

FCC Test Report

(Spot Check: Part 22 – GSM, WCDMA B5, LTE B5)

Report No.: RFBGTL-WTW-P22070227-6

FCC ID: APYHRO00316

Received Date: Feb. 19, 2022

Test Date: Jul. 26 ~ Jul. 27, 2022

Issued Date: Aug. 25, 2022

Applicant: SHARP Corporation Mobile Communication BU

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Manufacturer: Sharp Corporation

Address: 1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Test Location (2): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan

FCC Registration / 788550 / TW0003

Designation Number: 281270 / TW0032



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Release Control Record

Issue No.	Description	Date Issued
RFBGTL-WTW-P22070227-6	Original Release	Aug. 25, 2022

1 Certificate of Conformity

Product: Smart Phone

Brand: SHARP

Sample Status: Engineering Sample

Applicant: SHARP Corporation Mobile Communication BU

Manufacturer: Sharp Corporation

Test Date: Jul. 26 ~ Jul. 27, 2022

Standards: FCC Part 22, Subpart H

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 : *Lena Wang* , **Date:** Aug. 25, 2022
Lena Wang / Specialist

Approved by : *Jeremy Lin* , **Date:** Aug. 25, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	Pass	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -32.81dB at 1673.00MHz.

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	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~ 1000MHz	2.92 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	ESR3	102579	Jul. 01, 2022	Jun. 30, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM- (9000+2000+1000)	201230+ 201242+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM- NM- (9000+300+500)	201252+ 201250+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM- (5000+3000+2000)	201261+201258+ 201249	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7. 6.15.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190 004/MY55190007/MY55 210005	Jul. 13, 2022	Jul. 12, 2023
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Feb. 16, 2022	Feb. 15, 2023

- 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 WM Chamber 7.

3 General Information

3.1 General Description of EUT

Product	Smart Phone			
Brand	SHARP			
Sample Status	Engineering Sample			
Power Supply Rating	5.0Vdc (from adapter) 3.87Vdc (Battery)			
Modulation Type	GSM, GPRS: GMSK WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM, 64QAM			
Operating Frequency	GSM, GPRS	824.2MHz ~ 848.8MHz		
	WCDMA Band 5	826.4MHz ~ 846.6MHz		
	LTE Band 5 (Channel Bandwidth 1.4MHz)	824.7MHz ~ 848.3MHz		
	LTE Band 5 (Channel Bandwidth 3MHz)	825.5MHz ~ 847.5MHz		
	LTE Band 5 (Channel Bandwidth 5MHz)	826.5MHz ~ 846.5MHz		
	LTE Band 5 (Channel Bandwidth 10MHz)	829.0MHz ~ 844.0MHz		
Max. ERP Power	GSM	391.742mW (25.93dBm)		
	GPRS	389.942mW (25.91dBm)		
	WCDMA Band 5	44.978mW (16.53dBm)		
		QPSK	16QAM	64QAM
	LTE Band 5 (Channel Bandwidth 1.4MHz)	37.411mW (15.73dBm)	29.242mW (14.66dBm)	23.659mW (13.74dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	37.670mW (15.76dBm)	29.785mW (14.74dBm)	23.605mW (13.73dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	37.154mW (15.70dBm)	29.376mW (14.68dBm)	23.496mW (13.71dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	47.534mW (16.77dBm)	36.983mW (15.68dBm)	29.992mW (14.77dBm)
Antenna Type	Refer to note			
Antenna Connector	Refer to note			
Accessory Device	Refer to note			
Cable Supplied	NA			

Note:

1. This report is a supplementary report to the original BV CPS report no.: RFBGTL-WTW-P22020475-6. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Radiated emission and output power verification worst test refer to original report.

2. There are differences between FCC ID: APYHRO00314 & FCC ID: APYHRO00316:

FCC ID	APYHRO00314	APYHRO00316
FM Radio	Supports	Doesn't support

3. The EUT contains following support units.

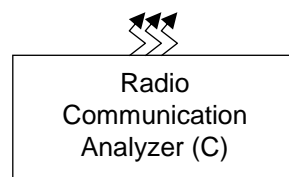
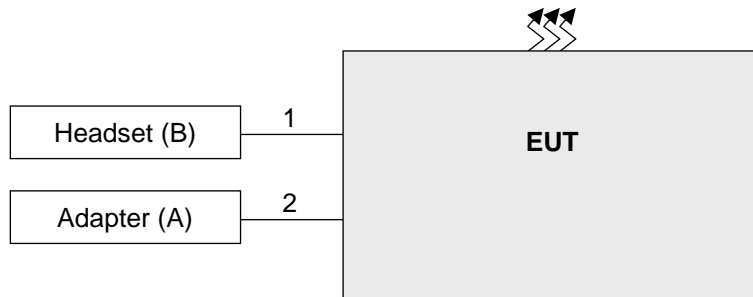
Product	Brand	Model	Description
Adapter (Support unit)	Salom	XN-2QC25	Input: 100-240Vac, 50/60Hz, 0.2A Output: 5.0Vdc, 800mA
Battery	-	-	3.87Vdc, Rated 4870mAh (18.9Wh), Typ. 5000mAh (19.4Wh)
Headset (Support unit)	Ambibio	AB-HI02JS	-
USB cable (Support unit)	Luxshare-ICT	L6KU2007-CS-H	0.95m shielded cable without core

4. The antenna information is listed as below.

Ant. No.	Type	Connector	Gain (dBi)										
			GSM 850	GSM 1900	WCDMA B2 / LTE B2	WCDMA B4 / LTE B4	WCDMA B5 / LTE B5	LTE B7	LTE B12	LTE B13	LTE B17	LTE B38	LTE B41
1	PIFA	IPEX	-	-2.9	-2.9	-4.9	-	-1.8	-	-	-	-1.9	-1.9
3	PIFA	IPEX	-4.8	-	-	-	-4.8	-	-5.6	-5.3	-5.6	-	-

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.2 Configuration of System under Test



Remote site

3.2.1 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.	Adapter	Salom	XN-2QC25	N/A	N/A	Provided by client
B.	Headset	Ambibio	AB-HI02JS	N/A	N/A	Provided by client
C.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item C acted as a communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Earphone Cable	1	1.1	N	0	Provided by client
2.	USB Cable	1	0.95	Y	0	Provided by client

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	Radiated Emission
GSM	X-plane
WCDMA Band 5	X-plane
LTE Band 5	X-plane

GSM Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128 (824.2MHz), 189 (836.4MHz), 251 (848.8MHz)	GSM, GPRS
-	Radiated Emission	128 to 251	189 (836.4MHz)	GSM

WCDMA Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA, HSDPA, HSUPA
-	Radiated Emission	4132 to 4233	4182 (836.4MHz)	WCDMA

LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407 (824.7MHz), 20525 (836.5MHz), 20643 (848.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20415 to 20635	20415 (825.5MHz), 20525 (836.5MHz), 20635 (847.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20425 to 20625	20425 (826.5MHz), 20525 (836.5MHz), 20625 (846.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20450 to 20600	20450 (829.0MHz), 20525 (836.5MHz), 20600 (844.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Radiated Emission	20450 to 20600	20525 (836.5MHz)	10MHz	QPSK	1

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Radiated Emission	22deg. C, 67%RH	120Vac, 60Hz	Edison Lee, Wade Huang

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards and References

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

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, WCDMA and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is

given in Equation as follows:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

$$\text{ERP} = P_{\text{Meas}} + G_T - 2.15$$

where

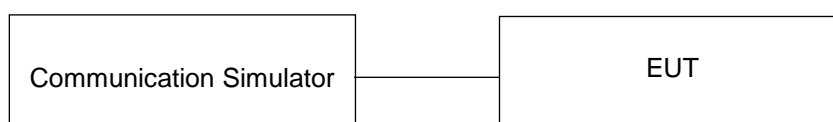
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

Band	GSM 850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	32.88	32.80	32.86
GPRS 1Tx Slot	32.86	32.60	32.64
GPRS 2Tx Slot	31.16	30.98	31.09
GPRS 3Tx Slot	29.52	29.35	29.51
GPRS 4Tx Slot	28.51	28.61	28.28

Band	WCDMA V		
TX Channel	4132	4182	4233
Rx Channel	4357	4407	4458
Frequency	826.4	836.4	846.6
RMC 12.2K	23.39	23.48	23.34
HSDPA Subtest-1	22.35	22.42	22.33
HSDPA Subtest-2	22.31	22.43	22.39
HSDPA Subtest-3	21.79	21.93	21.91
HSDPA Subtest-4	21.85	21.96	21.92
HSUPA Subtest-1	22.37	22.46	22.35
HSUPA Subtest-2	20.37	20.46	20.35
HSUPA Subtest-3	21.28	21.47	21.33
HSUPA Subtest-4	20.38	20.40	20.42
HSUPA Subtest-5	22.37	22.35	22.40

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	23.49	23.72	23.59
		1	24	23.39	23.48	23.47
		1	49	23.40	23.50	23.47
		25	0	22.48	22.57	22.54
		25	12	22.44	22.53	22.48
		25	25	22.32	22.43	22.43
		50	0	22.52	22.63	22.49
10M	16QAM	1	0	22.44	22.59	22.41
		1	24	22.32	22.50	22.21
		1	49	22.63	22.13	22.41
		25	0	21.52	21.60	21.51
		25	12	21.50	21.57	21.56
		25	25	21.42	21.60	21.54
		50	0	21.36	21.55	21.46
10M	64QAM	1	0	21.55	21.47	21.68
		1	24	21.59	21.72	21.65
		1	49	21.30	21.45	21.41
		25	0	20.47	20.64	20.52
		25	12	20.45	20.60	20.46
		25	25	20.48	20.55	20.50
		50	0	20.41	20.56	20.46

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	22.51	22.65	22.56
		1	12	22.37	22.56	22.44
		1	24	22.42	22.53	22.42
		12	0	21.47	21.61	21.58
		12	6	21.44	21.50	21.46
		12	13	21.39	21.46	21.42
		25	0	21.50	21.60	21.53
5M	16QAM	1	0	21.42	21.52	21.36
		1	12	21.36	21.46	21.21
		1	24	21.63	21.14	21.41
		12	0	20.49	20.59	20.55
		12	6	20.48	20.65	20.55
		12	13	20.46	20.54	20.57
		25	0	20.43	20.51	20.40
5M	64QAM	1	0	20.64	20.43	20.66
		1	12	20.52	20.65	20.61
		1	24	20.32	20.40	20.34
		12	0	19.48	19.67	19.55
		12	6	19.51	19.56	19.47
		12	13	19.48	19.54	19.46
		25	0	19.38	19.49	19.44

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	22.56	22.71	22.62
		1	7	22.35	22.47	22.42
		1	14	22.40	22.53	22.38
		8	0	21.52	21.58	21.58
		8	3	21.44	21.47	21.44
		8	7	21.32	21.43	21.40
		15	0	21.48	21.58	21.47
3M	16QAM	1	0	21.37	21.52	21.32
		1	7	21.35	21.47	21.24
		1	14	21.69	21.21	21.37
		8	0	20.54	20.62	20.51
		8	3	20.48	20.61	20.53
		8	7	20.50	20.57	20.52
		15	0	20.39	20.48	20.46
3M	64QAM	1	0	20.64	20.45	20.59
		1	7	20.60	20.68	20.64
		1	14	20.36	20.41	20.34
		8	0	19.49	19.64	19.55
		8	3	19.48	19.53	19.49
		8	7	19.47	19.51	19.47
		15	0	19.41	19.49	19.48

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	22.51	22.68	22.62
		1	2	22.35	22.53	22.49
		1	5	22.42	22.51	22.41
		3	0	22.44	22.59	22.56
		3	1	22.45	22.51	22.43
		3	3	22.35	22.45	22.45
		6	0	21.49	21.59	21.50
1.4M	16QAM	1	0	21.42	21.56	21.39
		1	2	21.29	21.45	21.22
		1	5	21.61	21.15	21.39
		3	0	21.50	21.60	21.54
		3	1	21.47	21.60	21.50
		3	3	21.47	21.60	21.50
		6	0	20.43	20.57	20.44
1.4M	64QAM	1	0	20.61	20.42	20.67
		1	2	20.50	20.69	20.62
		1	5	20.31	20.46	20.32
		3	0	20.50	20.68	20.57
		3	1	20.48	20.54	20.46
		3	3	20.39	20.60	20.53
		6	0	19.44	19.54	19.44

ERP Power (dBm)

Band	GSM 850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	25.93	25.85	25.91
GPRS 1Tx Slot	25.91	25.65	25.69
GPRS 2Tx Slot	24.21	24.03	24.14
GPRS 3Tx Slot	22.57	22.40	22.56
GPRS 4Tx Slot	21.56	21.66	21.33

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

Band	WCDMA V		
TX Channel	4132	4182	4233
Rx Channel	4357	4407	4458
Frequency	826.4	836.4	846.6
RMC 12.2K	16.44	16.53	16.39
HSDPA Subtest-1	15.40	15.47	15.38
HSDPA Subtest-2	15.36	15.48	15.44
HSDPA Subtest-3	14.84	14.98	14.96
HSDPA Subtest-4	14.90	15.01	14.97
HSUPA Subtest-1	15.42	15.51	15.40
HSUPA Subtest-2	13.42	13.51	13.40
HSUPA Subtest-3	14.33	14.52	14.38
HSUPA Subtest-4	13.43	13.45	13.47
HSUPA Subtest-5	15.42	15.40	15.45

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	16.54	16.77	16.64
		1	24	16.44	16.53	16.52
		1	49	16.45	16.55	16.52
		25	0	15.53	15.62	15.59
		25	12	15.49	15.58	15.53
		25	25	15.37	15.48	15.48
		50	0	15.57	15.68	15.54
10M	16QAM	1	0	15.49	15.64	15.46
		1	24	15.37	15.55	15.26
		1	49	15.68	15.18	15.46
		25	0	14.57	14.65	14.56
		25	12	14.55	14.62	14.61
		25	25	14.47	14.65	14.59
		50	0	14.41	14.60	14.51
10M	64QAM	1	0	14.60	14.52	14.73
		1	24	14.64	14.77	14.70
		1	49	14.35	14.50	14.46
		25	0	13.52	13.69	13.57
		25	12	13.50	13.65	13.51
		25	25	13.53	13.60	13.55
		50	0	13.46	13.61	13.51

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	15.56	15.70	15.61
		1	12	15.42	15.61	15.49
		1	24	15.47	15.58	15.47
		12	0	14.52	14.66	14.63
		12	6	14.49	14.55	14.51
		12	13	14.44	14.51	14.47
		25	0	14.55	14.65	14.58
5M	16QAM	1	0	14.47	14.57	14.41
		1	12	14.41	14.51	14.26
		1	24	14.68	14.19	14.46
		12	0	13.54	13.64	13.60
		12	6	13.53	13.70	13.60
		12	13	13.51	13.59	13.62
		25	0	13.48	13.56	13.45
5M	64QAM	1	0	13.69	13.48	13.71
		1	12	13.57	13.70	13.66
		1	24	13.37	13.45	13.39
		12	0	12.53	12.72	12.60
		12	6	12.56	12.61	12.52
		12	13	12.53	12.59	12.51
		25	0	12.43	12.54	12.49

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	15.61	15.76	15.67
		1	7	15.40	15.52	15.47
		1	14	15.45	15.58	15.43
		8	0	14.57	14.63	14.63
		8	3	14.49	14.52	14.49
		8	7	14.37	14.48	14.45
		15	0	14.53	14.63	14.52
3M	16QAM	1	0	14.42	14.57	14.37
		1	7	14.40	14.52	14.29
		1	14	14.74	14.26	14.42
		8	0	13.59	13.67	13.56
		8	3	13.53	13.66	13.58
		8	7	13.55	13.62	13.57
		15	0	13.44	13.53	13.51
3M	64QAM	1	0	13.69	13.50	13.64
		1	7	13.65	13.73	13.69
		1	14	13.41	13.46	13.39
		8	0	12.54	12.69	12.60
		8	3	12.53	12.58	12.54
		8	7	12.52	12.56	12.52
		15	0	12.46	12.54	12.53

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	15.56	15.73	15.67
		1	2	15.40	15.58	15.54
		1	5	15.47	15.56	15.46
		3	0	15.49	15.64	15.61
		3	1	15.50	15.56	15.48
		3	3	15.40	15.50	15.50
		6	0	14.54	14.64	14.55
1.4M	16QAM	1	0	14.47	14.61	14.44
		1	2	14.34	14.50	14.27
		1	5	14.66	14.20	14.44
		3	0	14.55	14.65	14.59
		3	1	14.52	14.65	14.55
		3	3	14.52	14.65	14.55
		6	0	13.48	13.62	13.49
1.4M	64QAM	1	0	13.66	13.47	13.72
		1	2	13.55	13.74	13.67
		1	5	13.36	13.51	13.37
		3	0	13.55	13.73	13.62
		3	1	13.53	13.59	13.51
		3	3	13.44	13.65	13.58
		6	0	12.49	12.59	12.49

*ERP = Conducted + antenna gain (-4.80dBi) - 2.15

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

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 .

4.2.2 Test Procedure

- a. In the semi-anechoic chamber, EUT placed on the 0.8m (below or equal 1GHz) and/or 1.5m (above 1GHz) height 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 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.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following C63.26 section 5.5 and 5.2.7
 - $\text{EIRP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
 - $\text{ERP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note:

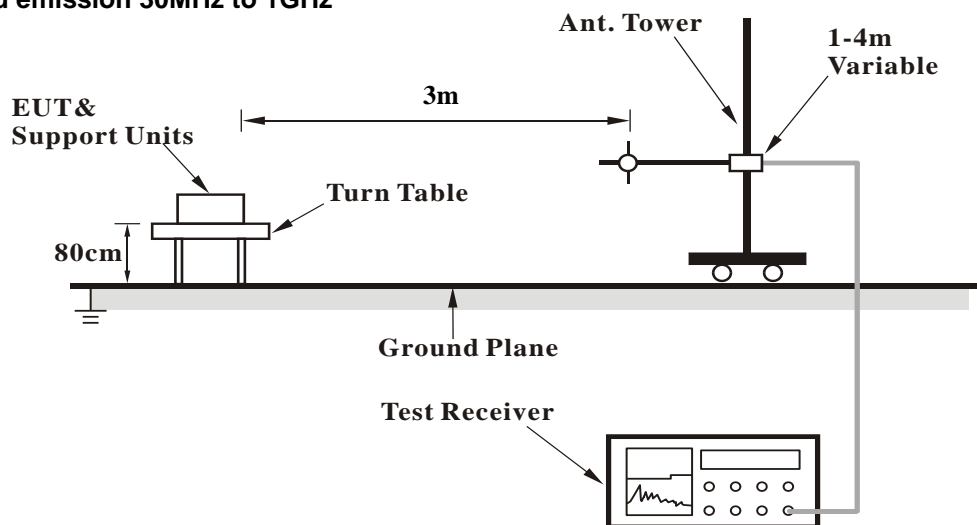
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.2.3 Deviation from Test Standard

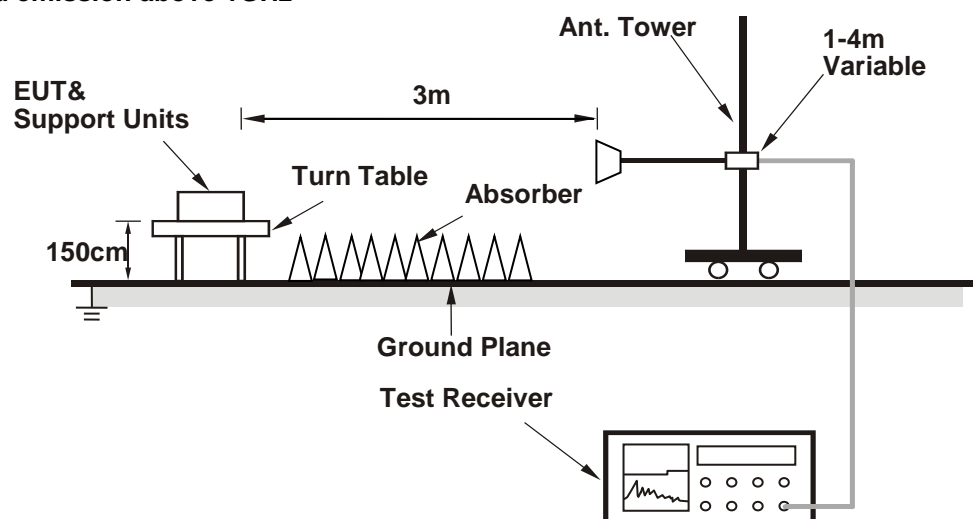
No deviation.

4.2.4 Test Setup

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).

4.2.5 Test Results

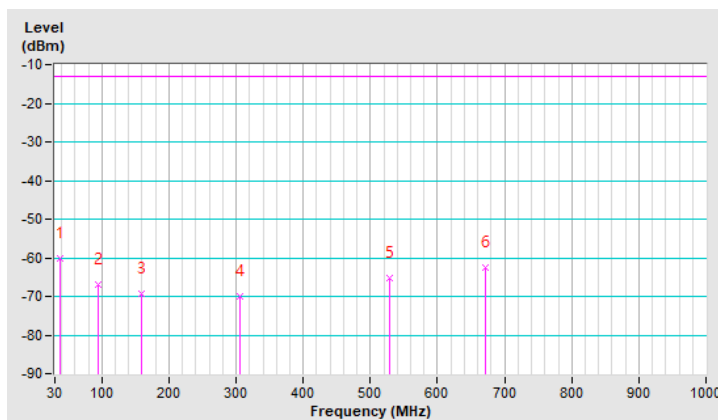
Below 1GHz
GSM

RF Mode	TX GSM 850	Channel	CH 189 : 836.4 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-60.20	-13.00	-47.20	1.50 H	28	51.06	-111.26
2	94.99	-66.85	-13.00	-53.85	2.00 H	19	49.15	-116.00
3	159.01	-69.24	-13.00	-56.24	1.00 H	83	41.40	-110.64
4	305.48	-70.11	-13.00	-57.11	2.00 H	345	40.19	-110.30
5	529.55	-65.19	-13.00	-52.19	1.00 H	58	39.80	-104.99
6	672.14	-62.49	-13.00	-49.49	1.00 H	234	39.78	-102.27

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.

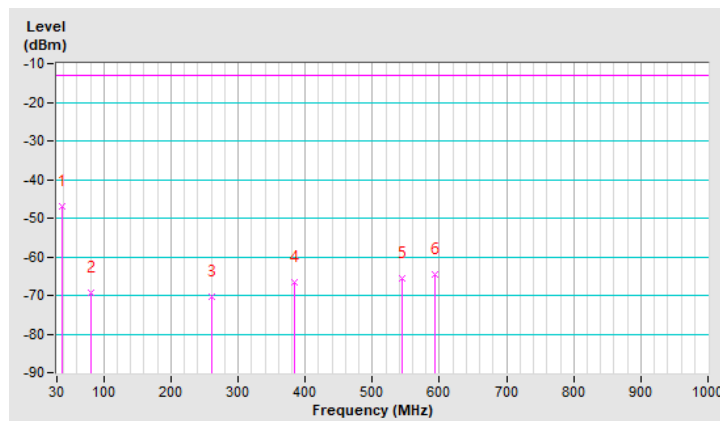


RF Mode	TX GSM 850	Channel	CH 189 : 836.4 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-46.92	-13.00	-33.92	1.50 V	194	64.34	-111.26
2	80.44	-69.38	-13.00	-56.38	1.00 V	68	46.43	-115.81
3	259.89	-70.34	-13.00	-57.34	1.00 V	134	41.52	-111.86
4	384.05	-66.58	-13.00	-53.58	1.00 V	334	41.60	-108.18
5	544.10	-65.44	-13.00	-52.44	1.00 V	355	39.36	-104.80
6	592.60	-64.42	-13.00	-51.42	2.00 V	121	39.02	-103.44

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.



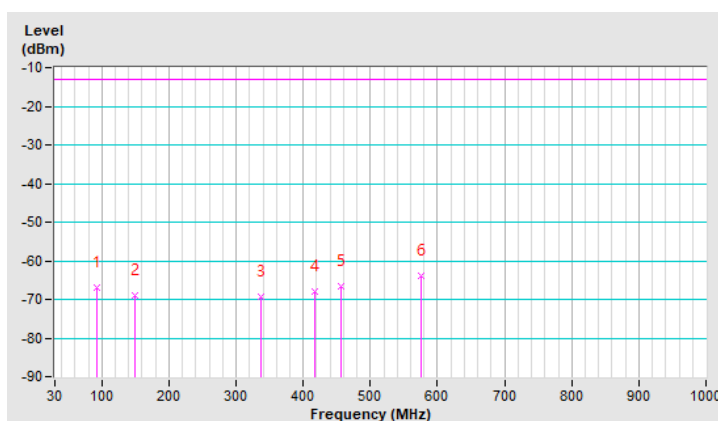
WCDMA

RF Mode	TX WCDMA Band V	Channel	CH 4182 : 836.4 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	93.05	-66.97	-13.00	-53.97	1.50 H	181	49.30	-116.27
2	148.34	-69.12	-13.00	-56.12	1.00 H	154	41.55	-110.67
3	336.52	-69.19	-13.00	-56.19	1.50 H	130	40.11	-109.30
4	418.00	-67.98	-13.00	-54.98	1.00 H	104	39.43	-107.41
5	455.83	-66.64	-13.00	-53.64	2.00 H	196	39.65	-106.29
6	576.11	-63.97	-13.00	-50.97	1.00 H	24	39.99	-103.96

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

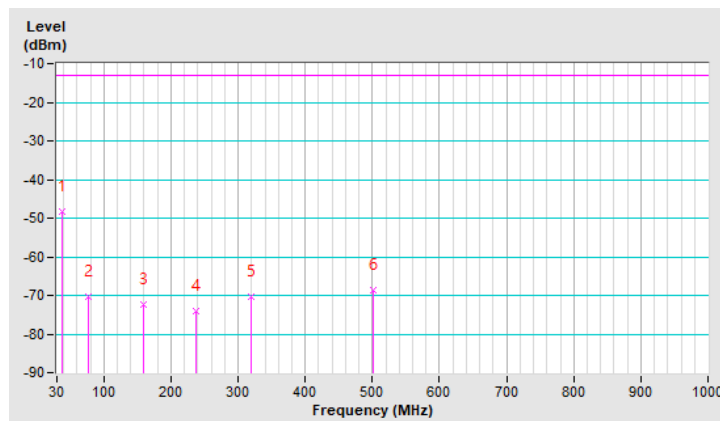


RF Mode	TX WCDMA Band V	Channel	CH 4182 : 836.4 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-48.30	-13.00	-35.30	1.50 V	290	62.96	-111.26
2	77.53	-70.46	-13.00	-57.46	1.00 V	75	44.60	-115.06
3	159.98	-72.52	-13.00	-59.52	1.00 V	17	38.07	-110.59
4	236.61	-74.00	-13.00	-61.00	2.00 V	51	38.71	-112.71
5	320.03	-70.43	-13.00	-57.43	1.00 V	219	39.36	-109.79
6	500.45	-68.51	-13.00	-55.51	1.00 V	14	37.11	-105.62

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.



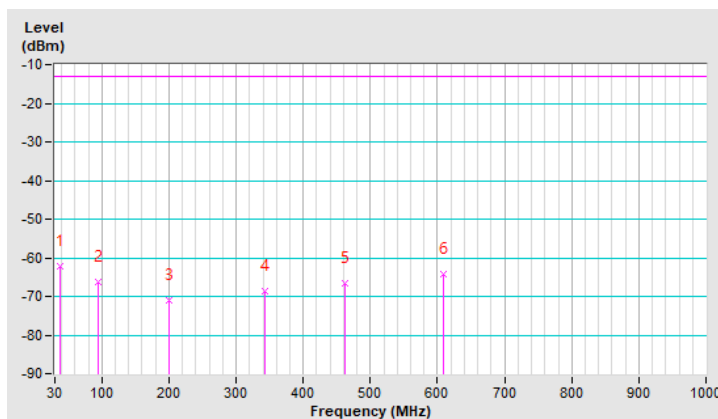
LTE Band 5 (Channel Bandwidth 10MHz)

RF Mode	TX LTE Band V-10MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-62.18	-13.00	-49.18	1.50 H	25	49.08	-111.26
2	94.02	-66.14	-13.00	-53.14	1.00 H	188	49.97	-116.11
3	200.72	-70.88	-13.00	-57.88	1.00 H	253	43.39	-114.27
4	343.31	-68.67	-13.00	-55.67	1.00 H	73	40.65	-109.32
5	461.65	-66.69	-13.00	-53.69	1.50 H	289	39.56	-106.25
6	609.09	-64.11	-13.00	-51.11	1.00 H	148	38.97	-103.08

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

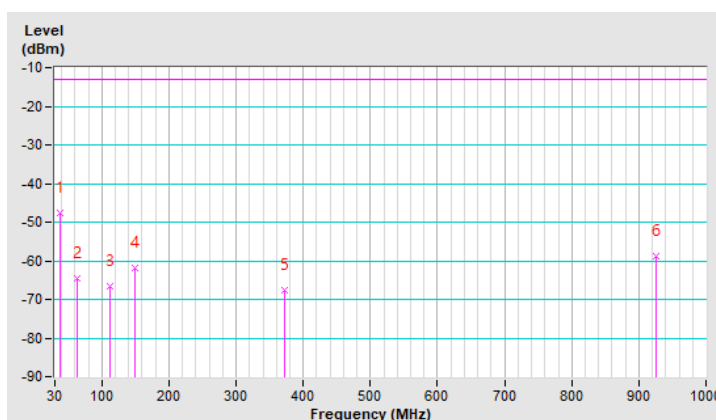


RF Mode	TX LTE Band V-10MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	-47.51	-13.00	-34.51	2.00 V	340	63.75	-111.26
2	62.98	-64.69	-13.00	-51.69	2.00 V	73	47.17	-111.86
3	112.45	-66.73	-13.00	-53.73	1.00 V	109	46.80	-113.53
4	148.34	-61.79	-13.00	-48.79	1.50 V	210	48.88	-110.67
5	371.44	-67.66	-13.00	-54.66	1.00 V	118	40.85	-108.51
6	925.31	-58.81	-13.00	-45.81	1.00 V	258	39.69	-98.50

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit.



Above 1GHz
GSM

RF Mode	TX GSM 850	Channel	CH 189 : 836.4 MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1672.80	-57.10	-13.00	-44.10	1.27 H	178	48.50	-105.60
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1672.80	-52.00	-13.00	-39.00	2.85 V	301	53.60	-105.60

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

WCDMA

RF Mode	TX WCDMA Band V	Channel	CH 4182 : 836.4 MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1672.80	-63.26	-13.00	-50.26	1.62 H	274	42.20	-105.46
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1672.80	-62.36	-13.00	-49.36	1.23 V	337	43.10	-105.46

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 5 (Channel Bandwidth 10MHz)

RF Mode	TX LTE Band V-10MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	1GHz ~ 18GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-45.81	-13.00	-32.81	1.56 H	296	59.65	-105.46
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-47.15	-13.00	-34.15	1.73 V	147	58.31	-105.46

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 – 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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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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