EMC TEST REPORT

Project No.	LBE20160691	**Issue No.**	0
Applicant	**Name of organization**	Samsung Electronics Co., Ltd.	
	Address	(Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea	
	Date of application	March 8, 2016	
EUT	**Type of device**	☒ Class B personal computers and peripherals ☐ All other devices	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LSMJ510MN	
	Kind of product	Mobile Phone	
	Model No.	SM-J510MN/DS	
	Variant Model No.	Refer to clause 4.6	
	Manufacturer	SAMSUNG ELECTRONICA DA AMAZONICA-CAMPINAS 13097-105 Av. Thomas Nilsen Junior, 150, Predio A Pq Imperador, Campinas, Sao Paulo, Sao Paulo, Brazil SAMSUNG ELECTRONICA DA AMAZONICA-MANAUS 69075-842 Av. Dos Oitis, 1460, Distrito Industrial, Manaus, Amazon, Brazil	
Applied Standards		FCC Part 15, Subpart B, Class B / ANSI C63.4-2009	
Test Period		March 9, 2016 ~ March 11, 2016	
Issue date		March 11, 2016	

Test result : Complied

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Tested by : Jong-Sup Jeong	**Reviewed by** : Tae-Young Jang

SAMSUNG

CS & Environment Center of Samsung Electronics Co., Ltd.
(Maetan dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-so, 16677, Republic of Korea

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1. Report Information

1.1 Revision history

No.	Revised detailed information
Issue 0	- LBE20160691 (SAMSUNG)

2. Summary of test results

2.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result
☒	Conducted Disturbance (Mains port)	FCC Part 15 Subpart B / ANSI C63.4-2009 (Class B)	Complied
☒	Radiated Disturbance		Complied

3. General Information

3.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at (Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea.
All testing are performed in Semi-anechoic chambers conforming to the site attenuation characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The CS & Environment center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

4. Test Setup configuration

4.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Mark	Description	Model No.	Serial No.	Manufacturer / Trademark	FCC ID / DoC
A	Mobile Phone	SM-J510MN/DS	-	SAMSUNG	A3LSMJ510MN
B	Battery	EB-BJ510CBE	BDaH218AS/2-B	SAMSUNG	-
C	Headset	EHS61ASFWE	-	SAMSUNG	-
D	Data Cable	ECB-DU68WE	-	SAMSUNG	-
E	microSD Card	32GB	-	SAMSUNG	-
F	Travel Adapter	EP-TA50EWE	DK3GC10VS/A-E	SAMSUNG	-
G	Desk-Top Computer	HP Compaq dx2200 Microtower	CNG7060LW0	HP	DoC
H	LCD Monitor	U2713HMt	CN-0GK0KD-74445 -332-106L	Dell	DoC
I	Mouse	M-SBF96	LZ949BG0D9Y	Logitech	DoC
J	Keyboard	K6723	CN13BA5903224A GP53DCK0590	SAMSUNG	DoC
K	Router	H3008	10070100009	EFM Networks	DoC
L	Power Supply	HB12B-050200SPA	HBK520201025	Shen Zhen	DoC

4.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	USB Mode (Data Communication)

4.3 Details of Sampling

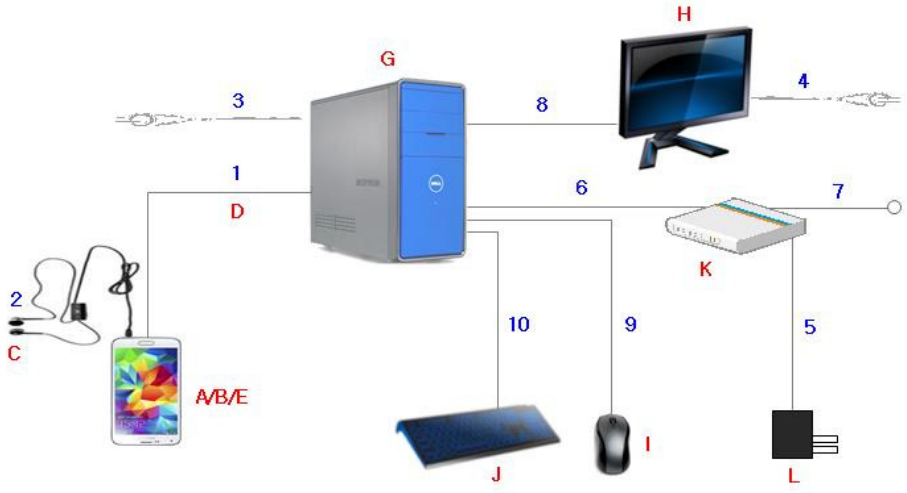
Customer selected, single unit.

4.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected:

No.	Connected cable	Length [m]	Shielded [Y/N]	Note
1	Data Cable / Travel Adapter	0.8	Y	From EUT to Desk-Top Computer / From EUT to Travel Adapter
2	Headset	1.6	N	For EUT
3	Power	1.8	N	For Desk-Top Computer
4	Power	1.8	N	For LCD Monitor
5	Power	1.8	N	From Router to Power Supply
6	LAN	1.5	N	From Desk-Top Computer to Router
7	LAN	1.5	N	From Router to Local Area Network
8	RGB	1.5	Y	From Desk-Top Computer to LCD Monitor
9	PS/2	1.9	Y	From Desk-Top Computer to Mouse
10	PS/2	1.9	Y	From Desk-Top Computer to Keyboard

4.5 Test arrangement



4.6 EUT Description

The EUT is a bar type mobile phone which can operate on GSM850/900/1800/1900, WCDMA FDD1/2/4/5/8, LTE FDD1/2/3/4/5/7/8/17/28 bands and incorporates a camera, bluetooth, ANT+, Wi-Fi, GPS, NFC, FM radio and MP3/MP4 player.

4.6.1 The variant models

- SM-J510MN : This model is identical to model SM-J510MN/DS, except for model name and SIM slot.

4.7 Clock Frequencies

Kind of Clocks	Frequency [MHz]	Kind of Clocks	Frequency [MHz]
CPU	1 200	USB 2.0	24

4.8 Test configuration and condition

☐ The EUT exercise program which is the samsung standardized emission test program for windows was used during all EMC measurements were tested. This program was contained on the PC hard disk drive. Once loaded, the program sequentially exercises each system component in turn.

☒ The EUT was exercised during the testing by data read and write cycles repeated with internal/ external storage devices. At the end of the test, the copied back data was compared with original.

☐ The EUT was connected to the PC by using USB data cable to charge.

☐ The system was configured for testing in a typical fashion that a customer would normally use, and was tested while in an automated non-attendant mode.

Power source for the EUT operating was supplied by CVCF made by the Pacific Power Source Corp.

- Test Voltage : AC 120 V, 60 Hz

4.9 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

4.9.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, *k* = 2)
Conducted disturbance	AC Mains	3.62 dB
Radiated Disturbance (30 MHz ~ 1 GHz)	Horizontal	4.90 dB
	Vertical	4.68 dB
Radiated Disturbance (1 GHz ~ 6 GHz)	Horizontal	5.51 dB
	Vertical	5.50 dB

5. Results of individual test

5.1 Conducted disturbance

The EUT was connected to the Desk-Top Computer which was powered from one LISN for the measurements. The support equipment power cables were connected to a second LISN.
Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

Limits for conducted disturbance at the mains ports of Class B ITE

Frequency range Limits [MHz]	Resolution Bandwidth [kHz]	Limits [dB(μV)]	
		Quasi-peak	Average
0,15 to 0,50	9	66 to 56	56 to 46
0,50 to 5	9	56	46
5 to 30	9	60	50
NOTE 1 The lower limit shall apply at the transition frequency. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.			

5.1.1 Test instrumentation

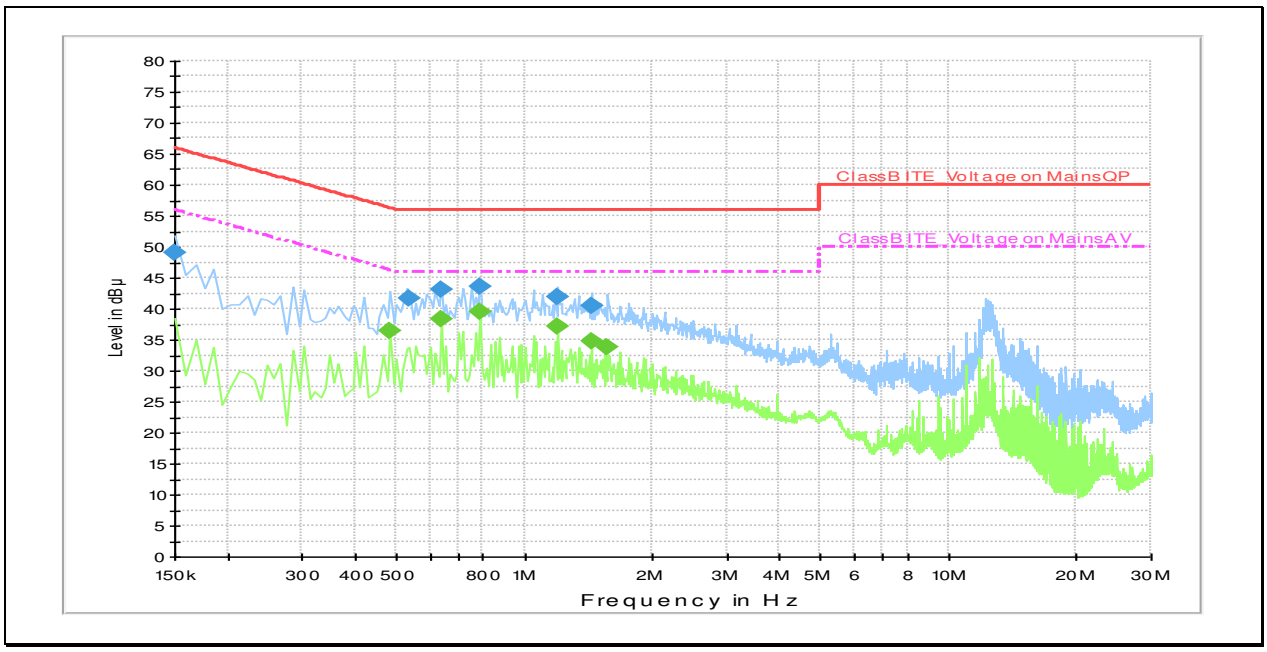
EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E3I-165	EMI Test Receiver	ESI-26	R&S	100010	2015-10-08	12
E3I-238	Universal Radio Communicator	CMU200	R&S	120045-IQ	2015-10-07	12
E3I-259	LISN	ENV216	R&S	101369	2015-11-25	12
E3I-260	LISN	ENV216	R&S	101366	2015-08-04	12

5.1.2 Temperature and humidity condition

Test date	2016-03-11	Test engineer	Jong-Sup Jeong
Climate condition	Ambient temperature	(22.3 ~ 22.8) ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	(40.1 ~ 40.7) % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	(100.7 ~ 101.2) kPa	Limit (86.0 to 106.0) kPa
Test place	Shield Room (SR8)		

5.1.3 Test results

☐ Operating Mode 1: AC Mains



Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

Final measurement results table(QP):

Frequency (MHz)	Level (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150	49.0	N	10.1	17.0	66.0
0.537	41.7	N	10.2	14.3	56.0
0.636	43.1	N	10.2	12.9	56.0
0.789	43.6	L1	10.0	12.4	56.0
1.203	41.9	L1	9.9	14.1	56.0
1.437	40.5	L1	9.9	15.5	56.0

Final measurement results table(CAV):

Frequency (MHz)	Level (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.483	36.4	N	10.2	9.9	46.3
0.636	38.3	N	10.2	7.7	46.0
0.789	39.5	L1	10.0	6.5	46.0
1.203	37.1	L1	9.9	8.9	46.0
1.437	34.9	L1	9.9	11.1	46.0
1.572	33.9	L1	9.8	12.1	46.0

Note 2) Level (QP and/or CAV) = Meter Reading (QP and/or CAV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or CAV) = Limit – Level (QP and/or CAV)
QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

5.2 Radiated disturbance

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 10 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [kHz]	Video Bandwidth [kHz]	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	120	300	Continuous

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using quasi-peak detector.

Peak/CISPR-Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th harmonics of the highest frequency in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [MHz]	Video Bandwidth [MHz]	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	1	3	0 ~ 345 (Step size: 15 degrees)

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using peak and CISPR-average detectors.

Limits for radiated disturbance of Class B ITE at a measuring distance of 3 m and 10 m

Frequency range Limits [MHz]	Field Strength		
	3 m [μV/m]	3 m [dB(μV/m)]	10 m [dB(μV/m)]
30 to 88	100	40.0	29.5
88 to 216	150	43.5	33.0
216 to 960	200	46.0	35.5
Above 960	500	54.0	43.5

Results checked manually; and points close to the limit line were re-measured.

5.2.1 Test instrumentation

EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E5I-015	EMI Test Receiver	ESU-08	R&S	100481	2015-05-13	12
E3I-170	Horn Antenna	HF906	R&S	100028	2014-10-20	24
E3I-190	BILOG Antenna	CBL6112B	Schaffner	2804	2014-05-14	24
E3I-233	EMI Test Receiver	ESU-26	R&S	100364	2015-03-31	12
E3I-238	Universal Radio Communicator	CMU200	R&S	120045-IQ	2015-10-07	12
E3I-273	Preamplifier	317	SONOMA	312701	2015-03-24	12
E3I-274	Preamplifier	317	SONOMA	312702	2015-03-24	12
E3I-284	Preamplifier	ESV-Z3	R&S	815111	2015-04-16	12
E3I-303	EMI Test Receiver	ESIB-26	R&S	100287	2015-06-29	12
E3I-320	BILOG Antenna	CBL6112D	Schaffner	22602	2015-10-06	24

5.2.2 Temperature and humidity condition

Test date	2016-03-09	**Test engineer**	Jong-Sup Jeong
Climate condition	Ambient temperature	(22.3 ~ 22.8) ℃	Limit (15.0 to 35.0) ℃
	Relative humidity	(39.8 ~ 40.3) % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	(101.3 ~ 101.9) kPa	Limit (86.0 to 106.0) kPa
Test place	Semi-Anechoic Chamber (SAC4)		

5.2.3 Test results

☐ Operating Mode 1

- Frequencies below 1 GHz

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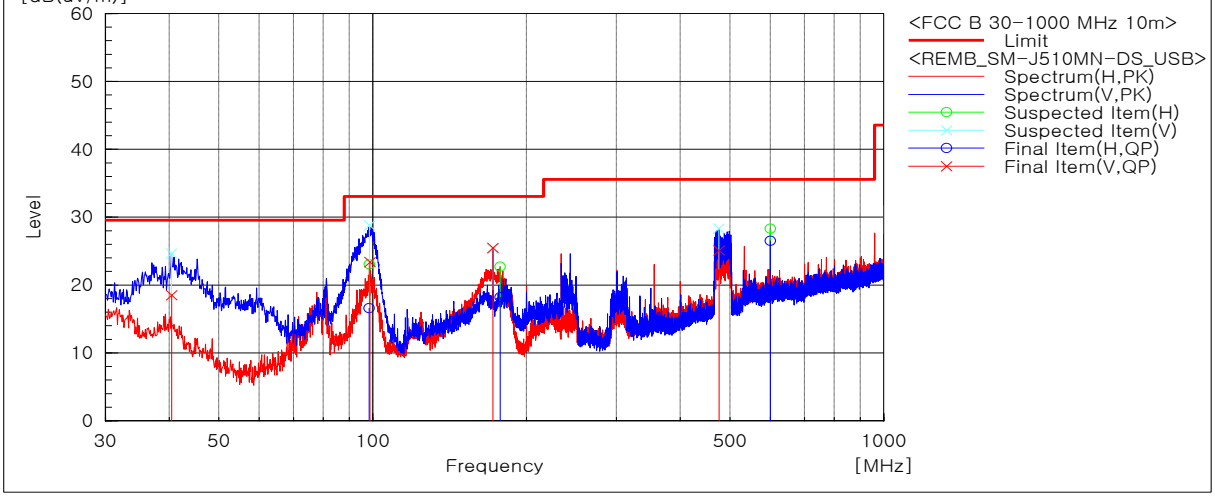
<<RADIATED EMISSION>>

Model	: SM-J510MN/DS	Standard	: FCC Part.15 Class B 3m
Serial	:	Remark1	: USB
Operator	: JJS	Remark2	:
AC Power	:	Remark3	:
Temp,Humidity	:	Remark4	:



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]	System
1	98.362	41.2	-24.6	16.6	33.0	16.4	304.0	309.0	1
2	177.652	43.3	-25.1	18.2	33.0	14.8	383.0	356.0	1
3	600.269	38.9	-12.4	26.5	35.5	9.0	179.0	161.0	1

--- Vertical Polarization (QP)---

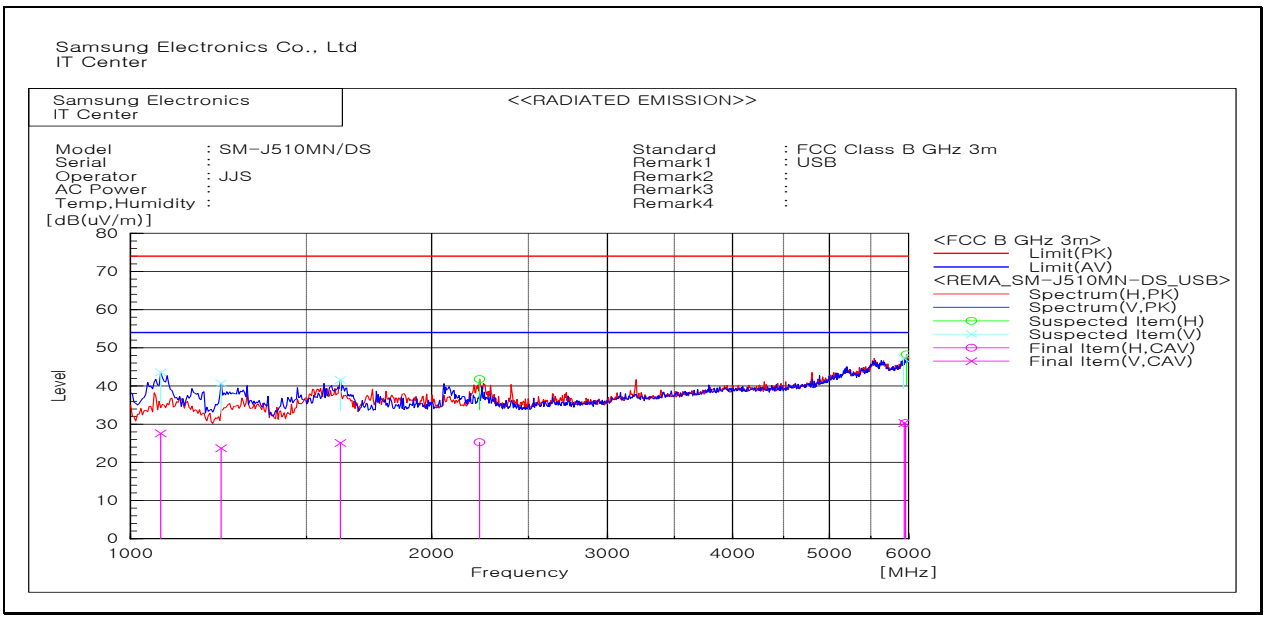
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]	System
1	40.427	42.7	-24.2	18.5	29.5	11.0	100.0	43.0	2
2	98.795	48.7	-25.3	23.4	33.0	9.6	279.0	309.0	2
3	171.818	51.4	-25.9	25.5	33.0	7.5	100.0	359.0	2
4	476.130	41.4	-16.3	25.1	35.5	10.4	290.0	10.0	2

Note) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 10 m, Antenna Height : 1 to 4 meters
Level (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)
Margin (QP) = Limit – Level (QP)
QP = Quasi-Peak, c.f = Correction Factor

5.2.3 Test results

☐ Operating Mode 1

- Frequencies above 1 GHz



Final measurement results table(PK):

Frequency (MHz)	Level (dBuV/m)	Height (cm)	Polarisation	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1 072.144	43.6	100	V	167	-11.7	30.4	74.0
1 232.465	40.7	100	V	151	-11.0	33.3	74.0
1 621.243	41.6	100	V	163	-9.2	32.4	74.0
2 234.469	41.8	100	H	237	-5.7	32.2	74.0
5 927.856	47.3	100	V	186	3.8	26.7	74.0
5 969.940	48.3	100	H	357	3.9	25.7	74.0

Final measurement results table(CAV):

Frequency (MHz)	Level (dBuV/m)	Height (cm)	Polarisation	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1 072.144	27.6	100	V	167	-11.7	26.4	54.0
1 232.465	23.7	100	V	151	-11.0	30.3	54.0
1 621.243	25.1	100	V	163	-9.2	28.9	54.0
2 234.469	25.3	100	H	237	-5.7	28.7	54.0
5 939.790	30.3	100	V	355	3.8	23.7	54.0
5 957.586	30.3	100	H	243	3.8	23.7	54.0

Note) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 3 m, Antenna Height : 1 to 4 meters
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)
Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)
PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor