

TEST REPORT

Product : Handheld UHF Reader
Trade mark : CHAINWAY
Model/Type reference : C76
Serial Number : N/A
Report Number : EED32K00243602
FCC ID : 2AC6AC76
Date of Issue : Mar. 28, 2019
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

Shenzhen Chainway Information Technology Co., Ltd.
9/F, Building 2, Daqian Industrial Park, Longchang Rd.,
District 67, Bao'an, Shenzhen

Prepared by:

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Mar. 28, 2019

Check No.:3096338075



2 Version

Version No.	Date	Description
00	Mar. 28, 2019	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Hopping Channel Number	47 CFR Part 15 Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Average Time of Occupancy	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15 Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested samples and the sample information are provided by the client.

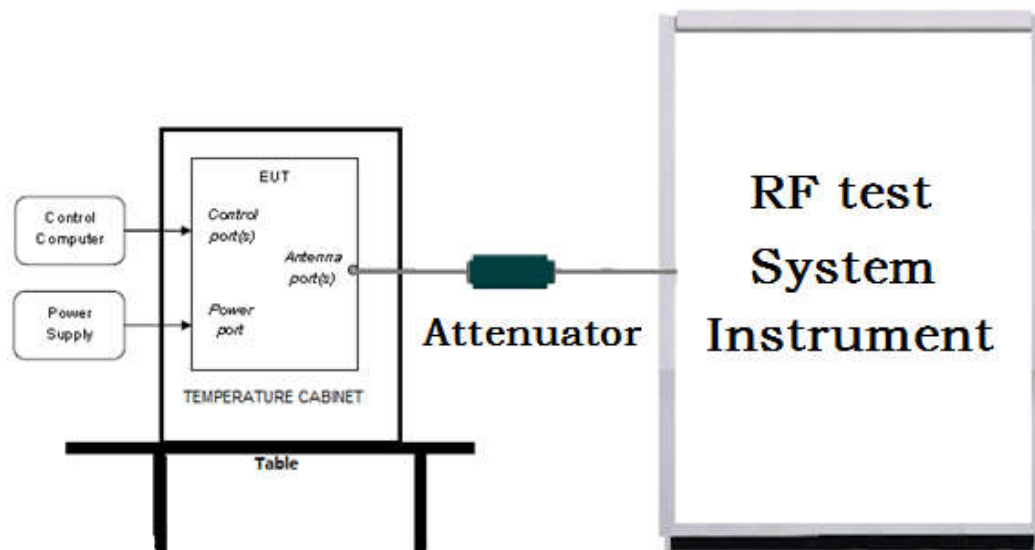
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5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

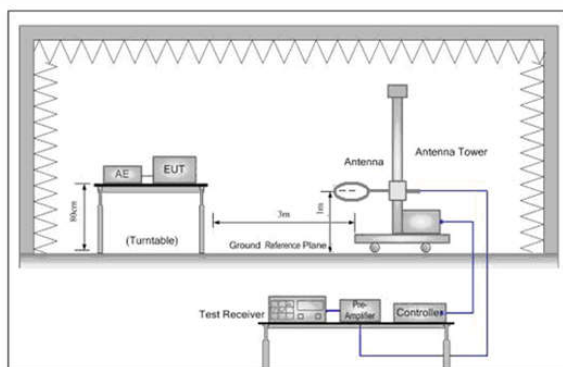


Figure 1. Below 30MHz

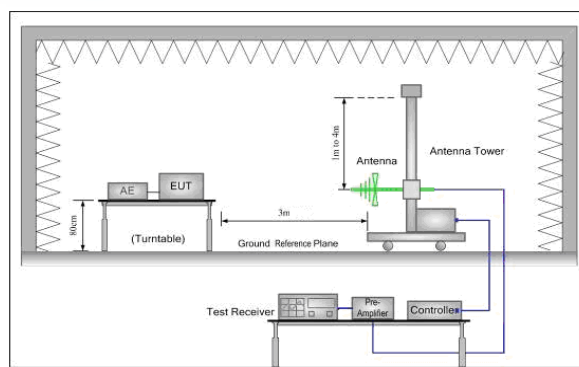


Figure 2. 30MHz to 1GHz

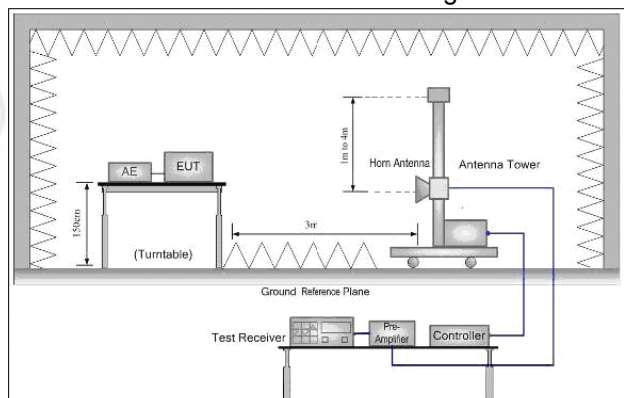
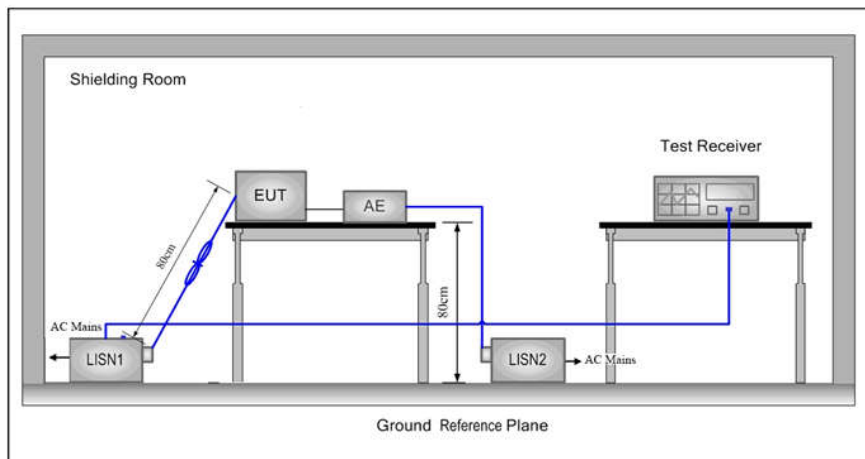


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:

Temperature:	25.0 °C
Humidity:	49 % RH
Atmospheric Pressure:	1010mbar

6 General Information

6.1 Client Information

Applicant:	Shenzhen Chainway Information Technology Co., Ltd.
Address of Applicant:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen
Manufacturer:	Shenzhen Chainway Information Technology Co., Ltd.
Address of Manufacturer:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen
Factory:	Shenzhen Chainway Information Technology Co., Ltd.
Address of Factory:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen

6.2 General Description of EUT

Product Name:	Handheld UHF Reader
Model No.(EUT):	C76
Trade mark:	CHAINWAY
EUT Supports Radios application:	BT 4.0 Single mode: 2402MHz to 2480MHz; 2.4GHz Wi-Fi: 802.11b/g/n(HT20)(HT40): 2412MHz ~2462 MHz; 5GHz Wi-Fi: U-NII-1: 5.15-5.25GHz; U-NII-2A: 5.25-5.35GHz; U-NII-2C: 5.470-5.725GHz; U-NII-3: 5.725-5.850GHz; 802.11a; 802.11n(20MHz/40MHz); RFID: 902MHz to 928MHz; NFC: 13.56MHz; GPS: 1559MHz to 1610MHz
Power Supply:	Adapter: Model: GME10D-050200FUu Input: 100-240V~ 50/60Hz, 0.28A Output: 5V---2A
	Battery: Rechargeable Li-ion Battery 3.8V, 4000mAh, 15.2Wh
USB cable:	100cm(Unshielded)
Sample Received Date:	Sep. 05, 2018
Sample tested Date:	Sep. 12, 2018 to Feb. 20, 2019

6.3 Product Specification subjective to this standard

Operation Frequency:	902MHz to 928MHz
Modulation Type:	ASK
Firmware version:	C76E_LWG_M0_V0.4.6_S171219
Hardware version:	C70SEA_MB_V11
Test Power Grade:	N/A
Test Software of EUT:	N/A
Antenna Type and Gain:	902.75MHz: Antenna type: PFC, Antenna gain: 4dBi
Test Voltage:	AC 120V, 60Hz

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	902.75MHz	16	910.25MHz	31	917.75MHz	46	925.25MHz
2	903.25MHz	17	910.75MHz	32	918.25MHz	47	925.75MHz
3	903.75MHz	18	911.25MHz	33	918.75MHz	48	926.25MHz
4	904.25MHz	19	911.75MHz	34	919.25MHz	49	926.75MHz
5	904.75MHz	20	912.25MHz	35	919.75MHz	50	927.25MHz
6	905.25MHz	21	912.75MHz	36	920.25MHz		
7	905.75MHz	22	913.25MHz	37	920.75MHz		
8	906.25MHz	23	913.75MHz	38	921.25MHz		
9	906.75MHz	24	914.25MHz	39	921.75MHz		
10	907.25MHz	25	914.75MHz	40	922.25MHz		
11	907.75MHz	26	915.25MHz	41	922.75MHz		
12	908.25MHz	27	915.75MHz	42	923.25MHz		
13	908.75MHz	28	916.25MHz	43	923.75MHz		
14	909.25MHz	29	916.75MHz	44	924.25MHz		
15	909.75MHz	30	917.25MHz	45	924.75MHz		

6.4 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name		Manufacture	model	serial number	Supplied by	Certification
AE1	Phone	Apple	A1367	TTF20120027	CTI	FCC
AE2	Router	HuaWei	WS550	K8E8W1531400 2784	CTI	FCC
AE3	PC	Apple	MMGF2 ZP/A	ODN20170212	CTI	FCC

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

6.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Spectrum Analyzer	Keysight	N9010A	MY54510339	03-13-2018	03-12-2019
Signal Generator	Keysight	N5182B	MY53051549	03-13-2018	03-12-2019
High-pass filter	Sinoscite	FL3CX03WG1 8NM12-0398-002	---	01-10-2018 01-08-2019	01-09-2019 01-07-2020
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-10-2018 01-08-2019	01-09-2019 01-07-2020
DC Power	Keysight	E3642A	MY54426035	03-13-2018	03-12-2019
PC-1	Lenovo	R4960d	---	03-13-2018	03-12-2019
BT&WI-FI Automatic control	R&S	OSP120	101374	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-2	15860006	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-1	15860004	03-13-2018	03-12-2019
RF control unit	JS Tonscend	JS0806-4	158060007	03-13-2018	03-12-2019
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	03-13-2018	03-12-2019
Temperature/Humidity Indicator	biaozi	HM10	1804186	10-13-2017 10-12-2018	10-12-2018 10-11-2019

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	05-25-2018	05-24-2019
Temperature/ Humidity Indicator	Defu	TH128	/	07-02-2018	07-01-2019
Communication test set	Agilent	E5515C	GB47050 534	03-16-2018	03-15-2019
Communication test set	R&S	CMW500	152394	03-16-2018	03-15-2019
LISN	R&S	ENV216	100098	05-10-2018	05-10-2019
LISN	schwarzbeck	NNLK8121	8121-529	05-10-2018	05-10-2019
Voltage Probe	R&S	ESH2-Z3 0299.7810.5 6	100042	06-13-2017	06-11-2020
Current Probe	R&S	EZ-17 816.2063.03	100106	05-30-2018	05-29-2019
ISN	TESEQ	ISN T800	30297	01-17-2018 01-16-2019	01-16-2019 01-15-2020
Barometer	changchun	DYM3	1188	07-02-2018	07-01-2019

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-04-2016	06-03-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-401	12-22-2017 07-30-2018	12-21-2018 07-29-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	08-21-2018	08-20-2019
Microwave Preamplifier	Agilent	8449B	3008A024 25	01-17-2018 01-16-2019	01-16-2019 01-15-2020
Microwave Preamplifier	Tonscend	EMC051845 SE	980380	04-25-2018	04-23-2021
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D- 1869	06-05-2018	06-03-2021
Horn Antenna	ETS- LINDGREN	3117	00057410	06-05-2018	06-04-2021
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	6042	06-05-2018	06-04-2021
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041	06-22-2017	06-21-2019
Loop Antenna	ETS	6502	00071730	05-11-2018	05-10-2019
Spectrum Analyzer	R&S	FSP40	100416	05-25-2018	05-24-2019
Receiver	R&S	ESCI	100435	11-23-2018	11-22-2019
Receiver	R&S	ESCI7	100938- 003	01-09-2018 01-07-2019	01-08-2019 01-06-2020
Multi device Controller	maturo	NCD/070/107 11112	---	05-11-2018	05-10-2019
LISN	schwarzbeck	NNBM8125	81251547	05-11-2018	05-10-2019
LISN	schwarzbeck	NNBM8125	81251548	03-13-2018	03-12-2019
Signal Generator	Agilent	E4438C	MY45095 744	03-13-2018	03-12-2019
Signal Generator	Keysight	E8257D	MY53401 106	10-11-2017 10-12-2018	10-12-2018 10-11-2019
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	03-16-2018	03-15-2019
Communication test set	Agilent	E5515C	GB47050 534	01-10-2018 01-09-2019	01-09-2019 01-08-2020
Cable line	Fulai(7M)	SF106	5219/6A	01-10-2018 01-09-2019	01-09-2019 01-08-2020
Cable line	Fulai(6M)	SF106	5220/6A	01-10-2018 01-09-2019	01-09-2019 01-08-2020
Cable line	Fulai(3M)	SF106	5216/6A	01-10-2018 01-09-2019	01-09-2019 01-08-2020
Cable line	Fulai(3M)	SF106	5217/6A	01-19-2017 01-18-2018	01-18-2018 01-17-2019
Communication test set	R&S	CMW500	104466	01-10-2018 01-09-2019	01-09-2019 01-08-2020
High-pass filter	Sinoscite	FL3CX03WG 18NM12- 0398-002	---	01-10-2018 01-09-2019	01-09-2019 01-08-2020
High-pass filter	MICRO- TRONICS	SPA-F- 63029-4	---	01-10-2018 01-09-2019	01-09-2019 01-08-2020
band rejection filter	Sinoscite	FL5CX01CA0 9CL12-0395- 001	---	01-10-2018 01-09-2019	01-09-2019 01-08-2020
band rejection filter	Sinoscite	FL5CX01CA0 8CL12-0393- 001	---	01-10-2018 01-09-2019	01-09-2019 01-08-2020
band rejection filter	Sinoscite	FL5CX02CA0 4CL12-0396- 002	---	01-10-2018 01-09-2019	01-09-2019 01-08-2020
band rejection filter	Sinoscite	FL5CX02CA0 3CL12-0394- 001	---	06-04-2016	06-03-2019

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

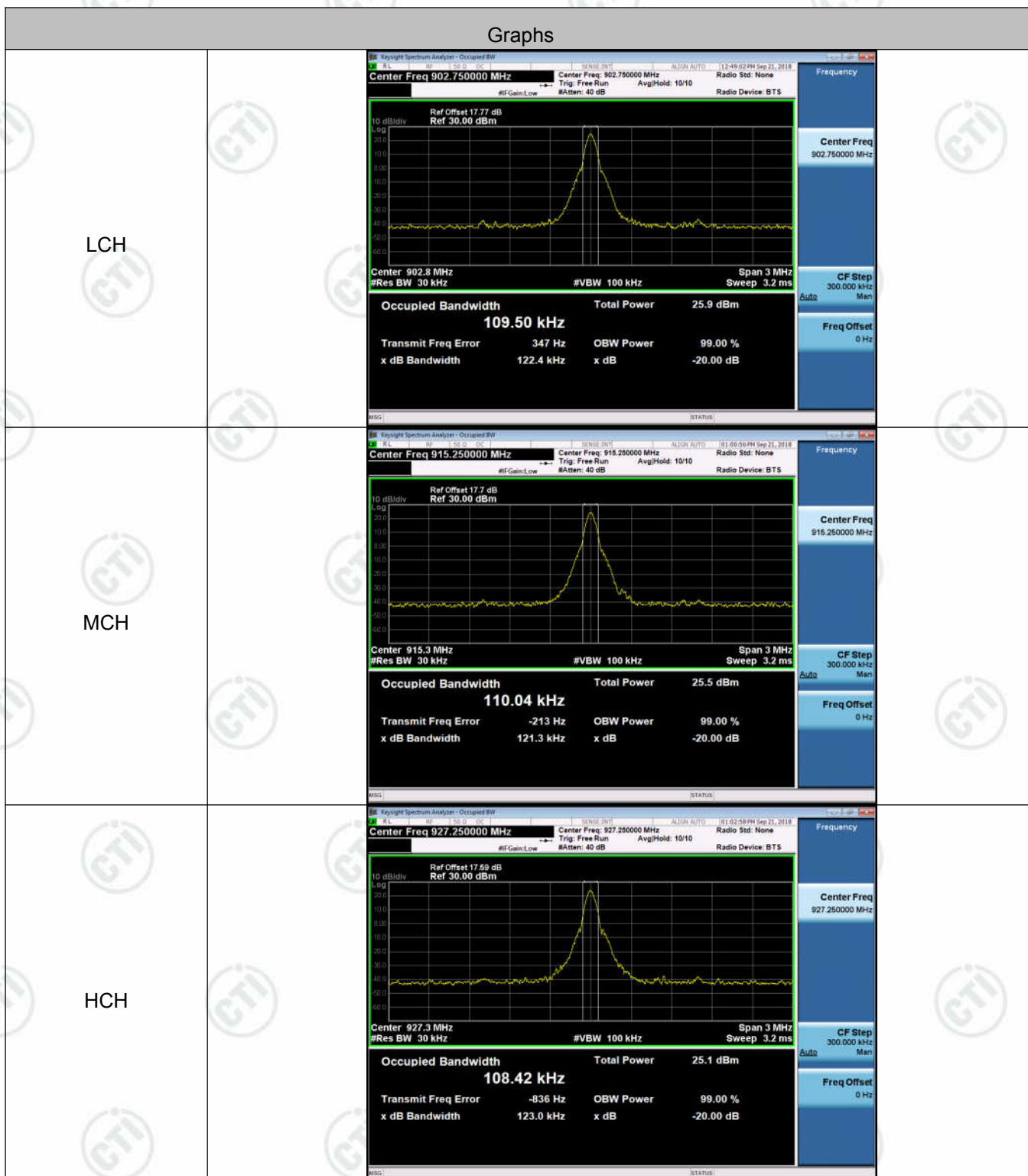
Test Results List:

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(1)	ANSI 63.10	20dB Occupied Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Carrier Frequencies Separation	PASS	Appendix B)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Average Time of Occupancy	PASS	Appendix C)
Part15C Section 15.247 (b)	ANSI 63.10	Hopping Channel Number	PASS	Appendix D)
Part15C Section 15.247 (b)(1)	ANSI 63.10	Conducted Peak Output Power	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix F)
Part15C Section 15.247(d)	ANSI 63.10	RF Conducted Spurious Emissions	PASS	Appendix G)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Pseudorandom Frequency Hopping Sequence	PASS	Appendix H)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix I)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	PASS	Appendix J)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated) Emission)	PASS	Appendix K)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix L)

Appendix A): 20dB Occupied Bandwidth Test Result

Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict	Remark
ASK	LCH	0.1224	0.10950	PASS	Peak detector
ASK	MCH	0.1213	0.11004	PASS	
ASK	HCH	0.1230	0.10842	PASS	

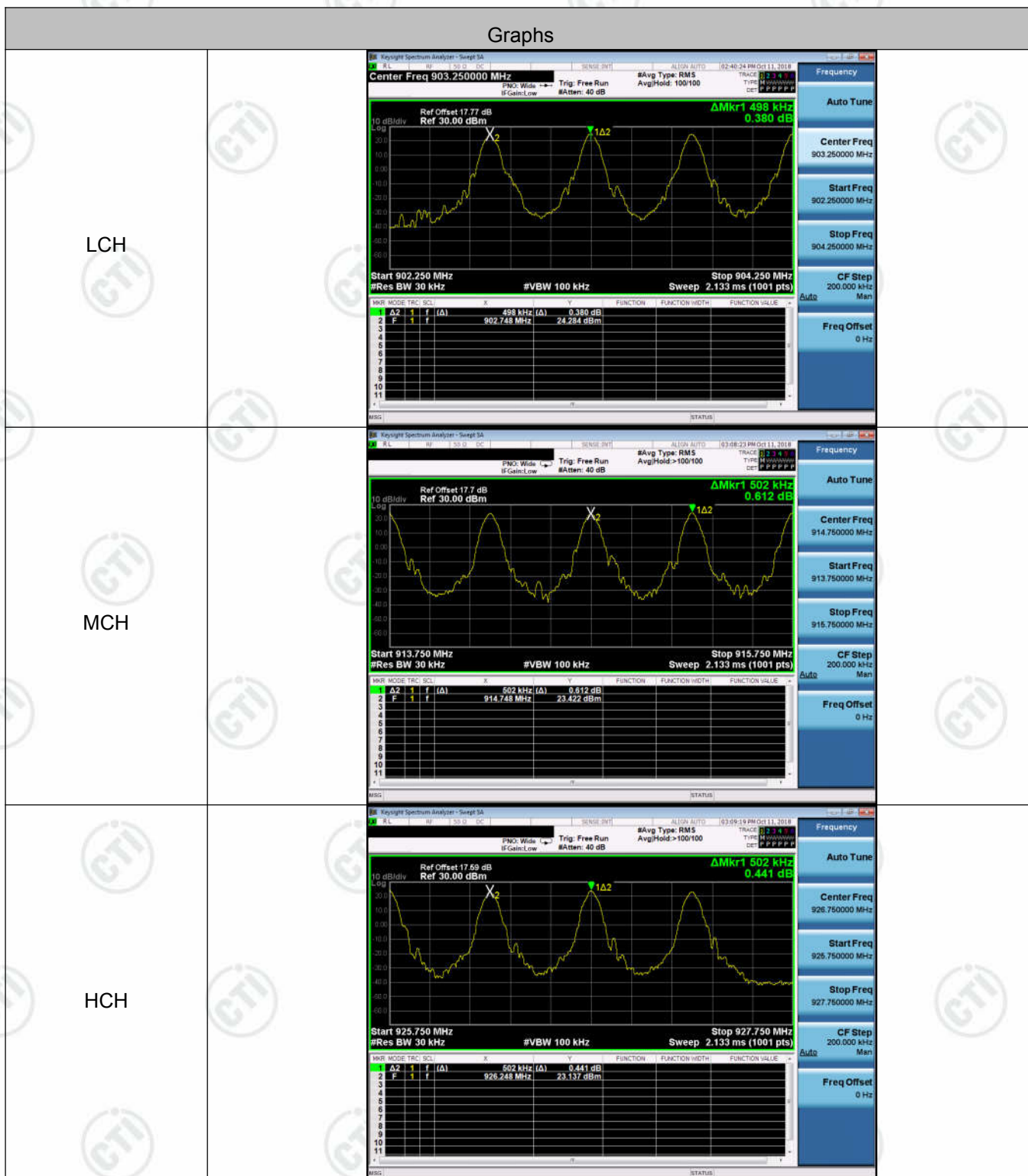
Test Graph



Appendix B): Carrier Frequency Separation Result Table

Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
ASK	LCH	0.498	PASS
ASK	MCH	0.502	PASS
ASK	HCH	0.502	PASS

Test Graph



Appendix C): Average Time of Occupancy

Result Table

Frequency Hops (max) = (20s window)/(Transmission duration) = 20s/0.01635 =

1223 frequency hops

Repetition on given channel (max) = 1223 / 50 channels = 24.46 hops per channel

Dwell time on each channel (max) = 24.46 * 16.35 ms = 399.921 ms total dwell time per channel < 400 ms

Frequency Hops (max) = (20s window)/(Transmission duration) = 20s/0.016375 =

1221 frequency hops

Repetition on given channel (max) = 1221 / 50 channels = 24.42 hops per channel

Dwell time on each channel (max) = 24.42 * 16.375 ms = 399.8775 ms total dwell time per channel < 400 ms

Frequency Hops (max) = (20s window)/(Transmission duration) = 20s/0.01635 =

1223 frequency hops

Repetition on given channel (max) = 1223 / 50 channels = 24.46 hops per channel

Dwell time on each channel (max) = 24.46 * 16.35 ms = 399.921 ms total dwell time per channel < 400 ms

Test Graph

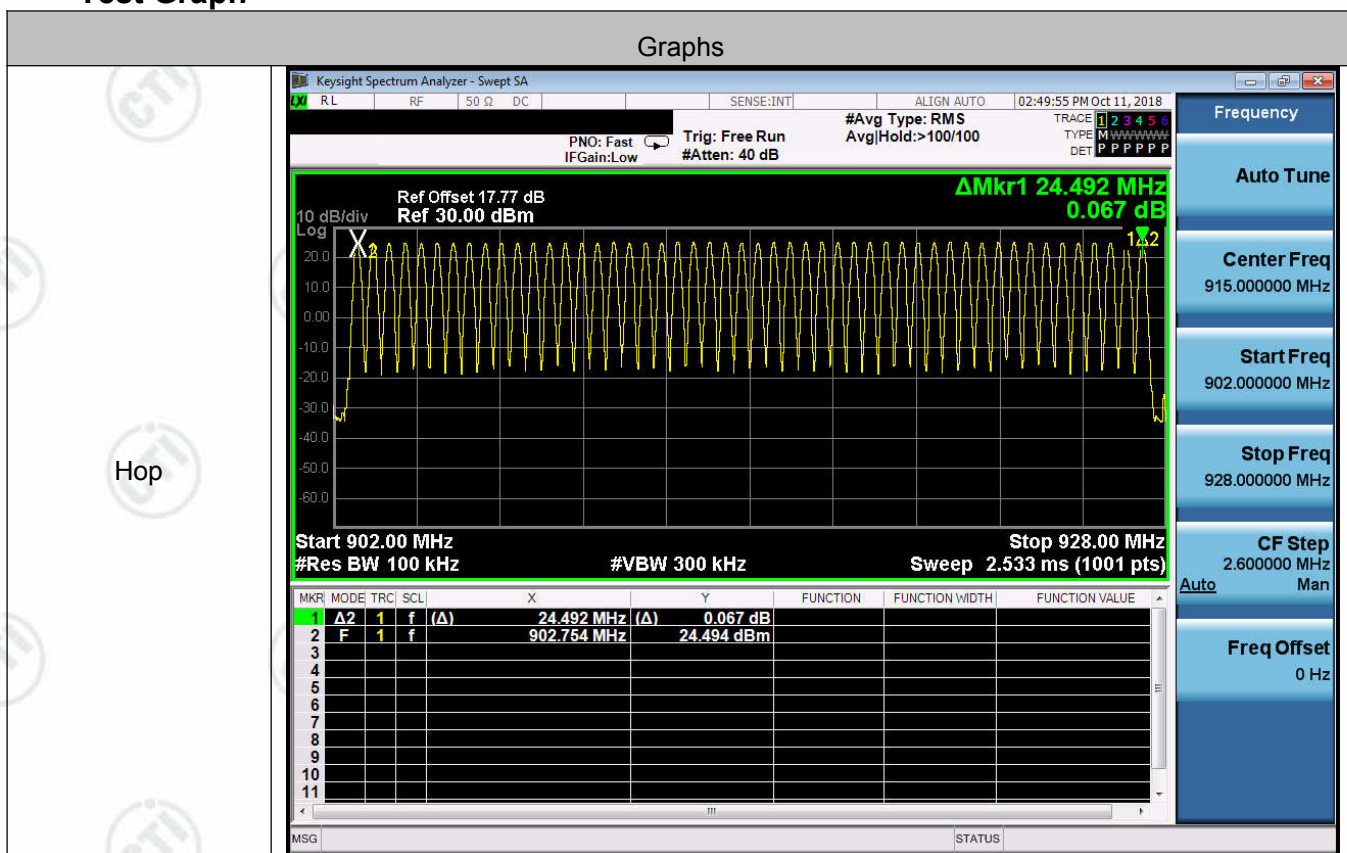


Appendix D): Hopping Channel Number

Result Table

Mode	Channel.	Number of Hopping Channel	Verdict
ASK	Hop	50	PASS

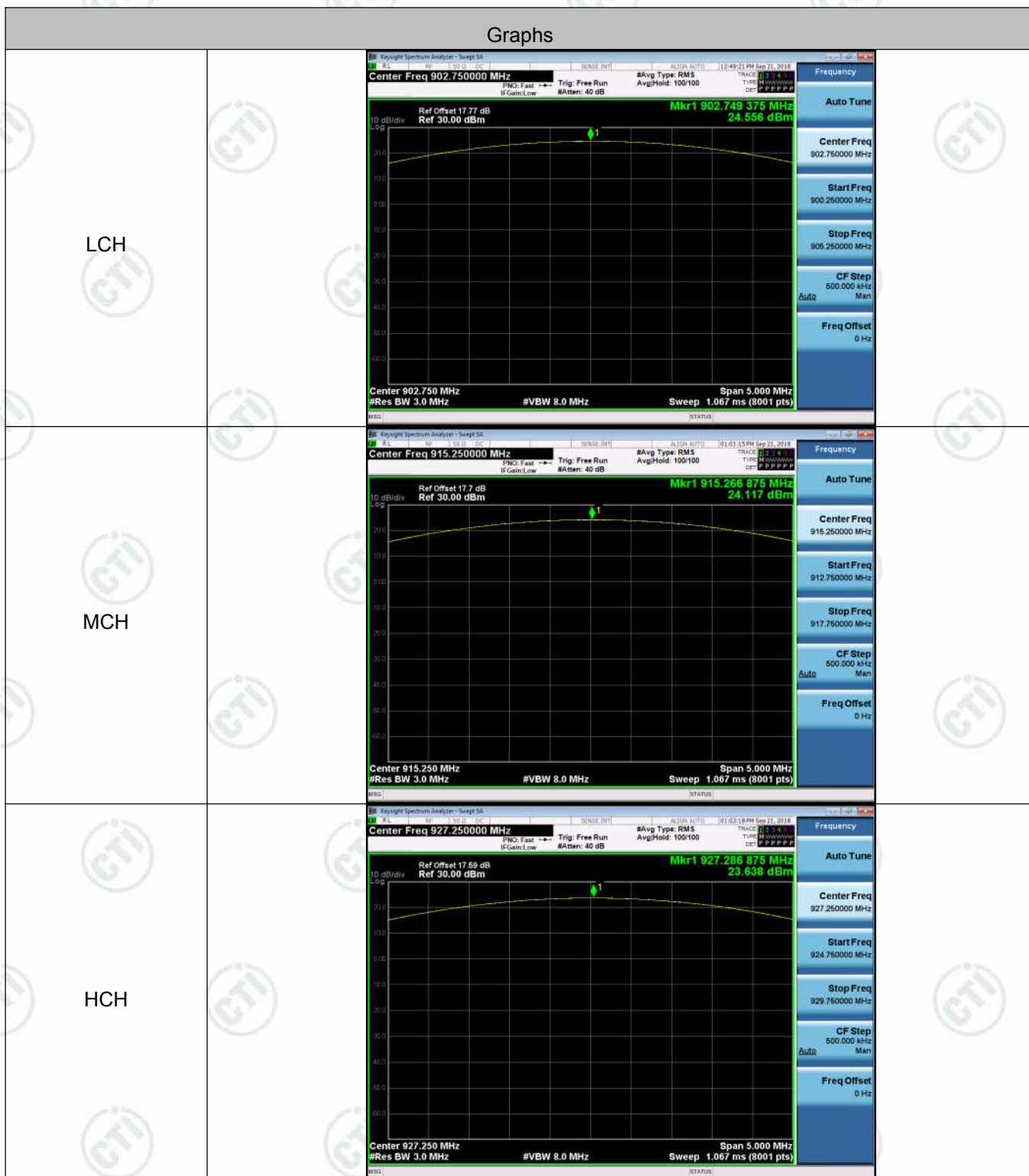
Test Graph



Appendix E): Conducted Peak Output Power Result Table

Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
ASK	LCH	24.556	PASS
ASK	MCH	24.117	PASS
ASK	HCH	23.638	PASS

Test Graph

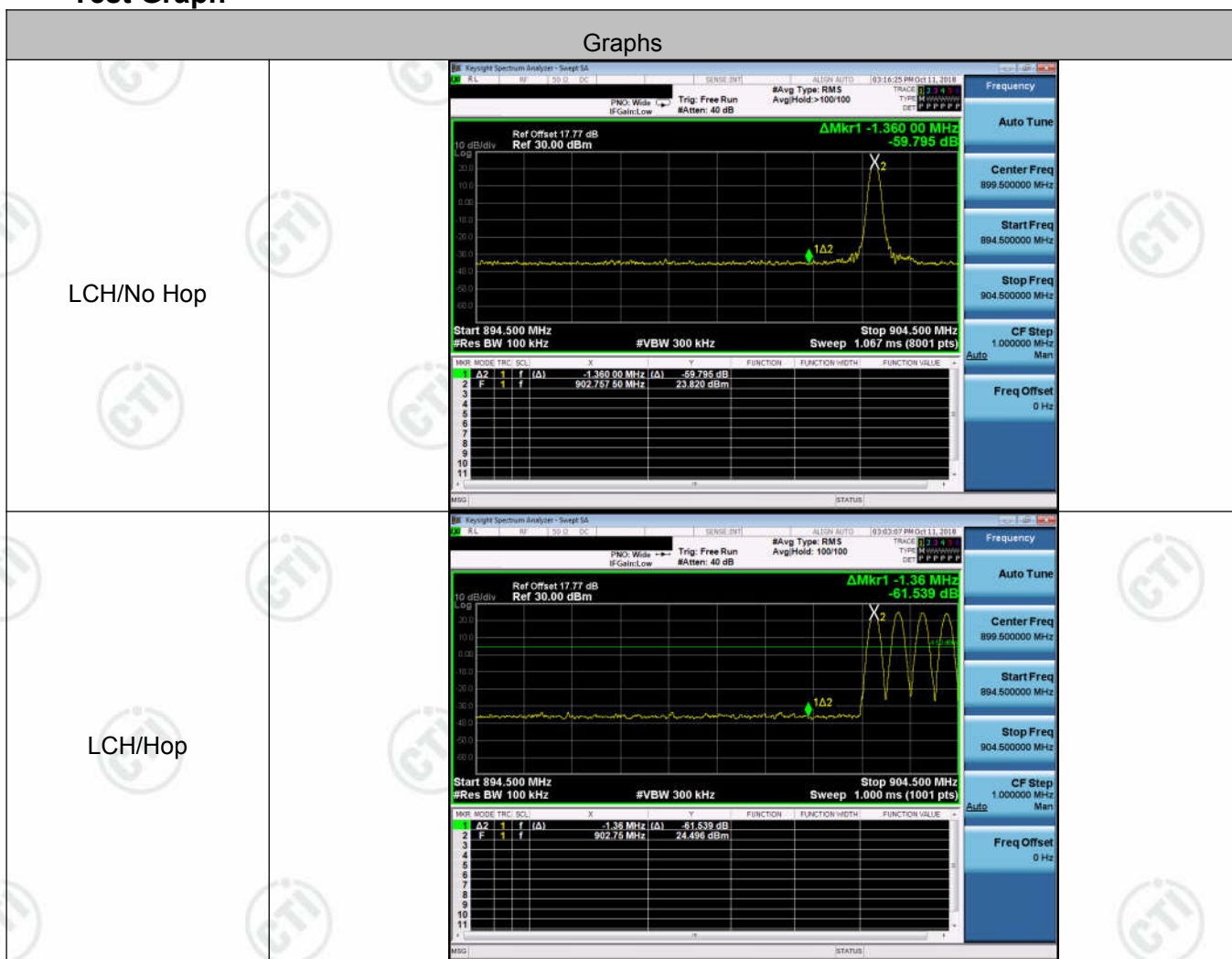


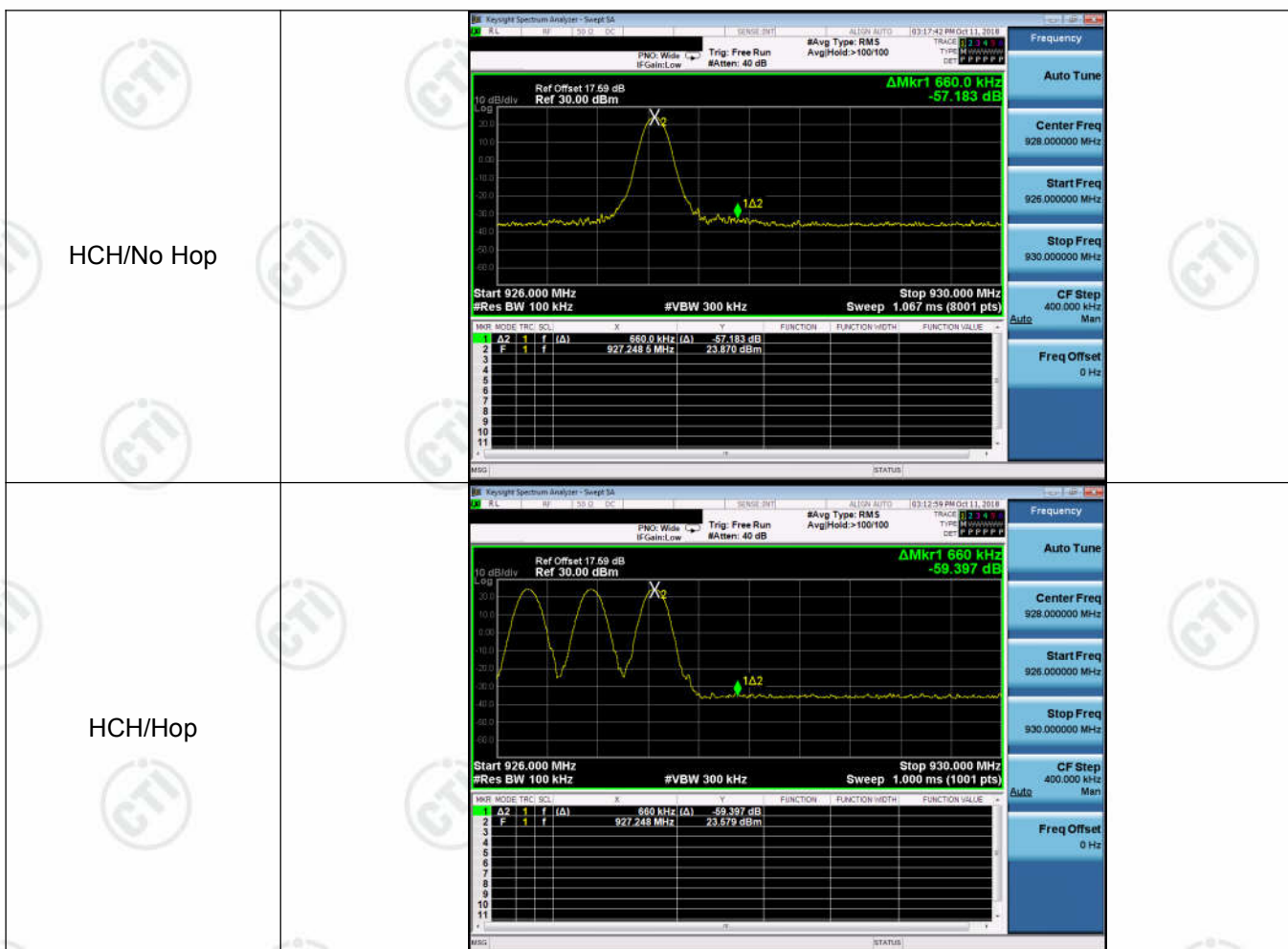
Appendix F): Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
ASK	LCH	901.39	-59.795	Off	23.820	3.82	PASS
			-61.539	On	24.496	4.50	PASS
ASK	HCH	927.9	-57.183	Off	23.870	3.87	PASS
			-59.397	On	23.579	3.58	PASS

Test Graph



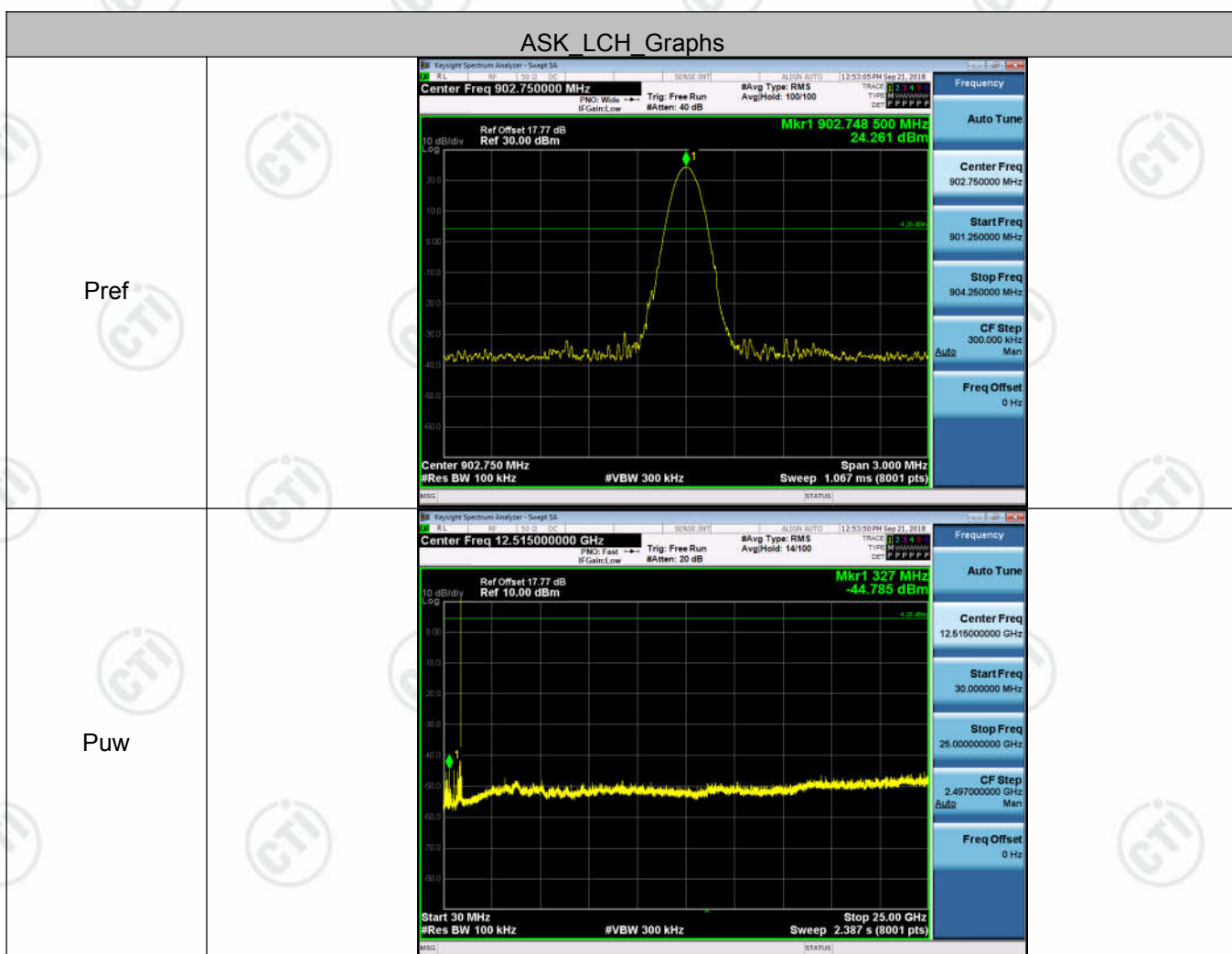


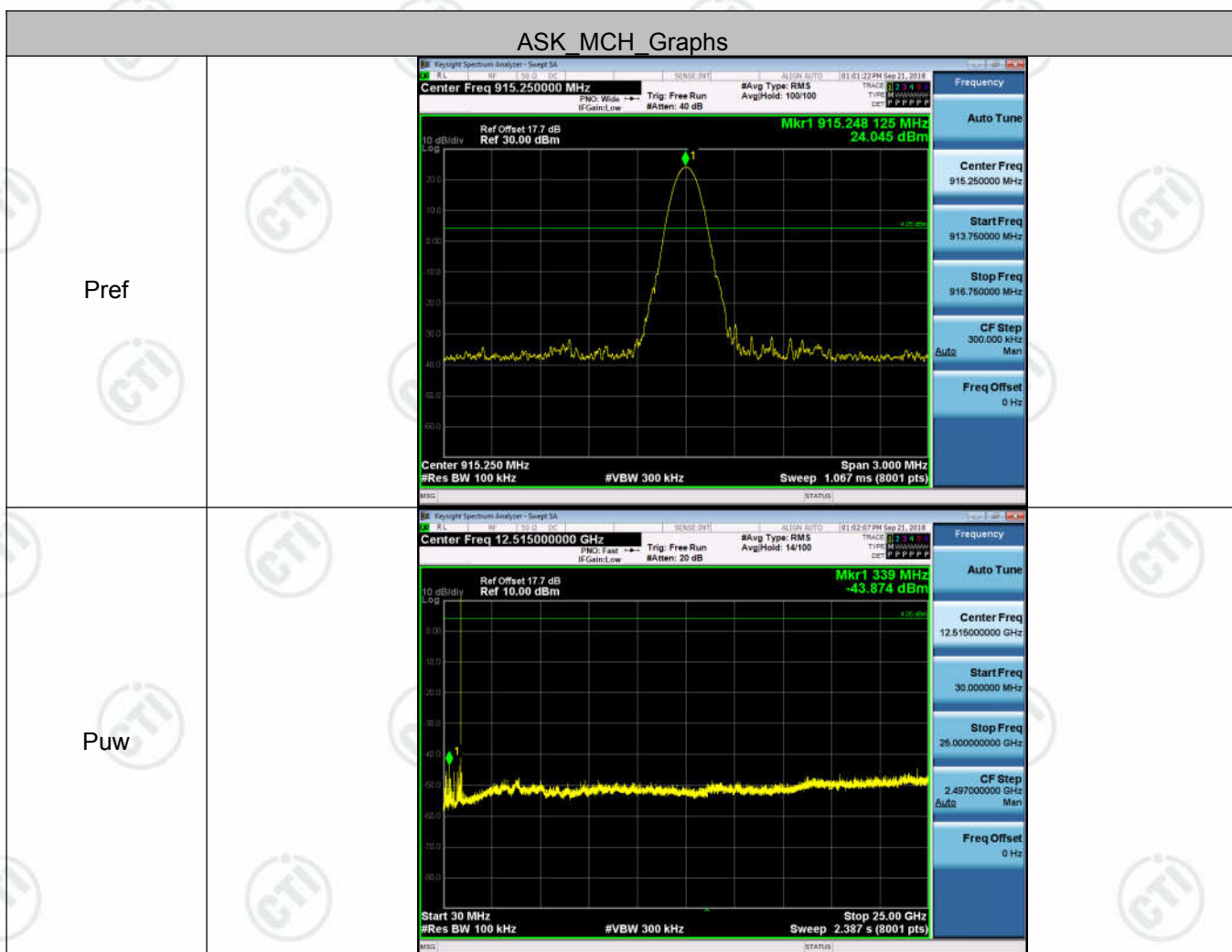
Appendix G): RF Conducted Spurious Emissions

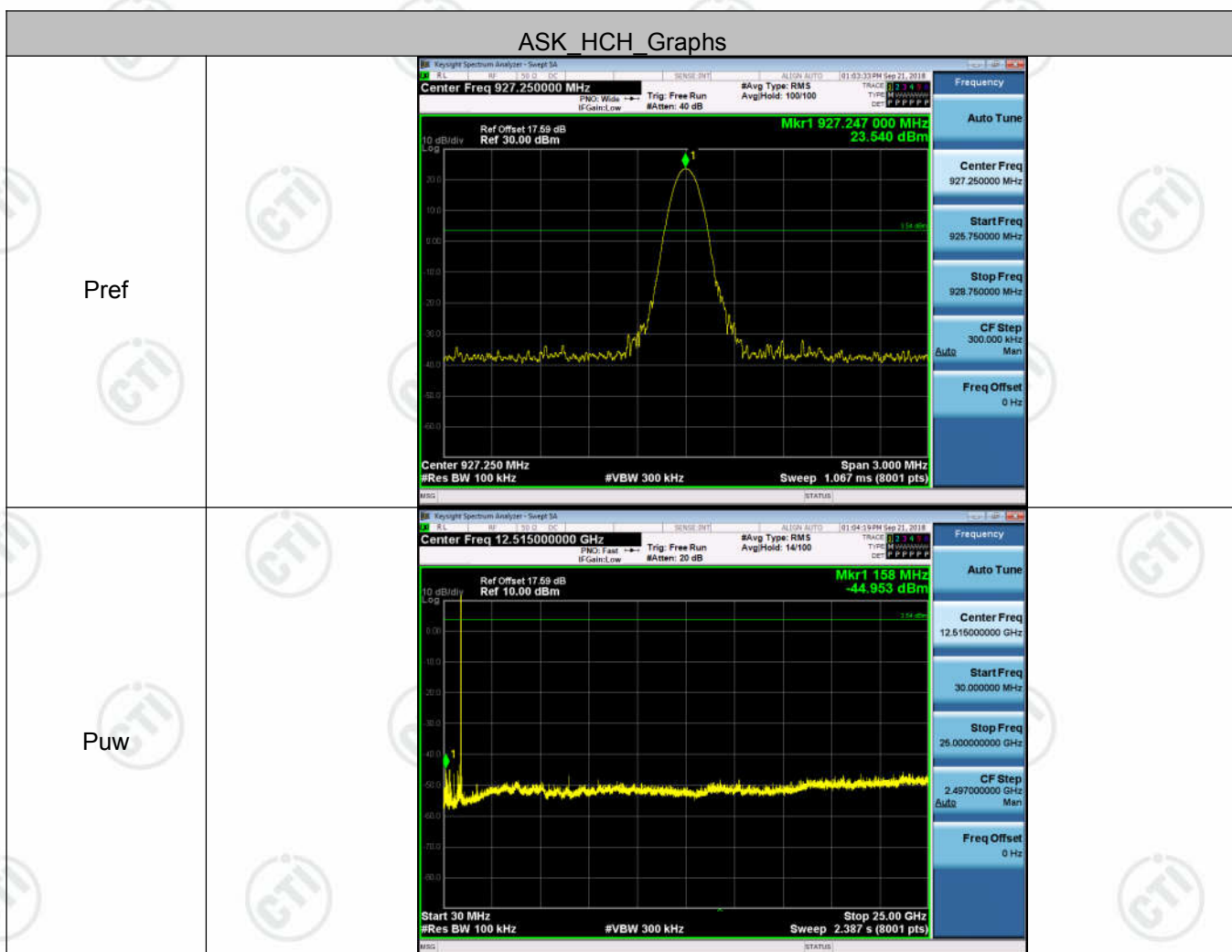
Result Table

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
ASK	LCH	24.261	<Limit	PASS
ASK	MCH	24.045	<Limit	PASS
ASK	HCH	23.54	<Limit	PASS

Test Graph







Appendix H): Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Ceramic Antenna and no consideration of replacement. The best case gain of the antenna is 4 dBi



Appendix I): AC Power Line Conducted Emission

Test Procedure:	<p>Test frequency range :150KHz-30MHz</p> <p>1)The mains terminal disturbance voltage test was conducted in a shielded room.</p> <p>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</p> <p>3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</p> <p>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</p> <p>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</p>														
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> <p>* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.</p> <p>NOTE : The lower limit is applicable at the transition frequency</p>	Frequency range (MHz)	Limit (dBμV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBμV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

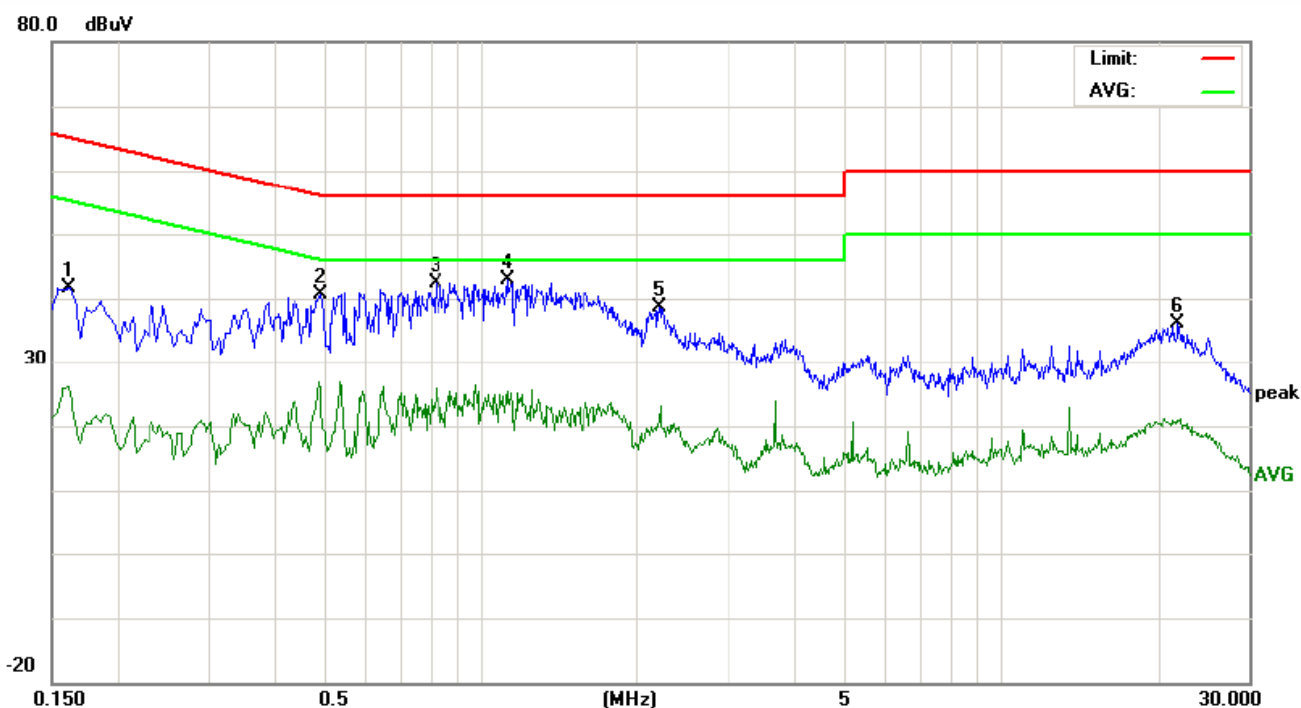
Product : Handheld UHF Reader

Model/Type reference : C76

Temperature : 22℃

Humidity : 53%

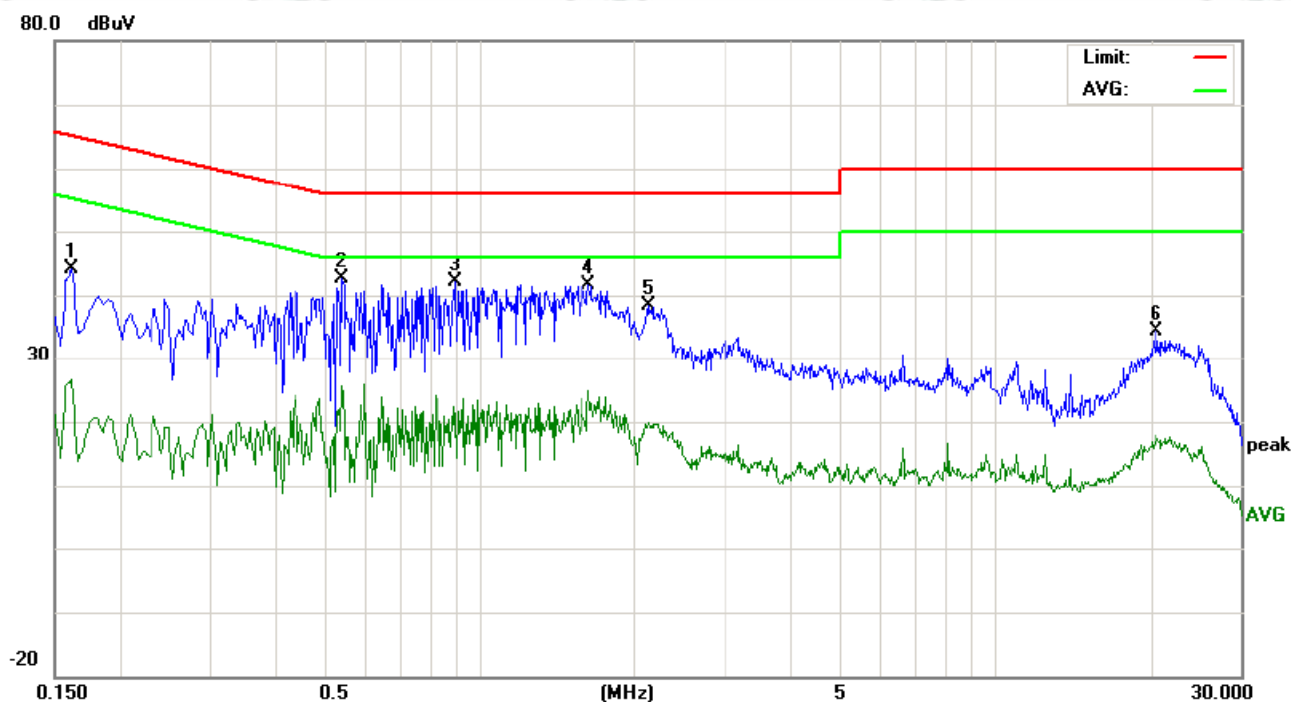
Phase : L



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	31.95	28.64	16.48	9.75	41.70	38.39	26.23	65.36	55.36	-26.97	-29.13	P	
2	0.4940	30.80	27.61	15.86	9.71	40.51	37.32	25.57	56.10	46.10	-18.78	-20.53	P	
3	0.8180	32.58	29.35	14.65	9.74	42.32	39.09	24.39	56.00	46.00	-16.91	-21.61	P	
4	1.1260	33.15	30.14	15.75	9.72	42.87	39.86	25.47	56.00	46.00	-16.14	-20.53	P	
5	2.2020	28.98	25.47	11.10	9.71	38.69	35.18	20.81	56.00	46.00	-20.82	-25.19	P	
6	21.9540	25.95	22.34	10.50	10.11	36.06	32.45	20.61	60.00	50.00	-27.55	-29.39	P	

Product : Handheld UHF Reader
Temperature : 22℃
Phase : N

Model/Type reference : C76
Humidity : 53%



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	34.39	31.24	16.92	9.75	44.14	40.99	26.67	65.36	55.36	-24.37	-28.69	P	
2	0.5420	32.81	29.37	15.79	9.73	42.54	39.10	25.52	56.00	46.00	-16.90	-20.48	P	
3	0.9020	32.34	29.64	10.83	9.75	42.09	39.39	20.58	56.00	46.00	-16.61	-25.42	P	
4	1.6340	31.80	28.74	15.07	9.72	41.52	38.46	24.79	56.00	46.00	-17.54	-21.21	P	
5	2.1260	28.55	25.13	10.01	9.72	38.27	34.85	19.73	56.00	46.00	-21.15	-26.27	P	
6	20.6940	24.27	21.47	7.83	10.08	34.35	31.55	17.91	60.00	50.00	-28.45	-32.09	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

Appendix J): Radiated Spurious Emissions

Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Test Procedure:					
Below 1GHz test procedure as below:					
<p>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>					
Above 1GHz test procedure as below:					
<p>g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).</p> <p>h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>					
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Radiated Spurious Emissions test Data:

Product : Handheld UHF Reader **Model/Type reference** : C76
Temperature : 21°C **Humidity** : 60%

Radiated Emission below 1GHz

Mode:	Transmitting	Channel:	902.75
Remark:	QP		

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	61.8224	11.13	1.08	-32.04	32.04	12.21	40.00	27.79	Pass	Horizontal
2	129.9300	7.71	1.63	-32.02	31.56	8.88	43.50	34.62	Pass	Horizontal
3	208.9038	11.13	2.07	-31.94	35.32	16.58	43.50	26.92	Pass	Horizontal
4	290.2060	13.00	2.46	-31.87	42.03	25.62	46.00	20.38	Pass	Horizontal
5	437.0934	15.99	3.03	-31.86	41.17	28.33	46.00	17.67	Pass	Horizontal
6	806.7373	20.98	4.19	-32.01	33.88	27.04	46.00	18.96	Pass	Horizontal

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	52.5085	12.80	0.99	-32.10	42.32	24.01	40.00	15.99	Pass	Vertical
2	71.9124	8.64	1.21	-32.06	37.69	15.48	40.00	24.52	Pass	Vertical
3	208.9038	11.13	2.07	-31.94	41.89	23.15	43.50	20.35	Pass	Vertical
4	290.5941	13.01	2.46	-31.87	41.59	25.19	46.00	20.81	Pass	Vertical
5	439.4219	16.03	3.04	-31.88	39.72	26.91	46.00	19.09	Pass	Vertical
6	687.5975	19.70	3.89	-32.06	33.81	25.34	46.00	20.66	Pass	Vertical

Mode:	Transmitting	Channel:	915.25
Remark:	QP		

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	61.2402	11.28	1.08	-32.05	34.51	14.82	40.00	25.18	Pass	Horizontal
2	208.9038	11.13	2.07	-31.94	35.35	16.61	43.50	26.89	Pass	Horizontal
3	295.4451	13.11	2.48	-31.86	40.77	24.50	46.00	21.50	Pass	Horizontal
4	439.4219	16.03	3.04	-31.88	41.10	28.29	46.00	17.71	Pass	Horizontal
5	626.0872	19.21	3.66	-31.99	32.68	23.56	46.00	22.44	Pass	Horizontal
6	819.3499	21.13	4.25	-31.94	33.55	26.99	46.00	19.01	Pass	Horizontal

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	52.8966	12.74	0.99	-32.10	41.10	22.73	40.00	17.27	Pass	Vertical
2	184.2609	9.40	1.95	-31.97	41.96	21.34	43.50	22.16	Pass	Vertical
3	295.8332	13.12	2.48	-31.86	41.00	24.74	46.00	21.26	Pass	Vertical
4	432.0484	15.91	3.02	-31.83	40.95	28.05	46.00	17.95	Pass	Vertical
5	687.5975	19.70	3.89	-32.06	33.47	25.00	46.00	21.00	Pass	Vertical
6	819.1558	21.13	4.25	-31.94	32.25	25.69	46.00	20.31	Pass	Vertical

Mode:	Transmitting	Channel:	927.25
Remark:	QP		

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	48.0456	13.20	0.95	-32.11	35.20	17.24	40.00	22.76	Pass	Horizontal
2	208.9038	11.13	2.07	-31.94	37.23	18.49	43.50	25.01	Pass	Horizontal
3	295.0570	13.10	2.48	-31.86	43.68	27.40	46.00	18.60	Pass	Horizontal
4	434.5709	15.95	3.02	-31.84	41.78	28.91	46.00	17.09	Pass	Horizontal
5	635.0130	19.28	3.70	-32.05	32.82	23.75	46.00	22.25	Pass	Horizontal
6	687.5975	19.70	3.89	-32.06	32.99	24.52	46.00	21.48	Pass	Horizontal

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	55.0310	12.40	1.01	-32.08	42.44	23.77	40.00	16.23	Pass	Vertical
2	184.2609	9.40	1.95	-31.97	43.22	22.60	43.50	20.90	Pass	Vertical
3	208.9038	11.13	2.07	-31.94	40.01	21.27	43.50	22.23	Pass	Vertical
4	284.7730	12.90	2.44	-31.91	42.53	25.96	46.00	20.04	Pass	Vertical
5	429.7199	15.88	3.01	-31.83	41.34	28.40	46.00	17.60	Pass	Vertical
6	687.5975	19.70	3.89	-32.06	33.12	24.65	46.00	21.35	Pass	Vertical

Transmitter Emission above 1GHz

Mode:	Transmitting	Channel:	902.75
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NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1830.5000	30.58	3.07	-36.90	61.20	57.95	74.00	16.05	Pass	Horizontal	Peak
2	2745.7500	32.79	3.66	-36.75	47.53	47.23	74.00	26.77	Pass	Horizontal	Peak
3	4576.2500	34.50	4.51	-36.33	41.33	44.01	74.00	29.99	Pass	Horizontal	Peak
4	6404.7500	35.88	5.40	-36.33	41.58	46.53	74.00	27.47	Pass	Horizontal	Peak
5	7322.0000	36.42	5.90	-36.40	46.71	52.63	74.00	21.37	Pass	Horizontal	Peak
6	8237.2500	36.50	6.16	-36.67	43.14	49.13	74.00	24.87	Pass	Horizontal	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1830.5000	30.58	3.06	-36.90	53.84	50.58	54.00	3.42	Pass	Horizontal	Average

Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1830.5000	30.58	3.07	-36.90	66.03	62.78	74.00	11.22	Pass	Vertical	Peak
2	2745.7500	32.79	3.66	-36.75	47.12	46.82	74.00	27.18	Pass	Vertical	Peak
3	4576.2500	34.50	4.51	-36.33	42.27	44.95	74.00	29.05	Pass	Vertical	Peak
4	6404.7500	35.88	5.40	-36.33	41.61	46.56	74.00	27.44	Pass	Vertical	Peak
5	7322.0000	36.42	5.90	-36.40	51.28	57.20	74.00	16.80	Pass	Vertical	Peak
6	8237.2500	36.50	6.16	-36.67	42.08	48.07	74.00	25.93	Pass	Vertical	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1830.5000	30.58	3.06	-36.90	54.07	50.81	54.00	3.19	Pass	Vertical	Average

Mode:	Transmitting	Channel:	915.25
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NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1854.5000	30.74	3.09	-36.93	60.43	57.33	74.00	16.67	Pass	Horizontal	Peak
2	2432.3966	32.31	3.37	-36.62	47.46	46.52	74.00	27.48	Pass	Horizontal	Peak
3	3709.0000	33.57	4.00	-36.19	42.35	43.73	74.00	30.27	Pass	Horizontal	Peak
4	5635.6068	35.22	4.93	-36.06	43.97	48.06	74.00	25.94	Pass	Horizontal	Peak
5	6490.7500	35.90	5.58	-36.23	49.83	55.08	74.00	18.92	Pass	Horizontal	Peak
6	7418.0000	36.52	5.90	-36.29	47.09	53.22	74.00	20.78	Pass	Horizontal	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1854.5000	30.74	3.09	-36.93	48.95	45.85	54.00	8.15	Pass	Horizontal	Average
2	6490.7500	35.90	5.58	-36.23	43.64	48.89	54.00	5.11	Pass	Horizontal	Average

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1854.5000	30.74	3.09	-36.93	61.59	58.49	74.00	15.51	Pass	Vertical	Peak
2	2626.8688	32.60	3.52	-36.65	45.75	45.22	74.00	28.78	Pass	Vertical	Peak
3	3709.0000	33.57	4.00	-36.19	41.89	43.27	74.00	30.73	Pass	Vertical	Peak
4	4646.2073	34.50	4.55	-36.16	44.68	47.57	74.00	26.43	Pass	Vertical	Peak
5	6490.7500	35.90	5.58	-36.23	52.74	57.99	74.00	16.01	Pass	Vertical	Peak
6	7418.0000	36.52	5.90	-36.29	52.79	58.92	74.00	15.08	Pass	Vertical	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1854.5000	30.74	3.09	-36.93	49.99	46.89	54.00	7.11	Pass	Vertical	Average
2	6490.7500	35.90	5.58	-36.23	43.33	48.58	54.00	5.42	Pass	Vertical	Average
3	7418.0000	36.52	5.90	-36.29	42.19	48.32	54.00	5.68	Pass	Vertical	Average

Mode:	Transmitting	Channel:	927.25
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Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1805.5000	30.42	3.02	-36.83	66.12	62.73	74.00	11.27	Pass	Horizontal	Peak
2	2708.2500	32.73	3.71	-36.72	47.63	47.35	74.00	26.65	Pass	Horizontal	Peak
3	3241.4246	33.30	3.85	-36.80	46.99	47.34	74.00	26.66	Pass	Horizontal	Peak
4	5060.4155	34.56	4.81	-36.08	43.78	47.07	74.00	26.93	Pass	Horizontal	Peak
5	6319.2500	35.86	5.31	-36.19	43.71	48.69	74.00	25.31	Pass	Horizontal	Peak
6	7222.0000	36.32	5.75	-36.43	44.25	49.89	74.00	24.11	Pass	Horizontal	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1805.5000	30.42	3.02	-36.83	52.81	49.42	74.00	24.58	Pass	Horizontal	Average

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1805.5000	30.42	3.02	-36.83	63.21	59.82	74.00	14.18	Pass	Vertical	Peak
2	2708.2500	32.73	3.71	-36.72	46.77	46.49	74.00	27.51	Pass	Vertical	Peak
3	3502.2876	33.40	4.09	-36.58	45.05	45.96	74.00	28.04	Pass	Vertical	Peak
4	5711.9856	35.34	4.96	-36.12	43.33	47.51	74.00	26.49	Pass	Vertical	Peak
5	6319.2500	35.86	5.31	-36.19	44.29	49.27	74.00	24.73	Pass	Vertical	Peak
6	7222.0000	36.32	5.75	-36.43	45.24	50.88	74.00	23.12	Pass	Vertical	Peak

Final Data List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1805.5000	30.42	3.02	-36.83	52.87	49.48	74.00	24.52	Pass	Vertical	Average

Note:

1) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak values are measured.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

4) Scan from 9kHz to 9GHz, the disturbance above 7.22GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

PHOTOGRAPHS OF TEST SETUP

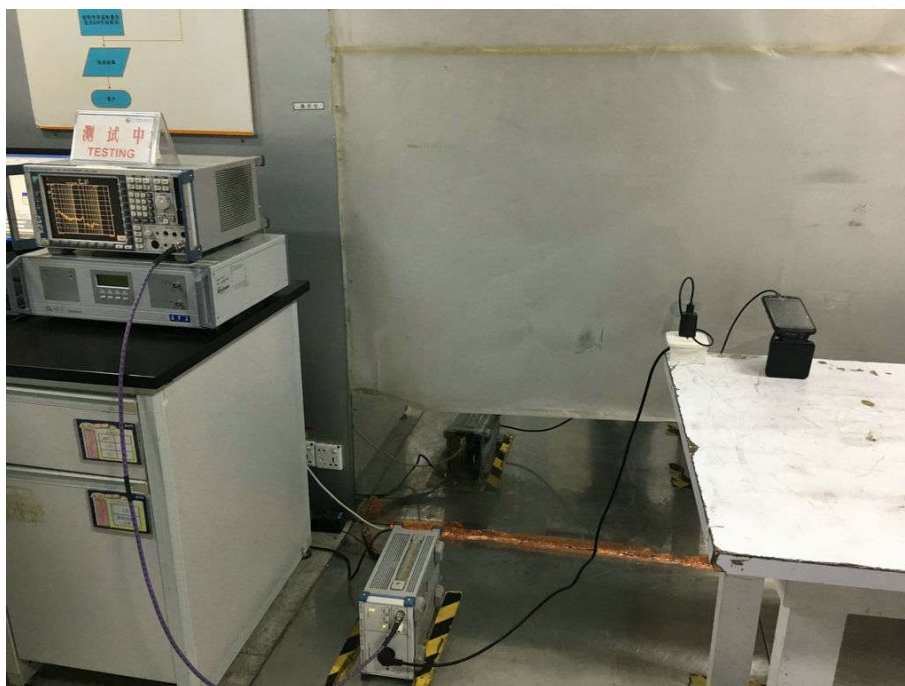
Test model No.: C76



Radiated spurious emission Test Setup-1(30MHz~1GHz)



Radiated spurious emission Test Setup-2(1GHz~18GHz)



Conducted Emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No.EED32K00243601 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.