

Test Report

Product: Wireless carplay adapter

Trade Mark: N/A

Model Number: TY-001

FCC ID: 2BN85-TY001

Prepared for

Dongguan phonemate Electronics co., LTD
Room 601, No.13, Administrative Inner Ring Road, Humen Town, Dongguan
City, Guangdong Province

Prepared by

Shenzhen HongBiao Certification& Testing Co., Ltd
Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan
Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen,
China
Tel.: +86-755-2998 9321 Fax.: +86-755-2998 5110
Website: <http://www.sz-hongbiao.com>

Table of Contents

1	GENERAL DESCRIPTION	6
1.1	DESCRIPTION OF EUT	6
1.2	TEST MODE.....	7
1.3	OPERATION CHANNEL LIST.....	7
1.4	TEST SETUP	8
1.5	POWER SETTING CONFIGURATION PARAMETERS	8
1.6	ANCILLARY EQUIPMENT	8
2	SUMMARY OF TEST RESULT.....	9
3	TEST FACILITIES AND ACCREDITATIONS	10
3.1	TEST LABORATORY	10
3.2	ENVIRONMENTAL CONDITIONS	10
3.3	MEASUREMENT UNCERTAINTY	10
3.4	TEST SOFTWARE	11
4	LIST OF TEST EQUIPMENT.....	12
5	TEST ITEM AND RESULTS	14
5.1	ANTENNA REQUIREMENT	14
5.1.1	<i>Standard Requirement</i>	14
5.1.2	<i>Test Result</i>	14
5.2	CONDUCTED EMISSION.....	15
5.2.1	<i>Limits</i>	15
5.2.2	<i>Test Procedures</i>	15
5.2.3	<i>Test Setup</i>	16
5.2.4	<i>Test Result</i>	16
5.3	RADIATED EMISSION	19
5.3.1	<i>Limits</i>	19
5.3.2	<i>Test Procedures</i>	19
5.3.3	<i>Test Setup</i>	19
5.3.4	<i>Test Result</i>	20
5.3.5	<i>Radiated Band Edge</i>	25
5.4	PEAK OUTPUT POWER	28
5.4.1	<i>Limit</i>	28
5.4.2	<i>Test Procedure</i>	28
5.4.3	<i>Test Setup</i>	28
5.4.4	<i>Test Results</i>	28
5.5	POWER SPECTRAL DENSITY.....	30
5.5.1	<i>Limit</i>	30
5.5.2	<i>Test Procedure</i>	30
5.5.3	<i>Test Setup</i>	30
5.5.4	<i>Test Results</i>	30
5.6	6dB BANDWIDTH	37
5.6.1	<i>Limit</i>	37
5.6.2	<i>Test Procedure</i>	37
5.6.3	<i>Test Setup</i>	37
5.6.4	<i>Test Results</i>	37
5.7	DUTY CYCLE	44
5.7.1	<i>Limit</i>	44
5.7.2	<i>Test Procedure</i>	44

5.7.3	Test Setup.....	44
5.7.4	Test Results	45
5.8	CONDUCTED BAND EDGE	55
5.8.1	Limit	55
5.8.2	Test Procedure	55
5.8.3	Test Setup.....	55
5.8.4	Test Results	55
5.9	SPURIOUS RF CONDUCTED EMISSIONS	60
5.9.1	Limit	60
5.9.2	Measuring Instruments	60
5.9.3	Test Procedure	60
5.9.4	Test Setup.....	60
5.9.5	Test Results	60
6	PHOTOGRAPHS OF THE TEST SETUP.....	62
7	PHOTOGRAPHS OF THE EUT	64

TEST RESULT CERTIFICATION

Applicant's Name..... : Dongguan phonemate Electronics co., LTD
Address : Room 601, No.13, Administrative Inner Ring Road, Humen
Town, Dongguan City, Guangdong Province
Manufacturer's Name : Dongguan phonemate Electronics co., LTD
Address : Room 601, No.13, Administrative Inner Ring Road, Humen
Town, Dongguan City, Guangdong Province

Product description

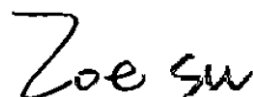
Product name : Wireless carplay adapter
Model Number : TY-001
Standards : FCC Part 15.247
Test procedure : IEEE/ANSI C63.10-2020
KDB558074 D01 15.247 Meas Guidance v05r02

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

Date of Test

Date (s) of performance of tests : Mar. 13, 2025~ Mar. 24, 2025
Test Result..... : **Pass**

Testing Engineer :



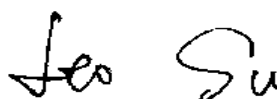
(Z o e S u)

Technical Manager :



(G a r y l u)

Authorized Signatory :



(L e o S u)

[illegible]

1 General Description

1.1 Description of EUT

Product name:	Wireless carplay adapter
Model name:	TY-001
Series Model:	TY-002, TY-003, TY-004, TY-005, TY-006, TY-007, TY-008, KY-4139, KY-4141, KY-4143, KY-4145, KY-4151, KY-4161, KY-4163
Different of series model:	Except for the model, appearance color, appearance shape, appearance materials, electronic accessories, all models have the same circuits and modules.
Operation frequency:	IEEE 802.11b/g/n20/ax20: 2412~2462 MHz IEEE 802.11n40/ax40: 2422~2452 MHz
Modulation type::	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Bit Rate of transmitter:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20/HT40: Up to MCS15 IEEE 802.11ax-HE20/ HE40: Up to MCS11
Antenna type:	PCB antenna
Antenna gain:	-12.46dBi
Max. output power:	17.87dBm
Hardware version:	V0.3
Software version:	202407041001C
Battery:	N/A
Power supply:	DC 5V from adapter AC 120V/60Hz
Adapter information:	N/A

Note: The circuit and electronic structure of all models listed in the report have not changed, and differences between all models have been tested. The final report only reflects the test data of the TY-001 main model in the worst-case scenario.

1.2 Test Mode

Channel List for 802.11b/g/n/ax (20)

Channel	Channel	Frequency (MHz)
Low	01	2412
Middle	06	2437
High	11	2462

Channel List for 802.11n/ax (40)

Channel	Channel	Frequency (MHz)
Low	03	2422
Middle	06	2437
High	09	2452

Note: 802.11ax mode only support full resource unit size.

1.3 Operation Channel list

Channel List for 802.11b/g/n/ax (20)

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	\	\

Channel List for 802.11n/ax (40)

Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	07	2442
04	2427	08	2447
05	2432	09	2452

06	2437	\	\
----	------	---	---

1.4 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.5 Power setting configuration parameters

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product. Transmitting duty cycle is less 98%.

The software is PUSH and CMD tool Use together.

Test software Version		PUSH and CMD	
Mode	802.11b/g	802.11n20	802.11n40
Parameters	Default	Default	Default
RF cable			
Description	Connector	Length	Supplied by
Antenna Cable	SMA	10cm	Applicant

Note: Disclaimer: the loss of RF cable is too small and can be ignored.

1.6 Ancillary Equipment

Equipment	Model	S/N	Manufacturer
Adapter	CD289	35810	Ugreen Group Limited
Laptop	BDR-WDH	A3RQPM24200 04454	HONR

Note: The laptop is used to assist the RF test. In order to prevent the laptop from causing unnecessary impact on the test, the laptop will be removed from the test environment after the EUT successfully transmits at a fixed frequency using the laptop.

2 Summary of Test Result

No.	Standard Section	Test Item	Result	Remark
1	15.203	Antenna Requirement	Pass	
2	15.247 (b)	Peak Output Power	Pass	
3	15.207	Conducted Emission	Pass	
4	15.247 (d) & 15.209	Radiated Spurious Emission	Pass	
5	15.247 (e)	Power Spectral Density	Pass	
6	15.247 (a)(2)	6dB Bandwidth	Pass	
7	558074 D01 15.247 Meas Guidance v05r02 Chapter 6	Duty Cycle	Pass	
8	15.205	Band Edge Emission	Pass	
9	15.247(d)	Spurious RF Conducted Emissions	Pass	

3 Test Facilities and Accreditations

3.1 Test Laboratory

Test Site	Shenzhen HongBiao Certification& Testing Co., Ltd
Test Site Location	Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China
Telephone:	(86-755) 2998 9321
Fax:	(86-755) 2998 5110
FCC Registration No.:	CN1341
A2LA Certificate No.:	6765.01

3.2 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C~35°C
Relative Humidity:	20%~75%
Air Pressure:	98kPa~101kPa

3.3 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Measurement Frequency Range	U, (dB)	Note
RF frequency	2×10^{-5}	
RF power, conducted	± 0.57 dB	
Conducted emission(150kHz~30MHz)	± 2.5 dB	
Radiated emission(9kHz-30MHz)	± 2.5 dB	
Radiated emission(30MHz~1GHz)	± 4.2 dB	
Radiated emission (above 1GHz)	± 4.7 dB	
Occupied Bandwidth	$\pm 3\%$	
Temperature	± 1 degree	
Humidity	$\pm 5 \%$	

3.4 Test Software

Software name	Manufacturer	Model	Version
Conducted Emission test Software	Farad	EZ-EMC	EMC-CON 3A1.1+
Radiated Emission test Software	Farad	EZ-EMC	FA-03A2
RF Test System	MWRF	MTS 8310	2.0.0.0

4 List of Test Equipment

Radiation emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E001	Horn Antenna	Schwarzbeck	BBHA 9120D	02592	2024-05-18	2026-05-17
2	HB-E002	Biconical log-periodic composite antenna	Schwarzbeck	VULB 9168	01340	2024-05-18	2026-05-17
3	HB-E003	SHF-EHF Horn	Schwarzbeck	BBHA 91270	01193	2024-05-18	2026-05-17
4	HB-E005	Preamplifier	Noyetec	LAN-0118	NYCM1420102	2024-05-17	2025-05-16
5	HB-E006	Preamplifier	Noyetec	LAN-1840	NYCM1420103	2024-05-17	2025-05-16
6	HB-E007	EMI TEST RECEIVER	R&S	ESR7	102520	2024-05-17	2025-05-16
7	HB-E009	POSITINAL COTROLLE R	Noyetec	N/A	N/A	/	/
8	HB-E013	RF switch	Noyetec	NY-RF4	NY0CM1420204	/	/
9	HB-E066	Illuminance Tester	TASI	TA8121	N/A	2024-05-21	2025-05-20
10	HB-E075	Active loop antenna	Schwarzbeck	FMZB 1519B	1519B-245	2024-05-18	2026-05-17
11	HB-E076	Preamplifier	Hewlett Packard	8447D	1937A02278	2024-05-17	2025-05-16
Conduction emission							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E014	4 Path V-LISN	Schwarzbeck	NNLK 8121	00770	2024-05-17	2025-05-16
2	HB-E015	Pulse Limiter	Schwarzbeck	VTSD 9561-F	00949	2024-05-17	2025-05-16
3	HB-E016	ZN23201	Noyetec	ZN23201	N/A	2024-05-21	2025-05-20
4	HB-E059	Attenuator	Xianghua	TS2-6-1	220215166	2024-05-17	2025-05-16
5	HB-E069	EMI TEST RECEIVER	R&S	ESCI	N/A	2024-05-17	2025-05-16
RF							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E041	MXG Anaio Signal	Agilent	N5181A	MY47070421	2024-05-17	2025-05-16

		Generator					
2	HB-E042	WIDEBAND RADIO COMMUNICA TION TESTER	R&S	CMW500	132108	2024-05-17	2025-05-16
3	HB-E043	MXG Anaio Signal Generator	Agilent	N5182A	US46240335	2024-05-17	2025-05-16
4	HB-E044	Signal& spectrum Analyzer	R&S	FSV3044	101264	2024-05-17	2025-05-16
5	HB-E045	RF Control Box	Noyetec	NY100-R FCB	N/A	2024-08-19	2025-08-18
6	HB-E058	Thermometer Clock Humidity Monitor	N/A	HTC-1	N/A	2024-08-19	2025-08-18

Note:

1. The calibration interval of the above test instruments is 12&24 months and the calibrations are traceable to international system unit (SI).
2. The instrument RF Control Box, numbered HB-E045, contains power meter.

5 Test Item And Results

5.1 Antenna Requirement

5.1.1 Standard Requirement

15.203 requirement: For intentional device, according to 15.203: 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

5.1.2 Test Result

The EUT antenna is PCB Antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 Conducted Emission

5.2.1 Limits

Limits – Class B		
Frequency (MHz)	Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Note:

- the tighter limit applies at the band edges.
- the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.2.2 Test Procedures

a) EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

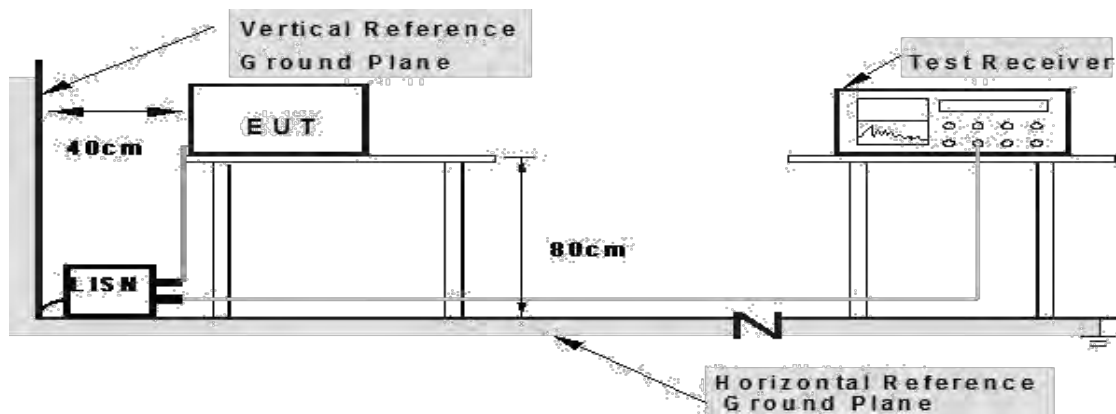
b) The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from nearest part of EUT chassis.

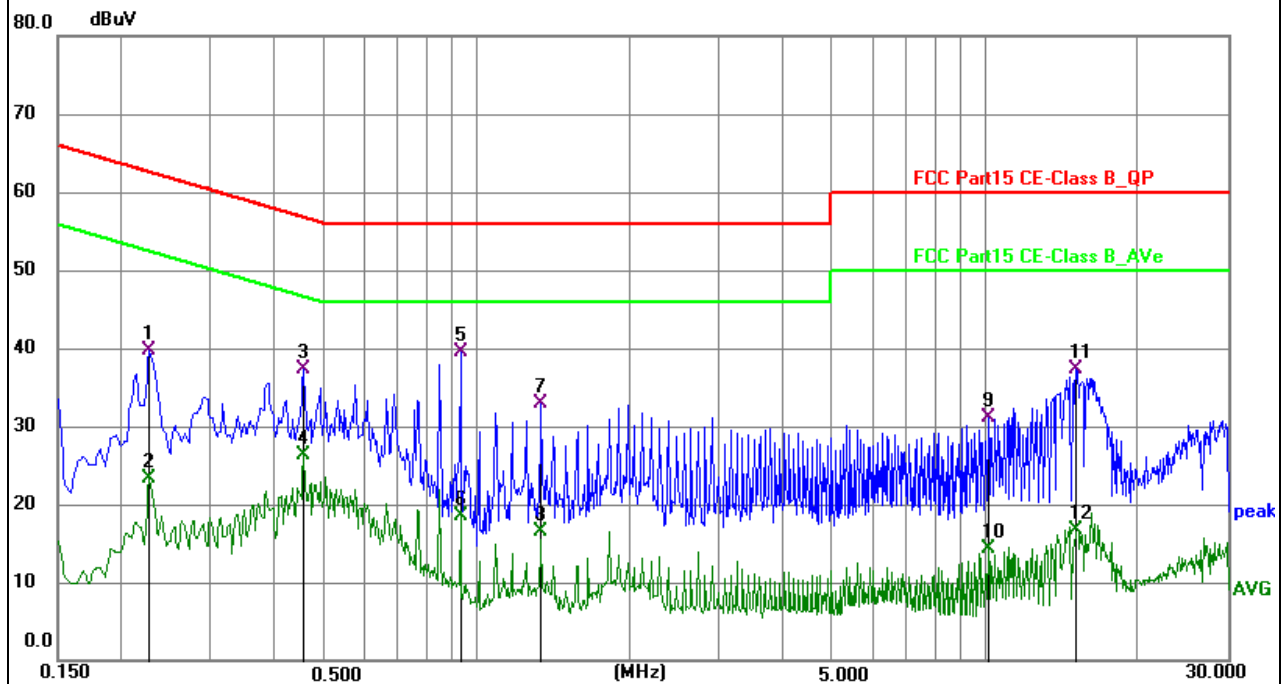
- g) For the actual test configuration, please refer to the related Item – photographs of the test setup.

5.2.3 Test Setup



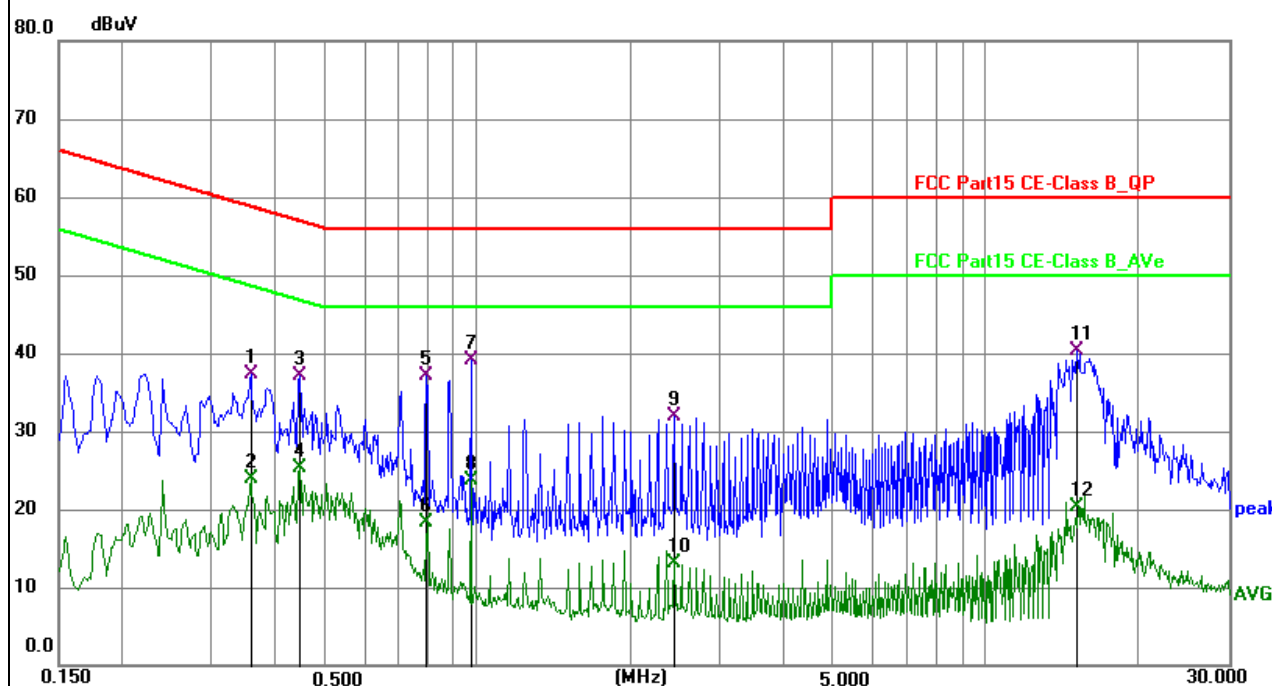
5.2.4 Test Result

EUT:	Wireless carplay adapter	Model Name:	TY-001
Test Mode:	TX	Phase:	L
Test Voltage:	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.226500	29.25	10.47	39.72	62.58	-22.86	QP
2	0.226500	12.92	10.47	23.39	52.58	-29.19	AVG
3	0.456000	26.89	10.49	37.38	56.77	-19.39	QP
4	0.456000	15.83	10.49	26.32	46.77	-20.45	AVG
5 *	0.928400	29.16	10.44	39.60	56.00	-16.40	QP
6	0.928400	8.00	10.44	18.44	46.00	-27.56	AVG
7	1.338000	22.47	10.45	32.92	56.00	-23.08	QP
8	1.338000	5.98	10.45	16.43	46.00	-29.57	AVG
9	10.148700	20.40	10.67	31.07	60.00	-28.93	QP
10	10.148700	3.61	10.67	14.28	50.00	-35.72	AVG
11	15.103500	25.78	11.56	37.34	60.00	-22.66	QP
12	15.103500	5.14	11.56	16.70	50.00	-33.30	AVG

EUT:	Wireless carplay adapter	Model Name:	TY-001
Test Mode:	TX	Phase:	N
Test Voltage:	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.356800	26.78	10.46	37.24	58.80	-21.56	QP
2	0.356800	13.37	10.46	23.83	48.80	-24.97	AVG
3	0.447000	26.65	10.42	37.07	56.93	-19.86	QP
4	0.447000	14.93	10.42	25.35	46.93	-21.58	AVG
5	0.793300	26.67	10.37	37.04	56.00	-18.96	QP
6	0.793300	7.88	10.37	18.25	46.00	-27.75	AVG
7 *	0.968800	28.84	10.35	39.19	56.00	-16.81	QP
8	0.968800	13.42	10.35	23.77	46.00	-22.23	AVG
9	2.435900	21.58	10.39	31.97	56.00	-24.03	QP
10	2.435900	2.68	10.39	13.07	46.00	-32.93	AVG
11	15.099000	28.73	11.58	40.31	60.00	-19.69	QP
12	15.099000	8.78	11.58	20.36	50.00	-29.64	AVG

5.3 Radiated Emission

5.3.1 Limits

Frequencies (MHz)	Field Strength (micorvolts/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

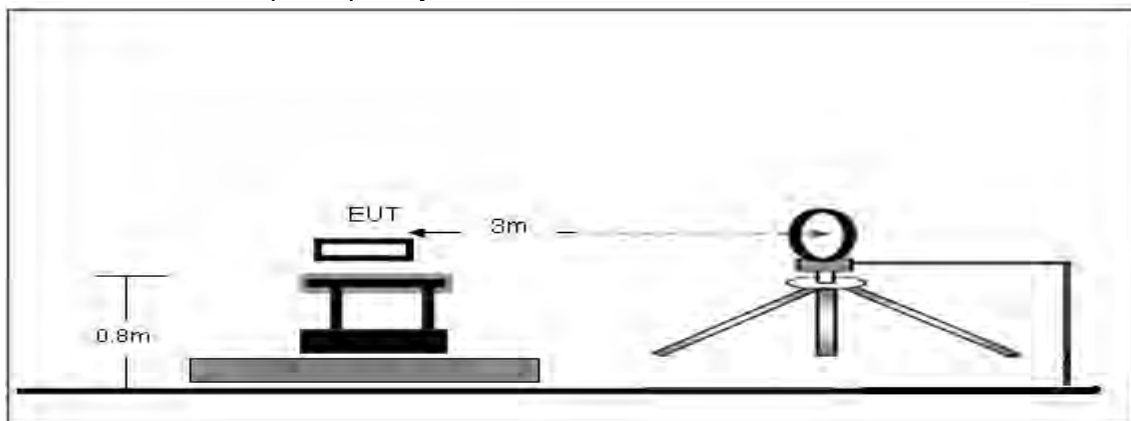
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.3.2 Test Procedures

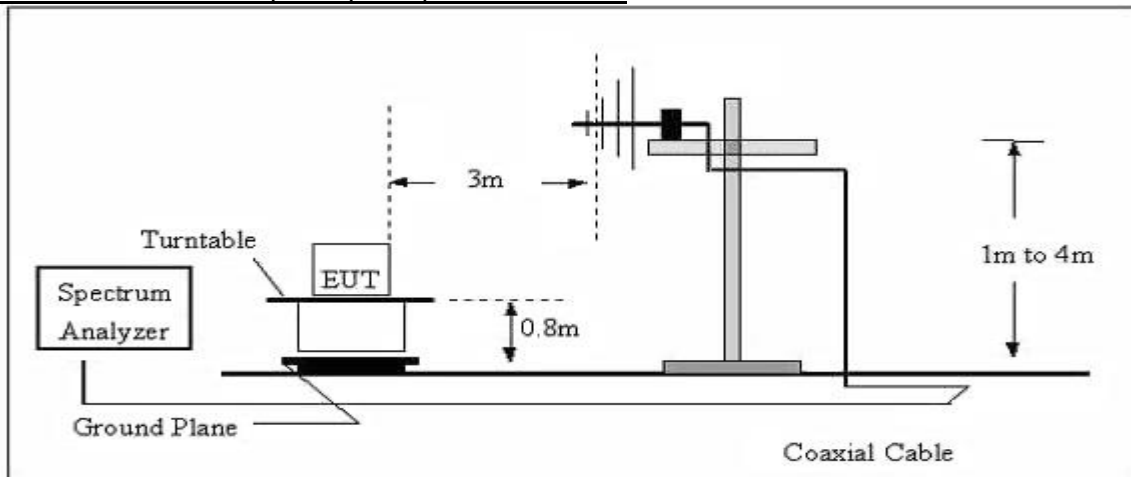
- The radiated emission tests were performed in the 3 meters.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.
- If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.
- For the actual test configuration, please refer to the related item – EUT test photos.

5.3.3 Test Setup

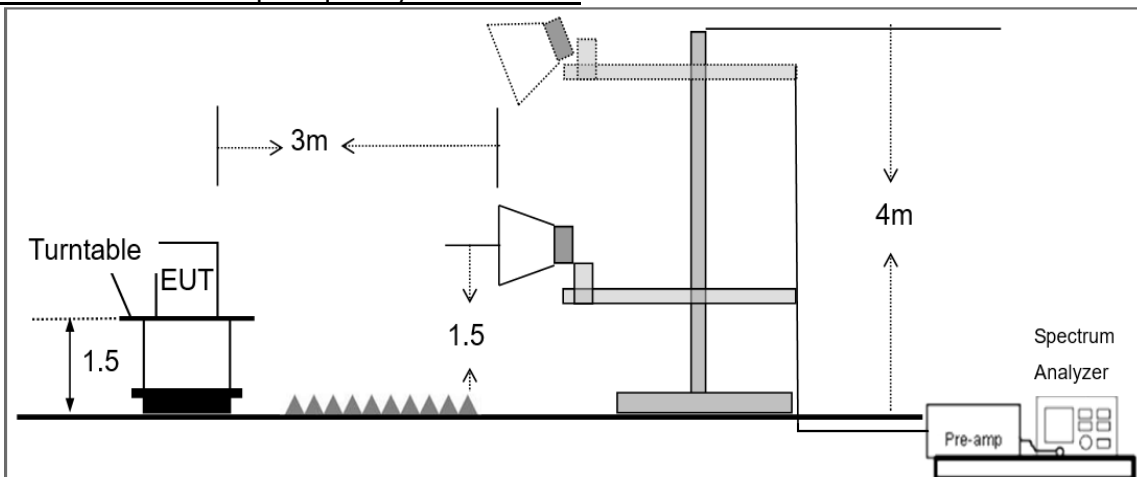
Radiated Emission Test-Up Frequency Below 30MHz



Radiated Emission Test-Up Frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.3.4 Test Result

Below 30MHz

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1010 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX	Polarization:	--

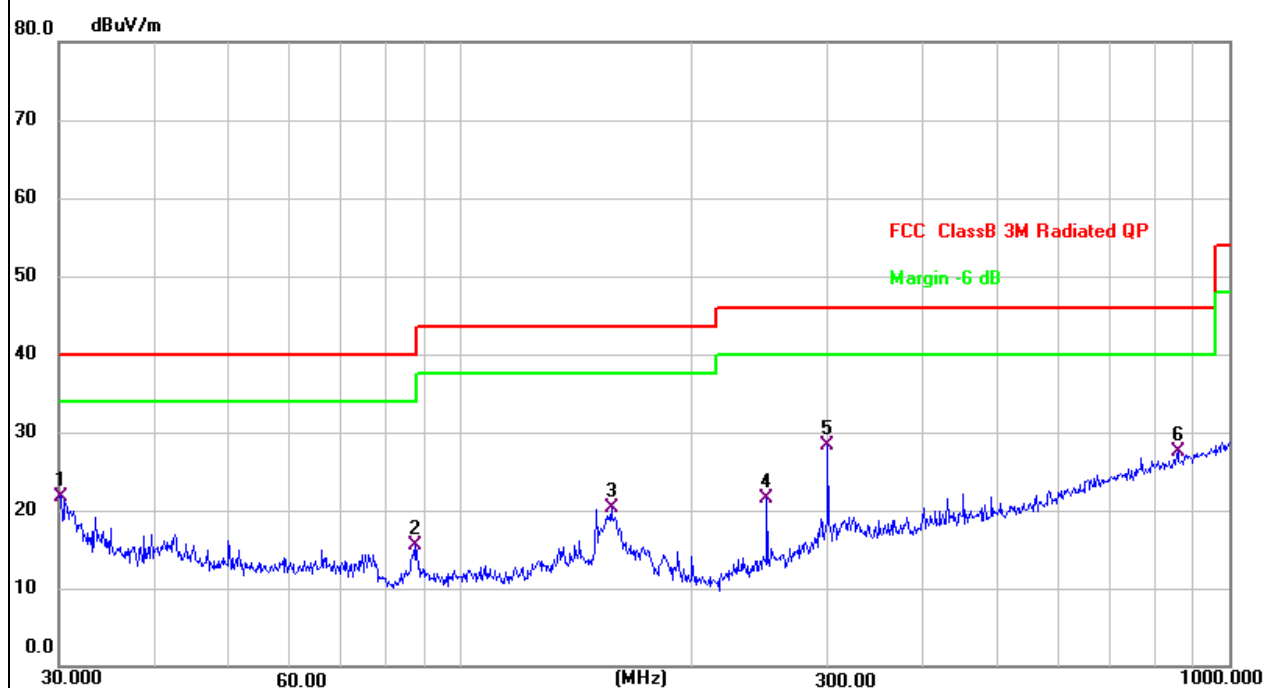
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:

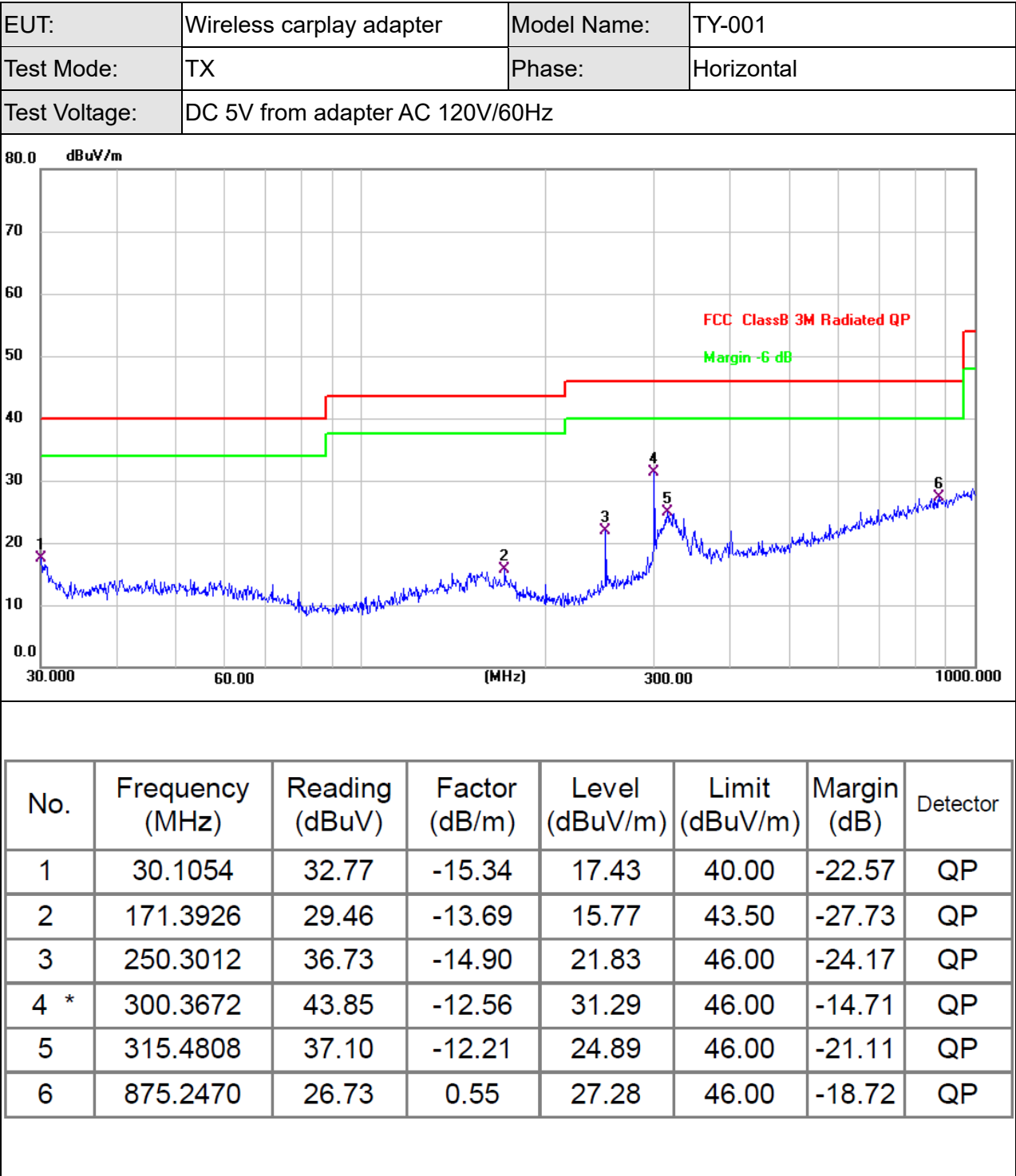
1. For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);
3. Limit line = specific limits (dBuV) + distance extrapolation factor.

Frequency range (30MHz – 1GHz)

EUT:	Wireless carplay adapter	Model Name:	TY-001
Test Mode:	TX	Phase:	Vertical
Test Voltage:	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.2111	37.12	-15.32	21.80	40.00	-18.20	QP
2	87.1117	33.66	-18.21	15.45	40.00	-24.55	QP
3	157.0074	33.64	-13.32	20.32	43.50	-23.18	QP
4	250.3012	36.35	-14.90	21.45	46.00	-24.55	QP
5 *	300.3672	40.95	-12.56	28.39	46.00	-17.61	QP
6	857.0247	27.20	0.34	27.54	46.00	-18.46	QP



Frequency range (1GHz-25GHz)

Frequency (MHz)	Read Level (dBμV)	Cable loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
Low Channel (2412 MHz)(802.11b)--Above 1G									
4824.161	43.52	4.83	33.6	30.80	51.15	74.00	-22.85	Pk	Vertical
4824.161	32.00	4.83	33.6	30.80	39.63	54.00	-14.37	AV	Vertical
7236.396	42.39	5.85	37.45	31.50	54.19	74.00	-19.81	Pk	Vertical
7236.396	32.16	5.85	37.45	31.50	43.96	54.00	-10.04	AV	Vertical
4824.154	43.36	4.83	33.6	30.80	50.99	74.00	-23.01	Pk	Horizontal
4824.154	31.79	4.83	33.6	30.80	39.42	54.00	-14.58	AV	Horizontal
7236.168	43.43	5.85	37.45	31.50	55.23	74.00	-18.77	Pk	Horizontal
7236.168	32.08	5.85	37.45	31.50	43.88	54.00	-10.12	AV	Horizontal
Middle Channel (2437 MHz)(802.11b)--Above 1G									
4874.112	42.80	4.88	33.75	30.80	50.63	74.00	-23.37	Pk	Vertical
4874.112	31.93	4.88	33.75	30.80	39.76	54.00	-14.24	AV	Vertical
7311.247	44.45	5.90	38.10	31.59	56.86	74.00	-17.14	Pk	Vertical
7311.247	32.66	5.90	38.10	31.59	45.07	54.00	-8.93	AV	Vertical
4874.132	43.76	4.88	33.75	30.80	51.59	74.00	-22.41	Pk	Horizontal
4874.132	31.83	4.88	33.75	30.80	39.66	54.00	-14.34	AV	Horizontal
7311.085	44.01	5.90	38.10	31.59	56.42	74.00	-17.58	Pk	Horizontal
7311.085	32.82	5.90	38.10	31.59	45.23	54.00	-8.77	AV	Horizontal
High Channel (2462 MHz)(802.11b)--Above 1G									
4924.169	43.28	4.93	34.04	30.08	52.17	74.00	-21.83	Pk	Vertical
4924.169	32.06	4.93	34.04	30.08	40.95	54.00	-13.05	AV	Vertical
7386.215	43.49	6.01	37.90	31.74	55.66	74.00	-18.34	Pk	Vertical
7386.215	32.55	6.01	37.90	31.74	44.72	54.00	-9.28	AV	Vertical
4924.045	44.20	4.93	34.04	30.08	53.09	74.00	-20.91	Pk	Horizontal
4924.045	32.24	4.93	34.04	30.08	41.13	54.00	-12.87	AV	Horizontal
7386.132	43.59	6.01	37.90	31.74	55.76	74.00	-18.24	Pk	Horizontal
7386.132	32.46	6.01	37.90	31.74	44.63	54.00	-9.37	AV	Horizontal

Note:

1. Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
2. All other emissions more than 20dB below the limit.
3. The three modulated high, medium and low channels have been tested. The report only shows the worst mode. The worst mode is 802.11b.

5.3.5 Radiated Band Edge

Frequency (MHz)	Meter Reading (dBμV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b (Channel 01&11)									
2310.00	46.16	3.40	27.80	32.41	44.69	74	-29.31	Pk	Horizontal
2310.00	33.38	3.40	27.80	32.41	32.07	54	-21.93	AV	Horizontal
2310.00	44.85	3.40	27.80	32.41	43.44	74	-30.56	Pk	Vertical
2310.00	33.68	3.40	27.80	32.41	32.22	54	-21.78	AV	Vertical
2390.00	45.65	3.45	27.70	32.49	44.10	74	-29.90	Pk	Vertical
2390.00	34.49	3.45	27.70	32.49	33.01	54	-20.99	AV	Vertical
2390.00	46.25	3.45	27.70	32.49	44.79	74	-29.21	Pk	Horizontal
2390.00	34.44	3.45	27.70	32.49	32.99	54	-21.01	AV	Horizontal
2483.50	47.32	3.48	28.53	32.55	46.51	74	-27.49	Pk	Vertical
2483.50	34.04	3.48	28.53	32.55	33.28	54	-20.72	AV	Vertical
2483.50	46.16	3.48	28.53	32.55	45.56	74	-28.44	Pk	Horizontal
2483.50	33.91	3.48	28.53	32.55	33.17	54	-20.83	AV	Horizontal
2500.00	45.42	3.49	29.20	32.66	45.27	74	-28.73	Pk	Vertical
2500.00	33.93	3.49	29.20	32.66	33.73	54	-20.27	AV	Vertical
2500.00	45.43	3.49	29.20	32.66	45.21	74	-28.79	Pk	Horizontal
2500.00	33.90	3.49	29.20	32.66	33.66	54	-20.34	AV	Horizontal
802.11g(Channel 01&11)									
2310.00	46.06	3.40	27.80	32.41	44.69	74	-29.31	Pk	Horizontal
2310.00	33.47	3.40	27.80	32.41	32.07	54	-21.93	AV	Horizontal
2310.00	44.66	3.40	27.80	32.41	43.44	74	-30.56	Pk	Vertical
2310.00	33.64	3.40	27.80	32.41	32.22	54	-21.78	AV	Vertical
2390.00	45.62	3.45	27.70	32.49	44.10	74	-29.90	Pk	Vertical
2390.00	34.54	3.45	27.70	32.49	33.01	54	-20.99	AV	Vertical
2390.00	46.14	3.45	27.70	32.49	44.79	74	-29.21	Pk	Horizontal
2390.00	34.33	3.45	27.70	32.49	32.99	54	-21.01	AV	Horizontal
2483.50	47.30	3.48	28.53	32.55	46.51	74	-27.49	Pk	Vertical
2483.50	33.98	3.48	28.53	32.55	33.28	54	-20.72	AV	Vertical
2483.50	46.23	3.48	28.53	32.55	45.56	74	-28.44	Pk	Horizontal
2483.50	33.97	3.48	28.53	32.55	33.17	54	-20.83	AV	Horizontal
2500.00	45.38	3.49	29.20	32.66	45.27	74	-28.73	Pk	Vertical
2500.00	33.79	3.49	29.20	32.66	33.73	54	-20.27	AV	Vertical
2500.00	45.45	3.49	29.20	32.66	45.21	74	-28.79	Pk	Horizontal
2500.00	33.64	3.49	29.20	32.66	33.66	54	-20.34	AV	Horizontal

802.11n20(Channel 01&11)									
2310.00	46.14	3.40	27.80	32.41	44.93	74	-29.07	Pk	Horizontal
2310.00	33.57	3.40	27.80	32.41	32.36	54	-21.64	AV	Horizontal
2310.00	44.95	3.40	27.80	32.41	43.74	74	-30.26	Pk	Vertical
2310.00	33.57	3.40	27.80	32.41	32.36	54	-21.64	AV	Vertical
2390.00	45.58	3.45	27.70	32.49	44.24	74	-29.76	Pk	Vertical
2390.00	34.36	3.45	27.70	32.49	33.02	54	-20.98	AV	Vertical
2390.00	46.13	3.45	27.70	32.49	44.79	74	-29.21	Pk	Horizontal
2390.00	34.43	3.45	27.70	32.49	33.09	54	-20.91	AV	Horizontal
2483.50	47.28	3.48	28.53	32.55	46.74	74	-27.26	Pk	Vertical
2483.50	33.96	3.48	28.53	32.55	33.42	54	-20.58	AV	Vertical
2483.50	46.35	3.48	28.53	32.55	45.81	74	-28.19	Pk	Horizontal
2483.50	33.76	3.48	28.53	32.55	33.22	54	-20.78	AV	Horizontal
2500.00	45.42	3.49	29.20	32.66	45.45	74	-28.55	Pk	Vertical
2500.00	33.91	3.49	29.20	32.66	33.94	54	-20.06	AV	Vertical
2500.00	45.23	3.49	29.20	32.66	45.26	74	-28.74	Pk	Horizontal
2500.00	33.84	3.49	29.20	32.66	33.87	54	-20.13	AV	Horizontal
802.11n40(Channel 03&09)									
2310.00	45.99	3.40	27.80	32.41	44.78	74	-29.22	Pk	Horizontal
2310.00	33.29	3.40	27.80	32.41	32.08	54	-21.92	AV	Horizontal
2310.00	44.69	3.40	27.80	32.41	43.48	74	-30.52	Pk	Vertical
2310.00	33.65	3.40	27.80	32.41	32.44	54	-21.56	AV	Vertical
2390.00	45.67	3.45	27.70	32.49	44.33	74	-29.67	Pk	Vertical
2390.00	34.38	3.45	27.70	32.49	33.04	54	-20.96	AV	Vertical
2390.00	46.16	3.45	27.70	32.49	44.82	74	-29.18	Pk	Horizontal
2390.00	34.41	3.45	27.70	32.49	33.07	54	-20.93	AV	Horizontal
2483.50	47.13	3.48	28.53	32.55	46.59	74	-27.41	Pk	Vertical
2483.50	34.03	3.48	28.53	32.55	33.49	54	-20.51	AV	Vertical
2483.50	46.34	3.48	28.53	32.55	45.80	74	-28.20	Pk	Horizontal
2483.50	33.86	3.48	28.53	32.55	33.32	54	-20.68	AV	Horizontal
2500.00	45.42	3.49	29.20	32.66	45.45	74	-28.55	Pk	Vertical
2500.00	33.82	3.49	29.20	32.66	33.85	54	-20.15	AV	Vertical
2500.00	45.24	3.49	29.20	32.66	45.27	74	-28.73	Pk	Horizontal
2500.00	33.67	3.49	29.20	32.66	33.70	54	-20.30	AV	Horizontal

802.11ax20(Channel 01&11)									
2310.00	45.96	3.40	27.80	32.41	44.75	74	-29.25	Pk	Horizontal
2310.00	33.36	3.40	27.80	32.41	32.15	54	-21.85	AV	Horizontal
2310.00	44.90	3.40	27.80	32.41	43.69	74	-30.31	Pk	Vertical
2310.00	33.70	3.40	27.80	32.41	32.49	54	-21.51	AV	Vertical
2390.00	45.52	3.45	27.70	32.49	44.18	74	-29.82	Pk	Vertical
2390.00	34.42	3.45	27.70	32.49	33.08	54	-20.92	AV	Vertical
2390.00	46.40	3.45	27.70	32.49	45.06	74	-28.94	Pk	Horizontal
2390.00	34.54	3.45	27.70	32.49	33.20	54	-20.80	AV	Horizontal
2483.50	47.34	3.48	28.53	32.55	46.80	74	-27.20	Pk	Vertical
2483.50	33.94	3.48	28.53	32.55	33.40	54	-20.60	AV	Vertical
2483.50	46.18	3.48	28.53	32.55	45.64	74	-28.36	Pk	Horizontal
2483.50	33.87	3.48	28.53	32.55	33.33	54	-20.67	AV	Horizontal
2500.00	45.31	3.49	29.20	32.66	45.34	74	-28.66	Pk	Vertical
2500.00	33.73	3.49	29.20	32.66	33.76	54	-20.24	AV	Vertical
2500.00	45.46	3.49	29.20	32.66	45.49	74	-28.51	Pk	Horizontal
2500.00	33.92	3.49	29.20	32.66	33.95	54	-20.05	AV	Horizontal
802.11ax40(Channel 03&09)									
2310.00	45.92	3.40	27.80	32.41	44.71	74	-29.29	Pk	Horizontal
2310.00	33.45	3.40	27.80	32.41	32.24	54	-21.76	AV	Horizontal
2310.00	44.69	3.40	27.80	32.41	43.48	74	-30.52	Pk	Vertical
2310.00	33.73	3.40	27.80	32.41	32.52	54	-21.48	AV	Vertical
2390.00	45.63	3.45	27.70	32.49	44.29	74	-29.71	Pk	Vertical
2390.00	34.59	3.45	27.70	32.49	33.25	54	-20.75	AV	Vertical
2390.00	46.22	3.45	27.70	32.49	44.88	74	-29.12	Pk	Horizontal
2390.00	34.43	3.45	27.70	32.49	33.09	54	-20.91	AV	Horizontal
2483.50	47.21	3.48	28.53	32.55	46.67	74	-27.33	Pk	Vertical
2483.50	33.86	3.48	28.53	32.55	33.32	54	-20.68	AV	Vertical
2483.50	46.27	3.48	28.53	32.55	45.73	74	-28.27	Pk	Horizontal
2483.50	33.96	3.48	28.53	32.55	33.42	54	-20.58	AV	Horizontal
2500.00	45.44	3.49	29.20	32.66	45.47	74	-28.53	Pk	Vertical
2500.00	33.97	3.49	29.20	32.66	34.00	54	-20.00	AV	Vertical
2500.00	45.20	3.49	29.20	32.66	45.23	74	-28.77	Pk	Horizontal
2500.00	33.93	3.49	29.20	32.66	33.96	54	-20.04	AV	Horizontal

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor.

5.4 Peak Output Power

5.4.1 Limit

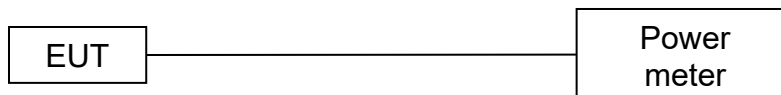
FCC Part15 Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(b)(3)	Peak output power	1 watt or 30dBm	2400-2483.5

5.4.2 Test Procedure

1. PKPM1 Peak power meter measurement

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

5.4.3 Test Setup



5.4.4 Test Results

EUT:	Wireless carplay adapter	Model Name:	TY-001
Test Mode:	TX	Test Voltage:	DC 5V from adapter AC 120V/60Hz

802.11b

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH01	2412	17.48	30
CH06	2437	16.25	30
CH11	2462	17.70	30

802.11g

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH01	2412	16.71	30
CH06	2437	16.30	30
CH11	2462	16.02	30

802.11n20

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH01	2412	16.74	30
CH06	2437	16.26	30
CH11	2462	16.10	30

802.11n40

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH03	2422	16.83	30
CH06	2437	16.92	30
CH09	2452	17.03	30

802.11ax20

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH01	2412	16.32	30
CH06	2437	17.70	30
CH11	2462	17.54	30

802.11ax40

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)	Limit (dBm)
CH03	2422	17.87	30
CH06	2437	17.52	30
CH09	2452	17.60	30

5.5 Power Spectral Density

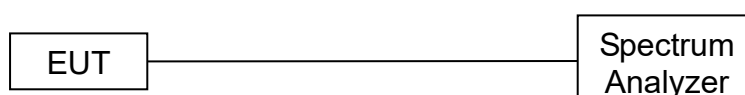
5.5.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247	Power Spectral Density	8 dBm (in any 3kHz)	2400-2483.5

5.5.2 Test Procedure

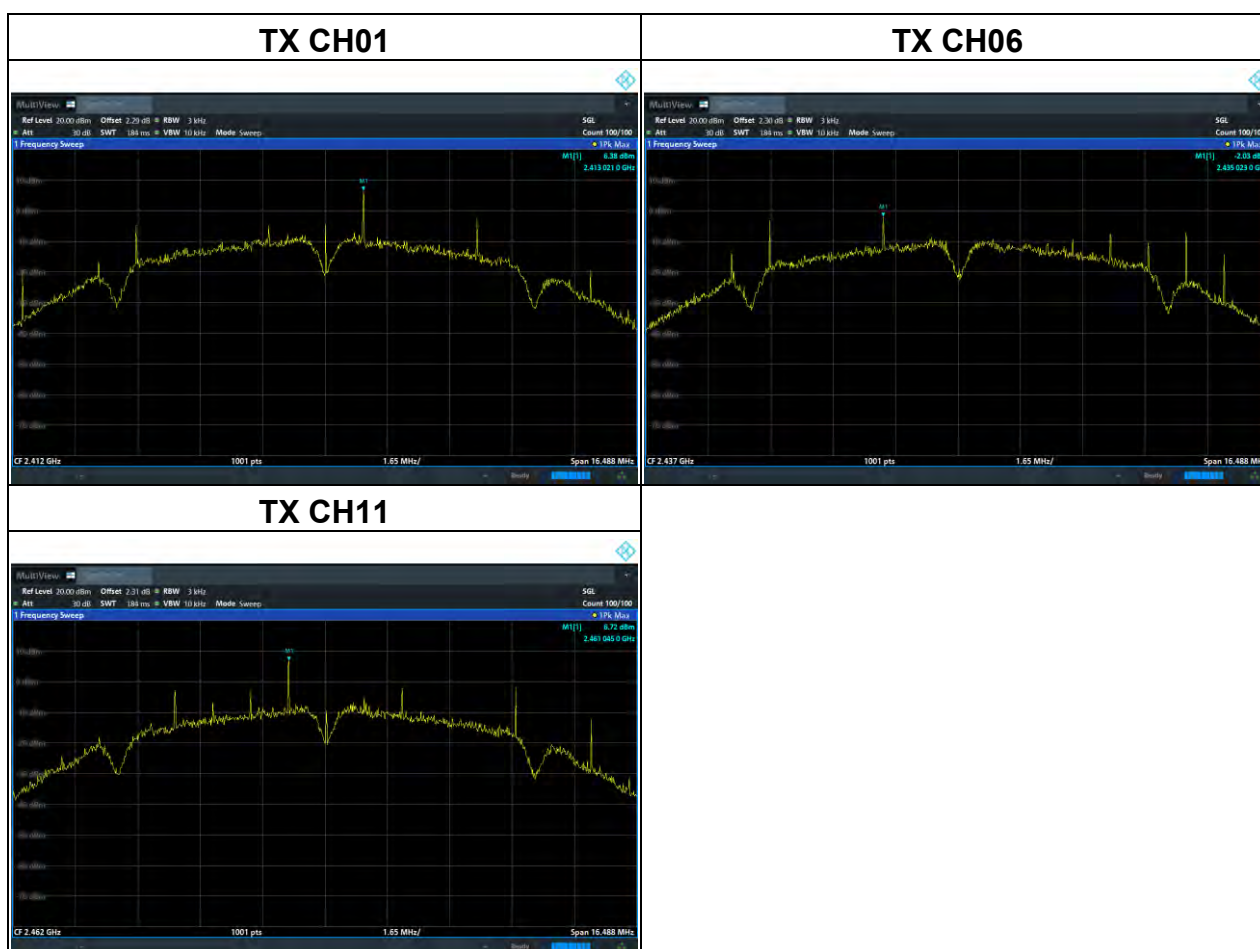
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW $\geq 3 \times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.5.3 Test Setup

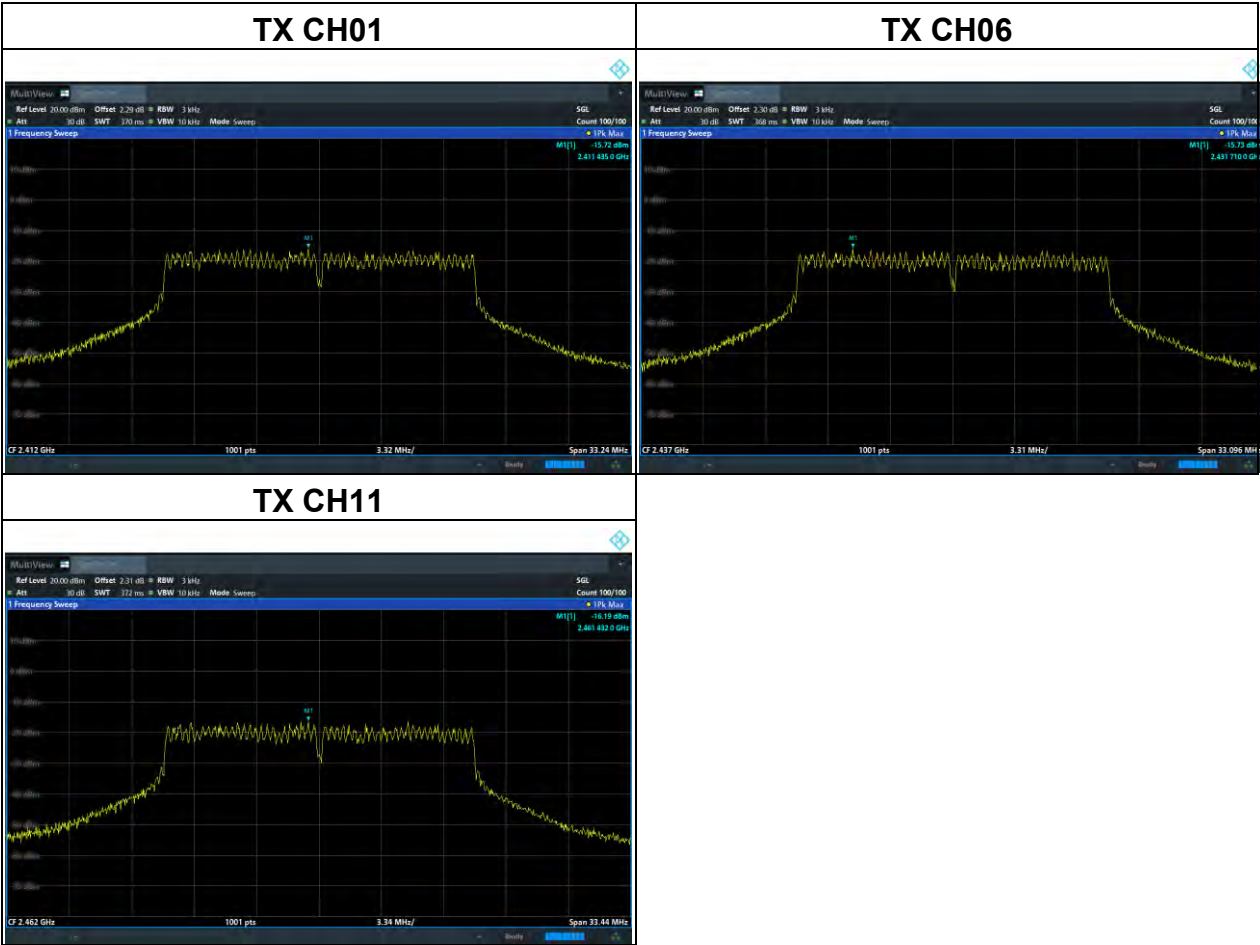


5.5.4 Test Results

802.11b			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	6.38	8	Pass
2437 MHz	-2.03	8	Pass
2462 MHz	6.72	8	Pass

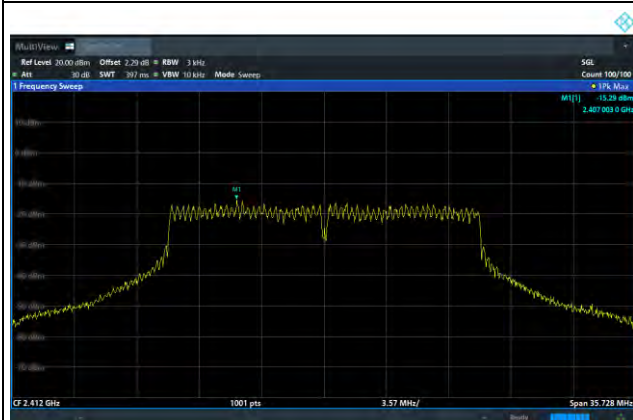


802.11g			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-15.72	8	Pass
2437 MHz	-15.73	8	Pass
2462 MHz	-16.19	8	Pass

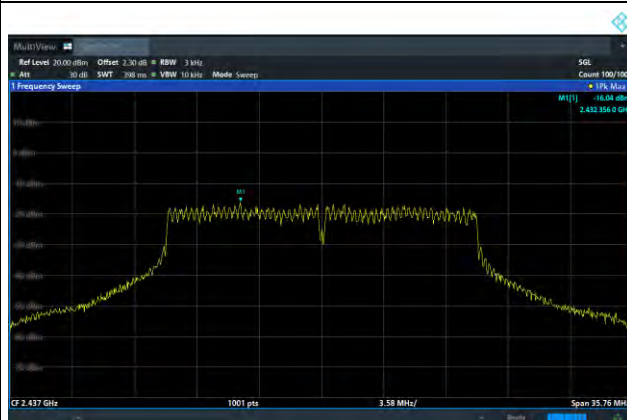


802.11n20			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-15.29	8	Pass
2437 MHz	-16.04	8	Pass
2462 MHz	-16.47	8	Pass

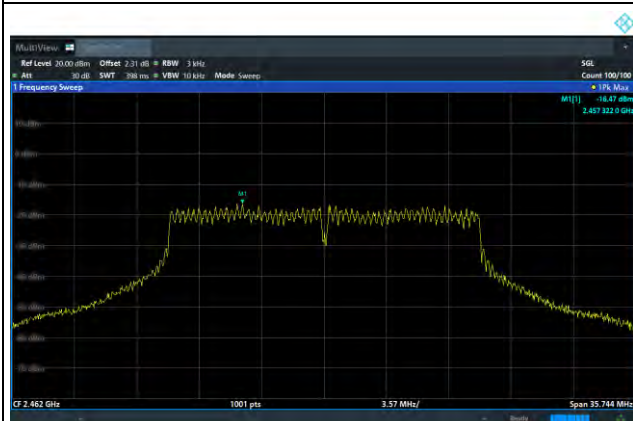
TX CH01



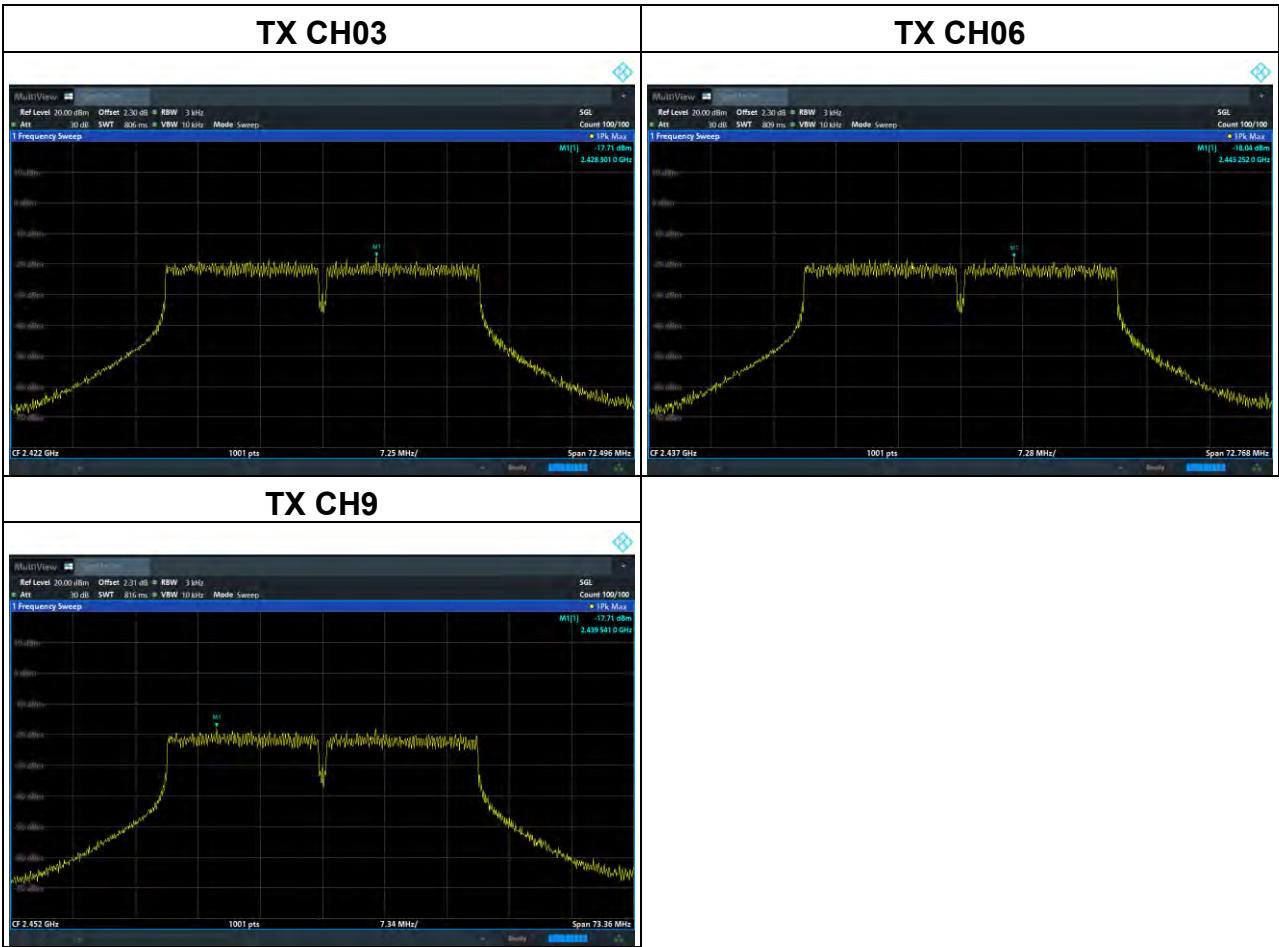
TX CH06



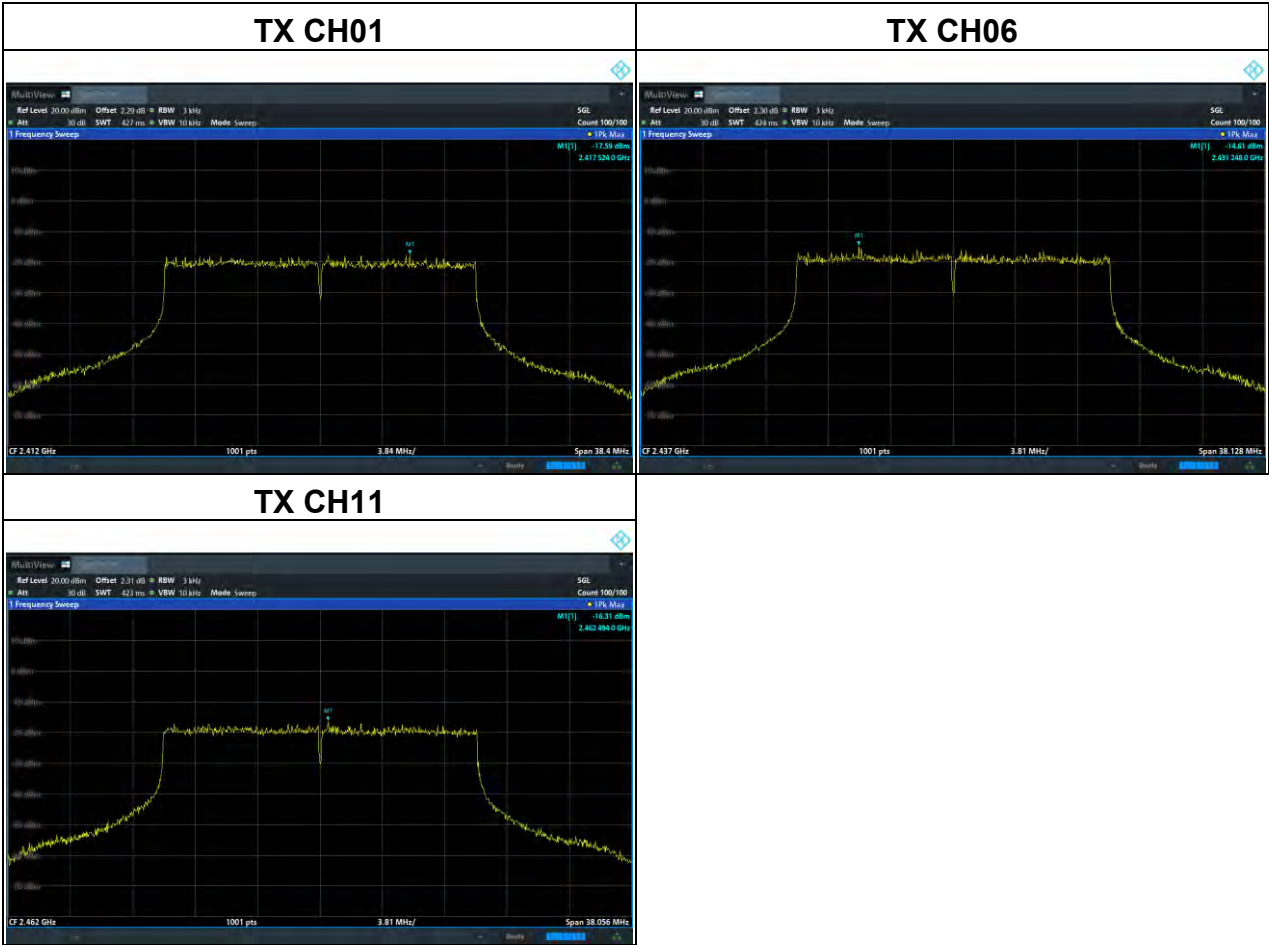
TX CH11



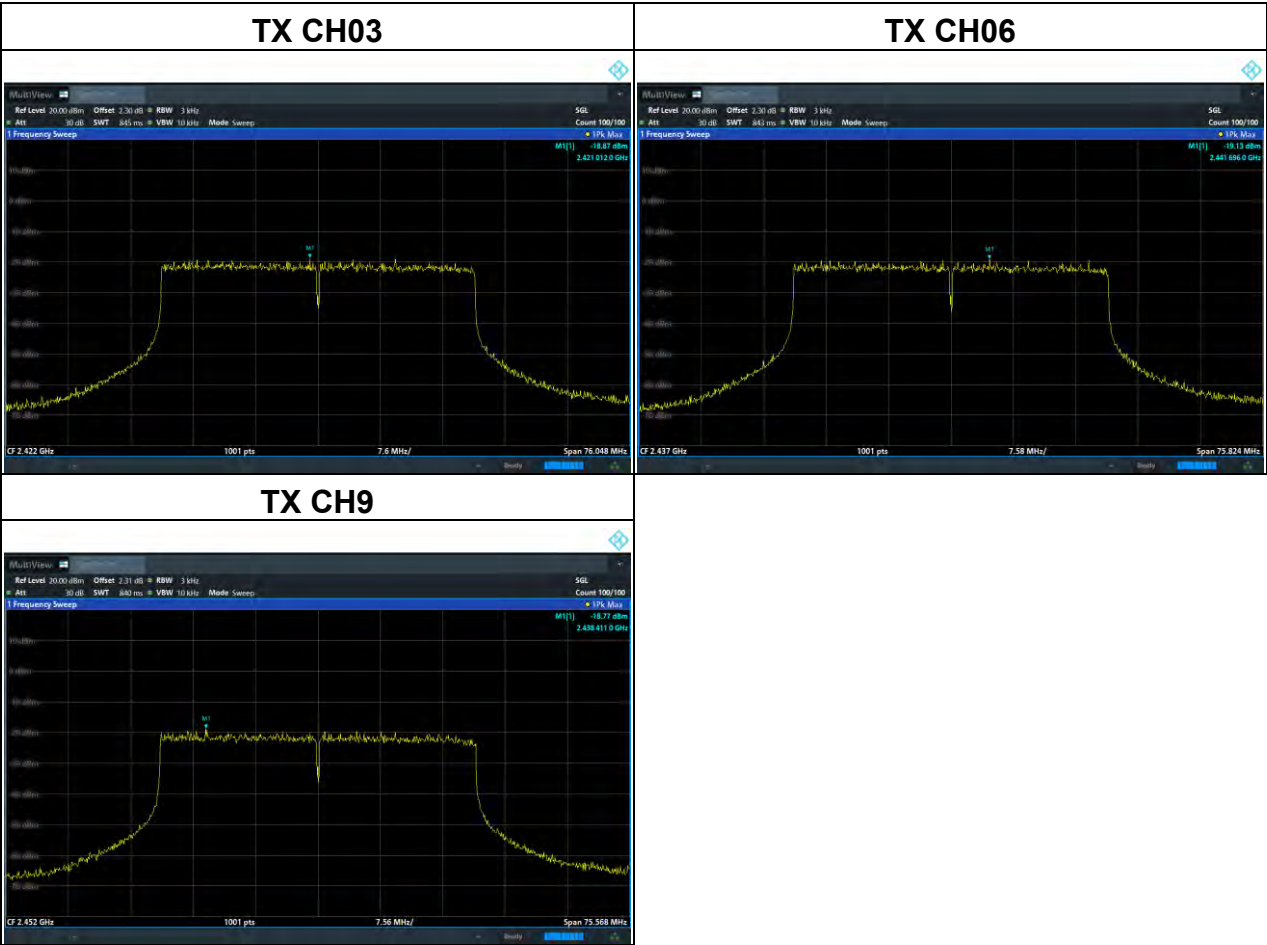
802.11n40			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422 MHz	-17.71	8	Pass
2437 MHz	-18.04	8	Pass
2452 MHz	-17.71	8	Pass



802.11ax20			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-17.59	8	Pass
2437 MHz	-14.61	8	Pass
2462 MHz	-16.31	8	Pass



802.11ax40			
Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422 MHz	-18.87	8	Pass
2437 MHz	-19.13	8	Pass
2452 MHz	-18.77	8	Pass



5.6 6dB Bandwidth

5.6.1 Limit

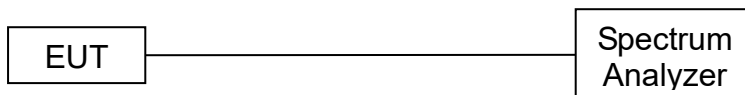
FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(2)	Bandwidth	$\geq 500\text{kHz}$ (6dB bandwidth)	2400-2483.5

5.6.2 Test Procedure

The steps for the first option are as follows:

- Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Trace mode = max-hold.
- Sweep = No faster than coupled (auto) time.
- Allow the trace to stabilize.
- Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value.

5.6.3 Test Setup

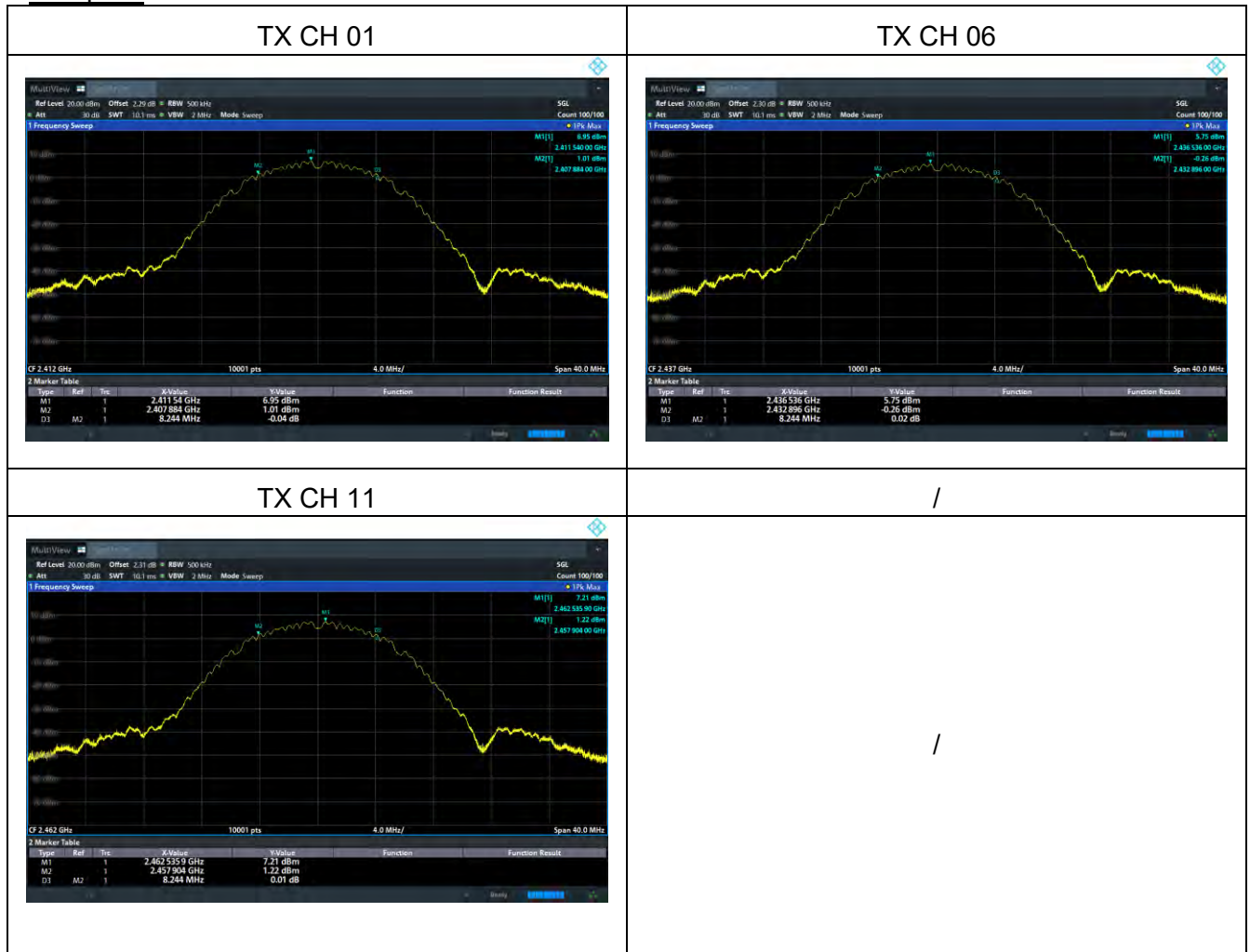


5.6.4 Test Results

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	8.244	500	Pass
Middle	2437	8.244	500	Pass
High	2462	8.244	500	Pass

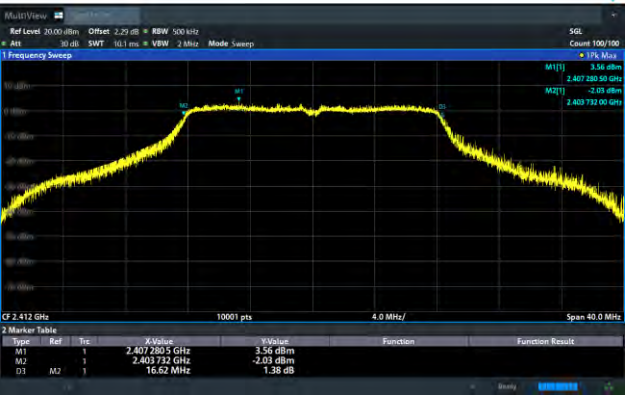
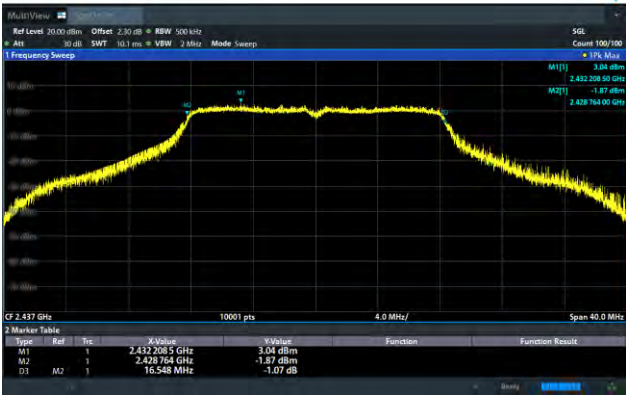
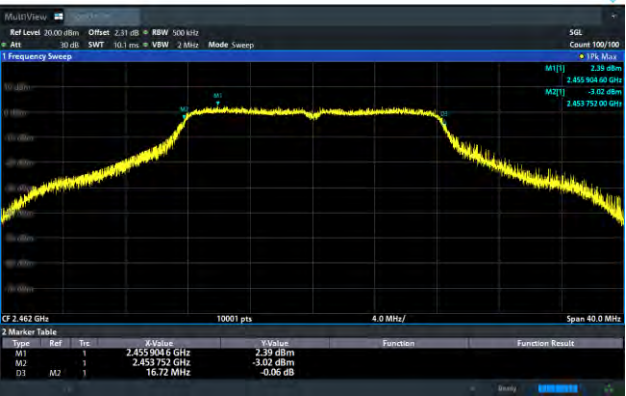
Test plots



EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.620	500	Pass
Middle	2437	16.548	500	Pass
High	2462	16.720	500	Pass

Test plots

TX CH 01 	TX CH 06 
TX CH 11 	/ /

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX n20 Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.864	500	Pass
Middle	2437	17.880	500	Pass
High	2462	17.872	500	Pass

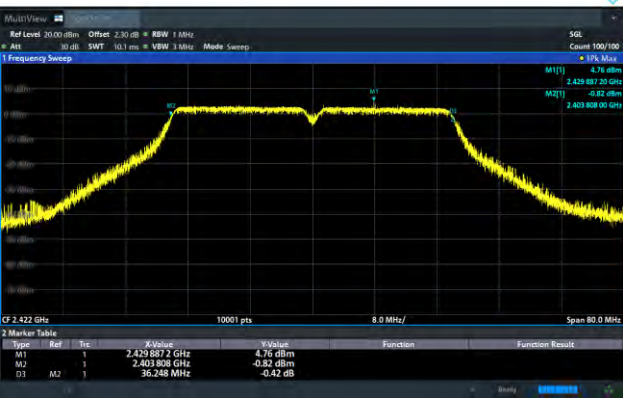
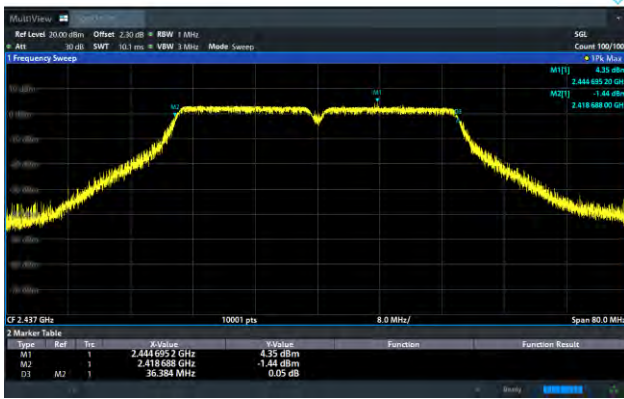
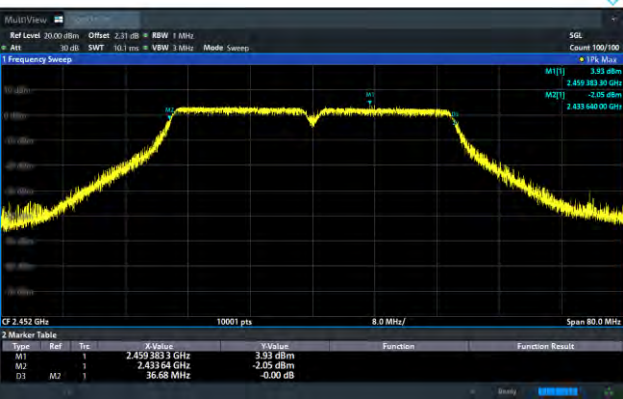
Test plots

TX CH 01	TX CH 06
TX CH 11	/
	/

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX n40 Mode /CH03, CH06, CH09		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.248	500	Pass
Middle	2437	36.384	500	Pass
High	2452	36.680	500	Pass

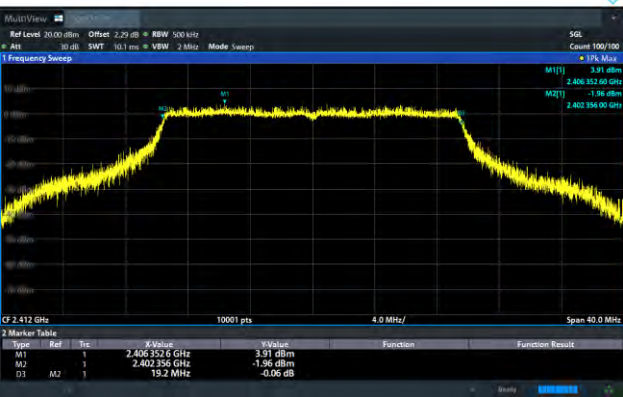
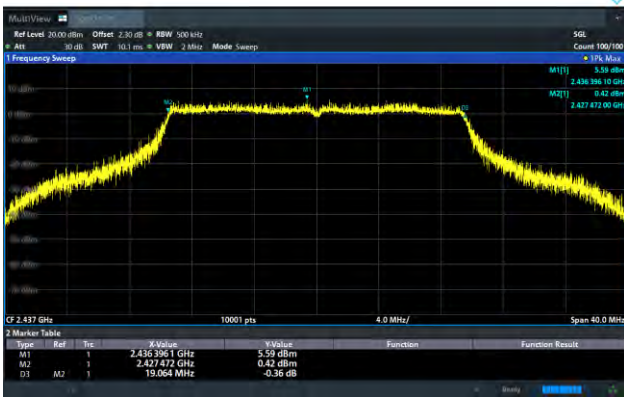
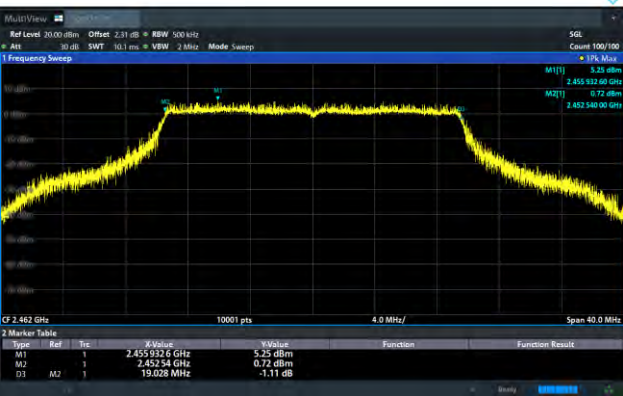
Test plots

TX CH 03 	TX CH 06 
TX CH 09 	/ /

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX ax20 Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	19.20	500	Pass
Middle	2437	19.064	500	Pass
High	2462	19.028	500	Pass

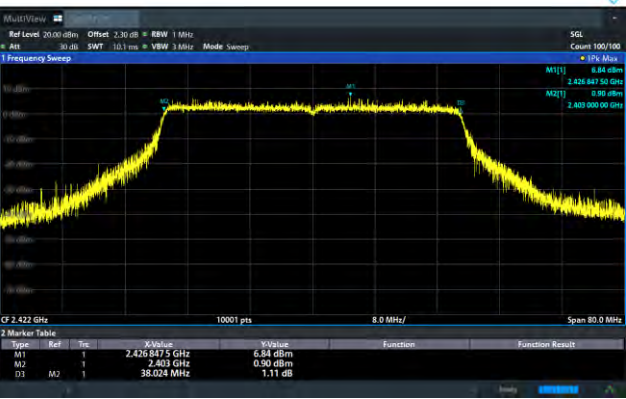
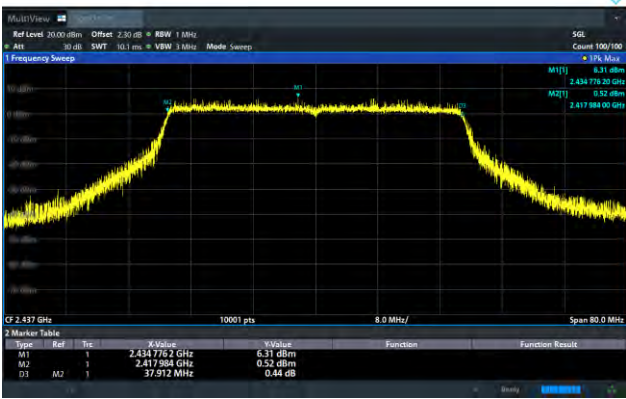
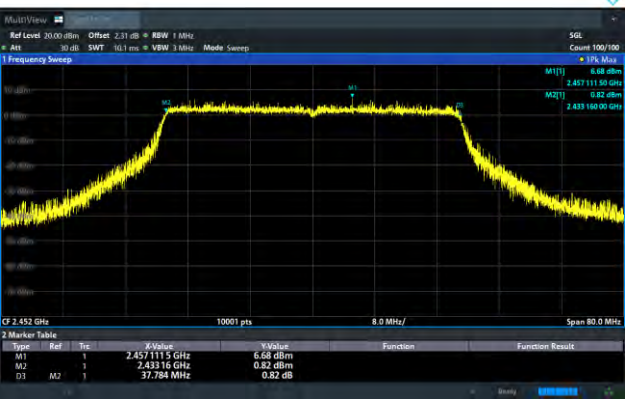
Test plots

TX CH 01 	TX CH 06 
TX CH 11 	/

EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX ax40 Mode /CH03, CH06, CH09		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	38.024	500	Pass
Middle	2437	37.912	500	Pass
High	2452	37.784	500	Pass

Test plots

TX CH 03 	TX CH 06 
TX CH 09 	/ /

5.7 Duty Cycle

5.7.1 Limit

No limit requirement.

5.7.2 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0(b) in KDB 558074 D01 DTS Meas Guidance v05r02.

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 10MHz (the largest available value)

VBW = 10MHz ($\geq$ RBW)

Number of points in Sweep > 100

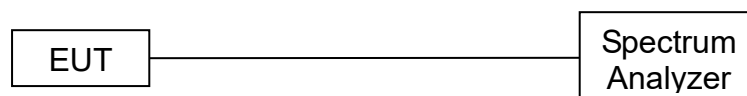
Detector function = peak

Trace = Clear write

Measure Total and Ton

Calculate Duty Cycle = $Ton / Total$

5.7.3 Test Setup



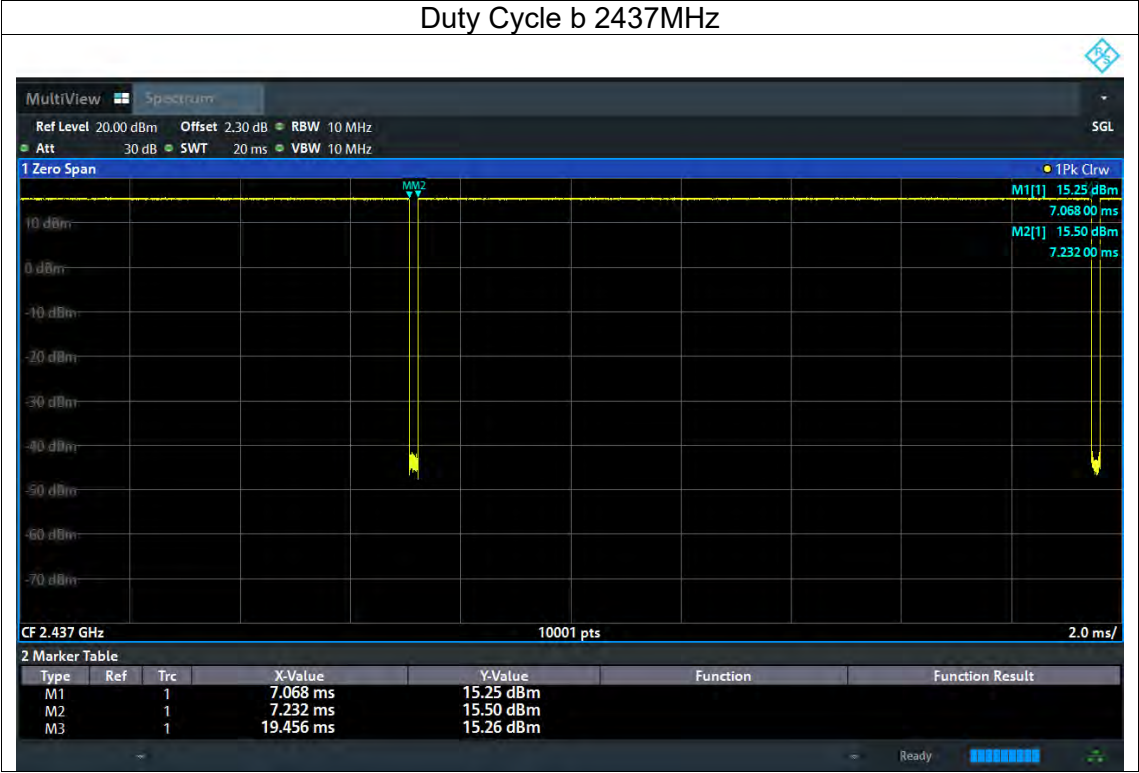
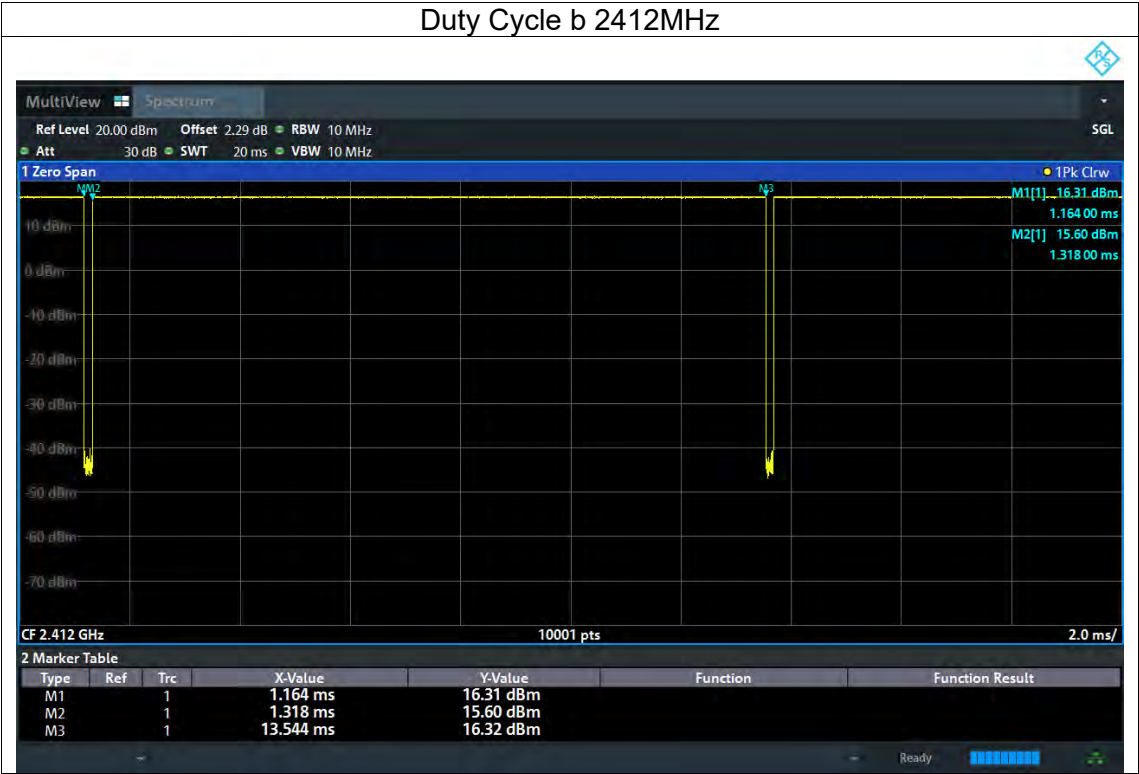
5.7.4 Test Results

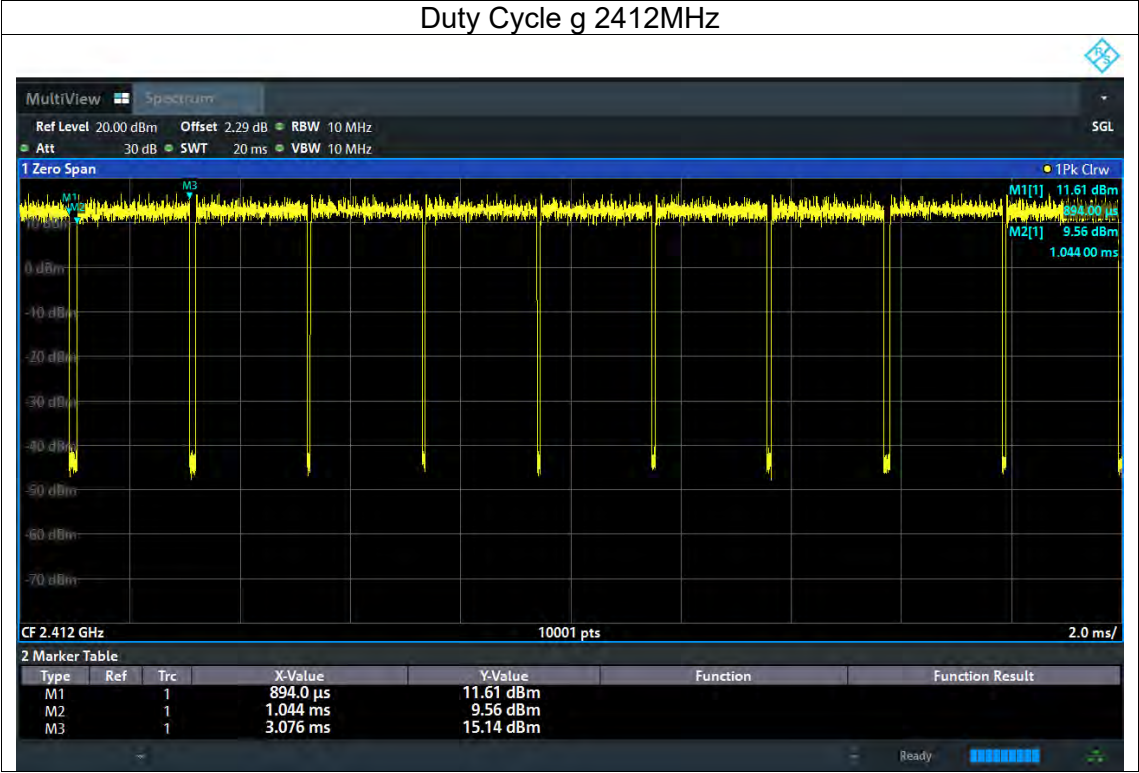
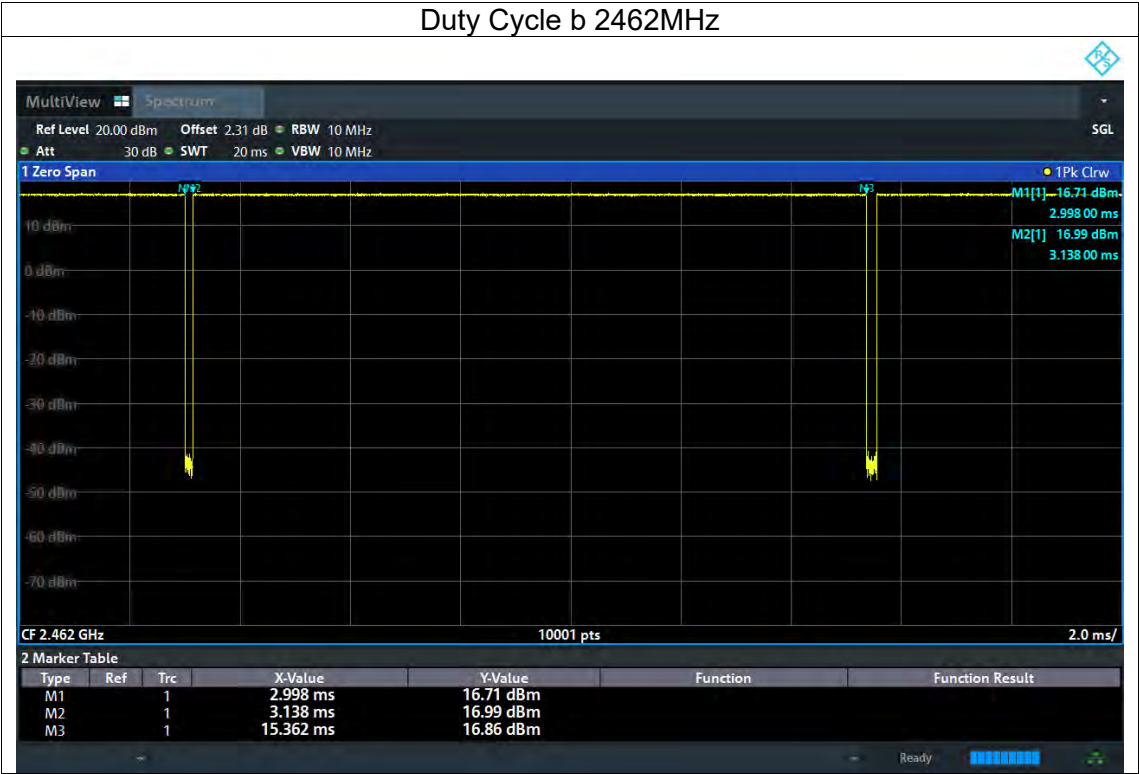
EUT:	Wireless carplay adapter	Model Name:	TY-001
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX b/g/n/ax(20/40) Mode		

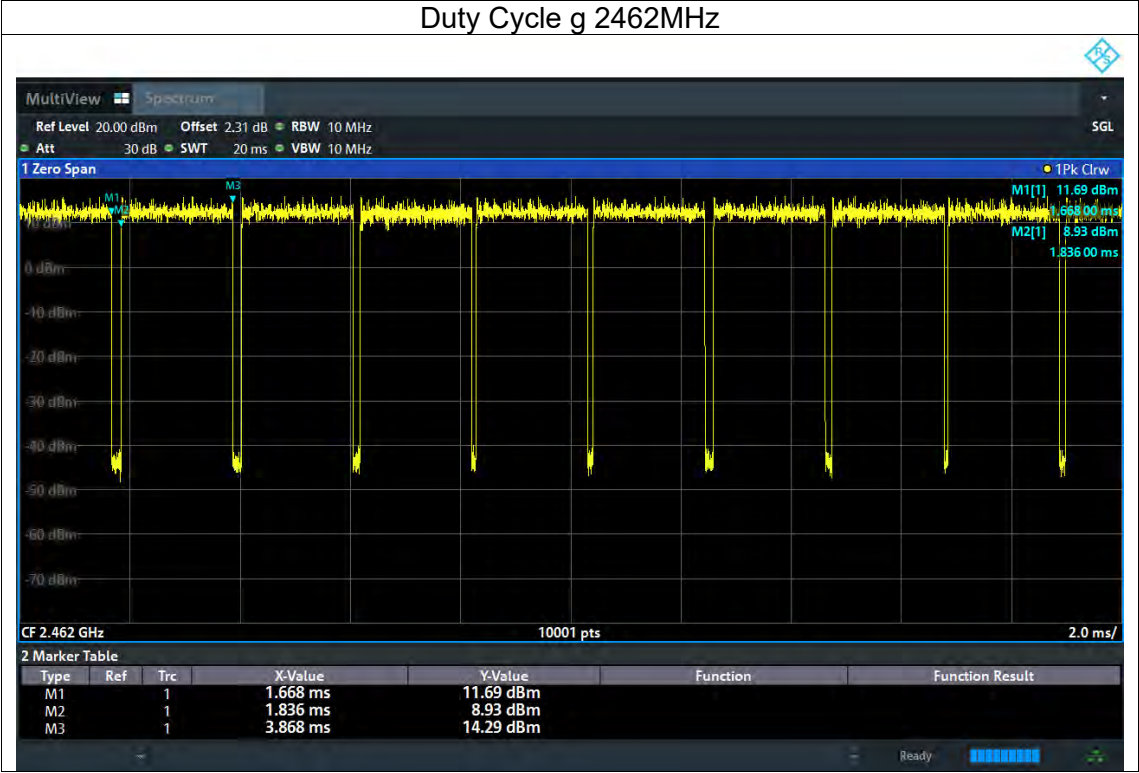
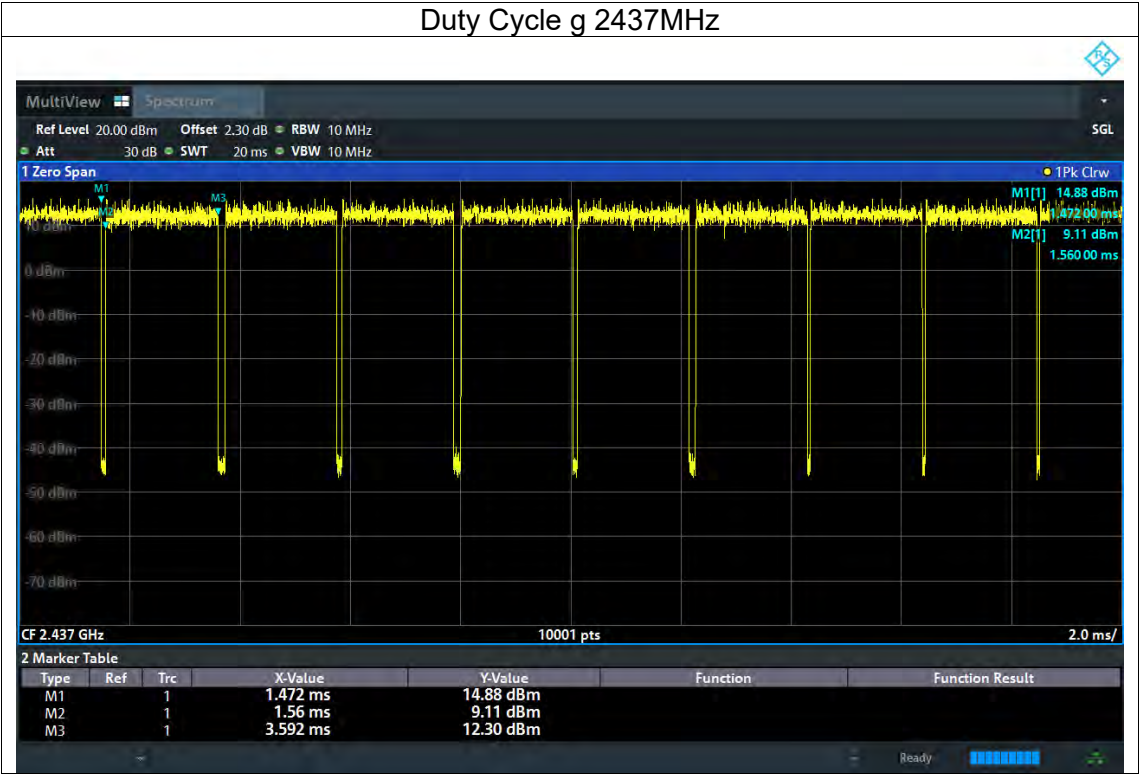
Mode	Data rate	Frequency (MHz)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
b	11 Mbps	2412	12.226	12.380	98.76	0	0.08
b	11 Mbps	2437	12.224	12.388	98.68	0	0.08
b	11 Mbps	2462	12.224	12.364	98.87	0	0.08
g	54 Mbps	2412	2.032	2.182	93.13	0.31	0.49
g	54 Mbps	2437	2.032	2.120	95.85	0.18	0.49
g	54 Mbps	2462	2.032	2.200	92.36	0.35	0.49
n20	MCS15	2412	1.892	2.060	91.84	0.37	0.53
n20	MCS15	2437	1.892	1.988	95.17	0.21	0.53
n20	MCS15	2462	1.892	2.082	90.87	0.42	0.53
n40	MCS15	2422	0.932	1.100	84.73	0.72	1.07
n40	MCS15	2437	0.932	1.050	88.76	0.52	1.07
n40	MCS15	2452	0.932	1.082	86.14	0.65	1.07
ax20	MCS11	2412	3.862	3.950	97.77	0.1	0.26
ax20	MCS11	2437	3.862	4.006	96.41	0.16	0.26
ax20	MCS11	2462	3.862	4.040	95.59	0.2	0.26
ax40	MCS11	2422	1.958	2.108	92.88	0.32	0.51
ax40	MCS11	2437	1.958	2.174	90.06	0.45	0.51
ax40	MCS11	2452	1.958	2.066	94.77	0.23	0.51

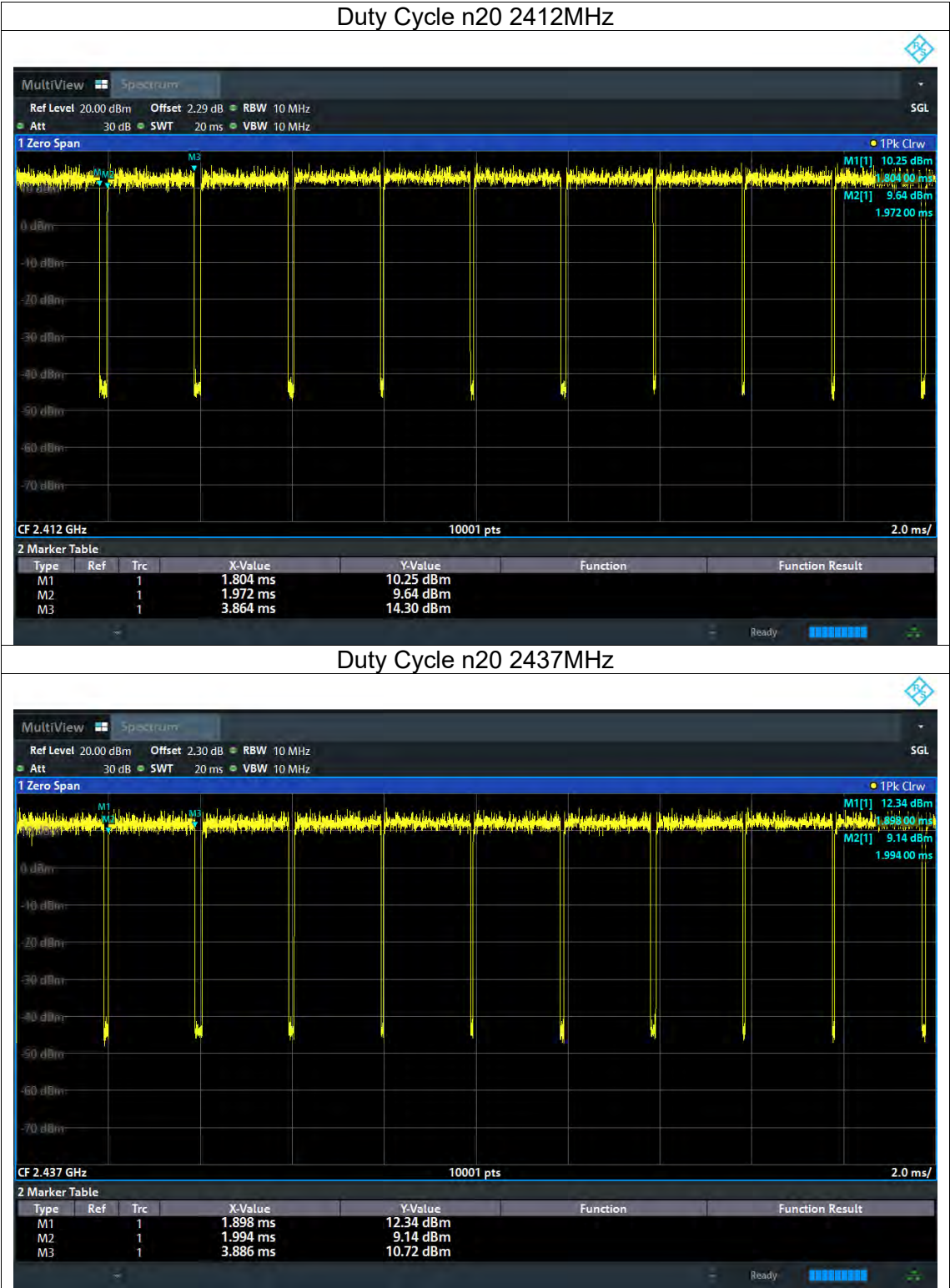
Note:

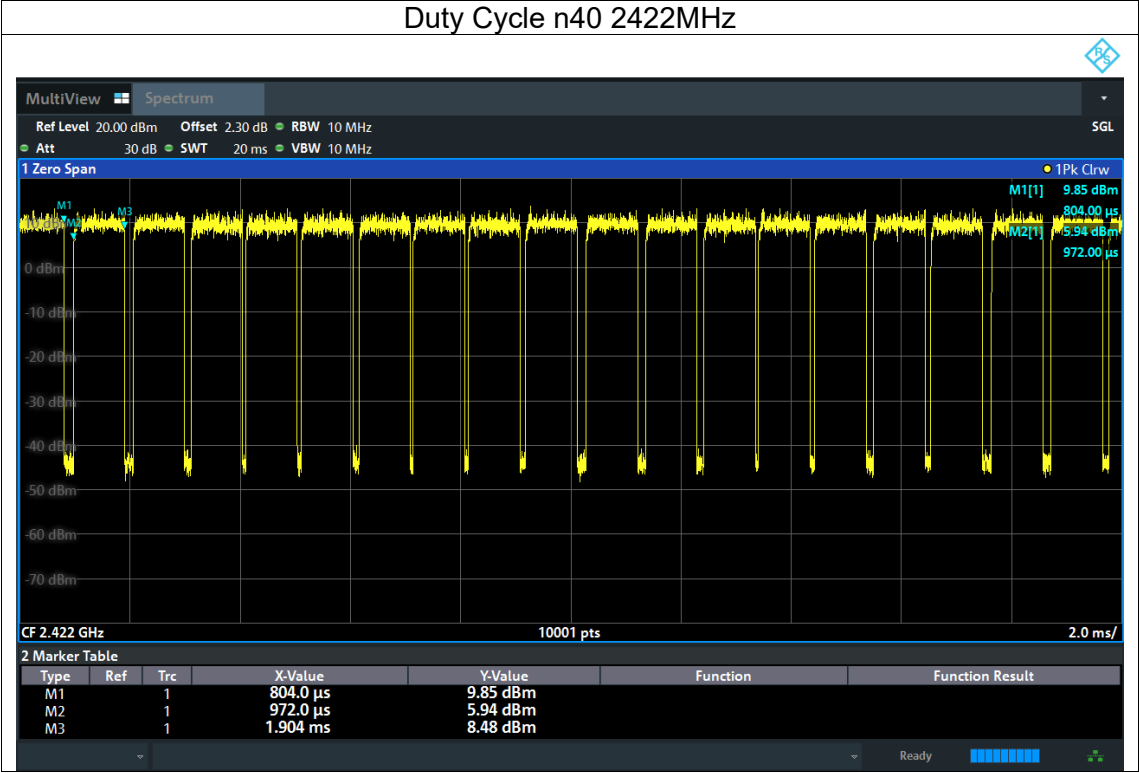
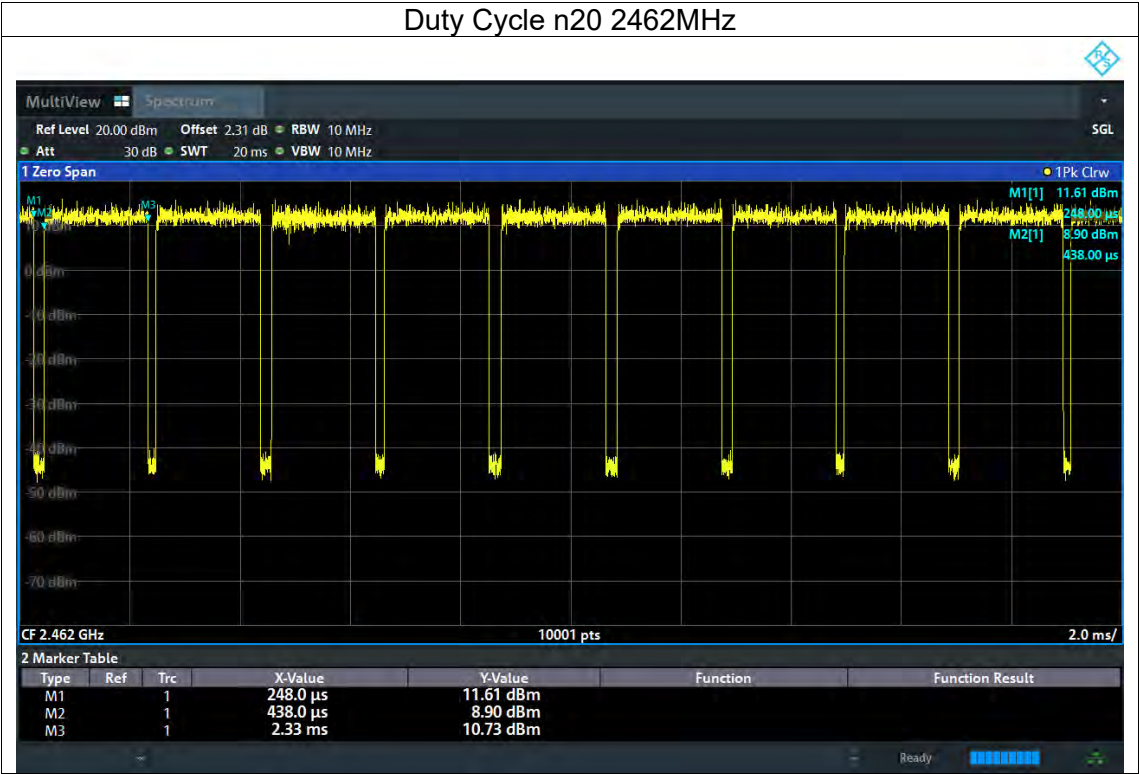
1. Duty Cycle = T_{on} / T_{total}
2. Correction Factor = $10 \log (1 / \text{Duty Cycle})$
3. $1 / T = 1 / T_{on}$

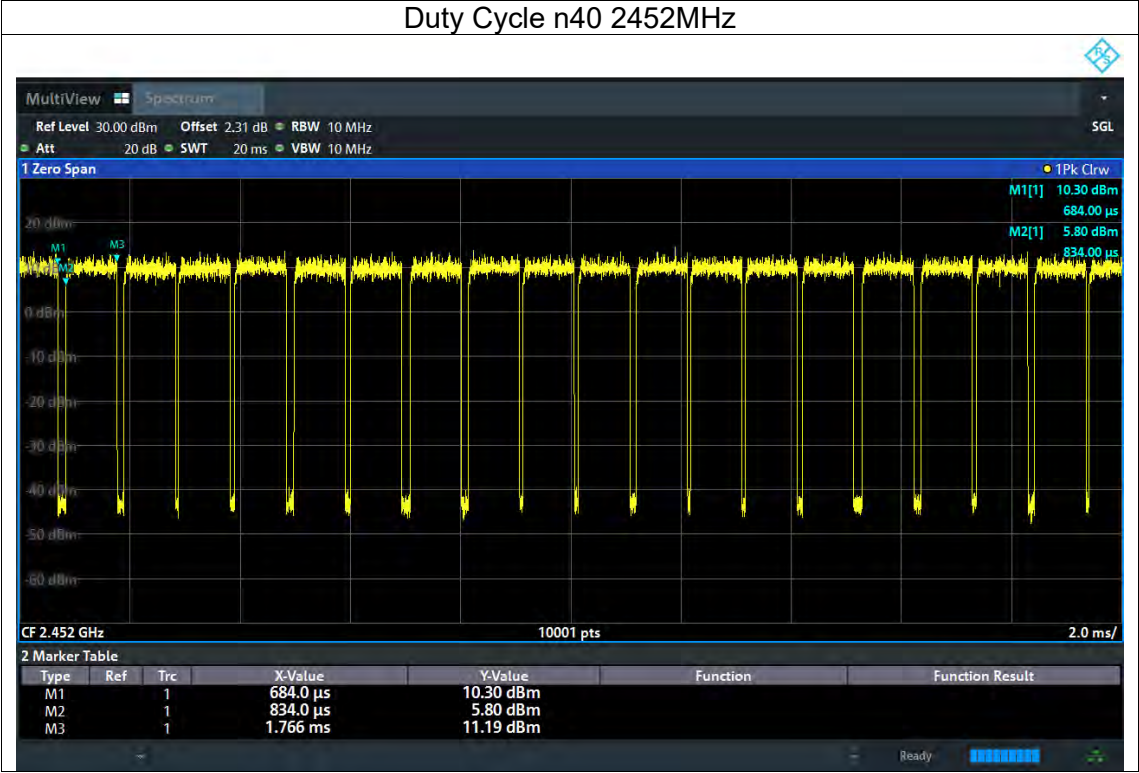
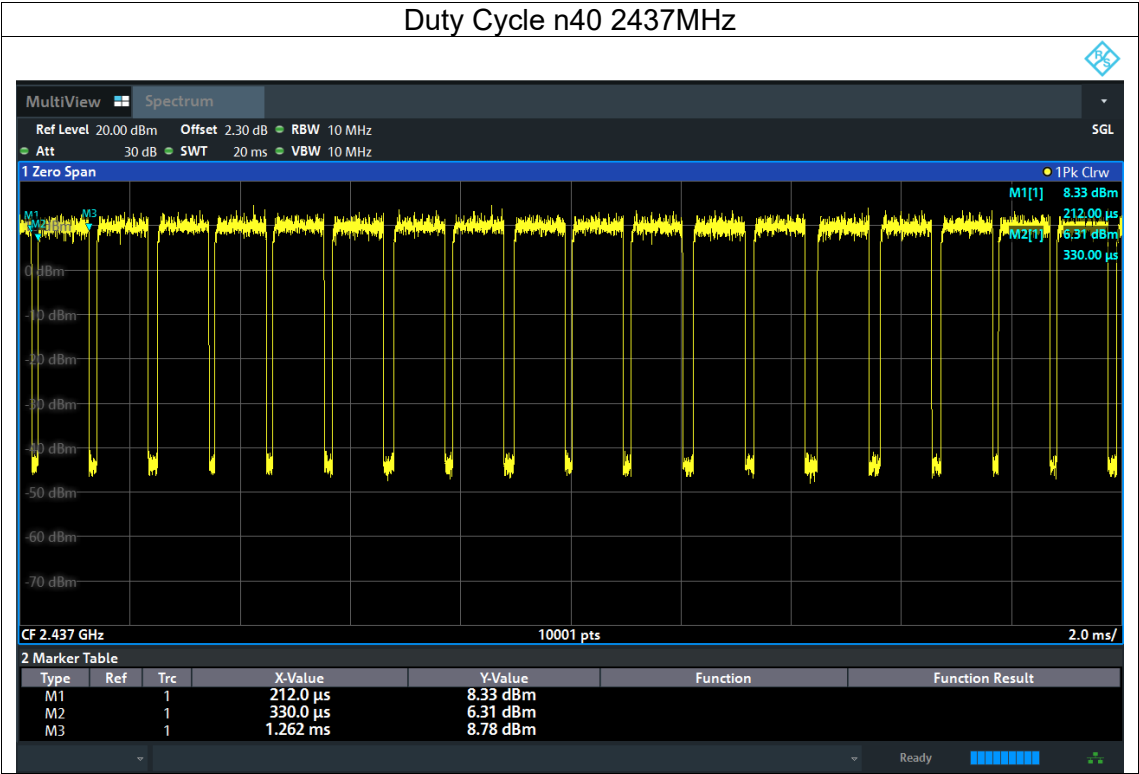


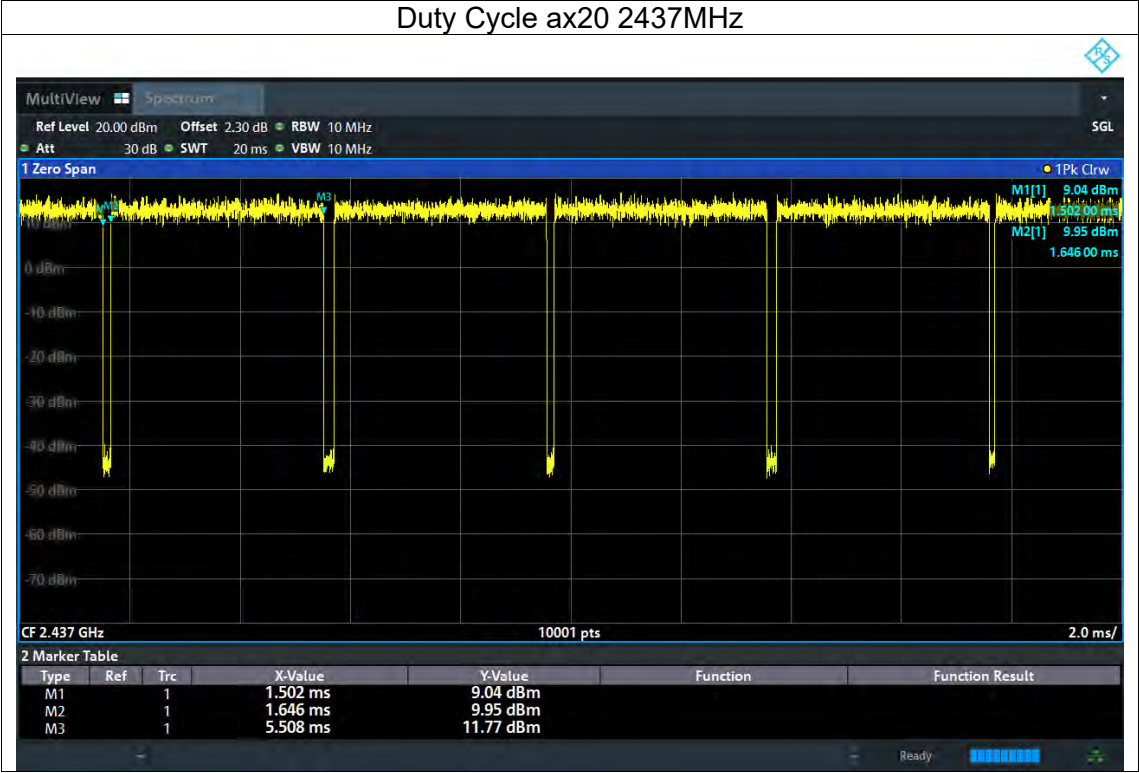
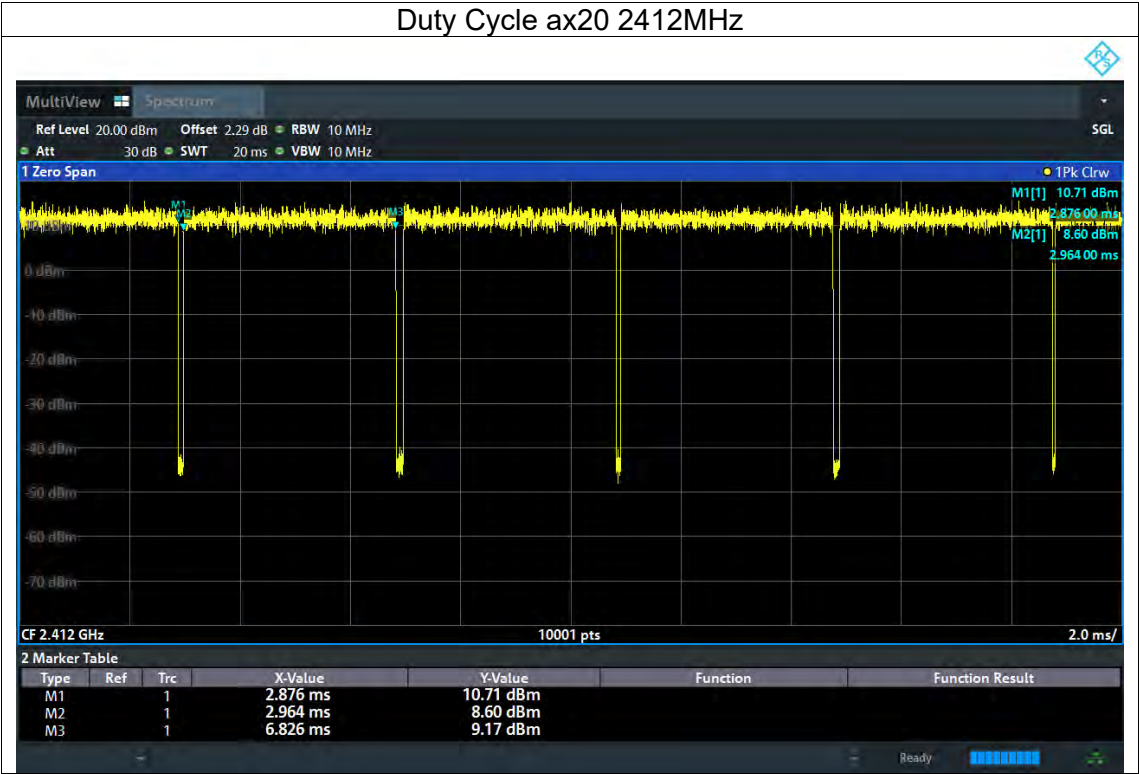


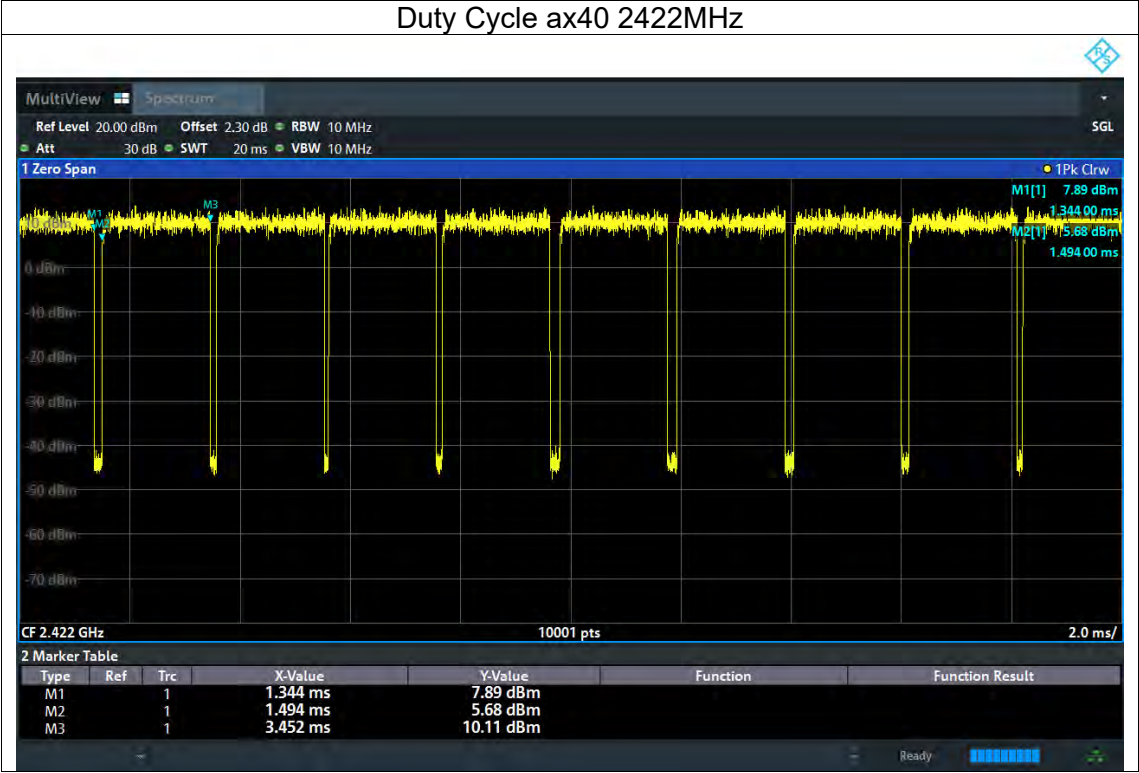
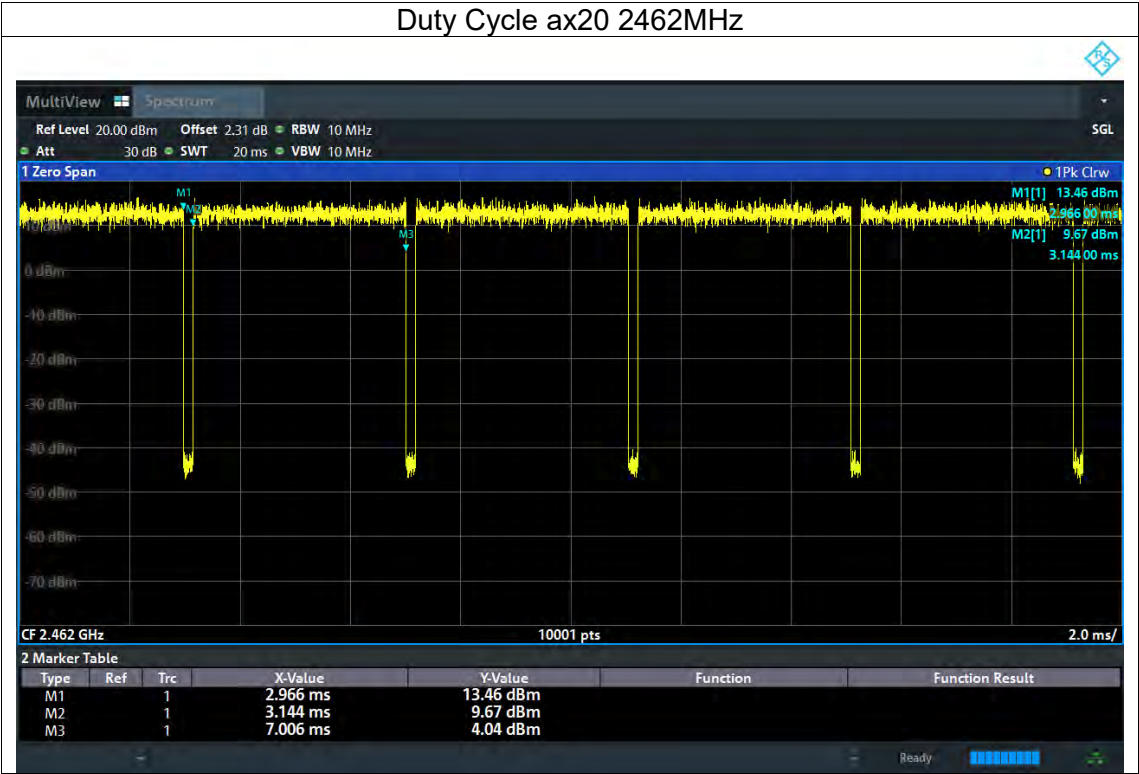


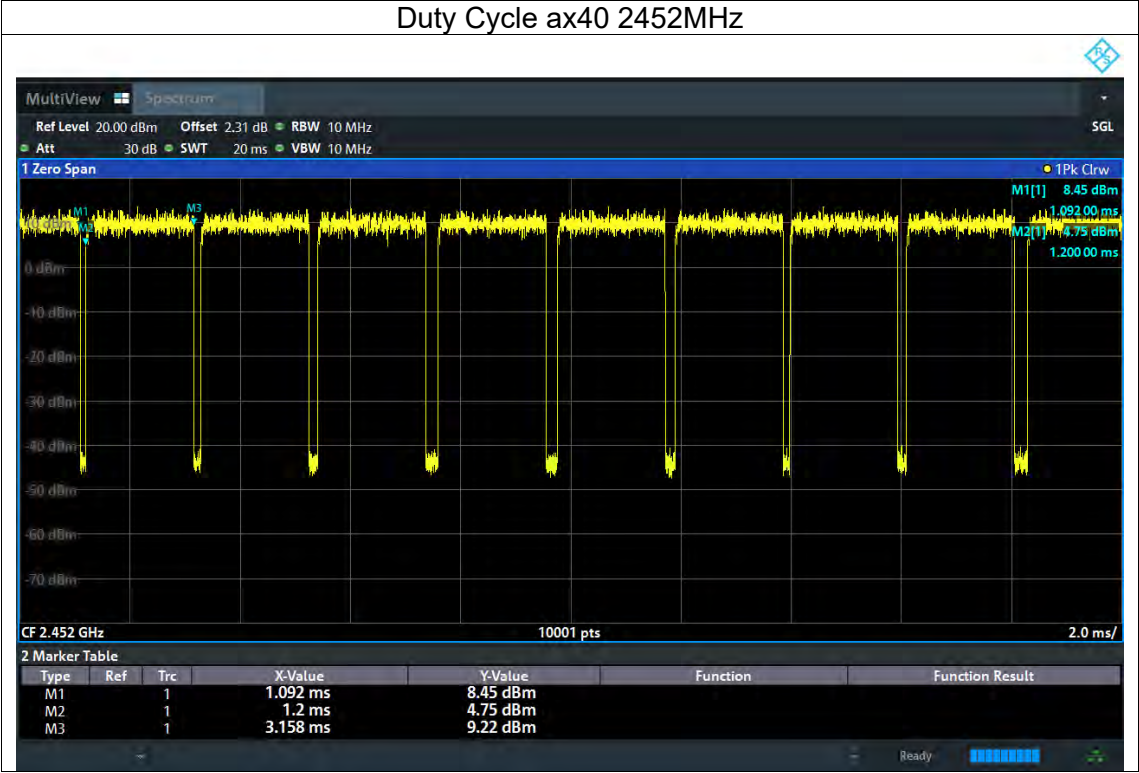
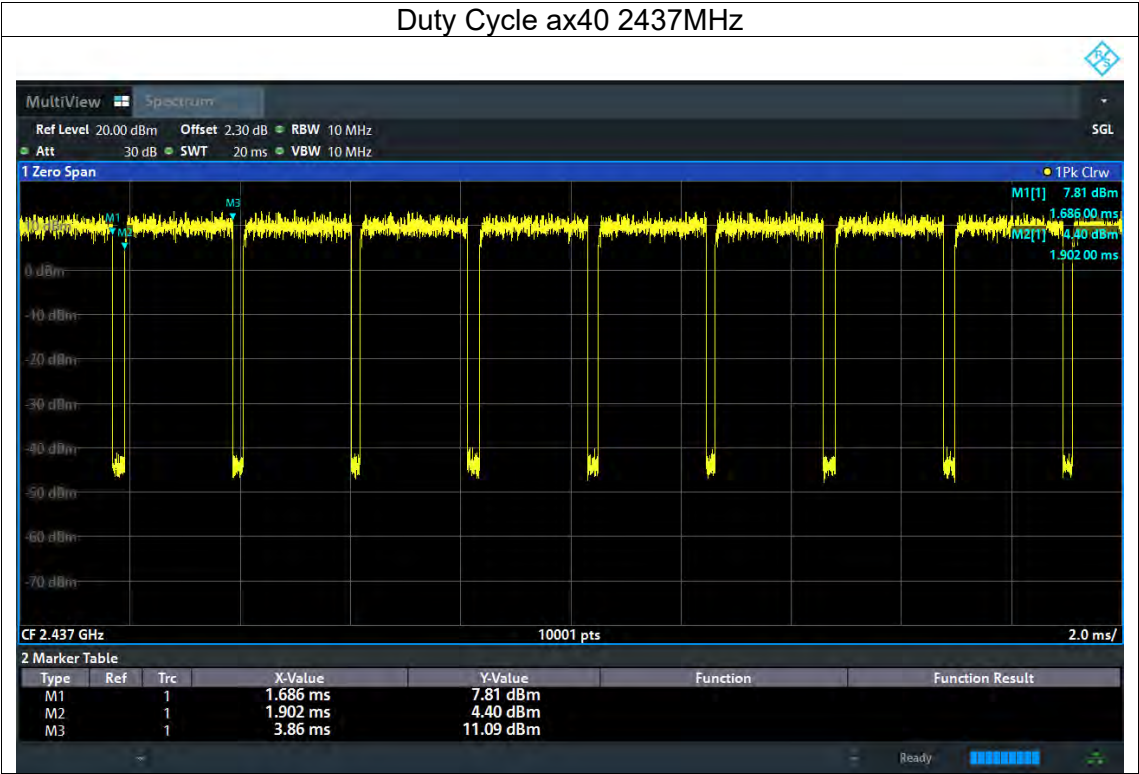












5.8 Conducted Band Edge

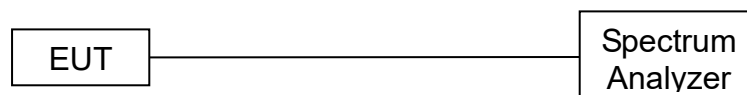
5.8.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.8.2 Test Procedure

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

5.8.3 Test Setup

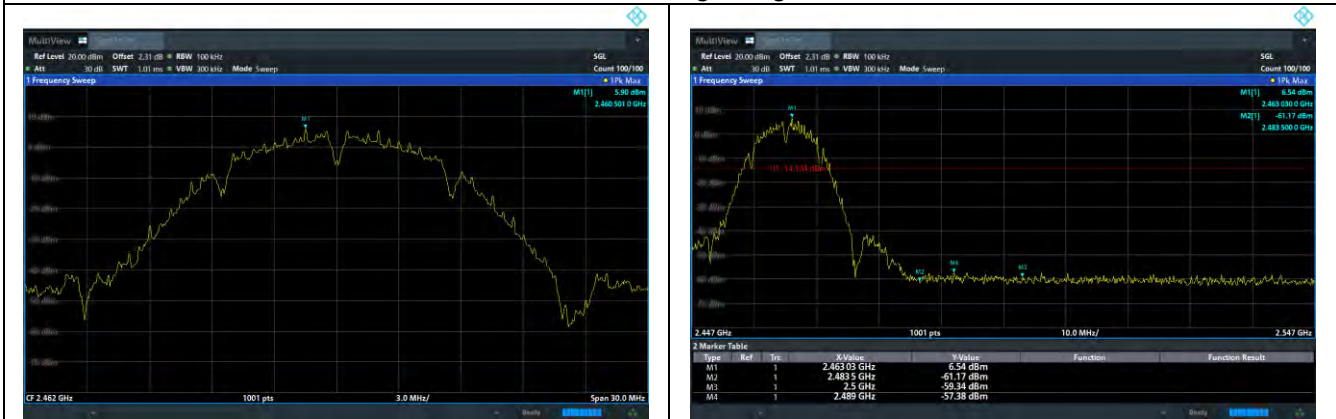


5.8.4 Test Results

802.11b: Band Edge, Left Side



802.11b: Band Edge, Right Side



802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side



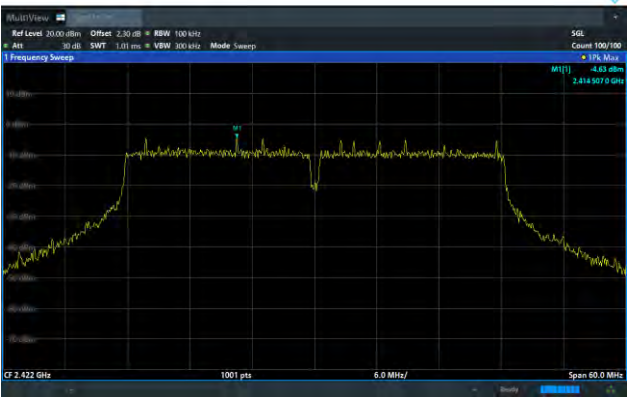
802.11n20: Band Edge, Left Side



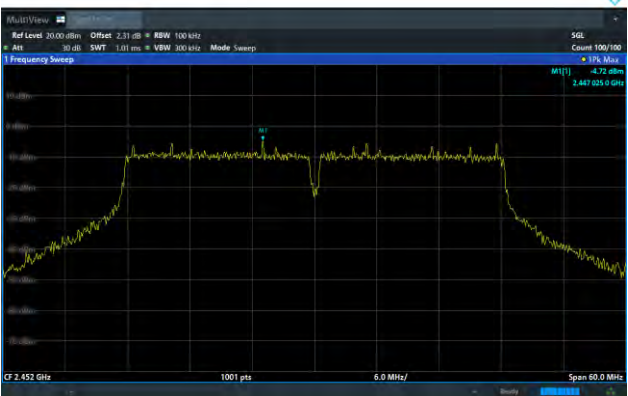
802.11n20: Band Edge, Right Side



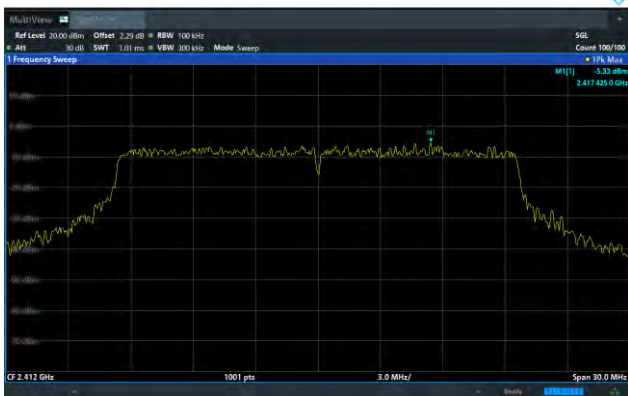
802.11n40: Band Edge, Left Side



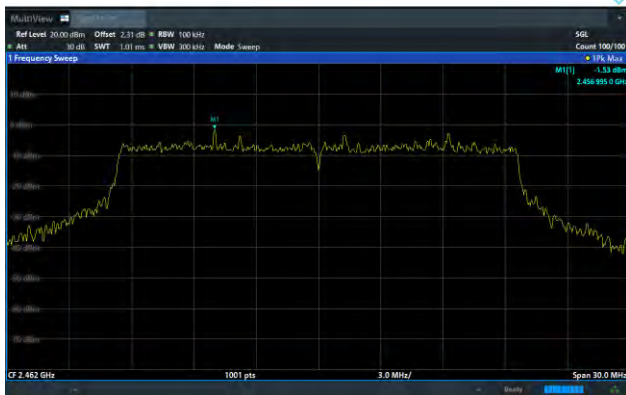
802.11n40: Band Edge, Right Side



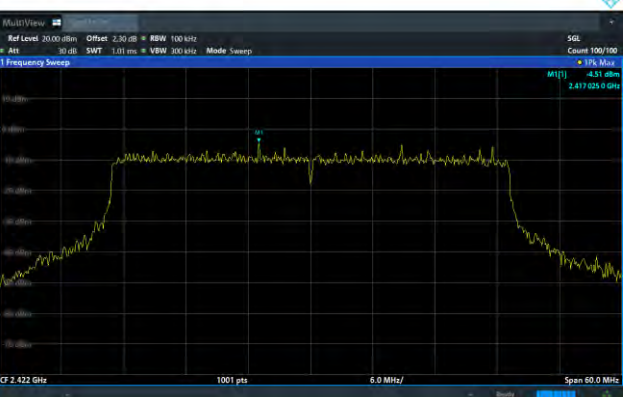
802.11ax20: Band Edge, Left Side



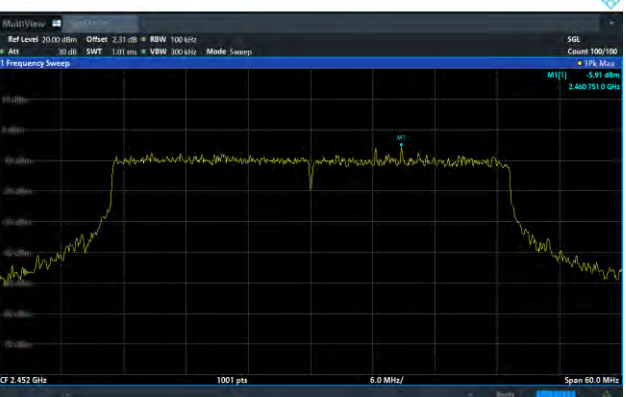
802.11n20: Band Edge, Right Side



802.11ax40: Band Edge, Left Side



802.11ax40: Band Edge, Right Side



5.9 Spurious RF Conducted Emissions

5.9.1 Limit

Below -20dB of the highest emission level in operating band.

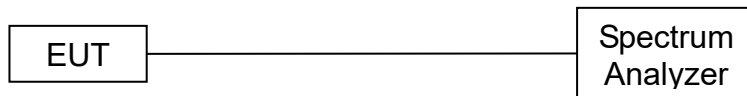
5.9.2 Measuring Instruments

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

5.9.3 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW=300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

5.9.4 Test Setup



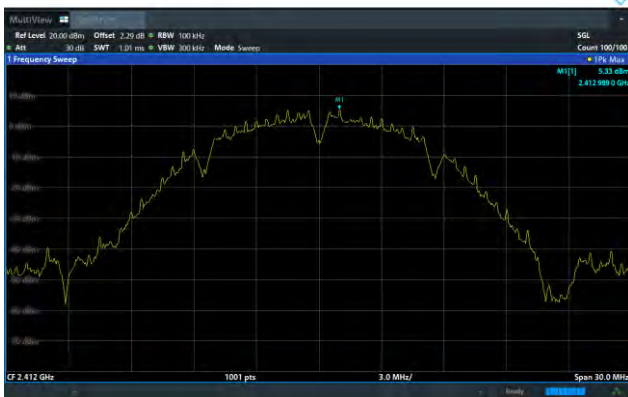
5.9.5 Test Results

Note:

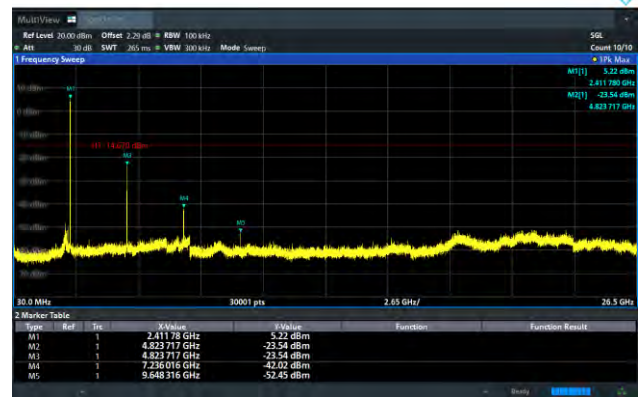
1: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency; The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

2: The three modulated high, medium and low channels have been tested. The report only shows the worst mode. The worst mode is 802.11b CH01/06/11.

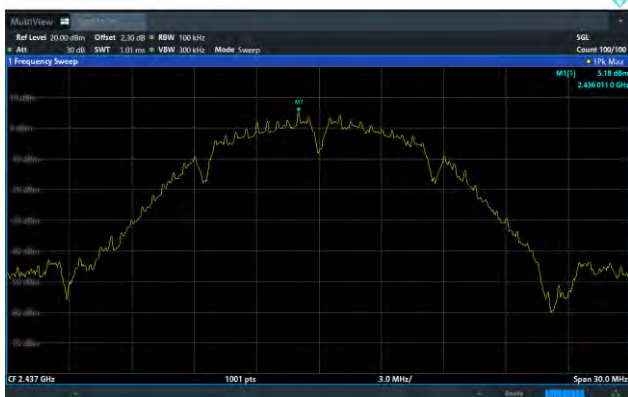
802.11b on Channel 01



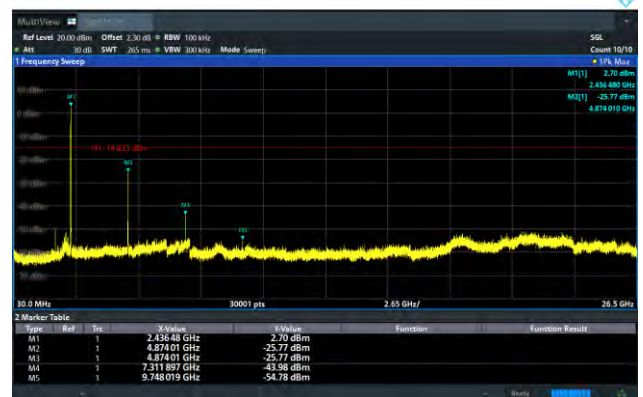
802.11b on Channel 01



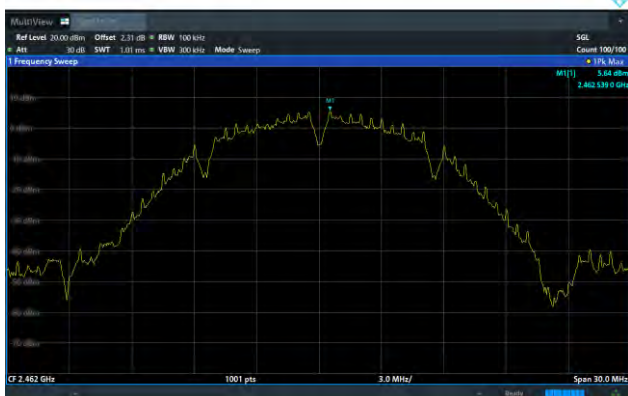
802.11b on Channel 06



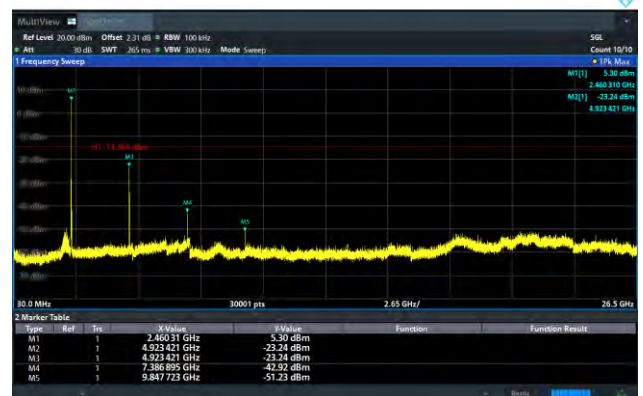
802.11b on Channel 06



802.11b on Channel 11

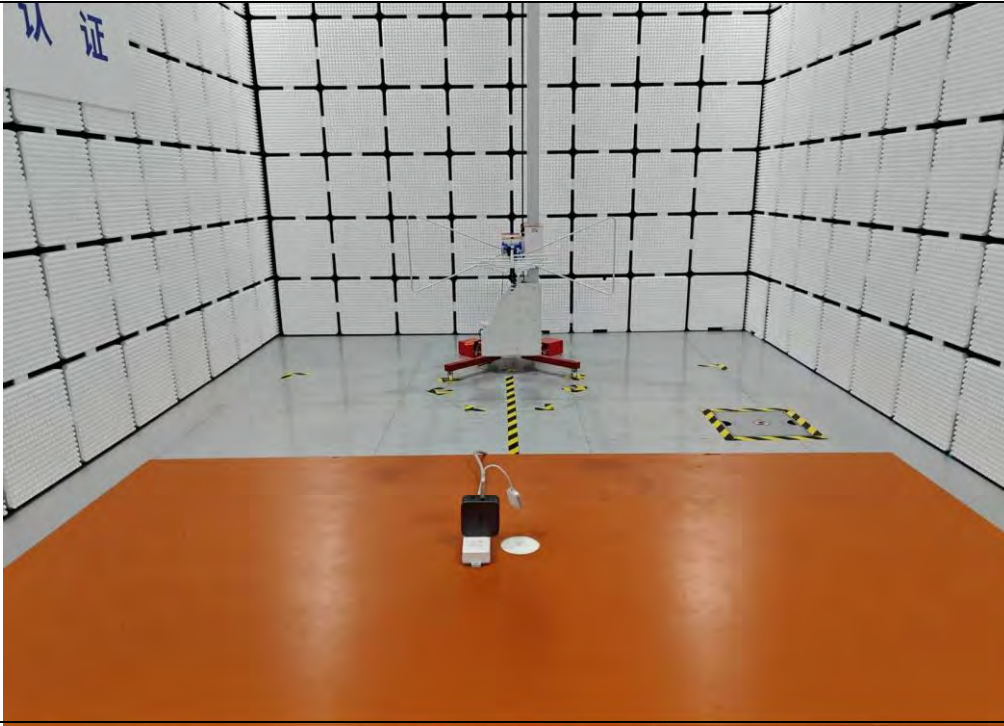


802.11b on Channel 11



6 Photographs of the Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



Conducted Emission



7 Photographs of the EUT

Please refer to report HB20250313008E-01 for product photos.

******* END OF REPORT *******