RADIO TEST REPORT

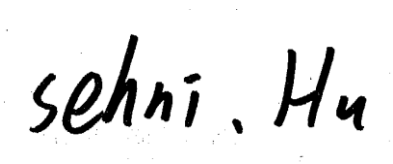
FCC 47 CFR PART 15 SUBPART C (CLASS II PERMISSIVE CHANGE) INDUSTRY CANADA RSS-247 (CLASS IV PERMISSIVE CHANGE)

Test Standard	**FCC Part 15.247** **IC RSS-247 issue 3 and IC RSS-GEN issue 5**
Product name	**Smart Module**
Brand Name	**Mio / MAGELLAN / NAVMAN / MiTAC**
Model No.	**SC680A-NA**
Test Result	**Pass**
Statements of Conformity	**Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.
The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory)

Approved by:



Sehni Hu
Supervisor

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 16, 2024	Initial Issue	ALL	Peggy Tsai

Table of contents

1. GENERAL INFORMATION 4
1.1 EUT INFORMATION 4
1.2 EUT CHANNEL INFORMATION 6
1.3 ANTENNA INFORMATION 6
1.4 MEASUREMENT UNCERTAINTY 7
1.5 FACILITIES AND TEST LOCATION 7
1.6 INSTRUMENT CALIBRATION 8
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT 10
1.8 TEST SETUP DIAGRAM 11
1.9 TEST PROGRAM 11
1.10 TEST METHODOLOGY AND APPLIED STANDARDS 11
2. TEST SUMMARY 12
3. DESCRIPTION OF TEST MODES 13
3.1 THE WORST MODE OF OPERATING CONDITION 13
3.2 THE WORST MODE OF MEASUREMENT 14
4. TEST RESULT 15
4.1 AC POWER LINE CONDUCTED EMISSION 15
4.2 OUTPUT POWER MEASUREMENT 22
4.3 RADIATION BANDEDGE AND SPURIOUS EMISSION 25
APPENDIX-A TEST PHOTO A-1

1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Mitac Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
Manufacturer	Mitac Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
Equipment	Smart Module
Brand Name	Mio / MAGELLAN / NAVMAN / MiTAC
Model Name	SC680A-NA
Model Discrepancy	Difference of the those brand names (list on this report) are just for marketing purpose only.
Host Equipment	Tablet
Host model	N727
HMN	PRO X
Received Date	May 29, 2024
Date of Test	June 20 ~ July 10, 2024
Power Supply	1. Power from Adapter. LUCENT TRANS / 1A52-PD20W I/P: 100-240Vac, 800mA, 50-60Hz O/P: 5Vdc, 3A or 9Vdc, 2.22A 2. Power from Adapter. TTT / MSS050200BI I/P: 100-240Vac,0.3A, 50-60Hz O/P: 5.0Vdc, 2A(10.0W) 3. Power from Car Charger. TTT/ TCV10100 I/P: DC 12-24V O/P: DC 5V, 2A (MAX) 4. Power from Cradle. Webfleet solutions / N653 Video Cradle I/P (1): DC 12V, 1A or DC 24V, 0.5A (Fleet Port) I/P (2): DC 5V, 2A (USB-C) 5. Power from Battery. Apower Electronics Co., Ltd. / AEC565786B Rating: 3.8Vdc, 4000mAh, 15.2Wh 6. Power from Host System.(DC 5V)

PMN	SC680A-NA
EUT Serial #	HO145U00012
Class II Permissive Change	The product has been granted by FCC dated 03/25/2024 under FCC ID: P4Q-SC680A. The intention of this application is to enable the modular certified FCC ID:P4Q-SC680A to be integrated in MiTAC Tablet N727. The module installed into host platform mentioned above is electronically and mechanically identical to the original certified module. Software security remains unchanged from the original application.
Class IV Permissive Change	The product has been granted by IC dated 03/26/2024 under IC : 2420C-SC680A. The intention of this application is to enable the modular certified IC: 2420C-SC680A to be integrated in MiTAC Tablet N727. The module installed into host platform mentioned above is electronically and mechanically identical to the original certified module. Software security remains unchanged from the original application.

Remark:
1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. Disclaimer: Variant information between/among trademarks is provided by the applicant, test results of this report are applicable to the sample EUT received of main test model name.

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	GFSK for BLE 1 Mbps GFSK for BLE 2 Mbps
Number of channels	40 Channels

Remark:
Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 and RSS-GEN Table 1 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	**Number of frequencies**	**Location in frequency range of operation**
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Specification	☒ PIFA ☐ PCB ☐ Dipole ☐ Coils
Antenna Gain	Gain: 0.44 dBi
Brand / Model	MIO / N722 8" PAD

Notes:
1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203 and RSS-GEN 6.8.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	± 2.213 dB
RF output power (Power Meter + Power sensor)	± 0.243 dB
Radiated Emission_9kHz-30MHz	± 3.761 dB
Radiated Emission_30MHz-200MHz	± 3.473 dB
Radiated Emission_200MHz-1GHz	± 3.946 dB
Radiated Emission_1GHz-6GHz	± 3.797 dB
Radiated Emission_6GHz-18GHz	± 4.803 dB
Radiated Emission_18GHz-26GHz	± 3.459 dB
Radiated Emission_26GHz-40GHz	± 3.297 dB

Remark:
1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at
☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.
CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Ben Yang	-
Radiation	Tony Chao、Ray Li	-
RF Conducted	Marco Chan	-

Remark: The lab has been recognized as the FCC accredited lab. under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

Conducted_FCC/NCC/IC(All)					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Power Sensor	Anritsu	MA2411B	1911387	2023-07-25	2024-07-24
Power Meter	Anritsu	ML2496A	2136002	2023-11-16	2024-11-15
Cable	Woken	SUMITOMO	1	2024-03-02	2025-03-01
Signal Analyzer	KEYSIGHT	N9030B	MY62291089	2023-10-13	2024-10-12
Software	Radio Test Software Ver. 21				

AC Mains Conduction					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	100064	2024-06-14	2025-06-13
LISN	TESEQ	LN2-16N	22012	2024-02-29	2025-02-27
Cable	Woken	SFL402	185A	2024-07-08	2025-07-07
Software	e3 V6-110812				

Remark:
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

966A_Radiated					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Signal Analyzer	KEYSIGHT	N9010A	MY52220817	2024-03-15	2025-03-14
Thermo-Hygro Meter	WISEWIND	1206	D07	2023-12-08	2024-12-07
Active Loop Antenna	SCHWARZBECK	FMZB 1513-60	1513-60-028	2023-12-13	2024-12-12
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2023-08-08	2024-08-07
Preamplifier	EMEC	EM330	060609	2024-02-21	2025-02-20
Cable	Huber+Suhner	104PEA	20995+21000+182330	2024-02-21	2025-02-20
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2023-12-28	2024-12-27
Preamplifier	HP	8449B	3008A00965	2023-12-22	2024-12-21
Cable	EMCI	EMC101G	221213+221011+221012	2023-10-17	2024-10-16
Attenuator	Mini-Circuits	BW-S9W5	BWS9W5-09-966A-01	2024-02-07	2025-02-06
High Pass Filters	Titan Microwave	T04H30001800070S01	22011402-4	2024-06-12	2025-06-13
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2023-12-13	2024-12-12
Pre-Amplifier	EMCI	EMC184045SE	980860	2023-12-12	2024-12-11
Radio Communication Analyzer	Anritsu	MT-8820C	6201240043	2023-12-24	2024-12-23
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Site Validation	CCS	966A	N/A	2023-07-10	2024-07-09
Software	e3 V9-210616c				

Remark:
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

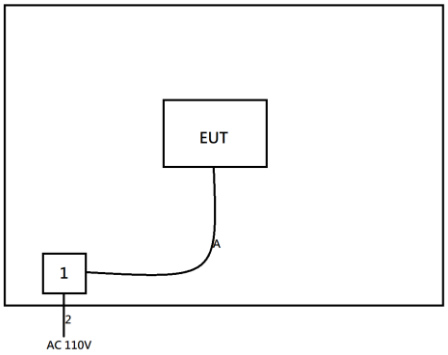
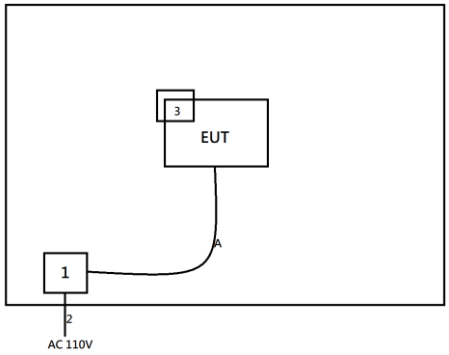
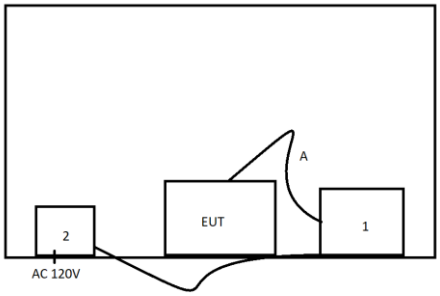
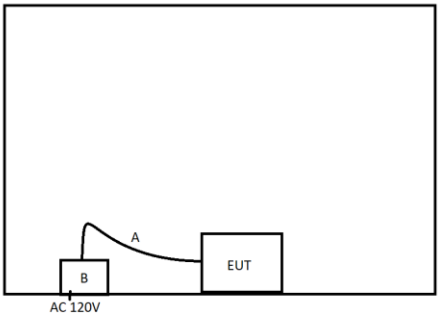
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment						
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**	**IC**
	N/A					

Support Equipment (Conduction)						
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**	**IC**
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A	N/A
2	Adapter	Lenovo	ADLX45DLC3A	N/A	N/A	N/A
A	Type-C Cable	N/A	N/A	N/A	N/A	N/A
B	Adapter	TTT	MSS050200BI	N/A	N/A	N/A

Support Equipment (RSE、Co-Location)						
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**	**IC**
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A	N/A
2	Adapter	Lenovo	ADLX45DLC3A	N/A	N/A	N/A
3	Proximity card	Easycard	N/A	8380 3765 0294 5360	N/A	N/A
A	USB-A to Type-C Cable	N/A	N/A	N/A	N/A	N/A

1.8 TEST SETUP DIAGRAM

RSE	Co-Location
	
Conduction_Mode 1	**Conduction_Mode 2**
	

1.9 TEST PROGRAM

The EUT connection corresponds to the surrounding fixture control board.
This EUT uses " QRCT4 v4.0" software to set the frequency, modulation, and power to allow the sample to continuously transmit (including frequency hopping mode).

1.10 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074, RSS-247 Issue 3 and RSS-GEN Issue 5.

2. TEST SUMMARY

IC Standard Section	FCC Standard Section	Report Section	Test Item	Result
RSS-Gen 6.8	15.203	1.3	Antenna Requirement	Pass
RSS-GEN 8.8	15.207(a)	4.1	AC Conducted Emission	Pass
RSS-247(5.4)(d)	15.247(b)(3)	4.2	Output Power Measurement	Pass
RSS-GEN 8.9, 8.10	15.247(d) 15.205	4.3	Radiation Band Edge	Pass
RSS-GEN 8.9, 8.10	15.247(d) 15.209 15.205	4.3	Radiation Spurious Emission	Pass

Note:
The host antenna is of a different type than originally approved, RF output power was reduced compared to the original application, so conducted performance in the intended frequency bands is expected to be lower than measured in the original modular approval. However, radiation performance will be fully evaluated for product compliance.

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	BLE Mode (1Mbps) BLE Mode (2Mbps)
Test Channel Frequencies	1.Lowest Channel : 2402MHz 2.Middle Channel : 2440MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	**AC Power line conducted emission for line and neutral**
Power supply Mode	**Mode 1: EUT Power by Host System** **Mode 2: EUT Power by Adapter(TTT)+USB-A** **Mode 3: EUT Power by Adapter(LUCENT TRANS)+USB-A**
Worst Mode	**☒ Mode 1 ☒ Mode 2 ☐ Mode 3 ☐ Mode 4**

Radiated Emission Measurement Above 1G	
Test Condition	**Radiated Emission Above 1G**
Power supply Mode	**Mode 1: EUT Power by Host System**
Worst Mode	**☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4**
Worst Position	**☐ Placed in fixed position.** **☐ Placed in fixed position at X-Plane (E2-Plane)** **☐ Placed in fixed position at Y-Plane (E1-Plane)** **☒ Placed in fixed position at Z-Plane (H-Plane)**

Radiated Emission Measurement Below 1G	
Test Condition	**Radiated Emission Below 1G**
Power supply Mode	**Mode 1: EUT Power by Adapter(LUCENT TRANS)+Type-C** **Mode 2: EUT Power by Adapter(TTT)+USB-A** **Mode 3: EUT Power by Car charger(12V)+Type-C+Cradle** **Mode 4: EUT Power by Car charger(24V)+Type-C+Cradle** **Mode 5: EUT Power by Cradle(12V)** **Mode 6: EUT Power by Cradle(24V)** **Mode 7: EUT Power by Host System**
Worst Mode	**☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4** **☐ Mode 5 ☐ Mode 6 ☐ Mode 7**

Radiated Emission Measurement [Co-Location]	
Test Condition	**Radiated Emission [Co-Location]**
Power supply Mode	**Mode 1: EUT Power by NFC+BLE+LTE_Band2** **Mode 2: EUT Power by NFC+BLE+LTE_Band13**
Worst Mode	**☐ Mode 1 ☒ Mode 2 ☐ Mode 3 ☐ Mode 4**

Remark:

1. The worst mode was record in this test report.
2. AC power line conducted emission were performed the EUT transmit at the highest output power channel as worse case.
3. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Z-Plane) were recorded in this report
4. The platform device has an NFC transmitter and a WLAN&WWAN 's module, which evaluates Radiated Emission based on co-location.

4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a), and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

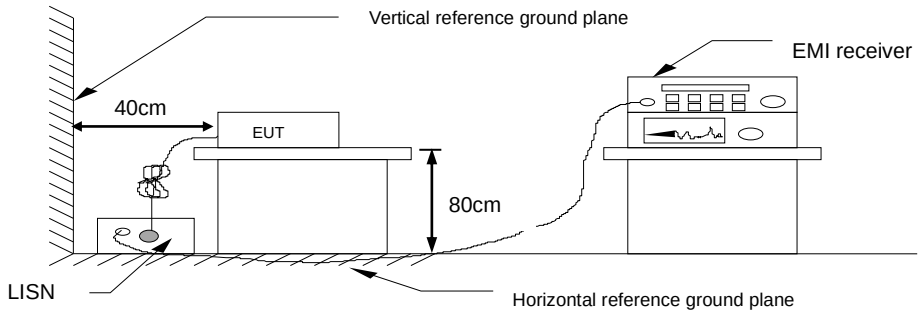
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed above horizontal ground plane and 0.4m above vertical ground plane
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup

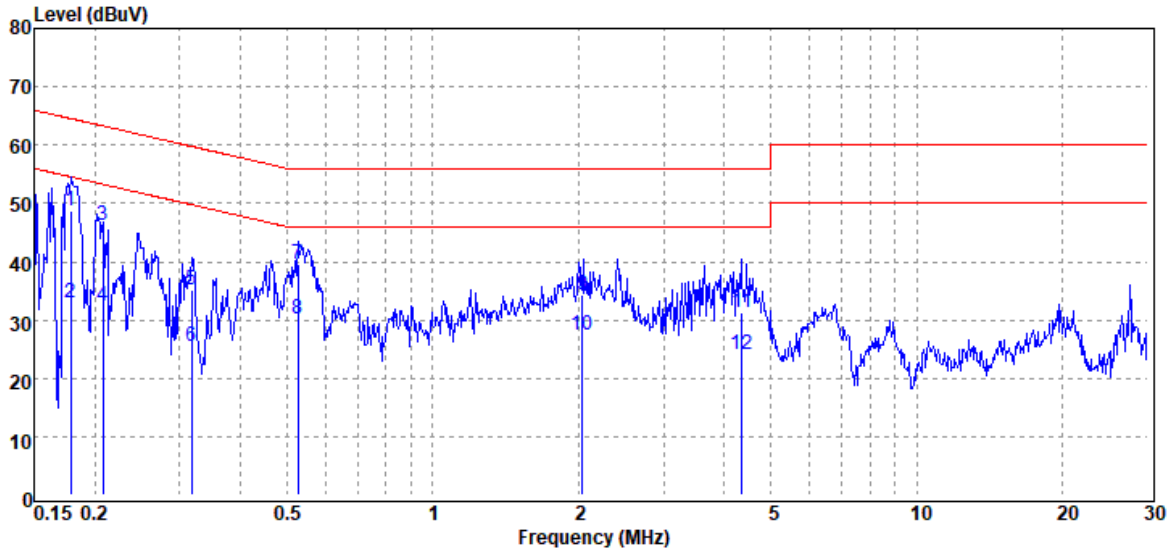


4.1.4 Test Result

Pass.

Test Data

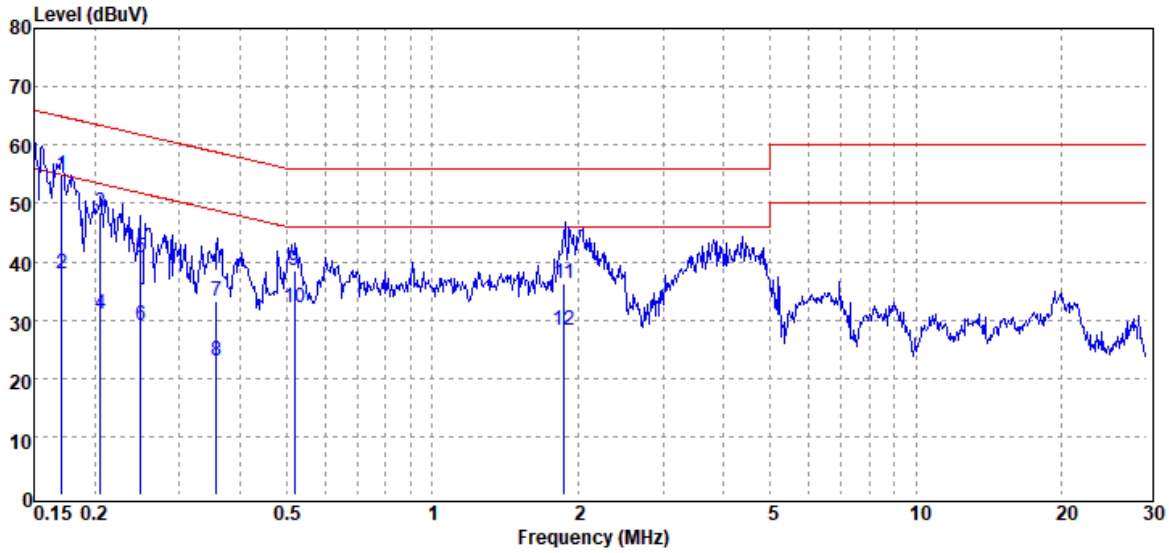
Project No	: TM-2405000413P	Test Date	: 2024-07-08
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: LINE	Test Voltage	: AC 120V/60Hz
Note	: Mode 1		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.179	QP	48.57	0.12	48.69	64.54	-15.85
0.179	Average	32.92	0.12	33.04	54.54	-21.50
0.208	QP	46.13	0.12	46.25	63.29	-17.04
0.208	Average	32.13	0.12	32.25	53.29	-21.04
0.318	QP	35.04	0.11	35.15	59.76	-24.61
0.318	Average	25.42	0.11	25.53	49.76	-24.23
0.526	QP	39.47	0.11	39.58	56.00	-16.42
0.526	Average	30.16	0.11	30.27	46.00	-15.73
2.037	QP	34.26	0.15	34.41	56.00	-21.59
2.037	Average	27.24	0.15	27.39	46.00	-18.61
4.355	QP	31.21	0.21	31.42	56.00	-24.58
4.355	Average	23.81	0.21	24.02	46.00	-21.98

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

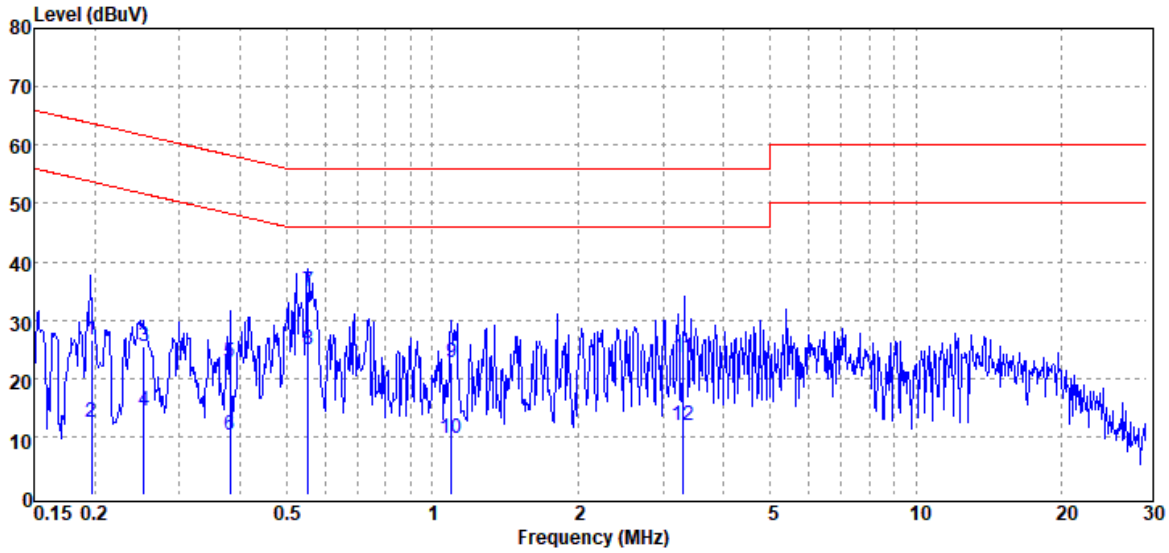
Project No	: TM-2405000413P	Test Date	: 2024-07-08
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: NEUTRAL	Test Voltage	: AC 120V/60Hz
Note	: Mode 1		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.171	QP	54.79	0.10	54.89	64.92	-10.03
0.171	Average	37.92	0.10	38.02	54.92	-16.90
0.205	QP	48.34	0.09	48.43	63.39	-14.96
0.205	Average	30.81	0.09	30.90	53.39	-22.49
0.249	QP	40.71	0.09	40.80	61.79	-20.99
0.249	Average	28.99	0.09	29.08	51.79	-22.71
0.358	QP	33.20	0.08	33.28	58.78	-25.50
0.358	Average	22.94	0.08	23.02	48.78	-25.76
0.519	QP	38.27	0.08	38.35	56.00	-17.65
0.519	Average	32.11	0.08	32.19	46.00	-13.81
1.872	QP	36.20	0.13	36.33	56.00	-19.67
1.872	Average	28.03	0.13	28.16	46.00	-17.84

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

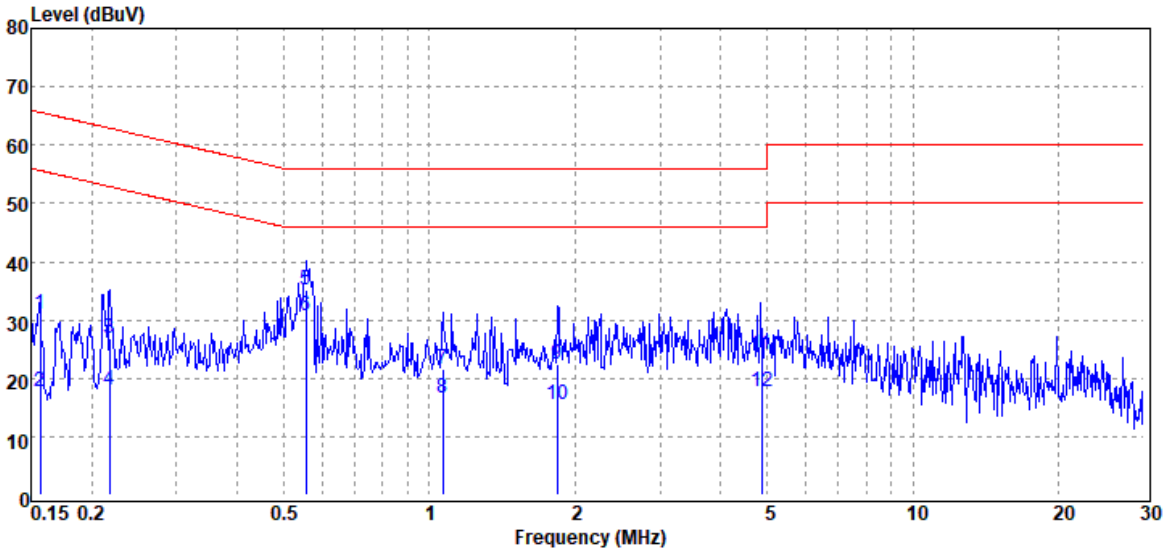
Project No	: TM-2405000413P	Test Date	: 2024-07-10
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: LINE	Test Voltage	: AC 120V/60Hz
Note	: Mode 2		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.197	QP	26.20	0.37	26.57	63.74	-37.17
0.197	Average	12.05	0.37	12.42	53.74	-41.32
0.253	QP	25.12	0.39	25.51	61.67	-36.16
0.253	Average	14.13	0.39	14.52	51.67	-37.15
0.382	QP	22.36	0.38	22.74	58.24	-35.50
0.382	Average	9.90	0.38	10.28	48.24	-37.96
0.554	QP	34.59	0.38	34.97	56.00	-21.03
0.554	Average	24.56	0.38	24.94	46.00	-21.06
1.093	QP	22.61	0.16	22.77	56.00	-33.23
1.093	Average	9.53	0.16	9.69	46.00	-36.31
3.300	QP	23.22	0.22	23.44	56.00	-32.56
3.300	Average	11.62	0.22	11.84	46.00	-34.16

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

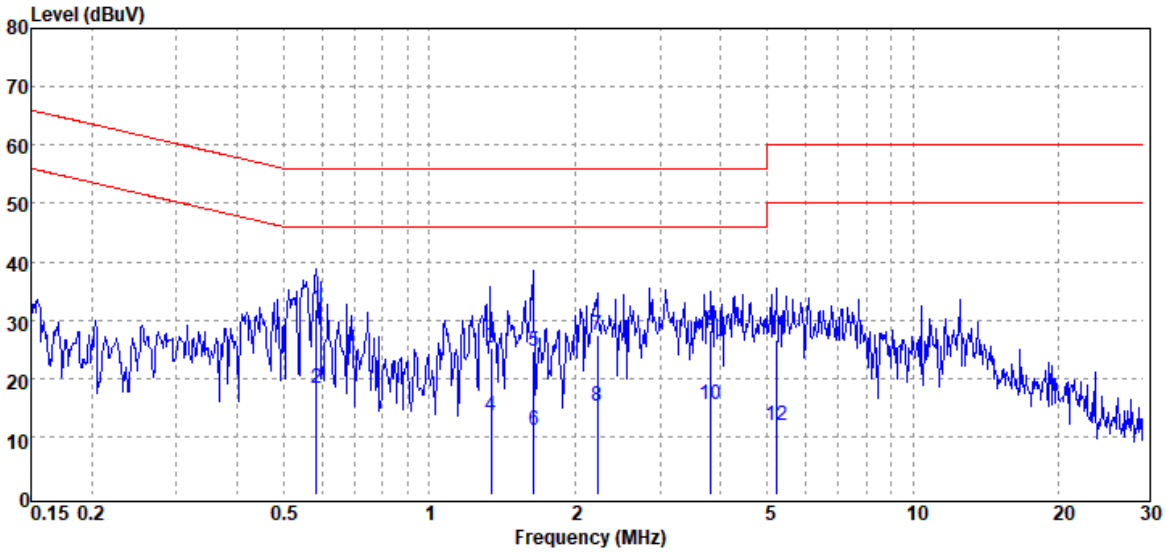
Project No	: TM-2405000413P	Test Date	: 2024-07-10
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: NEUTRAL	Test Voltage	: AC 120V/60Hz
Note	: Mode 2		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.156	QP	30.75	0.14	30.89	65.65	-34.76
0.156	Average	17.45	0.14	17.59	55.65	-38.06
0.218	QP	26.51	0.36	26.87	62.89	-36.02
0.218	Average	17.61	0.36	17.97	52.89	-34.92
0.556	QP	34.72	0.35	35.07	56.00	-20.93
0.556	Average	30.39	0.35	30.74	46.00	-15.26
1.067	QP	21.38	0.13	21.51	56.00	-34.49
1.067	Average	16.53	0.13	16.66	46.00	-29.34
1.839	QP	22.25	0.16	22.41	56.00	-33.59
1.839	Average	15.32	0.16	15.48	46.00	-30.52
4.868	QP	23.96	0.23	24.19	56.00	-31.81
4.868	Average	17.39	0.23	17.62	46.00	-28.38

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

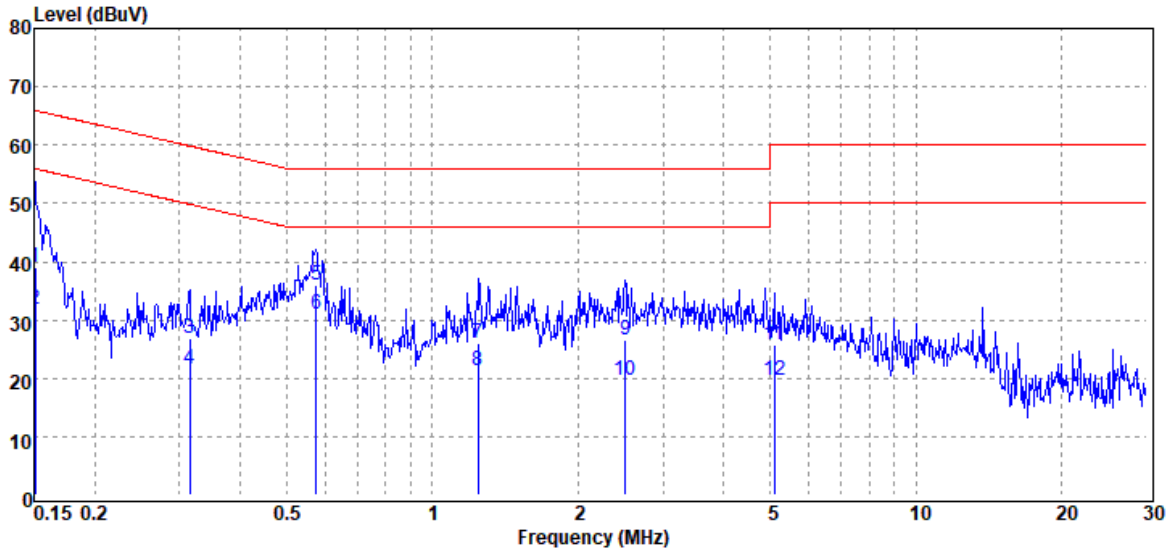
Project No	: TM-2405000413P	Test Date	: 2024-07-10
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: LINE	Test Voltage	: AC 230V/60Hz
Note	: Mode 2		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.583	QP	31.34	0.38	31.72	56.00	-24.28
0.583	Average	17.95	0.38	18.33	46.00	-27.67
1.344	QP	24.94	0.16	25.10	56.00	-30.90
1.344	Average	13.28	0.16	13.44	46.00	-32.56
1.643	QP	24.52	0.18	24.70	56.00	-31.30
1.643	Average	10.82	0.18	11.00	46.00	-35.00
2.223	QP	27.15	0.18	27.33	56.00	-28.67
2.223	Average	15.18	0.18	15.36	46.00	-30.64
3.824	QP	28.12	0.24	28.36	56.00	-27.64
3.824	Average	15.28	0.24	15.52	46.00	-30.48
5.237	QP	26.23	0.27	26.50	60.00	-33.50
5.237	Average	11.74	0.27	12.01	50.00	-37.99

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

Project No	: TM-2405000413P	Test Date	: 2024-07-10
Operation Mode	: BLE	Temp./Humi.	: 23.4°C / 54%
Test Chamber	: Conduction	Engineer	: Ben Yang
Probe	: NEUTRAL	Test Voltage	: AC 230V/60Hz
Note	: Mode 2		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.151	QP	38.82	0.11	38.93	65.94	-27.01
0.151	Average	31.82	0.11	31.93	55.94	-24.01
0.315	QP	26.46	0.35	26.81	59.83	-33.02
0.315	Average	21.30	0.35	21.65	49.83	-28.18
0.576	QP	35.67	0.35	36.02	56.00	-19.98
0.576	Average	30.76	0.35	31.11	46.00	-14.89
1.244	QP	25.89	0.14	26.03	56.00	-29.97
1.244	Average	21.26	0.14	21.40	46.00	-24.60
2.504	QP	26.38	0.18	26.56	56.00	-29.44
2.504	Average	19.57	0.18	19.75	46.00	-26.25
5.099	QP	25.36	0.25	25.61	60.00	-34.39
5.099	Average	19.43	0.25	19.68	50.00	-30.32

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS - Limit

4.2 OUTPUT POWER MEASUREMENT

4.2.1 Test Limit

According to §15.247(b)(3) and RSS-247 section 5.4(d)

Peak output power：

FCC

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement,

IC

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Limit	☒ Antenna not exceed 6 dBi：30dBm ☐ Antenna with DG greater than 6 dBi [Limit = 30 – (DG – 6)] ☐ Point-to-point operation

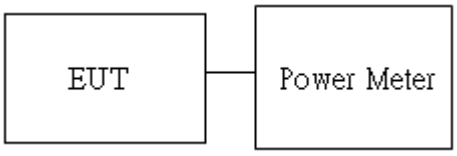
Average output power：For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

Temperature:	21.6 ~ 22.1℃	**Test date:**	June 20 ~ 21, 2024
Humidity:	59 ~ 62% RH	**Tested by:**	Marco Chan

Peak & Average output power：

BLE 1M mode:

CH	Frequency (MHz)	Power Setting	Peak Output Power (dBm)	Required Limit (dBm)
Low	2402	default	-4.37	30
Mid	2440	default	-4.73	30
High	2480	default	-1.67	30
CH	**Frequency (MHz)**	**Power Setting**	**Avg. Output Power (dBm)**	**Required Limit (dBm)**
Low	2402	default	-4.54	30
Mid	2440	default	-4.90	30
High	2480	default	-1.80	30

Note:

1.Measured by power meter, cable loss dB + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

BLE 2M mode:

CH	Frequency (MHz)	Power set	Peak Output Power (dBm)	Required Limit (dBm)
Low	2402	default	-4.16	30
Mid	2440	default	-4.40	30
High	2480	default	-1.44	30
CH	**Frequency (MHz)**	**Power set**	**Avg. Output Power (dBm)**	**Required Limit (dBm)**
Low	2402	default	-4.37	30
Mid	2440	default	-4.63	30
High	2480	default	-1.55	30

Note:

1.Measured by power meter, cable loss 0 dB + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

EIRP Power:

EIRP BLE 1M mode

CH	Frequency (MHz)	Power Setting	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit
Low	2402	default	-4.54	0.44	-4.10	4W= 36 dBm
Mid	2440	default	-4.90	0.44	-4.46	4W= 36 dBm
High	2480	default	-1.80	0.44	-1.36	4W= 36 dBm

* ***Note:*** EIRP = Average Power + Gain

EIRP BLE 2M mode

CH	Frequency (MHz)	Power set	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit
Low	2402	default	-4.37	0.44	-3.93	4W= 36 dBm
Mid	2440	default	-4.63	0.44	-4.19	4W= 36 dBm
High	2480	default	-1.55	0.44	-1.11	4W= 36 dBm

* ***Note:*** EIRP = Average Power + Gain

4.3 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.3.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Remark:
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

IC according to RSS-247 section 5.5, RSS-Gen, Section 8.9 and 8.10

RSS-Gen Table 3 and Table 5 – General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz (Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Measurements for compliance with the limits in table 3 may be performed at distances other than 3 metres, in accordance with Section 6.6.

RSS-Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement Distance (m)
9-490 kHz Note	6.37/F (F in kHz)	300
490-1,705 kHz	63.7/F (F in kHz)	30
1.705-30 MHz	0.08	30

Note: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT is placed on a turntable, below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.

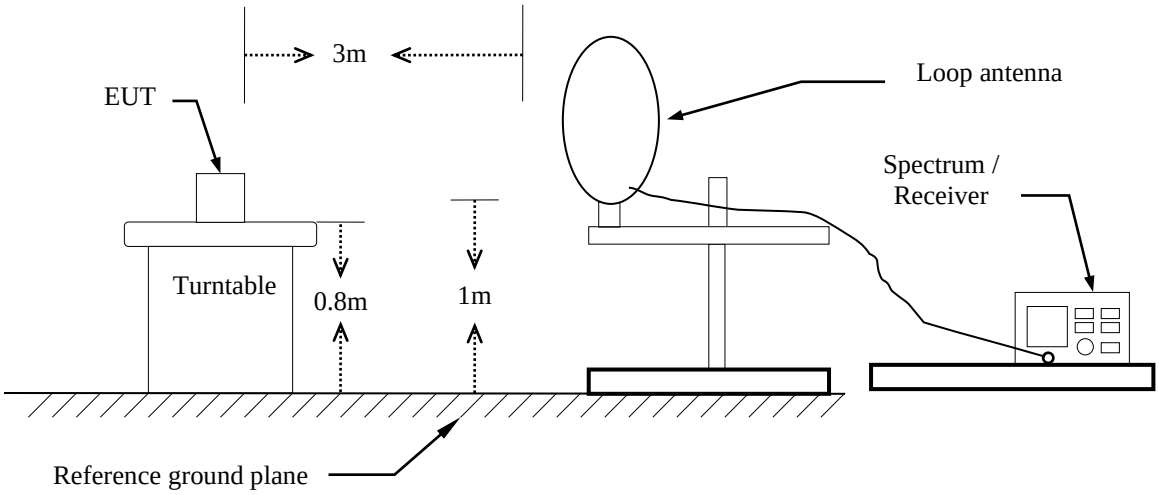
3. Span shall wide enough to full capture the emission measured. The SA from 9KHz to 1GHz set to high power channels with the EUT transmit.

Remark:
1. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
2. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
3. The SA setting following：
(1) Below 30MHz：
(1.1) 9KHz-490KHz : RBW=200Hz / VBW=1kHz / Sweep=AUTO
(1.2) 490KHz-30MHz : RBW=10kHz / VBW=30kHz / Sweep=AUTO
(2) 30MHz to 1GHz：RBW = 100kHz, VBW≥ 3*RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
(3) Above 1GHz：
(3.1) For Peak measurement：RBW = 1MHz, VBW≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
(3.2) For Average measurement：RBW = 1MHz,VBW
˙If Duty Cycle ≥98%, VBW=10Hz.
˙If Duty Cycle < 98%, VBW=1/T.

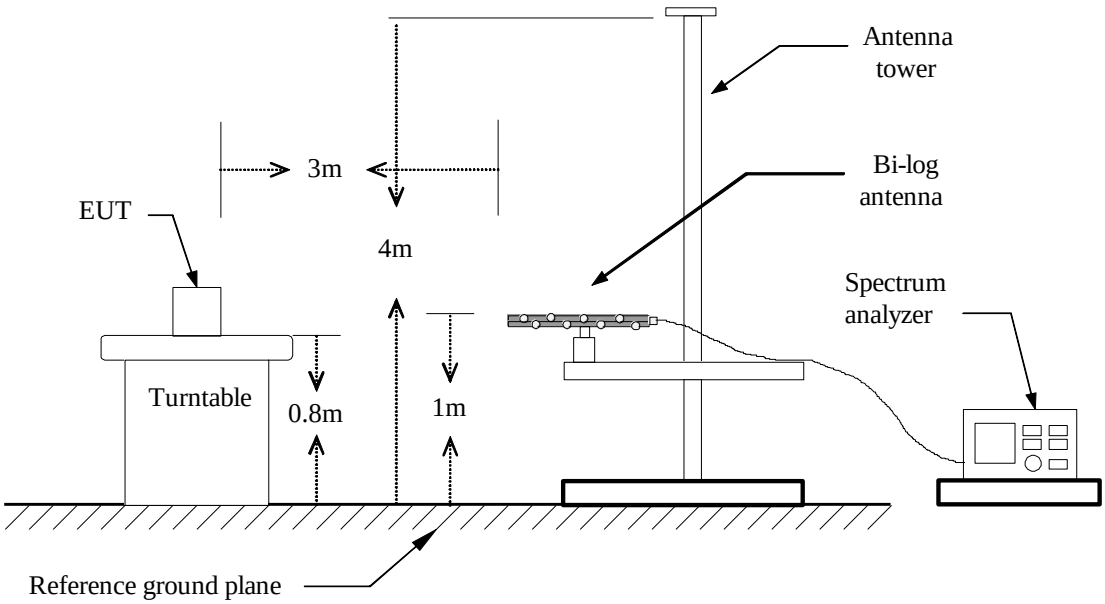
4. Data result
Actual FS=Spectrum Reading Level+Factor
Margin=Actual FS- Limit

4.3.3 Test Setup

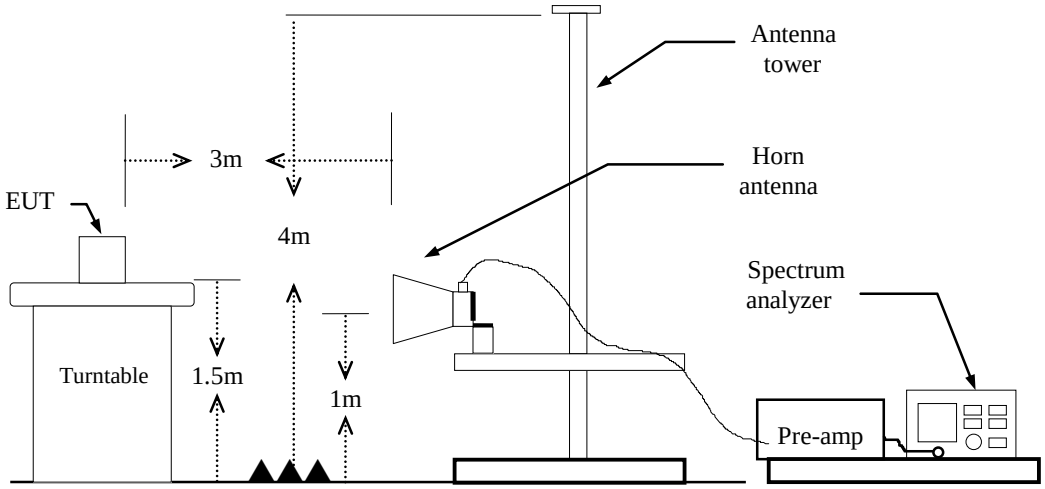
9kHz ~ 30MHz



30MHz ~ 1GHz



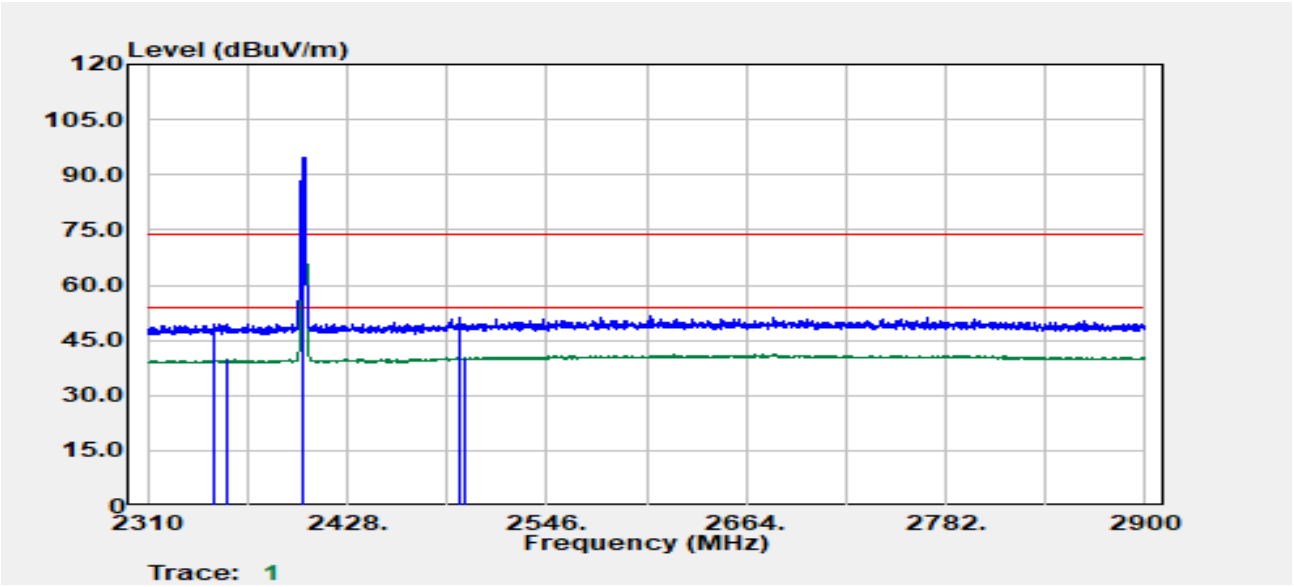
Above 1 GHz



4.3.4 Test Result

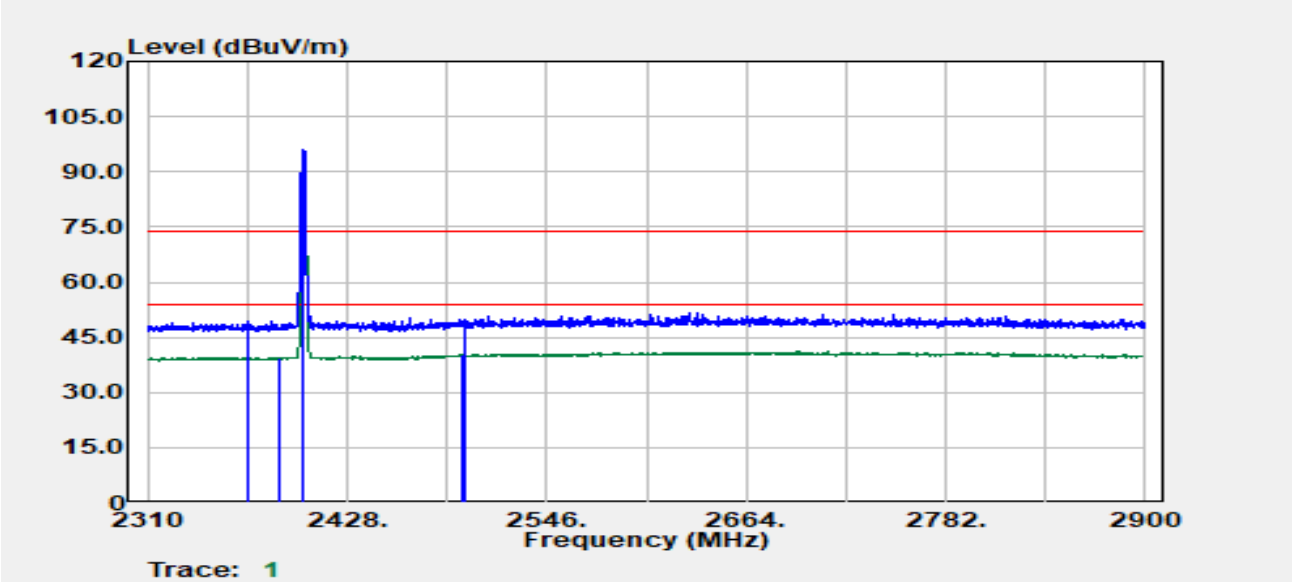
Band Edge Test Data

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



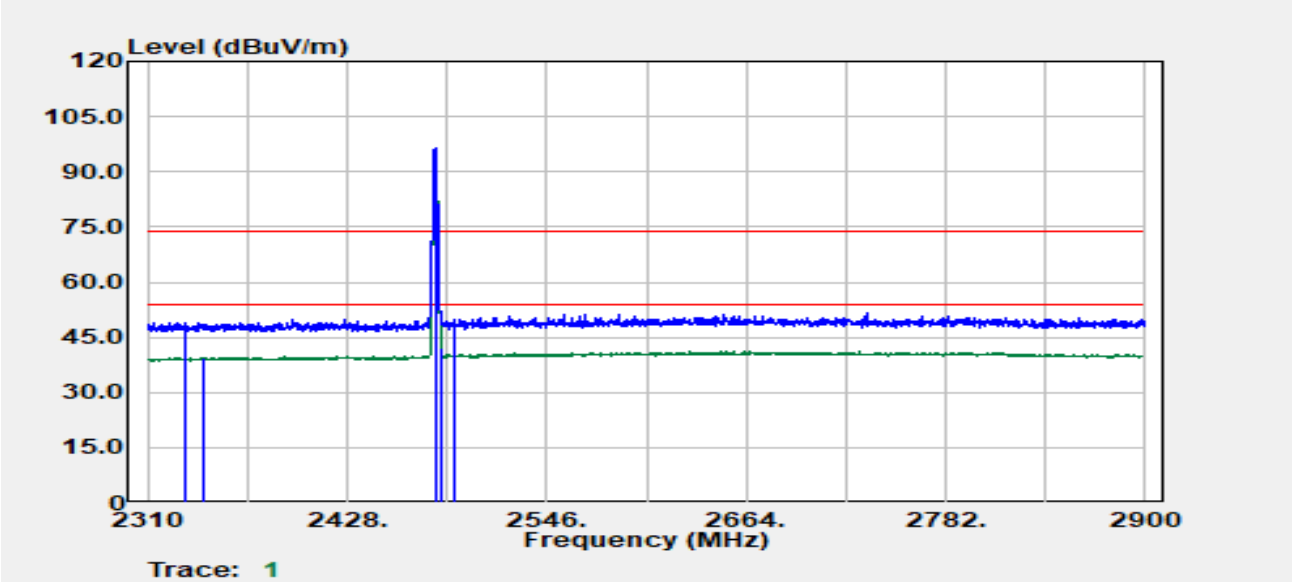
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
2349.77	Peak	43.34	6.24	49.58	74.00	-24.42
2357.52	Average	33.59	6.25	39.83	54.00	-14.17
2402.00	Peak	88.52	6.29	94.81	--	--
2402.00	Average	88.30	6.29	94.59	--	--
2494.33	Peak	44.15	6.82	50.96	74.00	-23.04
2497.83	Average	33.34	6.83	40.17	54.00	-13.83

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



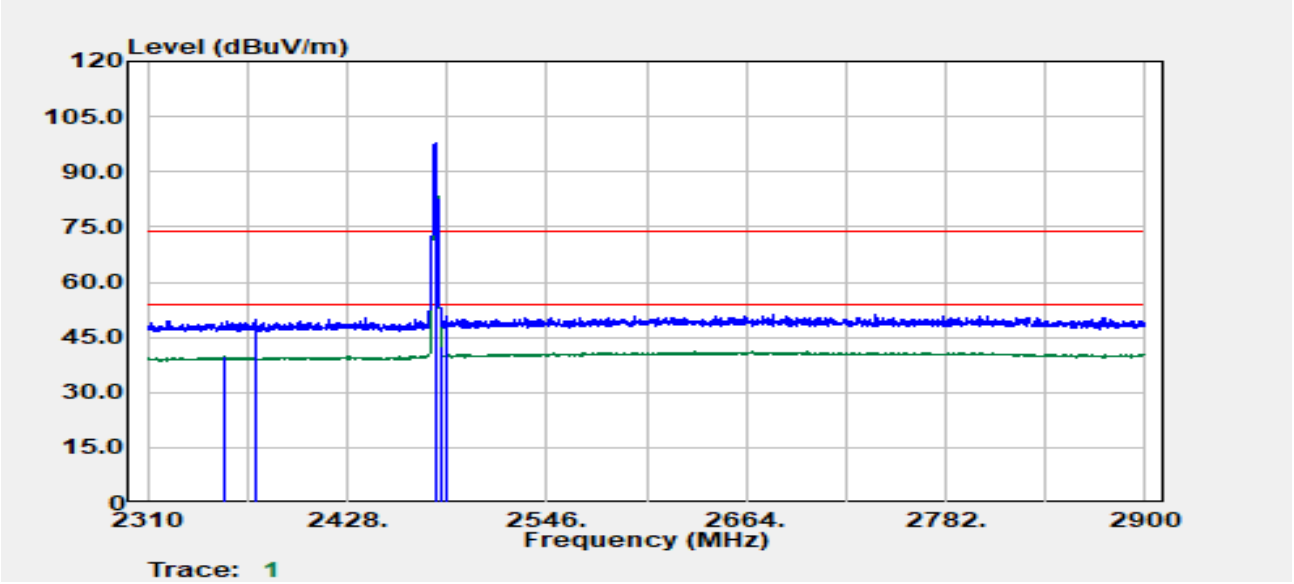
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2369.28	Peak	43.03	6.17	49.20	74.00	-24.80
2388.03	Average	33.34	6.24	39.58	54.00	-14.42
2402.00	Peak	89.74	6.29	96.03	--	--
2402.00	Average	89.49	6.29	95.78	--	--
2496.08	Average	33.58	6.83	40.40	54.00	-13.60
2497.83	Peak	43.20	6.83	50.04	74.00	-23.96

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



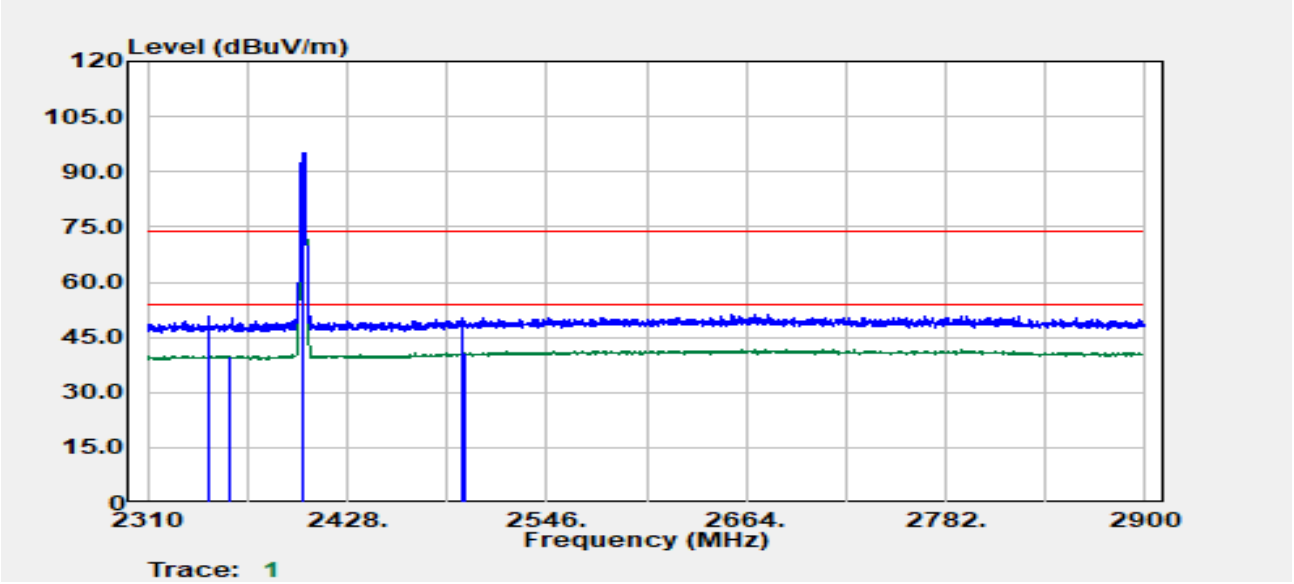
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2331.76	Peak	42.85	6.17	49.03	74.00	-24.97
2343.01	Average	33.32	6.15	39.47	54.00	-14.53
2480.00	Peak	89.60	6.67	96.27	--	--
2480.00	Average	89.28	6.67	95.95	--	--
2483.57	Average	35.35	6.72	42.06	54.00	-11.94
2490.83	Peak	42.87	6.81	49.68	74.00	-24.32

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



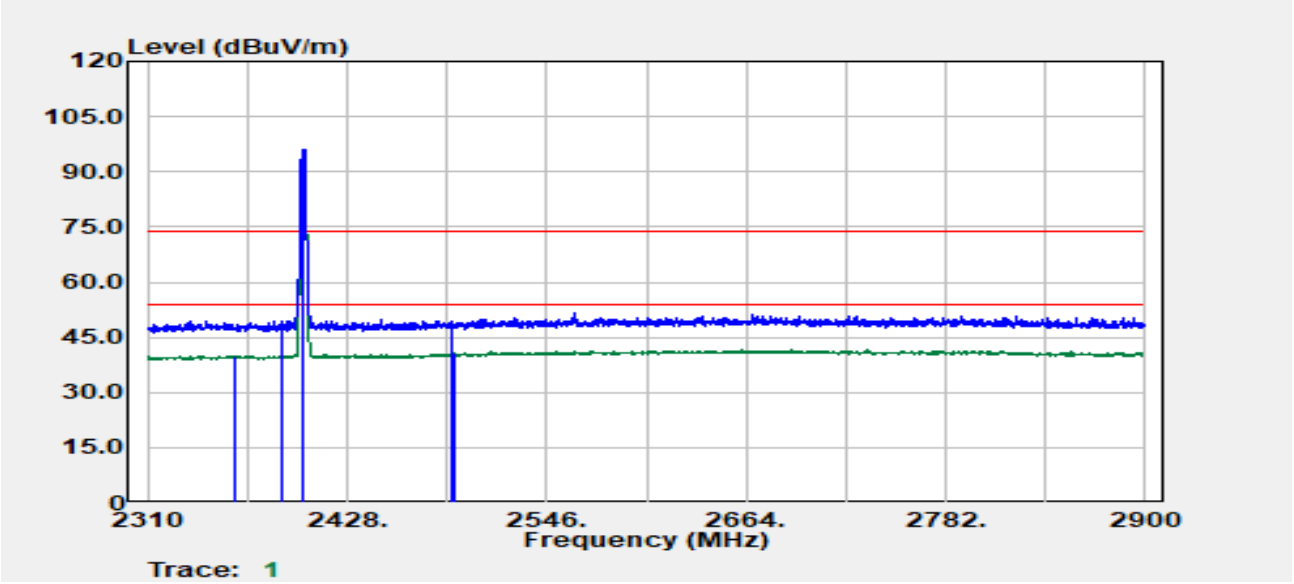
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2356.02	Average	33.39	6.25	39.63	54.00	-14.37
2374.28	Peak	43.58	6.12	49.70	74.00	-24.30
2480.00	Peak	90.95	6.67	97.62	--	--
2480.00	Average	90.68	6.67	97.35	--	--
2483.57	Average	35.91	6.72	42.63	54.00	-11.37
2486.33	Peak	43.80	6.75	50.55	74.00	-23.45

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



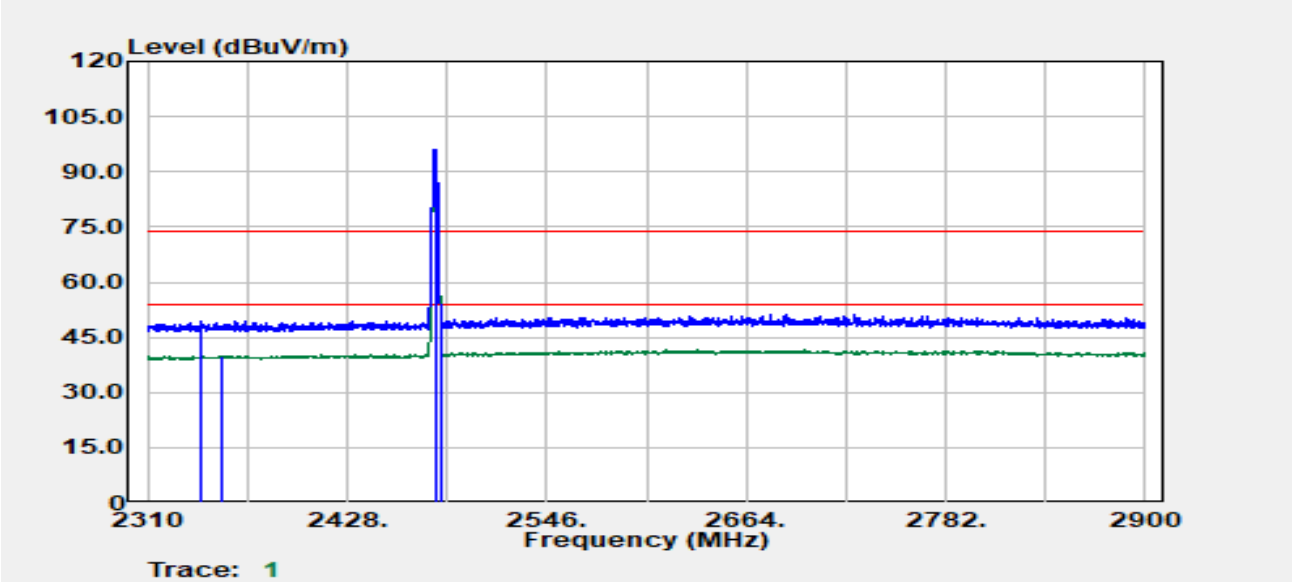
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2346.02	Peak	44.35	6.19	50.54	74.00	-23.46
2358.77	Average	33.70	6.25	39.95	54.00	-14.05
2402.00	Peak	88.73	6.29	95.02	--	--
2402.00	Average	87.52	6.29	93.82	--	--
2496.33	Peak	43.41	6.83	50.24	74.00	-23.76
2497.08	Average	33.81	6.83	40.64	54.00	-13.36

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



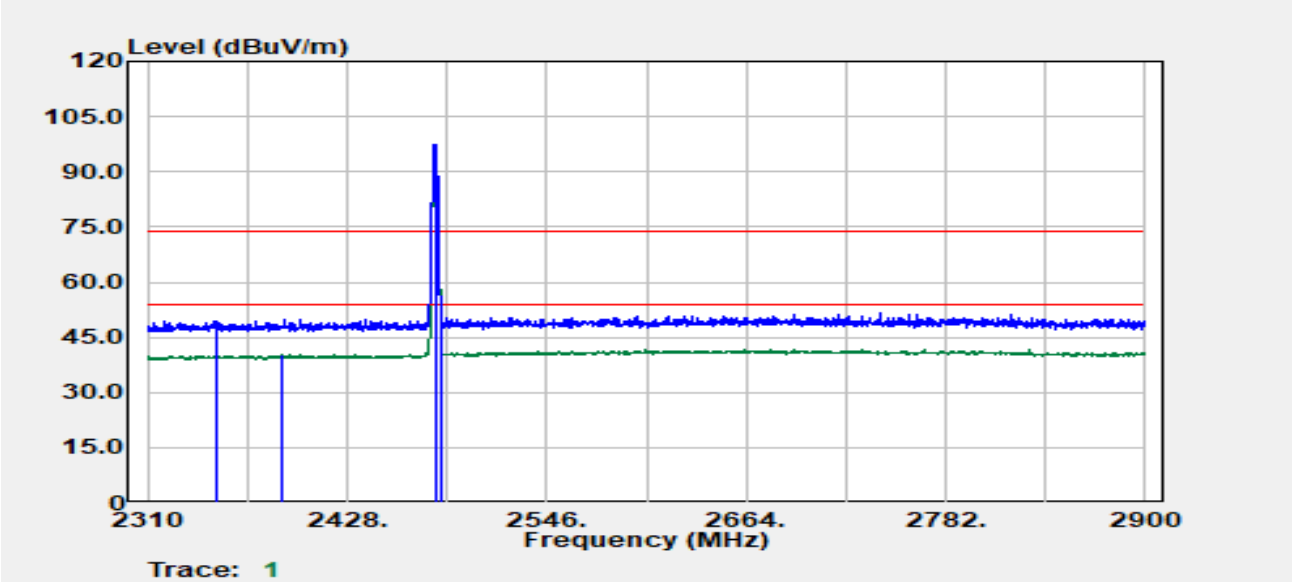
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2362.27	Average	33.71	6.23	39.94	54.00	-14.06
2388.78	Peak	43.26	6.25	49.52	74.00	-24.48
2402.00	Peak	89.93	6.29	96.23	--	--
2402.00	Average	88.74	6.29	95.03	--	--
2489.58	Peak	42.38	6.80	49.18	74.00	-24.82
2491.58	Average	34.09	6.81	40.90	54.00	-13.10

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2341.26	Peak	43.43	6.13	49.55	74.00	-24.45
2354.52	Average	33.79	6.24	40.04	54.00	-13.96
2480.00	Peak	89.50	6.67	96.17	--	--
2480.00	Average	88.26	6.67	94.93	--	--
2483.57	Peak	43.60	6.72	50.32	74.00	-23.68
2483.57	Average	38.18	6.72	44.90	54.00	-9.10

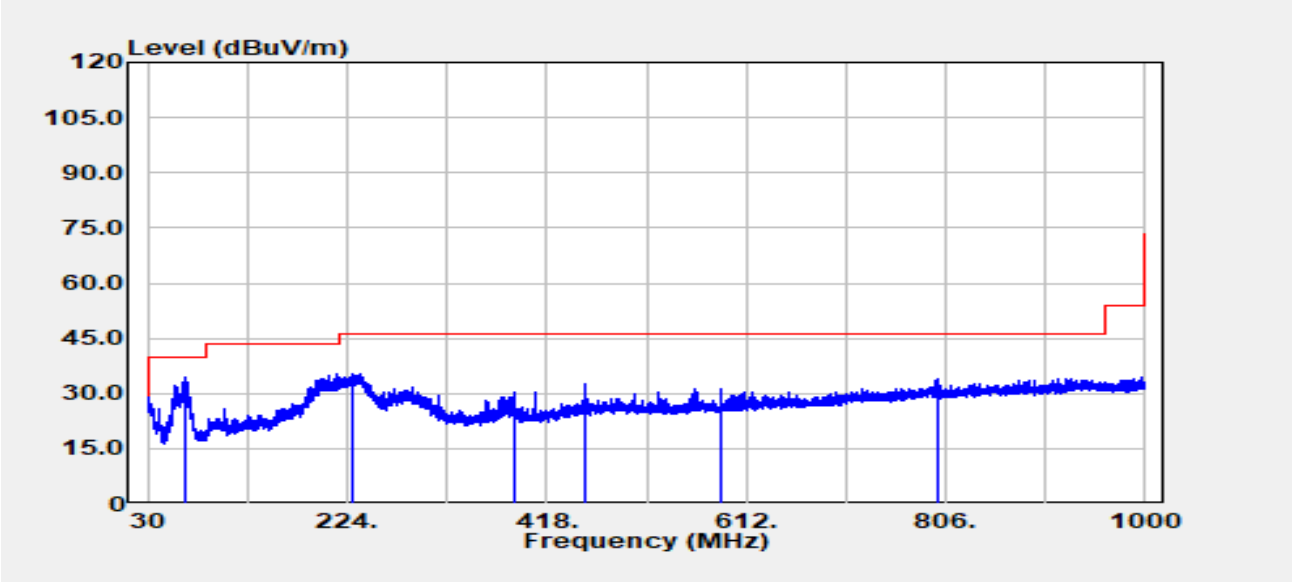
Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2350.27	Peak	43.01	6.24	49.25	74.00	-24.75
2388.78	Average	33.85	6.25	40.10	54.00	-13.90
2480.00	Peak	90.83	6.67	97.50	--	--
2480.00	Average	89.69	6.67	96.36	--	--
2483.57	Peak	44.49	6.72	51.21	74.00	-22.79
2483.57	Average	39.30	6.72	46.01	54.00	-7.99

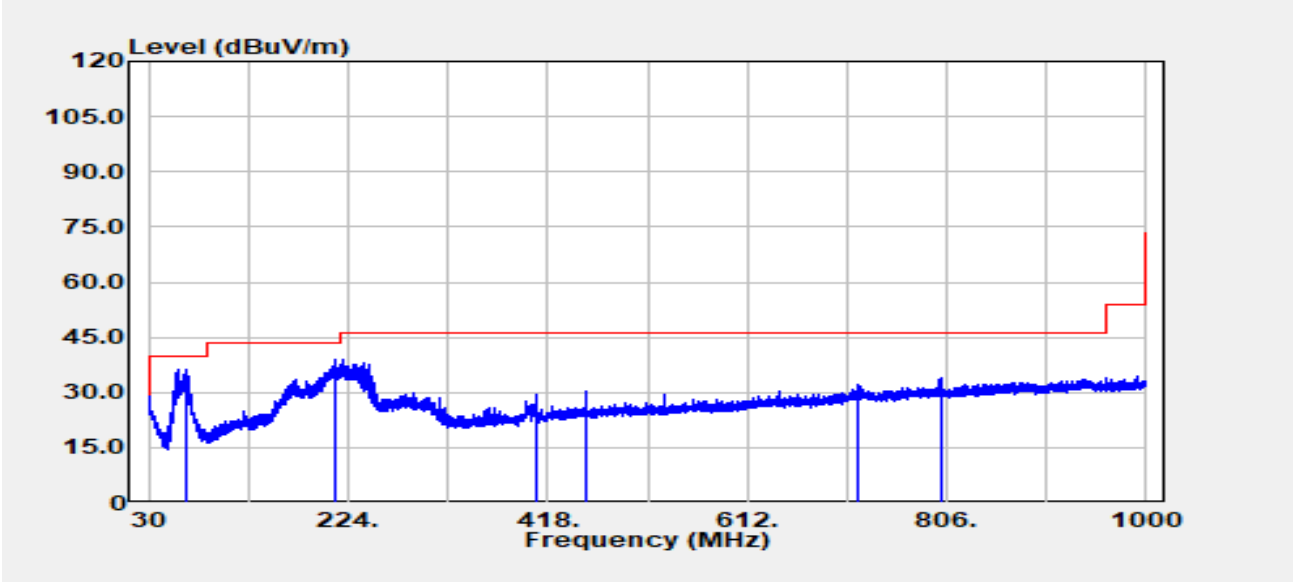
TX Test Data

Project No	:TM-2405000413P	Test Date	:2024-07-04
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



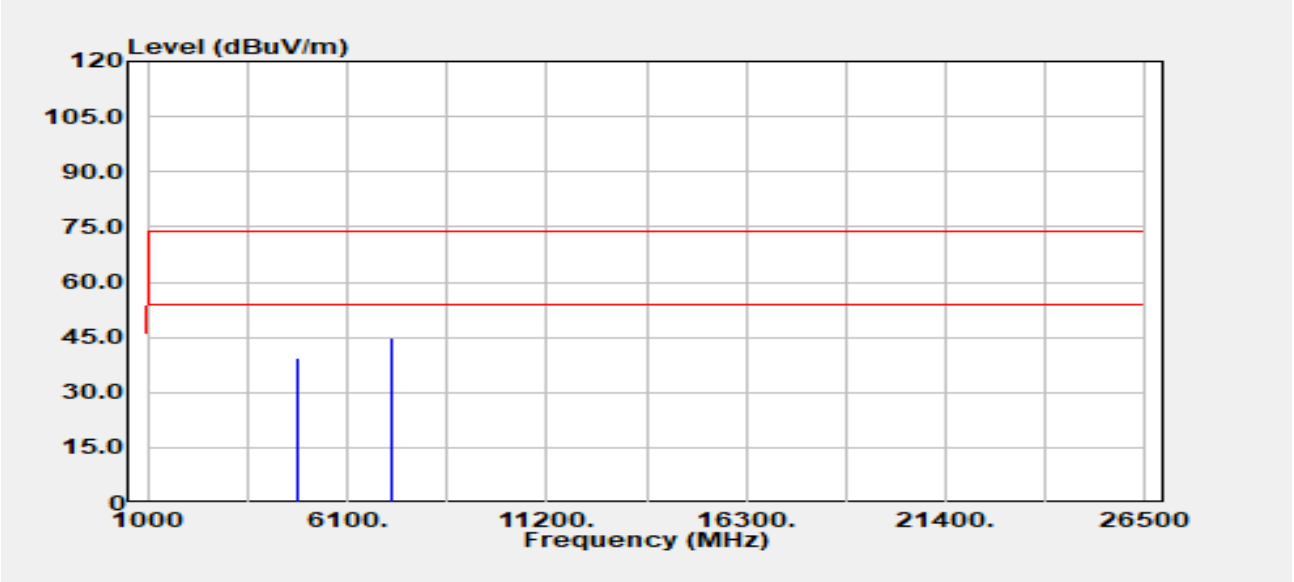
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
66.50	Peak	49.83	-15.41	34.42	40.00	-5.58
228.00	Peak	46.93	-11.40	35.53	46.00	-10.47
386.48	Peak	36.78	-6.38	30.40	46.00	-15.60
455.95	Peak	36.85	-4.21	32.64	46.00	-13.36
588.24	Peak	33.56	-2.23	31.33	46.00	-14.67
798.48	Peak	32.33	1.47	33.80	46.00	-12.20

Project No	:TM-2405000413P	Test Date	:2024-07-04
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



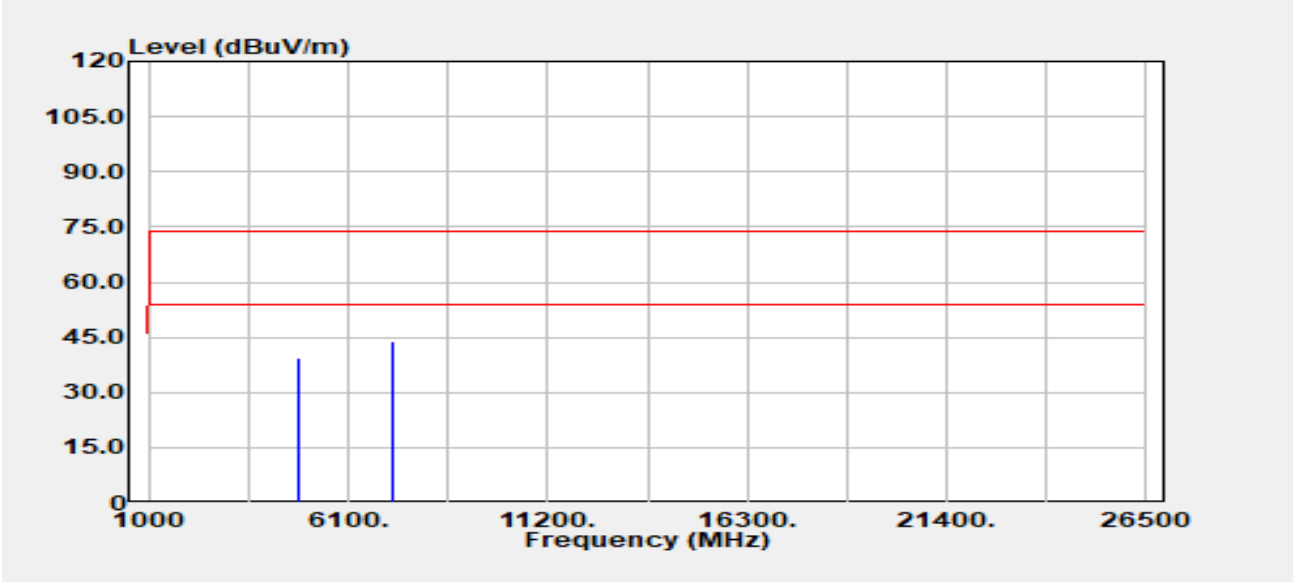
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
66.25	Peak	51.79	-15.48	36.31	40.00	-3.69
210.78	Peak	51.25	-12.20	39.05	43.50	-4.45
408.06	Peak	35.04	-5.50	29.54	46.00	-16.46
455.95	Peak	34.63	-4.21	30.42	46.00	-15.58
719.43	Peak	31.72	0.36	32.08	46.00	-13.92
801.39	Peak	32.33	1.50	33.83	46.00	-12.17

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



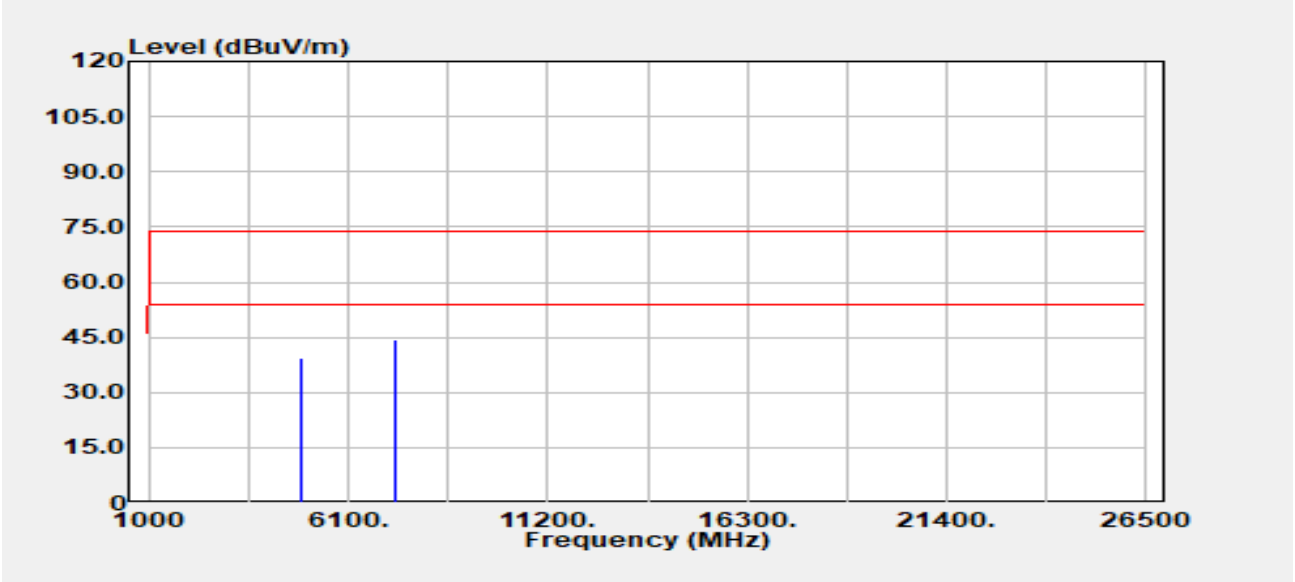
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00	Peak	37.16	2.23	39.39	74.00	-34.61
4804.00	Average	28.62	2.23	30.85	54.00	-23.15
7206.00	Peak	35.85	9.01	44.86	74.00	-29.14
7206.00	Average	26.92	9.01	35.93	54.00	-18.07

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



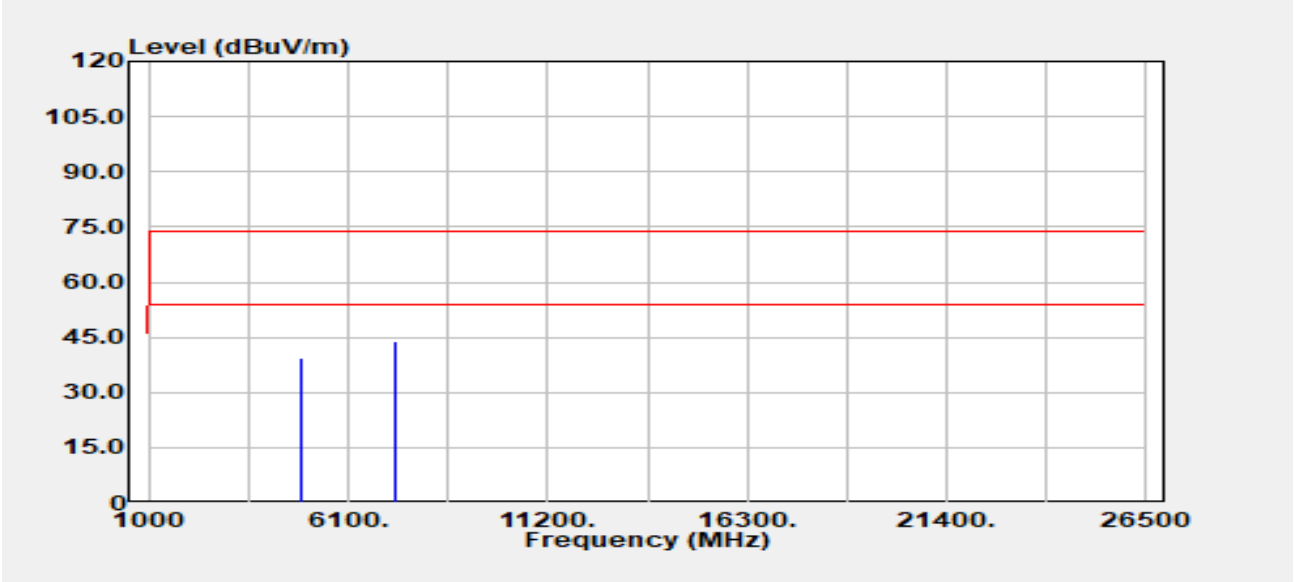
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00	Peak	37.22	2.23	39.44	74.00	-34.56
4804.00	Average	28.71	2.23	30.93	54.00	-23.07
7206.00	Peak	34.83	9.01	43.84	74.00	-30.16
7206.00	Average	26.99	9.01	36.00	54.00	-18.00

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2440 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



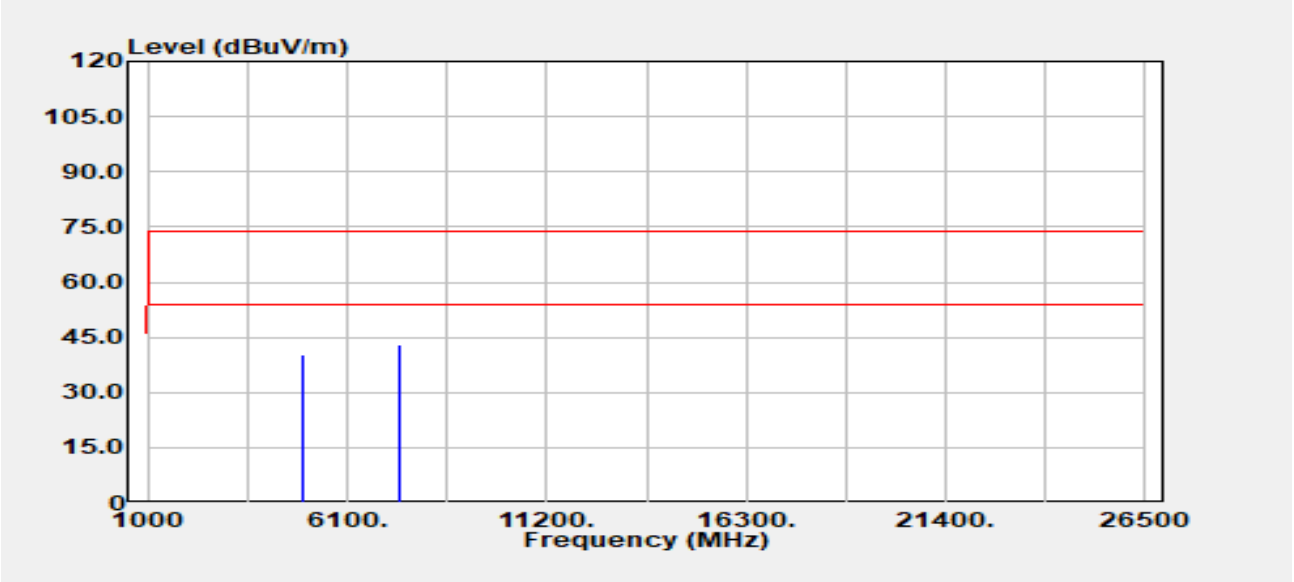
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4880.00	Peak	36.91	2.55	39.46	74.00	-34.54
4880.00	Average	27.82	2.55	30.36	54.00	-23.64
7320.00	Peak	35.61	8.96	44.57	74.00	-29.43
7320.00	Average	26.86	8.96	35.82	54.00	-18.18

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2440 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



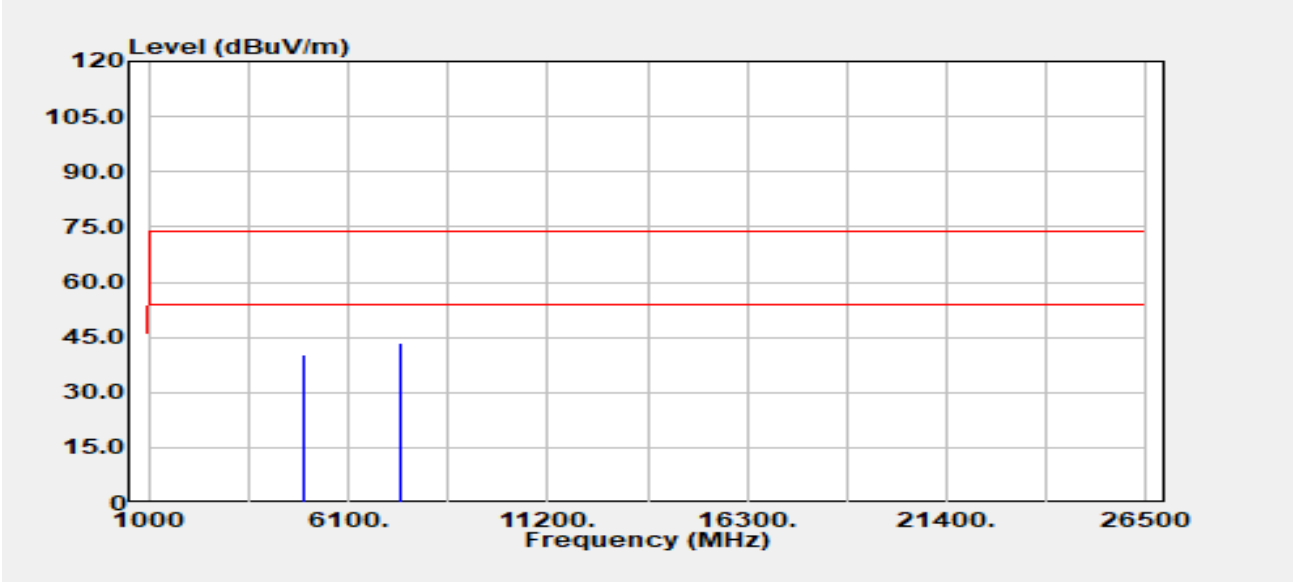
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4880.00	Peak	36.71	2.55	39.26	74.00	-34.74
4880.00	Average	27.69	2.55	30.24	54.00	-23.76
7320.00	Peak	35.09	8.96	44.05	74.00	-29.95
7320.00	Average	27.17	8.96	36.13	54.00	-17.87

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



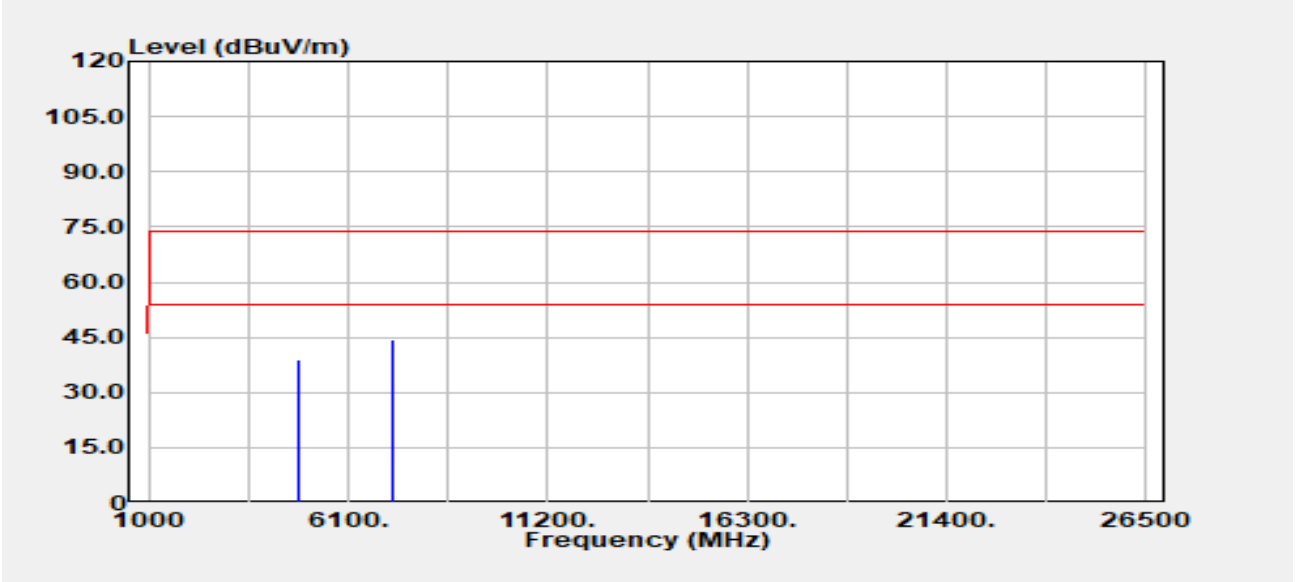
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4960.00	Peak	37.26	3.21	40.47	74.00	-33.53
4960.00	Average	28.40	3.21	31.61	54.00	-22.39
7440.00	Peak	33.99	8.92	42.91	74.00	-31.09
7440.00	Average	26.98	8.92	35.90	54.00	-18.10

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 1M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



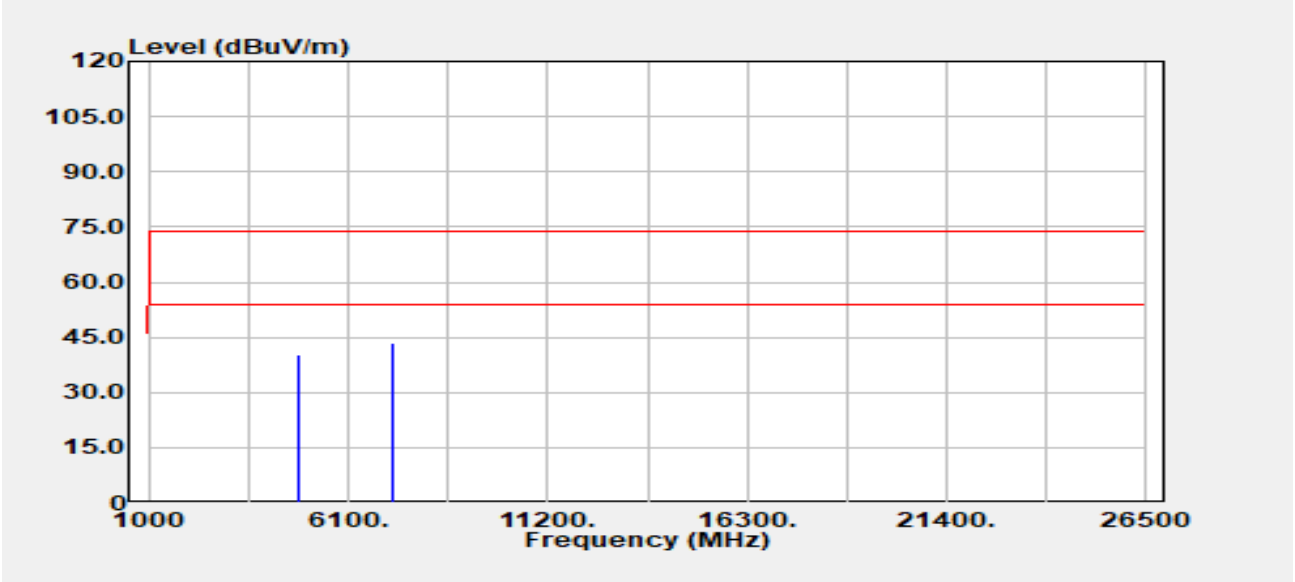
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4960.00	Peak	37.12	3.21	40.33	74.00	-33.67
4960.00	Average	28.33	3.21	31.55	54.00	-22.45
7440.00	Peak	34.50	8.92	43.42	74.00	-30.58
7440.00	Average	26.82	8.92	35.74	54.00	-18.26

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



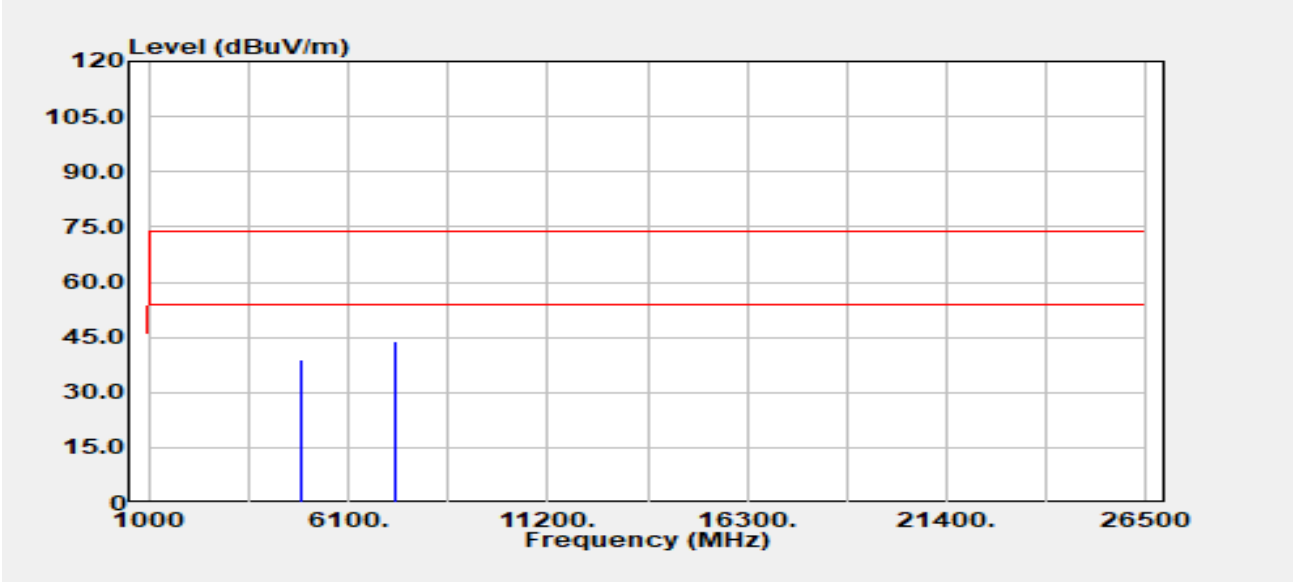
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00	Peak	36.63	2.23	38.86	74.00	-35.14
4804.00	Average	29.03	2.23	31.26	54.00	-22.74
7206.00	Peak	35.52	9.01	44.53	74.00	-29.47
7206.00	Average	27.35	9.01	36.36	54.00	-17.64

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2402 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



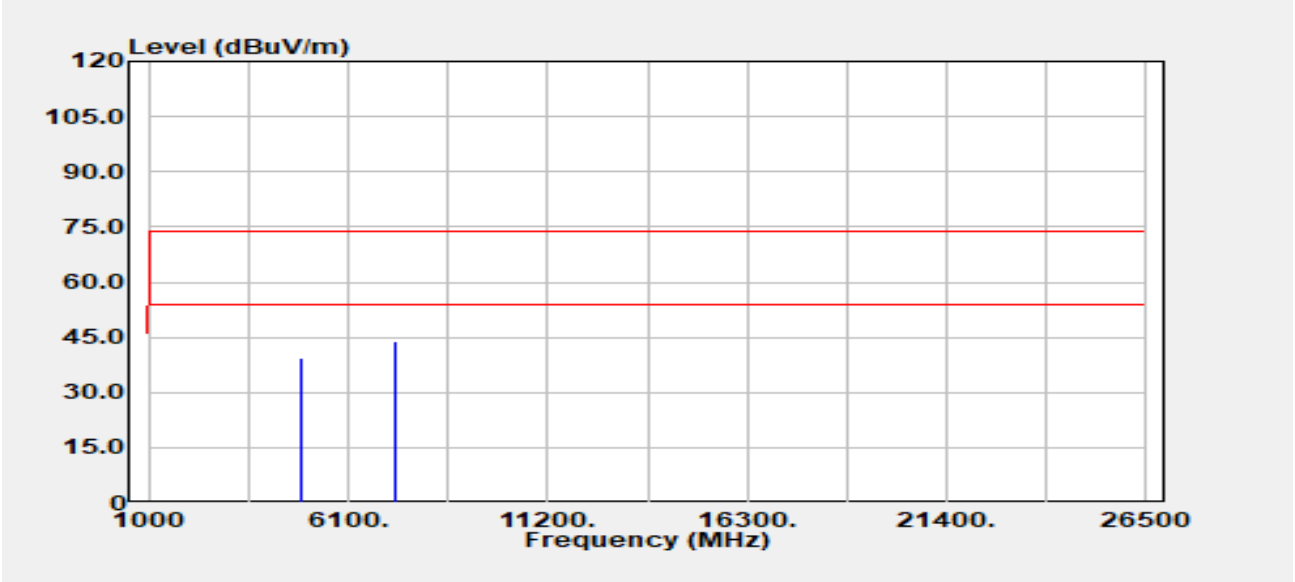
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4804.00	Peak	37.95	2.23	40.18	74.00	-33.82
4804.00	Average	29.12	2.23	31.35	54.00	-22.65
7206.00	Peak	34.54	9.01	43.55	74.00	-30.45
7206.00	Average	27.44	9.01	36.45	54.00	-17.55

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2440 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



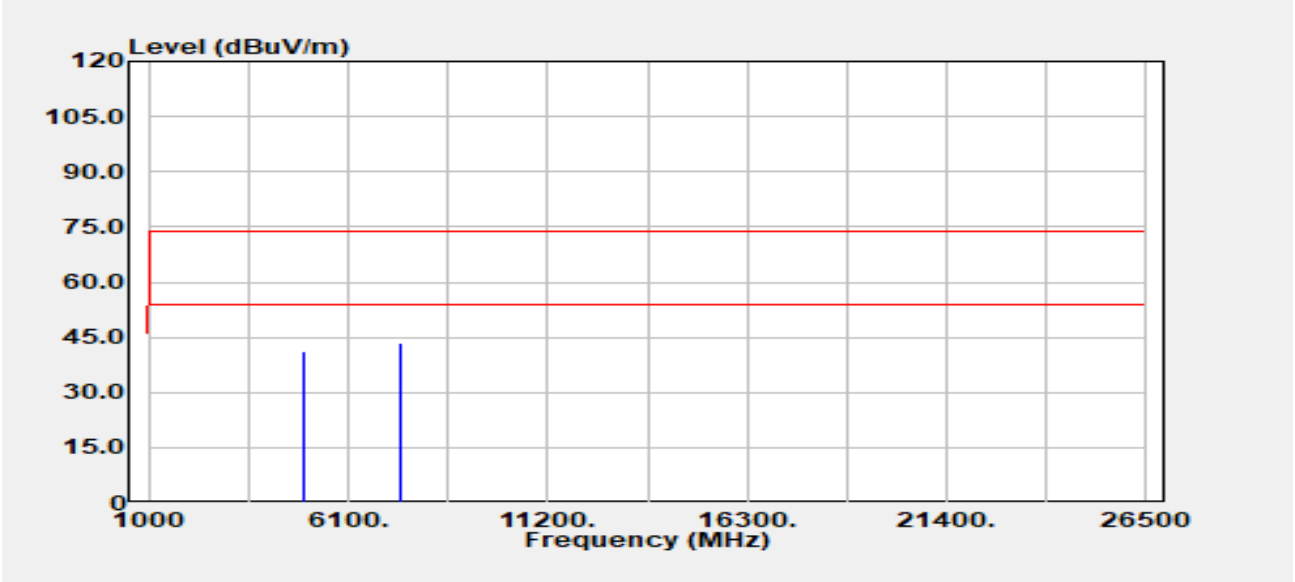
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4880.00	Peak	36.40	2.55	38.95	74.00	-35.05
4880.00	Average	28.41	2.55	30.96	54.00	-23.04
7320.00	Peak	34.81	8.96	43.77	74.00	-30.23
7320.00	Average	27.47	8.96	36.43	54.00	-17.57

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2440 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



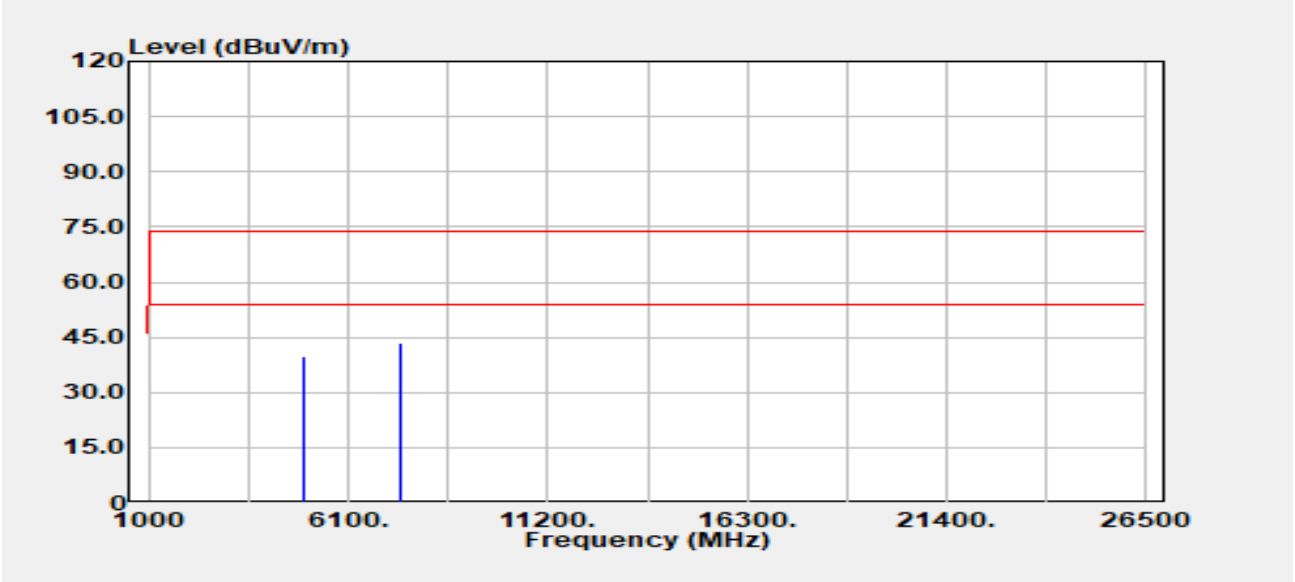
Freq.	Detector Mode	Spectrum Read Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4880.00	Peak	36.73	2.55	39.28	74.00	-34.72
4880.00	Average	28.25	2.55	30.79	54.00	-23.21
7320.00	Peak	35.15	8.96	44.11	74.00	-29.89
7320.00	Average	27.53	8.96	36.49	54.00	-17.51

Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4960.00	Peak	37.80	3.21	41.01	74.00	-32.99
4960.00	Average	28.80	3.21	32.02	54.00	-21.98
7440.00	Peak	34.73	8.92	43.65	74.00	-30.35
7440.00	Average	27.53	8.92	36.45	54.00	-17.55

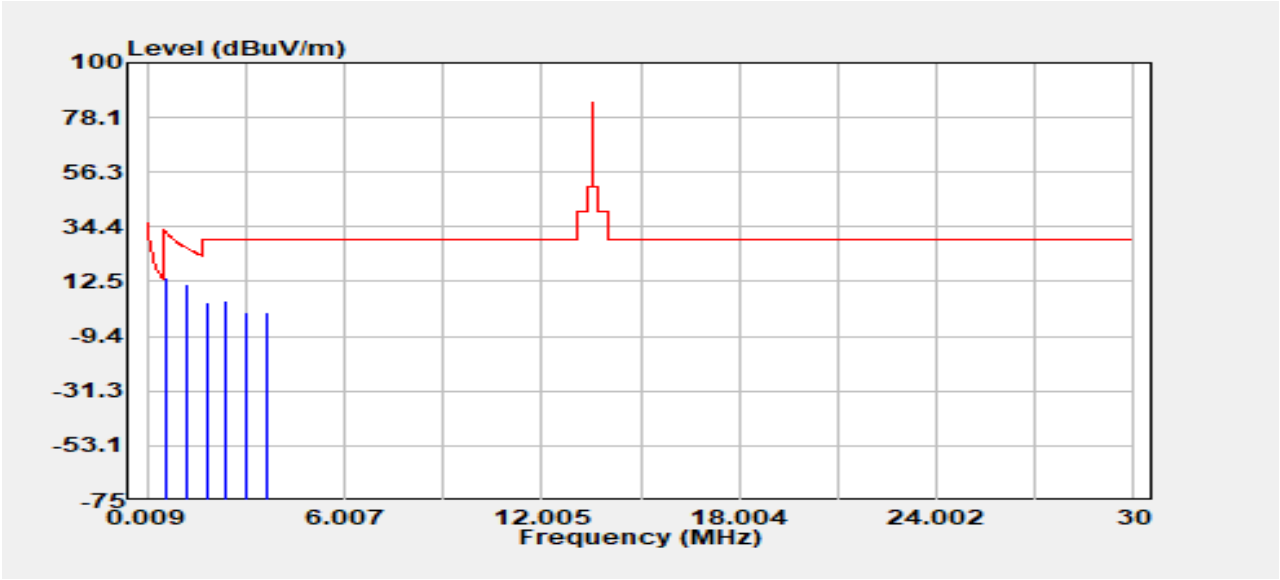
Project No	:TM-2405000413P	Test Date	:2024-07-03
Operation Band	:BLE 2M	Temp./Humi.	:24.6/57
Frequency	:2480 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4960.00	Peak	36.81	3.21	40.02	74.00	-33.98
4960.00	Average	28.89	3.21	32.10	54.00	-21.90
7440.00	Peak	34.64	8.92	43.56	74.00	-30.44
7440.00	Average	27.77	8.92	36.69	54.00	-17.31

Co-location

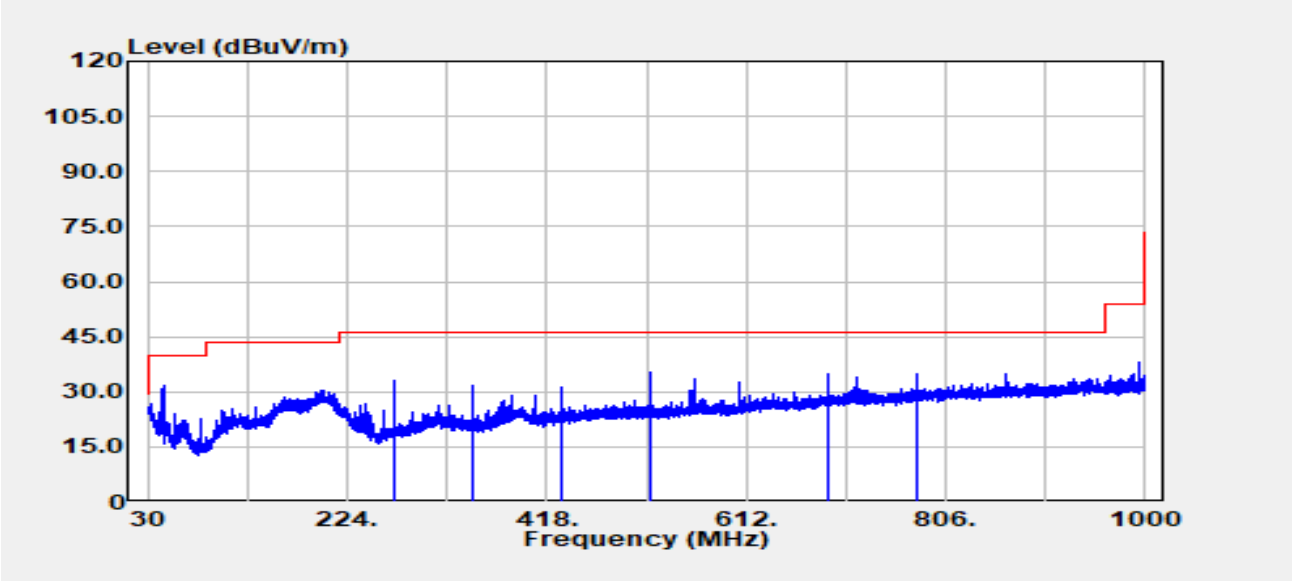
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band2 QPSK1,0 20M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_1871 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq.	Detector Mode	Spectrum Read Level @3m	Factor @3m	Actual FS @3m	Factor @30m&300m	Actual FS @30m&300m	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dB	dBµV/m	dBµV/m	dB
0.60	Peak	34.91	19.53	54.44	-40.00	14.44	31.99	-17.55
1.21	Peak	31.66	19.63	51.29	-40.00	11.29	25.97	-14.68
1.81	Peak	24.68	19.64	44.32	-40.00	4.32	29.54	-25.22
2.41	Peak	25.10	19.65	44.75	-40.00	4.75	29.54	-24.79
3.02	Peak	20.36	19.66	40.02	-40.00	0.02	29.54	-29.52
3.61	Peak	20.72	19.75	40.47	-40.00	0.47	29.54	-29.07

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

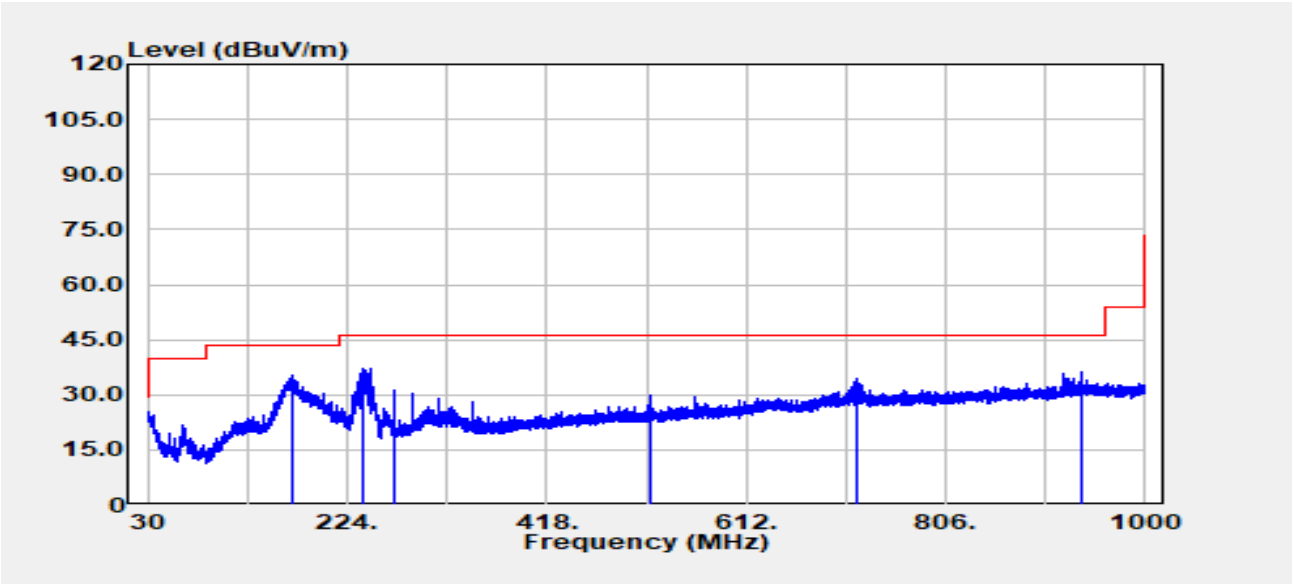
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band2 QPSK1,0 20M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_1871 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
270.00	Peak	42.08	-9.02	33.06	46.00	-12.94
345.60	Peak	39.09	-7.53	31.56	46.00	-14.44
432.00	Peak	35.93	-4.81	31.13	46.00	-14.87
518.40	Peak	38.36	-3.17	35.19	46.00	-10.81
691.20	Peak	35.13	-0.28	34.85	46.00	-11.15
777.60	Peak	33.43	1.31	34.74	46.00	-11.26

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

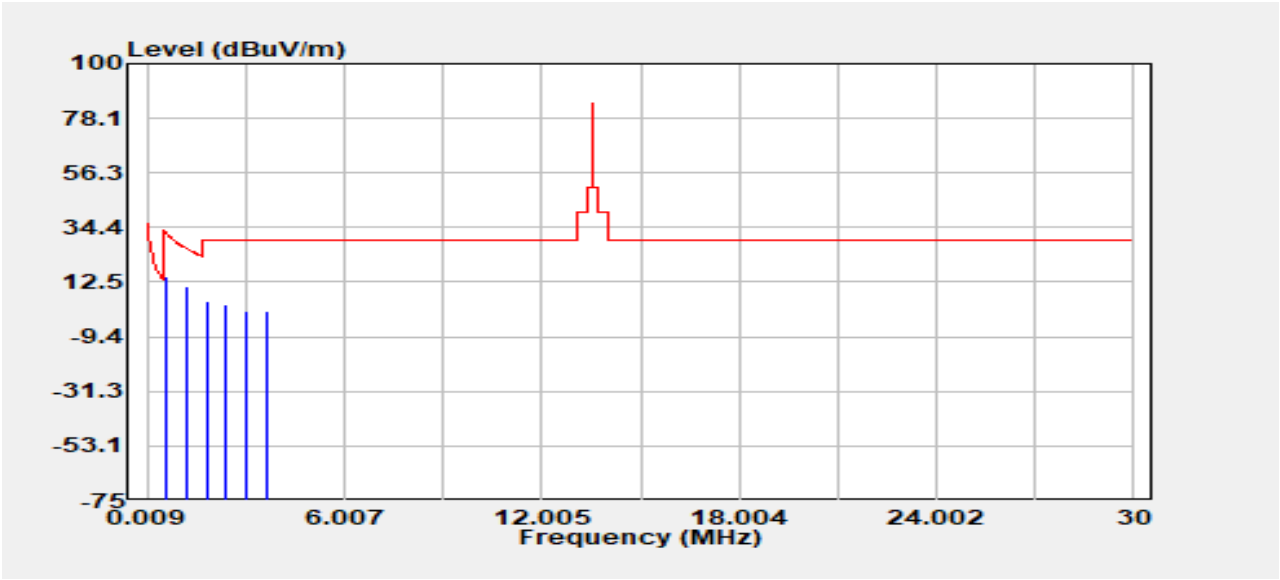
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band2 QPSK1,0 20M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_1871 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
171.80	Peak	46.25	-11.15	35.10	43.50	-8.40
240.00	Peak	47.87	-10.60	37.27	46.00	-8.73
270.00	Peak	40.08	-9.02	31.06	46.00	-14.94
518.40	Peak	33.18	-3.17	30.00	46.00	-16.00
720.00	Peak	34.01	0.36	34.37	46.00	-11.63
937.50	Peak	32.35	3.79	36.14	46.00	-9.86

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

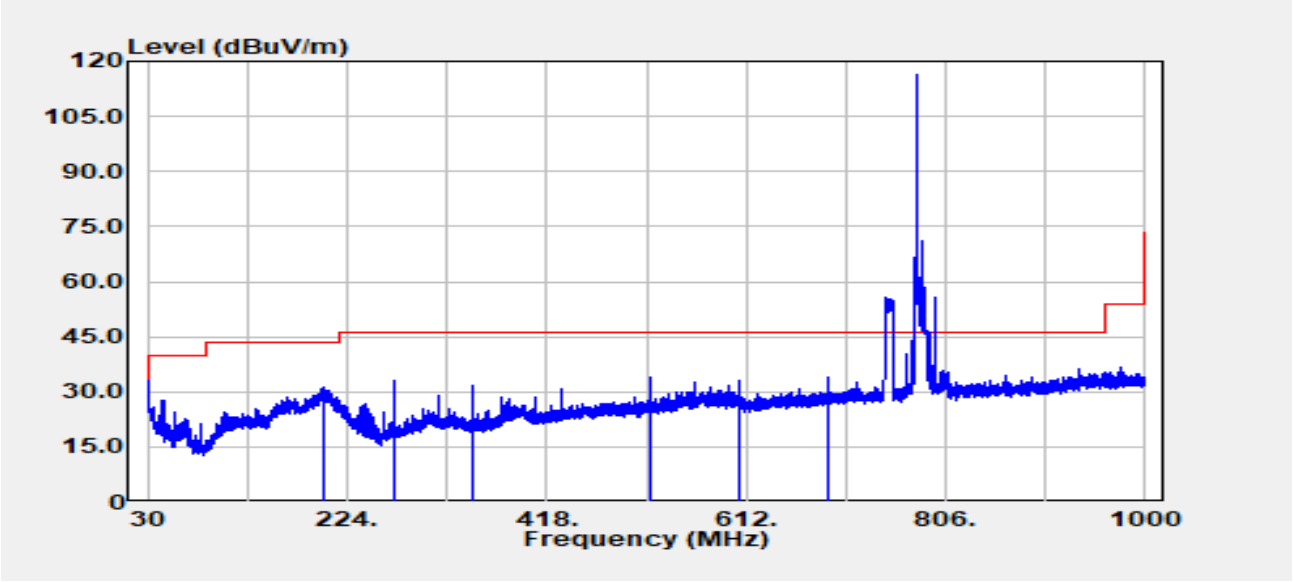
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band13 QPSK1,0 10M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_777.6 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq.	Detector Mode	Spectrum Read Level @3m	Factor @3m	Actual FS @3m	Factor @30m&300m	Actual FS @30m&300m	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dB	dBµV/m	dBµV/m	dB
0.60	Peak	35.02	19.53	54.56	-40.00	14.56	31.99	-17.43
1.21	Peak	31.42	19.63	51.05	-40.00	11.05	25.97	-14.92
1.81	Peak	25.26	19.64	44.90	-40.00	4.90	29.54	-24.64
2.41	Peak	23.74	19.65	43.39	-40.00	3.39	29.54	-26.15
3.01	Peak	21.12	19.66	40.78	-40.00	0.78	29.54	-28.76
3.62	Peak	20.92	19.75	40.67	-40.00	0.67	29.54	-28.87

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

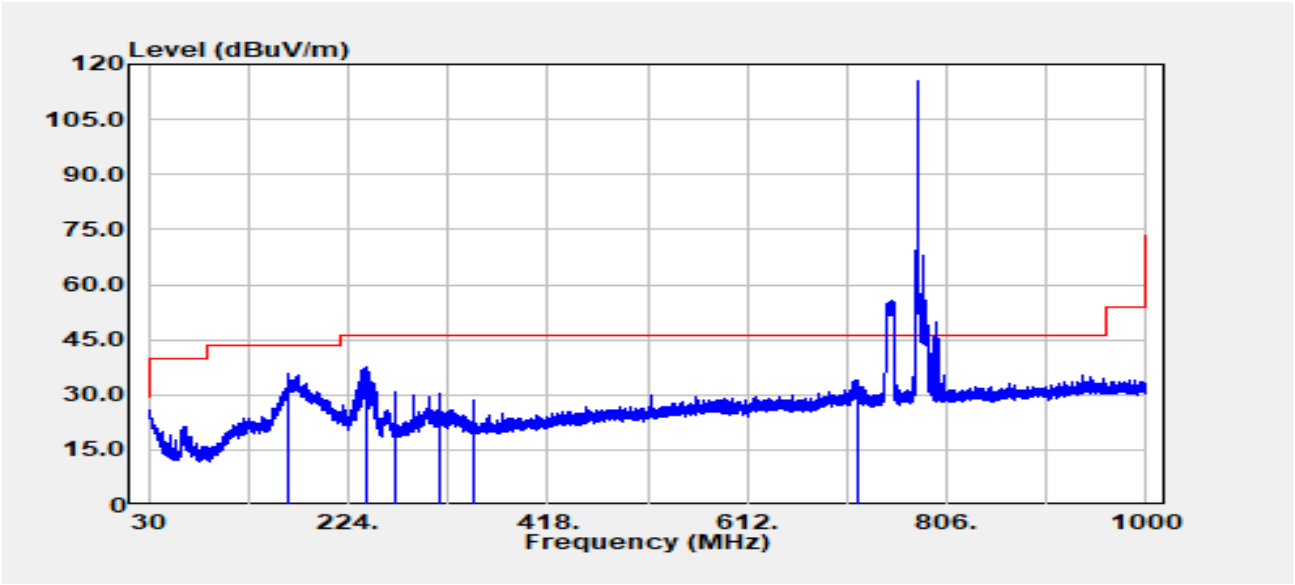
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band13 QPSK1,0 10M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_777.6 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
202.30	Peak	42.10	-10.68	31.42	43.50	-12.08
270.00	Peak	41.90	-9.02	32.88	46.00	-13.12
345.60	Peak	39.13	-7.53	31.60	46.00	-14.40
518.40	Peak	37.16	-3.17	33.98	46.00	-12.02
604.80	Peak	35.15	-2.03	33.12	46.00	-12.88
691.20	Peak	34.27	-0.28	34.00	46.00	-12.00

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

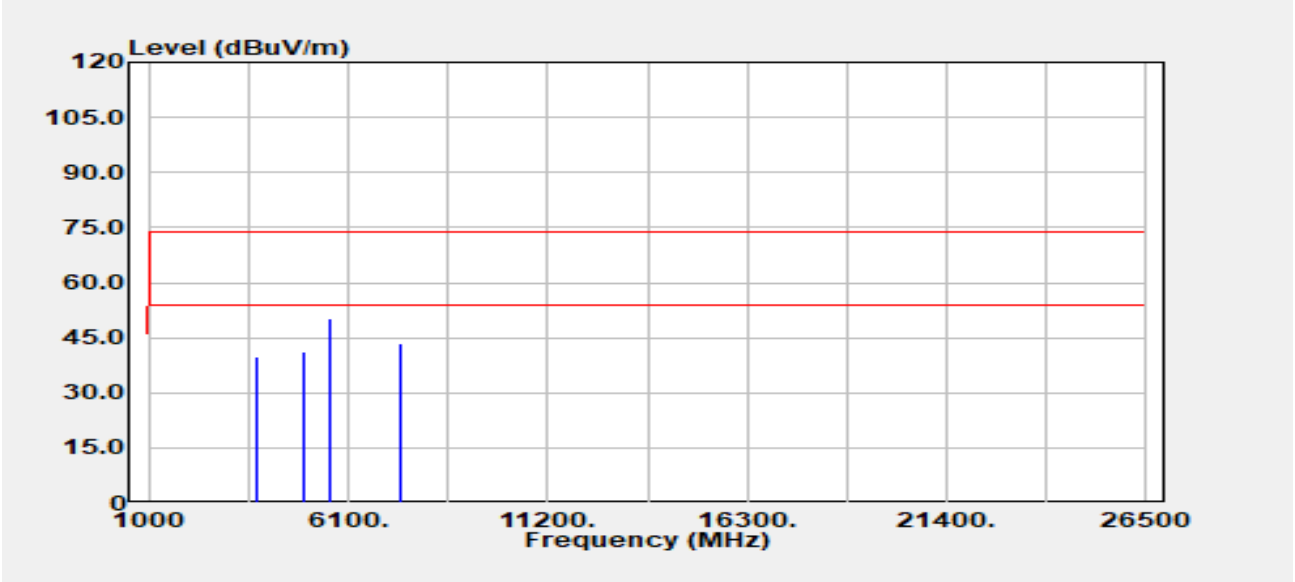
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band13 QPSK1,0 10M	Temp./Humi.	:24.6/57
Frequency	:13.56 MHz_2480 MHz_777.6 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
166.10	Peak	46.74	-10.83	35.91	43.50	-7.59
242.20	Peak	48.11	-10.62	37.50	46.00	-8.50
270.00	Peak	39.78	-9.02	30.76	46.00	-15.24
312.00	Peak	38.44	-8.26	30.18	46.00	-15.82
345.60	Peak	36.26	-7.53	28.73	46.00	-17.27
720.00	Peak	33.51	0.36	33.87	46.00	-12.13

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

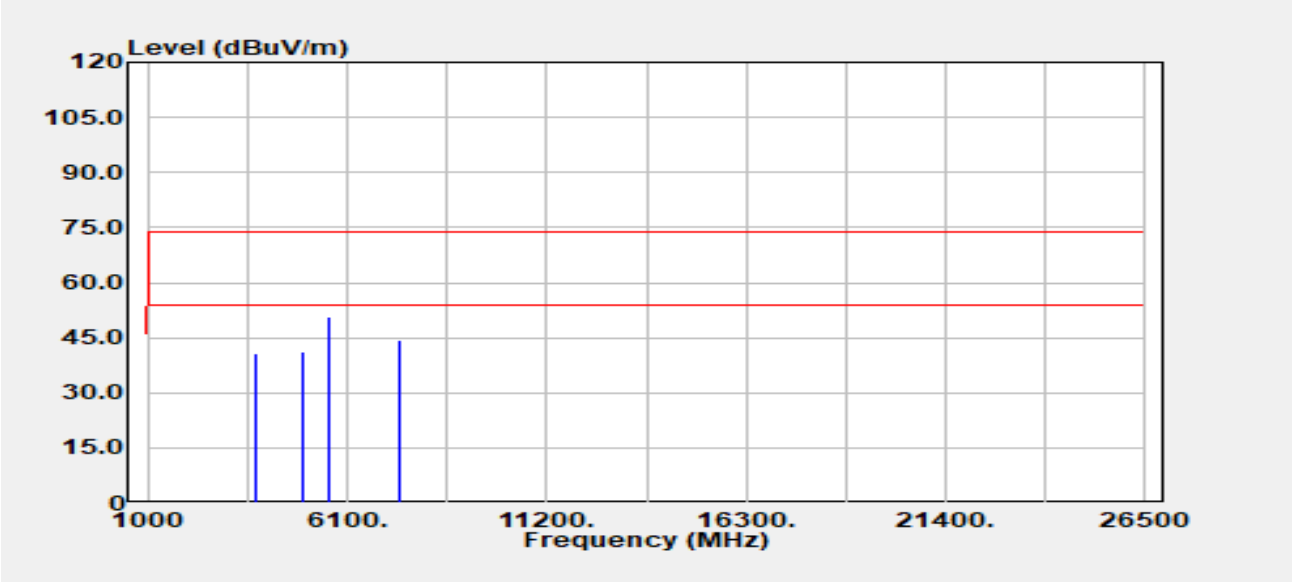
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	:NFC_BLE 2M_LTE Band2 QPSK1,0_20M	Temp./Humi.	:24.6/57
Frequency	:2480_1871 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
3742.00	Peak	39.77	0.21	39.97	82.20	-42.23
4960.00	Peak	37.91	3.21	41.12	74.00	-32.88
4960.00	Average	28.19	3.21	31.40	54.00	-22.60
5613.00	Peak	45.44	4.88	50.32	82.20	-31.88
7440.00	Peak	34.62	8.92	43.54	74.00	-30.46
7440.00	Average	26.38	8.92	35.30	54.00	-18.70

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

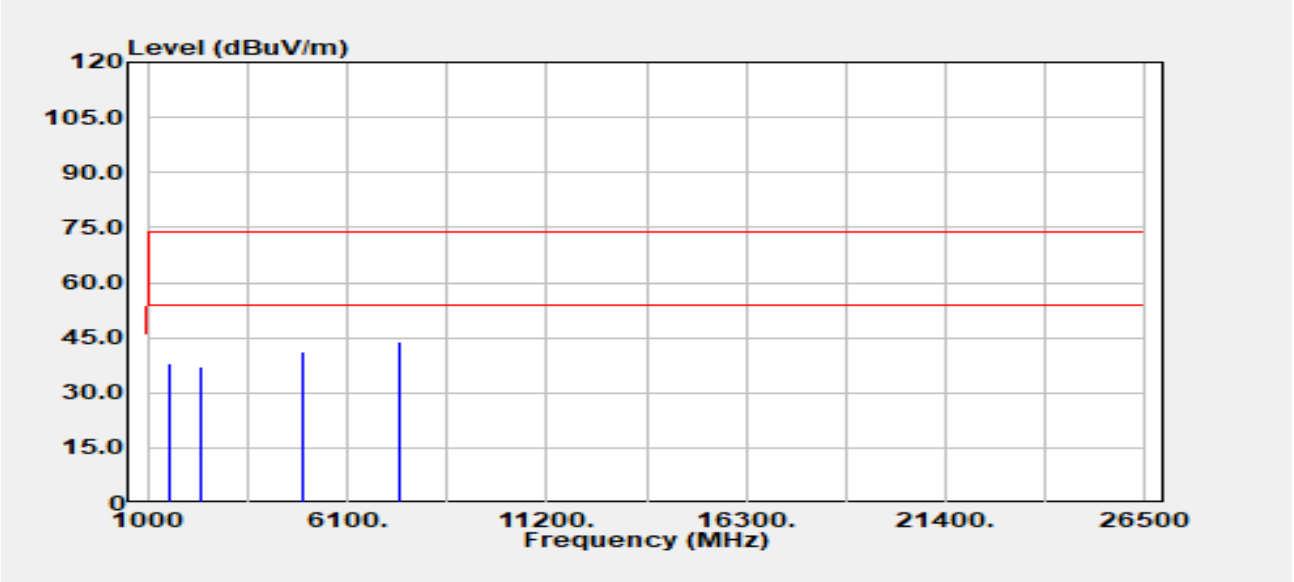
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	: NFC_BLE 2M_LTE Band2 QPSK1,0_20M	Temp./Humi.	:24.6/57
Frequency	:2480_1871 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
3742.00	Peak	40.69	0.21	40.89	82.20	-41.31
4960.00	Peak	38.12	3.21	41.33	74.00	-32.67
4960.00	Average	28.18	3.21	31.39	54.00	-22.61
5613.00	Peak	46.00	4.88	50.88	82.20	-31.32
7440.00	Peak	35.39	8.92	44.31	74.00	-29.69
7440.00	Average	26.36	8.92	35.28	54.00	-18.72

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

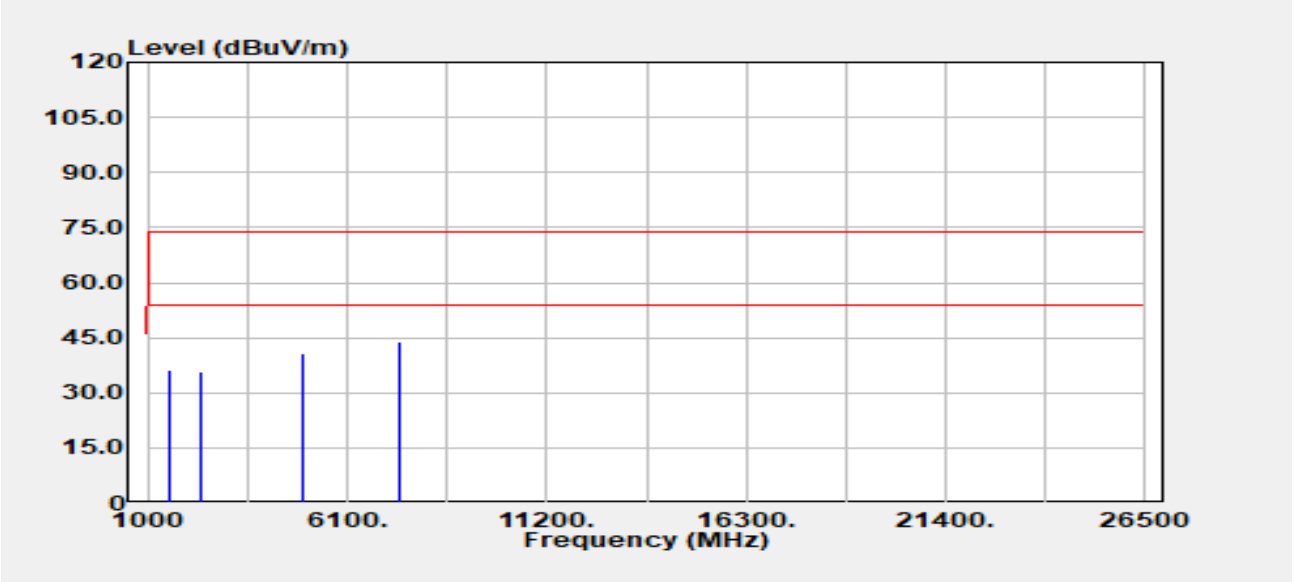
Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	: NFC_BLE 2M_LTE Band13 QPSK1,0_10M	Temp./Humi.	:24.6/57
Frequency	:2480_777.6 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
1555.20	Peak	45.41	-7.24	38.17	82.20	-44.03
2332.80	Peak	40.64	-3.61	37.03	82.20	-45.17
4960.00	Peak	38.00	3.21	41.22	74.00	-32.78
4960.00	Average	28.15	3.21	31.37	54.00	-22.63
7440.00	Peak	35.10	8.92	44.02	74.00	-29.98
7440.00	Average	26.24	8.92	35.16	54.00	-18.84

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

Project No	:TM-2405000413P	Test Date	:2024-07-05
Operation Band	: NFC_BLE 2M_LTE Band13 QPSK1,0_10M	Temp./Humi.	:24.6/57
Frequency	:2480_777.6 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
1555.20	Peak	43.30	-7.24	36.06	82.20	-46.14
2332.80	Peak	39.37	-3.61	35.76	82.20	-46.44
4960.00	Peak	37.59	3.21	40.81	74.00	-33.19
4960.00	Average	28.37	3.21	31.58	54.00	-22.42
7440.00	Peak	34.84	8.92	43.76	74.00	-30.24
7440.00	Average	26.44	8.92	35.36	54.00	-18.64

Note: The highest signals which over limit are WWAN co-location fundamental and harmonic signals. But it meets the signal's proprietary standards.

--End of Test Report--