

FCC Test Report

(Co-Located)

Report No.: RF200615C06-11

FCC ID: H8NTN502A1

Test Model: TN502A1

Series Model: TN502A1(WOS), access, access(WOS) (refer to item 3.1 for more details)

Received Date: Apr. 04, 2020

Test Date: Jun. 04 ~ Dec. 03, 2020

Issued Date: Dec. 03, 2020

Applicant: ASKEY COMPUTER CORP.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration/
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF200615C06-11	Original release	Dec. 03, 2020

1 Certificate of Conformity

Product: TurboFon E4 / Handheld Device (refer to item 3.1 for more details)

Brand: TURBONET / Copernic (refer to item 3.1 for more details)

Test Model: TN502A1

Series Model: TN502A1(WOS), access, access(WOS) (refer to item 3.1 for more details)

Sample Status: Engineering sample

Applicant: ASKEY COMPUTER CORP.

Test Date: Jun. 04 ~ Dec. 03, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

47 CFR FCC Part 15, Subpart E (Section 15.407)

FCC Part 22, Subpart H

FCC Part 24, Subpart E

FCC Part 27, Subpart C, F, H, L, M

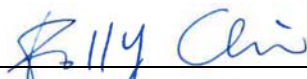
FCC Part 90, Subpart I, S

ANSI 63.26-2015

ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :


Polly Chien / Specialist

Date:

Dec. 03, 2020

Approved by :



Bruce Chen / Senior Project Engineer

Date:

Dec. 03, 2020

2 Summary of Test Results

Applied Standard	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407) FCC Part 22, Subpart H FCC Part 24, Subpart E FCC Part 27, Subpart C, F, H, L, M FCC Part 90, Subpart I, S ANSI 63.26-2015 ANSI C63.10-2013		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6) 2.1053 22.917 24.238 27.53(a) 27.53(c) 27.53(h) 27.53(m) 90.691	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -2.7dB at 30.00MHz & 896.06MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	TurboFon E4 / Handheld Device (Refer to Note)		
Brand	TURBONET / Coppernic (Refer to Note)		
Test Model	TN502A1		
Series Model	TN502A1(WOS), access, access(WOS)		
Model Difference	Refer to Note		
Sample Status	Engineering sample		
Power Supply Rating	3.85Vdc (from battery) 5.0Vdc / 9.0Vdc / 12.0Vdc (from adapter)		
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM	
	BT EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK	
	BT LE	GFSK	
	GSM/GPRS	GMSK	
	EDGE	GMSK, 8PSK	
	WCDMA	BPSK, QPSK	
	LTE	QPSK, 16QAM	
Modulation Technology	WLAN	DSSS, OFDM	
	BT EDR	FHSS	
Transfer Rate	WLAN	802.11b: 11/5.5/2/1Mbps 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps	
	BT EDR	1/2/3Mbps	
	BT LE	1/2Mbps	
Operating Frequency	WLAN	2.4GHz: 2412~2462MHz 5.0GHz: 5180~5240MHz, 5260~5320MHz, 5500~5700MHz, 5745~5825MHz	
	BT EDR	2402~2480MHz	
	BT LE	2402~2480MHz	
	GSM/GPRS/EDGE	GSM/GPRS/EDGE	824.2 ~ 848.8 MHz 1850.2 ~ 1909.8 MHz
	WCDMA	WCDMA Band 2	1852.4 ~ 1907.6 MHz
		WCDMA Band 4	1712.4 ~ 1752.6 MHz
		WCDMA Band 5	826.4 ~ 846.6 MHz

Operating Frequency	LTE	LTE Band 2	1850.7 ~ 1909.3 MHz
		LTE Band 4	1710.7 ~ 1754.3 MHz
		LTE Band 5	824.7 ~ 848.3 MHz
		LTE Band 7	2502.5 ~ 2567.5 MHz
		LTE Band 17	706.5 ~ 713.5 MHz
		LTE Band 26	814.7 ~ 823.3 MHz 824.7 ~ 848.3MHz
		LTE Band 38	2572.5 ~ 2617.5 MHz
		LTE Band 41	2498.5 ~ 2687.5 MHz
Antenna Type	WLAN/BT	Refer to note	
	WCDMA	Refer to note	
	LTE	Refer to note	
Antenna Connector	WLAN/BT	Refer to Note	
	WCDMA	Refer to note	
	LTE	Refer to note	
Accessory Device	Refer to note		
Cable Supplied	0.95m shielded USB cable without core		

Note:

1. All models are listed as below. Model TN502A1 is the representative for final test.

Brand	Product name	Model	Difference	
TURBONET	TurboFon E4	TN502A1	With scanner	-
		TN502A1(WOS)	Without scanner	-
Coppernic	Handheld Device	access	With scanner	Model: access is electrically identical to TN502A1, different brands and model names are for marketing purpose.
		access(WOS)	Without scanner	Model: access(WOS) is electrically identical to TN502A1(WOS), different brands and model names are for marketing purpose.

2. The EUT provide 1 completed transmitter and 1 receiver.

Band	Modulation Mode	TX Function
2.4GHz Band	802.11b	1TX
	802.11g	1TX
	802.11n (HT20)	1TX
	802.11n (HT40)	1TX
5GHz Band	802.11a	1TX
	802.11n (HT20)	1TX
	802.11n (HT40)	1TX
	802.11ac (VHT20)	1TX
	802.11ac (VHT40)	1TX
	802.11ac (VHT80)	1TX

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11ac mode, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

3. The EUT consumes power from the following accessory devices.

Battery	
Brand	ETI
Model	BP19-002710
Rating	3.85Vdc, 4000mAh, 15.4Wh

Adapter	
Brand	CHANNEL WELL TECHNOLOGY
Model	2ACP0183C
Input Power	100-240Vac~0.5A , 50/60Hz
Output Power	5.0Vdc / 3.0A 15.0W / 9.0Vdc / 2.0A 18.0W / 12.0Vdc / 1.5A 18.0W

Item	Brand	Model	Description
Docking Station 1 (optional)	TURBONET	DS12310	The models and brand names of docking station are electrically identical, different models and brand names are for marketing purpose. The docking station 1 was chosen for final test.
Docking Station 2 (optional)	COPPERNIC	DS-ACCESS	
Data Cable Supplied	0.95m shielding USB cable without core		
Adapter (For docking use)			
Brand	Sunny ELECTRONICS CORP.		
Model	SYS1541-2412		
Input Power	100-240Vac, 1.0A, 50/60Hz		
Output Power	+12Vdc, 2A		
Power line	1.5m power cable without core		

* After pretesting, the EUT with adapter was the worst cases and chose for final test.

4. The EUT uses the following antennas.

For WLAN/BT

Ant. Type	PIFA						
Ant. Connector	Spring						
Ant. 1 (WLAN)							
Frequency (MHz)	2400	2450	2500	5150	5350	5725	5825
Peak Gain (dBi)	0.76	1.31	1.46	1.07	1.46	2.23	1.65

* The max. gain was chosen for final tests.

For WWAN:

Antenna Type	PIFA							
Band	EDGE / WCDMA II / LTE 2	WCDMA IV / LTE 4	GSM / EDGE / WCDMA V / LTE5/LTE26	LTE 7	LTE 17	LTE 26	LTE 38	LTE 41
Gain	2.25	1.93	-0.76	1.39	-2.74	-0.76	1.47	1.59

* The max. gain was chosen for final tests.

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

5. The WWAN could transmit simultaneously either with WLAN 2.4GHz or 5GHz or BT at the same time.

3.2 Description of Test Modes

For WLAN:

For 2.4GHz

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

For 5500 ~ 5700MHz:

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz

5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

BT EDR:

79 channels are provided to this EUT:

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

BT LE:

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE $\geq$ 1G	RE<1G	
-	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11n (HT20) + GSM850	2412 ~ 2462	1 to 11	6 + 189	OFDM
		824.2~848.8	128 to 251		GSM
-	GFSK + GSM850	2402 ~ 2480	0 to 78	39 + 189	GFSK
		824.2~848.8	128 to 251		GSM
-	802.11a + GSM850	5260-5320	52 to 64	60 + 189	OFDM
		824.2~848.8	128 to 251		GSM

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11n (HT20) + GSM850	2412 ~ 2462	1 to 11	6 + 189	OFDM
		824.2~848.8	128 to 251		GSM
-	GFSK + GSM850	2402 ~ 2480	0 to 78	39 + 189	GFSK
		824.2~848.8	128 to 251		GSM
-	802.11a + GSM850	5260-5320	52 to 64	60 + 189	OFDM
		824.2~848.8	128 to 251		GSM

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	22 deg. C, 66% RH 23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
RE<1G	23 deg. C, 67% RH	120Vac, 60Hz	Titan Hsu

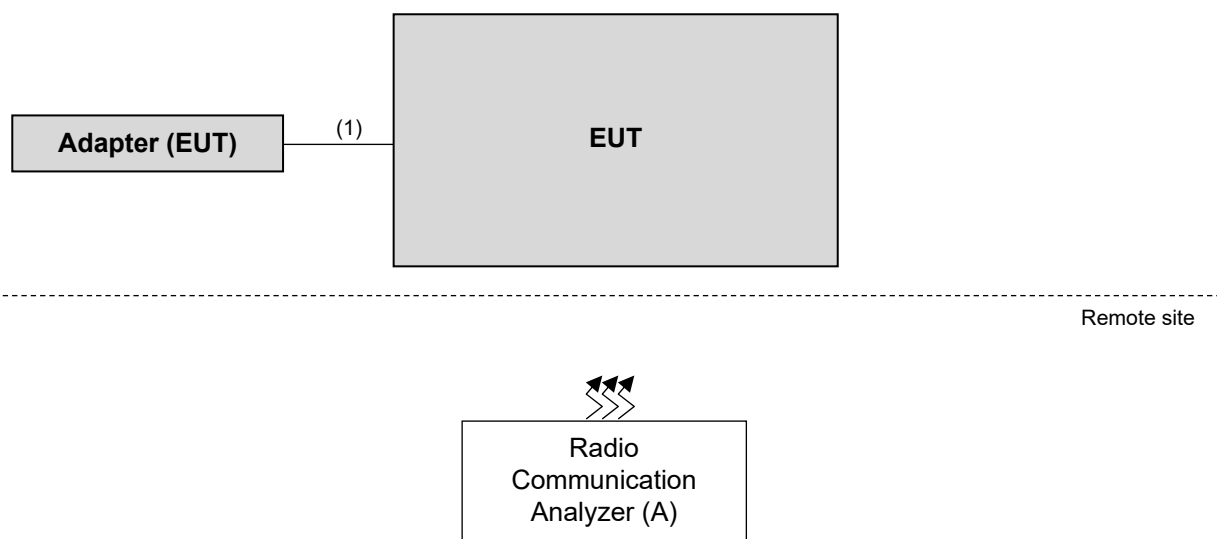
3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	-

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.45	Y	0	Accessory of EUT

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart C (Section 15.247)

47 CFR FCC Part 15, Subpart E (Section 15.407)

FCC Part 22, Subpart H

FCC Part 24, Subpart E

FCC Part 27, Subpart C, F, H, L, M

FCC Part 90, Subpart I, S

ANSI 63.26-2015

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

For WLAN/BT:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3m	
			PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK: -27 (dBm/MHz)	PK: 68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBμV/m) ^{*1} PK: 105.2 (dBμV/m) ^{*2} PK: 110.8(dBμV/m) ^{*3} PK: 122.2 (dBμV/m) ^{*4}
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.			^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.			^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts).}$$

For WWAN

The power of any emission 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. The emission limit equal to -13dBm .

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Dec. 31, 2019	Dec. 30, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 04, 2019	Jun. 03, 2020
			Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
			Nov. 04, 2020	Nov. 03, 2021
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
			Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 20, 2019	Aug. 19, 2020
			Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 23, 2020	Mar. 22, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 20, 2019	Aug. 19, 2020
			Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 20, 2019	Aug. 19, 2020
			Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 20, 2019	Aug. 19, 2020
			Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190 004/MY55190007/MY55 210005	Jul. 15, 2019	Jul. 14, 2020
			Jul. 13, 2020	Jul. 12, 2021
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 05, 2019	Sep. 04, 2020
			Sep. 04, 2020	Sep. 03, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.

4.1.3 Test Procedures

For WLAN/BT

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- c. The height of antenna 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.
- 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

For WWAN

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

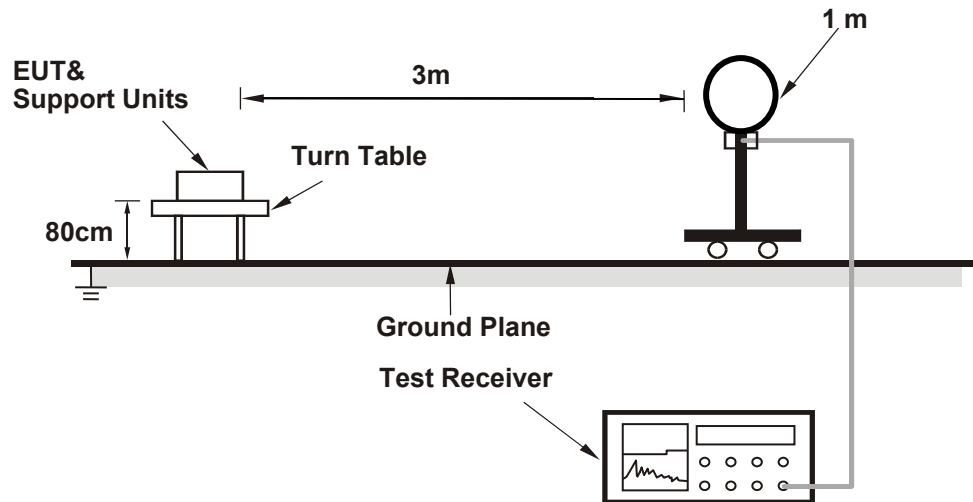
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.1.4 Deviation from Test Standard

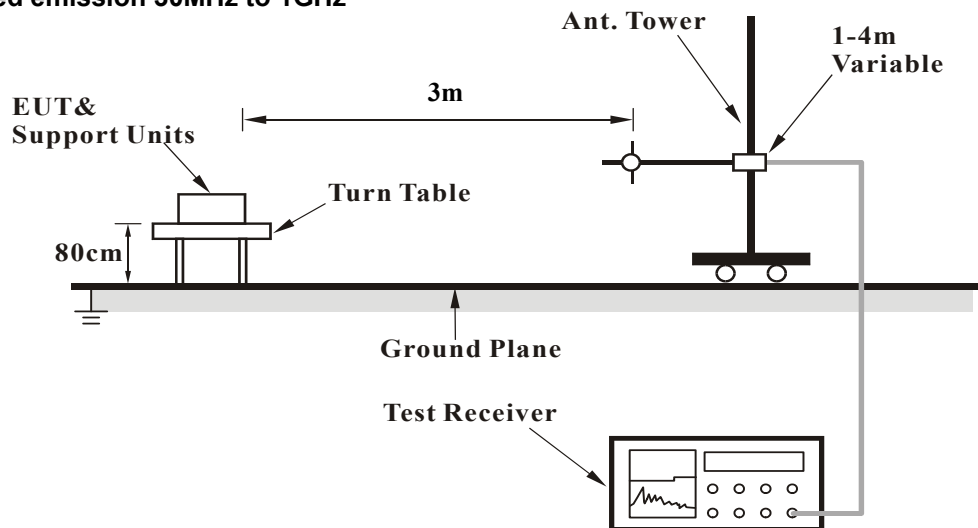
No deviation.

4.1.5 Test Setup

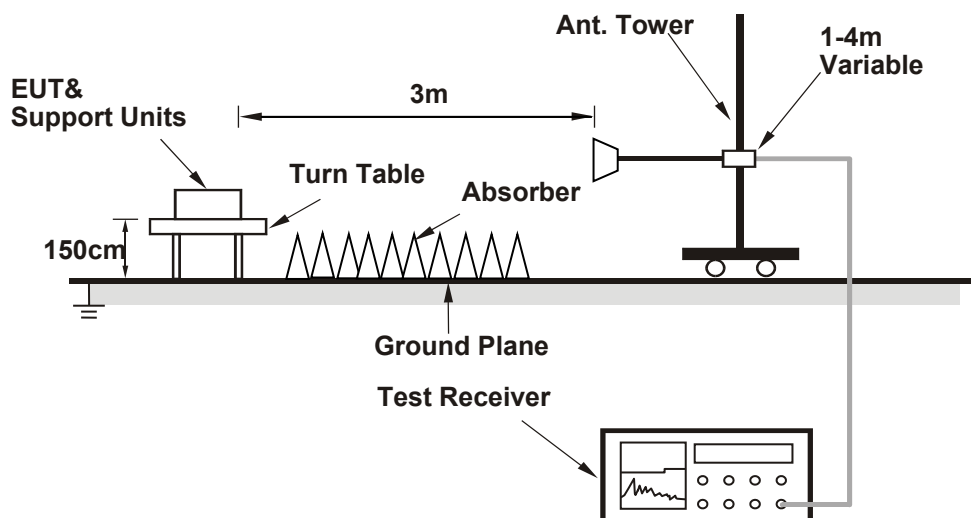
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. The EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11n (HT20) + GSM850

CHANNEL	CH 6 + CH 189	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	116.8 PK			1.77 H	0	84.5	32.3
2	*2437.00	108.6 AV			1.74 H	0	76.3	32.3
3	4874.00	47.7 PK	74.0	-26.3	2.04 H	122	44.0	3.7
4	4874.00	41.7 AV	54.0	-12.3	2.04 H	122	38.0	3.7
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	109.8 PK			1.20 V	344	77.5	32.3
2	*2437.00	102.3 AV			1.20 V	344	70.0	32.3
3	4874.00	55.6 PK	74.0	-18.4	1.55 V	333	51.9	3.7
4	4874.00	41.8 AV	54.0	-12.2	1.55 V	333	38.1	3.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL		CH 6 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-1.0	31.4	0.2	31.6	38.5	-6.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-6.8	26.4	0.2	26.6	38.5	-11.9

CHANNEL		CH 6 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-34.1	-37.4	5.5	-31.9	-13.0	-18.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-32.2	-34.3	5.5	-28.8	-13.0	-15.8

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)} + 2.15dB$.

GFSK + GSM850

CHANNEL	CH 39 + CH 189	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	106.7 PK			1.11 H	256	74.4	32.3
2	*2441.00	81.9 AV			1.11 H	256	49.6	32.3
3	4882.00	49.1 PK	74.0	-24.9	1.40 H	201	45.6	3.5
4	4882.00	24.3 AV	54.0	-29.7	1.40 H	201	20.8	3.5
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	101.1 PK			2.00 V	160	68.8	32.3
2	*2441.00	76.3 AV			2.00 V	160	44.0	32.3
3	4882.00	49.1 PK	74.0	-24.9	1.93 V	188	45.6	3.5
4	4882.00	24.3 AV	54.0	-29.7	1.93 V	188	20.8	3.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL		CH 39 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-1.1	31.3	0.2	31.5	38.5	-7.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-7.0	26.2	0.2	26.4	38.5	-12.1

CHANNEL		CH 39 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-33.8	-37.0	5.5	-31.5	-13.0	-18.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-32.1	-34.2	5.5	-28.7	-13.0	-15.7

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)} + 2.15dB$.

802.1a + GSM850

CHANNEL	CH 60 + CH 189	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	111.9 PK			1.82 H	255	72.8	39.1
2	*5300.00	102.1 AV			1.82 H	255	63.0	39.1
3	10600.00	62.0 PK	74.0	-12.0	1.50 H	300	43.1	18.9
4	10600.00	49.0 AV	54.0	-5.0	1.50 H	300	30.1	18.9
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	115.3 PK			1.69 V	106	76.2	39.1
2	*5300.00	105.0 AV			1.69 V	106	65.9	39.1
3	10600.00	63.1 PK	74.0	-10.9	1.79 V	222	44.2	18.9
4	10600.00	49.4 AV	54.0	-4.6	1.79 V	222	30.5	18.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL		CH 60 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-1.0	31.4	0.2	31.6	38.5	-6.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-6.9	26.3	0.2	26.5	38.5	-12.0

CHANNEL		CH 60 + CH 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-34.5	-37.8	5.5	-32.3	-13.0	-19.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-32.5	-34.5	5.5	-29.0	-13.0	-16.0

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} + \text{Cable Loss (dB)} + 2.15dB$.

Below 1GHz data

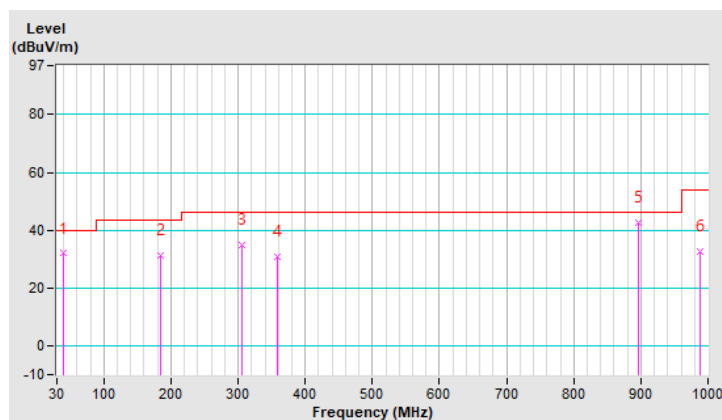
802.11n (HT20) + GSM850

CHANNEL	CH 6 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.84	31.9 QP	40.0	-8.1	1.49 H	87	41.4	-9.5
2	184.65	31.1 QP	43.5	-12.4	1.49 H	91	41.6	-10.5
3	305.56	34.9 QP	46.0	-11.1	1.00 H	117	42.1	-7.2
4	357.58	30.6 QP	46.0	-15.4	1.00 H	118	36.6	-6.0
5	896.06	42.8 QP	46.0	-3.2	1.99 H	15	38.2	4.6
6	987.45	32.8 QP	54.0	-21.2	1.49 H	105	27.3	5.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

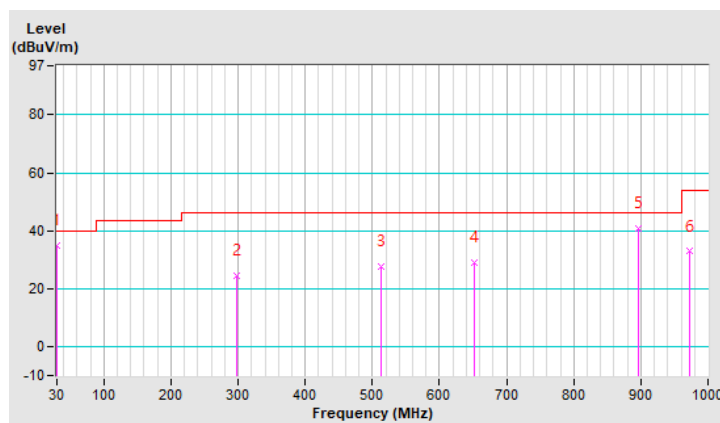


CHANNEL	CH 6 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	35.0 QP	40.0	-5.0	1.50 V	355	45.4	-10.4
2	297.13	24.6 QP	46.0	-21.4	1.50 V	321	32.1	-7.5
3	512.24	27.6 QP	46.0	-18.4	1.50 V	35	28.6	-1.0
4	652.83	29.2 QP	46.0	-16.8	1.00 V	93	27.7	1.5
5	896.06	41.0 QP	46.0	-5.0	1.50 V	15	36.4	4.6
6	971.98	32.8 QP	54.0	-21.2	1.00 V	12	27.5	5.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

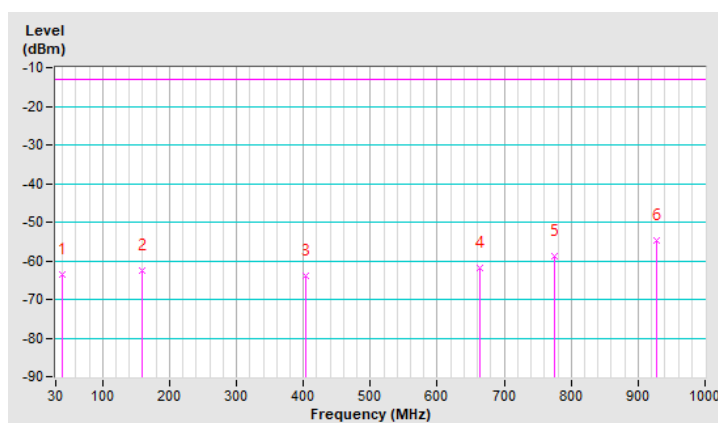


CHANNEL	CH 6 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	40.67	-64.0	-52.8	-10.8	-63.6	-13.0	-50.6
2	160.04	-54.9	-63.1	0.4	-62.7	-13.0	-49.7
3	403.45	-61.5	-69.2	5.2	-64.0	-13.0	-51.0
4	664.38	-62.5	-67.0	5.0	-62.0	-13.0	-49.0
5	775.93	-62.0	-63.0	4.3	-58.7	-13.0	-45.7
6	928.22	-61.2	-58.8	3.9	-54.9	-13.0	-41.9

Remarks:

1. $ERP\ (dBm) = S.G\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Substitution\ Antenna\ Gain\ (dB) - Cable\ Loss\ (dB) + 2.15dB$.

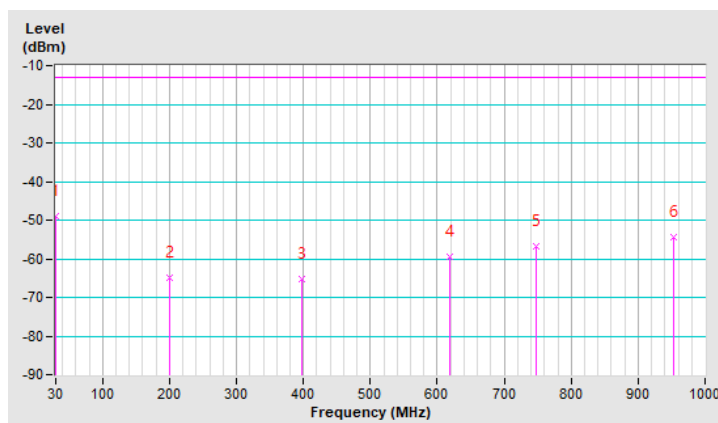


CHANNEL	CH 6 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-38.4	-36.7	-12.2	-48.9	-13.0	-35.9
2	200.75	-61.5	-70.4	5.4	-65.0	-13.0	-52.0
3	397.63	-63.1	-70.6	5.2	-65.4	-13.0	-52.4
4	617.82	-62.1	-64.0	4.6	-59.4	-13.0	-46.4
5	747.80	-61.9	-61.4	4.7	-56.7	-13.0	-43.7
6	952.47	-61.9	-58.3	3.9	-54.4	-13.0	-41.4

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



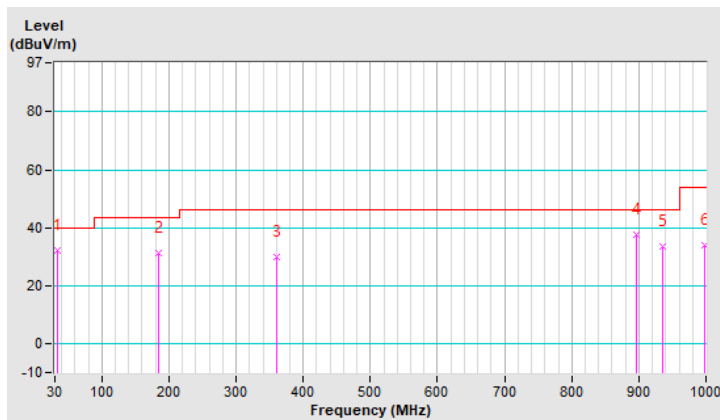
GFSK + GSM850

CHANNEL	CH 39 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	34.22	32.0 QP	40.0	-8.0	1.49 H	269	42.3	-10.3
2	184.65	31.1 QP	43.5	-12.4	1.49 H	80	41.6	-10.5
3	360.40	29.8 QP	46.0	-16.2	1.00 H	131	35.6	-5.8
4	896.06	37.4 QP	46.0	-8.6	2.00 H	13	32.8	4.6
5	935.43	33.5 QP	46.0	-12.5	1.49 H	201	28.5	5.0
6	997.29	33.8 QP	54.0	-20.2	1.00 H	277	28.4	5.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

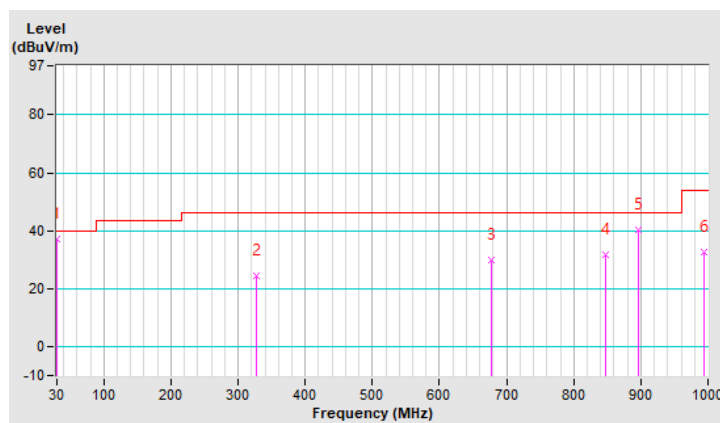


CHANNEL	CH 39 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	37.3 QP	40.0	-2.7	1.00 V	247	47.7	-10.4
2	328.06	24.5 QP	46.0	-21.5	2.00 V	5	31.1	-6.6
3	678.14	30.1 QP	46.0	-15.9	2.00 V	5	28.2	1.9
4	848.26	31.9 QP	46.0	-14.1	1.00 V	279	28.3	3.6
5	896.06	40.4 QP	46.0	-5.6	2.00 V	5	35.8	4.6
6	994.48	32.8 QP	54.0	-21.2	1.49 V	172	27.4	5.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

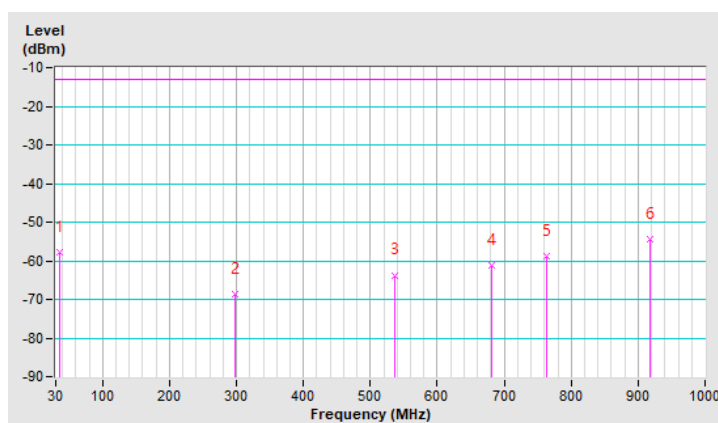


CHANNEL	CH 39 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	35.82	-57.9	-46.4	-11.4	-57.8	-13.0	-44.8
2	297.72	-64.1	-73.7	5.1	-68.6	-13.0	-55.6
3	537.31	-62.0	-68.4	4.7	-63.7	-13.0	-50.7
4	680.87	-62.0	-66.2	5.1	-61.1	-13.0	-48.1
5	763.32	-61.5	-63.4	4.5	-58.9	-13.0	-45.9
6	917.55	-60.6	-58.5	4.0	-54.5	-13.0	-41.5

Remarks:

1. $ERP\ (dBm) = S.G\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Substitution\ Antenna\ Gain\ (dB) - Cable\ Loss\ (dB) + 2.15dB$.

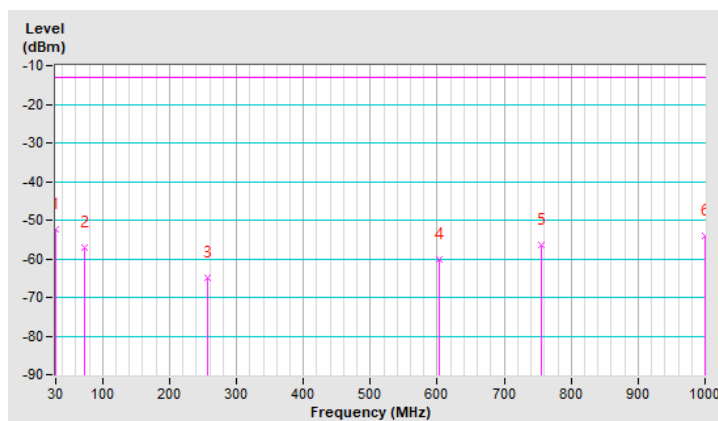


CHANNEL	CH 39 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.97	-42.2	-40.2	-12.1	-52.3	-13.0	-39.3
2	72.68	-48.0	-53.1	-4.1	-57.2	-13.0	-44.2
3	256.01	-64.5	-70.3	5.3	-65.0	-13.0	-52.0
4	602.30	-62.1	-64.7	4.5	-60.2	-13.0	-47.2
5	754.59	-61.9	-61.1	4.6	-56.5	-13.0	-43.5
6	1000.00	-62.6	-58.0	4.0	-54.0	-13.0	-41.0

Remarks:

1. $ERP\ (dBm) = S.G\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Substitution\ Antenna\ Gain\ (dB) - Cable\ Loss\ (dB) + 2.15dB$.



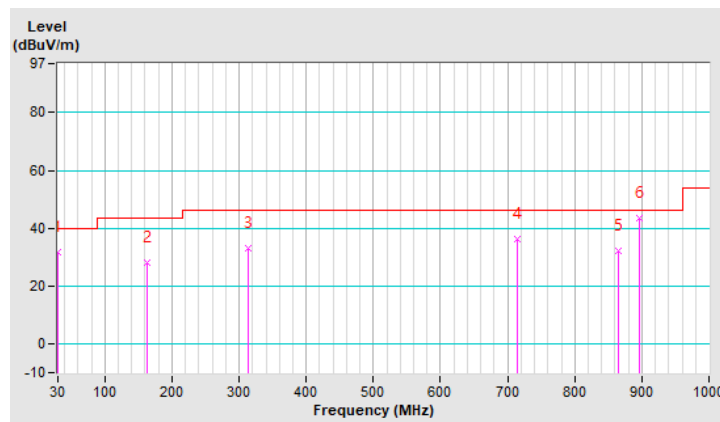
802.11a + GSM850

CHANNEL	CH 60 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	31.9 QP	40.0	-8.1	1.50 H	100	42.3	-10.4
2	163.56	28.0 QP	43.5	-15.5	1.50 H	247	36.7	-8.7
3	314.00	33.0 QP	46.0	-13.0	1.00 H	130	39.9	-6.9
4	714.69	36.2 QP	46.0	-9.8	1.50 H	11	34.0	2.2
5	865.13	32.3 QP	46.0	-13.7	1.50 H	11	28.4	3.9
6	896.06	43.3 QP	46.0	-2.7	2.00 H	54	38.7	4.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

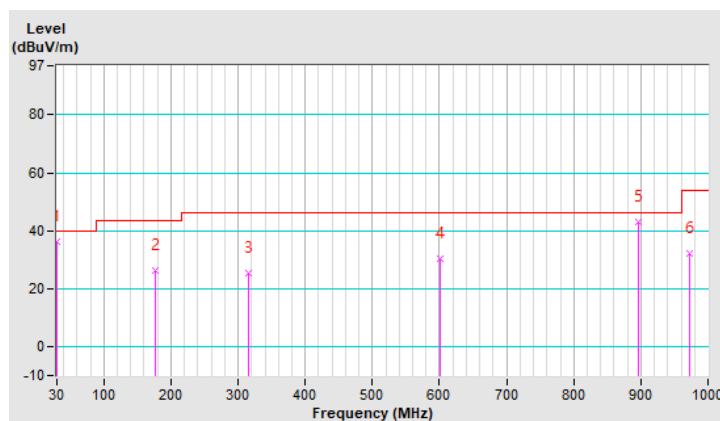


CHANNEL	CH 60 + CH 189	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	36.2 QP	40.0	-3.8	1.49 V	19	46.6	-10.4
2	176.22	26.3 QP	43.5	-17.2	1.00 V	147	35.7	-9.4
3	315.41	25.5 QP	46.0	-20.5	2.00 V	16	32.4	-6.9
4	600.81	30.2 QP	46.0	-15.8	1.49 V	0	29.1	1.1
5	896.06	43.2 QP	46.0	-2.8	2.00 V	16	38.6	4.6
6	973.39	32.3 QP	54.0	-21.7	1.00 V	237	27.0	5.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

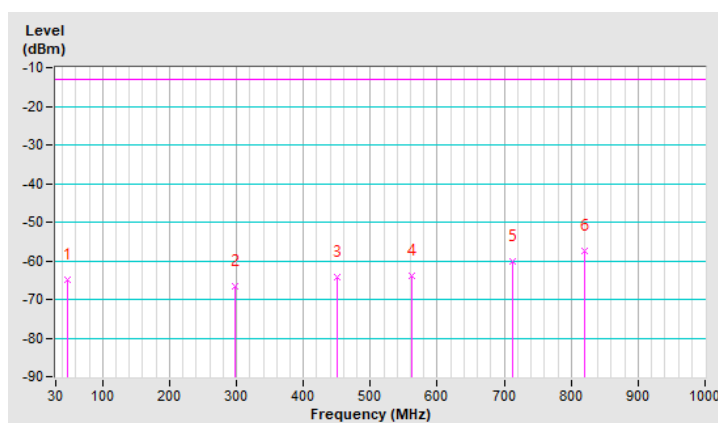


CHANNEL	CH 60 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	47.46	-64.2	-55.3	-9.7	-65.0	-13.0	-52.0
2	298.69	-62.1	-71.7	5.1	-66.6	-13.0	-53.6
3	450.98	-62.3	-69.3	5.0	-64.3	-13.0	-51.3
4	562.53	-62.8	-68.4	4.6	-63.8	-13.0	-50.8
5	712.88	-61.7	-65.3	5.1	-60.2	-13.0	-47.2
6	820.55	-61.9	-61.3	4.0	-57.3	-13.0	-44.3

Remarks:

1. $ERP (dBm) = S.G \text{ Value (dBm)} + \text{Correction Factor (dB)}$.
2. $\text{Correction Factor (dB)} = \text{Substitution Antenna Gain (dB)} - \text{Cable Loss (dB)} + 2.15dB$.

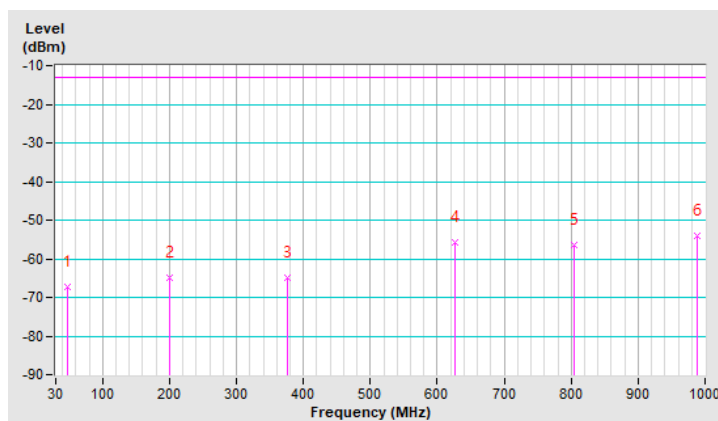


CHANNEL	CH 60 + CH 189	FREQUENCY RANGE	Below 1000 MHz
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Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	47.46	-57.6	-57.7	-9.7	-67.4	-13.0	-54.4
2	199.75	-61.3	-70.4	5.5	-64.9	-13.0	-51.9
3	376.29	-62.5	-70.1	5.3	-64.8	-13.0	-51.8
4	626.55	-59.0	-60.4	4.7	-55.7	-13.0	-42.7
5	805.03	-62.3	-60.4	4.0	-56.4	-13.0	-43.4
6	987.39	-62.8	-58.0	3.9	-54.1	-13.0	-41.1

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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