

FCC 15.247 & RSS-247 2.4GHz Test Report

for

FUTABA Corporation

**1080 Yabutsuka Chosei-son Chosei-gun,
Chiba-ken, 299-4395 Japan.**

Product Name : Radio Control
Model Name : T16IZS
Brand : Futaba
FCC ID : AZPT16IZS-24G
IC : 2914D-T16IZS

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

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APPENDIX A TEST DATA AND PLOTS
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TEST REPORT

Applicant : FUTABA Corporation
Manufacturer : FUTABA Corporation
EUT Description
(1) Product : Radio Control
(2) Model : T16IZS
(3) Brand : Futaba
(4) Power Supply: (1)DC 5V (USB)
(2)DC7.4V (Battery)

Applicable Standards:

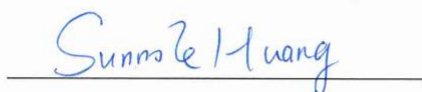
Title 47 CFR FCC Part 15 Subpart C
RSS-Gen (Issue 5), Amendment 2, February 2021
RSS-247 (Issue 2), February 2017

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2023. 02. 14

Reviewed by:



(Sunnie Huang/Administrator)

Approved by:



(Johnny Hsueh/Section Manager)

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Date	Revision Summary	Report Number
0	2023. 02. 14	Original Report	EM-F230133

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	PASS
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	RSS-247 §5.2(1)	DTS/Occupied Bandwidth	PASS
15.247(b)(3)	RSS-247 §5.4(4)	Maximum Peak Output Power	PASS
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	RSS-247 §5.2(2)	Peak Power Spectral Density	PASS
15.203	---	Antenna Requirement	Compliance

Note: The uncertainties value is not used in determining the result.

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	FUTABA Corporation 1080 Yabutsuka Chosei-mura Chosei-gun Chiba-ken, 299-4395 Japan.
Manufacturer	FUTABA Corporation 1080 Yabutsuka Chosei-mura Chosei-gun Chiba-ken, 299-4395 Japan.
Product	Radio Control
Model	T16IZS
Brand	Futaba

3.2. Description of EUT

Test Model	T16IZS		
Serial Number	N/A		
Power Rating	(1)DC 5V (USB) (2)DC7.4V (Battery)		
Software Version	N/A		
RF Features	DSSS: FASSTest, FASST FHSS: S-FHSS, T-FHSS		
Transmit Type	1T1R		
Test Sample	Sample No.	Test Item	Firmware
	01	AC Conduction, RSE, RF Conducted	N/A
Sample Status	Trial sample		
Date of Receipt	2022. 12. 07		
Date of Test	2022. 12. 22 ~ 2023.02.10		
Interface Ports of EUT	<ul style="list-style-type: none">• Micro SD Slot x 1• PC Port (Type C) x 1• S.I/F (S.BUS setting)Port x 1• Trainer Port x 1• Charging Port (Type C) x 1• Earphone Jack x 1• Battery Connector x 1		
Accessories Supplied	<ul style="list-style-type: none">• Type C Cable		

3.3. Reference Test Guidance

ANSI C63.10:2013

3.4. Antenna Information

No.	Antenna Type	Manufacture	Antenna Part Number	Frequency (MHz)	Max Gain (dBi)
1.	1/2λ Sleeve antenna	SANSEI	ANTB24	2400 - 2500	1.48

3.5. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (kbps)
FASSTest	2405.376 - 2472.960	23	DSSS	136
FASST	2405.376 - 2477.056	36	DSSS	136

FASSTest							
Channel List							
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
00	2405.376	06	2423.808	12	2442.240	18	2460.672
01	2408.448	07	2426.880	13	2445.312	19	2463.744
02	2411.520	08	2429.952	14	2448.384	20	2466.816
03	2414.592	09	2433.024	15	2451.456	21	2469.888
04	2417.664	10	2436.096	16	2454.528	22	2472.960
05	2420.736	11	2439.168	17	2457.600		

FASST							
Channel List							
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
02	2405.376	20	2423.808	38	2442.240	56	2460.672
04	2407.424	22	2425.856	40	2444.288	58	2462.720
06	2409.472	24	2427.904	42	2446.336	60	2464.768
08	2411.520	26	2429.952	44	2448.384	62	2466.816
10	2413.568	28	2432.000	46	2450.432	64	2468.864
12	2415.616	30	2434.048	48	2452.480	66	2470.912
14	2417.664	32	2436.096	50	2454.528	68	2472.960
16	2419.712	34	2438.144	52	2456.576	70	2475.008
18	2421.760	36	2440.192	54	2458.624	72	2477.056

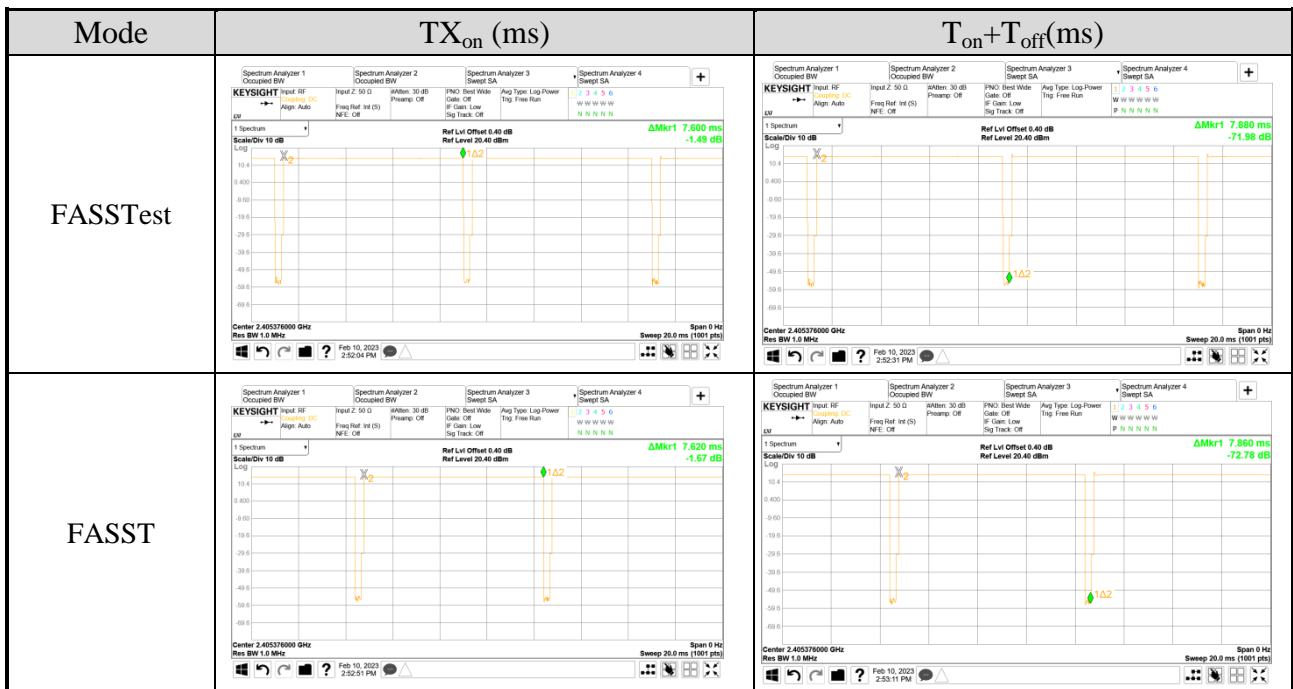
3.6. Descriptions of Key Components

Item	Supplier/Brand	Model	Specification
Wireless Module	Futaba	TC57A	DSSS: FASSTest, FASST FHSS: S-FHSS, T-FHSS
Lithium-ion polymer battery	Futaba	LT2F2000B	DC 7.4A, 2000mA, 14.8Wh
Type C Cable	Futaba	KH7674-011	Shielded, Detachable, 1.0m

3.7. Test Configuration

Mode	TX _{on} (ms)	TX _{on+off} (ms)	Duty Cycle (x)	Duty Cycle Factor [10log(1/x)] (dB)
FASSTest	7.600	7.880	0.964	N/A
FASST	7.620	7.860	0.969	N/A

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.



AC Conduction	
Charge Mode	

Item	Mode	Test Channel
Radiated Test Case	Charge	---
	FASSTest	22
	FASST	72

Item	Mode	Test Channel
Radiated Test Case	Radiated Band Edge <small>Note</small>	FASSTest 0/22
	FASST	02/72
	Radiated Spurious Emission <small>Note</small>	FASSTest 0/22
	FASST	02/72

Item	Mode	Test Channel
Conducted Test Case	DTS/Occupied Bandwidth	FASSTest 00/11/22
		FASST 02/38/72
	Peak Output Power	FASSTest 00/11/22
		FASST 02/38/72
	Band Edge	FASSTest 00/22
		FASST 02/72
	Spurious Emission	FASSTest 00/11/22
		FASST 02/38/72
	Peak Power Spectral Density	FASSTest 00/11/22
		FASST 02/38/72

Note : Mobile Device Portable Device
 and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow:
 Lie Side Stand

3.8. Output Power Setting

Mode	Centre Frequency (MHz)	Power Setting
FASSTest	2405.376	Default
	2439.168	Default
	2472.960	Default
FASST	2405.376	Default
	2442.240	Default
	2477.056	Default

3.9. Tested Supporting System List

3.9.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	Approval
1.	AC Adapter Wall-mount, 2C (DC 5V)	ASUS	AD2022M20	N/A	N/A
2.	Power Socket	N/A	N/A	N/A	N/A
3.	Earphone	I-phone	N/A	N/A	N/A
4.	Micro SD Card (16GB)	SanDisk	N/A	N/A	N/A

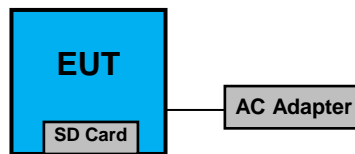
3.9.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	USB Cable: Shielded, Detachable, 1.0m
2.	AC Power Cable: Unshielded, Undetachable, 1.8m
3.	Audio Cable: Unshielded, Undetachable, 1.0m

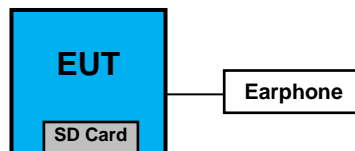
3.10. Setup Configuration

3.10.1. EUT Configuration for Power Line & Radiated Emission

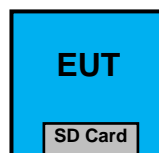
- Charge mode



- Transmit Mode



3.10.2. EUT Configuration for RF Conducted Test Items



3.11. Operating Condition of EUT

- Charge Mode: The EUT connects the AC adapter on charge mode.
Transmit Mode: Press the button of the EUT is used for enabling EUT RF function under continues transmitting and choosing mode/channel.

3.12. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.8 Shielded Room (2) No.1 3m Semi Anechoic Chamber

3.13.Measurement Uncertainty

Test Items/Facilities		Frequency Range	Uncertainty	
Conduction Test	<input type="checkbox"/>	No. 7 Shielded Room	9kHz-150kHz	±3.7dB
			150kHz-30MHz	±3.4dB
	<input checked="" type="checkbox"/>	No. 8 Shielded Room	9kHz-150kHz	±3.7dB
			150kHz-30MHz	±3.5dB
Radiation Test	<input checked="" type="checkbox"/>	No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.8dB
			200MHz-1000MHz, 3m, Horizontal	±4.4dB
			30MHz-200MHz, 3m, Vertical	±4.5dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.9dB
			6GHz-18GHz, 3m	±4.5dB
	<input type="checkbox"/>	No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.0dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.6dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
	<input type="checkbox"/>	No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.3dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.6dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.4dB
	<input type="checkbox"/>	No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.3dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.5dB
			200MHz-1000MHz, 3m, Vertical	±4.6dB
			1GHz-6GHz, 3m	±4.9dB
			6GHz-18GHz, 3m	±4.1dB
	Radiated emissions (18GHz-40GHz)		18GHz-40GHz, 3m	±3.4dB

Remark : Uncertainty = $ku_c(y)$

Test Item	Uncertainty
Bandwidth	$\pm 0.05\text{kHz}$
Maximum peak output power	$\pm 0.33\text{dB}$
Power spectral density	$\pm 0.13\text{dB}$
Conducted Emission Limitations	$\pm 0.13\text{dB}$

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2022. 01. 11	1 Year
2.	A.M.N.	R&S	ENV432	101567	2022. 05. 26	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2022. 12. 19	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2022. 12. 14	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2022. 04. 14	1 Year
6.	Coaxial Cable	Yeida	RG/58AU	CE-08	2022. 09. 07	1 Year
7.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-526	MY57410128	2022.12.21	1 Year
2.	Test Receiver	R&S	ESCS30	100338	2022.06.15	1 Year
3.	Amplifier	HP	8447D	2944A06305	2022.01.05	1 Year
4.	Microwave Preamplifier	HP	8449B	3008A01284	2022.06.01	1 Year
5.	Microwave Amplifier	Keysight	83051A	MY56480113	2022.09.07	1 Year
6.	Bilog Antenna	TESEQ	CBL6112D	33821	2022.07.01	1 Year
7.	Double-Ridged Waveguide Horn	EMCO	3115	9112-3775	2022.05.18	1 Year
8.	Horn Antenna	COM-POWER	AH-840	101092	2022.01.06	1 Year
9.	2.4GHz Notch Filter	K&L Microwave	7NSL10-2441.5/E130.5-O/O	2	2022.07.23	1 Year
10.	High-Pass Filter	Microwave	H3G018G1	484796	2022.07.23	1 Year
11.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2022.01.20	1 Year
12.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 106	RE-14	2022.01.20	1 Year
13.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2022.08.22	1 Year
14.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2022.04.14	1 Year
15.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2022.04.08	1 Year
2.	Digital Thermo-Hygro Meter	iMax	HTC-1	RF-03	2022.04.14	1 Year

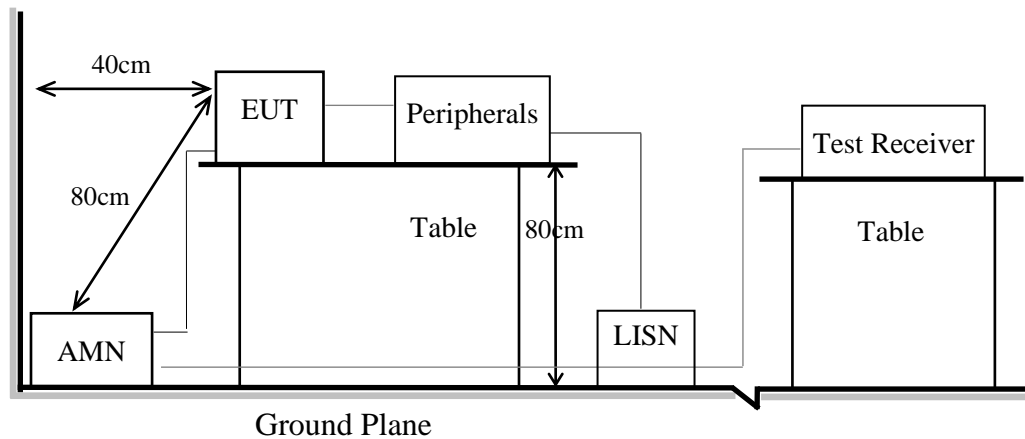
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.10

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

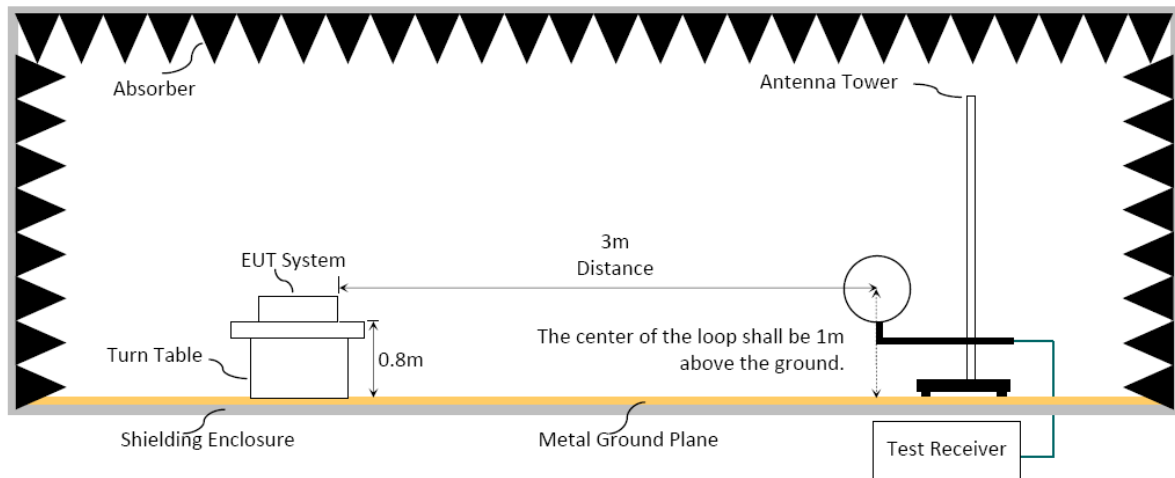
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

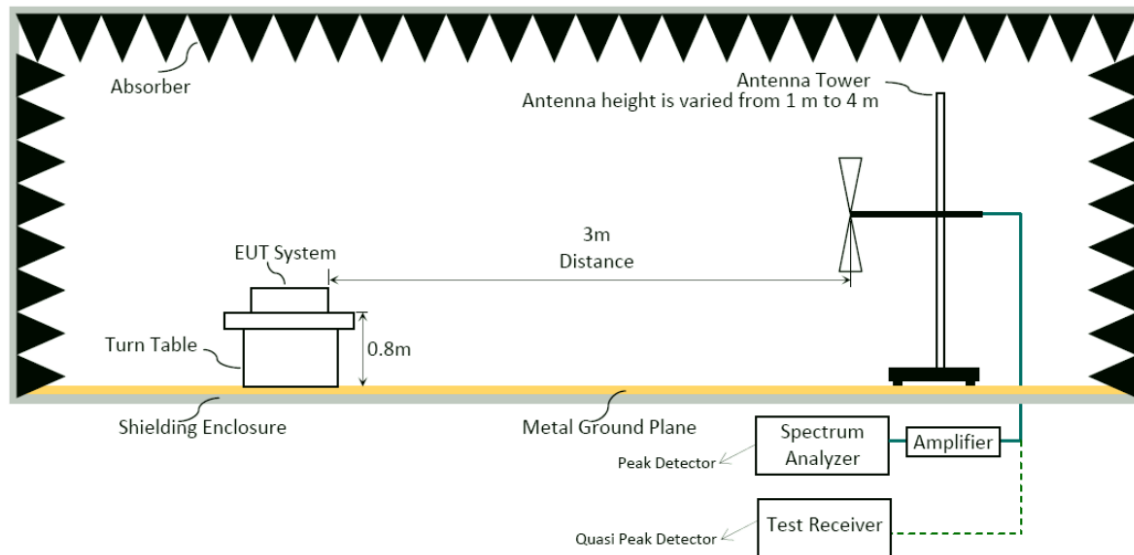
6.1.1. Block Diagram of EUT

Indicated as section 3.10

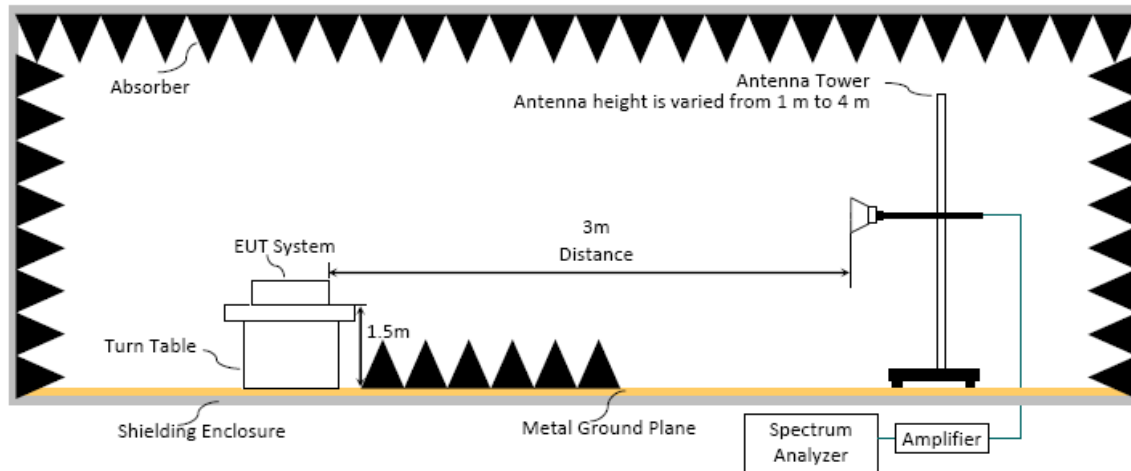
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000MHz



6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance(m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/m)

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 25GHz:

The EUT setup on the turn table which has 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1)RBW = 120KHz
- (2)VBW \geq 3 x RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.

Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic (up to 25 GHz):

Peak Detector:

- (1)RBW = 1MHz
- (2)VBW \geq 3 x RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

Average Detector:

Option 1:

(1) RBW = 1MHz

(2) VBW $\geq 1/T$. (Duty Cycle < 98%, when duty cycle presented in section 3.7)

Modulation Type	VBW Setting (VBW $\geq 1/T$) (kHz)
FASSTest	1.5
FASST	1.5

(3) VBW = 10Hz (Duty Cycle $\geq 98\%$, when duty cycle presented in section 3.7)

(4) Detector = Peak.

(5) Sweep time = auto.

(6) Trace mode = max hold.

(7) Allow sweeps to continue until the trace stabilizes.

Option 2:

Average Emission Level = Peak Emission Level + D.C.C.F.

6.4. Measurement Result Explanation

Peak Emission Level (dB μ V/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading (dB μ V).

Average Emission Level (dB μ V/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading (dB μ V).

Average Emission Level (dB μ V/m) = Peak Emission Level (dB μ V/m) + DCCF (dB)
Duty Cycle Correction Factor (DCCF) (dB) = $20\log(TX_{on}/TX_{on+off})$ presented in section 3.7.

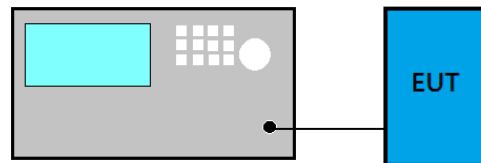
ERP (dBm) = Peak Emission Level (dB μ V/m) - 95.2dB - 2.14dB

6.5. Test Results

Please refer to Appendix A.

7. DTS/OCCUPIED BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The minimum bandwidth shall be at least 500kHz.

7.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

For DTS Bandwidth

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x to -6dB power to record the final bandwidth..

For 99% Occupied Bandwidth

- (1) Set Span range 1.5~5 times the OBW
- (2) Set RBW close to 1% to 5% of OBW.
- (3) Set $VBW \geq 3 \times RBW$.
- (4) Detector = Peak.
- (5) Trace mode = Max hold
- (6) Sweep = Auto couple.
- (7) Allow the trace to stabilize.

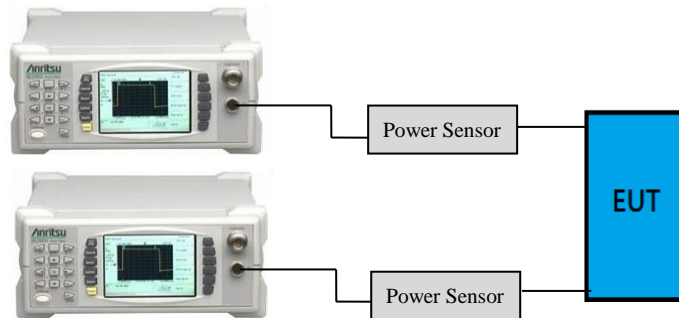
7.4. Test Results

Please refer to Appendix A

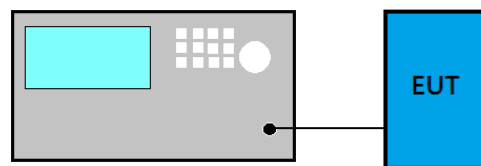
8. MAXIMUM PEAK OUTPUT POWER

8.1. Block Diagram of Test Setup

- For WLAN Function



- For BLE Function



8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

8.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

PKPM1 Peak power meter method:

EUT is connected to power sensor and record the maximum output power.

Maximum peak conducted output power method:

- (1) Set the RBW \geq DTS bandwidth
- (2) Set VBW $\geq 3 \times$ RBW
- (3) Set span $\geq 3 \times$ RBW.
- (4) Sweep time = auto couple
- (5) Detector = peak.
- (6) Trace mode = max hold.
- (7) Allow trace to fully stabilize.
- (8) Use peak marker function to determine the peak amplitude level.

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

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is $< 98\%$.

Method AVGSA-2 (Spectrum channel power)

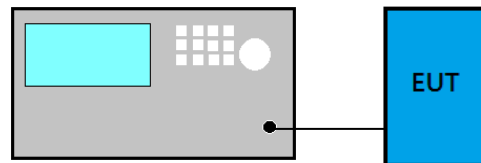
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5% of OBW
- (3) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.7 is $< 98\%$.

8.4. Test Results

Please refer to Appendix A

9. EMISSION LIMITATIONS

9.1. Block Diagram of Test Setup



9.2. Specification Limits

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

■ Reference Level

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 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 to find the max PSD as reference level.

■ Emission Level Measurement

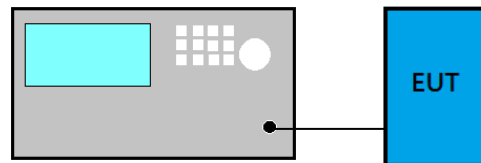
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max level.

9.4. Test Results

Please refer to Appendix A

10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

■ Method PKPSD (peak PSD)

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- (4) Set the VBW $\geq 3 \times \text{RBW}$.
- (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.

□ Method AVGPSD-2

- (1) Using peak PSD procedure step 1 to step 4.
- (2) Detector = RMS detector
- (3) Sweep time = auto couple
- (4) Trace mode = trace averaging over a minimum of 100 traces
- (5) Use the peak marker function to determine the maximum amplitude level.
- (6) Duty cycle factor is added when duty cycle presented in section 3.7 < 98%.
- (7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

10.4. Test Results

Please refer to Appendix A

11.DEVIATION TO TEST SPECIFICATIONS

【NONE】



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No. 491, Zhongfu Rd., Linkou Dist.,
New Taipei City 244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

APPENDIX A

TEST DATA AND PLOTS

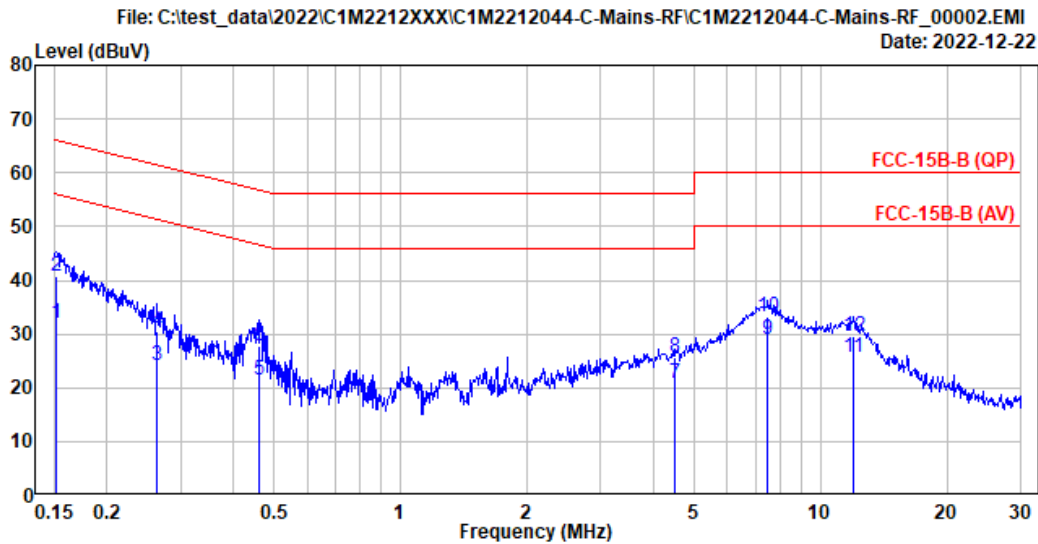
(Model: T16IZS)

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A.1 CONDUCTED EMISSION

Test Date	2022/12/22	Temp./Hum.	20°C/51%
Test Voltage	AC 120V 60Hz (Via AC Adapter)	Tested By	Ken Yang

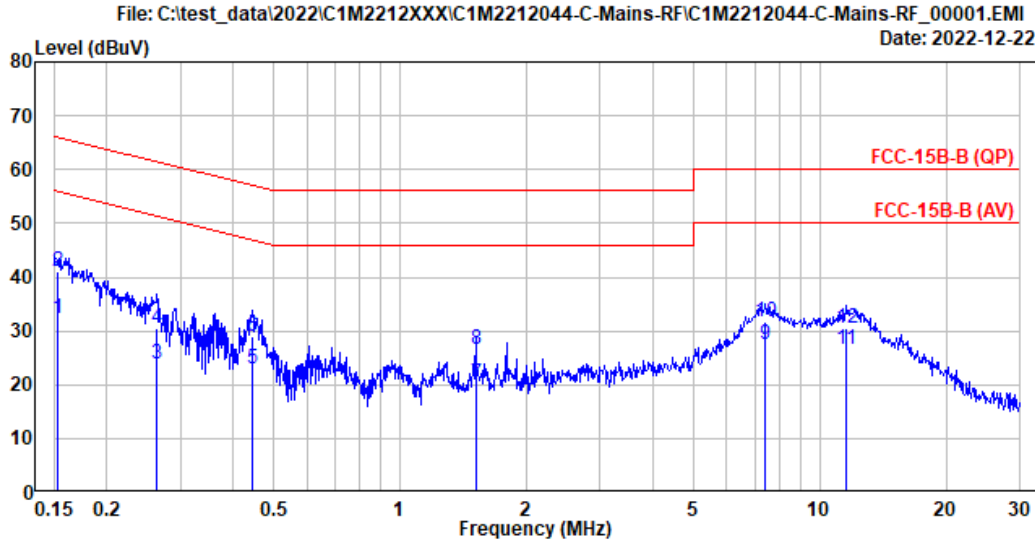


Site No.	: No.8 Shielded Room	Data No.	: 2
Instrument 1	: Receiver ESR(774)		
Instrument 2	: ENV432 (567)(A) CE-08 ESH3-Z2 (354)		
Limit	: FCC-15B-B (QP)	Phase	: Neutral
Environment	: 20°C/51%	Test Rating	: 120Vac/60Hz
EUT Model	: T16IZS	Engineer	: Ken Yang
Test Mode	: Charge		

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.152	10.34	0.03	9.85	11.65	31.87	55.92	24.05	Average
2	0.152	10.34	0.03	9.85	20.46	40.68	65.92	25.24	QP
3	0.262	10.32	0.03	9.85	4.10	24.30	51.36	27.06	Average
4	0.262	10.32	0.03	9.85	10.33	30.53	61.36	30.83	QP
5	0.460	10.32	0.03	9.85	1.36	21.56	46.69	25.13	Average
6	0.460	10.32	0.03	9.85	7.44	27.64	56.69	29.05	QP
7	4.491	10.43	0.09	9.87	0.35	20.74	46.00	25.26	Average
8	4.491	10.43	0.09	9.87	5.20	25.59	56.00	30.41	QP
9	7.505	10.56	0.12	9.88	8.51	29.07	50.00	20.93	Average
10	7.505	10.56	0.12	9.88	12.55	33.11	60.00	26.89	QP
11	11.990	10.74	0.15	9.90	4.85	25.64	50.00	24.36	Average
12	11.990	10.74	0.15	9.90	8.88	29.67	60.00	30.33	QP

Remarks: 1. Emission Level(dBµV)= AMN Factor(dB) + Cable Loss(dB) + Pulse Att.(dB) + Reading(dBµV).

Test Date	2022/12/22	Temp./Hum.	20°C/51%
Test Voltage	AC 120V 60Hz (Via AC Adapter)	Tested By	Roy Hung



Site No.	: No.8 Shielded Room	Data No.	: 1
Instrument 1	: Receiver ESR(774)		
Instrument 2	: ENV432 (567)(A) CE-08 ESH3-Z2 (354)		
Limit	: FCC-15B-B (QP)	Phase	: Line
Environment	: 20°C/51%	Test Rating	: 120Vac/60Hz
EUT Model	: T16IZS	Engineer	: Ken Yang
Test Mode	: Charge		

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	10.22	0.03	9.85	12.29	32.39	55.88	23.49	Average
2	0.152	10.22	0.03	9.85	20.86	40.96	65.88	24.92	QP
3	0.263	10.22	0.03	9.85	3.79	23.89	51.32	27.43	Average
4	0.263	10.22	0.03	9.85	10.51	30.61	61.32	30.71	QP
5	0.445	10.22	0.03	9.85	2.85	22.95	46.98	24.03	Average
6	0.445	10.22	0.03	9.85	8.82	28.92	56.98	28.06	QP
7	1.515	10.24	0.05	9.86	0.01	20.16	46.00	25.84	Average
8	1.515	10.24	0.05	9.86	6.35	26.50	56.00	29.50	QP
9	7.430	10.37	0.11	9.87	7.14	27.49	50.00	22.51	Average
10	7.430	10.37	0.11	9.87	11.20	31.55	60.00	28.45	QP
11	11.521	10.46	0.15	9.90	5.97	26.48	50.00	23.52	Average
12	11.521	10.46	0.15	9.90	10.13	30.64	60.00	29.36	QP

Remarks: 1. Emission Level(dBμV)= AMN Factor(dB) + Cable Loss(dB) + Pulse Att.(dB) + Reading(dBμV).

A.2 RADIATED EMISSION

Test Date	2022/12/26~27	Temp./Hum.	16-20°C /40-51%
Test Voltage	(1) AC 120V 60Hz (Via AC Adapter) (2) DC 7.4V (Via Battery)	Tested By	Martin Chen

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1GHz

Mode	Charge	Frequency	---
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
323.910	19.93	5.02	25.82	30.34	29.47	46.00	16.53	Peak
378.230	21.18	5.69	26.28	36.50	37.09	46.00	8.91	Peak
431.580	22.24	6.21	26.68	33.28	35.05	46.00	10.95	Peak
485.900	23.24	6.65	27.04	32.26	35.11	46.00	10.89	Peak
540.220	23.86	6.90	27.24	30.87	34.39	46.00	11.61	Peak
827.340	25.50	8.36	27.20	29.15	35.81	46.00	10.19	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
38.730	20.02	1.61	26.47	37.23	32.39	40.00	7.61	Peak
50.370	14.09	1.84	26.46	40.74	30.21	40.00	9.79	Peak
323.910	19.93	5.02	25.82	31.20	30.33	46.00	15.67	Peak
378.230	21.18	5.69	26.28	36.66	37.25	46.00	8.75	Peak
431.580	22.24	6.21	26.68	34.08	35.85	46.00	10.15	Peak
485.900	23.24	6.65	27.04	34.15	37.00	46.00	9.00	Peak

Mode	FASSTest	Frequency	TX 2472.960MHz					
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
169.680	15.93	3.40	25.91	43.99	37.41	43.50	6.09	Peak
229.820	17.31	4.05	25.73	44.49	40.12	46.00	5.88	Peak
378.230	21.18	5.69	26.28	36.56	37.15	46.00	8.85	Peak
431.580	22.24	6.21	26.68	34.19	35.96	46.00	10.04	Peak
485.900	23.24	6.65	27.04	34.41	37.26	46.00	8.74	Peak
540.220	23.86	6.90	27.24	31.78	35.30	46.00	10.70	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
155.130	16.58	3.26	25.97	43.59	37.46	43.50	6.04	Peak
169.680	15.93	3.40	25.91	41.49	34.91	43.50	8.59	Peak
182.290	15.51	3.54	25.85	41.28	34.48	43.50	9.02	Peak
378.230	21.18	5.69	26.28	35.65	36.24	46.00	9.76	Peak
431.580	22.24	6.21	26.68	34.17	35.94	46.00	10.06	Peak
577.080	24.20	7.03	27.34	32.18	36.07	46.00	9.93	Peak

Mode	FASST	Frequency	TX 2477.056MHz					
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Antenna at Horizontal Polarization

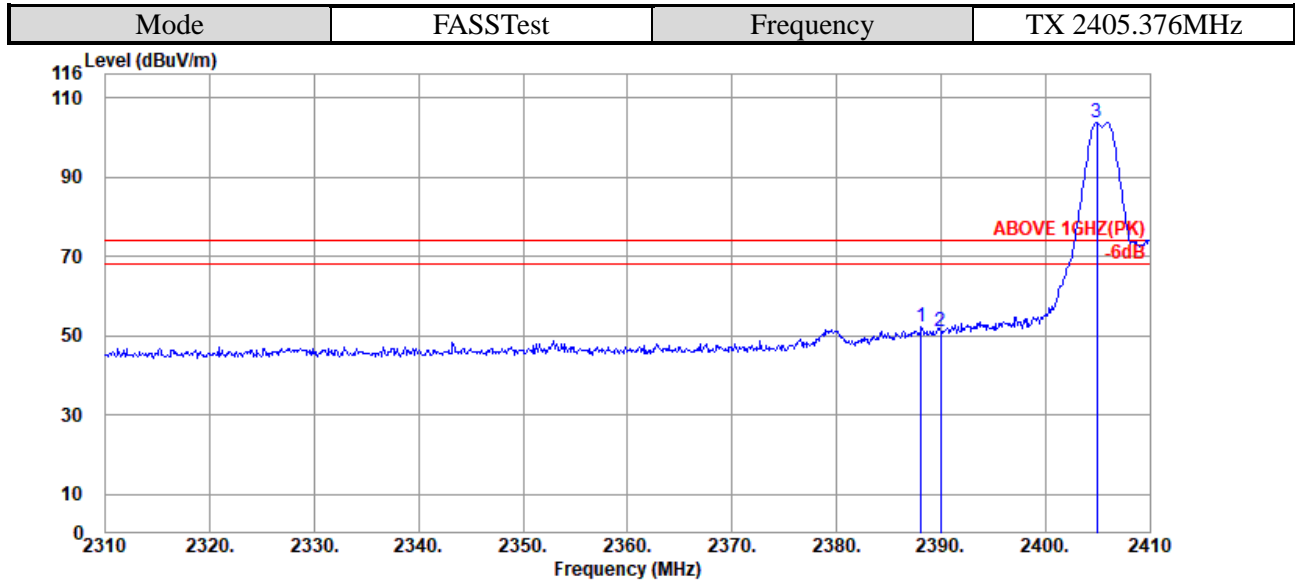
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
229.820	17.31	4.05	25.73	33.28	28.91	46.00	17.09	Peak
323.910	19.93	5.02	25.82	30.87	30.00	46.00	16.00	Peak
378.230	21.18	5.69	26.28	36.54	37.13	46.00	8.87	Peak
431.580	22.24	6.21	26.68	33.63	35.40	46.00	10.60	Peak
485.900	23.24	6.65	27.04	32.59	35.44	46.00	10.56	Peak
540.220	23.86	6.90	27.24	32.27	35.79	46.00	10.21	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
50.370	14.09	1.84	26.46	40.68	30.15	40.00	9.85	Peak
125.060	17.88	2.92	26.13	34.66	29.33	43.50	14.17	Peak
378.230	21.18	5.69	26.28	36.79	37.38	46.00	8.62	Peak
431.580	22.24	6.21	26.68	33.66	35.43	46.00	10.57	Peak
485.900	23.24	6.65	27.04	33.88	36.73	46.00	9.27	Peak
540.220	23.86	6.90	27.24	32.56	36.08	46.00	9.92	Peak

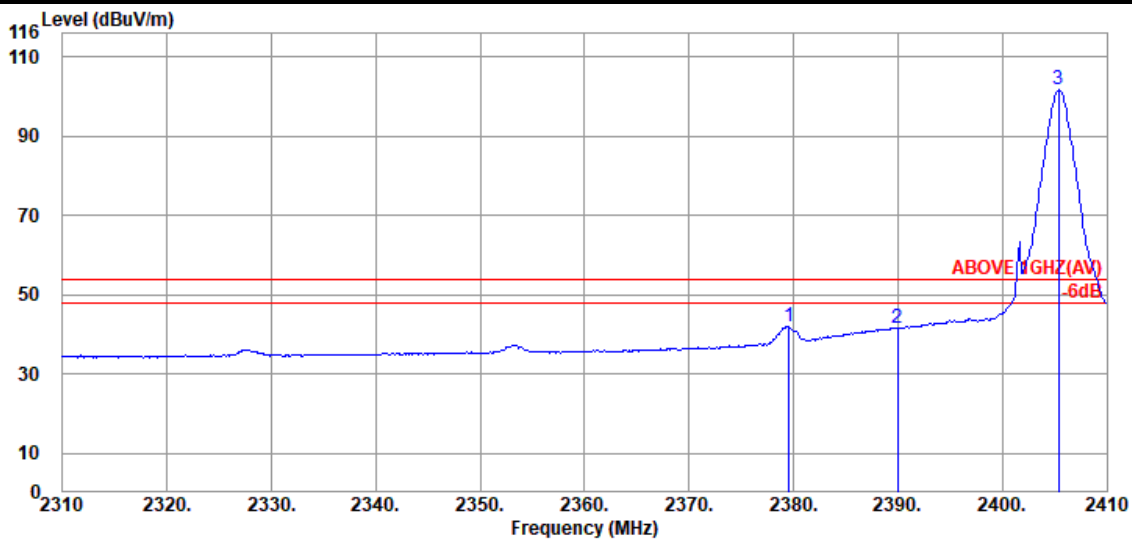
A.2.1.3 Frequency Above 1 GHz to 10th harmonics

Band Edge:



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.100	28.21	5.72	39.93	58.42	52.42	74.00	21.58	Peak
2390.000	28.21	5.72	39.93	57.09	51.09	74.00	22.91	Peak
@ 2404.900	28.14	5.75	39.93	109.70	103.66	---	---	Peak

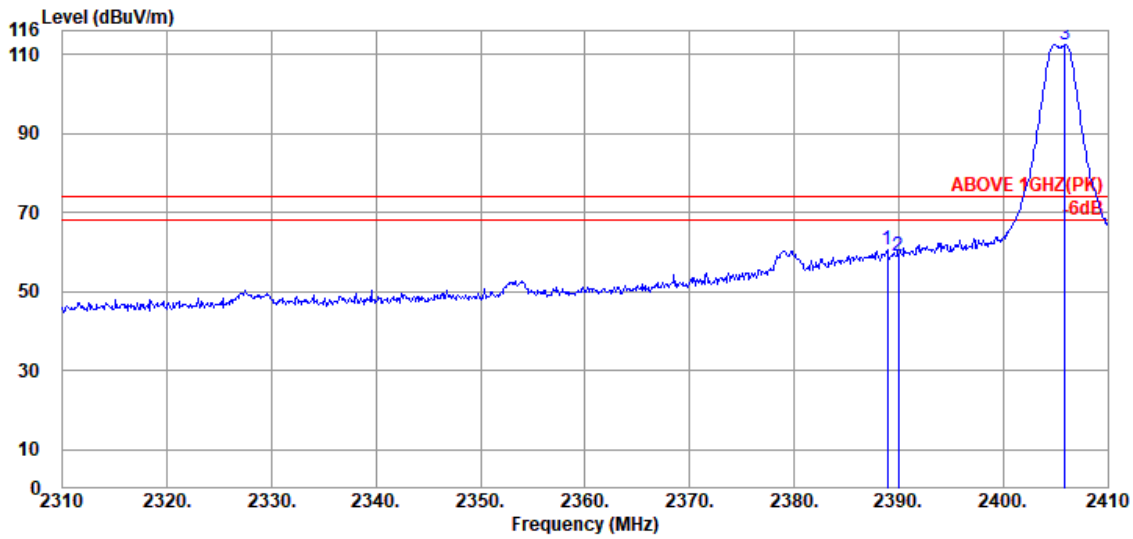


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.600	28.27	5.71	39.93	47.81	41.86	54.00	12.14	Average
2390.000	28.21	5.72	39.93	47.60	41.60	54.00	12.40	Average
@ 2405.400	28.14	5.75	39.93	107.60	101.56	---	---	Average

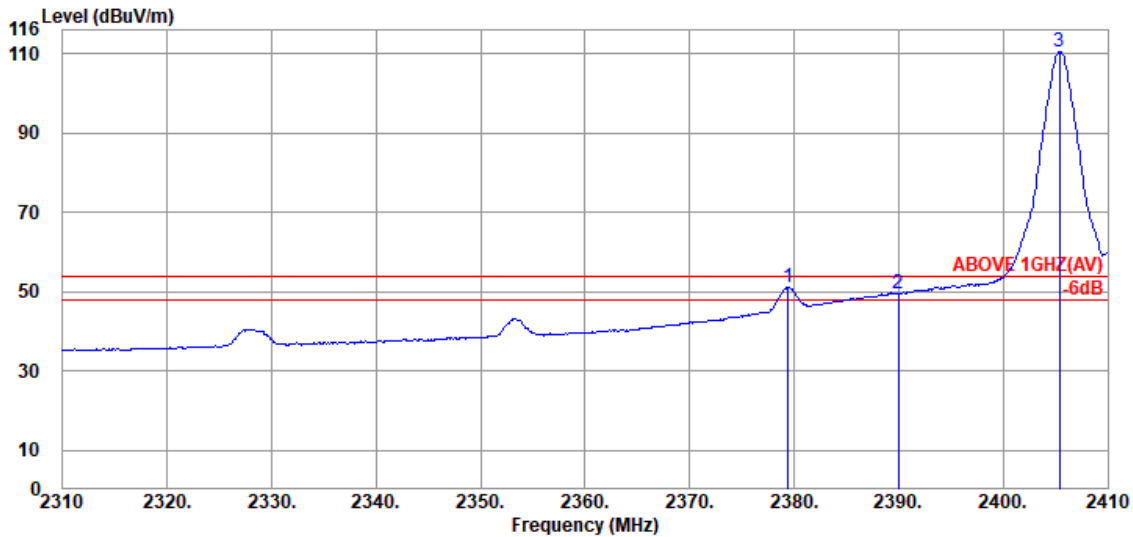
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASSTest	Frequency	TX 2405.376MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.900	28.21	5.72	39.93	66.54	60.54	74.00	13.46	Peak
2390.000	28.21	5.72	39.93	65.07	59.07	74.00	14.93	Peak
@ 2405.900	28.14	5.75	39.93	118.53	112.49	---	---	Peak

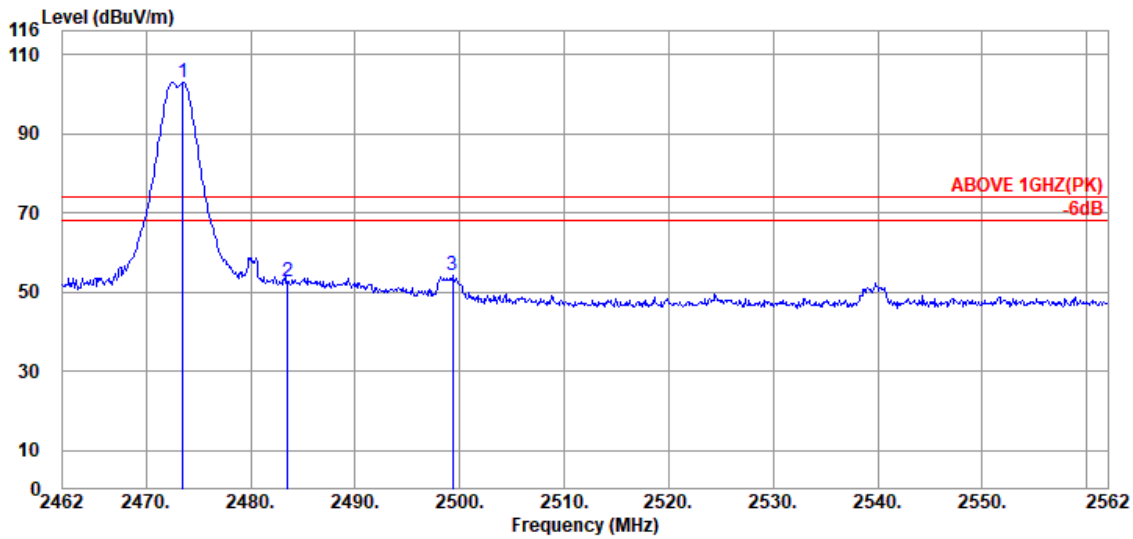


Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.400	28.27	5.71	39.93	57.07	51.12	54.00	2.88	Average
2390.000	28.21	5.72	39.93	55.44	49.44	54.00	4.56	Average
@ 2405.400	28.14	5.75	39.93	116.40	110.36	---	---	Average

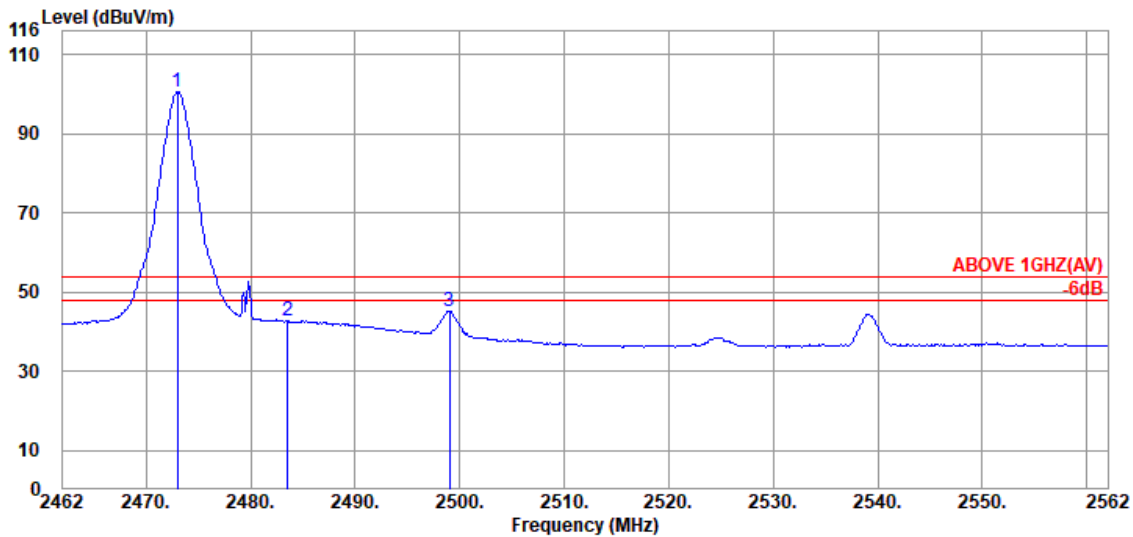
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASSTest	Frequency	TX 2472.960MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2473.500	28.44	5.85	39.92	108.51	102.88	---	---	Peak
2483.500	28.47	5.87	39.92	58.21	52.63	74.00	21.37	Peak
2499.300	28.50	5.89	39.92	59.80	54.27	74.00	19.73	Peak

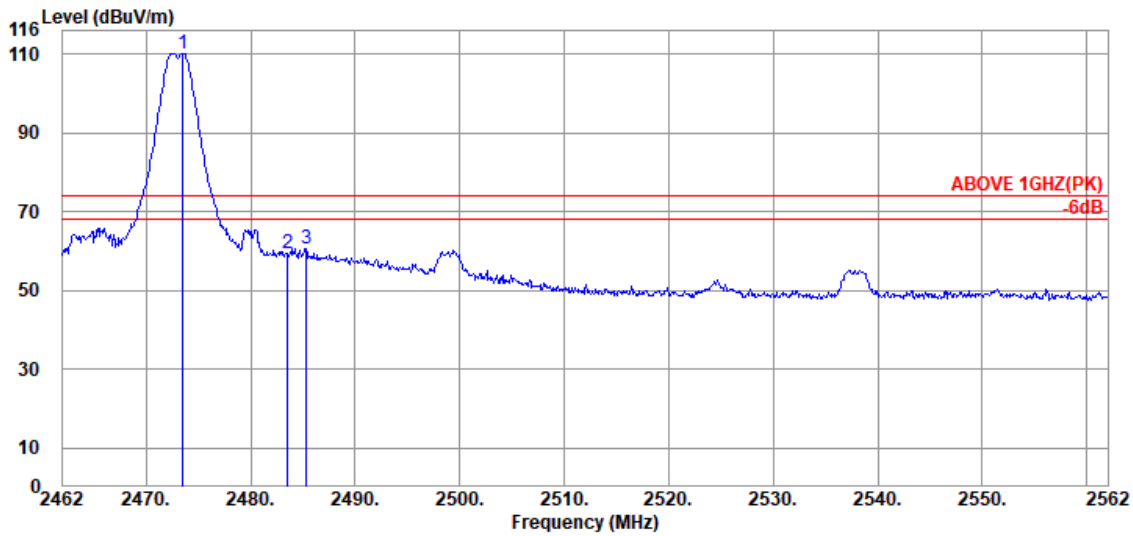


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2473.000	28.44	5.85	39.92	106.21	100.58	---	---	Average
2483.500	28.47	5.87	39.92	48.15	42.57	54.00	11.43	Average
2499.000	28.50	5.89	39.92	50.79	45.26	54.00	8.74	Average

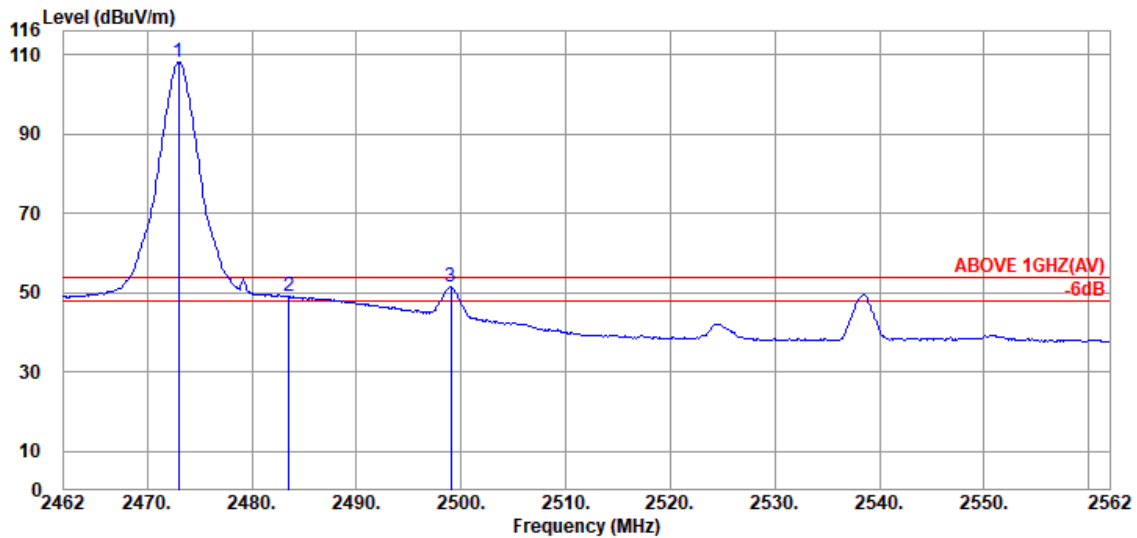
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASSTest	Frequency	TX 2472.960MHz
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Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@	2473.500	28.44	5.85	39.92	115.81	110.18	---	---	Peak
	2483.500	28.47	5.87	39.92	64.94	59.36	74.00	14.64	Peak
	2485.300	28.47	5.87	39.92	66.17	60.59	74.00	13.41	Peak

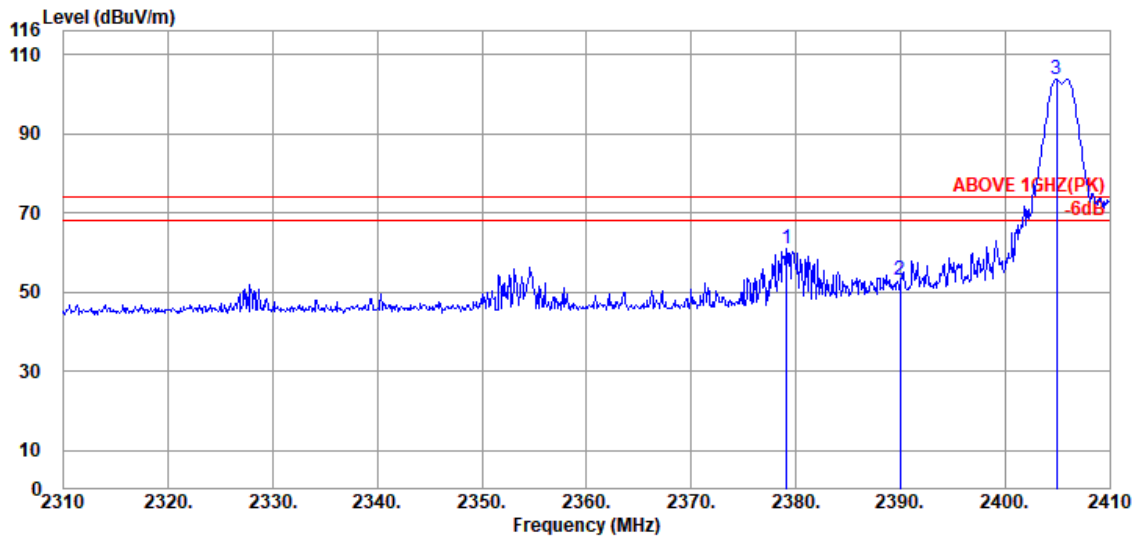


Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@	2473.000	28.44	5.85	39.92	113.55	107.92	---	---	Average
	2483.500	28.47	5.87	39.92	54.65	49.07	54.00	4.93	Average
	2499.000	28.50	5.89	39.92	57.04	51.51	54.00	2.49	Average

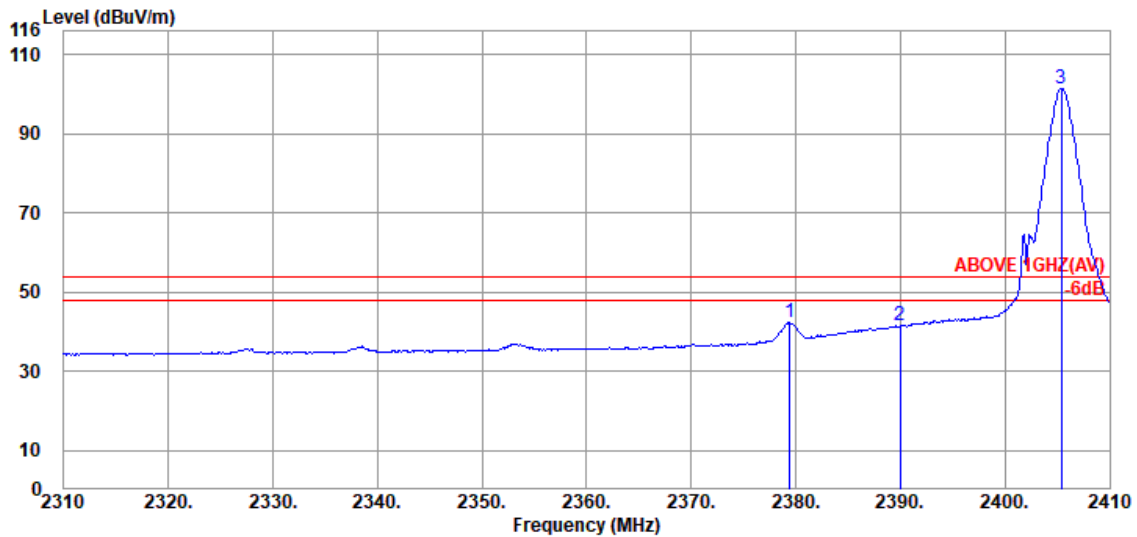
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASST	Frequency	TX 2405.376MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.100	28.27	5.71	39.93	66.87	60.92	74.00	13.08	Peak
2390.000	28.21	5.72	39.93	58.89	52.89	74.00	21.11	Peak
@ 2404.900	28.14	5.75	39.93	109.66	103.62	---	---	Peak

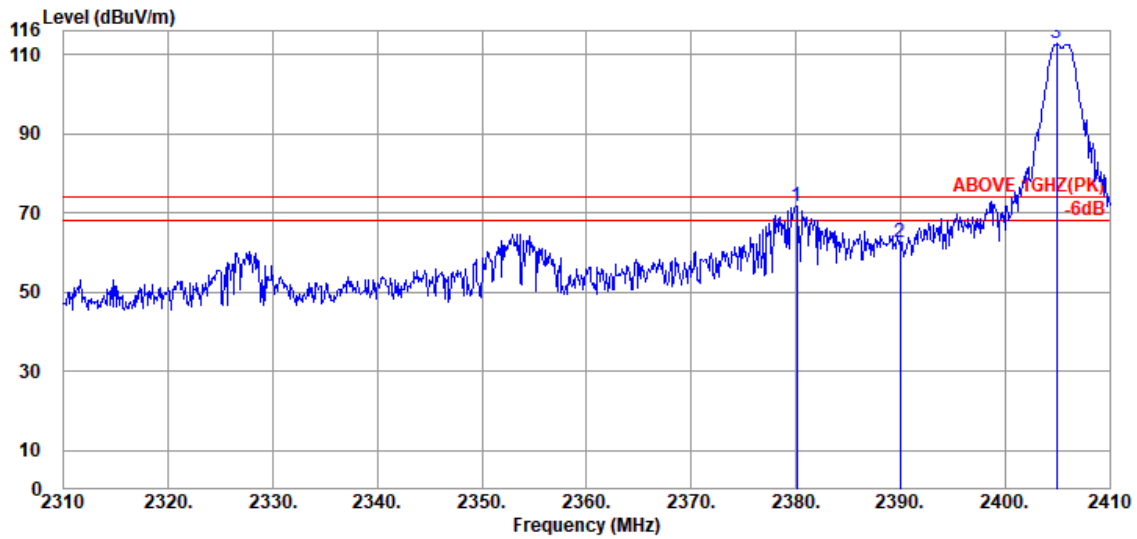


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.400	28.27	5.71	39.93	48.28	42.33	54.00	11.67	Average
2390.000	28.21	5.72	39.93	47.53	41.53	54.00	12.47	Average
@ 2405.400	28.14	5.75	39.93	107.59	101.55	---	---	Average

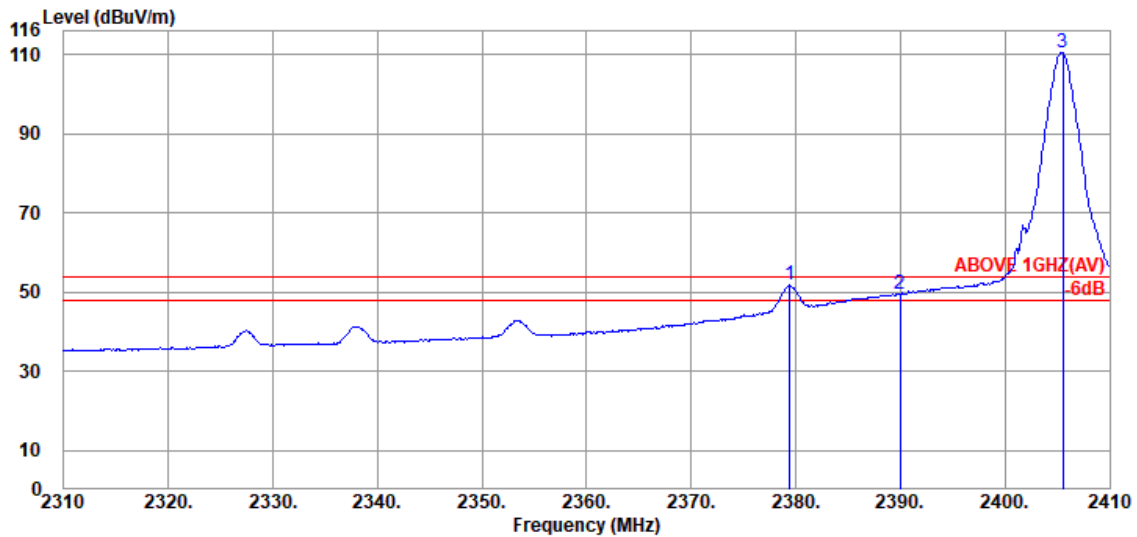
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASST	Frequency	TX 2405.376MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2380.100	28.27	5.71	39.93	77.65	71.70	74.00	2.30	Peak
2390.000	28.21	5.72	39.93	68.54	62.54	74.00	11.46	Peak
@ 2404.900	28.14	5.75	39.93	118.68	112.64	---	---	Peak

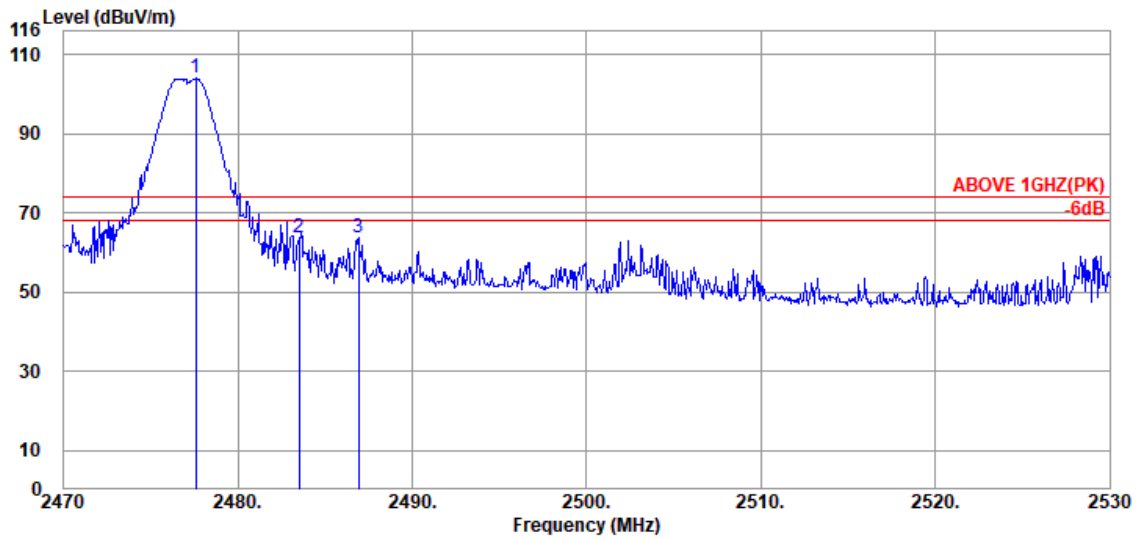


Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.400	28.27	5.71	39.93	57.73	51.78	54.00	2.22	Average
2390.000	28.21	5.72	39.93	55.60	49.60	54.00	4.40	Average
@ 2405.500	28.14	5.75	39.93	116.50	110.46	---	---	Average

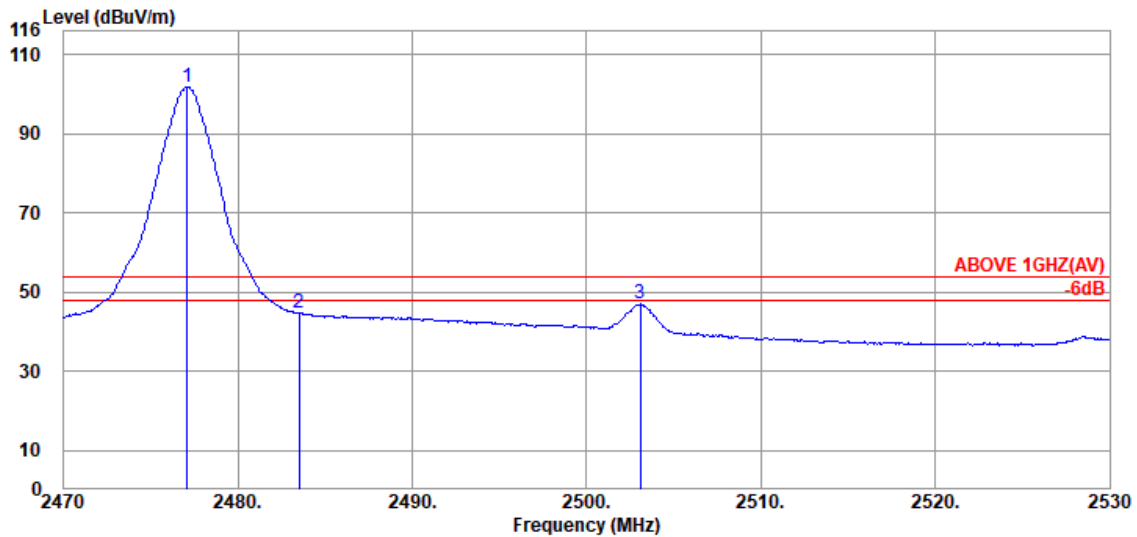
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASST	Frequency	TX 2477.056MHz
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Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@	2477.560	28.46	5.86	39.92	109.54	103.94	---	---	Peak
	2483.500	28.47	5.87	39.92	69.33	63.75	74.00	10.25	Peak
	2486.920	28.47	5.87	39.92	69.41	63.83	74.00	10.17	Peak

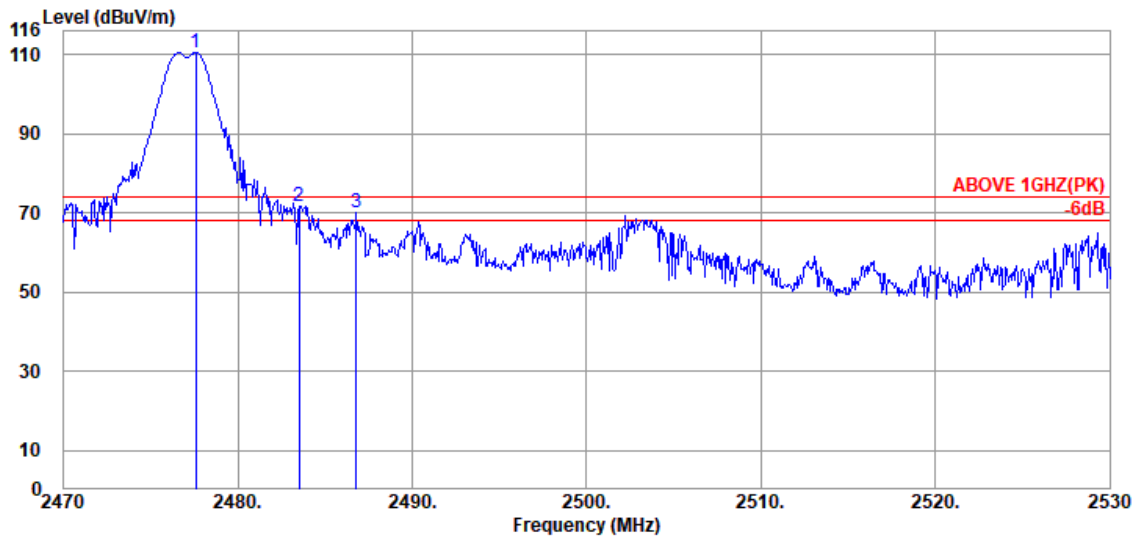


Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@	2477.080	28.46	5.86	39.92	107.31	101.71	---	---	Average
	2483.500	28.47	5.87	39.92	50.21	44.63	54.00	9.37	Average
	2503.060	28.50	5.89	39.92	52.56	47.03	54.00	6.97	Average

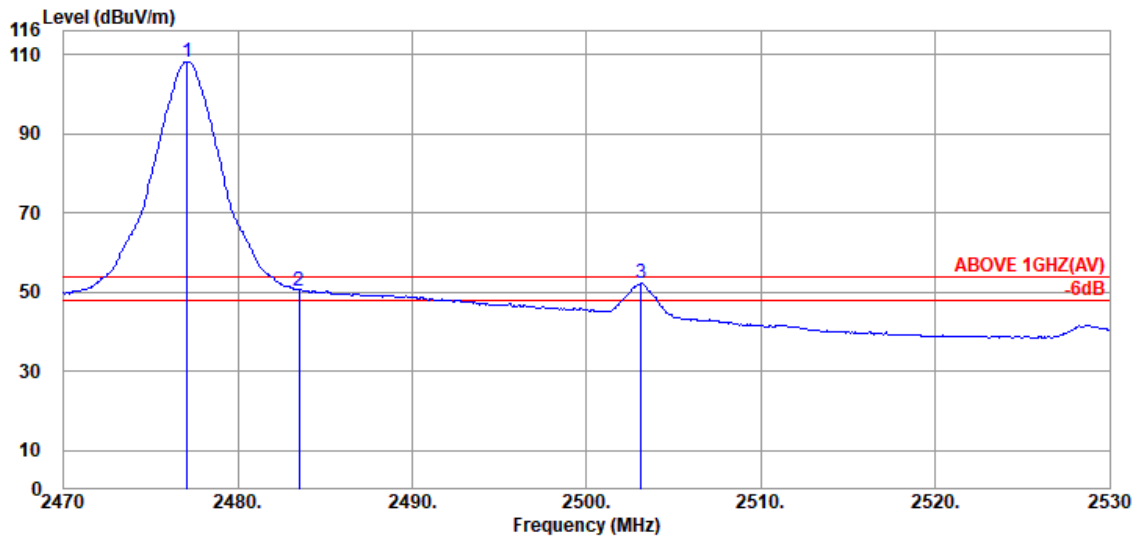
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	FASST	Frequency	TX 2477.056MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2477.560	28.46	5.86	39.92	116.01	110.41	---	---	Peak
2483.500	28.47	5.87	39.92	77.21	71.63	74.00	2.37	Peak
2486.800	28.47	5.87	39.92	75.55	69.97	74.00	4.03	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2477.080	28.46	5.86	39.92	113.84	108.24	---	---	Average
2483.500	28.47	5.87	39.92	56.03	50.45	54.00	3.55	Average
2503.120	28.50	5.89	39.92	57.74	52.21	54.00	1.79	Average

Remark: The “@” means fundamental frequency, it is ignored in this section.

A.2.2 Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Mode	Normal	Frequency	---
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4935.000	33.37	8.70	39.33	42.88	45.62	54.00	8.38	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4935.000	33.37	8.70	39.33	43.24	45.98	54.00	8.02	Peak

Mode	FASSTest	Frequency	TX 2405.376MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4810.000	33.00	8.53	39.39	48.26	50.40	54.00	3.60	Average
4810.000	33.00	8.53	39.39	55.61	57.75	74.00	16.25	Peak
7217.000	36.30	9.92	39.52	46.13	52.83	54.00	1.17	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4810.000	33.00	8.53	39.39	49.26	51.40	54.00	2.60	Average
4810.000	33.00	8.53	39.39	58.70	60.84	74.00	13.16	Peak
7217.000	36.30	9.92	39.52	43.73	50.43	54.00	3.57	Peak

Mode	FASSTest	Frequency	TX 2439.168MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	33.20	8.62	39.35	49.45	51.92	54.00	2.08	Average
4880.000	33.20	8.62	39.35	59.08	61.55	74.00	12.45	Peak
7322.000	36.55	10.01	39.55	45.80	52.81	54.00	1.19	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	33.20	8.62	39.35	49.97	52.44	54.00	1.56	Average
4880.000	33.20	8.62	39.35	59.56	62.03	74.00	11.97	Peak
7322.000	36.55	10.01	39.55	43.79	50.80	54.00	3.20	Peak

Mode	FASSTest	Frequency	TX 2472.960MHz					
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4945.850	33.40	8.72	39.32	47.83	50.63	54.00	3.37	Average
4945.850	33.40	8.72	39.32	56.42	59.22	74.00	14.78	Peak
7418.775	36.60	10.08	39.57	46.60	53.71	54.00	0.29	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4945.850	33.40	8.72	39.32	49.38	52.18	54.00	1.82	Average
4945.850	33.40	8.72	39.32	59.07	61.87	74.00	12.13	Peak
7418.775	36.60	10.08	39.57	44.92	52.03	54.00	1.97	Peak

Mode	FASST	Frequency	TX 2405.376MHz					
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4810.000	33.00	8.53	39.39	47.14	49.28	54.00	4.72	Average
4810.000	33.00	8.53	39.39	54.66	56.80	74.00	17.20	Peak
7217.000	36.30	9.92	39.52	45.54	52.24	54.00	1.76	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4810.000	33.00	8.53	39.39	50.53	52.67	54.00	1.33	Average
4810.000	33.00	8.53	39.39	58.22	60.36	74.00	13.64	Peak
7217.000	36.30	9.92	39.52	43.58	50.28	54.00	3.72	Peak

Mode	FASST	Frequency	TX 2442.240MHz					
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	33.20	8.62	39.35	48.06	50.53	54.00	3.47	Average
4880.000	33.20	8.62	39.35	56.77	59.24	74.00	14.76	Peak
7322.000	36.55	10.01	39.55	45.77	52.78	54.00	1.22	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	33.20	8.62	39.35	48.78	51.25	54.00	2.75	Average
4880.000	33.20	8.62	39.35	57.46	59.93	74.00	14.07	Peak
7322.000	36.55	10.01	39.55	44.08	51.09	54.00	2.91	Peak

Mode	FASST	Frequency	TX 2477.056MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4954.000	33.40	8.74	39.32	45.95	48.77	54.00	5.23	Average
4954.000	33.40	8.74	39.32	54.71	57.53	74.00	16.47	Peak
7430.000	36.60	10.10	39.57	45.81	52.94	54.00	1.06	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4954.000	33.40	8.74	39.32	49.84	52.66	54.00	1.34	Average
4954.000	33.40	8.74	39.32	57.70	60.52	74.00	13.48	Peak
7430.000	36.60	10.10	39.57	42.81	49.94	54.00	4.06	Peak

A.2.3 Emissions in Non-restricted Frequency Bands:

Pursuant to ANSI C63.10:2013 that emission levels below the FCC 15.209(a)/RSS-Gen Section 8.9 table 4 general radiated emissions limits is not required.

A.3 DTS/OCCUPIED BANDWIDTH

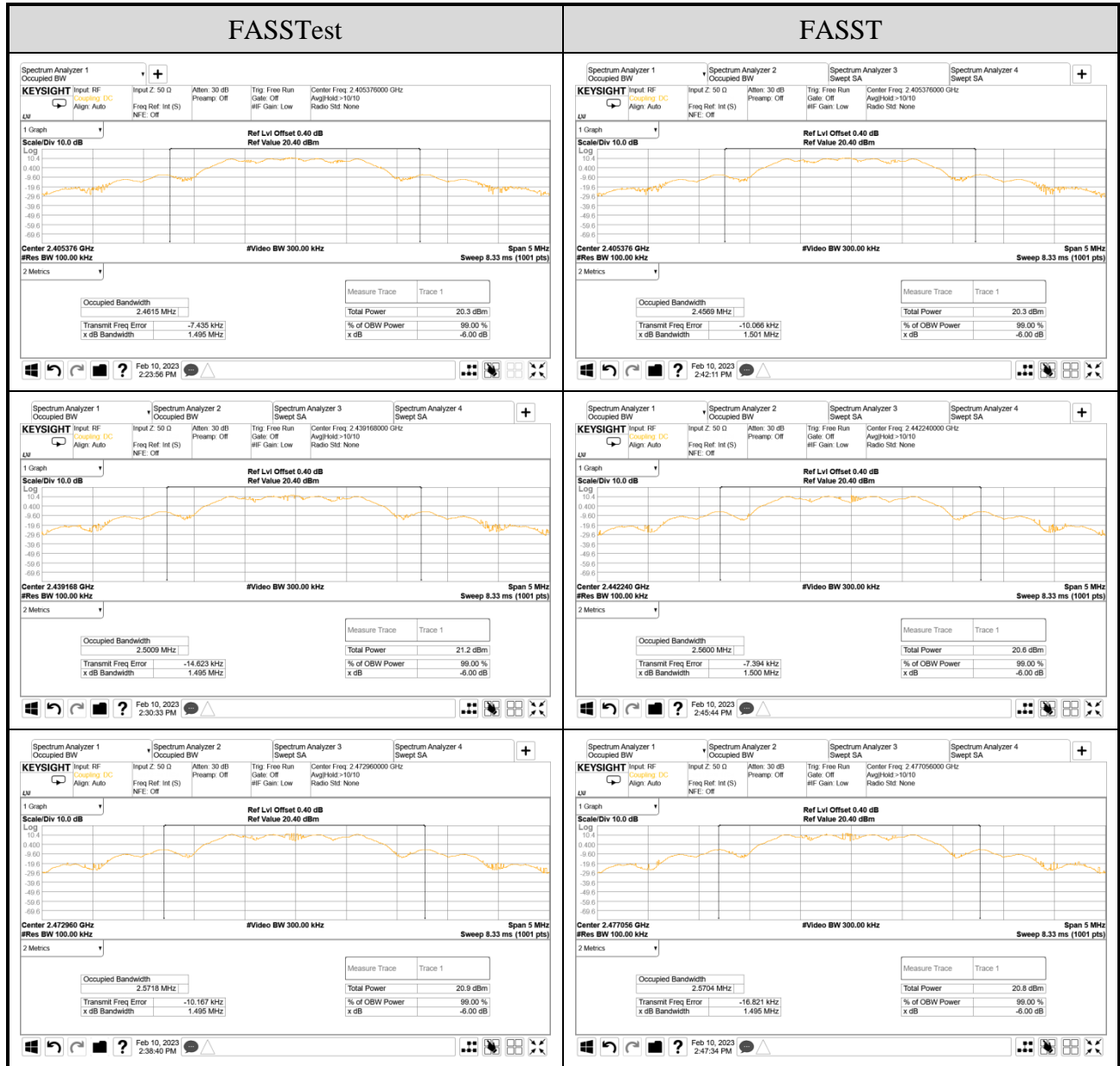
Test Date	2023/02/10	Temp./Hum.	22°C /70%
Cable Loss	0.4dB	Tested By	Sam Chang
Test Voltage	DC 7.4V (Via Battery)		

A.3.1 DTS/Occupied Bandwidth Result

Mode	Centre Frequency (MHz)	DTS (6dB) Bandwidth (MHz)	Occupied (99%) Bandwidth (MHz)	Limit
FASSTest	2405.376	1.495	2.5345	>500kHz
	2439.168	1.495	2.5594	
	2472.960	1.495	2.5995	
FASST	2405.376	1.501	2.5360	>500kHz
	2442.240	1.500	2.5702	
	2477.056	1.495	2.5975	

A.3.2 Measurement Plots

● DTS (6dB) Bandwidth



● Occupied (99%) Bandwidth



A.4 MAXIMUM PEAK OUTPUT POWER

Test Date	2023/02/10	Temp./Hum.	22°C/70%
Cable Loss	0.4dB	Tested By	Sam Chang
Test Voltage	DC 7.4V (Via Battery)		

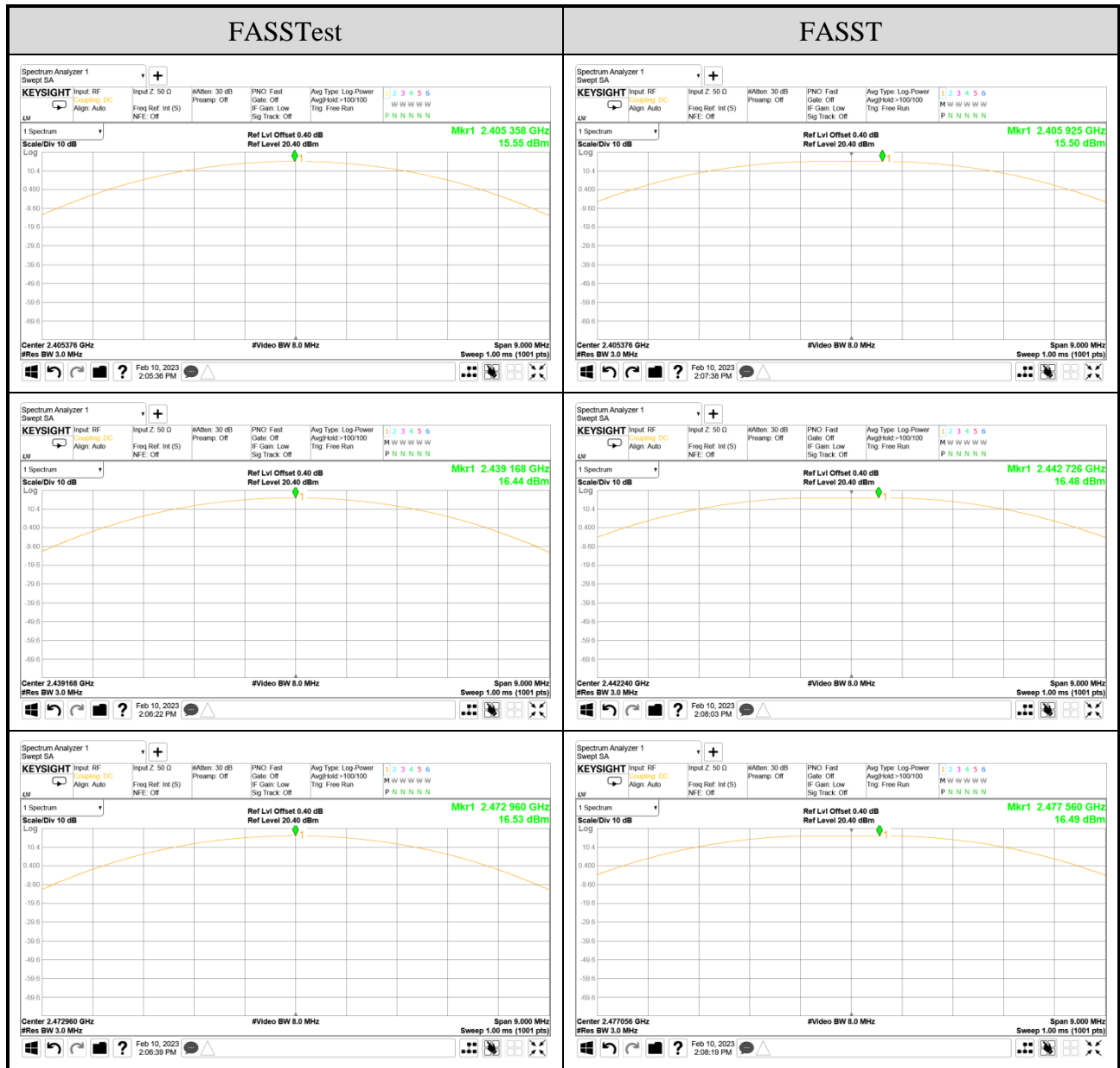
A.4.1 Peak Output Power

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm) ^{Note 2}	Limit
FASSTest	2405.376	15.55	1.48	17.03	<30dBm (Maximum Peak Output Power) <36dBm (E.I.R.P)
	2439.168	16.44	1.48	17.92	
	2472.960	16.53	1.48	18.01	
FASST	2405.376	15.50	1.48	16.98	
	2442.240	16.48	1.48	17.96	
	2477.056	16.49	1.48	17.97	

Note: 1. The results have been included cable loss.

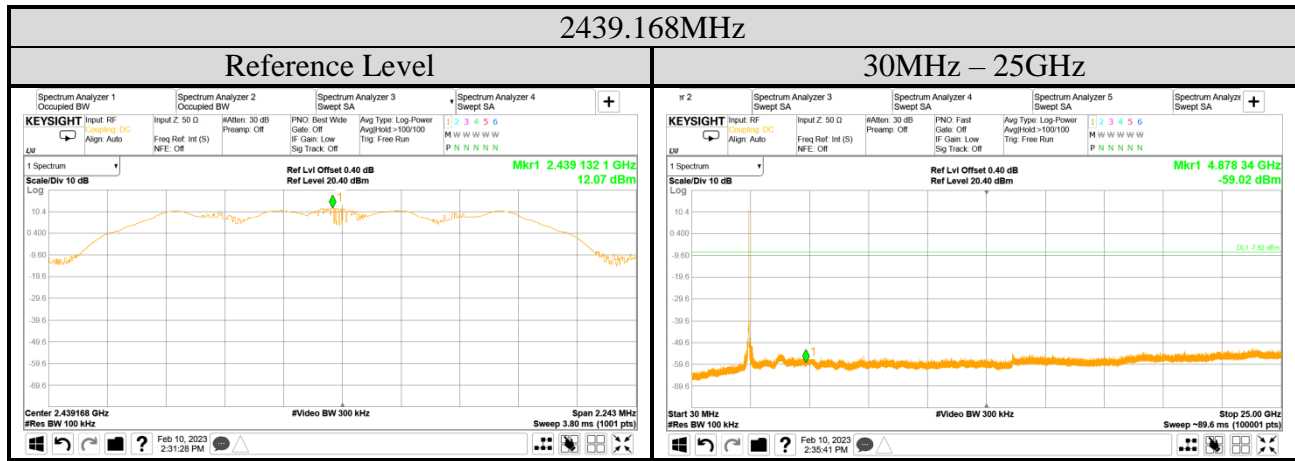
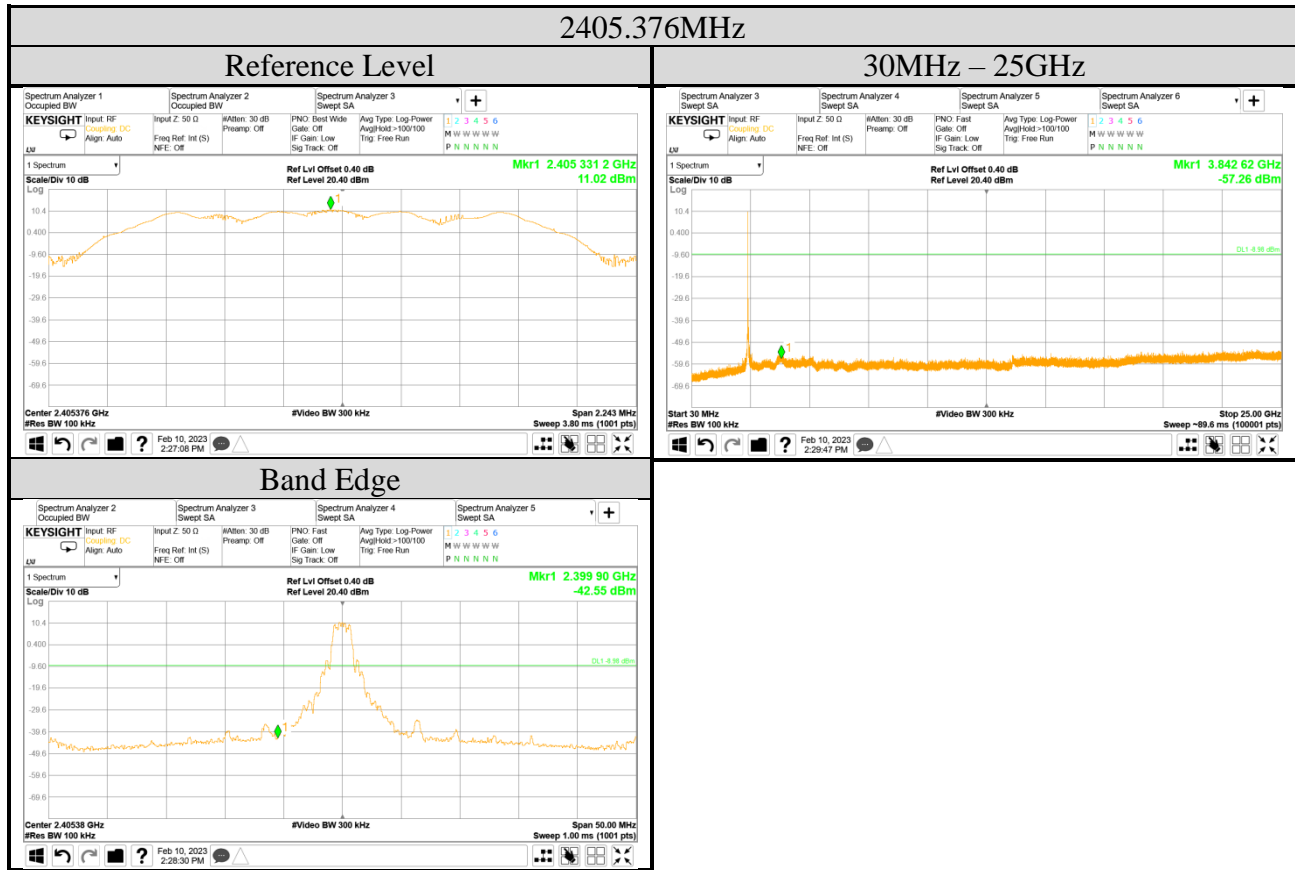
2. E.I.R.P.= The Peak Output Power (dBm)+ Antenna Gain (dBi).

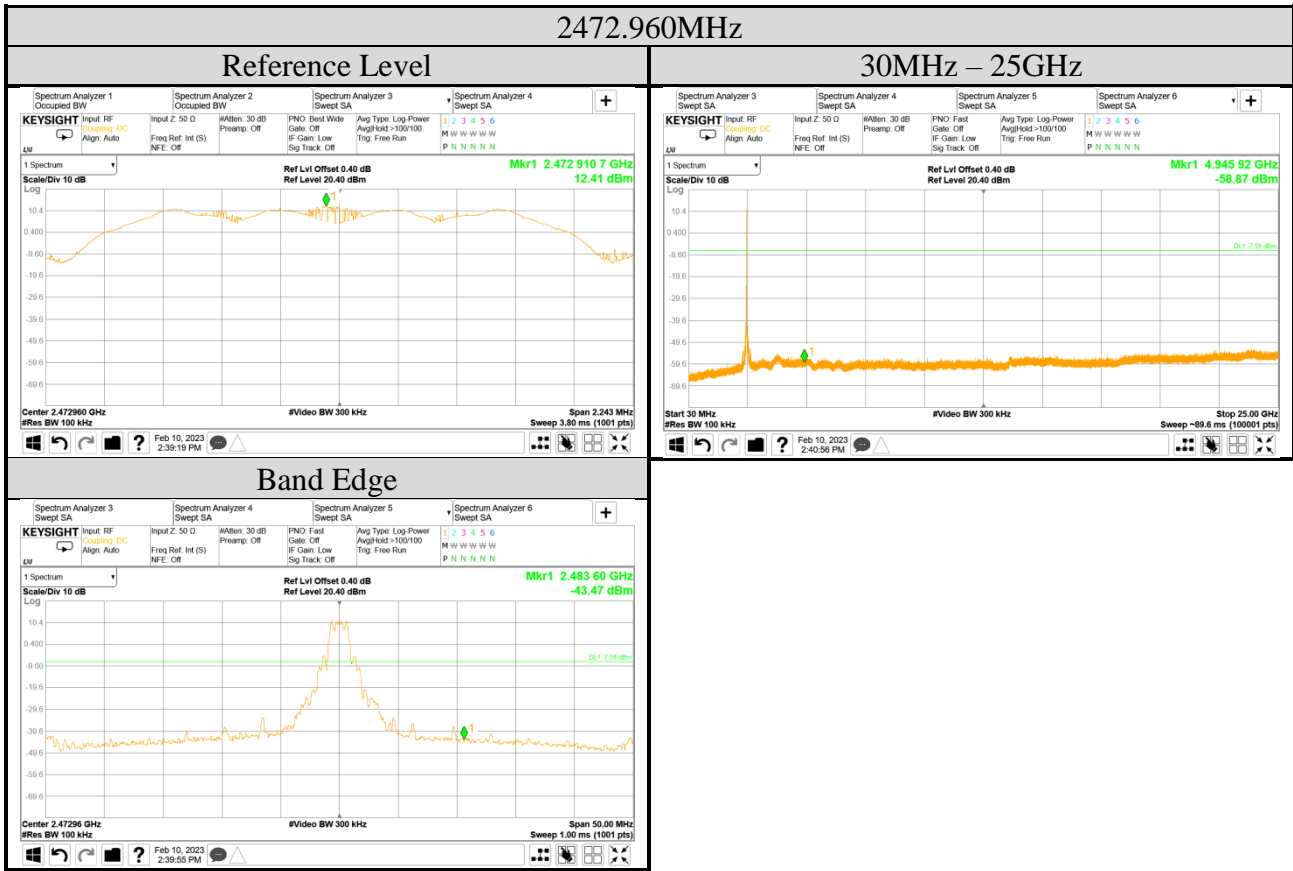
A.4.2 Measurement Plots



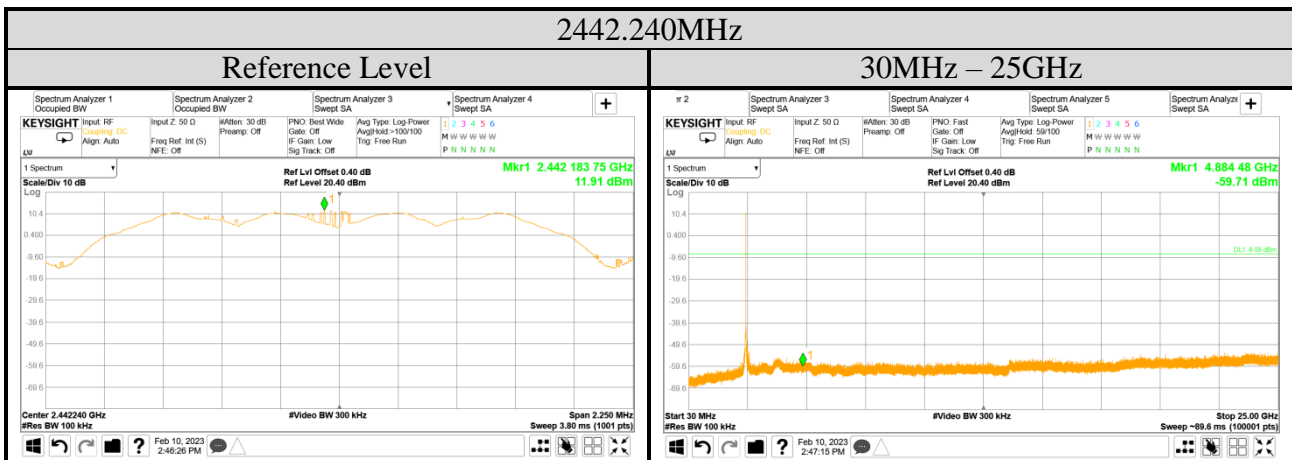
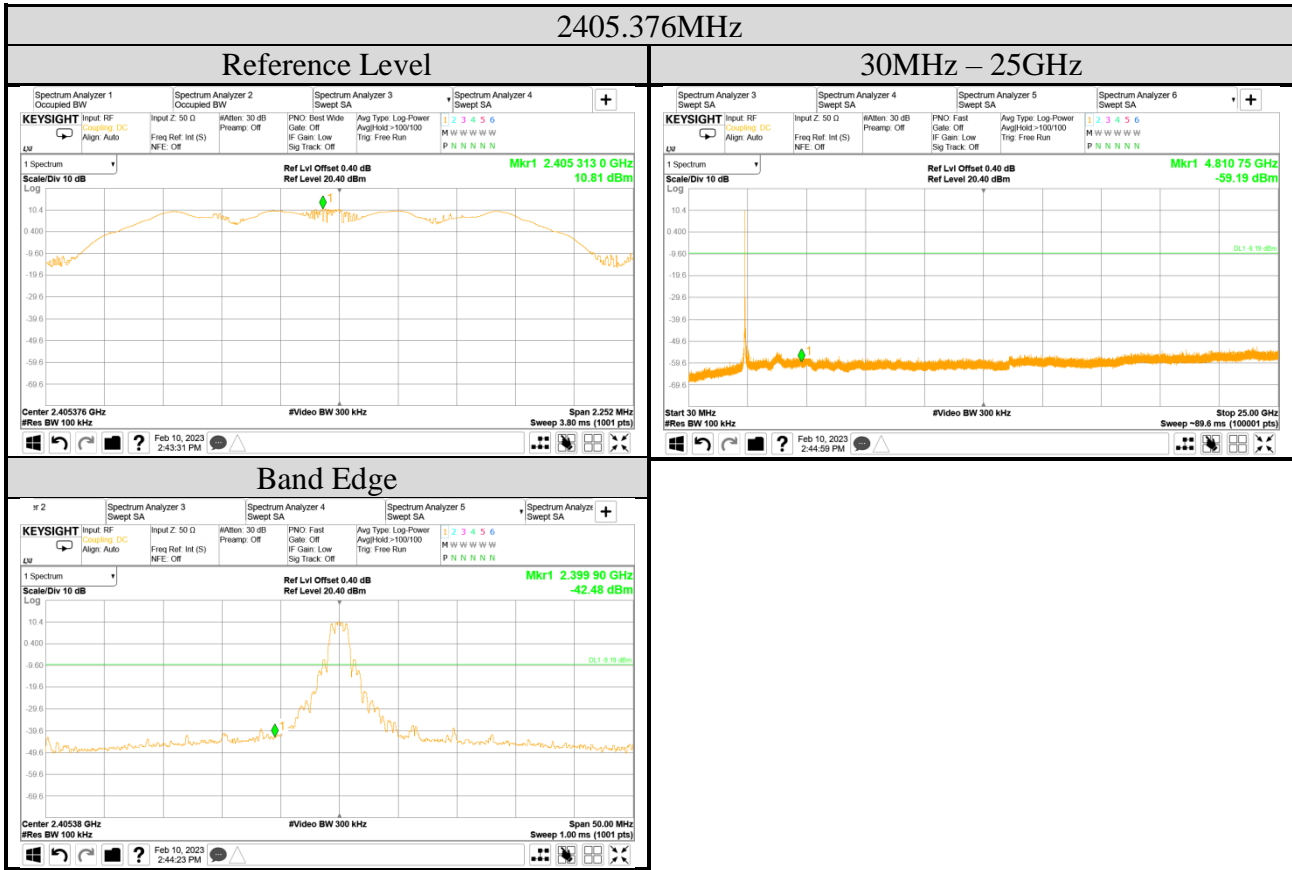
A.5 EMISSION LIMITATIONS

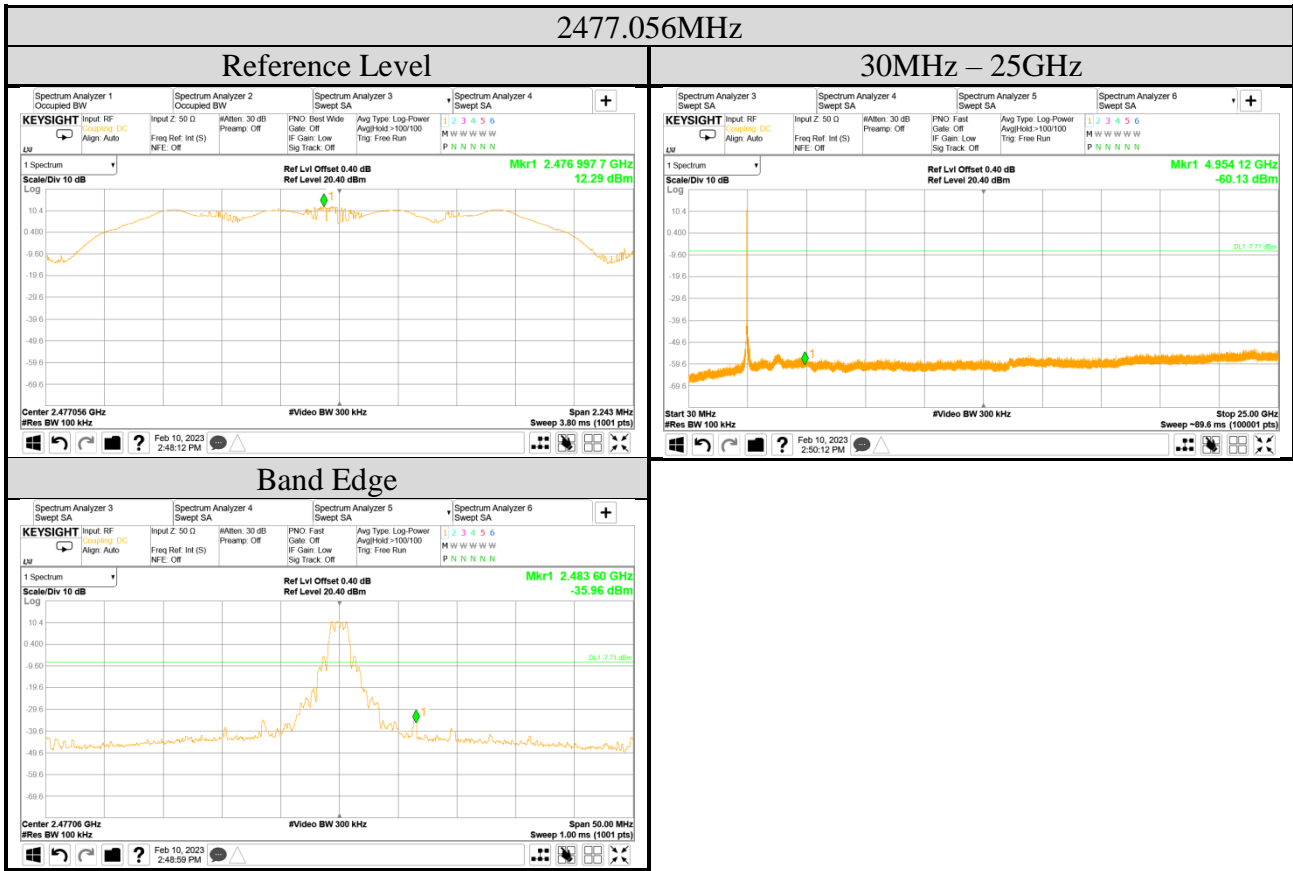
Test Date	2023/02/10	Temp./Hum.	22°C /70%
Cable Loss	0.40dB	Tested By	Sam Chang
Test Voltage	DC 7.4V (Via Battery)	Mode	FASSTes
Simultaneous Factor 10 log(N _{ANT})(Note: where N _{ANT} is the number of outputs)			0dB





Test Date	2023/02/10	Temp./Hum.	22°C /70%
Cable Loss	0.40dB	Tested By	Sam Chang
Test Voltage	DC 7.4V (Via Battery)	Mode	FASST
Simultaneous Factor 10 log(N _{ANT})(Note: where N _{ANT} is the number of outputs)			0dB





A.6 POWER SPECTRAL DENSITY

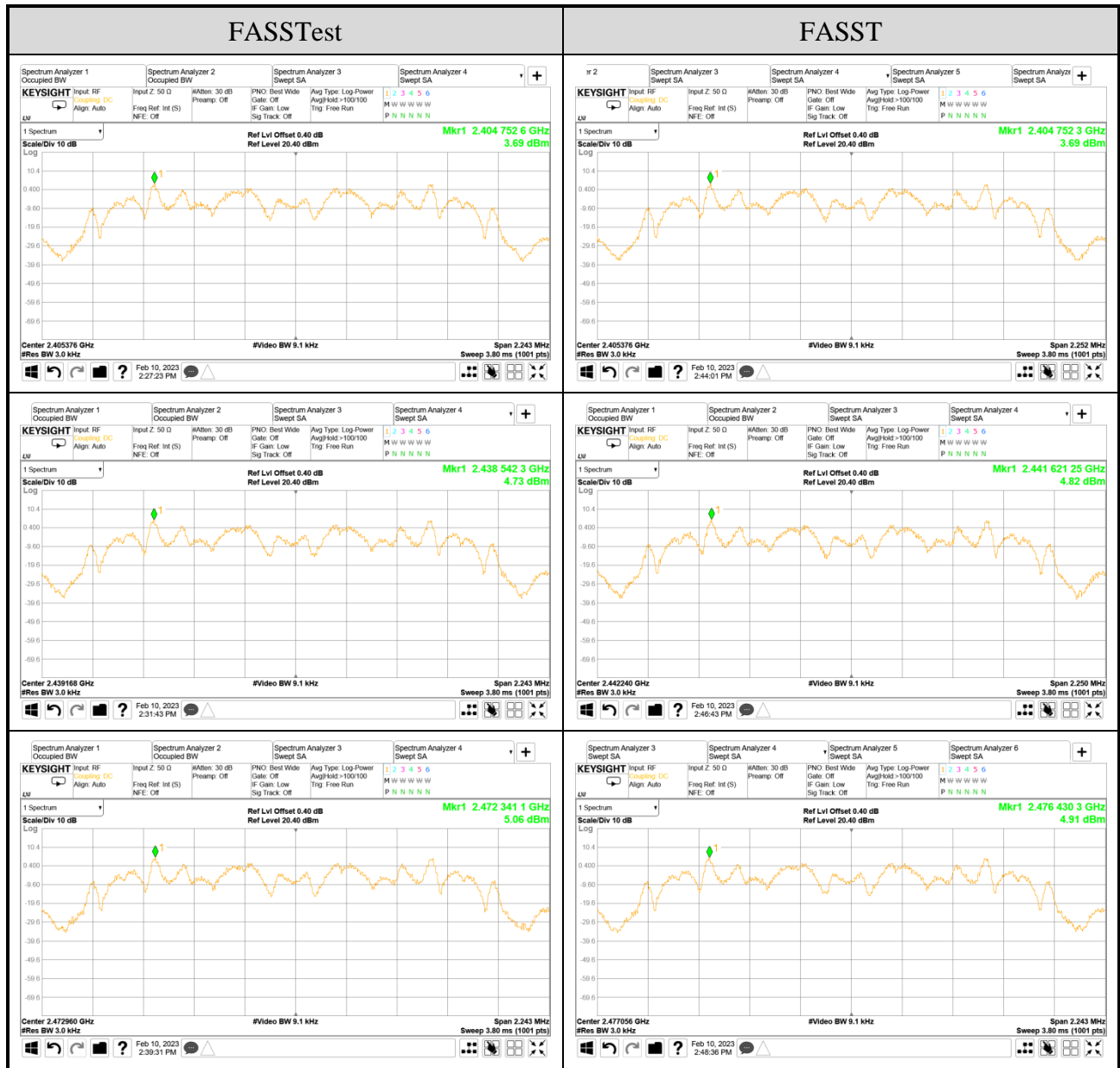
Test Date	2023/02/10	Temp./Hum.	22°C/70%
Cable Loss	0.40dB	Tested By	Sam Chang
Test Voltage	DC 7.4V (Via Battery)		

A.6.1 Power Spectral Density Result

Mode	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
FASSTest	2405.376	3.69	<8 dBm/3kHz
	2439.168	4.73	
	2472.960	5.06	
FASST	2405.376	3.69	
	2442.240	4.82	
	2477.056	4.91	

Note: All results have been included cable loss.

A.6.2 Measurement Plots



Note: All results have been included cable loss.