FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2421-5
FCC ID	:	IHDT56AR3
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DSS) Spread Spectrum Transmitter
TEST DATE(S)	:	Nov. 02, 2023 ~ Nov. 28, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR381720A	Rev. 01	Initial issue of report	Dec. 13, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
4.1	15.247(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
4.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 13.52 dB at 53.28 MHz
4.3	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2421-5
FCC ID	IHDT56AR3
IMEI Code	355031480008859
HW Version	DVT2
SW Version	ULA34.53
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Antenna Type / Gain	PIFA Antenna type with gain -3.6 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) :π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-101
AC Adapter 1(EU)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-102
AC Adapter 1(UK)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-103
AC Adapter 1(AU)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-105
AC Adapter 1(CHILE)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-109
AC Adapter 2(US)	**Brand Name**	Motorola (chenyang)	**Model Name**	MC-101
AC Adapter 2(EU)	**Brand Name**	Motorola (chenyang)	**Model Name**	MC-102
AC Adapter 2(UK)	**Brand Name**	Motorola (chenyang)	**Model Name**	MC-103
AC Adapter 2(AU)	**Brand Name**	Motorola (chenyang)	**Model Name**	MC-105
AC Adapter 3(US)	**Brand Name**	Motorola (aohai)	**Model Name**	MC-101
AC Adapter 3(EU)	**Brand Name**	Motorola (aohai)	**Model Name**	MC-102
AC Adapter 3(UK)	**Brand Name**	Motorola (aohai)	**Model Name**	MC-103
AC Adapter 3(AU)	**Brand Name**	Motorola (aohai)	**Model Name**	MC-105
Battery 1	**Brand Name**	Motorola (ATL)	**Model Name**	QF50
Battery 2	**Brand Name**	Motorola (Sunwoda)	**Model Name**	QF50
Earphone 1	**Brand Name**	Motorola (New leader)	**Model Name**	NLD-EM313A-20SF
Earphone 2	**Brand Name**	Motorola (JWELL)	**Model Name**	JWEP1205-L20H
USB Cable 1	**Brand Name**	Motorola (JWELL)	**Model Name**	JWUB1631-L20H
USB Cable 2	**Brand Name**	Motorola (Saibao)	**Model Name**	SLQ-A238A

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH07-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH07-KS	AUDIX	E3	210616

1.9 Applicable Standards

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

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Re-use of Measured Data

2.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2421-5, FCC ID: IHDT56AR3) is electrically identical to the reference device (Model: XT2421-2, FCC ID: IHDT56AR1) for the portions of the circuitry corresponding to the data being re-used. Based on their similarity, the FCC Part 15C (equipment class: DSS) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 Referencing Test Data v02r01.

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: IHDT56AR3 .

2.2 Model Difference Information

The **main** difference between FCC ID: IHDT56AR1 and FCC ID: IHDT56AR3 is as below:

- Remove GSM1900, WCDMA Band II / IV and LTE Band 2/4/13/26/38/66.
- Add NFC function and LTE Band 20/41.

Other differences and all the details of similarity and difference can be found in the confidential documents (XT2421-5_Operational Description of Product Equality Declaration).

2.3 Reference detail Section:

Rule Part	Equipment Class	Frequency Band (MHz)	Reference FCC ID(Parent)	Type Grant/ Permissive Change	Reference Title	FCC ID Filling (Variant)	Report Title/Section
15C	DSS (BR/EDR)	2400~2483.5	IHDT56AR1	Original Grant	FR381717A	IHDT56AR3	All sections applicable except for RSE

2.4 Spot Check Verification Data Section

Conducted power test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.
All test procedures follow the related section of parent report.

Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, show a deviation d_{dB} from the reference data no larger than 3 dB:

$$d_{dB} = | V_{dB} – R_{dB} | \leq 3 \text{ dB} \quad (1)$$

V_{dB}, the variant spot-check level
R_{dB}, the corresponding measurement level for the reference model

An alternative to the limit of eq. (1) is available, and is based on considering how far the reference data R_{dB} is from the compliance threshold C_{dB} (also expressed in dB), for the particular test under consideration. In this case, if $M_{dB} =|C_{dB} – R_{dB}|$ is the margin in dB from the compliance limit, a spot check may be considered acceptable when the deviation ddB from the reference data satisfies the following condition:

$$d_{dB} = | V_{dB} – R_{dB} | \leq (3 + M_{dB} /20) \text{ dB , for } 0 \leq M_{dB} \leq 60 \text{ dB} \quad (2)$$

where "| |" is the absolute value of the measured quantity.
When using the option in eq. (2), d_{dB} increases linearly from 3 dB to 6 dB.

Summary for power spot check for each rule entry and technology is listed as below:

Test Item	Mode	IHDT56AR1 Parent Worst Result	IHDT56AR3 Variant Check Result	Deviation (dB)	Limit (dB)
Conducted Power (dBm)	BT BR/EDR	10.42	10.16	0.26	3

Conclusion:
Conducted Power test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

Based on the spot check test result, the test data from the original model is representative for the variant model. The power level spot check are shown within expected level compliant to limit line.

We are using power measurements from the original parent model reports to list on the grant.

We confirm that the test data reuse policy of FCC KDB 484596 D01 Referencing Test Data v02r01 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

3 Test Configuration of Equipment Under Test

3.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	27	2429	54	2456
	1	2403	28	2430	55	2457
	2	2404	29	2431	56	2458
	3	2405	30	2432	57	2459
	4	2406	31	2433	58	2460
	5	2407	32	2434	59	2461
	6	2408	33	2435	60	2462
	7	2409	34	2436	61	2463
	8	2410	35	2437	62	2464
	9	2411	36	2438	63	2465
	10	2412	37	2439	64	2466
	11	2413	38	2440	65	2467
	12	2414	39	2441	66	2468
	13	2415	40	2442	67	2469
	14	2416	41	2443	68	2470
	15	2417	42	2444	69	2471
	16	2418	43	2445	70	2472
	17	2419	44	2446	71	2473
	18	2420	45	2447	72	2474
	19	2421	46	2448	73	2475
	20	2422	47	2449	74	2476
	21	2423	48	2450	75	2477
	22	2424	49	2451	76	2478
	23	2425	50	2452	77	2479
	24	2426	51	2453	78	2480
	25	2427	52	2454	-	-
	26	2428	53	2455	-	-

3.2 Test Mode

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report, and the worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.

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

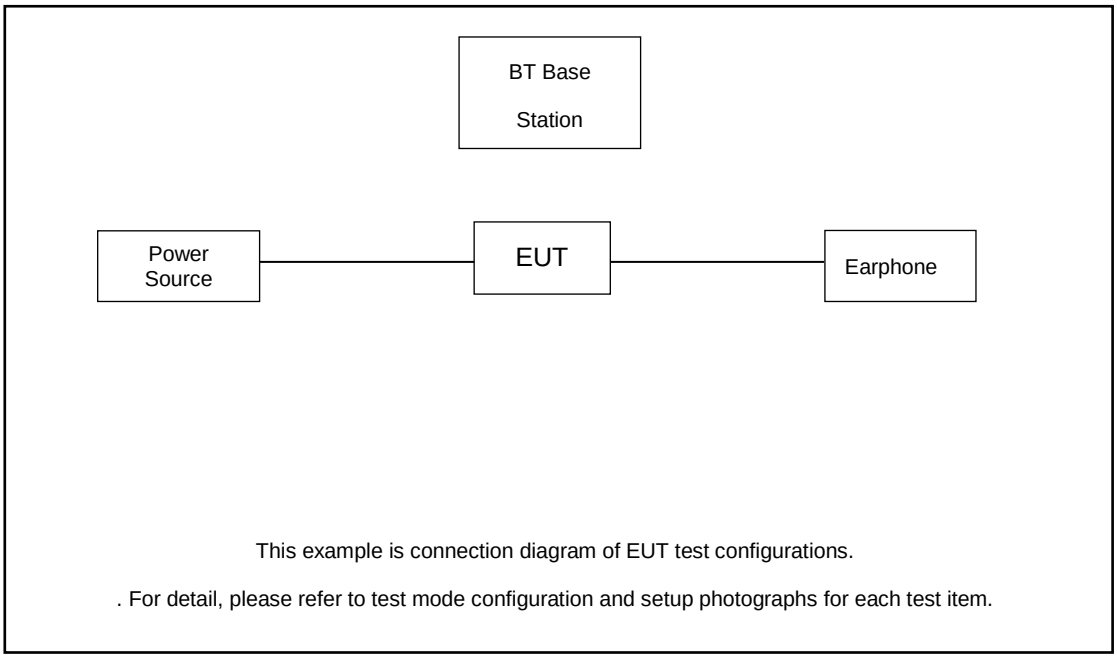
Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Radiated Test Cases	**Bluetooth EDR 3Mbps 8-DPSK**
	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz

Remark:

1. For radiated test cases, the worst mode data rate 3Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and no other significantly frequencies found in conducted spurious emission.
2. For Radiated Test Cases, The tests were performed with Adapter1 , Earphone 1 and USB Cable1 .

3.3 Connection Diagram of Test System

Radiated Emission:



3.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	BT Base Station	R&S	CBT	N/A	N/A	Unshielded,1.8m

3.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit.

4 Test Result

4.1 Output Power Measurement

4.1.1 Limit of Output Power

The maximum peak conducted output power of the intentional radiator shall not exceed the following: For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps, 2Mbps, 3Mbps and AFH modes are 0.125 watts.

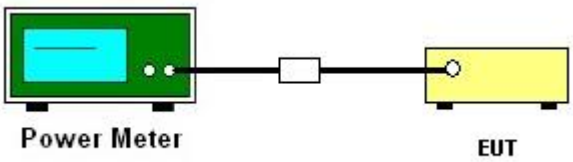
4.1.2 Measuring Instruments

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

4.1.3 Test Procedures

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

4.1.4 Test Setup



4.1.5 Test Result of Peak Output Power

Please refer to Spot Check Verification Data Section.

4.2 Radiated Band Edges and Spurious Emission Measurement

4.2.1 Limit of Radiated Band Edges and Spurious Emission

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

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

4.2.2 Measuring Instruments

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

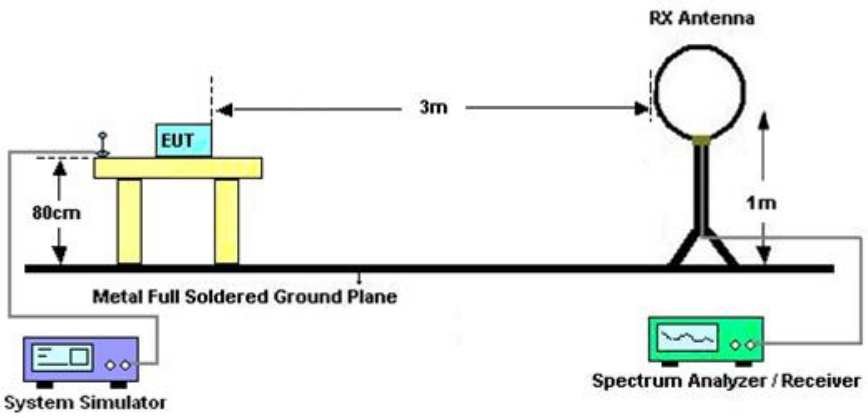
4.2.3 Test Procedures

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

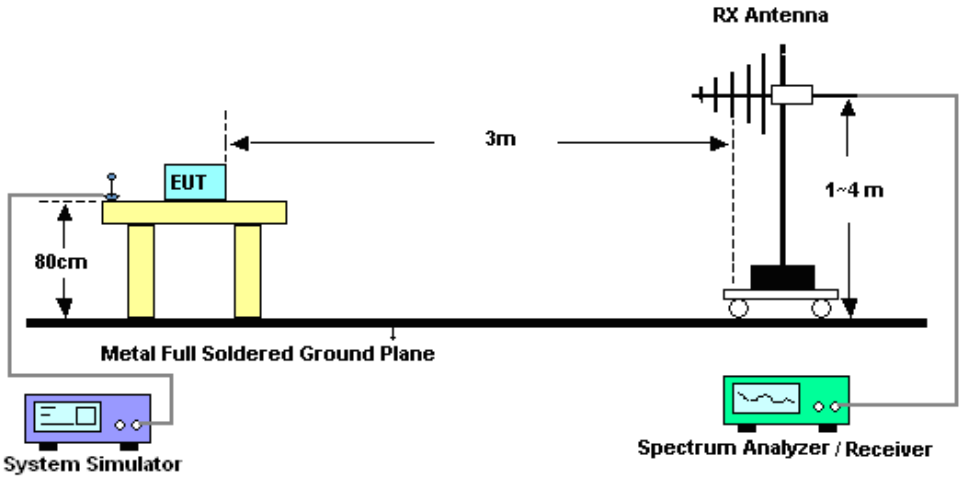
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.70dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

4.2.4 Test Setup

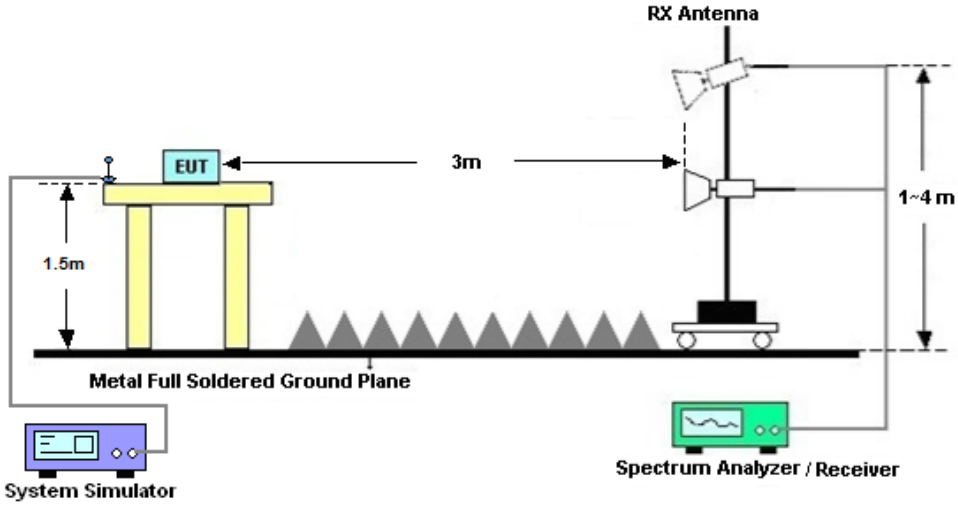
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

4.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

4.2.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix A

4.2.8 Duty cycle correction factor for average measurement

Please refer to Appendix B.

4.3 Antenna Requirements

4.3.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

4.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4.3.3 Antenna Gain

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

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2023	Nov. 02, 2023	Jan. 04, 2024	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2023	Nov. 02, 2023	Jan. 04, 2024	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
Bilog Antenna	TeseQ	CBL6111D	59913	30MHz-1GHz	Aug. 12, 2023	Nov. 28, 2023	Aug. 11, 2024	Radiation (03CH07-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218642	1GHz~18GHz	Apr. 06, 2023	Nov. 28, 2023	Apr. 05, 2024	Radiation (03CH07-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 05, 2023	Nov. 28, 2023	Jan. 04, 2024	Radiation (03CH07-KS)
Amplifier	EM	EM01G18GA	060834	1Ghz-18Ghz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH07-KS)
Amplifier	EM	EM18G40GGA	060851	18~40GHz	Jan. 05, 2023	Nov. 28, 2023	Jan. 04, 2024	Radiation (03CH07-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Nov. 28, 2023	NCR	Radiation (03CH07-KS)
Turn Table	EM	EM 1000-T	N/A	0~360 degree	NCR	Nov. 28, 2023	NCR	Radiation (03CH07-KS)
Antenna Mast	EM	EM 1000-A	N/A	1 m~4 m	NCR	Nov. 28, 2023	NCR	Radiation (03CH07-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Conducted Power	**±0.46 dB**

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.20 dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.86 dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.24 dB**

---------- THE END ----------

Appendix A. Radiated Spurious Emission

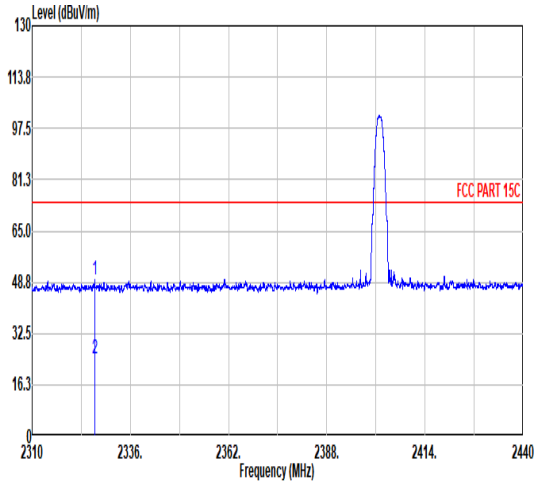
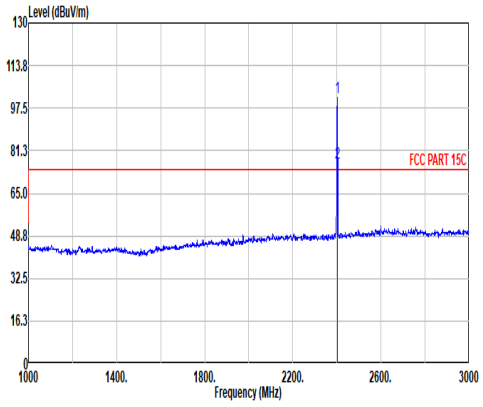
Test Engineer :	Levi zhao	Relative Humidity :	41~ 42%
		Temperature :	22 ~ 23℃

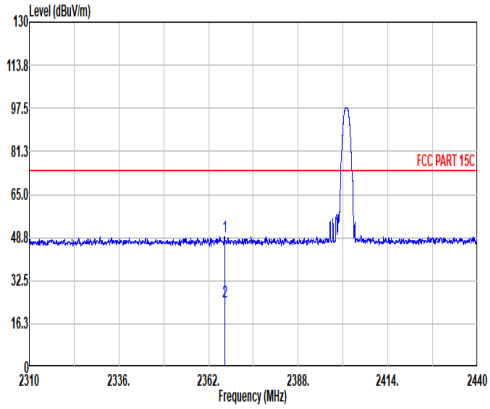
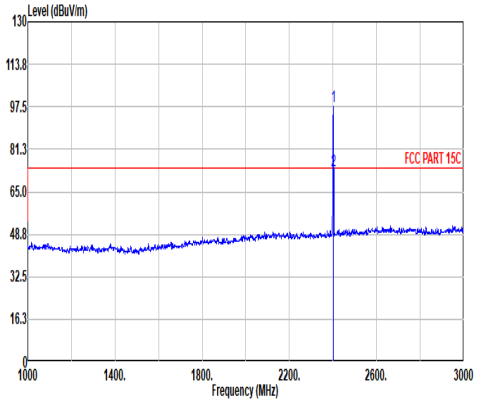
Radiated Spurious Emission Test Modes

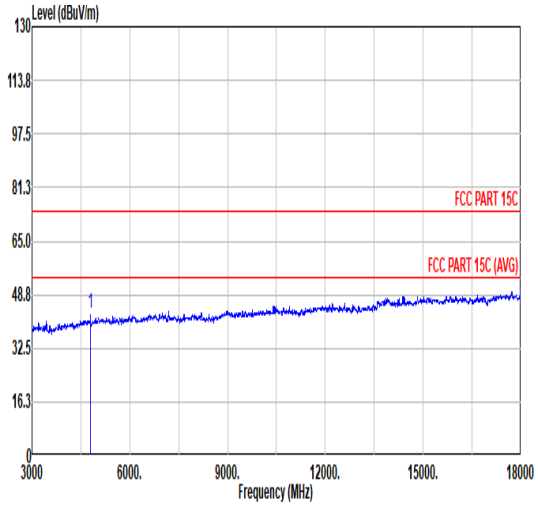
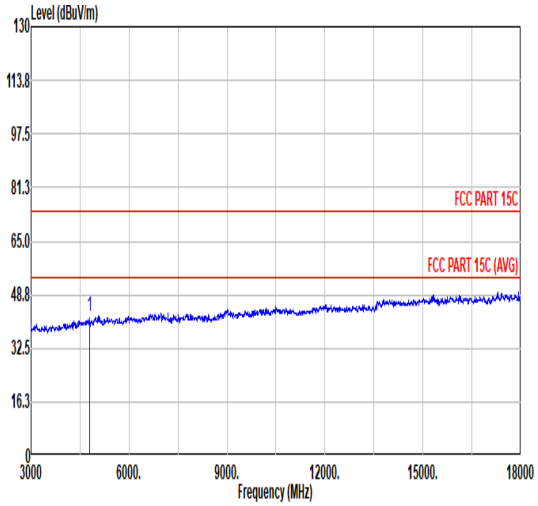
Mode	Band (MHz)	Modulation	Channel	Frequency	Data Rate	Remark
Mode 1	2400-2483.5	Bluetooth BR_GFSK	00	2402	1Mbps	-
Mode 2	2400-2483.5	Bluetooth BR_GFSK	39	2441	1Mbps	-
Mode 3	2400-2483.5	Bluetooth BR_GFSK	78	2480	1Mbps	-

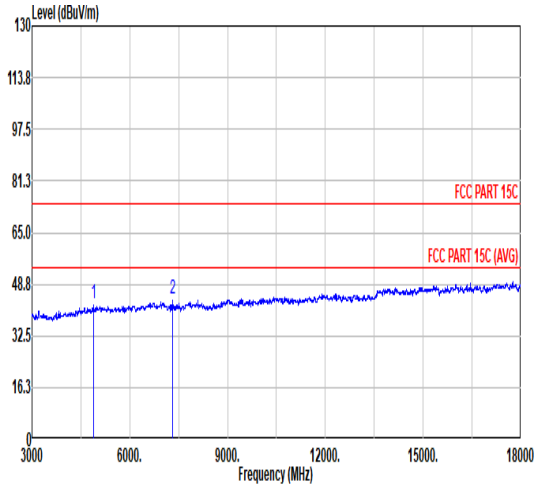
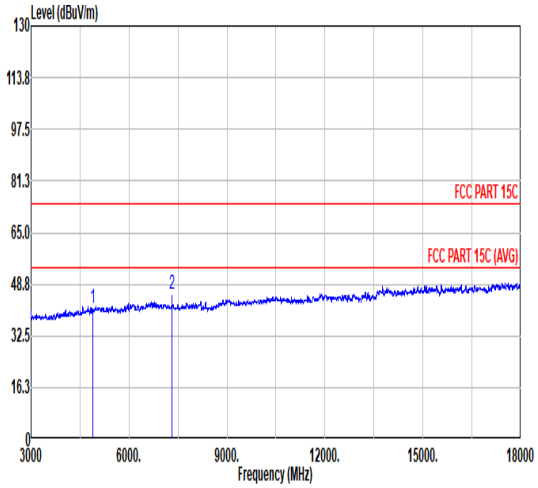
Summary of each worse mode

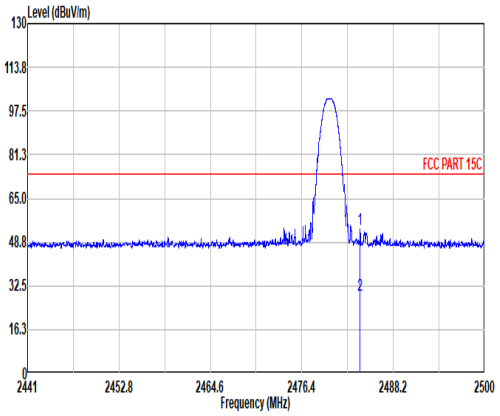
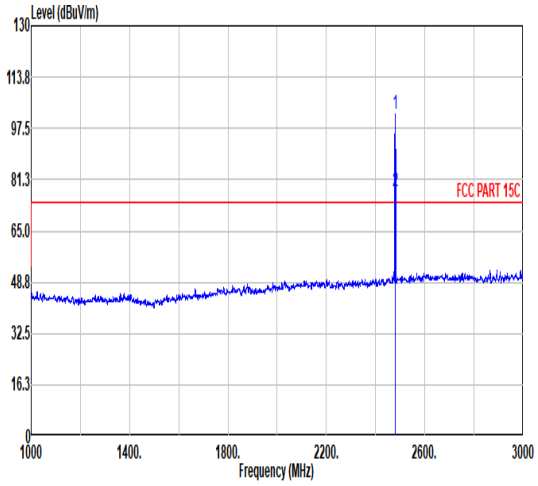
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth BR_GFSK	00	2326.58	49.46	74.00	-24.54	H	PEAK	Pass	Band Edge
1	Bluetooth BR_GFSK	00	4804.00	43.09	74.00	-30.91	H	PEAK	Pass	Harmonic
2	Bluetooth BR_GFSK	39	-	-	-	-	-	-	-	Band Edge
2	Bluetooth BR_GFSK	39	7323.00	45.42	74.00	-28.58	V	PEAK	Pass	Harmonic
3	Bluetooth BR_GFSK	78	2483.93	53.57	74.00	-20.43	H	PEAK	Pass	Band Edge
3	Bluetooth BR_GFSK	78	7440.00	44.86	74.00	-29.14	V	PEAK	Pass	Harmonic
-	Bluetooth BR_GFSK	78	53.28	26.48	40.00	-13.52	V	PEAK	Pass	LF

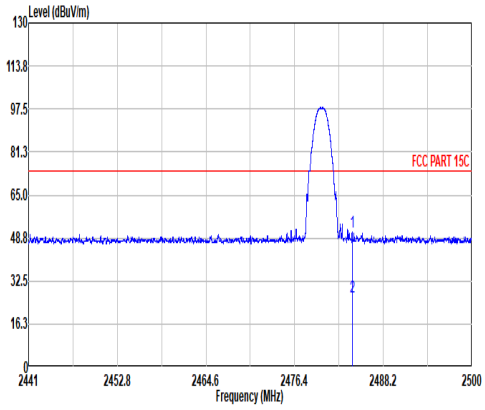
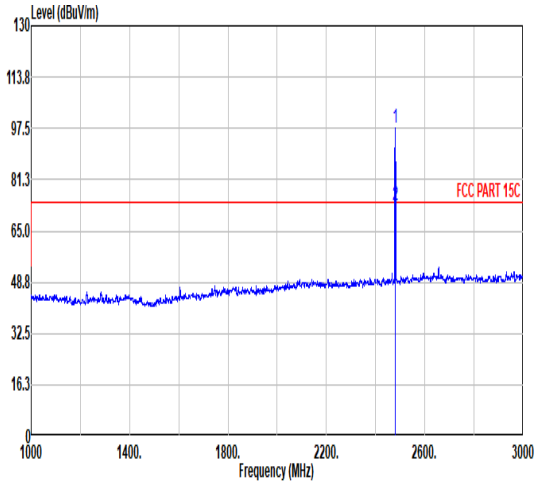
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2326.58 49.46 74.00 -24.54 40.77 31.58 7.03 35.92 6.00 100 48 PEAK 2 2326.58 24.76 54.00 -29.24 16.07 31.58 7.03 35.92 6.00 100 48 Average	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 101.44 ------ ------ 92.34 31.80 7.13 35.83 6.00 100 48 PEAK 2 2402.00 76.74 ------ ------ 67.64 31.80 7.13 35.83 6.00 100 48 Average

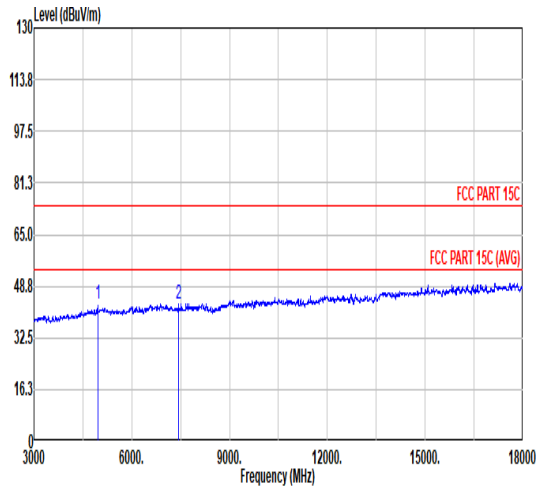
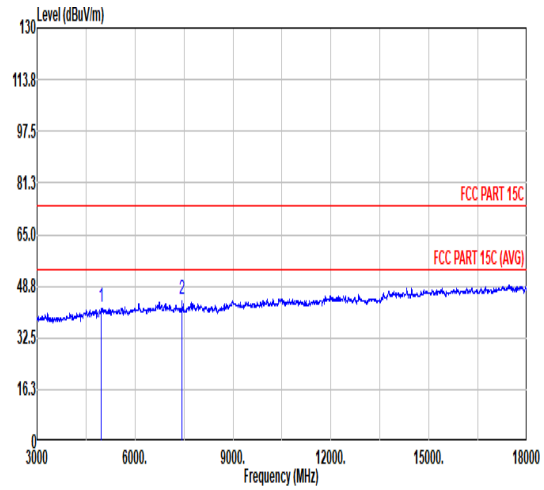
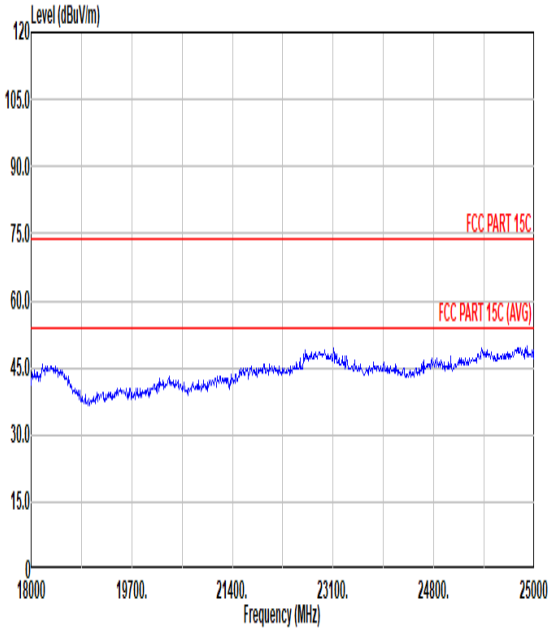
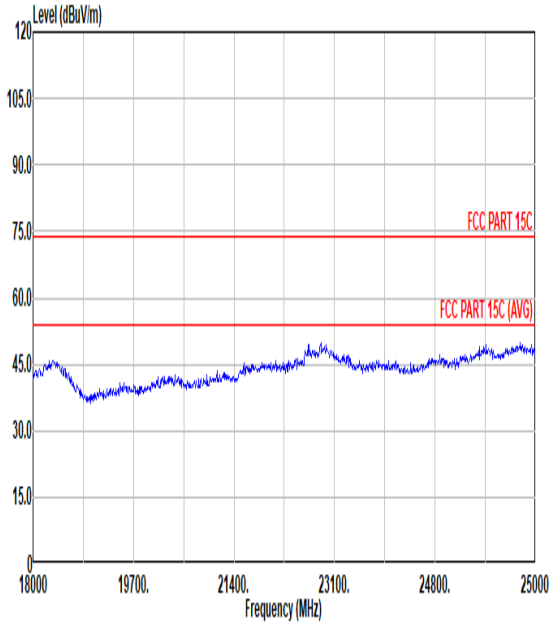
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2366.62 49.29 74.00 -24.71 40.38 31.70 7.08 35.87 6.00 150 360 PEAK 2 2366.62 24.59 54.00 -29.41 15.68 31.70 7.08 35.87 6.00 150 360 Average	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 97.78 ------ ------ 88.68 31.80 7.13 35.83 6.00 150 360 PEAK 2 2402.00 73.08 ------ ------ 63.98 31.80 7.13 35.83 6.00 150 360 Average

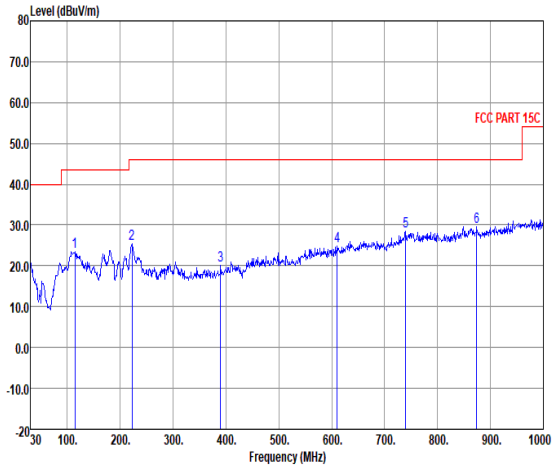
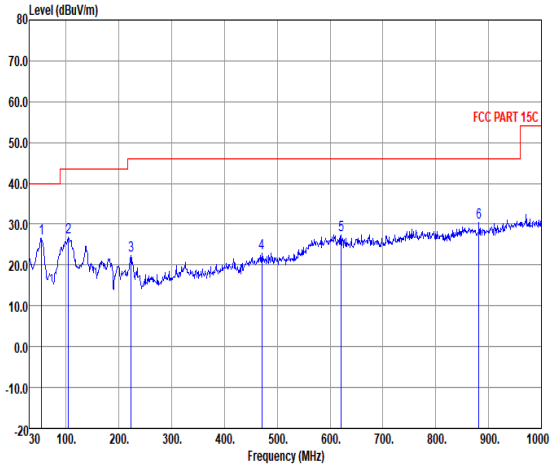
Mode	1	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4804.00 43.09 74.00 -30.91 61.97 34.30 10.30 63.48 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4804.00 42.27 74.00 -31.73 61.15 34.30 10.30 63.48 0.00 --- --- PEAK

Mode	2	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH39_2441MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4882.00 42.72 74.00 -31.28 61.50 34.30 10.40 63.48 0.00 --- --- PEAK 2 7323.00 43.97 74.00 -30.03 59.05 35.78 12.82 63.68 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4882.00 41.40 74.00 -32.60 60.18 34.30 10.40 63.48 0.00 --- --- PEAK 2 7323.00 45.42 74.00 -28.58 60.50 35.78 12.82 63.68 0.00 --- --- PEAK

Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.93 53.57 74.00 -20.43 44.04 31.97 7.29 35.73 6.00 100 48 PEAK 2 2483.93 28.87 54.00 -25.13 19.34 31.97 7.29 35.73 6.00 100 48 Average	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 102.12 ------ ------ 92.62 31.96 7.28 35.74 6.00 100 48 PEAK 2 2480.00 77.49 ------ ------ 67.98 31.96 7.28 35.73 6.00 100 48 Average

Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2484.04 51.26 74.00 -22.74 41.73 31.97 7.29 35.73 6.00 100 190 PEAK 2 2484.04 26.56 54.00 -27.44 17.03 31.97 7.29 35.73 6.00 100 190 Average	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 97.66 ------ ------ 88.16 31.96 7.28 35.74 6.00 100 190 PEAK 2 2480.00 72.96 ------ ------ 63.45 31.96 7.28 35.73 6.00 100 190 Average

Mode	3	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 43.14 74.00 -30.86 61.69 34.42 10.51 63.48 0.00 --- --- PEAK 2 7440.00 43.37 74.00 -30.63 58.51 35.74 12.87 63.75 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4960.00 42.25 74.00 -31.75 60.80 34.42 10.51 63.48 0.00 --- --- PEAK 2 7440.00 44.86 74.00 -29.14 60.00 35.74 12.87 63.75 0.00 --- --- PEAK
Peak	 	

Mode	-	
	LF	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
Pol.	Horizontal	Vertical
Peak		

Horizontal:

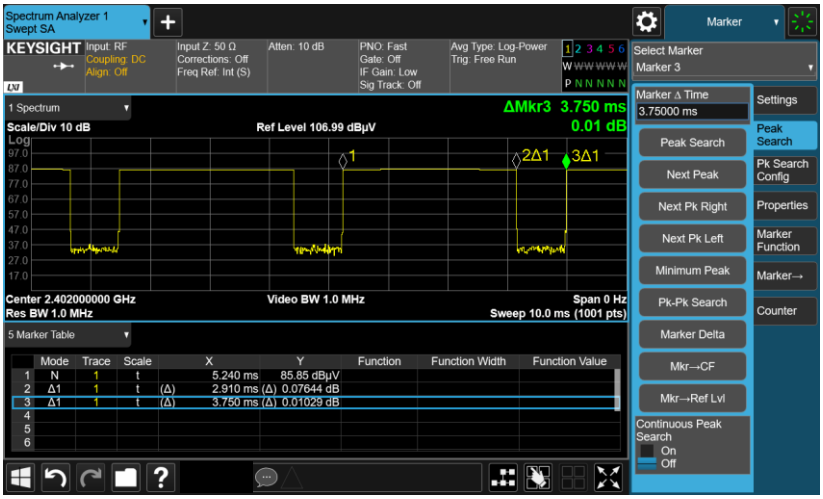
	Freq	Level	Over Limit	Limit Line	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	114.39	23.59	-19.91	43.50	37.06	17.27	1.43	32.17	---	---	Peak
2	222.06	25.28	-20.72	46.00	39.92	15.52	2.01	32.17	---	---	Peak
3	389.87	20.13	-25.87	46.00	28.16	21.55	2.66	32.24	---	---	Peak
4	610.06	24.85	-21.15	46.00	27.94	25.94	3.34	32.37	---	---	Peak
5	740.04	28.36	-17.64	46.00	28.95	27.91	3.68	32.18	---	---	Peak
6	873.90	29.59	-16.41	46.00	28.07	29.20	3.98	31.66	---	---	Peak

Vertical:

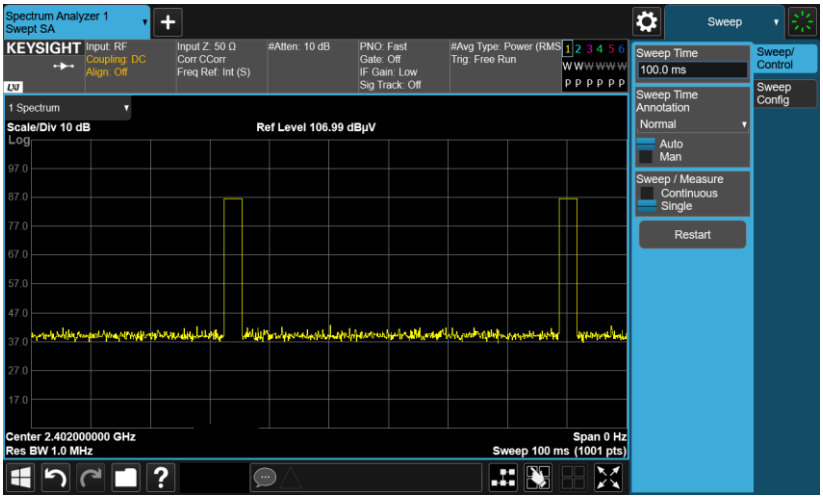
	Freq	Level	Over Limit	Limit Line	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	53.28	26.48	-13.52	40.00	44.59	13.65	0.76	32.52	---	---	Peak
2	104.69	26.69	-16.81	43.50	40.93	16.55	1.38	32.17	---	---	Peak
3	223.03	22.27	-23.73	46.00	36.79	15.63	2.02	32.17	---	---	Peak
4	470.38	22.79	-23.21	46.00	29.00	23.46	2.93	32.60	---	---	Peak
5	620.73	27.45	-18.55	46.00	30.35	26.09	3.37	32.36	---	---	Peak
6	881.66	30.35	-15.65	46.00	28.79	29.17	4.00	31.61	---	---	Peak

Appendix B. Duty Cycle Plots

3DH5 on time (One Pulse) Plot



3DH5 on time (Count Pulses) Plot on Channel 00



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.91 / 100 = 5.82 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.70 dB
3. 3DH5 has the highest duty cycle worst case and is reported.

Appendix D. Reference Report

Please refer to Sporton report number FR381717A which is issued separately.