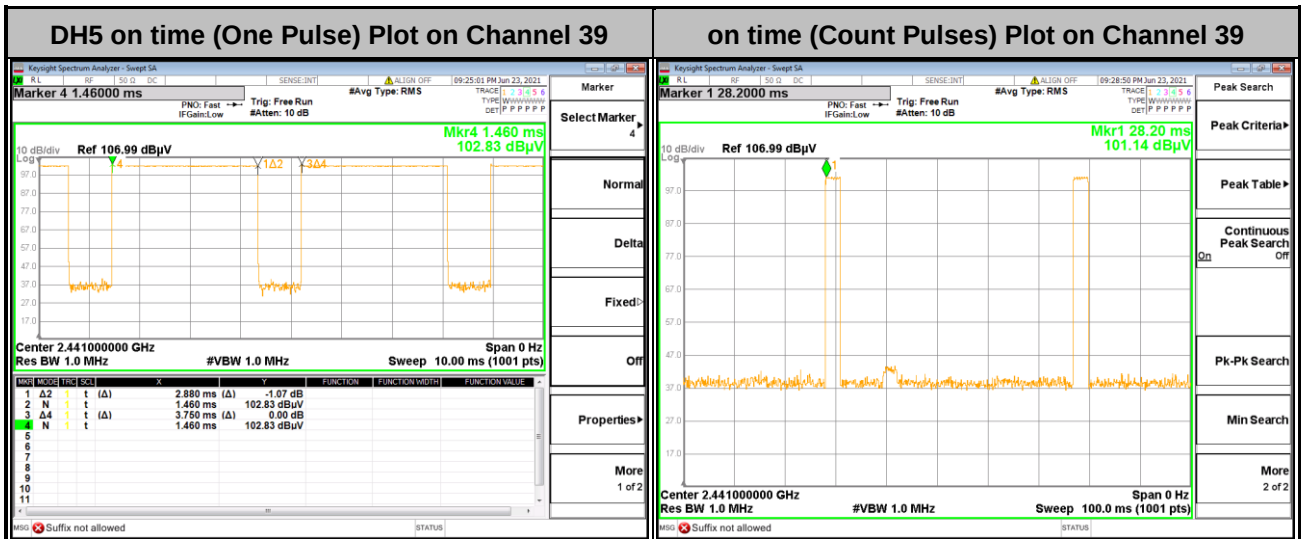
$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100 \text{ ms}) = -24.79 \text{ dB}$$



MIMO <Ant. 4+3>



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 \times 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 \times \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100 \text{ ms} / 57.6 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100 \text{ ms}) = -24.79 \text{ dB}$$

—————THE END—————