

TEST REPORT

Reference No...... : WTX24X11256034W001
FCC ID..... : 2BOTS-UA60
Applicant..... : Runione Tech Co., Ltd
Address..... : Building D, 3rd Floor, No.599 Gaojing Road, Qingpu District, Shanghai,
China
Manufacturer..... : The same as Applicant
Address..... : The same as Applicant
Product Name..... : Rugged handheld
Model No...... : UA60
Standards..... : FCC Part 22H, FCC Part 24E
Date of Receipt sample..... : 2024-11-04
Date of Test..... : 2024-11-04 to 2025-03-30; 2025-04-05 to 2025-04-08
Date of Issue..... : 2025-04-08
Test Report Form No...... : WTX_Part 22_ Part 24W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

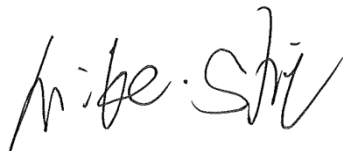
Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
Block 70 Bao'an District, Shenzhen, Guangdong, China

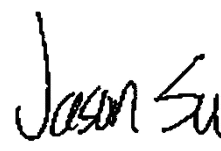
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Tested by:



Mike Shi/Project Engineer

Approved by:



Jason Su/Manager

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2 TEST STANDARDS	6
1.3 TEST METHODOLOGY	6
1.4 TEST FACILITY	6
1.5 EUT SETUP AND TEST MODE	7
1.6 MEASUREMENT UNCERTAINTY	9
1.7 TEST EQUIPMENT LIST AND DETAILS	10
2. SUMMARY OF TEST RESULTS	17
3. RF OUTPUT POWER.....	18
3.1 STANDARD APPLICABLE	18
3.2 TEST PROCEDURE	18
3.3 SUMMARY OF TEST RESULTS/PLOTS	18
4. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER.....	22
4.1 STANDARD APPLICABLE	22
4.2 TEST PROCEDURE	22
4.3 SUMMARY OF TEST RESULTS	22
5. EMISSION BANDWIDTH	23
5.1 STANDARD APPLICABLE	23
5.2 TEST PROCEDURE	23
5.3 SUMMARY OF TEST RESULTS/PLOTS	23
6. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL	24
6.1 STANDARD APPLICABLE	24
6.2 TEST PROCEDURE	24
6.3 SUMMARY OF TEST RESULTS/PLOTS	24
7. SPURIOUS RADIATED EMISSIONS	25
7.1 STANDARD APPLICABLE	25
7.2 TEST PROCEDURE	25
7.3 SUMMARY OF TEST RESULTS/PLOTS	25
8. FREQUENCY STABILITY	46
8.1 STANDARD APPLICABLE	46
8.2 TEST PROCEDURE	46
8.3 SUMMARY OF TEST RESULTS/PLOTS	46
9. MODULATION CHARACTERISTICS	47
9.1 STANDARD APPLICABLE	47
9.2 TEST PROCEDURE	47
9.3 SUMMARY OF TEST RESULTS/PLOTS	47
APPENDIX PHOTOGRAPHS	48

Report version

Version No.	Date of issue	Description
Rev.00	2025-04-08	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	Rugged handheld
Trade Name:	/
Model No.:	UA60
Adding Model(s):	/
Rated Voltage:	DC3.8V
Battery:	8000mAh
Adapter Model:	/
<i>The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.33dBm, GSM1900: 29.53dBm EDGE850: 26.26dBm, EDGE1900: 25.35dBm
Type of Emission:	GSM850: 244KGXW, GSM1900: 245KGXW EDGE850: 246KG7W, EDGE1900: 246KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	FPC Antenna
Antenna Gain:	GSM850: 0.33dBi; GSM1900:1.05dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 22.46dBm, WCDMA Band 5: 22.40dBm
Type of Emission:	WCDMA Band 2: 4M18F9W WCDMA Band 5: 4M18F9W
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	FPC Antenna
Antenna Gain:	WCDMA Band 2:1.05dBi, WCDMA Band 5:0.33dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.

FCC Rules Part 22: Private Land Mobile Radio Services.

FCC Rules Part 24: Public Mobile Services.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

KDB 971168 D01 Power Meas License Digital Systems v03r01: Measurement Guidance for Certification of Licensed Digital Transmitters.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels
TM10	WCDMA Band 2	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency(MHz)	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2	128
		836.6	190
		848.8	251
PCS 1900	GSM/GPRS/EDGE	1850.2	512
		1880.0	661
		1909.8	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4	4132
		836.6	4183
		846.6	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4	9262
		1880.0	9400
		1907.6	9538
Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	45~75 %
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	1.0	Shielded	With Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Computer	Lenovo	L13 Yoga	/
Adapter	/	MDY-08-EH	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	0.57dB
Occupied Bandwidth	Conducted	0.015MHz
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	0.42dB
Transmitter Spurious Emissions	Radiated	30-200MHz, 4.52dB
		0.2-1GHz 5.56dB
		1-6GHz, 3.84dB
		6-18GHz, 3.92dB

1.7 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041 A1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2024-02-24	2025-02-23
WTXE1022 A1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2024-02-27	2025-02-26
WTXE1104 A1001	MXG Vector Signal Generator	Agilent	N5182A	MY47420108	2024-02-24	2025-02-23
WTXE1104 A1002	DC Power Supply	Agilent	E3634A	MY40009294	2024-02-24	2025-02-23
WTXE1104 A1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2024-02-24	2025-02-23
WTXE1104 A1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2024-02-24	2025-02-23
WTXE1104 A1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0658	2024-03-23	2025-03-22
WTXE1103 A1003	Attenuator	Pasternack	PE4007-4	/	2024-02-24	2025-02-23
WTXE1003 A1-005	Coaxial Cable	/	0M4RFC	/	2024-07-03	2025-01-03
					2025-01-03	2025-07-02
☐ Chamber A: Below 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-02-24	2025-02-23
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1007 A1001	Amplifier	HP	8447F	2805A03475	2024-02-24	2025-02-23
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
WTXE1010 A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2024-02-24	2025-02-23
WTXE1104 A1032-1	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
WTXE1104 A1032-2	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
WTXE1104 A1032-3	Coaxial Cable	/	RC_6G-N-M	/	2024-03-15	2025-03-14
☐ Chamber A: Above 1GHz						
WTXE1005	Spectrum	Rohde &	FSP30	836079/03	2024-02-24	2025-02-23

A1003	Analyzer	Schwarz		5		
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1065 A1001	Amplifier	C&D	PAP-1G18	2002	2024-02-27	2025-02-26
WTXE1010 A1005	Horn Antenna	ETS	3117	00086197	2024-02-26	2025-02-25
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
WTXE1004 A1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2024-02-27	2025-02-26
WTXE1104 A1033-1	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
WTXE1104 A1033-2	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
WTXE1104 A1033-3	Coaxial Cable	/	C16-07-07	/	2024-03-15	2025-03-14
☐ Chamber B:Below 1GHz						
WTXE1010 A1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
WTXE1038 A1001	Amplifier	Agilent	8447D	2944A104 57	2024-02-24	2025-02-23
WTXE1001 A1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2024-02-24	2025-02-23
WTXE1104 A1031-1	Coaxial Cable	/	1.5MRFC-LWB 3	/	2024-07-03	2025-07-02
WTXE1104 A1031-2	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
WTXE1104 A1031-3	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
☒ Chamber C:Below 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
WTXE1010 A1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17
WTXE1007 A1002	Amplifier	HP	8447F	2944A038 69	2024-02-24	2025-02-23
WTXE1010	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25

A1007						
WTXE1104 A1034-1	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
WTXE1104 A1034-2	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
WTXE1104 A1034-3	Coaxial Cable	/	RC_6G-N-M	/	2024-07-03	2025-07-02
☒ Chamber C: Above 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
WTXE1103 A1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
WTXE1103 A1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2024-02-27	2025-02-26
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
WTXE1104 A1035-1	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
WTXE1104 A1035-2	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
WTXE1104 A1035-3	Coaxial Cable	/	RC-18G-N-M	/	2024-07-03	2025-07-02
☐ Conducted Room 1#						
WTXE1104 A1029	EMI Test Receiver	Rohde & Schwarz	ESCI	100525	2024-12-08	2025-12-07
WTXE1002 A1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2024-02-24	2025-02-23
WTXE1003 A1001	AC LISN	Schwarz beck	NSLK8126	8126-279	2024-02-24	2025-02-23
WTXE1104 A1036	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02
WTXE1104 A1038	Coaxial Cable	/	6MRFC-DP	/	2024-07-03	2025-07-02
☒ Conducted Room 2#						
WTXE1001 A1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2024-02-24	2025-02-23
WTXE1003 A1003	LISN	Rohde & Schwarz	ENV 216	100097	2024-02-24	2025-02-23
WTXE1104 A1037	Coaxial Cable	/	RG 316	/	2024-07-03	2025-07-02

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041 A1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2025-02-23	2026-02-22
WTXE1022 A1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2025-02-23	2026-02-22
WTXE1104 A1001	MXG Vector Signal Generator	Agilent	N5182A	MY47420108	2025-02-23	2026-02-22
WTXE1104 A1002	DC Power Supply	Agilent	E3634A	MY40009294	2025-02-23	2026-02-22
WTXE1104 A1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2025-02-23	2026-02-22
WTXE1104 A1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2025-02-23	2026-02-22
WTXE1104 A1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0658	2025-02-23	2026-02-22
WTXE1103 A1003	Attenuator	Pasternack	PE4007-4	/	2025-02-23	2026-02-22
WTXE1003 A1-005	Coaxial Cable	/	0M4RFC	/	2025-02-23	2026-02-22
☐ Chamber A: Below 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2025-02-23	2026-02-22
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2025-02-23	2026-02-22
WTXE1007 A1001	Amplifier	HP	8447F	2805A03475	2025-02-23	2026-02-22
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2026-02-25
WTXE1010 A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2025-02-23	2026-02-22
WTXE1104 A1032-1	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22
WTXE1104 A1032-2	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22
WTXE1104 A1032-3	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22
☐ Chamber A: Above 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2025-02-23	2026-02-22
WTXE1001	EMI Test	Rohde &	ESPI	101611	2025-02-23	2026-02-22

A1001	Receiver	Schwarz				
WTXE1065 A1001	Amplifier	C&D	PAP-1G18	2002	2025-02-23	2026-02-22
WTXE1010 A1005	Horn Antenna	ETS	3117	00086197	2025-02-23	2026-02-22
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2026-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2025-02-23	2026-02-22
WTXE1004 A1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2025-02-23	2026-02-22
WTXE1104 A1033-1	Coaxial Cable	/	C16-07-07	/	2025-02-23	2026-02-22
WTXE1104 A1033-2	Coaxial Cable	/	C16-07-07	/	2025-02-23	2026-02-22
WTXE1104 A1033-3	Coaxial Cable	/	C16-07-07	/	2025-02-23	2026-02-22
☐ Chamber B:Below 1GHz						
WTXE1010 A1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
WTXE1038 A1001	Amplifier	Agilent	8447D	2944A104 57	2025-02-23	2026-02-22
WTXE1001 A1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2025-02-23	2026-02-22
WTXE1104 A1031-1	Coaxial Cable	/	1.5MRFC-LWB 3	/	2025-02-23	2026-02-22
WTXE1104 A1031-2	Coaxial Cable	/	RG 316	/	2025-02-23	2026-02-22
WTXE1104 A1031-3	Coaxial Cable	/	RG 316	/	2025-02-23	2026-02-22
☒ Chamber C:Below 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2025-02-23	2026-02-22
WTXE1010 A1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17
WTXE1007 A1002	Amplifier	HP	8447F	2944A038 69	2025-02-23	2026-02-22
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2026-02-25
WTXE1104	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22

A1034-1						
WTXE1104 A1034-2	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22
WTXE1104 A1034-3	Coaxial Cable	/	RC_6G-N-M	/	2025-02-23	2026-02-22
☒ Chamber C: Above 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2025-02-23	2026-02-22
WTXE1103 A1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
WTXE1103 A1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2025-02-23	2026-02-22
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2026-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2025-02-23	2026-02-22
WTXE1104 A1035-1	Coaxial Cable	/	RC-18G-N-M	/	2025-02-23	2026-02-22
WTXE1104 A1035-2	Coaxial Cable	/	RC-18G-N-M	/	2025-02-23	2026-02-22
WTXE1104 A1035-3	Coaxial Cable	/	RC-18G-N-M	/	2025-02-23	2026-02-22
☐ Conducted Room 1#						
WTXE1104 A1029	EMI Test Receiver	Rohde & Schwarz	ESCI	100525	2024-12-08	2025-12-07
WTXE1002 A1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2025-02-23	2026-02-22
WTXE1003 A1001	AC LISN	Schwarz beck	NSLK8126	8126-279	2025-02-23	2026-02-22
WTXE1104 A1036	Coaxial Cable	/	RG 316	/	2025-02-23	2026-02-22
WTXE1104 A1038	Coaxial Cable	/	6MRFC-DP	/	2025-02-23	2026-02-22
☒ Conducted Room 2#						
WTXE1001 A1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2025-02-23	2026-02-22
WTXE1003 A1003	LISN	Rohde & Schwarz	ENV 216	100097	2025-02-23	2026-02-22
WTXE1104 A1037	Coaxial Cable	/	RG 316	/	2025-02-23	2026-02-22

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission A)	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission B)	Farad	EZ-EMC	RA-03A1 (1.1.4.2)
EMI Test Software (Radiated Emission C)	Farad	EZ-EMC	RA-03A1-2 (1.1.4.2)

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§22.913(a), §24.232(c)	RF Output Power	Compliant
§24.51	Peak-to-average Ratio (PAR) of Transmitter	Compliant
§22.917(b), §24.238(b)	Emission Bandwidth	Compliant
§22.917(a), §24.238(a)	Spurious Emissions at Antenna Terminal	Compliant
§22.917(a), §24.238(a)	Spurious Radiation Emissions	Compliant
§22.917(a), §24.238(a)	Out of Band Emissions	Compliant
§22.355, §24.235	Frequency Stability	Compliant
§2.1047	Modulation characteristics	Compliant

N/A: Not applicable.

3. RF Output Power

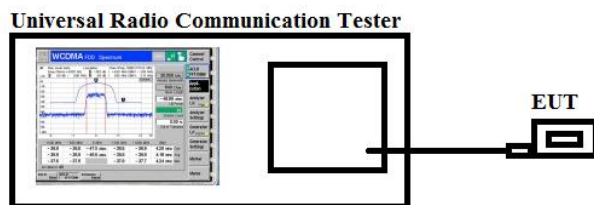
3.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

3.3 Summary of Test Results/Plots

Note: The test was conducted using the radiation method, and the data was only showed the maximum polar: Horizontal

➤ **Max. Radiated Power**

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	128	V	28.18	<38.45	Pass
		H	19.64		
	190	V	28.56		
		H	20.36		
	251	V	28.34		
		H	21.41		
GPRS850	128	V	28.12	<38.45	Pass
		H	20.10		
	190	V	27.86		
		H	21.96		
	251	V	26.92		
		H	21.25		
EGPRS850	128	V	24.46	<38.45	Pass
		H	18.84		
	190	V	23.62		
		H	19.38		
	251	V	24.58		
		H	19.79		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	27.76	<33.00	Pass
		H	23.41		
	661	V	28.13		
		H	23.60		
	810	V	28.79		
		H	22.81		
GPRS1900	512	V	29.11	<33.00	Pass
		H	23.67		
	661	V	28.06		
		H	23.44		
	810	V	26.89		
		H	21.79		
EGPRS1900	512	V	21.99	<33.00	Pass
		H	17.67		
	661	V	22.52		
		H	17.01		
	810	V	23.14		
		H	16.18		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	19.31	<38.45	Pass
		H	15.40		
	4183	V	19.15		
		H	15.18		
	4233	V	19.47		
		H	13.79		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	20.73	<33.00	Pass
		H	15.46		
	9400	V	20.61		
		H	14.51		
	9538	V	19.97		
		H	15.57		

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

➤ **Max. Conducted Power (Average power)**

Please refer to Appendix A

4. Peak-to-average Ratio (PAR) of Transmitter

4.1 Standard Applicable

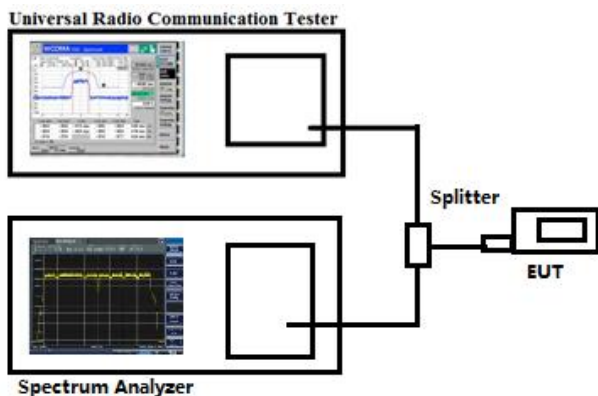
According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

4.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled.
2. Frequency = carrier center frequency.
3. Measurement BW > Emission bandwidth of signal.
4. The signal analyzer was set to collect one million samples to generate the CCDF curve.
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

Test Configuration for the emission bandwidth testing:



4.3 Summary of Test Results

Please refer to Appendix B.

5. Emission Bandwidth

5.1 Standard Applicable

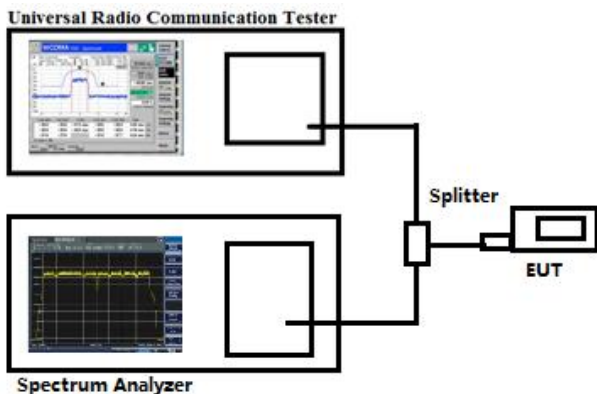
According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Summary of Test Results/Plots

Please refer to Appendix C

6. Out of Band Emissions at Antenna Terminal

6.1 Standard Applicable

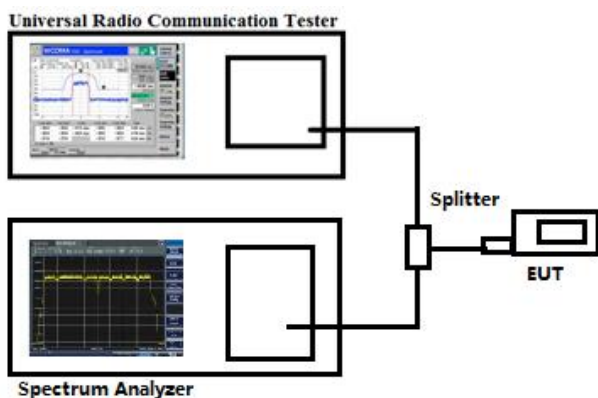
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



6.3 Summary of Test Results/Plots

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

Please refer to Appendix D

7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

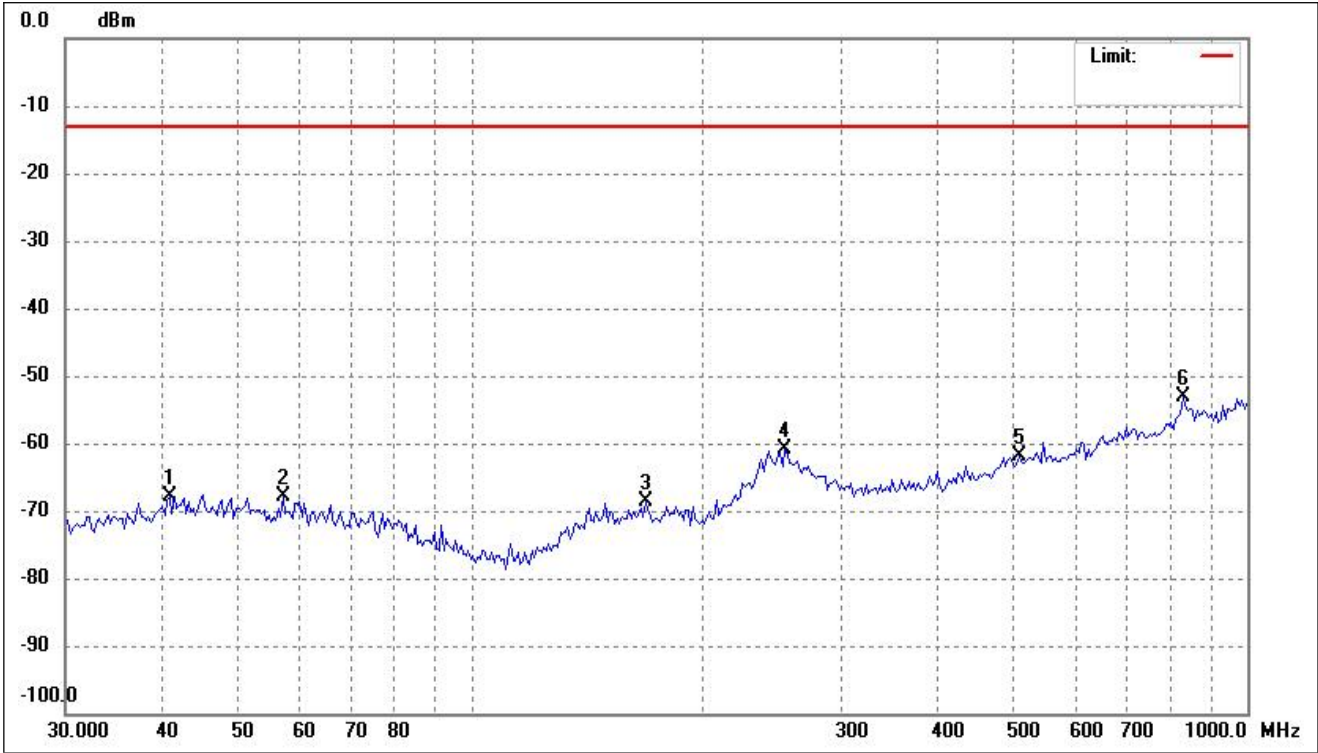
Spurious attenuation limit in dB $= 43 + 10 \log_{10}(\text{power out in Watts})$

7.3 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

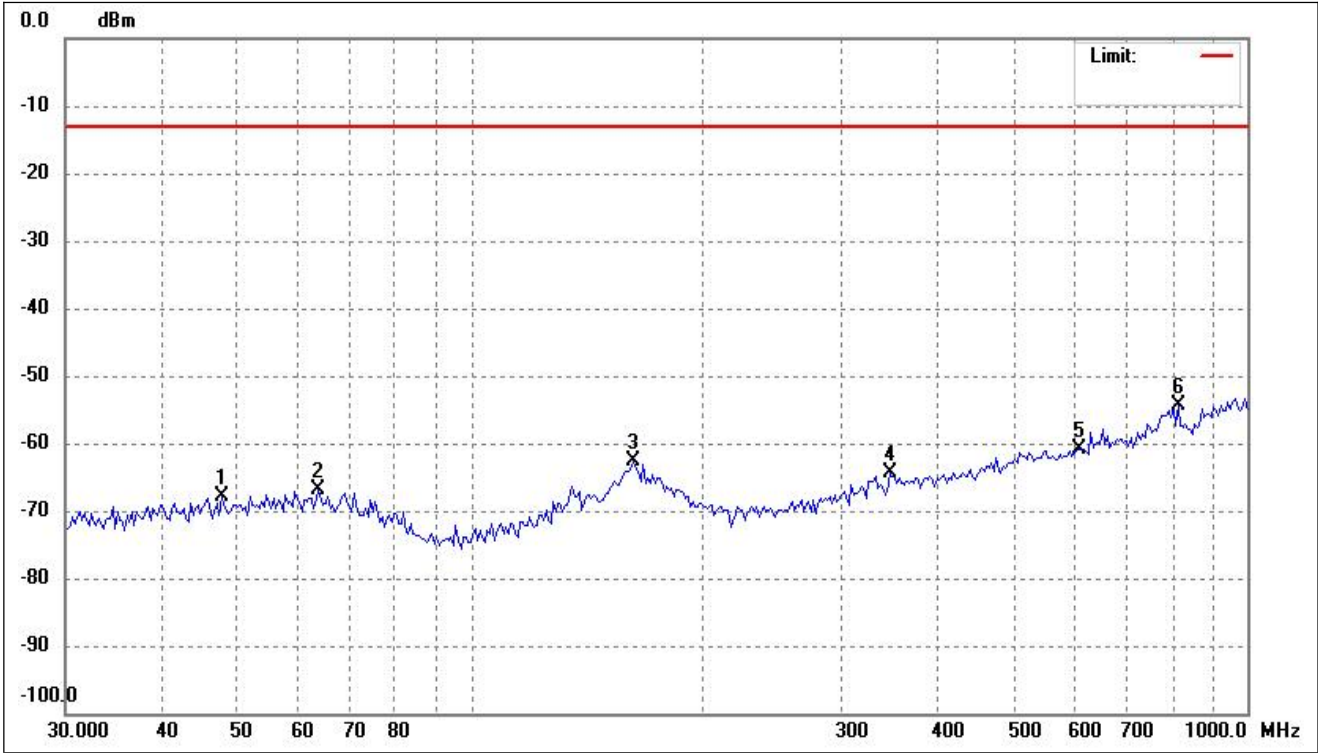
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



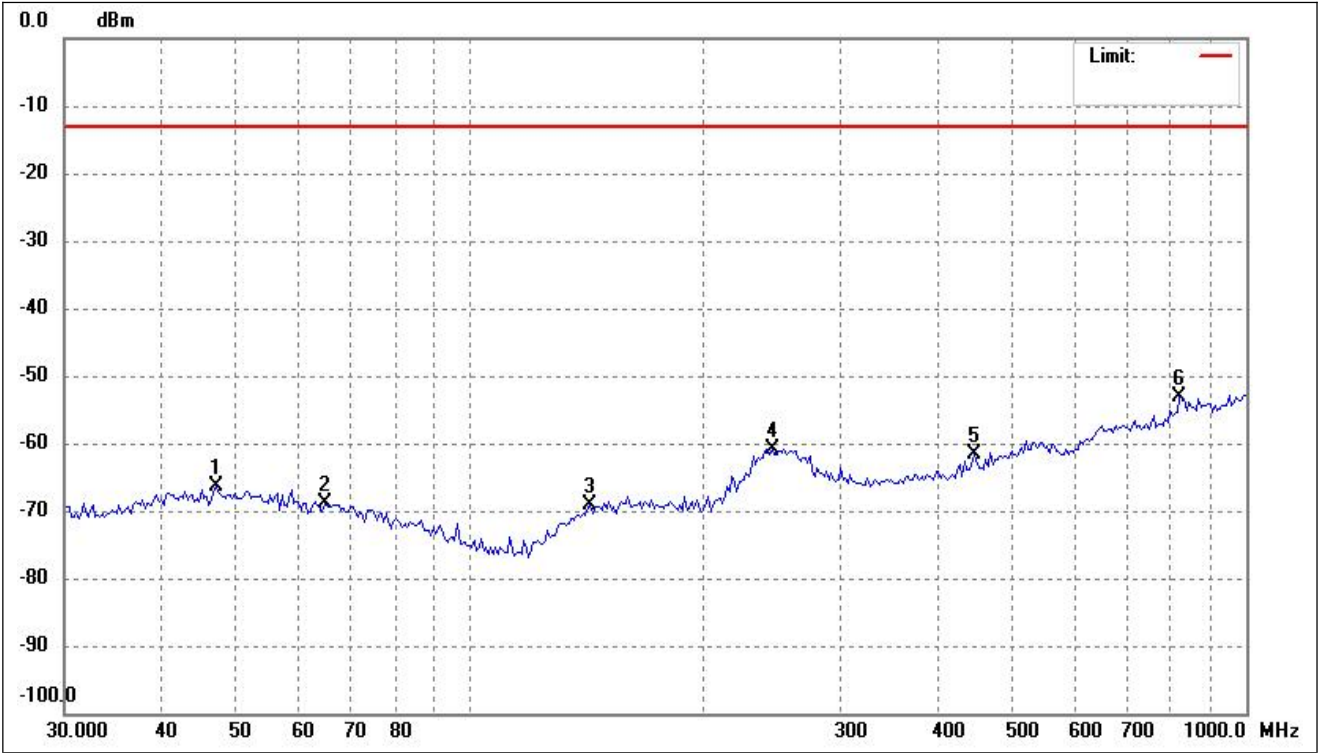
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.8699	-70.40	2.63	-67.77	-13.00	-54.77	-	-	peak
2	57.2654	-70.57	2.62	-67.95	-13.00	-54.95	-	-	peak
3	167.8136	-69.62	0.98	-68.64	-13.00	-55.64	-	-	peak
4	254.0312	-69.04	8.21	-60.83	-13.00	-47.83	-	-	peak
5	509.3559	-69.31	7.37	-61.94	-13.00	-48.94	-	-	peak
6	827.1795	-66.32	13.24	-53.08	-13.00	-40.08	-	-	peak

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



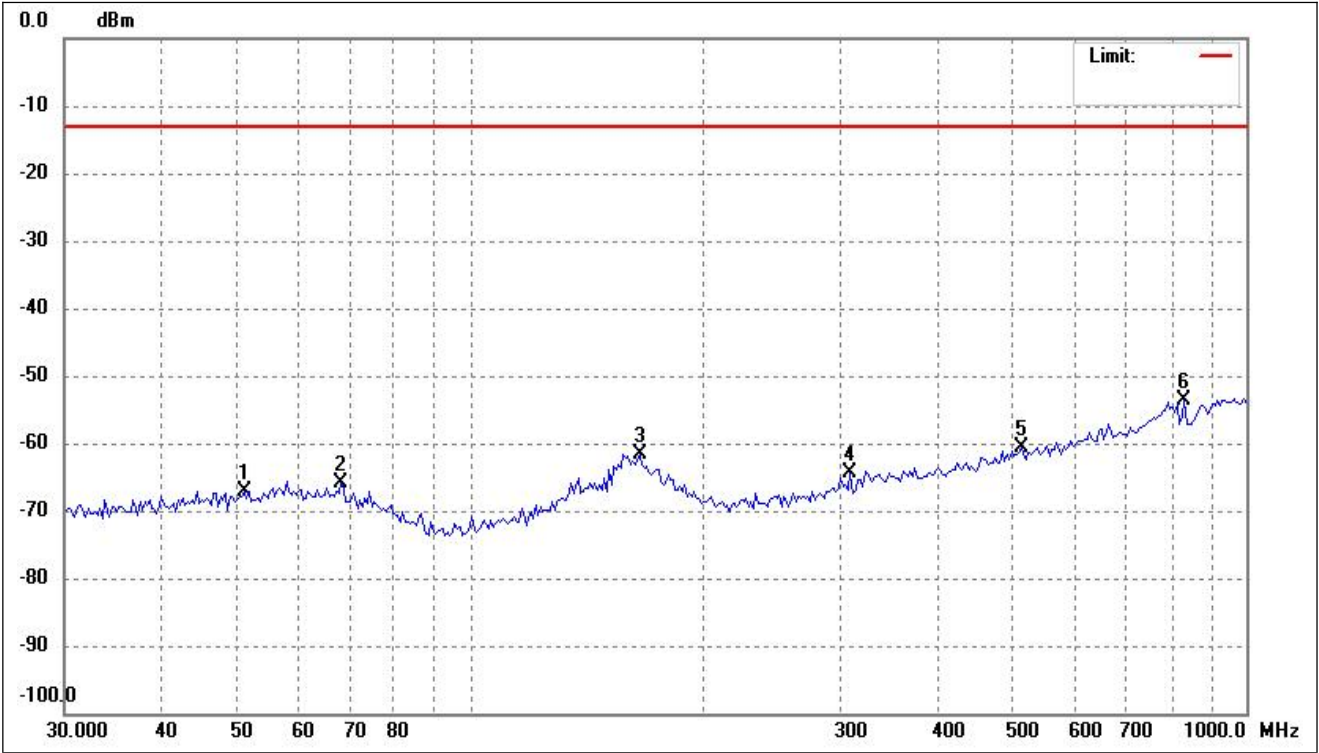
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	47.7028	-71.05	3.28	-67.77	-13.00	-54.77	-	-	peak
2	63.6312	-70.15	3.22	-66.93	-13.00	-53.93	-	-	peak
3	162.0197	-70.12	7.57	-62.55	-13.00	-49.55	-	-	peak
4	346.0740	-68.51	4.26	-64.25	-13.00	-51.25	-	-	peak
5	607.1806	-69.67	8.92	-60.75	-13.00	-47.75	-	-	peak
6	815.6353	-66.30	11.83	-54.47	-13.00	-41.47	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	47.0371	-69.71	3.22	-66.49	-13.00	-53.49	-	-	peak
2	64.9869	-70.48	1.68	-68.80	-13.00	-55.80	-	-	peak
3	142.7692	-69.24	0.01	-69.23	-13.00	-56.23	-	-	peak
4	245.2606	-68.52	7.74	-60.78	-13.00	-47.78	-	-	peak
5	445.6932	-67.43	5.85	-61.58	-13.00	-48.58	-	-	peak
6	821.3871	-66.01	12.97	-53.04	-13.00	-40.04	-	-	peak

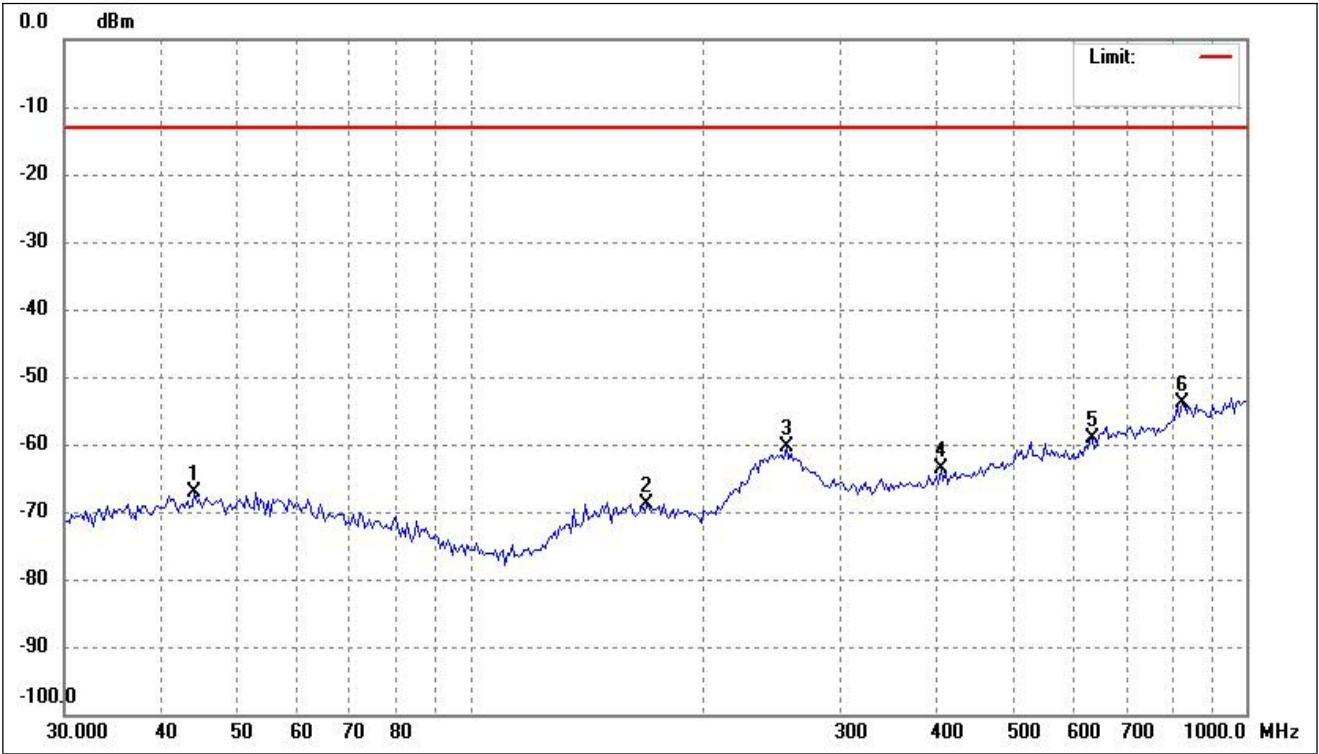
For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	51.1756	-70.50	3.48	-67.02	-13.00	-54.02	-	-	peak
2	68.2636	-69.07	3.13	-65.94	-13.00	-52.94	-	-	peak
3	165.4716	-68.55	6.96	-61.59	-13.00	-48.59	-	-	peak
4	309.2710	-67.76	3.50	-64.26	-13.00	-51.26	-	-	peak
5	512.9478	-68.09	7.38	-60.71	-13.00	-47.71	-	-	peak
6	833.0127	-64.84	11.28	-53.56	-13.00	-40.56	-	-	peak

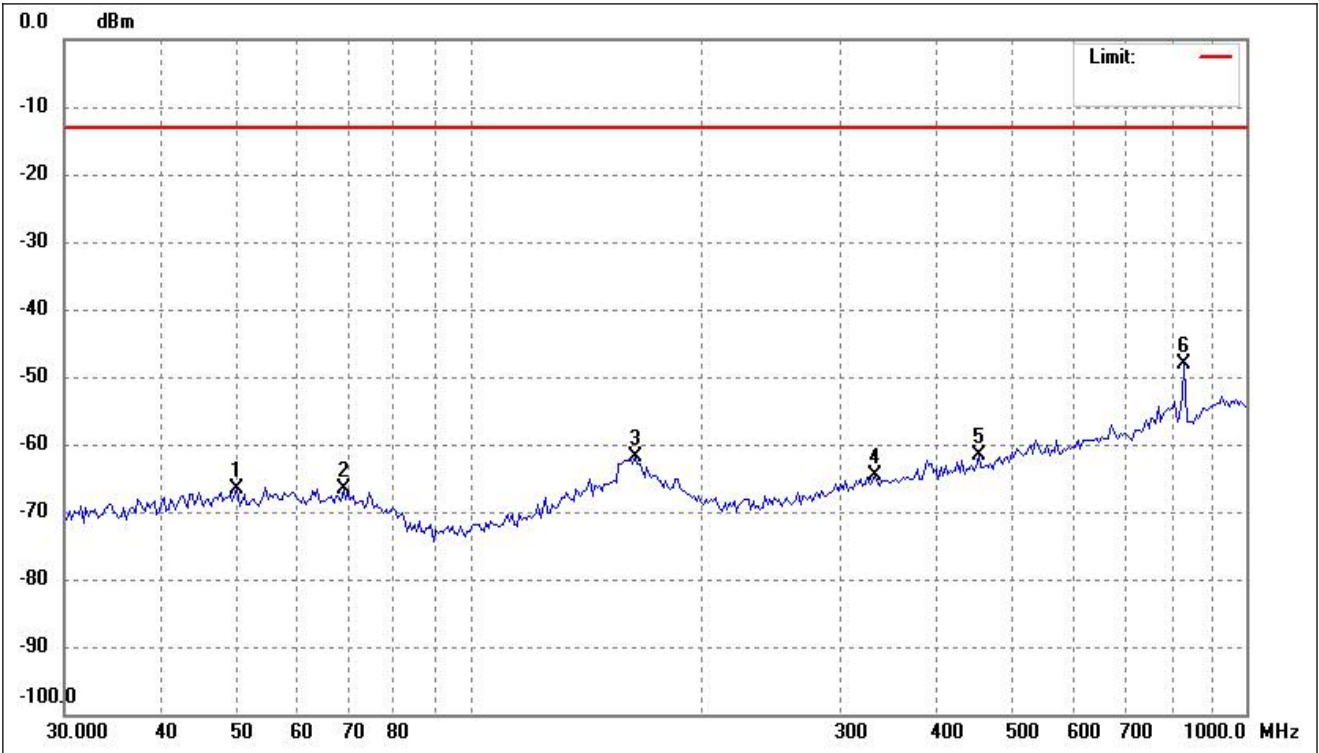
Note: Margin= (Reading+ Correct)- Limit

Test Channel	band 5	Polarity:	Horizontal
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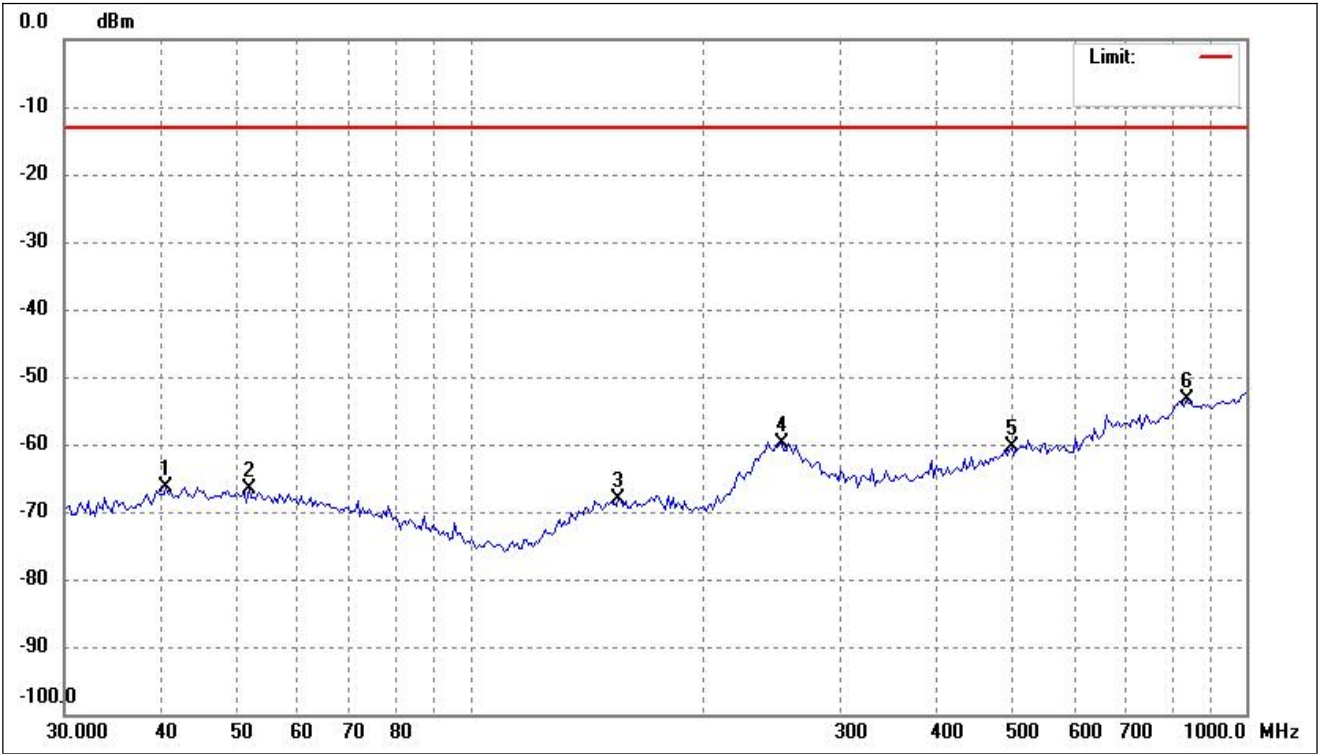
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.1544	-70.15	2.94	-67.21	-13.00	-54.21	-	-	peak
2	168.9970	-69.77	0.98	-68.79	-13.00	-55.79	-	-	peak
3	255.8226	-68.55	8.07	-60.48	-13.00	-47.48	-	-	peak
4	403.9335	-68.43	4.74	-63.69	-13.00	-50.69	-	-	peak
5	633.3285	-68.14	9.12	-59.02	-13.00	-46.02	-	-	peak
6	827.1795	-67.04	13.24	-53.80	-13.00	-40.80	-	-	peak

Test Channel	band 5	Polarity:	Vertical
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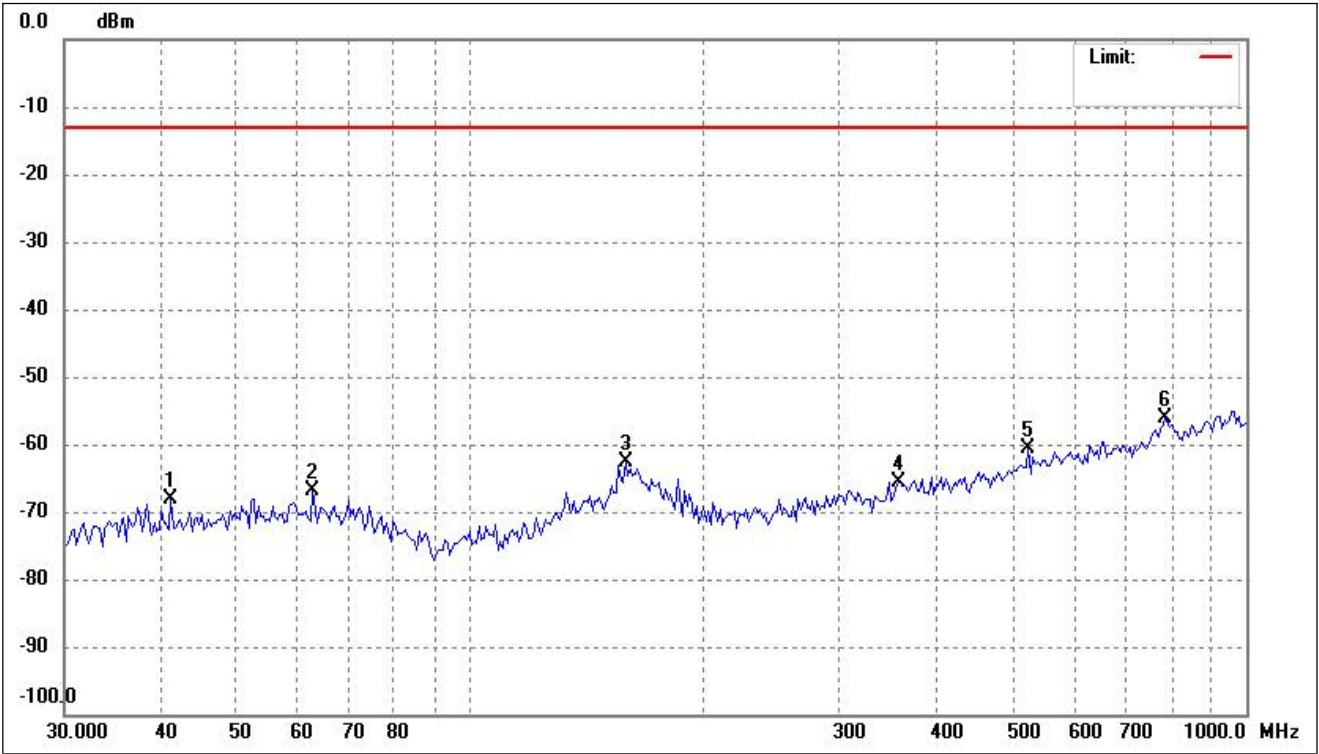
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.1080	-70.12	3.50	-66.62	-13.00	-53.62	-	-	peak
2	68.7450	-69.76	3.12	-66.64	-13.00	-53.64	-	-	peak
3	163.1623	-69.15	7.37	-61.78	-13.00	-48.78	-	-	peak
4	331.7858	-68.56	3.96	-64.60	-13.00	-51.60	-	-	peak
5	452.0013	-67.99	6.31	-61.68	-13.00	-48.68	-	-	peak
6	833.0127	-59.42	11.28	-48.14	-13.00	-35.14	-	-	peak

Test Channel	band 2	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.5837	-69.10	2.61	-66.49	-13.00	-53.49	-	-	peak
2	51.8999	-69.96	3.27	-66.69	-13.00	-53.69	-	-	peak
3	155.3305	-69.05	0.93	-68.12	-13.00	-55.12	-	-	peak
4	252.2523	-68.11	8.36	-59.75	-13.00	-46.75	-	-	peak
5	498.7303	-67.65	7.26	-60.39	-13.00	-47.39	-	-	peak
6	838.8870	-66.89	13.50	-53.39	-13.00	-40.39	-	-	peak

Test Channel	band 2	Polarity:	Vertical
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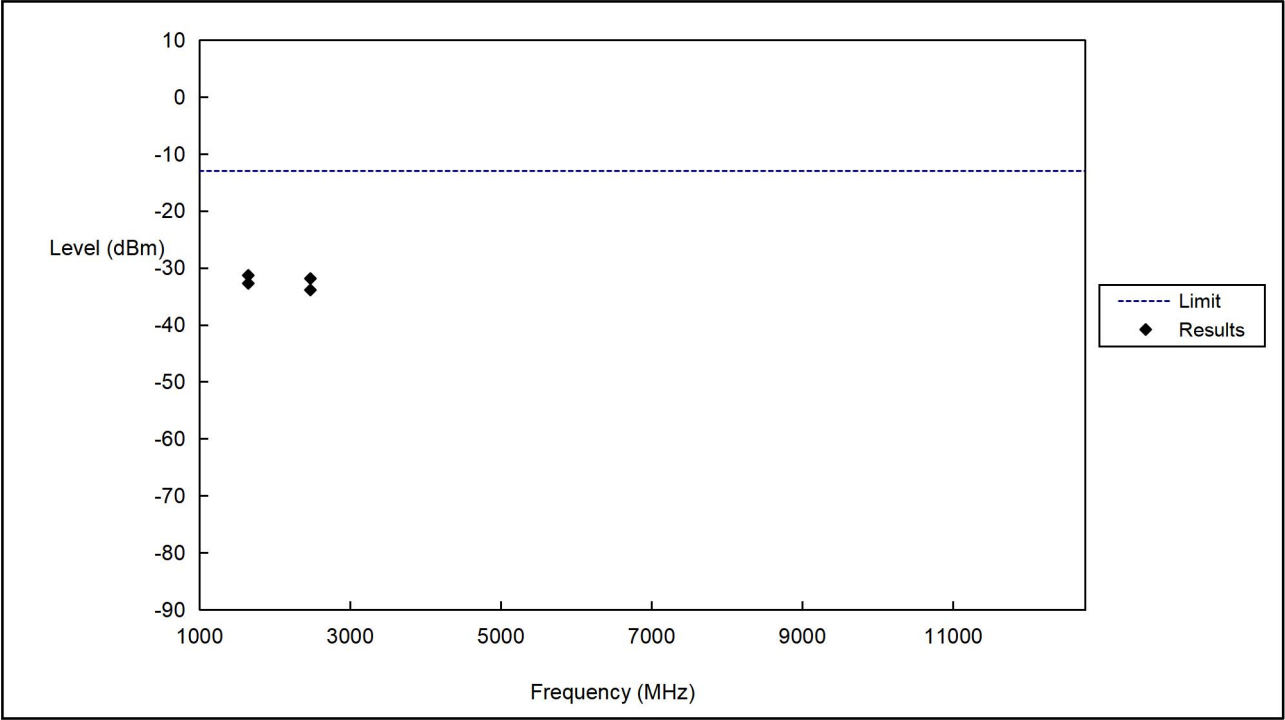
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.1581	-70.72	2.66	-68.06	-13.00	-55.06	-	-	peak
2	62.7432	-70.15	3.24	-66.91	-13.00	-53.91	-	-	peak
3	158.6399	-69.90	7.39	-62.51	-13.00	-49.51	-	-	peak
4	355.9397	-70.04	4.46	-65.58	-13.00	-52.58	-	-	peak
5	523.8763	-68.09	7.57	-60.52	-13.00	-47.52	-	-	peak
6	787.4749	-68.39	12.34	-56.05	-13.00	-43.05	-	-	peak

Note: $Margin = (Reading + Correct) - Limit$

Remark: '-' Means the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

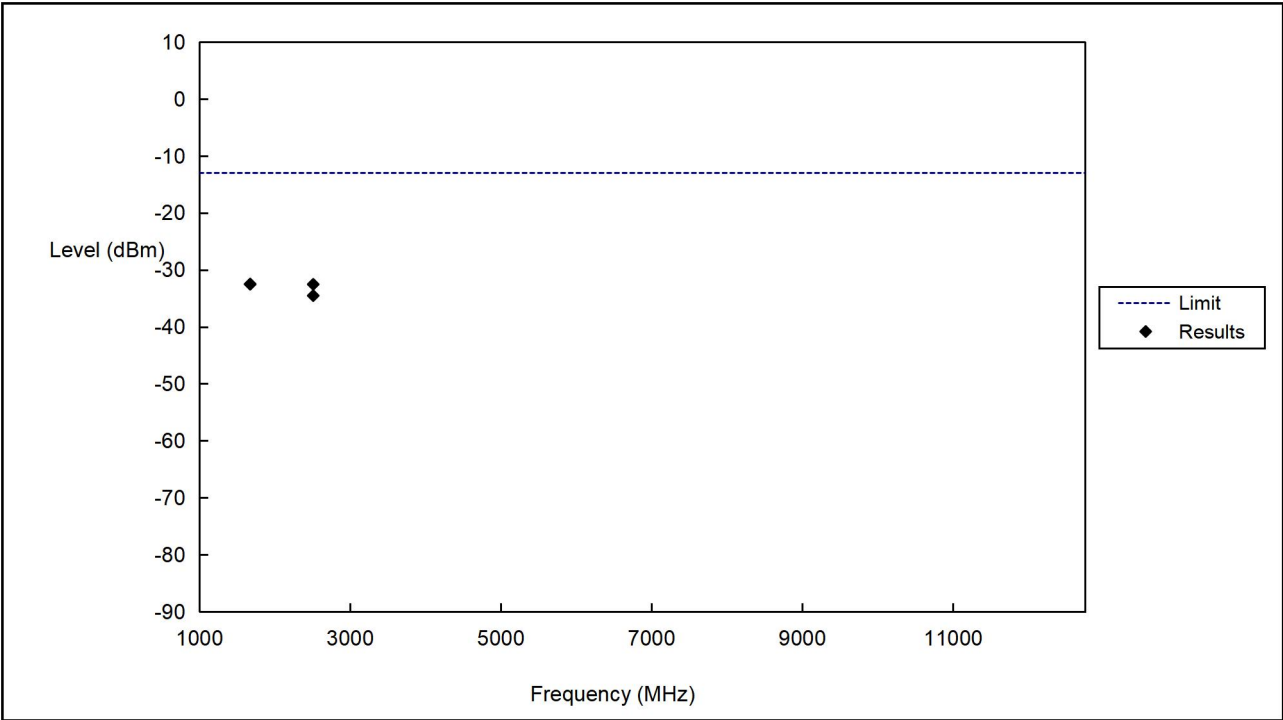
- Spurious Emissions Above 1GHz
- For Cellular Band_GSM850 Mode

Low Channel



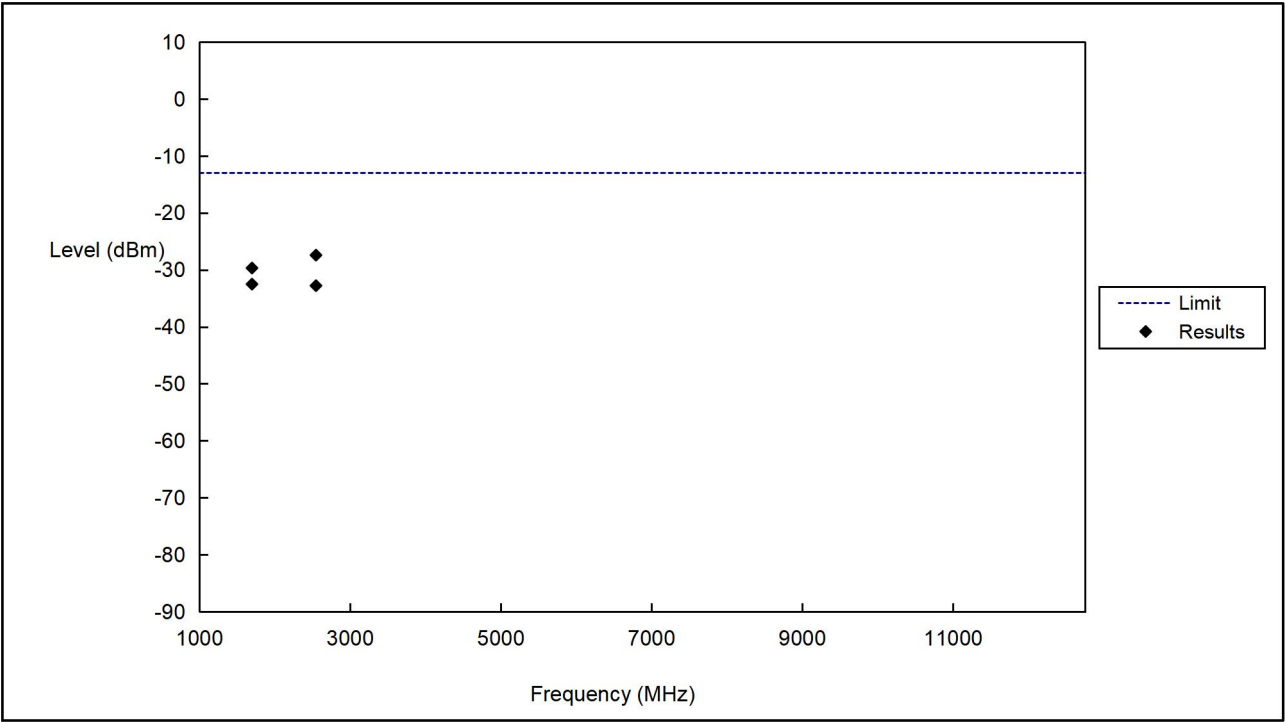
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1648.4	-32.74	-13	-19.74	H	RMS
2	2472.6	-33.90	-13	-20.90	H	RMS
1	1648.4	-31.33	-13	-18.33	V	RMS
2	2472.6	-31.89	-13	-18.89	V	RMS

Middle Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1673.2	-32.52	-13	-19.52	H	RMS
2	2509.8	-32.55	-13	-19.55	H	RMS
1	1673.2	-32.52	-13	-19.52	V	RMS
2	2509.8	-34.54	-13	-21.54	V	RMS

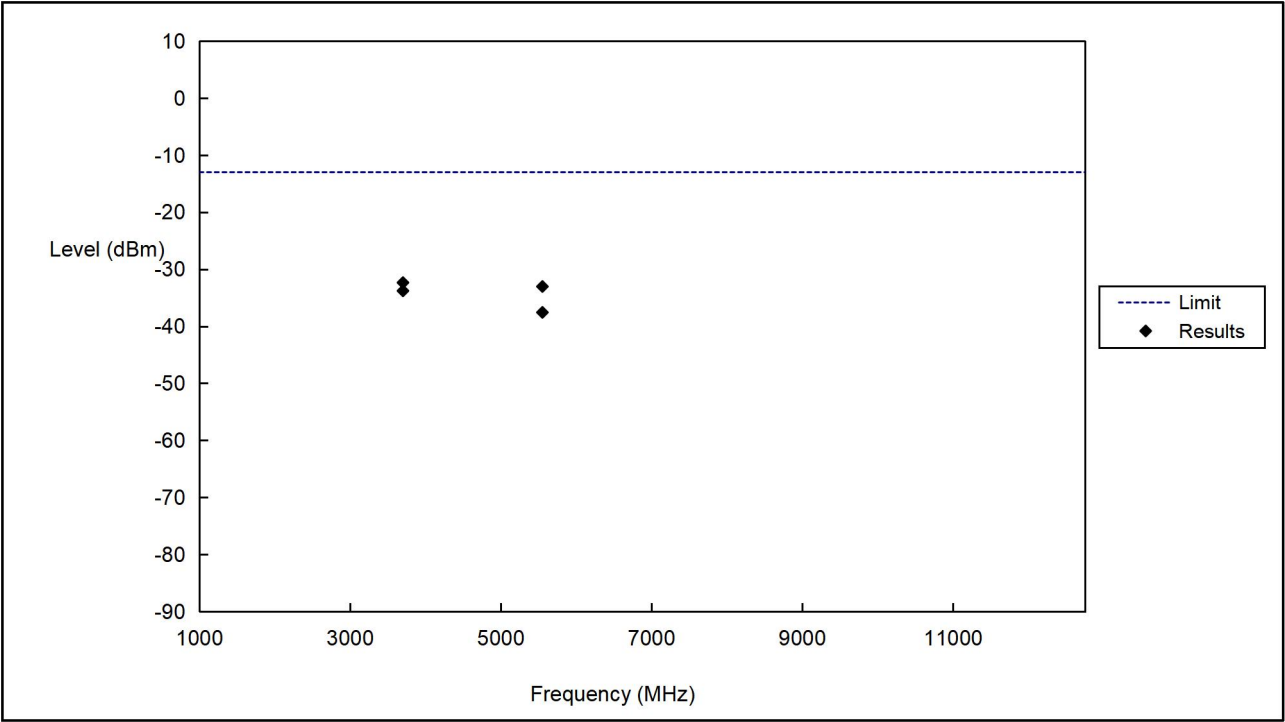
High Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1697.6	-32.52	-13	-19.52	H	RMS
2	2546.4	-32.79	-13	-19.79	H	RMS
1	1697.6	-29.69	-13	-16.69	V	RMS
2	2546.4	-27.43	-13	-14.43	V	RMS

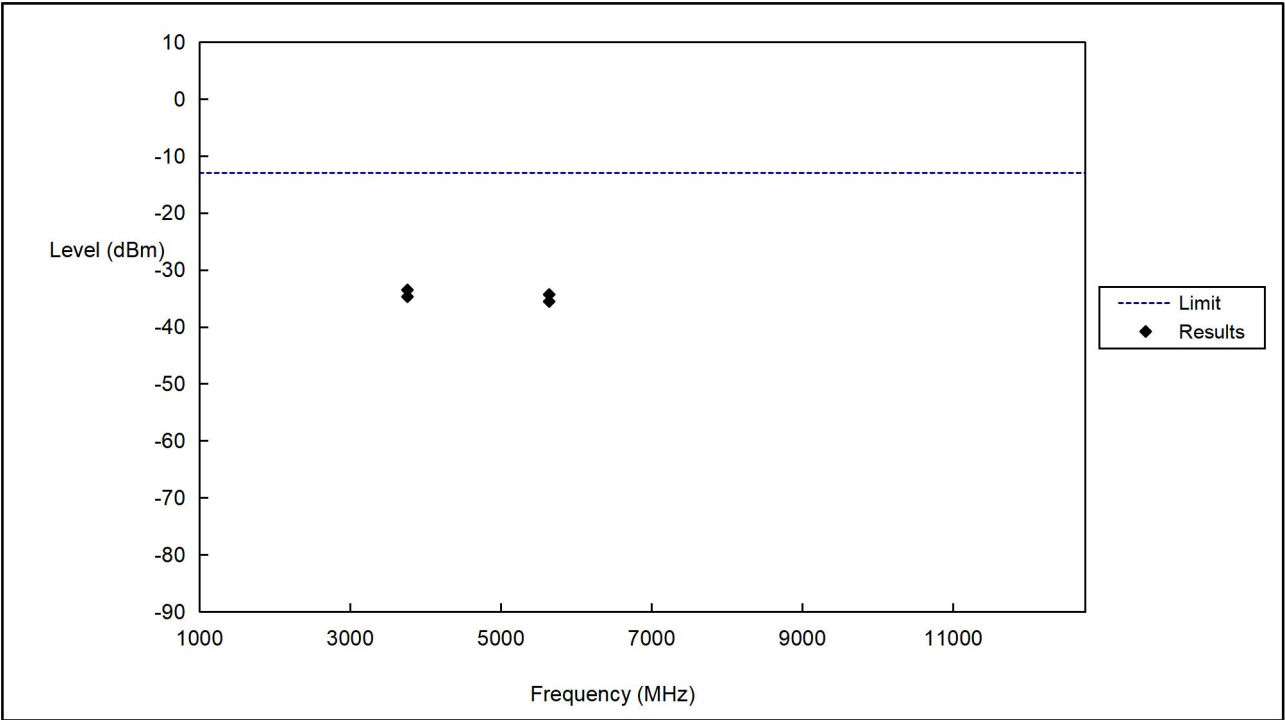
➤ For PCS Band_GSM1900 Mode

Low Channel



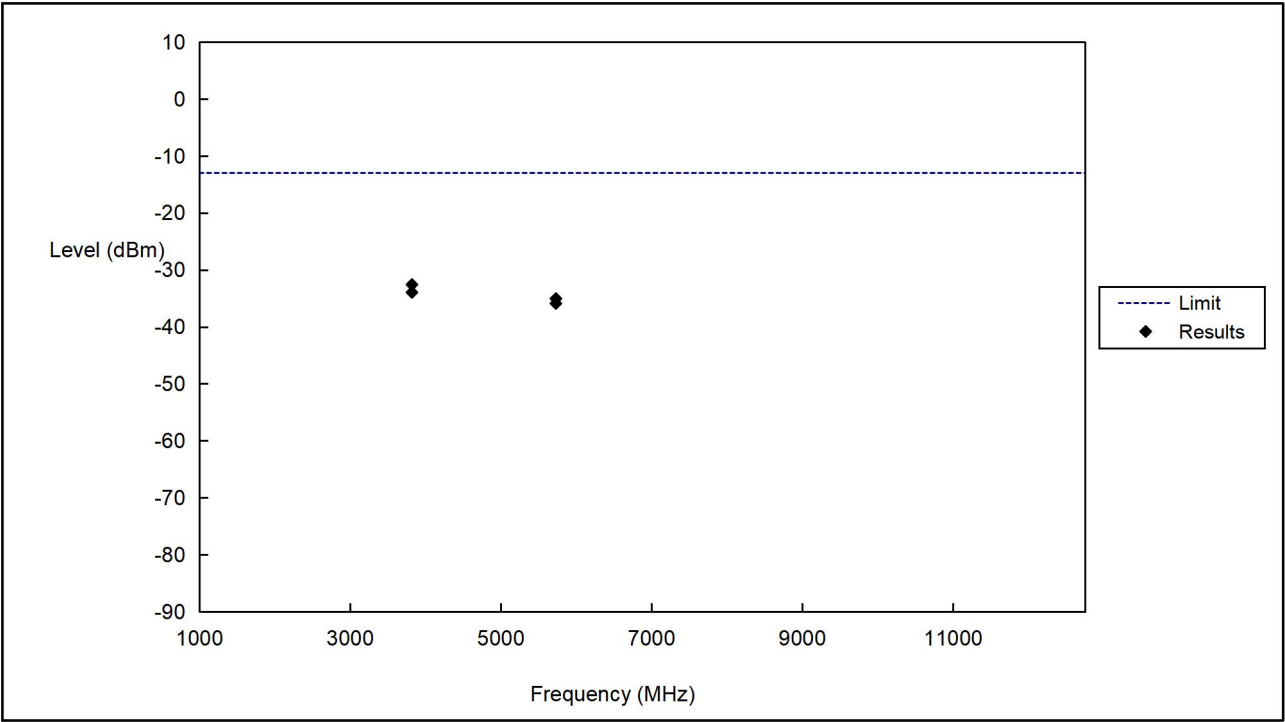
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3700.4	-33.80	-13	-20.80	H	RMS
2	5550.6	-33.04	-13	-20.04	H	RMS
1	3700.4	-32.36	-13	-19.36	V	RMS
2	5550.6	-37.58	-13	-24.58	V	RMS

Middle Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3760.0	-34.73	-13	-21.73	H	RMS
2	5640.0	-34.34	-13	-21.34	H	RMS
1	3760.0	-33.54	-13	-20.54	V	RMS
2	5640.0	-35.57	-13	-22.57	V	RMS

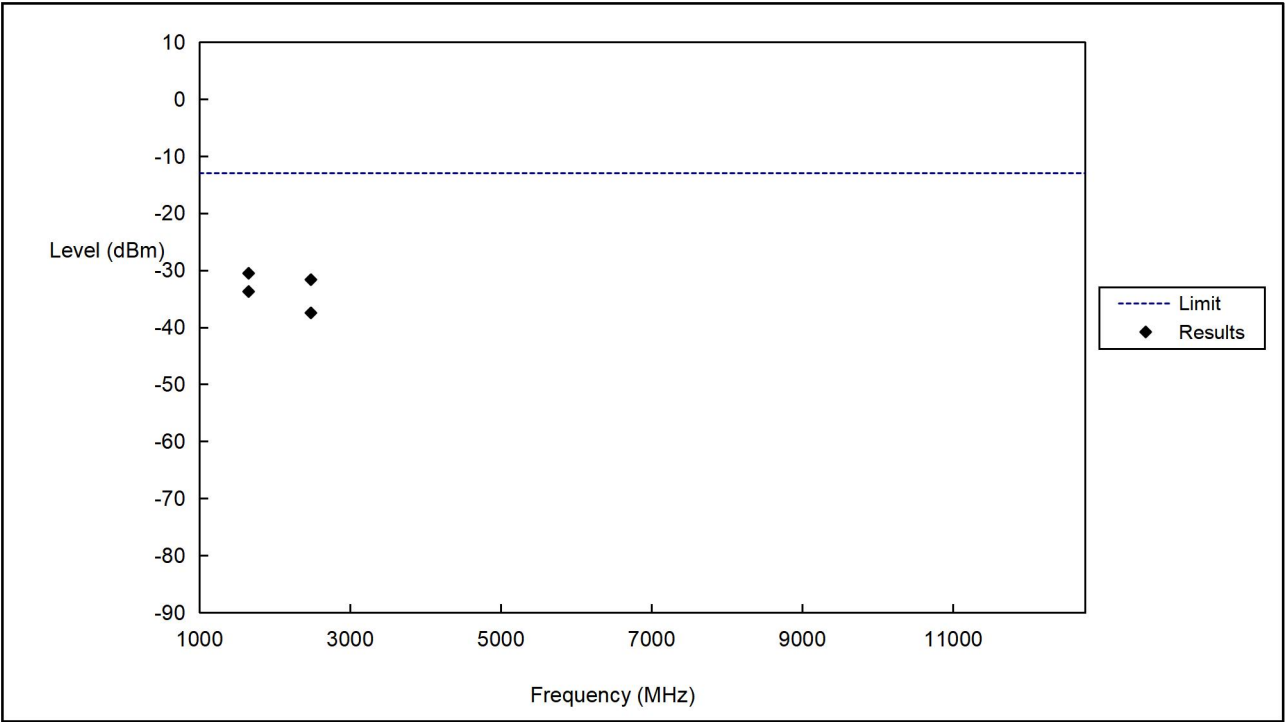
High Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3819.6	-33.97	-13	-20.97	H	RMS
2	5729.4	-35.06	-13	-22.06	H	RMS
1	3819.6	-32.60	-13	-19.60	V	RMS
2	5729.4	-35.91	-13	-22.91	V	RMS

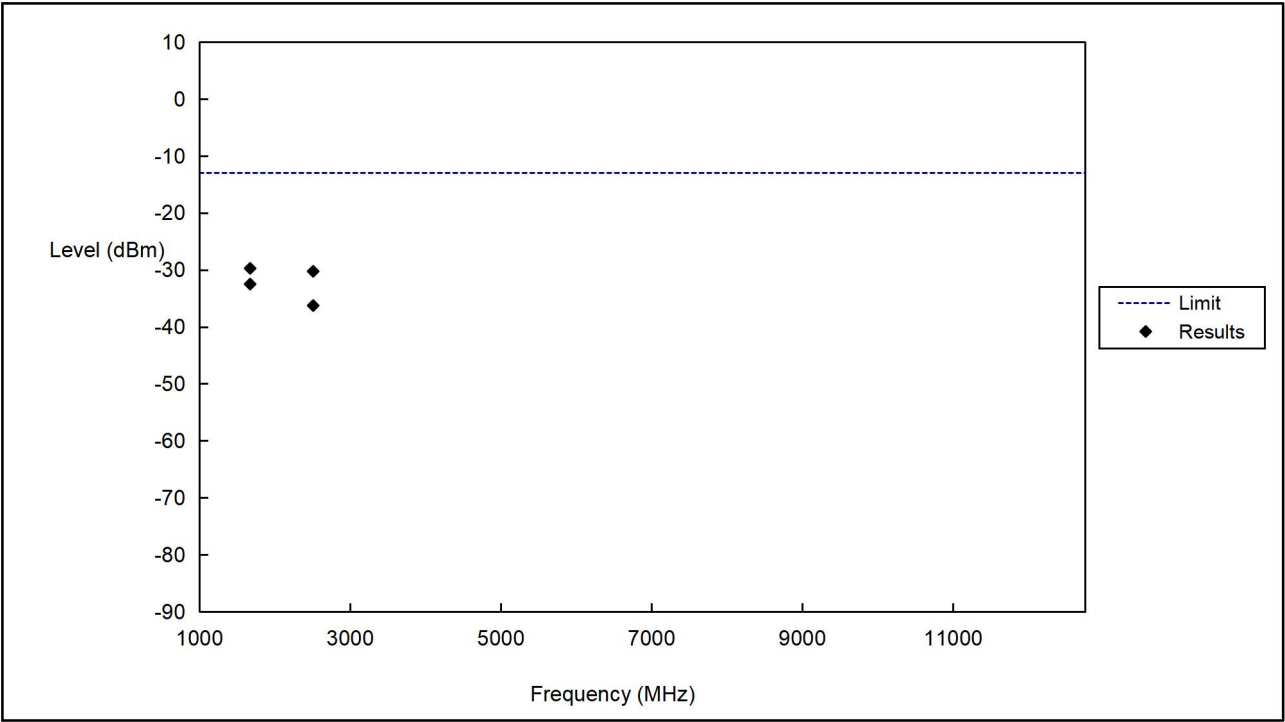
➤ For WCDMA Band V Mode

Low Channel



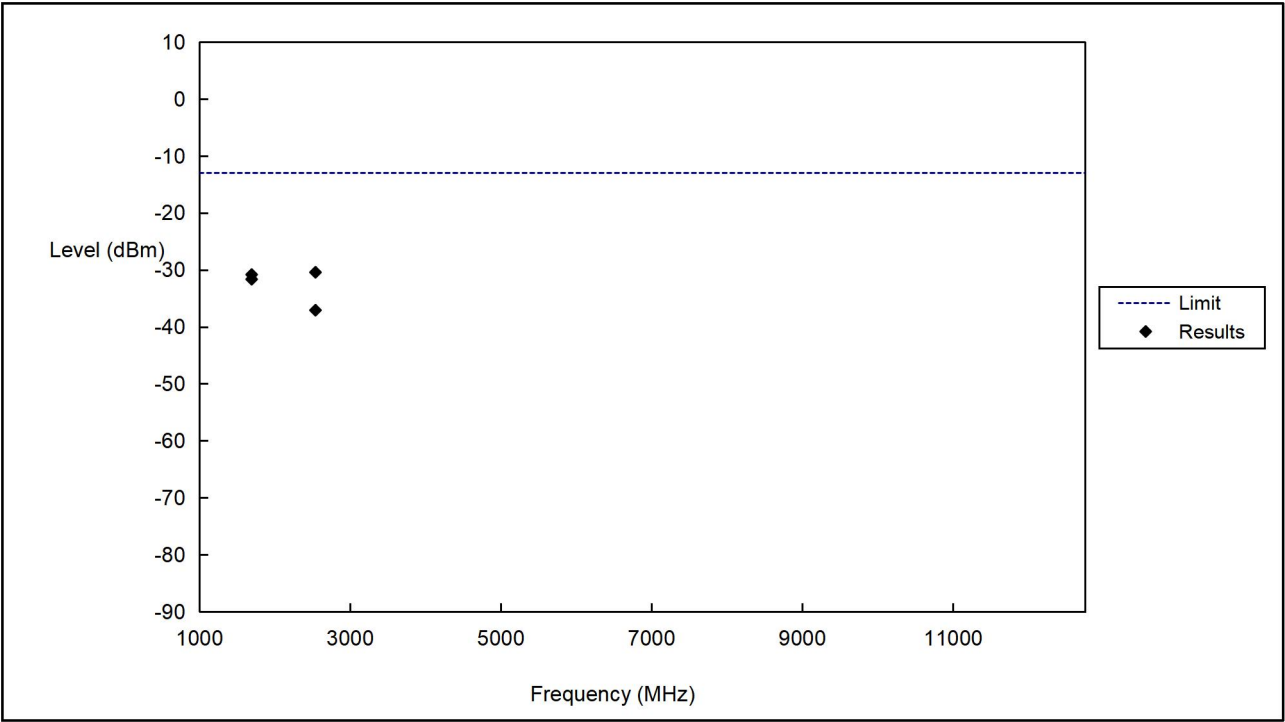
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1652.8	-33.75	-13	-20.75	H	RMS
2	2479.2	-31.67	-13	-18.67	H	RMS
1	1652.8	-30.55	-13	-17.55	V	RMS
2	2479.2	-37.49	-13	-24.49	V	RMS

Middle Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1672.8	-32.51	-13	-19.51	H	RMS
2	2509.2	-30.27	-13	-17.27	H	RMS
1	1672.8	-29.75	-13	-16.75	V	RMS
2	2509.2	-36.28	-13	-23.28	V	RMS

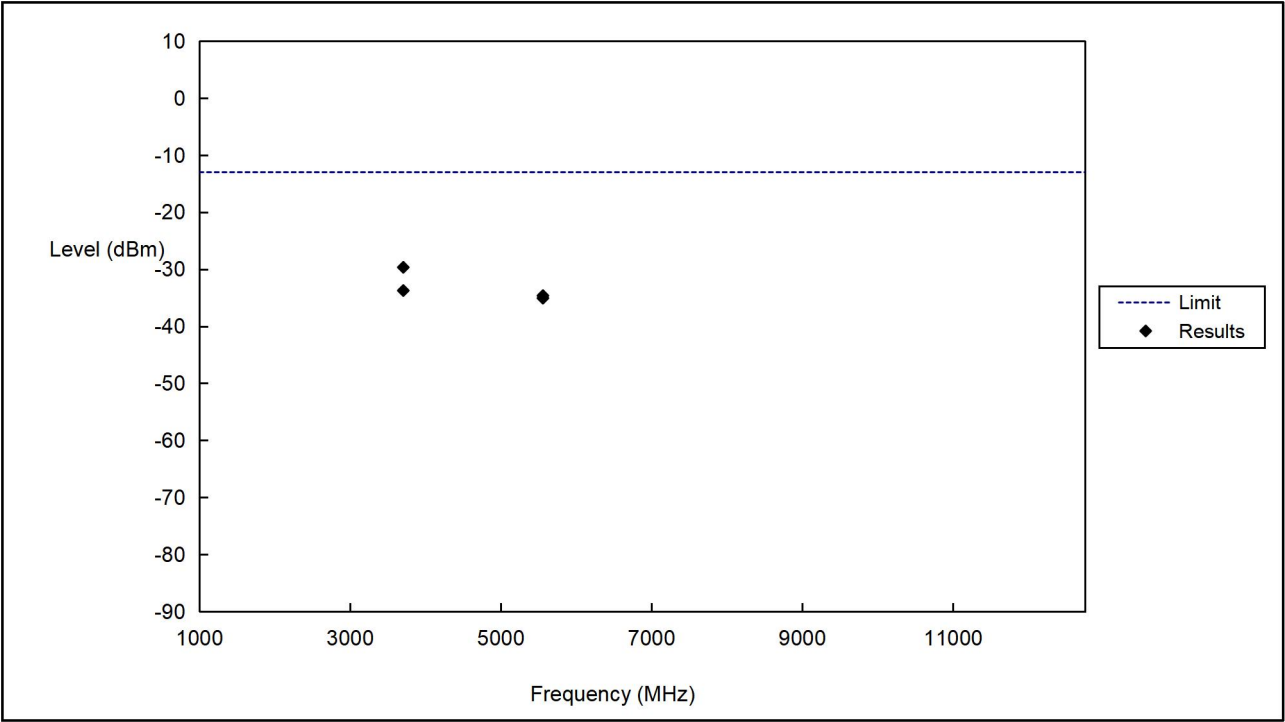
High Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1693.2	-30.84	-13	-17.84	H	RMS
2	2539.8	-30.44	-13	-17.44	H	RMS
1	1693.2	-31.66	-13	-18.66	V	RMS
2	2539.8	-37.10	-13	-24.10	V	RMS

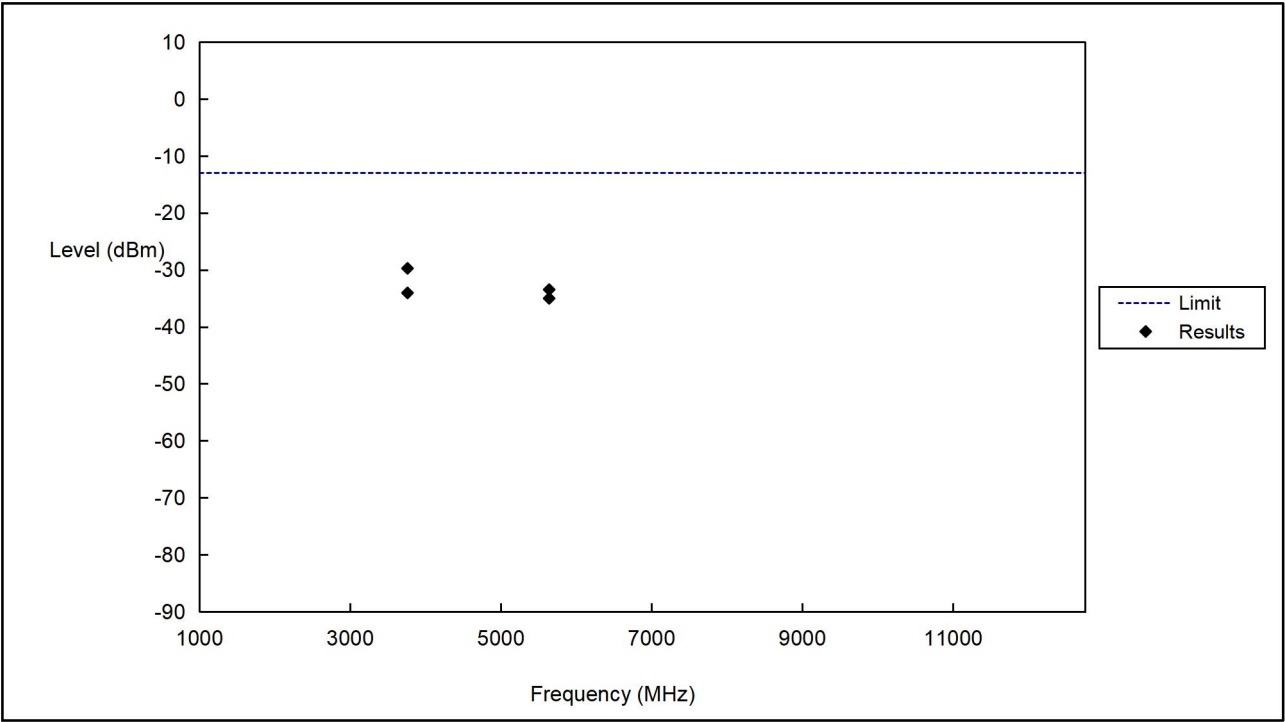
➤ For WCDMA Band II Mode

Low Channel



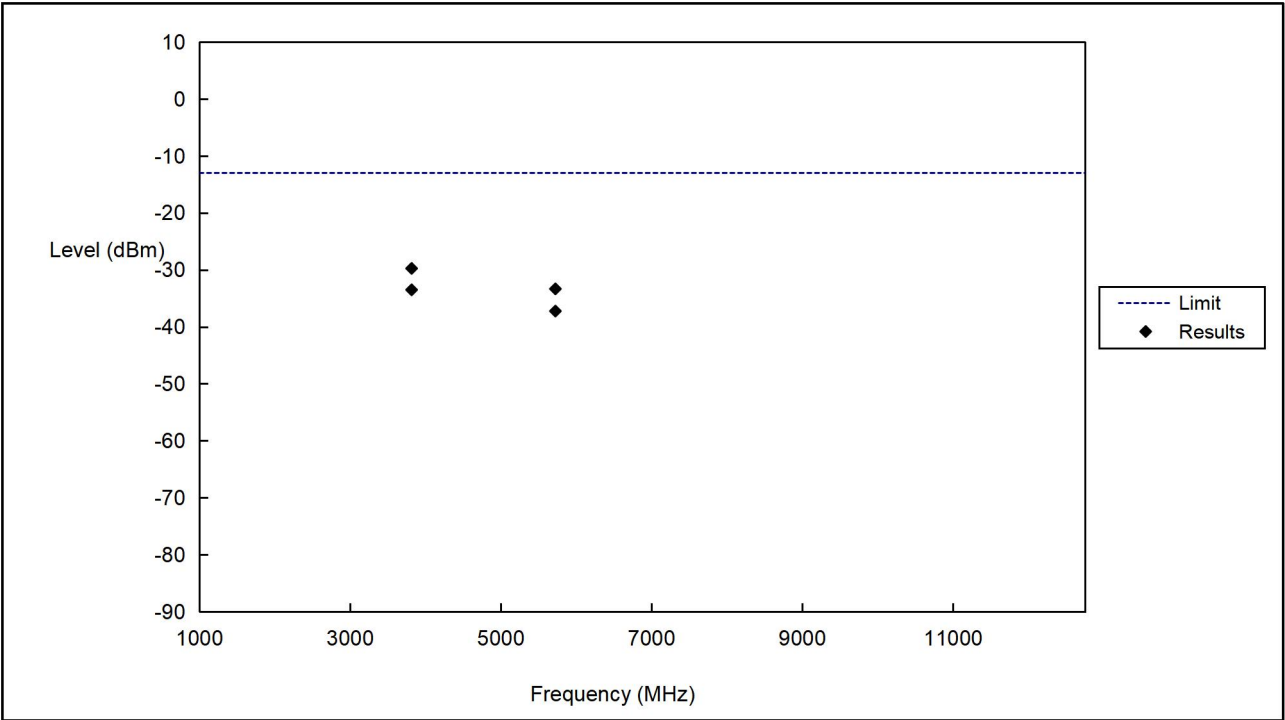
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3704.8	-33.75	-13	-20.75	H	RMS
2	5557.2	-35.09	-13	-22.09	H	RMS
1	3704.8	-29.68	-13	-16.68	V	RMS
2	5557.2	-34.64	-13	-21.64	V	RMS

Middle Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3760.8	-34.06	-13	-21.06	H	RMS
2	5640.0	-35.02	-13	-22.02	H	RMS
1	3760.8	-29.75	-13	-16.75	V	RMS
2	5640.0	-33.48	-13	-20.48	V	RMS

High Channel



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3815.2	-33.52	-13	-20.52	H	RMS
2	5722.8	-37.25	-13	-24.25	H	RMS
1	3815.2	-29.76	-13	-16.76	V	RMS
2	5722.8	-33.35	-13	-20.35	V	RMS

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Conducted Spurious Emission Please refer to Appendix E

8. Frequency Stability

8.1 Standard Applicable

According to §22.355, §24.235 the limit is 2.5ppm.

8.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

8.3 Summary of Test Results/Plots

Please refer to Appendix F

9. Modulation characteristics

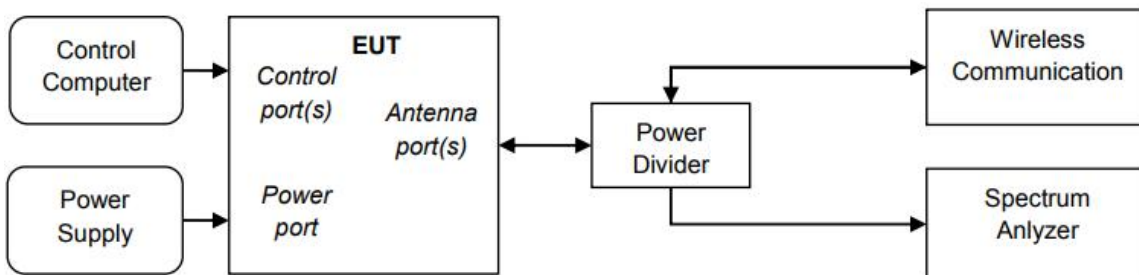
9.1 Standard Applicable

According to §2.1047, measurements required: Modulation characteristics is given below:

- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
- (c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
- (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

9.2 Test Procedure

According to ANSI C63.26-2015 section 5.3.2, the following test setup was performed.



9.3 Summary of Test Results/Plots

Only the worst case was selected to record.

Please refer to Appendix G

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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