FCC RADIO TEST REPORT

FCC ID	:	**SZGGNN2Z**
Equipment	:	**Wireless Device**
Model Name	:	**GNN2Z**
Applicant	:	**Weifang Goertek Electronics Co., Ltd Gaoxin 2 Road, Free Trade Zone, Weifang, Shandong, 261205, P.R.China**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Dec. 09, 2024 and testing was performed from Dec. 20, 2024 to May 13, 2025. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FR4N2022B	01	Initial issue of report	Mar. 03, 2025
FR4N2022B	02	Revise appendix A and C This report is an updated version, replacing the report issued on Mar. 03, 2025.	May 08, 2025
FR4N2022B	03	Revise appendix A This report is an updated version, replacing the report issued on Mar. 08, 2025.	May 14, 2025

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(1)	Number of Channels	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	Pass	-
3.4	2.1049	99% Occupied Bandwidth	Pass	-
3.5	15.247(b)(1) 15.247(b)(4)	Peak Output Power	Pass	-
3.6	15.247(d)	Conducted Band Edges	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	-
3.9	15.207	AC Conducted Emission	Pass	-
3.10	15.203	Antenna Requirement	Pass	-

Remark: Except Conducted and Radiated Band Edges and Radiated Spurious Emission are carrying out, The FR4N2022B report reuses test data from the FR4N2548B report.

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

Reviewed by: Duko Chen
Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs Bluetooth-LE, BLE ASK and BLE GFSK. **Antenna Type** Bluetooth-LE, BLE ASK and BLE GFSK: PCB Antenna

EUT Information List	
S/N	**Performed Test Item**
S907080	RF Conducted Measurement
4A23C7560	Radiated Spurious Emission
4A31LZACOL6416 4A31LZACOR6448	Conducted Emission

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	0.2

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	TH05-HY, CO07-HY, 03CH20-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW3786

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2404-2478 MHz	2	2404	32	2434	59	2461
	3	2405	33	2435	60	2462
	4	2406	34	2436	61	2463
	5	2407	35	2437	62	2464
	6	2408	36	2438	63	2465
	7	2409	37	2439	64	2466
	8	2410	38	2440	65	2467
	9	2411	39	2441	66	2468
	10	2412	40	2442	67	2469
	11	2413	41	2443	68	2470
	12	2414	42	2444	69	2471
	13	2415	43	2445	70	2472
	14	2416	44	2446	71	2473
	15	2417	45	2447	72	2474
	16	2418	46	2448	73	2475
	17	2419	47	2449	74	2476
	18	2420	48	2450	75	2477
	19	2421	49	2451	76	2478
	20	2422	50	2452	-	-
	21	2423	51	2453	-	-
	22	2424	52	2454	-	-
	26	2428	53	2455	-	-
	27	2429	54	2456	-	-
	28	2430	55	2457	-	-
	29	2431	56	2458	-	-
	30	2432	57	2459	-	-
	31	2433	58	2460	-	-

2.2 Test Mode

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz)radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

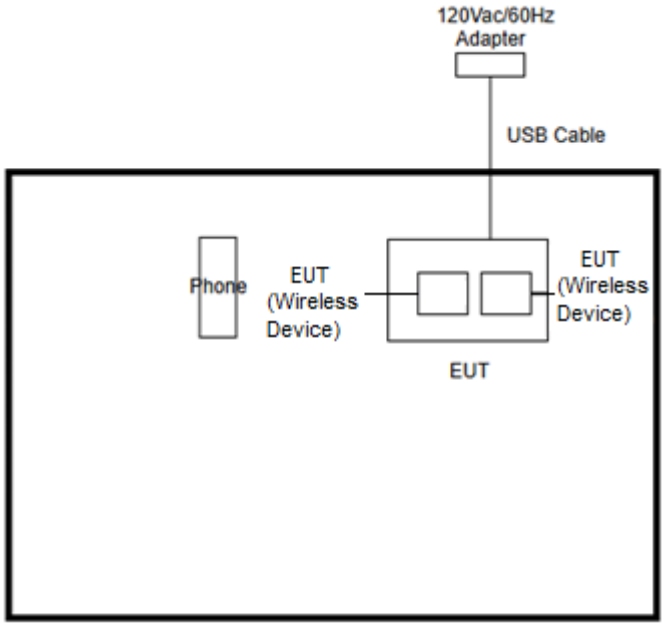
b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

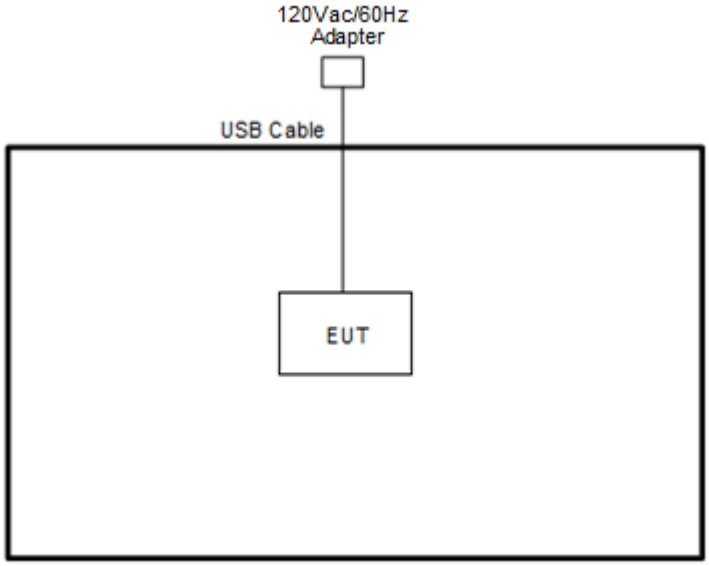
Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Conducted Test Cases	**Bluetooth LE 1Mbps ASK**
	Mode 1: CH02_2404 MHz Mode 2: CH38_2440 MHz Mode 3: CH76_2478 MHz
AC Conducted Emission	Mode 1 : Bluetooth Link + MP3 + Battery + Wireless Device + USB Cable (Charging from Adapter)
Remark: 1. For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power. 2. The detailed Radiated test modes are shown in Appendix C.	

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<Bluetooth-LE ASK Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Phone	N/A	N/A	N/A	N/A	N/A
2.	Adapter	N/A	N/A	N/A	N/A	N/A
3.	USB Cable	N/A	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “BDT v.5.7.4” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

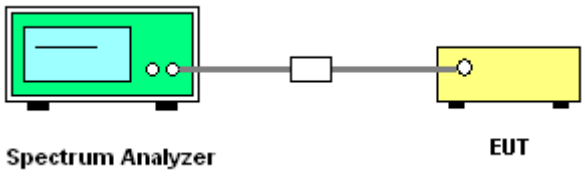
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW = 300 kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

3.1.4 Test Setup



3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

3.2 Hopping Channel Separation Measurement

3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

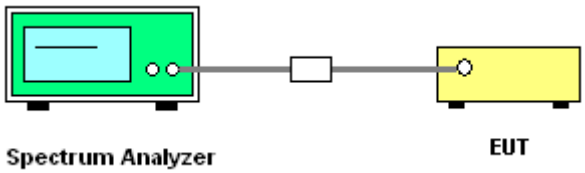
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.2.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels;
   RBW = 300 kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Hopping Channel Separation

Please refer to Appendix A.

3.3 Dwell Time Measurement

3.3.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

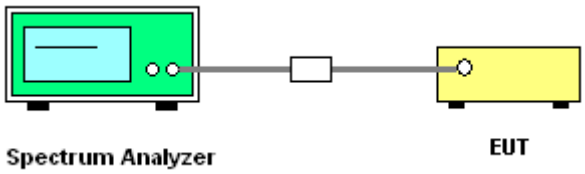
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.4.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

3.3.4 Test Setup



3.3.5 Test Result of Dwell Time

Please refer to Appendix A.

3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

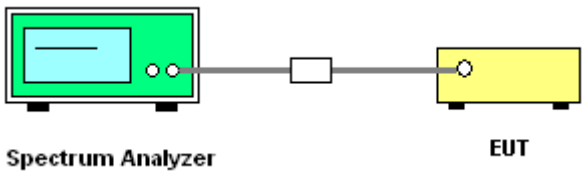
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Use the following spectrum analyzer settings for 20 dB Bandwidth measurement.
   Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
   Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;
   RBW within 1-5% of the 99% bandwidth; VBW ≥ 3 * RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
6. Measure and record the results in the test report.

3.4.4 Test Setup



3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.

3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

3.5 Output Power Measurement

3.5.1 Limit of Output Power

The maximum peak conducted output power of the intentional radiator shall not exceed the following: For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts.

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.

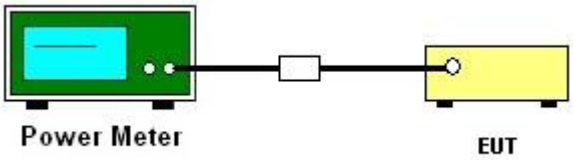
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. The average power is compensated with duty factor.
6. Record the results in the test report.

3.5.4 Test Setup



3.5.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.5.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

3.6 Conducted Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

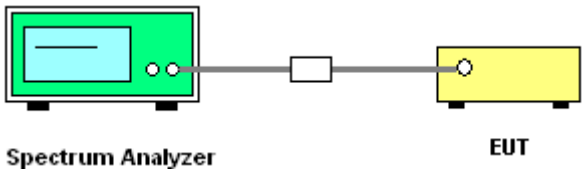
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.6.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Set RBW = 100 kHz, VBW = 300 kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2 and 3.
5. Measure and record the results in the test report.

3.6.4 Test Setup



3.6.5 Test Result of Conducted Band Edges

Please refer to Appendix A.

3.6.6 Test Result of Conducted Hopping Mode Band Edges

Please refer to Appendix A.

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

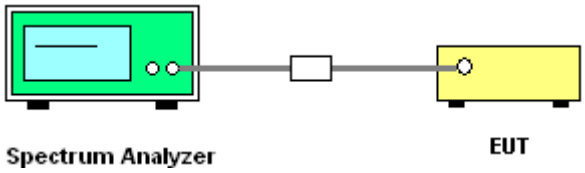
3.7.2 Measuring Instruments

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

3.7.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurious must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4 Test Setup



3.7.5 Test Result of Conducted Spurious Emission

Please refer to Appendix A.

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

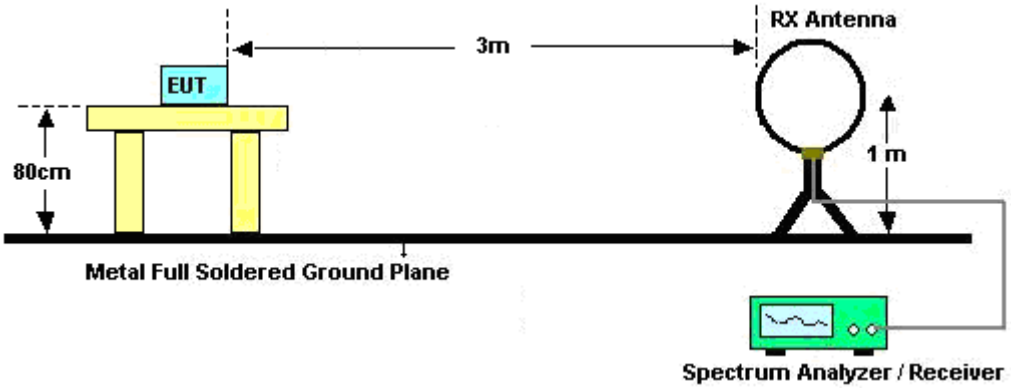
Please refer to the measuring equipment list in this test report.

3.8.3 Test Procedures

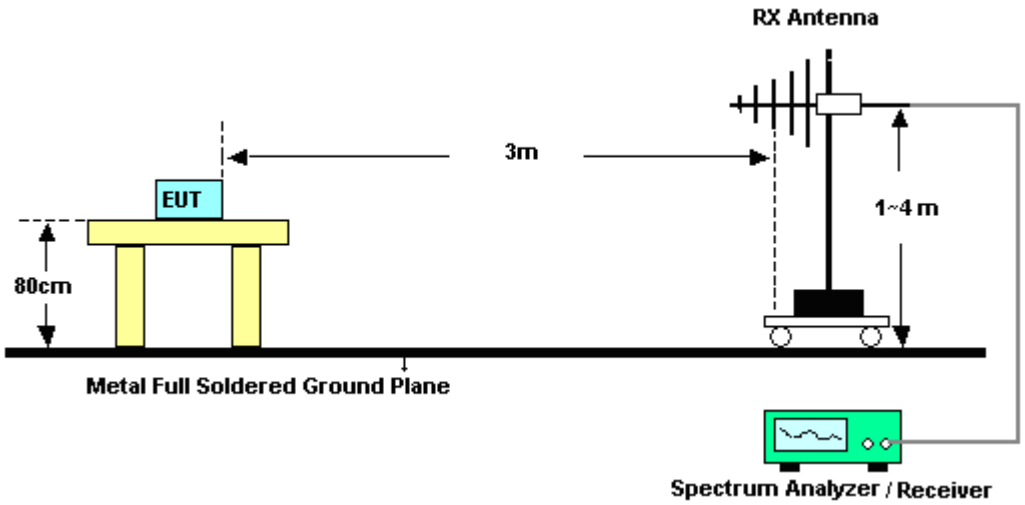
1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT is 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: Set RBW = 100 kHz for f < 1 GHz, RBW = 1 MHz for f>1 GHz ; VBW ≥ 10Hz; Sweep = auto; Detector function = peak; Trace = max hold for average
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“.

3.8.4 Test Setup

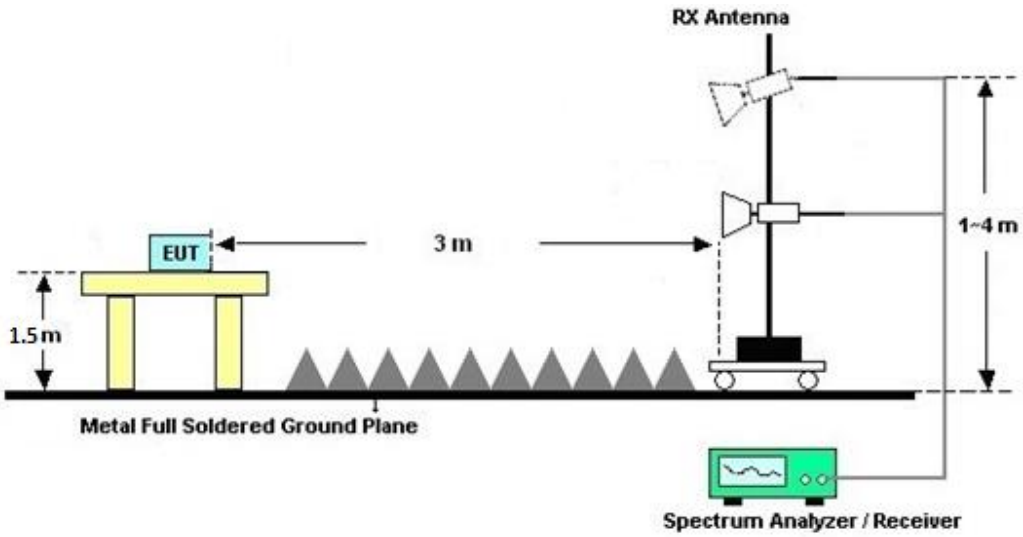
For radiated test below 30MHz



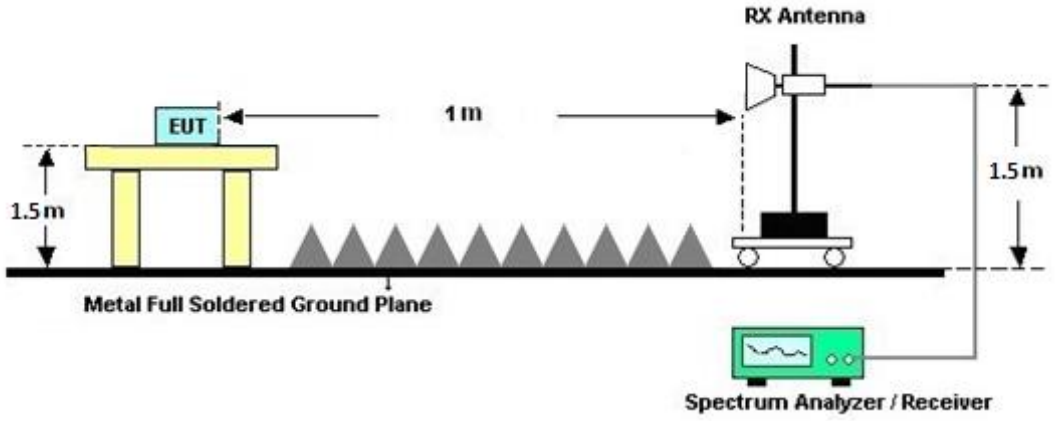
For radiated test from 30MHz to 1GHz



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 starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is 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 comes out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.8.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

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 (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.

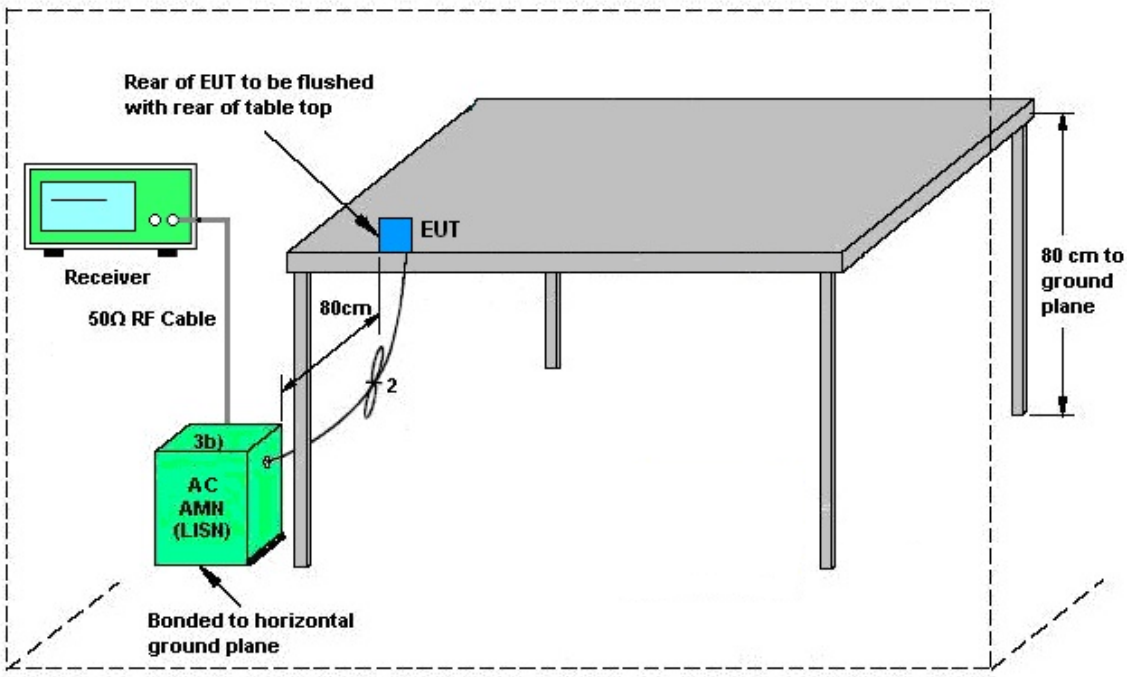
3.9.2 Measuring Instruments

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

3.9.3 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. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.4 Test Setup



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

3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.10 Antenna Requirements

3.10.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.10.2 Antenna Anti-Replacement Construction

Antenna permanently attached.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	N/A	Oct. 16, 2024	Jan. 17, 2025~ Jan. 25, 2025	Oct. 15, 2025	Radiation (03CH20-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Aug. 29, 2024	Jan. 17, 2025~ Jan. 25, 2025	Aug. 28, 2025	Radiation (03CH20-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 02, 2024	Jan. 17, 2025~ Jan. 25, 2025	Dec. 01, 2025	Radiation (03CH20-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Jan. 17, 2025~ Jan. 25, 2025	N/A	Radiation (03CH20-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jan. 17, 2025~ Jan. 25, 2025	N/A	Radiation (03CH20-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jan. 17, 2025~ Jan. 25, 2025	N/A	Radiation (03CH20-HY)
Signal Analyzer	Keysight	N9010B	MY60240520	N/A	Dec. 09, 2024	Jan. 17, 2025~ Jan. 25, 2025	Dec. 08, 2025	Radiation (03CH20-HY)
Bilog Antenna	TESEQ	CBL 6111D&00802 N1D01N-06	55606 & 08	30MHz~1GHz	Nov. 27, 2024	Jan. 17, 2025~ Jan. 25, 2025	Nov. 26, 2025	Radiation (03CH20-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	02360	1GHz-18GHz	Nov. 01, 2024	Jan. 17, 2025~ Jan. 25, 2025	Oct. 31, 2025	Radiation (03CH20-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1224	18GHz-40GHz	Jun. 24, 2024	Jan. 17, 2025~ Jan. 25, 2025	Jun. 23, 2025	Radiation (03CH20-HY)
Preamplifier	COM-POWER	PAM-103	18020201	1MHz-1000MHz	Dec. 31, 2024	Jan. 17, 2025~ Jan. 25, 2025	Dec. 30, 2025	Radiation (03CH20-HY)
Amplifier	EMCI	EMC118A45SE	980792	N/A	Nov. 12, 2024	Jan. 17, 2025~ Jan. 25, 2025	Nov. 11, 2025	Radiation (03CH20-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519229/2,804015/2,804027/2	N/A	Jan. 16, 2025	Jan. 17, 2025~ Jan. 25, 2025	Jan. 15, 2026	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303A	TP211382	N/A	Mar. 27, 2024	Jan. 17, 2025~ Jan. 25, 2025	Mar. 26, 2025	Radiation (03CH20-HY)
Software	Audix	N/A	RK-002156	N/A	N/A	Jan. 17, 2025~ Jan. 25, 2025	N/A	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 01, 2024	Dec. 20, 2024~ May 13, 2025	Oct. 31, 2025	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 04, 2024	Dec. 20, 2024~ May 13, 2025	Jul. 03, 2025	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 04, 2024	Dec. 20, 2024~ May 13, 2025	Jul. 03, 2025	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 23, 2024	Dec. 20, 2024~ May 13, 2025	Aug. 22, 2025	Conducted (TH05-HY)
Switch Control Mainframe	Burgeon	ETF-058	EC1300484 (BOX3)	N/A	May 20, 2024	Dec. 20, 2024~ May 13, 2025	May 19, 2025	Conducted (TH05-HY)
Software	Sporton	BTWIFI_Final_version_241211	N/A	Conducted Other Test Item	N/A	Dec. 20, 2024~ May 13, 2025	N/A	Conducted (TH05-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Jan. 09, 2025	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jan. 09, 2025	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 23, 2024	Jan. 09, 2025	Oct. 22, 2025	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 14, 2024	Jan. 09, 2025	Mar. 13, 2025	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 10, 2024	Jan. 09, 2025	Mar. 09, 2025	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 23, 2024	Jan. 09, 2025	Sep. 22, 2025	Conduction (CO07-HY)

5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.7 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.7 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.4 dB**

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.6 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.7 dB**

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Mina Liu	Temperature:	21~25	°C
Test Date:	2024/12/20~2025/01/08	Relative Humidity:	51~54	%

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
ASK	1Mbps	1	02	2404	0.027	0.023	0.999	0.0250	Pass
ASK	1Mbps	1	38	2440	0.026	0.023	0.994	0.0250	Pass
ASK	1Mbps	1	76	2478	0.027	0.024	1.003	0.0250	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
ASK	72	427.000	0.25	0.11	0.4	Pass

TEST RESULTS DATA
Peak Power Table

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
ASK 1M	02	1	7.63	20.97	Pass
	38	1	7.72	20.97	Pass
	76	1	7.73	20.97	Pass

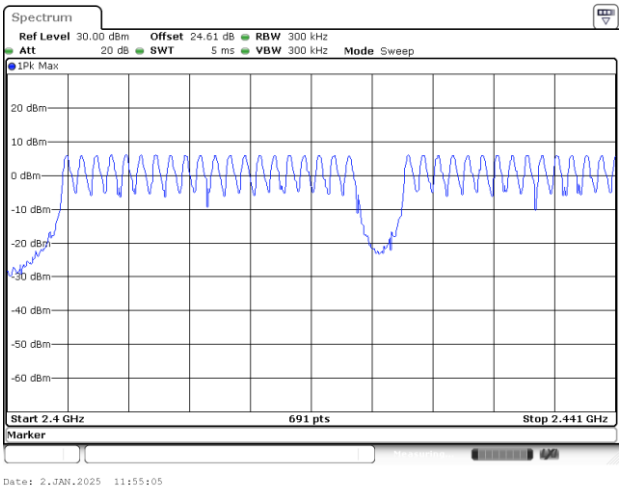
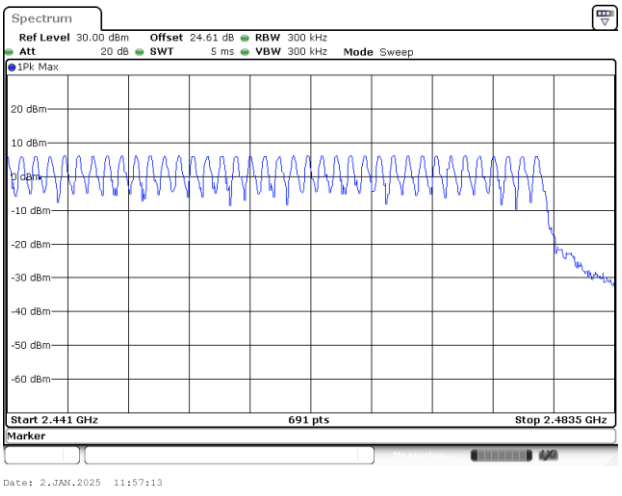
TEST RESULTS DATA
Average Power Table
(Reporting Only)

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
ASK 1M	02	1	6.29	0.00
	38	1	6.52	0.00
	76	1	6.45	0.00

TEST RESULTS DATA
Number of Hopping Frequency

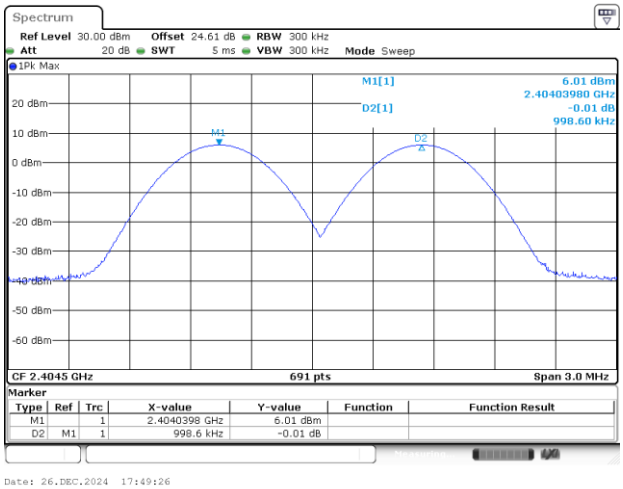
Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
72	20	> 15	Pass

Number of Hopping Frequency

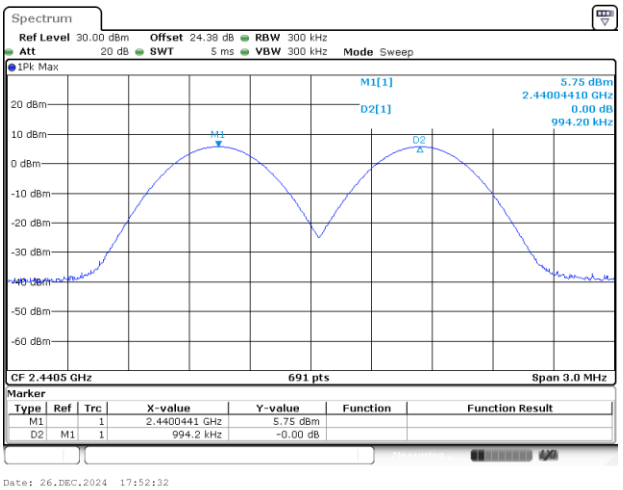
Number of Hopping Channel Plot	
Channel 02 - 38	**Channel 38 - 76**
	

Hopping Channel Separation

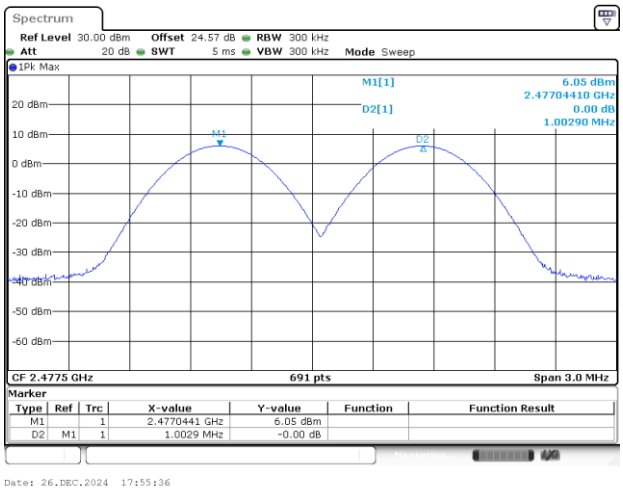
Channel Separation Plot on Channel 02 - 03



Channel Separation Plot on Channel 38 - 39

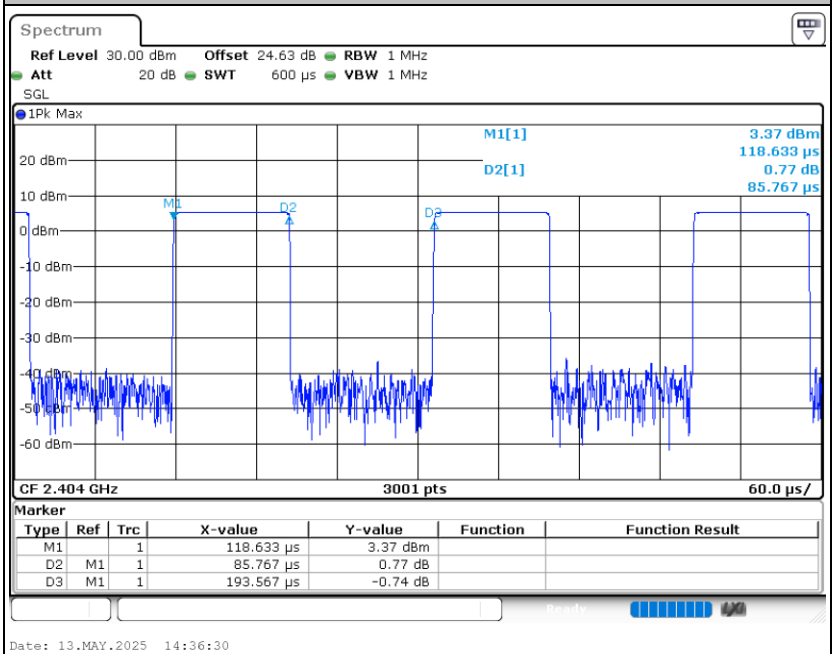


Channel Separation Plot on Channel 75 - 76



Dwell Time

Package Transfer Time Plot

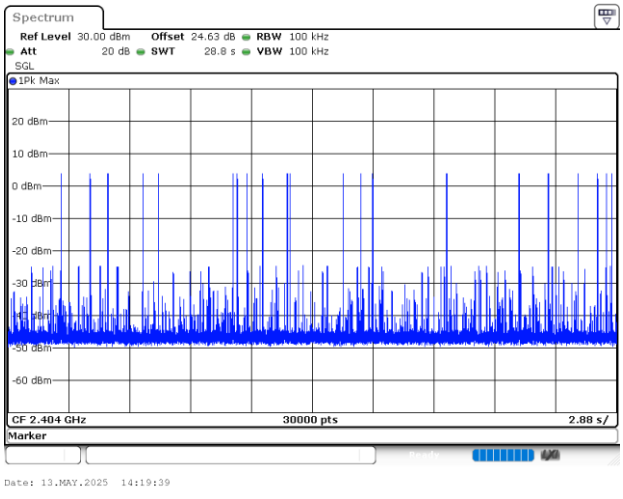


Remark:

1. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

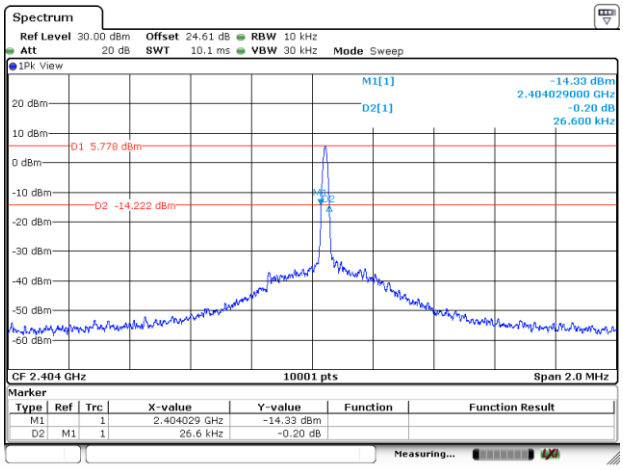
= 468 x 0.086 ms = 0.037 sec

2. The observation Occupancy time is hopping channel 72 channels x 400ms = 28.8sec using sweep point 30,000. This shows that 1ms per on-time contains 1 hop. The total hops is finally counted via computer analysis.

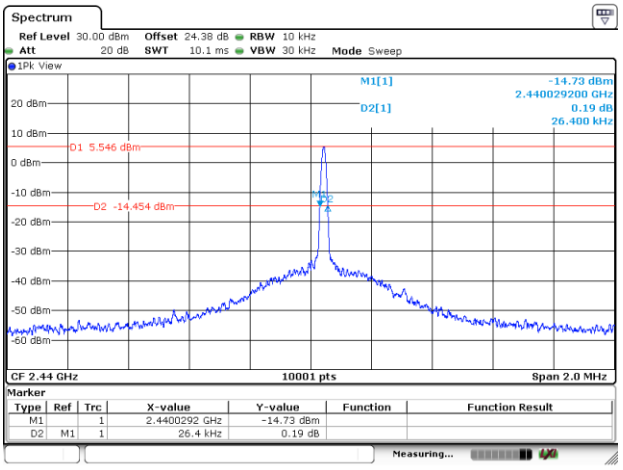
Dwell time Plot in Channel 02	On-time hop count 303
	

20dB Bandwidth

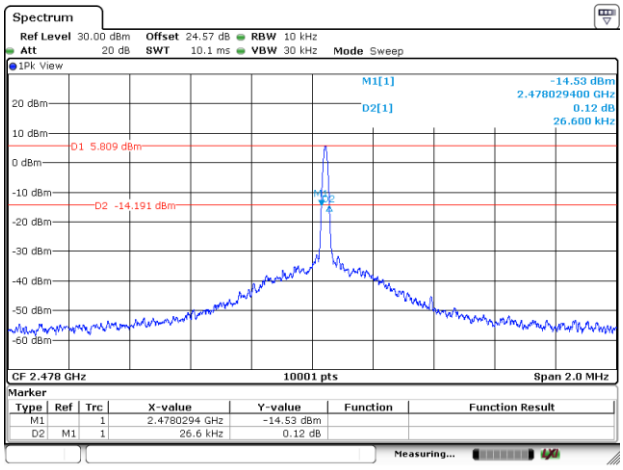
20 dB Bandwidth Plot in Channel 02



20 dB Bandwidth Plot in Channel 38

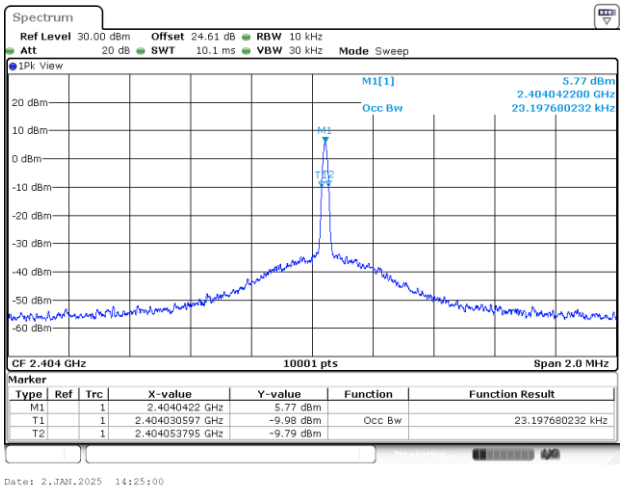


20 dB Bandwidth Plot in Channel 76

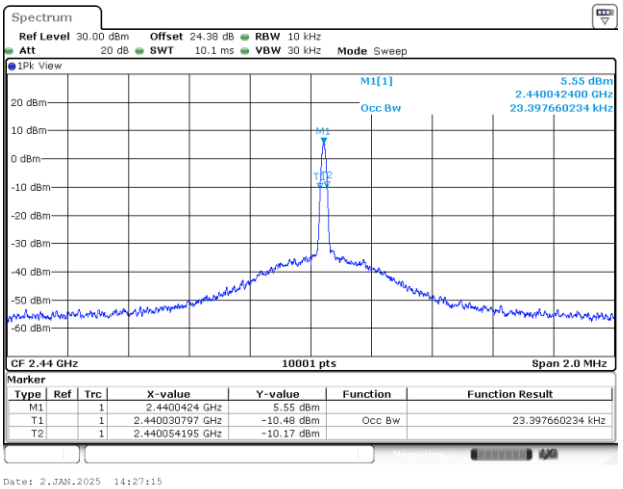


99% Occupied Bandwidth

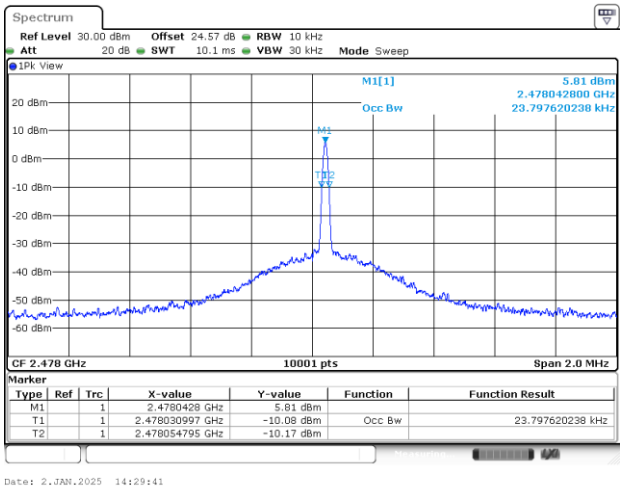
99% Occupied Bandwidth on Channel 02



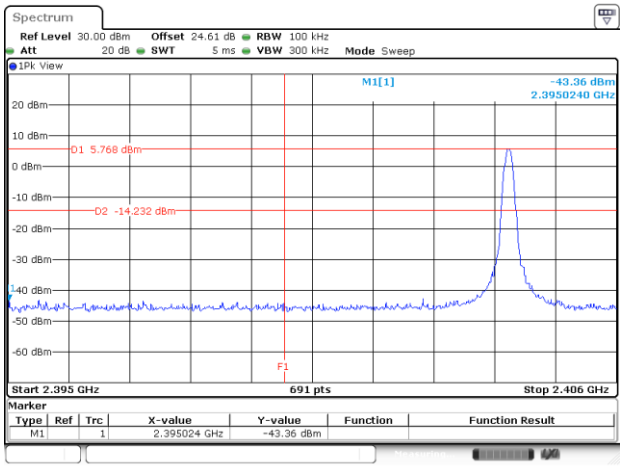
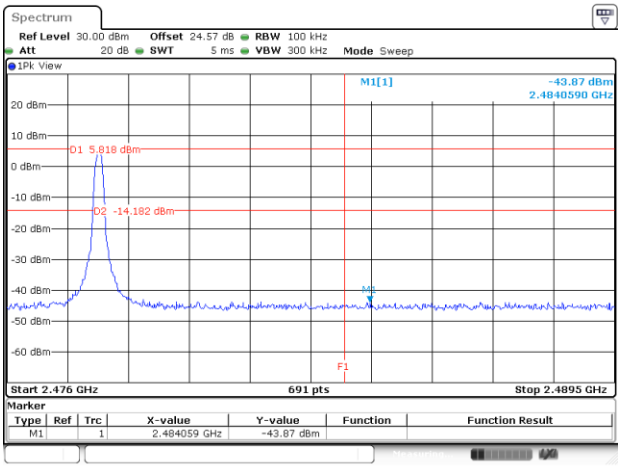
99% Occupied Bandwidth on Channel 38



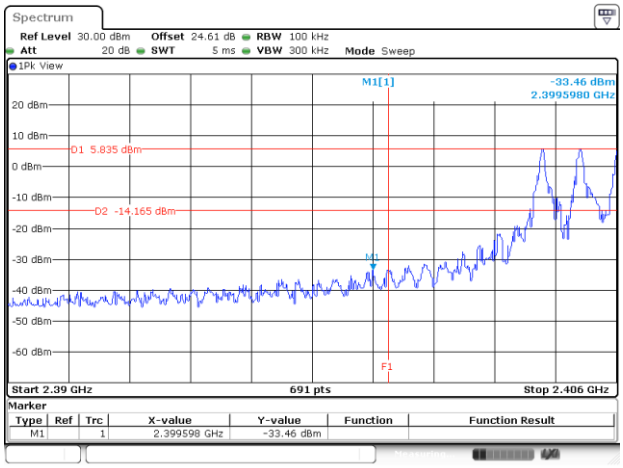
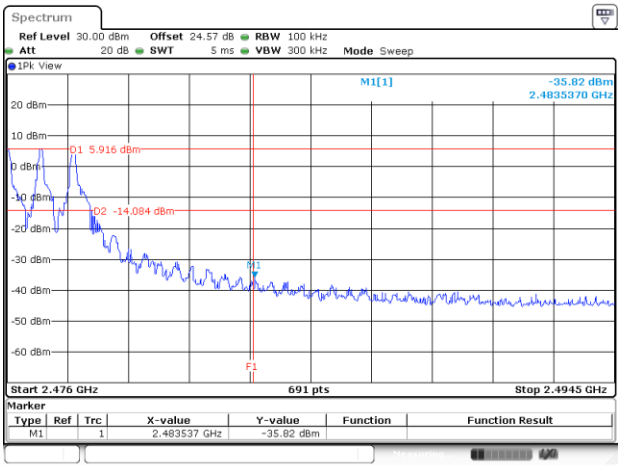
99% Occupied Bandwidth on Channel 76



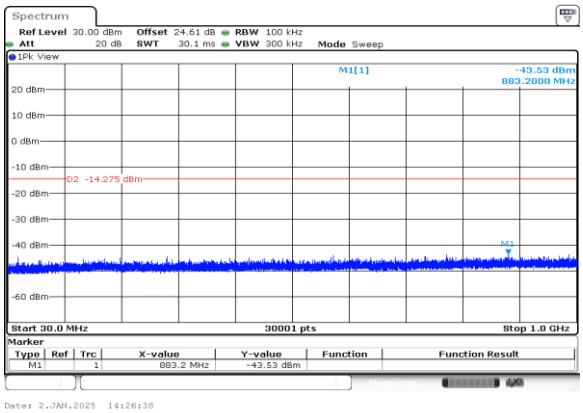
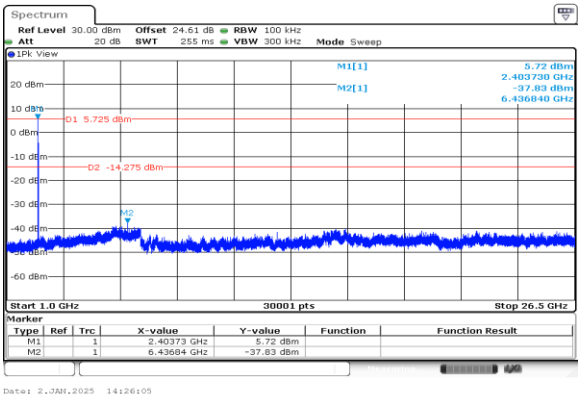
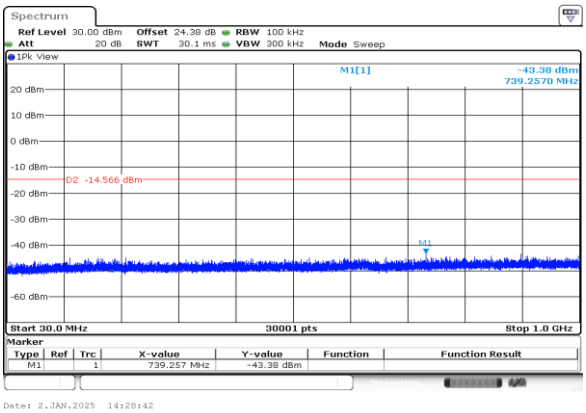
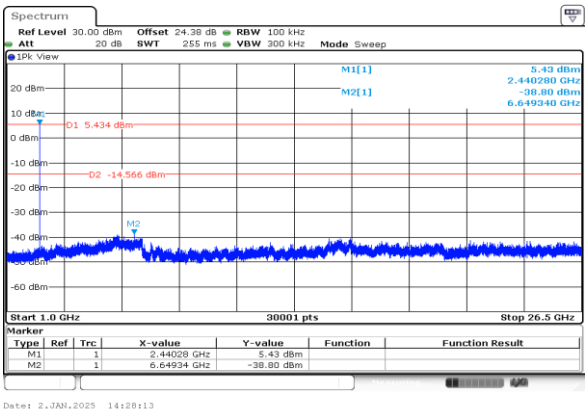
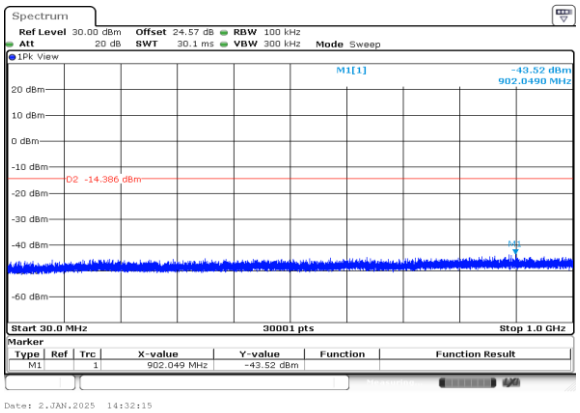
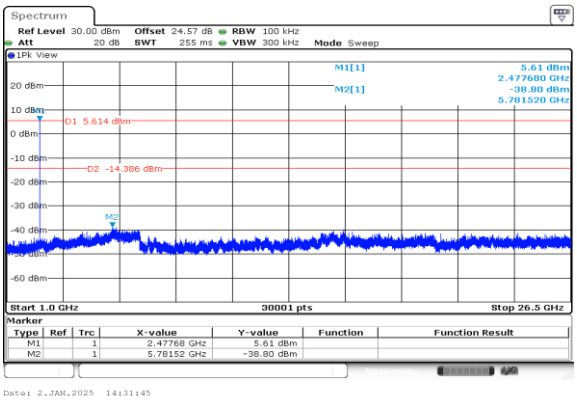
Band Edges

Low Band Edge Plot on Channel 02	High Band Edge Plot on Channel 76
	

Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot	Hopping Mode High Band Edge Plot
	

Conducted Spurious Emission

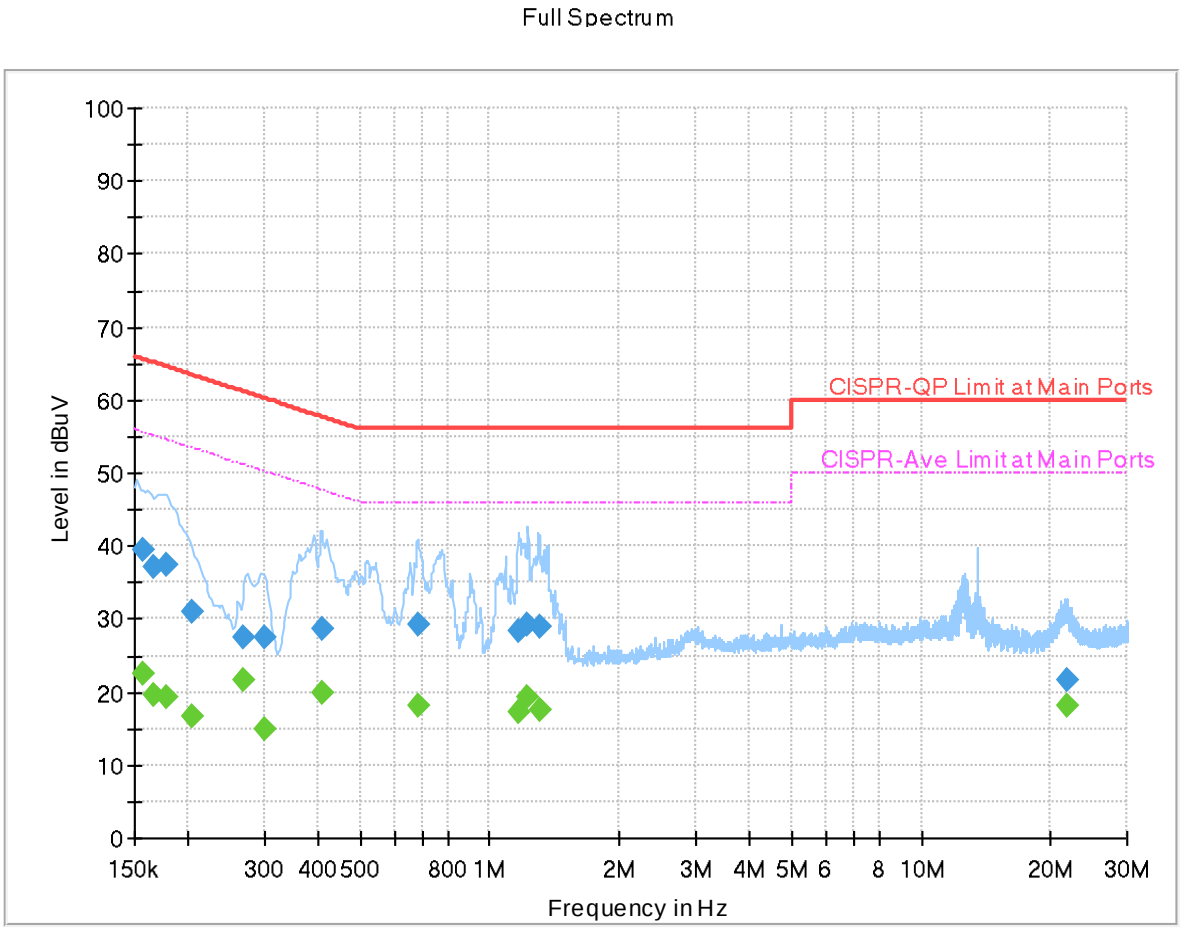
CSE Plot on Low Ch between 30MHz ~ 1 GHz	CSE Plot on Low Ch between 1GHz ~ 26.5GHz
	
CSE Plot on Mid. Ch between 30MHz ~ 1 GHz	**CSE Plot on Mid. Ch between 1GHz ~ 26.5GHz**
	
CSE Plot on High Ch between 30MHz ~ 1 GHz	**CSE Plot on High Ch between 1GHz ~ 26.5GHz**
	

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	**Temperature :**	18.2~20.3℃
		Relative Humidity :	40.2~47.6%

EUT Information

Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line



Final_Result

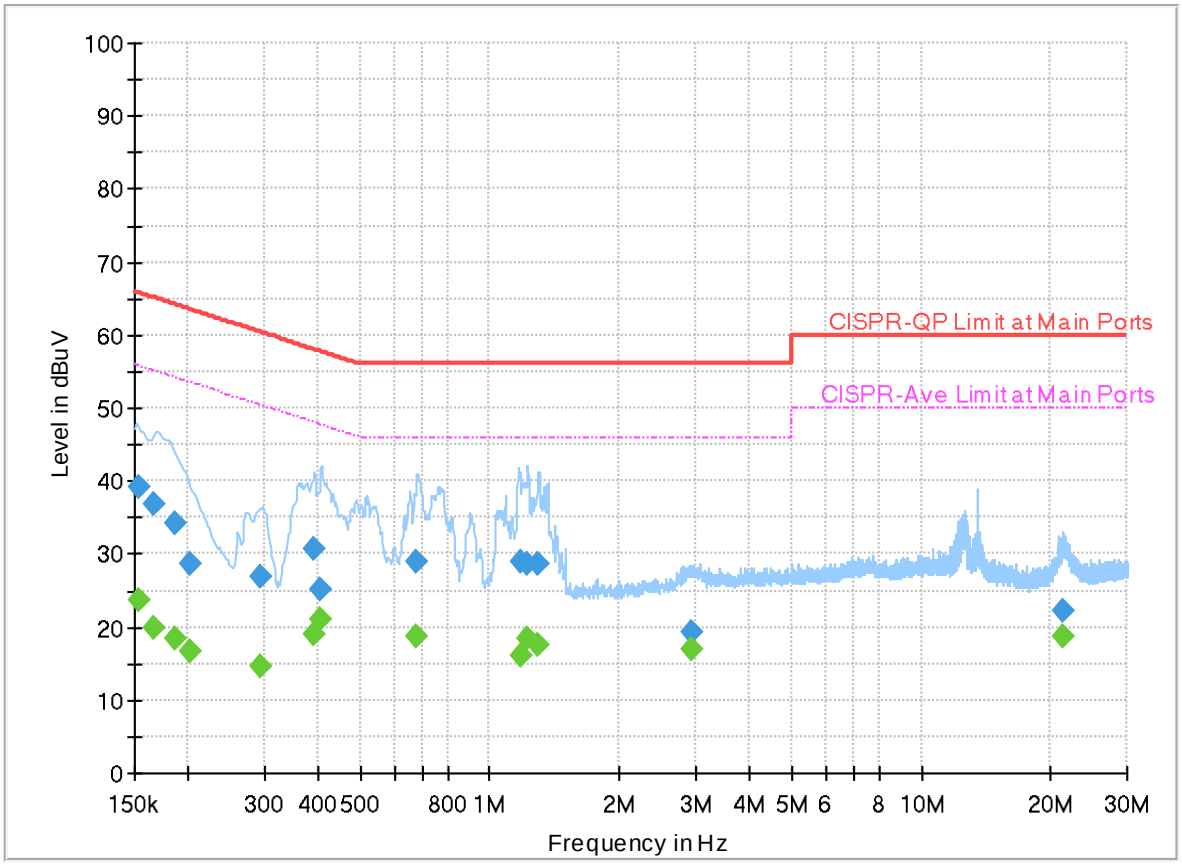
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	PE	Corr. (dB)
0.156278	39.39	---	65.66	26.27	L1	FLO	19.9
0.156278	---	22.42	55.66	33.24	L1	FLO	19.9
0.165750	37.28	---	65.17	27.89	L1	FLO	19.9
0.165750	---	19.58	55.17	35.59	L1	FLO	19.9
0.177810	37.44	---	64.59	27.15	L1	FLO	19.9
0.177810	---	19.22	54.59	35.37	L1	FLO	19.9
0.204000	31.13	---	63.45	32.32	L1	FLO	19.9
0.204000	---	16.66	53.45	36.79	L1	FLO	19.9
0.269070	27.46	---	61.15	33.69	L1	FLO	19.9
0.269070	---	21.66	51.15	29.49	L1	FLO	19.9
0.299040	27.54	---	60.27	32.73	L1	FLO	19.9
0.299040	---	14.81	50.27	35.46	L1	FLO	19.9
0.408030	28.52	---	57.69	29.17	L1	FLO	19.9
0.408030	---	19.91	47.69	27.78	L1	FLO	19.9
0.678930	29.33	---	56.00	26.67	L1	FLO	19.9
0.678930	---	18.08	46.00	27.92	L1	FLO	19.9
1.169610	28.31	---	56.00	27.69	L1	FLO	19.9
1.169610	---	17.17	46.00	28.83	L1	FLO	19.9
1.221180	29.24	---	56.00	26.76	L1	FLO	19.9

1.221180	**---**	**19.17**	**46.00**	**26.83**	**L1**	**FLO**	**19.9**
1.302000	**28.90**	**---**	**56.00**	**27.10**	**L1**	**FLO**	**19.9**
1.302000	**---**	**17.64**	**46.00**	**28.36**	**L1**	**FLO**	**19.9**
21.859080	**21.51**	**---**	**60.00**	**38.49**	**L1**	**FLO**	**20.2**
21.859080	**---**	**18.10**	**50.00**	**31.90**	**L1**	**FLO**	**20.2**

EUT Information

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	PE	Corr. (dB)
0.153578	---	23.73	55.80	32.07	N	FLO	20.0
0.153578	39.26	---	65.80	26.54	N	FLO	20.0
0.165750	---	19.75	55.17	35.42	N	FLO	19.9
0.165750	36.93	---	65.17	28.24	N	FLO	19.9
0.185460	---	18.42	54.24	35.82	N	FLO	19.9
0.185460	34.17	---	64.24	30.07	N	FLO	19.9
0.201750	---	16.68	53.54	36.86	N	FLO	19.9
0.201750	28.69	---	63.54	34.85	N	FLO	19.9
0.294000	---	14.59	50.41	35.82	N	FLO	19.9
0.294000	26.85	---	60.41	33.56	N	FLO	19.9
0.391200	---	18.95	48.04	29.09	N	FLO	19.9
0.391200	30.79	---	58.04	27.25	N	FLO	19.9
0.404250	---	21.00	47.77	26.77	N	FLO	19.9
0.404250	25.17	---	57.77	32.60	N	FLO	19.9
0.674250	---	18.72	46.00	27.28	N	FLO	19.9
0.674250	28.97	---	56.00	27.03	N	FLO	19.9
1.173120	---	16.07	46.00	29.93	N	FLO	20.0
1.173120	28.98	---	56.00	27.02	N	FLO	20.0
1.218750	---	18.29	46.00	27.71	N	FLO	20.0

1.218750	**28.63**	**---**	**56.00**	**27.37**	**N**	**FLO**	**20.0**
1.293090	**---**	**17.51**	**46.00**	**28.49**	**N**	**FLO**	**20.0**
1.293090	**28.51**	**---**	**56.00**	**27.49**	**N**	**FLO**	**20.0**
2.931180	**---**	**16.93**	**46.00**	**29.07**	**N**	**FLO**	**20.0**
2.931180	**19.42**	**---**	**56.00**	**36.58**	**N**	**FLO**	**20.0**
21.425100	**---**	**18.71**	**50.00**	**31.29**	**N**	**FLO**	**20.2**
21.425100	**22.29**	**---**	**60.00**	**37.71**	**N**	**FLO**	**20.2**

Appendix C. Radiated Spurious Emission Test Data

Test Engineer :	John Chuang, David Dai and Sam Chou	**Temperature :**	19.1~22.2°C
		Relative Humidity :	65.4~70.5%

Note symbol

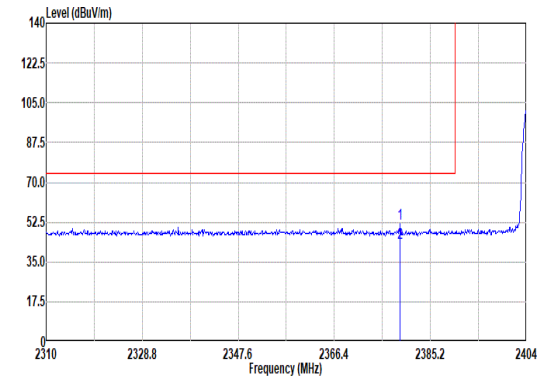
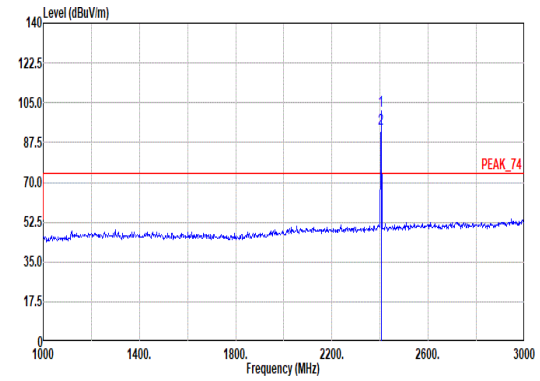
-L	**Low channel location**
-R	**High channel location**

C1. Radiated Spurious Emission Test Modes

Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 14	2400-2483.5	1	Bluetooth BR_ASK	02	2404	1Mbps	-	-
Mode 15	2400-2483.5	1	Bluetooth BR_ASK	38	2440	1Mbps	-	-
Mode 16	2400-2483.5	1	Bluetooth BR_ASK	76	2478	1Mbps	-	-
Mode 17	2400-2483.5	1	Bluetooth BR_ASK	76	2478	1Mbps	-	LF
Mode 18	2400-2483.5	1	Bluetooth BR_ASK	76	2478	1Mbps	-	SHF

C2. Summary of each worse mode

Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	RU	Remark
14	Bluetooth BR_ASK	02	2379.28	43.57	54.00	-10.43	H	Avg.	Pass	-	Band Edge
	Bluetooth BR_ASK	02	4804.00	43.94	54.00	-10.06	H	Avg.	Pass	-	Harmonic
15	Bluetooth BR_ASK	38	2487.40	42.15	54.00	-11.85	H	Avg.	Pass	-	Band Edge
	Bluetooth BR_ASK	38	7320.00	46.49	54.00	-7.51	H	Avg.	Pass	-	Harmonic
16	Bluetooth BR_ASK	76	2491.57	43.00	54.00	-11.00	H	Avg.	Pass	-	Band Edge
	Bluetooth BR_ASK	76	7434.00	46.78	54.00	-7.22	H	Avg.	Pass	-	Harmonic
17	LF	76	51.34	32.92	40.00	-7.08	V	Peak	Pass	-	LF
18	SHF	76	23922.00	42.86	74.00	-31.14	V	Peak	Pass	-	SHF

Mode	14	
	Band Edge	
	2400-2483.5_Bluetooth BR_ASK_CH02_2404MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak		

Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

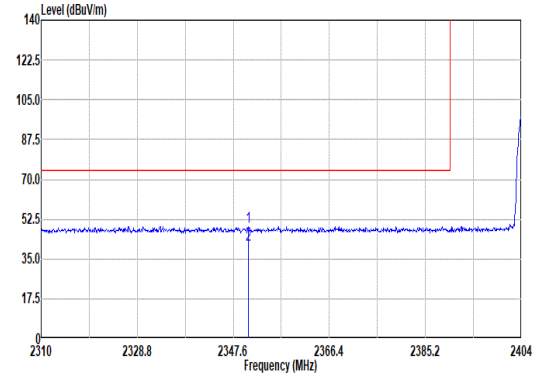
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2379.28	51.62	74.00	-22.38	42.39	27.21	8.60	36.26	9.68	200	201	PEAK
2	2379.28	43.57	54.00	-10.43	--	--	--	--	--	200	201	Average

Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2404.00	101.49	------	------	91.99	27.44	8.65	36.27	9.68	200	201	PEAK
2	2404.00	93.44	------	------	--	--	--	--	--	200	201	Average

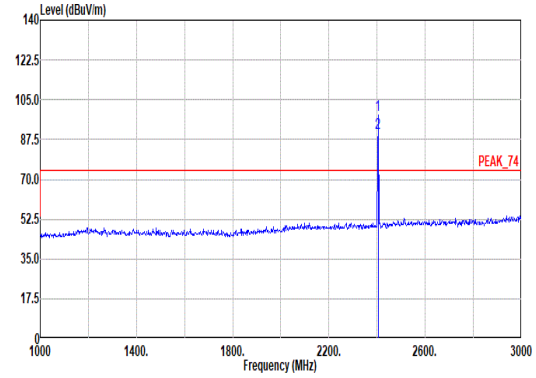
Mode	14	
	Band Edge	
	2400-2483.5_Bluetooth BR_ASK_CH02_2404MHz	
ANT	1	
Pol.	Vertical	Fundamental

Peak



Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 VERTICAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

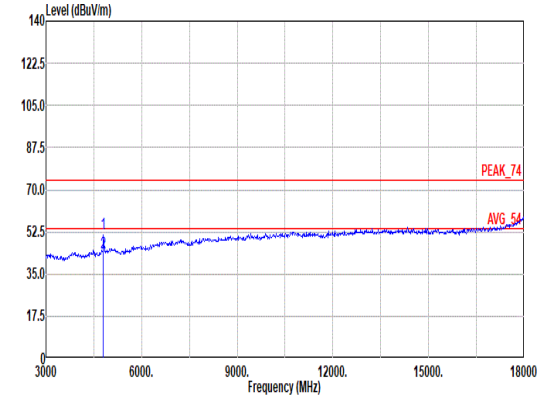
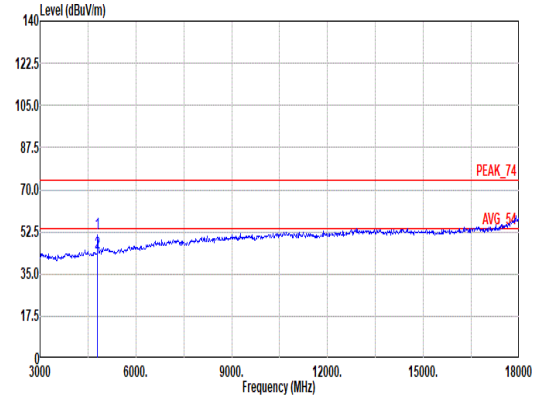
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2350.51	49.28	74.00	-24.72	40.01	27.30	8.55	36.26	9.68	100	183	PEAK
2	2350.51	41.23	54.00	-12.77	--	--	--	--	--	100	183	Average



Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2404.00	98.18	------	------	88.68	27.44	8.65	36.27	9.68	100	183	PEAK
2	2404.00	90.13	------	------	--	--	--	--	--	100	183	Average

Mode	14
	Harmonic
	2400-2483.5_Bluetooth BR_ASK_CH02_2404MHz
ANT	1

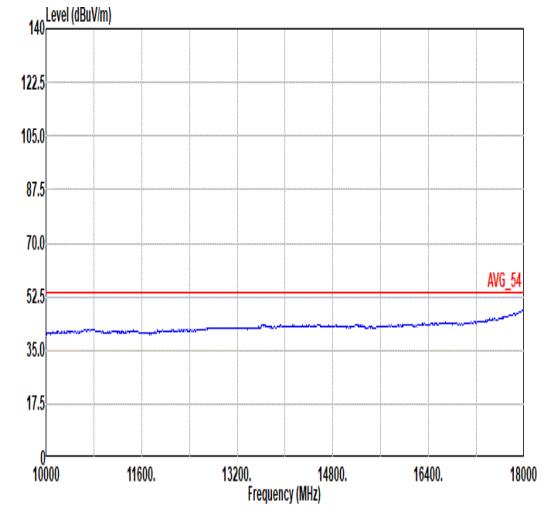
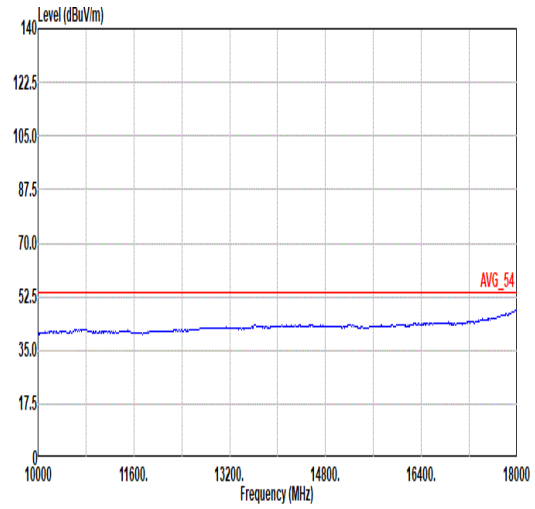
Pol.	Horizontal	Vertical
Peak Avg		

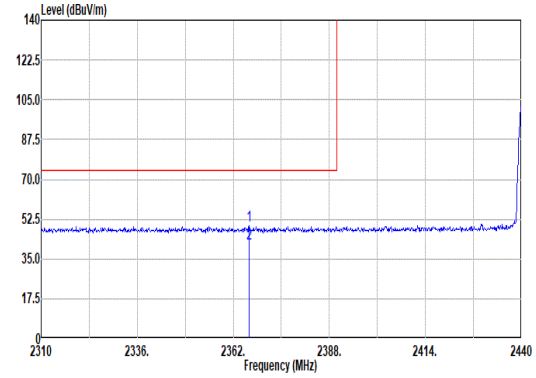
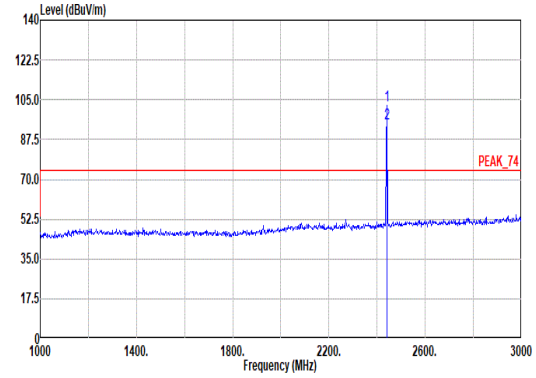
Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4804.00	51.99	74.00	-22.01	44.19	32.23	12.25	37.51	0.83	100	171	PEAK
2	4804.00	43.94	54.00	-10.06	--	--	--	--	--	100	171	Average

Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4804.00	51.69	74.00	-22.31	43.89	32.23	12.25	37.51	0.83	100	171	PEAK
2	4804.00	43.64	54.00	-10.36	--	--	--	--	--	100	171	Average

Mode	14	
	Harmonic	
	2400-2483.5_Bluetooth BR_ASK_CH02_2404MHz	
ANT	1	
Pol.	Horizontal	Vertical
10G ~18G Avg	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 HORIZONTAL	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 VERTICAL

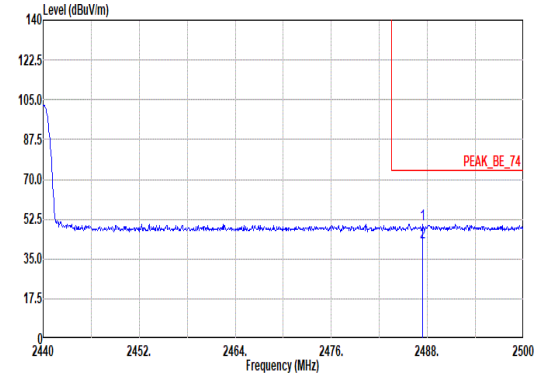
Mode	15	
	Band Edge - L	
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak		

Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2366.29	49.55	74.00	-24.45	40.25	27.30	8.58	36.26	9.68	236	200	PEAK
2	2366.29	41.50	54.00	-12.50	32.20	27.30	8.58	36.26	9.68	236	200	Average

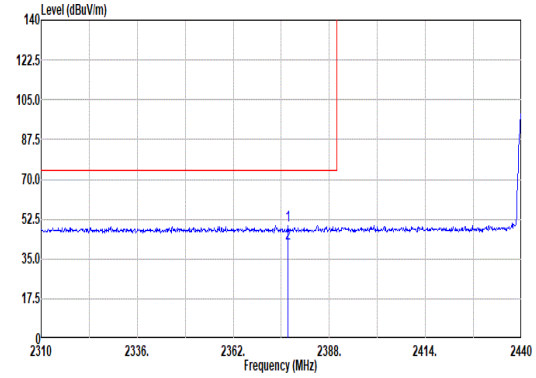
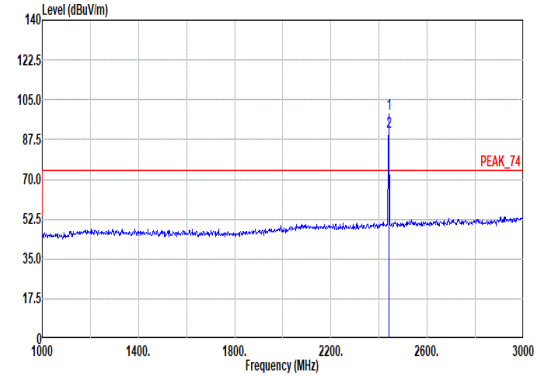
Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2440.00	102.50	------	------	92.79	27.60	8.71	36.28	9.68	236	200	PEAK
2	2440.00	94.45	------	------	--	--	--	--	--	236	200	Average

Mode	15	
	Band Edge - R	
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak		Blank

Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2487.40	50.20	74.00	-23.80	40.05	27.97	8.80	36.30	9.68	236	200	PEAK
2	2487.40	42.15	54.00	-11.85	--	--	--	--	--	236	200	Average

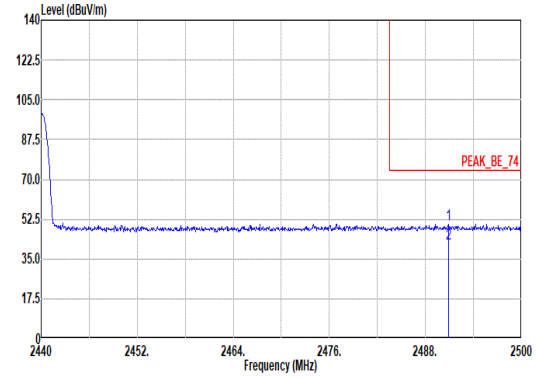
Mode	15	
	Band Edge - L	
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak		

Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 VERTICAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2376.82	49.54	74.00	-24.46	40.29	27.23	8.60	36.26	9.68	100	175	PEAK
2	2376.82	41.49	54.00	-12.51	--	--	--	--	--	100	175	Average

Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2440.00	99.00	------	------	89.29	27.60	8.71	36.28	9.68	100	175	PEAK
2	2440.00	90.95	------	------	--	--	--	--	--	100	175	Average

Mode	15	
	Band Edge - R	
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak		Blank

Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 VERTICAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

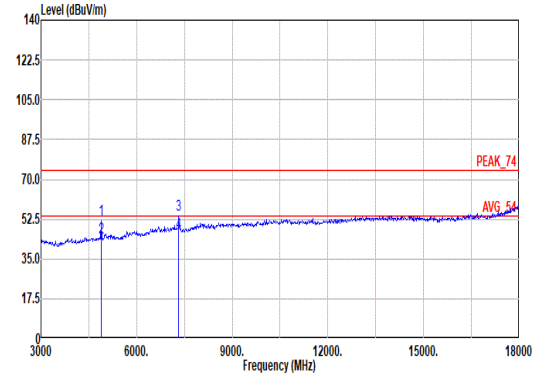
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2490.88	50.00	74.00	-24.00	39.81	28.00	8.81	36.30	9.68	100	175	PEAK
2	2490.88	41.95	54.00	-12.05	--	--	--	--	--	100	175	Average

Mode	15
	Harmonic
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz
ANT	1

Pol.	Horizontal	Vertical

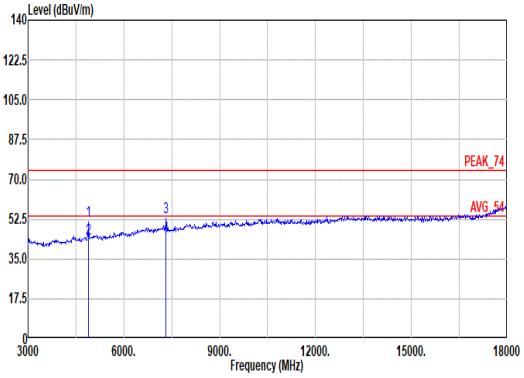
Peak

Avg



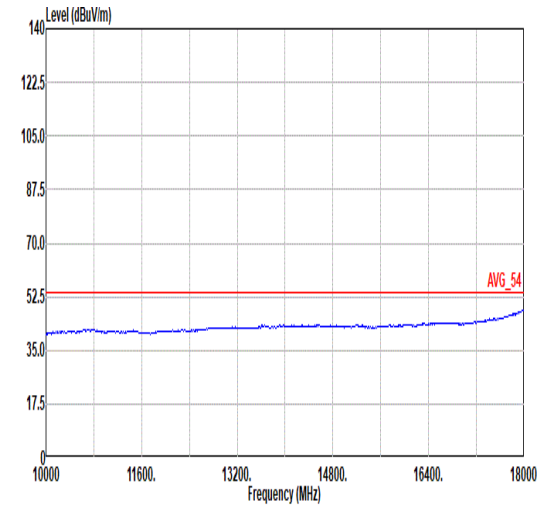
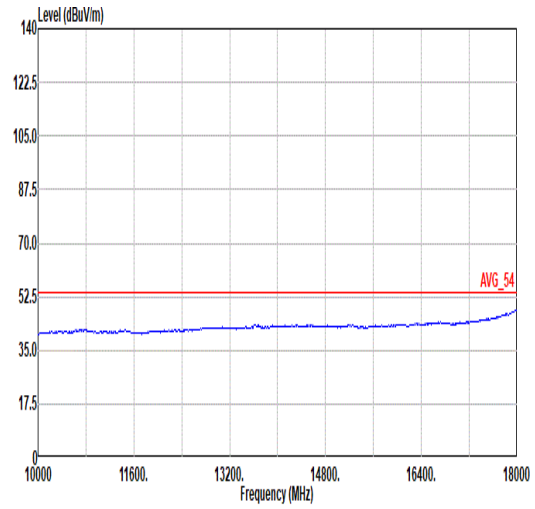
Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4880.00	52.46	74.00	-21.54	44.25	32.72	12.39	37.57	0.67	103	186	PEAK
2	4880.00	44.41	54.00	-9.59	--	--	--	--	--	103	186	Average
3	7320.00	54.54	74.00	-19.46	40.51	36.78	15.38	38.48	0.35	100	213	PEAK
4	7320.00	46.49	54.00	-7.51	--	--	--	--	--	100	213	Average



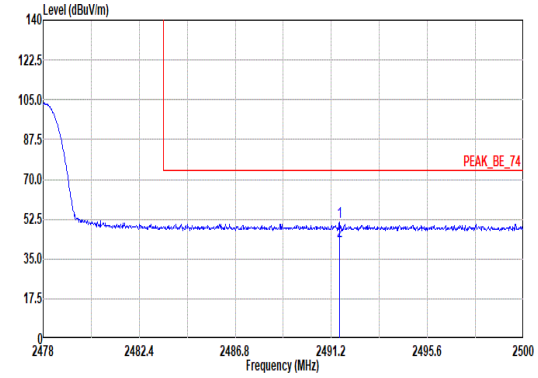
Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4880.00	51.66	74.00	-22.34	43.45	32.72	12.39	37.57	0.67	109	238	PEAK
2	4880.00	43.61	54.00	-10.39	--	--	--	--	--	109	238	Average
3	7320.00	53.12	74.00	-20.88	39.09	36.78	15.38	38.48	0.35	100	205	PEAK
4	7320.00	45.07	54.00	-8.93	--	--	--	--	--	100	205	Average

Mode	15	
	Harmonic	
	2400-2483.5_Bluetooth BR_ASK_CH38_2440MHz	
ANT	1	
Pol.	Horizontal	Vertical
10G ~18G Avg	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 HORIZONTAL	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 VERTICAL

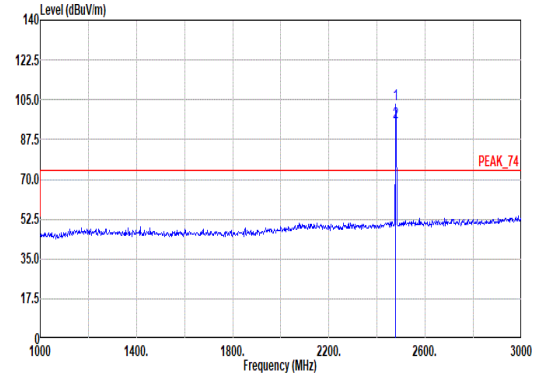
Mode	16	
	Band Edge	
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz	
ANT	1	
Pol.	Horizontal	Fundamental

Peak



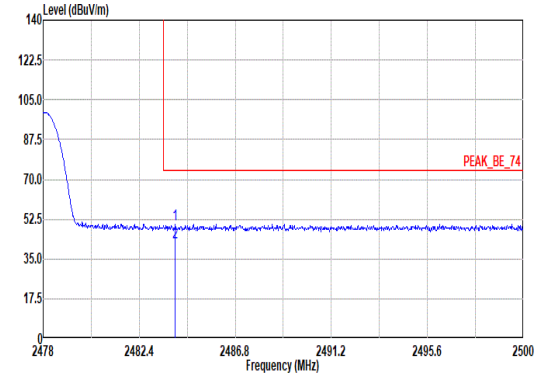
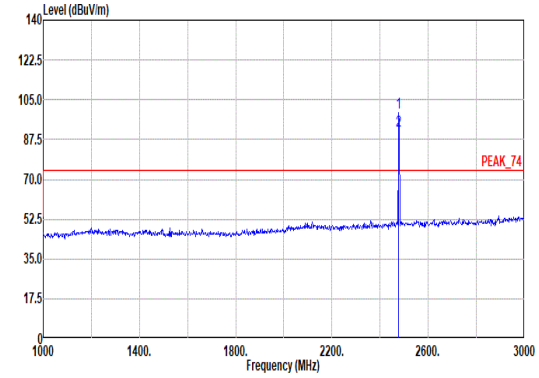
Site : 03CH20-HY
Condition: PEAK_BE_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2491.57	51.05	74.00	-22.95	40.86	28.00	8.81	36.30	9.68	230	199	PEAK
2	2491.57	43.00	54.00	-11.00	--	--	--	--	--	230	199	Average



Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL
: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	2478.00	103.28	------	------	93.23	27.88	8.78	36.29	9.68	230	199	PEAK
2	2478.00	95.23	------	------	--	--	--	--	--	230	199	Average

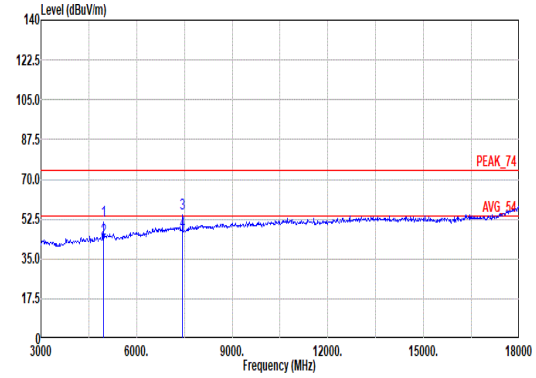
Mode	16	
	Band Edge	
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak	 Site : 03CH20-HY Condition: PEAK_BE_74 3m HF_9120D_02360_241101 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Freq / Level / Limit Line / Margin / Read Level / Ant Factor / Cable Loss / Preamp Factor / Aux Factor / APos / TPos / Remark 1 2484.05 MHz 50.43 dBuV/m 74.00 dB -23.57 40.31 dBuV 27.94 dB/m 8.80 dB 36.30 dB 9.68 dB -- cm 100 deg 179 PEAK 2 2484.05 MHz 42.38 dBuV/m 54.00 dB -11.62 -- dBuV -- dB/m -- dB -- dB -- cm 100 deg 179 Average	 Site : 03CH20-HY Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Freq / Level / Limit Line / Margin / Read Level / Ant Factor / Cable Loss / Preamp Factor / Aux Factor / APos / TPos / Remark 1 2478.00 MHz 99.42 dBuV/m ------ dB ------ 89.37 dBuV 27.88 dB/m 8.78 dB 36.29 dB 9.68 dB -- cm 100 deg 179 PEAK 2 2478.00 MHz 91.37 dBuV/m ------ dB ------ -- dBuV -- dB/m -- dB -- dB -- cm 100 deg 179 Average

Mode	16
	Harmonic
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz
ANT	1

Pol.	Horizontal	Vertical

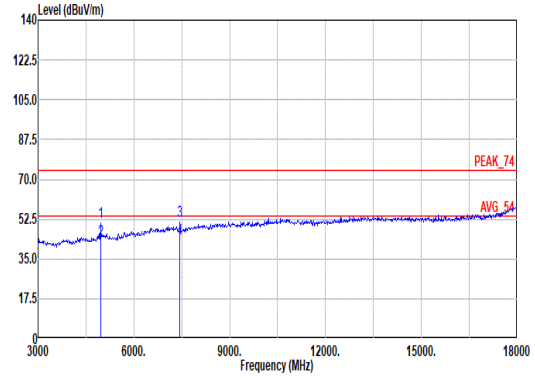
Peak

Avg



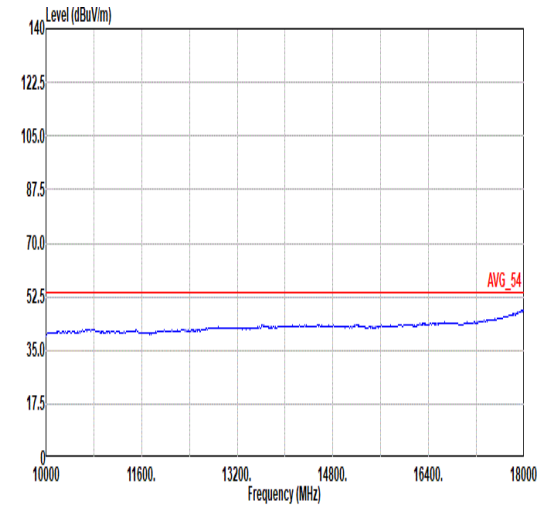
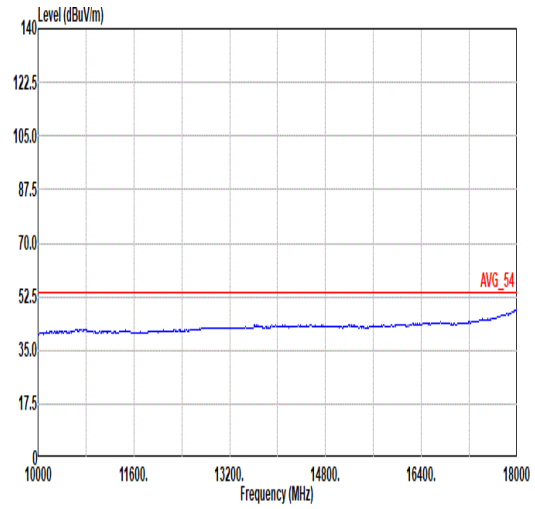
Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4956.00	51.85	74.00	-22.15	43.30	33.14	12.53	37.63	0.51	100	188	PEAK
2	4956.00	43.80	54.00	-10.20	43.80	--	--	--	--	100	188	Average
3	7434.00	54.83	74.00	-19.17	41.33	36.23	15.51	38.57	0.33	100	212	PEAK
4	7434.00	46.78	54.00	-7.22	--	--	--	--	--	100	212	Average



Site : 03CH20-HY
Condition: PEAK_74 3m HF_9120D_02360_241101 VERTICAL

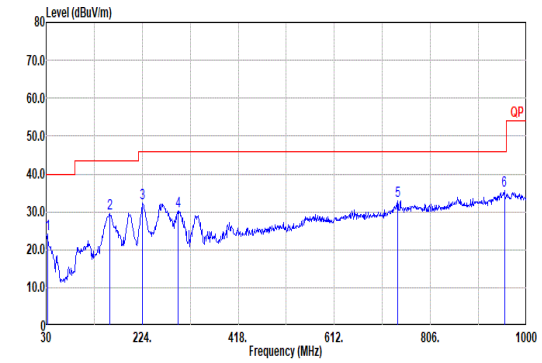
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	4956.00	51.13	74.00	-22.87	42.58	33.14	12.53	37.63	0.51	303	232	PEAK
2	4956.00	43.08	54.00	-10.92	--	--	--	--	--	303	232	Average
3	7434.00	51.81	74.00	-22.19	38.31	36.23	15.51	38.57	0.33	100	203	PEAK
4	7434.00	43.76	54.00	-10.24	--	--	--	--	--	100	203	Average

Mode	16	
	Harmonic	
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz	
ANT	1	
Pol.	Horizontal	Vertical
10G ~18G Avg	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 HORIZONTAL	 Site : 03CH20-HY Condition: AVG_54 3m HF_9120D_02360_241101 VERTICAL

Mode	17
	LF
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz
ANT	1

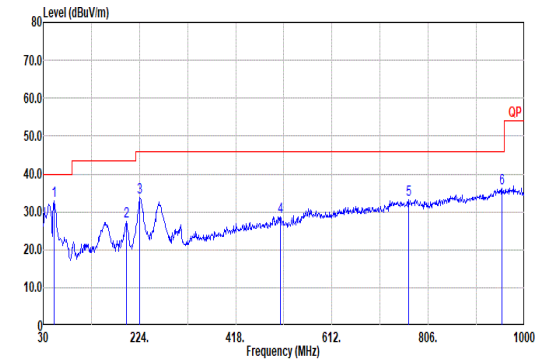
Pol.	Horizontal	Vertical

QP/ Peak



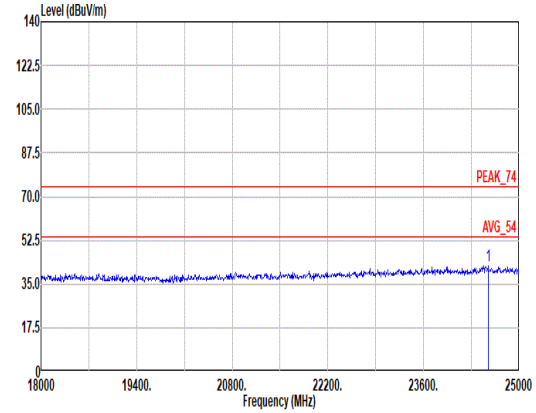
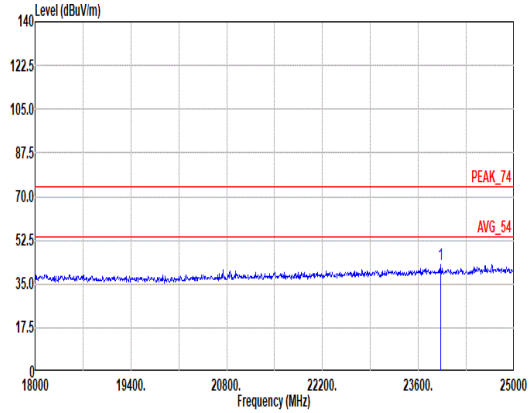
Site : 03CH20-HY
Condition: QP 3m Bilog_55606 & 08_241127 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	32.91	24.04	40.00	-15.96	35.34	23.21	1.01	35.75	0.23	--	--	Peak
2	158.04	29.46	43.50	-14.04	45.92	16.71	2.24	35.59	0.18	--	--	Peak
3	224.97	32.16	46.00	-13.84	48.98	15.78	2.66	35.46	0.20	--	--	Peak
4	295.78	30.09	46.00	-15.91	42.84	19.30	3.05	35.29	0.19	--	--	Peak
5	740.04	32.94	46.00	-13.06	33.84	28.07	4.81	33.93	0.15	--	--	Peak
6	955.38	35.50	46.00	-10.50	32.17	30.94	5.44	33.14	0.09	--	--	Peak



Site : 03CH20-HY
Condition: QP 3m Bilog_55606 & 08_241127 VERTICAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	51.34	32.92	40.00	-7.08	53.14	14.02	1.26	35.74	0.24	--	--	Peak
2	197.81	27.58	43.50	-15.92	45.35	15.03	2.51	35.51	0.20	--	--	Peak
3	224.97	33.71	46.00	-12.29	50.53	15.78	2.66	35.46	0.20	--	--	Peak
4	508.21	28.68	46.00	-17.32	35.30	24.02	3.98	34.75	0.13	--	--	Peak
5	767.20	33.29	46.00	-12.71	33.85	28.22	4.89	33.82	0.15	--	--	Peak
6	954.41	36.36	46.00	-9.64	33.03	30.94	5.44	33.14	0.09	--	--	Peak

Mode	18	
	SHF	
	2400-2483.5_Bluetooth BR_ASK_CH76_2478MHz	
ANT	1	
Pol.	Horizontal	Vertical
Peak		

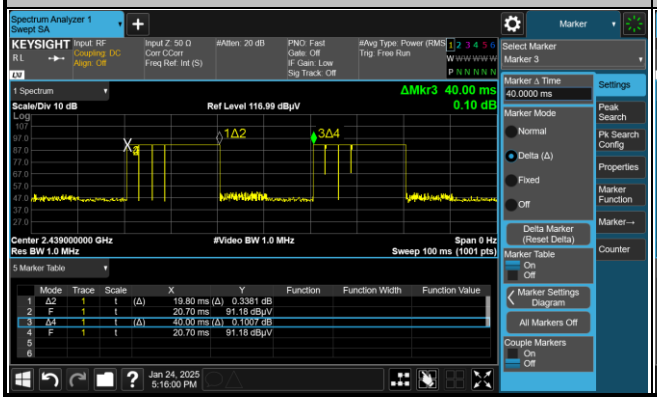
Site : 03CH20-HY
Condition: PEAK_74 1m BBHA9170_1224_240624 HORIZONTAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	24545.00	42.35	74.00	-31.65	36.63	39.30	28.87	52.91	-9.54	--	--	Peak

Site : 03CH20-HY
Condition: PEAK_74 1m BBHA9170_1224_240624 VERTICAL

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	Aux Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	dB	cm	deg	
1	23922.00	42.86	74.00	-31.14	38.16	38.70	28.56	53.02	-9.54	--	--	Peak

Appendix D. Duty Cycle Plots

Bluetooth - LE for 1Mbps	Bluetooth - LE for 1Mbps
	

Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 19.8 / 100 = 39.6 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -8.05 dB

Duty Cycle Correction Factor Consideration for AFH mode:

The maximum possible ON time:

19.8 ms x 2 = 39.6 ms

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

20 x log(39.6 ms/100 ms) = -8.05 dB

————THE END————